

1

2

3

4

5

6

7

8

A

B

C

D

E

F

A

B

C

D

E

F

Push Button 2
Symbol: P008

Push Button 1
Symbol: P008

Push Button Rear
Symbol: P008

Thumbwheel 1
Color: 5



DİKKAT
CAUTION

Makersan Order No : MO391-387_V0009

Makersan Config ID : MO 391-387 - H20 - S11 - A - 0 - P01 - 3 - D3

Part Name : Joystick Base + Grip

Customer : EHR Elektronik

Project : -

Can Protocol : H20 - S11 - CANOpen

Node ID : A - 4(04h)

Axis of Actuation : 0 - 2 Axis Full

Program : P01 - Dual Cros

Rear : 3 - With Button - Presence Det. Switch

Front Panel : C3 - 1 Thumbwheel Right Vertical with 2 Push Buttons

Special Requirements :

Please refer to MO391-387_H2X datasheet for other information.

- Olası bir yay kırılmasında, joystick kalan yaylar ile kesinlikle kullanılmamalıdır.

In case of a spring break, joystick must not be used with remaining springs.

- Şok ve darbeye maruz kalan veya yere düşen joystick hurdaya ayrılmalıdır, kullanılmamalıdır.

Joystick must be separated to scrap if it has been exposed to any shock, impact or free fall.

- Joystick Base ve Grip'e ait datasheet'deki güvenlik talimatlarına uyulmalıdır.

Safety instruction in the Joystick Base and Grip datasheet shall be respected.

- Joystick Base ve Grip'e ait datasheet'deki hata modları, araç üreticisi tarafından dikkate alınmalıdır.

Failure modes in the Joystick Base and Grip datasheet should be taken into account by the vehicle manufacturer.

- Joystick Base and Grip'e ait kullanım kılavuzundaki uyarı işaretlerine uyulmalıdır.

The warning indications in the Joystick Base and Grip user manual shall be respected.

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REVIZYON REVISION	-	TARİH DATE	28-Apr-26 08:00:00 AM	KONTROL CHECKED BY	Levent ERKOCAK	ACIKLAMA DESCRIPTION			
Belirtilmeyen toleranslar / Unspecified tolerances according to TS 1980-1 (DIN ISO 2768-1)				v		MALZEME/MATERIAL		YUZEY/AREA_mm2 -	AGIRLIK/MASS_kg -
CİZEN DRAWN BY	U.DEMİR		TARİH/DATE	11/11/20		YUZEY İŞLEM/FINISH		ISIL İŞLEM/HEAT TREATMENT	
OLÇEK/SCALE 0,750	A3				PARÇA ADI /PART NAME		 www.makersan.com		
PARÇA /PART NO MO391-387_HXX_X_PXX_X_XX					MO 391&387 Joystick Grip Kompleksi				

DATASHEET
MO 391.H2X&387 Grip



Product Characteristics

Technology Lifetime at Full Stroke Connector Lever Operating Angle Lever Other Specification Operating Temp. Protection Axis of Actuation	Contactless Hall Measuring Principle (Redundant) Up to 5 million Deutsch 8 Pins $\pm 20^\circ$ Self Centering Two Centering Spring Forces $-40C^\circ \sim +85C^\circ$ IP67 from surface of mounting till top 2 Axis Full
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Electrical Data

Supply Voltage Supply Current CAN Protocol Baud Rate Termination Resistor Programmable Parameters	8-32V DC 80 mA typ. @12V supply ISO 11898, CAN specification 2.0A - 2.0B SAE J1939 or CANopen 250 kbit/s (default) External Node ID, baud rate and others
Extra I/O Overvoltage Protection Reverse Battery Protection	4 provided, programmable; - Digital input (active low) - Digital output (low side, 80mA sink max, up to 32V switching voltage) Up to 36V Provided

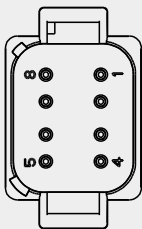
Environment

	All the tests specified above were performed in Makersan's in-house testing facility for the purpose of design verification except EMC. The in-house testing facility does not hold an accreditation.
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- For applications outside this parameters, please consult us.

Electrical Connection

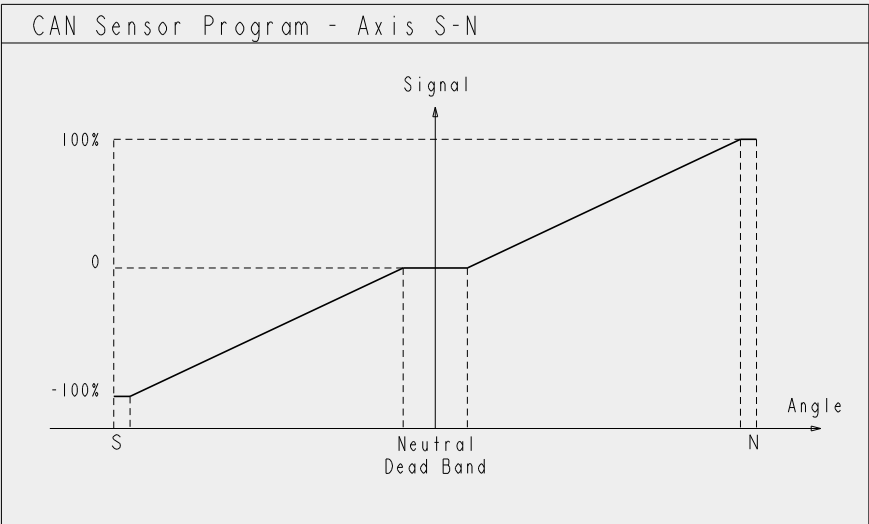
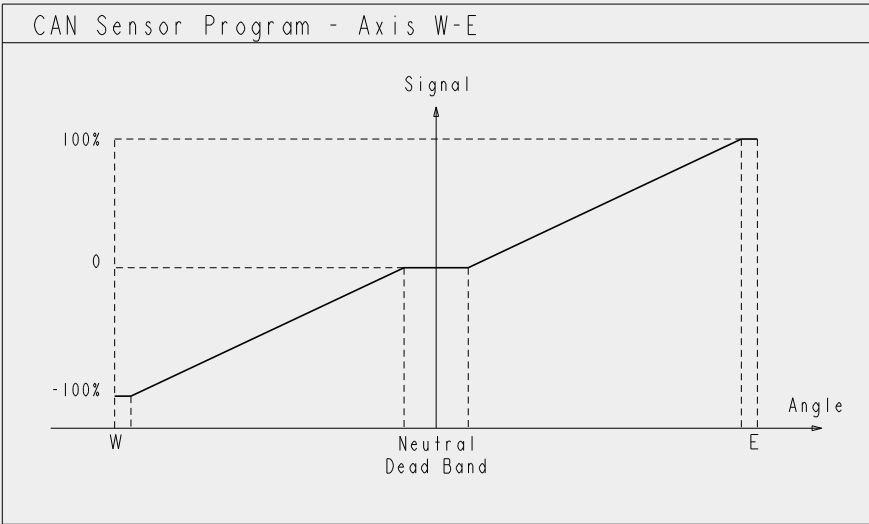
DEUTSCH CONNECTOR



Mating Connector :
DT 06-08SA

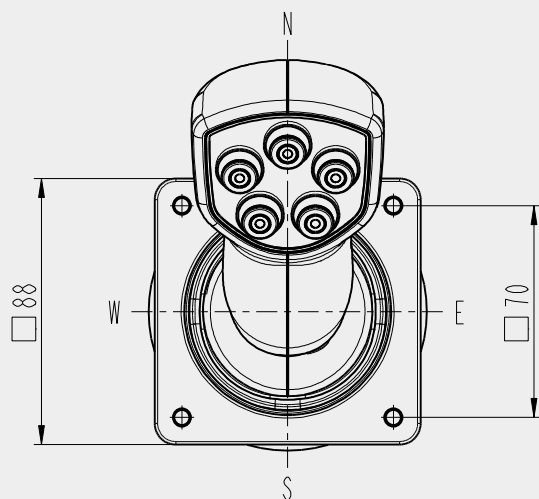
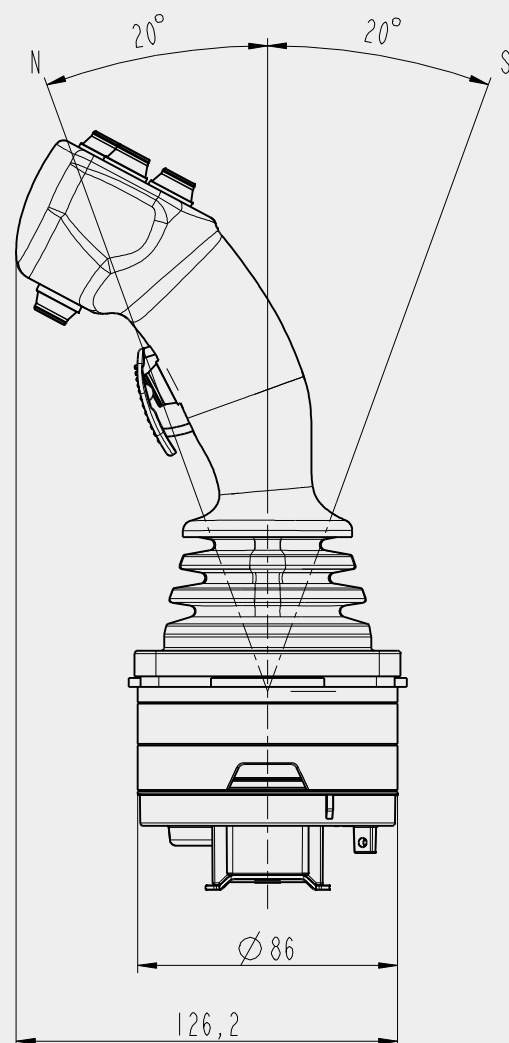
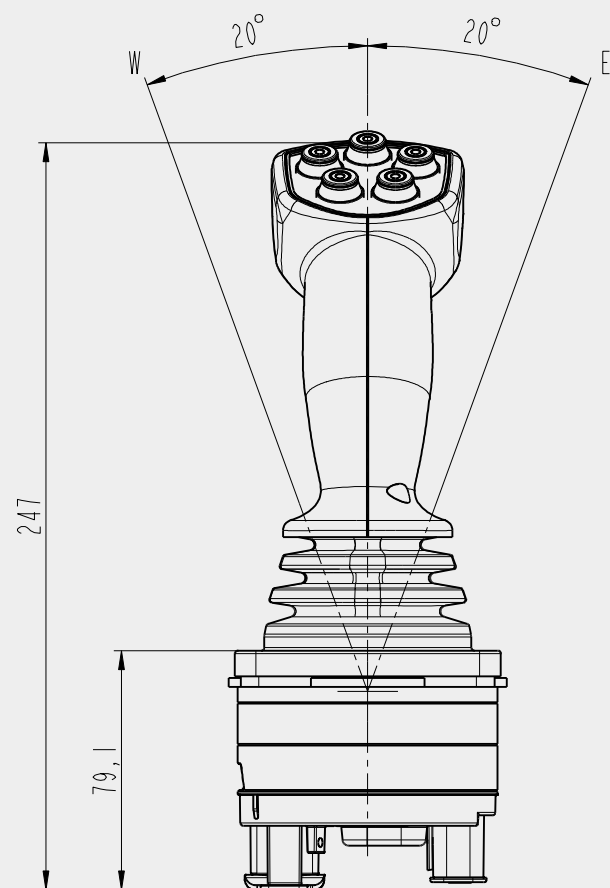
DEUTSCH PINS	
Pin No	Function
1	Programmable 1/01
2	Programmable 1/02
3	Programmable 1/03
4	Programmable 1/04
5	VS
6	GND
7	CAN L
8	CAN H

Signal Output

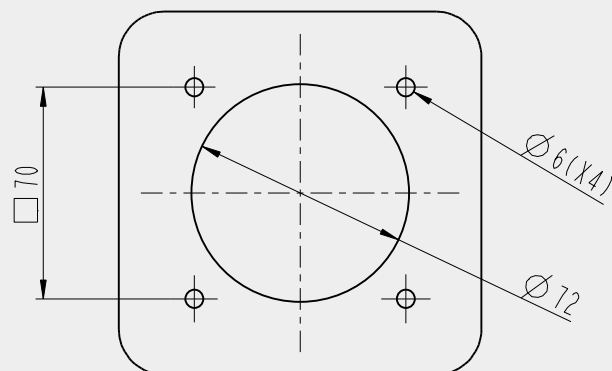


DATASHEET
MO 391.H2X&387 Grip

Technical Drawing

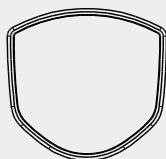


Cut-Out Dimensions

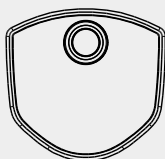


Front Panel Available Variants

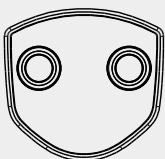
Push Button



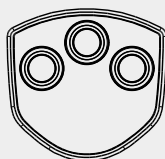
A0
No push
button



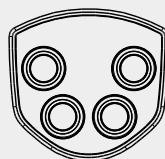
A1
1 push
button



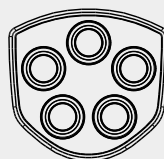
A2
2 push
button



A3
3 push
button



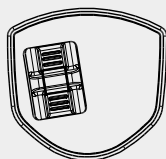
A4
4 push
button



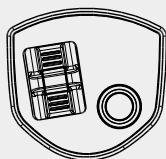
A5
5 push
button

Front Panel Available Variants

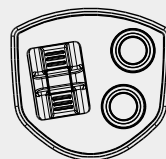
1 Thumbwheel Left (Vertical) with Push Button



B1
1 Thumbwheel left
vertical with no push
button



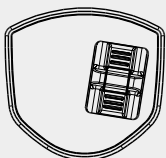
B2
1 Thumbwheel left
vertical with 1 push
button



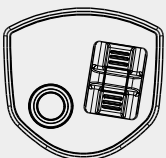
B3
1 Thumbwheel left
vertical with 2 push
button

Front Panel Available Variants

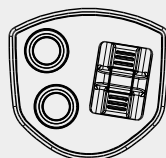
1 Thumbwheel Right (Vertical) with Push Button



C1
1 Thumbwheel right
vertical with no push
button



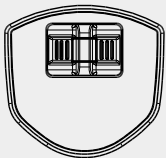
C2
1 Thumbwheel right
vertical with 1 push
button



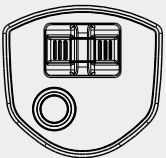
C3
1 Thumbwheel right
vertical with 2 push
button

Front Panel Available Variants

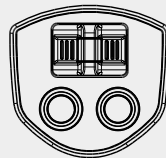
1 Thumbwheel (Horizontal) with Push Button



D1
1 Thumbwheel
horizontal
with no push button



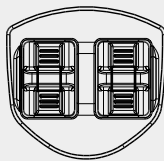
D2
1 Thumbwheel
horizontal
with 1 push button



D3
1 Thumbwheel
horizontal
with 2 push button

Front Panel Available Variants

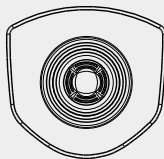
2 Thumbwheel



E1
2 Thumbwheel

Front Panel Available Variants

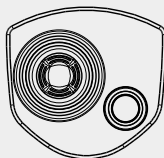
1 Micro Joystick



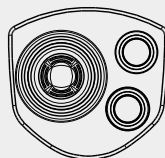
F1
1 Micro Joystick

Front Panel Available Variants

1 Micro Joystick Left with Push Button



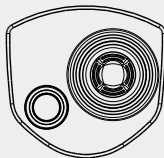
G1
1 Micro Joystick left
with 1 push button



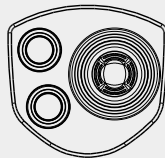
G2
1 Micro Joystick left
with 2 push button

Front Panel Available Variants

1 Micro Joystick Right with Push Button

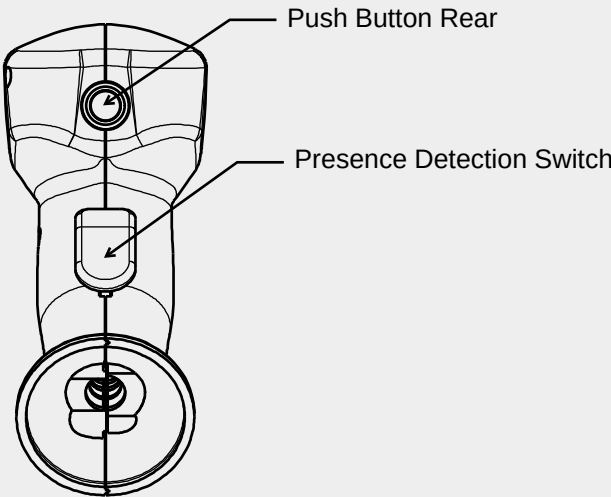


H1
1 Micro Joystick right
with 1 push button



H2
1 Micro Joystick right
with 2 push button

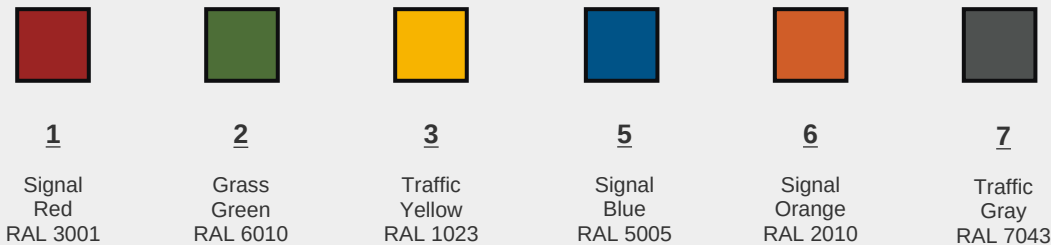
Rear



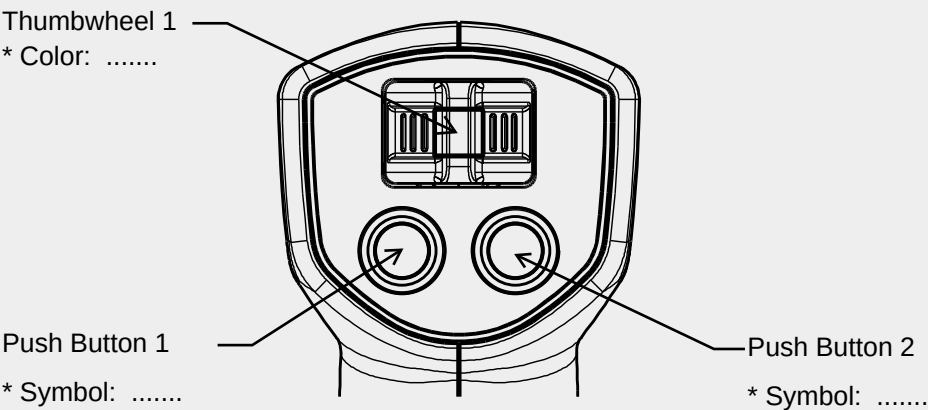
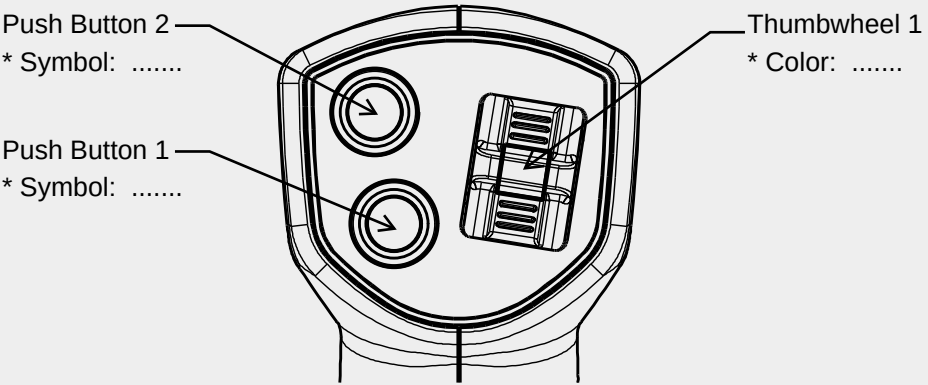
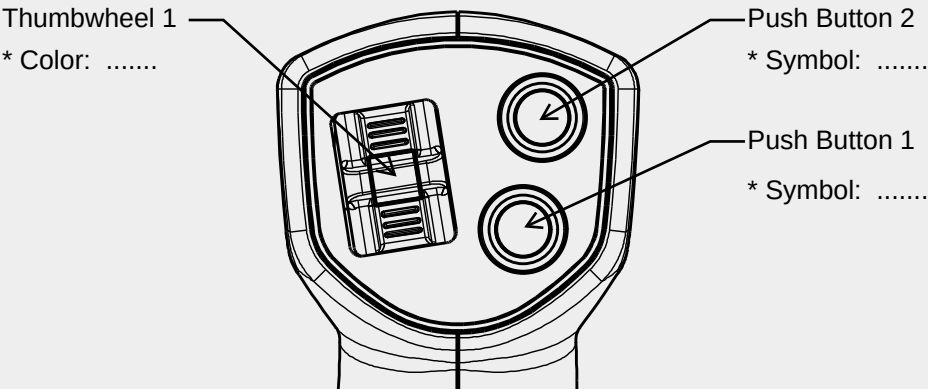
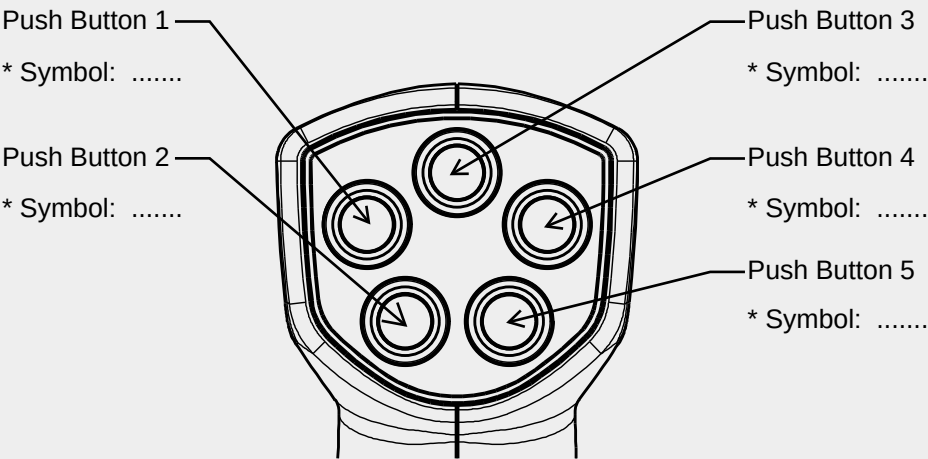
Push Button Symbol Options

Code	Symbol	Description	Code	Symbol	Description
P001		RAL 9003 Signal White	P051		Background Color: RAL 7043 Legend Color: RAL 9003 "Arrow 1"
P002		RAL 3001 Signal Red	P501		Background Color: RAL 7043 Legend Color: RAL 9003 "Arrow 2"
P003		RAL 5005 Signal Blue	P502		Background Color: RAL 9005 Legend Color: RAL 9003 "Differential Lock"
P004		RAL 6010 Signal Green	P503		Background Color: RAL 9005 Legend Color: RAL 9003 "HORN"
P005		RAL 1023 Traffic Yellow	P504		Background Color: RAL 9005 Legend Color: RAL 9003 "TIP SHIFT"
P006		RAL 2010 Signal Orange			
P007		RAL 9005 Jet Black			
P008		RAL 7043 Signal Gray B			

Thumbwheel Color Options

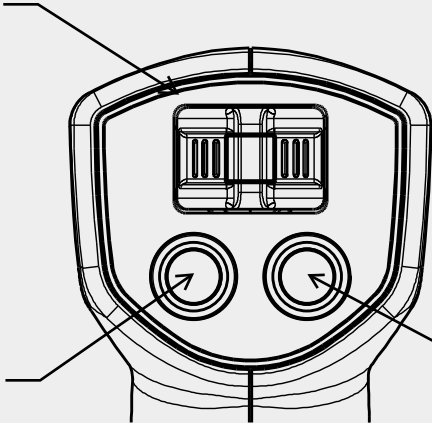


Symbol Table



Symbol Table

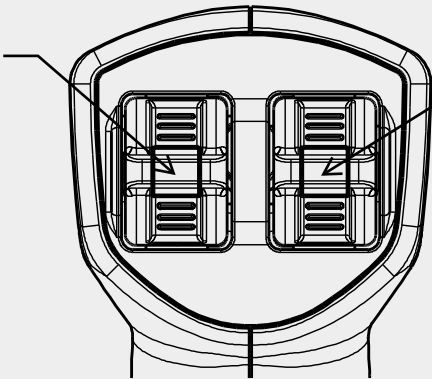
Thumbwheel 1
* Color:



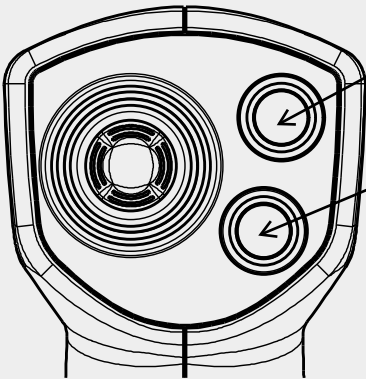
Push Button 1
* Symbol:

Push Button 2
* Symbol:

Thumbwheel 1
* Color:



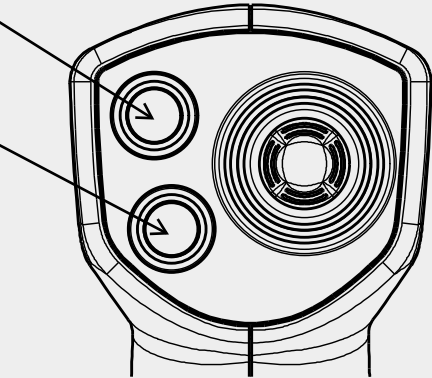
Thumbwheel 2
* Color:



Push Button 2
* Symbol:

Push Button 1
* Symbol:

Push Button 2
* Symbol:



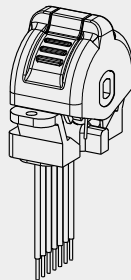
Push Button 1
* Symbol:

* If unspecified; push button symbol is P008, thumbwheel color is 7.

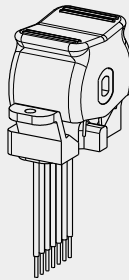
DATASHEET
MO 391.H2X&387 Grip

Thumbwheel Options

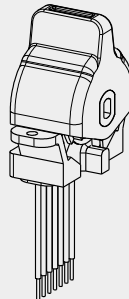
Thumbwheel



Thumbwheel with
Rocker



Thumbwheel with
Toggle



Ordering Code

For Base Options				For 387 Grip Options	
MO 391&387 - H20 - SXX - X - X - PXX				-	XX
CAN Protocol S10- SAE J1939 S11- CANopen *	Node ID <i>J1939 CANopen</i> A- 128(80h) 4(04h) B- 129(81h) 5(05h) C- 130(82h) 6(06h)	Axis of Actuation 0- 2 Axis Full	Program P01- Dual Cross	Rear 0: Without Button - Presence Det. Switch 1: With Button - Without Presence Det. Switch 2: Without Button-With Presence Det. Switch 3: With Button - Presence Det. Switch	Front Panel A0: No Push Button A1: 1 Push Button A2: 2 Push Buttons A3: 3 Push Buttons A4: 4 Push Buttons A5: 5 Push Buttons B1: 1 Thumbwheel Left Vertical with No Push Button B2: 1 Thumbwheel Left Vertical with 1 Push Button B3: 1 Thumbwheel Left Vertical with 2 Push Buttons B4: 1 Rocker Left Vertical with No Push Button B5: 1 Rocker Left Vertical with 1 Push Button B6: 1 Rocker Left Vertical with 2 Push Buttons B7: 1 Toggle Left Vertical with No Push Button B8: 1 Toggle Left Vertical with 1 Push Button B9: 1 Toggle Left Vertical with 2 Push Buttons C1: 1 Thumbwheel Right Vertical with No Push Button C2: 1 Thumbwheel Right Vertical with 1 Push Button C3: 1 Thumbwheel Right Vertical with 2 Push Buttons C4: 1 Rocker Right Vertical with No Push Button C5: 1 Rocker Right Vertical with 1 Push Button C6: 1 Rocker Right Vertical with 2 Push Buttons C7: 1 Toggle Right Vertical with No Push Button C8: 1 Toggle Right Vertical with 1 Push Button C9: 1 Toggle Right Vertical with 2 Push Buttons D1: 1 Thumbwheel Horizontal with No Push Button D2: 1 Thumbwheel Horizontal with 1 Push Button D3: 1 Thumbwheel Horizontal with 2 Push Buttons D4: 1 Rocker Horizontal with No Push Button D5: 1 Rocker Horizontal with 1 Push Button D6: 1 Rocker Horizontal with 2 Push Buttons D7: 1 Toggle Horizontal with No Push Button D8: 1 Toggle Horizontal with 1 Push Button D9: 1 Toggle Horizontal with 2 Push Buttons E1: Thumbwheel / Thumbwheel E2: Thumbwheel / Rocker E3: Thumbwheel / Toggle E4: Rocker / Thumbwheel E5: Rocker / Rocker E6: Rocker / Toggle E7: Toggle / Thumbwheel E8: Toggle / Rocker E9: Toggle / Toggle F1: 1 Micro Joystick G1: 1 Micro Joystick Left with 1 Push Button G2: 1 Micro Joystick Left with 2 Push Buttons H1: 1 Micro Joystick Right with 1 Push Button H2: 1 Micro Joystick Right with 2 Push Buttons

* Available upon request with minimum order quantity.

Example : MO 391&387 - H20 - S10 - A - 0 - P01 - 1 - A0
Joystick Base & Grip, SAE J1939 CAN Protocol, Node ID of
128(80h), 2 Axis Full Actuation, Dual Cross Program,
No Push Button

Safety Instructions

- *Do not use device in hazardous and explosive environment.
- *Keep the device away from magnets and radio equipment . Hall devices are sensitive to external magnetic fields.
- *Do not place the device to the direct air flow of vehicles heating cooling air duct due to the high temperature stress.
- *Screen with the vehicle's ground the electric cables connected to device.Far away the device cable from power-conducting lines.
- *Provide a clean power supply to the device. Otherwise voltage transients may damage the device.
- *Do not direct the pressure washing jet to device.
- *Unplug connectors from the device during electrical welding operations.
- *Damages which result from improper use, all warranty and liability claims with respect to the manufacturer void.
- *To perform a risk analysis of the system is customer's responsibility at use in safety-related functions of the device.
- *These products are ESD (Electrostatic Discharge) sensitive devices. ESD may cause permanent damage. When handling these devices please observe standard ESD precautions.
- *Never use torn silicone rubber

Makersan reserves the right to make corrections, enhancements, improvements and other changes to its products at any time and without notice.