

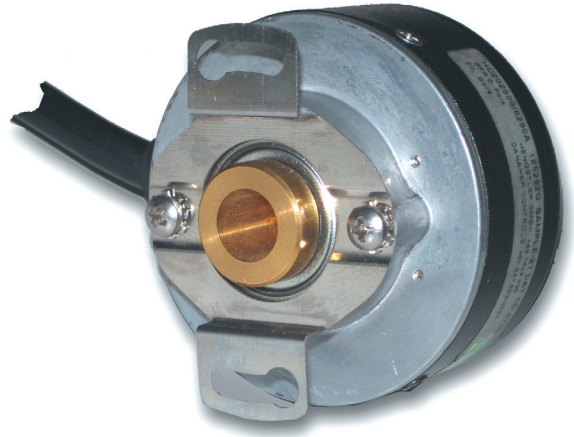
# SERIES HC20

**Dynapar™ brand**

## For Stepper & Small Servo Motors

### Key Features

- Economical Servomotor Feedback with New Phased Array ASIC
- High 120°C Operating Temperature Won't Limit Motor Performance
- Up to 2500 PPR Direct-Read with Commutation Channels



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

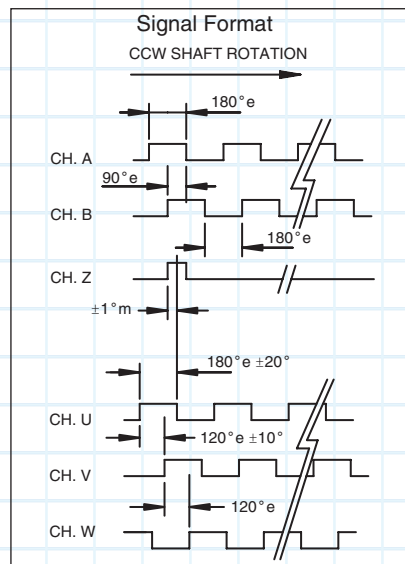
**Code:** Incremental, Optical  
**Resolution:** 500 to 2500 PPR (Pulses/Revolution)  
**Commutation:** 4/6/8 pole  
**Format:** Two channel quadrature (AB) with optional Index (Z) and complementary outputs  
**Phase Sense:** Phasing for CCW rotation of motor shaft (viewing from encoder cover side): A leads B by  $90^\circ \pm 22.5^\circ$  electrical, and U leads V leads W by  $120^\circ$   
**Accuracy:**  
 Incremental: 40 arc-sec. max. edge to any edge;  
 Commutation:  $\pm 6$  arc minutes max.  
**Index:**  $90^\circ$  electrical (gated A and B high)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Supply Voltage:** DC 5V  $\pm 10\%$  (SELV)  
**Max. Current (w/o load):**  
 Incremental: 150mA  
 Incremental + Commutation: 175mA  
**Max. Output Frequency:**  
 250 kHz (up to 1024 ppr)  
 500 kHz (> 1024 ppr)

### Signal Level:

NPN: Open Collector  
 Differential Line Driver: RS 422  
**Output Current:** RS422:  $\pm 40$  mA (26LS31); NPN O.C.: 16mA (2k. int. pull up)  
**Connection:** Axial or Raidal cable available



### MECHANICAL

**Dimensions:**  
 Outside Diameter with Cover: 50 mm  
 Mounting Depth: 36mm  
**Bore Size:**  
 Blind Hole Shaft: 8.00mm dia; 20mm depth  
 Hollow Shaft: 6.00 or 8.00mm dia  
 Taper Shaft: 9.00mm dia. nominal;  $2.8624^\circ + 0.2289/-0$  Taper  
**Mating Shaft Runout:**  $\pm 0.2$ mm max. (Includes shaft perpendicularity to mounting surface)  
**Mating Shaft Axial Movement:** max.  $\pm 0.8$ mm.  
**Max. Velocity:** RPM = (Frequency/PPR) x 60 or 2000 min<sup>-1</sup>, whichever is less  
**Material:**  
 Bearing Housing: Aluminium;  
 Cover: Aluminium;  
 Shaft: Brass: 699477-0001  
**Weight:** 120g typical

### ENVIRONMENTAL

**Operating Temperature:** 0...+120°C  
**Storage Temperature:** -40...+120°C  
**Shock Resistance:** 100 G for 6 ms  
**Vibration Resistance:** 5 to 2000 Hz at 2.5 G  
**Humidity:** Up to 98% (non-condensing)  
**Enclosure Rating:** IP51 (cable must be oriented downwards)



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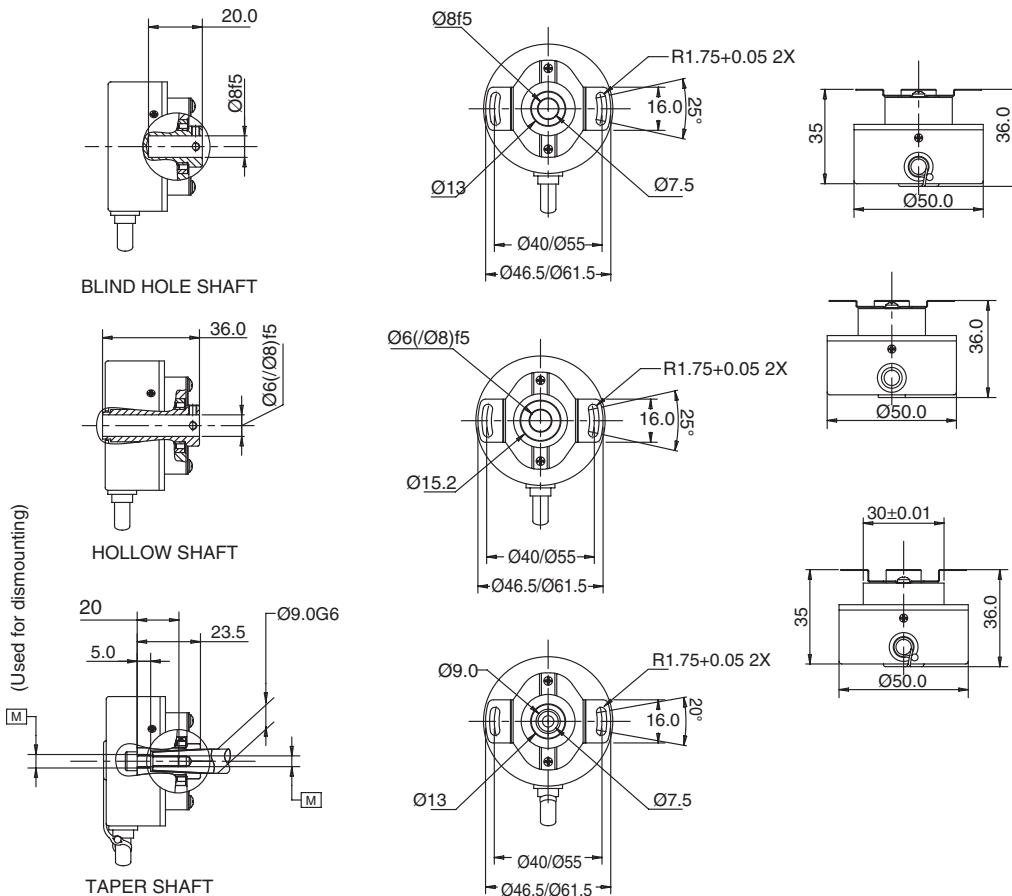
Ordering Information

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

Code 1: Model	Code 2: PPR Incremental <sup>2</sup>	Code 3: Poles Commutation <sup>2</sup>	Code 4: Mounting	Code 5: Electrical <sup>1</sup>	Code 6: Shaft	Code 7: Connection																																																	
<b>HC20</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"/>																																																	
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<b>HC20</b> Compact Hollowshaft Encoder	<b>0500 2000</b> <b>0512 2048</b> <b>1000 2500</b> <b>1024</b>	<b>0</b> None <b>4</b> 4 Pole <b>6</b> 6 Pole <b>8</b> 8 Pole	<b>0</b> No tether <b>Tether</b> <b>1</b> 1.575" (40mm) TK <b>2</b> 2.166" (55mm) TK	incremental only, <=2048/0 (ppr/poles) <b>0</b> U <sub>inc</sub> = DC 5V; output <sub>inc</sub> = NPN-O.C. incremental only without commutation <b>2</b> U <sub>inc</sub> = DC 5-26V; output <sub>inc</sub> = RS 422 <b>3</b> U <sub>inc</sub> = DC 5V; output <sub>inc</sub> = RS 422 incremental plus commutation signals <b>6</b> U <sub>inc</sub> = DC 5V; output <sub>inc</sub> = RS 422 U <sub>com</sub> = DC 5V; output <sub>com</sub> = NPN-O.C. <b>9</b> U <sub>inc</sub> = DC 5V; output <sub>inc</sub> = RS 422 U <sub>com</sub> = DC 5V; output <sub>com</sub> = RS 422	<b>0</b> Taper shaft(Ø9,1:10) <b>1</b> Blind vertical shaft Ø6 <b>2</b> Blind vertical shaft Ø8 <b>3</b> Hollow shaft Ø6 <b>4</b> Hollow shaft Ø8	<b>Axial plug</b> <b>1</b> 1 Ft. cable <b>2</b> 2 Ft. cable <b>3</b> 3 Ft. cable <b>4</b> 4 Ft. cable <b>5</b> 5 Ft. cable <b>6</b> 6 Ft. cable <b>7</b> 7 Ft. cable <b>8</b> 8 Ft. cable	<b>Radial plug</b> <b>A</b> 1 Ft. cable <b>B</b> 2 Ft. cable <b>C</b> 3 Ft. cable <b>D</b> 4 Ft. cable <b>E</b> 5 Ft. cable <b>F</b> 6 Ft. cable <b>G</b> 7 Ft. cable <b>H</b> 8 Ft. cable																																																
	<table border="1"> <thead> <tr> <th colspan="5">Available Combinations (PPR/Poles)</th> </tr> <tr> <th rowspan="2">Incremental PPR</th> <th colspan="4">Number of Poles</th> </tr> <tr> <th>0</th> <th>4</th> <th>6</th> <th>8</th> </tr> </thead> <tbody> <tr> <td>0500</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>0512</td> <td></td> <td></td> <td></td> <td>x</td> </tr> <tr> <td>1000</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>1024</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>2000</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>2048</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>2500</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> </tbody> </table>		Available Combinations (PPR/Poles)					Incremental PPR	Number of Poles				0	4	6	8	0500	x	x	x	x	0512				x	1000	x	x	x	x	1024	x	x	x	x	2000	x	x	x	x	2048	x	x	x	x	2500	x	x	x	x				
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1 U<sub>inc</sub>: Supply voltage incremental, U<sub>com</sub>: Supply voltage commutation (only if commutation is selected); 2 See available combinations (pulses/poles)

Dimensions (mm)



Connection:

Pin	Signal	Color
1	V <sub>cc</sub>	Red
2	U	Brown
3	GND	Black
4	V	Gray
5	A	Blue
6	W	White
7	A̅	Blue/Black
8	N.C.	—
9	B	Green
10	U̅	Brown/Black
11	B̅	Green/Black
12	V̅	Gray/Black
13	Z	Violet
14	W̅	White/Black
15	Z̅	Violet/Black
16	N.C.	—