# Incremental encoders

## With through hollow shaft

## 1…65536 pulses per revolution programmable (interpolated system)



### EIL580P-T - *OptoPulse®*

EIL580P-T with through hollow shaft

**Features**

- **Size ø58 mm**
- **Precise optical sensing (interpolated)**
- **Output signal level programmable (TTL or HTL)**
- **Through hollow shaft, ø8…15 mm**
- **Connection radial or tangential**
- **Pulses per revolution 1...65536, programmable**
- **High protection up to IP 67**
- **High resistance to shock and vibrations**

**Technical data - electrical ratings**

| | |
|---|---|
| Voltage supply | 4.75...30 VDC |
| Reverse polarity protection | Yes |
| Short-circuit proof | Yes |
| Consumption w/o load | ≤70 mA |
| Initializing time | ≤30 ms after power on |
| Pulses per revolution | 1...65536 |
| Duty cycle | 45...55 % typical at 1024, 2048 ppr (further see table Duty cycle) |
| Reference signal | Zero pulse 90° or 180° |
| Sensing method | Optical |
| Output frequency | ≤300 kHz (TTL)<br>≤160 kHz (HTL) |
| Output signals | A+, B+, R+, A-, B-, R- |
| Output stages | TTL/RS422<br>HTL/push-pull |
| Programmable parameters | Output level TTL/HTL<br>Pulse number 1...65536<br>Zero pulse width 90°/180°<br>Zero pulse position<br>Signal sequence |
| Interference immunity | DIN EN 61000-6-2 |
| Emitted interference | DIN EN 61000-6-3 |
| Approval | UL 508 / CSA 22.2 |

**Technical data - mechanical design**

| | |
|---|---|
| Size (flange) | ø58 mm |
| Shaft type | ø8...15 mm (through hollow shaft) |
| Protection DIN EN 60529 | IP 65 (without shaft seal),<br>IP 67 (with shaft seal) |
| Operating speed | ≤3000 rpm (+20 °C, IP 67)<br>≤6000 rpm (+20 °C, IP 65) |
| Starting torque | ≤0.025 Nm (+20 °C, IP 65)<br>≤0.03 Nm (+20 °C, IP 67) |
| Materials | Housing: aluminium die-cast<br>Flange: aluminium |
| Operating temperature | -40...+100 °C |
| Relative humidity | 90 % non-condensing |
| Resistance | DIN EN 60068-2-6<br>Vibration 30 g, 10-2000 Hz<br>DIN EN 60068-2-27<br>Shock 250 g, 6 ms |
| Connection | Flange connector M12, 8-pin<br>Flange connector M23, 12-pin<br>Cable |
| Weight approx. | 300 g |

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### Part number

| EIL580P- | T | | | . | | | F | . | 01024 | . | B |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Operating temperature**
- B -40...+100 °C

**Pulses programmable**
- 01024 1...65536 programmable (factory setting: 1024)

**Voltage supply / output stages**
- F 4.75...30 VDC, TTL/RS422, 6 channel (Vout = 5 VDC) - Factory setting
  HTL/push-pull 6 channel (Vout = Vin) - programmable by customer

**Connection**
- R Cable radial, 1 m
- L Cable radial, 2 m
- F Flange connector M23, 12-pin, radial, male contacts, CCW
- B Flange connector M12, 8-pin, radial, male, CCW
- P Cable tangential, 1 m
- Q Cable tangential, 2 m

**Protection**
- 5 IP 65
- 7 IP 67

**Specification hollow shaft**

| | | |
|---|---|---|
| 08 | ø8 mm, clamping ring at A side | \| 15 ø15 mm, clamping ring at A side |
| U3 | ø3/8” (9,52 mm), clamping ring at A side | \| V3 ø3/8” (9,52 mm), clamping ring at B side |
| 10 | ø10 mm, clamping ring at A side | \| B0 ø10 mm, clamping ring at B side |
| 12 | ø12 mm, clamping ring at A side | \| B2 ø12 mm, clamping ring at B side |
| U4 | ø1/2” (12.7 mm), clamping ring at A side | \| V4 ø1/2” (12.7 mm), clamping ring at B side |
| 14 | ø14 mm, clamping ring at A side | \| B4 ø14 mm, clamping ring at B side |

**Flange**
- N Without stator coupling
- M With stator coupling 1-armed, hole circle ø63...94 mm, M4, mounting position 180°
- T With stator coupling ø63 mm
- P Torque pin 3 mm, axial/radial

**Shaft type**
- T Through hollow shaft

(Factory setting: 1024 ppr, Vout = 5 VDC TTL, signal sequence A leading B (CW), zero pulse 90° A&B high)

## EIL580P-T - *OptoPulse®*

### Accessories

**Connectors and cables**

| | |
|---|---|
| 10127844 | Connection cable 2 m shielded with female connector M12, 8-pin, straight (ESG 34FH0200G) |
| 10129332 | Connection cable 5 m shielded with female connector M12, 8-pin, straight (ESG 34FH0500G) |
| 10129333 | Connection cable 10 m shielded with female connector M12, 8-pin, straight (ESG 34FH1000G) |
| 11053961 | Connection cable 2 m shielded with female connector M12, 8-pin, angled (ESW 33FH0200G) |
| 11053962 | Connection cable 5 m shielded with female connector M12, 8-pin, angled (ESW 33FH0500G) |
| 10170054 | Connection cable 10 m shielded with female connector M12, 8-pin, angled (ESW 33FH1000G) |
| 11212849 | Connection cable 1 m shielded with female connector M23, 12-pin - EIL580P |
| 11212870 | Connection cable 2 m shielded with female connector M23, 12-pin - EIL580P |
| 11212871 | Connection cable 5 m shielded with female connector M23, 12-pin - EIL580P |
| 11212872 | Connection cable 10 m shielded with female connector M23, 12-pin - EIL580P |
| 11119280 | Connection cable connector M12 / connector D-SUB, 0.2 m |
| 11119720 | Connection cable connector M12 / connector D-SUB, 1 m |
| 11119257 | Connection cable connector M23 / connector D-SUB, 0.2 m (S2BG12/K4SG9) |
| 11119723 | Connection cable connector M23 / connector D-SUB, 1 m (S2BG12/K4SG9) |

**Mounting accessories**

| | |
|---|---|
| 11066081 | Torque arm, 1-arm, bolt circle ø82 mm, mounting M4 (mounting kit 003) |
| 11066083 | Torque arm, 1-arm, bolt circle ø74…94 mm, mounting M4/M5 (mounting kit 006) |
| 11073119 | Torque arm, 1-arm, bolt circle ø65.5...281 mm, mounting M4, can be cut to length (mounting kit 021) |
| 11067367 | Torque arm, 1-arm, bolt circle ø74…94 mm, mounting M6 (mounting kit 028) |
| 11113210 | Torque arm, 1-arm, bolt circle ø63...94 mm, mounting M4 (mounting kit 047) |
| 11155325 | Mounting plate, 1-arm, pitch circle diameter ø95 mm, mounting M6, isolated, rigid, suitable for Baumer torque arm size M6 (DMS 6) (mounting kit 099) |

**Mounting accessories**

| | |
|---|---|
| 11129153 | Torque arm, 1-arm open, bolt circle ø82...108 mm, mounting M4 (mounting kit 200) |
| 11100198 | Stator coupling, 2-armed, bolt circle ø63 mm, mounting M3 (mounting kit 046) |
| 11106627 | Fan cover clip 8 mm |
| 11094674 | Clamping ring 12/31/ 8 M3 8.8 for EIL580 hollow shaft ø8...10 mm for clamping at A or B side |
| 11094675 | Clamping ring 17/31/ 8 M3 8.8 for EIL580 hollow shaft ø12...15 mm for clamping at A side |
| 11116921 | Insulating sleeve ø10 mm/ø12 mm/25 mm long |
| 11116923 | Insulating sleeve ø12 mm/ø14 mm/25 mm long |

**Programming accessories**

| | |
|---|---|
| 11120657 | Handheld Programming Tool Z-PA-EI-H |
| 11120547 | PC Programming Tool Z-PA-EI-P |

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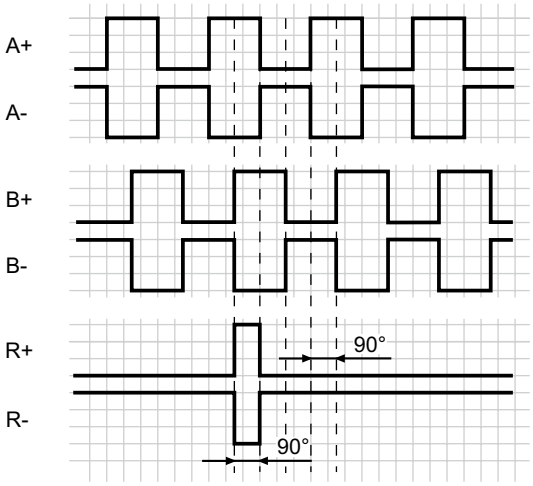
## 1…65536 pulses per revolution programmable (interpolated system)

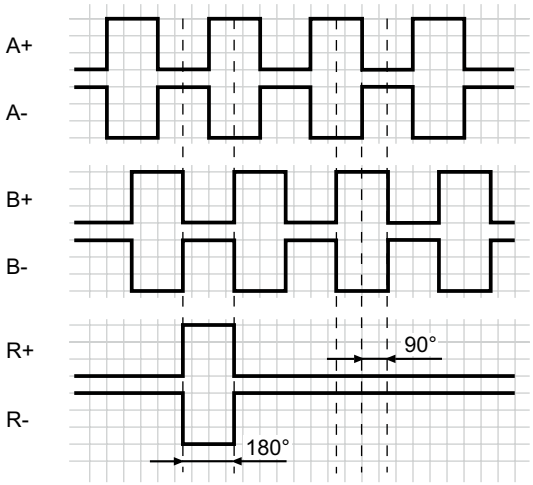
**EIL580P-T** - *OptoPulse®*

### Output signals

Zero pulse electrical 90° A&B high
(Factory setting at clockwise rotation (CW)
in view of the encoder flange)




Zero pulse electrical 180° B low
(at clockwise rotation (CW)
in view of the encoder flange)




### Trigger level

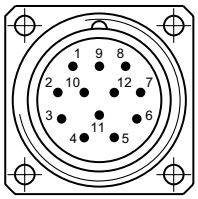
| **Outputs** | **TTL/RS422** |
|---|---|
| Output level High | ≥2.5 V |
| Output level Low | ≤0.5 V |
| Load | ≤20 mA |

| **Outputs** | **HTL/Push-pull** |
|---|---|
| Output level High | ≥UB -3 V |
| Output level Low | ≤1.5 V |
| Load | ≤20 mA |

### Terminal assignment

**Flange connector M23, 12-pin / cable**

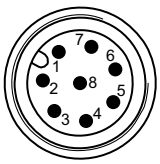
| Pin | Core color | Assignment |
|---|---|---|
| 1 | pink | B- |
| 2 | – | – |
| 3 | blue | R+ |
| 4 | red | R- |
| 5 | green | A+ |
| 6 | yellow | A- |
| 7 | – | R-Set [1] |
| 8 | grey | B+ |
| 9 | – | – |
| 10 | white | GND |
| 11 | – | – |
| 12 | brown | UB |
| Screen: | Connected to housing | |
| Cable data: | PUR, [4x2x0,14 mm²], bending radius >45,8 mm, outer diameter 6.1 mm | |




[1] The R-Set input is used to set the reference pulse (zero pulse) on the current shaft position.
R-Set = UB ≥ 200 ms

**Flange connector M12, 8-pin**

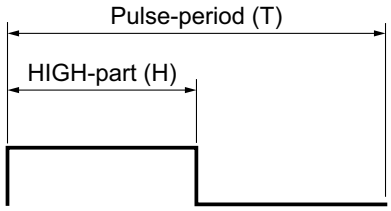
| Pin | Assignment |
|---|---|
| 1 | GND |
| 2 | UB |
| 3 | A+ |
| 4 | A- |
| 5 | B+ |
| 6 | B- |
| 7 | R+ |
| 8 | R- |



### EIL580P-T - *OptoPulse®*

#### Duty cycle

The duty cycle (D) is defined as the time ratio between the HIGH pulse duration (H) and the pulse period (T).
System-induced and depending on the pulse number, the measured values may vary which has an impact on speed and position acquisition.
Binary pulse numbers are recommended for speed feedback.



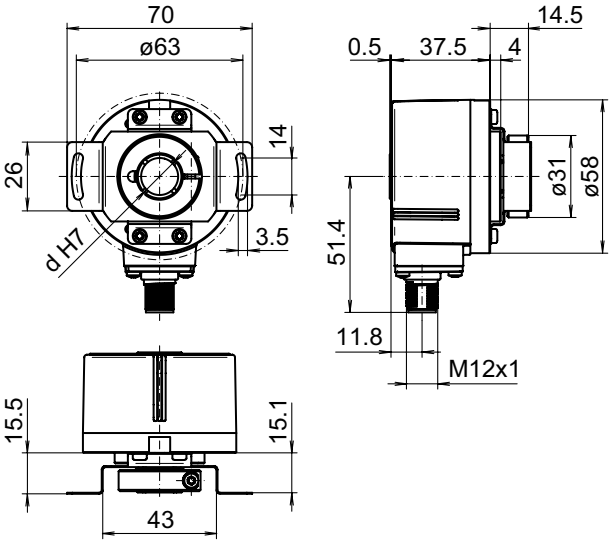

$$D = \frac{H}{T}$$

| Programmed pulse number | Scan ratio (D) (maximum) | Jitter (+/-) (maximum) |
|---|---|---|
| 1…1023 | 45...55 % | 5% |
| 1024, 2048 | 45...55 % | 5% |
| 1025…5000 | 40...60 % | 10% |
| 8192, 16384 | 35...85 % | 15% |
| 5001…10000 | 22...78 % | 28% |
| 32768 | 25...75 % | 25% |
| 65536 | 15...85 % | 35% |
| all other | Jitter[%]=(programmed pulse number -10000)*0,0007%+28% | |

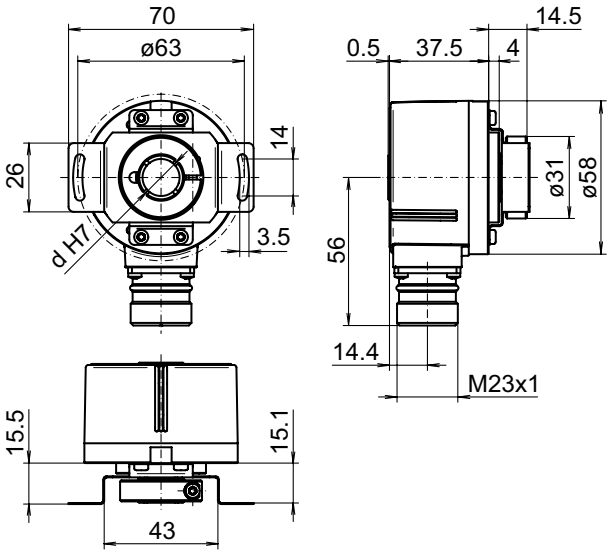
**EIL580P-T** - *OptoPulse®*

### Dimensions

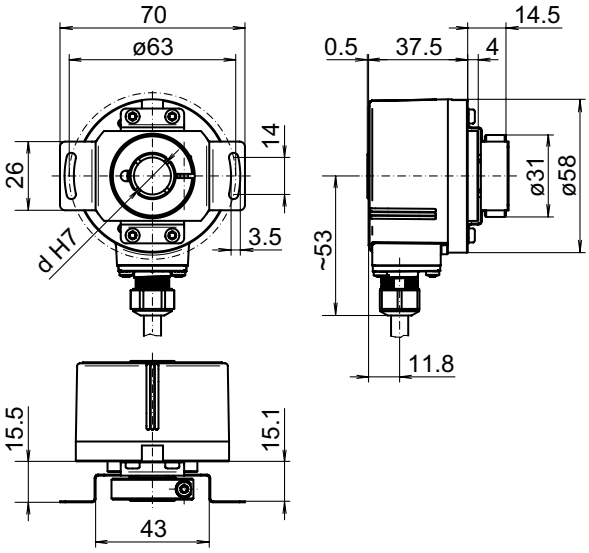
**Clamping ring at A-side:**
**Through hollow shaft, flange connector M12 radial**



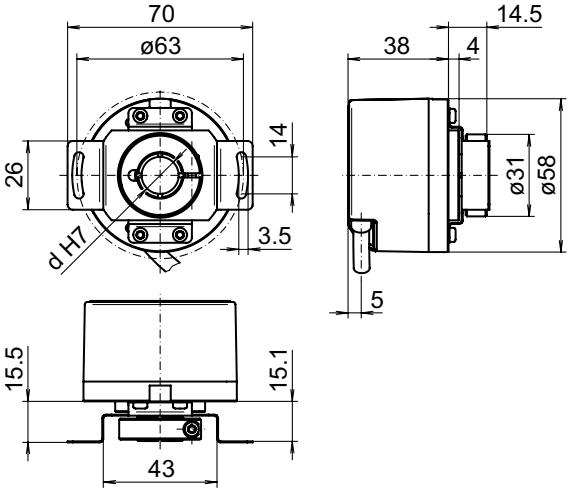

**Clamping ring at A-side:**
**Through hollow shaft, flange connector M23 radial**




**Clamping ring at A-side:**
**Through hollow shaft, cable radial**



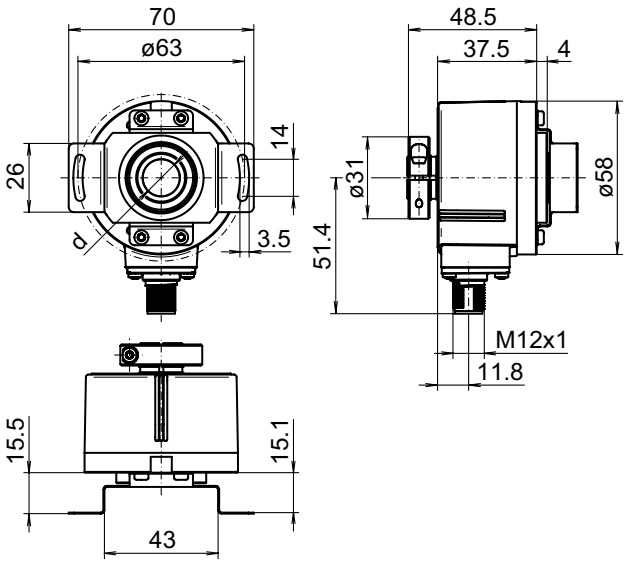

**Clamping ring at A-side:**
**Through hollow shaft, cable tangential**



## EIL580P-T - *OptoPulse®*

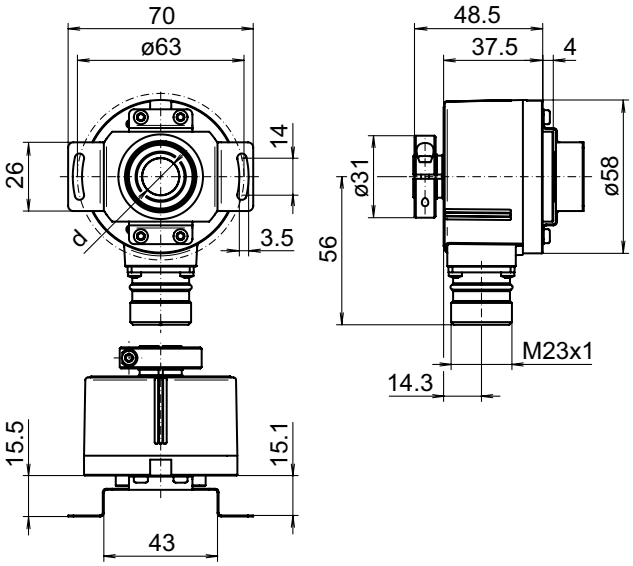
### Dimensions

**Clamping ring at B-side:**
**Through hollow shaft, flange connector M12 radial**



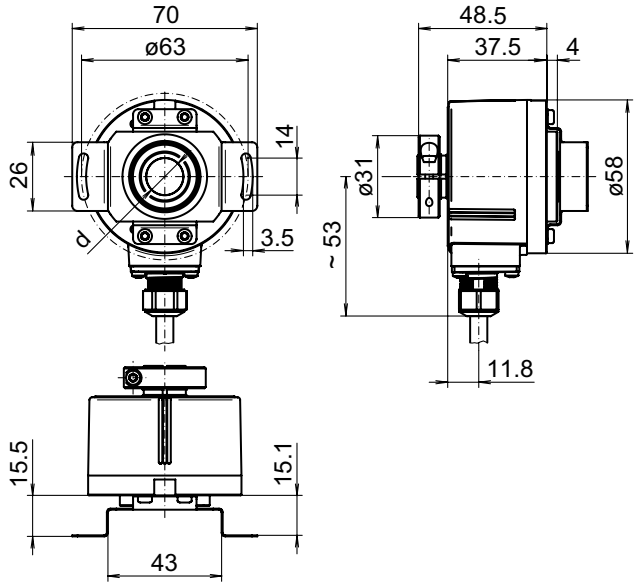

d H7: ø10, ø12, ø14
d G7: ø3/8" (ø9.52), ø1/2" (ø12.7)

**Clamping ring at B-side:**
**Through hollow shaft, flange connector M23 radial**



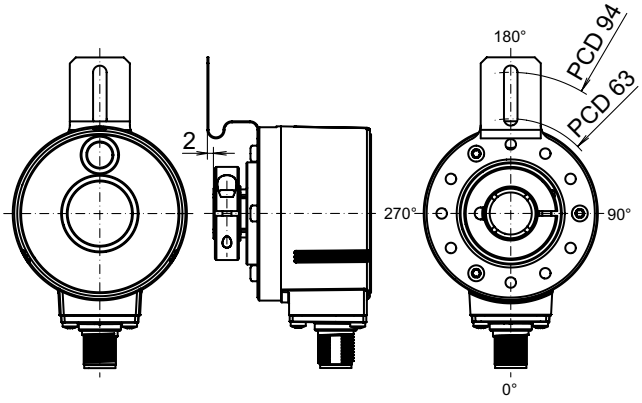

d H7: ø10, ø12, ø14
d G7: ø3/8" (ø9.52), ø1/2" (ø12.7)

**Clamping ring at B-side:**
**Through hollow shaft, cable radial**



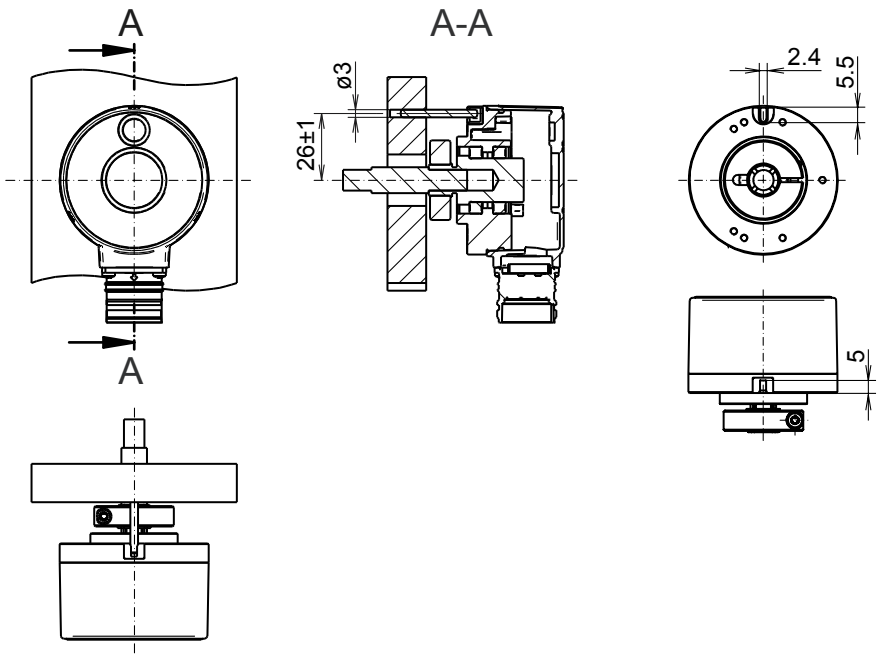

d H7: ø10, ø12, ø14
d G7: ø3/8" (ø9.52), ø1/2" (ø12.7)

**Flange version M:**
**Mounting position torque support**

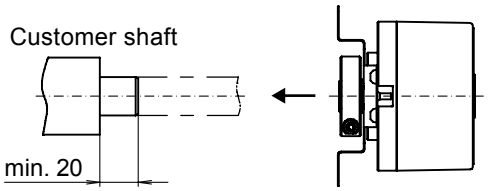


### Dimensions

**Flange version P:**
**Pin torque support, axial, clamping ring at A-side**




**Clamping ring at A-side:**
**Through hollow shaft**




**Clamping ring at B-side:**
**Through hollow shaft**