

# LIBRASCOPE TRACK-BALL CRT CURSOR CONTROL

SOLID-STATE MAGNETIC



## TECHNICAL DATA

The trackball produced by Librascope Division of The Singer Company is a two-axis digital control that provides simultaneous X and Y scalar increments as inputs to a system. Use of non-contact magnetic encoders for X and Y axes insures long life and reliable outputs.

The X and Y incremental output pulses provide direction sensing inputs for a display of the coordinates represented by motion of the ball. Or, the ball rotation can directly control two-axes motion.

## SPECIAL FEATURES

Librascope trackballs have been "human" engineered for ease and convenience of operation. Self-contained electronics provide outputs in the form of 90° phased square waves or logically-derived, direction sensed pulse outputs. Units are "drip proof" sealed.

Despite compact design, construction is exceptionally rugged; a unique bearing arrangement permits applying up to 30 times greater pressure and shock against the ball than other models on the market.

## OPERATION

The ball is hand rotated by the operator. Rotation of the ball is translated to two signal-generating encoder elements located 90° apart within the case.

Rotation in the +X to -X range produces a pulse rate output for the X-axis only. Rotation in the +Y to -Y range produces a pulse rate output along with Y-axis only. Rotation in any other direction produces a digital output as a function of the amount of X and Y rotation. Continuous rotation is possible on both axes.

## APPLICATIONS

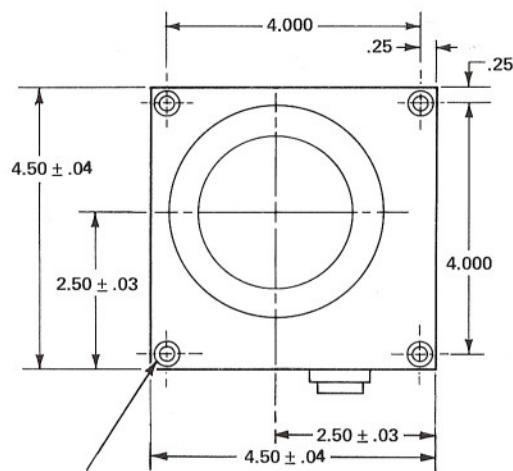
The Librascope trackball is an ideal manually operated direct digital input for control of CRT graphic displays where its primary use is adding new data. Experience has shown that data entry is easier with the trackball than with any other type of interactive control device. The trackball is used for modifying existing data displayed on the cathode ray tube and is also used for cursor control. The solid-state device may be used to lock a weapons system, a radar, or a sonar, onto a target return image displayed on a cathode ray tube.

Potential applications include fast and accurate positioning of plotters, cranes, numerical manual control of machine tool operations, two-axes proportional remote controls for steel mill equipment, high speed marine targets, and as an improved manual control for other applications.

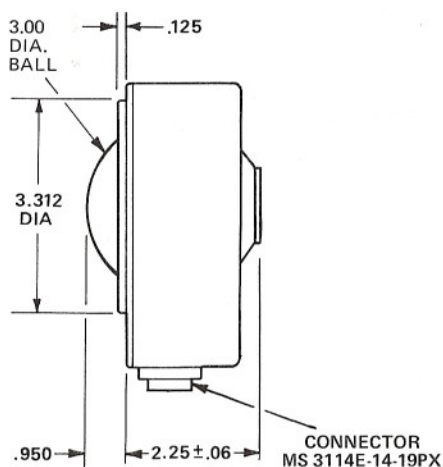
### GENERAL SPECIFICATIONS

Input: 5V DC 100 to 400 MA (depending on circuit chosen).  
 Output: TTL & DTL compatible — Logical "1" = 2.4 V min.  
 Logical "0" = 0.4 V max.  
 10 MA sink.

Weight:  $30 \pm 2$  oz.  
 Tangential force to move ball:  $4 \pm 2$  oz.  
 Mating connector: MS 3116E14-19SX  
 Life: 5 years under typical operating conditions.



THD INSERT NO. 10-32 X .44 MIN. THD  
 C'BORE .280 X .12 DEEP 4 PLACES



### TYPICAL ENGINEERING SPECIFICATIONS

3.0" BALL MODEL NUMBER	OUTPUT FORMAT — PER AXIS	RESOLUTION — PER AXIS
30-856-00-14	Two channels: Channel A — "up" count pulses. Channel B — "down" count pulses.	480 negative-going, $2 \pm 1$ $\mu$ sec pulses per ball revolution*.
30-856-00-16	Two channels; square waves phased $90^\circ$ .	120 square waves per channel per ball revolution.

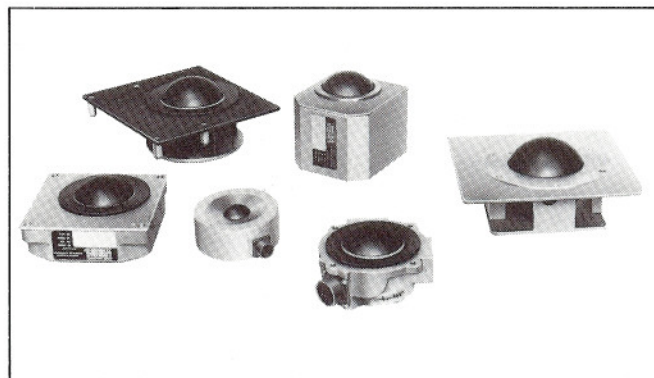
\*  $\frac{1}{2}$  or  $\frac{1}{4}$  of above resolution available

### ENVIRONMENTAL SPECIFICATIONS

Temperature, Operating: -55 C to +85 C.  
 Humidity (R. H.): 10 days, 95% R. H. per MIL-E-5272 Procedure 1.  
 Vibration: 20 g at 500 Hz per MIL-T-5422.  
 Shock and Crash Safety: Non-operating per MIL-T-5422.  
 Altitude: Sea level to 50,000 feet.  
 Salt Fog: 48 hours per MIL-T-5422.  
 Sand & Dust: Per MIL-T-5422.  
 Explosive Atmosphere: Operating per MIL-T-5422.  
 Operating Life: 5 years continuous operation without major adjustments or servicing.

### DESIGN VARIATIONS

Small and light-weight models for airborne consoles and handheld thumbtracker for training and supervisory applications.  
 Other counts available.  
 Variations in electronics: Output format & input supply.



Other special models available.

For additional information write or telephone:  
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