JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH GRIP

The HJLG3 medium Hall effect joystick with grip allows you to easily create a standard, catalog codable solution that handles loads up to 250 lbs., has a compact behind-panel size, and a long life. Choose from a variety of grips, faceplates, outputs and gating options that match your application.

Grip choices include G3-A, G3-B, G3-C, and G3-CK Universal Grips as well as the G3-D Control Grip that altogether include nearly 50 standard faceplate design options to choose from.

Analog and digital outputs, CANopen, CANbus J1939, PWM, USB, and redundant sensor output selections are available. Gating options are single axis, single axis with center detent, dual axis, and various omnidirectional selections that include square smooth feel, on-axis and off-axis guided feel, square on-axis guided feel and center detent.

The HJLG3 serves agriculture, construction, off-highway, material handling and industrial equipment markets.

Features:

- **Compact design made for armrest and panel mounting**
- **Contactless Hall effect technology**
- **Mechanical life up to 6 million cycles**
- **Handles loads up to 250 lbs.**
- **Multiple output options, both analog and digital**
- **Electronics sealed to IP68S**
- **Redundant sensors available**
- **Variety of gating options**
- **Modular design**
- **Left or right handed**
- **RoHS compliant**
- **CANbus J1939 and CANopen outputs with integral Deutsch connector option**

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Standard Characteristics/Ratings:

ELECTRICAL:

Joystick				
Rated at Vcc = 5V @ 20˚C	**Units**	**Min**	**Typ**	**Max**
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	
Grip Touch Switch*				
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
Friction @ GRP, Y-Axis	Lbs.	1.0	3.5	6.0
Maximum Allowable Load @ 5" GRP	Lbs.			250 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 End	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 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:

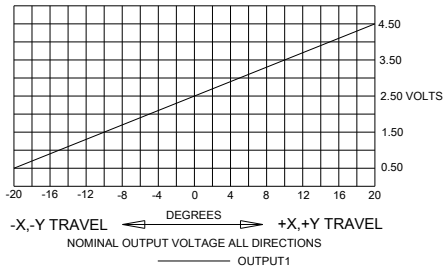
Joystick	
Plunger	Thermoplastic
Housing	Thermoplastic, Black
Bellows	Silicone, Black
Cable	Output Option AA, DD, JJ & KK: 22 AWG (19 strands of 34 AWG TSC) PVC/Polyurethane Blend Outer Jacket Output Option BB, CC, EE, FF, GG & HH: 24 AWG (19 strands of 34 AWG TSC) PVC/Polyurethane Blend Outer Jacket
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 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)

*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.

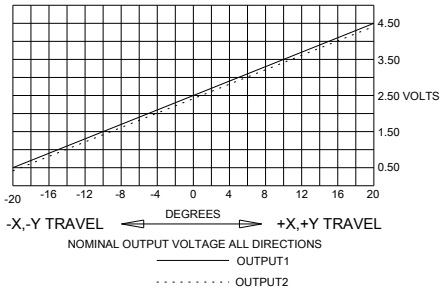
HALL EFFECT JOYSTICK WITH GRIP

HJLG3 OUTPUT CONFIGURATIONS

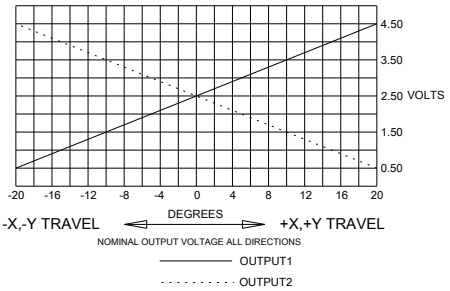
OPTION AA



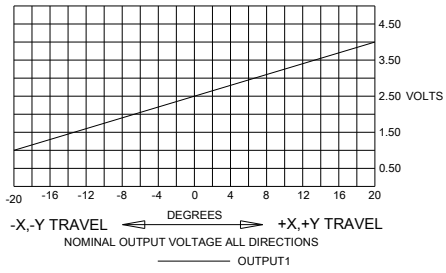
OPTION BB



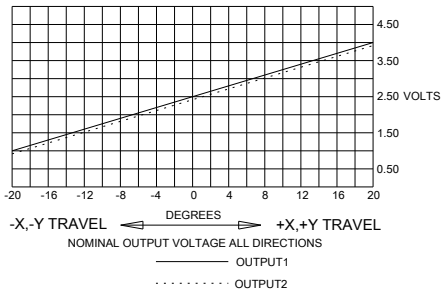
OPTION CC



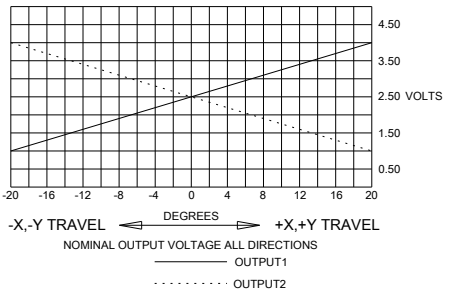
OPTION DD



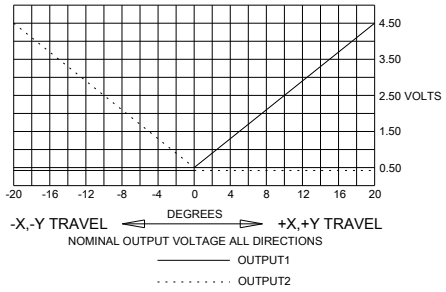
OPTION EE



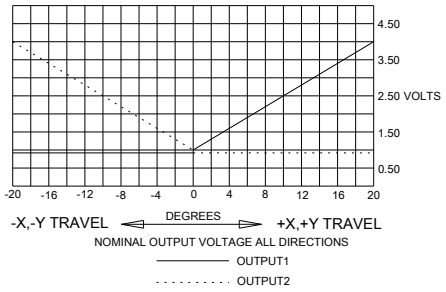
OPTION FF



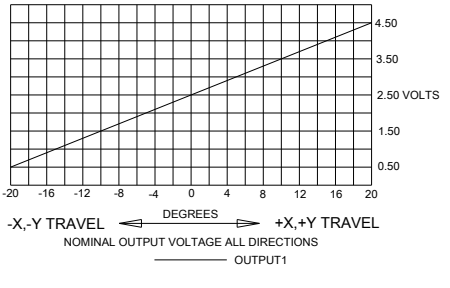
OPTION GG



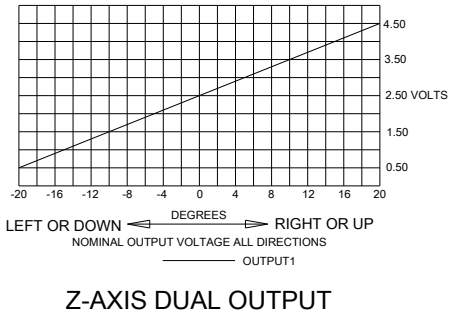
OPTION HH



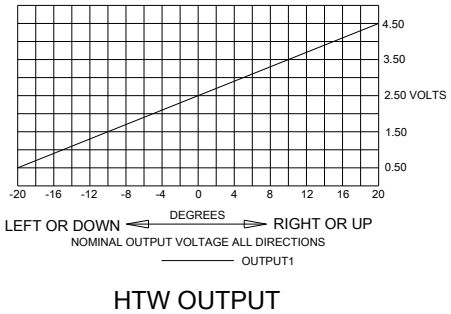
HTLT4 OUTPUT



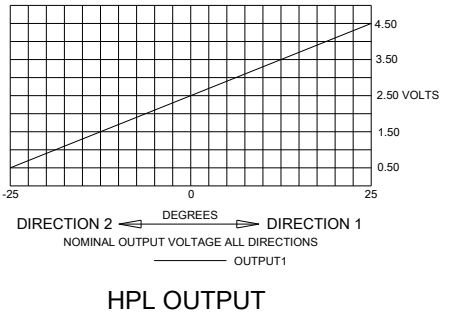
HTWM OUTPUT



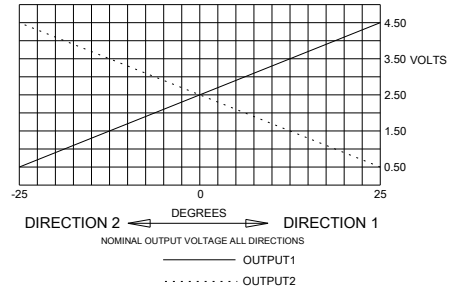
HTWS OUTPUT



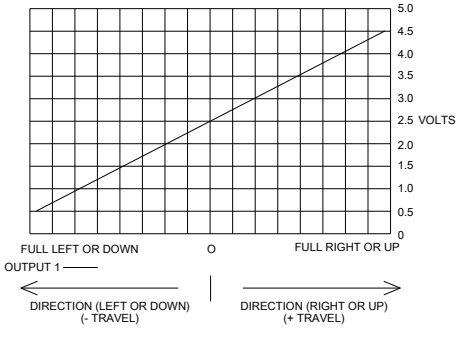
Z-AXIS SINGLE OUTPUT



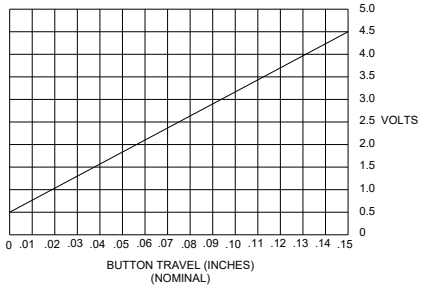
Z-AXIS DUAL OUTPUT



HTW OUTPUT



HPL OUTPUT



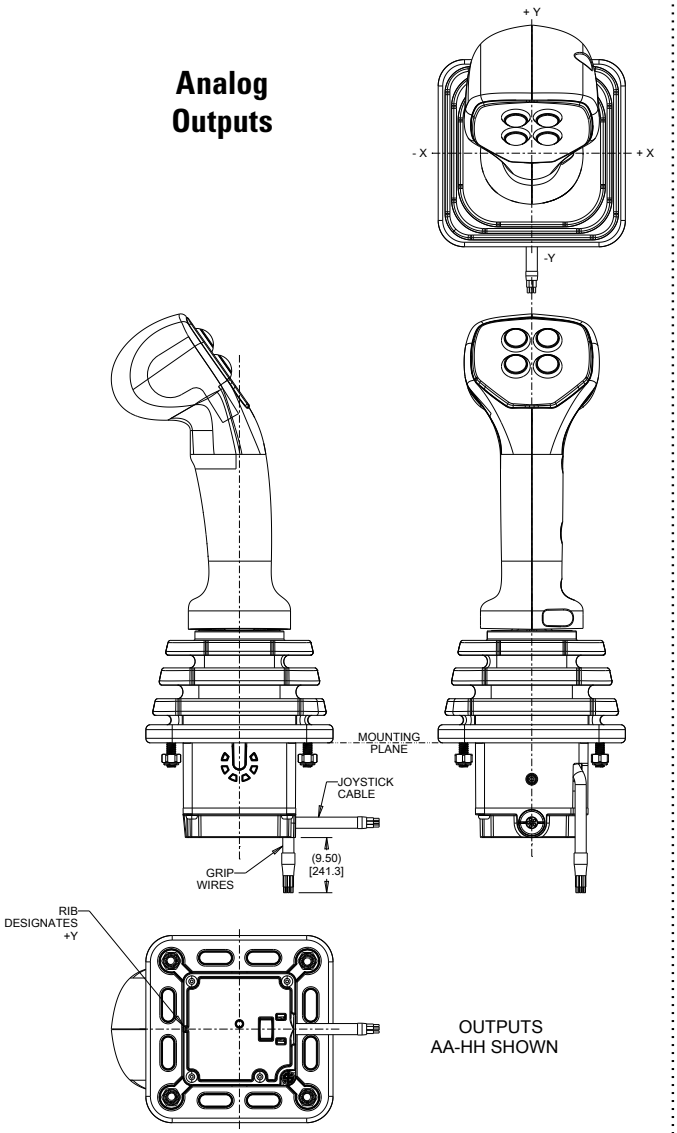
JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH GRIP

OUTPUTS AND JOYSTICK SCHEMATICS

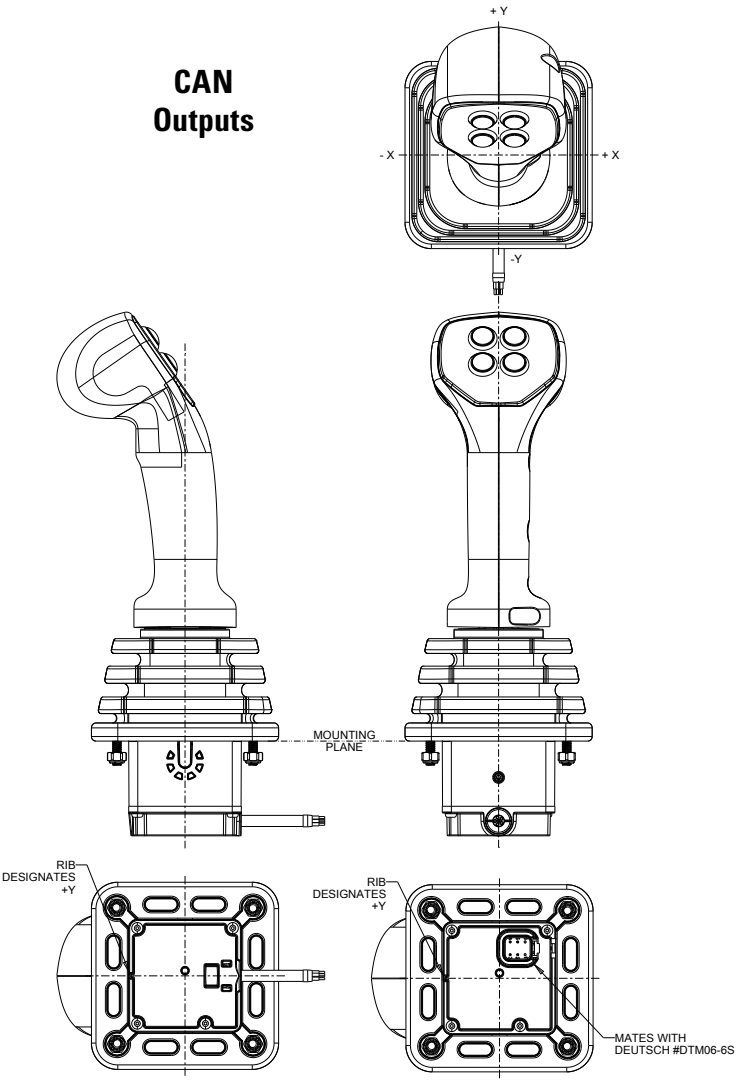
HJLG3-C with Faceplate shown

Analog Outputs



OUTPUTS
AA-HH SHOWN

CAN Outputs

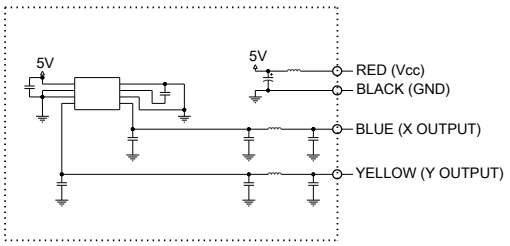


OUTPUTS JJ AND KK SHOWN

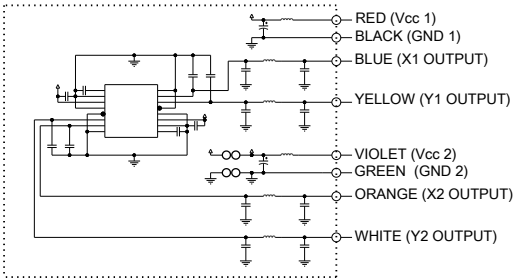
FUNCTION	COLOR
CAN HIGH	YELLOW
+SUPPLY	RED
-SUPPLY	BLACK
CAN LOW	GREEN

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)

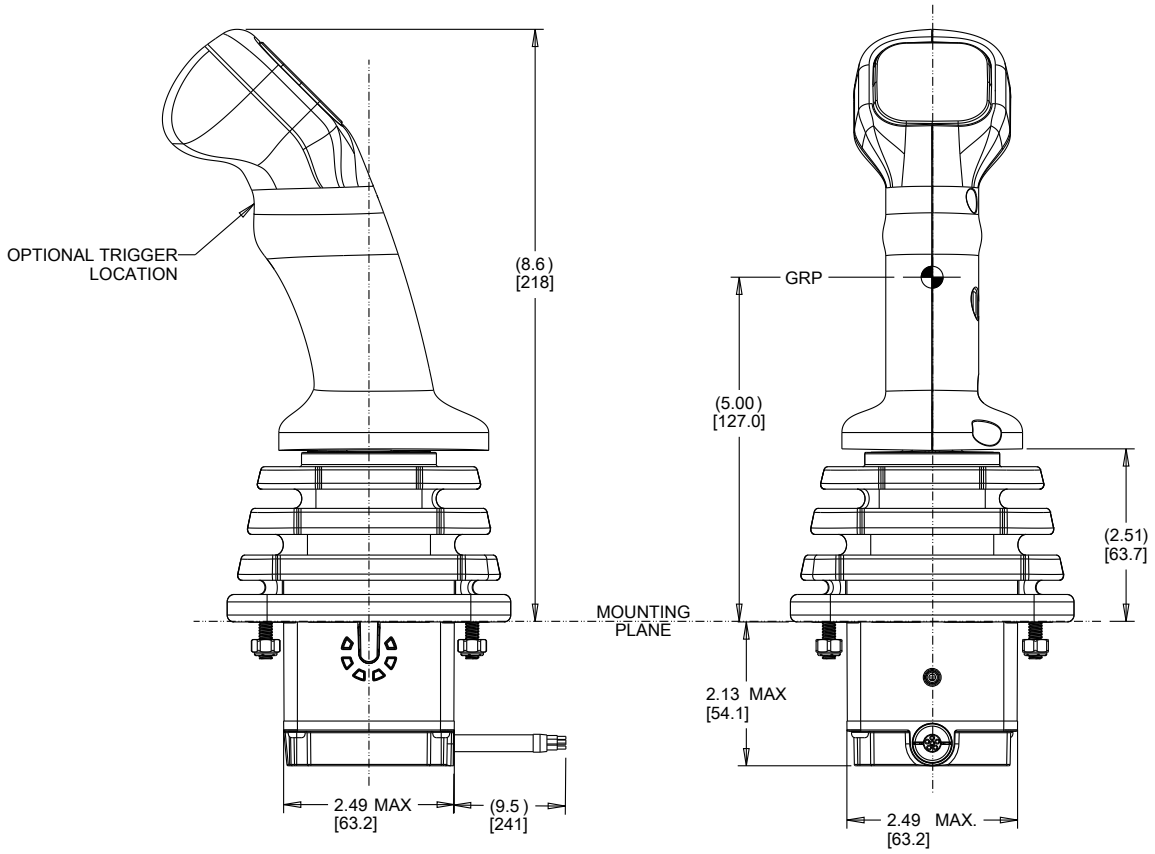


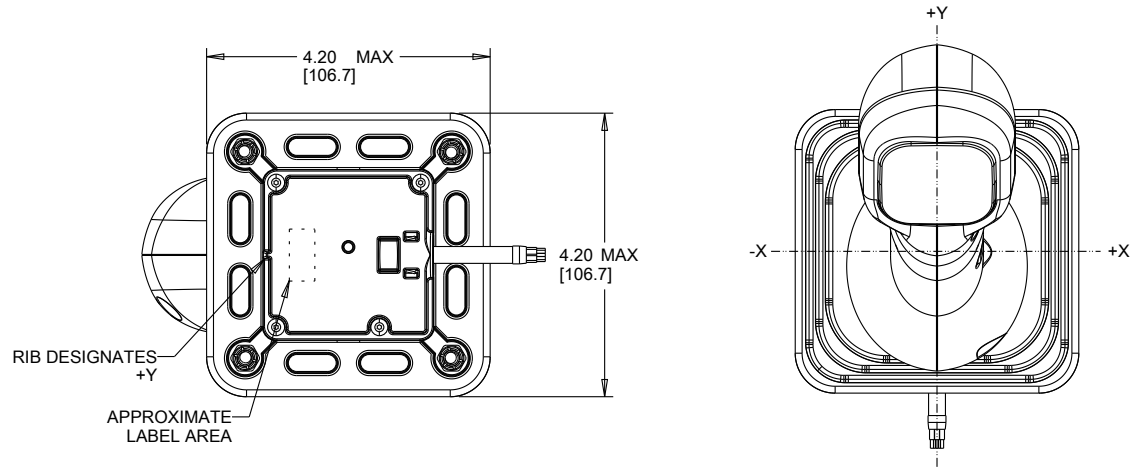
JOYSTICK SCHEMATIC
(BB, CC, EE, FF, GG, & HH OUTPUTS)

JOYSTICK WITH GRIP OPTIONS

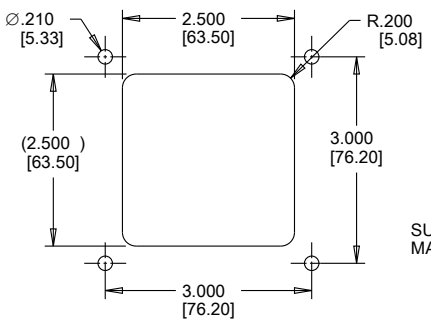
HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

HJLG3-M DRAWINGS





HJLG3-M SUGGESTED PANEL OPENING

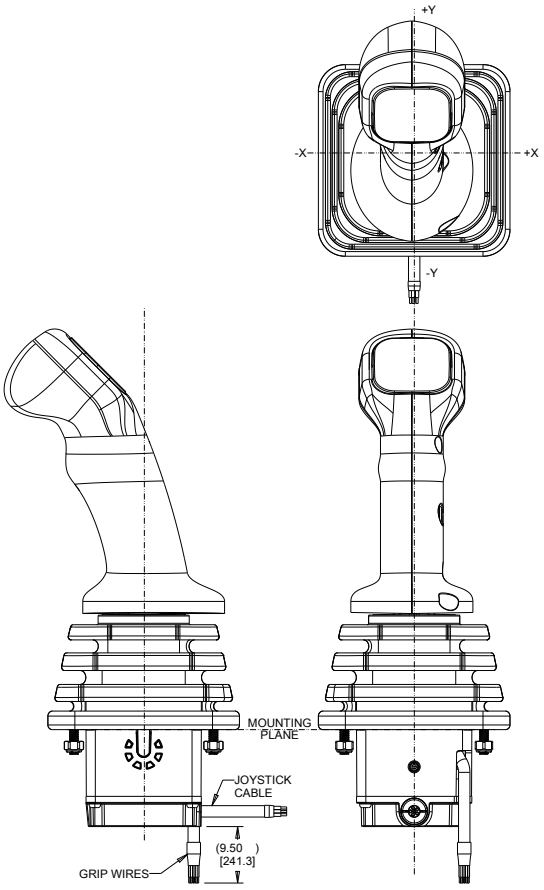


SUGGESTED PANEL OPENING
MAX. PANEL THICKNESS OF .250

JOYSTICK WITH GRIP OPTIONS

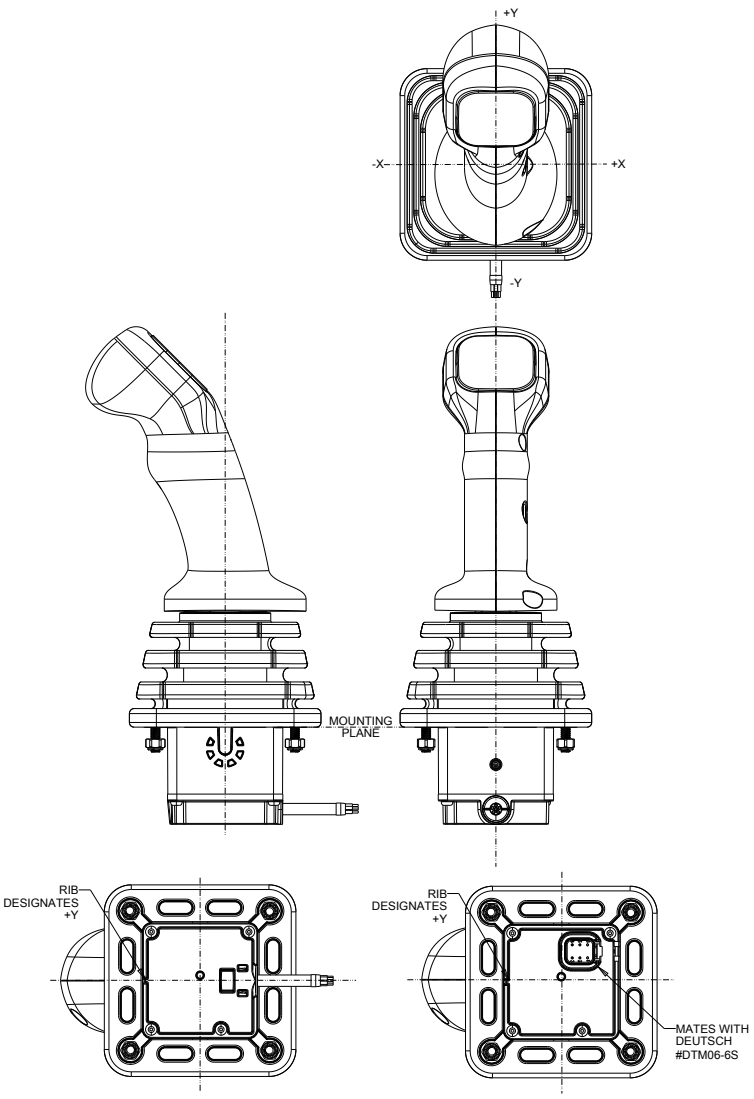
HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

HJLG3-M OUTPUTS AND JOYSTICK SCHEMATICS



OUTPUTS
AA-HH SHOWN
FACEPLATE CP SHOWN

CABLE & WIRES
NOT SHOWN TO
SCALE FOR CLARITY

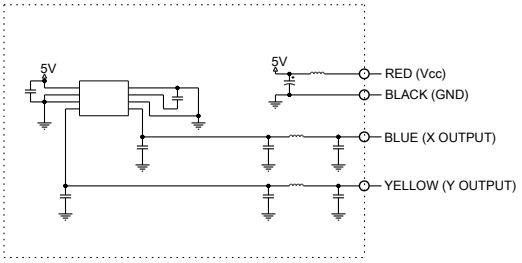


OUTPUTS JJ AND KK SHOWN

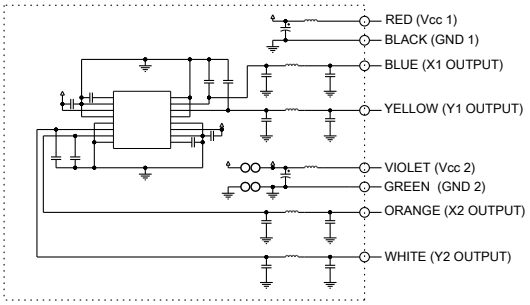
FUNCTION	COLOR
CAN HIGH	YELLOW
+SUPPLY	RED
-SUPPLY	BLACK
CAN LOW	GREEN

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)

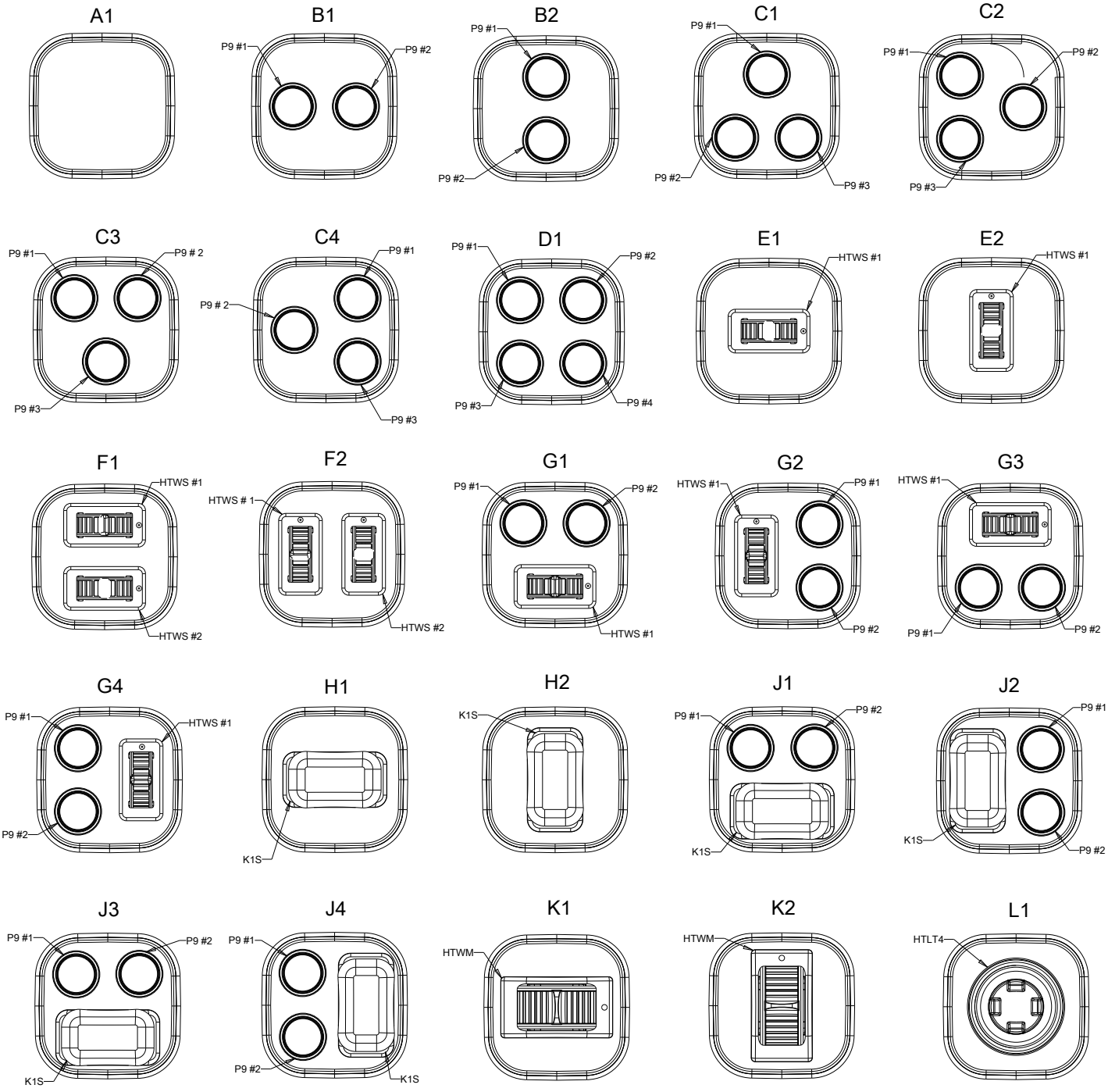


JOYSTICK SCHEMATIC
(BB, CC, EE, FF, GG, & HH OUTPUTS)

JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

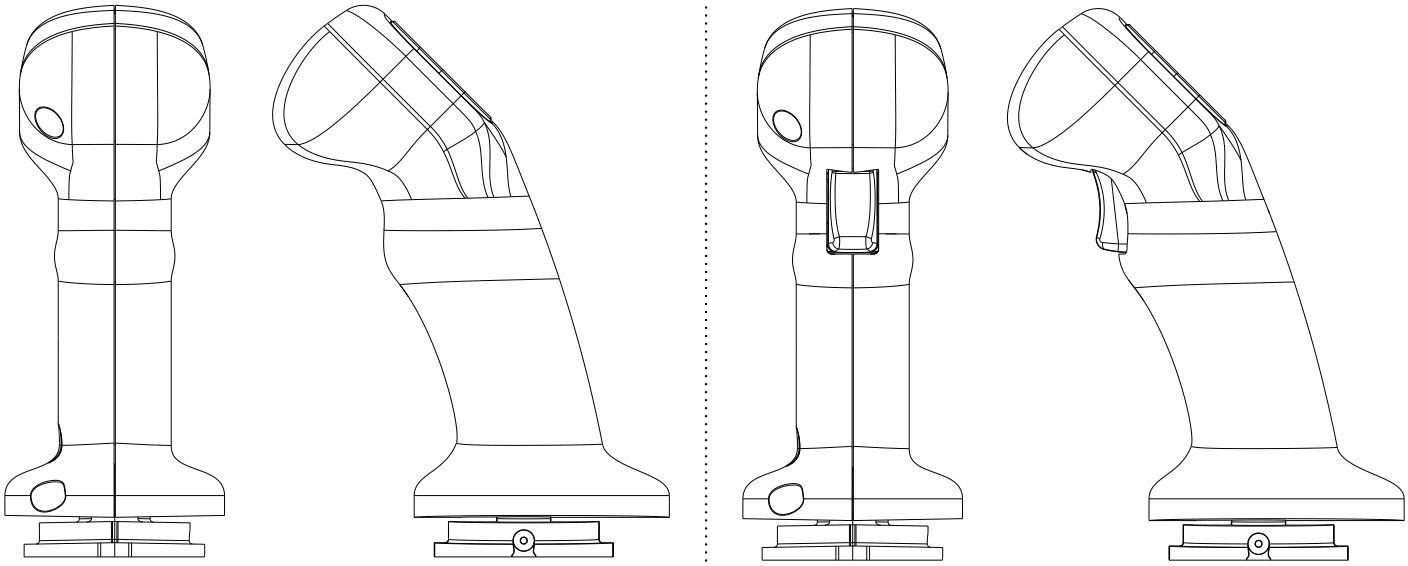
HJLG3-M FACEPLATES



JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

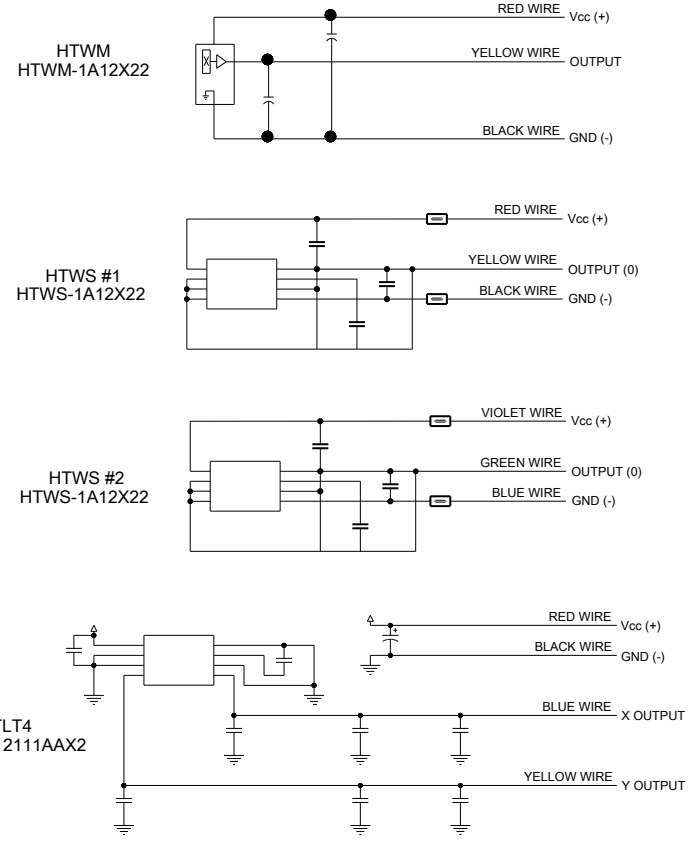
HJLG3-M TRIGGER CONFIGURATIONS



No Trigger

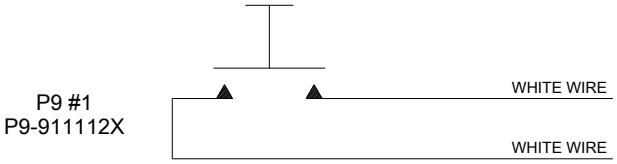
With Trigger

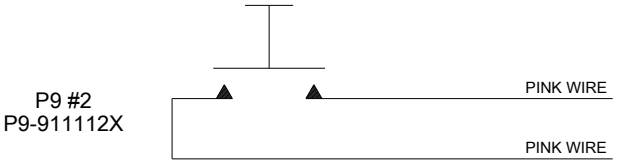
HJLG3-M SCHEMATICS

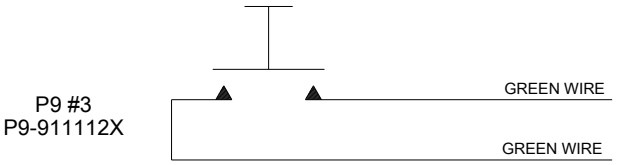


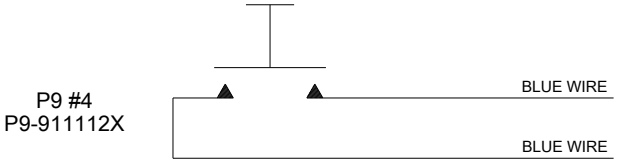
HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

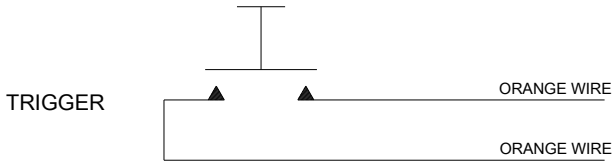
HJLG3-M SCHEMATICS

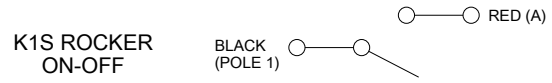


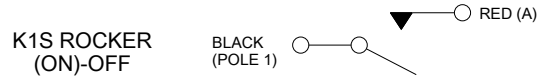


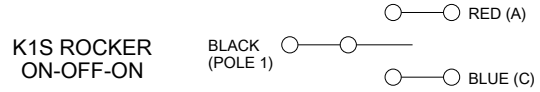


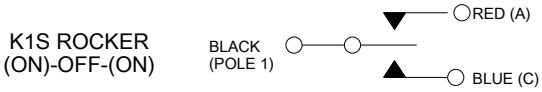


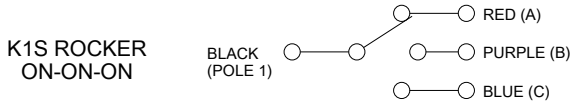












JOYSTICK WITH GRIP OPTIONS

HALL EFFECT JOYSTICK WITH G3-M CONTROL GRIP

HJLG3-M PART NUMBER CODE

HJLG3-M – X XX X XX X X Continued Below

Gating Options

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 Y-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**

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

Operate Force

2. Medium
3. High

Faceplate

A1	**G1**
B1	**G2**
B2	**G3**
C1	**G4**
C2	**H1**
C3	**H2**
C4	**J1**
D1	**J2**
E1	**J3**
E2	**J4**
F1	**K1**
F2	**K2**
	L1

Trigger

1. None
2. YES

K1S Rocker Style - Black***

1. None
2. On-Off
3. (On)-Off
4. On-Off-On
5. (On)-Off-(On)
6. On-On-On
7. (On)-On-(On)

Note: ( ) Denotes Momentary Action

HJLG3-M PART NUMBER CODE CONTINUED

Cont. X X X X

P9 #1 Button Color	P9 #2 Button Color	P9 #3 Button Color	P9 #4 Button Color
1. Red	**1.** Red	**1.** Red	**1.** Red
2. Black	**2.** Black	**2.** Black	**2.** Black
3. Orange	**3.** Orange	**3.** Orange	**3.** Orange
4. Yellow	**4.** Yellow	**4.** Yellow	**4.** Yellow
5. Green	**5.** Green	**5.** Green	**5.** Green
6. Blue	**6.** Blue	**6.** Blue	**6.** Blue
7. Violet	**7.** Violet	**7.** Violet	**7.** Violet
8. Gray	**8.** Gray	**8.** Gray	**8.** Gray
9. White	**9.** White	**9.** White	**9.** White
N. None	**N.** None	**N.** None	**N.** None

*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.

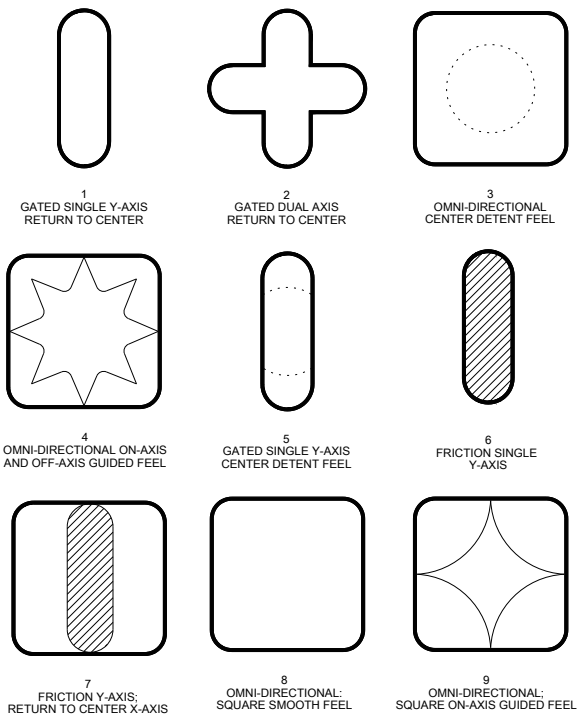
**Options "BB"and "EE" provide redundant output 2 which duplicates output 1. Options "CC"and "FF"provide redundant output 2 which is inverse of output 1.

*** K1S Rocker Switches: on position or momentary position is up or to the right and ( ) denotes momentary action. Contact factory for rocker legends and additional color options.

① 22 AWG Cable

② 24 AWG Cable

HJLG3-M GATING ICONS



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