

# Data Sheet for Joysticks

Hand Joystick

Series 891



- Cobra head ergonomic multifunction handle
- Outstanding quality of mechanics and sensors
- Equipped with conductive plastic potentiometers or Hall sensors (optional redundant)
- Available with spring return to centre position or with friction brake
- Versions with 1 to 4 axes available, special versions with fully rotatable cobra knob available
- Optional up to six micro switches, plus four pushbuttons and two switches

The large hand joysticks of the 891 series with cobra handle were specially developed for the multi-axis control of machines in harsh environments where the highest demands are placed on quality and feel and many additional functions are required. The 891 joysticks are a guarantee for success in these demanding applications.

## Technical Data Joystick

Angle of Movement X-, Y-Axis	$\pm 22$ to $\pm 26^\circ$ from center
Angle of Movement Z1-, Z2-Axis	$15^\circ \pm 4^\circ$
Vibration	10 G
Shock	30 G
Length of Wires	300 mm
Return to Center Accuracy X / Y	$\pm 3\%$
Operating Force	2 to 12 N
Expected Life	10 million cycles
Operating Temperature	-20..+60°C
Weight (depending on configuration)	ca. 950 g
IP protection (above panel):	Standard minimum IP40, up to IP65 depending on configuration

## Options and Customizations

The axis mechanism of the 891 series is made of metal. The sensors of the two main axes can be configured independently of one another:

- The handle can either be configured to automatically return to its center position by a spring (different spring strengths available) or the position can be configured to remain at the current position by a friction brake
- Detent positions (for the x and y axes) can be implemented in order to convey to the operator haptically that certain positions have been reached..

The design for the application can be individualized through specific functional equipment with mini-joysticks, rockers, dead man's switch, buttons above and below the joystick head. Multiple rockers can optionally be installed, which means that the joystick can be equipped with a large number of degrees of freedom. The ergonomic design of the Cobra knob ensures that the additional functions can be reached.

For safety-critical applications, trigger switches can be integrated in the handle and micro-switches can be ordered to detect the operating status, which switch to a position specified by the customer when the x and y axes are deflected. Redundant switch assemblies are also possible.

As a special variant, the entire handle can also be designed to be rotatable as the third degree of freedom of the main axes. However, then only 6 lead wires can be fed through the main shaft. When using common wires for ground and supply of the control elements in the knob, the following possibilities arise:

- 1 rocker (3 wires), 2 pushbuttons (1 wire per button, common ground with rocker)
- 2 rockers (4 wires, common supply and ground), no pushbuttons
- 5 pushbuttons (common ground, incl. or excl. trigger switch, no illuminated switches)

Please contact us for information about the possible combinations of the aforementioned options as well as minimum order quantities and customization cost.

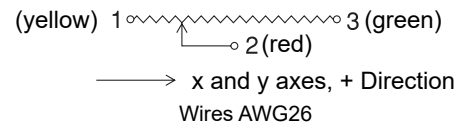
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## Technical Data Potentiometers X- / Y-Axis

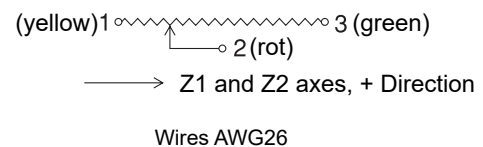
Total Resistance Value	10 kOhm $\pm 15\%$
Electrical Rotating Angle	44° $\pm 5^\circ$
Expected Life	approx. 5 million cycles
Power Rating	max. 0,2 W
Independent Linearity	$\pm 3\%$
Return to Center Accuracy	$\pm 1,5\%$



The main sensors are only wired when the joystick is ordered with a housing. These are then led to the outside through a cable outlet.

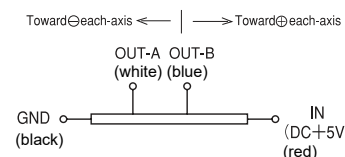
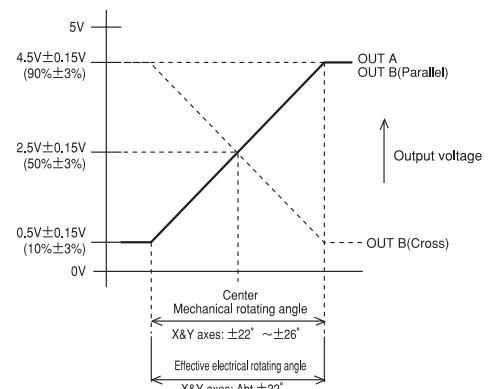
## Technical Data Potentiometers Z1, Z2

Total Resistance Value	10 kOhm $\pm 15\%$
Electrical Rotating Angle	30° $\pm 5^\circ$
Expected Life	approx. 2 million cycles
Power Rating	max. 0,2 W
Independent Linearity	$\pm 3\%$
Return to Center Accuracy	$\pm 3\%$



## Technical Data Hall Sensor Type H

Supply Voltage	5 VDC $\pm 10\%$
Current Consumption	approx. 6 mA
Output Voltage	0,5 .. 4,5 VDC
Impedance	> 100 kOhm
Independent Linearity	$\pm 3\%$
Temperature Drift Out	< $\pm 2,5\% U_{Out}$ FS
Temperature Drift Center	< $\pm 0,5\% U_{Out}$ FS
Dielectric Strength	1 minute at 250 VAC
Insulation Resistance	> 100 MOhm at 250 VDC
Operating Temperature	-20..+65 °C
Expected Life	approx. 5 million cycles



Note: Max. Voltage < 50 VAC resp. < 75 VDC, additionally max. power rating must be considered.

## Technical Data Micro Switches (activated by handle deflection)

Joysticks of Series 891 can be optionally supplied with micro switches. For each axis, up to 3 angles for activation of these switches are possible. The specification of suitable angles can be given by the customer. E.g. one variant could be: One switch for the detection of center position (Joystick at rest) plus additional positions at +10° and -10° on each axis.

	Angle Position (without / with housing)	Center Detection
Voltage, Current	50 VAC, 5 A / 30 VDC, 100 mA	50 VAC, 5 A
Expected Life approx.	200.000 / 100.000	200.000

# Data Sheet for Joysticks

## Hand Joystick Series 891

Please contact us for information regarding stock articles, delivery times and minimum order quantities.

### Order Code

Series	891																				
<b>Axes</b>																					
1 Axis																					1
2 Axes																					2
3 Axes, with rocker Z1																					3
3 Axes, with rocker Z2																					4
3 Axes by rotating cobra handle <sup>(2)</sup>																					5
4 Axes, with rockers Z1 + Z2																					6
<b>Sealing:</b>																					
<b>Rubber Boot</b>																					
																					5
<b>Return mechanism/axis behaviour:</b>																					
Spring return to center position																					1
Without spring return (only for x and y axes)																					2
Friction clutch with detent in center position (only for x and y axes) <sup>(1)</sup>																					5
Friction clutch (only for x and y axes)																					6
<b>Handle configuration</b>																					
Cobra																					1
Cobra with trigger SW7																					2
Cobra with pushbutton SW3																					3
<b>Trim function:</b>																					
No trim function (standard)																					1
With trim function (only w/ pot and w/o housing)																					3
<b>Sensors</b>																					
Potentiometer F (X-/Y-Axis), PW30 (Z-Axis)																					4
Hall sensors (X-/Y-Axis), PW30 (Z-Axis)																					H
<b>Housing</b>																					
Without housing																					0
With housing <sup>(1)</sup>																					1
<b>Limiters</b>																					
Round (standard)																					1
Square																					2
„L“-Shape																					3
Single axis Y																					6
Single axis X																					7
Plus shape „+“																					9
<b>Micro Switches</b>																					
Without center detecting switch																					0
Center detect X-/Y-Axis <sup>(1)</sup>																					1
Position switch X-/Y-Axis ON at $\pm 5^\circ$ deflection <sup>(1)</sup>																					2
Position switch X-/Y-Axis ON at $\pm 5^\circ$ deflection & center detecting switch <sup>(1)</sup>																					3
<b>Pushbuttons</b>																					
None																					0
1 Pushbutton SW6																					1
2 Pushbuttons SW1, SW2																					2
3 Pushbuttons SW6, SW1, SW2																					3
<b>Switches</b>																					
None																					0
1 Switch SW4																					1
2 Switches SW4, SW5																					2

<sup>(1)</sup> Micro switches, rotatable handle and detents are only available for versions without housing  
<sup>(2)</sup> Available with friction hold. If the handle is rotatable, only 6 connection strands are available for wiring the cobra knob. See notes on what input elements are possible on page 1.

**For higher quantities or on-going demand, additional options are available**

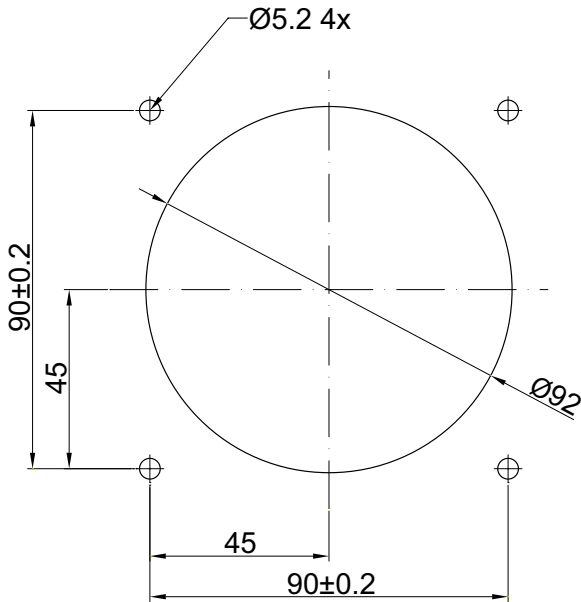
Please see page 1 for a description of the possible configurations.

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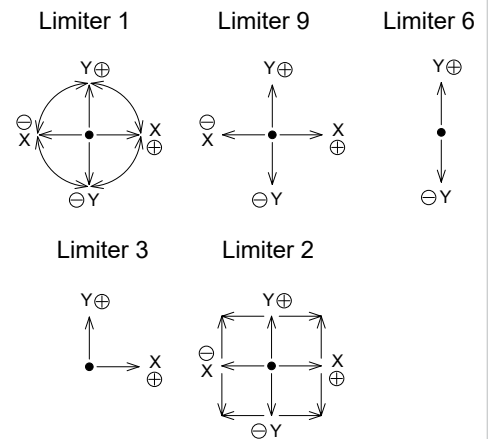
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## Mounting Cut-Out and Orientation of Limiters



### Orientation of Limiters

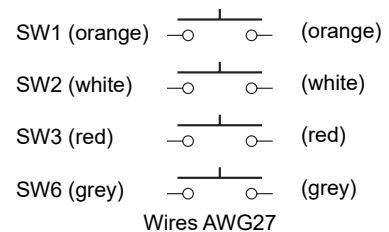


All Dimensions in mm

## Technical Data Pushbuttons

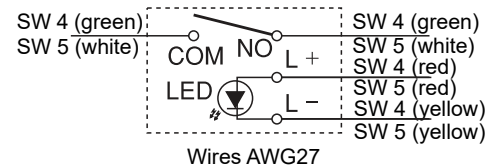
### Pushbuttons SW1, SW2, SW3, SW6

Operating Characteristics	ON when pushed (momentary)
Insulation Resistance	> 1.000 MOhm at 500 VDC
Expected Life	approx. 500.000 operations
Rating	50 VDC / 0,1 A
Dielectric Strength	1 minute at 1.000 VAC



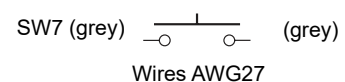
### Pushbuttons SW4, SW5, illuminated

Operating Characteristics	Alternate type
Insulation Resistance	> 200 MOhm at 500 VDC
Expected Life	approx. 10.000 operations
Rating	30 VDC / 5 A
Rating LED	1,85 VDC / 20 mA

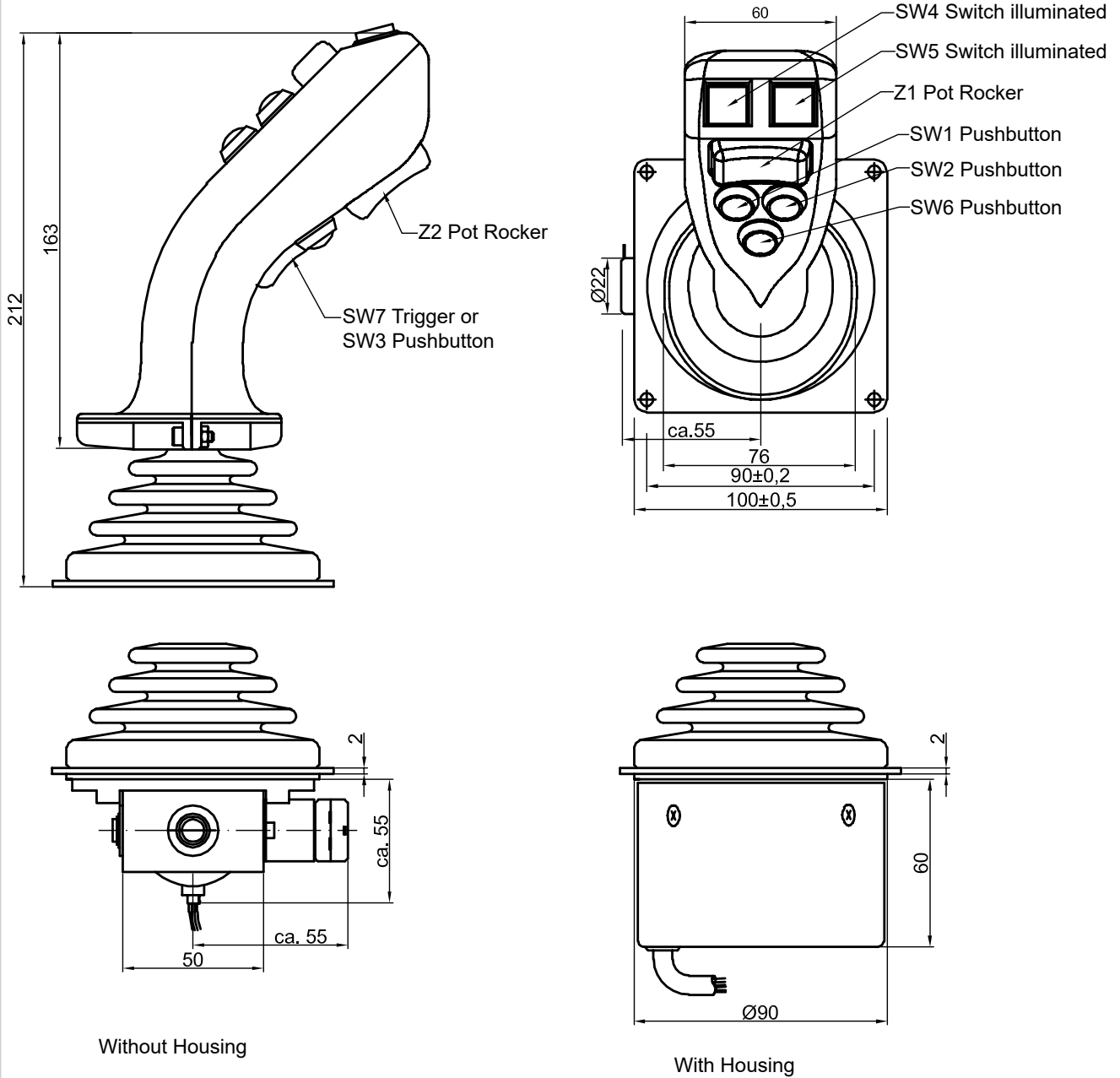


### Trigger SW7

Operating Characteristics	ON when pushed (momentary)
Insulation Resistance	> 100 MOhm at 500 VDC
Expected Life	approx. 100.000 operations
Rating	30 VDC / 100 mA
Dielectric Strength	1 minute at 600 VAC



## Technical Drawings



All Dimensions in mm