

## Korry® 389 LED-Illuminated 5/8-Inch Switch

A virtual industry standard for versatile, reliable switching solutions with outstanding illumination

## Korry 389 high-performance 5/8-inch LED switches serve on most commercial and military platforms

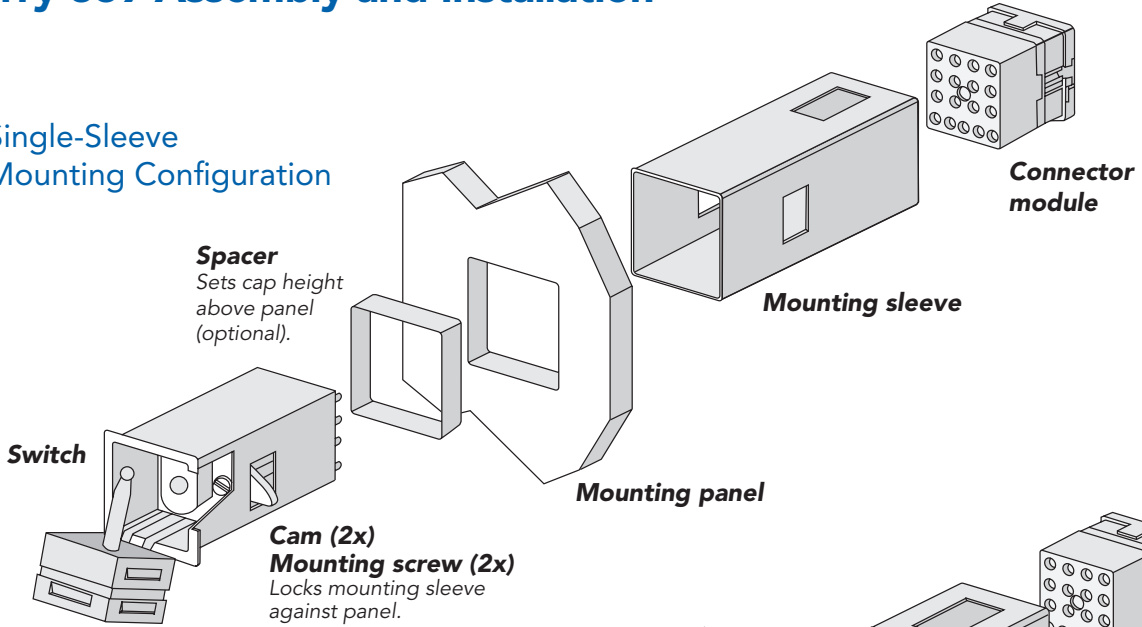


Esterline has engineered its Korry 389 LED switch for human machine interface (HMI) applications where superior lighting performance, product reliability, and system versatility are required. Its innovative circuitry design has earned the company several patents.

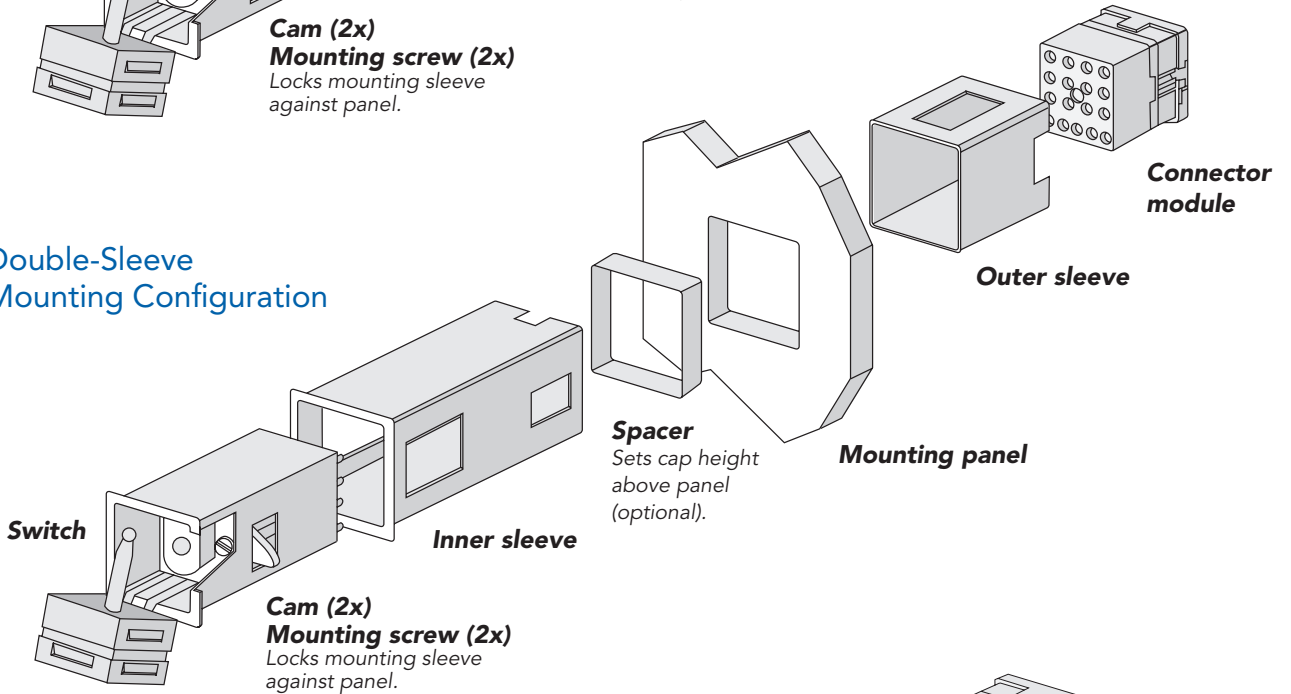
- Surface-mounted electronics with the latest generation of high-brightness LEDs
- Uncompromising performance in system interface capabilities
- Exceptional illumination characteristics such as brightness output and dimming control
- Versatile circuit card assembly (CCA) design for any type of dimming requirement
- Mechanically interchangeable with most 5/8-inch switch products

# Korry 389 Assembly and Installation

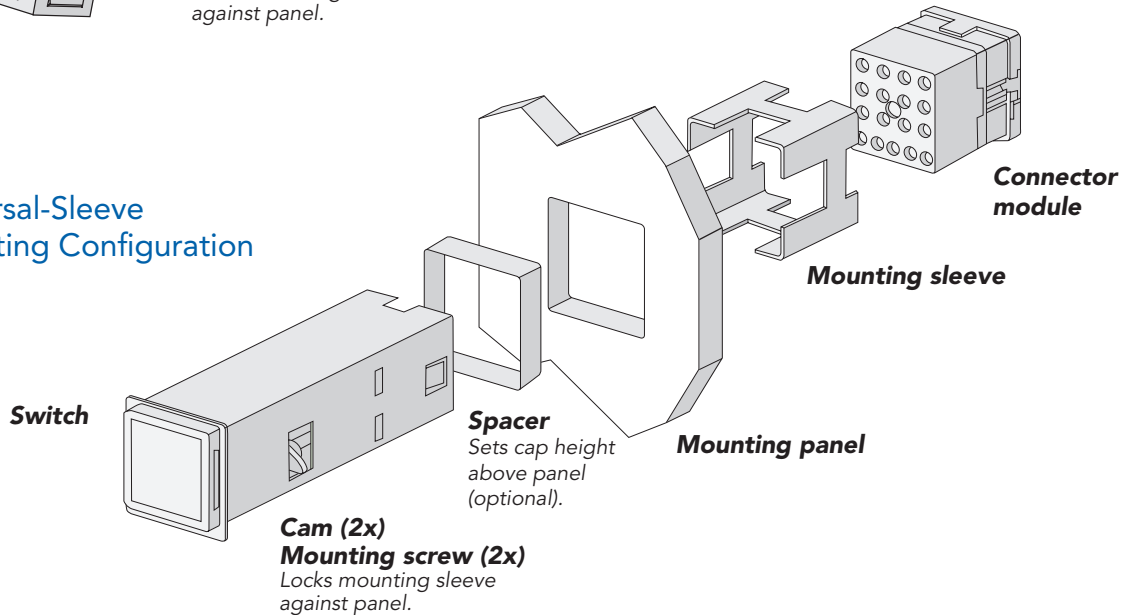
## Single-Sleeve Mounting Configuration



## Double-Sleeve Mounting Configuration



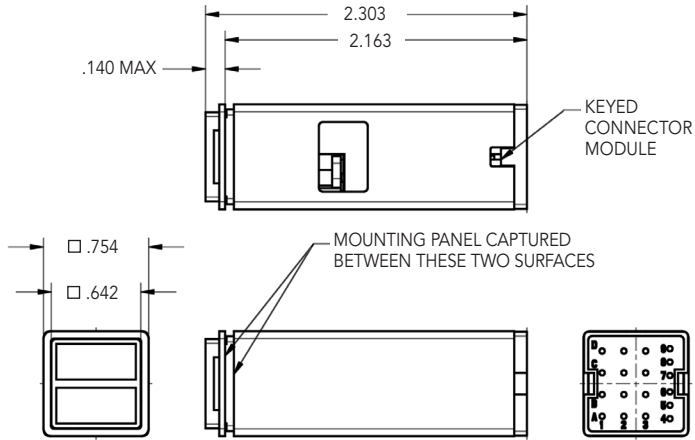
## Universal-Sleeve Mounting Configuration



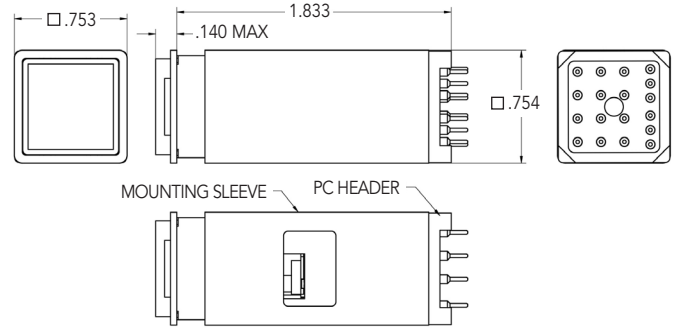
# Standard 389 Configuration Envelopes and Panel Cutouts

(dimensions in inches)

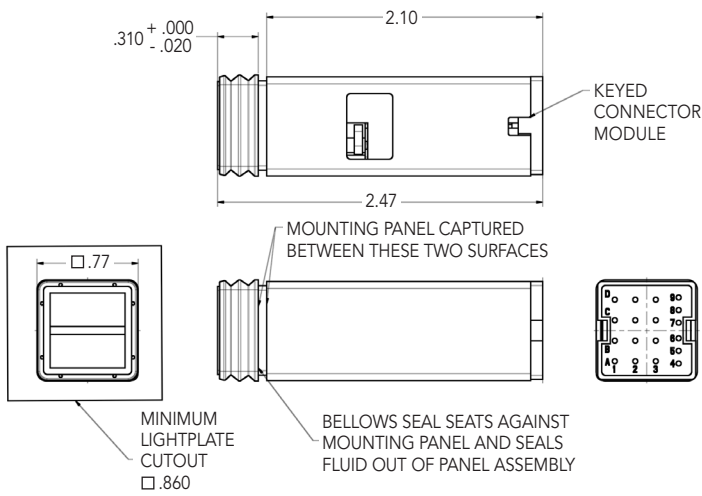
## Single Sleeve and Connector Module



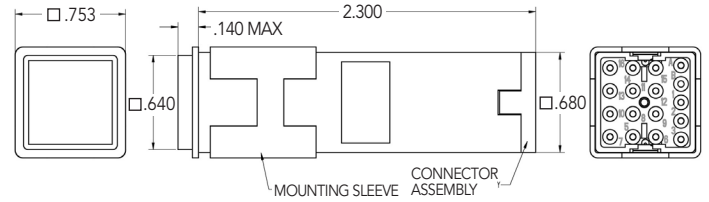
## Single Sleeve and PC Header



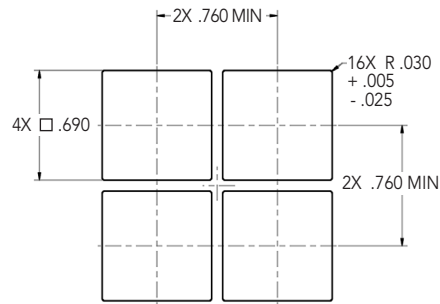
## Single Sleeve, Connector Module, and Bellows Seal



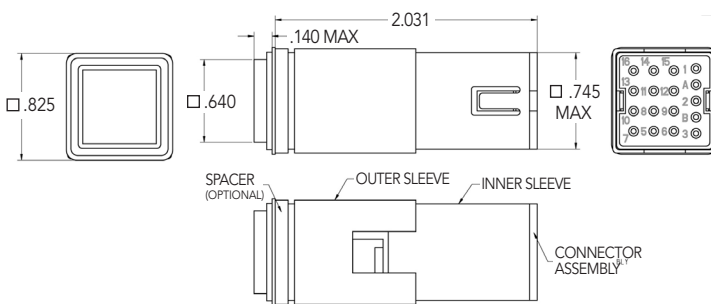
## Universal Sleeve and Connector Module



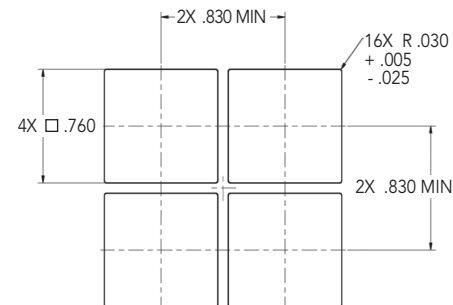
## Panel Cutout for Single Sleeve



## Double Sleeve and Connector Module



## Panel Cutout for Double Sleeve

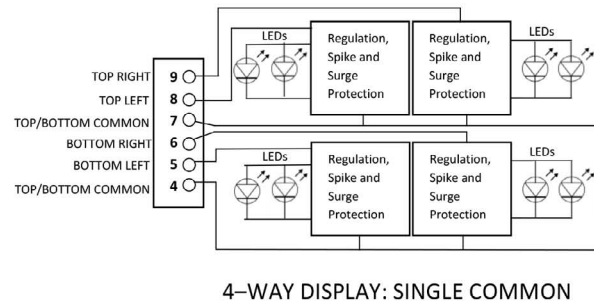
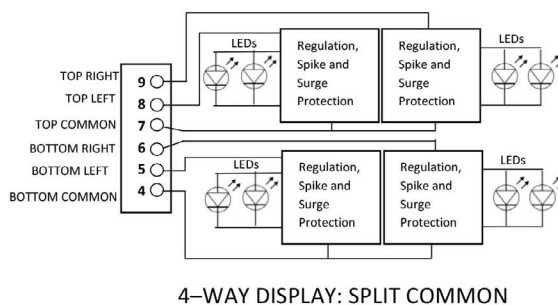
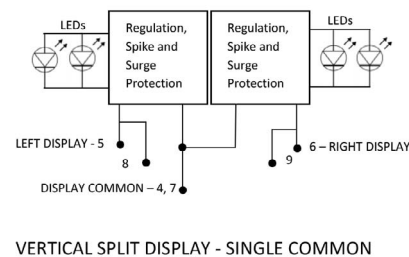
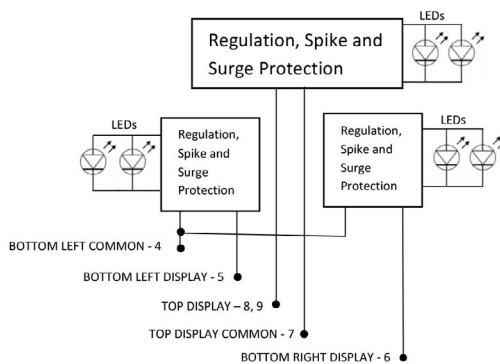
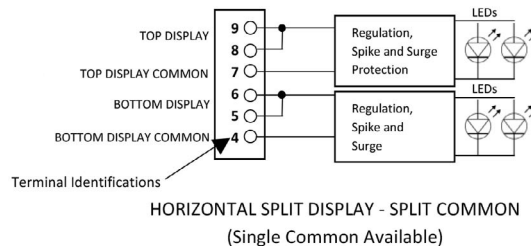
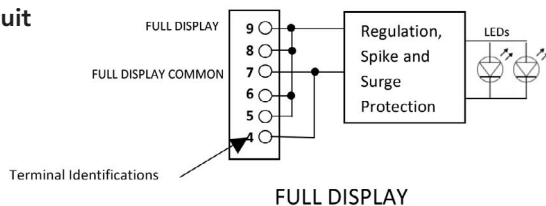


For additional information, please email [korry.techinfo@esterline.com](mailto:korry.techinfo@esterline.com)

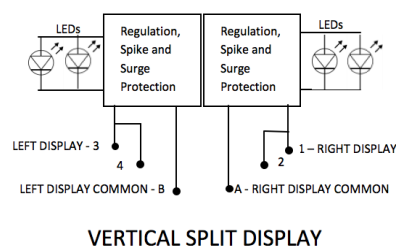
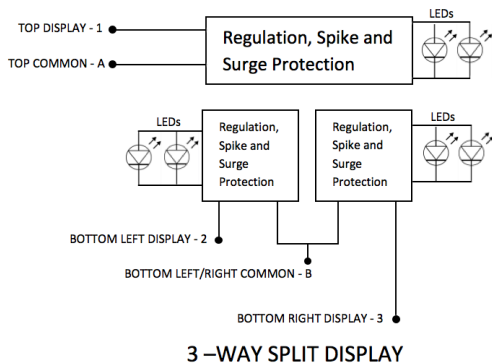
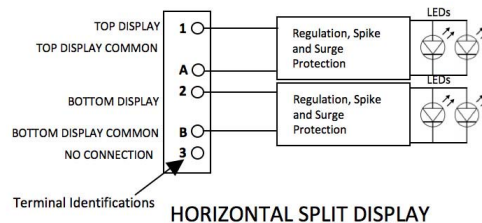
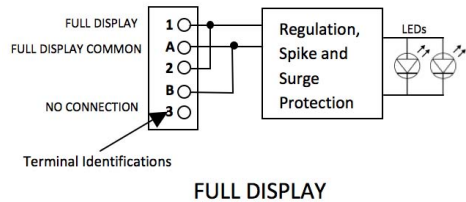
# Standard 389 Electrical Schematics and Electrical Interface Options

Shown are examples of standard circuits. Other options are available upon request. Terminal designations are for reference only.

## 6-Pin Lamp Circuit (bipolar design)

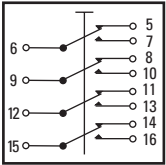


## 5-Pin Lamp Circuit (bipolar design)



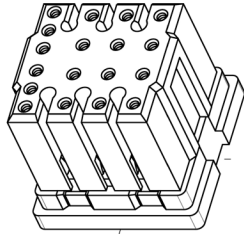
Note: 4-way split display (not shown) is also available with a 5-pin lamp circuit.

### Switch Circuit



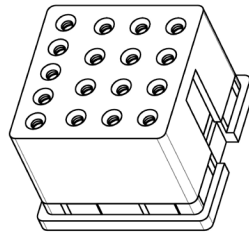
Terminal identification is optional.

### 6-Pin Connector Module



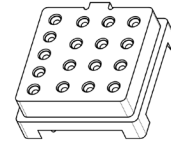
19854-XXX module uses M39029/57-354 crimp pins, accepts AWG 22, 24, and 26.

### 5-Pin Connector Module

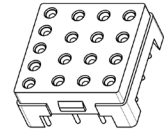


28196-XXX module uses M39029/22-192 crimp pins, accepts AWG 20, 22, and 24.

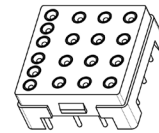
### Printed Circuit Board (PCB) Headers



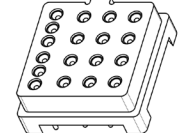
38803-002  
5-pin rigid CCA



38803-001  
5-pin flex CCA



27493-001  
6-pin flex CCA



33463-001  
6-pin rigid CCA

## Electrical and Operating Characteristics

Switch type	Momentary/alternate action, four pole, double throw, form C, single break microswitch IAW MIL-PRF-8805
Switch contact ratings	Resistive: sea level 7 A at 28 VDC Inductive: sea level 4 A at 28 VDC Lamp: sea level 2.5 A at 28 VDC
LED current rating	35 mA max. at 28 VDC, bright mode, full display
Total cap travel	0.177 inch max. (4.49 mm)
Actuation force	2-5 pounds (0.91-2.27 kg)
Cap extraction	2-5 pounds (0.91-2.27 kg)
Mounting torque	16-20 inch-ounces
Actuation life	100,000 cycles (MIL-PRF-22885)
Temperature	-55° C to +85° C (MIL-PRF-22885)

## Optical Characteristics

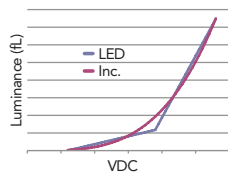
	Luminance (fL)		Chromaticity		Contrast	
	Dim @ 14 VDC	Bright @ 28VDC	x	y	On	Off
RED	10±5	200-500	0.670	0.334	0.6 Min	0±0.1
			0.670	0.310		
			0.695	0.285		
			0.710	0.292		
AMBER	10±5	200-500	0.570	0.430	0.6 Min	0±0.1
			0.560	0.420		
			0.600	0.380		
			0.610	0.390		
GREEN	10±5	200-500	0.200	0.640	0.6 Min	0±0.1
			0.200	0.740		
			0.320	0.740		
			0.320	0.640		
BLUE	10±5	150-400	0.140	0.250	0.4 Min	0±0.1
			0.140	0.150		
			0.200	0.150		
			0.200	0.250		
WHITE	10±5	200-500	0.280	0.270	0.6 Min	0±0.1
			0.280	0.370		
			0.340	0.370		
			0.340	0.270		

- Luminance and color requirements are for legend types S(1B), B(1C), W(2D), N(2G2), C(2B), and (2F).
- Type N legends are used for night visibility and are designed to match the light-plate luminance value.
- NVIS colors are available per MIL-STD-3009.
- Korry products meet the night-vision compatibility requirements of MIL-STD-3009.
- Contrast shown is for S legends only.
- Other optical characteristics are available upon request.

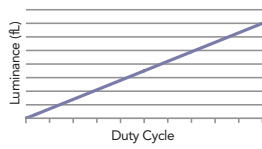
For additional information, please email [korry.techinfo@esterline.com](mailto:korry.techinfo@esterline.com)

# Dimming Methodologies

Variable Voltage



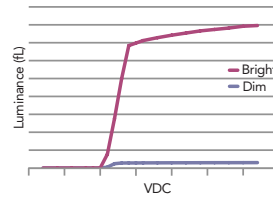
Pulse Width Modulation (PWM)



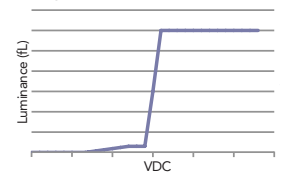
Logic Input

2-to-4-point dimming using multiple ground pins

Constant Illumination over Variable Voltage



Programmable

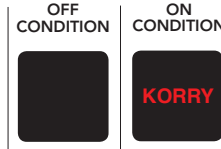


## Legends

### Legend Types

#### S (1B)

Hidden legend. Letters not visible until illuminated. Lighted colored letters on opaque black background when energized.



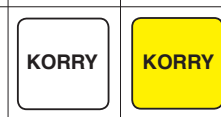
#### B (1C)

Hidden legend. Letters not visible until illuminated. Lighted colored background with opaque black letters when energized.



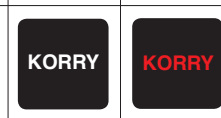
#### W (2D)

Opaque black letters on white background. Background shows color when energized.



#### N (2G2)

White letters on opaque black background. Letters show color when energized.



#### C (2B)

Opaque black letters on colored background. Lighted colored background when energized.

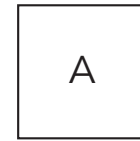


#### (2F)

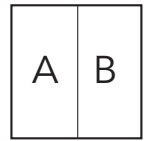
Opaque white letters on dark background. Background shows color when energized.



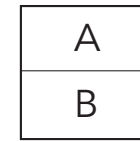
### Lens Configurations



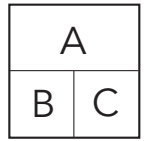
Full



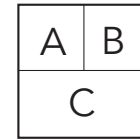
Vertical split



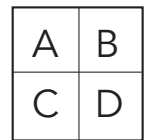
Horizontal split



3-way split



3-way B split



4-way split

### Fonts and Sizes Versus Character Capacities

	Character height	TEXT		TEXT		TEXT		TEXT	
		Lines	Characters per line	Lines	Characters per line	Lines	Characters per line	Lines	Characters per line
Futura Medium	.093	1-4	6	1-2	6	1	2	1	4
	.125	1-3	4	1	4	1	2	1	3
Futura Medium Condensed	.090	1-4	9	1-2	9	1	3	1-2	4
	.125	1-3	7	1	7	1	3	1	3
Helvetica Medium	.093	1-4	5	1-2	5	1	2	1	4
	.125	1-3	4	1	4	1	2	1	3
Helvetica Medium Condensed	.093	1-4	7	1-2	7	1	3	1	4
	.125	1-3	5	1	5	1	2	1	3
GORTON NORMAL	.093	1-4	6	1-2	6	1	2	1	4
	.125	1-3	4	1	4	1	2	1	3
GORTON NORMAL CONDENSED	.093	1-4	7	1-2	7	1	3	1-2	4
	.125	1-3	5	1	5	1	2	1	3
GORTON EXTRA CONDENSED	.093	1-4	9	1-2	9	1	3	1-2	4
	.125	1-3	7	1	7	1	2	1	3
News Gothic	.093	1-4	6	1-2	6	1	2	1-2	4
	.125	1-3	5	1	5	1	2	1	3
DIN Mittelschrift 1451	.093	1-4	6	1-2	6	1	2	1	4
	.125	1-3	4	1	4	1	2	1	3
DIN Engschrift 1451	.093	1-4	9	1-2	9	1	3	1-2	4
	.125	1-3	6	1	6	1	2	1	3

Number of characters per line can vary depending on characters selected. Other fonts are available upon request.

## Environmental

Test	Specification
Contact resistance	MIL-STD-202F, Method 307
Contact bounce	MIL-PRF-22885F, ¶4.7.5
Touch temperature	MIL-PRF-22885/109A (USAF)
Permanency of marking	MIL-STD-202F, Method 215J
Strength of actuating means	MIL-PRF-22885F, ¶4.7.10
Thermal shock	MIL-STD-202F, Method 107G, Condition A
Vibration	MIL-STD-810C, Method 514.2, Category B2, Procedure 1A
Shock	MIL-STD-202F, Method 213B, Condition B
Moisture resistance	MIL-STD-202F, Method 106F
Insulation resistance	MIL-STD-202F, Method 302, Condition B
Dielectric withstanding voltage	MIL-STD-202F, Method 301 MIL-STD-202F, Method 105C, Condition B
Salt spray*	MIL-STD-202F, Method 101D, Condition A
Explosion	MIL-STD-202F, Method 109B
Sand and dust*	MIL-STD-202F, Method 110A
Overload cycling	MIL-PRF-22885F, ¶4.7.27
Electrical endurance	MIL-PRF-22885F, ¶4.7.28
Mechanical endurance	MIL-PRF-22885F, ¶4.7.29
Power	RTCA/DO-160D, §16 and §17, Category A
Audio frequency conducted susceptibility	RTCA/DO-160D, §18, Category Z
Magnetic effect	RTCA/DO-160D, §15, Category Z
Induced signal susceptibility	RTCA/DO-160D, §19, Category Z
Radio frequency susceptibility	RTCA/DO-160D, §20, Category T
Radio frequency emission	RTCA/DO-160D, §21, Category M
Lightning induced transient	RTCA/DO-160D, §22, Category XXC3
Temperature / altitude	MIL-STD-810C, Method 504.1, Category 1
Field of view	MIL-PRF-22885F, ¶4.7.39
Stray light	MIL-PRF-22885F, ¶4.7.38

\* Results are based on switches being inside of an enclosure. To meet higher requirements, see the back page for sealing options. An enclosure would still be required.

## Reliability

The Korry 389 switch has an MTBF of 1.5 million hours, which varies by configuration and application. The 1.5-million-hour MTBF is for a standard full display, assuming a 20-degree C ambient operating temperature and 3,000 flying hours per year. This prediction was performed using 217 Plus from RiAC™ software.

## 389 Switch Accessories

### Sealing Accessories

To meet higher requirements than those listed in the environmental specifications (page 6), the following sealing options are available.

	Drip proof	Sand and dust	Waterproof	Humidity	Spill proof	Salt fog
Wiper seal*	X	X				
Internal seal*		X		X		X
External seal*	X	X	X	X	X	X
Bellows seal*	X	X	X	X	X	X

\* Panel seals are also available.

### Electrical Interface Accessories

- M39029 crimp pins: solder-less wire connections that can easily be removed and reinstalled into the connector module.
- Connector module: a standard electrical interface that accommodates the M39029 crimp-pin feature.
- PCB header: for installation onto a PCB or CCA.

### Miscellaneous Accessories

- Spacers: available for insertion between the mounting panel and housing flange to position the cap assembly level with an adjacent lightplate.
- Mounting sleeves: three different mounting-sleeve configurations compatible with either the connector-module or PC-header electrical interface.
  - Universal sleeve: a single-sleeve option accommodating mounting panel thicknesses from 0.032 to 0.432-inch thicknesses. Access to the rear of the mounting panel is required.
  - Single sleeve: used with the connector module interface to secure the switch around the mounting panel. This sleeve does not allow for the switch to be replaced from the front of the panel. Access to the rear of the mounting panel is required.
  - Double sleeve: used with the connector module interface. This sleeve allows for the switch to be replaced from the front of the panel.
- Flip-guard assembly: multiple styles available to prevent inadvertent switch actuation.
- Connector-module extraction tool: M22885/108T8234.

## Custom Options

For specific applications, custom circuits and lighting are available upon request.

Find out more about Korry 389 switches at [www.esterline.com/controlandcommunication](http://www.esterline.com/controlandcommunication), or contact us at +1-425-297-9700 or [korry.techinfo@esterline.com](mailto:korry.techinfo@esterline.com).

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