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## HEAVY EQUIPMENT & MATERIAL HANDLING GRIPS

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OTTO Controls manufactures a wide range of styles in its G3 Universal Grips series. G3 grips deliver high performance and long-lasting durability and are ideal for vehicles and machinery in construction, agriculture, material handling, mining and many other commercial and industrial applications.

All grips have a modular design and accommodate OTTO JH, JHL and JHM series Hall effect joysticks. Visit the Joystick Bases

and Grips section of the website to see integrated joystick/grip assemblies.

Customize OTTO grips to meet unique requirements or choose from many standard faceplates and features. Grips come with a variety of pushbuttons, rockers, toggles and Hall effect switches. Triggers are available on most grip handles.

## G3 UNIVERSAL AND CONTROL GRIP MODELS



**G3-A:** smaller grip with up to four switches on its faceplates and has a Z-axis option



**G3-CK:** medium, ergonomic grip with eight faceplate pushbuttons and an optional side keypad



**G3-B:** larger grip that fits as many as six faceplate switches and has a Z-axis option



**G3-D:** control grip that can be configured with a rocker or pushbutton at the top of the handle and an Operator Presence switch



**G3-C:** medium, ergonomic grip with more switch content, a Z-axis option and other advanced functions



**G3-E:** control grip with five or seven pushbuttons and a rocker on the handle



**G3-M:** medium grip that fits up to four switches on its faceplate

OTTO's ergonomically designed and customizable G3-C Universal Grip works well with only a few switches or high switch content for versatile operation of high-performance industrial vehicle and machinery applications. The G3-C can be panel mounted as a fixed control grip or combined with a JH, JHL or JHM series joystick. Options includes Z-axis rotation, Grip Touch sensing, trigger switches, field replaceability and a CANbus board in the grip head.

In addition to 13 standard faceplates, hundreds of combinations of OTTO pushbuttons, rockers, toggles and Hall effect switches can be custom ordered. The Grip Touch switch uses a sensor to detect the presence of the operator's hand on the grip handle. The Z-axis feature allows for a +/- 25° horizontal rotation of the grip when mounted on an OTTO joystick. Trigger switch selections for the back of the grip include single, dual momentary and dual maintained triggers.

## Features:

- **Compatible with OTTO JH, JHL and JHM series Hall effect joysticks**
- **Choose from 13 standard faceplates or customize with hundreds of switch combinations**
- **Back of the grip handle can come with pushbuttons, a thumbwheel or trigger switches**
- **CANbus board optional in grip head\***
- **Grips are optionally field replaceable\***
- **Z-axis option with +/- 25° rotation**
- **Grip Touch operator sensing available on handle**
- **Single and dual output available**
- **Various mounting and termination styles**
- **Modular design reduces the need for tooling charges**

*\*Contact factory for ordering information*



G3-C with CC Faceplate



G3-C with Custom Faceplate Configuration



G3-C with Dual Direction Trigger on Back



G3-C with Pushbutton on Side and Back



HIGH PERFORMANCE, HEAVY EQUIPMENT AND MATERIAL HANDLING GRIPS

**G3-C UNIVERSAL GRIP PART NUMBER CODE**

<b>G3-C</b>	<b>X</b>	<b>XX</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	Part Number Code Continues Below
Configuration		Faceplate	Trigger in Handle	PB in Grip Head - Black	K1 Rocker #1 Style - Black **	K1 Rocker #2 Style - Black **	
1. Grip With Adapter	See Configuration	1. None	1. None	1. None	1. None	1. None	
2. Grip Without Adapter	Configuration	2. One Pushbutton, Black	2. Left	2. ON-OFF	2. ON-OFF	2. ON-OFF	
3. Grip Without Adapter, With Grip Touch Switch (Active Low)	Sheet	3. Two Pushbuttons, Black	3. Right	3. (ON)-OFF	3. (ON)-OFF	3. (ON)-OFF	
4. Grip With Adapter, With Grip Touch Switch (Active Low)		4. HTWS*	4. Left & Right	4. ON-OFF-ON	4. ON-OFF-ON	4. ON-OFF-ON	
5. Grip Without Adapter, With Grip Touch Switch (Active High)		5. Single Direction Momentary		5. (ON)-OFF-(ON)	5. (ON)-OFF-(ON)	5. (ON)-OFF-(ON)	
6. Grip With Adapter, With Grip Touch Switch (Active High)		6. Dual Direction Momentary					
		7. Dual Direction Maintained					
		8. HPL					

\* HTWS-1A12X22

\*\* ( ) denotes momentary action. On position or momentary position is up or to the right. Contact factory for rocker legends and additional color options.

**G3-C PART NUMBER CODE CONTINUED**

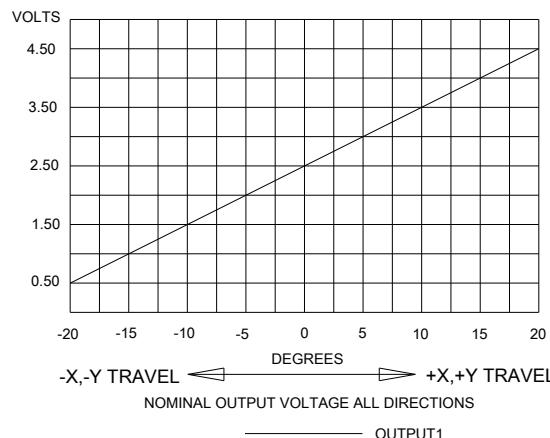
<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
HTWM #1***	HTWM #2***	P9 Button #1 Color	P9 Button #2 Color	P9 Button #3 Color	P9 Button #4 Color	P9 Button #5 Color	P9 Button #6 Color	P9 Button #7 Color	P9 Button #8 Color
1. None	1. None	1. Red							
2. Return to Center <sup>1</sup>	2. Return to Center <sup>1</sup>	2. Black							
		3. Orange							
		4. Yellow							
		5. Green							
		6. Blue							
		7. Violet							
		8. Gray							
		9. White							
1 = HTWM-1J12X22****		N. None							

\*\*\* Positive travel is up or to the right. Contact factory for additional options.

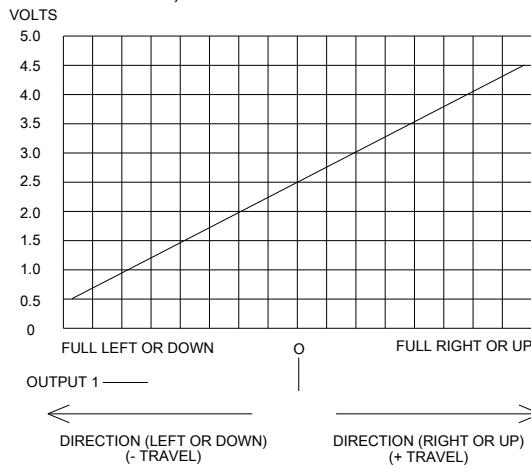
\*\*\*\* Contact factory for additional options.

**G3-C OUTPUT**

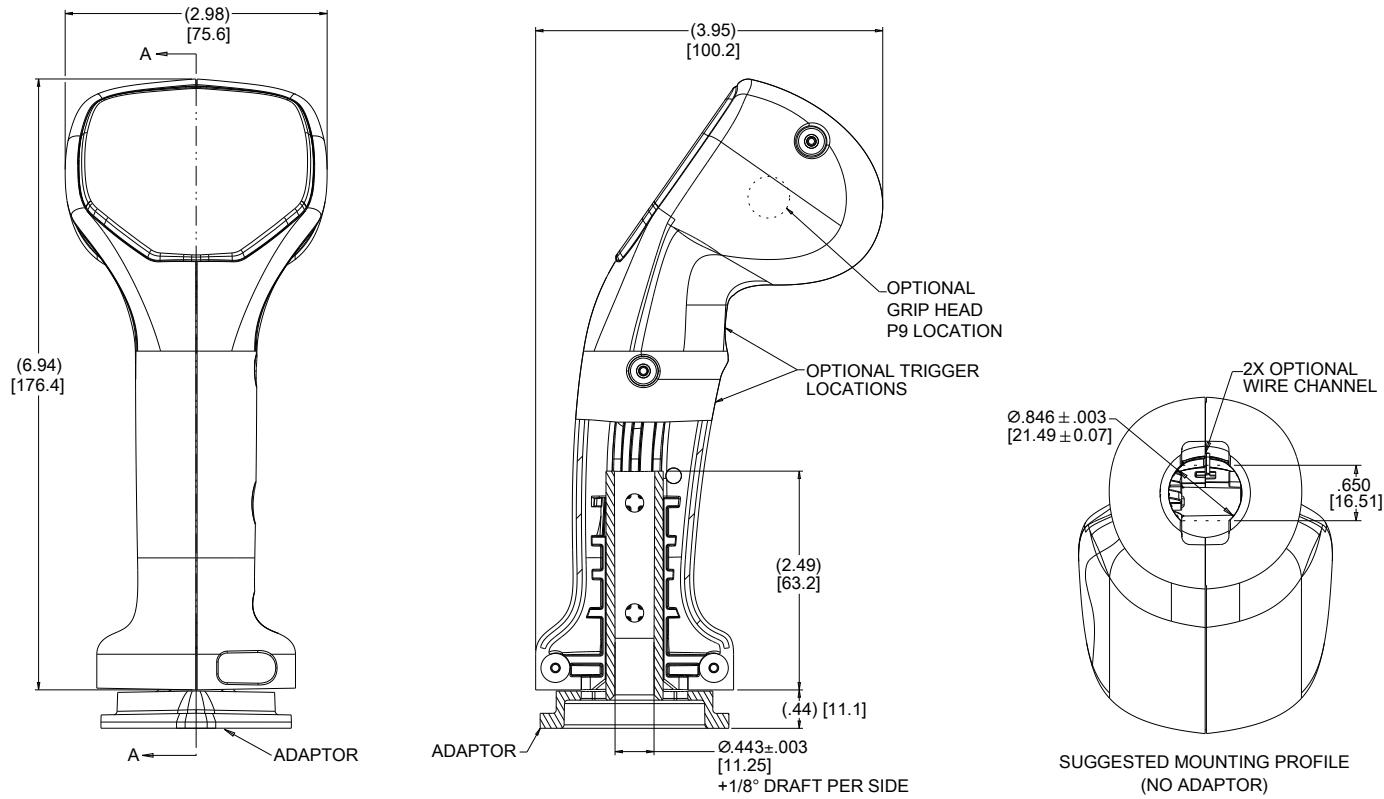
**HTLT4 OUTPUT**



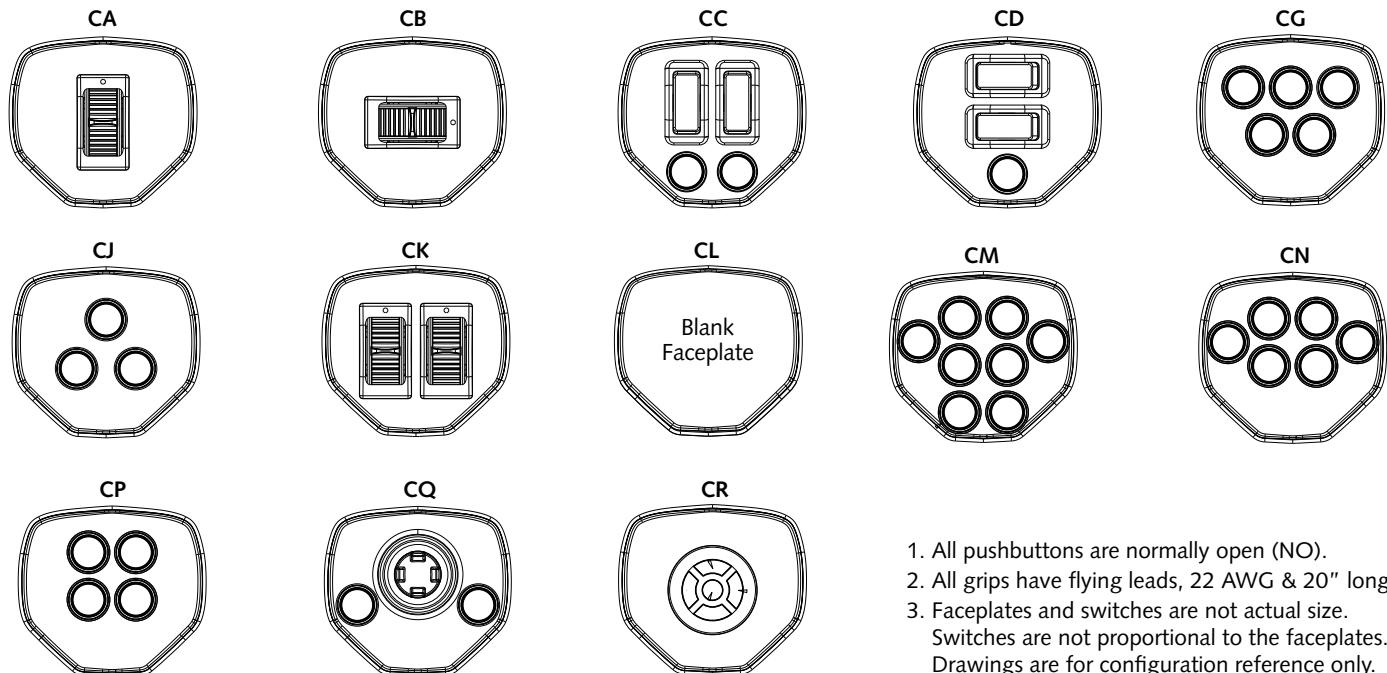
**HPL, HTWM & HTWS OUTPUT**



## G3-C DRAWINGS



## G3-C FACEPLATES

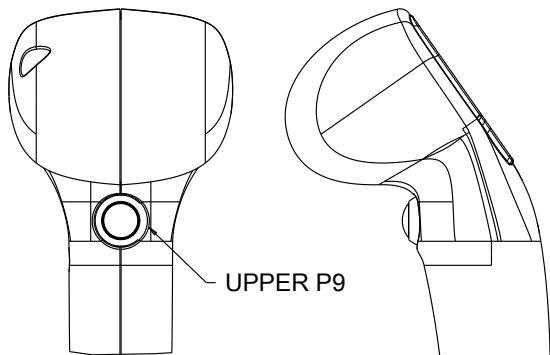


1. All pushbuttons are normally open (NO).
2. All grips have flying leads, 22 AWG & 20" long.
3. Faceplates and switches are not actual size. Switches are not proportional to the faceplates. Drawings are for configuration reference only.

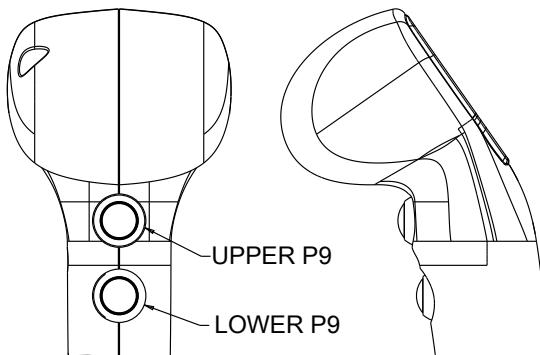
HIGH PERFORMANCE, HEAVY EQUIPMENT AND MATERIAL HANDLING GRIPS

## G3-C TRIGGER CONFIGURATIONS

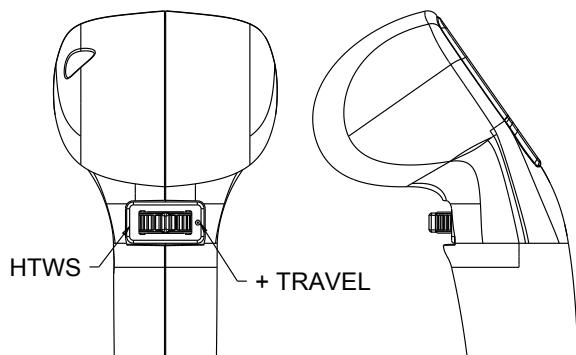
**CONFIGURATION #2**



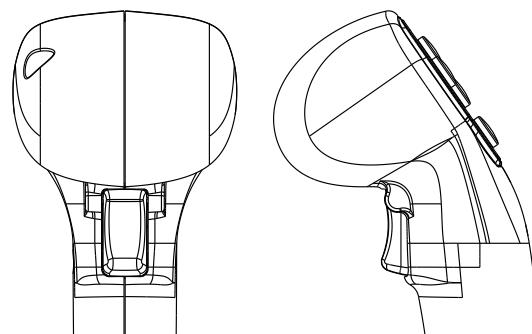
**CONFIGURATION #3**



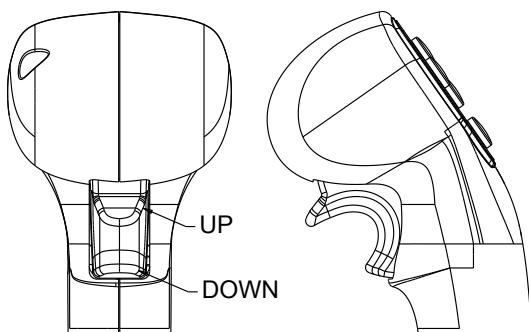
**CONFIGURATION #4**



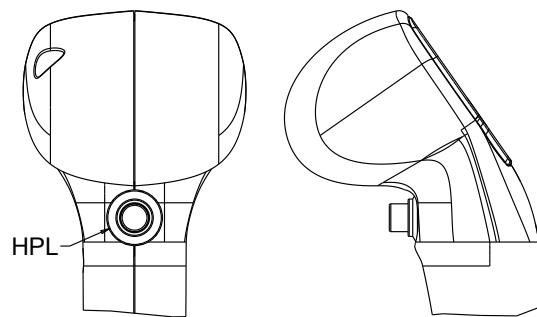
**CONFIGURATION #5**



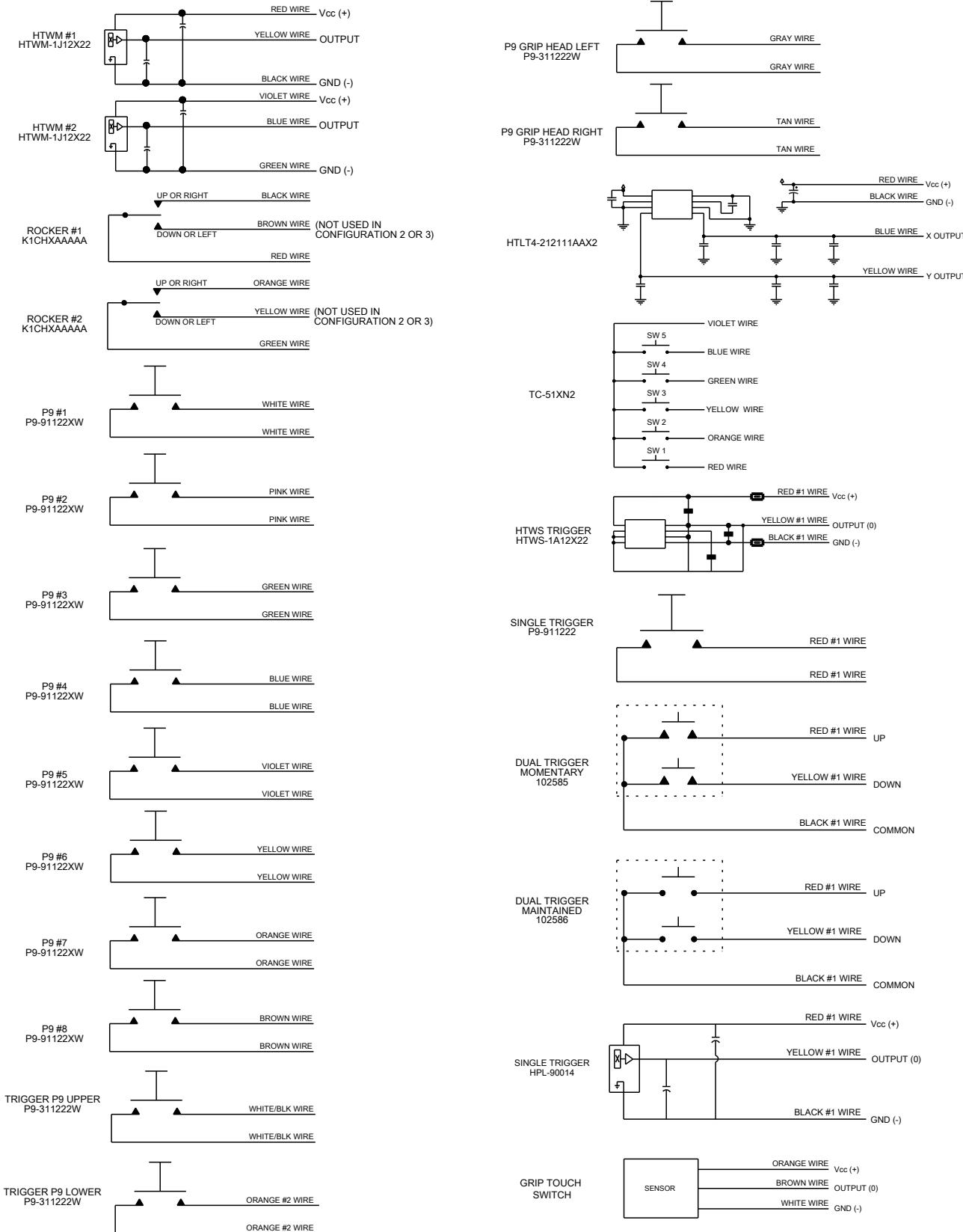
**CONFIGURATION #6, 7**



**CONFIGURATION #8**



**G3-C SCHEMATICS**



HIGH PERFORMANCE, HEAVY EQUIPMENT AND MATERIAL HANDLING GRIPS

## G3-C & G3-CK UNIVERSAL GRIPS

Standard Characteristics/Ratings:				
<b>ELECTRICAL RATINGS:</b>				
<b>K1 Switches</b>				
Electrical Rating @ 28 VDC	16 AMP Resistive Load; 7 AMP Inductive Load			
Electrical Life	25,000 Cycles at Full Load			
<b>Keypads</b>				
Circuit Configuration	SPST N.O.			
Voltage	1-32 VDC			
Current	10-100mA Resistive			
<b>P9 Switches, Single and Dual Trigger</b>				
Electrical Rating @ 28 VDC	5 AMP Resistive Load; 3 AMP Inductive Load	10mA Resistive Load @ 5VDC		
Electrical Life	25,000 Cycles at Full Load	1,250,000 Cycles		
<b>HPL Switches</b>				
	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
Supply Voltage	VDC	4.50	5.00	5.50
Output Voltage - (Button Up)	VDC @ 5V Vcc	0.35	0.50	0.85
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
<b>HTWM Switches</b>				
Rated at Vcc = 5V @ 25°C; Load = 1ma (4-7KΩ)	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
Supply Voltage	VDC	4.50	5.00	5.50
Output Voltage - Return to Center Tolerance at Center	VDC @ 5V Vcc	-.15	N/A	+.15
Output Voltage Tolerance Full Travel	VDC @ 5V Vcc	-.25	N/A	+.25
Supply Current B=0, Vcc=5V, Iout=0	mA	N/A	N/A	10
<b>HTWS Switches</b>				
Rated at Vcc = 5V @ 25°C; Load = 1ma (4-7KΩ)	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
Supply Voltage	VDC	4.50	5.00	5.50
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	N/A	+.25
Output Voltage Tolerance Full Travel	VDC @ 5V Vcc	-.25	N/A	+.25
Supply Current B=0, Vcc=5V, Iout=0	mA	N/A	N/A	20
<b>HTLT4 Switches</b>				
Rated at Vcc = 5V @ 25°C; Load = 1ma (4-7KΩ)	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
Supply Voltage	VDC	4.50	5.00	5.50
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-.25	N/A	+.25
Output Voltage Tolerance Full Travel	VDC @ 5V Vcc	-.25	N/A	+.25
Supply Current B=0, Vcc=5V, Iout=0	mA	N/A	10	12
<b>TC-5 Switches</b>				
Electrical Rating @ 1-32 VDC	10-100mA			
Electrical Life	3,000,000 Cycles			
<b>Grip Touch Switch</b>				
Rated at Vcc = 5V @ 25°C; Load = 1ma (4-7KΩ)	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
Supply Voltage	VDC	3.15	NA	5.50
Output (Active Low)	VDC	N/A	N/A	0.60
Output Current (Sink)	mA	N/A	N/A	10

Standard Characteristics/Ratings (continued):				
<b>MECHANICAL RATINGS</b>				
<b>K1 Switches</b>				
Mechanical Life		100,000 Cycles		
<b>Keypads</b>				
Mechanical Life		3,000,000 Cycles		
<b>P9 Switches, Single and Dual Trigger</b>				
Mechanical Life		1,250,000 Cycles		
<b>HPL Switches</b>				
Mechanical Life (Full Stroke Per Button)		100,000 Cycles		
<b>HTWM Switches</b>				
Mechanical Life (Full Forward to Full Back)		3,000,000 Cycles (Return to Center)		
<b>HTWS Switches</b>				
Mechanical Life (Full Forward to Full Back)		3,000,000 Cycles		
<b>HTLT4 Switches</b>				
Mechanical Life		3,000,000 Cycles		
<b>TC-5 Switches</b>				
Mechanical Life		3,000,000 Cycles		
<b>ENVIRONMENTAL:</b>				
<b>Operating Temperature:</b>	<b>Units</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>
	°C	-40*	20	85
<b>K1 Switches</b>				
Switch Seal Integrity		Watertight per IP68S and IP69K		
<b>Keypads</b>				
Switch Seal Integrity		Watertight per IP68S		
<b>P9 Switches, Single and Dual Trigger</b>				
Switch Seal Integrity		Watertight per IP68S		
<b>HPL Switches</b>				
Electronics Seal Integrity		Watertight per IP68S		
<b>HTWM Switches</b>				
Electronics Seal Integrity		Watertight per IP68S		
<b>HTWS Switches</b>				
Electronics Seal Integrity		Watertight per IP68S		
<b>HTLT4 Switches</b>				
Electronics Seal Integrity		Watertight per IP68S		
<b>TC-5 Switches</b>				
Electronics Seal Integrity		Watertight per IP68S		
<b>Grip</b>				
Seal Integrity		Unsealed		
<b>MATERIALS:</b>				
<b>Handle</b>		Thermoplastic, Glass Reinforced, Black		
<b>Faceplate</b>		Thermoplastic, Glass Reinforced, Black		
<b>Keypads</b>		Silicone Rubber, Black		
<b>Keypads, Lighted</b>		Silicone Rubber, Black with White Graphic		
<b>Wires</b>		22 AWG		
<b>Side Keypad Wires</b>		24 AWG		
<b>Wire Length</b>		20 +/- 3 inches		

\* The min. temperature is -30°C when using a K1 switch.

**WARNING:** Do not use the Grip Touch switch as a safety or emergency stop device 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.