

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 to match your application.

G3-A, G3-B, G3-C, G3-CK and G3-M Universal Grips, as well as the G3-D Control Grip, altogether offer nearly 50 standard faceplate design options.

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**

JOYSTICK WITH GRIP OPTIONS

HJLG3
MEDIUM
JOYSTICK
WITH GRIP

HALL EFFECT JOYSTICK WITH GRIP

Standard Characteristics/Ratings:

ELECTRICAL:

Joystick

Rated at Vcc = 5V @ 20°C Load = 1 ma (4.7 KΩ)	Units	Min	Typ	Max
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
Op. Force (w/Bellows) @ GRP, Friction Y-Axis	Lbs.	1.0	3.5	6.0
Maximum Allowable Load @ 5" GRP	Lbs.			250 Lbs.

Keypads

Mechanical Life	3,000,000 Cycles			
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P9 Switches

Mechanical Life	1,250,000 Cycles			
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K1 Switches

Mechanical Life	1,000,000 Cycles			
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HPL Switches

Mechanical Life	100,000 Cycles			
Full Stroke Per Button				
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	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)			
HTWS Switches	Units	Min	Typ	Max
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	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)			

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)			

***WARNING ON PERSONAL INJURY AND ANY USE AS SAFETY RELATED:**

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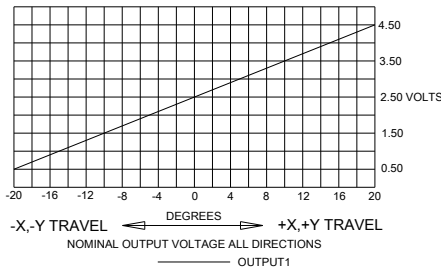
JOYSTICK WITH GRIP OPTIONS

HJLG3
MEDIUM
JOYSTICK
WITH GRIP

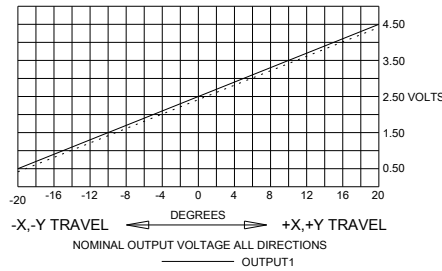
HALL EFFECT JOYSTICK WITH GRIP

HJLG3 OUTPUT CONFIGURATIONS

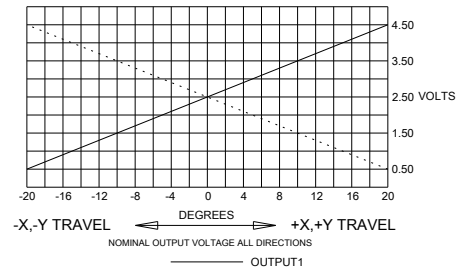
OPTION AA



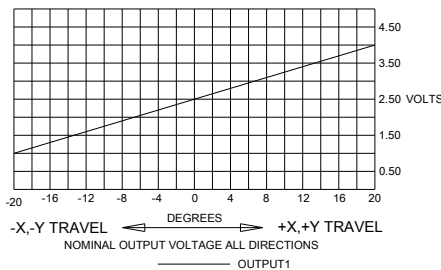
OPTION BB



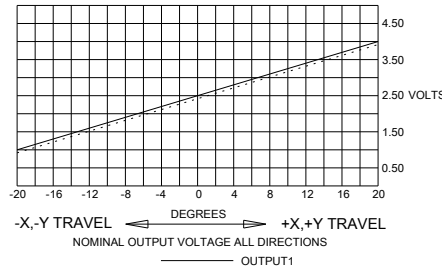
OPTION CC



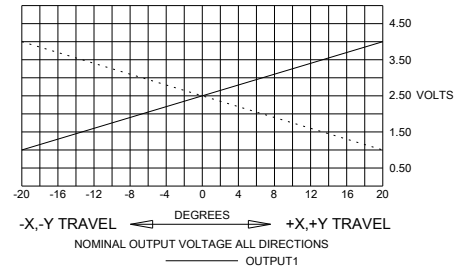
OPTION DD



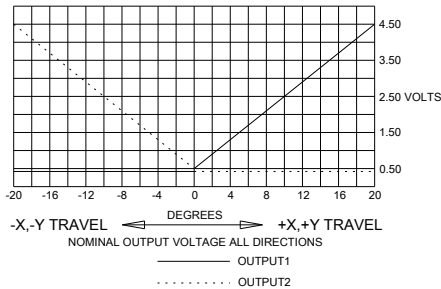
OPTION EE



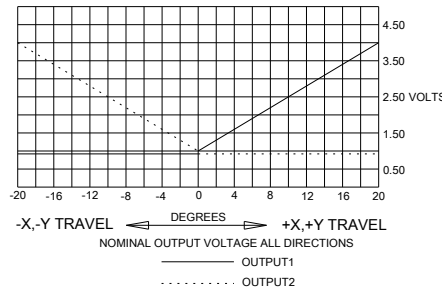
OPTION FF



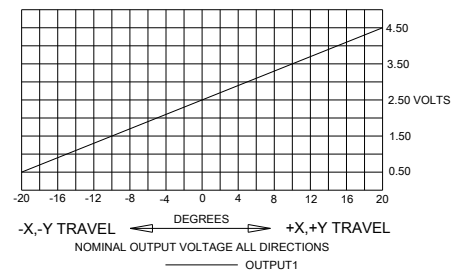
OPTION GG



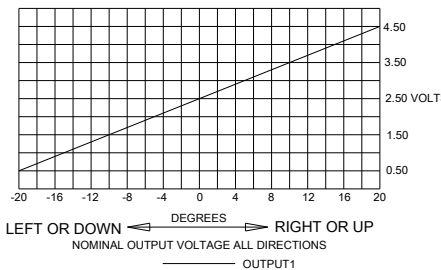
OPTION HH



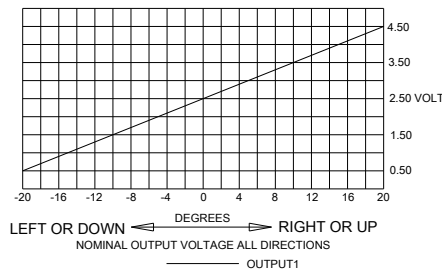
HTLT4 OUTPUT



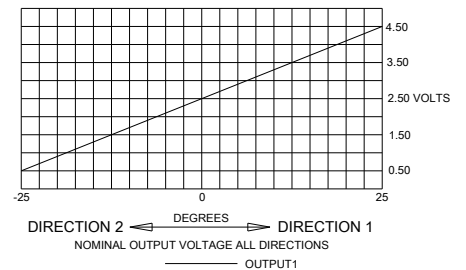
HTWM OUTPUT



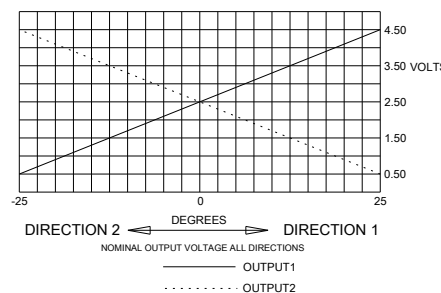
HTWS OUTPUT



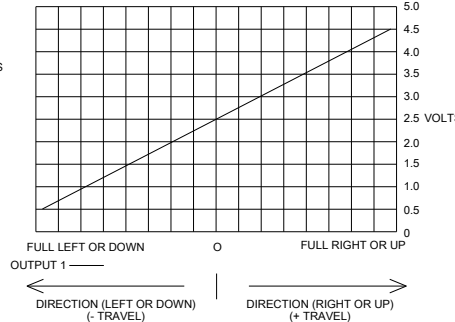
Z-AXIS SINGLE OUTPUT



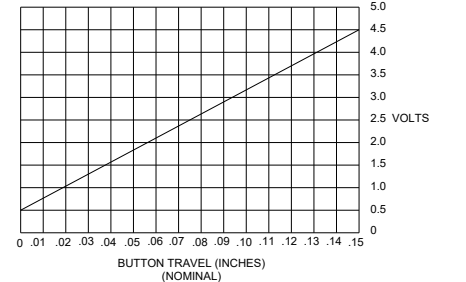
Z-AXIS DUAL OUTPUT



HTW OUTPUT



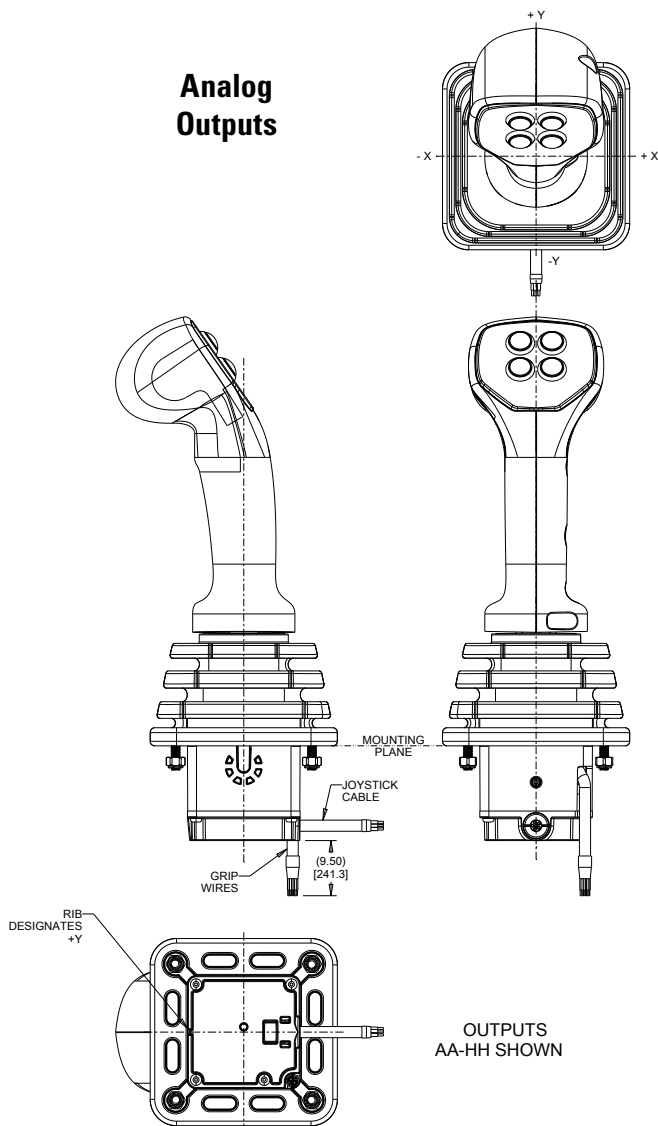
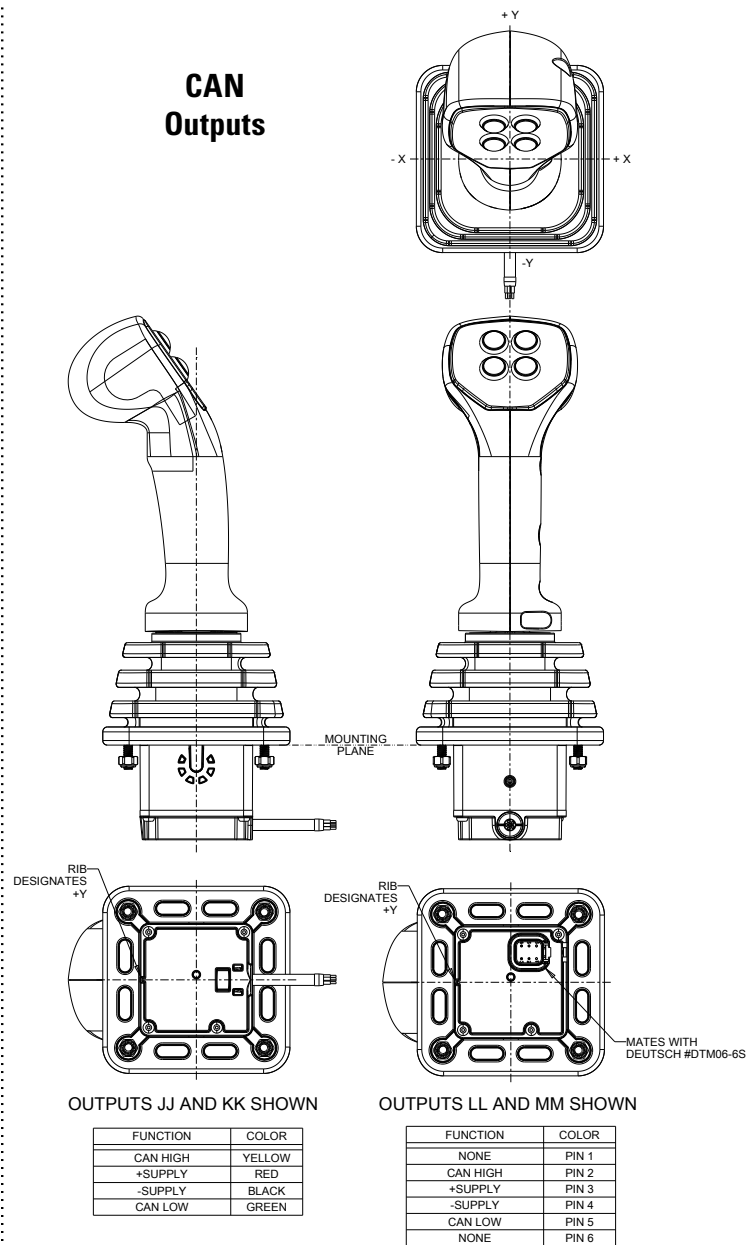
HPL OUTPUT



HALL EFFECT JOYSTICK WITH GRIP

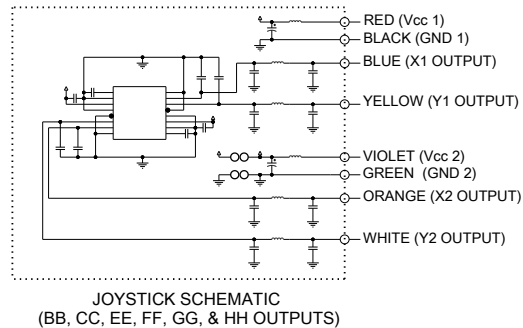
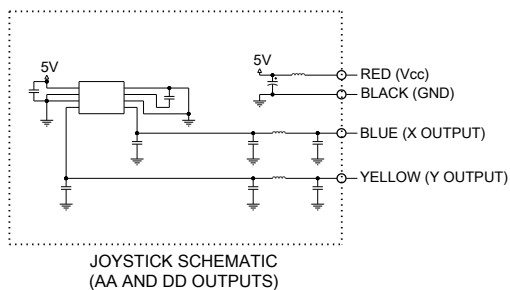
OUTPUTS AND JOYSTICK SCHEMATICS

HJLG3-C with Faceplate shown

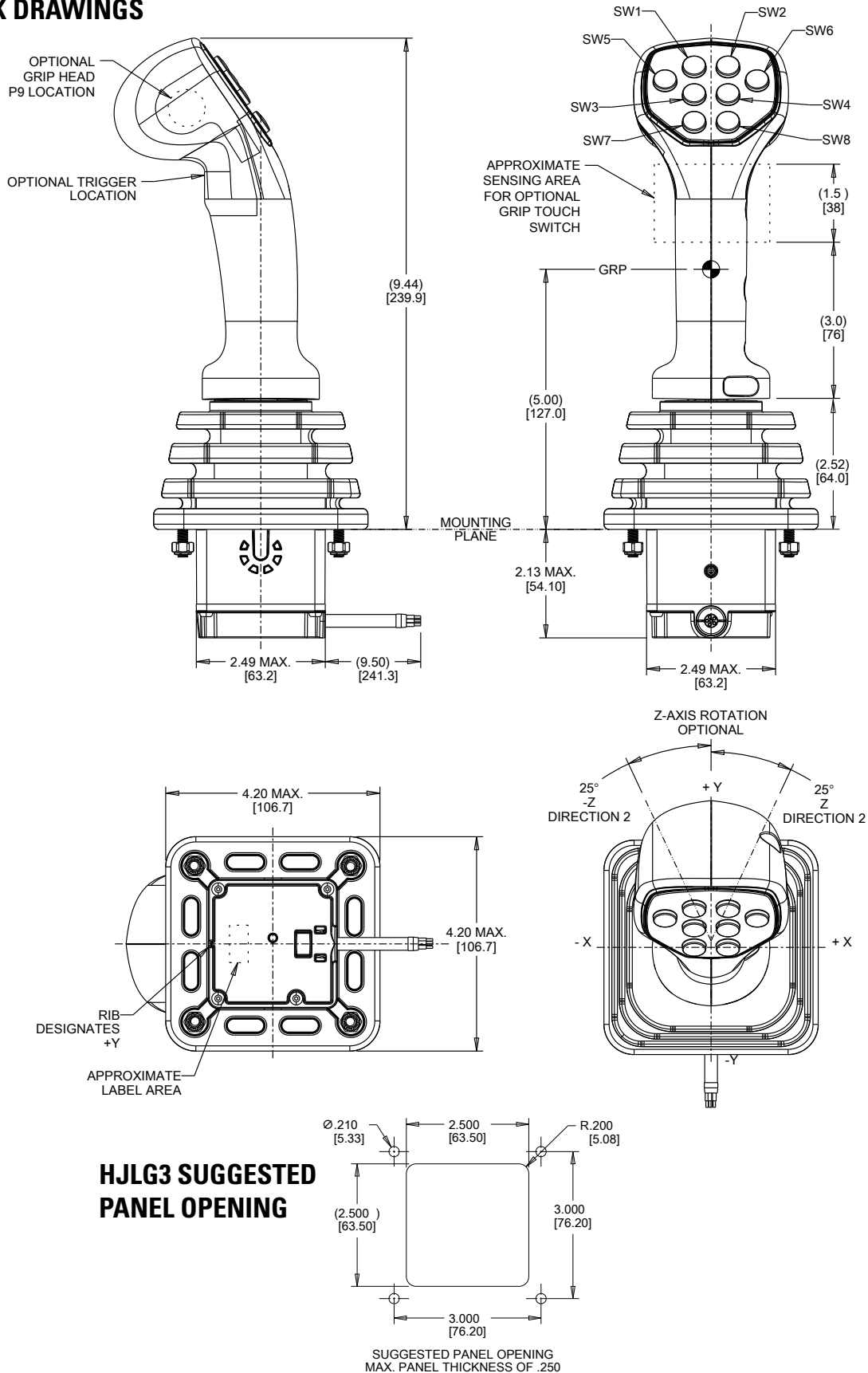
Analog
OutputsCAN
Outputs

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



HJLG3-CK DRAWINGS

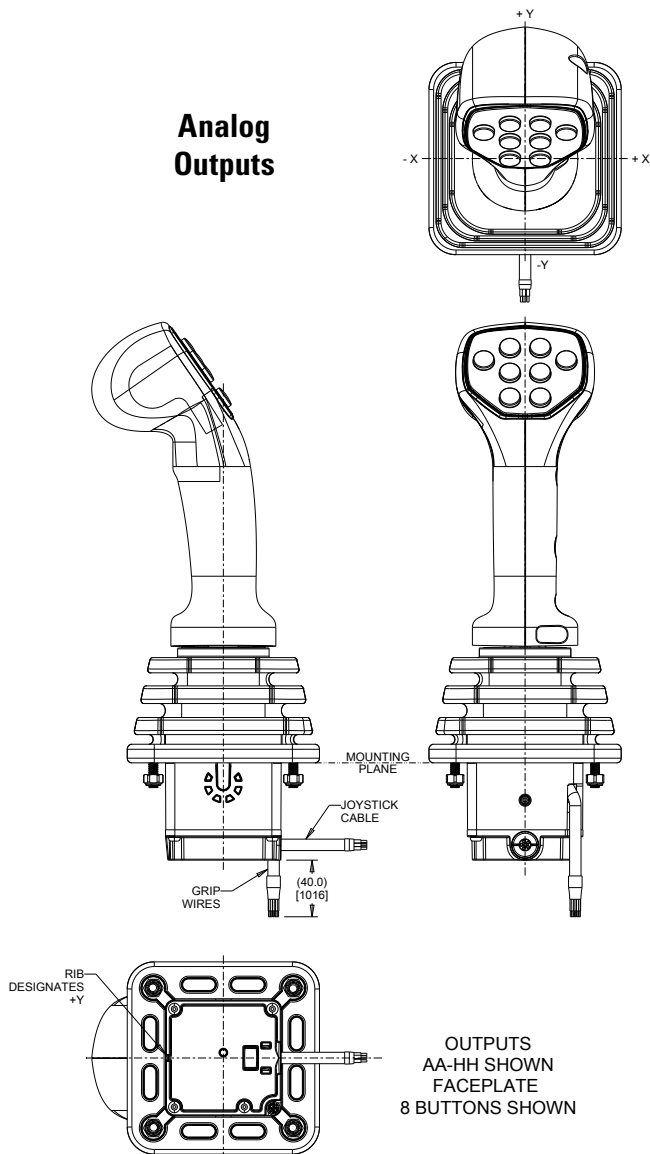


JOYSTICK WITH GRIP OPTIONS

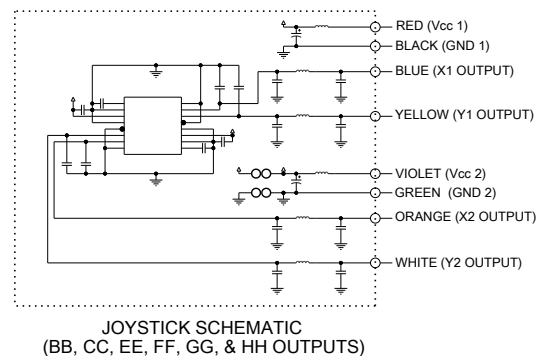
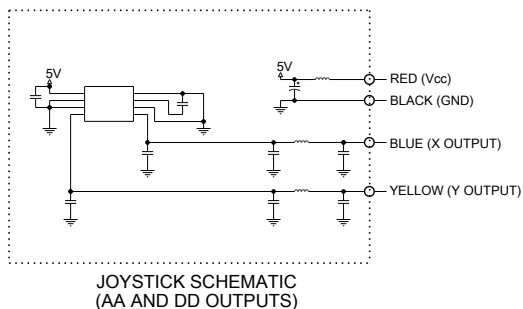
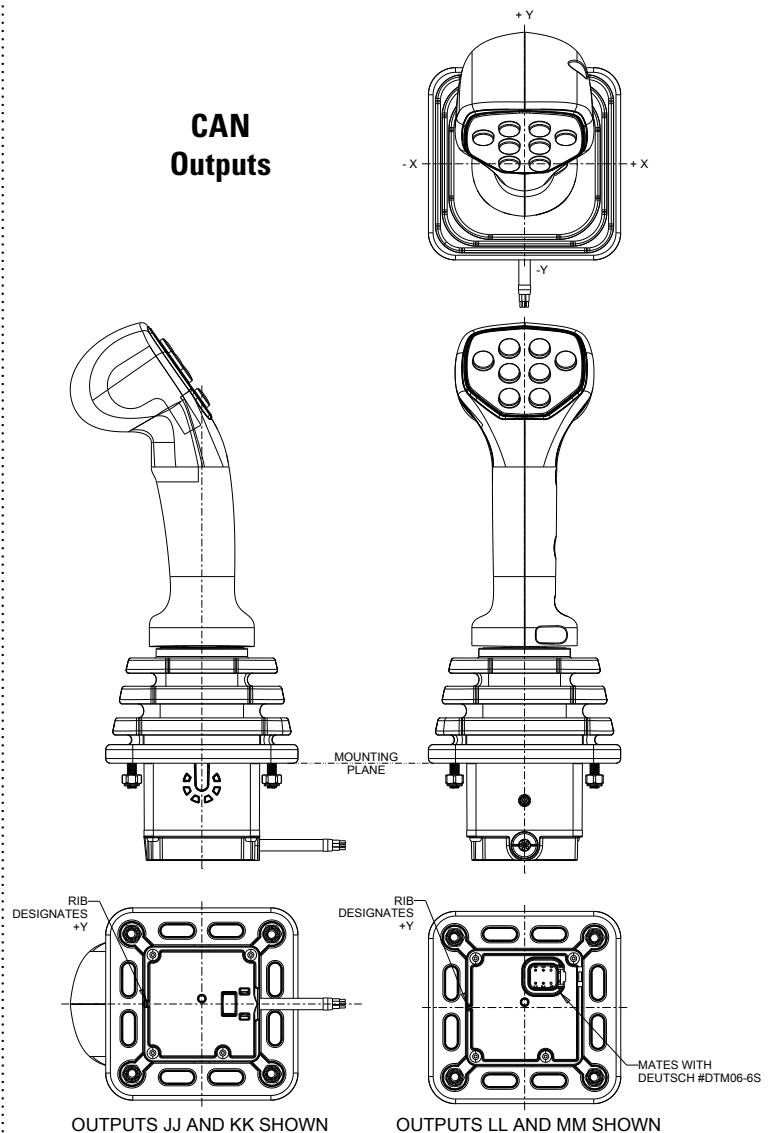
HALL EFFECT JOYSTICK WITH G3-CK UNIVERSAL GRIP

HJLG3-CK OUTPUTS AND JOYSTICK SCHEMATICS

Analog Outputs

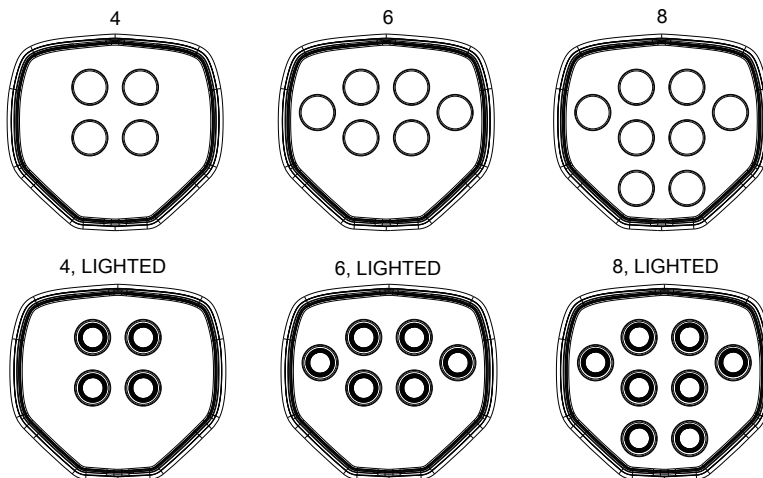


CAN Outputs

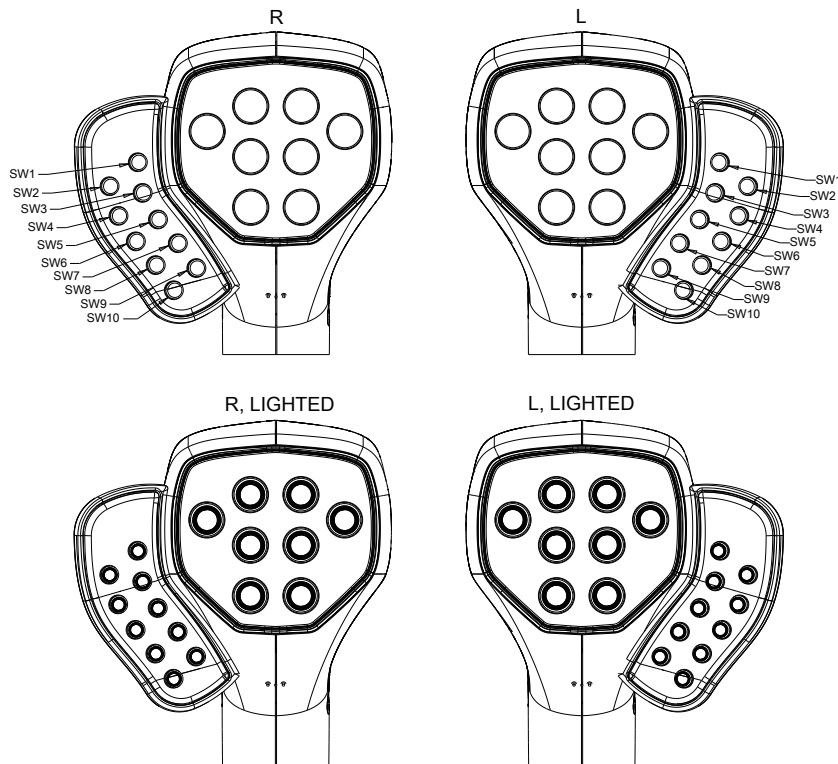


HJLG3-CK KEYPAD CONFIGURATIONS AND SCHEMATICS

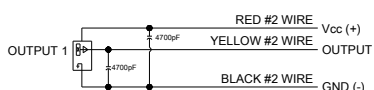
CENTER KEYPAD CONFIGURATIONS



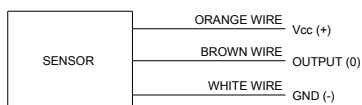
SIDE KEYPAD CONFIGURATIONS



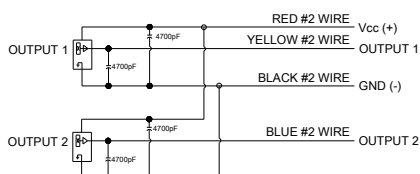
Z-AXIS SINGLE OUTPUT



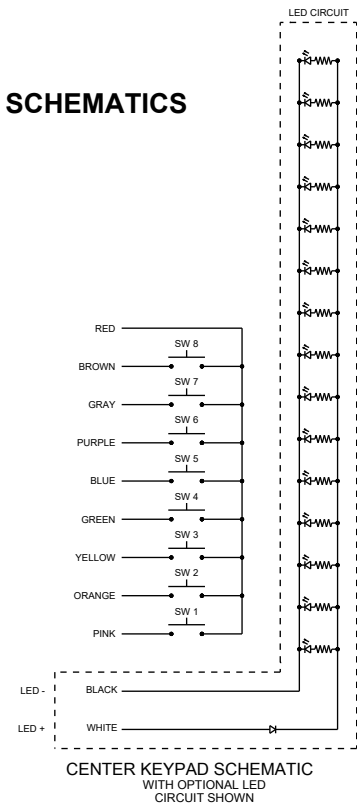
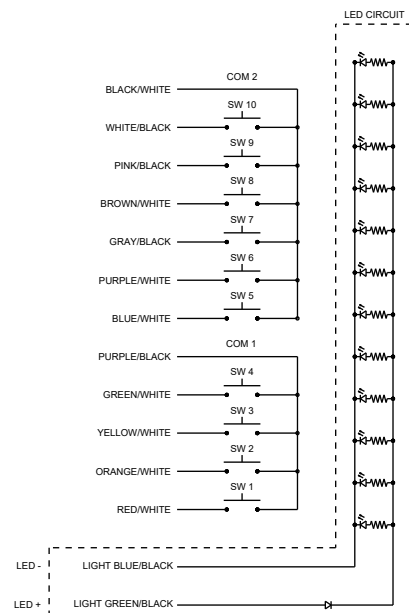
GRIP TOUCH SWITCH



Z-AXIS DUAL OUTPUT



SCHEMATICS

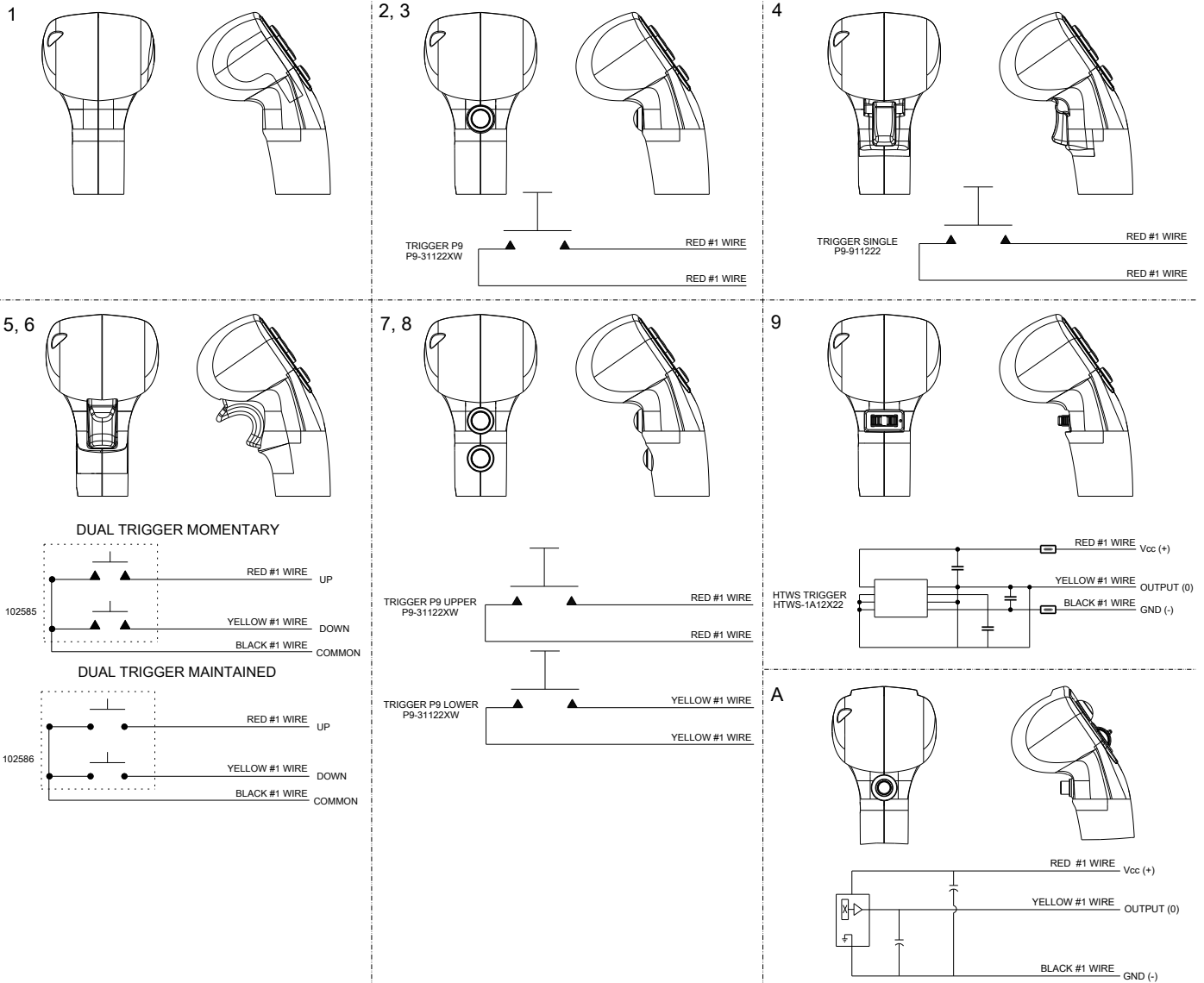
CENTER KEYPAD SCHEMATIC
WITH OPTIONAL LED
CIRCUIT SHOWNSIDE KEYPAD SCHEMATIC
WITH OPTIONAL LED
CIRCUIT SHOWN

JOYSTICK WITH GRIP OPTIONS

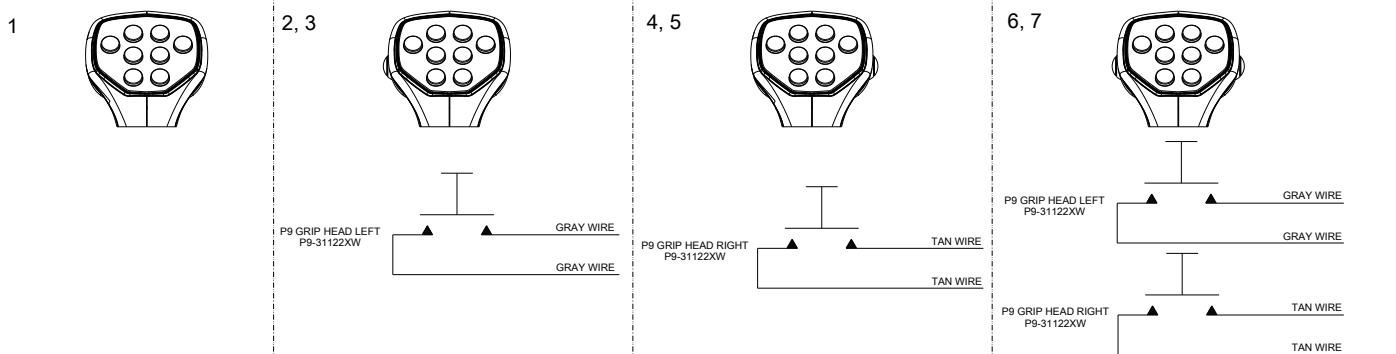
HJLG3-CK
MEDIUM
JOYSTICK
WITH GRIP

HALL EFFECT JOYSTICK WITH G3-CK UNIVERSAL GRIP

HJLG3-CK TRIGGER OPTIONS



HJLG3-CK HEAD PUSHBUTTON OPTIONS



HALL EFFECT JOYSTICK WITH G3-CK UNIVERSAL GRIP

HJLG3-CK PART NUMBER CODE

HJLG3-CK — X

Z-Axis/Grip Touch Switch*

1. No Z-Axis with No Grip Touch Switch
2. Grip Touch Switch Only (Active High)** ① ②
3. Z-Axis (Single Output) with No Grip Touch Switch
4. Z-Axis (Dual Output) with No Grip Touch Switch
5. Grip Touch Switch Only (Active Low)** ① ②

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

XX

Joystick Output 1***

- AA. 2.5 +/- 2.0VDC③
BB. 2.5 +/- 2.0VDC④
CC. 2.5 +/- 2.0VDC④
DD. 2.5 +/- 1.5VDC③
EE. 2.5 +/- 1.5VDC④
FF. 2.5 +/- 1.5VDC④
GG. 0.5 - 4.5VDC④
HH. 1.0 - 4.0VDC④
JJ. CANbus J1939③
KK. CANopen③
LL. CANbus J1939 w/ Deutsch Connector
MM. CANopen w/ Deutsch Connector

Joystick Output 2****

- NONE
2.5 +/- 2.0VDC
2.5 +/- 2.0VDC
NONE
2.5 +/- 1.5VDC
2.5 +/- 1.5VDC
0.5 - 4.5VDC
1.0 - 4.0VDC
NONE
NONE
NONE
NONE

X

Operate Force

2. Medium
3. High

X

Trigger in Handle*

1. None
2. P9 - Black
3. P9 - Red
4. Single
5. Dual Momentary
6. Dual Maintained
7. 2 P9s - Black
8. 2 P9s - Red
9. HTWS - Black ⑤
A. HPL

X

Continued Below

Grip Head Pushbutton*

1. None
2. Left (Black)
3. Left (Red)
4. Right (Black)
5. Right (Red)
6. Left and Right (Black)
7. Left and Right (Red)

HJLG3-CK PART NUMBER CODE CONTINUED

Cont.

X

Faceplate Keypad Configuration

4. 4 Buttons
6. 6 Buttons
8. 8 Buttons

X

Side Keypad Configuration

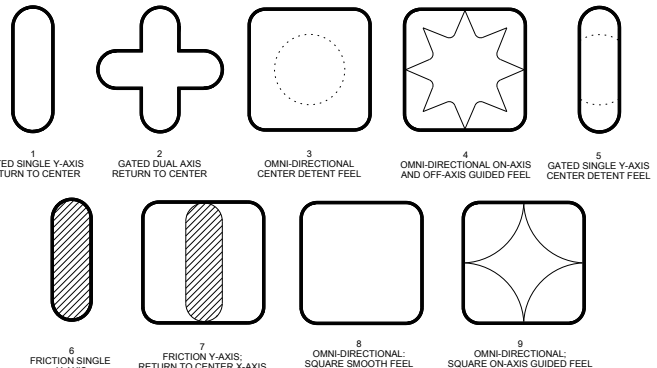
1. None
- L. Left Hand
- R. Right Hand

X

Back Lighting ⑥

- N. None
- L. Lighted Faceplate Keypad & Side Keypad
- F. Lighted Faceplate Keypad Only
- S. Lighted Side Keypad Only

HJLG3 GATING ICONS



*Wires from Z-Axis, Trigger, Head Position and Grip Touch Switch will be bundled in a shrink tube.

**Grip Touch Switch is not available with trigger option 5 or 6.

***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 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.

② User Caution: To guarantee the intended operating characteristics of the capacitive switches, the zone around the switch must be free from materials which can affect switch performance. Those materials include but are not limited to water, cleaning solutions, and other conductive materials. Failure to maintain this contaminant free zone may result in unintended actuation of the capacitive switch.

③ 22 AWG Cable

④ 24 AWG Cable

⑤ HTWS Trigger Switches: positive travel is to the right. Contact factory for additional options.

⑥ White LED's

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