

- Designed primarily for Telehandlers
- Ergonomic grips
- Stand-alone or fitted to a JC6000 or JC8100 joystick
- Hall-effect sensor technology
- Choice of CAN or voltage outputs
- Optional left and right roller overpress
- Center-reference signal
- Switches rated for 1 million cycles and rollers for 2 million cycles
- Enclosure sealing to IP67
- EMC performance to 100V/m
- Integrated connector (CAN) or flying-lead termination (Analogue)
- Customizable face plate colors and logo option
- Backlit option



The HM Grip, which is available as a right-hand option, offers a wide range of non-contacting rollers and push-button switch combinations along with an FNR option in the rear panel.

A contoured front panel means the rollers are within an easy sweep of an operator's thumb, while the switch arrays are angled to allow for similarly convenient actuation. Further customization is possible with OEM logo/text embossed on front panel with an additional choice of 32 logos which can be printed on each of the switches, with or without a backlit option.

The controls on the rear panel are situated to provide comfortable operation with a first finger. To further enhance operator comfort, the grip is oriented to lean forward and inwards.

Non-contacting, Hall-effect roller sensing technology ensures smooth operation and a long life, while a center-reference signal, enhance overall system safety.

The stand-alone grip is available as CAN Open, CAN J1939 (both fitted with Deutsch connector) or on request a 5V analogue electrical interface supplied with a flying lead to enable a customer to choose their preferred connector.

In addition, the HM Grip can be supplied fitted to a JC6000 or JC8100 joystick.

Careful material selection ensures maximum robustness to impact, liquids, and dust, with the enclosure being sealed to IP67 and an EMC performance level of 100V/m.



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CONFIGURATION & ORDERING CODES

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XXX

| Type | Version | Front Plate Layout | Left Roller Overpress | Right Roller Overpress | Front Plate Color | Backlit | Front Button Options | Left Roller Color | Right Roller Color | Rear Layout | Rear Function Colors | Mechanical Interface | Electrical Interface |
|--------|---------|--------------------|-----------------------|------------------------|-------------------|---------|----------------------|-------------------|--------------------|-------------|----------------------|----------------------|----------------------|
| HM-GEN | X | XX | XX | XX | X | X | XXXXXXXXXX | X | X | X | XX | X | XX |
| | R | 2A | LD | RD | B | W | B | B | B | A | B | A | CO |
| | | 2B | LF | RF | G | N | Y | Y | Y | B | Y | B | C1 |
| | | 2C | LB | RB | R | | L | L | L | C | L | C | 5V |
| | | 2D | LN | RN | | | O | O | O | D | O | D | |
| | | 2E | | | | | R | R | R | E | R | E | |
| | | 2F | | | | | / | | | F | / | | |
| | | | | | | | Logo | | | G | | | |
| | | | | | | | | | H | | | | |
| | | | | | | | | | I | | | | |
| | | | | | | | | | / | | | | |

Note: Button logos are available on request, please contact the sales office to confirm availability and lead-time

HANDED VERSION

HM-GEN-~~X~~-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description |
|------|-------------|
| R | Right |

FRONT PLATE LAYOUT

HM-GEN-X-~~XX~~-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | Roller Slope Inward | Roller Slope Outward |
|------|--|---------------------|----------------------|
| 2A | 2 Lower Switches / 2 Rollers (<i>Slope inwards</i>) | | |
| 2B | 3 Upper Switches / 2 Rollers (<i>Slope inwards</i>) | | |
| 2C | 5 Switches / 2 Rollers (<i>Slope inwards</i>) | | |
| 2D | 2 Lower Switches / 2 Rollers (<i>Slope outwards</i>) | | |
| 2E | 3 Upper Switches / 2 Rollers (<i>Slope outwards</i>) | | |
| 2F | 5 Switches / 2 Rollers (<i>Slope outwards</i>) | | |

2 Lower Switch front plate



3 Upper Switch front plate



5 Switch front plate





LEFT ROLLER OVERPRESS

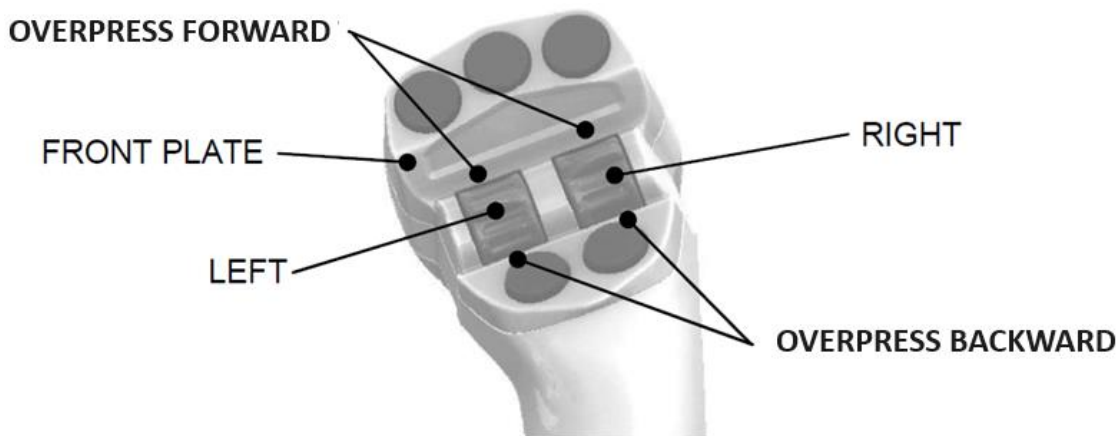
HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | |
|------|----------------|---|
| LD | Left, Dual | Rollers are available with an overpress function at the ends of travel. |
| LF | Left, Forward | The selection can be made as both ends or either end or not at all. |
| LB | Left, Backward | |
| LN | Not Selected | |

RIGHT ROLLER OVERPRESS

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | |
|------|-----------------|---|
| RD | Right, Dual | Rollers are available with an overpress function at the ends of travel. This function gives an increase in force to reach the end of travel but does not lock the roller in this position |
| RF | Right, Forward | The selection can be made as both ends or either end or not at all. |
| RB | Right, Backward | |
| RN | Not Selected | |



FRONT PLATE COLOR

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | |
|------|-------------|----------|
| B | Black | RAL 9005 |
| G | Grey | RAL 7042 |
| R | Red | RAL 3020 |

BACKLIGHTING

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | Color |
|------|--------------|-------|
| W | Backlight | White |
| N | Not Selected | |

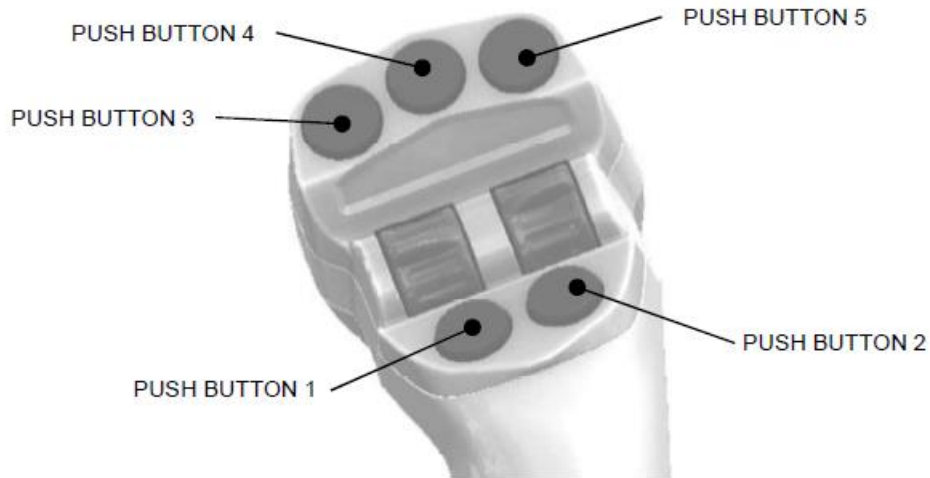


FRONT BUTTON OPTIONS

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

Button options are selected as a button color and button logo for each button location:

| Button 1 | Button 2 | Button 3 | Button 4 | Button 5 |
|----------|----------|----------|----------|----------|
| XX | XX | XX | XX | XX |




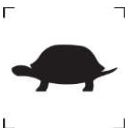



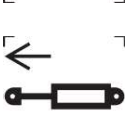
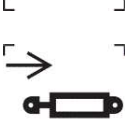
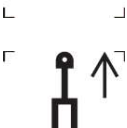
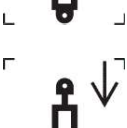

| Code | Button Color | Logo Color | |
|------|-----------------|------------|--|
| B | Black RAL 9005 | White | Contact the Curtiss-Wright sales team to check on the lead-time for buttons with a logo and if you require alternative color/logo combinations |
| Y | Yellow RAL 1023 | Black | |
| L | Blue RAL 5010 | White | |
| O | Orange RAL 2009 | White | |
| R | Red RAL 3020 | White | |
| / | Not Selected | | |

| Code | Description | Logo |
|------|-------------|---|
| A | Start | <div style="text-align: center;"> START </div> |
| B | Stop | <div style="text-align: center;"> STOP </div> |
| C | Off | <div style="text-align: center;"> OFF </div> |



| | | | |
|---|-------------|--|---------------|
| D | OK | | |
| E | Neutral | | |
| F | Arrow Right | | ISO 7000-0251 |
| G | Arrow Up | | ISO 7000-1861 |
| H | Arrow Left | | |
| I | Arrow Down | | |
| J | Horn | | ISO 7000-0244 |
| K | Padlock | | ISO 7000-1656 |
| L | Plus | | ISO 7000-5005 |
| M | Minus | | ISO 7000-5006 |



| | | | |
|---|------------------------------------|---|--------------------|
| N | Hare |  | ISO 7000-2810 |
| O | Tortoise |  | ISO 7000-2811 |
| P | Snail |  | ISO 7000-2812 |
| Q | Differential Lock |  | ISO 7000-1662 |
| R | Float |  | ISO 7000-1441 |
| S | Remote Hydraulic Cylinder, Extend |  | ISO 7000-1570 |
| T | Remote Hydraulic Cylinder, Retract |  | ISO 7000-1571 |
| U | Remote Hydraulic Cylinder, Extend |  | |
| V | Remote Hydraulic Cylinder, Retract |  | |
| W | Custom Fast/Slow |  | ISO 7000-2811/2810 |



| | | | |
|---|-----------------------------|--|---------------|
| X | Top Lift, Retract Laterally | | ISO 7000-2375 |
| Y | Top Lift, Extend Laterally | | ISO 7000-2372 |
| Z | Twist Lock, Lock | | ISO 7000-2370 |
| 2 | Twist Lock, Unlock | | ISO 7000-2369 |
| 3 | Fork Spread, Close | | ISO 7000-1192 |
| 4 | Fork Spread, Open | | |
| 6 | Side Shift, Right | | ISO 7000-1190 |
| 7 | Side Shift, Left | | ISO 7000-1189 |
| 8 | Custom Shake | | |
| / | Not Selected | | |

Note: Logo's will be white except when an un-lit yellow button is selected when it will be black
When illumination is selected the logo's will be white
Contact the sales team if you require alternative combinations



LEFT ROLLER COLOR

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-XX-X-XX

| Code | Color | |
|------|--------|----------|
| B | Black | RAL 9005 |
| Y | Yellow | RAL 1023 |
| L | Blue | RAL 5010 |
| O | Orange | RAL 2009 |
| R | Red | RAL 3020 |

RIGHT ROLLER COLOR

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-XX-X-XX

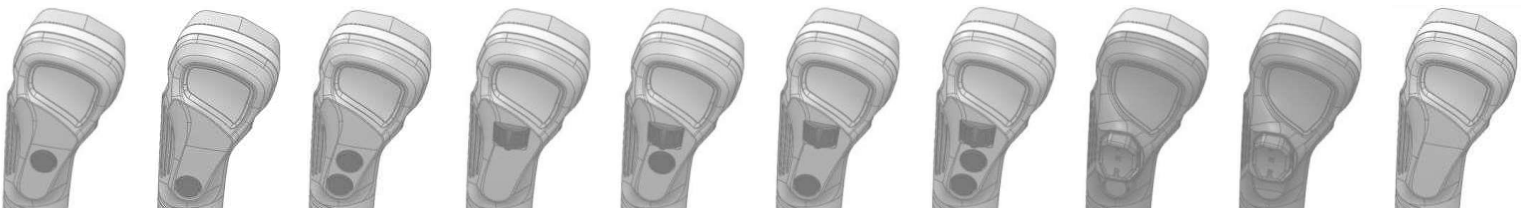
| Code | Color | |
|------|--------|----------|
| B | Black | RAL 9005 |
| Y | Yellow | RAL 1023 |
| L | Blue | RAL 5010 |
| O | Orange | RAL 2009 |
| R | Red | RAL 3020 |

REAR LAYOUT

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-XX-X-XX

| Code | Description |
|------|--------------------------------------|
| A | 1 Switch (<i>upper</i>) |
| B | 1 Switch (<i>lower</i>) |
| C | 2 Switches |
| D | 1 Roller |
| E | 1 Roller / 1 Switch (<i>upper</i>) |
| F | 1 Roller / 1 Switch (<i>lower</i>) |
| G | 1 Roller / 2 Switches |
| H | 1 FNR / 1 Switch |
| I | 1 FNR |
| N | No Rear Function |

| | | | | | | | | | |
|----------------|----------------|------------|----------|-----------------------------|-----------------------------|-------------------------|------------------------|-----|------------------|
| 1 switch upper | 1 switch lower | 2 switches | 1 roller | 1 roller and 1 upper switch | 1 roller and 1 lower switch | 1 roller and 2 switches | FNR and 1 lower switch | FNR | No rear function |
|----------------|----------------|------------|----------|-----------------------------|-----------------------------|-------------------------|------------------------|-----|------------------|





REAR FUNCTION COLORS

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

Roller and FNR Color XX

| Code | Description | Color |
|-----------------|--------------|-----------------|
| B (Roller Only) | Black | Black RAL 9005 |
| Y (Roller Only) | Yellow | Yellow RAL 1023 |
| L (Roller Only) | Blue | Blue RAL 5010 |
| O | Orange | Orange RAL 2009 |
| R (Roller Only) | Red | Red RAL 3020 |
| / | Not Selected | |

Button Color XX

| Code | Description | Color |
|------|--------------|-----------------|
| B | Black | Black RAL 9005 |
| Y | Yellow | Yellow RAL 1023 |
| L | Blue | Blue RAL 5010 |
| O | Orange | Orange RAL 2009 |
| R | Red | Red RAL 3020 |
| / | Not Selected | |

Notes: The FNR Logo is not illuminated
 The FNR actuator is only available in Orange and has FNR lettering
 If two rear buttons are selected, they must both be the same color



MECHANICAL INTERFACE

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-X-XX

| Code | Description |
|------|--|
| A | Fitted to JC6000 |
| B | Fitted to JC8100 |
| C | M12 x 1.75 (<i>Internal</i>) Thread depth in adaptor is 24mm |
| D | M14 x 1.5 (<i>External</i>) Thread depth in adaptor is 26mm |
| E | M12 x 1.75 (<i>External</i>) Thread depth in adaptor is 26mm |

ELECTRICAL INTERFACE

HM-GEN-X-XX-XX-XX-X-X-XXXXXXXXXX-X-X-X-XX-X-XX

| Code | Description | Default Source Address |
|------|--------------|------------------------|
| CO | CAN Open | 0x48 |
| C1 | CAN - J1939 | 0x33 |
| 5V | *5V Analogue | |

*Available upon request



EXAMPLE OF POPULATED CONFIGURATION STRING

HM-GEN-R-2A-LN-RD-R-N-LLYM/////O-B-G-YB-A-5V

- HM generic grip
- Right-Handed
- 2 switches and 2 rollers slope inwards
- No left roller overpress
- Dual right roller overpress
- Front plate color Red
- No back lighting on the buttons
- Button 1 Blue with white minus logo
- Button 2 Yellow with Black plus logo
- Button 3 not required
- Button 4 not required
- Button 5 not required
- Left roller Orange
- Right roller Black
- Rear layout 1 roller and 2 buttons
- Rear roller Yellow
- Button 6 Blue
- Button 7 Blue
- Mated to a JC6000 unit
- Electrical interface 5V analogue

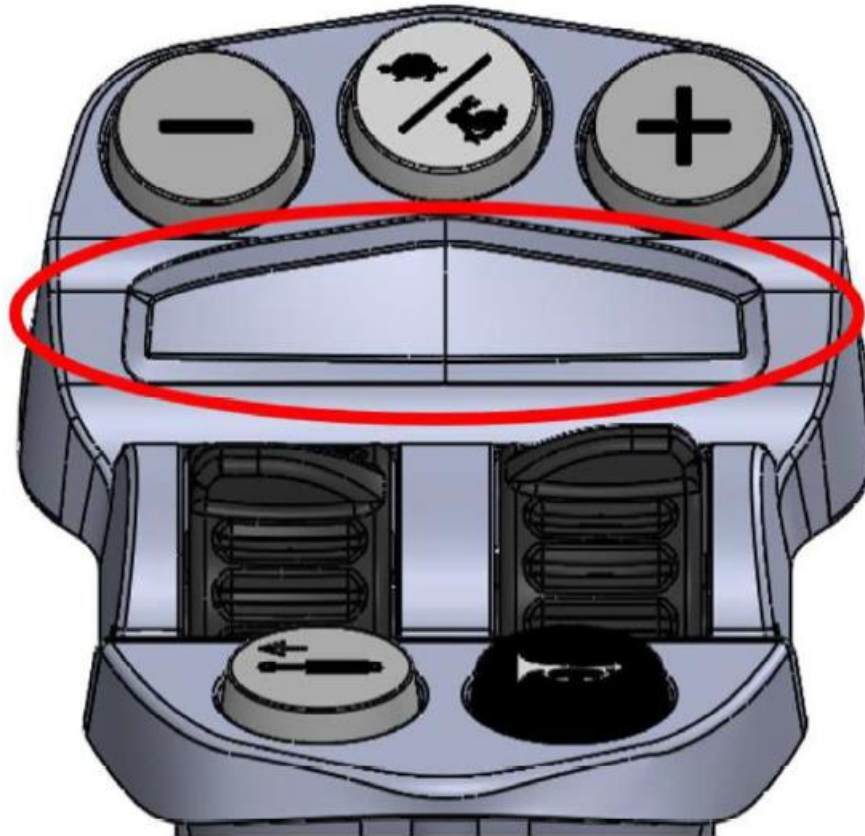




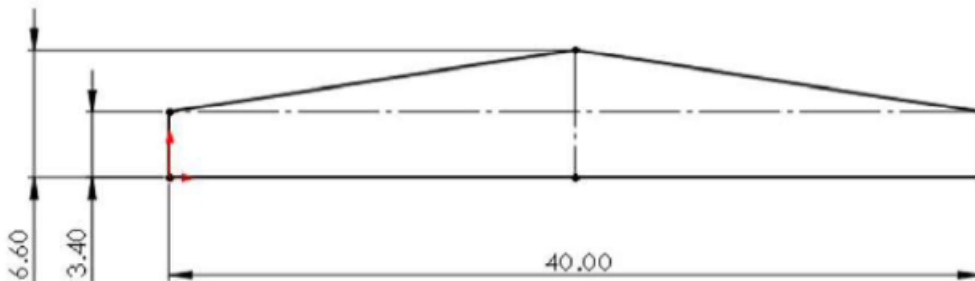
CUSTOM LOGO/NAME PLATE

A custom logo, company logo or text can be embossed into the area highlighted below.

Please discuss your needs with the sales team as this option requires tooling charge and minimum order quantity



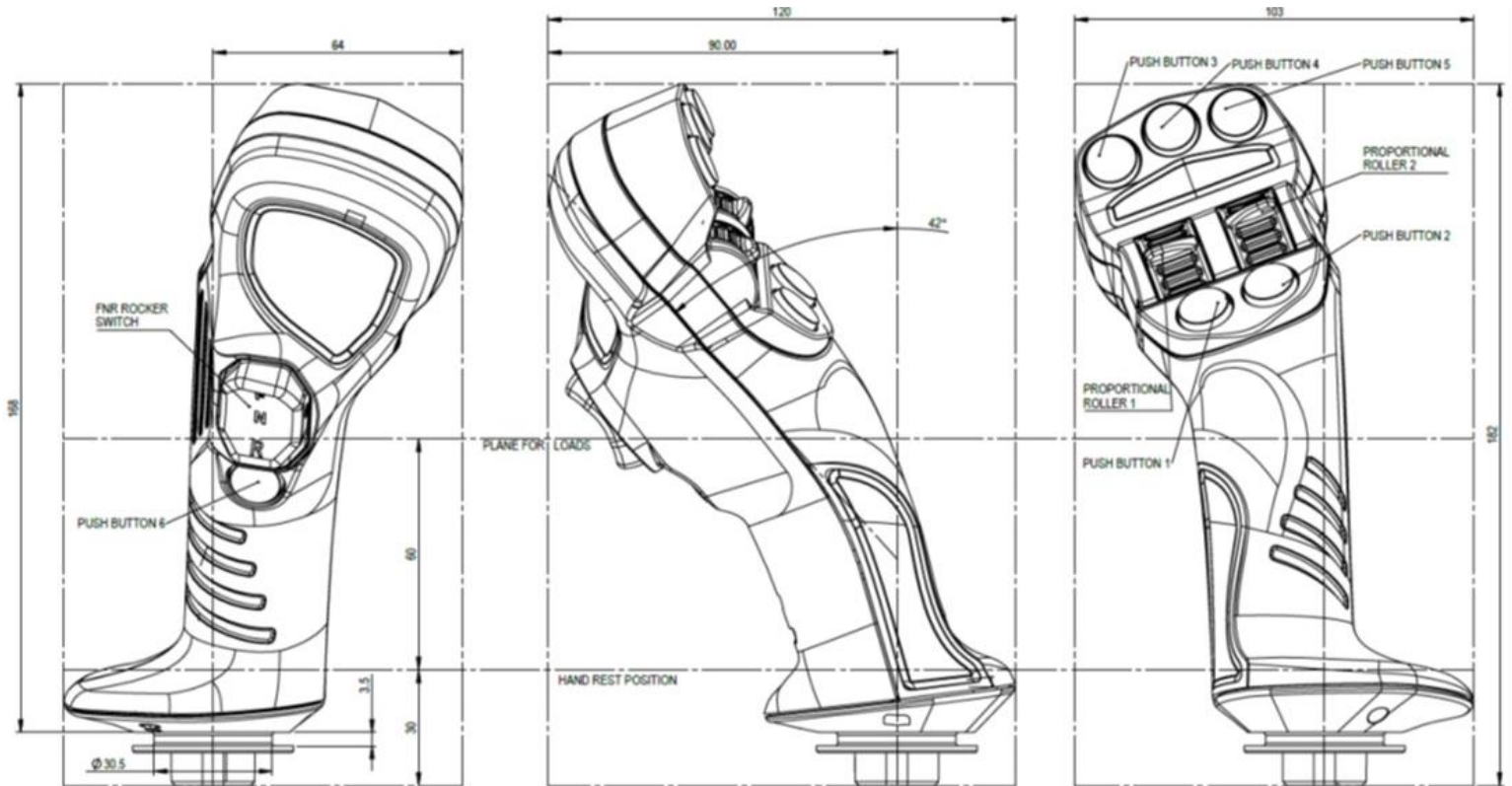
The size of the available space is detailed below





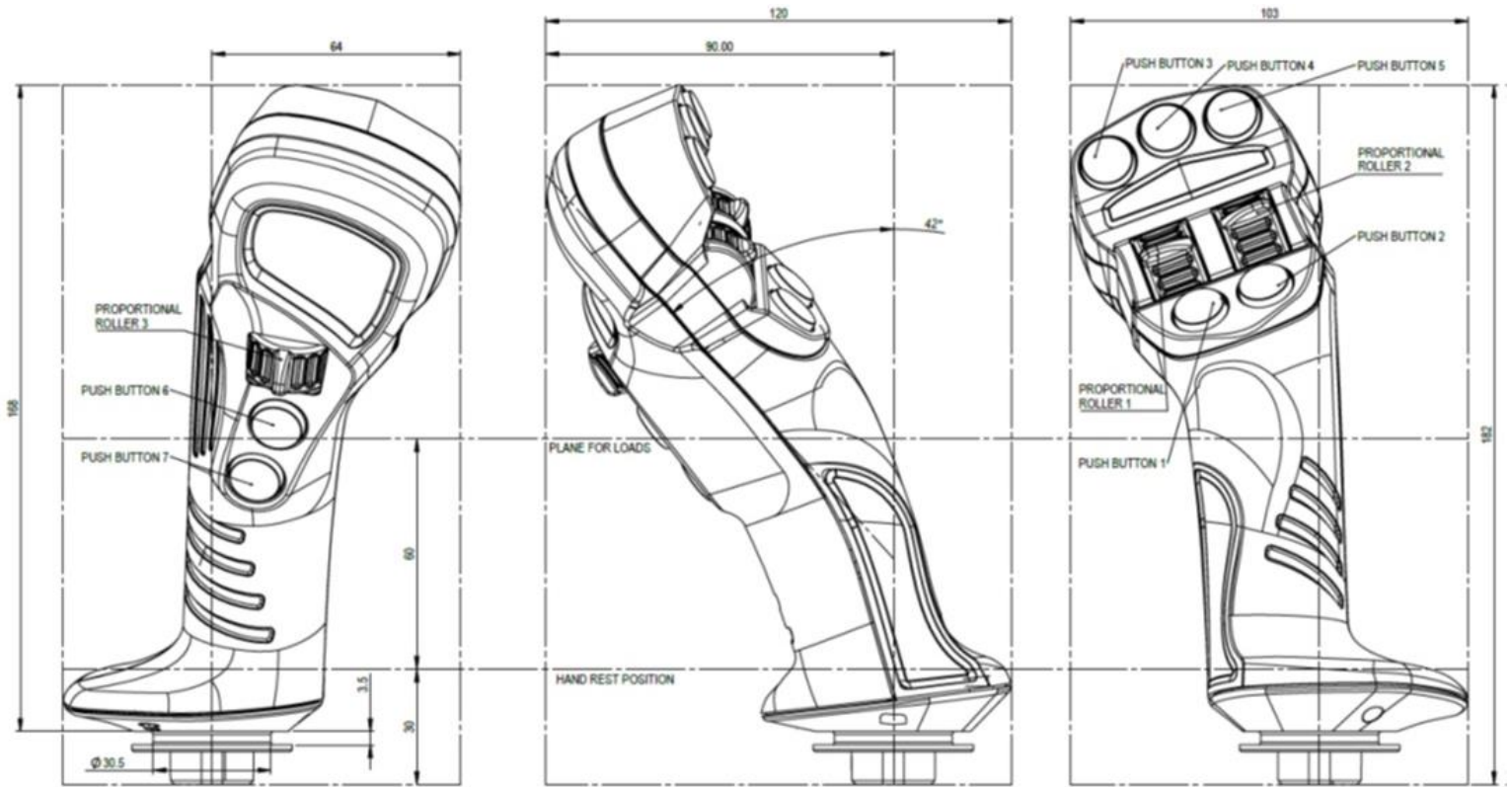
INSTALLATION

RIGHT HAND FNR GRIP





RIGHT HAND ROLLER GRIP





ELECTRICAL CONNECTIONS

Termination: Analogue Wire Colors

20 AWG PTFE insulated 16/0.2 wires, 350 mm long with protective braid

| Function | Common | Output |
|---------------|-----------|-------------|
| Push Button 1 | Black/Red | Blue |
| Push Button 2 | Black/Red | Yellow |
| Push Button 3 | Black/Red | Blue/White |
| Push Button 4 | Black/Red | White/Green |
| Push Button 5 | Black/Red | Red |
| Push Button 6 | Black/Red | Violet |
| Push Button 7 | Black/Red | Blue/Orange |

| Function | Common (5V) | Ground (0V) | Output |
|--------------|-------------|-------------|--------------|
| Roller 1 | White/Red | Pink/Grey | Pink |
| Roller 2 | White/Red | Pink/Grey | White |
| Roller 3/FNR | White/Red | Pink/Grey | Green/Yellow |

| Function | Common (5V) | Ground (0V) |
|------------------|-------------|-------------|
| LED Backlighting | Red/Yellow | Black |

Note: The maximum number of wires that can be routed from the stand-alone analogue grip is 14
 The maximum number of wires when the grip is fitted to a Curtiss-Wright joystick is limited by the joystick selected (JC6000 or JC8100)

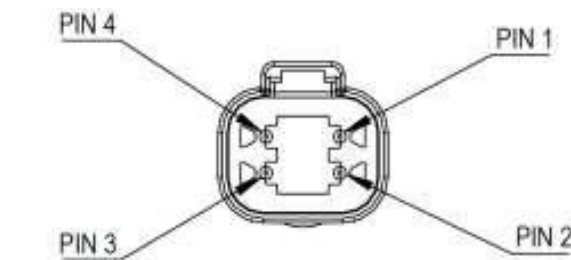
Termination: CAN

20 AWG PTFE insulated 16/0.2 wires, 300 mm long with protective braid

Deutsch DT04-4P connector with Gold-plated contacts

Note: the mating connector must be fitted with Gold-plated pins to ensure stable output from the joystick

| Pin Number | Function |
|------------|----------|
| 1 | Power |
| 2 | Ground |
| 3 | CAN High |
| 4 | CAN Low |

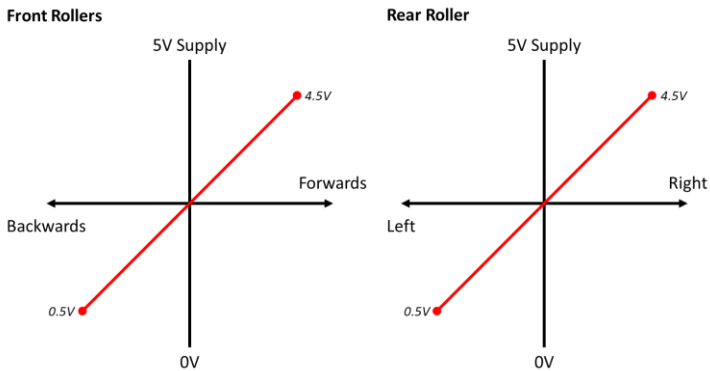




SPECIFICATIONS

ELECTRICAL – ANALOGUE STAND-ALONE GRIP

| | |
|--------------------------------|--|
| SUPPLY VOLTAGE – ANALOGUE | 5Vdc \pm 0.5V to the rollers 5V to 24Vdc to the pushbutton common |
| OUTPUT VOLTAGE - ROLLERS | 10% to 90% of the supply voltage |
| CENTERING ACCURACY – ROLLERS | 50% \pm 5.5% of supply voltage (as supplied) |
| END VOLTAGE ACCURACY - ROLLERS | 10% (+4%/-2%) Low end, 90% (+2%/-4%) High end of the output span |
| OUTPUT IMPEDANCE - ROLLERS | 100 Ω (nominal) |
| OVERPRESS ACTUATION VOLTAGE | 20% \pm 5% (Low end) and 80% \pm 5% (High end) of supply voltage |
| ROLLER OUTPUT SENSE | |



| | |
|-----------------------------|---|
| SWITCH CURENT RATING | The pushbutton switches operate via a MOSFET (open drain) and can accommodate a current up to 100mA @ 24Vdc (maximum) |
| SHORT CIRCUIT PROTECTION | 5V Rollers; 24V Switches (VFET) |
| REVERSE POLARITY PROTECTION | -5.5V Rollers; -24V Switches |
| OVERVOLTAGE | 5.5V Rollers; 24V Switches |
| CURRENT CONSUMPTION | 93 mA |

ELECTRICAL – ANALOGUE FNR SWITCH

| | |
|-----------------------------|-----------------------|
| SUPPLY VOLTAGE | 4.5V to 5.5V |
| MAXIMUM VOLTAGE | 5.5V |
| REVERSE POLARITY PROTECTION | -5.5V |
| FORWARD OUTPUT | -2.75V (\pm 0.25V) |
| NEUTRAL OUTPUT | -1.75V (\pm 0.15V) |
| REVERSE OUTPUT | -0.75V (\pm 0.25V) |

ELECTRICAL – CAN STAND-ALONE GRIP

| | |
|----------------------|---|
| SUPPLY VOLTAGE – CAN | 8.5V to 18Vdc Temporary Cold Cranking – 6V for 10 seconds Temporary Jumpstart – 26V for 5 minutes |
| REVERSE POLARITY | -48V |
| OVERVOLTAGE | 48V Supply Overvoltage |

**ELECTRICAL – BACKLIGHTING**

| | |
|------------------------|---|
| ANALOGUE – STAND-ALONE | Available on request |
| CAN – STAND-ALONE | Variable through CAN when chosen as an option |
| CAN – JC6000 | Fixed brightness when chosen as an option |
| CAN – JC8100 | Available on request |

MECHANICAL

| | |
|-----------------------------------|---|
| STRENGTH – Grip Static overload | 1100N (Forward/Backward), 400N (Left/Right) |
| STRENGTH – Grip Horizontal Impact | 10J |
| STRENGTH – Grip Maximum Torque | 20Nm when mounted to JC6000, 30Nm when mounted to JC8100 |
| STRENGTH – Pushbutton Overload | 110N |
| STRENGTH – Roller Overload | 17N at the tip of the tab |
| STRENGTH – FNR Overload | 100 N |
| LIFE – Pushbutton | 1 million operations |
| LIFE – Roller | 2 million cycles reduced to 200k in overpress. Cycle defined as; Centre – Full Forward – Full Reverse – Return to Centre |
| LIFE – FNR | 1 million cycles at 0.5Hz. Cycle defined as; Centre – Full Forward – Full Reverse – Return to Centre with 10N overload at the ends of travel |
| TRAVEL – Pushbutton | 3 mm |
| TRAVEL – Roller | ±30° - front mounted, ±25° rear mounted |
| TRAVEL – FNR | ±18° at start of latch, ±20° at end of travel |
| OPERATING FORCE - Pushbutton | 5N |
| BREAKOUT FORCE - Roller | 3.5N @ Tab |
| OVERPRESS FORCE - Roller | 17N @ Tab |
| OPERATING FORCE - FNR | 5N ±1N (3N ±0.5N at end of life) |
| WEIGHT | Grip only <300g Grip/joystick when fitted to JC6000 <875g Grip/joystick when fitted to JC8100 <1200g |
| MTTFd | Standalone CAN > 36yrs Standalone Analogue > 39yrs |

**EMC AND MAGNETIC FIELD**

| | | |
|--|---|--|
| EMC IMMUNITY LEVEL | ISO 11452-2: 2004 | Radiated immunity (Free Field ALSE) 100V/m, CW/AM 1kHz sine 80% 80MHz – 200MHz 100V/m, CW/AM 1kHz sine 80% 200MHz – 400MHz 100V/m, CW/PM/AM 1kHz sine 80% 400MHz – 1000MHz 100V/m, CW/AM 1000MHz – 2000MHz |
| RADATED EMISSIONS | CISPR25: 2008 3 rd Edition 2008 and corrigendum 1 2008 | 30-300-1000MHz Test limits EN55016-2-3: 2010 +A1: 2010 +A2: 2014 (Class 2) |
| ESD IMMUNITY LEVEL | EN ISO10605: 2008 Air discharge Contact discharge Performance Criteria | Network 330pf // 2kR 15kV (Powered and unpowered) 8kV (Powered and unpowered) Class B – Unit operates correctly, without intervention after interference |
| RADIATED IMMUNITY (BCI) | ISO 11452-4: 2011 | Test level 100mA, 1kHz sine 80% 1MHz – 400MHz |
| CONDUCTED DISTURBANCE IMMUNITY | ISO 7637-2:2004 / ISO 7637-2:2011 (CAN Grip) EN ISO 16750-2: 2012 (CAN Grip) Performance Criteria | Pulses – 1, 2a, 2b, 3a, 4 to 12V standard Pulse – 5a: (unclamped) to Vs+79V, Rs=4R, Td=40ms Pulse – 5b: (clamped) to Vs+35V, Rs=4R, Td=40ms Class A – No intervention, no loss of operation |
| POWER FREQUENCY MAGNETIC FIELD IMMUNITY | EN 61000-4-8: 2010 Performance Criteria | 30A/m; 50Hz & 60 Hz. Class A – No intervention, no loss of operation |



ENVIRONMENTAL AND LEGISLATIVE

| | | |
|---------------------------------|------------------------|--|
| DRY HEAT | BS EN 60068-2-2: 2007 | +85°C |
| COLD | BS EN 60068-2-1: 2007 | -40°C |
| OPERATING TEMPERATURE (CYCLING) | BS EN 60068-2-14: 2009 | -40° to +85°C |
| TEMPERATURE & HUMIDITY | BS EN 60068-2-38: 2021 | -40° to +85°C, up to 95% RH. 8.5V to 18V CAN / 5V Analogue, 10 x 24hr Cycles |
| WATER AND DUST INGRESS | BS EN 60529: 1992 | IP67 Note: The grip has a flow in-flow out design and the internal components are sealed to meet the stated rating. Unless mounted on a C-W joystick, the cable exit point is open, and it is therefore the responsibility of the customer to ensure adequate sealing in the application |
| THERMAL SHOCK | BS EN 60068-2-14: 2009 | -40° to +85°C with dousing |
| SALT MIST | EN 60068-2-11: 2021 | 96 hours |
| VIBRATION (SINUSOIDAL) | EN 60068-2-6: 2008 | 3gn, 10-200Hz, 1 hour per axis |
| VIBRATION (RANDOM) | EN 60068-2-64: 2008 | 3.6gn, 10-200Hz, 2 hours per axis |
| BUMP | EN 60068-2-27: 2009 | 25g, 10ms; 500 bumps in each of 6 directions |
| SHOCK | EN 60068-2-27: 2009 | 50gn, ½ Sine 6ms: 3 shocks in each of 6 directions |
| DROP (Packaged) | BS EN 60068-2-32:1993 | 1m |
| UV | ASTM G155: 2013 | 3600 lx, 3000 hours |
| OZONE | ASTM D1149: 2018 | 72hrs at 50 (±5) pphm |
| ABRASION (BUTTONS) | BS EN 60068-2-70: 2000 | 50,000 cycles at 10N |

IMPORTANT INFORMATION

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.

Continual research and development may require change to products and specification without prior notification.

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