



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.



JC120

SINGLE AXIS JOYSTICK

Developed for applications where ergonomics and system integrity are paramount, the JC120 is a minimum width, low profile joystick that provides smooth, precise fingertip control in one axis with a choice of two lever lengths. The JC120 is sealed to IP66 to enable it to operate in extreme environments. Standing only 54 or 64mm high, the JC120 is less susceptible to unintentional operation. With all of the components contained within the handle, it is ideal for mounting in low profile panels and arm rests. Installation time has been reduced through the use of a standard electronic connector, and the joystick has been designed for maintenance-free operation throughout an operating life of greater than five million operations. An optional neoprene boot is available for the short handle version, allowing operation in environments where aggressive materials are present, protecting from dust and dirt ingress.

Typical applications include remote control chest packs and the control of construction, agricultural or material handling equipment.

PERFORMANCE MECHANICAL

		Short handle	Short handle with boot	Long handle
Breakout force	N	3.1*	3.8*	2.3*
Operating force	N	5.1*	13.2*	3.4* Full deflection
Maximum allowable force	N	50*	50*	35* Full deflection
Lever operating angle	°	±30	±30	±30 (or 0-60)
Lever action		Self centering	Self centering	Self centering or end return
Expected life (operations)		>5 million	>1million for boot (replaceable)	>5 million
Weight	g	45	47	45

*At top of handle

ENVIRONMENTAL

Operating temperature	°C	-25 to +70
Storage temperature	°C	-40 to +85
Environmental protection above flange		IP66† IEC 60529

†Seal integrity can only be achieved when using sealing gasket supplied and screws are tightened to 1Nm. Sealing gasket not required when neoprene boot is fitted to short handle version.

ELECTRICAL

Analogue Track

Resolution		Virtually infinite
Track resistance (±20%)	kΩ	4 or 5
Track electrical angle	°	±28
Output voltage range	%	0-100, 10-90 or 25-75 of input (±2%)
Center tap voltage (no load)	%	48 - 52 of applied voltage
Center tap angle	°	2.5 either side of center
Supply voltage - maximum	Vdc	32
Wiper circuit impedance	MΩ	Greater than 0.1**
Power dissipation @ 20°C	W	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

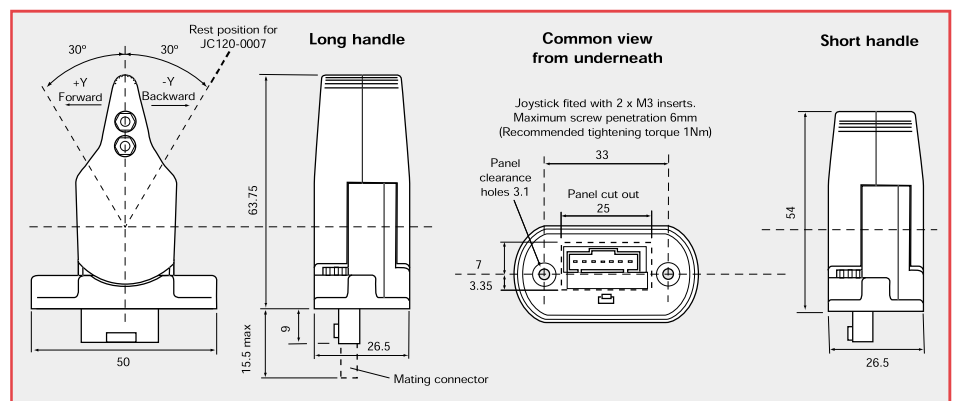
Switch operating angle	°	5 either side of center
Supply voltage - maximum	Vdc	35
Load resistance - minimum	kΩ	10
Load current - maximum	mA	2 (resistive)
Typical contact resistance	Ω	150

ORDERING CODES

Short handle	0-100% output voltage range, 4k with boot fitted	JC120-0001
	10-90% output voltage range, 5k with boot fitted	JC120-0002
	25-75% output voltage range, 5k with boot fitted	JC120-0003 JC120-0013
Long handle	0-100% output voltage range, 4k	JC120-0004
	10-90% output voltage range, 5k	JC120-0005
	25-75% output voltage range, 5k	JC120-0006
Long handle	0-100% output voltage range, 4k With lever return to backward position Ask for full specification details	JC120-0007
Mating connector	With 0.5m flyleads	SA301649
Neoprene boot	For short handle version only	P304856

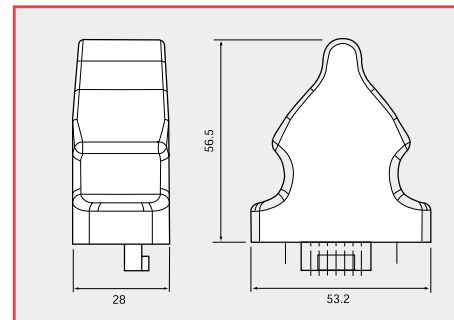
DIMENSIONS AND MOUNTING OPTIONS

JC120



JC120 short handle - neoprene boot option

Recommended JC120 pitch spacing is 39mm minimum when neoprene boot is fitted



ELECTRICAL CONNECTIONS

Connection

Mating connector kit (order separately)

7 pin Molex series latching male (70553-0006)

SA301649 (7 pin Molex series latching female with 0.5m flyleads fitted)

	Description	Pin Number	Mating Connector/Flylead colour
A	Center tap	A	Orange
B	Positive voltage supply	B	Yellow
C	Output voltage signal	C	Green
D	Negative or zero voltage supply	D	Blue
E	N/O switch, lever backward (-Y)	E	Red
F	N/O switch, lever forward (+Y)	F	White
G	Common terminal for switches	G	Black

Pin A and E are not connected on JC 120-0007