LIBRASCOPE

Absolute Binary Magnetic Noncontact Encoder

TECHNICAL DATA

Binary V-Scan and Gray Code Magnetic noncontact encoders produced by The Singer Co., Librascope Division, are designed to convert a shaft angle into a digital code whose output voltage levels are TTL compatible with computers and microprocessors. These encoders will operate from static to high rotational speeds with long service life and proven reliability. Librascope magnetic noncontact encoders operate reliably between –55°C to +125°C and meet the rigid environmental requirements of MIL-E-5272. Special high temperature, 400°F, units are available. Resolutions up to 8 bits per turn (256 counts) and 14 bits full scale (16,384 counts) capacity with parallel readout in binary code are available.

FEATURES

Angular positions are magnetically encoded spots on a ferrite disc which turns with the shaft rotation. Fixed position ferrite core sensors, separated by an air gap spacing from the disc, sense the presence or absences of magnetization of the encoded pattern. The sensor cores are driven by a 200 KC source in a single wire that is wound sequentially through all of the ferrite core sensors. Each ferrite core sensor has its own "output" winding. When a sensor core is not saturated, a condition that occurs when no magnetized spot on the disc exists at the sensor core air gap, the 200 KC drive switches the ferrite core sensors resulting in an output at the 200 KC rate. A magnetized disc spot opposite a sensor core completely inhibits the switching of the core and there is no sensor output. Thus, the encoder output is

essentially the 200 KC drive modulated according to the angular position of magnetically encoded disc and of sufficient amplitude and duration to drive conventional TTL logic.
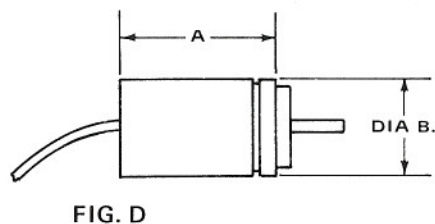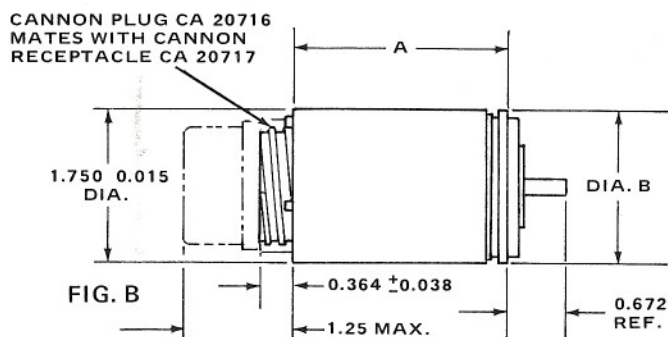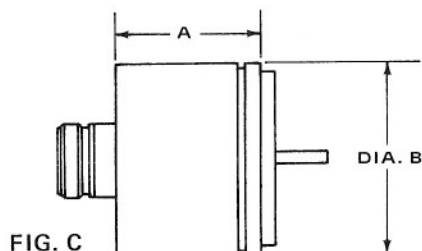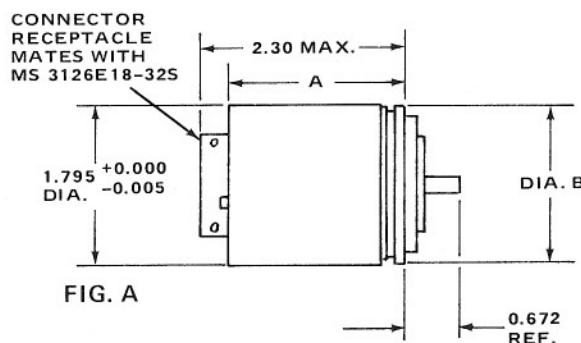
The 200 KC drive need not be continuous. One may pulse interrogate and eliminate the need for continuous input drive circuitry and the resultant output signal demodulation and shaping circuits. When a mini or microprocessor is used, all of the required encoder output circuitry may be completely eliminated by pulse interrogating the encoder. By feeding the encoder output directly into the processor register, the output detection may be done serially or in parallel by a simple software or ROM program.

APPLICATIONS

1. The rigorous environments of the military and industrial.
2. Airborne/shipboard navigation and weapons fire control.
3. Radar platforms on track vehicles.
4. Steel rolling mills.
5. Satellite and star tracking.
6. Barge steering control.
7. Numerical Process Control.
8. Numerical machine tool control.

Librascope magnetic encoders lend themselves well to all of these proven applications with established reliability in all types of environments including those subject to nuclear radiation.

Absolute Binary Magnetic Noncontact Encoder

CONNECTOR
RECEPTACLE
MATES WITH
MS 3126E18–32S

2.30 MAX.

A

1.795 DIA. +0.000 / –0.005

DIA. B

FIG. A

0.672 REF.

CANNON PLUG CA 20716
MATES WITH CANNON
RECEPTACLE CA 20717

A

1.750 0.015 DIA.

DIA. B

FIG. B

0.364 ±0.038

1.25 MAX.

0.672 REF.

A

DIA. B

FIG. C

A

DIA B.

FIG. D

ENGINEERING SPECIFICATIONS

Model No.	Size	Reference Figure	Capacity		Total Shaft Revolutions Full Scale	Scan	Length Dimension "A" (Note 1)	Diameter Dimension "B"	Weight (Note 1)	Slew Shaft Input Speed (Max. Rpm)
			Single Turn	Full Scale						
807–11	11	D	7–bits	7–bits	1	V	2.00	1.062	4 oz.	8,000
807–18	18	B	7–bits	7–bits	1	V	1.850	1.750	5 oz.	10,000
808–18	18	B	8–bits	8–bits	1	V	1.850	1.750	5.oz.	10,000
813–18	18	B	7–bits	13–bits	64	V	1,850	1.750	8 oz.	4,000
814–18	18	A	8–bits	14–bits	64	V	1,850	1.750	8 oz.	4,000
878–23	23	C	8–bits	8–bits	1	gray	1.250	2.250	8 oz.	10,000

Note: (1) Nominal Length and Weight excludes connector.

GENERAL CHARACTERISTICS

Environmental capability	Meets or exceeds MIL–E–5272, e.g., Humidity at 95% with condensation Vibration to 2000 Hz at ±20 g's Salt Spray, Fungus, Sunshine, Rain, Sand and Dust, Temperature shock Immersion, Explosion proof, Temperature/altitude, and Shock at 50 g's Temperature range, operating –55° to +125°C
Service Life	1 Billion shaft revolutions or 10 years whichever occurs first
Input torque (max.)	0.04 in.–oz.
Moment of inertia (max.)	0.37 oz.–in.^{2}

Input driver for continuous interrogation

Current	200 mA, peak–to–peak
Frequency Range	20–to–200 kHz
Sine or Trapezoidal Wave Form	

Output in parallel from sensing cores, typical

Voltage	3.2 V peak into a 1 k ohm load.
Impedance	220 ohms at 60 kHz.
Logic Levels	TTL compatible
Signal to noise ratio	10:1 or greater
User option	Pulse interrogation serial output

Ask for Theory of Operation Sheets "The Magnetic V–Scan Encoder", "The Gray Code Encoder" and "Comparison of Encoders by Types"