



Rotary position sensor

DST X520

For mobile hydraulic applications

Description

The Danfoss DST X520 rotary position sensors without shaft are designed for use in mobile hydraulic applications.

Danfoss DST X520 series uses contactless Hall technology with measurement ranges up to 360°. The Sensors designed for off-highway applications and resistant to shock and vibrations and with high electromagnetic compatibility.

They are E1 approved for on-highway applications. They comes with either analogue, CANopen or SAE J1939 output.

Single and redundant sensor types are available, making the complete portfolio suitable for safetycritical applications.

Features & benefits

- Contactless Hall technology for almost infinite sensor life time
- Single or Redundant ranges up to 360° ($\pm 180^\circ$)
- Output: Analogue, CANopen or SAE J1939
- Linearity: $< \pm 0.5\%$ FS
- Resolution:
 - 12 bit (analog)
 - 14 bit (CANopen/SAE J1939)
- IP protection level IP67 - IP69K with female mating connector
- High quality 10 mm SmCo Magnet

Ordering

Product code numbers

DST X520, ordering

Type	Output signal	Configurations	Code no.
DST X520 incl. PKIT magnet	5 V Ratiometric	$\pm 180^\circ$ Clockwise CW	098G1500
	5 V Ratiometric	$\pm 180^\circ$ Counterclockwise CCW/CH2 clockwise CW	098G1501
	36 V CANopen	$\pm 180^\circ$ Clockwise CW	098G1502
	36 V SAE J1939	$\pm 180^\circ$ Clockwise CW	098G1503

Ordering code - on request

Electrical connections	
AMP Superseal 6P connector	A
Cable (specify cabel length)	F

Circuit type	
Single Analog and half redundant CANopen/ J1939	S
Redundant Analog	R

Angle/Channel 1 (output for single channel)	
(Analog output A1-A2-A3 programmable in steps of $\pm 15^\circ$) (CAN/J 1939 = 180)	xxx

Angle/Channel 2 (redundant/half redundant)	
Analog output = same as Channel 1 and (CAN/J 1939 = 000)	xxx

Supply voltage	
+5Vdc (only for A1 output)	L
+9...+36Vdc (see output signal for right supply voltage)	H

Output type	
+0.5...+4.5V DC output (available with supply L = ratiometric output and with supply H = 0.5...4.5V output)	A1
0...+10Vdc output (powered at +11...36V DC)	A2
4...20mA output (powered at +9...36V DC)	A3
CANopen output (powered at +9...36V DC) (available in single version with +/-180° measurement range)	C1
SAE J1939 (powered at +9...36V DC) (available in single version with +/-180° measurement range)	C2

Rotation direction	
Clockwise CW (single) Both clockwise CW (redundant or CAN/J1939)	1
Counterclockwise CCW (single) Both counterclockwise CCW (redundant or CAN/J1939)	2
CHANNEL 1 clockwise CW and CHANNEL 2 counterclockwise CCW (redundant version or CAN/J1939)	3
CHANNEL 1 counterclockwise CCW and CHANNEL 2 clockwise CW (redundant version or CAN/J1939)	4

Cable	
Single cable without connector (always "0" in case of DST X520 A version)	0
Cable + M12, 5-pin male overprinted connector	1

Reserved	00
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Linearity curve	
No linearity curve attached	0
Linearity curve to be attached	L

Standard	033
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Accessories	
No accessories	X
Shaft kit + magnet D 15 M10 hexagonal (PKIT 384) (Standard)	A
Shaft kit to insert + magnet D 15 (PKIT 389)	B
Kit magnet Ø15 (PKIT 418)	C

Cable length	
100 mm	01
200 mm	02
500 mm	05
1 m	10
2 m	20
Other length on request	-

Example of ordering: DST X520-AS180000HC14000 0033A00

A	AMP Superseal 6p
S	Half redundant CAN/J 1939
180	±180°
000	000
H	+9 - +36 Vdc
C1	CANopen
4	Channel 1: Counterclockwise CCW Channel 2: Clockwise CW

0	No cable
00	Reserved
0	No linearity curve
033	Standard
A	Magnet PKIT384
00	Not defined (only cable version)

Note: For a detailed overview of our existing code numbers, please visit the Danfoss Product Store at store.danfoss.com. You can use the filtering options to find the right sensor for your specific needs.

Product details

General data

Technical data

Performance

Measuring range	CAN	$\pm 180^\circ$ (360 °C)
	Analogue	Programmable $\pm 15^\circ\text{C}$
Linearity		$\leq \pm 0.5\%$ FS
Resolution and speed of rotation	12 bit (analog output)	120 rpm max.
	14 bit (CANopen/SAE J1939 output)	
Durability		No wear through the use of permanent external magnet

Electrical specifications

Electrical connections	AMP Superseal 6p 282108, Cable or cable + M12	
Output signal	CANopen / SAE J1939, Ratiometric 10-90% of Vs, 0.5–4.5 V DC, 0–10 V DC or 4–20 mA	
Supply voltage	CANopen/J1939, 0.5–4.5 V DC, 4–20 mA: 9–36 V DC 0–10 V DC, 11–36 V DC Ratiometric: 10-90% of Vs: 5 V DC	
Current consumption	Analogue: < 10 mA / pr. channel (no load) CANopen/J1939: < 15 mA (no load)	
MTTFd [Years]	CANopen/J1939: 336 Analogue: 406 (Single Channel)	

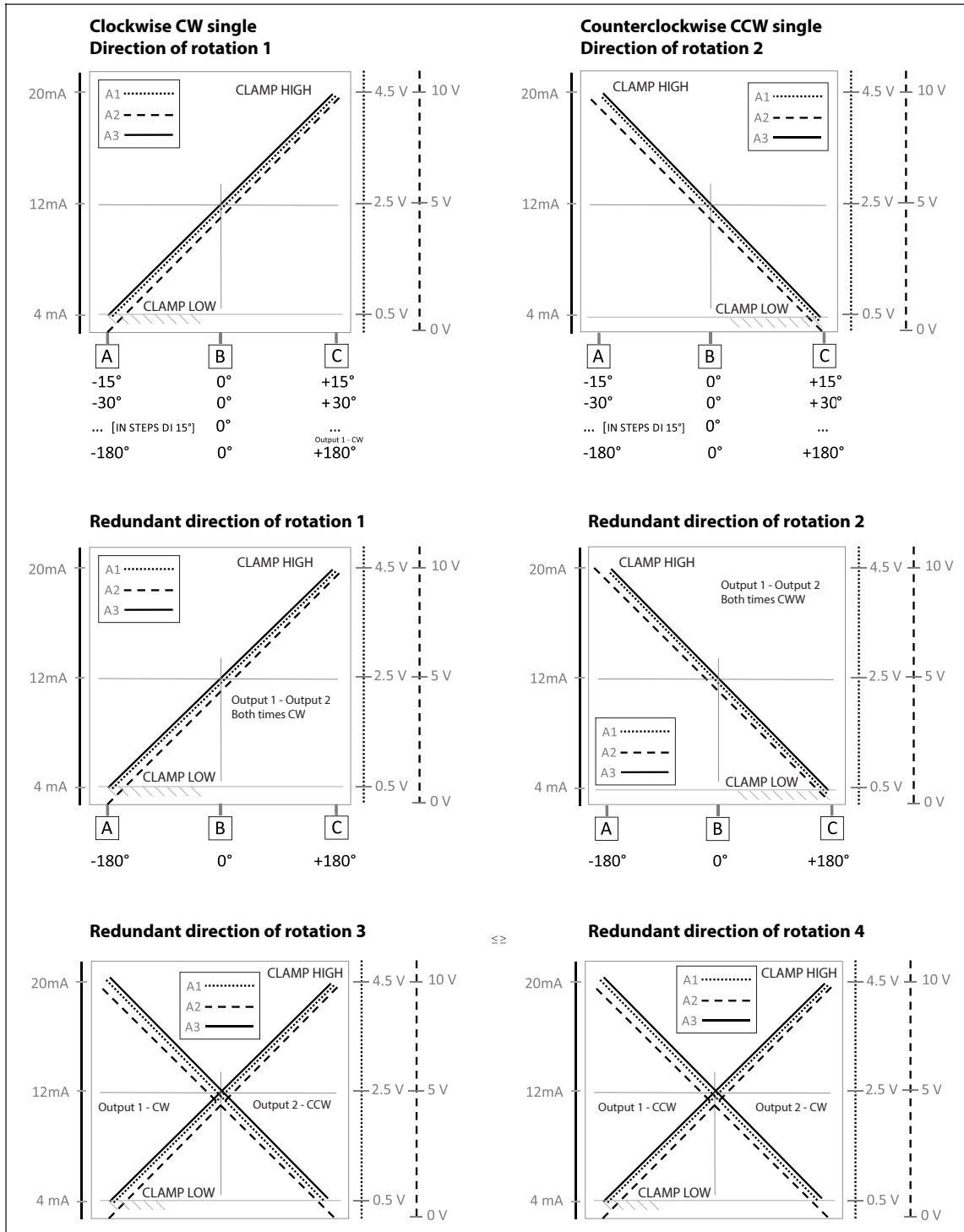
Environmental conditions

Operating temperature range		-40 – 85 °C	
Thermal drift temperature		< 50 ppm/°C	
EMC		Emission	EN 55011 and CISPR 25
		Immunity	EN 61236-3-2 and ISO 11452-2
		Transient on supply lines	ISO 7637-2
		Bulk current injection	ISO 11452-4
Vibration stability	Sinusoidal	20 g, 10 Hz – 2,000 kHz	IEC 60068-2-6
Shock resistance	Impulsive on 3 axes	50 g, 11 ms	IEC 60068-2-27
IP protection		AMP Superseal: IP67 - IP69K with female mating connect Cable: IP69K Cable + M12: IP67	

Mechanical characteristics

Materials	Enclosure	PBT (Polybutylene terephthalate)
Net weight		0.036 kg

Sensor output graph



Load conditions

+0.5 V DC – 4.5 V DC output with power 9 – 36 V DC and +0 – 10 V DC output with power 11 – 36 V DC: it is recommended a load resistance $> 100 \text{ k}\Omega$

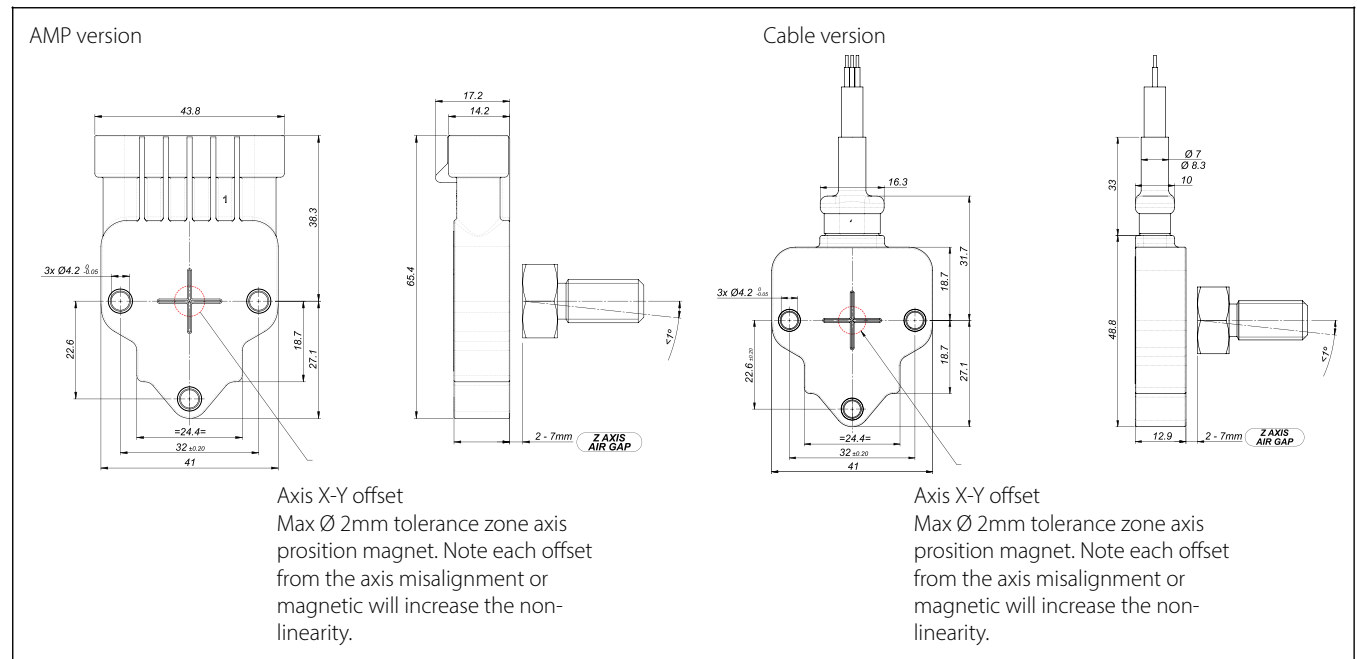
+0.5 V DC – 4.5 V DC output with power +5 V DC: it is recommended a load resistance $> 10 \text{ k}\Omega$

+4 – 20 mA output with power 9 – 15 V DC: maximum load resistance is 200Ω

+4 – 20 mA output with power 15 – 36 V DC: maximum load resistance is 500Ω

Dimensions

AMP and Cable version



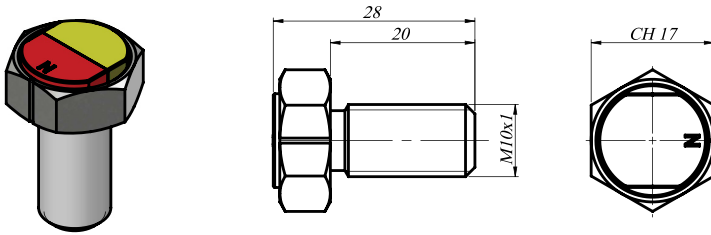
Note: Dimensions are in mm, unless stated otherwise.

Magnets models

Accessories

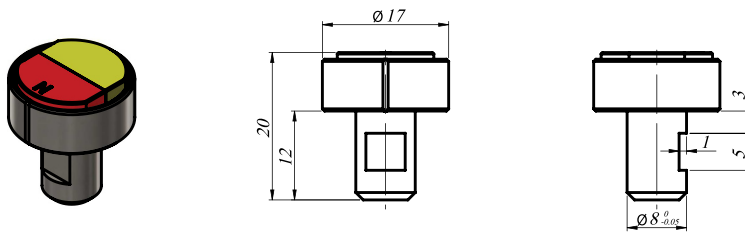
PKIT384 Shaft kit + magnet D15 M10 Hexagonal Accessory "A"

Air gap 2-7 mm axis offset Ø4 mm



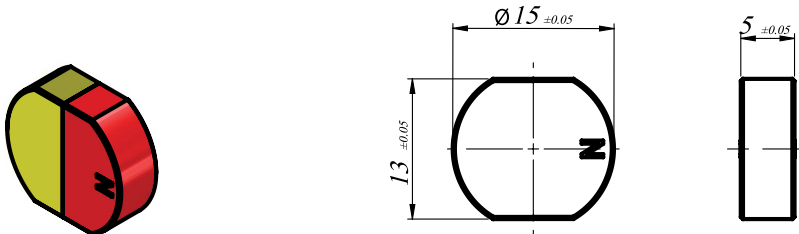
PKIT389 Shaft kit to insert+ magnet D15 - Accessory "B"

Air gap 2-7 mm axis offset Ø4 mm



PKIT384 Shaft kit + magnet D15 M10 Hexagonal - Accessory "C"

Air gap 2-7 mm axis offset Ø4 mm

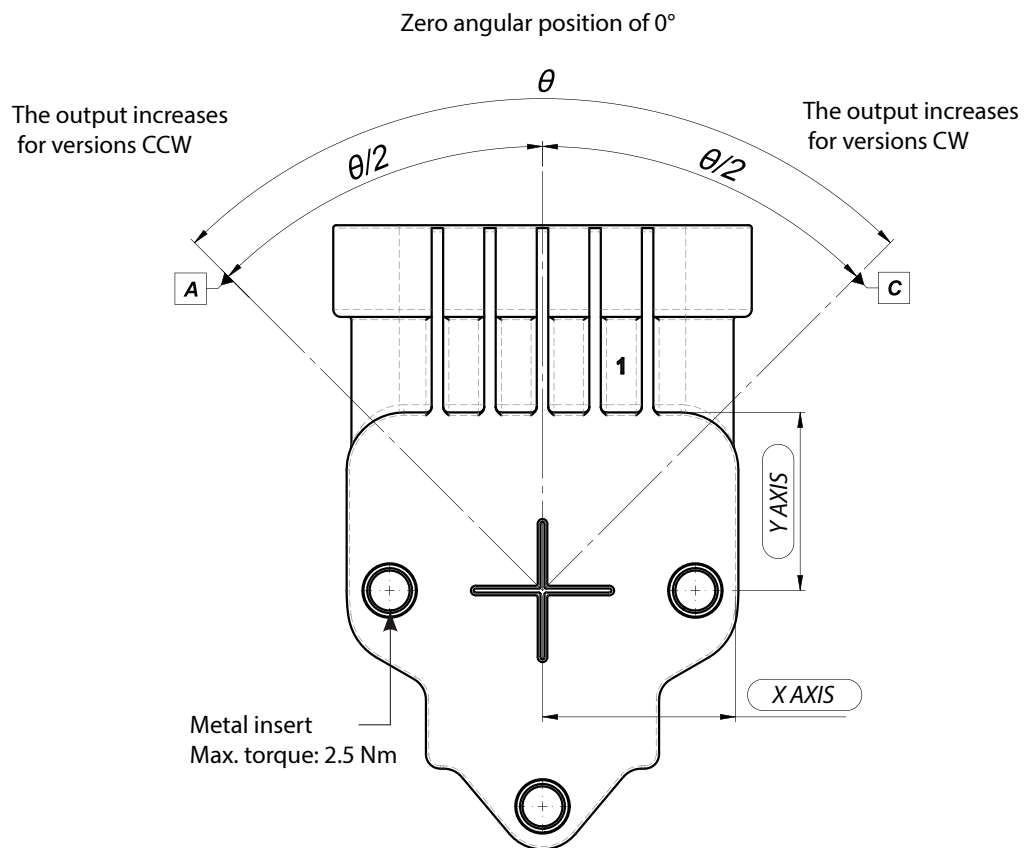


Note: Dimensions are in mm, unless stated otherwise.

Connections

Electrical connections

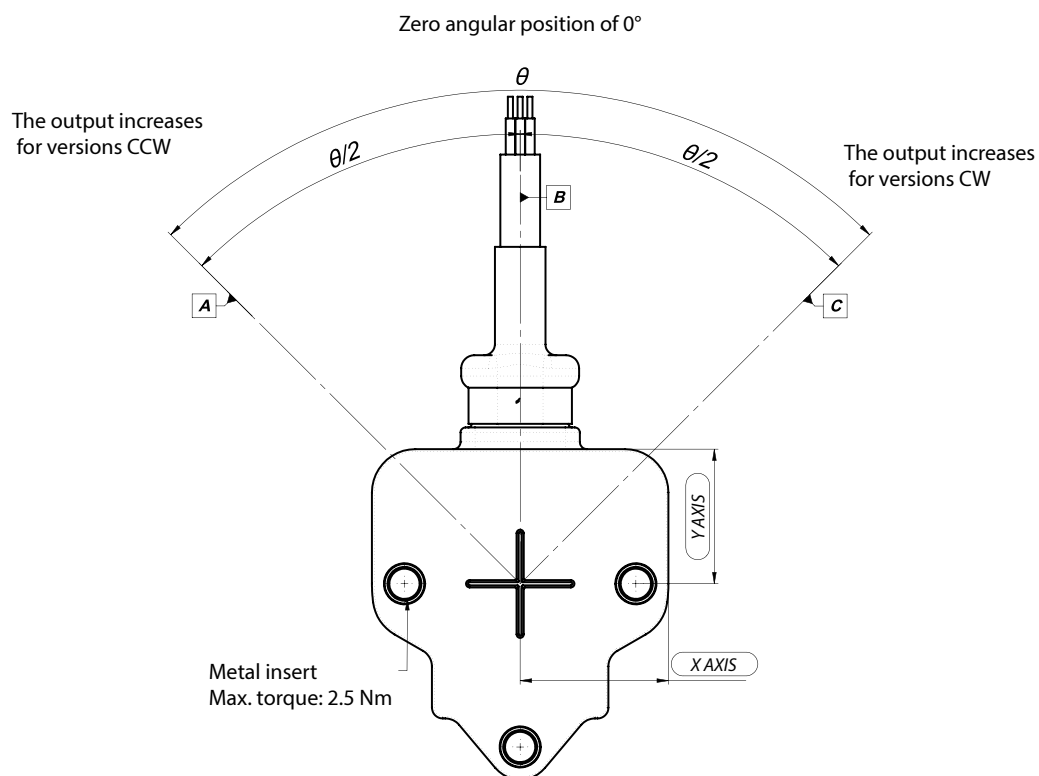
AMP version, angular positions



General data

Ref.	CW output	CWW output
A	0.5 V DC	4.5 V DC
B	Zero angular position of 0°	Zero angular position of 0°
C	4.5 V DC	0.5 V DC

Cable version, angular positions

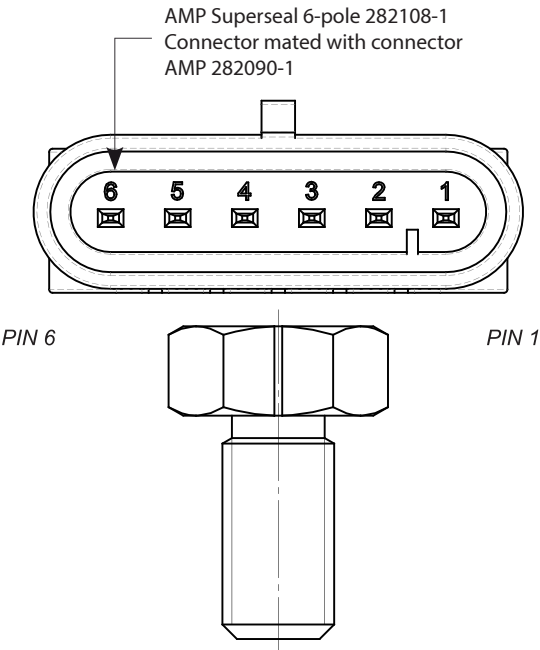


General data

Ref.	CW output	CWW output
A	0.5 V DC	4.5 V DC
B	Zero angular position of 0°	Zero angular position of 0°
C	4.5 V DC	0.5 V DC



AMP version, connections



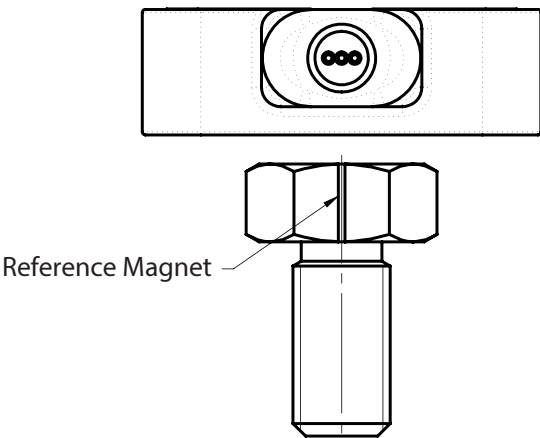
Connections

1	Ground 1
2	+ Supply 1
3	Output 1
4	Ground 2
5	+ Supply 2
6	Output 2

Connections - CAN/J 1939

1	OV (GND)
2	+ Vs (+9 - 36 V DC)
3	GND
4	GND
5	CAN-L
6	CAN-H

Cable version, connections



Connections

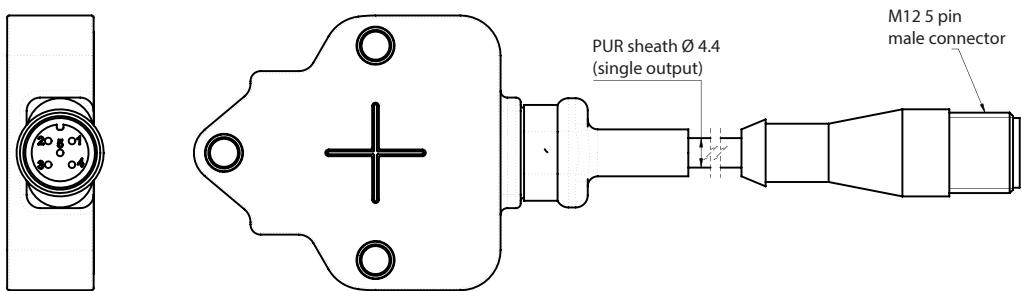
Black:	Ground 1
Red:	+ Supply 1
Yellow:	Output 1
Green:	Ground 2
Blue:	+ Supply 2
White:	Output 2

Connections - CAN/J 1939

Black:	Ground 1
Red:	+ Supply 1
Yellow:	NC
Green:	NC
Blue:	CAN-L
White:	CAN-H



Cable + M12 version, connections



1	Ground 1
2	+ Supply 1
3	Output 1
4	NC
5	NC

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the ‘Declaration of Conformity’. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU-UK Declaration	Danfoss EU-UK 098R0008.04	Danfoss	EMC
UA Declaration	Danfoss UA 2023-01-10 Regulators PL01 PL04	Danfoss	Pressure
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
UA Declaration	Danfoss UA 2024-07-25 cooling sensors	Danfoss	LVD
Export Control Declaration	Pressure & Temperature Sensors	Danfoss	
Export Control Declaration	Refrigerant Leakage Sensor	Danfoss	

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.



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