

Rotary Sensor potentiometric Heavy-duty

Series IPX-7900



Special features

- exceptionally durable design for extreme environmental conditions
- absolute potentiometric measuring system
- angle ranges 120°, 200° or 350° in one or two-channel versions
- increased corrosion protection by anodized aluminum housing and stainless steel shaft, salt spray resistant
- very good linearity
- repeatability 0.01°
- no mechanical rotation limit
- sealed to IP6K9K (w/cable output)
- high temperature range
- high lifetime >100 million movements, even under high vibration environments

Applications

- Position measurement in steering systems
- pivotable vehicle bracings
- Transport systems with several axes
- Construction and agricultural machinery

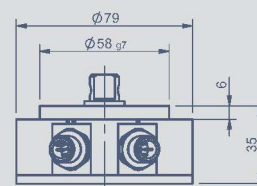
The IPX7900 was developed for measuring the steering angle in electro-hydraulic steering systems. It offers reliable operation in mobile applications, under extreme environmental conditions.

It uses Novotechnik's highly-regarded conductive plastic potentiometer technology, with damped precious metal wiper.

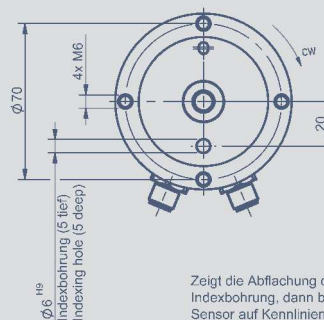
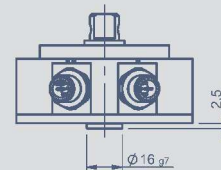
An anodized aluminum housing and a stainless steel shaft with double ball bearing provide an extremely strong housing.

High shaft load specifications allow the use of lever arms (see options) or other couplings.

Zentrierung am Gehäuse an Wellenseite
Centering shaft side
IPX-791



Zentrierung am Gehäuse an Wellen- und Deckelseite
Centering shaft and cover side
IPX-794



Zeigt die Abflachung der Welle in Richtung Indexbohrung, dann befindet sich der Sensor auf Kennlinienmitte.
When the flattening of the shaft points towards the indexing hole, the sensor is near the electrical center position.

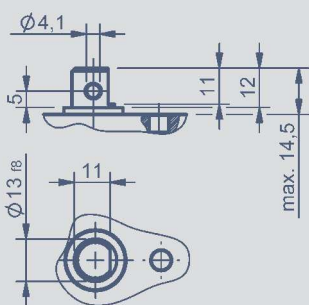
Description

| | |
|------------------------|--|
| Housing | anodized aluminium; AMgSe1, salt spray resistant |
| Shaft | stainless steel 1.4305 / X10CrNiS18-9 |
| Bearing | double ball bearings |
| Resistance element | conductive plastic |
| Wiper | precious metal multifinger wiper |
| Electrical connections | cable with cable gland or plug M12x1 |

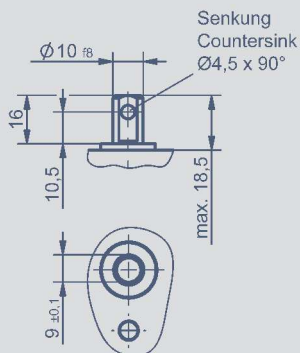
Connection assignment

Shaft versions

IPX-79_1- - - - -

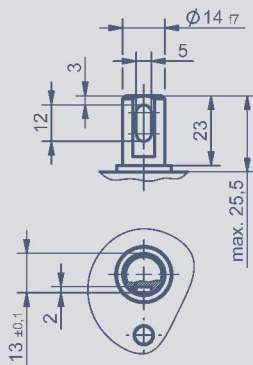


IPX-79_3- - - - -



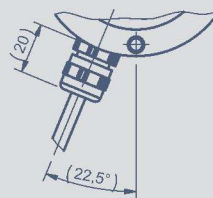
On request

IPX-79_5- - - - -

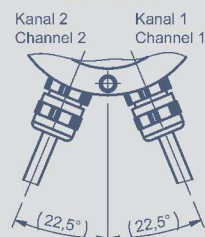


Elektrische Anschlüsse
Electrical connections

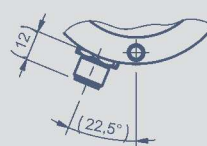
IPX-79 - - - - -202



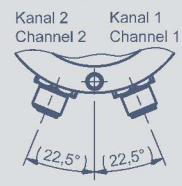
IPX-79 - - - - -302



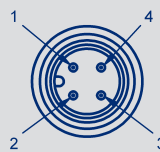
IPX-79 - - - - -551



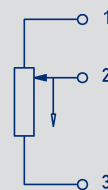
IPX-79 - - - - -651



Connector pin assignment
Pin #4 not connected!



Schematic of connection



Connection assignment

| Signal | Connector M12 | | Cable | |
|-------------------|---------------|------------|-------------|-----------|
| | one-channel | redundant | one-channel | redundant |
| K1 / connection 1 | pin 1 | K1 / pin 1 | GN | K1 / GN |
| K1 / connection 2 | pin 2 | K1 / pin 2 | WH | K1 / WH |
| K1 / connection 3 | pin 3 | K1 / pin 3 | BN | K1 / BN |
| K1 not assigned | pin 4 | K1 / pin 4 | YE | K1 / YE |
| K2 / connection 1 | - | K2 / pin 1 | - | K2 / GN |
| K2 / connection 2 | - | K2 / pin 2 | - | K2 / WH |
| K2 / connection 3 | - | K2 / pin 3 | - | K2 / BN |
| K2 not assigned | - | K2 / pin 4 | - | K2 / YE |

K1 = channel 1, K2 = channel 2

Technical Data

| Electrical Data | | | | |
|--|--|--------|--------|-------------------|
| Electrical range | 120 ±2 | 200 ±2 | 350 ±2 | ° |
| Nominal resistance | 2 | 2 | 5 | kΩ |
| Resistance tolerance | ± 15 | | | % |
| Repeatability | 0.002 (0.007°) | | | % |
| Temperature coefficient of the output to applied voltage ratio | typ. 10 | | | ppm/K |
| Independent linearity | < ±0.2 | < ±0.1 | < ±0.1 | % |
| Max. permissible applied voltage | 42 | | | V |
| Recommended operating wiper current | < 10 | | | μA |
| Max. allowed wiper current in case of malfunction | 10 | | | mA |
| Insulation resistance (500 VDC, 1 bar, 2 s) | > 100 | | | MΩ |
| Dielectric strength (50 Hz, 2 s, 1 bar, 500 VAC) | ≤ 1000 | | | V _{RMS} |
| Mechanical Data | | | | |
| Dimensions | see dimension drawing | | | |
| Mounting | with 4 screws M6, screw-in depth 15 mm min. | | | |
| Fastening torque of mounting screws at housing flange | 8 ±1 | | | Ncm |
| Mechanical travel | 360 continuous | | | ° |
| Permitted shaft load (static or dynamic force) | 300 | | | N |
| Operating torque max. * | 4 | | | Ncm |
| Maximum operational speed | 50 | | | min ⁻¹ |
| Weight approx. | 500 | | | g |
| Environmental Data | | | | |
| Operation and storage temperature | -40 ... +105 | | | °C |
| Vibration IEC 60068-2-6 | 5 ... 2000 Amax = 0.75 amax = 5 | | | Hz mm g |
| Shock IEC 60068-2-27 | 50 6 | | | g ms |
| Life time | > 100 x 10 ³ | | | movements |
| Protection class ISO 20653 | IP67 connector output M12 IP6K9K cable output | | | |

*) Depending on the environmental temperature and standstill time, the necessary force for the initial operating of the shaft may increase.

Ordering specifications

Preferred types printed in bold

Electrical version
001: Potentiometer with standard linearity

Electrical connection
one-channel version: 1 output
202: 1 x cable 4-pole, 2.0 m, shielded
551: 1 x connector M12, 4-pole
fully redundant version: 2 outputs
302: 2 x cable 4-pole, 2.0 m, shielded
651: 2 x connector M12, 4-pole
Cable version and assembled connectors on request

I P X - 7 9 1 1 - 8 3 5 - 0 0 1 - 6 5 1

Electrical angle
12, 20, 35: Electrical angle 120°, 200°, 350°

Number of channels
6: one-channel version (1 x supply voltage U_b , 1 x output)
8: fully redundant version (2 x supply voltage U_b , 2 x output)

Shaft
1: Steel D13x12 mm with cross hole D 4.1 mm
3: Steel D10x16 mm with countersink D4.5 x 90°

Housing
1: Centering shaft side
4: Centering shaft and cover side

Series
IPX

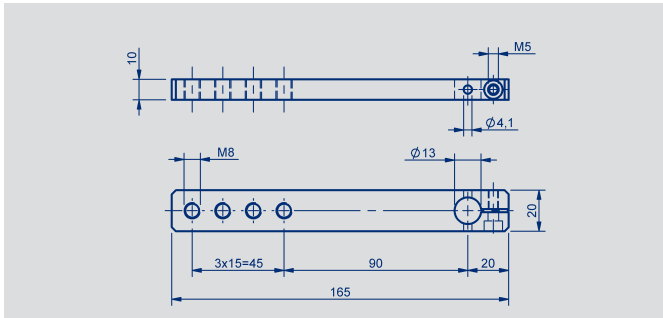
Design / Size
79: Ø 79 x 35 mm

Important

All the values given in this data sheet for linearity, lifetime and temperature coefficient in the voltage dividing mode are quoted for the device operating with the wiper voltage driving on operational amplifier working as a voltage follower, where virtually no load is applied to the wiper ($I_e \leq 1 \mu A$).

Accessories

Sensor mounting

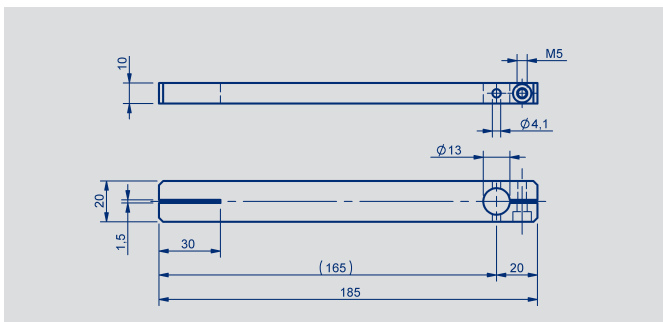


Z-IPX-M01

Lever arm 165 x 20 mm for pivot head drive

- aluminum, anodized
- for shaft IPX-79_1-...
- P/N 400105430

Assembly material (screw, locking pin) included in delivery

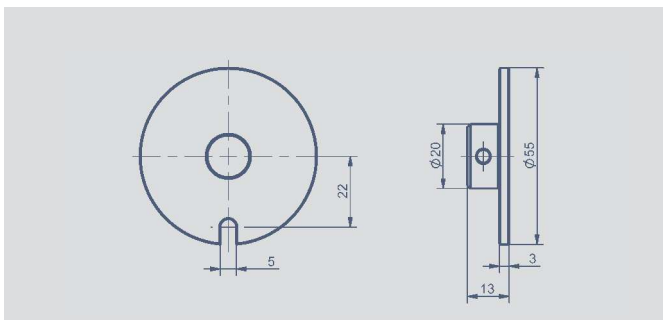


Z-IPX-M11

Lever arm 185 x 20 mm for lever arm drive, clamp connection on dimension 20 mm

- aluminum, anodized
- for shaft IPX-79_1-...
- P/N 400105431

Assembly material /screw, locking pin) included in delivery

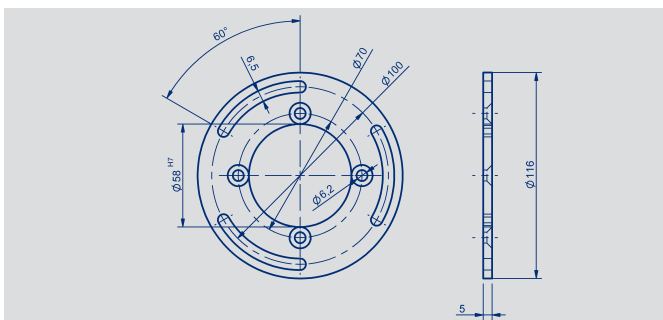


Z-IPX-M21

Driving plate D = 55 mm for lateral shaft drive with locking pin

- aluminum, anodized
- for shaft IPX-79_1-...
- P/N 400105433

Assembly material (locking pin) included in delivery



Z-IPX-M31

Mounting plate for adjustable mounting on screw-hole circle 100 mm

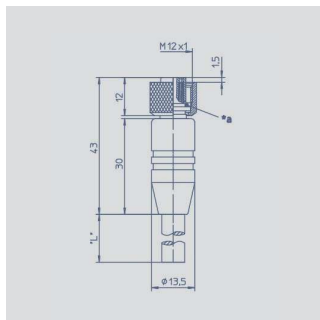
- aluminum, anodized
- P/N 400105432

Assembly material (4 x countersink screw) included in delivery

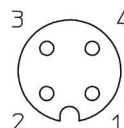
Accessories
Connector System M12

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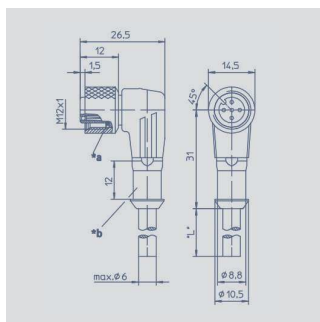


Pin assignment
1 = brown
2 = white
3 = blue
4 = black

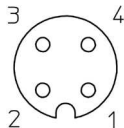


M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, shielded, IP67, open ended

| | | |
|-------------------|---|------------|
| Connector housing | Plastic PA | |
| Cable sheath | PUR; Ø = max. 6 mm, -25 °C...+80 °C (moved) -50 °C...+80 °C (fixed) | |
| Wires | PP, 0.34 mm ² | |
| Length | Type | P/N |
| 2 m | EEM 33-32 | 005600 |
| 5 m | EEM 33-62 | 005609 |
| 10 m | EEM 33-97 | 005650 |



Pin assignment
1 = brown
2 = white
3 = blue
4 = black



M12x1 Mating female connector, 4-pin, angled, A-coded, with molded cable, shielded, IP67, open ended

| | | |
|-------------------|---|------------|
| Connector housing | Plastic PA | |
| Cable sheath | PUR; Ø = max. 6 mm, -25 °C...+80 °C (moved) -50 °C...+80 °C (fixed) | |
| Wires | PP, 0.34 mm ² | |
| Length | Type | P/N |
| 2 m | EEM 33-33 | 005601 |
| 5 m | EEM 33-63 | 005610 |
| 10 m | EEM 33-99 | 005696 |

IP67 Protection class IP67 DIN EN 60529
UL UL - approved

- Very good resistance to oils, coolants und lubricants
- Suited for applications in dragchains
- Very good Electromagnetic Compatibility (EMC) and shield systems

Note: The protection class is valid only in locked position with its plugs. The application of these products in harsh environments must be checked in particular cases.

The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.