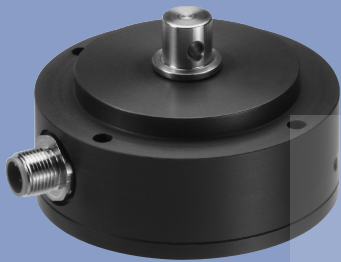


**Precision  
Rotary Sensor  
potentiometric**

Series IPX 7900



**Special features**

- very 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 shaft made of stainless steel and anodized aluminium housing; sea water resistant
- very good linearity
- high resolution
- no mechanical rotation limit
- splash water proof
- high temperature resistant
- high life time, >100 Mio. movements, even under high vibration environments
- full redundant version with 2 separate connections, fulfills SIL3 according to IEC61508

This angle sensor was developed for rough operation under extreme environmental conditions in mobile applications.

Equipped with a conductive plastic resistance element and a long term stable multifinger wiper, the IPX angle sensor is suitable for durable operation even under challenging conditions.

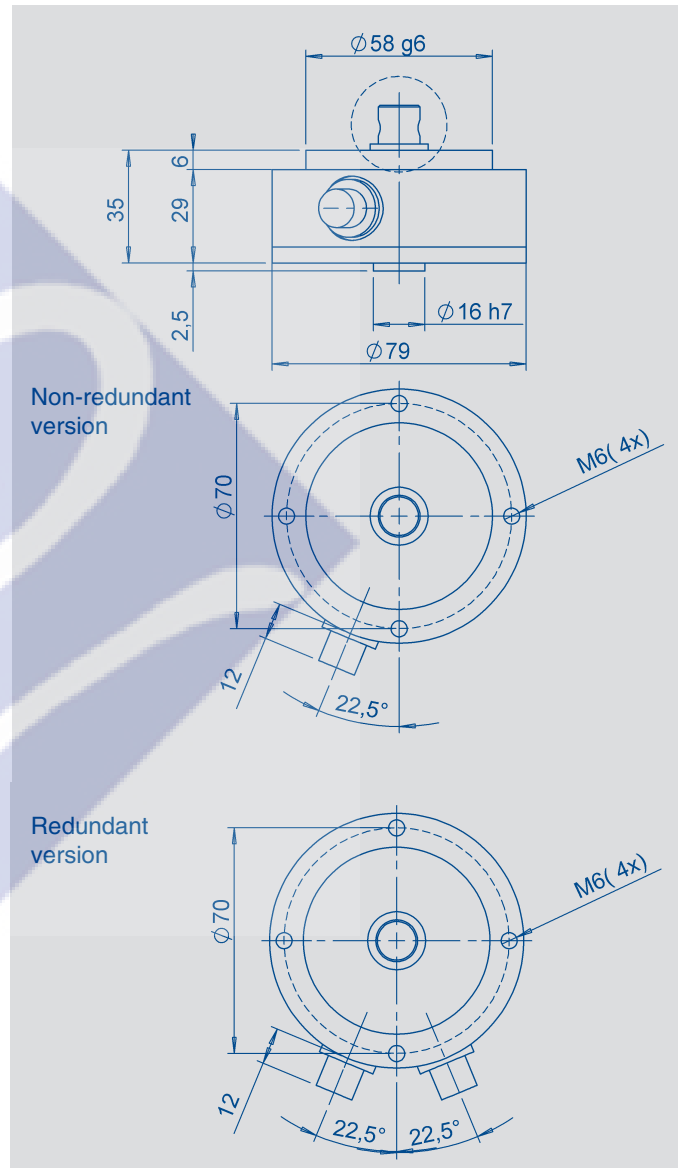
A durable full metal housing, a continuous stainless steel shaft with double ball bearing with large distance as well as an interlocking top cover protect the wiper from outer force effects.

Hermetic sealing and the accuracy and reliability of the absolute angle measurement are further special features of this sensor. The massive but compact design allows the direct connection of the shaft using a strong lever arm or other couplings.

This sensor's main application is the measurement of the steering angle in electro-hydraulic steering systems.

The centering of the housing is provided by a 58g6 mm centering diameter or - if mounted overhead - by a 16h7 mm diameter in the top cover.

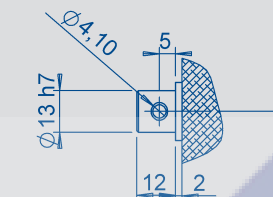
A POM shaft can be employed alternatively for enhanced isolation requirements.



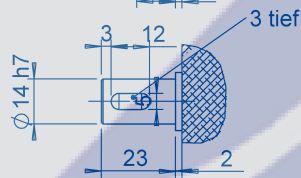
| Description            |  |
|------------------------|--|
| Size                   | Ø 79 mm, h 35 mm (without shaft)         |
| Housing                | anodized aluminium; salt spray resistant |
| Shaft                  | stainless steel (1.4305)                 |
| Bearing                | double ball bearings with large distance |
| Resistance element     | conductive plastic                       |
| Wiper                  | precious metal multifinger wiper         |
| Electrical connections | cable output with PG screw<br>M12 plug   |

### IPX7900 shaft types

Shaft code 01/02  
Hole for split pin  
Ø 4 mm DIN 7346

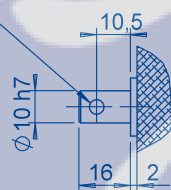


Shaft code 05



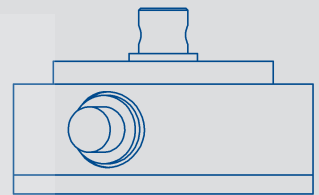
counter sink  $\phi 4,5 \times 90^\circ$

Shaft code 03

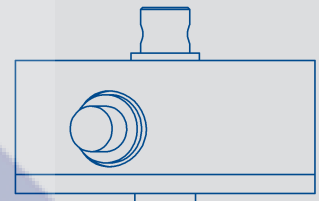


### Housing types

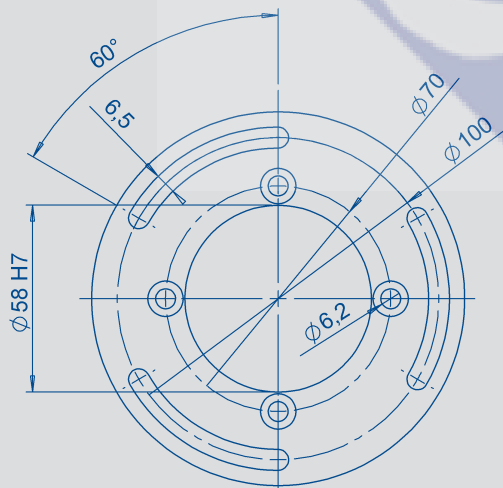
Housing code 01



Housing code 02



### Z-IPX-M31 mounting flange for IPX7900 sensor



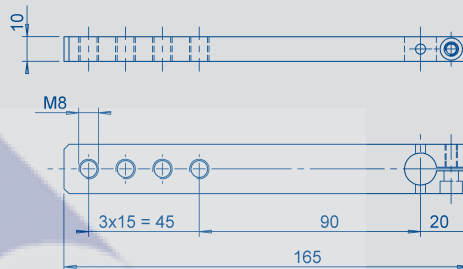
### Connector pin assignment

| Signal     | Connector output         |                      | Cable output                  |                           |
|------------|--------------------------|----------------------|-------------------------------|---------------------------|
|            | not redundant<br>Pin-No. | redundant<br>Pin-No. | not redundant<br>Wire marking | redundant<br>Wire marking |
| System 1/1 | S1/ 1                    | S1/ 1                | K1/ "1"                       | K1/ "1"                   |
| System 1/2 | S1/ 2                    | S1/ 2                | K1/ GN/YE                     | K1/ GN/YE                 |
| System 1/3 | S1/ 3                    | S1/ 3                | K1/ "2"                       | K1/ "2"                   |
| System 2/1 | -                        | S2/ 1                | -                             | K2/ "1"                   |
| System 2/2 | -                        | S2/ 2                | -                             | K2/ GN/YE                 |
| System 2/3 | -                        | S2/ 3                | -                             | K2/ "2"                   |

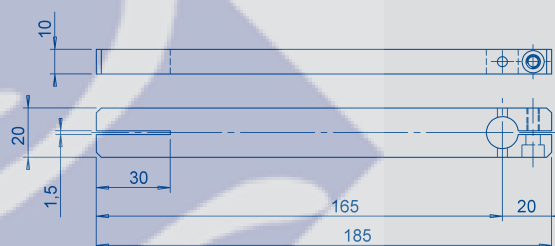
S1 = connector No. 1, S2 = connector No. 2, K1 = cable output No. 1, K2 = cable output No. 2

| 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. 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             |
|  | with POM-shaft ≤ 3000                         |        |        | V RMS             |
| Mechanical Data  |   |        |        |                   |
| Dimensions   | see drawings                                  |        |        |                   |
| Mounting   | 4 screws M6 or M5 (depends on mounting style) |        |        |                   |
| Mechanical travel  | 360 continuous                                |        |        |                   |
| Permitted shaft load (static or dynamic force)                 | 300 (axial), 400 (radial)                     |        |        | N                 |
| Torque max.  | 4   |        |        | Ncm               |
| Maximum operational speed                                      | 50  |        |        | min <sup>-1</sup> |
| Weight approx.   | 0,5   |        |        | kg                |
| Environmental Data   |   |        |        |                   |
| Temperature range  |   |        |        |                   |
| Operation and storage temperature                              | -40 ...+120 (M12 plug)                        | °C     |        |                   |
|  | -40...+100 (cable output)                     | °C     |        |                   |
| Vibration  | 5...2000                                      | Hz     |        |                   |
|  | A <sub>max</sub> = 0,75                       | mm     |        |                   |
|  | a <sub>max</sub> = 5                          | g      |        |                   |
| Shock  | 50  | g      |        |                   |
|  | 11  | ms     |        |                   |
| Life time  | > 100 x 10 <sup>6</sup>                       |        |        | movem.            |
| Protection class   | IP 69k (with PG connection)                   |        |        |                   |
|  | IP 67 (M12 plug with fastened connector)      |        |        |                   |

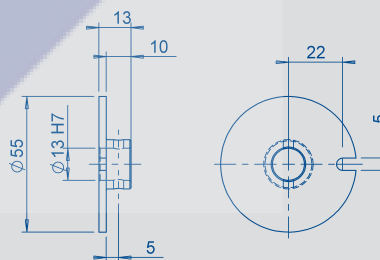
Z-IPX-01 lever arm 165 x 20 mm



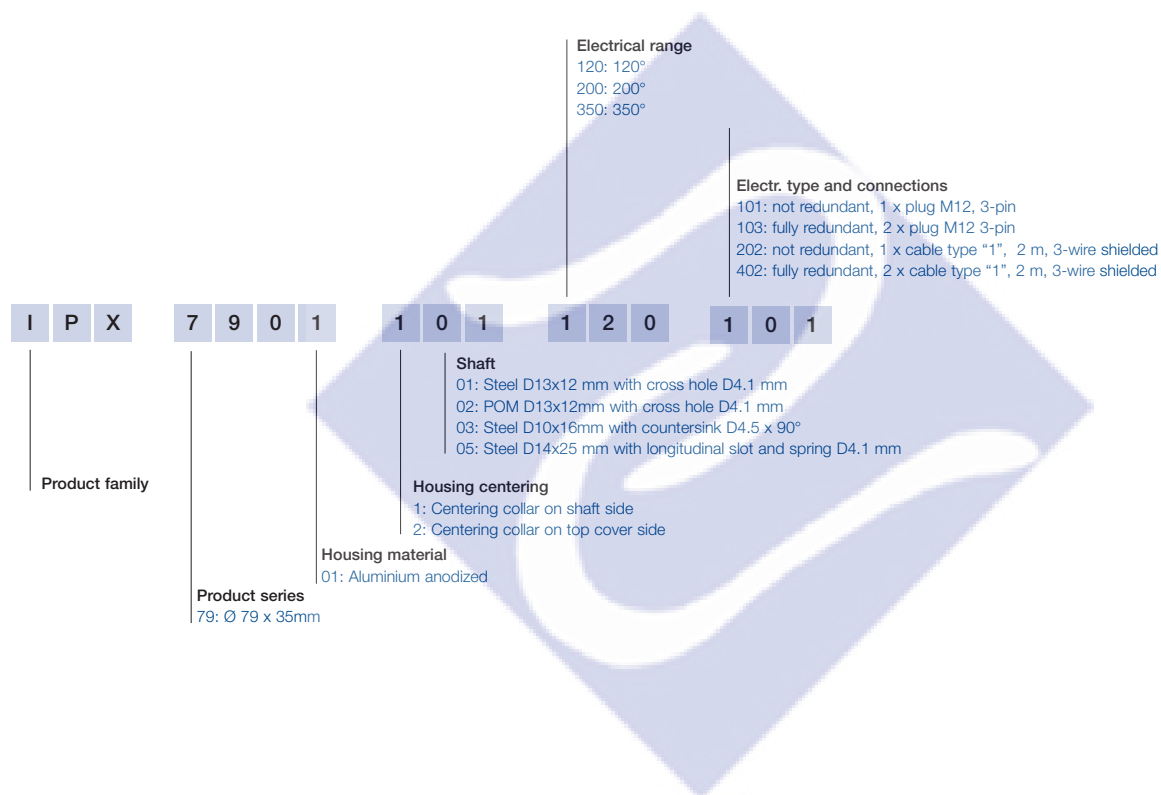
Z-IPX-11 lever arm 185 x 20 mm



Z-IPX-M21 disc Ø 55 mm for shaft with adjust pin



## Ordering specifications



### 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 ( $I_e \leq 10 \mu A$ ).

### Accessories

- Lever arm 165 x 20 mm, Z-IPX-01, Art.No. 056501
- Lever arm 185 x 20 mm, Z-IPX-11, Art.No. 056502
- Disc Ø 70 mm Z-IPX-21, Art.No. 056503
- Mounting plate Z-IPX-31, Art.No. 056504