

# Series HR25

- Ultra-reliable, heavy-duty Size 25 (2.5") encoder
- Unbreakable code disk
- Complete electrical protection and noise immunity
- Environmentally sealed to NEMA4/IP66
- Up to 1024 PPR with optional marker pulse



## APPLICATION/INDUSTRY

The Dynapar brand Series HR25 is a rugged, reliable and economical encoder for industrial motion applications.

## DESCRIPTION

The unbreakable code disk meets the demands of the most severe shock and vibration generating processes; and long life bearings that keep tough loads from disrupting internal alignment, avoiding failure due to the disk "crashes" so typical in competitive encoders. Protection against installation problems such as wiring errors prevents the encoder from damage, while immunity to electrical noise keeps the encoder signals intact. A NEMA4 / IP66 sealing option protects against damage from contamination.

Packaged in an industry standard 2.5" enclosure, the Series HR25 offers a variety of mechanical options: servo or face mounting, and 1/4" or 3/8" shafts. Electrical options include: resolutions from 1 to 1024 pulses/revolution; bidirectional operation with optional index; single ended open collector or push-pull outputs, or differential line drivers; and connector or cable exit terminations.

The Series HR25 utilizes the latest technology optical emitters and sensors, surface mount assembly and precisely fabricated metal components to deliver high reliability and performance in a compact and economical package.

## FEATURES AND BENEFITS

### Mechanical / Environmental Features

- Unbreakable code disk and long life 80 lb bearings available
- Extended temperature range available
- Industry Standard, Size 25 Form Factor
- NEMA4 / IP66 washdown rating option

### Electrical Features

- Noise Immune to ESD, RFI and electrical transients
- High current outputs
- Over-Voltage protection
- Reverse Voltage protection
- Output Short-Circuit Protection

## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** 1 to 1024 PPR (pulses/revolution)  
**Accuracy:** (Worst case any edge to any other edge)  $\pm 7.5$  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 EN50082-2 (Heavy 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) 80 lbs. radial, 80 lbs. axial  
**Shaft Speed:** 10,000 RPM max.  
**Shaft Runout:** 0.001" max. TIR  
**Moment of Inertia:**  $3.0 \times 10^{-4}$  oz-in-sec<sup>2</sup>

### ENVIRONMENTAL

**Operating Temperature:**  
 Standard: 0 to +70 °C;  
 Extended: -40 to +85 °C  
**Storage Temperature:** -40 to +90 °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:**  
 HR525: NEMA12/IP54 (dirt tight, splashproof);  
 HR625: NEMA4/IP66 (dust proof, washdown)

## 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

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 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

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	
	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

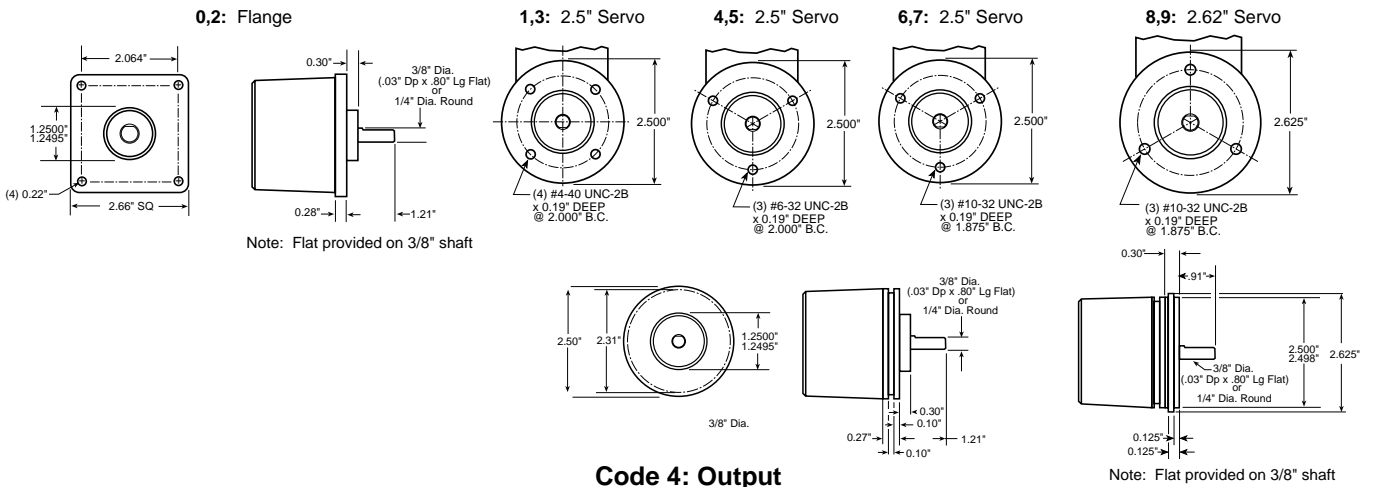
\* Index not provided on all models. See ordering information

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

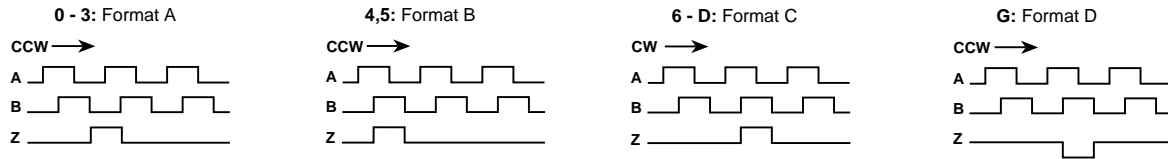
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

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## Code 3: Mechanical



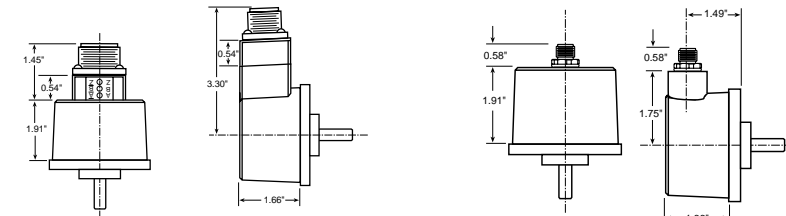
## Code 4: Output



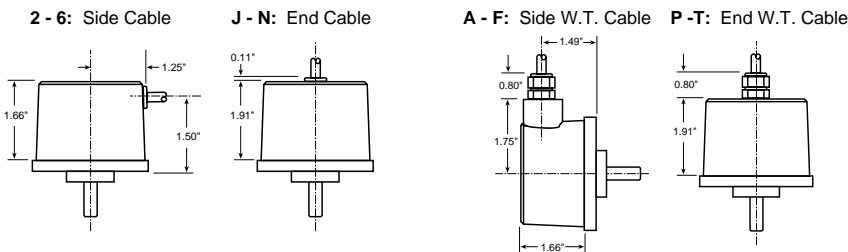
## Code 6: Termination

**0:** End MS Connector    **1:** Side MS Connector  
 When Code 4 is 0 to 6 or A to G

**0:** End M12 Connector    **1:** Side M12 Connector  
 When Code 4 is H to Z



Code 6: 0 & 1 dimensions shown with LED Output Indicator Option (Code 7: PS)



ORDERING INFORMATION

Series HR25

INDUSTRIAL

Code 1: Model	Code 2: PPR	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination	Code 7: Options
HR 25	□□□□	□	□	□	□	□□
Ordering Information						
<b>HR525</b> Size 25 Enclosed, Shielded Bearings <b>HR625</b> Size 25 Enclosed, with Shaft Seal	0001 0250 0005 0256 0010 0300 0012 0360 0050 0400 0060 0500 0086 0512 0100 0600 0120 0635 0125 0800 0180 0900 0200 1000 0240 1024	0 Flange Mount, 3/8" Shaft 1 2.50" Servo Mount/ 4 Hole, 2.00" BC Face Mount, 3/8" Shaft 2 Flange Mount, 1/4" Shaft 3 2.50" Servo Mount/ 4 Hole 2.00" BC Face Mount, 1/4" Shaft 4 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 3/8" Shaft 5 2.50" Servo Mount/ 3 Hole, 2.00" BC Face Mount, 1/4" Shaft 6 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 7 2.50" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft 8 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 3/8" Shaft 9 2.62" Servo Mount/ 3 Hole, 1.88" BC Face Mount, 1/4" Shaft	<b>7 Pin Connector or Cable</b> 0 Single Ended, no Index, Format A, Table 2 1 Single Ended, with Index, Format A, Table 2 4 Single Ended, with Index, Format B, Table 2 6 Differential, no Index, Format C, Table 3 A Single Ended, with Index, Format C, Table 2 C Single Ended, no Index, Format C, Table 2 G Single Ended, with Index, Format D, Table 2 <b>10 Pin Connector or Cable</b> 2 Differential, no Index, Format A, Table 1 3 Differential, with Index, Format A, Table 1 5 Differential, with Index, Format B, Table 1 B Differential, with Index Format C, Table 1 D Differential, no Index, Format C, Table 1 <b>5 Pin M12 Connector</b> H Single ended, no index, Format A, Table 4 J Single ended, with index, Format A, Table 4 K Single ended, with index, Format B, Table 4 L Single ended, with index, Format C, Table 4 M Single ended, no index, Format C, Table 4 N Single ended, with index, Format D, Table 4 <b>8 Pin M12 Connector</b> P Single ended, no index, Format A, Table 5 Q Single ended, with index, Format A, Table 5 R Single ended, with index, Format B, Table 5 S Single ended, with index, Format C, Table 5 T Single ended, no index, Format C, Table 5 U Single ended, with index, Format D, Table 5 V Differential, no index, Format A, Table 6 W Differential, with index, Format A, Table 6 X Differential, with index, Format B, Table 6 Y Differential, with index, Format C, Table 6 Z Differential, no index, Format C, Table 6	0 5-26V in; 5-26V Open Collector with 2.2kΩ Pullup out 1 5-26V in; 5-26V Open Collector out 2 5-26V in; 5V Totem Pole out 3 5-26V in; 5V Line Driver out (7272) 4 5-26V in; 5-26V Line Driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5- 15V Differential Line Driver out (4469) A Same as "0" with extend. temp range B Same as "1" with extend. temp range C Same as "2" with extend. temp range D Same as "3" with extend. temp range E Same as "4" with extend. temp range	0 End Mount Connector 1 Side Mount Connector 2 18" Cable, Side 3 3' Cable, Side 4 6' Cable, Side 5 10' Cable, Side 6 15' Cable, Side J 18" Cable, End K 3' Cable, End L 6' Cable, End M 10' Cable, End N 15' Cable, End available when Code 1 is HR625: A 18" Watertight, Side B 3' Watertight, Side C 6' Watertight, Side D 10' Watertight, Side F 15' Watertight, Side P 18" Watertight, End Q 3' Watertight, End R 6' Watertight, End S 10' Watertight, End T 15' Watertight, End	available when Code 4 is 0 thru G, and Code 6 is 0 or 1: <b>PS LED</b> Output Indicator