

## HS35

### Industrial Hollow Shaft Incremental Encoder

#### Features

Resolutions up to 16,384 PPR

Hollow shaft bores up to 1-1/8"  
or 30 mm

Differential line driver, open  
collector and 1v<sub>p-p</sub> sine/cosine  
output drivers

Anti-rotation pin or tether arm  
mounting

Environmentally sealed to  
NEMA 4/IP66

Overvoltage, reverse voltage  
and short circuit proof

CE compliant



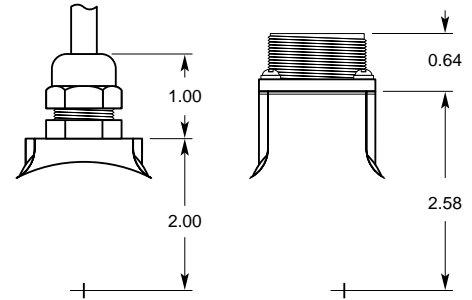
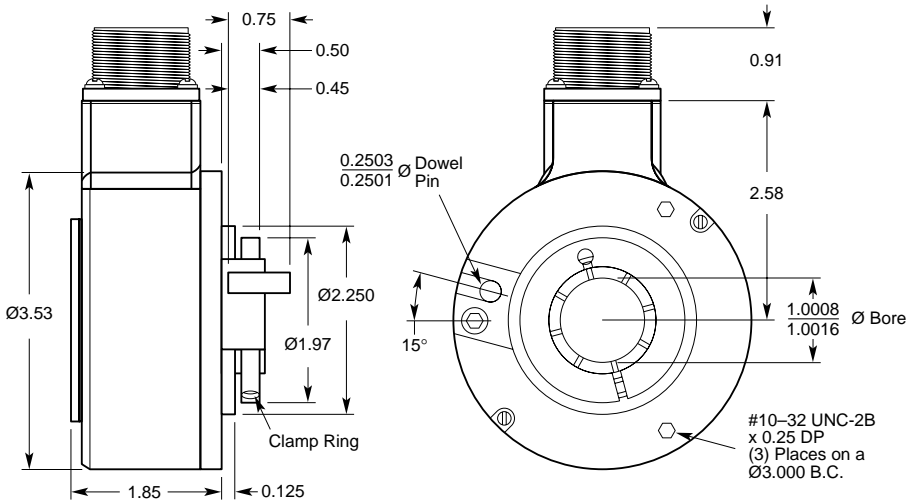
## Technical Data/Features

Number of pulses per revolution (Z)	120, 360, 600, 1024, 2048, 2500, 4096, 5000, 8192, 10000*, 16384*		
	*Not available with 5 or 6 driver options		
Interfaces	+5 VDC Line Driver (3487); +5 to 26 VDC Line Driver (7272); +5 to 15 VDC Line Driver (4469); +5 to 26 VDC Open Collector (7273); +10 to 30 VDC Push-Pull (Discrete); +5 VDC in, 1V <sub>p-p</sub> sine/cosine out		
Dimensions	See drawing		
Mass	16 oz (1.1 kg)		
Moment of inertia of rotor	490 gcm <sup>2</sup>		
Measurement step	90/Z°		
Error limits	45/Z°		
Measurement step deviation	45/Z°		
Max output frequency	200 kHz Push-Pull (1-8192 PPR) 300 kHz all other drivers (1-8192 PPR) 600 kHz (x 2 multiplication) (above 8192 PPR)		
Max operating speed	3000 rpm; Higher rpms available, please consult factory		
Max angular acceleration	1 x 10 <sup>5</sup> rads/sec <sup>2</sup>		
Running torque @ 25°C	9.91 oz. in.		
Starting torque	12.78 oz. in.		
Permissible shaft loading	Radial movement	static	±0.5 mm
		dynamic	±0.1 mm
	Axial movement	static	±0.5 mm
		dynamic	±0.5 mm
Service life of bearings	4.5 x 10 <sup>9</sup> revolutions		
Design performance temp. range	-20 to +85°C		
Operating temperature range	-20 to +85°C		
Storage temperature range	-30 to +85°C		
Permissible relative humidity	95% (condensation not permitted)		
EMC in accordance with EN50082-2 and 50081-2			
Shock resistance to DIN IEC 68 part 2-27	50 Gs for 11 ms		
Vibration resistance to DIN IEC 68 part 2-6	5 to 2,000 Hz at 20 Gs		
Protection class (blind or through seals)	Conn.	IP65	
	Cable	IP66	
	Terminal Block	IP40	
Operating current at no load	24 V	100 mA	
	5 V	120 mA	

# HS35

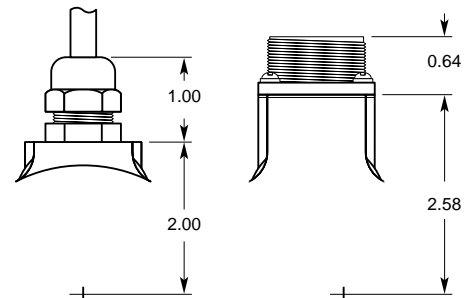
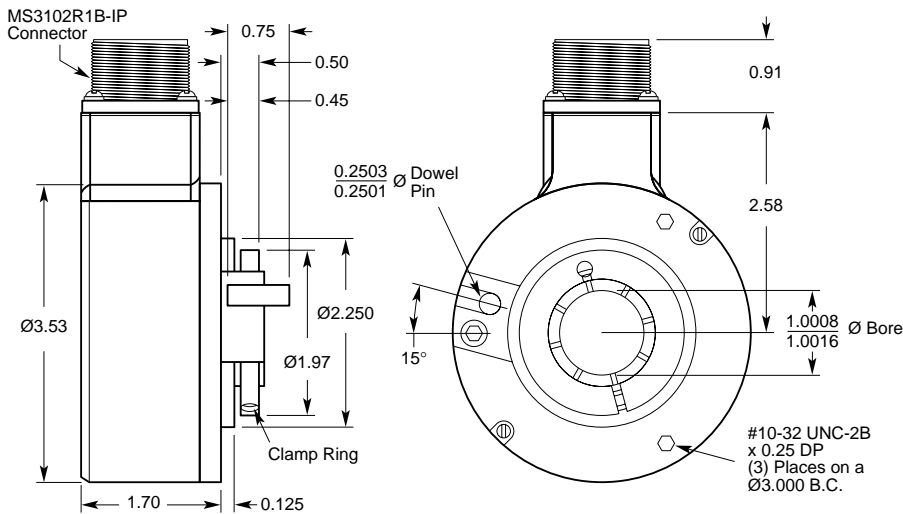
## Dimensions (in.)

### HS35 Blind Shaft – B (Anti-rotation pin shown)



Bore	Mating Shaft Diameter	Insertion Depth Min/Max
1/2	0.499 / 0.500	1.00 / 2.125
5/8	0.624 / 0.625	1.00 / 2.125
3/4	0.749 / 0.750	1.00 / 2.125
7/8	0.874 / 0.875	1.00 / 2.125
1.0	0.999 / 1.000	1.00 / 2.125
1 1/8	1.124 / 1.125	1.79 / 2.125
M30	29.96 / 29.98	46 / 54

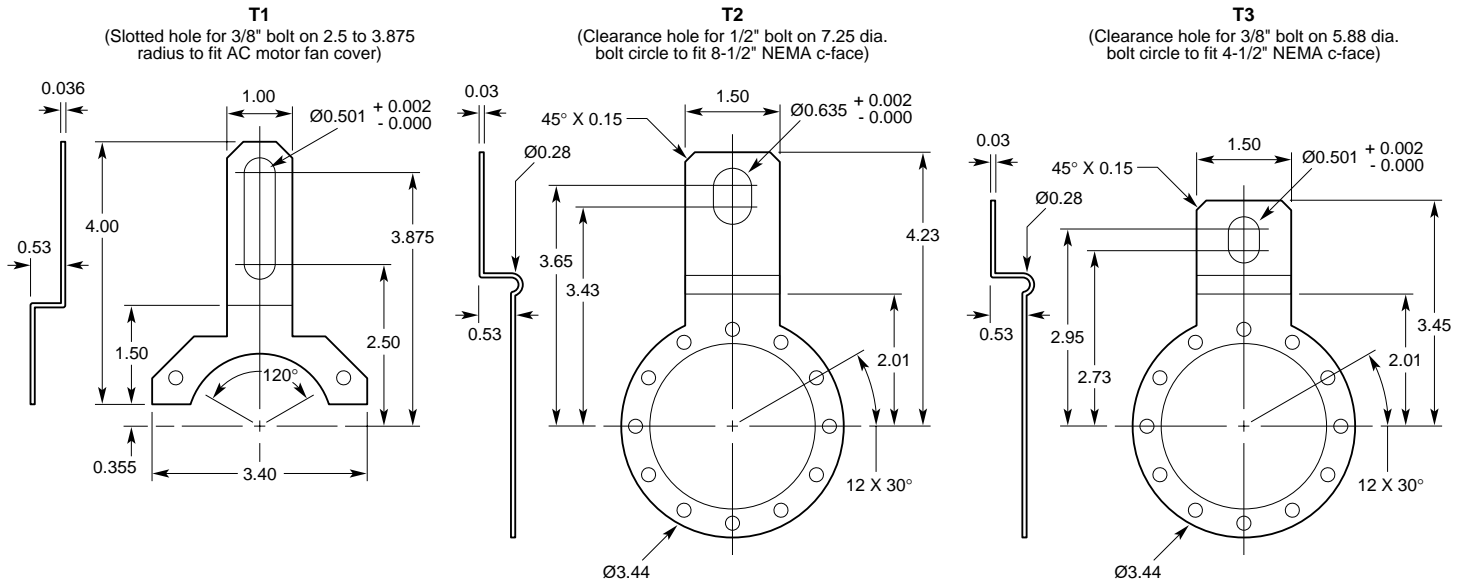
### HS35 Through Shaft – T (Anti-rotation pin shown)



Bore	Mating Shaft Diameter	Insertion Depth Min
1/2	0.499 / 0.500	1.00
5/8	0.624 / 0.625	1.00
3/4	0.749 / 0.750	1.00
7/8	0.874 / 0.875	1.00
1.0	0.999 / 1.000	1.00
1 1/8	1.124 / 1.125	1.79
M30	29.96 / 29.98	46

## Dimensions (in.) (continued)

### Tether Options



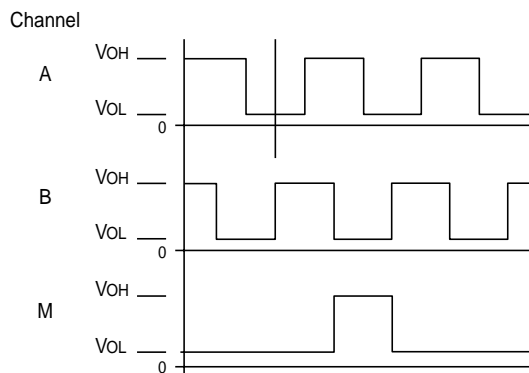
## Electrical Connections

### Connector Types

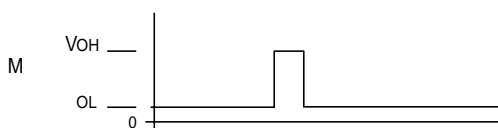
Function	10 pin	Terminal Block	Shielded Cable
Common	F	4	Blue
+Vs	D	3	Red
M output	C	7	Violet
A output	A	1	White
B output	B	2	Pink
Case Ground	G	N/A	Green
$\bar{A}$ output	H	5	Brown
$\bar{B}$ output	I	6	Black
$\bar{M}$ output	J	8	Yellow
Shield	-	-	Drain wire

## Output Waveforms

### Square Wave

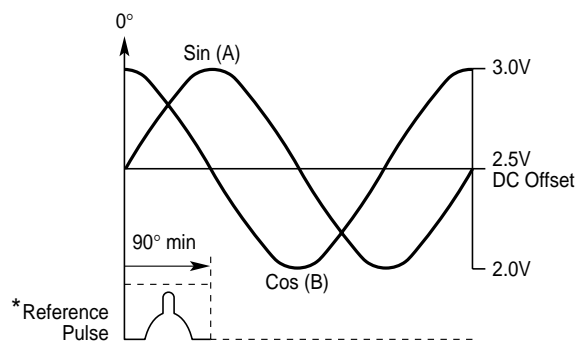


For resolutions less than 10,000 PPR



For resolutions greater than or equal to 10,000 PPR and push-pull driver option (5)

### Sine Wave



\* Waveforms shown are single-ended. Voltages are referenced from ground.

\* The standard marker pulse is a basic analog signal. An optional square wave marker pulse is available upon request from the factory.

## How To Order

Use the numbered chart below to construct your ordering code as shown below.

HS35  -    -  -  -

①    ②    ③    ④    ⑤    ⑥    ⑦    ⑧

### ① Model

**HS35** Size 35 heavy duty hollow shaft encoder

### ② Housing

**T** Thru shaft with dual seals  
**B** Blind shaft with dual seals and back cover

### ③ Shaft Size

**4** 1/2"  
**5** 5/8"  
**6** 3/4"  
**7** 7/8"  
**8** 1"  
**9** 1 1/8"  
**1** 30 mm

### ④ Mounting Configuration

**T1** Tether, 3/8" bolt on 2.5 to 3.875 radius  
**T2** Tether, 1/2" bolt on 7.25 dia. bolt circle  
**T3** Tether, 3/8" bot on 5.88 dia. bolt circle  
**P1** Anti-rotation pin

### ⑤ Output Signal

**1** All signals, A, B, M and complements  
**2** No marker  
**3** No complements  
**4** No marker and no complements

### ⑥ Connection Type

**0010** 10 pin MS3102R  
**Cxxx** Shielded cable 22AWG (xxx - inches)  
**000T** Terminal block

### ⑦ Supply Voltage Output Driver

**1** +5 VDC differential line driver (3487)  
**2** +5 to 26 VDC differential line driver (7272)  
**3** +5 to 15 VDC differential line driver (4469)  
**4** +10 to 30 VDC open collector (7273)  
**5** +10 to 30 VDC push-pull (no complements)  
**6** 1 Volt p-p sin/cos  
**7\*** +5 to 26 VDC differential line driver (3487)

\*Output voltage is regulated to +5 VDC.

### ⑧ PPR

**00120**  
**00360**  
**00600**  
**01024**  
**02048**  
**02500**  
**04096**  
**05000**  
**08192**  
**10000\*\***  
**16384\*\***

\*\*Not available with supply voltage output drivers 5 or 6.



### Example for ordering:

**HS35T-8T11-0010-1-16384**

This is a size 35 heavy duty hollow shaft encoder having a thru shaft housing with dual seals, 1" bore size, T1 tether mount, all signals, 10 pin MS connector, 5 V differential line driver and 16384 PPR.