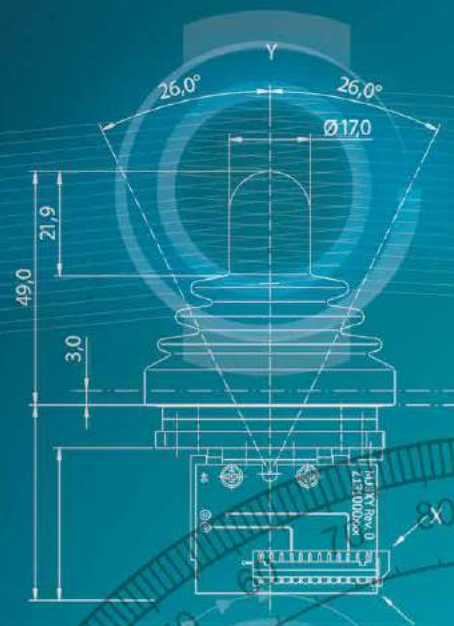
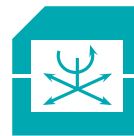


# JOYSTICKS



▶ MJ-1L



▶ MJ-2K



▶ MJ-3K



▶ MJ-4K

LEADING IN SENSORS

metallux.de

# TRUST THE X!





## Fair partnership and customer-specific solutions.

We appreciate your interest in our Metallux joysticks.


Every single one of our premium products offers excellent quality, extreme precision, state-of-the-art technology, innovative design and maximum reliability. Our company's consulting expertise ensures that our customers receive the best possible advice. We serve both as an innovator and as a consultant. By integrating quality management according to ISO 9001:2015 in all areas, we ensure that each Metallux product offers maximum safety. We are committed to provide personalised, individual consultation and building trust-based, long-term partnerships with our customers.

Metallux joysticks are compact, precise, robust and light-weight. Whether you are looking for a standard joystick, a combination of various mechanics with different sensor technologies (conductive plastic contacts, MetaPot sealed membrane potentiometers, Hall effect), or a customer specific designed device, our team of experts will work with you to identify and find the best solution.

 ANDREAS OBERASCHER  
Chairman of the board / CEO

 METALLUX AG – founded in 1986 and for years now, a leading manufacturer of sensors, membrane sensors, resistors, pressure sensors and industrial joysticks in thick-film technology.



 METALLUX Joysticks: Whether standard or customised solutions, we offer a broad range of joystick versions.

## JOYSTICKS FOR INDUSTRY AND MEDICINE

Our MJ-xx series joysticks are designed for long-term continuous service and reliable operation in harsh industrial environments as well as in clinical- or rehabilitation applications. Depending on the requirements of your application, different technologies such as Conductive Plastic, MetaPot, or Hall technology will be implemented.



### MJ-2K

Standard joysticks  
Drawings  
Connection diagrams



### MJ-3K

Standard joysticks  
Drawings  
Connection diagrams



### MJ-1L

Standard joysticks  
Drawings  
Connection diagrams



### MJ-4K HALL

Standard joysticks  
Drawings  
Connection diagrams



Mounting,  
Technology, Options



# METALLUX JOYSTICKS

- Low weight, less strain on the worker during on-site use
- Grease-free bearings for secure resetting
- Wear-proof rubber gaiter
- Vibration proof

## APPLICATIONS

- Safety radio remote controls
- Construction machines, forklift trucks
- Municipal vehicles
- Marine
- Electric wheelchairs
- Operating tables
- Robots, CNC machines

## OVERVIEW

VERSION	MJ-2K	MJ-3K	MJ-1L	MJ-4K
Page	6 – 11	12 – 17	18 – 19	20 – 21
<b>PROTECTION CLASS</b>				
IP 65		x		x
IP 66	x		x	
<b>NUMBER OF AXES</b>				
1	x	x	x	
2	x	x		x
3	x	x		
<b>SENSOR TECHNOLOGY</b>				
Conductive Plastic	x	x	x	
MetaPot	x	x		
Hall		x	x	x

## BENEFITS

- Accurate zero-point return for secure handling and precise steering
- Various sensor technologies for different application requirements
- Light-weight and robustness for maximum user safety
- High degree of protection and resistant gaiters for reliable operation



# APPLICATIONS FOR MJ-XX SERIES JOYSTICKS

Latest technologies for your application.



## CONSTRUCTION MACHINES/CONVEYORS/HOISTS

Metallux joysticks of the MJ-2K and MJ-3K series are compact as well as robust. The variety of sensor technologies such as conductive plastic, MetaPot and Hall effect, make it possible to select the ideal sensor for each application. Our customers from the construction equipment, forklift, and working platform industries also value the ergonomic adaptability, various options for additional functions, as well as the quick realisation of customer specific solutions.



## MUNICIPAL VEHICLES

From Obertauern in the Austrian Alps to Mexico City, the joysticks of the MJ-1L series, with their extra protective cover, are the perfect actuation element for refuse collection vehicles. Regardless of heat, cold, de-icing salt or dust, the compact Metallux joysticks provide reliable control of the lifting mechanism. And in the unlikely event that the extremely resistant protective cover fails, the joystick's IP 66 protection will ensure its function until the cover is replaced. Optional with Hall effect technology.



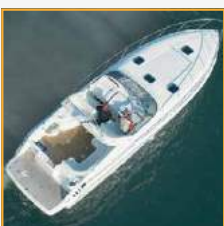
## MEDICAL TECHNOLOGY

Safety is paramount for electric wheelchairs. The proven, industrial-grade MJ-4K joystick has been designed to suit the requirements of medical rehabilitation and complies with all relevant standards, so that users can rest assured when it comes to reliability and safety. The Hall effect technology makes it possible to reduce the installation space to a minimum. The various handles can also be easily adapted for the perfect fit. Metallux joysticks are the favoured control elements for surgical tables and chairs.



## INDUSTRIAL SAFETY RADIO REMOTE CONTROL

Low-weight equipment makes work easier and reduces operator strain. This is a key factor for industrial wireless remote controls. The MJ-2K is lightweight and durable. Metallux conductive plastic sensors reduce power consumption to a minimum resulting in a longer battery life. Special gaiter materials enhance durability, and grease-free bearings ensure reliable operation at any operating temperature.



## MARINE

You can manoeuvre a yacht with a three-axle joystick. To easily and accurately control a large boat using only three fingers, you need a reliable joystick with precise zero return and hermetically sealed, vibration-proof sensors. Thanks to MetaPot and Hall sensor technology, the salty sea air is not a problem. It makes a grand impression in the harbour!

# ANALOGUE 1- AND 2-AXIS INDUSTRIAL JOYSTICKS MJ-2K CP OM



MJ-2K series joysticks with IP 66 protection and a special lamellar gaiter seal provide a compact and robust human-machine interface. Analogue sensor elements using robust conductive plastic contact technology ensure high-precision control. 1- and 2-axis versions with galvanically isolated directional contacts provide reliable motion control for construction equipment, in mobile hydraulics, for heavy machinery and in marine technology.

## FEATURES

- Long service life
- Robust design
- Compact
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote controls
- Forklift trucks
- Hydraulics
- Measuring machines
- Medical technology
- Microscopy



## ELECTRICAL SPECIFICATIONS

<b>Resistance value</b>	5 k $\Omega$ *
<b>Resistance tolerance</b>	$\pm$ 20 %
<b>Deflection angle, el.</b>	$> \pm 26^\circ$ *
<b>Independent linearity</b>	$\pm$ 2 %
<b>Zero position switch per axis</b>	$< \pm 3^\circ$ open
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Contact current</b>	$< 10 \mu$ A
<b>Max. contact current</b>	3 mA (typ.: 1 mA; in case of malfunction: max. 5 mA)
<b>Insulation resistance</b>	10 G $\Omega$ at 500 VDC
<b>Dielectric strength</b>	2,000 V

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	5 million cycles
---------------------	------------------

Specifications are subject to change without notice.  
\* Other values on request.

<b>Deflection angle, mech.</b>	See drawing
<b>Operating force</b>	5 N typically
<b>Gate shape</b>	Square, soft cross guide
<b>Wiper zero position</b>	$\pm 1^\circ$
<b>Impact strength</b>	200 N
<b>User control</b>	Handle with Gaiter
<b>Mounting</b>	Outside mounting (OM)

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 66

## MATERIALS

<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	12-pin Hirose plug
<b>Mounting</b>	M2.5 x 16 with 3 mm mounting plate, mounting ring. Select screw length to match plate thickness.

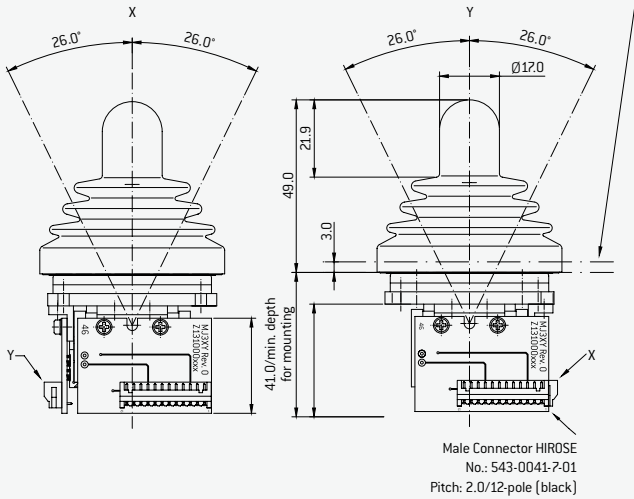
## MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE OM

Type Item number	MJ-2K X:0 Y:5k MC 1-0-1 OM Hirose 12-pin E060200412	Type Item number	MJ-2K XYZ: 5k MC 1-0-1 OM Hirose 12-pin E060200380
Type Item number	MJ-2K XY: 5k MC 1-0-1 OM Hirose 12-pin E060200394	Connection cable Item number	MJ-2K Hirose 12-pin (ws) LiYv 0.14mm_500mm Z301000512
Type Item number	MJ-2K XY:5k MC1-0-1 DS series 1B OM Hirose 12-pin E060200395		

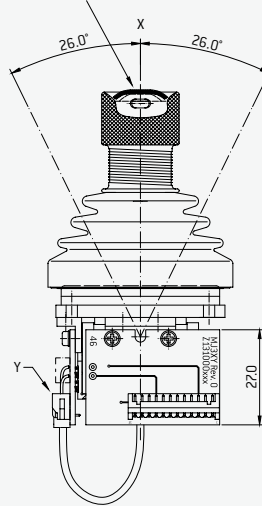
DRAWINGS FOR MJ-2K CP XY OM

DRAWINGS FOR MJ-2K CP XY OM BUTTON

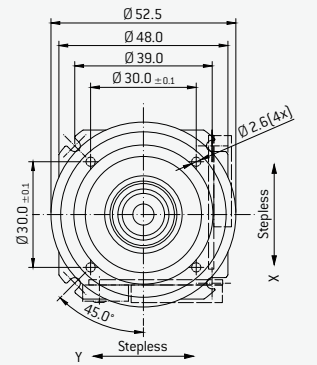
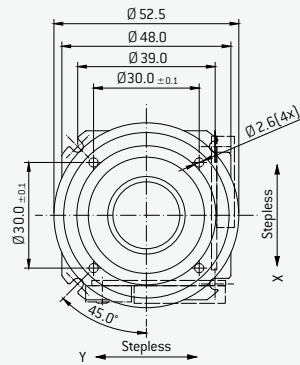
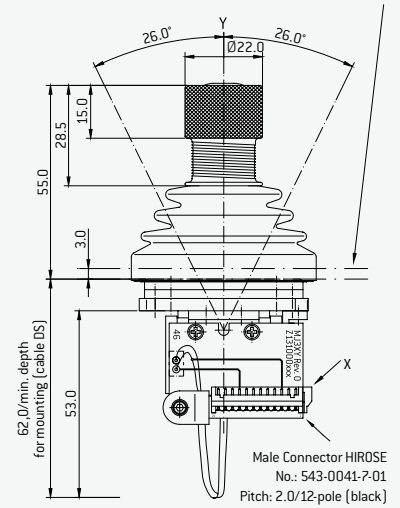
Assembly of Gaiter together with Mounting Ring  
 MJ-2K 4 x M2,5/30 x 30 MLX-Art.-No.: Z404000023  
 If thickness of mounting panel is 3 mm: Use Screw M2,5 x 16 mm/Center Hole D = 35.0



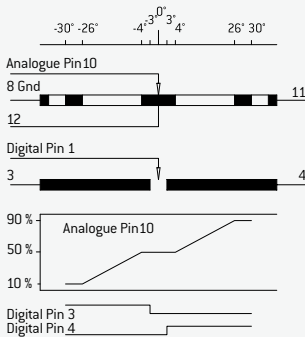
Push to operate  
 "Deadman switch" (DS series IB)



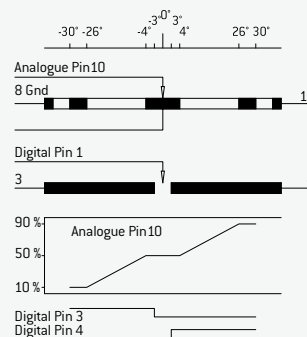
Assembly of Gaiter together with Mounting Ring  
 MJ-2K 4 x M2,5/30 x 30 MLX-Art.-No.: Z404000023  
 If thickness of mounting panel is 3mm:  
 Use Screw M2,5 x 16 mm/Center Hole D = 35.0



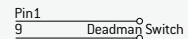
CONNECTOR PIN ASSIGNMENT/DIAGRAM



Connect. Resistance: 5 kOhm  $\pm 20\%$   
 Analogue band: 10 % – 90 %, Utotall  $\pm 3\%$   
 Medium Voltage: 50 %, Utotall  $\pm 2,5\%$   
 Linearity:  $\pm 2\%$   
 Contact Resistance Switch: < 1 kOhm  
 Life CP/PCB: > 5 Mio Cycles



Connect. Resistance: 5 kOhm  $\pm 20\%$   
 Analogue band: 10 % – 90 %, Utotall  $\pm 3\%$   
 Medium Voltage: 50 %, Utotall  $\pm 2,5\%$   
 Linearity:  $\pm 2\%$   
 Contact Resistance Switch: < 1 kOhm  
 Life CP/PCB: > 5 Mio Cycles



OPTIONS/ACCESSORIES

Description	Short form	Description	Option
Cross gate	CG	Without direction guide	NG
Soft Control	SC	Mechanical detents	1 – 5 steps with end stops, free combination
(60 % of standard operation force, not in combination with mechanical detents)		Outside mounting	OM
Digital to ground switching	GND	Electrical contact	Solder connection
Push Button in the handle	DS (series IB)		

# ANALOGUE 3-AXIS INDUSTRIAL JOYSTICK MJ-2K OM



The 3-axis version of the MJ-2K series joystick with IP 66 protection stands out through its high-precision zero return. A special lamellar gaiter seal provides the required operating reliability even in harsh environments. Analogue sensors enable high-precision control at low power consumption. Galvanized isolated directional contacts provide reliable operation on construction sites, in robotics, in mechanical and systems engineering, for construction equipment and even boats.

## FEATURES

- Long service life
- Robust design
- Compact
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote controls
- Forklift trucks
- Hydraulics
- Robotics
- Microscopy



## ELECTRICAL SPECIFICATIONS

<b>Resistance value</b>	5 kΩ *
<b>Resistance tolerance</b>	± 20 %
<b>Deflection angle, el.</b>	XY: > ± 19,5° ; Z: > ± 37° *
<b>Independent linearity</b>	± 2 %
<b>Zero position switch per axis</b>	XY: < ± 3° open ; Z: < ± 4° open
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Contact current</b>	< 10 μA
<b>Max. contact current</b>	3 mA (typ.: 1 mA; in case of malfunction: max. 5 mA)
<b>Insulation resistance</b>	10 GΩ at 500 VDC
<b>Dielectric strength</b>	2,000 V

## MECHANICAL SPECIFICATIONS

**Service life** XY: 5 million cycles, Z: 3 million cycles

Specifications are subject to change without notice.  
\* Other values on request.

<b>Deflection angle, mech.</b>	See drawing
<b>Operating force</b>	XY: 5 N typically
<b>Gate shape</b>	Square, soft cross guide
<b>Wiper zero position</b>	± 1°
<b>Impact strength</b>	XY: 150 N/Z: 1.5 Nm
<b>User control</b>	Handle with Gaiter
<b>Mounting</b>	Outside mounting (OM)

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 66

## MATERIALS

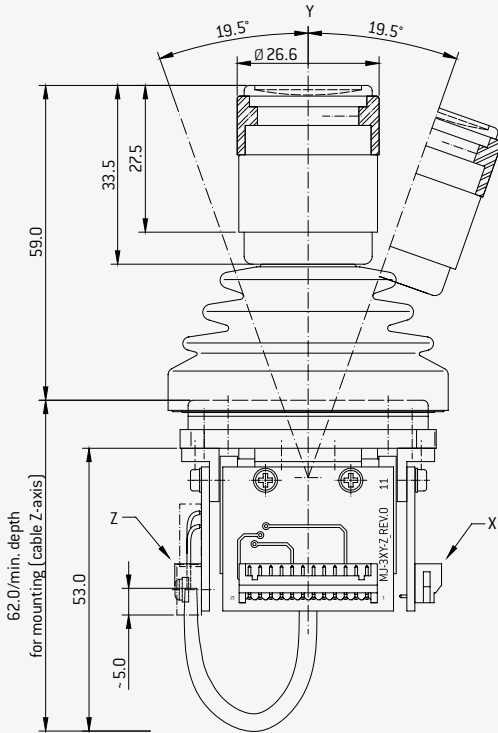
<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	12-pin Hirose plug
<b>Mounting</b>	M2.5 x 16 with 3 mm mounting plate, mounting ring. Select screw length to match plate thickness.

## MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE OM

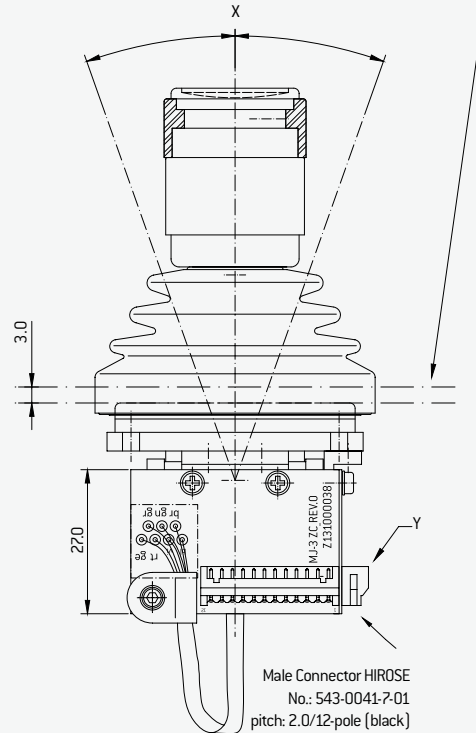
Type Item number	MJ-2K X:0 Y:5k MC 1-0-1 OM Hirose 12-pin E060200412	Type Item number	MJ-2K XYZ: 5k MC 1-0-1 OM Hirose 12-pin E060200380
Type Item number	MJ-2K XY: 5k MC 1-0-1 OM Hirose 12-pin E060200394	Connection cable Item number	MJ-2K Hirose 12-pin (ws) LiYv 0.14mm_500mm Z301000512
Type Item number	MJ-2K XY:5k MC1-0-1 DS series IB OM Hirose 12-pin E060200395		



**DRAWINGS FOR MJ-2K CP XYZ OM**

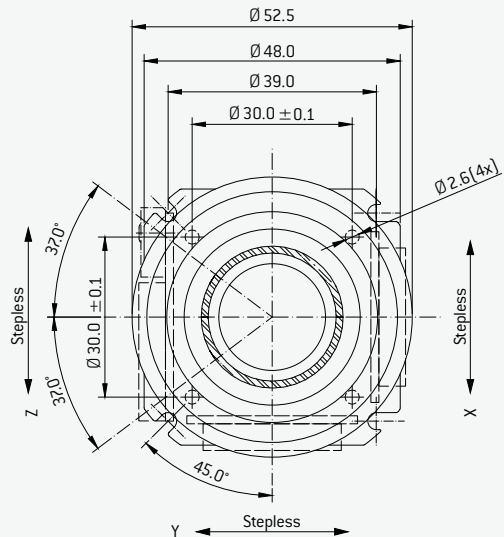
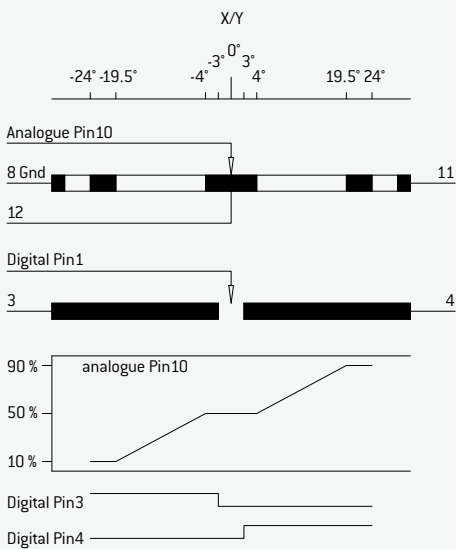


Assembly of Gaiter together with Mounting Ring  
 MJ-2K 4 x M2,5/30 x 30 MLX-Art.-No.: Z404000023  
 If thickness of mounting panel is 3 mm: Use Screw M2,5 x 16 mm/Center Hole D = 35.0

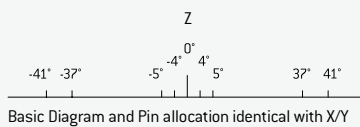


Male Connector HIROSE  
 No.: 543-0041-7-01  
 pitch: 2.0/12-pole [black]

**CONNECTOR PIN ASSIGNMENT/DIAGRAM**



Connect. Resistance: 5 kOhm ± 20 %  
 Analogue band: 10 % – 90 %, Utotal ± 3 %  
 Medium Voltage: 50 %, Utotal ± 2,5 %  
 Linearity: ± 2 %  
 Contact Resistance Switch: < 1 kOhm  
 Life CP/PCB: > 5 Mio Cycles



# DIGITAL 1- AND 2-AXIS INDUSTRIAL JOYSTICK MJ-2K CP OM



The MJ-2K series joysticks are also available with digital output signals. Mechanical detents provide tactile feedback. The galvanized isolated directional contacts provide maximum operating reliability for the control of crane systems on factory floors or on construction sites. Despite their robustness, the joysticks are very light and ergonomically designed for comfortable operation.

## FEATURES

- Long service life
- Robust design
- Compact
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote controls
- Forklift trucks
- Hydraulics



## ELECTRICAL SPECIFICATIONS

<b>Switching current</b>	5 mA at 5 V *
<b>Versions</b>	Digital 1- to 4-stage (1-0-1 to 4-0-4), optional: 5-0-5
<b>Deflection angle, el.</b>	4 x 6.5°*, optional: 5 x 5.2°
<b>Zero position switch per axis</b>	< ± 3° open
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Insulation resistance</b>	1 GΩ at 500 VDC
<b>Dielectric strength</b>	2,000 V

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	> 3 million cycles
<b>Deflection angle, mech.</b>	See drawing
<b>Operating force</b>	5 N typically

Specifications are subject to change without notice.  
\* Other values on request.

<b>Gate shape</b>	Square, soft cross guide
<b>Wiper zero position</b>	± 1°
<b>Impact strength</b>	200 N
<b>User control</b>	Handle with Gaiter
<b>Mounting</b>	Outside mounting (OM)

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 66

## MATERIALS

<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	12-pin Hirose plug
<b>Mounting</b>	M2.5 x 16 with 3 mm mounting plate, mounting ring. Select screw length to match plate thickness.

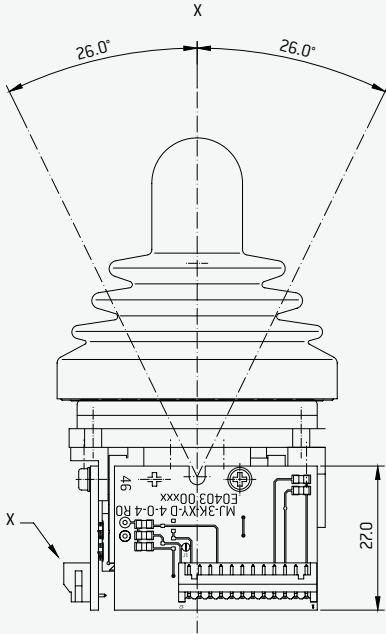
## MJ-2K CP (CONDUCTIVE PLASTIC) DIGITAL OM

Type	MJ-2K CP X: 0 Y: 4-0-4 OM Hirose 12-pin	Type	MJ-2K CP XY: 4-0-4 DS series IB OM Hirose 12-pin
Item number	E060200421	Item number	E060200397
Type	MJ-2K CP XY: 4-0-4 OM Hirose 12-pin	Connection cable	MJ-2K Hirose 12-pin (ws) LiYv 0.14mm_500mm
Item number	E060200398	Item number	Z301000512

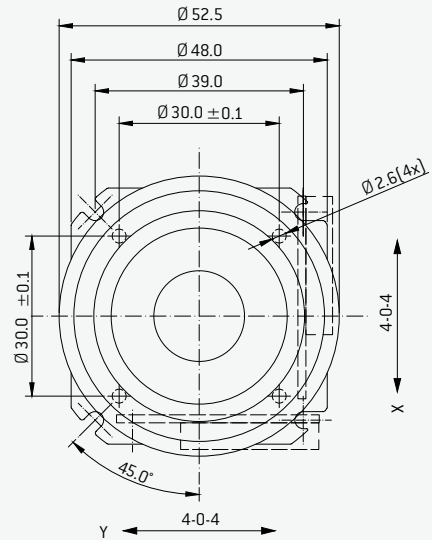
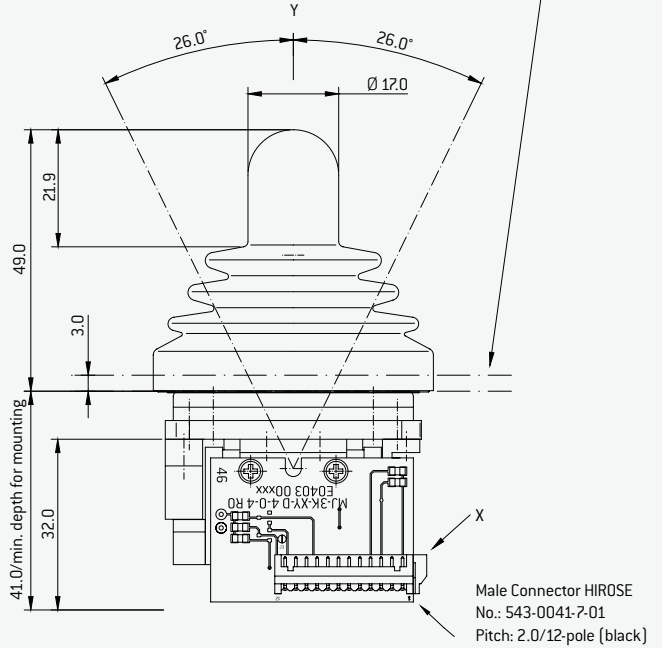
## MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE OM/MECHANICAL DETENTS

Type	MJ-2K X:0 Y: 4-0-4 5k MC 1-0-1 OM Hirose 12-pin	Type	MJ-2K X:0 Y: 5-0-5 5k MC 1-0-1 OM Hirose 12-pin
Item number	E060200450	Item number	E060200451
Type	MJ-2K XY: 4-0-4 5k MC 1-0-1 OM Hirose 12-pin	Type	MJ-2K XY: 5-0-5 5k MC 1-0-1 OM Hirose 12-pin
Item number	E060200402	Item number	E060200443
Type	MJ-2K XY: 4-0-4 5k MC 1-0-1 DS series IB OM Hirose 12-pin	Connection cable	MJ-2K Hirose 12-pin (ws) LiYv 0.14mm_500mm
Item number	E060200420	Item number	Z301000512

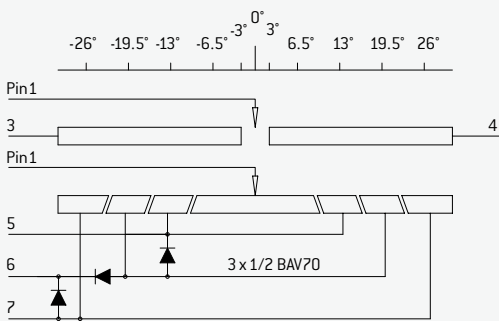
**DRAWINGS FOR MJ-2K CP XY OM**



Assembly of Gaiter together with Mounting Ring  
 MJ-2K 4 x M2,5/30 x 30 MLX-Art.-No.: Z40400023  
 If thickness of mounting panel is 3 mm: Use Screw M2,5 x 16 mm/Center Hole D = 35,0



**CONNECTOR PIN ASSIGNMENT/DIAGRAM 4-0-4**



Contact Resistance Switch: < 1 kOhm  
 Life CP/PCB: > 3 Mio Cycles  
 Anti-interference condensator (100 pF) for switch contacts 4-0-4

	-26°	-19.5°	-13°	-6.5°	0°	6.5°	13°	19.5°	-26°
PIN 3	x	x	x	x					
PIN 4						x	x	x	x
PIN 5	o	x	x				x	x	o
PIN 6	x	x						x	x
PIN 7	x								x

x = electrical Connection/Combination o = optional with Solder-Jumper J1

# ANALOGUE 1-, 2- AND 3-AXIS INDUSTRIAL JOYSTICK MJ-3K CP



The MJ-3K joystick series offers compact and robust industrial joysticks which can be supplied with conductive-plastic potentiometer sensor elements in analogue versions as well as with galvanized isolated direction contacts. The joysticks are available with 1, 2 or 3 axes for applications such as the safety radio remote control of machinery and systems or for mobile hydraulic applications.

## FEATURES

- Long service life
- Robust design
- Compact
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote controls
- Forklift trucks
- Mobile hydraulics
- Steering of boats

## OPTIONS

- Handle length 55
- Handle length 65



## ELECTRICAL SPECIFICATIONS

<b>Resistance value</b>	5 kΩ *
<b>Resistance tolerance</b>	± 20 %
<b>Deflection angle, el.</b>	> ± 26° *
<b>Independent linearity</b>	± 2 %
<b>Zero position switch per axis</b>	< ± 3° open
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Contact current</b>	< 10 μA
<b>Max. contact current</b>	3 mA (typ.: 1 mA; in case of malfunction: max. 5 mA)
<b>Insulation resistance</b>	1 GΩ at 500 VDC
<b>Dielectric strength</b>	2,000 V

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	5 million cycles
---------------------	------------------

Specifications are subject to change without notice.  
\* Other values on request.

<b>Deflection angle, mech.</b>	± 26°
<b>Operating force</b>	5 N typically
<b>Gate shape</b>	Square, soft cross guide
<b>Wiper zero position</b>	± 1°
<b>Impact strength</b>	200 N
<b>User control</b>	Handle with Gaiter

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 65

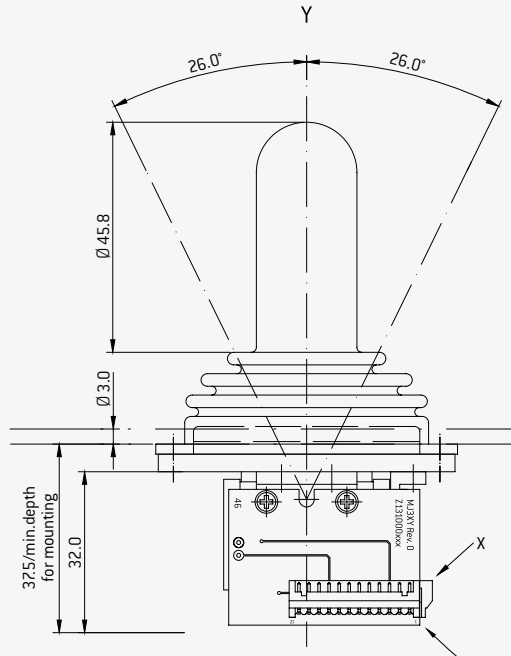
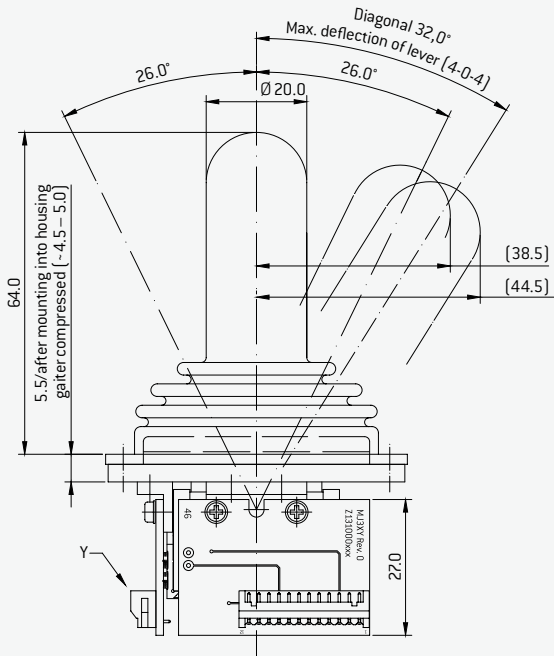
## MATERIALS

<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	12-pin Hirose plug, 6-pin Dubox plug
<b>Mounting</b>	Screws M3

## MJ-3K CP (CONDUCTIVE PLASTIC) ANALOGUE

Type	MJ-3K 55 CP X:0 Y:5K MC 1-0-1 Hirose 12-pin	Type	MJ-3K 65 CP XY:2.5k 1-0-1 Dubox 6-pin
Item number	E060200038	Item number	E060200466 [2-axis]
Type	MJ-3K 55 CP XY:5K MC 1-0-1 Hirose 12-pin	Type	MJ-3K 65 CP XY:5K MC 1-0-1 Hirose 12-pin
Item number	E060200037	Item number	E060200444 [2-axis]
Type	MJ-3K 55 CP X:0 Y:2.5K 1-0-1 Dubox 6-pin	Connection cable	Hirose 12-pin (ws) LiYv 0.14mm <sup>2</sup> 500mm
Item number	E060200487 [1-axis]	Item number	Z301000512
Type	MJ-3K 55 CP XY:2.5k 1-0-1 Dubox 6-pin	Connection cable	Dubox 6-pin LiYv 0.14mm <sup>2</sup> 500mm
Item number	E060200465 [2-axis]	Item number	Z301000500

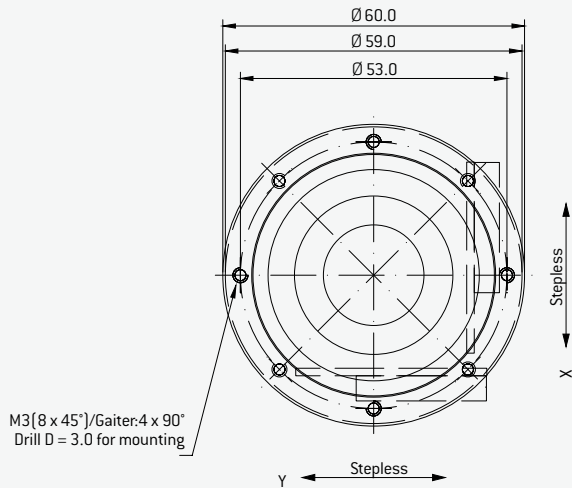
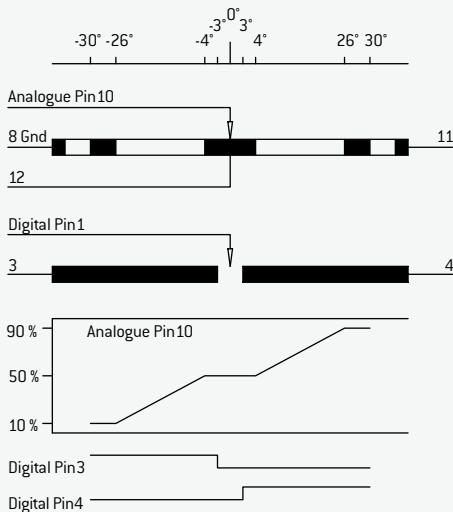
DRAWINGS FOR MJ-3K CP 65



Assembly into Housing from Inside/Screw Head outside of housing  
 If thickness of mounting panel is 3 mm:  
 Use Screw M3 x 10 mm/Center Hole D = 49.0

Male Connector HIROSE  
 No.: 543-0041-7-01  
 Pitch: 2.0/12-pole (black)

CONNECTOR PIN ASSIGNMENT/DIAGRAM



Connect. Resistance: 5 kOhm ± 20 %  
 Analogue band: 10 % - 90 % Utotal ± 3 %  
 Medium Voltage: 50 % Utotal ± 2,5 %  
 Linearity: ± 2 %  
 Contact Resistance Switch: < 1 kOhm  
 Life CP/PCB: > 5 Mio Cycles

# DIGITAL 1- AND 2-AXIS INDUSTRIAL JOYSTICK MJ-3K



Digital versions of the Metallux MJ-3K joysticks were designed for optimal control of crane systems. They are also available with mechanical detents for a distinct feedback and ease of control for the operator. Galvanically isolated direction contacts provide the necessary operational reliability and meet the requirements of the Machinery Directive. Their light weight and long service life encourage high productivity not only on construction and building sites but also on factory floors.

## FEATURES

- Long service life
- Robust design
- Compact
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote control
- Forklift trucks
- Hydraulics



## ELECTRICAL SPECIFICATIONS

<b>Switching current</b>	5 mA at 5 V*
<b>Versions</b>	Digital 1- to 4-stage (1-0-1 to 4-0-4), optional: 5-0-5, 4-bit gray code / GC4B
<b>Deflection angle, el.</b>	4 x 6.5°, optional: 5 x 5.2°
<b>Zero position switch per axis</b>	< ± 3° open
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Insulation resistance</b>	1 GΩ bei 500 VDC
<b>Dielectric strength</b>	2,000 V

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	> 3 million cycles
<b>Deflection angle, mech.</b>	± 26°

Specifications are subject to change without notice.  
\* Other values on request.

<b>Operating force</b>	5 N typically
<b>Gate shape</b>	Square, soft cross guide
<b>Wiper zero position</b>	± 1°
<b>Impact strength</b>	200 N
<b>User control</b>	Handle with Gaiter

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 65

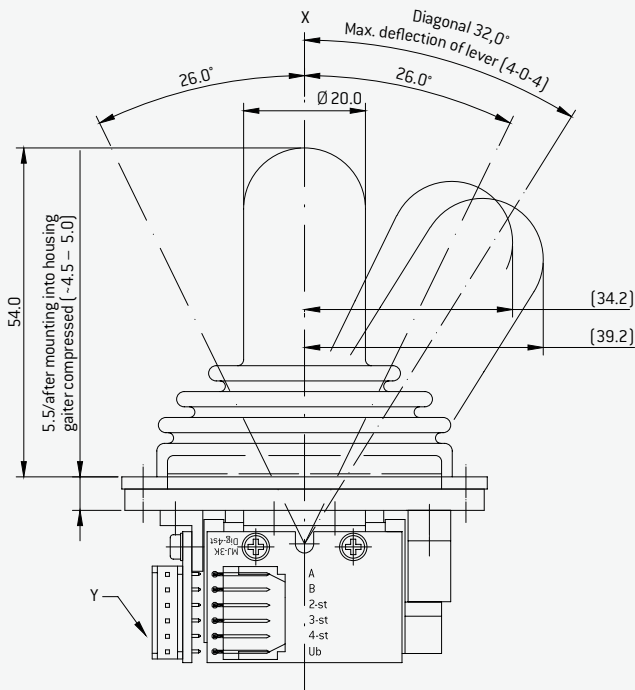
## MATERIALS

<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	12-pin Hirose plug, 6-pin Dubox plug
<b>Mounting</b>	Screws M3

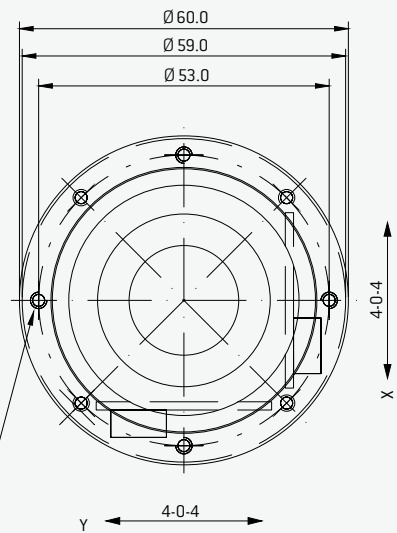
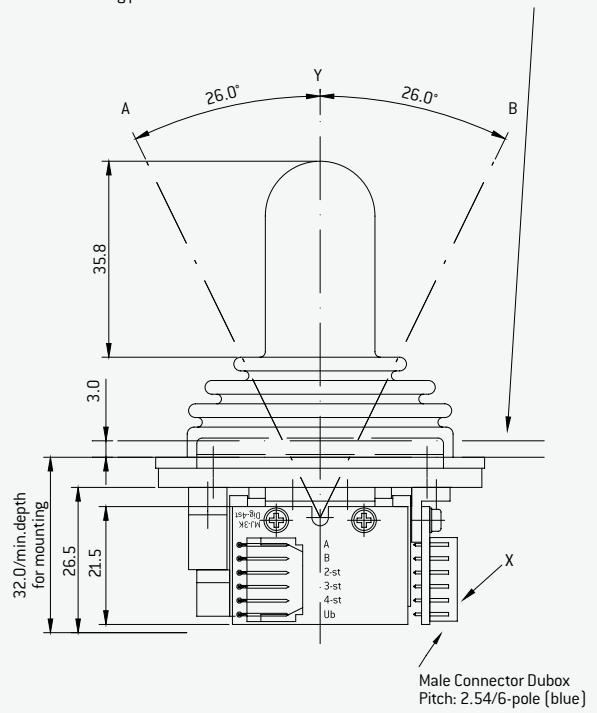
## MJ-3K CP (CONDUCTIVE PLASTIC) DIGITAL

Type	MJ-3K 55 CP x:0 y:4-0-4 Dubox 6-pin	Type	MJ-3K 65 CP x:0 y:4-0-4 Dubox 6-pin
Item number	E060200514 (1-axis)	Item number	E060200508 (1-axis)
Type	MJ-3K 55 CP xy:4-0-4 Dubox 6-pin	Type	MJ-3K 65 CP xy:4-0-4 Dubox 6-pin
Item number	E060200428 (2-axis)	Item number	E060200468 (2-axis)
Type	MJ-3K 55 CP x:0 y:4-0-4 Hirose	Connection cable	MJ-3K 65 CP xy:4-0-4 DS Dubox 6-pin
Item number	E0602xxxxx (1-axis)	Item number	E060200430 (2-axis)
Type	MJ-3K 55 CP xy:4-0-4 Hirose	Connection cable	Hirose 12-pin (ws) LiYv 0.14mm <sup>2</sup> 500mm
Item number	E060200411 (2-axis)	Item number	Z301000512
Type	MJ-3K 55 CP xy:4-0-4 DS Dubox 6-pin	Connection cable	Dubox 6-pin LiYv 0.14mm <sup>2</sup> 500mm
Item number	E060200025	Item number	Z301000500

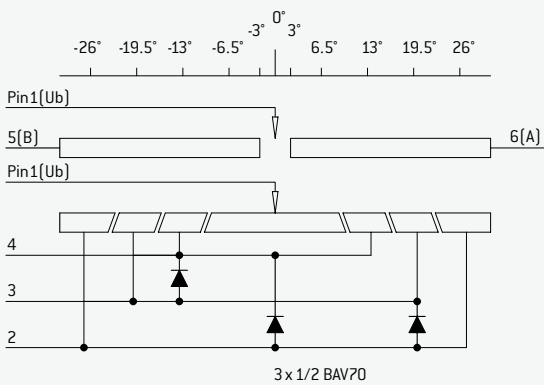
**DRAWINGS FOR MJ-3K 55 DIGITAL**



Assembly into Housing from Inside/Screw Head outside of housing  
If thickness of mounting panel is 3 mm: Use Screw M3 x 10 mm/Center Hole D = 49.0



**CONNECTOR PIN ASSIGNMENT/DIAGRAM 4-0-4**



M3(8 x 45°)/Gater: 4 x 90°  
Drill D = 3.0 for mounting

	-26°	-19.5°	-13°	-6.5°	0°	6.5°	13°	19.5°	-26°
PIN 5	x	x	x	x					
PIN 6						x	x	x	x
PIN 4	x	x	x				x	x	x
PIN 3	x	x						x	x
PIN 2	x								x

x = electrical Connection/Combination

Contact Resistance Switch: < 1 kOhm  
Life CP/PCB: > 3 Mio Cycles  
Anti-interference condensator (100 pF) for switch contacts 4-0-4

# 1-, 2- AND 3-AXIS INDUSTRIAL JOYSTICKS MJ-3K MTP



A sealed sensor is the distinguishing feature of the MetaPot technology. This technology is also used in the 1-, 2- and 3-axis versions of the Metallux MJ-3K joystick series. Analogue output signals and galvanically isolated direction contacts provide reliable manoeuvring of boats and construction equipment. Salty sea air does not influence the function of the joysticks. The third axis is realised by a compact, sealed conductive-plastic potentiometer.

## FEATURES

- Long service life
- Robust design
- Compact
- MetaPot membrane sensor technology
- EMC-safe

## APPLICATIONS

- Aerial work platforms
- Wireless remote controls
- Forklift trucks
- Hydraulics
- Marine



## ELECTRICAL SPECIFICATIONS

<b>Resistance value</b>	2.5 kΩ *
<b>Resistance tolerance</b>	± 20 %
<b>Deflection angle, el.</b>	> ± 26° *
<b>Independent linearity</b>	± 3 %
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Contact current</b>	< 10 μA
<b>Max. contact current</b>	3 mA (typ.: 1 mA; in case of malfunction: max. 5 mA)
<b>Insulation resistance</b>	1 GΩ at 500 VDC
<b>Dielectric strength</b>	2,000 V
<b>Output signal</b>	7.5 % / 92.5 % of VCC (± 2.5 %) *

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	5 million cycles
---------------------	------------------

Specifications are subject to change without notice.  
\* Other values on request.

<b>Deflection angle (mech.)</b>	< ± 26°
<b>Operating force</b>	5 N typically *
<b>Gate shape</b>	Square*, soft cross guide
<b>Wiper zero position</b>	± 1°
<b>Impact strength</b>	200 N
<b>User control</b>	Handle with Gaiter

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-25° C – +70° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 65

## MATERIALS

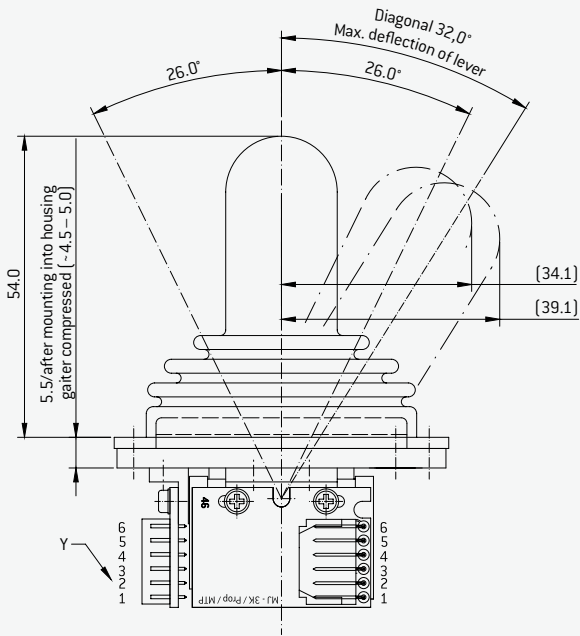
<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic
<b>Electrical connection</b>	6-pin Dubox plug
<b>Mounting</b>	Screws M3

## MJ-3K MTP ANALOGUE

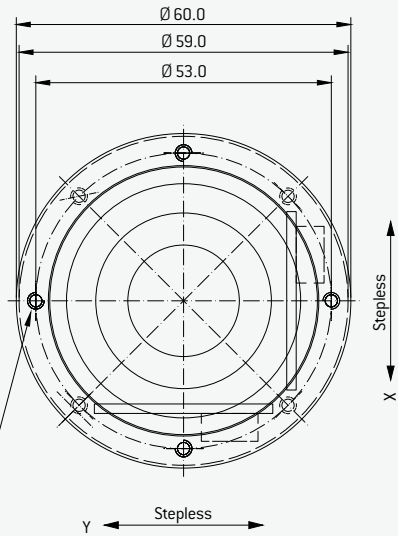
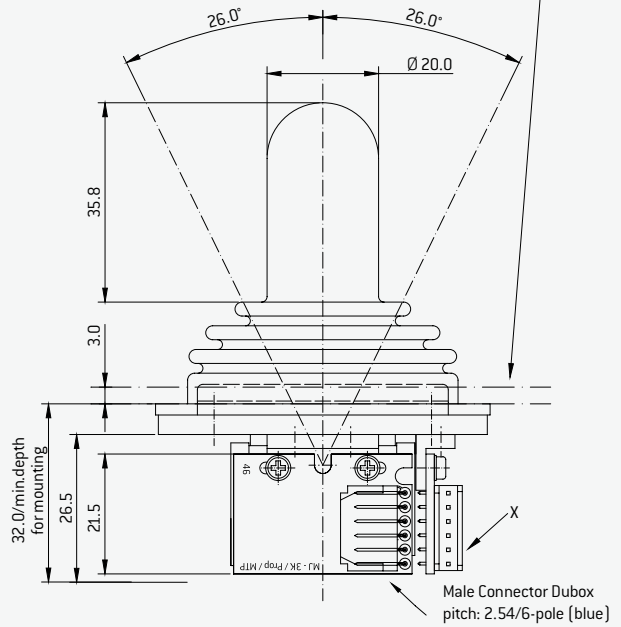
Type Item number	MJ-3K 55 MTP x: 0 y: 2K5 1-0-1 Dubox 6-pin E060200xxx (1-axis)	Type Item number	MJ-3K MTP xyz: 2.5k 1-0-1 Dubox 6-pin E060200401 (3-axis)
Type Item number	MJ-3K 55 MTP xy: 2K5 1-0-1 Dubox 6-pin E060200012 (2-axis)	Type Item number	MJ-3K 55 MTP xy: 2.5k 1-0-1 DS Dubox 6-pin E060200014 (2-axis)
Type Item number	MJ-3K 65 MTP x:0 y: 2.5k 1-0-1 Dubox 6-pin E060200xxx (1-axis)	Type Item number	MJ-3K 65 MTP xy: 2.5k 1-0-1 DS Dubox 6-pin E060200027 (2-axis)
Type Item number	MJ-3K 65 MTP xy: 2K5 1-0-1 Dubox 6-pin E060200491 (2-axis)	Connection cable Item number	Dubox 6-pin LiYv 0.14mm <sup>2</sup> 500mm Z301000500



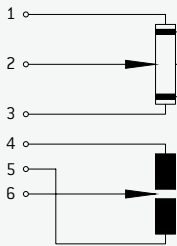
**DRAWINGS FOR MJ-3K MTP 55**



Assembly into Housing from Inside/Screw Head outside of housing  
If thickness of mounting panel is 3 mm: Use Screw M3 x 10 mm/Center Hole D = 49,0

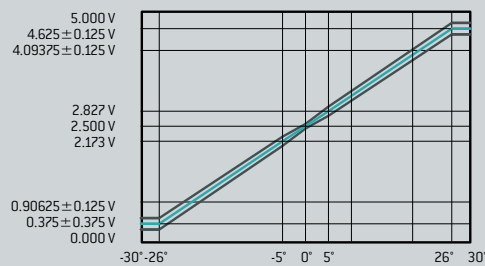


**CONNECTOR PIN ASSIGNMENT/DIAGRAM**

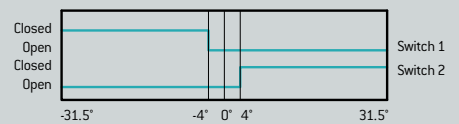


Connect. Resistance: 2.5 kOhm ± 20 %  
Analogue band: 7.5 % – 92.5 %, Utotal ± 3 %  
Medium Voltage: 50 % Utotal ± 2.5 %  
Linearity: ± 3 %  
Contact Resistance Switch: < 1 kOhm  
Life CP/PCB: > 5 Mio Cycles

**OUTPUT CHARACTERISTIC POTENTIOMETER**



**OUTPUT CHARACTERISTIC DIRECTIONAL CONTACTS**



# LINEAR 1-AXIS INDUSTRIAL JOYSTICK MJ-1L



The linear joystick of the MJ-1L type series is the robust light-weight of the MJ-xx joystick series. One of its feature characteristics is space-saving in the customer's housing. The installation space and extra functions, combined with a compact housing are excellent arguments to choose the MJ-1L. Less weight, easier controls of operations are huge advantages for end users. The robust design [also available with additional protective cover] guarantees a long service life.

## CHARACTERISTICS

- Ultra light
- Robust design
- Compact
- Minimal installation dimensions
- Long service life
- Conductive plastic technology

## APPLICATIONS

- Aerial work platforms
- Radio remote controls
- Forklift trucks
- Mobile hydraulics
- Steering of boats

## OPTION

- Protective cover



## ELECTRICAL SPECIFICATIONS

<b>Resistance value</b>	5 kohm $\pm 20\%$ (2 x 2.5 K $\pm 20\%$ )
<b>Linearity</b>	$\pm 2\%$
<b>Deflection angle, el.</b>	$> \pm 28^\circ$ *
<b>Load capacity/axis</b>	0.2 W at 40° C
<b>Operating voltage (VCC)</b>	Max. 30 VDC
<b>Contact current</b>	$< 10 \mu\text{A}$
<b>Max. contact current</b>	3 mA (typ.: 1 mA; in case of malfunction: max. 5 mA)
<b>Contact resistance (CRV)</b>	$< 400 \text{ ohm}$ (switch level)
<b>Insulation resistance</b>	1 G $\Omega$ at 500 V
<b>Dielectric strength</b>	2,000 V
<b>Output signal</b>	10 – 90 % ( $\pm 1\%$ ) of VCC 0 – 100 % ( $\pm 1\%$ ) of VCC 2 x 2.5 k 10 – 90 % reverse redundant
<b>Neutral position</b>	$\pm 2.5\%$ (50% $\pm 0.5\%$ of VCC measured load-free)

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	5 million cycles
---------------------	------------------

<b>Deflection angle, mech.</b>	$\pm 30^\circ$
<b>Operating force</b>	4 N typically *
<b>Impact strength</b>	Max. 180 N
<b>Weight</b>	About 35 g

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25° C – +70° C
<b>Protection class</b>	IP 66

## MATERIALS

<b>Base</b>	Plastics
<b>Bearing</b>	Plastics
<b>Electrical connection</b>	7-pin Molex

## DEFINITIONS

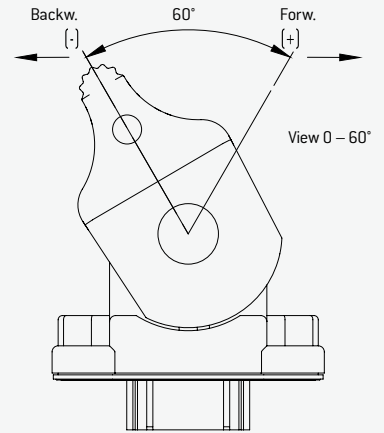
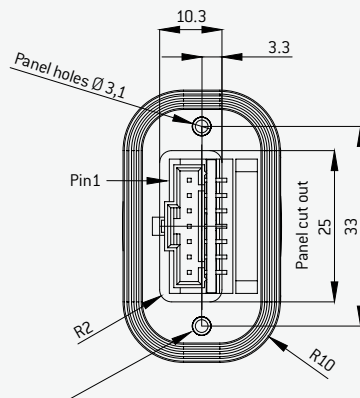
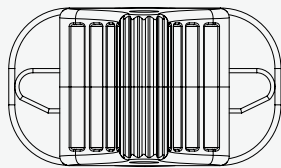
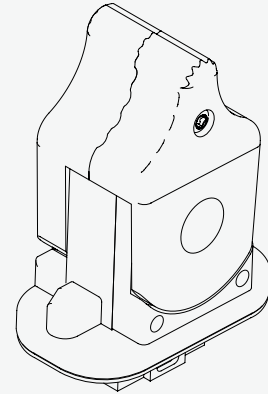
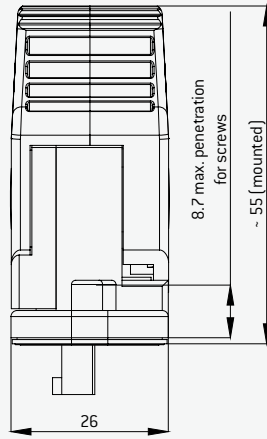
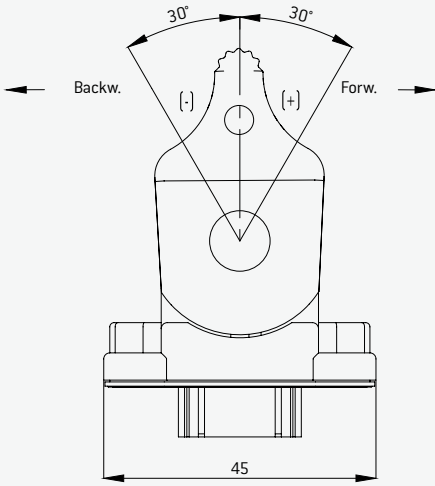
<b>BRS-0</b>	Stepless brake, detent in the zero position
<b>BRS</b>	Stepless brake
<b>0 – 60°</b>	-30° = zero position

Specifications are subject to change without notice. | \* Other values on request.

## MJ-1L

Type	MJ-1L 5K MC 1-0-1 10 – 90 % Molex 7-pin	Type	MJ-1L BRS-0 5k MC 1-0-1 0 – 100 % Molex 7-pin
Item number	E060200030 (1-axis)	Item number	E060201130 (1-axis)
Type	MJ-1L 5K MC 1-0-1 0 – 100 % Molex 7-pin	Type	MJ-1L BRS 5K MC 1-0-1 10 – 90 % Molex 7-pin
Item number	E060200130 (1-axis)	Item number	E060202030 (1-axis)
Type	MJ-1L 2x2.5K 10 – 90 % reverse redundant Molex 7-pin	Type	MJ-1L BRS 5K MC 1-0-1 0 – 100 % Molex 7-pin
Item number	E060200231 (1-axis)	Item number	E060202130 (1-axis)
Type	MJ-1L BRS-0 5K MC 1-0-1 10 – 90 % Molex 7-pin	Type	MJ-1L 0 – 60° 2x2.5K 10 – 90 % reverse redundant Molex 7-pin
Item number	E060201030 (1-axis)	Item number	E060203231 (1-axis)
Connection cable	Molex 7-pin LiYv 0.14mm <sup>2</sup> 500mm	Item number	Z301000507

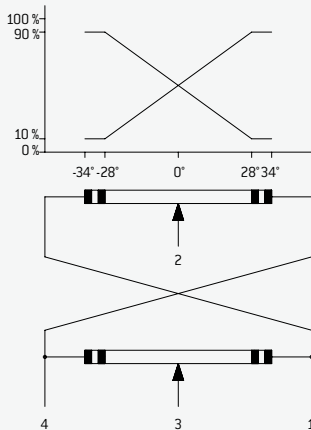
**DRAWINGS FOR MJ-1L**



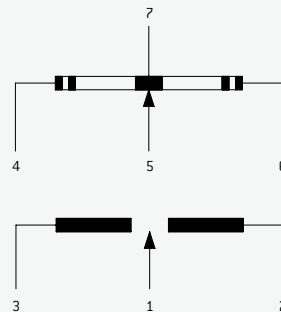
Mounting: 2 x screws for plastic  
K30x\_Z1 A2 [supplied]  
Drive mode: PH1/Z1 ~0.7 Nm  
Plate thickness up to 3.50 mm: K30 x 10  
Z408000031  
Plate thickness from 4.0 – 6.0 mm: K30 x 12  
Z408000018

Connector:  
Male header Molex 70553-0111  
Connector latching: 7 pol. Molex  
Cable 500 mm ws/white LiYv 0.14 mm² VDE0812  
[order separately: Z30100050?]

**CONNECTOR PIN ASSIGNMENT/DIAGRAM**



Potentiometer:  
Resistance value: 2.5 kOhm ± 20 %  
Output signal reverse redundant  
10 – 90 % of supplied voltage  
  
Pin 1: Voltage supply  
Pin 2: Output voltage signal  
Pin 3: Output voltage signal  
Pin 4: Voltage supply



Potentiometer:  
Resistance value: 5 kOhm ± 20 %  
Output signal:  
10 – 90 % ± 1 % of supplied voltage  
  
Pin 1: Common terminal-switches  
Pin 2: N/O switch lever forward (+)  
Pin 3: N/O switch lever backward (-)  
Pin 4: Negat. or zero volt. supply  
Pin 5: Output voltage signal  
Pin 6: Positive voltage supply  
Pin 7: Center tap

**ACCESSORIES**

Type	Neoprene protective cover MJ-1L	Type	Locking connector, 7-pin Molex
Item number	Z405000018 (not applicable for BRS/BRS-0/0 – 60°)	Item number	500mm, white LiYv 0.14mm²_VDE 0812
Type	Neoprene protective cover MJ-1L SC (Soft Control)		Z30100050?
Item number	Z405000023 (not applicable for BRS/BRS-0/0 – 60°)		

# STANDARD JOYSTICK MJ-4K



The use of contactless Hall technology in this joystick is recommended, if only limited installation space is available or the application is subject to high vibration. The MJ-4K 2-axis joystick fulfills all these requirements. The trusted durability of the MJ-xx joystick series is also guaranteed with the MJ-4K as is the proven reliability.

The applications are vast and range from rehabilitation equipment and automation technology to construction equipment and marine applications.



## ELECTRICAL SPECIFICATIONS

<b>Operational voltage</b>	5 V ± 0.5 V
<b>Output signal</b>	0.5 – 4.5 V
<b>Linearity</b>	± 3 %
<b>Deflection angle, el.</b>	± 19°
<b>Power consumption</b>	< 20 mA
<b>Max. output current</b>	± 8 mA
<b>Resolution</b>	16 bit
<b>Option</b>	Redundant output signal
<b>Electrostatic discharge</b>	BS EN 61000-4-2
<b>Radio interference</b>	BS EN 61000-4-3
<b>High-frequency interfering signals</b>	BS EN 61000-4-4
<b>Conducted interfering signals</b>	BS EN 61000-4-6
<b>Radiated emission</b>	EN 55016-2-3:2010+A1:2010

Specifications are subject to change without notice.  
\* Other values on request.

## MECHANICAL SPECIFICATIONS

<b>Service life</b>	5 million cycles
<b>Deflection angle, mech.</b>	± 19°
<b>Operating force</b>	3.5 N typically *
<b>Gate shape</b>	Circular
<b>Centre position tolerance</b>	± 1°
<b>Impact strength</b>	200 N

## ELECTRICAL CONNECTION

FCI Minitex 98414

## AMBIENT CONDITIONS

<b>Storage temperature</b>	-40° C – +85° C
<b>Operating temperature</b>	-25 – 70° C (opt. -40 – 85° C)
<b>Protection class (above mounting flange)</b>	IP 65

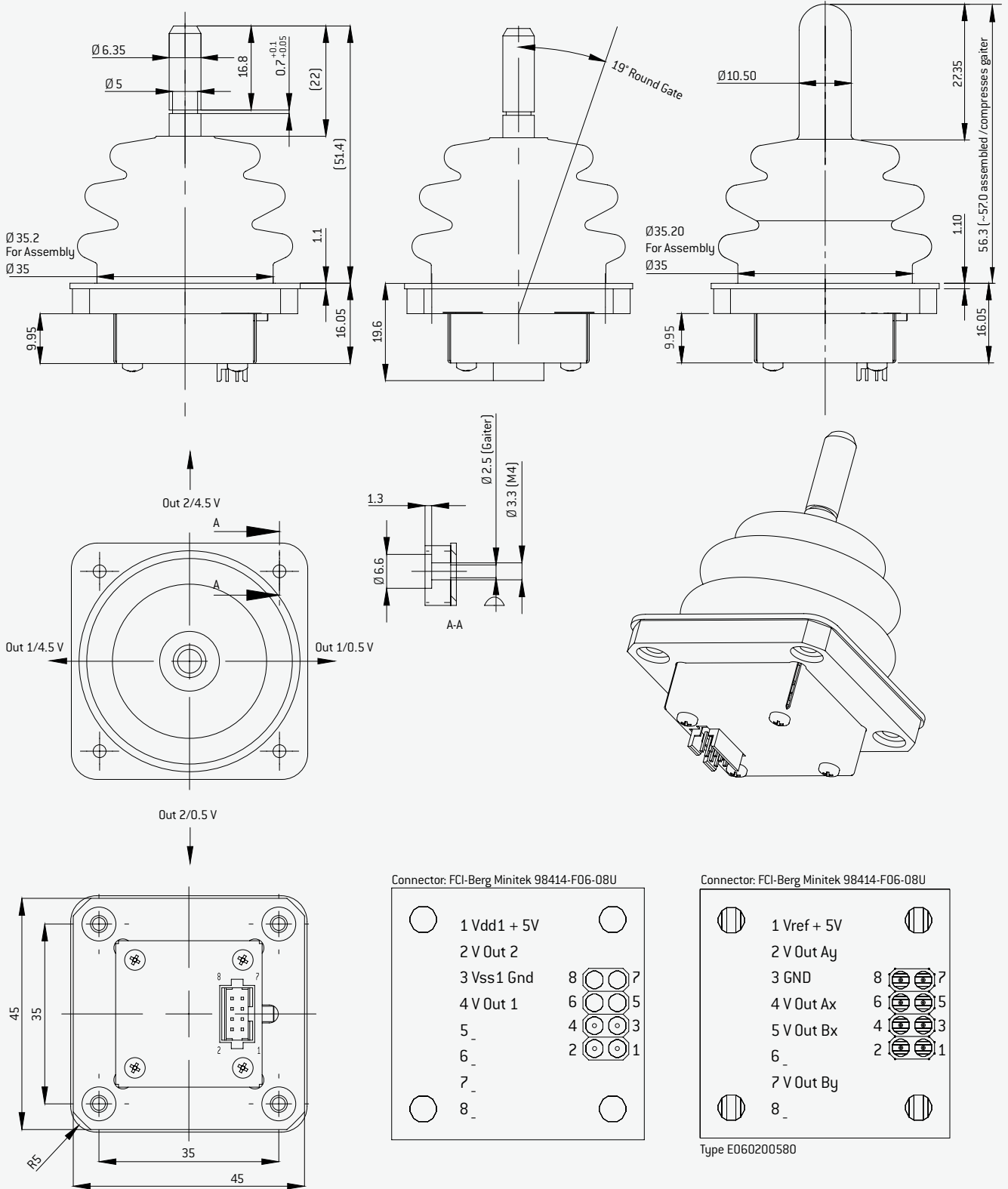
## MATERIALS

<b>Base</b>	Aluminium
<b>Bearing</b>	Stainless steel/plastic

## MJ-4K

Type	MJ-4K XY: Hall 0.5 – 4., 5 V, open gaiter version for adapter assembly	Type	MJ-4K XY: Hall 0.5 – 4.5 V redundant, additional variant with closed rubber boot
Item number	E060200408 (2-axis)	Item number	E060200580 (2-axis)
Type	MJ-4K XY: Hall 0.5 – 4.5 V, additional variant with closed rubber boot	Connection cable	Connecting plug with locking device; 8-poles, FCI Minitex 500mm, white AWG 26
Item number	E060200570 (2-axis)	Item number	Z301000104

DRAWINGS FOR MJ-4K

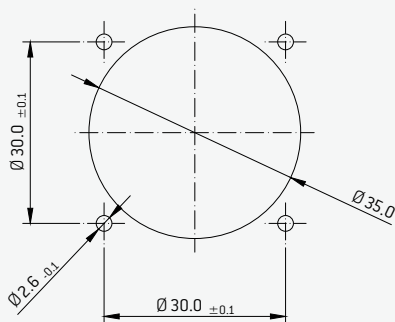


# MOUNTING HOLES FOR MJ-2K AND MJ-3K



Mounting, Technology and Options

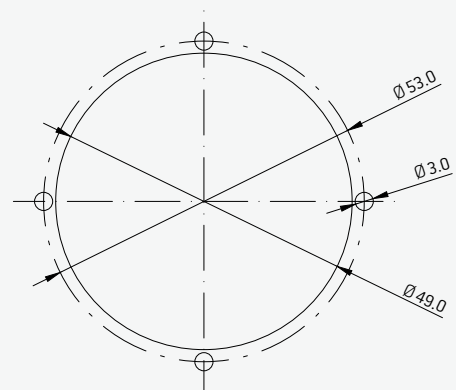
## MOUNTING HOLE MJ-2K OM



Dimension Tolerance  
DIN ISO 2768-m

If thickness of mounting panel/housing is 3 mm thickness, following screw is to be used: Mounting Screw Type for example: M2,5 x 16 DIN7985 (4x)/H/Z/TX  
Material: Steel galvanized/A2 (stainless). Length of screw has to be changed accordingly to mounting panel/housing thickness, to avoid damages to the gaiter!

## MOUNTING HOLE MJ-3K



Dimension Tolerance  
DIN ISO 2768-m

If thickness of mounting panel/housing is 3 mm thickness, following screw is to be used: Mounting Screw Type for example: M3 x 10 DIN7985 (4x)/H/Z/TX  
Material: Steel galvanized/A2 (stainless). Length of screw has to be changed accordingly to mounting panel/housing thickness.

KEY TECHNOLOGY/OPTIONS	SHORT FORM
<b>Technology</b>	
Conductive plastic	CP
Membrane sensor	MTP
Hall effect	Hall
<b>Options</b>	
Square platform	MJ-2K
Circular platform	MJ-3K
Handle height 55 (only MJ-3K)	55
Handle height 65 (only MJ-3K)	65
Center tap	MC
Dead man switch outside	DS series IB
Dead man switch (microswitch-inside)	DS
Cross gate	CG
Gaiter assembled from "outside" with respective mounting ring; IP 66	OM
Brake stepless – Put and Stay	BRS
Brake respective step – max. 2-0-2	BR 2-0-2
Circular deflection: 19.5°	3C
Soft control	SC
No guiding	NG

[www.metallux.de](http://www.metallux.de)

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System Certification  
to ISO 9001:2015