

SERIES HSD38

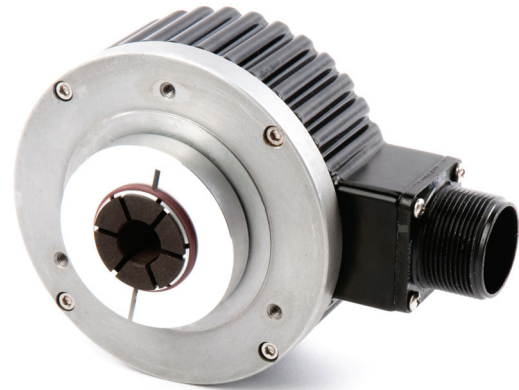
NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Premier Choice for Vector Motor OEMs
- Unbreakable Code Disc up to 5000 PPR
- Dual-Sealed Housing
- Electrically & Thermally Isolated Hollow shaft

HD
Heavy Duty

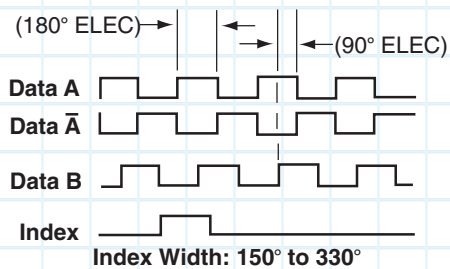


SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
Resolution: 15 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 CCW shaft rotation viewing the shaft clamp end of the encoder
Quadrature Phasing: For resolutions to 1200 PPR: 90° ± 15° electrical; For resolutions over 1250 PPR: 90° ± 30° electrical
Symmetry:
 For resolutions to 1024 PPR: 180° ± 18° electrical
 For resolutions over 1024 PPR: 180° ± 25° electrical
Index: 150° to 330°, Reverse Phasing, A leads B for CW also available: See Code 7 in Ordering Information
Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

DATA AND INDEX Not all complements shown A shown for reference



A leads B, CCW (From Clamp End)
 (Reverse phasing, A leads B for CW also available: See Code 7 in Ordering Information)

ELECTRICAL

Input Power: 5-26VDC. 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: 125 kHz (data & index)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: MS Connector; M12 Connector; M23 Connector; cable exit w/seal.
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, NEMA4 Style (MCN-N6N4)
 10 Pin Bayonet, Style MS3116-F12-10S (MCN-B1)
 12 Pin CW M23 Connector (MCN-C1)
 Cable w/ 5 Pin M12 Connector (112859-XXXX)
 Cable w/ 8 Pin M12 Connector (112860-XXXX)

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

MECHANICAL

Bore Diameter: 12mm - 20mm, 1/2" - 1". Insulated inserts provided for bores under 1 inch
Mounting Configuration: Hollow Bore, direct mount over shaft with multiple tether options
Bore Tolerance:
 1" bore: 1.0005" -0.0000" / +0.0010"
 < 1" bore: Nominal -0.000" / +0.002"
Shaft Speed: 6000 RPM Maximum
Mating Shaft Requirements:
 Configuration: Keyway allowed, Flat not allowed
 Runout: ±0.025" (0.635mm) radial, typical
 Endplay: ±0.050" (1.27mm) axial, typical
 Length: 1.25", Minimum, 1.60", Recommended
 Maximum Length (w/ cover on): 2.50" (63.5mm)
Starting Torque: 8 in-oz. maximum (at 25°C)
Running Torque: 5 in-oz. maximum (at 25°C)
Bearings: 61806-ZZ
Housing and Cover: Aluminum
Shaft Material: 6061-T6 Aluminum
Disc Material: Mylar
Weight: 26 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C
Storage temperature: -40 to 100°C
Shock: 50G's for 11msec duration
Vibration: 5 to 2000Hz @ 20 G's
Humidity: Up to 98% (non-condensing)
Enclosure Rating: IP67

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: Format	Code 5: Output	Code 6: Termination	Code 7: Options	Code 8: Housing
HSD38	□□□□	□	□	□	□	□	□
Ordering Information							
HSD38 Size 38 Heavy-duty, hollowshaft encoder	0015	Electrically isolated:	0 Single Ended, Unidirectional (A)	0 5-26V in, 5-26V Open Collector out (7273)	0 6 pin connector	0 No Option	0 Cast Aluminum Housing, Slotted Tether Included
	0032	6 12mm	1 Single Ended, Bidirectional (AB)	2 5-26V in, 5-26V Push-Pull out (7272)	1 7 pin connector	1 Internally Isolated 1" Bore	6 Cast Aluminum Housing, No Tether
	0050	9 15 mm	2 Single Ended, Bidirectional with Index (ABZ)	Available when: Code 4 is 3 or 4	2 10 pin connector	2 Reverse Phasing, No Bore Isolation	C Cast Aluminum Housing, Single- Point Tether Included (NEMA 4-1/2" C-Face)
	0060	7 1/2"	Available when Code 5 is 3 or 4 and Code 6 is 1, 2, 3, 4, 6, 7, 8, 9, A, B, C, D, G, J, K, P	3 5-26V in, 5-26V Differential Line Driver out (7272)	3 12 pin connector	3 Internally Isolated 1" Bore, and Reverse Phasing	D Same as "0" with Cover Kit
	0100	8 5/8"	3 Differential, Bidi- rectional (AA BB)	4 5-26V in, 5V Differential Line Driver out (7272)	4 10 pin Bayonet con- nector		E Same as "C" with Cover Kit
	0200	A 16mm	Available when Code 5 is 3 or 4 and Code 6 is 2, 3, 4, 7, 8, 9, A, B, C, D, G, J, K, P		5 6 pin + mating con- nector		K Cast Aluminum Housing, Single- Point Tether Included (NEMA 8-1/2" C-Face)
	0240	C 3/4"			6 7 pin + mating con- nector		M Swivel-Rod Tether with Metric Hardware
	0250	D 20mm			7 10 pin + mating con- nector		N Same as "K" with Cover Kit
	0500	E 7/8"			8 10 pin Bayonet + mating connector		
	0512	T 5/8"			9 12 pin + mating connec- tor		
	0600	Stainless Steel Collar			A 18" (.5m) cable		
	1000				B 36" (1m) cable		
	1024				C 72" (2m) cable		
	1200				D 144" (4m) cable		
	2000				G 13" (.3m) cable		
	2048				J 8 pin M12 connector		
	3072				K 18" (.5m) Cable with 10-pin In-Line Connector		
	4000	Not electrically isolated:			P 1.5 ft (18") Cable with 10-pin Bulkhead Connector		
	4096	G 1"			Available when: Code 5 is 0 or 2		
	5000	H 1" Stainless Steel Collar			H 5 pin M12 connector		
					L 5 pin M12 connector w/special pinout		

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
- 114448-XXXX** 10 Bayonet, 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 M23 Connector*

- 115901-XXXX** 12 pin M23, Cable Assy. For Use with Differential Line Driver with Index Outputs, CW

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** Pin M12, Cable Assy. For Use with Differential Line Driver 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
- MCN-B1** 10 Pin Bayonet, style MS3116-F12-10S
- MCN-C1** 12 Pin CW M23 Connector

Accessory Kits

- 114619-0001** Tether Kit, 4.5" C-Face Single Point with 3/8" Bolt
- 114620-0001** Tether Kit, Slotted with T-Bolts for Standard AC Motor Fan Covers
- 114621-0001** Tether Kit, 8.5" C-Face Single Point with 1/2" Bolt
- 114591-0001** Cover Kit, 56 C-Face
- 114592-0001** Cover Kit, Fan Cover
- 114593-0001** Dual Cover Kit, 56 C-Face
- 114594-0001** Dual Cover Kit, Fan Cover

*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.

SERIES HSD38

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS and M23 Connectors and Cables

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	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Dif Line Driver With Out Index		**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index		Cable # 114448-XXXX 10 Pin Bayonet		Cable #115901-XXXX 12 Pin (CW)		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	A	BRN	5	BRN	GRN
Sig. B	D	ORG	B	ORG	B	ORG	B	ORG	B	ORG	8	ORN	BLU
Sig. Z*	C	YEL	C	YEL	—	—	C	YEL	C	YEL	3	YEL	ORG
Power +V	B	RED	D	RED	D	RED	D	RED	D	RED	12	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	F	BLK	10	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	G	GRN	9	—	WHT
N/C-SLD	F	—	E	—	—	—	E	—	E	—	7	—	—
Sig. A	—	—	—	—	C	BRN/WHT	H	BRN/WHT	H	BRN/WHT	6	BRN/WHT	VIO
Sig. B	—	—	—	—	E	ORG/WHT	I	ORG/WHT	I	ORG/WHT	1	ORN/WHT	BRN
Sig. Z*	—	—	—	—	—	—	J	YEL/WHT	J	YEL/WHT	4	YEL/WHT	YEL

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.

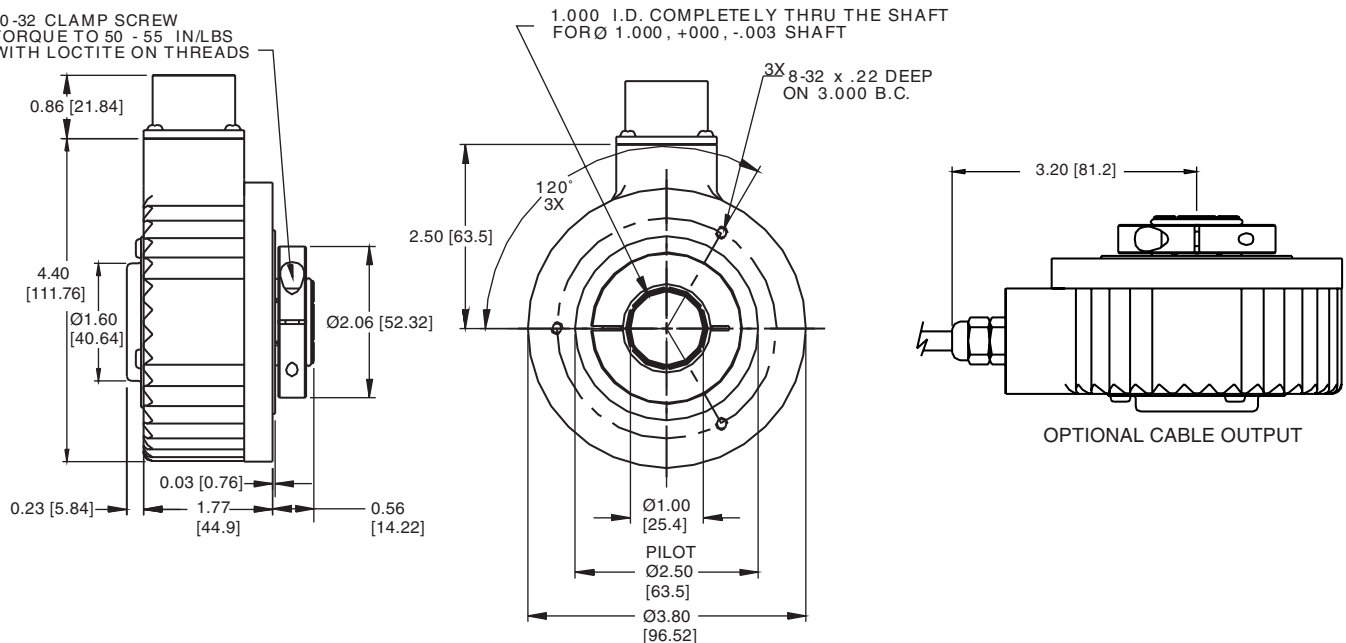
Encoder Function	Cable # 112859-XXXX 5 Pin Single Ended		Cable # 112860-XXXX 8 Pin Single Ended		Cable # 112860-XXXX 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
Sig. Z*	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK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

NOTES:

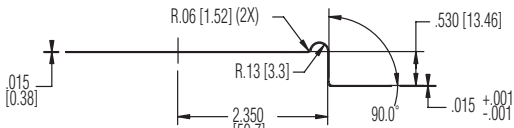
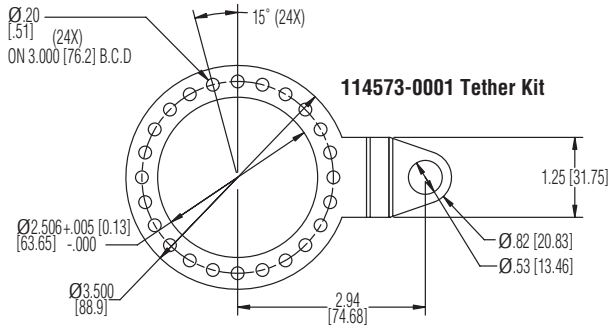
- 1) Cable Configuration (**Table 1**): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 24 AWG (output signals), plus 2 twisted pairs 22 AWG (input power)
- 2) Cable Configuration (**Table 2**): PVC jacket, 105°C rated, overall foil shield; 24 AWG conductors, minimum
- 3) Standard cable 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-build cables are rated NEMA 12
- 7) "M12" Cable assemblies are rated IP67

DIMENSIONS inch [mm]

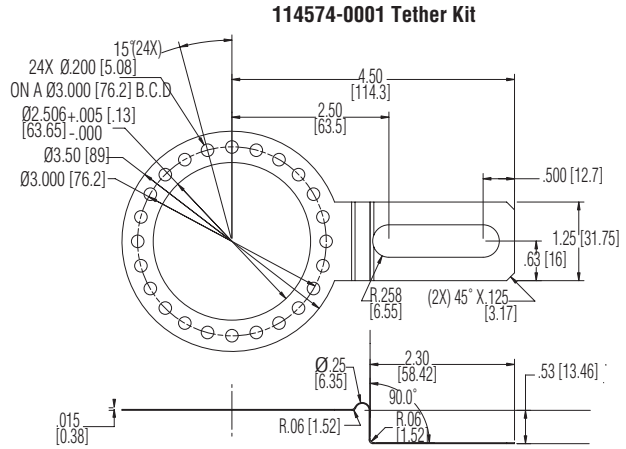
10-32 CLAMP SCREW
TORQUE TO 50 - 55 IN/LBS
WITH LOCTITE ON THREADS



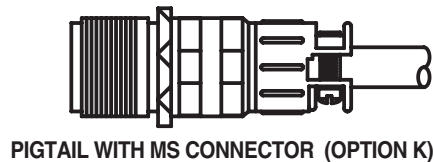
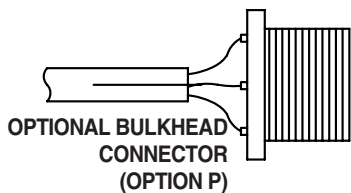
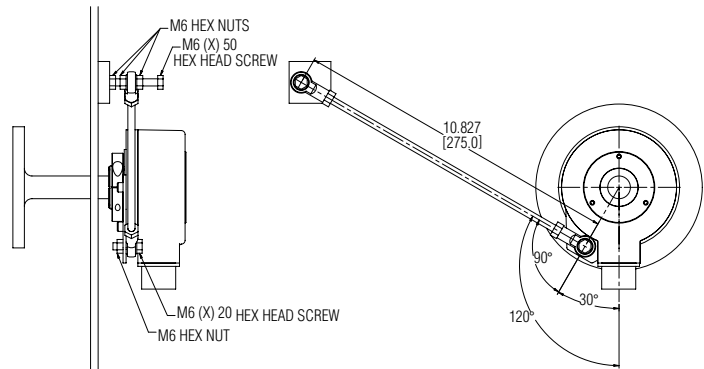
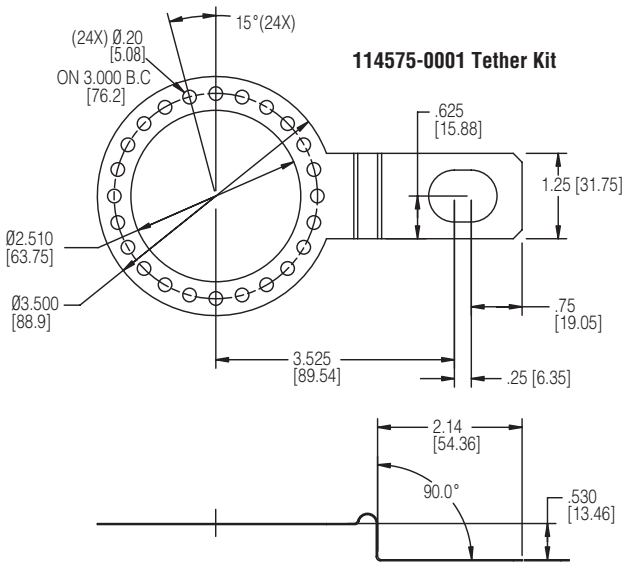
DIMENSIONS inch [mm]



SINGLE POINT TETHERS
SUPPLIED WITH ADAPTOR BUSHINGS
FROM 0.25 TO 0.375



SLOTTED TETHER
SUPPLIED WITH ADAPTOR BUSHINGS
FROM 0.25 TO 0.375



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