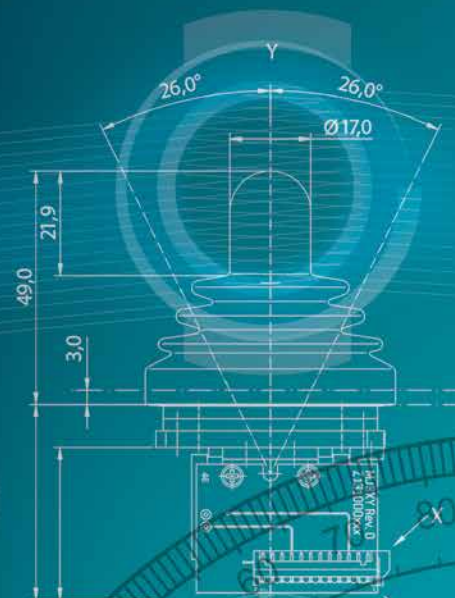
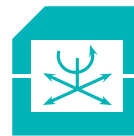


JOYSTICKS



▶ 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 DIN EN ISO 9001:2008 and ISO/TS 16949:2009 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

▶ FRANK STÜHR
CTO



▶ 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



Special application example
Mounting,
Technology, Options



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 IP66 protection will ensure its function until the cover is replaced. Optional with Hall effect technology.



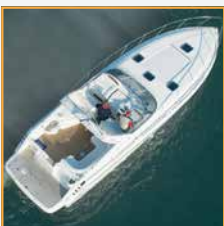
MEDICAL TECHNOLOGY

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-axe 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 IP66 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

Resistance value	5k Ω *
Resistance tolerance	\pm 20%
Deflection angle, el.	$> \pm 26^\circ$ *
Independent linearity	\pm 2%
Zero position switch per axis	$< \pm 3^\circ$ open
Load capacity/axis	0,2 W at 40°C
Operating voltage (VCC)	Max. 30 VDC
Contact current	$< 10 \mu\text{A}$
Max. contact current	1 mA in case of malfunction
Insulation resistance	10 G Ω at 500 VDC
Dielectric strength	2000 V

MECHANICAL SPECIFICATIONS

Service life	5 million cycles
---------------------	------------------

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

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

AMBIENT CONDITIONS

Storage temperature	$-40^\circ\text{C} \dots +85^\circ\text{C}$
Operating temperature	$-25^\circ\text{C} \dots +70^\circ\text{C}$
Protection class	IP 66

MATERIALS

Base	Aluminium
Bearing	Stainless steel/plastic
Electrical connection	12-pin Hirose plug
Mounting	M2.5x16 with 3 mm mounting plate, mounting ring. Select screw length to match plate thickness.

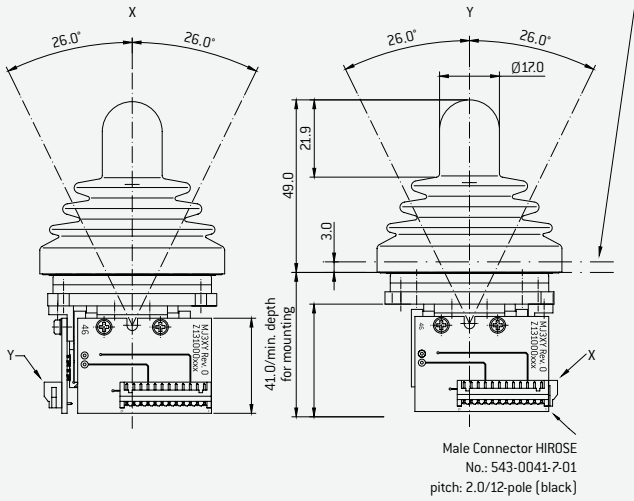
MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE OM

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		

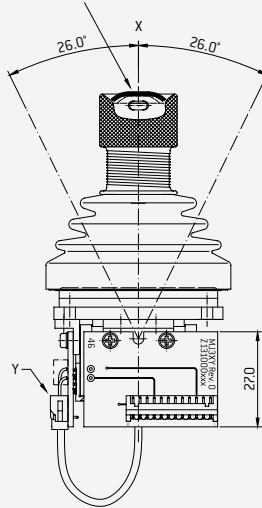
DRAWINGS FOR MJ-2K CP XY OM

DRAWINGS FOR MJ-2K CP XY OM BUTTON

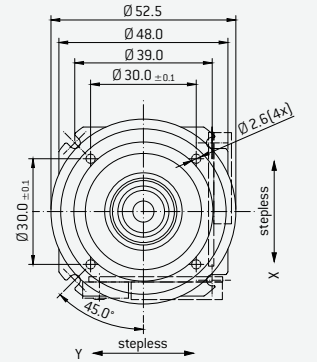
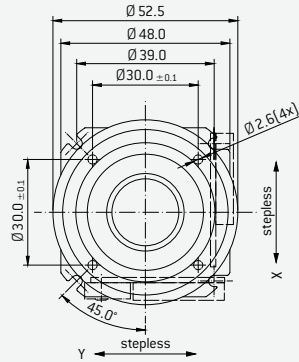
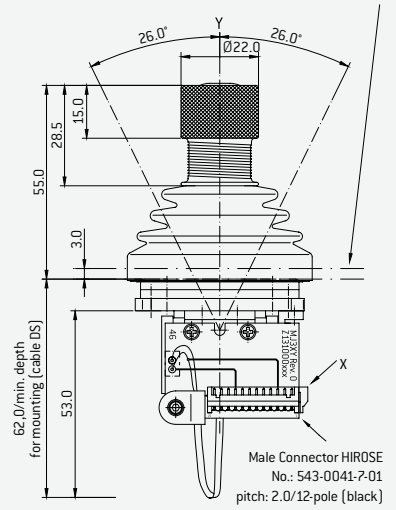
Assembly of Gaiter together with Mounting Ring
 MJ-2K 4xM2,5/30x30 MLX-Art.-No.: Z404000023
 If thickness of mounting panel is 3mm: Use Screw M2,5x16mm / Center Hole D=35.0



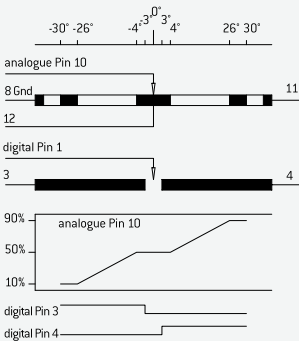
Push to operate
 "Deadman switch" (DS series IB)



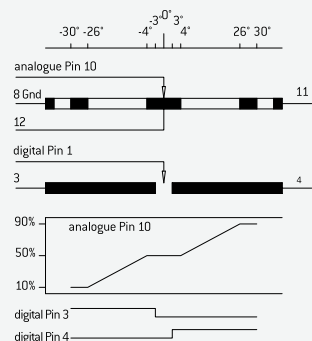
Assembly of Gaiter together with Mounting Ring
 MJ-2K 4xM2,5/30x30 MLX-Art.-No.: Z404000023
 If thickness of mounting panel is 3mm:
 Use Screw M2,5x16mm / Center Hole D=35.0



CONNECTOR PIN ASSIGNMENT / DIAGRAM



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



Connect. Resistance 5 kOhm $\pm 20\%$
 Analogue band 10% – 90% Utotal $\pm 3\%$
 Medium Voltage 50% Uttotal $\pm 2,5\%$
 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 0M



The 3-axis version of the MJ-2K series joystick with IP66 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

Resistance value	5k Ω *
Resistance tolerance	\pm 20%
Deflection angle, el.	XY: $> \pm 19.5^\circ$; Z: $> \pm 37^\circ$ *
Independent linearity	\pm 2%
Zero position switch per axis	XY: $< \pm 3^\circ$ open; Z: $< \pm 4^\circ$ open
Load capacity/axis	0,2 W at 40°C
Operating voltage (VCC)	Max. 30 VDC
Contact current	$< 10 \mu\text{A}$
Max. contact current	1 mA in case of malfunction
Insulation resistance	10 G Ω at 500 VDC
Dielectric strength	2000 V

MECHANICAL SPECIFICATIONS

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

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

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

AMBIENT CONDITIONS

Storage temperature	$-40^\circ\text{C} \dots +85^\circ\text{C}$
Operating temperature	$-25^\circ\text{C} \dots +70^\circ\text{C}$
Protection class	IP 66

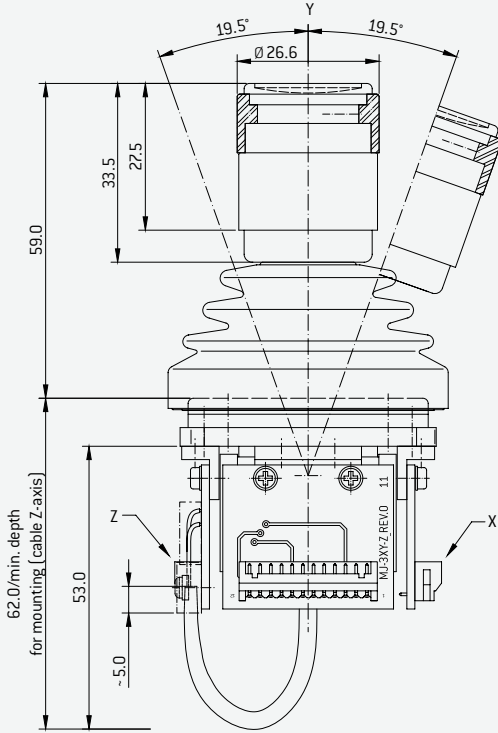
MATERIALS

Base	Aluminium
Bearing	Stainless steel/plastic
Electrical connection	12-pin Hirose plug
Mounting	M2.5x16 with 3mm mounting plate, mounting ring. Select screw length to match plate thickness.

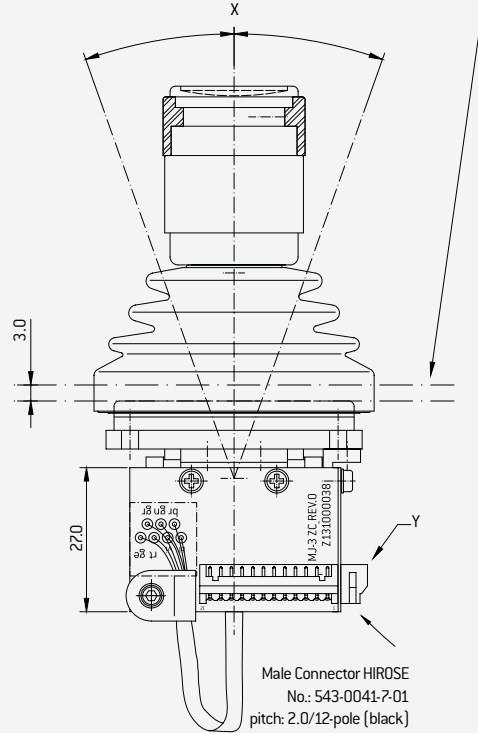
MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE 0M

Type Item number	MJ-2K X:0 Y:5k MC 1-0-1 0M Hirose 12-pin E060200412	Type Item number	MJ-2K XYZ: 5k MC 1-0-1 0M Hirose 12-pin E060200380
Type Item number	MJ-2K XY: 5k MC 1-0-1 0M 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 0M Hirose 12-pin E060200395		

DRAWINGS FOR MJ-2K CP XYZ OM

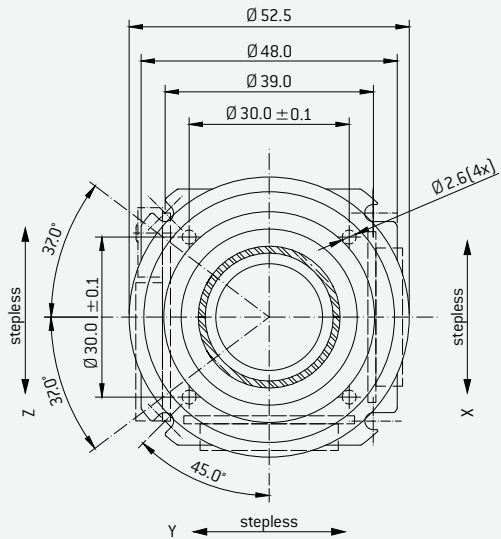
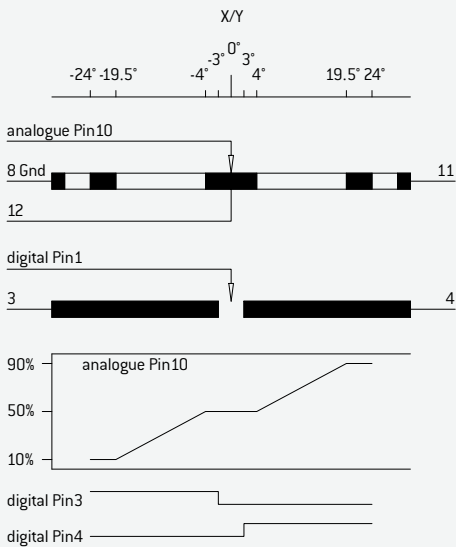


Assembly of Gaiter together with Mounting Ring
 MJ-2K 4xM2,5/30x30 MLX-Art.-No.: Z404000023
 If thickness of mounting panel is 3mm: Use Screw M2,5x16mm / Center Hole D=35.0

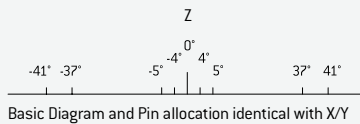


Male Connector HIROSE
 No.: 543-0041-7-01
 pitch: 2.0/12-pole [black]

CONNECTOR PIN ASSIGNMENT / DIAGRAM



Connect. Resistance 5 kOhm $\pm 20\%$
 Analogue band 10%–90% $U_{total} \pm 3\%$
 Medium Voltage 50% $U_{total} \pm 2,5\%$
 Linearity = $\pm 2\%$
 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

Switching current	5 mA at 5 V *
Versions	Digital 1- to 4-stage (1-0-1 to 4-0-4), optional: 5-0-5
Deflection angle, el.	4 x 6,5°*, optional: 5 x 5,2°
Zero position switch per axis	< ± 3° open
Load capacity/axis	0,2 W at 40°
Operating voltage (VCC)	Max. 30 VDC
Insulation resistance	1 GΩ at 500 VDC
Dielectric strength	2000 V

MECHANICAL SPECIFICATIONS

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

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

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

AMBIENT CONDITIONS

Storage temperature	-40°C ... +85°C
Operating temperature	-25°C ... +70°C
Protection class	IP 66

MATERIALS

Base	Aluminium
Bearing	Stainless steel / plastic
Electrical connection	12-pin Hirose plug
Mounting	M2.5x16 with 3mm mounting plate, mounting ring. Select screw length to match plate thickness.

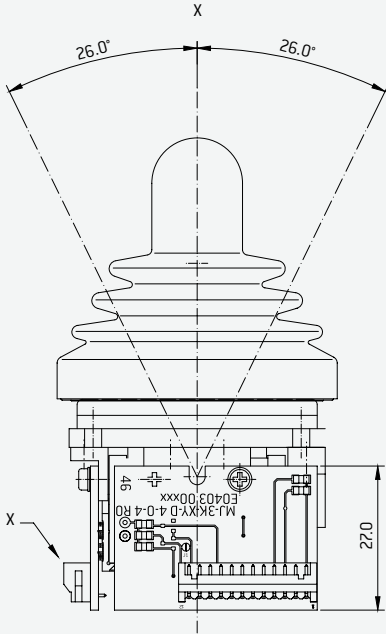
MJ-2K CP (CONDUCTIVE PLASTIC) DIGITAL OM

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

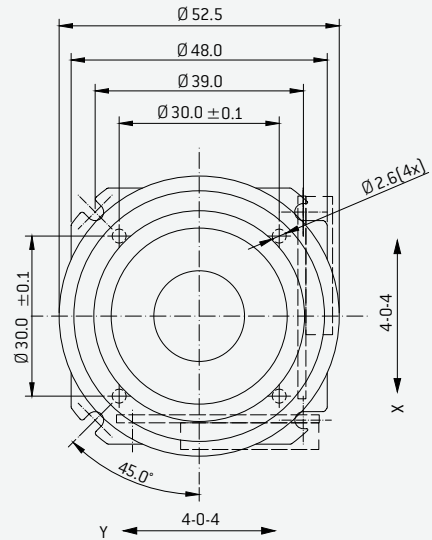
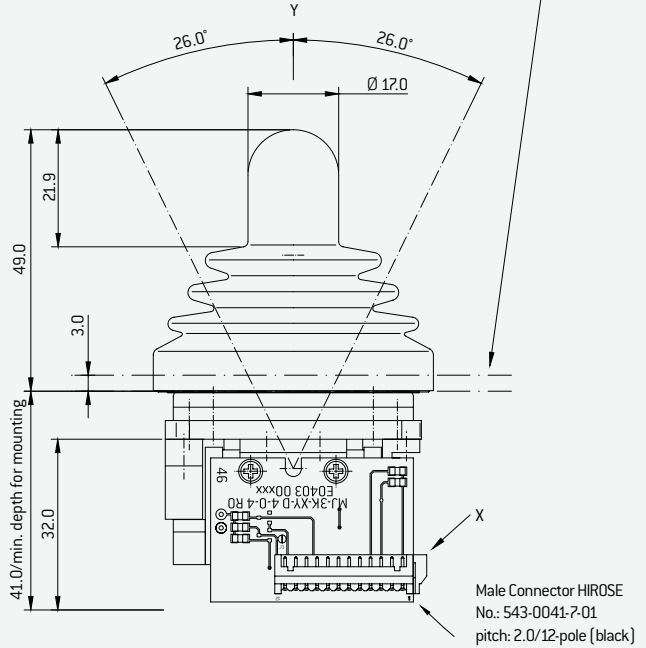
MJ-2K CP (CONDUCTIVE PLASTIC) ANALOGUE OM/MECHANICAL DETENTS

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

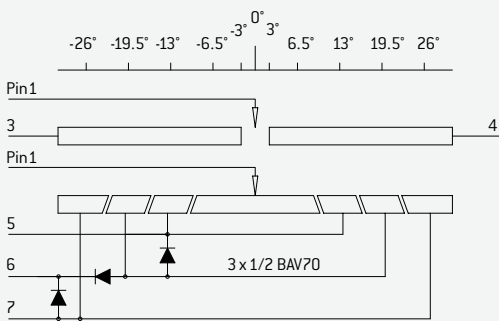
DRAWINGS FOR MJ-2K CP XY OM



Assembly of Gaiter together with Mounting Ring
 MJ-2K 4xM2,5/30x30 MLX-Art.-No.: Z404000023
 If thickness of mounting panel is 3mm: Use Screw M2,5x16mm / Center Hole D=35,0



CONNECTOR PIN ASSIGNMENT / DIAGRAM 4-0-4



Contact Resistance Switch < 1k0hm
 Life CP/PCB > 3 Mio Cycles
 Anti-interference condensator {100pF} 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

Resistance value	5 kΩ *
Resistance tolerance	± 20%
Deflection angle, el.	> ± 26° *
Independent linearity	± 2%
Zero position switch per axis	< ± 3° open
Load capacity/axis	0,2 W at 40°C
Operating voltage (VCC)	Max. 30 VDC
Contact current	< 10 μA
Max. contact current	1 mA in case of malfunction
Insulation resistance	1 GΩ at 500 VDC
Dielectric strength	2000 V

MECHANICAL SPECIFICATIONS

Service life 5 million cycles

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

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

AMBIENT CONDITIONS

Storage temperature	-40°C ... +85°C
Operating temperature	-25°C ... +70°C
Protection class	IP 65

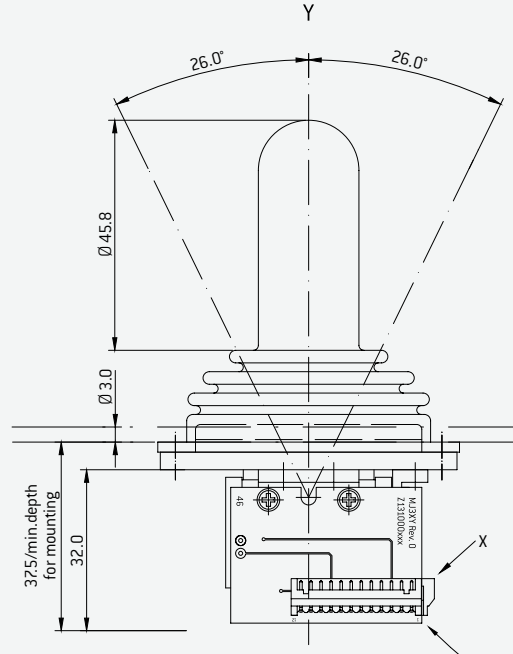
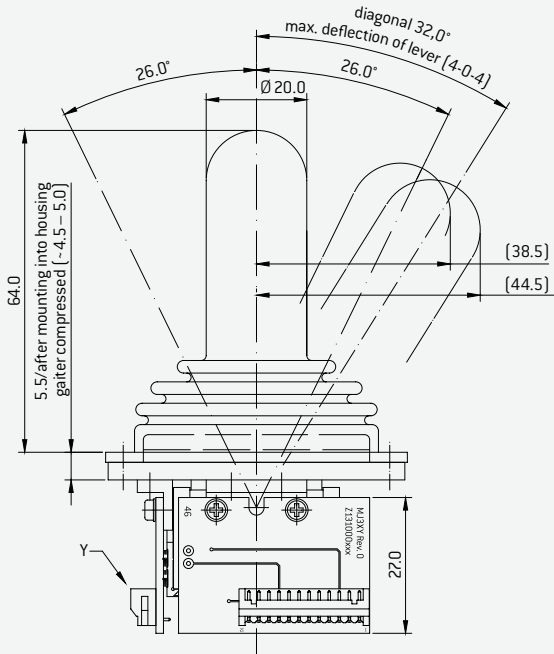
MATERIALS

Base	Aluminium
Bearing	Stainless steel/plastic
Electrical connection	12-pin Hirose plug, 6-pin Dubox plug
Mounting	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 0.14mm² 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 0.14mm² 500mm
Item number	E060200465 [2-axis]	Item number	Z301000500

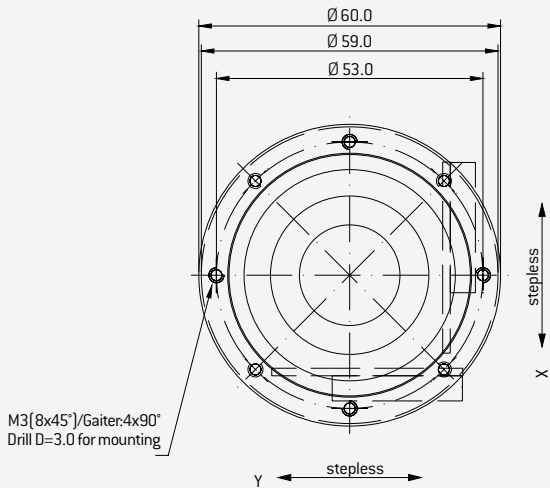
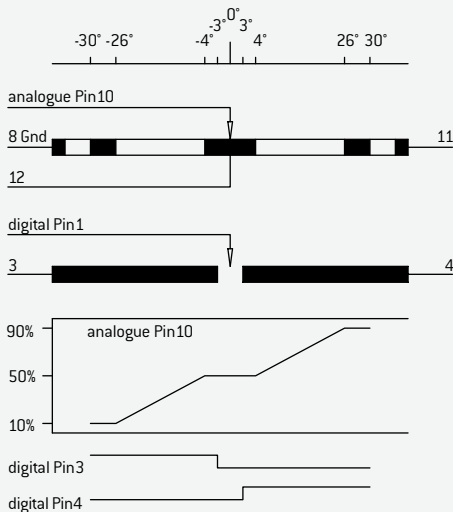
DRAWINGS FOR MJ-3K CP 65



Assembly into Housing from Inside / Screw Head outside of housing
 If thickness of mounting panel is 3mm:
 Use Screw M3x10mm / 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 $\pm 20\%$
 Analogue band 10% – 90% $U_{total} \pm 3\%$
 Medium Voltage 50% $U_{total} \pm 2,5\%$
 Linearity = $\pm 2\%$
 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

Switching current	5 mA at 5 V *
Versions	Digital 1- to 4-stage (1-0-1 to 4-0-4), optional: 5-0-5, 4-bit gray code / GC4B
Deflection angle, el.	4 x 6,5°, optional: 5 x 5,2°
Zero position switch per axis	< ± 3° open
Load capacity/axis	0,2 W at 40°
Operating voltage (VCC)	Max. 30 VDC
Insulation resistance	1 GΩ bei 500 VDC
Dielectric strength	2000 V

MECHANICAL SPECIFICATIONS

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

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

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

AMBIENT CONDITIONS

Storage temperature	-40°C ... +85°C
Operating temperature	-25°C ... +70°C
Protection class	IP 65

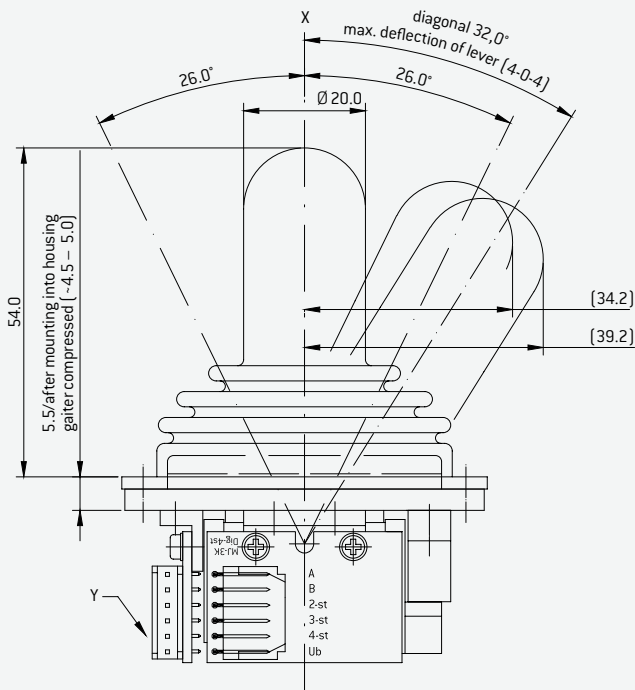
MATERIALS

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

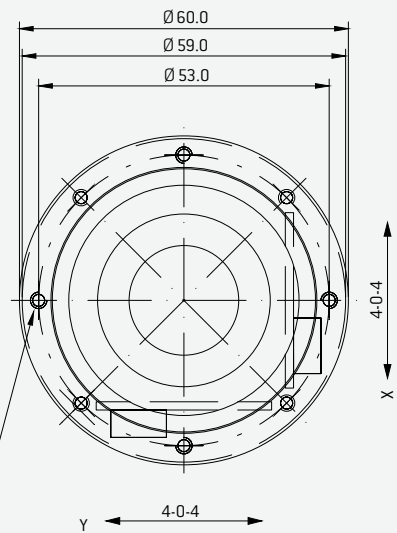
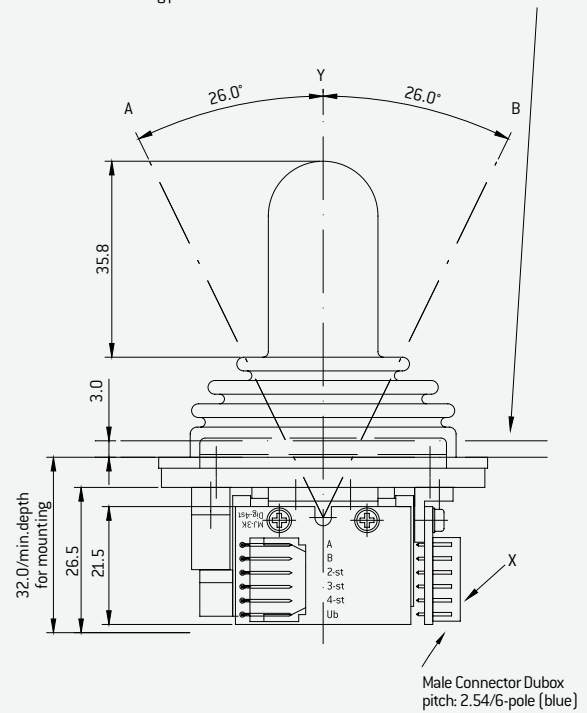
MJ-3K CP (CONDUCTIVE PLASTIC) DIGITAL

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 ² 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 ² 500mm
Item number	E060200025	Item number	Z301000500

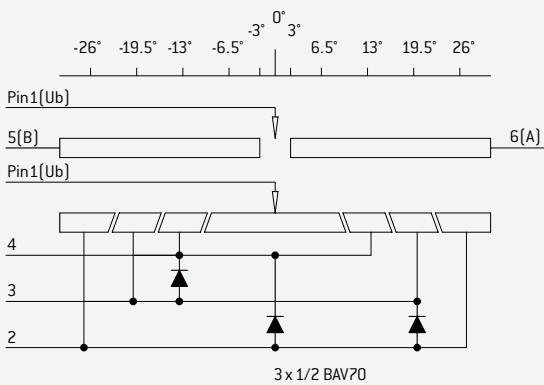
DRAWINGS FOR MJ-3K 55 DIGITAL



Assembly into Housing from Inside / Screw Head outside of housing
If thickness of mounting panel is 3mm: Use Screw M3x10mm / Center Hole D=49.0



CONNECTOR PIN ASSIGNMENT / DIAGRAM 4-0-4



Contact Resistance Switch < 1k0hm
Life CP/PCB > 3 Mio Cycles
Anti-interference condensator (100pF) for switch contacts 4-0-4

	-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

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

Resistance value	2,5 kΩ *
Resistance tolerance	± 20%
Deflection angle, el.	> ± 26° *
Independent linearity	± 3%
Load capacity/axis	0,2 W at 40°
Operating voltage (VCC)	Max. 30 VDC
Contact current	< 10 μA
Max. contact current	1 mA in case of malfunction
Insulation resistance	1 GΩ at 500 VDC
Dielectric strength	2000 V
Output signal	7.5% / 92.5 % of VCC (± 2.5%) *

MECHANICAL SPECIFICATIONS

Service life	5 million cycles
---------------------	------------------

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

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

AMBIENT CONDITIONS

Storage temperature	-25°C...+70°C
Operating temperature	-25°C...+70°C
Protection class	IP 65

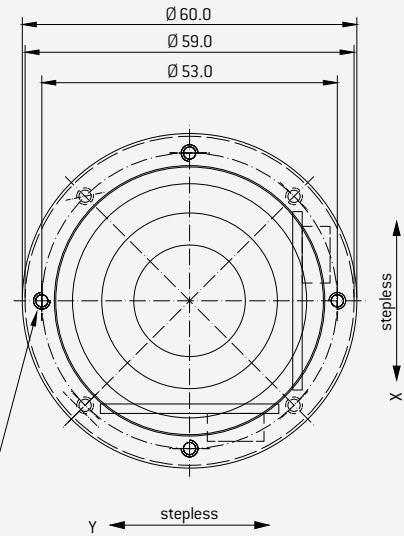
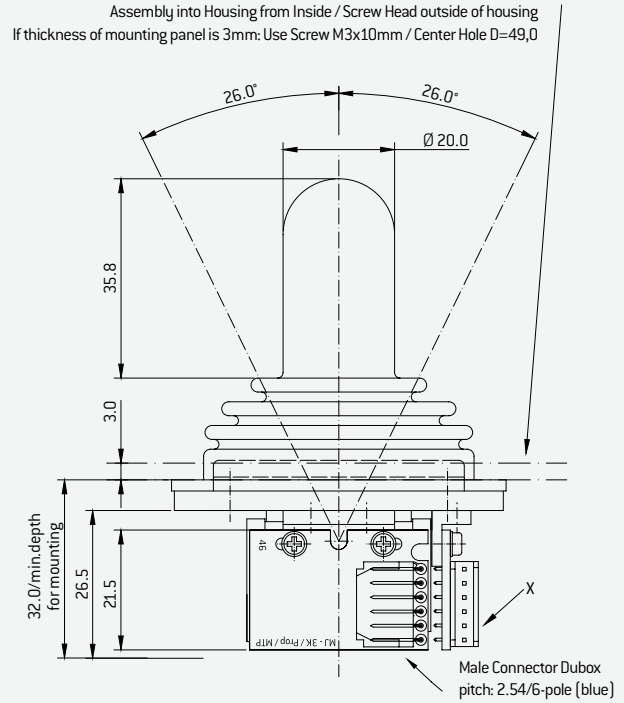
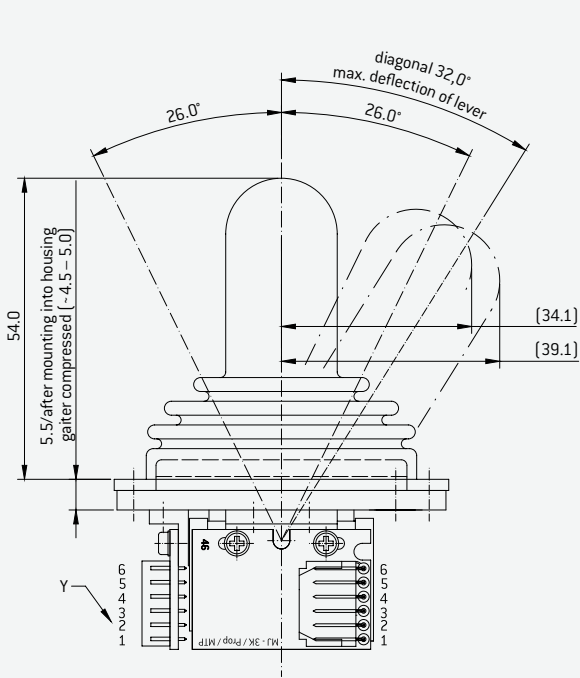
MATERIALS

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

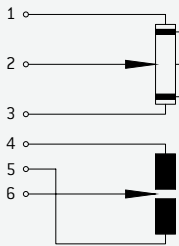
MJ-3K MTP ANALOGUE

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 ² 500mm Z301000500

DRAWINGS FOR MJ-3K MTP 55

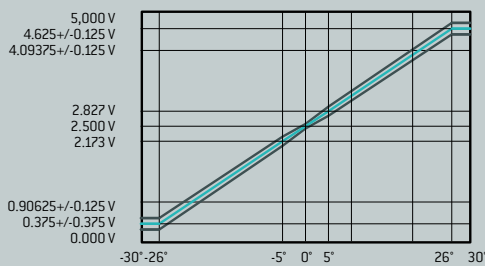


CONNECTOR PIN ASSIGNMENT / DIAGRAM

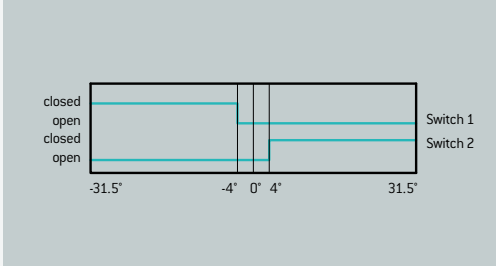


Connect. Resistance 2.5 kOhm ± 20%
 Analogue band 7.5% - 92.5% Utotal ± 3%
 Medium Voltage 50% Utotal ± 2.5%
 Linearity = ± 3%
 Contact Resistance Switch < 1kOhm
 Life CP/PCB > 5 Mio Cycles

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

Resistance value	5 kohm $\pm 20\%$ (2x2.5 K $\pm 20\%$)
Linearity	$\pm 2\%$
Deflection angle, el.	$> \pm 28^\circ$ *
Loading capacity	0,2 W at 40°C
Operating voltage (VCC)	Max. 30 VDC
Contact current	$< 10 \mu\text{A}$
Max. contact current	1 mA in case of malfunction
Contact resistance (CRV)	$< 400 \text{ ohm}$ (switch level)
Insulation resistance	1 G Ω at 500V
Dielectric strength	2000 V
Output signal	10 – 90% ($\pm 1\%$) of VCC 0 – 100% ($\pm 1\%$) of VCC 2x2.5 k 10 – 90% reverse redundant
Neutral position	$\pm 2.5^\circ$ (50% $\pm 0.5\%$ of VCC measured load-free)

MECHANICAL SPECIFICATIONS

Service life	5 million cycles
---------------------	------------------

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

AMBIENT CONDITIONS

Storage temperature	$-40^\circ\text{C} \dots +85^\circ\text{C}$
Operating temperature	$-25^\circ\text{C} \dots +70^\circ\text{C}$
Protection class	IP 66

MATERIALS

Base	Plastics
Bearing	Plastics
Electrical connection	7-pin Molex

DEFINITIONS

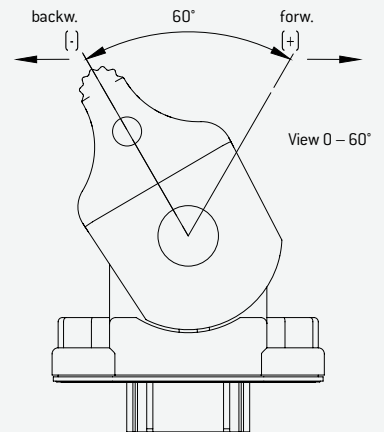
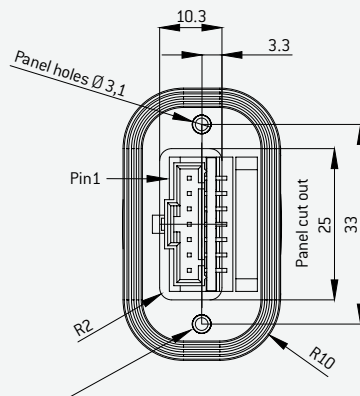
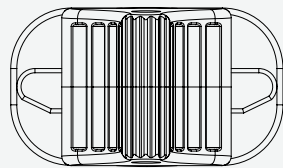
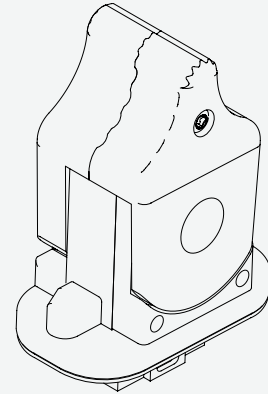
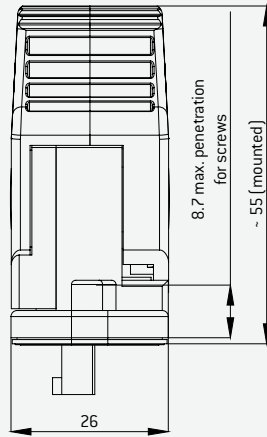
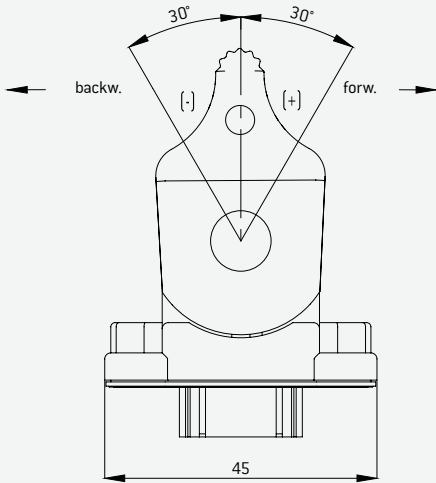
BRS-0	Stepless brake, detent in the zero position
BRS	Stepless brake
0 – 60°	$-30^\circ =$ zero position

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 ² 500mm	Item number	Z301000507

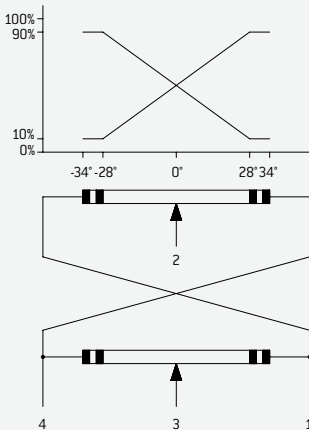
DRAWINGS FOR MJ-1L



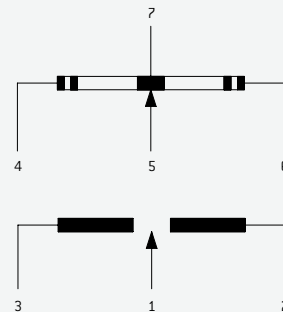
Mounting: 2x screws for plastic
K30x_Z1 A2 (supplied)
Drive mode: PH1/Z1 ~ 0.7Nm
Plate thickness up to 3.50mm: K30x10
Z408000031
Plate thickness from 4.0 – 6.0mm: K30x12
Z408000018

Connector:
Male header Molex 70553-0111
Connector latching: 7pol. Molex
Cable 500mm ws/white LiYv 0,14mm² VDE0812
[order separately: Z301000507]

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)		Z301000507
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

Operational voltage	5 V ± 0,5 V
Output signal	0,5 ... 4,5 V
Linearity	± 3%
Deflection angle, el.	± 19°
Power consumption	< 20 mA
Max. output current	± 8 mA
Resolution	16 bit
Option	Redundant output signal
Electrostatic discharge	BS EN 61000-4-2
Radio interference	BS EN 61000-4-3
High-frequency interfering signals	BS EN 61000-4-4
Conducted interfering signals	BS EN 61000-4-6
Radiated emission	EN 55016-2-3:2010+A1:2010

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

MECHANICAL SPECIFICATIONS

Service life	5 million cycles
Deflection angle, mech.	± 19°
Operating force	3,5 N typically *
Gate shape	Circular
Centre position tolerance	± 1°
Impact strength	200 N

ELECTRICAL CONNECTION

FCI Minitex 98414

AMBIENT CONDITIONS

Storage temperature	−40°C ... +85°C
Operating temperature	−25 ... 70°C (opt. −40 ... 85°C)
Protection class (above mounting flange)	IP 65

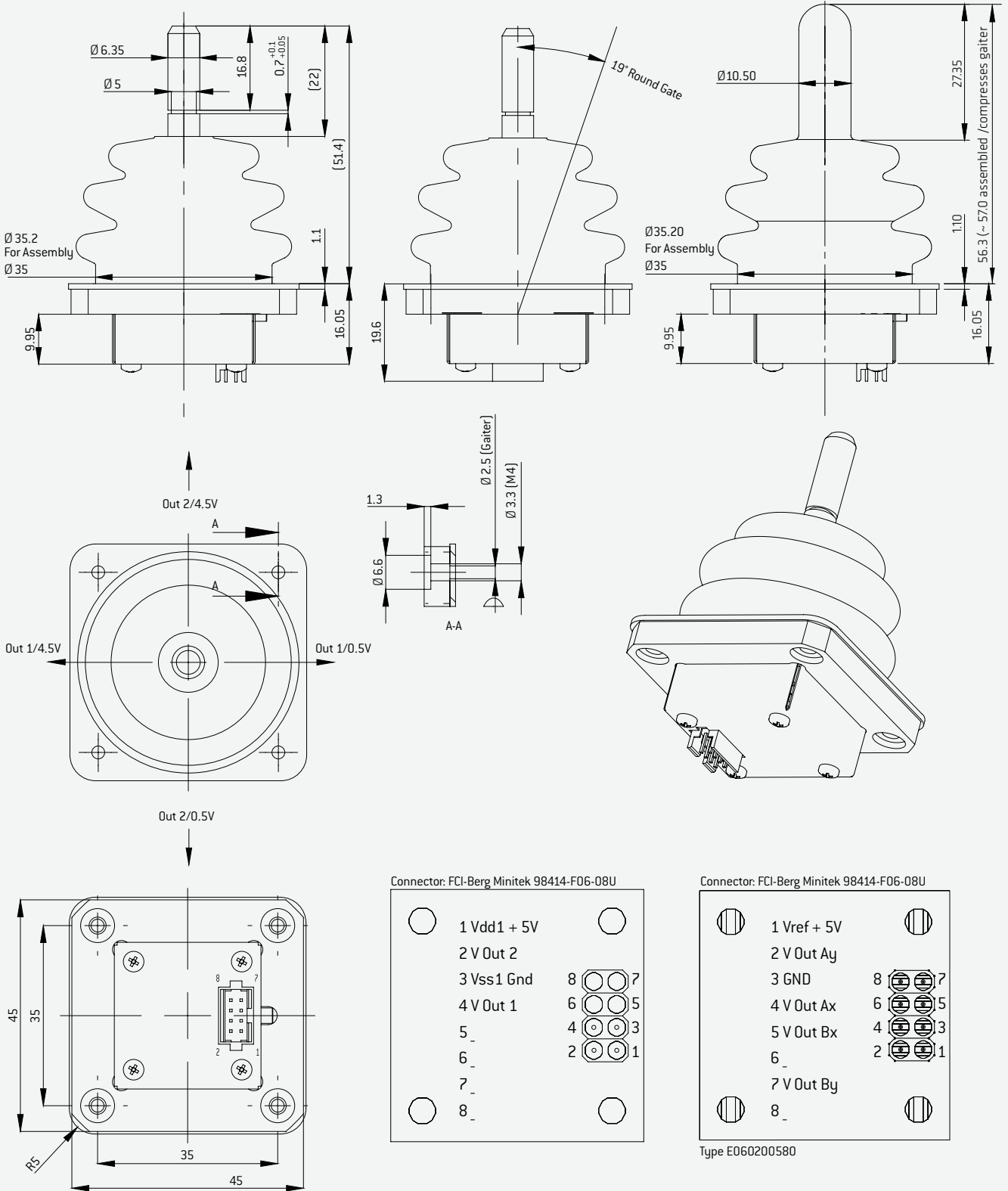
MATERIALS

Base	Aluminium
Bearing	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

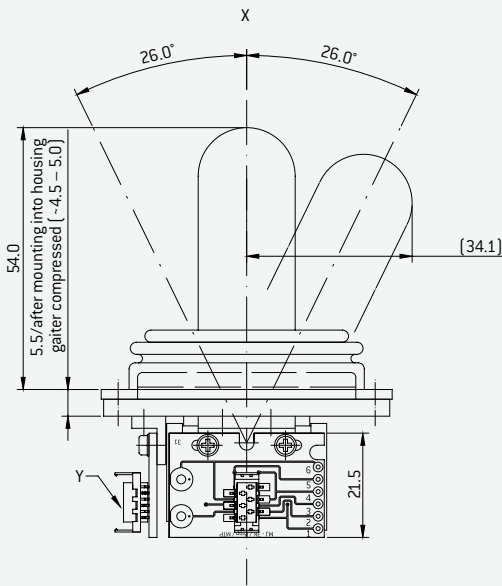


JOYSTICK MJ-3K BRS

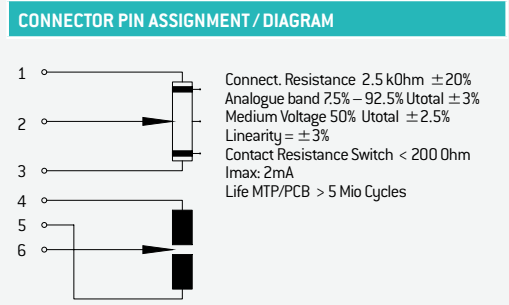
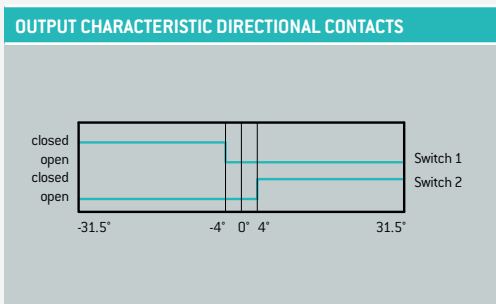
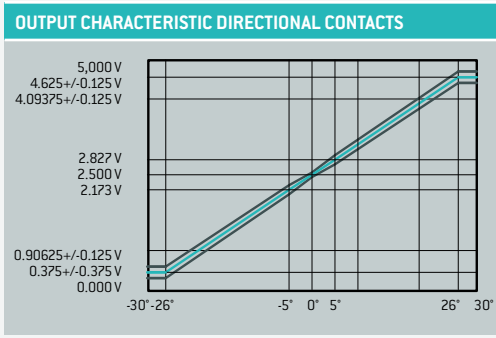
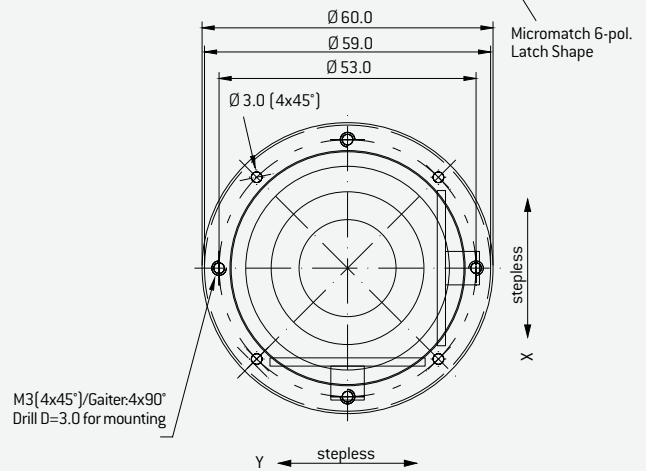
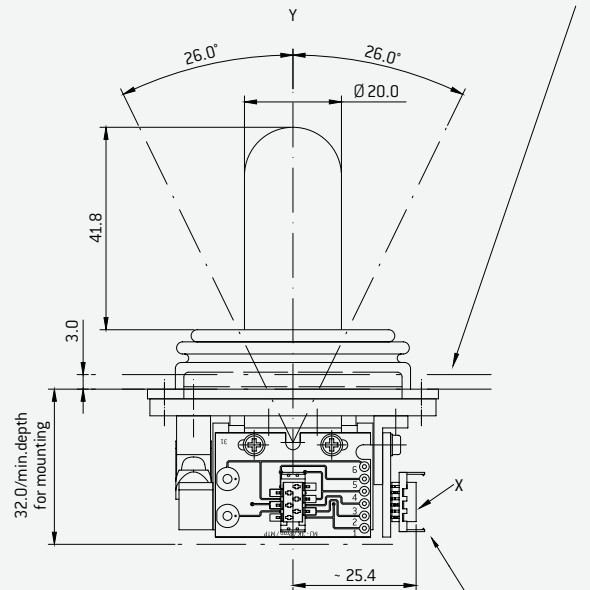


A modular system makes it possible to select from various mechanical designs according to customer requirements and combine this design with matching sensors. Please ask our team.

Special applications based on the standard product can also be quickly realised. The example below shows a MJ-3K joystick with friction brake "put 'n stay".



Assembly into Housing from Inside / Screw Head outside of housing
If thickness of mounting panel is 3mm: Use Screw M3x10mm / Center Hole D=49,0



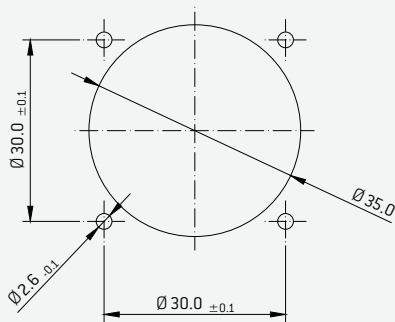
MJ-3K BRS	
Type	MJ-3K 55 MTP xy: 2.5k 1-0-1 BRS 4x45° D=3.0 Micromatch 6-pin
Item number	E060200472 (2-axis)
Type	MJ-3K 55 MTP xy: 2.5k 1-0-1 3C BRS 4x45° D=3.0 Micromatch 6-pin
Item number	E060200418 (2-axis)

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



Mounting, Technology and Options

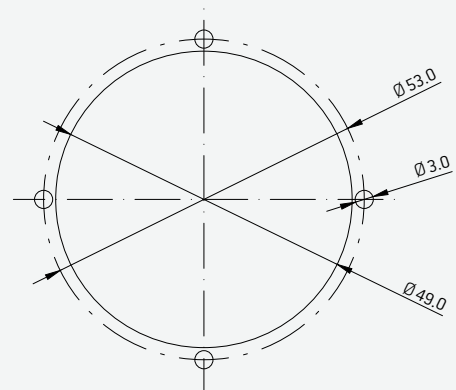
MOUNTING HOLE MJ-2K OM



Dimension Tolerance
DIN ISO 2768-m

If thickness of mounting panel/housing is 3mm thickness, following screw is to be used: Mounting Screw Type for example: M2,5x16 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 3mm thickness, following screw is to be used: Mounting Screw Type for example: M3x10 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
Technology	
Conductive plastic	CP
Membrane sensor	MTP
Hall effect	Hall
Options	
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

© www.metallux.de 02/2017



METALLUX AG

Robert-Bosch-Straße 29
71397 Leutenbach-Nellmersbach
Germany

FON +49 (0)7195/59 80 - 0
FAX +49 (0)7195/59 80 - 300
E-mail: info@metallux.de

System Certification
to ISO/TS 16949