

## SERIES HS35R



### Heavy Duty Hollowshaft Encoder

#### Key Features

- High Resolution up to 20,000 PPR
- Heavy Duty Design rated to 400G Shock and 20G Vibration
- Phased Array Optics for Reliable Output
- Environmentally Protected up to IP67
- Customizable Mounting and Protective Cover Options Included

**IND**  
Industrial Duty



#### SPECIFICATIONS

##### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental, Optical  
**Resolution:** 1 to 20,000 PPR (pulses/revolution)  
**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:**  $90^\circ \pm 30^\circ$  electrical  
**Symmetry:**  $180^\circ \pm 25^\circ$  electrical  
**Index:**  $180^\circ$  default gated to B low  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

##### ELECTRICAL

**Input Power:** 5-26VDC, 5-15VDC. 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  
 2707 Differential Line Driver: 60mA, sink or source  
**Frequency Response:** 200 kHz (data and index)  
**Noise Immunity:** Tested to EN61326-1  
**Electrical Immunity:** Reverse polarity (All models); Short circuit protection (7272, 7273, and 2707 line drivers only)  
**Termination:** MS Connector; M12 Connector; cable exit with 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, NEMA4 style (MCN-N6N4)  
 10 pin Bayonet, MS3116-F12-10S (MCN-B1)  
 12 Pin CCW M23 Connector (MCN-C2)  
 Cable with 5 pin M12 Connector (112859-XXXX)  
 Cable with 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:** 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:** 10.0 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, Stainless Steel for Extended Temp Option  
**Disc Material:** Aluminum  
**Weight:** 1.76lb (28 Oz) Typical

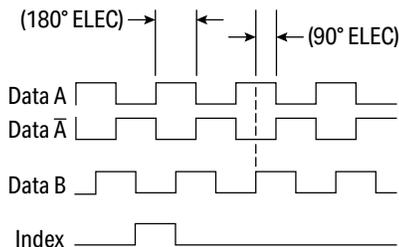
##### ENVIRONMENTAL

**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, 6ms  
**Vibration:** 5 to 3000 Hz, 20G  
**Humidity:** Up to 98% (non-condensing)  
**Enclosure Rating:** IP67\* (IP64 at shaft speed above 5000 RPM)

\* Ingress protection rating dependent on mating connector rating

##### STANDARD DATA AND INDEX

Not all complements shown  
 A shown for reference



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

## SERIES HS35R



### ORDERING INFORMATION

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

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Output Format	Code 6: Termination	Code 7: Options
<b>HS35R</b>	<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"/>
HS35R Heavy-Duty, Hollowshaft Encoder	Enter Custom PPR from 1 to 20,000 Examples: <b>0001</b> = 1 PPR <b>0256</b> = 256 PPR <b>1000</b> = 1000 PPR <b>9999</b> = 9999 PPR <b>A000</b> = 10,000 PPR <b>B000</b> = 11,000 PPR <b>C999</b> = 12,999 PPR : <b>G000</b> = 16,000 PPR <b>G384</b> = 16,384 PPR <b>H000</b> = 17,000 PPR <b>J000</b> = 18,000 PPR <b>K000</b> = 19,000 PPR <b>L000</b> = 20,000 PPR  Note: Letter "I" is skipped and not used	Electrically Isolated (Non-Metallic Insert)	Available for all Code options <b>0</b> None <b>1</b> 4.5" C-face tether <b>2</b> 8.5" C-face tether <b>3</b> Slotted tether (to fit standard AC motor fan cover)	Available for all Code 6 options <b>0</b> ABZ, 5-26VDC push-pull (7272) <b>1</b> ABZ, 5-26VDC O/C (7273) <b>2</b> ABZ, 5-26VDC O/C w/2.2kOhm (7273) <b>H</b> Same as "0" with Extended temp range <b>J</b> Same as "1" with Extended temp range <b>K</b> Same as "2" with Extended temp range	<b>0</b> 6 Pin Connector <b>1</b> 7 Pin Connector <b>2</b> 10 Pin Connector <b>3</b> 12 Pin Connector <b>4</b> 10 Pin Bayonet Connector <b>5</b> 6 Pin+Mating Connector <b>6</b> 7 Pin+Mating Connector <b>7</b> 10 Pin+Mating Connector <b>8</b> 12 Pin+Mating Connector <b>9</b> 10 Pin Bayonet+Mating Connector <b>A</b> 0.5m (18") Cable <b>C</b> 1m (36") Cable <b>D</b> 2m (72") Cable <b>E</b> 3m (120") Cable <b>F</b> 0.3m (13") Cable with 10-Pin Bulkhead Connector and Mate <b>G</b> 0.3m (13") Cable <b>H</b> 5 Pin M12 Connector <b>J</b> 8 Pin M12 Connector	<b>Blank</b> No Option <b>01</b> Reverse Phasing (A leads B, CCW)  Available when Code 5 is 0-2 and Code 6 is 0 or 5; OR Code 5 is 0-9, A-G and Code 6 is 1-2 or 6-7 <b>PS</b> LED Output
		Not Electrically Isolated (No Insert) <b>K</b> 1-1/4" <b>S</b> 30mm	Not available when Code 5 is D,E,F,G, Q, R <b>4</b> Same as 1 w/cover <b>5</b> Same as 3 w/cover <b>C</b> Same as A with 56C cover (Single Only)	Available when Code 5 is D,E,F,G, Q, R <b>6</b> Same as 1 w/dual cover <b>7</b> Same as 3 w/dual cover <b>8</b> Same as 2 w/ 180 C-face cover (single or dual output)		

# SERIES HS35R



## COMPATIBLE ACCESSORIES

### CABLE ASSEMBLIES WITH MS CONNECTOR

- 108594-XXXX** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 112123-XXXX** 6 Pin MS, Cable Assy. For Use with Differential Line Driver without Index 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 without 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-N6N4** 10 pin, NEMA4 style
- 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.

## SERIES HS35R



### ELECTRICAL CONNECTIONS

#### 6, 7 AND 10 PIN MS CONNECTORS AND CABLES - CODE 6 = 0 TO 9, A TO G

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.

Table 1																
Encoder Function	Cable #108594-XXXX 6 Pin Single Ended		Cable #112123-XXXX 6 Pin Differential Line Drive without Driver		Cable #108596-XXXX 7 Pin Differential Line Drive without Driver		Cable #108595-XXXX 7 Pin (If used)		Cable #109209-XXXX* or 14000635XXXX 10 Pin Differential Line Driver with Index		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	
Signal A	E	BRN	E	BRN	A	BRN	A	BRN	A	BRN	A	BRN	5	BRN	BRN	
Signal B	D	ORN	D	ORN	B	ORN	B	ORN	B	ORN	B	ORN	8	ORN	ORN	
Signal Z <sup>†</sup>	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	—	—	
Common	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	
Signal $\bar{A}$	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT	H	BRN/WHT	6	BRN/WHT	BRN/WHT	
Signal $\bar{B}$	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT	J	ORN/WHT	1	ORN/WHT	ORN/WHT	
Signal $\bar{Z}^{\dagger}$	—	—	—	—	—	—	—	—	J	YEL/WHT	K	YEL/WHT	4	YEL/WHT	YEL/WHT	
OV Sense	—	—	—	—	—	—	—	—	—	—	—	—	2	BLK/WHT	—	
+V Sense	—	—	—	—	—	—	—	—	—	—	—	—	11	GRN	—	

#### 5 AND 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.

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
Signal A	4	BLK	1	BRN	1	BRN
Signal B	2	WHT	4	ORG	4	ORG
Signal Z <sup>†</sup>	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Common	3	BLU	7	BLK	7	BLK
Signal $\bar{A}$	—	—	—	—	3	BRN/WHT
Signal $\bar{B}$	—	—	—	—	5	ORG/WHT
Signal $\bar{Z}^{\dagger}$	—	—	—	—	8	YEL/WHT

#### Notes:

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)

Cable Configuration (Table 2): PVC jacket, 105°C rated, overall foil shield; 24 AWG conductors, minimum

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

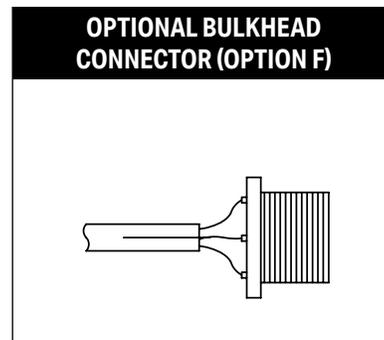
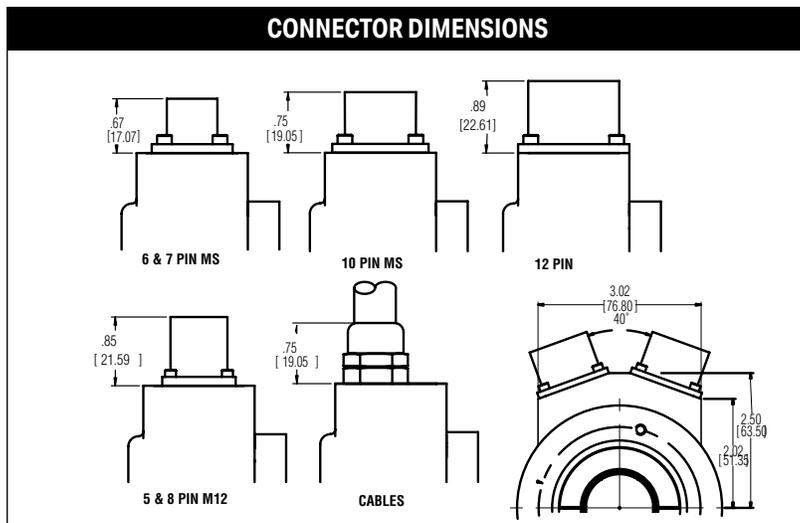
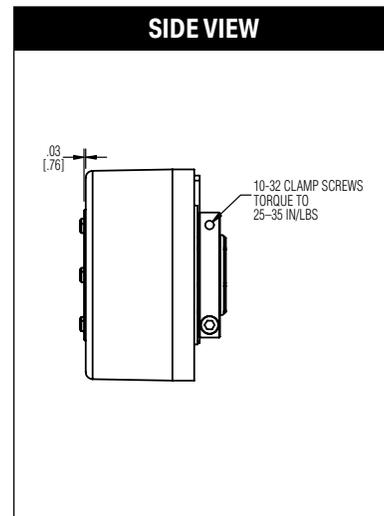
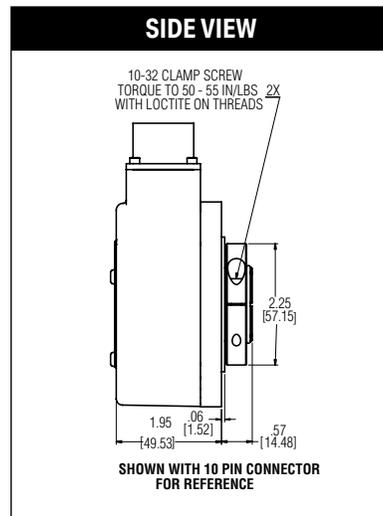
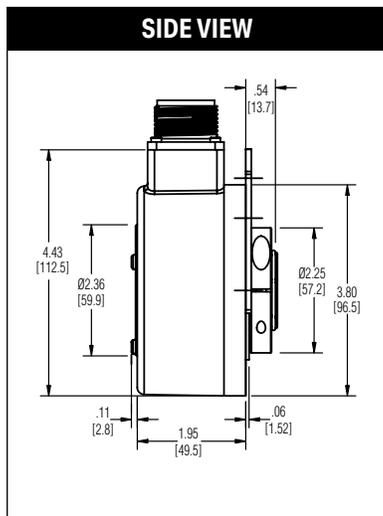
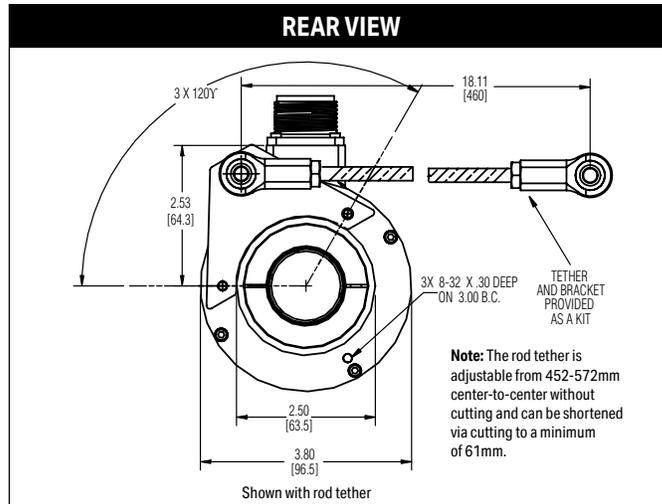
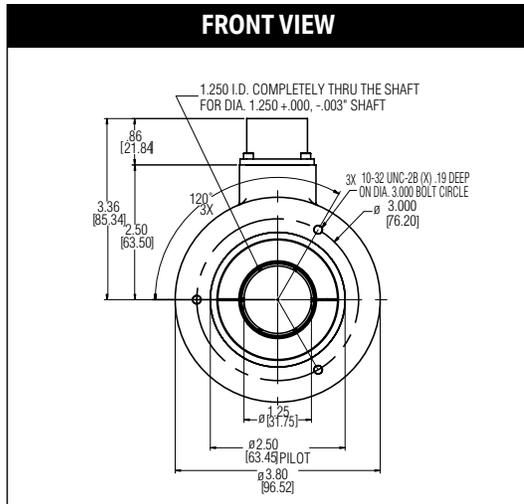
\*For watertight applications, use NEMA 4 10 pin cable and connector 109209-XXXX

<sup>†</sup> Index not provided on all models. See ordering information

## SERIES HS35R

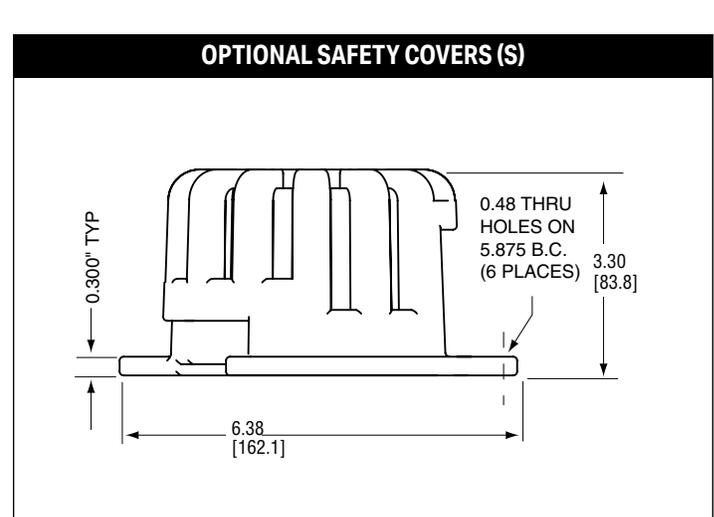
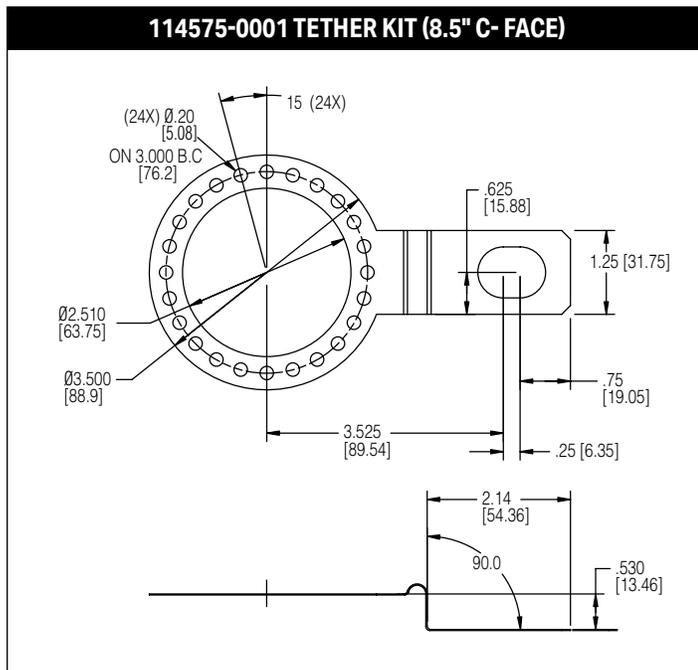
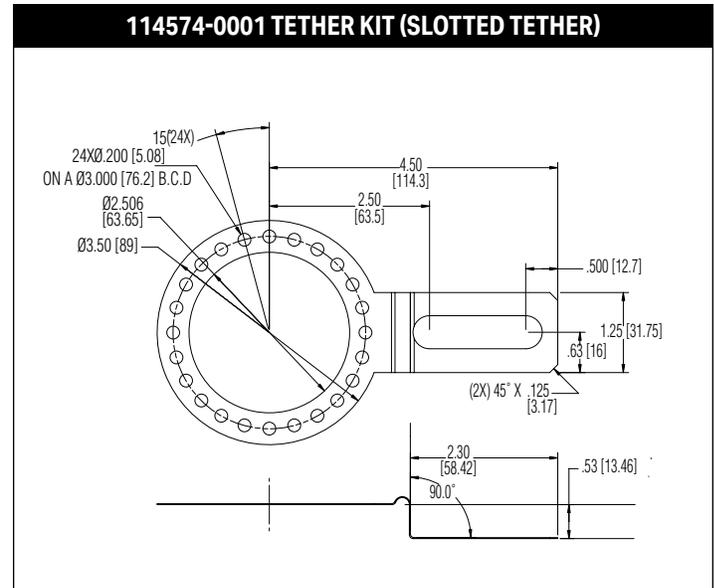
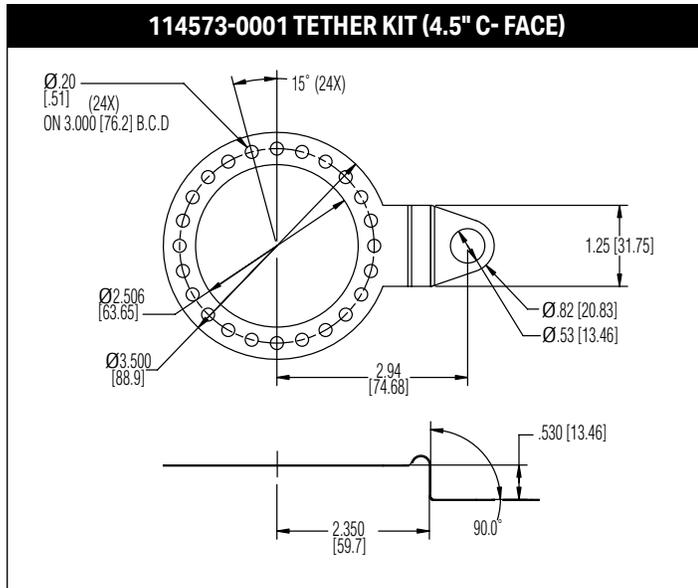


Dimensions: inch [mm]



# SERIES HS35R

Dimensions: inch [mm]



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

[WWW.DYNAPAR.COM](http://WWW.DYNAPAR.COM)



**Headquarters**  
2100 West Broad St.  
Elizabethtown, NC 28337  
USA

**Customer Service:**  
Tel: +1.800.234.8731  
custserv@dynapar.com

**Technical Support**  
Tel.: +1.800.234.8731  
support@dynapar.com

**European Sales Representative**  
Hengstler GmbH  
Uhlandstrasse 49, 78554 Aldingen  
Germany  
[www.hengstler.com](http://www.hengstler.com)