



The LT series trackball utilizes advanced laser tracking technology in a sealed, contactless device that provides precise and accurate cursor control at all speeds, with the versatility to fit most applications. The design incorporates a standard removable bezel for easy cleaning, decontamination, sterilization, and maintenance, ensuring optimum performance and operation under the harshest of conditions. The LT series trackballs are available with a variety of electrical outputs, tracking force options, and sealing capabilities up to IP68. Designed to be back-panel mounted in keyboards and consoles, LT series trackballs are often used in medical systems, marine systems, custom keyboard applications, and industrial consoles.



## KEY FEATURES

- ☐ **Solid state sensing technology – laser tracking engine**
- ☐ **IP68 sealing**
- ☐ **Output: USB, PS/2 or SUN Systems**
- ☐ **Smooth operation in rugged environments**
- ☐ **Multiple top plate configurations**
- ☐ **Custom connector options**



# LT series

## Panel mount miniature trackball

### OPTION SELECTION

LT					
SERIES	BALL DIAMETER	PROTOCOL FORMAT	TOP PLATE AND BODY STYLE	COLOR*	
	13 13mm (0.51in)	3 PS/2 6 SUN Systems 7 USB	1 Black Top Ring & Body - Damper Ring 2 Black Top Ring & Body - Silicone Rubber Seal	D Metallic Gray	

\*For more color options, please contact APEM

### SPECIFICATIONS

#### MECHANICAL

Weight:	–	~15 g (0.53oz)
Ball:	–	Ø12.7mm (0.5")
Ball Material:	–	Phenolic, polyester, epoxy resin
Tracking Force:	–	10 g (0.35oz) nominal – damper ring 10-30 g (0.35-1.06oz) – Silicone rubber seal
Ball Load:	–	50N (5Kg) maximum downward pressure for 2 minutes @ 20°C (68°F)
Resolvable Ball Speed:	–	30 IPS (inches per second)
Mounting Position:	–	All angles
Tracking Engine:	–	Laser navigation technology
Top Plate Material:	–	PC/ABS – Black
Sealing Gasket:	–	Silicone seal (DC7091 black)
Vibration:	–	2g (0.18oz), 10-500Hz, 1 octave/min, 10 sweep cycles (IEC 60068-2-6)
Operating Shock:	–	15g (0.53oz)/11ms, ½ sine, 3 shocks in +ve and –ve direction, all 3 axis (IEC 60068-2-27)
Mechanical Lifetime:	–	1 million ball revolutions
MTBF:	–	In excess of 100,000 hours (MIL-STD-217F)

#### PROTOCOL OPTIONS AND ELECTRICAL SPECIFICATIONS

Protocol:	–	USB, PS/2 or SUN Systems
Supply Voltage:	–	4.4V to 5.25VDC
Resolution:	–	300 counts per ball revolution @ 1IPS (inches per second) +/- 10% 600 counts per ball revolution @ 5IPS (inches per second) +/-10%
Output Connector:	–	8 way, right-angled JST film connector
Mating Output Connector:	–	Flexible flat cable (FFC), 1.0mm pitch
Laser Safety Class:	–	Embedded class 1M laser safety, IEC 60825-1
ESD:	–	15kV air-discharge and 8kV contact discharge (IES 60068-4-2)
EMC:	–	Radiated immunity – limits according to lever 3 of IEC 61000-4-3 Radiated emissions to EN55022 class B

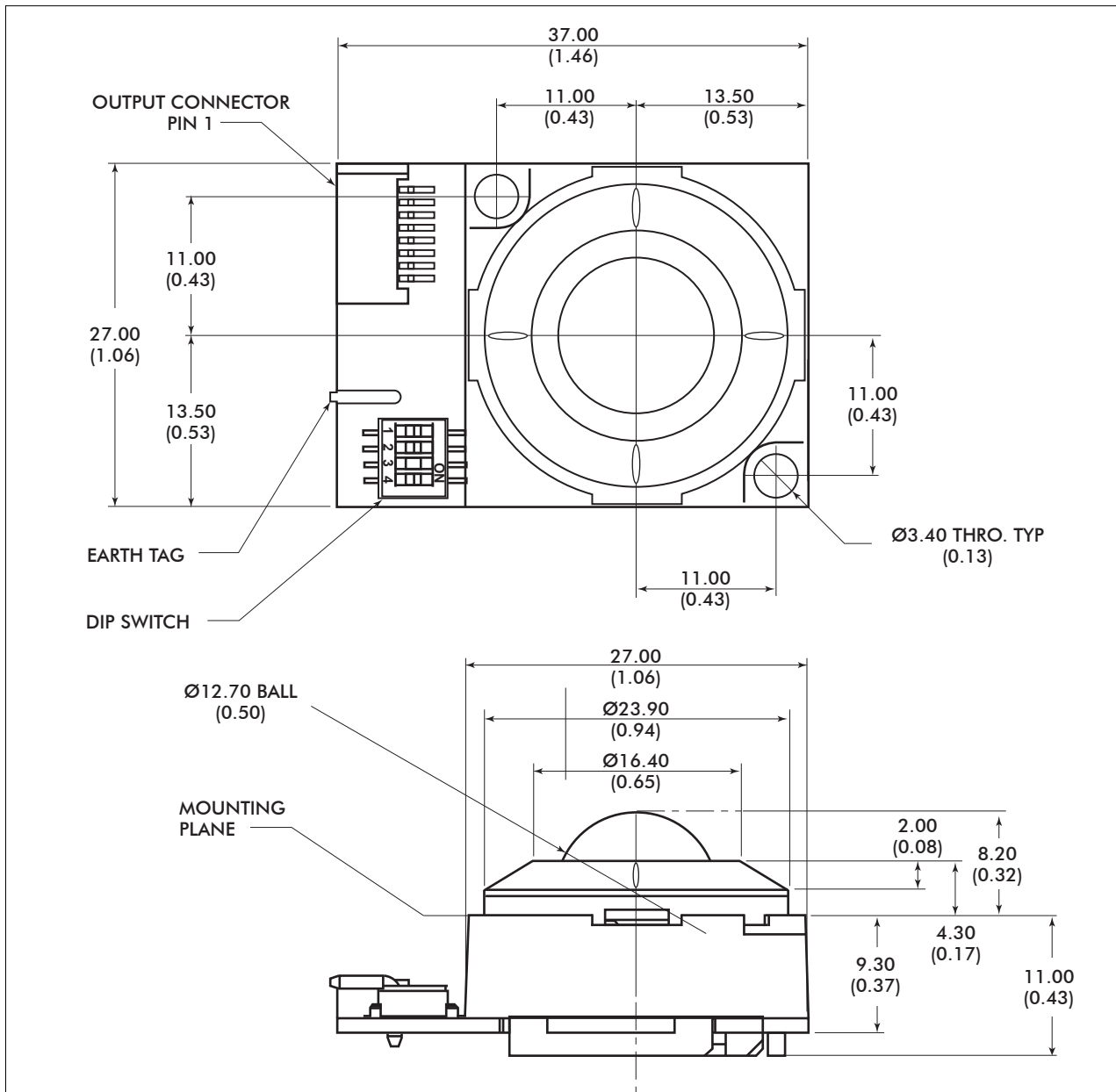
#### ENVIRONMENTAL

Operating Temperature:	–	0°C to +55°C (32°F to +131°F) (IEC 60068-2-1, IEC 60068-2-2)
Storage Temperature:	–	-40°C to +85°C (-40°F to +185°F) (IEC 60068-2-1, IEC 60068-2-2)
Operating Humidity:	–	93% RH @ 40°C, non-condensing (IEC 60068-2-78)
Storage Humidity:	–	10%-95% non-condensing (IEC 60068-2-78)
Sealing Capability:	–	IP68 (BS EN 60529)

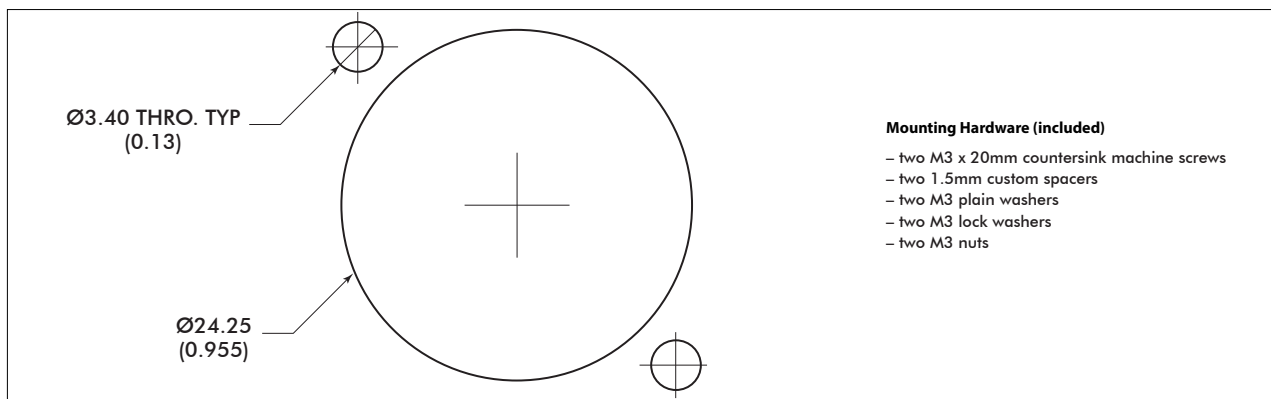
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### DIMENSIONAL DRAWINGS



### MOUNTING CUT-OUT DIMENSIONS



#### NOTES:

Dimensional drawing specifies factory default orientation.  
Tolerances +/-0.2mm unless otherwise stated.  
Please note that an IGES model is available on request. Please contact factory for more information.

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### CONNECTION DETAILS

Connection is made to the LT series trackball by means of a single 8-way, right-angled, JST film connector (or equivalent). The table below highlights the connection details. Contact APEM for custom connections.

### OUTPUT CONNECTOR

Description: Header 8 way 1.0mm pitch	Manufacturer: JST (or equivalent)
Part Number: 08FM-1.0SP-1.9TF	Mating Connector: Flexible flat cable (FFC), 1.0mm pitch

PIN NUMBER	USB / PS/2	SUN SYSTEMS
1	+5VDC	+5VDC
2	D-, PS/2 data	Data
3	D+, PS/2 clock	Do not connect
4	Right switch	Right switch
5	Left switch	Left switch
6	0V	0V
7	Middle switch	Middle switch
8	N.C.	N.C.

### TRACKBALL CONFIGURATION

The LT series trackball provides features that may be selected using the DIP switch located on the printed circuit board. The table below details the assigned function of each switch.

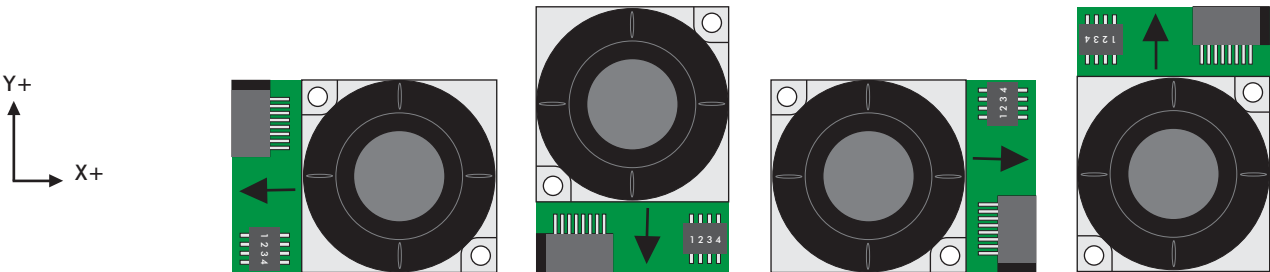
DIP Switch Functions

DIP SWITCH*	FUNCTION	OFF	ON
1	Orientation 1 Setting	See Figure	See Figure
2	Orientation 2 Setting	See Figure	See Figure
3	Tracking Mode	Ballistic Tracking	Linear Tracking
4	Factory Setting	Switch must be set in OFF position	

\*Factory default setting: All DIP switches OFF

### ORIENTATION

The orientation function allows the user to mount the LT series trackball device in one of four positions as seen in the illustration below. The orientation of the device is determined by the direction in which the output connector is facing (when viewed from the top of trackball device). The trackball device orientation can be selected to accommodate customer requirements for connector location and wiring.



SWITCH 1 (ORIENTATION 1)	OFF	ON	OFF	ON
SWITCH 2 (ORIENTATION 2)	OFF	OFF	ON	ON

### TRACKING MODE

**Ballistic Tracking:** Intuitive tracking algorithm to provide increased cursor resolution at maximum speeds, while retaining the original resolution for tracking accurately at slow speeds.

**Linear Tracking:** No tracking algorithm. 300 counts per ball revolution maintained at all tracking speeds.

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