



An Affiliate of ELECTRO SWITCH

# T10X3 Industrial Trackball

NEMA 12 (IP54) PANEL MOUNT INDUSTRIAL TRACKBALL SUB-ASSEMBLY

## T10X3 INDUSTRIAL TRACKBALL

CTI's Panel Mount T10x3 Series Industrial Trackball is comprised of a proprietary mineral filled rollerball, ABEC 7 shielded bearings, stainless steel shafts, Teflon Ring, Aluminum Collar, Delrin (or Aluminum) housing, optical encoders, metal encoder wheels, and patented infrared LED age compensating circuitry and firmware. The 2.0 inch (50mm) diameter rollerball has a homogeneous density with an unrivaled moment of inertia and the ability to withstand expansion/contraction over an operating temperature range of -40°C to +80°C. Shielded ABEC bearings and the stainless steel shafts ensure a minimum of 100,000 hours of usage. A Teflon Ring with optional Vibration Dampening Material will ensure smooth rotation and variation of the breakout force upon the rollerball for mobile applications. The aluminum mounting collar will retain the rollerball against a shock of 10g. Lastly, the digital output signal is either USB Mouse Protocol or legacy PS/2, RS-232 Microsoft Serial Mouse, or RS-232 Mouse Systems Serial Protocol. The standard encoder count of 640 counts per revolution can be doubled or quadrupled with special USB firmware for high pixel density and/or large screen sizes (i.e. UHD 4k / 8k, 2160p / 4320p). CTI's sealed mechanical momentary switches provide left, middle and right mouse button functionality.

The NEMA 12 (IP54) sealed Industrial Trackball is most suitable for critical applications requiring high durability (10+ years), high reliability (99.999% availability), and/or ensured performance over extended operating temperatures. It's well protected against high vibration, exposure to electromagnetic and radio frequency interference, electro static discharges, shocks, and humidity.

This Panel Mount Industrial Trackball with digital interface PCB is offered to Systems Integrators and Commercial End Users with a neoprene gasket for mounting into an enclosure. The T10x3 Series industrial trackball mounts with four screws and occupies 2.2" (56mm) or 1.5" (38mm) of below panel depth. The digital output signal is provided through a 9.5 foot shielded cable with the appropriate connector (USB, PS/2, DB9). The combined features of the Panel Mount Industrial Trackball meet and/or exceed industry standards specifications in aerospace, marine, medical, and military.

## T10X3 MANUFACTURING OPTIONS

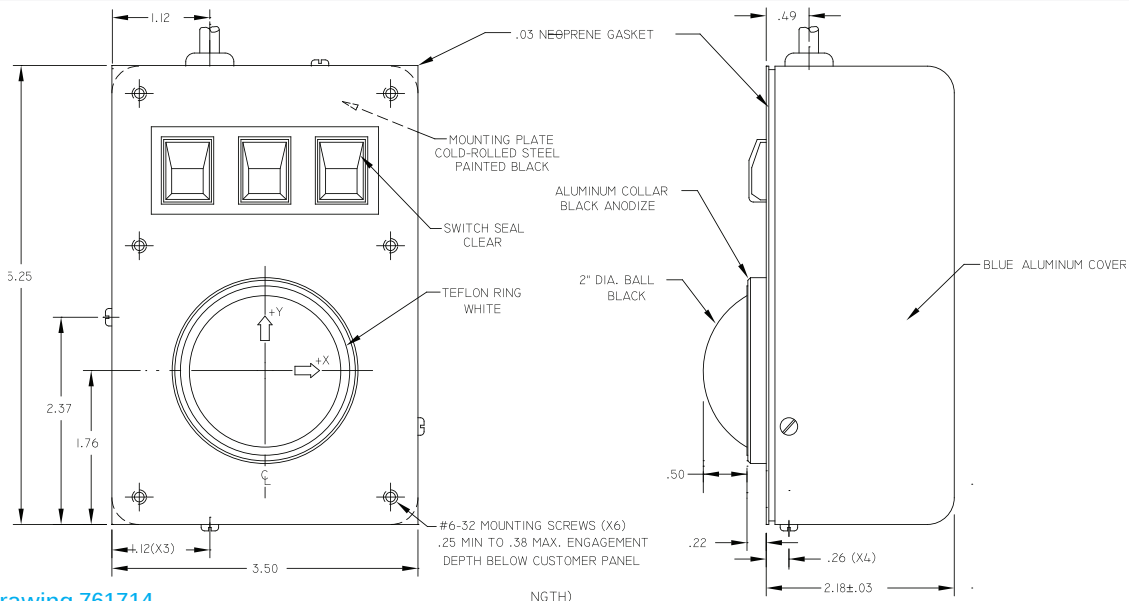
V/V1	Vibration Dampening Material (Standard / Light)
P1351	Optional Operating Temperature Range -40°C to 80°C (-40°F to 176°F)

\*For complete ordering information refer to Technical Drawings

## T10X3 TECHNICAL DRAWINGS

<a href="#">761714</a>	<a href="#">T10X3 Panel Mount Industrial Trackball</a>
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## T10X3 PANEL MOUNT MARINE TRACKBALL TECHNICAL DRAWING



CTI Technical Drawing 761714

• Shown above T10X3 Panel Mount Aerospace Trackball

## T10X3 STANDARD FEATURES

- NEMA 12 (IP54) sealing
- Standard Operating Temperature -25°C to 80°C (-13°F to 176°F)
- Optional Operating Temperature -40°C to 80°C (-40°F to 176°F)
- High reliability and durability (MTBF 100,000+ hours, 20,000,000+ random cycles)
- Trackball sub-assembly and PCB layout offers EMI/RFI shielding and Ground Connection (ESD)
- Standard 9.5ft USB or PS/2 Cable, Legacy Protocols (Call Factory)
- Precision Ground Ball with ± 0.002" Tolerance
- Precision ground and hardened stainless steel shafts
- PTFE Sealing ring in aluminum collar ensures smooth ball rotation
- Micro etched metal encoder wheels allow for greater resolution than possible with plastic
- Precision instrument grade, shielded, bearings (ABEC Grade 7)
- Dual IR Optical Encoders with patented circuitry for LED aging
- 2.0" (50mm) Diameter Trackball
- Blue anodized aluminum bottom cover protects electronics
- Neoprene gasket ensures watertight sealing to panel

performance

durability

reliability



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## PANEL MOUNT INDUSTRIAL TRACKBALL COMPARISON CHART

	T70X3	T10X3	T40X3
Dimensions (Inches)	2.83" x 4.50" x 1.78" (below panel)	3.50" x 5.25" x 2.18" (below panel)	4.25" x 6.00" x 2.65" (below panel)
Dimensions (mm)	71.88 x 114.3 x 45.21mm	88.9 x 133.35 x 55.37mm	107.95 x 152.4 x 67.31mm
Trackball Diameter	1.5" (38mm)	2.0" (50mm)	3.0" (76mm)
Weight	16 Oz (454g)		
Trackball Materials	Specially formulated mineral filled ball, precision ground to ± 0.002" tolerance		
	Precision ground and hardened stainless steel shaft		
	PTFE sealing ring in aluminum collar for smooth ball rotation		
	Micro etched metal encoder wheels allow for greater resolution than possible with plastic		
	Precision instrument grade, shielded, bearings (ABEC Grade 7)		
Azimuth	Standard: 0° to 30° incline		Optional: > 30° Incline (Call Factory)
Vibration	Standard Vibration Dampening (V Option)		Light Vibration Dampening (V1 Option)
Output Signal	USB		Serial Digital Interface
Cable	9.5ft USB Cable		9.5ft PS/2 Cable
<b>OPTIONAL COMPONENTS</b>			
Mouse Protocol	USB Mouse Protocol		Serial Mouse Protocol
Mouse Button	Three (3) Mechanical Momentary Switches		
USB (Cursor Speeds)	Standard Encoder Count (HD 1080p)	2 x Encoder Count (UHD 4k/8k 2160p/4320p)	4 x Encoder Count (UHD 4k/8k 2160p/4320p)

## T10X3 SPECIFICATION

T10X3 Measurements	Width: 3.50" (88.9mm)	Height: 5.25" (133.35mm)	Depth: 2.18" (55.37mm)	Weight:		
Trackball Specification	Diameter	2.0" (50mm)	Resolution	640 cts/rev	Encoder Wheel	0.73" Dia.; 40 Slots
Operating Systems	Microsoft Windows® Operating System (Windows XP, Windows 7, Windows 8, Windows 10), Mac OS X® or Linux OS					

## T10X3 ELECTRICAL SPECIFICATION

MTBF	Greater than 100,000 hours per MIL-HDBK-217F (For Military Trackball & Aerospace Trackball)				
Cabling	Ribbon cable with 10-Pin IDC Connector has Standard 0.1" (25.4mm) Spacing				
Power Requirements	Max 40mA @ 5V without interface PCB		Max 70mA @ 5V with interface PCB		
EMI/RFI Shielding	Designed into Trackball sub-assembly and interface PCB				
ESD Protection	8Kv (Contact), 15Kv (Air)				
Infrared LEDs	Dual IR Optical Encoders with patented circuitry for LED aging				

## T10X3 MECHANICAL SPECIFICATION

Life Expectancy	20,000,000 random cycles					
Shock	Peak Value	100g	Peak Duration	11ms	Waveform	Half Sine
Vibration	Frequency / Displacement 5 -55 Hz @ 0.013 DA					

## T10X3 ENVIRONMENTAL SPECIFICATION

Operating Temperature	Standard: -25° C to 80° C / -13° F to 176° F	Optional: -40° C to 80° C / -40° F to 176° F (P1351 Option)
Storage Temperature	-40° C to 80° C / -40° F to 176° F	
Relative Humidity	up to 95% condensing per MIL-STD-810G	
Sealing Rating	NEMA 12 (IP 54)	
Operating Environment	Up to 40,000 ft with conformal coating	

## CONFORMANCE / CERTIFICATIONS / COMPLIANCE

subject to manufacturing options applied

U.S.A. Standards	U.S. FCC 47 CFR 15 Class A & B	RF Emissions Compliant 8Kv (Contact), 15Kv (Air)
	RTCA DO-160	Airborne Equipment and Instruments Conformance
	MIL-STD-461F	Radiated Emissions and Susceptibility Conformance
	MIL-STD-810G	Protection against humidity, fungus, and salt spray Conformance
	MIL-STD-901D	Protection against shock Conformance
	MIL-STD-167-1	Protection against vibration Conformance
	MIL-HDBK-217F	Military & Aerospace Reliability Conformance
	MIL-I-45208	Quality System Conformance
	IPC-A-610 II	Acceptability of Electronics Assemblies Certification
	European Standards	ISO 9001:2008 (Registration No. 74 300 3983)
	"CE" Compliant	
	Restriction of Hazardous Substance (RoHS) Directive Compliant	
	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Directive Compliant	
International Standards	IEC 61000-4-2 and EN61000-4-2	ESD 8Kv contact and 15Kv air Conformance
	IEC 61000-4-3 and EN61000-4-3	Radiated Emissions and Susceptibility Conformance
	IEC 61000-6-3 and EN61000-6-3	Electromagnetic Compatibility Conformance

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