

# HOLLOW TYPE

# HES<sub>Model</sub>



## Best Seller Hollow Shaft Encoder

- Wide Variation of Outputs (6) and Resolution (20~3600 P/R).

### Model

**HES** - [ ] - **2M** [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] **0 0**

Resolution			
002	20P/R	05	500P/R
003	30P/R	0512	512P/R
0032	32P/R	06	600P/R
004	40P/R	08	800P/R
005	50P/R	09	900P/R
006	60P/R	10	1000P/R
01	100P/R	1024	1024P/R
0125	125P/R	12	1200P/R
02	200P/R	15	1500P/R
0250	250P/R	18	1800P/R
0256	256P/R	20	2000P/R
03	300P/R	2048	2048P/R
036	360P/R	25	2500P/R
04	400P/R	36	3600P/R

**Output Mode**

- No Indication : Voltage Output
- C : Open Collector Output
- HC : Open Collector Output / High Voltage
- HCP : PNP Mode Open Collector Output / High Voltage
- HT : Push-Pull Output / High Voltage
- D : Line Driver Output  
Low Power Consumption C-MOS Output Available

**Hollow Shaft Diameter**

- 800 : 8
- 635 : 6.35
- 600 : 6
- 500 : 5

**Cable Length**

- 050 : 500mm (Standard)
- 100 : 1000mm
- 300 : 3000mm

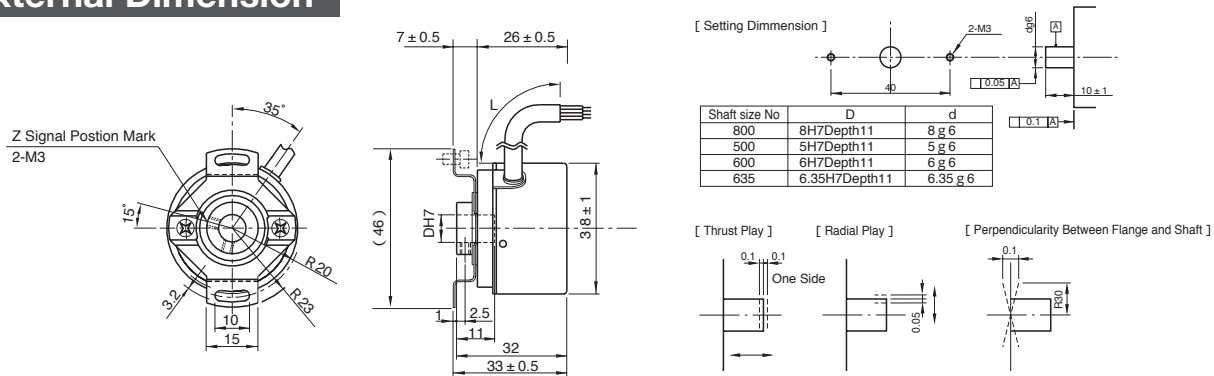
**Signals** ——— 2M : AB90° Phase Difference + Zero Signal

**Other than D output**  
No Indication : Other than D output

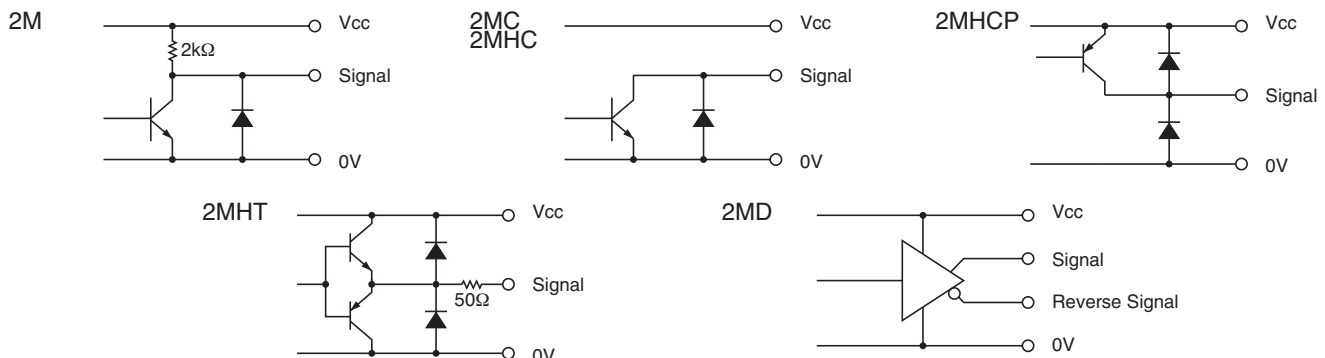
**D output with LS**  
No Indication : D output with LS

**D output with C-MOS**  
C : D output with C-MOS

### External Dimension



### Circuit of Output Signal



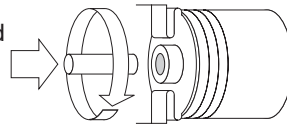
### Electrical Spec.

※1) at Maximum Output Current ※2) Maximum Source Current

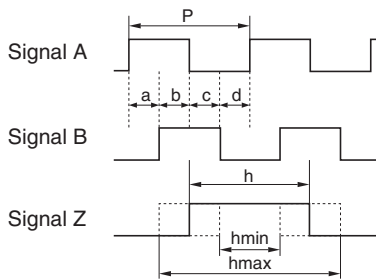
TYPE		2 • 2M	2C•2MC	2HC•2MHC	2HCP•2MHCP	2HT•2MHT	2MD
Supply Voltage		DC4.5 ~ 13.2 V			DC10.8 ~ 26.4 V		DC4.75 ~ 5.25V C-MOS DC4.5 ~ 5.5V
Requirement		80 mA Max	60 mA Max		100 mA Max	60 mA Max	150 mA Max C-MOS60 mA Max
Output Voltage	“H”	Within -1 Power Volt	_____		Within -1 <sup>2</sup> Power Volt	Within -3 Power Volt	2.5 V or More
	“L” ※1	0.5 V Max			_____	3 V Max	0.5 V Max
Maximum Output Current		20 mA MAX				40 mA MAX	20 mA MAX
Rise & Fall Time		1 μs Max					200 ns Max
Maximum Frequency Response		200 kHz			50 kHz	200 kHz	
Withstanding Voltage of Output Tr.		_____	50 V MAX.		_____		

### Wave Form.

CW → Rotating Toward Clockwise Viewed from an Arrow



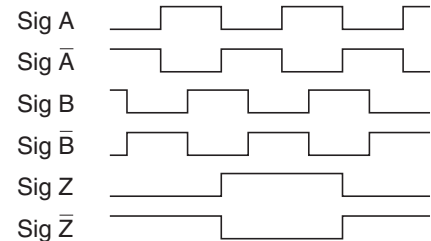
Rising point of A-Signal is always at one point while Z-Signal is at H-Level in CW.



$$P = \frac{1}{1\text{Resolution}}$$

$$a, b, c, d = \frac{P}{4} \pm \frac{P}{8} \quad \frac{P}{2} \leq h \leq \frac{3P}{2}$$

Wave Ratio (Duty); 50 ± 25 (%)



### Electrical Connections

2M 2MC 2MHC 2MHCP 2MHT	Color of Lead Wire	Description
	Red	Power Source
	Black	0V Common
	Green or Blue	Signal A
	White	Signal B
	Yellow	Signal Z
	Shielding Braid	NC

2MD	Color of Lead Wire	Description	Color of Lead Wire	Description
	Red	Power Source	White	Signal B
	Black	0V Common	Gray	Signal B
	Green	Signal A	Yellow	Signal Z
	Blue	Signal A	Orange	Signal Z
	Shielding Braid	NC		

### Mechanical Spec.

Starting Torque		9.8×10 <sup>-4</sup> N • m Max
Angular Acceleration		1×10 <sup>5</sup> rad/s <sup>2</sup>
Shaft Loading	Thrust axial	9.8N
	Radial	29.4N
Moment of Inertia		8×10 <sup>-7</sup> kg • m <sup>2</sup>
Maximum RPM		6000r/min
Net Weight		120g Max

### Environmental Spec.

Operating Temperature	-10°C ~ +70°C
Storage Temperature	-30°C ~ +80°C
Humidity	RH 85% Max No Condensation
Vibration	10~55 Hz / 1.5mm 2 h
Shock	294m/s <sup>2</sup> , 11ms X, Y, Z Each 3 times
Degree of Protection	IP50