

Control Grips



"S" Handle
Page 1-2



"C" Handle
Page 3-4



"J" Handle
Page 5-6



"L" Handle
Page 7-8



"K" Knob
Page 9

Proportional
Joysticks



"JM" Joystick
Page 10



"JL" Joystick
Page 11-12



Slider Module
Page 13



Micro Joystick
Page 13

Switch Options

Page 13



LEDs



Push Button Switches



Toggle Switches



Standard Switches



Variable Voltage Module



Proportional Buttons

Accessories

Page 14-15



Bushing Adapters



Jam Nuts



Studs



Connectors



Rocker Kit



10 Button Keypad



Inline Diode Pack

Electronics

Page 16-18



SDB-P1
Single Axis Driver Board



JDB-P2
Joystick Driver Board



DBL-17
Logic Driver Board



DFA-01
Danfoss Adapter Board

Technical Info

Surge Suppression Explained Typical Switch Life Wire Routing Tips

Profiles

Sure Grip Warranty Sure Grip Ordering Blanket Orders Returns Discounts

S Series Handle

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com



S1-M2-02

Description

The "S" Series Control Grip is our small low cost grip that is designed for simple applications. It is commonly used as a replacement handle when installing a new attachment or for OEM applications in a variety of industries. It can be supplied in combination with any of our electronic joysticks.

The cases are molded from a high impact ABS polymer into a comfortable shape for a rugged, lightweight control handle for extreme duty applications. The standard Sure Grip switches are covered with our tough flexible membrane **overlay** that protects the switches from dirt and moisture.

The Standard grip features a momentary trigger and 2 momentary thumb switches. We can also supply this grip with some limited custom configurations such as toggle switches and LED's. (Consult factory for details)

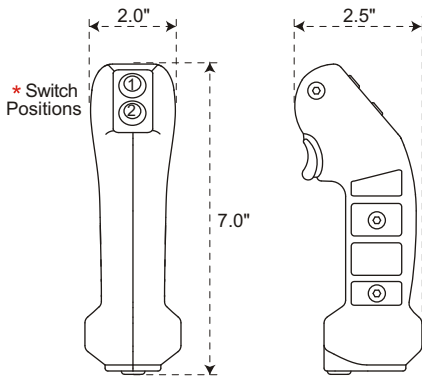
(★ Canadian and International patents apply)

Specification

- Dimensions: 7" x 2.5" x 2" wide
- Switch Pack: 1 or 2 switches with spade terminals
- Trigger: blank or 1 switch
- Weight: 150 grams (5 oz.)
- Overlay: embossed .007 polyester
- Case: 1/8" thick high impacABS
- Mounting Pin: 7/8" NC female (to fit adapters)
- Wire: standard 2' @ 20 gauge
- Switch Rating: 5 amps (standard)
- Switch Life: 10 million mechanical (typical)
2.5 million @ 500 ma.



- 1 Blank Faceplate
- 2 1 Switch Button Faceplate
- 3 "S" handle with our "JM" and "JL" joystick



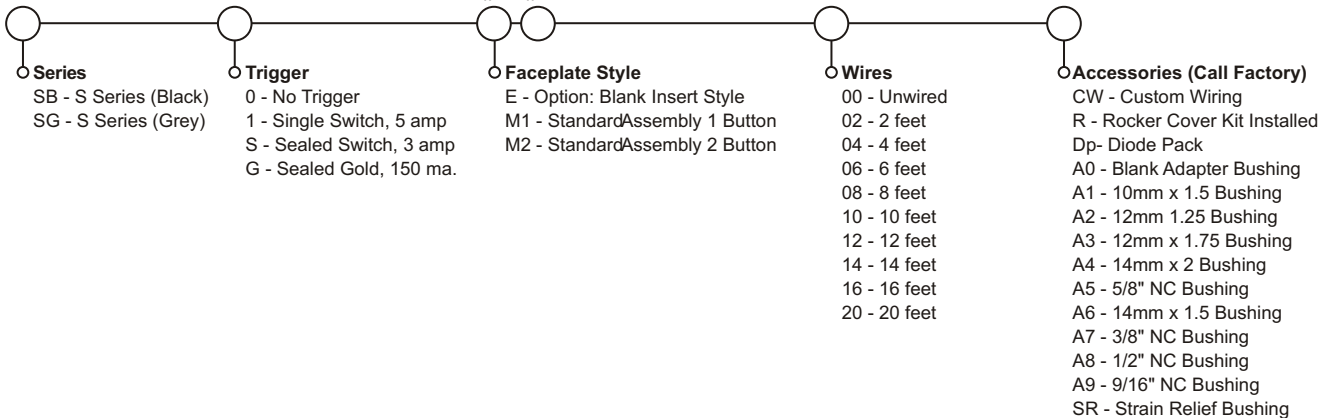
Stock Handle Part Number

- S1-M2-02**
- + Single trigger
- + 2 button momentary
- + 2 feet wire
- + Grey cases



Customer Order Guide

* Switch Positions

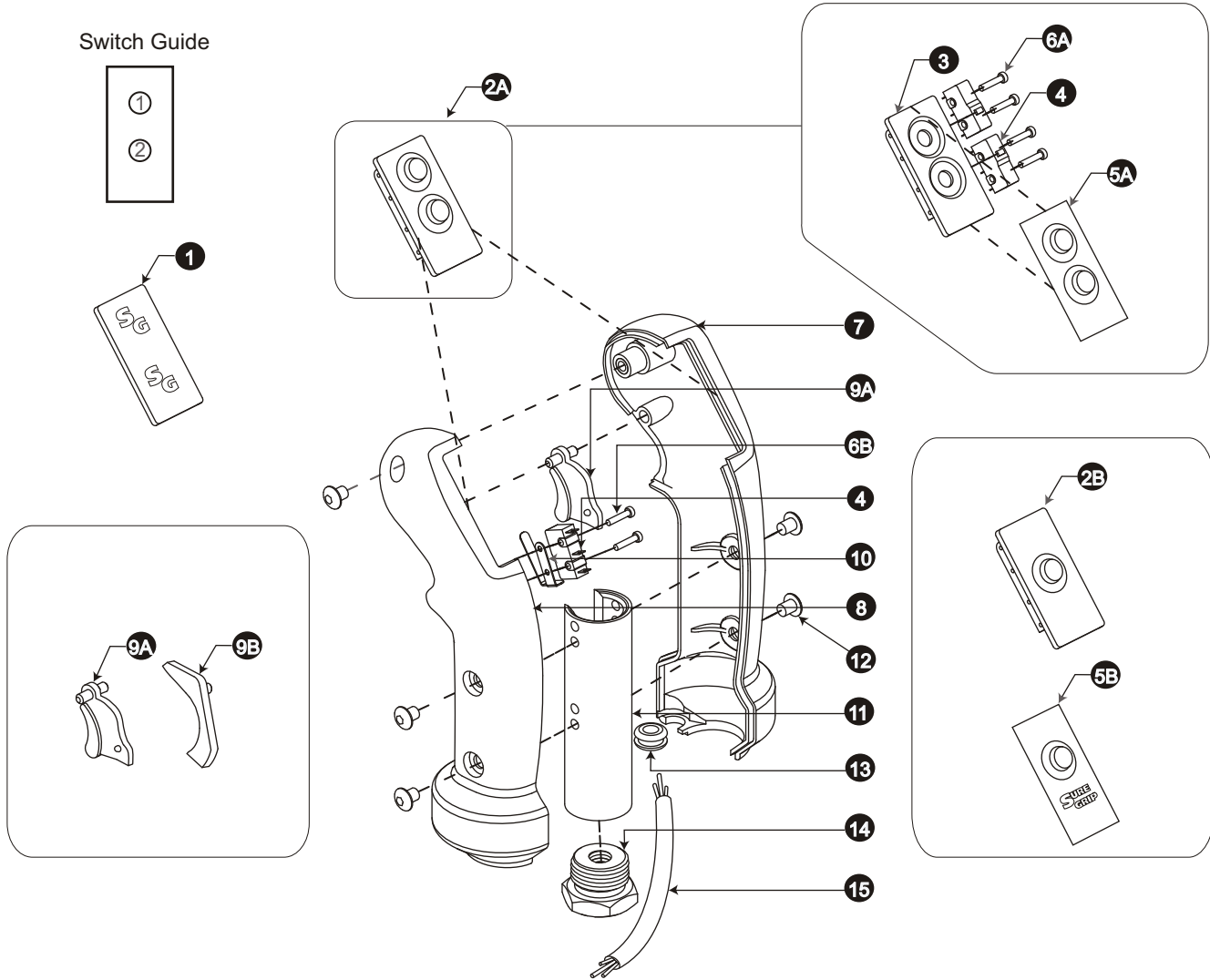


S HandleParts List

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP™
CONTROLS INC.



FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
1	S-FP-00	"S" Blank Faceplate			
2A	S-FP-A2	"S" 2 Function Switch Pack Assy.			
2B	S-FP-A1	"S" 1 Function Switch Pack Assy.			
3	S-FP-01	"S" Empty Faceplate			
4	SW-00	Handle Switch, L/S			
5A	S-ME-A2	"S" Series 2 Button Overlay			
5B	S-ME-A1	"S" Series 1 Button Overlay			
6A	SC-03	2 x 7/16" Tapping Screw - Pan Head (Faceplate)			
6B	SC-21	2 x 9/16" Tapping Screw - Pan Head (Trigger)			
7	S-HL-02-G	"S" Series Handle Case Right - Grey (Black)			
8	S-HL-01-G	"S" Series Handle Case Left - Grey (Black)			
9A	S-TR-01	"S" Series Single Trigger			
9B	S-TR-00	"S" Trigger Insert			
10	LS-00	Leaf Spring for Trigger			
11	PN-03	Mounting Pin "L/S"			
12	SC-02SS	10-32 x 3/8" Capscrew - Button Head			
13	GR-01	3/8" x 1/4" Grommet			
14	BU-00	Adapter Bushing - 1/4" Hole (See Page 15)			
15	S1-M2-W	"S" Handle Wire Harness			

C Series Handle

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP™
CONTROLS INC.



C1-M4-10

Description

The "C" Series Industrial Control Grip is our mid sized Compact grip designed to offer 2 or 4 switches in the faceplate as well as the option of a trigger switch or deadman lever

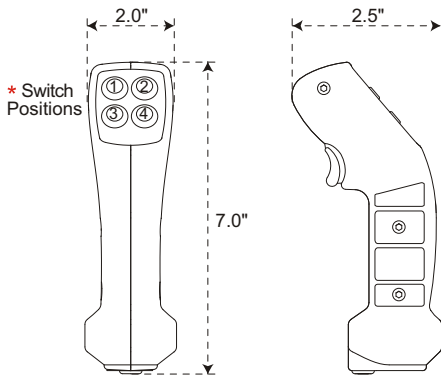
It is also fully customizable with all the Sure Grip Rocker switches, our Proportional modules, LED's, push on/push off maintained switches and toggle switches. The "C" Series grips can be installed on all of our electronic joysticks.

The cases are molded using a super-tough high impact ABS polymer into a comfortable shape for a rugged, light-weight control handle for extreme duty applications. The standard Sure Grip switches are covered with our tough flexible membrane **overlay** that protects the switches from dirt and moisture.

(* Canadian and International patents apply)

Specification

Dimensions: 7" x 2.5" x 2" wide
Switch Pack: blank, 2, or 4 switches
Trigger: single
Weight: 150 grams (5 oz.)
Overlay: embossed .007 polyester
Case: 1/8" thick high impact ABS
Mounting Pin: 6061 aluminum 1" dia.
Wire: standard 2' @ 20 gauge
Switch Rating: 5 amps
Switch Life: 10 million mechanical (typical)
2.5 million @ 500 ma.
Bushings: 10 mm - 5/8" (internal threads)



Stock Handle Part Numbers

C1-M2-10:

- + Single trigger
- + 2 button momentary
- + 10 feet wire
- + Grey cases

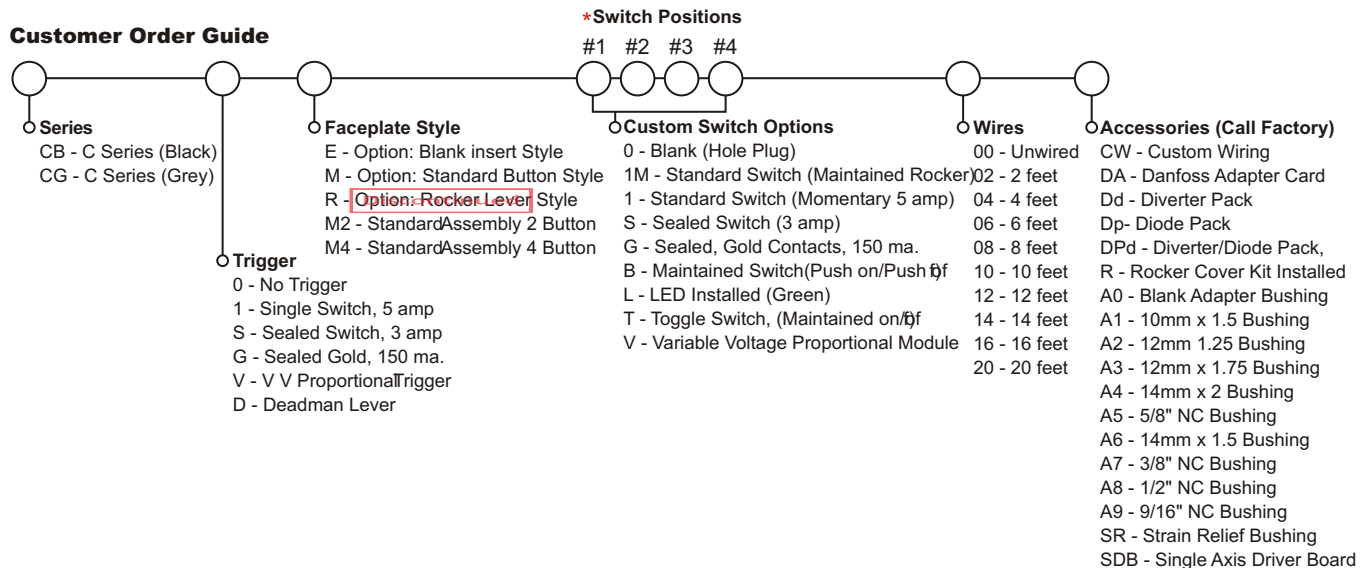
C1-M4-10:

- + Single trigger
- + 4 button momentary
- + 10 feet wire
- + Grey cases

- ① 2 Switch Faceplate
- ② 4 Switch Faceplate
- ③ 2 Proportional +2 standard Button Faceplate
- ④ "C" Handle with our "JM" and "JL" joystick



Customer Order Guide



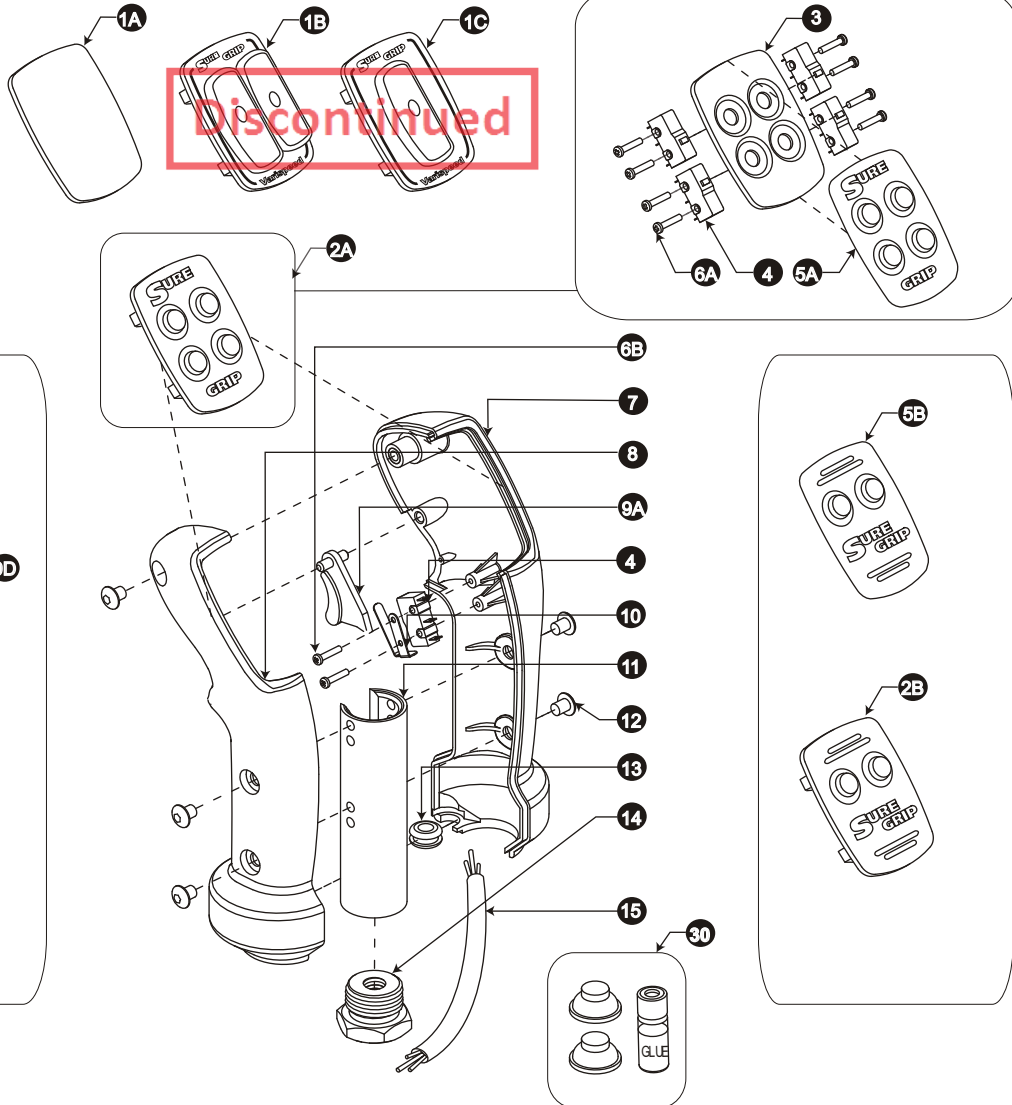
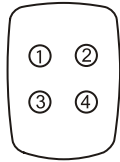
C Handle Parts List

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP™
CONTROLS INC.

Switch Guide



FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
1A	C-FP-00	"C" Blank Faceplate	12	SC-02SS	10-32 x 3/8" Capscrew - Button Head
1B	C-FP-R-??	"C" Series Dual Rocker (Call Factory)	13	GR-01	3/8" x 1/4" Grommet
1C	C-FP-R-??	"C" Series Single Rocker (Call Factory)	14	BU-00	Adapter Bushing - 1/4" Hole (See Page 15)
2A	C-FP-A4	"C" Series 4 Button Faceplate Assy.	15	C1-M2-W	"C" Handle 2 Button Faceplate Wire Harness
2B	C-FP-A2	"C" Series 2 Button Faceplate Assy.		C1-M4-W	"C" Handle 4 Button Faceplate Wire Harness
3	C-FP-01	"C" Series Empty Faceplate	30	FB-VV-A	Flex Button Repair Kit: 2 VV/V2 Modules
4	SW-00	Handle Switch, L/S			
5A	C-ME-A4	"C" Series 4 Button Overlay			
5B	C-ME-A2	"C" Series 2 Button Overlay			
6A	SC-03	2 x 7/16" Tapping Screw - Pan Head (Faceplate)			
6B	SC-21	2 x 9/16" Tapping Screw - Pan Head (Trigger)			
7	C-HL-02-G	"C" Series Handle Case Right - Grey (Black)			
8	C-HL-01-G	"C" Series Handle Case Left - Grey (Black)			
9A	C-TR-01	"C" Series Single Trigger			
9B	C-TR-00	Trigger Insert			
9C	TR-P1-A	Proportional Trigger/Spring Assy.			
9D	TR-D1-G	Deadman Trigger Lever - Grey (Black)			
10	LS-00	Leaf Spring for Trigger			
11	PN-03	Mounting Pin "L/S"			

J Series Handle

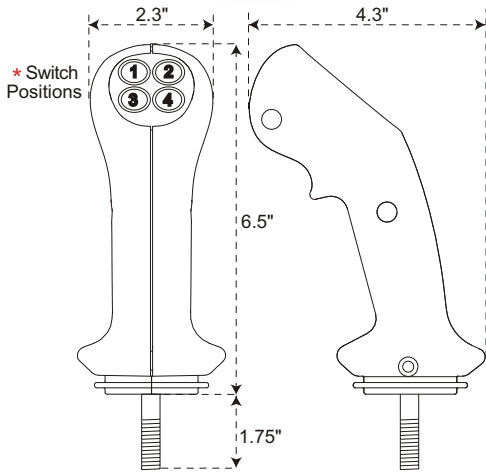
#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP
CONTROLS INC.



J1-M4-10



Description

The "J" Series Industrial Control Grip is our newest mid-size grip designed specifically to be used with our JM/JL Joysticks. We have designed a new look and feel for this grip. It is just as comfortable and ergonomically friendly when supplied with the rounded blank faceplate or with a fully switched faceplate.

It can be ordered as a blank grip, with 2 or 4 Sure Grip switches in the faceplate and optional trigger switch. It is the standard handle for the JM/JL series joysticks but can also be supplied with a threaded male stud for installation on customer's joysticks. The groove at the bottom of the handle is designed for a 1.5" (37mm) boot opening. The standard Sure Grip switches are covered with our tough flexible membrane **overlay** that protects the switches from dirt and moisture.

Our unique design also gives us the flexibility to install a variety of customer-specified toggles, push-buttons, proportional modules, LED's and other switch options in this grip.

(★ Canadian and International patents apply)

Specification

Dimensions: 6.5" x 4.3" x 2.3" wide
Switch Pack: blank, 2, or 4 switches
Trigger: single
Weight: 150 grams (5 oz.)
Overlay: embossed .007 polyester
Case: 1/8" thick high impact ABS
Mounting Stud: 12mm x 125 threaded
12mm x 175 threaded
14mm x 2 threaded
Wire: standard 2' @ 20 gauge
Switch Rating: 5 amps
Switch Life: 10 million mechanical (typical)
2.5 million @ 500 ma.
Bushings: 10 mm - 5/8" (internal threads)



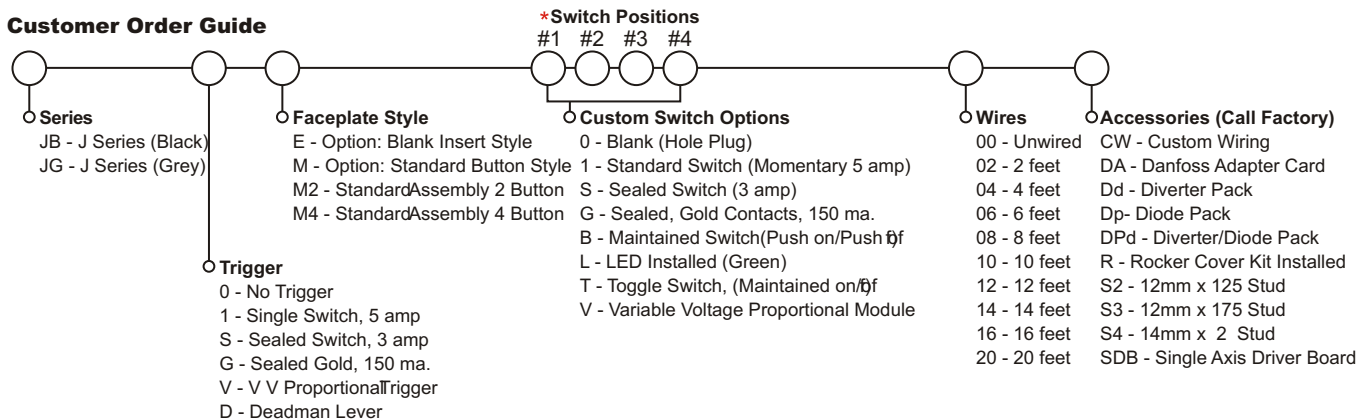
- 1 Blank Faceplate
- 2 2 Switch Faceplate
- 3 "J" Handle with our "JM" and "JL" joystick



Stock Handle Part Numbers

- J1-M2-10:**
- + Single trigger
 - + 2 button momentary
 - + 10 feet wire
 - + Grey cases
- J1-M4-10:**
- + Single trigger
 - + 4 button momentary
 - + 10 feet wire
 - + Grey cases

Customer Order Guide



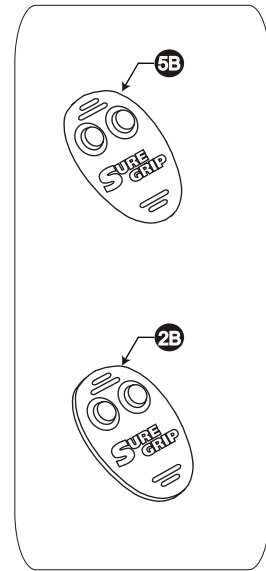
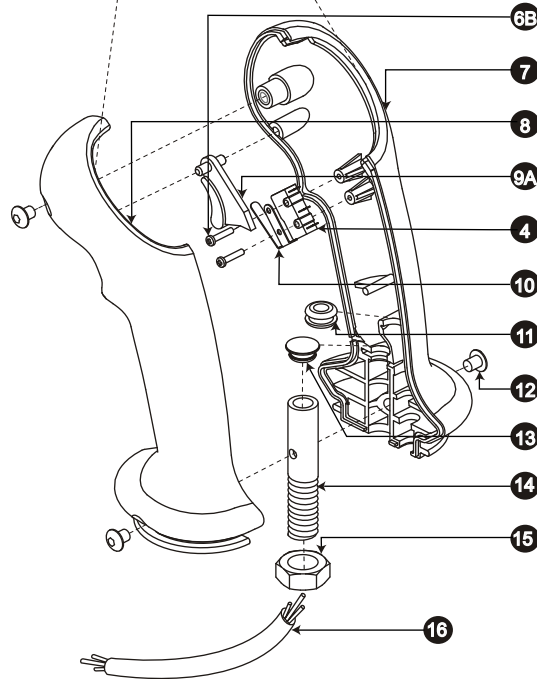
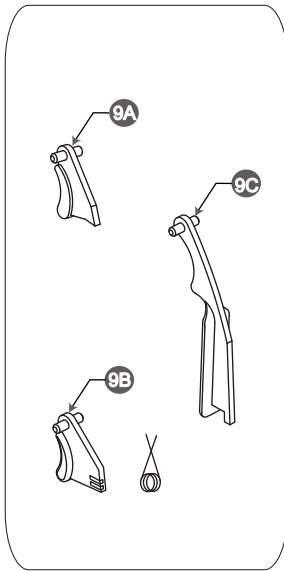
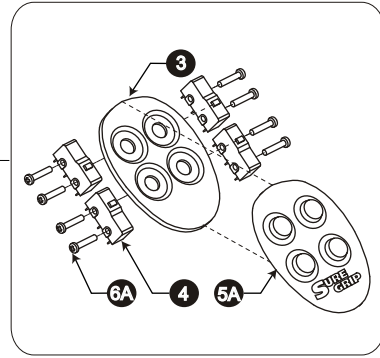
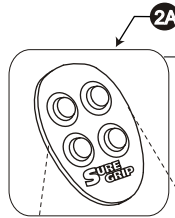
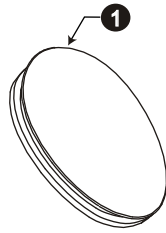
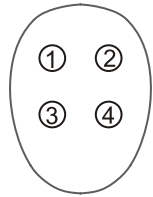
J Handle Parts List

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP™
CONTROLS INC.

Switch Guide



FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
1	J-FP-00	"J" Blank Faceplate		ST-08-175	"J" Series Handle Mounting Stud: 12mm x 1.75
2A	J-FP-A4	"J" Series 4 Button Faceplate Assy.		ST-08-14x2	"J" Series Handle Mounting Stud: 14mm x 2
2B	J-FP-A2	"J" Series 2 Button Faceplate Assy.	15	NT-05	12 x 1.25 mm Jam Nut
3	J-FP-01	"J" Series Empty Faceplate	16	J1-M2-W	"J" Handle 2 Button Faceplate Wire Harness
4	SW-00	Handle Switch, L/S		J1-M4-W	"J" Handle 4 Button Faceplate Wire Harness
5A	J-ME-A4	"J" Series 4 Button Overlay			
5B	J-ME-A2	"J" Series 2 Button Overlay			
6A	SC-03	2 x 7/16" Tapping Screw - Pan Head (Faceplate)			
6B	SC-21	2 x 9/16" Tapping Screw - Pan Head (Trigger)			
7	J-HL-02-G	"J" Series Handle Case Right - Grey (Black)			
8	J-HL-01-G	"J" Series Handle Case Left - Grey (Black)			
9A	C-TR-01	Single Trigger			
9B	TR-P1-A	Proportional Trigger/Spring Assy.			
9C	TR-D1-G	Deadman Trigger Lever - Grey (Black)			
10	LS-00	Leaf Spring for Trigger			
11	GR-01	3/8" x 1/4" Grommet			
12	SC-02SS	10-32 x 3/8" Capscrew - Button Head			
13	HP-01	3/8" Hole Plug			
14	ST-08-125	"J" Series Handle Mounting Stud: 12mm x 1.25			

L Series Handle

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP™
CONTROLS INC.



**L1-M8-10 with
Optional 10 Button Keypad**

Description

Sure Grip "L" Series Control Grip is our Large handle commonly found on forestry mining and construction machinery. The tough ABS housing combined with a comfortable shape creates a rugged lightweight control handle that has become very popular for extreme duty applications requiring up to 10 switches. We also have a keypad that can be installed on the left or right side of the grip for an additional 10 switches.

The stock handle configurations come with 2, 4, 6 or 8 thumb switches and a single or double acting trigger. The standard Sure Grip switches are covered with a tough, flexible membrane **overlay**★ that protects the switches from dirt and moisture.

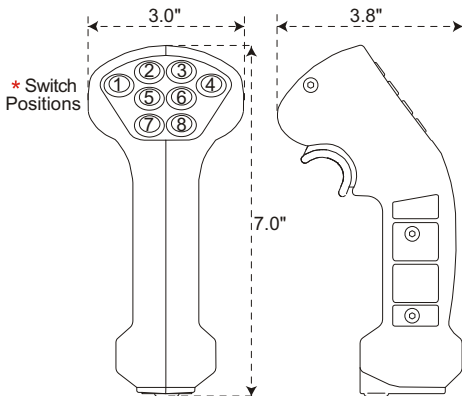
These grips are also very customizable and can be supplied with a deadman lever toggle switches, push on-push off maintained switches, proportional modules, LED's and rocker switches. The "L" Series grips can also be installed on all of our electronic joysticks.

(★ Canadian and International patents apply)

Specification

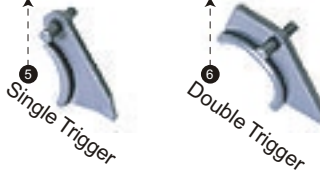
Dimensions: 7" x 3.8" x 3" wide
Switch Pack: up to 8 buttons or toggles with spade terminals
Trigger: single or double trigger
Overlay: embossed .007 polyester
Case: 1/8" thick high impact ABS (300 grams 10 oz. wired)
Mounting Pin: 6061 aluminum 1" dia.
Wire: standard 10' @ 20 or 22 gauge
Switch Rating: 5 amps @ 24 VDC (typical)
2.5 million cycles @
500 mA electrical

- ① 2 Switches Faceplate
- ② 4 Switches Faceplate
- ③ 6 Switches Faceplate
- ④ "L" Handle with our "JM" and "JL" joystick

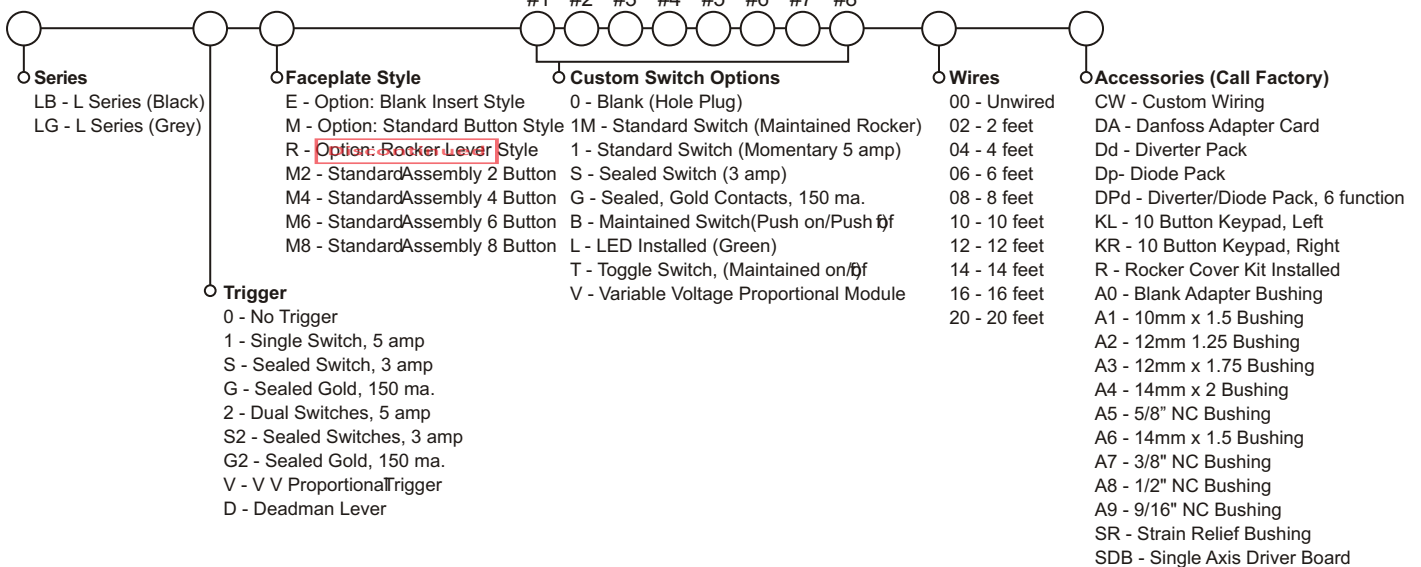


Stock Handle (Grey Cases) Part Numbers

- L1-M2-10
- L1-M4-10
- L1-M6-10
- L1-M8-10
- L2-M2-10
- L2-M4-10
- L2-M6-10
- L2-M8-10



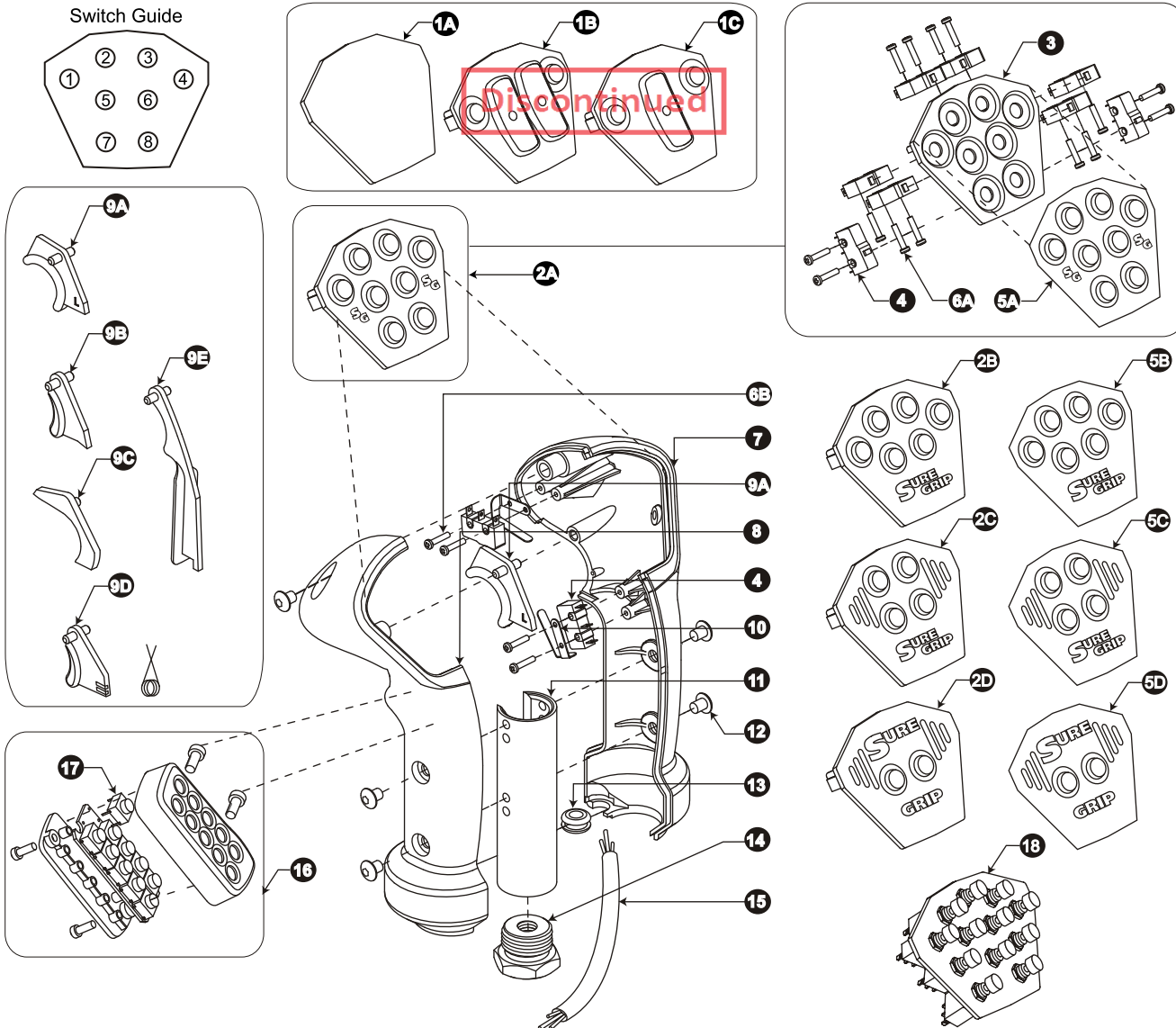
Customer Order Guide



L Handle Parts List

#4-1413 McGill Road
 Kamloops B.C. Canada V2C 6K7
 Ph: (250) 374-2278

Fax: (250) 374-1099
 Toll Free: 1-800-831-2278
 www.suregripcontrols.com



FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
1A	L-FP-00	"L" Blank Faceplate	7 8	L-HLR-Kit-B	"L" Handle Case Upgrade Kit Assy. - Black(Grey)
1B	L-FP-R-??	"L" Series Dual Rocker (Call Factory)	9A	L-TR-02	"L" Double Trigger
1C	L-FP-R-??	"L" Series Single Rocker (Call Factory)	9B	L-TR-01	"L" Single Trigger
2A	L-FP-A8	"L" 8 Switch Pack Assy.	9C	L-TR-00	"L" Trigger Insert
2B	L-FP-A6	"L" 6 Switch Pack Assy.	9D	TR-P1-A	Proportional Trigger/Spring Assy.
2C	L-FP-A4	"L" 4 Switch Pack Assy.	9E	TR-D1-G	Deadman Trigger Lever - Grey (Black)
2D	L-FP-A2	"L" 2 Switch Pack Assy.	10	LS-00	Leaf Spring for Trigger
3	L-FP-01	"L" Series Empty Faceplate	11	PN-03	Mounting Pin "L/S"
4	SW-00	Handle Switch, L/S	12	SC-02SS	10-32 x 3/8" Capscrew - Button Head
5A	L-ME-A8	"L" 8 Button Overlay	13	GR-01	3/8" x 1/4" Grommet
5B	L-ME-A6	"L" 6 Button Overlay	14	BU-00	Adapter Bushing - 1/4" Hole (See Page 15)
5C	L-ME-A4	"L" 4 Button Overlay	15	L2-M2-W	"L" Handle 2 Button Faceplate Wire Harness
5D	L-ME-A2	"L" 2 Button Overlay		L2-M4-W	"L" Handle 4 Button Faceplate Wire Harness
6A	SC-03	2 x 7/16" Tapping Screw - Pan Head (Faceplate)		L2-M6-W	"L" Handle 6 Button Faceplate Wire Harness
6B	SC-21	2 x 9/16" Tapping Screw - Pan Head (Trigger)		L2-M8-W	"L" Handle 8 Button Faceplate Wire Harness
7	L-HL-R-G	"L" Handle Case Right - Grey (Black)	16	KP-10L1	Keypad 10 Button, (Fits Left Handle)
		(L-HL-02 Handle Case Right - Old Style)		KP-10R1	Keypad 10 button, (Fits Right Handle)
8	L-HL-L-G	"L" Handle Case Left - Grey (Black)	17	SW-07	Key Pad Switch
		(L-HL-01 Handle Case Left - Old Style)	18	L-FP-A-B12	12 button "L" series faceplate assembly

K Series Knob

#4-1413 McGill Road
 Kamloops B.C. Canada V2C 6K7
 Ph: (250) 374-2278

Fax: (250) 374-1099
 Toll Free: 1-800-831-2278
 www.suregripcontrols.com

SURE GRIP
 CONTROLS INC.



KG-M2-02

Description

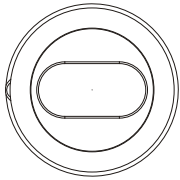
This compact joystick "Knob" is available in grey or black, as a blank knob or with 1 or 2 momentary switches.

When installed on our joysticks the knob is suitable for wet or exposed applications requiring an IP-66 rating.

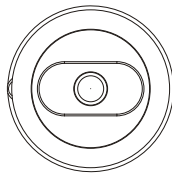
It is designed to fit the JM or JL joysticks. The groove fits a 1.5" opening. It is also available separately as a blank knob with a 12mm stud.

Specification

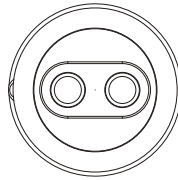
Dimensions: 2.5" x 1.8" wide
 Switch Pack: 1 or 2 switches
 Weight: 50 grams (5 oz.)
 Overlay: embossed .007 polyester
 Case: high impact ABS
 Mounting Stud: 12mm x 125 threaded
 12mm x 175 threaded
 14mm x 2 threaded
 Wire: standard 2' @ 20 gauge
 Switch Rating: 5 amps (standard)
 Switch Life: 10 million mechanical (typical)
 2.5 million @ 500 ma.



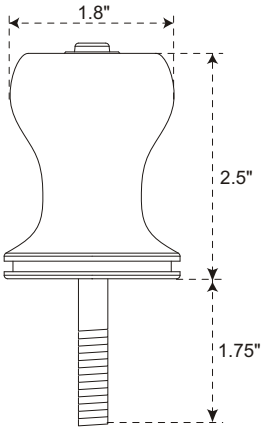
Blank Knob



1 Button Switch



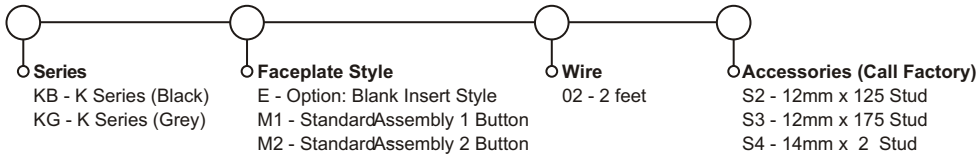
2 Button Switches



- ① "K" knob with our "JL" joystick
- ② "K" knob with our "JM" joystick



Customer Order Guide



Joystick Description

Sure Grip JM/JL joysticks are designed for the really tough applications. They are configurable as:

- Single or dual axis
- Friction maintained
- Switched outputs
- Proportional 5 VDC outputs
- High current PWM driver card
- Gated action
- Gated latching
- Adjustable mounting brackets (JL Series only)

Joystick Electronics

The JM/JL Series proportional joysticks incorporate non-contact Hall Sensor technology to detect and transmit handle position. Two programmable, temperature-compensated Hall Sensors are mounted 90 degrees from one another at the equator of a magnetized ball located in the base of the handle. The output of the Hall sensor changes in proportion to changes in the magnetic field caused by handle movement. This electronic design yields a linear relationship between handle position and signal output, with no hysteresis and a stable null.

JM/JL Series joysticks are designed to function in control systems as a signal level device. A regulated 5 VDC supply input yields a 0.5 - 2.5 - 4.5 VDC signal output.

A separate high current valve driver module is available that installs within the joystick housing to drive solenoid valves. High reliability in extreme duty applications is the product design goal for the JM/JL Series joysticks. It is resistant to the levels of temperature, shock, vibration and EMI/RFI typically found in mobile machine operating environments.

The switched output configuration uses two (single axis) or four (dual axis) long life 5 amp switches. The switches and wire harness utilize spade connectors for easy servicing.

Mechanical Specification:

Maximum handle travel:
20 +/- 1 degrees (on axis)
28 +/- 1 degrees (at 45 degrees)
Force measured at bottom of faceplate (typical) to come out of center:
600 grams (on axis)
750 grams (at 45 degrees)
Force measured at bottom of faceplate (typical) at end of stroke:
750 grams (on axis)
900 grams (at 45 degrees)
Environmental Rating:
Joystick c/w J Series Basic Grip: IP-64
Joystick c/w handle with trigger: IP-55

The pivot ball and centering shoe are molded using a high performance polymer-tereflon blend that is designed to operate without the use of lubricating oil or grease.

Proportional Voltage Output: (typical)

Supply voltage: 5.0 VDC (+/- 0.1 VDC)
Supply current: 30 mA maximum
Typical Output: 0.5 - 2.5 - 4.5VDC, (+/- 0.1 VDC)
Output at maximum negative X or Y displacement:
8% +/- 4% of supply voltage
Actual Output at null (handle center):
50% +/- 2% of supply voltage
Output at maximum positive X or Y displacement:
92% +/- 4% of supply voltage
Maximum Output current:
2mA (Outputs protected against shorts to supply or ground as long as supply voltage is within operational range, maximum survival voltage 18 VDC)

Switched Output Joystick

Momentary Switched:
24 VDC: 5 amps, (3 amps inductive)
1 20 VAC: 5 amps (3 amps @ 250 VAC)
Movement to Activate:
16 degrees, on axis (+/- 2 degrees)
22 degrees, at 45 degrees (+/- 2 degrees)
Common power wire to switches, and spade connectors on wire harness.
(If switching inductive loads, diode protection should be included in the circuit to maximum switch life)

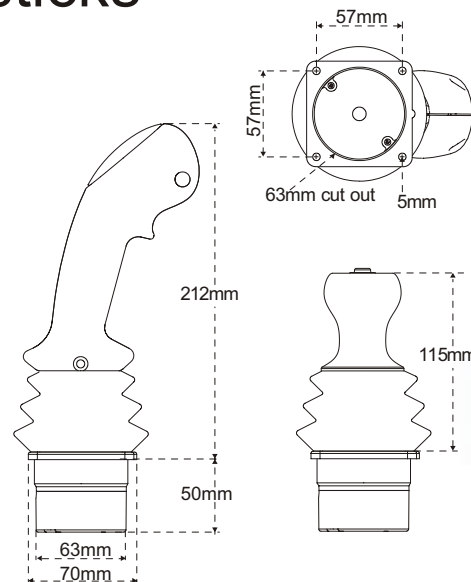
JM Series Joysticks

JM Joystick Description

JM Series Hall Effect joystick has a compact body but uses the same internal components of the larger JL Series. The JM Series joystick has an IP-66 rating when supplied with the handle as shown.

JM Series Joystick Part Numbers

- JM-P1-JB** Single axis proportional joystick
c/w J Series Black grip
- JM-P2-JB** Dual axis proportional joystick
c/w J Series Black grip
- JM-S1-JB** Single axis switched joystick
c/w J Series Black grip
- JM-S2-JB** Dual axis switched joystick
c/w J Series Black grip



JM-P2-K2B

JL Series Joystick

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripccontrols.com

SURE GRIP™
CONTROLS INC.



JL Joystick★ Description

The JL Series is a simple, reliable and "Operator Friendly" input device that will change the way you look at electronic joysticks. Our unique spherical metal housing ensures a solid base that protects the electronics from outside interference and provides the foundation for a revolutionary new concept, an operator adjustable mounting system. The spherical body of the joystick is mounted within a two piece clamp that permits up to 20 degrees of adjustment in any direction. This feature allows an operator to quickly and easily adjust the mounting angle of the joystick to optimize ergonomics and reduce fatigue.

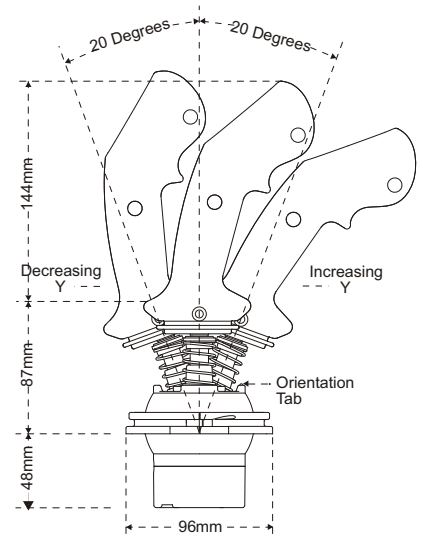
(★ Patent Pending)

JL Joystick Special Features

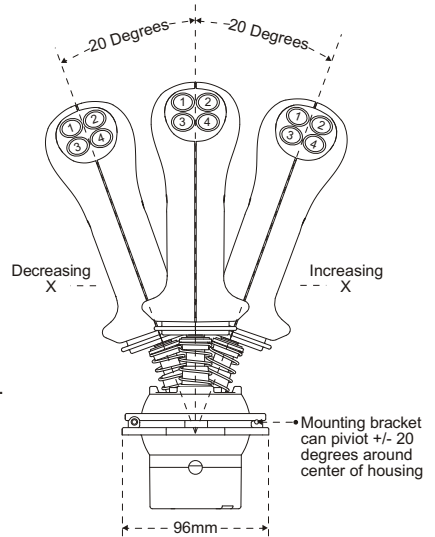
- + Gimbal mounting +/- 20 degrees
- + 360 degree rotation
- + Internal or external wire routing
- + Gated or maintained positioning
- + Spring return to center

Adjustable Mounting Bracket

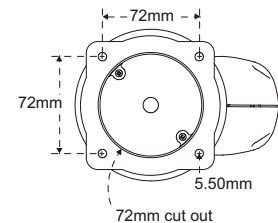
The spherical body of the joystick is mounted within a two piece clamp that permits up to 20 degrees of adjustment/rotation in any direction. The operator simply lifts up the rubber boot to expose the adjustable clamp, loosens off the clamping screw and rotates the joystick assembly into the desired position.



JL Series Side View



JL Series Front View



JL Series Bottom View

Adjustable
+/- 20°

JL-P2 Joystick with
JG1-M4-10 Handle



JL Series Joystick Part Numbers

- JL-P1-JB Single axis proportional joystick
c/w J Series Black grip
- JL-P2-JB Dual axis proportional joystick
c/w J Series Black grip
- JL-S1-JB Single axis switched joystick
c/w J Series Black grip
- JL-S2-JB Dual axis switched joystick
c/w J Series Black grip

Joystick Customer Order Guide

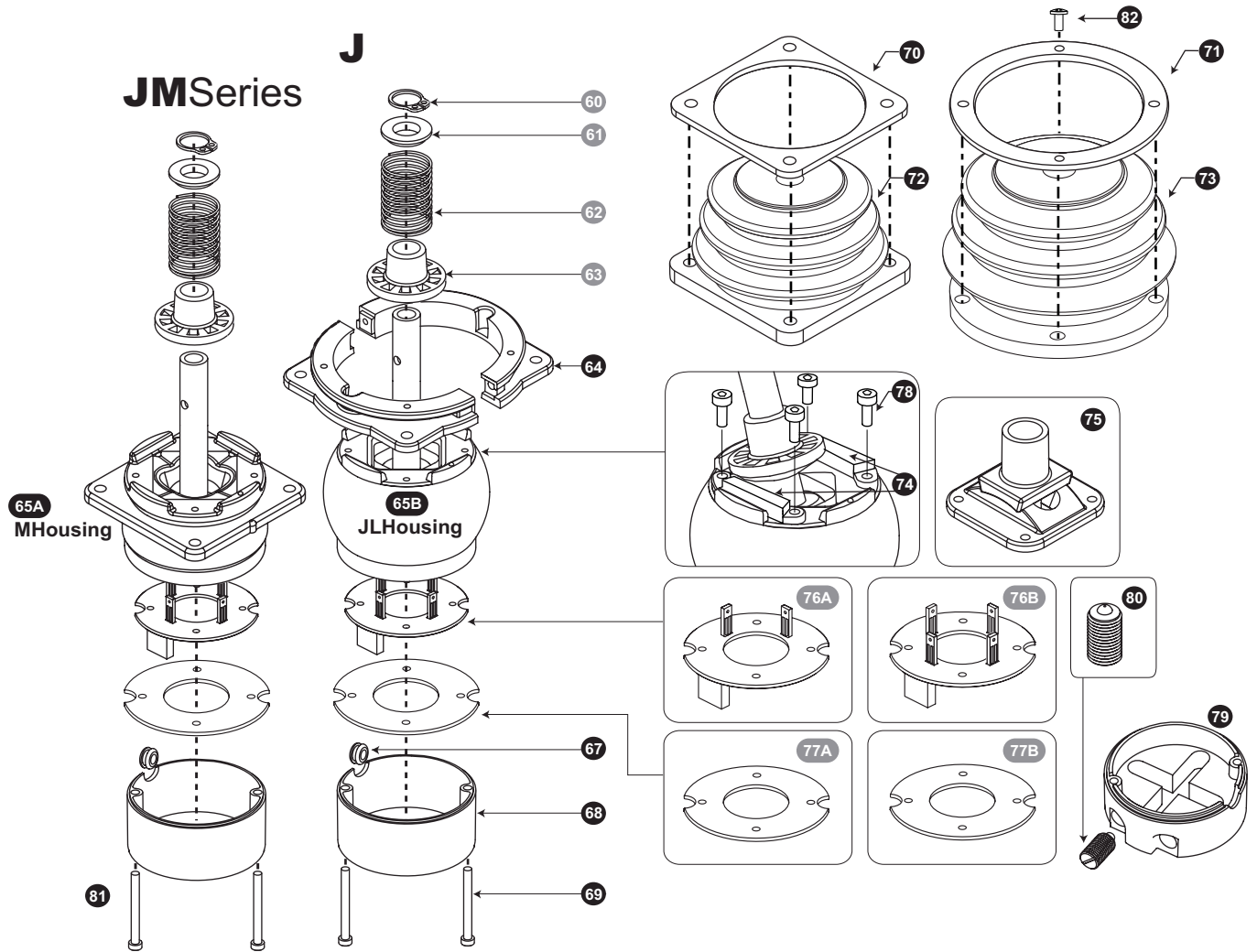
Series	Outputs	Proportional Valve Driver	Wire	Option (Call Factory)
JM	P1- Single Axis 5 vdc	D2- 2.5amp 2Axis Valve Driver	02 - 2 feet	JG - J Handle Grey
JL	P2- Dual Axis 5vdc			JB - J Handle Black
	S1- Single Axis Switched			KB - Knob Black
	S1G- Single Axis Gold Switched			K1B - Knob Black 1 Button
	S2- Dual Axis Switched			K2B - Knob Black 2 Button
	S2G- Dual Axis Gold Switches			CW - Custom Wiring
				G - Gated
				G1 - Gated 1 Latch
				G2 - Gated 2 Latch

Joystick PartsList

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP
CONTROLS INC.



● Serviceable at Factory Only

↑ Used in Assy. Above

FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
62	SP-07	Spring:JM/JL Joystick	71	JL-15	JL Boot Ring
63			72	BT-14	JM Joystick Boot R1
64	JL-109-A	JL Joystick: Adjustable Bracket		SC-50	↑ Washer
65A	JM-110	JM Joystick: 12mm Shaft-Ball Assembly	73	BT-15	JL Joystick Boot R1
	JM-103	↑ JM Joystick: Lower Housing (Included in Assy.)		SC-50	↑ Washer
	SC-34	↑ 6-32 x 3/4" Flat Head Screw, Stainless (Included in Assy.)	74	JL-107-A	Joystick: Single Axis Guide Kit
	PN-3x16	↑ Pin: 3mm x 16mm (Included in Assy.)	75	FG-S1	
68	JL-102	↑ JM Joystick: Housing Cover (Included in Assy.)	76A		JM/JL Joystick: Sensor Board, Dual Axis
65B	JL-110	JL Joystick: 12mm Shaft-Ball Assembly	76B	CC-J01-X4-A	JM/JL Joystick: Switched Board, Dual Axis Redundant
	JL-103	↑ JL Joystick: Lower Housing (Included in Assy.)	77A		
	SC-34	↑ 6-32 x 3/4" Flat Head Screw, Stainless (Included in Assy.)	77B	CC-J-H2-A	JM/JL Joystick: Switched Board, High current
	PN-3x16	↑	78	SC-25	6-32x3/8" Socket Cap Screw, Stainless JL-107-A
68	JL-102	↑	79		JM/JL Gated Joystick Housing Cover
67	GR-01	3/8"x1/4" Grommet	80	SC-43	↑ Spring Plunger: 3/8" x 5/8" High Force
69	SC-33	6-32x1.25" Cap Screw, Stainless	81	SC-40	↑ 6-32x13/8" Cap Screw, Stainless
70	JM-14	JM Boot Ring	82	SC-51	Screw

Switch Options

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com



LEDs
Red #LED-24R
Green #LED-24G



Push Button Switch ① PB-2MA **Push Button Boot** ② BT-02
This is a push-on/push-off maintained action switch with sealed boot type actuator. It is a good choice for a maintained function as there is nothing that can be moved or knocked accidentally. Rated up to 3 amps @ 24 VDC.



Toggle Switch
① TO-2MA - on/off
TO-3MA - on/off/on
TO-3MO - (on)off(on)

Toggle Boot (Partial cover) BT-01
②
Toggle Boot (Full cover) BT-04
③



Toggle Switch (Large bat)
④ TO-3MA-L
Toggle Boot (For Large bat) BT-04
⑤

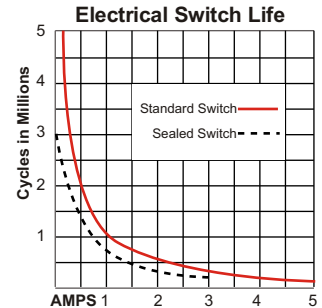


Standard Switch ① SW-01
Electrical Rating: Standard 5 amp. 30 vdc
Mechanical Life: Standard 10 million cycles
Electrical Life: (see chart)

Sealed Switch ② SW-00S

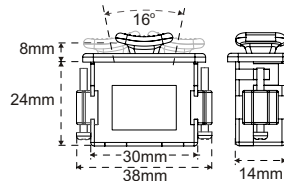
Electrical Rating: Sealed 3 amp. 30 vdc Enclosure Rating: Sealed IP67 (IEC 529)
Mechanical Life: Sealed 5 million cycles Temperature Range: - 40 to 85° C
Electrical Life: (see chart) Ambient Humidity: 95% max.

Sealed Switch Gold Contacts SW-00SG
Electrical Rating: Gold 100 ma 30 vdc



Slider Module
The Slider module is a Proportional Hall Effect module available in three configurations. These compact proportional modules are designed for applications such as grapples, bucket thumbs, grab and tilt or rotate functions that will benefit from simple speed control. The 3 position detented version is suitable for a forward-neutral-reverse transmission control while the friction maintained version could be used as a throttle or machine speed control.

Specification:
Input Voltage: 5 VDC @ 15ma
Output: 0.5 - 2.5 - 4.5 VDC (+/-0.2)
Rating: IP-66 (above panel)

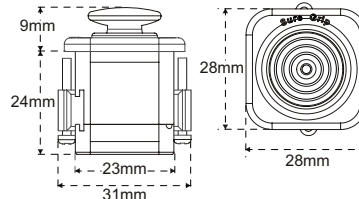


Part #: SM-P1
Operation: Spring return to center
Travel: +/- 16°
Part #: SM-M1
Operation: 3 position detented
Travel: detents @ 0° -16° -32°

Part #: SM-F1
Operation: Friction Maintained
Travel: 0 - 32°



Micro Joystick ★
The Micro Joystick is a miniature Proportional Hall Effect joystick with only 3 moving parts. Designed for exposed application, this simple thumb operated joystick provides an additional 2 axis of proportional control within a control grip faceplate. (★ Patent Pending)



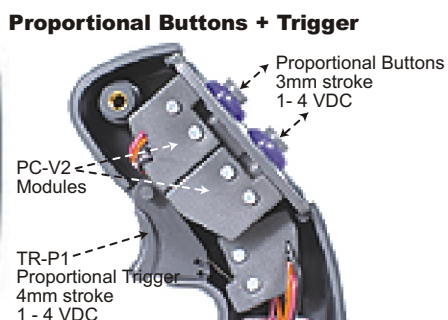
Part #: MJS-P2
Operation: Dual axis, spring return
Input Voltage: 5 VDC @ 30ma
Output: 0.5 - 2.5 - 4.5 VDC (+/- 0.2)
Rating: IP-66 (above panel)
Travel: +/- 14°



Variable Voltage Module (Part #: PC-V2)
The Variable Voltage module is designed to be used with our "Flex Buttons" or Proportional Trigger actuators below. This simple module incorporates a Hall Effect sensor that detects magnetic fields. When a magnet is moved

closer to the sensor the output signal changes relative to the distance to the magnet. The closer the magnet, the higher the output signal.

Specifications:
Input Voltage: 5 VDC @ 15 ma
Output: 0.8 - 4.2 VDC (+/- 0.2)
Range: up to 4mm magnet travel (Factory Calibrated)



When the Variable Voltage modules are supplied in a faceplate, they are activated using a **Flexing Button** ★. This is a special flexible dome shaped button that houses a small magnet. As the button is depressed the magnet is simply moved closer to the module which increases the output signal. The further the button is depressed, the higher the output signal from the module and because there is no contact or wear between the parts, the estimated life is more than 5 million cycles.

The Proportional Trigger works much the same as the flex buttons. There is a small magnet embedded in the proportional trigger lever. As the trigger is depressed it is simply moving the magnet closer to the Variable Voltage Module to increase the output signal. (★ Canadian and International patents apply)



Bushing Adapters

- ① BU-00 1/4" unthreaded hole
- ② BU-01S-A 10mm c/w set screws
- ③ BU-03C-A 12mm clamping c/w screws
- BU-01 10mm x 1.5 threaded
- BU-02 12mm x 1.25 threaded
- BU-03 12mm x 1.75 threaded
- BU-04 14mm x 2 threaded
- BU-05 5/8" x 11 threaded
- BU-06 14mm x 1.5 threaded
- BU-07 3/8" x 16 threaded
- BU-08 1/2" x 13 threaded
- BU-09 9/16" x 12 threaded
- BU-04C-A 14mm clamping c/w screws



Jam Nuts

- NT- 01 12mm x 1.75 jam nut
- NT- 02 14mm x 2.0 jam nut
- NT- 03 2-56 nut
- NT- 04 10mm x 1.5 jam nut
- NT- 05 12mm x 1.25 jam nut
- NT- 06 1/4 x 40 jam nut
- NT- 07 9/16" x 12 jam nut
- NT- 08 5/8" x 11 jam nut



Studs

- ① ST-02 14mm x 2 x 40 mm straight stud
- ② ST-04 9/16" x 75 mm wire exit, straight stud
- ③ ST-05 12mm x 1.75 x 70 mm drilled, bent stud
- ④ ST-06 5/8"NC - 14mm x 85 wire exit, bent stud
- ⑤ ST-08-125 J Handle stud: 12mm x 1.25
- ST-08-175 J Handle stud: 12mm x 1.75
- ST-08-14x2 J Handle stud: 14mm x 2



Sealed Connectors

Sure Grip maintains a variety of Deutsch Connectors in stock. (Call Factory for details)



Rocker Kit

- ① High Profile Rocker
 - ② Low Profile Rocker
 - ③ Vial ABS Glue
- Sure Grip control handles are supplied with buttons bonded to the overlay that directly activate the switches. A Rocker Cover Kit is available that contains two styles of rockers and a small bottle of adhesive. The rocker cover permanently mounts across 2 horizontal or vertical buttons. (Require overlays with small buttons)



10 Button Keypad (For "L" Series Grip Only)

Sure Grip 10 Button Keypads provide extra switching functions to control computer, PLC or power relays.

Our newly redesigned 10 Button Keypads have greatly improved operator comfort. The buttons are now mounted closer into the grip resulting in reduced fatigue and strain. The switches and wire harness are also completely enclosed within the case for a more integrated look. Wire is foil shielded to eliminate unwanted interference with signal-level switching.

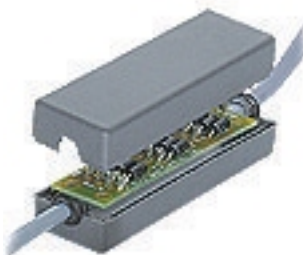
- ① KP-10L1 (B/G) is for use by the left hand
- ② KP-10R1 (B/G) is for use by the right hand.

Switches: Electrical: 100 ma @ 24 VDC
Mechanical: 10 million cycles

Housing: High impact ABS

Wire: Standard 10' @ 24 gauge routed through the handle case

Operating Force: 250 grams, snap action



Inline Diode Protection Pack

The Sure Grip Inline Diode Pack fits all handles or wiring harnesses to protect switches against destructive voltage surges. The In-Line Diode Pack provides efficient surge suppression protection for your control handle to ensure maximum switch life. Simple solder connections ensure trouble-free life and allow the Diode Pack to be installed anywhere on the wiring harness. A tough two piece molded case protects the diode board and makes installation quick and easy. Diode Boards are furnished with diodes to protect up to 12 switches.

- Case:** measures 1" x 1" x 4.5" long
- Diodes:** 2 amps continuous, 6 amps surge
- Wire Size:** 20 - 22 gauge, stranded

Model DP-12: for up to 12 switch functions

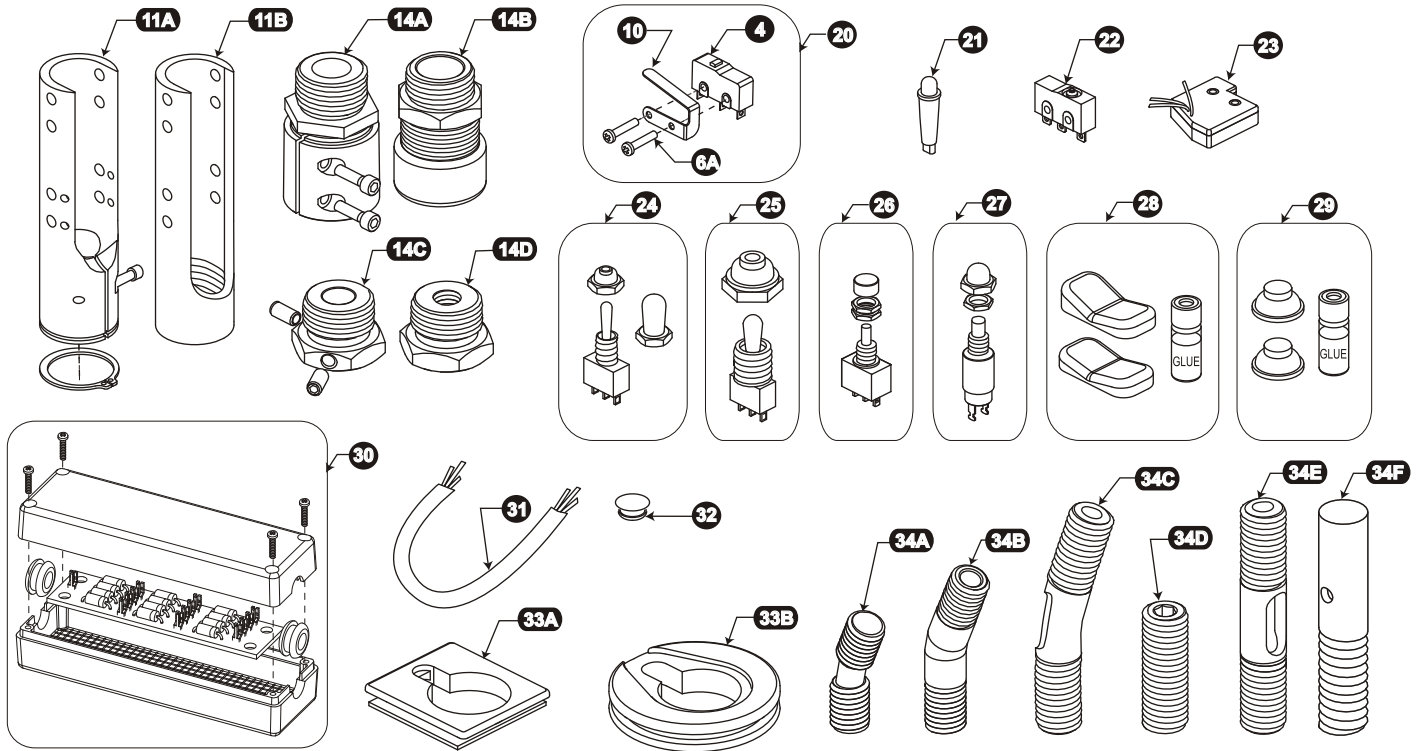
Model DP-03: for up to 3 switch functions

Accessories List

#4-1413 McGill Road
 Kamloops B.C. Canada V2C 6K7
 Ph: (250) 374-2278

Fax: (250) 374-1099
 Toll Free: 1-800-831-2278
 www.suregripcontrols.com

SURE GRIP
 CONTROLS INC.



FLG	PART#	DESCRIPTION	FLG	PART#	DESCRIPTION
4	SW-00	Handle Switch, L/S	27	PB-2MA-A	Pushbutton Switch - Maintained C/W Boot
6A	SC-03	2 x 7/16" Tapping Screw - Pan Head	28	RK-02	Rocker Kit
10	LS-00	Leaf Spring for Trigger	29	FB-VV-A	Flex Button Repair Kit: 2 VV/2 Modules
11A	PN-05-385-A	Mounting pin, Clamping C/W .385" Bore	30	DP-03	Diode Pack Assy. 3 Functions
11B	PN-03	Mounting Pin "L/S"		DP-12	Diode Pack Assy. 12 Functions
14A	BU-03C-	Mounting Adapter: 12 mm Clamping	31	WR-07	7 Cond. Wire, 20 Gauge/Foot
	BU-04C-A	Mounting Adapter: 14 mm Clamping		WR-09	9 Cond. Wire, 20 Gauge/Foot
14B	SR-01	Strain Relief: SS Bushing Adapter		WR-13	13 Cond. Wire, 22 Gauge/Foot
14C	BU-01S-A	Adapter Bushing - 10mm, Set Screws		WR-12S	12 Cond. Wire, 24 Gauge Shielded
14D	BU-00	Adapter Bushing - 1/4" Hole		WR-15	15 Cond. Wire, 22 Gauge/Foot
	BU-01	Adapter Bushing - 10mm x 1.5	32	HP-01	3/8" Hole Plug
	BU-02	Adapter Bushing - 12mm x 1.25	33A	AD-01	Joystick Boot Adapter: 1.125" Square Hole
	BU-03	Adapter Bushing - 12mm x 1.75	33B	AD-02	Boot Adapter: 1 1/2" Round Opening
	BU-04	Adapter Bushing - 14mm x 2	34A	ST-07	12mm x 1.75 x 40mm, Bent Stud
	BU-05	Adapter Bushing - 5/8" NC	34B	ST-05	12mm x 1.75 x 70mm Drilled, Bent Stud
	BU-06	Adapter Bushing - 14mm x 1.5	34C	ST-06	5/8"NC - 14mm x 85mm Wire Exit, Bent Stud
	BU-07	Adapter Bushing - 3/8" NC	34D	ST-02	14mm x 2.0 x 40mm Straight Stud
	BU-08	Adapter Bushing - 1/2" NC	34E	ST-04	9/16" x 75mm Wire Exit, Straight Stud
	BU-09	Adapter Bushing - 9/16" NC	34F	ST-08-125	J Handle Stud: 12mm x 1.25
	BU-10	Adapter Bushing - 12 x 1.5mm		ST-08-175	J Handle Stud: 12mm x 1.75
20	SK-01	Leaf Spring and Switch Kit		ST-08-14x2	J Handle Stud: 14mm x 2
21	LED-24G	LED Green 24 Volt - Resistor:1/4"			
22	SW-00S	Handle Switch, L/S Sealed			
	SW-00SG	Handle Switch, L/S Sealed Gold			
23	PC-V2	Variable Voltage Module 1-4 VDC			
24	TO-2MA-A	Toggle: 2 Pos Main SPDT C/W Boot			
25	TO-2MA-L	Toggle 2 Pos Main, SPDT Large Bat			
	TO-3MA-A	Toggle: 3 Pos Main SPDT C/W Boot			
	TO-3MA-L	Toggle: 3 Pos Main, SPDT Large Bat			
	TO-3MA,MO-A	Toggle: 3 Pos Main/mom SPDT C/W Boot			
26	PB-1MO	Pushbutton Switch/Cap - Momentary			

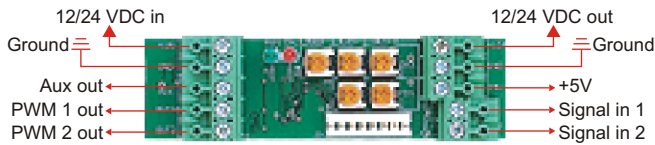
Single Axis Driver Board

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP
CONTROLS INC.

Single Axis Driver Board (Part# SDB-P1)



The Single Axis Driver Board is designed to proportionally drive two solenoids from proportional signal devices such as Variable Voltage Modules or a Joystick. The SDB-P1 driver board can be configured to accept one 0.5 - 2.5 - 4.5 VDC signal or two 0-5 VDC input signals (Variable Voltage Modules).

The SDB-P1 has two proportional high current PWM outputs and one switched "auxiliary" output that is turned on when either of the PWM outputs are activated. This "auxiliary" function is often used to divert hydraulic oil to an auxiliary valve for the attachment. The PWM outputs are also "current compensated" to correct for changes in coil resistance as the solenoid coils heat up and cool down.

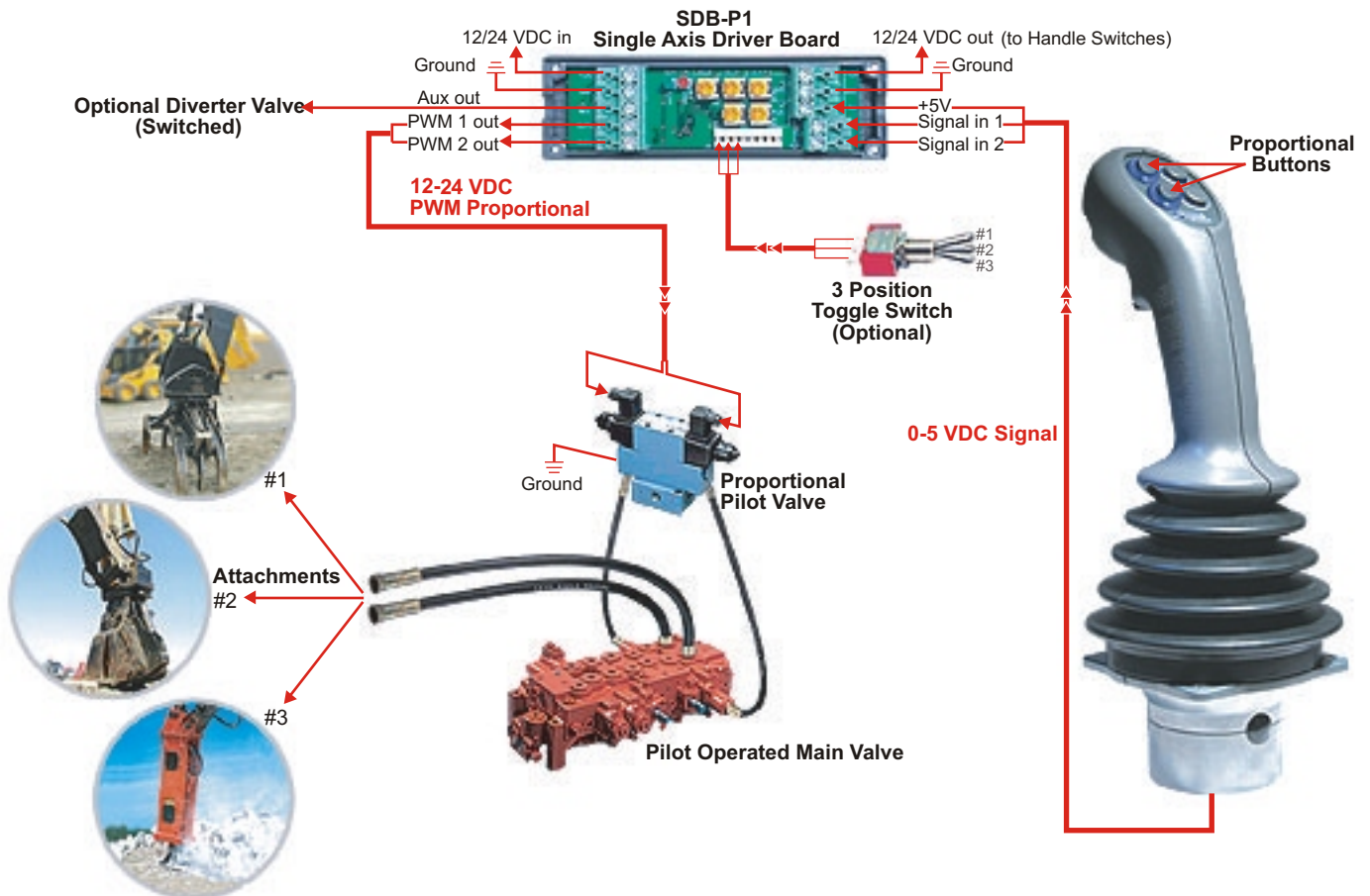
All the outputs include protection against inductive kick back and are short circuit protected. If any of the outputs are accidentally shorted to ground, the board will automatically shut down to protect itself until the problem is corrected.

Optional

The SDB-P1 driver board can be supplied with special software that allows up to three different settings to be stored in the memory for three different attachments. When an attachment is changed, the operator moves the toggle switch to the new position corresponding to the new attachment and restarts the machine to activate the new flow setting. This feature allows the operation of up to three attachments using one valve.

Calibration of the board is performed using onboard potentiometers to set the minimum and maximum flow for each solenoid. There are also LED's that show when the board is in "Run" or "Calibrate" mode.

Typical Proportional System



Specifications

Parameter	Min.	Typ.	Max.	Unit
Power Supply:				
Supply voltage	6	-	28	VDC
Supply current (idle)	-	20	-	mA
Supply current (max)	-	5	-	A
Aux. Vout	-	5	-	VDC
Aux. Current (+5V)	20	-	30	mA
Analog Inputs:				
Input range	0.5	-	4.5	VDC
Neutral point (single)	-	2.5	-	VDC
Neutral point (dual)	-	0.5	-	VDC
PWM Outputs:				
Frequency	-	200	-	Hz
Min. duty cycle	-	5	-	%
Max. duty cycle	-	99	-	%
Output current	-	-	2.5	A
Current Compensation:				
Correction range	-40	-	+40	%
Max. coil size	-	3000	-	mA

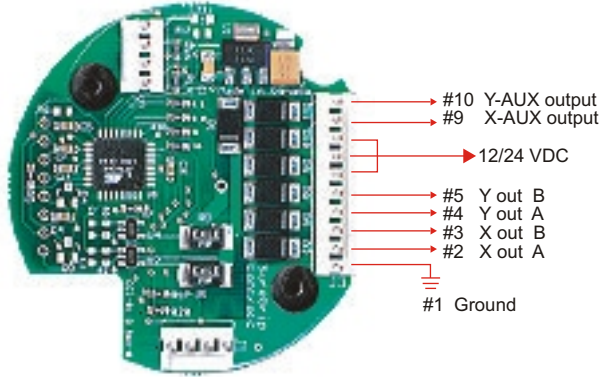
Joystick Driver Board

#4-1413 McGill Road
 Kamloops B.C. Canada V2C 6K7
 Ph: (250) 374-2278

Fax: (250) 374-1099
 Toll Free: 1-800-831-2278
 www.suregripcontrols.com



Joystick Driver Board (Part# JDB-P2)



Joystick Driver Board (Part#: JDB-P2) is designed to work with our JM and JL Hall Effect joysticks when a direct joystick to solenoid valve solution is desired.

Specifications

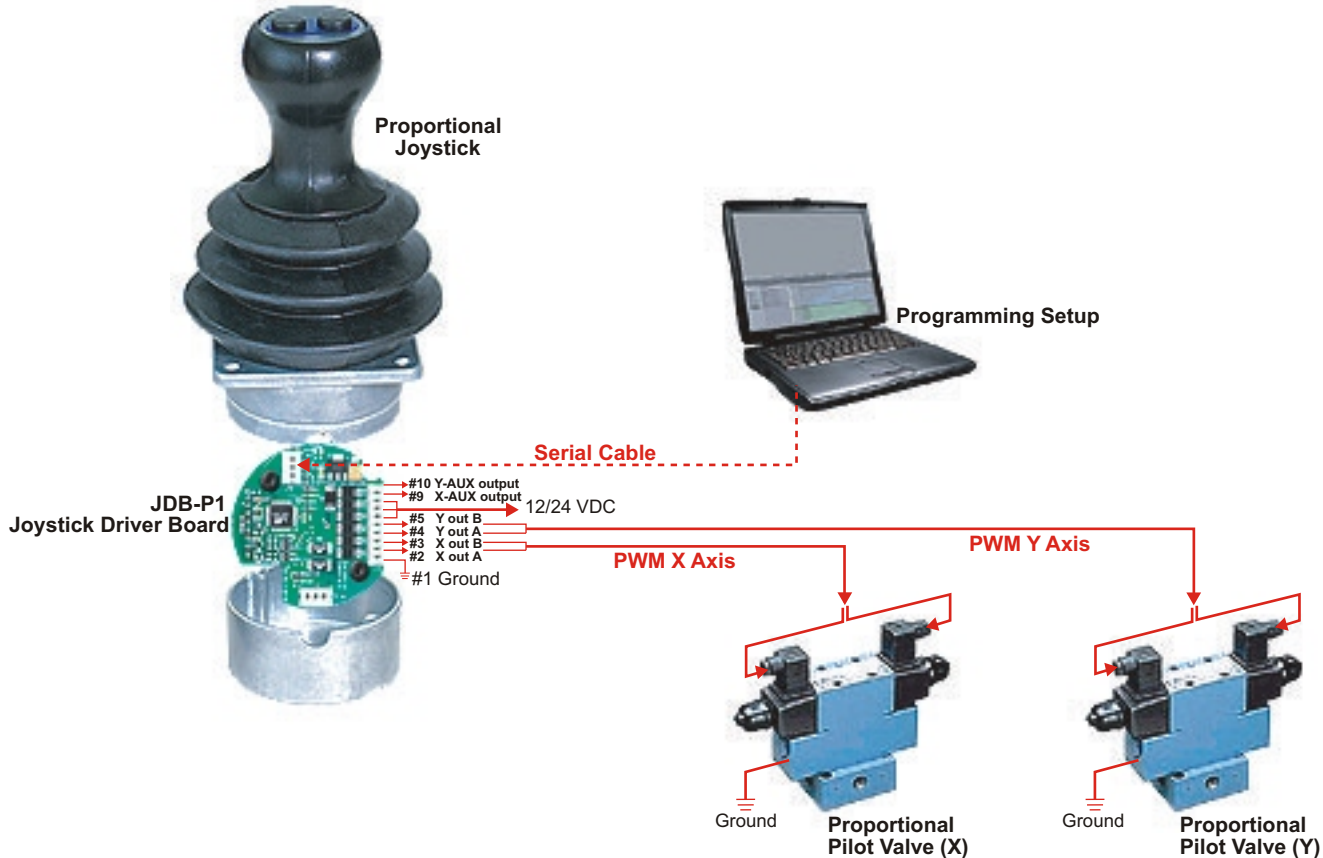
Parameter	Min.	Typ.	Max.	Unit
Power Supply:				
Supply voltage	6	-	28	VDC
Supply current (idle)	-	20	-	mA
Supply current (max)	-	12	-	A
Aux. Vout	-	5	-	VDC
Aux. Current (+5V)	20	-	30	mA
Analog Inputs:				
Input range	0.5	-	4.5	VDC
Neutral point	-	2.5	-	VDC
PWM Outputs:				
Frequency	-	200	-	Hz
Min. duty cycle	-	5	-	%
Max. duty cycle	-	99	-	%
Output current	-	-	3	A
Current Compensation:				
Correction range	-40	-	+40	%
Max. coil size	-	3000	-	mA

The JDB-P2 boards are equipped with four current compensated PWM proportional outputs and two "neutral" switched output. The board also includes a 50ma 5 volt supply to power the JM or JL Hall Effect joysticks.

All the outputs include protection against inductive kick back and are short circuit protected. If any of the outputs are accidentally shorted to ground, the board will automatically shut down to protect itself until the problem is corrected.

The board fits inside the lower joystick housing and is easily programmed by plugging in a serial cable and using the standard Windows "terminal" program. The minimum flow, maximum flow and ramp rate can all be individually adjusted for each proportional output.

Typical Joystick Proportional System



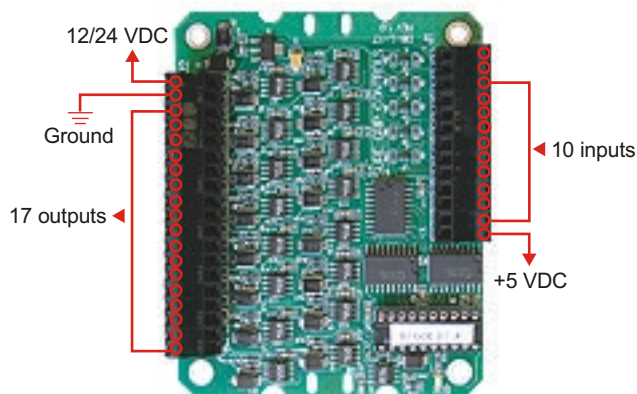
DBL-17 Logic Driver Board

#4-1413 McGill Road
Kamloops B.C. Canada V2C 6K7
Ph: (250) 374-2278

Fax: (250) 374-1099
Toll Free: 1-800-831-2278
www.suregripcontrols.com

SURE GRIP
CONTROLS INC.

DBL-17 Logic Driver Board



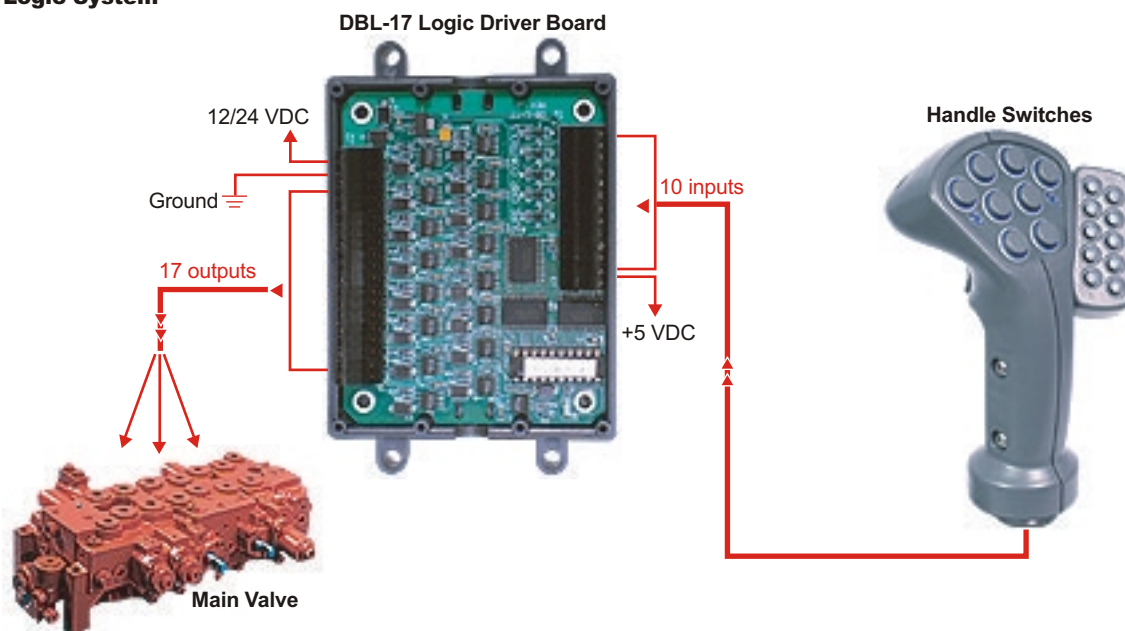
Specifications

Parameter	Min.	Typ.	Max.	Unit
Power Supply:				
Supply voltage	6	-	28	VDC
Supply current (idle)	-	15	-	mA
Supply current (max)	-	24	-	A
Aux. Vout	-	5	-	VDC
Inputs:				
Input range	0	-	supply	VDC
Outputs:				
Output current	-	-	2.5	A

The DB-L17 Logic Driver Board can read up to 10 switched inputs and control up to 17 high current switched outputs to allow complex control of a machine's functions from a simple, easy to use control handle. The DB-L17 is factory programmed to the customer's specifications and is designed for easy installation and reliable operation in mobile equipment. The DB-L17 can be used to replace relays, timers, diode logic circuits and programmable logic controllers (PLCs) in many applications.

All the outputs include protection against inductive kick back and are short circuit protected. If any of the outputs are accidentally shorted to ground, the board will automatically shut down to protect itself until the problem is corrected.

Typical Switch Logic System



Danfoss Adapter Driver Board



Danfoss Adapter Board (Part# DFA-01/02)

The DFA-01/02 provides direct from handle to valve, proportional control for the operation of industry-standard ratio metric proportional valves. You can now use Sure Grip Controls' non-contact proportional modules or our joysticks to directly control proportional valves such as the Sauer Danfoss PVG 120 and PVG 32 series proportional valves.

Specifications

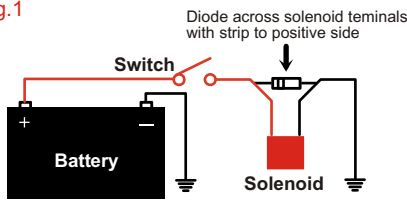
- + Operating voltage: 6-28 VDC
- + Wire terminals: solder post
- + Ramp rate (factory): 300 ms
- + Enable output: 2 amps max.
- + Signal output (neutral) 50% machine voltage +/- 2%
(max) 80% machine voltage +/- 5%
(min) 20% machine voltage +/- 5%
- + Case size: 4" x 1" x 1"
- + Operating temperature: -40 to 70 celsius

Surge Suppression Explained

Inductive kick (surge) occurs any time an electrically generated field collapses. A voltage, opposite in polarity to the original applied voltage is generated by the collapsing magnetic field.

The effect happens whenever a solenoid on a hydraulic valve is shut off. The voltage surge can reach several hundred volts which will arc across the switch contacts and quickly destroy them. Switch life can be reduced to one-tenth of normal.

Fig.1



Installation Tips

Diodes should be installed as close as possible to the solenoid. Soldering a diode directly across the 2 solenoid terminals is ideal.

Diodes rated at 200 volts and 1 amp are readily available for a few cents and are appropriate for most applications.

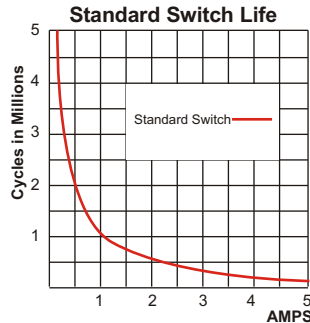
Diodes have a stripe on one end of the case. On equipment wired with negative grounds, the end with the stripe should be installed on the most positive side of the solenoid. (This is usually the side that has the wire from the switch.) (See Fig. 1)

Sure Grip manufactures a diode pack which can be used to provide surge suppression.

Typical Switch Life

Sure Grip Handles use reliable snap action micro switches that have proven to give the longest life and greatest reliability of any switch on the market.

Fig.2



While the switches are rated for up to 10 million cycles, switch life is dependent on the load (in amps) and proper diode protection.

If the handles will be switching computer signals (under 20 ma), the best performance will be obtained using switches with gold plated contacts.

Wire Routing Tips

Wire breakage inside the cable can be one of the most difficult and frustrating problems to find. Almost all wire breakage problems can be traced to two common installation errors:

1. Crushing the wire:

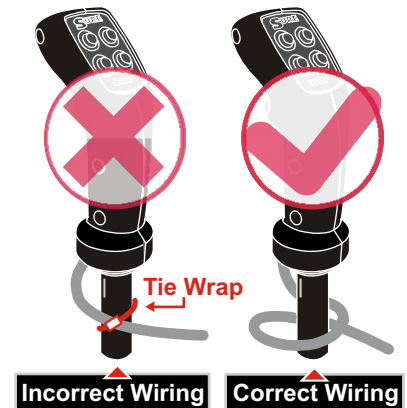
Nylon tie wraps are very useful in giving the wiring harness a neat and finished appearance, but applying them too tightly can crush the wire insulation and pinch the wires. When the cable is pinched, it doesn't allow the wire to slide inside the cable jacket and creates a stress point (See Fig.3).

2. Forcing the wire to flex at one point :

If the wire from the control handle is routed down the joystick shaft with little slack, the wire will tend to flex over a small area. Eventually, the repeated flexing will cause the wire strands to break. The solution is to provide enough slack in the cable so that the flexing motion is distributed over a longer section of wire.

Ideally, a loop should be left around the mounting stud to spread the flexing point over a larger area. The loop can be created either inside or outside the rubber boot.

Fig.3



Do not clamp wire tightly with tie wraps

Dear Customer,

Sure Grip Controls is constantly striving to improve our products and welcomes your suggestions. As a direct result of your comments, we have incorporated many new features into our handles. We are also excited about the new products we are introducing in this catalog. We look forward to providing you with the best service, fast order turn around and top quality products that you can pass on to your customers with confidence. We value your business and will do our best to live up to your confidence in us.

Please visit our web site for the latest innovations
www.suregripcontrols.com.

Owners and Staff
Sure Grip Controls Inc.

Sure Grip Warranty

Sure Grip Controls is absolutely committed to building top quality products and will go to great lengths to ensure our customers are completely satisfied with all our products. Sure Grip Controls offers our customers one year parts and labor warranty on all mechanical components and 30 days on electrical components.

Sure Grip Controls, Inc. has no control over the installation or final application of our products and therefore makes no claims as to the suitability of our products for any application. In using any of our products, it is understood that Sure Grip Control's liability is limited to the repair or replacement of defective parts and under no circumstances shall we be liable for any incidental, consequential or special damages, including losses or expenses associated with the use of our products, losses due to improper installation, cost incurred in the replacement of defective parts or application of this warranty. All our products undergo rigorous electrical and mechanical testing before shipment.

Sure Grip Ordering

Sure Grip Controls usually ships products in 2-3 business days. Shipments outside North America must be prepaid by Visa, or Wire Transfer, unless previous credit arrangements have been made. Shipping is FOB Kamloops, BC, Canada.

Outside of Canada, all prices are quoted and invoiced in US funds.

Blanket Orders

Blanket purchase orders can cover a period for up to one year and must contain the scheduled shipment dates (max 6) and the number of items for each shipment.

Returns

An RMA (Return Material Authorization) number is required for all product returned to Sure Grip. Custom configured products are not eligible for return or exchange. All items must be shipped prepaid to Sure Grip Controls Inc.

Sure Grip Discounts

Volume discounts are offered to customers based upon the total number of handles purchased on one Purchase Order. Various handle models can be grouped for maximum discounts but must be on one Purchase Order. Parts can not be grouped to obtain larger volume discounts.

