

## 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

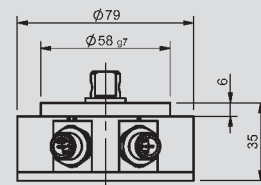
The IPX7900 was developed for measuring the steering angle in electro-hydraulic steering systems. It offers reliable operation in mobile applications, under extreme environmental conditions.

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

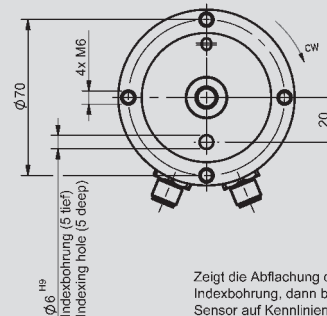
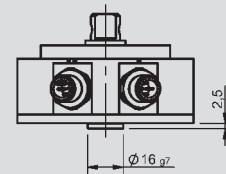
An anodized aluminum housing and a stainless steel shaft with double ball bearing provide an extremely strong housing.

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.

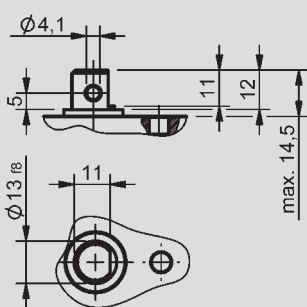
### Description

Housing	anodized aluminium; AlMgSi1, 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

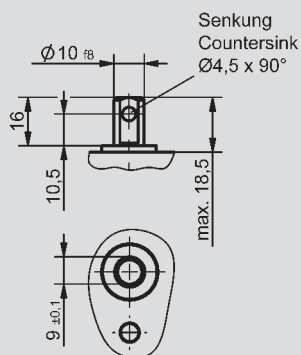
## Connection assignment

Shaft versions

IPX-79\_1- - - - -

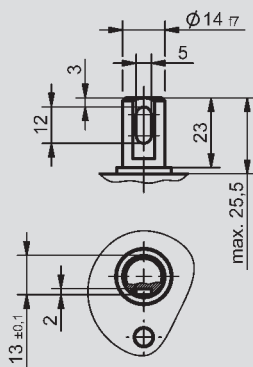


IPX-79\_3- - - - -



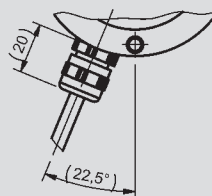
On request

IPX-79\_5- - - - -

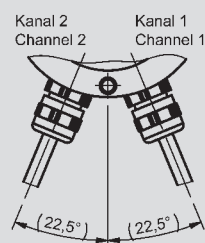


Elektrische Anschlüsse  
Electrical connections

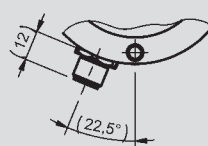
IPX-79 - - - - -202



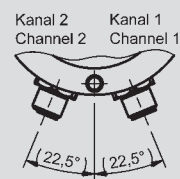
IPX-79 - - - - -302



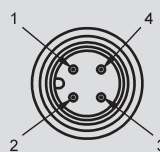
IPX-79 - - - - -551



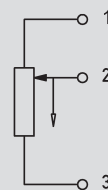
IPX-79 - - - - -651



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

<b>Electrical Data</b>				
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 <sub>RMS</sub>
<b>Mechanical Data</b>				
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 <sup>-1</sup>
Weight approx.	500			g
<b>Environmental Data</b>				
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 <sup>5</sup>			movements
MTTF	429			years
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

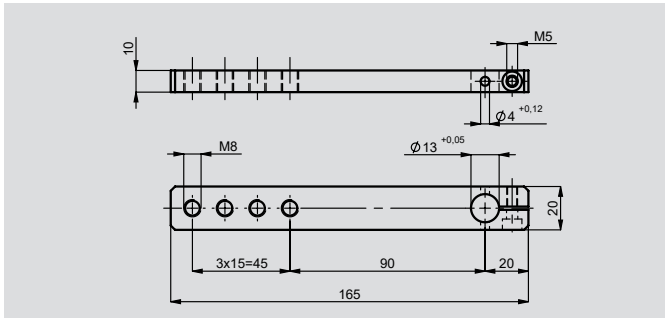
79: Ø 79 x 35 mm

## 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

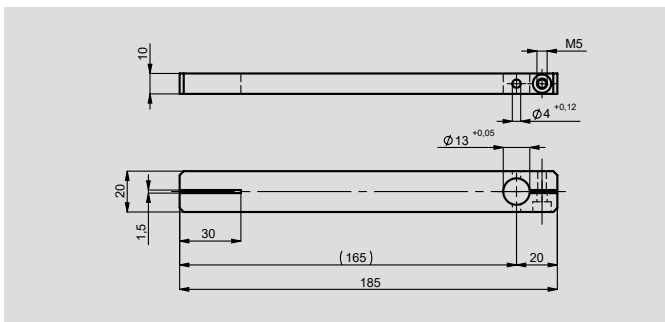


#### Z-IPX-M01

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

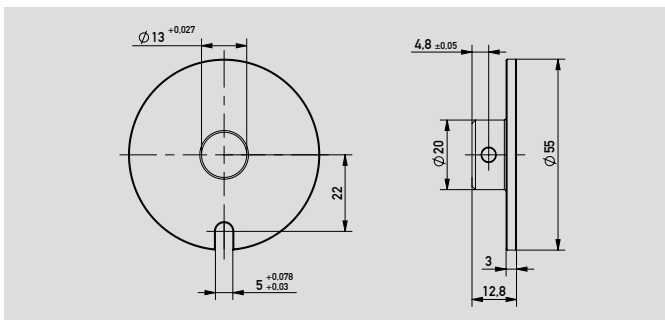


#### Z-IPX-M11

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

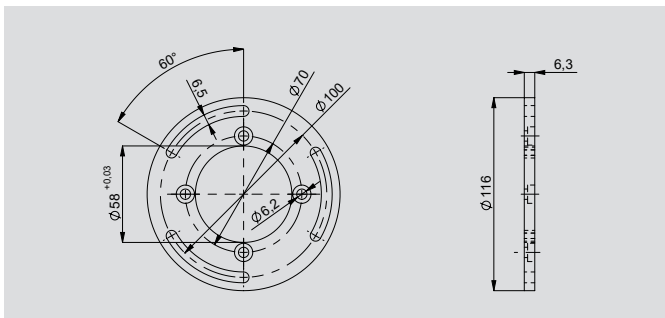


#### Z-IPX-M21

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

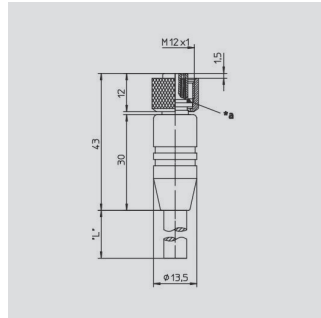
Assembly material (4 x countersink screw) included in delivery

**Accessories**  
Connector System M12

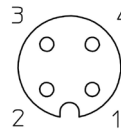
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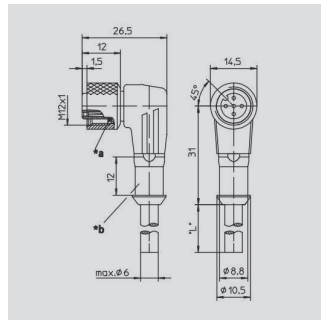
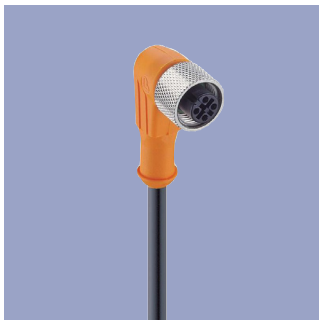


Pin assignment  
1 = brown  
2 = white  
3 = blue  
4 = black

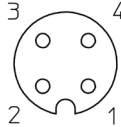


**M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, shielded, IP67, open ended**

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 <sup>2</sup>	
<b>Length</b>	<b>Type</b>	<b>P/N</b>
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 <sup>2</sup>	
<b>Length</b>	<b>Type</b>	<b>P/N</b>
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.