MODEL HS35 DRAWWORKS OPTICAL ENCODER

Product Description

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.

SPECIFICATIONS

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	150 KHz
Output Termination Pinouts	See Table 1

Mechanical Specifications

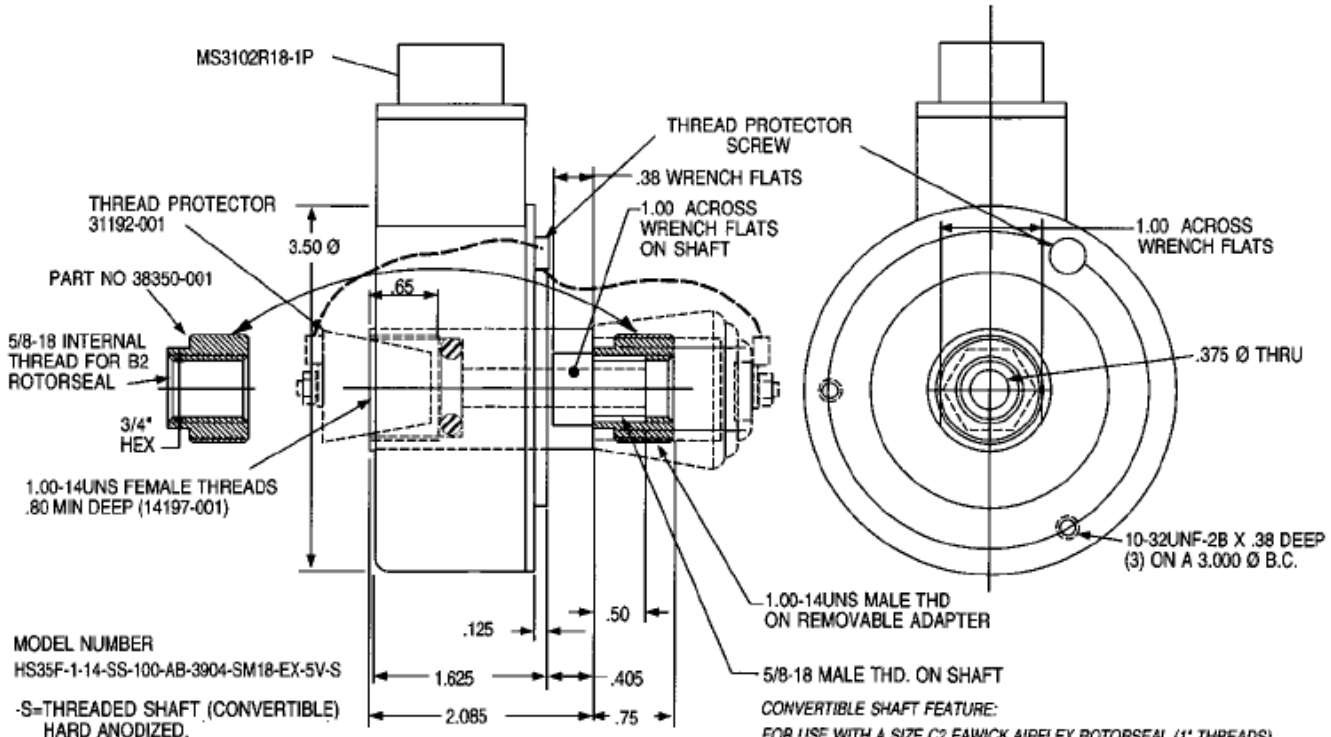
Shaft Bore	0.375" diameter through with convertible adapter for 1" or 5/8" air coupler.
Starting Torque at 25°C	7in-oz
Shaft Material	416 stainless steel
Bearings	52100 bearing steel
Bearing Housing	Die cast aluminum
Bearing Life	7.5 X 10^9 revs at rated load (50,000 hrs at 2500 RPM)
Maximum RPM	6,000 RPM (see frequency response, below)
Moment of Inertia	0.019 oz-in-sec^2
Weight	Approximately 18 oz.

Environmental Specifications

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

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

CONVERTIBLE SHAFT FEATURE:
FOR USE WITH A SIZE C2 FAWICK AIRFLEX ROTORSEAL (1" THREADS), LEAVE THE REMOVABLE ADAPTER ON THE FRONT OF THE SHAFT.
FOR SIZE B2 ROTOR SEAL (5/8" THREADS), REMOVE THE ADAPTER FROM THE FRONT AND SCREW IT INTO THE REAR 1" THREAD.

TABLES

Table 1 —
Output Terminations

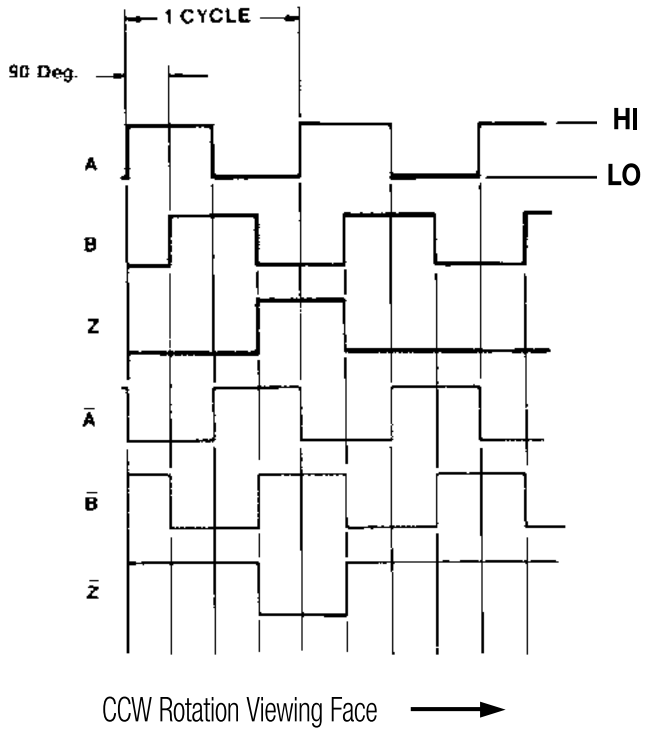
PIN	ABZ	ABZC
A	CH A	CH A
B	CH B	CH B
C	INDEX, Z	INDEX, Z
D	+V (Supply Voltage)	
E	—	
F	0V (Circuit Common)	
G	Case Ground	
H	N/C	$\overline{A}$
I	N/C	CH B
J	N/C	CH Z

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

FIGURE 1

Output Waveforms



ORDERING OPTIONS

HS35F 1-14 – SS – 200 – ABZC – C – 5V/OC – SM18 – EX S

Type

Hollow Shaft 3.5" Diameter

Threading

1-14: 1" Threaded Bore
1-14L: 1" Threaded Bore
100-S: 1" Straight Bore

Shaft Seal

SS: Shaft Seal

Cycles Per Turn

(Enter Cycles)
(See Table A)

No. of Channels

A: Single Channel
AB: Dual Channel in Quadrature.
ABZ: Dual Channel with Index
AZ: Single Channel with Index

Compliments

C: Complimentary Outputs (5V/V)

Output IC

5V/OC: (Open Collector)
9V/OC: (Open Collector)
5V/OCR: (Open Collector with Internal Pull-Up Resistor)
5V/V: (Line Driver)

Connector

SM18: MS3102F18S-1P, 10 Pin Connector

Intrinsic Safety

EX: Intrinsically Safe Rated Encoder. Must be installed with proper IS barriers.

Special Features

For shaft insert assembly, add –S to model number and specify one of the following P/N on your Purchase Order:

31386-001: 1"-14 threads on both ends
31386-002: 1"-14 threads on female end, 5/8"-18 threads on male end
31386-003: 1"-14 threads on female end, 5/8"-18 threads on male end and adapter nut

Additional Components

BEI Intrinsic Safety Barrier

Supply Voltage to Barrier	Output Type from Barrier	Barrier Part Number
12-24 VDC	V_{out} = 5VDC	924-60004-002
12-24 VDC	V_{out} = V_{in}	924-60004-003
12-24 VDC	V_{out} = 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

AGENCY APPROVALS & CERTIFICATIONS

Agency	File Number
CE	EN 55011 and EN 61000-6-2
UL	U.S. Standards Class I, Group A,B,C, & D, Class II Group E, F, & G
cUL	Canadian Standards Class I, Zone 0, Group IIC
EX	CENELEC EEX ia IIC T4

Consult factory for more details.