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

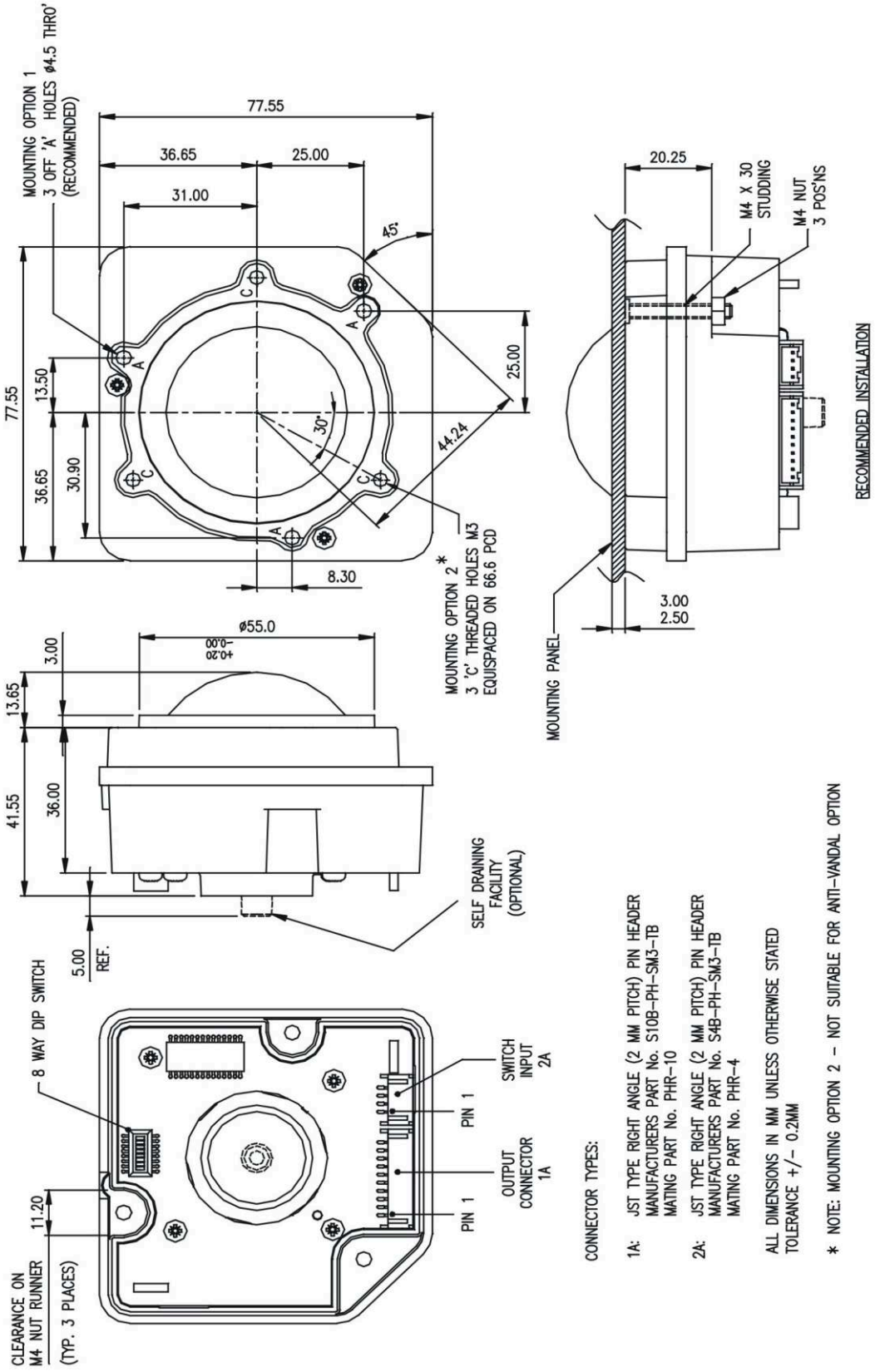
Standard Output Connector	JST style 2mm Pitch PH series 10 way right-angled header
Mating Connector	JST style 10 way CR, KR or KRD type connector JST part no: PHR 10
Resolution (Quadrature)	314 / 157 pulses per ball revolution, switchable (custom resolutions available)
Resolution (Protocol mode)	1256 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 +60°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)

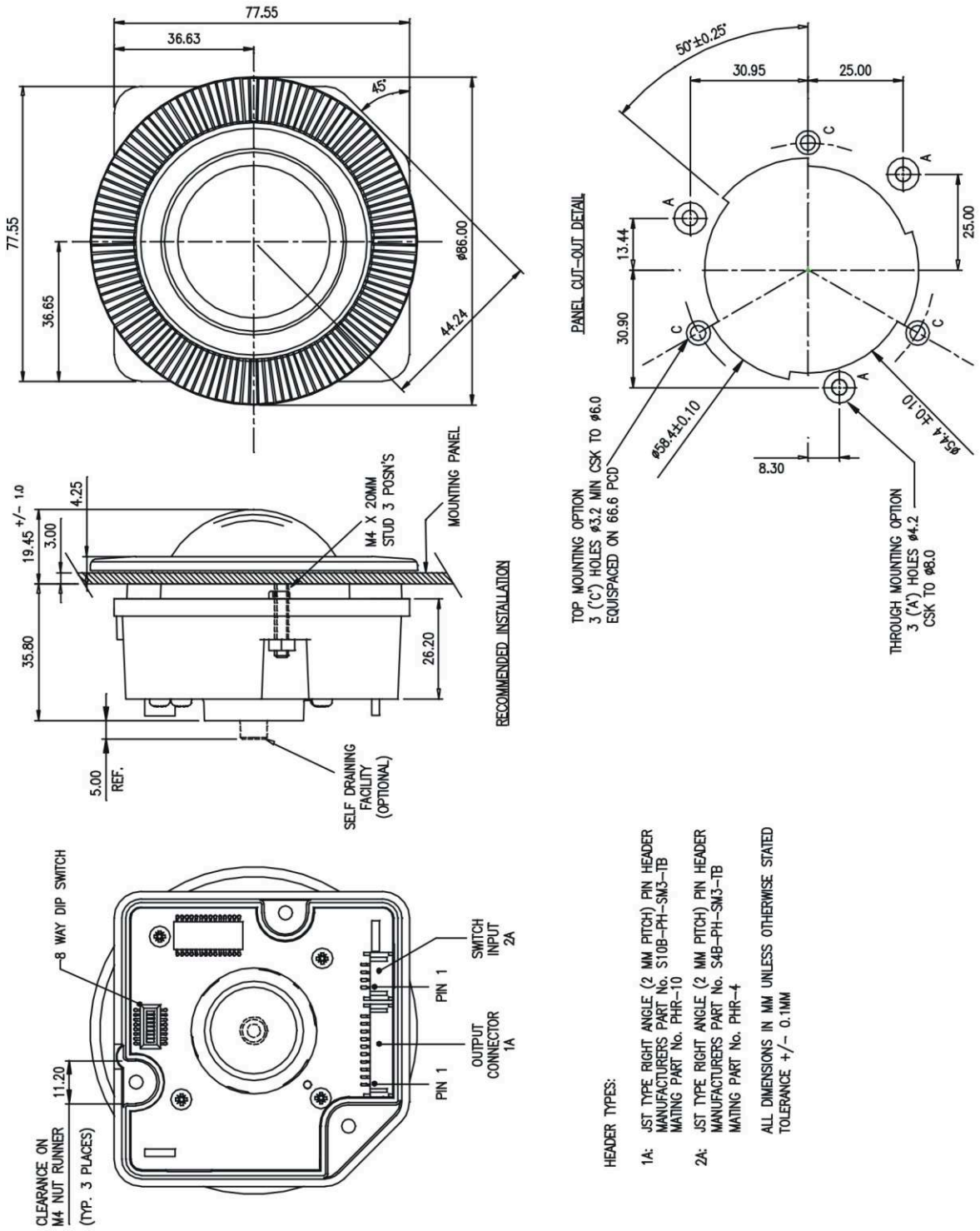
• DIMENSIONAL DRAWING

Dimensions for free running and fixed friction/scraper devices



• DIMENSIONAL DRAWING

Dimensions for Variable Friction / Removable Ball device



• 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.

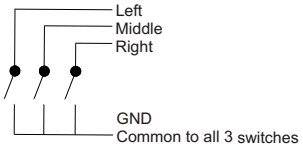
Output Connector 1A

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

• 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. 3rd 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.

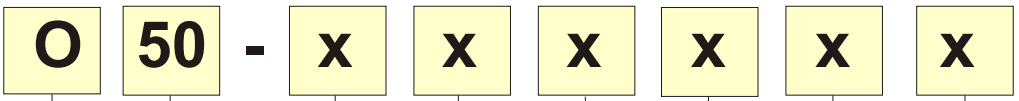
Switch 6, 7 & 8

Switch functions not used.

050 series OPTICAL TRACKBALLS

• 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.



Product Range
O= Optical

Ball Size
(nominal mm)

Sealing Capabilities
7 = IP68/Nema4

Electrical Output
0 = Quadrature
6 = USB/PS/2

Integrated Switches
0 = No Switches

Mounting Option
2= Panel

Top Plate, Body Style
0 = Free Running
1 = Friction/Scraper Ring
4 = Variable Friction/Removable Ball
5 = Free Running, Self-Draining
6 = Friction/Scraper Ring, Self-Draining
7 = Variable Friction/Removable Ball, Self-Draining

Ball Colour
A = Metallic Charcoal (non-standard)
D = Metallic Light Grey (standard)

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.

Cursor Controls

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