



INDUSTRIAL DUTY ENCODERS GUIDE

DYNAPAR 2010

Dynapar's Industrial duty encoders are well-suited for general purpose use in today's factories and manufacturing environments. Applications such as vector motor feedback, machine tool positioning, printing equipment, medical equipment, material handling machinery, and elevators all benefit from such features as:

- Dual-row ball bearings for long life
- Optional shaft seals for environmental protection
- Unbreakable code disks on select models
- High resolution capability to 10,000PPR on select models
- Variety of communication options on absolute encoders
- True battery-less multi-turn positioning on absolute models

High performance feedback in industry standard sizes with some of the shortest lead times in the industry is the benchmark of the Dynapar product line. Most models are manufactured right here in the USA in Gurnee, IL using the advanced cellular manufacturing concept, ensuring Just-In-Time delivery to meet your needs.



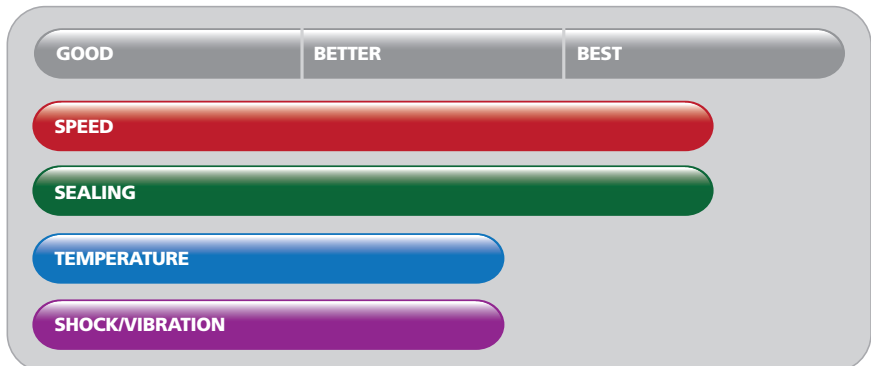


Often considered the “workhorse” of the encoder world, industrial duty encoders achieve a good compromise between ruggedness and performance. These encoders are typically used in factory environments where contaminants like dust and moisture are common. The hollow-shaft variety of industrial duty encoders is often the preferred choice of vector motor OEM's for speed feedback.



HA25 Pictured

INDUSTRIAL DUTY ENCODER GENERAL PERFORMANCE DATA





OPTICAL - INCREMENTAL

Product	Qube 22	H20	HA25	HR25	HC25	H58	H42	HA725	
Shaft/Bore Sizes	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	6 or 10mm	3/8"	3/8"	
Available Resolutions (PPR)	1 to 1270	1 to 2540	1 to 2540	1 to 1024	3000 to 5000	1 to 2540	1 to 600	8192 to 10000	
Input Voltage (VDC)	5-26	5-26	5-26	5-26	5 to 26	5-26	5-26	5 or 10 to 30	
Operating Temperature (°C)	0 to +70	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70	-10 to +70	
Enclosure Rating	NEMA 12/IP54	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54	NEMA 4/IP66	
Key Features	Economical anodized housing	Reliable dual-row bearing design	Wide range of resolutions available	Unbreakable code disc	High 5000PPR capability	Euro-Standard 58mm mounting	Simplified economical design	Direct-read resolution up to 10,000PPR	
Page Number	2.04	2.08	2.12	2.16	2.20	2.24	2.28	2.30	

OPTICAL - ABSOLUTE

Product	AI25 (DeviceNet)	AI25 (Profibus)	AI25 (Interbus)	AI25 (CANBus)	AI25 (CANLayer2)	
Shaft/Bore Sizes	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	
Available Resolutions (Bits)	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 12 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	
Input Voltage (VDC)	10 to 30	10 to 30	10 to 30	10 to 30	10 to 30	
Operating Temperature (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	
Enclosure Rating	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	
Key Features	DeviceNet interface	Profibus interface	Interbus interface	CANBus interface	CANLayer 2 interface	
Page Number	2.64	2.70	2.72	2.66	2.68	



OPTICAL - INCREMENTAL

H20 Hub	HS20	HS35	HS35R	RI80E	HA26	HR26	HC26	Product
3/8" or 5/8"	1/4" to 5/8" 6mm to 16mm	1/4" to 1 1/8" 6mm to 24mm	up to 1-1/4" hollow shaft	Max 45mm	1/4", 3/8" or 1/2"	1/4", 3/8" or 1/2"	1/4", 3/8" or 1/2"	Shaft/Bore Sizes
1 to 2540	1 to 2540	1 to 2500	1 to 5000	1024, 2048, 4096	1 to 2540	1 to 1024	3000 to 5000	Available Resolutions (PPR)
5-26	5-26	5-26	5-26	5-30	5-26	5-26	5-26	Input Voltage (VDC)
0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	-40 to +70 (0 to +100)	-40 to +70 (0 to +100)	-20 to +70	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	Operating Temperature (°C)
NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 4/IP65	NEMA 4/IP65	IP67	NEMA 1/IP50	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	Enclosure Rating
Hubshaft with spring tether	Electrically isolated hollow shaft	Electrically isolated hollow shaft sizes up to 1.25"	New ruggedized design	Fault detection	Integral coupling	Unbreakable code disc	High 5000PPR resolution capability	Key Features
2.32	2.36	2.40	2.44	2.48	2.50	2.54	2.58	Page Number

OPTICAL - ABSOLUTE

AI25 (Parallel)	AI25 (SSI)	AI25 (BiSS)	AC36	AC110	Product
Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	8mm	50mm	Shaft/Bore Sizes
Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 17 bit SingleTurn, 12 bit Multiturn	Up to 22 bit SingleTurn, 12 bit Multiturn	Up to 22 bit SingleTurn 12 bit Multiturn	Up to 22 bit SingleTurn 12 bit Multiturn	Available Resolutions (Bits)
5 or 10-30	5 or 10-30	5 or 10-30	5 or 7-30	5 or 10-30	Input Voltage (VDC)
-40 to +100	-40 to +100	-40 to +100	-15 to +120	-20 to +70	Operating Temperature (°C)
IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64	IP40	Enclosure Rating
Parallel output	SSI output	BiSS interface	Multi-turn positioning in compact size	Large 50mm hollow shaft	Key Features
2.80	2.76	2.74	2.62	2.84	Page Number

SERIES 22

Dynapar™ brand

“QUBE” Encoder

Key Features

- Economical Anodized Housing
- Dual Shaft Output Option
- Up to 1270PPR with Optional Index



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 1270 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge)
±2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW shaft rotation as viewed from the shaft end of the encoder farthest from the connector or cable

Quadrature Phasing: 90° ± 18° electrical

Symmetry: 180° ± 18° electrical

Index: 225° ± 90° electrical (active high)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:
4.5 min. to 26 VDC max. at 110 mA max., not including output loads

Outputs:
7273 Open Collector: 30 VDC max., 40 mA sink max.
7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 120 kHz min. data, 50 kHz min. Index

CONNECTIONS

Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4)

7 pin, style MS3106A-16S-1S (MCN-N5)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

Mechanical

Shaft Loading: 40 lbs. radial, 30 lbs. axial

Shaft Speed: 6,000 RPM max.

Shaft Tolerance: Nominal -0.0003"/-0.0007"

Starting Torque: 2.5 oz-in max.

Moment of Inertia: 1.3 x 10⁻⁴ oz-in-sec²

Weight: 14 oz. max.

ENVIRONMENTAL

Operating Temperature: 0 to +70 °C;

Storage Temperature: -40 to +90 °C



SERIES 22

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
□ □ □	□ □ □ □	□	□	□	□
Ordering Information					
22 Qube Encoder, Bidirectional	0001	0360	0 3/8" Double Ended Shaft	0 Single Ended, Table 1	available when Code4 = 0, 1, 5, 6, 7 or 8: 0 5-26 VDC in, 5-26 VDC Open Collector w/2.2k pull-ups out 1 5-26 VDC in, 5-26 VDC Open Collector w/o pull-up out 2 5-26 VDC in, 5V Totem Pole out
	0010	0400	1 3/8" Single Ended Shaft	2 Differential, Table 2	
22M Metric Qube Encoder, Bidirectional	0050	0480	2 1/4" Double Ended Shaft	4 Differential, Table 4	available when Code4 = 2, 3, 4, 9 or A: 3 5-26 VDC in, 5V Line Driver out 4 5-26 VDC in, 5-26 VDC CMOS Line Driver
	0060	0500	3 1/4" Single Ended Shaft	1 Single Ended, with Index, Table 3	
	0100	0512	available when Code 1 = 22M:	available only when Code 6 is 1 to 5:	
	0120	0600	4 6mm Double Ended Shaft	3 Differential, with Index, Table 5	
	0125	0720	5 6mm Single Ended Shaft	available only when Code 6 is 6:	
	0150	0800		5 5 pin M12 connector, single ended, no index, Table 6	
	0180	0900		6 5 pin M12 connector, single ended, with index, Table 6	
	0192	1000		7 8 pin M12 connector, single ended, no index, Table 7	
	0200	1024		8 8 pin M12 connector, single ended, with index, Table 7	
	0250	1200		9 8 pin M12 connector, differential, no index, Table 8	
0256	1250		A 8 pin M12 connector, differential, with index, Table 8		
0300	1270				
					0 MS Connector 1 18" Cable 2 3' Cable 3 6' Cable 4 10' Cable 5 15' Cable 6 M12 Connector

10 foot Cable Assemblies with MS Connector

- 1400607-0010 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108241-0010 6 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400664-0010 6 Pin MS, Cable Assy. For Use with Differential Line Driver Outputs
- 1400431-0010 7 Pin MS, Cable Assy. For Use with Differential Line Driver Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)

ELECTRICAL CONNECTIONS

MS Connector Accessory Cables - when Code 4= 0 to 4

Table 1 – Current Sink Output

Pin	Function	Wire Color Code	Cable Acc'y #14006070010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Case (Ground)	GRN/BLK	GRN
D	Signal A	GRN	BRN
E	Signal B	ORN	ORN
F	Supply Common	BLK	BLK

Table 2 – 7 Pin Line Driver Output

Pin	Function	Wire Color Code	Cable Acc'y #14004310010 Color Code
A	Signal A	GRN	RED
B	Signal B	ORN	BLU
C	Signal \bar{A}	RED/BLK	YEL
D	Power Source	RED	WHT
E	Signal \bar{B}	WHT/BLK	GRN
F	Common	BLK	BLK
G	Case (Ground)	GRN/BLK	

Table 3 – Current Sink Output w/Marker

Pin	Function	Wire Color Code	Cable Acc'y #108241-0010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Signal Z	WHT	GRN
D	Signal A	GRN	BRN
E	Signal B	ORN	ORN
F	Common	BLK	BLK

Table 4 – 6-Pin Line Driver

Pin	Function	Wire Color Code	Cable Acc'y #14006640010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Signal A	GRN	BRN
D	Signal \bar{A}	RED/BLK	BRN/WHT
E	Signal B	ORN	ORN
F	Signal \bar{B}	WHT/BLK	ORN/WHT

Table 5 – Cable termination Line Driver Output with Marker

Function	Wire Color Code
Signal A	GRN
Signal B	ORN
Signal Z	WHT
Power Source	RED
Supply Common	BLK
Case (Ground)	GRN/BLK
Signal \bar{A}	RED/BLK
Signal \bar{B}	WHT/BLK
Signal \bar{Z}	BLU

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables - when Code 4= 5 to 9 and A

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 6 5 Pin Single Ended		Table 7 8 Pin Single Ended		Table 8 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	-	-	-	-	3	BRN/WHT
Sig. \bar{B}	-	-	-	-	5	ORG/WHT
*Sig. \bar{Z}	-	-	-	-	8	YEL/WHT

* Index not provided on all models. See ordering information

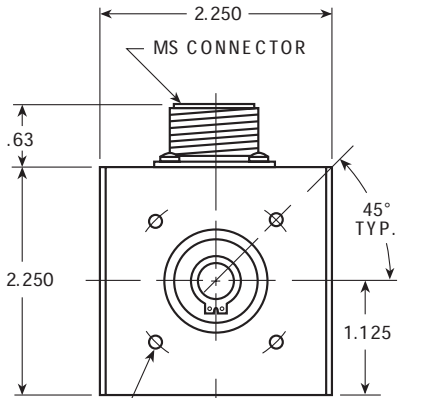
Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

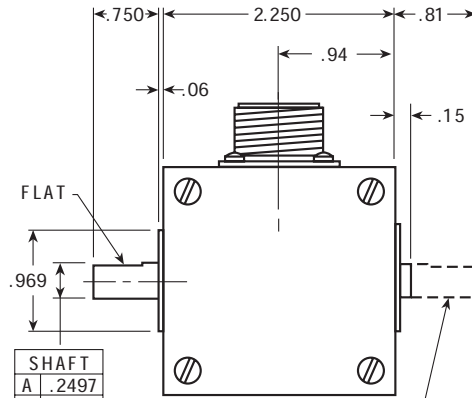
DIMENSIONS

MS Connector Models

Approximate Dimensions (in inches)

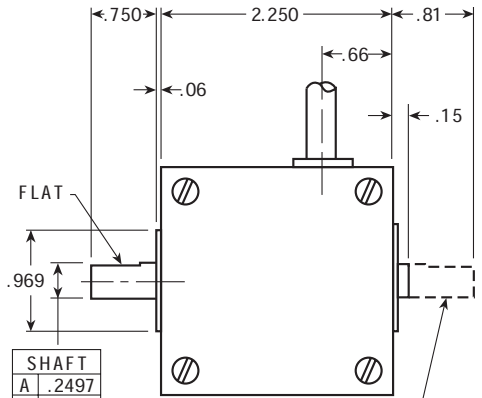


6-32 UNC-2B THREADS x .187 DEEP ON 2.00 DIA. B.C., 4 HOLES ON 3 FACES (FRONT, REAR & BOTTOM).
 FOR MODELS 22M ONLY: M3 x 0.5^{GH} THREADS x 5mm DEEP ON A 50.8mm DIA. B.C. ON (3) FACES



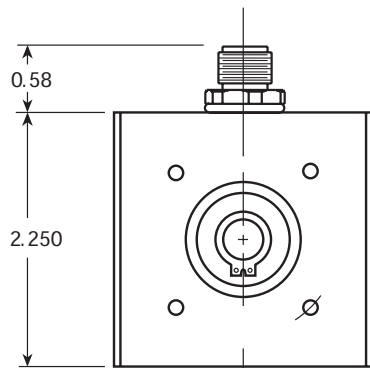
OPTIONAL DOUBLE-ENDED SHAFT

Prewired Cable Models



OPTIONAL DOUBLE-ENDED SHAFT

M12 Connector Models



SERIES H20

Dynapar™ brand

Shafted Encoder

Key Features

- **Reliable Dual-Row Bearing Design**
- **IP66 Sealing Option**
- **Optional Unbreakable Code Disc**

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ≤ 1024 PPR (metal disk): ± 7.5 arc-min.
 > 1024 PPR (glass disk): ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CCW shaft rotation as viewed from the shaft end of the encoder

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA, sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients.

CONNECTIONS

Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4);

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft Loading: (at 0.25" from encoder face)

Resolutions ≤ 1024 PPR: 80 lbs. radial, axial

Resolutions > 1024 PPR: 40 lbs. radial, axial

Shaft Speed:

Resolutions ≤ 1024 PPR: 10,000 RPM max.

Resolutions > 1024 PPR: 5,000 RPM max.

Starting Torque: (max at 25 °C)

without shaft seal: 1.0 oz-in;

with shaft seal: 2.0 oz.-in

Moment of Inertia: 3.0×10^{-4} oz-in-sec²

Disk Material: Glass or plastic based on PPR

Weight: 10 oz. max.

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof); NEMA4/IP66 (dust proof, washdown) when ordered with shaft seal and either MS connector or watertight cable exit



SERIES H20

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Housing	Code 4: Shaft	Code 5: Face Mount	Code 6: Pilot, Seal	Code 7: Electrical	Code 8: Termination	Code 9: Options
H2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>								
Ordering Information								
1 Unidirectional 2 Bidirectional 3 Bidirectional with Index	0001 0500 0005 0512 0010 0600 0012 0800 0050 0900 0060 1000 0086 1024 0100 1200 0120 1250 0125 1270 0180 1500 0200 1600 0240 1800 0250 1968 0254 2000 0256 2048 0300 2400 0360 2500 0400 2540	0 Servo Mount 1 Flange Mount	0 3/8" Dia. Shaft with flat 1 1/4" Dia. Shaft, no flat 4 10mm Dia. Shaft, no flat	0 no face mount available when Code 3 is 0: 1 (4) #10-32 @ 1.63" BC 2 (3) #4-40 @ 1.50" BC 3 (3) #6-32 @ 1.75" BC available when Code 3 is 1: 4 (4) #6-32 @ 2.00" BC	0 1.18" Dia. Female Pilot 1 1.25" Dia. Male Pilot 2 1.25" Dia. Male Pilot with Shaft Seal 3 0.69" Dia. Male Pilot 4 0.69" Dia. Male Pilot with Shaft Seal	0 5-26V in, 5-26V Open Collector out 1 5-26V in, 5-26V Open Collector out with 2.2 kΩ Pullups 2 5-26V in, 5-26V Push-Pull out A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range available when: Code 1 is 1 or 2 and Code 8 is 2 through M, Q or R; or Code 1 is 3 and Code 8 is 4 thru M, Q or R: 3 5-26V in, 5-26V Differential Line Driver out (7272) 4 5-26V in, 5V Differential Line Driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5-15V Differential Line Driver out (4469) D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 6 Pin Conn, End Mount 1 6 Pin Conn, Side Mount 2 7 Pin Conn, End Mount 3 7 Pin Conn, Side Mount 4 10 Pin Conn, End Mount 5 10 Pin Conn, Side Mount 6 18" Cable, End Exit 7 18" Cable, Side Exit 8 36" Cable, End Exit 9 36" Cable, Side Exit A 10' Cable, End Exit B 10' Cable, Side Exit J 25' Cable, End Exit K 25' Cable, Side Exit N 5 Pin M12 Connector, End Mount P 5 Pin M12 Connector, Side Mount Q 8 Pin M12 Connector, End Mount R 8 Pin M12 Connector, Side Mount available when Code 6 is 2 or 4: C 18" Sealed Cbl, End Exit D 18" Sealed Cbl, Side Exit E 36" Sealed Cbl, End Exit F 36" Sealed Cbl, Side Exit G 10' Sealed Cbl, End Exit H 10' Sealed Cbl, Side Exit L 25' Sealed Cbl, End Exit M 25' Sealed Cbl, Side Exit	available when Code 8 is 0 to 5: PS LED Output Indicator

See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

10 foot Cable Assemblies with MS Connector

- 108594-0010 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

SERIES H20

Dynapar™ brand

CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 8= 0 to 9, A to M

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. H20 models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Dif Line Drv w/o Idx		Cable # 1400635-10 Pin Dif Line Drv w/ Idx	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN
Sig. B	D	ORN	B	ORG	B	ORG	B	ORG
Sig. Z	C	YEL	C	YEL	—	—	C	YEL
Power +V	B	RED	D	RED	D	RED	D	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK
Case	—	—	G	GRN	G	GRN	G	GRN
N/C	F	—	E	—	—	—	E	—
Sig. \bar{A}	—	—	—	—	C	BRN/WHT	H	BRN/WHT
Sig. \bar{B}	—	—	—	—	E	ORG/WHT	I	ORG/WHT
Sig. \bar{Z}	—	—	—	—	—	—	J	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables when Code 8= N to R

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

* Index not provided on all models. See ordering information

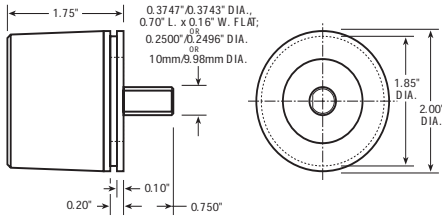
Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

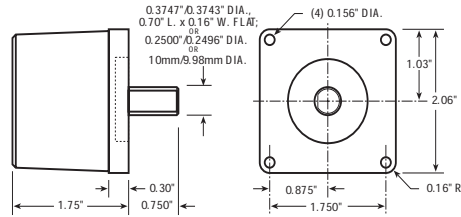
DIMENSIONS

Code 3: Housings

0 Servo Mount

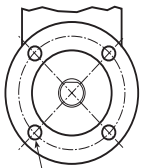


1 Flange Mount

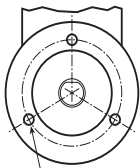


Code 5: Face Mounts

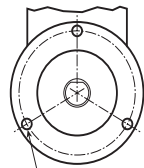
1



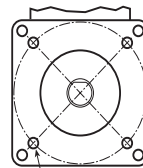
2



3

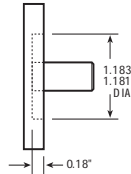


4

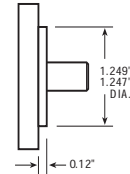


Code 6: Pilots

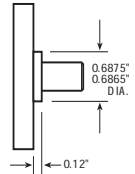
0 Female



1, 2 Male



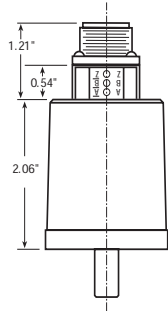
3, 4 Male



Code 8: Terminations

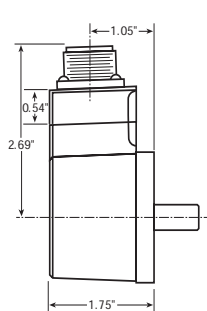
0, 2

6, 7 Pin End Conn



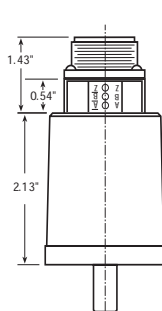
1, 3

6, 7 Pin Side Conn



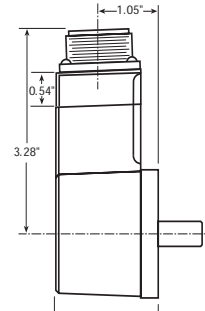
4

10 Pin End Conn



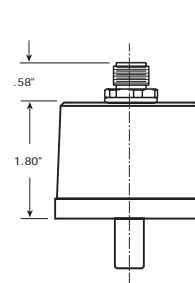
5

10 Pin Side Conn



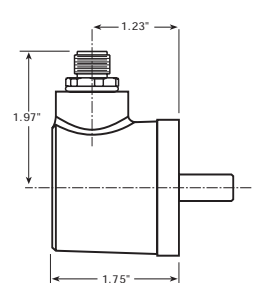
N, Q

M12 End Conn



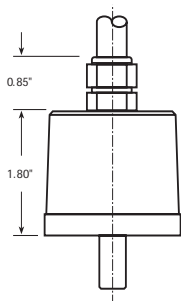
P, R

M12 Side Conn

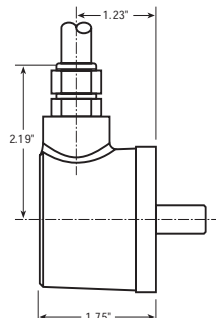


Code 8: 0-5 dimensions shown with LED Output Indicator Option (Code 9: PS)

6, 8, A, C, E, G
End Exit Cable



7, 9, B, D, F, H
Side Exit Cable



SERIES HA25

Dynapar™ brand

Shafted Encoder

Key Features

- Industry Standard Size 25 (2.5")
- Wide Range of Resolutions Available
- Optional Extended Temperature Range of -40° to $+85^{\circ}\text{C}$

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^{\circ} \pm 22.5^{\circ}$ electrical

Symmetry: $180^{\circ} \pm 18^{\circ}$ electrical

Index: $180^{\circ} \pm 18^{\circ}$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pF

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA, sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

CONNECTIONS

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft Loading: (at 0.25" from encoder face) 35 lbs. radial, 40 lbs. axial

Shaft Speed: 5,000 RPM max.

Starting Torque: (max at 25°C)

HA525: 1.0 oz-in;

HA625: 2.5 oz-in

Moment of Inertia: 3.0×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to $+70^{\circ}\text{C}$;

Extended: -40 to $+85^{\circ}\text{C}$

Storage Temperature: -40 to $+90^{\circ}\text{C}$

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating:

HA525: NEMA12/IP54 (dirt tight, splashproof);

HA625: NEMA4/IP66 (dust proof, washdown)



SERIES HA25

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HA <input type="checkbox"/> 25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

Ordering Information						
HA525 Size 25 Enclosed, Shielded Bearings, Glass Disk HA625 Size 25 Enclosed, with Shaft Seal, Glass Disk	0001 0600 0005 0625 0010 0635 0012 0720 0050 0800 0060 0900 0100 1000 0120 1024 0150 1200 0180 1250 0200 1270 0240 1500 0250 1600 0256 1800 0300 1968 0360 2000 0400 2048 0500 2400 0512 2500 2540	0 Flange Mount, 3/8" Shaft	7 Pin MS Connector or Cable 0 Single Ended, no Index, Format A, Table 2 1 Single Ended, with Index, Format A, Table 2 4 Single Ended, with Index, Format B, Table 2 6 Differential, no Index, Format C, Table 3 A Single Ended, with Index, Format C, Table 2 C Single Ended, no Index, Format C, Table 2 G Single Ended, with Index, Format D, Table 2	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Line Driver out (7272) 4 5-26V in; 5-26V Line Driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5-15V Differential Line Driver out (4469) A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side J 18" Cable, End K 3' Cable, End L 6' Cable, End M 10' Cable, End N 15' Cable, End	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
		2 Flange Mount, 1/4" Shaft 3 2.50" Servo Mount/ 4 Hole 2.00" BC Face Mount, 1/4" Shaft 4 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 3/8" Shaft 5 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft 6 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 7 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft 8 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 9 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	10 Pin MS Connector or Cable 2 Differential, no Index, Format A, Table 1 3 Differential, with Index, Format A, Table 1 5 Differential, with Index, Format B, Table 1 B Differential, with Index Format C, Table 1 D Differential, no Index, Format C, Table 1 5 Pin M12 Connector H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4 8 Pin M12 Connector P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	available when Code 1 is HA625: A 18" Watertight, Side B 3' Watertight, Side C 6' Watertight, Side D 10' Watertight, Side F 15' Watertight, Side P 18" Watertight, End Q 3' Watertight, End R 6' Watertight, End S 10' Watertight, End T 15' Watertight, End		

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

SERIES HA25

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 6, or A, B, C, D or G

Table 1 – Differential			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH
*Cable Accessory: P/N 14006350010			

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Table 2 – Single Ended			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD
*Cable Accessory: P/N 14004310010			

Table 3 – Differential		
Pin	Function (If Used)	Cable Accessory Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal \bar{A}	BRN/WHT
D	Power Source	RED
E	Signal \bar{B}	ORN/WHT
F	Common	BLK
G	Case	GRN
*Cable Accessory: P/N 108596		

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables - when Code 4= H to Z

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

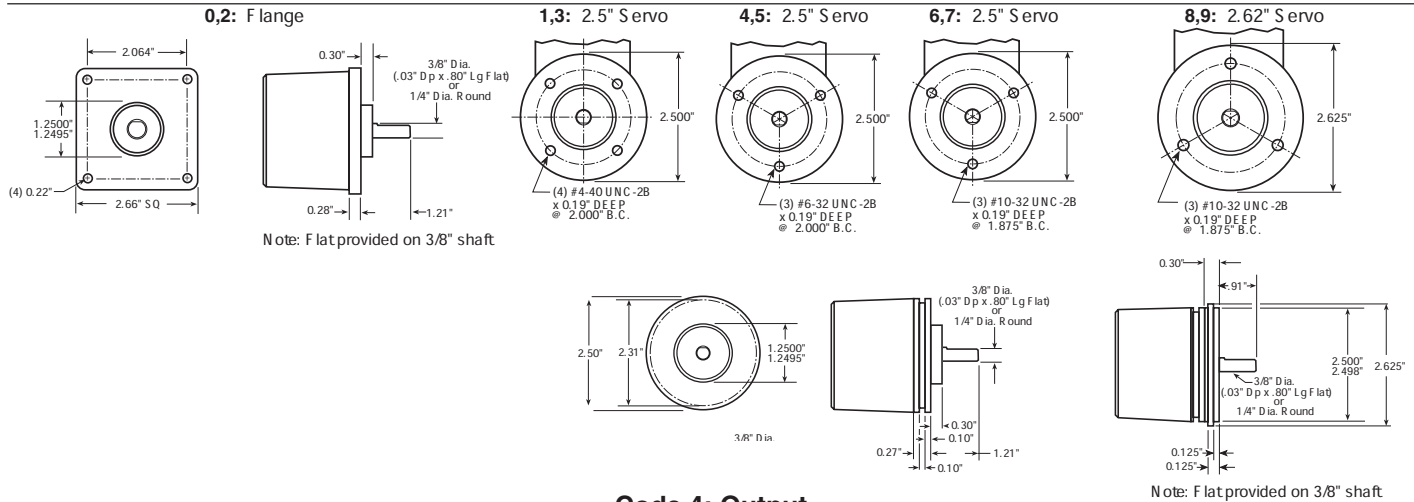
* Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

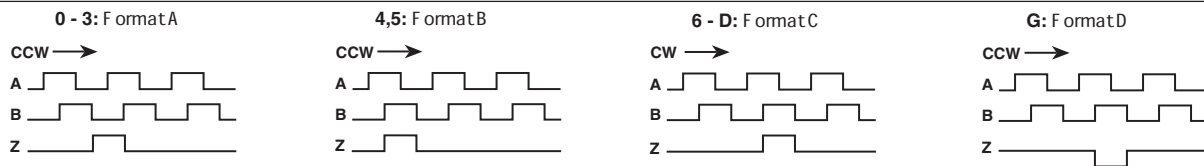
See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

Code 3: Mechanical

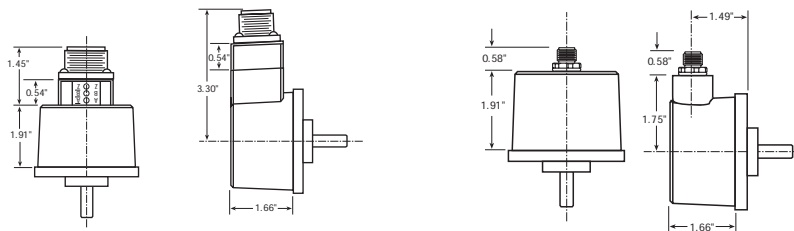


Code 4: Output



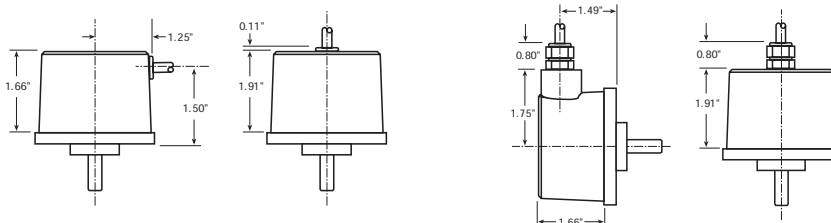
Code 6: Termination

0: End MS Connector **1: Side MS Connector** **0: End M12 Connector** **1: Side M12 Connector**
 When Code 5 is 0 to 6 or A to G When Code 5 is H to Z



Code 6: 0 & 1 dimensions shown with LED Output Indicator Option (Code 7: PS)

2 - 6: Side Cable **J - N: End Cable** **A - F: Side W.T. Cable** **P - T: End W.T. Cable**



SERIES HR25

Dynapar™ brand

Shafted Encoder

Key Features

- **Reliable Dual Row Bearing Design**
- **Unbreakable Code Disc**
- **Industry Standard Size 25 (2.5")**



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 1024 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ± 7.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA, sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

CONNECTIONS

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft Loading: (at 0.25" from encoder face) 80 lbs. radial, 80 lbs. axial

Shaft Speed: 10,000 RPM max.

Shaft Runout: 0.001" max. TIR

Moment of Inertia: 3.0×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;
Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating:

HR525: NEMA12/IP54 (dirt tight, splashproof);
HR625: NEMA4/IP66 (dust proof, washdown)



SERIES HR25

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HR <input type="checkbox"/> 25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

Ordering Information						
HR525 Size 25 Enclosed, Shielded Bearings HR625 Size 25 Enclosed, with Shaft Seal	0001 0250 0005 0256 0010 0300 0012 0360 0050 0400 0060 0500 0086 0512 0100 0600 0120 0635 0125 0800 0180 0900 0200 1000 0240 1024	0 Flange Mount, 3/8" Shaft 1 2.50" Servo Mount/ 4 Hole, 2.00" BC Face Mount, 3/8" Shaft 2 Flange Mount, 1/4" Shaft 3 2.50" Servo Mount/ 4 Hole 2.00" BC Face Mount, 1/4" Shaft 4 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 3/8" Shaft 5 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft 6 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 7 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft 8 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 9 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	7 Pin Connector or Cable 0 Single Ended, no Index, Format A, Table 2 1 Single Ended, with Index, Format A, Table 2 4 Single Ended, with Index, Format B, Table 2 6 Differential, no Index, Format C, Table 3 A Single Ended, with Index, Format C, Table 2 C Single Ended, no Index, Format C, Table 2 G Single Ended, with Index, Format D, Table 2	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Line Driver out (7272) 4 5-26V in; 5-26V Line Driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5- 15V Differential Line Driver out (4469) A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side J 18" Cable, End K 3' Cable, End L 6' Cable, End M 10' Cable, End N 15' Cable, End	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
			10 Pin Connector or Cable 2 Differential, no Index, Format A, Table 1 3 Differential, with Index, Format A, Table 1 5 Differential, with Index, Format B, Table 1 B Differential, with Index Format C, Table 1 D Differential, no Index, Format C, Table 1	5 Pin M12 Connector H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4	8 Pin M12 Connector P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	available when Code 1 is HR625: A 18" Watertight, Side B 3' Watertight, Side C 6' Watertight, Side D 10' Watertight, Side F 15' Watertight, Side P 18" Watertight, End Q 3' Watertight, End R 6' Watertight, End S 10' Watertight, End T 15' Watertight, End

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

SERIES HR25

Dynapar™ brand

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 6, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH

*Cable Accessory: P/N 14006350010

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

*Cable Accessory: P/N 14004310010

Pin	Function (If Used)	Cable Accessory Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal \bar{A}	BRN/WHT
D	Power Source	RED
E	Signal \bar{B}	ORN/WHT
F	Common	BLK
G	Case	GRN

*Cable Accessory: P/N 1085960010

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables - when Code 4= H to Z

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

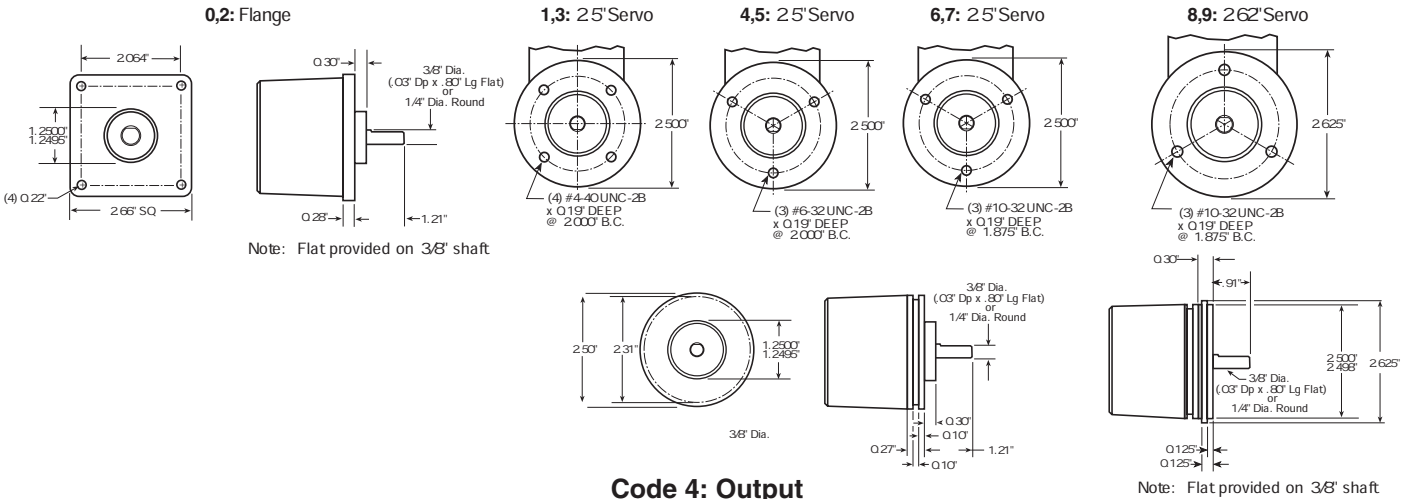
* Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

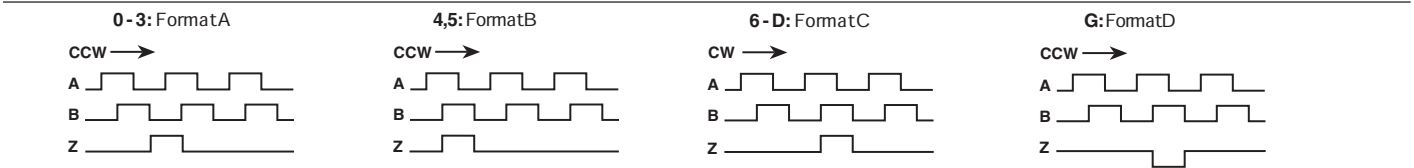
See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

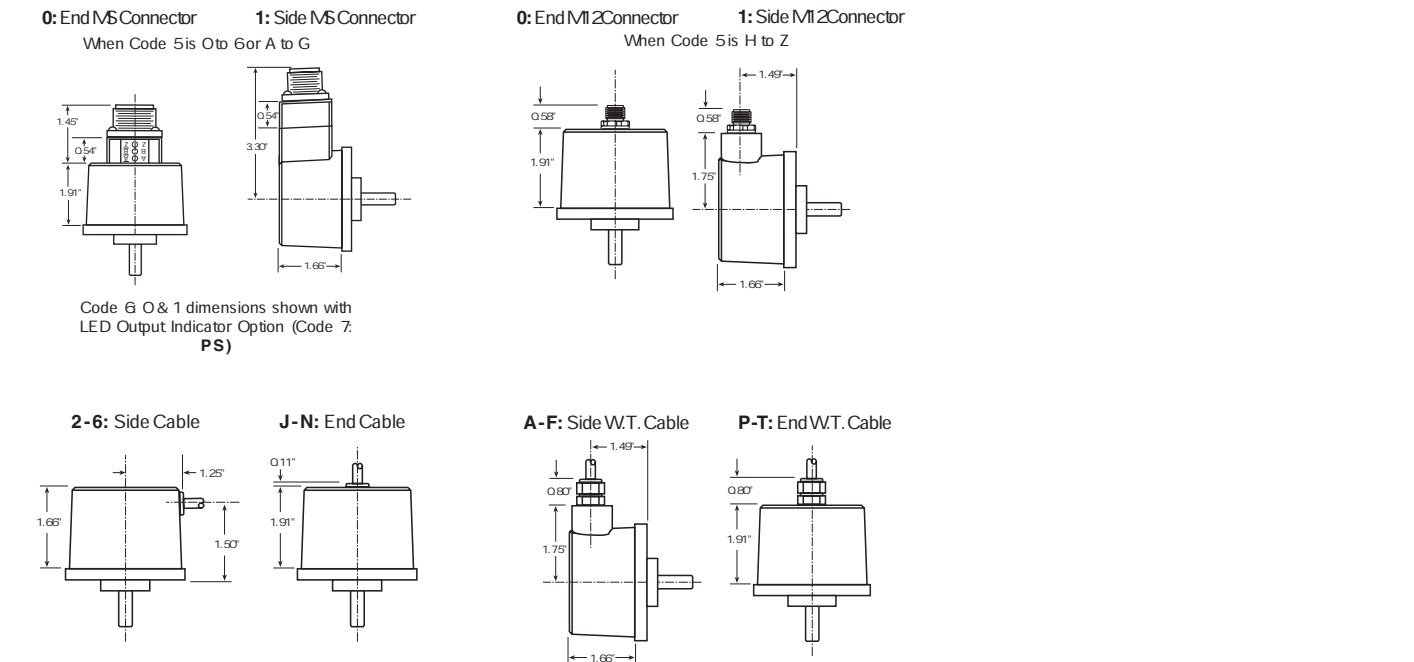
Code 3: Mechanical



Code 4: Output



Code 6: Termination



SERIES HC25

Dynapar™ brand

Shafted Encoder

Key Features

- Optional Extended Temperature Range of -40° to $+85^{\circ}\text{C}$
- High 5000PPR Resolution Available
- Industry Standard Size 25 (2.5")



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 3000 to 5000 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) $\pm 10.8^{\circ}/\text{PPR}$

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^{\circ} \pm 25^{\circ}$ electrical

Symmetry: $180^{\circ} \pm 25^{\circ}$ electrical

Index: $90^{\circ} \pm 25^{\circ}$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs: 7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 250 kHz

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

CONNECTIONS

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft Loading: 40 lbs. radial, 30 lbs. axial

Shaft Speed: 10,000 RPM max. (See Frequency Response)

Starting Torque: (max at 25°C)

HC525: 1.0 oz-in;

HC625: 2.5 oz-in

Moment of Inertia: 2.83×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to $+70^{\circ}\text{C}$;

Extended: -40 to $+85^{\circ}\text{C}$

Storage Temperature: -40 to $+90^{\circ}\text{C}$

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating:

HC525: NEMA12/IP54 (dirt tight, splashproof);

HC625: NEMA4/IP66 (dust proof, washdown)



SERIES HC25

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HC <input type="checkbox"/> 25 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>

Ordering Information

HC525 Size 25 Enclosed, Shielded Bearings	3000 3,000	0 Flange Mount, 3/8" Shaft	7 Pin Connector or Cable	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out	0 End Mount Connector	Blank None
	3600 3,600					
HC625 Size 25 Enclosed, with Shaft Seal	4096 4,096	1 2.50" Servo Mount/ 4 Hole, 2.00" BC Face Mount, 3/8" Shaft	1 Single Ended, with Index, Format A, Table 2	2 5-26V in; 5V Totem Pole out	2 18" Cable, Side	PS LED Output Indicator
	5000 5,000					
		2 Flange Mount, 1/4" Shaft	4 Single Ended, no Index, Format C, Table 3	4 5-26V in; 5-26V Line Driver out	4 6' Cable, Side	
		3 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 3/8" Shaft	A Single Ended, with Index, Format C, Table 2	5 Same as "0" with extend. temp range	5 15' Cable, Side	
		4 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft	C Single Ended, no Index, Format C, Table 2	6 Same as "1" with extend. temp range	6 3' Watertight, Side	
		5 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft	G Single Ended, with Index, Format D, Table 2	7 Same as "2" with extend. temp range	8 15' Watertight, Side	
		6 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft	10 Single Ended, no Index, Format D, Table 2	8 Same as "3" with extend. temp range	10 6' Watertight, Side	
		7 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	11 Single Ended, with Index, Format D, Table 2	9 Same as "4" with extend. temp range	12 15' Watertight, Side	
		8 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft	12 Single Ended, no Index, Format A, Table 4	10 Same as "5" with extend. temp range	14 6' Watertight, End	
		9 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	13 Single Ended, with index, Format A, Table 4	11 Same as "6" with extend. temp range	16 15' Watertight, Side	
			14 Single ended, no index, Format A, Table 4		18 6' Watertight, End	
			J Single ended, with index, Format A, Table 4		19 10' Watertight, End	
			K Single ended, with index, Format B, Table 4		20 15' Watertight, End	
			L Single ended, with index, Format C, Table 4		21 3' Watertight, End	
			M Single ended, no index, Format C, Table 4		22 6' Watertight, End	
			N Single ended, with index, Format D, Table 4		23 10' Watertight, End	
			8 Pin M12 Connector		24 15' Watertight, End	
			P Single ended, no index, Format A, Table 5			
			Q Single ended, with index, Format A, Table 5			
			R Single ended, with index, Format B, Table 5			
			S Single ended, with index, Format C, Table 5			
			T Single ended, no index, Format C, Table 5			
			U Single ended, with index, Format D, Table 5			
			V Differential, no index, Format A, Table 6			
			W Differential, with index, Format A, Table 6			
			X Differential, with index, Format B, Table 6			
			Y Differential, with index, Format C, Table 6			
			Z Differential, no index, Format C, Table 6			

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

SERIES HC25

Dynapar™ brand

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 6, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Table 1 – Differential			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH

*Cable Accessory: P/N 14006350010

Table 2 – Single Ended			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

*Cable Accessory: P/N 14004310010

Table 3 – Differential		
Pin	Function (If Used)	Cable Accessory Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal \bar{A}	BRN/WHT
D	Power Source	RED
E	Signal \bar{B}	ORN/WHT
F	Common	BLK
G	Case	GRN

*Cable Accessory: P/N 1085960010

Cable Configuration: PVC jacket, 105°C rated, overall foil shield; 3 twisted pairs 26AWG (output signals), plus 2 twisted pairs 24AWG (input power)

5 & 8 Pin M12 Accessory Cables - when Code 4= H to Z

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT2	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

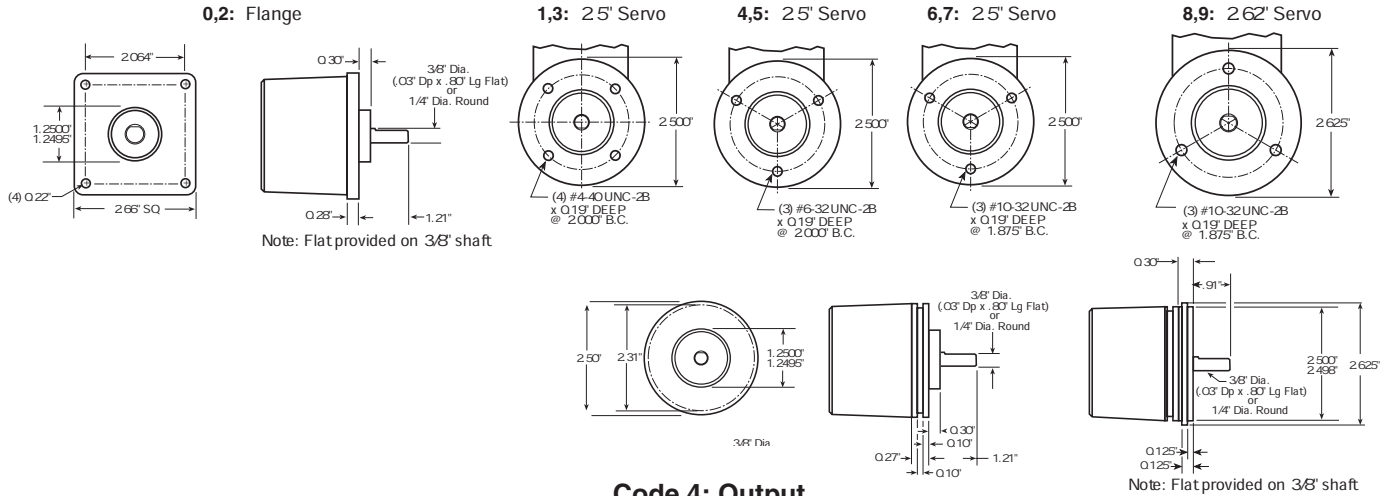
* Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

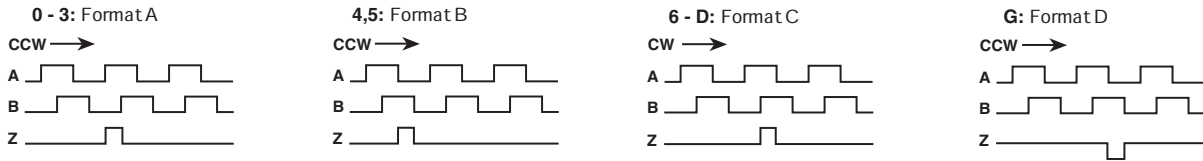
See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

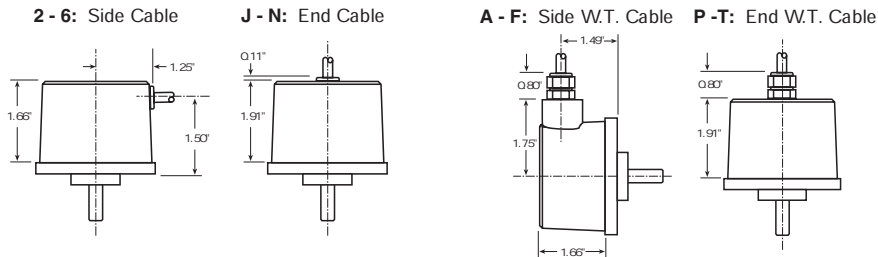
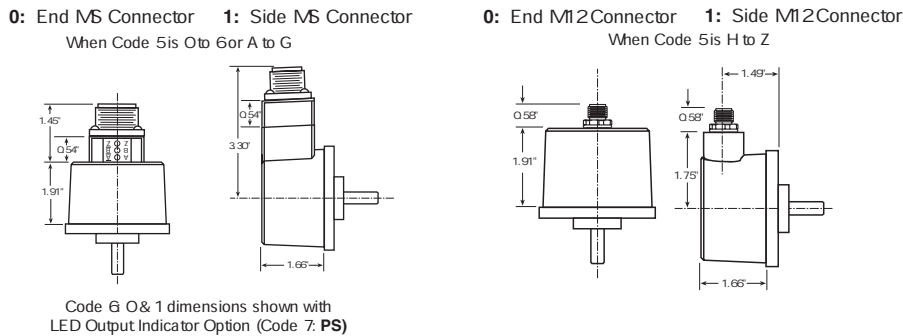
Code 3: Mechanical



Code 4: Output



Code 6: Termination



SERIES H58

Dynapar™ brand

Shafted Encoder

Key Features

- Industry Standard 58mm Mounting
- Multiple Connection Options
- Rugged Design with Long-Life Bearings

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ≤ 1024 PPR (metal disk): ± 7.5 arc-min.
 > 1024 PPR (glass disk): ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CCW shaft rotation as viewed from the shaft end of the encoder

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA, sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

CONNECTIONS

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

12 pin style M23, CW (605560-0001)

12 pin style M23, CCW (605560-0002)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft Loading: (at 6 mm from encoder face)

Resolutions ≤ 1024 PPR: 356 N radial, axial

Resolutions > 1024 PPR: 178 N radial, axial

Shaft Speed:

Resolutions ≤ 1024 PPR: 10,000 RPM max.

Resolutions > 1024 PPR: 5,000 RPM max.

Starting Torque: (max at 25 °C)

without shaft seal: 0.007 N-m;

with shaft seal: 0.014 N-m

Moment of Inertia: 21.2 g-cm²

Weight: 283 g. (10 oz.) max.

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof); NEMA4/IP66 (dust proof, washdown) when ordered with shaft seal and either MS connector or watertight cable exit



SERIES H58

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Pilot, Face	Code 4: Shaft	Code 5: Shaft Seal	Code 6: Electrical	Code 7: Termination	Code 8: Connector	
H58	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ordering Information								
H58 Bidirectional with Index (Channels A, B and Z)	0001	0500	0 (3) M4 @ 42mm BC, no Pilot	0 6mm Dia. Shaft	0 no Shaft Seal	0 5-26V in, 5-26V Push-Pull out available when Code 7 is 2 thru B, E or F: 1 5-26V in, 5-26V Differential Line Driver out (7272) 2 5-26V in, 5V Differential Line Driver out (7272) 3 5-26V in, 5V Differential Line Driver out (4469) 4 5-15V in, 5-15V Differential Line Driver out (4469) A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range	0 7 Pin Conn, End Mount 1 7 Pin Conn, Side Mount 2 10 Pin Conn, End Mount 3 10 Pin Conn, Side Mount 4 12 Pin CCW Conn, End Mount 5 12 Pin CCW Conn, Side Mount 6 12 Pin CW Conn, End Mount 7 12 Pin CW Conn, Side Mount C 5 pin M12 Conn, End Mount D 5 pin M12 Conn, Side Mount E 8 pin M12 Conn, End Mount F 8 pin M12 Conn, Side Mount available when Code 5 is 1: 8 1m Sealed Cbl, End Exit 9 1m Sealed Cbl, Side Exit A 3m Sealed Cbl, End Exit B 3m Sealed Cbl, Side Exit	0 no Mating Connector 1 7 Pin Mating Connector 2 10 Pin Mating Connector 3 12 Pin CCW Mating Connector 4 12 Pin CW Mating Connector
	0005	0512			1 Shaft Seal			
	0010	0600		1 10mm Dia. Shaft				
	0012	0800	1 (3) M3 @ 48mm BC, 36mm Dia. Pilot					
	0050	0900						
	0060	1000						
	0086	1024						
	0100	1200						
	0120	1250						
	0125	1270						
0180	1500							
0200	1600							
0240	1800							
0250	1968							
0254	2000							
0256	2048							
0300	2400							
0360	2500							
0400	2540							

10 foot Cable Assemblies with MS Connector

- 108595-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 108615-0010** 12 Pin CCW (if used) MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 108616-0010** 12 Pin CW (if used) MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

SERIES H58

Dynapar™ brand

ELECTRICAL CONNECTIONS

7, 10 and 12 Pin Connectors and Cables - Code 7= 0 to 7

Connector & mate accessory cable assembly pin numbers and wire color information is provided here for reference. Models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable # 108595-7 Pin (If Used)		Cable # 1400635-10 Pin (If Used)		Cable # 108615-12 Pin CCW (If Used)		Cable # 108616-12 Pin CW (If Used)	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	A	BRN	A	BRN	5	BRN	3	BRN
Sig. B	B	ORN	B	ORG	8	ORG	4	ORG
Sig. Z	C	YEL	C	YEL	3	YEL	7	YEL
Power +V	D	RED	D	RED	12	RED	2	RED
N/C	E	—	E	—	7	—	—	—
Com	F	BLK	F	BLK	10	BLK	1	BLK
Case	G	GRN	G	GRN	9	—	—	—
Sig. \bar{A}	—	—	H	BRN/WHT	6	BRN/WHT	5	BRN/WHT
Sig. \bar{B}	—	—	I	ORG/WHT	1	ORG/WHT	6	ORG/WHT
Sig. \bar{Z}	—	—	J	YEL/WHT	4	YEL/WHT	8	YEL/WHT
5V Sense	—	—	—	—	2	GRN	—	—
0V Sense	—	—	—	—	11	BLK/WHT	—	—

Mating connector/cable assembly wire color information is provided here for reference. H58 models with direct cable exit carry the same color coding as shown for each output configuration.

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables when Code 7= C to F

Connector pin numbers and cable assembly wire color information is provided here for reference.

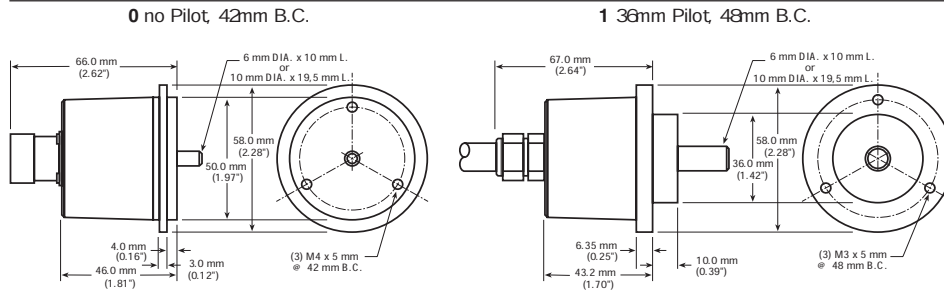
Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

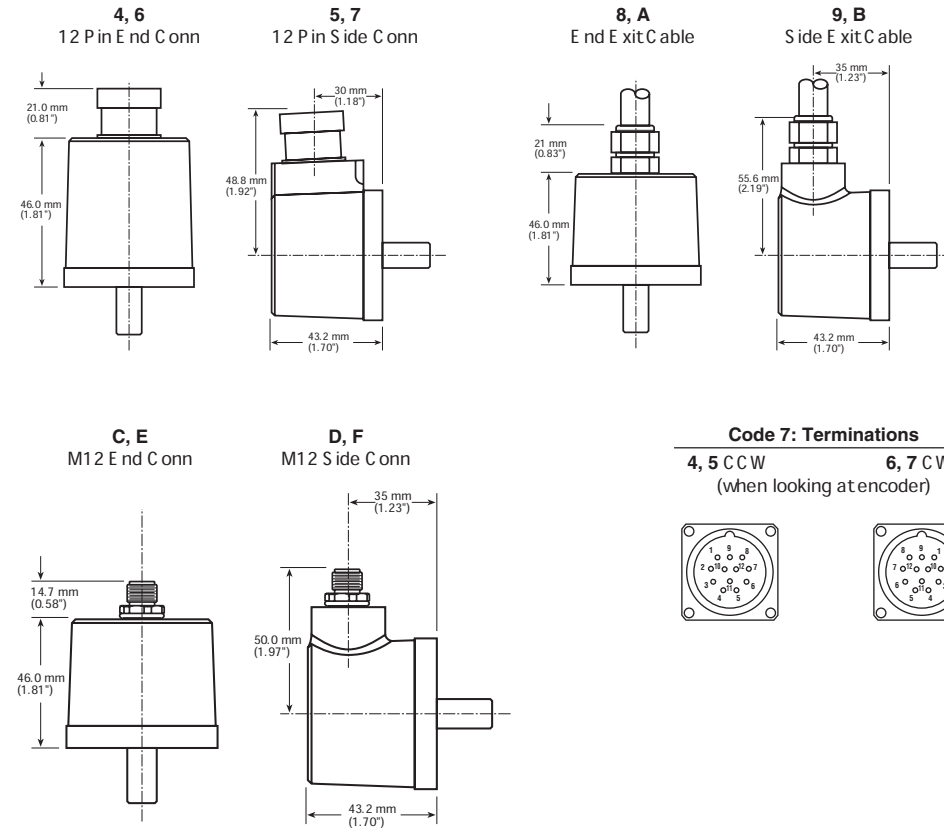
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

Code 3: Pilot, Face Mounts



Code 7: Terminations



SERIES H42

Dynapar™ brand

Shafted Encoder

Key Features

- Simplified Economical Design
- Unbreakable Code Disc
- Rugged Cast Aluminum Housing

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 600 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ± 7.5 arc-min.

Format: Two channel quadrature (AB) with complementary outputs

Phase Sense: A leads B for CW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^\circ \pm 20^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 90 mA max., not including output loads

Outputs:

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

ELECTRICAL CONNECTIONS

With Line Driver Output		
Pin	Function (If Used)	#14004310010* Cable Accessory Color Code
A	Signal A	RED
B	Signal B	BLUE
C	Signal \bar{A}	YELLOW
D	Power Source	WHITE
E	Signal \bar{B}	GREEN
F	Common	BLACK
G	Case	SHIELD

*This is a mating connector/cable assembly described in the Encoder Accessories section of this catalog. Color-coding information is provided here for reference.

CONNECTIONS

Connector Termination:

7 pin, style MS3102E-16S-1P

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

MECHANICAL

Shaft Loading: (at 0.25" from encoder face) 80 lbs. radial, 80 lbs. axial

Shaft Speed: 7200 RPM max.

Shaft Runout: 0.001" max. TIR

Moment of Inertia: 3.0×10^{-4} oz-in-sec²

Weight: 13 oz.

ENVIRONMENTAL

Operating Temperature: 0 to +70 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof)

Ordering Information

To order, complete the model number with code numbers from the table below.

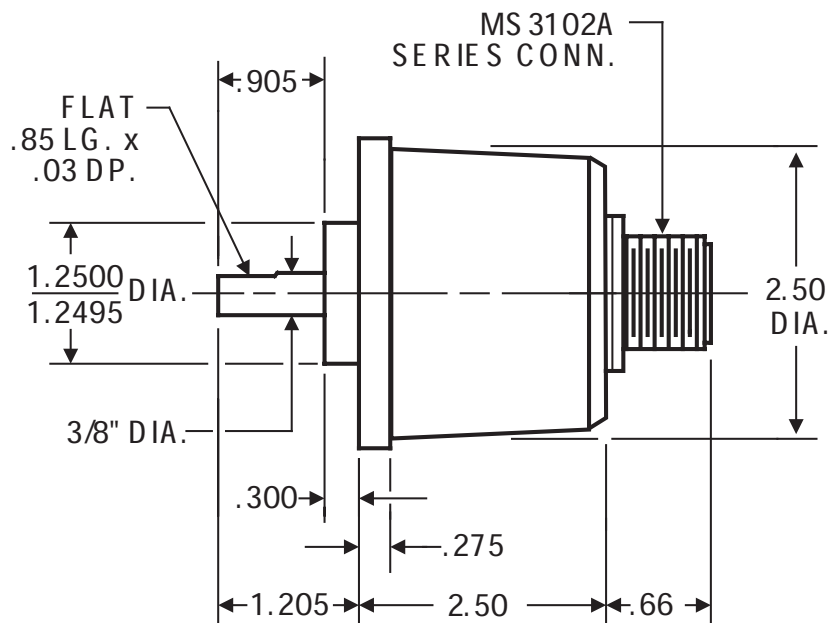
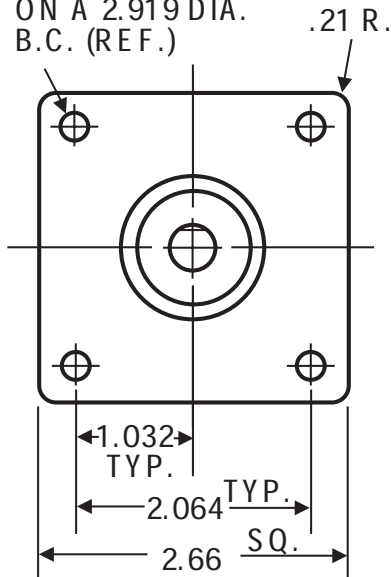
Code 1: Model	Code 2: Pulses/Rev
H42	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
H42 Size 25, Economical	0001
	0012
	0060
	0100
	0120
	0500
	0600

10 foot Cable Assembly with MS Connector

1400635-0010 7 Pin MS, Cable Assy. For Use with Differential Line Driver Outputs

DIMENSIONS

.218 DIA. 4 HOLES
ON A 2.919 DIA.
B.C. (REF.)



SERIES HA725

Dynapar™ brand

Shafted Encoder

Key Features

- High, direct-read resolutions up to 10,000PPR
- Industry Standard size 25 (2.5")
- IP66 Sealing



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 8192 to 10,000 PPR (pulses/revolution)

Accuracy:

Any edge to any like edge of the same channel:

±10.8°/PPR (±3.9 arc-sec at 10,000 PPR)

Any edge to any edge of the opposite channel:

±40°/PPR (±14 arc-sec at 10,000 PPR)

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CCW shaft rotation as viewed from the shaft end of the encoder

Quadrature Phasing: 90° ± 25° electrical

Symmetry: 180° ± 25° electrical

Index: 90° ± 25° electrical (gated with A and B high)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: (not including output loads)

Push-pull: 10 min. to 30 VDC max. at 60 mA max.

Line driver: 5 VDC ±10% at 40 mA max.

Outputs:

Push-pull: ±30 mA, short circuit protected

Line Driver: ±20 mA

Frequency Response:

Push-pull: 200 kHz min

Line Driver: 300 kHz min.

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted

and Magnetic Interference

CONNECTIONS

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

MECHANICAL

Shaft Loading: 35 lbs. radial, 24 lbs. axial

Shaft Speed: 10,000 RPM max.mechanical

Bearing Life:

10⁹ revolutions at 35% of rated load

10⁸ revolutions at 75% of rated load

10⁷ revolutions at 100% of rated load

Moment of Inertia: 2.83 x 10⁻⁴ oz-in-sec²

ENVIRONMENTAL

Operating Temperature: 0 to +70 °C;

Storage Temperature: -25 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 2 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA4/IP66 (dust proof, washdown)

ELECTRICAL CONNECTIONS

*Mating connector/cable assembly wire color information is provided here for reference.

Encoder Function	Cable #108595-* 7 Pin Single Ended		Cable #1400635-* 10 Pin Dif Line Drv w/Inx	
	Pin	Wire Color	Pin	Wire Color
Sig. A	A	BRN	A	BRN
Sig. B	B	ORG	B	ORG
Sig. Z	C	YEL	C	YEL
Power +V	D	RED	D	RED
Com	F	BLK	F	BLK
Case	G	GRN	G	GRN
N/C	E	—	E	—
Sig. A̅	—	—	H	BRN/WHT
Sig. B̅	—	—	I	ORG/WHT
Sig. Z̅	—	—	J	YEL/WHT

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
HA725	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HA725 Size 25, High Resolution	08192 09000 10000	0 Flange Mount, 3/8" Shaft	0 Single Ended 2 Differential	Available when Code 4 = 0: 0 10-30V in; 10-30V Push-Pull out	0 Connector, End Mount 1 Connector, Side Mount
				Available when Code 4 = 2: 4 5V in; 5V Line Driver out	

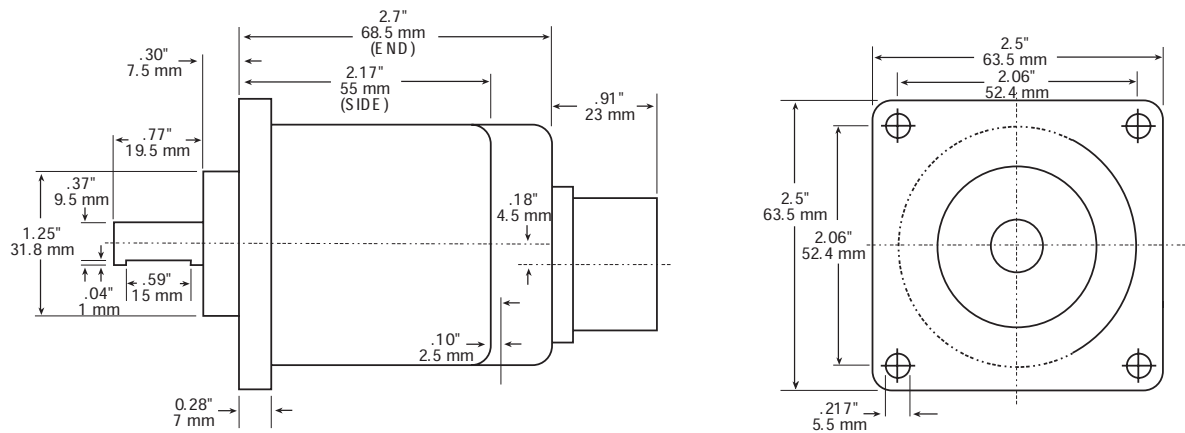
10 foot Cable Assemblies with MS Connector

108595-0010 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs

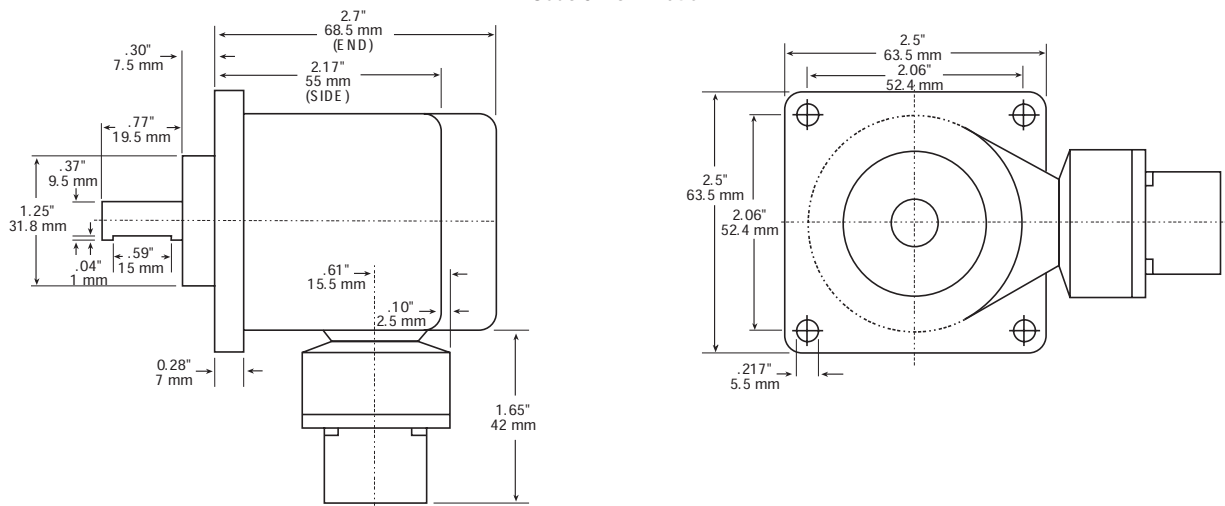
1400635-0010 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

DIMENSIONS

Code 6: Termination: 0



Code 6: Termination: 1



SERIES H20 Hubshaft

Dynapar™ brand

Shafted Encoder

Key Features

- Hubshaft with Spring Tether for Simplified Installation
- Industry Standard 2.0" Size
- IP66 Sealing Option



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ≤ 1024 PPR (metal disk): ± 7.5 arc-min.

> 1024 PPR (glass disk): ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CCW shaft rotation as viewed from the shaft end of the encoder

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4);

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Mating Shaft Requirements:

Length: 0.38" min., 0.50" max.

Runout: 0.010" max. TIR

Endplay: ± 0.025 " max.

Shaft Speed:

Resolutions ≤ 1024 PPR: 10,000 RPM max.

Resolutions > 1024 PPR: 5,000 RPM max.

Starting Torque: (max at 25 °C)

without shaft seal: 1.0 oz-in;

with shaft seal: 3.0 oz.-in

Moment of Inertia: 3.0×10^{-4} oz-in-sec²

Weight: 10 oz. max.

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof); NEMA4/IP66 (dust proof, washdown) when ordered with shaft seal and either MS connector or watertight cable exit



SERIES H20 Hubshaft

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Housing	Code 4: Shaft	Code 5: Face Mount	Code 6: Shaft Seal	Code 7: Electrical	Code 8: Termination	Code 9: Options
H2 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ordering Information								
1 Unidirectional (Channel A only)	0001 0500 0005 0512 0010 0600 0012 0800	0 Servo Mount C Same as "0" above includes protective cover kit for mounting on 4 1/2" C-face	2 5/8" Dia. Hub Shaft and flex coupling 3 3/8" Dia. Hub Shaft and flex coupling 5 1/2" Dia. Hub Shaft and flex coupling 6 1/4" Dia. Hub Shaft and flex coupling	2 (3) #4-40 @ 1.50" BC	0 no Shaft Seal 5 Shaft Seal	0 5-26V in, 5-26V Open Collector out 1 5-26V in, 5-26V Open Collector out with 2.2 kΩ Pullups 2 5-26V in, 5-26V Push-Pull out A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range	0 6 Pin Conn, End Mount 1 6 Pin Conn, Side Mount 2 7 Pin Conn, End Mount 3 7 Pin Conn, Side Mount 4 10 Pin Conn, End Mount 5 10 Pin Conn, Side Mount 7 18" Cable, Side Exit 9 36" Cable, Side Exit B 10' Cable, Side Exit K 25' Cable, Side Exit N 5 Pin M12 Connector, End Mount P 5 Pin M12 Connector, Side Mount Q 8 Pin M12 Connector, End Mount R 8 Pin M12 Connector, Side Mount	available when Code 8 is 0 to 5: PS LED Output Indicator Option
2 Bidirectional (Channels A and B)	0050 0900 0060 1000 0086 1024 0100 1200	F Same as "0" above includes protective cover kit for mounting on fan cover				available when: Code 1 is 1 or 2 and Code 8 is 2 through M, Q or R; or Code 1 is 3 and Code 8 is 4 thru M, Q or R: 3 5-26V in, 5-26V Differential Line Driver out (7272) 4 5-26V in, 5V Differential Line Driver out (7272) 5 5-26V in, 5 V Differential Line Driver out (4469) 6 5-15V in, 5-15 V Differential Line Driver out (4469) D Same as "3" with extend. temp range E Same as "4" with extend. temp range		
3 Bidirectional with Index (Channels A, B and Z)	0120 1250 0125 1270 0180 1500 0200 1600 0240 1800 0250 1968 0254 2000 0256 2048 0300 2400 0360 2500 0400 2540						available when Code 6 is 5: D 18" Sealed Cbl, Side Exit F 36" Sealed Cbl, Side Exit H 10' Sealed Cbl, Side Exit M 25' Sealed Cbl., Side Exit	

109296-0001 Replacement flexible mount for Series H20 Hub Shaft

10 foot Cable Assemblies with MS Connector

- 108594-0010** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010** 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 8= 0 to 9, B to M

C connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. H20 models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Dif Line Drv w/o Idx		Cable # 1400635-10 Pin Dif Line Drv w/Idx	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN
Sig. B	D	ORN	B	ORG	B	ORG	B	ORG
Sig. Z	C	YEL	C	YEL	—	—	C	YEL
Power +V	B	RED	D	RED	D	RED	D	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK
Case	—	—	G	GRN	G	GRN	G	GRN
N/C	F	—	E	—	—	—	E	—
Sig. \bar{A}	—	—	—	—	C	BRN/WHT	H	BRN/WHT
Sig. \bar{B}	—	—	—	—	E	ORG/WHT	I	ORG/WHT
Sig. \bar{Z}	—	—	—	—	—	—	J	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables when Code 8= N to R

C connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

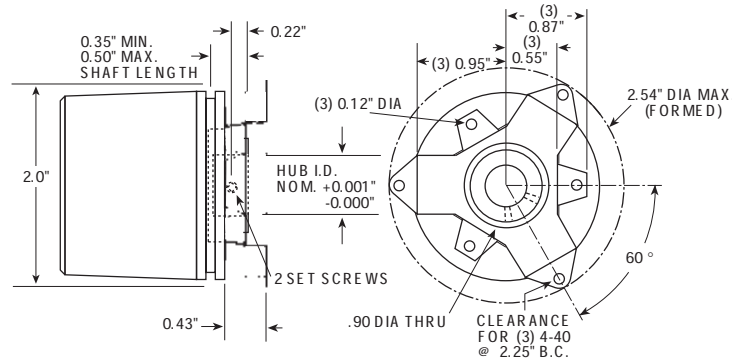
* Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

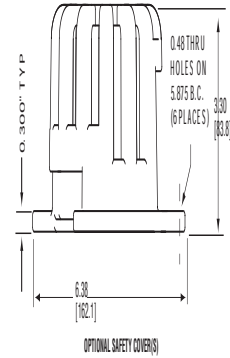
See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

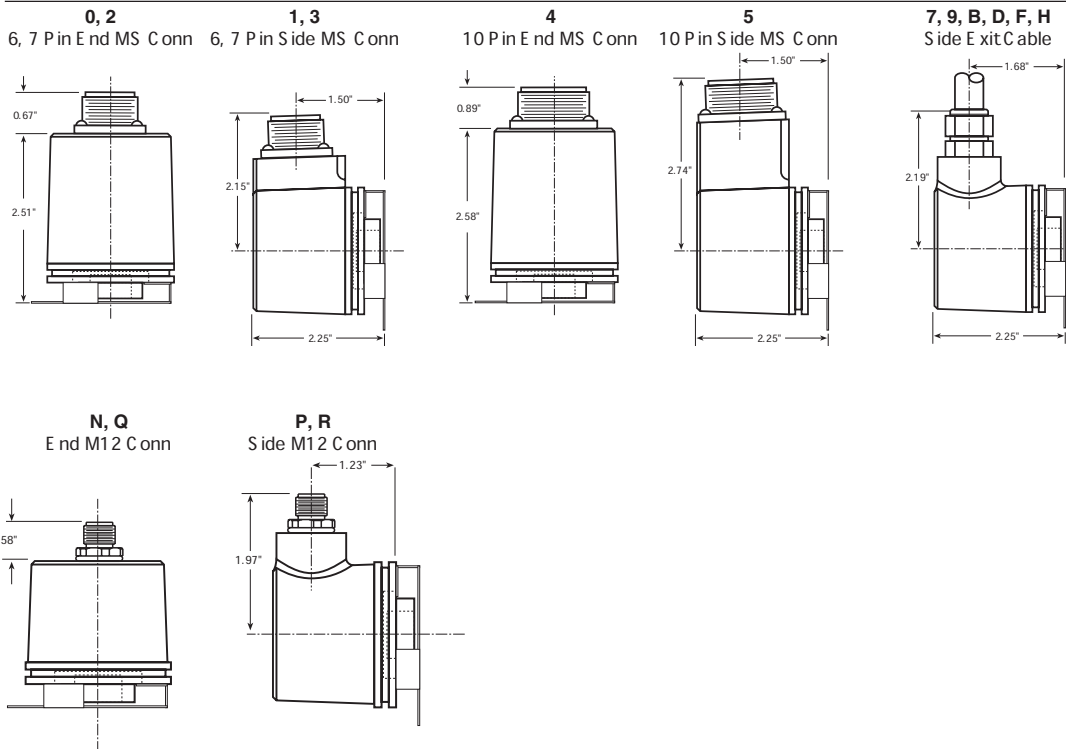
Codes 3-5: Housing, Shafts, Face Mount



Cover Option: C, F



Code 8: Terminations



SERIES HS20

Dynapar™ brand

Sealed Hollowshaft Encoder

Key Features

- Hollowshaft Design Eliminates Brackets and Couplings
- Electrically Isolated Shaft Design
- Compact Size for Tight Mounting Constraints

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ≤ 1024 PPR (metal disk): ± 7.5 arc-min.

> 1024 PPR (glass disk): ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CCW shaft rotation viewing the hub clamp end of the encoder

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ + 18^\circ / -135^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 100 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4);

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6);

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Bearing Life: (at maximum tether loading)

Standard tether: 5×10^9 revolutions

Slotted tether: 8×10^9 revolutions

Shaft Speed: 6000 RPM max.

Shaft Bore Tolerance: Nominal $+0.0002$ " $+0.0008$ " ($+0.005/+0.020$ mm)

Mating Shaft Requirements:

Runout: ± 0.005 " (± 0.13 mm) radial, max.

Endplay: ± 0.050 " (± 1.27 mm) axial, max.

Length: 0.80 " (20 mm), minimum

Starting Torque: 3.0 oz-in max.

Moment of Inertia: 5.1×10^{-4} oz-in-sec²

Weight: 10 oz. max.

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to $+70^\circ$ C

Extended: -40 to $+85^\circ$ C

Storage Temperature: -40 to $+85^\circ$ C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 2.5 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA4/IP65 (dust proof, washdown)



SERIES HS20

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Format	Code 6: Output	Code 7: Termination	Code 8: Options	
HS20	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
Ordering Information								
HS20	Size 20 heavy-duty, sealed hollowshaft encoder	Metal Disk: 0001 0300 0005 0360 0010 0400 0012 0500 0050 0512 0060 0600 0100 0720 0120 0768 0180 0800 0200 0900 0240 1000 0250 1024 0256	0 6 mm 1 1/4" 2 5/16" 3 8 mm 4 3/8" 5 10 mm 6 12 mm 7 1/2" 8 5/8" 9 15 mm A 16 mm	0 None - customer supplied 1 Clearance hole for 3/8" bolt on 5.88" dia. bolt circle (to fit 4-1/2" NEMA C-face) 3 Slotted hole for bolt on 1.87" to 2.95" radius 4 Same as '1', w/ protective cover kit 5 Same as '3', w/ Protective cover kit	0 single ended, unidirectional (A) 1 single ended, bidirectional (AB) 2 single ended, bidirectional with index (ABZ) available when Code 6 is 3, 4, A or B: 3 differential, bidirectional (AĀ BB) available when Code 6 is 3, 4, A or B and code 7 is 2, or 7 thru G: 4 differential, bidirectional with index (AĀ BB ZZ)	0 5-26V in, 5-26V open collector out 1 5-26V in, 5-26V open collector out w/ 2.2kΩ pullups 2 5-26V in, 5-26V push-pull out available when Code 5 is 3 or 4: 3 5-26V in, 5V line driver out 4 5-26V in, 5-26V line driver out A same as '3' with extended temp. -40° to 85°C B same as '4' with extended temp. -40° to 85°C	0 6 pin connector 1 7 pin connector 2 10 pin connector 5 6 pin connector, plus mating connector 6 7 pin connector, plus mating connector 7 10 pin connector, plus mating connector A 18" (.5m) cable B 36" (1m) cable C 72" (2m) cable D 10' (3m) cable F 13" (.3m) cable with 10 pin connector plus mating connector G 13" (.3m) cable J 8 Pin M12 Connector available when Code 5 is 0 thru 2 H 5 Pin M12 Connector	available when Code 7 is 0 or 5 and Code 5 is 0-2, or Code 7 is 1, 2, 6, 7: PS LED Output Indicator
	11 2096-0001	T ether K it (clearance hole for 3/8" bolt on 5.88" diameter bolt-circle)						
11 2096-0002	T ether K it (slotted hole for bolt on 1.87" to 2.75" radius)							
11 2105-0001	P rotective C over A ccessory							

10 foot Cable Assemblies with MS Connector

- 108594-0010 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 7= 0 to 7, A to G

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HS 20 models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable #108594-* 6 Pin Single Ended		Cable #112123-* 6 Pin Dif Line Drv w/o Idx		Cable #108596-* 7 Pin Dif Line Drv w/o Idx		Cable #108595-* 7 Pin (If Used)		Cable #1400635-* 10 Pin (If Used)	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	E	BRN	E	BRN	A	BRN	A	BRN	A	BRN
Sig. B	D	ORN	D	ORN	B	ORN	B	ORN	B	ORN
Sig. Z	C	YEL	—	—	—	—	C	YEL	C	YEL
Power +V	B	RED	B	RED	D	RED	D	RED	D	RED
N/C	F	—	—	—	—	—	E	—	E	—
Com	A	BLK	A	BLK	F	BLK	F	BLK	F	BLK
Case	—	—	—	—	G	GRN	G	GRN	G	GRN
Sig. \bar{A}	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT
Sig. \bar{B}	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT
Sig. \bar{Z}	—	—	—	—	—	—	—	—	J	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

5 & 8 Pin M12 Accessory Cables when Code 7= H or J

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-* 5 Pin Single Ended		Cable # 112860-* 8 Pin Single Ended		Cable # 112860-* 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
†Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

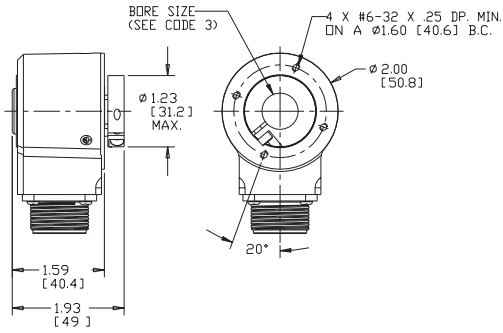
*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.

†Note: Index not provided on all models. See ordering information

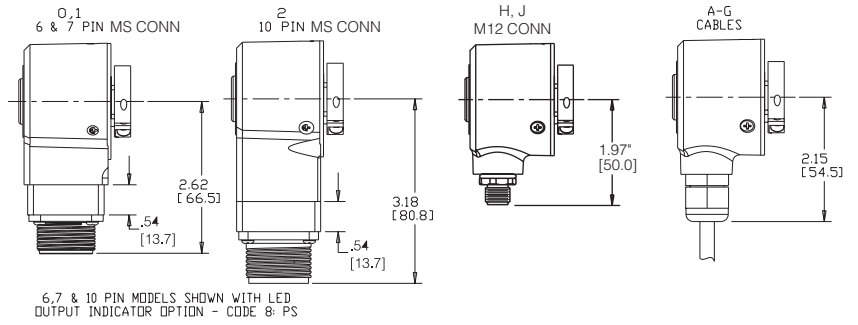
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

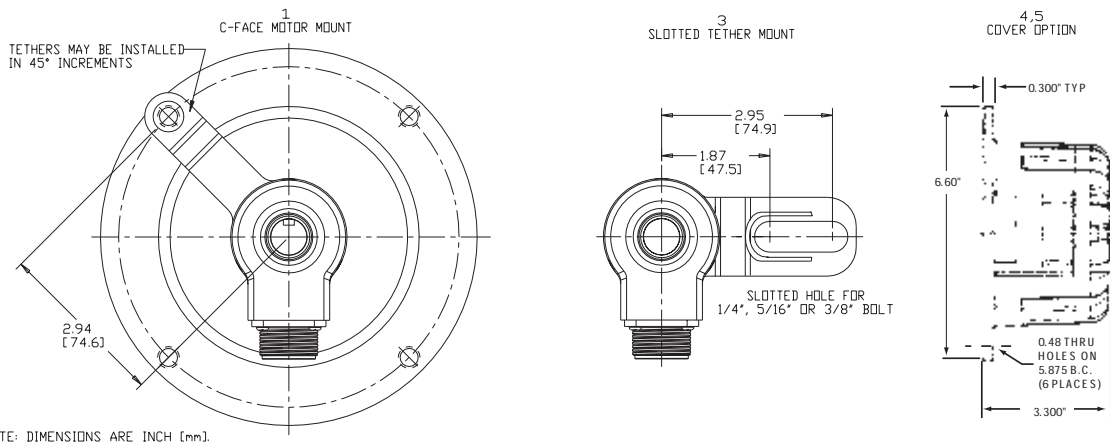
DIMENSIONS



CODE 7: TERMINATION



CODE 4: FIXING



SERIES HS35

Dynapar™ brand

Sealed Hollowshaft Encoder

Key Features

- The Original Vector-Duty Hollowshaft Size 35 Encoder
- Electrically Isolated Shaft Sizes up to 1.25"
- Multitude of Configurations and Accessories Available
- Hazardous Location Certification Available



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2500 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ± 7.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW shaft rotation

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: (each output)
4.5 min. to 26 VDC max. at 100 mA max., not including output loads

OUTPUTS:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio

Frequency Interference, Electrical Fast

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

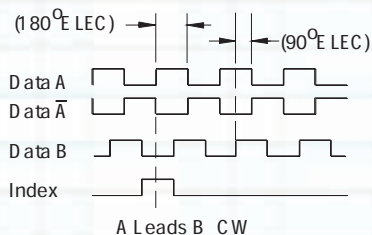
Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

DATA AND INDEX

Not all complements shown.

A shown for reference



Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4);

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Bearing Life: 80,000 hours at 3600 RPM; 128,000 hours at 1800 RPM

Shaft Loading: 40 lbs. radial, 30 lbs. axial

Shaft Speed: 3600 RPM max. (Important: see Operating Temperature derating for >1800 RPM)

Shaft Bore Tolerance: Nominal +0.0003" +0.0005"

(+0.008/+0.013 mm)

Mating Shaft Requirements:

Runout: ± 0.025 " (0.63 mm) radial typical ;

Endplay: ± 0.050 " (1.27 mm) axial typical ;

Minimum: 1.25" (32 mm) recommended;

Maximum: 2.0" (51 mm) to fit inside cover;

Solid shaft recommended; keyway allowed; flatted shaft should not be used

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Transients, Conducted and Magnetic Interference

Starting Torque: 5.0 oz-in max.

Running Torque: 4.5 oz-in max.

Moment of Inertia:

$\leq 5/8$ " bore: 7.9×10^{-4} oz-in-sec²

$> 5/8$ " bore: 25.6×10^{-4} oz-in-sec²

Weight: 16 oz. max.

ENVIRONMENTAL

Operating Temperature:

Standard: -40 to +70 °C;

Extended: -40 to +100 °C;

$\leq 5/8$ " bore: Derate 5 °C per 1000 RPM above 1800 RPM;

$> 5/8$ " bore: Derate 10 °C per 1000 RPM above 1800 RPM.

Storage Temperature: -40 to +90 °C

Shock: 50 Gs for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 Gs

Humidity: to 98% without condensation

Enclosure Rating: NEMA4/IP67

Hazardous Location Certification:

Available as Optional Feature. Class I, Division

2, Group A, B, C & D. CSA File No. LR86404



SERIES HS35

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Format	Code 6: Output	Code 7: Termination	Code 8: Options
HS35	□□□□	□	□	□	□	□	□□
Ordering Information							
HS35 Size 35 heavy-duty, sealed hollowshaft encoder	0001 0500 0003 0512 0010 0600 0012 0900 0050 1000 0060 1024 0064 1200 0100 1270 0120 1500 0240 1800 0250 2000 0300 2048 0360 2400 2500	0 6 mm 1 1/4" 2 5/16" 3 8 mm 4 3/8" 5 10 mm 6 12 mm 7 1/2" 8 5/8" 9 15 mm A 16 mm B 19 mm C 3/4" D 20 mm E 7/8" F 24 mm G 1" H 1-1/8" P 1-1/4"	0 None - customer supplied 1 Clearance hole for 3/8" bolt on 5.88" dia. bolt circle (to fit 4-1/2" NEMA C-face) 2 Clearance hole for 1/2" bolt on 7.25" dia. bolt circle (to fit 8-1/2" NEMA C-face) 3 Slotted hole for bolt on 2.5" to 4.0" radius (to fit standard AC motor fan cover slots) Available when Code 5 is 0-4: 4 Same as '1', w/ cover kit 5 Same as '3', w/ cover kit Available when Code 5 is 5: 6 Same as '1' w/ dual cover kit 7 Same as '3' w/ dual cover kit	0 single ended, unidirectional (A) 1 single ended, bidirectional (AB) 2 single ended, bidirectional with index (ABZ) available when Code 6 is 3, 4, 5, 6, A or B: 3 differential, bidirectional (AĀ BB̄) available when Code 6 is 3, 4, 5, 6, A or B and Code 7 is 2, 3, or 7 thru G, J: 4 differential, bidirectional with index (AĀ BB̄ Z̄Z̄) available when Code 6 is 3, 4, 5, 6, A or B, and Code 7 is 2, 7, A thru G, J: 5 Dual isolated differential, bi-directional w/index (AĀBBZ̄Z̄)	0 5-26V in, 5-26V open collector out 1 5-26V in, 5-26V open collector out w/ 2.2kΩ pullups 2 5-26V in, 5-26V push-pull out available when Code 5 is 3, 4 or 5: 3 5-26V in, 5V line driver out (7272) 4 5-26V in, 5-26V line driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5-15 V Differential Line Driver out (4469) A same as '3' with extended temp. to 100°C B same as '4' with extended temp. to 100°C	0 6 pin connector 1 7 pin connector 2 10 pin connector 3 12 pin connector 5 6 pin connector, plus mating connector 6 7 pin connector, plus mating connector 7 10 pin connector, plus mating connector 8 12 pin connector, plus mating connector A 18" (.5m) cable B 36" (1m) cable C 72" (2m) cable D 10' (3m) cable F 13" (.3m) cable with 10 pin connector plus mating connector G 13" (.3m) cable J 8 Pin M12 Connector available when Code 5 is 0 thru 2 H 5 Pin M12 Connector	D2 Hazardous Location Certified available when Code 7 is 2 D3 Same as D2 including adapter for CSA Div. 2, Group F & G Certification (see specifications) <i>Note: Requires use of Mating Cable Assembly 114074-XXXX</i> available when Code 7 is 0 or 5 and Code 5 is 0-2, or Code 7 is 1, 2, 6, 7: PS LED Output Indicator <i>Not provided with "Hazardous Location Certified" Option</i> Leave Blank : No Option

109473-0001 Tether kit (clearance hole for 3/8" bolt on 5.88" dia. bolt circle)
 109473-0002 Tether kit (clearance hole for 1/2" bolt on 7.25" dia. bolt circle)
 109473-0003 Tether kit (slotted hole for bolt on 2.5" to 4.0" radius)
 112121-0001 Spare Hub Clamp (Bore size Code 3: 0 - 9)
 112121-0002 Spare Hub Clamp (Bore size Code 3: A - H)
 110533-0001 Cover Kit, 56C face

110533-0002 Cover Kit, fan cover
 110533-0003 Dual Cover Kit, 56C face
 110533-0004 Dual Cover Kit, fan cover
 114064-0001 Adapter Kit, CSA Division 2, Group F & G, Cert.
 114074-XXXX D3 Mating Cable Assembly. "XXXX" denotes length in feet; example -0010 equals 10 feet.

10 foot Cable Assemblies with MS Connector

- 108594-0010** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010** 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 112123-0010** 6 Pin MS, Cable Assy. For Use with Differential Line Driver without Index Outputs
- 108615-0010** 12 Pin CCW MS, Cable Assy.

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

SERIES HS35

Dynapar™ brand

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 7= 0 to 8, A to G

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HS 35 models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable #108594-* 6 Pin Single Ended		Cable #112123-* 6 Pin Dif Line Drv w/o Id x		Cable #108596-* 7 Pin Dif Line Drv w/o Id x		Cable #108595-* 7 Pin (If Used)		Cable #1400635-* 10 Pin (If Used)		Cable #108615-* 12 Pin CCW (If Used)	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	E	BRN	E	BRN	A	BRN	A	BRN	A	BRN	5	BRN
Sig. B	D	ORN	D	ORN	B	ORN	B	ORN	B	ORN	8	ORN
Sig. Z	C	YEL	—	—	—	—	C	YEL	C	YEL	3	YEL
Power +V	B	RED	B	RED	D	RED	D	RED	D	RED	12	RED
N/C	F	—	—	—	—	—	E	—	E	—	7	—
Com	A	BLK	A	BLK	F	BLK	F	BLK	F	BLK	10	BLK
Case	—	—	—	—	G	GRN	G	GRN	G	GRN	9	—
Sig. \bar{A}	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT	6	BRN/WHT
Sig. \bar{B}	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT	1	ORN/WHT
Sig. \bar{Z}	—	—	—	—	—	—	—	—	J	YEL/WHT	4	YEL/WHT
0V Sense	—	—	—	—	—	—	—	—	—	—	2	GRN
5V Sense	—	—	—	—	—	—	—	—	—	—	11	BLK/WHT

5 & 8 Pin M12 Accessory Cables when Code 7= H or J

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-* 5 Pin Single Ended		Cable # 112860-* 8 Pin Single Ended		Cable # 112860-* 8Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
†Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

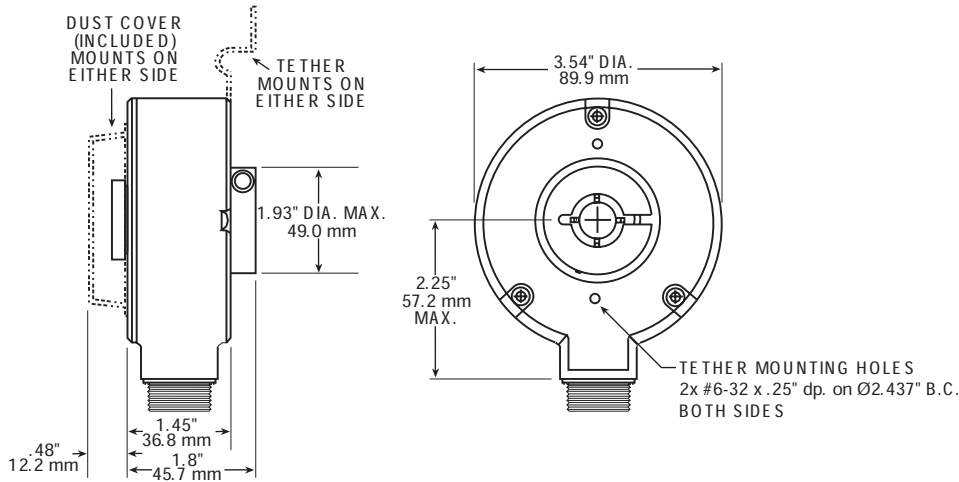
Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.

†Note: Index not provided on all models. See ordering information

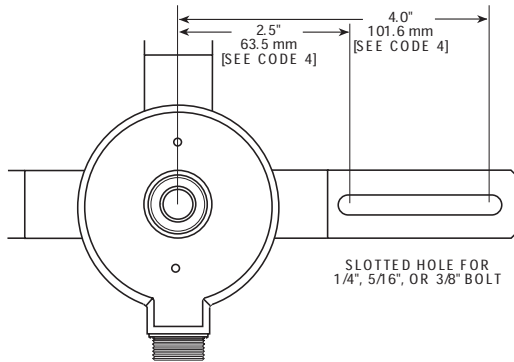
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

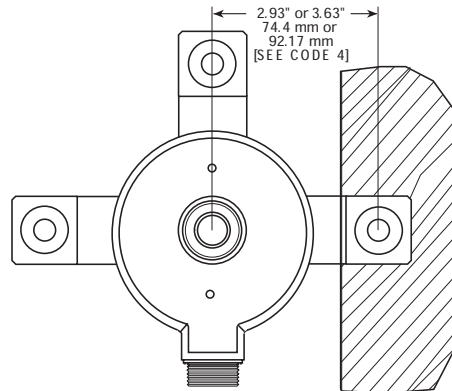


Code 4: Fixing

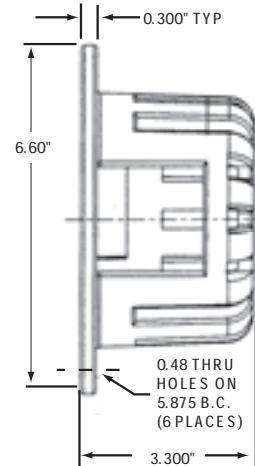
3
Fan Cover Motor Mount



1, 3
Machine Mount

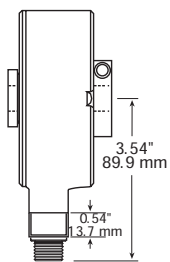


4, 5, 6, 7
Cover Option

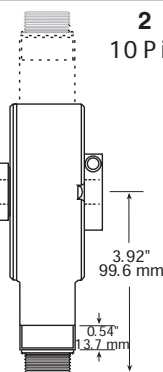


Code 7: Termination

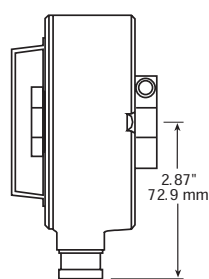
0, 1
6 & 7 Pin MS



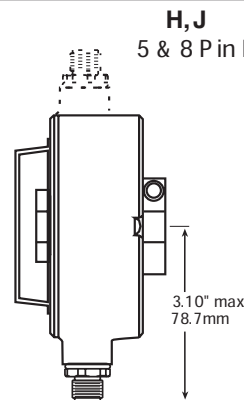
2
10 Pin MS



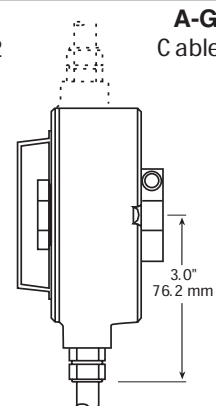
3
12 Pin MS



H, J
5 & 8 Pin M12



A-G
Cables



6 & 7 Pin and 10 Pin shown with LED Output Indicator Option - Code 8: **PS**

SERIES HS35R

Dynapar™ brand

Sealed Hollowshaft Encoder

Key Features

- Phased Array Sensor for Reliable Signal Output
- Rugged Design Withstands up to 400g Shock
- Unbreakable Code Disc up to 5000PPR
- Improved Seal Design for Increased Moisture Resistance



STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: to 5000 PPR (pulses/revolution) See Ordering Information

Format: Two channel quadrature (AB) with optional Index (Z), and complementary outputs

Phase Sense: A leads B for CW shaft rotation viewing the shaft clamp end of the encoder

Quadrature Phasing: For resolutions to 1200 PPR: $90^\circ \pm 15^\circ$ electrical; For resolutions over 1250 PPR: $90^\circ \pm 30^\circ$ electrical

Symmetry:

For resolutions to 1024PPR: $180^\circ \pm 18^\circ$ electrical
For resolutions over 1024PPR: $180^\circ \pm 25^\circ$ electrical

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 5-26VDC, 5-15VDC. 50 mA max., not including output loads.

Outputs: ET7272, ET7273, 4469

Frequency Response: 125 kHz (data & index)

Noise Immunity: Tested to EN61326-1 EMC

Termination: MS Connector; M12 Connector; cable exit w/seal. See Ordering Information

Mating Connector:

6 pin MS, style MS3106A-14S-6S (MCN-N4)

7 pin MS, style MS3106A-16S-1S (MCN-N5)

10 pin MS, style MS3106A-18-1S (MCN-N6)

10 pin Bayonet, MS3116-F12-10S (607545-0001)

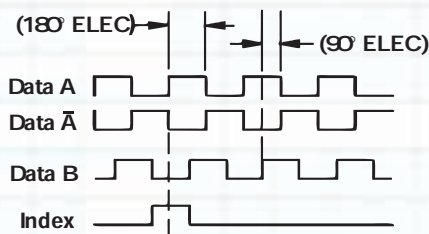
Cable w/ 5 pin M12 connector, p/n 112859-xxx

Cable w/ 8 pin M12 connector, p/n 112860-xxx

DATA AND INDEX

Not all complements shown

\bar{A} shown for reference



A leads B, CW (from clamp end)

(Reverse Phasing, A leads B for CCW also available: See Code 7 in Ordering Information)

MECHANICAL

Shaft Material: 6061-T6 Aluminum

Bore Diameter: 6mm to 28mm, 1.4" to 1.25", electrically isolated

Mating Shaft Length: 1.25", Minimum, 1.60", Recommended

Shaft Speed: 6000 RPM, Maximum (Enclosure Rating is IP64 at speed over 5000 RPM)

Starting torque: 8.0 in-oz. maximum (at 25°C)

Running torque: 5.0 in-oz. maximum (at ambient)

Bearings: ABEC 1

Housing and cover: Hard Anodized and Powder Coated Aluminum

Disc material: Plastic or metal (unbreakable)

Weight: 1.76lb (28 Oz) Typical

ENVIRONMENTAL

Standard Operating Temperature: -40 to +85°C (0 to +70°C with 4469 line driver, see "Ordering Information"). At shaft speed above 3000 RPM, derate 10°C per 1000 RPM

Extended Temperature Range: -40 to +100°C (See ordering information)

Storage temperature: -40 to +100°C

Shock: 400g, 6mSec

Vibration: 5 to 3000 Hz, 20g

Humidity: 100%

Enclosure Rating: IP67 (IP64 at shaft speed above 5000 RPM)

Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12. "M12" Cable assemblies are rated IP67



SERIES HS35R

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Output Format	Code 6: Termination	Code 7: Options
HS35R	□□□□	□	□	□	□	□□
Ordering Information						
HS35R Industrial-duty, hollowshaft encoder	0001 0500	0 6mm	0 None	0 ABZ, 5-26VDC push-pull	0 6 pin	01 Reverse Phasing (A leads B, CCW) Not available when Code 6 is 3, 8, A through J or when Code 5 is 4, 5, 6, 7, 8, 9, A, C, D, E, F, G, L, M, N, P, Q, R and Code 6 is 0 or 5 PS LED Output
	0003 0512	1 1/4"	1 4.5" C-face tether	1 ABZ, 5-26VDC O/C	1 7 pin	
	0010 0600	2 5/16"	2 8.5" C-face tether	2 ABZ, 5-26VDC O/C w2.2kOhm	2 10 pin	
	0012 0900	3 8mm	3 Slotted tether (to fit standard AC motor fan cover)	H Same as "0" with Extended temp range	3 12 pin	
	0015 1000	4 3/8"		J Same as "1" with Extended temp range	4 10 pin bayonet	
	0032 1024	5 10mm		K Same as "2" with Extended temp range	5 6 pin+mating	
	0050 1200	6 12mm		Not available when Code 6 is H	6 7 pin+mating	
	0060 1500	7 1/2"	Not available when Code 5 is D,E,F,G, Q, R	4 Differential AB only, 5-26VDC, 5-26VDC out (7272)	7 10 pin+mating	
	0100 2000	8 5/8"	4 Same as 1 w/cover	5 Differential AB only, 5-26VDC in, 5VDC out (7272)	8 12 pin+mating	
	0120 2048	9 15mm	5 Same as 3 w/cover	A Differential AB only, 5-26VDC in, 5VDC out (4469)	9 10pin bayonet+mating	
	0200 2400	A 16mm	Not available when Code 5 is 0 through C or H through P	C Differential AB only, 5-15VDC in, 5-15VDC out (4469)	A 0.5m (18") cable	
	0240 2500	C 19mm	6 Same as 1 w/dual cover	L Same as "4" with Extended temp range	C 1m (36") cable	
	0240 2500	D 3/4"	7 Same as 3 w/dual cover	M Same as "5" with Extended temp range	D 2m (72") cable	
	0250 3072	E 20mm		Not available when Code 6 is 0, 1, 5, 6, or H	E 3m (120") cable	
	0300 4000	F 7/8"		6 Differential ABZ, 5-26VDC in, 5VDC out (7272)	F 0.3m (13") cable with 10 pin connector and mate	
	0360 4096	G 24mm		7 Differential ABZ, 5-26VDC in, 5-26VDC out (7272)	G 0.3m (13") cable	
	5000	H 1"		8 Differential ABZ, 5-26VDC in, 5VDC out (4469)	H 5 pin M12	
		J 1-1/8"		9 Differential ABZ, 5-15VDC in, 5-15VDC out (4469)	J 8 pin M12	
		K 1-1/4"		D Dual isolated outputs, same as "6"		
		M 14mm		E Dual isolated outputs, same as "7"		
		N 18mm		F Dual isolated outputs, same as "8"		
		P 25mm		G Dual isolated outputs, same as "9"		
		R 28mm		N Same as "6" with Extended temp range		
				P Same as "7" with Extended temp range		
				Q Same as "D" with Extended temp range		
				R Same as "E" with Extended temp range		

10 foot Cable Assemblies with MS Connector

- 108594-0010 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 112123-0010 6 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 114448-0010 10 Bayonet, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-0010 NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

10 foot Cable Assemblies with M23 Connector

- 108615-0010 12 M23, Cable Assy. For Use with Differential Line Driver with Index Outputs, CCW

15 foot Cable Assemblies with M12 Connector

- 112859-0015 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)
- 10 pin bayonet, style MS3116-F12-10S (607545-0001)

Accessory Kits:

- 114573-0001 Tether Kit, 4.5" C-face single point with 3/8" bolt
- 114574-0001 Tether Kit, Slotted with T-bolts for standard AC motor fan covers
- 114575-0001 Tether Kit, 8.5" C-face single point with 1/2" bolt
- 114591-0001 Cover Kit, 56C face
- 114592-0001 Cover Kit, fan cover
- 114593-0001 Dual Cover Kit, 56C face
- 114594-0001 Dual Cover Kit, fan cover

SERIES HS35R

Dynapar™ brand

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 6 = 0 to 9, A to G

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. Models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable #108594-* 6 Pin Single Ended		Cable #112123-* 6 Pin Dif Line Drv w/o ldx		Cable #108596-* 7 Pin Dif Line Drv w/o ldx		Cable #108595-* 7 Pin (If Used)		Cable #1400635- or 109209- (NEMA4) 10 Pin Dif Line Drv w/ldx (If Used)		Cable #108615-* 12 Pin CCW (If Used)		Cable #114448-* 10Pin Bayonet	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
	Sig. A	E	BRN	E	BRN	A	BRN	A	BRN	A	BRN	5	BRN	A
Sig. B	D	ORN	D	ORN	B	ORN	B	ORN	B	ORN	8	ORN	B	ORN
Sig. Z	C	YEL	—	—	—	—	C	YEL	C	YEL	3	YEL	C	YEL
Power +V	B	RED	B	RED	D	RED	D	RED	D	RED	12	RED	D	RED
N/C	F	—	—	—	—	—	E	—	E	—	7	—	E	—
Com	A	BLK	A	BLK	F	BLK	F	BLK	F	BLK	10	BLK	F	BLK
Case	—	—	—	—	G	GRN	G	GRN	G	GRN	9	—	G	GRN
Sig. A	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT	6	BRN/WHT	H	BRN/WHT
Sig. B	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT	1	ORN/WHT	J	ORN/WHT
Sig. Z	—	—	—	—	—	—	—	—	J	YEL/WHT	4	YEL/WHT	K	YEL/WHT
0V Sense	—	—	—	—	—	—	—	—	—	—	2	GRN	—	—
5V Sense	—	—	—	—	—	—	—	—	—	—	11	BLK/WHT	—	—

5 & 8 Pin M12 Accessory Cables when Code 6 = H or J

Connector pin numbers and cable assembly wire color information is provided here for reference.

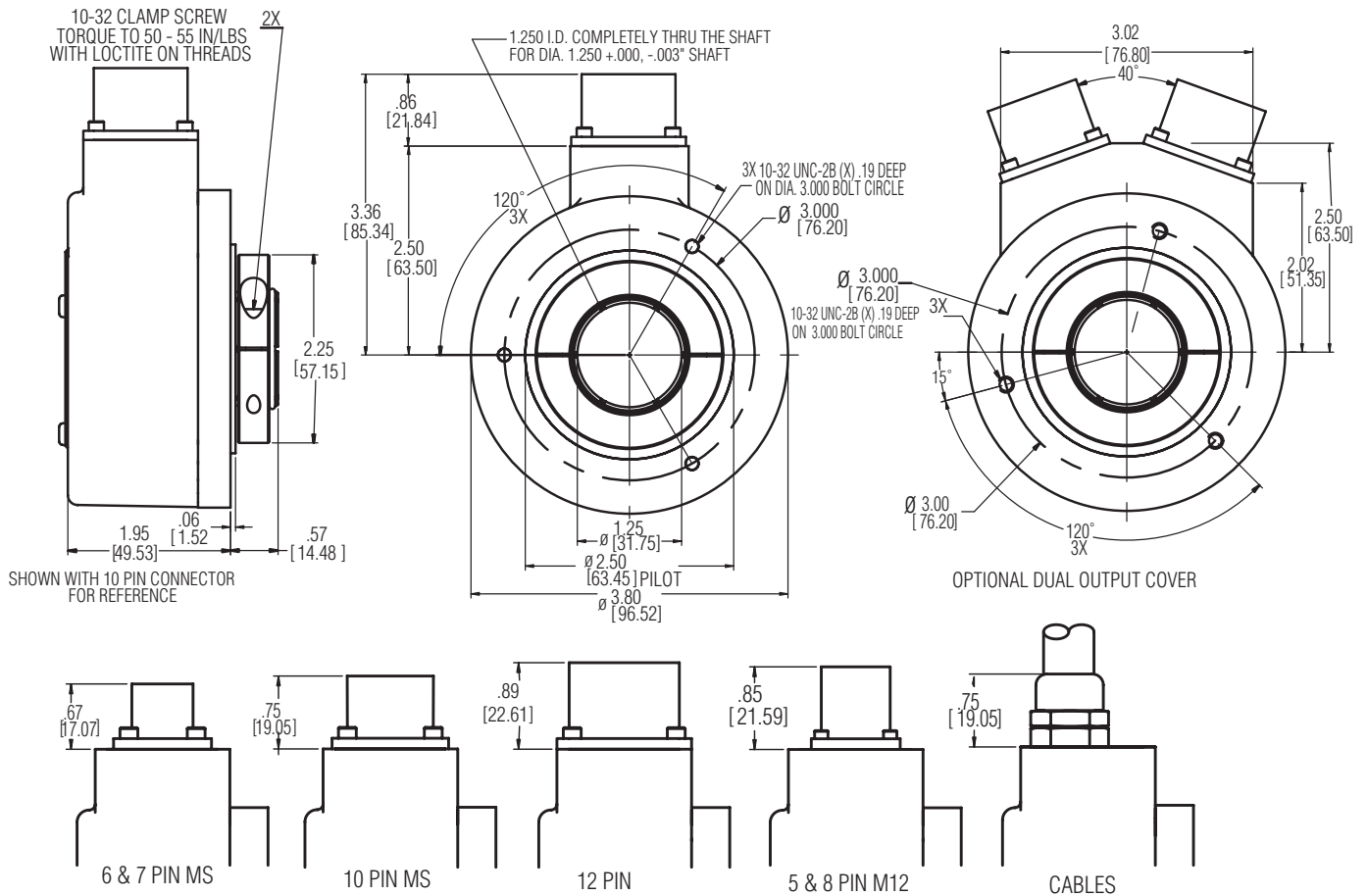
Encoder Function	Cable # 112859- 5 Pin Single Ended		Cable # 112860- 8 Pin Single Ended		Cable # 112860- 8Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. A	—	—	—	—	3	BRN/WHT
Sig. B	—	—	—	—	5	ORG/WHT
†Sig. Z	—	—	—	—	8	YEL/WHT

† Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

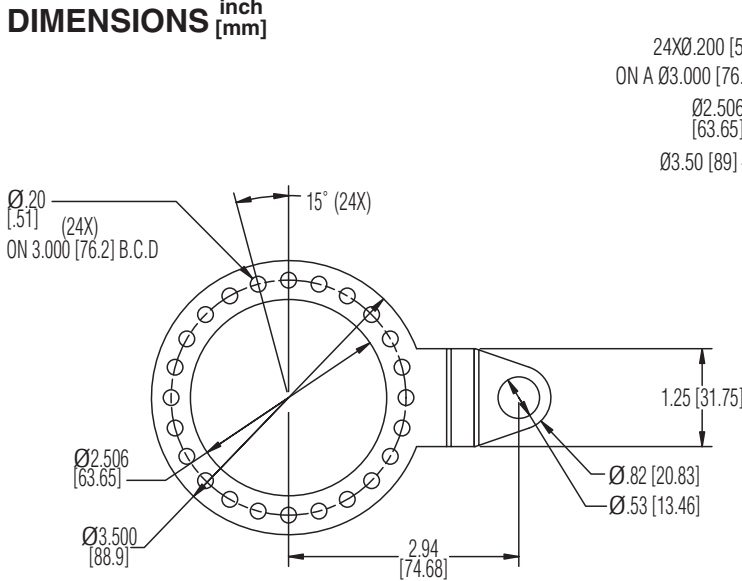
- * 1) Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.
- 2) "MS" type mating connectors and prebuilt cables are rated NEMA 12. "M12" Cable assemblies are rated IP67
- 3) For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX.

DIMENSIONS inch [mm]

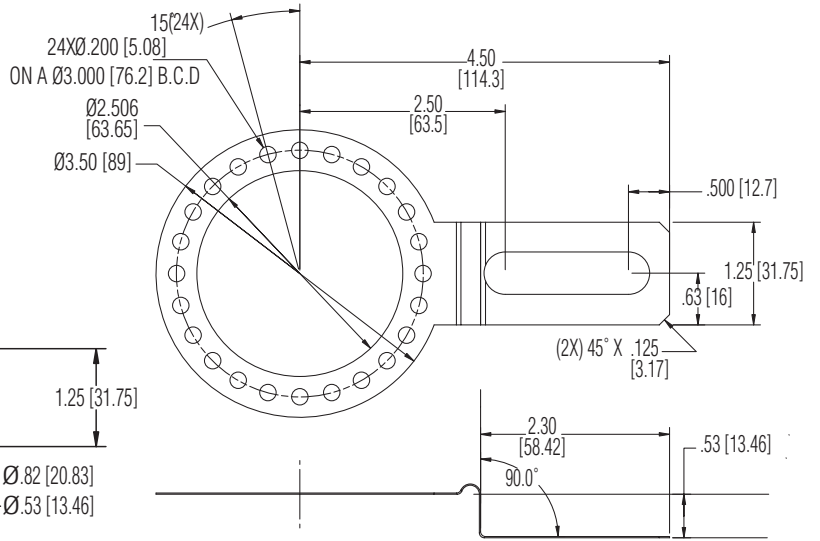
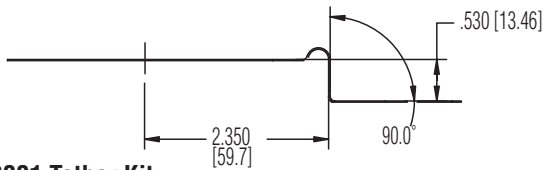


SERIES HS35R

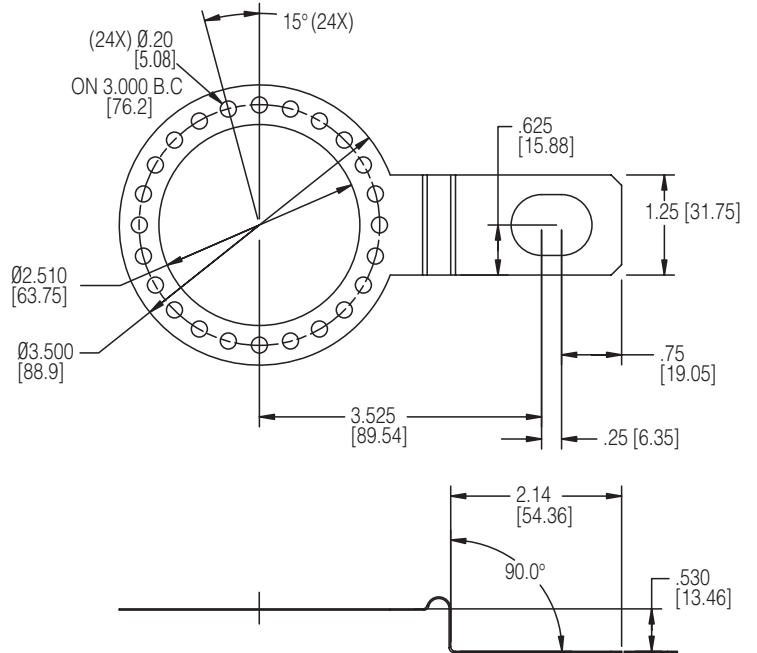
DIMENSIONS ^{inch}
[mm]



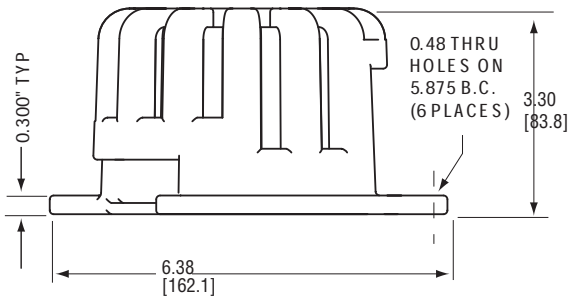
114573-0001 Tether Kit



114574-0001 Slotted Tether Kit



114575-0001 Tether Kit



OPTIONAL SAFETY COVER(S)

SERIES RI80E

Hengstler™ brand

Hollowshaft Encoder

Key Features

- **Advanced Opto-ASIC Provides Fault Detection**
- **Oversized Bearings for Long Life**
- **Unbreakable Code Disc**
- **Specifically Designed for Elevator Geared Traction Drives**



SPECIFICATIONS

MECHANICAL

Shaft fixation: Keyway, set screw
Coupling: Spring tether (single, double)
Protection: IP50, IP64
Max. Speed: 3600 min⁻¹ (IP50); 1500 min⁻¹ (IP64)
Moment of inertia: 240 kgmm²
Max. parallel shaft misalignment:
 Axial: ± 0.5 mm
 Radial: ± 0.05 mm
Operating temperature: -20 ... +70 °C
Storage temperature: -40 ... +70 °C
Housing Material: Glass fiber-reinforced plastic/
 aluminum
Weight: 1000 g

ELECTRICAL

General design: As per DIN EN 61010, protection class III, Contamination level 2, over voltage class II
Supply voltage: DC 5V ±10% or DC 5-30V¹
Max. current: w/o load max 60mA (DC 5V), 60mA (DC 10V), 35mA (DC 24V)
Standard output versions:
 With RS 422 (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , Alarm, Sense
 With push-pull (K): A, B, N, Alarm
 With push-pull (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , Alarm, Sense
Connection: Sub-D 15-pole, cable radial

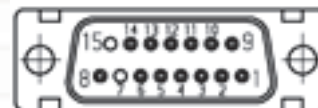
¹ Pole protection with supply voltage DC 5 ... 30 V

ELECTRICAL CONNECTIONS

Pin	Signal 15 pole	Signal 9 pole
1	\bar{B}	GND
2	B	+Ub
3	\bar{A}	A
4	A	B
5	GND	N
6	+Ub	\bar{A}
7	n.c.	\bar{B}
8	screen	\bar{N}
9	\bar{N}	
10	N	
11	n.c.	
12	n.c.	
13	n.c.	
14	n.c.	
15	n.c.	

Color	RS 422 + Alarm + Sense (R)	Push-pull (K)	Push-pull Complement. (I)
brown	Channel A	Channel A	Channel A
green	Channel \bar{A} Channel		\bar{A}
grey	Channel B	Channel B	Channel B
pink	Channel \bar{B} Channel		\bar{B}
red	Channel N	Channel N	Channel N
black	Channel \bar{N} Channel		\bar{N}
violet	Alarm	Alarm	Alarm
white	Sense GND		Sense GND
blue	Sense V _{CC}		Sense V _{CC}
brown/green	DC 5 - 30 V	DC 5 - 30 V	DC 5 - 30 V
white/green	GND	GND	GND
screen ¹	screen ¹	screen ¹	screen ¹

¹ connected with encoder housing



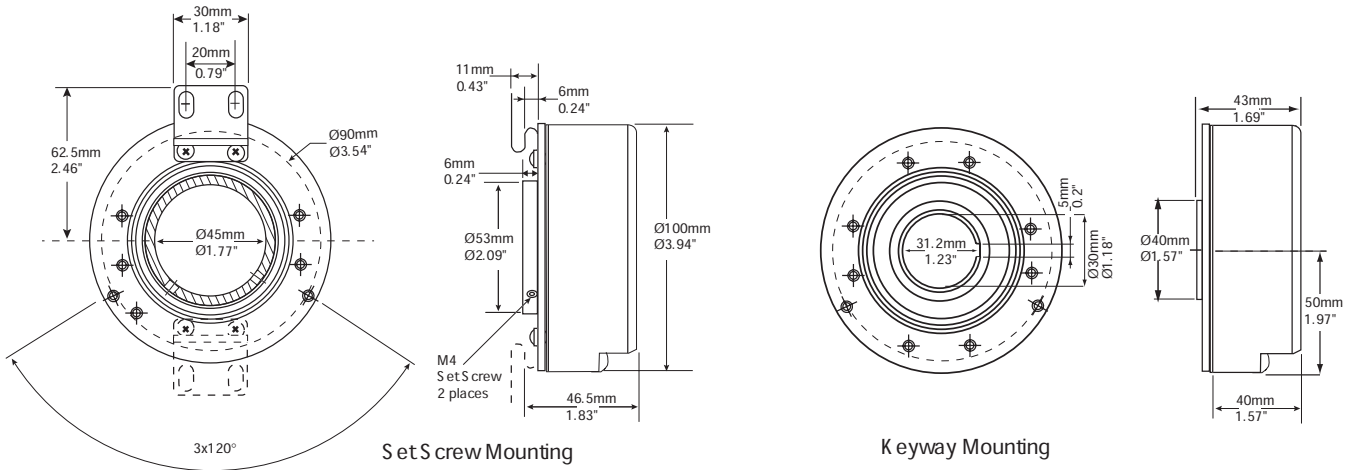
Ordering Information

To order, complete the model number with code numbers from the table below.

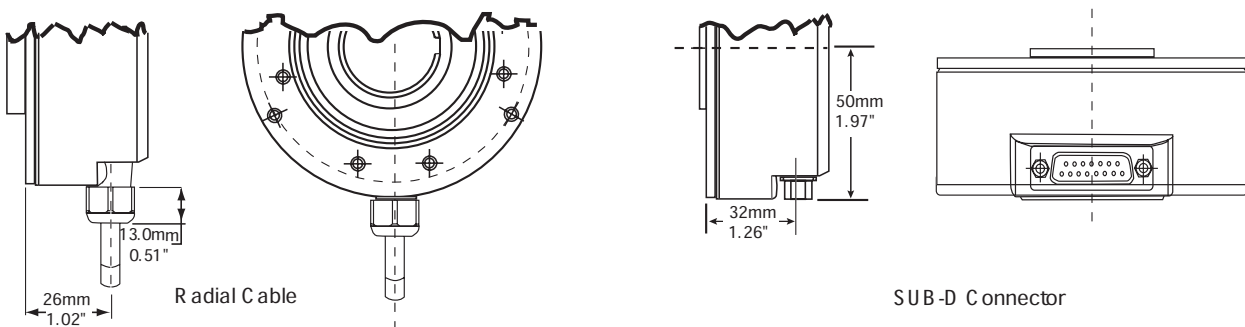
Code 1: Model	Code 2: Resolution	Code 3: Voltage	Code 4: Mounting	Code 5: Protection	Code 6: Shaft Fixing	Code 7: Shaft Size	Code 8: Output	Code 9: Connection	Code 10: Cable Length
Ordering Information									
RI80E	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
RI80E	1024 2048 4096 5000	A 5 VDC B 5-30VDC	O No Tether A Single Tether B Dual Tether	0 IP40 1 IP50 4 IP64	K Keyway G Setscrew	30 30mm 32 32mm 38 38mm 45 45mm	I Push-Pull, Diff+Alarm with Voltage B K Push-Pull + Alarm with Voltage B R RS422 + Alarm with Voltage A or B	F Radial Cable 3 9 pin d-Sub Connector 4 15 pin d-Sub Connector	Blank 1.5m (standard) DO 3m FO 5m KO 10m PO 15m UO 20m VO 25m

DIMENSIONS

Codes 4, 6: Tether, Mounting/Shaft



Code 8: Connections



SERIES HA26

Dynapar™ brand

Integral Coupling Encoder

Key Features

- Industry Standard 2.5" Rugged Encoder Size
- Integral Coupling and Flange Provide Thermal and Electrical Isolation
- Field Replaceable Coupling



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shafts coupling: accepts 1/4", 3/8" and 1/2" motor or machinery shafts

Shafts alignment: 0.002" max. TIR runout; 0.005" max. radial offset; 3° max. angular

Shaft Speed: 5,000 RPM max.

Starting Torque: (max at 25 °C) 1.0 oz-in;

Moment of Inertia: 4.3×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof)



SERIES HA26

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HA526	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Ordering Information						
HA526 Size 25 with Integral Coupling and Flange Adapter, Glass Code Disk	0001 0600 0005 0625 0010 0635 0012 0720 0050 0800 0060 0900 0100 1000 0120 1024 0150 1200 0180 1250 0200 1270 0240 1500 0250 1600 0256 1800 0300 1968 0360 2000 0400 2048 0500 2400 0512 2500 2540	A Flange Adapter with Pilot B Flange Adapter without Pilot C Flange Adapter for NEMA Size 42 Motors	7 Pin Connector or Cable 0 Single Ended, no Index, Format A, Table 1 1 Single Ended, with Index, Format A, Table 1 4 Single Ended, with Index, Format B, Table 1 A Single Ended, with Index, Format C, Table 1 C Single Ended, no Index, Format C, Table 1 G Single Ended, with Index, Format D, Table 1	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Differential Line Driver out (7272) 4 5-26V in; 5-26V Differential Line Driver out (7272) 5 5-26V in, 5 V Differential Line Driver out (4469) 6 5-15V in, 5-15 V Differential Line Driver out (4469)	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
	For Resolutions above 2540, see Series HC526			10 Pin Connector or Cable 2 Differential, no Index, Format A, Table 2 3 Differential, with Index, Format A, Table 2 5 Differential, with Index, Format B, Table 2 B Differential, with Index Format C, Table 2 D Differential, no Index, Format C, Table 2		
			5 Pin M12 Connector H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4			
			8 Pin M12 Connector P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range		
605512-0020	Flexible Coupling 3/8"; 1/4", 3/8", 1/2"					

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 5, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

*Cable Accessory: P/N 14004310010

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH

*Cable Accessory: P/N 14006350010

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	–	–	–	–	3	BRN/WHT
Sig. \bar{B}	–	–	–	–	5	ORG/WHT
*Sig. \bar{Z}	–	–	–	–	8	YEL/WHT

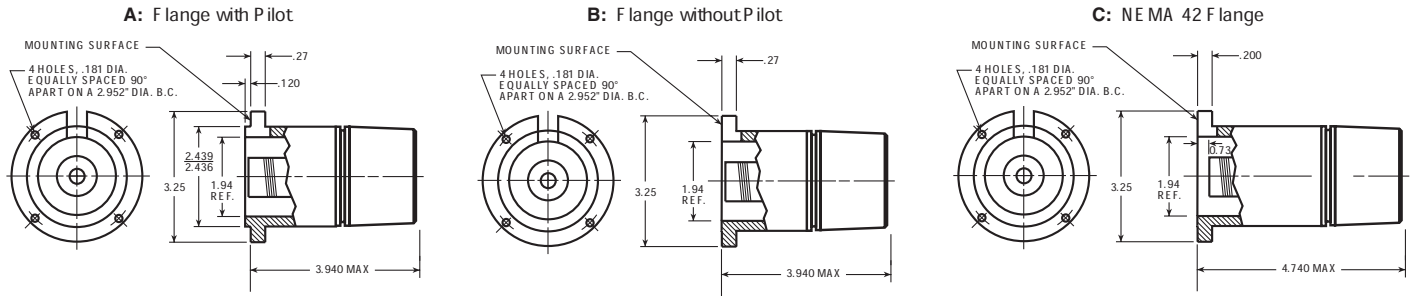
* Index not provided on all models. See ordering information

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

Code 3: Mechanical



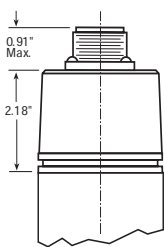
Mating shaft lengths: Typically: 0.5" max. available into the coupling as measured from the A/B mounting surface.
1.3" max. available into the coupling as measured from the C mounting surface.

Code 4: Output

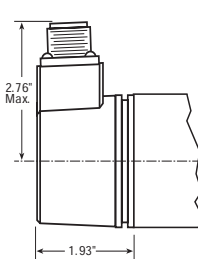


Code 6: Termination

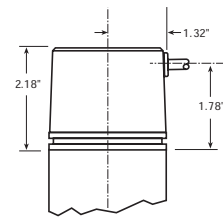
0: End MS Connector
When Code 5 is 0 to 5 or A to G



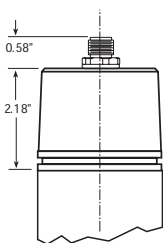
1: Side MS Connector
When Code 5 is 0 to 5 or A to G



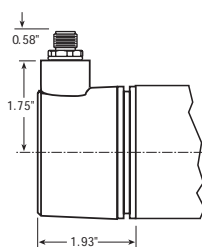
2 - A: Side Cable



0: End M12 C connector
When Code 5 is H to Z



1: Side M12 C connector
When Code 5 is H to Z



SERIES HR26

Dynapar™ brand

Integral Coupling Encoder

Key Features

- **Unbreakable Code Disc with Rugged Dual Row Bearings**
- **Integral Coupling and Flange Provide Thermal and Electrical Isolation**
- **Field Replaceable Coupling**



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 1024 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ± 7.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $180^\circ \pm 18^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA sink or source

Frequency Response: 100 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5)

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shaft coupling: accepts 1/4", 3/8" and 1/2" motor or machinery shafts

Shafts alignment: 0.002" max. TIR runout; 0.005" max. radial offset; 3° max. angular

Shaft Speed: 10,000 RPM max.

Starting Torque: (max at 25 °C) 1.0 oz-in

Moment of Inertia: 4.3×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof)



SERIES HR26

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HR526	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Ordering Information						
HR526 Size 25 with Integral Coupling and Flange Adapter	0001 0250 0005 0256 0010 0300 0012 0360 0050 0400 0060 0500 0086 0512 0100 0600 0120 0635 0125 0800 0180 0900 0200 1000 0240 1024	A Flange Adapter with Pilot B Flange Adapter without Pilot C Flange Adapter for NEMA Size 42 Motors	7 Pin Connector or Cable 0 Single Ended, no Index, Format A, Table 1 1 Single Ended, with Index, Format A, Table 1 4 Single Ended, with Index, Format B, Table 1 A Single Ended, with Index, Format C, Table 1 C Single Ended, no Index, Format C, Table 1 G Single Ended, with Index, Format D, Table 1	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Differential Line Driver out (7272) 4 5-26V in; 5-26V Differential Line Driver out (7272) 5 5-26V in, 5 V Differential Line Driver out (4469) 6 5-15V in, 5-15 V Differential Line Driver out (4469)	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
			10 Pin Connector or Cable 2 Differential, no Index, Format A, Table 2 3 Differential, with Index, Format A, Table 2 5 Differential, with Index, Format B, Table 2 B Differential, with Index Format C, Table 2 D Differential, no Index, Format C, Table 2			
			5 Pin M12 Connector H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4			
			8 Pin M12 Connector P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range		
605512-0020	Flexible Coupling 3/8"; 1/4", 3/8", 1/2"					

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

SERIES HR26

Dynapar™ brand

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 5, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Table 1 – Single Ended			
Pin	Function (If Used)	Wire Color Code	Cable Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

Cable Accessory: P/N 14004310010

Table 2 – Differential			
Pin	Function (If Used)	Wire Color Code	Cable Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH

Cable Accessory: P/N 14006350010

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	–	–	–	–	3	BRN/WHT
Sig. \bar{B}	–	–	–	–	5	ORG/WHT
†Sig. \bar{Z}	–	–	–	–	8	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

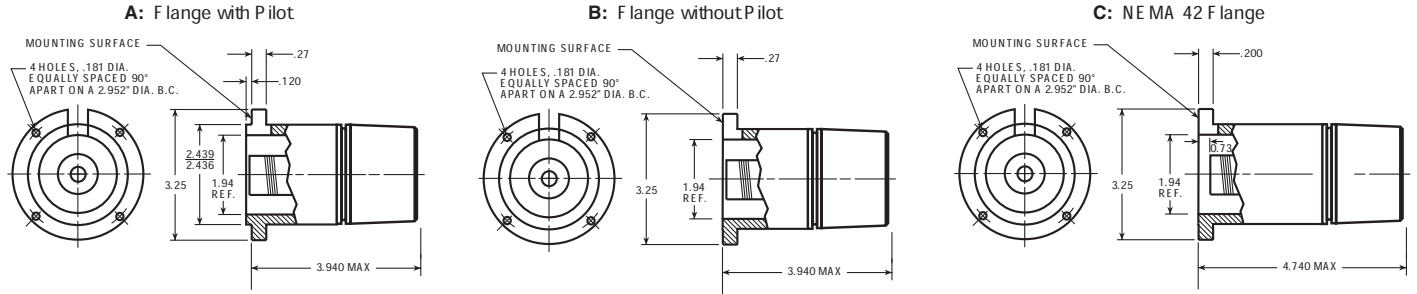
*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.

†Note: Index not provided on all models. See ordering information

See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

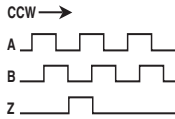
Code 3: Mechanical



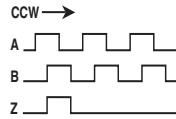
Mating shaft lengths: Typically: 0.5" max. available into the coupling as measured from the A/B mounting surface.
1.3" max. available into the coupling as measured from the C mounting surface.

Code 4: Output

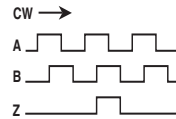
0 - 3: Format A



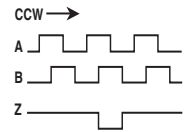
4 - 5: Format B



6 - D: Format C



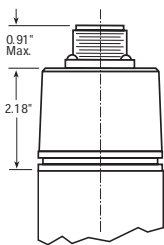
G: Format D



Code 6: Termination

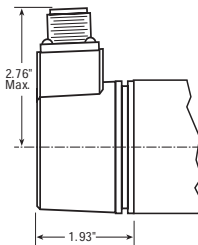
0: End MS Connector

When Code 5 is 0 to 5 or A to G

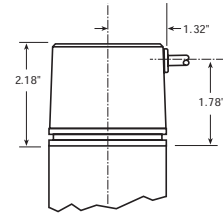


1: Side MS Connector

When Code 5 is 0 to 5 or A to G

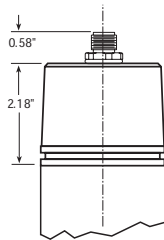


2 - A: Side Cable



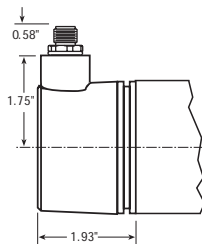
0: End M12 C Connector

When Code 5 is H to Z



1: Side M12 C Connector

When Code 5 is H to Z



SERIES HC26

Dynapar™ brand

Integral Coupling Encoder

Key Features

- High 5000PPR Resolution Available
- Integral Coupling and Flange Provide Thermal and Electrical Isolation
- Field Replaceable Coupling

CE



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 3000 to 5000 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) $\pm 10.8^\circ/\text{PPR}$

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: $90^\circ \pm 25^\circ$ electrical

Symmetry: $180^\circ \pm 25^\circ$ electrical

Index: $90^\circ \pm 25^\circ$ electrical (gated with B low)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 250 kHz min.

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

MECHANICAL

Shafts coupling: accepts 1/4", 3/8" and 1/2" motor or machinery shafts

Shafts alignment: 0.002" max. TIR runout; 0.005" max. radial offset; 3° max. angular

Shaft Speed: 10,000 RPM max.

Starting Torque: (max at 25 °C) 1.0 oz-in

Moment of Inertia: 4.3×10^{-4} oz-in-sec²

ENVIRONMENTAL

Operating Temperature:

Standard: 0 to +70 °C;

Extended: -40 to +85 °C

Storage Temperature: -40 to +90 °C

Shock: 50 G's for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G's

Humidity: to 98% without condensation

Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof)



SERIES HC26

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HC526	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Ordering Information						
HC526 Size 25 Enclosed with Integral Coupling and Flange Adapter	3000 3,000 3600 3,600 4096 4,096 5000 5,000	A Flange Adapter with Pilot B Flange Adapter without Pilot C Flange Adapter for NEMA Size 42 Motors	7 Pin Connector or Cable 0 Single Ended, no Index, Format A, Table 1 1 Single Ended, with Index, Format A, Table 1 4 Single Ended, with Index, Format B, Table 1 A Single Ended, with Index, Format C, Table 1 C Single Ended, no Index, Format C, Table 1 G Single Ended, with Index, Format D, Table 1 10 Pin Connector or Cable 2 Differential, no Index, Format A, Table 2 3 Differential, with Index, Format A, Table 2 5 Differential, with Index, Format B, Table 2 B Differential, with Index Format C, Table 2 D Differential, no Index, Format C, Table 2 5 Pin M12 Connector H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4 8 Pin M12 Connector P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Differential Line Driver out (7272) 4 5-26V in; 5-26V Differential Line Driver out (7272) A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
	CPLX1250375 Flexible Coupling 3/8" to 1/4", 3/8" or 1/2"					

10 foot Cable Assemblies with MS Connector

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

ELECTRICAL CONNECTIONS

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 5, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

*Cable Accessory: P/N 14004310010

Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal \bar{A}	BRN/WH	BRN/WH
I	Signal \bar{B}	ORN/WH	ORN/WH
J	Signal \bar{Z}	YEL/WH	YEL/WH

*Cable Accessory: P/N 14006350010

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	–	–	–	–	3	BRN/WHT
Sig. \bar{B}	–	–	–	–	5	ORG/WHT
†Sig. \bar{Z}	–	–	–	–	8	YEL/WHT

Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

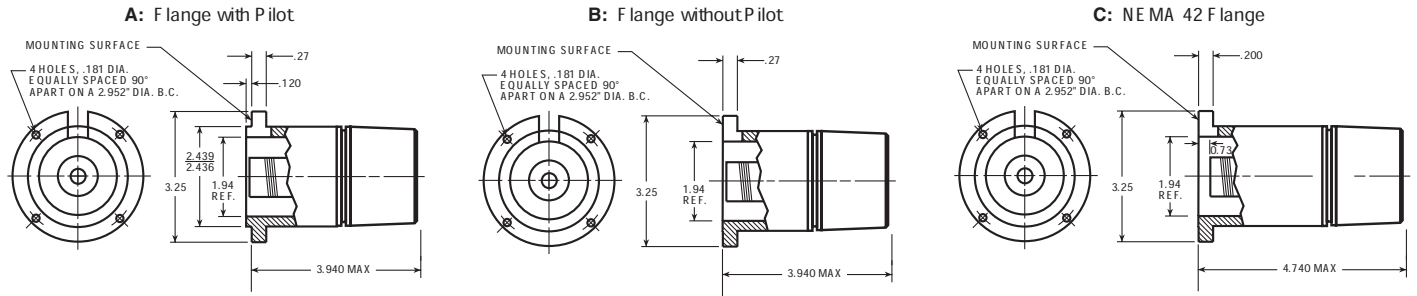
*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.

†Note: Index not provided on all models. See ordering information

See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

DIMENSIONS

Code 3: Mechanical



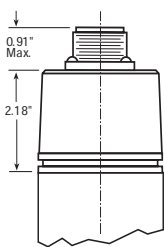
Mating shaft lengths: Typically: 0.5" max. available into the coupling as measured from the A/B mounting surface.
1.3" max. available into the coupling as measured from the C mounting surface.

Code 4: Output

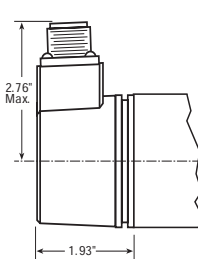


Code 6: Termination

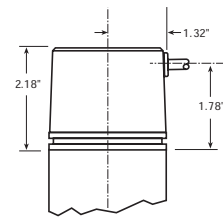
0: End MS Connector
When Code 5 is 0 to 5 or A to G



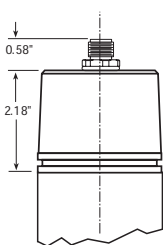
1: Side MS Connector
When Code 5 is 0 to 5 or A to G



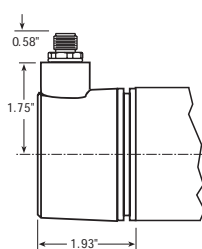
2 - A: Side Cable



0: End M12 C connector
When Code 5 is H to Z



1: Side M12 C connector
When Code 5 is H to Z



SERIES AC36

ACURO

Absolute Encoder

Key Features

- Up to 22 bit Singleturn and 12 bit multiturn true absolute positioning
- Small 38mm diameter housing
- Wide -15 to +100C temperature range



SPECIFICATIONS

ELECTRICAL

Supply Voltage: -5%/ 10% DC 5 V; DC 7-30 V
Max. Current: w/o load 50 mA (ST), 100 mA (MT)
Resolution: singleturn 12 -17 Bit; multiturn 12 Bit
Output Code: Gray, Binary
Drives: Clock and Data / RS422
Incremental signals: Optional Sine-Cosine 1 Vpp
Number of Pulses: 2048
3dB Limiting Frequency: 500 kHz
Alarm Output: Alarm bit (SSI Option), warning and alarm bit (BiSS)

MECHANICAL

Housing Diameter: 37.5 mm
Shaft Diameter: 6 mm (Solid shaft)
Flange (Mounting of housing): Pilot flange
Protection Class Shaft Input (EN 60529): IP64
Protection Class Housing (EN 60529): IP64
Max. Shaft Speed: 10 000 rpm (continuous), 12 000 rpm (short term)
Torque: 0.01 Nm
Moment of Inertia: ca. 2.5×10^{-6} kgm²

ENVIRONMENTAL

Vibration Resistance (DIN EN 60068-2-6): 100 m/s² (10 to 2000 Hz)
Shock resistance (DIN EN 60068-2-27): 1000 m/s² (6 ms)
Operating Temperature: -40°C to +100°C
Storage Temperature: -15°C to +85°C
Weight: approx. 80 g (ST) / 130 g (MT)
Connection: Cable, axial or radial

ELECTRICAL CONNECTIONS

SIGNAL	CABLE COLOR
5 / 7-30 V (U _B)	White
0 V (U _N)	Brown
Clock	Yellow
Clock	Green
Data	Pink
Data	Grey
A	White/Green ¹
\bar{A}	Brown/Green ¹
B	Red/Blue ¹
\bar{B}	Grey/Pink ¹
5V Sensor	Violet ¹
0V Sensor	Black ¹

¹only with "SC"

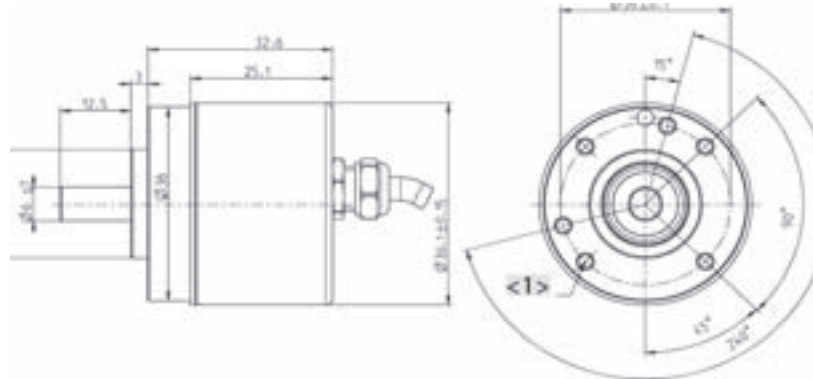
Ordering Information

To order, complete the model number with code numbers from the table below.

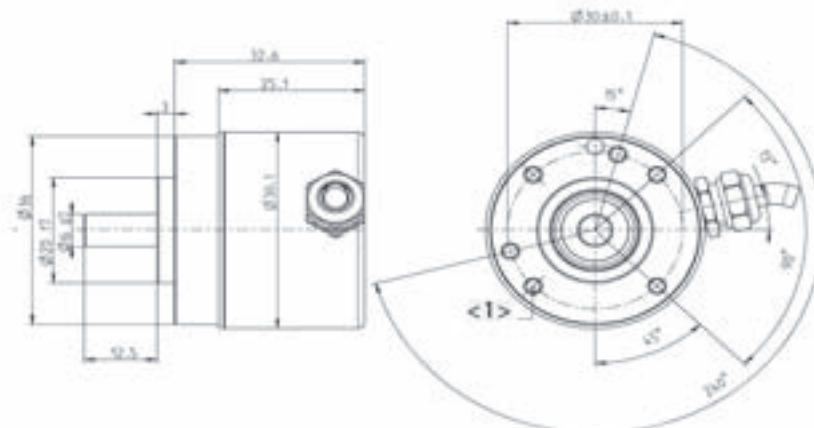
Code 1: Model	Code 2: Resolution	Code 3: Supply Voltage	Code 4: Mounting	Code 5: Protection Class	Code 6: Shaft Size	Code 7: Interface	Code 8: Connection
AC36/	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
Ordering Information							
ACURO Series AC36 Absolute Encoder	<u>Single Turn</u> 0012 0013 0014 0017 Available when Code 7 is BI 0019 0022 <u>Multiturn</u> 1212 1213 1214 1217 Available when Code 7 is BI 1219 1222	A 5 VDC E 7-30 VDC	R Round Flange	4 IP 64	1 6mm	BI BISS SB SSI Binary SC SSI Gray + sin/cos 1Vpp SG SSI Gray	A Cable, axial, 1.5m, 12 pole B Cable, radial, 1.5m, 12 pole

DIMENSIONS

Axial



Radial



SERIES AI25 DeviceNet

ACURO

Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- DeviceNet Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14 Bit

Multi-turn Resolution: 12 bit

Linearity: +/- 1/2 LSB

Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)

Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)

Code format: Binary
Electrical

Connection: Bus Cover with spring terminal clamps

Supply voltage: 10-30 VDC

Intrinsic current consumption: 200 mA (ST), 220 mA (MT)

Baud Rate: 125, 250, 500 kBaud

Interface: CAN Highspeed according to ISO/DIS 11898, CAN Specification 2.0 B (11 and 29 bit identifier)

Protocol: According to DeviceNet V2.0

Transfer mode:

Poll mode

Bit strobe (time-synchronous for all devices)

Change of State (automatic after change of values) Cyclic, with adjustable cycle timer

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping

Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Body Diameter: 58 mm, nominal

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 85° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

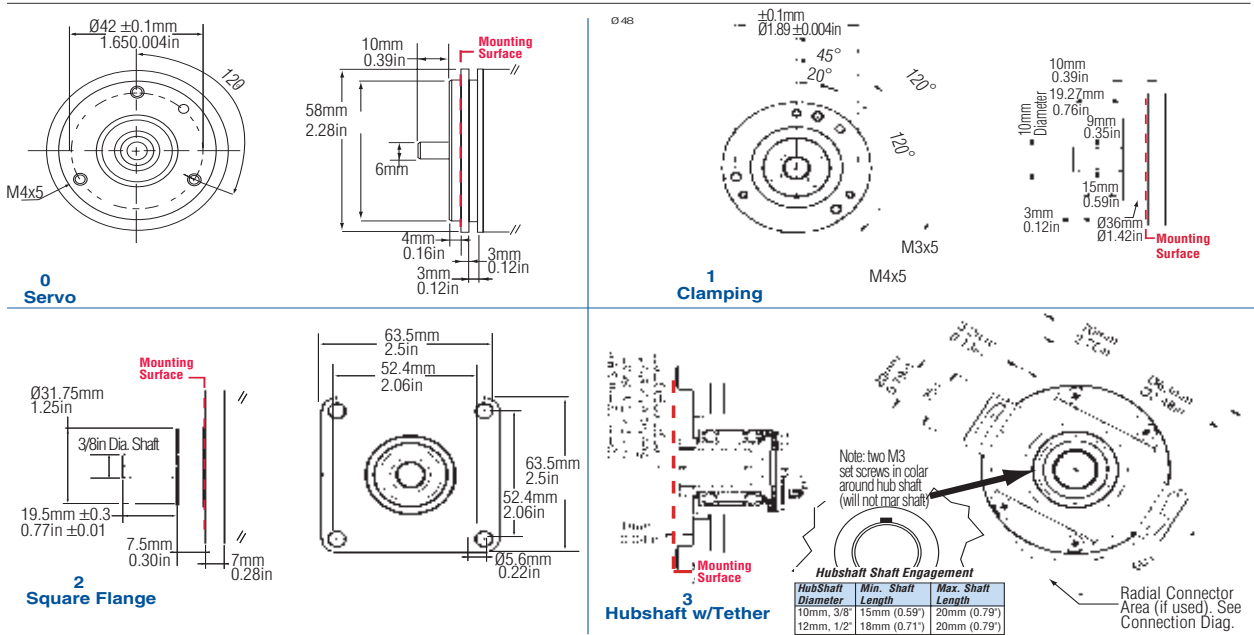
Ordering Information

To order, complete the model number with code numbers from the table below:

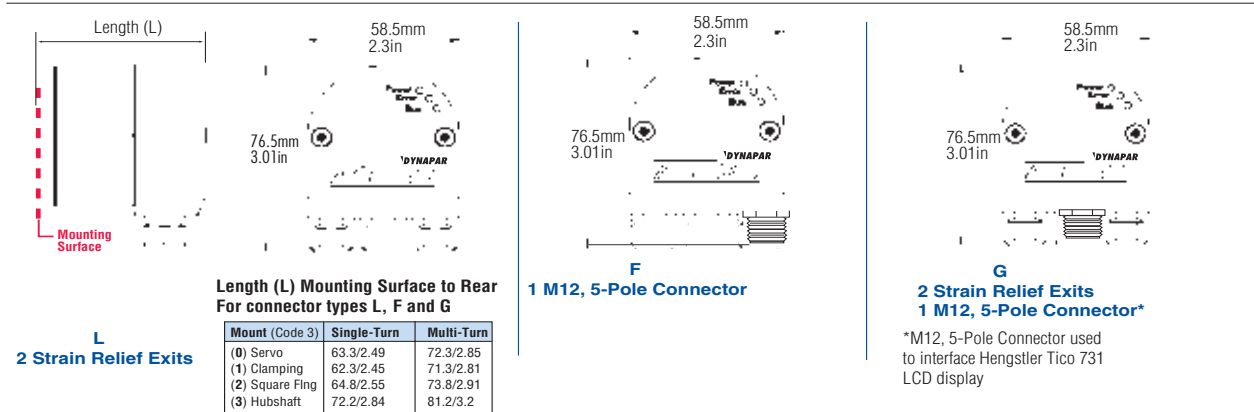
Code 1: Mdel	Code 2 Bits	Code 3: Mounting	Code 4 Shaft Size	Code 5 Protocol	Code 6 Electrical	Code 7: Connector
AI25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AI25 Size 25 Acuro Absolute Encoder	Single-Turn 0010 10Bit 0012 12Bit 0013 13Bit 0014 14Bit Multi-Turn 1212 12Bit Multi-Turn, 12Bit Single-Turn 1213 12Bit Multi-Turn, 13Bit Single-Turn 1214 12Bit Multi-Turn, 14Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/Tether† * 58mm Dia. ** 2.5" Square † 63mm BC	w/o shaft seal (IP64) 0 6mm 1 3/8" 2 10mm 3 3/8" Hub Shaft 4 12mm Hubshaft 5 1/2" Hubshaft 6 10mm Hub Shaft w/ shaft seal (IP67) A 6mm B 3/8" C 10mm	9 Devicenet	2 10-30VDC	F Bus Cover 1 M12, 5-Pole Connector G Bus Cover 2 Strain Relief Exits and 1 M12, 5-Pole Connector (for Tico display). Internal T-coupler included L Bus Cover 2 Strain Relief Exits. Internal T-coupler included

DIMENSIONS

Code 3: Mounting



Code 7: Connector



SERIES AI25 CAN Open

ACURO

Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- CAN Open Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14 Bit

Multi-turn Resolution: 12 bit

Linearity: +/- 1/2 LSB

Absolute Accuracy: ± 0.01° mechanical (36 arc-sec.)

Repeatability: ± 0.002° mechanical (7.2 arc-sec.)

Code format: Binary
Electrical

Connection: Bus Cover with spring terminal clamps; 12 pin Conin CW; Cable with Pigtail

Supply voltage: 10-30 VDC

Intrinsic current consumption: 200 mA (ST), 220 mA (MT)

Baud Rate: 125, 250, 500 kBaud

Interface: CAN High-Speed according to ISO/DIS 11898.

Protocol: CANopen according to DS 301 with profile DSP 406, programmable encoder according to C2

Transfer mode:

Poll mode

Bit strobe (time-synchronous for all devices)

Change of State (automatic after change of values) Cyclic, with adjustable cycle timer

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping

Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Body Diameter: 58 mm, nominal

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo,

Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 85° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

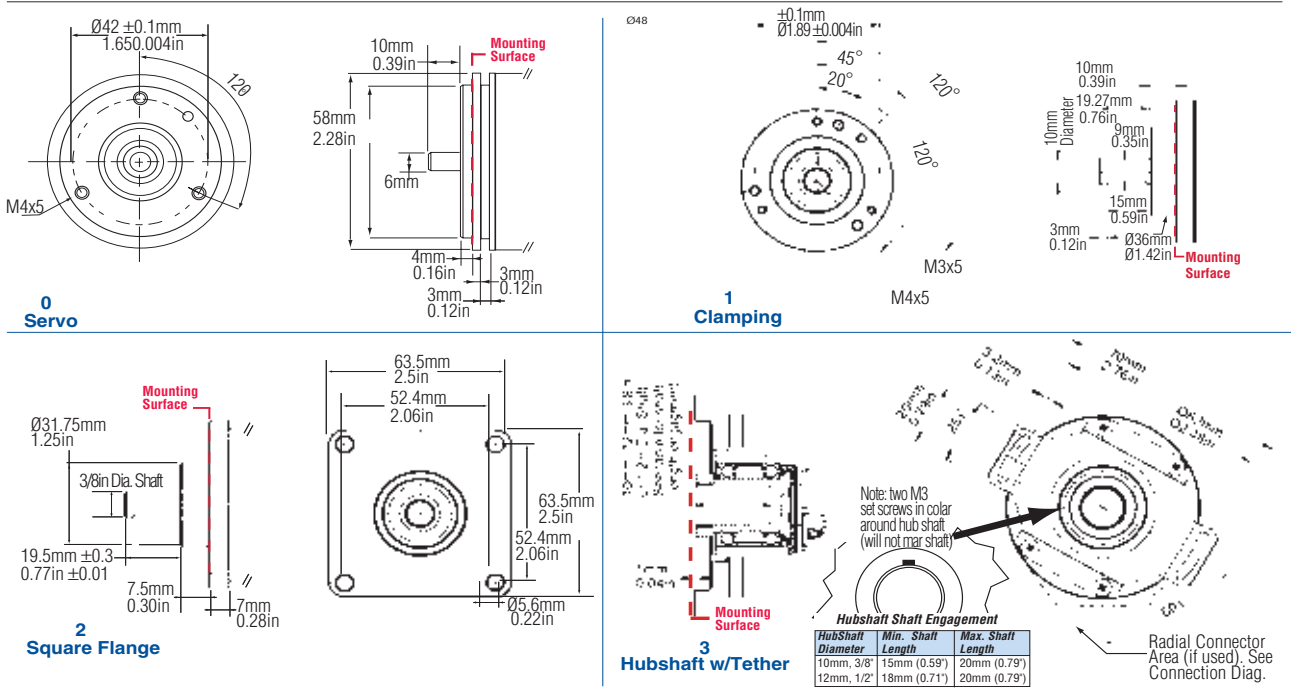
Ordering Information

To order, complete the model number with code numbers from the table below:

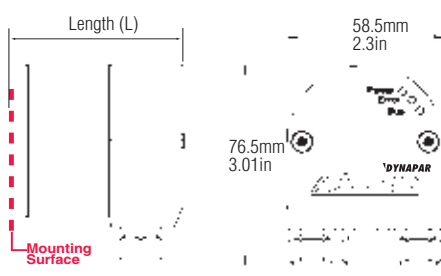
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AI25 Size 25 Acuro Absolute Encoder	Single-Turn 0010 10Bit 0012 12Bit 0013 13Bit 0014 14Bit Multi-Turn 1212 12Bit Multi-Turn, 12Bit Single-Turn 1213 12Bit Multi-Turn, 13Bit Single-Turn 1214 12Bit Multi-Turn, 14Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/Tether†	w/o shaft seal (IP64) 0 6mm 1 3/8" 2 10mm 3 3/8" Hub Shaft 4 12mm Hubshaft 5 1/2" Hubshaft 6 10mm Hub Shaft w/ shaft seal (IP67) A 6mm B 3/8" C 10mm	8 CANopen	2 10-30VDC	0 1.5m Axial Cable 1 1.5m Radial Cable 2 M23 Conin 12 pin Axial CW 3 M23 Conin 12 pin Radial CW F Bus Cover 1 M12, 5-Pole Connector L Bus Cover 2 Strain Relief Exits. Internal T-coupler included

DIMENSIONS

Code 3: Mounting



Code 7: Connector



Length (L) Mounting Surface to Rear For connector types L, and F

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	63.3/2.49	72.3/2.85
(1) Clamping	62.3/2.45	71.3/2.81
(2) Square Flange	64.8/2.55	73.8/2.91
(3) Hubshaft	72.2/2.84	81.2/3.2

2 Strain Relief Exits

SERIES AI25 CANLayer 2

ACURO

Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- CANbus CAN Layer 2 Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14 Bit

Multi-turn Resolution: 12 bit

Linearity: +/- 1/2 LSB

Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)

Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)

Code format: Binary
Electrical

Connection: Bus Cover with spring terminal clamps; 12 pin Conin CW; Cable with Pigtail

Supply voltage: 10-30 VDC

Intrinsic current consumption: 220 mA (ST), 250 mA (MT)

Baud Rate: Range of 10 through 1000 Kbits/s

Interface: CAN High-Speed according to ISO/DIS 11898

Protocol: CAN 2.0A

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping

Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Body Diameter: 58 mm, nominal

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo,

Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 85° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

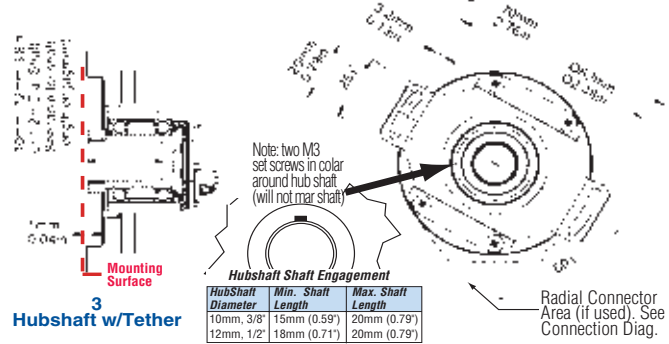
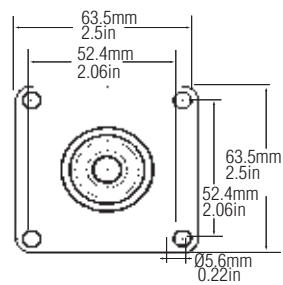
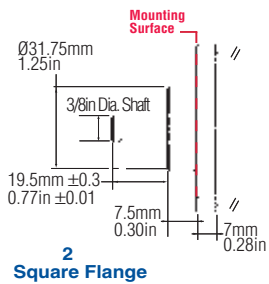
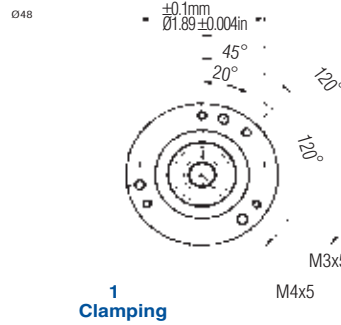
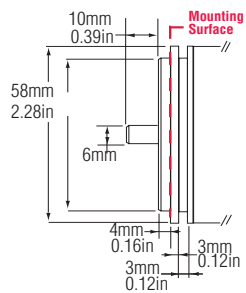
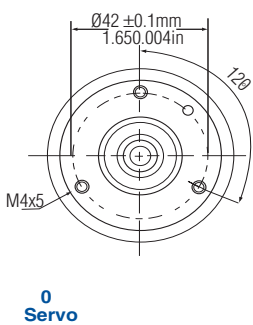
Ordering Information

To order, complete the model number with code numbers from the table below:

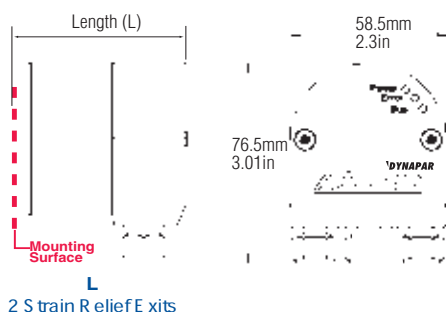
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AI25 Size 25 Acuro Absolute Encoder	Single-Turn 0010 10 Bit 0012 12 Bit 0013 13 Bit 0014 14 Bit Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn 1213 12 Bit Multi-Turn, 13 Bit Single-Turn 1214 12 Bit Multi-Turn, 14 Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether†	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm	7 CAN L2	2 10-30 VDC	0 1.5m Axial Cable 1 1.5m Radial Cable 2 M23 Conin 12 pin Axial CW 3 M23 Conin 12 pin Radial CW F Bus Cover 1 M12, 5-Pole Connector L Bus Cover 2 Strain Relief Exits. Internal T-coupler included

DIMENSIONS

Code 3: Mounting



Code 7: Connector



Length (L) Mounting Surface to Rear For connector types L, and F

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	63.3/2.49	72.3/2.85
(1) Clamping	62.3/2.45	71.3/2.81
(2) Square Flange	64.8/2.55	73.8/2.91
(3) Hubshaft	72.2/2.84	81.2/3.2

SERIES AI25 Profibus

ACURO

Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- Profibus Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14 Bit
Multi-turn Resolution: 12 bit
Linearity: +/- 1/2 LSB
Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)
Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)
Code format: Binary
 Electrical
Connection: Bus Cover with spring terminal clamps
Supply voltage: 10-30 VDC
Intrinsic current consumption: 200 mA (ST), 220 mA (MT)
Baud Rate: 12 Mbaud
Interface: Profibus-DP, Encoder Profile
Programmable: According to Class 2
Special Functions: Speed, Acceleration

MECHANICAL

Shaft diameter:
 Shaft: 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)
 Hubshaft: 10mm, 12 mm, 3/8", 1/2"
Maximum shaft load:
 6 mm shaft: 13 lb axial, 24 lb radial
 10 mm shaft: 24 lb axial, 35 lb radial
Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)
Starting torque: < 1.4 in-oz
Weight (approx.): 350 g ST, 400 g MT
Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial
Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether
Bearing life:
 1 x 10^{10} revolutions at 35% full rated shaft load
 1 x 10^9 revolutions at 75% full rated shaft load
 1 x 10^8 revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 85° C
Storage Temperature: -40 to 100° C
Enclosure Rating: IP64 or IP67
Shock: 1,000 m/s² (6 ms)
Vibration: 100 m/s² (10 to 2,000 Hz)

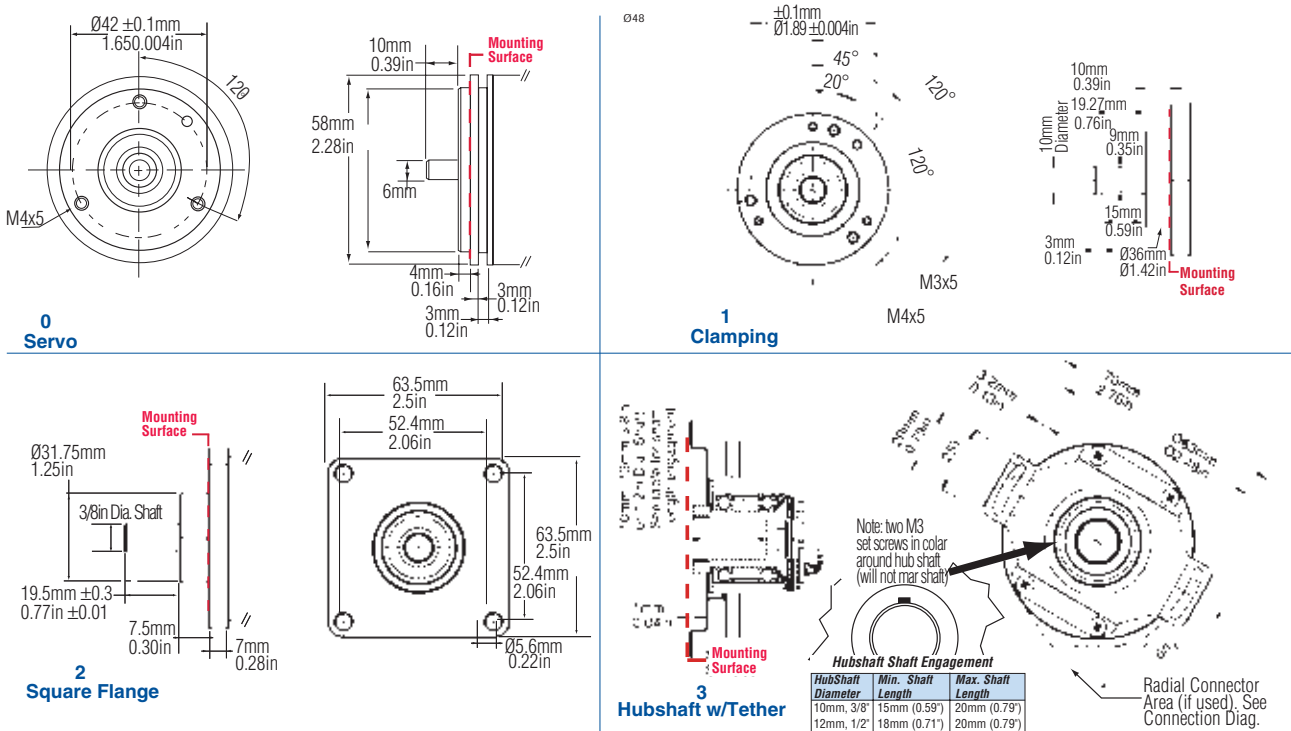
Ordering Information

To order, complete the model number with code numbers from the table below.

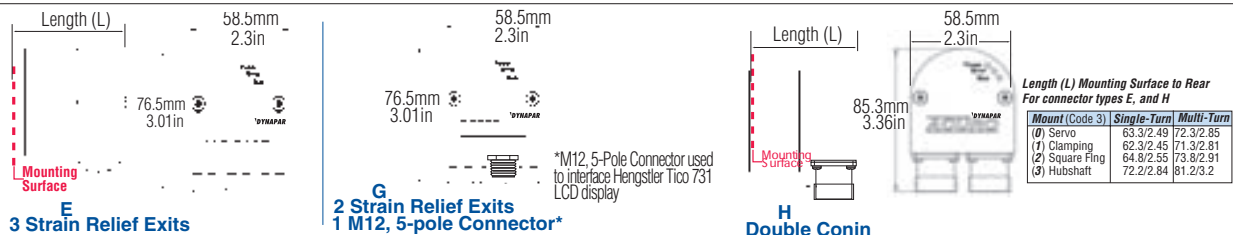
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AI25 Size25 Acuro Absolute Encoder	Single-Turn 0010 10 Bit 0012 12 Bit 0013 13 Bit 0014 14 Bit Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn 1213 12 Bit Multi-Turn, 13 Bit Single-Turn 1214 12 Bit Multi-Turn, 14 Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC.	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm	6 Profibus	2 10-30 VDC	E Bus Cover 3 Strain Relief Exits. Internal T-coupler included G Bus Cover 2 Strain Relief Exits and 1 M12, 5-Pole Connector (for Tico display). Internal T-coupler included H Bus Cover Double Conin. Internal T-coupler included

DIMENSIONS

Code 3: Mounting



Code 7: Connector



SERIES AI25 Interbus

ACURO

Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- Interbus Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12 Bit

Multi-turn Resolution: 12 bit (only available with 12 bit ST resolution)

Linearity: +/- 1/2 LSB

Absolute Accuracy: ± 0.01° mechanical (36 arc-sec.)

Repeatability: ± 0.002° mechanical (7.2 arc-sec.)

Code format: 32 Bit Binary
Electrical

Connection: Bus Cover with spring terminal clamps; cable with connector

Supply voltage: 10-30 VDC

Intrinsic current consumption: 220 mA (ST), 250 mA (MT)

Baud Rate: 500 kBaud according to ENCOM

Interface: Interbus, ENCOM Profile K3 (parameterizable)

Programmable: Direction, scaling factor, preset, offset

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 85° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

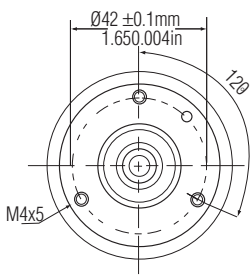
Ordering Information

To order, complete the model number with code numbers from the table below.

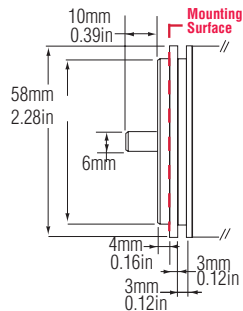
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AI25 Size 25 Auro Absolute Encoder	Single-Turn 0010 10 Bit 0012 12 Bit Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm	5 Interbus K 3	2 10-30 VDC	E Bus Cover 3 Strain Relief Exits. Internal T-coupler included G Bus Cover 2 Strain Relief Exits and 1 M12, 5-Pole Connector (for Tico display). Internal T-coupler included H Double Conin. Internal T-coupler included

DIMENSIONS

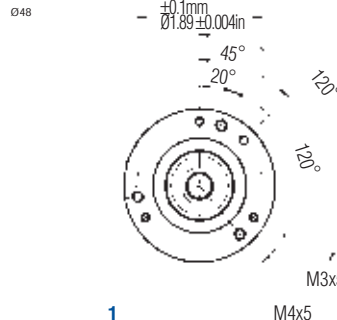
Code 3: Mounting



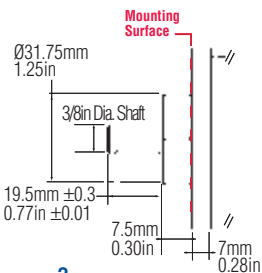
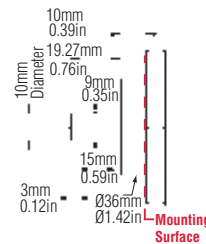
0
Servo



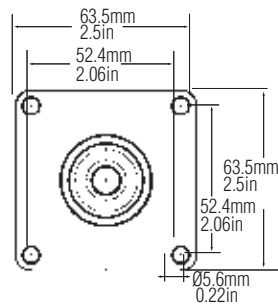
1
Clamping



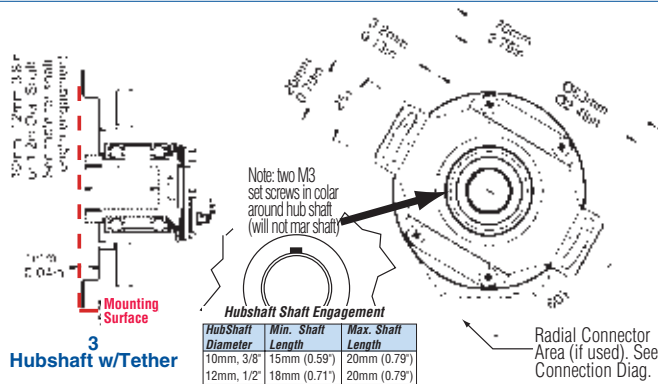
3
Hubshaft w/Tether



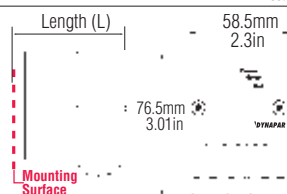
2
Square Flange



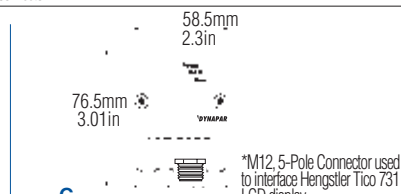
3
Hubshaft w/Tether



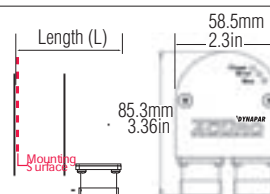
Code 7: Connector



E
3 Strain Relief Exits



G
2 Strain Relief Exits
1 M12, 5-pole Connector*



H
Double Conin

Length (L) Mounting Surface to Rear For connector types E, and H

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	63.3/2.49	72.3/2.85
(1) Clamping	62.3/2.45	71.3/2.81
(2) Square Flange	64.8/2.55	73.8/2.91
(3) Hubshaft	72.2/2.84	81.2/3.2

SERIES AI25 BiSS

ACURO

Absolute Encoder

Key Features

- Up to 22 Bit True Singleturn Positioning
- Onboard Diagnostics
- BiSS Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14, 17 Bit

Multi-turn Resolution: 12 bit (only available with 12, 13, 14 or 17 bit ST resolution)

Linearity: +/- 1/2 LSB

Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)

Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)

Code format: Binary, Gray, Gray Excess, parameterization through *AcuruSoft*

Parameterization: Resolution code type, sense of rotation, warning, alarm
Electrical

Connection: Cable, M23 - 12 pole Conin connector, M12 - 8-pole connector

Supply voltage: 5 VDC -5%/+10% or 10-30 VDC

Intrinsic current consumption: 50 mA (ST), 100 mA (MT) not including output current

Output current: 60 mA per bit, short circuit protected

Frequency response: 500 kHz

Maximum cable length: 400 m

Control Inputs: Direction

Alarm output: Warning and Alarm bits

Status LED: Green = OK, Red = Alarm (IP64 only)

Preset Switch: Sets encoder to zero output at present mechanical position (IP64 only)

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping

Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 100° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

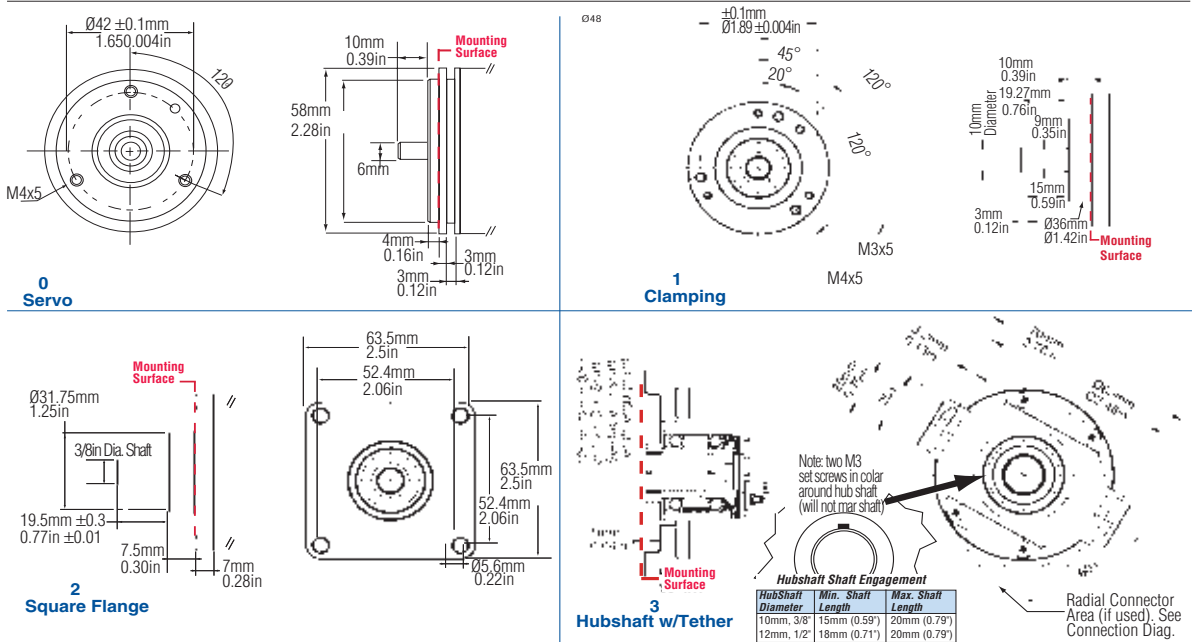
Ordering Information

To order, complete the model number with code numbers from the table below.

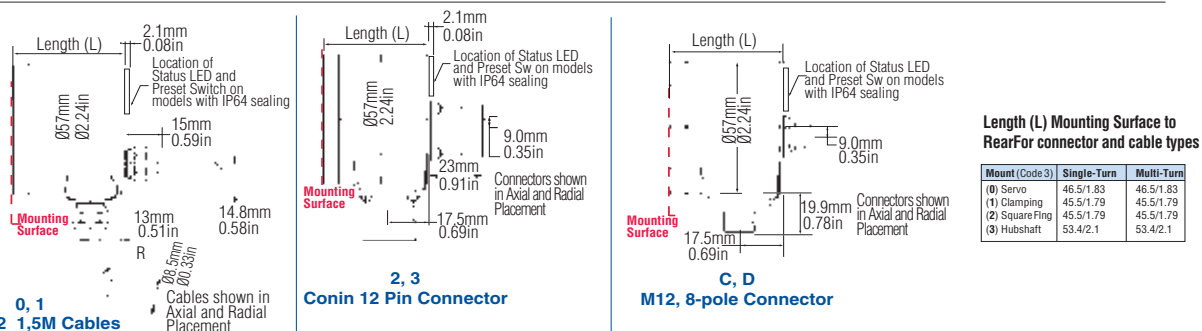
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	□ □ □ □	□	□	□	□	□
AI25 Size25 Acuro Absolute Encoder	Single-Turn 0010 10 Bit 0012 12 Bit 0013 13 Bit 0014 14 Bit 0017 17 Bit Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn 1213 12 Bit Multi-Turn, 13 Bit Single-Turn 1214 12 Bit Multi-Turn, 14 Bit Single-Turn 1217 12 Bit Multi-Turn, 17 Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm	A BiSS	0 5 VDC 2 10-30 VDC	0 1.5m axial cable 1 1.5m radial cable 2 M23 Conin 12 pin axial CW 3 M23 Conin 12 pin radial CW C M12, 8-pole connector axial D M12, 8-pole connector radial

DIMENSIONS

Code 3: Mounting



Code 7: Connector



SERIES AI25 SSI

ACURO

Absolute Encoder

Key Features

- Up to 17 Bit True Singleturn Positioning
- Onboard Diagnostics
- SSI Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14, 17 Bit

Multi-turn Resolution: 12 bit (only available with 12 or 13 bit ST resolution)

Linearity: +/- 1/2 LSB

Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)

Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)

Code format: Binary, Gray, Gray Excess, parameterization through *AcuroSoft*

Parameterization: Resolution code type, sense of rotation, warning, alarm

Electrical

Connection: Cable, M23 - 12 pole Conin connector, M12- 8-pole connector

Supply voltage: 5 VDC -5%/+10% or 10-30 VDC

Intrinsic current consumption: 50 mA (ST), 100 mA (MT) not including output current

Output current: 60 mA per bit, short circuit protected

Frequency response: 500 kHz

Maximum cable length: 400 m

Control Inputs: Direction

Alarm output: Alarm bit

Status LED: Green = OK, Red = Alarm (IP64 only)

Preset Switch: Sets encoder to zero output at present mechanical position (IP64 only)

MECHANICAL

Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping

Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting torque: < 1.4 in-oz

Weight (approx.): 350 g ST, 400 g MT

Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial

Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether

Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load

1 x 10⁹ revolutions at 75% full rated shaft load

1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 100° C

Storage Temperature: -40 to 100° C

Enclosure Rating: IP64 or IP67

Shock: 1,000 m/s² (6 ms)

Vibration: 100 m/s² (10 to 2,000 Hz)

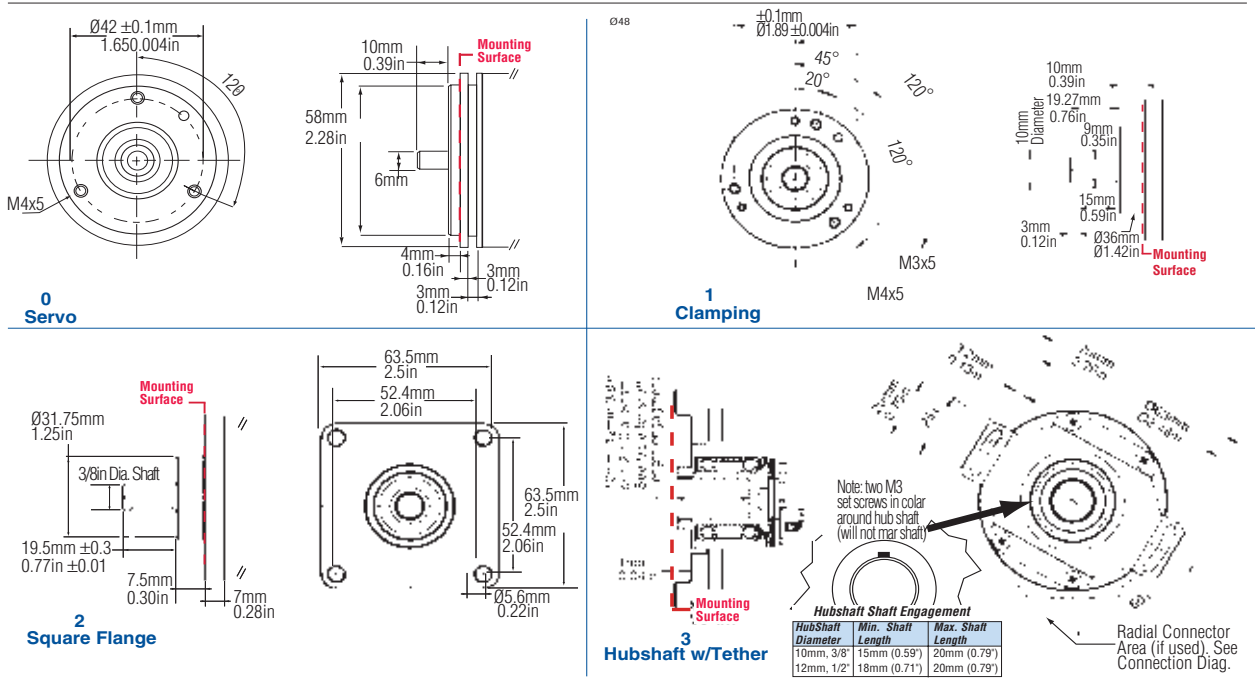
Ordering Information

To order, complete the model number with code numbers from the table below

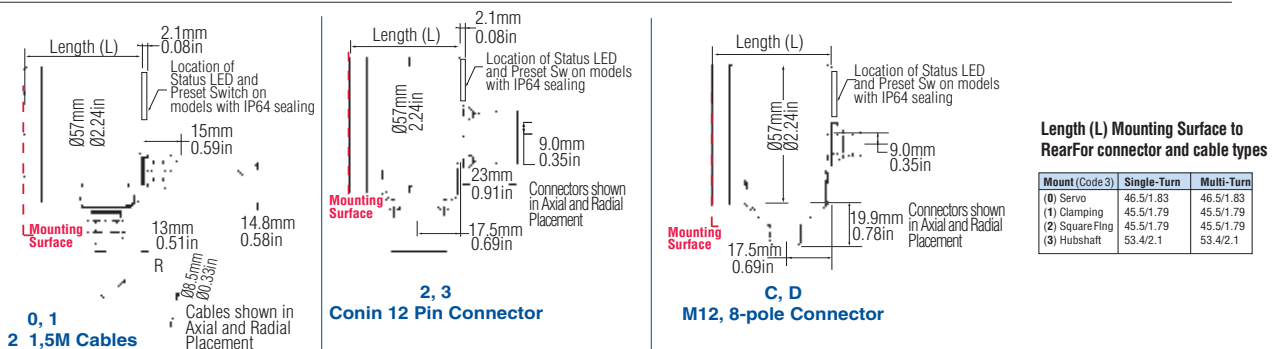
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	□ □ □ □	□	□	□	□	□
AI25 Size25 A curo A bsolute E ncoder	Single-Turn 0010 10 Bit 0012 12 Bit 0013 13 Bit 0014 14 Bit 0017 17 Bit Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn 1213 12 Bit Multi-Turn, 13 Bit Single-Turn	Available when Code 4 is 0 or A 0 Servo* Available when Code 4 is 2 or C 1 Clamping* Available when Code 4 is 1 or B 2 Square flange** Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm	2 SSI Gray 3 SSI Binary	0 5 VDC 2 10-30 VDC	0 1.5m axial cable 1 1.5m radial cable 2 M23 Conin 12 pin axial CW 3 M23 Conin 12 pin radial CW 4 M23 CCW axial 5 M23 CCW Radial C M12, 8-pole connector axial D M12, 8-pole connector radial

DIMENSIONS

Code 3: Mounting



Code 7: Connector



SERIES AI25 SSI



SSI Data Format

Bits	T1 - T10	T11	T12	T13	T14	T15	T16	T17	T18	T19
10	S9 - S0	0	0	0	0	S9	S8	S7	S6	S5
12	S11 - S2	S1	S0	0	0	S11	S10	S9	S8	S7
13	S12 - S3	S2	S1	S0	0	S12	S11	S10	S9	S8
14	S13 - S4	S3	S2	S1	S0	0	S13	S12	S11	S10
17	S16 - S7	S6	S5	S4	S3	S2	S1	S0	0	S16

Bits	T1 - T12	T13 - T21	T22	T23	T24	T25	T26	T27	T28	T29
1212	M11 - M0	S11 - S3	S2	S1	S0	0	0	M11	M10	M9
1213	M11 - M0	S12 - S4	S3	S2	S1	S0	0	M11	M10	M9

S9, S8 Data Bits for resolution per turn.

M11, M10 Data Bits for number of turns.

T1, T2 SSI Clock number

S9 - S0 Data Bits S9, S8, S7, S6, S5, S4, S3 Etc.

M11- M0 Turn Data Bits M11, M10, M9, M8, Etc.

ELECTRICAL CONNECTIONS

Electrical Connections 12 pin CONIN

Wire Color	Pin	Function
Brown	1	0V
Pink	2	Data
Yellow	3	Clock
—	4	N.C.
Blue	5	Direction
Red	6	N.C.
Violet	7	N.C.
White	8	5V / 10-30V
—	9	N.C.
Gray	10	Data
Green	11	Clock
Black	12	0 V Data

12 pin CONIN Connector **Part Number: G3 539 202**

Bulk Cable (sold by the meter) **Part Number: 113101-0001**

Cable Assembly (with Connector)

3 meters **Part Number: G1 542 003**

5 meters **Part Number: G1 542 004**

10 meters **Part Number: G1 542 005**

Electrical Connections 8 pin M12

Wire Color	Pin	Function
White	1	5/10-30 Volt
Brown	2	0 Volt
—	3	N.C.
Green	4	Clock
Pink	5	Data
Yellow	6	Clock
Blue	7	Direction
Gray	8	Data

8 pin M12 Connector **Part Number: G3 539 597**

Bulk Cable (sold by the meter) **Part Number: G3 280 220**

Cable Assembly (with Connector)

3 meters **Part Number: G1 565 329**

5 meters **Part Number: G1 565 330**

10 meters **Part Number: G1 565 331**

SERIES AI25 Parallel



Absolute Encoder

Key Features

- Up to 14 Bit of Singleturn and 12 Bits of True Multiturn Absolute Positioning
- Onboard Diagnostics
- Parallel Interface



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Single-turn Resolution: 10, 12, 13, 14 Bit, 360 PPR, 720 PPR
Multi-turn Resolution: 12 bit (only available with 12 bit ST resolution)
Absolute Accuracy: $\pm 0.01^\circ$ mechanical (36 arc-sec.)
Repeatability: $\pm 0.002^\circ$ mechanical (7.2 arc-sec.)
Code format: Binary, Gray, Gray Excess
Electrical
Connection: Cable, Conin Connector, MS Connector, Cable with Sub-D Connector (MT only)
Supply voltage: 5 VDC -5%/+10%, or 10-30 VDC
Intrinsic current consumption: 200 mA (ST), 300 mA (MT)
Output current: 30 mA per bit, short circuit protected
Frequency response: 500 kHz on single-turn, 1.5m cable.
Update Rate: 1mHz for Single-turn; 100kHz for Multi-turn
Latch Delay: 20 μ Sec.
Alarm output: NPN open collector max 5 mA
Maximum cable length: 100 m
Status LED: Green = OK, Red = Alarm (IP64 only, not available on connector type J)
Preset Switch: Sets encoder to zero output at present mechanical position (Multi-turn IP64

Control Inputs		
Input	Logic Level	Function
Direction	1	Ascending code values when turning clockwise
	0	Descending code values when turning clockwise
Latch	1	Encoder data continuously changing at output
	0	Encoder data stored and constant at output
Tristate (ST)	1	Outputs active
	0	Outputs at high impedance (Tristate mode)
Tristate (MT)	1	Outputs at high impedance (Tristate mode)
	0	Outputs active

only, not available on connector type J)
Control Inputs: Latch, Direction, Tri-state (see table below)

MECHANICAL

Shaft diameter:
 Shaft: 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)
 Hubshaft: 10mm, 12 mm, 3/8", 1/2"
Maximum shaft load:
 6 mm shaft: 13 lb axial, 24 lb radial
 10 mm shaft: 24 lb axial, 35 lb radial
Maximum shaft speed: 10,000 RPM (continuous), 12,000 RPM (peak)
Starting torque: < 1.4 in-oz
Weight (approx.): 350 g ST, 400 g MT
Shaft tolerance (hubshaft only): +/- 1.5 mm axial, +/- 0.2 mm radial
Flange configurations: Square, Clamp, Servo, Hubshaft with flexible tether
Bearing life:

1 x 10¹⁰ revolutions at 35% full rated shaft load
 1 x 10⁹ revolutions at 75% full rated shaft load
 1 x 10⁸ revolutions at 100% full rated shaft load

ENVIRONMENTAL

Operating Temperature: -40 to 100° C
Storage Temperature: -40 to 100° C
Enclosure Rating: IP64 or IP67
Shock: 1,000 m/s² (6 ms)
Vibration: 100 m/s² (10 to 2,000 Hz)

Ordering Information

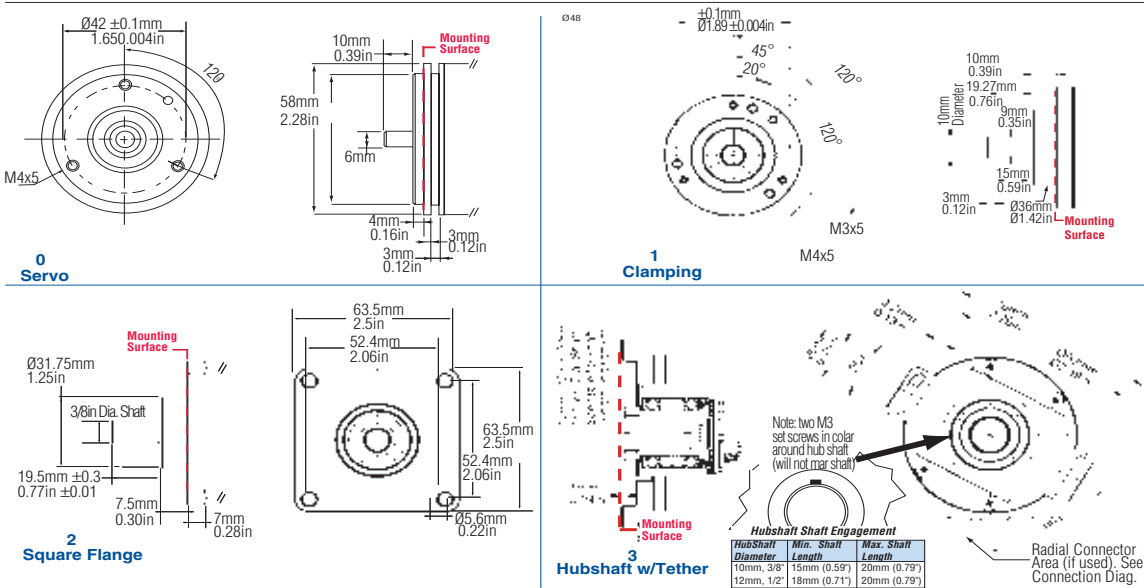
To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
AI25	□ □ □ □	□	□	□	□	□
AI25 Size 25 Absolute Encoder	Single-Turn 0010 10 Bit 0012 12 Bit 0013 13 Bit 0014 14 Bit 0360 360 PPR (Gray excess) 0720 720 PPR (Gray excess)	Available when Code 4 is 0 or A 0 Servo*	w/o shaft seal (IP64) 0 6 mm 1 3/8" 2 10 mm 3 3/8" Hub Shaft 4 12 mm Hubshaft 5 1/2" Hubshaft 6 10 mm Hub Shaft	0 Parallel Binary 1 Parallel Gray	0 5 VDC 2 10-30 VDC	0 1.5m axial cable 1 1.5m radial cable
		Available when Code 4 is 2 or C 1 Clamping*				
	Available when Code 6 is 2 Multi-Turn 1212 12 Bit Multi-Turn, 12 Bit Single-Turn	Available when Code 4 is 1 or B 2 Square flange**	w/ shaft seal (IP67) A 6 mm B 3/8" C 10 mm			Available when Code 2 is 00X X, 0360 or 0720 6 M23 Conin 17 pin axial CW 7 M23 Conin 17 pin radial CW 8 17 pin Conin axial CCW 9 17 pin Conin radial J 17 pin MS axial * K 19 pin Bayonet radial
		Available when Code 4 is 3, 4, 5 or 6 3 Hubshaft w/tether†				Available when Code 2 is 1212 A Cable 1.5m radial w/ 37 pin sub-D B Cable 1.5m axial w/37 pin sub-D

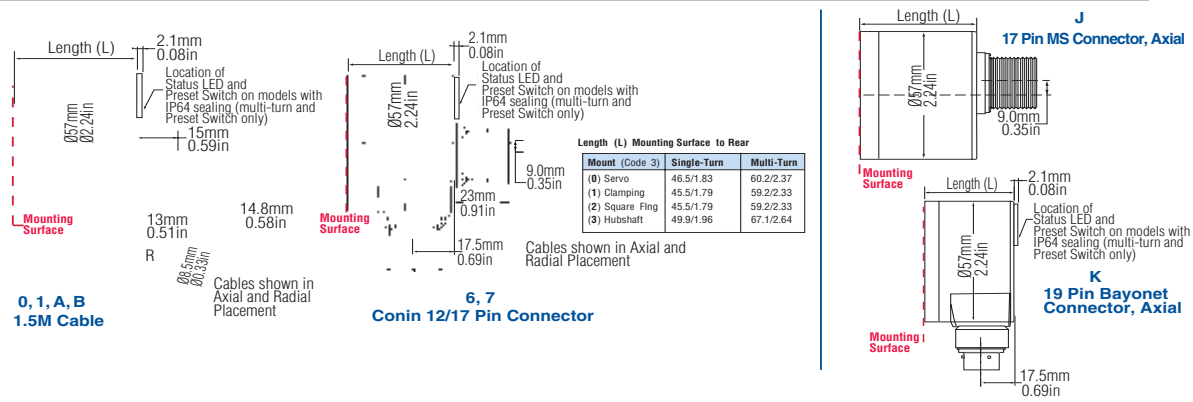
* Status LED and Preset Switch features not available with "J"

DIMENSIONS

Code 3: Mounting



Code 7: Connector



SERIES AI25 Parallel



CONNECTOR WIRING

Explanation of Terms	
Tristate	+UB = Outputs at high impedance (Tristate mode) 0 V ²⁾ = Outputs active
Tristate	+UB ²⁾ = Outputs active 0 V = Outputs at high impedance (Tristate-Mode)
Latch	+UB ²⁾ = Encoder data continuously changing at output 0 V = Encoder data stored and constant at output
Direction	+UB ²⁾ = Ascending code value when turning cw 0 V = Descending code value when turning cw
N.C.	= Not Connected
LSB	= Least Significant Bit
MSB	= Most Significant Bit
S0, S1, ...	= Data bits for resolution per turn
M0, M1, ... (Multiturn)	= Data bits for number of turns

2) 0 r unattached (floating)

PVC-cable (Singleturn) 9-12 Bit			
Color	9 Bit / 360 ³⁾	10 Bit/720 ³⁾	12 Bit
brn/gry	N.C.	N.C.	S0 (LSB)
red/blu	N.C.	N.C.	S1
vio	N.C.	S0 (LSB)	S2
wht/brn	S0 (LSB)	S1	S3
wht/grn	S1	S2	S4
wht/yel	S2	S3	S5
wht/gry	S3	S4	S6
wht/pnk	S4	S5	S7
wht/blu	S5	S6	S8
wht/red	S6	S7	S9
wht/blk	S7	S8	S10
brn/grn	S8 (MSB)	S9 (MSB)	S11 (MSB)
yel	Tristate D0...D8	Tristate D0...D9	Tristate D0... D11
pnk	Latch ⁴⁾	Latch ⁴⁾	Latch ⁴⁾
grn	Direction	Direction	Direction
blk	0 V	0 V	0 V
red	5/10...30VDC	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 9-12 Bit			
Pin	9 Bit / 360 ³⁾	10 Bit / 720 ³⁾	12 Bit
1	S0 (LSB)	S0 (LSB)	S0 (LSB)
2	S1	S1	S1
3	S2	S2	S2
4	S3	S3	S3
5	S4	S4	S4
6	S5	S5	S5
7	S6	S6	S6
8	S7	S7	S7
9	S8 (MSB)	S8	S8
10	N.C.	S9 (MSB)	S9
11	N.C.	N.C.	S10
12	Tristate S0...S8	Tristate S0...S9	S11 (MSB)
13	Latch ⁴⁾	Latch ⁴⁾	Latch ⁴⁾
14	Direction	Direction	Direction
15	0 V	0 V	0 V
16	5/10...30VDC	5/10...30VDC	5/10...30VDC
17	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 13-14 Bit		
Pin	13 Bit	14 Bit
1	S12 (MSB)	S13 (MSB)
2	S11	S12
3	S10	S11
4	S9	S10
5	S8	S9
6	S7	S8
7	S6	S7
8	S5	S6
9	S4	S5
10	S3	S4
11	S2	S3
12	S1	S2
13	S0 (LSB)	S1
14	Direction	S0 (LSB)
15	0 V	0 V
16	5/10...30VDC	5/10...30VDC
17	Latch (Binarycode) Alarm (Graycode)	Latch (Binarycode) Alarm (Graycode)

TPE-cable (Multiturn 13-14 Bit) 37 pol. Sub-D		
Color	Pin	
brn	2	S0
grn	21	S1
yel	3	S2
gry	22	S3
pnk	4	S4
vio	23	S5
gry/pnk	5	S6
red/blu	24	S7
wht/grn	6	S8
brn/grn	25	S9
wht/yel	7	S10
yel/brn	26	S11
wht/gry	8	M0
gry/brn	27	M1
wht/pnk	9	M2
pnk/brn	28	M3
wht/blu	14	M4
brn/blu	33	M5
wht/red	15	M6
brn/red	34	M7
wht/blk	16	M8
brn/blk	35	M9
gry/grn	17	M10
yel/gry	36	M11
pnk/grn	18	Alarm
yel/pnk	10	Direction
grn/blu	30	Latch
yel/blu	12	Tristate
red	13	10...30 VDC
wht	31	10...30 VDC
blu	1	0 V
blk	20	0 V



SERIES AI25

CONNECTOR WIRING

MS style 17 pin connectors					
Pin	Function		107865 Cable Accessory* Color Code	14 BIT	13 BIT
	12 Bit 4096 CPR	10 Bit 1024 CPR			
A	Vin		Red	D13 (MSB)	D12 (MSB)
B	N.C.		Violet	D12	D11
C	Latch (binary only)		Green	D11	D10
D	Direction		Orange	D10	D9
E	S1	N.C.	White	D9	D8
F	S3	S1	White/Brown	D8	D7
G	S5	S3	White/Orange	D7	D6
H	S7	S5	White/Green	D6	D5
J	S8	S6	White/Blue	D5	D4
K	S9	S7	White/Violet	D4	D3
L	S11 (MSB)	S9 (MSB)	White/Black/Brown	D3	D2
M	GND		Black	D2	D1
N	S4	S2	White/Red	D1	D0 (LSB)
P	S0 (LSB)	N.C.	Gray	D0 (LSB)	Direction
R	S2	S0 (LSB)	White/Black	GND	GND
S	S6	S4	White/Yellow	Latch	Latch
T	S10	S8	White/Grey	Vin	Vin
10ft Cable # 107865-0010			NA		
Mating Connector: MS 17 pin style MS3106A-20-29S part # MCN-N8					
*This is a mating connector/cable assembly. Color coding information is provided here for reference					

PVC-cable (Singleturn 13-14 Bit)		
Color	13 Bit	14 Bit
gry/pnk	N.C	S0 (LSB)
brn/yel	S0 (LSB)	S1
brn/gry	S1	S2
red/blu	S2	S3
vio	S3	S4
wht/brn	S4	S5
wht/grn	S5	S6
wht/yel	S6	S7
wht/gry	S7	S8
wht/pnk	S8	S9
wht/blu	S9	S10
wht/red	S10	S11
wht/blk	S11	S12
brn/grn	S12 (MSB)	S13 (MSB)
yel	Tristate S0...S12	Tristate S0...S13
pnk	Latch ⁴⁾	Latch ⁴⁾
grn	Direction	Direction
blk	0 V	0 V
red	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm

4) Binary 0 only

Bayonet style 19 pin connectors							
Pin	Function 14 Bit 16384 CPR	112077 Cable Accessory* Color Code	Function 13 bit 8192 CPR	112076 Cable Accessory* Color Code	Function		110158 Cable Accessory* Color Code
					12 Bit 4096 CPR	10 Bit 1024 CPR	
A	S13 (MSB)	White/Black/Brown	S12	White/Black/Brown	S11 (MSB)	S9 (MSB)	White/Black/Brown
B	S12	White/Grey	S11	White/Grey	S10	S8	White/Grey
C	S11	White/Violet	S10	White/Violet	S9	S7	White/Violet
D	S10	White/Blue	S9	White/Blue	S8	S6	White/Blue
E	S9	White/Green	S8	White/Green	S7	S5	White/Green
F	S8	White/Orange	S7	White/Orange	S6	S4	White/Orange
G	S7	White/Yellow	S6	White/Yellow	S5	S3	White/Yellow
H	S6	White/Red	S5	White/Red	S4	S2	White/Red
J	S5	White/Brown	S4	White/Brown	S3	S1	White/Brown
K	S4	White/Black	S3	White/Black	S2	S0 (LSB)	White/Black
L	S3	Brown	S2	Blue	S1	N.C.	White
M	S2	Blue	S1	White	S0 (LSB)	N.C.	Grey
N	S1	White	S0 (LSB)	Grey	N.C.	N.C.	
P	S0 (LSB)	Grey	GND	Black	GND		Black
R	Direction	Orange	Direction	Orange	Direction		Orange
S	Case	Violet	Case	Violet	Case		Violet
T	GND	Black	GND	Yellow	GND		Yellow
U	Latch	Green	Latch	Green	Latch (binary only)		Green
V	Vin	Red	Vin	Red	Vin		Red
10ft Cable # 112077-0010			10ft Cable # 112076-0010		10ft Cable # 110158-0010		
Mating Connector: 19 pin Bayonet style PT06E-14-19S part # 606219-0001							

*This is a mating connector/cable assembly. Color coding information is provided here for reference

SERIES AC110



Absolute Encoder

Key Features

- Large 50mm Hollowshaft Available
- Integrated Diagnostic System
- Up to 22 bits of True Singleturn Absolute Positioning



SPECIFICATIONS

ELECTRICAL

Supply Voltage: -5%/ +10% DC 5 V; DC 10-30 V
Max. Current w/o Load: 120 mA
EMC: EN 61326 Class A
Resolution: Singleturn 11 - 19 Bit (22 Bit on request); Multiturn: 16 Bit
Output Code: Binary, Gray
Drives: Clock and Data / RS422
Incremental Signals: Optional Sine-Cosine 1 Vpp
Number of Pulses: 4096
3dB Limiting Frequency: 500 kHz
Alarm Output: Alarm bit (SSI Option), Warning and Alarm bit (BiSS)

ELECTRICAL CONNECTIONS

Cable Color	Cable Connector	Signal
brown ⁴	1	0 V (supply voltage)
pink	2	Data
yellow	3	Clock
—	4	N.C.
blue	5	Direction ¹
—	6	N.C.
—	7	N.C.
white ⁴	8	DC 5 V ³ / DC 10 - 30 V
—	9	N.C.
grey	10	Data
green	11	Clock
black	12	0 V-signal output ²
Screen		Shielded with housing

¹ Direction: + UB or unconnected = ascending code values with rotation cw
 0 V = descending code values with rotation cw
² Connected with 0 V in the encoder. Use this output to lay Direction on logical "0" if required.
³ Notice: when supply voltage = 5VDC or more, max. cable length is 10 m
⁴ Use only thin wires 0.14mm²

MECHANICAL

Housing Diameter: 110 mm
Shaft Diameter: 50 mm (Hub shaft)
Mounting of Shaft: Keyway, Rear clamping ring
Hubshaft Axial Endplay: ± 0.5 mm
Hubshaft Radial Runout: ± 0.05 mm
Max. Speed: IP40: 3600 rpm; IP50: 2000 rpm; IP64: 1500 rpm
Torque: 15 Ncm
Shaft Material: Stainless Steel / Aluminum, ceramic coated
Housing Material: Aluminum
Weight approx.: 1000g (2.2lbs.)
Connection: Cable, radial; Cable 1.5 m with M23 connector (Conin), 12 pole, axial or radial

Recommended Data Transfer Rate bei SSI

Cable Length	Frequency
< 50 m	< 400 kHz
< 100 m	< 300 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

Maximum data transfer rate depends on cable length. For Clock / $\overline{\text{Clock}}$ and Data / $\overline{\text{Data}}$. Use cable with twisted pairs in shield.

ENVIRONMENTAL

Operating Temperature: -20°C to +100°C (-20°F to 212°F)
Storage Temperature: -50°C to +80°C (-58°F to 176°F)
Vibration (DIN EN 60068-2-6): 100 m/s² (10 to 500 Hz)
Shock (DIN EN 60068-2-27): 1000 m/s² (6 ms)
Enclosure Rating: (EN 60529) IP40 or IP64
Shaft Rating: (EN 60529) IP50 or IP64

Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: Resolution	Code 3: Supply Voltage	Code 4: Spring Tether	Code 5: Protection Class	Code 6: Shaft Mounting	Code 7: Shaft Size	Code 8: Interface	Code 9: Connection	Code 10: Cable Length
AC110/	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Ordering Information

ACURO Series AC110 Absolute Encoder	0011	A 5 VDC	0 None	0 IP 40	K Keyway 4 x 1.2	50 50mm	SB SSI Binary	B Cable, radial, 1.5m	B5 1.5m
	0012	E 10-30 VDC	B With Spring Tether	1 IP 50	H Clamping Ring		SG SSI Gray		DO 3m
	0013			4 IP 64			BI BISS		FO 5m
	0014								KO 10m
	0017								
	0019								
	0022								

DIMENSIONS

