

## JS6000 Joystick Base

### Mobile Machine Management

The JS6000 joystick base is an element of the flexible, powerful, expandable, and affordable joystick family of mobile machine management products. The JS6000 has been specially developed to meet the harsh operating requirements of today's mobile machine market. Combine the JS6000 joystick base with a standard or custom grip to configure a complete joystick solution.

### Versatile Design

The JS6000 joystick base is available with either contactless Hall effect sensors or long-life potentiometer sensors to meet the specific requirements of your most demanding applications.

### Reliable Performance

Hall effect sensor or potentiometer sensor options are both offered with single or dual sensors on each axis for redundancy in safety critical systems. Additional security can be added with optional mechanical neutral switches and an operator presence trigger switch.



JS6000 Joystick Base

### Features

- Hall effect or long-life potentiometer position sensing
- Redundant sensors
- Single (Y axis) or dual axis
- Optional mechanical neutral switches
- Two centering spring forces
- Three friction-hold forces
- Four output options:
  - Analog
  - CAN 2.0 B, J1939 protocol
  - CANopen protocol
  - High current PWM
- Operating life:
  - Potentiometer: > 7.5 million cycles
  - Hall effect: > 15 million cycles
- Environmental sealing – grip dependent
- Multiple grip options:
  - HKN – plain knob
  - MG – with operator trigger and hand rest
  - A – configurable ergonomic
  - No grip

See Sauer-Danfoss publication *JS6000 Joystick Grips Technical Information*, **520L0872** for detailed information on available grip options.

See Sauer-Danfoss publication *JS6000 Joystick Base Technical Information*, **520L0760** for technical details on all JS6000 versions.

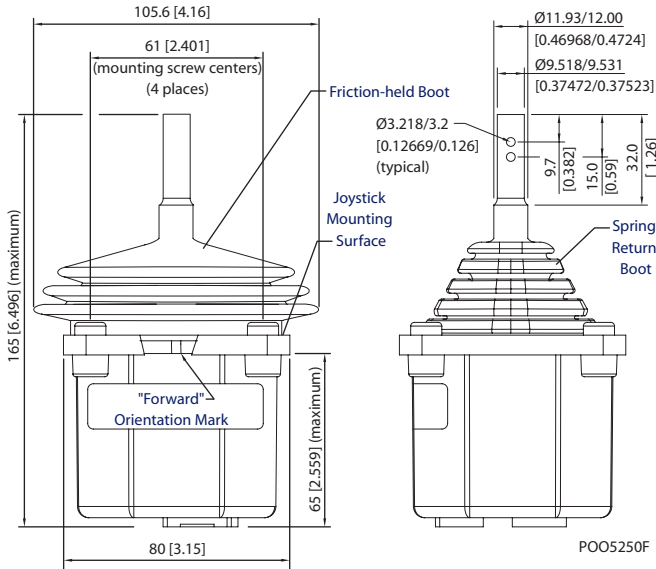
See Sauer-Danfoss publication *JS6000 PWM Service Tool User Manual*, **11060942** for technical details on the JS6000 PWM Joystick Base and complete details regarding the use of the PLUS+1 GUIDE Service Tool interface for troubleshooting and configuring the device.

Obtain free Service Tool software license and download the P1D file at: <http://www.sauer-danfoss.com/Products/MobileElectronics/PLUS1Guide/PLUS1GuideDownloads/PLUS1GUIDEServiceToolSoftwareLicense/index.htm>

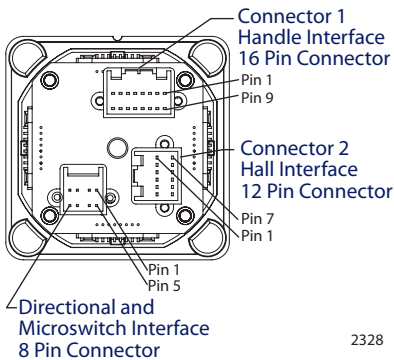
Local Address:

## Grip Dimensions and Installation Details

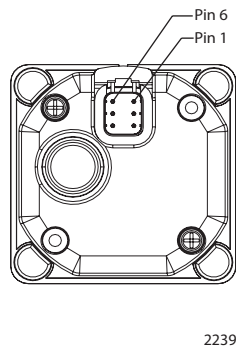
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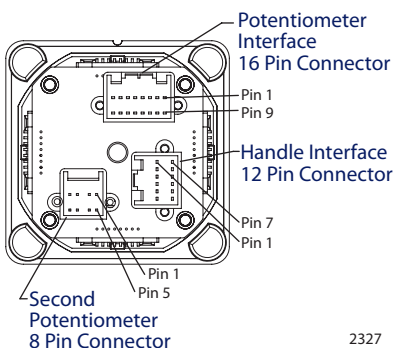
### Hall Sensor Analog



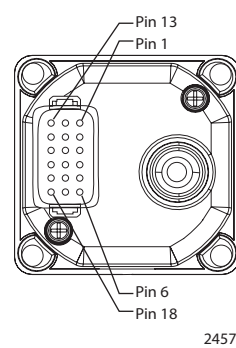
### CAN J1939 and CANopen



### Potentiometric Sensor Analog



### CAN+ and PWM



Comprehensive technical information  
(including pin assignments):

JS6000 Joystick Grips, **520L0872**

JS6000 Joystick Base, **520L0760**

Sauer-Danfoss product literature is on line at:  
[www.sauer-danfoss.com](http://www.sauer-danfoss.com)

## Specifications

### Electrical Characteristics

<b>Sensor type</b>	Long-life potentiometer Hall effect
<b>Resolution</b>	Infinite
<b>Supply voltage (Vs)</b>	Potentiometer: 9 to 36 Vdc Hall effect: 5 ± 0.5 Vdc
<b>Output</b>	Analog: 0.5 to 4.5 Vdc nominal CAN: 2.0 B, J1939 protocol and CANopen protocol PWM: 2.5 Amps maximum; Digital: 3.0 Amps maximum
<b>Hall effect sensor current consumption (base without grip)</b>	Hall effect with analog output: 50 mA Hall effect with CAN output: 100 mA

### Mechanical Characteristics

<b>Lever mechanical angle</b>	±20°
<b>Lever operating force</b>	Medium: 6 to 8.5 N [1.349 to 1.911 lbf] High: 12 to 19 N [2.698 to 4.271 lbf]
<b>Operating life</b>	Potentiometer: > 7.5 million cycles Hall effect: > 15 million cycles
<b>Vibration</b>	3 G random sinusoidal
<b>Shock</b>	20 G
<b>Weight (base without grip)</b>	0.75 kg [1.653 lb]

### Environmental Parameters

<b>Operating temperature</b>	-40°C to 80°C [-40°F to 176°F]
<b>Storage temperature</b>	-40°C to 85°C [-40°F to 185°F]
<b>Ingress protection rating</b>	Above panel: IP65, IP66, IP67 Below panel: IP66, IP40
<b>EMI/RFI rating</b>	100 V/m

### Pinout and Wiring Information

<b>Sensor and grip dependent</b>	Refer to comprehensive technical information *
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## Related Product

Mating connector assemblies	Sauer-Danfoss material number
16 pin AMP® connector bag assembly	10101552
12 pin AMP connector bag assembly	10101020
8 pin AMP connector bag assembly	10101022
12 and 8 pin AMP connector bag assembly	10101023
6 pin Deutsch® connector bag assembly	10101551
18 pin Deutsch connector bag assembly	11012648
16 pin connector with 400 mm [15.75 in] leads	10101556
12 pin connector with 400 mm [15.75 in] leads	10101555
8 pin connector with 400 mm [15.75 in] leads	10101554
6 pin connector with 400 mm [15.75 in] leads	10101557
18 pin connector with 400 mm [15.75 in] wire harness	11012646



## JS2000 Dual Axis Fingertip Joystick

### MOBILE MACHINE MANAGEMENT

The JS2000 dual axis fingertip joystick is an element of the flexible, powerful, expandable, and affordable joystick family of mobile machine management products. The JS2000 has been specially designed to provide two and three axis proportional control in a compact package that meets the harsh operating requirements of today's mobile machine market.

### ERGONOMIC AND PRECISE OPERATION

Developed for applications where ergonomics and precise proportional control are required, the JS2000's compact design provides smooth fingertip control with low operating forces that minimize repetitive stresses and operator fatigue.

### COMPACT DESIGN

The compact design of the JS2000 is ideal for mounting in low clearance locations such as seating armrests and chest packs.

### RELIABILITY

In applications where safety and long maintenance free life is required, the contactless and redundant Hall Effect sensing design provides security and reliability in an easy to operate device.

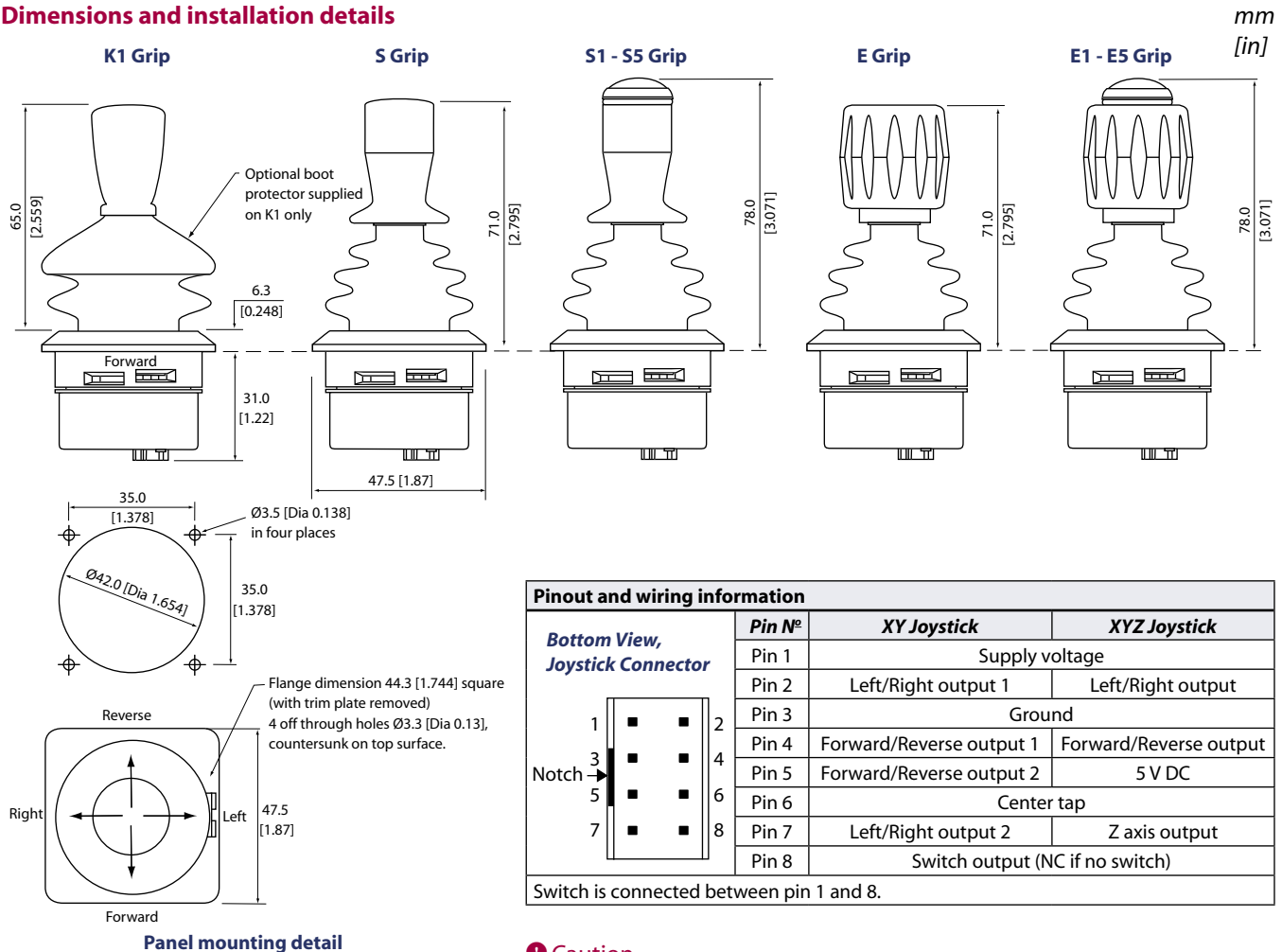


*JS2000 is available with multiple grip configurations*

### Features and options:

- Contactless hall effect sensing
- Redundant sensors
- Single or dual axis
- Multiple gate options
- Spring return to center
- Compact size
- Low operating forces
- Easy installation
- Operating life > 15 million cycles
- Output: 10 to 90% Vs
- IP 65 environmental sealing above panel
- CE approved
- Multiple grip options, including Z-axis twist

## Dimensions and installation details



Pinout and wiring information			
Bottom View, Joystick Connector	Pin №	XY Joystick	XYZ Joystick
		Pin 1	Supply voltage
Pin 2		Left/Right output 1	Left/Right output
Pin 3		Ground	
Pin 4		Forward/Reverse output 1	Forward/Reverse output
Pin 5		Forward/Reverse output 2	5 V DC
Pin 6		Center tap	
Pin 7		Left/Right output 2	Z axis output
Pin 8		Switch output (NC if no switch)	

Switch is connected between pin 1 and 8.

### Caution

Red lead on mating connector ribbon cable is assigned to pin 8.

## Specifications

Electrical characteristics	
Sensor type	Hall effect
Resolution	Infinite
Supply voltage (Vs)	5 ± 0.5 V DC regulated
Output voltage	10 to 90% nominal of Vs
Current consumption	17.5 mA nominal

Environmental parameters	
Operating temperature	-25 °C to 70 °C [-77 °F to 158 °F]
Storage temperature	-40 °C to 70 °C [-104 °F to 158 °F]
Protection	IP 65 BS EN 60529

Mechanical characteristics	
Lever mechanical angle	20° forward/reverse (single axis only)
Lever operating force	2 N [0.45 lbf] nominal (full deflection)
XY axes expected life	15 million cycles
Z axis	5 million cycles
Weight (without grip)	0.090 kg [0.198 lb]

Mating connector assemblies	
Type	Sauer-Danfoss ordering number
Connector with 400 mm [15.75 in] ribbon cable	10102031

See Sauer-Danfoss publication *JS2000 Dual Axis Fingertip Joystick, Technical Information* for more information. Sauer-Danfoss product literature is online at [www.sauer-danfoss.com](http://www.sauer-danfoss.com).

## JS1000 Joystick Base

### Mobile Machine Management

The JS1000 joystick base is an element of the flexible, powerful, expandable, and affordable joystick family of mobile machine management products. Sauer-Danfoss has developed the JS1000 to meet the harsh operating requirements of today's mobile machine market. Combine the JS1000 joystick base with a standard or custom grip to configure a complete joystick solution.

### Rugged Compact Design

The unique design of the JS1000 joystick base incorporates contactless Hall effect sensors into a simple, compact and rugged mechanical construction for the most demanding applications. It is ideally suited for low clearance and armrest mounting, and yet withstands the most punishing environments.

### Environmental Sealing

The JS1000 joystick base is designed and tested for use in harsh out of cab environments. It meets IP 67 environmental protection below the panel mount if the vent plug is installed. The vent plug is a base option. If it is not ordered, the base is not protected from below-panel particulate and moisture ingress. Environmental protection above the panel mount is IP 67 with the exception of the Pro grip option. The Pro grip is for in machine cab use only.

Local Address:



*JS1000, available with multiple grip configurations.*

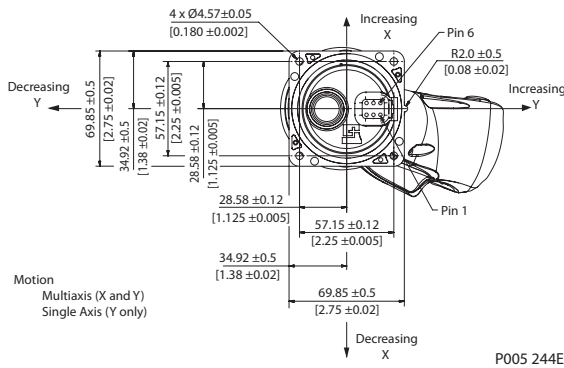
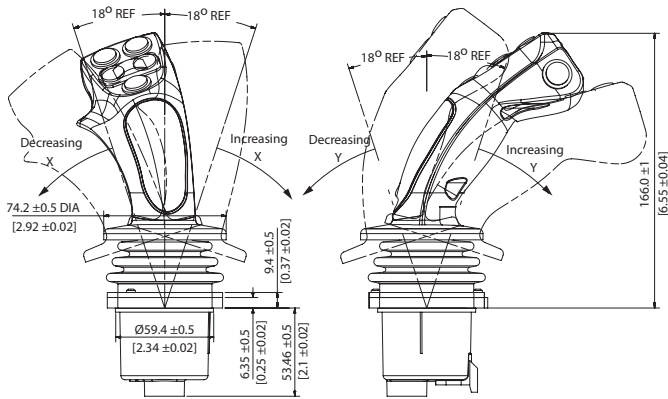
### Features and Options

- Non-contacting hall effect sensing
  - Available redundant sensing per axis for CAN output configurations
- Single or dual axis
- X – Y axis guided
- Spring return to center
- Choice of two centering spring forces
- Operating life > 10 million cycles per axis
- Two output options:
  - 0.5 to 4.5 Vdc
  - CAN 2.0 B, J1939 protocol
  - CAN 2.0 B, CANopen protocol
- IP 67 environmental sealing above panel (grip dependent)
- IP 67 environmental sealing below panel with vent plug installed (base dependent)
- Integrated 6 pin Deutsch® DTM connector
- Multiple grip options:
  - Ball grip
  - Grip with analog rocker switch
  - Grip with analog banana switch
  - PRO style ergonomic grip, which offers a wide variety of configurable push-button switches and proportional roller switch functions. (Pro grip is not recommended in an open cab environment)
  - Custom designed grips to meet specific user requirements

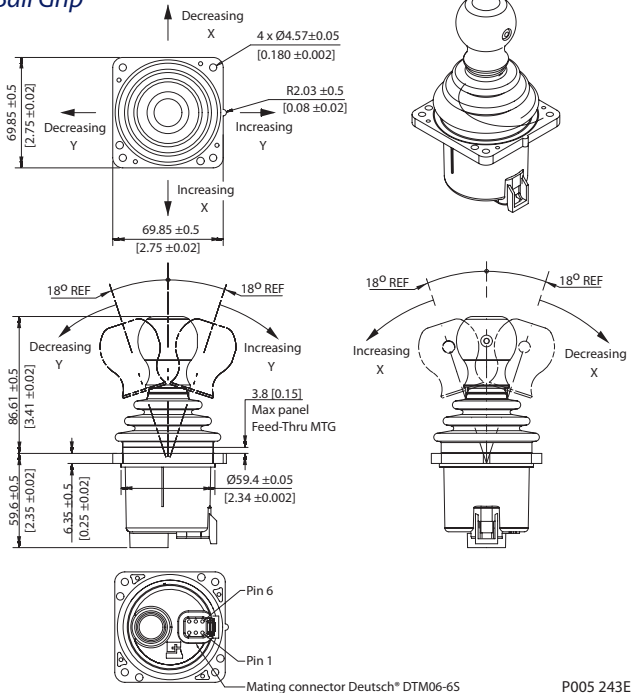
See Sauer-Danfoss publication *JS1000, JS6000 Joystick Grips Technical Information*, **520L0872** for more information.

## Dimensions and Installation Details

### PRO Grip



### Ball Grip



Grip mounting dimensions in millimeters [inches].

## Specifications

### Electrical Characteristics

<b>Sensor type</b>	Hall effect
<b>Resolution</b>	Infinite
<b>Supply voltage (Vs)</b>	Analog output: 5 ± 0.5 Vdc CAN: 9 to 32 Vdc
<b>Output</b>	Analog: 0.5 to 4.5 Vdc nominal CAN: 2.0 B, J1939 protocol
<b>Current consumption</b>	25 mA PRO grip = 150 mA

### Mechanical Characteristics

<b>Lever mechanical angle</b>	±18° on axis
<b>Operating life</b>	> 10 million cycles
<b>Vibration</b>	7.67 Gs RMS
<b>Shock</b>	50 Gs
<b>Weight (base without grip)</b>	0.38 kg [0.838 lb]

### Environmental Parameters

<b>Operating temperature</b>	-40° C to +80° C [-40° F to +175° F]
<b>Storage temperature</b>	-55° C to +85° C [-67° F to +180° F]
<b>Protection</b>	Above panel ball grip: IP 67 (PRO grip IP 43 and IP 40 with proportional roller function) Below panel: IP 67 with vent plug installed
<b>EMI/RFI rating</b>	100 V/m

### Pinout and Wiring Information

Pin	CAN	Analog
Pin 1	Ground	Ground
Pin 2	Power	Power
Pin 3	CAN high	X output signal
Pin 4	CAN low	Y output signal
Pin 5	CAN shield	Rocker switch
Pin 6	No connection	No connection

### Mating Connector Assemblies

Type	Sauer-Danfoss ordering number
6 pin Deutsch® connector bag assembly	10101551
6 pin connector with 400 mm [15.75 in] leads	10101557

Comprehensive technical information: *JS1000 Joystick Base Technical Information*, **520L0826**  
Sauer-Danfoss product literature is online at: [www.sauer-danfoss.com](http://www.sauer-danfoss.com)





Data sheet

## JS120 Single Axis Fingertip Joystick

### Mobile Machine Management

The JS120 single axis fingertip joystick is an element of the flexible, powerful, expandable, and affordable joystick family of mobile machine management products. The JS120 has been specially designed to provide proportional control in a slim low profile joystick that meets the harsh operating requirements of today's mobile machine market.

### Ergonomic and Precise Operation

Developed for applications where ergonomics and precise proportional control are required, the JS120's slim low profile design provides smooth fingertip control with low operating forces that minimize repetitive stresses and operator fatigue.

### Compact Design

The compact design of the JS120 is ideal for improving operator panel layouts, and installs easily into chest packs and seating arm rests.

### Multi-function

The long life conductive plastic potentiometer technology used in the JS120 to provide the ratiometric sensor output, also incorporates direction switch outputs for independent forward and reverse signals.



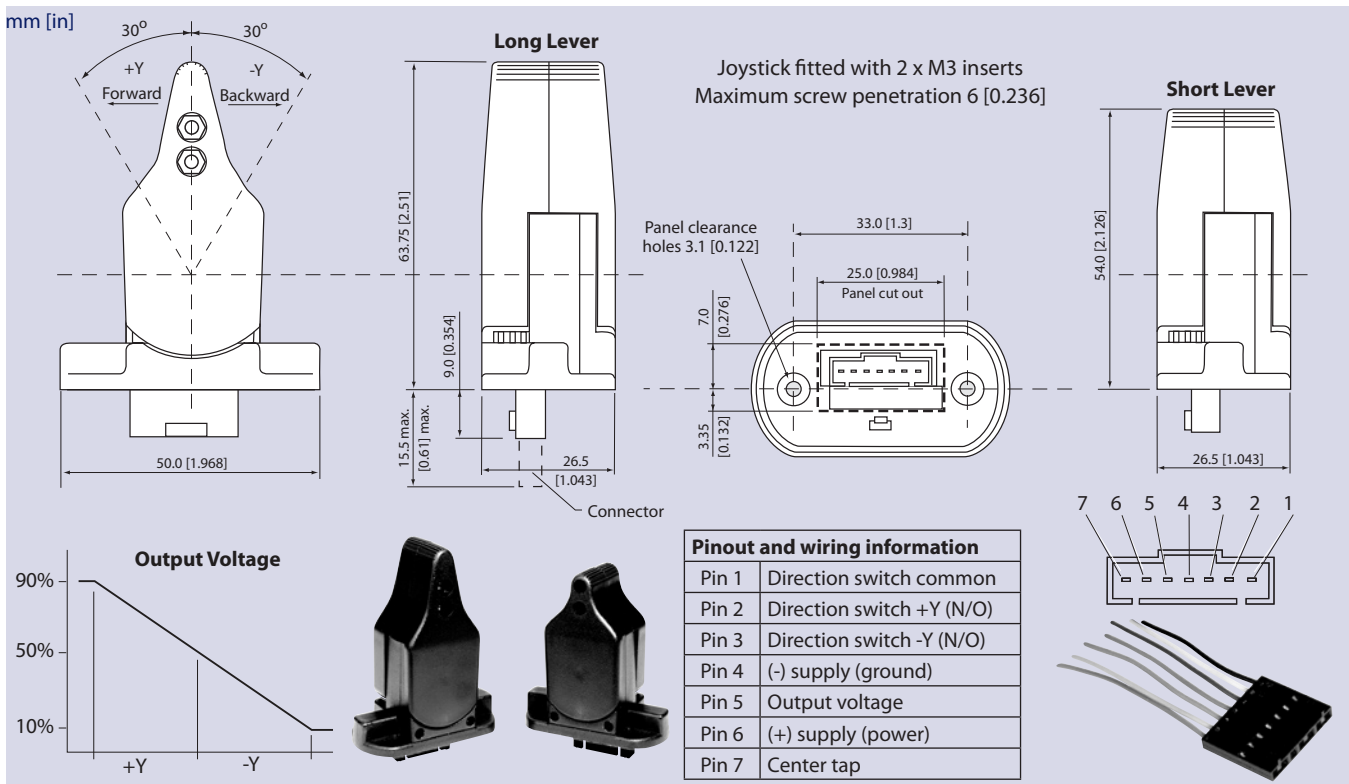
JS120 Long and Short Levers

### Features and Options

- Long life potentiometric sensing
- Single axis
- Spring center return and end return options
- Slim profile with low operating forces
- Easy installation
- Operating life > 5 million cycles
- Output options:
  - 10 to 90 % Vs
  - 25 to 75 % Vs
- IP 66 environmental sealing above panel
- Independent direction switch signals

Local Address:

## JS120 Dimensions and Installation Details



P108024

## Specifications

### Electrical Characteristics

<b>Sensor type</b>	Potentiometric
<b>Electrical angle of movement</b>	± 28 degrees
<b>Total track resistance</b>	4 kΩ or 5 kΩ (± 20%)
<b>Maximum supply voltage (Vs)</b>	35 Vdc
<b>Maximum wiper current</b>	5 mA (non-destructive)
<b>Maximum power dissipation</b>	0.25 W at 20 °C [at 68 °F]
<b>Wiper circuit impedance</b>	200 kΩ minimum
<b>Output voltage</b>	10 to 90 % Vs 25 to 75 % Vs
<b>Resolution</b>	Infinite
<b>Center tap voltage (no load)</b>	50 % Vs ± 2%
<b>Center tap angle</b>	± 2.5° either side of center (±1° tolerance)
<b>Insulation resistance</b>	> 50 MΩ at 500 Vdc
<b>Connector</b>	7 pin AMP® series latching male
<b>Switch operating angle</b>	± 5° of center (± 1° tolerance)
<b>Load resistance minimum</b>	10 kΩ
<b>Load current maximum</b>	2 mA resistive

### Mechanical Characteristics

Lever type	Short lever	Long lever
Breakout force (at lever tip)	3.1 N [0.70 lbf]	2.3 N [0.52 lbf]
Operating force (at tip, full deflection)	5.1 N [1.15 lbf]	3.4 N [0.76 lbf]
Maximum allowable force	50 N [11.24 lbf]	35 N [7.87 lbf]
Lever operating angle	± 30 degrees	
Lever action	Self centering or end return	
Expected life	> 5 million cycles	
Weight	0.045 kg [0.099 lb]	

### Environmental Parameters

<b>Operating temperature</b>	-25°C to 70°C [-13 °F to +158°F]
<b>Storage temperature</b>	-40°C to 85°C [-40°F to +185°F]
<b>Environmental sealing above the flange</b>	IP 66 - BS EN 60529

### Mating Connector – AMPMODU™ MTE Series

Connector	AMP ordering number
7 pin	103957-6

### Mating Connector Assembly

Type	Sauer-Danfoss ordering number
7 pin with 610 mm [24.02 in] leads	10101762

Comprehensive technical information: *JS120 Single Axis Fingertip Joystick Technical Information*, **520L0877**  
Sauer-Danfoss product literature is on line at: [www.sauer-danfoss.com](http://www.sauer-danfoss.com)