



DFS20/DFS21/DFS22/DFS25 Incremental Encoders

High-resolution factory-configured and user programmable encoders
for complex applications and high operational demands

High-resolution factory-configured programmable encoder for applications with mounting hole dimensions in inches










UL certification only valid for encoders with cable and M12 connections

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Product description

The DFS2x family of products are high-resolution incremental encoders that provide industry standard 2 and 2.5-inch mechanical interfaces and are available as factory-configured or programmable devices. Factory-configured encoders can be ordered with TTL, HTL, or open-collector outputs as well as integer resolutions from 1 to 65,536 counts per revolution. Programmable encoders allow the user to select the integer resolution and either

TTL or HTL outputs. DFS2x encoders incorporate rugged internal technology that allows them to operate over a wide temperature range and tolerate twice the shock & vibration levels of comparable encoders. The flexibility and reliability of these encoders allows you to confidently standardize on a single encoder platform for position sensing across a wide variety of applications while simultaneously reducing your spare part requirements.

At a glance

- Compact 2-inch and 2.5-inch design
- Integer resolutions from 1 to 65,536 counts per revolution.
- Compatible with PGT-08-S PC based programming tool.
- User programmable DFS2x encoders allow the user to configure resolution, zero pulse phase, zero pulse position, and output electrical interface.
- Flange, hollow shaft, and blind hollow shaft options.
- M12 connector, MS connector, and flying lead cable connection options.

Your benefit

- Programmable DFS2x encoders simplify machine designs by allowing the same model encoder to be used for different applications.
- Spare parts inventory requirements are reduced because a single programmable DFS2x encoder can be used across a variety of applications.
- Flexible electrical interface configurations reduces the risk that the selected encoder will be incompatible with input electronics.
- High-resolution provides more precise positioning for applications that require high accuracy.
- Wide operating temperature range and high tolerance of shock and vibration reduces downtime on machinery.

Detailed technical specifications

Performance

Number of lines per revolution	1 to 65, 536 Integer
Measuring step	90° electrical / number of lines
Reference signal	
Number	1
Phase Electrical	Factory configured 90° or 180°
Phase Mechanical	Programmable 1°-359°
Error limits	± 0.03°
Measuring step deviation	
Number of lines 1 ... 99	± 0.04°
Number of lines 100 ... 10000	± 0.008°
Number of lines > 10000	± 0.002°

¹⁾ See maximum revolution range on page 5.

Interfaces

Supply Voltage/Output Type	4.5-5.5 Volt DC Supply Voltage, 5 Volt Line Driver Output (TTL)
	8-30 Volt DC Supply Voltage, 5 Volt Line Driver Output (TTL)
	8-30 Volt DC Supply Voltage, 8-30 Volt Line Driver (HTL/Push-pull)
	8-30 Volt DC Supply Voltage, 8-30 Volt Open Collector
	4.75-30 Volt DC Supply Voltage, User Programmable: 5 Volt (TTL) or 8-30 Volt (HTL) Line Driver ¹⁾
Initialization Time	
After Power-on	40 ms
After Zero-Set	Max. 30 ms
Zero-Set Input²⁾	Active High ³⁾

¹⁾ Factory default set to TTL/RS422 Differential Line Driver

²⁾ The Zero-Set function is not available with 6-pin MS connector or M12 connector options

³⁾ When activated, the Zero-Set function assigns the zero marker pulse location to the encoder's current shaft position. To activate the Zero-Set function, the input must be low or open for at least 1 second and then be driven high for at least 250 msec. The high signal must be at least 0.43 times the encoder supply voltage.

Mechanics/Electrical system

Shaft diameter	
Square and Servo Mount Flange	1/4 inch with flat, 3/8 in with flat, and 10 mm with flat
Blind and Through Hollow Shaft	3/8 inch and 1/2 inch
Weight	
Square, Servo, and Face Mount Flange	0.4 kg (MS connector)
Blind hollow shaft and through hollow shaft	0.3 kg (M12 connector)
Rotor moment of inertia	
Square, Servo, and Face Mount Flange	15 gcm ²
Blind hollow shaft and through hollow shaft	40 gcm ²
Max. output frequency	
Open Collector	150 kHz
Line Driver	820 kHz
Operating speed ¹⁾	
Square, Servo, and Face Mount Flange	9,000 rpm
Blind hollow shaft and through hollow shaft	6,000 rpm
Angular acceleration	
	5 x 10 ⁵ rad/s ²
Operating torque at 20 °C	
Square, Servo, and Face Mount Flange	0.3 Ncm
Blind hollow shaft and through hollow shaft	0.6 Ncm
Start-up torque at 20 °C	
Square, Servo, and Face Mount Flange	0.5 Ncm
Blind hollow shaft and through hollow shaft	0.8 Ncm
Permissible shaft loading	
Square, Servo, and Face Mount Flange	80 N (radial, 20 mm from front bearing) 40 N (axial)
Permissible shaft movement of the drive element static/dynamic	
Blind hollow shaft and through hollow shaft	± 0.3/± 0.05 mm (radial) ± 0.5/± 0.1 mm (axial)
Bearing lifetime	
	3.6 x 10 ⁹ revolutions
Load current	
All output types	30 mA
Supply current with no load	
Programmable Versions	75 mA
Pre-configured Versions	50 mA
Power consumption with no load	
All output types	0.7 W
Reverse polarity protection	
Open Collector	Yes
Line Driver	Yes
Cable	
Type	UL AWM 20327 105°C 300V, 9 conductor 26 AWG, braided shield, black TPE jacket
Bending Radius	Minimum 5x non-flexing
Outer Diameter	6.2 mm (0.245 in)
Environmental	Oil resistant to VDE 0472 part 803, general resistant to fuels, acids, bleaches, detergents, and dusts.

Short-circuit protection of the outputs	
5 Volt Line Driver	Yes ¹⁾
8-30 Volt Line Driver	Yes ¹⁾
Open Collector	Yes ¹⁾
User Programmable: 5 Volt (TTL) or 8-30 Volt (HTL) Line Driver	Yes ¹⁾
MTTFd: mean time to dangerous failure ²⁾	330 years (EN ISO 13849-1)

¹⁾ Channel-to-channel or channel-to-GND short is permissible for 30s max.

²⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

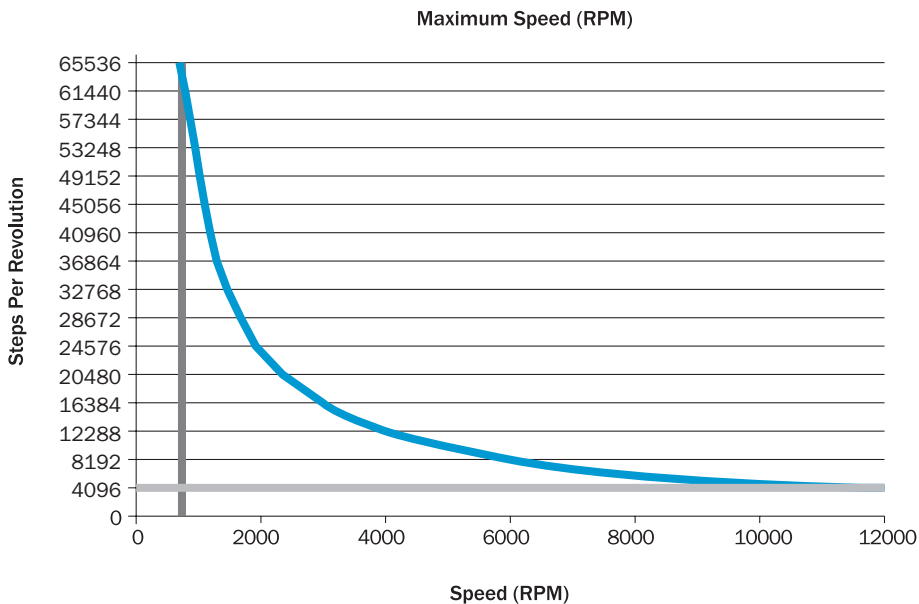
Environment

Working temperature range	-30 ... +85 °C
Storage temperature range (without packaging)	-40 ... +100 °C
Permissible relative air humidity ¹⁾	90 %
EMC ²⁾	As per EN 61000-6-2 and EN 61000-6-3
Resistance	
Shock, non-repetitive per EN 60068-2-27	100 g/11 msec duration
Vibration per EN 60068-2-6	30 g/10-2,000 Hz
Enclosure rating as per IEC 60529	On the shaft IP 65, on the housing/connector outlet IP 67, on the housing cable outlet IP 67 ²⁾

¹⁾ Condensation on the optical scanner not permissible.

²⁾ When the mating connector is installed.

Maximum Speed vs. Steps Per Revolution



Ordering information

Ordering code for DFS25A 2.5 inch size square, servo and face mount flange encoder.



Encoder Diameter/Type

5 2.5 Inch Dia. Solid Shaft

Mounting Type

A 2.5 Inch Square Flange

B 2.5 Inch Servo Mount

N 60 mm Face Mount

Shaft Type

1 1/4 Inch Dia. Shaft with Flat

2 3/8 Inch Dia. Shaft with Flat

4 10 mm Dia. Shaft with Flat

Electrical Interface

A 5 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)

B 8-30 Volt DC Supply, 8-30 Volt Line Driver Outputs (HTL/Push-pull)

C 8-30 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)

D 8-30 Volt DC Supply, 8-30 Volt Open Collector Outputs

E 5 Volt DC Supply, 5 Volt Open Collector Outputs

P 5 Volt DC Supply, User Programmable 5 Volt (TTL) or 8-30 Volt (HTL/Push-pull) Line Driver Outputs¹⁾

Counting Direction (for A-leads-B when facing shaft) and Marker Type

1 Clock-wise, 180 Degree Marker Gated with A

2 Clock-wise, 90 Degree Marker Gated with A and B

A Counter Clock-wise, 180 Degree Marker Gated with BN²⁾

B Counter Clock-wise, 180 Degree Marker Gated with A

D Counter Clock-wise, 90 Degree Marker Gated with A and B

Connection Type

C Radial Exit M12 Connector, 8-pin

D Radial Exit MS Connector, 10-pin

E Radial Exit MS Connector, 7-pin

F Radial Exit MS Connector, 6-pin

L Radial Exit Shielded Cable, 1.5 m

N Radial Exit Shielded Cable, 5 m

O Radial Exit Shielded Cable, 10 m

1 Axial Exit M12 Connector, 8-pin

2 Axial Exit MS Connector, 10-pin

3 Axial Exit MS Connector, 7-pin

4 Axial Exit MS Connector, 6-pin

5 Axial Exit Shielded Cable, 1.5 m

7 Axial Exit Shielded Cable, 5 m

8 Axial Exit Shielded Cable, 10 m

Pulses per Revolution

Specify 00001 through 65536 lines per revolution¹⁾

D F S 2 5 A - A 1 A 1 C 0 0 3 6 0 0

Programmable DFS2x encoders allow configuration of the following parameters¹⁾ :

- Integer number of lines per revolution from 1 to 65536
- Zero pulse width 90, 180, and 270 electrical degrees
- Zero pulse position 1-359 integer mechanical degrees
- Electrical output circuit 5 Volt (TTL) or 8-30 Volt (HTL) Line Driver
- Direction of rotation for A leads B (CW or CCW)

¹⁾ Requires PGT-08-S programming tool (see accessories on page 15)

¹⁾ Electrical interface option P provides user selectable output type (5 or 8-30 Volt Line Driver), pulses per revolution, and counting direction. The factory default setting is to 5 Volt line driver outputs, 0 pulse width.

²⁾ Direction of rotation/marker option A (Counter Clock-wise, 180 Degree Marker Gated with BN) is not available with electrical interface option P (5-30 Volt DC Supply, User Selectable 5 Volt or 8-30 Volt Line Driver Outputs).

Ordering code for DFS20A 2 inch size square, servo and face mount flange encoder.



DFS20 encoder with servo mount flange and cable connection



DFS20 encoder with square flange and MS connector connection



DFS20 encoder with servo mount flange and M12 connector connection

Encoder Diameter/Type

0 2 Inch Dia. Solid Shaft

Mounting Type

A 2 Inch Square Flange

B 2 Inch Servo Mount

M 58mm Servo Mount

Shaft Type

1 1/4 Inch Dia. Shaft with Flat

2 3/8 Inch Dia. Shaft with Flat

3 6 mm Dia. Shaft with Flat

4 10 mm Dia. Shaft with Flat

Electrical Interface

A 5 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)

B 8-30 Volt DC Supply, 8-30 Volt Line Driver Outputs (HTL/Push-pull)

C 8-30 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)

D 8-30 Volt DC Supply, 8-30 Volt Open Collector Outputs

E 5 Volt DC Supply, 5 Volt Open Collector Outputs

P 5-30 Volt DC Supply, User Programmable 5 Volt (TTL) or 8-30 Volt (HTL/Push-pull) Line Driver Outputs¹⁾

Counting Direction (for A-leads_B when facing shaft) and Marker Type

1 Clock-wise, 180 Degree Marker Gated with A

2 Clock-wise, 90 Degree Marker Gated with A and B

A Counter Clock-wise, 180 Degree Marker Gated with BN²⁾

B Counter Clock-wise, 180 Degree Marker Gated with A

D Counter Clock-wise, 90 Degree Marker Gated with A and B

Connection Type

C Radial Exit M12 Connector, 8-pin

D Radial Exit MS Connector, 10-pin

E Radial Exit MS Connector, 7-pin

F Radial Exit MS Connector, 6-pin

L Radial Exit Shielded Cable, 1.5 m

N Radial Exit Shielded Cable, 5 m

O Radial Exit Shielded Cable, 10 m

S Radial Exit M12 Connector, 8-pin

Q Radial Exit MS Connector, 10-pin

R Radial Exit MS Connector, 7-pin

T Radial Exit MS Connector, 6-pin

Pulses per Revolution

Specify 00001 through 65536 lines per revolution¹⁾

D F S 2 0 A - A 1 A 1 C 0 0 3 6 0 0

Programmable DFS2x encoders allow configuration of the following parameters¹⁾ :

- Integer number of lines per revolution from 1 to 65536
- Zero pulse width 90, 180, and 270 electrical degrees
- Zero pulse position 1-359 integer mechanical degrees
- Electrical output circuit 5 Volt (TTL) or 8-30 Volt (HTL) Line Driver
- Direction of rotation for A leads B (CW or CCW)

¹⁾ Requires PGT-08-S programming tool (see accessories on page 15)

¹⁾ Electrical interface option P provides user selectable output type (5 or 8-30 Volt Line Driver), pulses per revolution, and counting direction. The factory default setting is to 5 Volt line driver outputs, 0 pulse width.

²⁾ Direction of rotation/marker option A (Counter Clock-wise, 180 Degree Marker Gated with BN) is not available with electrical interface option P (5-30 Volt DC Supply, User Selectable 5 Volt or 8-30 Volt Line Driver Outputs).

Ordering code for DFS21A/DFS22A 2 inch size through hollow shaft and blind hollow shaft encoders.



DFS22 encoder with 2 point stator coupling, blind hollow shaft, and cable connection



DFS21 encoder with 2 point stator coupling, through hollow shaft mount, and M12 connector connection

Mounting Type

- 1 2 Inch Dia. Through Hollow Shaft
- 2 2 Inch Dia. Blind Hollow Shaft

Coupling Type

- K 2-Point Stator Coupling
- L 3-Point Stator Coupling

Shaft Type

- C 3/8 Inch Bore Metal Hollow Shaft
- F 1/2 Inch Bore Metal Hollow Shaft

Electrical Interface

- A 5 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)
- B 8-30 Volt DC Supply, 8-30 Volt Line Driver Outputs (HTL/Push-pull)
- C 8-30 Volt DC Supply, 5 Volt Line Driver Outputs (TTL)
- D 8-30 Volt DC Supply, 8-30 Volt Open Collector Outputs
- E 5 Volt DC Supply, 5 Volt Open Collector Outputs
- P 5-30 Volt DC Supply, User Programmable 5 Volt (TTL) or 8-30 Volt (HTL/Push-pull) Line Driver Outputs¹⁾

Counting Direction (for A-leads-B when facing shaft) and Marker Type

- 1 Clock-wise, 180 Degree Marker Gated with A
- 2 Clock-wise, 90 Degree Marker Gated with A and B
- A Counter Clock-wise, 180 Degree Marker Gated with BN²⁾
- B Counter Clock-wise, 180 Degree Marker Gated with A
- D Counter Clock-wise, 90 Degree Marker Gated with A and B

Connection Type

- C Radial Exit M12 Connector, 8-pin
- L Radial Exit Shielded Cable, 1.5 m
- N Radial Exit Shielded Cable, 5 m
- O Radial Exit Shielded Cable, 10 m
- S Radial Exit M12 Connector, 8-pin

Pulses per Revolution

Specify 00001 through 65536 lines per revolution¹⁾

Programmable DFS2x encoders allow configuration of the following parameters¹⁾ :

- Integer number of lines per revolution from 1 to 65536
- Zero pulse width 90, 180, and 270 electrical degrees
- Zero pulse position 1-359 integer mechanical degrees
- Electrical output circuit 5 Volt (TTL) or 8-30 Volt (HTL) Line Driver
- Direction of rotation for A leads B (CW or CCW)

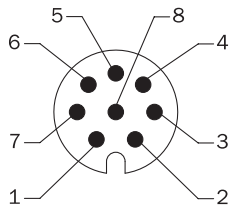
¹⁾ Requires PGT-08-S programming tool (see accessories on page 15)

D F S 2 1 A - K F A 1 C 0 0 3 6 0 0

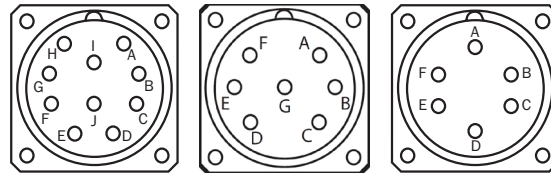
¹⁾ Electrical interface option P provides user selectable output type (5 or 8-30 Volt Line Driver), pulses per revolution, and counting direction. The factory default setting is to 5 Volt line driver outputs, 0 pulse width.

²⁾ Direction of rotation/marker option A (Counter Clock-wise, 180 Degree Marker Gated with BN) is not available with electrical interface option P (5-30 Volt DC Supply, User Selectable 5 Volt or 8-30 Volt Line Driver Outputs).

Signal PIN and wire assignments



View of the MS12 connector on the encoder.

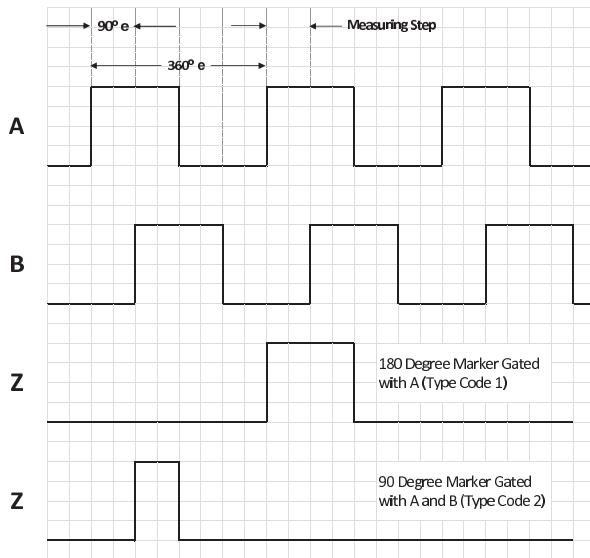


View of the MS connector on the encoder

M12 8-Pin	MS 10-Pin	MS 7-Pin	MS 6-Pin	Cable 9-Wire	Signal	Explanation
1	H	-	-	Brown	AN	Output Signal
2	A	A	E	White	A	Output Signal
3	I	-	-	Black	BN	Output Signal
4	B	B	D	Pink	B	Output Signal
5	J	-	-	Yellow	ZN	Output Signal
6	C	C	C	Violet	Z	Output Signal
7	F	F	A	Blue	GND	Us Return (-)
8	D	D	B	Red	Us	Supply Voltage (+)
-	E	E	-	Orange	Zero Set	Input Signal
-	G	G	F	-	Case	Housing Potential
-	-	-	-	bare	Drain	Drain Wire
-	-	-	-	braid	Shield	Cable shield

Incremental Signals

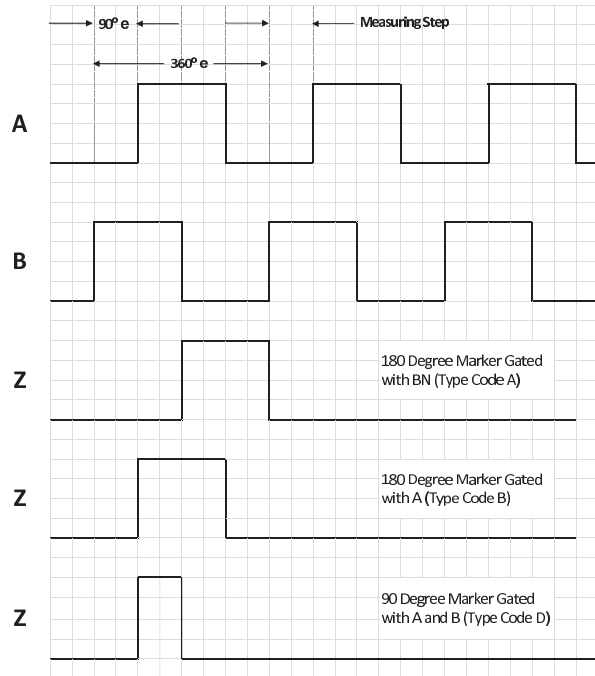
Signal Outputs with Clock-wise Counting Direction Option Selected^{1,2}
(A-leads-B for clock-wise rotation)



¹Shows signals when shaft is rotated clock-wise viewed from shaft end of encoder

²Complement signals AN, BN, and ZN are not shown

Signal Outputs with Counter Clock-wise Counting Direction Option Selected^{1,2}
(B-leads-A for clock-wise rotation)

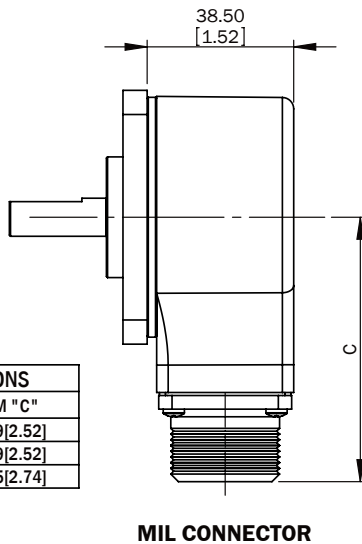
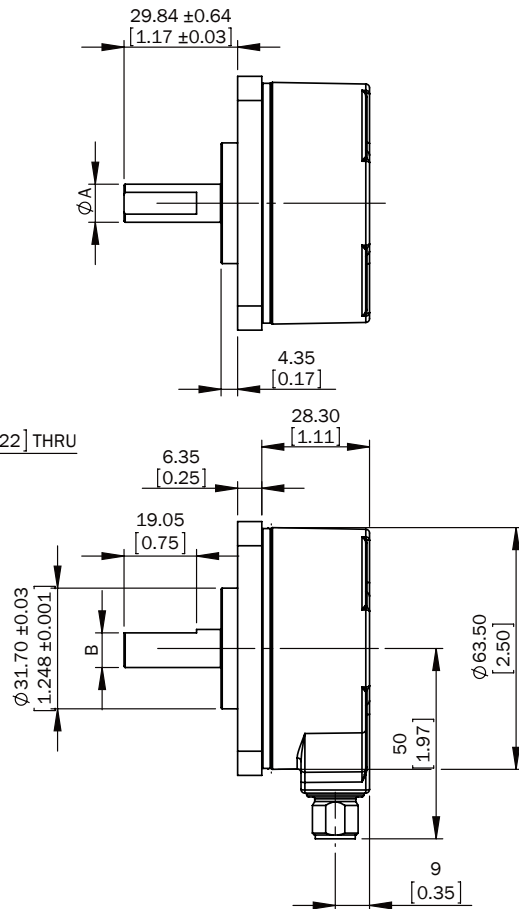
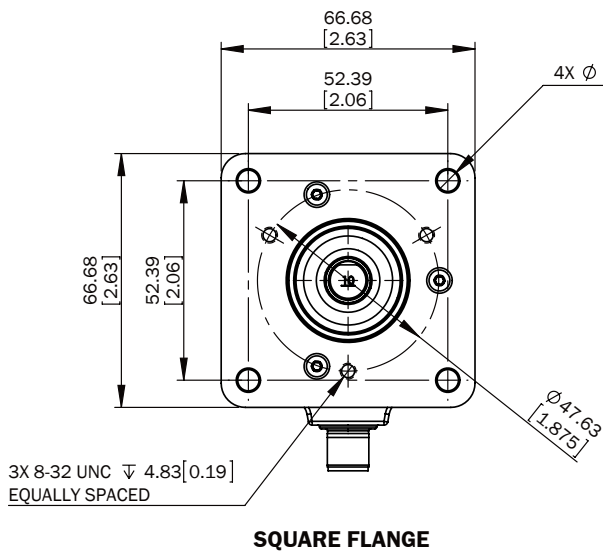


Dimensional drawings

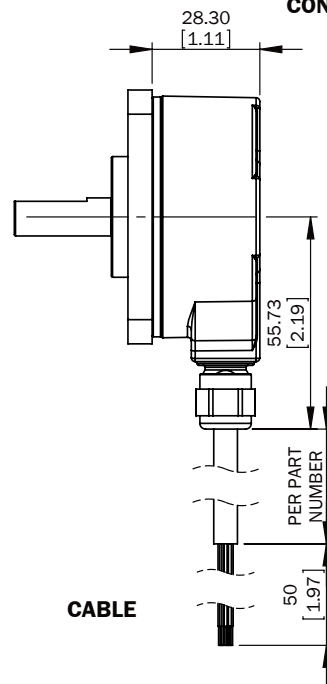
DFS25A square flange mount, radial connector outlet M12 and MS, cable outlet.

SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]

All dimensions in mm (inches)



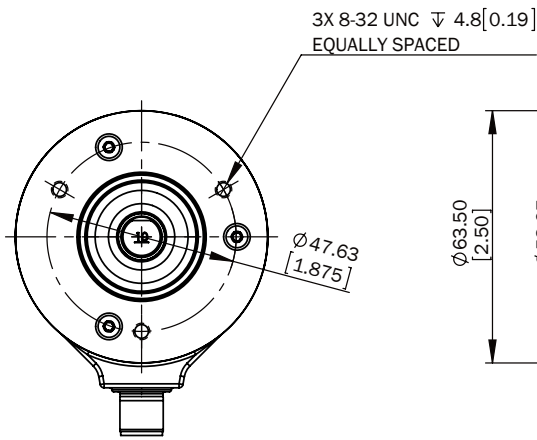
MIL CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.5[2.74]



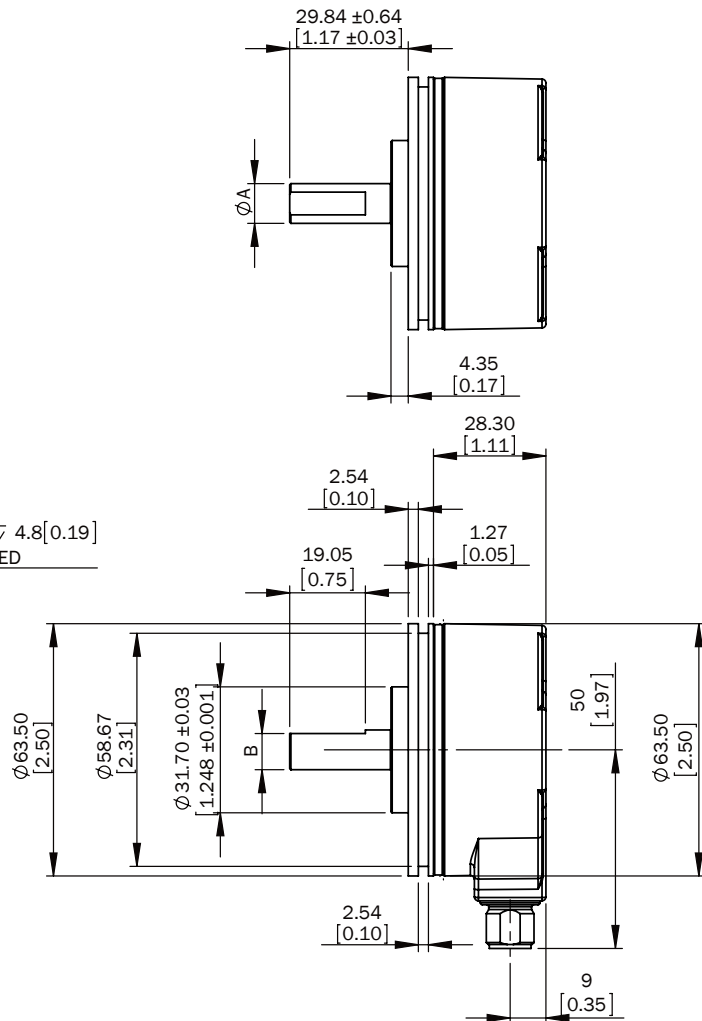
DFS25A servo flange mount, radial connector outlet M12 and MS, cable outlet.

SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]

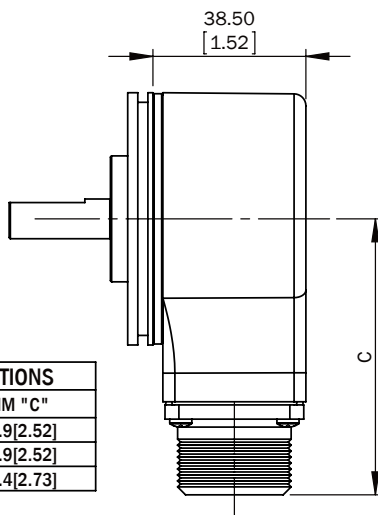
All dimensions in mm (inches)



SERVO FLANGE

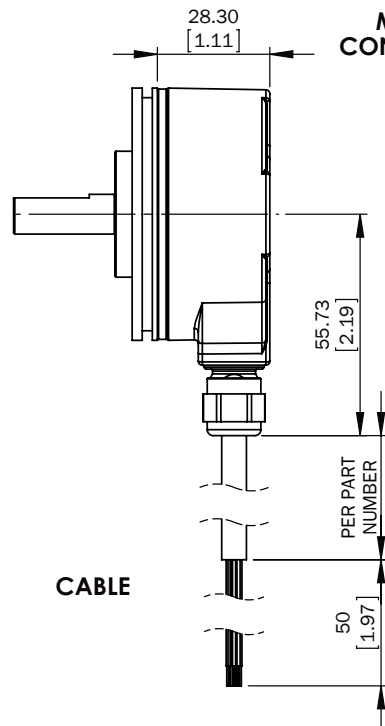


M12X1 CONNECTOR



MIL CONNECTOR

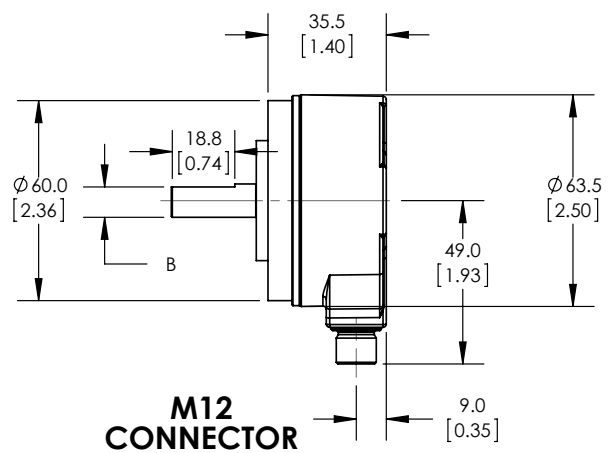
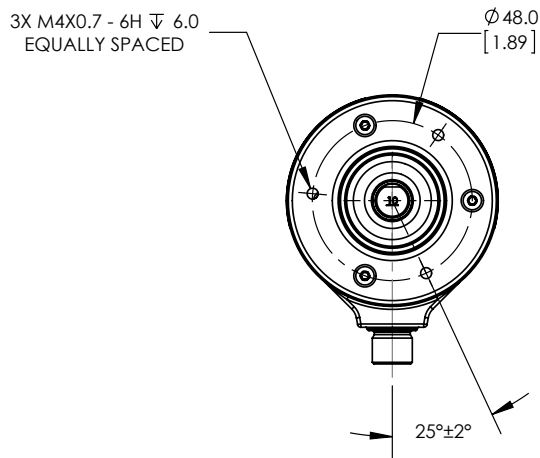
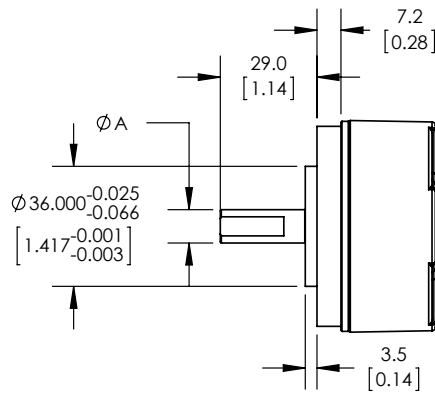
MIL CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.4[2.73]



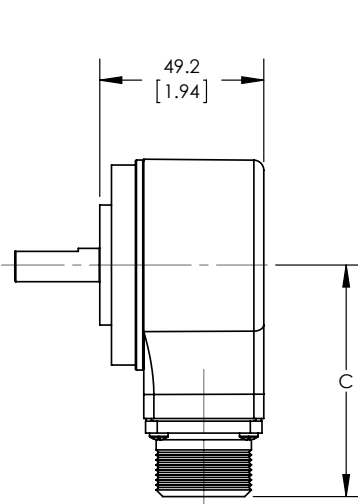
CABLE

DFS25A 60 mm face mount flange, radial connector outlet M12 and MS, cable outlet.

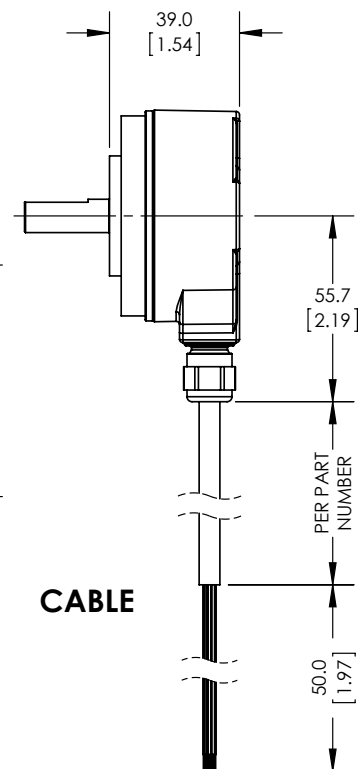
SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
6MM	6.000/5.988[.2362/.2357]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]



M12 CONNECTOR



MS CONNECTOR



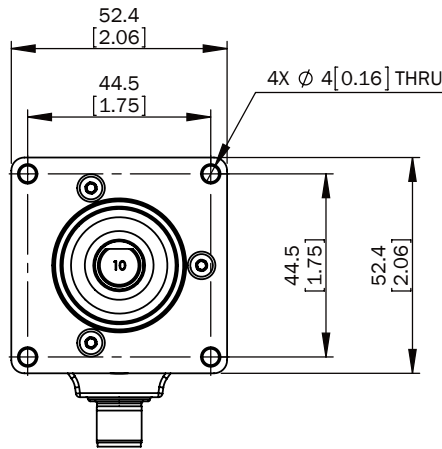
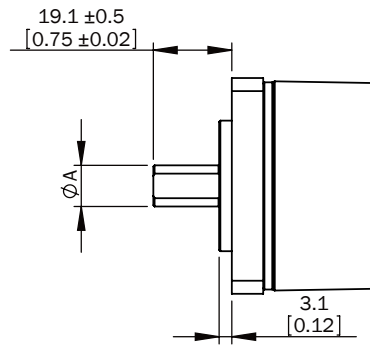
CABLE

MS CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.4[2.73]

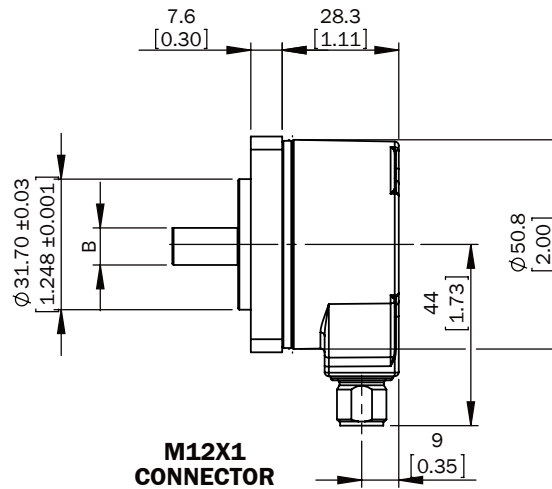
DFS20A square flange mount, radial connector outlet M12 and MS, cable outlet.

SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]

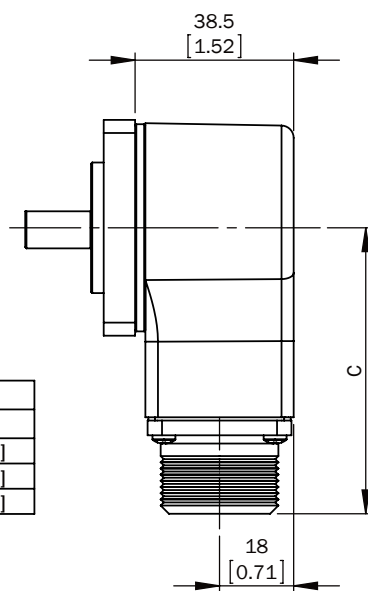
All dimensions in mm (inches)



SQUARE FLANGE

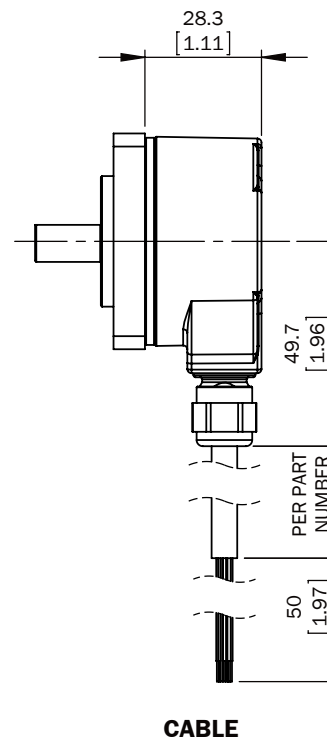


M12X1 CONNECTOR



MIL CONNECTOR

MIL CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.4[2.73]

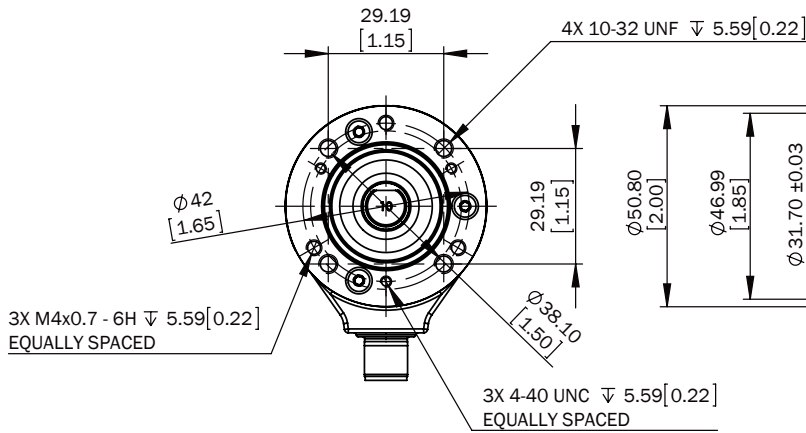


CABLE

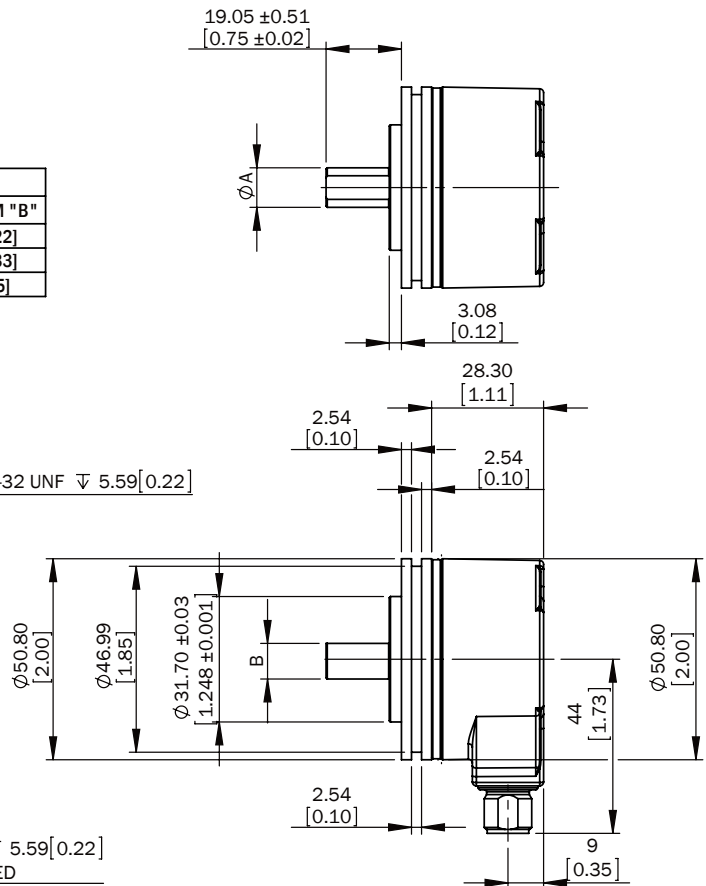
DFS20A servo flange mount, radial connector outlet M12 and MS, cable outlet.

SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]

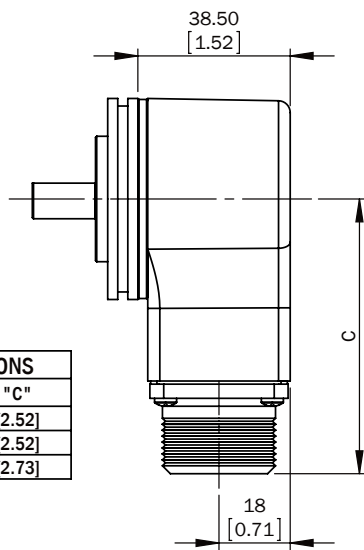
All dimensions in mm (inches)



SERVO FLANGE

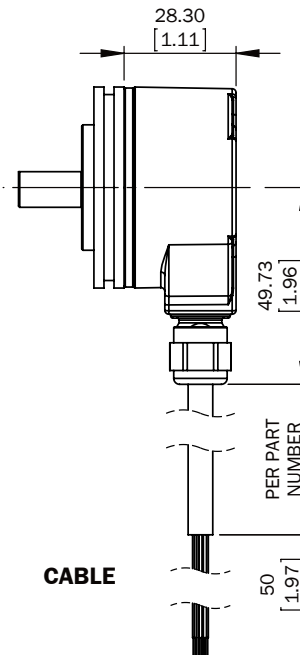


M12X1 CONNECTOR



MIL CONNECTOR

MIL CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.4[2.73]

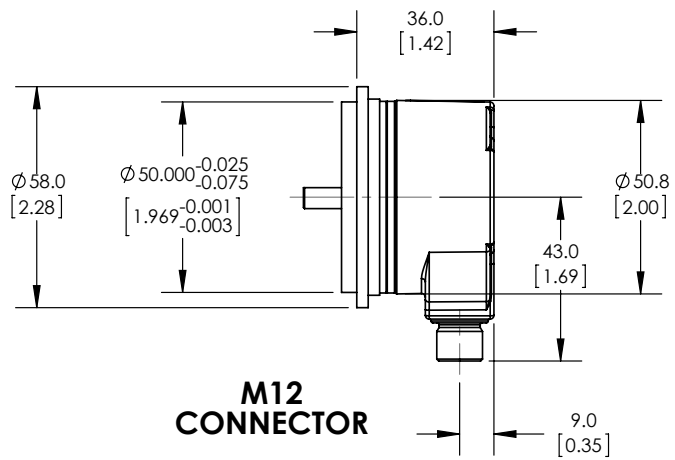
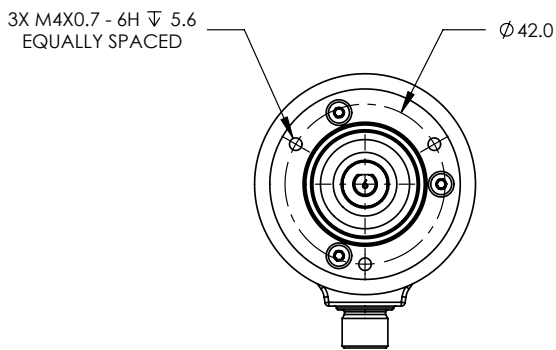
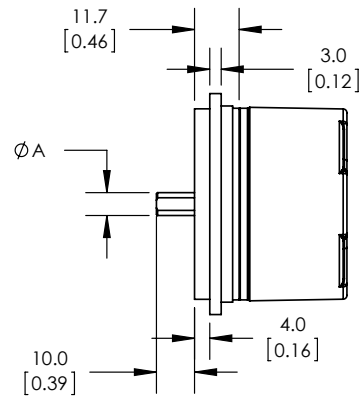


CABLE

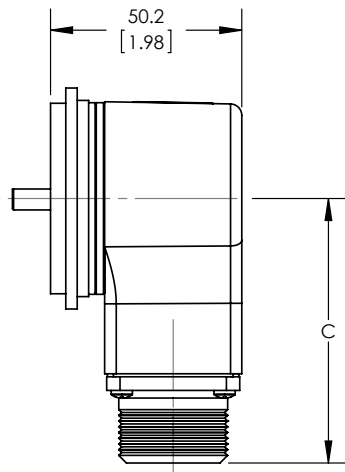
DFS20A 58 mm servo mount flange, radial connector outlet M12 and MS, cable outlet.

58MM Flange

SHAFT OPTIONS		
NOMINAL	SHAFT ϕ "A"	FLAT DIM "B"
1/4"	6.327/6.312[.2491/.2485]	5.5[.22]
6MM	6.000/5.988[.2362/.2357]	5.5[.22]
3/8"	9.507/9.492[.3743/.3737]	8.5[.33]
10MM	9.977/9.962[.3928/.3922]	9[.35]

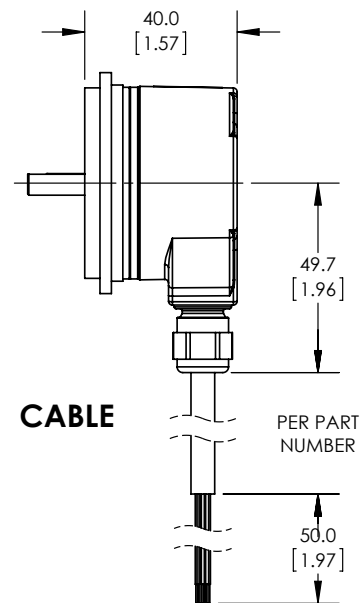


M12 CONNECTOR



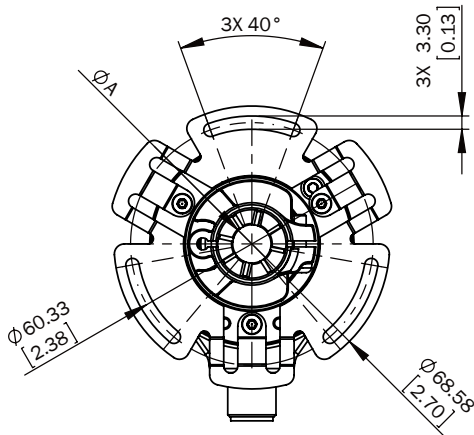
MS CONNECTOR

MS CONNECTOR OPTIONS	
TYPE	DIM "C"
6 PIN	63.9[2.52]
7 PIN	63.9[2.52]
10 PIN	69.4[2.73]



CABLE

DFS21A through hollow shaft, radial connector outlet M12, cable outlet.

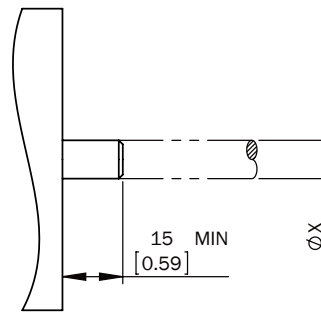
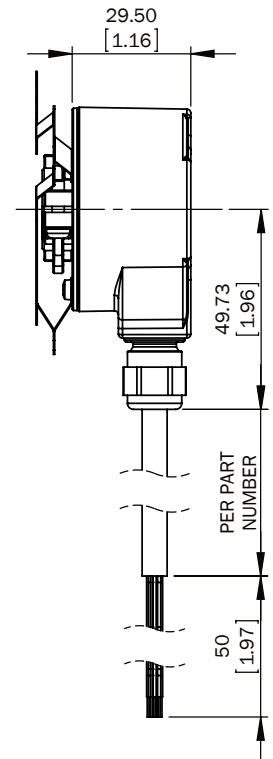
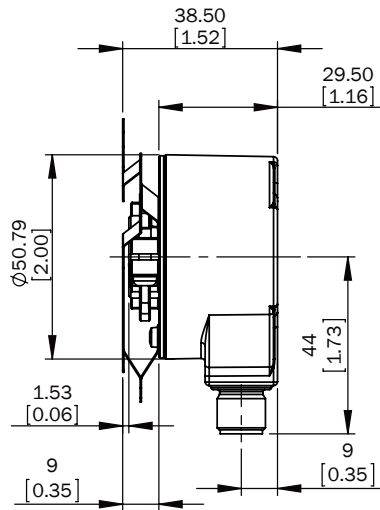


**THROUGH HOLLOW SHAFT
3 POINT STATOR COUPLER**

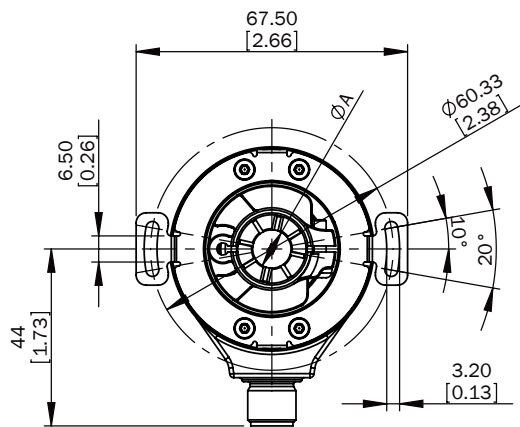
BORE OPTIONS	
NOMINAL	BORE Ø "A"
3/8"	9.543/9.558[.3757/.3763]
1/2"	12.716/12.734[.5006/.5013]

CUSTOMER SHAFT SIZE	
NOMINAL	SHAFT Ø "X"
3/8"	9.535/9.520[.3754/.3748]
1/2"	12.712/12.694[.5005/.4998]

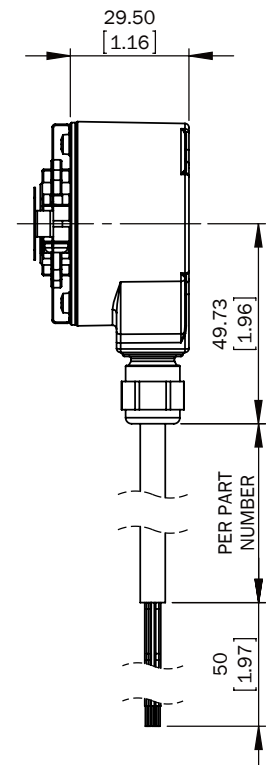
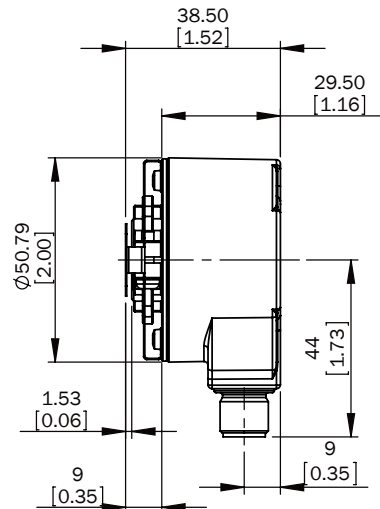
REFERENCE ONLY



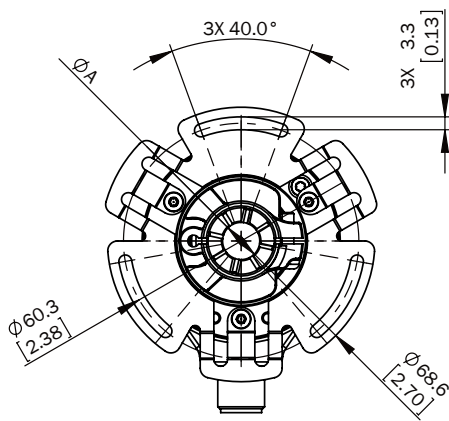
**CUSTOMER SHAFT
REFERENCE ONLY**



**THROUGH HOLLOW SHAFT
2 POINT STATOR COUPLER**



DFS22A blind hollow shaft, radial connector outlet M12, cable outlet.

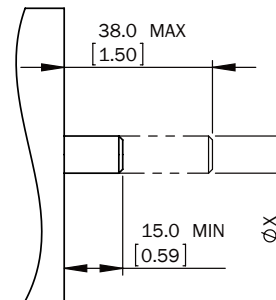
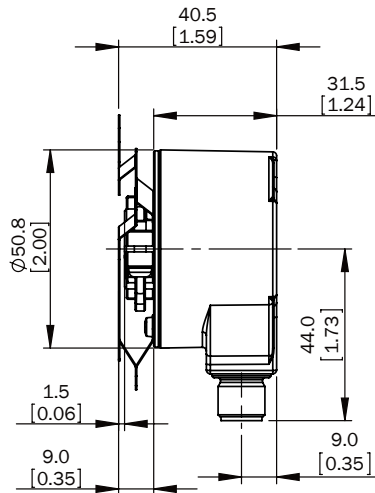


**BLIND HOLLOW SHAFT
3 POINT STATOR COUPLER**

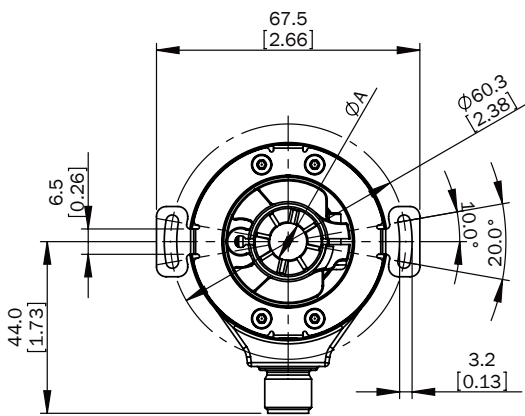
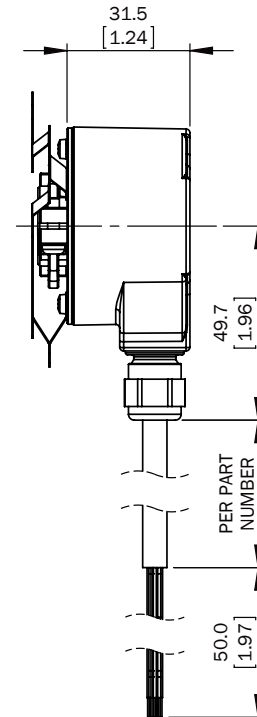
BORE OPTIONS	
NOMINAL	BORE Ø "A"
3/8"	9.543/9.558[.3757/.3763]
1/2"	12.716/12.734[.5006/.5013]

CUSTOMER SHAFT SIZE	
NOMINAL	SHAFT Ø "X"
3/8"	9.535/9.520[.3754/.3748]
1/2"	12.712/12.694[.5005/.4998]

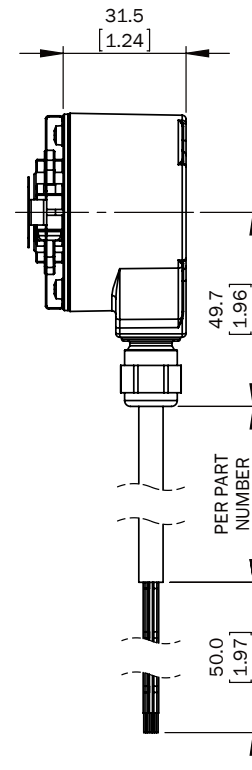
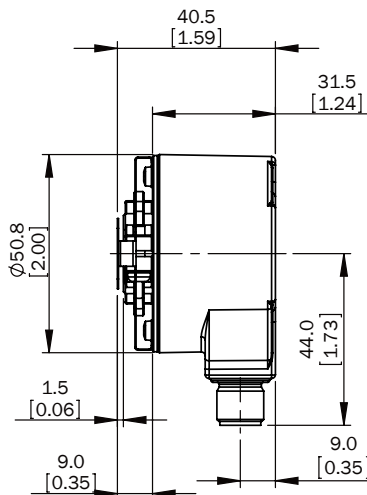
REFERENCE ONLY



**CUSTOMER SHAFT
REFERENCE ONLY**




**BLIND HOLLOW SHAFT
2 POINT STATOR COUPLER**



Accessories

Programming Tools

	Description	Type	Part no.
	PC based programming tool for DFS2x and DFS60 encoders (requires SOPAS software)	PGT-08-S	1036616

Adapter cable for programming tools

The following adapter cables are required to program the SICK incremental encoders.

Description	Type	Part no.
Adapter cable for programming incremental encoders with 8-pin M12 connectors using the PGT-08-S programming tool 0.5 meter 9-pin D-sub to 8-pin M12 connector, 8-conductor shielded cable, 4 x 2 x 0.08mm ² .	DSL-2D08-G0M5AC3	2046579
Adapter cable for programming incremental encoders with 10-pin MS connectors using the PGT-08-S programming tool 0.5 meter 9-pin D-sub to 10-pin MS connector, 8-conductor shielded cable, 4 x 2 x 0.08mm ² .	DSL-4D08-G0M5AC5	2067176

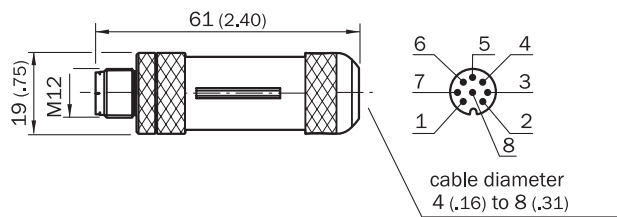
Plug connectors and cables

M12 screw-in system

- Straight, shielded, convertible (on adapter)

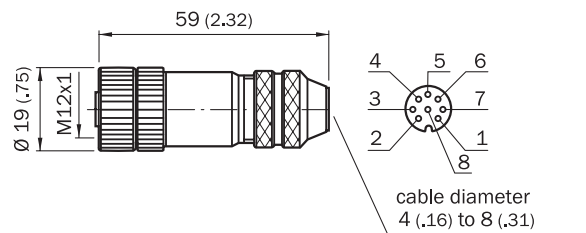
Contacts	Cable diameter	Description	Type	Part no.
8	4 ... 8 mm	Cable connector	STE-1208-GA01	6044892
		Cable socket	DOS-1208-GA01	6045001

STE-1208-GA01



All dimensions in mm (inch)

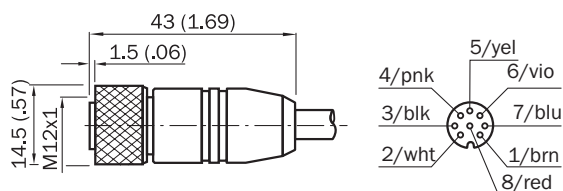
DOS-1208-GA01



All dimensions in mm (inch)

Description	Cable length	Type	Part no.
Cable socket, 8-pin, straight, fitted with 8-core cable, 4 x 2 x 0.25 mm ² , shielded, carrier-capable (on adapter)	2.0 m	DOL-1208-G02MAC1	6032866
	5.0 m	DOL-1208-G05MAC1	6032867
	10.0 m	DOL-1208-G10MAC1	6032868
	20.0 m	DOL-1208-G20MAC1	6032869

DOL-1208-GxxMAC1



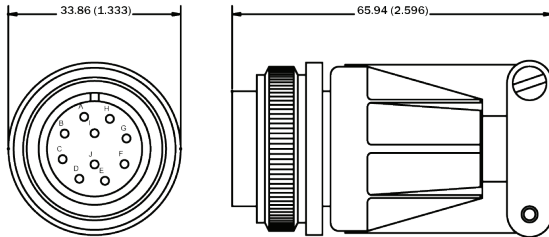
All dimensions in mm (inch)

Dimensional drawings and order information.

Connector systems, MS 10 pin

Contacts	Type	Part no.
10	DOS-MS10-G	7102129

DOS-MS10-G



All dimensions in mm (inches)

Mating Cable Wire Colors	
A	White
B	Pink
C	Violet
D	Red
E	Orange
F	Blue
G	Green
H	Brown
I	Black
J	Yellow

Cable Type

AWM20626 80° C 300V
 2 x 20 AWG, 9 x 24 AWG
 7.9 mm (0.31 in) outer diameter
 Minimum 5x bending radius
 Black TPE jacket
 Braided overall shield

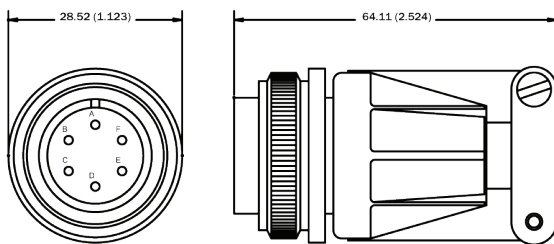
Connector MS 3105 female, 10 pin, straight

Cable length	Type	Part no.
1.5 m	DOL-MS10-G1M5MA2	7102130
3.0 m	DOL-MS10-G03MMA2	7102131
5.0 m	DOL-MS10-G05MMA2	7102132
10.0 m	DOL-MS10-G10MMA2	7102133
20.0 m	DOL-MS10-G20MMA2	7102134
30.0 m	DOL-MS10-G30MMA2	7102135

Connector systems, MS 6 pin

Contacts	Type	Part no.
6	DOS-MS06-G	7102136

DOS-MS06-G



All dimensions in mm (inches)

Mating Cable Wire Colors	
A	White
B	Pink
C	Violet
D	Red
E	Orange
F	Blue

Cable Type

AWM20626 80° C 300V
 2 x 20 AWG, 9 x 24 AWG
 7.9 mm (0.31 in) outer diameter
 Minimum 5x bending radius
 Black TPE jacket
 Braided overall shield

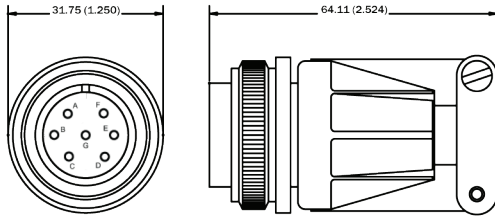
Connector MS 3105 female, 6 pin, straight

Cable length	Type	Part no.
1.5 m	DOL-MS06-G1M5MA2	7102137
3.0 m	DOL-MS06-G03MMA2	7102138
5.0 m	DOL-MS06-G05MMA2	7102139
10.0 m	DOL-MS06-G10MMA2	7102140
20.0 m	DOL-MS06-G20MMA2	7102141
30.0 m	DOL-MS06-G30MMA2	7102142

Connector systems, MS 7 pin

Contacts	Type	Part no.
7	DOS-MS07-G	7102143

DOS-MS07-G



DOS-MS07-G

All dimensions in mm (inches)

Mating Cable Wire Colors	
A	White
B	Pink
C	Violet
D	Red
E	Orange
F	Blue
G	Green

Cable Type

AWM20626 80° C 300V
 2 x 20 AWG, 9 x 24 AWG
 7.9 mm (0.31 in) outer diameter
 Minimum 5x bending radius
 Black TPE jacket
 Braided overall shield

Connector MS 3105 female, 7 pin, straight

Cable length	Type	Part no.
1.5 m	DOL-MS07-G1M5MA2	7102144
3.0 m	DOL-MS07-G03MMA2	7102145
5.0 m	DOL-MS07-G05MMA2	7102146
10.0 m	DOL-MS07-G10MMA2	7102147
20.0 m	DOL-MS07-G20MMA2	7102148
30.0 m	DOL-MS07-G30MMA2	7102149

Couplings

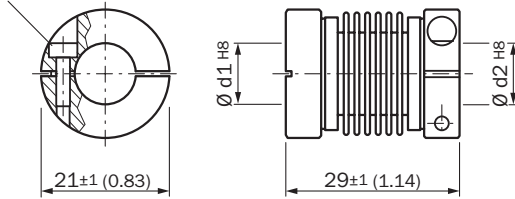
- Bellow coupling, max. shaft offset radially ± 0.3 mm, axially 0.4 mm, angle ± 4 degrees, torsion spring stiffness of 120 Nm/rad, stainless steel bellow, aluminum hub.

Shaft diameter	Type	Part no.
6 mm ... 10 mm	KUP-0610-B	5312982
10 mm ... 10 mm	KUP-1010-B	5312983
10 mm ... 12 mm	KUP-1012-B	5312984

KUP-0610-B

KUP-1010-B

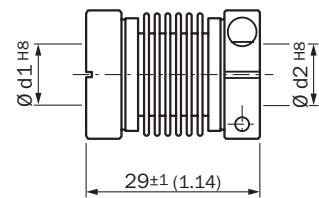
Cheese-head screw
 M2.5 x 8, DIN 912 A2



All dimensions in mm (inch)

KUP-1012-B

Cheese-head screw
 M2.5 x 8, DIN 912 A2



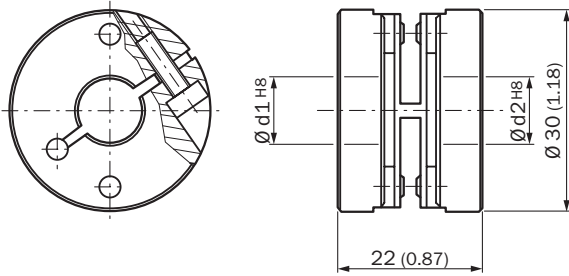
All dimensions in mm (inch)

Spring-disc coupling, max. shaft offset radially ± 0.3 mm, axially 0.4 mm, angle ± 2.5 degrees, torsion spring stiffness of 50 Nm/rad, aluminum flange, plastic spring washer glass-fiber reinforced.

Shaft diameter	Type	Part no.
6 mm ... 10 mm	KUP-0610-F	5312985
10 mm ... 10 mm	KUP-1010-F	5312986

KUP-0610-F

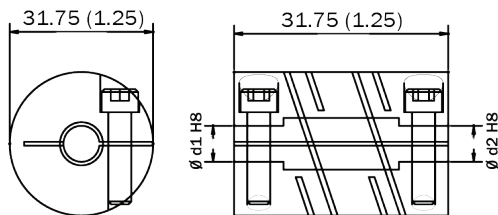
KUP-1010-F



All dimensions in mm (inch)

Description	Shaft diameter	Type	Part no.
Helvetical curved beam, max shaft offset radial 0.010 in., axial 0.012 in., torsional stiffness 0.5 lb-in/min., anodized aluminum	1/4 in...1/4 in	KUP-1414-H	7102150
	3/8 in...3/8 in	KUP-3838-H	7102151
	3/8 in...1/4 in	KUP-3814-H	7102152
	10 mm...3/8 in	KUP-1038-H	7102153
	10 mm...10 mm	KUP-1010-H	7102154

KUP-XXXX-H



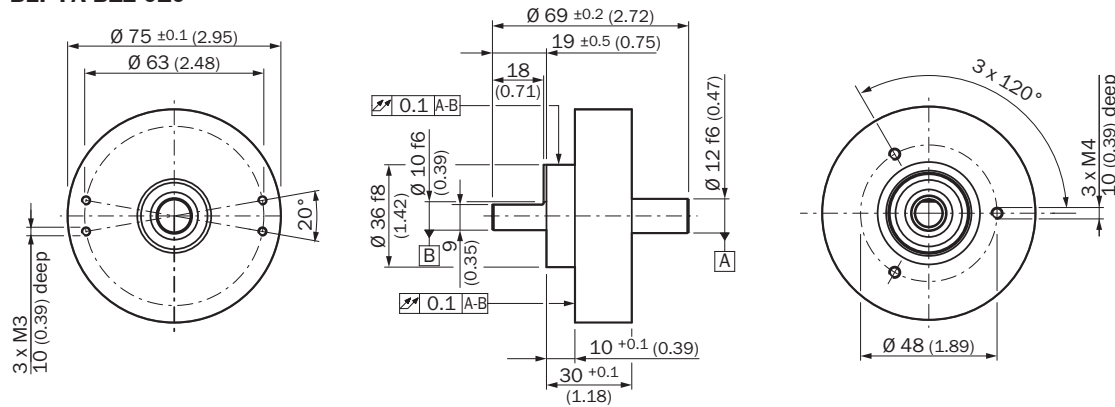
KUP-XXXX-H

All dimensions in mm (inches)

Bearing blocks

Description	Type	Part no.
Bearing block designed for large radial and axial shaft loading, permissible radial and axial shaft loading 100 N	BEF-FA-B12-010	2042728

BEF-FA-B12-010



All dimensions in mm (inch)

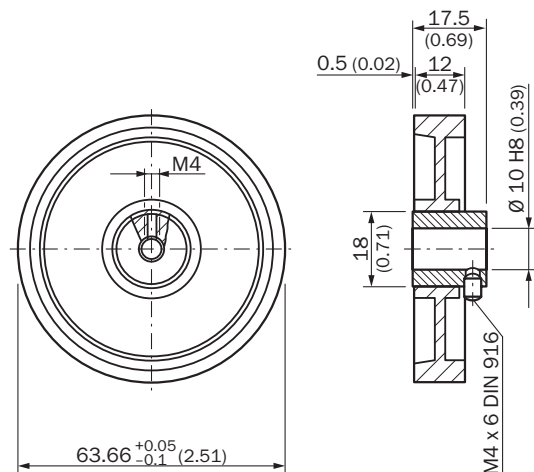
Measuring wheels

- 200 mm circumference

Description	Type	Part no.
Measuring wheels with a circumference of 200 mm for encoder shafts of 10 mm diameter, plastic (Hytrel) coating, plastic wheel body with aluminum hub, smooth surface	BEF-MR-010020	5312988
Measuring wheels with a circumference of 200 mm for encoder shafts of 10 mm diameter, plastic (Hytrel) coating, plastic wheel body with aluminum hub, corrugated surface	BEF-MR-010020G	5318678

BEF-MR-010020

BEF-MR-010020G

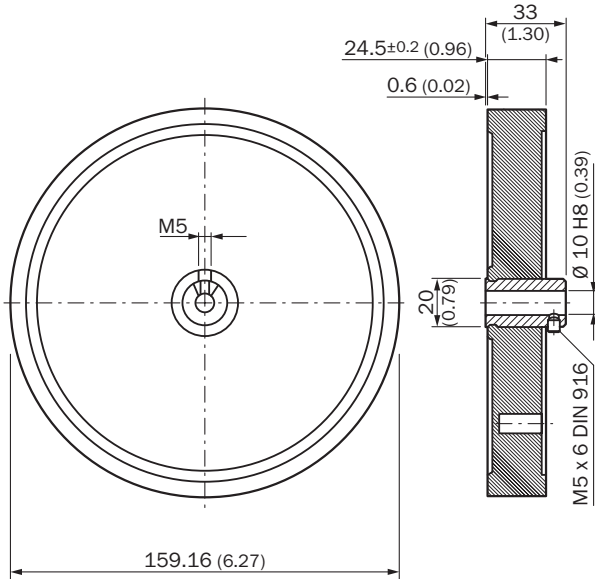


All dimensions in mm (inch)

- 500 mm circumference

Description	Type	Part no.
Measuring wheels with a circumference of 500 mm for encoder shafts of 10 mm diameter, plastic (Hytre) coating, plastic wheel body with aluminum hub, smooth surface	BEF-MR-010050	5312989

BEF-MR-010050

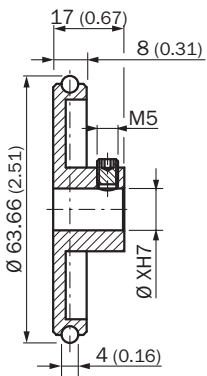


All dimensions in mm (inch)

- 200 mm circumference

Description	Type	Part no.
200 mm circumference measuring wheels for encoder shafts with a diameter of 10 mm, O-ring NBR70 surface	BEF-MR010020R	2055224

BEF-MR010020R

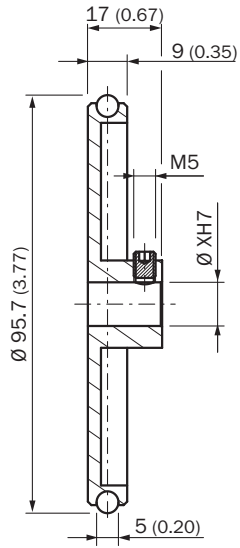


All dimensions in mm (inch)

- 300 mm circumference

Description	Type	Part no.
300 mm circumference measuring wheels for encoder shafts with a diameter of 10 mm, O-ring NBR70 surface	BEF-MR010030R	2049278

BEF-MR010030R



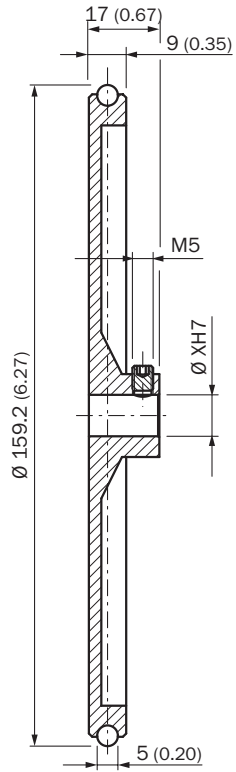
All dimensions in mm (inch)

- 500 mm circumference

Description	Type	Part no.
500 mm circumference measuring wheels for encoder shafts with a diameter of 6 mm, O-ring NBR70 surface	BEF-MR006050R	2055225
500 mm circumference measuring wheels for encoder shafts with a diameter of 10 mm, O-ring NBR70 surface	BEF-MR010050R	2055227

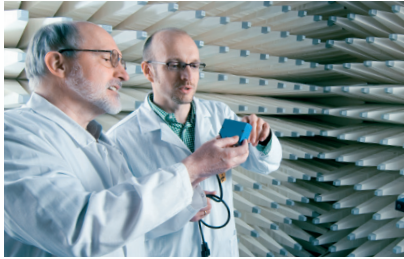
BEF-MR006050R

BEF-MR010050R



All dimensions in mm (inch)

SICK at a glance



Leading technologies

With a staff of more than 5,000 and over 50 subsidiaries and representations worldwide, SICK is one of the leading and most successful manufacturers of sensor technology. The power of innovation and solution competency have made SICK the global market leader. No matter what the project and industry may be, talking with an expert from SICK will provide you with an ideal basis for your plans – there is no need to settle for anything less than the best.



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- Accident and operator protection with sensors, safety software and services
- Automatic identification with bar code and RFID readers
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- Complete system solutions for analysis and flow measurement of gases and liquids



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- Application centers in Europe, Asia and North America for the development of system solutions under real-world conditions
- E-Business Partner Portal www.mysick.com – price and availability of products, requests for quotation and online orders

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México
Nederland
Norge
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Slovenija
South Africa
South Korea
Suomi
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