

- Extremely robust design for arduous applications
- Center detent for enhanced return-to-center performance
- Under panel depth has been minimized to 78mm
- Pivot-point position minimizes grip cable flex
- Rated for 5 million cycles
- Hall-effect sensor technology
- Dual outputs with sense options
- Electronics sealed to IP69k
- Can be supplied as 'base-only'
- More functions, e.g. CAN interface, to follow
- Multiple grip options ...

**HE****AMF****MG**

The JC8000 offers high mechanical strength for very heavy-duty applications and features a center detent that provides guaranteed return-to-center, as well as a positive feel to the operator, throughout 5 million cycles. While maintaining an overall minimum under-panel depth of the joystick body, the shaft pivot-point position has been designed to be as low as possible so as to ensure a high strength capability in the small body space envelope. This reduction in angular deflection reduces wear on base-to-grip wiring, so enhancing overall reliability.

Hall-effect sensing eliminates contact wear and provides safety functionality via dual outputs, which can be set to positive or negative ramps, or a combination of both. Electronic robustness is assured with sealing of the internal PCB to a rating of IP69k.

A choice of multi-function grips are available, plus the option of 'base-only' enabling custom grips to be fitted. Beyond this initial release, further models will be introduced to provide increased grip functionality, CAN bus interfaces and mechanical variation.



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## CONFIGURATION & ORDERING CODES

The ordering configuration is made up of the product name, followed by a multi digit code. The code is generated by the configuration required for each aspect of the joystick.

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Type	Axes	Outputs	Output Sense	Operation	Spring	Features	Gate	Grip	Rocker Output	Rocker Profile	Boot	Termination
JC8000	XX	X	XX	X	X	XXXX	X	XXXX	X	X	X	X
	XY	M	PP	S	M	0000	S	NH00	E	S	F	A
		K	PN					NHA0	N	V	R	
		L	NP					NHFL	Q	X		
								NHAF	R			
								AXXX	X			
								MGXX				
								HKNO				
							HEXX					

### AXES

JC8000-~~XX~~-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
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XY	Dual
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### OUTPUTS

JC8000-XX-~~X~~-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Supply Voltage	Min Output Voltage	Center Voltage	Max Output Voltage
M	5V Regulated <sup>(1)</sup>	10%	50%	90%
K	5V Regulated <sup>(1)</sup>	25%	50%	75%
L	5V Regulated <sup>(1)</sup>	20%	50%	80%

### NOTES

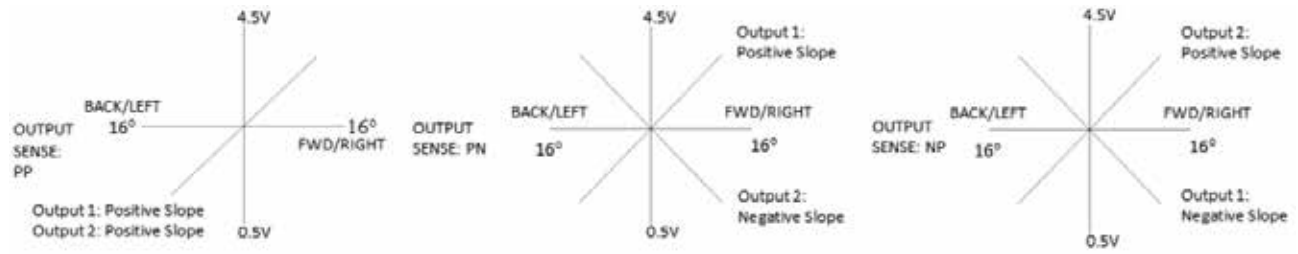
(1) 5V Regulated equates to 4.5–5.5V.



### OUTPUT SENSE

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

CODE	DESCRIPTION
PP	Output 1: Positive Slope Output 2: Positive Slope
PN	Output 1: Positive Slope Output 2: Negative Slope
NP	Output 1: Negative Slope Output 2: Positive Slope



### OPERATION

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
S	Spring return-to-center

### SPRING

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
M	Standard

### FEATURES

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
0000	No mechanical features

### GATE

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
S	Square



### GRIP

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

Code	Description
NH00	No grip
NHA0	No grip, extended operating rod
NHFL	No grip, 13x flying leads (cable type 30AWG – 19/0.06, PTFE, Uni-Lay)
NHAF	No grip, extended operating rod, 13x flying leads (cable type 30AWG – 19/0.06, PTFE, Uni-Lay)
AXXX	AMF grip <sup>(1)</sup>
MGXX	MG grip <sup>(1)</sup>
HKNO	HKN grip <sup>(1)</sup>
HEXX	HE grip <sup>(1)</sup>

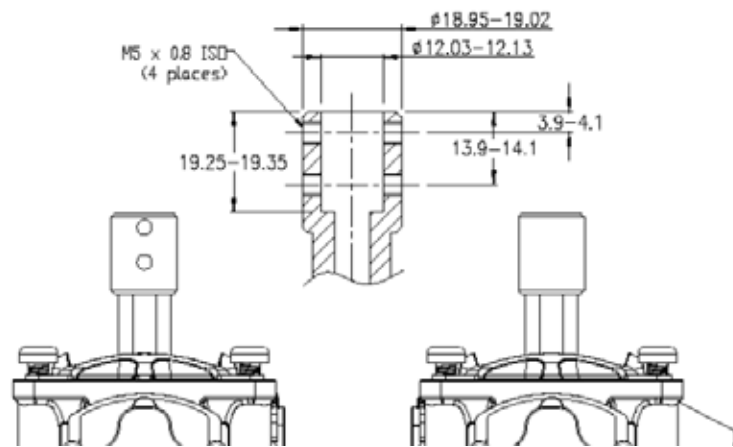
### NOTES

(1) Refer to the relevant grip specification for configuration details.

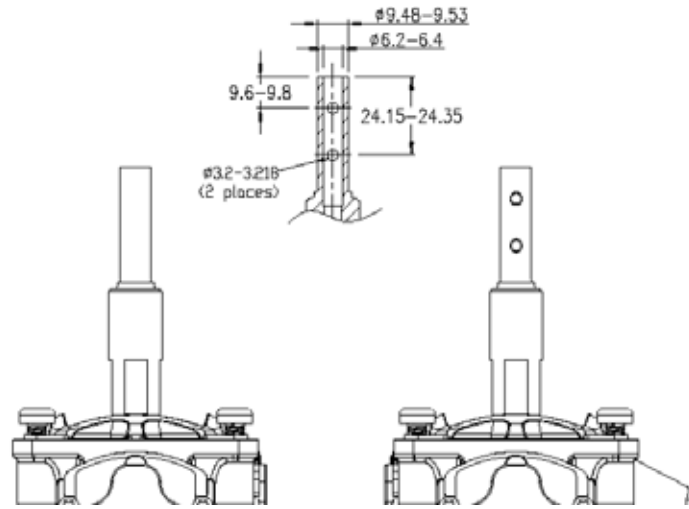
The overall performance of the joystick may be limited by the grip chosen (refer to grip specification).

It is the responsibility of the customer when fitting the grip to ensure wires are correctly terminated (flying lead version only).

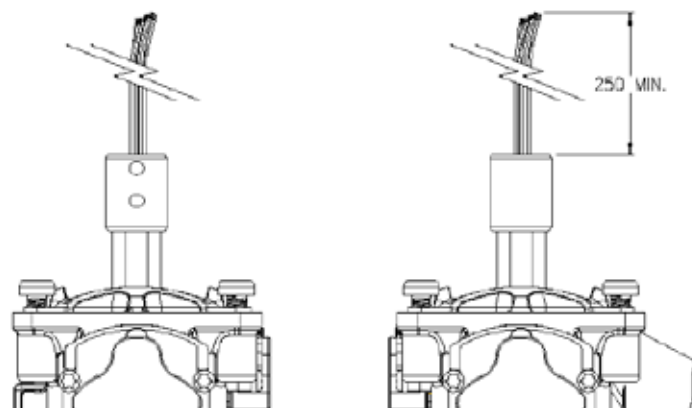
### NH00



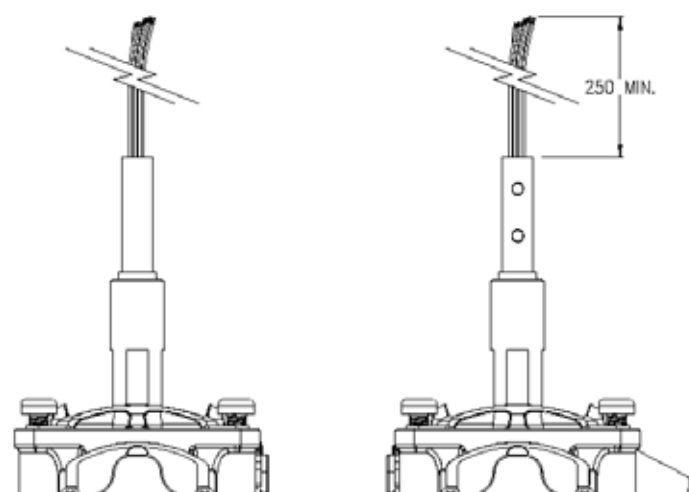
**NHA0**



**NHFL**

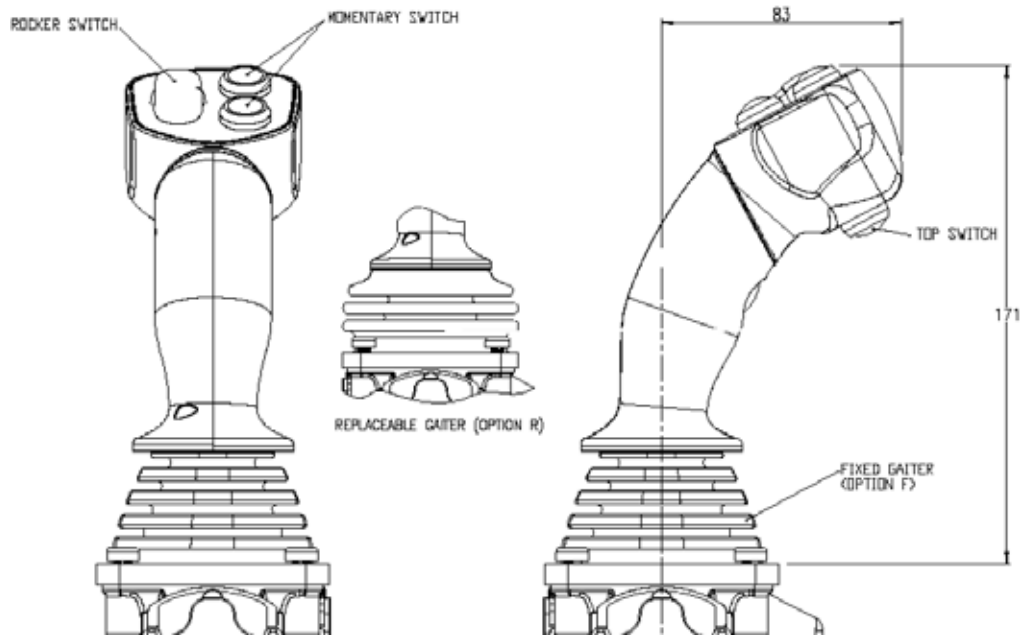


**NHAF**

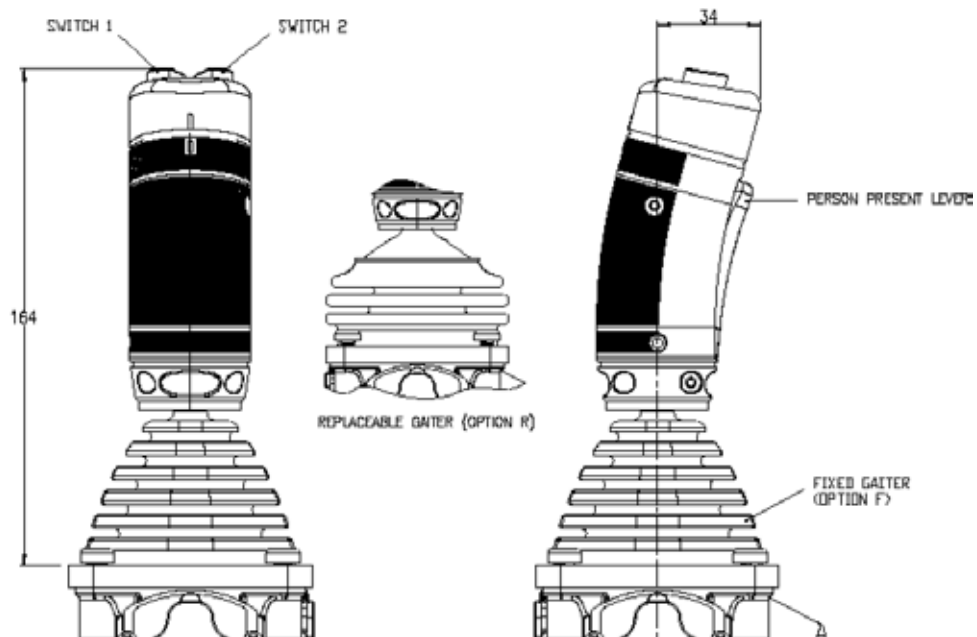




**AXXX**

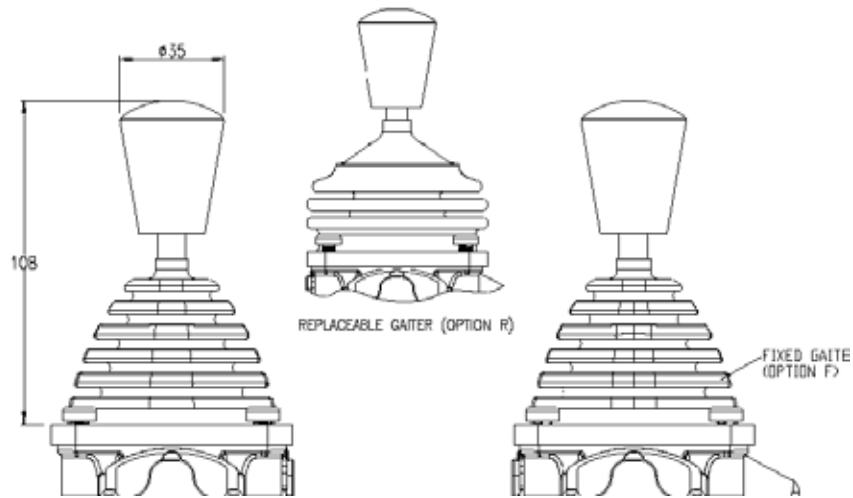


**MGXX**

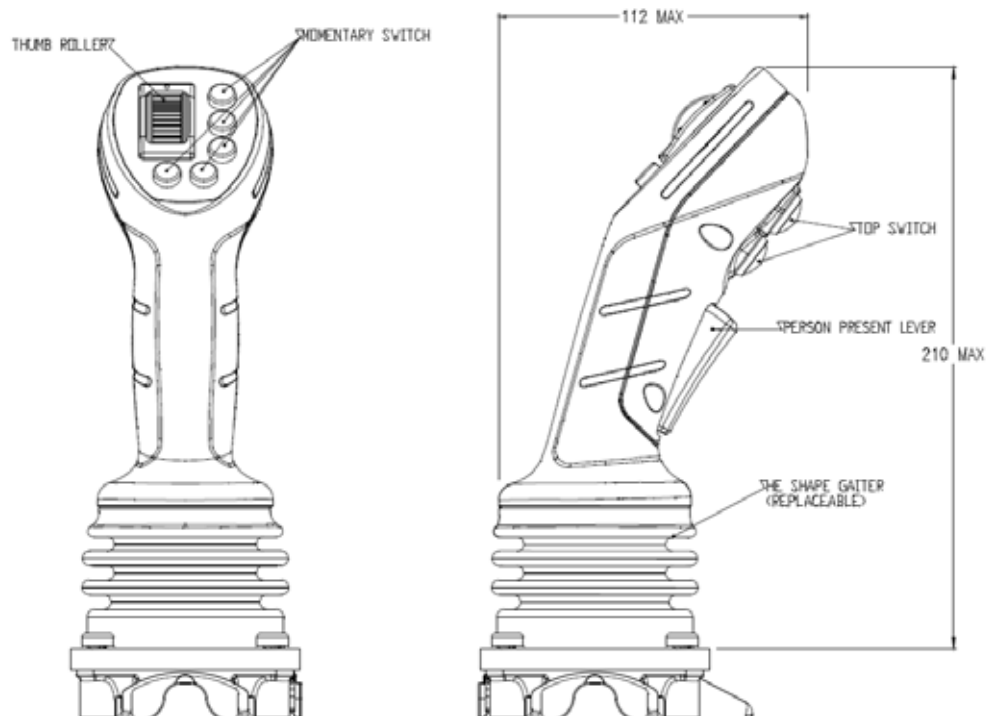




HKNO



HEXX







## ROCKER OUTPUT

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

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Code	Description
E	0–100% Output (4.0–6.0k $\Omega$ )
N	0–100% Output (1.4–2.2k $\Omega$ )
Q	25–75% Output (2.2–3.6k $\Omega$ )
R	10–90% Output (1.6–2.4k $\Omega$ )
X	No rocker fitted

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### NOTES

AMF grip only.

## ROCKER PROFILE

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

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Code	Description
S	Standard
V	V-profile
X	No rocker fitted

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### NOTES

AMF grip only.

## BOOT

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

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Code	Description
F	Fixed
R	Replaceable
N	No boot fitted

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### NOTES

The 'N' option is not available with the HKN, MGMF, AMF &amp; HE grip options.

## TERMINATION

JC8000-XX-X-XX-X-X-XXXX-X-XXXX-X-X-X-X

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Code	Description
A	Molex Mini-Fit 22-way – (5557 series)

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### NOTES

Gold plated contacts should be used in the mating connector.



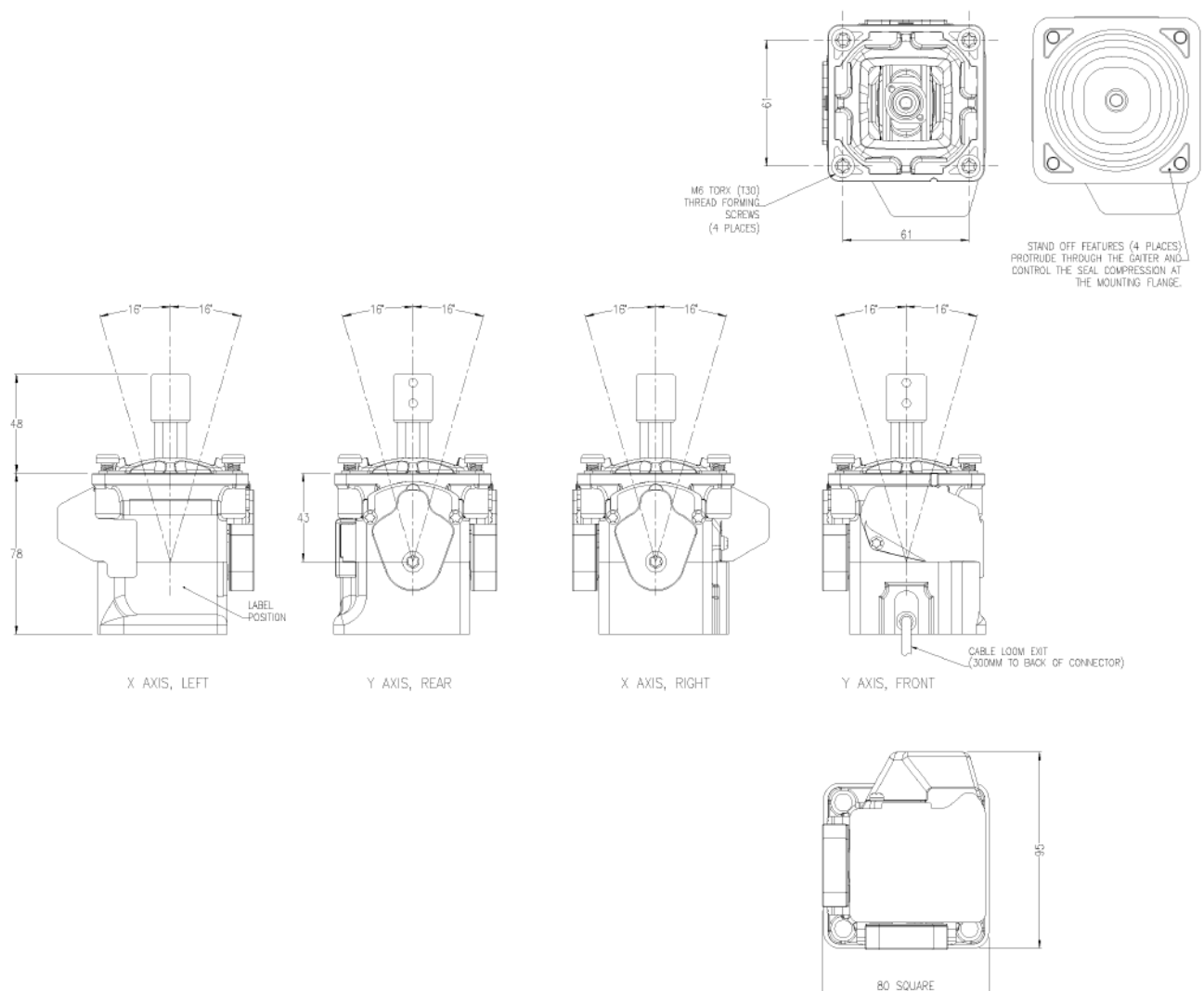
## INSTALLATION

### MECHANICAL

The joystick is designed to be fitted from below the mounting panel through a 72mm diameter hole. The effectiveness of the joystick flange sealing is dependent on the panel mounting surface being sufficiently rigid to compress the sealing boot. The surface finish of the mounting panel is critical to achieve an adequate seal and rough surface finishes, paint chips, deep scratches, etc. should be avoided.

**Panel thickness:** 3.5–4.5mm

**Screw torque** (using supplied screws): 5Nm





## ELECTRICAL CONNECTIONS

### 22-Way Joystick Connector

#### Molex Mini Fit 22-way – (5557 Series)

Pin	Function	Pin	Function
1	0V	12	5V
2	X-axis Output 2	13	X-axis Output 1
3	Y-axis Output 2	14	Y-axis Output 1
4	Center tap	15	See chosen grip specification
5	See chosen grip specification	16	See chosen grip specification
6	Not connected	17	Not connected
7	See chosen grip specification	18	See chosen grip specification
8	See chosen grip specification	19	See chosen grip specification
9	See chosen grip specification	20	See chosen grip specification
10	See chosen grip specification	21	See chosen grip specification
11	See chosen grip specification	22	See chosen grip specification

#### NOTES

Gold plated contacts should be used in the mating connector.

### Base-to-Grip Connections

22-way Molex to flying leads.

Pin	Description	Pin	Description
1	n/a	12	n/a
2	n/a	13	n/a
3	n/a	14	n/a
4	n/a	15	Grey
5	Yellow	16	Red
6	n/a	17	n/a
7	Orange	18	Brown
8	Black	19	Green
9	White	20	Blue
10	Violet	21	Pink
11	Red / Yellow	22	Black / Red

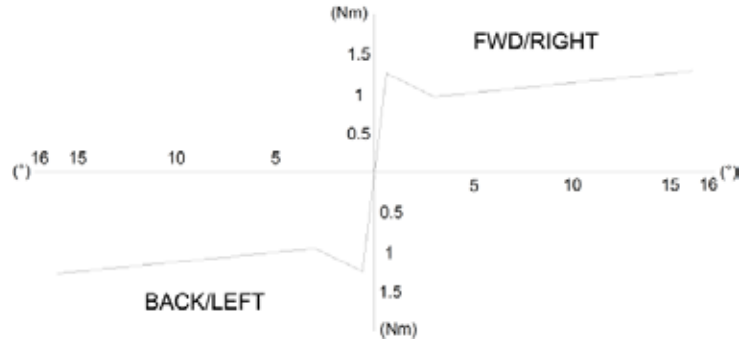


## SPECIFICATIONS

### MECHANICAL

#### OPERATING TORQUE<sup>(1)</sup>

BREAKOUT	1.2Nm
MAXIMUM	1.2Nm



#### LOADS<sup>(2)</sup>

HORIZONTAL	240Nm
VERTICAL	5000N
ROTATIONAL	50Nm

#### IMPACT

HORIZONTAL	100J (on operating rod)
VERTICAL	20J (on operating rod)

#### MISCELLANEOUS

LEVER MECHANICAL ANGLE	±16° in X- or Y-axes
EXPECTED LIFE	5,000,000 cycles <sup>(3)</sup> (20,000,000 operations) <sup>(4)</sup>
MASS	1.1kg (without grip fitted)

#### NOTES

- (1) The operating torque values are measured on-axis.
- (2) Loads are based on NH00 & NHFL grip options. The strength of the product will be limited by the grip/adaptor fitted to the joystick (NHA0 & NHAF are limited to 25Nm horizontal static loading).
- (3) One cycle is defined as moving from center to the end of travel, returning past the center to the other extreme and back to center. Joystick is cycled at a speed of 1Hz at an ambient temperature of 25°C.
- (4) One operation is defined as one movement (e.g. from center to the end of travel).

**ELECTRICAL**

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MAXIMUM SUPPLY CURRENT	<64mA
RESOLUTION	12-bits (4096)
OUTPUT	Two outputs per axis
OUTPUT VOLTAGE RANGE (M)	10-90% of 5Vsupply
OUTPUT VOLTAGE RANGE (K)	25-75% of 5Vsupply
OUTPUT VOLTAGE RANGE (L)	20-80% of 5Vsupply
CENTER ACCURACY	±4% supplied ±5.5% after life (including temperature effects)
END ACCURACY	+2.8%/-4.5% of upper voltage +4.5%/-2.8% of lower voltage
LINEARITY ACCURACY	±2.8%
MATCHING ACCURACY	±4%
OUTPUT IMPEDANCE	100Ω (nominal)
CENTER REFERENCE OUTPUT	50% ±0.7% of Vsupply
CENTER REF. OUTPUT IMPEDANCE	1100Ω
REVERSE POLARITY PROTECTION	-10Vdc
POWER-ON SETTLEMENT TIME	Up to 15ms
INSULATION RESISTANCE @ 10VDC	>10MΩ
CLAMPING	During the programming of the joystick the output at the ends of travel correspond to the nominal. The outputs are clamped and therefore the output range will not exceed the range by +/-2.8% (i.e. 7.2% - 92.8% of the supply voltage for the 10 to 90% span).

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**NOTES**

Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolutely maximum rated conditions for extended periods may affect product reliability.

**ENVIRONMENTAL**

SEALING <sup>(1)</sup> – ABOVE PANEL	EN 60529	IP66 / IP69k dependent on grip
SEALING <sup>(2)</sup> – ELECTRONICS	EN 60529 DIN 40 050 Part 9	IP66 / IP69k
DRY HEAT	EN 60068-2-2	85°C
COLD	EN 60068-2-1	-50°C
OPERATING TEMPERATURE (CYCLING)	EN 60068-2-14	-40°C to 80°C
TEMPERATURE & HUMIDITY	EN 60068-2-38	Pt2.1 Z/AD - 65°C For 10 cycles
SALT MIST	EN 60068-2-52	Severity 2
SINUSOIDAL VIBRATION	EN 60068-2-6	10-200Hz; 3gn; 1h per axis
RANDOM VIBRATION	EN 60068-2-64	10-200Hz; 3.6gn; 2h per axis
BUMP	EN 60068-2-27	40gn; ½ sine 6ms; 1350 in each axis
SHOCK	EN 60068-2-27	25gn, 10ms, 500 in 6 directions
RADIATED EMISSIONS	EN 55011	Passes emissions levels of: EN 55011, EN 61000-6-3, EN 61000-6-4, EN 12895, ISO14982 & ISO13766
ESD	EN 61000-4-2	Air & contact discharges ±15kV
RFI	EN 6100-4-3	80-1000MHz and 1-2.7GHz 30V/m (80% AM, 1kHz sine)
	ISO11452-2	200-1000MHz 100V/m (80% AM, 1kHz sine)
	ISO11452-4	20-800MHz 80mA (80% AM, 1kHz sine)
CONDUCTED DISTURBANCE IMMUNITY	EN 61000-4-6	150kHz-80MHz 3Vrms (80% AM, 1kHz sine)
POWER FREQUENCY IMMUNITY	EN 6100-4-8	30A/m 50Hz & 60Hz

**NOTES**

(1) The overall sealing performance of the joystick is limited by the grip/boot fitted to the joystick.

(2) The Molex connector is not rated.

**LABELLING**

Label to contain.

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**P&G CONTROLS LTD. UK**

SPECIFICATION TYPE	JC8000-GEN-XXXX
BATCH NO.:	XXXXXXX
ISSUE STATUS	X
REFERENCE	XXXXXMMYYYY

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**IMPORTANT INFORMATION**

In the event of the boot rupturing or being removed, it is recommended that immediate replacement of the boot is carried out to minimize the effects of particle and water ingress from the surrounding environment.

Whilst Curtiss-Wright Industrial Group - Penny & Giles has designed this joystick to meet a range of applications it is the responsibility of the customer to ensure it meets their specific requirement.

Penny & Giles Controls Ltd makes no warranty or representation in respect of product fitness or suitability for any particular design application, environment, or otherwise, except as may subsequently be agreed in contract for the sale and purchase of products. Customers should therefore satisfy themselves of the actual performance requirements and subsequently the product's suitability for any particular design application and the environment in which the product is to be used.

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