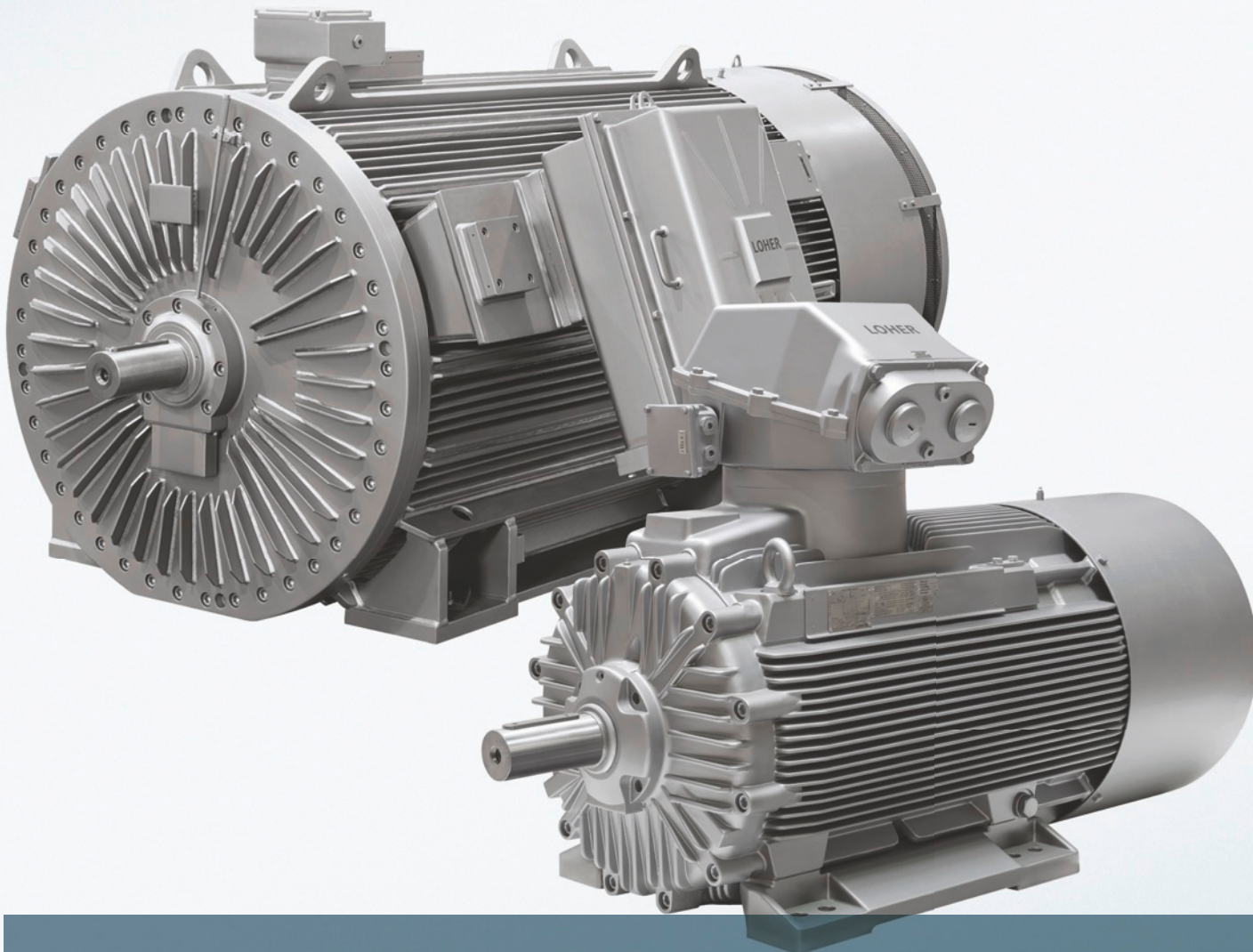


SIEMENS



LOHER Low-Voltage Motors

Type series 1MD5, 1PS0, 1PS1, 1PS4 and 1PS5

Frame sizes 71 to 500

Power range 0.12 to 1400 kW

Motors

Catalog
D 83.1

Edition
2016

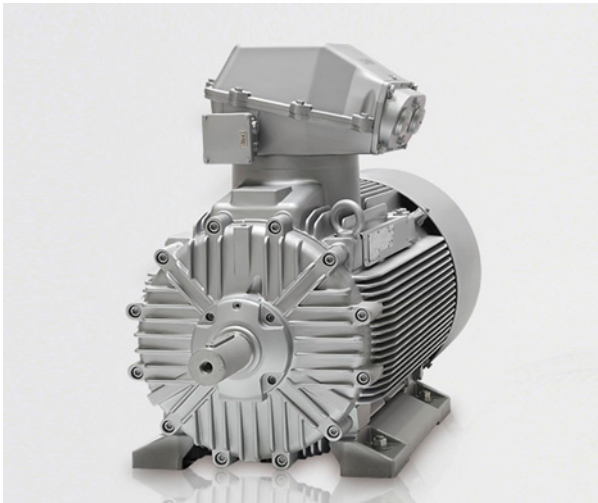
Related catalogs

<p>SINAMICS G180 D 18.1 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled</p> <p>E86060-K5518-A111-A2-7600</p>		<p>All information material, such as brochures, catalogs, manuals and operating instructions for standard drive systems are available up-to-date on the Internet at the following address: www.siemens.com/motors/printmaterial</p> <p>The listed documentation can be ordered here or it is available in commonly used file formats (PDF, ZIP) for downloading.</p> <p>Energy saving/Energy-saving program SinaSave</p> <p>Further information on the subject of energy saving and the energy-saving program SinaSave is available at the following address: www.siemens.com/energysaving</p> <p>Interactive Catalog CA 01 – Drive Technology Configurator</p> <p>The Drive Technology Configurator is available in conjunction with the electronic catalog CA 01 on DVD.</p>
<p>SIMOGEAR MD 50.1 Geared Motors</p> <p>E86060-K5250-A111-A4-7600</p>		
<p>SIMOTICS GP, SD, XP, DP Low-Voltage Motors D 81.1 Type series 1LE1, 1MB1 and 1PC1 Frame sizes 71 to 315 Power range 0.18 to 200 kW E86060-K5581-A111-A8-7600</p>		
<p>Motion Control Drives D 31 SINAMICS Inverters for Single-Axis Drives and SIMOTICS Motors</p> <p>E86060-K5531-A101-A2-7600</p>		<p>In addition, the Drive Technology Configurator (DT Configurator) can be used on the Internet without requiring any installation. The DT Configurator can be found in the Siemens Mall under the following address: www.siemens.com/dt-configurator</p>
<p>SINAMICS G130 D 11 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units E86060-K5511-A101-A6-7600</p>		<p>The DT Configurator for motors, mechanical components, converters, connection systems, control and licenses and system configuration can be found in the CA 01 main menu, under drive systems, selection and engineering tools.</p> <ul style="list-style-type: none"> • 2D/3D model generator for motors and drives • Data sheet generator • Start-up calculation • Comprehensive product-specific documentation
<p>Industrial Communication IK PI SIMATIC NET</p> <p>E86060-K6710-A101-B8-7600</p>		<p>Hardware and software requirements</p> <ul style="list-style-type: none"> • PC with 2 GHz CPU or faster • 1 GB RAM (for installation of product configurators 2 GB RAM) • Operating systems <ul style="list-style-type: none"> – Windows Vista – Windows 7 – Windows 8 – Windows 8.1
<p>SIMOTICS NEMA Motors D 81.2 Low Voltage AC Motors Selection and Pricing Guide</p> <p>Further details available on the Internet at: www.usa.siemens.com/motors</p>		<ul style="list-style-type: none"> • Monitor resolution 1024 x 768 pixels or higher (1280 x 1024 pixels recommended) • DVD drive for offline version (CA 01) • 6.8 GB free disk space (full installation) • 1.6 GB free disk space for each additional data package (optional)
<p>Products for Automation and Drives CA 01 Interactive Catalog, DVD</p> <p>E86060-D4001-A510-D6-7600</p>		<p>Installation</p> <p>The CA01 catalog can be directly installed on the hard disk or in the network from the DVD as a partial or full version.</p>
<p>Industry Mall Information and Ordering Platform in the Internet:</p> <p>www.siemens.com/industrymall</p>		

LOHER Low-Voltage Motors

Type series 1MD5, 1PS0, 1PS1, 1PS4 and 1PS5

Motors



Catalog D 83.1 · 2016

Supersedes:
Catalog D 83.1 · 2014

Refer to the Industry Mall for current updates of
this catalog:

www.siemens.com/industrymall

The products contained in this catalog can also be found
in the Interactive Catalog CA 01.

Article No.: E86060-D4001-A510-D6-7600

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this catalog are manufactured/distributed
under application of a certified quality
management system in accordance with
DIN EN ISO 9001 (Certified Registration
No. 002241 QM08). The certificate is
recognized by all IQNet countries.

Introduction

LOHER motors
General information regarding efficiency
in accordance with International Efficiency
Guide to selecting and ordering the motors
General technical specifications

1

Motors with Explosion Protection

Orientation
SIMOTICS XP 1MD5 motor series
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series
LOHER CHEMSTAR and VARIO 1PS1 motor series

2

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

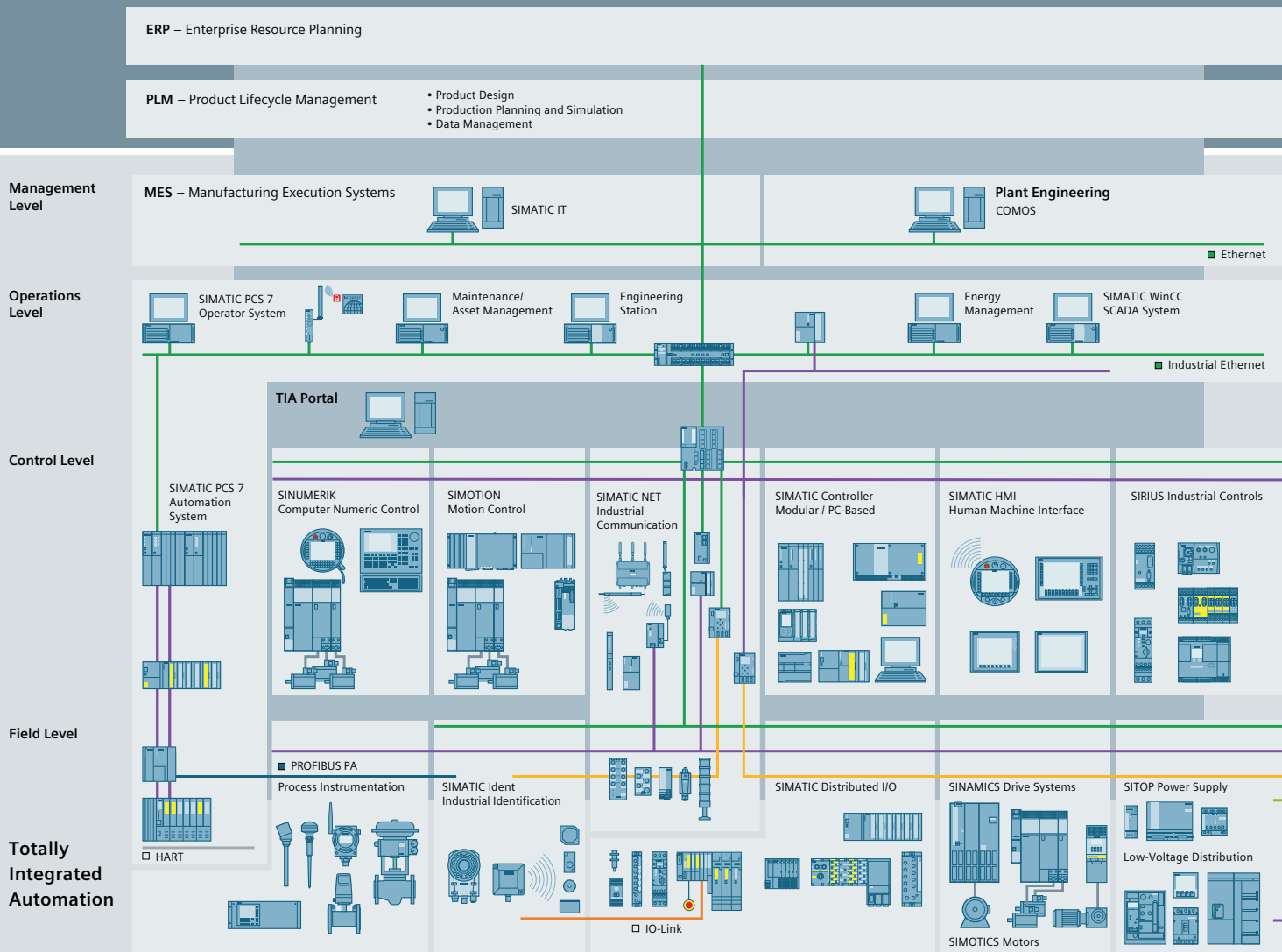
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Tools and Engineering

4

Appendix

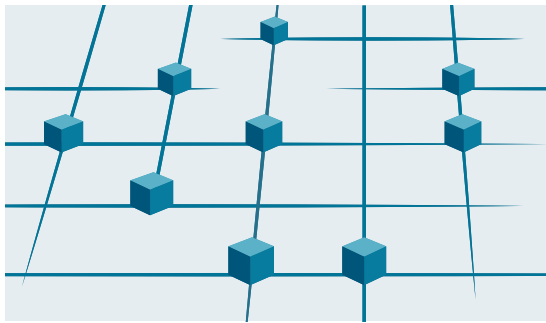
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Efficient automation starts with efficient engineering.

Totally Integrated Automation: Efficiency driving productivity.

Efficient engineering is the first step toward better production that is faster, more flexible, and more intelligent. With all components interacting efficiently, Totally Integrated Automation (TIA) delivers enormous time savings right from the engineering phase. The result is lower costs, faster time-to-market, and greater flexibility.



Totally Integrated Automation
Efficient interoperability of all automation components



- PROFINET
- Industrial Ethernet
- PROFIBUS
- AS-Interface
- KNX GAMMA instabus



A unique complete approach for all industries

As one of the world's leading automation suppliers, Siemens provides an integrated, comprehensive portfolio for all requirements in process and manufacturing industries. All components are mutually compatible and system-tested. This ensures that they reliably perform their tasks in industrial use and interact efficiently, and that each automation solution can be implemented with little time and effort based on standard products. The integration of many separate individual engineering tasks into a single engineering environment, for example, provides enormous time and cost savings.

With its comprehensive technology and industry-specific expertise, Siemens is continuously driving progress in manufacturing industries – and Totally Integrated Automation plays a key role.

Totally Integrated Automation creates real value added in all automation tasks, especially for:

- **Integrated engineering**
Consistent, comprehensive engineering throughout the entire product development and production process
- **Industrial data management**
Access to all important data occurring in productive operation – along the entire value chain and across all levels
- **Industrial communication**
Integrated communication based on international cross-vendor standards that are mutually compatible
- **Industrial security**
Systematic minimization of the risk of an internal or external attack on plants and networks
- **Safety Integrated**
Reliable protection of personnel, machinery, and the environment thanks to seamless integration of safety technologies into the standard automation

Making things right with Totally Integrated Automation

Totally Integrated Automation, industrial automation from Siemens, stands for the efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on end-to-end shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

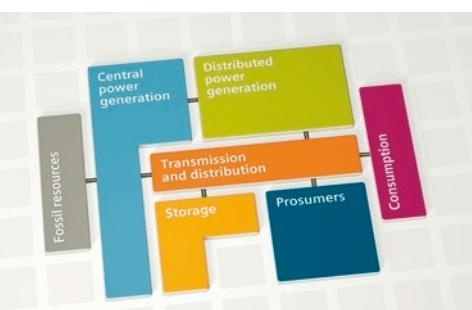
Totally Integrated Automation lays the foundation for comprehensive optimization of the production process:

- Time and cost savings due to efficient engineering
- Minimized downtime due to integrated diagnostic functions
- Simplified implementation of automation solutions due to global standards
- Better performance due to interoperability of system-tested components



Totally Integrated Power

We bring power to the point – safely and reliably.



Comprehensive answers for power distribution in complex energy systems – from Siemens

Efficient, reliable, safe: These are the demands placed on electrification and especially power distribution. And our answer – for all application areas of the energy system – is Totally Integrated Power (TIP). It's based on our comprehensive range of products, systems, and solutions for low and medium voltage, rounded out by our support throughout the entire lifecycle – from planning with our own software tools to installation, operation, and services.

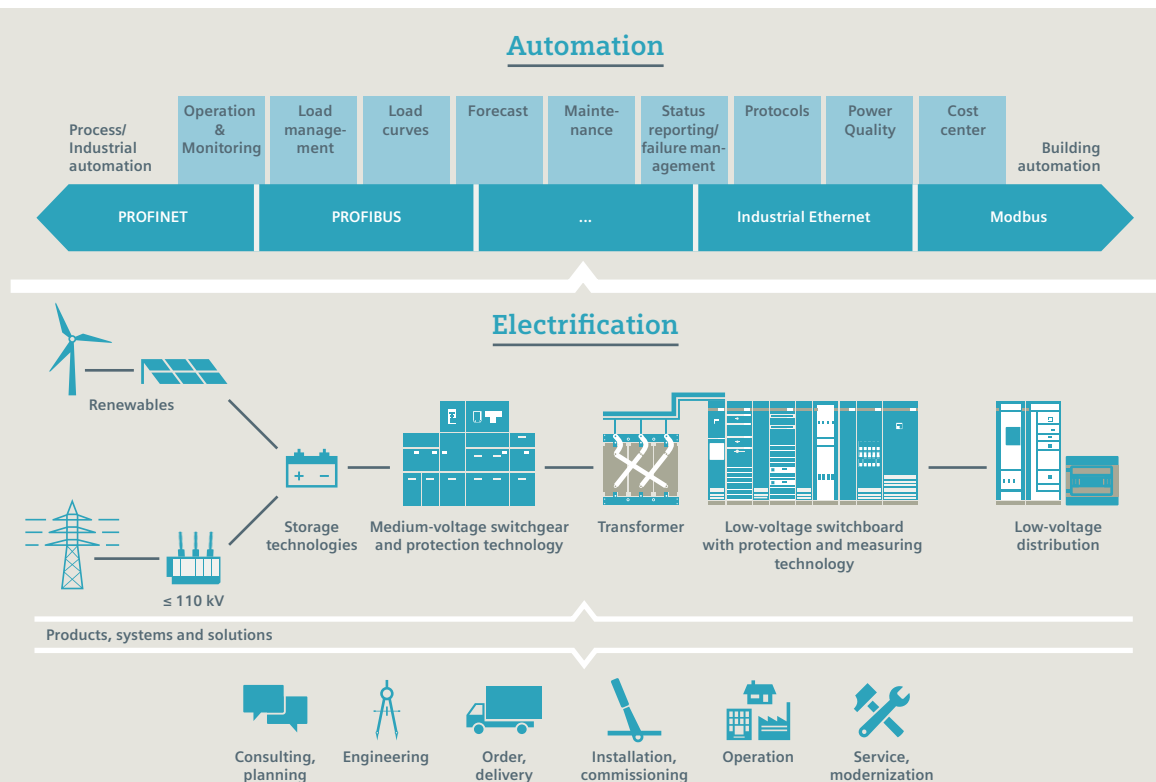
Smart interfaces allow linking to industrial or building automation, making it possible to fully exploit all the optimization potential of an integrated solution. This is how we provide our customers around the world with answers to their challenges. With highly efficient, reliable, and safe power distribution, we lay the foundation for sustainable infrastructure and cities, buildings, and industrial plants. We bring power to the point – wherever and whenever it is needed.

More information: www.siemens.com/tip

Totally Integrated Power offers more:

- **Consistency:**
For simplified plant engineering and commissioning as well as smooth integration into automation solutions for building or production processes
- **One-stop-shop:**
A reliable partner with a complete portfolio for the entire process and lifecycle – from the initial idea to after-sales service
- **Safety:**
A comprehensive range of protection components for personnel safety and line and fire protection, safety by means of type testing
- **Reliability:**
A reliable partner who works with customers to develop long-lasting solutions that meet the highest quality standards
- **Efficiency:**
Bringing power to the point means greater plant availability and maximum energy efficiency in power distribution
- **Flexibility:**
End-to-end consistency and modular design of Totally Integrated Power for any desired expansions and adaptation to future requirements
- **Advanced technology:**
Reliable power distribution especially for applications in which supply is critical, continuous refinement of the technology

Challenges are our speciality



Integrated Drive Systems

Faster on the market and in the black with Integrated Drive Systems

LOHER Low-Voltage Motors are important elements of a Siemens Integrated Drive System, contributing significantly to increased efficiency, productivity, and availability in industrial production processes.

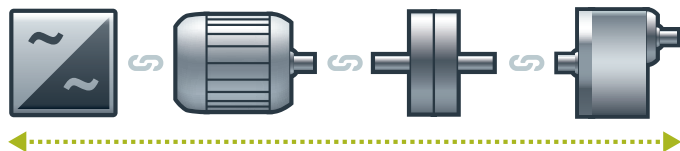
Integrated Drive Systems are Siemens' trendsetting answer to the high degree of complexity that characterizes drive and automation technology today. The world's only true one-stop solution for entire drive systems is characterized in particular by its threefold integration: Horizontal, vertical,

and lifecycle integration ensure that every drive system component fits seamlessly into the whole system, into any automation environment, and even into the entire lifecycle of a plant.

The outcome is an optimal workflow – from engineering all the way to service that entails more productivity, increased efficiency, and better availability. That's how Integrated Drive Systems reduce time to market and time to profit.

Horizontal integration

Integrated drive portfolio: The core elements of a fully integrated drive portfolio are frequency converters, motors, couplings, and gear units. At Siemens, they're all available from a single source. Perfectly integrated, perfectly interacting. For all power and performance classes. As standard solutions or fully customized. No other player in the market can offer a comparable portfolio. Moreover, all Siemens drive components are perfectly matched, so they are optimally interacting.



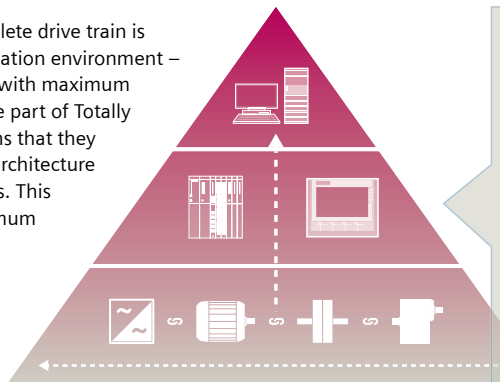
You can boost the availability of your application or plant to up to

99%*

*e.g., conveyor application

Vertical integration

Thanks to **vertical integration**, the complete drive train is seamlessly integrated in the entire automation environment – an important prerequisite for production with maximum value added. Integrated Drive Systems are part of Totally Integrated Automation (TIA), which means that they are perfectly embedded into the system architecture of the entire industrial production process. This enables optimal processes through maximum communication and control.



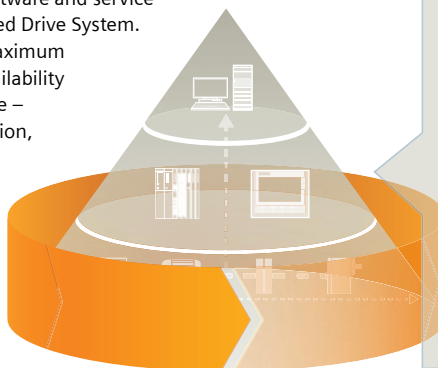
With TIA Portal you can cut your engineering time by up to

30%

Lifecycle integration

Lifecycle integration adds the factor of time: Software and service are available for the entire lifecycle of an Integrated Drive System. That way, important optimization potential for maximum productivity, increased efficiency, and highest availability can be leveraged throughout the system's lifecycle – from planning, design, and engineering to operation, maintenance, and all the way even to modernization.

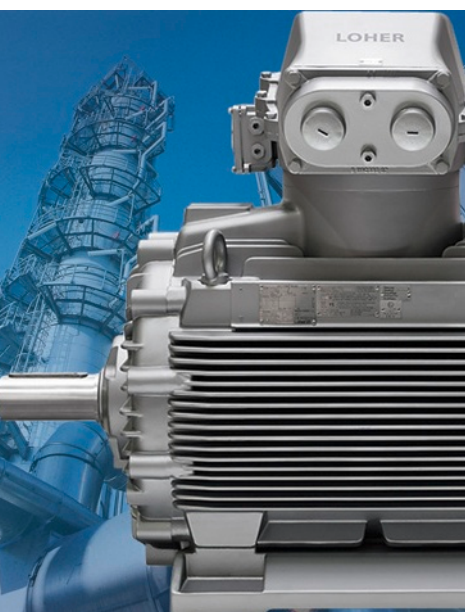
With Integrated Drive Systems, assets become important success factors. They ensure shorter time to market, maximum productivity and efficiency in operation, and shorter time to profit.



With Integrated Drive Systems you can reduce your maintenance costs by up to

15%

Introduction



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Introduction

LOHER motors

Customized and industry-specific drive solutions in the process industry

1

Overview

With the LOHER CHEMSTAR, LOHER VARIO and SIMOTICS XP motor series, Siemens has a range of drive solutions that are specifically tailored to customized or industry-specific requirements.

Building on well-proven standard platforms, the motors and converters are adapted to a specific project with considerable versatility in terms of mechanical and electrical design, as well as special monitoring systems and cooling methods. Totally individual drive systems are generated as a consequence which are tailor made for the respective plant, application or customer specification, thus enabling even highly sophisticated drives to be achieved over the complete power range.

Motors in all applicable types of protection – from 0.1 kW through to the megawatt range

LOHER CHEMSTAR and LOHER VARIO motors are available depending on their classification from 0.1 to around 3000 kW in all applicable types of protection. The motors ensure reliable operation even in explosive atmospheres and provide maximum safety for persons, machines and the environment.

The motors are available with the following types of protection:

- Dust explosion protection in hazardous zones 21 and 22
- "Non-sparking" **Ex nA** for Zone 2
- "Pressurized enclosure" **Ex p** for Zone 1
- "Increased safety" **Ex e** for Zone 1
- "Explosion-proof enclosure" **Ex d** for Zone 1

The portfolio comprises motors of Group II (EU Directive 2014/34/EU) for use in environments containing explosive gases in the chemical, petrochemical and oil and gas industries, as well as motors of Group I for firedamp protection in mining.

The motors are ATEX certified and also have country-specific certificates such as EAC (Eurasian Customs Union), CCOE (India) and NEPSI (China). The range of explosion-proof low-voltage motors has been expanded with motors of the SIMOTICS XP series. It represents the future standard product series. The SIMOTICS XP motors are available in the type of protection "Explosion-proof enclosure" **Ex d** for a power range from 0.25 to 500 kW and supplement the LOHER CHEMSTAR series. In comparison to the LOHER CHEMSTAR series, the smaller range of products and fixed product characteristics ensure significantly shorter delivery times and a considerably easier ordering process.

Double protection for maximum safety

LOHER CHEMSTAR and LOHER VARIO motors can also be used for drive solutions with double protection. This involves, on the one hand, a combination of gas and dust explosion protection for locations in which both fine dust and explosive gases can occur, e.g. in the process industry or in mining. On the other hand, this can be the double protection of the Ex d and Ex e types of protection. This double protection is, for example, appropriate onboard liquid gas tankers whereby electrical equipment must be totally excluded as a possible ignition source due to the hazardous load. For this purpose, the explosion-proof motors are mechanically designed with the type of protection "Explosion-proof enclosure." At the same time, the temperatures of the active parts correspond to the "increased safety" type of protection.

Further products

This catalog contains explosion-proof motors in fin-cooled designs. In the case of high powers up to 13.5 MW, tube-cooled motors are available (normally in the type of protection "explosion-proof enclosure" Ex d) as well as LOHER VARIO PLUS motors with built-on heat exchangers (air-to-air or air-to-water). The normal types of protection here are "non-sparking" Ex n and "pressurized enclosure" Ex p. Specially designed motors are also available in the larger frame sizes for converter operation. They are characterized by subcritical operation, i.e. the critical bending speed is higher than the rated speed. The full control range can be utilized. The motors are designed with sleeve bearings or roller bearings in accordance with their power rating and number of poles.

Application

The drive solutions with LOHER motors are matched to application-specific requirements – however extreme the actual location of use. The range comprises, in particular:

- Explosion-proof drives of all common types of protection
- Winch drives that stand unprotected on the deck of a ship
- Subsea components for transporting mineral resources from the deep sea
- Drill drives for drilling tunnels or for underground coal mining
- Vibration-proof, shock-resistant and earthquake-resistant motors
- Motors for deserts – specially designed for heat, dust and sand storms
- Low-temperature drives for drive tasks in polar climates

**LOHER CHEMSTAR and LOHER VARIO**

LOHER CHEMSTAR and LOHER VARIO motors cover all common types of protection with power ratings ranging from 0.25 to 1400 kW. The standard degree of protection is IP55. The range of degrees of protection, however, extends as far as IP66. The enclosure is made of rugged cast-iron or steel. Possible options include reinforced bearings and integrated PTC thermistors. LOHER CHEMSTAR and LOHER VARIO motors are supplied with industry-specific documentation, including ATEX certificates for the chemical and petrochemical industries.

With motors of the LOHER CHEMSTAR series, there is often no need for an anti-condensation heater even under conditions of extremely high humidity. The motors operate reliably in a temperature range from -55 to +70 °C, even in zones with dust and gas. The motors can therefore also be used in desert and polar regions. Versions with corrosion-resistant stainless steel screws are available. Shaft seals in IP55 degree of protection are available as standard and provide protection against water and dust to ensure problem-free outdoor installation.

Versions in industry-specific design are possible, for example with a high-quality, particularly chemical-resistant finish or galvanized fan covers for corrosion protection in aggressive atmospheres.

**Special solutions exclusively for special cases****Subsea components**

The subsea motors are developed especially for operation on the ocean floor. They operate smoothly at depths of 1000 m. They are used as drives for pumps, multi-phase pumps and compressors and therefore play an important role in the optimum exploitation of oil and gas fields.

Platform drives

Compliance with extremely stringent standards is necessary here with regard to the requirements for the operation of drive systems on drilling platforms. The platform motors satisfy the requirements of these standards, both in general terms of reliability, monitoring equipment and integration in platform-wide monitoring systems, as well as in specific applications for example with requirements such as ice protection for polar regions. The platform motors generally feature a special offshore paint finish for protection against salty sea air. Bolts and other exposed parts are made of stainless steel.

Introduction

LOHER motors

Customized and industry-specific drive solutions in the process industry

1

Application (continued)

Integrated pump drives

In the chemical industry, special motors are used that are integrated into pumps. They operate reliably even under extreme conditions of temperature and pressure. In this industry, temperatures can range from -50 to +400 °C and system pressures can be as high as 1200 bar.



Design

The motors described in this catalog are surface-cooled, low-voltage motors designed for the highest demands on availability and reliability. The motors are extremely rugged and reliable and are available as standard versions without explosion protection, as well as in the Ex nA, Ex d(e), Ex p and Ex e types of protection. For extreme requirements, motors are available with double protection against gas and dust.

The highly efficient motors cover the power range of 0.25 to 1400 kW in 2- to 16-pole versions (higher power ratings are possible on request) and, in compliance with IEC 60034-30-1, they achieve efficiency class IE2 in the power range 0.75 to 375 kW in 2-, 4- and 6-pole versions, and they are available for 50 Hz and 60 Hz.

The LOHER CHEMSTAR and SIMOTICS XP motor series are self-ventilated, surface-cooled finned motors for line and converter operation.

The LOHER VARIO series, which is also surface-cooled, is characterized by its special internal air circulation / hollow fin technology for an extremely high power density with a very high degree of efficiency.

Overview

Standardization of the efficiency classes

Different energy efficiency standards exist worldwide for induction motors. To promote international standardization, the international standard IEC 60034-30-1 03/2014 (Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)) was created. This groups low-voltage asynchronous motors into new efficiency classes (first released in October 2008).

Applicability (excerpt)

- Low-voltage motors up to 1000 V (50/60 Hz with line operation)
- Power: 0.12 to 1000 kW; with 2, 4, 6 or 8 poles
- Operating mode: S1

The efficiencies in IEC 60034-30-1 are based on the method for determining losses according to IEC 60034-2-1:2014.

IE efficiency classes

The efficiency classes are grouped according to the following nomenclature (IE = International Efficiency):

- IE1 (Standard Efficiency)
- IE2 (High Efficiency)
- IE3 (Premium Efficiency)
- IE4 (Super Premium Efficiency)

IEC 60034-30-1	NEMA-MG1	GB 18613-2012
IE4 ¹⁾		Grade 1 (IE4)
IE3	Premium efficient (60 Hz)	Grade 2 (IE3)
IE2	Energy efficient (60 Hz)	Grade 3 (IE2)

Comparison of IE efficiency classes

Note:

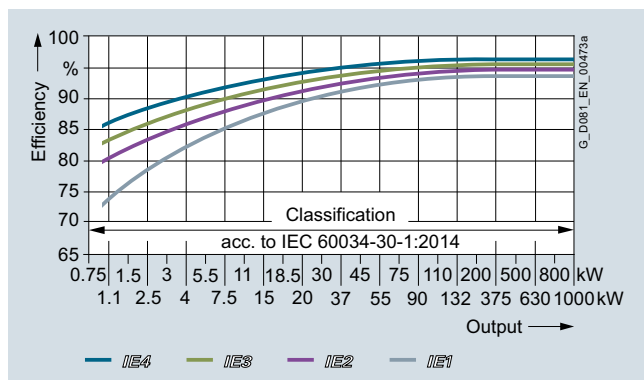
All efficiency classes are stated with reference to 50 Hz data (unless specified otherwise).

Measuring method according to IEC 60034-2-1:2014 for determining the efficiency

With this measuring method, motor losses are no longer applied as a percentage, but are determined by standard methods. The nominal efficiencies are therefore reduced from EFF1 to IE2 and from EFF2 to IE1, even though there have been no technical or physical changes to the motors.

Previously: $P_{LL} = 0.5\% \text{ of } P_1$ was added (IEC 60034-2)
 Now: $P_{LL} = \text{individual measurement}$ (IEC 60034-1)

P_{LL} = Load-dependent supplementary losses



IE1 to IE4 efficiencies, 4-pole, 50 Hz, according to the power rating

Minimum efficiencies according to IEC 60034-30-1:2014

Rated power $P_{rated, 50\text{ Hz}}$ kW	Efficiency η in % IEC IE class							
	IE1 – Standard Efficiency				IE2 – High Efficiency			
	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole
0.18	52.8	57.0	45.5	38.0	60.4	64.7	56.6	45.9
0.20	54.6	58.5	47.6	39.7	61.9	65.9	58.2	47.4
0.25	58.2	61.5	52.1	43.4	64.8	68.5	61.6	50.6
0.37	63.9	66.0	59.7	49.7	69.5	72.7	67.6	56.1
0.40	64.9	66.8	61.1	50.9	70.4	73.5	68.8	57.2
0.55	69.0	70.0	65.8	56.1	74.1	77.1	73.1	61.7
0.75	72.1	72.1	70.0	61.2	77.4	79.6	75.9	66.2
1.1	75.0	75.0	72.9	66.5	79.6	81.4	78.1	70.8
1.5	77.2	77.2	75.2	70.2	81.3	82.8	79.8	74.1
2.2	79.7	79.7	77.7	74.2	83.2	84.3	81.8	77.6
3	81.5	81.5	79.7	77.0	84.6	85.5	83.3	80.0
4	83.1	83.1	81.4	79.2	85.8	86.6	84.6	81.9
5.5	84.7	84.7	83.1	81.4	87.0	87.7	86.0	83.8
7.5	86.0	86.0	84.7	83.1	88.1	88.7	87.2	85.3
11	87.6	87.6	86.4	85.0	89.4	89.8	88.7	86.9
15	88.7	88.7	87.7	86.2	90.3	90.6	89.7	88.0
18.5	89.3	89.3	88.6	86.9	90.9	91.2	90.4	88.6
22	89.9	89.9	89.2	87.4	91.3	91.6	90.9	89.1
30	90.7	90.7	90.2	88.3	92.0	92.3	91.7	89.8
37	91.2	91.2	90.8	88.8	92.5	92.7	92.2	90.3
45	91.7	91.7	91.4	89.2	92.9	93.1	92.7	90.7
55	92.1	92.1	91.9	89.7	93.2	93.5	93.1	91.0
75	92.7	92.7	92.6	90.3	93.8	94.0	93.7	91.6
90	93.0	93.0	92.9	90.7	94.1	94.2	94.0	91.9
110	93.3	93.3	93.3	91.1	94.3	94.5	94.3	92.3
132	93.5	93.5	93.5	91.5	94.6	94.7	94.6	92.6
160	93.8	93.8	93.8	91.9	94.8	94.9	94.8	93.0
200 ... 1000	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5

Rated power $P_{rated, 50\text{ Hz}}$ kW	Efficiency η in % IEC IE class							
	IE3 – Premium Efficiency				IE4 – Super Premium Efficiency			
	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole
0.18	65.9	69.9	63.9	58.7	70.8	74.7	70.1	67.2
0.20	67.2	71.1	65.4	60.6	71.9	75.8	71.4	68.4
0.25	69.7	73.5	68.6	64.1	74.3	77.9	74.1	70.8
0.37	73.8	77.3	73.5	69.3	78.1	81.1	78.0	74.3
0.40	74.6	78.0	74.4	70.1	78.9	81.7	78.7	74.9
0.55	77.8	80.8	77.2	73.0	81.5	83.9	80.9	77.0
0.75	80.7	82.5	78.9	75.0	83.5	85.7	82.7	78.4
1.1	82.7	84.1	81.0	77.7	85.2	87.2	84.5	80.8
1.5	84.2	85.3	82.5	79.7	86.5	88.2	85.9	82.6
2.2	85.9	86.7	84.3	81.9	88.0	89.5	87.4	84.5
3	87.1	87.7	85.6	83.5	89.1	90.4	88.6	85.9
4	88.1	88.6	86.8	84.8	90.0	91.1	89.5	87.1
5.5	89.2	89.6	88.0	86.2	90.9	91.9	90.5	88.3
7.5	90.1	90.4	89.1	87.3	91.7	92.6	91.3	89.3
11	91.2	91.4	90.3	88.6	92.6	93.3	92.3	90.4
15	91.9	92.1	91.2	89.6	93.3	93.9	92.9	91.2
18.5	92.4	92.6	91.7	90.1	93.7	94.2	93.4	91.7
22	92.7	93.0	92.2	90.6	94.0	94.5	93.7	92.1
30	93.3	93.6	92.9	91.3	94.5	94.9	94.2	92.7
37	93.7	93.9	93.3	91.8	94.8	95.2	94.5	93.1
45	94.0	94.2	93.7	92.2	95.0	95.4	94.8	93.4
55	94.3	94.6	94.1	92.5	95.3	95.7	95.1	93.7
75	94.7	95.0	94.6	93.1	95.6	96.0	95.4	94.2
90	95.0	95.2	94.9	93.4	95.8	96.1	95.6	94.4
110	95.2	95.4	95.1	93.7	96.0	96.3	95.8	94.7
132	95.4	95.6	95.4	94.0	96.2	96.4	96.0	94.9
160	95.6	95.8	95.6	94.3	96.3	96.6	96.2	95.1
200	95.8	96.0	95.8	94.6	96.5	96.7	96.3	95.4
250	95.8	96.0	95.8	94.6	96.5	96.7	96.5	95.4
315 ... 1000	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4

¹⁾ Defined in IEC/TS 60034-31.

Introduction

General information regarding efficiency in accordance with International Efficiency

Efficiency classes and efficiencies according to IEC 60034-30-1

1

Overview (continued)

Background information

Comprehensive laws have been introduced in the European Union with the objective of reducing energy consumption and therefore CO₂ emissions. EU Directive 640/2009 concerns the energy consumption or efficiency of induction motors in the industrial environment. This Directive is now in force in every country of the European economic area.

For further details on internationally applicable standards and legal requirements, visit:

www.siemens.com/international-efficiency

Exceptions to the EU Directive

- Motors that are designed to be operated totally submerged in a liquid;
- Motors fully integrated into a product (e.g. a gear unit, pump, fan or compressor) whose energy efficiency cannot be measured independently of the product;
- Motors that are specially designed for operation under the following conditions:
 - At altitudes greater than 4000 meters above sea level;
 - At ambient temperatures above 60 °C;
 - At maximum operating temperatures above 400 °C;
 - At ambient temperatures below -30 °C (any motor);
 - With cooling liquid temperatures at the product intake of below 0 °C, below -15 °C for water-cooled motors or above 32 °C;
 - In hazardous areas in the context of Directive 2014/34/EU of the European Parliament and Council;
- Brake motors

The following motors are not involved:

- 8-pole motors
- Pole-changing motors
- Synchronous motors
- Single-phase motors
- Motors specially developed for converter operation in accordance with IEC 60034-25

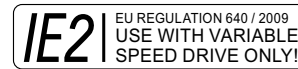
The following changes will come into effect on the dates below:

Since January 1, 2015:

Compliance with the legally required minimum efficiency class IE3 for power ratings from 7.5 to 375 kW or, as an alternative, IE2 motor plus frequency converter

Changes in accordance with EU Motor Regulation 640/2009

All converter compatible low-voltage motors with a power rating of between 7.5 and 375 kW and efficiency IE2 must be labeled as follows with effect from January 1, 2015:



This obligation applies only within the European Economic Area. Correct application is the sole responsibility of the customer.

Beginning January 1, 2017:

Compliance with the legally required minimum efficiency class IE3 for power ratings from 0.75 to 375 kW or, as an alternative, IE2 motor plus frequency converter

Note:

Different minimum efficiency class requirements apply in China, Korea and Australia. Other countries will be available soon.

Abbreviations

NEMA: National Electrical Manufacturers Association

IEC: International Electrotechnical Commission

IE: International Efficiency

Overview

Steps for drive selection

Step 1	Orientation and general technical information		
Technical requirements for the motor	Rated frequency and rated voltage	50/60 Hz 3 AC	400/500/690 V
	Operating mode	Standard duty (continuous duty S1 according to EN 60034-1)	
	Degree of protection or type of explosion protection required	IP..	
	Rated speed (No. of poles)	$n = \dots$ rpm	
	Rated power	$P = \dots$ kW	
	Rated torque	$T = P \cdot 9550/n = \dots$ Nm	
	Type of construction	IM..	
Step 2	Preselection in accordance with the application		
Determination of the installation conditions and definition of the application, if necessary	Ambient temperature	≤ 40 °C	> 40 °C
	Installation altitude	≤ 1000 m	> 1000 m
	Factors for derating	None	Determine the factor for derating (for reduction factor, see "Information about electric motor dimensioning")
Cross-reference to other motors	These can be SIMOTICS motors for special requirements and applications or motors to the NEMA standard		
Step 3	Preliminary selection of the motor		
Determination of the range of possible motors	Select the frame size and therefore the possible motors on the basis of the following parameters: cooling method, degree of protection, rated power, rated speed and rated torque range. Note: The standard temperature range of the motors is from -20 to +40 °C.		

Structure of the selection and ordering tables

Power, frame size, temperature class		Operating values at rated power											Article No., add. data					
Table header – Meaning													Article No.	$m_{IM\ B3}$	J			
$P_{rated, 50\ Hz}$	$P_{rated, 60\ Hz}$	$P_{rated, 60\ Hz}$	Frame size	$n_{rated, 50\ Hz}$	$T_{rated, 50\ Hz}$	IE class	$\eta_{rated, 50\ Hz, 4/4}$	$\eta_{rated, 50\ Hz, 3/4}$	$\eta_{rated, 50\ Hz, 2/4}$	$\cos\phi_{rated, 50\ Hz, 4/4}$	$I_{rated, 50\ Hz, 400\ V}$	$I_{rated, 50\ Hz, 690\ V}$				T_{LR}/T_{rated}	I_{LR}/I_{rated}	T_B/T_{rated}
kW	kW	hp	FS	rpm	Nm		%	%	%		A	A					kg	kgm ²
Rated power at 50 Hz	Rated power at 60 Hz	Rated power at 60 Hz	Frame size	Rated speed at 50 Hz	Rated torque at 50 Hz	Efficiency class according to IEC 60034-30-1 standard	Efficiency at 50 Hz 4/4 load	Efficiency at 50 Hz 3/4 load	Efficiency at 50 Hz 2/4 load	Power factor at 50 Hz 4/4 load	Rated current at 50 Hz	Rated current at 690 V, 50 Hz	Locked-rotor torque on direct switch-on as a multiple of the rated torque	Locked-rotor current on direct switch-on as a multiple of the rated current	Breakdown torque on direct switch-on as a multiple of the rated torque	Article number	Weight for IM B3 type of construction approx.	Moment of inertia

Legend:

Primary key

Standard values for all motors

Specially for versions for converter operation

Note on pole-changing motors:

The operating values are specified here for the rated power for the 2 or 3 different pole numbers.

Step 4	Detailed selection of the motors in the selection and ordering data tables	
Determination of the basic Article No. of the motor	Determine the motor Article No. according to the following parameters: rated power, rated speed, rated torque and rated current from the "Selection and ordering data" for the motors that have already been identified as possibilities.	
Step 5	Selection of the special versions or options	
Completing the motor Article No.	Determine special versions and the associated order codes (e.g. special voltages and types of construction, motor protection and degrees of protection, windings and insulation, colors and paint finish, mountings and mounting technology, etc.).	
Step 6	Additional information for motor selection	
Checking the required measurements	The dimensions are specified in each catalog section under the heading of "Dimensions".	
Selection of the frequency converter, if required	Article No. of the converter as well as its selection, see Catalogs D 11, D 11.1, D 18.1, D 21.3, D 31 and DA 51.2.	

Introduction

Guide to selecting and ordering the motors

Drive selection and catalog orientation

Overview (continued)

Range of motors with explosion protection

Catalog section	Motor type	Motor version	No. of poles	Frequency	Frame size – rated power at 50 or 60 Hz														
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400
2	Motors with explosion protection 1MD5, PS4, 1PS5 and 1PS1																		
1MD5	High Efficiency IE2	2-pole	50 Hz	0.37 ... 460 kW															
			60 Hz	0.37 ... 500 kW															
		4-pole	50 Hz	0.25 ... 460 kW															
			60 Hz	0.25 ... 490 kW															
		6-pole	50 Hz	0.25 ... 360 kW															
			60 Hz	0.25 ... 380 kW															
	Premium Efficiency IE3	2-pole	50 Hz	0.37 ... 460 kW															
			60 Hz	0.43 ... 460 kW															
		4-pole	50 Hz	0.25 ... 460 kW															
			60 Hz	0.29 ... 460 kW															
		6-pole	50 Hz	0.25 ... 360 kW															
			60 Hz	0.25 ... 360 kW															
	1PS4	High Efficiency IE2	2-pole	50 Hz															
				60 Hz	400 ... 1200 kW														
4-pole			50 Hz																
			60 Hz	355 ... 900 kW															
6-pole			50 Hz	400 ... 1400 kW															
			60 Hz	315 ... 1000 kW															
8-pole			50 Hz	315 ... 1120 kW															
			50 Hz	200 ... 950 kW															
10-pole			50 Hz	160 ... 750 kW															
			50 Hz	140 ... 600 kW															
12-pole	50 Hz	110 ... 500 kW																	
	50 Hz	90 ... 400 kW																	
1PS5	High Efficiency IE2	2-pole	50 Hz	0.37 ... 1200 kW															
			60 Hz	0.43 ... 900 kW															
		4-pole	50 Hz	0.25 ... 1400 kW															
			60 Hz	0.29 ... 1000 kW															
		6-pole	50 Hz	0.25 ... 1120 kW															
			60 Hz	0.25 ... 380 kW															
		8-pole	50 Hz	0.09 ... 950 kW															
			50 Hz																
	10-pole	50 Hz	160 ... 750 kW																
		50 Hz	140 ... 600 kW																
	12-pole	50 Hz	110 ... 500 kW																
		50 Hz	90 ... 400 kW																
	Premium Efficiency IE3	2-pole	50 Hz	0.37 ... 460 kW															
			60 Hz	0.43 ... 500 kW															
4-pole		50 Hz	0.25 ... 460 kW																
		60 Hz	0.29 ... 490 kW																
6-pole		50 Hz	0.25 ... 360 kW																
		60 Hz	0.25 ... 380 kW																

IE code classification according to IEC 60034-30-1 up to 1000 kW.

¹⁾ Frame sizes 560 to 630 on request.

Overview (continued)

Range of motors with explosion protection (continued)

Catalog section	Motor type	Motor version	No. of poles	Frequency	Frame size – rated power at 50 or 60 Hz																	
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450	500	560 ¹⁾
2 Motors with explosion protection 1MD5, PS4, 1PS5 and 1PS1 (continued)																						
1PS5	Pole-changing (50 Hz)	4-/2-pole	50 Hz					1.9/2.4 ... 150/200 kW		For a constant load torque												
								0.22/1.1 ... 50/200 kW		For square-law load torque												
								0.6/0.9 ... 125/180 kW		For a constant load torque												
			6-/4-pole	50 Hz					0.4/1.3 ... 75/200 kW		For square-law load torque											
									0.45/0.6 ... 115/150 kW		For square-law load torque											
	Brake motors High Efficiency IE2		4-pole	50 Hz					0.75 ... 30 kW													
			6-pole	50 Hz					0.55 ... 22 kW													
	Brake motors Premium Efficiency IE3		4-pole	50 Hz					0.75 ... 30 kW													
			6-pole	50 Hz					0.55 ... 22 kW													
	1PS1	High Efficiency IE2	2-pole	50 Hz	0.37 ... 1200 kW																	
60 Hz				0.43 ... 900 kW																		
4-pole			50 Hz	0.25 ... 1400 kW																		
			60 Hz	0.29 ... 1000 kW																		
6-pole			50 Hz	0.25 ... 1000 kW																		
			60 Hz	0.25 ... 200 kW																		
8-pole			50 Hz	0.37 ... 950 kW																		
10-pole			50 Hz																	180 ... 750 kW		
12-pole			50 Hz																	160 ... 600 kW		
14-pole			50 Hz																	125 ... 500 kW		
16-pole		50 Hz																	100 ... 400 kW			
Premium Efficiency IE3		2-pole	50 Hz	0.37 ... 250 kW																		
			60 Hz	0.37 ... 250 kW																		
		4-pole	50 Hz	0.25 ... 250 kW																		
	60 Hz		0.25 ... 250 kW																			
6-pole	50 Hz	0.25 ... 200 kW																				
	60 Hz	0.25 ... 200 kW																				

IE code classification according to IEC 60034-30-1 up to 1000 kW.

¹⁾ Frame sizes 560 to 630 on request.

Introduction

Guide to selecting and ordering the motors

Drive selection and catalog orientation

Overview (continued)

Range of motors without explosion protection

Cata- log sec- tion	Motor type	Motor version	No. of poles	Fre- quency	Frame size – rated power at 50 or 60 Hz															
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450
3	1PS0 motors without explosion protection																			
1PS0	High Efficiency IE2	2-pole	50 Hz	0.37 ... 1200 kW																
			60 Hz	0.43 ... 900 kW																
		4-pole	50 Hz	0.25 ... 1400 kW																
			60 Hz	0.29 ... 1000 kW																
		6-pole	50 Hz	0.25 ... 1250 kW																
			60 Hz	0.25 ... 200 kW																
		8-pole	50 Hz	0.09 ... 950 kW																
		10-pole	50 Hz	180 ... 750 kW																
		12-pole	50 Hz	160 ... 600 kW																
		14-pole	50 Hz	125 ... 500 kW																
		16-pole	50 Hz	100 ... 5400 kW																
		Premium Efficiency IE3	2-pole	50 Hz	0.37 ... 250 kW															
				60 Hz	0.37 ... 250 kW															
			4-pole	50 Hz	0.25 ... 250 kW															
60 Hz	0.25 ... 250 kW																			
6-pole	50 Hz		0.25 ... 200 kW																	
	60 Hz		0.25 ... 200 kW																	
Pole- changing	4-/2-pole	50 Hz	0.65/2.4 ... 4.3/16 kW For square-law load torque																	
	6-/4-pole	50 Hz	0.6/1.7 ... 9.5/26 kW For square-law load torque																	
	8-/4-pole	50 Hz	0.5/2 ... 7.5/28 kW For square-law load torque																	
	4-/2-pole	50 Hz	1.9/2.4 ... 13/16 kW For a constant load torque																	
Brake motors High Efficiency IE2	2-pole	50 Hz	5.5 ... 11 kW																	
	4-pole	50 Hz	5.5 ... 55 kW																	
Brake motors Premium Efficiency IE3	2-pole	50 Hz	5.5 ... 11 kW																	
	4-pole	50 Hz	5.5 ... 75 kW																	
		6-pole	50 Hz	3 ... 37 kW																
		6-pole	50 Hz	3 ... 37 kW																

IE code classification according to IEC 60034-30-1 up to 1000 kW.

¹⁾ Frame sizes 560 to 630 on request.

Overview

The Article No. consists of a combination of digits and letters and is divided into three hyphenated blocks to provide a better overview, e.g.:

1PS5070-0BD10-4AA0-Z
A15

The first block (positions 1 to 7) identifies the motor type complete with shaft height and overall length; the second block (positions 8 to 12) defines the insulation, machine type, stator frame and voltage/connection/frequency; and in the third block (positions 13 to 16) the temperature class, number of poles, bearing type and product version are encoded.

For deviations in the second and third block from the catalog codes, either **-Z** or **9** should be used as appropriate.

Ordering data:

- Complete Article No. and order code(s) or plain text
- If a quotation is available, please specify the quotation number in addition to the Article No.
- When ordering a complete motor as a spare part, please specify the works serial No. for the previously supplied motor as well as the Article No.

Structure of the Article No.:		Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16															
Motors with explosion protection 1PS1, 1PS4, 1PS5, 1MD5 and motors without explosion protection 1PS0																	
Positions 1 to 3 Digit, letter, letter, digit	Motor series LOHER CHEMSTAR, LOHER VARIO	1	P	S													
Position 4 Digit	Type of protection • Without explosion protection • "Non-sparking" Ex nA version • "Explosion-proof enclosure" Ex de IIB/Ex d IIB • "Explosion-proof enclosure" Ex de IIC/Ex d IIC																
Positions 1 to 3 Digit, letter, letter, digit	Motor series SIMOTICS XP	1	M	D													
Position 4 Digit	Type of protection "Explosion-proof enclosure" Ex de IIC/Ex d IIC																
Positions 5 and 6 Digits	Frame size (FS) 07: FS 71; 08: FS 80; 09: FS 90; 10: FS 100; 11: FS 112; 13: FS 132; 20: FS 200; 22: FS 225; 25: FS 250; 28: FS 280; 16: FS 160; 18: FS 180; 31: FS 315; 35: FS 355; 40: FS 400; 45: FS 450; 56: FS 560																
Position 7 Digit	Power identifier (encoded) Length + power levels																
Position 8 Digit	Insulation 0: Low-voltage, line operation; 1: Low-voltage, converter operation, standard insulation; 2: Low-voltage, converter operation, special insulation; 3: Low-voltage, line operation, pre-formed coil; 4: Low-voltage, converter operation, pre-formed coil																
Position 9 Letter	Type of machine B: Induction motor, squirrel-cage rotor, enclosed machine; F: Asynchronous generator, squirrel-cage rotor, enclosed machine; N: Induction motor, pole-changing, fan design; R: Induction motor with built-on brake																
Position 10 Letter	Enclosure and cooling D: Cast-iron, TEFC (self-ventilated); F: Cast-iron, TEFC (forced-air cooled) J: Steel, TEFC (self-ventilated); J: Steel, TEFC (forced-air cooled)																
Position 11 Digit	Voltage, circuit and frequency 0: 690 VΔ, 50 Hz; 1: 230/400 VΔ/Y, 50 Hz; 3: 500 VY; 50 Hz; 4: 400 VΔ, 50 Hz; 5: 500 VΔ, 50 Hz; 6: 400/690 VΔ/Y, 50 Hz; 8: 690 VY, 50 Hz; 9: Other voltages																
Position 12 Digit	Type of construction 0: IM B3; 1: IM B5; 2: IM B34; 3: IM B14; 4: IM V1 with protective cover; 6: IM B35; 8: IM V1 without protective cover (without explosion protection); 9: Other types of construction																
Position 13 Digit	Temperature class 0: Without temperature class; 3: Temperature class T3; 4: Temperature class T4																
Position 14 Letter	No. of poles A: 2-pole; B: 4-pole; C: 6-pole; D: 8-pole; E: 10-pole; F: 12-pole; G: 14-pole; H: 16-pole; N: 4-/2-pole; P: 6-/4-pole; Q: 8-/4-pole; R: 8-/6-pole; S: 8-/6-/4-pole																
Position 15 Letter	Bearing type/rotor type A: Roller bearing/standard rotor; B: Roller bearing/special rotor																
Position 16 Digit	Product version 0: Fanned enclosure; 1: Cast-ingot enclosure (1MD5...1); 2: Fanned enclosure IE2 design 3: Cast-ingot enclosure (1PS5...3); 4: Cast-ingot enclosure, platform																

Ordering example

Selection criteria	Requirement	Structure of the Article No.
Motor type 1PS	Industry motor LOHER CHEMSTAR with type of protection "Explosion-proof enclosure"	1PS5■■■■ - ■■■■■■ - ■■■■
Frame size	071	1PS507■ - ■■■■■■ - ■■■■
Power identifier	S	1PS5070 - ■■■■■■ - ■■■■
Line operation, induction motor with squirrel-cage rotor, cast-iron (self-ventilated)		1PS5070 - 0BD■■■ - ■■■■
Voltage/delta connection/frequency	690 VΔ, 50 Hz	1PS5070 - 0BD1■ - ■■■■
Type of construction	IM B3	1PS5070 - 0BD10 - ■■■■
Temperature class	T4	1PS5070 - 0BD10 - 4■■■
No. of poles	2-pole	1PS5070 - 0BD10 - 4A■■■
Bearing type/rotor	Roller bearing/standard rotor	1PS5070 - 0BD10 - 4AA■
Product version	Cast-ingot enclosure	1PS5070 - 0BD10 - 4AA3

Introduction

Guide to selecting and ordering the motors

1

Special tests in the test bay

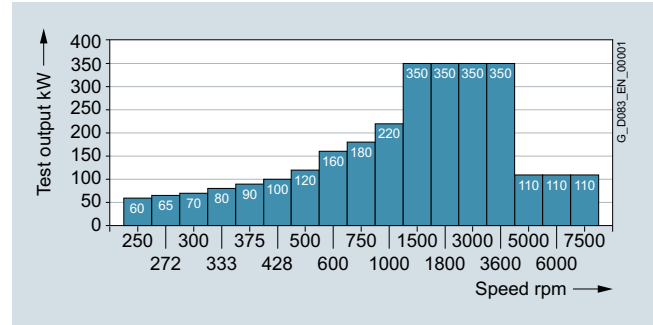
Overview

Tests, test bay

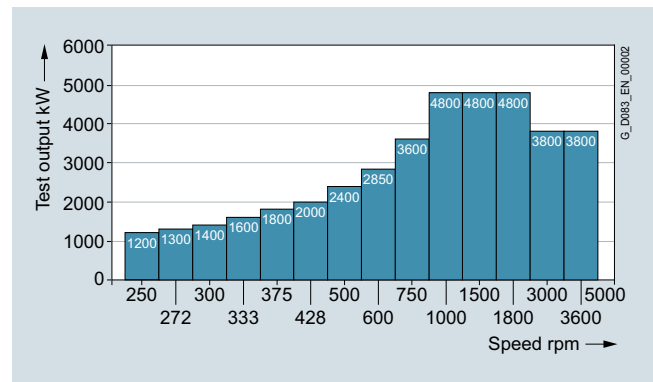
The Siemens Ruhstorf site is equipped with an ultra-modern test bay to enable it to fulfill the stringent requirements of the chemical industry and the oil and gas sector. The quality and reliability of the tests is also confirmed, for example, by the certification authorities for Ex motors. The in-house motor test bays are equipped for testing the complete range of options of the 1PS and 1MD5 motor series in accordance with the latest standards and regulations. Each motor is subjected to a short routine test prior to delivery. Type testing, warm-up runs and special tests are possible. The testing capacities are subdivided into two test units according to motor power. The power classification is shown in the following diagrams.

Tests are organized on the site ranging from acceptance tests in the presence of the customer through to system acceptance tests with supply equipment such as transformers and converters. Special tests are possible on request in accordance with customer specifications or standard tests such as API compliance. In our submersion tanks, motors to IP68 can be submerged in water and tested under load conditions.

Noise measurements are performed on request in a soundproof room. Under normal circumstances, noise measurements are performed under no-load conditions. On request, the measurements can also be taken under load conditions. So-called "hold points" can be agreed in addition to the possibilities offered by the test environments. These "hold points" are time points in which semi-finished/finished motor parts are tested in accordance with requirements. These tests are performed at the installed test sections of the production facility or, if necessary, in the test bays.



Overview of the range of tests available in the test bay for industrial motors



Overview of the range of tests available in the test bay for non-standard motors

Overview (continued)

Tests and acceptance tests for 1PS0, 1PS1, 1PS4 and 1PS5 motors

Additional identification code -Z with order code		Documentation	Test description	Available for	
For internal tests	For acceptance test with customer or inspector			Frame size	LOHER type series
Standard	F01	U51	Routine test to IEC (sine-wave voltage)	71 ... 500	CHEMSTAR, VARIO
–	F03	¹⁾	Visual inspection	71 ... 500	CHEMSTAR, VARIO
F14	F15	²⁾	Recording of no-load characteristic	71 ... 500	CHEMSTAR, VARIO
F16	F17	²⁾	Recording of short-circuit characteristic	71 ... 500	CHEMSTAR, VARIO
F28	F29	U55	Noise test (no-load), without noise analysis	71 ... 500	CHEMSTAR, VARIO
F38	F39		Overspeed test	71 ... 500	CHEMSTAR, VARIO
F46	F47	U73	Partial-discharge measurement	Pre-formed coil	VARIO
F52	F53	^{1) 2)}	Locked-rotor torque and current measurement	71 ... 500	CHEMSTAR, VARIO
F54	F55	^{1) 2)}	Polarization index measurement	Pre-formed coil	VARIO
F56	F57	^{1) 2)}	Measurement of shaft vibration	355 ... 500	VARIO
F58	F59	U56 ^{1) 2)}	Vibration modal analysis (2-pole and V1 fixed mounted)	71 ... 500	CHEMSTAR, VARIO
F62	F63	U55	Noise measurement – octave analysis in conjunction with F28/F29 or F74/F75	71 ... 500	CHEMSTAR, VARIO
F70	–	U79	Ultrasonic test on motor shaft with certificate	71 ... 500	CHEMSTAR, VARIO
Standard	F71	U50	Rotor balancing	355 ... 500	VARIO
F74	F75	U55	Noise test under load, without noise analysis – in combination with type tests F82/F83 or F92/F93	71 ... 500	CHEMSTAR, VARIO
F76	–	U76	Magnetic particle test on motor shaft	315 ... 500	CHEMSTAR, VARIO
–	F77	U81	Painting inspection (order sample paint sheets separately with V08)	71 ... 500	CHEMSTAR, VARIO
F78	–	–	Exp machine settings	355 ... 500	VARIO
–	F79	–	Packaging inspection by third-party inspector or customer	71 ... 500	CHEMSTAR, VARIO
F82	F83	U53	Type test with heat run for horizontal motors according to IEC (sine wave voltage)	71 ... 500	CHEMSTAR, VARIO
F92	F93	U53	Type test with heat run for vertical motors according to IEC (sine wave voltage)	71 ... 500	CHEMSTAR, VARIO
–	F95	U53	Type test, motor together with SINAMICS G180 converter	71 ... 500	CHEMSTAR, VARIO
–	F97	U53	Type test – acceptance of motor together with SINAMICS G.../S... (max. 3 days service technician for converter adjustment not included)	71 ... 355	CHEMSTAR
			Type test – acceptance of motor together with SINAMICS GM/SM or SINAMICS PERFECT HARMONY frequency converter (max. 3 days service technician for converter adjustment not included)	355 ... 500	VARIO
–	F99	U53	Type test – acceptance of motor with non-Siemens converter (max. 3 days service technician for converter adjustment not included)	71 ... 500	CHEMSTAR, VARIO
–	–		Special test on request	71 ... 500	CHEMSTAR, VARIO
–	–		Special tests in combination with manufacturing of test equipment; special shafts and special mounting types on request	71 ... 500	CHEMSTAR, VARIO
–	–		Ship approval after FV 109 type test	71 ... 500	CHEMSTAR, VARIO
–	–		Ship approval after FV 109 routine test	71 ... 500	CHEMSTAR, VARIO
–	–		Shaft notch impact test and tensile strength test	71 ... 500	CHEMSTAR, VARIO
–	–		Special test: locked-rotor torque measurement	71 ... 500	CHEMSTAR, VARIO

¹⁾ Only in combination with a type test **F82/F83** or **F92/F93**: Document U53.

²⁾ Only in combination with a routine test, at inspection **F01**: Document U51.

Introduction

Guide to selecting and ordering the motors

Special tests in the test bay

Overview (continued)

Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors

Additional identification code -Z with order code	Documentation	Available for Languages	Frame size	LOHER type series
U90	Document package NM1 (=U06+U15+U18+U58) consisting of installation and operating instructions, EU type-examination certificate, dimensional drawing, wiring diagram(s)	De, En	71 ... 355	CHEMSTAR
U91	Document package NM2 (=U01+U04+U06+U15+U18+U40+U58) consisting of installation and operating instructions, wiring diagram(s), EU type-examination certificate, data sheet, manufacturer's declaration, dimensional drawing, current-torque characteristic	De, En	71 ... 355	CHEMSTAR
U92	Document package TM1 (=U01+U04+U06+U08+U15+U17+U24+U25+U36+U43+U51+U56+U57+U58) consisting of data sheet, current-torque characteristic, detail dimensional drawing, terminal box drawing, wiring diagrams, installation and operating instructions, set values	De, En	355 ... 500	VARIO
U01	Siemens data sheet	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
U02	Customer data sheet		71 ... 500	CHEMSTAR, VARIO
U03	Current-starting time characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
U04	Current-torque characteristic with load torque characteristic – Load data must be provided for new orders	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
U05	Transient air-gap torques	De, En	71 ... 500	CHEMSTAR, VARIO
U06	Circuit diagram	De, En, Fr	71 ... 500	CHEMSTAR, VARIO
U07	Equivalent circuit diagram	De, En, Fr, It, Es	71 ... 500	CHEMSTAR, VARIO
U08	Terminal box drawing	De, En	71 ... 500	CHEMSTAR, VARIO
U09	Wöhler curve	De, En	355 ... 500	VARIO
U10	Indication of shock resistance	De, En	71 ... 500	CHEMSTAR, VARIO
U11	Shock resistance calculation	De, En	71 ... 500	CHEMSTAR, VARIO
U12	Foundation load	De, En, Fr, It, Es	280 ... 500	CHEMSTAR, VARIO
U13	Calculation of axial magnetic pull	De, En	355 ... 500	VARIO
U14	Lateral critical speed analysis	De, En	200 ... 500	CHEMSTAR, VARIO
U15	Dimensional drawing	De, En	71 ... 500	CHEMSTAR, VARIO
U16	Speed-starting time characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
U17	Bearing and lubrication data sheet	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
U18	Operating instructions	De, En, Fr, It, Es	71 ... 500	CHEMSTAR, VARIO
U19	Shaft dimensional drawing with torsional stiffness values	De, En	200 ... 500	CHEMSTAR, VARIO
U20	Shaft dimensional drawing (without torsional stiffness values)	De, En	71 ... 500	CHEMSTAR, VARIO
U21	Instrument data sheet (all instruments combined)	De, En	71 ... 500	CHEMSTAR, VARIO
U22	Rating plate drawing	De, En	71 ... 500	CHEMSTAR, VARIO
U23	Noise characteristics report (standard)	De, En	71 ... 500	CHEMSTAR, VARIO
U24	Setpoint values (e.g. Pt100)	De, En	200 ... 500	CHEMSTAR, VARIO
U25	Water cooler instructions	De, En	355 ... 500	VARIO
U26	Spare parts list with cross-section name (without prices)	De, En	71 ... 500	CHEMSTAR, VARIO
U27	Spare parts list with cross-section name (with prices)	De, En	355 ... 500	VARIO
U28	Drawing of motor thermal growth	De, En	200 ... 500	CHEMSTAR, VARIO
U29	Winding data	De, En	71 ... 500	CHEMSTAR, VARIO
U30	Winding diagram	De, En	71 ... 500	CHEMSTAR, VARIO
U31	Shell record card	En	71 ... 500	CHEMSTAR, VARIO
U32	Test certificate 2.2 (EN 10204)	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
U33	SASO certificate	En	71 ... 500	CHEMSTAR, VARIO
U34	Calculation of the REED frequency	De, En	71 ... 500	CHEMSTAR, VARIO
U35	Lifting transport recommendation	De, En	71 ... 500	CHEMSTAR, VARIO
U36	Coating description	De, En	71 ... 500	CHEMSTAR, VARIO
U37	P & ID diagram	De, En	71 ... 500	CHEMSTAR, VARIO
U38	Power factor-efficiency characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
U39	Power factor-speed characteristic	De, En	71 ... 500	CHEMSTAR, VARIO

Overview (continued)

Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors (continued)

Additional identification code -Z with order code	Documentation	Available for Languages	Frame size	LOHER type series
U40	EU declaration of conformity	De, En	71 ... 500	CHEMSTAR, VARIO
U41	Certificate of conformity for mounting parts	De, En	71 ... 500	CHEMSTAR, VARIO
U42	Certificate of conformity for terminal box	De, En	71 ... 500	CHEMSTAR, VARIO
U43	Declaration of Incorporation	De, En	71 ... 500	CHEMSTAR, VARIO
U44	Certificate of conformity for IP degree of protection	De, En	71 ... 500	CHEMSTAR, VARIO
U45	Lifting lug calculation	De, En	71 ... 500	CHEMSTAR, VARIO
U46	Bearing life time calculation	De, En	71 ... 500	CHEMSTAR, VARIO
U47	Air gap calculation	De, En	355 ... 500	VARIO
U48	Motor 2D dimensional drawing, DXF file	De, En	71 ... 500	CHEMSTAR, VARIO
U49	3D motor model, STEP file	De, En	71 ... 500	CHEMSTAR, VARIO
U50	Balance certificate (multi)	De, En	71 ... 500	CHEMSTAR, VARIO
U51	Inspection certificate 3.1 EN 10204 (multi)	De, En, Fr, Ru	71 ... 500	CHEMSTAR, VARIO
U52	Type test report (original motor)	De, En	71 ... 500	CHEMSTAR, VARIO
U53	Type test report (order-specific) – only in combination with F82/F83 or F92/F93	De, En	71 ... 500	CHEMSTAR, VARIO
U54	Load characteristics	De, En	71 ... 500	CHEMSTAR, VARIO
U55	Order-specific noise measurement report according to F option selected	De, En	71 ... 500	CHEMSTAR, VARIO
U56	Vibration test report 3.1 (EN 10204) – at no load	De, En	71 ... 500	CHEMSTAR, VARIO
U57	Data information – for converter operation	De, En	71 ... 500	CHEMSTAR, VARIO
U58	EU type examination certificate	De, En	71 ... 500	CHEMSTAR, VARIO
U59	Acceptance test certificate	De, En	71 ... 500	CHEMSTAR, VARIO
U60	Shaft material certificate 3.1	De, En	71 ... 500	CHEMSTAR, VARIO
U61	Cooler certificate 3.1	De, En	355 ... 500	VARIO
U62	Calibration certificates for all Pt100 resistance thermometers installed	De, En	71 ... 500	CHEMSTAR, VARIO
U63	Inspection and test plan	De, En	71 ... 500	CHEMSTAR, VARIO
U64	Thermal limit curve	De, En	71 ... 500	CHEMSTAR, VARIO
U65	Temperature-rise curve	De, En	71 ... 500	CHEMSTAR, VARIO
U66	External certificate according to design option	De, En	71 ... 500	CHEMSTAR, VARIO
U67	Certificate flame path 3.1	De, En	71 ... 500	CHEMSTAR, VARIO
U68	Certificate of Compliance	De, En	71 ... 500	CHEMSTAR, VARIO
U69	Manufacturing Record Book	De, En	71 ... 500	CHEMSTAR, VARIO
U70	Tangent-delta measuring protocol (complete winding) 3.1	De, En	Pre-formed coil	VARIO
U71	Tangent-delta measuring protocol (10 % of the coils) 3.1	De, En	Pre-formed coil	VARIO
U72	Sample coil test protocol 3.1	De, En	Pre-formed coil	VARIO
U73	Partial discharge measurement report 3.1	De, En	Pre-formed coil	VARIO
U74	Material certificate for lamination 2.2	De, En	71 ... 500	CHEMSTAR, VARIO
U75	Material certificate for copper 2.2	De, En	71 ... 500	CHEMSTAR, VARIO
U76	Magnetic particle test report for shaft	De, En	315 ... 500	CHEMSTAR, VARIO
U77	Magnetic particle test report for lifting lugs 3.1	De, En	355 ... 500	VARIO
U78	Die penetration test report for shaft 3.1	De, En	315 ... 500	CHEMSTAR, VARIO
U79	Ultrasonic test report for motor shaft 3.1 (only in combination with F70)	De, En	315 ... 500	CHEMSTAR, VARIO
U80	Air gap measurement report 3.1	De, En	315 ... 500	CHEMSTAR, VARIO
U81	Layer thickness protocol 3.1 – total layer thickness	De, En	71 ... 500	CHEMSTAR, VARIO
U82	Protection level certificate	De, En	71 ... 500	CHEMSTAR, VARIO
U83	Shaft vibration and run out protocol	De, En	355 ... 500	VARIO
U84	Customer-specific dimension protocol	De, En	71 ... 500	CHEMSTAR, VARIO
U85	Paint thickness measuring report 3.1 for individual layers	De, En	71 ... 500	CHEMSTAR, VARIO
U86	Standard test description	De, En	71 ... 500	CHEMSTAR, VARIO
U87	Technical passport, Russia	En	71 ... 500	CHEMSTAR, VARIO
U99	Special documentation in line with NLO	De, En	71 ... 500	CHEMSTAR, VARIO

Note: The delivery time for the factory test certificates may differ from the delivery time for the motors.

Introduction

Guide to selecting and ordering the motors

Special tests in the test bay

Overview (continued)

Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors (continued)

Additional identification code -Z with order code	Documentation	Available for Languages	Frame size	LOHER type series
D00	Documentation in German		71 ... 500	CHEMSTAR, VARIO
D54	Documentation in Czech (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D55	Documentation in Polish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D56	Documentation in Russian (operating instructions, data sheet)		71 ... 500	CHEMSTAR, VARIO
D57	Documentation in Japanese (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D62	Documentation in Danish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D71	Documentation in Danish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D72	Documentation in Italian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D73	Documentation in Finnish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D74	Documentation in Dutch (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D75	Documentation in Turkish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D76	Documentation in English		71 ... 500	CHEMSTAR, VARIO
D77	Documentation in French (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D78	Documentation in Spanish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D79	Documentation in Portuguese (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D80	Documentation in Bulgarian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D81	Documentation in Norwegian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D82	Documentation in Hungarian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D83	Documentation in Swedish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D84	Documentation in Chinese, simplified (operating instructions)		71 ... 500	CHEMSTAR, VARIO
D91	Documentation in Serbian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
B00	No documentation		71 ... 500	CHEMSTAR, VARIO
B08	Documents requiring authorization according to selected U-options – no test records, delivery time plus 2 weeks		71 ... 500	CHEMSTAR, VARIO
B16	Photos for approval before shipment (rating plates + 2 views of motor, delivery after approval by customer)		71 ... 500	CHEMSTAR, VARIO
B17	Expediting during production (per order position)		71 ... 500	CHEMSTAR, VARIO
B21	Documentation on CD		71 ... 500	CHEMSTAR, VARIO
B22	Documentation as email		71 ... 500	CHEMSTAR, VARIO
B23	Documentation on paper, 1 set		71 ... 500	CHEMSTAR, VARIO
B24	Preliminary documentation only		71 ... 355	CHEMSTAR
B29	Final documentation only		71 ... 355	CHEMSTAR
B38	Document – Recommended spare parts		355 ... 500	VARIO
B43	Document - Production schedule: Generated once		355 ... 500	VARIO
B45	Document - Production schedule: Updated monthly		355 ... 500	VARIO
B48	Order-specific inspection and test plan		355 ... 500	VARIO
On request	Customer entry in drawing – per drawing: <ul style="list-style-type: none"> • Adding of additional title blocks in all drawings (title block has to made available by the customer in the form of a DXF file) • Approval documentation • Motor sectional drawing • Special documentation • Plant-specific or order-specific creation of operating instructions • Compilation of final documentation in a folder 			

Languages for the main components (e.g. operating and maintenance instructions) – also available for 1MD5 motors: Official EU languages (English/Spanish/French/Italian and German) available to download!
Please consult the factory about availability/delivery time/feasibility.

Cut-away diagram of a LOHER CHEMSTAR low-voltage motor

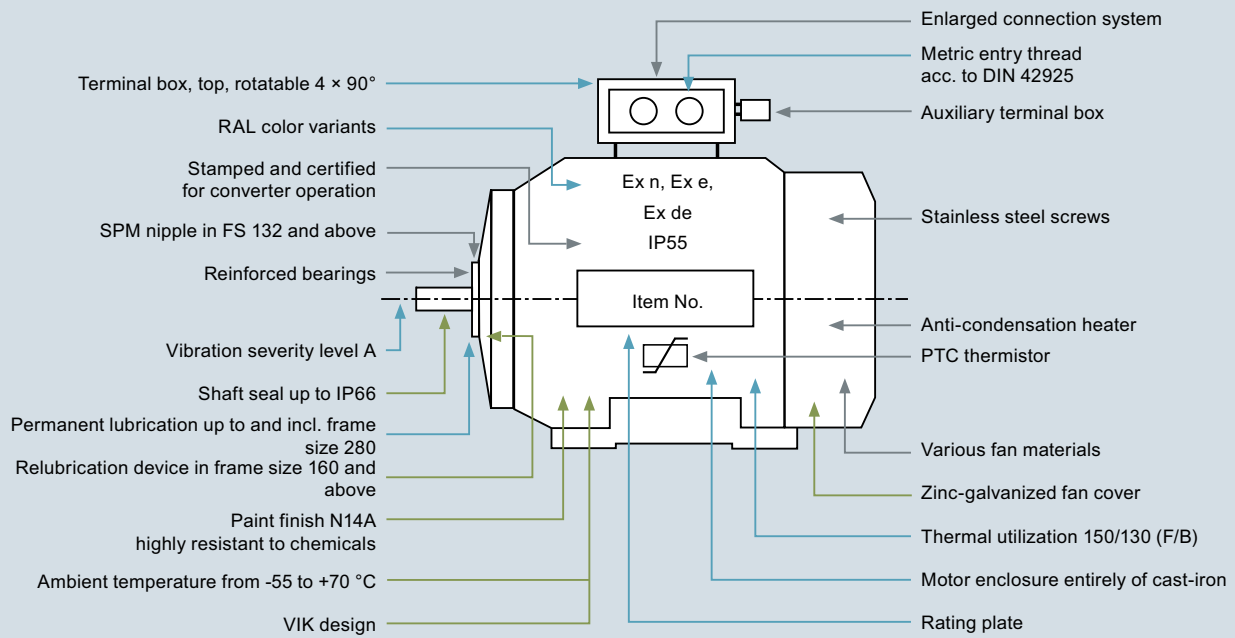
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Overview

LOHER CHEMSTAR motors, standard version

LOHER CHEMSTAR motors with option W09

Additional options



LOHER CHEMSTAR motors, standard version

- Vibration severity level A
- Permanent lubrication up to and incl. frame size 280
- Terminal box, top, rotatable 4 × 90°
- Metric entry thread according to DIN 42925
- Thermal utilization 155/130 (F/B)
- Motor enclosure entirely of cast-iron
- RAL color variants
- Rating plate

LOHER CHEMSTAR motors with W09 option package for applications in the chemical and petrochemical industry

- VIK design
- Vibration severity values such as level B
- IP56 degree of protection for motor
- IP66 for shaft seal
- Zinc-galvanized fan cover
- Paint finish N14A highly resistant to chemicals

Other options (with and without W09)

- Stamped and certified for converter operation with standard and special insulation
- SPM measuring nipple
- Reinforced bearings
- Relubrication device for frame size 160 and above
- Stainless steel screws
- Anti-condensation heater
- Various fan materials
- Ambient temperatures from -55 to +70 °C
- PTC thermistor as additional protection or sole protection
- Auxiliary terminal box
- Special paint finishes
- Special paint colors
- Cable glands also for shielded or armored cables
- Enlarged connection system
- And much more

G_D0893_EN_00081

Introduction

General technical specifications

Paint finishes

1

Overview

	Additional identification code -Z with order code							
	Standard	V09	V10 (W14)	V11	-	W15	K24	
LOHER paint finish	System N04	System N08	System N14/J08 (paint finish System N14A)	System Z21/J08	System S14 – ETO option (Engineer To Order) without order code	Special prime coat system Z05 with internal corrosion protection system J08	System G04	
Use	Standard paint finish, indoor installation, standard for 1PS0, 1PS1	Outdoor climate, tropical climate, humid indoor climate, standard for 1PS4, 1PS5	Tropical climate, humid indoor climate, VIK standard paint finish, incl. J08 (N14A without J08) highly aggressive chemicals, decontamination capability, ships, onshore	Offshore, drilling platforms, customer request, incl. J08/optional (V19) with layer thickness 275 µm complies with C5-M _{high}	Special under-water offshore paint approved according to NORSOK M-501 Coating System 1B	Customer request (top coat from customer), incl. J08	Customer request (top coat from customer)	
Max. corrosiveness category/expected protection lifetime in accordance with EN ISO 12944 – see next page								
Internal	-	C3 _{high}	C5-M _{low}	C5-M _{mid}	C5-M _{high}	-	1m 1h	
External	C3 _{mid}	C3 _{mid}	C5-I _{mid}	C5-M _{low}	C5-M _{high}	-	1m 1h	
Layer thickness								
µm	40	80	140	210	310	50	40	
Resistance								
Climate groups acc. to EN 60721-3	Moderate	Worldwide	Worldwide	Worldwide	Worldwide	1)	1)	
Condensation climate acc. to KFW DIN 50017	+	+	++	++	++	+	+	
Sulfur dioxide acc. to EN ISO 6988	0	+	+ / ++	++	++	+	0	
Saltwater according to DIN 53167	0	+	+ / ++	++	+ / ++	+	0	
Resistance according to EN ISO 2812-1								
Ammonia ~10 %	+	++	++	++	++	+	+	
Mineral oil, grease, solvent, benzene/ benzol, alcohol	+	++	++	++	++	++	+	
Sulfuric acid 10 %	0	+	++	++	+	+	0	
Sulfuric acid 50 %	-	0	+	+	0	0	-	
Bicarbonate of soda 10 %	0	+	++	++	+	+	-	
Bicarbonate of soda 40 %	-	0	++	++	+	+	--	
Hydrochloric acid 37 %	0	0	+	+	-	-	-	
Temperature range								
	-40 ... +130 °C (temporarily -60 ... +150 °C, at +180 °C possible slight discoloration)							
Humidity								
	90 %		100 %		100 %		90 %	90 %
Ability to be painted								
	Good within 1 week, afterwards sanding down is necessary					Very good		Very good
Adhesion acc. to EN ISO 2409								
	Characteristic value Gt 1							
Pre-treatment of parts								
	All parts cleaned and degreased, steel and cast-iron parts sandblasted.							
Drying								
	All layers oven dried.							
Colors								
Standard	Standard RAL 7030 (stone gray)				RAL 7030	Gray ²⁾	RAL 7032 (pebble gray)	
Available colors ³⁾	RAL 1004, 1018, 2004, 5009, 5010, 5012, 5015, 5018, 6002, 6003, 6011, 7000, 7011, 7031, 7032, 7036, 7038, 9010, other colors are available on request							
Surface treatment of unpainted parts, shaft extension and flange								
	Coated with special rust-protection oil that repels water and palm sweat							
Miscellaneous								
	Abrasion-resistant, elastic, scratch-resistant, shock-proof, totally light resistant, physiologically harmless							

- ++ Long-term resistance
- + Good resistance
- 0 Limited resistance
- Temporary resistance
- Not resistant

1) The corrosion class is produced by the customer using the additional paint system.

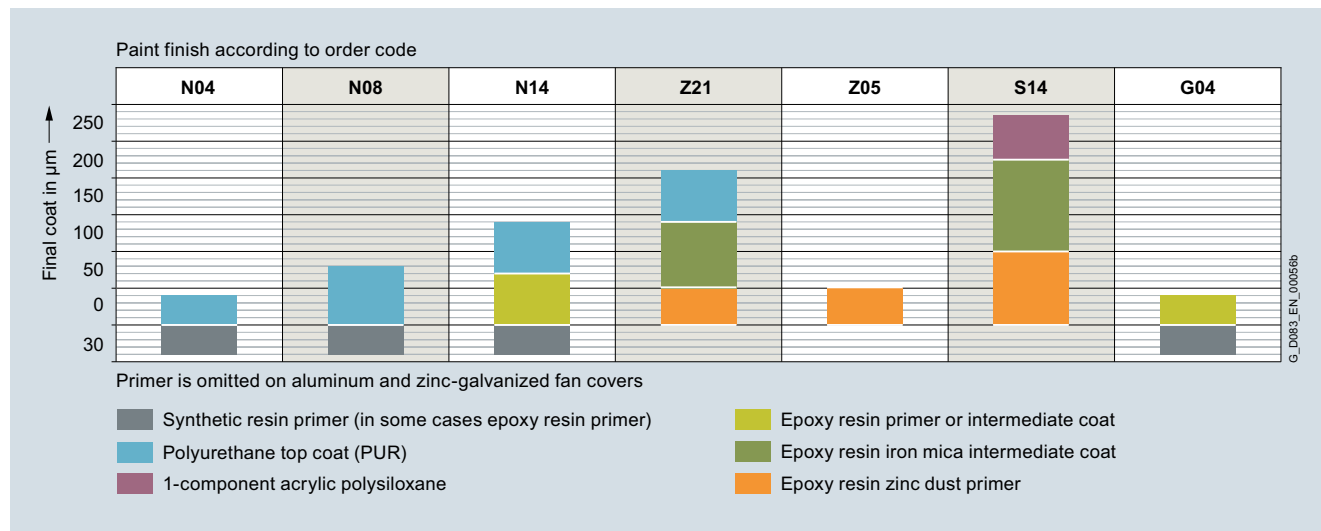
2) Color non-compliant with RAL.

Order code **W10** can be used to order an internal coating in the color RAL 7032 (pebble gray). This internal coating is included in the case of paint systems N14 (not N14A), Z21, Z05 and S14. The maximum corrosiveness category of this paint finish is C3_{high}.

3) Colors with poor coverage, e.g. white or yellow, are not implemented in N04, but instead with a greater layer thickness (e.g. N08).

Overview (continued)

Paint system



Max. corrosiveness category/expected protection lifetime in accordance with EN ISO 12944

Examples of the corrosiveness categories based on ambient conditions, in accordance with EN ISO 12944-2: 1998-07

Corrosiveness category	Ambient condition	Requirement	Examples of typical ambient conditions in a temperate climate (for information only)
C2	Low	External	Atmospheres with little pollution. Mostly rural areas.
		Internal	Unheated buildings where condensation may occur, e.g. warehouses, sports facilities
C3	Moderate	External	Urban and industrial atmospheres with moderate sulfur dioxide loads. Coastal areas with low salinity.
		Internal	Production areas with high humidity and some air pollution, e.g. food production areas, laundries, breweries and dairies.
C4	Severe	External	Industrial areas and coastal areas with moderate salinity.
		Internal	Chemical plants, swimming pools and bathhouses above seawater.
C5-I	Very heavy industry	External	Industrial areas with high humidity and aggressive atmosphere.
		Internal	Buildings or areas with almost constant condensation and severe contamination.
C5-M	Very heavy Sea	External	Coastal and offshore areas with high salinity.
		Internal	Buildings or areas with almost constant condensation and severe contamination.

Time intervals for the protection lifetime in accordance with EN ISO 12944-5: 2008-01

Expected protection lifetime	Time range	Comments
Low (L)	2 ... 5 years;	The protection lifetime depends on various parameters, such as: substrate pretreatment, type and application of the coating system, loading, ... The protection lifetime is no "warranty period". The protection lifetime is a technical term that can help the customer to specify a maintenance program. EN ISO 12944-5, item 5.5 must always be consulted for all questions concerning the protection lifetime.
Medium (M)	5 ... 15 years;	
High (H)	... 15 years;	

Introduction

General technical specifications

Packaging, safety notes, documentation and test certificates

1

Overview

Packing weights

For 1PS0, 1PS1, 1PS4, 1PS5, 1MD5 motors

Frame size	For land transport			Air freight			Sea freight		
	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg
71	Box	5 ¹⁾	5 ¹⁾	Box	5 ¹⁾	5 ¹⁾	Box	5 ¹⁾	5 ¹⁾
80		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾
90		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾
100		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾
112		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾		5 ¹⁾	5 ¹⁾
132	Crate	8 ²⁾	8 ²⁾	Crate	9 ²⁾	9 ²⁾	Plywood crate	35 ³⁾	45 ³⁾
160		8 ²⁾	8 ²⁾		9 ²⁾	9 ²⁾		40 ³⁾	50 ³⁾
180		10 ²⁾	10 ²⁾		11 ²⁾	11 ²⁾		45 ³⁾	60 ³⁾
200	Planks	5 ²⁾	8 ²⁾	Planks	5 ²⁾	8 ²⁾		60 ³⁾	60 ³⁾
225		6 ²⁾	9 ²⁾		6 ²⁾	9 ²⁾		65 ³⁾	65 ³⁾
250		7 ²⁾	10 ²⁾		7 ²⁾	10 ²⁾		70 ³⁾	80 ³⁾
280		8 ²⁾	11 ²⁾		8 ²⁾	11 ²⁾		80 ³⁾	95 ³⁾
315		15 ²⁾	30 ³⁾		15 ²⁾	30 ³⁾	Wooden crate	O. R. ³⁾	O. R. ³⁾
355		35 ³⁾	40 ³⁾		35 ³⁾	40 ³⁾		O. R. ³⁾	O. R. ³⁾
400		50 ³⁾	60 ³⁾		50 ³⁾	60 ³⁾		O. R. ³⁾	O. R. ³⁾
450		70 ³⁾	80 ³⁾		70 ³⁾	80 ³⁾		O. R. ³⁾	O. R. ³⁾
500		80 ³⁾	90 ³⁾		80 ³⁾	90 ³⁾		O. R. ³⁾	O. R. ³⁾

The packing weights for standard motors are not binding. Weights may vary for special versions and components specially built onto the motor.

Special packaging materials are possible on request, e.g. wooden crates for outdoor or long-term storage or wood with certificate for China, or with Sirex certificate.

Packaging for air and sea freight is implemented according to IPPS guidelines.

Pallets for Germany are EURO pallets.

Pallets for export are non-returnable pallets.

¹⁾ On pallet (more than one motor is possible on one pallet).

²⁾ Attached to pallet (more than one motor is possible on one pallet).

³⁾ Packaging can be transported with forklift trucks, in plywood crate for sea freight several motors may be possible per packing unit.

Overview

Quality assurance

Orders for electrical machines are processed throughout, from the quotation through to delivery, on the basis of a recognized quality assurance system that fulfills the requirements of the following quality standards:

- EN ISO 9001
- EN 29001

SIEMENS Ruhstorf is certified in accordance with Directive 94/9/EC:
PTB 01 ATEX Q009-5

For this certificate, an application for an extension of 3 years is submitted before the validity of the current certificate expires.

CE marking

The motors bear the CE mark in accordance with the following guidelines:

- Directive 2014/35/EU Low Voltage Directive (supersedes 2006/95/EC)
- Directive 94/9/EC

Applicable standards and specifications

The motors comply with the appropriate standards and regulations, especially those listed in the table below.

Title	EN	IEC
Rotating electrical machines – Rating and performance	EN 60034-1	IEC 60034-1 IEC 60085
Rotating electrical machines – Standard methods for determining losses and efficiency from tests	EN 60034-2-1	IEC 60034-2-1
Rotating electrical machines – Degrees of protection provided by integral design of rotating electrical machines (IP code)	EN 60034-5	IEC 60034-5
Rotating electrical machines – Methods of cooling (IC code)	EN 60034-6	IEC 60034-6
Rotating electrical machines – Classification of types of construction, mounting arrangements and terminal box position (IM code)	EN 60034-7	IEC 60034-7
Rotating electrical machines – Terminal markings and direction of rotation	EN 60034-8	IEC 60034-8
Rotating electrical machines – Noise limits	EN 60034-9	IEC 60034-9
Acoustics: Test code for the measurement of airborne noise emitted by rotating electrical machines	EN ISO 1680	–
Thermal protection	–	IEC 60034-11
Starting performance of single-speed three-phase cage induction motors	EN 60034-12	IEC 60034-12
Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibrations severity	EN 60034-14	IEC 60034-14
CENELEC standard voltages	–	IEC 60038
General purpose three-phase induction motors having standard dimensions and outputs – Frame numbers 56 to 315 and flange numbers 65 to 740	EN 50347	IEC 60072-1 ¹⁾
Center holes with thread	EN 332	–
Drive type fastenings without taper action; parallel keys, keyways, deep pattern	EN 6885-1	–
Rotating electrical machines – Partial discharge free electrical insulation system (Type I)	–	IEC 60037-18-41
In addition, the following applies to Ex motors:		
Hazardous areas – Electrical installations design, selection and erection	EN 60079-14	IEC 60079-14
Explosive atmospheres – Equipment protection by type of protection "n"	EN 60079-15	IEC 60079-15
Explosive atmospheres – Equipment protection by explosion-proof enclosures "d"	EN 60079-1	IEC 60079-1
Explosive atmospheres – Equipment dust ignition protection by enclosure "t"	EN 60079-31	IEC 60079-31
Explosive atmospheres – Equipment – General requirements	EN 60079-0	IEC 60079-0
Explosive atmospheres – Equipment protection by increased safety "e"	EN 60079-7	IEC 60079-7
Explosive atmospheres – Equipment protection by intrinsic safety "i"	EN 60079-11	IEC 60079-11

¹⁾ IEC 60072-1 specifies dimensions only, there is no assignment of outputs.
More than one motor is possible per packing unit.

Introduction

General technical specifications

Designs in accordance with standards and specifications

Overview (continued)

The following applies to explosion-proof motors:

Since the requirements of explosion-proof motors comply with the European standards EN 60079-0, EN 60079-15, EN 60079-31 and Directive 2014/34/EU (ATEX 95), the certificates issued by authorized testing agencies (PTB, DEKRA EXAM, etc.) are accepted by all member states of the EU. The remaining members of CENELEC, Switzerland in particular, also accept the certificates.

Certifications

Product certifications are to be differentiated in terms of safety-related certificates and efficiency certificates. Since 2011, it has been obligatory for low-voltage motors with power ratings in the range of 0.75 to 375 kW (2-, 4- and 6-pole) to be classified in accordance with the IEC 60034-30-1 efficiency standard and to be marked with the corresponding IE code (International Efficiency IE1, IE2 or IE3). The efficiency is determined using the summed losses method in accordance with IEC 60034-2-1.

Energy-saving motors for the European Economic Area in accordance with EU Directive 640/2009

Since June 2011, all low-voltage motors that fall within the scope of the EU directive must fulfill the specifications of international efficiency class IE2.

- Line voltage ≤ 1000 V
- Line frequency 50 or 50/60 Hz
- Power range 0.75 to 375 kW
- Pole number 2-, 4- and 6-pole
- Continuous duty S1

Since January 2015, the efficiency requirements for motors within the 7.5 to 375 kW range have increased to IE3, otherwise IE2 motors must be converter-fed.

This will also apply from January 2017 for 0.75 to < 7.5 kW motors.

Overview

In the standard version, the motor is designed without motor protection. The order variants for motor protection are coded by means of the selected options.

A distinction is made between current-dependent and motor temperature-dependent protection devices.

Current dependent protection devices

Fuses are only used to protect line cables in the event of a short-circuit. They are not suitable for overload protection of the motor.

The motors are usually protected by thermally delayed overload protection devices (circuit breakers for motor protection or overload relays). This protection is current-dependent and is particularly effective in the case of a locked rotor.

For standard duty with short start-up times and starting currents not too excessive and for low numbers of switching operations, motor protection switches provide adequate protection.

Motor protection switches are not suitable for heavy starting duty or large numbers of switching operations. Differences in the thermal time constants for the protection equipment and the motor result in unnecessary early tripping when the protection switch is set to rated current.

Motor temperature dependent protection devices

Temperature detectors installed in the motor winding are suitable protection devices in the case of slowly rising motor temperature.

The most comprehensive protection against thermal overloading of the motor is provided by PTC thermistors (thermistor motor protection) installed in the motor winding. The temperature of the winding can be accurately monitored thanks to its low heating capacity and the excellent heat contact with the winding. When a limit temperature is reached (rated tripping temperature), the PTC thermistors undergo a step change in resistance. This is evaluated by a tripping unit and can be used to open auxiliary circuits. The PTC thermistors themselves cannot be subjected to high currents and voltages. This would result in destruction of the semiconductor. The switching hysteresis of the PTC thermistor and tripping unit is low, which supports fast restarting of the drive. Motors with this type of protection are recommended for heavy duty starting, switching duty, extreme changes in load, high ambient temperatures or fluctuating supply systems.

Option A11

Motor protection through PTC thermistors with 3 embedded temperature sensors for tripping. In the terminal box, 2 auxiliary terminals are required.

Two sets of three temperature sensors are used if a warning is required before the motor is shut down (tripped). The warning is normally set to 10 K below the tripping temperature.

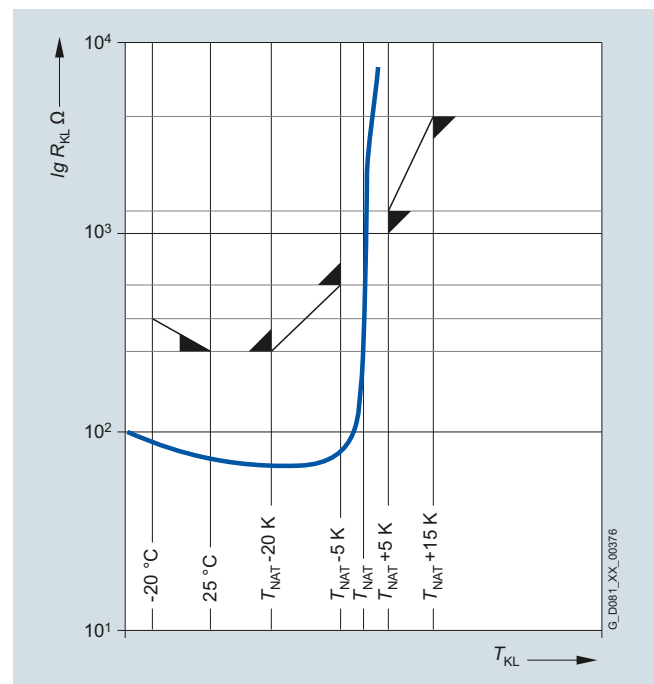
Option A12

Motor protection with PTC thermistors with 6 embedded temperature sensors for warning and tripping. In the terminal box, 4 auxiliary terminals are required.

In order to achieve full thermal protection it is necessary to combine a thermally delayed overcurrent release and a PTC thermistor. For full motor protection implemented only with PTC thermistors, please inquire.

Motor temperature detection with converter operation**PTC sensor**

The PTC thermistor is a temperature-dependent component. In the region of the rated response temperature, the resistance of the PTC increases very steeply.



PTC sensor characteristic

Option A15 or A16

For motors designed with explosion protection, the PTC sensors must be tested in the installed state for correct operation (TMS tests). For this test, the stator winding is heated to the tripping temperature. The option of a PTC sensor including TMS test can be ordered using Option **A15** (3 PTCs for tripping) and **A16** (6 PTCs for prewarning/tripping).

Introduction

General technical specifications

Voltages, currents and frequencies

Overview

Standard voltages and tolerances

The motors listed in this catalog are supplied with a fixed voltage (e.g. 400 V). The tolerance band for rated voltage is $\pm 10\%$. This tolerance is in compliance with the standard and is not stamped on the rating plate. The tolerance band for frequency is $\pm 2\%$.

The motors of the LOHER CHEMSTAR and LOHER VARIO series can be designed without explosion protection and for Ex zones with a non-standard winding for almost any frequency and any required line voltage up to 1000 V. The operating data listed in the power tables applies to the rated voltages specified with tolerance bands according to EN 60034-1.

EN 60034-1 differentiates between Category A (sum of voltage deviation and frequency deviation $\pm 5\%$) and Category B (sum of voltage deviation and frequency deviation $\pm 10\%$) for voltage and frequency fluctuations.

The motors can supply their rated torque in both Category A and Category B.

Tolerance range A (voltage $\pm 5\%$):

Motor must be functionally stable in continuous duty. The temperature rise is permitted to be 10 K higher than the limit value.

Tolerance range B (voltage $\pm 10\%$):

The motor must be functionally stable and is permitted to exhibit wide variations in characteristic data; operation over long periods close to the limits of Category B is not recommended.

Standard	Range	Range
EN 60034-1	A	B
Voltage deviation	$\pm 5\%$	$\pm 10\%$
Frequency deviation	$\pm 2\%$	+3 %/-5 %
Rating plate data stamped with rated voltage a (e.g. 230 V)	a $\pm 5\%$ (z. B. 230 V $\pm 5\%$)	a $\pm 10\%$ (z. B. 230 V $\pm 10\%$)

Rated current

In some power tables, the rated currents are only specified at a rated voltage of 400 V. At other voltages, the rated currents vary in accordance with the inverse of the voltage:

$$\frac{U}{U'} = \frac{I'}{I}$$

This means:

$$I' = \frac{U \cdot I}{U'}$$

Example:

According to the power table, the pole-changing motor ANGA-180MB-42 has a rated current of 31/37 A at 400 V. The rated current at 230 V is therefore:

$$I' = \frac{400 \cdot 31 \text{ or } 37}{230} = 54/64 \text{ A}$$

Tolerances for electrical values in the power tables

The following tolerances apply to the electrical values listed in the power tables according to EN 60034-1:

Efficiency	$\leq 150 \text{ kW}$: $-0.15 (1 - \eta)$ $> 150 \text{ kW}$: $-0.1 (1 - \eta)$
Power factor	$-\frac{1 - \cos \varphi}{6}$ (minimum 0.02, maximum 0.07)
Tightening torque	-15 % und +25 %
Breakdown torque	-10 %
Locked-rotor current	+20 % (no lower limit)
Slip at rated load and operating temperature	$\geq 1 \text{ kW}$ $\pm 20\%$ of the guaranteed slip $< 1 \text{ kW}$ $\pm 30\%$ of the guaranteed slip

Overview

The power ratings specified in the power tables are valid for duty type S1 (continuous duty at constant load) in accordance with EN 60034-1. For duty types S4, S5, S7 and S8 in addition to the values for cyclic duration factor and switching frequency, the moment of inertia of the motor (J_M) and driven machine (J_{ext}) must also be stamped. All moments of inertia must be referred to the motor speed.

EN 60034-1 categorizes the groups of duty types as follows:

1. Duty types in which starting and electrical braking do not affect the overtemperature of the stator winding of the motor:
 - S2: Short-time duty
Operating times of 10, 30, 60, and 90 minutes are recommended. After each period of duty the motor remains at zero current until the winding has cooled down to the coolant temperature.
 - S3: Intermittent duty without the influence of starting on the temperature.
Unless specified otherwise, the duty cycle time is 10 minutes. Values of 15, 25, 40 and 60 % are recommended for the cyclic duration factor.
 - S6: Continuous duty with intermittent load.
Unless specified otherwise, the duty cycle time is also 10 minutes. Values of 15, 25, 40 and 60 % are recommended for the cyclic duration factor.
2. Duty types in which starting and braking have a corresponding effect on the overtemperature of the stator winding and the rotor cage:
 - S4: Intermittent duty with the influence of starting on the temperature – switching cycles per hour (c/h) refers to starting cycles.
 - S5: Intermittent duty with the influence of starting and braking on the temperature – switching cycles per hour (c/h) refers to starting and braking cycles.
 - S7: Continuous duty with starting and braking – the load during the operating period must be known.
 - S8: Continuous duty with pole changing – the load during the operating period must be known.
 - S9: Continuous duty with non-periodic load and speed changes (converter operation).
 - S14: Duty with discrete constant loads.

Most of the intermittent operating conditions occurring in practice are a combination of the duty types listed under 1. and 2. All of the operating conditions must be known in order to precisely determine a suitable motor.

Introduction

General technical specifications

1

Rating plate and extra rating plates

Overview

Due to IE changeover, the affected motors will be equipped with new rating plates complete with modified technical specifications. There is no requirement to specify a voltage range. Only the rated voltages are specified. Unless specified otherwise, a voltage tolerance of up to ±10 % acc. to EN 60034-1. Range B applies.

Note: The transition phase for harmonization of line voltages with increased tolerance within the EU expired on January 1, 2008. Since then the admissible line tolerances are 230/400 V ±10 %, 50 Hz and 400/690 V ±10 %, 50 Hz. In general, the country of manufacture only is specified. The designation "D-94099 Ruhstorf" is omitted with the exception of explosion-proof motors.

New, according to EuP:

- Efficiency classes IE1, IE2, IE3 according to IEC 60034-30-1
- Specification of the nominal efficiencies according to IEC 60034-30-1:2014 and the rated current with the rating plate values or list values of power factor and efficiency (IEC 60034-30-1:2014 does not include any details regarding current)
- No separate specification of the rated voltage range

SIEMENS

LOHER DNGW-250MM-04A 1MD5253-1BD60-48A1-Z
 3-MOT. NO. LDX/3417569 520kg IM B3 IP55
 400/690Δ/Y V 101/59A 55kW 1479min⁻¹
 cos 0.84 Th CI 155/130(FB)
 50Hz

Ex de IIC T4 Gb

BVS 11 ATEX E045 X

IE2	η[%]	P[%]
	93.7	100
	94.2	75
	94.0	50

DATE: 20.09.12

Ex II 2 G CE 0 102

EN 60034/EN 60079/IEC 60079

Siemens AG, Hans-Loher-Str.32, DE-94099 Ruhstorf a.d. Rott Made in Germany

Main rating plate: Line operation

Füllung der Lager:
 Filling of the bearings:
 Remplissage des paliers:
 Shell Gadus S3 T 100 2

Extra rating plate: Bearing grease

SIEMENS

Type 9-101A 208.02 2016
 2xM40x1,5 + 1xM20x1,5
 IEEx BVS 09,0057U
 BVS 09 ATEX E 148 U
 0102 Ex II 2G Ex e IIC Gb

Siemens AG, DE-94099 Ruhstorf a.d. Rott Made in Germany

Extra rating plate: Ex marking for terminal box

Ex II 2 D

Ex tb IIC
 T 120 °C Db IP6X

CE 0102

Extra rating plate: Dust Ex protection

For Converter Supply

Mot. No. LDX/12345678 Th.CI.: 155/130(F/B)
 Type of converter PWM

P2	1,1	2,9	5,6	19,3	19,3	29,7	kW
Un	40	80	133	380	380		V Y Δ
	23	46	77	219	219	380	
In	28,5	31,5	34,5	39,0	39,0		A
	49,0	55,0	60,0	68,0	68,0	61,0	
n	129	275	471	1466	2932	2582	min ⁻¹
f	5	10	16,7	50	100	87	Hz
Md	86,3	101,8	115,1	126,0	62,9	110,1	Nm

minimum switching frequency 2,5 kHz

Rating plate: Converter operation

Type DNGW-180LS-04
 Mot. No. LDX/3415871

PTC DIN 44082 - 155
 Protected at
 Sinusoidal supply
 Inverter supply only

Testing
 with rotor U_{test} / U_{rat} 1,00
 without rotor I_{test} / I_{rat} 8,0

f 50 Hz t_A 21 s [20°C]

Extra rating plate: PTC thermistor for sole protection, line or converter operation

Heizung 210-250 V
 Heating
 Chauffage
 Calefacción 50 W
 Scaldiglia

Extra rating plate: Anti-condensation heater

SIEMENS

LOHER DNGW-250MM-04A 1MD5253-1BD60-48A1-Z
 3-MOT. NO. LDX/3417569 520kg IM B3 IP55
 400/690Δ/Y V 101/59A 55kW 1479min⁻¹
 cos 0.84 Th CI 155/130(FB)
 50Hz

Ex de IIC T4 Gb

BVS 11 ATEX E045 X

IE2	η[%]	P[%]
	93.7	100
	94.2	75
	94.0	50

DATE: 20.09.12

Ex II 2 G CE 0 102

EN 60034/EN 60079/IEC 60079

Siemens AG, Hans-Loher-Str.32, DE-94099 Ruhstorf a.d. Rott Made in Germany

- 1 Country of origin
- 2 Rated voltage
- 3 Frequency
- 4 Rated current
- 5 IE efficiency class and standard rated efficiency at 1/2, 3/4 and 4/4 load
- 6 Output
- 7 LOHER type
- 8 Article No.
- 9 Workshop ID/Serial number
- 10 Type of construction

Main rating plate: Line operation with legend

Overview

Efficiency and power factor

The efficiency η and power factor $\cos\phi$ for each rated power are listed in the selection tables in the individual sections of this catalog.

Rated speed and direction of rotation

The rated speeds are applicable for the rated data. The synchronous speed changes proportionally with the line frequency. The motors are suitable for clockwise and counter-clockwise rotation.

If U1, V1, W1 are connected to L1, L2, L3, clockwise rotation results as viewed onto the drive-end shaft extension. Counter-clockwise rotation is achieved by swapping two phases (see also "Heating and ventilation" on Page 1/28).

Rated torque

The rated torque in Nm delivered at the motor shaft is

$$T = \frac{9.55 \cdot P \cdot 1000}{n}$$

P Rated power in kW
 n Speed in rpm

If the voltage deviates from its rated value within the admissible limits, the locked-rotor torque, the pull-up torque and the breakdown torque vary with the approximate square of the value, but the locked-rotor current varies approximately linearly.

In the case of squirrel-cage motors, the locked-rotor torque and breakdown torque are listed in the selection tables as multiples of the rated torque.

Overview

High-grade enameled wires, suitable insulating sheet materials, and the type of impregnation (current UV or vacuum method) form insulation systems for the motor windings that ensure a high level of mechanical and electrical strength as well as good serviceability and a long service life. The insulation system is suitable for rated voltages up to 1000 V. These insulation systems protect the winding to a large degree against the effects of aggressive gases, vapors, dust and oil. They resist the stress of normal climates in accordance with EN 60721-3 and are suitable for use in tropical climates. In the case of a damp alternation climate, which also occurs in various tropical zones, the special version for increased humidity protection is required.

Silicone rubber encapsulation

Silicone rubber encapsulation is recommended in the following cases irrespective of the temperature class of the winding:

- When there is a heightened risk of condensation forming due to the type of drive or application of the motor.
- If deposits of highly conductive dust on the winding heads need to be prevented.

Encapsulation offers particular advantages in combination with temperature classes F and H for the following requirements:

- Motors with high switching frequencies
- Motors for particularly difficult starting and braking conditions
- Motors with increased mechanical short-circuit strength of the winding

Introduction

General technical specifications

Heating and ventilation

Overview

Anti-condensation heater

The motors can be equipped with anti-condensation heaters to protect them against internal condensation. The standard supply voltages are listed in the table below. Other supply voltages are possible on request. Anti-condensation heaters must not be switched on during operation.

Anti-condensation heaters for 1PS1 motors in the type of protection "Non-sparking" are supplied with a self-limiter. The heater output is listed in the adjacent table.

Alternatively, a voltage of between 5 and 10 % of the rated motor voltage can be connected to terminals U1 and V1 (1-phase) which will heat the stator winding sufficiently.

Frame size	Supply voltage V	Heater output per motor	
		1PS0, 1PS4, 1PS5 W	1PS1 W
LOHER CHEMSTAR motors			
71 ... 100	110 ... 120	12	12
112 ... 132	or 210 ... 250	25	24
160 ... 250		50	48
280 ... 315 S/M		100	100
315 L ... 355		200	200
LOHER VARIO motors			
355 ... 400	110 ... 120	250	250
450	or 210 ... 250	280	280
500		350	350

Cooling air flow and admissible back pressure

Frame size	3000 rpm		1500 rpm		1000 rpm		750 rpm	
	Cooling air flow m ³ /s	Admissible back pressure Pa	Cooling air flow m ³ /s	Admissible back pressure Pa	Cooling air flow m ³ /s	Admissible back pressure Pa	Cooling air flow m ³ /s	Admissible back pressure Pa
LOHER CHEMSTAR motors								
71	0.03	1						
80	0.04	2	0.02	1				
90	0.06	40	0.03	10	0.02	6		
100	0.08	50	0.04	12	0.03	8		
112	0.10	50	0.05	12	0.03	8	0.02	
132	0.15	70	0.1	18	0.07	10	0.05	5
160	0.25	90	0.15	30	0.1	15	0.08	8
180	0.35	100	0.2	40	0.15	20	0.1	10
200	0.4	120	0.3	50	0.2	25	0.15	12
225	0.5	120	0.45	50	0.3	30	0.23	15
250	0.6	140	0.55	60	0.33	35	0.28	20
280	0.8	160	0.7	80	0.45	45	0.33	25
315	1.0	160	0.9	80	0.6	45	0.45	25
355	1.5	160	1.5	80	1.0	45	0.8	25
LOHER VARIO motors								
400	1.8	200	1.8	100	1.4	60	1.1	30
450	2.2	200	2	150	1.8	80	1.4	40
500	2.9	200	3	150	2.5	100	2.4	50

If motors are equipped with forced ventilation, pipes for infeed or extraction of air, silencers, or similar, the values listed above must be complied with depending on frame size. They must also be used to calculate the static back pressure of piping.

The values for static back pressure in Pa (1 Pascal = 0.102 mm WS) are maximum values that must not be exceeded on self-ventilation and with the specified cooling air flow in pipes, silencers, or similar.













Overview

Degrees of protection of rotating electrical machines according to EN 60034-7

The most common types of construction are shown in the table. It can be seen from the option lists for which frame size range the individual types of construction are supplied. Other types of construction are available on request. The type of construction is specified on the rating plate in accordance with Code I, EN 60034-7, according to the type of construction ordered and also appears as code letters in the type designation. This is not the case with motor versions whose type of construction has not been standardized according to Code I. In such cases, the type of construction is specified in accordance with Code II. Standard motors, that is frame sizes 90 to 315 M, that are ordered in the basic (universal) types of construction IM B3, IM B5 or IM B14, can also be operated in other mounting positions as follows:

IM B3 in IM B6, IM B7, IM B8, IM V5 or IM V6,
IM B5 in IM V1 or IM V3,
IM B14 in IM V18 or IM V19.

For motors up to frame size 180 (standard version without condensation drain), this applies without constraints. With frame size 200 and above, it is important that the motors are installed with the condensation drainage holes at the lowest point. The line connection of the motors is suitable for all types of construction due to the ability to rotate the terminal box by 90°. The motors in the version "without explosion protection" for vertical installation with the shaft extension pointing downwards are supplied without a protective cover over the fan cover, unless specified otherwise.












Type of construction Acc. to EN 60034-7	Bearings		Motor type	Type of construction code, 12th position of the Article No.	Additional identification code with order code
Horizontal installation with bearing plates					
Without flange					
IM B3/IM 1001	2 bearing plates		A	0	
IM B6/IM 1051	2 bearing plates		B	9	+M1A
IM B7/IM 1061	2 bearing plates		B	9	+M1B
IM B8/IM 1071	2 bearing plates		B	9	+M1C
IM B15/IM 1201	1 bearing plate – IM B3 no bearing plate (also no roller bearing) at DE		J	9	+M2K or +M2L
IM B20/IM 1101	2 bearing plates		L	9	+M1Q
With flange					
IM B35/IM 2001	2 bearing plates		D	6	
IM B34/IM 2101	2 bearing plates		F	2	
IM B5/IM 3001	2 bearing plates		C	1	
IM B9/IM 9101	1 bearing plate – as for IM B5 or IM B14, but no bearing plate and no roller bearing at DE		G	9	
IM B14/IM 3601	2 bearing plates		E	3	
Special type of construction					
–/IM 5210 without shaft, rotor sits on external shaft	Without bearing		Y	9	

Introduction

General technical specifications

Types of construction

Overview (continued)

Type of construction Acc. to EN 60034-7	Bearings		Motor type	Type of construction code, 12th position of the Article No.	Additional identification code with order code
Vertical installation with bearing plates					
Without flange					
IM V5/IM 1011	2 bearing plates		<i>R</i>	9	+M1D or +M1F
IM V6/IM 1031	2 bearing plates		<i>R</i>	9	M1E
With flange					
IM V1/IM 3011	2 bearing plates		<i>T</i>	8 or 4	
IM V15/IM 2011	2 bearing plates		<i>T</i>	9	+M2K or +M2L
IM V2/IM 3231	2 bearing plates		<i>N</i>	9	
IM V3/IM 3031	2 bearing plates		<i>P</i>	9	+M1G
IM V36/IM 2031	2 bearing plates		<i>U</i>	9	+M1J
IM V8/IM 9111 type of construction IM V 1 or IM V 18	1 bearing plate – IM V1 or IM V18 without bearing plate and without roller bearing at DE		<i>G</i>	9	+M1L or +M1M
IM V9/IM 9131 type of construction IM V 3 or IM V 19	1 bearing plate – IM V3 or IM V19 without bearing plate and without roller bearing at DE		<i>Z</i>	9	
IM V18/IM 3611	2 bearing plates		<i>S</i>	9	+M2M or +M2N
IM V19/IM 3631	2 bearing plates		<i>S</i>	9	

Flange designations

In accordance with EN 50347 or IEC 60072-1, the mounting flanges are designated according to the nominal dimension of the hole diameter. Their assignment to frame sizes can be obtained from the dimensional drawings.

Flange with through holes, e.g. IM B5 EN 50347:
FF100, FF115, FF130, FF165, FF215, FF265, FF300, FF350,
FF400, FF500, FF600, FF740

Flange with tapped holes, e.g. IM B14 EN 50347:
FT65, FT75, FT85, FT100, FT115, FT130, FT165

Overview

The terminal box enclosures are made of cast-iron and designed to IP55 degree of protection (to IP56 in the case of LOHER VARIO) in accordance with EN 60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction. The terminal boxes for explosion-proof motors correspond to the respective standards.



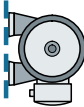
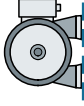
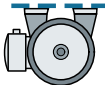
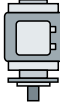


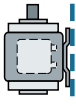
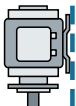
Explosion-proof motors are equipped as standard with terminal boxes in type of protection "Ex e" in accordance with EN 60079-0 and EN 60079-7. For motors in type of protection "Non-sparking", the terminal boxes are stamped with "Ex nA" in accordance with EN 60079-15. The "Ex nA" terminal box design is identical to that for "Ex e."

The position of the terminal box and cable entries can be obtained from the table below. The terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides. For motors in type of protection "explosion-proof enclosure," subsequent rotation of the terminal box for frame sizes 71 and 80 is only permitted to be performed in an authorized specialist workshop.

Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor.

Position of the terminal box

Assignment of terminal box position and cable entry to type of construction

Types of construction	Terminal box position
IM B3/IM B5, IM B3/IM B14 – terminal box on top	
IM B3/IM B5, IM B3/IM B14 – terminal box on side	
IM B6 ¹⁾	
IM B7 ¹⁾	
IM B8 ¹⁾	
IM V1, IM V18	
IM V3, IM V19	
IM V5 ¹⁾	
IM V6 ¹⁾	
IM V15, IM V17 ¹⁾	

¹⁾ For terminal box position on top, the design is as for IM B3/IM B5, IM B3/IM B14 – terminal box on top.

Introduction

General technical specifications

Degrees of protection and mechanical design

Overview

Degrees of protection acc. to EN 60034-5

Degree of protection	Scope of protection	Protection against water (2nd digit)
IP54	Shock hazard protection and protection against the ingress of foreign bodies (1st digit)	Protection against water (2nd digit)
IP55	Total protection against touching of live parts and against getting near such parts as well as touching of moving parts inside the enclosure.	Water sprayed from all directions onto the machine must not have a harmful effect.
IP56	Protection against harmful dust deposits: Ingress of dust is not totally prevented, but dust will not penetrate in sufficient quantities for satisfactory operation of the machine to be affected.	A jet of water from a nozzle that is aimed at the machine from all directions does not have a harmful effect.
IP65	Total protection against touching of live parts and against getting near such parts as well as touching of moving parts inside the enclosure. Protection against ingress of dust (dust tight).	Water due to heavy seas, or water in a powerful jet, will not penetrate the enclosure in any quantities that may cause damage.
		A jet of water from a nozzle that is aimed at the machine from all directions does not have a harmful effect.

All motors in the standard version correspond to **IP55 degree of protection**. Other degrees of protection are available as an option.

For all types of construction with the shaft extension pointing downwards, a suitable cover that prevents small parts from falling into the fan cover is essential. Exceptions to this rule are cases in which the motor is mounted such that the machine performs the function of the cover. This type of cover must, however, not adversely affect the cooling air flow. Motors that are installed outdoors must be protected against intensive exposure to the sun.

Motors to IP67 degree of protection

Special motor versions can be supplied for installation in plants which can be flooded occasionally, such as pumping stations. They are suitable for temporary submersion at standstill for up to 72 hours in a maximum depth of water of 8 m. During the entire period of submersion, the motor must not be in operation. To ensure that the built-in fan of the motor or the forced ventilation is not destroyed, the motor must be switched off before the water level reaches the fan.

Special measures, such as special sealing around the shaft and static joints in accordance with IP67 ensure that no water can enter the motor for the duration of submersion. After connecting the motor, the terminal box must be tightly sealed using the supplied casting resin in accordance with the installation instructions supplied with the motor.

Available types in IP67 degree of protection in frame size 160 and above:

- 1PS0 without explosion protection
- 1PS1 with type of protection Ex nA IIC

The technical specifications of the motors can be obtained from the type descriptions.

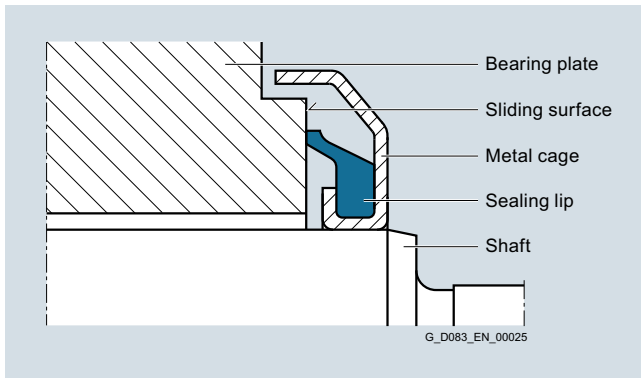
Additional options that are appropriate for IP67 degree of protection:

- PTC thermistor for winding monitoring
- Paint finish N14
- Stainless steel screws
- Anti-condensation heater
- Built-on level switch (not included in the scope of supply of the motor)

Overview (continued)

IP66 shaft seal (optional)

A shaft seal to IP66 is available as an option for motors of the LOHER CHEMSTAR 1PS series. It comprises an axial ring seal (Gammaring 9RB). The sealing lip slides over a carefully prepared metal surface. The contact pressure reduces as the speed increases. This reduces wear. The metal cage in combination with the enclosure forms a labyrinth gap which protects the sealing lip from water jets, dust and mechanical damage. This mechanical design prevents deposits of water in the vicinity of the sealing lip.



The shaft seal is suitable for horizontal and vertical motor types of construction. It is particularly suited to outdoor installations, especially V3.

IP66/65 degree of protection has been verified for the seal by DEKRA EXAM. The shaft seal has been successfully implemented under extreme conditions for 30 years.

LOHER VARIO motors are equipped as standard with a contactless, maintenance-free labyrinth sealing system. Degree of protection up to IP66 can be achieved by means of the special version with integrated seals. This sealing system is certified in accordance with the strict requirements for dust explosion-proof motors (Ex t).

Condensation drainage holes

For motors of frame size 132 and below, condensation drainage holes are not provided due to the minimal empty internal space and consequently minimal build-up of condensation. They will only be implemented in response to a special request. Such a request must be clearly stated when placing an order. Motors of frame size 160 and above feature condensation drainage holes as standard.

The location of the condensation drainage holes depends on the type of construction. They are located at the lowest point of the bearing plates. If the drainage holes are not at the lowest point following installation and commissioning of the motor, new holes must be drilled accordingly and the existing holes must be sealed with plugs. For IP55 and IP56 degrees of protection, the condensation drainage holes are sealed. For motors of the 1PS0 type series, the condensation drainage holes are sealed with a plug that is compliant with the degree of protection and which ensures condensation drainage. For motors of the 1PS1 type series, condensation drainage holes are tightly sealed with a bolt. The drilled hole must be opened regularly to allow the accumulated condensation water to drain away.

For the 1PS4, 1PS5 and 1MD5 motor series, condensation drainage holes cannot be implemented, as this would not comply with the type of protection "Explosion-proof enclosure".

In the case of vertical types of construction, the hole in the top bearing plate is sealed with a plug.

Introduction

General technical specifications

Bearings

Overview

The motors are equipped with deep groove ball bearings at the drive end (DE) and the non-drive end (NDE). For special versions with reinforced bearings, a cylindrical roller bearing is fitted at the DE in some cases.

To fix the rotor in the axial direction, a bearing must be designed as a so-called located bearing. To prevent expansion of the shaft in a warm motor in the direction of the driven machine, the located bearing is installed at the drive end. This does not apply to motors with reinforced bearings (roller bearings).

In accordance with the type of construction, the located bearing must be mounted on the NDE fan end. In LOHER VARIO motors of the 1PS0 and 1PS1 type series for vertical installation, the located bearing is also mounted at NDE.

The assignment and designation of bearings are shown in the tables under the heading "Selection of roller bearings."

Bearing shipping brace

Cylindrical roller bearings are sensitive to shock at standstill. This can occur during transportation, or it can be caused after installation by adjacent machines. This results in longitudinal grooves on the inner ring of the roller bearing. To prevent this, all motors with roller bearings are equipped with a special shipping brace. The rotor shaft is totally blocked by tightening several hexagon bolts. This prevents vibration on the moving surface of the bearing from being transferred.

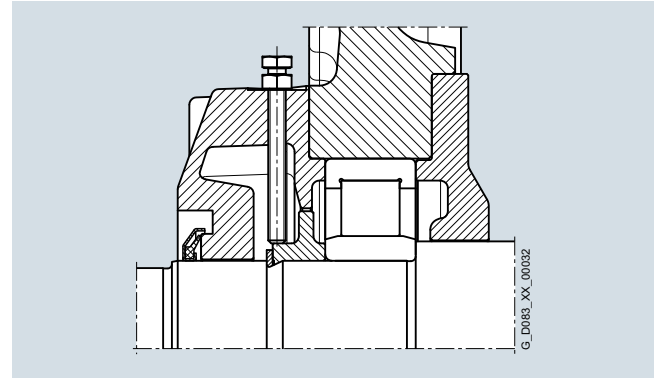
Standard bearings

Selection of roller bearings

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
LOHER CHEMSTAR 1PS0 and 1PS1 motors					
90	All	6205-2Z C3	6205-2Z C3	6205-2Z C3	6205-2Z C3
100	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
112	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
132	All	6308-2Z C3	6308-2Z C3	6308-2Z C3	6308-2Z C3
160	All	6310-2Z C3	6310-2Z C3	6310-2Z C3	6310-2Z C3
180	All	6311-Z C3	6311-Z C3	6311-Z C3	6311-Z C3
200	All	6312-Z C3	6312-Z C3	6312-Z C3	6312-Z C3
225	All	6313-Z C3	6313-Z C3	6313-Z C3	6313-Z C3
250	All	6314-Z C3	6314-Z C3	6314-Z C3	6314-Z C3
280	2	6314-Z C3	6314-Z C3	6314-Z C3	6314-Z C3
280	≥ 4	6316-Z C3	6316-Z C3	6316-Z C3	6316-Z C3
315	2	6316 C3	6316 C3 ¹⁾	6316 C3	6316 C3
315	≥ 4	6219 C3	6219 C3	6219 C3	6219 C3
355	2	6316 C3	6316 C3 ¹⁾	6316 C3	6316 C3
355	≥ 4	6320 C3	6320 C3	6320 C3	6320 C3
LOHER VARIO 1PS0 and 1PS1 motors					
355	2	6316 C3	6316 C3	6316 C3	7316 B ¹⁾
355	≥ 4	6320 C3	6320 C3	6320 C3	7320 B
400	2	6317 C3	6317 C3 ¹⁾	6317 C3	7317 B ¹⁾
400	≥ 4	6322 C3	6322 C3	6322 C3	7322 B
450	2	6318 C3 ¹⁾	²⁾	6318 C3 ¹⁾	²⁾
450	≥ 4	6324 C3	6324 C3	6324 C3	7324 B
500	2	²⁾	²⁾	²⁾	²⁾
500	≥ 4	6326 C3	6326 C3	6326 C3	7326 B

Continued on next page.

During commissioning, the bolts tightened with locknuts must be slackened by several turns and then retightened. This releases the shaft so that it can rotate freely in the bearings.



Example illustration

¹⁾ For 50 Hz operation only, for 60 Hz with C4 bearings.

²⁾ On request, sleeve bearings may be necessary.

Overview (continued)

Selection of roller bearings (continued)

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
LOHER CHEMSTAR 1PS5 and SIMOTICS XP 1MD5 motors					
71	All	6203-2Z	6203-2Z	6203-2Z	6203-2Z
80	All	6204-2Z	6204-2Z	6204-2Z	6204-2Z
90	All	6205-2Z C3	6205-2Z C3	6205-2Z C3	6205-2Z C3
100	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
112	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
132	All	6308-2Z C3	6308-2Z C3	6308-2Z C3	6308-2Z C3
160	All	6310-2Z C3	6310-2Z C3	6310-2Z C3	6310-2Z C3
180	All	6311 C3	6311 C3	6311 C3	6311 C3
200	All	6312 C3	6312 C3	6312 C3	6312 C3
225	All	6313 C3	6313 C3	6313 C3	6313 C3
250	All	6314 C3	6314 C3	6314 C3	6314 C3
280	2	6314 C3	6314 C3	6314 C3	6314 C3
280	≥ 4	6316 C3	6316 C3	6316 C3	6316 C3
315	2	6316 C3	6316 C3 ¹⁾	6316 C3	6316 C3
315	≥ 4	6219 C3	6219 C3	6219 C3	6219 C3
355	2 ²⁾	6316 C3+6320 C3	6316 C3+6320 C3	6316 C3	6316 C3
355	≥ 4	6320 C3+6322 C3	6320 C3+6322 C3	6316 C3+6320 C3	6316 C3+6320 C3
LOHER VARIO 1PS4 and 1PS5 motors					
355	2	6316 C4	6318 C4	6316 C4	6316 C4
355	≥ 4	6320 C3	6320 C3	6320 C3	6320 C3
400	2	6317 C4	6320 C4	6317 C4	6320 C4
400	≥ 4	6322 C3	6322 C3	6322 C3	6322 C3
450	2	NU1022M C3+6022 C3 ¹⁾	7218+6218 C4 ¹⁾	NU1022M C3	NU1022M C3
450	≥ 4	6324 C3	7224+6324 C3	6324 C3	NU1022M
500	2	NU1022M C3+6022 C3 ¹⁾	³⁾	NU1022M C3	³⁾
500	≥ 4	6326M C3	7226+6226 C3	6326M C3	NU1022M

¹⁾ For 50 Hz operation only, for 60 Hz with C4 bearings.²⁾ Only applies for 1PS5.³⁾ On request, sleeve bearings may be necessary.

Introduction

General technical specifications

Bearings

Overview (continued)

Admissible forces on shaft extension

The values apply to the bearings and drive end shaft extensions that are assigned in the following tables based on a calculated service life of $L_{10h} = 20000$ h.

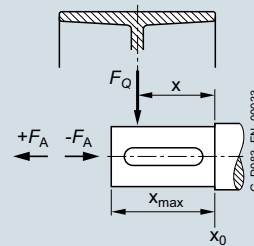
They are applicable for horizontal and vertical shafts.

F_Q = Cantilever force in N

F_A = Axial force in N

x = Distance between point of application of force and shoulder of shaft in mm

l = Length of shaft extension in mm



Admissible cantilever force

Admissible cantilever force F_Q

Valid are: x_0 values for $x = 0$, $x_{0.5}$ values for $x = 0.5 \cdot l$ and x_{max} values for $x = l$ (l = shaft extension)

Frame size	at x_0				at $x_{0.5}$				at x_{max}			
	at speed				at speed				at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors												
90	0.75	0.94	1.08	1.08	0.69	0.87	0.99	0.99	0.64	0.80	0.80	0.80
100	1.40	1.75	2.00	2.00	1.28	1.44	1.33	1.33	1.11	1.08	0.99	0.99
112	1.36	1.73	1.98	1.98	1.25	1.48	1.56	1.56	1.11	1.11	1.17	1.17
132	2.17	2.73	3.11	3.11	1.95	2.46	2.80	2.80	1.78	2.23	2.26	2.26
160	3.46	4.37	4.98	4.98	3.15	3.96	4.87	4.87	2.88	3.24	3.31	3.31
180	4.29	5.36	6.16	6.16	3.92	4.89	5.62	5.62	3.60	4.50	4.68	4.68
200	4.49	5.68	6.49	6.49	4.13	5.22	5.96	5.96	3.81	4.82	5.51	5.51
225	5.14	6.38	7.38	7.38	4.77	5.81	6.72	6.72	4.45	5.33	6.16	6.16
250	5.64	6.98	8.12	8.12	5.13	6.35	7.39	7.39	4.71	5.82	6.67	6.67
280	5.53	8.19	9.59	9.59	5.08	7.53	8.82	8.82	4.70	6.97	8.16	8.16
315 S/M	6.20	6.75	7.59	7.59	5.75	6.19	6.97	6.97	5.36	5.72	6.44	6.44
315 L	5.83	6.01	6.89	6.89	5.48	5.60	6.41	6.60	5.16	5.24	6.00	6.00
355 LB	Values on request				Values on request				Values on request			
LOHER VARIO 1PS0 and 1PS1 motors												
355 ... 500	Values on request				Values on request				Values on request			

Overview (continued)

Admissible cantilever force F_Q Valid are: x_0 values for $x = 0$, $x_{0,5}$ values for $x = 0.5 \cdot l$ and x_{max} values for $x = l$ (l = shaft extension)

Frame size	at x_0				at $x_{0,5}$				at x_{max}			
	at speed				at speed				at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
71	0.52	0.57	0.57	0.57	0.41	0.41	0.41	0.41	0.32	0.32	0.32	0.32
80	0.69	0.86	0.89	0.89	0.59	0.59	0.59	0.59	0.44	0.44	0.44	0.44
90	0.75	0.94	1.08	1.08	0.69	0.87	0.92	0.92	0.64	0.67	0.67	0.67
100	1.40	1.26	1.17	1.17	1.22	0.84	0.78	0.78	0.91	0.63	0.58	0.58
112	1.38	1.73	1.37	1.37	1.25	1.17	0.91	0.91	0.95	0.87	0.68	0.68
132	2.17	2.73	3.04	3.04	1.95	1.88	1.81	1.81	1.39	1.34	1.29	1.29
160	3.46	4.37	4.38	4.38	2.51	2.37	2.34	2.34	1.72	1.61	1.60	1.60
180	4.29	5.36	6.16	6.16	3.92	4.51	3.57	3.57	3.06	3.09	3.12	3.12
200	4.49	5.68	6.49	6.49	4.13	5.21	5.95	5.95	3.81	4.56	4.35	4.35
225	5.14	6.38	7.38	7.38	4.77	5.81	6.72	6.72	4.45	5.33	5.74	5.74
250	5.64	6.98	8.12	8.12	5.13	6.35	7.39	7.39	4.71	5.82	6.77	6.77
280	5.53	8.19	9.59	9.59	5.08	7.53	8.82	8.82	4.70	6.97	8.16	8.16
315 S/M	6.20	6.75	7.59	7.59	5.75	6.16	6.94	6.94	5.36	5.67	6.38	6.38
315 L	6.16	6.01	6.89	6.89	5.79	5.57	6.38	6.38	5.45	5.20	5.95	5.95
355 IM	6.80	15.05	16.30	Value O. R.	6.45	13.95	15.10	Value O. R.	6.15	13.00	14.10	Value O. R.
LOHER VARIO 1PS4 and 1PS5 motors												
355 ... 500	Values on request				Values on request				Values on request			

The specified cantilever forces must not be exceeded to ensure compliance with the maximum admissible shaft flexing in the ignition gap.

Introduction

General technical specifications

Bearings

Overview (continued)

Admissible axial force

In the case of exclusively axial loading, the values in the following tables are admissible. The values apply exclusively to the bearings listed below. The data is based on a fatigue life of $L_{10h} = 20000$ h.

The specified values apply to operation at 50 Hz. For a 60 Hz supply, the values must be reduced by 6 % to achieve the same service life.

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $+F_A$				Shaft extension at top – force acting upwards Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Shaft extension at top – force acting downwards Construction types IM V3, IM V6, IM V14, IM V19, IM V36			
	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors												
90	0.38	0.59	0.75	0.75	0.43	0.64	0.80	0.80	0.85	1.06	1.21	1.21
100	0.97	1.37	1.66	1.66	1.03	1.46	1.77	1.77	1.41	1.78	2.08	2.08
112	0.96	1.36	1.65	1.65	1.04	1.45	1.78	1.78	1.41	1.80	2.08	2.08
132	1.31	1.90	2.34	2.34	1.44	2.06	2.52	2.52	2.21	2.79	3.19	3.19
160	2.07	2.98	3.64	3.64	2.34	3.31	4.04	4.04	3.16	4.04	4.64	4.64
180	2.79	3.89	4.71	4.71	3.20	4.46	5.36	5.36	3.64	4.62	5.40	5.40
200	3.12	4.30	5.15	5.15	3.70	5.05	5.96	5.96	3.47	4.58	5.34	5.34
225	3.44	4.73	5.72	5.72	4.27	5.82	6.97	6.97	3.90	4.93	5.91	5.91
250 ¹⁾	3.25	4.66	5.79	5.79	4.27	6.22	7.26	7.26	4.89	5.98	7.17	7.17
280 ¹⁾	3.18	5.42	6.74	6.74	4.59	7.43	8.46	8.46	4.44	6.53	7.95	7.95
315 S/M	6.09	6.80	7.77	7.77	8.22	9.53	10.56	10.56	1.89	2.14	2.77	2.77
315 L	5.90	6.44	7.40	7.40	9.16	10.77	12.44	12.44	0.95	0.37	0.99	0.99
355 LB	Values on request				Values on request				Values on request			
Axial force $+F_A$												
LOHER VARIO 1PS0 and 1PS1 motors												
355 ... 500	Values on request				Values on request				Values on request			
Frame size	Horizontal shaft				Vertical shaft							
	Axial force $-F_A$				Shaft extension at bottom – force acting upwards Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Shaft extension at bottom – force acting downwards Construction types IM V1, IM V5, IM V10, IM V15, IM V18			
	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	at speed 3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors												
90	0.89	1.10	1.25	1.25	0.93	1.15	1.31	1.31	0.34	0.55	0.70	0.70
100	1.46	1.86	2.15	2.15	1.52	1.95	2.27	2.27	0.92	1.29	1.58	1.58
112	1.46	1.87	2.16	2.16	1.54	1.96	2.28	2.28	0.90	1.30	1.57	1.57
132	2.32	2.92	3.35	3.35	2.45	3.08	3.53	3.53	1.20	1.78	2.18	2.18
160	3.39	4.30	4.96	4.96	3.66	4.63	5.36	5.36	1.84	2.72	3.32	3.32
180	3.93	5.03	5.85	5.85	4.34	5.60	6.50	6.50	2.50	3.48	4.26	4.26
200	3.92	5.10	5.95	5.95	4.50	5.85	6.76	6.76	2.67	3.78	4.54	4.54
225	4.50	5.79	6.78	6.78	5.33	6.88	8.03	8.03	2.84	3.87	4.85	4.85
250 ²⁾	5.65	7.06	8.19	8.19	6.67	8.62	9.66	9.66	2.49	3.58	4.77	4.77
280 ²⁾	5.58	8.02	9.34	9.34	6.99	10.03	11.06	11.06	2.04	3.93	5.35	5.35
315 S/M	3.69	4.40	5.37	5.37	5.82	7.13	8.16	8.16	4.29	4.54	5.17	5.17
315 L	3.50	4.04	5.00	5.00	6.76	8.37	10.04	10.04	3.35	2.77	3.39	3.39
355 LB	Values on request				Values on request				Values on request			
LOHER VARIO 1PS0 and 1PS1 motors												
355 ... 500	Values on request				Values on request				Values on request			

¹⁾ For relubrication, see values for IM V1, IM V5, IM V10, IM V15, IM V18.

²⁾ For relubrication, see values for IM V3, IM V6, IM V14, IM V19, IM V36.

Overview (continued)

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $+F_A$				Shaft extension at top – force acting upwards				Shaft extension at top – force acting downwards			
	Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36			
at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed
3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm
kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
71	0.25	0.39	0.49	0.49	0.28	0.43	0.53	0.53	0.53	0.66	0.76	0.76
80	0.37	0.55	0.69	0.69	0.40	0.59	0.72	0.72	0.67	0.84	0.98	0.98
90	0.38	0.59	0.75	0.75	0.43	0.64	0.80	0.80	0.85	1.06	1.21	1.21
100	0.97	1.37	1.66	1.66	1.03	1.46	1.77	1.77	1.41	1.78	2.08	2.08
112	0.96	1.36	1.65	1.65	1.04	1.45	1.78	1.78	1.41	1.80	2.08	2.08
132	1.31	1.90	2.34	2.34	1.44	2.06	2.52	2.52	2.21	2.79	3.19	3.19
160	2.07	2.98	3.64	3.64	2.34	3.31	4.04	4.04	3.16	4.04	4.64	4.64
180	2.79	3.89	4.71	4.71	3.20	4.46	5.36	5.36	3.64	4.62	5.40	5.40
200	3.12	4.30	5.15	5.15	3.70	5.05	5.96	5.96	3.47	4.58	5.34	5.34
225	3.44	4.73	5.72	5.72	4.27	5.82	6.97	6.97	3.90	4.93	5.91	5.91
250	5.65	7.06	8.19	8.19	6.67	8.62	9.66	9.66	2.49	3.58	4.77	4.77
280	5.58	8.02	9.34	9.34	6.99	10.03	11.06	11.06	2.04	3.93	5.35	5.35
315 S/M	6.09	6.80	7.77	7.77	8.22	9.53	10.56	10.56	1.89	2.14	2.77	2.77
315 L	5.90	6.44	7.40	7.40	9.16	10.77	12.44	12.44	0.95	0.37	0.99	0.99
355 IM	4.80	9.60	10.4	Value O. R.	–	–	–	–	–	–	–	–

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $-F_A$				Shaft extension at bottom – force acting upwards				Shaft extension at bottom – force acting downwards			
	Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18			
at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed	at speed
3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm
kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
71	0.55	0.68	0.79	0.79	0.57	0.72	0.82	0.82	0.24	0.36	0.47	0.47
80	0.69	0.87	1.01	1.01	0.72	0.91	1.04	1.04	0.35	0.53	0.66	0.66
90	0.89	1.10	1.25	1.25	0.93	1.15	1.31	1.31	0.34	0.55	0.70	0.70
100	1.46	1.86	2.15	2.15	1.52	1.95	2.27	2.27	0.92	1.29	1.58	1.58
112	1.46	1.87	2.16	2.16	1.54	1.96	2.28	2.28	0.90	1.30	1.57	1.57
132	2.32	2.92	3.35	3.35	2.45	3.08	3.53	3.53	1.20	1.78	2.18	2.18
160	3.39	4.30	4.96	4.96	3.66	4.63	5.36	5.36	1.84	2.72	3.32	3.32
180	3.93	5.03	5.85	5.85	4.34	5.60	6.50	6.50	2.50	3.48	4.26	4.26
200	3.92	5.10	5.95	5.95	4.50	5.85	6.76	6.76	2.67	3.78	4.54	4.54
225	4.50	5.79	6.78	6.78	5.33	6.88	8.03	8.03	2.84	3.87	4.85	4.85
250	3.25	4.66	5.79	5.79	4.27	6.22	7.26	7.26	4.89	5.98	7.17	7.17
280	3.18	5.42	6.74	6.74	4.59	7.43	8.46	8.46	4.44	6.53	7.95	7.95
315 S/M	3.69	4.40	5.37	5.37	5.82	7.13	8.16	8.16	4.29	4.54	5.17	5.17
315 L	3.50	4.04	5.00	5.00	6.76	8.37	10.04	10.04	3.35	2.77	3.39	3.39
355 IM	2.40	7.20	8.00	Value O. R.	8.40	13.90	17.80	Value O. R.	1.00	5.60	5.80	Value O. R.

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Overview (continued)

Additional axial force with cantilever force on shaft extension

If the shaft extensions are loaded at $x = l$ (l = shaft extension) with the respective admissible cantilever force F_Q , the following additional forces are permitted to occur in the axial direction.

If the admissible cantilever forces are not exploited to the full, higher loads are possible in the axial direction (values on request).

Additional axial force

Frame size	Horizontal shaft				Vertical shaft										
	Axial force $+F_A$				Shaft extension at top – force acting upwards				Shaft extension at top – force acting downwards						
	Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36						
at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm
3000 rpm	kN	kN	kN	kN	3000 rpm	kN	kN	kN	kN	3000 rpm	kN	kN	kN	kN	kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors															
90	0.05	0.17	0.30	0.30	0.10	0.23	0.36	0.36	0.52	0.63	0.76	0.76			
100	0.45	0.94	1.14	1.14	0.41	1.03	1.13	1.13	0.73	1.36	1.46	1.46			
112	0.41	0.78	1.16	1.16	0.49	0.77	1.14	1.14	0.80	1.13	1.21	1.21			
132	0.53	1.08	1.48	1.48	0.52	0.85	1.66	1.66	1.16	1.56	2.18	2.18			
160	1.09	1.93	2.45	2.45	1.40	2.30	2.72	2.72	2.18	2.78	3.16	3.16			
180	1.24	2.01	2.86	2.86	1.64	2.59	3.50	3.50	2.07	2.73	3.54	3.54			
200	1.34	1.84	2.49	2.49	1.81	2.58	3.38	3.38	1.59	2.10	2.66	2.66			
225	1.45	1.99	2.48	2.48	2.17	2.93	3.71	3.71	1.79	2.04	2.65	2.65			
250 ¹⁾	1.02	1.67	2.16	2.16	1.92	3.06	3.43	3.43	2.54	2.82	3.35	3.35			
280 ¹⁾	1.02	2.01	2.58	2.58	2.42	3.81	4.06	4.06	2.15	2.94	3.57	3.57			
315 S/M	3.77	4.08	4.62	4.62	5.61	6.49	6.87	6.87	Values on request						
315 L	3.76	4.10	4.61	4.61	6.70	7.93	9.02	9.02	Values on request						
355 LB	Values on request				Values on request				Values on request						
LOHER VARIO 1PS0 and 1PS1 motors															
355 ... 500	Values on request				Values on request				Values on request						

Additional axial force

Frame size	Horizontal shaft				Vertical shaft										
	Axial force $-F_A$				Shaft extension at bottom – force acting upwards				Shaft extension at bottom – force acting downwards						
	Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18						
at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm	at speed	1500 rpm	1000 rpm	750 rpm
3000 rpm	kN	kN	kN	kN	3000 rpm	kN	kN	kN	kN	3000 rpm	kN	kN	kN	kN	kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors															
90	0.56	0.68	0.80	0.80	0.60	0.74	0.87	0.87	0.02	0.13	0.25	0.25			
100	0.94	1.43	1.64	1.64	0.91	1.53	1.62	1.62	0.23	0.87	0.96	0.96			
112	0.92	1.28	1.67	1.67	0.99	1.27	1.65	1.65	0.30	0.63	0.97	0.97			
132	1.55	2.09	2.50	2.50	1.55	1.87	2.68	2.68	0.14	0.55	1.16	1.16			
160	2.41	3.25	3.77	3.77	2.72	3.62	4.04	4.04	0.86	1.46	1.84	1.84			
180	2.38	3.15	4.00	4.00	2.78	3.73	4.64	4.64	0.93	1.59	2.40	2.40			
200	2.14	3.64	3.29	3.29	2.61	3.38	4.18	4.18	0.79	1.30	1.86	1.86			
225	2.51	3.05	3.54	3.54	3.23	3.99	4.77	4.77	0.73	0.98	1.59	1.59			
250 ²⁾	3.42	4.07	4.56	4.56	4.32	5.46	5.83	5.83	0.14	0.42	0.95	0.95			
280 ²⁾	3.42	4.61	5.18	5.18	4.82	6.41	6.66	6.66	Value O. R.	0.34	0.97	0.97			
315 S/M	1.37	1.68	2.22	2.22	3.21	4.09	4.47	4.47	1.79	1.66	1.80	1.80			
315 L	1.36	1.70	2.21	2.21	4.30	5.53	6.62	6.62	1.01	0.21	0.36	0.36			
355 LB	Values on request				Values on request				Values on request						
LOHER VARIO 1PS0 and 1PS1 motors															
355 ... 500	Values on request				Values on request				Values on request						

¹⁾ For relubrication, see values for IM V1, IM V5, IM V10, IM V15, IM V18.

²⁾ For relubrication, see values for IM V3, IM V6, IM V14, IM V19, IM V36.

Overview (continued)

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $+F_A$				Shaft extension at top – force acting upwards				Shaft extension at top – force acting downwards			
	Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36				Construction types IM V3, IM V6, IM V14, IM V19, IM V36			
	at speed				at speed				at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
71	0.07	0.18	0.27	0.27	0.09	0.22	0.31	0.31	0.34	0.45	0.54	0.54
80	0.10	0.25	0.36	0.36	0.13	0.29	0.40	0.40	0.40	0.54	0.65	0.65
90	0.05	0.17	0.30	0.30	0.10	0.23	0.36	0.36	0.52	0.63	0.76	0.76
100	0.45	0.94	1.25	1.25	0.51	1.03	1.36	1.36	0.89	1.36	1.66	1.66
112	0.41	0.78	1.16	1.16	0.49	0.87	1.28	1.28	0.86	1.22	1.58	1.58
132	0.53	1.08	1.48	1.48	0.66	1.24	1.66	1.66	1.44	1.96	2.34	2.34
160	1.09	1.93	2.45	2.45	1.40	2.30	2.93	2.93	2.18	2.98	3.45	3.45
180	1.24	2.01	2.86	2.86	1.64	2.59	3.50	3.50	2.07	2.73	3.54	3.54
200	1.34	1.84	2.49	2.49	1.81	2.58	3.38	3.38	1.59	2.10	2.66	2.66
225	1.45	1.99	2.48	2.48	2.17	2.93	3.71	3.71	1.79	2.04	2.65	2.65
250	3.42	4.07	4.56	4.56	4.32	5.46	5.83	5.83	0.14	0.42	0.95	0.95
280	3.42	4.61	5.18	5.18	4.82	6.41	6.66	6.66	Value O. R.	0.34	0.97	0.97
315 S/M	3.77	4.08	4.62	4.62	5.61	6.49	6.87	6.87	Values on request			
315 L	3.76	4.10	4.61	4.61	6.70	7.93	9.02	9.02	Values on request			
355	Values on request				Values on request				Values on request			

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $-F_A$				Shaft extension at bottom – force acting upwards				Shaft extension at bottom – force acting downwards			
	Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18				Construction types IM V1, IM V5, IM V10, IM V15, IM V18			
	at speed				at speed				at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
71	0.36	0.47	0.57	0.57	0.38	0.51	0.60	0.60	0.05	0.16	0.25	0.25
80	0.42	0.57	0.68	0.68	0.45	0.60	0.72	0.72	0.08	0.22	0.33	0.33
90	0.56	0.68	0.80	0.80	0.60	0.74	0.87	0.87	0.02	0.13	0.25	0.25
100	0.94	1.43	1.74	1.74	1.00	1.53	1.85	1.85	0.40	0.87	1.17	1.17
112	0.92	1.28	1.67	1.67	0.99	1.38	1.79	1.79	0.35	0.71	1.08	1.08
132	1.55	2.09	2.50	2.50	1.68	2.25	2.68	2.68	0.43	0.95	1.32	1.32
160	2.41	3.25	3.77	3.77	2.72	3.62	4.25	4.25	0.86	1.66	2.13	2.13
180	2.38	3.15	4.00	4.00	2.78	3.73	4.64	4.64	0.93	1.59	2.40	2.40
200	2.14	2.64	3.29	3.29	2.61	3.38	4.18	4.18	0.79	1.30	1.86	1.86
225	2.51	3.05	3.54	3.54	3.23	3.99	4.77	4.77	0.73	0.98	1.59	1.59
250	1.02	1.67	2.16	2.16	1.92	3.06	3.43	3.43	2.54	2.82	3.35	3.35
280	1.02	2.01	2.58	2.58	2.42	3.81	4.06	4.06	2.15	2.94	3.57	3.57
315 S/M	1.37	1.68	2.22	2.22	3.21	4.09	4.47	4.47	1.79	1.66	1.80	1.80
315 L	1.36	1.70	2.21	2.21	4.30	5.53	6.62	6.62	1.01	0.21	0.36	0.36
355	Values on request				Values on request				Values on request			

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Bearings

Overview (continued)

Reinforced bearings

Motors of the 1PS0, 1PS1 1PS5 and 1MD5 type series can be designed with cylindrical roller bearings at DE for higher cantilever forces, e.g. for belt drives. For frame size 160 and above, the motors are equipped with a relubrication device at DE and NDE.

Selection of roller bearings

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
LOHER CHEMSTAR 1PS0 and 1PS1 motors					
160	All	NU310E C3	NU310E C3	6310 C3	6310 C3
180	All	NU311E C3	NU311E C3	6311 C3	6311 C3
200	2	NU312E C3	NU312E C3	6312 C3	6312 C3
200	≥ 4	NU312E	NU312E	6312 C3	6312 C3
225	2	NU313E C3	NU313E C3	6313 C3	6313 C3
225	≥ 4	NU313E	NU313E	6313 C3	6313 C3
250	2	NU314E C3	NU314E C3	6314 C3	6314 C3
250	≥ 4	NU314E	NU314E	6314 C3	6314 C3
280	2	NU314E C3	NU314E C3	6314 C3	6314 C3
280	≥ 4	NU316E	NU316E	6316 C3	6316 C3
315	2	NU316E C3	NU316E C3	6316 C3	6316 C3 ¹⁾
315	≥ 4	NU219E	NU219E	6219 C3	6219 C3
355	2	NU316E C3 ²⁾	NU316E C3 ²⁾	6316 C3	6316 C3 ¹⁾
355	4	NU320E C3	NU320E	6320 C3	6320 C3
355	≥ 6	NU320E	NU320E	6320 C3	6320 C3
LOHER VARIO 1PS0 and 1PS1 motors					
355 ... 500	All	Bearing types on request			
LOHER CHEMSTAR 1PS5 and SIMOTICS XP 1MD5 motors					
160	All	NU310E C3	NU310E C3	6310 C3	6310 C3
180	All	NU311E C3	NU311E C3	6311 C3	6311 C3
200	2	NU312E C3	NU312E C3	6312 C3	6312 C3
200	≥ 4	NU312E	NU312E	6312 C3	6312 C3
225	2	NU313E C3	NU313E C3	6313 C3	6313 C3
225	≥ 4	NU313E	NU313E	6313 C3	6313 C3
250	2	NU314E C3	NU314E C3	6314 C3	6314 C3
250	≥ 4	NU314E	NU314E	6314 C3	6314 C3
280	2	NU314E C3	NU314E C3	6314 C3	6314 C3
280	≥ 4	NU316E	NU316E	6316 C3	6316 C3
315	2	NU316E C3	NU316E C3	6316 C3	6316 C3 ¹⁾
315	≥ 4	NU219E	NU219E	6219 C3	6219 C3
LOHER VARIO 1PS4 and 1PS5 motors					
355	≥ 4	NU322E C3	NU322E C3	6316 C3	6316 C3

For SIMOTICS XP motors, the version with cylindrical roller bearings at DE and relubrication device at DE and NDE is an alternative to the standard version.

The located bearing is at NDE. A relubrication device for DE and NDE is standard.

¹⁾ For operation at 60 Hz, C4 bearing.

²⁾ For operation at 50 Hz only, please inquire regarding operation at 60 Hz.

Overview (continued)Admissible forces on shaft extension

The following values are based on a calculated service life of $L_{10h} = 20000$ h. They are applicable for horizontal and vertical shafts.

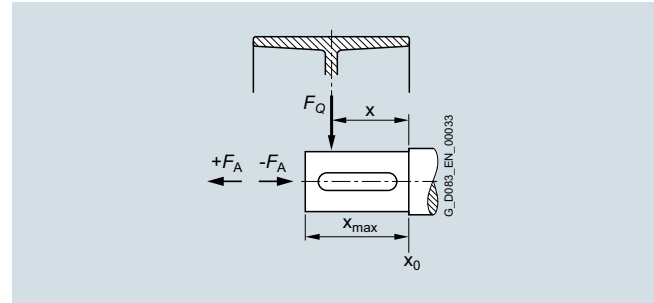
The cantilever forces specified in the tables must not be exceeded to ensure compliance with the maximum admissible shaft flexing in the ignition gap. Where values are not specified in the tables, an increase in admissible force cannot be achieved by using a roller bearing in place of a normal bearing, due to flexing of the shaft.

F_Q = Cantilever force in N

F_A = Axial force in N

x = Distance between point of application of force and shoulder of shaft in mm

l = Length of shaft extension in mm



Admissible cantilever force

Admissible cantilever force F_Q

Valid are: x_0 values for $x = 0$, $x_{0.5}$ values for $x = 0.5 \cdot l$ and x_{max} values for $x = l$ (l = shaft extension)

Frame size	at x_0 at speed				at $x_{0.5}$ at speed				at x_{max} at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors												
160	9.74	8.71	7.10	7.10	5.21	4.66	–	–	3.31	–	–	–
180	11.93	14.66	12.66	12.66	6.85	6.85	6.85	6.85	4.68	4.68	4.68	4.68
200	13.23	15.59	15.59	15.59	8.63	8.63	8.63	8.63	5.96	5.96	5.96	5.96
225	16.17	18.85	18.85	18.85	10.67	9.53	9.53	9.53	7.42	6.37	6.37	6.37
250	17.52	20.41	20.41	20.41	11.04	11.04	11.04	11.04	7.57	7.57	7.57	7.57
280	17.91	27.38	28.72	28.72	10.69	15.96	15.96	15.96	7.40	11.05	11.05	11.05
315 S/M	22.14	23.49	26.38	26.38	15.86	21.56	22.71	22.71	9.63	14.07	14.07	14.07
315 L	22.08	23.06	26.02	26.02	15.86	21.72	23.72	23.72	9.63	14.65	14.65	14.65
355 LB	Values on request				Values on request				Values on request			
LOHER VARIO 1PS0 and 1PS1 motors												
355 ... 500	Values on request				Values on request				Values on request			
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
160	–	–	–	–	–	–	–	–	–	–	–	–
180	5.65	5.65	5.69	5.69	–	–	–	–	–	–	–	–
200	9.38	12.57	12.00	12.00	5.19	6.98	6.65	6.65	–	4.80	4.59	4.59
225	15.83	16.97	16.97	16.97	8.95	8.57	8.57	8.57	6.24	5.74	5.74	5.74
250	10.89	18.37	18.37	18.37	5.95	9.94	9.94	9.94	–	6.81	6.81	6.81
280	10.95	25.85	24.08	24.08	6.08	14.36	13.38	13.38	–	9.94	9.26	9.26
315 S/M	9.49	19.90	18.94	18.94	5.30	9.96	9.48	9.48	–	6.63	–	–
315 L	6.35	23.06	23.32	23.32	3.55	12.19	11.67	11.67	–	8.12	7.77	7.77
LOHER VARIO 1PS4 and 1PS5 motors												
355 ... 500	Values on request				Values on request				Values on request			

Introduction

General technical specifications

Bearings

Overview (continued)

Additional axial force with cantilever force on shaft extension

If the shaft extensions are loaded at $x = l$ with the respective admissible cantilever force F_Q , the following additional forces are permitted to occur in the axial direction. If the admissible cantilever forces are not exploited to the full, higher loads are possible in the axial direction (values on request).

Additional axial force

Frame size	Horizontal shaft				Vertical shaft							
	Axial force $+F_A$ or $-F_A$				Force acting upwards				Force acting downwards			
	at speed				at speed				at speed			
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
LOHER CHEMSTAR 1PS0 and 1PS1 motors												
160	2.22	2.92	3.46	3.46	2.50	3.25	3.95	3.95	2.01	2.69	3.15	3.15
180	2.65	3.46	4.29	4.29	3.09	4.05	4.96	4.96	2.38	3.07	3.87	3.87
200	2.71	3.66	4.41	4.41	3.31	4.43	5.23	5.23	2.28	3.16	3.82	3.82
225	3.07	4.12	4.97	4.97	3.95	5.28	6.27	6.27	2.51	3.30	4.15	4.15
250	3.32	4.52	5.51	5.51	4.40	6.13	7.04	7.04	2.62	3.49	4.55	4.55
280	3.32	4.94	6.04	6.04	4.83	7.04	7.90	7.90	2.29	3.56	4.77	4.77
315 S/M	3.75	3.48	4.50	4.50	5.94	6.29	7.17	7.17	2.02	1.38	1.91	1.91
315 L	3.73	3.45	4.31	4.31	7.01	7.72	9.10	9.10	1.23	–	0.34	0.34
355 LB	Values on request				Values on request				Values on request			
LOHER VARIO 1PS0 and 1PS1 motors												
355 ... 500	Values on request				Values on request				Values on request			
SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS5 motors												
160	–	–	–	–	–	–	–	–	–	–	–	–
180	3.03	3.98	4.81	4.81	–	–	–	–	–	–	–	–
200	2.99	3.85	4.60	4.60	3.62	4.63	5.49	5.49	–	3.35	4.01	4.01
225	3.21	4.23	5.09	5.09	4.08	5.38	6.39	6.39	2.65	3.41	4.27	4.27
250	3.80	4.65	5.65	5.65	4.89	6.25	7.18	7.18	–	3.62	4.69	4.69
280	3.70	5.11	6.26	6.26	5.23	7.21	8.20	8.20	–	3.72	5.00	5.00
315 S/M	4.34	4.41	5.12	5.12	6.59	7.35	8.36	8.36	–	2.20	–	–
315 L	3.70	4.20	5.07	5.07	6.81	8.53	10.08	10.08	–	0.59	1.07	1.07
355	Values on request				Values on request				Values on request			
LOHER VARIO 1PS4 and 1PS5 motors												
355 ... 500	Values on request				Values on request				Values on request			

Overview

Motors of the 1PS and 1MD5 type series up to frame size 280 have permanent lubrication. The grease reservoir is sufficient for several years. Motors of frame size 315 and above are equipped with a relubrication device. A relubrication system is available for roller bearings as an option (**K40**) for series 1PS and 1MD5 in frame sizes 160 ... 280.

Standard bearings

Frame size	Grease lifetime/relubrication interval for optional relubrication, see values in brackets in operating hours at rated speed					
	Horizontal type of construction (B) 3000 rpm			Vertical type of construction (V) 3000 rpm		
	1500 rpm	≤ 1000 rpm	1500 rpm	1500 rpm	≤ 1000 rpm	
LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motors						
71	33000	40000	40000	24000	33000	40000
80		(8000)	(8000)			(8000)
90						
100						
112						
132	24000			16000	26000	
160	(4000)			(2800)	(5600)	
180						
200						
225						
250						
280						
315	4000	8000	11000	2800	5600	8000
355					4000	5600
LOHER VARIO 1PS0, 1PS1, 1PS4 and 1PS5 motors						
355	4000	8000	11000	2800	4000	5600
400		5600	8000	2000		
450	2000			1400	2800	4000
500	2000	4000	5600	–	2000	

Introduction

General technical specifications

Grease lifetime, relubrication intervals, grease quantities

Overview (continued)

Reinforced bearings

Frame size	Relubrication interval in operating hours at rated speed			Vertical type of construction (V)		
	Horizontal type of construction (B)			Vertical type of construction (V)		
	3000 rpm	1500 rpm	≤ 1000 rpm	3000 rpm	1500 rpm	≤ 1000 rpm
LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motors						
160	2800	5600	8000	2000	4000	5600
180						
200						
225						
250	2000			1400	2800	4000
280		4000	5600			
315						
355		2800				
LOHER VARIO 1PS0, 1PS1, 1PS4 and 1PS5 motors						
355 ... 500	Values on request					

The specified relubrication intervals are valid for maximum ambient temperatures of 40 °C. For every 10 °C increase in temperature, the lubrication interval is reduced by a factor of 0.7 of the value in the table (max. 20 °C = factor 0.5). Times for operation on 60-Hz systems on request.

Special aspects of grease lifetime

For VARIO types in vertical types of construction, angular-contact ball bearings or combined bearings are sometimes installed at NDE. This reduces the grease lifetime for the NDE bearings.

At an ambient temperature of ≤ 25 °C, the grease lifetime can be expected to be doubled. Due to the durability of the grease in years, it is limited to a maximum of 40000 h.

The grease lifetime or relubrication interval must be regarded independently of the mechanical service life of the bearing. In coupling operation with an elastic coupling, for example, the calculated mechanical service life of the bearing is $L_{10h} = 50000$ h. The grease lifetime for permanently lubricated bearings is, however, limited to 40000 h. Relubrication must be performed within the specified intervals.

The intervals for operation on 60-Hz systems are available on request. They can be estimated for higher speeds by means of the following rule.

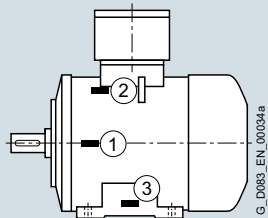
At speeds above the rated speed on 50-Hz systems, the grease lifetime and relubrication intervals are reduced. With reference to the time t_{50} at 50 Hz, the reductions are as shown in the table below.

Reduction in grease lifetime of relubrication interval

The specified relubrication intervals are valid for maximum ambient temperatures of 40 °C. For every 10 °C increase in temperature, the lubrication interval must be reduced to half of the value in the table.

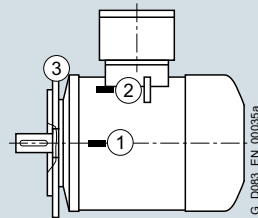
	Rated frequency				
	60 Hz	70 Hz	80 Hz	90 Hz	100 Hz
t_i/t_{50}	0.75	0.65	0.55	0.50	0.45

Overview



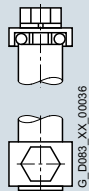
- ① Frame sizes 71 to 112
- ② Frame sizes 132 to 315
- ③ Frame sizes 355 to 500

Motors with feet, frame sizes 71 to 500

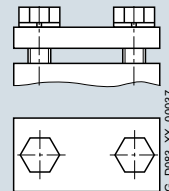


- ① Frame sizes 71 to 112
- ② Frame sizes 132 to 315
- ③ Frame sizes 355 to 500

Flange-mounting motors, frame sizes 71 to 500



Clamping bracket for frame sizes 71 to 112



Flat terminal for frame sizes 132 to 500

Frame size	Conductor cross-section mm ²
LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motors	
71 ... 112	2.5 ... 10
132	1.5 ... 35
160	1.5 ... 35
180 ... 225	1.5 ... 35
250 ... 280	1.5 ... 70
315 ... 355	1.5 ... 150

Introduction

General technical specifications

Measuring-surface sound pressure level

Overview

The table below lists the measuring-surface sound pressure level L_{pFA} as well as the sound power level L_{WA} for motors of the 1PS0 type series without explosion protection and the 1PS4, 1PS5 and 1MD5 type series with the type of protection "Explosion-proof enclosure." The noise values apply to no-load operation at a rated frequency of 50 Hz. The noise measurements are performed according to EN ISO 1680 in a noise measuring chamber under no-load conditions. The tolerance is +3 dB(A). Noise values in converter operation may differ from these values, because the speed can vary and an increase in the noise level can be expected due to the non-sinusoidal voltages and currents.

At 60 Hz, the values for 2-pole motors increase by approximately 5 dB(A), and for 4-pole motors or higher pole numbers by approximately 4 dB(A).

For a rated frequency of 50 Hz and operation on the SINAMICS G180 converter, the sound pressure level will increase by approximately 3 dB(A). Noise data is not available for operation on other SINAMICS types.

Noise values in converter operation are also dependent on the operating point of the application and the parameter settings (e.g. clock frequency) of the converter. Noise values can therefore only be given provisionally for a system controlled by a PWM converter (pulse width modulation).

As the frequency/speed decreases, the noise level is reduced. Experience has shown that, with high-quality converters, many motors under real operating conditions that frequently involve lower speeds and lower power, generate less noise than a comparable motor in line operation.

Measuring-surface sound pressure level L_{pFA} and sound power level L_{WA} in no-load operation at fixed voltage for 1PS0, 1PS4, 1PS5 and 1MD5 motors

Frame size	Motors in standard design – noise class 1								Low-noise motors with fans for one direction of rotation – noise class 3 ¹⁾			
	2-pole 3000 rpm		4-pole 1500 rpm		6-pole 1000 rpm		8-pole 750 rpm		2-pole 3000 rpm		4-pole 1500 rpm	
	L_{pFA} dB	L_{WA} dB	L_{pFA} dB	L_{WA} dB	L_{pFA} dB	L_{WA} dB	L_{pFA} dB	L_{WA} dB	L_{pFA} dB	L_{WA} dB	L_{pFA} dB	L_{WA} dB
LOHER CHEMSTAR 1PS0, 1PS5 and SIMOTICS XP 1MD5 motors												
71	54	65	46	57	48	59	45	56	–	–	–	–
80	57	68	49	60	48	59	50	61	–	–	–	–
90	62	74	50	61	52	63	52	63	–	–	–	–
100	64	76	54	66	52	64	52	64	–	–	–	–
112	65	77	54	66	55	67	55	67	–	–	–	–
132	68	80	62	74	57	69	57	69	56	68	–	–
160	70	82	65	77	60	72	60	72	61	73	–	–
180	71	84	66	79	61	74	63	76	62	75	–	–
200	75	88	66	79	61	74	63	76	66	79	–	–
225	76	89	69	82	62	75	64	77	67	80	–	–
250	76	90	71	85	62	76	64	78	67	81	–	–
280	78	92	73	87	66	80	66	80	68	82	–	–
315	80	94	73	87	68	82	71	85	70	84	–	–
355	80	–	77	–	77	89	74	87	77	92	75	–
LOHER VARIO²⁾ 1PS0, 1PS4 and 1PS5 motors												
355	78	93	76	91	74	89	75	90	74	89.5	–	–
400	80	95.5	78	93.5	77	92.5	77	92.5	77	93	75	91
450	82	98	80	96	79	95	79	95	79	95	77	93
500	–	–	82	98.5	80	96.5	79	95.5	81	97.5	79	95.5

¹⁾ The motor length (dimension L or LC) increases for noise class 3.

²⁾ LOHER VARIO 2-pole and 4-pole motors are equipped as standard with unidirectional fans.

Overview

Power

The rated power and operating values specified in the selection tables apply to duty type S1 in accordance with EN 60034-1 at a rated frequency of 50 Hz at rated voltage, a coolant temperature (CT) of up to 40 °C and an installation altitude of up to 1000 m above sea level.

The motors can also be used at a coolant temperature of between 40 °C and 60 °C or an installation altitude of between 1000 m and 4000 m above sea level. In these cases, the rated power specified in the selection tables must be reduced in accordance with the diagram, or a sufficiently larger motor type or higher temperature class should be selected. If the coolant temperature is reduced at installation altitudes of over 1000 m above sea level, there is no need for a reduction in the rating data.

Occasional current overload

In accordance with EN 60034-1., the motors with a rated power up to 315 kW are designed to withstand 1.5 times the rated current for 2 minutes at operating temperature without adversely affecting the service life. No specifications have been defined for larger motors.

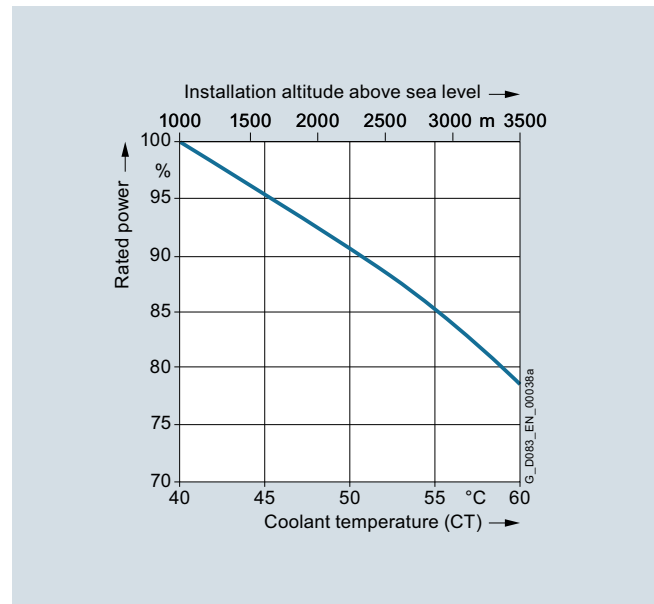
Conversion of power from kW to hp

The power can be converted from kW to hp as follows:

$$1 \text{ kW} = 1.341 \text{ hp}$$

Reduction factors for increased ambient temperature and installation altitude:

- The motor power can be approximated in accordance with the following characteristic curve.



- The following derating tables are superordinately applicable for the 1PS motor series in line operation.
- In converter operation, the derating factor applies in accordance with the curve.

Introduction

General technical specifications

Coolant temperature and installation altitudes

1

Overview

SIMOTICS XP 1MD5 motors

The rated power specified in the selection tables is applicable for continuous duty in accordance with EN 60034-1 at the frequency of 50 Hz, a coolant temperature (CT) or ambient temperature of 40 °C and an installation altitude (IA) up to 1000 m above sea level.

For higher coolant temperatures and/or installation altitudes greater than 1000 m above sea level, the specified motor power must be reduced using the factor k_{HT} .

This results in an admissible power of the motor of:

$$P_{adm} = P_{rated} \cdot k_{HT}$$

P_{adm} Admissible motor power in kW

P_{rated} Rated power in kW

k_{HT} Factor for abnormal coolant temperature and/or installation altitude

If the admissible motor power is no longer adequate for the drive, it should be checked whether the motor with the next higher rated power fulfills the requirements.

The motors are designed for temperature class 155 (F) and utilized in temperature class 130 (B). Under non-standard operating conditions, if they are to be used in this class, the admissible power must be determined from the tables below.

If the coolant temperature differs from the standard +40 °C, for compliance with explosion protection standards the option **C22** for +45 °C or **C23** for +50 °C must be selected for the applicable coolant temperature. The maximum coolant temperature as well as the reduced power are stamped on the rating plate.

Reduction factor k_{HT} for different installation altitudes and/or coolant temperatures

Installation altitude above sea level	Coolant temperature		
	40 °C	45 °C	50 °C
1000 m	1.00	0.96	0.92

The coolant temperature is rounded up to the next 5 °C.

LOHER CHEMSTAR

For motors of the LOHER CHEMSTAR series, the power ratings or reduced power ratings listed in the following tables apply for the specified coolant temperatures and installation altitudes for a winding utilization of 130 °C (B). The options specified here must be explicitly ordered. The coolant temperature and power are stamped on the rating plate.

Overview (continued)

1PS0, 1PS1 and 1PS5 motors

Derating tables for increased ambient temperatures and installation altitudes

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes		
			≤ +40 °C, ≤ 1000 m	+45 °C, 1000 m D11	+50 °C, 1000 m D12	+55 °C, 1000 m D13
				+40 °C, 1500 m D06	+45 °C, 1500 m D11+D06	+50 °C, 1500 m D12+D06
					+40 °C, 2000 m D07	+45 °C, 2000 m D11+D07
				+40 °C, 2500 m D08		
			Winding utilization 130 °C (B)			
			P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW
1PS0, 1PS1 and 1PS5 motors – 2-pole						
1PS.070-BD...-AA4	.NG.-071BR-02	IE2	0.37	0.37	0.37	0.37
1PS.071-BD...-AA4	.NG.-071BS-02	IE2	0.55	0.55	0.55	0.55
1PS.080-BD...-AA4	.NG.-080BR-02	IE2	0.75	0.75	0.75	0.75
1PS.081-BD...-AA4	.NG.-080BS-02	IE2	1.1	1.1	1.1	1.1
1PS.095-BD...-AA4	.NG.-090LR-02	IE2	1.5	1.5	1.5	1.5
1PS.098-BD...-AA4	.NG.-090LS-02	IE2	2.2	2.2	2.2	2.0
1PS.106-BD...-AA4	.NG.-100LS-02	IE2	3	3	3	3
1PS.113-BD...-AA4	.NG.-112MS-02	IE2	4	4	3.6	3.4
1PS.131-BD...-AA4	.NG.-132SR-02	IE2	5.5	5.5	5.5	5.0
1PS.132-BD...-AA4	.NG.-132SS-02	IE2	7.5	7.5	6.5	6.5
1PS.163-BD...-AA4	.NG.-160MR-02	IE2	11	11	11	11
1PS.165-BD...-AA4	.NG.-160MS-02	IE2	15	15	13.5	13.0
1PS.166-BD...-AA4	.NG.-160LS-02	IE2	18.5	17.5	17.0	16.0
1PS.183-BD...-AA4	.NG.-180MS-02	IE2	22	21	20	19.0
1PS.206-BD...-AA4	.NG.-200LR-02	IE2	30	30	30	30
1PS.208-BD...-AA4	.NG.-200LS-02	IE2	37	37	34	32
1PS.223-BD...-AA4	.NG.-225MS-02	IE2	45	45	41	39
1PS.253-BD...-AA4	.NG.-250MM-02	IE2	55	52	50	47
1PS.280-BD...-AA4	.NG.-280SL-02	IE2	75	75	69	65
1PS.283-BD...-AA4	.NG.-280MM-02	IE2	90	85	80	75
1PS.311-BD...-AA4	.NG.-315SL-02	IE2	110	110	110	110
1PS.313-BD...-AA4	.NG.-315ML-02	IE2	132	132	120	110
1PS.315-BD...-AA4	.NG.-315MN-02	IE2	160	150	145	135
1PS.316-BD...-AA4	.NG.-315LL-02	IE2	200	190	180	170
1PS.318-BD...-AA4	.NG.-315LN-02	IE2	250	240	230	210
1PS5353-BD...-4AA3	DNGW-355MR-02	IE2	315	300	280	270
1PS5355-BD...-4AA3	DNGW-355MS-02	IE2	360	340	330	310
1PS5357-BD...-4AA3	DNGW-355MT-02	IE2	460	440	420	400

Introduction

General technical specifications

Coolant temperature and installation altitudes

Overview (continued)

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes			
			≤ +40 °C, ≤ 1000 m	+45 °C, 1000 m D11	+50 °C, 1000 m D12	+55 °C, 1000 m D13	
				+40 °C, 1500 m D06	+45 °C, 1500 m D11+D06	+50 °C, 1500 m D12+D06	
					+40 °C, 2000 m D07	+45 °C, 2000 m D11+D07	+40 °C, 2500 m D08
				Winding utilization 130 °C (B)			
			P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW
1PS0, 1PS1 and 1PS5 motors – 4-pole							
1PS.070-.BD..-BA4	.NG.-071BR-04	IE2	0.25	0.25	0.25	0.25	0.25
1PS.071-.BD..-BA4	.NG.-071BS-04	IE2	0.37	0.37	0.37	0.37	0.37
1PS.080-.BD..-BA4	.NG.-080BR-04	IE2	0.55	0.55	0.55	0.55	0.55
1PS.081-.BD..-BA4	.NG.-080BS-04	IE2	0.75	0.75	0.75	0.75	0.75
1PS.095-.BD..-BA4	.NG.-090LR-04	IE2	1.1	1.1	1.1	1.1	1.1
1PS.098-.BD..-BA4	.NG.-090LS-04	IE2	1.5	1.5	1.5	1.5	1.5
1PS.106-.BD..-BA4	.NG.-100LR-04	IE2	2.2	2.2	2.2	2.2	2.2
1PS.108-.BD..-BA4	.NG.-100LS-04	IE2	3	3	3	3	3
1PS.113-.BD..-BA4	.NG.-112MS-04	IE2	4	4	4	4	3.6
1PS.131-.BD..-BA4	.NG.-132SR-04	IE2	5.5	5.5	5.5	5.5	5.5
1PS.133-.BD..-BA4	.NG.-132MS-04	IE2	7.5	7.5	7.5	7.5	6.5
1PS.163-.BD..-BA4	.NG.-160MR-04	IE2	11	11	11	11	11
1PS.166-.BD..-BA4	.NG.-160LS-04	IE2	15	15	15	15	15
1PS.183-.BD..-BA4	.NG.-180MR-04	IE2	18.5	18.5	17.0	17.0	16.0
1PS.186-.BD..-BA4	.NG.-180LS-04	IE2	22	21	20	20	19.0
1PS.206-.BD..-BA4	.NG.-200LS-04	IE2	30	30	27	27	26
1PS.220-.BD..-BA4	.NG.-225SR-04	IE2	37	35	34	34	32
1PS.223-.BD..-BA4	.NG.-225MS-04	IE2	45	43	41	41	39
1PS.253-.BD..-BA4	.NG.-250MM-04	IE2	55	52	50	50	47
1PS.280-.BD..-BA4	.NG.-280SL-04	IE2	75	75	75	75	69
1PS.283-.BD..-BA4	.NG.-280MM-04	IE2	90	85	80	80	75
1PS.311-.BD..-BA4	.NG.-315SL-04	IE2	110	110	110	110	110
1PS.313-.BD..-BA4	.NG.-315ML-04	IE2	132	132	132	132	120
1PS.315-.BD..-BA4	.NG.-315MN-04	IE2	160	150	145	145	135
1PS.316-.BD..-BA4	.NG.-315LL-04	IE2	200	190	180	180	170
1PS.317-.BD..-BA4	.NG.-315LM-04	IE2	250	240	230	230	210
1PS5353-.BD..-4BA3	DNGW-355MR-04	IE2	315	300	280	280	270
1PS5355-.BD..-4BA3	DNGW-355MS-04	IE2	360	340	330	330	310
1PS5357-.BD..-4BA3	DNGW-355MT-04	IE2	460	440	420	420	400

Overview (continued)

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes		
			≤ +40 °C, ≤ 1000 m	+45 °C, 1000 m D11	+50 °C, 1000 m D12	+55 °C, 1000 m D13
				+40 °C, 1500 m D06	+45 °C, 1500 m D11+D06	+50 °C, 1500 m D12+D06
					+40 °C, 2000 m D07	+45 °C, 2000 m D11+D07
				+40 °C, 2500 m D08		
			Winding utilization 130 °C (B)			
			P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW
1PS0, 1PS1 and 1PS5 motors – 6-pole						
1PS.071-.BD..-CA4	.NG.-071BS-06	–	0.25	0.25	0.25	0.25
1PS.080-.BD..-CA4	.NG.-080BR-06	IE2	0.37	0.37	0.37	0.37
1PS.081-.BD..-CA4	.NG.-080BS-06	IE2	0.55	0.55	0.55	0.55
1PS.095-.BD..-CA4	.NG.-090LR-06	IE2	0.75	0.75	0.75	0.75
1PS.098-.BD..-CA4	.NG.-090LS-06	IE2	1.1	1.1	1.1	1.1
1PS.106-.BD..-CA4	.NG.-100LS-06	IE2	1.5	1.5	1.5	1.5
1PS.113-.BD..-CA4	.NG.-112MS-06	IE2	2.2	2.2	2.2	2.2
1PS.131-.BD..-CA4	.NG.-132SR-06	IE2	3	3	3	3
1PS.133-.BD..-CA4	.NG.-132MR-06	IE2	4	4	3.6	3.4
1PS.135-.BD..-CA4	.NG.-132MS-06	IE2	5.5	5.5	5.0	4.7
1PS.163-.BD..-CA4	.NG.-160MR-06	IE2	7.5	7.5	7.5	7.5
1PS.166-.BD..-CA4	.NG.-160LS-06	IE2	11	11	10.0	9.5
1PS.186-.BD..-CA4	.NG.-180LS-06	IE2	15	15	13.5	13.0
1PS.206-.BD..-CA4	.NG.-200LR-06	IE2	18.5	18.5	17.0	16.0
1PS.208-.BD..-CA4	.NG.-200LS-06	IE2	22	21	20	19.0
1PS.223-.BD..-CA4	.NG.-225MS-06	IE2	30	30	27	26
1PS.253-.BD..-CA4	.NG.-250MM-06	IE2	37	35	34	32
1PS.280-.BD..-CA4	.NG.-280SL-06	IE2	45	45	41	39
1PS.283-.BD..-CA4	.NG.-280MM-06	IE2	55	52	50	47
1PS.311-.BD..-CA4	.NG.-315SL-06	IE2	75	75	75	69
1PS.313-.BD..-CA4	.NG.-315ML-06	IE2	90	90	90	80
1PS.314-.BD..-CA4	.NG.-315MM-06	IE2	110	110	110	110
1PS.315-.BD..-CA4	.NG.-315MN-06	IE2	132	132	132	120
1PS.316-.BD..-CA4	.NG.-315LL-06	IE2	160	150	145	135
1PS.317-.BD..-CA4	.NG.-315LM-06	IE2	200	190	180	170
1PS5353-.BD..-4CA3	DNGW-355MR-06	IE2	280	260	250	240
1PS5355-.BD..-4CA3	DNGW-355MS-06	IE2	315	300	280	270
1PS5357-.BD..-4CA3	DNGW-355MT-06	IE2	360	340	330	310

Please inquire regarding higher ambient temperatures and other combinations.

Introduction

General technical specifications

Coolant temperature and installation altitudes

Overview (continued)

1PS4 and 1PS5 motors – type of protection "Explosion-proof enclosure"

Derating tables for increased ambient temperatures and installation altitudes

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes			
			≤ +40 °C, ≤ 1000 m	≤ +45 °C, ≤ 1000 m D11	≤ +50 °C, ≤ 1000 m D12	≤ +55 °C, ≤ 1000 m D13	
				≤ +40 °C, ≤ 1500 m D06	≤ +45 °C, ≤ 1500 m D11+D06	≤ +50 °C, ≤ 1500 m D12+D06	
				≤ +40 °C, ≤ 2000 m D07		≤ +45 °C, ≤ 2000 m D11+D07	
				≤ +40 °C, ≤ 2500 m D08			
				Winding utilization 130 °C (B)			
				P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW
1PS0, 1PS1 and 1PS5 motors – 2-pole							
1PS.070-.BD..-AH4	.NG.-071BS-02	IE3	0.37	0.37	0.37	0.37	
1PS.071-.BD..-AH4	.NG.-071BT-02	IE3	0.55	0.55	0.55	0.55	
1PS.080-.BD..-AH4	.NG.-080BS-02	IE3	0.75	0.75	0.75	0.75	
1PS.081-.BD..-AH4	.NG.-080BT-02	IE3	1.1	1.1	1.1	1.1	
1PS.095-.BD..-AH4	.NG.-090LS-02	IE3	1.5	1.5	1.5	1.5	
1PS.098-.BD..-AH4	.NG.-090LT-02	IE3	2.2	2.2	2.2	2.2	
1PS.106-.BD..-AH4	.NG.-100LT-02	IE3	3	3	3	3	
1PS.113-.BD..-AH4	.NG.-112MT-02	IE3	4	4	4	4	
1PS.131-.BD..-AH4	.NG.-132SS-02	IE3	5.5	5.5	5.5	5.5	
1PS.132-.BD..-AH4	.NG.-132ST-02	IE3	7.5	7.5	7.5	7.5	
1PS.163-.BD..-AH4	.NG.-160MS-02	IE3	11	11	11	11	
1PS.165-.BD..-AH4	.NG.-160MT-02	IE3	15	15	15	15	
1PS.166-.BD..-AH4	.NG.-160LT-02	IE3	18.5	18.5	18.5	18.5	
1PS.183-.BD..-AH4	.NG.-180MT-02	IE3	22	22	22	22	
1PS.206-.BD..-AH4	.NG.-200LS-02	IE3	30	30	27	26	
1PS.208-.BD..-AH4	.NG.-200LT-02	IE3	37	37	34	32	
1PS.223-.BD..-AH4	.NG.-225MT-02	IE3	45	45	45	45	
1PS.253-.BD..-AH4	.NG.-250MN-02	IE3	55	55	55	55	
1PS.280-.BD..-AH4	.NG.-280SM-02	IE3	75	75	75	75	
1PS.283-.BD..-AH4	.NG.-280MN-02	IE3	90	90	80	75	
1PS.311-.BD..-AH4	.NG.-315SL-02	IE3	110	110	110	110	
1PS.313-.BD..-AH4	.NG.-315ML-02	IE3	132	132	132	120	
1PS.315-.BD..-AH4	.NG.-315MN-02	IE3	160	160	145	135	
1PS.316-.BD..-AH4	.NG.-315LL-02	IE3	200	190	180	170	
1PS.318-.BD..-AH4	.NG.-315LN-02	IE3	250	240	230	210	
1PS5353-.BD..-4AH3	DNGW-355MR-02	IE3	315	300	280	270	
1PS5355-.BD..-4AH3	DNGW-355MS-02	IE3	360	340	330	310	
1PS5357-.BD..-4AH3	DNGW-355MT-02	IE3	460	440	420	400	

Overview (continued)

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes							
			≤ +40 °C, ≤ 1000 m	≤ +45 °C, ≤ 1000 m D11	≤ +50 °C, ≤ 1000 m D12	≤ +55 °C, ≤ 1000 m D13	≤ +40 °C, ≤ 1500 m D06	≤ +45 °C, ≤ 1500 m D11+D06	≤ +50 °C, ≤ 1500 m D12+D06	≤ +40 °C, ≤ 2000 m D07	≤ +45 °C, ≤ 2000 m D11+D07
			P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW				
1PS0, 1PS1 and 1PS5 motors – 4-pole											
1PS.070-.BD..-BH4	.NG.-071BS-04	IE3	0.25	0.25	0.25	0.25	0.25				
1PS.071-.BD..-BH4	.NG.-071BT-04	IE3	0.37	0.37	0.37	0.37	0.37				
1PS.080-.BD..-BH4	.NG.-080BS-04	IE3	0.55	0.55	0.55	0.55	0.55				
1PS.081-.BD..-BH4	.NG.-080BT-04	IE3	0.75	0.75	0.75	0.75	0.75				
1PS.095-.BD..-BH4	.NG.-090LS-04	IE3	1.1	1.1	1.1	1.1	1.1				
1PS.098-.BD..-BH4	.NG.-090LT-04	IE3	1.5	1.5	1.5	1.5	1.5				
1PS.106-.BD..-BH4	.NG.-100LS-04	IE3	2.2	2.2	2.2	2.2	2.2				
1PS.108-.BD..-BH4	.NG.-100LT-04	IE3	3	3	3	3	3				
1PS.113-.BD..-BH4	.NG.-112MT-04	IE3	4	4	4	4	4				
1PS.131-.BD..-BH4	.NG.-132ST-04	IE3	5.5	5.5	5.5	5.5	5.5				
1PS.133-.BD..-BH4	.NG.-132MT-04	IE3	7.5	7.5	7.5	7.5	7.5				
1PS.163-.BD..-BH4	.NG.-160MS-04	IE3	11	11	11	11	11				
1PS.166-.BD..-BH4	.NG.-160LT-04	IE3	15	15	15	15	15				
1PS.183-.BD..-BH4	.NG.-180MS-04	IE3	18.5	18.5	18.5	18.5	17.0				
1PS.186-.BD..-BH4	.NG.-180LT-04	IE3	22	22	22	22	22				
1PS.206-.BD..-BH4	.NG.-200LT-04	IE3	30	30	30	30	30				
1PS.220-.BD..-BH4	.NG.-225SS-04	IE3	37	37	37	37	37				
1PS.223-.BD..-BH4	.NG.-225MT-04	IE3	45	45	45	45	45				
1PS.253-.BD..-BH4	.NG.-250MN-04	IE3	55	55	55	55	55				
1PS.280-.BD..-BH4	.NG.-280SM-04	IE3	75	75	75	75	75				
1PS.283-.BD..-BH4	.NG.-280MN-04	IE3	90	90	90	90	90				
1PS.311-.BD..-BH4	.NG.-315SL-04	IE3	110	110	110	110	100				
1PS.313-.BD..-BH4	.NG.-315ML-04	IE3	132	132	132	132	132				
1PS.315-.BD..-BH4	.NG.-315MN-04	IE3	160	150	145	135	135				
1PS.316-.BD..-BH4	.NG.-315LL-04	IE3	200	200	180	170	170				
1PS.317-.BD..-BH4	.NG.-315LM-04	IE3	250	240	230	210	210				
1PS5353-.BD..-4BH3	DNGW-355MR-04	IE3	315	300	280	270	270				
1PS5355-.BD..-4BH3	DNGW-355MS-04	IE3	360	340	330	310	310				
1PS5357-.BD..-4BH3	DNGW-355MT-04	IE3	460	440	420	400	400				

Introduction

General technical specifications

Coolant temperature and installation altitudes

Overview (continued)

Type	Motor type	IE class	Rated power for standard version	Rated power for ambient temperature and installation altitude Additional identification code -Z with appropriate order codes							
			≤ +40 °C, ≤ 1000 m	≤ +45 °C, ≤ 1000 m D11	≤ +50 °C, ≤ 1000 m D12	≤ +55 °C, ≤ 1000 m D13	≤ +40 °C, ≤ 1500 m D06	≤ +45 °C, ≤ 1500 m D11+D06	≤ +50 °C, ≤ 1500 m D12+D06	≤ +40 °C, ≤ 2000 m D07	≤ +45 °C, ≤ 2000 m D11+D07
			P_{rated} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW	P_{adm} kW				
1PS0, 1PS1 and 1PS5 motors – 6-pole											
1PS.071-.BD..-CH4	.NG.-071BS-06	IE3	0.25	0.25	0.25	0.25	0.25				
1PS.080-.BD..-CH4	.NG.-080BR-06	IE3	0.37	0.37	0.37	0.37	0.37				
1PS.081-.BD..-CH4	.NG.-080BS-06	IE3	0.55	0.55	0.55	0.55	0.55				
1PS.095-.BD..-CH4	.NG.-090LS-06	IE3	0.75	0.75	0.75	0.75	0.75				
1PS.105-.BD..-CH4	.NG.-100LT-06	IE3	1.1	1.1	1.1	1.1	1.1				
1PS.112-.BD..-CH4	.NG.-112MT-06	IE3	1.5	1.5	1.5	1.5	1.5				
1PS.130-.BD..-CH4	.NG.-132SR-06	IE3	2.2	2.2	2.2	2.2	2.2				
1PS.131-.BD..-CH4	.NG.-132SS-06	IE3	3	3	3	3	3				
1PS.133-.BD..-CH4	.NG.-132MS-06	IE3	4	4	4	4	4				
1PS.135-.BD..-CH4	.NG.-132MT-06	IE3	5.5	5.5	5.5	5.5	5.5				
1PS.163-.BD..-CH4	.NG.-160MS-06	IE3	7.5	7.5	7.5	7.5	7.5				
1PS.166-.BD..-CH4	.NG.-160LT-06	IE3	11	11	11	11	11				
1PS.186-.BD..-CH4	.NG.-180LT-06	IE3	15	15	15	15	15				
1PS.206-.BD..-CH4	.NG.-200LS-06	IE3	18.5	18.5	18.5	18.5	18.5				
1PS.208-.BD..-CH4	.NG.-200LT-06	IE3	22	22	22	22	22				
1PS.223-.BD..-CH4	.NG.-225MT-06	IE3	30	30	30	30	30				
1PS.253-.BD..-CH4	.NG.-250MN-06	IE3	37	37	37	37	37				
1PS.280-.BD..-CH4	.NG.-280SM-06	IE3	45	45	45	45	45				
1PS.283-.BD..-CH4	.NG.-280MN-06	IE3	55	55	55	55	55				
1PS.311-.BD..-CH4	.NG.-315SL-06	IE3	75	75	75	75	75				
1PS.313-.BD..-CH4	.NG.-315ML-06	IE3	90	90	90	90	80				
1PS.314-.BD..-CH4	.NG.-315MM-06	IE3	110	110	110	110	110				
1PS.315-.BD..-CH4	.NG.-315LK-06	IE3	132	132	132	132	132				
1PS.316-.BD..-CH4	.NG.-315LL-06	IE3	160	160	145	145	135				
1PS.317-.BD..-CH4	.NG.-315LM-06	IE3	200	190	180	180	170				
1PS5353-.BD..-4CH3	DNGW-355MR-06	IE3	280	260	250	250	240				
1PS5355-.BD..-4CH3	DNGW-355MS-06	IE3	315	300	280	280	270				
1PS5357-.BD..-4CH3	DNGW-355MT-06	IE3	360	340	330	330	310				

Overview

On request, three-phase motors of the LOHER CHEMSTAR 1PS and SIMOTICS XP 1MD5 series can be designed in accordance with VIK guidelines ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry). VIK motors have the same power as the motors of this list, but also satisfy the VIK recommendation both mechanically and electrically. The most important points of the minimum design to the VIK recommendation of March 2011 are outlined in the table below.

VIK recommendation	Execution 1PS. or 1MD5
Motor enclosure and terminal box in cast-iron, steel is permitted for frame size 355 and above	LOHER CHEMSTAR in cast-iron as standard LOHER VARIO in steel as standard
Standard temperature range -20 to +40 °C	Standard
Paint finish suitable for industrial climates with corrosive gases and vapors	Paint system N14A or higher quality
Fan covers must be designed with corrosion protection	Fan cover of zinc-plated sheet steel or increased wall thickness
The motor compartment must be protected to prevent any small parts entering through the terminal box	Flexible implementation for 1PS0 and 1PS1. For 1PS5 and 1MD5 this separation is standard due to the Ex type of protection.
Terminal box of minimum size and rotatable 4 × 90°, observe derating factors regarding the load on cables and wires	The required size and conductor cross-sections as well as rotation capability correspond to the standard design of 1PS and 1MD5, wire cross-sections are adapted
Nominal bearing lifetime 40000 h for coupling drive, the grease lifetime can be different or use of relubrication device	Standard for 1PS and 1MD5 Flat grease nipples are used with relubrication device
Efficiency at least IE2 also for explosion-proof motors	Standard
Defined noise emission limits	Standard
Motors in explosion-proof enclosures and optionally selected PTC thermistors must be designed for sole protection	1PS5 and 1MD5 with PTC thermistors (A11) are designed for VIK (K30) with sole protection (no converter rating plates). In larger industrial motors, sole protection is only provided and stamped as such for converter operation.
For converter operation, the bearing at NDE must be insulated in frame size 315 and above	Options for converter operation are not included in the VIK options and must be ordered separately. If line-operated motors with explosion-proof enclosures and PTC thermistors are subsequently used for converter operation, insulated bearings must be retrofitted by the customer.
Motors in type of protection Ex d must be constructed with Ex e terminal boxes and must fulfill IIC type of protection in frame size 315 and below	Standard
Minimum requirements for the documentation	Documentation is not included with the VIK design (K30 or W09) and must be ordered separately

Introduction

General technical specifications

Brakes and brake motors

1

Overview

Three-phase brake motors with cage rotor

Due to the demands of modern manufacturing systems, the brake motor has become a special drive component in machine construction. In the rationalization of machines, in addition to the requirement for higher working speeds in switching operation, there is a demand for shortening the non-productive intervals. The brake motor ensures short braking times for the rotating masses, even with a high switching frequency. Another important application of brake motors is in stopping loads and reversing torques. The 1PS0 brake motor comprises a three-phase induction motor that is combined with a brake in a single unit.

Benefits

Thanks to its compact design, the brake motor is a useful component in drive technology wherever minimum braking time is a priority. The familiar advantages of the three-phase induction motor with a squirrel-cage rotor are also retained. This brake motor is suitable for multi-faceted customer-specific application cases. It can be used both for switching operation at a high switching frequency, a high follow-on accuracy and longer service life and as a high-power brake motor with a large operating capacity. The right brake size must be selected for the application. The brake motor is also particularly suitable for driving hoists and traversing gear.

The brake motors have the following properties:

- Short switching times
- High operational reliability
- A low motor flywheel effect
- Favorable dimensions
- Low space requirements

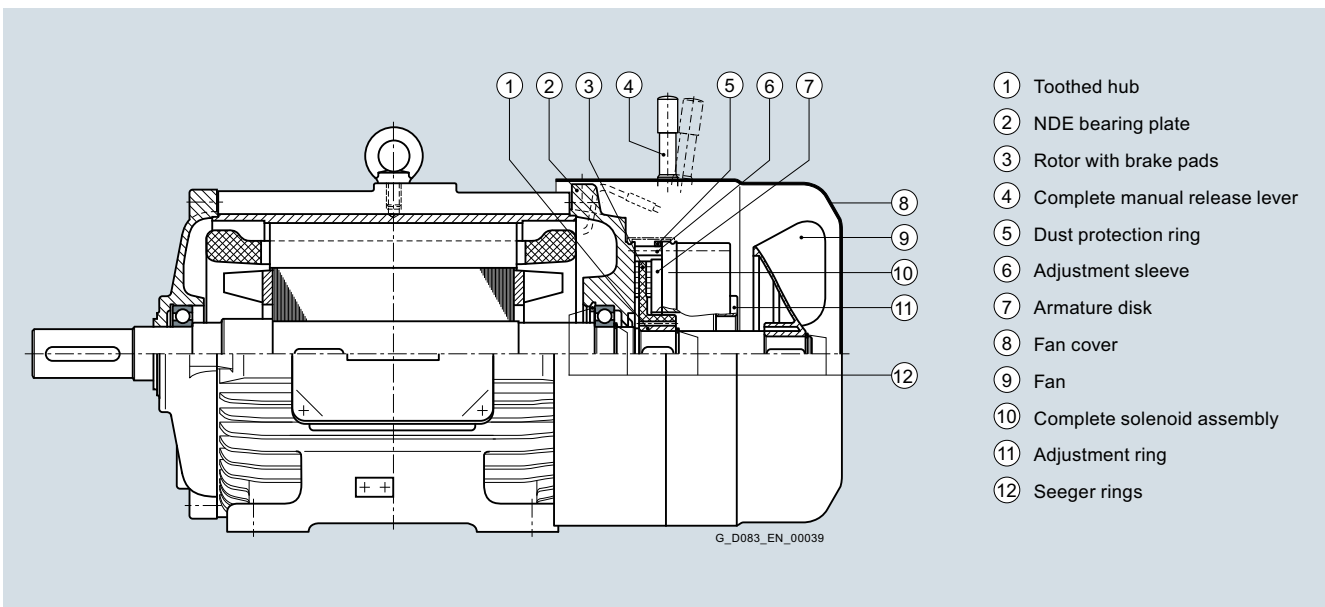
Application

The main application areas are as follows:

- Braking of loads and centrifugal masses
- Braking in the event of danger
- Shortening of follow-on times
- Increased setting accuracy

Brake motors are available as shown in the selection tables, but also with higher power ratings, different voltages, frequencies and numbers of poles as well as in pole-changing versions.

Design



Sectional drawing of brake motor type 1PS020 frame size 200 with single-disk spring-operated brake

Overview (continued)

The surface-cooled brake motors are equipped with a quiescent current-operated (fail-safe) single-disk spring-operated brake with two asbestos-free brake pads. The bearing plate at the non-drive end is specially shaped and it is made of cast-iron in every motor. Refer to the table for the size of the bearings. Otherwise, in terms of their mechanical design, the brake motors correspond to the surface-cooled three-phase motors.

The brakes and fans of the brake motors are suitable for both directions of rotation. The degree of protection for the brake motors is IP55. Other degrees of protection are possible on request.

If it is necessary to rotate the shaft in the zero current state, the brake can be specially ordered with a manual release. All brakes feature torque adjustment.

Single-disk spring-operated brake

Design

Single-disk spring-operated brakes are fail-safe brakes with 2 frictional surfaces in which an electromagnetic field is used to release the brake which is applied using spring force. The spring-operated brake brakes in the zero current state and releases when current is flowing.

Special characteristics of the single-disk spring-operated brake:

- Braking in accordance with DIN VDE 0580 "Electromagnetic devices and components – General specifications"
- Holding brake with spring-loaded operation
- Microswitch for air gap monitoring as an option (brake size 12 and above)
- Braking torque is active in zero current state (fail-safe brake)
- Rugged and simple design
- High level of operational reliability due to long service life
- Brakes are designed for temperature class F
- Large operating air gap makes automatic readjustment superfluous
- Under conditions of extremely high wear, the operating air gap is easily adjusted
- Braking torque can be adjusted between 100 % and approximately 60 %
- Manual release with automatic return
- Brakes are corrosion-protected, asbestos-free friction pads
- The brakes are designed for 100 % duty ratio
- The brakes will operate in any position

The standard voltages for the brake coils are: 24 V, 103 V, 180 V, 205 V +5 to 10 %. For the relationship between brake control voltage, rectifier type and brake coil voltage, see the section "Circuit diagrams".

Brakes with special requirements

Special brakes can be ordered for particular environments and requirements.

Other versions are available for:

- Ship design, e.g. acc. to DNV GL, ABS, etc.
- Highly corrosive environments (e.g. offshore, onshore)
- Special customer requirements
 - in conjunction with special paint systems (V11, V12, W05)
 - in conjunction with high degrees of protection (IP65, IP66)
 - in conjunction with a second shaft extension or forced ventilation
 - in conjunction with explosion protection for gas zone 1/2 and dust zone 21/21
 - in conjunction with increased ambient air temperatures

Electrical connection

In the terminal box, apart from the motor connection terminals, there is also a bridge rectifier for the standard 230-V brake control voltage. For higher brake control voltages, either a half-wave rectifier with zero diodes can be installed or connection can be performed via an intermediate transformer that is, however, not included in the scope of supply. For cases in which the motor operating voltage does not comply with the brake control voltage, a separate brake control voltage must be supplied via an additional contact.

Introduction

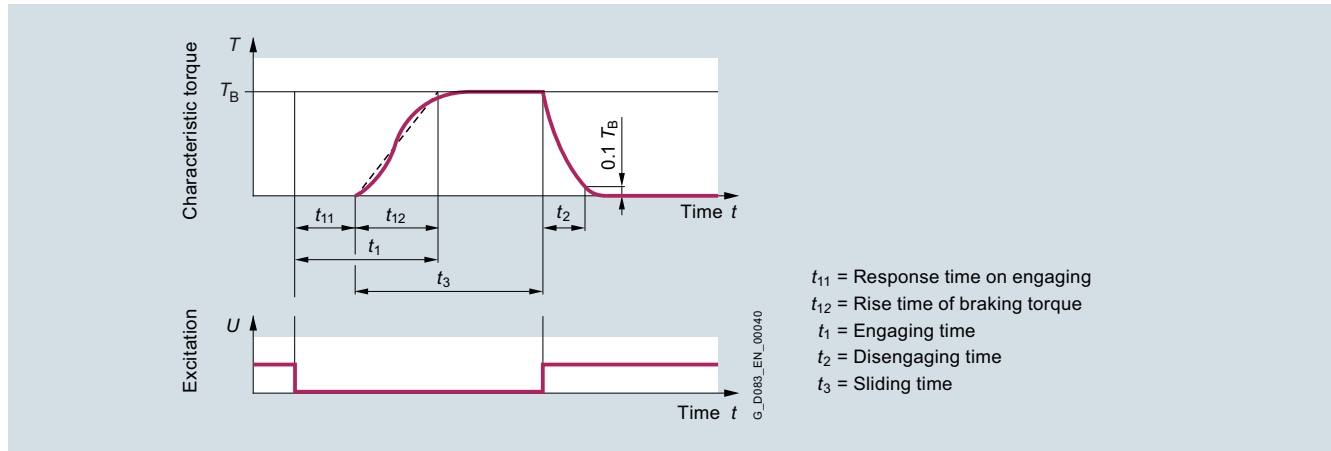
General technical specifications

Brakes and brake motors

Overview (continued)

Switching times

The switching times are given in the table below.
The times are shown in the diagram.



Torque/time curve as a function of excitation voltage

- AC-side switching – extended engaging time (delayed response of the brake). The disengaging time is the same as for DC-side switching.
- DC-side switching – short activation time, short engaging time (quick response of the brake).

The switching times for DC-side switching are as follows:

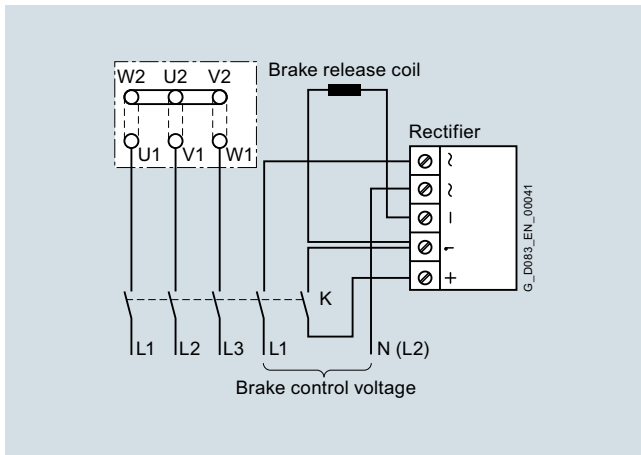
Brake size	Brake characteristic torque T_B ¹⁾ Nm	Maximum admissible switching energy for single switching Q_E J	Transitional switching frequency S_{ft} h^{-1}	Switching times at $s_{GapRated}$			
				DC engage			Disengage
				t_{11} ms	t_{12} ms	t_1 ms	t_2 ms
12	32	24000	30	28	25	53	115
14	60	30000	28	17	25	42	210
16	80	36000	27	27	30	57	220
18	150	36000	20	33	45	78	270
20	260	80000	19	65	100	165	340
25	400	120000	15	110	120	230	390

With AC-side switching, the t_1 values increase for the brakes to about 6 times the values.

¹⁾ Minimum braking torque for run-in frictional surfaces.

Overview (continued)

Circuit diagrams for brake motor with single-disk spring-operated brake



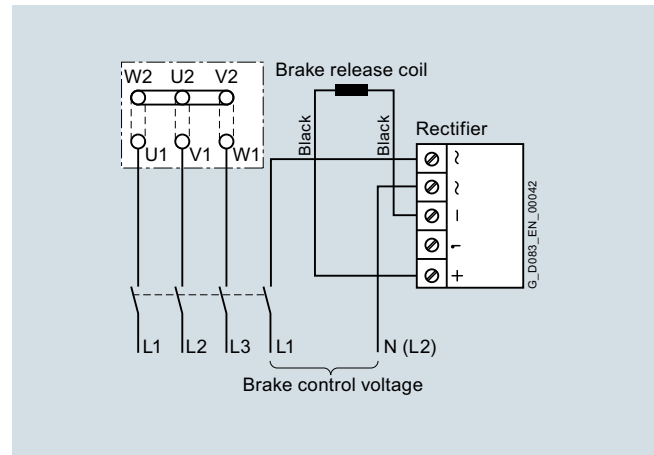
Brake switched at DC side and AC side (additional switching contact K required; reconnect brake connection cable from + to 1).

The control voltage of the brake on the rating plate must be observed

Alternating voltage (brake control voltage) V	Rectifier type	DC brake coil voltage V
230	Bridge	205
400	Half-wave	180

Pole-changing brake motors and brake motors with higher switching frequency: On request.

The ambient temperature range for brake motors is: -20 to +40 °C.



Brake switched at AC side (as delivered).
Note control voltage on rating plate of the brake.

Introduction

General technical specifications

Brakes and brake motors

Overview (continued)

Technical specifications

Brake size			10	12	14	16	18	20	25
Characteristic torque	T_B ¹⁾	Nm	16	32	60	80	150	260	400
Braking torque in %									
• at 1500 rpm		%	83	81	80	79	77	75	73
• at 3000 rpm		%	76	74	73	72	70	68	68
Speed, max.		rpm	3000	3000	3000	3000	3000	1500	1500
Input power	$P_{20\text{ °C}}$	W	30	40	50	55	85	100	110
Weight, approx.		kg	2.5	3.5	5.2	7.9	12	19.3	29.1
Moment of inertia	J ²⁾	kg m ²	0.0002	0.00045	0.00063	0.0015	0.0029	0.0073	0.02
Air gap adjustment, max.		mm	1.5	2.0	2.5	3.5	3.0	4.0	4.5
Brake rotor thickness, min.		mm	7.5	8.0	7.5	8.0	10.0	12.0	15.5
Operating energy, max. adm. (per switching operation)	W_E	kJ	12	24	30	36	60	80	120
Operating energy (up to 0.1 mm abrasion)	$W_{R\ 0.1}$	Nm	On request						
Operating air gap									
• min.		mm	0.3	0.3	0.3	0.3	0.4	0.4	0.5
• max.		mm	0.75	0.75	0.75	0.75	1.0	1.0	1.25

The brake coil has a supply voltage of 205 V. Other standard voltages for the coil are 24 V, 103 V and 180 V. Supply voltages other than those specified here are available at an additional charge. Voltage tolerance 10 % according to IEC 60038.

Torque adjustment

The rotor with brake pads is connected to the motor shaft via the toothed hub. The armature disk is pressed firmly against the rotor in the zero-current state by means of springs. The braking torque is applied by means of this pressure.

The braking torque that can be transferred can be altered by adjusting the spring force. The brake is equipped with an adjustment ring. The spring force, and therefore the braking torque, can be adjusted by rotating the adjustment ring.

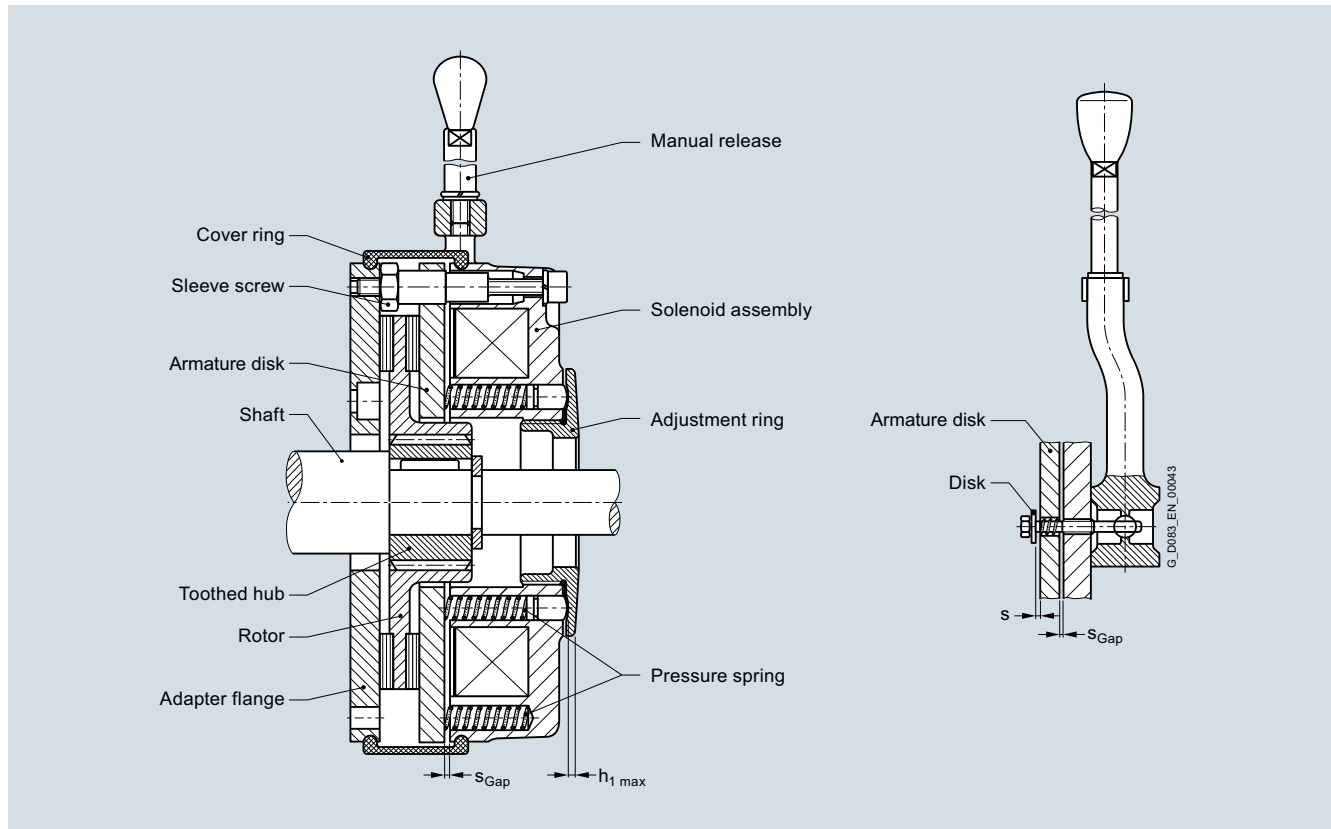
¹⁾ For possible assignment to motor frame sizes, see the power rating tables.

²⁾ Rotating parts of the brake

Overview (continued)**Brake with manual release**

The brake can also be supplied with manual release as an option. When the manual release lever is pulled under zero current conditions, the armature disk is pulled by means of the tension bolts against the pressure springs in the solenoid assembly. An air gap is created between the rotor and the armature disk.

The brake is mechanically released and the shaft can rotate easily. The pressure spring on the tension bolts holds the manual release lever in its normal position during operation.



The air gap "s" is the distance between the armature disk and the disk. The dimension "s" must be taken into consideration when the manual release is installed.

Brake size	Air gap		
	s_{Gap} mm	$s^{+0.1}$ mm	
12	0.3	1.5	Operating brake ($s_{Gap \text{ max. ca. } 2.5 \times s_{Gap}}$)
14			
16			
18	0.4	2	Holding brake with emergency stop function ($s_{Gap \text{ max. approx. } 1.5 \times s_{Gap}}$)
20			
25	0.5	2.5	

Important:

Even with reduced characteristic torque, the release distance must be adjusted when the maximum air gap $s_{Gap \text{ max.}}$ is reached.

Noise behavior

During operation, the noise response of the brake motor is hardly affected by the brake. The measuring-surface sound pressure level can therefore be obtained from the noise value tables for 1PS0, 1PS4, 1PS5 and 1MD5 motors (without brakes) in the section "Measuring-surface sound pressure level."

When the brake is released or engaged, however, sudden noises arise. These are recorded by means of the A-weighted emission sound pressure level (impulse sound pressure level) according to EN ISO 1680 – see Table.

Frame size	A-weighted emission sound pressure level (guide values) L_{pAF} dB (A)
132	76
160	80
180 ... 250	83

Introduction

General technical specifications

Brakes and brake motors

1

Overview (continued)

Basis for the calculation

A brake is designed mainly in accordance with the required braking torque T_{req} .

The masses to be braked (moments of inertia), relative speeds, braking times and the switching frequencies must be included in the calculations. The boundary conditions, such as ambient temperature, air humidity, dust accumulation and mounting position must be known. In the case of extreme/critical operating conditions, the manufacturer should be consulted. Dimensioning must be in accordance with VDI guideline 2241.

The friction surfaces must be kept free of grease and oil at all times.

Safety factor

In order to ensure that mechanical transmission is reliable even under extreme operating conditions, the calculated braking torque should include the safety factor K which must be selected in accordance with the operating conditions.

Load types

In practice, the following main types of load occur:

$$T_{req} = T_a \cdot K + T_B$$

Dynamic and static loading

Most application cases involve a mixture of loads, because a dynamic load is added to a static load torque.

$$T_{req} = (T_a \pm T_L) \cdot K + T_B$$

+ T_L is used, for example, when lowering a load
- T_L is used for normal braking

Rough determination of the required braking torque or frame size

If only the drive power to be transferred is known, the required torque or braking torque can be determined as follows:

$$T_{req} = 9550 \frac{P}{\Delta n_0} \times K \leq T_B$$

Thermal load capacity

If high switching frequencies and increased friction energy per switching cycle are expected, thermal recalculation of the brake is recommended.

The friction energy per switching cycle is calculated as follows:

$$Q = \frac{J_L + \Delta n^2}{182.5} \times \frac{T_B}{T_B + T_L}$$

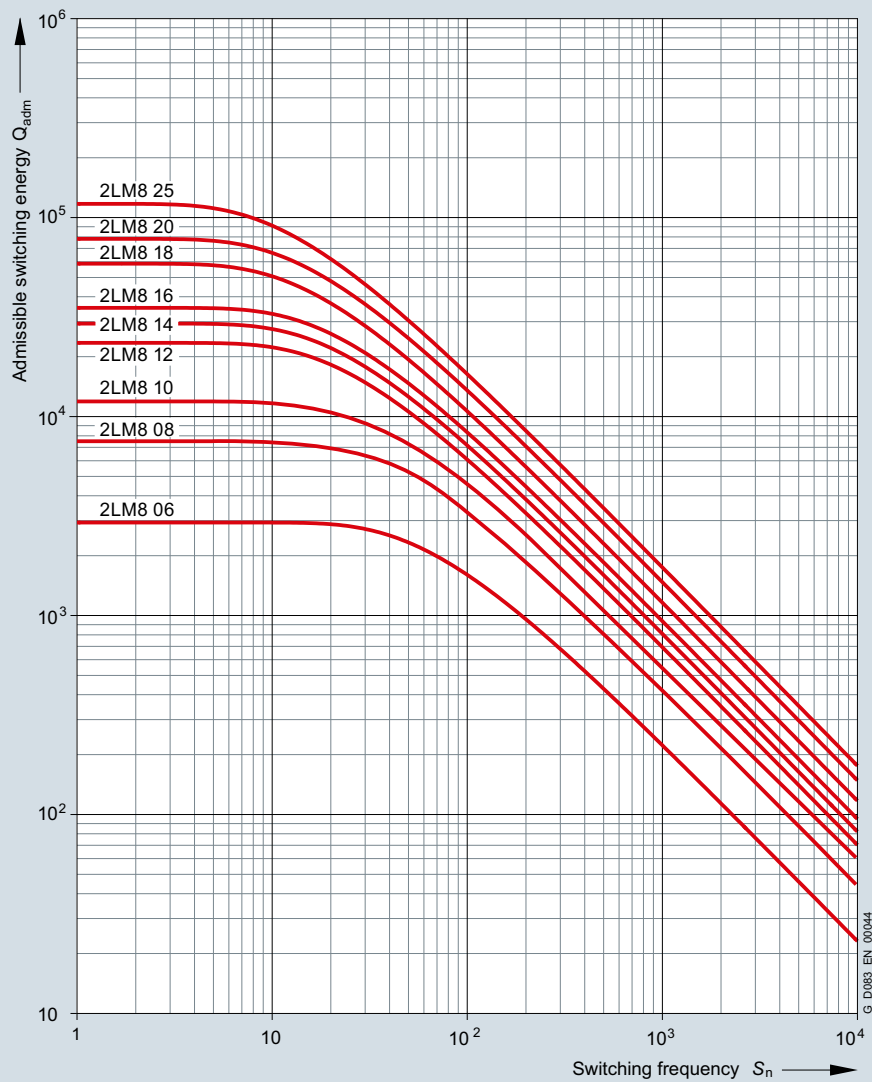
- T_L is used, for example, when lowering a load
+ T_L is used for normal braking

The admissible friction energy per switching cycle for a known switching frequency can be obtained from the following diagram. For a known friction energy per switching cycle, the admissible switching frequency can similarly be obtained from this diagram.

Abbreviations and definitions used

P	Drive power in kW
T_B	Characteristic torque for the brake in Nm
T_L	Load torque in Nm
T_{req}	Required braking torque in Nm
T_a	Deceleration torque in Nm
Δn_0	Initial relative speed of the brake in rpm
J_L	Moment of inertia of all drive components referred to the shaft to be braked in kgm^2
t_1	Application time, $t_1 = t_{11} + t_{12}$ in s
t_2	Disengaging time (time from the start of torque removal until the value $0.1 T_B$ is reached) in s
t_3	Sliding (time during which a relative movement occurs between the input and the output with the brake engaged) in s. This time depends on the delay required by the application case e.g. switching frequency
t_{11}	Responding delay on engaging (time from voltage switch-off up to the moment when the torque begins to rise) in s
t_{12}	Time taken for the braking torque to rise in s
K	Safety factor
Q	Calculated switching energy per switching cycle in J
Q_{adm}	Max. admissible switching energy per switching cycle in J
S_n	Switching frequency, i.e. the number of braking operations distributed evenly over the time unit in h^{-1}

Overview (continued)

Admissible switching energy Q_{adm} as a function of the switching frequency S_n

Introduction

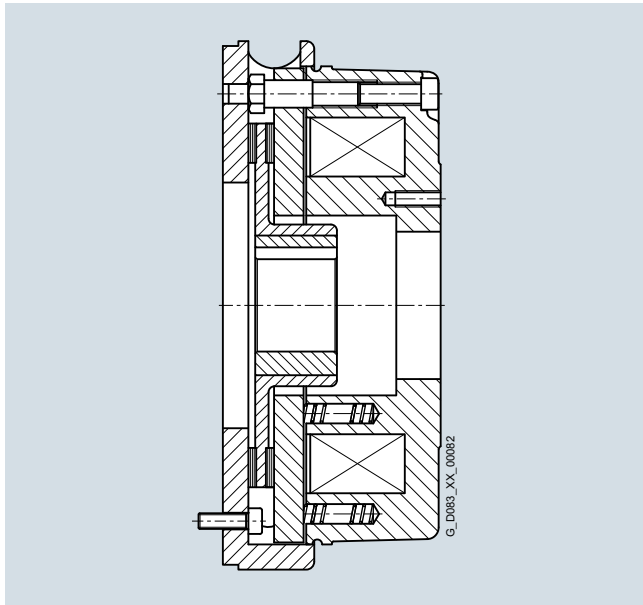
General technical specifications

Brakes and brake motors

1

Overview (continued)

Seawater-protected spring-operated brake IP67



The solenoid double-disk spring-operated brake of type 4BZFM (Stromag) brakes the motor if the supply is disconnected or in the event of power failure. Motors with built-on brakes are mainly used in cranes to drive traversing, trolley and hoisting gear, but also in marine winch drives. The size of the brake depends on the external moment of inertia, brake speed and the required braking time.

Further characteristics of the solenoid double-disk spring-operated brake of type 4BZFM

- Seawater-protected solenoid double-disk spring-operated brake
- Torque range: 100 to 1600 Nm (static torque)
- For use in cranes and offshore
- A cast-iron cover ensures IP67 degree of protection, so it can be used under the most difficult climatic conditions
- All surfaces finished
- When the cover is removed, the braking function is maintained
- Minimal wear, brake pads are easy to replace
- Emergency release
- IEC – mounting flange
- As an option: switching status indication, terminal box, anti-condensation heater, prepared for tachometer mounting
- Type approval: Germanisch Lloyd, Lloyds Register of Shipping, American Bureau of Shipping

Solenoid double-disk spring-operated brake of type 4BZFM

			Brake size						
			10	16	25	40	63	100	160
Switchable torque	T_{SN}	Nm	100	160	250	400	630	1000	1600
Transmittable torque	T_{trans}	Nm	110	175	275	440	690	1100	1750
Air gap, normal	s_{Gap}	mm	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Air gap, max.	$s_{Gap\ max.}$	mm	1.2	1.2	1.2	1.5	1.8	2.1	2.4
Speed, max.	n	rpm	6000	6000	5500	4700	4000	3600	3200
Moment of inertia	J	kg m ²	0.0019	0.0026	0.0050	0.0133	0.0271	0.0366	0.0600
Weight, approx.	m	kg	32	40	56	73	107	138	205
Rated DC voltage	U	V	110	110	110	110	110	110	110
Exciter power at 20 °C	P	W	122	142	164	214	249	332	403

Brakes for explosion-proof motors

Special information for brakes for explosion-proof motors, see catalog section 2.

Overview

Basics

Due to optimized design and manufacturing, most 1PS0 motors (without explosion protection) and 1PS1, 1PS4, 1PS5, 1MD5 motors (with explosion protection) can also be used for converter operation without the need to modify the electrical and mechanical design. The maximum limits and parameters for converter operation are summarized in this catalog. The special mechanical characteristics which must be taken into account that result from the higher speeds are listed below.

Bearing currents

It is known that in motors supplied from the line, a voltage can form along the mechanical shaft due to magnetic unbalance. If this shaft voltage exceeds a threshold value of approximately 500 mV, bearing currents that can damage the bearings start to flow. This phenomenon only occurs with larger motors. Therefore, to prevent bearing currents, the non-drive end bearing should be insulated for frame sizes 315 and higher. However, we recommend that motors of frame size 225 and above be equipped with insulated bearings on the non-drive end. The bearing insulation is performed by insulating the bearing seat on the motor shaft or through the use of current-insulated rolling-contact bearings. The minimum requirement for the ordering options is described in detail under "Power tables for converter operation."

Converter operation can increase these shaft voltages and bearing currents (typically by approximately 30 to 50 %). Additional high-frequency shaft voltages and currents can occur during operation with pulse converters (common mode bearing currents and circulating currents). The bearing currents depend on the motor size and the converter version (clock frequency, pulse modulation, output filter).

Previous experience shows that drives with SINAMICS G180 pulse converters (clock frequency 3 to 7.5 kHz, pulse modulation through voltage vector control, standard dv/dt output filter) and 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors are not damaged by the bearing currents that occur.

Mechanical limit speeds

When the motor is operated above its rated frequency, it is important to note that the maximum speeds are limited by the limits for the roller bearings, the critical rotor speed and the rigidity of the rotating parts. In the case of motors for use in potentially explosive areas of Zone 1 or 2, in accordance with EN 60079-0, the peripheral speed and therefore the speed of plastic fans is also limited.

For the limit speeds listed in the tables below, further special measures may be required.

Mechanical limit speeds for standard version: 1PS0 and 1PS1 motors without explosion protection and with type of protection "Non-sparking"

Frame size	No. of poles							
	2		4		6		8	
	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>
	rpm	Hz	rpm	Hz	rpm	Hz	rpm	Hz

LOHER VARIO 1PS0 and 1PS1 motors

355	3600	60	2700	90	2400	120	2400	160
400	3000	50	2250	75	2200	110	2100	140
450	3000	50	2100	70	2000	100	1900	127
500	3000	50	1800	60	1600	80	1500	100

Mechanical stress and grease lifetime

High speeds that exceed the rated speed with converter operation and the resulting increased vibrations alter the mechanical smooth running operation and the bearings are subject to increased mechanical stress. This reduces the grease lifetime and the bearing lifetime (please inquire where applicable).

The use of rigid couplings should be avoided as far as possible. For converter operation in particular, compliance with the mechanical limit speeds n_{\max} at maximum supply frequency f_{\max} is essential, see the following table "Mechanical limit speeds n_{\max} at maximum supply frequency f_{\max} ."

We supply SIPLUS CMS Condition Monitoring Systems for monitoring mechanical components. Servicing procedures are then easier to plan and execute on time in the context of preventative maintenance. Order code **Q05**.

Mechanical limit speeds for standard version: 1PS5 motors with type of protection "Ex d"

Frame size	No. of poles							
	2		4		6		8	
	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>
	rpm	Hz	rpm	Hz	rpm	Hz	rpm	Hz

LOHER VARIO 1PS5 motors

355	3600	60	2700	90	2400	120	2400	160
400	3000	50	2250	75	2200	110	2100	140
450	3000	50	2100	70	2000	100	1900	127
500	3000	50	1800	60	1600	80	1500	100

SIMOTICS XP 1MD5 and LOHER CHEMSTAR 1PS motors

71	6000	100	4500	150	4000	200	3000	200
80	6000	100	4500	150	4000	200	3000	200
90	6000	100	4500	150	4000	200	3000	200
100	6000	100	4200	140	3600	180	3000	200
112	6000	100	4200	140	3600	180	3000	200
132	5400	90	4200	140	3600	180	3000	200
160	4800	80	4200	140	3600	180	3000	200
180	4600	76	4200	140	3600	180	3000	200
200	4500	75	4200	140	3600	180	3000	200
225	4500	75	4500	150	4400	220	4400	293
250	3900	65	3700	123	3700	185	3700	247
280	3600	60	3000	100	3000	150	3000	200
315	3600	60	2600	87	2600	130	2600	173
355	3600	60	2600	87	2600	130	2600	173

Introduction

General technical specifications

Converter operation – General information

Overview (continued)

Operating explosion-proof motors on a converter

For the safe operation of explosion-proof motors on a converter, some basic rules must be observed. These rules are summarized in the R20000 guideline. The current version of R20000 is stamped on the rating plate.

The guideline must be complied with regardless of the type and manufacturer of the converter.

If explosion-proof motors are to be operated at frequencies above 60 Hz or 10 % above the cutoff frequency, it may be necessary to perform a system test of the motor with the converter.

The minimum requirement for the ordering options is described in detail under "Power tables for converter operation." The customer is responsible for fulfillment of the regulations which may be affected by the use of sine-wave filters, long cables, etc.

Operating dust explosion-proof motors on a converter

Dust explosion-proof motors can be operated on a converter if suitable monitoring equipment is used (e.g. PTC thermistor for sole protection and certified evaluation units). The boundary conditions described above also apply in this case and compliance with the R20000 guideline, in particular, is essential. For motors in the admissible type of protection for Zone 21, the limits of the control range between 5 and 50 (60 Hz) also apply. The maximum possible power in converter operation must not exceed the power for line operation even in the case of higher thermal utilization on the converter. In special cases, it may be necessary to test the original system comprising the motor with the converter, or a system comprising the same types.

If the motor is operated on SINAMICS G180 or on a different SINAMICS converter with a suitable filter (e.g. dv/dt filter), operation on line supplies from 500 V to 690 V is possible. Operation on converters with vector control is admissible. Compliance with the boundary conditions described in the guideline No. 20000 must be ensured by the operating company.

Siemens R20000 guideline for converter operation of explosion-proof, low-voltage, three-phase motors

Converter operation of explosion-proof, low-voltage, three-phase motors with type of protection "Explosion-proof enclosure" and "Non-sparking" for temperature classes T1 - T4

Explosion-proof three-phase motors may be operated on a converter if the following conditions are satisfied:

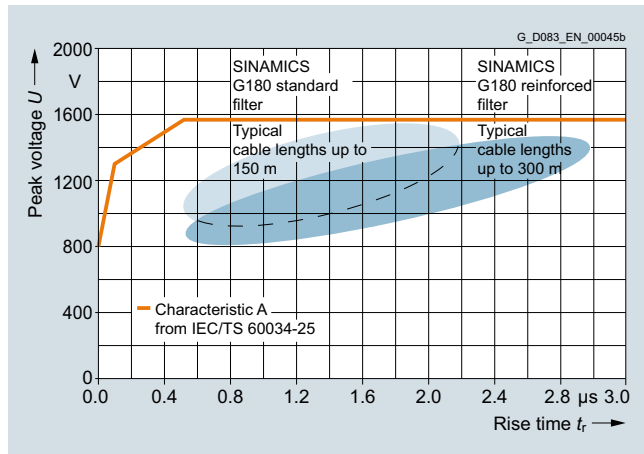
1. The output voltage of the converter shall be controlled such that within the frequency range below the rated frequency of the motor, an approximately linear relationship is maintained between the voltage (fundamental component) and the frequency (fundamental component), i.e. practically constant machine flux in accordance with the rated data. Operation above 1.1 times the rated frequency is only admissible when the motor has an appropriate rating plate for converter operation.
2. $I_{\text{continuous}}$ is the value to which the current is restricted by converter control in continuous duty. The maximum value which can be set for $I_{\text{continuous}}$ is the continuously admissible rated motor current in accordance with the rating plate on the motor or the value specified in the documents that describe converter operation (R No.).
3. I_{temp} is the value to which the current is limited by converter control in the case of temporary overloads of a maximum duration of t_{temp} . The maximum value which can be set for I_{temp} is $1.5 \times I_{\text{continuous}}$.
4. t_{temp} is the amount of time for which the converter permits $I_{\text{continuous}}$ to be exceeded. t_{temp} is to be set for a maximum of 60 seconds.
5. The installed thermistors (e.g. PTC thermistors), which must be suitable as sole protection, are to be connected to a tripping device conforming to guideline 94/9/EC with a prototype test certificate such as CK140: PTB 04 ATEX 3038 or CK144/145: PTB 02 ATEX 3059.
6. Voltage peaks
(especially for pulse converters with long motor cable)
 - a) The assessment of the terminal box in relation to clearances and creep age distances allows for converter operation with voltage peaks (\hat{U}_{LL} and \hat{U}_{LE}) of up to $\hat{U} = 4600$ V with explosion protection type Ex eb (formerly Ex e) terminal boxes and up to $\hat{U} = 3000$ V for explosion protection type Ex ec (formerly Ex nA) terminal boxes. This is not permitted to be exceeded for reasons of explosion protection.
 - b) To prevent partial discharges arising, with Ex ec (formerly Ex nA) machines with standard insulation the voltage at the motor terminals must also be limited in relation to the rise time to values which fall below the characteristic curve of the "withstand voltage curve" diagram (see picture below). With Ex d motors, this is recommended so as not to limit the service life.

Ruhstorf, 2016-04-01
Siemens Aktiengesellschaft

Overview (continued)

Typical voltage stress of motors for operation on the SINAMICS G180 converter at 690 V

Motors of the 1PS or 1MD5 series with standard insulation are designed for peak voltages up to 1500 V (IEC/TS 60034-25).



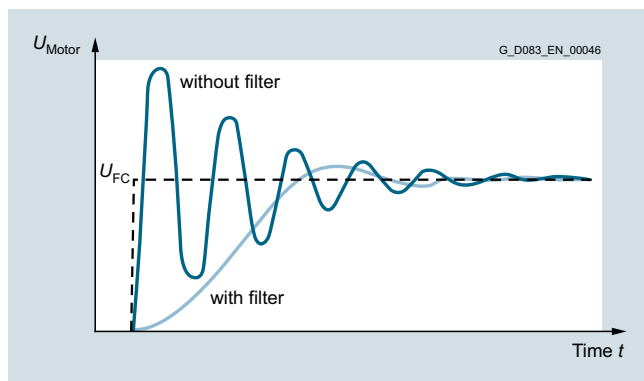
As an option, 1PS motors are also available with special insulation for peak voltages of 2.25 kV. In this case, the winding is suitable for peak voltages in accordance with IEC/TS 60034-25 Curve B. Due to the space required by the special winding insulation, this option can only be ordered for frame size 160 and above. The possible power of the motor is then 5 % lower than a motor with standard insulation. The limits for peak voltage with regard to explosion protection, especially for the terminal box, are applicable as specified in the R20000 regulation.

Engineering information for converter operation**Admissible voltage stress**

More stress is placed on the insulation of the motor winding with converter operation than with line operation. The voltage stress also depends on the type of converter used.

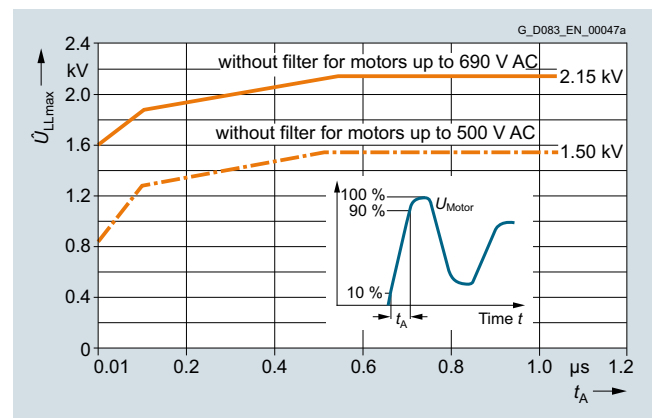
Voltage stress on a converter with pulse width modulation (PWM)

The PWM converter subjects the motor windings to wear and tear mainly by quickly applying voltage pulses. Each switching process of the converter releases a voltage wave onto the motor supply cable that can result in excessive motor voltages due to reflection (see diagram).



Typical progression of converter voltage U_{FC} and motor voltage U_{Motor} on the PWM converter (converter with and without output filter, length of motor cable 100 m)

The maximum voltage is influenced by the rise time of the pulses and by the length of cable used between motor and converter. A dv/dt output filter at the converter can reduce the maximum motor voltage to uncritical values. With the SINAMICS G180 converters, a high-quality dv/dt output filter is included as standard. With converters without dv/dt output filters, inadmissible voltage peaks can occur even with a relatively short motor cable (approx. 10 m). With the dv/dt output filters of the SINAMICS G180 converter, depending on the supply voltage, cable lengths of 150 m (at 690 V) to 300 m (at 400 to 500 V) are possible. The admissible voltage stress for the motor depends on the rise t_r of the converter output voltage. The admissible voltage stress for our motors with standard insulation (1.50 kV curve) is shown in the diagram below. Special insulation is necessary for higher voltage stress (2.15 kV curve; on request, additional charge).



Admissible voltage stress for motors with standard insulation ($U_{LL,max}$ = Maximum value of phase-to-phase voltage)

The operation of the 1PS0/5 and 1MD5 motor series on Siemens G180, G150, G130, G120 PM230, G120 PM240x, S150 and S120 converters is possible in the standard version with a supply voltage up to 500 V with a typical cable length up to 150 m.

Testing using the provisions set out in guideline R20000 is necessary for other converter types or manufacturers.

Motor operation on converter with sine-wave filter

In special applications, e.g. with extremely long motor cables, so-called sine-wave filters are used which result in a smoother converter voltage than dv/dt filters. When a sine-wave filter is used, it is important to note that a significant drop in motor voltage of up to 15 % occurs. Under these operating conditions, derating is necessary to prevent the motors from overheating. For operation with sine-wave filters and the consequent reduction of 10 to 15 % in motor voltage, the admissible power ratings for converter operation must be similarly reduced by 10 to 15 %.

For the LOHER CHEMSTAR and LOHER VARIO series, it is possible to dimension the motors for the reduced voltage at the motor terminals that results from the converter, which can prevent a reduction in power rating due to reduced voltage.

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview

Individual drive check of variable speed drive (VSD) systems (IC411 self-ventilated motors) with configuration characteristics for converter operation - motors 1PS0, 1PS1, 1PS5 and 1MD5

Limits for example control ranges are listed in the power tables on the following pages. For individual drive checks, the following configuration characteristics apply to frame sizes 71 to 200 and 225 to 355.

For driven machine power or torque less than or equal to rated data, operation up to f_{max} in accordance with the power tables is possible. This applies to configurations with any load torques and control ranges.

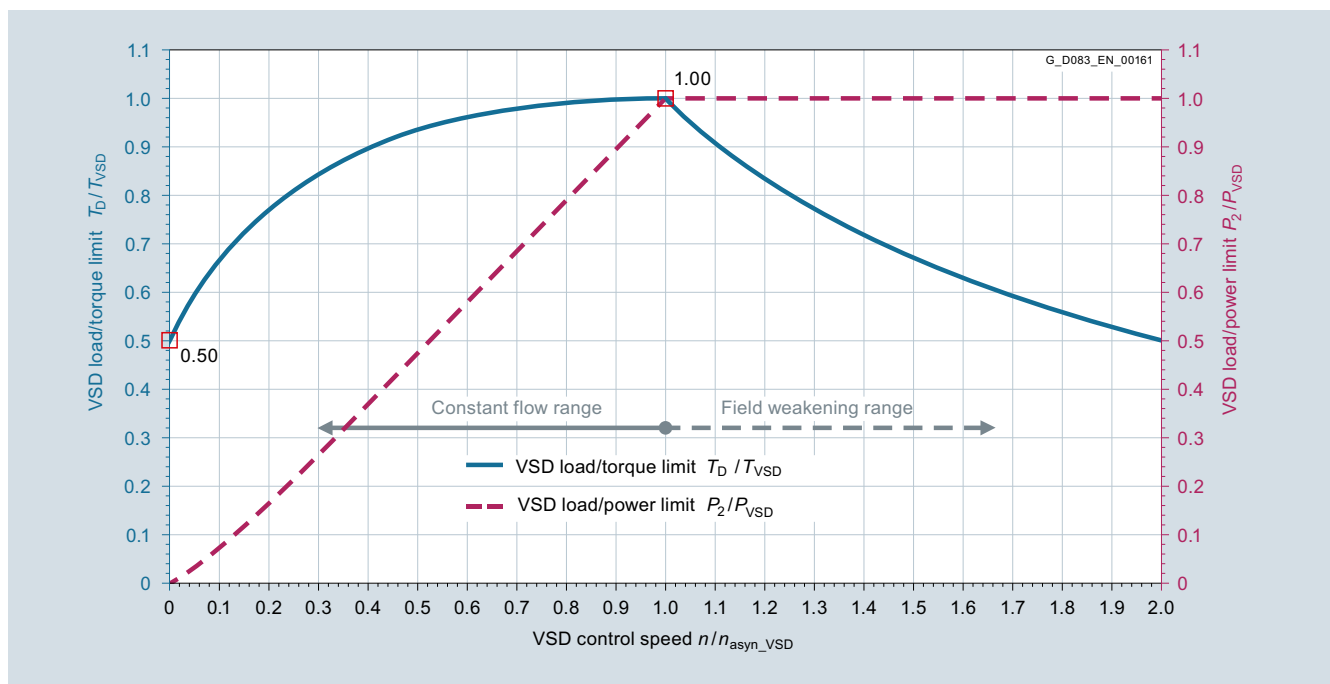
The maximum admissible speed in field weakening can be calculated by dividing $f_{max} \cdot 120$ by the motor's number of poles.

Review of the feasibility of the desired operating point

For this purpose:

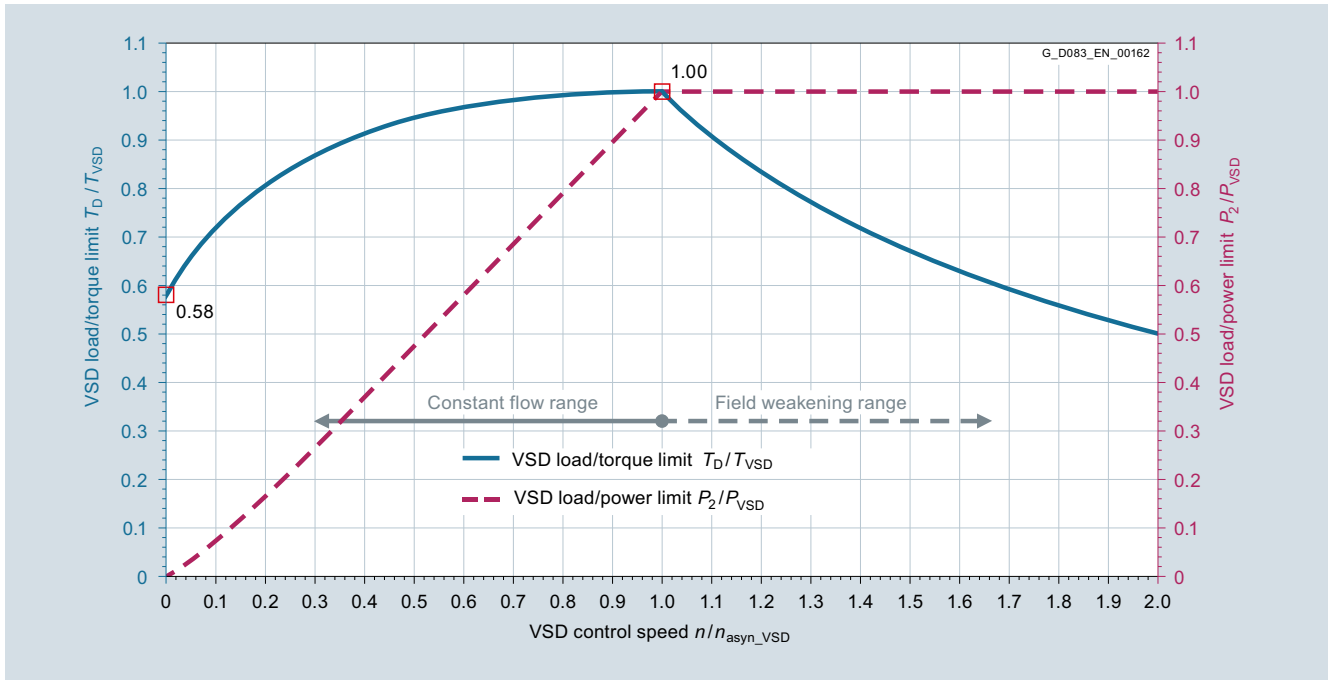
- The desired load/power P_2 must be divided by the VSD power P_{VSD}
- The desired control speed n must be divided by the VSD asynchronous speed n_{asyn_VSD}
- The desired load/torque T_D must be divided by the VSD torque T_{VSD} .

These calculated values should be checked afterwards against the following diagrams to determine whether the desired operating point is below the VSD load/torque limit T_D/T_{VSD} and the load/power limit P_2/P_{VSD} .



Configuration characteristics for frame sizes 71 to 200

Overview (continued)



Configuration characteristics for frame sizes 225 to 355

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

SIMOTICS XP 1MD5 (Ex d (e)) motors – Power tables for converter operation

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim r^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	

Cooling: self-ventilated (IC411)

Efficiency: High Efficiency IE2

Ambient temperature: 40 °C, installation altitude: 1000 m

2-pole: 3000 rpm at 50 Hz

Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)

1MD50701BD..4AA1	<i>DNGW-071BR-02.</i>	0.37	0.34	1.15	2823	0.88	100	0.34	0.88
1MD50711BD..4AA1	<i>DNGW-071BS-02.</i>	0.55	0.50	1.71	2792	1.29	100	0.50	1.27
1MD50801BD..4AA1	<i>DNGW-080BR-02.</i>	0.75	0.65	2.37	2619	1.58	95	0.65	1.50
1MD50811BD..4AA1	<i>DNGW-080BS-02.</i>	1.10	1.00	3.43	2784	2.30	100	1.00	2.25
1MD50951BD..4AA1	<i>DNGW-090LR-02.</i>	1.50	1.30	4.60	2699	3.00	100	1.30	2.90
1MD50981BD..4AA1	<i>DNGW-090LS-02.</i>	2.20	2.00	6.70	2851	4.30	100	2.00	4.25
1MD51061BD..4AA1	<i>DNGW-100LS-02.</i>	3.00	2.70	9.10	2833	5.70	100	2.70	5.60
1MD51131BD..4AA1	<i>DNGW-112MS-02.</i>	4.00	3.70	12.0	2944	7.30	100	3.70	7.30
1MD51311BD..4AA1	<i>DNGW-132SR-02.</i>	5.50	5.10	16.5	2952	9.80	90	5.10	9.90
1MD51321BD..4AA1	<i>DNGW-132SS-02.</i>	7.50	6.50	22.5	2759	13.3	90	6.50	12.6
1MD51631BD..4AA1	<i>DNGW-160MR-02.</i>	11.0	10.0	33.0	2894	19.2	80	10.0	18.9
1MD51651BD..4AA1	<i>DNGW-160MS-02.</i>	15.0	13.5	44.9	2871	25.5	80	13.5	25.0
1MD51661BD..4AA1	<i>DNGW-160LS-02.</i>	18.5	17.0	55.0	2952	31.5	80	17.0	31.0
1MD51831BD..4AA1	<i>DNGW-180MS-02.</i>	22.0	20.0	66.0	2894	37.5	76	20.0	37.0
1MD52061BD..4AA1	<i>DNGW-200LR-02.</i>	30.0	27.5	90.0	2918	51.0	75	27.5	50.0
1MD52081BD..4AA1	<i>DNGW-200LS-02.</i>	37.0	34.0	111	2925	61.0	75	34.0	61.0
1MD52231BD..4AA1	<i>DNGW-225MS-02.</i>	45.0	41.5	134	2957	74.0	75	41.5	74.0
1MD52531BD..4AA1	<i>DNGW-250MM-02.</i>	55.0	51.0	164	2970	89.0	65	51.0	89.0
1MD52801BD..4AA1	<i>DNGW-280SL-02.</i>	75.0	69.5	223	2976	124	60	69.5	124
1MD52831BD..4AA1	<i>DNGW-280MM-02.</i>	90.0	83.0	268	2957	146	60	83.0	146
1MD53111BD..4AA1	<i>DNGW-315SL-02.</i>	110	102	327	2979	174	60	102	174
1MD53131BD..4AA1	<i>DNGW-315ML-02.</i>	132	122	392	2972	205	60	122	205
1MD53151BD..4AA1	<i>DNGW-315MN-02.</i>	160	148	475	2975	245	60	148	245
1MD53161BD..4AA1	<i>DNGW-315LL-02.</i>	200	185	594	2974	305	60	185	305
1MD53181BD..4AA1	<i>DNGW-315LN-02.</i>	250	231	741	2977	385	60	231	385
1MD53531BD..4AA1	<i>DNGW-355MR-02.</i>	315	292	934	2985	500	60	292	500
1MD53551BD..4AA1	<i>DNGW-355MS-02.</i>	360	333	1068	2977	570	60	333	570
1MD53571BD..4AA1	<i>DNGW-355MT-02.</i>	460	426	1364	2982	710	60	426	710

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10				Setting range 1 : 3			
$T = \text{constant}$				$T = \text{constant}$			
Constant flux				Constant flux			
5 ... 50 Hz				16 ² / ₃ ... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{5 \text{ Hz}}$	$P_{50 \text{ Hz}}$	T	I_{VSD}	$P_{16 \text{ 2/3 Hz}}$	$P_{50 \text{ Hz}}$	T	I_{VSD}
kW	kW	Nm		kW	kW	Nm	A

0.01	0.22	0.72	0.76	0.09	0.29	0.98	0.83
0.02	0.32	1.07	1.07	0.13	0.22	0.72	0.76
0.02	0.44	1.46	1.18	0.17	0.60	2.02	1.41
0.04	0.65	2.15	1.73	0.26	0.32	1.07	1.07
0.07	0.90	2.94	2.40	0.37	1.20	3.96	2.80
0.10	1.30	4.31	3.45	0.55	1.70	5.80	3.95
0.15	1.80	5.90	4.25	0.75	2.40	7.90	5.20
0.22	2.40	7.80	5.30	1.00	3.20	10.4	6.60
0.30	3.30	10.8	7.20	1.40	4.40	14.3	8.80
0.41	4.50	14.7	9.70	1.90	6.00	19.5	11.9
0.60	6.50	21.6	14.0	2.80	8.50	28.6	17.1
0.80	9.00	29.4	18.4	3.90	12.0	39.0	22.5
1.00	11.0	36.3	22.5	4.80	14.5	48.1	27.5
1.10	13.0	43.1	26.5	5.50	17.5	57.0	33.0
1.60	18.0	59.0	36.0	7.50	24.0	78.0	45.0
2.00	22.5	73.0	43.0	9.50	29.5	96.0	54.0
2.70	29.5	95.0	56.0	12.0	36.5	119	67.0
3.40	36.0	116	67.0	14.5	45.0	145	80.0
4.70	49.0	158	94.0	20.0	61.5	197	112
5.50	59.0	190	109	24.0	73.5	237	131
7.00	72.5	232	128	29.0	90.0	289	156
8.00	87.0	279	150	35.0	108	347	184
10.0	105	338	179	43.0	131	421	220
12.5	132	422	220	54.0	164	526	275
16.0	165	528	280	67.0	205	657	345
20.0	208	665	375	84.0	258	828	450
23.0	237	760	420	96.0	295	946	510
29.0	303	971	530	124	378	1209	640

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power	Power	Torque	Speed	Current	Max. frequency	Power	Current		
P_{rated} kW	P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	(at 400 V f_{max})	
Cooling: self-ventilated (IC411)									
Efficiency: High Efficiency IE2									
Ambient temperature: 40 °C, installation altitude: 1000 m									
2-pole: 3000 rpm at 50 Hz									
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional									
1MD50701BD..4AA1	DNGW-071BR-02.	0.37	0.38	1.27	2857	0.93	100	0.38	0.92
1MD50711BD..4AA1	DNGW-071BS-02.	0.55	0.55	1.90	2764	1.36	100	0.55	1.34
1MD50801BD..4AA1	DNGW-080BR-02.	0.75	0.75	2.63	2723	1.70	85	0.75	1.67
1MD50811BD..4AA1	DNGW-080BS-02.	1.10	1.10	3.82	2750	2.45	100	1.10	2.40
1MD50951BD..4AA1	DNGW-090LR-02.	1.50	1.50	5.10	2809	3.25	100	1.50	2.90
1MD50981BD..4AA1	DNGW-090LS-02.	2.20	2.20	7.50	2801	4.60	100	2.20	4.50
1MD51061BD..4AA1	DNGW-100LS-02.	3.00	3.00	10.2	2809	6.20	100	3.00	6.10
1MD51131BD..4AA1	DNGW-112MS-02.	4.00	4.10	13.3	2944	8.00	100	4.10	8.00
1MD51311BD..4AA1	DNGW-132SR-02.	5.50	5.50	18.3	2870	10.8	90	5.50	10.5
1MD51321BD..4AA1	DNGW-132SS-02.	7.50	7.50	25.0	2865	14.5	90	7.50	14.1
1MD51631BD..4AA1	DNGW-160MR-02.	11.0	11.0	36.6	2870	21.0	80	11.0	20.5
1MD51651BD..4AA1	DNGW-160MS-02.	15.0	15.0	49.9	2871	28.0	80	15.0	27.0
1MD51661BD..4AA1	DNGW-160LS-02.	18.5	19.0	62.0	2926	34.5	80	19.0	34.0
1MD51831BD..4AA1	DNGW-180MS-02.	22.0	22.5	74.0	2904	41.0	76	22.5	41.0
1MD52061BD..4AA1	DNGW-200LR-02.	30.0	30.5	100	2913	56.0	75	30.5	55.0
1MD52081BD..4AA1	DNGW-200LS-02.	37.0	38.0	123	2950	67.0	75	38.0	67.0
1MD52231BD..4AA1	DNGW-225MS-02.	45.0	46.0	149	2948	82.0	75	46.0	81.0
1MD52531BD..4AA1	DNGW-250MM-02.	55.0	56.5	182	2964	98.0	65	56.5	98.0
1MD52801BD..4AA1	DNGW-280SL-02.	75.0	77.0	248	2965	136	60	77.0	136
1MD52831BD..4AA1	DNGW-280MM-02.	90.0	92.0	298	2948	161	60	92.0	160
1MD53111BD..4AA1	DNGW-315SL-02.	110	113	363	2973	192	60	113	192
1MD53131BD..4AA1	DNGW-315ML-02.	132	135	435	2964	230	60	135	225
1MD53151BD..4AA1	DNGW-315MN-02.	160	164	528	2966	270	60	164	270
1MD53161BD..4AA1	DNGW-315LL-02.	200	205	660	2966	340	60	205	340
1MD53181BD..4AA1	DNGW-315LN-02.	250	231	741	2977	385	60	231	385
1MD53531BD..4AA1	DNGW-355MR-02.	315	292	934	2985	500	60	292	500
1MD53551BD..4AA1	DNGW-355MS-02.	360	333	1068	2977	570	60	333	570
1MD53571BD..4AA1	DNGW-355MT-02.	460	426	1364	2982	710	60	426	710

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10				Setting range 1 : 3			
$T = \text{constant}$				$T = \text{constant}$			
Constant flux				Constant flux			
5 ... 50 Hz				16 ² / ₃ ... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16\ 2/3\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD} A

identification code **-Z** and order code **C32** "Power data for converter operation, utilization of thermal class F (155 °C)"

0.01	0.24	0.80	0.78	0.10	0.32	1.09	0.86
0.02	0.36	1.19	1.10	0.14	0.24	0.80	0.78
0.02	0.48	1.61	1.24	0.19	0.65	2.24	1.51
0.04	0.70	2.37	1.81	0.29	0.36	1.19	1.10
0.07	0.95	3.25	2.50	0.41	1.30	4.40	2.95
0.11	1.40	4.76	3.60	0.60	1.90	6.40	4.15
0.16	2.00	6.50	4.55	0.80	2.60	8.80	5.60
0.24	2.70	8.70	5.70	1.10	3.50	11.6	7.10
0.33	3.70	12.0	7.70	1.50	4.90	15.9	9.60
0.45	5.00	16.3	10.4	2.10	6.50	21.7	12.9
0.65	7.00	23.9	15.0	3.10	9.50	31.8	18.6
0.90	10.0	32.6	19.8	4.30	13.0	43.3	25.0
1.10	12.5	40.3	24.0	5.30	16.5	53.0	30.5
1.20	14.5	47.8	28.5	6.00	19.5	64.0	36.0
1.80	20.0	65.0	38.5	8.50	26.5	87.0	49.0
2.20	25.0	81.0	47.0	10.5	33.0	107	59.0
3.00	32.5	105	61.0	13.0	41.0	132	73.0
3.70	40.0	129	73.0	16.0	50.0	161	88.0
5.20	54.5	176	102	22.0	68.0	219	123
6.00	65.5	211	119	26.0	82.0	263	144
7.50	80.0	258	141	33.0	100	321	172
9.00	96.0	309	165	39.0	120	386	205
11.0	117	375	197	48.0	146	467	240
14.0	146	469	245	60.0	182	584	300
17.5	165	528	280	74.0	228	730	380
22.0	208	665	375	94.0	287	920	495
25.0	237	760	420	108	328	1051	560
32.0	303	971	530	138	419	1343	700

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)									
Efficiency: High Efficiency IE2									
Ambient temperature: 40 °C, installation altitude: 1000 m									
4-pole: 1500 rpm at 50 Hz									
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)									
1MD50701BD..4BA1	DNGW-071BR-04.	0.25	0.23	1.56	1408	0.78	100	0.23	0.77
1MD50711BD..4BA1	DNGW-071BS-04.	0.37	0.34	2.36	1376	0.99	100	0.34	0.99
1MD50801BD..4BA1	DNGW-080BR-04.	0.55	0.50	3.38	1413	1.32	100	0.50	1.31
1MD50811BD..4BA1	DNGW-080BS-04.	0.75	0.65	4.61	1346	1.71	100	0.65	1.65
1MD50951BD..4BA1	DNGW-090LR-04.	1.10	1.00	6.80	1404	2.40	100	1.00	2.35
1MD50981BD..4BA1	DNGW-090LS-04.	1.50	1.30	9.30	1335	3.15	100	1.30	3.05
1MD51061BD..4BA1	DNGW-100LR-04.	2.20	2.00	13.4	1425	4.40	100	2.00	4.35
1MD51081BD..4BA1	DNGW-100LS-04.	3.00	2.70	18.3	1409	5.80	100	2.70	5.70
1MD51131BD..4BA1	DNGW-112MS-04.	4.00	3.70	24.3	1454	7.80	100	3.70	7.80
1MD51311BD..4BA1	DNGW-132SR-04.	5.50	5.10	33.2	1467	10.7	100	5.10	10.7
1MD51331BD..4BA1	DNGW-132MS-04.	7.50	6.50	45.3	1370	13.8	100	6.50	13.1
1MD51631BD..4BA1	DNGW-160MR-04.	11.0	10.0	66.0	1447	19.6	100	10.0	19.3
1MD51661BD..4BA1	DNGW-160LS-04.	15.0	13.5	90.0	1432	26.5	100	13.5	26.0
1MD51831BD..4BA1	DNGW-180MR-04.	18.5	17.0	112	1449	32.5	100	17.0	32.5
1MD51861BD..4BA1	DNGW-180LS-04.	22.0	20.0	133	1436	39.0	100	20.0	38.0
1MD52061BD..4BA1	DNGW-200LS-04.	30.0	27.5	181	1451	52.0	100	27.5	52.0
1MD52201BD..4BA1	DNGW-225SR-04.	37.0	34.0	223	1456	61.0	87	34.0	61.0
1MD52231BD..4BA1	DNGW-225MS-04.	45.0	41.5	270	1468	75.0	87	41.5	75.0
1MD52531BD..4BA1	DNGW-250MM-04.	55.0	51.0	329	1480	94.0	80	51.0	94.0
1MD52801BD..4BA1	DNGW-280SL-04.	75.0	69.5	447	1485	124	75	69.5	124
1MD52831BD..4BA1	DNGW-280MM-04.	90.0	83.0	536	1479	148	75	83.0	148
1MD53111BD..4BA1	DNGW-315SL-04.	110	102	654	1489	183	65	102	183
1MD53131BD..4BA1	DNGW-315ML-04.	132	122	784	1486	215	65	122	215
1MD53151BD..4BA1	DNGW-315MN-04.	160	148	951	1486	260	65	148	260
1MD53161BD..4BA1	DNGW-315LL-04.	200	185	1188	1487	325	65	185	325
1MD53171BD..4BA1	DNGW-315LM-04.	250	231	1488	1482	410	65	231	410
1MD53531BD..4BA1	DNGW-355MR-04.	315	292	1874	1488	520	60	292	520
1MD53551BD..4BA1	DNGW-355MS-04.	360	333	2142	1485	600	60	333	600
1MD53571BD..4BA1	DNGW-355MT-04.	460	426	2737	1486	750	60	426	750

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10

$T = \text{constant}$

Constant flux

5 ... 50 Hz

5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	

Setting range 1 : 3

$T = \text{constant}$

Constant flux

$16 \frac{2}{3}$... 50 Hz

$16 \frac{2}{3}$ Hz Power	50 Hz Power	$16 \frac{2}{3}$... 50 Hz Torque	Current
$P_{16 \frac{2}{3}\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	A

Setting range 10 : 17²⁾

Any load characteristic

Constant flux

50 ... 87 Hz

Power	Torque	Current
P	T	I_{VSD}
kW	Nm	

0.01	0.14	0.98	0.70	0.06	0.20	1.34	0.74	0.36	1.36	1.29
0.01	0.21	1.44	0.88	0.08	0.29	2.00	0.94	0.50	2.05	1.64
0.02	0.33	2.15	1.13	0.13	0.44	2.91	1.24	0.75	2.95	2.15
0.03	0.45	2.93	1.41	0.18	0.60	3.97	1.59	1.05	4.02	2.75
0.04	0.65	4.30	1.95	0.27	0.85	5.90	2.20	1.50	6.00	3.90
0.06	0.85	5.90	2.55	0.37	1.20	8.00	2.90	2.10	8.10	5.10
0.11	1.30	8.60	3.35	0.55	1.70	11.6	3.95	3.10	11.70	6.90
0.15	1.80	11.8	4.35	0.75	2.40	15.8	5.20	4.20	15.90	9.10
0.20	2.40	15.7	6.20	1.00	3.20	21.0	7.20	5.70	21.10	12.50
0.29	3.30	21.6	8.10	1.40	4.40	28.8	9.60	7.80	29.00	16.80
0.39	4.50	29.4	10.1	1.90	6.00	39.2	12.3	10.60	39.50	21.50
0.55	6.50	43.1	14.6	2.80	8.50	57.0	17.6	15.60	57.80	30.50
0.80	9.00	59.0	19.5	3.90	12.0	78.0	23.5	21.20	78.50	41.00
0.95	11.0	73.0	23.5	4.80	14.5	97.0	29.0	26.30	97.50	51.00
1.10	13.0	86.0	28.5	5.50	17.5	115	35.0	31.30	115.90	61.00
1.60	18.0	118	38.0	7.50	24.0	157	46.5	42.60	157.50	81.00
2.10	24.0	156	45.0	9.50	30.0	197	55.0	–	–	–
2.60	29.5	190	56.0	11.5	36.5	238	67.0	–	–	–
3.30	36.0	232	71.0	14.5	45.0	291	84.0	–	–	–
4.60	49.0	317	92.0	20.0	61.5	396	111	–	–	–
5.50	59.0	380	112	24.0	73.5	474	134	–	–	–
6.50	72.5	464	138	29.0	90.0	579	165	–	–	–
8.00	87.0	557	161	35.0	108	694	194	–	–	–
10.0	105	675	196	43.0	131	842	235	–	–	–
12.5	132	844	245	54.0	164	1052	295	–	–	–
15.5	164	1055	310	67.0	205	1317	370	–	–	–
19.5	207	1330	395	84.0	258	1659	470	–	–	–
22.0	237	1520	450	96.0	295	1896	540	–	–	–
28.0	303	1942	560	124	378	2422	680	–	–	–

²⁾ Optional voltage with **9** at the 11th position of the Article No. and order code **L1P**: 230/400 VΔ/Y, 50 Hz; 400 VΔ, 87Hz (operating values at 87 Hz and motor in Δ circuit).

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)									
Efficiency: High Efficiency IE2									
Ambient temperature: 40 °C, installation altitude: 1000 m									
4-pole: 1500 rpm at 50 Hz									
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional									
1MD50701BD..4BA1	<i>DNGW-071BR-04.</i>	0.25	0.25	1.74	1372	0.80	100	0.25	0.79
1MD50711BD..4BA1	<i>DNGW-071BS-04.</i>	0.37	0.38	2.62	1385	1.03	100	0.38	1.03
1MD50801BD..4BA1	<i>DNGW-080BR-04.</i>	0.55	0.55	3.76	1397	1.39	100	0.55	1.37
1MD50811BD..4BA1	<i>DNGW-080BS-04.</i>	0.75	0.75	5.1	1404	1.82	100	0.75	1.79
1MD50951BD..4BA1	<i>DNGW-090LR-04.</i>	1.10	1.10	7.6	1382	2.55	100	1.10	2.50
1MD50981BD..4BA1	<i>DNGW-090LS-04.</i>	1.50	1.50	10.3	1391	3.35	100	1.50	3.30
1MD51061BD..4BA1	<i>DNGW-100LR-04.</i>	2.20	2.20	14.9	1410	4.75	100	2.20	4.65
1MD51081BD..4BA1	<i>DNGW-100LS-04.</i>	3.00	3.00	20.3	1411	6.30	100	3.00	6.20
1MD51131BD..4BA1	<i>DNGW-112MS-04.</i>	4.00	4.10	26.9	1455	8.40	100	4.10	8.40
1MD51311BD..4BA1	<i>DNGW-132SR-04.</i>	5.50	5.50	36.9	1423	11.6	100	5.50	11.3
1MD51331BD..4BA1	<i>DNGW-132MS-04.</i>	7.50	7.50	50	1432	15.1	100	7.50	14.7
1MD51631BD..4BA1	<i>DNGW-160MR-04.</i>	11.0	11.0	74	1419	21.5	100	11.0	21.0
1MD51661BD..4BA1	<i>DNGW-160LS-04.</i>	15.0	15.0	100	1432	29.0	100	15.0	28.0
1MD51831BD..4BA1	<i>DNGW-180MR-04.</i>	18.5	19.0	124	1463	35.5	100	19.0	35.5
1MD51861BD..4BA1	<i>DNGW-180LS-04.</i>	22.0	22.5	148	1452	42.5	100	22.5	42.0
1MD52061BD..4BA1	<i>DNGW-200LS-04.</i>	30.0	30.5	201	1449	57.0	100	30.5	57.0
1MD52201BD..4BA1	<i>DNGW-225SR-04.</i>	37.0	38.0	248	1463	67.0	87	38.0	67.0
1MD52231BD..4BA1	<i>DNGW-225MS-04.</i>	45.0	46.0	300	1464	82.0	87	46.0	82.0
1MD52531BD..4BA1	<i>DNGW-250MM-04.</i>	55.0	56.5	366	1474	103	80	56.5	102
1MD52801BD..4BA1	<i>DNGW-280SL-04.</i>	75.0	77.0	497	1479	136	75	77.0	136
1MD52831BD..4BA1	<i>DNGW-280MM-04.</i>	90.0	92.0	596	1474	163	75	92.0	162
1MD53111BD..4BA1	<i>DNGW-315SL-04.</i>	110	113	726	1486	200	65	113	200
1MD53131BD..4BA1	<i>DNGW-315ML-04.</i>	132	135	871	1480	240	65	135	235
1MD53151BD..4BA1	<i>DNGW-315MN-04.</i>	160	164	1056	1483	285	65	164	285
1MD53161BD..4BA1	<i>DNGW-315LL-04.</i>	200	205	1320	1483	360	65	205	355
1MD53171BD..4BA1	<i>DNGW-315LM-04.</i>	250	231	1488	1482	410	65	231	410
1MD53531BD..4BA1	<i>DNGW-355MR-04.</i>	315	292	1874	1488	520	60	292	520
1MD53551BD..4BA1	<i>DNGW-355MS-04.</i>	360	333	2142	1485	600	60	333	600
1MD53571BD..4BA1	<i>DNGW-355MT-04.</i>	460	426	2737	1486	750	60	426	750

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10 $T = \text{constant}$ Constant flux 5 ... 50 Hz				Setting range 1 : 3 $T = \text{constant}$ Constant flux $16 \frac{2}{3} \dots 50 \text{ Hz}$				Setting range 10 : 17 ²⁾ Any load characteristic Constant flux 50 ... 87 Hz		
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	$16 \frac{2}{3} \text{ Hz}$ Power	50 Hz Power	$16 \frac{2}{3} \dots 50 \text{ Hz}$ Torque	Current	Power	Torque	Current
$P_{5 \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16 \frac{2}{3} \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD} A	P kW	T Nm	I_{VSD}

identification code **-Z** and order code **C32** “Power data for converter operation, utilization of thermal class F (155 °C)”

0.01	0.16	1.08	0.71	0.06	0.22	1.48	0.76	0.40	1.52	1.33
0.01	0.23	1.58	0.89	0.09	0.32	2.22	0.97	0.60	2.28	1.70
0.02	0.36	2.38	1.16	0.15	0.48	3.23	1.30	0.85	3.28	2.25
0.03	0.49	3.24	1.46	0.20	0.65	4.40	1.67	1.10	4.47	2.90
0.05	0.70	4.74	2.00	0.29	0.95	6.50	2.35	1.70	6.60	4.05
0.07	0.95	6.50	2.65	0.40	1.30	8.80	3.05	2.30	9.00	5.40
0.11	1.40	9.50	3.50	0.60	1.90	12.8	4.25	3.40	13.0	7.50
0.16	2.00	13.0	4.65	0.80	2.60	17.5	5.60	4.70	17.7	9.90
0.22	2.60	17.4	6.50	1.10	3.50	23.3	7.60	6.30	23.5	13.3
0.31	3.60	23.9	8.50	1.50	4.90	31.9	10.4	8.60	32.2	18.1
0.43	5.00	32.6	10.8	2.10	6.50	43.6	13.4	11.8	43.9	23.5
0.60	7.00	47.8	15.6	3.10	9.50	64.0	19.0	17.3	64.2	33.0
0.90	10.0	65.0	21.0	4.30	13.0	87.0	25.5	23.6	87.2	44.5
1.05	12.0	80.0	25.5	5.20	16.5	107	31.5	29.2	108.3	55.0
1.20	14.5	96.0	30.5	6.00	19.5	128	37.5	34.7	128.8	66.0
1.70	20.0	130	40.5	8.50	26.5	174	51.0	47.3	175	88.0
2.30	26.5	173	49.0	10.5	33.5	218	60.0	–	–	–
2.90	32.5	211	61.0	13.0	40.5	265	74.0	–	–	–
3.60	40.0	258	77.0	16.0	50.0	323	92.0	–	–	–
5.10	54.5	352	100	22.0	68.0	439	122	–	–	–
6.00	65.5	422	122	26.0	82.0	527	146	–	–	–
7.50	80.0	516	150	33.0	100	643	180	–	–	–
9.00	96.0	619	176	39.0	120	771	215	–	–	–
11.0	117	750	215	48.0	145	935	260	–	–	–
14.0	146	937	265	60.0	182	1169	320	–	–	–
17.0	164	1055	310	74.0	205	1317	370	–	–	–
22.0	207	1330	395	94.0	258	1659	470	–	–	–
24.0	237	1520	450	106	295	1896	540	–	–	–
31.0	303	1942	560	136	378	2422	680	–	–	–

²⁾ Optional voltage with **9** at the 11th position of the Article No. and order code **L1P**: 230/400 VΔ/Y, 50 Hz; 400 VΔ, 87Hz (operating values at 87 Hz and motor in Δ circuit).

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)									
Efficiency: High Efficiency IE2									
Ambient temperature: 40 °C, installation altitude: 1000 m									
6-pole: 1000 rpm at 50 Hz									
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)									
1MD50701BD..4CA1	DNGW-071BS-06.	0.25	0.23	2.57	855	0.79	95	0.23	0.79
1MD50801BD..4CA1	DNGW-080BR-06.	0.37	0.34	3.54	917	1.04	99	0.34	1.03
1MD50811BD..4CA1	DNGW-080BS-06.	0.55	0.50	5.20	918	1.57	100	0.50	1.56
1MD50951BD..4CA1	DNGW-090LR-06.	0.75	0.65	7.10	874	1.96	100	0.65	1.90
1MD50981BD..4CA1	DNGW-090LS-06.	1.10	1.00	10.4	918	2.80	100	1.00	2.90
1MD51061BD..4CA1	DNGW-100LS-06.	1.50	1.30	13.7	906	3.55	100	1.30	3.40
1MD51131BD..4CA1	DNGW-112MS-06.	2.20	2.00	20.2	945	4.90	100	2.00	4.85
1MD51311BD..4CA1	DNGW-132SR-06.	3.00	2.70	27.4	941	7.00	100	2.70	6.90
1MD51331BD..4CA1	DNGW-132MR-06.	4.00	3.70	36.5	968	8.70	95	3.70	8.70
1MD51351BD..4CA1	DNGW-132MS-06.	5.50	5.10	50.0	974	11.6	100	5.10	11.6
1MD51631BD..4CA1	DNGW-160MR-06.	7.50	6.50	68.0	913	15.9	90	6.50	15.3
1MD51661BD..4CA1	DNGW-160LS-06.	11.0	10.0	100	955	22.5	91	10.0	22.0
1MD51861BD..4CA1	DNGW-180LS-06.	15.0	13.5	136	948	29.5	100	13.5	29.0
1MD52061BD..4CA1	DNGW-200LR-06.	18.5	17.0	167	972	34.0	85	17.0	33.5
1MD52081BD..4CA1	DNGW-200LS-06.	22.0	20.0	199	960	40.0	80	20.0	39.5
1MD52231BD..4CA1	DNGW-225MS-06.	30.0	27.5	271	969	53.0	87	27.5	53.0
1MD52531BD..4CA1	DNGW-250MM-06.	37.0	34.0	334	972	65.0	80	34.0	65.0
1MD52801BD..4CA1	DNGW-280SL-06.	45.0	41.5	404	981	78.0	75	41.5	78.0
1MD52831BD..4CA1	DNGW-280MM-06.	55.0	51.0	494	986	93.0	75	51.0	93.0
1MD53111BD..4CA1	DNGW-315SL-06.	75.0	69.5	672	988	129	65	69.5	129
1MD53131BD..4CA1	DNGW-315ML-06.	90.0	83.0	806	983	154	65	83.0	153
1MD53141BD..4CA1	DNGW-315MM-06.	110	102	986	988	183	65	102	183
1MD53151BD..4CA1	DNGW-315MN-06.	132	122	1183	985	220	65	122	220
1MD53161BD..4CA1	DNGW-315LL-06.	160	148	1434	986	265	65	148	265
1MD53171BD..4CA1	DNGW-315LM-06.	200	185	1788	988	345	65	185	345
1MD53531BD..4CA1	DNGW-355MR-06.	280	259	2496	991	485	60	259	480
1MD53551BD..4CA1	DNGW-355MS-06.	315	292	2808	993	540	60	292	540
1MD53571BD..4CA1	DNGW-355MT-06.	360	333	3206	992	610	60	333	610

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10

$T = \text{constant}$

Constant flux

5 ... 50 Hz

5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	A

Setting range 1 : 3

$T = \text{constant}$

Constant flux

$16^{2/3}$... 50 Hz

$16^{2/3}$ Hz Power	50 Hz Power	$16^{2/3}$... 50 Hz Torque	Current
$P_{16^{2/3}\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	A

0.0041	0.13	1.44	0.73	0.05	0.19	2.13	0.76
0.01	0.21	2.16	0.90	0.08	0.13	1.44	0.73
0.02	0.32	3.21	1.35	0.12	0.44	4.46	1.48
0.02	0.44	4.39	1.64	0.17	0.21	2.16	0.9
0.04	0.60	6.40	2.30	0.26	0.85	8.90	2.55
0.07	0.90	8.80	2.80	0.38	1.20	11.8	3.25
0.10	1.30	12.9	3.85	0.55	1.70	17.4	4.5
0.15	1.80	17.6	5.90	0.75	2.40	23.6	6.5
0.20	2.40	23.5	6.90	1.00	3.20	31.5	8.00
0.27	3.30	32.3	9.10	1.40	4.40	43.4	10.6
0.39	4.50	44.1	12.5	1.90	6.00	59.0	14.6
0.55	6.50	65.0	17.1	2.80	8.5	86.0	20.0
0.75	9.00	88.0	23.5	3.80	12.0	118	27.0
0.95	11.0	109	25.0	4.80	14.5	145	30.5
1.10	13.0	129	29.0	5.50	17.5	172	35.5
1.70	19.5	190	40.5	7.50	24.5	239	48.0
2.10	24.0	235	48.5	9.50	30.0	294	59.0
2.60	29.5	285	59.0	12.0	36.5	357	70.0
3.20	36.0	348	69.0	14.5	45.0	437	83.0
4.50	49.0	475	99.0	20.0	61.5	594	117
5.50	59.0	570	116	24.0	73.5	713	139
6.50	72.0	697	135	29.0	90.0	871	164
8.00	86.0	836	163	35.0	108	1046	197
9.50	105	1014	200	42.0	131	1268	240
12.0	131	1267	270	53.0	164	1582	315
17.5	184	1773	370	74.0	230	2210	435
19.5	207	1995	410	84.0	258	2486	485
22.0	237	2279	470	96.0	295	2839	550

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)									
Efficiency: High Efficiency IE2									
Ambient temperature: 40 °C, installation altitude: 1000 m									
6-pole: 1000 rpm at 50 Hz									
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional									
1MD50701BD..4CA1	DNGW-071BS-06.	0.25	0.25	2.86	835	0.81	86	0.25	0.80
1MD50801BD..4CA1	DNGW-080BR-06.	0.37	0.38	3.93	923	1.08	89	0.38	1.08
1MD50811BD..4CA1	DNGW-080BS-06.	0.55	0.55	5.80	906	1.65	100	0.55	1.63
1MD50951BD..4CA1	DNGW-090LR-06.	0.75	0.75	7.90	907	2.05	93	0.75	2.05
1MD50981BD..4CA1	DNGW-090LS-06.	1.10	1.10	11.6	906	2.95	96	1.10	2.90
1MD51061BD..4CA1	DNGW-100LS-06.	1.50	1.50	15.2	942	3.80	100	1.50	3.70
1MD51131BD..4CA1	DNGW-112MS-06.	2.20	2.20	22.4	938	5.30	100	2.20	5.20
1MD51311BD..4CA1	DNGW-132SR-06.	3.00	3.00	30.4	942	7.30	93	3.00	7.20
1MD51331BD..4CA1	DNGW-132MR-06.	4.00	4.10	40.6	964	9.30	85	4.10	9.20
1MD51351BD..4CA1	DNGW-132MS-06.	5.50	5.50	56.0	938	12.4	96	5.50	12.1
1MD51631BD..4CA1	DNGW-160MR-06.	7.50	7.50	76.0	942	17.1	81	7.50	16.8
1MD51661BD..4CA1	DNGW-160LS-06.	11.0	11.0	111	946	24.0	82	11.0	23.5
1MD51861BD..4CA1	DNGW-180LS-06.	15.0	15.0	151	949	31.5	100	15.0	31.0
1MD52061BD..4CA1	DNGW-200LR-06.	18.5	19.0	186	975	37.0	85	19.0	37.0
1MD52081BD..4CA1	DNGW-200LS-06.	22.0	22.5	221	972	43.5	80	22.5	43.5
1MD52231BD..4CA1	DNGW-225MS-06.	30.0	30.5	301	968	58.0	87	30.5	58.0
1MD52531BD..4CA1	DNGW-250MM-06.	37.0	38.0	371	978	72.0	80	38.0	71.0
1MD52801BD..4CA1	DNGW-280SL-06.	45.0	46.0	449	978	86.0	75	46.0	85.0
1MD52831BD..4CA1	DNGW-280MM-06.	55.0	56.5	549	983	102	75	56.5	102
1MD53111BD..4CA1	DNGW-315SL-06.	75.0	77.0	747	984	141	65	77.0	141
1MD53131BD..4CA1	DNGW-315ML-06.	90.0	92.0	896	981	169	65	92.0	168
1MD53141BD..4CA1	DNGW-315MM-06.	110	113	1095	985	200	65	113	200
1MD53151BD..4CA1	DNGW-315MN-06.	132	135	1314	981	240	65	135	240
1MD53161BD..4CA1	DNGW-315LL-06.	160	164	1593	983	290	65	164	290
1MD53171BD..4CA1	DNGW-315LM-06.	200	185	1788	988	345	65	185	345
1MD53531BD..4CA1	DNGW-355MR-06.	280	259	2496	991	485	60	259	480
1MD53551BD..4CA1	DNGW-355MS-06.	315	292	2808	993	540	60	292	540
1MD53571BD..4CA1	DNGW-355MT-06.	360	333	3206	992	610	60	333	610

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:
 $T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10				Setting range 1 : 3			
T = constant				T = constant			
Constant flux				Constant flux			
5 ... 50 Hz				16 ² / ₃ ... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16\ 2/3\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD} A

identification code **-Z** and order code **C32** “Power data for converter operation, utilization of thermal class F (155 °C)”

0.0034	0.15	1.56	0.73	0.05	0.21	2.34	0.77
0.01	0.23	2.37	0.92	0.09	0.15	1.56	0.73
0.02	0.35	3.54	1.38	0.13	0.48	4.94	1.54
0.03	0.48	4.83	1.68	0.19	0.23	2.37	0.92
0.04	0.70	7.10	2.35	0.28	0.95	9.80	2.70
0.08	1.00	9.80	2.95	0.42	1.30	13.1	3.45
0.11	1.40	14.3	4.05	0.60	1.90	19.3	4.80
0.16	2.00	19.5	6.10	0.80	2.60	26.2	6.80
0.21	2.60	26.0	7.30	1.10	3.50	35.0	8.50
0.29	3.60	35.8	9.60	1.50	4.90	48.1	11.2
0.42	5.00	48.8	13.1	2.10	6.50	65.0	15.5
0.60	7.00	72.0	18.0	3.10	9.50	96.0	21.5
0.85	10.0	98.0	24.5	4.20	13.0	131	28.5
1.05	12.0	121	26.5	5.30	16.5	161	33.0
1.20	14.5	143	31.0	6.00	19.5	191	39.0
1.80	21.5	211	44.0	8.50	27.0	265	52.0
2.30	26.5	260	53.0	10.5	33.5	327	64.0
2.90	32.5	316	64.0	13.0	40.5	397	77.0
3.60	40.0	387	75.0	16.0	50.0	485	91.0
5.00	54.5	527	107	22.0	68.0	660	127
6.00	65.5	633	126	26.0	82.0	792	152
7.00	80.0	773	148	32.0	100	968	180
8.50	96.0	928	178	39.0	120	1161	215
10.5	116	1125	215	47.0	145	1408	260
13.5	131	1267	270	59.0	164	1582	315
19.5	184	1773	370	84.0	230	2210	435
22.0	207	1995	410	94.0	258	2486	485
25.0	237	2279	470	108	295	2839	550

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

LOHER CHEMSTAR 1PS5 (Ex d(e)), 1PS1 (Ex nA) and 1PS0 motors (non Ex) – Power tables for converter operation

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Constant flux				Field weakening		
			Setting range 1 : 10 $T \sim r^2$				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic		
		Rated power	Power	Torque	Speed	Current	Max. frequency	Power	Current
		P_{rated} kW	P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	50 Hz ... f_{max} f_{max} Hz	(at 400 V f_{max}) P_{VSD} kW	(at 400 V f_{max}) I_{VSD} A

Cooling: self-ventilated (IC411)

Efficiency: High Efficiency IE2

Ambient temperature: 40 °C, installation altitude: 1000 m

2-pole: 3000 rpm at 50 Hz

Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)

1PS ■ 070-1BD...AA4	□□□□ -071BR-02.	0.37	0.41	1.40	2842	0.96	100	0.41	0.95
1PS ■ 071-1BD...AA4	□□□□ -071BS-02.	0.55	0.60	2.08	2830	1.42	98	0.60	1.39
1PS ■ 080-1BD...AA4	□□□□ -080BR-02.	0.75	0.75	2.72	2792	1.70	82	0.75	1.63
1PS ■ 081-1BD...AA4	□□□□ -080BS-02.	1.10	1.20	4.19	2813	2.55	91	1.20	2.50
1PS ■ 095-1BD...AA4	□□□□ -090LR-02.	1.50	1.60	5.60	2876	3.40	100	1.60	3.25
1PS ■ 098-1BD...AA4	□□□□ -090LS-02.	2.20	2.20	7.30	2889	4.50	100	2.20	4.50
1PS ■ 106-1BD...AA4	□□□□ -100LS-02.	3.00	3.10	10.5	2904	6.20	100	3.10	6.10
1PS ■ 113-1BD...AA4	□□□□ -112MS-02.	4.00	3.80	12.5	2942	7.50	100	3.80	7.40
1PS ■ 131-1BD...AA4	□□□□ -132SR-02.	5.50	5.50	18.0	2940	10.4	90	5.50	10.4
1PS ■ 132-1BD...AA4	□□□□ -132SS-02.	7.50	7.20	23.4	2952	13.3	90	7.20	13.2
1PS ■ 163-1BD...AA4	□□□□ -160MR-02.	11.0	11.7	37.9	2952	21.0	80	11.7	21.0
1PS ■ 165-1BD...AA4	□□□□ -160MS-02.	15.0	14.4	46.8	2957	26.5	80	14.4	26.5
1PS ■ 166-1BD...AA4	□□□□ -160LS-02.	18.5	17.1	55.4	2958	31.0	80	17.1	31.0
1PS ■ 183-1BD...AA4	□□□□ -180MS-02.	22.0	20.4	66.2	2944	37.0	76	20.4	37.0
1PS ■ 206-1BD...AA4	□□□□ -200LR-02.	30.0	31.9	103.3	2952	57.0	75	31.9	57.0
1PS ■ 208-1BD...AA4	□□□□ -200LS-02.	37.0	35.7	115.3	2961	63.0	75	35.7	63.0
1PS ■ 223-1BD...AA4	□□□□ -225MS-02.	45.0	43.4	139.9	2966	77.0	75	43.4	77.0
1PS ■ 253-1BD...AA4	□□□□ -250MM-02.	55.0	51.0	163.9	2972	89.0	65	51.0	89.0
1PS ■ 280-1BD...AA4	□□□□ -280SL-02.	75.0	72.4	232	2979	129	60	72.4	129
1PS ■ 283-1BD...AA4	□□□□ -280MM-02.	90.0	83.0	268	2977	146	60	83.0	146
1PS ■ 311-1BD...AA4	□□□□ -315SL-02.	110	117	375	2981	198	60	117	197
1PS ■ 313-1BD...AA4	□□□□ -315ML-02.	132	127	408	2983	210	60	127	210
1PS ■ 315-1BD...AA4	□□□□ -315MN-02.	160	148	475	2983	245	60	148	245
1PS ■ 316-1BD...AA4	□□□□ -315LL-02.	200	185	594	2983	305	60	185	305
1PS ■ 318-1BD...AA4	□□□□ -315LN-02.	250	231	741	2986	385	60	231	380
1PS 0 356-1BD...0AA2	A N G A -355LB-02.	315	290	934	2985	495	60	290	495
1PS 1 356-1BD...3AA2	A N G K -355LB-02.	315	290	934	2985	495	60	290	495
1PS 5 353-1BD...4AA3	D N G W -355MR-02.	315	292	934	2985	500	60	292	500
1PS 5 355-1BD...4AA3	D N G W -355MS-02.	360	333	1068	2985	570	60	333	570
1PS 5 357-1BD...4AA3	D N G W -355MT-02.	460	426	1364	2986	710	60	426	710

	Motor
0	A N G A LOHER CHEMSTAR 1PS0
1	A N G K LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)
5	D N G W LOHER CHEMSTAR 1PS5

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits according to IEC 60079-0 [29.15]

Setting range 1 : 10 $T = \text{constant}$ Constant flux 5 ... 50 Hz				Setting range 1 : 3 $T = \text{constant}$ Constant flux $16^{2/3}$... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	$16^{2/3}$ Hz Power	50 Hz Power	$16^{2/3}$... 50 Hz Torque	Current
$P_{5 \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16^{2/3} \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD} A
0.01	0.26	0.871	0.79	0.10	0.35	1.20	0.89
0.02	0.39	1.29	1.13	0.15	0.50	1.78	1.30
0.03	0.49	1.66	1.24	0.19	0.65	2.31	1.52
0.05	0.75	2.58	1.86	0.31	1.05	3.57	2.30
0.08	1.05	3.55	2.60	0.45	1.40	4.82	3.05
0.11	1.40	4.66	3.55	0.55	1.90	6.30	4.10
0.16	2.00	6.70	4.55	0.85	2.70	9.10	5.60
0.22	2.50	8.20	5.40	1.05	3.30	10.9	6.70
0.31	3.60	11.7	7.50	1.50	4.80	15.6	9.30
0.43	4.70	15.3	9.70	2.00	6.30	20.3	11.9
0.65	7.60	24.7	15.2	3.30	10.1	32.9	18.8
0.85	9.50	30.6	18.9	4.10	12.6	40.7	23.5
1.00	11.3	36.3	22.0	4.80	14.9	48.1	27.5
1.10	13.3	43.1	26.5	5.70	17.7	57.4	33.0
1.80	20.9	67.5	39.5	9.00	27.7	89.7	50.0
2.10	23.5	75.6	44.0	10.1	31.1	100.2	56.0
2.80	30.8	98.9	57.0	12.6	38.5	123.8	69.0
3.40	36.2	116.1	67.0	14.8	45.2	145.1	80.0
4.90	51.5	164.9	97.0	21.2	64.2	206	116
5.60	59.3	190	109	24.3	73.9	237	131
8.00	83.0	267	144	34.3	103.5	333	176
8.70	90.5	290	154	37.4	113	362	189
10.1	105.5	338	178	43.5	131.5	421	220
12.7	132	422	220	54.3	164	526	275
16.0	165	528	280	68.0	205	657	340
20.0	205	665	365	84.0	255	828	440
20.0	205	665	365	84.0	255	828	440
20.1	208	665	375	85.5	259	828	450
23.0	237	760	420	98.0	296	947	510
29.4	303	971	530	125	378	1209	640

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	

Cooling: self-ventilated (IC411)

Efficiency: High Efficiency IE2

Ambient temperature: 40 °C, installation altitude: 1000 m

2-pole: 3000 rpm at 50 Hz

Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional

1PS ■ 070-1BD...AA4	□□□□ -071BR-02.	0.37	0.45	1.55	2824	1.02	95	0.45	1.00
1PS ■ 071-1BD...AA4	□□□□ -071BS-02.	0.55	0.65	2.31	2812	1.51	88	0.65	1.46
1PS ■ 080-1BD...AA4	□□□□ -080BR-02.	0.75	0.85	3.02	2769	1.85	74	0.85	1.79
1PS ■ 081-1BD...AA4	□□□□ -080BS-02.	1.10	1.30	4.65	2793	2.80	82	1.30	2.65
1PS ■ 095-1BD...AA4	□□□□ -090LR-02.	1.50	1.80	6.20	2862	3.65	100	1.80	3.55
1PS ■ 098-1BD...AA4	□□□□ -090LS-02.	2.20	2.40	8.10	2877	4.85	100	2.40	4.75
1PS ■ 106-1BD...AA4	□□□□ -100LS-02.	3.00	3.50	11.7	2893	6.80	100	3.50	6.70
1PS ■ 113-1BD...AA4	□□□□ -112MS-02.	4.00	4.20	13.9	2936	8.20	100	4.20	8.10
1PS ■ 131-1BD...AA4	□□□□ -132SR-02.	5.50	6.10	20.0	2933	11.4	90	6.10	11.3
1PS ■ 132-1BD...AA4	□□□□ -132SS-02.	7.50	8.00	26.0	2946	14.5	90	8.00	14.4
1PS ■ 163-1BD...AA4	□□□□ -160MR-02.	11.0	12.9	42.1	2947	23.0	80	12.9	23.0
1PS ■ 165-1BD...AA4	□□□□ -160MS-02.	15.0	16.0	52.0	2952	29.0	80	16.0	28.5
1PS ■ 166-1BD...AA4	□□□□ -160LS-02.	18.5	19.0	61.6	2954	34.0	80	19.0	34.0
1PS ■ 183-1BD...AA4	□□□□ -180MS-02.	22.0	22.6	73.6	2938	40.5	76	22.6	40.5
1PS ■ 206-1BD...AA4	□□□□ -200LR-02.	30.0	35.4	114.8	2947	62.0	75	35.4	62.0
1PS ■ 208-1BD...AA4	□□□□ -200LS-02.	37.0	39.6	128.1	2957	69.0	75	39.6	69.0
1PS ■ 223-1BD...AA4	□□□□ -225MS-02.	45.0	48.2	155.5	2962	84.0	75	48.2	84.0
1PS ■ 253-1BD...AA4	□□□□ -250MM-02.	55.0	56.6	182.1	2969	98.0	65	56.6	98.0
1PS ■ 280-1BD...AA4	□□□□ -280SL-02.	75.0	80.0	258	2976	141	60	80.0	140
1PS ■ 283-1BD...AA4	□□□□ -280MM-02.	90.0	92.5	298	2974	161	60	92.5	161
1PS ■ 311-1BD...AA4	□□□□ -315SL-02.	110	130	417	2979	220	60	130	220
1PS ■ 313-1BD...AA4	□□□□ -315ML-02.	132	141.5	454	2981	235	60	141.5	235
1PS ■ 315-1BD...AA4	□□□□ -315MN-02.	160	164.5	528	2981	270	60	164.5	270
1PS ■ 316-1BD...AA4	□□□□ -315LL-02.	200	205	660	2981	340	60	205	340
1PS ■ 318-1BD...AA4	□□□□ -315LN-02.	250	231	741	2986	385	60	231	380
1PS 0 356-1BD...0AA2	A N G A -355LB-02.	315	290	934	2985	495	60	290	495
1PS 1 356-1BD...3AA2	A N G K -355LB-02.	315	290	934	2985	495	60	290	495
1PS 5 353-1BD...4AA3	D N G W -355MR-02.	315	292	934	2985	500	60	292	500
1PS 5 355-1BD...4AA3	D N G W -355MS-02.	360	333	1068	2985	570	60	333	570
1PS 5 357-1BD...4AA3	D N G W -355MT-02.	460	426	1364	2986	710	60	426	710

	Motor
0	A N G A LOHER CHEMSTAR 1PS0
1	A N G K LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)
5	D N G W LOHER CHEMSTAR 1PS5

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10				Setting range 1 : 3			
T = constant				T = constant			
Constant flux				Constant flux			
5 ... 50 Hz				16 ² / ₃ ... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16\ 2/3\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD} A

identification code **-Z** and order code **C32** "Power data for converter operation, utilization of thermal class F (155 °C)"

0.01	0.29	0.96	0.81	0.11	0.39	1.33	0.93
0.02	0.43	1.43	1.17	0.17	0.55	1.97	1.37
0.03	0.50	1.83	1.30	0.21	0.75	2.56	1.63
0.05	0.85	2.84	1.96	0.34	1.10	3.96	2.45
0.08	1.10	3.92	2.75	0.49	1.60	5.30	3.30
0.12	1.50	5.20	3.70	0.65	2.10	7.00	4.40
0.17	2.20	7.40	4.85	0.95	3.00	10.0	6.00
0.24	2.80	9.00	5.80	1.10	3.70	12.1	7.30
0.34	4.00	13.0	8.10	1.70	5.30	17.3	10.1
0.47	5.20	17.0	10.4	2.20	6.90	22.6	12.9
0.75	8.50	27.4	16.3	3.60	11.2	36.5	20.5
0.95	10.5	34.0	20.5	4.50	13.9	45.1	25.5
1.10	12.5	40.3	24.0	5.30	16.5	53.5	30.0
1.30	14.8	47.8	28.5	6.30	19.6	63.8	36.0
2.00	23.2	74.8	43.0	9.90	30.7	99.6	55.0
2.30	26.0	83.8	48.0	11.2	34.5	111.2	61.0
3.10	34.1	109.8	62.0	13.9	42.7	137.5	76.0
3.70	40.1	128.9	73.0	16.4	50.1	161.2	88.0
5.40	57.1	183	106	23.4	71.2	228	127
6.20	65.8	211	119	26.9	82.0	263	144
8.80	92.5	296	158	37.9	115	369	195
9.60	100.5	322	170	41.4	125.5	402	210
11.2	117	375	196	48.3	146	468	240
14.0	146.5	469	245	60.2	182.5	584	300
16.0	165	528	280	68.0	205	657	340
20.0	205	665	365	84.0	255	828	440
20.0	205	665	365	84.0	255	828	440
20.1	208	665	375	85.5	259	828	450
23.0	237	760	420	98.0	296	947	510
29.4	303	971	530	125	378	1209	640

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate							
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}			
		Rated power	Power	Torque	Speed	Current	Max. frequency	Power	Current	
		P_{rated} kW	P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)										
Efficiency: High Efficiency IE2										
Ambient temperature: 40 °C, installation altitude: 1000 m										
4-pole: 1500 rpm at 50 Hz										
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)										
1PS	■ 070-1BD...-BA4	□□□□ -071BR-04.	0.25	0.28	1.91	1404	0.80	100	0.28	0.80
1PS	■ 071-1BD...-BA4	□□□□ -071BS-04.	0.37	0.41	2.87	1376	1.06	95	0.41	1.05
1PS	■ 080-1BD...-BA4	□□□□ -080BR-04.	0.55	0.60	4.12	1432	1.47	100	0.60	1.44
1PS	■ 081-1BD...-BA4	□□□□ -080BS-04.	0.75	0.80	5.60	1432	1.88	100	0.80	1.81
1PS	■ 095-1BD...-BA4	□□□□ -090LR-04.	1.10	1.20	8.30	1421	2.70	98.0	1.20	2.65
1PS	■ 098-1BD...-BA4	□□□□ -090LS-04.	1.50	1.60	11.3	1421	3.60	100	1.60	3.45
1PS	■ 106-1BD...-BA4	□□□□ -100LR-04.	2.20	2.40	16.3	1449	4.95	100	2.40	4.80
1PS	■ 108-1BD...-BA4	□□□□ -100LS-04.	3.00	3.30	22.3	1449	6.70	100	3.30	6.50
1PS	■ 113-1BD...-BA4	□□□□ -112MS-04.	4.00	4.00	26.4	1460	8.30	100	4.00	8.20
1PS	■ 131-1BD...-BA4	□□□□ -132SR-04.	5.50	5.80	38.2	1463	11.8	100	5.80	11.7
1PS	■ 133-1BD...-BA4	□□□□ -132MS-04.	7.50	7.50	49.3	1465	14.8	100	7.50	14.7
1PS	■ 163-1BD...-BA4	□□□□ -160MR-04.	11.0	11.7	76.1	1468	22.0	100	11.7	22.0
1PS	■ 166-1BD...-BA4	□□□□ -160LS-04.	15.0	15.9	103.5	1473	29.5	100	15.9	29.5
1PS	■ 183-1BD...-BA4	□□□□ -180MR-04.	18.5	17.8	116.4	1466	34.0	100	17.8	33.5
1PS	■ 186-1BD...-BA4	□□□□ -180LS-04.	22.0	20.4	132.9	1468	39.0	100	20.4	39.0
1PS	■ 206-1BD...-BA4	□□□□ -200LS-04.	30.0	28.9	188.2	1471	54.0	100	28.9	54.0
1PS	■ 220-1BD...-BA4	□□□□ -225SR-04.	37.0	34.3	223	1472	61.0	87	34.3	61.0
1PS	■ 223-1BD...-BA4	□□□□ -225MS-04.	45.0	41.7	270	1477	75.0	87	41.7	75.0
1PS	■ 253-1BD...-BA4	□□□□ -250MM-04.	55.0	51.0	329	1481	93.0	80	51.0	93.0
1PS	■ 280-1BD...-BA4	□□□□ -280SL-04.	75.0	75.5	486	1485	133	75	75.5	133
1PS	■ 283-1BD...-BA4	□□□□ -280MM-04.	90.0	83.0	536	1487	148	75	83.0	148
1PS	■ 311-1BD...-BA4	□□□□ -315SL-04.	110	117	751	1489	205	65	117	205
1PS	■ 313-1BD...-BA4	□□□□ -315ML-04.	132	132.5	852	1490	230	65	132.5	230
1PS	■ 315-1BD...-BA4	□□□□ -315MN-04.	160	148	951	1491	260	65	148	260
1PS	■ 316-1BD...-BA4	□□□□ -315LL-04.	200	185	1188	1491	325	65	185	325
1PS	■ 317-1BD...-BA2	□□□□ -315LM-04.	250	231	1488	1488	405	65	231	405
1PS	0 356-1BD...-0BB2	A N G A -355LB-04.	315	290	1874	1491	520	60	290	520
1PS	1 356-1BD...-3BB2	A N G K -355LB-04.	315	290	1874	1491	520	60	290	520
1PS	5 353-1BD...-4BA3	D N G W -355MR-04.	315	292	1874	1489	520	60	292	520
1PS	5 355-1BD...-4BA3	D N G W -355MS-04.	360	333	2142	1489	600	60	333	600
1PS	5 357-1BD...-4BA3	D N G W -355MT-04.	460	426	2737	1489	750	60	426	750
		Motor								
0		A N G A	LOHER CHEMSTAR 1PS0							
1		A N G K	LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)							
5		D N G W	LOHER CHEMSTAR 1PS5							

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10

$T = \text{constant}$

Constant flux

5 ... 50 Hz

5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	

Setting range 1 : 3

$T = \text{constant}$

Constant flux

16 ²/₃ ... 50 Hz

16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{16\ 2/3\ \text{Hz}}$	$P_{50\ \text{Hz}}$	T	I_{VSD}
kW	kW	Nm	A

Setting range 10 : 17 ²)

Any load characteristic

Constant flux

50 ... 87 Hz

Power	Torque	Current
P	T	I_{VSD}
kW	Nm	

0.01	0.17	1.17	0.71	0.07	0.24	1.63	0.76	0.36	1.36	1.29
0.01	0.25	1.72	0.90	0.10	0.35	2.43	1.00	0.50	2.05	1.64
0.02	0.39	2.60	1.19	0.16	0.50	3.54	1.35	0.75	2.95	2.15
0.03	0.5	3.54	1.48	0.22	0.70	4.83	1.71	1.05	4.02	2.75
0.05	0.75	5.20	2.10	0.32	1.05	7.10	2.45	1.50	6.00	3.90
0.07	1.05	7.10	2.75	0.44	1.40	9.70	3.25	2.10	8.10	5.10
0.12	1.60	10.4	3.65	0.65	2.10	14.1	4.45	3.10	11.7	6.90
0.17	2.10	14.2	4.80	0.90	2.90	19.2	5.90	4.20	15.9	9.10
0.22	2.60	17.0	6.40	1.10	3.40	22.8	7.50	5.70	21.1	12.5
0.32	3.80	24.7	8.70	1.60	5.00	33.1	10.6	7.80	29.0	16.8
0.42	4.90	31.9	10.6	2.00	6.50	42.6	13.1	10.60	39.5	21.5
0.65	7.60	49.4	15.9	3.20	10.1	66.0	19.5	15.60	57.8	30.5
0.90	10.4	67.5	21.0	4.40	13.8	89.8	26.0	21.20	78.5	41.0
1.00	11.6	75.5	24.5	4.90	15.5	100.8	30.0	26.30	97.5	51.0
1.10	13.3	86.3	28.5	5.70	17.7	115.2	35.0	31.30	115.9	61.0
1.60	18.9	122.5	39.0	8.10	25.1	163.2	48.0	42.60	157.5	81.0
2.10	24.2	156.4	45.0	9.80	30.3	196.7	55.0	–	–	–
2.60	29.5	190.1	56.0	12.0	36.9	239	67.0	–	–	–
3.30	36.1	232	71.0	14.7	45.1	291	84.0	–	–	–
5.00	53.6	344	98.0	21.9	66.9	430	119	–	–	–
5.60	59.3	380	112	24.3	73.9	475	134	–	–	–
7.90	83.0	533	154	34.2	103.5	665	185	–	–	–
9.00	94.5	605	172	38.9	117.5	755	210	–	–	–
10.1	105.5	675	195	43.4	131.5	842	235	–	–	–
12.6	132	844	245	54.3	164	1053	295	–	–	–
15.6	164.5	1055	305	67.6	205	1318	365	–	–	–
19.5	205	1330	395	84.0	255	1658	470	–	–	–
19.5	205	1330	395	84.0	255	1658	470	–	–	–
19.7	207	1330	395	85.0	258	1660	470	–	–	–
22.6	237	1520	450	97.5	295	1897	540	–	–	–
28.8	303	1942	560	124.5	378	2424	680	–	–	–

²) Optional voltage with **9** at the 11th position of the Article No. and order code **L1P**: 230/400 VΔ/Y, 50 Hz; 400 VΔ, 87Hz (operating values at 87 Hz and motor in Δ circuit).

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
		Rated power	Power	Torque	Speed	Current	Max. frequency	Power	Current
		P_{rated} kW	P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A

Cooling: self-ventilated (IC411)

Efficiency: High Efficiency IE2

Ambient temperature: 40 °C, installation altitude: 1000 m

4-pole: 1500 rpm at 50 Hz

Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional

1PS ■ 070-1BD...-BA4	□□□□ -071BR-04.	0.25	0.30	2.12	1393	0.83	95	0.30	0.82
1PS ■ 071-1BD...-BA4	□□□□ -071BS-04.	0.37	0.45	3.19	1362	1.12	85	0.45	1.10
1PS ■ 080-1BD...-BA4	□□□□ -080BR-04.	0.55	0.65	4.58	1425	1.56	94	0.65	1.50
1PS ■ 081-1BD...-BA4	□□□□ -080BS-04.	0.75	0.90	6.20	1425	2.00	94	0.90	1.95
1PS ■ 095-1BD...-BA4	□□□□ -090LR-04.	1.10	1.30	9.20	1412	2.90	88	1.30	2.80
1PS ■ 098-1BD...-BA4	□□□□ -090LS-04.	1.50	1.80	12.6	1412	3.85	100	1.80	3.75
1PS ■ 106-1BD...-BA4	□□□□ -100LR-04.	2.20	2.70	18.1	1443	5.40	100	2.70	5.30
1PS ■ 108-1BD...-BA4	□□□□ -100LS-04.	3.00	3.70	24.7	1443	7.30	94	3.70	7.20
1PS ■ 113-1BD...-BA4	□□□□ -112MS-04.	4.00	4.40	29.3	1455	8.90	100	4.40	8.80
1PS ■ 131-1BD...-BA4	□□□□ -132SR-04.	5.50	6.40	42.4	1459	12.8	94	6.40	12.7
1PS ■ 133-1BD...-BA4	□□□□ -132MS-04.	7.50	8.30	54.7	1461	16.1	99	8.30	16.0
1PS ■ 163-1BD...-BA4	□□□□ -160MR-04.	11.0	12.9	84.6	1464	24.0	91	12.9	23.5
1PS ■ 166-1BD...-BA4	□□□□ -160LS-04.	15.0	17.7	115	1470	32.0	97	17.7	32.0
1PS ■ 183-1BD...-BA4	□□□□ -180MR-04.	18.5	19.8	129.4	1462	37.0	100	19.8	37.0
1PS ■ 186-1BD...-BA4	□□□□ -180LS-04.	22.0	22.6	147.7	1464	42.0	100	22.6	42.0
1PS ■ 206-1BD...-BA4	□□□□ -200LS-04.	30.0	32.1	209	1468	59.0	100	32.1	59.0
1PS ■ 220-1BD...-BA4	□□□□ -225SR-04.	37.0	38.0	248	1469	67.0	87	38.0	67.0
1PS ■ 223-1BD...-BA4	□□□□ -225MS-04.	45.0	46.3	300	1474	82.0	87	46.3	82.0
1PS ■ 253-1BD...-BA4	□□□□ -250MM-04.	55.0	56.6	366	1479	102	80	56.6	102
1PS ■ 280-1BD...-BA4	□□□□ -280SL-04.	75.0	83.5	540	1483	147	75	83.5	146
1PS ■ 283-1BD...-BA4	□□□□ -280MM-04.	90.0	92.5	596	1486	163	75	92.5	162
1PS ■ 311-1BD...-BA4	□□□□ -315SL-04.	110	130	835	1488	225	65	130	225
1PS ■ 313-1BD...-BA4	□□□□ -315ML-04.	132	147.5	947	1489	255	65	147.5	255
1PS ■ 315-1BD...-BA4	□□□□ -315MN-04.	160	164.5	1056	1490	285	65	164.5	285
1PS ■ 316-1BD...-BA4	□□□□ -315LL-04.	200	205	1320	1490	360	65	205	355
1PS ■ 317-1BD...-BA2	□□□□ -315LM-04.	250	231	1488	1488	405	65	231	405
1PS 0 356-1BD...-0BA2	A N G A -355LB-04.	315	290	1874	1491	520	60	290	520
1PS 1 356-1BD...-3BA3	A N G K -355LB-04.	315	290	1874	1491	520	60	290	520
1PS 5 353-1BD...-4BA3	D N G W -355MR-04.	315	292	1874	1489	520	60	292	520
1PS 5 355-1BD...-4BA3	D N G W -355MS-04.	360	333	2142	1489	600	60	333	600
1PS 5 357-1BD...-4BA3	D N G W -355MT-04.	460	426	2737	1489	750	60	426	750

	Motor
0	A N G A LOHER CHEMSTAR 1PS0
1	A N G K LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)
5	D N G W LOHER CHEMSTAR 1PS5

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10 $T = \text{constant}$ Constant flux 5 ... 50 Hz				Setting range 1 : 3 $T = \text{constant}$ Constant flux $16 \frac{2}{3} \dots 50 \text{ Hz}$				Setting range 10 : 17 ²⁾ Any load characteristic Constant flux 50 ... 87 Hz		
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	$16 \frac{2}{3} \text{ Hz}$ Power	50 Hz Power	$16 \frac{2}{3} \dots 50 \text{ Hz}$ Torque	Current	Power	Torque	Current
$P_{5 \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16 \frac{2}{3} \text{ Hz}}$ kW	$P_{50 \text{ Hz}}$ kW	T Nm	I_{VSD} A	P kW	T Nm	I_{VSD}

identification code **-Z** and order code **C32** “Power data for converter operation, utilization of thermal class F (155 °C)”

0.01	0.19	1.29	0.72	0.07	0.26	1.80	0.79	0.40	1.52	1.33
0.01	0.28	1.89	0.92	0.10	0.38	2.69	1.03	0.60	2.28	1.70
0.03	0.43	2.87	1.24	0.17	0.55	3.93	1.43	0.85	3.28	2.25
0.04	0.55	3.91	1.54	0.24	0.80	5.40	1.82	1.10	4.47	2.90
0.05	0.85	5.70	2.20	0.35	1.10	7.90	2.60	1.70	6.60	4.05
0.07	1.10	7.80	2.85	0.47	1.60	10.7	3.45	2.30	9.00	5.40
0.13	1.70	11.5	3.85	0.7	2.30	15.6	4.80	3.40	13.00	7.50
0.18	2.40	15.7	5.10	1.00	3.20	21.3	6.40	4.70	17.70	9.90
0.23	2.80	18.8	6.80	1.20	3.80	25.3	8.00	6.30	23.50	13.30
0.35	4.20	27.3	9.20	1.70	5.60	36.7	11.4	8.60	32.20	18.10
0.46	5.40	35.3	11.4	2.30	7.20	47.3	14.3	11.80	43.90	23.50
0.70	8.40	54.8	17.0	3.60	11.2	73.2	21.0	17.30	64.20	33.00
1.00	11.5	74.8	23.0	4.90	15.3	99.7	28.5	23.60	87.20	44.50
1.10	12.9	83.6	26.0	5.40	17.2	111.9	33.0	29.20	108.30	55.00
1.20	14.7	95.6	30.5	6.20	19.6	127.8	37.5	34.70	128.80	66.00
1.80	21.0	135.7	42.0	8.90	27.9	181.1	53.0	47.30	175.00	88.00
2.30	26.8	173.4	49.0	10.8	33.6	218	60.0	–	–	–
2.90	32.7	211	61.0	13.2	40.9	265	74.0	–	–	–
3.60	40.0	258	76.0	16.3	50.1	323	92.0	–	–	–
5.50	59.4	382	107	24.3	74.2	478	131	–	–	–
6.10	65.8	422	122	26.9	82.0	527	146	–	–	–
8.70	92.0	592	168	37.9	115	739	205	–	–	–
9.90	105	672	188	43.1	130.5	839	230	–	–	–
11.2	117	750	215	48.2	146	936	255	–	–	–
14.0	146.5	937	265	60.2	182.5	1169	320	–	–	–
15.6	164.5	1055	305	67.6	205	1318	365	–	–	–
19.5	205	1330	395	84.0	255	1658	470	–	–	–
19.5	205	1330	395	84.0	255	1658	470	–	–	–
19.7	207	1330	395	85.0	258	1660	470	–	–	–
22.6	237	1520	450	97.5	295	1897	540	–	–	–
28.8	303	1942	560	124.5	378	2424	680	–	–	–

²⁾ Optional voltage with **9** at the 11th position of the Article No. and order code **L1P**: 230/400 VΔ/Y, 50 Hz; 400 VΔ, 87Hz (operating values at 87 Hz and motor in Δ circuit).

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate							
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}			
		Rated power	Power	Torque	Speed	Current	Max. frequency	Power	Current	
		P_{rated} kW	P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	
Cooling: self-ventilated (IC411)										
Efficiency: High Efficiency IE2										
Ambient temperature: 40 °C, installation altitude: 1000 m										
6-pole: 1000 rpm at 50 Hz										
Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 130 (B)										
1PS	■ 070-1BD...-CA4	□□□□ -071BS-06.	0.25	0.27	3.10	853	0.80	67	0.27	0.79
1PS	■ 080-1BD...-CA4	□□□□ -080BR-06.	0.37	0.41	4.32	915	1.12	81	0.41	1.11
1PS	■ 081-1BD...-CA4	□□□□ -080BS-06.	0.55	0.60	6.40	921	1.66	97	0.60	1.63
1PS	■ 095-1BD...-CA4	□□□□ -090LR-06.	0.75	0.80	8.70	927	2.20	85	0.80	2.10
1PS	■ 098-1BD...-CA4	□□□□ -090LS-06.	1.10	1.20	12.7	927	3.10	88	1.20	3.00
1PS	■ 106-1BD...-CA4	□□□□ -100LS-06.	1.50	1.60	16.7	966	3.85	95	1.60	3.70
1PS	■ 113-1BD...-CA4	□□□□ -112MS-06.	2.20	2.40	24.6	960	5.50	95	2.40	5.30
1PS	■ 131-1BD...-CA4	□□□□ -132SR-06.	3.00	3.10	31.5	968	7.30	90	3.10	7.20
1PS	■ 133-1BD...-CA4	□□□□ -132MR-06.	4.00	3.80	38.0	971	8.80	91	3.80	8.70
1PS	■ 135-1BD...-CA4	□□□□ -132MS-06.	5.50	5.30	52.3	971	11.7	100	5.30	11.7
1PS	■ 163-1BD...-CA4	□□□□ -160MR-06.	7.50	7.90	78.3	973	17.4	79	7.90	17.3
1PS	■ 166-1BD...-CA4	□□□□ -160LS-06.	11.0	10.6	104	976	23.0	87	10.6	23.0
1PS	■ 186-1BD...-CA4	□□□□ -180LS-06.	15.0	14.4	141.9	976	30.0	100	14.4	30.0
1PS	■ 206-1BD...-CA4	□□□□ -200LR-06.	18.5	17.8	174.4	979	35.0	100	17.8	35.0
1PS	■ 208-1BD...-CA4	□□□□ -200LS-06.	22.0	20.4	199.1	980	40.0	100	20.4	40.0
1PS	■ 223-1BD...-CA4	□□□□ -225MS-06.	30.0	28.9	282	981	55.0	87	28.9	55.0
1PS	■ 253-1BD...-CA4	□□□□ -250MM-06.	37.0	34.3	334	983	65.0	80	34.3	65.0
1PS	■ 280-1BD...-CA4	□□□□ -280SL-06.	45.0	43.4	421	986	80.0	75	43.4	80.0
1PS	■ 283-1BD...-CA4	□□□□ -280MM-06.	55.0	51.0	494	986	93.0	75	51.0	93.0
1PS	■ 311-1BD...-CA4	□□□□ -315SL-06.	75.0	75.5	730	988	138	65	75.5	138
1PS	■ 313-1BD...-CA4	□□□□ -315ML-06.	90.0	90.5	876	988	166	65	90.5	165
1PS	■ 314-1BD...-CA4	□□□□ -315MM-06.	110	117	1133	987	205	65	117	205
1PS	■ 315-1BD...-CA4	□□□□ -315MN-06.	132	132.5	1286	988	235	65	132.5	235
1PS	■ 316-1BD...-CA4	□□□□ -315LL-06.	160	148	1434	989	265	65	148	265
1PS	■ 317-1BD...-CA4	□□□□ -315LM-06.	200	185.5	1788	991	345	65	185.5	345
1PS	0 356-1BD...-0CB2	A N G A -355LB-06.	250	230	2227	994	425	60	230	425
1PS	1 317-1BD...-3CB2	A N G K -355LB-06.	315	230	2227	994	425	60	230	425
1PS	5 353-1BD...-4CA3	D N G W -355MR-06.	315	259	2496	994	485	60	259	480
1PS	5 355-1BD...-4CA3	D N G W -355MS-06.	315	292	2808	994	540	60	292	540
1PS	5 357-1BD...-4CA3	D N G W -355MT-06.	360	333	3206	994	610	60	333	610
		Motor								
0		A N G A	LOHER CHEMSTAR 1PS0							
1		A N G K	LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)							
5		D N G W	LOHER CHEMSTAR 1PS5							

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10

$T = \text{constant}$

Constant flux

5 ... 50 Hz

5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	A

Setting range 1 : 3

$T = \text{constant}$

Constant flux

$16^{2/3}$... 50 Hz

$16^{2/3}$ Hz Power	50 Hz Power	$16^{2/3}$... 50 Hz Torque	Current
$P_{16^{2/3}\text{ Hz}}$	$P_{50\text{ Hz}}$	T	I_{VSD}
kW	kW	Nm	A

0.0035	0.16	1.69	0.73	0.05	0.23	2.54	0.77
0.01	0.25	2.58	0.93	0.10	0.35	3.65	1.04
0.02	0.38	3.84	1.38	0.15	0.50	5.40	1.54
0.03	0.50	5.30	1.73	0.21	0.70	7.40	1.99
0.04	0.75	7.70	2.40	0.30	1.05	10.8	2.80
0.08	1.05	10.7	3.00	0.45	1.40	14.4	3.50
0.12	1.50	15.6	4.05	0.65	2.10	21.2	4.90
0.16	2.00	20.2	6.00	0.85	2.70	27.2	6.80
0.20	2.50	24.5	7.00	1.05	3.30	32.9	8.10
0.28	3.40	33.6	9.20	1.40	4.60	45.2	10.7
0.43	5.10	50.5	13.3	2.20	6.90	67.7	15.8
0.55	6.90	67.3	17.4	2.90	9.20	90.0	21.0
0.80	9.40	91.8	23.0	4.00	12.5	122.8	27.5
1.00	11.6	113.2	25.5	4.90	15.5	151.1	31.5
1.10	13.3	129.4	29.0	5.70	17.7	172.6	35.5
1.70	20.4	197.9	42.0	8.20	25.6	249	50.0
2.10	24.2	235	48.5	9.80	30.3	295	59.0
2.70	30.7	297	60.0	12.5	38.4	372	72.0
3.20	36.1	348	69.0	14.7	45.1	437	83.0
4.90	53.5	516	105	21.8	66.9	646	125
5.90	64.2	619	124	26.2	80.0	775	149
7.60	82.5	800	153	33.8	103.5	1002	185
8.60	94.0	908	177	38.4	117.5	1137	210
9.70	105	1014	200	43.0	131	1268	240
12.30	131.5	1267	265	54.0	164	1583	310
15.50	164	1583	330	19.5	205	1972	385
15.50	164	1583	330	19.5	205	1972	385
17.70	184.5	1773	370	76.0	230	2211	435
19.90	207	1995	410	85.5	259	2488	485
22.90	237	2279	470	97.5	296	2841	550

Introduction

General technical specifications

Converter operation – VSD drive configuration

Overview (continued)

Type	Motor type	Line operation	Operating values for converter operation – rated data for rating plate						
			Setting range 1 : 10 $T \sim n^2$ Constant flux 5 ... 50 Hz				$P_{VSD} = \text{constant}^{1)}$ Any load characteristic Field weakening 50 Hz ... f_{max}		
Rated power		Power	Torque	Speed	Current	Max. frequency	Power	Current	
P_{rated} kW		P_{VSD} kW	T_{VSD} Nm	n_{asyn_VSD} rpm	I_{VSD} A	f_{max} Hz	P_{VSD} kW	I_{VSD} A	

Cooling: self-ventilated (IC411)

Efficiency: High Efficiency IE2

Ambient temperature: 40 °C, installation altitude: 1000 m

6-pole: 1000 rpm at 50 Hz

Insulation: Thermal class 155 (F) – VSD utilization of the winding in accordance with thermal class 155 (F) – can be ordered with additional

1PS ■ 070-1BD...-CA4	□□□□ -071BS-06.	0.25	0.30	3.45	837	0.82	61	0.30	0.81
1PS ■ 080-1BD...-CA4	□□□□ -080BR-06.	0.37	0.45	4.80	906	1.18	73	0.45	1.16
1PS ■ 081-1BD...-CA4	□□□□ -080BS-06.	0.55	0.65	7.10	912	1.75	88	0.65	1.69
1PS ■ 095-1BD...-CA4	□□□□ -090LR-06.	0.75	0.90	9.60	918	2.35	76	0.90	2.25
1PS ■ 098-1BD...-CA4	□□□□ -090LS-06.	1.10	1.30	14.1	918	3.30	79	1.30	3.15
1PS ■ 106-1BD...-CA4	□□□□ -100LS-06.	1.50	1.80	18.5	962	4.15	85	1.80	4.00
1PS ■ 113-1BD...-CA4	□□□□ -112MS-06.	2.20	2.70	27.3	956	5.90	85	2.70	5.80
1PS ■ 131-1BD...-CA4	□□□□ -132SR-06.	3.00	3.50	35.0	964	7.80	81	3.50	7.70
1PS ■ 133-1BD...-CA4	□□□□ -132MR-06.	4.00	4.20	42.2	968	9.50	82	4.20	9.30
1PS ■ 135-1BD...-CA4	□□□□ -132MS-06.	5.50	5.80	58.1	968	12.6	93	5.80	12.4
1PS ■ 163-1BD...-CA4	□□□□ -160MR-06.	7.50	8.80	87.0	970	18.8	71	8.80	18.7
1PS ■ 166-1BD...-CA4	□□□□ -160LS-06.	11.0	11.7	115.6	973	25.0	78	11.7	24.5
1PS ■ 186-1BD...-CA4	□□□□ -180LS-06.	15.0	16.0	157.6	973	32.5	100	16.0	32.5
1PS ■ 206-1BD...-CA4	□□□□ -200LR-06.	18.5	19.8	193.8	976	38.0	93	19.8	38.0
1PS ■ 208-1BD...-CA4	□□□□ -200LS-06.	22.0	22.6	221	977	43.5	97	22.6	43.5
1PS ■ 223-1BD...-CA4	□□□□ -225MS-06.	30.0	32.1	314	979	60.0	87	32.1	60.0
1PS ■ 253-1BD...-CA4	□□□□ -250MM-06.	37.0	38.0	371	981	72.0	80	38.0	71.0
1PS ■ 280-1BD...-CA4	□□□□ -280SL-06.	45.0	48.2	468	984	88.0	75	48.2	88.0
1PS ■ 283-1BD...-CA4	□□□□ -280MM-06.	55.0	56.6	549	985	102	75	56.6	102
1PS ■ 311-1BD...-CA4	□□□□ -315SL-06.	75.0	83.5	812	987	152	65	83.5	151
1PS ■ 313-1BD...-CA4	□□□□ -315ML-06.	90.0	100.5	974	987	182	65	100.5	182
1PS ■ 314-1BD...-CA4	□□□□ -315MM-06.	110	129.5	1259	986	230	65	129.5	225
1PS ■ 315-1BD...-CA4	□□□□ -315MN-06.	132	147.5	1428	987	260	65	147.5	260
1PS ■ 316-1BD...-CA4	□□□□ -315LL-06.	160	164.5	1593	988	290	65	164.5	290
1PS ■ 317-1BD...-CA4	□□□□ -315LM-06.	200	185.5	1788	991	345	65	185.5	345
1PS 0 356-1BD...-0CB2	A N G A -355LB-06.	250	230	2227	994	425	60	230	425
1PS 1 317-1BD...-3CB2	A N G K -355LB-06.	315	230	2227	994	425	60	230	425
1PS 5 353-1BD...-4CA3	D N G W -355MR-06.	315	259	2496	994	485	60	259	480
1PS 5 355-1BD...-4CA3	D N G W -355MS-06.	315	292	2808	994	540	60	292	540
1PS 5 357-1BD...-4CA3	D N G W -355MT-06.	360	333	3206	994	610	60	333	610

	Motor
0	A N G A LOHER CHEMSTAR 1PS0
1	A N G K LOHER CHEMSTAR 1PS1 (converter operation Ex nA can only be ordered with add. identification code -Z and order code M73)
5	D N G W LOHER CHEMSTAR 1PS5

¹⁾ The reduced torque in the field-weakening range shall be calculated as follows:

$$T [\text{Nm}] = 9550 \cdot P_{VSD} [\text{kW}] / n [\text{rpm}]$$

“Converter operation” (Frequency – control range) – rating plate: Operational torque limits acc. to IEC 60079-0 [29.15]

Setting range 1 : 10				Setting range 1 : 3			
T = constant				T = constant			
Constant flux				Constant flux			
5 ... 50 Hz				16 ² / ₃ ... 50 Hz			
5 Hz Power	50 Hz Power	5 ... 50 Hz Torque	Current	16 ² / ₃ Hz Power	50 Hz Power	16 ² / ₃ ... 50 Hz Torque	Current
$P_{5\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD}	$P_{16\ 2/3\text{ Hz}}$ kW	$P_{50\text{ Hz}}$ kW	T Nm	I_{VSD} A

identification code **-Z** and order code **C32** “Power data for converter operation, utilization of thermal class F (155 °C)”

0.0025	0.17	1.83	0.74	0.05	0.25	2.80	0.78
0.01	0.27	2.83	0.95	0.10	0.38	4.04	1.08
0.02	0.41	4.22	1.42	0.16	0.55	6.00	1.61
0.03	0.55	5.80	1.79	0.22	0.75	8.10	2.10
0.04	0.80	8.50	2.50	0.33	1.10	11.9	2.95
0.09	1.20	11.8	3.15	0.50	1.60	16.0	3.75
0.13	1.70	17.3	4.30	0.70	2.30	23.5	5.30
0.18	2.20	22.3	6.20	0.95	3.00	30.1	7.20
0.22	2.70	27.1	7.30	1.10	3.70	36.5	8.60
0.30	3.80	37.2	9.70	1.60	5.10	50.1	11.4
0.47	5.70	55.9	14.0	2.40	7.60	75.1	16.9
0.60	7.60	74.5	18.5	3.20	10.2	99.9	22.5
0.85	10.4	101.6	24.5	4.40	13.9	136.3	29.5
1.10	12.9	125.4	27.5	5.50	17.2	167.8	34.0
1.20	14.7	143.4	31.0	6.30	19.6	191.6	39.0
1.90	22.6	219	45.0	9.10	28.4	277	54.0
2.30	26.8	260	53.0	10.8	33.6	327	64.0
3.00	34.0	329	65.0	13.8	42.6	413	79.0
3.60	40.0	387	75.0	16.2	50.1	485	91.0
5.40	59.3	572	114	24.1	74.2	717	136
6.50	71.2	687	135	29.0	89.0	861	163
8.30	91.5	887	167	37.4	115	1112	205
9.50	104.5	1008	192	42.6	130.5	1263	230
10.7	116.5	1125	215	47.6	145.5	1409	260
12.3	131.5	1267	265	54.0	164	1583	310
15.5	164	1583	330	19.5	205	1972	385
15.5	164	1583	330	19.5	205	1972	385
17.7	184.5	1773	370	76.0	230	2211	435
19.9	207	1995	410	85.5	259	2488	485
22.9	237	2279	470	97.5	296	2841	550

Introduction

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Technical definitions for pole-changing motors

1

Overview

General information

Mechanically, all pole-changing motors correspond to the single-speed motors. Pole-changing motors in frame size 225 and above of the 2-pole level have the same bearings and the same shaft extensions as the corresponding frame sizes of the single-speed 2-pole motors.

Voltage and frequency

The pole-changing motors in this catalog are supplied for the following voltages in 50 Hz supply systems: 400 V, 500 V or 690 V.

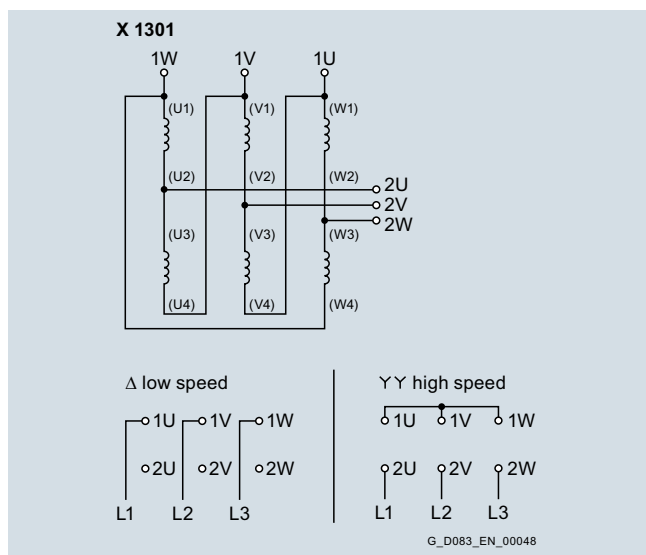
Within the range of these voltages, motors can be supplied with abnormal windings for any rated voltage required. For rated voltages below 400 V as well as different frequencies, it is essential to inquire.

Power

The power ratings specified in the selection tables apply to duty type S1 according to EN 60034-1.

With regard to coolant temperatures above 40 °C and installation altitudes above 1000 m above sea level, the same points apply as for single-speed motors.

Circuit diagrams for two speeds

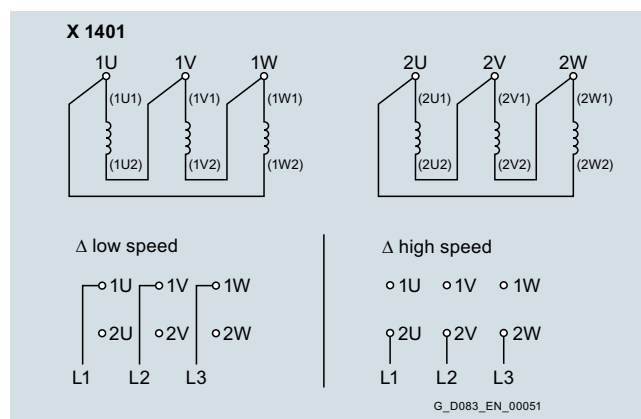
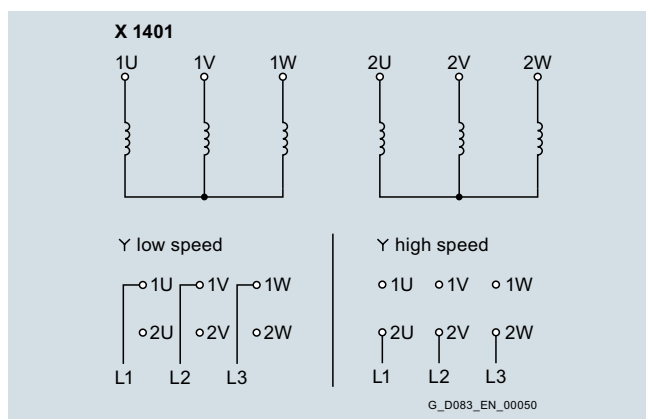
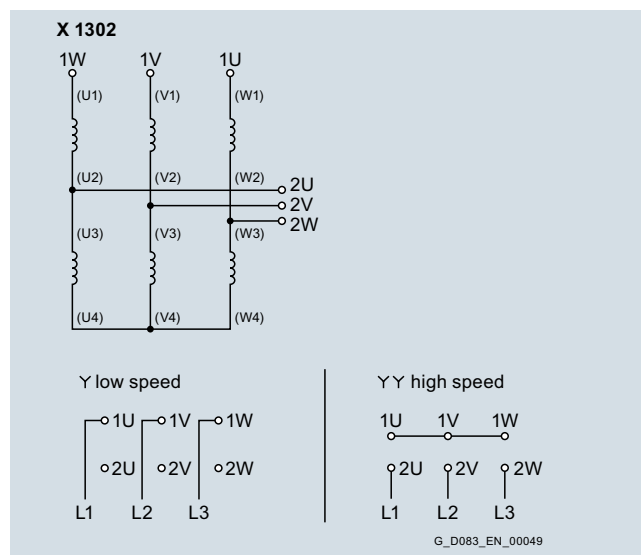


Torque

The pole-changing motors can be started up from standstill whatever the number of poles. In the power rating tables, the starting torques are specified for direct switch-on and the rotor classes. The high speed levels can have pull-up torques; so where possible start-up must be performed at the lower speed levels. Starting is improved as a result, and with heavy starting the temperature rise is reduced.

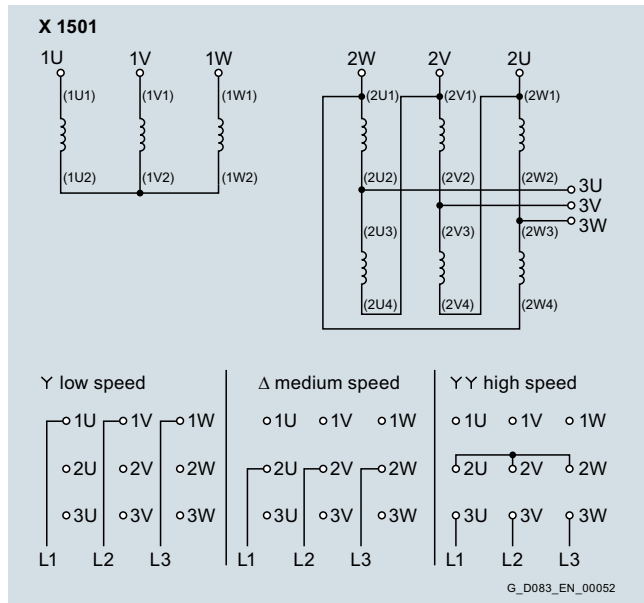
The pole-changing motors included in the power rating tables are supplied for 2 or 3 fixed speed levels.

If power levels are required other than those listed in the catalog, the motors in Dahlander circuits can also be supplied with 2 separate windings. The power will, however, be considerably lower than for a motor with a Dahlander circuit. The following variants are available:

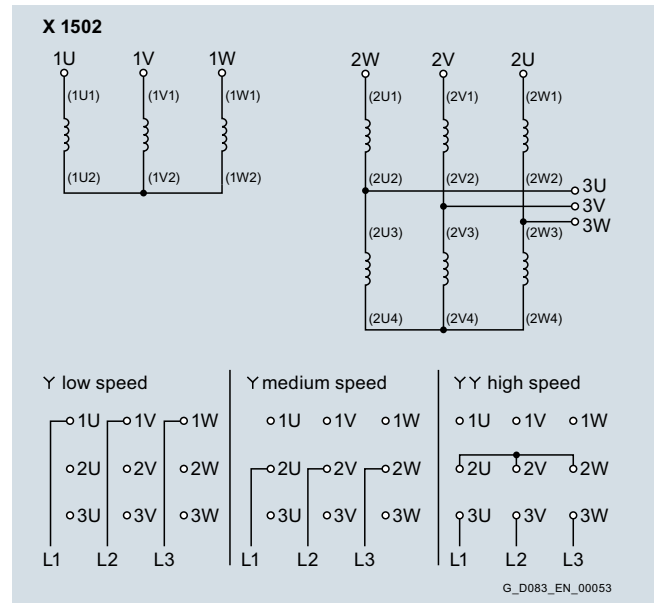


Overview (continued)

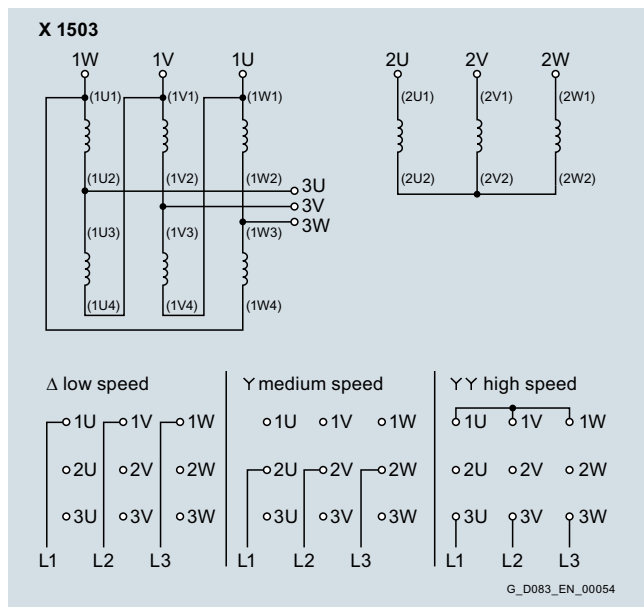
Circuit diagrams for three speeds



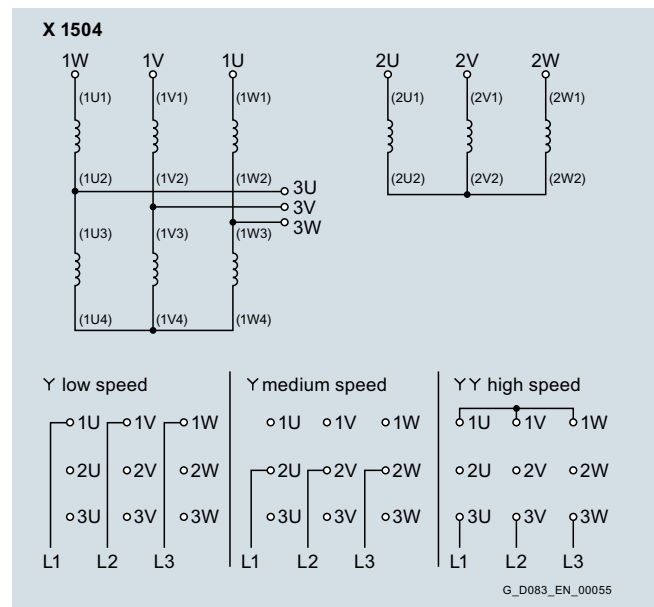
Speed ratio 1:2:4; Dahlander circuit, 4-/2-pole, separate winding 8-pole, Y/Δ/YY circuit – 2 separate windings also possible in Δ-circuit for constant torque 8-/4-/2-pole



Speed ratio 1:2:4; Dahlander circuit, 4-/2-pole, separate winding 8-pole, Y/Y/YY circuit – 2 separate windings also possible in Δ-circuit for torque that reduces in accordance with the square law (fan drive) 8-/4-/2-pole



Speed ratio 1:1.33:2; Dahlander circuit, 8-/4-pole, separate winding 6-pole, Y/Δ/YY circuit – 2 separate windings also possible in Δ-circuit for constant torque 8-/6-/4-pole



Speed ratio 1:1.33:2; Dahlander circuit, 8-/4-pole, separate winding 6-pole, Y/Y/YY circuit – 2 separate windings also possible in Δ-circuit for torque that reduces in accordance with the square law (fan drive) 8-/6-/4-pole

Introduction

General technical specifications

Notes

1

Motors with Explosion Protection

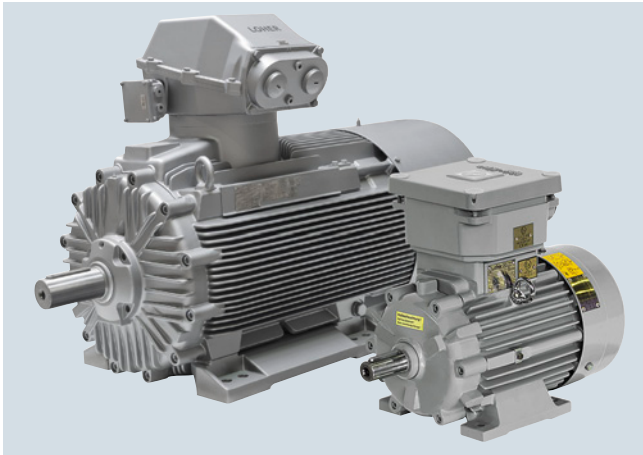


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Motors with Explosion Protection

Orientation

Overview



In many industrial and public sectors, explosion protection or explosion hazards are ever-present, e.g. in the chemicals industry, in refineries, on drilling platforms, at gas stations, in feed manufacturing and in sewage treatment plants.

The risk of explosion is always present when gases, fumes, mist or dust are mixed with oxygen in the air in an explosive ratio close to sources of ignition that are able to release the so-called minimum ignition energy.

In the chemical and petrochemical industries in particular, when crude oil and natural gas are transported, or in mining, milling (e.g. grain and granular solids), this can result in serious injury to persons and damage to equipment.

To ensure maximum safety in these areas, legislators in most countries have implemented appropriate stipulations in the form of laws and regulations based on national and international standards.

Explosion-protected equipment is designed such that an explosion can be prevented when it is used properly.

The explosion-protected equipment can be designed in accordance with various types of protection.

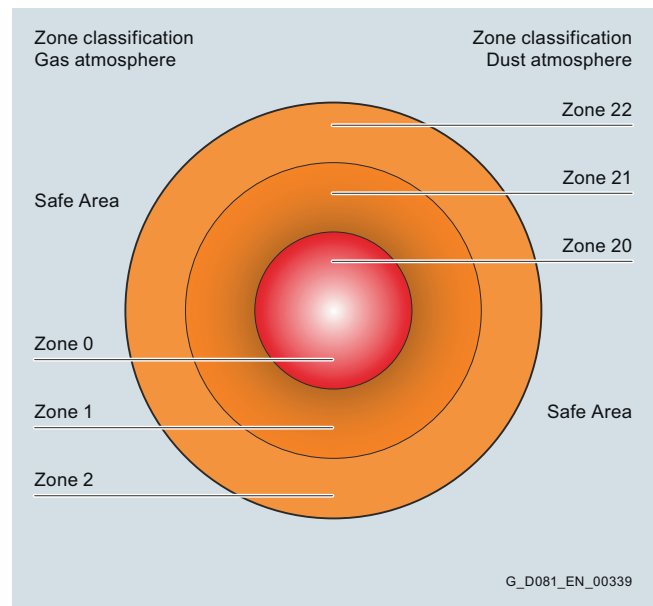
The local conditions must be subdivided into specified zones by the user with the assistance of the responsible authorities in accordance with the frequency of occurrence of an explosion hazard. Device (equipment) categories are assigned to these zones. The zones are then subdivided into possible types of protection and therefore into possible equipment (product) types.

Classification of zones

Areas subject to explosion hazard are divided into zones. Division into zones depends on the chronological and geographical probability of the presence of a hazardous, potentially explosive atmosphere. Information and specifications for classification of the zones are laid down in the following standards:

- IEC/EN 60079-10-1 for gas atmospheres
- IEC/EN 60079-10-2 for dust atmospheres

Further, a distinction is made between various explosion groups as well as temperature classes and these are included in the hazard assessment.



Depending on the particular zone and therefore the associated hazard, operating equipment must comply with defined minimum requirements regarding the type of protection. The different types of protection require corresponding measures to prevent ignition that should be implemented at the motor in order to prevent that a surrounding explosive atmosphere is ignited.

Zone	Zone definition acc. to		Assigned types of protection	Category according to 2014/34/EU	Equipment protection level acc. to IEC/EN 60079-0
Gas 1) 2)	Dust 1) 2)	IEC/EN 60079-10-1 for gas atmospheres IEC/EN 60079-10-2 for dust atmospheres			
0	-	An area in which there is an explosive gas atmosphere constantly, over a long period or frequently .	Low-voltage motors not permitted	1	Ga
1	-	An area in which in normal operation it is expected that an explosive gas atmosphere will occur occasionally during normal operation.	Ex e Ex de Ex d	2	Gb
2	-	An area in which in normal operation it is expected that an explosive gas atmosphere will occur only rarely and then only briefly .	Ex nA	3	Gc
-	20	An area in which there is an explosive gas atmosphere comprising a dust-air mixture constantly, over a long period or frequently .	Low-voltage motors not permitted	1	Da
-	21	An area in which it is expected that an explosive gas atmosphere comprising a dust-air mixture will occur occasionally during normal operation.	Ex tb	2	Db
-	22	An area in which in normal operation it is expected that an explosive gas atmosphere in the form of a cloud of flammable dust in air will occur only rarely and then only briefly .	Ex tc ³⁾	3	Dc

1) Motors of
- Zone 1 may also be used in Zone 2.
- Zone 21 may also be used in Zone 22.

2) Motors which are certified for gas or dust protection must not be used in hybrid mixtures! Hybrid mixtures:
When explosive gas and dust atmospheres occur simultaneously.

3) Motors are not approved for operation in environments containing conductive dust.

Overview (continued)

Hazardous areas

Zone acc. to EN 60079-14	Explanations	Examples	Permissible electrical equipment	
			General	Motors
Gases, vapors and mist				
Zone 0	Areas in which there is an explosive gas atmosphere <u>constantly or over a long period</u> .	This normally only applies to the internal space of containers or apparatus.	Electrical equipment is only permitted to be used in Zone 0 which is explicitly certified for use in this zone.	Explosion-proof motors are not permitted to be used here whatever their type of protection. Exceptions can only be applied by the monitoring authorities.
Zone 1	Areas in which it is to be expected that a hazardous, potentially explosive atmosphere will only occur <u>occasionally</u> .	These include, for example: Close proximity to Zone 0, the internal space of equipment, close proximity to <ul style="list-style-type: none"> • Feed openings • Filling and draining facilities • Fragile apparatus or pipes made of glass or ceramics, etc. 	Electrical equipment must be explosion-proof in accordance with one of the EN 60079-0 types of protection.	In Zone 1, explosion-proof motors must be used that have type of protection "Explosion-proof enclosure", "Increased safety" or "Pressurized enclosure".
Zone 2	Areas in which it is to be expected that a hazardous, potentially explosive atmosphere will occur <u>only rarely and then only for a short period</u> .	These include, for example: Areas surrounding Zones 0 and 1. Areas surrounding flange connections with flat seals for pipes in closed rooms.		Explosion-proof motors in the type of protection "Non-sparking" Ex nA can be used in Zone 2.
Dust				
Zone 20	Areas in which a potentially explosive gaseous atmosphere in the form of a cloud of combustible dust is present <u>constantly over long periods, or frequently</u> .	This normally only applies to the internal space of apparatus (mills, dryers, mixers, pipelines, silos, etc.)	Electrical equipment is only permitted to be used in Zone 20 which is explicitly certified for use in this zone.	Explosion-proof motors are not permitted to be used here. Exceptions can only be applied by the monitoring authorities.
Zone 21	Areas in which a potentially explosive atmosphere in the form of a cloud of combustible dust is <u>occasionally present in normal operation</u> .	This zone may also include: Areas in the immediate vicinity of filling and draining stations and areas in which dust deposits build up that could occasionally result in an explosive mixture of combustible dust and air during normal operation		Motors with type of protection "Explosion-proof enclosure", "Increased safety" or "Non-sparking" can be used in Zone 21 provided that they comply with IP6x degree of protection, if they have an EC/EU type-examination certificate for Category 2D and fulfill the requirements of EN 60079-0 and EN 60079-31.
Zone 22	Areas in which a dangerous explosive atmosphere in the form of a cloud in the air containing flammable dust does <u>not usually occur or occurs only briefly during normal operation</u> .	These include, for example: Areas in the vicinity of apparatus when dust may be expelled from unsealed areas (e.g. mill rooms).		Motors without EU type-examination certificate (with EC Declaration of Conformity of the manufacturer) are also permitted to be used in Zone 22. For non-conductive dust, IP5x degree of protection must be implemented as a minimum and the requirements of EN 60079-0 and EN 60079-31 must be fulfilled. In the case of conductive dust, the requirements for Zone 21 apply.

Note:

The installation regulations of VDE 0118 apply to firedamp protection equipment. In mining, the areas are not subdivided into Zones.

Note I:

Layers, deposits and accumulations of combustible dust must be taken into consideration like any other possible cause of an explosive atmosphere.

Note II:

Normal operation refers to the state in which the equipment is used within its design parameters.

Motors with Explosion Protection

Orientation

Overview (continued)

Types of protection

Type of protection "Non-sparking" Ex nA acc. to IEC/EN 60079-15

For motors with type of protection "Non-sparking", the type of construction prevents the occurrence of arcing, sparks or hot surfaces during normal operation. Motors of this type of protection are occasionally located in a potentially explosive atmosphere whereby the atmosphere can achieve a level that poses a risk. These motors are assigned to device group II – category 3G (corresponding to Zone 2).

The LOHER CHEMSTAR and LOHER VARIO Ex nA series are generally certified for the highest class "IIC". They are marked in accordance with the EC directive (2014/34/EU) with II 3G Ex nA IIC T3 Gc. Compliance with the regulations is documented with an EC Declaration of Conformity.

The motor terminal boxes are also marked and certified as "Non-sparking". The terminal boxes of the LOHER CHEMSTAR and LOHER VARIO Ex nA series are identical in construction to the Ex e "Increased safety" connection system. In accordance with the current, harmonized edition, EN 60079-0, the gas for the type of protection test must be specified in the case of type of protection "Non-sparking".

Type of protection "Explosion-proof enclosure" Ex d acc. to IEC/EN 60079-1

For motors in type of protection "Explosion-proof enclosure", it is ensured that any explosion will be restricted to within the motor. The enclosure must resist the pressure of the explosion and also prevent ignition from the internal to the external atmospheres. Motors in type of protection "Explosion-proof enclosure Ex d" are used in a potentially explosive atmosphere whereby this atmosphere can achieve a level that poses a risk. These motors are assigned to device group II – category 2G (corresponding to Zone 1). They ensure a high degree of safety.

To define the risk posed by a potentially explosive gas, the minimum ignition temperature of a dust cloud is required as well as details of the possibility of a flame exiting through a narrow slit in the motor enclosure. This is achieved by classification in explosion groups IIA, IIB and IIC, whereby IIC represents the highest requirements (see the table "Assignment of combustible gases and vapors").

LOHER CHEMSTAR Ex d(e) motors

The LOHER CHEMSTAR 1PS5 motor series in type of protection Ex d(e) are approved for use in potentially explosive atmospheres of Zone 1 according to EN 60079-0, EN 60079-1 and EN 60079-7. They are marked in accordance with the EC directive (94/9/EC) with II 2G Ex d IIB T3-T6 Gb and II 2G Ex d IIC T3-T6 Gb. If the terminal box is in type of protection "Increased safety", they are marked with II 2G Ex de IIB T3-T6 Gb and II 2G Ex de IIC T3-T6 Gb. Compliance with the regulations is ensured in every case with an EU type-examination certificate.

SIMOTICS XP motors

The SIMOTICS XP 1MD5 motor series are positioned in the range of explosion-proof motors alongside the LOHER motor series and represent the future standard product series. SIMOTICS XP motors are characterized by significantly shorter delivery times, as well as by a considerable simplification of order processing, but in comparison to the 1PS5 motor series the variety of products is limited and the product characteristics are fixed. The components with relevance for the type of protection, such as enclosure, bearing plate and terminal box, are identical in design in the 1MD5 and 1PS5 motor series. These two series are therefore mechanically interchangeable and offer a well-rounded portfolio ranging from 1MD5 standard applications to 1PS5 special applications.

The SIMOTICS XP 1MD5 motors are explosion-proof, 3-phase induction motors with squirrel-cage rotors. They are suitable for use under ambient conditions in which there is a high risk of an explosive atmosphere being generated as a result of gas, vapor or mist (Zone 1). The motors comply with directive ATEX 94/9/EC and are marked with II 2G Ex de IIC T3-T6 Gb.

Type of protection "Dust explosion protection" Ex t acc. to IEC/EN 60079-31

The motor series in types of protection "Non-sparking" and "Explosion-proof enclosure" already described can also be designed for dust explosion protection. Atmospheres with potentially explosive dust are classified as frequently occurring (Zone 21) and rarely occurring (Zone 22). Further classification differentiates between conductive and non-conductive dust. In general, motors of the 1PS and 1MD5 series can be used in Zone 21 for non-conductive and conductive dust and in Zone 22 for non-conductive dust. The motors are marked in accordance with EN 60079-0 and EN 60079-31 with II 3D Ex tc IIB T130 °C Dc (Zone 22, non-conductive dust) or II 2D Ex tb IIC T130 °C (Zone 21, conductive dust). The installed terminal boxes are marked and certified in accordance with the dust and gas explosion protection class.

Suitability of the motors is confirmed for Zone 21 with an EU type-examination certificate and for Zone 22 with an EU Declaration of Conformity.

Motors with dual labeling for gas and dust may only be used in applications in which gas and dust occur simultaneously after prior examination of the properties of the hybrid mixtures by the user.

For further information, see Chapter "Operation of motors with type of protection "Dust explosion protection".

Changes to the Ex marking

In accordance with the latest edition of the standards for the "Explosion-proof enclosure" and "Increased safety" types of protection, there is a change to the device marking. The type of protection "Non-sparking" Ex nA acc. to IEC/EN 60079-15 has been integrated into the latest edition of the standard for "Increased safety" according to IEC/EN 60079-7 as Ex ec. This has the following effect on the Ex marking:

- "Increased safety" for Zone 1 and Zone 2 (previously Ex e): II 2G Ex eb IIC T3 Gb
- "Increased safety" for Zone 2 (previously Ex nA): II 3G Ex ec IIC T3 Gc
- "Explosion-proof enclosure" for Zone 1 and Zone 2 (previously Ex d): II 2G Ex db IIC T4 Gb

After the end of a transitional period, the new editions of the standards are to be applied with the changed Ex marking. The transitional period for "Explosion-proof enclosure" ends on August 1, 2017, whereas the transitional period for "Increased safety" and therefore also "Non-sparking" ends on July 31, 2018.

There are no changes for the user other than the device marking.

Overview (continued)

Overview of standards for explosion protection

The explosion-proof three-phase motors comply with the European standards. The European standards are recognized by all member states of CENELEC (European Committee for Electrotechnical Standardization). The national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, Portugal, and United Kingdom (UK) are affiliated to CENELEC.

Equipment	European standard
General provisions	EN 60079-0
Explosion-proof enclosures	EN 60079-1
Increased safety	EN 60079-7
Classification of areas (gases, vapors and mist)	EN 60079-10-1
Classification of areas (dust)	EN 60079-10-2
Intrinsic safety	EN 60079-11
Electrical equipment in potentially explosive atmospheres (gases, vapors, mist)	EN 60079-14
Type of protection "n" (Zone 2)	EN 60079-15
Maintenance of Ex equipment	EN 60079-17
Intrinsically safe electrical systems	EN 60079-25
Equipment "Dust" (dust explosion protection by enclosure)	EN 60079-31
Equipment "Dust"	EN 50281-2-1
Equipment "Dust"	EN 61241-2-2
Basic concepts and methodology	EN 1127-1

Explosion Protection Directive 2014/34/EU

Explosion protection has been fully harmonized by directive 2014/34/EU in Germany and in the other member states of the European Union. The requirements of the new law came into force on July 1, 2003 and since then only those devices and protection systems that comply with directive 2014/34/EU are permitted to be marketed.

Directive 2014/34/EU and directive 1999/92/EC specify that only specific electrical equipment and devices are permitted to be used in the zones. The devices are assigned to device groups and categories.

Certifications

The motors in this catalog are certified by the certification authority DEKRA "Exam". In a few exceptional cases, there is certification from the German Federal Testing Laboratory (PTB). EU type-examination certificates from the German Federal

Testing Laboratory for explosion-proof electrical equipment in accordance with EN standards are valid in all EU member states.

Any deviations from the certified electrical and mechanical design specified in this catalog may require a supplement to be issued, or re-certification.

Use of electrical equipment in accordance with EN 60079-14

Electrical equipment used in potentially explosive workshops and storage areas must comply with EN 60079-14/ VDE 0165-1 "Explosive atmospheres - Part 14: Electrical installations design, selection and erection". All other general regulations issued by the responsible supervisory authorities and the Employer's Liability Insurance Association or any specifically issued for individual case are also applicable.

A plant subject to inspection is not permitted to be commissioned initially or following a significant modification until the plant has been inspected by an approved testing agency for correctness of assembly, installation, site conditions and safe operation taking into account the intended mode of operation. Devices compliant with directive 94/9/EC are permitted to be commissioned in accordance with the responsible supervisory authority. (cf. German Health and Safety at Work Regulations (BetrSichV), section 3, § 14)

Device marking


The device group and category are specified in the device marking.

The device marking is specified as follows:

e.g.  II 2G Ex d IIC T4 Gb

- CE conformity mark, CE stands for "Communauté Européenne" (French for "European Community")

The manufacturer declares by means of CE marking that the relevant product has been manufactured in accordance with all applicable regulations and requirements of directive 94/9/EC and the product has been subjected to the relevant conformity evaluation process.

-0102 Identification number for the supervisory authority in the case of 1PS and 1MD5 motors, this is the German Federal Testing Laboratory (PTB)

- Marking for prevention of explosions in accordance with directive 2014/34/EU

Example "Non-sparking":

CE marking

Number of the certifying "notified" body (0102 = German Federal Testing Laboratory certification)

Explosion protection marking

Device group: **I** = Underground
II = All other areas

Category: **2** (Zone 1/21)
3 (Zone 2/22)

Ex atmosphere **G** = Gas
D = Dust

Explosion-proof equipment – Explosion protection (protection method) in accordance with European standards

Type of protection **nA**, **d**, **de**, **e**, **tb** or **tc** (de = Motor enclosure Ex d with terminal box Ex e) – see types of protection

Explosion group and explosion subgroup **II** = Gas (IIA, IIB or IIC)
III = Dust (IIIA, IIIB or IIIC)

See table "Examples of the assignment of combustible gases and vapors"

Temperature class with max. surface temperature **T1** = 450 °C **T4** = 135 °C
(see section below) **T2** = 300 °C **T5** = 100 °C
"Temperature classes and groups" **T3** = 200 °C **T6** = 85 °C

Equipment Protection Level: **G** = Gas **D** = Dust
Ga = Very high protection, **Da** = Very high protection,
Gb = High protection, **Db** = High protection,
Gc = increased protection, **Dc** = increased protection

Additional information on the subject of explosion protection, types of protection and zones is provided in the Siemens brochure "Explosion Protection".

Motors with Explosion Protection

Orientation

Overview (continued)

Temperature classes and groups

Combustible gases and vapors are divided into temperature classes according to their ignitability and into groups according to their spark ignition capacity. The marking of a three-phase motor with the codes for the type of protection, group and temperature class specifies that it can be used without danger in hazardous areas depending on the zone classification. The numerical sequence of the codes for the group and temperature class has been selected so that motors that satisfy the requirements for a certain group and temperature class also satisfy the requirements for lower groups and classes.

Temperature classes

Temperature class of electrical equipment	Maximum surface temperature of electrical equipment	Ignition temperature of gases or vapors
T1	450 °C	> 450 °C
T2	300 °C	> 300 °C
T3	200 °C	> 200 °C
T4	135 °C	> 135 °C
T5	100 °C	> 100 °C
T6	85 °C	> 85 °C

Examples of the assignment of combustible gases and vapors

Group	Temperature classes											
	T1		T2		T3		T4		T5		T6	
	Material designation	Ignition temperature °C	Material designation	Ignition temperature °C	Material designation	Ignition temperature °C	Material designation	Ignition temperature °C	Material designation	Ignition temperature °C	Material designation	Ignition temperature °C
IIA ¹⁾	Acetone	540	i-amyl acetate	380	Benzine		Acetaldehyde	140				
	Ethane	515	n-butane	365	Gasoline	2)						
	Ethyl acetate	460	n-butyl alcohol	340	Special benzine	2)						
	Ethyl chloride	510	Cyclohexanone	430	Diesel fuel	2)						
	Ammonia	630	1,2-dichloroethane	440	Heating oils	2)						
	Benzene	555	Acetic acid anhydride	330	n-hexane	240						
	Acetic acid	485										
	Carbon monoxide	605										
	Methane	595										
	Methanol	455										
	Methyl chloride	625										
	Naphthalene	520										
	Phenol	595										
	Propane	470										
Toluene	535											
IIB ¹⁾	Town gas (illuminating gas)	560	Ethyl alcohol	425	Hydrogen sulfide	270	Ethyl ether	180				
			Ethylene	425								
			Ethylene oxide	440								
IIC ¹⁾	Hydrogen	560	Acetylene	305							Carbon disulfide	95

¹⁾ Subgroups IIA, IIB and IIC must be specified for the Ex nA and Ex de types of protection described in this list in accordance with EN 60079-0.

²⁾ The minimum ignition temperature depends on the composition and lies between 220 and 300 °C, over 300 °C in special cases.

Overview (continued)**Operation of motors with type of protection "Dust explosion protection"**

Potentially explosive atmospheres with dust can arise in industry and in agriculture. For a specific environment (Zone), a product (device or motor) is permitted to be used only if it is assigned to the appropriate device group and category (see the following table).

An important feature of dust protection is the IP degree of protection. Depending on the environmental conditions, differing requirements are placed on the dust-tightness of the enclosure.

For dust explosion protection, it is important to ensure that the surface temperature of the motors is limited to a value below the minimum ignition temperature of the combustible dust or a dust layer.

- Surface temperature of motors $< \frac{2}{3}$ minimum ignition temperature of the dust/air mixture.
- Surface temperature of motors $<$ minimum ignition temperature of a dust layer (of 5 mm depth) -75 K.

The user determines the category and maximum permissible surface temperature based on the hazardous area and the type of dust.

Note:

Conductive or non-conductive dust changes the device category (see table below).

The motors are designed for ambient temperatures between -20 and +40 °C.

Dust explosion protection EN 60079-0 and EN 60079-31

Equipment group	II		
Category	2D	3D	
Zone	21	22	
Dust group	IIIC	IIIB	IIIC
	Conductive dust	Non-conductive dust	Conductive dust
IP degree of protection	IP6x	IP5x	IP6x
Max. surface temperature	T130 °C		
Marking	II 2D Ex tb IIIC T130 °C Db	II 3D Ex tc IIIB T130 °C Dc	II 3D Ex tc IIIC T130 °C Dc
ATEX certification	EU type examination certificate	EU Declaration of Conformity of the manufacturer	
IECEx certification	IECEx Certificate of Conformity	No IECEx certificate available	

Zone 22 non-conductive dust:

Can be ordered as an option (Zone 22 options) with LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motor series.

Zone 22 conductive dust:

Implemented and certified normally as Zone 21, the option for Zone 21 must be selected in this case.

Zone 21 non-conductive dust:

Handled and certified as for Zone 21 conductive dust.

Zone 21 conductive dust:

Can be ordered as an option (Zone 21 options) with LOHER CHEMSTAR 1PS1, 1PS5 and SIMOTICS XP 1MD5 motor series.

Hybrid mixtures

When dust explosion protection is combined with gas explosion protection, it is important to consider the possibility that hybrid mixtures can occur: Hybrid mixtures are mixtures of flammable dusts with explosive gas/air atmospheres which can together create a dangerous explosive atmosphere if they occur at the same time. Changes can arise in the safety characteristics here, such as a change in the zone classification, increase in the explosion pressure, reduction in the minimum ignition energy and a reduction in the maximum temperatures to be observed.

For this reason, the relative characteristics must be considered both for gas (Zones 0, 1 and 2) and for dust (Zones 20, 21 and 22) where hybrid mixtures arise. It is necessary for a competent assessor to determine in the individual case whether the parameters determining ignition are unfavorably affected in a particular hybrid mixture. Motors with dual labeling for gas (G) and dust (D) may only be used in applications in which gas and dust occur simultaneously after prior examination of the properties of the hybrid mixtures by the user.

Maintaining explosion protection during normal operation

Electrical machines must be protected against overheating as a result of overload. The protection devices that can be considered depend on the operating mode, but also on the design and suitability of the electrical machine.

Overcurrent protection devices with inverse-time delayed tripping in accordance with EN 60947, e.g. motor circuit breakers in all phase conductors, must be set to the rated current of the motor. Furthermore, they should be selected such that the motor is thermally protected even under short-circuit conditions (i.e. with a blocked rotor). This requirement is regarded as fulfilled when the tripping time obtained from the tripping characteristic (starting temperature 20 °C) for the ratio I_A/I_N does not exceed the warm-up time t_E for the relevant ignition group.

Windings in a Δ connection should preferably be protected in such a way that the trip unit or relay is connected in series with the winding phases. When selecting and configuring the trip unit, the rated value of the phase current (i.e. 0.58 times the rated motor current) is to be taken as a basis. If, however, the trip unit is connected in the line supply conductor, protective measures must be taken to ensure that sufficient motor protection is afforded when only one phase fails.

For pole-changing motors, inverse-time delayed trip units or relays must be provided for each speed level that must be mutually interlocked.

Thermal motor protection for direct temperature monitoring, e.g. with PTC thermistors, in combination with a certified monitoring device alone or in addition to overcurrent protection. Motors with thermal motor protection as sole protection are available on request.

The motors are only permitted to be used for continuous duty and not for normal, infrequently repeated start-ups in which no significant start-up temperature rise occurs. The values for temperature rise time t_E for the individual ignition groups and for the inrush current ratio I_A/I_N are specified on the rating plate of the respective motor and are stated in the test certificate from the German Federal Testing Laboratory.

Motors with Explosion Protection

Orientation

Overview (continued)

Overview of explosion-proof motors

	Type of protection "d"	Type of protection "n"
Motor series	1MD5	1PS5
<i>Motor type</i>	<i>DNGW</i>	<i>D..L/D..W</i>
Frame size	71 ... 355	71 ... 500
Powers	0.25 ... 460 kW	0.25 ... 1120 kW
Temperature class	T4	T3 ... T6
Type of protection	II 2G Ex d(e) IIC Gb IEC/EN 60079-0 IEC/EN 60079-1	II 2G Ex d(e) IIC Gb IEC/EN 60079-0 IEC/EN 60079-1
Ex zones	Gas Zone 1 optional Dust Zone 22/21	Gas Zone 1 optional Dust Zone 22/21
Guidelines	2014/34/EU	
Cooling	Surface-cooled IC 411	Surface-cooled, water-jacket-cooled on request
No. of poles	2- to 6-pole	2- to 12-pole, multi-pole + pole-changing on request
Voltage/frequency	400, 500, 690 V/50 Hz	All common voltages in 50 Hz; 60 Hz special designs on request
Degree of protection	IP55, IP56, IP65	IP55 to IP66
Type of construction	All common types of construction	All common types of construction + special types of construction
Enclosure	Cast-iron	Cast-iron or steel
Insulation	Class F utilized according to B	Class F utilized according to B
Special versions	For outdoor temperature -20 to +50 °C	For outdoor temperature -55 to +60 °C (other temperatures on request)
	Installation altitude 1000 m above sea level	Installation altitude up to 3000 m (> 3000 m on request) Modified windings, for example, for increased ambient temperatures, installation altitude for optimum electrical values
	Permanent load S1	Permanent load S1 as well as partial load operation, e.g. S2/S3/S6
	Version for line and/or converter operation	Version for line and/or converter operation
	Efficiency classification IE2 (≥ 0.75 kW)	IE2 efficiency class (≥ 0.75 ... 375 kW), IE3 on request
	Drive-end located bearing	Drive-end located bearing; special bearing for increased axial/radial forces Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc. LOHER CHEMSTAR copper rotor as an option LOHER VARIO copper rotor as standard Metal fan in aluminum, steel or brass Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc.
	Country-specific certificate according to EAC (Eurasian Customs Union), PES (CCOE India)	Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEx (international) Version for offshore, on-deck and/or marine classifications Combination with brakes + rotary encoder + forced ventilation Enlarged connection system and/or larger terminal box for large cable cross-sections Designs true to the specification, excellent project capability Customized documentation, excellent project capability

Technical specifications

SIMOTICS XP 1MD5 motor series, type of protection "Explosion-proof enclosure"

SIMOTICS XP motors of the 1MD5 series are surface-cooled, fully enclosed motors in type of protection "Explosion-proof enclosure" Ex d. They can be designed in accordance with the current VIK recommendation ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

The motors are marked in accordance with EN 60079-0 and EN 60079-1 with II 2G Ex de IIC T4 Gb for operation in Zone 1.

General technical specifications

SIMOTICS XP 1MD5 motors

<i>Motor type</i>	<i>DNGW</i>
Frame size	71 ... 355
Powers	0.25 ... 460 kW
Temperature class	T4
Type of protection	II 2G Ex d(e) IIC Gb, IEC/EN 60079-0, IEC/EN 60079-1
Ex zones	Gas Zone 1 optional Dust Zone 22/21
Guidelines	2014/34/EU
Cooling	Surface-cooled IC 411
No. of poles	2-, 4-, 6-pole
Voltage/frequency	230 ... 690 V, 50 Hz 460 ... 575 V, 60 Hz
Degree of protection	IP55, IP56, IP65
Type of construction	All common types of construction
Enclosure	Cast-iron
Insulation	Class F utilized according to B

Special versions

- For outdoor temperatures -20 to +50 °C
- Permanent load S1
- Drive-end located bearing
- Country-specific certificates such as EAC (Eurasian Customs Union), PESO (CCOE India), China Energy Label

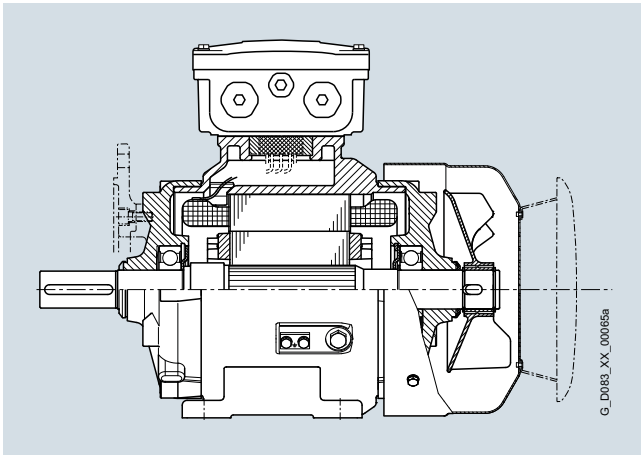
Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

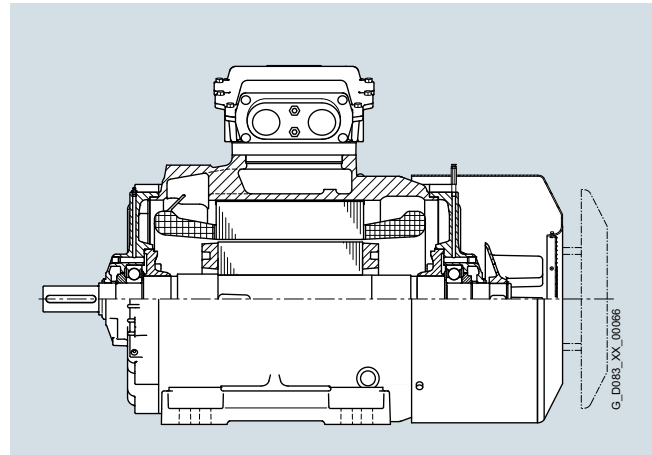
General information

Technical specifications (continued)

Mechanical design



Sectional view of 1MD5 three-phase motor, frame sizes 71 to 132,
Example: 1MD5131-0BD60-4AA1 (Motor type: DNGW-132SR-02)
7.5 kW, 2-pole



Sectional view of 1MD5 three-phase motor, frame sizes 160 to 355
Example: 1MD5315-0BD60-4AA1 (Motor type: DNGW-315LL-02)
200 kW, 2-pole

Enclosure and ventilation

Enclosure and fan for motors of the SIMOTICS XP 1MD5 series

Frame size	Enclosure			Bearing plates		Fan cover	Fan
	Material	Design of enclosure feet ¹⁾	Surface	Material	Flange ring on bearing plate	Material	Material
71	Cast-iron	Cast	With cooling fins	Cast-iron	Screwed on	Sheet steel	Plastic ³⁾
80 ... 112					Cast		
132		Cast ²⁾			Screwed on		
160					Screwed on		
180 ... 280		Screwed on					
315							
355	Cast		Metal ^{3) 4)}				

¹⁾ For designs with feet only.

²⁾ Terminal boxes are screwed on at the side on frame sizes 132 and 160.

³⁾ With specific operating conditions, the external fans can be constructed with special materials (see special versions).

⁴⁾ Only one direction of rotation for 2-pole and 4-pole version.

Technical specifications (continued)

Protection against ingress of condensation

Condensation drainage holes must not be drilled into encapsulated explosion-proof motors, otherwise the type of protection can no longer be ensured. In frame size 250 and above, the explosion-proof encapsulated motors have separate chambers at the drive end (DE) and non-drive end (NDE) for collection of any condensation that may arise. This prevents possible damage to the winding as a result of condensation in the winding overhang spaces. In the case of smaller motors (frame sizes 71 to 225), the risk of adverse effects from condensation is countered by applying increased humidity protection to the winding insulation.

In the standard version, the motor can be used in environments with up to 80 % relative humidity without the need for further measures. If the motor is ordered with the option "Increased tropicalization, humidity \geq 80 %" (order code **W61**), the hollow spaces and internal parts can be finished with special paint, which enables operation at up to 100 % humidity to be achieved as an option. An anti-condensation heater is not necessary in most cases. This is known as a "tropical insulation version".

Terminal boxes

The design of the terminal boxes can be seen in the following figures. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below. Terminal boxes in type of protection "Explosion-proof enclosure" Ex d IIC according to EN 60079-0 and EN 60079-1 can be supplied on request. Separate terminal boxes for main connections and accessories are available in type of protection "Explosion-proof enclosures" for auxiliary terminals for frame sizes 200 to 355 only.

Figure 1 Terminal box for frame sizes 71 to 112

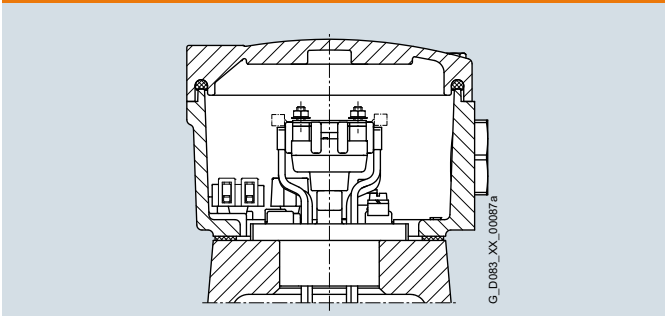


Figure 2 Terminal box for frame sizes 132 to 225

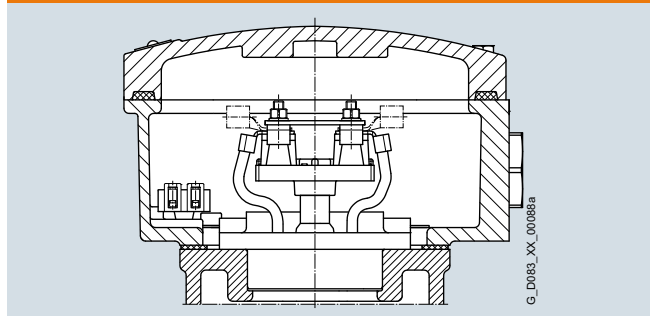


Figure 3 Terminal box for frame sizes 250 to 280

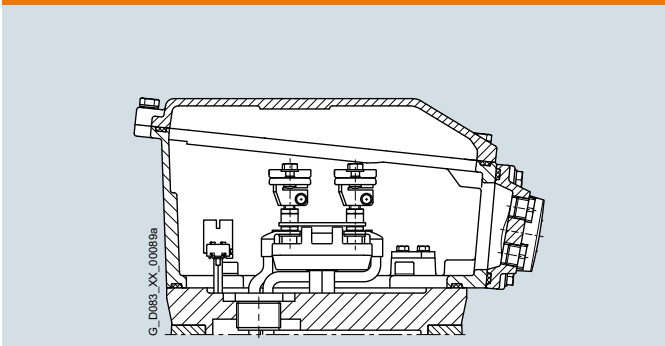
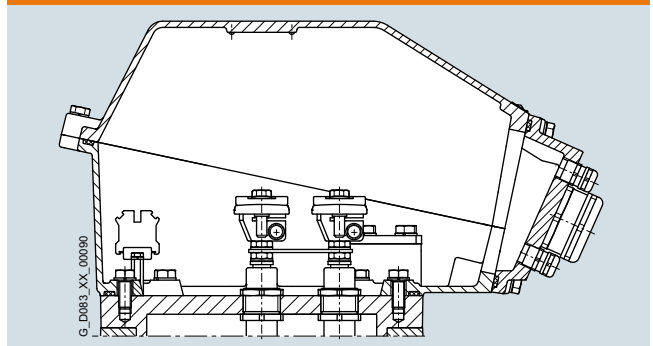


Figure 4 Terminal box for frame sizes 315 to 355



Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

General information

Technical specifications (continued)

Terminal box for 1MD5...1 motor

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Enclosure material: Cast-iron

Frame size	Standard terminal box		Auxiliary terminals in main terminal box		PE/ground connection		Fig. No. on Page 2/11
	Terminal studs	Conductor cross-section min. mm ²	max. mm ²	Number × max. cross-section ¹⁾ mm ²	max. mm ²		
71	6 × M4	1	4 (6) ²⁾	4 × 2.5	4	6 ²⁾	Fig. 1
80							
90							
100							
112							
132	6 × M5	1	10 (25) ²⁾		25		Fig. 2
160							
180							
180	6 × M6	2.5	35 (50) ²⁾	12 × 4	70		Fig. 2
200							
225							
250	6 × M10	6 ... 70			95		Fig. 3
280							
315 S/M	6 × M12	16 ... 150		16 × 4	150		Fig. 4
315 L							
355	6 × M16/M20 ³⁾	16 ... 300					

Number and size of entry thread and cable glands (to be ordered specially), see table "Cable glands for 1MD5 motors".

The terminals are designed for the connection of 1 conductor per terminal. For connection of 2 conductors per terminal, please inquire at Siemens Ruhstorf specifying the conductor cross-sections.

Cable glands for 1MD5 motors

Frame size	Standard cable glands		Removable gland plate (for Ex e terminal box only)	
	Entry thread ⁴⁾	Cable diameter ⁵⁾ Type HSK-M-Ex ⁶⁾ for Ex e mm	Type ADE 1F ⁷⁾ for Ex d mm	
71	1 × M25 × 1.5	10 ... 16	10 ... 16	None
80				
90				
100	1 × M32 × 1.5	13 ... 20	13 ... 20.5	
112				
132	2 × M32 × 1.5			
160				
160	2 × M40 × 1.5	22 ... 32	23 ... 34	
180				
200	2 × M50 × 1.5	32 ... 38	29 ... 41	None
225				
250				
250	2 × M63 × 1.5	37 ... 44	42 ... 56	With
280				
315				
355				
355				

Auxiliary entry threads, e.g. for PTC thermistor and heating:

- Ex e IIC: M20 × 1.5/D = 6 to 12 mm
- Ex d IIC: M20 × 1.5/D = 6 to 12 mm

Entry threads are sealed on delivery with certified plugs, cable glands can be ordered separately.

¹⁾ Rated voltage/max. working voltage 400 V/440 V.

²⁾ Maximum conductor cross-section with cable lug.

³⁾ Alternatively, larger studs for higher rated current.

⁴⁾ Number and size of entry threads according to DIN 42925.

⁵⁾ Cable glands suitable for unshielded/non-reinforced cables and leads. Option **K54** (Ex e), **W91** (Ex d) – 1 unit for main connection.

⁶⁾ Cable glands from the company Hummel.

⁷⁾ Cable gland from the company RST.

Technical specifications (continued)**Auxiliary terminal box**

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Enclosure material: Cast-iron

Frame size	Standard terminal box		Auxiliary terminal box	
	Main terminal box	Fig. No. on Page 2/11	Design	Max. connections ¹⁾ (number × max. cross-section) mm
71	2	Fig. 1	–	–
80				
90				
100				
112				
132	6	Fig. 2	Cast	6 × 2.5
160				
180	12	Fig. 2	Screwed on	12 × 4
200				
225				
250	20	Fig. 3	Screwed on	36 × 4
280				
315 L	36	Fig. 4	Screwed on	42 × 4
355				

Explosion-proof terminal boxes with a cast auxiliary terminal box only (max. 12 × 4 mm²), for number and size of entry threads, see "Cable glands" table.

Standard connection of anti-condensation heater and monitoring devices in the motor terminal box:

- Accessories (heater, motor monitor) are connected in the main terminal box as standard in frame sizes 71 to 355. Exception: In frame size 355, an auxiliary terminal box must always be ordered.
- Due to the terminals required in the terminal box, an auxiliary terminal box is always required when ordering Pt100 resistance thermometers as monitoring devices for the bearing or winding.

Assignment of the various possible additional / auxiliary terminal boxes for 1MD5 motors:

- 1MD5 motor: Auxiliary terminal box – order code **W72**
- 1MD5 motor + order code **M13** (anti-condensation heater 210 to 250 V): Auxiliary terminal box – order code **M52**
- 1MD5 motor + order code **K53** (explosion-proof main terminal box, Ex d IIC): Auxiliary terminal box – order code **V43**

Connection of the anti-condensation heater and monitoring devices when ordering additional / auxiliary terminal boxes (order code **M52, W72, V43**):

- When ordering an anti-condensation heater (order code **M13**) or monitoring devices, e.g. motor protection with PTC thermistor (order code **A11, A12, A15, A16**) and/or a Pt100 resistance thermometer (order code **A42, A62**), the connection is made in the auxiliary terminal box.
- When ordering an anti-condensation heater in combination with monitoring devices, the monitoring devices are connected in the auxiliary terminal box and the anti-condensation heater is connected in the main terminal box.
- If there are two auxiliary terminal boxes, anti-condensation heater and monitoring devices are each placed in separate auxiliary terminal boxes.

¹⁾ Rated voltage/max. working voltage 400 V/440 V.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

General information

Technical specifications (continued)

Electrical design

The insulation system of the SIMOTICS XP 1MD5 motor series is suitable for line voltages up to 690 V. The connection system (terminal box, terminals) is also designed for this rated voltage.

The explosion-proof motors are equipped with 6 terminals. They can thus be operated in star or delta. If a voltage variant with dual voltage e.g. 400 VΔ/690 VY is selected, the rated data of both voltage levels will be stamped on the rating plate.

The motors in the SIMOTICS XP 1MD5 series are manufactured with an insulation system of thermal class 155 °C. Utilization at rated operation corresponds to thermal class 130 °C.

Operation on a frequency converter

The general use of high-quality insulation systems enable operation on a frequency converter.

The permissible speed and torque range is stamped on an additional rating plate.

For operation on a frequency converter, the motor with explosion protection must be fitted with PTC thermistors. These are installed in the stator winding and, in combination with a certified trip unit (EU type examination certificate), they perform sole motor protection in the case of converter operation. Motor circuit breakers can be dispensed with.

Line operation

Motors operated directly on the line must be protected, e.g. by a suitable motor circuit breaker. Alternatively, motor protection using a PTC thermistor for full motor protection (sole protection) may be selected on request. As the load case "blocked shaft, motor draws full starting current" also has to be monitored, this version cannot be used consistently.

The larger the motor and the smaller the number of poles, the more difficult it is to achieve sole protection using PTC thermistors in line operation. Due to the laws of increasing size, larger machines become ever more "rotor-critical". The sole protection limit for 4-pole motors typically lies in the region of frame size 280.

Voltage tolerances

The motors are suitable for operation with voltage and frequency tolerances according to EN 60034-1.

In addition, tests are to be performed to ensure that the permissible temperature limits for the outer surface of the explosion-proof enclosure according to EN 60079-1 are not exceeded during continuous operations at the voltage limits ($\pm 10\%$).

The motors in the 1MD5 range in this catalog are certified for T4. The maximum permitted surface temperature is 135 °C.

Selection and ordering data

P _{rated} 50 Hz	Frame size	Operating values at rated power							Motor type						Article No.	m	J	
		$\eta_{50\text{ Hz}}$	$T_{50\text{ Hz}}$	IE class	$\eta_{50\text{ Hz}, 4/4}$	$\eta_{50\text{ Hz}, 3/4}$	$\eta_{50\text{ Hz}, 2/4}$	$\text{COS}\phi_{50\text{ Hz}, 4/4}$	$I_{50\text{ Hz}, 400\text{ V}}$	$I_{50\text{ Hz}, 500\text{ V}}$	$I_{50\text{ Hz}, 690\text{ V}}$	T_{LR}/T_{rat}	I_{LR}/I_{rat}	T_B/I_{rat}				
kW	FS	rpm	Nm	-	%	%	%	-	A	A	A	-	-	-		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																		
2-pole: 3000 rpm at 50 Hz																		
0.37	71 B	2860	1.24	IE2	78.0	77.0	74.0	0.75	0.91	0.73	0.53	3.6	6.5	3.1	DNGW-071BR-02	1MD5070- BD -4AA1	25	0.0004
0.55	71 B	2850	1.84	IE2	78.0	77.0	73.0	0.76	1.34	1.07	0.78	3.6	6.3	2.9	DNGW-071BS-02	1MD5071- BD -4AA1	26	0.0005
0.75	80 B	2805	2.55	IE2	77.4	79.5	78.8	0.84	1.67	1.33	0.97	1.9	4.9	2.3	DNGW-080BR-02	1MD5080- BD -4AA1	27	0.0008
1.1	80 B	2835	3.71	IE2	79.6	81.3	80.8	0.83	2.40	1.92	1.39	2.4	6.0	3.1	DNGW-080BS-02	1MD5081- BD -4AA1	29	0.0011
1.5	90 L	2885	4.96	IE2	81.3	82.3	80.8	0.84	3.15	2.55	1.84	2.7	6.9	3.6	DNGW-090LR-02	1MD5095- BD -4AA1	33	0.0017
2.2	90 L	2890	7.30	IE2	83.2	83.9	82.3	0.85	4.50	3.60	2.60	2.5	7.1	3.7	DNGW-090LS-02	1MD5098- BD -4AA1	36	0.0021
3	100 L	2905	9.90	IE2	84.6	85.2	84.7	0.84	6.10	4.85	3.55	2.3	7.0	3.3	DNGW-100LS-02	1MD5106- BD -4AA1	53	0.0044
4	112 M	2950	12.9	IE2	85.8	86.7	86.1	0.86	7.80	6.30	4.55	2.4	7.4	3.3	DNGW-112MS-02	1MD5113- BD -4AA1	61	0.0092
5.5	132 S	2950	17.8	IE2	87.0	88.0	87.4	0.87	10.5	8.40	6.10	1.8	6.6	2.9	DNGW-132SR-02	1MD5131- BD -4AA1	91	0.020
7.5	132 S	2950	24.3	IE2	88.1	88.7	88.6	0.87	14.1	11.3	8.20	2.2	7.5	3.1	DNGW-132SS-02	1MD5132- BD -4AA1	96	0.024
11	160 M	2955	35.5	IE2	89.4	90.0	89.1	0.87	20.5	16.3	11.8	2.1	7.4	3.2	DNGW-160MR-02	1MD5163- BD -4AA1	167	0.045
15	160 M	2955	48.5	IE2	90.3	90.9	90.3	0.88	27.0	22.0	15.8	2.4	7.6	3.4	DNGW-160MS-02	1MD5165- BD -4AA1	175	0.053
18.5	160 L	2955	60.0	IE2	90.9	91.2	90.4	0.88	33.5	26.5	19.4	2.9	7.9	3.6	DNGW-160LS-02	1MD5166- BD -4AA1	185	0.061
22	180 M	2940	71.0	IE2	91.3	91.8	91.4	0.87	40.0	32.0	23.0	2.7	7.4	3.6	DNGW-180MS-02	1MD5183- BD -4AA1	226	0.069
30	200 L	2955	97.0	IE2	92.0	92.3	91.7	0.87	54.0	43.5	31.5	2.5	6.9	3.3	DNGW-200LR-02	1MD5206- BD -4AA1	311	0.13
37	200 L	2960	119	IE2	92.5	92.8	92.3	0.88	66.0	52.0	38.0	2.7	7.4	3.5	DNGW-200LS-02	1MD5208- BD -4AA1	331	0.15
45	225 M	2965	145	IE2	92.9	93.1	92.5	0.88	79.0	64.0	46.0	2.7	7.8	3.7	DNGW-225MS-02	1MD5223- BD -4AA1	412	0.23
55	250 M	2970	177	IE2	93.2	93.3	92.4	0.89	96.0	77.0	55.0	2.3	6.8	3.1	DNGW-250MM-02	1MD5253- BD -4AA1	505	0.40
75	280 S	2978	240	IE2	93.8	93.6	92.4	0.87	133	106	77.0	2.5	7.2	3.2	DNGW-280SL-02	1MD5280- BD -4AA1	675	0.71
90	280 M	2975	289	IE2	94.1	94.2	93.5	0.88	157	125	91.0	2.5	7.1	3.1	DNGW-280MM-02	1MD5283- BD -4AA1	720	0.83
110	315 S	2982	352	IE2	94.3	94.2	93.3	0.90	187	150	108	2.4	7.3	3.0	DNGW-315SL-02	1MD5311- BD -4AA1	975	1.3
132	315 M	2982	423	IE2	94.6	94.7	94.1	0.91	220	177	128	2.4	7.2	3.1	DNGW-315ML-02	1MD5313- BD -4AA1	1060	1.6
160	315 M	2982	512	IE2	94.8	94.9	94.3	0.92	265	210	154	2.3	7.0	3.1	DNGW-315MN-02	1MD5315- BD -4AA1	1100	1.8
200	315 L	2982	640	IE2	95.0	95.2	94.8	0.92	330	265	191	2.4	7.1	3.0	DNGW-315LL-02	1MD5316- BD -4AA1	1370	2.2
250	315 L	2985	800	IE2	95.0	95.5	95.2	0.92	415	330	240	3.2	8.6	3.5	DNGW-315LN-02	1MD5318- BD -4AA1	1550	3.5
315	355 M	2984	1008	IE2	95.6	95.4	94.5	0.88	540	430	315	1.6	6.8	2.3	DNGW-355MR-02 ¹⁾	1MD5353- BD -4AA1	2520	4.8
360	355 M	2984	1152	IE2	95.9	95.6	95.0	0.89	610	485	355	1.7	6.8	2.4	DNGW-355MS-02 ¹⁾	1MD5355- BD -4AA1	2660	5.3
460	355 M	2985	1472	IE2	96.3	96.3	95.7	0.90	770	610	445	1.9	6.8	2.6	DNGW-355MT-02 ¹⁾	1MD5357- BD -4AA1	2800	6.4
Operating modes		Frame size												Order code				
Line operation		71 ... 355										0		-				
Converter operation, standard insulation		71 ... 355										1		-				
Voltages		Frame size												Order code				
690 VΔ, 50 Hz		355										0		-				
230 V/400 V, 50 Hz		71 ... 200										1		-				
500 VY, 50 Hz		71 ... 315 ²⁾										3		-				
500 VΔ, 50 Hz		71 ... 355										5		-				
400 V/690 V, 50 Hz		71 ... 355										6		-				
For other voltages, see Page 2/27		71 ... 355										9		...				
Types of construction		Frame size												Order code				
IM B3		71 ... 355										0		-				
IM B5		71 ... 315										1		-				
IM B34		71 ... 112										2		-				
IM B14		71 ... 112										3		-				
IM V1/cover		71 ... 355										4		-				
IM B35		71 ... 355										6		-				
For other types of construction, see from Page 1/29 and 2/27		71 ... 355										9		...				

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

²⁾ Up to 200 kW.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series



Motors with High Efficiency IE2 in cast-iron version

Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²				
		n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	COSφ _{rated} 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V	I _{rated} 50 Hz, 690 V					T _{LR} /T _{rat}	I _{LR} /I _{rat}	T _B /T _{rat}	
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	–	kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																			
4-pole: 1500 rpm at 50 Hz																			
0.25	71 B	1415	1.69	IE2	71.0	69.0	63.0	0.64	0.79	0.64	0.46	3.1	4.3	3.1	DNGW-071BR-04	1MD5070- BD -4BA1	25	0.0007	
0.37	71 B	1390	2.54	IE2	72.7	72.7	67.0	0.72	1.02	0.82	0.59	2.8	4.2	2.8	DNGW-071BS-04	1MD5071- BD -4BA1	26	0.0009	
0.55	80 B	1440	3.65	IE2	78.1	78.9	76.1	0.74	1.37	1.10	0.80	2.2	5.3	3.1	DNGW-080BR-04	1MD5080- BD -4BA1	28	0.0017	
0.75	80 B	1440	4.97	IE2	79.6	80.2	78.0	0.76	1.79	1.43	1.04	2.2	5.6	3.1	DNGW-080BS-04	1MD5081- BD -4BA1	29	0.0021	
1.1	90 L	1425	7.40	IE2	81.4	81.7	79.9	0.78	2.50	2.00	1.45	2.3	5.6	2.9	DNGW-090LR-04	1MD5095- BD -4BA1	33	0.0028	
1.5	90 L	1435	10.0	IE2	82.8	83.5	82.0	0.79	3.30	2.65	1.92	2.6	6.4	3.4	DNGW-090LS-04	1MD5098- BD -4BA1	35	0.0036	
2.2	100 L	1455	14.4	IE2	84.3	85.1	84.3	0.81	4.65	3.70	2.70	2.1	6.9	3.3	DNGW-100LR-04	1MD5106- BD -4BA1	53	0.0086	
3	100 L	1455	19.7	IE2	85.5	86.7	86.0	0.82	6.20	4.95	3.60	2.0	6.9	3.1	DNGW-100LS-04	1MD5108- BD -4BA1	56	0.011	
4	112 M	1460	26.2	IE2	86.6	87.3	86.5	0.81	8.20	6.60	4.75	2.5	7.1	3.2	DNGW-112MS-04	1MD5113- BD -4BA1	64	0.014	
5.5	132 S	1465	35.9	IE2	87.7	89.0	87.7	0.80	11.3	9.10	6.60	2.3	6.9	2.9	DNGW-132SR-04	1MD5131- BD -4BA1	94	0.027	
7.5	132 M	1465	48.9	IE2	88.7	90.3	88.8	0.83	14.7	11.8	8.50	2.3	6.9	2.9	DNGW-132MS-04	1MD5133- BD -4BA1	101	0.034	
11	160 M	1470	71.0	IE2	89.8	90.9	90.8	0.85	21.0	16.6	12.1	2.1	6.7	2.8	DNGW-160MR-04	1MD5163- BD -4BA1	171	0.065	
15	160 L	1475	97.0	IE2	90.6	91.3	91.0	0.85	28.0	22.5	16.3	2.3	7.3	3.0	DNGW-160LS-04	1MD5166- BD -4BA1	184	0.083	
18.5	180 M	1465	121	IE2	91.2	92.0	91.9	0.84	35.0	28.0	20.0	2.5	7.2	3.4	DNGW-180MR-04	1MD5183- BD -4BA1	238	0.12	
22	180 L	1465	143	IE2	91.6	92.2	91.9	0.84	41.5	33.0	24.0	2.6	7.3	3.5	DNGW-180LS-04	1MD5186- BD -4BA1	245	0.13	
30	200 L	1470	195	IE2	92.3	92.8	92.6	0.84	56.0	44.5	32.5	2.5	6.7	3.3	DNGW-200LS-04	1MD5206- BD -4BA1	323	0.20	
37	225 S	1470	240	IE2	92.7	93.5	93.5	0.88	65.0	52.0	38.0	2.3	6.6	2.9	DNGW-225SR-04	1MD5220- BD -4BA1	406	0.42	
45	225 M	1475	291	IE2	93.1	93.8	93.7	0.87	80.0	64.0	46.5	2.5	6.9	3.1	DNGW-225MS-04	1MD5223- BD -4BA1	430	0.46	
55	250 M	1480	355	IE2	93.5	93.9	93.5	0.85	100	80.0	58.0	2.7	6.8	3.0	DNGW-250MM-04	1MD5253- BD -4BA1	540	0.75	
75	280 S	1485	482	IE2	94.0	94.2	93.8	0.87	132	106	77.0	2.5	6.8	3.0	DNGW-280SL-04	1MD5280- BD -4BA1	735	1.3	
90	280 M	1486	578	IE2	94.2	94.3	93.6	0.87	159	127	92.0	2.6	7.3	3.1	DNGW-280MM-04	1MD5283- BD -4BA1	750	1.4	
110	315 S	1490	705	IE2	94.5	94.6	94.0	0.86	195	156	113	2.7	7.4	3.0	DNGW-315SL-04	1MD5311- BD -4BA1	980	2.0	
132	315 M	1490	846	IE2	94.7	94.9	94.6	0.87	230	185	134	2.7	7.1	2.9	DNGW-315ML-04	1MD5313- BD -4BA1	1040	2.3	
160	315 M	1490	1025	IE2	94.9	95.0	94.5	0.87	280	225	162	2.8	7.2	3.1	DNGW-315MN-04	1MD5315- BD -4BA1	1120	2.8	
200	315 L	1490	1282	IE2	95.1	95.3	94.7	0.87	350	280	200	3.1	7.5	3.2	DNGW-315LL-04	1MD5316- BD -4BA1	1370	3.5	
250	315 L	1487	1605	IE2	95.1	95.4	95.0	0.87	435	350	255	2.6	7.5	2.6	DNGW-315LM-04	1MD5317- BD -4BA1	1550	4.2	
315	355 M	1488	2022	IE2	95.5	95.6	95.0	0.85	560	450	325	2.0	6.8	2.2	DNGW-355MR-04 ¹⁾	1MD5353- BD -4BA1	2480	6.1	
360	355 M	1488	2310	IE2	95.7	95.8	95.2	0.85	640	510	370	2.2	6.9	2.2	DNGW-355MS-04 ¹⁾	1MD5355- BD -4BA1	2610	6.8	
460	355 M	1488	2952	IE2	96.0	96.1	95.8	0.86	800	640	465	2.2	7.1	2.2	DNGW-355MT-04 ¹⁾	1MD5357- BD -4BA1	2750	8.5	
Operating modes		Frame size												Order code					
Line operation		71 ... 355										0		–					
Converter operation, standard insulation		71 ... 355										1		–					
Voltages		Frame size												Order code					
690 VΔ, 50 Hz		355										0		–					
230 V/400 V, 50 Hz		71 ... 200										1		–					
500 VY, 50 Hz		71 ... 315 ²⁾										3		–					
500 VΔ, 50 Hz		71 ... 355										5		–					
400 V/690 V, 50 Hz		71 ... 355										6		–					
For other voltages, see Page 2/27		71 ... 355										9		...					
Types of construction		Frame size												Order code					
IM B3		71 ... 355										0		–					
IM B5		71 ... 315										1		–					
IM B34		71 ... 112										2		–					
IM B14		71 ... 112										3		–					
IM V1/cover		71 ... 355										4		–					
IM B35		71 ... 355										6		–					
For other types of construction, see from Page 1/29 and 2/27		71 ... 355										9		...					

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

²⁾ Up to 200 kW.

Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²			
		n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	cos φ _{rated} 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V	I _{rated} 50 Hz, 690 V					T _{LR} / T _{rat}	I _{LR} / I _{rat}	T _β / T _{rat}
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																		
6-pole: 1000 rpm at 50 Hz																		
0.25	71 B	860	2.78	IE2	61.6	61.8	57.0	0.73	0.80	0.64	0.47	2.2	3.0	2.3	DNGW-071BS-06	1MD5070- BD -4CA1	26	0.0008
0.37	80 B	925	3.82	IE2	71.4	71.0	67.5	0.70	1.07	0.85	0.62	2.1	4.0	2.4	DNGW-080BR-06	1MD5080- BD -4CA1	28	0.0020
0.55	80 B	930	5.60	IE2	74.0	74.2	71.0	0.66	1.63	1.30	0.94	2.5	4.4	2.9	DNGW-080BS-06	1MD5081- BD -4CA1	30	0.0030
0.75	90 L	935	7.70	IE2	75.9	76.1	74.0	0.70	2.05	1.63	1.18	2.0	4.1	2.5	DNGW-090LR-06	1MD5095- BD -4CA1	33	0.0038
1.1	90 L	935	11.2	IE2	78.1	78.0	76.5	0.70	2.90	2.30	1.68	2.2	4.4	2.6	DNGW-090LS-06	1MD5098- BD -4CA1	36	0.0054
1.5	100 L	970	14.8	IE2	79.8	80.5	79.0	0.73	3.70	2.95	2.15	2.0	5.4	2.8	DNGW-100LS-06	1MD5106- BD -4CA1	54	0.011
2.2	112 M	965	21.8	IE2	81.8	82.6	81.4	0.75	5.20	4.15	3.00	2.0	5.0	2.8	DNGW-112MS-06	1MD5113- BD -4CA1	64	0.014
3	132 S	970	29.5	IE2	83.3	83.4	80.9	0.72	7.20	5.80	4.20	1.6	5.0	2.5	DNGW-132SR-06	1MD5131- BD -4CA1	90	0.024
4	132 M	970	39.4	IE2	84.6	85.5	84.5	0.75	9.10	7.30	5.30	1.6	5.0	2.3	DNGW-132MR-06	1MD5133- BD -4CA1	96	0.029
5.5	132 M	970	54.0	IE2	86.0	87.0	86.5	0.76	12.1	9.70	7.00	1.9	5.6	2.6	DNGW-132MS-06	1MD5135- BD -4CA1	105	0.037
7.5	160 M	975	73.0	IE2	87.2	88.0	87.3	0.74	16.8	13.4	9.70	1.9	4.7	2.2	DNGW-160MR-06	1MD5163- BD -4CA1	180	0.125
11	160 L	975	108	IE2	88.7	89.6	89.2	0.76	23.5	18.8	13.7	1.9	4.8	2.2	DNGW-160LS-06	1MD5166- BD -4CA1	192	0.144
15	180 L	975	147	IE2	89.7	90.1	90.2	0.78	31.0	25.0	17.9	2.5	6.0	3.1	DNGW-180LS-06	1MD5186- BD -4CA1	233	0.17
18.5	200 L	978	181	IE2	90.4	91.3	91.2	0.82	36.0	29.0	21.0	2.4	5.8	2.6	DNGW-200LR-06	1MD5206- BD -4CA1	302	0.25
22	200 L	978	215	IE2	90.9	91.6	91.2	0.82	42.5	34.0	24.5	2.5	6.2	2.6	DNGW-200LS-06	1MD5208- BD -4CA1	322	0.30
30	225 M	980	292	IE2	91.7	92.5	92.3	0.83	57.0	45.5	33.0	2.5	6.1	2.8	DNGW-225MS-06	1MD5223- BD -4CA1	416	0.58
37	250 M	982	360	IE2	92.2	93.1	93.1	0.83	70.0	56.0	40.5	2.8	6.0	2.5	DNGW-250MM-06	1MD5253- BD -4CA1	515	0.86
45	280 S	985	436	IE2	92.7	93.4	93.2	0.84	83.0	67.0	48.5	2.7	6.3	2.6	DNGW-280SL-06	1MD5280- BD -4CA1	640	1.1
55	280 M	985	533	IE2	93.1	93.9	94.0	0.86	99.0	79.0	57.0	2.5	6.4	2.6	DNGW-280MM-06	1MD5283- BD -4CA1	690	1.4
75	315 S	988	725	IE2	93.7	94.0	93.6	0.84	138	110	80.0	2.5	6.7	2.8	DNGW-315SL-06	1MD5311- BD -4CA1	910	2.1
90	315 M	988	870	IE2	94.0	94.3	93.6	0.84	165	132	95.0	2.6	6.9	2.8	DNGW-315ML-06	1MD5313- BD -4CA1	965	2.5
110	315 M	988	1063	IE2	94.3	94.6	94.5	0.86	196	157	113	2.7	7.0	2.8	DNGW-315MM-06	1MD5314- BD -4CA1	1130	3.6
132	315 M	988	1276	IE2	94.6	94.9	94.7	0.86	235	187	136	3.0	7.5	2.9	DNGW-315MN-06	1MD5315- BD -4CA1	1160	4.0
160	315 L	988	1546	IE2	94.8	94.7	94.4	0.86	285	225	164	3.1	7.7	3.3	DNGW-315LL-06	1MD5316- BD -4CA1	1390	4.7
200	315 L	990	1929	IE2	95.0	95.3	94.9	0.83	365	295	210	2.8	7.5	3.3	DNGW-315LM-06	1MD5317- BD -4CA1	1560	7.6
280	355 M	993	2693	IE2	95.7	95.7	95.2	0.82	520	410	300	2.1	7.1	2.8	DNGW-355MR-06	1MD5353- BD -4CA1	2460	13
315	355 M	993	3029	IE2	95.9	95.9	95.5	0.83	570	455	330	2.1	7.1	2.8	DNGW-355MS-06	1MD5355- BD -4CA1	2590	15
360	355 M	994	3458	IE2	96.0	96.1	95.7	0.83	650	520	380	2.2	7.2	2.9	DNGW-355MT-06	1MD5357- BD -4CA1	2730	16
Operating modes												Frame size				Order code		
Line operation												71 ... 355	0			–		
Converter operation, standard insulation												71 ... 355	1			–		
Voltages												Frame size			Order code			
690 VΔ, 50 Hz												355	0		–			
230 V/400 V, 50 Hz												71 ... 200	1		–			
500 VY, 50 Hz												71 ... 315 ¹⁾	3		–			
500 VΔ, 50 Hz												71 ... 355	5		–			
400 V/690 V, 50 Hz												71 ... 355	6		–			
For other voltages, see Page 2/27												71 ... 355	9		...			
Types of construction												Frame size			Order code			
IM B3												71 ... 355	0		–			
IM B5												71 ... 315	1		–			
IM B34												71 ... 112	2		–			
IM B14												71 ... 112	3		–			
IM V1/cover												71 ... 355	4		–			
IM B35												71 ... 355	6		–			
For other types of construction, see from Page 1/29 and 2/27												71 ... 355	9		...			

¹⁾ Up to 200 kW.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

IE2

Motors with High Efficiency IE2 in cast-iron version

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power							Motor type			Article No.	m IM B3	J kgm ²		
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	COSφ _{rated} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat}	I _{LR} / I _{rat}				T _B / T _{rat}	
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
2-pole: 3600 rpm at 60 Hz																
0.43	71 B	3450	1.19	IE2	73.0	74.0	72.0	0.76	0.97	3.8	7.2	3.3	DNGW-071BR-02	1MD5070- BD -4AA1	25	0.0004
0.63	71 B	3460	1.74	IE2	74.0	74.3	71.6	0.78	1.37	3.8	7.2	3.8	DNGW-071BS-02	1MD5071- BD -4AA1	26	0.0005
0.86	80 B	3410	2.41	IE2	75.5	75.5	72.5	0.84	1.70	1.9	5.2	2.3	DNGW-080BR-02	1MD5080- BD -4AA1	27	0.0008
1.27	80 B	3430	3.54	IE2	82.5	82.5	81.5	0.84	2.30	2.7	6.3	3.3	DNGW-080BS-02	1MD5081- BD -4AA1	29	0.0011
1.75	90 L	3480	4.80	IE2	84.0	84.0	83.0	0.85	3.10	2.6	7.4	3.8	DNGW-090LR-02	1MD5095- BD -4AA1	33	0.0017
2.55	90 L	3485	7.00	IE2	85.5	85.5	84.5	0.86	4.35	2.6	7.6	3.9	DNGW-090LS-02	1MD5098- BD -4AA1	36	0.0021
3.45	100 L	3510	9.40	IE2	87.5	87.1	85.2	0.85	5.80	2.4	7.7	3.5	DNGW-100LS-02	1MD5106- BD -4AA1	53	0.0044
4.55	112 M	3540	12.3	IE2	87.5	87.7	86.4	0.86	7.60	2.2	8.3	3.3	DNGW-112MS-02	1MD5113- BD -4AA1	61	0.0092
6.3	132 S	3550	16.9	IE2	88.5	88.5	87.5	0.88	10.2	1.8	6.9	2.9	DNGW-132SR-02	1MD5131- BD -4AA1	91	0.020
8.6	132 S	3550	23.1	IE2	89.5	89.5	88.5	0.88	13.7	2.0	7.4	3.1	DNGW-132SS-02	1MD5132- BD -4AA1	96	0.024
12.6	160 M	3555	33.8	IE2	90.2	90.2	89.2	0.88	19.9	2.1	7.4	3.2	DNGW-160MR-02	1MD5163- BD -4AA1	167	0.045
17.3	160 M	3555	46.5	IE2	91.0	91.0	90.0	0.89	27.0	2.4	7.6	3.4	DNGW-160MS-02	1MD5165- BD -4AA1	175	0.053
21.3	160 L	3555	57.0	IE2	91.0	91.0	90.0	0.89	33.0	2.9	7.9	3.6	DNGW-160LS-02	1MD5166- BD -4AA1	185	0.061
24.5	180 M	3540	66.0	IE2	91.0	91.2	89.9	0.87	39.0	2.8	7.7	3.8	DNGW-180MS-02	1MD5183- BD -4AA1	226	0.069
33.5	200 L	3560	90.0	IE2	92.4	92.3	90.8	0.87	52.0	2.5	6.9	3.3	DNGW-200LR-02	1MD5206- BD -4AA1	311	0.13
41.5	200 L	3560	111	IE2	93.0	93.0	92.2	0.88	64.0	2.9	7.3	3.5	DNGW-200LS-02	1MD5208- BD -4AA1	331	0.15
51	225 M	3565	137	IE2	93.0	93.0	92.0	0.88	78.0	2.7	7.6	3.7	DNGW-225MS-02	1MD5223- BD -4AA1	412	0.23
62	250 M	3570	166	IE2	93.0	92.8	91.6	0.89	94.0	2.3	6.8	3.1	DNGW-250MM-02	1MD5253- BD -4AA1	505	0.4
84	280 S	3578	224	IE2	94.5	94.1	92.7	0.87	128	2.5	7.2	3.1	DNGW-280SL-02	1MD5280- BD -4AA1	675	0.71
101	280 M	3575	270	IE2	94.5	94.4	93.4	0.89	151	2.5	7.2	3.1	DNGW-280MM-02	1MD5283- BD -4AA1	720	0.83
123	315 S	3582	328	IE2	94.5	94.3	93.0	0.90	182	2.4	7.0	3.0	DNGW-315SL-02	1MD5311- BD -4AA1	975	1.3
148	315 M	3582	395	IE2	95.0	94.9	94.0	0.91	215	2.4	7.2	3.1	DNGW-315ML-02	1MD5313- BD -4AA1	1060	1.6
180	315 M	3580	480	IE2	95.4	95.3	94.4	0.92	255	2.5	7.0	3.0	DNGW-315MN-02	1MD5315- BD -4AA1	1100	1.8
224	315 L	3580	597	IE2	95.4	95.4	94.8	0.92	320	2.9	7.4	3.0	DNGW-315LL-02	1MD5316- BD -4AA1	1370	2.2
270	315 L	3582	720	IE2	95.4	95.9	95.4	0.92	385	3.4	9.5	3.7	DNGW-315LN-02	1MD5318- BD -4AA1	1550	3.5
340	355 M	3580	907	IE2	95.4	95.0	93.5	0.88	510	1.7	7.5	2.4	DNGW-355MR-02 ¹⁾	1MD5353- BD -4AA1	2520	4.8
385	355 M	3580	1027	IE2	95.5	95.2	94.0	0.89	570	1.8	7.5	2.5	DNGW-355MS-02 ¹⁾	1MD5355- BD -4AA1	2660	5.3
500	355 M	3580	1334	IE2	96.0	95.8	94.8	0.90	730	2.0	7.5	2.7	DNGW-355MT-02 ¹⁾	1MD5357- BD -4AA1	2800	6.4
Operating modes										Frame size					Order code	
Line operation										71 ... 355			0		–	
Converter operation, standard insulation										71 ... 355			1		–	
Voltages										Frame size					Order code	
For other voltages, see Page 2/27										71 ... 355			9		...	
Types of construction										Frame size					Order code	
IM B3										71 ... 355			0		–	
IM B5										71 ... 315			1		–	
IM B34										71 ... 112			2		–	
IM B14										71 ... 112			3		–	
IM V1/cover										71 ... 355			4		–	
IM B35										71 ... 355			6		–	
For other types of construction, see from Page 1/29 and 2/27										71 ... 355			9		...	

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power							Motor type			Article No.	m IM B3	J kgm ²		
		η_{rated} 60 Hz	T_{rated} 60 Hz	IE class	η_{rated} 60 Hz, 4/4	η_{rated} 60 Hz, 3/4	η_{rated} 60 Hz, 2/4	COS ϕ rated, 60 Hz, 4/4	I_{rated} 60 Hz, 460 V	$T_{LR}/$ $T_{rat.}$	$I_{LR}/$ $I_{rat.}$				$T_B/$ $T_{rat.}$	
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
4-pole: 1800 rpm at 60 Hz																
0.29	71 B	1695	1.63	IE2	70.0	70.0	66.0	0.69	0.75	2.4	4.1	2.6	DNGW-071BR-04	1MD5070- BD -4BA1	25	0.0007
0.43	71 B	1680	2.44	IE2	72.0	72.4	70.0	0.72	1.04	2.4	4.0	2.4	DNGW-071BS-04	1MD5071- BD -4BA1	26	0.0009
0.63	80 B	1735	3.47	IE2	80.0	80.0	79.0	0.76	1.30	2.3	6.0	3.2	DNGW-080BR-04	1MD5080- BD -4BA1	28	0.0017
0.86	80 B	1740	4.72	IE2	82.5	82.5	81.5	0.76	1.72	2.2	6.2	3.3	DNGW-080BS-04	1MD5081- BD -4BA1	29	0.0021
1.27	90 L	1725	7.00	IE2	84.0	84.0	83.0	0.78	2.45	2.3	6.1	3.0	DNGW-090LR-04	1MD5095- BD -4BA1	33	0.0028
1.75	90 L	1730	9.70	IE2	84.0	84.0	83.0	0.79	3.30	2.6	6.4	3.4	DNGW-090LS-04	1MD5098- BD -4BA1	35	0.0036
2.55	100 L	1755	13.9	IE2	87.5	87.5	86.5	0.82	4.45	2.1	7.3	3.3	DNGW-100LR-04	1MD5106- BD -4BA1	53	0.0086
3.45	100 L	1755	18.8	IE2	87.5	87.5	86.5	0.82	6.00	2.0	7.5	3.1	DNGW-100LS-04	1MD5108- BD -4BA1	56	0.011
4.55	112 M	1760	24.7	IE2	87.5	87.5	86.5	0.82	8.00	2.4	7.5	3.2	DNGW-112MS-04	1MD5113- BD -4BA1	64	0.014
6.3	132 S	1765	34.1	IE2	89.5	89.5	88.5	0.81	10.9	2.3	7.3	2.9	DNGW-132SR-04	1MD5131- BD -4BA1	94	0.027
8.6	132 M	1765	46.5	IE2	89.5	89.5	88.5	0.83	14.5	2.3	7.1	2.9	DNGW-132MS-04	1MD5133- BD -4BA1	101	0.034
12.6	160 M	1770	68.0	IE2	91.0	91.0	90.0	0.85	20.5	2.2	7.0	2.8	DNGW-160MR-04	1MD5163- BD -4BA1	171	0.065
17.3	160 L	1775	93.0	IE2	92.4	92.4	91.4	0.86	27.5	2.3	7.7	2.9	DNGW-160LS-04	1MD5166- BD -4BA1	184	0.083
21.3	180 M	1765	115	IE2	92.4	93.1	92.9	0.85	34.0	2.5	6.8	3.4	DNGW-180MR-04	1MD5183- BD -4BA1	238	0.12
25.3	180 L	1765	137	IE2	92.4	92.9	92.5	0.85	40.5	2.6	7.5	3.4	DNGW-180LS-04	1MD5186- BD -4BA1	245	0.13
34.5	200 L	1770	186	IE2	93.0	93.4	93.1	0.85	55.0	2.7	7.2	3.2	DNGW-200LS-04	1MD5206- BD -4BA1	323	0.20
40	225 S	1773	215	IE2	93.0	93.0	92.5	0.87	62.0	2.4	7.4	3.0	DNGW-225SR-04	1MD5220- BD -4BA1	406	0.42
49.5	225 M	1775	266	IE2	93.6	93.7	93.0	0.87	76.0	2.6	7.2	3.2	DNGW-225MS-04	1MD5223- BD -4BA1	430	0.46
63	250 M	1780	338	IE2	94.1	94.4	94.0	0.85	99.0	2.8	6.6	2.9	DNGW-250MM-04	1MD5253- BD -4BA1	540	0.75
86	280 S	1785	460	IE2	94.5	94.6	94.0	0.88	130	2.5	6.7	2.8	DNGW-280SL-04	1MD5280- BD -4BA1	735	1.3
104	280 M	1785	556	IE2	95.0	95.1	94.3	0.87	158	2.5	7.2	3.1	DNGW-280MM-04	1MD5283- BD -4BA1	750	1.4
127	315 S	1788	678	IE2	95.0	95.0	94.3	0.86	195	2.7	7.2	2.9	DNGW-315SL-04	1MD5311- BD -4BA1	980	2.0
152	315 M	1788	812	IE2	95.0	95.1	94.5	0.87	230	2.6	7.1	2.8	DNGW-315ML-04	1MD5313- BD -4BA1	1040	2.3
184	315 M	1788	983	IE2	95.4	95.4	94.6	0.88	275	2.9	7.2	3.0	DNGW-315MN-04	1MD5315- BD -4BA1	1120	2.8
230	315 L	1790	1227	IE2	95.4	95.5	94.9	0.87	350	3.4	7.7	3.1	DNGW-315LL-04	1MD5316- BD -4BA1	1370	3.5
280	315 L	1789	1495	IE2	95.8	95.8	95.3	0.87	420	2.7	8.0	2.7	DNGW-315LM-04	1MD5317- BD -4BA1	1550	4.2
350	355 M	1787	1870	IE2	95.4	95.3	94.8	0.85	540	2.0	7.3	2.3	DNGW-355MR-04 ¹⁾	1MD5353- BD -4BA1	2480	6.1
390	355 M	1788	2083	IE2	95.5	95.4	95.0	0.85	600	2.1	7.3	2.3	DNGW-355MS-04 ¹⁾	1MD5355- BD -4BA1	2610	6.8
490	355 M	1789	2616	IE2	95.8	95.9	95.5	0.86	750	2.3	7.5	2.4	DNGW-355MT-04 ¹⁾	1MD5357- BD -4BA1	2750	8.5
Operating modes		Frame size										Order code				
Line operation		71 ... 355										0				
Converter operation, standard insulation		71 ... 355										1				
Voltages		Frame size										Order code				
For other voltages, see Page 2/27		71 ... 355										9				
Types of construction		Frame size										Order code				
IM B3		71 ... 355										0				
IM B5		71 ... 315										1				
IM B34		71 ... 112										2				
IM B14		71 ... 112										3				
IM V1/cover		71 ... 355										4				
IM B35		71 ... 355										6				
For other types of construction, see from Page 1/29 and 2/27		71 ... 355										9				

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series



Motors with High Efficiency IE2 in cast-iron version

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power							Motor type			Article No.	m IM B3	J kgm ²		
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cosφ _{rated} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}				T _B / T _{rat.}	
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
6-pole: 1200 rpm at 60 Hz																
0.25	71 B	1080	2.21	IE2	59.5	55.0	47.0	0.57	0.93	2.5	3.0	2.5	DNGW-071BS-06	1MD5070- BD -4CA1	26	0.0008
0.37	80 B	1140	3.10	IE2	75.3	74.1	69.5	0.63	0.98	2.3	4.6	2.9	DNGW-080BR-06	1MD5080- BD -4CA1	28	0.0017
0.55	80 B	1135	4.63	IE2	77.0	77.5	74.0	0.61	1.47	2.9	5.2	3.6	DNGW-080BS-06	1MD5081- BD -4CA1	30	0.0025
0.75	90 L	1150	6.20	IE2	80.0	80.5	78.0	0.68	1.73	1.9	4.7	2.6	DNGW-090LR-06	1MD5095- BD -4CA1	33	0.0038
1.1	100 L	1175	8.90	IE2	85.5	85.4	83.4	0.73	2.20	2.1	6.0	3.0	DNGW-100LR-06	1MD5105- BD -4CA1	54	0.011
1.5	100 L	1175	12.2	IE2	86.5	86.3	84.2	0.69	3.15	2.2	6.4	3.2	DNGW-100LS-06	1MD5106- BD -4CA1	54	0.011
2.2	112 M	1170	18.0	IE2	87.5	87.3	85.5	0.73	4.30	2.1	6.3	3.2	DNGW-112MS-06	1MD5113- BD -4CA1	64	0.014
3	132 S	1175	24.4	IE2	87.5	87.1	84.6	0.69	6.20	1.8	6.0	2.9	DNGW-132SR-06	1MD5131- BD -4CA1	90	0.024
3.7	132 M	1180	29.9	IE2	87.5	87.5	85.8	0.71	7.50	1.9	6.2	3.0	DNGW-132MR-06	1MD5133- BD -4CA1	96	0.029
5.5	132 M	1175	44.7	IE2	89.5	89.8	88.8	0.73	10.6	2.1	6.5	2.9	DNGW-132MS-06	1MD5135- BD -4CA1	105	0.037
7.5	160 M	1180	61.0	IE2	89.5	89.6	88.4	0.73	14.4	2.1	5.4	2.5	DNGW-160MR-06	1MD5163- BD -4CA1	180	0.075
11	160 L	1180	89.0	IE2	90.2	90.5	89.5	0.74	20.5	2.2	5.5	2.5	DNGW-160LS-06	1MD5166- BD -4CA1	192	0.098
15	180 L	1178	122	IE2	90.2	90.2	89.0	0.77	27.0	2.8	6.9	3.4	DNGW-180LS-06	1MD5186- BD -4CA1	233	0.17
18.5	200 L	1182	149	IE2	91.7	92.1	91.5	0.81	31.5	2.6	6.7	3.0	DNGW-200LR-06	1MD5206- BD -4CA1	302	0.25
22	200 L	1182	178	IE2	91.7	92.1	91.5	0.81	37.0	3.0	7.4	3.0	DNGW-200LS-06	1MD5208- BD -4CA1	322	0.30
30	225 M	1182	242	IE2	93.0	93.3	92.6	0.83	49.0	2.9	7.0	3.1	DNGW-225MS-06	1MD5223- BD -4CA1	416	0.58
37	250 M	1185	298	IE2	93.0	93.3	92.6	0.83	60.0	3.3	7.3	2.8	DNGW-250MM-06	1MD5253- BD -4CA1	515	0.86
45	280 S	1188	362	IE2	93.6	93.8	93.1	0.84	72.0	3.1	7.4	3.0	DNGW-280SL-06	1MD5280- BD -4CA1	640	1.1
55	280 M	1188	442	IE2	93.6	93.9	93.4	0.85	87.0	3.1	7.2	2.9	DNGW-280MM-06	1MD5283- BD -4CA1	690	1.4
75	315 S	1190	602	IE2	94.1	94.1	93.2	0.83	121	2.7	7.5	3.0	DNGW-315SL-06	1MD5311- BD -4CA1	910	2.1
90	315 M	1190	722	IE2	94.1	94.4	93.5	0.84	143	2.9	7.6	3.1	DNGW-315ML-06	1MD5313- BD -4CA1	965	2.5
110	315 M	1190	883	IE2	95.0	95.0	94.6	0.85	171	3.3	8.1	3.2	DNGW-315MM-06	1MD5314- BD -4CA1	1130	3.6
132	315 M	1190	1059	IE2	95.0	95.0	94.4	0.85	205	3.7	9.2	3.6	DNGW-315MN-06	1MD5315- BD -4CA1	1160	4.0
160	315 L	1192	1202	IE2	95.0	94.9	94.2	0.85	235	4.3	9.6	3.8	DNGW-315LL-06	1MD5316- BD -4CA1	1390	4.7
200	315 L	1191	1604	IE2	95.2	95.2	94.5	0.82	320	2.9	8.3	3.5	DNGW-315LM-06	1MD5317- BD -4CA1	1560	7.6
290	355 M	1193	2321	IE2	95.8	95.5	94.8	0.82	465	2.2	7.8	2.6	DNGW-355MR-06	1MD5353- BD -4CA1	2460	13
330	355 M	1193	2641	IE2	95.9	95.5	95.0	0.84	510	2.3	7.8	2.9	DNGW-355MS-06	1MD5355- BD -4CA1	2590	15
380	355 M	1193	3042	IE2	96.0	96.0	95.5	0.83	600	2.3	7.9	2.9	DNGW-355MT-06	1MD5357- BD -4CA1	2730	16
Operating modes		Frame size										Order code				
Line operation		71 ... 355										0				
Converter operation, standard insulation		71 ... 355										1				
Voltages		Frame size										Order code				
For other voltages, see Page 2/27		71 ... 355										9				
Types of construction		Frame size										Order code				
IM B3		71 ... 355										0				
IM B5		71 ... 315										1				
IM B34		71 ... 112										2				
IM B14		71 ... 112										3				
IM V1/cover		71 ... 355										4				
IM B35		71 ... 355										6				
For other types of construction, see from Page 1/29 and 2/27		71 ... 355										9				



Selection and ordering data

Operating values at rated power											Motor type	Article No.	m	J				
P _{rated} 50 Hz	Frame size	n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	COSφ _{rated} 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V	I _{rated} 50 Hz, 690 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}	T _B / T _{rat.}	IM B3	kg	kgm ²	
kW	FS	rpm	Nm	-	%	%	%	-	A	A	A	-	-	-		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																		
2-pole: 3000 rpm at 50 Hz																		
0.37	71 B	2850	1.24	IE3	73.8	73.3	69.7	0.76	0.95	0.76	0.55	3.5	5.8	3.5	DNGW-071BS-02	1MD5070-BD-4AH1	27	0.0005
0.55	71 B	2850	1.84	IE3	77.8	77.5	74.5	0.76	1.34	1.07	0.78	3.7	6.1	3.7	DNGW-071BT-02	1MD5071-BD-4AH1	28	0.0006
0.75	80 B	2850	2.51	IE3	80.7	82.2	81.9	0.86	1.56	1.25	0.90	2.6	6.2	3.0	DNGW-080BS-02	1MD5080-BD-4AH1	29	0.0011
1.1	80 B	2885	3.64	IE3	82.7	83.9	83.1	0.85	2.25	1.81	1.31	3.0	7.1	3.3	DNGW-080BT-02	1MD5081-BD-4AH1	30	0.0013
1.5	90 L	2910	4.92	IE3	84.2	84.6	83.2	0.86	3.00	2.40	1.73	2.7	8.1	4.2	DNGW-090LS-02	1MD5095-BD-4AH1	36	0.0021
2.2	90 L	2910	7.20	IE3	85.9	86.8	86.1	0.88	4.20	3.35	2.45	2.6	8.3	4.0	DNGW-090LT-02	1MD5098-BD-4AH1	40	0.0031
3	100 L	2920	9.80	IE3	87.1	87.9	87.5	0.88	5.60	4.50	3.25	3.2	8.1	4.6	DNGW-100LT-02	1MD5106-BD-4AH1	56	0.0054
4	112 M	2950	12.9	IE3	88.1	88.7	88.2	0.89	7.40	5.90	4.25	2.5	8.7	4.0	DNGW-112MT-02	1MD5113-BD-4AH1	68	0.012
5.5	132 S	2950	17.8	IE3	89.2	90.1	89.7	0.90	9.90	7.90	5.70	1.9	7.3	3.7	DNGW-132SS-02	1MD5131-BD-4AH1	97	0.024
7.5	132 S	2950	24.3	IE3	90.1	90.9	90.7	0.92	13.1	10.4	7.60	2.1	8.3	4.0	DNGW-132ST-02	1MD5132-BD-4AH1	107	0.031
11	160 M	2955	35.5	IE3	91.2	91.3	90.2	0.87	20.0	16.0	11.6	2.5	7.6	3.8	DNGW-160MS-02	1MD5163-BD-4AH1	176	0.053
15	160 M	2960	48.4	IE3	91.9	91.9	91.0	0.87	27.0	21.5	15.7	2.8	8.8	4.3	DNGW-160MT-02	1MD5165-BD-4AH1	186	0.061
18.5	160 L	2955	59.8	IE3	92.4	92.8	92.3	0.90	32.0	25.5	18.6	2.8	8.3	3.9	DNGW-160LT-02	1MD5166-BD-4AH1	197	0.068
22	180 M	2950	71.2	IE3	92.7	93.0	92.4	0.89	38.5	31.0	22.5	2.3	7.5	3.5	DNGW-180MT-02	1MD5183-BD-4AH1	243	0.080
30	200 L	2955	96.9	IE3	93.3	93.6	93.3	0.87	53.0	42.5	31.0	2.5	7.0	3.3	DNGW-200LS-02	1MD5206-BD-4AH1	319	0.130
37	200 L	2955	119.6	IE3	93.7	93.9	93.5	0.88	65.0	52.0	37.5	2.5	7.1	3.2	DNGW-200LT-02	1MD5208-BD-4AH1	343	0.158
45	225 M	2960	145.2	IE3	94.0	94.5	94.4	0.89	78.0	62.0	45.0	2.4	6.9	3.3	DNGW-225MT-02	1MD5223-BD-4AH1	438	0.26
55	250 M	2975	176.5	IE3	94.3	94.5	93.9	0.89	95.0	76.0	55.0	2.3	6.7	3.1	DNGW-250MN-02	1MD5253-BD-4AH1	535	0.46
75	280 S	2975	241	IE3	94.7	94.8	94.1	0.89	128	103	74.0	2.4	6.8	3.0	DNGW-280SM-02	1MD5280-BD-4AH1	700	0.77
90	280 M	2975	289	IE3	95.0	95.1	94.6	0.90	152	122	88.0	2.4	7.2	3.1	DNGW-280MN-02	1MD5283-BD-4AH1	755	0.94
110	315 S	2982	352	IE3	95.2	95.4	94.9	0.91	183	147	106	2.4	7.1	3.1	DNGW-315SL-02	1MD5311-BD-4AH1	1000	1.39
132	315 M	2982	423	IE3	95.4	95.5	95.2	0.91	220	176	127	2.5	7.2	3.1	DNGW-315ML-02	1MD5313-BD-4AH1	1070	1.60
160	315 M	2982	512	IE3	95.6	95.7	95.2	0.92	265	210	152	2.8	7.8	3.3	DNGW-315MN-02	1MD5315-BD-4AH1	1150	1.90
200	315 L	2982	640	IE3	95.8	95.9	95.5	0.92	330	260	190	2.5	7.2	3.0	DNGW-315LL-02	1MD5316-BD-4AH1	1400	2.30
250	315 L	2985	800	IE3	95.8	96.0	95.8	0.93	405	325	235	2.3	8.6	3.0	DNGW-315LN-02	1MD5318-BD-4AH1	1550	2.50
315	355 M	2984	1008	IE3	95.8	95.4	94.5	0.88	540	430	315	1.6	6.8	2.3	DNGW-355MR-02 ¹⁾	1MD5353-BD-4AH1	2520	4.80
360	355 M	2984	1152	IE3	95.9	95.6	95.0	0.89	610	485	355	1.7	6.8	2.4	DNGW-355MS-02 ¹⁾	1MD5355-BD-4AH1	2660	5.30
460	355 M	2985	1472	IE3	96.3	96.3	95.7	0.90	770	610	445	1.9	6.8	2.6	DNGW-355MT-02 ¹⁾	1MD5357-BD-4AH1	2800	6.40
Operating modes											Frame size			Order code				
Line operation											71 ... 355	0		-				
Converter operation, standard insulation											71 ... 355	1		-				
Voltages											Frame size			Order code				
690 VΔ, 50 Hz											355	0		-				
230 V/400 V, 50 Hz											71 ... 200	1		-				
500 VY, 50 Hz											71 ... 315 ²⁾	3		-				
500 VΔ, 50 Hz											71 ... 355	5		-				
400 V/690 V, 50 Hz											71 ... 355	6		-				
For other voltages, see Page 2/27											71 ... 355	9		...				
Types of construction											Frame size			Order code				
IM B3											71 ... 355	0		-				
IM B5											71 ... 315	1		-				
IM B34											71 ... 112	2		-				
IM B14											71 ... 112	3		-				
IM V1/cover											71 ... 355	4		-				
IM B35											71 ... 355	6		-				
For other types of construction, see from Page 1/29 and 2/27											71 ... 355	9		...				



¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

²⁾ Up to 200 kW.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron version

Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²				
		n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	COSφ _{rated} 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V	I _{rated} 50 Hz, 690 V					T _{LR} / T _{rat}	I _{LR} / I _{rat}	T _B / T _{rat}	
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	–	kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																			
4-pole: 1500 rpm at 50 Hz																			
0.25	71 B	1395	1.71	IE3	73.5	73.7	70.4	0.72	0.68	0.55	0.40	2.5	4.2	2.6	DNGW-071BS-04	1MD5070-BD-4BH1	27	0.0010	
0.37	71 B	1410	2.51	IE3	77.3	76.8	73.2	0.70	0.99	0.79	0.57	3.1	4.8	3.1	DNGW-071BT-04	1MD5071-BD-4BH1	29	0.0014	
0.55	80 B	1440	3.65	IE3	80.8	81.1	79.3	0.78	1.26	1.01	0.73	2.1	5.9	3.1	DNGW-080BS-04	1MD5080-BD-4BH1	29	0.0017	
0.75	80 B	1450	4.94	IE3	82.5	82.3	79.9	0.75	1.75	1.40	1.01	2.7	7.1	3.9	DNGW-080BT-04	1MD5081-BD-4BH1	32	0.0029	
1.1	90 L	1440	7.30	IE3	84.1	84.7	83.4	0.78	2.40	1.94	1.40	2.9	6.9	3.6	DNGW-090LS-04	1MD5095-BD-4BH1	35	0.0036	
1.5	90 L	1445	9.90	IE3	85.3	85.9	84.9	0.80	3.15	2.55	1.84	2.7	7.2	3.6	DNGW-090LT-04	1MD5098-BD-4BH1	39	0.0049	
2.2	100 L	1465	14.3	IE3	86.7	87.0	85.9	0.83	4.40	3.55	2.55	3.2	8.4	4.4	DNGW-100LS-04	1MD5106-BD-4BH1	61	0.014	
3	100 L	1460	19.6	IE3	87.7	88.5	87.9	0.83	5.90	4.75	3.45	2.5	8.3	3.9	DNGW-100LT-04	1MD5108-BD-4BH1	61	0.014	
4	112 M	1460	26.2	IE3	88.6	89.2	88.6	0.82	7.90	6.40	4.60	2.4	7.1	3.7	DNGW-112MT-04	1MD5113-BD-4BH1	69	0.017	
5.5	132 S	1470	35.7	IE3	89.6	90.0	89.4	0.82	10.8	8.60	6.30	2.9	8.6	3.7	DNGW-132ST-04	1MD5131-BD-4BH1	108	0.046	
7.5	132 M	1465	48.9	IE3	90.4	91.1	90.8	0.84	14.3	11.4	8.30	2.6	8.2	3.7	DNGW-132MT-04	1MD5133-BD-4BH1	113	0.046	
11	160 M	1475	71.2	IE3	91.4	91.8	91.2	0.84	20.5	16.5	12.0	2.6	7.6	3.4	DNGW-160MS-04	1MD5163-BD-4BH1	178	0.083	
15	160 L	1475	97.1	IE3	92.1	92.3	91.5	0.82	28.5	23.0	16.6	2.5	8.5	3.8	DNGW-160LT-04	1MD5166-BD-4BH1	197	0.099	
18.5	180 M	1470	120.2	IE3	92.6	93.1	93.0	0.82	35.0	28.0	20.5	2.5	7.2	3.3	DNGW-180MS-04	1MD5183-BD-4BH1	244	0.13	
22	180 L	1470	142.9	IE3	93.0	93.6	93.6	0.83	41.0	33.0	24.0	2.3	6.8	3.3	DNGW-180LT-04	1MD5186-BD-4BH1	254	0.14	
30	200 L	1470	194.9	IE3	93.6	94.2	94.2	0.84	55.0	44.0	32.0	2.6	7.3	3.1	DNGW-200LT-04	1MD5206-BD-4BH1	340	0.22	
37	225 S	1478	239	IE3	93.9	94.5	94.4	0.86	66.0	53.0	38.5	2.5	6.4	2.7	DNGW-225SS-04	1MD5220-BD-4BH1	421	0.42	
45	225 M	1478	291	IE3	94.2	94.9	95.1	0.86	80.0	64.0	46.5	2.6	6.4	2.7	DNGW-225MT-04	1MD5223-BD-4BH1	443	0.47	
55	250 M	1482	354	IE3	94.6	95.1	95.0	0.87	96.0	77.0	56.0	2.5	6.8	2.9	DNGW-250MN-04	1MD5253-BD-4BH1	570	0.85	
75	280 S	1485	482	IE3	95.0	95.3	95.0	0.86	133	106	77.0	2.5	6.9	3.0	DNGW-280SM-04	1MD5280-BD-4BH1	755	1.39	
90	280 M	1485	579	IE3	95.2	95.5	95.3	0.87	157	125	91.0	2.6	7.2	3.0	DNGW-280MN-04	1MD5283-BD-4BH1	820	1.7	
110	315 S	1488	706	IE3	95.4	95.8	95.5	0.87	191	153	111	2.6	6.8	2.9	DNGW-315SL-04	1MD5311-BD-4BH1	1010	2.2	
132	315 M	1490	846	IE3	95.6	95.9	95.9	0.87	230	183	133	2.8	7.3	3.0	DNGW-315ML-04	1MD5313-BD-4BH1	1090	2.9	
160	315 M	1490	1025	IE3	95.8	96.1	96.1	0.87	275	220	161	2.9	7.3	3.1	DNGW-315MN-04	1MD5315-BD-4BH1	1120	3.1	
200	315 L	1488	1284	IE3	96.0	96.3	96.1	0.88	340	275	198	3.2	7.4	3.0	DNGW-315LL-04	1MD5316-BD-4BH1	1340	3.7	
250	315 L	1492	1600	IE3	96.0	96.0	95.5	0.86	435	350	255	2.5	7.5	3.0	DNGW-315LM-04	1MD5317-BD-4BH1	1550	4.2	
315	355 M	1488	2022	IE3	95.5	95.6	95.0	0.85	560	450	325	2.0	6.8	2.2	DNGW-355MR-04 ¹⁾	1MD5353-BD-4BH1	2480	6.1	
360	355 M	1488	2310	IE3	95.7	95.8	95.2	0.85	640	510	370	2.2	6.9	2.2	DNGW-355MS-04 ¹⁾	1MD5355-BD-4BH1	2610	6.8	
460	355 M	1488	2952	IE3	96.2	96.3	96.0	0.86	800	640	465	2.2	7.1	2.2	DNGW-355MT-04 ¹⁾	1MD5357-BD-4BH1	2750	8.5	
Operating modes		Frame size												Order code					
Line operation		71 ... 355										0		–					
Converter operation, standard insulation		71 ... 355										1		–					
Voltages		Frame size												Order code					
690 VΔ, 50 Hz		355										0		–					
230 V/400 V, 50 Hz		71 ... 200										1		–					
500 VY, 50 Hz		71 ... 315 ²⁾										3		–					
500 VΔ, 50 Hz		71 ... 355										5		–					
400 V/690 V, 50 Hz		71 ... 355										6		–					
For other voltages, see Page 2/27		71 ... 355										9		...					
Types of construction		Frame size												Order code					
IM B3		71 ... 355										0		–					
IM B5		71 ... 315										1		–					
IM B34		71 ... 112										2		–					
IM B14		71 ... 112										3		–					
IM V1/cover		71 ... 355										4		–					
IM B35		71 ... 355										6		–					
For other types of construction, see from Page 1/29 and 2/27		71 ... 355										9		...					

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

²⁾ Up to 200 kW.



Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²				
		η_{rated} 50 Hz	T_{rated} 50 Hz	IE class	η_{rated} 50 Hz, 4/4	η_{rated} 50 Hz, 3/4	η_{rated} 50 Hz, 2/4	$\cos\phi$ rated, 50 Hz, 4/4	I_{rated} 50 Hz, 400 V	I_{rated} 50 Hz, 500 V	I_{rated} 50 Hz, 690 V					$T_{LR}/$ $T_{rat.}$	$I_{LR}/$ $I_{rat.}$	$T_{\beta}/$ $T_{rat.}$	
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																			
6-pole: 1000 rpm at 50 Hz																			
0.25	71 B	885	2.70	IE3	68.6	69.5	66.2	0.69	0.76	0.61	0.44	2.6	3.2	2.6	DNGW-071BS-06	1MD5071-BD-4CH1	31	0.0015	
0.37	80 B	940	3.76	IE3	73.5	73.1	69.4	0.66	1.10	0.88	0.64	2.3	4.2	2.7	DNGW-080BR-06	1MD5080-BD-4CH1	30	0.002	
0.55	80 B	935	5.60	IE3	77.2	77.0	73.9	0.67	1.53	1.23	0.89	2.5	4.5	2.8	DNGW-080BS-06	1MD5081-BD-4CH1	32	0.003	
0.75	90 L	945	7.60	IE3	78.9	80.0	78.8	0.70	1.96	1.57	1.14	2.2	4.6	2.6	DNGW-090LS-06	1MD5095-BD-4CH1	36	0.004	
1.1	100 L	975	10.8	IE3	81.0	81.0	79.0	0.71	2.75	2.20	1.60	2.2	5.6	2.9	DNGW-100LS-06	1MD5105-BD-4CH1	61	0.014	
1.5	112 M	975	14.7	IE3	82.5	82.8	81.2	0.76	3.45	2.75	2.00	2.0	5.7	2.8	DNGW-112MT-06	1MD5112-BD-4CH1	69	0.017	
2.2	132 S	980	21.4	IE3	84.3	84.6	83.7	0.76	4.95	3.95	2.85	2.0	6.7	3.1	DNGW-132SR-06	1MD5130-BD-4CH1	105	0.037	
3	132 S	980	29.2	IE3	85.6	86.3	85.7	0.76	6.70	5.30	3.85	2.0	6.3	3.0	DNGW-132SS-06	1MD5131-BD-4CH1	105	0.037	
4	132 M	975	39.2	IE3	86.8	87.7	87.4	0.76	8.80	7.00	5.10	2.0	6.1	2.8	DNGW-132MS-06	1MD5133-BD-4CH1	105	0.037	
5.5	132 M	975	53.9	IE3	88.0	88.9	88.5	0.76	11.9	9.50	6.90	2.0	6.3	2.9	DNGW-132MT-06	1MD5135-BD-4CH1	114	0.046	
7.5	160 M	980	73.1	IE3	89.1	89.8	89.2	0.76	16.0	12.8	9.30	2.0	5.1	2.3	DNGW-160MS-06	1MD5163-BD-4CH1	196	0.098	
11	160 L	975	107.7	IE3	90.3	91.1	90.7	0.77	23.0	18.3	13.2	2.0	5.1	2.4	DNGW-160LT-06	1MD5166-BD-4CH1	215	0.12	
15	180 L	975	146.9	IE3	91.2	91.9	91.9	0.80	29.5	23.5	17.2	2.3	5.9	2.8	DNGW-180LT-06	1MD5186-BD-4CH1	242	0.19	
18.5	200 L	978	180.6	IE3	91.7	92.5	92.5	0.79	37.0	29.5	21.5	2.5	5.6	2.6	DNGW-200LS-06	1MD5206-BD-4CH1	317	0.28	
22	200 L	978	215	IE3	92.2	93.1	93.2	0.79	43.5	35.0	25.5	2.5	5.6	2.6	DNGW-200LT-06	1MD5208-BD-4CH1	331	0.32	
30	225 M	982	292	IE3	92.9	93.6	93.5	0.83	56.0	45.0	32.5	2.6	6.6	3.0	DNGW-225MT-06	1MD5223-BD-4CH1	472	0.67	
37	250 M	985	359	IE3	93.3	94.0	94.0	0.85	67.0	54.0	39.0	2.7	7.0	2.9	DNGW-250MN-06	1MD5253-BD-4CH1	550	1.0	
45	280 S	988	435	IE3	93.7	94.3	94.2	0.85	82.0	65.0	47.5	3.0	6.8	2.8	DNGW-280SM-06	1MD5280-BD-4CH1	695	1.4	
55	280 M	988	532	IE3	94.1	94.6	94.4	0.85	99.0	79.0	58.0	3.2	7.2	3.0	DNGW-280MN-06	1MD5283-BD-4CH1	740	1.6	
75	315 S	990	723	IE3	94.6	94.9	94.4	0.84	136	109	79.0	2.6	7.5	3.1	DNGW-315SL-06	1MD5311-BD-4CH1	990	2.6	
90	315 M	991	867	IE3	94.9	95.2	94.9	0.85	161	129	93.0	2.5	6.7	2.8	DNGW-315ML-06	1MD5313-BD-4CH1	1060	3.1	
110	315 M	991	1060	IE3	95.1	95.5	95.3	0.84	199	159	115	2.8	7.2	3.0	DNGW-315MM-06	1MD5314-BD-4CH1	1160	3.9	
132	315 M	991	1272	IE3	95.4	95.9	95.8	0.84	240	190	138	2.7	7.2	3.0	DNGW-315LK-06	1MD5315-BD-4CH1	1360	4.4	
160	315 L	991	1542	IE3	95.6	95.8	95.4	0.83	290	235	169	3.3	7.7	3.5	DNGW-315LL-06	1MD5316-BD-4CH1	1400	4.6	
200	315 L	990	1929	IE3	95.0	95.3	94.9	0.83	365	295	210	2.8	7.5	3.3	DNGW-315LM-06	1MD5317-BD-4CH1	1650	7.6	
280	355 M	993	2693	IE3	95.7	95.7	95.2	0.82	520	410	300	2.1	7.1	2.8	DNGW-355MR-06	1MD5353-BD-4CH1	2460	13	
315	355 M	993	3029	IE3	95.9	95.9	95.5	0.83	570	455	330	2.1	7.1	2.8	DNGW-355MS-06	1MD5355-BD-4CH1	2590	15	
360	355 M	994	3458	IE3	96.0	96.1	95.7	0.83	650	520	380	2.2	7.2	2.9	DNGW-355MT-06	1MD5357-BD-4CH1	2730	16	
Operating modes																			
Line operation											Frame size		71 ... 355		0		Order code		
Converter operation, standard insulation											Frame size		71 ... 355		1		Order code		
Voltages																			
690 VΔ, 50 Hz											Frame size		355		0		Order code		
230 V/400 V, 50 Hz											Frame size		71 ... 200		1		Order code		
500 VY, 50 Hz											Frame size		71 ... 315		3		Order code		
500 VΔ, 50 Hz											Frame size		71 ... 355		5		Order code		
400 V/690 V, 50 Hz											Frame size		71 ... 355		6		Order code		
For other voltages, see Page 2/27											Frame size		71 ... 355		9		Order code		
Types of construction																			
IM B3											Frame size		71 ... 355		0		Order code		
IM B5											Frame size		71 ... 315		1		Order code		
IM B34											Frame size		71 ... 112		2		Order code		
IM B14											Frame size		71 ... 112		3		Order code		
IM V1/cover											Frame size		71 ... 355		4		Order code		
IM B35											Frame size		71 ... 355		6		Order code		
For other types of construction, see from Page 1/29 and 2/27											Frame size		71 ... 355		9		Order code		



Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron version

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power						Motor type			Article No.	m IM B3	J kgm ²			
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	COSφ _{rated} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat}				I _{LR} / I _{rat}	T _B / T _{rat}	
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–	–	–	–	–
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
2-pole: 3600 rpm at 60 Hz																
0.43	71 B	3445	1.19	IE3	73.4	72.6	68.9	0.76	0.97	3.6	6.0	3.6	DNGW-071BS-02	1MD5070- BD -4AH1	27	0.0005
0.63	71 B	3450	1.74	IE3	76.8	76.1	72.9	0.76	1.35	3.9	6.6	3.9	DNGW-071BT-02	1MD5071- BD -4AH1	28	0.0006
0.86	80 B	3450	2.38	IE3	77.0	78.0	77.2	0.86	1.63	2.6	6.4	3.1	DNGW-080BS-02	1MD5080- BD -4AH1	29	0.0011
1.27	80 B	3480	3.48	IE3	84.0	84.6	83.4	0.85	2.25	2.8	7.4	3.4	DNGW-080BT-02	1MD5081- BD -4AH1	30	0.0013
1.75	90 L	3510	4.76	IE3	85.5	85.6	84.0	0.87	2.95	2.6	8.7	4.2	DNGW-090LS-02	1MD5095- BD -4AH1	36	0.0021
2.55	90 L	3510	6.90	IE3	86.5	87.0	85.9	0.88	4.20	2.6	8.3	4.2	DNGW-090LT-02	1MD5098- BD -4AH1	40	0.0031
3.45	100 L	3520	9.40	IE3	88.5	89.2	88.5	0.89	5.50	3.3	8.5	4.7	DNGW-100LT-02	1MD5106- BD -4AH1	56	0.0054
4.55	112 M	3550	12.2	IE3	88.5	88.7	87.6	0.90	7.20	2.6	9.0	4.1	DNGW-112MT-02	1MD5113- BD -4AH1	68	0.012
6.3	132 S	3545	17.0	IE3	89.5	89.9	89.1	0.91	9.70	1.9	7.5	3.8	DNGW-132SS-02	1MD5131- BD -4AH1	97	0.024
8.6	132 S	3550	23.1	IE3	90.2	90.5	90.0	0.92	13.0	2.1	8.4	4.1	DNGW-132ST-02	1MD5132- BD -4AH1	107	0.031
12.6	160 M	3555	33.8	IE3	91.0	90.8	89.3	0.89	19.5	2.4	7.6	3.7	DNGW-160MS-02	1MD5163- BD -4AH1	176	0.053
17.3	160 M	3560	46.4	IE3	91.7	91.5	90.3	0.88	27.0	2.7	8.7	4.2	DNGW-160MT-02	1MD5165- BD -4AH1	186	0.061
21.3	160 L	3550	57.3	IE3	91.7	91.8	91.1	0.91	32.0	2.7	8.2	3.8	DNGW-160LT-02	1MD5166- BD -4AH1	197	0.068
24.5	180 M	3550	65.9	IE3	91.7	91.7	90.6	0.89	37.5	2.3	7.5	3.6	DNGW-180MT-02	1MD5183- BD -4AH1	243	0.080
33.5	200 L	3555	90.0	IE3	93.0	93.1	92.6	0.87	52.0	2.5	7.1	3.3	DNGW-200LS-02	1MD5206- BD -4AH1	319	0.134
41.5	200 L	3555	111.5	IE3	93.6	93.6	92.9	0.89	63.0	2.5	7.1	3.2	DNGW-200LT-02	1MD5208- BD -4AH1	343	0.158
51	225 M	3560	136.8	IE3	93.6	93.9	93.6	0.89	77.0	2.4	6.8	3.2	DNGW-225MT-02	1MD5223- BD -4AH1	438	0.26
62	250 M	3575	165.6	IE3	93.6	93.6	92.7	0.90	92.0	2.3	6.7	3.0	DNGW-250MN-02	1MD5253- BD -4AH1	535	0.46
75	280 S	3578	200	IE3	94.1	93.9	92.7	0.89	112	2.7	7.6	3.2	DNGW-280SM-02	1MD5280- BD -4AH1	700	0.77
90	280 M	3578	240	IE3	95.0	94.8	93.8	0.90	132	2.7	8.1	3.3	DNGW-280MN-02	1MD5283- BD -4AH1	755	0.94
123	315 S	3582	328	IE3	95.0	95.0	94.2	0.91	179	2.4	7.2	3.0	DNGW-315SL-02	1MD5311- BD -4AH1	1000	1.39
148	315 M	3582	395	IE3	95.4	95.3	94.6	0.91	215	2.5	7.1	3.0	DNGW-315ML-02	1MD5313- BD -4AH1	1070	1.6
160	315 M	3582	427	IE3	95.4	95.1	94.6	0.92	230	2.8	7.7	3.1	DNGW-315MN-02	1MD5315- BD -4AH1	1150	1.9
224	315 L	3582	597	IE3	95.8	95.9	95.4	0.92	320	2.9	7.1	2.9	DNGW-315LL-02	1MD5316- BD -4AH1	1400	2.3
270	315 L	3582	720	IE3	95.8	95.9	95.4	0.92	385	3.4	9.5	3.7	DNGW-315LN-02	1MD5318- BD -4AH1	1550	2.5
500	355 M	3580	1334	IE3	96.0	95.8	94.8	0.90	730	2.0	7.5	2.7	DNGW-355MT-02 ¹⁾	1MD5357- BD -4AA1	2800	6.4
Operating modes										Frame size				Order code		
Line operation										71 ... 355			0	–		
Converter operation, standard insulation										71 ... 355			1	–		
Voltages										Frame size				Order code		
For other voltages, see Page 2/27										71 ... 355			9	...		
Types of construction										Frame size				Order code		
IM B3										71 ... 355			0	–		
IM B5										71 ... 315			1	–		
IM B34										71 ... 112			2	–		
IM B14										71 ... 112			3	–		
IM V1/cover										71 ... 355			4	–		
IM B35										71 ... 355			6	–		
For other types of construction, see from Page 1/29 and 2/27										71 ... 355			9	...		

¹⁾ Direction of rotation must be specified (order code **K97** or **K98**).

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power							I _{rated} , 60 Hz, 460 V	Motor type			Article No.	m IM B3	J kgm ²	
		n _{rated} , 60 Hz	T _{rated} , 60 Hz	IE class	η _{rated} , 60 Hz, 4/4	η _{rated} , 60 Hz, 3/4	η _{rated} , 60 Hz, 2/4	COSφ _{rated} , 60 Hz, 4/4		T _{LR} / T _{rat}	I _{LR} / I _{rat}	T _B / T _{rat}				
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
4-pole: 1800 rpm at 60 Hz																
0.29	71 B	1695	1.63	IE3	73.4	73.3	70.0	0.72	0.69	2.5	4.5	2.6	DNGW-071BR-04	1MD5070- BD -4BH1	27	0.0010
0.43	71 B	1710	2.40	IE3	78.2	77.5	74.1	0.70	0.99	3.0	5.1	3.1	DNGW-071BS-04	1MD5071- BD -4BH1	29	0.0014
0.55	80 B	1740	3.02	IE3	81.1	81.3	79.4	0.78	1.09	2.4	6.4	3.3	DNGW-080BR-04	1MD5080- BD -4BH1	29	0.0021
0.75	80 B	1760	4.07	IE3	83.5	83.2	80.8	0.71	1.59	3.1	8.3	4.7	DNGW-080BT-04	1MD5081- BD -4BH1	32	0.0029
1.27	90 L	1740	7.00	IE3	86.5	86.9	85.6	0.79	2.35	2.9	7.4	3.8	DNGW-090LS-04	1MD5095- BD -4BH1	35	0.0028
1.75	90 L	1740	9.60	IE3	86.5	87.0	86.9	0.80	3.15	2.6	7.5	3.7	DNGW-090LT-04	1MD5098- BD -4BH1	39	0.0049
2.55	100 L	1765	13.8	IE3	89.5	89.7	88.5	0.84	4.25	3.0	8.5	4.4	DNGW-100LS-04	1MD5106- BD -4BH1	61	0.014
3.45	100 L	1755	18.8	IE3	89.5	90.1	89.5	0.84	5.80	2.7	8.4	3.9	DNGW-100LT-04	1MD5108- BD -4BH1	61	0.014
4.55	112 M	1760	24.7	IE3	89.5	90.0	89.3	0.83	7.70	2.5	7.3	3.8	DNGW-112MT-04	1MD5113- BD -4BH1	69	0.017
6.3	132 S	1770	34.0	IE3	91.7	92.0	91.3	0.83	10.4	3.4	8.4	3.9	DNGW-132ST-04	1MD5131- BD -4BH1	108	0.046
8.6	132 M	1765	46.5	IE3	91.7	92.0	91.7	0.85	13.8	2.3	8.4	3.6	DNGW-132MT-04	1MD5133- BD -4BH1	113	0.046
12.6	160 M	1770	68.0	IE3	92.4	92.6	92.0	0.85	20.0	2.6	7.9	3.3	DNGW-160MS-04	1MD5163- BD -4BH1	178	0.083
17.3	160 L	1775	93.1	IE3	93.6	93.7	92.9	0.83	28.0	2.5	8.5	3.7	DNGW-160LT-04	1MD5166- BD -4BH1	197	0.099
21.3	180 M	1770	114.9	IE3	93.6	94.0	93.8	0.83	34.5	2.4	7.2	3.2	DNGW-180MS-04	1MD5183- BD -4BH1	244	0.13
25.3	180 L	1770	136.5	IE3	93.6	94.1	94.0	0.83	41.0	2.2	6.9	3.2	DNGW-180LT-04	1MD5186- BD -4BH1	254	0.14
30	200 L	1778	161.1	IE3	94.1	94.3	93.8	0.83	48.0	3.0	8.1	3.5	DNGW-200LT-04	1MD5206- BD -4BH1	340	0.22
37	225 S	1782	198.3	IE3	94.5	94.7	94.2	0.85	58	2.8	7.5	3.0	DNGW-225SS-04	1MD5220- BD -4BH1	421	0.42
45	225 M	1782	241	IE3	95.0	95.0	94.5	0.84	71	2.9	7.2	3.0	DNGW-225MT-04	1MD5223- BD -4BH1	443	0.47
55	250 M	1786	294	IE3	95.4	95.6	95.1	0.86	84	2.8	7.6	3.2	DNGW-250MN-04	1MD5253- BD -4BH1	570	0.85
75	280 S	1788	401	IE3	95.4	95.3	94.5	0.85	116	2.8	7.7	3.3	DNGW-280SM-04	1MD5280- BD -4BH1	755	1.3
90	280 M	1788	481	IE3	95.4	95.5	94.9	0.87	136	2.9	8.0	3.3	DNGW-280MN-04	1MD5283- BD -4BH1	820	1.7
127	315 S	1788	678	IE3	95.8	96.1	95.8	0.87	191	2.5	6.7	2.7	DNGW-315SL-04	1MD5311- BD -4BH1	1010	2.2
152	315 M	1788	812	IE3	96.2	96.5	96.3	0.88	225	2.7	7.2	2.8	DNGW-315ML-04	1MD5313- BD -4BH1	1090	2.9
184	315 M	1788	983	IE3	96.2	96.5	96.3	0.88	275	3.0	7.2	2.9	DNGW-315MN-04	1MD5315- BD -4BH1	1120	3.1
185	315 L	1791	986	IE3	96.2	96.2	95.5	0.87	275	3.9	9.0	3.6	DNGW-315LL-04	1MD5316- BD -4BH1	1340	3.7
250	315 L	1791	1333	IE3	96.2	96.0	95.3	0.85	385	3.8	9.6	3.8	DNGW-315LM-04	1MD5317- BD -4BH1	1550	4.2
490	355 M	1789	2616	IE3	96.2	96.0	95.3	0.86	740	2.31	7.5	2.4	DNGW-355MT-04 ¹⁾	1MD5357- BD -4BH1	2750	8.5
Operating modes										Frame size					Order code	
Line operation										71 ... 355			0		–	
Converter operation, standard insulation										71 ... 355			1		–	
Voltages										Frame size					Order code	
For other voltages, see Page 2/27										71 ... 355			9		...	
Types of construction										Frame size					Order code	
IM B3										71 ... 355			0		–	
IM B5										71 ... 315			1		–	
IM B34										71 ... 112			2		–	
IM B14										71 ... 112			3		–	
IM V1/cover										71 ... 355			4		–	
IM B35										71 ... 355			6		–	
For other types of construction, see from Page 1/29 and 2/27										71 ... 355			9		...	

1) Direction of rotation must be specified (order code **K97** or **K98**).

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron version

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power								Motor type			Article No.	m IM B3	J kgm ²	
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cos φ _{rated} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}	T _β / T _{rat.}				
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
6-pole: 1200 rpm at 60 Hz																
0.25	71 B	1110	2.15	IE3	71.4	70.6	66.4	0.64	0.69	3.2	3.9	3.2	DNGW-071BS-06	1MD5071- BD -4CH1	31	0.0015
0.37	80 B	1150	3.07	IE3	75.3	74.3	70.0	0.61	1.01	2.7	5.0	3.3	DNGW-080BR-06	1MD5080- BD -4CH1	30	0.0025
0.55	80 B	1145	4.59	IE3	81.7	80.5	76.4	0.63	1.34	2.8	5.3	3.4	DNGW-080BS-06	1MD5081- BD -4CH1	32	0.003
0.75	90 L	1155	6.20	IE3	82.5	82.4	79.9	0.65	1.76	2.4	5.3	3.1	DNGW-090LS-06	1MD5095- BD -4CH1	36	0.004
1.1	100 L	1180	8.90	IE3	87.5	87.2	84.8	0.69	2.30	2.4	6.7	3.3	DNGW-100LS-06	1MD5105- BD -4CH1	61	0.014
1.5	112 M	1175	12.2	IE3	88.5	88.3	86.2	0.73	2.90	2.2	6.9	3.2	DNGW-112MT-06	1MD5112- BD -4CH1	69	0.017
2.2	132 S	1185	17.7	IE3	89.5	89.3	87.7	0.74	4.15	2.3	8.0	3.5	DNGW-132SR-06	1MD5130- BD -4CH1	105	0.037
3	132 S	1185	24.2	IE3	89.5	89.6	88.4	0.75	5.60	2.3	7.5	3.3	DNGW-132SS-06	1MD5131- BD -4CH1	105	0.037
3.7	132 M	1175	30.1	IE3	89.5	89.6	88.4	0.73	7.10	2.4	7.6	3.4	DNGW-132MS-06	1MD5133- BD -4CH1	105	0.037
5.5	132 M	1180	44.5	IE3	91.0	91.4	90.5	0.74	10.3	2.3	7.2	3.3	DNGW-132MT-06	1MD5135- BD -4CH1	114	0.046
7.5	160 M	1185	60.4	IE3	91.0	91.1	90.0	0.75	13.8	2.4	5.9	2.6	DNGW-160MS-06	1MD5163- BD -4CH1	196	0.098
11	160 L	1180	89.0	IE3	91.7	91.9	91.0	0.75	20.0	2.3	5.8	2.6	DNGW-160LT-06	1MD5166- BD -4CH1	215	0.12
15	180 L	1178	121.6	IE3	91.7	92.0	91.4	0.79	26.0	2.5	6.8	3.0	DNGW-180LT-06	1MD5186- BD -4CH1	242	0.19
18.5	200 L	1180	149.7	IE3	93.0	93.8	93.8	0.78	32.0	2.8	6.5	3.0	DNGW-200LS-06	1MD5206- BD -4CH1	317	0.28
22	200 L	1180	178	IE3	93.0	93.5	93.4	0.79	37.5	2.6	6.3	2.8	DNGW-200LT-06	1MD5208- BD -4CH1	331	0.32
30	225 M	1185	242	IE3	94.1	94.4	94.1	0.82	49.0	2.9	7.6	3.3	DNGW-225MT-06	1MD5223- BD -4CH1	472	0.67
37	250 M	1188	297	IE3	94.1	94.4	93.9	0.83	59.0	3.1	8.0	3.1	DNGW-250MN-06	1MD5253- BD -4CH1	550	1.0
45	280 S	1190	361	IE3	94.5	94.6	94.1	0.83	72.0	3.3	7.7	3.1	DNGW-280SM-06	1MD5280- BD -4CH1	695	1.4
55	280 M	1190	441	IE3	94.5	94.6	94.0	0.83	88.0	3.6	7.9	3.3	DNGW-280MN-06	1MD5283- BD -4CH1	740	1.6
75	315 S	1192	601	IE3	95.0	94.9	94.1	0.82	121	3.1	8.4	3.3	DNGW-315SL-06	1MD5311- BD -4CH1	990	2.6
90	315 M	1192	721	IE3	95.0	95.0	94.4	0.84	142	2.7	7.7	3.0	DNGW-315ML-06	1MD5313- BD -4CH1	1060	3.1
110	315 M	1192	881	IE3	95.8	95.9	95.5	0.83	174	3.2	8.2	3.4	DNGW-315MM-06	1MD5314- BD -4CH1	1160	3.9
132	315 M	1192	1057	IE3	95.8	96.0	95.6	0.84	205	3.1	8.4	3.3	DNGW-315LK-06	1MD5315- BD -4CH1	1360	4.4
160	315 L	1192	1202	IE3	95.8	95.7	95.0	0.81	245	3.6	9.6	4.1	DNGW-315LL-06	1MD5316- BD -4CH1	1400	4.6
280	355 M	1192	2244	IE3	95.8	95.8	94.8	0.81	450	2.2	7.8	2.9	DNGW-355MR-06	1MD5353- BD -4CH1	2460	13
315	355 M	1192	2524	IE3	95.8	95.8	95.0	0.83	495	2.2	7.8	2.9	DNGW-355MS-06	1MD5355- BD -4CH1	2590	15
380	355 M	1193	3042	IE3	96.0	96.0	95.5	0.83	600	2.3	7.9	2.9	DNGW-355MT-06	1MD5357- BD -4CH1	2730	16
Operating modes										Frame size				Order code		
Line operation										71 ... 355			0	–		
Converter operation, standard insulation										71 ... 355			1	–		
Voltages										Frame size				Order code		
For other voltages, see Page 2/27										71 ... 355			9	...		
Types of construction										Frame size				Order code		
IM B3										71 ... 355			0	–		
IM B5										71 ... 315			1	–		
IM B34										71 ... 112			2	–		
IM B14										71 ... 112			3	–		
IM V1/cover										71 ... 355			4	–		
IM B35										71 ... 355			6	–		
For other types of construction, see from Page 1/29 and 2/27										71 ... 355			9	...		

Selection and ordering data

Voltages	Voltage code 11th position of the Article No.	Additional identification code with order code and plain text if required	Motor series													
			SIMOTICS XP													
1MD5.....■-.....			Frame size													
			71	80	90	100	112	132	160	180	200	225	250	280	315	355
Optional voltages																
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	-	-	0
230 VΔ/400 VY, 50 Hz	1		0	0	0	0	0	0	0	0	0	0	0	0	0	-
500 VY, 50 Hz	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0 ¹⁾
500 VΔ, 50 Hz	5		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0
400 VΔ/690 VY, 50 Hz	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0
415 VY, 50 Hz	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0 ¹⁾
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
230/400 VΔ/Y, 50 Hz and 460 VY, 60 Hz (60 Hz power) ²⁾	9	L1M	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
400/690 VΔ/Y, 50 Hz and 460 VΔ, 60 Hz (60-Hz power) ²⁾	9	L1N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
230/400 VΔ/Y, 50 Hz; 400 VΔ, 87 Hz (increased power at 87 Hz) ³⁾	9	L1P	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
460 VY, 60 Hz (60 Hz power)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
460 VΔ, 60 Hz (60-Hz power)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
575 VY, 60 Hz (60 Hz power)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
575 VΔ, 60 Hz (60-Hz power)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
440 VΔ, 60 Hz (60-Hz power)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-

✓ With additional charge
 - Not possible
 0 Without additional charge

Types of construction	Type of construction code 12th position of the Article No.	Additional identification code with order code and plain text if required	Motor series													
			SIMOTICS XP													
1MD5.....■-.....			Frame size													
			71	80	90	100	112	132	160	180	200	225	250	280	315	355
Optional types of construction																
IM B3	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
IM B5	1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
IM B34	2		✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
IM B14	3		✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
IM V1, with protective cover	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IM B35	6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IM V6	9	M1E	0	0	0	0	0	0	0	0	0	0	0	0	0	-
IM V5, with protective cover	9	M1F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
IM V3	9	M1G	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
IM V15, with protective cover	9	M2K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
IM V18, with protective cover	9	M2M	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-

✓ With additional charge
 - Not possible
 0 Without additional charge

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:
 - For motors for converter operation, the converter rating plate is stamped with 380 V or 400 V.

1) Up to 200 kW.

2) Not available for 6-pole motors with 1.1 kW.

3) For 4-pole motors only.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Special versions

Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series													
		SIMOTICS XP													
		Frame size													
1MD5.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355
Special electrical designs/winding protection															
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	A11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	A12	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	A15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	A16	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	A42	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – in 2-wire design	A60	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A64	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Power data for converter operation, utilization in accordance with temperature class F (155 °C)	C32	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ambient temperature +45° C, insulation class F, utilization B, derating 4 %	C22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ambient temperature +50° C, Insulation class F, utilization B, derating 8 %	C23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Colors and paint finish															
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3		□	□	□	□	□	□	□	□	□	□	□	□	□	□
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	V10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	W14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	V11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	K24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted	K23	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Special paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – specify special coating system in addition, e.g. V10 , V11 , W14 , etc.	Y54 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	Y51 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

For legend, see Page 2/31.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series													
		SIMOTICS XP													
		Frame size													
1MD5...-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355
Design for Zones according to ATEX															
Version for gas group IIC, but stamped IIB	M99	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Design in double protection additionally for dust, Zone 22 for line operation, no hybrid certification – non-conductive dust	W20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design additionally for dust, Zone 21 for line operation, no hybrid certification, IP65 – design and certification for conductive dust (incl. non-conductive dust)	W21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design additionally for dust, Zone 21 for converter operation, no hybrid certification – non-conductive dust, select options for converter operation separately	W22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design additionally for dust, Zone 21 for converter operation, no hybrid certification, IP65 – version and certification for conductive dust (incl. non-conductive dust), select options for converter operation separately	W23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual certifications															
China Energy Efficiency Label	D34	○	○	○	○	○	○	○	○	○	○	○	○	○	○
EAC certificate for the Eurasian Customs Union	D35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC Ex certificate	D37	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ex certification for India (PESO – CCOE)	D38	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special mechanical designs															
Terminal box on right-hand side (viewed onto DE)	K09	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–
Terminal box on left-hand side (viewed onto DE)	K10	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–
Terminal box on top		□	□	□	□	□	□	□	□	□	□	□	□	□	□
1 × cable gland for non-armored cable – for main terminal box	K54	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1 × cable gland, standard thread size for additional connection (for non-armored cable)	W33	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cable gland, standard Ex d (non-armored cable) 1 unit – only in combination with K53 , specify exact cable data	W91	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Explosion-proof main terminal box, Ex d IIC	K53	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box Ex d IIC, cast-iron – with standard thread according to catalog	V43	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Auxiliary terminal box Ex e, cast-iron – not in combination with K53 (Ex d terminal box)	W72	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box, cast-iron, for heater	M52	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
6 cables protruding, radial, 1.5 m long – 7-wire cable; D or S interconnection, customer-supplied	W38	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Extension of the cable to 3 m – only in combination with W38	W39	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Connection cable for accessories – only in combination with W38 , length as power cable	W40	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–

For legend, see Page 2/31.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series													
		SIMOTICS XP													
1MD5.....-Z		Frame size													
		71	80	90	100	112	132	160	180	200	225	250	280	315	355
Special mechanical designs (continued)															
Cable entry from DE	K83	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	K84	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	K85	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14		□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter operation only at lowest and highest speed of speed range	K02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising K40 ; FS 355: for 4 and 6-pole motors only; not possible for 2-pole motors	K20	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓
Metal external fan	K35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□
Regreasing device DE/NDE	K40	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	□	□
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 355 for converter operation	L27	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓
Located bearing DE		□	□	□	□	□	□	□	□	□	□	□	□	□	□
VIK design	K30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Second rating plate, supplied loose	K31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	W47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate with rating data for converter operation according to limit characteristic	Y80 • and customer specifications	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Extra rating plate for customer data (each plate) – data must be specified as text in the order	Y82 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional information on motor plate and on package label – max. 20 characters possible	Y84 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater, 210 to 250 V (min. 200 V, max. 264 V)	M13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP56 degree of protection	K51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP65 degree of protection	K50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increased tropicalization, humidity ≥ 80 % – LOHER CHEMSTAR incl. V10 and W71 , LOHER VARIO incl. V10 and P45	W61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Fan with anti-corrosion protection in case of metal fan	W63	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Operation in both directions of rotation – from FS 355 2-/4-pole, possibly increased noise values and derating		□	□	□	□	□	□	□	□	□	□	□	□	□	–
Clockwise (viewed onto DE) – direction of rotation must be specified for motors from FS 355 2-/4-pole	K97	–	–	–	–	–	–	–	–	–	–	–	–	–	○
Counter-clockwise (viewed onto DE) – direction of rotation must be specified for motors from FS 355 2-/4-pole	K98	–	–	–	–	–	–	–	–	–	–	–	–	–	○
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with K97 or K98	L20	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Stainless steel screws and plates	W71	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

For legend, see Page 2/31.

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series													
		SIMOTICS XP													
1MD5.....-Z		Frame size													
		71	80	90	100	112	132	160	180	200	225	250	280	315	355
Special mechanical designs (continued)															
SPM bearing monitoring: Measuring nipple system 32 - thread M8, DE and NDE	G50	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	W84	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	A40	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Documentation															
Terminal box drawing	U08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Inspection certificate 3.1 EN10204 (multi)	U51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Type test report (original motor)	U52	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Documentation package NM2	U91	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Languages for the main components (e.g. operating and maintenance instructions):															
Documentation in German	D00	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Documentation in English	D76	○	○	○	○	○	○	○	○	○	○	○	○	○	○
For other languages, see Page 1/16. Also select the required documents, e.g. U91															
Tests															
Routine test in accordance with IEC without acceptance (sine-wave voltage)		□	□	□	□	□	□	□	□	□	□	□	□	□	□
Extension of the liability for defects															
Extension of the liability for defects by 12 months up to a total of 24 months	Q80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months up to a total of 30 months	Q81	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months up to a total of 36 months	Q82	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- Not possible

Motors with Explosion Protection

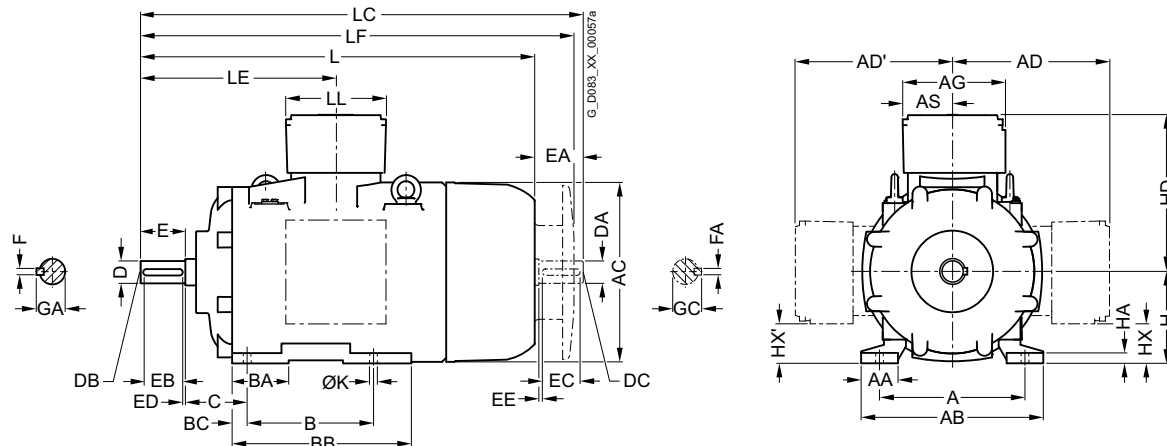
SIMOTICS XP 1MD5 motor series

Dimensions for frame sizes 71 B to 250 M

Dimensional drawings

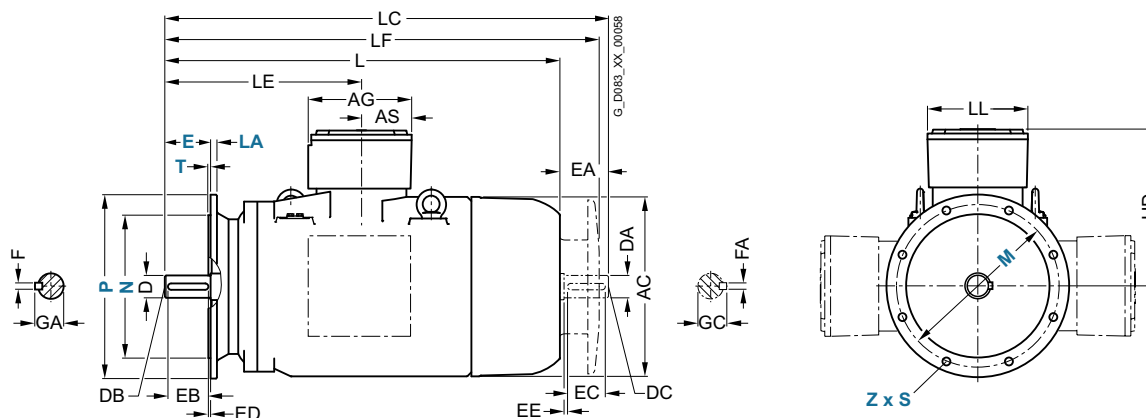
Type of construction IM B3

For flange dimensions, see Page 2/36



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/36

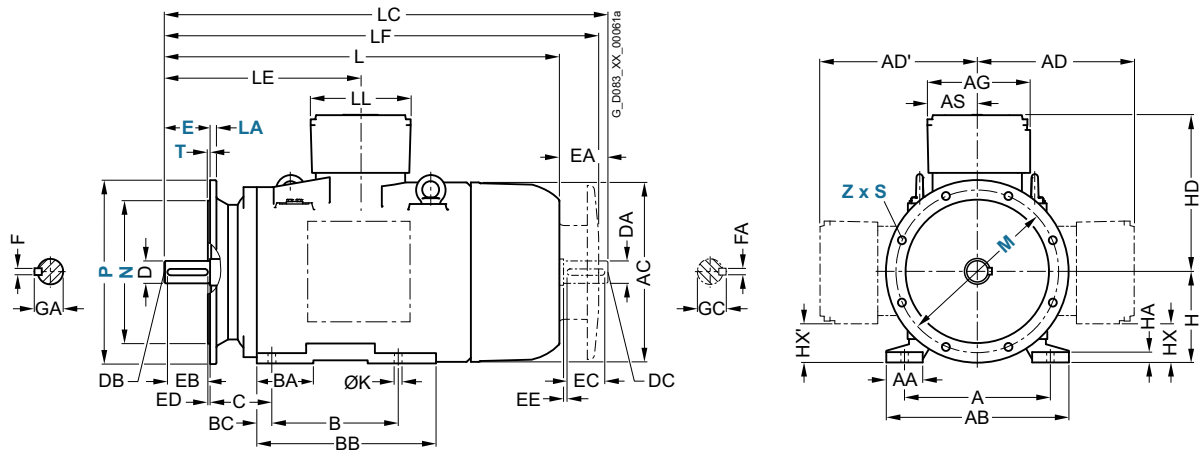


Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
SIMOTICS XP																		
71 B	2, 4, 6	112	30	140	148	-	138	69	90	30	125	10	45	71	10	200	7	345
80 B	2, 4, 6	125	35	160	168	-	138	69	100	35	130	13	50	80	10	209	10	358
90 L	2, 4, 6	140	40	180	186	-	138	69	125	40	155	15	56	90	13	213	10	426
100 L	2, 4, 6	160	45	205	213	-	138	69	140	45	170	15	63	100	18	227	12	482
112 M	2, 4, 6	190	50	240	237	-	138	69	140	60	170	15	70	112	18	240	12	465
132 S	2, 4, 6	216	50	260	278	274	186	92	140	88	228	25	89	132	18	274	12	574
132 M	2, 4, 6	216	50	260	278	274	186	92	178	88	228	25	89	132	18	274	12	574
160 M	2, 4, 6	254	60	310	331	304	186	92	210	61	307	21	108	160	27	305	14.5	786
160 L	2, 4, 6	254	60	310	331	304	186	92	254	61	307	21	108	160	27	305	14.5	786
180 M	2, 4, 6	279	70	349	363	349	254	123	241	99	359	24	121	180	19	349	14.5	822
180 L	2, 4, 6	279	70	349	363	349	254	123	279	99	359	24	121	180	19	349	14.5	822
200 L	2, 4, 6	318	80	400	402	367	254	123	305	120	425	32	133	200	25	369	18.5	884
225 S	2	356	90	446	451	384	254	123	286	136	438	34	149	225	26	384	18.5	966
	4, 6																	996
225 M	2	356	90	446	451	384	254	123	311	136	438	34	149	225	26	384	18.5	966
	4, 6																	996
250 M	2	406	100	505	490	522	382	176	349	110	420	36	168	250	35	522	24	1028
	4, 6																	

Dimensional drawings (continued)

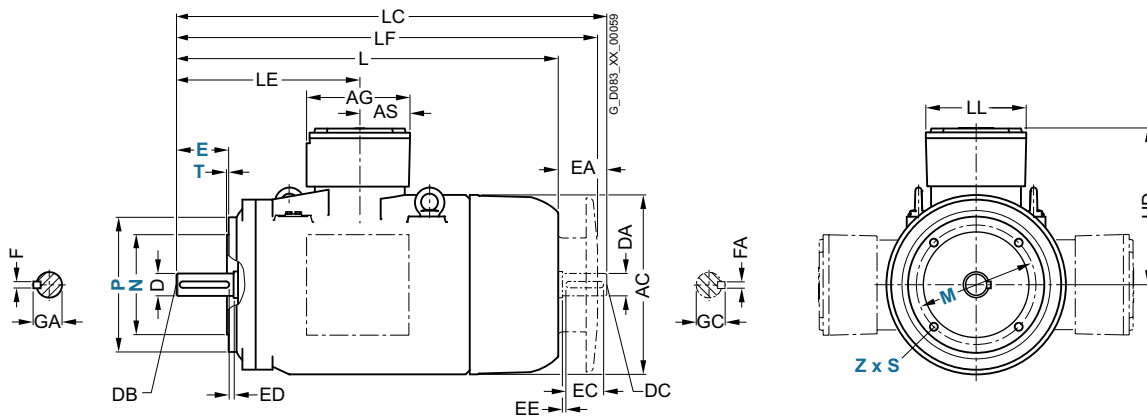
Type of construction IM B35

For flange dimensions, see Page 2/36



Type of construction IM B14

For flange dimensions, see Page 2/36



Frame size	No. of poles	Dimension designation acc. to IEC DE shaft extension										NDE shaft extension							
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
SIMOTICS XP																			
71 B	2, 4, 6	385	135	377	138	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16
80 B	2, 4, 6	408	158	391	138	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	22
90 L	2, 4, 6	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2, 4, 6	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2, 4, 6	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2, 4, 6	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2, 4, 6	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2, 4, 6	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2, 4, 6	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2, 4, 6	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	52
180 L	2, 4, 6	942	415	912	246	48	M16	110	100	5	14	51.6	48	M16	110	100	5	14	52
200 L	2, 4, 6	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4, 6	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4, 6	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4, 6				65							69	65						



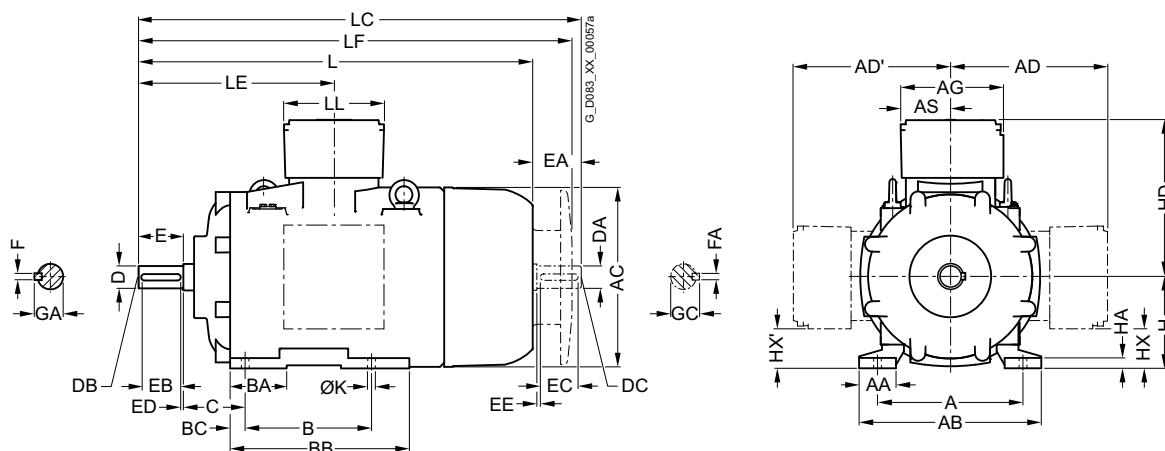
Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Dimensions for frame sizes 280 S to 355 M

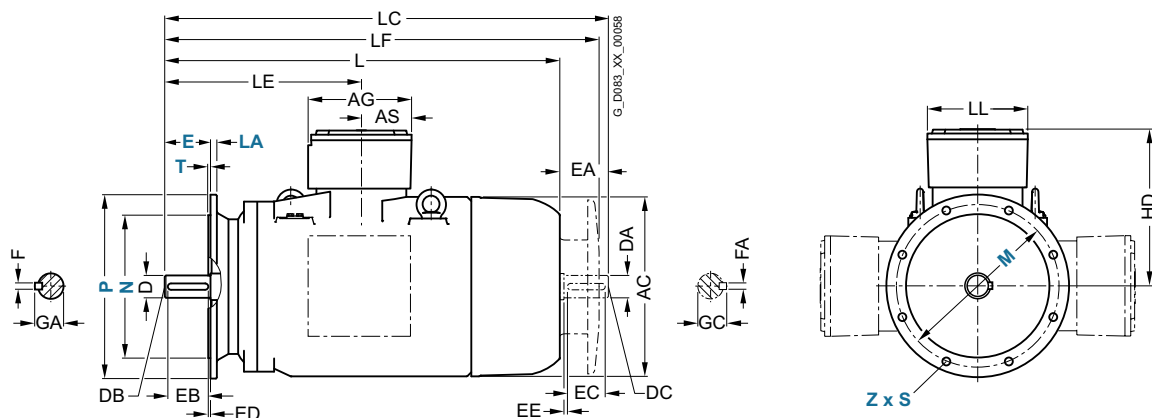
Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/36

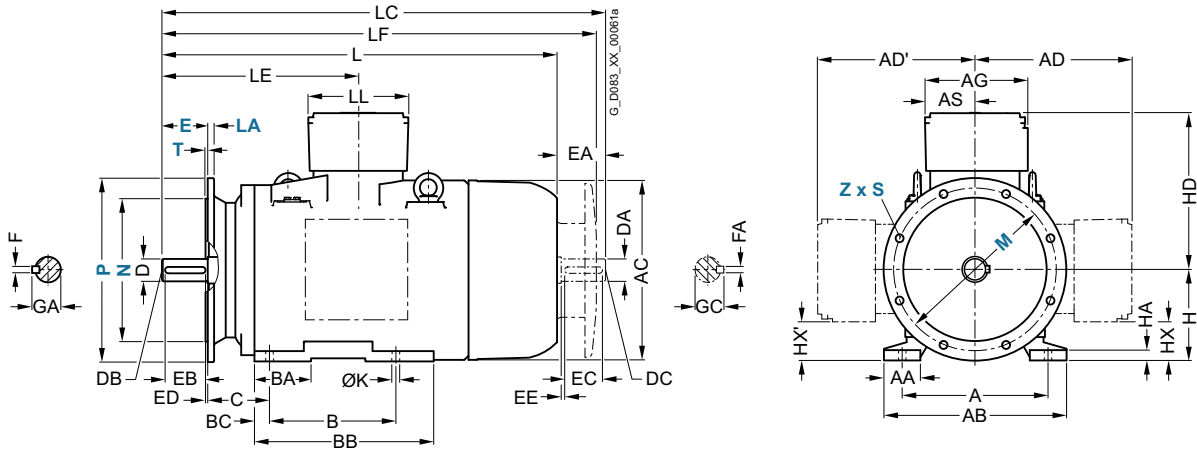


Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
SIMOTICS XP																		
280 S	2 4, 6	457	110	570	550	552	382	176	368	150	520	51	190	280	40	552	24	1119
280 M	2 4, 6	457	110	570	550	552	382	176	419	150	520	51	190	280	40	552	24	1119
315 S	2 4, 6	508	125	630	622	660	509	196	406	165	575	59	216	315	40	660	28	1304 1334
315 M	2 4, 6	508	125	630	622	660	509	196	457	165	575	59	216	315	40	660	28	1304 1334
315 LL	2 4, 6	508	125	630	622	676	509	196	508	165	675	59	216	315	40	676	28	1491 1521
315 L	2 4, 6	508	125	630	622	676	509	196	560	165	675	59	216	315	40	676	28	1491 1521
355 M	2 4, 6	630	150	780	734	-	509	196	800	220	980	90	254	355	35	827	35	1781 1840

Dimensional drawings (continued)

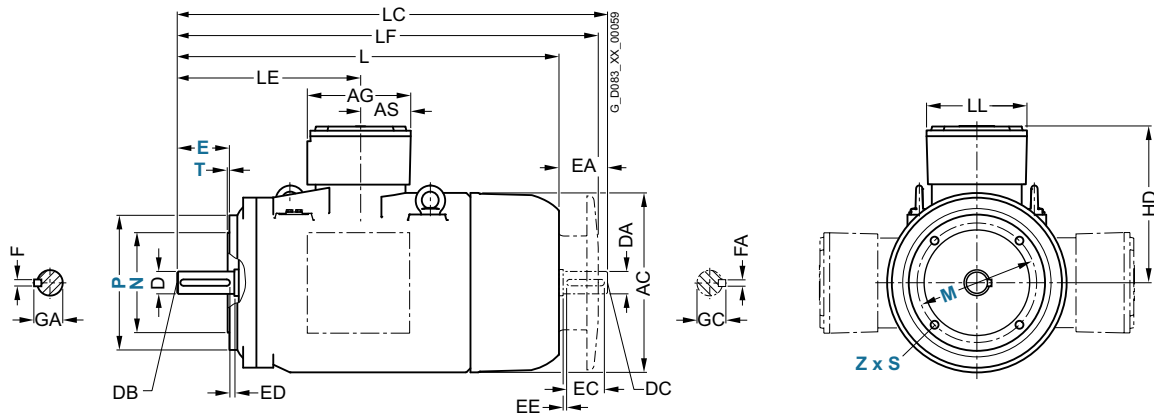
Type of construction IM B35

For flange dimensions, see Page 2/36



Type of construction IM B14

For flange dimensions, see Page 2/36



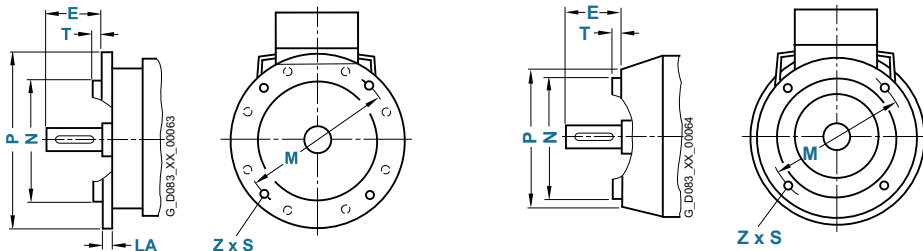
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
SIMOTICS XP																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6																		
355 M	2	1986	793	1947	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4, 6																		

Motors with Explosion Protection

SIMOTICS XP 1MD5 motor series

Flange dimensions

Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes. (Z = the number of retaining holes)

Frame size	No. of poles	Flange with Through hole (FF)/ tapped hole (FT) according to EN 50347	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
SIMOTICS XP										
71 B	2, 4	FF130	10	30	130	110	160	9.5	3.5	4
		FT85	15	30	85	70	105	M6	2.5	4
80 B	2, 4	FF165	10	40	165	130	200	11.5	3.5	4
		FT100	15	40	100	80	120	M6	3	4
90 L	2, 4	FF165	10	50	165	130	200	11.5	3.5	4
		FT115	10	50	115	95	140	M8	3	4
100 L	2, 4	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
112 M	2, 4	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
132 S	2, 4	FF265	12	80	265	230	300	14	4	4
132 M	2, 4	FF265	12	80	265	230	300	14	4	4
160 M	2, 4, 6	FF300	20	110	300	250	350	18	5	4
160 L	2, 4, 6	FF300	20	110	300	250	350	18	5	4
180 M	2, 4, 6	FF300	16	110	300	250	350	18	5	4
180 L	2, 4, 6	FF300	16	110	300	250	350	18	5	4
200 L	2, 4, 6	FF350	20	110	350	300	400	18	5	8
225 S	2	FF400	16	110	400	350	450	18	5	8
	4, 6		140							
225 M	2	FF400	16	110	400	350	450	18	5	8
	4, 6		140							
250 M	2, 4, 6	FF500	18	140	500	450	550	18	5	8
280 S	2, 4, 6	FF500	18	140	500	450	550	18	5	8
280 M	2, 4, 6	FF500	18	140	500	450	550	18	5	8
315 S	2	FF600	22	140	600	550	660	24	6	8
	4, 6		170							
315 M	2	FF600	22	140	600	550	660	24	6	8
	4, 6		170							
315 LL	2	FF600	22	140	600	550	660	24	6	8
	4, 6		170							
315 L	2	FF600	22	140	600	550	660	24	6	8
	4, 6		170							
355 M	2	FF740	25	140	740	680	800	24	6	8
	4, 6		210							

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series, type of protection "Explosion-proof enclosure"

LOHER CHEMSTAR and VARIO motors of the 1PS4 and 1PS5 series are surface-cooled motors in type of protection "Explosion-proof enclosure" Ex d. The CHEMSTAR motors can be designed in accordance with the current VIK recommendation ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

The motors are marked in accordance with EN 60079-0 Ed.2009 and EN 60079-1 with II 2G Ex de IIB T3-6 Gb or II 2G Ex de IIC T3-6 Gb for operation in Zone 1.

General technical specifications

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motors	
<i>Motor type</i>	<i>D..L/D..W</i>
Frame size	71 ... 500
Powers	0.25 ... 1120 kW
Temperature class	T1 ... T6
Type of protection	II 2G Ex d(e) IIB or IIC Gb, IEC/EN 60079-0, IEC/EN 60079-1
Ex zones	Gas Zone 1 optional, Dust Zone 22/21
Guidelines	2014/34/EU
Cooling	Surface-cooled, water-jacket-cooled on request
No. of poles	2- to 12-pole, multi-pole + pole-changing versions on request
Voltage/frequency	All common voltages, special designs in 50 Hz and 60 Hz on request
Degree of protection	IP55 to IP68
Type of construction	All common types of construction + special types of construction
Enclosure	Cast-iron or steel
Insulation	Class F utilized according to B
Special versions	
<ul style="list-style-type: none"> • For outdoor temperatures -55 to +60 °C (other temperatures are available on request) • Installation altitude up to 3000 m (> 3000 m on request) • Modified windings, for example, for increased ambient temperatures, installation altitude for optimum electrical values • Permanent load S1 as well as partial load operation, e.g. S2/S3/S6 • Drive-end located bearing; special bearing for increased axial/radial forces • Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc. • CHEMSTAR: Copper rotor as an option • Metal fan in aluminum, steel or brass • Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc. • Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEx (international) • Version for offshore, on-deck and/or marine classifications • Combination with brakes + rotary encoder + forced ventilation • Enlarged connection system and/or larger terminal box for large cable cross-sections 	

Motors with Explosion Protection

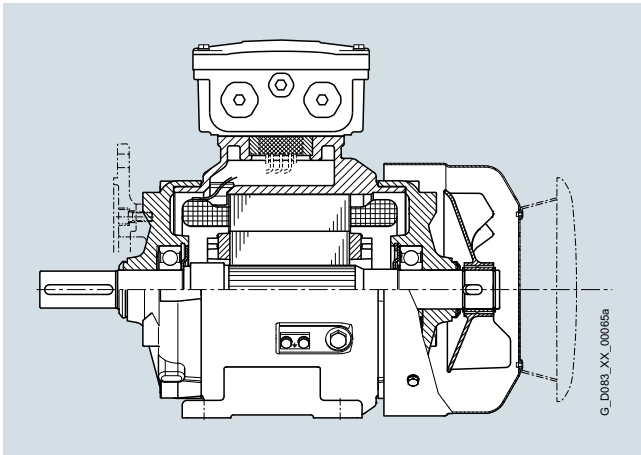
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

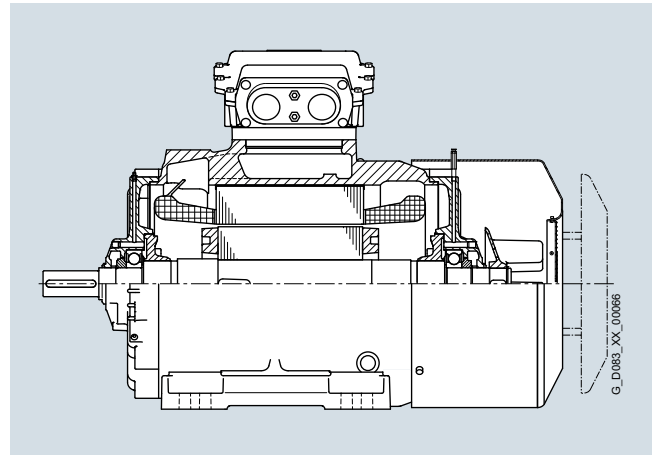
Technical specifications (continued)

Mechanical design

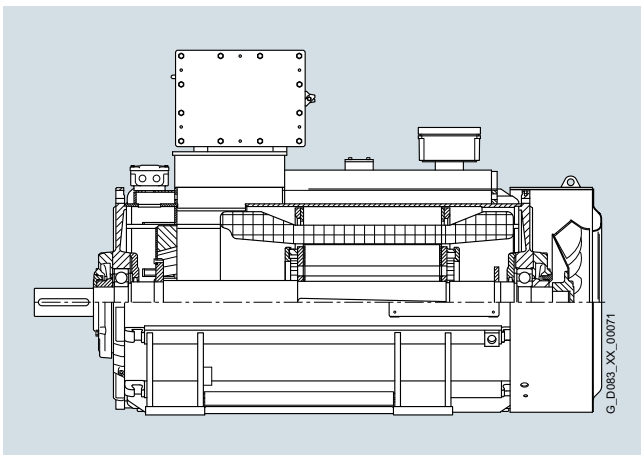
2



Sectional view of CHEMSTAR 1PS5 three-phase motor,
frame sizes 71 to 132,
Example: 1PS5131-0BD60-4AA4 (motor type: *DNGW-132SR-02*)
7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS5 three-phase motor,
frame sizes 160 to 315,
Example: 1PS5316-0BD60-4AA4 (motor type: *DNGW-315LL-02*)
200 kW, 2-pole



Sectional view of VARIO 1PS4/5 three-phase motor,
frame sizes 355 to 500,
Example: 1PS4356-0BH60-4AA0 (motor type: *DNGL-355LB-02*)
315 kW, 2-pole

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

Enclosure and ventilation

Enclosure and fan for motors of the LOHER CHEMSTAR and VARIO 1PS4/1PS5 series

Frame size	Enclosure		Surface	Bearing plates		Fan cover	Fan Material		
	Material	Design of enclosure feet ¹⁾		Material	Flange ring on bearing plate				
LOHER CHEMSTAR									
71	Cast-iron	Cast	With cooling fins	Cast-iron	Screwed on	Sheet steel	Plastic ³⁾		
80 ... 112		Cast ²⁾			Screwed on			Cast, optionally screwed on	
132								Screwed on	
160		Screwed on			Cast			Metal ³⁾	
180 ... 280									Metal ^{3) 4)}
315									
355									
LOHER VARIO									
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	–	Sheet steel	Metal ⁴⁾		
500				Steel, bearing hub in cast iron					

Protection against ingress of condensation

Condensation drainage holes must not be drilled into encapsulated explosion-proof motors, otherwise the type of protection can no longer be ensured. In frame size 250 and above, the explosion-proof encapsulated motors have separate chambers at the drive end (DE) and non-drive end (NDE) for collection of any condensation that may arise. This prevents possible damage to the winding as a result of condensation in the winding overhang spaces. In the case of smaller motors (frame size range 71 to 225), the risk of adverse effects from condensation is countered by applying increased humidity protection to the winding insulation.

In the standard version, the motor can be used in environments with up to 80 % relative humidity without the need for further measures. If the motor is ordered with the option "Increased tropicalization, humidity \geq 80 % (order code **W61**), the hollow spaces and internal parts can be finished with special paint, which enables operation at up to 100 % humidity to be achieved as an option. In the CHEMSTAR motor series, an anti-condensation heater is not necessary in most cases. This is known as a "tropical insulation version".

Explosion-proof three-phase motors in type of protection Ex d for ambient temperatures down to -55 °C

Motors of the 1PS4/1PS5 series can also be designed for hazardous areas with ambient temperatures down to -55 °C.

Advantages	The motors can be used in hazardous areas at ambient temperatures down to -55 °C without the need for expensive additional heating. This saves on expensive switching and monitoring devices, the associated cables and leads, as well as heating energy.
Explosion protection	According to European standards EN 60079-0, EN 60079-1, EN 60079-7
Marking	II 2G Ex de IIB T3-6 Gb or II 2G Ex de IIC T3-6 Gb
Certifications	EU type examination certificate
Ambient temperature range	-55 to +60 °C
Type series	CHEMSTAR and VARIO 1PS4/1PS5 motors
Rated voltage U_{rated}	Up to 690 V
Design	Selection of materials for temperatures down to -55 °C Group IIC or IIB Optional version possible Motors with built-on components, such as brakes and speed encoders, cannot be supplied for ambient temperatures down to -55 °C.
Note	The fan must not be blocked by ice or snow.

¹⁾ For designs with feet only.

²⁾ Terminal boxes are screwed on at the side on frame sizes 132 and 160.

³⁾ With specific operating conditions, the external fans can be constructed with special materials (see special versions).

⁴⁾ Only one direction of rotation for 2-pole and 4-pole version.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

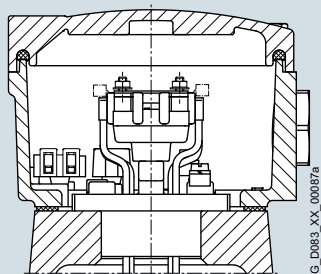
Terminal boxes

The terminal boxes comply with the type of protection "Increased safety" Ex e in accordance with EN 60079-0 and EN 60079-7. The enclosures are made of cast iron and designed to IP55 degree of protection in accordance with EN 60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction.

The position of the terminal box and cable entries can be obtained from the tables below. In frame size 90 and above, the terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides. In frame sizes 71 and 80, the terminal box can only be rotated subsequently in an authorized specialist workshop (due to opening the explosion-proof enclosure).

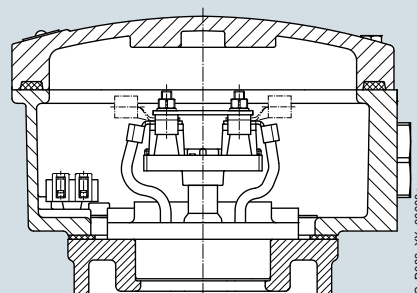
Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box in type of protection Ex e IIC mounted on the side of the terminal box. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below. Terminal boxes in type of protection "Explosion-proof enclosure" Ex d IIC according to EN 60079-0 and EN 60079-1 can be supplied on request. Separate terminal boxes for main connections and accessories are available in type of protection "Explosion-proof enclosure" for auxiliary terminals for frame sizes 200 to 500 only.

Figure 1 Terminal box for LOHER CHEMSTAR frame sizes 71 to 112



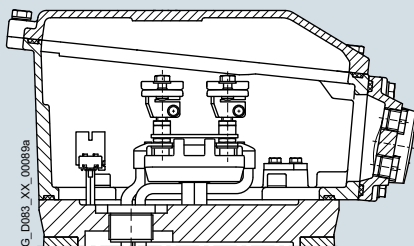
Auxiliary terminal box is not possible.

Figure 2 Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



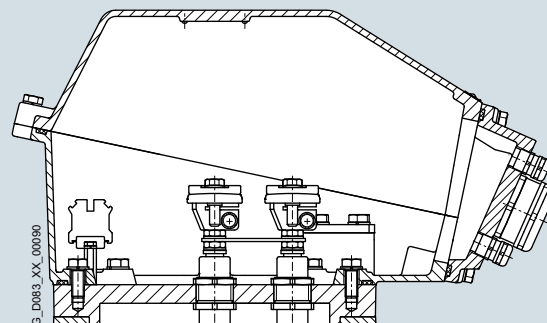
Frame sizes 132 to 160, 1 auxiliary terminal box Ex e (**W72, M52**) is possible, frame sizes 180 to 225, 2 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

Figure 3 Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



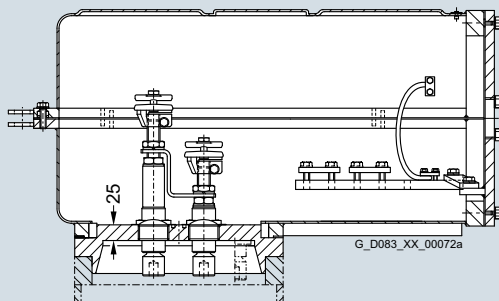
3 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

Figure 4 Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

Figure 5 Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the enclosure.

For versions with terminal box Ex d, no auxiliary terminal boxes are possible for frame sizes 71 to 112 and 1 auxiliary terminal box Ex d (**V43**) is possible for frame sizes 132 to 355.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

Terminal boxes for 1PS4 and 1PS5 motors

Degree of protection: IP55
 Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7
 Enclosure material: Cast-iron

Frame size	Standard terminal box					Enlarged terminal box – Option L00						
	Terminal studs		Conductor cross-section		Additional terminals in main terminal box Number × max. cross-section ¹⁾	PE/ground connection max.	Fig. No. on Page 2/40	Terminal studs		Conductor cross-section		Fig. No. on Page 2/40
	min.	max.	min.	max.				min.	max.			
			mm ²	mm ²	mm ²	mm ²			mm ²	mm ²		
LOHER CHEMSTAR												
71	6 × M4		1	2.5 (6) ²⁾	4 × 2.5	4	6 ²⁾	Fig. 1	6 × M5	1	10 (25) ²⁾	Fig. 2
80												
90												
100												
112												
132	6 × M5		1	10 (25) ²⁾		25		Fig. 2	6 × M6	2.5	35 (50) ²⁾	Fig. 2
160												
180	6 × M6		2.5	35 (50) ²⁾	12 × 4	70		Fig. 2	6 × M10	6	70	Fig. 3
200												
225												
250	6 × M10		6 ... 70			95		Fig. 3	6 × M12	16	150	Fig. 4
280												
315 S/M	6 × M12		16 ... 150		16 × 4	150		Fig. 4	6 × M16	16	300	Fig. 4
315 L/355	6 × M16/M20 ³⁾		16 ... 300						Special connection system on request			
LOHER VARIO												
355 ... 500								Fig. 5				

Number and size of entry threads and cable glands (to be ordered specially), see table "Cable glands for 1PS4 and 1PS5 motors".

Cable glands for 1PS4 and 1PS5 motors

Frame size	Standard cable glands				Max. entry threads ⁶⁾			
	Entry thread ⁴⁾	Cable diameter ⁵⁾		Removable gland plate (for Ex e terminal box only)	Ex e terminal box		Ex d terminal box	
		Type HSK-M-Ex for Ex e mm	Type ADE 1F for Ex d mm		Metric	NPT	Metric	NPT
LOHER CHEMSTAR								
71	1 × M25 × 1.5	10 ... 16	8.5 ... 16	None	1 × M32 × 1.5	2 × 1"	2 × M40 × 1.5	2 × 1 ¹ / ₄ "
80								
90								
100	1 × M32 × 1.5	13 ... 20	18 ... 27.5					
112	2 × M32 × 1.5							
132					2 × M50 × 1.5	2 × 2"	2 × M63 × 1.5	2 × 2"
160	2 × M40 × 1.5	22 ... 32	23 ... 34					
180				None	2 × M63 × 1.5			
200	2 × M50 × 1.5	32 ... 38	29 ... 41					
225								
250	2 × M63 × 1.5	37 ... 44	42 ... 56	With				
280								
315/355					2 × M100 × 2	2 × 4"	2 × M100 × 2	2 × 4"

Additional entry threads, e.g. for PTC thermistor, heating:

- Ex e IIC: M20 × 1.5/D = 6 to 12 mm
- Ex d IIC: M20 × 1.5/D = 6 to 12 mm

Entry threads are sealed on delivery with certified plugs, cable glands can be ordered separately.

¹⁾ Rated voltage/max. working voltage 400 V/440 V.
²⁾ Maximum conductor cross-section with cable lug.
³⁾ Alternatively, larger studs for higher rated current.

⁴⁾ Number and size of entry threads according to DIN 42925.
⁵⁾ Cable glands suitable for unshielded/non-reinforced cables and leads. Option **K54** (Ex e), **W91** (Ex d).
⁶⁾ Other threads, number and size on request.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

Auxiliary terminal box

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Enclosure material: Cast-iron

Frame size	Standard terminal box		Auxiliary terminal box		Max. configuration of auxiliary terminal boxes ²⁾			
	Main terminal box		Design	Max. connections ¹⁾ (number × max. cross-section) mm	Max. auxiliary connections	Fig. No. on Page 2/40	Auxiliary terminal box Design	Max. connections ¹⁾ (number × max. cross-section) mm
LOHER CHEMSTAR								
71	2	Fig. 1	–	–	6	Fig. 2	Cast	6 × 2.5
80								
90								
100								
112								
132	6	Fig. 2	Cast	6 × 2.5	12	Fig. 2	Screwed on	12 × 4
160								
180	12	Fig. 2	Screwed on	12 × 4	20	Fig. 3	Screwed on	36 × 4
200								
225								
250	20	Fig. 3	Screwed on	36 × 4	36	Fig. 4	Screwed on	42 × 4
280								
315 L	36	Fig. 4	Screwed on	42 × 4	Special solution on request			

Explosion-proof terminal boxes with a cast auxiliary terminal box only (max. 12 × 4 mm²), for number and size of entry threads, see "Cable glands for IPS5 motors" table.

Special cable gland

For the assignment table of the cable data for special cable glands, see special versions – order code **Y97**

Designation	Outer cable diameter mm	Inner cable diameter mm
LOHER CHEMSTAR		
ADE4F M 20 × 1.5	7.0 ... 12.0	4.5 ... 8.0
ADE4F M 20 × 1.5	10.0 ... 16.0	7.0 ... 12.0
ADE4F M 20 × 1.5	13.5 ... 21.0	10.0 ... 15.5
ADE4F M 25 × 1.5	10.0 ... 16.0	7.0 ... 12.0
ADE4F M 25 × 1.5	13.5 ... 21.0	10.0 ... 15.5
ADE4F M 25 × 1.5	18.0 ... 27.5	13.5 ... 20.5
ADE4F M 32 × 1.5	18.0 ... 27.5	13.5 ... 21.0
ADE4F M 32 × 1.5	23.0 ... 34.0	18.0 ... 26.0
ADE4F M 40 × 1.5	23.0 ... 34.0	18.0 ... 27.5
ADE4F M 40 × 1.5	29.0 ... 41.0	23.0 ... 34.0
ADE4F M 50 × 1.5	29.0 ... 41.0	23.0 ... 34.0
ADE4F M 50 × 1.5	35.0 ... 48.0	29.0 ... 41.0
ADE4F M 63 × 1.5	42.0 ... 56.0	35.0 ... 48.0
ADE4F M 63 × 1.5	50.0 ... 65.0	42.0 ... 53.0
ADE4F M 75 × 1.5	50.0 ... 65.0	42.0 ... 56.0
ADE4F M 75 × 1.5	58.0 ... 74.0	50.0 ... 62.5
ADE4F M 90 × 2.0	66.0 ... 83.0	58.0 ... 74.0
ADE4F M 90 × 2.0	75.0 ... 93.0	66.0 ... 78.0
ADE4F M 90 × 2.0	85.0 ... 104.0	66.0 ... 89.0
ADE4F M 110 × 2.0	85.0 ... 104.0	75.0 ... 93.0

ADE4F: Ms-Ni cable gland for armored cable
ATEX EX d IIC / Ex e / Ex tb -60 °C to +140 °C ADE4F

¹⁾ Rated voltage/max. working voltage 400 V/440 V.

²⁾ Only in conjunction with enlarged terminal box.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

Electrical design

The insulation system of the 1PS4 and 1PS5 motor series is suitable for line voltages up to 690 V. The connection system (terminal box, terminals) is also designed for this rated voltage.

The explosion-proof motors are equipped with 6 terminals. They can thus be operated in star or delta. If a voltage variant with dual voltage e.g. 400 VΔ/690 VY is selected, the rated data of both voltage levels will be stamped on the rating plate.

The motors in the 1PS4 and 1PS5 series are manufactured with an insulation system in thermal class 155 °C. Utilization at rated operation corresponds to thermal class 130 °C.

Operation on a frequency converter

The general use of high-quality insulation systems enable operation on a frequency converter.

The permissible speed and torque range is stamped on an additional rating plate.

For operation on a frequency converter, the motor with explosion protection must be fitted with PTC thermistors (or Pt100 as an option for LOHER VARIO). These are installed in the stator winding and, in combination with a certified trip unit (EU type examination certificate), they perform sole motor protection in the case of converter operation. Motor circuit breakers can be dispensed with.

Line operation

Motors operated directly on the line must be protected, e.g. by a suitable motor circuit breaker. Alternatively, motor protection using a PTC thermistor for full motor protection (sole protection) may be selected on request. As the load case "blocked shaft, motor draws full starting current" also has to be monitored, this version cannot be used consistently.

The larger the motor and the smaller the number of poles, the more difficult it is to achieve sole protection using PTC thermistors in line operation. Due to the laws of increasing size, larger machines become ever more "rotor-critical". The sole protection limit for 4-pole motors typically lies in the region of frame size 280.

Voltage tolerances

The motors are suitable for operation with voltage and frequency tolerances according to EN 60034-1.

In addition, tests are to be performed to ensure that the permissible temperature limits for the outer surface of the explosion-proof enclosure according to EN 60079-1 are not exceeded during continuous operations at the voltage limits ($\pm 10\%$).

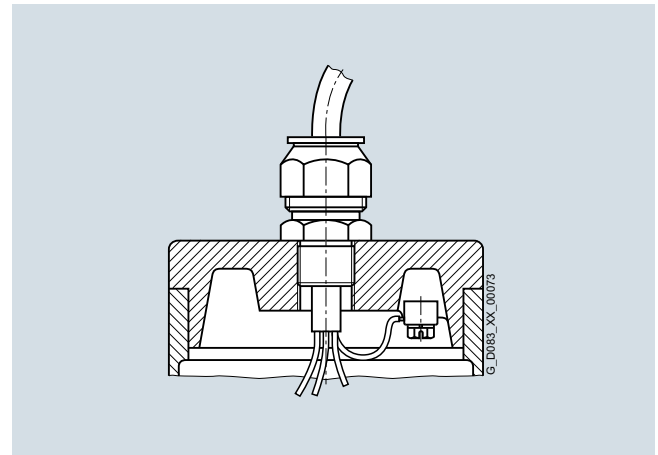
The motors in the 1PS4 and 1PS5 series in this catalog are certified for T4. The maximum permitted surface temperature is 135 °C.

Three-phase motors with external cables

Three-phase motors with externally routed connecting cables are used in machines or ventilation systems in which the electrical connections are routed via a separately mounted terminal box due to the space constraints.

Design

The motors correspond to the surface-cooled versions in this catalog. A gland plate is mounted in place of the terminal box (Options **W38/W39**).



Explosion protection: II 2G Ex d IIC T4 Gb

Frame sizes and types of construction: see dimensional drawings

Coolant temperature: -20 to +50 °C

Connection cable (standard design): NSSHöu-J

The free length of connection cable must be specified when ordering. The standard length is 1.5 m. Two or more cable entries are used in the case of pole-changing or single-speed motors with rated current > 70 A.

Rated voltage: 1000 V

Max. operating temperature at conductor: -20 to +80 °C

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

General information

Technical specifications (continued)

Motors with built-on backstop

If reverse motion of the drive has to be prevented following switch-off, three-phase motors with mechanical backstop can be used. Backstops are maintenance-free and have individual spring-loaded clamping elements. The backstops of the type CSK are supplied with permanent lubrication. The clamping elements have a tendency to lift. In backstops of the FXM type series, the clamping elements lift automatically after approach due to the centrifugal force. Wear therefore does not occur at rated speed of the motor.

The backstop is not permitted to be used as protection against rotation in the wrong direction caused by switching despite the interlock. The direction of rotation must be specified on ordering.

The motor power ratings are as specified in the selection tables in this catalog. The assignment of backstops to frame sizes is specified in the table below. Frame sizes 90 to 112 have the same dimensions as standard motors. Dimensional drawings are available for the larger types on request.

Backstops for motors of frame sizes 132 to 355

Motor Frame size	No. of poles	Backstop	
		Type	M_t Nm
132	2, 4, 6	FXM 51-25 DX	On request
160	2, 4, 6	FXM 66-25 DX	400
180	2, 4, 6	FXM 66-25 DX	400
200	2, 4, 6, 8	FXM 86-25 DX	430
225	2, 4, 6, 8	FXM 86-25 DX	430
250	2, 4, 6, 8	FXM 100-50 DX	860
280	2, 4, 6, 8	FXM 120-50 SX	860
315	2, 4, 6, 8	FXM 120-50 SX	On request
355	2	FXM 120-50 SX	On request
355	4, 6	FXM 140-50 SX	On request

With the backstops listed in the table above, motors of frame sizes 90 to 355 can be supplied in IP55 or IP56 degree of protection. Higher degrees of protection on request.

Axially-mounted forced ventilation

Forced ventilation with axially-mounted fans is mainly used with converter operation. It serves to increase the motor utilization while lowering the sound level in accordance with the synchronous speed. Motors with forced ventilation are designed for rated voltage ranges in accordance with the following table. The data is shown on the rating plate on the external fan or on the motor with forced ventilation.

Special versions for higher ambient temperatures, increased vibration loading on request.

Retrofitting of forced ventilation is only possible following the prior consent of Siemens Ruhstorf.

Degree of protection: IP55, available as a special version up to IP66.

Rated voltage ranges for forced ventilation on motors of the 1PS4 and 1PS5 series

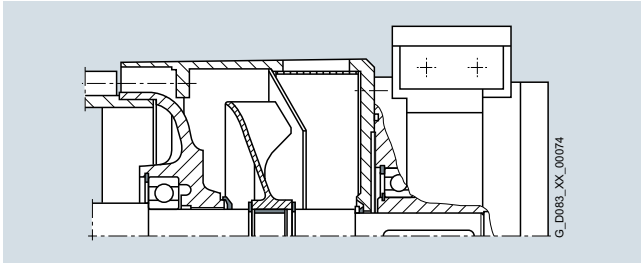
Motor Frame size	Motor type	Line/ Connection	Rated voltage range V	Frequency Hz	Rated power kW	Rated current max. A
LOHER CHEMSTAR						
132 ... 225	<i>DN.W-071BG-04</i>	Y	400	50	0.25	0.70
	<i>DN.W-071BH-04</i>		440	60	0.44	1.05
250	<i>DN.W-071BG-04</i>	Y	400	50	0.25	0.70
	<i>DN.W-080BH-04</i>		440	60	0.90	1.90
280 ... 315	<i>DN.W-080BG-04</i>	Y	400	50	0.75	1.70
	<i>DN.W-080BH-04</i>		440	60	0.90	1.90
355 IM	<i>DN.W-100LS-04</i>	Δ	400	50	3	6.40
	60 Hz on request					
LOHER VARIO						
355 ... 500	50 Hz on request					
	60 Hz on request					

Technical specifications (continued)

Built-on single-disk spring-operated brake

Design

The explosion-proof single-disk spring-operated brake is attached to the reinforced fan cover and the extended motor shaft. Otherwise, in terms of their mechanical design, the motors are identical to the surface-cooled motors in this catalog.



Voltage and frequency: Motors with a built-on brake are supplied for the voltages and frequencies specified in the power tables.

Power: The power ratings specified in the selection tables are applicable to S4 duty type in accordance with EN 60034-1.

Thermal motor protection: The motors have 3 embedded PTC thermistors and are designed for sole protection in combination with a trip unit.

Possible brake size: See power table

Connection: The brake is connected in the terminal box mounted on the brake.

Brake: Type 76...-..B

Degree of protection acc. to EN 60034-5: IP67

Permissible ambient temperature: -20 to +40/50 °C

Type of protection acc. to EN 60079-0, EN 60079-1 and EN 60079-7: II 2G Ex de IIC T5/T4 Gb

Terminal box: II 2G Ex e II Gb

In special design with dust protection II 2D Ex tb IIIC T95/115 °C Db, approval DMT02 ATEX E 122 X

AC connection:

Preferred voltage 230 V 1 AC, frequency 40 to 60 Hz or

DC connection:

Preferred voltages 24 V DC, 205 V DC

The single-disk spring-operated brake is an electromagnetic unit for dry-running operation. An electromagnetic field is used to release the brake which is applied using spring force.

The spring-operated brake brakes at zero current and releases when an AC or DC voltage is applied. The brake can be operated on the AC or DC side when alternating current is flowing.

The brake is equipped with a microswitch and 2 thermostatic switches. These switching elements are dimensioned for 250 V AC, 2.5 A inductive. In the control line of the motor contactor, the microswitch prevents the motor starting in opposition to the unreleased brake. The microswitch is not permitted to be used in lifting gear and elevators. The thermostatic switches (NC) connected in series with the microswitch (NO) interrupt the control circuit as soon as an impermissible temperature rise occurs in the brake. The motor is only permitted to be controlled via the microswitch of the spring-operated brake to ensure that it can never start in opposition to the unreleased brake. The brake can be equipped with a manual release on request, which allows the brake to be released manually.

If the motor is only ordered and used for S1 duty type and the built-on brake is only required as a holding brake, the motor can be protected with a motor circuit breaker in accordance with DIN VDE 0165.

Mechanical design with brake

Dust and explosion protection II for DC or single-phase AC

General technical specifications

		Brake designs	
		76 ..E..B00 – DC (direct current)	76 ..G..B00 – AC (alternating current)
Standard rated voltage	V	205 V DC	230 V AC
Degree of protection	–	IP67	
Temperature class	–	T4/T5 (according to EN60079-0)	
Rated torque	Nm	10 ... 270	

Technical specifications

		Brake size					
		10	11	13	16	19	24
Braking torque T_2	Nm	10	20	50	100	150	270
Max. speed n_{max}	rpm	6000	6000	3600	3600	3600	3600
Maximum switching power P_{max}	kJ/h	270	270	400	400	570	570
Maximum operating energy ($Z = 1$) W_{max}	kJ	41	41	55	55	80	80
Rated power P_{rated}	W	56	56	82	82	91	91
Apparent power P_S	VA	62	62	88	88	95	95
Application time t_1	ms	80	70	110	90	180	140
Release time t_2	ms	80	110	170	230	240	350
Moment of inertia of brake (driver and friction disk)	kg m ²	0.0025	0.0025	0.0215	0.0215	0.125	0.125
Weight m	kg	14.5	14.5	29	29	57	57

Selection and ordering data (continued)

Table with columns: P_rated, Frame size, Operating values at rated power (n_rated, eta_rated, IE class, I_rated, cos phi, T_rated, I_LR, I_PB), Motor type, Article No., m, J. Includes sections for LOHER CHEMSTAR, LOHER VARIO, Degrees of protection, Operating modes, Voltages, and Types of construction.

2

1) Outside the IE code classification according to IEC 60034-30-1.

2) Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

P_{rat} , 50 Hz	Frame size	Motor type	Article No.	J
kW	FS			kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 				
14-pole: 430 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
110	355 L	DNS ■ -355LB-14	1PS ■ 356-■BH ■■-4GA0	2250
125	355 L	DNS ■ -355LC-14	1PS ■ 357-■BH ■■-4GA0	2500
140	355 L	DNS ■ -355LD-14	1PS ■ 358-■BH ■■-4GA0	2600
160	400 L	DNS ■ -400LL-14	1PS ■ 404-■BJ ■■-4GA0	3400
180	400 L	DNS ■ -400LN-14	1PS ■ 405-■BJ ■■-4GA0	3700
200	400 L	DNS ■ -400LN-14	1PS ■ 407-■BJ ■■-4GA0	3700
225	400 L	DNS ■ -400LX-14	1PS ■ 408-■BJ ■■-4GA0	3900
250	450 L	DNS ■ -450LL-14	1PS ■ 454-■BJ ■■-4GA0	4700
280	450 L	DNS ■ -450LN-14	1PS ■ 455-■BJ ■■-4GA0	5100
315	450 L	DNS ■ -450LN-14	1PS ■ 457-■BJ ■■-4GA0	5100
340	450 L	DNS ■ -450LX-14	1PS ■ 458-■BJ ■■-4GA0	5300
355	500 L	DNS ■ -500LL-14	1PS ■ 504-■BJ ■■-4GA0	6200
400	500 L	DNS ■ -500LN-14	1PS ■ 505-■BJ ■■-4GA0	7000
450	500 L	DNS ■ -500LN-14	1PS ■ 507-■BJ ■■-4GA0	7000
500	500 L	DNS ■ -500LX-14	1PS ■ 508-■BJ ■■-4GA0	7200
16-pole: 375 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
90	355 L	DNS ■ -355LB-16	1PS ■ 356-■BH ■■-4HA0	2250
100	355 L	DNS ■ -355LC-16	1PS ■ 357-■BH ■■-4HA0	2500
110	355 L	DNS ■ -355LD-16	1PS ■ 358-■BH ■■-4HA0	2600
132	400 L	DNS ■ -400LL-16	1PS ■ 405-■BJ ■■-4HA0	3400
160	400 L	DNS ■ -400LN-16	1PS ■ 407-■BJ ■■-4HA0	3700
180	400 L	DNS ■ -400LX-16	1PS ■ 408-■BJ ■■-4HA0	3900
200	450 L	DNS ■ -450LL-16	1PS ■ 454-■BJ ■■-4HA0	4700
225	450 L	DNS ■ -450LN-16	1PS ■ 455-■BJ ■■-4HA0	5100
250	450 L	DNS ■ -450LN-16	1PS ■ 457-■BJ ■■-4HA0	5100
265	450 L	DNS ■ -450LX-16	1PS ■ 458-■BJ ■■-4HA0	5300
280	500 L	DNS ■ -500LL-16	1PS ■ 504-■BJ ■■-4HA0	6200
315	500 L	DNS ■ -500LN-16	1PS ■ 505-■BJ ■■-4HA0	7000
355	500 L	DNS ■ -500LN-16	1PS ■ 507-■BJ ■■-4HA0	7000
400	500 L	DNS ■ -500LX-16	1PS ■ 508-■BJ ■■-4HA0	7200
Degrees of protection		Frame size		Order code
Ex de IIB/Ex d IIB		355 ... 500	L	4
Ex de IIC/Ex d IIC		355 ... 500	W	5
Operating modes		Frame size		Order code
Line operation		355 ... 450		0
Converter operation, standard insulation		355 ... 450		1
Converter operation with special insulation (derating approx. 5 %) ¹⁾		355 ... 500		2
Line operation, pre-formed coil		500		3
Converter operation, pre-formed coil		500		4
Voltages		Frame size		Order code
690 VA, 50 Hz		355 ... 500		0
500 VA, 50 Hz		355 ... 450		5
400 V/690 V, 50 Hz		355 ... 400		6
690 VY, 50 Hz		355 ... 400		8
For other voltages, see Page 2/65		355 ... 500		9
Types of construction		Frame size		Order code
IM B3		355 ... 500		0
IM V1/cover		355 ... 450		4
IM B35		355 ... 500		6
For other types of construction, see from Page 1/29 and 2/66		355 ... 500		9

¹⁾ Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

IE2

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

		Operating values at rated power									Motor type			Article No.		m J	
P _{rat.} 60 Hz	Frame size	n_{rated}	T_{rated}	IE	η_{rated}	η_{rated}	η_{rated}	$\cos\phi_{rat.}$	I_{rated}	$T_{LR}/$	$I_{LR}/$	$T_{P}/$	m	J			
		60 Hz	60 Hz	class	60 Hz, 4/4	60 Hz, 3/4	60 Hz, 2/4	60 Hz, 4/4	60 Hz, 460 V	T _{rat.}	I _{rat.}	T _{rat.}			IM B3	kg	kgm ²
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-					
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																	
6-pole: 1200 rpm at 60 Hz																	
LOHER CHEMSTAR																	
0.25	71 B	1080	2.21	-	59.5	55.0	47.0	0.57	0.93	2.5	3.0	2.5	DNGW-071BS-06	1PS5071-BD-4CA4	26	0.0008	
0.37	80 B	1140	3.10	IE2	77.3	76.4	72.5	0.64	0.94	2.3	4.6	2.9	DNGW-080BR-06	1PS5080-BD-4CA4	28	0.0020	
0.55	80 B	1144	4.59	IE2	78.9	78.0	74.3	0.62	1.41	2.9	5.2	3.6	DNGW-080BS-06	1PS5081-BD-4CA4	30	0.0030	
0.75	90 L	1150	6.20	IE2	80.0	80.5	78.0	0.68	1.73	1.9	4.7	2.6	DNGW-090LR-06	1PS5095-BD-4CA4	33	0.0054	
1.1	100 L	1175	8.90	IE2	85.5	85.4	83.4	0.73	2.20	2.1	6.0	3.0	DNGW-100LR-06	1PS5105-BD-4CA4	54	0.011	
1.5	100 L	1175	12.2	IE2	86.8	86.6	84.2	0.69	3.15	2.2	6.4	3.2	DNGW-100LS-06	1PS5106-BD-4CA4	54	0.011	
2.2	112 M	1170	18.0	IE2	87.5	88.0	87.4	0.75	4.20	2.1	6.3	3.2	DNGW-112MS-06	1PS5113-BD-4CA4	64	0.014	
3	132 S	1175	24.4	IE2	87.5	88.0	86.0	0.70	6.10	1.75	6.0	2.9	DNGW-132SR-06	1PS5131-BD-4CA4	90	0.024	
3.7	132 M	1180	29.9	IE2	88.0	88.5	86.5	0.71	7.40	1.9	6.2	3.0	DNGW-132MR-06	1PS5133-BD-4CA4	96	0.029	
5.5	132 M	1175	44.7	IE2	89.5	89.8	88.8	0.73	10.6	2.1	6.5	2.9	DNGW-132MS-06	1PS5135-BD-4CA4	105	0.037	
7.5	160 M	1180	61.0	IE2	89.7	90.0	88.7	0.73	14.4	2.1	5.4	2.5	DNGW-160MR-06	1PS5163-BD-4CA4	180	0.075	
11	160 L	1180	89.0	IE2	90.2	90.5	89.5	0.74	20.5	2.2	5.5	2.5	DNGW-160LS-06	1PS5166-BD-4CA4	192	0.098	
15	180 L	1178	122	IE2	92.1	92.3	91.5	0.77	26.5	2.8	6.9	3.4	DNGW-180LS-06	1PS5186-BD-4CA4	233	0.17	
18.5	200 L	1182	149	IE2	92.1	92.6	92.1	0.81	31.0	2.6	6.7	3.0	DNGW-200LR-06	1PS5206-BD-4CA4	302	0.25	
22	200 L	1182	178	IE2	92.2	92.7	92.3	0.81	37.0	3.0	7.4	3.0	DNGW-200LS-06	1PS5208-BD-4CA4	322	0.30	
30	225 M	1182	242	IE2	93.2	93.5	93.0	0.83	48.5	2.9	7.0	3.1	DNGW-225MS-06	1PS5223-BD-4CA4	416	0.58	
37	250 M	1185	298	IE2	93.0	93.3	92.6	0.83	60.0	3.3	7.3	2.8	DNGW-250MM-06	1PS5253-BD-4CA4	515	0.86	
45	280 S	1188	362	IE2	93.6	94.0	93.6	0.84	72.0	3.1	7.4	3.0	DNGW-280SL-06	1PS5280-BD-4CA4	640	1.1	
55	280 M	1188	442	IE2	93.7	94.0	93.7	0.85	87.0	3.1	7.2	2.9	DNGW-280MM-06	1PS5283-BD-4CA4	690	1.4	
75	315 S	1190	602	IE2	94.4	94.4	93.7	0.83	120	2.7	7.5	3.0	DNGW-315SL-06	1PS5311-BD-4CA4	910	2.1	
90	315 M	1190	722	IE2	94.7	94.9	94.2	0.84	142	2.9	7.6	3.1	DNGW-315ML-06	1PS5313-BD-4CA4	965	2.5	
110	315 M	1190	883	IE2	95.2	95.3	94.7	0.85	171	3.3	8.1	3.2	DNGW-315MM-06	1PS5314-BD-4CA4	1130	3.6	
132	315 M	1190	1059	IE2	95.3	95.4	94.7	0.85	205	3.7	9.2	3.6	DNGW-315MN-06	1PS5315-BD-4CA4	1160	4.0	
150	315 L	1191	1203	IE2	95.5	95.7	94.8	0.85	230	4.3	9.6	3.8	DNGW-315LL-06	1PS5316-BD-4CA4	1390	4.7	
200	315 L	1191	1604	IE2	95.5	95.4	94.8	0.82	320	2.9	8.3	3.5	DNGW-315LM-06	1PS5317-BD-4CA4	1560	7.6	
290	355 M	1193	2321	IE2	95.8	95.5	94.8	0.82	465	2.2	7.8	2.6	DNGW-355MR-06	1PS5353-BD-4CA4	2460	13	
330	355 M	1193	2641	IE2	95.9	95.5	95.0	0.84	510	2.3	7.8	2.9	DNGW-355MS-06	1PS5355-BD-4CA3	2590	15	
380	355 M	1193	3042	IE2	96.0	96.0	95.5	0.83	600	2.3	7.9	2.9	DNGW-355MT-06	1PS5357-BD-4CA3	2730	16	
LOHER VARIO on request																	
Operating modes		Frame size											Order code				
Line operation		71 ... 355									0		-				
Converter operation, standard insulation		71 ... 355									1		-				
Converter operation with special insulation (derating approx. 5% ¹⁾)		160 ... 355									2		-				
Voltages		Frame size											Order code				
For other voltages, see Page 2/65		71 ... 355									9		...				
Types of construction		Frame size											Order code				
IM B3		71 ... 355									0		-				
IM B5		71 ... 355									1		-				
IM B34		71 ... 112									2		-				
IM B14		71 ... 112									3		-				
IM V1/cover		71 ... 355									4		-				
IM B35		71 ... 355									6		-				
For other types of construction, see from Page 1/29 and 2/66		71 ... 355									9		...				

¹⁾ Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.



Selection and ordering data

P _{rat.} 50 Hz	Frame size	Operating values at rated power											Motor type	Article No.	m IM B3	J kgm ²		
		η _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	cos φ _{rat.} 4/4	I _{rated} 400 V	I _{rated} 500 V	I _{rated} 690 V	T _{LR} / T _{rat.}					I _{LR} / I _{rat.}	T _B / T _{rat.}
		rpm	Nm	-	%	%	%	-	A	A	A	-					-	-
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																		
2-pole: 3000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
0.37	71 B	2850	1.24	IE3	78.5	77.5	74.5	0.76	0.90	0.72	0.52	3.5	5.8	3.5	DNGW-071BS-02	1PS5070-■BD■-4AH4	27	0.0005
0.55	71 B	2865	1.83	IE3	81.5	80.1	76.9	0.76	1.28	1.03	0.74	3.7	6.1	3.7	DNGW-071BT-02	1PS5071-■BD■-4AH4	28	0.0006
0.75	80 B	2850	2.51	IE3	82.5	84.0	83.0	0.86	1.53	1.22	0.88	3.0	6.2	3.3	DNGW-080BS-02	1PS5080-■BD■-4AH4	29	0.0011
1.1	80 B	2885	3.64	IE3	84.7	85.4	84.0	0.85	2.20	1.76	1.28	2.7	7.1	4.2	DNGW-080BT-02	1PS5081-■BD■-4AH4	30	0.0013
1.5	90 L	2910	4.92	IE3	85.0	85.1	84.0	0.86	2.95	2.35	1.72	2.7	8.1	4.2	DNGW-090LS-02	1PS5095-■BD■-4AH4	36	0.0021
2.2	90 L	2910	7.20	IE3	86.0	86.8	86.1	0.88	4.20	3.35	2.45	2.6	8.3	4.0	DNGW-090LT-02	1PS5098-■BD■-4AH4	40	0.0031
3	100 L	2920	9.80	IE3	88.5	88.9	87.7	0.88	5.60	4.45	3.20	3.2	8.1	4.6	DNGW-100LT-02	1PS5106-■BD■-4AH4	56	0.0054
4	112 M	2955	12.9	IE3	89.8	90.1	89.3	0.89	7.20	5.80	4.20	2.5	8.7	4.0	DNGW-112MT-02	1PS5113-■BD■-4AH4	68	0.012
5.5	132 S	2950	17.8	IE3	90.0	90.5	90.5	0.90	9.80	7.80	5.70	1.9	7.3	3.7	DNGW-132SS-02	1PS5131-■BD■-4AH4	97	0.024
7.5	132 S	2955	24.2	IE3	91.6	92.5	92.5	0.92	12.8	10.3	7.40	2.1	8.3	4.0	DNGW-132ST-02	1PS5132-■BD■-4AH4	107	0.031
11	160 M	2955	35.5	IE3	91.7	91.8	90.5	0.87	19.9	15.9	11.5	2.5	7.6	3.8	DNGW-160MS-02	1PS5163-■BD■-4AH4	176	0.053
15	160 M	2960	48.4	IE3	92.6	92.6	92.0	0.87	27.0	21.5	15.6	2.8	8.8	4.3	DNGW-160MT-02	1PS5165-■BD■-4AH4	186	0.061
18.5	160 L	2955	59.8	IE3	92.8	93.0	92.3	0.90	32.0	25.5	18.5	2.8	8.3	3.9	DNGW-160LT-02	1PS5166-■BD■-4AH4	197	0.068
22	180 M	2950	71.2	IE3	93.6	94.2	94.0	0.89	38.0	30.5	22.0	2.3	7.5	3.5	DNGW-180MT-02	1PS5183-■BD■-4AH4	243	0.080
30	200 L	2955	96.9	IE3	94.0	94.5	94.2	0.87	53.0	42.5	30.5	2.5	7.0	3.3	DNGW-200LS-02	1PS5206-■BD■-4AH4	319	0.130
37	200 L	2955	119.6	IE3	94.0	94.3	94.0	0.88	65.0	52.0	37.5	2.5	7.1	3.2	DNGW-200LT-02	1PS5208-■BD■-4AH4	343	0.158
45	225 M	2960	145.2	IE3	94.5	95.0	95.0	0.89	77.0	62.0	45.0	2.4	6.9	3.3	DNGW-225MT-02	1PS5223-■BD■-4AH4	438	0.26
55	250 M	2975	176.5	IE3	94.3	94.5	93.9	0.89	95.0	76.0	55.0	2.3	6.7	3.1	DNGW-250MN-02	1PS5253-■BD■-4AH4	535	0.46
75	280 S	2975	241	IE3	94.8	94.8	94.1	0.89	128	103	74.0	2.4	6.8	3.0	DNGW-280SM-02	1PS5280-■BD■-4AH4	700	0.77
90	280 M	2975	289	IE3	95.3	95.4	95.0	0.90	151	121	88.0	2.4	7.2	3.1	DNGW-280MN-02	1PS5283-■BD■-4AH4	755	0.94
110	315 S	2982	352	IE3	95.3	95.4	94.9	0.91	183	146	106	2.4	7.1	3.1	DNGW-315SL-02	1PS5311-■BD■-4AH4	1000	1.39
132	315 M	2982	423	IE3	95.9	96.0	95.6	0.91	220	175	127	2.5	7.2	3.1	DNGW-315ML-02	1PS5313-■BD■-4AH4	1070	1.6
160	315 M	2982	512	IE3	95.7	95.7	95.2	0.92	260	210	152	2.8	7.8	3.3	DNGW-315MN-02	1PS5315-■BD■-4AH4	1150	1.9
200	315 L	2982	640	IE3	96.1	96.3	96.1	0.92	325	260	189	2.5	7.2	3.0	DNGW-315LL-02	1PS5316-■BD■-4AH4	1400	2.3
250	315 L	2985	800	IE3	96.1	96.3	96.0	0.93	405	325	235	2.3	8.6	3.0	DNGW-315LN-02	1PS5318-■BD■-4AH4	1550	2.5
315	355 M	2984	1008	IE3	95.8	95.4	94.5	0.88	540	430	315	1.6	6.8	2.3	DNGW-355MR-02 ¹⁾	1PS5353-■BD■-4AH3	2650	4.8
360	355 M	2984	1152	IE3	95.9	95.6	95.0	0.89	610	485	355	1.7	6.8	2.4	DNGW-355MS-02 ¹⁾	1PS5355-■BD■-4AH3	2790	5.3
460	355 M	2985	1472	IE3	96.3	96.3	95.7	0.9	770	610	445	1.9	6.8	2.6	DNGW-355MT-02 ¹⁾	1PS5357-■BD■-4AH3	2940	6.4
Operating modes											Frame size				Order code			
Line operation											71 ... 355		0		-			
Converter operation, standard insulation											71 ... 355		1		-			
Voltages											Frame size				Order code			
690 VΔ, 50 Hz											355		0		-			
230 V/400 V, 50 Hz											71 ... 280		1		-			
500 VY, 50 Hz											71 ... 315 ²⁾		3		-			
500 VΔ, 50 Hz											71 ... 355		5		-			
400 V/690 V, 50 Hz											71 ... 355		6		-			
690 VY, 50 Hz											71 ... 355		8		-			
For other voltages, see Page 2/65											71 ... 355		9		...			
Types of construction											Frame size				Order code			
IM B3											71 ... 355		0		-			
IM B5											71 ... 315		1		-			
IM B34											71 ... 112		2		-			
IM B14											71 ... 112		3		-			
IM V1/cover											71 ... 355		4		-			
IM B35											71 ... 355		6		-			
For other types of construction, see from Page 1/29 and 2/66											71 ... 355		9		...			

¹⁾ Direction of rotation must be specified (option **K97** or **K98**).

²⁾ Up to 200 kW.



Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rat.} 50 Hz	Frame size	Operating values at rated power														Motor type	Article No.	m	
		$\eta_{rated, 50 Hz}$	$T_{rated, 50 Hz}$	IE class	$\eta_{rated, 50 Hz, 4/4}$	$\eta_{rated, 50 Hz, 3/4}$	$\eta_{rated, 50 Hz, 2/4}$	$\cos\phi_{rat, 50 Hz, 4/4}$	$I_{rated, 400 V}$	$I_{rated, 500 V}$	$I_{rated, 690 V}$	$T_{LR}/T_{rat.}$	$I_{LR}/I_{rat.}$	$T_B/T_{rat.}$	IM B3			J	
kW	FS	rpm	Nm	-	%	%	%	-	A	A	A	-	-	-		kg	kgm ²		
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																			
6-pole: 1000 rpm at 50 Hz																			
LOHER CHEMSTAR																			
0.25	71 B	885	2.70	IE3	72.7	73.0	69.0	0.70	0.71	0.57	0.41	2.6	3.2	2.6	DNGW-071BT-06	1PS5071--4CH4	30	0.0015	
0.37	80 B	940	3.76	IE3	74.0	74.1	70.1	0.66	1.09	0.87	0.63	2.3	4.2	2.7	DNGW-080BS-06	1PS5080--4CH4	31	0.002	
0.55	80 B	935	5.60	IE3	77.2	77.0	73.9	0.67	1.53	1.23	0.89	2.5	4.5	2.8	DNGW-080BT-06	1PS5081--4CH4	32	0.003	
0.75	90 L	945	7.60	IE3	78.9	80.0	78.8	0.70	1.96	1.57	1.14	2.2	4.6	2.6	DNGW-090LS-06	1PS5095--4CH4	36	0.004	
1.1	100 L	975	10.8	IE3	81.0	81.0	79.0	0.71	2.75	2.20	1.60	2.2	5.6	2.9	DNGW-100LS-06	1PS5105--4CH4	61	0.014	
1.5	112 M	975	14.7	IE3	82.5	82.8	81.2	0.76	3.45	2.75	2.00	2.0	5.7	2.8	DNGW-112MT-06	1PS5112--4CH4	69	0.017	
2.2	132 S	980	21.4	IE3	88.5	89.0	88.5	0.76	4.70	3.80	2.75	2.0	6.7	3.1	DNGW-132SR-06	1PS5130--4CH4	105	0.037	
3	132 S	980	29.2	IE3	88.5	89.0	88.5	0.76	6.40	5.20	3.75	2.0	6.3	3.0	DNGW-132SS-06	1PS5131--4CH4	105	0.037	
4	132 M	975	39.2	IE3	88.5	89.3	89.0	0.76	8.60	6.90	5.00	2.0	6.1	2.8	DNGW-132MS-06	1PS5133--4CH4	105	0.037	
5.5	132 M	975	53.9	IE3	89.8	90.9	90.9	0.76	11.6	9.30	6.70	2.0	6.3	2.9	DNGW-132MT-06	1PS5135--4CH4	114	0.046	
7.5	160 M	980	73.1	IE3	89.1	89.8	89.2	0.76	16.0	12.8	9.30	2.0	5.1	2.3	DNGW-160MS-06	1PS5163--4CH4	196	0.098	
11	160 L	975	107.7	IE3	90.3	91.1	90.7	0.77	23.0	18.3	13.2	2.0	5.1	2.4	DNGW-160LT-06	1PS5166--4CH4	215	0.12	
15	180 L	975	146.9	IE3	91.5	92.5	92.3	0.80	29.5	23.5	17.1	2.3	5.9	2.8	DNGW-180LT-06	1PS5186--4CH4	242	0.19	
18.5	200 L	978	180.6	IE3	91.9	92.7	92.7	0.79	37.0	29.5	21.5	2.5	5.6	2.6	DNGW-200LS-06	1PS5206--4CH4	317	0.28	
22	200 L	978	215	IE3	92.5	93.3	93.5	0.79	43.5	35.0	25.0	2.5	5.6	2.6	DNGW-200LT-06	1PS5208--4CH4	331	0.32	
30	225 M	982	292	IE3	93.3	94.0	94.0	0.83	56.0	44.5	32.5	2.6	6.6	3.0	DNGW-225MT-06	1PS5223--4CH4	472	0.67	
37	250 M	985	359	IE3	93.3	94.0	94.0	0.85	67.0	54.0	39.0	2.7	7.0	2.9	DNGW-250MN-06	1PS5253--4CH4	550	1.0	
45	280 S	988	435	IE3	93.7	94.3	94.2	0.85	82.0	65.0	47.5	3.0	6.8	2.8	DNGW-280SM-06	1PS5280--4CH4	695	1.4	
55	280 M	988	532	IE3	94.1	94.6	94.4	0.85	99.0	79.0	58.0	3.2	7.2	3.0	DNGW-280MN-06	1PS5283--4CH4	740	1.6	
75	315 S	990	723	IE3	94.6	94.9	94.4	0.84	136	109	79.0	2.6	7.5	3.1	DNGW-315SL-06	1PS5311--4CH4	990	2.6	
90	315 M	991	867	IE3	94.9	95.2	94.9	0.85	161	129	93.0	2.5	6.7	2.8	DNGW-315ML-06	1PS5313--4CH4	1060	3.1	
110	315 M	991	1060	IE3	95.1	95.5	95.3	0.84	199	159	115	2.8	7.2	3.0	DNGW-315MM-06	1PS5314--4CH4	1160	3.9	
132	315 M	991	1272	IE3	95.4	95.9	95.8	0.84	240	190	138	2.7	7.2	3.0	DNGW-315LK-06	1PS5315--4CH4	1360	4.4	
160	315 L	991	1542	IE3	95.6	95.8	95.4	0.83	290	235	169	3.3	7.7	3.5	DNGW-315LL-06	1PS5316--4CH4	1400	4.6	
200	315 L	990	1929	IE3	95.0	95.3	94.9	0.83	365	295	210	2.8	7.5	3.3	DNGW-315LM-06	1PS5317--4CH4	1650	7.6	
280	355 M	993	2693	IE3	95.8	95.8	95.2	0.82	510	410	300	2.1	7.1	2.6	DNGW-355MR-06	1PS5353--4CH3	2580	13	
315	355 M	993	3029	IE3	95.8	95.8	95.3	0.83	570	455	330	2.1	7.1	2.6	DNGW-355MS-06	1PS5355--4CH3	2720	15	
360	355 M	994	3458	IE3	96.0	96.1	95.7	0.83	650	520	380	2.2	7.2	2.9	DNGW-355MT-06	1PS5357--4CH3	2870	16	
Operating modes																			
		Frame size													Order code				
Line operation		71 ... 355												0	-				
Converter operation, standard insulation		71 ... 355												1	-				
Voltages																			
		Frame size													Order code				
690 VΔ, 50 Hz		355												0	-				
230 V/400 V, 50 Hz		71 ... 280												1	-				
500 VY, 50 Hz		71 ... 315 ¹⁾												3	-				
500 VΔ, 50 Hz		71 ... 355												5	-				
400 V/690 V, 50 Hz		71 ... 355												6	-				
690 VY, 50 Hz		71 ... 355												8	-				
For other voltages, see Page 2/65		71 ... 355												9	...				
Types of construction																			
		Frame size													Order code				
IM B3		71 ... 355												0	-				
IM B5		71 ... 315												1	-				
IM B34		71 ... 112												2	-				
IM B14		71 ... 112												3	-				
IM V1/cover		71 ... 355												4	-				
IM B35		71 ... 355												6	-				
For other types of construction, see from Page 1/29 and 2/66		71 ... 355												9	...				

¹⁾ Up to 200 kW.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²	
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cos φ _{rat.} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}					T _B / T _{rat.}
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–			kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
2-pole: 3600 rpm at 60 Hz																
LOHER CHEMSTAR																
0.43	71 B	3445	1.19	IE3	79.5	79.1	75.5	0.76	0.89	1.19	6.0	3.6	DNGW-071BS-02	1PS5070-BD-4AH4	27	0.0005
0.63	71 B	3460	1.74	IE3	81.5	80.6	76.0	0.76	1.28	1.74	6.6	3.9	DNGW-071BT-02	1PS5071-BD-4AH4	28	0.0006
0.86	80 B	3450	2.38	IE3	83.8	84.6	83.5	0.86	1.50	2.38	6.4	3.1	DNGW-080BS-02	1PS5080-BD-4AH4	29	0.0011
1.27	80 B	3480	3.48	IE3	85.5	85.8	84.0	0.85	2.20	3.48	7.4	3.4	DNGW-080BT-02	1PS5081-BD-4AH4	30	0.0013
1.75	90 L	3510	4.76	IE3	85.5	85.6	84.0	0.87	2.95	4.76	8.7	4.2	DNGW-090LS-02	1PS5095-BD-4AH4	36	0.0021
2.55	90 L	3510	6.90	IE3	86.7	87.1	85.9	0.88	4.20	6.90	8.3	4.2	DNGW-090LT-02	1PS5098-BD-4AH4	40	0.0031
3.45	100 L	3525	9.30	IE3	88.6	89.2	88.5	0.89	5.50	9.30	8.5	4.7	DNGW-100LT-02	1PS5106-BD-4AH4	56	0.0054
4.55	112 M	3555	12.2	IE3	90.0	90.0	88.7	0.90	7.10	12.2	9.0	4.1	DNGW-112MT-02	1PS5113-BD-4AH4	68	0.012
6.30	132 S	3545	17.0	IE3	90.5	91.0	90.2	0.91	9.60	17.0	7.5	3.8	DNGW-132SS-02	1PS5131-BD-4AH4	97	0.024
8.60	132 S	3555	23.1	IE3	91.8	92.4	92.1	0.92	12.8	23.1	8.4	4.1	DNGW-132ST-02	1PS5132-BD-4AH4	107	0.031
12.6	160 M	3555	33.8	IE3	91.5	90.8	89.3	0.89	19.4	33.8	7.6	3.7	DNGW-160MS-02	1PS5163-BD-4AH4	176	0.053
17.3	160 M	3560	46.4	IE3	92.0	92.0	90.6	0.88	27.0	46.4	8.7	4.2	DNGW-160MT-02	1PS5165-BD-4AH4	186	0.061
21.3	160 L	3560	57.1	IE3	92.5	92.4	91.1	0.91	32.0	57.1	8.2	3.8	DNGW-160LT-02	1PS5166-BD-4AH4	197	0.068
24.5	180 M	3555	65.8	IE3	93.9	94.2	93.6	0.89	37.0	65.8	7.5	3.6	DNGW-180MT-02	1PS5183-BD-4AH4	243	0.080
33.5	200 L	3555	90.0	IE3	94.2	94.4	94.0	0.87	51.0	90.0	7.1	3.3	DNGW-200LS-02	1PS5206-BD-4AH4	319	0.130
41.5	200 L	3555	111.5	IE3	94.2	94.0	92.9	0.89	62.0	111.5	7.1	3.2	DNGW-200LT-02	1PS5208-BD-4AH4	343	0.158
51	225 M	3560	136.8	IE3	94.5	95.0	94.5	0.89	76.0	136.8	6.8	3.2	DNGW-225MT-02	1PS5223-BD-4AH4	438	0.26
62	250 M	3575	165.6	IE3	93.6	93.6	92.7	0.90	92.0	165.6	6.7	3.0	DNGW-250MN-02	1PS5253-BD-4AH4	535	0.46
75	280 S	3578	200	IE3	94.1	93.9	92.7	0.89	112	200	7.6	3.2	DNGW-280SM-02	1PS5280-BD-4AH4	700	0.77
90	280 M	3578	240	IE3	95.0	94.9	93.9	0.90	132	240	8.1	3.3	DNGW-280MN-02	1PS5283-BD-4AH4	755	0.94
123	315 S	3582	328	IE3	95.0	95.0	94.2	0.91	179	328	7.2	3.0	DNGW-315SL-02	1PS5311-BD-4AH4	1000	1.39
148	315 M	3582	395	IE3	95.4	95.3	94.6	0.91	215	395	7.1	3.0	DNGW-315ML-02	1PS5313-BD-4AH4	1070	1.6
160	315 M	3587	426	IE3	95.4	95.1	94.0	0.91	230	426	7.8	3.4	DNGW-315MN-02	1PS5315-BD-4AH4	1150	1.9
224	315 L	3582	597	IE3	95.8	95.9	95.4	0.92	320	597	7.1	2.9	DNGW-315LL-02	1PS5316-BD-4AH4	1400	2.3
270	315 L	3582	720	IE3	96.0	96.0	95.5	0.92	385	720	9.5	3.7	DNGW-315LN-02	1PS5318-BD-4AH4	1550	2.5
500	355 M	3580	1334	IE3	96.0	95.8	94.8	0.90	730	1334	7.5	2.7	DNGW-355MT-02	1PS5357-BD-4AH3	2800	6.4
Operating modes											Frame size		Order code			
Line operation											71 ... 355	0	–			
Converter operation, standard insulation											71 ... 355	1	–			
Voltages											Frame size		Order code			
For other voltages, see Page 2/65											71 ... 355	9	...			
Types of construction											Frame size		Order code			
IM B3											71 ... 355	0	–			
IM B5											71 ... 315	1	–			
IM B34											71 ... 112	2	–			
IM B14											71 ... 112	3	–			
IM V1/cover											71 ... 355	4	–			
IM B35											71 ... 355	6	–			
For other types of construction, see from Page 1/29 and 2/66											71 ... 355	9	...			



Motors with Explosion Protection
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²	
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cosφ _{rat.} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}					T _B / T _{rat.}
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-			kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
4-pole: 1800 rpm at 60 Hz																
LOHER CHEMSTAR																
0.29	71 B	1695	1.63	IE3	75.0	75.5	72.0	0.72	0.67	2.5	2.6	DNGW-071BS-04	1PS 5070- BD -4BH4	27	0.0010	
0.43	71 B	1710	2.40	IE3	80.2	79.5	76.1	0.70	0.96	3.0	3.1	DNGW-071BT-04	1PS 5071- BD -4BH4	29	0.0014	
0.55	80 B	1740	3.02	IE3	81.1	81.3	79.4	0.78	1.09	2.4	3.3	DNGW-080BS-04	1PS 5080- BD -4BH4	29	0.0017	
0.75	80 B	1760	4.07	IE3	85.5	84.5	81.0	0.71	1.55	3.1	4.7	DNGW-080BT-04	1PS 5081- BD -4BH4	32	0.0029	
1.27	90 L	1740	7.00	IE3	86.5	86.9	85.6	0.79	2.35	2.9	3.8	DNGW-090LS-04	1PS 5095- BD -4BH4	35	0.0036	
1.75	90 L	1740	9.60	IE3	87.0	87.4	86.1	0.8	3.15	2.6	3.7	DNGW-090LT-04	1PS 5098- BD -4BH4	39	0.0049	
2.55	100 L	1765	13.8	IE3	89.5	89.7	88.5	0.84	4.25	3.0	4.4	DNGW-100LS-04	1PS 5106- BD -4BH4	61	0.014	
3.45	100 L	1760	18.7	IE3	89.8	90.1	89.5	0.84	5.70	2.7	3.9	DNGW-100LT-04	1PS 5108- BD -4BH4	61	0.014	
4.55	112 M	1760	24.7	IE3	90.5	91.0	90.5	0.83	7.60	2.5	3.8	DNGW-112MT-04	1PS 5113- BD -4BH4	69	0.017	
6.30	132 S	1770	34.0	IE3	91.7	92.0	91.3	0.83	10.4	3.4	3.8	DNGW-132ST-04	1PS 5131- BD -4BH4	108	0.046	
8.60	132 M	1770	46.4	IE3	91.7	92.2	91.8	0.86	13.7	2.3	3.6	DNGW-132MT-04	1PS 5133- BD -4BH4	113	0.046	
12.6	160 M	1770	68.0	IE3	92.4	92.6	92.0	0.85	20.0	2.6	3.3	DNGW-160MS-04	1PS 5163- BD -4BH4	178	0.083	
17.3	160 L	1775	93.1	IE3	93.6	93.7	92.9	0.83	28.0	2.5	3.7	DNGW-160LT-04	1PS 5166- BD -4BH4	197	0.099	
21.3	180 M	1770	114.9	IE3	93.6	94.0	93.8	0.83	34.5	2.4	3.2	DNGW-180MS-04	1PS 5183- BD -4BH4	244	0.13	
25.3	180 L	1770	136.5	IE3	93.6	94.1	94.0	0.83	41.0	2.2	3.2	DNGW-180LT-04	1PS 5186- BD -4BH4	254	0.14	
30	200 L	1778	161.1	IE3	94.3	94.5	93.9	0.84	47.5	3.0	3.5	DNGW-200LT-04	1PS 5206- BD -4BH4	340	0.22	
37	225 S	1782	198.3	IE3	94.6	94.7	94.2	0.85	58.0	2.8	3.0	DNGW-225SS-04	1PS 5220- BD -4BH4	421	0.42	
45	225 M	1782	241	IE3	95.0	95.0	94.5	0.84	71.0	2.9	3.0	DNGW-225MT-04	1PS 5223- BD -4BH4	443	0.47	
55	250 M	1786	294	IE3	95.4	95.6	95.1	0.86	84.0	2.8	3.2	DNGW-250MN-04	1PS 5253- BD -4BH4	570	0.85	
75	280 S	1788	401	IE3	95.5	95.3	94.5	0.85	116	2.8	3.3	DNGW-280SM-04	1PS 5280- BD -4BH4	755	1.39	
90	280 M	1788	481	IE3	95.5	95.5	94.9	0.87	136	2.9	3.3	DNGW-280MN-04	1PS 5283- BD -4BH4	820	1.7	
127	315 S	1788	678	IE3	95.8	96.1	95.8	0.87	191	2.5	2.7	DNGW-315SL-04	1PS 5311- BD -4BH4	1010	2.2	
152	315 M	1788	812	IE3	96.2	96.5	96.3	0.88	225	2.7	2.8	DNGW-315ML-04	1PS 5313- BD -4BH4	1090	2.9	
184	315 M	1788	983	IE3	96.2	96.5	96.3	0.88	275	3.0	2.9	DNGW-315MN-04	1PS 5315- BD -4BH4	1120	3.1	
185	315 L	1791	986	IE3	96.2	96.2	95.5	0.87	275	3.9	3.6	DNGW-315LL-04	1PS 5316- BD -4BH4	1340	3.7	
250	315 L	1791	1333	IE3	96.2	96.0	95.3	0.85	385	3.8	3.8	DNGW-315LM-04	1PS 5317- BD -4BH4	1550	4.2	
490	355 M	1789	2616	IE3	96.2	96.0	95.3	0.86	740	2.3	2.4	DNGW-355MT-04 ¹⁾	1PS 5357- BD -4BH4	2750	8.5	
Operating modes																
Line operation										Frame size		0		Order code		
Converter operation, standard insulation										Frame size		1		-		
Voltages																
For other voltages, see Page 2/65										Frame size		9		...		
Types of construction																
IM B3										Frame size		0		-		
IM B5										Frame size		1		-		
IM B34										Frame size		2		-		
IM B14										Frame size		3		-		
IM V1/cover										Frame size		4		-		
IM B35										Frame size		6		-		
For other types of construction, see from Page 1/29 and 2/66										Frame size		9		...		

¹⁾ Direction of rotation must be specified (option **K97** or **K98**).



Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series



Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power							Motor type				Article No.	m IM B3	J kgm ²	
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cosφ _{rat.} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}	T _B / T _{rat.}				
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-			kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																
6-pole: 1200 rpm at 60 Hz																
LOHER CHEMSTAR																
0.25	71 B	1110	2.15	IE3	75.6	74.4	69.3	0.64	0.65	3.2	3.9	3.2	DNGW-071BT-06	1PS5071- BD -4CH4	31	0.0015
0.37	80 B	1150	3.07	IE3	76.0	75.0	71.0	0.61	1.00	2.7	5.0	3.3	DNGW-080BS-06	1PS5080- BD -4CH4	30	0.002
0.55	80 B	1145	4.59	IE3	81.7	80.5	76.4	0.63	1.34	2.8	5.3	3.4	DNGW-080BT-06	1PS5081- BD -4CH4	32	0.003
0.75	90 L	1155	6.20	IE3	82.5	82.4	79.9	0.65	1.76	2.4	5.3	3.1	DNGW-090LS-06	1PS5095- BD -4CH4	36	0.004
1.10	100 L	1180	8.90	IE3	87.5	87.2	84.8	0.69	2.30	2.4	6.7	3.3	DNGW-100LT-06	1PS5105- BD -4CH4	61	0.014
1.50	112 M	1175	12.2	IE3	88.5	88.3	86.2	0.73	2.90	2.2	6.9	3.2	DNGW-112MT-06	1PS5112- BD -4CH4	69	0.017
2.20	132 S	1185	17.7	IE3	90.3	90.0	89.0	0.74	4.15	2.3	8.0	3.5	DNGW-132SR-06	1PS5130- BD -4CH4	105	0.037
3.00	132 S	1185	24.2	IE3	90.3	90.0	89.0	0.75	5.60	2.3	7.5	3.3	DNGW-132SS-06	1PS5131- BD -4CH4	105	0.037
3.70	132 M	1175	30.1	IE3	90.3	90.5	89.3	0.73	7.00	2.4	7.6	3.4	DNGW-132MS-06	1PS5133- BD -4CH4	105	0.037
5.50	132 M	1180	44.5	IE3	91.3	91.8	91.3	0.74	10.2	2.3	7.2	3.3	DNGW-132MT-06	1PS5135- BD -4CH4	114	0.046
7.50	160 M	1185	60.4	IE3	91.0	91.1	90.0	0.75	13.8	2.4	5.9	2.6	DNGW-160MS-06	1PS5163- BD -4CH4	196	0.098
11.0	160 L	1180	89.0	IE3	91.7	91.9	91.0	0.75	20.0	2.3	5.8	2.6	DNGW-160LT-06	1PS5166- BD -4CH4	215	0.12
15.0	180 L	1178	121.6	IE3	93.0	93.4	92.9	0.79	25.5	2.5	6.8	3.0	DNGW-180LT-06	1PS5186- BD -4CH4	242	0.19
18.5	200 L	1180	149.7	IE3	93.0	93.8	93.8	0.78	32.0	2.8	6.5	3.0	DNGW-200LS-06	1PS5206- BD -4CH4	317	0.28
22	200 L	1180	178	IE3	93.5	93.9	93.6	0.79	37.5	2.6	6.3	2.8	DNGW-200LT-06	1PS5208- BD -4CH4	331	0.32
30	225 M	1185	242	IE3	94.3	94.6	94.1	0.82	48.5	2.9	7.6	3.3	DNGW-225MT-06	1PS5223- BD -4CH4	472	0.67
37	250 M	1188	297	IE3	94.1	94.4	93.9	0.83	59.0	3.1	8.0	3.1	DNGW-250MN-06	1PS5253- BD -4CH4	550	1.0
45	280 S	1190	361	IE3	94.5	94.6	94.1	0.83	72.0	3.3	7.7	3.1	DNGW-280SM-06	1PS5280- BD -4CH4	695	1.4
55	280 M	1190	441	IE3	94.5	94.6	94.0	0.83	88.0	3.6	7.9	3.3	DNGW-280MN-06	1PS5283- BD -4CH4	740	1.6
75	315 S	1192	601	IE3	95.0	94.9	94.1	0.82	121	3.1	8.4	3.3	DNGW-315SL-06	1PS5311- BD -4CH4	990	2.6
90	315 M	1192	721	IE3	95.0	95.0	94.4	0.84	142	2.7	7.7	3.0	DNGW-315ML-06	1PS5313- BD -4CH4	1060	3.1
110	315 M	1192	881	IE3	95.8	95.9	95.5	0.83	174	3.2	8.2	3.4	DNGW-315MM-06	1PS5314- BD -4CH4	1160	3.9
132	315 L	1192	1057	IE3	95.8	96.0	95.6	0.84	205	3.1	8.4	3.3	DNGW-315LK-06	1PS5315- BD -4CH4	1360	4.4
150	315 L	1192	1202	IE3	95.8	95.7	95.0	0.81	245	3.6	9.6	4.1	DNGW-315LL-06	1PS5316- BD -4CH4	1400	4.6
200	315 L	1190	1605	IE3	95.2	95.2	95.0	0.84	315	2.9	8.3	3.5	DNGW-315LM-06	1PS5317- BD -4CH4	1650	7.6
280	355 M	1193	2241	IE3	95.8	95.8	94.8	0.81	455	2.2	7.8	2.9	DNGW-355MR-06	1PS5353- BD -4CH3	2460	13
315	355 M	1193	2521	IE3	95.8	95.8	95.0	0.83	495	2.2	7.8	2.9	DNGW-355MS-06	1PS5355- BD -4CH3	2590	15
380	355 M	1193	3042	IE3	96.0	96.0	95.5	0.83	600	2.3	7.9	2.9	DNGW-355MT-06	1PS5357- BD -4CH3	2730	16
Operating modes		Frame size										Order code				
Line operation		71 ... 355										0				
Converter operation, standard insulation		71 ... 355										1				
Voltages		Frame size										Order code				
For other voltages, see Page 2/65		71 ... 355										9				
Types of construction		Frame size										Order code				
IM B3		71 ... 355										0				
IM B5		71 ... 315										1				
IM B34		71 ... 112										2				
IM B14		71 ... 112										3				
IM V1/cover		71 ... 355										4				
IM B35		71 ... 355										6				
For other types of construction, see from Page 1/29 and 2/66		71 ... 355										9				

Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Pole-changing motors in cast-iron and steel versions

Selection and ordering data

Operating values at rated power																	Article No.		m J		
$P_{rat.1}$ 50 Hz	$P_{rat.2}$ 50 Hz	Frame size	$n_{rat.1}$ 50 Hz	$T_{rat.1}$ 50 Hz	$\phi_{rat.1}$ 50 Hz	$\cos \phi$ rat.1, 50 Hz	$I_{rat.1}$ 50 Hz	$T_{LR}/T_{rat.1}$ 50 Hz	$I_{LR}/I_{rat.1}$ 50 Hz	$T_B/T_{rat.1}$ 50 Hz	$n_{rat.2}$ 50 Hz	$T_{rat.2}$ 50 Hz	$\eta_{rat.2}$ 50 Hz	$\cos \phi$ rat.2, 50 Hz	$I_{rat.2}$ 50 Hz	$T_{LR}/T_{rat.2}$ 50 Hz	$I_{LR}/I_{rat.2}$ 50 Hz	$T_B/T_{rat.2}$ 50 Hz		IM B3	
KW	KW	FS	rpm	Nm	%	A					rpm	Nm	%	A						kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Line operation: double pole-changing for constant load torque • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																					
4/2-pole: 1500/3000 rpm at 50 Hz with one winding connected in Dahlander circuit																					
1500 rpm	3000 rpm		1500 rpm								3000 rpm										
LOHER CHEMSTAR																					
1.9	2.4	100 L	1390	13.1	72.0	0.87	4.40	1.7	4.1	1.8	2800	8.20	70.0	0.88	5.60	1.8	4.2	1.8	1PS5106- BD -4NA4	61	0.0059
2.5	3.1	100 L	1440	16.6	76.3	0.87	5.40	1.9	5.2	2.8	2840	10.4	77.3	0.90	6.40	2.1	5.2	2.9	1PS5108- BD -4NA4	64	0.0078
3.7	4.4	112 M	1420	24.9	79.9	0.86	7.80	1.8	4.9	2.3	2885	14.6	80.8	0.92	8.50	2.1	6.4	2.6	1PS5113- BD -4NA4	69	0.010
4.7	5.9	132 S	1440	31.2	82.0	0.84	9.80	1.6	5.6	2.7	2875	19.6	80.0	0.89	12.0	1.8	5.6	2.8	1PS5131- BD -4NA4	108	0.019
6.5	8	132 M	1435	43.3	82.0	0.86	13.3	1.7	5.4	2.6	2880	26.5	82.0	0.92	15.3	1.8	6.3	2.8	1PS5133- BD -4NA4	113	0.024
9.3	11.5	160 M	1440	61.7	84.5	0.87	18.3	1.7	5.7	2.8	2870	38.3	82.0	0.92	22.0	1.8	6.0	2.9	1PS5163- BD -4NA4	178	0.044
13	16	160 L	1450	85.6	87.0	0.85	25.5	1.6	6.0	2.3	2920	52.3	86.0	0.94	35.5	1.9	7.1	2.8	1PS5166- BD -4NA4	197	0.068
6/4-pole: 1000/1500 rpm at 50 Hz with two windings																					
1000 rpm	1500 rpm		1000 rpm								1500 rpm										
LOHER CHEMSTAR																					
0.55	1.1	100 L	715	7.30	57.0	0.53	2.65	2.0	3.0	2.7	1425	7.40	77.7	0.87	2.35	1.7	4.6	2.1	1PS5106- BD -4PA4	61	0.0059
0.9	1.5	100 L	700	12.3	64.2	0.64	3.15	1.5	2.9	2.0	1415	10.1	77.7	0.89	3.15	1.5	4.5	1.9	1PS5108- BD -4PA4	64	0.0078
1.1	1.9	112 M	715	14.7	66.5	0.60	4.00	1.6	3.2	2.3	1440	12.6	80.9	0.87	3.90	1.6	5.4	2.3	1PS5113- BD -4PA4	69	0.010
1.6	3.2	132 S	730	20.9	61.5	0.53	7.10	1.6	3.3	2.6	1450	21.1	82.3	0.87	6.50	1.4	5.0	2.1	1PS5131- BD -4PA4	108	0.019
2.2	4.4	132 M	730	28.8	68.0	0.52	9.00	2.0	3.8	3.0	1450	29.0	84.5	0.88	8.50	1.5	5.5	2.3	1PS5133- BD -4PA4	113	0.024
3.5	7	160 M	730	45.8	77.5	0.57	11.4	2.0	4.2	2.8	1450	46.1	84.0	0.90	13.4	1.6	5.2	2.2	1PS5163- BD -4PA4	178	0.044
5.6	11	160 L	725	73.8	80.2	0.60	16.8	1.9	4.0	2.7	1445	72.7	84.4	0.90	21.0	1.5	5.1	2.2	1PS5166- BD -4PA4	197	0.056
LOHER VARIO on request																					
Operating modes																	Frame size		Order code		
Line operation																	100 ... 160		0 -		
Converter operation, standard insulation																	100 ... 160		1 -		
Voltages																	Frame size		Order code		
230 V, 50 Hz																	100 ... 160		1 -		
500 VY, 50 Hz																	100 ... 160		3 -		
400 V, 50 Hz																	100 ... 160		6 -		
690 VY, 50 Hz																	100 ... 160		8 -		
For other voltages, see Page 2/65																	100 ... 160		9 ...		
Types of construction																	Frame size		Order code		
IM B3																	100 ... 160		0 -		
IM B5																	100 ... 160		1 -		
IM B34																	100 ... 112		2 -		
IM B14																	100 ... 112		3 -		
IM V1/cover																	100 ... 160		4 -		
IM B35																	100 ... 160		6 -		
For other types of construction, see from Page 1/29 and 2/66																	100 ... 160		9 ...		

Selection and ordering data

P _{rat.} 50 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m	J		
		η _{rated} 50 Hz	T _{rat.} 50 Hz	T _B	c/h · J S4- 40%	IE class	η _{rated} 50 Hz	cosφ _{rat.} 4/4	I _{rated} 50 Hz	I _{rated} 50 Hz	I _{rated} 50 Hz					I _{LR} / I _{rat.}	I _{LR} / I _{rat.}
kW	FS	rpm	Nm	Nm	-	%	-	A	A	A	-	-	-		kg	kgm ²	
<ul style="list-style-type: none"> Cooling: self-ventilated (IC 411) Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb 																	
4-pole: 1500 rpm at 50 Hz																	
LOHER CHEMSTAR																	
0.75	80 B	1440	4.97	10.0	2.20	IE2	79.6	0.78	1.74	1.39	1.01	2.2	5.6	3.1	DBGW-080BS-04	1PS5081- RD -4BA4	0.0021
1.1	90 L	1430	7.30	10.0	2.00	IE2	81.4	0.78	2.50	2.00	1.45	2.3	5.6	2.9	DBGW-090LR-04	1PS5095- RD -4BA4	0.0028
1.5	90 L	1430	10.0	20.0	3.00	IE2	82.8	0.79	3.30	2.65	1.92	2.6	6.0	3.4	DBGW-090LS-04	1PS5098- RD -4BA4	0.0036
2.2	100 L	1455	14.4	20.0	6.25	IE2	84.8	0.83	4.50	3.60	2.60	2.1	6.9	3.3	DBGW-100LR-04	1PS5106- RD -4BA4	0.0086
3	100 L	1455	19.7	50.0	7.50	IE2	86.1	0.83	6.10	4.85	3.50	2.0	6.9	3.1	DBGW-100LS-04	1PS5108- RD -4BA4	0.011
4	112 M	1460	26.2	50.0	7.45	IE2	86.6	0.81	8.20	6.60	4.75	2.5	7.1	3.2	DBGW-112MS-04	1PS5113- RD -4BA4	0.014
5.5	132 S	1465	35.9	50.0	10.0	IE2	88.4	0.80	11.2	9.00	6.50	2.3	6.9	2.9	DBGW-132SR-04	1PS5131- RD -4BA4	0.027
7.5	132 M	1465	48.9	100	12.5	IE2	88.9	0.83	14.7	11.7	8.50	2.3	6.9	2.9	DBGW-132MS-04	1PS5133- RD -4BA4	0.034
11	160 M	1470	71.0	100	15.0	IE2	89.8	0.85	21.0	16.6	12.1	2.1	6.5	2.8	DBGW-160MR-04	1PS5163- RD -4BA4	0.065
15	160 L	1475	97.0	150	12.5	IE2	91.2	0.85	28.0	22.5	16.2	2.3	6.5	3.0	DBGW-160LS-04	1PS5166- RD -4BA4	0.083
18.5	180 M	1465	121	150	20.0	IE2	91.2	0.84	35.0	28.0	20.0	2.5	7.2	3.4	DBGW-180MR-04	1PS5183- RD -4BA4	0.12
22	180 L	1465	143	270	22.5	IE2	91.7	0.84	41.0	33.0	24.0	2.6	7.3	3.5	DBGW-180LS-04	1PS5186- RD -4BA4	0.13
30	200 L	1470	195	270	24.0	IE2	92.3	0.84	56.0	44.5	32.5	2.5	6.7	3.3	DBGW-200LS-04	1PS5206- RD -4BA4	0.20
6-pole: 1000 rpm at 50 Hz																	
LOHER CHEMSTAR																	
0.55	80 B	930	5.60	10.0	3.50	IE2	74.4	0.68	1.57	1.26	0.91	2.5	4.4	2.9	DBGW-080BS-06	1PS5081- RD -4CA4	0.0030
0.75	90 L	935	7.70	10.0	3.75	IE2	75.9	0.70	2.05	1.63	1.18	2.0	4.1	2.5	DBGW-090LR-06	1PS5095- RD -4CA4	0.0038
1.1	90 L	935	11.2	20.0	6.25	IE2	78.1	0.71	2.85	2.30	1.66	2.2	4.4	2.6	DBGW-090LS-06	1PS5098- RD -4CA4	0.0054
1.5	100 L	970	14.8	20.0	8.75	IE2	83.4	0.73	3.55	2.85	2.05	2.0	5.4	2.8	DBGW-100LS-06	1PS5106- RD -4CA4	0.011
2.2	112 M	965	21.8	50.0	10.0	IE2	84.8	0.75	5.00	4.00	2.90	2.0	5.0	2.8	DBGW-112MS-06	1PS5113- RD -4CA4	0.014
3	132 S	970	29.5	50.0	13.75	IE2	85.0	0.72	7.10	5.70	4.10	1.6	5.0	2.5	DBGW-132SR-06	1PS5131- RD -4CA4	0.024
4	132 M	970	39.4	50.0	17.5	IE2	85.2	0.75	9.00	7.20	5.20	1.6	5.0	2.3	DBGW-132MR-06	1PS5133- RD -4CA4	0.029
5.5	132 M	970	54.0	100	20.0	IE2	87.0	0.76	12.0	9.60	7.00	1.9	5.6	2.6	DBGW-132MS-06	1PS5135- RD -4CA4	0.037
7.5	160 M	975	73.0	100	27.5	IE2	87.8	0.74	16.7	13.3	9.70	1.9	4.5	2.2	DBGW-160MR-06	1PS5163- RD -4CA4	0.075
11	160 L	975	108	150	42.0	IE2	88.7	0.76	23.5	18.8	13.7	1.9	5.0	2.2	DBGW-160LS-06	1PS5166- RD -4CA4	0.098
15	180 L	975	147	270	35.0	IE2	89.9	0.78	31.0	24.5	17.9	2.5	6.0	3.1	DBGW-180LS-06	1PS5186- RD -4CA4	0.17
18.5	200 L	978	181	270	65.0	IE2	90.4	0.82	36.0	29.0	21.0	2.4	5.8	2.6	DBGW-200LR-06	1PS5206- RD -4CA4	0.25
22	200 L	978	215	270	65.0	IE2	90.9	0.82	42.5	34.0	24.5	2.5	6.2	2.6	DBGW-200LS-06	1PS5208- RD -4CA4	0.30
Operating modes																	
Line operation											Frame size	0	Order code				
Converter operation, standard insulation											Frame size	1	Order code				
Voltages																	
230 V/400 V, 50 Hz											Frame size	1	Order code				
500 VY, 50 Hz											Frame size	3	Order code				
400 V/690 V, 50 Hz											Frame size	6	Order code				
690 VY, 50 Hz											Frame size	8	Order code				
For other voltages, see Page 2/65											Frame size	9	Order code				
Types of construction																	
IM B3											Frame size	0	Order code				
IM B5											Frame size	1	Order code				
IM B34											Frame size	2	Order code				
IM B14											Frame size	3	Order code				
IM V1/cover											Frame size	4	Order code				
IM B35											Frame size	6	Order code				
For other types of construction, see from Page 1/29 and 2/66											Frame size	9	Order code				

T_B = Braking torque in Nm

The maximum permissible number of starts is limited for all motors to 20 c/h. For conditions for a higher number of starts, please inquire.

In the case of a number of starts of > 1 per hour, the brake dimensioning must be checked.

Conversion factor "c/h · J" depending on the duty cycle.

Standard brake supply voltage: 230 V 1 AC

Example 1

Motor: 1PS5113-. RD.-4BA4
(Motor type: DBGW-112MS-04), S4-40 %, 20 c/h
Required: ΣJ
Solution: c/h · J = 7.45 from table
ΣJ = 7.45/20 = 0.3725 kgm²

Example 2

Motor: 1PS5113-. RD.-4BA4
(Motor type: DBGW-112MS-04), S4-40 %
Required: c/h
Solution: ΣJ = 0.05 kgm²
c/h · J = 7.45
c/h = 7.45/0.05 = 149

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series



Brake motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data

P _{rat.} , 50 Hz	Frame size	Operating values at rated power											Motor type	Article No.	m IM B3	J	
		n _{rated} , 50 Hz	T _{rat.} , 50 Hz	T _B	c/h · J S4-40%	IE class	n _{rated} , 50 Hz	COSφ _{rat.} , 50 Hz	I _{rated} , 50 Hz	I _{rated} , 50 Hz	I _{rated} , 50 Hz	T _{LR} / T _{rat.}					I _{LR} / I _{rat.}
kW	FS	rpm	Nm	Nm	-	-	%	-	A	A	A	-	-	-		kg	kgm ²

- Cooling: self-ventilated (IC 411)
- Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %
- Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: II 2G Ex d(e) IIC T4 Gb

4-pole: 1500 rpm at 50 Hz

LOHER CHEMSTAR

0.75	80 B	1450	4.94	10.0	2.20	IE3	83.9	0.75	1.53	1.22	0.88	2.7	7.1	3.9	DBGW-080BT-04	1PS5081- RD -4BH4	0.0029
1.1	90 L	1440	7.30	10.0	2.00	IE3	84.1	0.80	2.20	1.76	1.28	2.9	6.9	3.6	DBGW-090LS-04	1PS5095- RD -4BH4	0.0036
1.5	90 L	1445	9.90	20.0	3.00	IE3	85.8	0.80	2.95	2.35	1.72	2.7	7.2	3.6	DBGW-090LT-04	1PS5098- RD -4BH4	0.0049
2.2	100 L	1465	14.3	20.0	6.25	IE3	86.7	0.80	4.20	3.35	2.45	3.2	8.4	4.4	DBGW-100LS-04	1PS5106- RD -4BH4	0.014
3	100 L	1460	19.6	50.0	7.50	IE3	88.9	0.80	5.60	4.45	3.20	2.5	8.3	3.9	DBGW-100LT-04	1PS5108- RD -4BH4	0.014
4	112 M	1460	26.2	50.0	7.45	IE3	88.6	0.80	7.20	5.80	4.20	2.4	7.1	3.7	DBGW-112MT-04	1PS5113- RD -4BH4	0.017
5.5	132 S	1475	35.6	50.0	10.0	IE3	89.6	0.80	9.80	7.80	5.70	2.9	8.6	3.7	DBGW-132ST-04	1PS5131- RD -4BH4	0.046
7.5	132 M	1470	48.7	100	12.5	IE3	91.1	0.90	12.8	10.3	7.40	2.6	8.2	3.7	DBGW-132MT-04	1PS5133- RD -4BH4	0.046
11	160 M	1475	71.2	100	15.0	IE3	91.4	0.80	19.9	15.9	11.5	2.6	7.6	3.4	DBGW-160MS-04	1PS5163- RD -4BH4	0.083
15	160 L	1480	96.8	150	12.5	IE3	92.5	0.80	27.0	21.5	15.6	2.5	8.5	3.8	DBGW-160LT-04	1PS5166- RD -4BH4	0.099
18.5	180 M	1470	120.2	150	20.0	IE3	92.6	0.80	32.0	25.5	18.5	2.5	7.2	3.3	DBGW-180MS-04	1PS5183- RD -4BH4	0.13
22	180 L	1470	142.9	270	22.5	IE3	93.0	0.80	38.0	30.5	22.0	2.3	6.8	3.3	DBGW-180LT-04	1PS5186- RD -4BH4	0.14
30	200 L	1470	194.9	270	24.0	IE3	93.9	0.80	53.0	42.5	30.5	2.6	7.3	3.1	DBGW-200LT-04	1PS5206- RD -4BH4	0.22

6-pole: 1000 rpm at 50 Hz

LOHER CHEMSTAR

0.55	80 B	935	5.60	10.0	3.50	IE3	77.2	0.67	1.53	1.23	0.89	2.5	4.5	2.8	DBGW-080BT-06	1PS5081- RD -4CH4	0.003
0.75	90 L	945	7.60	10.0	3.75	IE3	78.9	0.70	1.96	1.57	1.14	2.2	4.6	2.6	DBGW-090LS-06	1PS5095- RD -4CH4	0.004
1.1	100 L	975	10.8	20.0	6.25	IE3	81.0	0.70	2.75	2.20	1.60	2.2	5.6	2.9	DNGW-100LT-06	1PS5105- RD -4CH4	0.014
1.5	112 M	975	14.7	20.0	8.75	IE3	82.5	0.80	3.45	2.75	2.00	2.0	5.7	2.8	DNGW-112MT-06	1PS5112- RD -4CH4	0.017
2.2	132 S	980	21.4	50.0	10.0	IE3	84.3	0.80	4.70	3.80	2.75	2.0	6.7	3.1	DNGW-132SR-06	1PS5130- RD -4CH4	0.037
3	132 S	980	29.2	50.0	13.8	IE3	85.6	0.80	6.40	5.20	3.75	2.0	6.3	3.0	DBGW-132SS-06	1PS5131- RD -4CH4	0.037
4	132 M	975	39.2	50.0	17.5	IE3	86.8	0.80	8.60	6.90	5.00	2.0	6.1	2.8	DBGW-132MS-06	1PS5133- RD -4CH4	0.037
5.5	132 M	975	53.9	100	20.0	IE3	88.0	0.80	11.6	9.30	6.70	2.0	6.3	2.9	DBGW-132MT-06	1PS5135- RD -4CH4	0.046
7.5	160 M	980	73.1	100	27.5	IE3	89.1	0.80	16.0	12.8	9.30	2.0	5.1	2.3	DBGW-160MS-06	1PS5163- RD -4CH4	0.098
11	160 L	975	107.7	150	42.0	IE3	90.3	0.80	23.0	18.3	13.2	2.0	5.1	2.4	DBGW-160LT-06	1PS5166- RD -4CH4	0.12
15	180 L	975	146.9	270	35.0	IE3	91.2	0.80	29.5	23.5	17.1	2.3	5.9	2.8	DBGW-180LT-06	1PS5186- RD -4CH4	0.19
18.5	200 L	978	180.6	270	65.0	IE3	91.7	0.80	37.0	29.5	21.5	2.5	5.6	2.6	DBGW-200LS-06	1PS5206- RD -4CH4	0.28
22	200 L	978	215	270	65.0	IE3	92.5	0.80	43.5	35.0	25.0	2.5	5.6	2.6	DBGW-200LT-06	1PS5208- RD -4CH4	0.32

Operating modes

Line operation	Frame size	Order code
Line operation	80 ... 200	0
Converter operation, standard insulation	80 ... 200	1

Voltages

Voltage	Frame size	Order code
230 V/400 V, 50 Hz	80 ... 200	1
500 VY, 50 Hz	80 ... 200	3
400 V/690 V, 50 Hz	Standard	6
690 VY, 50 Hz	80 ... 200	8
For other voltages, see Page 2/65	80 ... 200	9

Types of construction

Construction type	Frame size	Order code
IM B3	Standard	0
IM B5	80 ... 200	1
IM B34	80 ... 112	2
IM B14	80 ... 112	3
IM V1/cover	80 ... 200	4
IM B35	80 ... 200	6
For other types of construction, see from Page 1/29 and 2/66	80 ... 200	9

T_B = Braking torque in Nm

The maximum permissible number of starts is limited for all motors to 20 c/h. For conditions for a higher number of starts, please inquire.

In the case of a number of starts of > 1 per hour, the brake dimensioning must be checked.

Conversion factor "c/h · J" depending on the duty cycle.

Standard brake supply voltage: 230 V 1 AC

Example 1

Motor: 1PS5113- RD.-4BH4
(Motor type: DBGW-112MT-04), S4-40 %, 20 c/h
 Required: ΣJ
 Solution: c/h · J = 7.45 from table
 ΣJ = 7.45/20 = 0.3725 kgm²

Example 2

Motor: 1PS5113- RD.-4BH4
(Motor type: DBGW-112MT-04), S4-40 %
 Required: c/h
 Solution: ΣJ = 0.05 kgm²
 c/h · J = 7.45
 c/h = 7.45/0.05 = 149

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Article No. supplements

Selection and ordering data

Voltages	Voltage code 11th position of the Article No.	Additional identification code with order code and plain text if required	Motor series																	
			LOHER CHEMSTAR												LOHER VARIO					
			Frame size																	
			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Optional voltages																				
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
230 VΔ/400 VY, 50 Hz	1		○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-
500 VY, 50 Hz – up to 200 kW	3		○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-
400 VΔ, 50 Hz	4		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
500 VΔ, 50 Hz	5		✓	✓	✓	✓	✓	○	○	○	○	○	○	○	○	○	○	○	○	○
400 VΔ/690 VY, 50 Hz	6		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
690 VY, 50 Hz	8		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
415 VY, 50 Hz – up to 200 kW	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
220 VΔ/380 VY, 50 Hz	9	L1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
Other voltages	9	L1Y • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
220 VΔ/380 VY, 60 Hz (50 Hz power)	9	L2A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
220 VΔ/380 VY, 60 Hz (60 Hz power)	9	L2B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (50 Hz power)	9	L2C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (60 Hz power)	9	L2D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
460 VY, 60 Hz (60 Hz power)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
460 VΔ, 60 Hz (60 Hz power)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
575 VY, 60 Hz (60 Hz power)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
575 VΔ, 60 Hz (60 Hz power)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
440 VY, 60 Hz (50 Hz power)	9	L2Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
440 VΔ, 60 Hz (50 Hz power)	9	L2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
460 VY, 60 Hz (50 Hz power)	9	L2S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
460 VΔ, 60 Hz (50 Hz power)	9	L2T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
575 VY, 60 Hz (50 Hz power)	9	L2U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
575 VΔ, 60 Hz (50 Hz power)	9	L2V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
440 VY, 60 Hz (60 Hz power)	9	L2W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
440 VΔ, 60 Hz (60 Hz power)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	O.R.	O.R.	O.R.	O.R.
Other voltages 60 Hz	9	L2Y • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O. R. Possible on request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.
Standard brake supply voltage: 230 V 1 AC



Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Article No. supplements

Selection and ordering data

Types of construction	Type of construction code 12th position of the Article No.	Additional identification code with order code and plain text if required	Motor series																	
			LOHER CHEMSTAR												LOHER VARIO					
			Frame size																	
			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Optional types of construction																				
IM B3	0		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
IM B5 ¹⁾	1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
IM B34	2		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-
IM B14	3		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	-	-	-	-	-	-	-	-	-
IM V1, with protective cover	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
IM B35	6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
IM B6 ¹⁾	9	M1A	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B7 ¹⁾	9	M1B	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B8 ¹⁾	9	M1C	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V6 ¹⁾	9	M1E	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V5, with protective cover ¹⁾	9	M1F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IM V3	9	M1G	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-
IM V15, with protective cover	9	M2K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-
IM V18, with protective cover	9	M2M	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-

- Without additional charge
- ✓ With additional charge
- O. R. Possible on request
- Not possible

Other types of construction and special flange dimensions upon request!

¹⁾ LOHER CHEMSTAR motors with frame size 315 and 355 only with direct coupling without vibration, otherwise O. R..

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection																			
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	A11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	A12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	A15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	A16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	A23	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Measuring of winding temperature by means of 2 × embedded KTY84-130 temperature sensors	A25	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – in 2-wire design	A60	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire design, for round-wire winding only	A61	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A64	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 resistance thermometers, with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design without surge arresters for 4-wire connection – for pre-formed coil winding only	A67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3- and 4-wire connection from terminal box – for pre-formed coil winding only	Q40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 bearing double resistance thermometer Pt100 in Ex i version – 2-wire from element, 4-wire from terminal box	V80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire design from sensor instead of from terminal (not Ex i PT100!) – optionally possible for A60, A61, A65, A66	Q43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire design from sensor instead of from terminal – optionally possible for V80, A40, A42	Q44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One thermocouple per bearing	Q49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z		Frame size																	
1PS5.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection (continued)																			
Sensor for enclosure vibration monitoring (preferred brand), with loose cable – for each sensor	V14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring (preferred brand), without terminal box – for each sensor	V15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	V16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
3 transmitters, 4 to 20 mA for Pt100 winding	P20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 transmitter with digital display with Ex d or Ex i approval	V88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pt100 winding in tolerance class A	V78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Installation altitude, max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude, max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection (continued)																			
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 30 °C (observe derating) – derating in accordance with reduction table.	D15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling air temperature max. 35 °C (observe derating) – derating in accordance with reduction table.	D16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling air temperature max. 40 °C (observe derating) – derating in accordance with reduction table.	D17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Power data for converter operation, utilization in accordance with temperature class F (155 °C)	C32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Utilization according to temperature class 155 (F) – in line operation max. rated power according to IEC possible. No additional charge if special voltage is selected (11th position of Article No. = 9).	C12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
Rated power of the next lower power level – IEC power levels are maintained, only in combination with D06 to D18 . No additional charge if special voltage is selected (11th position of Article No. = 9).	C29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Moderately extended speed range for converter operation	V82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Temperature class F	W00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Temperature class H	W01	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	-	-	-	-
Sealing of winding overhangs with silicone rubber	W03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Non-standard voltage and/or frequency for separate fan motor	Y81 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Colors and paint finish																			
Inner anti-corrosion protection system J08	W10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection (continued)																			
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	V10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	W14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Special prime coat system Z05 with internal corrosion protection system J08	W15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	V11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system Z21/J08 – 300 µm (offshore, C5M-M _{high}) – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (5 to 15 years) – sea climate	V19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special offshore paint finish S13 with reference to NORSOK M501 (C5M _{high}) with comments and deviations – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (> 15 years) – sea climate	V12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special coating system S11/J08 (e.g. submerged motors)	V13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	K24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Unpainted	K23	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
Outer coating 110 µm for zinc-galvanized noise cabinet	V98	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Special colors according to Munsell or British Standard	Y50 • and customer specifications	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Standard paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	Y53 • and standard finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002, 9002 – (specify special coating system in addition, e.g. V10 , V11 , W14 , etc.)	Y54 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	Y51 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special non-RAL colors	Y71 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		Frame size																	
1PS4-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
1PS5-Z																			
Design for Zones according to ATEX																			
Version for gas group IIC, but stamped IIB	M99	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Design for Zone 21 (conductive dust) for line operation, IP65	M34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for line operation	M35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design for Zone 21 (conductive dust) for converter operation, IP65	M38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for converter operation	M39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for line operation, no hybrid certification – non-conductive dust	W20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design additionally for dust, Zone 21 for line operation, no hybrid certification, IP65 – design and certification for conductive dust (incl. non-conductive dust)	W21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for converter operation, no hybrid certification – non-conductive dust, select options for converter operation separately	W22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design additionally for dust, Zone 21 for converter operation, no hybrid certification, IP65 – version and certification for conductive dust (incl. non-conductive dust), select options for converter operation separately	W23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Ship design "Operation below deck"																			
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	W24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	W25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration – non essential	W26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV GL (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	W27	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	W28	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to RINA (Registro Italiano Navale), CT 50 °C with manufacturer's declaration – non essential	W29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	W99	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR														LOHER VARIO				
1PS4.....-Z		Frame size																		
1PS5.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Ship design "Operation below deck" (continued)																				
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive ¹⁾	Q60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV GL (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive ¹⁾	Q64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to RINA (Registro Italiano Navale), CT 50 °C with manufacturer's declaration, essential drive ¹⁾	Q65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to USSR (Russia) with manufacturer's declaration, essential drive ¹⁾	Q67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to PR (Poland) with manufacturer's declaration, essential drive ¹⁾	Q68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to NKK (Japan) with manufacturer's declaration, essential drive ¹⁾	Q69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Individual certifications																				
Operation at ambient temperatures down to -50 °C, transport down to -50 °C – roller bearing design	D02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Operation at ambient temperatures down to -40 °C, transport down to -40 °C – roller bearing design	D03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Operation at ambient temperatures down to -30 °C, transport down to -40 °C – roller bearing design	D04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Electrical design according to NEMA MG 1-12	D30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ex certification for China	D32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
China Energy Efficiency Label	D34	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
EAC certificate for the Eurasian Customs Union	D35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ex certification for India (PESO – CCOE)	D38	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC Ex certificate	D37	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	✓	✓	✓	✓
MEPS Australia	D70	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs																			
Terminal box on right-hand side (viewed onto DE)	K09	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	□	□	□	□
Terminal box on left-hand side (viewed onto DE)	K10	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	○	○	○	○
Terminal box on top	K11	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○
Terminal box to IP65	Q71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Cable entry thread metrically different from standard – thread dimension must be specified	W30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Enlarged connection system for main terminal box – not in combination with K53 (Ex d terminal box)	L00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Undrilled cable gland plate on main terminal	L01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□
Main terminal box in Ex d version with standard terminals	Q31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
1 × NPT thread for main terminal (observe sizes) – specify thread, cable gland not in supply	W32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
1 × cable gland for non-armored cable – for main terminal box	K54	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
1 × cable gland, standard thread size for additional connection (for non-armored cable)	W33	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Saddle terminal for connection without cable lug	W35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Special cable gland, 1 unit – specify exact cable data; selection table for CHEMSTAR motors, see page 2/42	Y97 • and customer specifications	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Cable gland, standard Ex d (non-armored cable) 1 unit – only in combination with K53 , specify exact cable data	W91	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Cable gland for accessories Ex d – 1 unit (non-armored cable)	W92	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Explosion-proof main terminal box, Ex d IIC	K53	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box Ex d IIC, cast-iron – with standard thread according to catalog	V43	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box Ex e, cast-iron – not in combination with K53 (Ex d terminal box)	W72	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Material of auxiliary terminal box: Stainless steel – not in combination with K53 (Ex d terminal box)	M51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box, cast-iron, for heater	M52	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with K53 (Ex d terminal box)	Q75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with K53 (Ex d terminal box)	Q76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 cables protruding, radial, 1.5 m long – 7 conductor cables; Δ or Y interconnection, customer-supplied	W38	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Extension of the cable to 3 m – only in combination with W38	W39	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Connection cable for accessories – only in combination with W38 , length as power cable	W40	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Additional separately supplied terminal box made of cast-iron with baseplate – main terminal box certified acc. to Ex e	W41	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Cable entry from DE	K83	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	K84	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	K85	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14	K01	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter operation only at lowest and highest speed of speed range	K02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft and flange with increased accuracy according to DIN 42955-R	K04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (oil-tight)	K17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Radial sealing ring at DE for vertical flange-mounting types (oil-tight)	W43	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Labyrinth sealing for external bearing seal	W44	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	□	□	□	□
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising K40 ; FS 355: for 4 and 6-pole motors only; not possible for 2-pole motors	K20	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.
Bearings for increased axial forces	V20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Regreasing device DE/NDE	K40	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	□
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter operation	L27	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft grounding device – up to -20 °C only	V36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Located bearing DE	K94	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	L04	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Pt100 bearing or coolant in tolerance class A – only in combination with Q44	V76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One transmitter each (2 in total) 4 to 20 mA for Pt100 bearing DE and NDE	V83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	V17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	V18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Grease extractors for DE and NDE	V21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	V22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	V25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
External grounding (additionally)	W46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
VIK design – including W14, W47, W69	K30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-
LOHER CHEMSTAR Plus design, including VIK design, IP56 – including K30, K51, W14, W69 and IP66 shaft seal, vibration quantity level as grade B	W09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Second rating plate, supplied loose	K31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	W47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate with rating data for converter operation according to limit characteristic	Y80 • and customer specifications	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Extra rating plate for customer data (each plate) – data must be specified as text in the order	Y82 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional information on motor plate and on package label – max. 20 characters possible	Y84 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates made of stainless steel	W48	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates in languages other than English and German – main rating plate or extra rating plates O.R., factory clarification essential	W49	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	W50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	K45	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Anti-condensation heater 115 V	K46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z		Frame size																	
1PS5.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Anti-condensation heater, 110 to 120 V (min. 100 V, max. 132 V) – preferred	M12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater, 210 to 250 V (min. 200 V, max. 264 V) – preferred	M13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater rated voltage range 110 to 120 V (min. 100 V, max. 132 V) Ex e	M14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater rated voltage range 220 to 240 V (min. 200 V, max. 264 V) Ex e II T3	M15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Heater in main terminal box	P84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Second standard shaft extension – for 100% torque; VARIO 50% torque	K16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓
Second shaft extension for IM B3 up to 100 % torque; cylindrical with feather key	Q21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	Y55 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft of material 1.7225	W51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	W52	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft end of stainless steel butt-welded (material 1.4571)	W53	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft made of special steel – down to -40 °C only	L72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator enclosure for surface-cooled motors – factory clarification required because of possible dimension deviations	W54	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	O.R.	□	□	□	□
Welded copper bar rotors	W55	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	□	□	□	□
Special rotors for heavy duty starting (e.g. double-cage rotor or brass rotor) – type test needed	Q22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Generator design (asynchronous) with 1.8 times runaway speed – only 4-pole and higher	W56	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	-	-	-	-
IP56 degree of protection	K51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	K50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	L94	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Increased tropicalization, humidity ≥ 80 % – LOHER CHEMSTAR incl. V10 and W71 , LOHER VARIO incl. V10 and P45	W61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	L28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream of driven fan. Without external air stream cooling, factory clarification required due to derating	W62	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		Frame size																	
1PS4-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
1PS5-Z																			
Special mechanical designs (continued)																			
Fan with anti-corrosion protection in case of metal fan	W63	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	W64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Fan of steel	W65	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
External fan of brass	W66	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	V94	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	O.R.
Special ventilation for on-deck motors	W67	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan cover of steel sheet (3 mm thick)	W68	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Galvanized fan cover – included in K30 and W09	W69	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	O.R.	O.R.	O.R.	O.R.
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	K37	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	K38	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
Clockwise (viewed onto DE) – direction of rotation must be specified for motors with FS 355 2-/4-pole	K97	–	–	–	–	–	–	–	–	–	–	–	–	–	○	○	○	○	○
Counter-clockwise (viewed onto DE) – direction of rotation must be specified for motors with FS 355 2-/4-pole	K98	–	–	–	–	–	–	–	–	–	–	–	–	–	○	○	○	○	○
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with K97 or K98	L20	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓
Stainless steel grid for air inlet silencer – only in combination with L20	L25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) for GG1	V32	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Noise cabinet with inspection door – V4A unpainted – noise reduction approx. 15 dB(A) for GG1	V35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Insulation sheath for noise reduction approx. 3 to 5 dB(A) for standard GG1	V34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Operation in both directions of rotation – from FS 355 2-/4-pole, possibly increased noise values and derating; CHEMSTAR FS 355: technical factory clarification essential	K99	□	□	□	□	□	□	□	□	□	□	□	□	□	O.R.	✓	✓	✓	O.R.
Higher number of starts (up to 3000 starts per year)	Q23	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Full-key balancing	L68	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Support ring for coupling guard	L15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	L17	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	L31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	L33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Half-key balancing	L69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□
Stainless steel screws and plates	W71	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Stainless steel external bolts	P45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ambient temperatures down to -40 °C; preheating before operation necessary – factory clarification required regarding the heating power required, heating via the winding may be necessary. Installed heating elements in motor at additional charge.	W73	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Ambient temperatures down to -60 °C; preheating before operation necessary – factory clarification required regarding the heating power required, heating via the winding may be necessary. Installed heating elements in motor at additional charge.	W74	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	-	-	-
Ambient temperatures down to -40 °C; without preheating before operation	W97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Ambient temperature down to -55° C; without preheating before operation	W98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Mounted rotary pulse encoder, 1024 pulses per revolution -10 to 30 V, HTL level – Ex d; cable length 5 m	W96	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Mounted rotary pulse encoder Ex version (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version	V72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted rotary pulse encoder Ex version with integrated shaft grounding (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version; -20+ to +50 °C; select bearing insulation separately	V77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Mechanical protection for rotary pulse encoder – in combination with V72 , V77	M68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted radial forced ventilation	W81	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Forced ventilation at NDE – for Ex motors – axial forced ventilation	V28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked) – dimensions may differ	G48	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked), – dimensions may differ	G49	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓
Manual mechanical release for standard brake	K82	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
Brake supply voltage 400 V AC/50 Hz 1-phase	C01	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
Brake supply voltage 24 V DC / 1-phase	C00	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-

For legends and footnotes, see Page 2/80.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Tapered shaft extension with shaft nut	T36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Microswitch for brake – optionally deselectable if monitoring is implemented differently	W83	-	□	□	□	□	□	□	□	□	○	○	○	○	-	-	-	-	-
Sun protection shield – fixing parts of mild steel, cover unpainted stainless steel for vertical motors	V87	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Sun protection shield – fixing parts of mild steel, cover of unpainted stainless steel for horizontal motors	V99	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	W84	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drain valve IP66 (drain and breather) for main terminal box – not in combination with V43 (Ex d terminal box)	Q77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Condensation drain valve IP66 (drain and breather) for main terminal box – not in combination with K53 (Ex d terminal box)	Q78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Machined surface on motor foot with dowel pin holes	Q94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Base frame for height adaptation of max. 2 frame sizes difference	Q96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	Q97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of flange dimensions and drilled holes in flange	Q98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Preparation for later installation of sun protection shield	Q99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Measuring nipple system 32 – thread M8, DE and NDE	G50	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shock pulse measurement (SPM), fixed sensor and distribution box	H05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Fixed sensor system 40 – thread M8	W85	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	-	-	-	-
Bearing temperature monitoring with PTC thermistors at DE/NDE	W86	-	-	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	-	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	A03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A40	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 3- or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers without contacts, capillary principle	A70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers with 2 NO contacts, capillary principle	A71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection – 2-wire from terminal box	A72	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		Frame size																	
1PS4.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	V89	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Labeling of terminal box, engraved	V96	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	Q92	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
4 mm shims, brass base – not laminated	V31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Slotted feet holes	Q95	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Pre-formed coil for LV motors	V01	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	V08	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Impact protection – for built-on devices, per device	M81	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Special mechanical designs (continued)																			
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required	W87	–	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Retrofit (description of special design separately) – adaptation to an existing motor	B15	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Extension of the liability for defects																			
Extension of the liability for defects by 12 months up to a total of 24 months	Q80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months up to a total of 30 months	Q81	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months up to a total of 36 months	Q82	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 30 months up to a total of 42 months	Q83	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 36 months up to a total of 48 months	Q84	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 48 months up to a total of 60 months	Q85	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O. R. Possible on request
- Not possible

1) Acceptance tests must be selected additionally. For example, for the first motor select **F83** or **F93**, and for each additional motor **F01**. Inclusive of costs for certification authority and inspector, and shaft test if specified by certification authority. LOHER CHEMSTAR for essential drive is possible on request as an ETO option (Engineer To Order) without an option code.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Engineer To Order (ETO)

Overview

Engineering

In addition to the standard options, for the LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series, it is also possible to order special versions.

The following variants are available via the electronic ordering tools:

- Mounted axial forced ventilation (non heavy sea) – forced ventilation can be ordered with **F** in the 10th position of the article number.
A mounted forced ventilation is available for frame sizes 132 to 355.
- Special insulation for increased voltage load in converter operation (phase/phase 2250 V_{Peak}/derating) – can be ordered for LOHER CHEMSTAR in frame sizes 160 to 355 with **2** in the 8th position of the article number.
This version is available on request for LOHER VARIO motors.

To fulfill the requirements of your application in the best possible way, we offer the motor in an "Engineer To Order" (ETO) version. These ETO options are specially defined and engineered to suit customer requirements.

They cannot be ordered using electronic ordering tools; they can only be ordered on request from a Siemens contact:

Special electrical designs/winding protection

- Design with reduced starting current – factory clarification required (type test may be necessary).
For all frame sizes on request.
- Special design according to load curve of driven machine or customer requirements – factory clarification required and type test may be necessary.
For all frame sizes on request.
- Adjustment of rating in response to customer requirements – factory clarification required and type test may be necessary.
For all frame sizes on request.
- Other special electrical designs/configurations.
For all frame sizes on request.

Special mechanical designs

- "High-speed motors" for speed range > 6000 rpm – factory clarification required; torque characteristic and cutoff frequency affect the design. Test with original frequency converter may be necessary.
For LOHER CHEMSTAR frame sizes 90 to 355 on request.

Colors and paint finish

- Other paint combinations/systems or RAL colors to customer specification.
For all frame sizes on request.

[More detailed information can be obtained from your Siemens sales partner.](#)

Motors with Explosion Protection

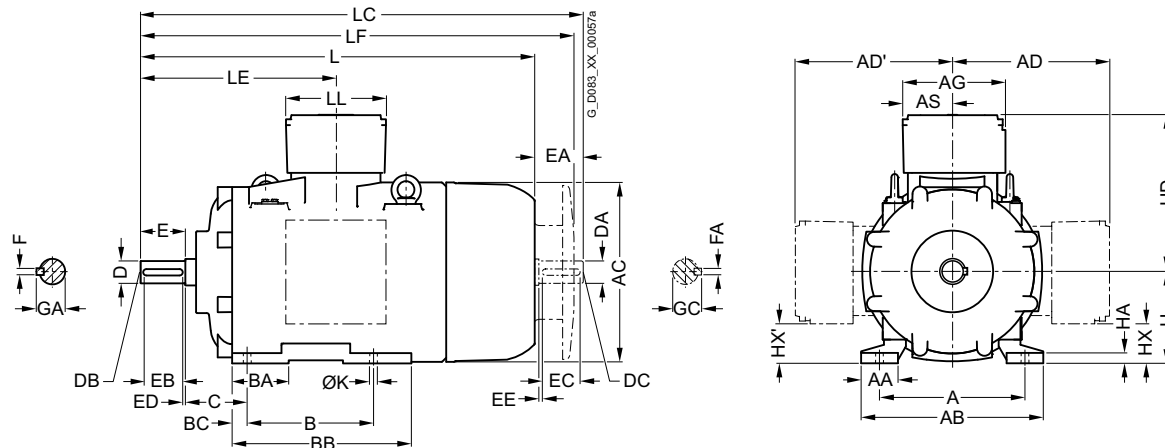
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 71 B to 250 M

Dimensional drawings

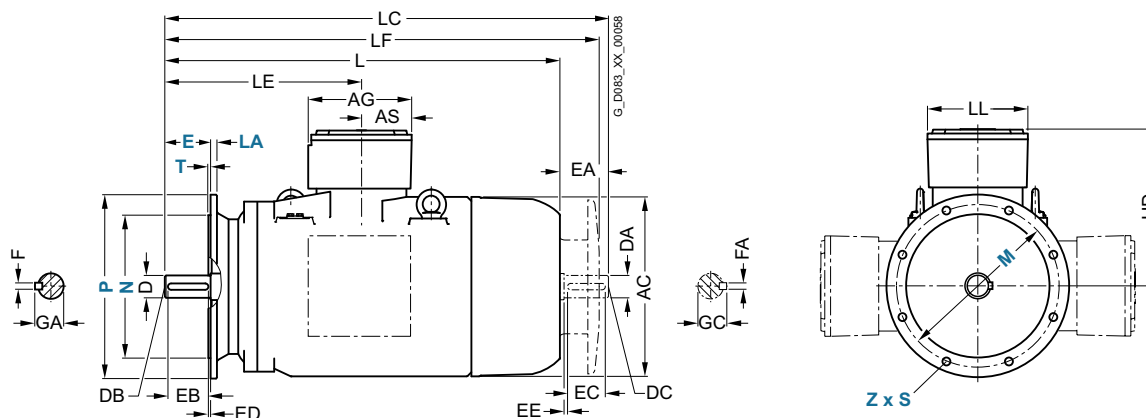
Type of construction IM B3

For flange dimensions, see Page 2/88



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/88



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER CHEMSTAR																		
71 B	2 ... 16	112	30	140	148	–	138	69	90	30	125	10	45	71	10	200	7	345
80 B	2 ... 16	125	35	160	168	–	138	69	100	35	130	13	50	80	10	209	10	358
90 L	2 ... 16	140	40	180	186	–	138	69	125	40	155	15	56	90	13	213	10	426
100 L	2 ... 16	160	45	205	213	–	138	69	140	45	170	15	63	100	18	227	12	482
112 M	2 ... 16	190	50	240	237	–	138	69	140	60	170	15	70	112	18	240	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	88	228	25	89	132	18	274	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	88	228	25	89	132	18	274	12	574
160 M	2 ... 16	254	60	310	331	304	186	92	210	61	307	21	108	160	27	305	15	786
160 L	2 ... 16	254	60	310	331	304	186	92	254	61	307	21	108	160	27	305	15	786
180 M	2 ... 16	279	70	349	363	349	254	123	241	99	359	24	121	180	19	349	15	822
180 L	2 ... 16	279	70	349	363	349	254	123	279	99	359	24	121	180	19	349	15	822
200 L	2 ... 16	318	80	400	402	367	254	123	305	120	425	32	133	200	25	369	19	884
225 S	2	356	90	446	451	384	254	123	286	136	438	34	149	225	26	384	19	966
	4 ... 16																	996
225 M	2	356	90	446	451	384	254	123	311	136	438	34	149	225	26	384	19	966
	4 ... 16																	996
250 M	2	406	100	505	490	522	382	176	349	110	420	36	168	250	35	522	25	1028
	4 ... 16																	

Motors with Explosion Protection

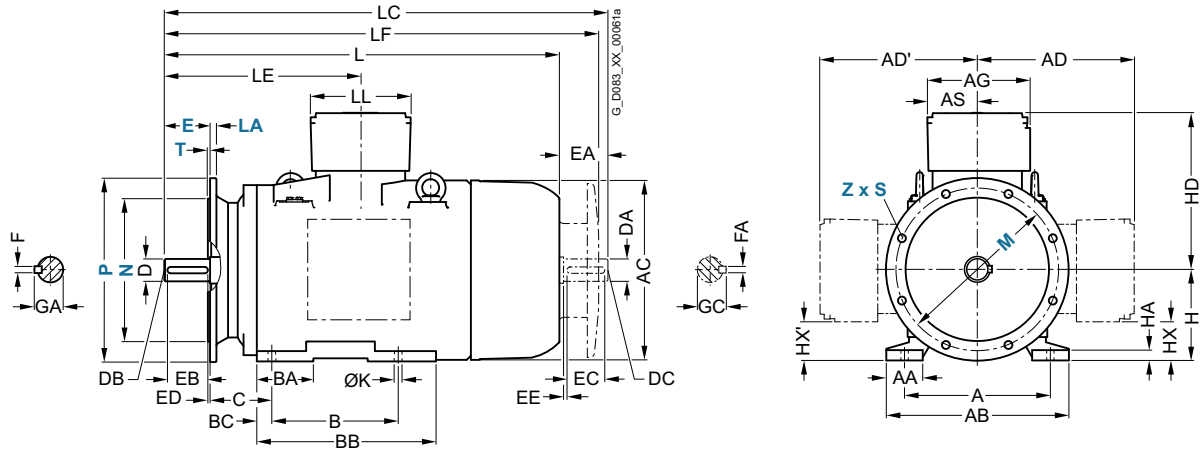
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 71 B to 250 M

Dimensional drawings (continued)

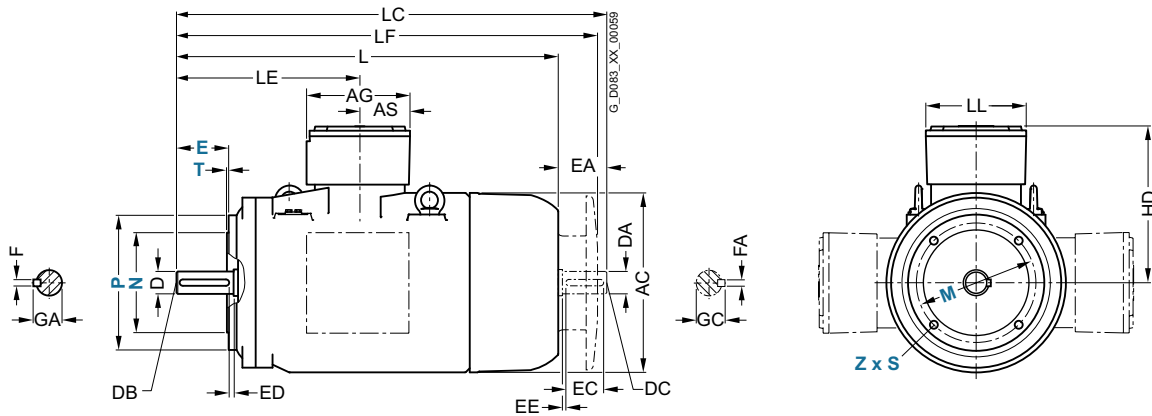
Type of construction IM B35

For flange dimensions, see Page 2/88



Type of construction IM B14

For flange dimensions, see Page 2/88



Frame size	No. of poles	Dimension designation acc. to IEC DE shaft extension										NDE shaft extension							
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER CHEMSTAR																			
71 B	2 ... 16	385	135	377	138	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16
80 B	2 ... 16	408	158	391	138	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	22
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	52
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.6	48	M16	110	100	5	14	52
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65	69						65	18					69	



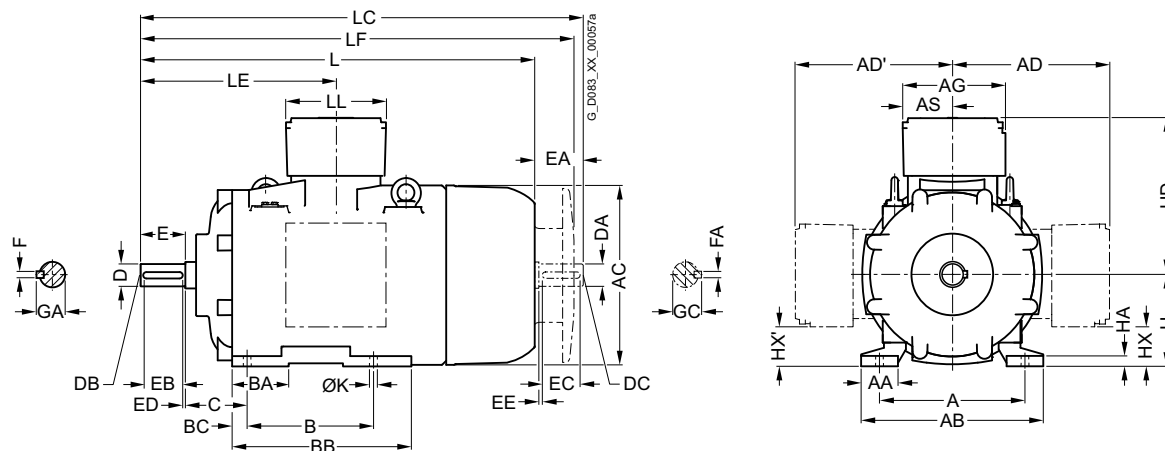
Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 280 S to 355 M

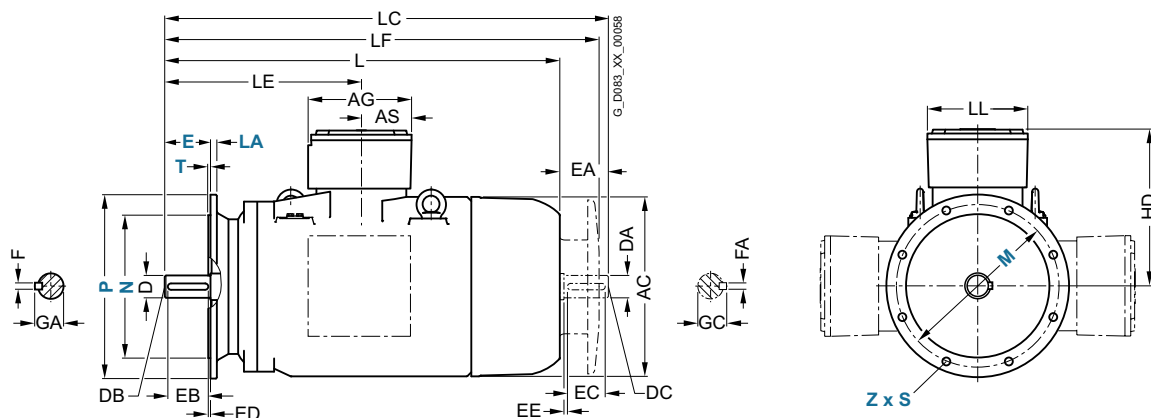
Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/88



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	ØK	L
LOHER CHEMSTAR																		
280 S	2	457	110	570	550	552	382	176	368	150	520	51	190	280	40	552	25	1119
	4 ... 16																	
280 M	2	457	110	570	550	552	382	176	419	150	520	51	190	280	40	552	25	1119
	4 ... 16																	
315 S	2	508	125	630	622	660	509	196	406	165	575	59	216	315	40	660	28	1304
	4 ... 16																	1334
315 M	2	508	125	630	622	660	509	196	457	165	575	59	216	315	40	660	28	1304
	4 ... 16																	1334
315 LL	2	508	125	630	622	676	509	196	508	165	675	59	216	315	40	676	28	1491
	4 ... 16																	1521
315 L	2	508	125	630	622	676	509	196	560	165	675	59	216	315	40	676	28	1491
	4 ... 16																	1521
355 M	2	630	150	780	734	–	509	196	800	220	980	90	254	355	35	827	35	1781
	4, 6																	1840

Motors with Explosion Protection

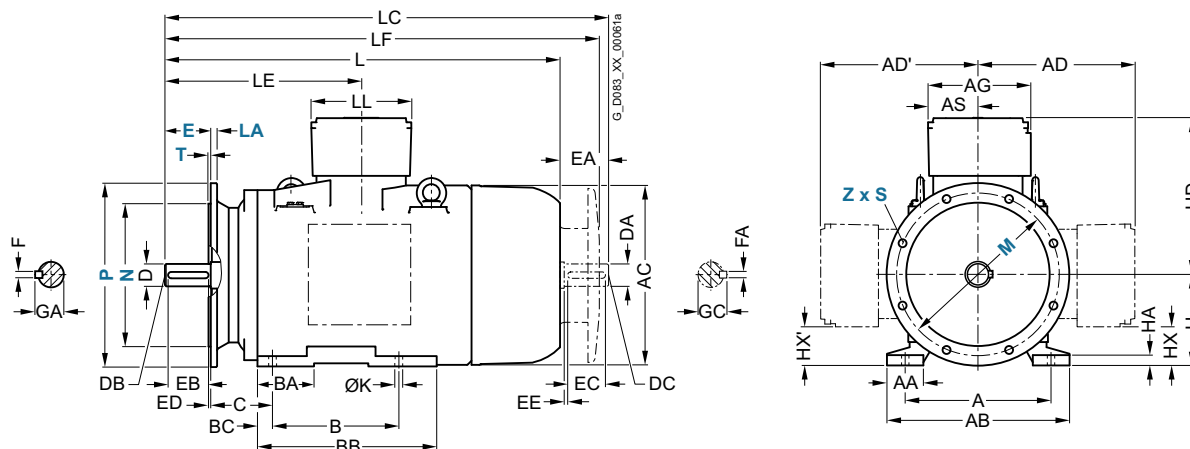
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 280 S to 355 M

Dimensional drawings (continued)

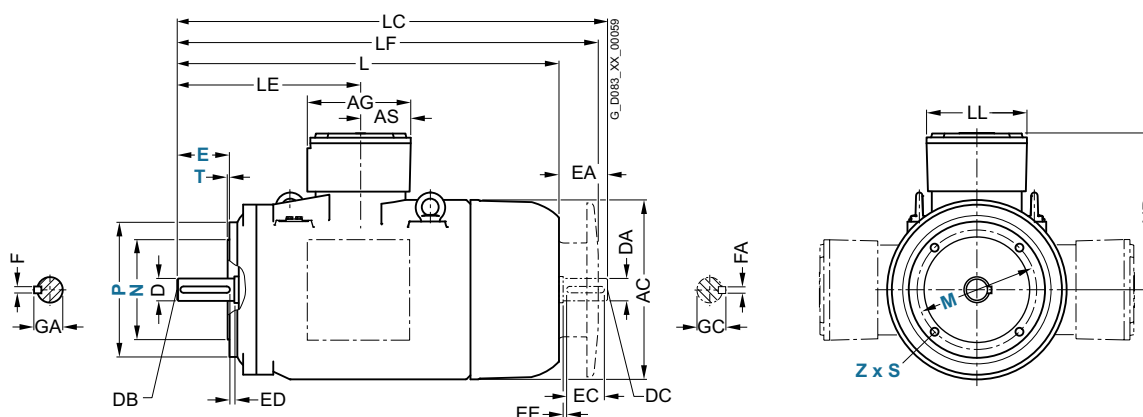
Type of construction IM B35

For flange dimensions, see Page 2/88



Type of construction IM B14

For flange dimensions, see Page 2/88



Frame size	No. of poles	Dimension designation acc. to IEC DE shaft extension											NDE shaft extension						
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER CHEMSTAR																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75				20	79.5	75						20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	80
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1986	793	1947	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80
	4 ... 16	2115	863	2006	401	100	M24	210	180	15	28	106	75	M20	140	125	7.5	20	79.5

Motors with Explosion Protection

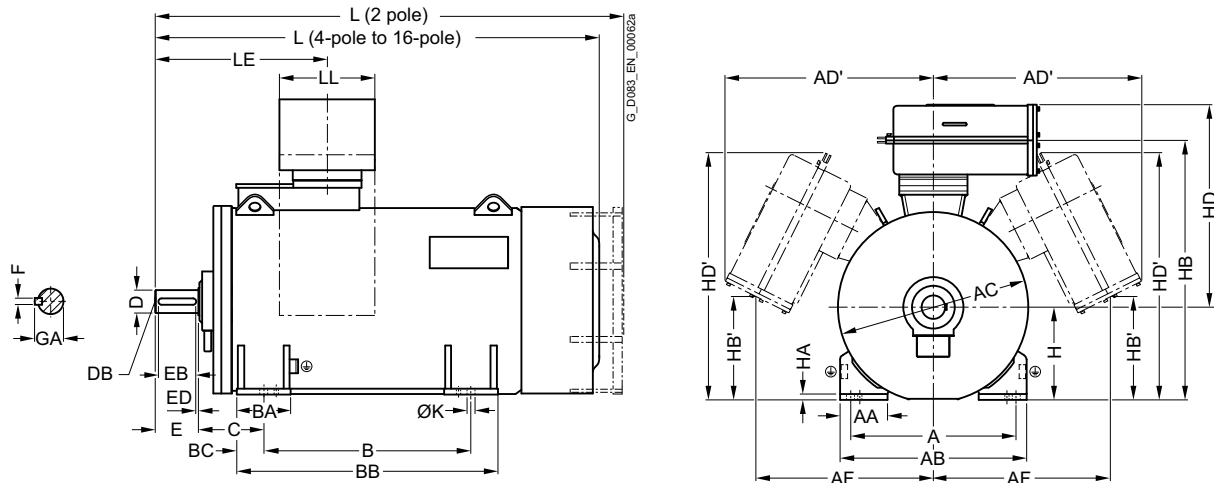
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 355 L to 500 L

Dimensional drawings (continued)

Type of construction IM B3

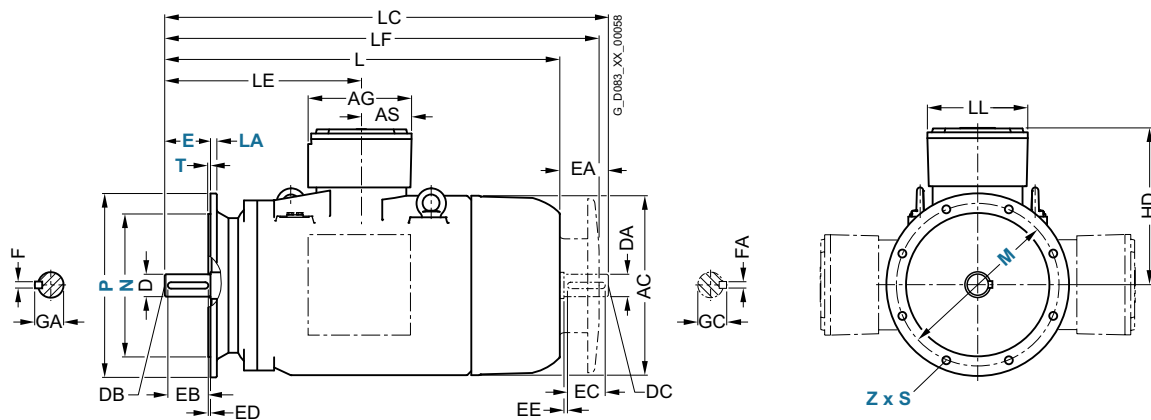
Design of terminal box and position for LOHER VARIO



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/88

Design of terminal box and position for LOHER VARIO



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER VARIO																		
355 LB	2	610	120	700	698				630	150	720		254	355	30	707	28	1870
	4 ... 16																	1775
355 LC/LD	2	610	120	700	698				800	150	890		254	355	30	707	28	1950
	4 ... 16																	1855
355 L	2	630	140	780	740		511		800	210	950		254	355	35	885	33	2016
	4 ... 16																	1900
400 L	2	710	185	860	820		511		900	210	1090		280	400	30	905	33	2131
	4 ... 16																	2025
450 L	2	800	230	900	920		511		1000	260	1260		315	450	30	980	39	2251
	4 ... 16																	2180
500 L	2	900	220	1030	1015		511		1120	280	1400		335	500	40	1030	39	2421
	4 ... 16																	2375

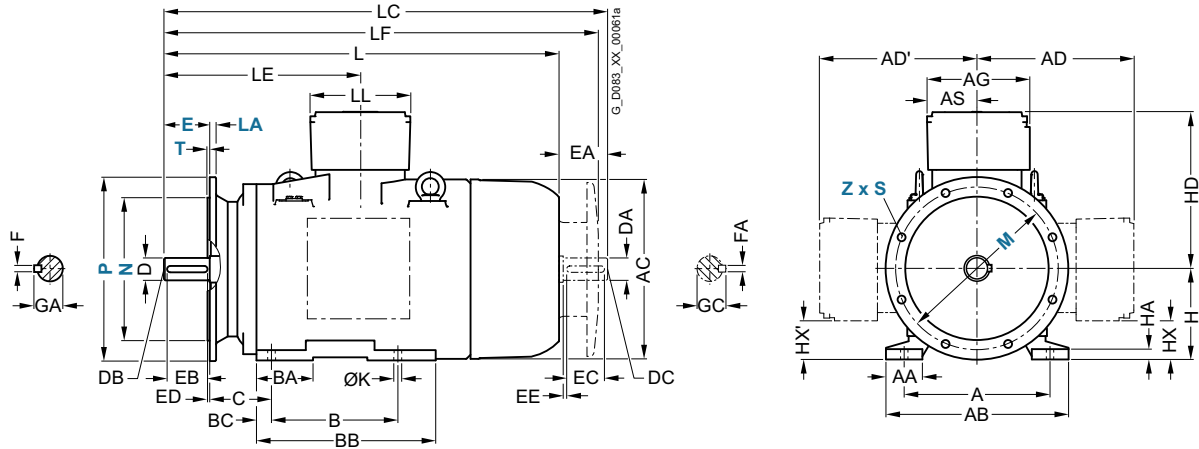
Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 355 L to 500 L

Dimensional drawings (continued)

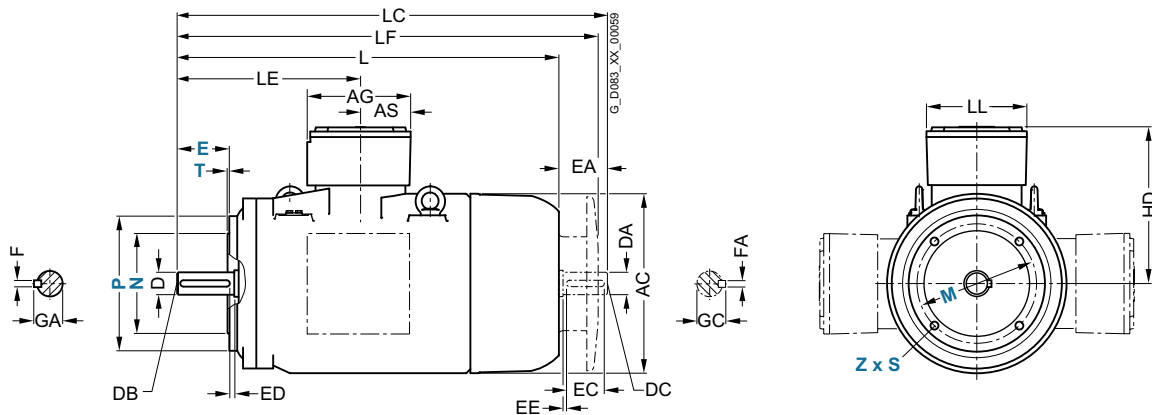
Type of construction IM B35

For flange dimensions, see Page 2/88
Design of terminal box and position for LOHER VARIO



Type of construction IM B14

For flange dimensions, see Page 2/88
Design of terminal box and position for LOHER VARIO



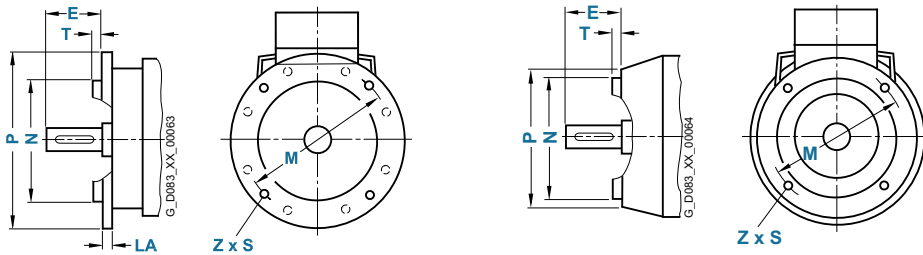
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER VARIO																			
355 LB	2	779	1870		75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80	
	4 ... 16	809	1935		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
355 LC/LD	2	779	1950		75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80	
	4 ... 16	809	2015		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
355 L	2	750	2016		75	M20	170	125	7.5	20	79.5	75	M20	170	125	7.5	20	80	
	4 ... 16	780	2066		90	M24	210	140	15	25	95	90	M24	210	140	15	25	95	
400 L	2	780	2131		80	M20	170	140	15	22	85	80	M20	170	140	15	22	85	
	4 ... 16	820	2191		100	M24	210	180		28	106	100	M24	210	180		28	106	
450 L	2	780	2251		85	M20	170	140	15	22	90	85	M20	170	140	15	22	90	
	4 ... 16	820	2346		110	M24	210	180		28	116	110	M24	210	180		28	116	
500 L	2	780	2421		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
	4 ... 16	820	2541		120		210	180		32	127	120		210	180		32	127	

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Flange dimensions

Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes. (Z = the number of retaining holes)

Frame size	No. of poles	Flange with Through hole (FF)/tapped hole (FT) according to EN 50347	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR										
71 B	2 ... 16	FF130	10	30	130	110	160	9.5	3.5	4
		FT85	15	30	85	70	105	M6	2.5	4
		<i>FT115¹⁾</i>	15	–	115	95	140	M8	3	4
		<i>FT100¹⁾</i>	15	–	100	80	120	M6	3	4
		<i>FT130¹⁾</i>	15	–	130	110	160	M8	3.5	4
80 B	2 ... 16	FF165	10	40	165	130	200	11.5	3.5	4
		FT100	15	40	100	80	120	M6	3	4
		<i>FT130¹⁾</i>	10	–	130	110	160	M8	3.5	4
		<i>FT85¹⁾</i>	15	–	85	70	105	M6	2.5	4
		<i>FT115¹⁾</i>	15	–	115	95	140	M8	3	4
90 L	2 ... 16	FF165	10	50	165	130	200	11.5	3.5	4
		FT115	10	50	115	95	140	M8	3	4
		<i>FT130¹⁾</i>	13.5	–	130	110	160	M8	3.5	4
		<i>FT110¹⁾</i>	13.5	–	110	80	140	M6	3	4
100 L	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
		<i>FT115¹⁾</i>	10	–	115	95	140	M8	3	4
		<i>FT165¹⁾</i>	12	–	165	130	200	M10	3.5	4
112 M	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
		<i>FT165¹⁾</i>	12	–	165	130	200	M10	3.5	4
132 S	2 ... 16	FF265	12	80	265	230	300	14	4	4
132 M	2 ... 16	FF265	12	80	265	230	300	14	4	4
160 M	2 ... 16	FF300	20	110	300	250	350	18	5	4
160 L	2 ... 16	FF300	20	110	300	250	350	18	5	4
180 M	2 ... 16	FF300	16	110	300	250	350	18	5	4
180 L	2 ... 16	FF300	16	110	300	250	350	18	5	4
200 L	2 ... 16	FF350	20	110	350	300	400	18	5	8
225 S	2	FF400	16	110	400	350	450	18	5	8
	4 ... 16			140						
		<i>FF500¹⁾</i>	22	–	500	450	550	18	5	8
225 M	2	FF400	16	110	400	350	450	18	5	8
	4 ... 16			140						
		<i>FF500¹⁾</i>	22	–	500	450	550	18	5	8
250 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		<i>FF600¹⁾</i>	22	–	600	550	660	22	6	8

¹⁾ Flange is selectable at no additional cost.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Flange dimensions

Dimensional drawings (continued)

Frame size	No. of poles	Flange with Through hole (FF)/ tapped hole (FT) according to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR (continued)										
280 S	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		<i>FF600¹⁾</i>	22	–	600	550	660	22	6	8
280 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		<i>FF600¹⁾</i>	22	–	600	550	660	22	6	8
315 S	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF500¹⁾</i>		22	–	500	450	550	18.5	5	8	
315 M	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF500¹⁾</i>		22	–	500	450	550	18.5	5	8	
315 LL	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF740¹⁾</i>		25	–	740	680	800	24	6	8	
315 L	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF740¹⁾</i>		25	–	740	680	800	24	6	8	
355 M	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			210						
LOHER VARIO										
355 LB	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
355 LC/LD	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
355 L	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
400 L	2	FF940	28	170	940	880	1000	24	6	8
	4 ... 16			210						
450 L	2	FF1080	30	170	1080	1000	1150	28	6	8
	4 ... 16			210						
500 L	2	FF1180	30	170	1180	1120	1250	28	7	8
	4 ... 16			210						

¹⁾ Flange is selectable at no additional cost.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

General information

Technical specifications

LOHER CHEMSTAR and VARIO 1PS1 motor series, type of protection "Non-sparking"

The LOHER CHEMSTAR and VARIO motors of the 1PS1 series are fully-enclosed, surface-cooled motors in the "Non-sparking" type of protection Ex nA II. In these motors, the type of construction prevents the occurrence of arcing, sparks or hot surfaces during normal operation, ensuring that the required level of safety is maintained. The CHEMSTAR motors can be designed in accordance with the applicable VIK specifications ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

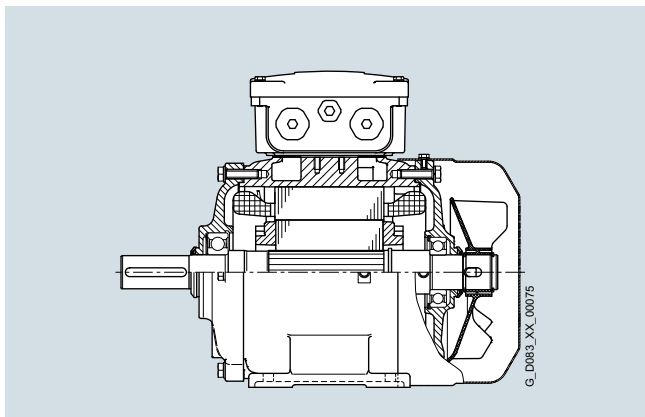
The motors are assigned to device group II – category 3G (corresponding to Zone 2) and are approved and optimized for use in hazardous areas of Zone 2 in accordance with EN 60079-0 and EN 60079-15. The motors are marked according to EN 60079-15 with II 3G Ex nA IIC T3 Gc for use in Zone 2.

General technical specifications

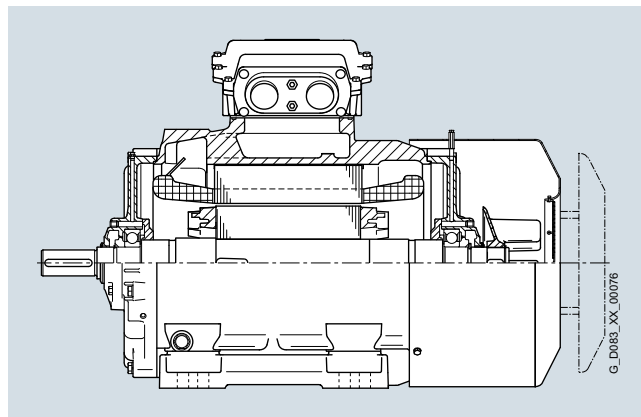
LOHER CHEMSTAR and VARIO 1PS1 motors	
Motor type	A..K
Frame size	90 ... 500
Powers	0.25 ... 1120 kW
Temperature class	T3
Type of protection	II 3G Ex nA IIC T3 Gc, IEC/EN 60079-15
Ex zones	Gas Zone 2 optional, Dust Zone 22/21
Guidelines	2014/34/EU
Cooling	Surface-cooled, water-jacket-cooled on request
No. of poles	2- to 12-pole, multi-pole + pole-changing versions on request
Voltage/frequency	All common voltages, in 50 Hz and 60 Hz special designs on request
Degree of protection	IP55 to IP68
Type of construction	All common types of construction + special types of construction
Enclosure	Cast-iron or steel
Insulation	Class F utilized according to B
Special versions	
<ul style="list-style-type: none"> • For outdoor temperatures -55 to +60 °C (other temperatures are available on request) • Installation altitude up to 3000 m (> 3000 m on request) • Modified windings, for example, for increased ambient temperatures, installation altitude for optimum electrical values • Permanent load S1 as well as partial load operation, e.g. S2/S3/S6 • Drive-end located bearing; special bearing for increased axial/radial forces • Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc. • CHEMSTAR: Copper rotor as an option • Metal fan in aluminum, steel or brass • Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc. • Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEX (international) • Version for offshore, on-deck and/or marine classifications • Combination with brakes + encoder + forced ventilation • Enlarged connection system and/or larger terminal box for large cable cross-sections 	

Technical specifications (continued)

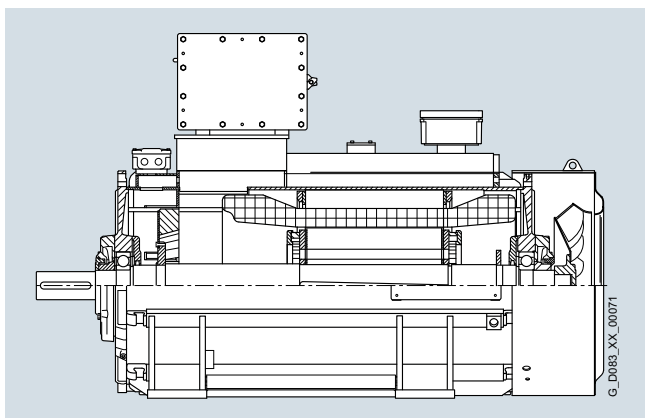
Mechanical design



Sectional view of CHEMSTAR 1PS1 three-phase motor, frame sizes 90 to 200 LB,
Example: 1PS1131-0BD60-3AA4 (motor type: *ANGK-132SR-02*)
7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS1 three-phase motor, frame sizes 225 to 355,
with regreasing device (frame size 315 and above)
Example: 1PS1316-0BD60-3AA4 (motor type: *ANGK-315LL-02*)
200 kW, 2-pole



Sectional view of VARIO three-phase motor, frame sizes 355 to 500,
with regreasing device
Example: 1PS1357-0BH60-3AA0 (motor type: *ANSK-355LC-02*)
355 kW, 2-pole

Enclosure, ventilation

Enclosure and fan for motors of the LOHER CHEMSTAR and VARIO 1PS1 series

Frame size	Enclosure		Bearing plates	Fan cover	Fan		
	Material	Design of enclosure feet ¹⁾				Material	Flange ring on bearing plate
LOHER CHEMSTAR							
71	Cast-iron	Cast	With cooling fins	Cast-iron	Screwed on	Sheet steel	Plastic ³⁾
80 ... 112							
132		Cast ²⁾	Screwed on	Cast, optionally screwed on			
160							
180 ... 280		Cast	Screwed on	Screwed on			
315							
355						Metal ³⁾	
LOHER VARIO							
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	–	Sheet steel	Metal ⁴⁾
500							

¹⁾ For designs with feet only.

²⁾ Terminal boxes are screwed on at the side on frame sizes 132 and 160.

³⁾ With specific operating conditions, the external fans can be constructed with special materials (see special versions).

⁴⁾ Only one direction of rotation for 2-pole and 4-pole version.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

General information

Technical specifications (continued)

Terminal boxes

The installed terminal boxes are also marked and certified as "Non-sparking". Ex nA terminal boxes of the CHEMSTAR and VARIO series are identical in construction to the Ex e "Increased safety" connection system. In accordance with the current, harmonized edition EN 60079-0, the gas for the Ex type of protection test must be specified in the case of type of protection "Non-sparking". The CHEMSTAR and VARIO series are generally certified for the highest class as per "IIC". They are marked in accordance with the EC directive (2014/34/EU) with II 3G Ex nA IIC T3 Gc. Compliance with the regulations is documented here with an EC Declaration of Conformity.

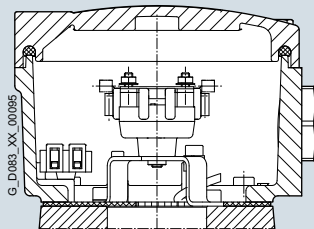
The terminal boxes comply with the "Increased safety" Ex e IIC type of protection. The enclosures are made of cast iron and designed to IP55 degree of protection in accordance with EN

60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction.

The position of the terminal box and cable entries can be obtained from the tables below. Terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides.

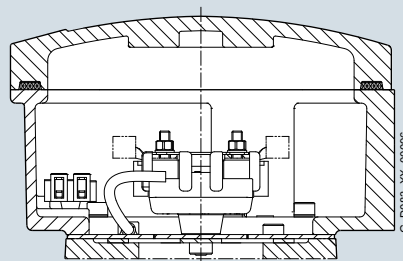
Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below.

Figure 1 Terminal box for LOHER CHEMSTAR frame sizes 90 to 112



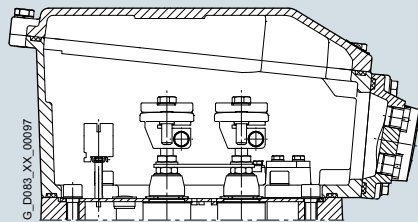
No auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

Figure 2 Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



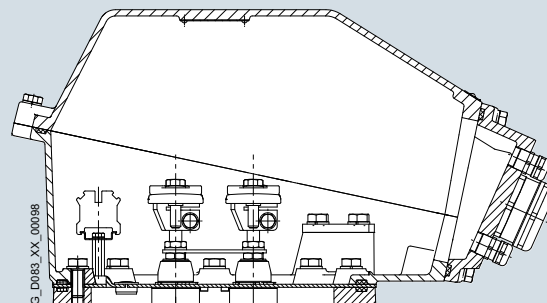
Frame sizes 132 to 160, 1 auxiliary terminal box Ex e (**W72**, **M52**) is possible, frame sizes 180 to 225, 2 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

Figure 3 Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



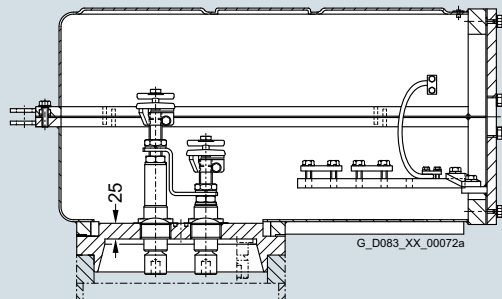
3 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

Figure 4 Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

Figure 5 Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the enclosure.

For motors of type series 1PS1 CHEMSTAR and VARIO, the terminal pins are fitted with round terminals in accordance with DIN 46223.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

General information

Technical specifications (continued)

Terminal box for 1PS1 motors

Degree of protection: IP55
 Type of protection: Ex e IIC acc. to EN 60079-7
 Enclosure material: Cast-iron

Frame size	Standard terminal box				PE/ground connection max. mm ²	Fig. No. on Page 2/92	Enlarged terminal box – Option L00				
	Terminal studs	Conductor cross-section min. max. mm ² mm ²		Auxiliary terminals in main terminal box Number × max. cross-section ¹⁾ mm ²			Terminal studs	Conductor cross-section min. max. mm ² mm ²		Fig. No. on Page 2/92	
LOHER CHEMSTAR											
90	6 × M4	1	2.5 (6) ²⁾	4 × 2.5	4	6 ²⁾	Fig. 1	6 × M5	1	10 (25) ²⁾	Fig. 2
100											
112											
132	6 × M5	1	10 (25) ²⁾		25		Fig. 2	6 × M6	2.5	35 (50) ²⁾	Fig. 2
160											
180	6 × M6	2.5	35 (50) ²⁾	12 × 4	70		Fig. 2	6 × M10	6	70	Fig. 3
200											
225											
250	6 × M10	6 ... 70			95		Fig. 3	6 × M12	16	150	Fig. 4
280											
315 S/M	6 × M12	16 ... 150		16 × 4	150		Fig. 4	6 × M16	16	300	Fig. 4
315 L	6 × M16/M20 ³⁾	16 ... 300						Special connection system on request			
LOHER VARIO											
355 ... 500							Fig. 5				

Number and size of entry thread and cable glands (to be ordered specially), see table "Cable glands for 1PS1 motors".

Cable glands for 1PS1 motors

Frame size	Standard cable glands ⁴⁾		Cable diameter, type HSK-K ⁷⁾ mm	Max. entry thread ⁵⁾	
	Entry thread ⁶⁾			Metric	NPT ⁸⁾
LOHER CHEMSTAR					
90	1 × M25 × 1.5		9 ... 16	1 × M25 × 1.5	1 × 1"
100	1 × M32 × 1.5		13 ... 20	1 × M32 × 1.5	2 × 1"
112	2 × M32 × 1.5			2 × M32 × 1.5	
132				2 × M40 × 1.5	2 × 1 ¹ / ₂ "
160	2 × M40 × 1.5		22 ... 32		
180				2 × M63 × 1.5	2 × 2"
200	2 × M50 × 1.5		32 ... 38		
225					
250	2 × M63 × 1.5		37 ... 44		
280					
315 S/M				2 × M100 × 1.5	2 × 3 ¹ / ₂ "
315 L					
355					
LOHER VARIO					
355 ... 500	⁹⁾		⁹⁾	⁹⁾	⁹⁾

Entry thread for PTC thermistor, heating: M20 × 1.5/D = 6 to 12 mm

Entry thread is sealed on delivery with certified plugs.

The terminal boxes will only be supplied with cable glands in accordance with the table if specially ordered. Special cable glands can be fitted on request.

¹⁾ Rated voltage/max. working voltage 400 V/440 V.

²⁾ Maximum conductor cross-section with cable lug.

³⁾ Alternatively, larger studs for higher rated current.

⁴⁾ Materials used for standard gland: Polyamide

⁵⁾ Other threads, number and size on request.

⁶⁾ Number and size of entry threads according to DIN 42925.

⁷⁾ Cable glands suitable for the infed of unshielded/non-reinforced cables and leads.

⁸⁾ Cable glands for NPT thread on request.

⁹⁾ Undrilled gland plate.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

General information

Technical specifications (continued)

Electrical design

The insulation system of the 1PS1 motor series is suitable for line voltages up to 690 V. The connection system (terminal box, terminals) is also designed for this rated voltage.

The explosion-proof motors are equipped with 6 terminals. They can thus be operated in star or delta. If a voltage variant with dual voltage e.g. 400 VΔ/690 VY is selected, the rated data of both voltage levels will be stamped on the rating plate.

The motors in the 1PS1 range are made with an insulation system which corresponds to thermal class 155 °C. Utilization at rated operation corresponds to thermal class 130 °C.

Operation on a frequency converter

The general use of high-quality insulation systems enable operation on a frequency converter.

The permissible speed and torque range is stamped on an additional rating plate.

For operation on a frequency converter, the motor with explosion protection must be fitted with PTC thermistors (or Pt100 as an option for LOHER VARIO). These are installed in the stator winding and, in combination with a certified trip unit (EU type examination certificate), they perform sole motor protection in the case of converter operation. Motor circuit breakers can be dispensed with. For motors with type of protection Ex n, the standard requires the motor manufacturer to perform a type test together with the original converter or to provide comparable evidence that guarantees that the explosion protection limits are observed.

Acceptance testing of explosion-proof motors of type of protection Ex nA

For dimensioning and for acceptance testing, with regard to the heat rise of all parts of the machine, the most unfavorable value is used. Motors of the 1PS1 series are certified for temperature class T3. None of the components, even those inside the enclosure (e.g. rotor cage winding), are permitted to exceed a temperature of 200 °C. The winding temperature is limited by the thermal class (e.g. 155 (F)). The reason for the above-mentioned initial test on the original converter is normally to establish compliance with the temperature limits for the motor with type of protection Ex nA.

Special cases "blocked shaft" and "starting":

Type of protection Ex nA excludes these two special cases. Limit temperatures are permitted here that do not take into account the temperature class. Even though "blocked shaft" and "starting" are excluded, a motor of the type of protection Ex nA is not permitted to be implemented for heavy starting. These motors are only permitted to be operated on soft-starting devices under the following conditions:

- The soft-starting device has been function-tested by the German Federal Testing Laboratory
- A motor circuit breaker must be provided as a minimum of protection
- The duty type does not give rise to expectations of a significant increase in temperature as a result of the starting procedure (e.g. pump drives with a low moment of inertia)

Voltage tolerances

The motors are suitable for operation with voltage and frequency tolerances according to EN 60034-1.

In addition, tests are to be performed to ensure that the permissible temperature limits for the outer surface of the explosion-proof enclosure according to EN 60079-1 are not exceeded during continuous operations at the voltage limits ($\pm 10\%$).

The motors in the 1PS1 range in this catalog are certified for T3. The maximum permitted surface temperature is 200 °C.

Selection and ordering data (continued)

Table with columns: P_rated, Frame size, Operating values at rated power (n_rated, T_rated, IE class, etc.), Motor type, Article No., m, J. Includes sections for LOHER CHEMSTAR and LOHER VARIO with various motor specifications and operating modes.

1) Outside the IE code classification according to IEC 60034-30-1.

3) Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.

2) Can only be ordered with additional identification code -Z and order code M73.

4) Up to 200 kW.

2

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

P_{rat} , 50 Hz	Frame size	Motor type	Article No.	m IM B3 kg
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Non sparking" in accordance with EN 60079-15; 2010: II 3G Ex nA IIC T3 Gc 				
14-pole: 430 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
125	355 L	ANSK-355LC-14	1PS1357-■BH■-3GA0	2350
140	355 L	ANSK-355LD-14	1PS1358-■BH■-3GA0	2400
160	400 L	ANSK-400LL-14	1PS1404-■BJ■-3GA0	2800
180	400 L	ANSK-400LN-14	1PS1405-■BJ■-3GA0	3100
200	400 L	ANSK-400LN-14	1PS1407-■BJ■-3GA0	3100
225	400 L	ANSK-400LX-14	1PS1408-■BJ■-3GA0	3250
250	450 L	ANSK-450LL-14	1PS1454-■BJ■-3GA0	4100
280	450 L	ANSK-450LN-14	1PS1455-■BJ■-3GA0	4400
315	450 L	ANSK-450LN-14	1PS1457-■BJ■-3GA0	4400
340	450 L	ANSK-450LX-14	1PS1458-■BJ■-3GA0	4600
355	500 L	ANSK-500LL-14	1PS1504-■BJ■-3GA0	5400
400	500 L	ANSK-500LN-14	1PS1505-■BJ■-3GA0	6100
450	500 L	ANSK-500LN-14	1PS1507-■BJ■-3GA0	6100
500	500 L	ANSK-500LX-14	1PS1508-■BJ■-3GA0	6500
16-pole: 375 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
100	355 L	ANSK-355LC-16	1PS1357-■BH■-3HA0	2350
110	355 L	ANSK-355LD-16	1PS1358-■BH■-3HA0	2400
132	400 L	ANSK-400LL-16	1PS1405-■BJ■-3HA0	2800
160	400 L	ANSK-400LN-16	1PS1407-■BJ■-3HA0	3100
180	400 L	ANSK-400LX-16	1PS1408-■BJ■-3HA0	3250
200	450 L	ANSK-450LL-16	1PS1454-■BJ■-3HA0	4100
225	450 L	ANSK-450LN-16	1PS1455-■BJ■-3HA0	4400
250	450 L	ANSK-450LN-16	1PS1457-■BJ■-3HA0	4400
265	450 L	ANSK-450LX-16	1PS1458-■BJ■-3HA0	4650
280	500 L	ANSK-500LL-16	1PS1504-■BJ■-3HA0	5400
315	500 L	ANSK-500LN-16	1PS1505-■BJ■-3HA0	6100
355	500 L	ANSK-500LN-16	1PS1507-■BJ■-3HA0	6100
400	500 L	ANSK-500LX-16	1PS1508-■BJ■-3HA0	6650
Operating modes				
Line operation	355 ... 500		0	Order code
Converter operation, standard insulation ¹⁾	355 ... 500		1	–
Converter operation with special insulation (derating approx. 5 %) ^{1) 2)}	355 ... 500		2	–
Line operation, pre-formed coil	450 ... 500		3	–
Converter operation, pre-formed coil	450 ... 500		4	–
Voltages				
690 VA, 50 Hz	355 ... 500		0	Order code
500 VY, 50 Hz	355 ... 500		3	–
500 VA, 50 Hz	355 ... 450		5	–
400 V/690 V, 50 Hz	355 ... 500		6	–
690 VY, 50 Hz	355 ... 500		8	–
For other voltages, see Page 2/110	355 ... 500		9	...
Types of construction				
IM B3	355 ... 500		0	Order code
IM V1/cover	355 ... 500		4	–
IM B35	355 ... 500		6	–
For other types of construction, see from Page 1/29 and 2/111	355 ... 500		9	...

¹⁾ Can only be ordered with additional identification code **-Z** and order code **M73**.

²⁾ Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.

Selection and ordering data (continued)

Table with columns: P_rated, Frame size, Operating values at rated power (n_rated, T_rated, IE class, eta_rated, COS phi_rated, I_rated, T_LR/rated, I_LR/rated, T_B/rated), Motor type, Article No., m, J. Includes sub-sections for LOHER CHEMSTAR and LOHER VARIO, and a table for Operating modes, Voltages, and Types of construction.

1) Outside the IE code classification according to IEC 60034-30-1.
2) Only possible with 690 V (values apply to 690 V).

3) Can only be ordered with additional identification code -Z and order code M73.
4) Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.



Selection and ordering data (continued)

P _{rated} , 60 Hz kW	Frame size FS	Operating values at rated power											Motor type	Article No.	m IM B3	J kgm ²	
		n _{rated} , 60 Hz rpm	T _{rated} , 60 Hz Nm	IE class	η _{rated} , 60 Hz, 4/4 %	η _{rated} , 60 Hz, 3/4 %	η _{rated} , 60 Hz, 2/4 %	cos φ _{rat.} , 60 Hz, 4/4 %	I _{rated} , 60 Hz, 460 V A	T _{LR} / I _{rated}	I _{LR} / I _{rated}	T _B / I _{rated}					
<ul style="list-style-type: none"> Cooling: self-ventilated (IC 411) Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % Type of protection: "Non sparking" in accordance with EN 60079-15; 2010: II 3G Ex nA IIC T3 Gc 																	
6-pole: 1200 rpm at 60 Hz																	
LOHER CHEMSTAR																	
0.25	71 B	1080	2.21	–	59.5	55.0	47.0	0.57	0.93	2.5	3.0	2.5	ANGK-071BS-06	1PS1071-■BD■-3CA4	26	0.0008	
0.37	80 B	1140	3.10	IE2	77.3	76.4	72.5	0.64	0.94	2.3	4.6	2.9	ANGK-080BR-06	1PS1080-■BD■-3CA4	28	0.0020	
0.55	80 B	1144	4.59	IE2	78.9	78.0	74.3	0.62	1.41	2.9	5.2	3.6	ANGK-080BS-06	1PS1081-■BD■-3CA4	30	0.0030	
0.75	90 L	1150	6.20	IE2	80.0	80.5	78.0	0.68	1.73	1.9	4.7	2.6	ANGK-090LR-06	1PS1095-■BD■-3CA4	33	0.0054	
1.1	100 L	1175	8.90	IE2	85.5	85.4	83.4	0.73	2.20	2.1	6.0	3.0	ANGK-100LR-06	1PS1105-■BD■-3CA4	36	0.011	
1.5	100 L	1175	12.2	IE2	86.8	86.6	84.2	0.69	3.15	2.2	6.4	3.2	ANGK-100LS-06	1PS1106-■BD■-3CA4	54	0.011	
2.2	112 M	1170	18.0	IE2	87.5	88.0	87.4	0.75	4.20	2.1	6.3	3.2	ANGK-112MS-06	1PS1113-■BD■-3CA4	64	0.014	
3	132 S	1175	24.4	IE2	87.5	88.0	86.0	0.70	6.10	1.8	6.0	2.9	ANGK-132SR-06	1PS1131-■BD■-3CA4	89	0.024	
3.7	132 M	1180	29.9	IE2	88.0	88.5	86.5	0.71	7.40	1.9	6.2	3.0	ANGK-132MR-06	1PS1133-■BD■-3CA4	95	0.029	
5.5	132 M	1175	44.7	IE2	89.5	89.8	88.8	0.73	10.6	2.1	6.5	2.9	ANGK-132MS-06	1PS1135-■BD■-3CA4	103	0.037	
7.5	160 M	1180	61.0	IE2	89.7	90.0	88.7	0.73	14.4	2.1	5.4	2.5	ANGK-160MR-06	1PS1163-■BD■-3CA4	177	0.075	
11	160 L	1180	89.0	IE2	90.2	90.5	89.5	0.74	20.5	2.2	5.5	2.5	ANGK-160LS-06	1PS1166-■BD■-3CA4	190	0.098	
15	180 L	1178	122	IE2	92.1	92.3	91.5	0.77	26.5	2.8	6.9	3.4	ANGK-180LS-06	1PS1186-■BD■-3CA4	230	0.17	
18.5	200 L	1182	149	IE2	92.1	92.6	92.1	0.81	31.0	2.6	6.7	3.0	ANGK-200LR-06	1PS1206-■BD■-3CA4	300	0.25	
22	200 L	1182	178	IE2	92.2	92.7	92.3	0.81	37.0	3.0	7.4	3.0	ANGK-200LS-06	1PS1208-■BD■-3CA4	320	0.30	
30	225 M	1182	242	IE2	93.2	93.5	93.0	0.83	48.5	2.9	7.0	3.1	ANGK-225MS-06	1PS1223-■BD■-3CA4	412	0.58	
37	250 M	1185	298	IE2	93.0	93.3	92.6	0.83	60.0	3.3	7.3	2.8	ANGK-250MM-06	1PS1253-■BD■-3CA4	485	0.86	
45	280 S	1188	362	IE2	93.6	94.0	93.6	0.84	72.0	3.1	7.4	3.0	ANGK-280SL-06	1PS1280-■BD■-3CA4	605	1.1	
55	280 M	1188	442	IE2	93.7	94.0	93.7	0.85	87.0	3.1	7.2	2.9	ANGK-280MM-06	1PS1283-■BD■-3CA4	655	1.4	
75	315 S	1190	602	IE2	94.4	94.4	93.7	0.83	120	2.7	7.5	3.0	ANGK-315SL-06	1PS1311-■BD■-3CA4	865	2.1	
90	315 M	1190	722	IE2	94.7	94.9	94.2	0.84	142	2.9	7.6	3.1	ANGK-315ML-06	1PS1313-■BD■-3CA4	920	2.5	
110	315 M	1190	883	IE2	95.2	95.3	94.7	0.85	171	3.3	8.1	3.2	ANGK-315MM-06	1PS1314-■BD■-3CA4	1045	3.6	
132	315 M	1190	1059	IE2	95.3	95.4	94.7	0.85	205	3.7	9.2	3.6	ANGK-315MN-06	1PS1315-■BD■-3CA4	1115	4.0	
150	315 L	1191	1203	IE2	95.5	95.7	94.8	0.85	230	4.3	9.6	3.8	ANGK-315LL-06	1PS1316-■BD■-3CA4	1345	4.7	
200	315 L	1191	1604	IE2	95.5	95.4	94.8	0.82	320	2.9	8.3	3.5	ANGK-315LM-06	1PS1317-■BD■-3CA4	1515	7.6	
LOHER VARIO on request																	
Operating modes												Frame size			Order code		
Line operation												71 ... 315	0		–		
Converter operation, standard insulation ¹⁾												71 ... 315	1		–		
Converter operation with special insulation (derating approx. 5 % ¹⁾²⁾												160 ... 315	2		–		
Voltages												Frame size			Order code		
For other voltages, see Page 2/110												71 ... 315	9		...		
Types of construction												Frame size			Order code		
IM B3												71 ... 315	0		–		
IM B5												71 ... 315	1		–		
IM B34												71 ... 112	2		–		
IM B14												71 ... 112	3		–		
IM V1/cover												71 ... 315	4		–		
IM B35												71 ... 315	6		–		
For other types of construction, see from Page 1/29 and 2/111												71 ... 315	9		...		

¹⁾ Can only be ordered with additional identification code **-Z** and order code **M73**.

²⁾ Insulation 2.15 kV IEC/TS 60035-25:2007 curve B.


Motors with Premium Efficiency IE3 in cast-iron and steel versions
Selection and ordering data (continued)

P_{rated} 60 Hz	Frame size	Operating values at rated power												Motor type	Article No.	m IM B3	J kgm ²
		n_{rated} 60 Hz	T_{rated} 60 Hz	IE class	η_{rated} 60 Hz, 4/4	η_{rated} 60 Hz, 3/4	η_{rated} 60 Hz, 2/4	$\cos\phi_{rat.}$ 60 Hz, 4/4	I_{rated} 60 Hz, 460 V	$T_{LR}/$ T_{rated}	$I_{LR}/$ I_{rated}	$T_B/$ T_{rated}					
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-			kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 according to IEC 60034-30-1 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Non sparking" in accordance with EN 60079-15; 2010: II 3G Ex nA IIC T3 Gc 																	
2-pole: 3000 rpm at 60 Hz																	
LOHER CHEMSTAR																	
0.43	71 B	3445	1.19	IE3	79.5	79.1	75.5	0.76	0.89	1.19	6.0	3.6	ANGK-071BS-02	1PS1070- BD -3AH4	27	0.0005	
0.63	71 B	3460	1.74	IE3	81.5	80.6	76.0	0.76	1.28	1.74	6.6	3.9	ANGK-071BT-02	1PS1071- BD -3AH4	28	0.0006	
0.86	80 B	3450	2.38	IE3	83.8	84.6	83.5	0.86	1.50	2.38	6.4	3.1	ANGK-080BS-02	1PS1080- BD -3AH4	29	0.0011	
1.27	80 B	3480	3.48	IE3	85.5	85.8	84.0	0.85	2.20	3.48	7.4	3.4	ANGK-080BT-02	1PS1081- BD -3AH4	30	0.0013	
1.75	90 L	3510	4.76	IE3	85.5	85.6	84.0	0.87	2.95	4.76	8.7	4.2	ANGK-090LS-02	1PS1095- BD -3AH4	36	0.0021	
2.55	90 L	3510	6.90	IE3	86.7	87.1	85.9	0.88	4.20	6.90	8.3	4.2	ANGK-090LT-02	1PS1098- BD -3AH4	40	0.0031	
3.45	100 L	3525	9.30	IE3	88.6	89.2	88.5	0.89	5.50	9.30	8.5	4.7	ANGK-100LT-02	1PS1106- BD -3AH4	56	0.0054	
4.55	112 M	3555	12.2	IE3	90.0	90.0	88.7	0.90	7.10	12.2	9.0	4.1	ANGK-112MT-02	1PS1113- BD -3AH4	66	0.012	
6.3	132 S	3545	17.0	IE3	90.5	91.0	90.2	0.91	9.60	17.0	7.5	3.8	ANGK-132SS-02	1PS1131- BD -3AH4	95	0.024	
8.6	132 S	3555	23.1	IE3	91.8	92.4	92.1	0.92	12.8	23.1	8.4	4.1	ANGK-132ST-02	1PS1132- BD -3AH4	105	0.031	
12.6	160 M	3555	33.8	IE3	91.5	90.8	89.3	0.89	19.4	33.8	7.6	3.7	ANGK-160MS-02	1PS1163- BD -3AH4	174	0.053	
17.3	160 M	3560	46.4	IE3	92.0	92.0	90.6	0.88	27.0	46.4	8.7	4.2	ANGK-160MT-02	1PS1165- BD -3AH4	184	0.061	
21.3	160 L	3560	57.1	IE3	92.5	92.4	91.1	0.91	32.0	57.1	8.2	3.8	ANGK-160LT-02	1PS1166- BD -3AH4	195	0.068	
24.5	180 M	3555	65.8	IE3	93.9	94.2	93.6	0.89	37.0	65.8	7.5	3.6	ANGK-180MT-02	1PS1183- BD -3AH4	241	0.080	
33.5	200 L	3555	90.0	IE3	94.2	94.4	94.0	0.87	51.0	90.0	7.1	3.3	ANGK-200LS-02	1PS1206- BD -3AH4	317	0.130	
41.5	200 L	3555	111.5	IE3	94.2	94.0	92.9	0.89	62.0	112	7.1	3.2	ANGK-200LT-02	1PS1208- BD -3AH4	340	0.158	
51	225 M	3560	136.8	IE3	94.5	95.0	94.5	0.89	76.0	137	6.8	3.2	ANGK-225MT-02	1PS1223- BD -3AH4	435	0.26	
62	250 M	3575	165.6	IE3	93.6	93.6	92.7	0.90	92.0	166	6.7	3.0	ANGK-250MN-02	1PS1253- BD -3AH4	505	0.46	
75	280 S	3578	200	IE3	94.1	93.9	92.7	0.89	112	200	7.6	3.2	ANGK-280SM-02	1PS1280- BD -3AH4	665	0.77	
90	280 M	3578	240	IE3	95.0	94.9	93.9	0.90	132	240	8.1	3.3	ANGK-280MN-02	1PS1283- BD -3AH4	720	0.94	
123	315 S	3582	328	IE3	95.0	95.0	94.2	0.91	179	328	7.2	3.0	ANGK-315SL-02	1PS1311- BD -3AH4	955	1.39	
148	315 M	3582	395	IE3	95.4	95.3	94.6	0.91	215	395	7.1	3.0	ANGK-315ML-02	1PS1313- BD -3AH4	1025	1.6	
160	315 M	3587	426	IE3	95.4	95.1	94.0	0.91	230	426	7.8	3.4	ANGK-315MN-02	1PS1315- BD -3AH4	1105	1.9	
224	315 L	3582	597	IE3	95.8	95.9	95.4	0.92	320	597	7.1	2.9	ANGK-315LL-02	1PS1316- BD -3AH4	1355	2.3	
270	315 L	3582	720	IE3	96.0	96.0	95.5	0.92	385	720	9.5	3.7	ANGK-315LN-02	1PS1318- BD -3AH4	1505	2.5	
Operating modes												Frame size			Order code		
Line operation												71 ... 315	0		-		
Converter operation, standard insulation ¹⁾												71 ... 315	1		-		
Voltages												Frame size			Order code		
For other voltages, see Page 2/110												71 ... 315	9		...		
Types of construction												Frame size			Order code		
IM B3												71 ... 315	0		-		
IM B5												71 ... 315	1		-		
IM B34												71 ... 112	2		-		
IM B14												71 ... 112	3		-		
IM V1/cover												71 ... 315	4		-		
IM B35												71 ... 315	6		-		
For other types of construction, see from Page 1/29 and 2/111												71 ... 315	9		...		

¹⁾ Can only be ordered with additional identification code **-Z** and order code **M73**.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Article No. supplements

Selection and ordering data

Voltages	Voltage code 11th position of the Article No.	Additional identifica- tion code with order code and plain text if required	Motor series																		
			LOHER CHEMSTAR													LOHER VARIO					
			Frame size																		
			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
	1PS1.....																			
Optional voltages																					
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○	
230 VΔ/400 VY, 50 Hz	1		○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-	
500 VY, 50 Hz – up to 200 kW	3		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
400 VΔ, 50 Hz	4		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
500 VΔ, 50 Hz	5		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
400 VΔ/690 VY, 50 Hz	6		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
690 VY, 50 Hz	8		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
415 VY, 50 Hz – up to 200 kW	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○	
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
220 VΔ/380 VY, 50 Hz	9	L1R	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-	-	
Other voltages	9	L1Y • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
220 VΔ/380 VY, 60 Hz (50 Hz power)	9	L2A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
220 VΔ/380 VY, 60 Hz (60 Hz power)	9	L2B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (50 Hz power)	9	L2C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (60 Hz power)	9	L2D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
460 VY, 60 Hz (60 Hz power)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
460 VΔ, 60 Hz (60 Hz power)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
575 VY, 60 Hz (60 Hz power)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
575 VΔ, 60 Hz (60 Hz power)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
440 VY, 60 Hz (50 Hz power)	9	L2Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
440 VΔ, 60 Hz (50 Hz power)	9	L2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
460 VY, 60 Hz (50 Hz power)	9	L2S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
460 VΔ, 60 Hz (50 Hz power)	9	L2T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
575 VY, 60 Hz (50 Hz power)	9	L2U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
575 VΔ, 60 Hz (50 Hz power)	9	L2V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
440 VY, 60 Hz (60 Hz power)	9	L2W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
440 VΔ, 60 Hz (60 Hz power)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
Other voltages 60 Hz	9	L2Y • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O. R. Possible on request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Article No. supplements

Selection and ordering data

Types of construction	Type of construction code	Additional identification code with order code and plain text if required	Motor series																		
			LOHER CHEMSTAR													LOHER VARIO					
			Frame size																		
			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
1PS1.....-.....																					
Optional types of construction																					
IM B3	0		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
IM B5 ¹⁾	1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
IM B34	2		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
IM B14	3		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	-	-	-	-	-	-	-	-	-	
IM V1, with protective cover	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
IM B35	6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
IM B6 ¹⁾	9	M1A	○	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B7 ¹⁾	9	M1B	○	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B8 ¹⁾	9	M1C	○	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V6 ¹⁾	9	M1E	○	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V5, with protective cover ¹⁾	9	M1F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IM V3	9	M1G	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
IM V15, with protective cover	9	M2K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
IM V18, with protective cover	9	M2M	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.

- Without additional charge
- ✓ With additional charge
- O. R. Possible on request
- Not possible

Other types of construction and special flange dimensions upon request!

¹⁾ LOHER CHEMSTAR motors with frame size 315 and 355 only with direct coupling without vibration, otherwise O. R..

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS1.....-Z		Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection																			
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	A11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	A12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	A15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	A16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	A23	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded temperature sensor 2 × KTY84-130	A25	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – in standard 2-wire design	A60	-	-	-	-	-	-	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	-	-	-	-
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire design, for round-wire winding only	A61	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3- and 4-wire connection from terminal box – for pre-formed coil winding only	Q40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 bearing double resistance thermometer Pt100 in Ex i version – 2-wire from element, 4-wire from terminal box	V80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire design from sensor instead of from terminal (not Ex i Pt100!) – optionally possible for A60, A61, A65, A66	Q43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire design from sensor instead of from terminal – optionally possible for V80, A40, A42	Q44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Indoor air Pt100 in 3- or 4-wire design from sensor instead of from terminal	Q45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection (continued)																			
One thermocouple per bearing	Q49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring (preferred brand), with loose cable – for each sensor	V14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring (preferred brand), without terminal box – for each sensor	V15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	V16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
3 transmitters, 4 to 20 mA for Pt100 winding	P20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 transmitter with digital display with Ex d or Ex i approval	V88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pt100 winding in tolerance class A	V78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Installation altitude, max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude, max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude, max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Installation altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection (continued)																			
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 30 °C (observe derating) – derating in accordance with reduction table.	D15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling air temperature max. 35 °C (observe derating) – derating in accordance with reduction table.	D16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling air temperature max. 40 °C (observe derating) – derating in accordance with reduction table.	D17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Power data for converter operation, utilization in accordance with temperature class F (155 °C)	C32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Utilization according to temperature class 155 (F) – in line operation max. rated power according to IEC possible. No additional charge if special voltage is selected (11th position of Article No. = 9).	C12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rated power of the next lower power level – IEC power levels are maintained, only in combination with D06 to D18 . No additional charge if special voltage is selected (11th position of Article No. = 9).	C29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Moderately extended speed range for converter operation	V82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Temperature class F	W00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Temperature class H	W01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	-	-	-
Sealing of winding overhangs with silicone rubber	W03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	O.R.	O.R.	O.R.
Sealing of cable duct with silicone rubber	W04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Non-standard voltage and/or frequency for separate fan motor	Y81 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Colors and paint finish																			
Inner anti-corrosion protection system J08	W10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3	V09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	V10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	W14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Special prime coat system Z05 with internal corrosion protection system J08	W15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR												LOHER VARIO						
		Frame size																		
	1PS1.....-Z	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Colors and paint finish (continued)																				
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	V11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Coating system Z21/J08 – 300 µm (offshore, C5M-M _{high}) – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (> 15 years) – sea climate	V19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special offshore paint finish S13 with reference to NORSOK M501 (C5-M _{high}) with comments and deviations – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (> 15 years) – sea climate	V12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special coating system S11/J08 (e.g. submerged motors)	V13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Unpainted, only primed	K24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	
Unpainted	K23	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–	
Outer coating 110 µm for zinc-galvanized noise cabinet	V98	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Special colors according to Munsell or British Standard	Y50 • and customer specifications	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Standard paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	Y53 • and standard finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – (specify special coating system in addition, e.g. V10 , V11 , W14 , etc.)	Y54 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RAL colors, other than those offered above	Y51 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special non-RAL colors	Y71 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
Design for Zones according to ATEX																				
Ex nA II T3 (Zone 2) design according to IEC 60079-15 for converter operation – system test on original converter	M73	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–	
Design for Zone 21 (conductive dust) for line operation, IP65	M34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	
Design for Zone 21 (conductive dust) for converter operation, IP65	M38	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	
Design for Zone 22 (non-conductive dust) for converter operation	M39	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	
Design in double protection additionally for dust, Zone 22 for line operation, no hybrid certification – non-conductive dust	W20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
Design additionally for dust, Zone 21 for line operation, no hybrid certification, IP65 – design and certification for conductive dust (incl. non-conductive dust)	W21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
Design in double protection additionally for dust, Zone 22 for converter operation, no hybrid certification – non-conductive dust, select options for converter operation separately	W22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Design for Zones according to ATEX (continued)																			
Design additionally for dust, Zone 21 for converter operation, no hybrid certification, IP65 – version and certification for conductive dust (incl. non-conductive dust), select options for converter operation separately	W23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Ship design "Operation below deck"																			
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	W24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	W25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration – non essential	W26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV GL (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	W27	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	W28	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Novale), CT 50 °C with manufacturer's declaration – non essential	W29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	W99	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive ¹⁾	Q60	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q61	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV GL (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive ¹⁾	Q64	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Novale), CT 50 °C with manufacturer's declaration, essential drive ¹⁾	Q65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive ¹⁾	Q66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to USSR (Russia) with manufacturer's declaration, essential drive ¹⁾	Q67	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to PR (Poland) with manufacturer's declaration, essential drive ¹⁾	Q68	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to NKK (Japan) with manufacturer's declaration, essential drive ¹⁾	Q69	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Individual certifications																			
Operation at ambient temperature down to -50 °C, transport down to -50 °C – roller bearing design	D02	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Operation at ambient temperature down to -40 °C, transport down to -40 °C – roller bearing design	D03	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Operation at ambient temperature down to -30 °C, transport down to -40 °C – roller bearing design	D04	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Individual certifications (continued)																			
Electrical design according to NEMA MG1-12	D30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ex certification for China	D32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
China Energy Efficiency Label	D34	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
EAC certificate for the Eurasian Customs Union	D35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Conformity statement in accordance with 94/9/EC (ATEX) of an independent body for Zone 2 motors (Ex nA)	D36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
IEC Ex certificate	D37	○	○	○	○	○	○	○	○	○	○	○	○	○	○	✓	✓	✓	✓
MEPS Australia	D70	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Special mechanical designs																			
Terminal box on right-hand side (viewed onto DE)	K09	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Terminal box on left-hand side (viewed onto DE)	K10	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○
Terminal box on top	K11	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○
Terminal box to IP65	Q71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Cable entry thread metrically different from standard – thread dimension must be specified	W30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Enlarged connection system for main terminal box – not in combination with K53 (Ex d terminal box)	L00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Undrilled cable gland plate on main terminal	L01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□
Main terminal box in Ex d version with standard terminals	Q31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Split terminal box	W31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 × NPT thread for main terminal ((observe sizes) – specify thread, cable gland not in supply)	W32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
1 × cable gland for non-armored cable – for main terminal box	K54	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
1 × cable gland, standard thread size for additional connection (for non-armored cable)	W33	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Main terminal with tinned cable lug for copper cable	W34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Saddle terminal for connection without cable lug	W35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Special cable gland, 1 unit – specify exact cable data; selection table for CHEMSTAR motors, see page 2/42	Y97 • and customer specifications	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Auxiliary terminal box, non-Ex, cast-iron design – without removable cable gland plate, with metric cable entry thread	M50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Material of auxiliary terminal box: Stainless steel – not in combination with K53 (Ex d terminal box)	M51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box, cast-iron, for heater	M52	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Heater in main terminal box	P84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Explosion-proof main terminal box, Ex d II C	K53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box Ex d IIC, cast-iron – with standard thread according to catalog	V43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with K53 (Ex d terminal box)	Q75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with K53 (Ex d terminal box)	Q76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box Ex e/ cast iron – not in combination with K53 (Ex d terminal box)	W72	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
6 cables protruding, radial, 1.5 m long – 7-wire cable; D or S interconnection, customer-supplied	W38	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-	-	-
Extension of the cable to 3 m – only in combination with W38	W39	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-	-	-
Connection cable for accessories – only in combination with W38 , length as power cable	W40	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-	-	-
Additional separately supplied terminal box made of cast-iron with baseplate – main terminal box certified acc. to Ex e	W41	-	-	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-	-	-
Cable entry from DE	K83	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	K84	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	K85	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter operation only at lowest and highest speed of speed range	K02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft and flange with increased accuracy according to DIN 42955-R	K04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (oil-tight)	K17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Radial sealing ring at DE for vertical flange-mounting types (DE oil-tight)	W43	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Labyrinth sealing for external bearing seal	W44	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	□	□	□	□
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising K40	K20	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.
Bearings for increased axial forces	V20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Regreasing device DE/NDE	K40	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	□
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter operation	L27	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft grounding device – down to -20 °C only	V36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Located bearing DE		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	L04	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Pt100 bearing or coolant in tolerance class A – only in combination with Q44	V76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One transmitter each (2 in total) 4 to 20 mA for Pt100 bearing DE and NDE	V83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for enclosure vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	V16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	V17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		Frame size																	
	1PS1.....-Z	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	V18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Grease extractors for DE and NDE	V21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	V22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	V25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
External grounding (additionally)	W46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
VIK design – including W14, W47, W69	K30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-
LOHER CHEMSTAR Plus design, including VIK design; IP56 – including K30, K51, W14, W69 and IP66 shaft seal, vibration quantity level as grade B	W09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Second rating plate, supplied loose	K31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	W47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate for customer data (each plate) – data must be specified as text in the order	Y82 • customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional information on rating plate and on package label (max. 20 characters)	Y84 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates made of stainless steel	W48	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates in languages other than English and German – main rating plate or extra rating plates O.R., factory clarification essential	W49	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	W50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	K45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater 115 V	K46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater, 110 to 120 V (min. 100 V, max. 132 V) – preferred	M12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater, 210 to 250 V (min. 200 V, max. 264 V) – preferred	M13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater rated voltage range 110 to 120 V (min. 100 V, max. 132 V) Ex e II T3	M14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater rated voltage range 220 to 240 V (min. 200 V, max. 264 V) Ex e II T3	M15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater 208 to 254 V – 1-phase (self-limiting for Ex e, Ex n)	W88	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Heater with thermostat	V75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Second standard shaft extension – for 100% torque; VARIO 50% torque	K16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	Y55 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Shaft of material 1.7225	W51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	W52	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft end of stainless steel butt-welded (material 1.4571)	W53	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft made of special steel – down to -40 °C only	L72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator enclosure for surface-cooled motors – factory clarification required because of possible dimension deviations	W54	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	□	□	□	□
Welded copper bar rotors	W55	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	□	□	□	□
Second shaft extension for IM B3 up to 100 % torque; cylindrical with feather key	Q21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special rotors for heavy duty starting (e.g. double-cage rotor or brass rotor) – type test needed	Q22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Generator design (asynchronous) with 1.8 times runaway speed – only 4-pole and higher	W56	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
IP56 degree of protection	K51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	K50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	L94	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IP67 degree of protection	K93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
IP67 degree of protection without level switch (resin material for terminal box protection will be shipped as extra package, 8 m submerged, 72 h max.)	W58	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drainage holes sealed with screw	W60	-	-	-	-	-	-	□	□	□	□	□	□	□	□	✓	✓	✓	✓
Increased tropicalization, humidity ≥ 80% – LOHER CHEMSTAR incl. V10 and W71 , LOHER VARIO incl. V10 and P45	W61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	L28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream; without external air stream cooling, factory clarification required due to derating	W62	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan with anti-corrosion protection in case of metal fan	W63	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	W64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	□	-	-	-	-	-
Fan of steel	W65	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
External fan of brass	W66	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	V94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special ventilation for on-deck motors	W67	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan cover of steel sheet (3 mm thick)	W68	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Galvanized fan cover – included in K30 and W09	W69	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	K37	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	K38	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Clockwise, viewed onto DE – direction of rotation must be specified for motors from frame size 355 2-/4-pole	K97	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR												LOHER VARIO						
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Special mechanical designs (continued)																				
Counter-clockwise, viewed onto DE – direction of rotation must be specified for motors from frame size 355 2-/4-pole	K98	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○	
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with K97 or K98	L20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Stainless steel grid for air inlet silencer – only in combination with L20	L25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) based on GG1	V32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Noise cabinet with inspection door – V4A unpainted – noise reduction approx. 15 dB(A) for GG1	V35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
Insulation sheath for noise reduction approx. 3 to 5 dB(A) for standard GG1	V34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
Operation in both directions of rotation – from frame size 355 2-/4-pole, possibly increased noise values and derating; for LOHER CHEMSTAR frame size 355 technical factory clarification essential	K99	□	□	□	□	□	□	□	□	□	□	□	□	□	□	O.R.	✓	✓	✓	O.R.
Higher number of starts (up to 3000 starts per year) – factory testing is necessary	Q23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Full-key balancing	L68	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Support ring for coupling guard	L15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	L17	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	L31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	L33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Half-key balancing		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Reinforced bearings at DE for belt drive	L96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	-	
Stainless steel screws and plates	W71	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Stainless steel external bolts	P45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Ambient temperatures down to -40° C; preheating before operation necessary – factory clarification required regarding the heating power required, heating via the winding may be necessary; installed heating elements in motor at additional charge.	W73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
Ambient temperatures down to -40° C; preheating before operation necessary – factory clarification required	W77	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	
Ambient temperatures down to -60° C; preheating before operation necessary – factory clarification required	W78	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	-	-	-	
Ambient temperatures down to -40° C; without preheating before operation	W97	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Ambient temperatures down to -55 °C; without preheating before operation	W98	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Mounted rotary pulse encoder, 1024 pulses per revolution -10 to 30 V, HTL level; cable length 5 m	W96	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Mounted rotary pulse encoder Ex version (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level; Ex d; cable length 5 m	V72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted rotary pulse encoder Ex version with integrated shaft grounding (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version; down to -20 °C only; select bearing isolation separately	V77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Mechanical protection for rotary pulse encoder – in combination with V72, V77	M68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted radial forced ventilation	W81	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Forced ventilation at NDE for Ex motors – axial forced ventilation	V28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked) – dimensions may differ	G48	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓	✓
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked), – dimensions may differ	G49	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓	✓
Tapered shaft extension with shaft nut	T36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sun canopy mounting in normal steel, cover in unpainted stainless steel for vertical motors	V87	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Sun canopy mounting in normal steel, cover in unpainted stainless steel for horizontal motors	V99	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	W84	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drain valve (drain and breather) IP 66 for auxiliary terminal box – not in combination with V43 (Ex d terminal box)	Q77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Condensation drain valve (drain and breather) IP 66 for main terminal box – not in combination with K53 (Ex d terminal box)	Q78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Machined surface on motor foot with dowel pin holes	Q94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Base frame for height adaptation of max. 2 frame sizes difference	Q96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	Q97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of flange dimensions and drilled holes in flange	Q98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Preparation for later installation of sun protection shield	Q99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Measuring nipple system 32 – thread M8, DE and NDE	G50	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shock pulse measurement (SPM), fixed sensor and distribution box	H05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Fixed sensor system 40 – thread M8	W85	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-

For legends and footnotes, see Page 2/124.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS1.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Bearing temperature monitoring with PTC thermistors at DE/NDE	W86	-	-	-	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	A03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A40	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 3- or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers without contacts, capillary principle	A70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers with 2 NO contacts, capillary principle	A71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection – 2-wire from terminal box	A72	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	V89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Labeling of terminal box, engraved	V96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	Q92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, brass base – not laminated	V31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Slotted feet holes	Q95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pre-formed coil for LV motors	V01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	V08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Impact protection – for built-on devices, per device	M81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Brackets for lifting and shifting	P42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Provision for enclosure vibration probe, one flat surface with thread M8 × 1	P63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pressure oil connection with cylindrical or stepped shaft extension instead of feather key connection	Y85 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required	W87	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Retrofit (description of special design separately) – adaptation to an existing motor	B15	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS1.....-Z		Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Extension of the liability for defects																			
Extension of the liability for defects by 12 months up to a total of 24 months	Q80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months up to a total of 30 months	Q81	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months up to a total of 36 months	Q82	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 30 months up to a total of 42 months	Q83	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 36 months up to a total of 48 months	Q84	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of liability for defects by 48 months up to a total of 60 months	Q85	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O. R. Possible on request
- Not possible

¹⁾ Acceptance tests must be selected additionally. For example, for the first motor select **F83** or **F93**, and for each additional motor **F01**. Inclusive of costs for certification authority (and inspector), and shaft test if specified by certification authority. LOHER CHEMSTAR for essential drive is possible on request as an ETO option (Engineer To Order) without an option code.

Overview

Engineering

In addition to the standard options, for LOHER CHEMSTAR and VARIO 1PS1 converters, it is also possible to order special designs.

The following variants are available via the electronic ordering tools:

- Mounted axial forced ventilation (non heavy sea) – forced ventilation can be ordered with **F** in the 10th position of the article number (old G17).
A mounted forced ventilation is available for frame sizes 132 to 355.
- Special insulation for increased voltage load in converter operation (phase/phase 2250 V_{Peak}/derating) – can be ordered for LOHER VARIO with **2** in the 8th position of the article number (additional charge).

To fulfill the requirements of your application in the best possible way, we offer the motor in an "Engineer To Order" (ETO) version. These ETO options are specially defined and engineered to suit customer requirements.

They cannot be ordered using electronic ordering tools; they can only be ordered on request from a Siemens contact:

Special electrical designs/winding protection

- Design with reduced starting current – factory clarification required (type test may be necessary).
For all frame sizes on request.
- Special design according to load curve of driven machine or customer requirements – factory clarification required and type test may be necessary.
For all frame sizes on request.
- Adjustment of rating in response to customer requirements – factory clarification required and type test may be necessary.
For all frame sizes on request.
- Other special electrical designs/configurations.
For all frame sizes on request.

Special mechanical designs

- "High-speed motors" for speed range > 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required.
For LOHER CHEMSTAR motors with frame sizes 90 to 355 on request.
- Special grease "Klüber Staburags NBU8EP"
With additional charge possible for LOHER CHEMSTAR motors, for LOHER VARIO motors on request.
- Special grease "Klüber Isoflex SL2"
With additional charge possible for LOHER CHEMSTAR motors, for LOHER VARIO motors on request.
- Special grease "Barierta L55/2"
With additional charge possible for LOHER CHEMSTAR motors of frame size 90 to 355, for LOHER VARIO motors on request.
- Other special grease
On request for LOHER CHEMSTAR and LOHER VARIO motors.

Colors and paint finish

- Other paint combinations/systems or RAL colors to customer specification.
For all frame sizes on request.

[More detailed information can be obtained from your Siemens sales partner.](#)

Motors with Explosion Protection

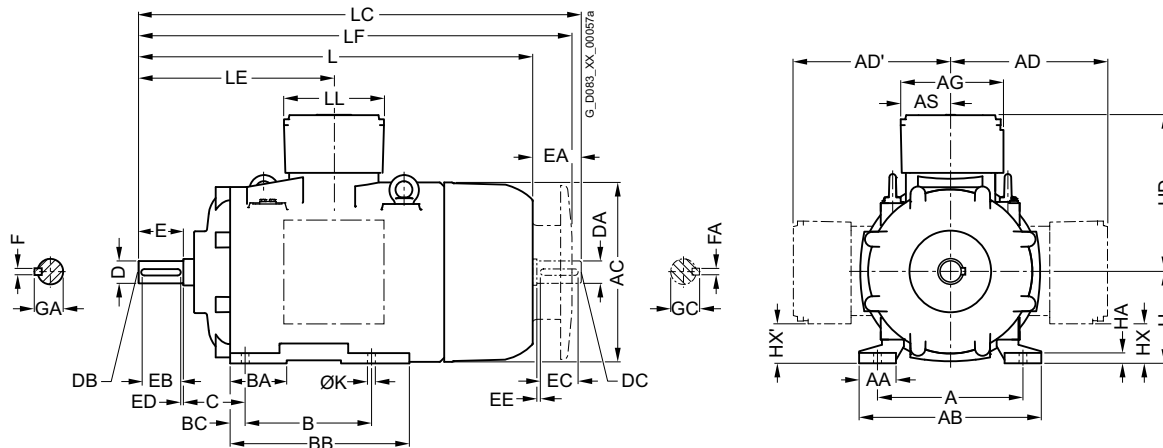
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 90 L to 250 M

Dimensional drawings

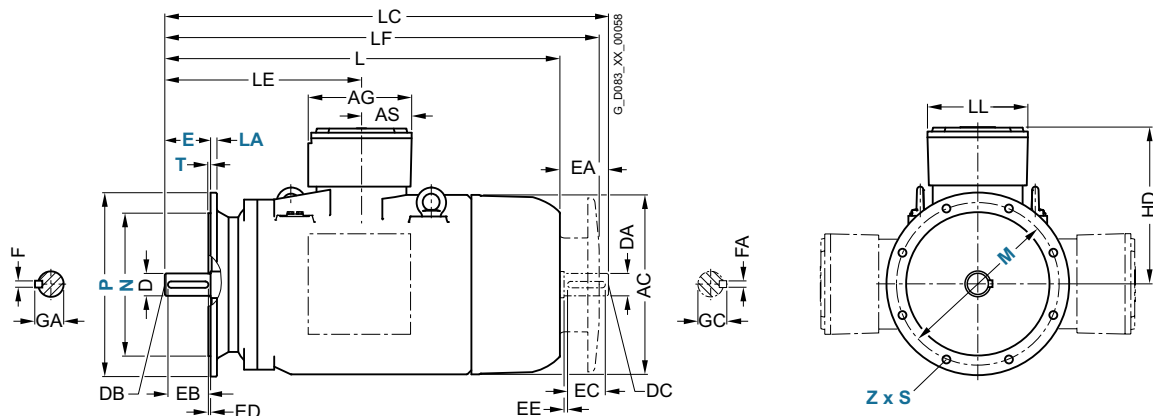
Type of construction IM B3

For flange dimensions, see Page 2/132



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/132



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER CHEMSTAR																		
90 L	2 ... 16	140	40	180	186	–	138	69	125	62	155	15	56	90	13	213	10	426
100 L	2 ... 16	160	40	205	213	–	138	69	140	45	170	15	63	100	18	227	12	482
112 M	2 ... 16	190	45	240	237	–	138	69	140	45	170	18	70	112	18	240	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	92	228	25	89	132	18	274	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	92	228	25	89	132	18	274	12	574
160 M	2 ... 16	254	60	310	331	305	186	92	210	60	307	21	108	160	27	305	15	786
160 L	2 ... 16	254	60	310	331	305	186	92	254	60	307	21	108	160	27	305	15	786
180 M	2 ... 16	279	70	349	364	349	254	123	241	99	359	24	121	180	19	349	15	822
180 L	2 ... 16	279	70	349	364	349	254	123	279	99	359	24	121	180	19	349	15	822
200 L	2 ... 16	318	80	400	404	367	254	123	305	120	425	32	133	200	25	369	19	884
225 S	2	356	90	446	451	384	254	123	286	136	438	34	149	225	26	384	19	966
	4 ... 16																	996
225 M	2	356	90	446	451	384	254	123	311	136	438	34	149	225	26	384	19	966
	4 ... 16																	996
250 M	2	406	100	505	489	522	382	176	349	110	420	35.5	168	250	35	522	25	1028
	4 ... 16																	

Motors with Explosion Protection

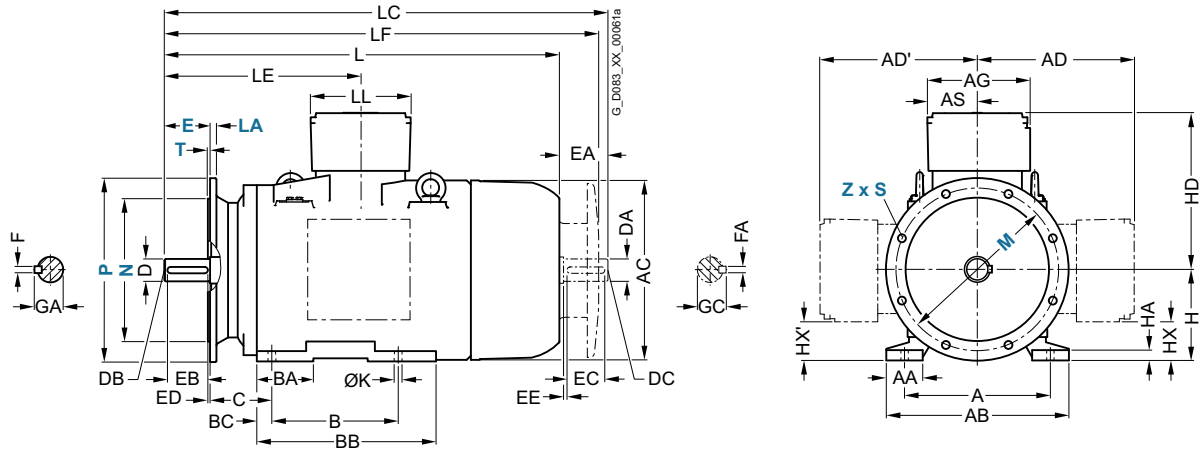
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 90 L to 250 M

Dimensional drawings (continued)

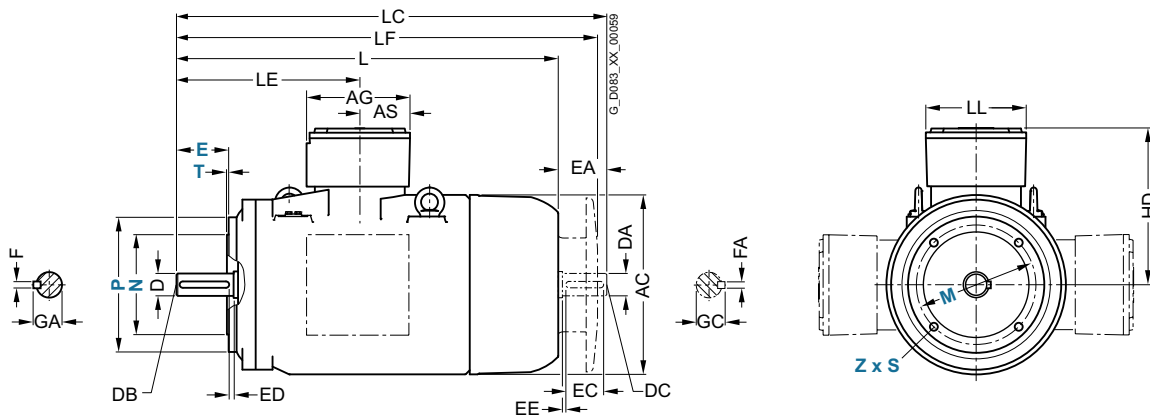
Type of construction IM B35

For flange dimensions, see Page 2/132



Type of construction IM B14

For flange dimensions, see Page 2/132



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER CHEMSTAR																			
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65							69	65						

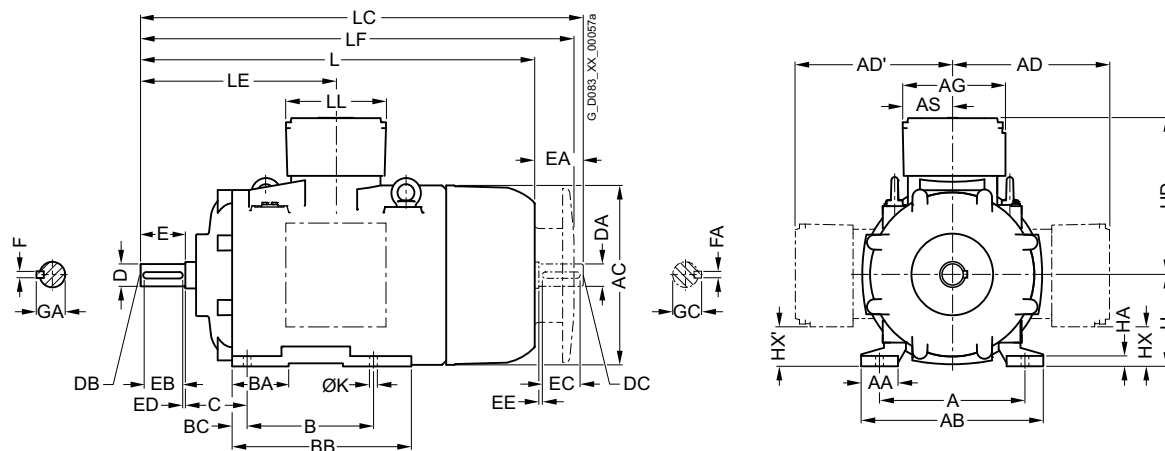
Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 280 S to 355 L

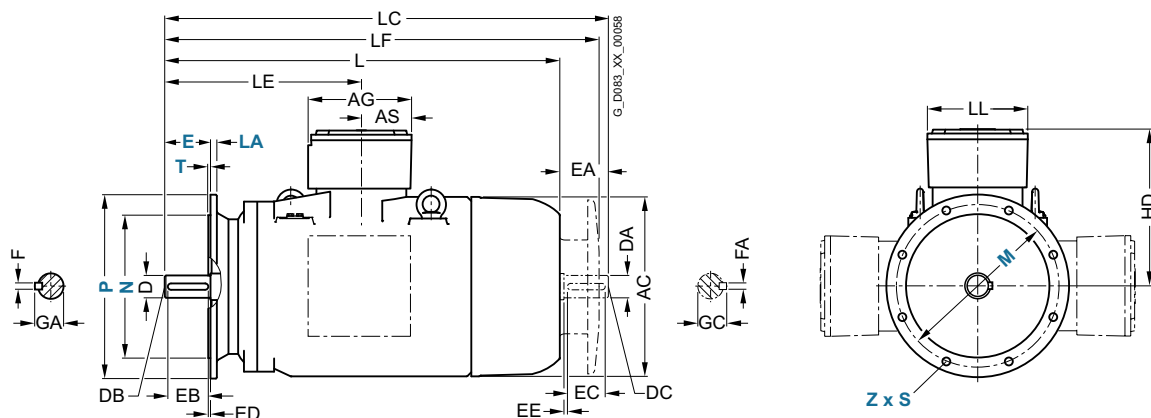
Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/132



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER CHEMSTAR																		
280 S	2	457	110	570	550	552	382	176	368	120	520	51	190	280	40	488	26	1119
	4 ... 16																	
280 M	2	457	110	570	550	552	382	196	419	120	520	51	190	280	40	488	26	1119
	4 ... 16																	
315 S	2	508	125	630	622	660	509	196	406	165	575	59	216	315	40	640	28	1304
	4 ... 16																	1334
315 M	2	508	125	630	622	660	509	196	457	165	575	59	216	315	40	640	28	1304
	4 ... 16																	1334
315 LL	2	508	125	630	622	676	509	196	508	165	675	59	216	315	40	656	28	1491
	4 ... 16																	1521
315 L	2	508	125	630	622	676	509	196	560	165	675	59	216	315	40	656	28	1491
	4 ... 16																	1521
355 M	2	610	120	730	700	729			560	150	650	45	254	355	50	729	30	1400
	4 ... 16																	1430
355 L	2	610	120	730	700	729			630	150	720	45	254	355	50	729	30	1470
	4 ... 16																	1500

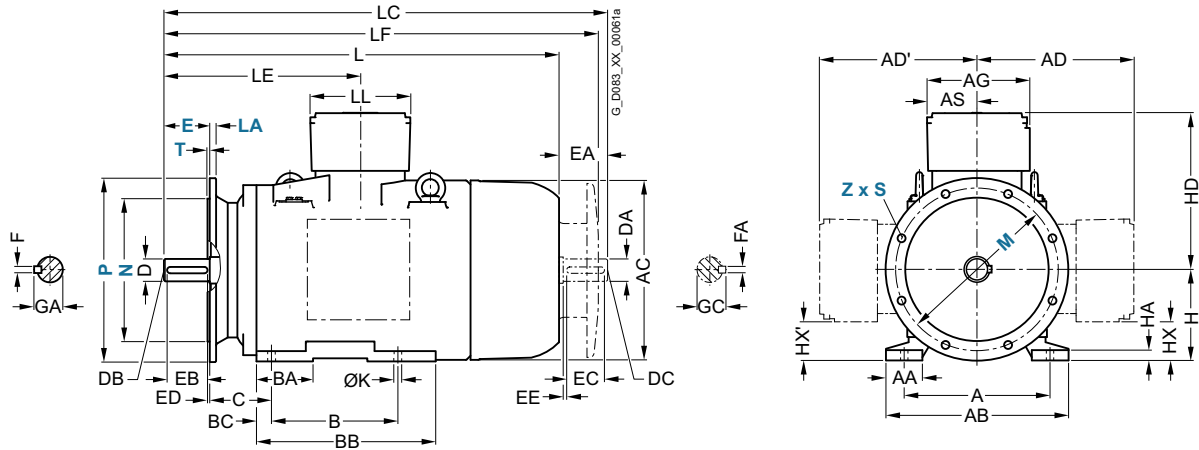
Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 280 S to 355 L

Dimensional drawings (continued)

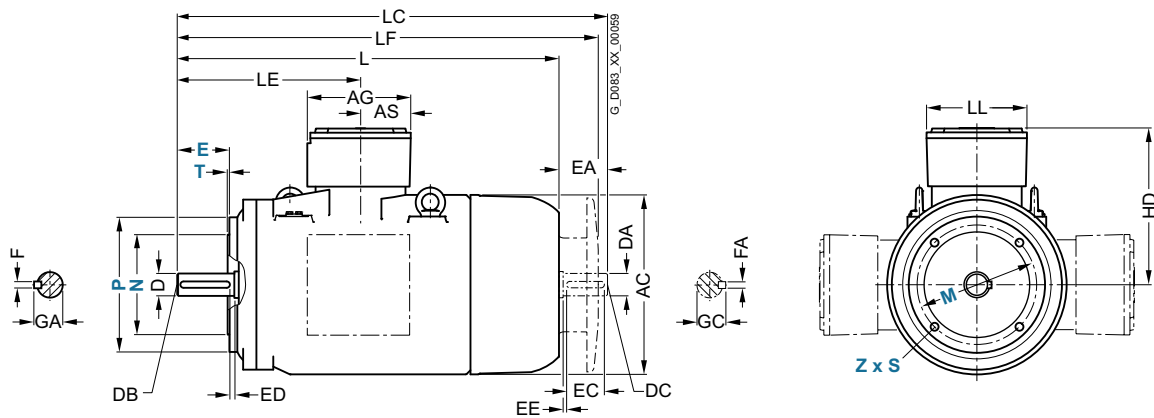
Type of construction IM B35

For flange dimensions, see Page 2/132



Type of construction IM B14

For flange dimensions, see Page 2/132



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER CHEMSTAR																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	79.5
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1550	674	1563	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1610	704	1593		90		M24	170	140	25	95	90		M24	170	140	25	95
355 L	2	1620	709	1633	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1680	739	1663		90		M24	170	140	25	95	90		M24	170	140	25	95

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Motors with Explosion Protection

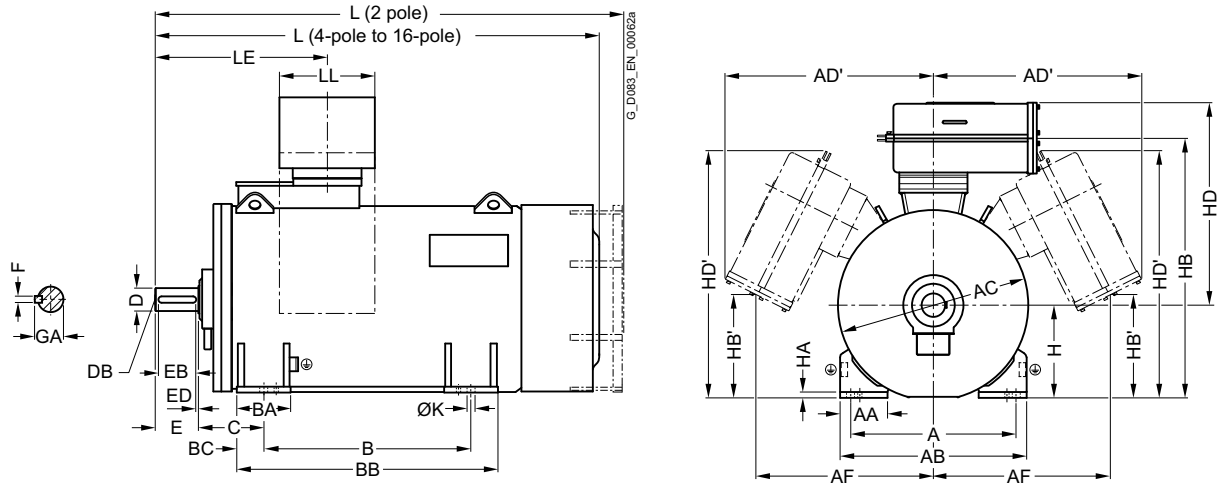
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 355 L to 500 L

Dimensional drawings (continued)

Type of construction IM B3

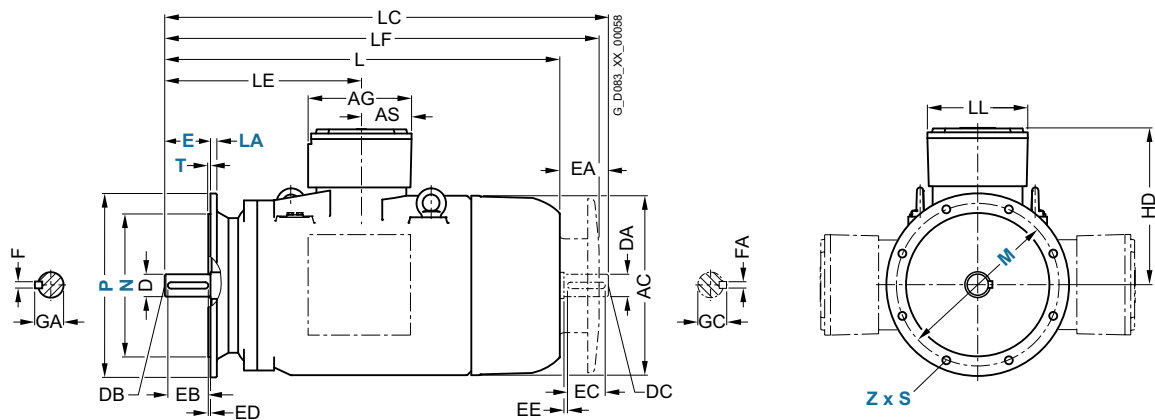
Design of terminal box and position for LOHER VARIO



Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/132

Design of terminal box and position for LOHER VARIO



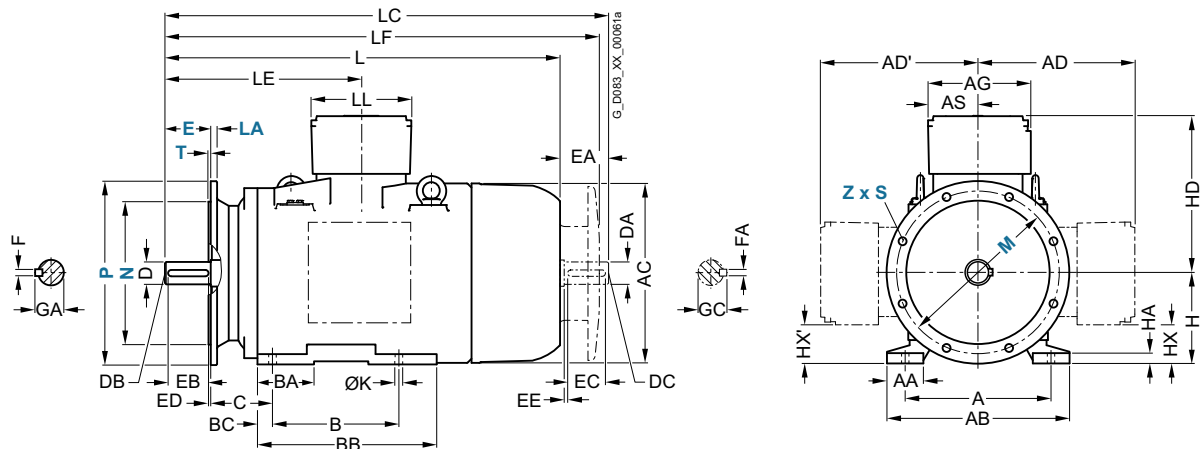
Frame size	No. of poles	Dimension designation acc. to IEC																	
		A	AA	AB	AC	AD/AD'	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER VARIO																			
355 L	2	630	140	780	740	500				800	210	950		254	355	35	835	33	1860
	4 ... 16																		1890
400 L	2	710	185	860	820	500				900	210	1090		280	400	30	897	33	1975
	4 ... 16																		2015
450 L	2	800	230	900	920	500				1000	260	1260		315	450	30	925	39	2095
	4 ... 16																		2135
500 L	2	900	220	1030	1015	500				1120	280	1400		335	500	40	979	39	–
	4 ... 16																		2305

Dimensional drawings (continued)

Type of construction IM B35

For flange dimensions, see Page 2/132

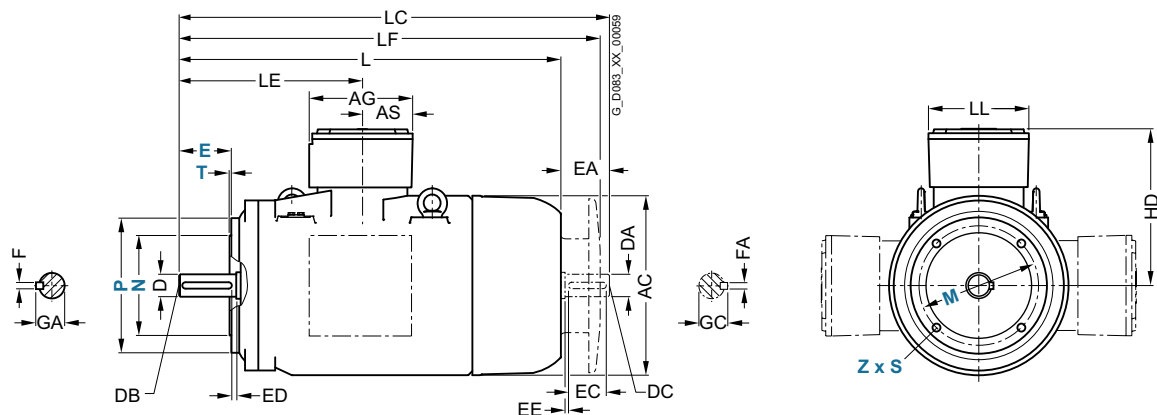
Design of terminal box and position for LOHER VARIO



Type of construction IM B14

For flange dimensions, see Page 2/132

Design of terminal box and position for LOHER VARIO



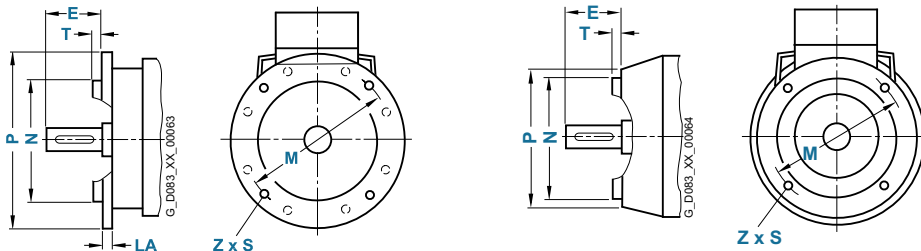
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER VARIO																			
355 L	2		657			75	M20	140			20	79.5	75	M20	140			20	79.5
	4 ... 16		687			90	M24	170			25	95	90	M24	170			25	95
400 L	2		695			80	M20	170			22	85	80	M20	170			22	85
	4 ... 16		732			100	M24	210			28	106	100	M24	210			28	106
450 L	2		707			85	M20	170			22	90	85	M20	170			22	90
	4 ... 16		747			110	M24	210			28	116	110	M24	210			28	116
500 L	2		–			–	–	–			–	–	–	–	–			–	–
	4 ... 16		747			120	M24	210			32	127	120	M24	210			32	127

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Flange dimensions

Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes. (Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR										
90 L	2 ... 16	FF165	10	50	165	130	200	11.5	3.5	4
		<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
		FT115	15	50	115	95	140	M8	3	4
		<i>FT100</i> ¹⁾	8	–	100	80	120	M6	3	4
		<i>FT130</i> ¹⁾	10	–	130	110	160	M8	3.5	4
100 L	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	11	60	130	110	160	M8	3.5	4
		<i>FT115</i> ¹⁾	10	–	115	95	140	M8	3	4
		<i>FT130</i> ¹⁾	12	–	165	130	200	M10	3.5	4
112 M	2 ... 16	FF215	11	60	215	180	250	14	4	4
		<i>FT165</i> ¹⁾	13	–	265	230	300	14	4	4
		FT130	11	60	130	110	160	M8	3.5	4
		<i>FT165</i> ¹⁾	12	–	165	130	200	M10	3.5	4
132 S	2 ... 16	FF265	12	80	265	230	300	14	4	4
		<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
132 M	2 ... 16	FF265	12	80	265	230	300	14	4	4
		<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
160 M	2 ... 16	FF300	20	110	300	250	350	18	5	4
		<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
		<i>FF265</i> ¹⁾	12	–	265	230	300	14	4	4
		FF300	20	110	300	250	350	18	5	4
160 L	2 ... 16	<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
		<i>FF265</i> ¹⁾	12	–	265	230	300	14	4	4
		FF300	20	110	300	250	350	18	5	4
		<i>FF215</i> ¹⁾	11	–	215	180	250	14	4	4
180 M	2 ... 16	FF300	13	110	300	250	350	18	5	4
		<i>FF265</i> ¹⁾	12	–	265	230	300	14	4	4
		<i>FF400</i> ¹⁾	16	–	400	350	450	18	5	8
		FF300	13	110	300	250	350	18	5	4
180 L	2 ... 16	<i>FF265</i> ¹⁾	12	–	265	230	300	14	4	4
		<i>FF400</i> ¹⁾	16	–	400	350	450	18	5	8
		FF350	15	110	350	300	400	18	5	8
		<i>FF300</i> ¹⁾	15	–	300	250	350	18	5	4
200 L	2 ... 16	<i>FF400</i> ¹⁾	16	–	400	350	450	18	5	8
		FF350	15	110	350	300	400	18	5	8
		<i>FF300</i> ¹⁾	15	–	300	250	350	18	5	4
		<i>FF400</i> ¹⁾	16	–	400	350	450	18	5	8
225 S	2	FF400	16	110	400	350	450	18	5	8
		<i>FF350</i> ¹⁾	15	–	350	300	400	18	5	8
	4 ... 16	FF400	17	140	400	350	450	18	5	8
		<i>FF350</i> ¹⁾	15	–	350	300	400	18	5	8

¹⁾ Flange is selectable at no additional cost.

Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Flange dimensions

Dimensional drawings (continued)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR (continued)										
225 M	2	FF400	16	110	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
	4 ... 16	FF400	16	140	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
250 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
280 S	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	22	–	400	350	450	18	5	8
280 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	22	–	400	350	450	18	5	8
315 S	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
315 M	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
315 LL	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
315 L	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
355 M	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
355 L	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
LOHER VARIO										
355 L	2	FF740	25	140	740	680	800	22	6	8
	4 ... 16			170						
400 L	2	FF940	28	170	940	880	1000	22	6	8
	4 ... 16			210						
450 L	2	FF1080	30	170	1080	1000	1150	26	6	8
	4 ... 16			210						
500 L	2	FF1180	30	–	1180	1120	1250	26	7	8
	4 ... 16			210						

¹⁾ Flange is selectable at no additional cost.

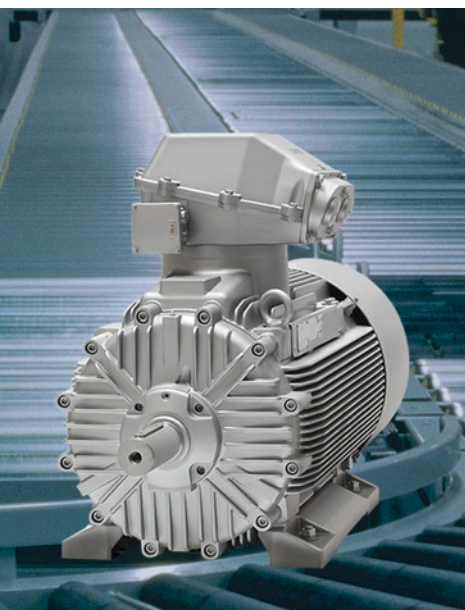
Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Notes

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Motors without Explosion Protection



3/2	LOHER CHEMSTAR and VARIO 1PS0 motor series
3/2	<u>General information</u>
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3/6	• Electrical design
3/6	• Operation on a frequency converter
3/6	• Three-phase motors with external cables
3/6	• Motors with built-on backstop
3/7	<u>Motors with High Efficiency IE2 in cast-iron and steel versions</u>
3/7	Selection and ordering data
3/17	<u>Motors with Premium Efficiency IE3 in cast-iron and steel versions</u>
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Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

General information

Technical specifications

LOHER CHEMSTAR and VARIO 1PS0 motor series without explosion protection

The motors of series 1PS0 without explosion protection are available as LOHER CHEMSTAR and VARIO motors. Motors that operate in a "safe" or "non-explosive" environment do not require any special mechanical and electrical protection against explosive gas, vapor or dust. There is no risk of explosion in this case. The CHEMSTAR motors can be mechanically designed in accordance with VIK specifications ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry). These motors therefore correspond mechanically to the VIK recommendation, they have no Ex marking and are not permitted to be used in potentially explosive atmospheres of Zone 2. VIK motors with Ex certification are available for selection in series 1PS1.

In general, these motors are suitable for applications in production plants or process engineering equipment in factories (conveyor belts, elevators and cranes, escalators and water pumps).

General technical specifications

LOHER CHEMSTAR and VARIO 1PS0 motors	
Motor type	A...A
Frame size	90 ... 500
Power range (50 Hz types)	0.37 ... 1400 kW (thermal utilization in accordance with temperature class B at ambient temperature = 40 °C)
Number of poles	2- to 12-pole, also higher number of poles for special versions Pole-changing: <ul style="list-style-type: none"> • 2 speeds, e.g. 4-/2-pole, 8-/4-pole, 12-/6-pole • 3 speeds, e.g. 8-/4-/2-pole, 8-/6-/4-pole Dahlander or separate windings for square-law or constant torques
Voltage range	Up to 1000 V
Rated voltage	Normal low voltage Non-standard voltage and/or frequency as required by the customer
Operating mode	S1 and others
Degree of protection	IP55, IP56 and IP65 to IP68
Cooling method	IC 411, IC 416, special cooling methods such as non-ventilated IC 410 IC 71W water-jacket-cooled
Type of construction	All common types of construction + special types of construction
Enclosure	Cast-iron or steel
Bearings	Roller bearings (standard) and special bearings for high axial and radial forces
Types of protection	None
Noise level	All motors are noise-optimized (noise values in accordance with EN 60034-9) Low-noise version for 2-pole motors (GG3) is possible as an option

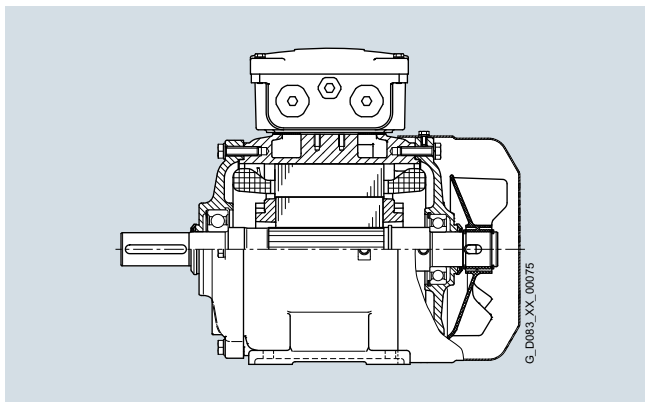
Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

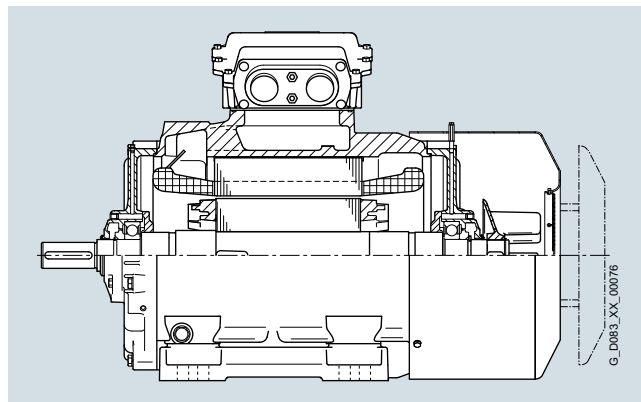
General information

Technical specifications (continued)

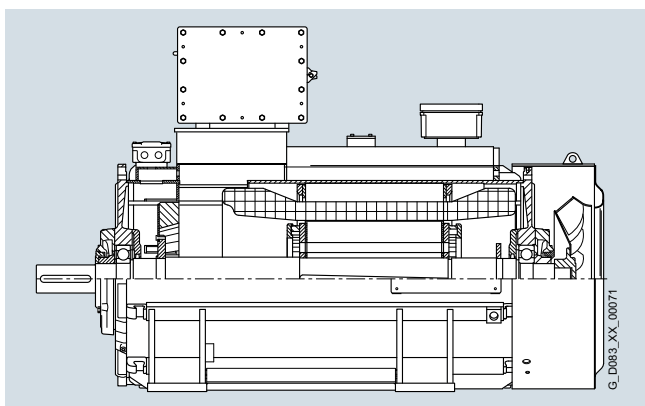
Mechanical design



Sectional view of CHEMSTAR 1PS0 three-phase motor, frame sizes 90 to 200 LB,
Example: 1PS0132-0BD60-0AA4 (*motor type: ANGA-132SR-02*)
7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS0 three-phase motor, frame sizes 225 to 355
Example: 1PS0316-0BD60-0AA4 (*motor type: ANGA-315LL-02*)
200 kW, 2-pole



Sectional view of VARIO 1PS0 three-phase motor, frame sizes 355 to 500,
with relubrication device
Example 1PS0357-0BH0.-0AA2 (*motor type: ANSA-355LC-02*)
355 kW, 2-pole

Enclosure, ventilation

Enclosure and fan for motors of the LOHER CHEMSTAR and VARIO 1PS0 series

Frame size	Enclosure		Surface	Bearing plates		Fan cover	Fan
	Material	Design of enclosure feet ¹⁾		Material	Flange ring on bearing plate	Material	Material
LOHER CHEMSTAR							
71	Cast-iron	Cast	With cooling fins	Cast-iron	Screwed on	Sheet steel	Plastic ³⁾
80 ... 112					Cast, optionally screwed on		
132							
160					Screwed on		
180 ... 280							
315							
355		Cast					Metal ³⁾⁴⁾
LOHER VARIO							
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	–	Sheet steel	Metal ⁴⁾
500				Steel, bearing hub in cast-iron			

¹⁾ For designs with feet only.

²⁾ Terminal boxes are screwed on at the side on frame sizes 132 and 160.

³⁾ With specific operating conditions, the external fans can be constructed with special materials (see special versions).

⁴⁾ Only one direction of rotation for 2-pole and 4-pole version.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

General information

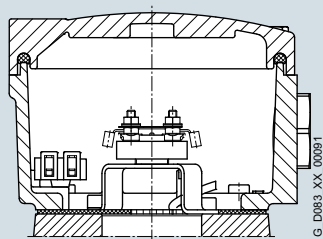
Technical specifications (continued)

Terminal boxes

The position of the terminal box and cable entries can be obtained from the tables below. The terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides.

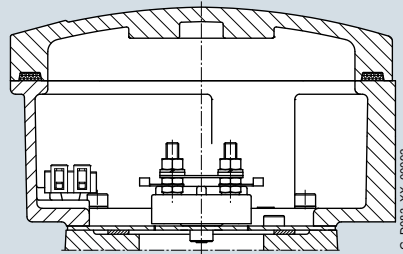
Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below.

Figure 1 Terminal box for LOHER CHEMSTAR frame sizes 90 to 112



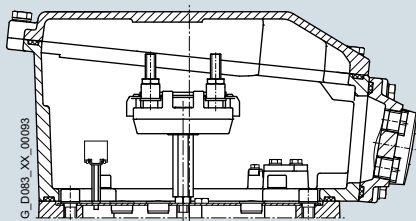
Auxiliary terminal box is not possible

Figure 2 Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



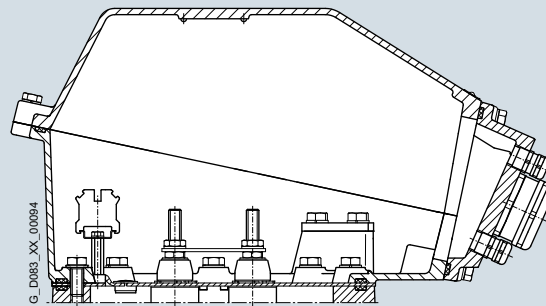
Frame sizes 132 to 160, 1 auxiliary terminal box (M50) is possible,
Frame sizes 180 to 225, 2 auxiliary terminal boxes (M50) are possible

Figure 3 Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



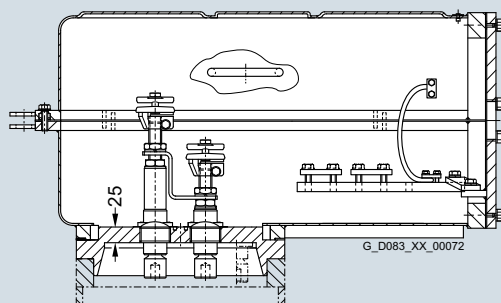
3 auxiliary terminal boxes (M50) are possible

Figure 4 Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes (M52) are possible

Figure 5 Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the enclosure

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

General information

Technical specifications (continued)

Terminal box for 1PS0 motors

Degree of protection: IP55

Type of protection: –

Enclosure material: Cast-iron

Frame size	Standard terminal box					Enlarged terminal box – Option L00					
	Terminal studs	Conductor cross-section		Auxiliary terminals in main terminal box	PE/ground connection	Fig. No. on Page 3/4	Terminal studs	Conductor cross-section		Fig. No. on Page 3/4	
		min.	max.	Number × max. cross-section ¹⁾	max.			min.	max.		
		mm ²	mm ²	mm ²	mm ²			mm ²	mm ²		
LOHER CHEMSTAR											
90	6 × M4	1	2.5 (6) ²⁾	4 × 2.5	4	6 ²⁾	Fig. 1	6 × M5	1	10 (25) ²⁾	Fig. 2
100											
112											
132	6 × M5	1	10 (25) ²⁾		25		Fig. 2	6 × M6	2.5	35 (50) ²⁾	Fig. 2
160											
180	6 × M6	2.5	35 (50) ²⁾	12 × 4	70		Fig. 2	6 × M10	6	70	Fig. 3
200											
225											
250	6 × M10	6 ... 70			95		Fig. 3	6 × M12	16	150	Fig. 4
280											
315 S/M	6 × M12	16 ... 150		16 × 4	150		Fig. 4	6 × M16	16	300	Fig. 4
315 L	6 × M16/M20 ³⁾	16 ... 300						Special connection system on request			
LOHER VARIO											
355 ... 500							Fig. 5				

Number and size of entry thread and cable glands (to be ordered specially), see table "Cable glands for 1PS0 motors".

Cable glands for 1PS0 motors

Frame size	Standard cable glands ⁴⁾		Cable diameter, type HSK-K ⁷⁾ mm	Max. entry thread ⁵⁾	
	Entry thread ⁶⁾			Metric	NPT ⁸⁾
LOHER CHEMSTAR					
90	1 × M25 × 1.5		9 ... 16	1 × M25 × 1.5	2 × 1"
100	1 × M32 × 1.5		13 ... 20	1 × M32 × 1.5	
112	2 × M32 × 1.5			2 × M32 × 1.5	
132				2 × M40 × 1.5	2 × 1½"
160	2 × M40 × 1.5		22 ... 32		
180				2 × M63 × 1.5	2 × 2"
200	2 × M50 × 1.5		32 ... 38		
225					
250	2 × M63 × 1.5		37 ... 44		
280					
315 S/M				2 × M100 × 1.5	2 × 3½"
315 L					
355					
LOHER VARIO					
355 ... 500	⁹⁾		⁹⁾	⁹⁾	⁹⁾

Entry thread for PTC thermistor, heating:
M20 × 1.5/D = 6 up to 12 mm

The entry threads are sealed on delivery with certified plugs. The terminal boxes will only be supplied with cable glands in accordance with the table if specially ordered. Special cable glands can be fitted on request.

- 1) Rated voltage/max. working voltage 400 V/440 V.
- 2) Maximum conductor cross-section with cable lug.
- 3) Alternatively, larger studs for higher rated current.
- 4) Materials used for standard gland: Polyamide
- 5) Other threads, number and size on request.
- 6) Number and size of entry threads according to DIN 42925.
- 7) Cable glands suitable for the infeed of unshielded/non-reinforced cables and leads.
- 8) Cable glands for NPT thread on request.
- 9) Undrilled gland plate.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

General information

Technical specifications (continued)

Electrical design

The insulation system of the 1PS0 motor series is suitable for line voltages up to 690 V. The connection system (terminal boxes, terminals) is also designed for this rated voltage.

The explosion-proof motors are equipped with 6 terminals. They can thus be operated in star or delta. If a voltage variant with dual voltage, e.g. 400 V Δ /690 VY is selected, the rated data of both voltage levels will be stamped on the rating plate.

The motors of the 1PS0 series are manufactured with an insulation system of thermal class 155 °C. Utilization at rated operation corresponds to thermal class 130 °C.

Voltage tolerances

The motors are suitable for operation at voltage and frequency tolerances in accordance with EN 60034-1.

Tests additionally ensure that the permissible limit temperatures of the exterior surface of the explosion-proof enclosure are not exceeded when operated continuously at the voltage limits ($\pm 10\%$) in accordance with EN 60079-1.

Operation on a frequency converter

The general use of high-quality insulation systems enables operation on a frequency converter.

The permissible speed and torque range is stamped on an additional rating plate.

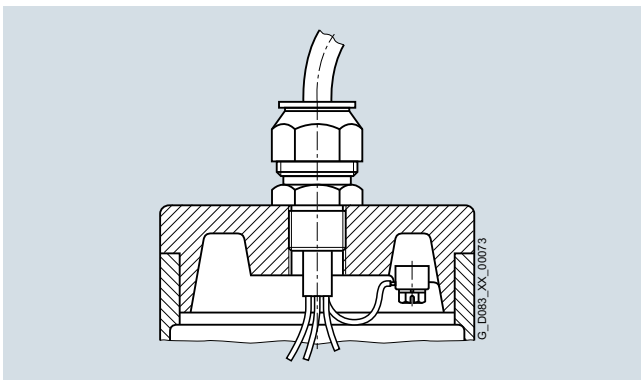
Monitoring of the winding by PTC thermistors or alternatively Pt100 is recommended for operation on a frequency converter. These are installed in the stator winding and monitored by a trip unit. Motor circuit breakers can then be dispensed with.

Three-phase motors with external cables

Three-phase motors with externally routed connecting cables are used in machines or ventilation systems in which the electrical connections are routed via a separately mounted terminal box due to the space constraints.

Version

The motors correspond to the surface-cooled versions in this catalog. A gland plate is mounted in place of the terminal box (Options **G48/G49**).



Frame sizes and types of construction: See dimensional drawings

Connection cables: The free length of connection cable must be specified when ordering. The standard length is 1.5 m. Two or more cable entries are used in the case of pole-changing motors or single-speed motors with rated current > 70 A. The permissible coolant temperature is dependent on the connection cables used.

Cable types (standard version)

Temperature class of the motor	Cable Type	Max. rated voltage	Max. temperature at conductor
		U_{rated} V	°C
F	Ölflex	500	-40 ... +80
F	NSSHöu-J	1000	-20 ... +80
F	EWKF/SIHF	500	-50 ... +180

Motors with built-on backstop

If reverse motion of the drive has to be prevented following switch-off, three-phase motors with mechanical backstop can be used. Backstops are maintenance-free and have individual spring-loaded clamping elements. The backstops of the type CSK are supplied with permanent lubrication. The clamping elements have a tendency to lift. In backstops of the FXM type series, the clamping elements lift automatically after approach due to the centrifugal force. Wear therefore does not occur at rated speed of the motor.

The backstop is not permitted to be used as protection against rotation in the wrong direction caused by switching despite the interlock. The direction of rotation must be specified on ordering.

The motor power ratings are as specified in the selection tables in this catalog. The assignment of backstops to frame sizes is specified in the table below. Frame sizes 90 to 112 have the same dimensions as standard motors. Dimensional drawings are available for the larger types on request.

Backstops for motors of frame sizes 132 to 355

Motor Frame size	No. of poles	Backstop	
		Type	M_t Nm
132	2, 4, 6	FXM 51-25 DX	680
160	2, 4, 6	FXM 66-25 DX	1480
180	2, 4, 6	FXM 66-25 DX	1480
200	2, 4, 6, 8	FXM 86-25 DX	2410
225	2, 4, 6, 8	FXM 86-25 DX	2410
250	2, 4, 6, 8	FXM 100-50 DX	6000
280	2, 4, 6, 8	FXM 120-50 SX	10400
315	2, 4, 6, 8	FXM 120-50 SX	10400
355	2	FXM 120-50 SX	10400
355	4, 6	FXM 140-50 SX	15200

With the backstops listed in the table above, motors of frame sizes 132 to 355 can be supplied in IP55 or IP56 degree of protection. Higher degrees of protection on request.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

Operating values at rated power														Motor type	Article No.	m IM B3	J kgm ²	
P _{rated} 50 Hz	Frame size	n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	cos φ _{rat.} 50 Hz, 4/4	I _{rated} 400 V	I _{rated} 500 V	I _{rated} 690 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}					T _B / T _{rat.}
KW	FS	rpm	Nm	-	%	%	%	-	A	A	A	-	-	-	kg	kgm ²		
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																		
10-pole: 600 rpm at 50 Hz																		
LOHER CHEMSTAR on request																		
LOHER VARIO																		
180	355 L	594	2889	1)	94.6	94.7	94.0	0.81	338	271	196	1.05	5.3	2.15	ANSA-355LC-10	1PS0357- BH -0EA0	2350	16.5
200	355 L	594	3211	1)	94.6	94.8	94.1	0.81	376	300	218	1.05	5.1	2.05	ANSA-355LD-10	1PS0358- BH -0EA0	2400	18
225	355 L	593	3620	1)	95.2	95.5	95.1	0.80	425	340	245	1.1	4.8	2.15	ANSA-355LX-10	1PS0358- BJ -0EA0	2550	19
250	400 L	594	4014	1)	95.4	95.7	95.2	0.80	475	380	275	0.95	4.7	2.05	ANSA-400LL-10	1PS0404- BJ -0EA0	2800	27
280	400 L	595	4495	1)	95.6	95.8	95.3	0.81	520	415	300	0.95	4.7	2.05	ANSA-400LN-10	1PS0405- BJ -0EA0	3100	32
315	400 L	595	5058	1)	95.6	95.8	95.4	0.80	595	475	345	0.95	4.7	2.05	ANSA-400LN-10	1PS0407- BJ -0EA0	3100	32
355	400 L	595	5700	1)	95.8	96.0	95.6	0.80	665	530	385	0.95	4.8	2.1	ANSA-400LX-10	1PS0408- BJ -0EA0	3300	35
400	450 L	595	6418	1)	96.0	96.1	95.5	0.80	750	600	435	1.0	4.9	2.1	ANSA-450LL-10	1PS0454- BJ -0EA0	4100	42
450	450 L	595	7221	1)	96.1	96.2	95.6	0.81	835	670	485	0.95	4.8	2.05	ANSA-450LN-10	1PS0455- BJ -0EA0	4400	50
500	450 L	595	8020	1)	96.2	96.3	95.7	0.80	940	750	545	0.95	5.0	2.15	ANSA-450LN-10	1PS0457- BJ -0EA0	4400	50
520	450 L	595	8336	1)	96.2	96.2	95.6	0.79	985	785	570	1.0	5.1	2.2	ANSA-450LX-10	1PS0458- BJ -0EA0	4700	55
560	500 L	596	8965	1)	96.1	96.1	95.3	0.80	1050	840	610	0.85	5.3	2.35	ANSA-500LL-10	1PS0504- BJ -0EA0	5400	82
630	500 L	596	10082	1)	96.2	96.2	95.4	0.80	1180	945	685	0.9	5.3	2.4	ANSA-500LN-10	1PS0505- BJ -0EA0	6100	98
670	500 L	597	10719	1)	96.3	96.2	95.4	0.80	1260	1005	730	0.95	5.5	2.45	ANSA-500LN-10	1PS0507- BJ -0EA0	6100	98
750	500 L	597	11998	1)	96.4	96.3	95.5	0.79	-	-	820	0.95	5.5	2.45	ANSA-500LX-10	1PS0508- BJ -0EA0	6500	108
Operating modes										Frame size						Order code		
Line operation										355 ... 450				0		-		
Converter operation, standard insulation										355 ... 450				1		-		
Converter operation with special insulation (derating approx. 5 %) ²⁾										355 ... 500				2		-		
Line operation, pre-formed coil										500				3		-		
Converter operation, pre-formed coil										500				4		-		
Voltages										Frame size						Order code		
690 VΔ, 50 Hz										355 ... 500				0		-		
500 VΔ, 50 Hz										355 ... 450				5		-		
400 V/690 V, 50 Hz										355 ... 400				6		-		
690 VY, 50 Hz										355 ... 400				8		-		
For other voltages, see Page 3/27										355 ... 500				9		...		
Types of construction										Frame size						Order code		
IM B3										355 ... 500				0		-		
IM V1/cover										355 ... 450				4		-		
IM B35										355 ... 500				6		-		
For other types of construction, see from Page 1/29 and 3/28										355 ... 500				9		...		

¹⁾ Outside the IE code classification according to IEC 60034-30-1.

²⁾ Insulation, 2.15 kV IEC/TS 60035-25:2007 curve B.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power											Motor type	Article No.	m	J	
		n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	cos φ _{rat.} 50 Hz, 4/4	I _{rated} 400 V	I _{rated} 500 V	I _{rated} 690 V	T _{LR} / T _{rat.}					I _{LR} / I _{rat.}
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																	
12-pole: 500 rpm at 50 Hz																	
LOHER CHEMSTAR on request																	
LOHER VARIO																	
160	355 L	493	3097	¹⁾	94.1	94.3	93.8	0.78	313	250	181	0.95	4.6	2.1	ANSA-355LC-12	1PS0357-■BH■-0FA0	2350 17
180	355 L	494	3481	¹⁾	94.3	94.5	93.9	0.77	355	285	205	1.0	4.7	2.15	ANSA-355LD-12	1PS0358-■BH■-0FA0	2400 19
190	355 L	494	3672	¹⁾	94.5	94.7	94.3	0.77	375	300	218	0.95	4.6	2.2	ANSA-355LX-12	1PS0358-■BJ■-0FA0	2550 18.5
200	400 L	494	3861	¹⁾	94.9	95.1	94.7	0.78	390	310	225	0.95	4.6	2.05	ANSA-400LL-12	1PS0404-■BJ■-0FA0	2800 26.5
225	400 L	495	4341	¹⁾	95.1	95.3	94.9	0.79	430	345	250	1.0	4.7	2.15	ANSA-400LN-12	1PS0405-■BJ■-0FA0	3100 32
250	400 L	495	4824	¹⁾	95.2	95.4	95.0	0.78	485	390	282	1.0	4.6	2.1	ANSA-400LN-12	1PS0407-■BJ■-0FA0	3100 32
280	400 L	495	5402	¹⁾	95.2	95.4	95.0	0.78	545	435	315	0.95	4.8	2.2	ANSA-400LX-12	1PS0408-■BJ■-0FA0	3300 35
315	450 L	495	6075	¹⁾	95.5	95.7	95.3	0.78	610	490	355	0.9	4.5	1.95	ANSA-450LL-12	1PS0454-■BJ■-0FA0	4100 42
355	450 L	495	6842	¹⁾	95.6	95.8	95.4	0.78	690	550	400	0.9	4.6	2.0	ANSA-450LN-12	1PS0455-■BJ■-0FA0	4400 50
400	450 L	495	7709	¹⁾	95.7	95.9	95.4	0.78	785	630	455	0.95	4.6	2.0	ANSA-450LN-12	1PS0457-■BJ■-0FA0	4400 50
420	450 L	495	8095	¹⁾	95.7	95.9	95.4	0.78	810	650	470	0.95	4.7	2.05	ANSA-450LX-12	1PS0458-■BJ■-0FA0	4600 55
450	500 L	496	8662	¹⁾	95.8	95.8	95.2	0.80	845	675	490	0.9	4.8	2.05	ANSA-500LL-12	1PS0504-■BJ■-0FA0	5400 82
500	500 L	496	9617	¹⁾	95.8	95.8	95.1	0.79	950	760	550	0.95	5.1	2.1	ANSA-500LN-12	1PS0505-■BJ■-0FA0	6100 98
560	500 L	496	10779	¹⁾	95.9	96.0	95.3	0.80	1055	840	610	0.9	4.9	2.2	ANSA-500LN-12	1PS0507-■BJ■-0FA0	6100 98
600	500 L	496	11546	¹⁾	96.0	96.1	95.5	0.80	-	905	655	0.9	5.1	2.15	ANSA-500LX-12	1PS0508-■BJ■-0FA0	6350 108
Operating modes																	
Line operation											Frame size				Order code		
Line operation											355 ... 450	0			-		
Converter operation, standard insulation											355 ... 450	1			-		
Converter operation with special insulation (derating approx. 5 %) ²⁾											355 ... 500	2			-		
Line operation, pre-formed coil											450 ... 500	3			-		
Converter operation, pre-formed coil											450 ... 500	4			-		
Voltages																	
690 VΔ, 50 Hz											Frame size				Order code		
690 VΔ, 50 Hz											355 ... 500	0			-		
500 VΔ, 50 Hz											355 ... 450	5			-		
400 V/690 V, 50 Hz											355 ... 400	6			-		
690 VY, 50 Hz											355 ... 400	8			-		
For other voltages, see Page 3/27											355 ... 500	9			...		
Types of construction																	
IM B3											Frame size				Order code		
IM B3											355 ... 500	0			-		
IM V1/cover											355 ... 450	4			-		
IM B35											355 ... 500	6			-		
For other types of construction, see from Page 1/29 and 3/28											355 ... 500	9			...		

¹⁾ Outside the IE code classification according to IEC 60034-30-1.²⁾ Insulation, 2.15 kV IEC/TS 60035-25:2007 curve B.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

P_{rated} , Frame size 50 Hz	Motor type	Article No.	m IM B3 kg
kW FS			
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 			
14-pole: 430 rpm at 50 Hz			
LOHER CHEMSTAR on request			
LOHER VARIO			
125 355 L	ANSA-355LC-14	1PS0357-■BH■-0GA0	2350
140 355 L	ANSA-355LD-14	1PS0358-■BH■-0GA0	2400
160 400 L	ANSA-400LL-14	1PS0404-■BJ■-0GA0	2800
180 400 L	ANSA-400LN-14	1PS0405-■BJ■-0GA0	3100
200 400 L	ANSA-400LN-14	1PS0407-■BJ■-0GA0	3100
225 400 L	ANSA-400LX-14	1PS0408-■BJ■-0GA0	3250
250 450 L	ANSA-450LL-14	1PS0454-■BJ■-0GA0	4100
280 450 L	ANSA-450LN-14	1PS0455-■BJ■-0GA0	4400
315 450 L	ANSA-450LN-14	1PS0457-■BJ■-0GA0	4400
340 450 L	ANSA-450LX-14	1PS0458-■BJ■-0GA0	4600
355 500 L	ANSA-500LL-14	1PS0504-■BJ■-0GA0	5400
400 500 L	ANSA-500LN-14	1PS0505-■BJ■-0GA0	6100
450 500 L	ANSA-500LN-14	1PS0507-■BJ■-0GA0	6100
500 500 L	ANSA-500LX-14	1PS0508-■BJ■-0GA0	6500
16-pole: 375 rpm at 50 Hz			
LOHER CHEMSTAR on request			
LOHER VARIO			
100 355 L	ANSA-355LC-16	1PS0357-■BH■-0HA0	2350
110 355 L	ANSA-355LD-16	1PS0358-■BH■-0HA0	2400
132 400 L	ANSA-400LL-16	1PS0405-■BJ■-0HA0	2800
160 400 L	ANSA-400LN-16	1PS0407-■BJ■-0HA0	3100
180 400 L	ANSA-400LX-16	1PS0408-■BJ■-0HA0	3250
200 450 L	ANSA-450LL-16	1PS0454-■BJ■-0HA0	4100
225 450 L	ANSA-450LN-16	1PS0455-■BJ■-0HA0	4400
250 450 L	ANSA-450LN-16	1PS0457-■BJ■-0HA0	4400
265 450 L	ANSA-450LX-16	1PS0458-■BJ■-0HA0	4650
280 500 L	ANSA-500LL-16	1PS0504-■BJ■-0HA0	5400
315 500 L	ANSA-500LN-16	1PS0505-■BJ■-0HA0	6100
355 500 L	ANSA-500LN-16	1PS0507-■BJ■-0HA0	6100
400 500 L	ANSA-500LX-16	1PS0508-■BJ■-0HA0	6650
Operating modes	Frame size		Order code
Line operation	355 ... 450	0	–
Converter operation, standard insulation	355 ... 450	1	–
Converter operation with special insulation (derating approx. 5 %) ¹⁾	355 ... 500	2	–
Line operation, pre-formed coil	355 ... 500	3	–
Converter operation, pre-formed coil	355 ... 500	4	–
Voltages	Frame size		Order code
690 VΔ, 50 Hz	355 ... 500	0	–
500 VΔ, 50 Hz	355 ... 450	5	–
400 V/690 V, 50 Hz	355 ... 400	6	–
690 VY, 50 Hz	355 ... 400	8	–
For other voltages, see Page 3/27	355 ... 500	9	...
Types of construction	Frame size		Order code
IM B3	355 ... 500	0	–
IM V1/cover	355 ... 450	4	–
IM B35	355 ... 500	6	–
For other types of construction, see from Page 1/29 and 3/28	355 ... 500	9	...

¹⁾ Insulation, 2.15 kV IEC/TS 60035-25:2007 curve B.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series



Motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power								Motor type			Article No.	m IM B3	J kgm ²	
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	cosφ _{rat.} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}	T _{Br} / T _{rat.}				
KW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-		kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																
6-pole: 1200 rpm at 60 Hz																
LOHER CHEMSTAR																
0.25	71 B	1080	2.21	-	59.5	55.0	47.0	0.57	0.93	2.5	3.0	2.5	ANGA-071BS-06	1PS0071-BD-0CA4	26	0.0008
0.37	80 B	1140	3.10	IE2	77.3	76.4	72.5	0.64	0.94	2.3	4.6	2.9	ANGA-080BR-06	1PS0080-BD-0CA4	28	0.0020
0.55	80 B	1144	4.59	IE2	78.9	78.0	74.3	0.62	1.41	2.9	5.2	3.6	ANGA-080BS-06	1PS0081-BD-0CA4	29	0.0030
0.75	90 L	1150	6.20	IE2	80.0	80.5	78.0	0.68	1.73	1.9	4.7	2.6	ANGA-090LR-06	1PS0095-BD-0CA4	33	0.0054
1.1	100 L	1175	8.90	IE2	85.5	85.4	83.4	0.73	2.20	2.1	6.0	3.0	ANGA-100LR-06	1PS0105-BD-0CA4	36	0.011
1.5	100 L	1175	12.2	IE2	86.8	86.6	84.2	0.69	3.15	2.2	6.4	3.2	ANGA-100LS-06	1PS0106-BD-0CA4	54	0.011
2.2	112 M	1170	18.0	IE2	87.5	88.0	87.4	0.75	4.20	2.1	6.3	3.2	ANGA-112MS-06	1PS0113-BD-0CA4	64	0.014
3	132 S	1175	24.4	IE2	87.5	88.0	86.0	0.70	6.10	1.8	6.0	2.9	ANGA-132SR-06	1PS0131-BD-0CA4	89	0.024
3.7	132 M	1180	29.9	IE2	88.0	88.5	86.5	0.71	7.40	1.9	6.2	3.0	ANGA-132MR-06	1PS0133-BD-0CA4	95	0.029
5.5	132 M	1175	44.7	IE2	89.5	89.8	88.8	0.73	10.6	2.1	6.5	2.9	ANGA-132MS-06	1PS0135-BD-0CA4	103	0.037
7.5	160 M	1180	61.0	IE2	89.7	90.0	88.7	0.73	14.4	2.1	5.4	2.5	ANGA-160MR-06	1PS0163-BD-0CA4	177	0.075
11	160 L	1180	89.0	IE2	90.2	90.5	89.5	0.74	20.5	2.2	5.5	2.5	ANGA-160LS-06	1PS0166-BD-0CA4	190	0.098
15	180 L	1178	122	IE2	92.1	92.3	91.5	0.77	26.5	2.8	6.9	3.4	ANGA-180LS-06	1PS0186-BD-0CA4	230	0.17
18.5	200 L	1182	149	IE2	92.1	92.6	92.1	0.81	31.0	2.6	6.7	3.0	ANGA-200LR-06	1PS0206-BD-0CA4	300	0.25
22	200 L	1182	178	IE2	92.2	92.7	92.3	0.81	37.0	3.0	7.4	3.0	ANGA-200LS-06	1PS0208-BD-0CA4	320	0.30
30	225 M	1182	242	IE2	93.2	93.5	93.0	0.83	48.5	2.9	7.0	3.1	ANGA-225MS-06	1PS0223-BD-0CA4	412	0.58
37	250 M	1185	298	IE2	93.0	93.3	92.6	0.83	60.0	3.3	7.3	2.8	ANGA-250MM-06	1PS0253-BD-0CA4	485	0.86
45	280 S	1188	362	IE2	93.6	94.0	93.6	0.84	72.0	3.1	7.4	3.0	ANGA-280SL-06	1PS0280-BD-0CA4	605	1.1
55	280 M	1188	442	IE2	93.7	94.0	93.7	0.85	87.0	3.1	7.2	2.9	ANGA-280MM-06	1PS0283-BD-0CA4	655	1.4
75	315 S	1190	602	IE2	94.4	94.4	93.7	0.83	120	2.7	7.5	3.0	ANGA-315SL-06	1PS0311-BD-0CA4	865	2.1
90	315 M	1190	722	IE2	94.7	94.9	94.2	0.84	142	2.9	7.6	3.1	ANGA-315ML-06	1PS0313-BD-0CA4	920	2.5
110	315 M	1190	883	IE2	95.2	95.3	94.7	0.85	171	3.3	8.1	3.2	ANGA-315MM-06	1PS0314-BD-0CA4	1045	3.6
132	315 M	1190	1059	IE2	95.3	95.4	94.7	0.85	205	3.7	9.2	3.6	ANGA-315MN-06	1PS0315-BD-0CA4	1115	4.0
150	315 L	1191	1203	IE2	95.5	95.7	94.8	0.85	230	4.3	9.6	3.8	ANGA-315LL-06	1PS0316-BD-0CA4	1345	4.7
200	315 L	1191	1604	IE2	95.5	95.4	94.8	0.82	320	2.9	8.3	3.5	ANGA-315LM-06	1PS0317-BD-0CA4	1515	7.6

LOHER VARIO on request

Operating modes	Frame size		Order code
Line operation	71 ... 315	0	-
Converter operation, standard insulation	71 ... 315	1	-
Converter operation with special insulation (derating approx. 5 %) ¹⁾	160 ... 315	2	-
Voltages	Frame size		Order code
For other voltages, see Page 3/27	71 ... 315	9	...
Types of construction	Frame size		Order code
IM B3	71 ... 315	0	-
IM B5	71 ... 315	1	-
IM B34	71 ... 112	2	-
IM B14	71 ... 112	3	-
IM V1/cover	71 ... 315	4	-
IM B35	71 ... 315	6	-
For other types of construction, see from Page 1/29 and 3/28	71 ... 315	9	...

¹⁾ Insulation, 2.15 kV IEC/TS 60035-25:2007 curve B.

Selection and ordering data

Operating values at rated power													Motor type	Article No.	m IM B3	J kgm ²		
P _{rated} 50 Hz	Frame size	n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	COSφ rated, 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V	I _{rated} 50 Hz, 690 V	T _{LR} / T _{rat}					I _{LR} / I _{rat}	T _{Br} / T _{rat}
kW	FS	rpm	Nm	—	%	%	%	—	A	A	A	—	—	—	kg	kgm ²		
• Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %																		
2-pole: 3000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
0.37	71 B	2850	1.24	IE3	78.5	77.5	74.5	0.76	0.90	0.72	0.52	3.5	5.8	3.5	ANGA-071BS-02	1PS0070-BD-0AH4	27	0.005
0.55	71 B	2865	1.83	IE3	81.5	80.1	76.9	0.76	1.28	1.03	0.74	3.7	6.1	3.7	ANGA-071BT-02	1PS0071-BD-0AH4	28	0.006
0.75	80 B	2850	2.51	IE3	82.5	84.0	83.0	0.86	1.53	1.22	0.88	3.0	6.2	3.3	ANGA-080BS-02	1PS0080-BD-0AH4	29	0.011
1.1	80 B	2885	3.64	IE3	84.7	85.4	84.0	0.85	2.20	1.76	1.28	2.7	7.1	4.2	ANGA-080BT-02	1PS0081-BD-0AH4	30	0.013
1.5	90 L	2910	4.92	IE3	85.0	85.1	84.0	0.86	2.95	2.35	1.72	2.7	8.1	4.2	ANGA-090LS-02	1PS0095-BD-0AH4	36	0.021
2.2	90 L	2910	7.20	IE3	86.0	86.8	86.1	0.88	4.20	3.35	2.45	2.6	8.3	4.0	ANGA-090LT-02	1PS0098-BD-0AH4	40	0.031
3	100 L	2920	9.80	IE3	88.5	88.9	87.7	0.88	5.60	4.45	3.20	3.2	8.1	4.6	ANGA-100LT-02	1PS0106-BD-0AH4	56	0.054
4	112 M	2955	12.9	IE3	89.8	90.1	89.3	0.89	7.20	5.80	4.20	2.5	8.7	4.0	ANGA-112MT-02	1PS0113-BD-0AH4	66	0.12
5.5	132 S	2950	17.8	IE3	90.0	90.5	90.5	0.90	9.80	7.80	5.70	1.9	7.3	3.7	ANGA-132SS-02	1PS0131-BD-0AH4	95	0.24
7.5	132 S	2955	24.2	IE3	91.6	92.5	92.5	0.92	12.8	10.3	7.40	2.1	8.3	4.0	ANGA-132ST-02	1PS0132-BD-0AH4	105	0.31
11	160 M	2955	35.5	IE3	91.7	91.8	90.5	0.87	19.9	15.9	11.5	2.5	7.6	3.8	ANGA-160MS-02	1PS0163-BD-0AH4	174	0.53
15	160 M	2960	48.4	IE3	92.6	92.6	92.0	0.87	27.0	21.5	15.6	2.8	8.8	4.3	ANGA-160MT-02	1PS0165-BD-0AH4	184	0.61
18.5	160 L	2955	59.8	IE3	92.8	93.0	92.3	0.90	32.0	25.5	18.5	2.8	8.3	3.9	ANGA-160LT-02	1PS0166-BD-0AH4	195	0.68
22	180 M	2950	71.2	IE3	93.6	94.2	94.0	0.89	38.0	30.5	22.0	2.3	7.5	3.5	ANGA-180MT-02	1PS0183-BD-0AH4	241	0.80
30	200 L	2955	96.9	IE3	94.0	94.5	94.2	0.87	53.0	42.5	30.5	2.5	7.0	3.3	ANGA-200LS-02	1PS0206-BD-0AH4	317	1.30
37	200 L	2955	119.6	IE3	94.0	94.3	94.0	0.88	65.0	52.0	37.5	2.5	7.1	3.2	ANGA-200LT-02	1PS0208-BD-0AH4	340	1.58
45	225 M	2960	145.2	IE3	94.5	95.0	95.0	0.89	77.0	62.0	45.0	2.4	6.9	3.3	ANGA-225MT-02	1PS0233-BD-0AH4	435	0.26
55	250 M	2975	176.5	IE3	94.3	94.5	93.9	0.89	95.0	76.0	55.0	2.3	6.7	3.1	ANGA-250MN-02	1PS0253-BD-0AH4	505	0.46
75	280 S	2975	241	IE3	94.8	94.8	94.1	0.89	128	103	74.0	2.4	6.8	3.0	ANGA-280SM-02	1PS0280-BD-0AH4	665	0.77
90	280 M	2975	289	IE3	95.3	95.4	95.0	0.90	151	121	88.0	2.4	7.2	3.1	ANGA-280MN-02	1PS0283-BD-0AH4	720	0.94
110	315 S	2982	352	IE3	95.3	95.4	94.9	0.91	183	146	106	2.4	7.1	3.1	ANGA-315SL-02	1PS0311-BD-0AH4	955	1.39
132	315 M	2982	423	IE3	95.9	96.0	95.6	0.91	220	175	127	2.5	7.2	3.1	ANGA-315ML-02	1PS0313-BD-0AH4	1025	1.6
160	315 M	2982	512	IE3	95.7	95.7	95.2	0.92	260	210	152	2.8	7.8	3.3	ANGA-315MN-02	1PS0315-BD-0AH4	1105	1.9
200	315 L	2982	640	IE3	96.1	96.3	96.1	0.92	325	260	189	2.5	7.2	3.0	ANGA-315LL-02	1PS0316-BD-0AH4	1355	2.3
250	315 L	2985	800	IE3	96.1	96.3	96.0	0.93	405	325	235	2.3	8.6	3.0	ANGA-315LN-02	1PS0318-BD-0AH4	1505	2.5
Operating modes													Frame size			Order code		
Line operation													71 ... 315			0	—	
Converter operation, standard insulation													71 ... 315			1	—	
Voltages													Frame size			Order code		
230 V/400 V, 50 Hz													71 ... 280			1	—	
500 VY, 50 Hz													71 ... 315 ¹⁾			3	—	
400 V/690 V, 50 Hz													71 ... 315			6	—	
690 VY, 50 Hz													71 ... 315			8	—	
For other voltages, see Page 3/27													71 ... 315			9	...	
Types of construction													Frame size			Order code		
IM B3													71 ... 315			0	—	
IM B5													71 ... 315			1	—	
IM B34													71 ... 112			2	—	
IM B14													71 ... 112			3	—	
IM V1/cover													71 ... 315			4	—	
IM B35													71 ... 315			6	—	
For other types of construction, see from Page 1/29 and 3/28													71 ... 315			9	...	



¹⁾ Up to 200 kW

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

Operating values at rated power										Motor type			Article No.		m J			
P_{rated} 50 Hz	Frame size	n_{rated} 50 Hz	T_{rated} 50 Hz	IE class	η_{rated} 50 Hz, 4/4	η_{rated} 50 Hz, 3/4	η_{rated} 50 Hz, 2/4	$\cos\phi$ 50 Hz, 4/4	I_{rated} 50 Hz, 400 V	I_{rated} 50 Hz, 500 V	I_{rated} 50 Hz, 690 V	$T_{LR}/$ $T_{rat.}$	$I_{LF}/$ $I_{rat.}$	$T_B/$ $T_{rat.}$			IM B3	
kW	FS	rpm	Nm	—	%	%	%	—	A	A	A	—	—	—			kg	kgm ²
<ul style="list-style-type: none"> Cooling: self-ventilated (IC 411) Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																		
4-pole: 1500 rpm at 50 Hz																		
LOHER CHEMSTAR																		
0.25	71 B	1395	1.71	IE3	73.5	73.7	70.4	0.72	0.68	0.55	0.40	2.5	4.2	2.6	ANGA-071BS-04	1PS0070-BD-OBH4	27	0.0010
0.37	71 B	1410	2.51	IE3	77.3	76.8	73.2	0.70	0.99	0.79	0.57	3.1	4.8	3.1	ANGA-071BT-04	1PS0071-BD-OBH4	29	0.0014
0.55	80 B	1440	3.65	IE3	80.8	81.1	79.3	0.78	1.26	1.01	0.73	2.1	5.9	3.1	ANGA-080BS-04	1PS0080-BD-OBH4	29	0.0017
0.75	80 B	1450	4.94	IE3	83.9	83.5	81.5	0.75	1.72	1.38	1.00	2.7	7.1	3.9	ANGA-080BT-04	1PS0081-BD-OBH4	32	0.0029
1.1	90 L	1440	7.30	IE3	84.5	85.0	83.6	0.78	2.40	1.93	1.40	2.9	6.9	3.6	ANGA-090LS-04	1PS0095-BD-OBH4	35	0.0036
1.5	90 L	1445	9.90	IE3	85.8	86.4	85.2	0.80	3.15	2.50	1.83	2.7	7.2	3.6	ANGA-090LT-04	1PS0098-BD-OBH4	39	0.0049
2.2	100 L	1465	14.3	IE3	88.4	88.5	87.8	0.83	4.35	3.45	2.50	3.2	8.3	4.4	ANGA-100LS-04	1PS0106-BD-OBH4	61	0.014
3	100 L	1460	19.6	IE3	88.9	89.2	88.2	0.83	5.90	4.70	3.40	2.5	8.3	3.9	ANGA-100LT-04	1PS0108-BD-OBH4	61	0.014
4	112 M	1460	26.2	IE3	89.5	90.2	89.7	0.82	7.90	6.30	4.55	2.4	7.1	3.7	ANGA-112MT-04	1PS0113-BD-OBH4	67	0.017
5.5	132 S	1470	35.7	IE3	90.2	90.5	90.0	0.82	10.7	8.60	6.20	2.9	8.6	3.7	ANGA-132ST-04	1PS0131-BD-OBH4	106	0.046
7.5	132 M	1470	48.7	IE3	91.1	91.7	91.4	0.85	14.0	11.2	8.10	2.6	8.2	3.7	ANGA-132MT-04	1PS0133-BD-OBH4	111	0.046
11	160 M	1475	71.2	IE3	92.0	92.3	91.7	0.84	20.5	16.4	11.9	2.6	7.6	3.4	ANGA-160MS-04	1PS0163-BD-OBH4	176	0.083
15	160 L	1480	96.8	IE3	92.5	92.7	92.1	0.82	28.5	23.0	16.5	2.5	8.5	3.8	ANGA-160LT-04	1PS0166-BD-OBH4	195	0.099
18.5	180 M	1470	120.2	IE3	92.6	93.1	93.0	0.82	35.0	28.0	20.5	2.5	7.2	3.3	ANGA-180MS-04	1PS0183-BD-OBH4	241	0.13
22	180 L	1470	142.9	IE3	93.0	93.6	93.6	0.83	41.0	33.0	24.0	2.3	6.8	3.3	ANGA-180LT-04	1PS0186-BD-OBH4	251	0.14
30	200 L	1470	194.9	IE3	93.9	94.6	94.7	0.84	55.0	44.0	32.0	2.6	7.3	3.1	ANGA-200LT-04	1PS0206-BD-OBH4	337	0.22
37	225 S	1478	239	IE3	93.9	94.5	94.4	0.86	66.0	53.0	38.5	2.5	6.4	2.7	ANGA-225SS-04	1PS0220-BD-OBH4	418	0.42
45	225 M	1478	291	IE3	94.2	94.9	95.1	0.86	80.0	64.0	46.5	2.6	6.4	2.7	ANGA-225MT-04	1PS0223-BD-OBH4	440	0.47
55	250 M	1482	354	IE3	94.8	95.3	95.2	0.87	96.0	77.0	56.0	2.5	6.8	2.9	ANGA-250MN-04	1PS0253-BD-OBH4	540	0.85
75	280 S	1485	482	IE3	95.1	95.3	95.0	0.86	132	106	77.0	2.5	6.9	3.0	ANGA-280SM-04	1PS0280-BD-OBH4	710	1.39
90	280 M	1485	579	IE3	95.3	95.5	95.3	0.87	157	125	91.0	2.6	7.2	3.0	ANGA-280MN-04	1PS0283-BD-OBH4	785	1.7
110	315 S	1488	706	IE3	95.5	95.8	95.5	0.87	191	153	111	2.6	6.8	2.9	ANGA-315SL-04	1PS0311-BD-OBH4	965	2.2
132	315 M	1490	846	IE3	95.6	95.9	95.9	0.87	230	183	133	2.8	7.3	3.0	ANGA-315ML-04	1PS0313-BD-OBH4	1045	2.9
160	315 M	1490	1025	IE3	95.8	96.1	96.1	0.87	275	220	161	2.9	7.3	3.1	ANGA-315MN-04	1PS0315-BD-OBH4	1075	3.1
200	315 L	1488	1284	IE3	96.0	96.3	96.1	0.88	340	275	198	3.2	7.4	3.0	ANGA-315LL-04	1PS0316-BD-OBH4	1295	3.7
250	315 L	1492	1600	IE3	96.1	96.2	95.8	0.86	435	350	255	2.5	7.5	3.0	ANGA-315LM-04	1PS0317-BD-OBH4	1500	4.2
Operating modes										Frame size					Order code			
Line operation										71 ... 315			0		—			
Converter operation, standard insulation										71 ... 315			1		—			
Voltages										Frame size					Order code			
230 V/400 V, 50 Hz										71 ... 280			1		—			
500 VY, 50 Hz										71 ... 315 ¹⁾			3		—			
400 V/690 V, 50 Hz										71 ... 315			6		—			
690 VY, 50 Hz										71 ... 315			8		—			
For other voltages, see Page 3/27										71 ... 315			9		...			
Types of construction										Frame size					Order code			
IM B3										71 ... 315			0		—			
IM B5										71 ... 315			1		—			
IM B34										71 ... 112			2		—			
IM B14										71 ... 112			3		—			
IM V1/cover										71 ... 315			4		—			
IM B35										71 ... 315			6		—			
For other types of construction, see from Page 1/29 and 3/28										71 ... 315			9		...			

1) Up to 200 kW

Selection and ordering data (continued)

P _{rated} 50 Hz	Frame size	Operating values at rated power									Motor type	Article No.	m IM B3	J kgm ²				
		n _{rated} 50 Hz	T _{rated} 50 Hz	IE class	η _{rated} 50 Hz, 4/4	η _{rated} 50 Hz, 3/4	η _{rated} 50 Hz, 2/4	cosφ _{rated} 50 Hz, 4/4	I _{rated} 50 Hz, 400 V	I _{rated} 50 Hz, 500 V					I _{rated} 50 Hz, 690 V	T _{LR} / T _{rat.}	I _{LR} / I _{rat.}	T _B / T _{rat.}
kW	FS	rpm	Nm	-	%	%	%	-	A	A	A	-	-	-	kg	kgm ²		
• Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %																		
6-pole: 1000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
0.25	71 B	885	2.70	-	72.7	73.0	69.0	0.70	0.71	0.57	0.41	2.6	3.2	2.6	ANGA-071BT-06	1PS0071-BD-0CA4	30	0.0015
0.37	80 B	940	3.76	IE3	74.0	74.1	70.1	0.66	1.09	0.87	0.63	2.3	4.2	2.7	ANGA-080BS-06	1PS0080-BD-0CH4	31	0.002
0.55	80 B	935	5.60	IE3	77.2	77.0	73.9	0.67	1.53	1.23	0.89	2.5	4.5	2.8	ANGA-080BT-06	1PS0081-BD-0CH4	32	0.003
0.75	90 L	945	7.60	IE3	78.9	80.0	78.8	0.70	1.96	1.57	1.14	2.2	4.6	2.6	ANGA-090LS-06	1PS0095-BD-0CH4	36	0.004
1.1	100 L	975	10.8	IE3	81.0	81.0	79.0	0.71	2.75	2.20	1.60	2.2	5.6	2.9	ANGA-100LT-06	1PS0105-BD-0CH4	61	0.014
1.5	112 M	975	14.7	IE3	82.5	82.8	81.2	0.76	3.45	2.75	2.00	2.0	5.7	2.8	ANGA-112MT-06	1PS0112-BD-0CH4	69	0.017
2.2	132 S	980	21.4	IE3	88.5	89.0	88.5	0.76	4.70	3.80	2.75	2.0	6.7	3.1	ANGA-132SR-06	1PS0130-BD-0CH4	103	0.037
3	132 S	980	29.2	IE3	88.5	89.0	88.5	0.76	6.40	5.20	3.75	2.0	6.3	3.0	ANGA-132SS-06	1PS0131-BD-0CH4	105	0.037
4	132 M	975	39.2	IE3	88.5	89.3	89.0	0.76	8.60	6.90	5.00	2.0	6.1	2.8	ANGA-132MS-06	1PS0133-BD-0CH4	105	0.037
5.5	132 M	975	53.9	IE3	89.8	90.9	90.9	0.76	11.6	9.30	6.70	2.0	6.3	2.9	ANGA-132MT-06	1PS0135-BD-0CH4	112	0.046
7.5	160 M	980	73.1	IE3	89.1	89.8	89.2	0.76	16.0	12.8	9.30	2.0	5.1	2.3	ANGA-160MS-06	1PS0163-BD-0CH4	194	0.098
11	160 L	975	107.7	IE3	90.3	91.1	90.7	0.77	23.0	18.3	13.2	2.0	5.1	2.4	ANGA-160LT-06	1PS0166-BD-0CH4	213	0.12
15	180 L	975	146.9	IE3	91.5	92.5	92.3	0.80	29.5	23.5	17.1	2.3	5.9	2.8	ANGA-180LT-06	1PS0186-BD-0CH4	240	0.19
18.5	200 L	978	180.6	IE3	91.9	92.7	92.7	0.79	37.0	29.5	21.5	2.5	5.6	2.6	ANGA-200LS-06	1PS0206-BD-0CH4	314	0.28
22	200 L	978	215	IE3	92.5	93.3	93.5	0.79	43.5	35.0	25.0	2.5	5.6	2.6	ANGA-200LT-06	1PS0208-BD-0CH4	328	0.32
30	225 M	982	292	IE3	93.3	94.0	94.0	0.83	56.0	44.5	32.5	2.6	6.6	3.0	ANGA-225MT-06	1PS0223-BD-0CH4	469	0.67
37	250 M	985	359	IE3	93.3	94.0	94.0	0.85	67.0	54.0	39.0	2.7	7.0	2.9	ANGA-250MN-06	1PS0253-BD-0CH4	520	1.0
45	280 S	988	435	IE3	93.7	94.3	94.2	0.85	82.0	65.0	47.5	3.0	6.8	2.8	ANGA-280SM-06	1PS0280-BD-0CH4	660	1.4
55	280 M	988	532	IE3	94.1	94.6	94.4	0.85	99.0	79.0	58.0	3.2	7.2	3.0	ANGA-280MN-06	1PS0283-BD-0CH4	695	1.6
75	315 S	990	723	IE3	94.6	94.9	94.4	0.84	136	109	79.0	2.6	7.5	3.1	ANGA-315SL-06	1PS0311-BD-0CH4	945	2.6
90	315 M	991	867	IE3	94.9	95.2	94.9	0.85	161	129	93.0	2.5	6.7	2.8	ANGA-315ML-06	1PS0313-BD-0CH4	1015	3.1
110	315 M	991	1060	IE3	95.1	95.5	95.3	0.84	199	159	115	2.8	7.2	3.0	ANGA-315MM-06	1PS0314-BD-0CH4	1115	3.9
132	315 L	991	1272	IE3	95.4	95.9	95.8	0.84	240	190	138	2.7	7.2	3.0	ANGA-315LK-06	1PS0315-BD-0CH4	1315	4.4
160	315 L	991	1542	IE3	95.6	95.8	95.4	0.83	290	235	169	3.3	7.7	3.5	ANGA-315LL-06	1PS0316-BD-0CH4	1355	4.6
200	315 L	990	1929	IE3	95.0	95.3	94.9	0.83	365	295	210	2.8	7.5	3.3	ANGA-315LM-06	1PS0317-BD-0CH4	1600	7.6
Operating modes																		
Line operation																		
Converter operation, standard insulation																		
Voltages																		
230 V/400 V, 50 Hz																		
500 VY, 50 Hz																		
400 V/690 V, 50 Hz																		
690 VY, 50 Hz																		
For other voltages, see Page 3/27																		
Types of construction																		
IM B3																		
IM B5																		
IM B34																		
IM B14																		
IM V1/cover																		
IM B35																		
For other types of construction, see from Page 1/29 and 3/28																		

1) Up to 200 kW

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

IE3

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power										Motor type	Article No.	m IM B3	J kgm ²		
		η_{rated} 60 Hz	T_{rated} 60 Hz	IE class	η_{rated} 60 Hz, 4/4	η_{rated} 60 Hz, 3/4	η_{rated} 60 Hz, 2/4	cos $\phi_{rat.}$ 60 Hz, 4/4	I_{rated} 60 Hz, 460 V	$T_{LF}/$ T_{rated}	$I_{LR}/$ I_{rated}					$T_B/$ T_{rated}	
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-			kg	kgm ²	
• Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %																	
2-pole: 3600 rpm at 60 Hz																	
LOHER CHEMSTAR																	
0.43	71 B	3445	1.19	IE3	79.5	79.1	75.5	0.76	0.89	1.19	6.0	3.6	ANGA-071BS-02	1PS0070-BD-0AH4	27	0.0005	
0.63	71 B	3460	1.74	IE3	81.5	80.6	76.0	0.76	1.28	1.74	6.6	3.9	ANGA-071BT-02	1PS0071-BD-0AH4	28	0.0006	
0.86	80 B	3450	2.38	IE3	83.8	84.6	83.5	0.86	1.50	2.38	6.4	3.1	ANGA-080BS-02	1PS0080-BD-0AH4	29	0.0011	
1.27	80 B	3480	3.48	IE3	85.5	85.8	84.0	0.85	2.20	3.48	7.4	3.4	ANGA-080BT-02	1PS0081-BD-0AH4	30	0.0013	
1.75	90 L	3510	4.76	IE3	85.5	85.6	84.0	0.87	2.95	4.76	8.7	4.2	ANGA-090LS-02	1PS0095-BD-0AH4	36	0.0021	
2.55	90 L	3510	6.90	IE3	86.7	87.1	85.9	0.88	4.20	6.90	8.3	4.2	ANGA-090LT-02	1PS0098-BD-0AH4	40	0.0031	
3.45	100 L	3525	9.30	IE3	88.6	89.2	88.5	0.89	5.50	9.30	8.5	4.7	ANGA-100LT-02	1PS0106-BD-0AH4	56	0.0054	
4.55	112 M	3555	12.2	IE3	90.0	90.0	88.7	0.90	7.10	12.2	9.0	4.1	ANGA-112MT-02	1PS0113-BD-0AH4	66	0.012	
6.3	132 S	3545	17.0	IE3	90.5	91.0	90.2	0.91	9.60	17.0	7.5	3.8	ANGA-132SS-02	1PS0131-BD-0AH4	95	0.024	
8.6	132 S	3555	23.1	IE3	91.8	92.4	92.1	0.92	12.8	23.1	8.4	4.1	ANGA-132ST-02	1PS0132-BD-0AH4	105	0.031	
12.6	160 M	3555	33.8	IE3	91.5	90.8	89.3	0.89	19.4	33.8	7.6	3.7	ANGA-160MS-02	1PS0163-BD-0AH4	174	0.053	
17.3	160 M	3560	46.4	IE3	92.0	92.0	90.6	0.88	27.0	46.4	8.7	4.2	ANGA-160MT-02	1PS0165-BD-0AH4	184	0.061	
21.3	160 L	3560	57.1	IE3	92.5	92.4	91.1	0.91	32.0	57.1	8.2	3.8	ANGA-160LT-02	1PS0166-BD-0AH4	195	0.068	
24.5	180 M	3555	65.8	IE3	93.9	94.2	93.6	0.89	37.0	65.8	7.5	3.6	ANGA-180MT-02	1PS0183-BD-0AH4	241	0.08	
33.5	200 L	3555	90.0	IE3	94.2	94.4	94.0	0.87	51.0	90.0	7.1	3.3	ANGA-200LS-02	1PS0206-BD-0AH4	317	0.13	
41.5	200 L	3555	111.5	IE3	94.2	94.0	92.9	0.89	62.0	111.5	7.1	3.2	ANGA-200LT-02	1PS0208-BD-0AH4	340	0.158	
51	225 M	3560	136.8	IE3	94.5	95.0	94.5	0.89	76.0	136.8	6.8	3.2	ANGA-225MT-02	1PS0223-BD-0AH4	435	0.26	
62	250 M	3575	165.6	IE3	93.6	93.6	92.7	0.90	92.0	165.6	6.7	3.0	ANGA-250MN-02	1PS0253-BD-0AH4	505	0.46	
75	280 S	3578	200	IE3	94.1	93.9	92.7	0.89	112	200	7.6	3.2	ANGA-280SM-02	1PS0280-BD-0AH4	665	0.77	
90	280 M	3578	240	IE3	95.0	94.9	93.9	0.90	132	240	8.1	3.3	ANGA-280MN-02	1PS0283-BD-0AH4	720	0.94	
123	315 S	3582	328	IE3	95.0	95.0	94.2	0.91	179	328	7.2	3.0	ANGA-315SL-02	1PS0311-BD-0AH4	955	1.39	
148	315 M	3582	395	IE3	95.4	95.3	94.6	0.91	215	395	7.1	3.0	ANGA-315ML-02	1PS0313-BD-0AH4	1025	1.6	
160	315 M	3587	426	IE3	95.4	95.1	94.0	0.91	230	426	7.8	3.4	ANGA-315MN-02	1PS0315-BD-0AH4	1105	1.9	
224	315 L	3582	597	IE3	95.8	95.9	95.4	0.92	320	597	7.1	2.9	ANGA-315LL-02	1PS0316-BD-0AH4	1355	2.3	
270	315 L	3582	720	IE3	96.0	96.0	95.5	0.92	385	720	9.5	3.7	ANGA-315LN-02	1PS0318-BD-0AH4	1505	2.5	
Operating modes												Frame size				Order code	
Line operation												71 ... 315		0		-	
Converter operation, standard insulation												71 ... 315		1		-	
Voltages												Frame size				Order code	
For other voltages, see Page 3/27												71 ... 315		9		...	
Types of construction												Frame size				Order code	
IM B3												71 ... 315		0		-	
IM B5												71 ... 315		1		-	
IM B34												71 ... 112		2		-	
IM B14												71 ... 112		3		-	
IM V1/cover												71 ... 315		4		-	
IM B35												71 ... 315		6		-	
For other types of construction, see from Page 1/29 and 3/28												71 ... 315		9		...	

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power								Motor type			Article No.	m IM B3	J kgm ²
		n _{rated} 60 Hz	T _{rated} 60 Hz	IE class	η _{rated} 60 Hz, 4/4	η _{rated} 60 Hz, 3/4	η _{rated} 60 Hz, 2/4	COS φ _{rated} 60 Hz, 4/4	I _{rated} 60 Hz, 460 V	T _{LR} / T _{rated}	I _{LR} / I _{rated}	T _B / T _{rated}			
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm ²
<ul style="list-style-type: none"> Cooling: self-ventilated (IC 411) Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 															
4-pole: 1800 rpm at 60 Hz															
LOHER CHEMSTAR															
0.29	71 B	1695	1.63	IE3	75.0	75.5	72.0	1.00	0.67	2.5	2.6	ANGA-071BS-04	1PS0070- BD -0BH4	27	0.0010
0.43	71 B	1710	2.40	IE3	80.2	79.5	76.1	0.70	0.96	3.0	3.1	ANGA-071BT-04	1PS0071- BD -0BH4	29	0.0014
0.55	80 B	1740	3.02	IE3	81.1	81.3	79.4	0.78	1.09	2.4	3.3	ANGA-080BS-04	1PS0080- BD -0BH4	29	0.0017
0.75	80 B	1760	4.07	IE3	85.5	84.5	81.0	0.71	1.55	3.1	4.7	ANGA-080BT-04	1PS0081- BD -0BH4	32	0.0029
1.27	90 L	1740	7.00	IE3	86.5	86.9	85.6	0.79	2.35	2.9	3.8	ANGA-090LS-04	1PS0095- BD -0BH4	35	0.0036
1.75	90 L	1740	9.60	IE3	87.0	87.4	86.1	0.80	3.15	2.6	3.7	ANGA-090LT-04	1PS0098- BD -0BH4	39	0.0049
2.55	100 L	1765	13.8	IE3	89.5	89.7	88.5	0.84	4.25	3.0	4.4	ANGA-100LS-04	1PS0106- BD -0BH4	61	0.014
3.45	100 L	1760	18.7	IE3	89.8	90.1	89.5	0.84	5.70	2.7	3.9	ANGA-100LT-04	1PS0108- BD -0BH4	61	0.014
4.55	112 M	1760	24.7	IE3	90.5	91.0	90.5	0.83	7.60	2.5	3.8	ANGA-112MT-04	1PS0113- BD -0BH4	67	0.017
6.3	132 S	1770	34.0	IE3	91.7	92.0	91.3	0.83	10.4	3.4	3.8	ANGA-132ST-04	1PS0131- BD -0BH4	106	0.046
8.6	132 M	1770	46.4	IE3	91.7	92.2	91.8	0.86	13.7	2.3	3.6	ANGA-132MT-04	1PS0133- BD -0BH4	111	0.046
12.6	160 M	1770	68.0	IE3	92.4	92.6	92.0	0.85	20.0	2.6	3.3	ANGA-160MS-04	1PS0163- BD -0BH4	176	0.083
17.3	160 L	1775	93.1	IE3	93.6	93.7	92.9	0.83	28.0	2.5	3.7	ANGA-160LT-04	1PS0166- BD -0BH4	195	0.099
21.3	180 M	1770	114.9	IE3	93.6	94.0	93.8	0.83	34.5	2.4	3.2	ANGA-180MS-04	1PS0183- BD -0BH4	241	0.13
25.3	180 L	1770	136.5	IE3	93.6	94.1	94.0	0.83	41.0	2.2	3.2	ANGA-180LT-04	1PS0186- BD -0BH4	251	0.14
30	200 L	1778	161.1	IE3	94.3	94.5	93.9	0.84	47.5	3.0	3.5	ANGA-200LT-04	1PS0206- BD -0BH4	337	0.22
37	225 S	1782	198.3	IE3	94.6	94.7	94.2	0.85	58.0	2.8	3.0	ANGA-225SS-04	1PS0220- BD -0BH4	418	0.42
45	225 M	1782	241	IE3	95.0	95.0	94.5	0.84	71.0	2.9	3.0	ANGA-225MT-04	1PS0223- BD -0BH4	440	0.47
55	250 M	1786	294	IE3	95.4	95.6	95.1	0.86	84.0	2.8	3.2	ANGA-250MN-04	1PS0253- BD -0BH4	540	0.85
75	280 S	1788	401	IE3	95.5	95.3	94.5	0.85	116	2.8	3.3	ANGA-280SM-04	1PS0280- BD -0BH4	710	1.39
90	280 M	1788	481	IE3	95.5	95.5	94.9	0.87	136	2.9	3.3	ANGA-280MN-04	1PS0283- BD -0BH4	785	1.7
127	315 S	1788	678	IE3	95.8	96.1	95.8	0.87	191	2.5	2.7	ANGA-315SL-04	1PS0311- BD -0BH4	965	2.2
152	315 M	1788	812	IE3	96.2	96.5	96.3	0.88	225	2.7	2.8	ANGA-315ML-04	1PS0313- BD -0BH4	1045	2.9
184	315 M	1788	983	IE3	96.2	96.5	96.3	0.88	275	3.0	2.9	ANGA-315MN-04	1PS0315- BD -0BH4	1075	3.1
185	315 L	1791	986	IE3	96.2	96.2	95.5	0.87	275	3.9	3.6	ANGA-315LL-04	1PS0316- BD -0BH4	1295	3.7
250	315 L	1791	1333	IE3	96.2	96.0	95.3	0.85	385	3.8	3.8	ANGA-315LM-04	1PS0317- BD -0BH4	1500	4.2
Operating modes										Frame size				Order code	
Line operation										71 ... 315		0		–	
Converter operation, standard insulation										71 ... 315		1		–	
Voltages										Frame size				Order code	
For other voltages, see Page 3/27										71 ... 315		9		...	
Types of construction										Frame size				Order code	
IM B3										71 ... 315		0		–	
IM B5										71 ... 315		1		–	
IM B34										71 ... 112		2		–	
IM B14										71 ... 112		3		–	
IM V1/cover										71 ... 315		4		–	
IM B35										71 ... 315		6		–	
For other types of construction, see from Page 1/29 and 3/28										71 ... 315		9		...	

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data (continued)

P _{rated} 60 Hz	Frame size	Operating values at rated power											Motor type	Article No.	m	J	
		n_{rated} 60 Hz	T_{rated} 60 Hz	IE class	η_{rated} 60 Hz, 4/4	η_{rated} 60 Hz, 3/4	η_{rated} 60 Hz, 2/4	$\cos\phi_{rated}$ 60 Hz, 4/4	I_{rated} 60 Hz, 460 V	$T_{LR}/$ T_{rated}	$I_{LR}/$ I_{rated}	$T_B/$ T_{rated}					
kW	FS	rpm	Nm	-	%	%	%	-	A	-	-	-				kg	kgm ²
• Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %																	
6-pole: 1200 rpm at 60 Hz																	
LOHER CHEMSTAR																	
0.25	71 B	1110	2.15	IE3	75.6	74.4	69.3	0.64	0.65	3.2	3.9	3.2	ANGA-071BT-06	1PS0071-BD-0CH4	30	0.0015	
0.37	80 B	1150	3.07	IE3	76.0	75.0	71.0	0.61	1.00	2.7	5.0	3.3	ANGA-080BS-06	1PS0080-BD-0CH4	31	0.002	
0.55	80 B	1145	4.59	IE3	81.7	80.5	76.4	0.63	1.34	2.8	5.3	3.4	ANGA-080BT-06	1PS0081-BD-0CH4	32	0.003	
0.75	90 L	1155	6.20	IE3	82.5	82.4	79.9	0.65	1.76	2.4	5.3	3.1	ANGA-090LS-06	1PS0095-BD-0CH4	36	0.004	
1.1	100 L	1180	8.90	IE3	87.5	87.2	84.8	0.69	2.30	2.4	6.7	3.3	ANGK-100LT-06	1PS0105-BD-0CH4	61	0.014	
1.5	112 M	1175	12.2	IE3	88.5	88.3	86.2	0.73	2.90	2.2	6.9	3.2	ANGK-112MT-06	1PS0112-BD-0CH4	69	0.017	
2.2	132 S	1185	17.7	IE3	90.3	90.0	89.0	0.74	4.15	2.3	8.0	3.5	ANGK-132SR-06	1PS0130-BD-0CH4	103	0.037	
3	132 S	1185	24.2	IE3	90.3	90.0	89.0	0.75	5.60	2.3	7.5	3.3	ANGA-132SS-06	1PS0131-BD-0CH4	105	0.037	
3.7	132 M	1175	30.1	IE3	90.3	90.5	89.3	0.73	7.00	2.4	7.6	3.4	ANGA-132MS-06	1PS0133-BD-0CH4	105	0.037	
5.5	132 M	1180	44.5	IE3	91.3	91.8	91.3	0.74	10.2	2.3	7.2	3.3	ANGA-132MT-06	1PS0135-BD-0CH4	112	0.046	
7.5	160 M	1185	60.4	IE3	91.0	91.1	90.0	0.75	13.8	2.4	5.9	2.6	ANGA-160MS-06	1PS0163-BD-0CH4	194	0.098	
11	160 L	1180	89.0	IE3	91.7	91.9	91.0	0.75	20.0	2.3	5.8	2.6	ANGA-160LT-06	1PS0166-BD-0CH4	213	0.12	
15	180 L	1178	121.6	IE3	93.0	93.4	92.9	0.79	25.5	2.5	6.8	3.0	ANGA-180LT-06	1PS0186-BD-0CH4	240	0.19	
18.5	200 L	1180	149.7	IE3	93.0	93.8	93.8	0.78	32.0	2.8	6.5	3.0	ANGA-200LS-06	1PS0206-BD-0CH4	314	0.28	
22	200 L	1180	178.0	IE3	93.5	93.9	93.6	0.79	37.5	2.6	6.3	2.8	ANGA-200LT-06	1PS0208-BD-0CH4	328	0.32	
30	225 M	1185	242	IE3	94.3	94.6	94.1	0.82	48.5	2.9	7.6	3.3	ANGA-225MT-06	1PS0223-BD-0CH4	469	0.67	
37	250 M	1188	297	IE3	94.1	94.4	93.9	0.83	59.0	3.1	8.0	3.1	ANGA-250MN-06	1PS0253-BD-0CH4	520	1.0	
45	280 S	1190	361	IE3	94.5	94.6	94.1	0.83	72.0	3.3	7.7	3.1	ANGA-280SM-06	1PS0280-BD-0CH4	660	1.4	
55	280 M	1190	441	IE3	94.5	94.6	94.0	0.83	88.0	3.6	7.9	3.3	ANGA-280MN-06	1PS0283-BD-0CH4	695	1.6	
75	315 S	1192	601	IE3	95.0	94.9	94.1	0.82	121	3.1	8.4	3.3	ANGA-315SL-06	1PS0311-BD-0CH4	945	2.6	
90	315 M	1192	721	IE3	95.0	95.0	94.4	0.84	142	2.7	7.7	3.0	ANGA-315ML-06	1PS0313-BD-0CH4	1015	3.1	
110	315 M	1192	881	IE3	95.8	95.9	95.5	0.83	174	3.2	8.2	3.4	ANGA-315MM-06	1PS0314-BD-0CH4	1115	3.9	
132	315 L	1192	1057	IE3	95.8	96.0	95.6	0.84	205	3.1	8.4	3.3	ANGA-315LK-06	1PS0315-BD-0CH4	1315	4.4	
150	315 L	1192	1202	IE3	95.8	95.7	95.0	0.81	245	3.6	9.6	4.1	ANGA-315LL-06	1PS0316-BD-0CH4	1355	4.6	
200	315 L	1190	1605	IE3	95.2	95.2	95.0	0.84	315	2.9	8.25	3.5	ANGA-315LM-06	1PS0317-BD-0CH4	1600	7.6	
Operating modes												Frame size			Order code		
Line operation												71 ... 315	0		-		
Converter operation, standard insulation												71 ... 315	1		-		
Voltages												Frame size			Order code		
For other voltages, see Page 3/27												71 ... 315	9		...		
Types of construction												Frame size			Order code		
IM B3												71 ... 315	0		-		
IM B5												71 ... 315	1		-		
IM B34												71 ... 112	2		-		
IM B14												71 ... 112	3		-		
IM V1/cover												71 ... 315	4		-		
IM B35												71 ... 315	6		-		
For other types of construction, see from Page 1/29 and 3/28												71 ... 315	9		...		

3

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Pole-changing motors in cast-iron and steel versions

Selection and ordering data (continued)

Operating values at rated power																Article No.					
$P_{rat.1}$ 50 Hz	$P_{rat.2}$ 50 Hz	Frame size	$n_{rat.1}$ 50 Hz	$T_{rat.1}$ 50 Hz	$\varphi_{rat.1}$ 50 Hz	cos 4/4	$I_{rat.1}$ 50 Hz	$T_{LF}/$ $T_{rat.1}$	$I_{LR}/$ $T_{rat.1}$	$T_{\beta}/$ $T_{rat.1}$	$n_{rat.2}$ 50 Hz	$T_{rat.2}$ 50 Hz	$\eta_{rat.2}$ 50 Hz	cos φ 4/4	I_{rated2} 50 Hz	$T_{LF}/$ $T_{rat.2}$	$I_{LR}/$ $T_{rat.2}$	$T_{\beta}/$ $T_{rat.2}$	IM B3	m J	
KW	KW	FS	rpm	Nm	%	A					rpm	Nm	%	A					kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Line operation: double pole-changing for constant load torque • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																					
4-/2-pole: 1500/3000 rpm at 50 Hz with one winding connected in Dahlander circuit																					
1500	3000		1500								3000										
rpm	rpm		rpm								rpm										
LOHER CHEMSTAR																					
1.9	2.4	100 L	1390	13.1	72.0	0.87	4.40	1.7	4.1	1.8	2800	8.20	70.0	0.88	5.60	1.8	4.2	1.8	1PS0106- BD -0NA4	61	0.0059
2.5	3.1	100 L	1440	16.6	76.3	0.87	5.40	1.9	5.2	2.8	2840	10.4	77.3	0.90	6.40	2.1	5.2	2.9	1PS0108- BD -0NA4	64	0.0078
3.7	4.4	112 M	1420	24.9	79.9	0.86	7.80	1.8	4.9	2.3	2885	14.6	80.8	0.92	8.50	2.1	6.4	2.6	1PS0113- BD -0NA4	69	0.010
4.7	5.9	132 S	1440	31.2	82.0	0.84	9.80	1.6	5.6	2.7	2875	19.6	80.0	0.89	12.0	1.8	5.6	2.8	1PS0131- BD -0NA4	108	0.019
6.5	8	132 M	1435	43.3	82.0	0.86	13.3	1.7	5.4	2.6	2880	26.5	82.0	0.92	15.3	1.8	6.3	2.8	1PS0133- BD -0NA4	113	0.024
9.3	11.5	160 M	1440	61.7	84.5	0.87	18.3	1.7	5.7	2.8	2870	38.3	82.0	0.92	22.0	1.8	6.0	2.9	1PS0163- BD -0NA4	178	0.044
13	16	160 L	1450	85.6	87.0	0.85	25.5	1.6	6.0	2.3	2920	52.3	86.0	0.94	35.5	1.9	7.1	2.8	1PS0166- BD -0NA4	197	0.068
6-/4-pole: 1000/1500 rpm at 50 Hz with two windings																					
1000	1500		1000								1500										
rpm	rpm		rpm								rpm										
LOHER CHEMSTAR																					
0.55	1.1	100 L	715	7.30	57.0	0.53	2.65	2.0	3.0	2.7	1425	7.40	77.7	0.87	2.35	1.7	4.6	2.1	1PS0106- BD -0PA4	61	0.0059
0.9	1.5	100 L	700	12.3	64.2	0.64	3.15	1.5	2.9	2.0	1415	10.1	77.7	0.89	3.15	1.5	4.5	1.9	1PS0108- BD -0PA4	64	0.0078
1.1	1.9	112 M	715	14.7	66.5	0.60	4.00	1.6	3.2	2.3	1440	12.6	80.9	0.87	3.90	1.6	5.4	2.3	1PS0113- BD -0PA4	69	0.010
1.6	3.2	132 S	730	20.9	61.5	0.53	7.10	1.6	3.3	2.6	1450	21.1	82.3	0.87	6.50	1.4	5.0	2.1	1PS0131- BD -0PA4	108	0.019
2.2	4.4	132 M	730	28.8	68.0	0.52	9.00	2.0	3.8	3.0	1450	29.0	84.5	0.88	8.50	1.5	5.5	2.3	1PS0133- BD -0PA4	113	0.024
3.5	7	160 M	730	45.8	77.5	0.57	11.4	2.0	4.2	2.8	1450	46.1	84.0	0.90	13.4	1.6	5.2	2.2	1PS0163- BD -0PA4	178	0.044
5.6	11	160 L	725	73.8	80.2	0.60	16.8	1.9	4.0	2.7	1445	72.7	84.4	0.90	21.0	1.5	5.1	2.2	1PS0166- BD -0PA4	197	0.056
LOHER VARIO on request																					
Operating modes		Frame size																	Order code		
Line operation		100 ... 160																	0		
Converter operation, standard insulation		100 ... 160																	1		
Voltages		Frame size																	Order code		
230 V, 50 Hz		100 ... 112																	1		
500 VY, 50 Hz		100 ... 160																	3		
400 V, 50 Hz		100 ... 160																	6		
690 VY, 50 Hz		100 ... 160																	8		
For other voltages, see Page 3/27		100 ... 160																	9		
Types of construction		Frame size																	Order code		
IM B3		100 ... 160																	0		
IM B5		100 ... 160																	1		
IM B34		100 ... 112																	2		
IM B14		100 ... 112																	3		
IM V1/cover		100 ... 160																	4		
IM B35		100 ... 160																	6		
For other types of construction, see from Page 1/29 and 3/28		100 ... 160																	9		



Motors without Explosion Protection
 LOHER CHEMSTAR and VARIO 1PS0 motor series

Brake motors with High Efficiency IE2 in cast-iron and steel versions

Selection and ordering data

Operating values at rated power														Motor type	Article No.	m	J	
P _{rated} 50 Hz	Frame size	n _{rated} 50 Hz	T _{rated} 50 Hz	T _B	c/h · J S4-40% 1)	IE class	η _{rated} 50 Hz	η _{rated} 50 Hz	COSφ _{rat.} 50 Hz	I _{rated} 50 Hz	I _{rated} 50 Hz	I _{rated} 50 Hz	T _{LR} / T _{rated}					I _{LR} / I _{rat.}
kW	FS	rpm	Nm	Nm	–	–	%	%	–	A	A	A	–	–	–	kg	kgm ²	
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																		
2-pole: 3000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
5.5	132 S	2910	18	80	–	IE2	88.9	89.9	0.9	9.90	7.90	5.80	2.6	6.7	3.1	ABGA-132SR-02	1PS0131-■RD■-0AA4	103 0.014
7.5	132 S	2910	25	80	–	IE2	89.5	90.1	0.91	13.3	10.6	7.70	3.0	7.6	3.3	ABGA-132SS-02	1PS0132-■RD■-0AA4	112 0.020
11	160 M	2930	36	150	–	IE2	89.6	90.0	0.88	20.0	16.1	11.7	2.5	6.7	3.0	ABGA-160MR-02	1PS0163-■RD■-0AA4	193 0.045
4-pole: 1500 rpm at 50 Hz																		
LOHER CHEMSTAR																		
5.5	132 S	1455	36	80	–	IE2	89.5	89.9	0.85	10.4	8.30	6.00	2.6	7.9	2.7	ABGA-132SR-04	1PS0131-■RD■-0BA4	103 0.030
7.5	132 M	1470	49	150	–	IE2	90.2	90.7	0.84	14.3	11.4	8.30	2.0	7.6	2.8	ABGA-132MS-04	1PS0133-■RD■-0BA4	112 0.030
11	160 M	1460	72	150	–	IE2	90.5	91.4	0.81	21.5	17.3	12.6	2.1	6.8	2.6	ABGA-160MR-04	1PS0163-■RD■-0BA4	193 0.077
15	160 L	1460	98	260	–	IE2	90.9	92.0	0.81	29.5	23.5	17.0	2.1	6.5	2.7	ABGA-160LS-04	1PS0166-■RD■-0BA4	210 0.098
18.5	180 M	1470	120	260	–	IE2	92.3	92.8	0.83	35.0	28.0	20.0	3.3	7.6	3.0	ABGA-180MR-04	1PS0183-■RD■-0BA4	270 0.16
22	180 L	1470	143	260	–	IE2	91.8	92.3	0.83	41.5	33.5	24.0	3.0	7.0	2.6	ABGA-180LS-04	1PS0186-■RD■-0BA4	280 0.16
30	200 L	1470	195	400	–	IE2	92.3	93.2	0.83	57.0	45.0	33.0	1.5	6.0	2.5	ABGA-200LR-04	1PS0206-■RD■-0BA4	366 0.27
37	225 S	1480	239	400	–	IE2	93.5	93.9	0.81	71.0	56.0	41.0	3.0	7.3	2.9	ABGA-225SR-04	1PS0220-■RD■-0BA4	456 0.37
45	225 M	1475	291	400	–	IE2	93.1	93.7	0.84	83.0	66.0	48.0	2.6	6.7	2.6	ABGA-225MS-04	1PS0223-■RD■-0BA4	490 0.41
55	250 M	1480	355	400	–	IE2	93.7	94.4	0.87	97.0	78.0	56.0	2.5	7.7	2.9	ABGA-250MM-04	1PS0253-■RD■-0BA4	616 0.79
6-pole: 1000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
3	132 S	955	30	80	–	IE2	84.1	85.0	0.79	6.50	5.20	3.80	2.3	6.5	2.5	ABGA-132SR-06	1PS0131-■RD■-0CA4	103 0.033
4	132 M	955	40	80	–	IE2	86.0	86.3	0.81	8.30	6.60	4.80	2.3	6.5	2.5	ABGA-132MR-06	1PS0133-■RD■-0CA4	112 0.045
5.5	132 M	955	55	150	–	IE2	86.1	86.8	0.77	12.0	9.60	6.90	2.4	6.1	2.6	ABGA-132MS-06	1PS0135-■RD■-0CA4	118 0.045
7.5	160 M	965	74	150	–	IE2	87.4	88.1	0.82	15.1	12.1	8.80	2.5	6.5	2.9	ABGA-160MR-06	1PS0163-■RD■-0CA4	193 0.125
11	160 L	970	108	260	–	IE2	89.0	89.2	0.74	24.0	19.3	14.0	3.0	6.7	3.0	ABGA-160LS-06	1PS0166-■RD■-0CA4	210 0.144
15	180 L	970	148	260	–	IE2	89.7	90.2	0.78	31.0	25.0	17.9	1.7	5.6	2.5	ABGA-180LS-06	1PS0186-■RD■-0CA4	270 0.138
18.5	200 L	980	180	400	–	IE2	91.2	91.5	0.80	36.5	29.5	21.0	2.5	7.0	2.6	ABGA-200LR-06	1PS0206-■RD■-0CA4	366 0.33
22	200 L	980	214	400	–	IE2	91.5	92.0	0.78	44.5	35.5	26.0	2.5	7.0	2.6	ABGA-200LS-06	1PS0208-■RD■-0CA4	375 0.33
30	225 M	980	292	400	–	IE2	91.8	92.5	0.80	59.0	47.0	34.0	2.8	6.0	2.3	ABGA-225MS-06	1PS0223-■RD■-0CA4	380 0.55
37	250 M	985	359	400	–	IE2	92.2	92.3	0.77	75.0	60.0	43.5	2.1	6.0	2.1	ABGA-250MM-06	1PS0253-■RD■-0CA4	560 1.0
Operating modes																		
Line operation														Frame size			Order code	
Converter operation, standard insulation														132 ... 250	0	1	–	
Voltages																		
230 V/400 V, 50 Hz														Frame size			Order code	
500 VY, 50 Hz														132 ... 250	1	3	–	
400 V/690 V, 50 Hz														132 ... 250	6	8	–	
690 VY, 50 Hz														132 ... 250	8	9	–	
For other voltages, see Page 3/27														132 ... 250			...	
Types of construction																		
IM B3														Frame size			Order code	
IM B5														132 ... 250	0	1	–	
IM B34														132 ... 250	2	3	–	
IM B14														132 ... 250	3	4	–	
IM V1/cover														132 ... 250	4	6	–	
IM B35														132 ... 250	6	9	–	
For other types of construction, see from Page 1/29 and 3/28														132 ... 250			...	

T_B = Braking torque in Nm

Standard brake supply voltage: 230 V 1-phase

1) Conversion factor „c/h · J“ depending on the duty cycle.



Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series



Brake motors with Premium Efficiency IE3 in cast-iron and steel versions

Selection and ordering data

Operating values at rated power													Motor type	Article No.	<i>m</i>	<i>J</i>		
<i>P</i> _{rated}	Frame size	<i>n</i> _{rated}	<i>T</i> _{rated}	<i>T</i> _B	<i>c/h</i> · <i>J</i> S4-40 % 1)	IE class	<i>η</i> _{rated}	<i>η</i> _{rated}	cos <i>φ</i> _{rat.}	<i>I</i> _{rated}	<i>I</i> _{rated}	<i>I</i> _{rated}	<i>T</i> _{LR} / <i>T</i> _{rat.}	<i>I</i> _{LR} / <i>I</i> _{rat.}	<i>T</i> _B / <i>T</i> _{rat.}		IM B3	
kW	FS	rpm	Nm	Nm	-	%	%	-	A	A	A	-	-	-	-		kg	kgm ²
<ul style="list-style-type: none"> • Cooling: self-ventilated (IC 411) • Efficiency: Premium Efficiency IE3 in accordance with IEC 60034-30-1 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % 																		
2-pole: 3000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
5.5	132 S	2950	17.8	80.0		IE3	89.2	0.90	9.80	7.80	5.70	1.9	7.3	3.7	ABGA-132SS-02	1PS0131-■RD■-0AH4		0.0240
7.5	132 S	2955	24.2	80.0		IE3	91.6	0.92	12.8	10.3	7.40	2.1	8.3	4.0	ABGA-132ST-02	1PS0132-■RD■-0AH4		0.0310
11	160 M	2955	35.5	150		IE3	91.2	0.87	19.9	15.9	11.5	2.5	7.6	3.8	ABGA-160MS-02	1PS0163-■RD■-0AH4		0.0530
4-pole: 1500 rpm at 50 Hz																		
LOHER CHEMSTAR																		
5.5	132 S	1475	35.6	80.0		IE3	89.6	0.8	10.7	8.60	6.20	2.9	8.6	3.7	ABGA-132ST-04	1PS0131-■RD■-0BH4		0.046
7.5	132 M	1470	48.7	150		IE3	91.1	0.9	14.0	11.2	8.10	2.6	8.2	3.7	ABGA-132MT-04	1PS0133-■RD■-0BH4		0.046
11	160 M	1475	71.2	150		IE3	91.4	0.8	20.5	16.4	11.9	2.6	7.6	3.4	ABGA-160MS-04	1PS0163-■RD■-0BH4		0.083
15	160 L	1480	96.8	260		IE3	92.5	0.8	28.5	23.0	16.5	2.5	8.5	3.8	ABGA-160LT-04	1PS0166-■RD■-0BH4		0.099
18.5	180 M	1470	120.2	26.0		IE3	92.6	0.8	35.0	28.0	20.5	2.5	7.2	3.3	ABGA-180MS-04	1PS0183-■RD■-0BH4		0.13
22	180 L	1470	142.9	26.0		IE3	93.0	0.8	41.0	33.0	24.0	2.3	6.8	3.3	ABGA-180LT-04	1PS0186-■RD■-0BH4		0.14
30	200 L	1470	194.9	400		IE3	93.9	0.8	55.0	44.0	32.0	2.6	7.3	3.1	ABGA-200LT-04	1PS0206-■RD■-0BH4		0.22
37	225 S	1478	239	400		IE3	93.9	0.9	66.0	53.0	38.5	2.5	6.4	2.7	ABGA-225SS-04	1PS0220-■RD■-0BH4		0.42
45	225 M	1478	291	400		IE3	94.2	0.9	80.0	64.0	46.5	2.6	6.4	2.7	ABGA-225MT-04	1PS0223-■RD■-0BH4		0.47
55	250 M	1482	354	400		IE3	94.6	0.9	96.0	77.0	56.0	2.5	6.8	2.9	ABGA-250MN-04	1PS0253-■RD■-0BH4		0.85
75	280 S	1485	482	400		IE3	95.0	0.9	132	106	77.0	2.5	6.9	3.0	ABGA-280SM-04	1PS0280-■RD■-0BH4		1.39
6-pole: 1000 rpm at 50 Hz																		
LOHER CHEMSTAR																		
3	132 S	980	29.2	80.0		IE3	85.6	0.8	6.40	5.20	3.75	2.0	6.3	3.0	ABGA-132SS-06	1PS0131-■RD■-0CH4		0.037
4	132 M	975	39.2	80.0		IE3	86.8	0.8	8.60	6.90	5.00	2.0	6.1	2.8	ABGA-132MS-06	1PS0133-■RD■-0CH4		0.037
5.5	132 M	975	53.9	150		IE3	88.0	0.8	11.6	9.30	6.70	2.0	6.3	2.9	ABGA-132MT-06	1PS0135-■RD■-0CH4		0.046
7.5	160 M	980	73.1	150		IE3	89.1	0.8	16.0	12.8	9.30	2.0	5.1	2.3	ABGA-160MS-06	1PS0163-■RD■-0CH4		0.098
11	160 L	975	107.7	26.0		IE3	90.3	0.8	23.0	18.3	13.2	2.0	5.1	2.4	ABGA-160LT-06	1PS0166-■RD■-0CH4		0.12
15	180 L	975	146.9	26.0		IE3	91.2	0.8	29.5	23.5	17.1	2.3	5.9	2.8	ABGA-180LT-06	1PS0186-■RD■-0CH4		0.19
18.5	200 L	978	180.6	400		IE3	91.7	0.8	37.0	29.5	21.5	2.5	5.6	2.6	ABGA-200LS-06	1PS0206-■RD■-0CH4		0.28
22	200 L	978	215	400		IE3	92.5	0.8	43.5	35.0	25.0	2.5	5.6	2.6	ABGA-200LT-06	1PS0208-■RD■-0CH4		0.32
30	225 M	982	292	400		IE4	92.9	0.8	56.0	44.5	32.5	2.6	6.6	3.0	ABGA-225MT-06	1PS0223-■RD■-0CH4		0.67
37	250 M	985	359	400		IE5	93.3	0.9	67.0	54.0	39.0	2.7	7.0	2.9	ABGA-250MN-06	1PS0253-■RD■-0CH4		1.00
Operating modes													Frame size			Order code		
Line operation													132 ... 280	0		-		
Converter operation, standard insulation													132 ... 280	1		-		
Voltages													Frame size			Order code		
230 V/400 V, 50 Hz													132 ... 280	1		-		
500 VY, 50 Hz													132 ... 280	3		-		
400 V/690 V, 50 Hz													132 ... 280	6		-		
690 VY, 50 Hz													132 ... 280	8		-		
For other voltages, see Page 3/27													132 ... 280	9		...		
Types of construction													Frame size			Order code		
IM B3													132 ... 280	0		-		
IM B5													132 ... 280	1		-		
IM B34													132 ... 280	2		-		
IM B14													132 ... 280	3		-		
IM V1/cover													132 ... 280	4		-		
IM B35													132 ... 280	6		-		
For other types of construction, see from Page 1/29 and 3/28													132 ... 280	9		...		

*T*_B = Braking torque in Nm

1) Conversion factor „*c/h* · *J*“ depending on the duty cycle.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Article No. supplements

Selection and ordering data

Voltages	Voltage code	Additional identification code with order code and plain text if required	Motor series																	
			LOHER CHEMSTAR												LOHER VARIO					
			Frame size																	
1PS0. ■ .-....			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Optional voltages																				
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
230 VΔ/400 VY, 50 Hz	1		○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-
500 VY, 50 Hz – up to 200 kW	3		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
400 VΔ, 50 Hz	4		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
500 VΔ, 50 Hz	5		✓	✓	✓	✓	✓	○	○	○	○	○	○	○	○	○	○	○	○	○
400 VΔ/690 VY, 50 Hz	6		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
690 VY, 50 Hz	8		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
415 VY, 50 Hz – up to 200 kW	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
220 VΔ/380 VY, 50 Hz	9	L1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
Other voltages	9	L1Y • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
220 VΔ/380 VY, 60 Hz (50 Hz power)	9	L2A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
220 VΔ/380 VY, 60 Hz (60 Hz power)	9	L2B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
380 VΔ/660 VY, 60 Hz (50 Hz power)	9	L2C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
380 VΔ/660 VY, 60 Hz (60 Hz power)	9	L2D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
460 VY, 60 Hz (60 Hz power)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
460 VΔ, 60 Hz (60 Hz power)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
575 VY, 60 Hz (60 Hz power)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
575 VΔ, 60 Hz (60 Hz power)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
440 VY, 60 Hz (50 Hz power)	9	L2Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
440 VΔ, 60 Hz (50 Hz power)	9	L2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
460 VY, 60 Hz (50 Hz power)	9	L2S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
460 VΔ, 60 Hz (50 Hz power)	9	L2T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
575 VY, 60 Hz (50 Hz power)	9	L2U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
575 VΔ, 60 Hz (50 Hz power)	9	L2V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
440 VY, 60 Hz (60 Hz power)	9	L2W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	
440 VΔ, 60 Hz (60 Hz power)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
Other voltages 60 Hz	9	L2Y • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.

Standard brake supply voltage: 230 V 1-phase

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Article No. supplements

Selection and ordering data

Types of construction	Type of construction code	Additional identification code with order code and plain text if required	Motor series																	
			LOHER CHEMSTAR														LOHER VARIO			
			Frame size																	
	1PS0	■ -	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Optional types of construction																				
IM B3	0		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
IM B5 ¹⁾	1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IM B34	2		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
IM B14	3		✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	-	-	-	-	-	-	-	-	-
IM V1, with protective cover	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
IM B35	6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IM V1, without protective cover	4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IM B6 ¹⁾	9	M1A	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B7 ¹⁾	9	M1B	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM B8 ¹⁾	9	M1C	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V5 ¹⁾	9	M1D	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V6 ¹⁾	9	M1E	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	-	-	-	-
IM V5, with protective cover ¹⁾	9	M1F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IM V3	9	M1G	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
IM V15, with protective cover	9	M2K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
IM V18, with protective cover	9	M2M	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
IM V18, without protective cover	9	M2N	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	-	-	-	-	-	-	-	-	-

- Without additional charge
- ✓ With additional charge
- O. R. Possible on request
- Not possible

Other frame sizes and special flange dimensions on request!

¹⁾ LOHER CHEMSTAR motors with frame size 315 and 355 only with direct coupling without vibrations, otherwise O. R.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR													LOHER VARIO				
1PS0. -Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special electrical designs/winding protection																			
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	A11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	A12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	A15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	A16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	A23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Measuring of winding temperature by means of 2 × embedded KTY84-130 temperature sensors	A25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers - as standard in 2-wire design	A60	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire design, for round-wire winding only	A61	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	A64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	A67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3-wire and 4-wire connection from terminal box – for pre-formed coil winding only	Q40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 double resistance thermometers in Ex i design – 2-wire from element, 4-wire from terminal box	V80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire design from sensor instead of from terminal (not Ex i-Pt100!) – optionally possible for A60, A61, A65, A66	Q43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire design from sensor instead of from terminal – optionally possible for V80, A40, A42	Q44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

For legends and footnotes, see Page 3/42.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																					
		LOHER CHEMSTAR											LOHER VARIO										
	1PS0.....-Z	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500				
Special electrical designs/winding protection (continued)																							
Indoor air Pt100 in 3- or 4-wire design from sensor instead of from terminal	Q45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O	R	O	R	O	R	O	R
One thermocouple per bearing	Q49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
Sensor for enclosure vibration monitoring (preferred brand), with loose cable – for each sensor	V14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
Sensor for enclosure vibration monitoring (preferred brand), without terminal box – for each sensor	V15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
Sensor for enclosure vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	V16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
3 transmitters, 4 to 20 mA for Pt100 winding	P20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
1 transmitter with digital display with Ex d or Ex i approval	V88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
Winding Pt100 in tolerance class A	V78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓				
Installation altitude, max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Installation altitude max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Installation altitude max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Installation altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

For legends and footnotes, see Page 3/42.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR														LOHER VARIO				
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Special electrical designs/winding protection (continued)																				
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge if special voltage is selected (11th position of Article No. = 9).	D14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cooling water temperature max. 30 °C (observe derating) – derating in accordance with reduction table	D15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling water temperature max. 35 °C (observe derating) – derating in accordance with reduction table	D16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Cooling water temperature max. 40 °C (observe derating) – derating in accordance with reduction table	D17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Power data for converter operation; utilization according to temperature class F (155 °C).	C32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
Utilization according to temperature class 155 (F) – in line operation max. rated power according to IEC possible. No additional charge if special voltage is selected (11th position of Article No. = 9).	C12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rated power of the next lower power level – IEC power levels are maintained, only in combination with D06 to D18 . No additional charge if special voltage is selected (11th position of Article No. = 9).	C29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Moderately extended speed range for converter operation	V82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Temperature class F	W00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Temperature class H	W01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	O.R.	O.R.	O.R.	O.R.
Sealing of winding overhangs with silicone rubber	W03	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	O.R.	O.R.	O.R.	O.R.	

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
1PS0...-Z																			
Special electrical designs/winding protection (continued)																			
Sealing of cable duct with silicone rubber	W04	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Non-standard voltage and/or frequency for separate fan motor	Y81 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Colors and paint finish																			
Internal corrosion protection system J08	W10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3	V09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 – industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	V10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 – industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	W14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Special prime coat system Z05 with internal corrosion protection system J08	W15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) - sea climate	V11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system Z21/J08 – 300 µm (offshore, C5M-M _{high}) – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (> 15 years) – sea climate	V19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special offshore paint finish S13 with reference to NORSOK M501 (C5M _{high}) with comments and deviations – corrosion resistance acc. to EN/ISO 12944-5 = C5 _{high} (> 15 years) – sea climate	V12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special coating system S11/J08 (e.g. submerged motors)	V13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	K24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Unpainted	K23	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Outer coating 110 µm for zinc-galvanized noise cabinet	V98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special colors according to Munsell or British Standard	Y50 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Standard finish in RAL 1004, 1018, 2000, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	Y53 • and standard finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Standard finish in RAL 1004, 1018, 2000, 1018, 2004, 5009, 5010, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – (specify special coating system in addition, e.g. V10 , V11 , W14 , etc.)	Y54 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Colors and paint finish (continued)																			
RAL colors, other than those offered above	Y51 • and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special non-RAL colors	Y71 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design for Zones according to ATEX																			
Design for Zone 21 (conductive dust) for line operation, IP65	M34	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for line operation	M35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design for Zone 21 (conductive dust) for converter operation, IP65	M38	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for converter operation	M39	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Ship design "Operation below deck"																			
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	W24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	W25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration – non essential	W26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	W27	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	W28	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Navale), CT 50 °C with manufacturer's declaration – non essential	W29	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	W99	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive ²⁾	Q60	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive ²⁾	Q61	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive ²⁾	Q62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive ²⁾	Q63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive ²⁾	Q64	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Navale), CT 50 °C with manufacturer's declaration, essential drive ²⁾	Q65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
1PS0...-Z																			
Ship design "Operation below deck" (continued)																			
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive ²⁾	Q66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to USSR (Russia) with manufacturer's declaration, essential drive ²⁾	Q67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to PR (Poland) with manufacturer's declaration, essential drive ²⁾	Q68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to NKK (Japan) with manufacturer's declaration, essential drive ²⁾	Q69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Motor exclusively for use in transportation equipment for passengers and freight transport corresponding to EVPG §1 dated February 27, 2008	D23	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Individual certifications																			
Motor without CE marking for export outside EEA (see EU Directive 640/2009)	D22	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
UL/CUL version	W19	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Operation at ambient temperatures down to -50 °C, transport down to -50 °C – roller bearing design	D02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Operation at ambient temperatures down to -40 °C, transport down to -40 °C – roller bearing design	D03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Operation at ambient temperatures down to -30 °C, transport down to -40 °C – roller bearing design	D04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Electrical design according to NEMA MG1-12	D30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ex certification for China	D32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
China Energy Efficiency Label	D34	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Certificate EAC for the Eurasian customs union	D35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MEPS Australia	D70	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Special mechanical designs																			
Terminal box on right-hand side (viewed onto DE)	K09	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Terminal box on left-hand side (viewed onto DE)	K10	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○
Terminal box on top	K11	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○
Mounted rotary pulse encoder Loher preferred brand	Q70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Terminal box to IP65	Q71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Cable entry thread metrically different from standard – thread dimension must be specified	W30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Enlarged connection system for main terminal box – not in combination with K53 (Ex d terminal box)	L00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Undrilled cable gland plate on main terminal box	L01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□
Split terminal box	W31	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
1 × NPT thread for main terminal (observe sizes) – specify thread, cable gland not in supply	W32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

For legends and footnotes, see Page 3/42.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR														LOHER VARIO				
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Special mechanical designs (continued)																				
1 x cable gland for non-armored cable – for main terminal box	K54	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	
One cable gland, standard thread size for additional connection (1 unit) (non-armored cable)	W33	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	
Main terminal with tinned cable lug for copper cable	W34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Saddle terminal for connection without cable lug	W35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	
Special cable gland 1 unit – specify exact cable data; selection table for CHEMSTAR motors see Page 2/42	Y97 • and customer specifications	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
Auxiliary terminal box, non-Ex, cast-iron design – without removable cable gland plate, with metric cable entry thread	M50	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Material of auxiliary terminal box: Stainless steel – not in combination with K53 (Ex d terminal box)	M51	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Auxiliary terminal box, cast iron, for heater	M52	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Heater in main terminal box	P84	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with K53 (Ex d terminal box)	Q75	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with K53 (Ex d terminal box)	Q76	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	
6 cables freely protruding, radial, 1.5 m long – 7-wire cable; D or S interconnection, customer-supplied	W38	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–	–	–
Extension of cable to 3 m – only in combination with W38	W39	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–	–	–
Connection cable for accessories – only in combination with W38 , length as power cable	W40	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–	–	–
Additional separately supplied terminal box made of cast iron with baseplate – main terminal box certified acc. to Ex e	W41	–	–	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–	–	–
Cable entry from DE	K83	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Cable entry from NDE	K84	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Rotation of the terminal box by 180°	K85	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Vibration quantity level A – IEC 60034-14		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Vibration quantity level B – IEC 60034-14 – for converter operation only at lowest and highest speed of speed range	K02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Shaft and flange with increased accuracy according to DIN 42955-R	K04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (oil-tight)	K17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Radial sealing ring at DE for vertical flange-mounting types (oil-tight)	W43	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Labyrinth sealing for external bearing seal	W44	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	□	□	□	□
Bearing for increased cantilever forces (roller bearing DE) with relubrication device – comprising K40	K20	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.
Bearings for increased axial forces	V20	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Relubrication device DE/NDE	K40	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	□
Grease-collecting chamber if relubrication is applied	W45	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	–	–	–	–
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter operation	L27	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft grounding device – down to -20 °C only	V36	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Located bearing DE		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	L04	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Pt100 bearing or coolant in tolerance class A – only in combination with Q44	V76	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
One transmitter each (2 in total) 4 to 20 mA for Pt100 bearing DE and NDE	V83	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Sensor for enclosure vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	V16	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	V17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	V18	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Grease extractors for DE and NDE	V21	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	V22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	V25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
External grounding (additionally)	W46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
VIK design – including W14, W47, W69	K30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	–
LOHER CHEMSTAR Plus design, including VIK design; IP56 – including K30, K51, W14, W69 and IP66 shaft seal, vibration quantity level as grade B	W09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Second rating plate, supplied loose	K31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

For legends and footnotes, see Page 3/42.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Second rating plate installed in terminal box	W47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate with rating data for converter operation according to limit characteristic	Y80 • and customer specifications	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Extra rating plate for customer data (each plate) – data must be specified as text in the order	Y82 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional information on motor plate and on package label – max. 20 characters possible	Y84 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates made of stainless steel	W48	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates in languages other than English and German – main rating plate or extra rating plates, factory clarification essential	W49	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	W50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	K45	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 115 V	K46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 110 to 120 V (min. 100 V, max. 132 V) – preferred	M12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 210 to 250 V (min. 200 V, max. 264 V) – preferred	M13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater with other voltages	Y83 • and customer specifications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Heater with thermostat	V75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Second standard shaft extension – for 100 % torque; VARIO 50 % torque	K16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	Y55 • and customer specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft of material 1.7225	W51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	W52	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft end of stainless steel butt-welded (material 1.4571)	W53	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft made of special steel – down to -40 °C only	L72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator enclosure for surface-cooled motors – factory clarification required because of possible dimension deviations	W54	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	□	□	□	□
Welded copper bar rotor	W55	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	□	□	□	□
Second shaft extension for IM B3 up to 100 % torque; cylindrical with feather key	Q21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Special rotor for heavy duty starting (e.g. double-cage rotor or brass rotor) – type test needed	Q22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Generator design (asynchronous) with 1.8 times runaway speed – only 4-pole and higher	W56	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
IP56 degree of protection	K51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	K50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	L94	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IP67 degree of protection	K93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
IP67 degree of protection without level switch (resin material for terminal box protection will be shipped as extra package, 8 m submerged, 72 h max.)	W58	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drainage holes sealed with plug	W59	-	-	-	-	-	-	□	□	□	□	□	□	□	□	-	-	-	-
Condensation drainage holes sealed with screw	W60	-	-	-	-	-	-	○	○	○	○	○	○	○	○	✓	✓	✓	✓
Increased tropicalization, humidity ≥ 80 % – LOHER CHEMSTAR incl. V10 and W71 , LOHER VARIO incl. V10 and P45	W61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	L28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream; without external air stream cooling, factory clarification required due to derating	W62	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan with corrosion protection in case of metal fan	W63	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	W64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	□	-	-	-	-
Fan of steel	W65	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
External fan of brass	W66	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	V94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	O.R.
Special ventilation for on-deck motors	W67	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan cover of steel sheet (3 mm thick)	W68	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Galvanized fan cover – included in K30 and W09	W69	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	K37	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	K38	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Clockwise, viewed onto DE – direction of rotation must be specified for motors from frame size 355 2-/4-pole	K97	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
Counter-clockwise, viewed onto DE – direction of rotation must be specified for motors from frame size 355 2-/4-pole	K98	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with K97 or K98	L20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

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Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Stainless steel grid for air inlet silencer – only in combination with L20	L25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) based on GG1	V32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Insulation sheath for noise reduction approx. 3 to 5 dB(A) to standard GG1	V34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Operation in both directions of rotation – from frame size 355 2-/4-pole, possibly increased noise values and derating, for LOHER CHEMSTAR frame size 355 technical factory clarification essential	K99	□	□	□	□	□	□	□	□	□	□	□	□	□	O.R.	✓	✓	✓	O.R.
Higher number of starts (up to 3000 starts per year)	Q23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Full-key balancing	L68	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Support ring for coupling guard	L15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	L17	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	L31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	L33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Half-key balancing		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Reinforced bearing at DE for belt drive	L96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	-
Stainless steel screws and plates	W71	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Stainless steel external bolts	P45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ambient temperatures down to -40 °C; preheating before operation necessary – factory clarification required regarding the heating power required, heating via the winding may be necessary. Installed heating elements in motor at additional charge.	W73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Ambient temperatures down to -40 °C; no preheating before operation necessary; without Ex protection	W75	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Ambient temperatures down to -60 °C; no preheating before operation necessary; without Ex protection	W76	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Mounted rotary pulse encoder 1024 pulses per revolution – 10 to 30 V, HTL level; not Ex; cable length 5 m – signals A, B, N + inverted signals	W80	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Mounted speed encoder non Ex design with integrated shaft grounding device (Loher preferred brand) – 1024 pulses per revolution – 10 to 30 V, HTL level – explosion-proof design; additionally select bearing insulation	V74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

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		LOHER CHEMSTAR														LOHER VARIO			
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Special mechanical designs (continued)																			
Hollow-shaft encoder (special brand) e.g. Baumer Hübner	Q93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mechanical protection for rotary pulse encoder – in combination with V72, V77	M68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted radial forced ventilation	W81	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked) – dimensions may differ	G48	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓	✓
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked) – dimensions may differ	G49	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	✓	✓	✓	✓
Mounted brake, standard design	G40	-	-	-	-	-	-	-	-	-	✓	✓	✓	O.R.	-	-	-	-	-
Manual mechanical release for standard brake	K82	-	-	-	-	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-
Brake supply voltage, 400 V AC, 50 Hz 1-phase	C01	-	-	-	-	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-
Brake supply voltage 24 V DC 1-phase	C00	-	-	-	-	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-
Tapered shaft extension with shaft nut	T36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Microswitch for brake – optionally deselectable if monitoring is implemented differently	W83	-	-	-	-	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-
Sun protection shield – fixing parts of mild steel, cover unpainted stainless steel for vertical motors	V87	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Sun protection shield – fixing parts of mild steel, cover of unpainted stainless steel for horizontal motors	V99	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	W84	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Machined surface on motor foot with dowel pin holes	Q94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Base frame for height adaptation of max. 2 frame sizes difference	Q96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	Q97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of flange dimensions and drilled holes in flange	Q98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Preparation for later installation of sun protection shield	Q99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: measuring nipple system 32 – thread M8, DE and NDE	G50	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shock pulse measurement (SPM), fixed sensor and distributor box	H05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Fixed sensor system 40 – thread M8	W85	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Bearing temperature monitoring with PTC thermistors at DE/NDE	W86	-	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	A03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

For legends and footnotes, see Page 3/42.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR												LOHER VARIO						
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
Special mechanical designs (continued)																				
2 Pt100 resistance thermometers for 3 or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A40	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 3- or 4-wire connection from terminal box, roller bearing design – 1 × DE and 1 × NDE	A42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
2 dial-type thermometers without contacts, capillary principle	A70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
2 dial-type thermometers with 2 NO contacts, capillary principle	A71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection – 2-wire from terminal box	A72	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 Pt100 double resistance thermometers for three-wire connection for roller bearings	A80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	V89	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Labeling of terminal box, engraved	V96	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	Q92	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
4 mm shims, brass base – not laminated	V31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Slotted feet holes	Q95	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Pre-formed coil for LV motors	V01	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	V08	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Impact protection – for built-on devices, per device	M81	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Brackets for lifting and shifting	P42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Provision for enclosure vibration probe, one flat surface with thread M8 × 1	P63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Pressure oil connection with cylindrical or stepped shaft extension instead of feather key connection	Y85 • and customer specifications	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required	W87	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–	–
Retrofit (description of special design separately) – adaptation to an existing motor	B15	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS0.....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
Extension of the liability for defects																			
Extension of the liability for defects by 12 months up to a total of 24 months	Q80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months up to a total of 30 months	Q81	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months up to a total of 36 months	Q82	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 30 months up to a total of 42 months	Q83	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 36 months up to a total of 48 months	Q84	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 48 months up to a total of 60 months	Q85	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

¹⁾ Coding in 8th position of the article number, for LOHER CHEMSTAR = 2.

²⁾ Acceptance tests must be selected additionally. For example, for the first motor select **F83** or **F93**, and for each additional motor **F01**. Inclusive of costs for certification authority and inspector, and shaft test if specified by certification authority. LOHER CHEMSTAR for essential drive is possible on request as an ETO option (Engineer To Order) without an option code.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Engineer To Order (ETO)

Overview

Engineering

In addition to the standard options, for the LOHER CHEMSTAR and VARIO 1PS0 motor series, there is also the option of ordering special versions.

The following variants are available via the electronic ordering tools:

- Mounted axial forced ventilation (non heavy sea) – forced ventilation can be ordered with **F** in the 10th position of the article number.
A mounted forced ventilation is available for frame sizes 132 to 500 (additional charge).
- Special insulation for increased voltage load in converter operation (phase/phase 2250 V_{Peak}/derating) – can be ordered for LOHER CHEMSTAR with **2** in the 8th position of the article number (additional charge).

To fulfill the requirements of your application in the best possible way we offer the motor in an "Engineer To Order" (ETO) version. These ETO options are specially defined and engineered to suit customer requirements.

They cannot be ordered using electronic ordering tools; they can only be ordered on request from a Siemens contact.

Special electrical designs/winding protection

- Design with reduced starting current – factory clarification required and type test may be necessary.
For all frame sizes on request.
- Special design according to load curve of driven machine or customer requirements – factory clarification required and type test may be necessary
For all frame sizes on request.
- Adjustment of rating in response to customer requirements – factory clarification required and type test may be necessary
For all frame sizes on request.
- Other special electrical designs/configurations
For all frame sizes on request.

Special mechanical designs

- "High speed motors" in speed range > 6000 rpm – only on request. Torque curve and cutoff frequency affect the design; test with original converter may be required
For frame sizes 71 to 355 on request.
- Special grease
"Klüber Staburags NBU8EP"
With additional charge possible for LOHER CHEMSTAR motors, for LOHER VARIO motors on request.
- Special grease
"Klüber Staburags SL2"
With additional charge possible for LOHER CHEMSTAR motors, for LOHER VARIO motors on request.
- Special grease
"Barierta L55/2"
With additional charge possible for LOHER CHEMSTAR motors of frame size 90 to 355, for LOHER VARIO motors on request.
- Other special grease
With additional charge possible for motors of frame size 90 to 500, for motors of frame sizes 71 and 80 on request.

Colors and paint finish

- Other paint combinations/systems or RAL colors to customer specification.
For all frame sizes on request.

More detailed information can be obtained from your Siemens sales partner.

Motors without Explosion Protection

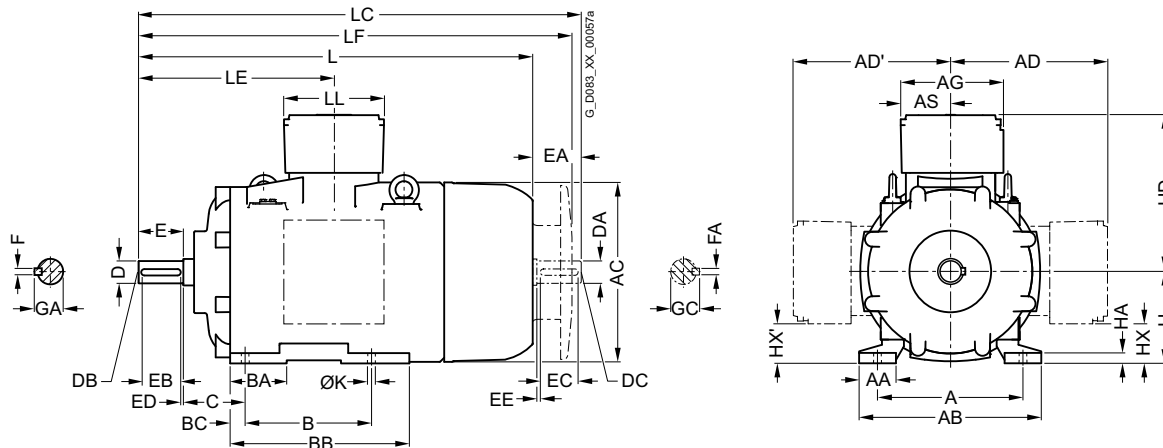
LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 90 L to 250 M

Dimensional drawings

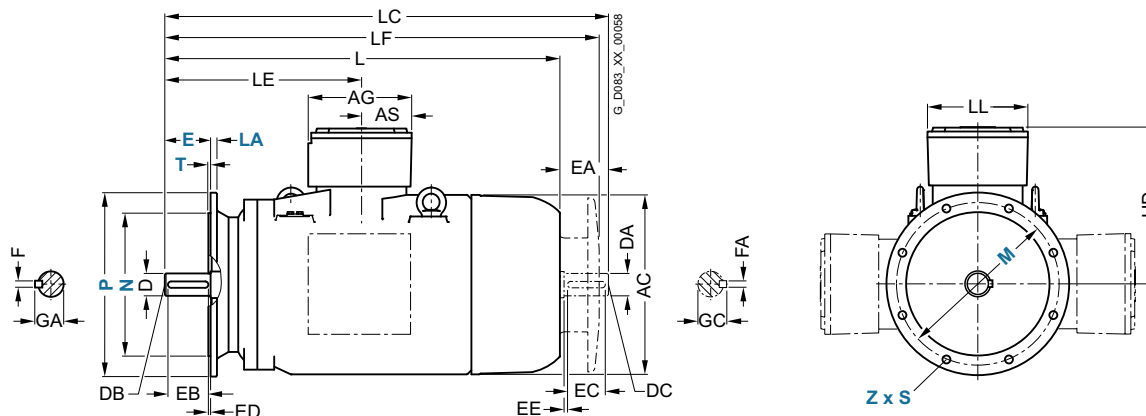
Type of construction IM B3

For flange dimensions, see Page 3/50



Types of construction IM B5 and IM V1

For flange dimensions, see Page 3/50



Dimension designation acc. to IEC

Frame size	No. of poles	A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER CHEMSTAR																		
90 L	2 ... 16	140	40	180	186	–	138	69	125	40	155	15	56	90	13	213	10	426
100 L	2 ... 16	160	40	205	213	–	138	69	140	50	170	15	63	100	18	227	12	482
112 M	2 ... 16	190	45	240	237	–	138	69	140	50	170	18	70	112	18	240	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	50	228	25	89	132	18	274	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	50	228	25	89	132	18	274	12	574
160 M	2 ... 16	254	60	310	331	305	186	92	210	83	307	21	108	160	23	305	14.5	786
160 L	2 ... 16	254	60	310	331	305	186	92	254	83	307	21	108	160	23	305	14.5	786
180 M	2 ... 16	279	70	349	364	349	254	123	241	99	359	24	121	180	18.5	349	14.5	822
180 L	2 ... 16	279	70	349	364	349	254	123	279	99	359	24	121	180	18.5	349	14.5	822
200 L	2 ... 16	318	80	400	404	367	254	123	305	120	425	32	133	200	25	369	18.5	884
225 S	2	356	90	450	451	384	254	123	286	136	438	34	149	225	26	384	19	966
4 ... 16	996																	
225 M	2	356	90	450	451	384	254	123	311	136	438	34	149	225	26	384	19	966
4 ... 16	996																	
250 M	2	406	100	505	490	522	382	176	349	110	420	36	168	250	35	522	25	1028
4 ... 16																		

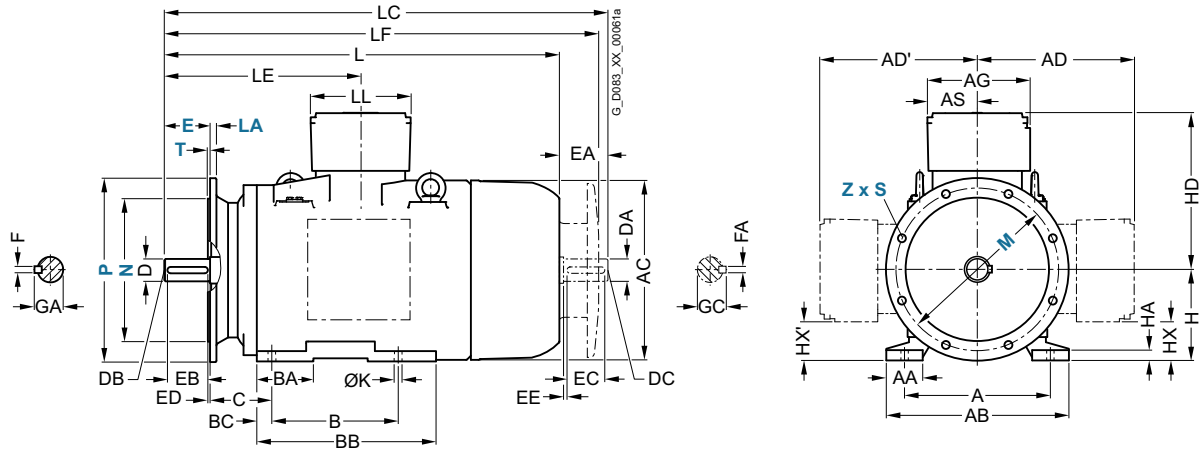
Motors without Explosion Protection LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 90 L to 250 M

Dimensional drawings (continued)

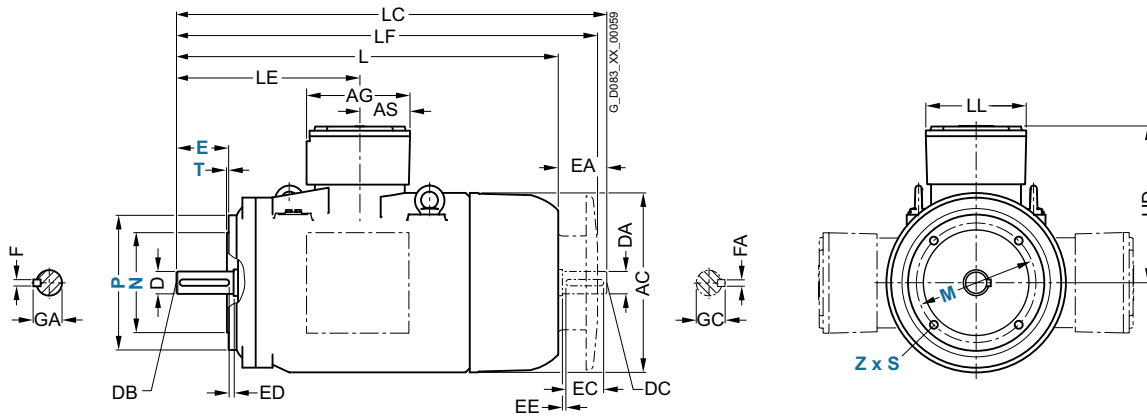
Type of construction IM B35

For flange dimensions, see Page 3/50



Type of construction IM B14

For flange dimensions, see Page 3/50



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension				NDE shaft extension			
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER CHEMSTAR																			
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	60	140	125	7.5	18	64	60	60	140	125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	60	140	125	7.5	18	64	60	60	140	125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65	65					69	65	65					69	69

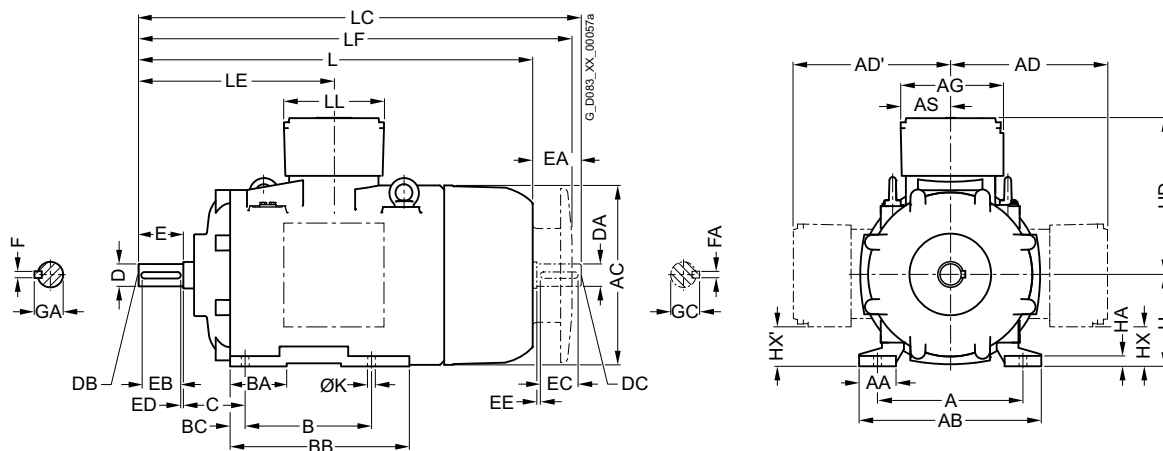
Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 280 S to 355 L

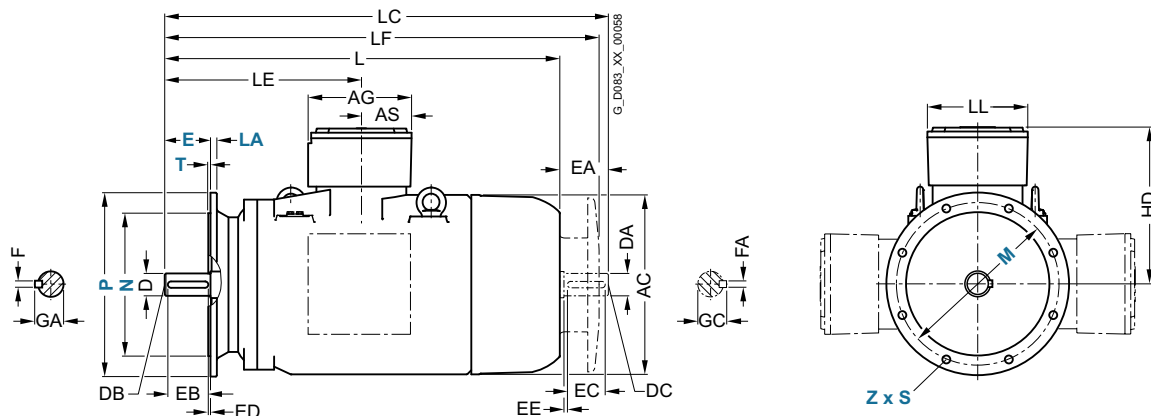
Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1

For flange dimensions, see Page 3/50



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER CHEMSTAR																		
280 S	2 4 ... 16	457	110	570	550	552	382	176	368	150	520	51	190	280	40	488	25	1119
280 M	2 4 ... 16	457	110	570	550	552	382	176	419	120	520	51	190	280	40	488	25	1119
315 S	2 4 ... 16	508	125	630	622	660	509	196	406	165	575	59	216	315	40	640	28	1304 1334
315 M	2 4 ... 16	508	125	630	622	660	509	196	457	165	675	59	216	315	40	640	28	1304 1334
315 LL	2 4 ... 16	508	125	630	622	676	509	196	508	165	675	59	216	315	40	656	28	1491 1521
315 L	2 4 ... 16	508	125	630	622	676	509	196	560	165	575	59	216	315	40	656	28	1491 1521
355 M	2 4 ... 16	610	120	730	700	729	509	196	560	150	650	45	254	355	50	729	30	1400 1430
355 L	2 4 ... 16	610	120	730	700	729	509	196	630	150	720	45	254	355	50	729	30	1470 1500

Motors without Explosion Protection

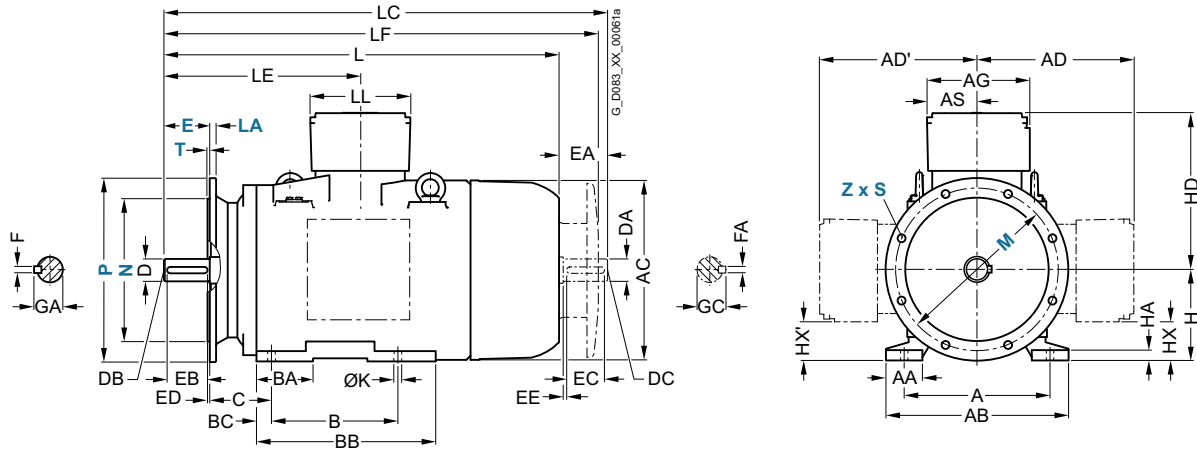
LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 280 S to 355 L

Dimensional drawings (continued)

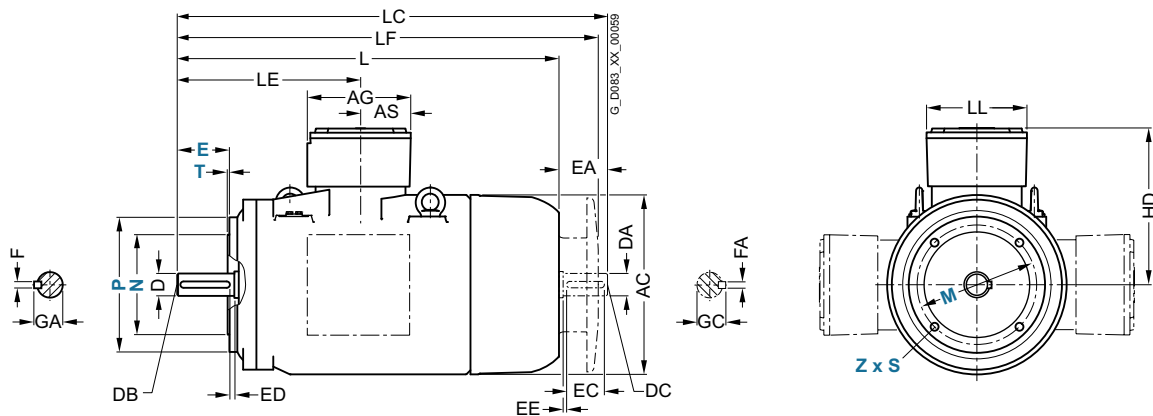
Type of construction IM B35

For flange dimensions, see Page 3/50



Type of construction IM B14

For flange dimensions, see Page 3/50



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension								NDE shaft extension			
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC				
LOHER CHEMSTAR																							
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16					75					20	79.5	75					20	79.5				
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16					75					20	79.5	75					20	79.5				
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	79.5				
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85				
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85				
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69				
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85				
355 M	2	1550	674	1563	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5				
	4 ... 16	1610	704	1593		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95				
355 L	2	1620	709	1633	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5				
	4 ... 16	1680	739	1663		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95				

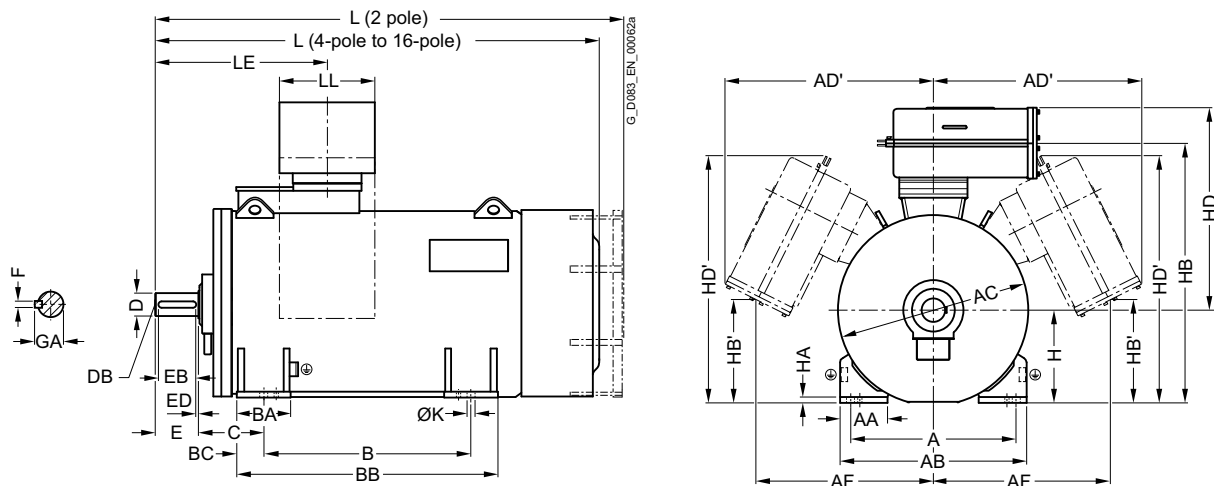
Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER VARIO 1PS0 motors, frame sizes 355 L to 500 L

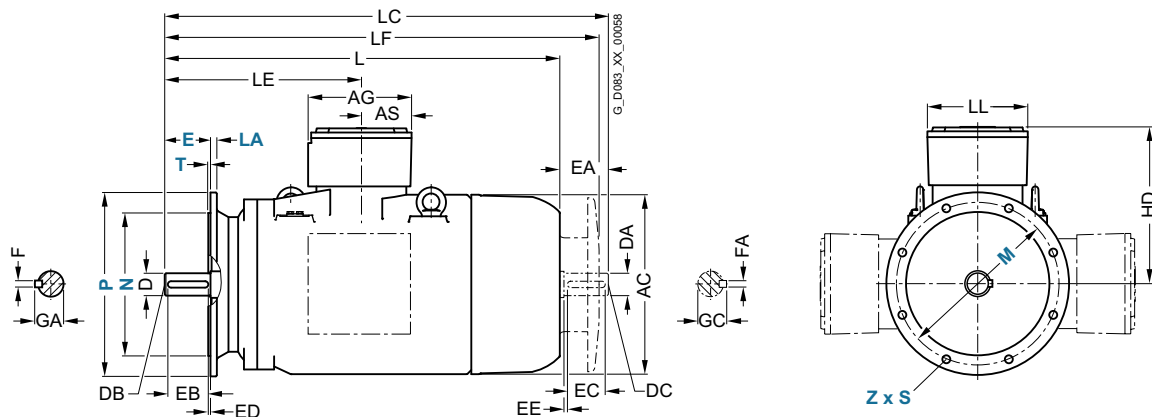
Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1

For flange dimensions, see Page 3/50



Frame size	No. of poles	Dimension designation acc. to IEC																	
		A	AA	AB	AC	AD/AD'	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
LOHER VARIO																			
355 L	2	630	140	780	740		500			800	210	950		254	355	35	835	33	1860
	4 ... 16																		1890
400 L	2	710	185	860	820		500			900	210	1090		280	400	30	897	33	1975
	4 ... 16																		2015
450 L	2	800	230	900	920		500			1000	260	1260		315	450	30	925	39	2095
	4 ... 16																		2135
500 L	2	900	220	1030	1015		500			1120	280	1400		335	500	40	979	39	-
	4 ... 16																		2305

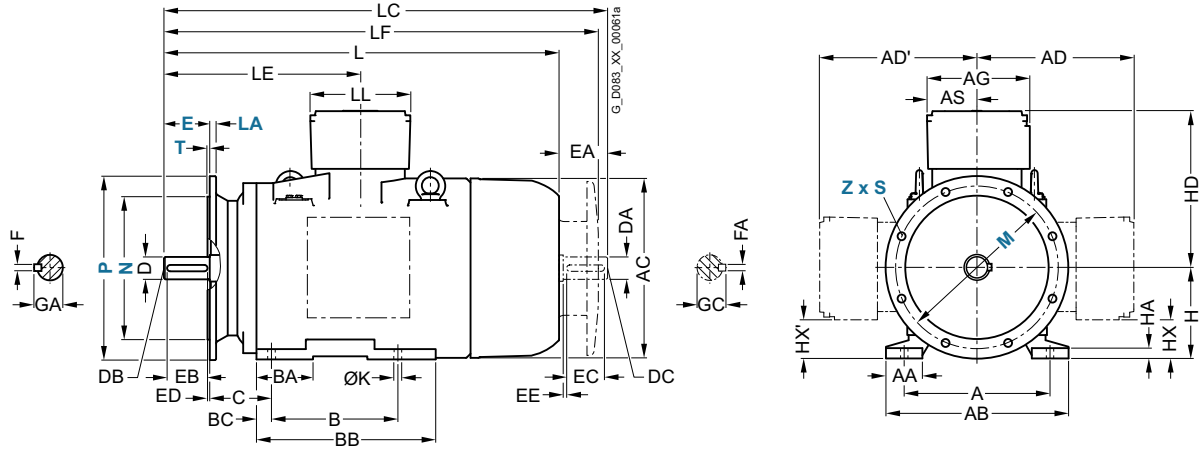
Motors without Explosion Protection LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER VARIO 1PS0 motors, frame sizes 355 L to 500 L

Dimensional drawings (continued)

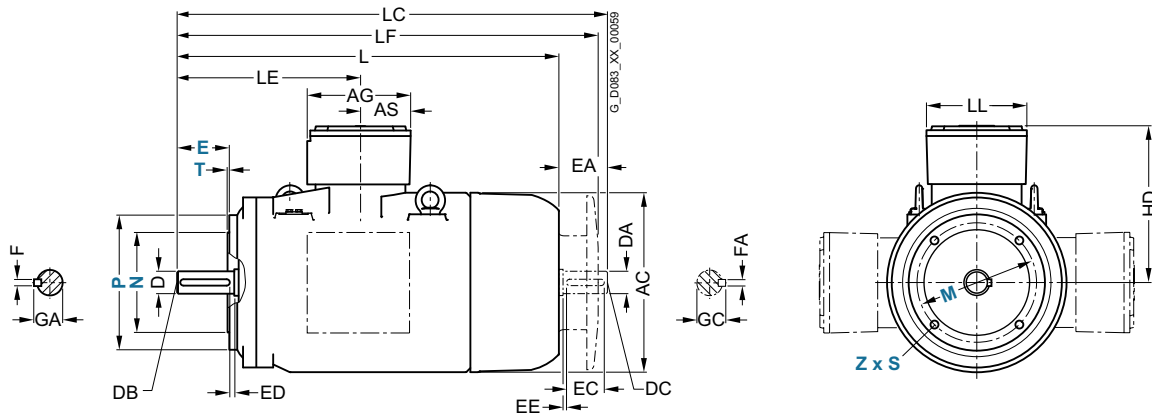
Type of construction IM B35

For flange dimensions, see Page 3/50



Type of construction IM B14

For flange dimensions, see Page 3/50



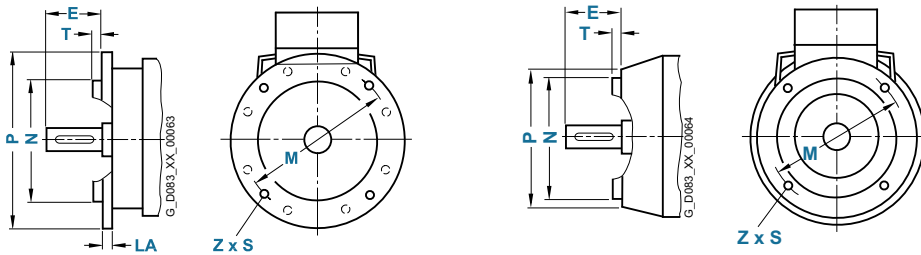
Frame size	No. of poles	Dimension designation acc. to IEC				DE shaft extension					NDE shaft extension								
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
LOHER VARIO																			
355 L	2		657			75	M20	140			20	79.5	75	M20	140			20	79.5
	4 ... 16		687			90	M24	170			25	95	90	M24	170			25	95
400 L	2		695			80	M20	170			22	85	80	M20	170			22	85
	4 ... 16		732			100	M24	210			28	106	100	M24	210			28	106
450 L	2		707			85	M20	170			22	90	85	M20	170			22	90
	4 ... 16		747			110	M24	210			28	116	110	M24	210			28	116
500 L	2		-			-	-	-			-	-	-	-	-			-	-
	4 ... 16		747			120	M24	210			32	127	120	M24	210			32	127

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Flange dimensions

Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes.
(Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR										
90 L	2 ... 16	FF165	10	50	165	130	200	11.5	3.5	4
		<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
		FT115	15	50	115	95	140	M8	3	4
		<i>FT100¹⁾</i>	8	–	100	80	120	M6	3	4
		<i>FT130¹⁾</i>	10	–	130	110	160	M8	3.5	4
100 L	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	11	60	130	110	160	M8	3.5	4
		<i>FT115¹⁾</i>	10	–	115	95	140	M8	3	4
		<i>FT130¹⁾</i>	12	–	165	130	200	M10	3.5	4
112 M	2 ... 16	FF215	11	60	215	180	250	14	4	4
		<i>FT165¹⁾</i>	13	–	265	230	300	14	4	4
		FT130	11	60	130	110	160	M8	3.5	4
		<i>FT165¹⁾</i>	12	–	165	130	200	M10	3.5	4
132 S	2 ... 16	FF265	12	80	265	230	300	14	4	4
		<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
132 M	2 ... 16	FF265	12	80	265	230	300	14	4	4
		<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
160 M	2 ... 16	FF300	20	110	300	250	350	18	5	4
		<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
		<i>FF265¹⁾</i>	12	–	265	230	300	14	4	4
		FF300	20	110	300	250	350	18	5	4
160 L	2 ... 16	<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
		<i>FF265¹⁾</i>	12	–	265	230	300	14	4	4
		FF300	20	110	300	250	350	18	5	4
		<i>FF215¹⁾</i>	11	–	215	180	250	14	4	4
180 M	2 ... 16	FF300	13	110	300	250	350	18	5	4
		<i>FF265¹⁾</i>	12	–	265	230	300	14	4	4
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		FF300	13	110	300	250	350	18	5	4
180 L	2 ... 16	<i>FF265¹⁾</i>	12	–	265	230	300	14	4	4
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		FF350	15	110	350	300	400	18	5	8
		<i>FF300¹⁾</i>	15	–	300	250	350	18	5	4
200 L	2 ... 16	<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
		FF400	16	110	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
		FF400	17	140	400	350	450	18	5	8
225 S	2	FF400	16	110	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
	4 ... 16	FF400	17	140	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8

¹⁾ Flange is selectable at no additional cost.

Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Flange dimensions

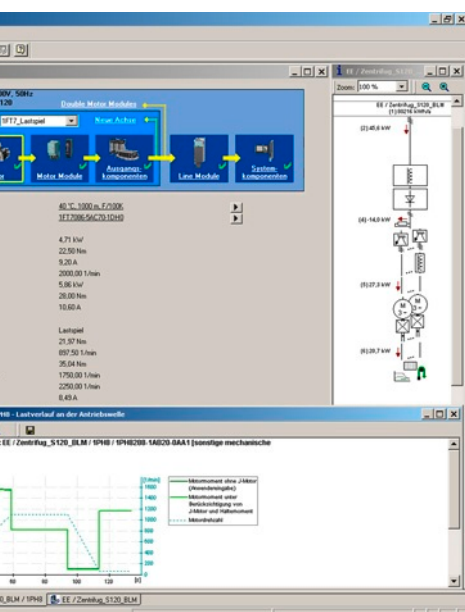
Dimensional drawings (continued)

Frame size	No. of poles	Flange with through hole (FF)/ tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
LOHER CHEMSTAR (continued)										
225 M	2	FF400	16	110	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
	4 ... 16	FF400	16	140	400	350	450	18	5	8
		<i>FF350¹⁾</i>	15	–	350	300	400	18	5	8
250 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	16	–	400	350	450	18	5	8
280 S	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	22	–	400	350	450	18	5	8
280 M	2 ... 16	FF500	18	140	500	450	550	18	5	8
		<i>FF400¹⁾</i>	22	–	400	350	450	18	5	8
315 S	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF500¹⁾</i>		22	–	500	450	550	18.5	5	8	
315 M	2	FF600	22	140	600	550	660	24	6	8
		<i>FF500¹⁾</i>	22	–	500	450	550	18.5	5	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF500¹⁾</i>		22	–	500	450	550	18.5	5	8	
315 LL	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF740¹⁾</i>		25	–	740	680	800	24	6	8	
315 L	2	FF600	22	140	600	550	660	24	6	8
		<i>FF740¹⁾</i>	25	–	740	680	800	24	6	8
	4 ... 16	FF600	22	170	600	550	660	24	6	8
<i>FF740¹⁾</i>		25	–	740	680	800	24	6	8	
355 M	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
355 L	2	FF740	25	140	740	680	800	24	6	8
	4 ... 16			170						
LOHER VARIO										
355 L	2	FF740	25	140	740	680	800	22	6	8
	4 ... 16			170						
400 L	2	FF940	28	170	940	880	1000	22	6	8
	4 ... 16			210						
450 L	2	FF1080	30	170	1080	1000	1150	26	6	8
	4 ... 16			210						
500 L	2	FF1180	30	–	1180	1120	1250	26	7	8
	4 ... 16			210						

¹⁾ Flange is selectable at no additional cost.

Motors without Explosion Protection

Notes



Security notes

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

To protect plants, systems, machines and networks against cyber attacks, it is necessary to implement a seamless and holistic industrial security concept that corresponds to state-of-the-art technology. It is also important that this is continuously maintained. Siemens products and solutions only represent one component of such a concept.

The customer is responsible for preventing unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit www.siemens.com/industrialsecurity

Siemens' products and solutions undergo continuous development to make them more secure. Siemens expressly recommends that updates are carried out as soon as they become available - and that only the current product version is always used. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at www.siemens.com/industrialsecurity

4/2	SinaSave energy efficiency tool
4/3	Drive Technology Configurator
4/4	SIZER for Siemens Drives engineering tool
4/5	SIZER WEB ENGINEERING engineering tool

Tools and Engineering

SinaSave energy efficiency tool

Overview

The SinaSave energy efficiency tool calculates potential energy savings and amortization times based on your individual conditions of use and therefore offers practical assistance in making decisions about investments in energy-efficient technologies.

From SinaSave version 6.0 and higher, the drive systems to be compared and the relevant drive component parameters are displayed graphically. An additional expansion includes numerous comparison possibilities for different control types and comprehensive product combinations for drive solutions for pump and fan applications. In addition to SIMOTICS motors and SINAMICS converters, the product portfolio comprises SIRIUS controls, offering a comprehensive range of comparison possibilities – according to your individual requirements.



SinaSave offers numerous comparison scenarios:

- Comparison of drive systems for pump and fan-applications in the power range from 2.2 kW (low voltage) to 5.5 MW (medium voltage) for
 - Reactor control (fixed speed; motor and switching device)
 - Bypass control (fixed speed; motor and switching device)
 - Speed control (variable speed; motor and converter)
- Comparison and evaluation of standard motors (incl. ignition protection motors) in different energy efficiency classes

SinaSave supports the evaluation of different product and system comparisons by

- Displaying the potential savings for energy and energy costs as well as CO2 emissions
- Estimation of the amortization time
- Estimation of the individual total lifecycle costs
- Representation of the system power losses according to EN 50598-2 for full load and partial load
- Direct comparison of Siemens drive systems with the reference Power Drive System (PDS) described in EN 50598-2



Access to the SinaSave energy efficiency tool

SinaSave can be accessed without the need for registration or logging in:

www.automation.siemens.com/sinasave

More information

For more information about the amortization calculator for energy-efficient drive systems, visit www.siemens.com/sinasave

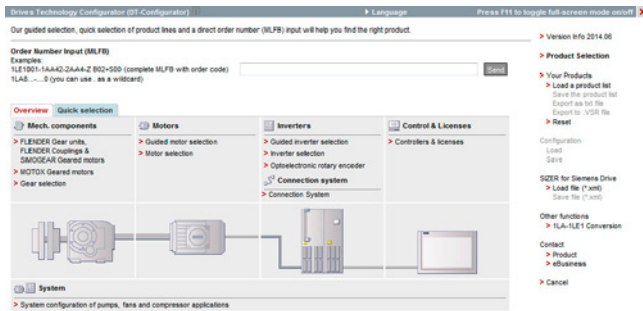
More information about services for energy saving is available on the Internet at:

www.siemens.com/energy-saving

Overview

The Drive Technology (DT) Configurator helps you to configure the optimum drive technology products for your application – starting with gear units, motors, converters as well as the associated options and components and ending with controllers, software licenses and connection systems. With or without detailed knowledge of products: preselected product groups, deliberate navigation through selection menus and direct product selection through entry of the product number support quick, efficient and convenient configuration.

In addition, comprehensive documentation comprising technical data sheets, 2D dimensional drawings/3D CAD models, operating instructions, certificates, etc. can be selected in the DT Configurator. Immediate ordering is possible by simply transferring a parts list to the shopping cart of the Industry Mall.



Drive Technology Configurator for efficient drive configuration with the following functions

- Quick, efficient configuration of drive products and associated components – gear units, motors, converters, controllers, connection systems
- Configuration of drive systems for pumps, fans and compressor applications from 1 kW to 2.6 MW
- Retrievable documentation for configured products and components, such as
 - Data sheets in up to 9 languages in PDF or RTF format
 - 2D dimensional drawings/3D CAD models in various formats
 - Terminal box drawing and terminal connection diagram
 - Operating instructions
 - Certificates
 - Start-up calculation for SIMOTICS motors
 - EPLAN macros
- Support with retrofitting in conjunction with Spares On Web (www.siemens.com/sow)
- Ability to order products directly through the Siemens Industry Mall

Access to the Drive Technology Configurator

The Drive Technology Configurator can be called up without registration and without a login:

www.siemens.com/dt-configurator

Selection and ordering data

Description	Article No.
Interactive Catalog CA 01 on DVD-ROM including Drive Technology Configurator, English	E86060-D4001-A510-D6-7600

More information

Online access to Drive Technology Configurator

More information about the Drive Technology Configurator is available on the Internet at

www.siemens.com/dt-configurator

Offline access to the Drive Technology Configurator in the Interactive Catalog CA 01

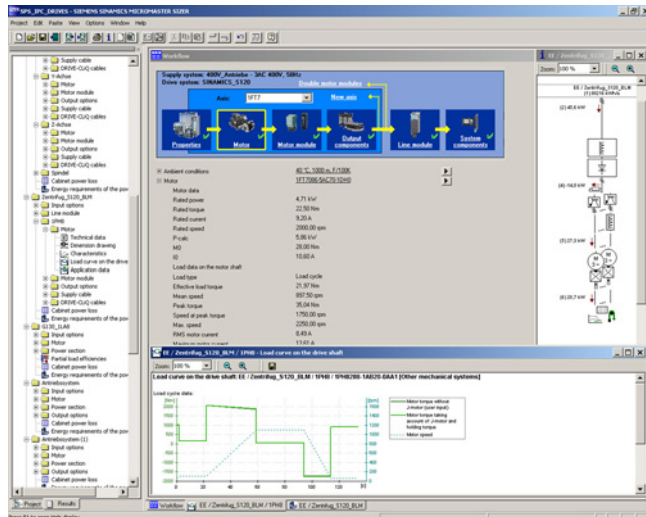
In addition, the Drive Technology Configurator is also included in the Interactive Catalog CA 01 on DVD-ROM - the offline version of the Siemens Industry Mall. The interactive catalog CA 01 can be ordered from the relevant Siemens sales office or via the Internet:

www.siemens.com/automation/CA01

Tools and Engineering

SIZER for Siemens Drives engineering tool

Overview



The following drives and controls can be engineered in a user-friendly way using the SIZER for Siemens Drives engineering tool:

- SIMOTICS low-voltage motors including servo geared motors
- SINAMICS low-voltage drive systems
- Motor starters
- SINUMERIK CNCs
- SIMOTION Motion Control controller
- SIMATIC controller

It provides support when selecting the technologies involved in the hardware and firmware components required for a drive task. SIZER for Siemens Drives covers the full range of operations required to configure a complete drive system, from basic single drives to complex multi-axis applications.

SIZER for Siemens Drives supports all of the engineering steps in a workflow:

- Configuring the power supply
- Designing the motor and gearbox, including calculation of mechanical transmission elements
- Configuring the drive components
- Compiling the required accessories
- Selecting the line-side and motor-side power options, e.g. cables, filters, and reactors

When SIZER for Siemens Drives was being designed, particular importance was placed on a high degree of usability and a universal, function-based approach to the drive application. The extensive user guidance makes it easy to use the tool. Status information keeps you continually informed about the progress of the configuration process.

The SIZER for Siemens Drives user interface is available in English, French, German and Italian.

The drive configuration is saved in a project. In the project, the components and functions used are displayed in a hierarchical tree structure.

The project view permits the configuration of drive systems and the copying/inserting/modifying of drives already configured.

The configuration process produces the following results:

- A parts list of the required components (export to Excel, use of the Excel data sheet for import to SAP)
- Technical specifications of the system
- Characteristic curves
- Comments on system reactions
- Mounting arrangement of drive and control components and dimensional drawings of motors
- Energy requirements of the configured application

These results are displayed in a results tree and can be reused for documentation purposes.

Support is provided by the technological online help menu:

- Detailed technical specifications
- Information about the drive systems and their components
- Decision-making criteria for the selection of components
- Online help in English, French, German, Italian, Chinese and Japanese

System requirements

- PG or PC with Pentium III min. 800 MHz (recommended > 1 GHz)
- 512 MB RAM (1 GB RAM recommended)
- At least 4.1 GB of free hard disk space
- An additional 100 MB of free hard disk space on the Windows system drive
- Screen resolution 1024 × 768 pixels (1280 × 1024 pixels recommended)
- Operating system:
 - Windows 7 Professional (32/64 bit)
 - Windows 7 Enterprise (32/64 bit)
 - Windows 7 Ultimate (32/64 bit)
 - Windows 7 Home (32/64 bit)
 - Windows 8.1 Professional (32/64 bit)
 - Windows 8.1 Enterprise (32/64 bit)
- Microsoft Internet Explorer V5.5 SP2

Selection and ordering data

Description	Article No.
SIZER for Siemens Drives engineering tool on DVD-ROM German, English, French, Italian	6SL3070-0AA00-0AG0

More information

The SIZER for Siemens Drives engineering tool is available free on the Internet at:

www.siemens.com/sizer

SIZER WEB ENGINEERING engineering tool

Overview



The SIZER WEB ENGINEERING tool is used to engineer motors, converters and drive systems for a broad spectrum of applications within a wide power range starting below 1 kW up to 30 MW and above. To engineer a solution, you need to enter parameters for the motor, converter or the system – as well as parameters for your own specific application.

When the process is complete, you will receive comprehensive technical documentation (e.g. 3D models) including price information.

An inquiry function integrated in SIZER WEB ENGINEERING allows you to design special solutions for your drive task.

SIZER WEB ENGINEERING fully supports you from the inquiry stage, through the process of engineering products and drive systems, until your own individual quotation is ready. It supplies pricing information and then transfers the engineered products to your shopping cart in the Industry Mall. Seamless support during the engineering process enables you to save time and increase your productivity because you only need to enter the data once. You can use the entered data and the result as a basis for inquiries and orders.

SIZER WEB ENGINEERING is the platform for flexible engineering of your drive tasks and user-friendly management of your projects in conjunction with the engineering tools Drive Technology Configurator and SIZER for Siemens Drives.

Furthermore, you can engineer high-voltage motors, medium-voltage systems and rectifiers for your projects in addition to products from the low-voltage range. Integral tool functions also include comprehensive documentation such as data sheets, start-up calculations for low and high-voltage motors, 2D dimensional drawings and 3D CAD models, and offer documentation, to name just a few.

Access to the SIZER WEB ENGINEERING engineering tool

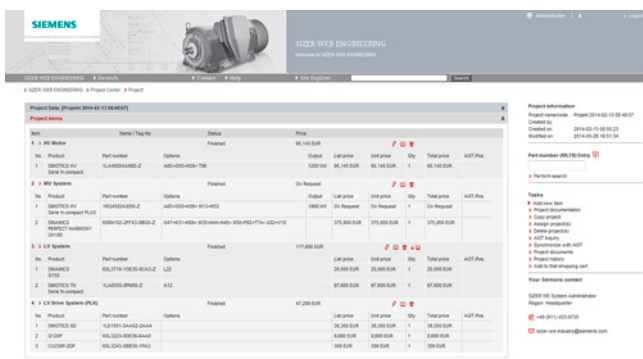
SIZER WEB ENGINEERING is available at the following website after registration and release:

www.siemens.com/sizer-we

More information

- Additional information on the SIZER WEB ENGINEERING tool is available on the Internet at www.siemens.com/sizer-we
- Home page "Selection and Engineering Tools": www.siemens.com/engineering-tools

Function



You can quickly find a solution for your drive task with the web-based tool: menu-prompted workflows navigate you through the technical selection and dimensioning of products and drive systems, including the accessories. Based on an integrated inquiry functionality, SIZER WEB ENGINEERING also offers you special customized solutions for applications which cannot be addressed using "Standard Products"; i.e. the focus is on flexibility and customized solutions.

Tools and Engineering

Notes

4

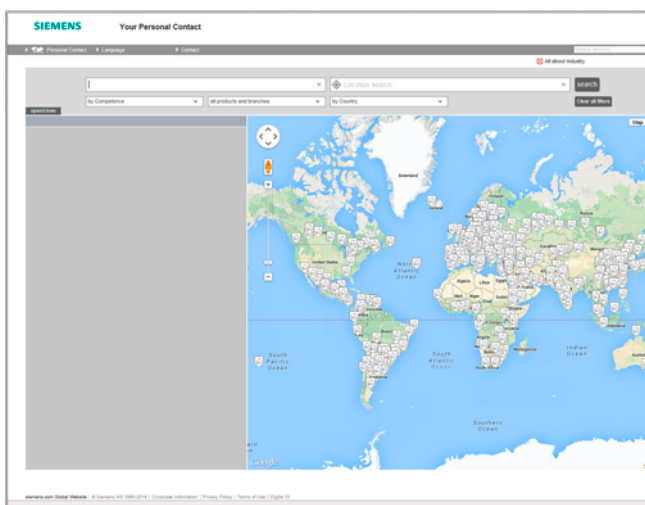
Appendix



5/2	Partner at Siemens
5/3	Online Services
5/3	<u>Information and Ordering Options on the Internet and DVD</u>
5/3	The Future of Manufacturing on the Internet
5/3	Product Selection Using the Interactive CA 01 Automation and Drives Catalog
5/3	Easy Shopping with the Industry Mall
5/4	<u>Information and Download Center, Social Media, Mobile Media</u>
5/4	Downloading Catalogs
5/4	Social and Mobile Media
5/5	Industry Services
5/5	Unleash potential – with services from Siemens
5/5	Increase your performance – with Industry Services
5/6	<u>Industry Services – Portfolio overview</u>
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5/8	<u>Online Support</u>
5/8	Online Support-App
5/13	Metal surcharges
5/13	<u>Explanation of the raw material/ metal surcharges</u>
5/13	Surcharge calculation
5/13	Structure of the metal factor
5/13	Weight method
5/13	Percentage method
5/13	Metal factor examples
5/14	<u>Explanation of the raw material/ metal surcharges for dysprosium and neodym (rare earths)</u>
5/14	Surcharge calculation
5/14	Three-month average price
5/14	Structure of the metal factor
5/14	Weight method
5/14	Metal factor examples
5/15	<u>Values of the metal factor</u>
5/16	Conditions of sale and delivery
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Appendix

Partner at Siemens



At Siemens we are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

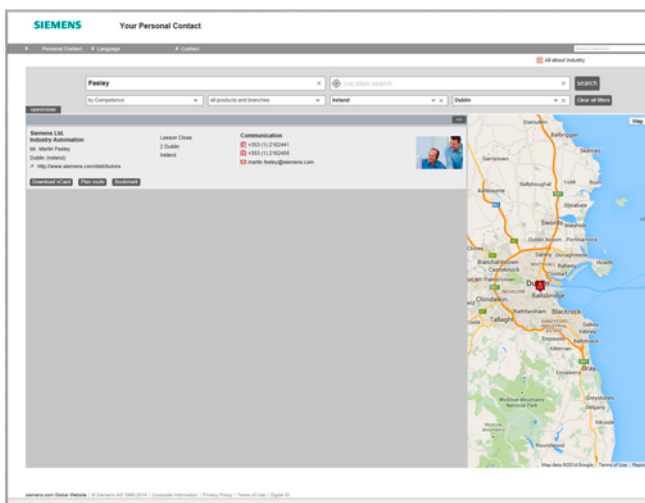
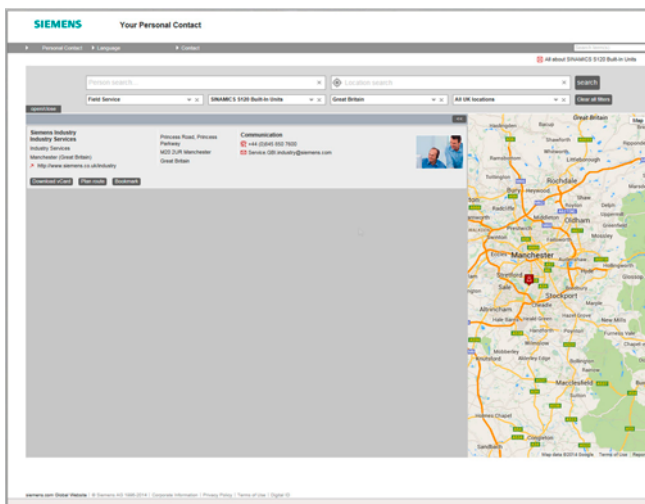
Your personal contact can be found in our Contacts Database at: www.siemens.com/automation-contact

You start by selecting

- the required competence,
- products and branches,
- a country,
- a city

or by a

- location search or
- person search.



The Future of Manufacturing on the Internet



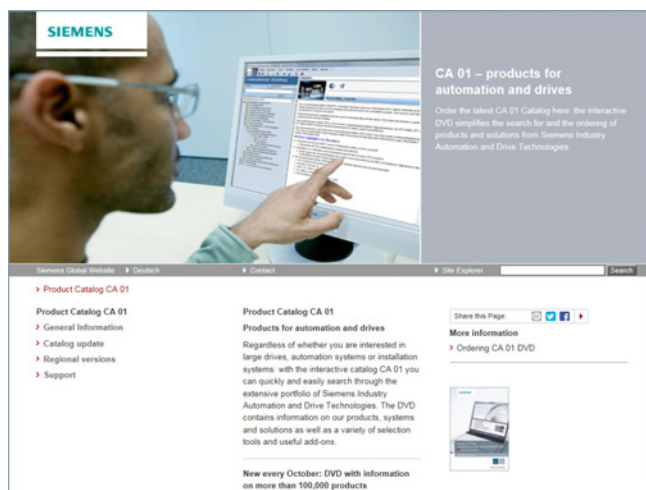
Detailed knowledge of the range of products and services available is essential when planning and engineering automation systems. It goes without saying that this information must always be as up-to-date as possible.

Industry is on the threshold of the fourth industrial revolution as digitization now follows after the automation of production. The goals are to increase productivity and efficiency, speed, and quality. In this way, companies can remain competitive on the path to the future of industry.

You will find everything you need to know about products, systems and services on the internet at:

www.siemens.com/industry

Product Selection Using the Interactive CA 01 Automation and Drives Catalog



Detailed information together with user-friendly interactive functions:

The CA 01 interactive catalog covers more than 100,000 products, thus providing a comprehensive overview of the product range provided by Siemens.

You will find everything you need here for solving tasks in the fields of automation, switching, installation and drives. All information is provided over a user interface that is both user-friendly and intuitive.

You can order the CA 01 product catalog from your Siemens sales contact or in the Information and Download Center:

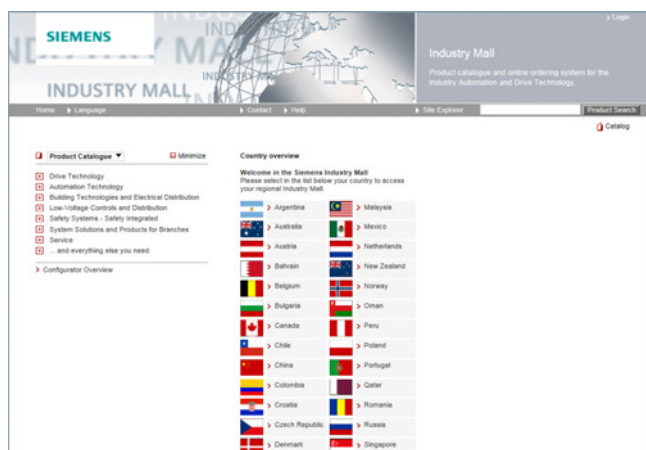
www.siemens.com/industry/infocenter

Information about the CA 01 interactive catalog can be found on the Internet at:

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure, from selection through ordering to tracking and tracing, to be carried out online. Availability checks, customer-specific discounts and bid creation are also possible.

Numerous additional functions are provided for your support. For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

You can find the Industry Mall on the Internet at:

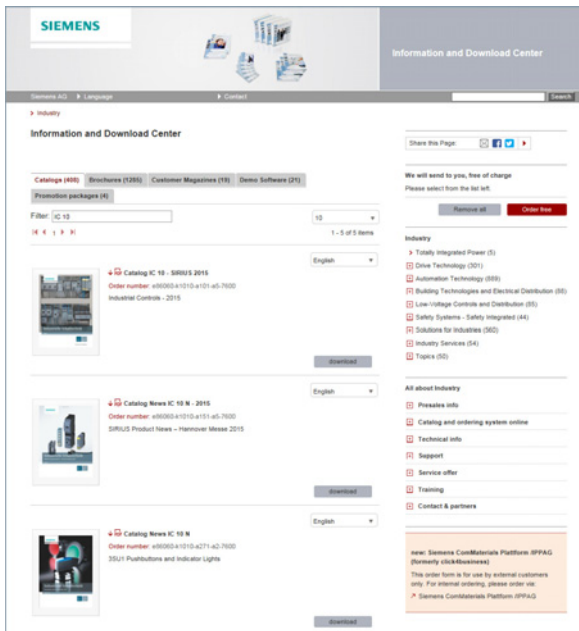
www.siemens.com/industrymall

Appendix

Online Services

Information and Download Center, Social Media, Mobile Media

Downloading Catalogs



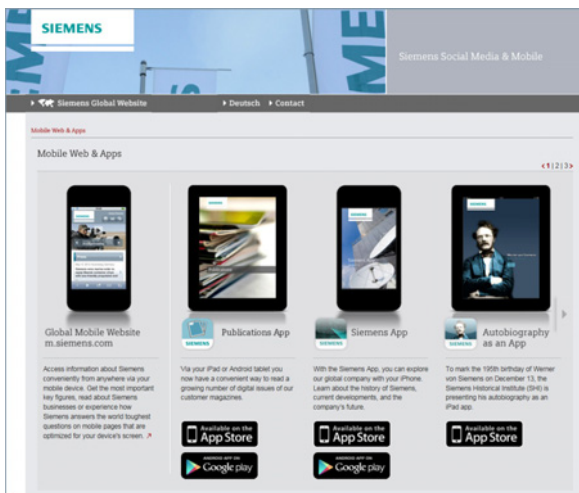
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. You can download these catalogs in PDF format without having to register.

The filter dialog above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "IC 10", both the IC 10 catalog and the associated news or add-ons are displayed.

Visit us at:

www.siemens.com/industry/infocenter

Social and Mobile Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

To find out more about Siemens' current social media activities, visit us at:

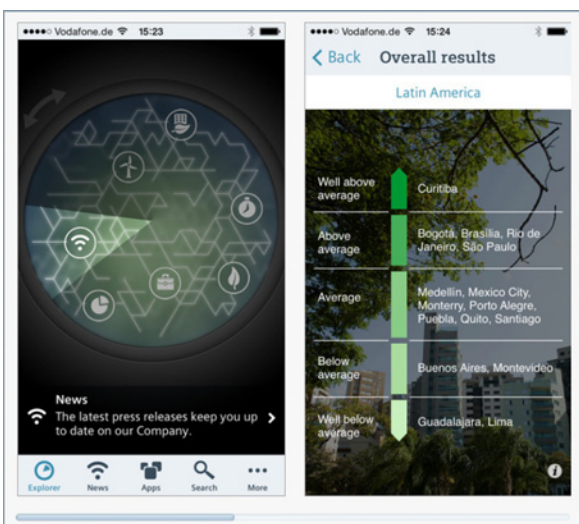
www.siemens.com/socialmedia

Or via our product pages at:

www.siemens.com/automation or www.siemens.com/drives

Connect with Siemens Industry at our central access point to read all the news on the future of manufacturing, watch current videos and inform yourself about all the latest industry developments:

www.siemens.com/future-of-manufacturing/news.html



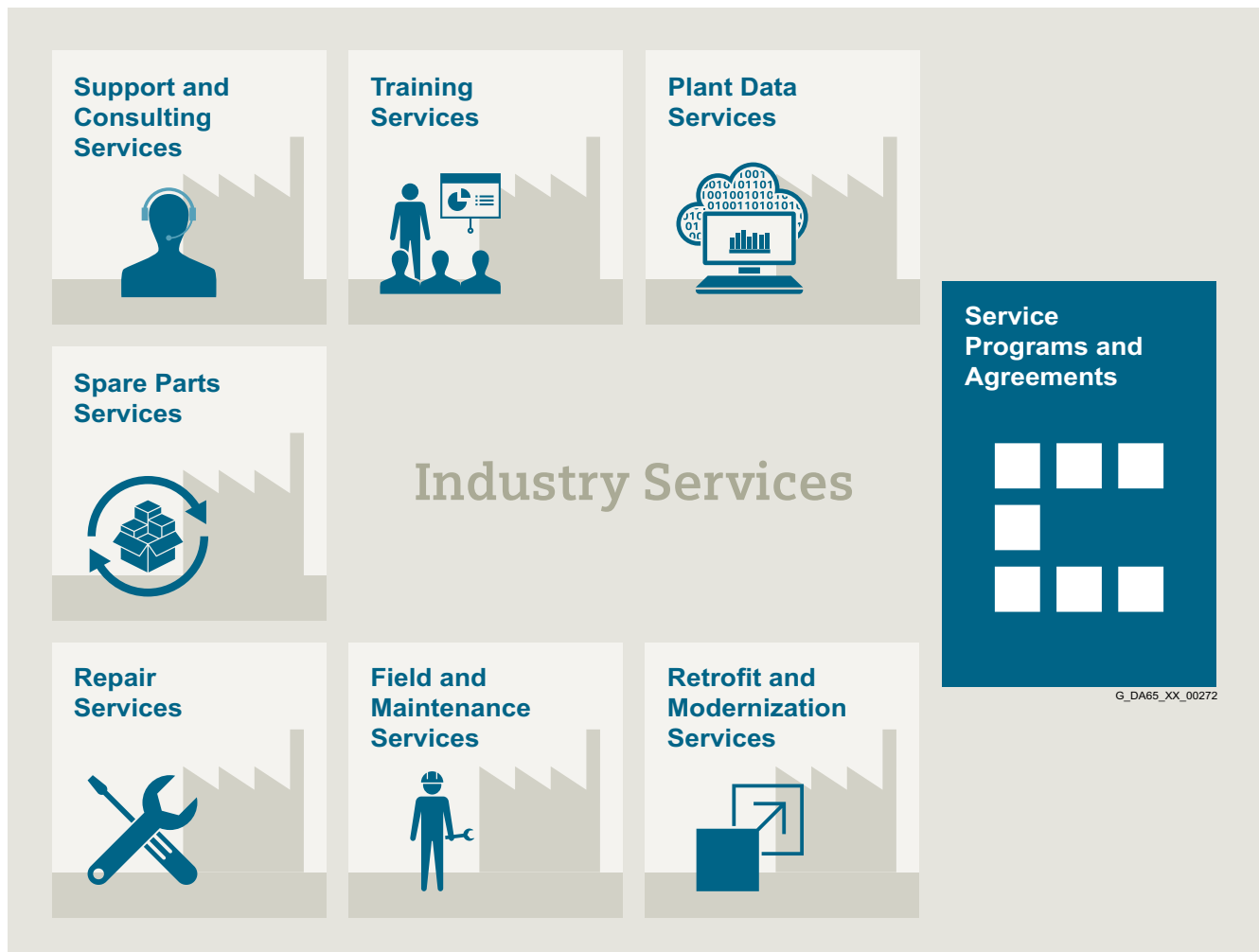
Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the App Store (iOS) or at Google Play (Android):

<https://itunes.apple.com/en/app/siemens/id452698392?mt=8>

<https://play.google.com/store/search?q=siemens>

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

Overview
Unleash potential – with services from Siemens

Increase your performance – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

Appendix

Industry Services

Industry Services – Portfolio overview

Overview

Plant Data Services



Make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber attack threats.

www.industry.siemens.com/services/global/en/portfolio/plant-data-services/Pages/index.aspx

Support and Consulting Services



Industry Online Support site for comprehensive information, application examples, FAQs and support requests.

Technical and Engineering Support for advice and answers for all inquiries about functionality, handling, and fault clearance.

Information & Consulting Services, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

www.industry.siemens.com/services/global/en/portfolio/support-consulting/Pages/index.aspx

Training Services



From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

www.industry.siemens.com/services/global/en/portfolio/training/Pages/index.aspx

Spare Parts Services



Are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Asset optimization services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

www.industry.siemens.com/services/global/en/portfolio/spare_parts/Pages/index.aspx

Overview (continued)

Repair Services



Are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.

www.industry.siemens.com/services/global/en/portfolio/repair_services/Pages/index.aspx

Retrofit and Modernization Services



Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants

www.industry.siemens.com/services/global/en/portfolio/retrofit-modernization/Pages/index.aspx

Field and Maintenance Services



Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance. All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

www.industry.siemens.com/services/global/en/portfolio/field_service/Pages/index.aspx

Service Programs and Agreements



A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.

www.industry.siemens.com/services/global/en/portfolio/service_programs/Pages/index.aspx

Appendix

Industry Services

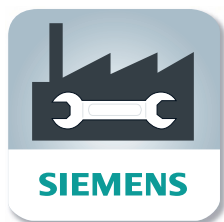
Online Support

Overview



Online Support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products – anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristic curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under “mySupport”. You also receive selected news on new functions, important articles or events in the News section.

The content, in six languages, is increasingly multimedia-based – and now also available as a mobile app. Online support’s “Technical Forum” offers users the opportunity to share information with each other. The “Support Request” option can be used to contact Siemens’ technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.

www.siemens.com/industry/onlinesupport

Scan the QR code
for information on
our Online Support
app.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

<https://support.industry.siemens.com/cs/ww/en/sc/2067>

Appendix

Notes

Appendix

Notes

Explanation of the raw material/metal surcharges¹⁾

Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium²⁾ and/or neodym²⁾, surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharges are calculated in accordance with the following criteria:

- Basic official price of the raw material
Basic official price from the day prior to receipt of the order or prior to release order (daily price) for³⁾
 - Silver (sales price, processed)
 - Gold (sales price, processed)
 and for⁴⁾
 - Copper (lower DEL notation + 1 %)
 - Aluminum (aluminum in cables)
 - Lead (lead in cables)
- Metal factor of the products
Certain products are displayed with a metal factor. The metal factor determines the official price (for those raw materials concerned) as of which the metal surcharges are applied and the calculation method used (weight or percentage method). An exact explanation is given below.

Structure of the metal factor

The metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a possible discounted price (customer net price) (L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)
3rd digit	for copper (CU)
4th digit	for aluminum (AL)
5th digit	for lead (PB)
6th digit	for gold (AU)
7th digit	for dysprosium (Dy) ²⁾
8th digit	for neodym (Nd) ²⁾

Weight method

The weight method uses the basic official price, the daily price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the daily price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

Percentage method

Use of the percentage method is indicated by the letters A-Z at the respective digit of the metal factor.

The surcharge is increased - dependent on the deviation of the daily price compared with the basic official price - using the percentage method in "steps" and consequently offers surcharges that remain constant within the framework of this "step range". A higher percentage rate is charged for each new step. The respective percentage level can be found in the table below.

Metal factor examples

L E A - - - -	<ul style="list-style-type: none"> Basis for % surcharge: List price Silver Basis 150 €, Step 50 €, 0.5 % Copper Basis 150 €, Step 50 €, 0.1 % No surcharge for aluminum No surcharge for lead No surcharge for gold No surcharge for dysprosium No surcharge for neodym
N - A 6 - - - -	<ul style="list-style-type: none"> Basis for % surcharge: Customer net price No surcharge for silver Copper Basis 150 €, Step 50 €, 0.1 % Aluminum acc. to weight, basic offic. price 225 € No surcharge for lead No surcharge for gold No surcharge for dysprosium No surcharge for neodym
- - 3 - - - -	<ul style="list-style-type: none"> No basis necessary No surcharge for silver Copper acc. to weight, basic official price 150 € No surcharge for aluminum No surcharge for lead No surcharge for gold No surcharge for dysprosium No surcharge for neodym

1) Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).

2) For a different method of calculation, refer to the separate explanation for these raw materials on the next page.

3) Source: Umicore, Hanau (www.metalsmanagement.umicore.com).

4) Source: Schutzvereinigung DEL-Notiz e.V. (www.del-notiz.org).

Appendix

Metal surcharges

Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

Surcharge calculation

To compensate for variations in the price of the raw materials silver¹⁾, copper¹⁾, aluminum¹⁾, lead¹⁾, gold¹⁾, dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. The surcharge for dysprosium and neodym is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price of the raw material²⁾
Three-month basic average price (see below) in the period before the quarter in which the order was received or the release order took place (= average official price) for
 - dysprosium (Dy metal, 99 % min. FOB China; USD/kg)
 - neodym (Nd metal, 99 % min. FOB China; USD/kg)
- Metal factor of the products
Certain products are displayed with a metal factor. The metal factor indicates (for those raw materials concerned) the basic official price as of which the surcharges for dysprosium and neodym are calculated using the weight method. An exact explanation of the metal factor is given below.

Three-month average price

The prices of rare earths vary according to the foreign currency, and there is no freely accessible stock exchange listing. This makes it more difficult for all parties involved to monitor changes in price. In order to avoid continuous adjustment of the surcharges, but to still ensure fair, transparent pricing, an average price is calculated over a three-month period using the average monthly foreign exchange rate from USD to EUR (source: European Central Bank). Since not all facts are immediately available at the start of each month, a one-month buffer is allowed before the new average price applies.

Examples of calculation of the average official price:

Period for calculation of the average price:	Period during which the order/release order is effected and the average price applies:
Sep 2012 - Nov 2012	Q1 in 2013 (Jan - Mar)
Dec 2012 - Feb 2013	Q2 in 2013 (Apr - Jun)
Mar 2013 - May 2013	Q3 in 2013 (Jul - Sep)
Jun 2013 - Aug 2013	Q4 in 2013 (Oct - Dec)

Structure of the metal factor

The metal factor consists of several digits; the first digit is not relevant to the calculation of dysprosium and neodym.

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG) ¹⁾
3rd digit	for copper (CU) ¹⁾
4th digit	for aluminum (AL) ¹⁾
5th digit	for lead (PB) ¹⁾
6th digit	for gold (AU) ¹⁾
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

Weight method

The weight method uses the basic official price, the average price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the average price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. Your Sales contact can inform you of the raw material weight.

Metal factor examples

-----71	No basis necessary
↑	No surcharge for silver
↑	No surcharge for copper
↑	No surcharge for aluminum
↑	No surcharge for lead
↑	No surcharge for gold
↑	Dysprosium acc. to weight, basic official price 300 €
↑	Neodym acc. to weight, basic official price 50 €

1) For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.

2) Source: Asian Metal Ltd (www.asianmetal.com)

Values of the metal factor

Percentage method	Basic official price in €	Step range in €	% surcharge 1st step	% surcharge 2nd step	% surcharge 3rd step	% surcharge 4th step	% surcharge per additional step	
			Price in € 150.01 - 200.00	Price in € 200.01 - 250.00	Price in € 250.01 - 300.00	Price in € 300.01 - 350.00		
A	150	50	0.1	0.2	0.3	0.4	0.1	
B	150	50	0.2	0.4	0.6	0.8	0.2	
C	150	50	0.3	0.6	0.9	1.2	0.3	
D	150	50	0.4	0.8	1.2	1.6	0.4	
E	150	50	0.5	1.0	1.5	2.0	0.5	
F	150	50	0.6	1.2	1.8	2.4	0.6	
G	150	50	1.0	2.0	3.0	4.0	1.0	
H	150	50	1.2	2.4	3.6	4.8	1.2	
I	150	50	1.6	3.2	4.8	6.4	1.6	
J	150	50	1.8	3.6	5.4	7.2	1.8	
			175.01 - 225.00	225.01 - 275.00	275.01 - 325.00	325.01 - 375.00		
O	175	50	0.1	0.2	0.3	0.4	0.1	
P	175	50	0.2	0.4	0.6	0.8	0.2	
R	175	50	0.5	1.0	1.5	2.0	0.5	
			225.01 - 275.00	275.01 - 325.00	325.01 - 375.00	375.01 - 425.00		
S	225	50	0.2	0.4	0.6	0.8	0.2	
U	225	50	1.0	2.0	3.0	4.0	1.0	
V	225	50	1.0	1.5	2.0	3.0	1.0	
W	225	50	1.2	2.5	3.5	4.5	1.0	
			150.01 - 175.00	175.01 - 200.00	200.01 - 225.00	225.01 - 250.00		
Y	150	25	0.3	0.6	0.9	1.2	0.3	
			400.01 - 425.00	425.01 - 450.00	450.01 - 475.00	475.01 - 500.00		
Z	400	25	0.1	0.2	0.3	0.4	0.1	
Price basis (1st digit)								
L	Calculation based on the list price							
N	Calculation based on the customer net price (discounted list price)							
Weight method	Basic official price in €							
1	50	Calculation based on raw material weight						
2	100							
3	150							
4	175							
5	200							
6	225							
7	300							
8	400							
9	555							
Miscellaneous								
-	No metal surcharge							

Appendix

Conditions of sale and delivery

1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"¹⁾ and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"¹⁾.

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"¹⁾ and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"¹⁾.

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges".

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i.a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

Further information can be obtained from our branch offices listed at www.siemens.com/automation-contact

Interactive Catalog on DVD Products for Automation and Drives	<i>Catalog</i> CA 01	Low-Voltage Power Distribution and Electrical Installation Technology SENTRON · SIVACON · ALPHA Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems Standards-Compliant Components for Photovoltaic Plants Electrical Components for the Railway Industry TÜV-certified Power Monitoring System Components for Industrial Control Panels according to UL Standards 3WT Air Circuit Breakers up to 4000 A 3VT Molded Case Circuit Breakers up to 1600 A <i>Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning</i> <i>Digital: ALPHA Distribution Systems</i> ALPHA FIX Terminal Blocks SIVACON S4 Power Distribution Boards SIVACON 8PS Busbar Trunking Systems <i>Digital: DELTA Switches and Socket Outlets</i>	<i>Catalog</i> LV 10 LV 11 LV 12 LV 14 LV 16 LV 35 LV 36 LV 50 LV 51 LV 52 LV 56 LV 70 ET D1
Building Control GAMMA Building Control	ET G1	Motion Control SINUMERIK 840 Equipment for Machine Tools SINUMERIK 808 Equipment for Machine Tools SINUMERIK 828 Equipment for Machine Tools SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines <i>Digital: Drive and Control Components for Cranes</i>	NC 62 NC 81.1 NC 82 PM 21 CR 1
Drive Systems SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition SINAMICS G180 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled SINAMICS S120 Chassis Format Units and Cabinet Modules SINAMICS S150 Converter Cabinet Units SINAMICS DCM DC Converter, Control Module SINAMICS DCM Cabinet SINAMICS Inverters for Single-Axis Drives and SIMOTICS Motors SINAMICS G120P and SINAMICS G120P Cabinet pump, fan, compressor converters LOHER VARIO High Voltage Motors Flameproof, Type Series 1PS4, 1PS5, 1MV4 and 1MV5 Frame Size 355 to 1000, Power Range 80 to 7100 kW Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN • Series H-compact • Series H-compact PLUS High Voltage Three-phase Induction Motors SIMOTICS HV Series A-compact PLUS Three-Phase Induction Motors SIMOTICS HV, Series H-compact Synchronous Motors with Permanent-Magnet Technology, HT-direct DC Motors SIMOREG DC MASTER 6RA70 Digital Chassis Converters SIMOREG K 6RA22 Analog Chassis Converters <i>Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i> SIMOVERT PM Modular Converter Systems SIEMOSYN Motors MICROMASTER 420/430/440 Inverters MICROMASTER 411/COMBIMASTER 411 <u>Low-Voltage Three-Phase-Motors</u> SIMOTICS Low-Voltage Motors SIMOTICS FD Low-Voltage Motors LOHER Low-Voltage Motors MOTOX Geared Motors SIMOGEAR Geared Motors SIMOGEAR Gearboxes with adapter <u>Mechanical Driving Machines</u> FLENDER Standard Couplings FLENDER High Performance Couplings FLENDER Backlash-free Couplings FLENDER SIP Standard industrial planetary gear units	D 11 D 12 D 15.1 D 18.1 D 21.3 D 23.1 D 23.2 D 31 D 35 D 83.2 D 84.1 D 84.9 D 86.1 D 86.2 DA 12 DA 21.1 DA 21.2 DA 22 DA 45 DA 48 DA 51.2 DA 51.3 D 81.1 D 81.8 D 83.1 D 87.1 MD 50.1 MD 50.11 MD 10.1 MD 10.2 MD 10.3 MD 31.1	Power Supply SITOP Power supply Safety Integrated Safety Technology for Factory Automation SIMATIC HMI / PC-based Automation Human Machine Interface Systems/ PC-based Automation SIMATIC Ident Industrial Identification Systems SIMATIC Industrial Automation Systems Products for Totally Integrated Automation SIMATIC PCS 7 Process Control System System components SIMATIC PCS 7 Process Control System Technology components Add-ons for the SIMATIC PCS 7 Process Control System SIMATIC NET Industrial Communication SIRIUS Industrial Controls <i>Digital: SIRIUS Industrial Controls</i>	KT 10.1 SI 10 ST 80/ ST PC ID 10 ST 70 ST PCS 7 ST PCS 7 T ST PCS 7 AO IK PI IC 10
Process Instrumentation and Analytics <i>Digital: Field Instruments for Process Automation</i> <i>Digital: SIPART Controllers and Software</i> Products for Weighing Technology <i>Digital: Process Analytical Instruments</i> <i>Digital: Process Analytics, Components for Continuous Emission Monitoring</i>	FI 01 MP 31 WT 10 AP 01 AP 11	Information and Download Center Digital versions of the catalogs are available on the Internet at: www.siemens.com/industry/infocenter There you'll find additional catalogs in other languages. Please note the section "Downloading catalogs" on page "Online services" in the appendix of this catalog.	

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

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