

- Solid State Optical Navigation Technology
- Totally Waterproof (IP68)
- ESD Protected (Impenetrable Barrier)
- Adjustable Friction Control
- Fixed and Removable Ball Versions
- Self-draining/back flushing Models
- OEM Custom Resolutions
- Decontamination Friendly



### • SPECIFICATIONS

#### **Mechanical**

Weight	120 grams
Ball	Epoxy Resin, 38.10 mm
Tracking Force	5 grams Nominal Continuous Free Running 20 grams Nominal Continuous Friction / Scraper Ring 5 - 200 grams Nominal Continuous Variable Friction Ring/Removable Ball
Ball Load	>300N Maximum downward pressure (30 Kg) for 2 mins.
Ball Rotation	Continuous and reversible any direction
Resolvable Ball Speed	14.4 Inches/sec.
Housing Material	Polycarbonate (Lexan®LS2 lens grade)
Transducer	Optical Navigation Technology (solid state sensing)
Mounting Position	All angles (Dependant on top plate arrangement)

#### **Electrical**

Standard Output Connector	JST style, 2mm Pitch, PH series 10 way right-angled header
Mating Connector	JST style, 10 way CR, KR or KRD type connector JST part no: PHR 10
Resolution (Quadrature)	314 / 157 pulses per ball revolution, switchable (custom resolutions available)
Resolution (Protocol mode)	1256 pulses per ball revolution (custom resolutions available)
External Switch Inputs	3 switches Left, Middle, and Right. Connection through JST, 2 mm pitch, 4-way right-angled header. Mating part no: PHR 4
Supply Voltage	3.6V to 5.5V
Supply Current	110mA typical 150mA maximum

#### **Environmental**

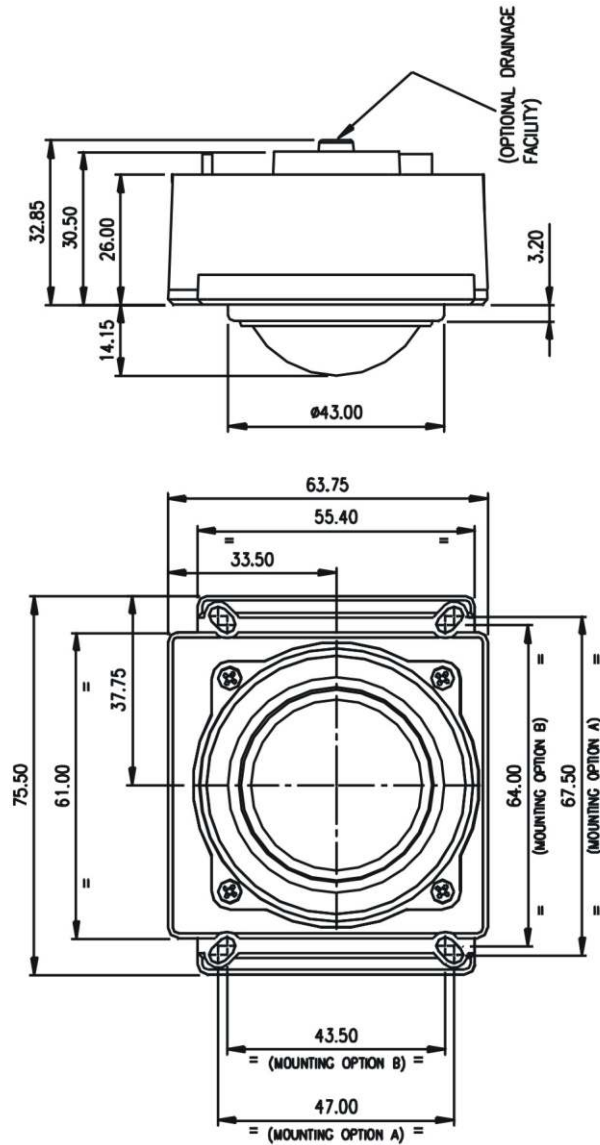
Operating Temperature	0°C to +55°C *
Storage Temperature	-25°C to + 85°C *
ESD	>15kV air discharge and 8 kV contact fully protected
Impact	10 Joules
Lifetime	> 1 million ball revolutions
Sealing Capabilities	Ip68

\* Rating of most sensitive components.

All specifications nominal at 20°C except where stated

## • DIMENSIONAL DRAWING

### Dimensions for free running and fixed friction/scrapper devices



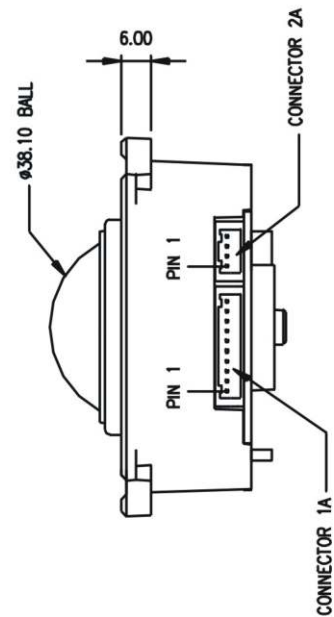
PIN	CONNECTOR 1A			CONNECTOR 2A		
	QUADRATURE OUTPUT	USB OUTPUT	PS/2 OUTPUT	SWITCH INPUTS		
1	X1 OUTPUT			LEFT SWITCH		
2	X2 OUTPUT			MIDDLE SWITCH		
3	Y1 OUTPUT			RIGHT SWITCH		
4	Y2 OUTPUT			GRD		
5	-	-	-	-		
6	-	-	-	-		
7	+5V	+5V	+5V	-		
8	-	D-	D-			
9	-	D+	D+			

**CONNECTOR TYPES:**

1A: JST TYPE RIGHT ANGLE (2 MM PITCH) PIN HEADER  
MANUFACTURERS PART No. S108-PH-SM3-TB  
MATING PART No. PHR-10

2A: JST TYPE RIGHT ANGLE (2 MM PITCH) PIN HEADER  
MANUFACTURERS PART No. S4B-PH-SM3-TB  
MATING PART No. PHR-4

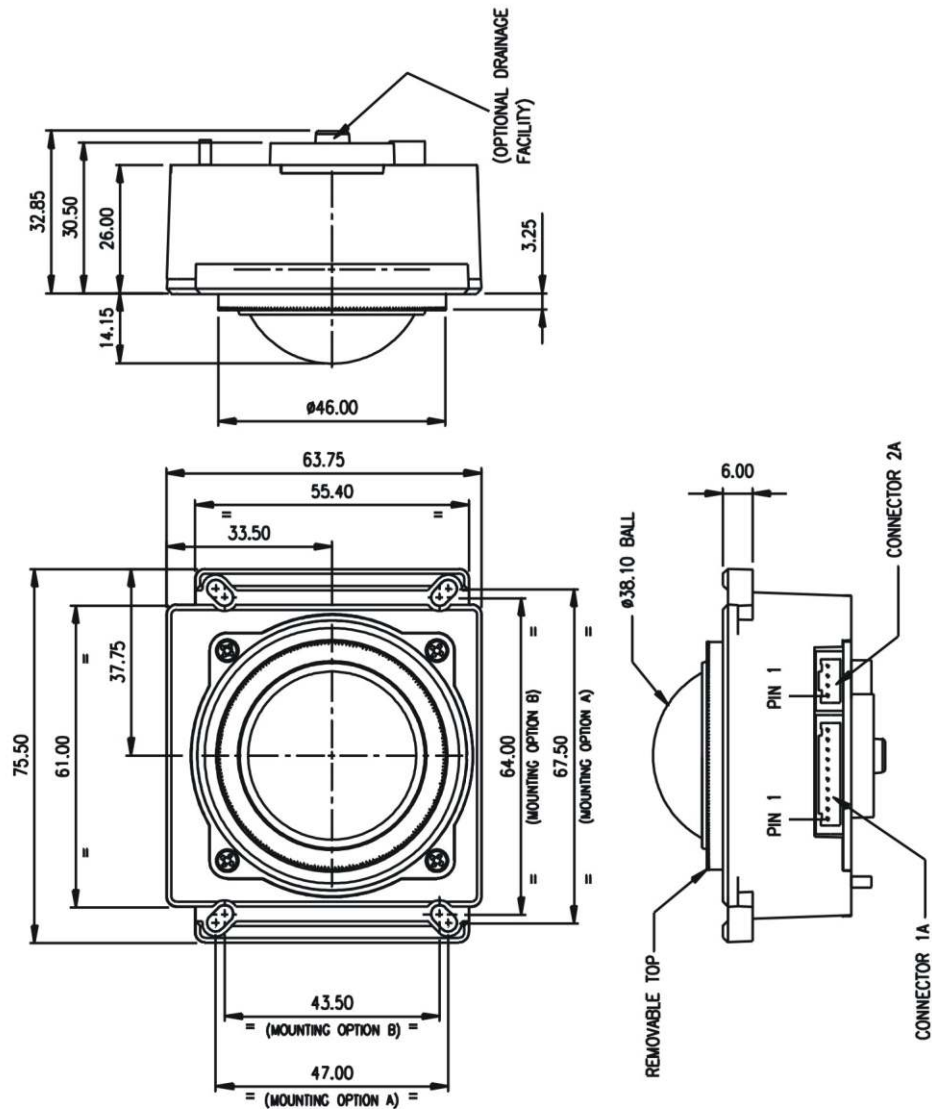
ALL DIMENSIONS IN MM UNLESS OTHERWISE STATED  
TOLERANCE  $\pm 0.2\text{MM}$



# O38 series OPTICAL TRACKBALLS

## • DIMENSIONAL DRAWING

### Dimensions for Variable Friction / Removable Ball device



#### NOTES:

1. MOUNTING OPTION A: 4 OFF HOLES Ø3.5 THRO' PROVIDING CLEARANCE ON M3 NUT RUNNER (RECOMMENDED)
2. MOUNTING OPTION B (RETROFIT): 4 OFF HOLES Ø3.5 THRO' REQUIRING 4 OFF M3 X 25MM SPACERS

#### CONNECTION DETAILS

PIN	CONNECTOR 1A		CONNECTOR 2A	
	QUADRATURE OUTPUT	USB OUTPUT	PS/2 OUTPUT	SWITCH INPUTS
1	X1 OUTPUT			LEFT SWITCH
2	X2 OUTPUT			MIDDLE SWITCH
3	Y1 OUTPUT			RIGHT SWITCH
4	Y2 OUTPUT			GND
5	-	-	-	-
6	-	-	-	-
7	+5V	+5V	+5V	-
8	-	D-	D-	-
9	-	D+	D+	-
10	GND	GND	GND	-

#### CONNECTOR TYPES:

- 1A: JST TYPE RIGHT ANGLE (2 MM PITCH) PIN HEADER  
MANUFACTURERS PART No. S10B-PH-SM3-TB  
MATING PART No. PHR-10
- 2A: JST TYPE RIGHT ANGLE (2 MM PITCH) PIN HEADER  
MANUFACTURERS PART No. S4B-PH-SM3-TB  
MATING PART No. PHR-4

ALL DIMENSIONS IN MM UNLESS OTHERWISE STATED  
TOLERANCE +/- 0.2MM

# O38 series OPTICAL TRACKBALLS

## • DIMENSIONAL DRAWING

Connections are made to the O38 series unit by means of two latching JST (or equivalent) connectors.

**Connector 1A:** - Quadrature, USB and PS/2 protocols.

**Connector 2A:** - Switch Inputs.

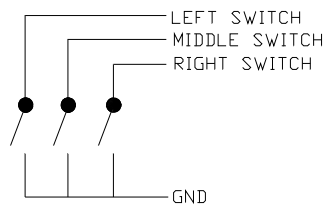
### Output Connector 1A

Pin Number	Quadrature output	USB Output	PS/2 Output
1	X1 output	-	-
2	X2 output	-	-
3	Y1 output	-	-
4	Y2 output	-	-
5	-	-	-
6	-	-	-
7	Vcc Supply	Vcc Supply	Vcc Supply
8	-	D-	PS/2 Data
9	-	D+	PS/2 Clock
10	GND	GND	GND

### External Switch Input Connector 2A

Pin number	Function
1	Left Switch
2	Middle Switch
3	Right Switch
4	GND

### Switch Schematic



## • OPTIONAL LEAD ASSEMBLIES

Standard Lead assemblies for connection to the O38 unit are available (See table 1). Other lead assemblies can also be supplied to customer specifications.

PS/2, USB		
Cursor Controls Part Number	Leads / Adapters	Description
T9902128	Output cable USB	10 way JST - USB type A, 2.2 meters long
T9902147	Output cable PS/2	10 way JST style - PS/2, 2.2 meters long
T9902125	Switch Input	4 way JST style - bare wires, 35 cm long
A3900126	Interconnection	Interconnection cable, 35 cm long

*Table1. Lead assemblies and adapters for connection to device*

# O38 series OPTICAL TRACKBALLS

## • CONFIGURATION

The 8-way dipswitch, located on the underside of the unit, provides the user with optional configuration features. These are detailed in table 2.

**Table 2: DIP Switch functionality (Universal Interface)**

Universal interface PS/2, USB			
Switch	Function	Off	On
1	Orientation 1 setting	See diagram (fig 1)	See diagram (fig 1)
2	Orientation 2 setting	See diagram (fig 1)	See diagram (fig 1)
3	VX3 - Virtual 3 axis	Feature Enabled	Feature Disabled
4	function	Feature Enabled	Feature Disabled
5	Ballistic Mode	Feature Disabled	Feature Enabled
6, 7, 8	Inverted Y	Default	

Factory default setting: Switches 1,2, and 3 ON

**Table 3: DIP Switch functionality (Phase Quadrature)**

Phase Quadrature			
Switch	Function	Off	On
1	Orientation 1 setting	See diagram (fig 1)	See diagram (fig 1)
2	Orientation 2 setting	See diagram (fig 1)	See diagram (fig 1)
3	N/A	Default	
4	Resolution	314 pulses per revolution	157 pulses per revolution
5	Inverted Y	Feature Disabled	Feature Enabled
6, 7, 8	N/A	Default	

Factory default setting: Switches 1 and 2 ON

### Switches 1 and 2: Orientation settings

Switches 1 and 2 allow four possible mounting orientations for the Trackerball (See figure.1)

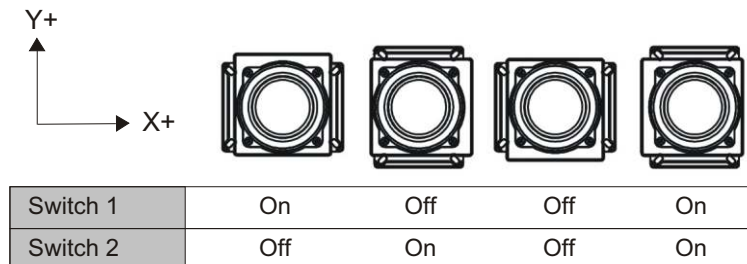


Figure.1 Mounting Orientations

### Switch 3

**VX3:** is a patent protected facility that provides the same 2 modes of function as a scroll wheel on a 3-axis mouse. This feature is disabled by default and must be enabled by setting dip switch 3 before use.

#### 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 operation.

### Switch 4

**Ballistic Mode:** Simulates cursor acceleration under fast ball movement. (Enabled by default)

### Switch 5

**Inverted Y:** Y-axis is inverted for overhead operation.

### Switch 6, 7 & 8

Switch functions not used.