

INCREMENTAL ENCODERS

SERIES H20

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial Duty

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
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: 5 to 26 VDC at 80 mA max., not including output loads
Outputs:
 7273 Open Collector: 40mA, sink max
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
 4469 Differential Line Driver: 100mA, sink or source
Frequency Response: 100 kHz min. (index 75 kHz min. for extended temperature range)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: MS Connector, M12 Connector, Cable Exit
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)
 10 pin, NEMA4 style (MCN-N6N4)
 Cable w/ 5 pin M12 Connector (112859-xxxx)
 Cable w/ 8 pin M12 Connector (112860-xxxx)

MECHANICAL

Shaft Sizes: 10mm, 1/4" or 3/8"
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
Housing and Cover: Aluminum
Shaft Material: Stainless Steel
Disk Material: Glass or plastic (PPR Dependant)
Weight: 10 oz. max.

ENVIRONMENTAL

Operating Temperature:
Standard: 0 to +70 °C;
Extended: 0 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: Up to 98% (non-condensing)
Enclosure Rating: NEMA12/IP54 (dirt tight, splashproof); NEMA4/IP66 (dust proof, wash-down) when ordered with shaft seal and either M12 connector or watertight cable exit



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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								

Ordering Information								
1 Unidirectional	0001 0600 0005 0800	0 Servo Mount	0 3/8" Dia. Shaft with flat	0 no face mount available when Code 3 is 0:	0 1.18" Dia. Female Pilot	0 5-26V in, 5-26V Open Collector out	0 6 Pin Conn, End Mount	available when Code 8 is 0 to 5: PS LED Output Indicator
2 Bidirectional	0010 0900 0012 1000	1 Flange Mount	1 1/4" Dia. Shaft, no flat	1 (4) #10-32 @ 1.63" BC	1 1.25" Dia. Male Pilot	1 5-26V in, 5-26V Open Collector out with 2.2 kΩ Pullups	1 6 Pin Conn, Side Mount	
3 Bidirectional with Index	0050 1024 0060 1200 0100 1250 0120 1270 0200 1500 0240 1600 0250 1800 0256 1968 0300 2000 0360 2048 0400 2400 0500 2500 0512 2540		4 10mm Dia. Shaft, no flat	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	2 1.25" Dia. Male Pilot with Shaft Seal	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	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	
					3 0.69" Dia. Male Pilot 4 0.69" Dia. Male Pilot with Shaft Seal	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	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	

Cable Assemblies with MS Connector*

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

Mating Connectors (no cable)

- MCN-N4 6 pin, style MS3106A-14S-6S
- MCN-N5 7 pin, style MS3106A-16S-1S
- MCN-N6 10 pin, style MS3106A-18-1S
- MCN-N6N4 10 pin, NEMA4 style

Cable Assemblies with M12 Connector*

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

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

INCREMENTAL ENCODERS

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. Models with direct cable exit carry the color coding as shown in the right hand column.

Table 1									
Encoder Function	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Dif Line Driver w/o Index		**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	BRN
Sig. B	D	ORN	B	ORG	B	ORG	B	ORG	ORG
Sig. Z*	C	YEL	C	YEL	—	—	C	YEL	YEL
Power +V	B	RED	D	RED	D	RED	D	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	GRN
N/C	F	—	E	—	—	—	E	—	—
Sig. A	—	—	—	—	C	BRN/WHT	H	BRN/WHT	BRN/WHT
Sig. B	—	—	—	—	E	ORG/WHT	I	ORG/WHT	ORG/WHT
Sig. Z*	—	—	—	—	—	—	J	YEL/WHT	YEL/WHT

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.

Table 2						
Encoder Function	Cable # 112859-XXXX 5 Pin Single Ended		Cable # 112860-XXXX 8 Pin Single Ended		Cable # 112860-XXXX 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. A	—	—	—	—	3	BRN/WHT
Sig. B	—	—	—	—	5	ORG/WHT
Sig. Z*	—	—	—	—	8	YEL/WHT

- 1) Cable Configuration (**Table 1**): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (**Table 2**): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 3) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 4) *Index not provided on all models. See ordering information.
- 5) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
- 6) "MS" Type mating connectors and pre-built cables are rated NEMA 12
- 7) "M12" Cable assemblies are rated IP67



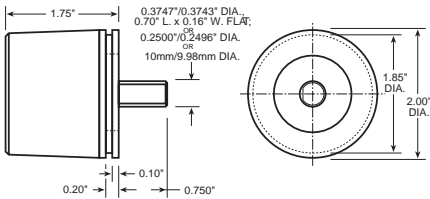
INCREMENTAL ENCODERS

SERIES H20

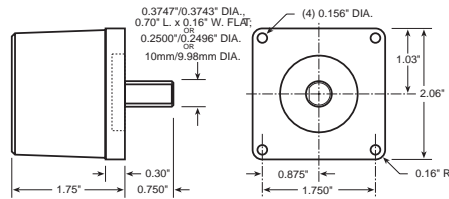
DIMENSIONS

Code 3: Housings

0 Servo Mount

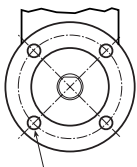


1 Flange Mount

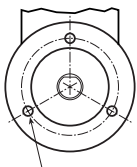


Code 5: Face Mounts

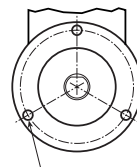
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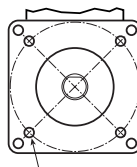
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3

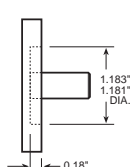


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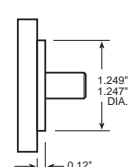


Code 6: Pilots

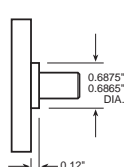
0 Female



1, 2 Male



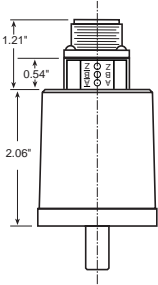
3, 4 Male



Code 8: Terminations

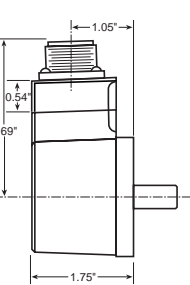
0, 2

6, 7 Pin End Conn



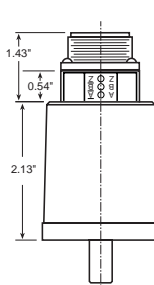
1, 3

6, 7 Pin Side Conn



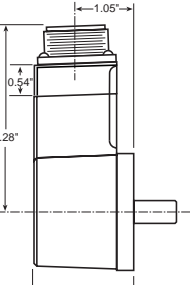
4

10 Pin End Conn



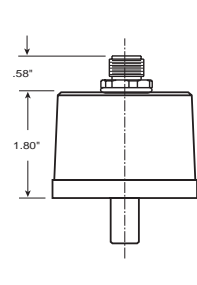
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10 Pin Side Conn



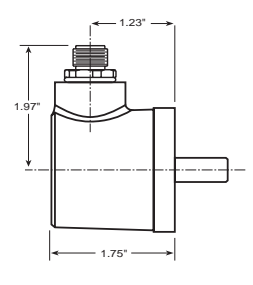
N, Q

M12 End Conn



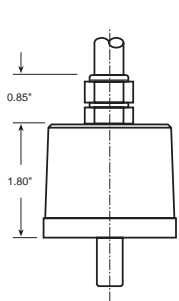
P, R

M12 Side Conn

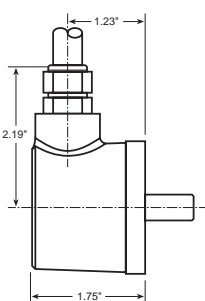


Code 8: 0-5 dimensions shown with LED Output Indicator Option (Code 9: PS)

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



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



INCREMENTAL ENCODERS

SERIES H58

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial Duty

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical**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:

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

Outputs:

7272 Push-Pull: 40mA, sink or source

7272 Differential Line Driver: 40 mA, sink or source

4469 Differential Line Driver: 100mA, sink or source

Frequency Response: 100 kHz min. (index)
75 kHz min. for extended temperature range)**Noise Immunity:** Tested to EN61326-1**Electrical Immunity:** Reverse polarity and short circuit protected**Termination:** MS Connector, M12 Connector, M23 Connector, Cable Exit**Mating Connector:**

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

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

10 pin, NEMA4 style (MCN-N6N4)

12 pin style M23, CW (MCN-C1)

12 pin style M23, CCW (MCN-C2)

Cable w/ 5 pin M12 Connector (112859-XXXX)

Cable w/ 8 pin M12 Connector (112860-XXXX)

MECHANICAL

Shaft Sizes: 6 mm, 10 mm**Shaft Loading:** (at 6 mm from encoder face)Resolutions ≤ 1024 PPR: 356 N radial, axialResolutions > 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**Housing and Cover:** Aluminum**Shaft Material:** Stainless Steel**Disc Material:** Glass**Weight:** 283 g. (10 oz.) max.

ENVIRONMENTAL

Operating Temperature:**Standard:** 0 to +70 °C;**Extended:** 0 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:** Up to 98% (non-condensing)**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof); NEMA4/IP66 (dust proof, wash-down) when ordered with shaft seal and either M12 connector or watertight cable exit



INCREMENTAL ENCODERS

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

Cable Assemblies with MS Connector*

- 108595-XXXX 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 1400635XXXX 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 108615-XXXX 12 Pin CCW (if used) MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 108616-XXXX 12 Pin CW (if used) MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

Cable Assemblies with M12 Connector*

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

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

Mating Connectors (no cable)

- MCN-N5 7 pin, style MS3106A-16S-1S
- MCN-N6 10 pin, style MS3106A-18-1S
- MCN-N6N4 10 pin, NEMA4 style
- MCN-C1 12 pin style M23, CW
- MCN-C2 12 pin style M23, CCW

INCREMENTAL ENCODERS

SERIES H58

Dynapar™ brand

ELECTRICAL CONNECTIONS

7, 10 & 12 Pin M23 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 color coding as shown in the right hand column.

Encoder Function	Table 1							
	Cable # 108595-XXXX 7 Pin Single Ended		**Cable # 109209-XXXX or 1400635XXXX 10 Pin Differential Line Driver w/ Index		Cable # 108615-XXXX 12 Pin CCW		Cable # 108616-XXXX 12 Pin CW	
	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code
Signal A	A	BRN	A	BRN	5	BRN	3	BRN
Signal B	B	ORG	B	ORG	8	ORG	4	ORG
Signal 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	—	—	—
Signal \bar{A}	—	—	H	BRN/WHT	6	BRN/WHT	5	BRN/WHT
Signal \bar{B}	—	—	I	ORG/WHT	1	ORG/WHT	6	ORG/WHT
Signal \bar{Z}	—	—	J	YEL/WHT	4	YEL/WHT	8	YEL/WHT
5V Sense	—	—	—	—	2	GRN	—	—
0V Sense	—	—	—	—	11	BLK/WHT	—	—

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

NOTES:

- 1) Cable Configuration (**Table 1**): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (**Table 2**): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 3) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 4) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX.
- 5) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 6) "M12" Cable assemblies are rated IP67

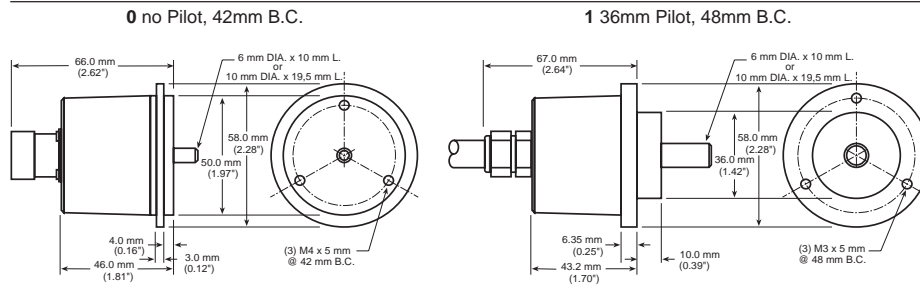


INCREMENTAL ENCODERS

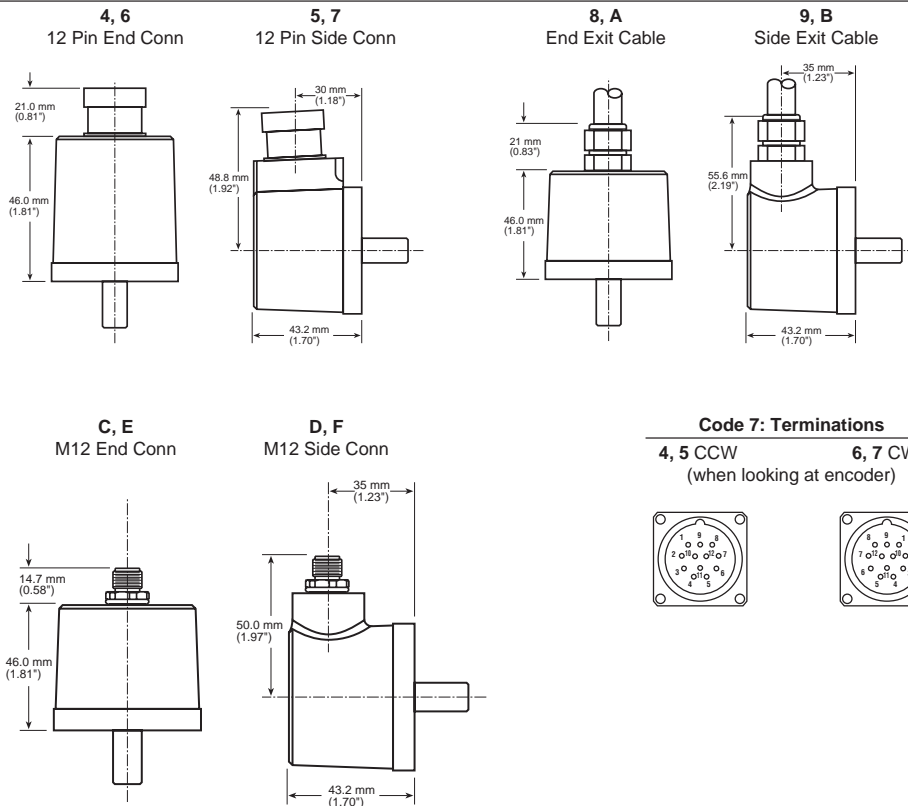
SERIES H58

DIMENSIONS

Code 3: Pilot, Face Mounts



Code 7: Terminations



INCREMENTAL ENCODERS

SERIES HA725

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial DutyCE
EN 61326-1

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical**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 EN61326-1**Electrical Immunity:** Reverse polarity and short circuit protected**Termination:** MS Connector

ELECTRICAL (Cont.)

Mating Connector:

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

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

10 pin, NEMA4 style (MCN-N6N4)

MECHANICAL**Shaft Size:** 3/8"**Shaft Loading:** 35 lbs. radial, 24 lbs. axial**Shaft Speed:** 10,000 RPM max.mechanical**Moment of Inertia:** 2.83 x 10⁻⁴ oz-in-sec²**Housing and Cover:** Aluminum**Shaft Material:** Stainless Steel**Disc Material:** Glass**Weight:** 1.5 lbs

ELECTRICAL CONNECTIONS

Encoder Function	Cable #108595-XXXX 7 Pin Single Ended		**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index	
	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	E	BLK	F	BLK
Case	F	GRN	G	GRN
N/C - Shield	G	—	E	—
Sig. A	—	—	H	BRN/WHT
Sig. B	—	—	I	ORG/WHT
Sig. Z	—	—	J	YEL/WHT

Notes:

- 1) Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 24 AWG (output signals), plus 2 twisted pairs 22 AWG (input power)
- 2) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 3) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
- 4) "MS" Type mating connectors and pre-build cables are rated NEMA 12



INCREMENTAL ENCODERS

SERIES HA725

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"/>	<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	

Cable Assemblies with MS Connector*

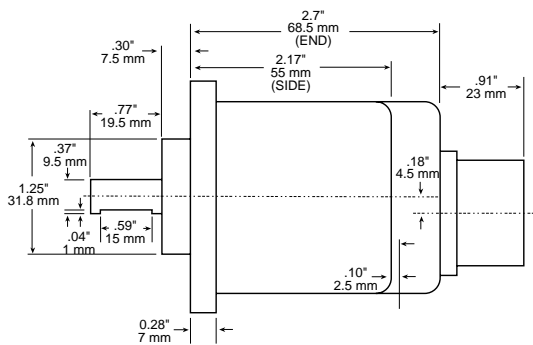
108595-XXXX 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs

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

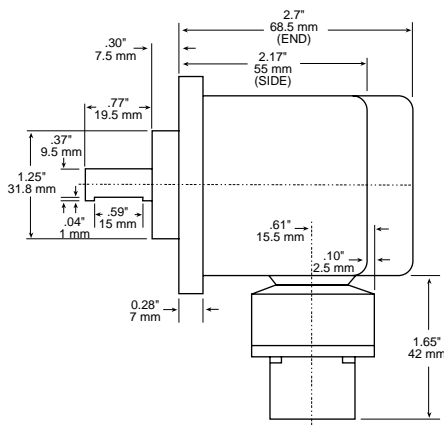
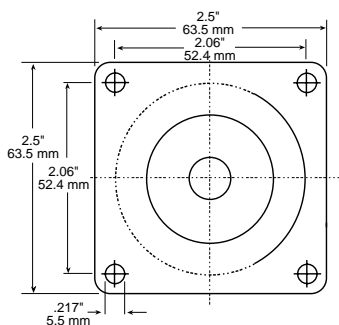
109209-XXXX NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index

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

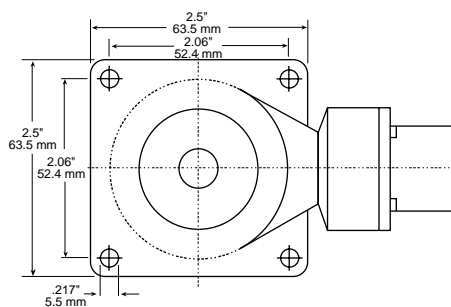
DIMENSIONS



Code 6: Termination: 0



Code 6: Termination: 1



INCREMENTAL ENCODERS

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°C

IND
Industrial Duty

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
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: 5 to 26 VDC max. at 80 mA max., not including output loads
Outputs:
 7273 Open Collector: 40mA, sink max
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
 4469 Differential Line Driver: 100mA, sink or source
Frequency Response: 100 kHz min. (index 75 kHz min. for extended temperature range)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: MS Connector, M12 Connector, Cable Exit
Mating Connector:
 7 pin, style MS3106A-16S-1S (MCN-N5);
 10 pin, style MS3106A-18-1S (MCN-N6)
 10 pin, NEMA4 style (MCN-N6N4)
 Cable w/ 5 pin M12 Connector (112859-XXXX)
 Cable w/ 8 pin M12 Connector (112860-XXXX)

MECHANICAL

Shaft Sizes: 1/4", 3/8"
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
Housing and Cover: Aluminium
Shaft Material: Stainless Steel
Disc Material: Glass
Weight: 1.5 lbs

ENVIRONMENTAL

Operating Temperature:
Standard: 0 to +70 °C;
Extended: 0 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: Up to 98% (non-condensing)
Enclosure Rating:
 HA525: NEMA12/IP54 (dirt tight, splashproof);
 HA625: NEMA4/IP66 (dust proof, washdown)



INCREMENTAL ENCODERS

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 □25	□□□□	□	□	□	□	□□

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 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 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 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 See page 3 for electrical tables and page 4 for formats.	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 Available when Code 1 is HA525: 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 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	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator

Cable Assemblies with MS Connector*

- 1400431XXXX 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-XXXX 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635XXXX 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

Cable Assemblies with M12 Connector*

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

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

Mating Connectors (no cable)

- MCN-N5 7 pin, style MS3106A-16S-1S
- MCN-N6 10 pin, style MS3106A-18-1S
- MCN-N6N4 10 pin, NEMA4 style

INCREMENTAL ENCODERS

SERIES HA25

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			
Encoder Function	**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	BRN
Signal B	B	ORN	ORG
Signal Z*	C	YEL	YEL
Power Source	D	RED	RED
N/C	E	—	—
Common	F	BLK	BLK
Case	G	GRN	GRN
Signal \bar{A}	H	BRN/WHT	BRN/WHT
Signal \bar{B}	I	ORN/WHT	ORN/WHT
Signal \bar{Z}	J	YEL/WHT	YEL/WHT

Table 2 – Single Ended			
Encoder Function	Cable # 1400431XXXX 7 Pin Single Ended w/ Index Outputs		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	RED
Signal B	B	ORN	BLUE
Signal Z*	C	YEL	YEL
Power Source	D	RED	WHT
No Connection	E	—	GRN
Common	F	BLK	BLK
Case	G	GRN	SHIELD

Table 3 – Differential		
Encoder Function	Cable # 108596-XXXX 7 Pin Dif Line Driver w/o Index	
	Pin	Cable Accessory Color Code
Signal A	A	RED
Signal B	B	BLUE
Signal \bar{A}	C	YEL
Power Source	D	WHT
Signal \bar{B}	E	GRN
Common	F	BLK
Case	G	SHIELD

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		Table 5		Table 6	
	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code
Signal A	4	BLK	1	BRN	1	BRN
Signal B	2	WHT	4	ORG	4	ORG
Signal Z*	5	GRY	6	YEL	6	YEL
Power +V	1	BRN BLU	2	RED	2	RED
Com	3	—	7	BLK	7	BLK
Signal \bar{A}	—	—	—	—	3	BRN/WHT
Signal \bar{B}	—	—	—	—	5	ORG/WHT
Signal \bar{Z} *	—	—	—	—	8	YEL/WHT

NOTES:

- 1) Cable Configuration (Tables 1 and 3): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (Table 2): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 3) Cable Configuration (Tables 4, 5 and 6): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 4) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 5) * Index not provided on all models. See ordering information.
- 6) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
- 7) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 8) "M12" Cable assemblies are rated IP67

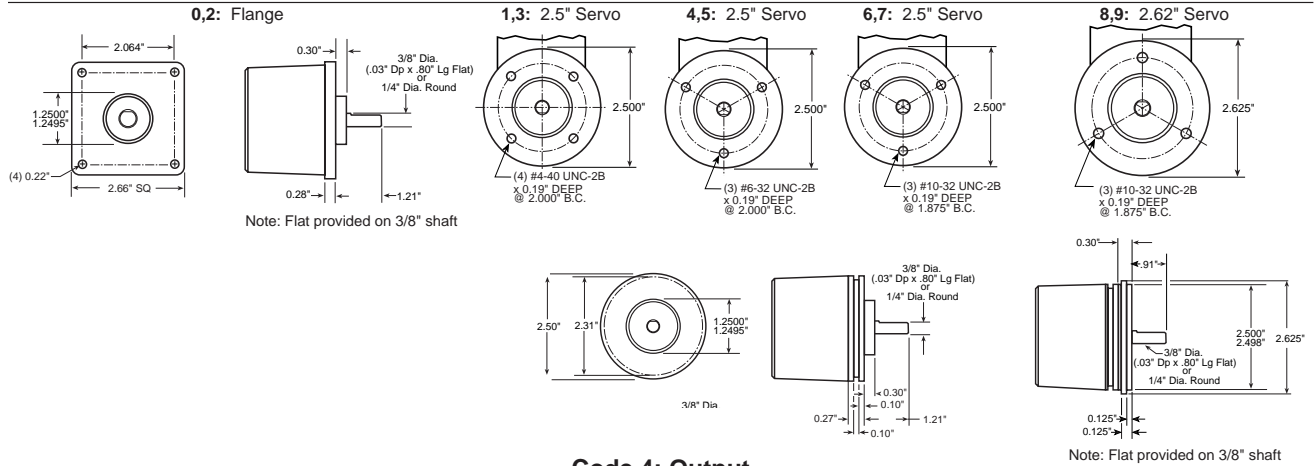


INCREMENTAL ENCODERS

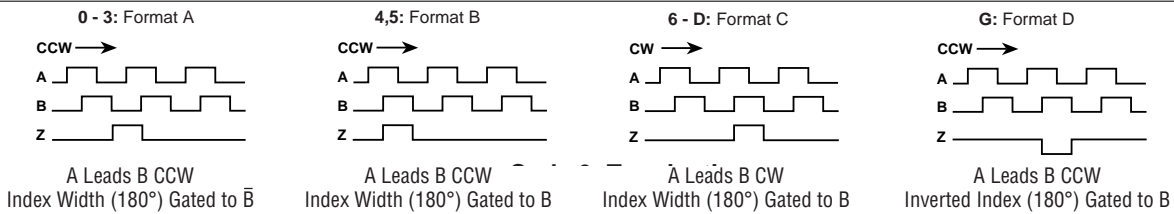
SERIES HA25

DIMENSIONS

Code 3: Mechanical

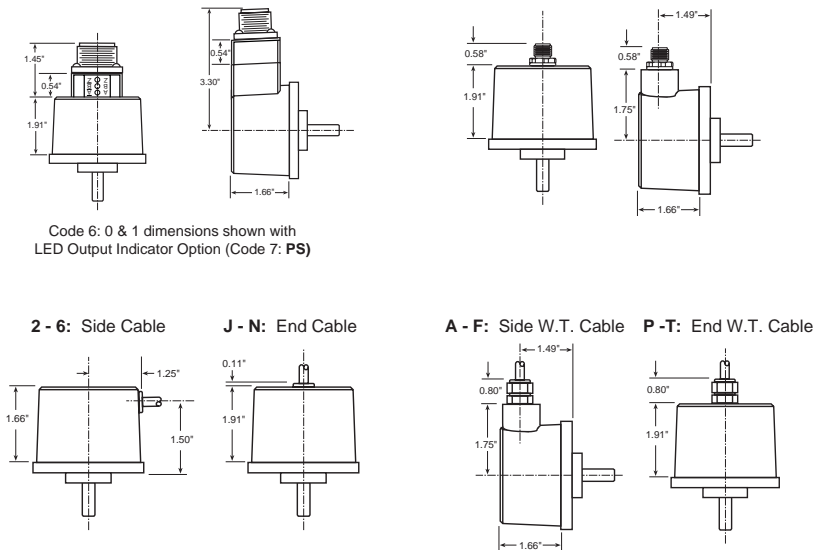


Code 4: Output



Code 6: Termination

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



INCREMENTAL ENCODERS

SERIES HC25

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial DutyCE
EN 61326-1

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
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:
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
 7273 Open Collector: 40mA, sink max
Frequency Response: 250 kHz
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: MS Connector, M12 Connector, Cable Exit
Mating Connector:
 7 pin, style MS3106A-16S-1S (MCN-N5);
 10 pin, style MS3106A-18-1S (MCN-N6)
 10 pin, NEMA4 style (MCN-N6N4)
 Cable w/ 5 pin M12 Connector (112859-XXXX)
 Cable w/ 8 pin M12 Connector (112860-XXXX)

MECHANICAL

Shaft Sizes: 1/4" or 3/8"
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
Housing and Cover: Aluminum
Shaft Material: Stainless Steel
Disc Material: Glass
Weight: 1.5 lbs

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: Up to 98% (non-condensing)
Enclosure Rating:
 HC525: NEMA12/IP54 (dirt tight, splashproof);
 HC625: NEMA4/IP66 (dust proof, washdown)



INCREMENTAL ENCODERS

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="text"/> 25	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Ordering Information						
HC525 Size 25 Enclosed, Shielded Bearings HC625 Size 25 Enclosed, with Shaft Seal	3000 3,000 3600 3,600 4096 4,096 5000 5,000	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 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 See page 3 for electrical tables and page 4 for formats.	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pul-lup 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 4 5-26V in; 5-26V Line Driver 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 D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 End Mount Connector 1 Side Mount Connector Available when Code 1 is HC525: 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 1 is HC625: 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	Blank None Available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator

Cable Assemblies with MS Connector*

- 1400431XXXX** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-XXXX** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635XXXX** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX** NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

Cable Assemblies with MS Connector*

- MCN-N5** 7 pin, style MS3106A-16S-1S
- MCN-N6** 10 pin, style MS3106A-18-1S
- MCN-N6N4** 10 pin, NEMA4 style

Cable Assemblies with M12 Connector*

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

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

INCREMENTAL ENCODERS

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			
Encoder Function	**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	BRN
Signal B	B	ORN	ORG
Signal Z*	C	YEL	YEL
Power Source	D	RED	RED
N/C	E	—	—
Common	F	BLK	BLK
Case	G	GRN	GRN
Signal \bar{A}	H	BRN/WHT	BRN/WHT
Signal \bar{B}	I	ORN/WHT	ORN/WHT
Signal \bar{Z}	J	YEL/WHT	YEL/WHT

Table 2 – Single Ended			
Encoder Function	Cable # 1400431XXXX 7 Pin Single Ended w/ Index Outputs		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	RED
Signal B	B	ORN	BLUE
Signal Z*	C	YEL	YEL
Power Source	D	RED	WHT
No Connection	E	—	GRN
Common	F	BLK	BLK
Case	G	GRN	SHIELD

Table 3 – Differential		
Encoder Function	Cable # 108596-XXXX 7 Pin Dif Line Driver w/o Index	
	Pin	Cable Accessory Color Code
Signal A	A	RED
Signal B	B	BLUE
Signal \bar{A}	C	YEL
Power Source	D	WHT
Signal \bar{B}	E	GRN
Common	F	BLK
Case	G	SHIELD

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

NOTES:

- 1) Cable Configuration (Tables 1 and 3): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (Table 2): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 3) Cable Configuration (Tables 4, 5 and 6): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 4) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 5) * Index not provided on all models. See ordering information.
- 6) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
- 7) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 8) "M12" Cable assemblies are rated IP67

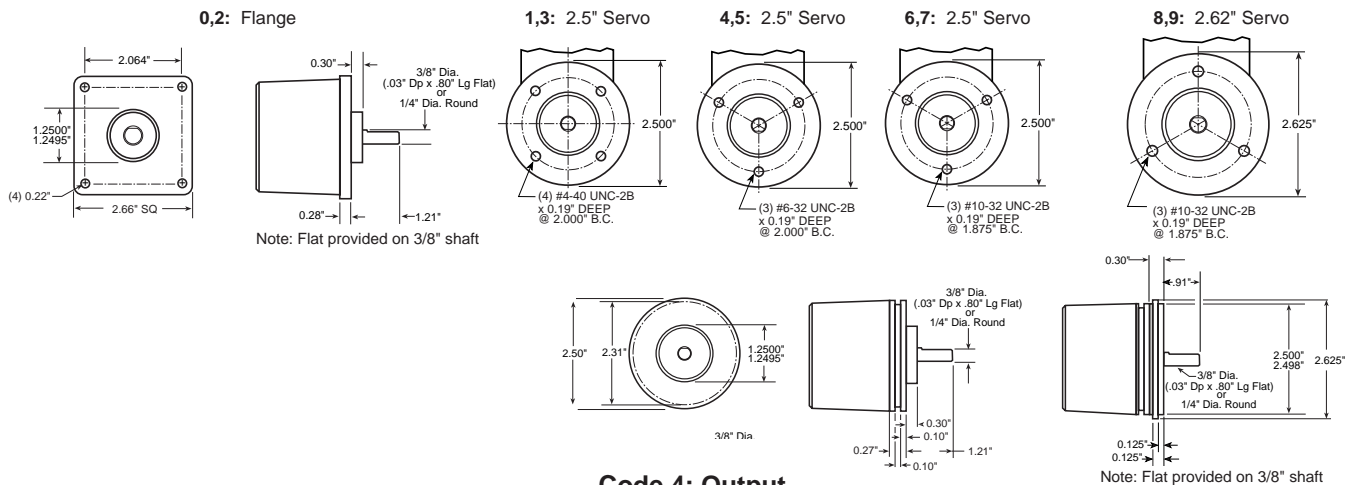
INCREMENTAL ENCODERS



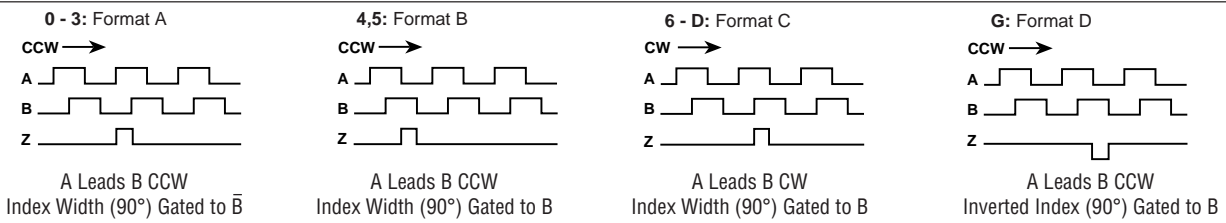
SERIES HC25

DIMENSIONS

Code 3: Mechanical

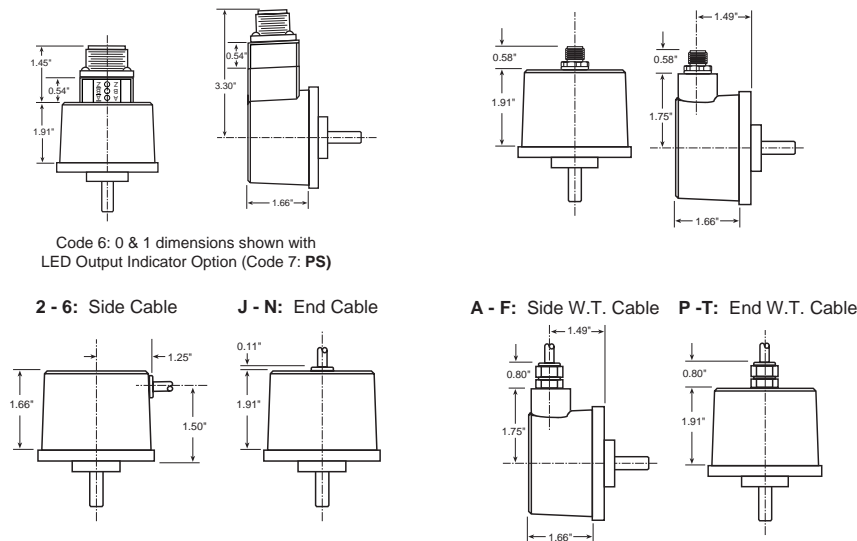


Code 4: Output



Code 6: Termination

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



INCREMENTAL ENCODERS

SERIES HR25

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial Duty

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
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: 5 to 26 VDC at 80 mA max., not including output loads
Outputs:
 4469 Differential Line Driver: 100mA, sink or source
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
 7273 Open Collector: 40mA, sink max
Frequency Response: 100 kHz min. (index 75 kHz min. for extended temperature range)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: MS Connector, M12 Connector, Cable Exits
Mating Connector:
 7 pin, style MS3106A-16S-1S (MCN-N5);
 10 pin, style MS3106A-18-1S (MCN-N6)
 10 pin, NEMA4 style (MCN-N6N4)
 Cable w/ 5 pin M12 Connector (112859-XXXX)
 Cable w/ 8 pin M12 Connector (112860-XXXX)

MECHANICAL

Shaft Sizes: 1/4" or 3/8"
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
Housing and Cover: Aluminum
Shaft Material: Stainless Steel
Disc Material: Mylar
Weight: 1.5 lbs

ENVIRONMENTAL

Operating Temperature:
Standard: 0 to +70 °C;
Extended: 0 to +85 °C (consult factory for low temperature operation to -40 °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: Up to 98% (non-condensing)
Enclosure Rating:
 HR525: NEMA12/IP54 (dirt tight, splashproof);
 HR625: NEMA4/IP66 (dust proof, washdown)



INCREMENTAL ENCODERS

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="text"/> 25	<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"/> <input type="text"/>

Ordering Information						
HR525 Size 25 Enclosed, Shielded Bearings HR625 Size 25 Enclosed, with Shaft Seal	0001 0250 0010 0300 0012 0360 0050 0400 0060 0500 0086 0600 0100 0800 0120 1000 0200 1024 0240	0 Flange Mount, 3/8" 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 Pull-up 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 Available when Code 1 is HR525: 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 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	Available when Code 4 is 0 thru G, and Code 6 is 0 or 1: PS LED Output Indicator
		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	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 See page 3 for electrical tables and page 4 for formats.			

Cable Assemblies with MS Connector

- 1400431XXXX** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-XXXX** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635XXXX** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX** NEMA4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

Mating Connectors (no cable)

- MCN-N5** 7 pin, style MS3106A-16S-1S
- MCN-N6** 10 pin, style MS3106A-18-1S
- MCN-N6N4** 10 pin, NEMA4 style

Cable Assemblies with M12 Connector

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

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

INCREMENTAL ENCODERS

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.

Table 1 – Differential			
Encoder Function	**Cable # 109209-XXXX or 1400635XXXX 10 Pin Differential Line Driver w/ Index		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	BRN
Signal B	B	ORN	ORG
Signal Z*	C	YEL	YEL
Power Source	D	RED	RED
N/C	E	—	—
Common	F	BLK	BLK
Case	G	GRN	GRN
Signal \bar{A}	H	BRN/WHT	BRN/WHT
Signal \bar{B}	I	ORN/WHT	ORN/WHT
Signal \bar{Z}	J	YEL/WHT	YEL/WHT

Table 2 – Single Ended			
Encoder Function	Cable # 1400431XXXX 7 Pin Single Ended w/ Index Outputs		
	Pin	Wire Color Code	Cable Accessory Color Code
Signal A	A	BRN	RED
Signal B	B	ORN	BLUE
Signal Z*	C	YEL	YEL
Power Source	D	RED	WHT
No Connection	E	—	GRN
Common	F	BLK	BLK
Case	G	GRN	SHIELD

Table 3 – Differential		
Encoder Function	Cable # 108596-XXXX 7 Pin Dif Line Driver w/o Index	
	Pin	Cable Accessory Color Code
Signal A	A	RED
Signal B	B	BLUE
Signal \bar{A}	C	YEL
Power Source	D	WHT
Signal \bar{B}	E	GRN
Common	F	BLK
Case	G	SHIELD

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

NOTES:

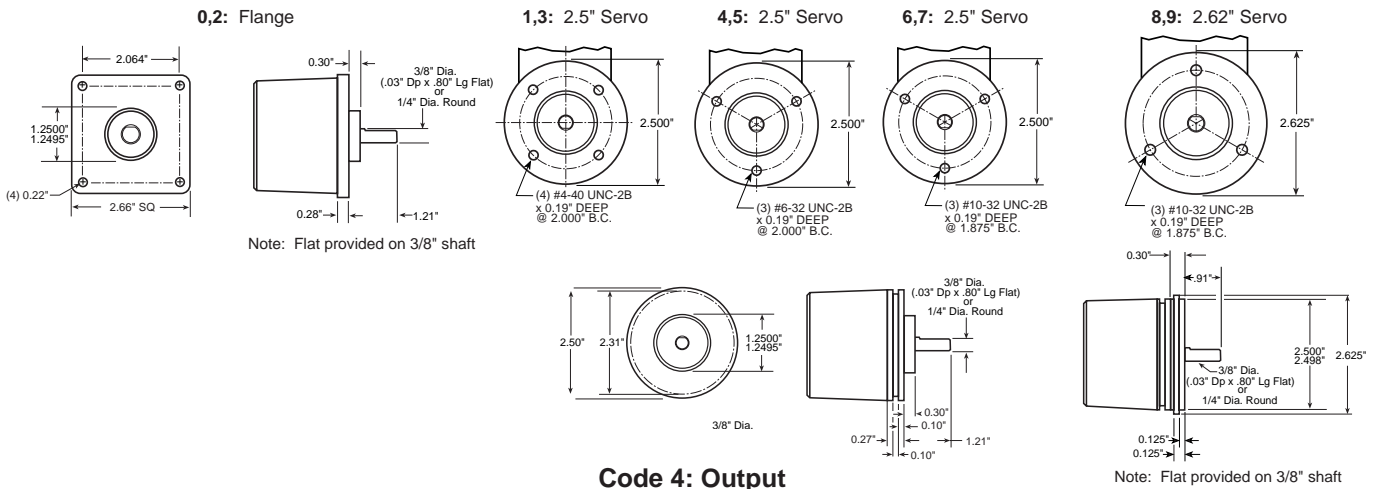
- 1) Cable Configuration (Tables 1 and 3): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (Table 2): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 3) Cable Configuration (Tables 4, 5 and 6): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 4) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 5) * Index not provided on all models. See ordering information.
- 6) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX.
- 7) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 8) "M12" Cable assemblies are rated IP67



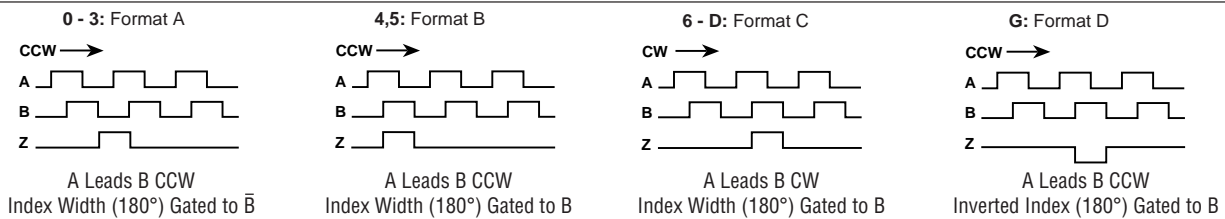
INCREMENTAL ENCODERS SERIES HR25

DIMENSIONS

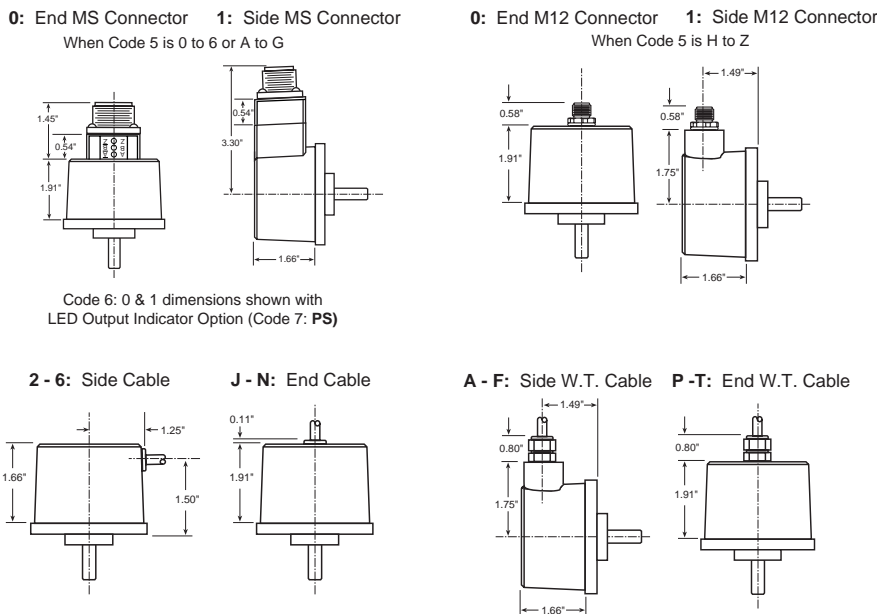
Code 3: Mechanical



Code 4: Output



Code 6: Termination



INCREMENTAL ENCODERS

SERIES H42

Dynapar™ brand

Shafted Encoder

Key Features

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

IND
Industrial Duty

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical**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: 5-26 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.**Noise Immunity:** Tested to EN61326-1**Electrical Immunity:** Reverse polarity and short circuit protected**Termination:**

7 pin, style MS3102E-16S-1P MS Connector

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

MECHANICAL

Shaft Size: 3/8"**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**Housing & Cover Material:** Aluminum**Shaft Material:** Stainless Steel**Disc Material:** Mylar**Weight:** 13 oz.

ELECTRICAL CONNECTIONS

Encoder Function	Cable # 108596-XXXX 7 Pin Dif Line Driver with Index	
	Pin	Wire Color
Signal A	A	RED
Signal B	B	BLUE
Signal \bar{A}	C	YELLOW
Power Source	D	WHITE
Signal \bar{B}	E	GREEN
Common	F	BLACK
Case	G	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.

NOTES:

- 1) Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 24 AWG (output signals), plus 2 twisted pairs 22 AWG (input power)
- 2) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 3) "MS" Type mating connectors and pre-build cables are rated NEMA 12



INCREMENTAL ENCODERS

SERIES H42

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

Cable Assembly with MS Connector*

108596-XXXX 7 Pin MS, Cable Assy. For Use with Differential Line Driver Outputs

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

DIMENSIONS

