

# SERIES HS35R

**Dynapar™ brand**

## Heavy Duty Hollowshaft Encoder

### Key Features

- **Phased Array Sensor for Reliable Signal Output**
- **Rugged Design Withstands up to 400G Shock and 20G Vibration**
- **Unbreakable Code Disc up to 5000 PPR**
- **Heavy Duty Design Rated for IP67**
- **Customizable Mounting Options including Torque Arm with Optional Grounding Strap**



CE  
EN 61326-1



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental, Optical

**Resolution:** 1 to 5000 PPR (pulses/revolution) See Ordering Information

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

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

**Quadrature Phasing:**

For resolutions 200 to 300 PPR and 1200 PPR and above: 90° ±30° electrical; all other resolutions: 90° ±15°

**Symmetry:**

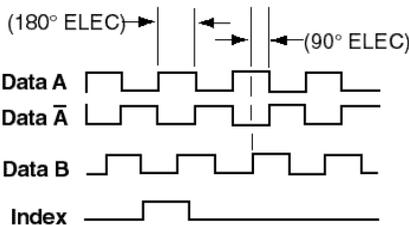
For resolutions 200-300 PPR and above: 1024 PPR: 180° ±25° electrical; all other resolutions: 180° ±18°

**Index:** 150° to 330° A leads B, CW (from clamp end) (Reverse Phasing, A leads B for CCW 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



Index Width: 150° to 330°

A leads B, CW (from clamp end)

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

### ELECTRICAL

**Input Power:** 5-26VDC, 5-15VDC. 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
- 4469 Differential Line Driver: 100mA, sink or source
- High-Power Mosfet Line Driver

**Frequency Response:** 125 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:**

- 6 pin MS, style MS3106A-14S-6S (MCN-N4)
- 7 pin MS, style MS3106A-16S-1S (MCN-N5)
- 10 pin MS, style MS3106A-18-1S (MCN-N6)
- 10 pin Bayonet, MS3116-F12-10S (MCN-B1)
- 12 Pin CGW M23 Connector (MCN-C2)
- Cable w/ 5 pin M12 connector, p/n 112859-xxxx
- Cable w/ 8 pin M12 connector, p/n 112860-xxxx

Note: "MS" type mating connectors and pre-built 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:** 8.0 in-oz. maximum (at 25°C)

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

**Bearings:** ABEC 1

**Housing and Cover:** Powder Coated Aluminum

**Shaft Material:** 6061-T6 Aluminum

**Disc Material:** Mylar (unbreakable)

**Weight:** 1.76lb (28 Oz) Typical

### ENVIRONMENTAL

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

**Extended Temperature Range:** -40 to +100°C

(See ordering information)

**Storage temperature:** -40 to +100°C

**Shock:** 400G, 6mSec

**Vibration:** 5 to 3000 Hz, 20G

**Humidity:** Up to 98% (non-condensing)

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

**Ordering Information**

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

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Output Format	Code 6: Termination	Code 7: Options
<b>HS35R</b>	□□□□	□	□	□	□	□□
Ordering Information						
<b>HS35R</b> Heavy-Duty, Hollowshaft Encoder	<b>0001 0500</b>	<b>0</b> 6mm	<b>0</b> None	<b>0</b> ABZ, 5-26VDC push-pull (7272)	<b>0</b> 6 Pin Connector	<b>Blank</b> No Option
	<b>0003 0512</b>	<b>1</b> 1/4"	<b>1</b> 4.5" C-face tether	<b>1</b> ABZ, 5-26VDC O/C (7273)	<b>1</b> 7 Pin Connector	
	<b>0010 0600</b>	<b>2</b> 5/16"	<b>2</b> 8.5" C-face tether	<b>2</b> ABZ, 5-26VDC O/C w/2.2kOhm (7273)	<b>2</b> 10 Pin Connector	Available when Code 5 is 0-2, 6 and 7 and when Code 6 is 0-2 or 5-7
	<b>0012 0900</b>	<b>3</b> 8mm	<b>3</b> Slotted tether (to fit standard AC motor fan cover)	<b>H</b> Same as "0" with Extended temp range	<b>3</b> 12 Pin Connector	
	<b>0015 1000</b>	<b>4</b> 3/8"	Not available when Code 5 is D,E,F,G, Q, R	<b>J</b> Same as "1" with Extended temp range	<b>4</b> 10 Pin Bayonet Connector	
	<b>0032 1024</b>	<b>5</b> 10mm		<b>K</b> Same as "2" with Extended temp range	<b>5</b> 6 Pin+Mating Connector	
	<b>0050 1200</b>	<b>6</b> 12mm	Available when Code 5 is D,E,F,G, Q, R	Not available when Code 6 is H	<b>6</b> 7 Pin+Mating Connector	
	<b>0060 1500</b>	<b>7</b> 1/2"			<b>4</b> Differential AB only, 5-26VDC, 5-26VDC out (7272)	
	<b>0100 2000</b>	<b>8</b> 5/8"	Same as 3 w/cover	<b>5</b> Differential AB only, 5-26VDC in, 5VDC out (7272)	<b>8</b> 12 Pin+Mating Connector	
	<b>0120 2048</b>	<b>9</b> 15mm		<b>A</b> Differential AB only, 5-26VDC in, 5VDC out (4469)	<b>9</b> 10 Pin Bayonet+Mating Connector	
	<b>0200 2400</b>	<b>A</b> 16mm	Same as A with 56C cover (Single Only)	<b>C</b> Differential AB only, 5-15VDC in, 5-15VDC out (4469)	<b>A</b> 0.5m (18") Cable	
	<b>0240 2500</b>	<b>C</b> 19mm		<b>L</b> Same as "4" with Extended temp range	<b>C</b> 1m (36") Cable	
	<b>0250 3072</b>	<b>D</b> 3/4"	Same as 1 w/dual cover	<b>M</b> Same as "5" with Extended temp range	<b>D</b> 2m (72") Cable	
	<b>0300 4000</b>	<b>E</b> 20mm		Not available when Code 6 is 0, 1, 5, 6, or H	<b>6</b> Differential ABZ, 5-26VDC in, 5VDC out (7272)	<b>E</b> 3m (120") Cable
	<b>0360 4096</b>	<b>F</b> 7/8"	Same as 3 w/dual cover		<b>7</b> Differential ABZ, 5-26VDC in, 5-26VDC out (7272)	<b>F</b> 0.3m (13") Cable with 10-Pin Bulk-head Connector and Mate
<b>5000</b>	<b>G</b> 24mm	Same as 2 w/ 180 C-face cover (single or dual output)		<b>8</b> Differential ABZ, 5-26VDC in, 5VDC out (4469)	<b>G</b> 0.3m (13") Cable	
	<b>H</b> 1"		Rod tether	<b>9</b> Differential ABZ, 5-15VDC in, 5-15VDC out (4469)	<b>H</b> 5 Pin M12 Connector	
	<b>J</b> 1-1/8"	Rod tether with ground strap.		<b>D</b> Dual isolated outputs, same as "6"	<b>J</b> 8 Pin M12 Connector	
	<b>M</b> 14mm		Same as B with 56C cover (Single Output)	<b>E</b> Dual isolated outputs, same as "7"		
	<b>N</b> 18mm	Rod tether with ground strap.		<b>F</b> Dual isolated outputs, same as "8"		
	<b>P</b> 25mm		Same as B with 56C cover (Single Output)	<b>G</b> Dual isolated outputs, same as "9"		
	<b>R</b> 28mm	Not Electrically Isolated		<b>N</b> Same as "6" with Extended temp range		
			K 1-1/4"	<b>P</b> Same as "7" with Extended temp range		
				<b>Q</b> Same as "D" with Extended temp range		
			<b>R</b> Same as "E" with Extended temp range			
			<b>W</b> ABZ, 10-24VDC Line Driver for cable runs up to 500 ft/120m using the Dynapar cable assemblies listed below			

**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
- 112123-XXXX** 6 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 1400635-XXXX** 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\***

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

**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

**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-B1** 10 pin bayonet, style MS3116-F12-10S
- MCN-C2** 12 Pin CCW M23 Connector

**Accessory Kits:**

- 114573-0001** Tether Kit, 4.5" C-Face Single Point with 3/8" Bolt
- 114574-0001** Tether Kit, Slotted with T-bolts for Standard AC Motor Fan Covers
- 114575-0001** Tether Kit, 8.5" C-Face Single Point with 1/2" Bolt
- 114591-0001** Cover Kit, 56 C-Face
- 114592-0001** Cover Kit, Fan Cover
- 114593-0001** Dual Cover Kit, 56 C-Face
- 114928-0001** Dual Cover Kit, 180 C-Face
- 114594-0001** Dual Cover Kit, Fan Cover
- 116233-0001** Rod Tether Only
- 116233-0002** Rod Tether + 56 C-Face Cover (Single)
- 116233-0004** Rod Tether + Grounding Strap
- 116233-0005** Rod Tether + Grounding Strap +56 C-Face Cover (Single)

\*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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## ELECTRICAL CONNECTIONS

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

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

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

### 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

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

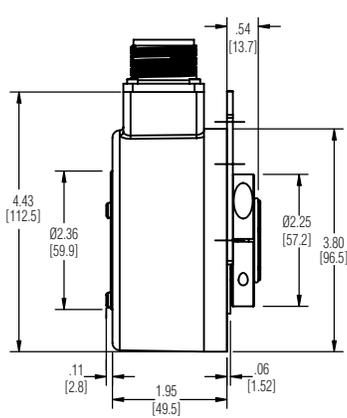
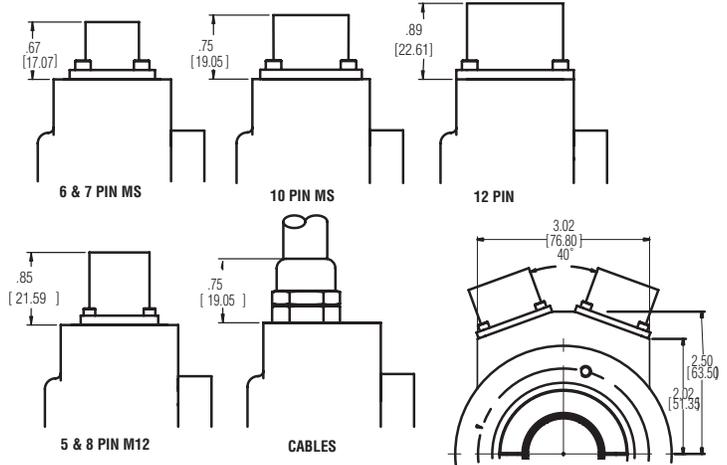
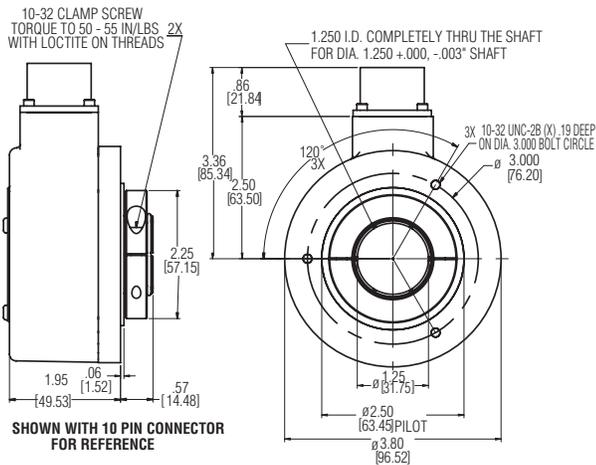
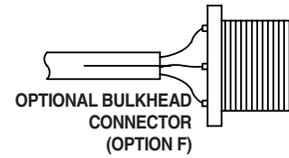
4) \*Index not provided on all models. See ordering information.

5) \*\*For watertight applications, use NEMA4 10 pin cable & connector 1400635XXXX or 109209-XXXX.

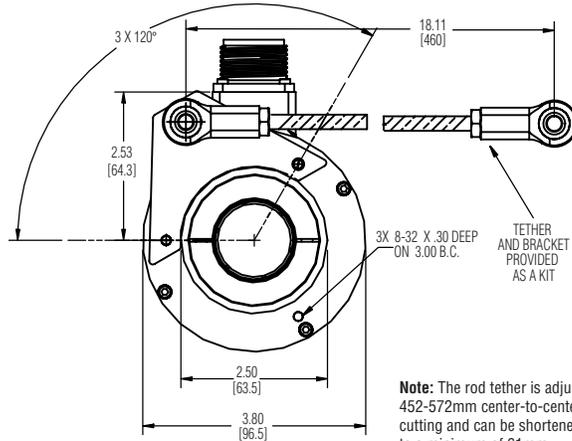
6) "MS" Type mating connectors and pre-build cables are rated NEMA 12

7) "M12" Cable assemblies are rated IP67

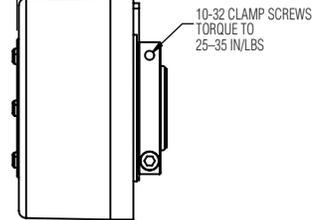
**DIMENSIONS** inch [mm]



**SHOWN WITH TORQUE ARM**



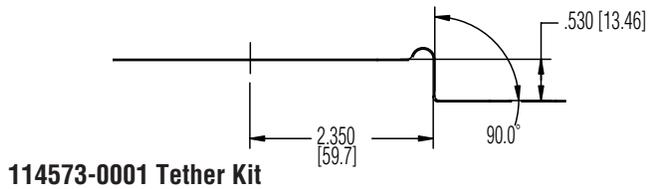
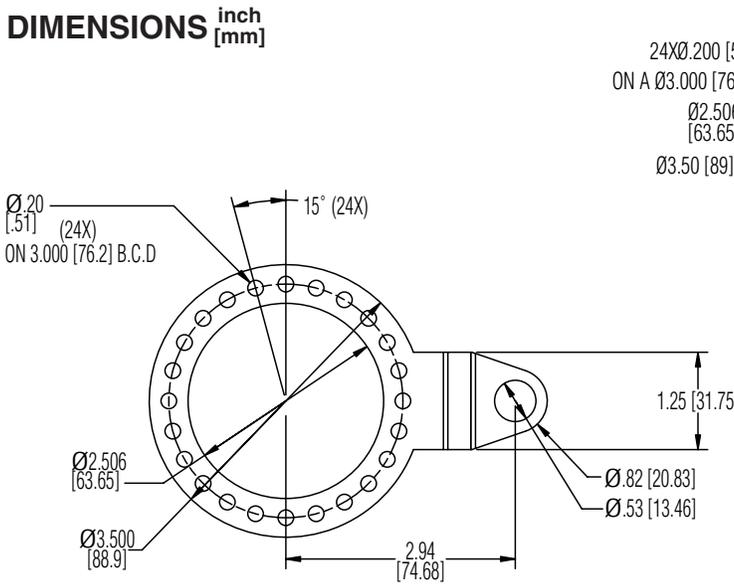
**Note:** The rod tether is adjustable from 452-572mm center-to-center without cutting and can be shortened via cutting to a minimum of 61mm.



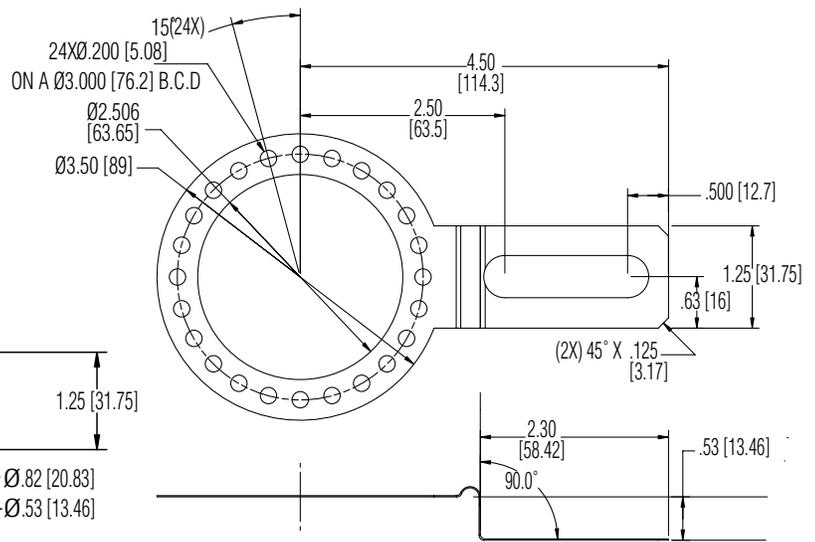
# SERIES HS35R



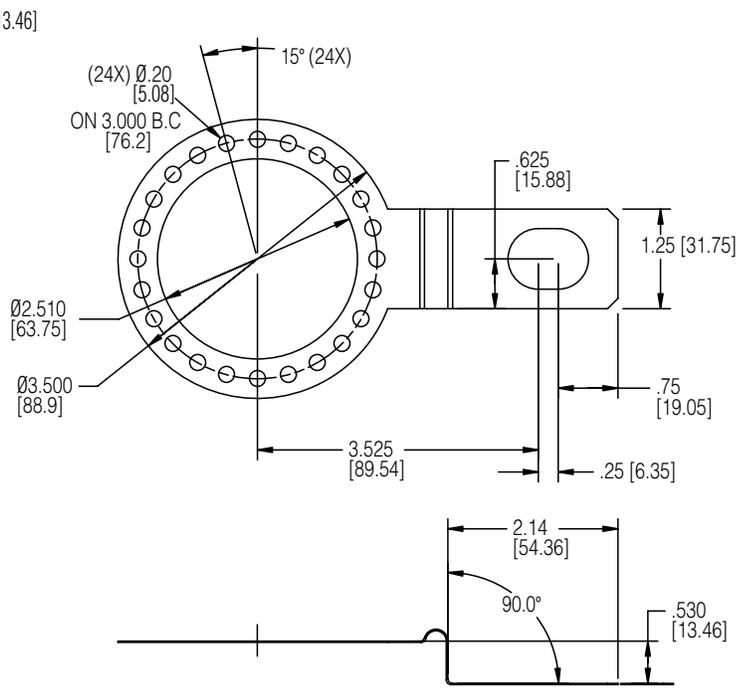
**DIMENSIONS** <sup>inch</sup>  
[mm]



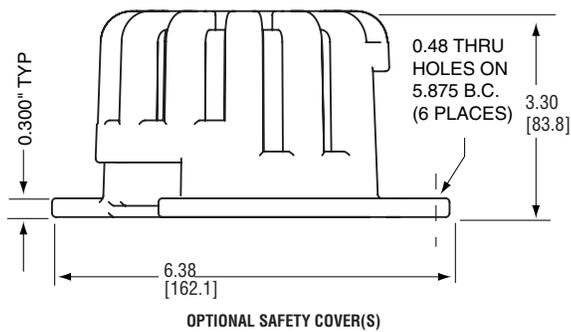
**114573-0001 Tether Kit**



**114574-0001 Slotted Tether Kit**



**114575-0001 Tether Kit**



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INNOVATION - CUSTOMIZATION - DELIVERY

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