JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH GRIP

HJLG3-A HJLG3-B HJLG3-C HJLG3-CK HJLG3-D HJLG3-M

The HJLG3 series combines a medium JHL Hall effect joystick base with a grip. The long-lasting, fully integrated assembly handles loads up to 225 lbs. and is well suited for machinery and vehicles in agriculture, construction, material handling and industrial markets. Choose from a variety of grips, faceplates, outputs, gating and Z-axis options.

Joystick and grip assemblies:

HJLG3-A comes with a smaller G3-A Universal Grip
HJLG3-B comes with a larger G3-B Universal Grip
HJLG3-C comes with a medium G3-C Universal Grip
HJLG3-CK comes with a medium G3-CK Universal Grip
HJLG3-D comes with a G3-D Control Grip
HJLG3-M comes with a medium G3-M Universal Grip

Altogether, these models offer nearly 50 standard grip faceplates with the flexibility to create custom faceplates with hundreds of switch configurations.

Output configurations include single analog, redundant analog, CANopen and J1939. The JHL joystick has a PLd option for functional safety applications: It has been designed in accordance with Safety Standard ISO 13849-1, performance level D, Category 3 to enable communications on two separate channels.

Select HJLG3 models offer optional field replaceability, which allows either grips or faceplates to be quickly replaced without costly machine downtime. Field-replaceable grips are available on the HJLG3-C and HJLG3-M models. Field-replaceable faceplates are an option for the HJLG3-A and HJLG3-B models.

Features:

- **Compact, behind-panel design for armrest and panel mounting**
- **Contactless Hall effect technology**
- **Several grip types with standard and custom faceplates that can accommodate pushbuttons, rockers, thumbwheels and other switches**
- **Field-replaceable grip or faceplate option on select models***
- **Mechanical life up to 6 million cycles**
- **Analog, PWM, USB, CANopen, J1939 and PLd outputs; CANopen and J1939 available with integral Deutsch® connector**
- **Electronics sealed to IP68S**
- **Redundant sensors available**
- **Gating options: single axis, single axis with center detent, dual axis and omnidirectional selections, including square smooth feel, on-axis and off-axis guided feel, square on axis guided feel and center detent.**
- **Modular design**
- **Left- and right-handed operation**
- **RoHS compliant**

**Contact factory for field-replaceable option information.*
The Z-axis feature is not available on field-replaceable models.

CANbus

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Standard Characteristics/Ratings:

ELECTRICAL:

Joystick	Units	Min	Typ	Max
Rated at Vcc = 5V @ 20˚C				
Load = 1 ma (4.7 KΩ)				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	N/A	+.25
Output Voltage Tolerance at Full Travel	VDC @ 5V Vcc	-.25	N/A	+.25
Output at Full Travel +X, +Y Direction	VDC @ 5V Vcc	4.25	4.50	4.75
Supply Current Per Die B=0, Vcc=5V, Iout=0	mA	N/A	10	12
Output Impedance	kΩ	N/A	1.0	N/A

Joystick CAN Open				
Supply Voltage	VDC	9	N/A	32
Node Identifier	Dec.		10	
Baud Rate	B/S		125K	

Joystick J1939				
Supply Voltage	VDC	9	N/A	32
Source Address	Dec.		51	
Baud Rate	B/S		250K	

Joystick PLd				
Supply Voltage	VDC	9	N/A	32
Inputs or Measure PWM	24 analog and digital inputs; six inputs can decode J2716 SENT protocol signals or measure PWM			
Outputs	Two PWM outputs			

Grip Touch Switch* *(see usage message)*				
Supply Voltage	VDC	3.15	NA	5.5
Output Active (Low)	VDC	NA	NA	0.60
Output Current Sink	mA	N/A	NA	10

Operator Presence	
Electrical Rating	10mA Resistive Load @ 5VDC
Logic Level Electrical Life	1,250,000 Cycles

Keypads	
Circuit Configuration	SPST N.O.
Voltage	1–32 VDC
Current	10–100 mA Resistive

P9 Switches	
Electrical Rating	10mA Resistive Load @ 5VDC
Logic Level Electrical Life	1,250,000 Cycles

K1 Switches	
Electrical Rating	10mA Resistive Load @ 5VDC
Electrical Life	100,000 Cycles

HPL Switches				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage (Button Up)	VDC @ 5V Vcc	0.35	0.50	0.65
Output Voltage (Button Down)	VDC @ 5V Vcc	4.35	4.50	4.65
Supply Current per Die B=0, Vcc=5V, Iout=0	mA	N/A	8.00	10
Continuous Output Current	mA	-1.2	N/A	1.2

HTW & HTWF Switches				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.15	NA	+.15
Output Voltage Tolerance at Full Travel	VDC @ 5V Vcc	-.25	N/A	-.25
Supply Current per Die B=0, Vcc=5V, Iout=0	mA	N/A	N/A	10

HTWM Switches				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	NA	+.25
Output Voltage Tolerance at Full Travel	VDC @ 5V Vcc	-.25	N/A	-.25
Supply Current per Die B=0, Vcc=5V, Iout=0	mA	N/A	N/A	10

Standard Characteristics/Ratings (continued):

HTWS Switches				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	NA	+.25
Output Voltage Tolerance at Full Travel	VDC @ 5V Vcc	-.25	N/A	+.25
Supply Current per Die B=0, Vcc=5V, Iout=0	mA	N/A	N/A	20

HTLT4 Switches				
Supply Voltage	VDC	4.5	5.0	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	NA	+.25
Output Voltage Tolerance at Full Travel	VDC @ 5V Vcc	-.25	N/A	-.25
Supply Current per Die B=0, Vcc=5V, Iout=0	mA	N/A	10	12

TC-5 Switches	
Electrical Rating @ 1-32 VDC	10-100mA
Electrical Life	3,000,000 Cycles

MECHANICAL:

Joystick	Units	Min	Typ	Max
Mechanical Life, Return to Center	6,000,000 cycles; 1,000,000 cycles (Detent) 250,000 cycles with Friction			
Travel Angle	Degrees	18	20	22
Op. Force (w/Bellows) Low Force @ GRP, Ret. to Ctr.	Lbs.	.25	.50	1.0
Op. Force (w/Bellows) Low Force @ GRP, Ret. to Ctr., Detent	Lbs.	.50	1.0	1.5
Op. Force (w/Bellows) Medium Force @ GRP, Ret. to Ctr.	Lbs.	.75	1.0	1.5
Op. Force (w/Bellows) Medium Force @ GRP, Ret. to Ctr., Detent	Lbs.	2.0	2.5	3.0
Op. Force (w/Bellows) High Force @ GRP, Ret. to Ctr.	Lbs.	1.5	2.0	2.5
Op. Force (w/Bellows) High Force @ GRP, Ret. to Ctr., Detent	Lbs.	2.0	4.0	6.0
Op. Force (w/Bellows) @ GRP, Friction Y-Axis	Lbs.	1.0	3.5	6.0
Maximum Allowable Load @ 5" GRP	Lbs.			225 Lbs.

Keypads	
Mechanical Life	3 ,000,000 Cycles

P9 Switches	
Mechanical Life	1,250,000 Cycles

K1 Switches	
Mechanical Life	1,000,000 Cycles

HPL Switches				
Mechanical Life Full Stroke Per Button	100,000 Cycles			
Button Travel	IN	.135	.150	.160
Operating Force 25˚C @ .150"	Lbs.	N/A	3.0	3.8
Reset Force @ 25˚C	Oz.	5	N/A	N/A

HTW & HTWF Switches				
Mechanical Life, Full Forward to Full Back, Ret. to Ctr.	3,000,000 Cycles			
Mechanical Life, Full Forward to Full Back, Friction	250,000 Cycles			
Operating Force (HTW) 25˚C at Top of Roller, Return to Ctr.	Oz.	2.0	5.0	8.0
Operating Force (HTWF) 25˚C at Top of Roller, Friction	Oz.	2.0	4.0	6.0
Maximum Allowable (HTW & HTWF) Radial Load	Lbs.	N/A	N/A	30

HTWM Switches				
Mechanical Life, Full Forward to Full Back, Ret. to Ctr.	3,000,000 Cycles			
Operating Force 25˚C at Top of Roller	Oz.	2.0	5.0	8.0
Maximum Allowable Radial Load	Lbs.	N/A	N/A	30.0

JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH GRIP

Standard Characteristics/Ratings (continued):

HTWS Switches				
Mechanical Life, Full Forward to Full Back	3,000,000 Cycles			
Operating Force 25˚C at Top of Roller	Oz.	2.0	5.0	8.0
Maximum Allowable Radial Load	Lbs.	N/A	N/A	15.0
HTLT4 Switches				
Mechanical Life,	3,000,000 Cycles			
Operating Force (w/Boot) Top of Roller @ 20˚C	Oz.	5.0	8.0	16.0
Maximum Allowable Vertical Force on Button	Lbs.	N/A	N/A	25.0
Maximum Allowable Radial Force on Top of Knob	Lbs.	N/A	N/A	25.0
Maximum Allowable Torque on Button about Shaft Axis	In-Lbs	N/A	N/A	5.0
TC-5 Switches				
Mechanical Life	3,000,000 Cycles			
Operating Force	Oz.	8.0	16.0	24.0

ENVIRONMENTAL:

Joystick	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Humidity	96% RH, 70˚C, 96 Hrs.			
Vibration	10g, 24 Hz – 2KHz Swept Sinusoidal			
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			
EMI/RFI Withstand	Per SAE J1113 (Contact factory for details)			

Keypads	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Faceplate and Side Keypad Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

P9 Switches	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

K1 Switches	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-30	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

HPL Switches	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

HTW & HTWF Switches	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

HTWM Switches				
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

HTWS Switches				
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP5K8S – Dust-protected, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

HTLT Switches				
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

Standard Characteristics/Ratings (continued):

TC-5 Switches				
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	ISO 20653, IP6K8S – Dusttight, Continuous Immersion, 1 meter for 31 minutes, Stationary during test(s)			

Grip	**Units**	**Min**	**Typ**	**Max**
Operating Temperature	˚C	-40	20	85
Electrical Enclosure Design	Unsealed			

MATERIAL:

Joystick	
Plunger	Thermoplastic
Housing	Thermoplastic, Black
Bellows	Silicone, Black
Cable	Output Option AA, DD, JJ & KK: 22 AWG (19 strands of 34 AWG TSC) PVC/Polyurethane Blend Outer Jacket Output Option BB, CC, EE, FF, GG & HH: 24 AWG (19 strands of 34 AWG TSC) PVC/Polyurethane Blend Outer Jacket
Mounting Hardware	#10–24 x 3/4 Carriage Bolts Self Locking Nuts
Keypads	
Keypads	Silicone Rubber, Black
Keypads, Lighted	Silicone Rubber, Black with White Graphic
P9 Switches	
Button	Thermoplastic
Housing	Thermoplastic
K1 Switches	
Button	Thermoplastic
Housing	Thermoplastic
HTW & HTWF Switches	
Button Top	Thermoplastic
Housing	Thermoplastic
HTWM Switches	
Button Top	Thermoplastic
Housing	Thermoplastic
HTWS Switches	
Button Top	Thermoplastic
Housing	Thermoplastic
HTLT4 Switches	
Housing and Flange	Thermoplastic
Bellows	Silicone, Black
TC-5 Switches	
Housing	PBT
Keypad	Silicone Rubber
Grip	
Handle	Thermoplastic, Glass Reinforced, Black
Faceplate	Thermoplastic, Glass Reinforced, Black
Wires	22 AWG, UL Style 1569 (8.5 in. long from bottom of joystick)
Side Keypad Wires	24 AWG, (26/.10TA) Insulation Diameter: .037 Insulation Type: PVC (40 in. from bottom of joystick)

*GRIP TOUCH SWITCH—WARNING ON PERSONAL INJURY AND ANY USE AS SAFETY RELATED:

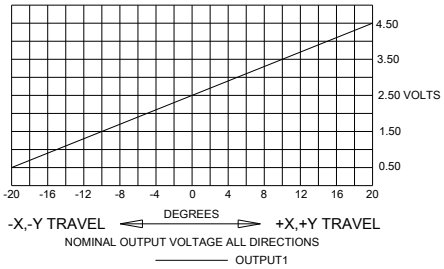
Do not use these products as safety or emergency stop devices or in any application where failure of the product could result in personal injury. Failure to comply with these instructions could result in death or serious injury. OTTO Engineering Inc. makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does OTTO Engineering Inc. assume any liability whatsoever arising out of the application or use of any product. The product sold hereunder by OTTO has been subject to limited testing and should not be used in conjunction with detection of the presence of an operator on or with any equipment that is in any way safety related. OTTO does not accept any liability for incidental, consequential damages, personal injury or loss of life for any claims against the use of this product.

JOYSTICK WITH GRIP OPTIONS

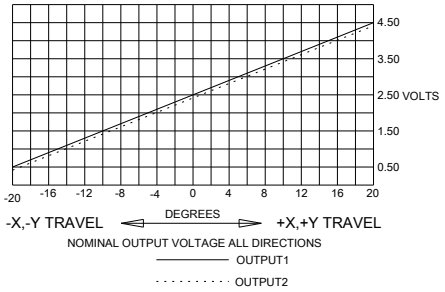
HALL EFFECT JOYSTICK WITH GRIP

HJLG3 OUTPUT CONFIGURATIONS

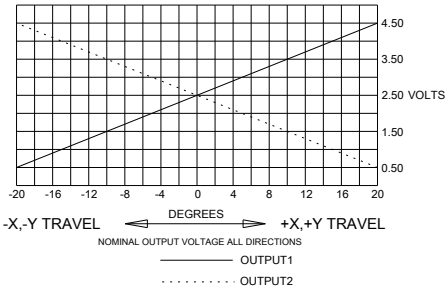
OPTION AA



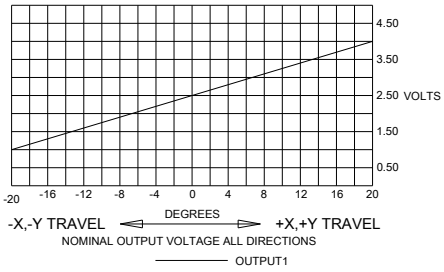
OPTION BB



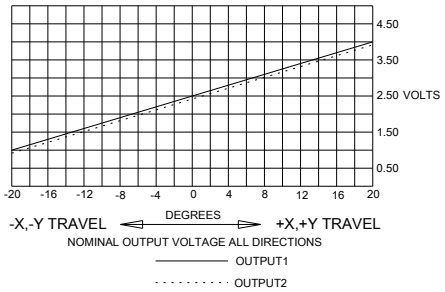
OPTION CC



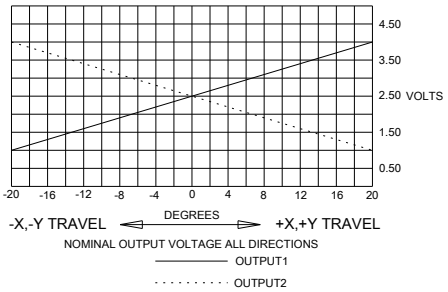
OPTION DD



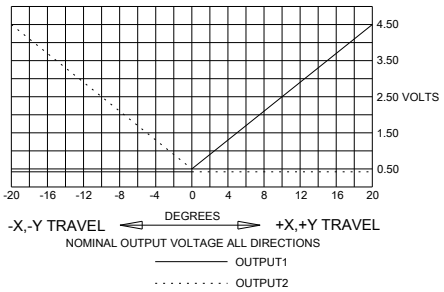
OPTION EE



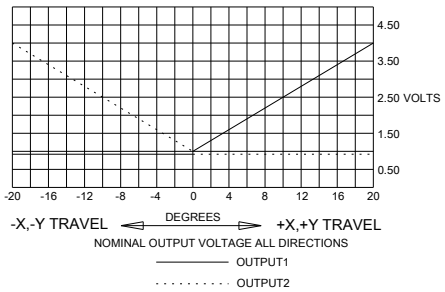
OPTION FF



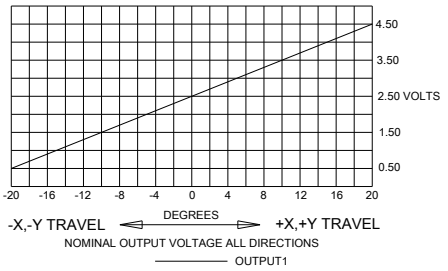
OPTION GG



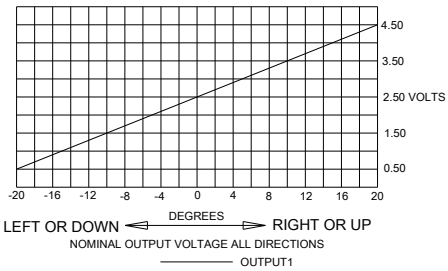
OPTION HH



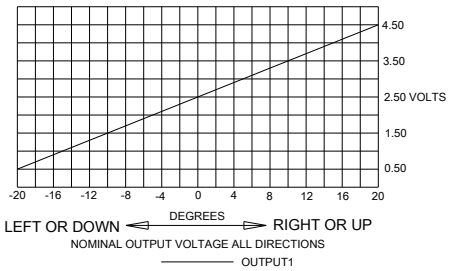
HTLT4 OUTPUT



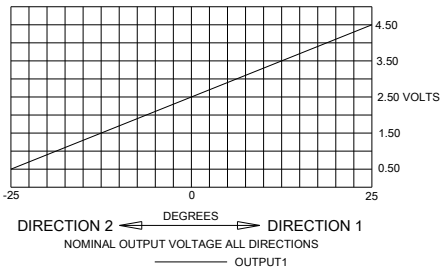
HTWM OUTPUT



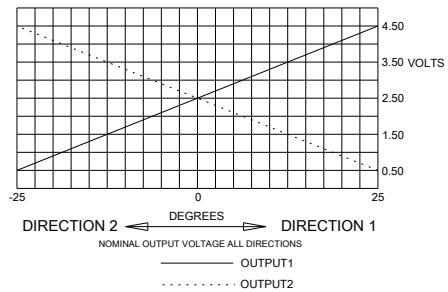
HTWS OUTPUT



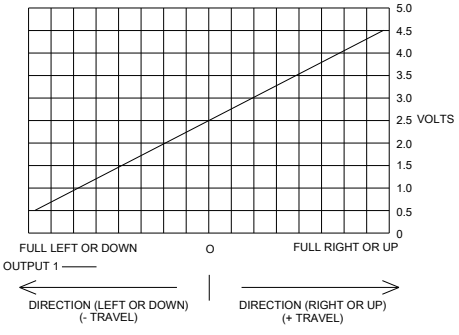
Z-AXIS SINGLE OUTPUT



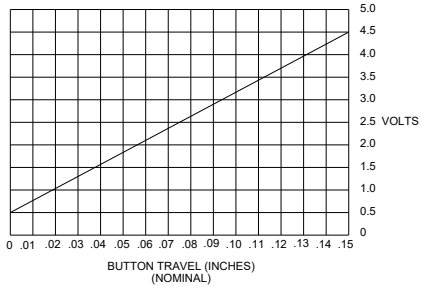
Z-AXIS DUAL OUTPUT



HTW OUTPUT



HPL OUTPUT



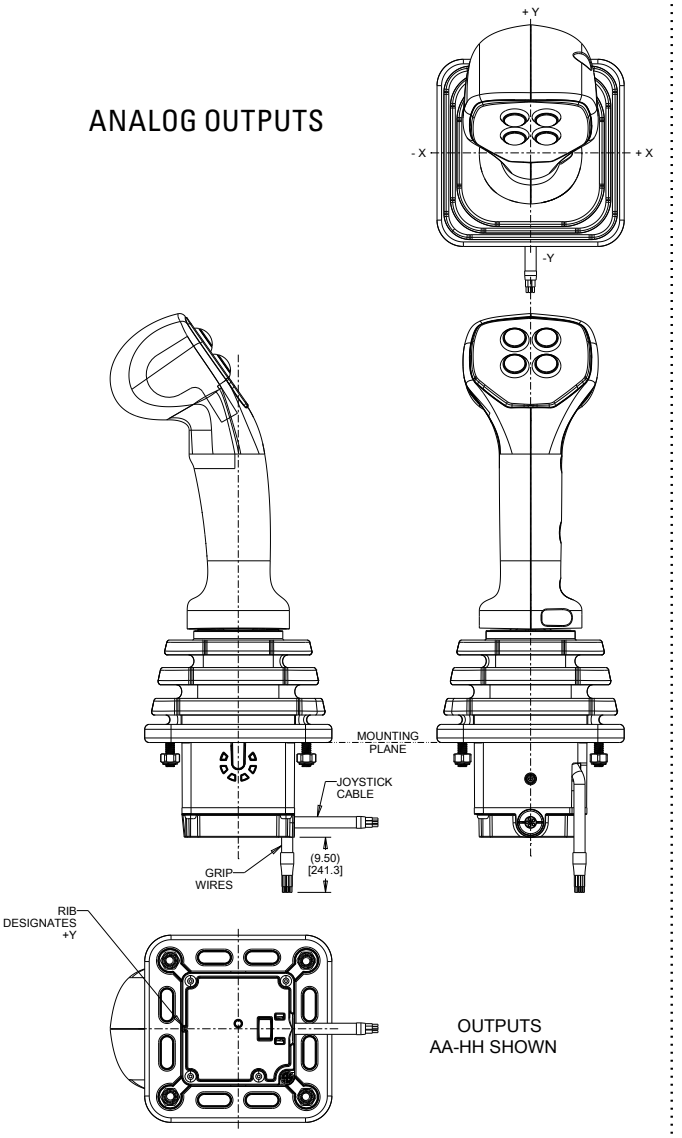
JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH GRIP

OUTPUTS AND JOYSTICK SCHEMATICS

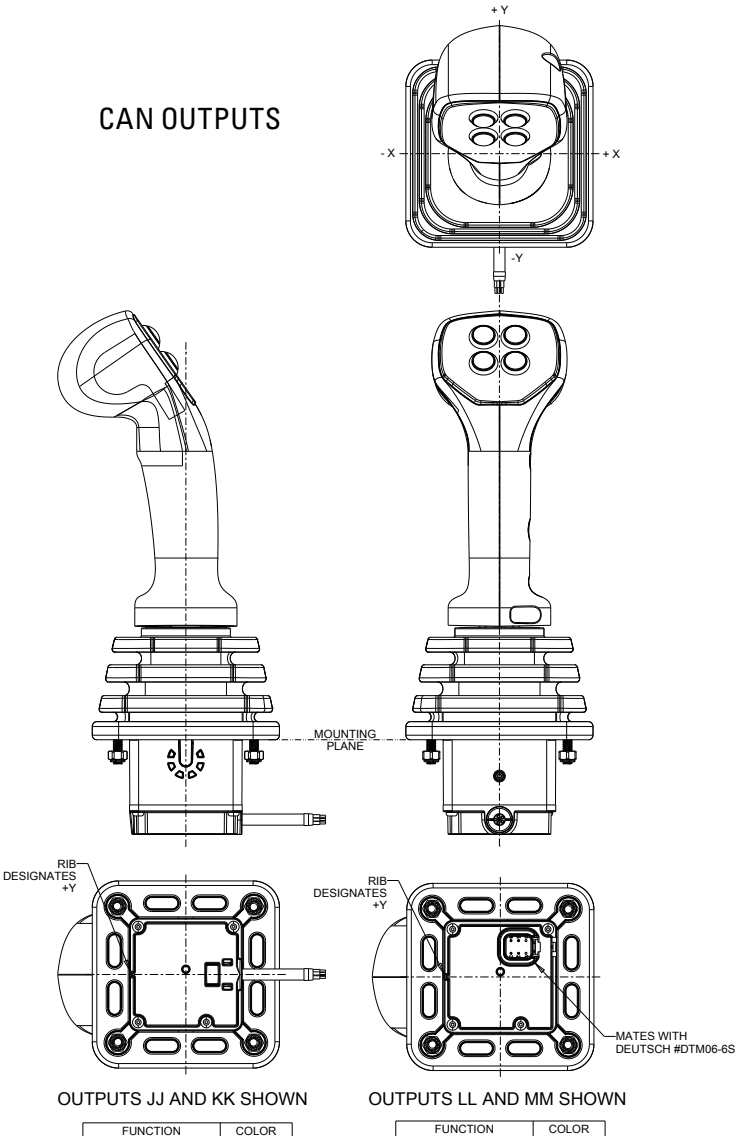
For All Models in the HJLG3 Series

ANALOG OUTPUTS



OUTPUTS AA-HH SHOWN

CAN OUTPUTS

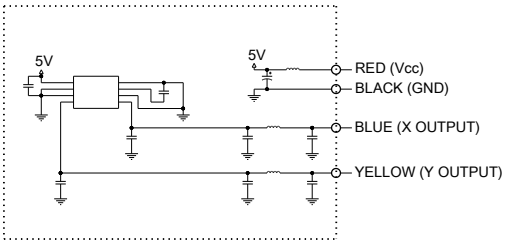


OUTPUTS JJ AND KK SHOWN

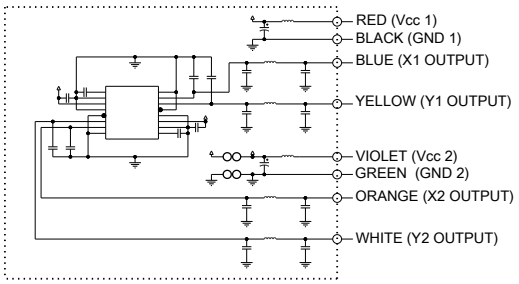
FUNCTION	COLOR
CAN HIGH	YELLOW
+SUPPLY	RED
-SUPPLY	BLACK
CAN LOW	GREEN

OUTPUTS LL AND MM SHOWN

FUNCTION	COLOR
NONE	PIN 1
CAN HIGH	PIN 2
+SUPPLY	PIN 3
-SUPPLY	PIN 4
CAN LOW	PIN 5
NONE	PIN 6



JOYSTICK SCHEMATIC
(AA AND DD OUTPUTS)



JOYSTICK SCHEMATIC
(BB, CC, EE, FF, GG, & HH OUTPUTS)

Specifications Subject To Change Without Notice

JOYSTICK WITH GRIP OPTIONS

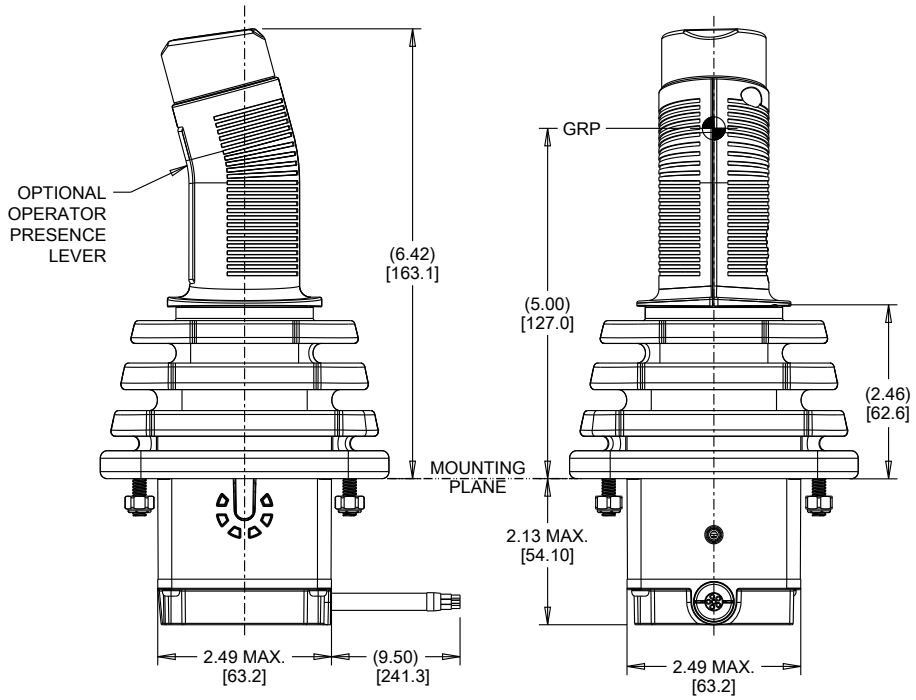
HALL EFFECT JOYSTICK WITH G3-D CONTROL GRIP

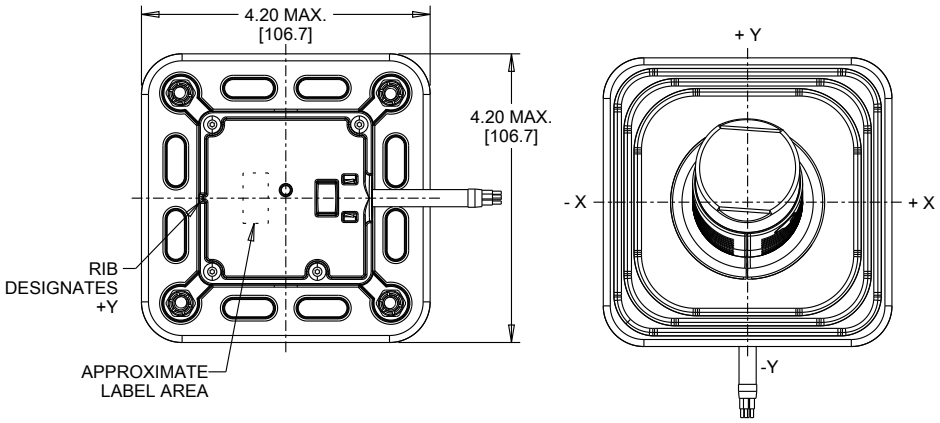
The HJLG3-D combines a G3-D Control Grip with a JHL Hall effect joystick base. Choose from numerous grip handle styles and an optional pushbutton or rocker on top of the grip.

Visit the G3-D product page for more information about the grip, which is customizable to customer specifications.

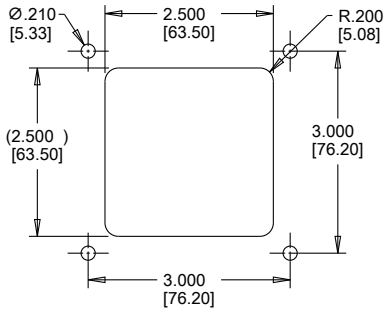
HJLG3-D

HJLG3-D DRAWINGS





HJLG3 Suggested Panel Opening



SUGGESTED PANEL OPENING
MAX. PANEL THICKNESS OF .250

Specifications Subject To Change Without Notice

JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH G3-D CONTROL GRIP

HJLG3-D PART NUMBER CODE

HJLG3-D – X XX X XX X

Gating

- **1.** Gated Single Y-Axis; Return to Center
- **2.** Gated Dual Axis; Return to Center
- **3.** Omni-directional; Center Detent Feel
- **4.** Omni-directional; On-Axis and Off-Axis Guided Feel
- **5.** Gated Single Y-Axis; Center Detent Feel
- **6.** Friction – Single Axis
- **7.** Friction Y-Axis; Return-to-Center X-Axis
- **8.** Omni-directional; Square Smooth Feel
- **9.** Omni-directional; Square On-Axis Guided Feel

Joystick Output 1*		Joystick Output 2**
AA.	2.5 +/- 2.0VDC ①	NONE
BB.	2.5 +/- 2.0VDC ②	2.5 +/- 2.0VDC
CC.	2.5 +/- 2.0VDC ②	2.5 -/+ 2.0VDC
DD.	2.5 +/- 1.5VDC ①	NONE
EE.	2.5 +/- 1.5VDC ②	2.5 +/- 1.5VDC
FF.	2.5 +/- 1.5VDC ②	2.5 -/+ 1.5VDC
GG.	0.5 - 4.5VDC ②	0.5 - 4.5VDC
HH.	1.0 - 4.0VDC ②	1.0 - 4.0VDC
JJ.	CANbus J1939 ①	NONE
KK.	CANopen ①	NONE
LL.	CANbus J1939 w/ Deutsch Connector	NONE
MM.	CANopen w/ Deutsch Connector	NONE
NN.	PLd	NONE

Operate Force

- **1.** Low
- **2.** Medium
- **3.** High

Faceplate Options

- **11.** Rocker (On)-Off-(On) and Operator Presence
- **22.** Rocker (On)-Off-(On) and No Operator Presence
- **33.** One Pushbutton and Operator Presence
- **44.** One Pushbutton and No Operator Presence
- **55.** No Pushbutton, No Rocker and Operator Presence
- **66.** No Pushbutton, No Rocker and No Operator Presence

OP & PB Configuration

- **1.** None③
- **2.** Normally Open (NO)
- **3.** 2 Circuit (NO/NC)④
- **4.** 2 Circuit (NO/NC)⑤

③ Can only be used with configurations 22 and 66.

④ For options 11 (Operator Presence), 44, 55.

⑤ For option 33.

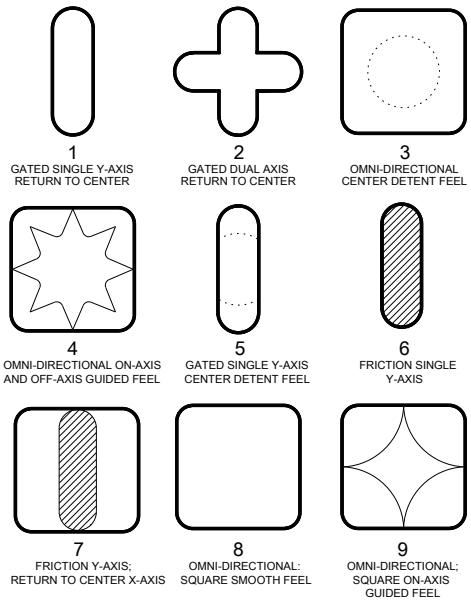
*Outputs are from the center to the full travel position in each direction. Options "AA", "BB", "CC", "DD", "EE", "FF" provide increased voltage in +x, +y; and decreasing voltage in -x, -y direction from 1 output per axis.
Options "GG" and "HH" provide increasing voltages in all directions (+x, +y, -x, -y) from 2 outputs per axis.

**Options "BB" and "EE" provide redundant output 2 which duplicates output 1.
Options "CC" and "FF" provide redundant output 2 which is inverse of output 1.

① 22 AWG Cable

② 24 AWG Cable

HJLG3 Gating Icons

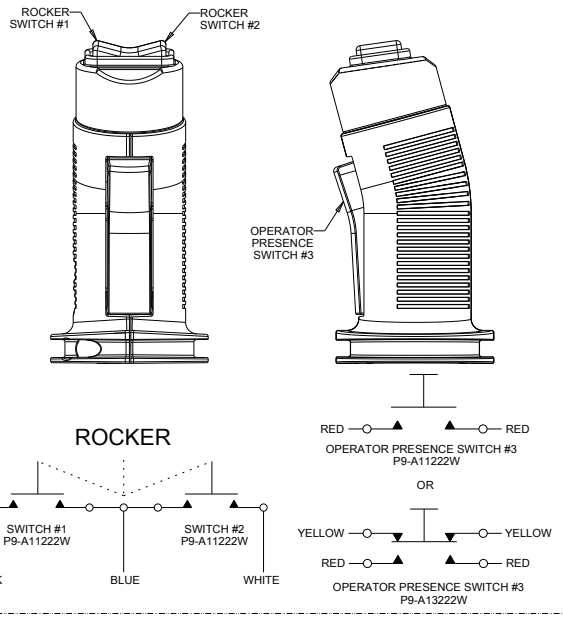


JOYSTICK WITH GRIP OPTIONS

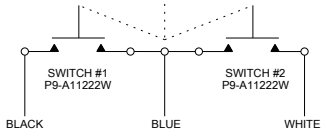
HALL EFFECT JOYSTICK WITH G3-D CONTROL GRIP

HJLG3-D FACEPLATE OPTIONS

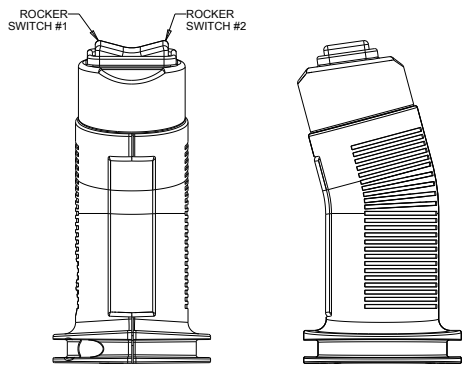
ROCKER AND OPERATOR PRESENCE



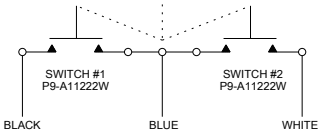
ROCKER



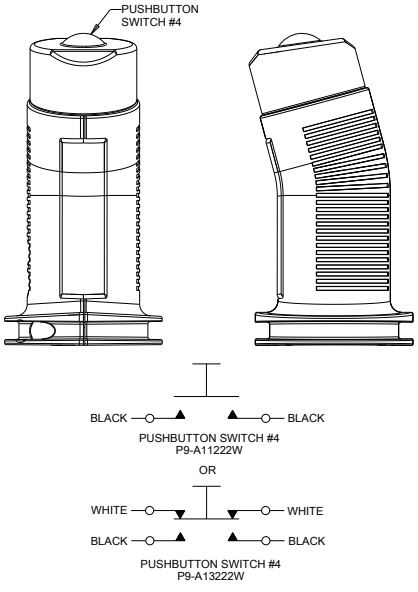
ROCKER



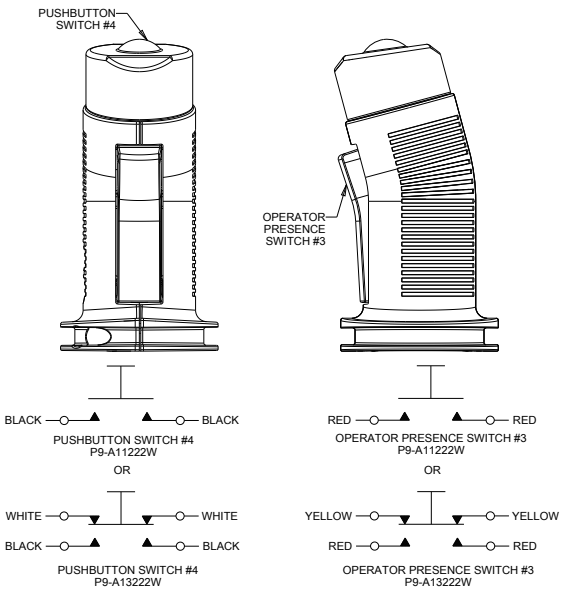
ROCKER



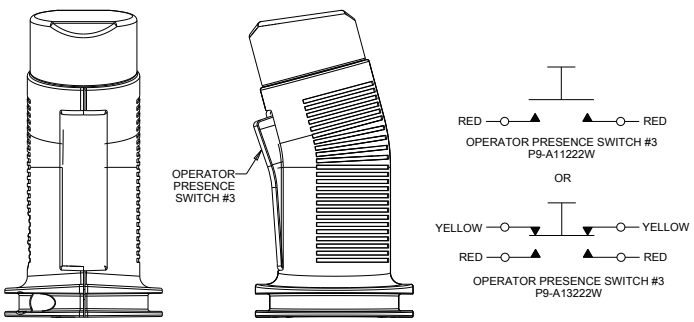
ONE PUSHBUTTON



ONE PUSHBUTTON AND OPERATOR PRESENCE



NO PUSHBUTTON AND OPERATOR PRESENCE



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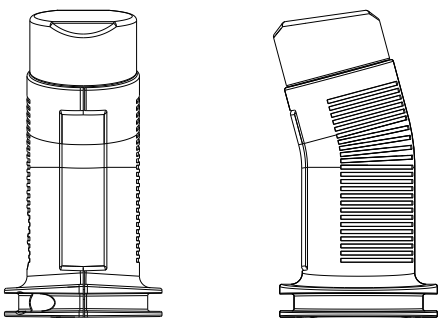

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