

# Model HS35 DrawWorks Optical Encoder

BEI Sensors



This specially configured DrawWorks Model HS35 encoder combines rugged, heavy-duty features into a unique through-shaft style for use as a winch-turns counter in the DrawWorks system of oil rigs. It incorporates dual bearings and shaft seals for NEMA 4 and 13 (IP65) ratings, a hard-anodized metal housing and a sealed connector. It comes with a standard 1"-14 diameter threaded connection and a convertible adapter that allows its use in systems with a 5/8"-18 threaded connection. This encoder has an UL, cUL, and ATEX/CENELEC intrinsically safe rating when installed with the proper barriers (refer to BEI P/N 924-60004-XXX series on the back of this specification sheet). This barrier is high performance, galvanically isolated and carries US and European agency approvals. It is suitable for ALL Hazardous locations, regardless of gas and dust types.

EN 55011 and EN 61000-6-2

CENELEC EEX ia IIC T4

U.S. Standards Class I, Group A,B,C & D;  
Class II Group E, F & G

Canadian Standards  
Class I, Zone 0, Group IIC

## Mechanical Specifications

**Shaft Bore:** 0.375" diameter through with convertible adapter for 1" or 5/8" air coupler.  
**Starting Torque at 25°C:** 7in-oz  
**Shaft Material:** 416 stainless steel  
**Bearing Housing:** Die cast aluminum  
**Bearing Life:** 7.5 x10<sup>9</sup> revs (50,000 hrs at 2500 RPM)  
**Maximum RPM:** 6,000 RPM (also see frequency response)  
**Moment of Inertia:** 0.019 oz-in-sec<sup>2</sup>  
**Weight:** Approximately 18 oz.

## Electrical Specifications

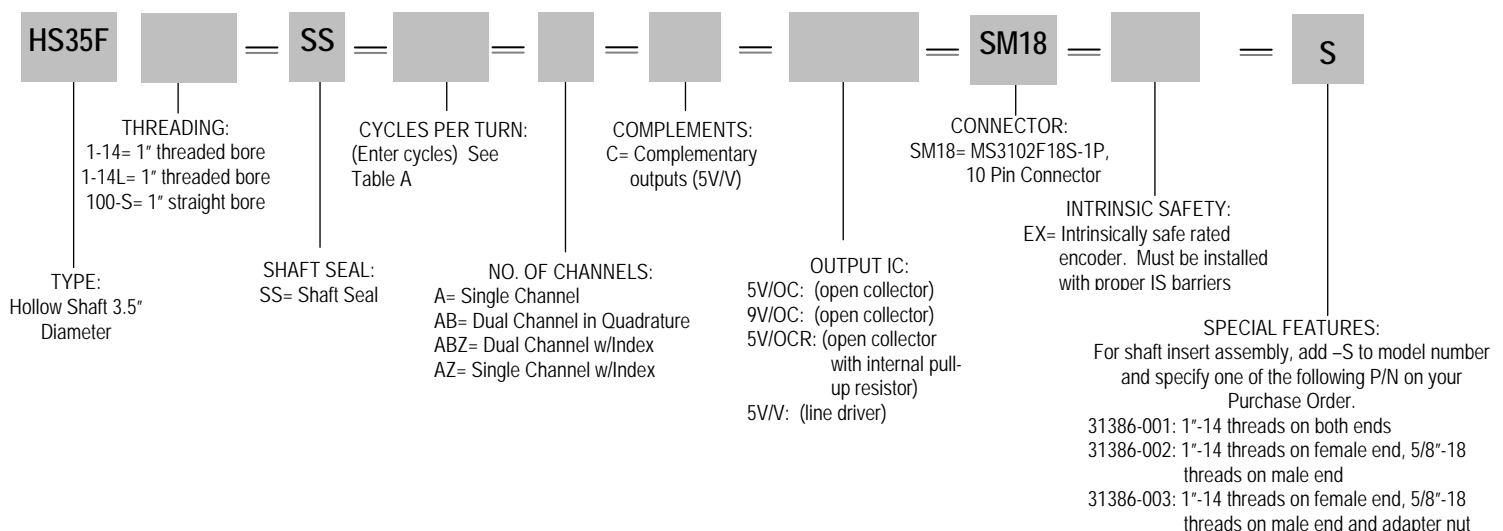
**Code:** Incremental  
**Output Format:** 2 channels (A and B) in quadrature ± 27° electrical, with index and complements (see figure 1)  
**Cycles Per Shaft Turn:** Up to 5,000 (see Table A)  
**Supply Voltage:** 5 or 9V  
**Current Requirements:** 120mA (typical)  
**Output Device:** 5V/OC, 9V/OC, 5V/OCR, 40mA max current sink; 5 or 5V/V line driver 100mA source/sink; 5V only  
**Frequency Response:** 150kHz  
**Output Termination Pinouts:** See Table 1

## Environmental Specifications

**Enclosure Rating:** NEMA 4/13 (IP65)  
**Temperature:** -40° to +80°C standard  
**Shock:** 50 G/s for 11 msec duration  
**Vibration:** 5 to 2000 Hz @ 20 G's  
**Humidity:** 98% RH without condensation

## HS35 DrawWorks Ordering Options for assistance, call 800.350.2727

Use this diagram, working from left to right to construct your model number (example: HS35F-1-14-SS-200-ABZC-4469-SM18-EX-S)  
 All notes and tables referred to can be found on the back of this page.



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Figure 1  
Output Waveforms

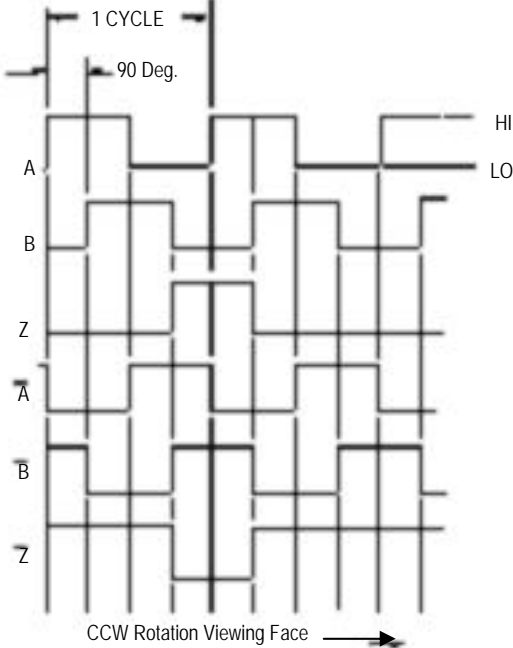


Table 1  
Output Terminations

PIN	ABZ	ABZC
A	CH A	CH A
B	CH B	CH B
C	INDEX, Z	INDEX, Z
D	+V SUPPLY VOLTAGE	
E	—	
F	0V/ (CIRCUIT COMMON)	
G	CASE GROUND	
H	N/C	$\bar{A}$
I	N/C	CH B
J	N/C	CH Z

Table A  
Disc Resolutions  
(cycles per turn)

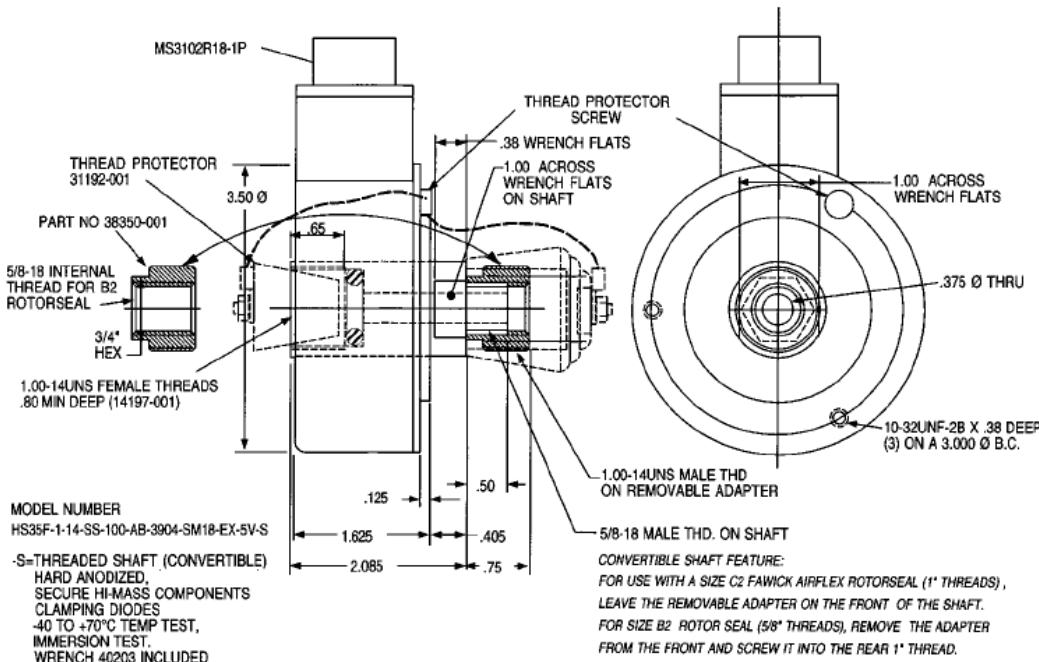
32, 100, 250, 360, 500, 512, 600, 1000, 1024, 1200, 1650, 1800, 2000, 2048, 2100, 2500, 2881, 2884, 3600, 3710, 4096, 5000

**All the Components You Need  
for a Complete Solution for Any  
Hazardous Environment—  
All from One Source**



HS35 DrawWorks Dimensions  
MS Connector Termination

TOLERANCES: .XX = ±0.01, .XXX = ±0.005



MODEL NUMBER  
HS35F-1-14-SS-100-AB-3904-SM18-EX-5V-S  
-S=THREADED SHAFT (CONVERTIBLE)  
HARD ANODIZED.  
SECURE HI-MASS COMPONENTS  
CLAMPING DIODES  
-40 TO +70°C TEMP TEST,  
IMMERSION TEST.  
WRENCH 40203 INCLUDED

INTRINSICALLY SAFE WHEN INSTALLED PER  
INSTALLATION DRAWING 924-08064-001

You no longer need to search through a stack of catalogs, mixing and matching sensors and barriers. With BEI's ATEX-approved components you can put together a full system—encoder, cable and barrier—with complete confidence that all components will work together perfectly. Integrating all three differential data inputs, as well as power and ground into a single, galvanically isolated barrier reduces both engineering and installation time. What's more, this complete system is Intrinsically Safe rated for ALL Gas and Dust groups. Let us provide you with one complete system that's easy to specify, easy to install, and can be used anywhere.

BEI Intrinsic Safety Barrier

SUPPLY VOLTAGE TO BARRIER	OUTPUT TYPE FROM BARRIER	BARRIER PART NUMBER
12-24 VDC	Vout = 5 VDC	924-60004-002
12-24 VDC	Vout = Vin	924-60004-003
12-24 VDC	Vout = Open Collector	924-60004-004

M18 Cable Assembly:

Part #	Cable Length
924-31186-1810	10 feet
924-31186-1820	20 feet
924-31186-1830	30 feet
924-31186-1850	50 feet

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