



# JOYSTICK CONTROLLERS

FINGER OPERATED

# INNOVATION IN MOTION

The Penny+Giles range of finger operated joystick controllers have been developed for the smooth, precise control of critical functions in a variety of industrial applications where a Human-Machine Interface (HMI) is required. Available in one, two or three axis configurations, the finger operated range has a choice of six different models, with ergonomic handle styles to enable superb proportional control. Each model has a range of selectable options for the most comprehensive matching of the joystick to your application.

## Features

- Potentiometric or Hall effect sensing
  - Single and multi-axis control
    - Low profile handles
- Most models protected to IP65 minimum above the panel
  - Choice of outputs and switches
- Choice of handles with additional functions
  - Standard connectors

## Benefits

- Long life and maintenance-free operation
- Suited to a range of control functions
- Unintentional operation reduced
- Operation in demanding environments
- Enables user configuration for system safety
- Increased operator control
- Simple, error free installation



## Ergonomic handles

This range has been developed with operator comfort in mind. By reducing the mental and physical effort required to operate your equipment, Penny+Giles joysticks can help to increase your productivity. The small single axis rockers and controllers require

minimal effort to move the handles, which are styled to fit comfortably with finger and thumb operation. The multi-axis controllers have a choice of handle styles that allow you to select additional functionality for operator controls, with push button switches for 'Person present' detection, or a third axis of proportional control. In addition, the JC400 model can be specified with a choice of three lever forces.

## Selection Guide

Penny+Giles offers the widest choice of options to suit your application.



JC025 Page 6

- Single axis rocker
- Compact, low profile with a choice of rocker styles and outputs

JC030 Page 6

- Single axis rocker
- Compact, low profile with a choice of outputs



### EMC Directive 89/336/EEC

The products detailed in this document are supplied as components for installation into an electrical apparatus or system. They are outside the scope of the EEC directive and will not be CE marked.



### Quality Assurance

Penny+Giles are accredited to BS EN ISO9001:2000

Quality is at the heart of all our systems ensuring the reliability of our products from initial design to final despatch.

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### Innovative design

The Penny+Giles joystick range are displacement joysticks that provide electrical signals in direct proportion to the movement of the lever. Two different types of sensing technology are utilised in the finger operated controller range.

The JC025, JC030, JC100, JC120 and JC400 models use long life potentiometer tracks with directional/center switching, and the JC2000 model uses non-contact Hall effect sensors.

### Potentiometric sensing

Designed to interface with an electronic controller, the long-life potentiometer tracks generate analogue outputs with switched reference signals that are proportional to the distance and direction over which the handle (or rocker) is moved. The analogue output can be factory configured to provide signals for fault detection circuits and a center tap provides an accurate voltage reference for the center position or a zero point for a bipolar supply voltage. An electrically independent switch operates with separate contacts each side of the joystick center position, in each available axis.

The key advantages of this technology are its linear output and the versatility it derives from its simplicity; it consists of a carbon-based potentiometer track with no complex circuitry or electronics, so it is not susceptible to electromagnetic interference or magnetic fields. However, as a contacting device it does have a long, but finite, life and due consideration should be given to applications subject to high intensity use or where high dither or vibration may be encountered.

### Hall effect sensing

The JC2000 model uses non-contact Hall effect sensors to provide one, two or three axes of precision fingertip control, with dual independent outputs in the single and dual axis models for built-in redundancy and increased reliability. The key advantage of using Hall effect sensors is that they offer very long life because they have no contacting parts. They allow a very compact under-panel depth - as much as half the space of comparable potentiometer designs. Hall effect joysticks are more sensitive to electromagnetic interference, but this has been minimised by using appropriate shielding and robust circuit design for all but the most demanding environments.



**JC100** Page 8

- Single axis joystick
- Low profile lever with a choice of outputs



**JC120** Page 10

- Single axis joystick
- Lower profile lever with a choice of heights, outputs and protective boot
- Narrow width



**JC400 Analogue** Page 12  
**JC400 Digital** Page 15

- Multi axis joystick
- Compact, minimal size with a wide range of mechanical and electrical options



**JC2000** Page 22

- Multi axis contactless joystick
- Compact, minimal under-panel depth with a wide range of mechanical and electrical options

# JOYSTICK CONTROLLERS

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### **Total reliability**

By using design innovation, careful materials selection and extensive real-life applications knowledge, Penny+Giles engineers have developed a range of joystick controllers that require no maintenance throughout an expected working life of greater than five million operations (fifteen million operations for the JC2000). We also fit standard electronic connectors to the majority of our joysticks to help reduce both your installation time and the potential for wiring errors during your manufacturing process.

### **Safety**

Joysticks fitted with the long-life potentiometer tracks can have additional resistors connected in series with the main resistive element to limit the output signals to 10-90% or 25-75%. This can be used as part of your systems comparison and error detection routine, where an out of range signal could indicate a wiring fault. Additional independent switch functions are provided for directional and center position indication - vital for system start-up safety. The JC2000 model uses Hall effect sensors and is supplied with dual independent outputs fitted as standard on the single and dual axis versions. The signals can be monitored and compared for failure detection in safety critical applications. See page 26 for application and usage notes on this model.



### **Custom design**

Penny+Giles offer an extensive range of finger operated joysticks in standard modular configurations, designed to meet the majority of individual customer needs, but we can customise our designs for OEMs who require something more specialised to their application. Please talk to our technical sales team about your requirements.

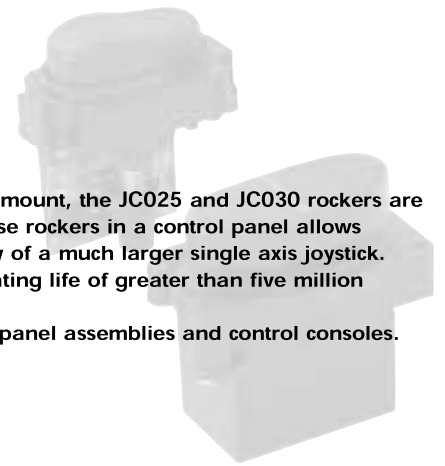
### **Cell manufactured**

The modular design of the finger operated joystick range is intended to provide the user with the widest possible choice of standard options, but allows efficient build and despatch by using cellular manufacturing principles. Contact your nearest sales office for the latest information on availability of these joysticks.



# JC025 AND JC030

## SINGLE AXIS ROCKER



Developed for applications where compact size and minimal above panel height is paramount, the JC025 and JC030 rockers are very low profile whilst still providing precise fingertip control in one axis. The use of these rockers in a control panel allows designers to develop very low profile assemblies whilst still maintaining the functionality of a much larger single axis joystick. These rockers have been designed for maintenance-free operation throughout an operating life of greater than five million operations.

Typical applications include remote control chest packs, pendant controllers, low profile panel assemblies and control consoles.

### PERFORMANCE MECHANICAL

<b>Breakout force</b>	<b>N</b>	5*
<b>Operating force</b>	<b>N</b>	15* Full deflection
<b>Maximum allowable force</b>	<b>N</b>	50* Full deflection
<b>Rocker operating angle</b>	°	±10
<b>Rocker action</b>		Self centering
<b>Expected life (operations)</b>		>5 million
<b>Weight</b>	<b>g</b>	30

\*14mm radius from center

### ENVIRONMENTAL

<b>Operating temperature</b>	°C	-25 to +70
<b>Storage temperature</b>	°C	-40 to +80
<b>Environmental protection</b>		
<b>JC025</b>		IP65 (when correctly panel sealed) IEC 60529
<b>JC030</b>		IP60 (when correctly panel sealed) IEC 60529

Units supplied with O ring seal

### ELECTRICAL

#### Analogue Track

<b>Resolution</b>		Virtually infinite
<b>Track resistance (±20%)</b>	<b>kΩ</b>	1.8, 2, 2.9 or 5
<b>Track electrical angle</b>	°	±9
<b>Output voltage range</b>	<b>%</b>	0-100, 10-90 or 25-75 of input (±2%)
<b>Center tap voltage (no load)</b>	<b>%</b>	48 - 52 of applied voltage
<b>Center tap angle</b>	°	1.5 either side of center
<b>Supply voltage - maximum</b>	<b>Vdc</b>	22
<b>Wiper circuit impedance</b>	<b>MΩ</b>	Greater than 0.1**
<b>Power dissipation @ 25°C</b>	<b>W</b>	0.25 (no load)

\*\* The long life resistive elements require a high impedance load in the wiper circuit to minimise the current flowing through the wiper for optimum conditions

#### Switch -

#### Directional or Center Off

<b>Switch operating angle</b>	°	2.5 either side of center
<b>Supply voltage - maximum</b>	<b>Vdc</b>	35
<b>Load current - maximum</b>	<b>mA</b>	5 resistive (or 200 with reduced switch life of 1 million operations)

### ORDERING CODES

JC025 - .... - .... - BLK

Track resistance

<b>N</b>	= 1.8k	0-100%
<b>E</b>	= 5k	0-100%
<b>R</b>	= 2k	10-90%
<b>Q</b>	= 2.9k	25-75%

Rocker profile

<b>STD</b>	= standard
<b>V00</b>	= V profile

## JC030 - .... - V00 - BLK

Track resistance

**N** = 1.8k 0-100%

**E** = 5k 0-100%

**R** = 2k 10-90%

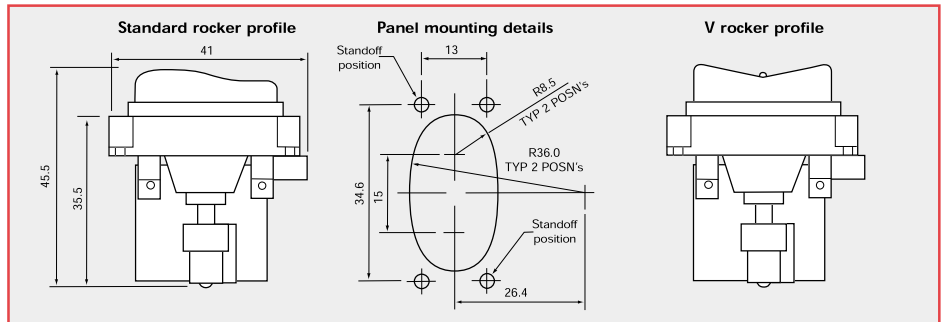
**Q** = 2.9k 25-75%

No option on rocker profile for JC030

## DIMENSIONS AND MOUNTING OPTIONS

### JC025

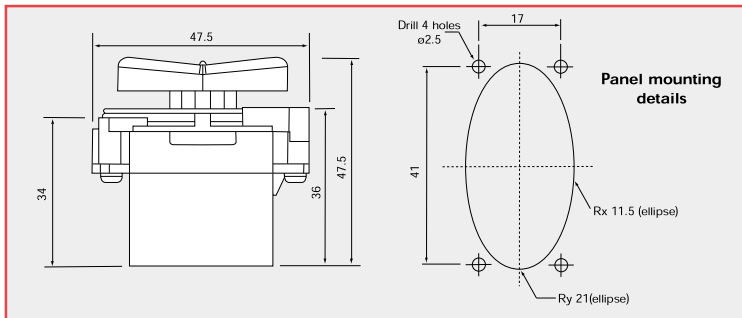
It is recommended that the JC025 is fitted from the back of the mounting panel using four M3 x 6mm female, self-clinching stand-offs (e.g. PEM ref. CSS M3-6) fitted to the back of the panel at opposite positions. The stand-offs are used in conjunction with four M3 x 6mm pan head screws. The panel cut-out and centers for the stand-offs are as shown in the panel mounting detail below.



The recommended panel thickness is 3mm. The O ring supplied must be used to seal the JC025 rocker assembly to the mounting panel to enable IP65 protection.

### JC030 - V profile only

It is recommended that the JC030 is fitted from the back of the mounting panel using four thread forming screws (supplied). Tighten the screws until initial contact with the body occurs ensuring body/flange relationship is square and flat. Continue tightening in 1/4 turn increments until a torque of 0.1 - 0.15Nm is achieved. The panel cut-out and centers are as shown below.



The recommended panel thickness is 3mm. The O ring supplied must be used to seal the JC030 rocker assembly to the mounting panel to enable IP60 protection. Supplied with 4 x panhead Pozidrive self tapping screws for mounting to panel.

Penny+Giles has designed the JC030 to meet IP60 rating, but it is the final responsibility of the customer to approve the product in it's application.

## ELECTRICAL CONNECTIONS

PTFE insulated 7/0.120 (28AWG) flying leads, 300mm long

### Description

Positive voltage supply

Center tap

Negative or zero voltage supply

Output voltage signal

N/O switch, rocker backward

N/O switch, rocker forward

Common terminal for switch

### Wire color

Pink/Grey

Yellow/Red

White/Red

Pink

Green

Blue/Orange

Black