motralec Danfoss Rotary position sensor Type DST X520 For mobile hydraul· DEMANDE DE PRIX >
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Data Sheet

Rotary position sensor Type **DST X520**

For mobile hydraulic applications



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

- Contactless Hall technology for almost infinite sensor life time
- Single or Redundant ranges up to 360° (±180°)
- Output: Analogue, CANopen or SAE J1939
- Linearity: < ± 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

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Product specification

Technical data

Table 1: Performance

Measuring range	CAN	±180° (360 °C)
	Analogue	Programmable ± 15 °C
Linearity		≤ ± 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

Table 2: 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)

Table 3: 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

Table 4: Mechanical characteristics

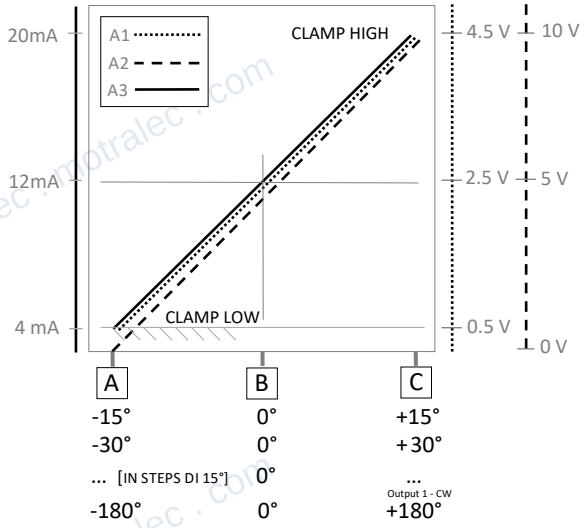
Materials	Enclosure	PBT (Polybutylene terephthalate)
Net weight		0.036 kg

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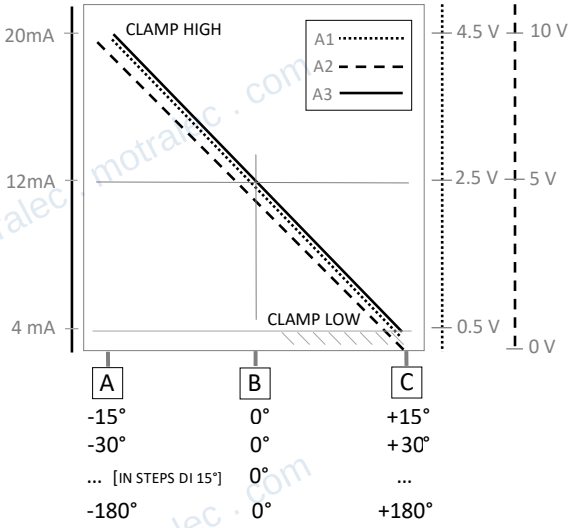
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Sensor output graph

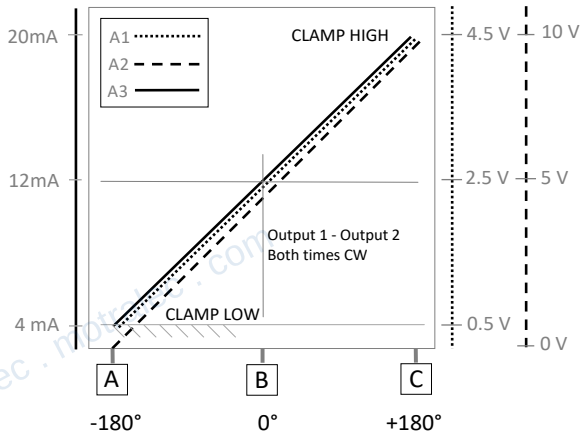
Clockwise CW single Direction of rotation 1



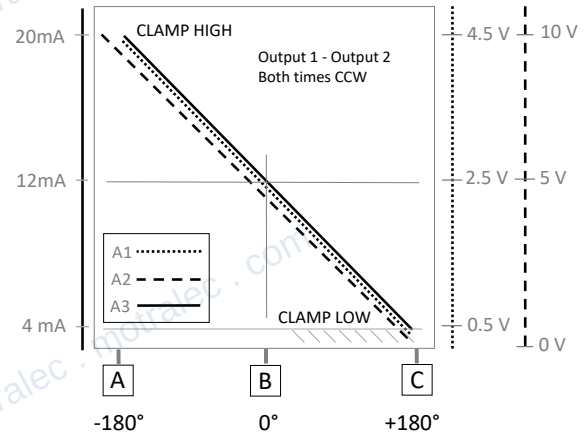
Counterclockwise CCW single Direction of rotation 2



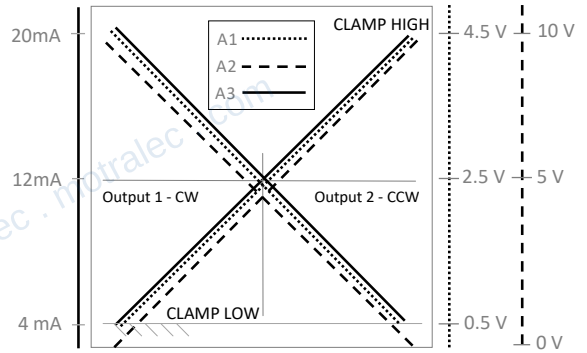
Redundant direction of rotation 1



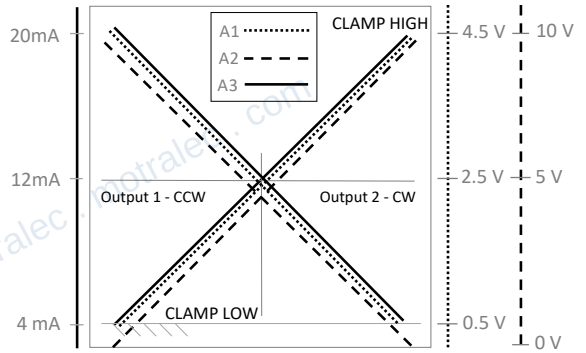
Redundant direction of rotation 2



Redundant direction of rotation 3



Redundant direction of rotation 4



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 KΩ

+0.5 V DC – 4.5 V DC output with power +5 V DC: it is recommended a load resistance > 10 KΩ

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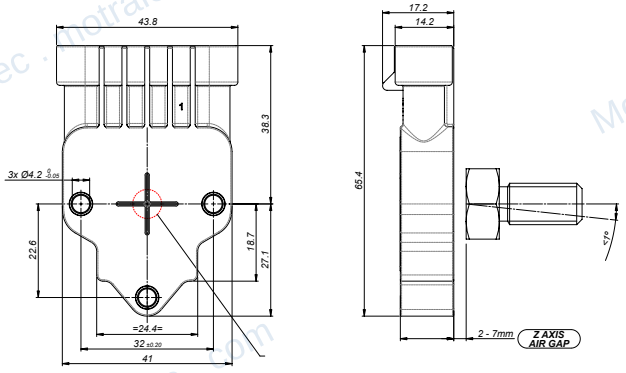
+4 – 20 mA output with power 9 - 15 V DC: maximum load resistance is 200 Ω

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

Dimensions

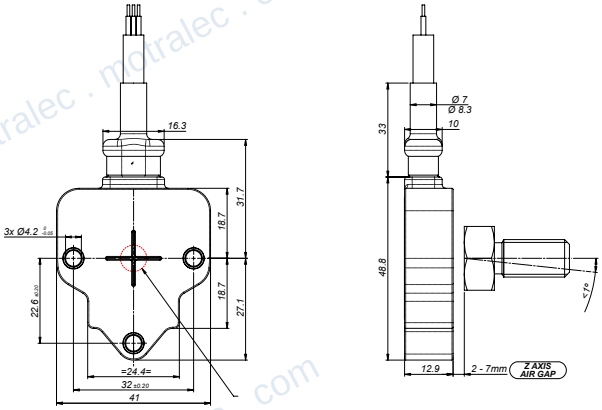
Figure 1: AMP and Cable version

AMP version



Axis X-Y offset
Max Ø 2mm tolerance zone axis prosition magnet. Note each offset from the axis misalignment or magnetic will increase the non-linearity.

Cable version



Axis X-Y offset
Max Ø 2mm tolerance zone axis prosition magnet. Note each offset from the axis misalignment or magnetic will increase the non-linearity.

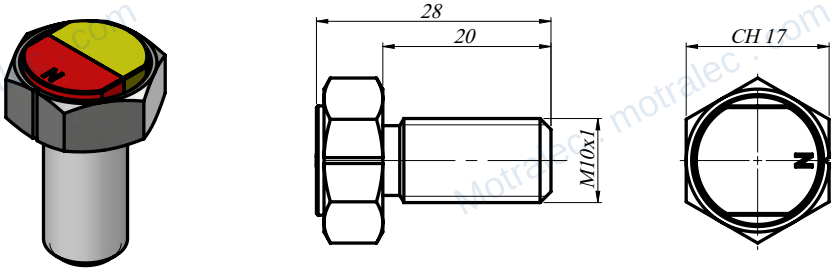
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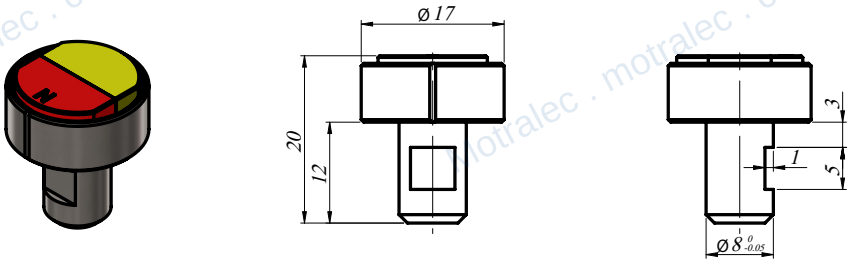
Magnets models

Figure 2: Accessories

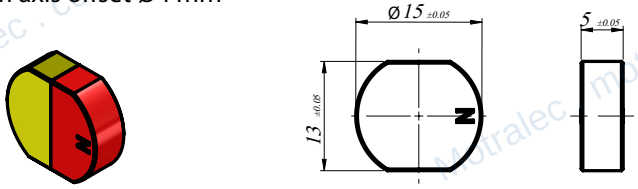
PKIT384 Shaft kit + magnet D15 M10 Hexagonal Accessory "A"
Air gap 2-7 mm axis offset Ø4 mm



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



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Electrical connections

Figure 3: AMP version, angular positions

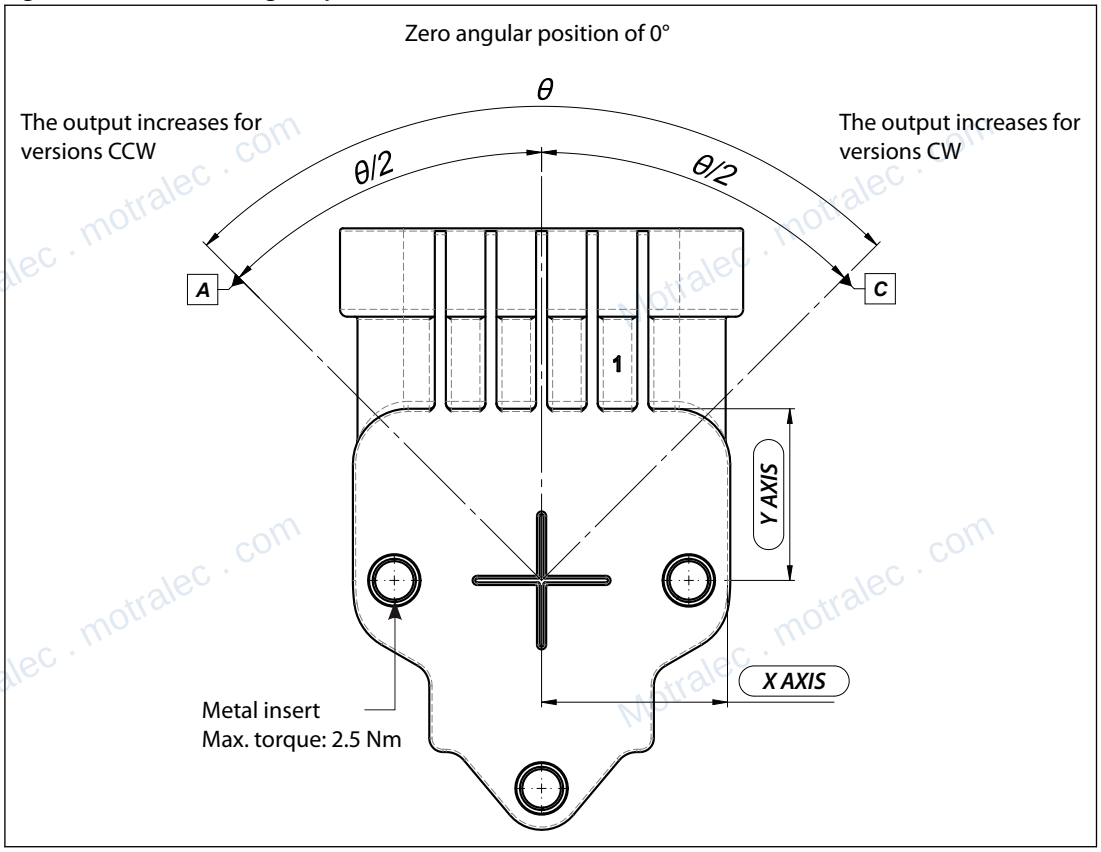


Table 5: General data

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

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Figure 4: Cable version, angular positions

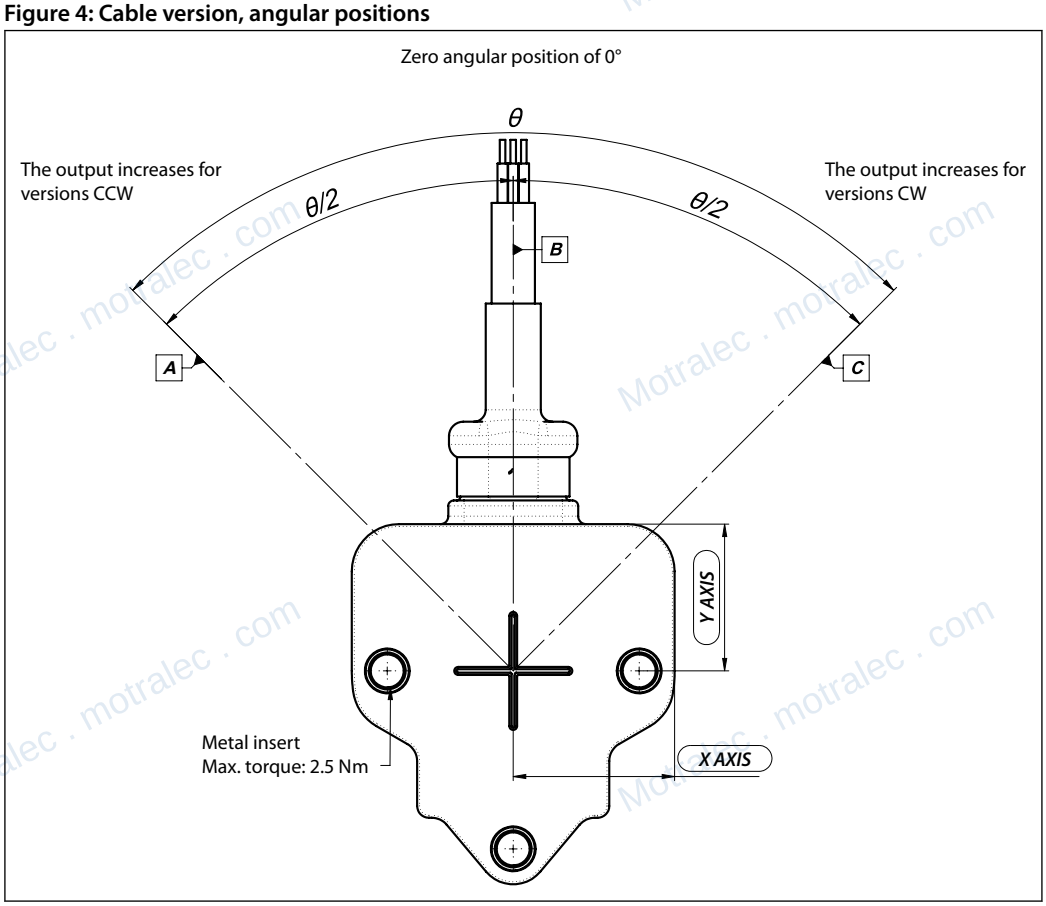
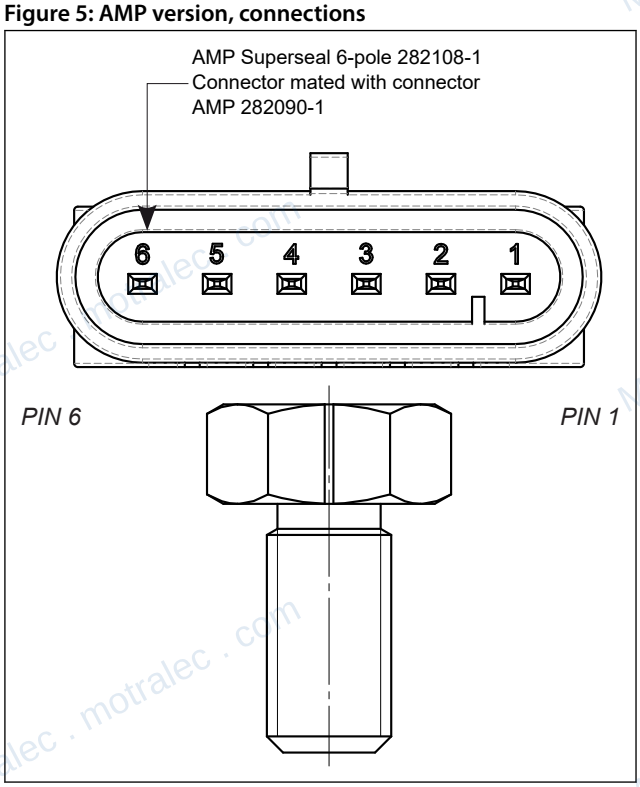


Table 6: General data

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

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Figure 5: AMP version, connections



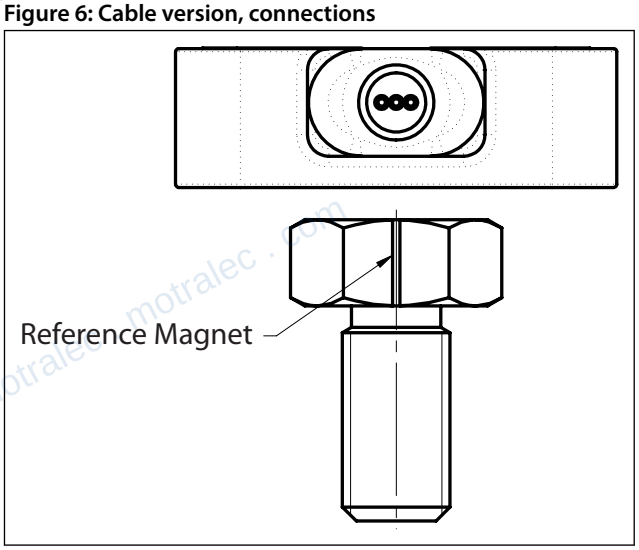
Connections

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

Figure 6: Cable version, connections



Connections

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

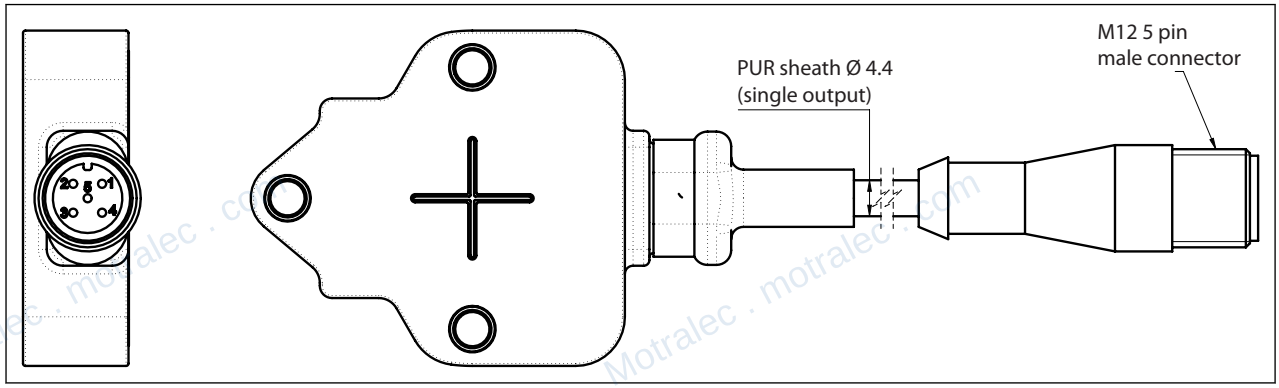
Connections - CAN/J 1939

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

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Figure 7: Cable + M12 version, connections



Connections

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

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Ordering

Ordering type

Table 7: DST X520, ordering

Type	Output signal	Cofigurations	Code no.
DST X520 incl. PKIT magnet	5 V Ratiometric	±180° Clockwise CW	098G1500
	5 V Ratiometric	±180° CounterclokwiseCCW/CH2 clockwise CW	098G1501
	36 V CANopen	±180° Clockwise CW	098G1502
	36 V SAE J1939	±180° 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 ±15°) (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

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)

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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.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 8: Declarations

Document name	Document type	Document topic	Approval authority
098R0008	EU Declaration	EMCD/ROHS	Danfoss

Approvals and Conformity

- CE
- RoHS
- E1 approval

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