# LINEAR AND ROTARY SENSORS







FIRST IN SENSORS

metallux USA, Inc.

# TRUST THE X!

OUR GUIDELINE: Fair partnership will ensure a successful and lasting business relationship. We pride ourselves in individual and direct consultation resulting in an innovative product range and reliability.

**Welcome to Metallux USA, Inc.**

Metallux USA, Inc. is the sole distributor of products for Metallux AG in Germany. A company that is internationally renowned for its sensor products.

We are located in Western New York State in the city of Rochester on the southern shore of Lake Ontario. The City is the home of internationally-recognized academic institutions like the University of Rochester and Rochester Institute of Technology. Metallux USA, by virtue of our sole relationship status with Germany, allows us to possess a direct line of communication with the head office in Germany. This line provides customer and potential customers the ability to receive prompt and accurate answers to all of their technical inquire.

Whether you are interested in industrial joysticks, pressure sensors, linear or rotary measurement sensors, high voltage and power or brake resistor, Metallux USA Inc. is always your first choice for a successful, satisfactory and well executed solution for all your sensor applications.

BERND H. OBERASCHER
President Metallux USA, Inc.

Whether standard or customised solution: Our linear and rotary sensors are used in a wide range of fields,including automotive and medical technology.

# CONDUCTIVE PLASTIC POTENTIOMETER POL 220

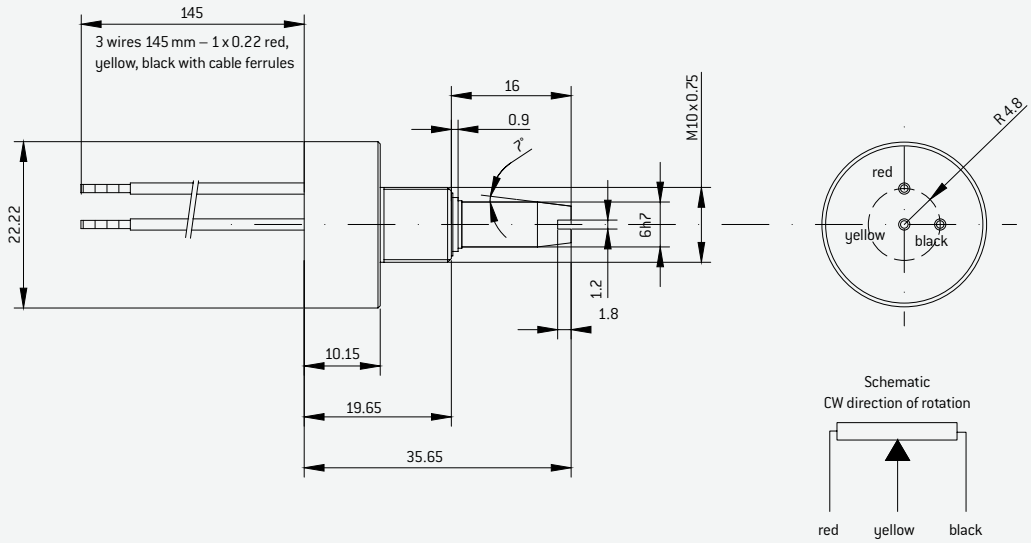
The Metallux single-turn precision potentiometer POL 220 is housed in robust aluminum housing with slide bearings; the cable or wires of the potentiometer are sealed. The potentiometer shaft is available in diameters of 3 – 6.35 mm. The POL 220 excels with a long lifetime and good linearity.

FEATURES

- Long lifetime
- Good linearity

APPLICATIONS

- Valve controls
- Joysticks
- Steering angle measurement
- Servo systems




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 320° * |
| **Independent linearity** | ± 2% * |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 10 million cycles |
| **Mechanical positioning range** | 360° continuous rotation |
| **Protection class** | IP 63 |
| **Torque** | < 0.3 Ncm |
| **Bearings** | Slide bearings |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | – 25°C ... +85°C |

| MATERIAL | |
|---|---|
| **Housing** | Anodised aluminium |
| **Axis** | Stainless steel |
| **Connectors** | Cable strand with end sleeves |

SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| H060400003 | POL 220 | 5 K | 320° | 3 x wire | IP 63 |

# CONDUCTIVE PLASTIC PRECISION POTENTIOMETER POL 230

with ball bearings

The single-turn precision potentiometer with conductive plastic technology and a servo flange features a robust aluminum housing as well as ball bearings to protect it from high mechanical stress. The cable, wire or pin connection is sealed. The axis diameter can be selected from a range of 3 – 6.35 mm. The POL 230 also features a long lifetime and good linearity.

### FEATURES

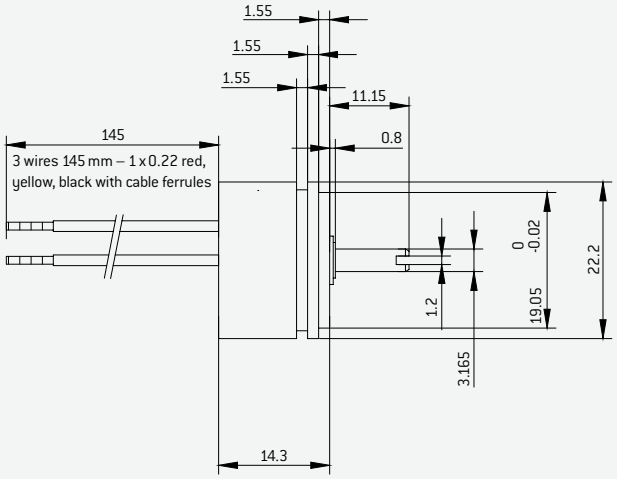
- Long lifetime
- Good linearity

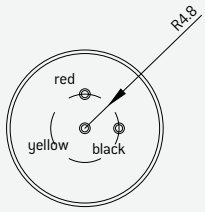
### APPLICATIONS

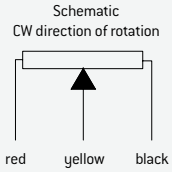
- High quality measuring systems
- Servo systems
- Drives

### SPECIAL FEATURES:

- 2x ball bearing
- Diameter: 22 mm
- Lifetime: 20 million cycles, redundant versions, special versions possible




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 340° * |
| **Independent linearity** | ± 2% * |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 20 million cycles |
| **Mechanical positioning range** | 360° continuous rotation |
| **Protection class** | IP 63 |
| **Torque** | < 0.2 Ncm |
| **Bearings** | Ball bearing |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | –25°C ... +85°C |

| MATERIALS | |
|---|---|
| **Housing** | Anodised aluminium |
| **Axis** | Stainless steel |
| **Connectors** | Flex cable with end sleeve |

### SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| H060423003 | POL 230 | 5 K | 340° | 3 x wire | IP 63 |

# CONDUCTIVE PLASTIC POTENTIOMETER POL 120

The Metallux single-turn potentiometer POL 120, with its robust design, is one of the smallest conductive plastic potentiometers (Ø 13 mm) and features a long lifetime, a wire outlet and good linearity. The servo flange makes precision installation possible.

### FEATURES

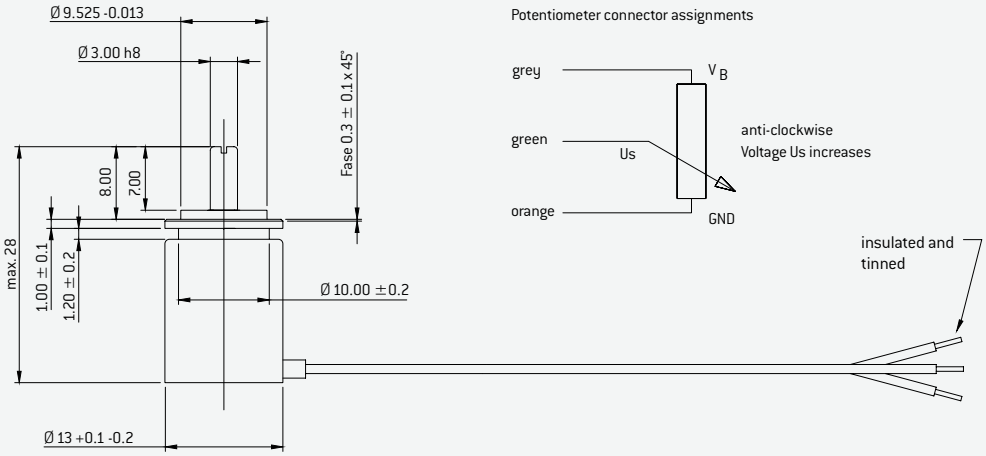
- Servo flange acc. to international standards
- Long lifetime
- Good linearity
- Size Ø 13 mm

### APPLICATIONS

- Valve controls
- Joysticks
- Steering angle measurement
- Servo systems

### SPECIAL FEATURES

- Diameter: 13 mm
- Lifetime: 3 million cycles
- Connection: Cable wires


## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Resistance range (Rn)** | 10 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 308° * |
| **Independent linearity** | ± 2.5% |
| **Load capacity** | 0.5 W at 70°C |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Lifetime** | 3 million cycles |
| **Mechanical positioning range** | Continuous rotation |
| **Protection class** | IP 65 |
| **Torque** | < 0.7 Ncm |
| **Bearings** | Slide bearings |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | −25°C ... +85°C |

## MATERIAL

| | |
|---|---|
| **Housing** | Brass (nickel plated) |
| **Axis** | Stainless steel |
| **Connectors** | Tinned cable wires |

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| E050200015 | POL 120 | 10 K | 308° | 3 x wire | IP 65 |

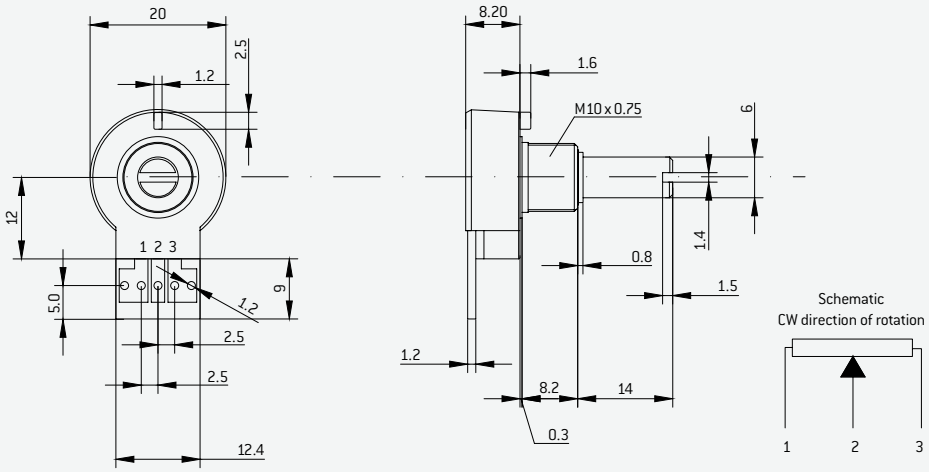
# CONDUCTIVE PLASTIC POTENTIOMETER POL 200

The special features of this single-turn potentiometer include plastic housing with injected metal thread and integrated slide bearings. The materials of axis and bearing are choosen to ensure a long lifetime.

### FEATURES
- Long lifetime
- Good linearity

### APPLICATIONS
- Valve controls
- Joysticks

### SPECIAL FEATURES
- Diameter: 20 mm
- Lifetime: 1 million cycles
- Option: Continuous axis




## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Resistance range (Rn)** | 10 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 320° * |
| **Independent linearity** | ± 2% * |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Lifetime** | 1 million cycles |
| **Mechanical positioning range** | Continuous rotation |
| **Protection class** | IP 50 |
| **Torque** | < 0.7 Ncm |
| **Bearings** | Slide bearings |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | −25°C ... +85°C |

## MATERIAL

| | |
|---|---|
| **Housing** | Thermoplastic |
| **Axis** | Stainless steel |
| **Connectors** | Gold-plated solder pads |

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| H060420000 | POL 200 | 10 K | 320° | Solder pad | IP 50 |

# CONDUCTIVE PLASTIC POTENTIOMETER POL 790

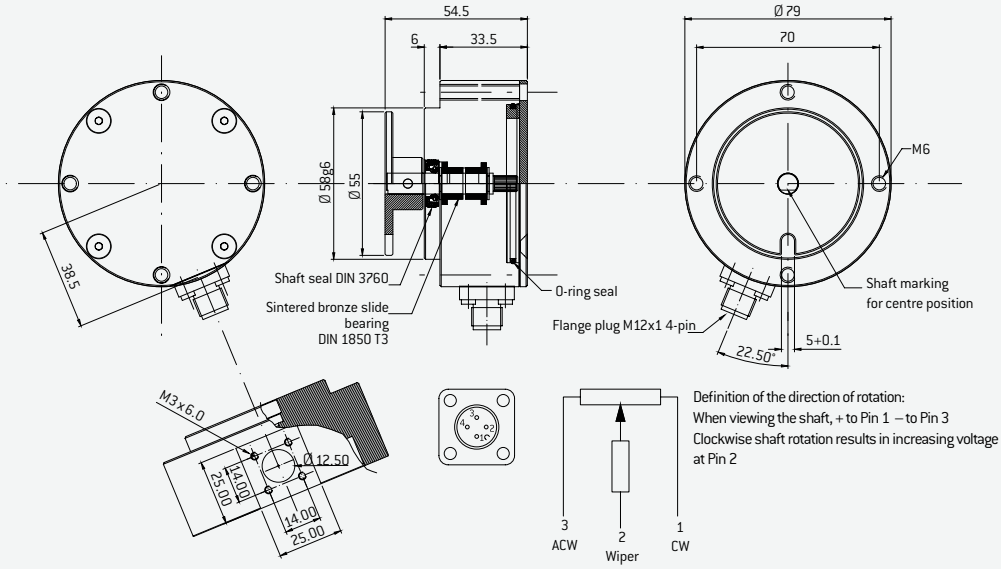
The Metallux conductive plastic precision potentiometer POL 790 is extremely robust and features excellent linearity, outstanding resolution and repeatability. The POL 790 is also available with plastic housing.

## FEATURES

- Extremely robust
- Extremely good linearity
- Excellent resolution and repeatability

## APPLICATIONS

- Steering angle measurement on special vehicles
- Axis position sensing in robotics
- Servo systems




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 350° * |
| **Independent linearity** | ± 2% * |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 10 million cycles |
| **Mechanical positioning range** | 360° continuous rotation |
| **Protection class** | IP 67 |
| **Bearings** | 2 fold sinterbronce friction bearing DIN 1850 |
| **Shaft diameter** | 8 mm |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | –25°C ... +85°C |

| MATERIALS | |
|---|---|
| **Housing** | Anodised aluminium |
| **Axis** | Stainless steel |
| **Electrical connectors** | Plug connector type M12x1 4-pole |

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| E050200416 | POL 790 | 5 K | 350° | Flange connector M12x1 | IP 67 |

# CONDUCTIVE PLASTIC, HOLLOW SHAFT POTENTIOMETER HWL 60

The Metallux hollow shaft potentiometer with conductive plastic technology features a long lifetime, a simple design and customised connectors.

### FEATURES

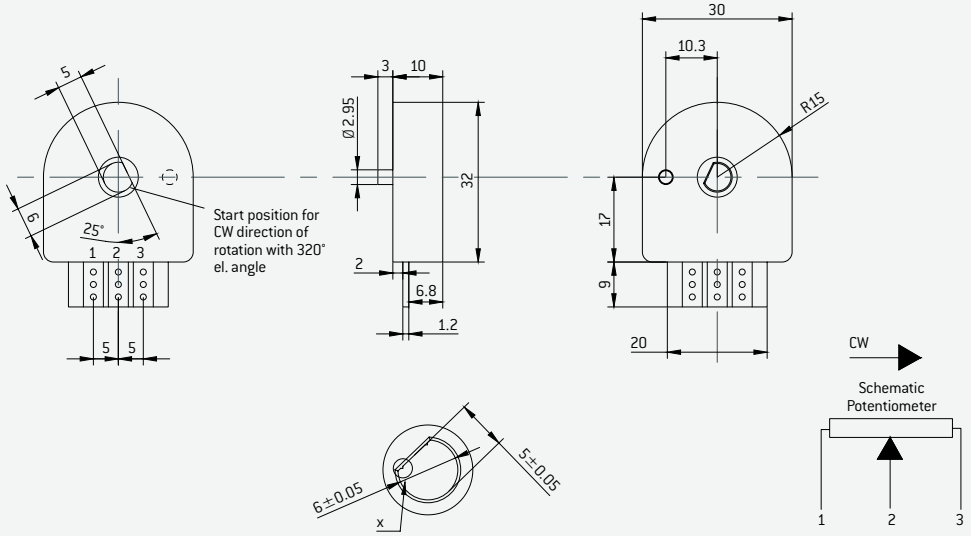
- Customised connectors
- Long lifetime

### APPLICATIONS

- Flap positioning
- Valve controls
- Joysticks
- Steering angle measurement

### SPECIAL FEATURES

- Redundancy possible
- Lifetime: 3 million cycles
- Special versions possible




## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Resistance range (Rn)** | 10 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | 320° * |
| **Independent linearity** | ± 2% * |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Lifetime** | 3 million cycles |
| **Mechanical positioning range** | continuous rotation |
| **Protection class** | IP 50 |
| **Torque** | < 0.7 Ncm |
| **Bearings** | floating |
| **Geometry of the bore** | D-profile |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | −25°C ... +85°C |

## MATERIAL

| | |
|---|---|
| **Housing** | Thermoplastic |
| **Connectors** | Gold-plated solder pads |

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| H060360013 | HWL 60 | 10 K | 320° | Solder pads | IP 50 |

# CONDUCTIVE PLASTIC HOLLOW SHAFT SENSOR PGL 60

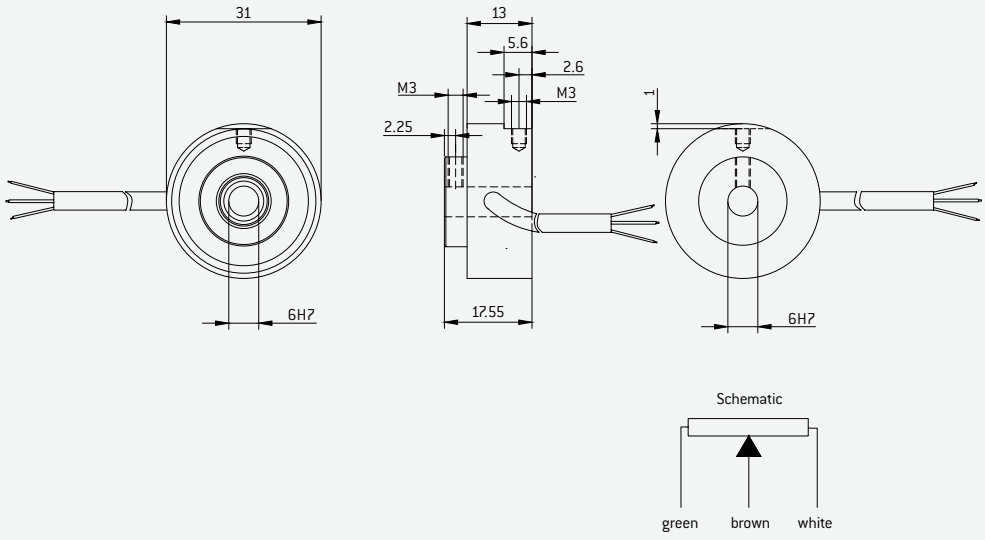
Extremely robust, with good linearity, excellent resolution and repeatability: These are the defining characteristics of the Metallux conductive plastic hollow shaft precision potentiometer PGL 60.

## FEATURES

- Hollow shaft
- Extremely robust
- Extremely good linearity
- Excellent resolution and repeatability

## APPLICATIONS

- Steering angle measurement on special vehicles
- Axis position sensing in robotics
- Servo systems




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 10 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical angle** | up to 320° * |
| **Independent linearity** | ± 2% |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 1000 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 10 million cycles |
| **Mechanical positioning range** | 360° continuous rotation |
| **Protection class** | IP 63 |
| **Bearings** | Ball bearing |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | −25°C ... +85°C |

| MATERIAL | |
|---|---|
| **Housing** | Anodised aluminium |
| **Electrical connectors** | Cable 1 m stripped and tinned |

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection | Protection class |
|---|---|---|---|---|---|
| H060502320 | PGL 60 | 10 K | 320° * | Cable connection | IP 63 |

# POTENTIOMETRIC CONDUCTIVE PLASTIC LINEAR POSITION SENSOR

## WPL-OS (without push rod)

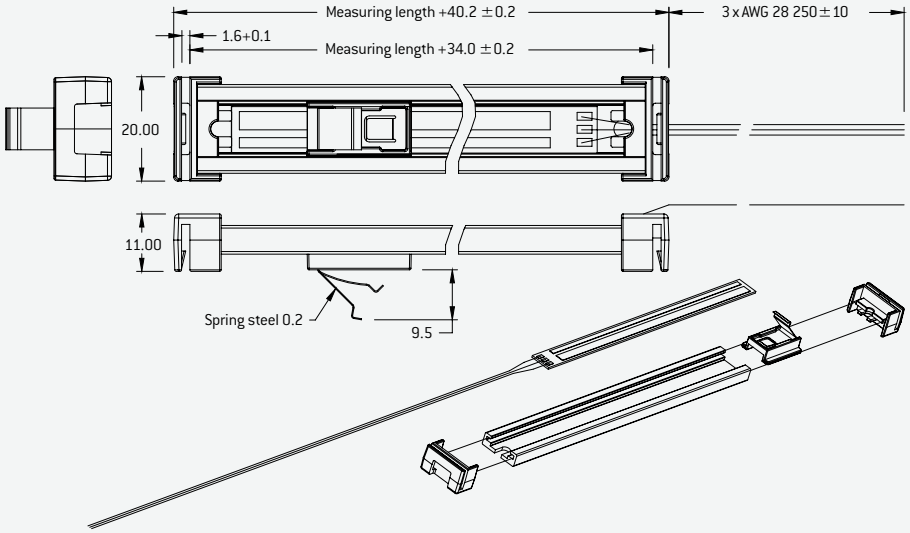
Our Metallux linear position sensor WPL-OS without push rod and using conductive plastic technology offers a wide range of integration possibilities as well as an easy installation. The electrical measuring range runs from 30 mm to 300 mm. With linearisation, it is possible to achieve a linearity of up to ±0,25%.

### FEATURES

- Wide range of possibilities for integration
- Easy installation

### APPLICATIONS

- Medical technology
- Cylinder stroke measurement
- Flap control
- Valve control




| ELEKTRISCHE DATEN | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ / 100mm * |
| **Resistance tolerance** | ± 20% |
| **Electrical stroke** | 30...300mm * |
| **Independent linearity** | ± 2% untrimmed<br>± 0,25% trimmed (Option) * |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 700 VAC |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 10 million cycles |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | −25°C ... 85°C |

| MATERIALS | |
|---|---|
| **Guidance** | Anodised aluminium |
| **Connectors** | Flat flexible cable * |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

**SAMPLE ORDER**

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| E050245727 | WPL-OS | 5 K | 105 mm | 3 x wire |

# POTENTIOMETRIC CONDUCTIVE PLASTIC LINEAR POSITION SENSOR WPL

As an absolute linear position sensor with robust design and a 3 or 4 mm push rod, the Metallux linear position sensor features conductive plastic technology, a long lifetime and easy installation. The mechanical coupling is by threaded connectors. The measuring range is from 25 mm to 300 mm. Customised versions according to customer specific requirements can be offered.

FEATURES

- Long lifetime
- Easy mounting

APPLICATIONS

- Displacement probes
- Cylinder stroke measurement
- Foot pedal position
- Valve control

| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 1kΩ per 10 mm * |
| **Resistance tolerance** | ± 20% |
| **Electrical stroke** | 25 ... 300 mm * |
| **Independent linearity** | ± 2% |
| **Resolution** | Nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |
| **Insulation resistance** | 10 GΩ at 500 VDC |
| **Dielectric strength** | 700 VAC |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | 5 million cycles |
| **Protection class** | IP 63 |
| **Adjustable force** | 2 – 8 N spring force<br>< 0.5 N without spring |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | – 25°C ... +65°C |

| MATERIALS | |
|---|---|
| **Housing** | Aluminium |
| **Push rod** | Stainless steel |
| **1 m connectors** | Flexible cable 3x 0.14 mm² |

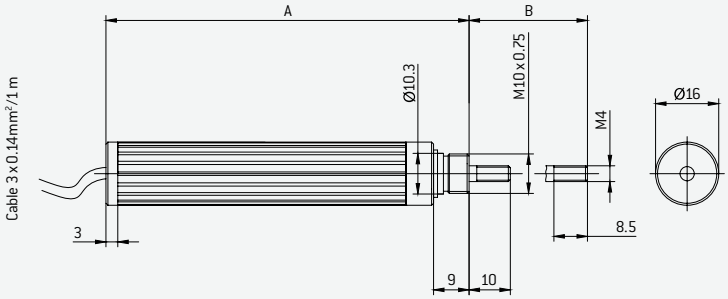
## CUSTOMIZED ORDER

# POTENTIOMETRIC CONDUCTIVE PLASTIC LINEAR POSITION SENSOR WPL (2)

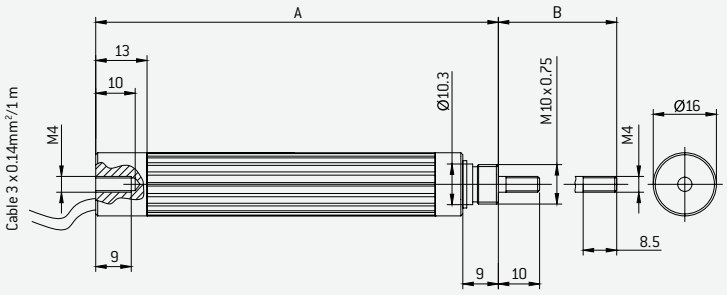
The potentiometric conductive plastic position sensor WPL is available in different designs.
Customized modifications can be realized at any time.

On request available with return spring.

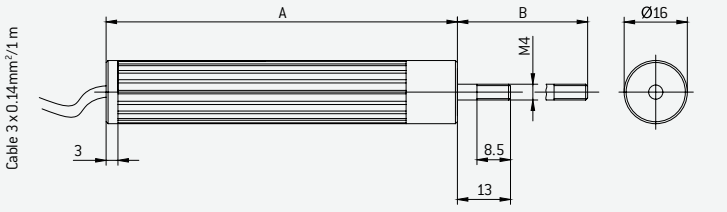
| WPL-LH-SGZ-XXX | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| El. stroke (mm) | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| Mech. stroke (mm) | 26 | 51 | 76 | 101 | 151 | 251 | 301 |
| Dim. A (mm) | 77 | 102 | 127 | 152 | 202 | 302 | 352 |
| Dim. B (mm) | 36 | 61 | 86 | 111 | 161 | 261 | 311 |
| Resistance ± 20% (kOhm) | 10 | 10 | 10 | 10 | 10 | 17 | 21 |



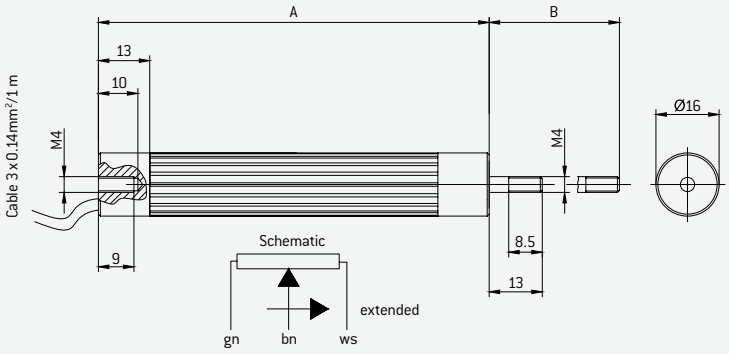

| WPL-LH-SEZ-XXX | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| El. stroke (mm) | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| Mech. stroke (mm) | 26 | 51 | 76 | 101 | 151 | 251 | 301 |
| Dim. A (mm) | 67 | 92 | 117 | 142 | 192 | 292 | 342 |
| Dim. B (mm) | 36 | 61 | 86 | 111 | 161 | 261 | 311 |
| Resistance ± 20% (kOhm) | 10 | 10 | 10 | 10 | 10 | 17 | 21 |




| WPL-LH-SE-XXX | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| El. stroke (mm) | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| Mech. stroke (mm) | 26 | 51 | 76 | 101 | 151 | 251 | 301 |
| Dim. A (mm) | 64 | 89 | 114 | 139 | 189 | 289 | 339 |
| Dim. B (mm) | 39 | 64 | 89 | 114 | 164 | 264 | 314 |
| Resistance ± 20% (kOhm) | 10 | 10 | 10 | 10 | 10 | 17 | 21 |




| WPL-LH-SE-XXX | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| El. stroke (mm) | 25 | 50 | 75 | 100 | 150 | 250 | 300 |
| Mech. stroke (mm) | 26 | 51 | 76 | 101 | 151 | 251 | 301 |
| Dim. A (mm) | 74 | 99 | 124 | 149 | 199 | 299 | 349 |
| Dim. B (mm) | 39 | 64 | 89 | 114 | 164 | 264 | 314 |
| Resistance ± 20% (kOhm) | 10 | 10 | 10 | 10 | 10 | 17 | 21 |



# POTENTIOMETER ELEMENT FOR ROTARY POSITION SENSING

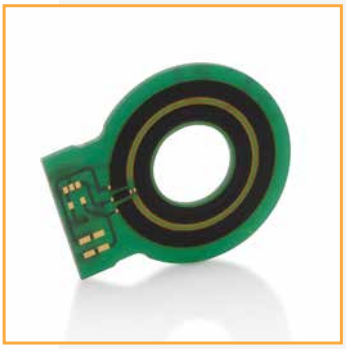
These Metallux potentiometer elements for rotary position sensing feature customised designs, efficient integration in existing installation spaces and a long lifetime. Linearisation with accuracy of up to ± 0.25% is possible.

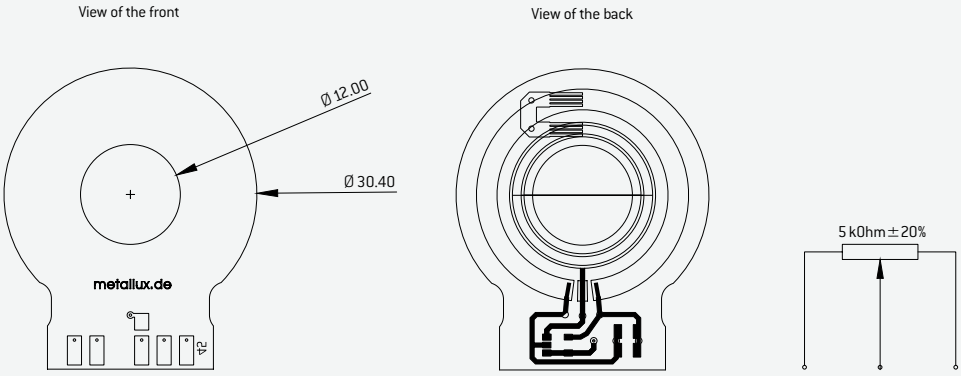
FEATURES

- Customised designs
- Various materials

APPLICATIONS

- Rotary position sensing
- Automotive
- Industrial applications
- Aerospace






| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ * |
| **Resistance tolerance** | ± 20% |
| **electrical angle** | 25° – 355° * |
| **Independent linearity** | ± 2% * |
| **Resolution** | Nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | Up to 50 million cycles |
| **Wiper** | Metallux PC Board system with bimetal wiper |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | −40°C ... +125° on FR4-carrier |

| MATERIALS | |
|---|---|
| **Substrates** | FR4, FR5, Polymer, Ceramic, Polyimid |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## CUSTOMIZED ORDER

# POTENTIOMETER ELEMENT FOR LINEAR POSITION SENSING

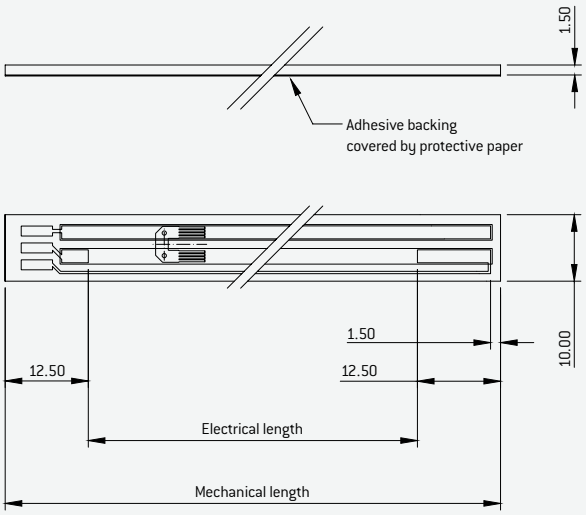
Our Metallux potentiometer elements are ideal for position sensing. We custom manufacture these elements according to the customer's specific requirements. They are also easy to integrate into existing installation spaces and feature an extremely long lifetime. Linearisation with accuracy of up to ±0,25% is possible.

### FEATURES

- Customised designs
- Various materials

### APPLICATIONS

- Linear position sensing
- Automotive
- Industrial applications
- Aerospace




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 5 kΩ * |
| **Resistance tolerance** | ± 20% |
| **Electrical positioning range** | 20 – 500 mm |
| **Independent linearity** | ± 2% untrimmed<br>± 0,25% trimmed (Option) |
| **Resolution** | nearly infinite |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | up to 50 million cycles |
| **Wiper** | Metallux PC Board system<br>with bimetal wiper |

| AMBIENT CONDITIONS | |
|---|---|
| FR4, polymer, ceramic | −40°C ... +125° on FR4-carrier |

| MATERIAL | |
|---|---|
| **Substrates** | FR4, FR5, Polymer, Ceramic, Polyimid |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## CUSTOMIZED ORDER

# METAPOT LINEAR MEMBRANE SENSOR MTP-L

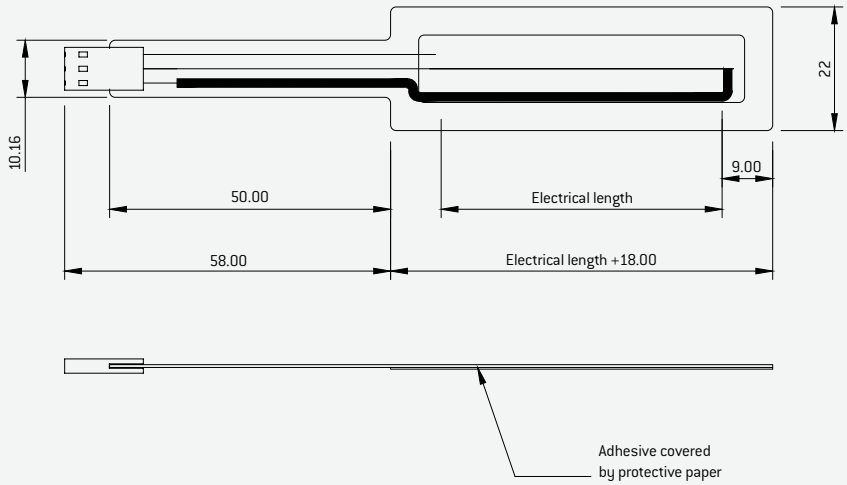
The linear membrane sensors are well suited for precision position sensing applications in a variety of industries. The MTP-L membrane sensors are non-wearing, easy to install and offer wide possibilities for integration, as well as an IP65 protection class.

## FEATURES

- Wide range of possibilities for integration
- Simple mounting
- Electrical measuring range of 30 – 500 mm

## APPLICATIONS

- Medical technology
- Cylinder stroke measurement
- Flap control
- Valve control




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 2.5 kΩ per 100 mm distance |
| **Resistance tolerance** | ± 30% |
| **Electrical distance** | 30 – 500 mm |
| **Independent linearity** | ± 2% ** |
| **Resolution** | < 0,05mm ** |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | > 5 million cycles ** |
| **Travel speed** | 0.1 m/s ** |
| **Max. sensor thickness** | 0.5 mm |
| **Actuation force** | 1 – 3 N ** |
| **Wiper** | See page 22 |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | – 25°C ... +85°C ** |
| **Protection class** | IP65, electrical connection and plug excluded |

| MATERIALS | |
|---|---|
| **Substrates** | PET polyester film, FR4 |

| ELECTRICAL CONNECTION | |
|---|---|
| | Female crimp contacts, Crimpflex solder pads * |

Mechanical and electrical characteristics are customizable. Specifications are subject to change without notice. * Others on request. ** Specifications may deviate according to temperature and installation conditions.

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| E080200099 | MTP | 2,5 K | 100 mm | Female crimp contacts |

# METAPOT ROTARY MEMBRANE SENSOR MTP-R

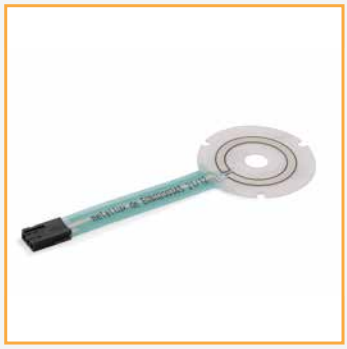
MetaPot membrane sensors are flat, non-wearing and with an IP 65 protection class, offer a favourably priced alternative to other sensor systems. The rotary membrane sensors are ideal for use in precision positioning applications in many applications.

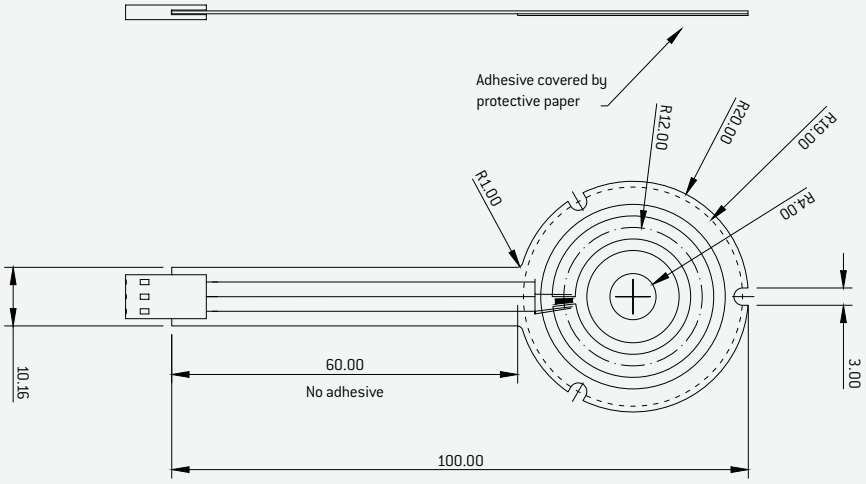
## FEATURES

- Extremely flat
- IP 65
- Adhesive backing
- Long lifetime

## APPLICATIONS

- Rotary position sensing
- Servo systems
- Industrial applications
- Automotive






| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 2.5 kΩ / 25 mm perimeter |
| **Resistance tolerance** | ± 30% |
| **Electrical angle** | 25° – 345° |
| **Independent linearity** | ± 2% ** |
| **Resolution** | < 0.05 mm perimeter ** |
| **Maximum wiper current** | 5 mA in case of malfunction |
| **Wiper load** | > 100 x Rn |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Lifetime** | > 5 million cycles ** |
| **Max. travel speed** | 0.1 m/s ** |
| **Sensor thickness** | 0.5 mm |
| **Actuation force** | 1 – 3 N ** |
| **Wiper** | see page 22 |

| AMBIENT CONDITIONS | |
|---|---|
| **Operating temperature** | – 25°C ... +85°C ** |
| **Protection class** | IP65, electrical connection and plug excluded |

| MATERIALS | |
|---|---|
| **Substrates** | PET polyester film, FR4 |
| **Electrical connectors** | Female crimp contacts, Crimpflex solder tabs * |

Mechanical and electrical characteristics are customizable. Specifications are subject to change without notice. * Others on request. ** Specifications may deviate according to temperature and installation conditions.

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| E080200345 | MTP-R | 2,5 K | 345° * | Female crimp contacts |

# MEMBRANE SENSOR MTP-LX

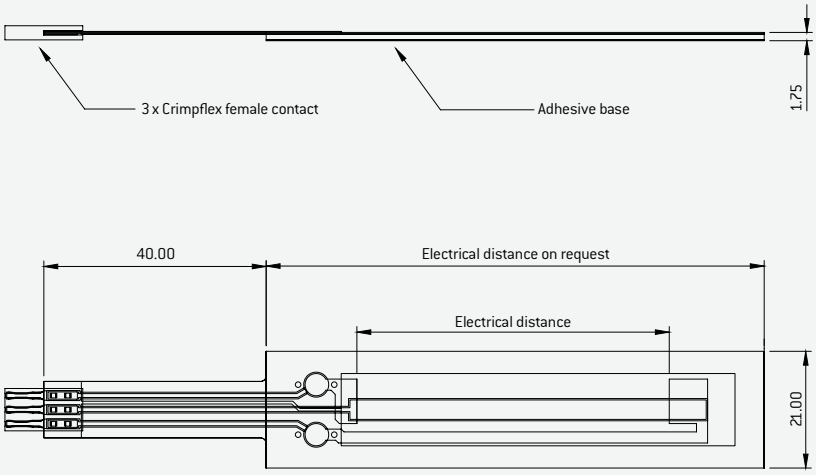
Together with the long lifetime, special features of the Metallux MTP-LX membrane sensors include excellent linearity of up to < ±0.3% and temperature resistance up to 105 °C. They are very robust, feature a flat shape and also offer resistance to dust, soiling and liquids.

## FEATURES

- Protection class IP 67
- Resistant to dust, soiling and liquids

## APPLICATIONS

- Mirror systems
- Adjustment systems in car and truck seats
- Controls for car windows and roofs
- Medical technology
- Solar panel positioning
- Robotic systems




| ELECTRICAL SPECIFICATIONS | |
|---|---|
| **Resistance range (Rn)** | 4 kΩ per 100 mm distance * |
| **Independent linearity** | Up to < ±0.3% ** |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| **Electrical distance** | 50 ... 500 mm in gradation of 50 mm |
| **Element length** | 90 ... 550 mm |
| **Position transducer (accessories)** | Mechanical wiper pin as M6 threaded part with spring-loaded ball |
| **Position transducer contact force** | 2 ± 1 N * |

Mechanical and electrical characteristics are customizable. Specifications are subject to change without notice. * Others on request. ** Specifications may deviate according to temperature and installation conditions.

| OPERATIONAL CONDITIONS | |
|---|---|
| **Temperature range** | Standard: −25°C ... +105°C, −40°C ... +125°C with limited performance specifications |
| **Operational humidity** | 0 – 95% R.H. |
| **Vibration acc. to DIN IEC 68T2-6** | 5 – 2000 Hz |
| **Shock acc. to DIN IEC 68T2-27** | 50 g, 11 ms |
| **Lifetime** | 25 x $10^6$ cycles |
| **Travel speed** | 1.0 m/s |
| **Protection class acc. to DIN EN 60529** | IP 67, electrical connection and plug excluded |
| **Options for fastening** | Optional adhesive film on back |

## ELECTRICAL CONNECTION

Standard Flex with 40 mm and 3 female crimp contacts, customer-specific connectors upon request

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| E080400100 | MTP-LX | 4 kΩ * | 106.4 mm | Female crimp contacts |

# CONTACTLESS LINEAR **MEMBRANE SENSOR MMP**

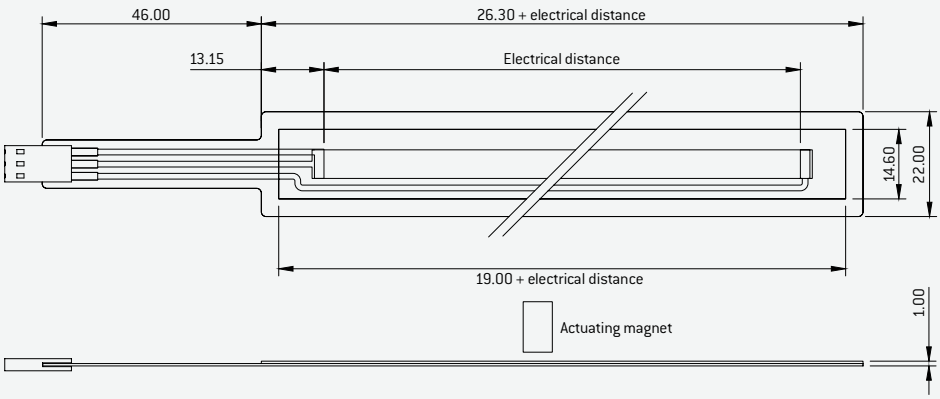
The technology of the MMP series is based on the MTP series. The linear, contactless Metallux membrane sensors can be used for position sensing in a wide range of applications. The contactless measurement is performed by means of a layer of metal foil integrated in the sensor and a magnet positioned at a set distance from the sensor.

## FEATURES

- Contactless magnetic coupling
- Flat design
- IP 65, electrical connection and plug excluded
- Long lifetime

## APPLICATIONS

- Linear position sensing, for instance in cylinders
- Servo systems
- Industrial applications




## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Resistance range (Rn)** | 2.5 kΩ /100 mm distance |
| **Resistance tolerance** | ± 30% |
| **Electrical distance** | 50 – 500 mm |
| **Independent linearity** | ± 2% ** |
| **Resolution** | < 0.1mm ** |
| **Load resistance** | > 100* Rn |
| **Max. load current in case of fault** | 5 mA |

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Lifetime** | 50 million cycles |
| **Travel speed** | ≤ 3 m/s * |
| **Cable connection** | L: 46 mm; W: 10.16 mm |
| **Max. measuring distance from magnet to sensor** | 2 mm |
| **Type of mount** | Adhesive film |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | – 10°C ... +70°C ** |
| **Protection class** | IP 65, electrical connection and plug excluded |

## MATERIALS

| | |
|---|---|
| **Substrates** | PET, PEEK, FR4 |

## ELECTRICAL CONNECTION

| | |
|---|---|
| | Female crimp contacts, Crimpflex solder pads * |

Mechanical and electrical characteristics are customizable. Specifications are subject to change without notice. * Others on request. ** Specifications may deviate according to temperature and installation conditions.

## SAMPLE ORDER

| Part no. | Type series | Resistance range | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| E090100100 | MMP | 2.5 K | 100 mm | Female crimp contacts |

# HALL POTENTIOMETER POH 120

The POH 120 is small and robust and features a freely programmable rotary angle. The measurement principle is via Hall effect as absolute measuring rotary sensor even after blackout. The POH series is available with a decoupled axis or integrated axis.

### FEATURES

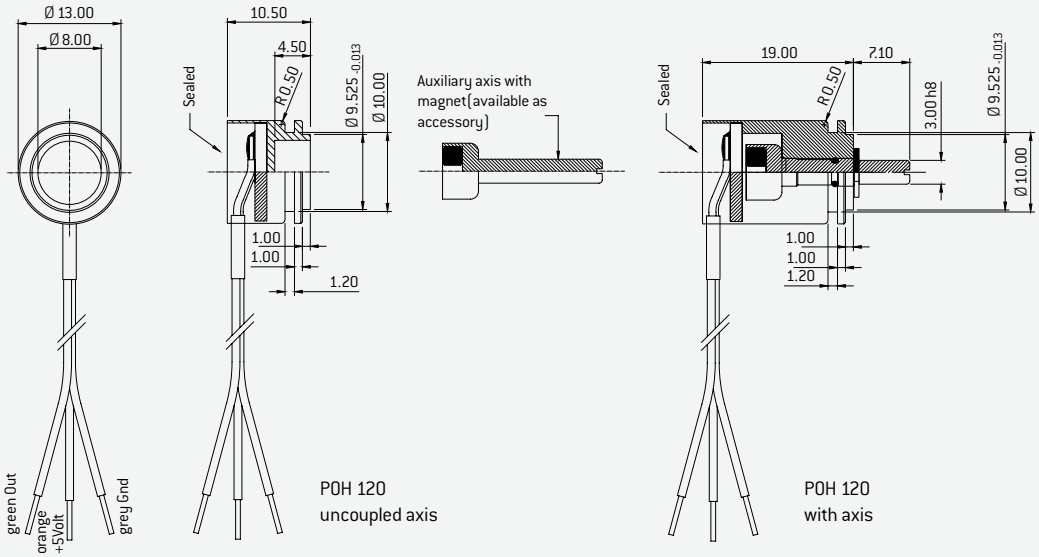
- Long lifetime
- Size Ø 13 mm

### APPLICATIONS

- Valve controls
- Joysticks
- Steering angle measurement
- Servo systems

### SPECIAL FEATURES

- Hall sensor
- Compensation for play and tolerance by decoupled axis possible
- Freely programmable angles possible
- load free engine when axis is uncoupled




## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Measuring range** | 0 – 360° programmable |
| **Independent linearity** | ± 0.5% |
| **Resolution** | 12 bit < 0.1° |
| **Supply voltage (Vs)** | 5 (± 10%) VDC |
| **Output signal** | 10% ... 90% of Vs |
| **Current consumption without load (typical)** | 18 mA |
| **Min. ohmic load at output** | 10 kOhm |
| **Max. capacitive load at output** | 10 nF |
| **Electrical connection** | Tinned cable wires |
| **Operating temperature** | –40°C ... +85°C * |

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Mechanical positioning range** | 360° continuous rotation |
| **Bearings** | Slide bearings / uncoupled load free |
| **Min. lifetime (mechanical)** | 200 million cycles |
| **Protection class** | IP 65 with axis / IP 67 uncoupled load free |

## MATERIALS

| | |
|---|---|
| **Housing material** | Stainless steel |
| **Axis material** | Brass (nickel plated) |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | –40°C ... +85°C * |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## SAMPLE ORDER

| | Part no. | Type series | Elect. measuring range | Elect. connection |
|---|---|---|---|---|
| POH 120 with axis | E050200120 | POH | 360° | Wire connection |
| POH 120 with uncoupled axis | E050200121 | POH | 360° | Wire connection |

# CONTACTLESS ROTARY SENSOR HMS 220

These contactless, absolute measuring rotary sensors based on the Hall effect are designed with robust housings. The Metallux series of rotary sensors HMS 220 features a long lifetime, excellent linearity and a robust design.

### FEATURES

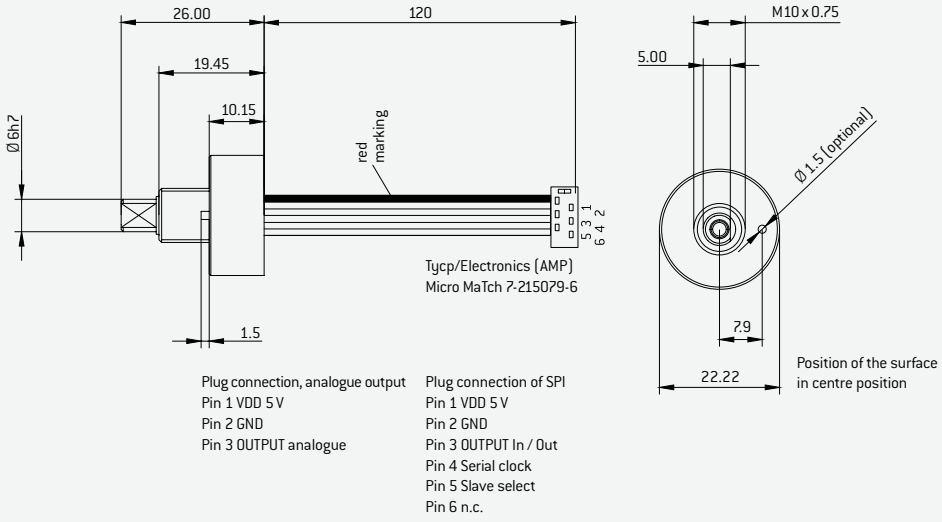
- Long lifetime
- Good linearity
- Robust design

### APPLICATIONS

- Joysticks
- Valve controls
- Steering angle measurement
- Servo systems

### SPECIAL FEATURES

- Hall sensor
- Freely programmable angles possible
- absolute measuring rotary sensors even after blackout




Plug connection, analogue output
Pin 1 VDD 5 V
Pin 2 GND
Pin 3 OUTPUT analogue

Plug connection of SPI
Pin 1 VDD 5 V
Pin 2 GND
Pin 3 OUTPUT In / Out
Pin 4 Serial clock
Pin 5 Slave select
Pin 6 n.c.

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Measuring range** | 0 – 360° programmable |
| **Independent linearity** | ± 0.5% |
| **Resolution** | 12 bit <0,1° |
| **Supply voltage (Vs)** | 5 (± 10%) VDC |
| **Output signal** | 10% ... 90% of Vs * |
| **Current consumption without load (typical)** | 18 mA |
| **Min. ohmic load at output** | 10 kOhm |
| **Max. capacitive load at output** | 10 nF |
| **Electrical connection** | Tinned cable wires |

Mechanical and electrical characteristics are customizable.
Specifications are subject to change without notice. * Others on request.

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Mechanical positioning range** | Continuous rotation |
| **Bearings** | Double ball bearing |
| **Min. lifetime (mechanical)** | 200 million cycles |

## MATERIALS

| | |
|---|---|
| **Housing material** | Anodised aluminium |
| **Axis material** | Stainless steel |

## AMBIENT CONDITIONS

| | |
|---|---|
| **Operating temperature** | –40°C ... +85°C * |

## OPTIONS

| | |
|---|---|
| **Electrical angle** | Programmable from 0° ... 360° |

## SAMPLE ORDER

| Part no. | Type series | Elect. measuring range | Elect. connection |
|---|---|---|---|
| H061500286 | HMS | 360° | Wire connection |

# ASSEMBLY: CONTACT-FREE MEMBRANE SENSORS AND MAGNET

Proper installation of our products is important for ensuring reliable operation and a long lifetime.
Please note the installation criteria listed below.

## PREPARING THE SURFACE

- The surface on which the membrane sensor is to be mounted has to be free of moisture, oil, grease and dust.
  Avoid change in temperature between the membrane sensor and the supporting surface.
- In addition, the surface should be flat in order to ensure faultless mounting and operation of the membrane sensor.
- Depending on the material of the supporting surface, isopropanol or butanone may be used as a cleaning agent.

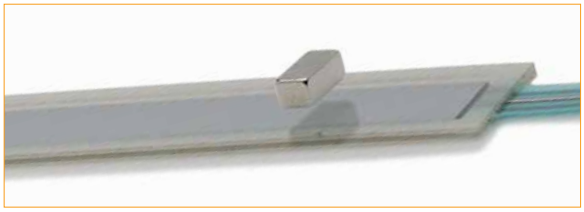
## MOUNTING THE MEMBRANE SENSOR

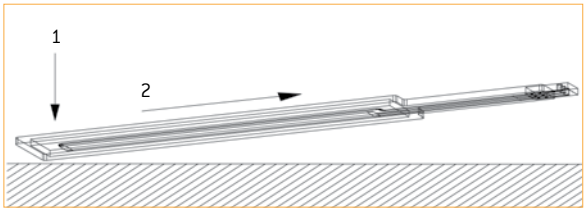
- Remove the protection paper from the adhesive film and place the membrane sensor at the desired position.
  Take care not to warp the sensor (bending or twisting).
- Gently press on one side of the membrane sensor (see point 1 in the drawing).
- Applying even pressure, move across the membrane sensor from the point of application
  until the sensor lies flush against the surface, without air bubbles (see point 2 in the drawing).

## MOUNTING THE MAGNET FOR CONTACTLESS MEMBRANE SENSORS

**In order to ensure proper actuation of the MMP, the magnet has to be mounted as follows:**

- In order for the measuring signal to be faultless, the magnet needs to be centred above the MMP.
- The magnet should be positioned at a distance of < 2.0 mm from the surface of the MMP.
- The magnet should be securely, permanently fixed in place. The magnet can be glued on or sealed in.





# MOUNTING RECOMMENDATION FOR MTP

Selecting the correct type of actuation and the correct materials is essential for ensuring the operational reliability of our MetaPot membrane sensors. Below, you will find the most important information for mounting. Our development team will be happy to assist you with your application.

| MATERIALS | BALL | SPRING FORCE |
|---|---|---|
| POM / Stainless steel | R 8 – 10 mm | 0.5 N – ...5 N * |

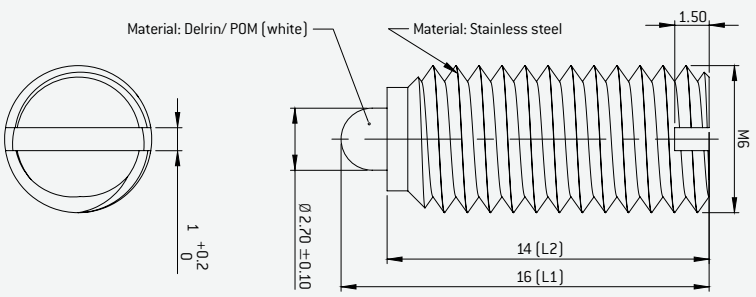
*** Contact force:** The contact force is the force required in order to establish the first electrical contact.
**Optimal spring force:** =1.5 x contact force

| EXAMPLE: | |
|---|---|
| **Contact force = 40 g** | (40g x 1.5 = 60g) |
| **Optimal spring force** | 60g ≙ about 0.6N |

**FACTORS THAT INFLUENCE THE SPRING FORCE:**

- Active measuring width
- Film material
- Travel speed

**STANDARD OPERATION SPRING LOADED PIN FOR MTP/MTP-LX ARTICLE NO. H959000000**



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