

# SERIES HA25

**Dynapar™ brand**

## Shafted Encoder

### Key Features

- Industry Standard Size 25 (2.5")
- Wide Range of Resolutions Available
- Optional Extended Temperature Range of  $-40^{\circ}$  to  $+85^{\circ}\text{C}$



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** 1 to 2540 PPR (pulses/revolution)

**Accuracy:** (Worst case any edge to any other edge)  $\pm 2.5$  arc-min.

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

**Phase Sense:** A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

**Quadrature Phasing:**  $90^{\circ} \pm 22.5^{\circ}$  electrical

**Symmetry:**  $180^{\circ} \pm 18^{\circ}$  electrical

**Index:**  $180^{\circ} \pm 18^{\circ}$  electrical (gated with B low)

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

#### Input Power:

4.5 min. to 26 VDC max. at 80 mA max., not including output loads

#### Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

4469 Differential Line Driver: 100 mA, sink or source

**Frequency Response:** 100 kHz min.

**Electrical Protection:** Overvoltage, reverse voltage and output short circuit protected

**Noise Immunity:** Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

### CONNECTIONS

#### Mating Connector:

7 pin, style MS3106A-16S-1S (MCN-N5);

10 pin, style MS3106A-18-1S (MCN-N6)

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

### MECHANICAL

**Shaft Loading:** (at 0.25" from encoder face) 35 lbs. radial, 40 lbs. axial

**Shaft Speed:** 5,000 RPM max.

**Starting Torque:** (max at  $25^{\circ}\text{C}$ )

HA525: 1.0 oz-in;

HA625: 2.5 oz-in

**Moment of Inertia:**  $3.0 \times 10^{-4}$  oz-in-sec<sup>2</sup>

### ENVIRONMENTAL

#### Operating Temperature:

Standard: 0 to  $+70^{\circ}\text{C}$ ;

Extended:  $-40$  to  $+85^{\circ}\text{C}$

**Storage Temperature:**  $-40$  to  $+90^{\circ}\text{C}$

**Shock:** 50 G's for 11 milliseconds duration

**Vibration:** 5 to 2000 Hz at 20 G's

**Humidity:** to 98% without condensation

#### Enclosure Rating:

HA525: NEMA12/IP54 (dirt tight, splashproof);

HA625: NEMA4/IP66 (dust proof, washdown)

**Ordering Information**

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

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
<b>HA</b> <input type="checkbox"/> <b>25</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"/>

Ordering Information							
<b>HA525</b> Size 25 Enclosed, Shielded Bearings, Glass Disk	<b>0001 0600</b>	<b>0</b> Flange Mount, 3/8" Shaft	<b>7 Pin MS Connector or Cable</b>	<b>0</b> 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out	<b>0</b> End Mount Connector	available when Code 4 is 0 thru G, and Code 6 is 0 or 1:  <b>PS</b> LED Output Indicator	
	<b>0005 0625</b>	<b>1</b> 2.50" Servo Mount/ 4 Hole, 2.00" BC Face Mount, 3/8" Shaft	<b>0</b> Single Ended, no Index, Format A, Table 2	<b>1</b> 5-26V in; 5-26V Open Collector out	<b>1</b> Side Mount Connector		
<b>HA625</b> Size 25 Enclosed, with Shaft Seal, Glass Disk	<b>0010 0635</b>	<b>2</b> Flange Mount, 1/4" Shaft	<b>1</b> Single Ended, with Index, Format A, Table 2	<b>1</b> 5-26V in; 5-26V Open Collector out	<b>2</b> 18" Cable, Side		
	<b>0012 0720</b>	<b>3</b> 2.50" Servo Mount/ 4 Hole 2.00" BC Face Mount, 1/4" Shaft	<b>4</b> Single Ended, with Index, Format B, Table 2	<b>2</b> 5-26V in; 5V Totem Pole out	<b>3</b> 3' Cable, Side		
	<b>0050 0800</b>	<b>4</b> 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 3/8" Shaft	<b>6</b> Differential, no Index, Format C, Table 3	<b>A</b> Single Ended, with Index, Format C, Table 2	<b>3</b> 5-26V in; 5V Line Driver out (7272)		<b>4</b> 6' Cable, Side
	<b>0060 0900</b>	<b>5</b> 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft	<b>A</b> Single Ended, with Index, Format C, Table 2	<b>C</b> Single Ended, no Index, Format C, Table 2	<b>4</b> 5-26V in; 5-26V Line Driver out (7272)		<b>5</b> 10' Cable, Side
	<b>0100 1000</b>	<b>6</b> 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft	<b>C</b> Single Ended, no Index, Format C, Table 2	<b>G</b> Single Ended, with Index, Format D, Table 2	<b>5</b> 5-26V in, 5V Differential Line Driver out (4469)		<b>6</b> 15' Cable, Side
	<b>0120 1024</b>	<b>7</b> 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	<b>D</b> Single Ended, with Index, Format D, Table 2	<b>10 Pin MS Connector or Cable</b>	<b>6</b> 5-15V in, 5-15V Differential Line Driver out (4469)		<b>J</b> 18" Cable, End
	<b>0150 1200</b>	<b>8</b> 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft	<b>5</b> 5 Pin M12 Connector	<b>2</b> Differential, no Index, Format A, Table 1	<b>A</b> Same as "0" with extend. temp range		<b>K</b> 3' Cable, End
	<b>0180 1250</b>	<b>9</b> 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	<b>H</b> Single ended, no index, Format A, Table 4	<b>3</b> Differential, with Index, Format A, Table 1	<b>B</b> Same as "1" with extend. temp range		<b>L</b> 6' Cable, End
	<b>0200 1270</b>		<b>J</b> Single ended, with index, Format A, Table 4	<b>5</b> Differential, with Index, Format B, Table 1	<b>C</b> Same as "2" with extend. temp range		<b>M</b> 10' Cable, End
	<b>0240 1500</b>		<b>K</b> Single ended, with index, Format B, Table 4	<b>B</b> Differential, with Index Format C, Table 1	<b>D</b> Same as "3" with extend. temp range		<b>N</b> 15' Cable, End
<b>0250 1600</b>		<b>L</b> Single ended, with index, Format C, Table 4	<b>D</b> Differential, no Index, Format C, Table 1	<b>E</b> Same as "4" with extend. temp range	available when Code 1 is HA625:		
<b>0256 1800</b>		<b>M</b> Single ended, no index, Format C, Table 4	<b>8 Pin M12 Connector</b>		<b>A</b> 18" Watertight, Side		
<b>0300 1968</b>		<b>N</b> Single ended, with index, Format D, Table 4	<b>P</b> Single ended, no index, Format A, Table 5		<b>B</b> 3' Watertight, Side		
<b>0360 2000</b>			<b>Q</b> Single ended, with index, Format A, Table 5		<b>C</b> 6' Watertight, Side		
<b>0400 2048</b>			<b>R</b> Single ended, with index, Format B, Table 5		<b>D</b> 10' Watertight, Side		
<b>0500 2400</b>			<b>S</b> Single ended, with index, Format C, Table 5		<b>F</b> 15' Watertight, Side		
<b>0512 2500</b>			<b>T</b> Single ended, no index, Format C, Table 5		<b>P</b> 18" Watertight, End		
<b>2540</b>			<b>U</b> Single ended, with index, Format D, Table 5		<b>Q</b> 3' Watertight, End		
			<b>V</b> Differential, no index, Format A, Table 6		<b>R</b> 6' Watertight, End		
			<b>W</b> Differential, with index, Format A, Table 6		<b>S</b> 10' Watertight, End		
			<b>X</b> Differential, with index, Format B, Table 6		<b>T</b> 15' Watertight, End		
			<b>Y</b> Differential, with index, Format C, Table 6				
			<b>Z</b> Differential, no index, Format C, Table 6				

**10 foot Cable Assemblies with MS Connector**

- 1400431-0010** 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

**15 foot Cable Assemblies with M12 Connector**

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

**Mating Connectors (no cable)**

- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

# SERIES HA25



## ELECTRICAL CONNECTIONS

### Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4= 0 to 6, or A, B, C, D or G

Table 1 – Differential			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	BRN
B	Signal B	ORN	ORN
C	Signal Z	YEL	YEL
D	Power Source	RED	RED
E	No Connection	—	—
F	Common	BLK	BLK
G	Case	GRN	GRN
H	Signal $\bar{A}$	BRN/WH	BRN/WH
I	Signal $\bar{B}$	ORN/WH	ORN/WH
J	Signal $\bar{Z}$	YEL/WH	YEL/WH

\*Cable Accessory: P/N 14006350010

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

Table 2 – Single Ended			
Pin	Function (If Used)	Wire Color Code	Cable* Accessory Color Code
A	Signal A	BRN	RED
B	Signal B	ORN	BLUE
C	Signal Z	YEL	YEL
D	Power Source	RED	WHT
E	No Connection	—	GRN
F	Common	BLK	BLK
G	Case	GRN	SHIELD

\*Cable Accessory: P/N 14004310010

Table 3 – Differential		
Pin	Function (If Used)	Cable Accessory Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal $\bar{A}$	BRN/WHT
D	Power Source	RED
E	Signal $\bar{B}$	ORN/WHT
F	Common	BLK
G	Case	GRN

\*Cable Accessory: P/N 108596

**Cable Configuration:** PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

### 5 & 8 Pin M12 Accessory Cables - when Code 4= H to Z

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Table 4 5 Pin Single Ended		Table 5 8 Pin Single Ended		Table 6 8 Pin Differential	
	Cable # 112859-		Cable # 112860-		Cable # 112860-	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
<b>Sig. A</b>	4	BLK	1	BRN	1	BRN
<b>Sig. B</b>	2	WHT	4	ORG	4	ORG
<b>*Sig. Z</b>	5	GRY	6	YEL	6	YEL
<b>Power +V</b>	1	BRN	2	RED	2	RED
<b>Com</b>	3	BLU	7	BLK	7	BLK
<b>Sig. <math>\bar{A}</math></b>	—	—	—	—	3	BRN/WHT
<b>Sig. <math>\bar{B}</math></b>	—	—	—	—	5	ORG/WHT
<b>*Sig. <math>\bar{Z}</math></b>	—	—	—	—	8	YEL/WHT

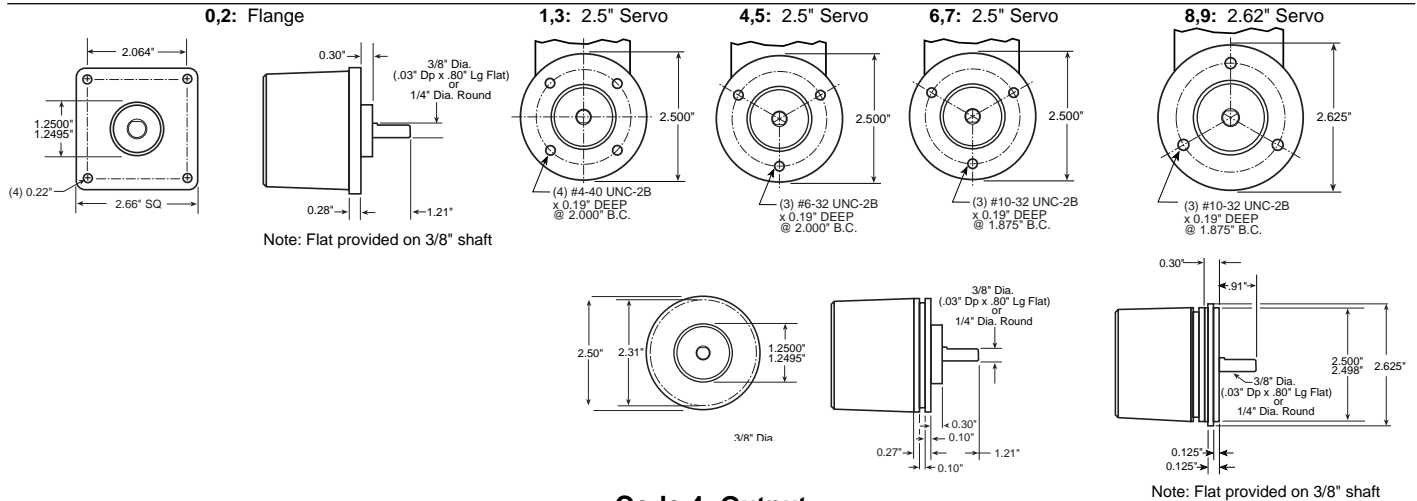
\* Index not provided on all models. See ordering information

**Cable Configuration:** PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

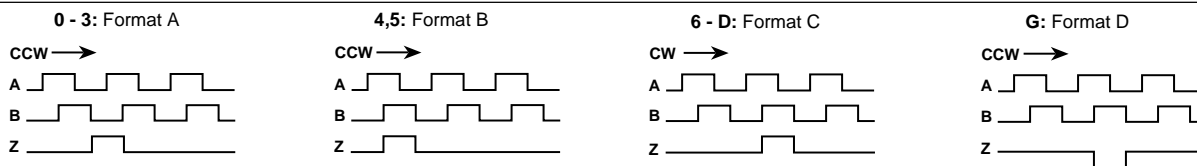
See “Accessories” Section for Connectors and Cable Assemblies Ordering Information

**DIMENSIONS**

**Code 3: Mechanical**

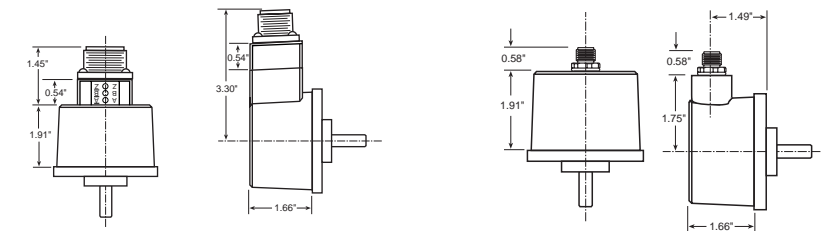


**Code 4: Output**

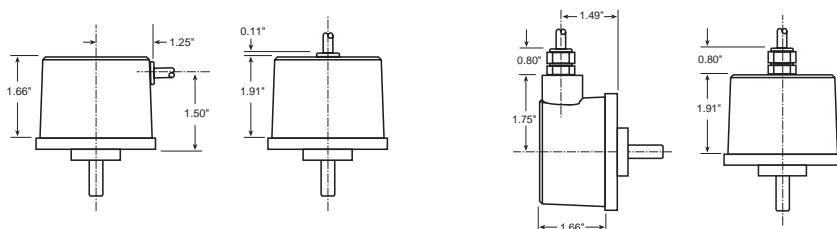


**Code 6: Termination**

**0:** End MS Connector    **1:** Side MS Connector    **0:** End M12 Connector    **1:** Side M12 Connector  
 When Code 5 is 0 to 6 or A to G    When Code 5 is H to Z



**2 - 6: Side Cable**    **J - N: End Cable**    **A - F: Side W.T. Cable**    **P - T: End W.T. Cable**



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