MPS-T, MPS-C, MPA
INTELLIGENT POSITION DETECTION – DESIGNED FOR PNEUMATIC DRIVES
Position sensors
The benefits of SICK position sensors at a glance

- Developed for and perfectly matched to non-contact distance measuring on pneumatic drives
- Time and money can be saved thanks to quick installation with mounting on the outside of the cylinder and easy integration even into existing equipment
- No complicated integration into the cylinder, no drilling of the piston rod
- Significant cost savings thanks to direct detection of the piston magnet without separate position encoders or additional mechanics
- Piston position is output as an analog signal, IO-Link process data, or flexible switching point
INTELLIGENT SENSORS FOR PNEUMATIC CYLINDERS

Pneumatic sensors by SICK impress with their intelligent functionality, their reliability, and their efficiency. With the MPS product family for direct mounting on T-slot and C-slot cylinders, and MPA for large piston diameters and long strokes, a sophisticated solution is available for every cylinder model.

SICK position sensors are used for the non-contact, continuous detection of the piston position in pneumatic cylinders. They are available in variants for different measuring ranges. The sensors developed specifically for pneumatic cylinders can be relied upon for high-resolution and precise position detection of the cylinder piston.

The MPA and MPS product families deliver crucial added value for automated processes. Such benefits are felt from the outset – the sensors are mounted on the outside of the piston cylinder, saving time and money right from the start. The continuous detection of the piston position by the position sensors significantly upgrades the functionality of pneumatic cylinders and drives, making them compatible for use in more intelligent applications, and thus providing solutions that are a great deal more efficient.

The MPS-T for direct mounting on T-slot cylinders.

The MPA is the ideal solution for large piston diameters and long strokes.
EXPANSION OF FIELDS OF APPLICATION FOR PNEUMATIC CYLINDERS AND DRIVES

Position sensors by SICK significantly expand the field of application of pneumatic cylinders and drives with their intelligent functionality. Efficient solutions for flexible machine concepts as well as optimum process control and quality monitoring can be implemented with the support of these sensors.

This is true, for example, of applications in which the movement of tools, format stops, feed mechanisms, or grippers has to be monitored permanently. There is a clear advantage here over conventional cylinder sensors, which can only detect individual positions. The position data from the piston position, which is output via the analog outputs or IO-Link, thus enables machine settings and process windows to be formulated in a much more flexible way.

In processes with multiple pneumatic cylinders, e.g., in a packaging machine, the motion sequences of the cylinders can be perfectly coordinated. As a result, the cycle time of the system can be reduced.

There are also benefits for quality control: Using a position sensor and a pneumatic cylinder is a very easy way of detecting position, situation, and other object properties (the material thickness of workpieces, for example).

The increases in efficiency that can be achieved by using SICK position sensors are not simply a quick fix for a specific step in the production process. Over a longer period of time, deviations from optimum process parameters can be derived from the application data and process data obtained from the response of the sensors, and used for continuous process control.

EXAMPLE APPLICATIONS

Precise position detection during final assembly with pneumatically-driven screw systems

Each SICK position sensor can detect up to six switching points per screwing unit (e.g., screw-in depth). A comparable solution would not be possible with single sensors because of restrictions in terms of the available slot space, the amount of wiring required in the tool, and the risk of mutual interference between the sensors.
High-precision monitoring of process windows in ultrasonic welding

SICK position sensors can be relied upon to very precisely detect and monitor the position of the sonotrodes in order to keep the ultrasonic welding process safely within a narrowly defined tolerance window. The sensors can be accessed from the outside without stopping and entering a system; if they need to be adjusted, the necessary work can be carried out without having to stop the machine and lose time due to retooling.

Additional areas of application

Process quality and product quality
- Automotive and parts supplier industry
  - Check for correct mounting and component dimensions
- Machine tools
  - Monitoring of the feed movement of the grinding disc to assure optimum surface quality of the workpiece
  - Monitoring on punching machines to ensure that the stamp penetrates the material at exactly the right depth
- Electronics production
  - Monitoring of the correct contact position of electronic components
- Handling and assembly technology
  - Measuring of material thickness and thus detection of OK and NOK parts
- Metal and steel processing
  - Double sheet detection

Flexible Automation
- Consumer goods and packaging
  - Quick adaptation of modified formats and process parameters
- Handling and assembly technology
  - Detection of the position, situation, and size of workpieces
- Packaging machines
  - Synchronization of multiple pneumatic movements in order to increase the cycle time of a machine
IDEALLY POSITIONED WITH A WHOLE HOST OF BENEFITS

SICK position sensors combine innovative technologies with high levels of user-friendliness and specific performance features.

Quick and easy mounting

Since the position sensors are mounted externally on the pneumatic cylinder, it is possible to integrate them at any suitable point in time in a machine. Even the installation direction can be freely selected. As the sensors detect the piston magnet directly, neither a separate position encoder nor a mechanism is required for their attachment to the piston rod of the cylinder.

Sensor solutions for every cylinder

SICK position sensors deliver genuine added value in terms of flexibility of drive selection. With sensors in various designs, SICK can offer the right solution for virtually any cylinder profile, thereby maximizing flexibility where drive selection is concerned – entirely independent of manufacturer, of course. What’s more, all product families are available in variants for multi-grade measuring ranges for both short and long strokes.

Save time during installation, commissioning, and whenever maintenance is required

High flexibility for machine design
Easy to operate

SICK position sensors offer particular benefits for the operators and users of machinery. Even post-installation, sensor settings such as measuring range, analog output, switching points, or switching behavior can be adapted to changes in the production process via a teach-in button or IO-Link. The ability to adapt the sensor parameters via IO-Link from the controller is of particular benefit if the pneumatic drives are difficult to access or are located in a fenced-off area of the system.

Examples of modifications via pushbutton or IO-Link:

- Adapting the measuring range
- Inverting the analog signal
- Setting switching points
- Inverting switching functions

Smart Sensor Solutions powered by IO-Link

By seamlessly integrating sensors into an automation network, you can tap into new ways of increasing flexibility, reliability, and efficiency and in so doing increase the productivity of a machine or system.

SICK position sensors offer all of the benefits of IO-Link communication, including:

- Easy device replacement
- Flexible sensor adjustment
- Condition monitoring
- Electronic parts list

In addition, the Smart Sensor Solutions technology creates advanced diagnostics and alarm functions as well as various options for configuring process data (position, switching points, logic).

High flexibility for modifications during live operation

Maximum productivity through intelligent, communicative sensors

OVERVIEW OF THE PRODUCT FAMILIES

<table>
<thead>
<tr>
<th>MPS-C</th>
<th>MPS-T</th>
<th>MPA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mounting</strong></td>
<td>Direct mounting in C-slots</td>
<td>Direct mounting in T-slots</td>
</tr>
<tr>
<td><strong>Measuring ranges</strong></td>
<td>25 mm, 50 mm, 10 mm, and 200 mm</td>
<td>32 mm, 64 mm, 96 mm, 128 mm, 160 mm, 92 mm, 224 mm, 256 mm</td>
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<tr>
<td><strong>Outputs</strong></td>
<td>0 V ... 10 V, 4 mA ... 20 mA, IO-Link, programmable switching output</td>
<td>0 V ... 10 V, 4 mA ... 20 mA, or IO-Link</td>
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<tr>
<td><strong>Suitable cylinders</strong></td>
<td>Short to medium strokes, grippers</td>
<td>Short to medium strokes</td>
</tr>
</tbody>
</table>

→ 8 | → 16 | → 22
Product description

MPS-T position sensors continuously detect the piston position of pneumatic actuators using a direct, non-contact method. They can be mounted in T-slots without the need for additional accessories. The sensor settings can be adjusted during installation and during operation later on, using a teach pad or – depending on the variant – using IO-Link. The sensors continuously supply data via analog outputs or IO-Link, enabling flexible machine concepts and making it possible to solve tasks in areas such as quality monitoring and process control in conjunction with pneumatic cylinders and drives. This continuous transfer of position data upgrades the functionality of the pneumatic cylinders by making them more intelligent – and, as a result, more versatile.

At a glance

- Position sensor for direct mounting in T-slots on pneumatic cylinders
- Sensor variants with measuring ranges of 32 mm to 256 mm
- Analog outputs (for current or voltage), switching output, and IO-Link
- Mounting on other cylinder types (e.g., round body cylinders) is possible with adapters

Your benefits

- Rapid mounting and exchange of sensors with drop-in
- Straightforward installation as no additional mechanical components or position elements are required
- Can be integrated into the machine at any time, as the sensor is attached to the cylinder externally
- Easy adjustment of sensor settings and parameters during operation using a teach field or IO-Link
- More flexibility compared to conventional cylinder sensors, as it is possible to define multiple switching points in the smallest of spaces
- Long service life thanks to non-contact measurement principle
- Advanced diagnostic options thanks to data transmission via IO-Link
Detailed technical data

Features

<table>
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<tr>
<th></th>
<th>MPS-T with analog output</th>
<th>MPS-T with IO-Link</th>
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<tr>
<td>Cylinder type</td>
<td>T-slot</td>
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<td>Cylinder types with adapter</td>
<td>Round body cylinder</td>
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<td>Profile cylinder and tie-rod cylinder</td>
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<td>Cylinders with dovetail-slot</td>
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<td></td>
<td>SMC rails CDQ2, SMC rails ECDQ2</td>
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<td></td>
<td>SMC cylinders with C-slot</td>
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<tr>
<td>Housing length</td>
<td>45 mm ... 269 mm (depending on type)</td>
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<td>Output function</td>
<td>Analog</td>
<td>IO-Link</td>
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<td>Analog output (voltage)</td>
<td>0 V ... 10 V</td>
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<td>Analog output (current)</td>
<td>4 mA ... 20 mA</td>
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<td>Enclosure rating (^2)</td>
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\(^1\) ± 1 mm.
\(^2\) According to EN 60529.

Mechanics/electronics

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<td>Supply voltage (^3)</td>
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<td>Power consumption (^2)</td>
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<td>Max. load resistance (^3)</td>
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<td>Min. load resistance (^4)</td>
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<td>Time delay before availability</td>
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<td>Linearity error, typ. (^6)</td>
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<td>Repeat accuracy, typ. (^7)</td>
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\(^3\) Reverse-polarity protected, operation in short-circuit protected network: max. 8 A.
\(^2\) Without load.
\(^4\) Power output, at 24 V.
\(^5\) Voltage output.
\(^6\) FSR: Full Scale Range; max. measuring range.
\(^7\) At 25 °C, linearity error (maximum deviation) depending on response curve and minimal deviation function.
\(^8\) At 25 °C, repeatability magnet movement in one direction.
\(^9\) Only in standard mode, not in IO-Link mode.

\(^1\) The analog measured value can deviate under transient conditions.
### MPS-T with analog output

- **Output function:** Analog
- **Cable material:** PUR

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<tr>
<th>Measuring range</th>
<th>Housing length</th>
<th>Teach-in</th>
<th>Connection 2)</th>
<th>Connection diagram</th>
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1) ± 1 mm.  
2) Do not bend below 0 °C.
MPS-T with IO-Link

- **Output function:** IO-Link
- **Cable material:** PUR

<table>
<thead>
<tr>
<th>Measuring range 1)</th>
<th>Housing length</th>
<th>Teach-in</th>
<th>Connection 2)</th>
<th>Connection diagram</th>
<th>Type</th>
<th>Part no.</th>
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<td>269 mm</td>
<td>✓</td>
<td>Cable with M12 male connector, 4-pin, 0.3 m</td>
<td>Cd-179</td>
<td>MPS-256TLTQ0</td>
<td>1062520</td>
</tr>
</tbody>
</table>

1) ± 1 mm.
2) Do not bend below 0 °C.

### Dimensional drawing (Dimensions in mm (inch))

#### Teach-in

![Teach-in Diagram](image)

- Function indicator
- Fixing screw
- Teach-in button

#### Without teach-in

![Without Teach-in Diagram](image)

- Function indicator
- Fixing screw

<table>
<thead>
<tr>
<th>Type</th>
<th>Total length (L1) mm</th>
<th>Measuring range (L2) mm</th>
<th>Distance mounting screws (L3) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS-32</td>
<td>45</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>MPS-64</td>
<td>77</td>
<td>64</td>
<td>72</td>
</tr>
<tr>
<td>MPS-96</td>
<td>109</td>
<td>96</td>
<td>104</td>
</tr>
<tr>
<td>MPS-128</td>
<td>141</td>
<td>128</td>
<td>136</td>
</tr>
<tr>
<td>MPS-160</td>
<td>173</td>
<td>160</td>
<td>168</td>
</tr>
<tr>
<td>MPS-192</td>
<td>205</td>
<td>192</td>
<td>200</td>
</tr>
<tr>
<td>MPS-224</td>
<td>237</td>
<td>224</td>
<td>232</td>
</tr>
<tr>
<td>MPS-256</td>
<td>269</td>
<td>256</td>
<td>264</td>
</tr>
<tr>
<td>MPS-32</td>
<td>45</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>MPS-64</td>
<td>77</td>
<td>64</td>
<td>72</td>
</tr>
<tr>
<td>MPS-96</td>
<td>109</td>
<td>96</td>
<td>104</td>
</tr>
<tr>
<td>MPS-128</td>
<td>141</td>
<td>128</td>
<td>136</td>
</tr>
<tr>
<td>MPS-160</td>
<td>173</td>
<td>160</td>
<td>168</td>
</tr>
<tr>
<td>MPS-192</td>
<td>205</td>
<td>192</td>
<td>200</td>
</tr>
<tr>
<td>MPS-224</td>
<td>237</td>
<td>224</td>
<td>232</td>
</tr>
<tr>
<td>MPS-256</td>
<td>269</td>
<td>256</td>
<td>264</td>
</tr>
</tbody>
</table>
Connection diagram

Cd-359
- brn
- blk
- wht
- blu

+ (L+)
U_{out}
I_{out}

Cd-034
- brn
- blk
- wht
- blu

+ (L+)
U_{out}
I_{out}

Cd-179
- brn
- blk
- wht
- blu

+ (L+)
not connected

Recommended accessories

Mounting systems

Brackets for cylinder sensors

For cylinders with dovetail-slot

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket for cylinder with dovetail slot</td>
<td>BEF-KHZ-ST1</td>
<td>2022703</td>
</tr>
</tbody>
</table>

For profile cylinders and tie-rod cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zinc diecast</td>
<td>Mounting bracket for integrated profile cylinder/tie-rod cylinder</td>
<td>BEF-KHZ-PT1</td>
<td>2022702</td>
</tr>
</tbody>
</table>

For round body cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 12 mm</td>
<td>BEF-KHZ-RT-12</td>
<td>2077681</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 16 mm</td>
<td>BEF-KHZ-RT-16</td>
<td>2077680</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 20 mm</td>
<td>BEF-KHZ-RT-20</td>
<td>2077679</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 25 mm</td>
<td>BEF-KHZ-RT-25</td>
<td>2077678</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 32 mm</td>
<td>BEF-KHZ-RT-32</td>
<td>2077677</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 40 mm</td>
<td>BEF-KHZ-RT-40</td>
<td>2077676</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 50 mm</td>
<td>BEF-KHZ-RT-50</td>
<td>2077675</td>
</tr>
<tr>
<td></td>
<td>Plastic, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 63 mm</td>
<td>BEF-KHZ-RT-63</td>
<td>2077674</td>
</tr>
</tbody>
</table>

For SMC cylinders with C-slot

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket with T-slot for mounting a MPS on SMC C-slot cylinders. For each MPS a minimum of 2 brackets is recommended.</td>
<td>BEF-KHZ-CT23</td>
<td>2074119</td>
</tr>
</tbody>
</table>
### For SMC rails CDQ2 (T-/C-slot)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket for mounting on SMC rails CDQ2 (T-slot)</td>
<td>BEF-KHZ-TT2</td>
<td>2046440</td>
</tr>
</tbody>
</table>

### For SMC rails ECDQ2 (T-/C-slot)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket for mounting on SMC rails ECDQ2 (T-slot)</td>
<td>BEF-KHZ-TT1</td>
<td>2046439</td>
</tr>
</tbody>
</table>

### Others

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Label Holder, 2.5 mm to 3.5 mm, 10 pcs.</td>
<td>LABEL HOLDER</td>
<td>2086019</td>
</tr>
<tr>
<td></td>
<td>Cable clips T-slot, 10 pcs./bag</td>
<td>CABLE CLIPS</td>
<td>2059322</td>
</tr>
</tbody>
</table>

### Connection systems

#### Connecting cables with female connector

**M12, 4-pin, PUR, halogen-free, Oil / grease resistant**

- **Cable material**: PUR, halogen-free
- **Connector material**: TPU

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M12, 4-pin, straight, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-1204-G02MC</td>
<td>6025900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-1204-G05MC</td>
<td>6025901</td>
</tr>
<tr>
<td></td>
<td>Female connector, M12, 4-pin, angled, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-1204-W02MC</td>
<td>6025903</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-1204-W05MC</td>
<td>6025904</td>
</tr>
</tbody>
</table>

**M8, 4-pin, PUR, halogen-free, Oil / grease resistant**

- **Cable material**: PUR, halogen-free
- **Connector material**: TPU

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-G02MC</td>
<td>6025894</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-0804-G05MC</td>
<td>6025895</td>
</tr>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-W02MC</td>
<td>6025897</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-0804-W05MC</td>
<td>6025898</td>
</tr>
</tbody>
</table>
## Female connectors (ready to assemble), M12, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image" /></td>
<td>Female connector, M12, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>DOS-1204-G</td>
<td>6007302</td>
</tr>
<tr>
<td><img src="image2" alt="Image" /></td>
<td>Female connector, M12, 4-pin, angled, unshielded</td>
<td>Screw-type terminals</td>
<td>DOS-1204-W</td>
<td>6007303</td>
</tr>
</tbody>
</table>

## Female connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Image" /></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>DOS-0804-G</td>
<td>6009974</td>
</tr>
<tr>
<td><img src="image4" alt="Image" /></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Solder connection</td>
<td>DOS-0804-W</td>
<td>6009975</td>
</tr>
</tbody>
</table>

## Male connectors (ready to assemble), M12, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Image" /></td>
<td>Male connector, M12, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>STE-1204-G</td>
<td>6009932</td>
</tr>
<tr>
<td><img src="image6" alt="Image" /></td>
<td>Male connector, M12, 4-pin, angled, unshielded</td>
<td>Screw-type terminals</td>
<td>STE-1204-W</td>
<td>6022084</td>
</tr>
</tbody>
</table>

## Male connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Image" /></td>
<td>Male connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>STE-0804-G</td>
<td>6037323</td>
</tr>
</tbody>
</table>
**Product description**

MPS-C position sensors continuously detect the piston position of pneumatic actuators using a direct, non-contact method. They can be mounted in C-slots without the need for additional accessories. The sensor settings can be adjusted during installation and during operation later on, using a teach field or IO-Link. The sensors continuously supply data via analog outputs or IO-Link, enabling flexible machine concepts and making it possible to solve tasks in areas such as quality monitoring and process control in conjunction with pneumatic cylinders and drives. This continuous transfer of position data upgrades the functionality of the pneumatic cylinders by making them more intelligent – and, as a result, more versatile.

**At a glance**

- Position sensor for direct mounting in C-slots on pneumatic cylinders and grippers
- Sensor variants with measuring ranges of 25 mm to 200 mm
- Analog outputs (for current or voltage), switching output, and IO-Link
- Mounting on other cylinder types (e.g., round body cylinders) is possible with adapters

**Your benefits**

- Rapid mounting and exchange of sensors with drop-in
- Straightforward installation as no additional mechanical components or position elements are required
- Can be integrated into the machine at any time, as the sensor is attached to the cylinder externally
- Easy adjustment of sensor settings and parameters during operation using a teach pad or IO-Link
- More flexibility compared to conventional cylinder sensors, as it is possible to define multiple switching points in the smallest of spaces
- Excellent reliability thanks to the rugged sensor design and non-contact measurement principle
- Advanced diagnostic options thanks to data transmission via IO-Link

**Additional information**

- Detailed technical data 17
- Ordering information 18
- Dimensional drawing 18
- Connection diagram 18
- Recommended accessories 19

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.
## Detailed technical data

### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder type</td>
<td>C-slot</td>
</tr>
<tr>
<td>Cylinder types with adapter</td>
<td>Round body cylinder</td>
</tr>
<tr>
<td></td>
<td>Profile cylinder and tie-rod cylinder</td>
</tr>
<tr>
<td></td>
<td>SMC rails CDQ2</td>
</tr>
<tr>
<td></td>
<td>SMC rails ECDQ2</td>
</tr>
<tr>
<td>Measuring range</td>
<td>25 mm ... 200 mm (^1) (depending on type)</td>
</tr>
<tr>
<td>Housing length</td>
<td>41 mm ... 215 mm (depending on type)</td>
</tr>
<tr>
<td>Output function</td>
<td>Analog, IO-Link, Output type</td>
</tr>
<tr>
<td>Analog output (voltage)</td>
<td>0 V ... 10 V</td>
</tr>
<tr>
<td>Analog output (current)</td>
<td>4 mA ... 20 mA</td>
</tr>
<tr>
<td>Teach-in</td>
<td>✓</td>
</tr>
<tr>
<td>Enclosure rating (^2)</td>
<td>IP 67</td>
</tr>
</tbody>
</table>

\(^1\) ± 1 mm.
\(^2\) According to EN 60529.

### Mechanics/electronics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (^3)</td>
<td>12 V DC ... 30 V DC</td>
</tr>
<tr>
<td>Power consumption (^4)</td>
<td>(\leq 42) mA</td>
</tr>
<tr>
<td>Max. load resistance (^3)</td>
<td>(\leq 500) (\Omega)</td>
</tr>
<tr>
<td>Min. load resistance (^4)</td>
<td>(\geq 2) (\Omega)</td>
</tr>
<tr>
<td>Protection class</td>
<td>III</td>
</tr>
<tr>
<td>Time delay before availability</td>
<td>1.5 s</td>
</tr>
<tr>
<td>Required magnetic field sensitivity, typ.</td>
<td>3 mT</td>
</tr>
<tr>
<td>Resolution, typ.</td>
<td>(\geq 50) (\mu m)</td>
</tr>
<tr>
<td>Linearity error, typ. (^5)</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>Repeat accuracy, typ. (^6)</td>
<td>0.1 mm</td>
</tr>
<tr>
<td>Sampling rate, typ. (^7)</td>
<td>1 ms</td>
</tr>
<tr>
<td>Digital switching output</td>
<td>✓</td>
</tr>
<tr>
<td>IO-Link</td>
<td>✓</td>
</tr>
<tr>
<td>Status indicator LED</td>
<td>✓</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>✓</td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td>✓</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>-20 °C ... +70 °C</td>
</tr>
<tr>
<td>Shock and vibration resistance</td>
<td>30 g, 11 ms / 10 ... 55 Hz, 1 mm</td>
</tr>
<tr>
<td>EMC (^8)</td>
<td>According to EN 60947-5-7</td>
</tr>
<tr>
<td>Housing material</td>
<td>Plastic</td>
</tr>
<tr>
<td>Cable material</td>
<td>PUR</td>
</tr>
<tr>
<td>Conductor cross-section</td>
<td>0.08 mm(^2)</td>
</tr>
<tr>
<td>UL File No.</td>
<td>NRKH.E181493</td>
</tr>
</tbody>
</table>

\(^3\) Reverse-polarity protected, operation in short-circuit protected network: max. 8 A.

\(^4\) Without load.

\(^5\) Power output, at 24 V.

\(^6\) Voltage output.

\(^7\) At 25 °C, linearity error (maximum deviation) depending on response curve and minimal deviation function.

\(^8\) At 25 °C, repeatability magnet movement in one direction.

\(^7\) Only in standard mode, not in IO-Link mode.

\(^8\) The analog measured value can deviate under transient conditions.
Ordering information
Other models ➔ www.sick.com/MPS-C

- **Output function**: Analog, IO-Link, Output type
- **Teach-in**: ✔
- **Cable material**: PUR

<table>
<thead>
<tr>
<th>Measuring range 1)</th>
<th>Housing length</th>
<th>Connection 2)</th>
<th>Connection diagram</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 mm</td>
<td>41 mm</td>
<td>Cable, 2 m</td>
<td>Cd-358</td>
<td>MPS-025CLTU0</td>
<td>1079359</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable with M8 male connector, 4-pin, 0.3 m</td>
<td>Cd-357</td>
<td>MPS-025CLTP0</td>
<td>1079358</td>
</tr>
<tr>
<td>50 mm</td>
<td>65 mm</td>
<td>Cable, 2 m</td>
<td>Cd-358</td>
<td>MPS-050CLTU0</td>
<td>1079361</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable with M8 male connector, 4-pin, 0.3 m</td>
<td>Cd-357</td>
<td>MPS-050CLTP0</td>
<td>1079360</td>
</tr>
<tr>
<td>100 mm</td>
<td>115 mm</td>
<td>Cable, 2 m</td>
<td>Cd-358</td>
<td>MPS-100CLTU0</td>
<td>1079363</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable with M8 male connector, 4-pin, 0.3 m</td>
<td>Cd-357</td>
<td>MPS-100CLTP0</td>
<td>1079362</td>
</tr>
<tr>
<td>200 mm</td>
<td>215 mm</td>
<td>Cable, 2 m</td>
<td>Cd-358</td>
<td>MPS-200CLTU0</td>
<td>1079365</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable with M8 male connector, 4-pin, 0.3 m</td>
<td>Cd-357</td>
<td>MPS-200CLTP0</td>
<td>1079364</td>
</tr>
</tbody>
</table>

1) ± 1 mm.
2) Do not bend below 0 °C.

---

**Dimensional drawing** (Dimensions in mm (inch))

---

**Connection diagram**

---
Recommended accessories

Mounting systems

For round body cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stainless steel, Aluminum</td>
<td>Mounting bracket on round body cylinder with piston diameter of 1 mm ... 25 mm (^1)</td>
<td>BEF-KHZ-RC1-25</td>
<td>2077685</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mounting bracket on round body cylinder with piston diameter of 1 mm ... 130 mm (^1)</td>
<td>BEF-KHZ-RC1-130</td>
<td>2077686</td>
</tr>
</tbody>
</table>

\(^1\) Ambient temperature min -30 °C max 80 °C.

For profile cylinders and tie-rod cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zinc diecast</td>
<td>Mounting bracket for integrated profile cylinder/tie-rod cylinder</td>
<td>BEF-KHZ-PC1</td>
<td>2076170</td>
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</tbody>
</table>

For SMC rails CDQ2 (T-/C-slot)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket for mounting on SMC rails CDQ2 (C-slot)</td>
<td>BEF-KHZ-TC2</td>
<td>2046442</td>
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</tbody>
</table>

For SMC rails ECDQ2 (T-/C-slot)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum</td>
<td>Mounting bracket for mounting on SMC rails ECDQ2 (C-slot)</td>
<td>BEF-KHZ-TC1</td>
<td>2046441</td>
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</table>

Others

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Label Holder, 2.5 mm to 3.5 mm, 10 pcs.</td>
<td>LABEL HOLDER</td>
<td>2086019</td>
</tr>
</tbody>
</table>
## Connection systems

Connecting cables with female connector

### M8, 4-pin, PUR, halogen-free, Oil / grease resistant
- **Cable material**: PUR, halogen-free
- **Connector material**: TPU

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-G02MC</td>
<td>6025894</td>
</tr>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-W02MC</td>
<td>6025897</td>
</tr>
</tbody>
</table>

### M8, 4-pin, PVC, chemical resistant
- **Cable material**: PVC
- **Locking nut material**: CuZn, nickel-plated brass

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-G02M</td>
<td>6009870</td>
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<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-W02M</td>
<td>6009871</td>
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</tbody>
</table>

### Female connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>DOS-0804-G</td>
<td>6009974</td>
</tr>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Solder connection</td>
<td>DOS-0804-W</td>
<td>6009975</td>
</tr>
</tbody>
</table>

### Male connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>STE-0804-G</td>
<td>6037323</td>
</tr>
</tbody>
</table>
Product description
MPA position sensors continuously detect the piston position of pneumatic actuators using a direct, non-contact method. The sensors in the MPA product family are ideal for large piston diameters and long strokes. The sensor settings can be adjusted during installation and during operation later on, using a teach field or – depending on the variant – using IO-Link. The sensors continuously supply data via analog outputs or IO-Link, enabling flexible machine concepts and making it possible to solve tasks in areas such as quality monitoring and process control in conjunction with pneumatic cylinders and drives. This continuous transfer of position data upgrades the functionality of the pneumatic cylinders by making them more intelligent – and, as a result, more versatile.

At a glance
• Position sensor for use on pneumatic cylinders
• Sensor variants with measuring ranges of 107 mm to 1,007 mm
• Analog outputs (for current or voltage), switching output, and IO-Link
• Mounting with adapters on a multitude of cylinder types (tie-rod cylinders, round body cylinders, profile cylinders)

Your benefits
• Straightforward installation as no position elements or additional mechanical components are required for coupling with the piston rod
• Can be integrated into the machine at any time, as the sensor is attached to the cylinder externally
• Easy adjustment of sensor settings and parameters during operation using a teach pad or IO-Link
• More flexibility compared to conventional cylinder sensors, as it is possible to define multiple switching points in the smallest of spaces
• Maximum reliability thanks to the rugged aluminum housing and non-contact measurement principle
• Advanced diagnostic options thanks to data transmission via IO-Link

Additional information
Detailed technical data ............ 23
Ordering information .............24
Dimensional drawing ..............25
Connection diagram ...............25
Recommended accessories ...... 26

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

www.sick.com/MPA
**Detailed technical data**

**Features**

<table>
<thead>
<tr>
<th>Cylinder types with adapter</th>
<th>Round body cylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tie-rod cylinder</td>
</tr>
<tr>
<td></td>
<td>T-slot cylinder</td>
</tr>
<tr>
<td></td>
<td>Festo cylinder DSBC</td>
</tr>
<tr>
<td></td>
<td>SMC cylinder CP96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>107 mm ... 1,007 mm (^1) (depending on type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing length</td>
<td>109 mm ... 1,009 mm (depending on type)</td>
</tr>
<tr>
<td>Output function</td>
<td>Analog, IO-Link</td>
</tr>
<tr>
<td>Analog output (voltage)</td>
<td>0 V ... 10 V</td>
</tr>
<tr>
<td>Analog output (current)</td>
<td>4 mA ... 20 mA</td>
</tr>
<tr>
<td>Teach-in</td>
<td>✔</td>
</tr>
<tr>
<td>Enclosure rating (^2)</td>
<td>IP 65, IP 67, IP 68</td>
</tr>
</tbody>
</table>

\(^1\) ± 1 mm.

\(^2\) According to EN 60529.

**Mechanics/electronics**

<table>
<thead>
<tr>
<th>Supply voltage (^3)</th>
<th>15 V DC ... 30 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption (^4)</td>
<td>≤ 35 mA</td>
</tr>
<tr>
<td>Max. load resistance (^5)</td>
<td>≤ 500 Ω</td>
</tr>
<tr>
<td>Min. load resistance (^6)</td>
<td>≥ 2 kΩ</td>
</tr>
<tr>
<td>Protection class</td>
<td>III</td>
</tr>
<tr>
<td>Required magnetic field sensitivity, typ.</td>
<td>2 mT</td>
</tr>
<tr>
<td>Resolution, typ. (^7)</td>
<td>0.03% FSR (max. ≥ 0.06 mm)</td>
</tr>
<tr>
<td>Linearity error, typ. (^8)</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>Repeat accuracy, typ. (^9)</td>
<td>0.06% FSR (≥ 0.1 mm)</td>
</tr>
<tr>
<td>Sampling rate, typ. (^10)</td>
<td>1.15 ms</td>
</tr>
<tr>
<td>IO-Link</td>
<td>✔</td>
</tr>
<tr>
<td>Status indicator LED</td>
<td>✔</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>✔</td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td>✔</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>-20 °C ... +70 °C</td>
</tr>
<tr>
<td>Shock and vibration resistance</td>
<td>30 g, 11 ms/10 Hz ... 55 Hz, 1 mm</td>
</tr>
<tr>
<td>EMC (^11)</td>
<td>According to EN 60947-5-2</td>
</tr>
<tr>
<td>Housing material</td>
<td>Aluminum, plastic</td>
</tr>
<tr>
<td>Cable material</td>
<td>PUR</td>
</tr>
<tr>
<td>Conductor cross-section</td>
<td>0.08 mm(^2)</td>
</tr>
<tr>
<td>UL File No.</td>
<td>NRKH.E181493</td>
</tr>
</tbody>
</table>

\(^3\) Reverse-polarity protected, operation in short-circuit protected network: max. 8 A.

\(^4\) Without load.

\(^5\) Power output, at 24 V.

\(^6\) Voltage output.

\(^7\) FSR: Full Scale Range; max. measuring range.

\(^8\) At 25 °C, linearity error (maximum deviation) depending on response curve and minimal deviation function.

\(^9\) At 25 °C, repeatability magnet movement in one direction.

\(^10\) Only in standard mode, not in IO-Link mode.

\(^11\) The analog measured value can deviate under transient conditions.
### Ordering Information

Other models ➔ [www.sick.com/MPA](http://www.sick.com/MPA)

- **Output function:** Analog, IO-Link
- **Teach-in:** ✓
- **Cable material:** PUR

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Housing length</th>
<th>Connection</th>
<th>Connection diagram</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>107 mm</td>
<td>109 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-107THTU0</td>
<td>1059443</td>
</tr>
<tr>
<td>143 mm</td>
<td>145 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-143THTU0</td>
<td>1059444</td>
</tr>
<tr>
<td>179 mm</td>
<td>181 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-179THTU0</td>
<td>1059447</td>
</tr>
<tr>
<td>215 mm</td>
<td>217 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-215THTU0</td>
<td>1059449</td>
</tr>
<tr>
<td>251 mm</td>
<td>253 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-251THTU0</td>
<td>1059451</td>
</tr>
<tr>
<td>287 mm</td>
<td>289 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-287THTU0</td>
<td>1059453</td>
</tr>
<tr>
<td>323 mm</td>
<td>325 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-323THTU0</td>
<td>1059455</td>
</tr>
<tr>
<td>359 mm</td>
<td>361 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-359THTU0</td>
<td>1059457</td>
</tr>
<tr>
<td>395 mm</td>
<td>397 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-395THTU0</td>
<td>1059459</td>
</tr>
<tr>
<td>431 mm</td>
<td>433 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-431THTU0</td>
<td>1059461</td>
</tr>
<tr>
<td>467 mm</td>
<td>469 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-467THTU0</td>
<td>1059463</td>
</tr>
<tr>
<td>503 mm</td>
<td>505 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-503THTU0</td>
<td>1059465</td>
</tr>
<tr>
<td>539 mm</td>
<td>541 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-539THTP0</td>
<td>1059464</td>
</tr>
<tr>
<td>575 mm</td>
<td>577 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-575THTP0</td>
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</tr>
<tr>
<td>611 mm</td>
<td>613 mm</td>
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<td>Cd-354</td>
<td>MPA-611THTP0</td>
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</tr>
<tr>
<td>647 mm</td>
<td>649 mm</td>
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<td>MPA-647THTP0</td>
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<tr>
<td>683 mm</td>
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<tr>
<td>719 mm</td>
<td>721 mm</td>
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<td>Cd-354</td>
<td>MPA-719THTP0</td>
<td>1059471</td>
</tr>
<tr>
<td>755 mm</td>
<td>757 mm</td>
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<td>Cd-354</td>
<td>MPA-755THTP0</td>
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</tr>
<tr>
<td>791 mm</td>
<td>793 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-791THTP0</td>
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</tr>
<tr>
<td>827 mm</td>
<td>829 mm</td>
<td>Cable, 2 m</td>
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<td>MPA-827THTP0</td>
<td>1059474</td>
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<tr>
<td>863 mm</td>
<td>865 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-863THTP0</td>
<td>1059475</td>
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<tr>
<td>899 mm</td>
<td>901 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-899THTP0</td>
<td>1059476</td>
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<tr>
<td>935 mm</td>
<td>937 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-935THTP0</td>
<td>1059477</td>
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<tr>
<td>971 mm</td>
<td>973 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-971THTP0</td>
<td>1059478</td>
</tr>
<tr>
<td>1,007 mm</td>
<td>1,009 mm</td>
<td>Cable, 2 m</td>
<td>Cd-354</td>
<td>MPA-1007THTP0</td>
<td>1059479</td>
</tr>
</tbody>
</table>

1) ± 1 mm.

2) Do not bend below 0 °C.
Dimensional drawing (Dimensions in mm (inch))

Connection diagram

Cd-354

Cd-355

1. Function signal indicator 1
2. Function signal indicator 2
3. Teach-Pad

<table>
<thead>
<tr>
<th>Total length (L1) mm</th>
<th>Measuring range (L2) mm</th>
<th>Total length (L1) mm</th>
<th>Measuring range (L2) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPA-107</td>
<td>109</td>
<td>MPA-575</td>
<td>577</td>
</tr>
<tr>
<td>MPA-143</td>
<td>145</td>
<td>MPA-611</td>
<td>613</td>
</tr>
<tr>
<td>MPA-179</td>
<td>181</td>
<td>MPA-647</td>
<td>649</td>
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<tr>
<td>MPA-215</td>
<td>217</td>
<td>MPA-683</td>
<td>685</td>
</tr>
<tr>
<td>MPA-251</td>
<td>253</td>
<td>MPA-719</td>
<td>721</td>
</tr>
<tr>
<td>MPA-287</td>
<td>289</td>
<td>MPA-755</td>
<td>757</td>
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<tr>
<td>MPA-323</td>
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<td>MPA-791</td>
<td>793</td>
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<tr>
<td>MPA-359</td>
<td>361</td>
<td>MPA-827</td>
<td>829</td>
</tr>
<tr>
<td>MPA-395</td>
<td>397</td>
<td>MPA-863</td>
<td>865</td>
</tr>
<tr>
<td>MPA-431</td>
<td>433</td>
<td>MPA-899</td>
<td>901</td>
</tr>
<tr>
<td>MPA-467</td>
<td>469</td>
<td>MPA-935</td>
<td>937</td>
</tr>
<tr>
<td>MPA-503</td>
<td>505</td>
<td>MPA-971</td>
<td>973</td>
</tr>
<tr>
<td>MPA-539</td>
<td>541</td>
<td>MPA-1007</td>
<td>1,009</td>
</tr>
</tbody>
</table>

8020056/2016-09-16
Subject to change without notice
### Recommended accessories

#### Mounting systems

For profile cylinders and tie-rod cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Measuring range sensor (amount of required brackets)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Adapter" /></td>
<td>Aluminum alloy (adapter), Stainless steel V2A (mounting/fixing screw)</td>
<td>107 mm ... 251 mm (2 pcs.), 287 mm ... 431 mm (3 pcs.), 467 mm ... 647 mm (4 pcs.), 683 mm ... 791 mm (5 pcs.), 827 mm ... 1,007 mm (6 pcs.)</td>
<td>For tie-rod cylinder (diameter tie-rod max. 18 mm)</td>
<td>BEF-KHZPZ1MPA</td>
<td>2065578</td>
</tr>
</tbody>
</table>

For round body cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Measuring range sensor (amount of required brackets)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Cylinder" /></td>
<td>Stainless steel V2A</td>
<td>107 mm ... 359 mm (2 pcs.), 395 mm ... 647 mm (3 pcs.), 683 mm ... 935 mm (4 pcs.), 971 mm ... 1,007 mm (5 pcs.)</td>
<td>For round body cylinders with diameter up to 85 mm</td>
<td>BEF-KHZR085MPA</td>
<td>2066626</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For round body cylinders with diameter up to 135 mm</td>
<td>BEF-KHZR135MPA</td>
<td>2066627</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For round body cylinders with diameter up to 210 mm</td>
<td>BEF-KHZR210MPA</td>
<td>2066628</td>
</tr>
</tbody>
</table>

For T-slot cylinders

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Measuring range sensor (amount of required brackets)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="T-slot" /></td>
<td>Stainless steel V2A (bracket/mounting screw), Brass (fixing screw/sliding nut)</td>
<td>107 mm ... 251 mm (2 pcs.), 287 mm ... 431 mm (3 pcs.), 467 mm ... 647 mm (4 pcs.), 683 mm ... 791 mm (5 pcs.), 827 mm ... 1,007 mm (6 pcs.)</td>
<td>For T-slot cylinders</td>
<td>BEF-KHZT01MPA</td>
<td>2065575</td>
</tr>
</tbody>
</table>

For Festo cylinders DSBC

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Measuring range sensor (amount of required brackets)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Festo" /></td>
<td>Stainless steel V2A</td>
<td>107 mm ... 251 mm (2 pcs.), 287 mm ... 431 mm (3 pcs.), 467 mm ... 647 mm (4 pcs.), 683 mm ... 791 mm (5 pcs.), 827 mm ... 1,007 mm (6 pcs.)</td>
<td>Sensor adapter DSBC-32</td>
<td>BEF-KHZPF032MPA</td>
<td>2086744</td>
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<td></td>
<td></td>
<td>Sensor adapter DSBC-40</td>
<td>BEF-KHZPF040MPA</td>
<td>2086745</td>
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<td></td>
<td></td>
<td>Sensor adapter DSBC-50</td>
<td>BEF-KHZPF050MPA</td>
<td>2086746</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor adapter DSBC-63</td>
<td>BEF-KHZPF063MPA</td>
<td>2086747</td>
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<tr>
<td></td>
<td></td>
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<td>Sensor adapter DSBC-80</td>
<td>BEF-KHZPF080MPA</td>
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<td></td>
<td></td>
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<td>Sensor adapter DSBC-100</td>
<td>BEF-KHZPF100MPA</td>
<td>2086749</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor adapter DSBC-125</td>
<td>BEF-KHZPF125MPA</td>
<td>2086750</td>
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</tbody>
</table>

For SMC cylinders CP96

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Messbereich Sensor (Anzahl benötigter Halter)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="SMC" /></td>
<td>Stainless steel V2A</td>
<td>107 mm ... 251 mm (2 pcs.), 287 mm ... 431 mm (3 pcs.), 467 mm ... 647 mm (4 pcs.), 683 mm ... 791 mm (5 pcs.), 827 mm ... 1,007 mm (6 pcs.)</td>
<td>Sensor adapter CP96-63</td>
<td>BEF-KHZTS063MPA</td>
<td>2086756</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Sensor adapter CP96-80</td>
<td>BEF-KHZTS080MPA</td>
<td>2086757</td>
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<td></td>
<td>Sensor adapter CP96-100</td>
<td>BEF-KHZTS100MPA</td>
<td>2086758</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor adapter CP96-125</td>
<td>BEF-KHZTS125MPA</td>
<td>2086759</td>
</tr>
</tbody>
</table>
### Mounting brackets

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Measuring range sensor (amount of required brackets)</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stainless steel V2A (bracket/mounting screw), Brass (fixing screw)</td>
<td>107 mm ... 251 mm (2 pcs.) 287 mm ... 431 mm (3 pcs.) 467 mm ... 647 mm (4 pcs.) 683 mm ... 791 mm (5 pcs.) 827 mm ... 1,007 mm (6 pcs.)</td>
<td>Bracket for low mounting</td>
<td>BEF-WNL01MPA</td>
<td>2065973</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bracket for lateral mounting</td>
<td>BEF-WNZ01MPA</td>
<td>2065577</td>
</tr>
</tbody>
</table>

1) For measuring application with separate encoder (e.g. magnet).

### Magnets

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Magnet with mounting hole for M4 countersunk screw, Ø 15.2 mm, height 6 mm</td>
<td>Magnet</td>
<td>5327349</td>
</tr>
</tbody>
</table>

### Others

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Label Holder, 2.5 mm to 3.5 mm, 10 pcs.</td>
<td>LABEL HOLDER</td>
<td>2086019</td>
</tr>
</tbody>
</table>

### Connection systems

Connecting cables with female connector

M8, 4-pin, PUR, halogen-free, oil / grease resistant

- **Cable material**: PUR, halogen-free
- **Connector material**: TPU

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-G02MC</td>
<td>6025894</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-0804-G05MC</td>
<td>6025895</td>
</tr>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Cable, Flying leads</td>
<td>2 m, 4-wire</td>
<td>DOL-0804-W02MC</td>
<td>6025897</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m, 4-wire</td>
<td>DOL-0804-W05MC</td>
<td>6025898</td>
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</tbody>
</table>

Female connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>DOS-0804-G</td>
<td>6009974</td>
</tr>
<tr>
<td></td>
<td>Female connector, M8, 4-pin, angled, unshielded</td>
<td>Solder connection</td>
<td>DOS-0804-W</td>
<td>6009975</td>
</tr>
</tbody>
</table>

Male connectors (ready to assemble), M8, 4-pin

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Type</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male connector, M8, 4-pin, straight, unshielded</td>
<td>Screw-type terminals</td>
<td>STE-0804-G</td>
<td>6037323</td>
</tr>
</tbody>
</table>
Dimensional drawings for accessories

Brackets for cylinder sensors

BEF-KHZ-ST1

BEF-KHZ-RT-xx

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Type</th>
<th>Ø D</th>
<th>Ø D (cylinder piston)</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>2077681</td>
<td>BEF-KHZ-RT-12</td>
<td>13.5</td>
<td>12</td>
<td>22.4</td>
</tr>
<tr>
<td>2077680</td>
<td>BEF-KHZ-RT-16</td>
<td>17.7</td>
<td>16</td>
<td>26.6</td>
</tr>
<tr>
<td>2077679</td>
<td>BEF-KHZ-RT-20</td>
<td>21.7</td>
<td>20</td>
<td>30.6</td>
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<tr>
<td>2077678</td>
<td>BEF-KHZ-RT-25</td>
<td>26.8</td>
<td>25</td>
<td>35.7</td>
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<tr>
<td>2077677</td>
<td>BEF-KHZ-RT-32</td>
<td>34</td>
<td>32</td>
<td>42.9</td>
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<tr>
<td>2077676</td>
<td>BEF-KHZ-RT-40</td>
<td>42</td>
<td>42</td>
<td>50.9</td>
</tr>
<tr>
<td>2077675</td>
<td>BEF-KHZ-RT-50</td>
<td>52.9</td>
<td>50</td>
<td>61.8</td>
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<tr>
<td>2077674</td>
<td>BEF-KHZ-RT-63</td>
<td>65</td>
<td>63</td>
<td>73.9</td>
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</table>

BEF-KHZ-PT1

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Type</th>
<th>Ø min.</th>
<th>Ø max.</th>
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</thead>
<tbody>
<tr>
<td>2077682</td>
<td>BEF-KHZ-RT1-25</td>
<td>5 (0.2)</td>
<td>19 (0.75)</td>
</tr>
<tr>
<td>2077683</td>
<td>BEF-KHZ-RT1-63</td>
<td>8 ... 25</td>
<td></td>
</tr>
<tr>
<td>2077684</td>
<td>BEF-KHZ-RT1-130</td>
<td>8 ... 130</td>
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</tbody>
</table>

Sensor adapter with T-slot
Fixing for cable < Ø 3.2 mm (0.126 inch)
Cylinder adapter
Mounting screws M5

Sensor adapter with T-slot
Fixing screw
Strap
Dimensional drawings for accessories  POSITION SENSORS

BEF-KHZ-PC1

1. Sensoradapter with C-slot for magn. cylinder sensors
2. Fixing for cable < Ø 3.2 mm (0.126 inch)
3. Cylinderadapter
4. Mounting screws M5

BEF-KHZ-RC1-1xx

1. Sensoradapter with C-slot for round body cylinder
2. Fixing screw
3. Strap

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Type</th>
<th>Ø D (cylinder piston)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2077673</td>
<td>BEF-KHZ-RC1-25</td>
<td>8 ... 25</td>
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<tr>
<td>2077672</td>
<td>BEF-KHZ-RC1-130</td>
<td>8 ... 130</td>
</tr>
</tbody>
</table>

BEF-KHZ-TC2
Position Sensors Dimensional drawings for accessories

BEF-KHZ.TC1

BEF-KHZPZ1MPA

BEF-KHZRxxxMPA

BEF-KHZT01MPA

Diameter (D) mm

BEF-KHZR085MPA  25 - 100
BEF-KHZR135MPA  25 - 150
BEF-KHZR210MPA  25 - 225
Dimensional drawings for accessories  POSITION SENSORS

**KHZFxxxMPA**

1. Sensor adapter
2. Mounting screw wrench size 1.5 for sensor
3. Mounting screw wrench size 1.5 for cylinder

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
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<tbody>
<tr>
<td>2086744</td>
<td>KHZF032MPA</td>
<td>38.7</td>
<td>16</td>
<td>8</td>
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<td>2086745</td>
<td>KHZF032MPA</td>
<td>40.7</td>
<td>16</td>
<td>8</td>
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<tr>
<td>2086746</td>
<td>KHZF032MPA</td>
<td>46.1</td>
<td>16</td>
<td>8</td>
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<td>BEF-KHZ-RT-32</td>
<td>54.3</td>
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<td>2086748</td>
<td>BEF-KHZ-RT-40</td>
<td>55.5</td>
<td>17.3</td>
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<tr>
<td>2086749</td>
<td>BEF-KHZ-RT-50</td>
<td>58.4</td>
<td>23.4</td>
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</table>

**BEF-KHZTSxxxMPA**

1. Sensor adapter
2. Mounting screw wrench size 1.5 for sensor
3. Mounting screw wrench size 1.5 for cylinder

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>2086756</td>
<td>BEF-KHZTS063MPA</td>
<td>10.9</td>
<td>11.7</td>
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<td>2086757</td>
<td>BEF-KHZTS080MPA</td>
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<td>13.7</td>
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<tr>
<td>2086758</td>
<td>BEF-KHZTS100MPA</td>
<td>14.8</td>
<td>12.9</td>
<td>8</td>
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<tr>
<td>2086759</td>
<td>BEF-KHZTS125MPA</td>
<td>14.6</td>
<td>12.2</td>
<td>8</td>
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</table>

Mounting brackets and mounting plates

**BEF-WNL01MPA**

<table>
<thead>
<tr>
<th></th>
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<th>25 (0.98)</th>
<th>2.5 (0.10)</th>
<th>18.5 (0.73)</th>
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<table>
<thead>
<tr>
<th></th>
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<th>10.9 (0.43)</th>
<th>20 (0.79)</th>
<th>33.6 (1.32)</th>
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**BEF-WNZ01MPA**

<table>
<thead>
<tr>
<th></th>
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<th>19.5 (0.77)</th>
<th>20 (0.79)</th>
<th>2.5 (0.10)</th>
</tr>
</thead>
</table>

Subject to change without notice
Plug connectors and cables

DOL-1204-G02MC (6025900)
DOL-1204-G05MC (6025901)

DOL-1204-W02MC (6025903)
DOL-1204-W05MC (6025904)

DOL-0804-G02MC (6025894)
DOL-0804-G05MC (6025895)

DOL-0804-W02MC (6025897)
DOL-0804-W05MC (6025898)

DOL-0804-G02M (6009870)
DOL-0804-G05M (6009872)

DOL-0804-W02M (6009871)
DOL-0804-W02M (6009873)

DOS-1204-G (6007302)

DOS-1204-W (6007303)

DOS-0804-G (6009974)

DOS-0804-W (6009975)

Dimensions in mm (inch)
Dimensional drawings for accessories

**POSITION SENSORS**

**STE-1204-G (6009932)**

- Cable diameter: 3 to 6.5 mm (0.12 to 0.26)

**STE-1204-W (6022084)**

- Cable diameter: 3 to 6.5 mm (0.12 to 0.26)

**STE-0804-G (6037323)**

- Cable diameter: 3.5 to 5 mm (0.14 to 0.20 inch)

**Magnets**

**Magnet (5327349)**

- Reduction 90°
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