

Data Sheet

# Joystick

## JS1 Heavy Duty Joysticks



### Mobile Machine Management

The JS1 Heavy Duty Joysticks (JS1-H) portfolio is a modular joystick design that allows complete grip and base configuration for efficient control of any machine. The heavy duty design will result in extended life for years of reliable operation.

Five different heavy duty grips can be paired with the JS1-H base to offer the operator complete comfort. Each of the grips can be configured with a comprehensive portfolio of finger functions for true customization.

The JS1-H base incorporates proven Danfoss design elements and builds on the PLUS+1® architecture. Several options are available for the electrical and mechanical output so the joystick can be tailored for a positive human machine interaction. The JS1-H base is designed to be dependable and reliable for the extreme and harsh conditions of the mobile machine environment.



### Features

- Hall effect with two sensors per axis or long life potentiometer position sensing
- Simultaneous operation of two proportional rollers
- Operator Presence switch
- CAN+
- Analog Category 1
- Analog Category 3
- PWM (programmable)

### Options

#### Axis

- Dual Axis Spring Return
- Single Axis Spring Return
- Single Axis with Friction
- Dual Axis with one axis Spring, one axis Friction

#### Output options

- CAN J1939
- CANopen
- PVE
- CANalog

#### Ergonomic grip

- Right hand
- Left hand
- Ambidextrous (used with either the left or right hand)

#### On axis shaft, deflection

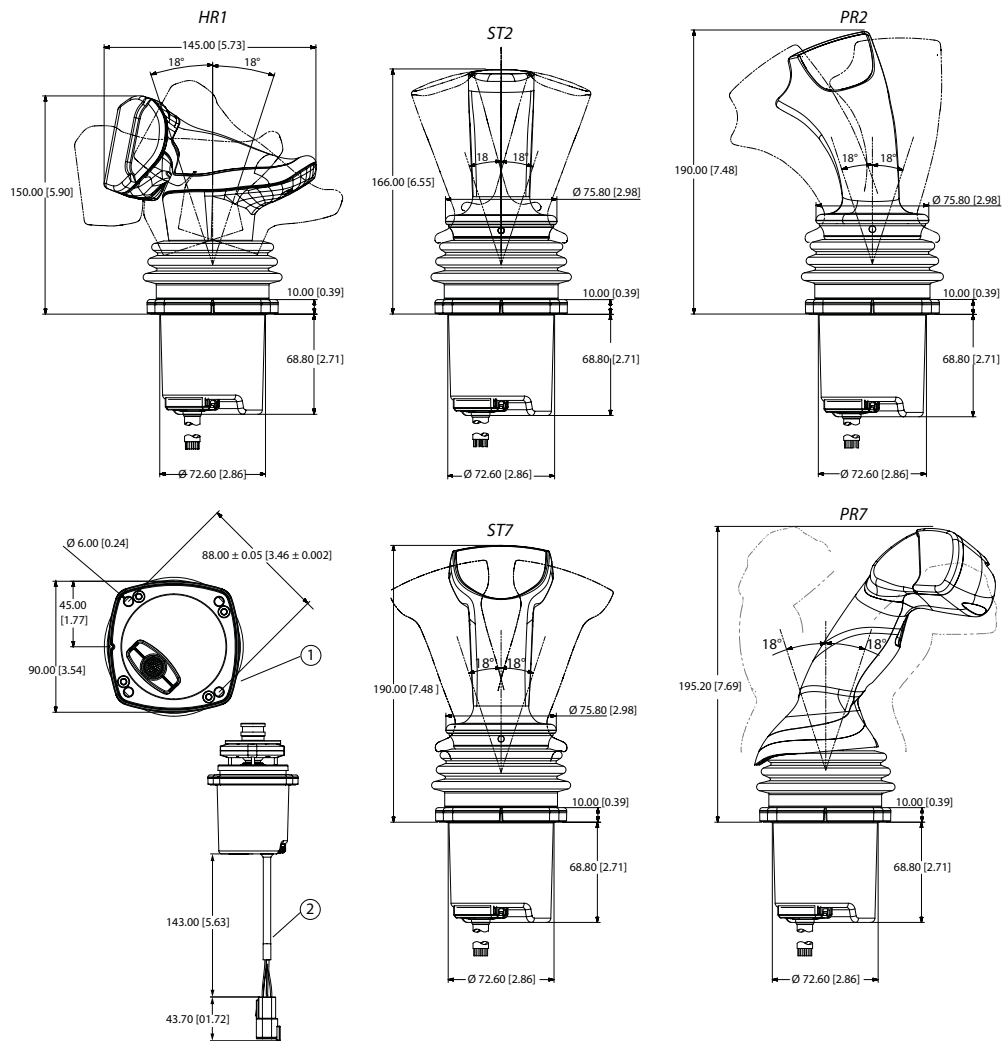
- $\pm 18^\circ$

#### JS1-H grips

- HR1
- ST2
- ST7
- PR2
- PR7

Comprehensive technical literature is online at [www.danfoss.com](http://www.danfoss.com)

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**JS1 Heavy Duty Joysticks**



Dimensions in millimeters [inches]

1. Bottom view
2. Cable harness (included) based on specific options, see *JS1 Heavy Duty Joysticks Technical Information*, **BC00000347**

*Spring return, base only*

Breakout load on axis	
Standard duty spring: 6 to 8.5 N (3.37 to 5.71 lbf)	Heavy duty spring: 12 to 19 N (2.698 to 4.271 lbf)

*Friction hold, base only*

Friction level		Friction	Center detent
A	Low friction-Low detent	0.8 Nm	1.5 Nm
B	Low friction-High detent	0.8 Nm	2.0 Nm
C	High friction-High detent	1.6 Nm	3.0 Nm

*Friction hold/Spring return, base only*

	Friction level	Spring type
E	A	Standard
J	A	Heavy

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### Mechanical characteristics

<b>Shaft mechanical angle limits</b>	± 18°
<b>Base mechanical life</b>	Single axis with friction = 1 million full operating cycles
	Single axis and dual axis with spring return = 2.0 million full operating cycles
	Dual axis with spring in one axis, friction in one axis = 1 million full operating cycles
<b>Maximum force on handle</b>	1000 N
<b>Maximum torque</b>	15 Nm
<b>Base only mass</b>	0.75 kg (1.65 lbf)
<b>Weight (base without grip)</b>	725 G (1.8 lb)
<b>Vertical maximum load</b>	2500 N (560 lbs)

### Electrical—PVE (Standard and Extended) characteristics

<b>Supply voltages</b>	$U_{DC}$	9 to 36 V <sub>DC</sub>	
<b>Maximum current consumption</b>	8 A		
<b>Current consumption, no load</b>	150 mA		
<b>Maximum load for push buttons and directional switches for all proportional functions</b>	0.6 A		
<b>Neutral position switch</b>	3 A		
<b>Sensor type</b>	Hall effect with redundant sensors		
	Potentiometer		
<b>Signal voltage <math>U_s</math></b>	<b>Minimum to maximum</b>	0.25 to 0.75	
	<b>Neutral position</b>	0.50	
<b>Signal load in neutral position</b>	<b>Load type</b>	<b>PVE</b>	<b>Other</b>
	<b>Load impedance</b>	>6 k $\Omega$	>15 k $\Omega$
<b>Signal current at maximum movement</b>	$U_{DC} = 12\text{ V}$	<b>6 k<math>\Omega</math></b>	<b>15 k<math>\Omega</math></b>
		± 0.6 mA	0.2 to 0.6 mA
	$U_{DC} = 24\text{ V}$	± 1.2 mA	0.4 to 1.2 mA
<b>Signal current in neutral position</b>	$U_{DC} = 12\text{ V}$	± 0 mA	± 0.4 mA
	$U_{DC} = 24\text{ V}$	± 0 mA	± 0.8 mA
<b>Inverter</b>	<b>Non inverted</b>	Output signal = $U_s$	
	<b>Inverted</b>	Output signal = $-1 \times (U_s - 0.5 \times U_+) + 0.5 \times U_+$	

### Electrical—PVE (Extended only) characteristics

<b>Signal regulation <math>U_s</math></b>	<b><math>U_s</math> Minimum (50%)</b>	0.37 to 0.63 at 100% movement
	<b><math>U_+</math> Maximum (200%)</b>	0.25 to 0.75 at 50% movement
<b>Dead band compensation</b>	<b><math>U_s</math> Minimum</b>	0.00
	<b><math>U_+</math> Maximum</b>	0.06

### Electrical—Analog Cat 1, Cat 3 characteristics

<b>Sensor type</b>	Hall effect with redundant sensors
<b>Supply voltage (Vs)</b>	4.5 to 5.5 V <sub>DC</sub>
<b>Output</b>	10 to 90% of input voltage
<b>Output impedance</b>	1 mA max output current at 200 Ohm output impedance
<b>Digital outputs</b>	Vs-0.3 V <sub>DC</sub> , maximum current 100 mA



Electrical—CAN, CAN+, and CANalog characteristics

<b>Sensor type</b>	Hall effect with redundant sensors
	Potentiometer
<b>Resolution</b>	12 bit
<b>Supply voltage (V<sub>s</sub>)</b>	9 to 36 V <sub>DC</sub>
<b>Output</b>	J1939 and CANopen protocols
<b>Can+ Sensor Power</b>	5.0 V <sub>DC</sub> +/- 5% at 250 mA
<b>CANalog volt reference</b>	5.0 V <sub>DC</sub> +/- 5% at 50 mA
<b>Base maximum current consumption</b>	120 mA at 9 V
<b>CANalog analog outputs</b>	0.5 to 4.5 V <sub>DC</sub> at 1 mA max

Electrical—PWM (programmable) characteristics

<b>Sensor type</b>	Hall effect with redundant sensors
	Potentiometer
<b>Resolution</b>	12 bit
<b>Supply voltage (Vs)</b>	9 to 36 Vdc
<b>Current consumption, no load</b>	120 mA
<b>Maximum current consumption</b>	15 A
<b>Outputs (3 amps)</b>	PWM(4)
	Digital(2)

Environmental characteristics

<b>Operating temperature</b>	CAN, CANalog, CAN+, Analog Cat1, Analog Cat3, PWM	-30° C to 80° C (-22° F to 176° F)
	PVE	-30° C to 70° C (-22° F to 158° F)
<b>Storage temperature</b>	-40° C to 85° C (-40° F to 185° F)	
<b>EMI/RFI rating</b>	150 V/m	
<b>Vibration</b>	25 G, 10 ms, 500 bumps in each of 6 directions IEC 60068-2-29 test Eb	
<b>Shock</b>	50 G, 11 ms, 3 shocks in each of 6 directions IEC 60068-2-29 test Ea	
<b>Ingress Protection (IP) rating</b>	Up to IP 66 (dependent on grip sealing selected)	

JS1-H part numbers, refer to: *JS1 Heavy Duty Joystick Family Technical Information*, **BC00000347**.

Danfoss connector bag assemblies part numbers (Must be ordered separately from joystick)

Description	Danfoss part number
One 6 pin DEUTSCH connector	10101551
Two 6 pin DEUTSCH connectors	11177980
Two 12 pin DEUTSCH connectors (GRY/BLK)	10100945
Two 12 pin and One 6 pin DEUTSCH connectors (GRY/BLK)	11176538

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