

# 050 Series OPTICAL TRACKBALLS

## IP68 Sealing

USB, PS/2 and Quadrature Outputs

- 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	210 grams
Ball	Epoxy Resin, 50.8 mm
Tracking Force	10 grams Nominal Continuous Free Running 80 grams Nominal Continuous Friction / Scraper Ring 10 - 160 grams Nominal Continuous Variable Friction Ring/Removable Ball
Ball Load	>500N Maximum downward pressure (50 Kg) for 2 mins
Ball Rotation	Continuous and reversible any direction
Resolvable Ball Speed	14.4 IPS (2.3 Ball Revolutions per Second)
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 contact fully protected
Impact	> 20 Joules
Lifetime	> 1 million ball revolutions
Sealing Capabilities	Ip68 (tested submerged at 2m depth for 24 hours)

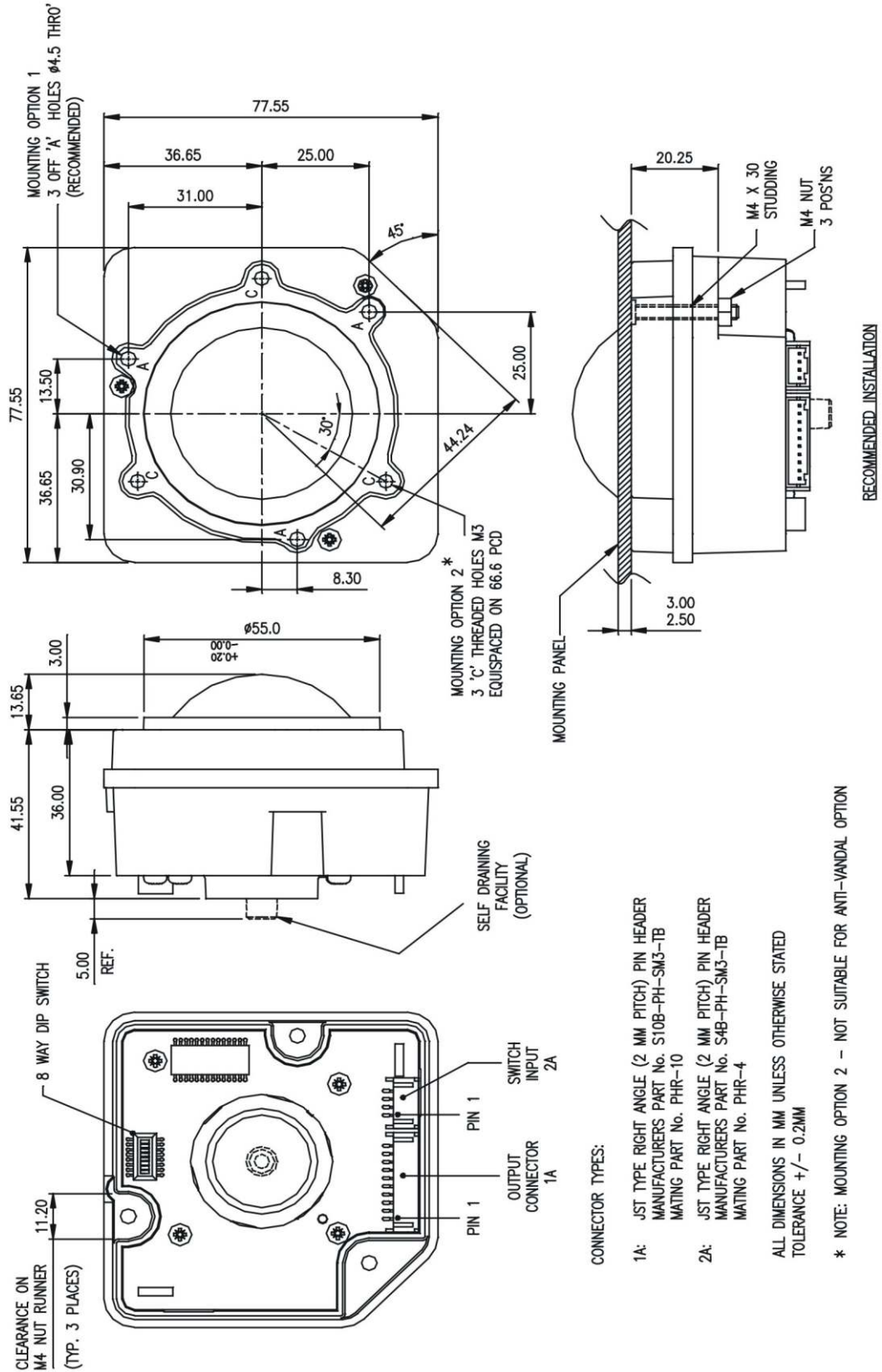
\* Rating of most sensitive components.

All specifications nominal at 20°C except where stated

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## • DIMENSIONAL DRAWING

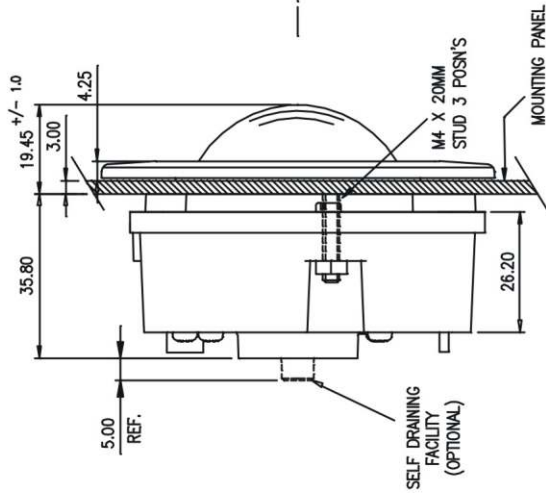
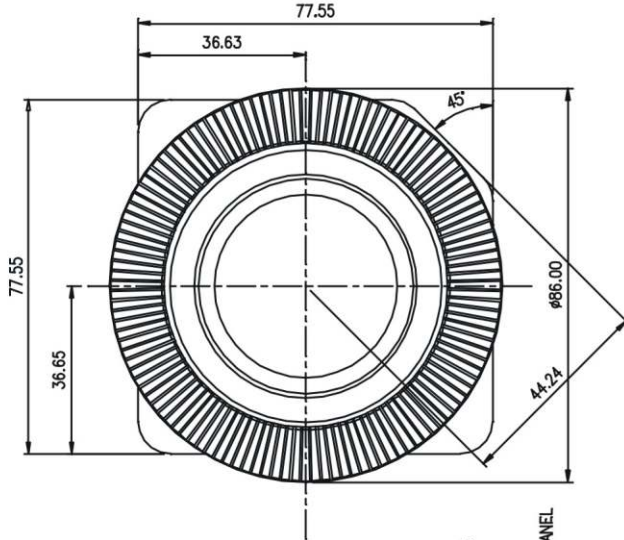
Dimensions for free running and fixed friction/scrapper devices



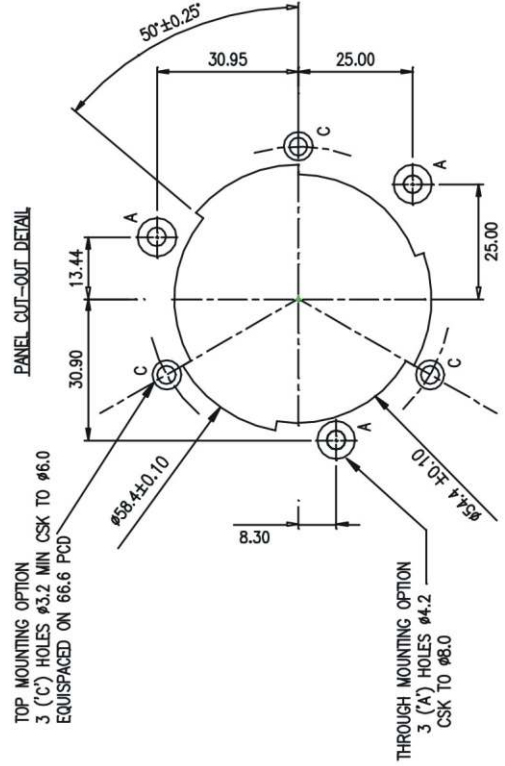
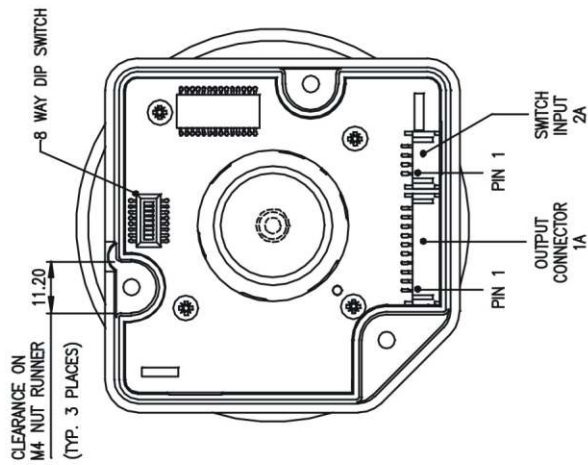
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## • DIMENSIONAL DRAWING

### Dimensions for Variable Friction / Removable Ball device



RECOMMENDED INSTALLATION



#### HEADER 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 +/- 0.1MM

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## • EXTERNAL CONNECTION DETAILS

Connections are made to the O50 series unit by means of two latching JST (or equivalent) connectors.

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

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

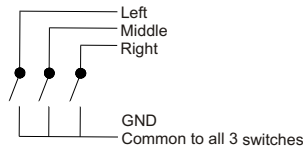
### Output Connector 1A

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

### Switch Input Connector 2A

Pin number	Universal interface
1	Left Switch (Sw1)
2	Middle Switch (Sw2)
3	Right Switch (Sw3)
4	GND

\* Each switch has one common line to GND (ground)



## • OPTIONAL LEAD ASSEMBLIES

Standard Lead assemblies for connection to the O50 unit are available (See table 1). Other lead assemblies can also be supplied to customer specifications.

PS/2, USB		
Part Number	Leads / Adapters	Description
OC5010160	Output cable USB	10 way JST - USB type A, 1,6 meters long
OC6010160	Output cable PS/2	10 way JST style - PS/2, 1,6 meters long
IC040035	Switch Input	4 way JST style - bare wires, 35 cm long
IC101035	Interconnection	Interconnection cable, 35 cm long

Table1. Lead assemblies and adapters for connection to device

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## • 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 function	Feature Enabled	Feature Disabled
4	Ballistic Mode	Feature Enabled	Feature Disabled
5	Inverted Y	Feature Disabled	Feature Enabled
6, 7, 8	N/A	Default	

Factory default setting: Switches 1,2, and 3 ON, all other switches OFF

**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, all other switches OFF

### Switches 1 and 2: Orientation settings

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



Switch 1	On	Off	Off	On
Switch 2	Off	On	Off	On

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.

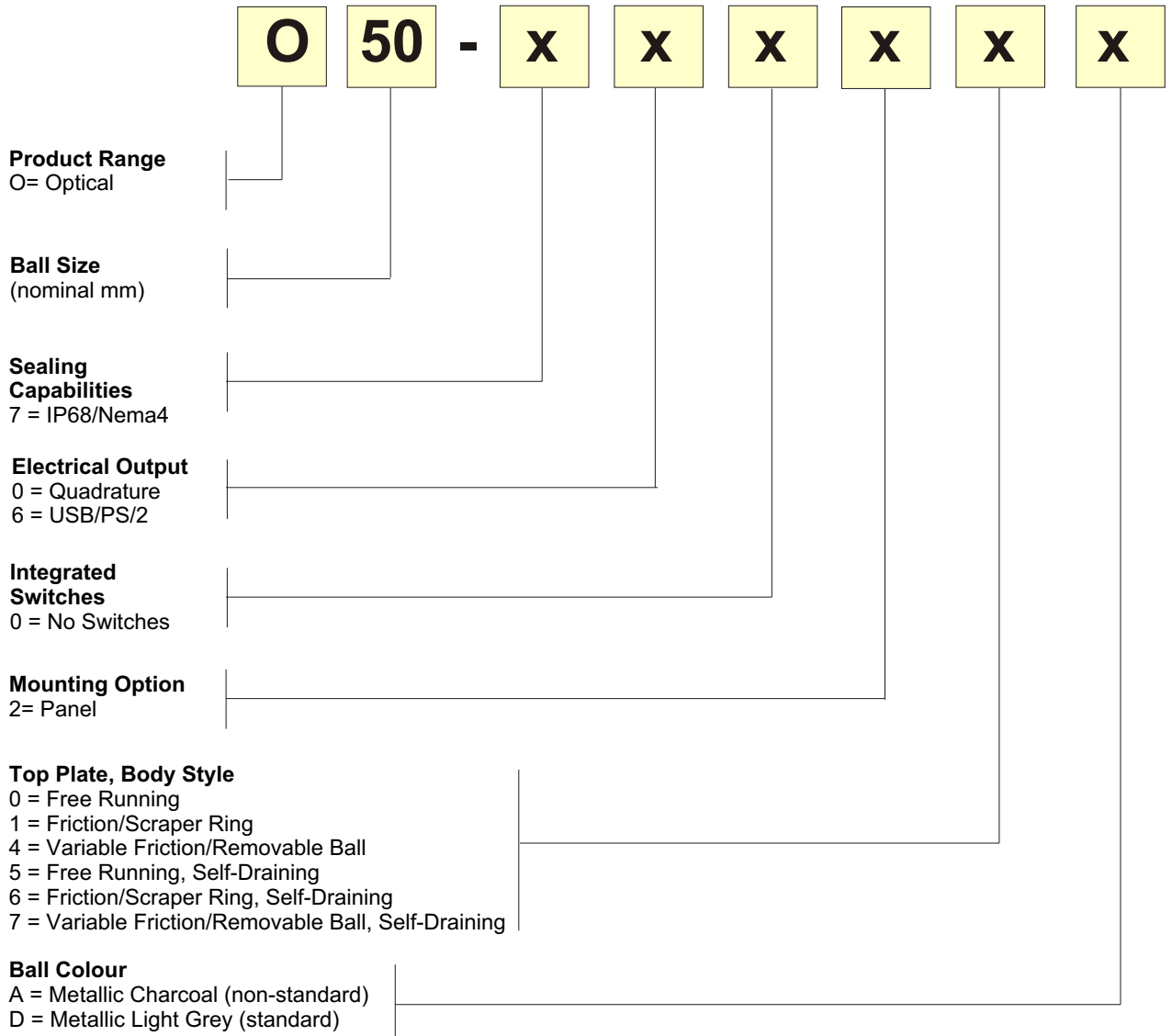
### Switch 6, 7 & 8

Switch functions not used.

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## • STANDARD PRODUCT OPTIONS

Product Ordering Code **O50 XXXXXX**. Please construct your standard product ordering code by selecting the numbers and letters to suit your specification.



Ordering Example **O50-70020D** :

Optical 50mm, IP68, phase quadrature only, no switches, panel mounted, free running, metallic light grey ball.

## • OPTIONAL EXTRAS

- Anti-Vandal Option.
- Self-Draining Facility
- Optional Ball Colours (MOQ applies)
- Customer Specific Colour Matching (MOQ applies)
- Lead Assemblies

Contact your local distributor for further details on product variants and custom specifications.



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