

SERIES HS35iQ

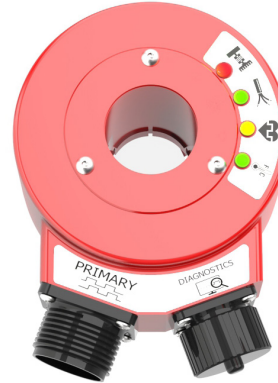


Hollowshaft Encoder with PulseIQ™ Technology

Key Features

- Revolutionary Visual Fault Forewarning For:
 - Encoder Health: Signal Quality, Low Voltage
 - Over/Under Environment Temperature
 - Cable Integrity Issues
 - Shaft Slip/Loose Clamp
- Fault Notification to Controls
- Advanced Diagnostics Via Software Service Tool
- Programmable Encoder Option to 20,000 PPR

IND
Industrial Duty



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
Resolution: Selectable resolution up to 20,000 PPR upon order or programmable resolution up to 20,000 PPR with factory default setting of 1,024 PPR. .
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: 90° ±30° electrical
Symmetry: 180° ±25° electrical
Index: 180° default gated to B low, with 90° and 360° programmable options
Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 5-26VDC (7272, 7273 line driver options), 5-15VDC (4469 line driver option), 250 mA max. not including output loads.
Primary Outputs:
 7272 Differential Line Driver: 40 mA, sink or source
 7273 Open Collector: 40mA, sink max
 4469 Differential Line Driver: 100mA, sink or source
Fault Outputs: TTL (5V) or HTL (5-26V), 12 mA max
Frequency Response: 200 kHz (data & index)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity, short circuit protected with 7272 or 7273 line drivers only
Termination: MS Connector; M12 Connector; cable exit w/seal. See Ordering Information
Mating Connector:
 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, MS3116-F12-10S (MCN-B1)
 Cable w/ 5 pin M12 Connector(112859-XXXX)
 Cable w/ 8 pin M12 Connector(112860-XXXX)
Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12. "M12" Cable assemblies are rated IP67

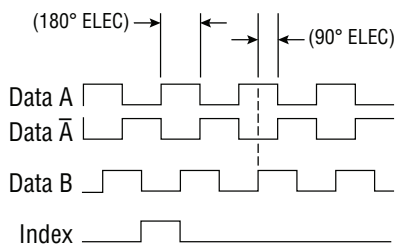
MECHANICAL

Bore Diameter: 6mm to 28mm, 1/4" to 1-1/8", 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: 10 in-oz. typical (at 25°C)
Running Torque: 5 in-oz. typical (at 25°C)
Bearings: ABEC 1
Housing and Cover: Powder Coated Aluminum
Shaft Material: 6061-T6 Aluminum, Stainless Steel for Extended Temp Option
Disc Material: Aluminum
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: Up to 98% (non-condensing)
Enclosure Rating: IP67 (IP64 at shaft speed above 5000 RPM)

STANDARD DATA AND INDEX
 Not all complements shown
 A shown for reference



Index Width: 180° Default
 A leads B, CW (from clamp end)





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PULSEiQ™ TECHNOLOGY SPECIFICATIONS

FAULT FOREWARNING

The HS35iQ Encoder with PulseIQ™ Technology provides fault forewarning for common encoder issues. Notification to the user is via status lights on the encoder and a digital output to the control system. Fault signal is provided as 5V (TTL) or 5-26V (HTL).

Fault	Fault Condition	Operation				Corrective Action Sequence
		Green	Red	Orange (Fault Recovery)	Orange (Warning)	
 Over-Temperature	Internal encoder temperature exceeds operating conditions	LED pulses green during normal operation	LED pulses red during fault condition	LED "flickers" (rapidly flashes) orange for 30 minutes after fault is corrected or cleared. Event logged in onboard memory.	LED pulses orange for temperature warning	Verify ambient temperature on and around the encoder is within acceptable limits.
 Shaft Slippage	Detection of shaft slippage				N/A	Stop rotation. Tighten coupling. Restart and monitor.
 Cable Integrity	Cable open or short condition such as damaged cable, touching or loose conductors.				N/A	Verify all cables are properly secured to the encoder and no damage or shorts are noticed.
 Encoder Internal Health	Electronics and voltage monitoring				LED pulses orange for encoder health warning	Check for sufficient voltage at encoder connector and/or review Instructional Manual for additional guidance.

PROGRAMMABILITY (OPTIONAL)

For programmable units, specifications can be customized from factory default settings to the programmable options below when using included software in expert mode. Please see manual for details.

Specification	Factory Default Setting	Programmable Options
Pulses Per Revolution	1,024 PPR	1 to 20,000 PPR in 1 PPR increments
Phasing	A leads B, CW from clamp end	A leads B, CW from clamp end A leads B, CCW from clamp end
Output Voltage	TTL, Unless Ordered HTL	TTL, HTL
Z Index Pulse Polarity	Standard High	Standard High, Inverted Low
Z Index Pulse Position and Gating	180° electrical gated to B low	90°, 180° or 360° electrical, many gating options to A/B

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See next page for non-programmable unit options and part number information.

PROGRAMMABLE UNIT 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: Control Output Format	Code 6: Termination	Code 7: Fault Output Format	Code 8: Options
HS35iQ	PROGR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS35iQ Hollowshaft Encoder	PROGR Programmable Resolution Up to 20,000 PPR. Set as 1,024 PPR From Factory	0 6mm 1 1/4" 2 5/16" 3 8mm 4 3/8" 5 10mm 6 12mm 7 1/2" 8 5/8" 9 15mm A 16mm C 19mm D 3/4" E 20mm F 7/8" G 24mm H 1" J 1-1/8" M 14mm N 18mm P 25mm R 28mm	0 None 1 Tether Kit, 4.5" C-Face Single Point with 3/8" Bolt 2 Tether Kit, 8.5" C-Face Single Point with 1/2" Bolt 3 Tether Kit, Slotted with T-bolts for Standard AC Motor Fan Covers 6 Same as 1 w/ Cover 7 Same as 3 w/ Cover 8 Same as 2 w/ Cover	0 ABZ, Single Ended, 5-26VDC (7272) 1 ABZ, Single Ended O/C (7273) 2 ABZ, Single Ended O/C w/2.2kOhm (7273) H Same as "0" with Extended Temp Range J Same as "1" with Extended Temp Range K Same as "2" with Extended Temp Range Not Available When Code 6 is H 4 Differential AB Only (7272). 5-26VDC In, Programmable Vin or 5VDC Out C Differential AB Only (4469). 5-15VDC In, Programmable Vin or 5VDC Out L Same as "4" with Extended Temp Range	6 Pin Not Available. Recommend 10 Pin MS and Mating Cable Assembly. 1 7 Pin MS* 6 7 Pin MS + Mating* 2 10 Pin MS 4 10 Pin Bayonet 7 10 Pin MS + Mating 9 10 Pin Bayonet + Mating H 5 pin M12* J 8 pin M12* A 0.5m (18") Cable C 1m (36") Cable D 2m (72") Cable E 3m (120") Cable F 0.3m (13") Cable with 10 Pin Bulk-head Connector and Mate G 0.3m (13") Cable	0 5V 1 5-26V* *5-26V output determined by input voltage	R1 Diagnostics and Output
		Not Electrically Isolated K 1-1/4" S 30mm	A Rod Tether B Rod Tether + Grounding Strap D Rod Tether + Grounding Strap + 4.5" C-Face Cover	Not Available When Code 6 is 1, 6, or H 7 Differential ABZ (7272). 5-26VDC In, Programmable Vin or 5VDC Out 9 Differential ABZ (4469). 5-15VDC In, Programmable Vin or 5VDC Out P Same as "7" with Extended Temp Range	*Fault Output Not Available on Primary Connector for 7 Pin Differential and All M12 Connectors. Fault Output Available on Primary Connector 7 pin Single Ended, 10 pin MS and Bayonet and cable exit. Always Available on Secondary Diagnostic Connector for All Options.		

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NON PROGRAMMABLE UNIT 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: Control Output Format	Code 6: Termination	Code 7: Fault Output Format	Code 8: Options
HS35iQ	<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"/>	<input type="checkbox"/> <input type="checkbox"/>
HS35iQ Hollowshaft Encoder	Enter Any Quadrature Resolution (PPR) From 00001-20000. Example: 00001 = 1 PPR	0 6mm 1 1/4" 2 5/16" 3 8mm 4 3/8" 5 10mm 6 12mm 7 1/2" 8 5/8" 9 15mm A 16mm C 19mm D 3/4" E 20mm F 7/8" G 24mm H 1" J 1-1/8" M 14mm N 18mm P 25mm R 28mm Not Electrically Isolated K 1-1/4" S 30mm	0 None 1 Tether Kit, 4.5" C-Face Single Point with 3/8" Bolt 2 Tether Kit, 8.5" C-Face Single Point with 1/2" Bolt 3 Tether Kit, Slotted with T-bolts for Standard AC Motor Fan Covers 6 Same as 1 w/ Cover 7 Same as 3 w/ Cover 8 Same as 2 w/ Cover A Rod Tether B Rod Tether + Grounding Strap D Rod Tether + Grounding Strap + 4.5" C-Face Cover	0 ABZ, Single Ended, 5-26VDC (7272) 1 ABZ, Single Ended O/C (7273) 2 ABZ, Single Ended O/C w/2.2kOhm (7273) H Same as "0" with Extended Temp Range J Same as "1" with Extended Temp Range K Same as "2" with Extended Temp Range Not Available When Code 6 is H 4 Differential AB Only, 5-26VDC, 5-26VDC out (7272) 5 Differential AB Only, 5-26VDC In, 5VDC Out (7272) A Differential AB Only, 5-26VDC In, 5VDC Out (4469) C Differential AB Only, 5-15VDC in, 5-15VDC Out (4469) L Same as "4" with Extended Temp Range M Same as "5" with Extended Temp Range Not Available When Code 6 is 1, 6, or H 6 Differential ABZ, 5-26VDC In, 5VDC Out (7272) 7 Differential ABZ (7272), 5-26V In, 5-26V Out 8 Differential ABZ, 5-26VDC In, 5VDC Out (4469) 9 Differential ABZ (4469), 5-15V In, 5-15V Out N Same as "6" with Extended Temp Range P Same as "7" with Extended Temp Range	6 Pin Not Available. Recommend 10 Pin MS and Mating Cable Assembly. 1 7 Pin MS* 6 7 Pin MS + Mating* 2 10 Pin MS 4 10 Pin Bayonet 7 10 Pin MS + Mating 9 10 Pin Bayonet + Mating H 5 pin M12* J 8 pin M12* A 0.5m (18") Cable C 1m (36") Cable D 2m (72") Cable E 3m (120") Cable F 0.3m (13") Cable with 10 Pin Bulk-head Connector and Mate G 0.3m (13") Cable *Fault Output Not Available on Primary Connector for 7 Pin Differential and All M12 Connectors. Fault Output Available on Primary Connector 7 pin Single Ended, 10 pin MS and Bayonet and cable exit. Always Available on Secondary Diagnostic Connector for All Options.	0 5V 1 5-26V* *5-26V output determined by input voltage	R1 Diagnostics and Output

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COMPATIBLE ACCESSORIES

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-B1** 10 pin bayonet, style MS3116-F12-10S

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
- 118024-0001** Cover Kit, 4.5" C-Face
- 118025-0001** Cover Kit, 8.5" C-Face
- 118026-0001** Cover Kit, Fan Cover for Standard AC Motor
- 116233-0001** Rod Tether Only
- 116233-0002** Rod Tether + 56 C-Face Cover (Single)
- 116233-0004** Rod Tether + Grounding Strap
- 118027-0004** Rod Tether + Grounding Strap + 4.5" C-Face Cover

PRIMARY CABLE ASSEMBLIES WITH MS CONNECTOR*

- 118019-XXXX** 7 Pin MS, Cable Assembly. For Use with Single Ended Outputs w/ Fault Output
- 108596-XXXX** 7 Pin MS, Cable Assembly. For Use with Differential Line Driver w/o Index Outputs w/o Fault Output
- 118020-XXXX** 10 Pin MS, Cable Assembly. For Use with Differential Line Driver with Index Outputs
- 118021-XXXX** 10 Pin Bayonet, Cable Assembly. For Use with Differential Line Driver with Index Outputs
- 118022-XXXX** NEMA4 10 pin MS, Cable Assembly. For Use with Differential Line Driver with Index Outputs

PRIMARY CABLE ASSEMBLIES WITH M12 CONNECTOR*

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

DIAGNOSTIC CABLE ASSEMBLIES

- 117995-0001** 6ft Diagnostic and Programming Cable to PC. 6 Pin MS to USB.
- 118023-XXXX** Cable Assembly for Fault Output on Secondary Connector. 6 Pin MS to Flying leads

SOLID STATE RELAY

- 608793-0001** Solid State Relay for Non Isolated Use of Fault Output. 60VDC max 3A

*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.

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PRIMARY ELECTRICAL CONNECTIONS

7 & 10 PIN MS CONNECTORS AND CABLES - CODE 6 = 1 TO 9

Connector and 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 #108596-XXXX 7 Pin Differential Line Driver without Index		Cable #118019-XXXX 7 Pin MS Single Ended		Cable #118020-XXXX 10 Pin MS or #118022-XXXX NEMA4 10 Pin Differential w Index*		Cable #118021-XXXX 10 Pin MS Bayonet		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	A	BRN	A	BRN	A	BRN	5	BRN	BRN
Sig. B	B	ORN	B	ORN	B	ORN	8	ORN	ORN
Sig. Z**	—	—	C	YEL	C	YEL	C	YEL	YEL
Power +V	D	RED	D	RED	D	RED	D	RED	RED
Fault	—	—	E	BLK/WHT	E	BLK/WHT	E	BLK/WHT	BLK/WHT
Com	F	BLK	F	BLK	F	BLK	F	BLK	BLK
Case	G	GRN	G	GRN	G	GRN	G	GRN	GRN
Sig. \bar{A}	C	BRN/WHT	—	—	H	BRN/WHT	H	BRN/WHT	BRN/WHT
Sig. \bar{B}	E	ORN/WHT	—	—	I	ORN/WHT	J	ORN/WHT	ORN/WHT
Sig. \bar{Z}**	—	—	—	—	J	YEL/WHT	K	YEL/WHT	YEL/WHT

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)

PRIMARY ELECTRICAL CONNECTIONS

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. \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

Notes:

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

“MS” Type mating connectors and pre-build cables are rated NEMA 12

“M12” Cable assemblies are rated IP67

**Index not provided on all models. See ordering information.

*For watertight applications, use NEMA4 10 pin cable and connector 118022-XXXX

DIAGNOSTIC ELECTRICAL CONNECTION

Encoder Function	Cable #118023-XXXX 6 Pin MS to Flying Lead	
	Pin	Wire Color
COM	A	BLK
—	B	N/C
—	C	N/C
—	D	N/C
—	E	N/C
Fault	F	BLK/WHT
118023-XXXX comes with an additional shield wire		

Encoder Diagnostic and Programming Cable (6ft)	Cable #117995-0001 6 Pin MS to USB
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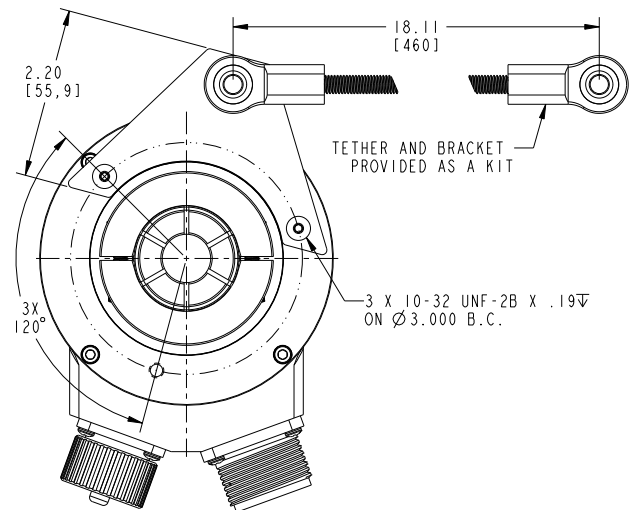
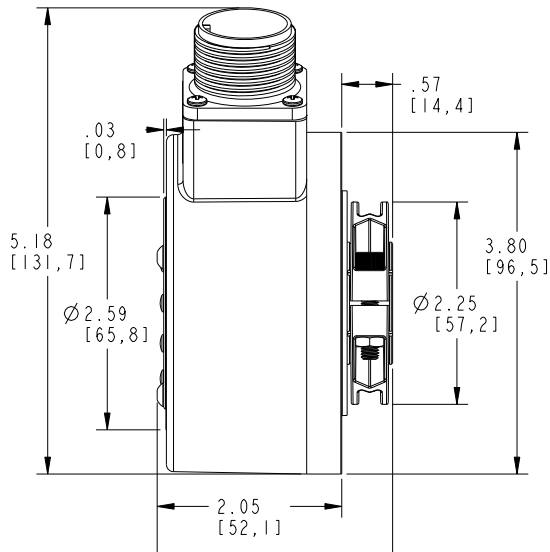
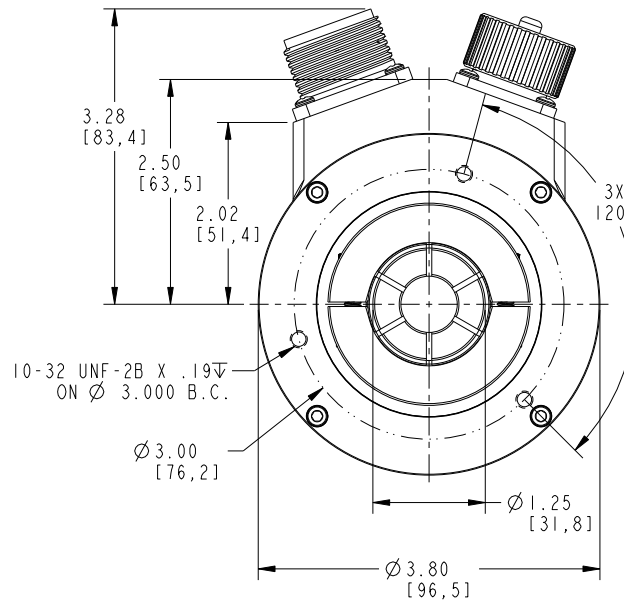
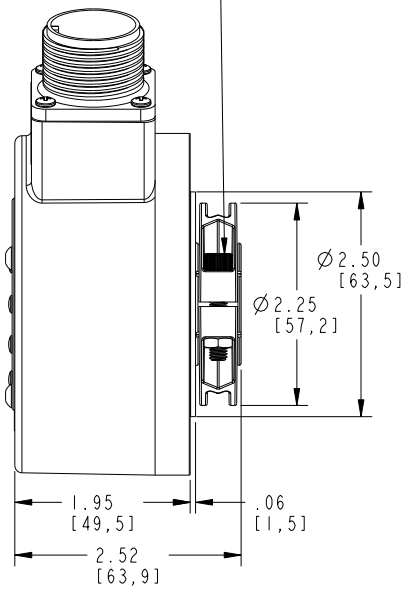
Dimensions: inch (mm)

HS35iQ Encoder

[Download Sample 3D Model File Here >](#)

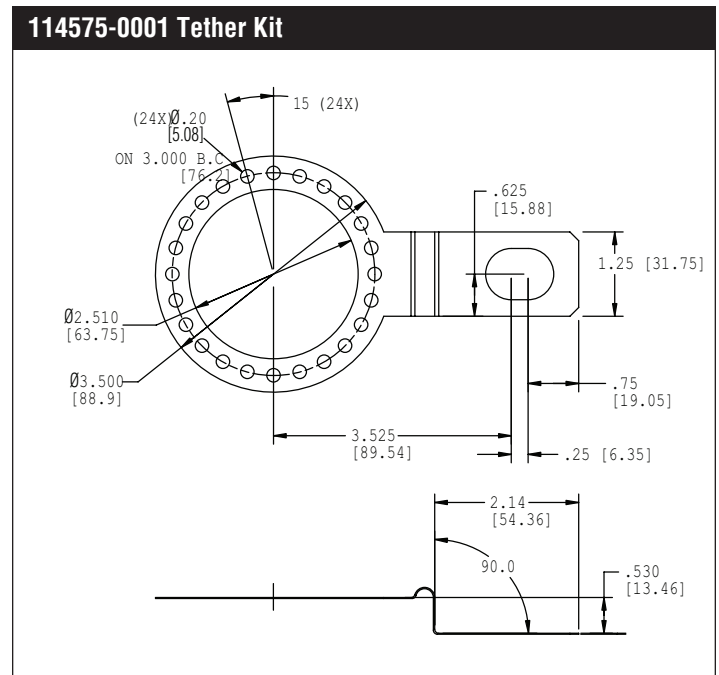
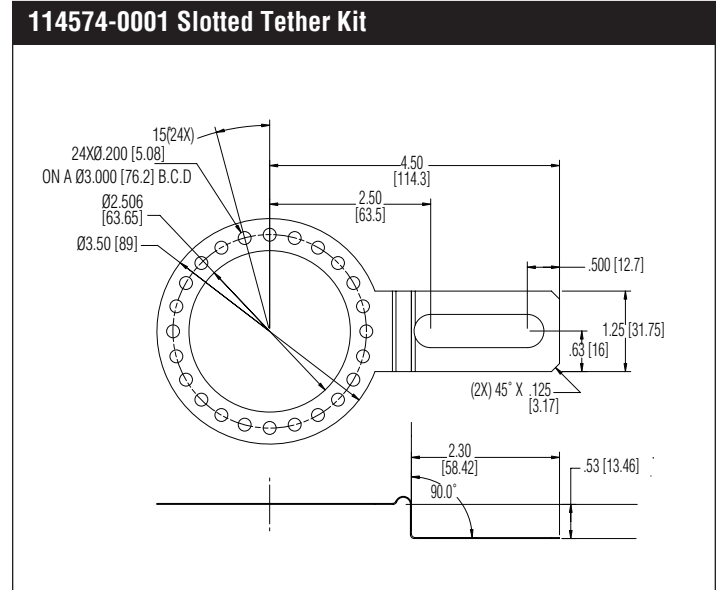
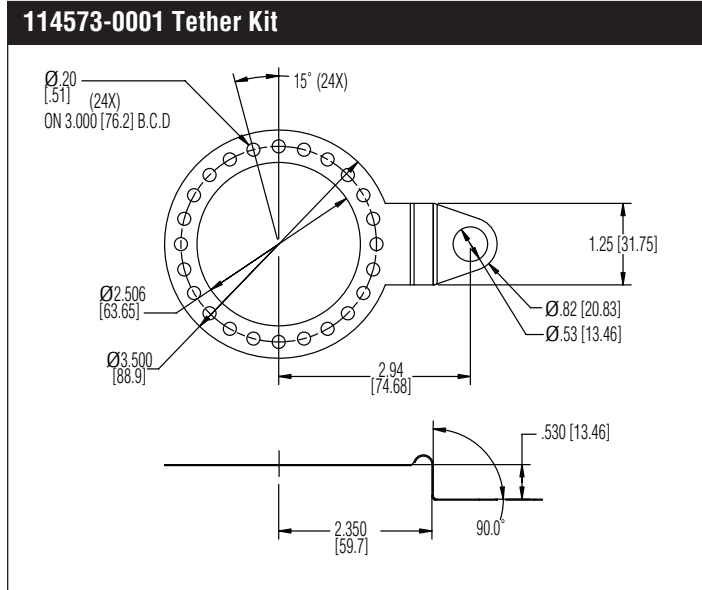
.stp format, 10 pin dual connector option

2 X 10-32 UNF CLAMP SCREW
TORQUE TO 50-55 IN-LBS



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Dimensions: inch (mm)



Worldwide Brands: Dynapar™ • NorthStar™ • Hengstler™ • Harowe™

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