Absolute rotary encoder KRP with Ethernet/IP interface

TWK ELEKTRONIK

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- **Design as a single-turn or multiturn rotary encoder**
- **Position and speed signal**
- **Resolution: up to 8192 steps / 360° (13-bit)**
- **Measuring range: up to 4096 revolutions**
- **Protection type: up to IP67**
- **Operating temperature range: - 40 °C to + 85 °C**
- **Resolution of position and velocity, code direction and preset programmable via Ethernet/IP**

Design and function

Robust housing made of corrosion-protected steel (>720 h salt spray test) - seawater-proof aluminium flange - stainless steel shaft - ball bearing with shaft seal - highly integrated optical sensor system with long-term stabilisation - absolute multiturn transmission - connection via M12 connector

The KRP model series rotary encoders are intended for connecting directly to the Ethernet/IP network. Setting the address, baud rate or terminating resistances is not necessary. The IP address is assigned via a BOOTP or DHCP server in the Ethernet/IP network.

The integrated 2-fold switch enables the KRP model series rotary encoders to be used in star, tree and line network topologies.

An exhaustive description of integration into an Ethernet/IP network can be found in the KRP 13387 manual.

Ethernet/IP properties

- IP address setting via DHCP or BOOTP
- Support of autocrossover and autonegotation
- Up to 256 simultaneous connections
- I/O and explicit messaging
- Diagnosis LEDs for link, activity and status
- Programming via Ethernet/IP

TWK-ELEKTRONIK GmbH
Heinrichstrasse 85
D-40041 Düsseldorf
Postbax 10 50 63
Tel. +49 211 96117-0
Fax +49 211 637705
info@twk.de
www.twk.de

Absolute rotary encoder model KRP

Technical data

Input data *

Depending on configuration:

- 4-byte position data or
- 4-byte position data and 4-byte velocity data

Electrical data

Sensor system:	Encoding disk with photo array
Operating voltage:	+ 10 VDC to + 30 VDC (protected against polarity reversal)
Power consumption:	< 3 W
Resolution:	4096 steps / 360°- (12-bit) or 8192 steps / 360° (13-bit)
Measuring range:	4096 revolutions (in the multiturn version)
Total number of steps:	Single-turn version: 12- or 13-bit, multiturn version 24- or 25-bit
Accuracy:	± 0.05°
Output code:	Binary
Code path:	CW / CCW
Velocity signal:	16-bit, with prefix, unit: steps / gate time (gate time adjustable, default: 1 s)

Ethernet data

MAC address:	00:0E:CF:XX:XX:XX The relevant, current MAC address is located on the model plate.
Transmission technology:	100 Base-TX
Transmission rate:	10 / 100 MBit/s
Line length:	Max. 100 m (between two subscribers)
Minimum cycle time:	1 ms

Mechanical data

Operating speed:	10,000 rpm max.
Moment of inertia (rotor):	30 gcm²
Operating torque:	≤ 5 Ncm (at 20 °C)
Starting torque:	≤ 4 Ncm
Perm. shaft load:	40 N axially, 110 N radially
Bearing service life:	> 108 revolutions
Weight:	Approx. 0.4 kg

Environmental data

Operating temperature range:	- 40 °C to + 85 °C
Storage temperature range:	- 40 °C to + 85 °C
Resistance:	
☐ To shock:	1000 m/s²; 6 ms (DIN EN 60068-2-27)
☐ To vibration:	100 m/s²; 10 ... 1000 Hz (DIN EN 60068-2-6)
EMC standards:	EN 61000-6-4 (interference emission) EN 61000-6-2 (interference immunity)
Protection type:	IP66 / IP 67

Electrical connection

Ethernet:	M12 connector D-coded 4-pin for bus in / bus out, socket
Supply:	M12 connector A-coded 4-pin, pins

* Aus Sicht der Steuerung.

Absolute rotary encoder model KRP

Technical data

Ethernet mating connector

- Connection type: M12 connector D-coded 4-pin
- Housing: Die-cast zinc, nickel-plated
- Contacts: Pins, gold
- Wire connection: Cage clamp
- Connection cross-section: Max. 0.75 mm^2
- Cable diameter: 6 - 8 mm
- Protection type: IP 67

Supply mating connector

- Connection type: M12 connector A-coded 4-pin
- Housing: Die-cast zinc, nickel-plated
- Contacts: Socket, gold
- Wire connection: Screw connection
- Connection cross-section: Max. 0.75 mm^2
- Cable diameter: 4-6 mm
- Protection type: IP 67

Pre-assembled Industrial Ethernet data cable

- Connection type: M12 connector D-coded 4-pin
- Contacts: Pins, gold
- Cable type: PUR, halogen-free, Profinet type C
- Cable cross-section: 4 x 0.38 mm^2 (AWG 22)
- Cable diameter: 6.2 mm
- Protection type: IP 67

Programmable parameters

Parameter	Value range	Parameter description
Scaling	Off / on	
Code sense	CW / CCW	CW (clockwise): ascending values on rotation clockwise CCW (counter clockwise): descending values on rotation clockwise (viewed looking at the shaft)
Resolution [steps/360°]	1 ... 4096 (8192)	Steps per revolution (360°)
Total number of steps [steps]	1 ... 16,777,216 (33,554,432)	Overall measuring range
Gate time	1 µs, 1 ms, 1 s, 1 min, rpm	Time basis for velocity registration
Reference value	0 ... total number of steps -1	For adaptation to the application, the position value can be set to any value within the measuring range.

(The values in brackets apply to the KRPxx-xxx8192R4096C1MPxx)

Electrical connection, diagnosis LEDs

Ethernet M12 connector connection assignment

(Port1 and port 2)

PIN	1	2	3	4
Signal	TX+	RX+	TX-	RX-
Colour*	Yellow	White	Orange	Blue

Supply M12 connector connection assignment

PIN	1	2	3	4
Signal	+ U_B (+ 24 VDC)	—	- U_B (0 VDC)	—

Diagnosis LEDs

Link 1/2	Active 1/2	Status1/2	Description
Green	Yellow	Green/red	
On			Network connection established
	Flashing		Connection establishment
	On		Connection established
		Green	Data exchange, device in operation and OK
		Fast green flashing	No IP address available
		Green slow flashing	IP address available but no connection to an Ethernet/IP master
		Red flashing	Impermissible parameter or preset value
		Red	Device error

* Industrial Ethernet cable colours according to ISO / IEC 8802-3.

Absolute rotary encoder model KRP

Order number

KRP	58 -	K	A	8192	R	4096	C1	M	P	01	→ Standard version

Electrical and / or mechanical variants*
01 Standard

Output:
P 100Base-TX

Electrical connection:
M M12 connector outlet, radial

Profile:
C1 Standard, EtherNet/IP

Measuring range:
1 ... 4096 Revolutions

Output code:
R Binary code, position value as double word (integer 32)

Resolution:
4096 steps / 360°
8192 steps / 360°

Housing material:
A Aluminium housing
S Stainless steel housing 1.4305

Flange type:
58 K Clamped flange, shaft 10 mm with flattened area
KP Clamped flange, shaft 10 mm with feather key
S Synchroniser flange, shaft 6 mm

Design form:
KRP K series multiturn with Ethernet/IP interface

* The basic versions according to the data sheet bear the number 01. Deviations are identified with a variant number and are documented in the factory.

Accessories, documentation, EDS file

Accessories (to be ordered separately)

- Documentation on CD

TTWK-CD-01	CD-ROM with documentation, device description file, bitmap and example programme

- Straight mating connector

STK4GP81	For Ethernet in/out (die-cast zinc)
STK4GP110	For Ethernet in/out (stainless steel 1.4404)
STK4GS60	For the supply voltage (die-cast zinc)
STK4GS104	For the supply voltage (stainless steel 1.4404)

- Angled mating connector (can only be used with aligned device connectors (option))

STK4WP82	For Ethernet in/out
STK4WS61	For the supply voltage

- Connecting cable

KABEL-xxx-114	Industrial Ethernet data cable with M12 connectors, D-coded, moulded on at both ends. Standard lengths: 1, 2, 3 and 5 m (xxx = length in metres)
KABEL-xxx-118	Industrial Ethernet data cable with M12 connector to RJ 45, IP 20 (xxx = length in metres)

- Couplings

BKK	Folding bellows coupling, large, see data sheet BKK11840
BKM	Folding bellows coupling, small, see data sheet BKM11995
KK14S	Clamp coupling, see data sheet KK12301

- Messzahnrad

ZRS	Play-compensating toothed gear ZRS11877

- Further installation accessories and securing clamps are available according to data sheet MZ10111.

Documentation, EDS file, etc.

The following documents plus the EDS file, a bitmap and example programmes can be found in the Internet www.twk.de in the documentation area, model KRP

- Data sheet No. KRP13386
- Manual No KRP13387

Optionally, a CD-ROM can be supplied. (Article No. TWK-CD-01; please specify when ordering.)

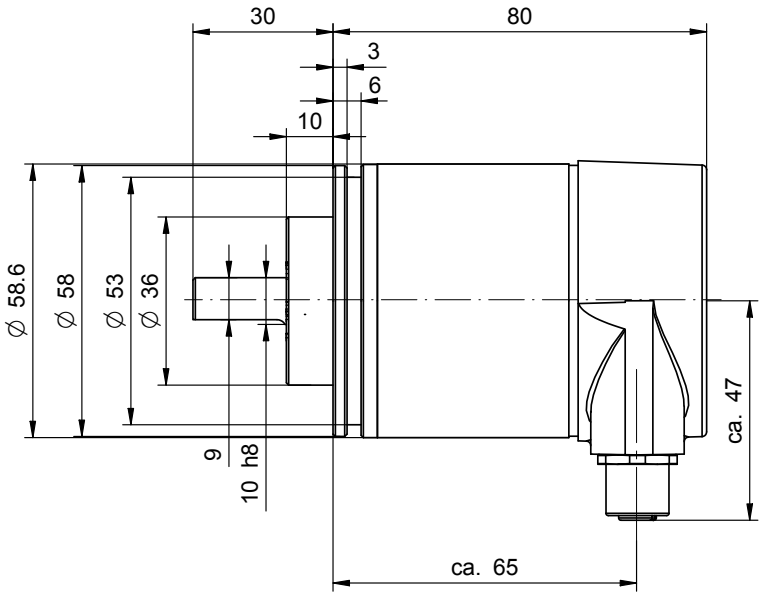
Absolute rotary encoder model KRP

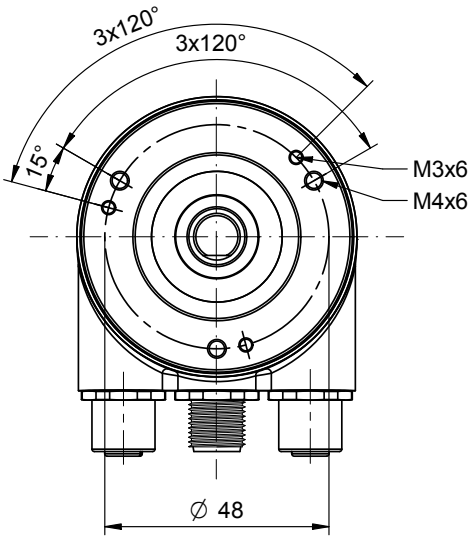
Installation drawings

Design form 58 with clamped flange, order number: KRP58-KA8192R4096C1MP01

Shaft ø 10 mm with flattened area

Dimensions in mm





Design form 58 with synchroniser flange, order number: KRP58-SA8192R4096C1MP01

Shaft ø 6 mm

Dimensions in mm