

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° 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 $+85^\circ\text{C}$ (0 to $+70^\circ\text{C}$ with 4469 line driver, see "Ordering Information"). At shaft speed above 3000 RPM, derate 10°C per 1000 RPM

Extended Temperature Range: -40 to $+100^\circ\text{C}$ (See ordering information)

Storage temperature: -40 to $+100^\circ\text{C}$

Shock: 400G, 6ms

Vibration: 5 to 3000 Hz, 20G

Humidity: Up to 98% (non-condensing)

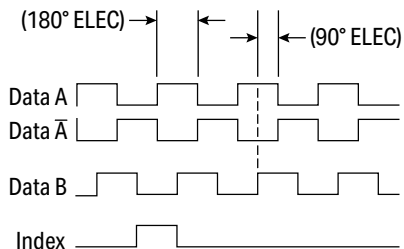
Enclosure Rating: IP67* (IP64 at shaft speed above 5000 RPM)

* Ingress protection rating dependent on mating connector rating

STANDARD DATA AND INDEX

Not all complements shown

$\bar{A}$ 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
HS35R						
HS35R Heavy-Duty, Hollowshaft Encoder	Enter Custom PPR from 1 to 20,000 Examples: 0001 = 1 PPR 0256 = 256 PPR 1000 = 1000 PPR 9999 = 9999 PPR A000 = 10,000 PPR B000 = 11,000 PPR C999 = 12,999 PPR ... G000 = 16,000 PPR G384 = 16,384 PPR H000 = 17,000 PPR J000 = 18,000 PPR K000 = 19,000 PPR L000 = 20,000 PPR Note: Letter "I" is skipped and not used	Electrically Isolated (Non-Metallic Insert) 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 (No Insert) K 1-1/4" S 30mm	Available for all Code options 0 None 1 4.5" C-face tether 2 8.5" C-face tether 3 Slotted tether (to fit standard AC motor fan cover) Not available when Code 5 is D,E,F,G, Q, R 4 Same as 1 w/cover 5 Same as 3 w/cover C Same as A with 56C cover (Single Only) Available when Code 5 is D,E,F,G, Q, R 6 Same as 1 w/dual cover 7 Same as 3 w/dual cover 8 Same as 2 w/ 180 C-face cover (single or dual output) Available for all Code options A Rod tether B Rod tether with ground strap. D Same as B with 56C cover (Single Output)	Available for all Code 6 options 0 ABZ, 5-26VDC push-pull (7272) 1 ABZ, 5-26VDC O/C (7273) 2 ABZ, 5-26VDC O/C w2.2kOhm (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 0, 1, 5, 6, or H 6 Differential ABZ, 5-26VDC in, 5VDC out (7272) 7 Differential ABZ, 5-26VDC in, 5-26VDC out (7272) 8 Differential ABZ, 5-26VDC in, 5VDC out (4469) 9 Differential ABZ, 5-15VDC in, 5-15VDC out (4469) D Dual isolated outputs, same as "6" E Dual isolated outputs, same as "7" F Dual isolated outputs, same as "8" G Dual isolated outputs, same as "9" N Same as "6" with Extended temp range P Same as "7" with Extended temp range Q Same as "D" with Extended temp range R Same as "E" with Extended temp range W Differential ABZ, 10-24VDC in, 10-24VDC out (2707)	0 6 Pin Connector 1 7 Pin Connector 2 10 Pin Connector 3 12 Pin Connector 4 10 Pin Bayonet Connector 5 6 Pin+Mating Connector 6 7 Pin+Mating Connector 7 10 Pin+Mating Connector 8 12 Pin+Mating Connector 9 10 Pin Bayonet+Mating Connector 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 Bulkhead Connector and Mate G 0.3m (13") Cable H 5 Pin M12 Connector J 8 Pin M12 Connector	Blank No Option 01 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 PS LED 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 [†]	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 [†]	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

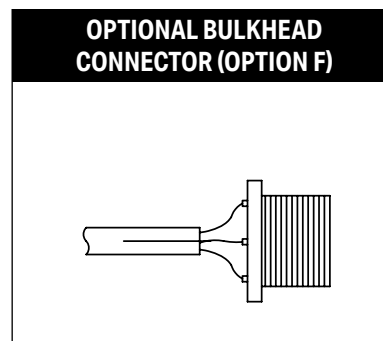
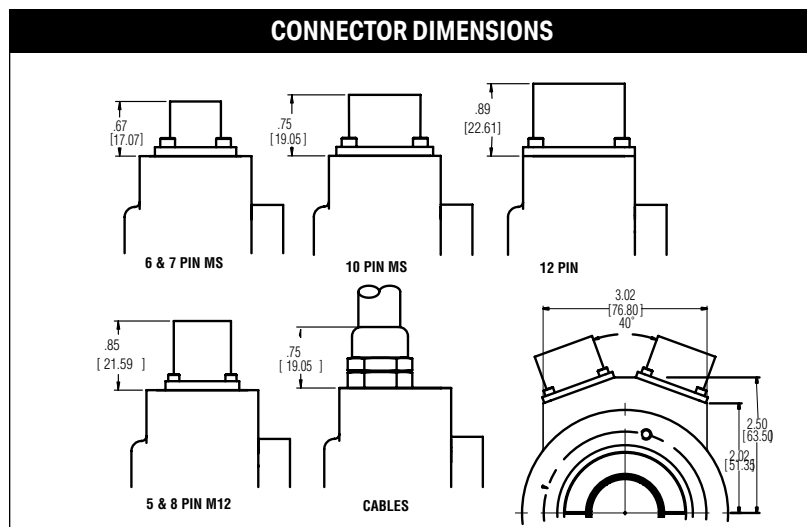
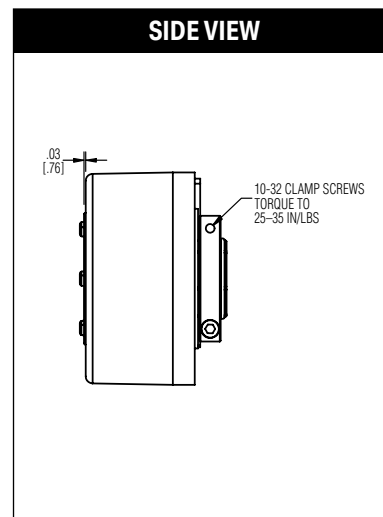
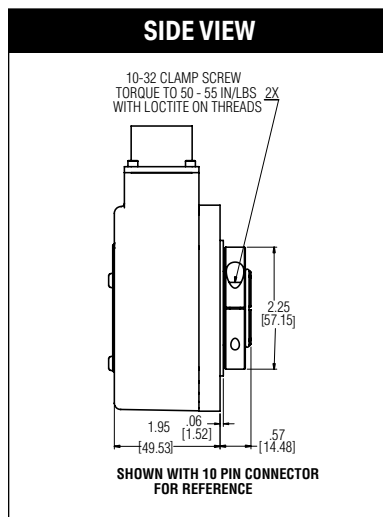
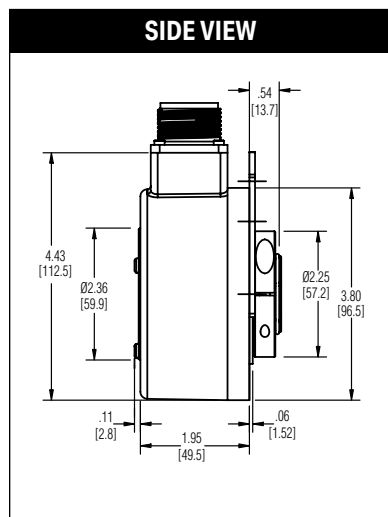
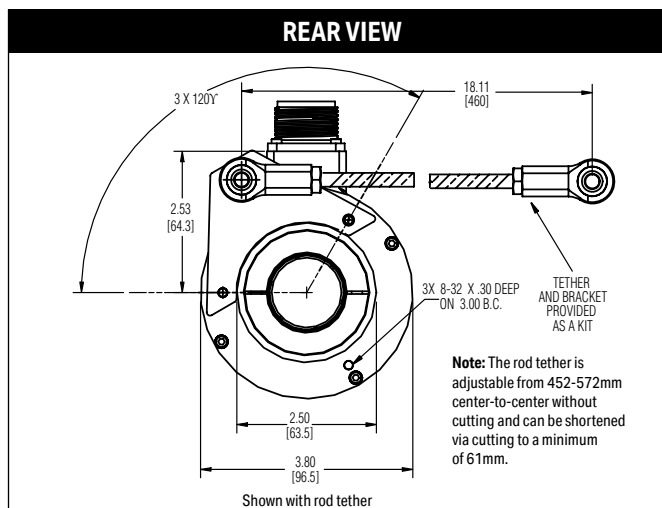
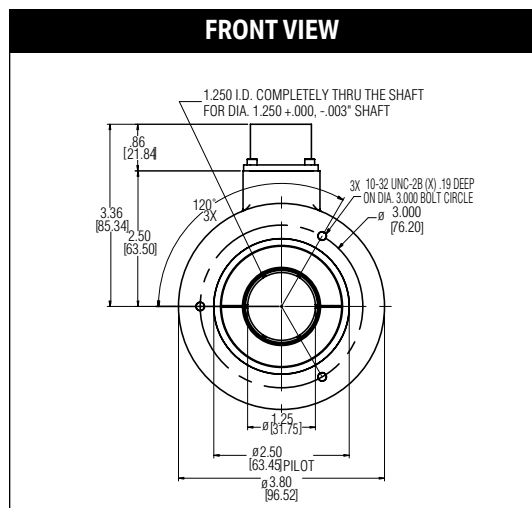
*For watertight applications, use NEMA 4 10 pin cable and connector 109209-XXXX

[†] Index not provided on all models. See ordering information

SERIES HS35R



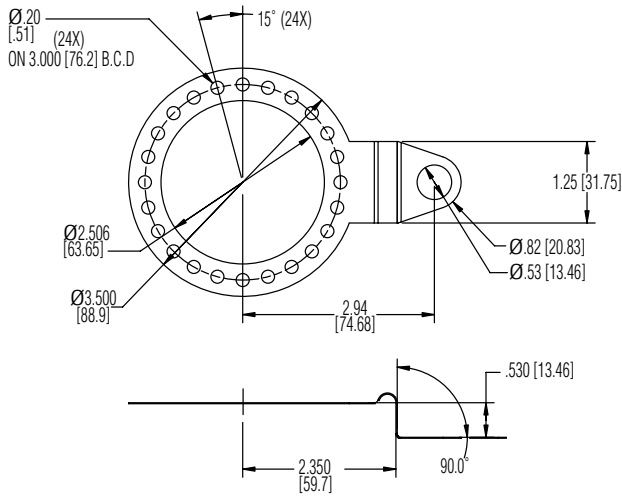
Dimensions: inch [mm]



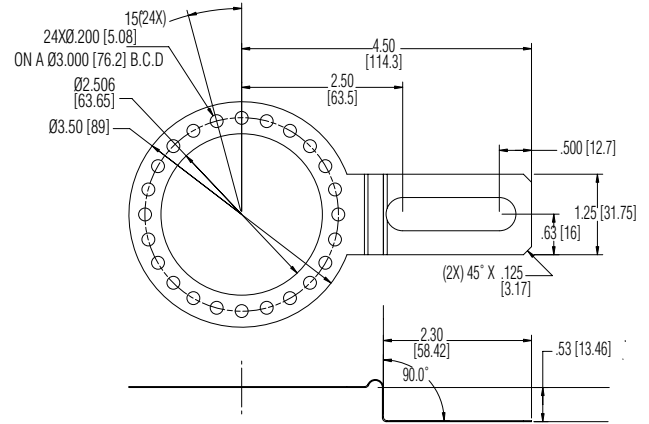
SERIES HS35R

Dimensions: inch [mm]

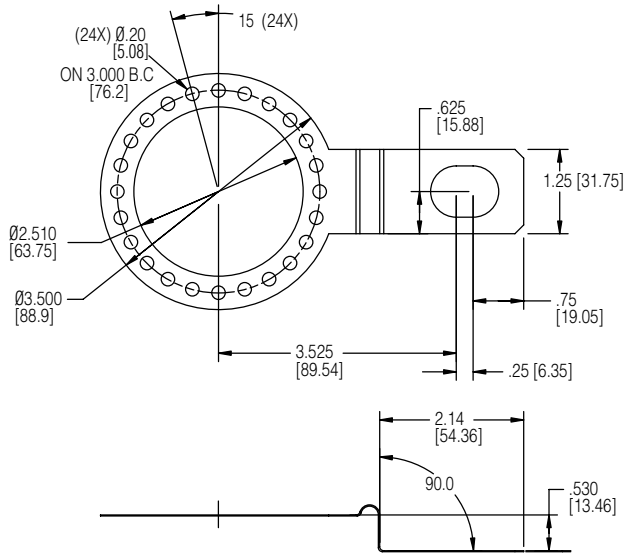
114573-0001 TETHER KIT (4.5" C- FACE)



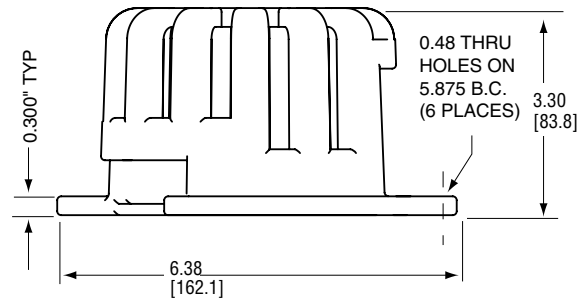
114574-0001 TETHER KIT (SLOTTED TETHER)



114575-0001 TETHER KIT (8.5" C- FACE)



OPTIONAL SAFETY COVERS (S)



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

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