# Panel-J™ USB/PS2 Joystick

## DESCRIPTION

The Panel J Joystick is especially suitable for use in aggressive environments where high levels of airborne and process contaminants (dust, saline solutions, liquids, lubricants etc) would render other pointing/input devices inoperable; and also in clean rooms and medical applications where extensive use of cleaning solutions make other pointing/input devices unviable.

With industry standard fixing centres via four welded studs, Panel J is designed for direct fascia-mounting (or retro-fitting) into panels used in industrial process control, food processing, mining/quarrying, marine, medical and similar applications.

Mounted in a brushed stainless steel fascia plate with three stainless steel buttons the inductive sensing, contactless joystick provides self-centering, omni-directional functionality and has been specifically designed to give the lowest possible sub-panel profile.

Panel J has an IP65 (NEMA 4) rating and combines PS/2 and USB formats (protocols) into a single unit, allowing for direct connection to a host computer.

Three stainless steel buttons are provided which are normally configured for left, middle and right operation. Any button may be configured for latching operations and, on request, the buttons may be wired in any order. A facility is also provided to connect a scroll wheel, similar to that on a 'wheel mouse', giving pan, zoom and scroll features in numerous software packages.

Each unit is shipped with a 2 metre cable according to the part numbering system on Page 7. Other cables are available as accessories.

*Model shown: J538BB13P*

## FEATURES

- Self-centering, omni-directional joystick.
- Low sub-panel profile.
- Attractive and rugged brushed stainless steel fascia plate.
- Three rugged stainless steel buttons.
- IP65 (NEMA 4) sealing.
- PS/2 and USB outputs for direct connection to a computer.

## APPLICATIONS

- Industrial process control.
- Food processing.
- Mining/quarrying/paper milling.
- Marine.
- Medical.
- Any aggressive environment.

## CONFIGURATION

The PanelJ boasts many features which may be selected using an 8-way DIP Switch located on the circuit board. Table 1 shows the function of each switch, and the remainder of this section describes each feature in detail:

| Sw | Function | Off | On |
|---|---|---|---|
| 1 | Orientation 1 | See Table 2 | See Table 2 |
| 2 | Orientation 2 | See Table 2 | See Table 2 |
| 3 | Left Button Latch | Off | On |
| 4 | Middle Button Latch | Off | On |
| 5 | Right Button Latch | Off | On |
| 6 | Latch Mode | Immediate | Delayed |
| 7 | Protocol 1 | PS2/USB auto | Fixed PS2 |
| 8 | No Function | - | - |

*Table 1: DIP Switch functionality*

### *Protocol*

For USB or PS/2 operation, the unit should be configured with DIP7 set to 'off'. The unit then automatically recognises the connection format when power is first applied. This auto-detection works even if the unit is hot-plugged into the host computer.

In certain systems such as Thin-Clients, it may be necessary to manually switch the unit into PS/2 mode by setting DIP7 on.

Note that quadrature outputs (X1, X2, Y1, Y2) are available simultaneously with whichever output protocol has been selected.

DIP7 is read by the on-board microprocessor only at power-up. Ensure that this switch is set appropriately before applying power. All other switches are continuously scanned.

### *Orientation*

The purpose of the orientation DIP Switch settings is to allow the unit to be mounted in one of four positions to suit the application. In particular, the positioning of the buttons can be selected to suit the layout of the customer's panel.

Table 2 gives full details of the DIP Switch settings and which quadrant the unit should be oriented in to give correct operation.

| Orientation2 (DIP Sw 2) | Orientation 1 (DIP Sw 1) | Unit orientation (when viewed from top- refers to main output connector) |
|---|---|---|
| Off | Off | Connector at 6 o'clock |
| Off | On | Connector at 9 o'clock |
| On | Off | Connector at 12 o'clock |
| On | On | Connector at 3 o'clock |

*Table 2: Orientation functionality*

### *Buttons*

Three buttons are provided on the PanelJ and in standard products these are deployed as left, middle and right click. A further two inputs are provided to allow buttons 4 and 5 to be connected externally, if required.

Latest Microsoft operating systems support these features, but please contact us if you have difficulties, or refer to AN0006.

All button inputs are pulled to +5V by approximately 7kΩ.

### *Button Latches*

A number of DIP Switches are allocated to the button latch features to afford the user maximum flexibility. The left, middle and right buttons may be individually programmed to exhibit latching functionality- see DIP Switches 3, 4 and 5 in Table 1. Note that buttons 4 and 5 may not be programmed to latch.

DIP Switch 6 selects the latch mode. With this switch 'off', a button will latch as soon as it is pressed and with the switch 'on', a button will latch if it is held down for 0.8 seconds. For example, if DIP Switches 3, 4 and 6 were on, this would set the left and middle buttons to delayed latching mode and the right button to momentary mode.

The unit may also be configured to give a '*draglock*' function where a single press of the middle button latches the left button. This is achieved by setting DIP Switches 3, 4 and 5 'off' and DIP Switch 6 'on'.

Regardless of the latch mode, a latch condition may be cancelled by pressing *any* button momentarily.

## WHEEL FEATURE (Z-AXIS)

A wheel may be connected to the unit to allow for 'pan', 'scroll' and 'zoom' features. Functionality of the wheel is identical to that on a 'wheel mouse'.

The Z-axis return is not simply connected to 0V. It is most important to use the Z-axis return signal and not ground since otherwise the USB suspend mode current limit may be violated.

Both Z-axis inputs are pulled to +5V by 100kΩ and are passed through Schmitt triggers on the main circuit board.

## TEST MODE

All Pretorian Technologies products support a Test Mode. This allows our comprehensive in-house test facilities to exhaustively test units prior to shipment.

To facilitate testing, a Test pin is provided on all connector options. No connection should be made to this pin. This is reserved for factory test purposes only.

## CONNECTION DETAILS

***JST Connector Option 'A'.***

- J1 is the output connector for Analog outputs and USB and PS/2 protocols (10-way).
- J2 is the button and scroll wheel (Z-axis) connector (10-way).
- All connectors are JST right-angled type-PH headers with 2mm pitch. Mating connectors are PH, CR or KR types.

| Pin | J1 Function | J2 Function |
|---|---|---|
| 1 | X Analog | Z-axis power (5V) |
| 2 | Y Analog | Z1 input |
| 3 | Ref Analog (2.5V) | Z2 input |
| 4 | N.C. | Z-axis return |
| 5 | DRAIN | Button 5 |
| 6 | TEST | Button 4 |
| 7 | +5V | Button 1 (L) |
| 8 | D-/DATA | Button 2 (M) |
| 9 | D+/CLK | Button 3 (R) |
| 10 | 0V | 0V |

*Table 3: Connector details- JST connector option 'A'.*

Although the PanelJ is shipped with a lead assembly, alternative lead assemblies are available separately from Pretorian Technologies Ltd. Please contact your local sales office.

## COMPATIBILITY

The PanelJ range has been tested for compatibility with the following operating systems. Refer to AN0003 and AN0008 for further details.

Windows – all versions up to and including Windows 7.
Redhat Linux
Apple MacOS
Sun Sparc
Passes USB 1.1 Chapter 9 and HIDview

## SPECIFICATIONS

### *Mechanical*

| | |
|---|---|
| Weight | 320 grams |
| Joystick dimensions | 65mm above panel, 18mm diameter knob |
| Fascia material | Brushed stainless steel 316 |
| Mounting torque (M4 bolt, washer and nut, 3 locations) | 40 Ncm |

### *Electrical*

| | |
|---|---|
| Supply voltage | 5.0V dc ±10% |
| Switch debounce | 30ms rising and falling |
| Supply current | 35mA maximum |
| Button pullup resistors | 7kΩ nominal |
| Z1, Z2 pullup resistors | 100kΩ nominal. |
| Maximum voltage connected to button and Z1, Z2 inputs | 5.5V dc |
| Minimum voltage connected to button and Z1, Z2 inputs | -0.7V dc |
| Minimum output high voltage Data, Clk | 4.5V |
| Maximum output low voltage Data, Clk | 0.8V |

### *Buttons*

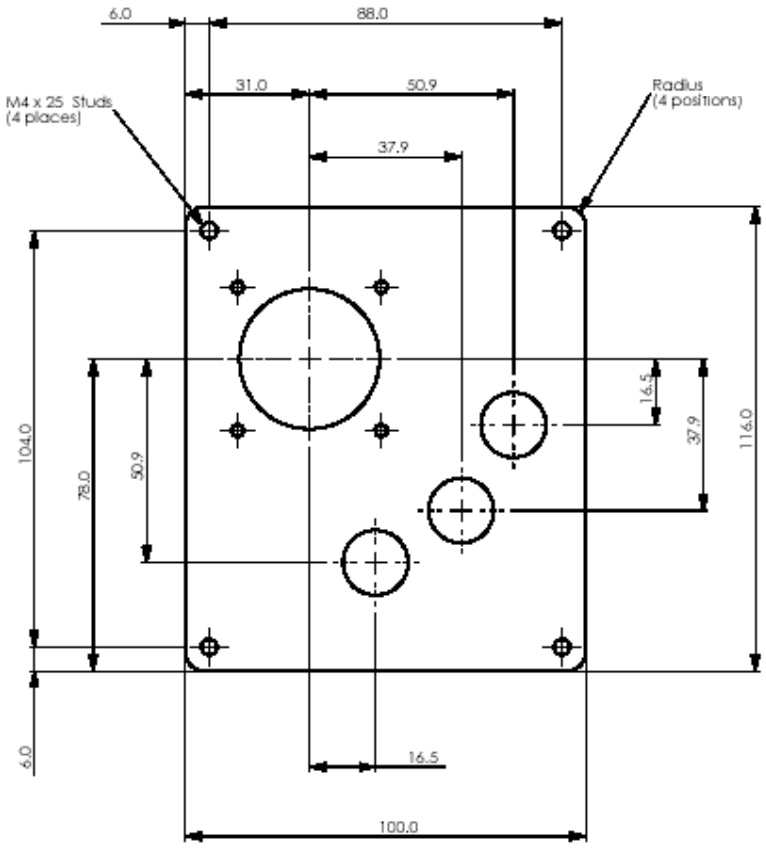
| | |
|---|---|
| Type | 16mm anti-vandal |
| Body Material | Nickel plated brass and PBT |
| Operating temperature | -20°C to +55°C |
| Switch rating | 200mA at 48V dc |
| Switch life | 1 000 000 cycles |

### *Environmental*

| | |
|---|---|
| Storage temperature | -25°C to +85°C |
| Operating temperature | 0°C to +70°C |
| Humidity | 95% rh, non-condensing, maximum |

## MOUNTING DETAILS (FROM REAR OF PANEL)

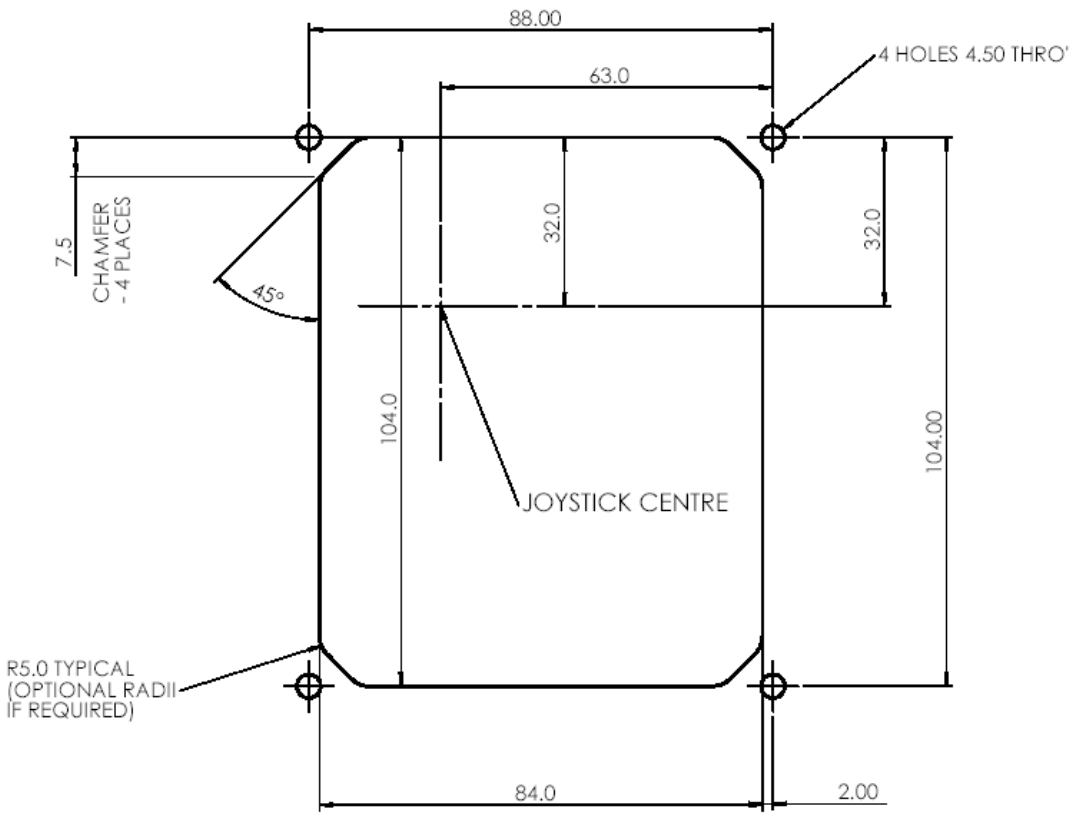
Note that an *IGES* model of this unit is available on request. This model contains only the outer detail but is sufficient to allow the model to be incorporated into a 3D model of the target equipment to ensure correct fitting.



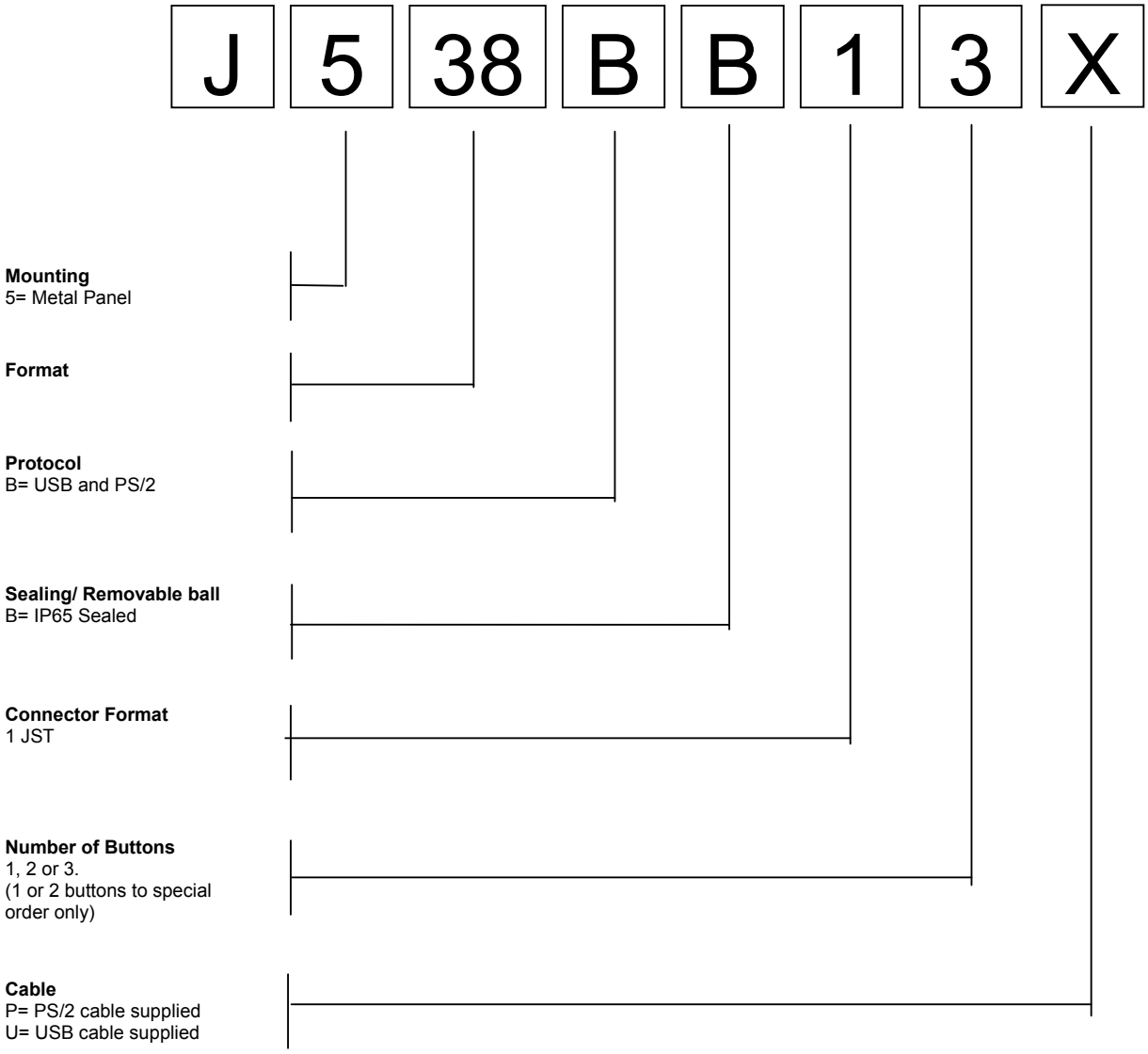

View on rear of panel
showing position of fixing studs

Panel thickness is 2mm
Grain direction is north-south

## SUGGESTED PANEL CUT-OUT DETAILS



## ORDERING INFORMATION




## OPTIONAL EXTRAS

2m Lead assembly USB (order code X199003)
Adaptor plug USB → PS2 (order code X199006)
0.5m Lead assembly buttons (order code X199012)
0.5m Lead assembly buttons/wheel (order code X199007)