

**Penny + Giles'** new single axis joystick controller enables use in heavy duty applications without compromising on smooth proportional control. The **JC1500** joystick utilises contactless rotary position sensor technology combined with a rugged, low profile design.

The joystick provides reliable and accurate output signals - and includes a second output to enable error checking of the system integrity. The **JC1500** is intended for use in the off-highway specialist vehicles market - particularly where reliability and strength are paramount e.g. Aerial Work Platforms.

The **JC1500** joystick complements the existing range of JC150 potentiometer track joysticks and has the same panel mounting details – allowing replacement or upgrade with no panel modifications. The new joystick is designed to share the same range of handles and grips used in the JC150 and JC6000 models.



## Key Features

- Contactless – Hall effect technology
- Single axis control with spring to center or friction hold lever action
- Lock and detent features
- Choice of handles and grips
- 5Vdc or 9-30Vdc supply
- Dual channel output with optional ramp directions
- Analog (Vdc) or Digital (PWM) outputs
- Extremely low signal noise – less than 1mV<sub>rms</sub>
- Operating temperature -40 to +85°C
- Environmental protection to IP69K above the panel
- 53mm under-panel depth
- Electrically interchangeable with potentiometers

# JC1500 SINGLE AXIS CONTACTLESS JOYSTICK

[www.pennyandgiles.com](http://www.pennyandgiles.com)

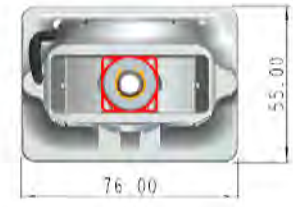
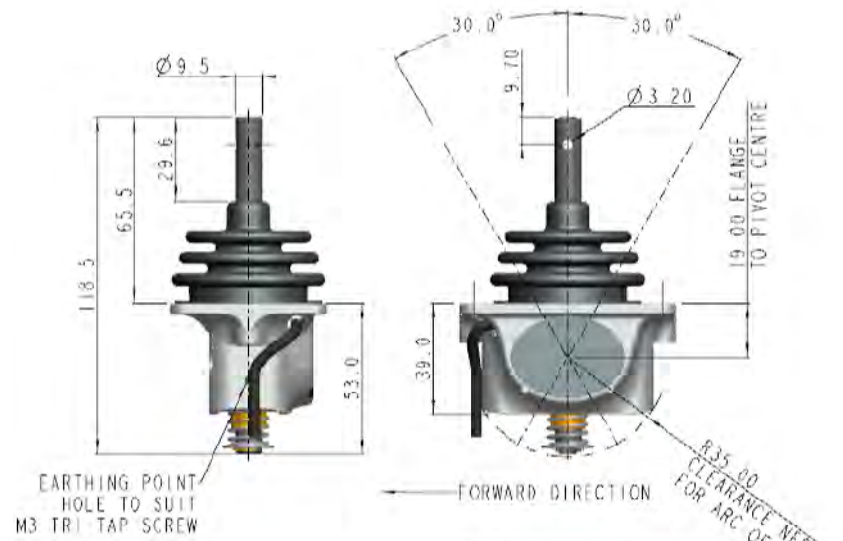
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1		2						3			4				5				6													
AXIS	OUTPUT	OUTPUT SENSE						OPERATION			SPRING			FEATURES				DETENT		HANDLE				ROCKER OUTPUT		ROCKER PROFILE		GAITER		INTERFACE		
Y	*	**						*			*			***				**		****				*		*		*		***		
	A	P	PP	PO	PN	NP	OO	S	F	L	M	N	NL	CL, CL1	EL, EL1	DO	D1	NH	NHF	HKN	HB	E	N	Q	R	S	V	R	S	L	STN	STA
ELECTRICAL DATA		OUTPUT SENSE						EC, EC1			FL, FL1			RL, RL1				A		MG				CL								
Insulation Resistance @50V DC; All sensor wires to main body		50 MΩ																														
Maximum Current consumption		12.5mA per Channel																														
Supply Voltage		5Vdc +/-0.5Vdc Regulated and 9V to 30Vdc Unregulated																														
Supply Current		≤25mA (12.5mA per Channel)																														
Supply reverse polarity protection		Yes																														
Short circuit protection output to GND		Yes																														
Short circuit protection output to supply		In 5V regulated mode only																														
Over voltage protection		up to 40V (-40 to +60°C)																														
Power on settlement		<1s																														
Resolution		12 Bit (0.025% of measurement range)																														
Non-linearity		<+/-0.4%																														
Temperature coefficient		<+/-30ppm/°C in 5V regulated supply mode <+/-90ppm/°C in 9-30V supply mode																														
Tracking Error		+/-2%																														
Output Clamping		Yes																														
OUTPUT (A or P)																																
Options		Analogue or Digital PWM																														
ANALOGUE OUTPUT OPTION (A)																																
Voltage output range (9-30V Supply)		Absolute voltage from 0.5V to 4.5V over measurement range (±150mV, 3%)																														
Voltage output range (5V Supply)		Ratiometric output voltage from 10% to 90% over measurement range (±50mV, 1%)																														
Monotonic range		0.25V (5%) and 4.75 (95%) nominal																														
Load Resistance		10 Kohms minimum (resistive to ground)																														
Output noise		<1mVrms																														
Input/Output delay		2.5ms																														
DIGITAL PWM OUTPUT OPTION (P)																																
PWM frequency		244Hz +/-20% over temperature range																														
PWM levels (9-30V supply)		0V and 5V nominal (+/-3%)																														
PWM levels (5V supply)		0v and Vsupply (+/-1%)																														
Duty cycle		10% to 90% over measurement range																														
Monotonic range		5% and 95% nominal																														
Load Resistance		10 Kohms minimum (resistive to ground)																														
Rise/Fall time		<20 us typical																														
OUTPUT PP OUTPUT 1 POSITIVE SLOPE OUTPUT 2 POSITIVE SLOPE																																
OUTPUT PO OUTPUT 1 POSITIVE SLOPE OUTPUT 2 NO OUTPUT																																
OUTPUT PN OUTPUT 1 POSITIVE SLOPE OUTPUT 2 NEGATIVE SLOPE																																
OUTPUT NP OUTPUT 1 NEGATIVE SLOPE OUTPUT 2 POSITIVE SLOPE																																
OUTPUT OO																																
		SELECT 'OO' WHEN A PWM OUTPUT IS REQUIRED BOTH PWM OUTPUTS 1 & 2 ARE THE SAME																														
A3								METRIC			ALL SCREW THREADS TO BS 3643 PT. 2 EXTERNAL CLASS: 6g INTERNAL CLASS: 6H TOLERANCES IN LINE WITH PENNY & GILES STANDARDS 56-301			RoHS COMPLIANCE				TITLE		SPECIFICATION NUMBER												
ACAD		©COPYRIGHT RESERVED.						NOT TO SCALE: DO NOT SCALE. IF IN DOUBT, ASK.			THIRD ANGLE PROJECTION TO BS 8888			YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>				SINGLE AXIS JOYSTICK		JC1500-GEN-****												
SHT 1 OF		THIS DOCUMENT CONTAINS CONFIDENTIAL AND/OR PROPRIETARY INFORMATION AND MAY NOT BE REPRODUCED IN ANY FORM WHATSOEVER, NOR MAY ITS CONTENTS BE DIVULGED TO THIRD PARTIES WITHOUT THE WRITTEN PERMISSION OF THE OWNER. ALL RIGHTS RESERVED.						CHANGES TO THIS BORDER MUST BE ACTIONED ON SK309927			LINEAR (MACHINING) 0, mm +/- 0.5mm 0,0 mm +/- 0.2mm 0,00 mm +/- 0.1mm 0,000 mm +/- 0,01mm			ANGULAR +/-1° UNLESS OTHERWISE STATED				3 06/10/11 GC		RD DA ECR 14734												
3 SHTS											ISSUE DATE DRAWN				ENG APPROVAL QUAL APPROVAL		CHANGES															



1		2			3		4		5		6	
MECHANICAL DATA												
OPERATION (S or F)												
SPRING RETURN		S		FRICTION			F					
SPRING (L, M OR N)												
LIGHT		L		MEDIUM		M		NO SPRING		N		
Breakout force		0.75Nm		Breakout force		1.15Nm		Breakout force		1.50Nm		
Operating force		1.25Nm		Operating force		1.85Nm		Operating force		1.50Nm		
NO SPRING OPTION AVAILABLE ON FRICTION JOYSTICKS ONLY												
Maximum Overload on Axis				110Nm								
Maximum Overload off Axis				70Nm								
Maximum Downward Load				1000N								
Maximum Torque				25Nm								
Mechanical Life (Centre & End Lock, Friction)				10 Million (1 Million)								
The loads required to deflect the joystick are measured 80mm from the joystick pivot point perpendicular to the operating rod, throughout the operating angle. (With no handle fitted). The operating force will be affected by the handle length & type. One cycle is defined as operation from the centre to one extreme and back to centre. The mechanical life is based on a test frequency of 1 Hertz.												
FEATURES (NL, CL, EL, EC, FL, RL, FC, RC)												
NO LOCK		NL		Spring Return								
CENTRE LOCK		CL		Mechanical Lock at Centre								
END LOCK		EL		Mechanical Lock at both Ends								
END LOCK WITH CENTRE LOCK		EC		Mechanical Lock at centre and both Ends								
FORWARD END LOCK		FL		Mechanical Lock In forward direction								
REVERSE END LOCK		RL		Mechanical Lock In reverse direction								
CENTRE AND FORWARD END LOCK		FC		Mechanical Lock at centre and forward direction								
CENTRE AND REVERSE END LOCK		RC		Mechanical Lock at centre and reverse direction								
FOR LONGER OPERATING ROD VERSIONS OF THE ABOVE ADD 1 TO THE CODE												
EXAMPLE. CENTRE LOCK WITH LONGER OPERATING ROD = CL1												
End lock Joysticks are limited to +/-25° travel												
DETENTS (D00 or D01)												
NO DETENT		D00		Used for 0° to 60° travel option (end to end)								
CENTRE		D01		Mechanical Detent at Centre								
FRICTION HELD ONLY AVAILABLE WITH NO CENTRE DETENT												
HANDLE (NH, NHF, HKN, HB, AMF, MGMF, CL)		CODE		HANDLE WIRES		GAITER OPTION						
NO HANDLE FITTED		NH		No Wires		R or S option						
NO HANDLE FITTED (wires through operating lever)		NHF		28 AWG		R or S option						
HKN HANDLE FITTED		HKN		No Wires		R or S option						
HB HANDLE RANGE FITTED		HB*		26 AWG		R or S option						
Refer to HB handle specification for details												
AMF HANDLE RANGE FITTED		A****		28 AWG		R option						
Refer to AMF handle specification for details												
MGMF HANDLE RANGE FITTED		MG**		26 AWG		R or S option						
Refer to MGMF handle specification for details												
PULL COLLAR HANDLE FITTED		CL		No Wires		R option						
CL HANDLE ONLY AVAILABLE WHEN LOCKS HAVE BEEN CHOSEN												

ROCKER OPTION (E, N, Q, R)		CODE	
0% - 100% OUTPUT		E 4.0 - 6.0 kΩ Resistance	
0% - 100% OUTPUT		N 1.4 - 2.2 kΩ Resistance	
25% - 75% OUTPUT		Q 2.2 - 3.6 kΩ Resistance	
10% - 90% OUTPUT		R 1.6 - 2.4 kΩ Resistance	
ROCKER PROFILE (S OR V)		CODE	
Standard Rocker Profile		S	
V - Rocker Profile		V	
ROCKERS ARE ONLY AVAILABLE ON AMF HANDLE OPTIONS			
REFER TO AMF HANDLE SPECIFICATION FOR DETAILS			

GAITER OPTION (R or S or L)							
Round Gaiter	R	STN Interface dimensions below	Square Gaiter	S	Lock Gaiter	L	STN Interface dimensions below

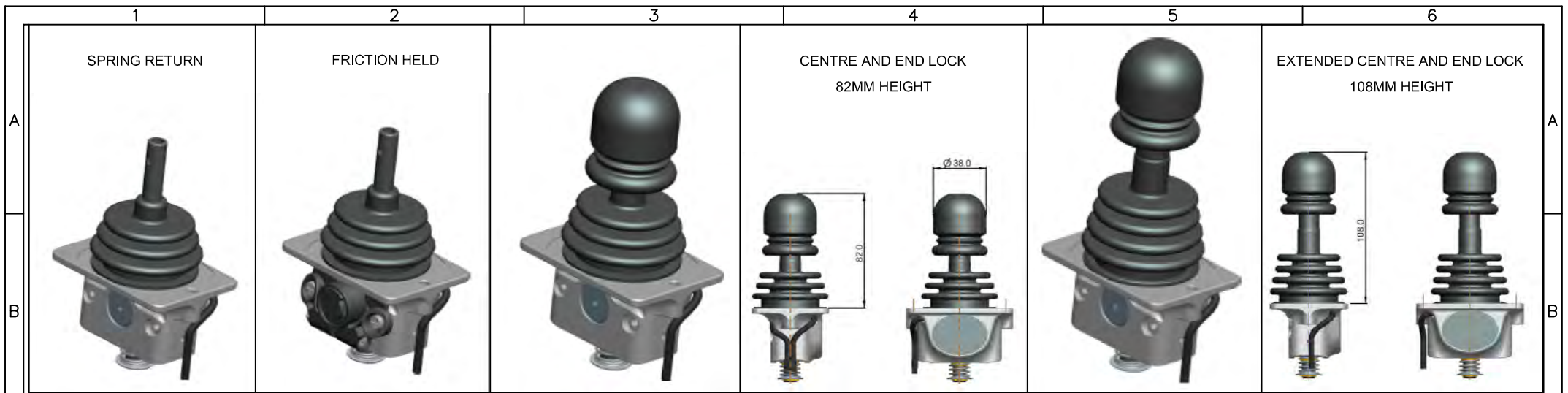
S OPTION (Square Gaiter) NOT AVAILABLE WITH CENTRE AND END LOCKS

2 Holes to suit M5

2 Holes to suit M5

Mounting Screws	M5 x 12mm Tri-Tap Countersunk Head (Supplied)
Mounting Torque	3.5Nm Maximum
Panel Thickness	3.0mm to 6mm
Round Gaiter (R). The joystick is designed to be fitted from below the mounting panel, through a 42 - 44mm diameter hole.	
Square Gaiter (S). The joystick is designed to be fitted from below the mounting panel, through a 48 by 54.5mm elliptical hole.	
It is the responsibility of the customer to ensure that the joystick mounting screws are torqued correctly and that the mounting panel is of a sufficient design to ensure a seal is formed on joystick installation.	

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SHT 2 OF 3 SHTS		THIRD ANGLE PROJECTION TO BS 8888 CHANGES TO THIS BORDER MUST BE ACTIONED ON SK309927		LINEAR (MACHINING) 0. mm +/- 0.5mm 0.0 mm +/- 0.2mm 0.00 mm +/- 0.1mm 0.000 mm +/- 0.01mm		ANGULAR +/-1° UNLESS OTHERWISE STATED		3 06/10/11 GC RD DA ECR 14734 ISSUE DATE DRAWN ENG' APPROVAL QUAL' APPROVAL CHANGES						



ENVIRONMENTAL DATA	
CRITERIA	TESTING STANDARD
Sealing (above mounting panel)	DIN 40050-9 rating IP69K
Sealing (below mounting panel)	Not Sealed Mechanically Under Panel
Sealing (electronics)	DIN 40050-9 rating IP69K
Operating Temperature range	BS EN 60068-2-14 (-40°C to +85°C)
Storage Temperature range	BS EN 60068-2-1 (-50°C)
Storage Temperature range	BS EN 60068-2-2 (+85°C)
Temperature \ Humidity	BS EN 60068-2-38
Vibration (Random)	BS EN 60068-2-64
Vibration (Sinusoidal)	BS EN 60068-2-6
Vibration (Shock)	BS EN 60068-2-27
Vibration (Bump)	BS EN 60068-2-29
Salt Spray	BS EN 60068-2-11
Drop Test	BS EN 60068-2-31
ESD	BS EN 61000-4-2
RFI	BS EN 61000-4-3
Fast Transients	BS EN 61000-4-4
Conducted RFI	BS EN 61000-4-6
Power Frequency Magnetic Immunity	BS EN 61000-4-8
Radiated Emissions	BS EN 55022 Class A

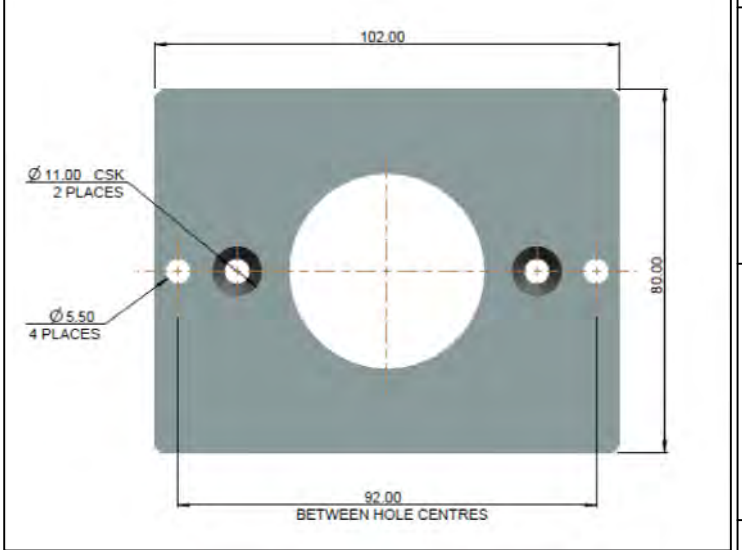
WIRING DETAILS (dual output, single supply)		
WIRE	COLOUR	FUNCTION
1	RED	5V Supply
2	BLACK	Ground
3	YELLOW	Joystick Output 1
4	WHITE	Joystick Output 2

Sensor wiring looms from Joystick will be 220mm ±10mm  
Sensor loom is extruded 4 core spec, 55A 24 AWG wires

Handle wiring looms from Joystick will be 220mm ±10mm  
See handle options on page 2 for specific wire diameters

LABELLING DETAIL		LABEL TO CONTAIN
		P&G CONTROLS Ltd. U.K
Specification Number	JC1500-GEN-****	JC1500 JOYSTICK
Serial Number	*****	
Reference	****MYYYY	
Reference Description		
Job Number	E.g 62854	
Month	MM	
Year	YYYY	

**STA INTERFACE OPTION**  
 JC1500 Adaptor plate P48692, This is needed when an AMF handle is fitted.  
 Plate thickness 2.90/3.35mm.  
 Finished in black eggshell epoxy (all surfaces).  
 Note: Joystick assembly is mounted from the top of the panel when adapter plate is fitted



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	©COPYRIGHT RESERVED.			THIRD ANGLE PROJECTION TO BS 8898	LINEAR (MACHINING) 0, mm +/- 0,5mm 0,0 mm +/- 0,2mm 0,00 mm +/- 0,1mm 0,000 mm +/- 0,01mm	ANGULAR +/-1° UNLESS OTHERWISE STATED	YES	NO	SINGLE AXIS JOYSTICK			JC1500-GEN-****
ACAD				3	06/10/11	GC	RD	DA	ECR 14734			
SHT 3 OF 3 SHTS	THIS DOCUMENT CONTAINS CONFIDENTIAL AND/OR PROPRIETARY INFORMATION AND MAY NOT BE REPRODUCED IN ANY FORM WHATSOEVER, NOR MAY ITS CONTENTS BE DIVULGED TO THIRD PARTIES WITHOUT THE WRITTEN PERMISSION OF THE OWNER. ALL RIGHTS RESERVED.	CHANGES TO THIS BORDER MUST BE ACTIONED ON SK309927		ISSUE	DATE	DRAWN	ENG APPROVAL	QUAL APPROVAL	CHANGES			