

## X19 Series - Laser Trackball, Panel Mount, Protocol Output



### 1. DESCRIPTION

Utilizing the latest and most advanced laser tracking technology, the X19 Series laser Trackerball™ is an extremely high specification, contact-less device, ideal for the most demanding of cursor control applications.

The laser tracking engine provides accurate cursor motion at all speeds and on virtually any ball, combining the benefits of solid state sensing (no moving parts except the ball) with the aesthetics, functionality and performance associated with the Cursor Controls product range.

X19 Series trackballs are available with a variety of electrical outputs and sealing to IP68. The solid state design allows the device to be subjected to extreme conditions and provides the user with the ability to wash down, decontaminate, and sterilise, making it the ideal trackball for a wide range of demanding applications and environments.

The unit has been designed to be back of panel mounted as part of OEM keyboards and consoles.

### 2. FEATURES

- Solid state sensing technology – laser tracking engine
- Sealing to IP68
- Output: USB/PS2 (auto-select), SUN (optional)
- Smooth operation in rugged environments
- Various top plate configurations
- Custom connector options
- Various ball colours
- VX3™ – integrated zoom feature for scroll wheel functionality

### 3. APPLICATIONS

- Medical systems
- Marine systems
- Custom keyboard applications
- Industrial consoles
- OEM custom solutions available

## 4. SPECIFICATIONS

### 4.1 Mechanical

Weight	~30 grams
Ball	Ø19mm (0.75")
Ball material	Phenolic, polyester, epoxy resin
Tracking force	10 grams nominal – damper ring
	30-60 grams – dust seal
Ball load	100N (10Kg) maximum downward pressure for 2 minutes @20°C
Resolvable ball speed	40 IPS (inches per second)
Mounting position	All angles
Tracking engine	Laser navigation technology - solid state sensing
Housing material	PC/ABS
Sealing material	PTFE – damper ring option
	Polyurethane – dust seal option
Sealing gasket	Cellular silicone

### 4.2 Electrical

Protocol	USB, PS/2 (auto-select), SUN (optional)
Supply voltage	4.4V to 5.25V D.C.
Supply current	23mA typical, 25mA maximum
Resolution	425 counts per ball revolution @ 1 IPS (inches per second) +/- 10% 850 counts per ball revolution @ 5 IPS (inches per second) +/- 10%
Output connector	6 Way JST, right-angled header, part no. S6B-PH-SM3-TB
Mating output connector	6 Way JST connector, part no. PH, CR or KR types (e.g. PHR-6)
Switch Inputs	3 switches: left, middle, and right.
	Connection through 4-way JST, right-angled header, part no: S4B-PH-SM3-TB
Mating switch connector	4 Way JST connector, part no: PH, CR or KR types (e.g. PHR-4)
Laser safety class	Embedded class 1M laser safety, IEC 60825-1

### 4.3 Environmental

Operating temperature	0°C to +55°C (IEC 60068-2-1, IEC60068-2-2)
Storage temperature	-40°C to + 85 °C (IEC 60068-2-1, IEC60068-2-2)
Operating humidity	93% RH @ 40°C, non-condensing (IEC 60068-2-78)
Storage humidity	10%-95% non-condensing (IEC 60068-2-78)
Vibration	5g, 10-500Hz, 1 octave/min, 10 sweep cycles (IEC 60068-2-6)
Operating Shock	15g/11ms, ½ sine, 3 shocks in +ve and –ve direction, all 3 axes (IEC 60068-2-27)
Non-operating shock	50g/11ms, ½ sine, 3 shocks in +ve and –ve direction, all 3 axes (IEC 60068-2-27)
Mechanical lifetime	1 million ball revolutions
MTBF	in excess of 80,000 hours (MIL-STD-217F)
ESD	15kV air-discharge and 8kV contact discharge (IEC 61000-4-2)
EMC	Radiated immunity - limits according to level 3 of IEC 61000-4-3
	Radiated emissions to EN55022 class A
Sealing capability	IP68 (BS EN 60529)

#### 4.4 Electrical Compatibility

The X19 Series trackball has been tested for compatibility with the following operating systems;

Windows 95
Windows 98
Windows 2000
Windows ME
Windows NT4
Windows XP
Windows Vista
Redhat Linux
Sun Sparc
Fully compliant with USB 1.1 framework (chapter 9) and HID specifications

**5. CONNECTION DETAILS**

Connection is made to the X19 Series trackball by means of two JST connectors (or equivalent). Tables 1 and 2 highlight the connection details. Custom connections are available (please contact your local sales office for further details).

**5.1 Output Connector: P1**

Description: 6 Way JST, right-angled header.  
 Manufacturer: JST (or equivalent)  
 Part No: S6B-PH-SM3-TB  
 Mating connector: PH, CR or KR types (e.g. PHR-6)

Pin Number	USB/PS/2	SUN
1	EARTH	EARTH
2	-	-
3	5V D.C	5V D.C
4	PS/2 Data, D-	Data
5	PS/2 Clock, D+	Do not connect
6	0V	0V

Table 1 Output connections

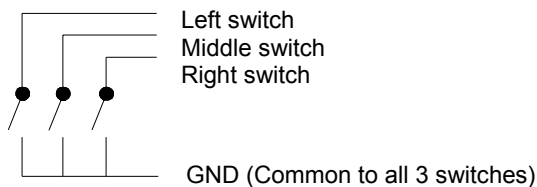
**5.2 Switch Input Connector: P2**

Description: 4-way JST, right-angled header.  
 Manufacturer: JST (or equivalent)  
 Part No: S4B-PH-SM3-TB  
 Mating connector: PH, CR or KR types (e.g. PHR-4)

Pin Number	Function
1	Left switch
2	Middle switch
3	Right switch
4	0V

Table 2 Switch connections

**5.3 Switch Schematic**



For alternative switch options and configurations please contact your local sales office.

## 6. TRACKBALL CONFIGURATION

The X19 Series trackball provides features that may be selected using the DIP switch located on the printed circuit board. Table 3 details the assigned function of each switch.

### 6.1 DIP Switch Functions

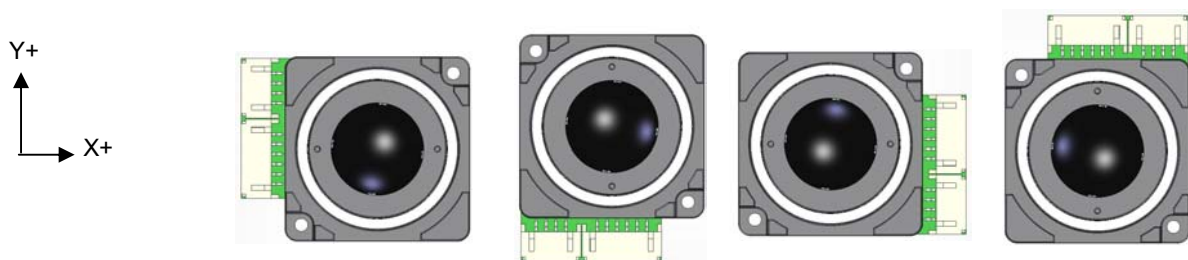
DIP Switch	Function	OFF	ON
1	Orientation 1 Setting	See Figure.1	See Figure.1
2	Orientation 2 Setting	See Figure.1	See Figure.1
3	VX3 - Virtual 3 Axis Function	Disabled	Enabled
4	Not used	N/A	N/A

Table 3 DIP switch functions

**Factory default setting: All DIP switches OFF**

### 6.2 Orientation

The orientation function allows the user to mount the X19 Series trackball device in one of four positions (see figure. 1 below). The orientation of the device is determined by the direction in which the output connector is facing (when viewed from the top of Trackerball device). The Tracker ball 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

Figure 1 Mounting Orientations

### 6.3 VX3™

VX3 is patent protected facility that provides the same 2 modes of functionality as a scroll wheel on a 3-axis mouse.

Operation:

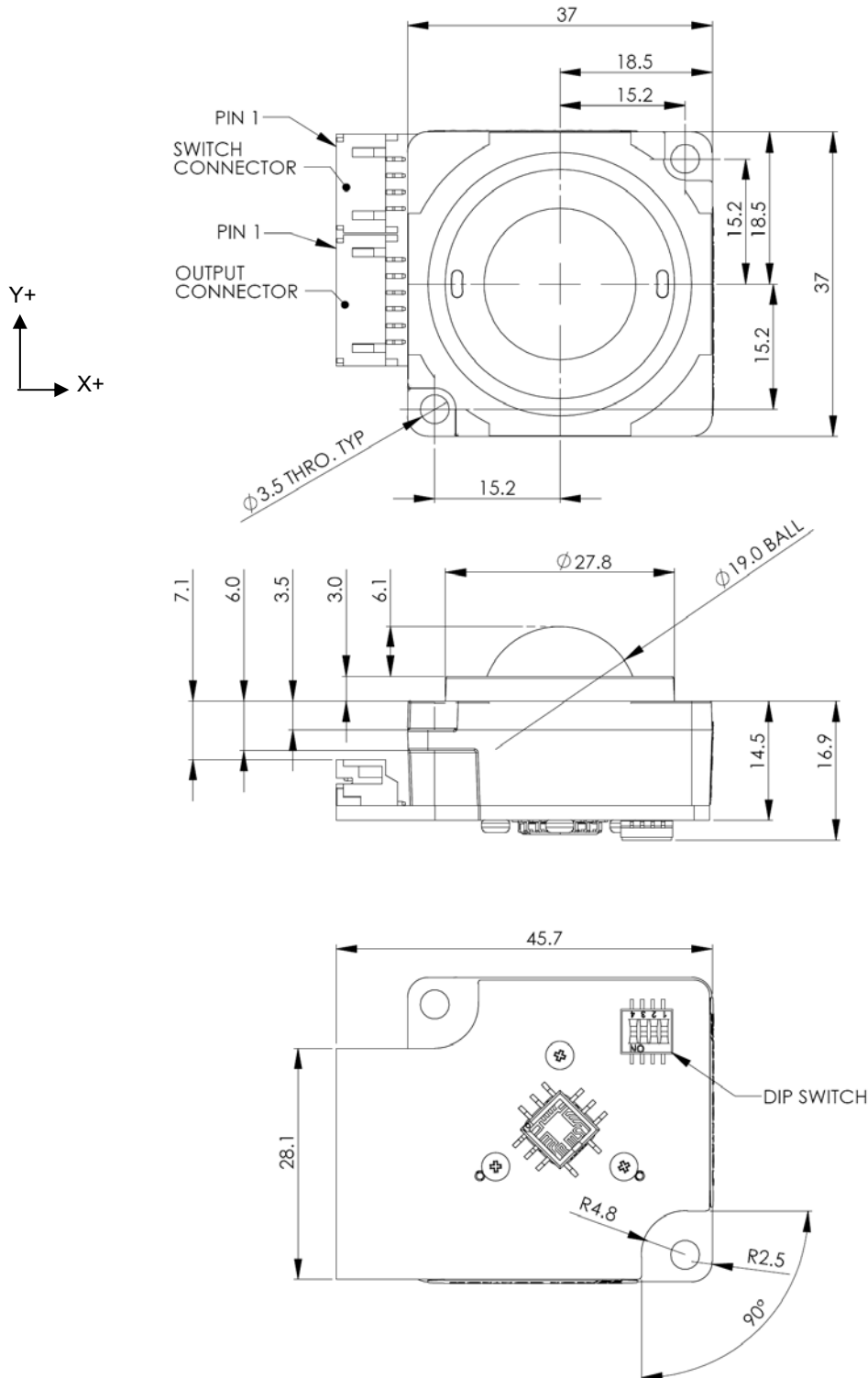
Press middle button once to latch scroll mode one (e.g. dynamic pan feature);

Press middle button again to latch scroll mode two (e.g. 3<sup>rd</sup> axis zoom feature);

Further middle button presses toggles between scroll mode one and scroll mode two;

Press either left or right buttons to cancel feature and resume normal X-Y cursor operation

7. DIMENSION DRAWING



Dimensional drawing specifies factory default orientation.

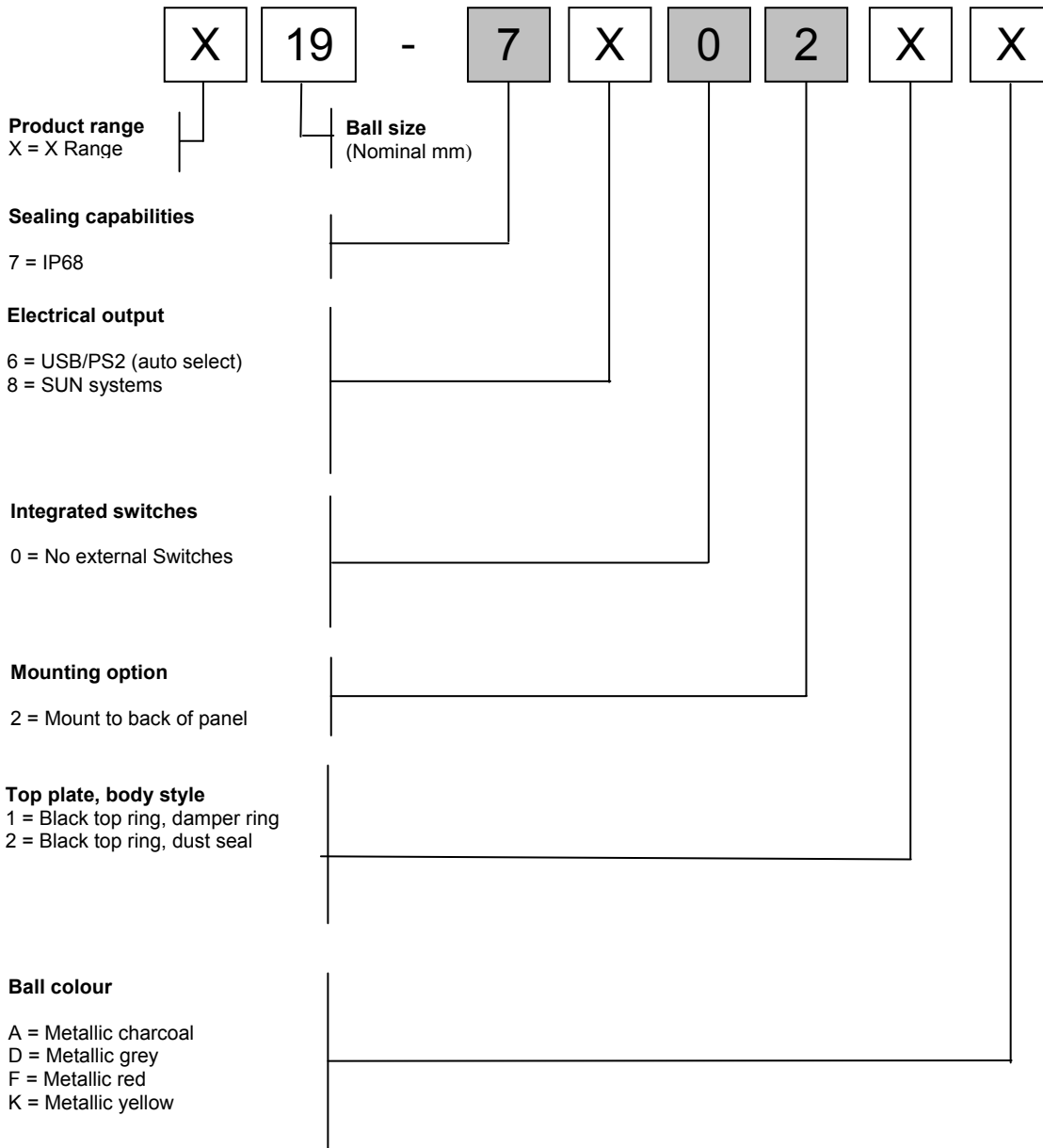
All dimensions are in mm unless otherwise stated.

Tolerances +/- 0.2mm unless otherwise stated

Please note that an IGES model is available on request. Please contact your local sales office for more information.

### 8. PRODUCT ORDERING CODE SYSTEM

Please construct your standard product ordering code by selecting the numbers and letters to suit your specification:



For further options on ball colours please contact your local sales representative

#### 8.1 Ordering Example

**X19-76021D:** X19, IP68, USB/PS/2, no switches, mount to back of panel, black top ring - damper ring, metallic grey ball.

9. ACCESSORIES

9.1 Cable Assemblies

Standard cable assemblies are available for connection to the X19 Series trackball (see table 4 below). Alternative cable assemblies can also be supplied to customer specifications (please contact your local sales office for further details).

Cable Type	Cable Part No.	Description
USB Output Cable	T9902209	Output cable, 2 metres, USB 'A' plug to 6 way JST
PS/2 Output Cable	T9902210	Output cable, 2 metres, PS/2 Male to 6 way JST
SUN output cable	T9902236	Output cable, 2 metres, 8 Pin Mini Din to 6 way JST
Switch cable	T9902125	Switch Cable, 4 way JST style to bare wires, 500mm long
Adapter	A3900126	USB to PS/2 converter for universal interface only

Table 4 Cable assemblies

Output Cable



Switch Cable



Adapter





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**10. DOCUMENT HISTORY**

Issue	Date	Author	Remarks
A	08.07.08	SdB	Document released

*Whilst the information provided herein is to the best of our knowledge true and accurate, it should be used for guidance only and may be subject to change. You are therefore advised to ensure all information provided herein is current and up to date and suitable for your application. Use of Cursor Controls Ltd products in life support systems is only permitted with prior written consent of the Company.*