

Series 584

Four Pole Lighted Pushbutton Switches

EATON



584 Four Pole Lighted Pushbutton Switches

Development

The Series 584 lighted pushbutton switch is designed to meet the demands of avionic, maritime and vetronic applications in the crew stations of aircraft, ships, off-road vehicles and control systems. The Series 584 is qualified to **MIL-S-22885/110**.

The switch design has evolved from specific customer requirements. We asked the people who manufacture avionic, vetronic and shipboard equipment what was needed in a four pole, lighted pushbutton switch and the answers to this question included reliability, lightweight, short behind panel depth, sunlight readability, night vision imaging system compatibility, LED illumination, spray-tight sealing and plug-in mounting. The **Series 584** provides these capabilities.

From the switch mechanism to the optics, the 584 is designed with the final application in mind. The 584 is not a simple repackaging of another manufacturer's basic switches with a lighted button added to the unit, but it is a "ground up" design offering the shortest, lightest, four pole configuration in the industry. The 584 also offers a broad range of options and can be customized to your specification.

Since 1942, our lighted products have proven to be the best in the industry at meeting customer requirements for quality, reliability, variety of options and technical performance.

Your program needs will be supported by a committed team of people at Eaton. Eaton wants to be your long-term partner in product innovation, just-in-time delivery, electronic data interchange, quality improvement, and responsiveness to changing design needs. A tour of our factory will prove our commitment to continuous improvement, quality control and responsiveness.

Switch Design

The **584** pushbutton switch is a four pole, snap action, Form C device available in momentary, indicating alternate, momentary action holding coil and alternate action holding coil configurations. It is also available in a simple indicator configuration. In the indicating alternate version, the lamp capsule remains flush to below the bezel in the latched condition. This feature inhibits the delatching of the switch if it is struck accidentally, without the need for a switch guard and provides a visible indication when the switch is in the latched position.

The **584** is available with two current carrying capabilities, the original plug-in unit designed for 5 amp current carrying capability and 8 amp terminations in solder, printed circuit board (PCB), integrated wire termination system (IWTS) and plug-in configurations. The 5 amp unit is supplied with 0.030 inch diameter gold plated terminals, including six in-line lamp terminals. The 8 amp versions are supplied with 0.040-inch diameter terminals. Lamp terminals on the 8 amp termination are spaced in two rows to allow the use of the heavier gage terminals. Switches and indicators weigh less than 25 grams and 20 grams each, respectively. Holding coil units weigh 40 grams.

Millennium Series Option

For the ultimate in reliability, the Series 584 is available with the Millennium Series Option. This option features 1,000,000-cycle life at .01 VDC, .003 amp resistive load. Materials have been upgraded to provide maximum strength and durability throughout the switch, with particular attention paid to high wear and high stress areas. Specific improvements above the standard 584 include stainless steel mounting pawls, hardened precision actuator bearings, precision spring pivots and hardened actuator levers. The Millennium 584 also has a cast aluminum lamp capsule base for increased thermal efficiency. Each Millennium switch is backed by a five-year warranty. Customers who want to specify the Millennium version may do so by identifying the series number as 584M.

■ Bi-stable Switch Mechanism

The proprietary Eaton contact design provides superior electrical and mechanical performance. The switch contacts are equally stable in the C-NO and C-NC states, which assures contact position stability under severe shock and vibration. In contrast, pushbutton switches using sub-sub miniature switches are dependent upon a precise balance of spring forces for proper operation. The basic switch system is a uni-stable mechanism that is sensitive to parts variation and only withstands limited shock and vibration before contact position is jeopardized.

■ Non-Teasable Contacts

The over-center mechanism of the 584 stores energy as the button is being depressed, and prevents movement of the contacts until the transfer point is reached. At the transfer point, all spring energy is used to change the state of the contacts, and the button cannot be stopped in an intermediate position once the transfer point has been passed. The over-center system also prevents the possibility of contact teasing when the pushbutton is only partially pressed. If the transfer point is not reached, the stored energy will not be released to the contact mechanism. When the contacts transfer, switch poles change state simultaneously within two milliseconds, including contact bounce.

The over-center mechanism has another benefit. Switch transfer is not dependent on the speed at which the button is depressed. The springs store and release the same amount of energy to the contacts on each cycle independent of the speed and force used to actuate the button. This contrasts with lighted pushbuttons using sub-sub miniature switches where the speed and force used to actuate the button directly affects the contact system. In a lighted pushbutton using sub-sub miniature switches, the contact transfer time will exceed 10 msec when operated with a slow actuation. This consists of a contact transit time of 6 msec, contact bounce of 5 msec, plus the time difference between the first and last sub-sub miniature switch transfer. In the 584, the typical transfer time for all four poles, is 2.5 msec with a maximum of 5 msec, and it doesn't vary with the force applied to the button. In addition, the constant actuation force applied to the 584 contact mechanism increases its reliability in low speed applications.

■ Contact Transfer Point

When operating the pushbutton, the contacts transfer after the pushbutton has been depressed below the level of the switch flange. This feature inhibits the accidental operation of the pushbutton, whether or not switchguards are used.

■ Logic Level and Low Level Switching Capability

The 584 switches 5 V, 10 mA loads for 50,000 cycles without a single contact miss. Although the contacts are not hermetically sealed, at low level loads of 10 mV, 10 mA, the 584 is capable of 100,000 cycles of operation. And the Millennium 584 will similarly transfer 3 mV at 10 mA for 1,000,000 cycles. These electrical loads are typical of today's switching applications and the 584 is specifically designed for this market niche, unlike sub-sub miniature switches designed to satisfy larger markets. Because Eaton manufactures its own contact system, the contact construction and plating schemes are specifically designed and qualified for these applications.

■ Tactile Response

The over-center mechanism provides a strong tactile feedback at switch transfer to the operator. This is a key consideration in noisy and high vibration environments, or when gloves are worn. The force profile is shown at the right.

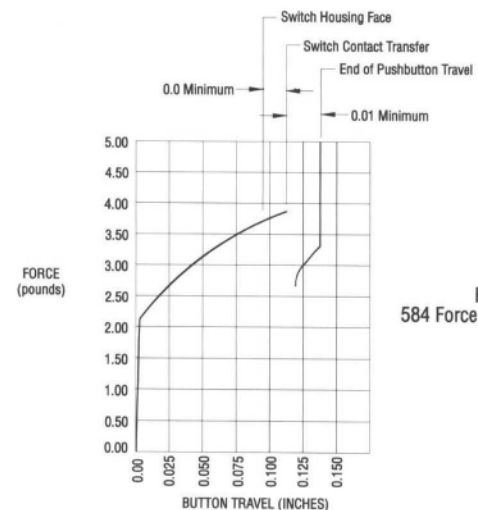


Figure 1
584 Force vs. Button Travel

High Strength Capsule Retention System

The lamp capsule retention system allows the removal and replacement of the lamp capsule, without requiring the replacement of the switch body, providing the lowest spares costs to the equipment operator. The lamp capsule retention system is built with stainless steel construction. It's high strength design prevents damage to the mechanism, even with rough handling. With two points of retention between the switch body and the lamp capsule, the 584 retention system prevents the accidental interchange of lamp capsules and maintains the orientation of the capsule to the switch body during lamp replacement

Short Length and Low Weight

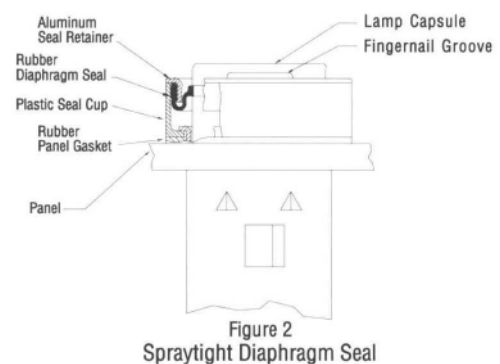
The Series 584 is the shortest four pole switch in the industry. In the short version, the behind-bezel length of the 584, excluding terminals, is 1.50 inches. The basic version is 1.71 inches. Use of high quality, high strength materials keeps the weight of the 584 switch under 25 grams.

Dual Mounting Pawls

In order to ensure switch mounting integrity and provide redundancy, two mounting pawls are designed into the 584 providing balanced engagement force with the panel. Two pawls balance clamping forces with the panel for superior performance under shock and vibration, and offer added safety in the event of external damage to the mounting hardware.

Sealing Capabilities

The Series 584 has three levels of sealing available; dust resistant seal, drip-proof internal seal and spraytight diaphragm seal. The dust resistant version does not have provisions to prevent water from entering the unit. The drip-proof version is sealed from the inside of the lamp capsule and includes a lamp capsule seal to protect the opening between the lamp capsule and switch housing. Also included with the drip-proof unit is an o-ring and retainer that mounts between the housing flange and panel to prevent water from penetrating through the panel cut out. The spray-tight version uses an external diaphragm seal to cover the opening between the capsule and housing and a flat panel seal to prevent water from leaking through the panel cut out.



RFI/EMI Protection

The primary ground path for RFI/EMI protection runs from the RFI screen, mounted in the lamp capsule behind the display screen, to the switch mounting pawl. Contact to the panel is made with the mounting sleeve. To maintain the ground circuit, all mounting sleeves are provided with a gold colored chemical film finish. Switch bodies are provided with a black anodized finish.

Holding Coil Switches

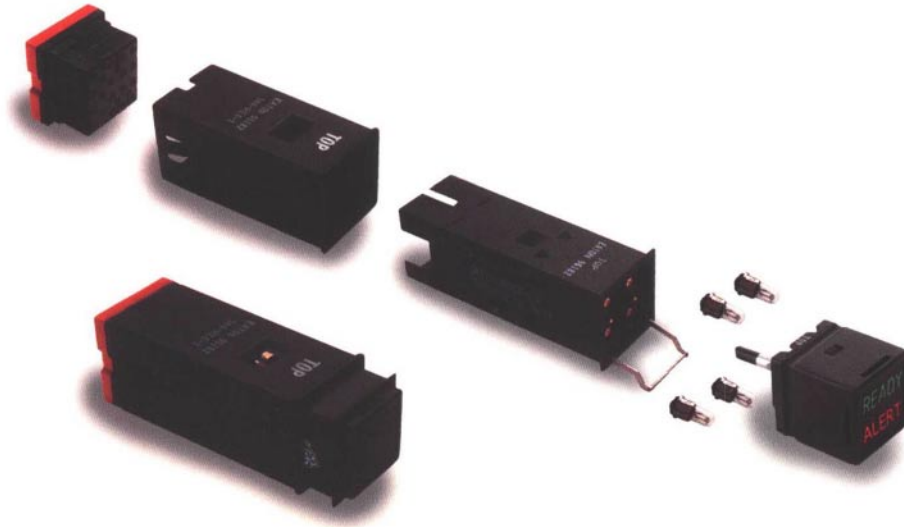
Holding coil switches have a magnetic coil inside the switch body that is energized through two terminals in the switch base. When the coil is energized and the button is pressed, the switch contacts remain engaged until external power to the coil is interrupted. This allows the switch to be released from a remote location. When the coil is not energized, the unit operates as a simple momentary switch. In the alternate action version, the power to the coil can be interrupted at the crew station by depressing the button a second time, allowing the operator to disarm or stop a function that has already been started. This is performed with an internal "fifth switch" in the magnetic coil circuit which opens when the coil is engaged and the button is pressed. Like interrupting the external power supply, opening the "fifth switch" breaks the flow of current and collapses the magnetic field that holds the coil in place, releasing the switch contacts and returning them to the normally open position. The alternate holding coil also has internal diodes in the coil circuit for arc suppression and reverse polarity protection. Holding coil switches can be used for engine start operations, as an electronic interlock or as a safety mechanism that disarms a critical system when power to the switch is lost. Then, the system is not armed when power is restored. For example, it may be desirable to have ordnance disarmed if power is lost in the control system to prevent an accidental ordnance launch when power is restored

Termination and Mounting Systems

Termination systems for the 584 include solder, PCB, IWTS and plug-in connections. A rod mount system is also available. The PCB termination can be soldered directly to a circuit board. The IWTS termination allows individual wires to be plugged directly into the switch while the plug-in system allows switches to be removed from the electrical system without disturbing the wire bundle behind the panel. Plug-in replacement switches can be reinserted into the connector with a minimum effort and loss of downtime.

In the rod mount version, the front housing flange is eliminated and a semi-circular relief is provided in the switch body. These alterations allow units to be stacked together and configured within the smallest space possible. The units are assembled together by fastening rods through the hole formed by aligning the two semi-circular features on adjoining switches to end plates located on either end of the switch stack. Rod mount is available with solder, PCB and IWTS terminations.

Panel spacers are used to adjust the exposure of the switch in front of the panel and to reduce the extension of the switch behind panel. When a lightplate is used, it is common for a spacer to be used above panel to mount the housing flange flush with the lightplate. In situations where behind panel depth is an issue, a panel spacer can be used to make the unit fit the space available. Custom switches with a shorter switch housing that expose more of the button can be designed for your specific application.



Optics

The **584** is available with high performance optics that provide superb uniformity and off angle legibility. Standard configurations include sunlight readable, lightplate white and NVIS compatible displays. Different colors are available; complying with MIL-S-22885/101, MIL-S-22885/110, MIL-C-25050 and MIL-L-85762. Custom lighting packages are available upon request.

The Eaton optics laboratory features state-of-the-art equipment necessary to design and measure displays in both sunlight readable and NVIS configurations. One highly sensitive spectroradiometer is equipped with an external detector cooled to -30°C that eliminates electronic noise. By eliminating low level noise, the spectroradiometer responds to 10E-15 watts/(cm2 steradian) for NVIS measurements. The resulting data gives Eaton the information to advance the boundaries of NVIS filter design. In addition, a computerized library of filter materials is used to model new designs before they are prototyped, shortening the development cycle for all display types.

NVIS Lighting

The **584** is one platform for Eaton's NVIS technology. The NVIS system uses a combination of low pass and band pass filters to screen out unwanted near-infrared light from crew station displays. More information on NVIS displays is contained in Eaton's "Crew Station Lighting for Night Operation" brochure.

LED Lighting

Eaton offers two styles of light-emitting diode light sources (LEDs), replaceable flange based T-1 LEDs and capsule replaceable sunlight readable LEDs, in green, yellow, amber and red colors. T-1 flange based LEDs are available in two and four chip configurations, offering the benefits of redundancy and ease of relamping. The sunlight readable system is replaceable as a capsule only. Contact the factory customer service center for information on specific requirements for split display sunlight readable LEDs. LED light sources have a rated life of 100,000 hours. New colors and more efficient LEDs will also be made available as LED technology matures.

The LED option offers the advantage of increased life with lower energy consumption. In the temperature range from -20°C to +50°C, the reliability of LEDs over incandescent light sources is expected to be greater than ten to one. And, unlike incandescent light sources, the display brightness remains relatively stable with variations in applied voltage because LEDs are current dependent devices. However, voltage stability does limit the ability to adjust crew station displays to the different light environments of day, dusk and night.

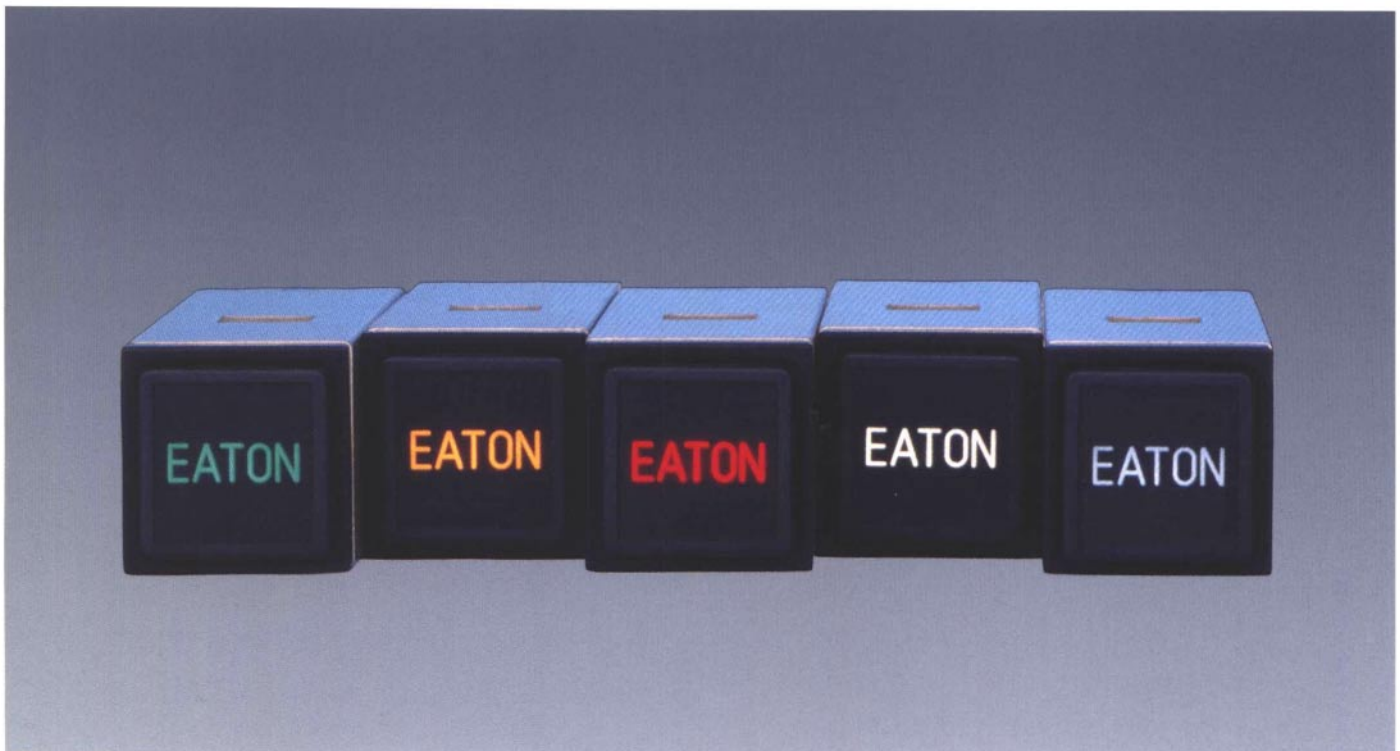
The trade-offs for using a LED light source include lower light output and limited color offerings. Also, the actual life and luminance of LEDs is temperature dependent with a 10% reduction in display luminance expected after 10,000 hours of operation.

Dual Color Displays

The Series 584 is also offered with two options allowing the same legend to illuminate in two different colors. In the incandescent version, this is accomplished by assembling a prism into the lamp capsule that directs the light from one side of the display through one color filter and the lamps from the second side of the display through a second color filter. In the LED version, the T-1 lamps provide the color. For example, in a full display, the legend can be made to light in red when the top two lamps are energized and light in green when the bottom two lamps are energized. Full displays and two-way split displays can be supplied with the dual color feature.

Low Power Full Display

With this patent pending option, a full display unit can be operated with two lamps and maintain sunlight readability, brightness and uniformity comparable to four lamp systems. It also delivers lower power consumption and touch temperature. Originally developed for military applications, the low power full display is now available to the commercial market. The minimum on-contrast is 1.0 for green, red, amber and white and 0.8 for blue when subjected to 6500 fc of incident light.





Test Facilities

Eaton has made long-term investments in testing equipment to ensure the continuing quality of each product line and speed the design process. Our capabilities include environmental testing, functional testing and calibration of all in-house measuring equipment.

As a U.S. Government approved laboratory, the majority of testing for military and customer qualification tests is completed at the factory. This testing includes mechanical life, electrical life, sinusoidal and random vibration, half sine and sawtooth shock, temperature, humidity, salt spray, altitude, sealing, tensile strength and lighting.

Military Qualification

The Series **584** is qualified to MIL-S-22885/110. Customers who want to specify quality assurance provisions in accordance with M22885/110 may do so by identifying the series number as 584H. The "H" designation assures that the product is submitted to group "A" inspection per M22885/110 and that it satisfies the qualification requirements of the governing Qualified Products List as of the date of shipment. The "H" designation also assures that the systems and controls required for inclusion on the QPL are in place at the time of order, that these systems and controls will be in place at the time of manufacture and that no changes have been made to either materials or manufacturing processes which may negate listing on the QPL. In addition, the "H" designation establishes the right to review all records of tests and approvals related to the QPL at any reasonable time.

Warranties

The Series 584 and 584H carry a two-year warranty for defects in materials and workmanship from the date of manufacture. The Series 584M carries a five-year warranty for defects in materials and workmanship from the date of manufacture.

Table of Contents

	page
MECHANICAL SPECIFICATIONS	1
MECHANICAL SPECIFICATIONS DIAGRAMS	2
DIMENSIONAL SPECIFICATIONS	3, 4
ENVIRONMENTAL SPECIFICATIONS	5
ELECTRICAL SPECIFICATIONS	5
ELECTRICAL SPECIFICATION DIAGRAMS	6
DISPLAY TYPE SPECIFICATIONS	7
OPTICAL SPECIFICATIONS	8
HOW TO USE THIS CATALOG	9
SERIES CODES	9
OPTION CODES	9
SWITCH ACTION CODES	10
TERMINATION AND MOUNTING CODES	10
LAMP CIRCUIT CODES	10
MOUNTING HARDWARE CODES	11
LIGHT SOURCE CODES	11, 12
DISPLAY SCREEN CODES	12
DISPLAY CONFIGURATION CODES	13
COLOR CODES	13, 14
CHARACTER FONT AND HEIGHT CODES	14
LEGEND CONFIGURATION CODES	15
LEGEND NOMENCLATURE	15
PLUG-IN MOUNTING SLEEVES WITH CONNECTOR BLOCK	16, 17, 18
SNAP-ON MOUNTING SLEEVES WITH CONNECTOR BLOCK	18
BEZEL MATRIX MOUNTING HARDWARE	19, 20
FLANGE MATRIX MOUNTING HARDWARE	20, 21
ROD MOUNT HARDWARE	22, 23
SPARE PARTS	24
ACCESSORIES	24
INSTALLATION AND REMOVAL TOOLS	24
WIRE SWITCH GUARD AND CLEAR PLASTIC SWITCH GUARD DIAGRAMS	24

Mechanical Specifications

The length of each unit is specified from the rear of the housing flange to the end of the switch body, not including terminals. Terminal length is 0.2 inches (5.1 mm) for solder and PCB units.

To calculate the actual behind panel depth for your application, subtract the thickness of the panel, the thickness of spacers used above panel and 0.030 inches for the drip-proof panel seal, if required, from the length of unit listed below. Weights listed are for switches with T-1 lamps.

The difference between the basic and short lengths is due to the size of the lamp capsule. The basic unit has better lighting uniformity, lower touch temperature and provides for lighting options such as the NVIS compatible display and the sunlight readable LED display.

	Maximum Length Behind Housing Flange	Maximum Weight
Short Length, Solder & PCB termination	1.50 inches (30.2 mm)	24 grams
Short Length, Plug-in termination	1.85 inches (47.0 mm)	25 grams
Basic Length, Solder & PCB termination	1.71 inches (35.6 mm)	27 grams
Basic Length, Plug-in termination	2.06 inches (52.3 mm)	28 grams
Basic Length, Solder & PCB termination, Diaphragm Seal	1.47 inches (37.3 mm)	32 grams
Basic Length, Plug-in termination, Diaphragm Seal	1.82 inches (46.2 mm)	33 grams
584-81/584-RE1 Plug-in Mount	See 584-R1/RE1	19 grams
584-85/584-RE5 Plug-in Mount	See 584-R5/RE5	16 grams
584 Switch Contacts	Fine silver plated with 50 millionth inches gold	
584 Millennium Switch Contacts	Fine silver plated with 100 millionths inches gold	

Switch Form	Form C single break
Actuation Travel	0.135 ± 0.010 inches (3.43 ± 0.25 mm)
Actuation Force	2 to 5 lbs (8.9 to 22.3 N)
Extraction Force	2 to 5 lbs (8.9 to 22.3 N)
Mounting Torque	18 ± 2 inch-oz. (0.127 ± 0.014 J)
Internal Seal	Drip-proof per MIL-S-22885
Diaphragm Seal	Spray-tight per MIL-STD-108
Mechanical Life	584: 200 000 cycles 584 Millennium: 1 000 000 cycles
EMI/RFI Shielding	When specified, resistance between the mounting panel and EMI/RFI screen shall be measured in accordance with MIL-STD-202, Method 307 and shall not exceed 3 ohms.
Marking	MIL-STD-130
Light Sources	Both incandescent and LED light sources are considered expendable parts and do not have a guaranteed life. Light sources are rated under ideal conditions and vary considerably in service. MTBF and life data presented in this catalog are for comparison purposes only.

Mechanical Specifications

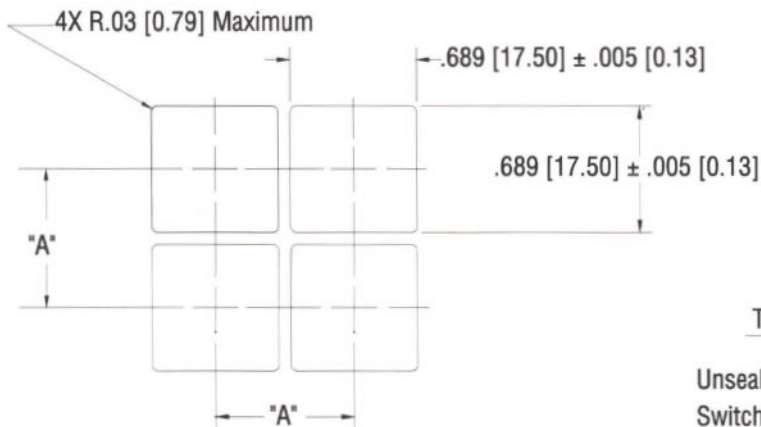


Figure 4
Recommended Panel Cutout

Type	Dimension "A"
Unsealed Switch	.780 [19.8]
Switch with Spray Tight Boot	.930 [23.62]

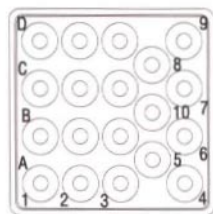


Figure 5
8 Amp IWTS Terminations

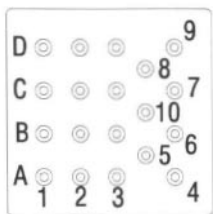


Figure 6
8 Amp Terminations

Styles
Solder
Plug-in
PCB (shown)

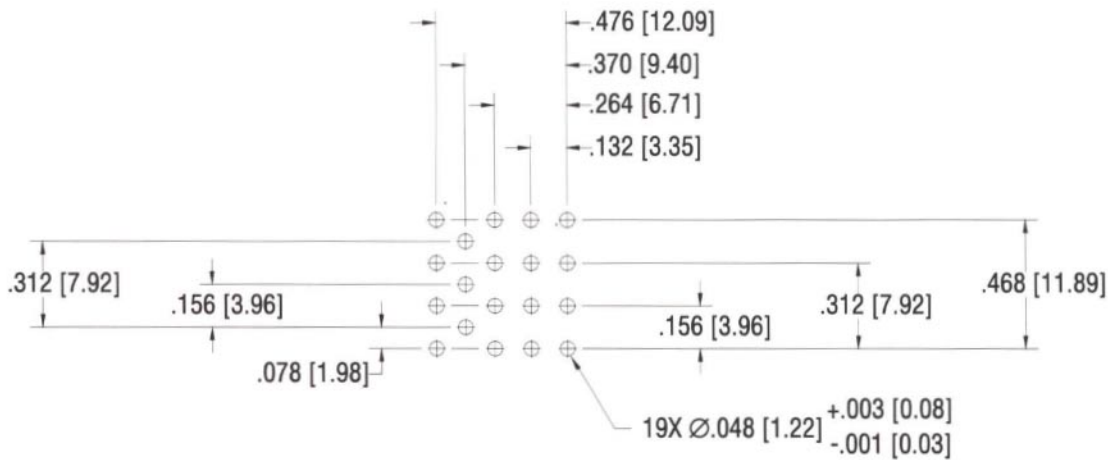


Figure 7
8 Amp Termination PCB Layout

Dimensional Specifications

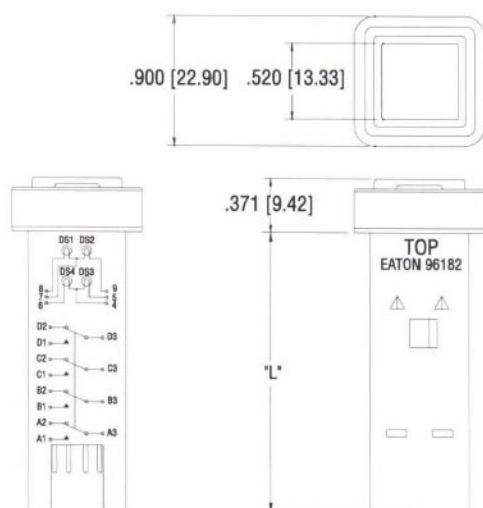


Figure 8
Spraytight Seal

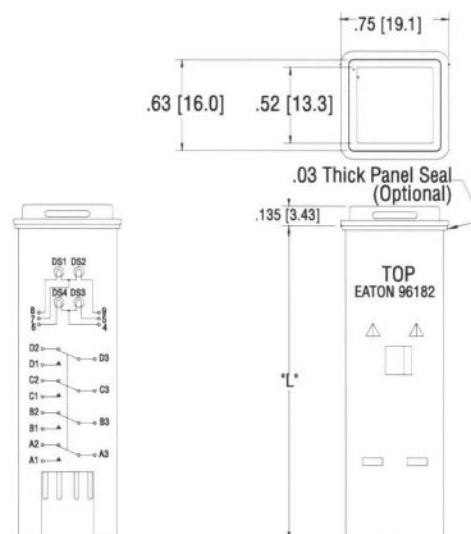


Figure 9
Dust Resistant or Dripproof Seal

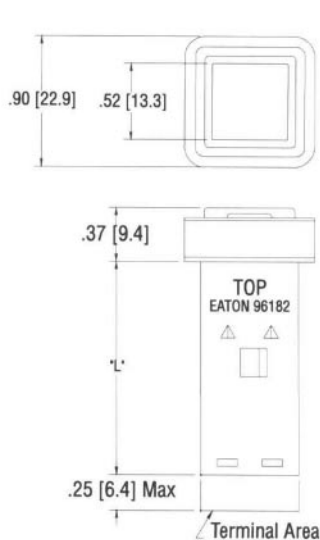


Figure 10
Spray Tight Seal

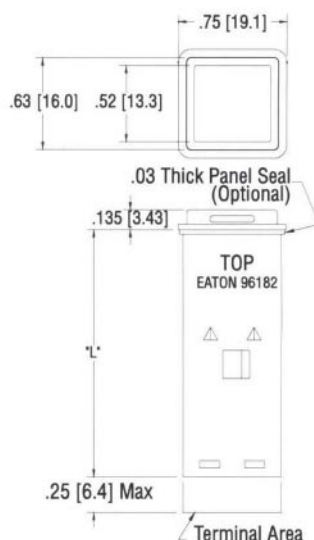


Figure 11
Dust Resistant or Dripproof Seal

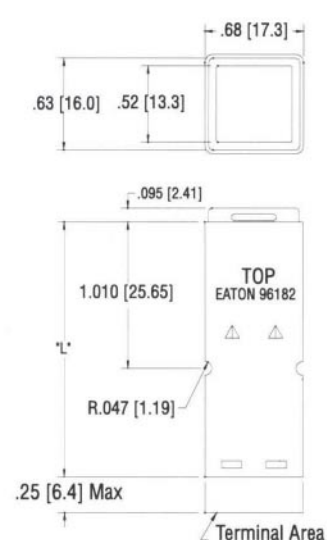


Figure 12
Rod Mount

Turret Terminal or PCB Termination

Termination Type	Device Description	Dim "L"	
		Unsealed or Dripproof	Spray Tight
Plug-in	Short, Switch	1.82 [46.1]	not available
	Basic, Switch	2.02 [51.3]	1.78 [45.3]
	Short, Hold. Coil	2.36 [59.8]	not available
	Basic, Hold. Coil	2.56 [65.0]	2.32 [59.0]
Solder Turret or PCB	Short, Switch	1.54 [39.0]	not available
	Basic, Switch	1.74 [44.1]	1.50 [38.1]
	Short, Hold. Coil	2.08 [52.7]	not available
	Basic, Hold. Coil	2.28 [57.8]	2.04 [51.8]
	Short, Hold. Coil, Rod Mtg.	2.12 [53.7]	not available
	Basic, Hold. Coil, Rod Mtg.	2.32 [58.9]	not available

Table 1. 8 Amp Plug-in Turret and PCB Terminations

Dimensional Specifications

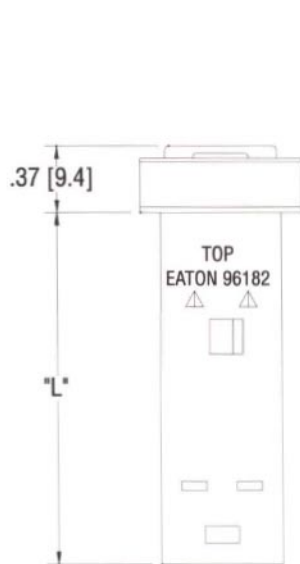
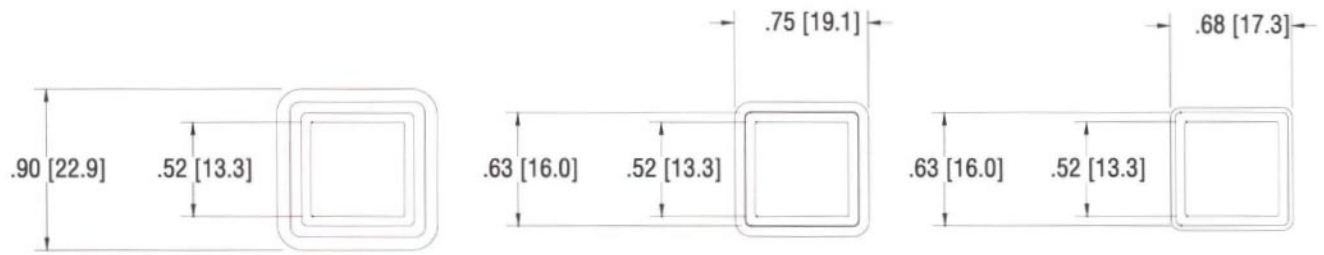


Figure 13

Spraytight Seal

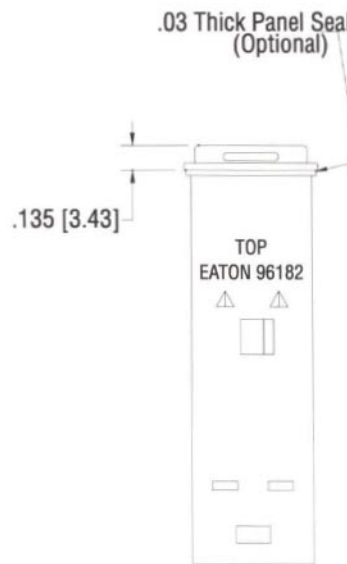


Figure 14

Dust Resistant or Dripproof Seal

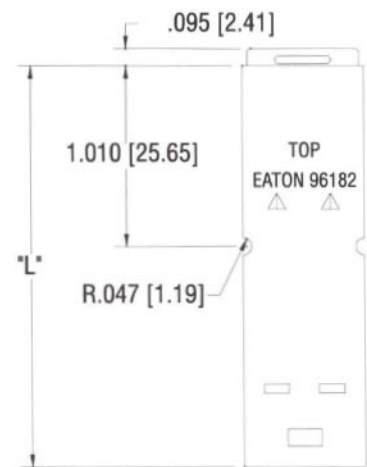


Figure 15

Rod Mount

IWTS Termination

Termination Type	Device Description	Dim "L"	
		Unsealed or Dripproof	Spray Tight
IWTS	Switch, Short	1.98 [50.3]	not available
	Switch, Basic	2.18 [55.4]	1.95 [49.4]
	Holding Coil, Short	2.52 [64.0]	not available
	Holding Coil, Basic	2.72 [69.1]	2.49 [63.1]
	Holding Coil, Short, Rod Mount	2.42 [61.5]	not available
	Holding Coil, Basic, Rod Mount	2.62 [66.6]	not available

Table 2
8 Amp IWTS Termination

Environmental Specifications

Operating Temperature	-55°C to + 71 °C -20°C to + 50°C for T-1 LED light sources -25°C to + 75°C for SLR LED light sources
Storage Temperatures	-55°C to + 85°C -64°C to + 95°C for 24 hours excluding LED light sources
Thermal Shock	MIL-STD-202, Method 107, Condition A
Moisture	MIL-STD-202, Method 106
Salt Spray	MIL-STD-202, Method 101, Condition A, 96 hours
Sand and Dust	MIL-STD-202, Method 110
Fungus	MIL-STD-810, Method 508, All materials used are non-nutrient to fungus
Vibration	MIL-STD-202, Method 204, Condition B, for single channel mount. For multiple channel matrix mount, contact the factory for information.
Shock	MIL-STD-202, Method 213, Condition B
Explosion	MIL-STD-202, Method 109

Electrical Specifications

584 and 584 Millennium Current Ratings ¹

Load	Sea Level 28 VDC max	Sea Level 115 VAC max	50 000 ft 28 VDC max	50 000 ft 115 VAC max	Life
Resistive	8.0 A	8.0 A	5.0 A	5.0 A	25 000 cycles
Resistive	5.0 A	5.0 A	3.0 A	3.0 A	100 000 cycles
Inductive	4.0 A	4.0 A	2.5 A	2.5 A	25 000 cycles
Inductive	0.5 A	0.5 A	0.3 A	0.3 A	100 000 cycles
Lamp	1.0 A	1.0 A	-	-	50 000 cycles

Other application values can be identified on the switch life graph shown below fig # 16.

584 and 584 Millennium Logic Level Ratings¹

Logic Level	Sea Level 5 VDC max	Life
Resistive	0.01 A	50 000 cycles

584 Low Level Rating¹

Low Level	Sea Level 0.03 VDC max	Life
Resistive	0.01 A	200 000 cycles

584 Millennium Low Level Rating ¹

Low Level	Sea Level 0.01 VDC max	Life
Resistive	0.003 A	1 000 000 cycles

1. Contacts subjected to currents over 100 mA are no longer usable for low current applications.

Contact Resistance: Initial contact resistance at 6 VDC, 100 mA is 25 mΩ maximum. Post application resistance is 1 % of the electrical circuit when measured during the operation of that circuit. Since the switch contacts are not hermetically sealed, actual contact resistance will vary based upon the cleanliness of the operating environment.

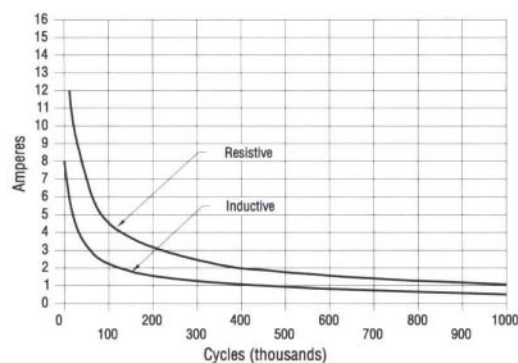


Figure 16
Typical 584 Switch Life vs. Electrical Load

Electrical Specifications

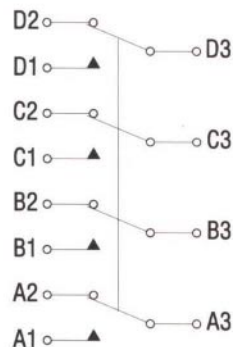


Figure 17
4PDPT Switch

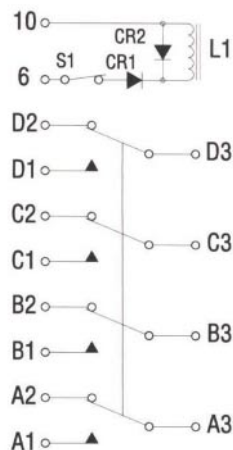


Figure 18
4PDPT Switch with
Alternate Holding Coil

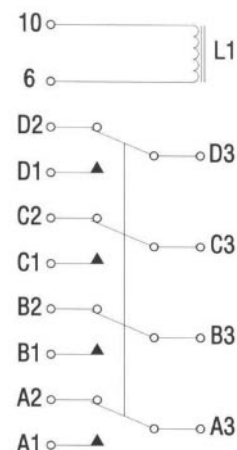


Figure 19
4PDPT Switch with
Momentary Holding Coil

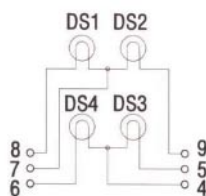


Figure 20
C1 Four Lamp Separate Power & Ground
Not available with holding coil devices, see
C2 or C3.

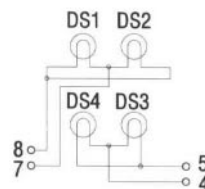


Figure 21
C2 Two Lamp Common Power & Ground

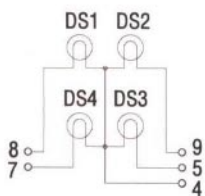


Figure 22
C3 Four Lamp Separate Power & Common Ground
Not available with 5 amp termination holding coil.

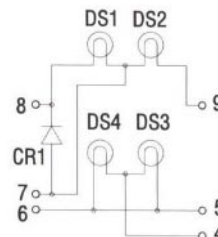


Figure 23
C4 Four Lamp Common Power & Separate Grounds
with Suppressor Diode. Not available with holding coil
devices, see C2 or C3.

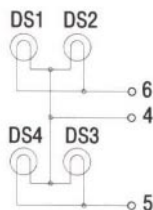


Figure 24
C5 Two Lamp Common Power & Four
Lamp Common Ground

Display Type Specifications

The Series 584 is available with a variety of display screens. The most common types are listed below, for special requirements, contact the factory customer service center.

Display Type	With light source not energized		With light source energized		Description
	Legend	Background	Legend	Background	
1	White	Black	Color	Black	White legend lights in color when energized.
2	Black	White	Black	Color	White background lights in color when energized.
5	Black	Black	Color	Black	Hidden legend lights in sunlight readable color when energized.
6	Black	Color	Black	Color	Colored background lights in color when energized.
8	Black	Black	Black	Color	Hidden background lights in sunlight readable color when energized.
9	White	Black	White	Color	Hidden background lights in sunlight readable color when energized. Legend is white at all times.
12	White	Black	Color	Black	Top Half: White legend lights in color when energized and is specifically designed for low ambient light conditions.
	Black	Black	Color	Black	Bottom half: Hidden legend lights in sunlight readable color when energized.
35	Gray	Black	Color	Black	Slightly visible gray legend lights in sunlight readable color when energized.
36	Black	Black	Color	Black	Top half: Hidden legend lights in sunlight readable color when energized.
	White	Black	Color	Black	Bottom Half: White legend lights in color when energized and is specifically designed for low ambient light conditions.
40	White	Black	Color	Black	White legend lights in color when energized. Designed for low ambient light conditions.
48	Black	Black	Black	Color	Top half: Hidden background lights in sunlight readable color when energized. Color may be visible in the unenergized condition.
	Black	Black	Color	Black	Bottom half: Hidden legend lights in sunlight readable color when energized.
72	Black	Black	Color	Black	Top half: Hidden legend lights in sunlight readable color when energized.
	Black	Black	Black	Color	Bottom half: Hidden background lights in sunlight readable color when energized. Some color may be visible in the unenergized condition.

Optical Specifications

Sunlight Readable Display Types & NVIS Displays in Sunlight Readable mode

On Contrast	> 0.6
Off Contrast	< 0.1
Character-to-Character Brightness Uniformity	< 2.0:1 Basic Length
Character-to-Character Brightness Uniformity	< 3.0:1 Short Length
Luminance (without RFI)	200 fL minimum
Luminance (with RFI)	175 fL minimum

All sunlight readable displays meet or exceed the requirements of MIL-S-22885/110 when used with a 0.15 MSCP lamp. See the military specification for more detailed information on the color coordinates and luminance of individual colors.

Non-Sunlight Readable Displays

For applications that do not have sunlight readability requirements, a line of commercial display screens is available. These displays meet the requirements listed below when used with a 0.15 MSCP lamp. Minimum values are in fL.

Color	Display Type 1		Display Type 2 & 6		Display Type 40	
	STD	RFI	STD	RFI	STD	RFI
White	300	150	350	175	3.0 ± 1.0	1.5 ± 1.0
Blue	25	12	30	12	3.0±1.0	1.5±1.0
Yellow	200	100	350	175	3.0 ± 1.0	1.5 ± 1.0
Green	40	20	50	25	3.0 ± 1.0	1.5 ± 1.0
Red	50	25	70	35	3.0 ± 1.0	1.5 ± 1.0

NVIS Display Types in NVIS mode

	NRa maximum	NAb maximum
Green A, Green B C 0.1 fL	8.0 X 10 ⁻¹¹	7.0 X 10 ⁻¹¹
Yellow 4 15.0 fL	5.0 X 10 ⁻⁸	5.0 X 10 ⁻⁸
Red @15.0 fL	N/A	1.5X10
White @10.0 fL	1.0X10 ⁻⁷	6.0X10

NVIS displays comply to the radiance requirements of MIL-L-85762 at derated voltage and the sunlight readability requirements of MIL-S-22885/110 when energized at full rated voltage with a 0.15 MSCP lamp. With 28 VDC lamps, green A, green B and white comply with the MIL-L-85762 luminance requirement when energized at approximately 6 VDC, yellow complies at approximately 12 VDC and red complies at approximately 14 VDC.

LED Displays

Approximate values of display luminance for a hidden message, lighted letter display type 5 are listed below. Values are in fL.

LED Color	Peak Wavelength	Two Chip	Four Chip	Sunlight Readable	SLR RFI
Pure Green	555 nm	20	40	100	80
Green	565 nm	40	80	200	160
Amber	585 nm	35	70	150	120
Orange	610 nm	45	90	200	160
Ultra Red	660 nm	45	90	200	160

1. Lighting values assume the use of four LED lamps in a full display. Splitting the display will nominally reduce luminance values.
2. Pure green is not sunlight readable.

How to Use this Catalog

This catalog describes the standard and optional features of the Series 584. To determine the correct part number, refer to the following pages. Samples of a typical part number are shown on each page to aid your selection.

584	11	A4	B5	C1	D21	F4	L5	N2	(GR)	P12	16	ON/OFF
Series Number	Unit Options	Switch Action	Termination	Lamp Circuit	Panel Thickness	Lamp Type	Display Screen	Display Configuration	Display Color	Character Font/Height	Legend Configuration	Legend

1. The panel thickness call-out is only required for solder and PCB part numbers where the mounting hardware is supplied with the unit. Plug-in termination mounting hardware is identified by separate part numbers listed in the rear of the catalog.

Series Codes

58411A4B5C1D2F4L5N2(GR).P12.16 ON/OFF

The Series number is identified by the first three or four digits of the part number.

Series	Code
584	584
584 with QA per M22885/110	584H
584 Millennium	584M

Option Codes

584**11**A4B5C1D2F4L5N2(GR).P12.16 ON/OFF

Several product options are identified by the next two digits of the part number. Use the table below to select the lighting option, sealing level and EMI/RFI screening.

Lighting Option	Behind Flange Length Solder/PCB	Behind Flange Length Plug-in w/ Connector	Fourth Digit
T-1 Lamp, Short Capsule	1.50 inches (30.2 mm)	1.85 inches (47.0 mm)	0
T-1 Lamp, Basic Capsule	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	1
LED-SLR	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	2
Dual Color, T-1 Incandescent	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	3
NVIS	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	4
Low Power Full Display ¹	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	5
Dual Color, T-1 LED	1.71 inches (35.6 mm)	2.06 inches (52.3 mm)	6

1. Patent Pending. Only uses two T-1 lamps mounted diagonally from each other.

Seal and RFI Option	Fifth Digit
Dust resistant	0
Drip-proof, w/ Panel Seal	1
Spraytight, w/ Diaphragm Seal	2
Dust resistant, w/ RFI	3
Drip-proof, w/ Panel Seal & RFI	4
Spraytight, w/ Diaph. Seal & RFI	5

Switch Action Codes

58411 **A4**B5C1 D2F4L5N2(GR).P12.16 ON/OFF

The letter "A" and the digit immediately following it identify the switch action and number of poles.

Basic Unit	Code
Indicator	A0
4PDT Momentary switch	A1
4PDT Alternate switch	A2
4PDT Momentary holding coil switch	A3
4PDT Alternate holding coil switch	A4

Termination and Mounting Codes

58411A4**B5**C1 D2F4L5N2(GR).P12.16 ON/OFF

The letter "B" and the digit following it identify the termination and mounting method.

Termination	Maximum Current Carrying Capability	Compatible Connector Pins	Wire Size	Code
Plug-in (obsolete for new design)	5 A	M39029/57-354 M39029/72-393	22-26 AWG Wire Wrap	B0
Plug-in	8 A	M39029/22-192	20-24 AWG	B5
Solder Turret	8 A	N/A	20-24 AWG	B2
PCB	8 A	N/A	20-24 AWG	B3
IWTS	8 A	M39029/1-100 M39029/1-101	22-26 AWG 20-24 AWG	B4
Solder Turret w/ Rod Mount	8 A	N/A		B7
PCB w/ Rod Mount	8 A	N/A		B8
IWTS w/ Rod Mount	8 A	M39029/1-100 M39029/1-101	22-26 AWG 20-24 AWG	B9

Lamp Circuit Codes

58411A4B5**C1**D2F4L5N2(GR).P12.16 ON/OFF

The letter "C" and the digit following it designate the lamp circuit. For information on custom circuits, contact the factory customer service center. Diode suppressed circuits are available.

Lamp Circuit	Code
Dual ground, 4 way split	C1
Dual ground, 2 way split	C2
Common ground, 4 way split	C3
Dual ground, 2 way split diode suppressed	C4
Common Ground, 2 way split	C5

Mounting Hardware Codes

58411A4B5C1 **D2** F4L5N2(GR).P12.16 ON/OFF

The letter "D" and the digit following it identify the mounting hardware requirements for solder and PCB units. This code is omitted if a plug-in mount unit is specified. Plug-in hardware is specified by separate part numbers listed later in this catalog. Custom mounting hardware is available by request. Contact the factory customer service center for information.

Spacer	Spacer Height ¹	Panel Thickness Range	Code
No Spacer	-	0.030 - 0.149 (0.76 - 3.79 mm)	D25
Black	0.100 (2.5 mm)	0.030 - 0.149 (0.76 - 3.79 mm)	D1
No Spacer	-	0.150 - 0.269 (3.80 - 6.83 mm)	D26
Black	0.100 (2.5 mm)	0.150 - 0.269 (3.80 - 6.83 mm)	D2

1. When a drip-proof unit is specified, the spacer provided will be 0.070 (1.8 mm) to accommodate the panel seal and panel seal retainer. Total spacing above panel will remain at 0.100 (2.5 mm).

Light Source Codes

58411A4B5C1D2 **F4** L5N2(GR).P12.16 ON/OFF

The letter "F" and the digits immediately following it identify the light source supplied with the unit. The Series 584 uses four T-1, midget flange, based lamps for a light source, except for the sunlight readable LED light source which uses integrally mounted LEDs in the capsule. T-1 lamps are the lowest replaceable unit when specified and are available in incandescent, 2 chip LED and 4 chip LED configurations.

T-1 Incandescent Lamps

Lamp Type	Design Volts	Design Amps	Design Watts	Avg MSCP ¹	Design Life (hrs)	Lamp Code
Incandescent 2,4	5.0	0.06	0.30	0.15	6,500	F8
Incandescent 2,3,4	5.0	0.115	0.58	0.15	40,000	F2
Incandescent	6.0	0.06	0.36	0.13	3,000	F13
Incandescent 3	12.0	0.04	0.48	0.15	16,000	F18
Incandescent 3	14.0	0.04	0.56	0.15	16,000	F6
Incandescent 3	18.0	0.026	0.47	0.15	10,000	F10
Incandescent 3.5	28.0	0.024	0.67	0.15	16,000	F4
Incandescent 3.10	28.0	0.026	0.73	0.23	16,000	F29
Low Power Displays 6	5.0	0.115	0.58	0.15	40,000	F46
Dummy lamp	-	-	-	-	-	F11

1. MSCP is defined as Mean Spherical Candle Power and is an indication of the total light emitted by the lamp. Lamps are aged and selected to a :15 % tolerance.
2. Five volt lamps have nickel plated bases to eliminate the effect of fretting corrosion in lead based lamps. Over time, the voltage seen by a lead based lamp will drop about 1.5 VDC due to the increased resistance caused by fretting corrosion.
3. When using lamps above 0.45 design watts, only the basic length versions can be used. Additional heat sinking and air flow is recommended. Matrix mounting is not recommended.
4. MS-24515
5. MS-3338
6. Two F2 lamps and two dummy plugs provided. Lamps are assembled in diagonally opposite positions.
7. Under mechanical stress, incandescent lamps will operate for approximately 20%-40% of their rated life before failure.
8. Series 584 units are designed for use with lamps installed. For proper operation of the switch, all four locations must have a lamp or dummy plug installed.
9. The lamps listed above will work with all display types. Other lamps with lower current and MSCP are available by request. Contact your local sales office for additional information.
10. Required for NVIS red specification compliance to MIL-L-85762. Minimizes radiance output of all NVIS colors at specified luminance.

Light Source Codes continued

T-1 Light-Emitting Diode Lamps with Internal Resistor ¹

LED Type	Peak Wavelength	Design Voltage	Design Amperage	Design Watts	Average Brightness (mcd)	Code
2 Chip LED, Pure Grn	555 nm	5.0	0.040	0.20	4	F40
2 Chip LED, Green	565 nm	5.0	0.040	0.20	13	F40
2 Chip LED, Amber	585 nm	5.0	0.040	0.20	11	F40
2 Chip LED, Orange	610 nm	5.0	0.040	0.20	11	F40
2 Chip LED, Ultra Red	660 nm	5.0	0.040	0.20	25	F40
4 Chip LED, Pure Grn	555 nm	28.0	0.020	0.56	10	F43
4 Chip LED, Green	565 nm	28.0	0.020	0.56	20	F43
4 Chip LED, Amber	585 nm	28.0	0.020	0.56	10	F43
4 Chip LED, Orange	610 nm	28.0	0.020	0.56	14	F43
4 Chip LED, Ultra Red	660 nm	28.0	0.020	0.56	30	F43

Sunlight Readable Light-Emitting Diode Capsule ^{2,3}

LED Type	Peak Wavelength	LED VForward Voltage	Design Amperage	Code
SR LED, Pure Grn	555 nm	7.5 max.	0.040 max.	F45
SR LED, Green	565 nm	7.5 max.	0.040 max.	F45
SR LED, Amber	585 nm	7.5 max.	0.040 max.	F45
SR LED, Orange	610 nm	7.5 max.	0.040 max.	F45

Display Screen Codes

58411 A4B5G1 D2F4**L5**N2(GR).P12.16 ON/OFF

The letter "L" and the digits immediately following it identify the display screen. Display screens vary by the light source specified. To select the proper display screen code, identify the display type listed in the left column and the light source listed across the top row. Display screen types are described in the Optical Specification section see page 8.

Display Screen Codes

Display Type	Incandescent	NVIS	SLR LED & T-1 LED	Dual Color	Low Power	LED Dual Color
1	L301		L401	L501	L601	L701
2	L302		L402	L502	L602	L702
5	L5	L60	L405	L5032	L605	L7032
6	L306					
7	L7				L607	
8	L81	L61	L408	L508	L608	L7082
9	L91	L409			L609	
12	L12	L62	L412		L612	
35	L35	L64	L435		L635	
36	L36	L65	L436			
40	L40	L66	L440		L640	
48	L481	L63	L448			
72	L421	L67	L472			

1. Color may be discernable in off condition in the short length version.

2. Not sunlight readable.

Display Configuration Codes

58411A4B5C1 D2F4L5**N2**(GR).P12.16 ON/OFF

The letter "N" and the number following it designate the lens configuration as follows. Color callouts are shown for orientation.



Color Codes

58411A4135C1D2F4L5N2(**GR**).P12.16 ON/OFF

The letters in parentheses following the lens configuration identify the lighted colors of the unit. In split displays, multiple letters are used to designate the colors of individual sections, in order from left to right and top to bottom. For example, in a four way split device, the designation (RDLG) would identify a red upper left quadrant, white upper right, blue lower left and green lower right. Note: For dual color displays, two color codes are required where one is used in the standard part number. For example, 58431 A2B5C1 F4L505N1(RG),P12,12 READY.

Incandescent Display Color Codes

The colors listed below have improved color discrimination throughout the dimming range when compared to the original 581 and 584 colors. Please note that the display screen designs for MIL-S-22885/101 blue and white are no longer available. Each color is defined by color coordinates published in the referenced military specification.

Color	Dominant Wavelength	Series 582 M22885/101	Series 584 M22885/110	MIL-C-25050	Code
Blue ¹	530 nm	No	Yes	No	L
Green ¹	543 nm	Yes	No	No	G
Green	553 nm	No	Yes	Yes	M
White ¹	565 nm	No	Yes	No	D
Amber ¹	592 nm	Yes	Yes	Yes	A
Red ¹	621 nm	Yes	Yes	Yes	R

1. Meets M22885/90, M22885/108 and M22885/109 color and luminance specifications.

2. Color coordinates are published in MIL-S-22885/101 and MIL-S-22885/110.

3. Aviation blue per MIL-C-25050 is not suitable for lighted pushbuttons because it cannot be made sunlight readable.

4. Eaton's white color "D" supersedes the use of aviation white. It overlaps part of the MIL-C-25050 white specification, but eliminates the undesired yellow and pink color variations inherent with aviation white's location on the CIE 1931 color chart.

NVIS Display Color Codes

Color	U'	V'	r'	NVIS Luminance	Fast Jet G/R	Helo G/R	Fast Jet NVG Gain	Sunlight Readable Luminance	Code
Green A	.088	.543	.037	10.1	230	1600	.387	>200 fL	F
Green B	.131	.623	.057	0.1	230	2600	.618	>200 fL	H
Yellow	.274	.622	.083	15.0	180	80	.910	>200 fL	J
Red	.450	.550	.060	15.0	120	25	.634	>160 fL	K
White	.195	.505	.037	10.0	330	210	.478	>200 fL	P

1. All NVIS colors meet the requirements of MIL-L-85762 and current UK military specifications. NVIS white was developed for the UK market. The U.S. military specification does not have a white requirement at this time.

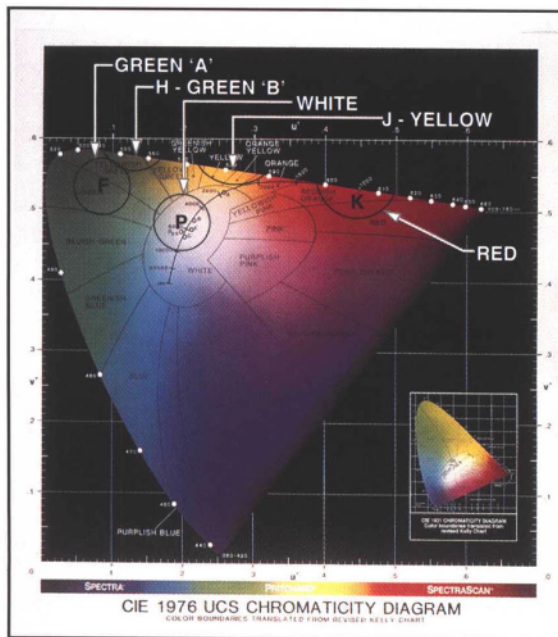
2. Luminance values are for full and half displays. Quarter displays have a 110 fL minimum.

3. G/R and NVG Gain are the measurements for NVIS compatibility in the UK. The values listed are specified at 14 VDC. Tests at the Defense Research Agency-Farnborough confirm these results.

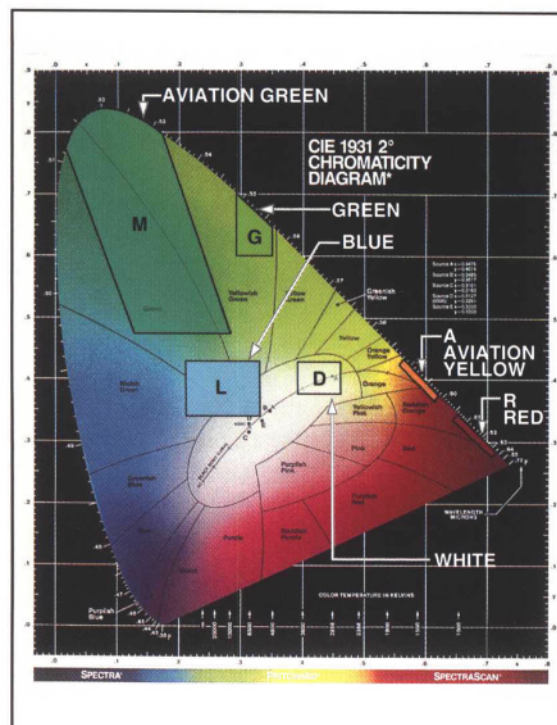
Color Codes continued

LED Display Color Codes

Color	Dominant Wavelength	Code
Pure Grn	555 nm	P
Green	565 nm	G
Amber	585 nm	A
Orange	610 nm	O
Ultra Red	660 nm	U



CIE Diagrams provided courtesy Photo Research.



Character Font and Height Codes

58411A4B5C1 D2F4L5N2(GR), **P12**.16 ON/OFF

The letter "P" and the digits following it identify the font style and character height to be used for the legend nomenclature.

Letter Style	Font #	Character Height	Letters per Full row ²	Letters per Half Row ³	Code
Helvetica Medium ¹	1	0.093 (2.4 mm) ¹	7	3	P11
Helvetica Medium	1	0.125 (3.2 mm)	5	2	P12
Helvetica Medium Bold ₄	1	0.125 (3.2 mm)	5	2	P12B
Helvetica Medium Condensed	2	0.093 (2.4 mm)	8	3	P14
Helvetica Medium Condensed	2	0.125 (3.2 mm)	6	2	P16
Helvetica Med Condensed Bold ₄	2	0.125 (3.2 mm)	6	2	P16B
DIN 1451/17	4	0.125 (3.2 mm)	4	2	P18
DIN 1451/17 Bold ₄	4	0.125 (3.2 mm)	4	2	P188
DIN 1451/17 Condensed	5	0.125 (3.2 mm)	6	2	P19
DIN 1451/17 Condensed	5	0.125 (3.2 mm)	6	2	P19B
Futura Medium	7	0.125 (3.2 mm)	5	2	P20
Futura Medium Bold ₄	7	0.125 (3.2 mm)	5	2	P20B
Futura Medium Condensed	8	0.125 (3.2 mm)	6	2	P21
Futura Med Condensed Bold ₄	8	0.125 (3.2 mm)	6	2	P21B

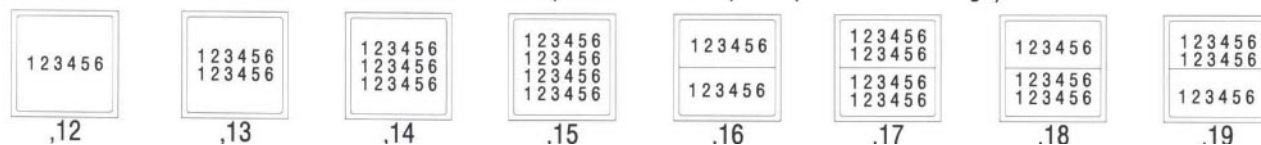
- Default letter style and height. Allows two rows of text per half (N2) display, larger heights only allow one row of text.
- Average for a full width N1 or N2 display. Each legend will vary based on the actual letters used.
- Average for a half width N3, N11, N12, N13, N14 or N15 display. Each legend will vary based on the actual letters used.
- 15% wider character strokewidth. Recommended for better off-angle viewing.

Legend Configuration Codes

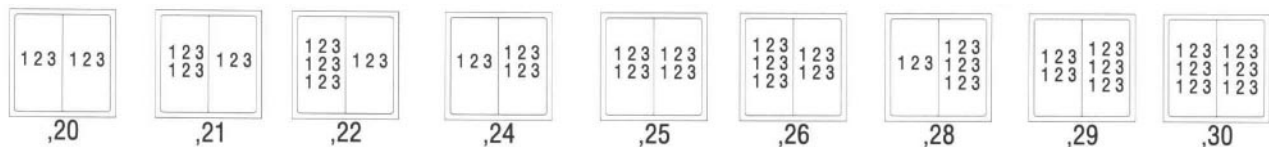
58411A4B5C1D2F4L5N2(GR),P12. **16** ON/OFF

The two digits following the second comma identify the legend configuration. Legend configurations are listed below. The 0.093 inch (2.4 mm) character height is shown.

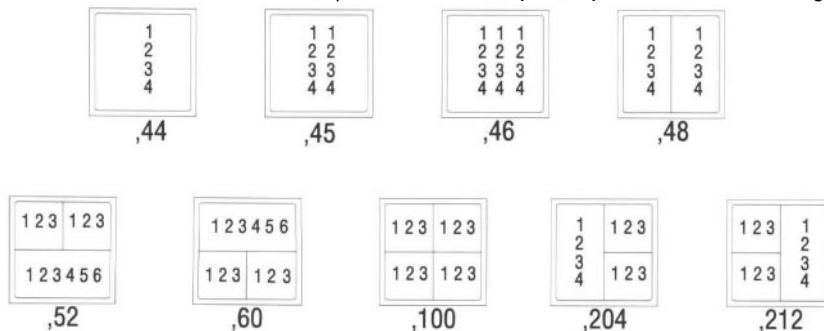
Horizontal Rows of Letters (6 characters or spaces per row 0.093" high)



Vertical Splits, Horizontal Rows of Letters (3 characters per row 0.093" high)



Vertical Columns of Letters (4 characters or spaces per column 0.093" high)



Legend Nomenclature

58411A4B5C1 D2F4L5N2(GR),P12,16 **ON/OFF**

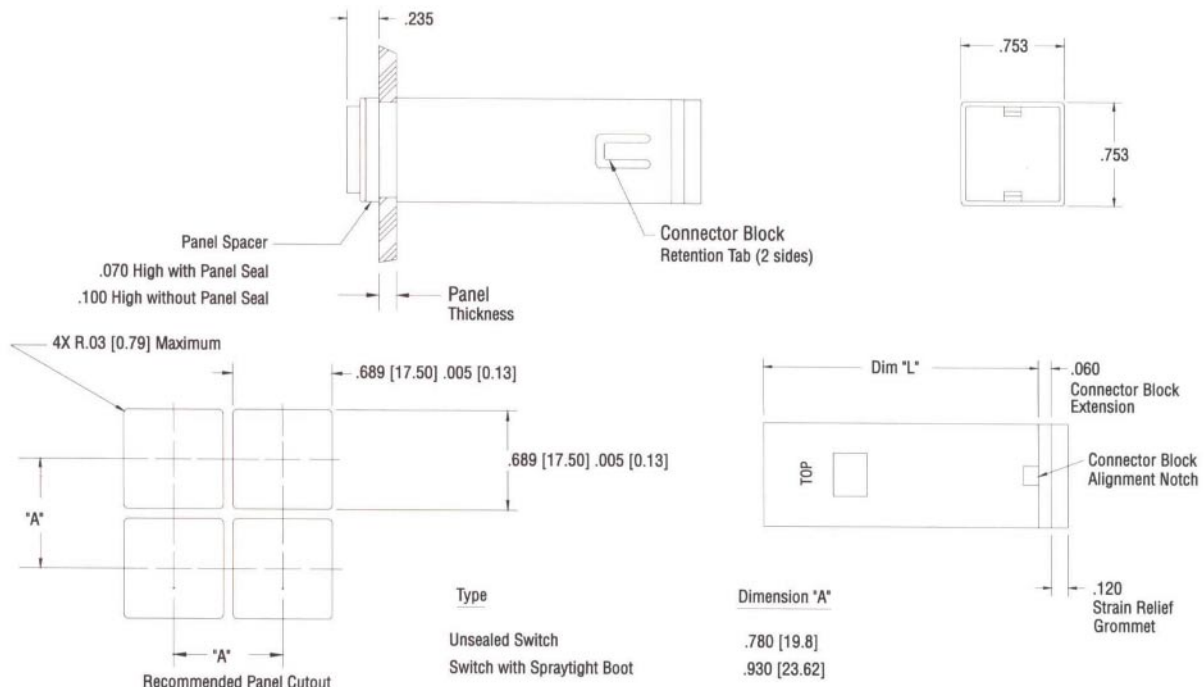
The legend nomenclature must be written out as part of the catalog part number when ordering a switch or indicator. The legend is appended to the catalog part number after the legend configuration code. Commas are used between rows of characters and a slash is used to identify legend splits. When specifying a legend with a split, the order for the nomenclature is upper left, upper right, lower left and lower right. Examples are listed below.



Series 584 Plug-In Mounting Sleeves with Connector Block

Basic Mounting Sleeve 584-R5-XXX, 584-RE5 for M39029/22-192 Connector Pins

After the switch has been inserted in the panel, this sleeve slides over the behind panel portion of the switch and is secured by tightening the pawl. When switch removal is necessary, access to both the front and rear of the panel is required.



Mounting Sleeve Dash Numbers for Dust Resistant, Spraytight, & Dripproof 8 Amp Devices

NOTE: Dash 1 thru dash 8 include a .100 thick spacer for use with edgelit panels. Dash 101 thru dash 108 include a .070 thick spacer for use with edge lift panels. Dash 201 thru 208 and dash 301 thru 308 do not include spacers.

Device Description	Code	Panel Thickness ? .010 [.254]							
		.032 [.813]	.063 [1.59]	.094 [2.39]	.125 [3.17]	.157 [3.99]	.188 [4.78]	.219 [5.56]	.250 [6.35]
Short, Switch	584-R5	-1	-2	-3	-4	-5	-6	-7	-8
Short, Holding Coil	584-RH5	-1	-2	-3	-4	-5	-6	-7	-8
Basic, Switch	584-RE5	-1	-2	-3	-4	-5	-6	-7	-8
Basic, Holding Coil	584-REH5	-1	-2	-3	-4	-5	-6	-7	-8
Short, Switch	584-R5	-201	-202	-203	-204	-205	-206	-207	-208
Short, Holding Coil	584-RH5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, Switch	584-RE5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, Holding Coil	584-REH5	-201	-202	-203	-204	-205	-206	-207	-208
Short, Switch, Dripproof	584-R5	-101	-102	-103	-104	-105	-106	-107	-108
Short, Switch, Dripproof	584-R5	-301	-302	-303	-304	-305	-306	-307	-308
Short, H.C., Dripproof	584-RH5	-101	-102	-103	-104	-105	-106	-107	-108
Short, H.C., Dripproof	584-RH5	-301	-302	-303	-304	-305	-306	-307	-308
Basic, Switch, Dripproof	584-RE5	-301	-302	-303	-304	-305	-306	-307	-308
Basic, Switch, Dripproof	584-RE5	-101	-102	-103	-104	-105	-106	-107	-108
Basic, H.C., Dripproof	584-REH5	-101	-102	-103	-104	-105	-106	-107	-108
Basic, H.C., Dripproof	584-REH5	-301	-302	-303	-304	-305	-306	-307	-308
Basic, Spray Tight	584-RD5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, H.C., Spray Tight	584-RDH5	-201	-202	-203	-204	-205	-206	-207	-208

Series 584 Plug-In Mounting Sleeves with Connector Block continued

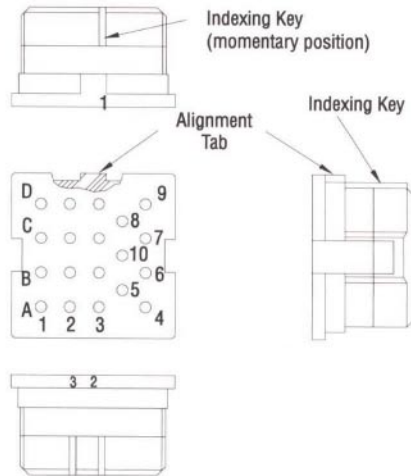
Basic Mounting Sleeve 584-R5-XXX, 584-RE5 for M39029/22-192 Connector Pins continued

Mounting Sleeve Lengths for Dust Resistant, Spraytight, & Dripproof 8 Amp Devices

		Code					
		584-R5	584-RD5	584-RDH5	584-RE5	584-REH5	584-RH5
Dimension "L" by Dash Number	-1 or -101	1.83 [46.5]			2.03 [51.6]	2.57 [65.3]	2.37 [60.2]
	-2 or -102	1.80 [45.7]			2.00 [50.8]	2.54 [64.5]	2.34 [59.4]
	-3 or -103	1.77 [45.0]			1.97 [49.8]	2.50 [63.5]	2.31 [58.7]
	-4 or -104	1.74 [44.2]			1.94 [48.8]	2.47 [62.7]	2.28 [57.9]
	-5 or -105	1.71 [43.4]			1.90 [48.3]	2.44 [61.9]	2.25 [57.1]
	-6 or -106	1.68 [42.7]			1.87 [47.5]	2.41 [61.2]	2.22 [56.4]
	-7 or -107	1.65 [41.9]			1.84 [46.8]	2.38 [60.2]	2.19 [55.6]
	-8 or -108	1.62 [41.1]			1.81 [46.0]	2.35 [59.7]	2.16 [54.9]
	-201	1.93 [49.0]	1.88 [46.7]	2.42 [61.5]	2.13 [53.8]	2.67 [66.5]	2.47 [62.2]
	-202	1.89 [48.0]	1.85 [45.9]	2.39 [60.7]	2.09 [53.0]	2.63 [65.8]	2.44 [61.4]
	-203	1.86 [47.2]	1.82 [45.2]	2.36 [59.9]	2.05 [52.2]	2.59 [64.8]	2.41 [60.7]
	-204	1.83 [46.5]	1.79 [44.4]	2.33 [59.2]	2.02 [50.3]	2.56 [64.0]	2.38 [59.9]
	-205	1.80 [45.7]	1.76 [43.8]	2.30 [58.4]	1.99 [49.5]	2.53 [63.2]	2.35 [59.1]
	-206	1.77 [44.9]	1.72 [42.7]	2.26 [57.9]	1.96 [48.7]	2.50 [62.5]	2.32 [58.4]
	-207	1.74 [44.2]	1.69 [41.9]	2.23 [56.6]	1.93 [48.0]	2.47 [61.7]	2.29 [57.6]
	-208	1.71 [43.4]	1.66 [41.1]	2.20 [55.9]	1.90 [47.2]	2.44 [60.9]	2.26 [56.9]
	-301	1.90 [48.3]			2.10 [53.1]	2.64 [67.0]	2.44 [62.0]
	-302	1.87 [47.6]			2.07 [52.3]	2.61 [66.3]	2.41 [61.2]
	-303	1.84 [46.9]			2.04 [51.3]	2.58 [65.3]	2.38 [60.5]
	-304	1.81 [46.1]			2.01 [50.6]	2.55 [64.7]	2.35 [59.7]
	-305	1.78 [45.3]			1.98 [49.8]	2.52 [64.0]	2.32 [58.9]
	-306	1.75 [44.6]			1.95 [49.0]	2.49 [63.2]	2.29 [58.2]
	-307	1.72 [43.8]			1.92 [48.3]	2.45 [62.4]	2.26 [57.4]
	-308	1.69 [43.0]			1.89 [47.5]	2.44 [62.0]	2.23 [56.7]

Series 584 Plug-In Mounting Sleeves with Connector Block continued

Basic Mounting Sleeve 584-R5-XXX, 584-RE5 for M39029/22-192 Connector Pins continued

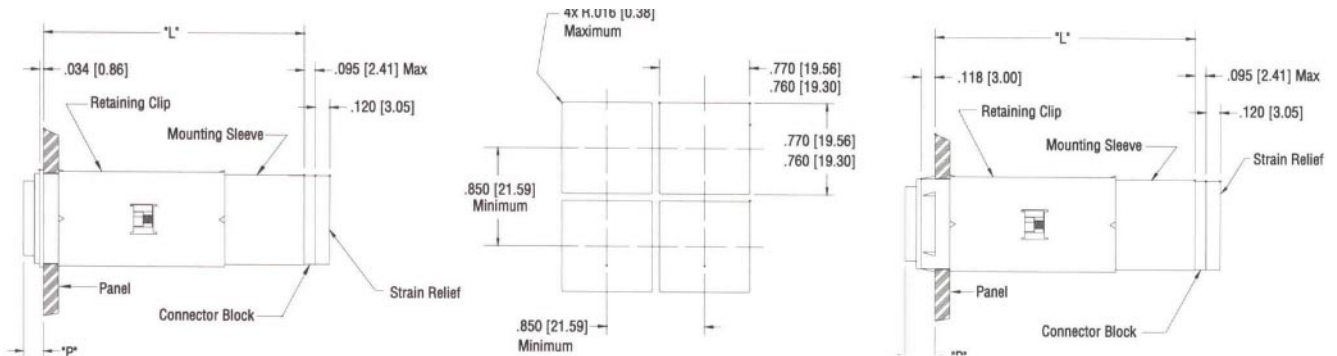


Key Slot Position	Type of Device
1	Momentary Switch
2	Alternate Switch
3	Indicator
1&2	Alternate Switch W/Holding Coil
1&3	Momentary Switch W/Holding Coil
2&3	Not used

Series 584 Snap-On Mounting Sleeves with Connector Block

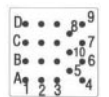
Snap-On Mounting Sleeves 584-R6-XXX, 584-RE6-XXX for M39029/22-192 Connector Pins

In the snap-on version, the 584-RE5 sleeve is modified to provide a positive stop above panel, leaving part of the sleeve protruding above the panel. The sleeve is installed and retained by a snap-on clip assembled from the rear of the panel. The sleeve assembly remains loosely attached to the panel until the switch is inserted and tightened, creating a rigid mounting. The switch is removable from the front of the panel, rear access is not required. Not available for use with the EMI/RFI option or diaphragm seal switches.



Panel Cutout Snap-on Mounting

Description	Dim. "P"	Dim. "L"	Code	Panel thickness $\pm .010$ [.25] & Dash No.							
				.030	[0.76]	.060	[1.52]	.090	[2.28]	.125	[3.17]
Flush Mt., Short	.169 [4.29]	1.91 [48.6]	584-R6	-001		-002		-003		-004	
Flush Mt., Short, with HC	.169 [4.29]	2.45 [62.2]	584-RH6	-001		-002		-003		-004	
Flush Mt., Basic	.169 [4.29]	2.12 [53.7]	584-RE6	-001		-002		-003		-004	
Flush Mt., Basic, with HC	.169 [4.29]	2.66 [67.4]	584-REH6	-001		-002		-003		-004	
Panel Mt., Short	.253 [6.43]	1.83 [46.5]	584-R6	-101		-102		-103		-104	
Panel Mt., Short, with HC	.253 [6.43]	2.37 [60.2]	584-RH6	-101		-102		-103		-104	
Panel Mt., Basic	.253 [6.43]	2.03 [51.6]	584-RE6	-101		-102		-103		-104	
Panel Mt., Basic, with HC	.253 [6.43]	2.57 [65.3]	584-REH6	-101		-102		-103		-104	



8 Amp
Terminations

Series 584 Matrices

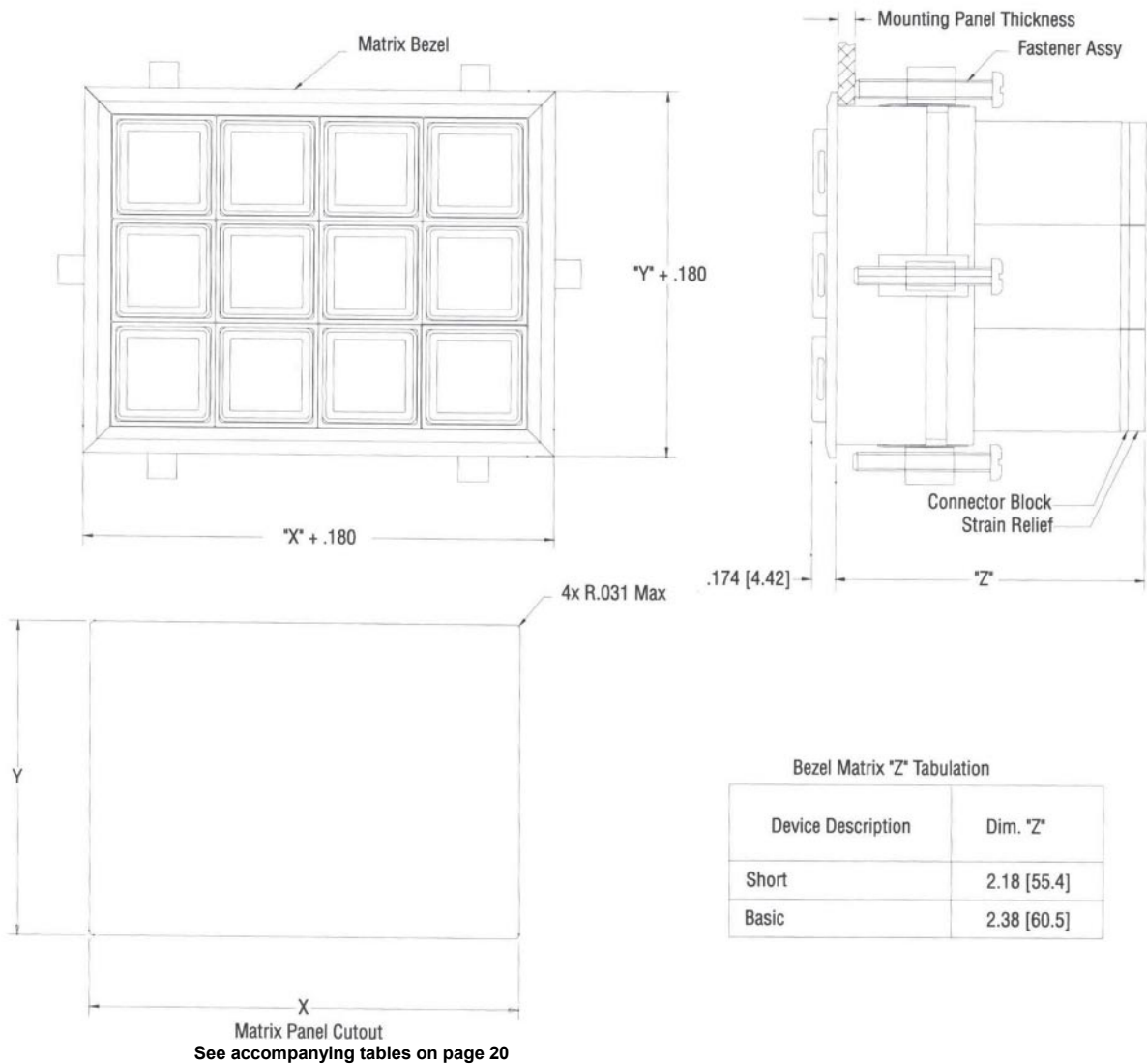
Series 584 matrices are modular units in which switches and indicators can be mounted. The maximum square matrix is 5 X 5 and the maximum rectangular matrix is 5 X 10. Contact factory customer service center for information on other configurations. Wire terminals and installation tools are listed on page 24.

Bezel Matrix 584-REWYxxxx-1

The bezel matrix has a black colored bezel and is inserted through the front of the panel. Matrix selection must be coordinated with switch length. Fasteners are inserted into slots in the matrix after the matrix has been inserted into the panel and are tightened to secure the unit. Switches are removable from the front of the panel, rear access is not required after being mounted in the panel. Not available with the diaphragm seal version.

Code	Identifies	Codes
584-REWY0203-1	Matrix length	Use REWY for basic units, RWY for short
584-REWY0203-1	No. of units per horizontal row	Two digits
584-REWY0203-1	No. of units per vertical column	Two digits
584-REWY0203-1	Connector M39029/22-192	One digit

Bezel Matrix Dimensions



Bezel Matrix "Z" Tabulation	
Device Description	Dim. "Z"
Short	2.18 [55.4]
Basic	2.38 [60.5]

Series 584 Matrices continued

Bezel Matrix Dimensions continued

Bezel Matrix Panel Cutout Sizes

X(Horiz) → No. of Stations Y(Vert) ↓	1		2		3		4		5		6		7		8		9		10	
	Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout	
	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y
1	.985 [25.02]	.985 [25.02]	1.740 [44.19]	.985 [25.02]	2.495 [63.37]	.985 [25.02]	3.250 [82.55]	.985 [25.02]	4.005 [101.73]	.985 [25.02]	4.760 [120.90]	.985 [25.02]	5.515 [140.08]	.985 [25.02]	6.270 [159.26]	.985 [25.02]	7.025 [178.43]	.985 [25.02]	7.780 [197.61]	.985 [25.02]
2	.985 [25.02]	1.740 [44.19]	1.740 [44.19]	1.740 [44.19]	2.495 [63.37]	1.740 [44.19]	3.250 [82.55]	1.740 [44.19]	4.005 [101.73]	1.740 [44.19]	4.760 [120.90]	1.740 [44.19]	5.515 [140.08]	1.740 [44.19]	6.270 [159.26]	1.740 [44.19]	7.025 [178.43]	1.740 [44.19]	7.780 [197.61]	1.740 [44.19]
3	.985 [25.02]	2.495 [63.37]	1.740 [44.19]	2.495 [63.37]	2.495 [63.37]	2.495 [63.37]	3.250 [82.55]	2.495 [63.37]	4.005 [101.73]	2.495 [63.37]	4.760 [120.90]	2.495 [63.37]	5.515 [140.08]	2.495 [63.37]	6.270 [159.26]	2.495 [63.37]	7.025 [178.43]	2.495 [63.37]	7.780 [197.61]	2.495 [63.37]
4	.985 [25.02]	3.250 [82.55]	1.740 [44.19]	3.250 [82.55]	2.495 [63.37]	3.250 [82.55]	3.250 [82.55]	3.250 [82.55]	4.005 [101.73]	3.250 [82.55]	4.760 [120.90]	3.250 [82.55]	5.515 [140.08]	3.250 [82.55]	6.270 [159.26]	3.250 [82.55]	7.025 [178.43]	3.250 [82.55]	7.780 [197.61]	3.250 [82.55]
5	.985 [25.02]	4.005 [101.73]	1.740 [44.19]	4.005 [101.73]	2.495 [63.37]	4.005 [101.73]	3.250 [82.55]	4.005 [101.73]	4.005 [101.73]	4.005 [101.73]	4.760 [120.90]	4.005 [101.73]	5.515 [140.08]	4.005 [101.73]	6.270 [159.26]	4.005 [101.73]	7.025 [178.43]	4.005 [101.73]	7.780 [197.61]	4.005 [101.73]
6	.985 [25.02]	4.760 [120.90]	1.740 [44.19]	4.760 [120.90]	2.495 [63.37]	4.760 [120.90]	3.250 [82.55]	4.760 [120.90]	4.005 [101.73]	4.760 [120.90]	4.760 [120.90]	4.760 [120.90]	5.515 [140.08]	4.760 [120.90]	6.270 [159.26]	4.760 [120.90]	7.025 [178.43]	4.760 [120.90]	7.780 [197.61]	4.760 [120.90]
7	.985 [25.02]	5.515 [140.08]	1.740 [44.19]	5.515 [140.08]	2.495 [63.37]	5.515 [140.08]	3.250 [82.55]	5.515 [140.08]	4.005 [101.73]	5.515 [140.08]	4.760 [120.90]	5.515 [140.08]	5.515 [140.08]	5.515 [140.08]	6.270 [159.26]	5.515 [140.08]	7.025 [178.43]	5.515 [140.08]	7.780 [197.61]	5.515 [140.08]
8	.985 [25.02]	6.270 [159.26]	1.740 [44.19]	6.270 [159.26]	2.495 [63.37]	6.270 [159.26]	3.250 [82.55]	6.270 [159.26]	4.005 [101.73]	6.270 [159.26]	4.760 [120.90]	6.270 [159.26]	5.515 [140.08]	6.270 [159.26]	6.270 [159.26]	6.270 [159.26]	7.025 [178.43]	6.270 [159.26]	7.780 [197.61]	6.270 [159.26]
9	.985 [25.02]	7.025 [178.43]	1.740 [44.19]	7.025 [178.43]	2.495 [63.37]	7.025 [178.43]	3.250 [82.55]	7.025 [178.43]	4.005 [101.73]	7.025 [178.43]	4.760 [120.90]	7.025 [178.43]	5.515 [140.08]	7.025 [178.43]	6.270 [159.26]	7.025 [178.43]	7.025 [178.43]	7.025 [178.43]	7.780 [197.61]	7.025 [178.43]
10	.985 [25.02]	7.780 [197.61]	1.740 [44.19]	7.780 [197.61]	2.495 [63.37]	7.780 [197.61]	3.250 [82.55]	7.780 [197.61]	4.005 [101.73]	7.780 [197.61]	4.760 [120.90]	7.780 [197.61]	5.515 [140.08]	7.780 [197.61]	6.270 [159.26]	7.780 [197.61]	7.025 [178.43]	7.780 [197.61]	7.780 [197.61]	7.780 [197.61]

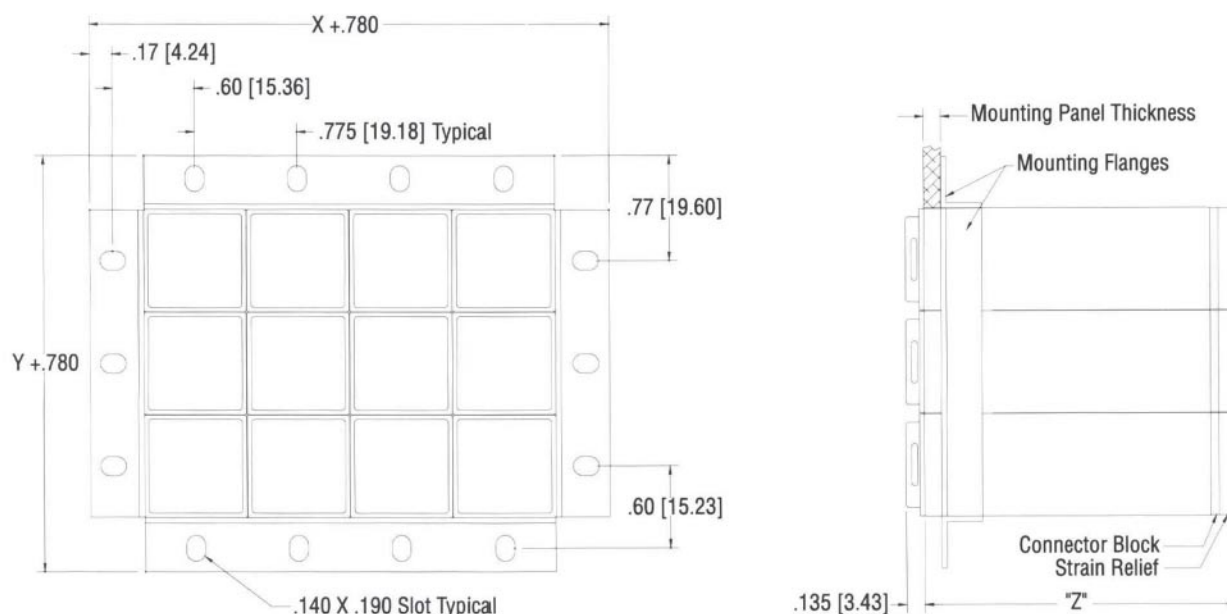
Flange Matrix 584-REXxxxx-.xxx

The flange matrix mounts from the rear of the panel and is secured with screws (not included). Flange mount matrices are RFI compatible, but are not supplied in drip-proof or diaphragm seal versions. Matrix selection must be coordinated with switch length. Letters in the part number are omitted if the feature is not required. Switches are removable from the front of the panel, rear access is not required after being mounted in the panel.

Code	Identifies	Codes
584-REX0203-1-.125	Matrix length	Use REX for basic units, RX - for short units
584-REX0203-1-.125	No. of units per horizontal row	Two digits
584-REX0203-1-.125	No. of units per vertical column	Two digits
584-REX0203-1-.125	Connector M39029/22-192	One digit
584-REX0203-1-.125	Panel thickness	Std thicknesses: 0.063 (1.6), 0.090 (2.3), 0.125 (3.2), 0.190 (4.8)

Series 584 Matrices continued

Flange Matrix Dimensions



Flanged Matrix "Z" Tabulation

Device Description	Dim. "Z"
Short	2.14 [54.4]
Basic	2.34 [59.5]

Flange Matrix Panel Cutout Sizes

X (Horiz) No. of Stations Y (Vert)	1		2		3		4		5		6		7		8		9		10	
	Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout	
	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y
1	.775 [19.68]	.775 [19.68]	1.530 [38.86]	.775 [19.68]	2.285 [58.04]	.775 [19.68]	3.040 [77.22]	.775 [19.68]	3.795 [96.39]	.775 [19.68]	4.550 [115.57]	.775 [19.68]	5.305 [134.75]	.775 [19.68]	6.060 [153.92]	.775 [19.68]	6.815 [173.10]	.775 [19.68]	7.570 [192.28]	.775 [19.68]
2	.775 [19.68]	1.530 [38.86]	1.530 [38.86]	1.530 [38.86]	2.285 [58.04]	1.530 [38.86]	3.040 [77.22]	1.530 [38.86]	3.795 [96.39]	1.530 [38.86]	4.550 [115.57]	1.530 [38.86]	5.305 [134.75]	1.530 [38.86]	6.060 [153.92]	1.530 [38.86]	6.815 [173.10]	1.530 [38.86]	7.570 [192.28]	1.530 [38.86]
3	.775 [19.68]	2.285 [58.04]	1.530 [38.86]	2.285 [58.04]	2.285 [58.04]	2.285 [58.04]	3.040 [77.22]	2.285 [58.04]	3.795 [96.39]	2.285 [58.04]	4.550 [115.57]	2.285 [58.04]	5.305 [134.75]	2.285 [58.04]	6.060 [153.92]	2.285 [58.04]	6.815 [173.10]	2.285 [58.04]	7.570 [192.28]	2.285 [58.04]
4	.775 [19.68]	3.040 [77.22]	1.530 [38.86]	3.040 [77.22]	2.285 [58.04]	3.040 [77.22]	3.040 [77.22]	3.040 [77.22]	3.795 [96.39]	3.040 [77.22]	4.550 [115.57]	3.040 [77.22]	5.305 [134.75]	3.040 [77.22]	6.060 [153.92]	3.040 [77.22]	6.815 [173.10]	3.040 [77.22]	7.570 [192.28]	3.040 [77.22]
5	.775 [19.68]	3.795 [96.39]	1.530 [38.86]	3.795 [96.39]	2.285 [58.04]	3.795 [96.39]	3.040 [77.22]	3.795 [96.39]	3.795 [96.39]	3.795 [96.39]	4.550 [115.57]	3.795 [96.39]	5.305 [134.75]	3.795 [96.39]	6.060 [153.92]	3.795 [96.39]	6.815 [173.10]	3.795 [96.39]	7.570 [192.28]	3.795 [96.39]
6	.775 [19.68]	4.550 [115.57]	1.530 [38.86]	4.550 [115.57]	2.285 [58.04]	4.550 [115.57]	3.040 [77.22]	4.550 [115.57]	3.795 [96.39]	4.550 [115.57]	4.550 [115.57]	4.550 [115.57]	5.305 [134.75]	4.550 [115.57]	6.060 [153.92]	4.550 [115.57]	6.815 [173.10]	4.550 [115.57]	7.570 [192.28]	4.550 [115.57]
7	.775 [19.68]	5.305 [134.75]	1.530 [38.86]	5.305 [134.75]	2.285 [58.04]	5.305 [134.75]	3.040 [77.22]	5.305 [134.75]	3.795 [96.39]	5.305 [134.75]	4.550 [115.57]	5.305 [134.75]	5.305 [134.75]	5.305 [134.75]	6.060 [153.92]	5.305 [134.75]	6.815 [173.10]	5.305 [134.75]	7.570 [192.28]	5.305 [134.75]
8	.775 [19.68]	6.060 [153.92]	1.530 [38.86]	6.060 [153.92]	2.285 [58.04]	6.060 [153.92]	3.040 [77.22]	6.060 [153.92]	3.795 [96.39]	6.060 [153.92]	4.550 [115.57]	6.060 [153.92]	5.305 [134.75]	6.060 [153.92]	6.060 [153.92]	6.060 [153.92]	6.815 [173.10]	6.060 [153.92]	7.570 [192.28]	6.060 [153.92]
9	.775 [19.68]	6.815 [173.10]	1.530 [38.86]	6.815 [173.10]	2.285 [58.04]	6.815 [173.10]	3.040 [77.22]	6.815 [173.10]	3.795 [96.39]	6.815 [173.10]	4.550 [115.57]	6.815 [173.10]	5.305 [134.75]	6.815 [173.10]	6.060 [153.92]	6.815 [173.10]	6.815 [173.10]	6.815 [173.10]	7.570 [192.28]	6.815 [173.10]
10	.775 [19.68]	7.570 [192.28]	1.530 [38.86]	7.570 [192.28]	2.285 [58.04]	7.570 [192.28]	3.040 [77.22]	7.570 [192.28]	3.795 [96.39]	7.570 [192.28]	4.550 [115.57]	7.570 [192.28]	5.305 [134.75]	7.570 [192.28]	6.060 [153.92]	7.570 [192.28]	6.815 [173.10]	7.570 [192.28]	7.570 [192.28]	7.570 [192.28]

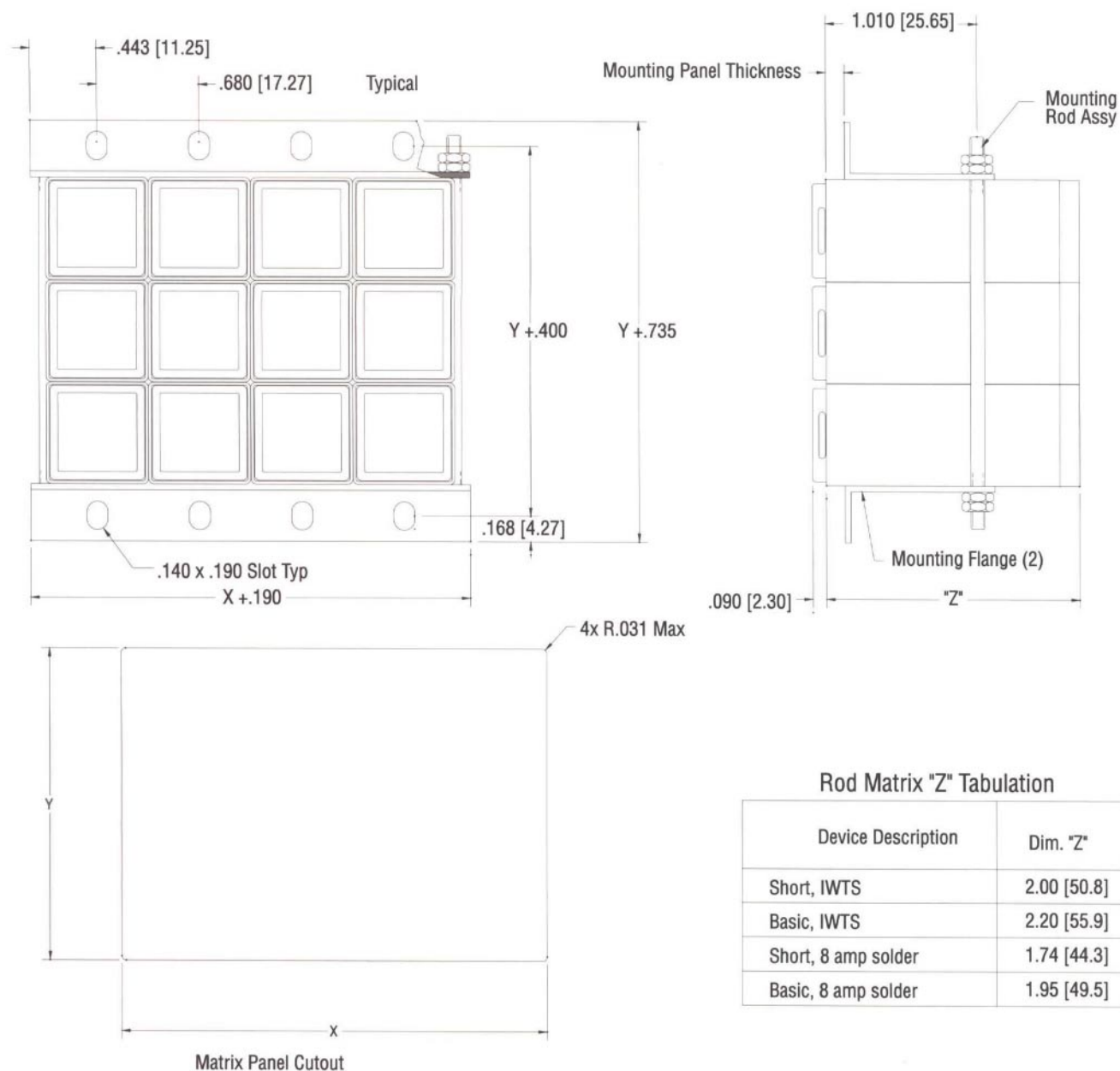
Series 584 Rod Mount Hardware

The rod mount system allows for units to be mounted in the smallest allowable space by using a system of rods and plates to hold the switch/indicator units together and fasten them to the mounting panel.

584-REMxxxx-.xxx

Code	Identifies	Codes
584-REM0303-.125	Matrix length	Use REM for basic units, RM - for short units
584-REM0303-.125	No. of units per horizontal row	Two digits
584-REM0303-.125	No. of units per vertical column	Two digits
584-REM0303-.125	Panel thickness	Std sizes: 0.063 (1.6), 0.090 (2.3), 0.125 (3.2)

584-REMxxxx-.xxx Dimensions



Rod Matrix "Z" Tabulation

Device Description	Dim. "Z"
Short, IWTS	2.00 [50.8]
Basic, IWTS	2.20 [55.9]
Short, 8 amp solder	1.74 [44.3]
Basic, 8 amp solder	1.95 [49.5]

See accompanying table on page 23

Series 584 Rod Mount Hardware continued

584-REMxxx-.xxx Dimensions continued

X (Horiz) ➡ No. of Stations Y (Vert) ▼	1		2		3		4		5		6	
	Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout		Panel Cutout	
	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y	Dim X	Dim Y
1	.700 (17.78)	.700 (17.78)	1.380 (35.05)	.700 (17.78)	2.060 (52.32)	.700 (17.78)	2.740 (69.60)	.700 (17.78)	3.420 (86.87)	.700 (17.78)	4.100 (104.14)	.700 (17.78)
2	.700 (17.78)	1.380 (35.05)	1.380 (35.05)	1.380 (35.05)	2.060 (52.32)	1.380 (35.05)	2.740 (69.60)	1.380 (35.05)	3.420 (86.87)	1.380 (35.05)	4.100 (104.14)	1.380 (35.05)
3	.700 (17.78)	2.060 (52.32)	1.380 (35.05)	2.060 (52.32)	2.060 (52.32)	2.060 (52.32)	2.740 (69.60)	2.060 (52.32)	3.420 (86.87)	2.060 (52.32)	4.100 (104.14)	2.060 (52.32)
4	.700 (17.78)	2.740 (69.60)	1.380 (35.05)	2.740 (69.60)	2.060 (52.32)	2.740 (69.60)	2.740 (69.60)	2.740 (69.60)	3.420 (86.87)	2.740 (69.60)	4.100 (104.14)	2.740 (69.60)
5	.700 (17.78)	3.420 (86.87)	1.380 (35.05)	3.420 (86.87)	2.060 (52.32)	3.420 (86.87)	2.740 (69.60)	3.420 (86.87)	3.420 (86.87)	3.420 (86.87)	4.100 (104.14)	3.420 (86.87)
6	.700 (17.78)	4.100 (104.14)	1.380 (35.05)	4.100 (104.14)	2.060 (52.32)	4.100 (104.14)	2.740 (69.60)	4.100 (104.14)	3.420 (86.87)	4.100 (104.14)	4.100 (104.14)	4.100 (104.14)

Spare Parts

Lamps	584 (See Pages 11, 12)
Capsule	584 (See Pages 10-15)
Body	584 (See Page 10)
Mounting Hardware	584 (See Page 11)
Panel Seal and Retainer, Black	584-515-1
Panel Seal and Retainer, Stainless Steel	584-515-2
Frame Matrix Fastener	584-526
5 amp, M39029/57-354 Connector Block	584-505
5 amp, M39029/57-354 Connector Block w/ Strain Relief	584-511
8 amp, M39029/22-192 Connector Block w/ Strain Relief	584-527

Accessories

Connector Pin, 8A, M39029/22-192, Crimp Style, 1 ea.	58A-111-1
Connector Pin, 8A, M39029/22-192, 25 ct	58A-111-2
Connector Pin, 8A, M39029/1-100, Crimp Style, 1 ea.	58A-110-1
Connector Pin, 8A, M39029/1-100, 25 ct	58A-110-2
Connector Pin, 8A, M39029/1-101, Crimp Style, 1 ea.	58A-110-3
Connector Pin, 8A, M39029/1-101, 25 ct	58A-110-4
Connector Pin, 5A, M39029/57-354, Crimp Style, 1 ea.	58A-108-1
Connector Pin, 5A, M39029/57-354, 25 ct	58A-108-2
Connector Pin, 5A, M39029/72-393, Wire Wrap, 1 ea.	58A-109-1
Connector Pin, 5A, M39029/72-393, 25 ct	58A-109-2
Clear Plastic Switchguard	58A-104
Wire Switchguard, Black	58A-105-1
Wire Switchguard, Red	58A-105-2
Panel Plug, Black	58A-112

Installation and Removal Tools

Lamp Capsule Removal Tool	58T-101
Connector Pin Crimp Tool, for M39029/1	58T-109-1
Connector Pin Crimp Tool, for M39029/22	58T-109-2
Connector Pin Crimp Tool, for M39029/57	58T-109-3
Connector Pin Removal Tool	58T-104
Connector Block Removal Tool	58T-107
Torque Screwdriver	58T-106

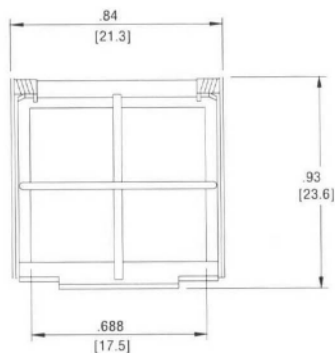


Figure 25
Wire Switch Guard
Not For Use With Matrices

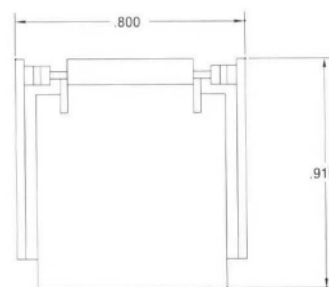
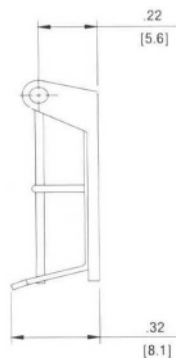
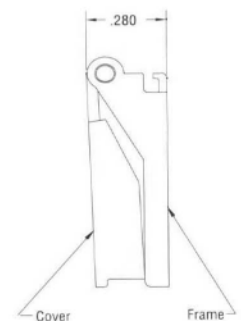


Figure 26
Clear Plastic Switch Guard
Not For Use With Matrices



Specifications, illustrations and features shown in this brochure are based on the latest available information at the time of publication. Although descriptions are relieved to be correct, accuracy cannot be guaranteed. Eaton Corporation reserves the right to make changes in specifications, materials, accessories and procedures at any time, without notice or obligation.



ELECTRONICS & DEFENSE

SERIES 584

**ILLUMINATED PUSHBUTTON SWITCHES
& INDICATORS WITH LED LIGHTING**

SAFRAN ELECTRONICS & DEFENSE

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Specializations

MRO, Flight Controls, Flight Operations Quality Assurance, Auto Pilot Systems, Aircraft Condition Monitoring, Integrated Cockpit Display Systems, Avionics Illuminated Pushbutton Switches.

TABLE OF CONTENTS

P. 6 / 584 PBA led presentation

P. 7 / Performance and reliability

P. 8 / Mechanical specifications

P.10 / Dimensional Specifications - Plug-in termination

P.11 / Turret terminal or PCB termination - IWTs termination

P. 12 / Environmental Specifications - Electrical specifications

P. 14 / Display Specifications

P. 15 / Optical Specifications

P. 18 / Create your own reference

P. 22 / Series 584 plug-in mounting sleeves with connector block

P. 24 / Series 584 snap-on mounting sleeves with connector block

P. 25 / Series 584 matrices

P. 28 / Series 584 rod mount hardware

P. 30 / Our presence in the United States of America



SERIES 584

ILLUMINATED PUSHBUTTON SWITCHES & INDICATORS WITH LED LIGHTING



Safran Electronics & Defense, Avionics USA, LLC has field proven capability and pedigree of development and manufacturing of illuminated pushbutton switches and control panel products. This development covers a wide array of applications for civil and military platforms.

At Safran Electronics & Defense, Avionics USA, LLC Costa Mesa facility we manufacture pushbutton switches, Illuminated panels, pilot controls and cockpit control panels at the site in Costa Mesa, California. The co-location of Safran Electronics & Defense, Avionics USA, LLC design and manufacturing enables superior Control and delivery of Quality product. Everyone at Safran Electronics & Defense, Avionics USA, LLC take great pride in their work and the Quality of the product being shipped to the customer. Additionally, the Safran Electronics & Defense, Avionics USA, LLC switches, pilot control products and cockpit control panels have demonstrated superior performance and reliability in the field.

584 PBA LED PRESENTATION

INTRODUCTION

The Series 584 PBA LED Lighted Avionics Pushbutton Switch is designed for life-of-the aircraft service. It features five aviation and five NVIS (Night Vision Imaging System) compatible colors. The Series 584 PBA is available in momentary action, alternate action, alternate action holding coil and indicator only configurations. Three termination systems are available: Plug-in, Solder turret and IWTs (Integrated Wire Termination System).

PEDIGREE

The Series 584 LED switch uses the proven four-pole switch contact pushbutton mechanism and qualified to MIL-PRF-22885/110. The switch display is illuminated by surface mount Light Emitting Diodes (LEDs) located within the lamp capsule.

Series 584 PBA switches, the LED version provides high reliability product in a lightweight, sunlight readable package with options of night vision compatibility, spray-tight sealing, and plug-in mounting.

SWITCH DESIGN

The Series 584 LED pushbutton switch is a four pole, snap action, Form C device available in momentary, indicating alternate, and indicator configurations. Safran Electronics & Defense, Avionics USA, LLC use of its proprietary bi-stable switch contact system differentiates the Series 584 switch from all other four pole pushbutton switches. This bi-stable design ensures contact reliability and speed by enabling four switch contacts to be equally stable in both C-NC and C-NO states, unlike sub-miniature switches which require a balanced spring system to maintain them in an activated mode. The switch actuation mechanism is a unique over-center snap actuator which precludes contact tease and inadvertent switch transfer by operators. The Series 584 PBAs deliver fast and simultaneous switch contact transfer based on the bi-stable and switch actuation mechanism..

Standard Series 584 LED pushbutton switch delivers 200,000 cycles. While the «Millennium» version delivers in excess of 1,000,000 cycles.

LED LIGHTING

The Series 584 LED PBA functions with 28-Volt aircraft DC power supply systems. Additionally, the LED PBA Lighting is available linear or step function. The linear dimming is proportional to the external current or voltage input while the step dimming is defined by the desired daytime and night mode voltage levels. Series 584 PBA illumination life exceeds 100,000 continuous hours due to optimized Electro-Opto-Mechanical design.



1. RELIABILITY

Switch life is based on three factors:

- Mechanical life,
- Electrical life of the switch contacts
- Electrical life of the lighting circuitry.

Mechanical Life

The 584 switch is rated for 1,000,000 actuations.

Switch Electrical Life

1,000,000 actuation cycle at 0.01 to 0.1 amperes resistive

Lighting Circuitry Life

100,000 continuous hours based on when the illumination degradation reaches 50% of its initial brightness value.

Reliability Prediction

The MTBF for the Series 584 LED pushbutton switch is predicted to be greater than 500,000 hours based on MIL-HDBK-217F and the Non-Electronic Parts Reliability Data (NPRD) and the assumption of one operation cycle per flight. However the MTBF computation is performed based on each application pending the environmental conditions. We can determine the MTBF for a given requirements.

2. PERFORMANCE CHARACTERISTICS

Polarity

LED's are polarity sensitive devices therefore we provide polarity definition as part of the electronic circuit information marked on the side of the 584 LED switches. Additionally, the polarity can be marked on the connector to prevent incorrect wiring. The electronic circuit is protected from accidental application of power with the wrong polarity.

Chromaticity and Luminance

Our LED illuminated switches are manufactured with true color LED's to meet specific chromaticity values. The LED luminance or brightness can be tailored to specific customer requirements if the application necessitates a deviation from the performance of the standard product provided here. Luminance levels for all LED capsule colors and legend configurations are derived for the specified bright and dim operating voltages. The selected voltage or current has minimal impact on legend colors. The LED color and luminance will operate consistently at the specified input voltages set for the bright and dim control voltages.

Low Power Consumption

The nominal power consumption for the Series 584 LED pushbutton switch is 1.5 Watts for the 28-Volt system. This represents a power savings of greater than 50% over a typical 28-Volt incandescent system.

Low Touch Temperature

The touch temperature at the face of the Series 584 LED pushbutton switch operated at 28 volts in an ambient temperature of 24 degrees Celsius has been tested at 38 degrees Celsius. This temperature rise of 14 degrees Celsius is as much as 40 degrees Celsius cooler than an equivalent 28 volt incandescent light source.

LED Design Redundancy

The Series 584 LED PBA design utilizes eight LED's. A full display is made up of 8 LED's, while a half display would have 4 LED's per each half. Given the long life of the individual LED's, LED replacement is highly unlikely during the life of an aircraft; however premature loss of one or two LED's in a full display capsule would not result in a non-legible capsule legend. A half display will remain legible with one failed LED.

Qualification Data

The Series 584 LED pushbutton switch is qualified to MIL-PRF-22885/110. The LED upgrade to the 584 product is based on incandescent series 584 PBA and does not impact the structural integrity of the switch, and the basic switch operating mechanism remains the same.

PERFORMANCE AND RELIABILITY

As an electronic component, the series 584 LED pushbutton switch is designed to meet the demanding environmental conditions for airborne equipment of RTCA/D0-160. The specific test methods used are listed under the detailed environmental specification in this catalog.

3. DESIGN AND PRODUCT FLEXIBILITY

Dimming Methods

We offer «linear dimming» and «step dimming» capabilities for the Series 584 LED PBA switch.

Linear dimming uses external voltage input for providing the dimming control. In this method, the voltage input to the switch is varied from full rated voltage (bright mode) to a desired dim voltage level (dim mode). In this configuration, the LED current limiting resistors are located inside the switch body which control the current and subsequently tune the luminance value of the LED's.

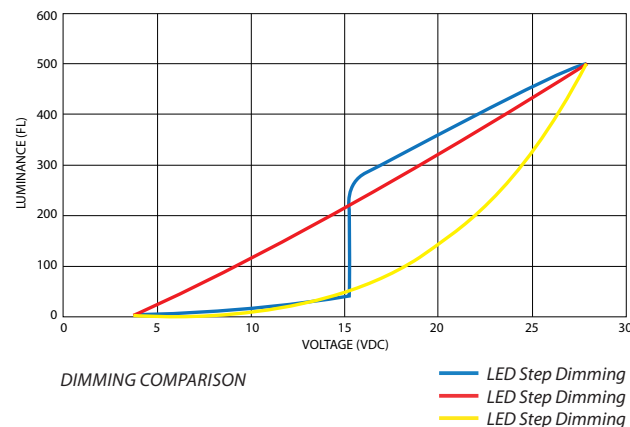
Step dimming provides dimming control internal to the switch and is generally designed to provide a «stair-step» response to bright and dim mode voltage inputs to achieve desired levels of luminance for day and night operation.

In a 28-Volt system, an electrical circuit within the switch housing provides the voltage reduction and dimming circuitry to provide the desired bright mode and dim mode luminance at the desired voltages. The dimming circuit is attached to the switch body to remove heat away from the LED capsule and thereby increase their operating life.

The graph shown compares the luminance versus voltage curve for a standard 28-Volt LED PBA switch with step dimming to that of a 28-Volt LED PBA switch with linear dimming and a typical 28-Volt incandescent switch. For custom applications the range of the dimming step can be pre-specified within 22 to 12 Volt for a 28-Volt system.

Legends

The legend and character sizes specified for the Series 584 LED are provided in the Character Font and Height Codes section of this catalog. We can provide legends to various standard fonts as well as custom legends and sizes.



4. HANDLING

Due to sensitivity of electronics and Electro-Optics component to ESD the series 584 LED PBAs shipped with ESD protection packaging. We strongly recommend that proper ESD handling procedures are used when working with the series 584 LED pushbutton switches.

MECHANICAL SPECIFICATIONS

The length of each unit is specified from the rear of the housing flange to the end of the switch body, not including terminals. Terminal length is 0.2 inches (5.1 mm) for solder and PCB units.

To calculate the actual behind panel depth for your application, subtract the thickness of the panel, the thickness of spacers used above panel and 0.030 inches for the drip-proof panel seal, if required, from the length of unit listed below.



	Maximum Length Behind Switch Housing Flange	Maximum Weight
Basic Length, Solder & PCB Termination	2.27 inches (35.mm)	26 grams
Basic Length, Plug-in Termination	2.56 inches (52.3.mm)	27grams
Basic Length, Solder & PCB Termination, Diaphragm Seal	2.00 inches (37.3.mm)	29 grams
Basic Length, Plug-in Termination, Diaphragm Seal	2.29 inches (46.2mm)	30 grams
584-REL5 Plug-in Mount	See 584-REL5	14 grams
584 Switch Contacts	Fine Silver Plated with 50 million th inches gold	
584 Millennium Switch Contacts	Fine Silver Plated with 100 million th inches gold	

Switch Form	Form C single break
Actuation Travel	0.135 ± 0.010 inches (3.43 ± 0.25 mm).
Actuation Force	2 to 5 lbs (8.9 to 22.3 N)
Extraction Force	3 to 5 lbs ((8.9 to 22.3 N)
Mounting Torque	18 ± 2 inch-oz. (0.127 ± 0.014 N-m)
Internal Seal	Drip-proof per MIL-S-22885
Diaphragm Seal	Spray-tight per MIL-STD-108
Mechanical Life	584: 200 000 cycles 584 Millennium: 1 000 000 cycles
Marking	MIL-STD-130

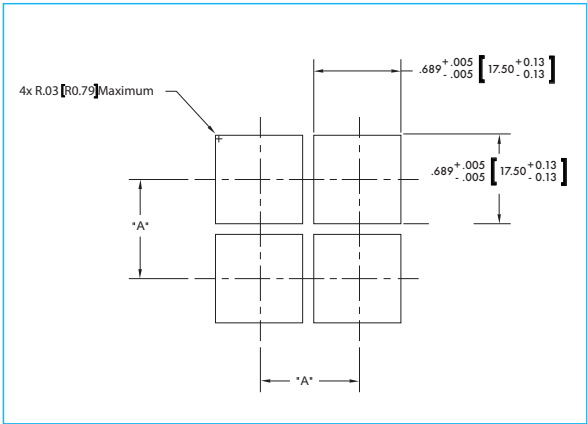


Figure 1. Recommended Panel Cutout

TYPE	DIMENSION "A"
Unsealed Switch	.780 [19.8]
Switch with Spray Tight Boot	.930 [23.62]

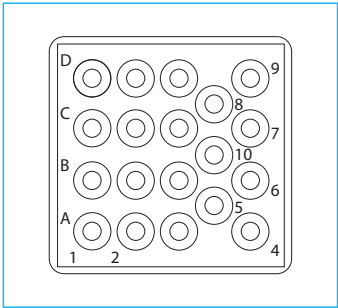


Figure 2. 8 Amp IWTS Terminations

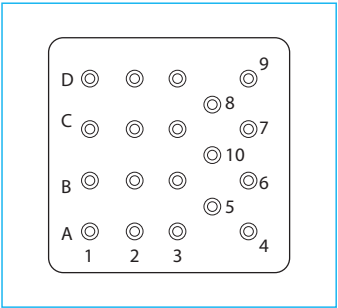
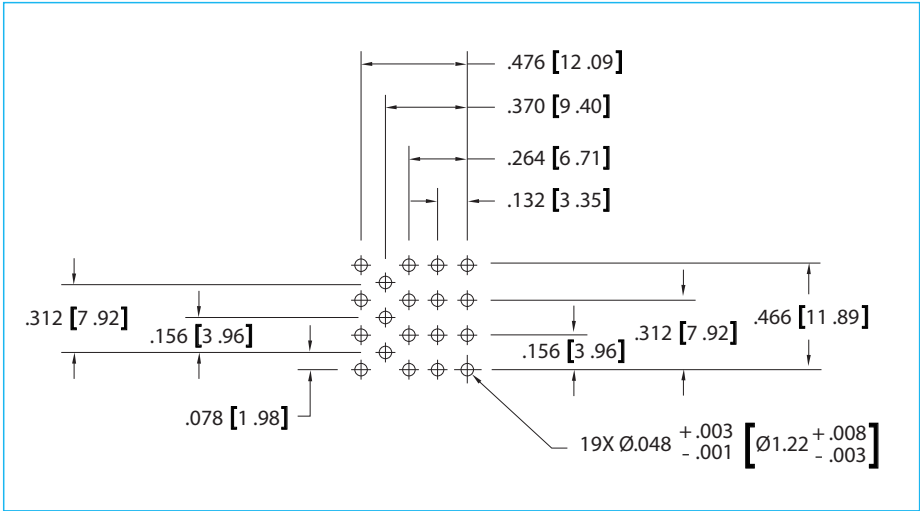


Figure 3. 8 Amp Terminations
Styles: Solder, Plug-in, PCB (shown)

Figure 4. 8 Amp Termination PCB Layout



DIMENSIONAL SPECIFICATIONS

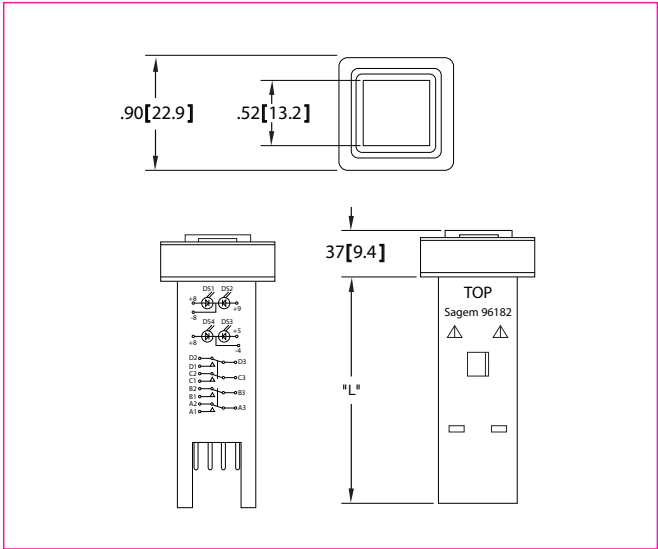


Figure 5. Spraytight Seal

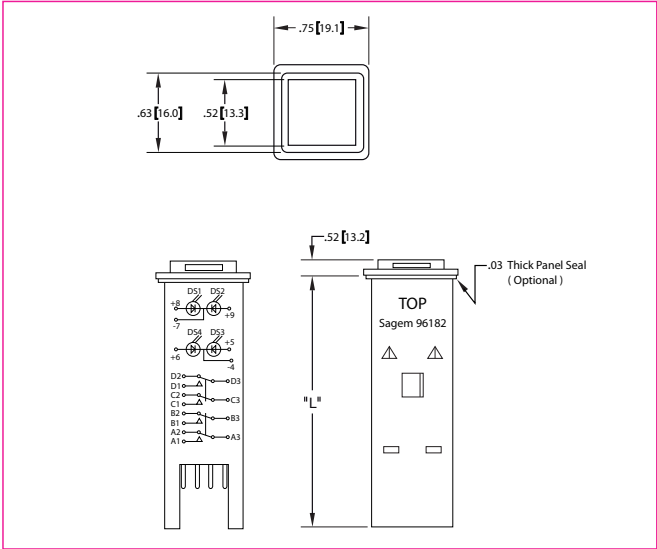


Figure 6. Dust Resistant or Drip Proof Seal

PLUG-IN TERMINATION

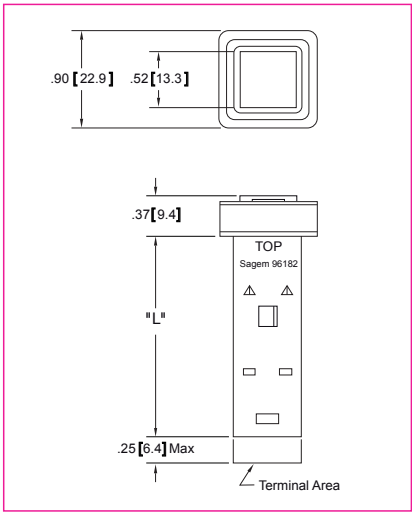


Figure 7. Spray Tight Seal

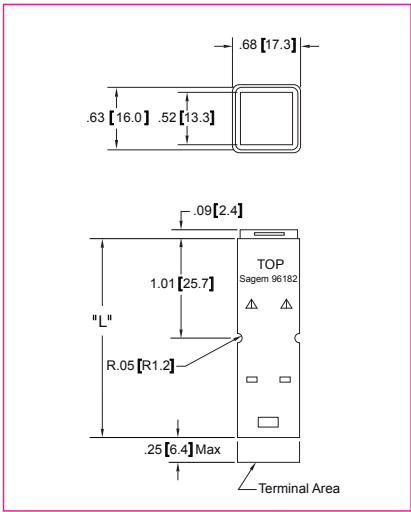


Figure 8. Dust Resistant or Drip Proof Seal

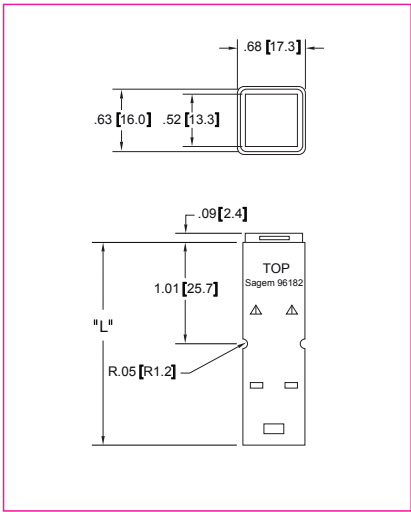
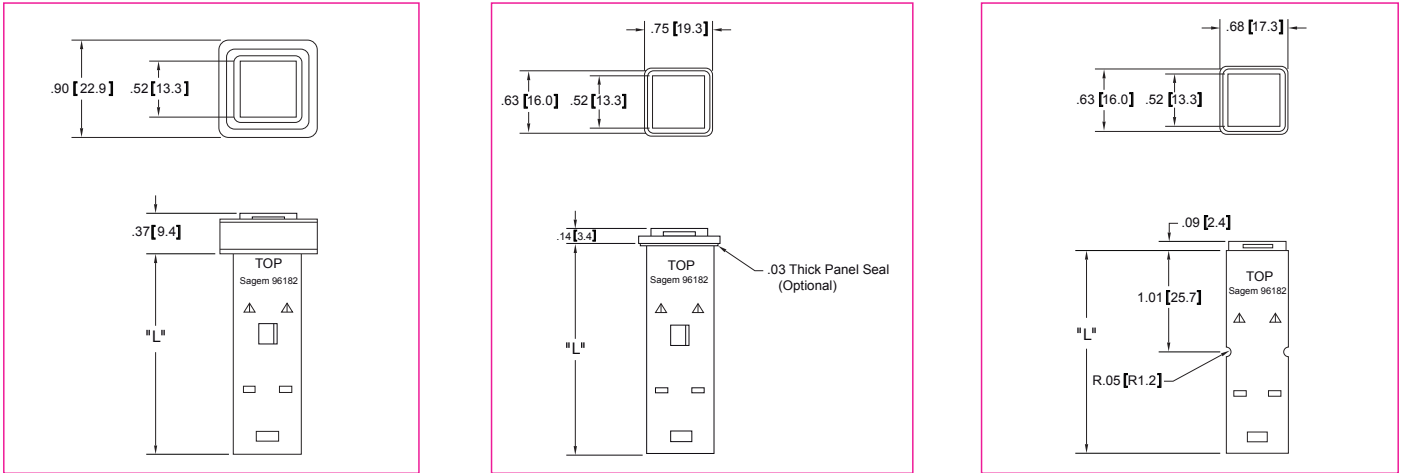


Figure 9. Rod Mount

TURRET TERMINAL OR PCB TERMINATION

Termination Type	Device Description	DIM «L»	
		Unsealed Or Dripproof	Spray Tight
Plug-in	Basic, Switch	2.56 [65.0]	2.29 [58.2]
	Basic, Holding Coil	3.10 [78.7]	2.83 [71.9]
Solder	Basic, Switch	2.27 [57.6]	2.00 [50.8]
Current	Basic, Holding Coil	2.81 [71.4]	2.54 [64.5]
or PCB	Basic, Holding Coil, Rod Mtg.	2.85 [72.4]	not available

Table 1. 8Amp Plug-in, Current and PCB Terminations



IWTS TERMINATION

Spray Tight	Termination Type	Device Description	DIM «L»	
			Unsealed Or Dripproof	
IWTS	Basic, Switch	2.74 [69.6]	2.47 [62.7]	
	Holding Coil, Basic	3.28 [83.3]	3.01 [76.4]	
	Holding Coil, Basic, Rod Mtg.	3.32 [84.3]	not available	

Table 2. 8 Amp IWTS

ENVIRONMENTAL SPECIFICATIONS

Operating Temperatures	-40C° to +71°C
Storage Temperatures	-55°C to +85°C
Thermal Shock	MIL-STD-202, Method 107, Condition A
Moisture	MIL-STD-202, Method 106
Salt Spray	MIL-STD-202, Method 101, Condition A, 96hours
Sand and Dust	MIL-STD-202, Method 110
Fungus	MIL-STD-810, Method 508, All Materials used are non-nutrient to fungus
Vibration	MIL-STD-202, Method 204m Condition B, for single channel mount. For multiple channel matrix mount, contact the factory for information
Shock	MIL-STD-202, Method 213, Condition B
Explosion	MIL-STD-202, Method 109
Magnet Effect	RTCA/DO-160, Section 15, Class Z
Power Input	RTCA/DO-160, Section 16, Category Z
Voltage Spike	RTCA/DO-160, Section 17, Category B
Audio Frequency Conducted Susceptibility	RTCA/DO-160, Section 18, Category Z
Induced Signal Susceptibility	RTCA/DO-160, Section 19, Category Z
Emission of Radio Frequency Energy	RTCA/DO-160, Section 21, Category M

ELECTRICAL SPECIFICATIONS

584 and 584 Millenium Current Ratings¹

Load	Sea level 28 vdc Max	Sea level 115 vac Max	50 000 Ft 28 vdc Max	50 000 Ft 115 vac Max	Life
Resistive	8.0 A	8.0 A	5.0 A	5.0 A	25 000 cycles
Resistive	5.0 A	5.0 A	3.0 A	3.0 A	100 000 cycles
Inductive	4.0 A	4.0 A	2.5 A	2.5 A	25 000 cycles
Inductive	0.5 A	0.5 A	0.3 A	0.3 A	100 000 cycles
Lamp	1.0 A	1.0 A	-	-	50 000 cycles

Table 3. Other application values can be identified on the switch life graph shown in figure 13.

584 and 584 Millenium Current Ratings¹

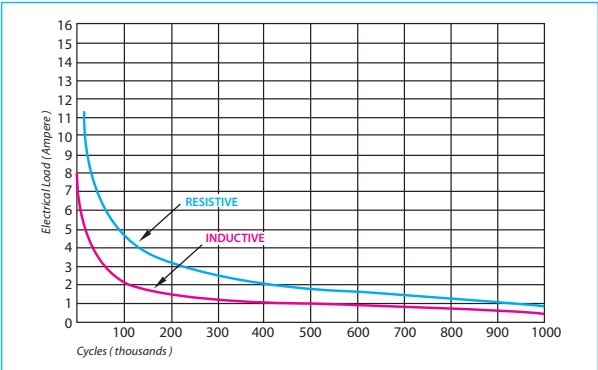
Logic Level	Sea Level 5 vdc Max	Life
Resistive	0.01 A	50 000 cycles

584 Low Level Rating¹

Low Level	Sea Level 0.03 vdc Max	Life
Resistive	0.01 A	200 000 cycles

584 Millenium Low Level Rating¹

Low Level	Sea Level 0.01 vdc Max	Life
Resistive	0.003 A	1 000 000 cycles



Note 1 Contacts subjected to currents over 100 mA are no longer useable for low current applications. Contact Resistance: Initial contact resistance at 6 VDC, 100 mA is 25 mΩ maximum. Post application resistance is 1% of the electrical circuit when measured during the operation of that circuit. Since the switch contacts are not hermetically sealed, actual contact resistance will vary based upon the cleanliness of the operating environment.

Note : Lamp positions are as viewed from the front of the display.

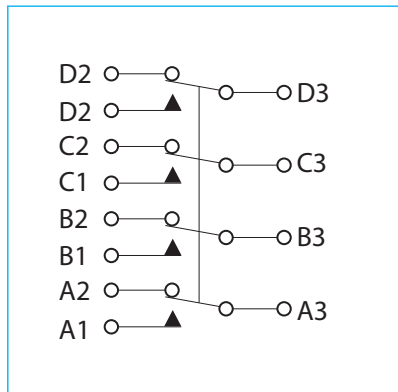


Figure 14.
4PDPT Switch

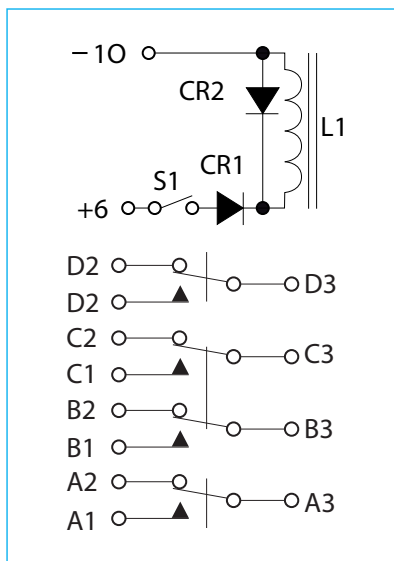


Figure 15.
4PDPT Switch with Alternate Holding Coil

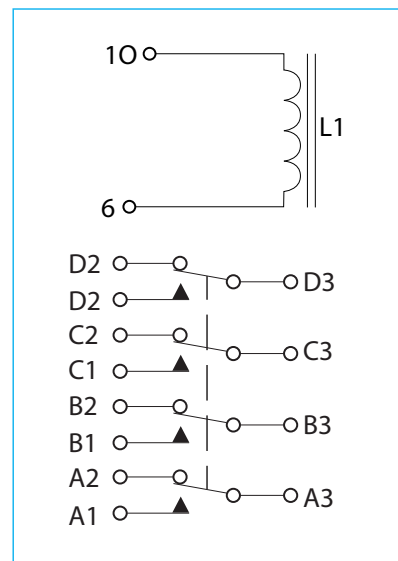


Figure 16.
4PDPT Switch with Momentary Holding Coil

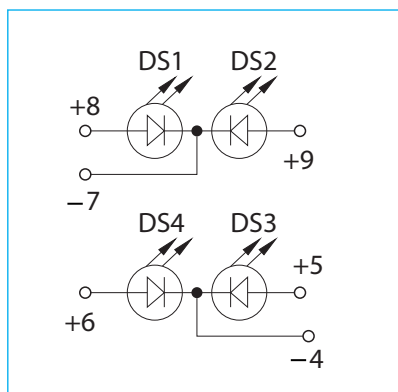


Figure 17.
C1 Four Lamp Separate Power & Ground not available with holding coil devices (see C2 or C3).

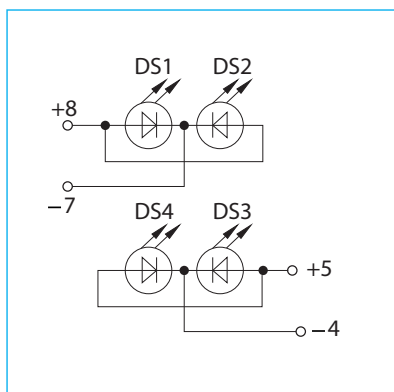


Figure 18.
C2 Two Lamp Common Power & Ground

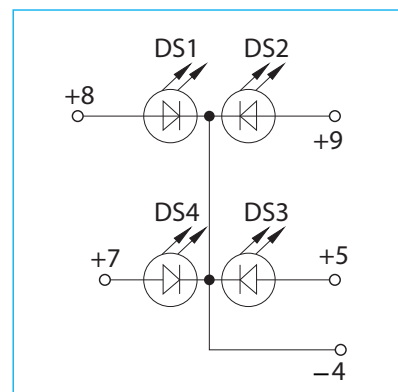


Figure 19.
C3 Four Lamp Separate Power & Common Ground

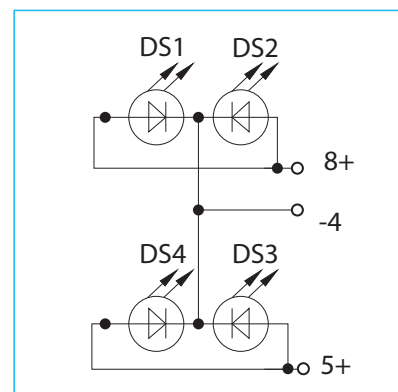
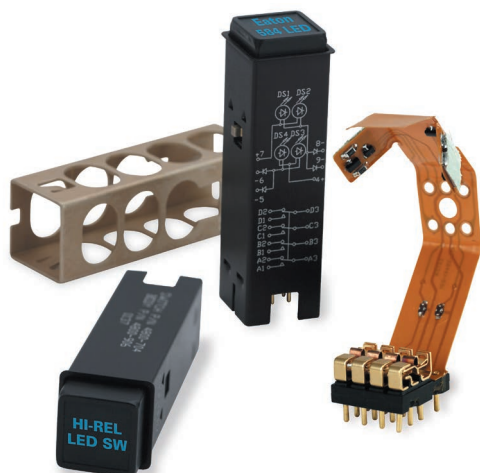


Figure 20.
C5 Two Lamp Common Power & Four Lamp Common Ground

DISPLAY SPECIFICATIONS

The Series 584 is available with a variety of display screens. The most common types are listed below. For special requirements, contact the factory customer service center.

DISPLAY TYPE DESIGNATION		WITH LIGHT SOURCE NOT ENERGIZED			WITH LIGHT SOURCE ENERGIZED		
MIL-PRF-22885	SAFRAN	LEGEND	BACKGROUND	APPEARANCE/DESCRIPTIONS	LEGEND	BACKGROUND	APPEARANCE/DESCRIPTIONS
N	1	White	Black	 White characters on opaque black background	Color	Black	 Color characters on black background
W	2	Black	White	 Opaque black characters on white background	Black	Color	 Black characters on color background
S	5	Not visible	Black	 Hidden characters on black background	Color	Black	 Color characters on black background. Sunlight Readable
C	6	Black	Color	 Opaque black characters on color background	Black	Color	 Black characters on color background
B	8	Not visible	Black	 Hidden characters on black background	Black	Color	 Black characters on color background
Special	9	White	Black	 Opaque white characters on opaque black background	White	Color	 White characters on color background
special	40	White	Black	 White characters on black background for low ambient light	Color	Black	 Color characters on black background for low ambient light
special	12	White	Black	 White characters on black background	Color	Black	 Color characters on black background.
		Black	Black	 Hidden characters on black background	Color	Black	 Color characters on black background.

OPTICAL SPECIFICATIONS

All sunlight readable displays meet or exceed the requirements of MIL-PRF-22885/110

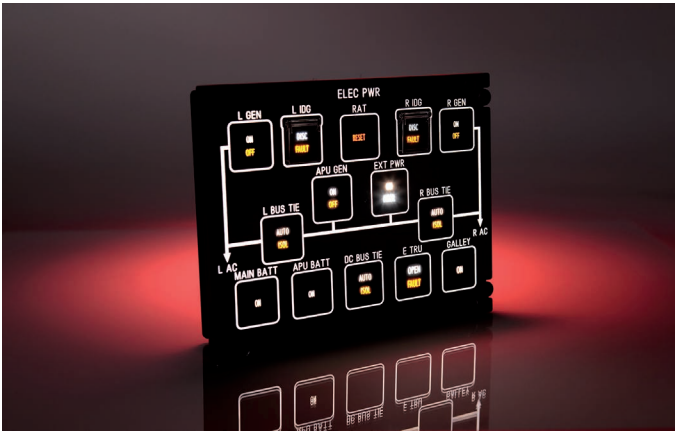
Luminance

The below table specifies the Luminance of PBAs at bright mode and dim mode. Bright mode luminance values are provided when the input voltage is 28V. Dim mode luminance values are provided when the input voltage is 14V. However, customers can specify non-standard dim voltage within the range of 12V to 22V.

Aviation Color	Luminance (fL) Bright mode at 28V	Luminance (fL) Dim mode at 14V
RED	≥ 250	15±5
AMBER	≥ 250	15±5
GREEN	≥ 250	15±5
WHITE	≥ 250	15±5
BLUE	≥ 200	10±5

Chromaticity

The typical color coordinates of illuminated characters and background shall be within the area defined by the following color coordinates based on the CIE 1931 Chromaticity diagram.



Control Panel with illuminated pushbutton switches

Contrast

The below table specifies the sunlight readability by contrast values between legend and background for sunlight readable display types. The measurements shall be performed at the following illumination conditions: 10,000 fC of 3000K to 5000K light source incidents to the measured surface at 45°±2°. The photometer is positioned perpendicular to the measured surface.







Aviation Color	On-Contrast (C _L)	Off-Contrast (C _{UL})
RED	≥ 0.6	≤ 0.1
AMBER	≥ 0.6	≤ 0.1
GREEN	≥ 0.6	≤ 0.1
WHITE	≥ 0.6	≤ 0.1
BLUE	≥ 0.6	≤ 0.1

Color	Chromaticity Coordinates based on CIE 1931	
	x	y
RED	0.665	0.335
	0.665	0.320
	0.695	0.290
	0.710	0.290
AMBER	0.540	0.459
	0.540	0.445
	0.610	0.375
	0.625	0.375
GREEN	0.150	0.808
	0.150	0.640
	0.300	0.640
	0.300	0.694
WHITE	0.290	0.315
	0.330	0.285
	0.400	0.390
	0.360	0.420
BLUE	0.175	0.005
	0.175	0.175
	0.077	0.175
	-	-

NVIS Compatible Display

Our NVIS compatible displays meet the requirements of MIL-L-85762A and MIL-STD-3009.

The typical sunlight readable NVIS displays are shown in the following table.

WITH LIGHT SOURCE NOT ENERGIZED			WITH LIGHT SOURCE ENERGIZED		
LEGEND	BACKGROUND	APPEARANCE/DESCRIPTIONS	LEGEND	BACKGROUND	APPEARANCE/DESCRIPTIONS
Not visible	Black	 Hidden characters on black background	Red	Black	 Red characters on black background
			Yellow	Black	 Yellow characters on color background
			White	Black	 White characters on black background. Sunlight Readable
			Breen B	Black	 Green B characters on color background
			Green A	Black	 Green A characters on color background

Luminance - NVIS Compatible Display

NVIS-Compatible Color	Class	Luminance (fL) Bright mode at 28V	Luminance (fL) Dim mode at 14V
RED	B	≥ 200	15±5
¹ YELLOW	A and B	≥ 200	15±5
¹ WHITE	A and B	≥ 200	15±5
¹ GREEN B	A and B	≥ 200	15±5
^{1 & 2} GREEN A	A and B	≥ 200	15±5

Note 1: PBAs of Yellow Class A, White, Green A, and Green B are able dimmable continuously to less than 0.1fL.

Note 2: Legends with Green A applications appear the same as the markings of the illuminated panels.

NVIS Color and Radiance

The center chromaticity coordinates and its radius of a circle for each NVIS compatible color is specified in the table. At the luminance level specified in the following table, the u' and v' chromaticity coordinate values for Green A and White shall be within the areas by the defined circles; the u' and v' chromaticity coordinate values for Green B, Yellow, and Red shall be within the area by the defined circles and CIE 1976 diagram boundary.

The NVIS radiance for each NVIS compatible color shall meet the requirements in the table at the specified luminance level.

NVIS-Compatible Color	Class	Chromaticity Coordinates Based on CIE 1976				NVIS RADIANCE (NRa or NRb) (W/cm ² · sr)
		u'	v'	r	Luminance (fL)	
RED	B	0.450	0.550	0.060	15	$4.7 \times 10^{-8} < \text{NRb} < 1.4 \times 10^{-7}$
YELLOW	B	0.274	0.622	0.083	15	$4.7 \times 10^{-8} < \text{NRb} < 1.4 \times 10^{-7}$
YELLOW	A	0.274	0.622	0.083	15	$5.0 \times 10^{-8} < \text{NRa} < 1.5 \times 10^{-7}$
GREEN B	A and B	0.131	0.623	0.057	0.1	$\text{NRa}, \text{NRb} < 1.7 \times 10^{-10}$
GREEN A	A and B	0.088	0.543	0.037	0.1	$\text{NRa}, \text{NRb} < 1.7 \times 10^{-10}$
WHITE	A and B	0.190	0.490	0.040	0.1	$\text{NRa}, \text{NRb} < 1.0 \times 10^{-9}$

Contrast – NVIS Compatible Display

The below table specifies the sunlight readability by contrast values between legend and background for sunlight readable display types. The measurements for NVIS Red, NVIS Yellow, and NVIS Green B shall be performed at the following illumination conditions: 10,000 fC of 3000K to 5000K light source incidents to the measured surface at $45^\circ \pm 2^\circ$. The photometer is positioned perpendicular to the measured surface. The measurements for NVIS Green A shall be performed at the following illumination conditions: 50 fC of cool light source F2 incidents to the measured surface at $45^\circ \pm 2^\circ$. The photometer is positioned perpendicular to the measured surface.

NVIS-Compatible Color	Class	On-Contrast (C_L)	Off-Contrast (C_{UL})
RED	B	≥ 0.6	≤ 0.1
YELLOW	A and B	≥ 0.6	≤ 0.1
WHITE	A and B	≥ 0.6	≤ 0.1
GREEN B	A and B	≥ 0.6	≤ 0.1
GREEN A	A and B	≥ 0.6	≤ 0.1

CREATE YOUR OWN REFERENCE

This catalog describes the standard and optional features of the Series 584. To determine the correct part number, refer to the following pages. Samples of the typical part number are shown on each page to aid your selection.

584	71	A4	B5	C1	D2	G28	L5000	N2	GR	P12	16	ON/OFF
Series No.	Unit Options	Switch Action	Termination	Lamp Circuit	Panel Thickness	Voltage	Display Screen	Display configuration	Display color	Character Font/Height	Legend Configuration	Legend

1 Series Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The series number is identified by the first three or four digits of the part number.

Series	Code
584	584
584 with QA per M22885/110	584H
584 Millennium	584M

2 Option Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

Several products options are identified by the next two digits of the part number. Use the table below to select the lighting option, sealing level.

Lighting Option	Fourth Digit
LED with Step Dimming	7
LED with Linear Dimming	8
LED-NVIS with Step Dimming	9

Seal Options	Fifth Digit
Dust Resistant	0
Drip-proof, with Panel Seal	1
Spraytight, With Diaphragm Seal	2

3 Switch Action Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter "A" and the digit immediately following it identify the switch action

Basic Unit	Code
Indicator	A0
4PDT Momentary Switch	A1
4PDT Alternate Switch	A2
4PDT Momentary Holding Coil Switch	A3
4PDT Alternate Holding Coil Switch	A4

4 Termination and Mounting

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter "B" and the digit following it identify the termination and mounting method.

Termination	Maximum Current Carrying Capacity	Compatible Connector Pins	Wire Size	Code
Plug-in	8A	M39029/22-192	20-24 AWG	B5
solder Turret	8A	N/A	20-24 AWG	B2
PCB	8A	N/A	20-24 AWG	B3
IWTS	8A	M39029/1-100	22-26 AWG	B4
		M39029/1-100	22-24 AWG	B4
Solder Turret w/Rod Mount	8A	N/A		B7
PCB w/Rod Mount	8A	N/A		B8
IWTS w/Rod Mount	8A	M39029/1-100	22-26 AWG	B9
		M39029/1-101	22-24 AWG	

5 Lamp Circuit Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter "C" and the digit following it designate the lamp circuit. For information on custom circuits, contact the factory customer service center.

Lamp Circuit	Code
Dual Ground , 4 Way Split	C1
Dual Ground , 2 Way Split	C2
Common Ground, 4 Way Split	C3
Common Ground, 2 Way Split	C5

6 Mounting Hardware Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter “D” and the digit following it identify the mounting hardware requirements for IWTs, solder and PCB units. This code is omitted if a plug-in mount unit is specified. Plug-in hardware is specified by separate part numbers listed later in this catalog. Custom mounting hardware is available by request. Contact the factory customer service center for information.

Spacer	Spacer Height	Panel Thickness Range	Code
No Spacer	-	0.030-0.149(0.76-3.79 mm)	D25
Black	0.100 (2.5mm)	0.030-0.149(0.76-3.79 mm)	D1
No Spacer	-	.150-0.269 (3.80-6.83 mm)	D26
Black	0.100 (2.5mm)	.150-0.269 (3.80-6.83 mm)	D2

7 Voltage Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter “G” and the digit(s) following identify the lighting system input voltage.

Voltage Type	Code
5-VDC	G5
28-VDC	G28

Note : 5-VDC is available with linear dimming only

8 Display Screen Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

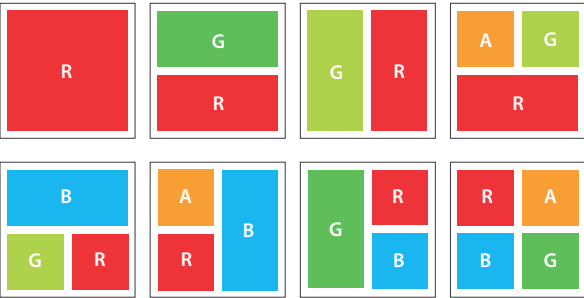
The letter “L” and the digits immediately following it identify the display screen. Display screens vary by the light source specified. To select the proper display screen code, identify the display type listed in the left column and the light source listed across the top row. Display screen types are described in the Optical Specification section.

Display Type	NVIS	Non-NVIS
1		L5001
2		L5002
5	L5060	L5000
6		L5006
7		L5007
8	L5061	L5008
9		L5009
12	L5062	L5012
40	L5066	L5040

9 Display Configuration Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The letter “N” and the number following it designate the lens configuration as follows: Full display and Split displays.



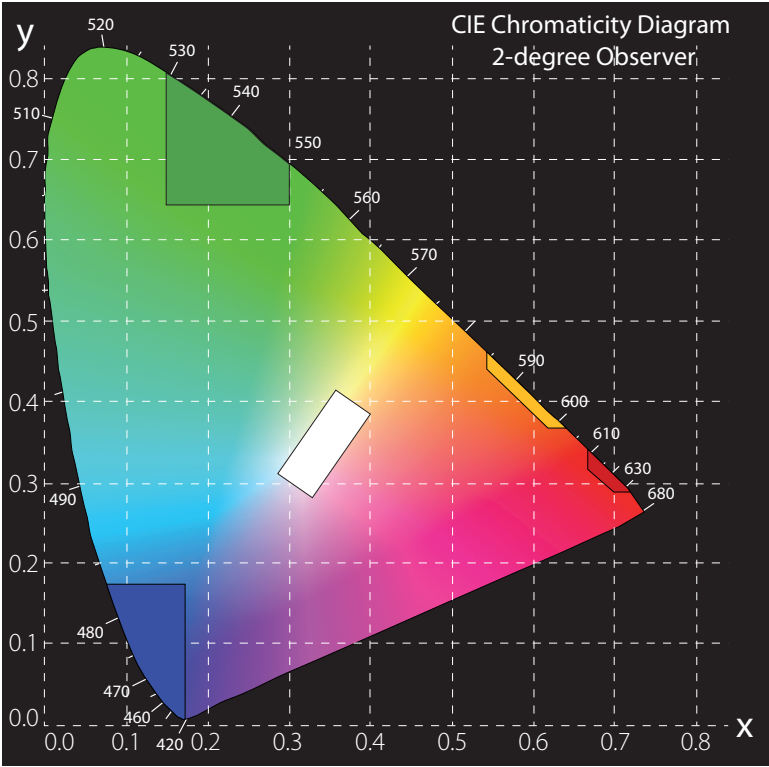
10 Color Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

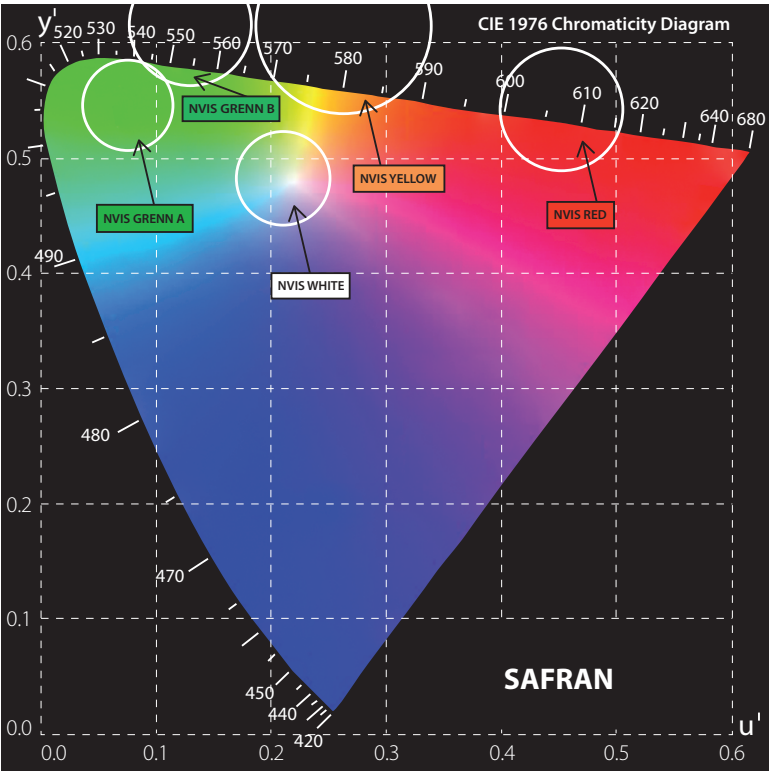
The Letters in parentheses following the lens configuration identify the lighted colors of the unit. In split displays, multiple letters are used to designate the colors of individual sections, in order from left to right and top to bottom. For example, in a four way split device, the designation (RWBG) would identify a red upper left quadrant, white upper right, blue lower left and green lower right.

Aviation Color	Display Code
RED	R
AMBER	A
GREEN	G
WHITE	W
BLUE	B

NVIS-Compatible Color	Class	NVIS-Compatible Display Code
RED	B	K
YELLOW	B	J
YELLOW	A	T
WHITE	A&B	V
GREEN B	A&B	H
GREEN A	A&B	F



Color limits within CIE Diagram



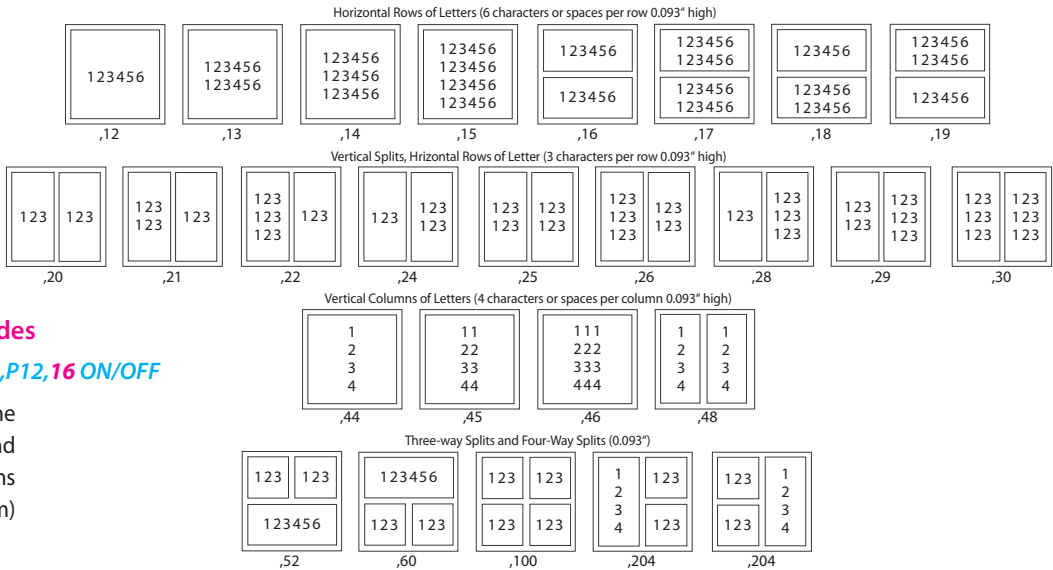
11 Character Font and Height Codes

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The Letter “P” and the digits following it identify the font style and character height to be used for the legend nomenclature

Letter Style	Font	Character Height	Letters Per Full Row ²	Letters Per Half Row ³	Code
Helvetica Medium ¹	1	0.093 (2.4 mm) ¹	7	3	P11
Helvetica Medium	1	0.125 (3.2 mm)	5	2	P12
Helvetica Medium Bold ⁴	1	0.125 (3.2 mm)	5	2	P12B
Helvetica Medium Condensed	2	0.093 (2.4 mm)	8	3	P14
Helvetica Medium Condensed	2	0.125 (3.2 mm)	6	2	P16
Helvetica Med Condensed Bold ⁴	2	0.125 (3.2 mm)	6	2	P16
DIN 1451/17	4	0.125 (3.2 mm)	4	2	P18
DIN 1451/17 Bold ⁴	4	0.125 (3.2 mm)	4	2	P18B
DIN 1451/17 Condensed	5	0.125 (3.2 mm)	6	2	P19
DIN 1451/17 Condensed	5	0.125 (3.2 mm)	6	2	P19B
Futura Medium	7	0.125 (3.2 mm)	5	2	P20
Futura Medium Bold ⁴	7	0.125 (3.2 mm)	5	2	P20B
Futura Medium Condensed	8	0.125 (3.2 mm)	6	2	P21
Futura Med Bold ⁴	8	0.125 (3.2 mm)	6	2	P21B

- Note 1: Default letter style and height. Allows two rows of text per half (N2) display, larger heights only allow one row of text.
- Note 1: Average for a full width N1 or N2 display. Each legend will vary based on the actual letters used.
- Note 1: Average for a half width N3,N11,N12,N13,N14 or N15 display. Each legend will vary based on the actual letters used.
- Note 1: 15% wider character stroke width. Recommended for better off-angle viewing.



12 Legend Configuration Codes

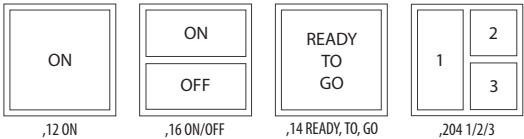
58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The two digits following the second comma identify the legend configuration. Legend configurations are listed below. The .093 inch (2.4mm) Character height is shown.

13 Legend Nomenclature

58471A4B5C1D2G28L5000N2(GR),P12,16 ON/OFF

The legend nomenclature must be written out as part of the catalog part number when ordering a switch or indicator. The legend is appended to the catalog part number after the legend configuration code. Commas are used between rows of characters and a slash is used to identify legend splits. When specifying a legend with a split, the order for the nomenclature is upper left, upper right, lower left and lower right. Examples are listed below.



SERIES 584 PLUG-IN MOUNTING SLEEVES

WITH CONNECTOR BLOCK

Basic Mounting Sleeve 584-RDL5-XXX, 584-REL5 for M39029/22-192 Connector Pins

After the switch has been inserted in the panel, this sleeve slides over the behind panel portion of the switch and is secured by tightening the pawl. When switch removal is necessary, access to both the front and rear of the panel is required.

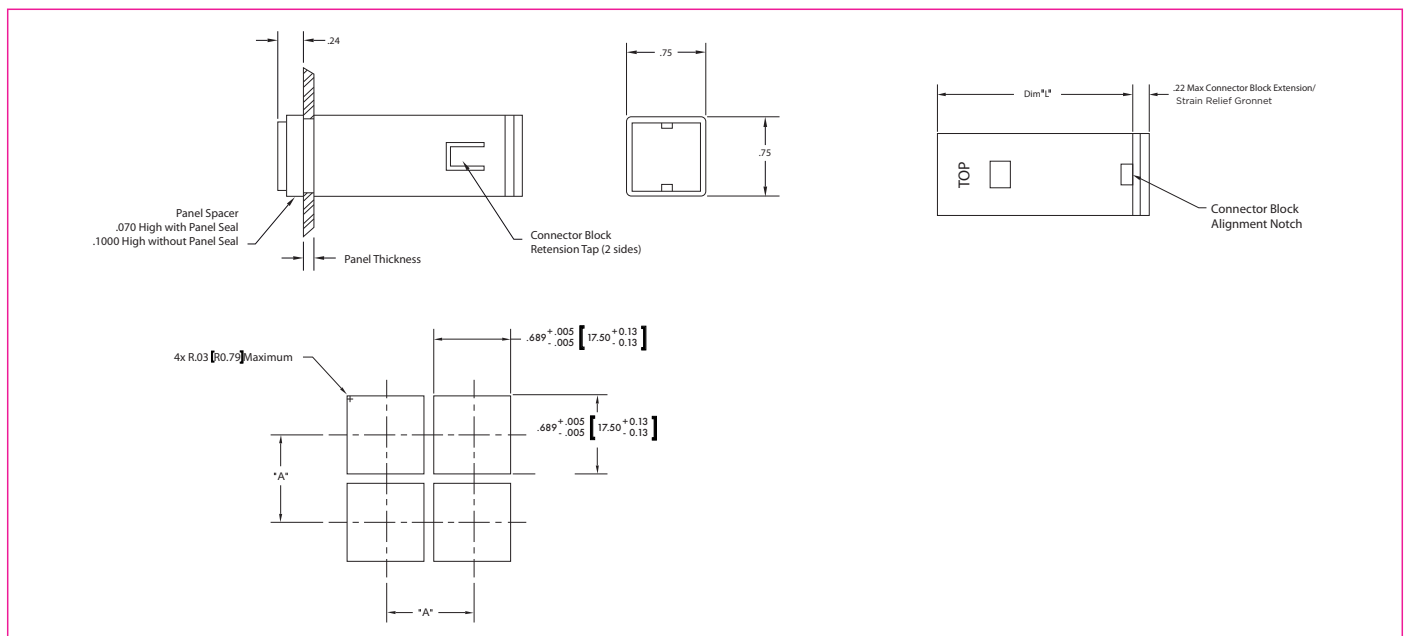
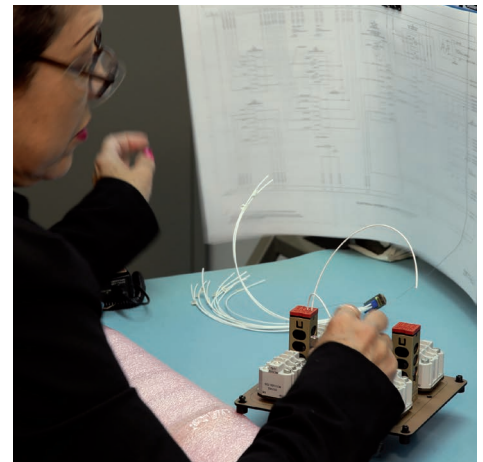


Figure 23.
Plug-In Mounting Sleeve with Connector and Plug-In Mounting Sleeve



Mounting Sleeve Dash Numbers for Dust Resistant, Spraytight & Dripproof 8 Amp Devices

Device Description	Code	Code Dash Numbers (-XXX)							
		.032 [.813]	.063 [1.59]	.094 [2.39]	.125 [3.17]	.157 [3.99]	.188 [4.78]	.219 [5.56]	.250 [6.35]
Basic, Switch	584-REL5	-1	-2	-3	-4	-5	-6	-7	-8
Basic, Holding Coil	584-REHL5	-1	-2	-3	-4	-5	-6	-7	-8
Basic, Switch	584-REL5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, Holding Coil	584-REHL5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, Switch, Dripproof	584-REL5	-301	-302	-303	-304	-305	-306	-307	-308
Basic, Switch, Dripproof	584-REL5	-101	-102	-103	-104	-105	-106	-107	-108
Basic, H.C., Dripproof	584-REHL5	-101	-102	-103	-104	-105	-106	-107	-108
Basic, H.C., Dripproof	584-REHL5	-301	-302	-303	-304	-305	-306	-307	-308
Basic, Spray Tight	584-RDL5	-201	-202	-203	-204	-205	-206	-207	-208
Basic, H.C., Spray Tight	584-RDHL5	-201	-202	-203	-204	-205	-206	-207	-208

Note: The dash numbers shown are for applications without switch guards. For applications employing switch guards, please consult customer service.

Table 8

Basic Mounting Sleeve 584-RDL5-XXX, 584-REL5 for M39029/22-192 Connector Pins (cont'd)

Mounting Sleeve Lengths For Dust Resistant, Spraytight & Dripproof 8 Amp Devices

	Dim L			
	rdL5	rdhL5	reL5	rehL5
-1 or -101	-	-	2.52	3.06
-2 or -102	-	-	2.49	3.03
-3 or -103	-	-	2.47	3.01
-4 or -104	-	-	2.43	2.97
-5 or -105	-	-	2.40	2.94
-6 or -106	-	-	2.37	2.91
-7 or -107	-	-	2.34	2.88
-8 or -108	-	-	2.31	2.85
-201	2.36	2.90	2.63	3.17
-202	2.32	2.86	2.59	3.13
-203	2.30	2.84	2.57	3.10
-204	2.25	2.80	2.53	3.07
-205	2.23	2.77	2.50	3.04
-206	2.20	2.74	2.47	3.01
-207	2.17	2.71	2.44	2.98
-208	2.14	2.68	2.41	2.95
-301	-	-	2.59	3.13
-302	-	-	2.57	3.10
-303	-	-	2.53	3.07
-304	-	-	2.50	3.04
-305	-	-	2.47	3.01
-306	-	-	2.44	2.98
-307	-	-	2.41	2.95
-308	-	-	2.38	2.92

Table 9

SERIES 584 SNAP-ON MOUNTING

SLEEVES WITH CONNECTOR BLOCK

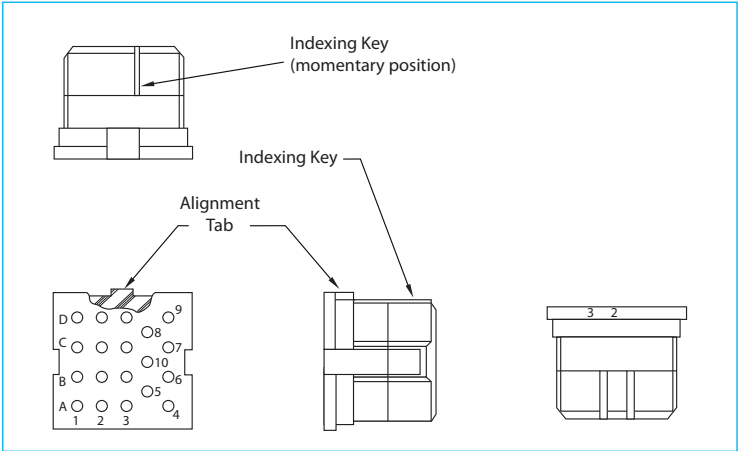
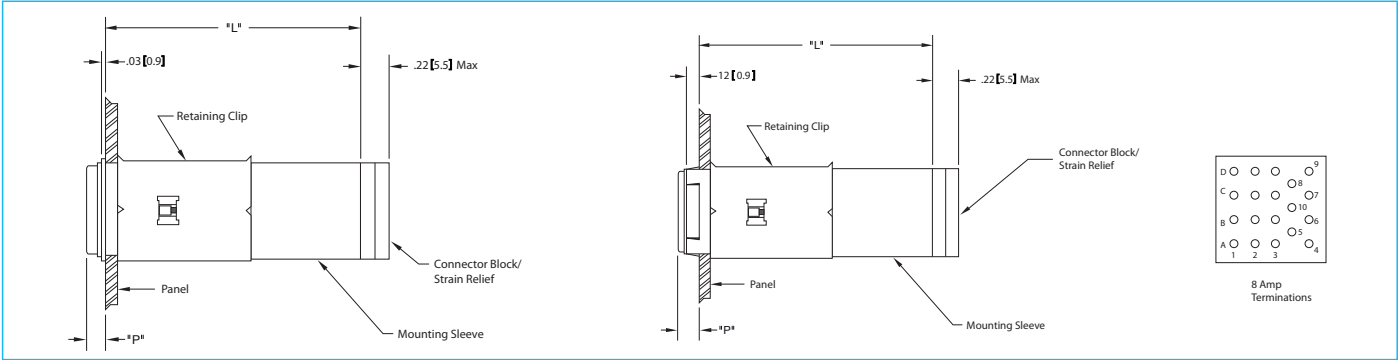


Figure 24.
Plug-In Mounting Sleeve Connector Block
Note: Polarity markings available upon request.

Figure 25.
Panel Cutout Snap-On Mounting Sleeve
Flush Mount (left) and Panel Mount (right)



Panel Cutout Snap-on Mounting Sleeve

Description	Dim "P"	Dim "L"	Code				
Flush Mt., Basic	.269 [4.29]	2.64 [53.7]	584-REL6	-001	-002	-003	-004
Flush Mt., Basic, w/HC	.169 [4.29]	3.18 [67.4]	584-REHL6	-001	-002	-003	-004
Panel Mt., Basic	.253 [6.43]	2.34 [51.6]	584-REL6	-101	-102	-103	-104
Panel Mt., Basic, with HC	.253 [6.43]	3.08 [65.3]	584-REHL6	-101	-102	-103	-104

Key Slot Position	Type of Device
1	Momentary switch
2	Alternate Switch
3	Indicator
1 & 2	Alternate Switch w/Holding Coil
2 & 3	Not Used

Table 10.

Snap-On Mounting Sleeves 584-REL6-XXX, for M39029/22-192 Connector Pins

In the snap-on version, the 584-REL5 sleeve is modified to provide a positive stop above panel, leaving part of the sleeve protruding above the panel. The sleeve is installed and retained by a snap-on clip assembled from the rear of the panel. The sleeve assembly remains loosely attached to the panel until the switch is inserted and tightened, creating a rigid mounting. The switch is removable from the front of the panel, rear access is not required. Not available for use with the diaphragm seal switches.

SERIES 584 MATRICES

Series 584 matrices are modular units in which switches and indicators can be mounted. The maximum square matrix is 5 x 5 and the maximum rectangular matrix is 5 x 10. Contact factory customer service center for information on other configurations. Wire terminals and installation tools are listed on page 24.

Bezel Matrix 584-RELWY xxxx-1

The bezel matrix has a black colored bezel and is inserted through the front of the panel. Matrix selection must be coordinated with switch length. Fasteners are inserted into slots in the matrix after the matrix has been inserted into the panel and are tightened to secure the unit. Switches are removable from the front of the panel, rear access is not required after being mounted in the panel. Not available with the diaphragm seal version.

Code	Identifies	Codes
584-RELWY0203-1	Matrix length	Use RELWY for basic units
584-RELWY0203-1	No. of units per horizontal row	Two digits
584-RELWY0203-1	No. of units per vertical column	Two digits
584-RELWY0203-1	Connector M39029/22-192	One digit

Bezel Matrix Dimensions

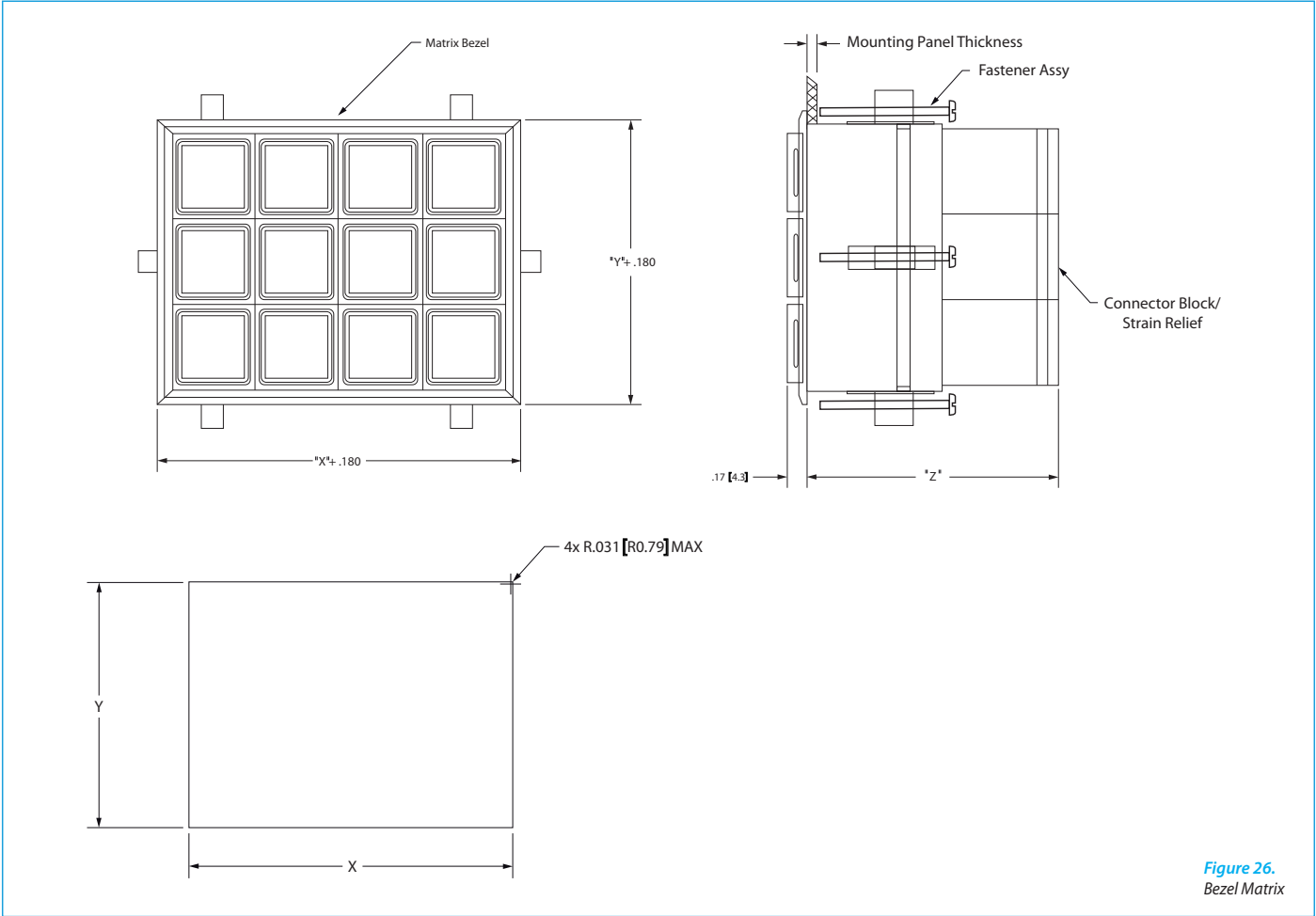


Figure 26.
Bezel Matrix

BEZEL MATRIX PANEL CUTOUT SIZES

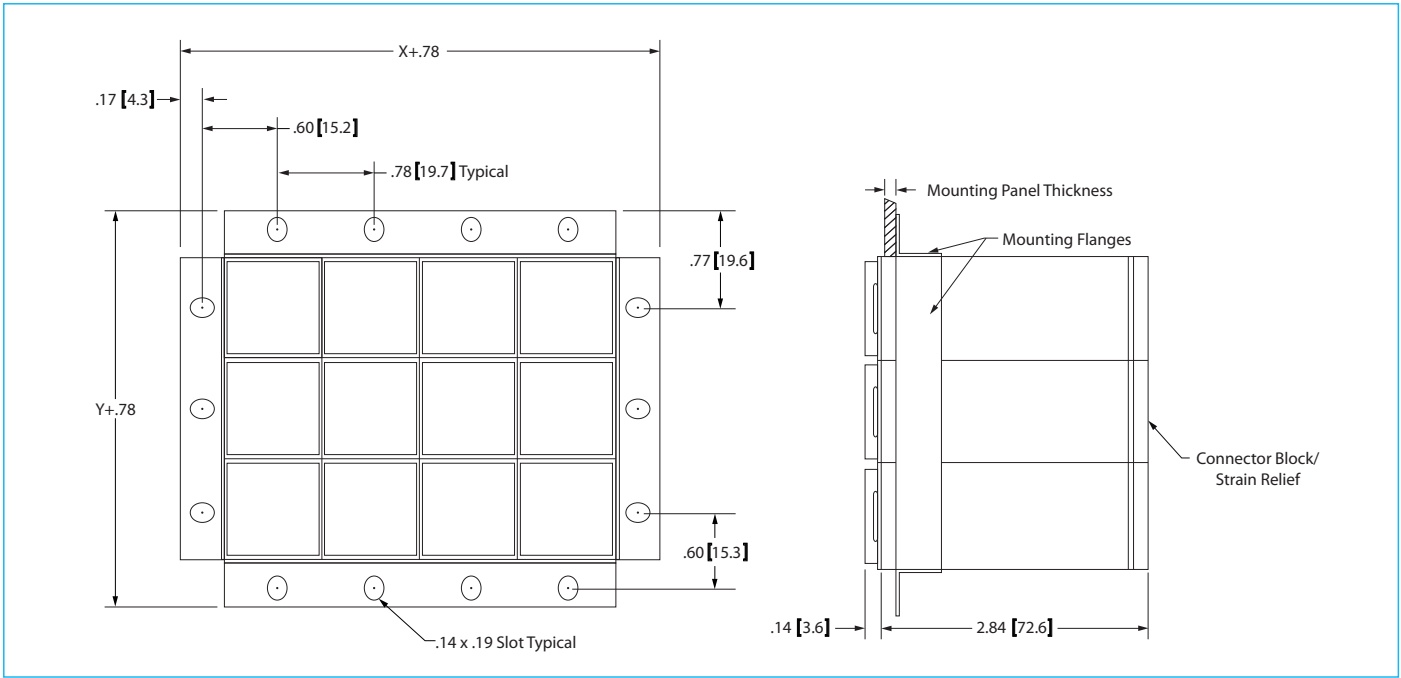
X (HORIZ) ➤	1		2		3		4		5		6		7		8		9		10	
NO. OF STATIONS	PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT	
Y (VERT) ▼	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y
1	.985	.985	1.740	.985	2.495	.985	3.250	.985	4.005	.985	4.760	.985	5.515	.985	6.270	.985	7.025	.985	7.780	.985
	[25.02]	[25.02]	[44.19]	[25.02]	[63.37]	[25.02]	[82.55]	[25.02]	[101.73]	[25.02]	[120.90]	[25.02]	[140.08]	[25.02]	[159.26]	[25.02]	[178.43]	[25.02]	[197.61]	[25.02]
2	.985	1.740	1.740	1.740	2.495	1.740	3.250	1.740	4.005	1.740	4.760	1.740	5.515	1.740	6.270	1.740	7.025	1.740	7.780	1.740
	[25.02]	[44.19]	[44.19]	[44.19]	[63.37]	[44.19]	[82.55]	[44.19]	[101.73]	[44.19]	[120.90]	[44.19]	[140.08]	[44.19]	[159.26]	[44.19]	[178.43]	[44.19]	[197.61]	[44.19]
3	.985	2.495	1.740	2.495	2.495	2.495	3.250	2.495	4.005	2.495	4.760	2.495	5.515	2.495	6.270	2.495	7.025	2.495	7.780	2.495
	[25.02]	[63.37]	[44.19]	[63.37]	[63.37]	[63.37]	[82.55]	[63.37]	[101.73]	[63.37]	[120.90]	[63.37]	[140.08]	[63.37]	[159.26]	[63.37]	[178.43]	[63.37]	[197.61]	[63.37]
4	.985	3.250	1.740	3.250	2.495	3.250	3.250	3.250	4.005	3.250	4.760	3.250	5.515	3.250	6.270	3.250	7.025	3.250	7.780	3.250
	[25.02]	[82.55]	[44.19]	[82.55]	[63.37]	[82.55]	[82.55]	[82.55]	[101.73]	[82.55]	[120.90]	[82.55]	[140.08]	[82.55]	[159.26]	[82.55]	[178.43]	[82.55]	[197.61]	[82.55]
5	.985	4.005	1.740	4.005	2.495	4.005	3.250	4.005	4.005	4.005	4.760	4.005	5.515	4.005	6.270	4.005	7.025	4.005	7.780	4.005
	[25.02]	[101.73]	[44.19]	[101.73]	[63.37]	[101.73]	[82.55]	[101.73]	[101.73]	[101.73]	[120.90]	[101.73]	[140.08]	[101.73]	[159.26]	[101.73]	[178.43]	[101.73]	[197.61]	[101.73]
6	.985	4.760	1.740	4.760	2.495	4.760	3.250	4.760	4.005	4.760	4.760	4.760	5.515	4.760	6.270	4.760	7.025	4.760	7.780	4.760
	[25.02]	[120.90]	[44.19]	[120.90]	[63.37]	[120.90]	[82.55]	[120.90]	[101.73]	[120.90]	[120.90]	[120.90]	[140.08]	[120.90]	[159.26]	[120.90]	[178.43]	[120.90]	[197.61]	[120.90]
7	.985	5.515	1.740	5.515	2.495	5.515	3.250	5.515	4.005	5.515	4.760	5.515	5.515	5.515	6.270	5.515	7.025	5.515	7.780	5.515
	[25.02]	[140.08]	[44.19]	[140.08]	[63.37]	[140.08]	[82.55]	[140.08]	[101.73]	[140.08]	[120.90]	[140.08]	[140.08]	[140.08]	[159.26]	[140.08]	[178.43]	[140.08]	[197.61]	[140.08]
8	.985	6.270	1.740	6.270	2.495	6.270	3.250	6.270	4.005	6.270	4.760	6.270	5.515	6.270	6.270	6.270	7.025	6.270	7.780	6.270
	[25.02]	[159.26]	[44.19]	[159.26]	[63.37]	[159.26]	[82.55]	[159.26]	[101.73]	[159.26]	[120.90]	[159.26]	[140.08]	[159.26]	[159.26]	[159.26]	[178.43]	[159.26]	[197.61]	[159.26]
9	.985	7.025	1.740	7.025	2.495	7.025	3.250	7.025	4.005	7.025	4.760	7.025	5.515	7.025	6.270	7.025	7.025	7.025	7.780	7.025
	[25.02]	[178.43]	[44.19]	[178.43]	[63.37]	[178.43]	[82.55]	[178.43]	[101.73]	[178.43]	[120.90]	[178.43]	[140.08]	[178.43]	[159.26]	[178.43]	[178.43]	[178.43]	[197.61]	[178.43]
10	.985	7.780	1.740	7.780	2.495	7.780	3.250	7.780	4.005	7.780	4.760	7.780	5.515	7.780	6.270	7.780	7.025	7.780	7.780	7.780
	[25.02]	[197.61]	[44.19]	[197.61]	[63.37]	[197.61]	[82.55]	[197.61]	[101.73]	[197.61]	[120.90]	[197.61]	[140.08]	[197.61]	[159.26]	[197.61]	[178.43]	[197.61]	[197.61]	[197.61]

Table 12.

Snap-On Mounting Sleeves 584-REL6-XXX, for M39029/22-192 Connector Pins

In the snap-on version, the 584-REL5 sleeve is modified to provide a positive stop above panel, leaving part of the sleeve protruding above the panel. The sleeve is installed and retained by a snap-on clip assembled from the rear of the panel. The sleeve assembly remains loosely attached to the panel until the switch is inserted and tightened, creating a rigid mounting. The switch is removable from the front of the panel, rear access is not required. Not available for use with the diaphragm seal switches.

Code	Identifies	Codes
584-RELX0203-1-.125	Matrix length	Use RELX for basic units
584-RELX0203-1-.125	No. of units per horizontal row	Two digits
584-RELX0203-1-.125	No. of units per vertical column	Two digits
584-RELX0203-1-.125	Connector M39029/22-192	One digit
584-RELX0203-1-.125	Panel thickness	Std thicknesses: 0.063 (1.6), 0.090 (2.3), 0.125 (3.2), 0.190 (4.8)



FLANGE MATRIX PANEL CUTOUT SIZES

X (HORIZ) ▸	1	2	3	4	5	6	7	8	9	10
NO. OF STATIONS	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT	PANEL CUTOUT
Y (VERT) ▾	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y	DIM X DIM Y
1	.775 .775 [19.68] [19.68]	1.530 .775 [38.86] [19.68]	2.285 .775 [58.04] [19.68]	3.040 .775 [77.22] [19.68]	3.795 .775 [96.39] [19.68]	4.550 .775 [115.57] [19.68]	5.305 .775 [134.75] [19.68]	6.060 .775 [153.92] [19.68]	6.815 .775 [173.10] [19.68]	7.570 .775 [192.28] [19.68]
2	.775 1.530 [19.68] [38.86]	1.530 1.530 [38.86] [38.86]	2.285 1.530 [58.04] [38.86]	3.040 1.530 [77.22] [38.86]	3.795 1.530 [96.39] [38.86]	4.550 1.530 [115.57] [38.86]	5.305 1.530 [134.75] [38.86]	6.060 1.530 [153.92] [38.86]	6.815 1.530 [173.10] [38.86]	7.570 1.530 [192.28] [38.86]
3	.775 2.285 [19.68] [58.04]	1.530 2.285 [38.86] [58.04]	2.285 2.285 [58.04] [58.04]	3.040 2.285 [77.22] [58.04]	3.795 2.285 [96.39] [58.04]	4.550 2.285 [115.57] [58.04]	5.305 2.285 [134.75] [58.04]	6.060 2.285 [153.92] [58.04]	6.815 2.285 [173.10] [58.04]	7.570 2.285 [192.28] [58.04]
4	.775 3.040 [19.68] [77.22]	1.530 3.040 [38.86] [77.22]	2.285 3.040 [58.04] [77.22]	3.040 3.040 [77.22] [77.22]	3.795 3.040 [96.39] [77.22]	4.550 3.040 [115.57] [77.22]	5.305 3.040 [134.75] [77.22]	6.060 3.040 [153.92] [77.22]	6.815 3.040 [173.10] [77.22]	7.570 3.040 [192.28] [77.22]
5	.775 3.795 [19.68] [96.39]	1.530 3.795 [38.86] [96.39]	2.285 3.795 [58.04] [96.39]	3.040 3.795 [77.22] [96.39]	3.795 3.795 [96.39] [96.39]	4.550 3.795 [115.57] [96.39]	5.305 3.795 [134.75] [96.39]	6.060 3.795 [153.92] [96.39]	6.815 3.795 [173.10] [96.39]	7.570 3.795 [192.28] [96.39]
6	.775 4.550 [19.68] [115.57]	1.530 4.550 [38.86] [115.57]	2.285 4.550 [58.04] [115.57]	3.040 4.550 [77.22] [115.57]	3.795 4.550 [96.39] [115.57]	4.550 4.550 [115.57] [115.57]	5.305 4.550 [134.75] [115.57]	6.060 4.550 [153.92] [115.57]	6.815 4.550 [173.10] [115.57]	7.570 4.550 [192.28] [115.57]
7	.775 5.305 [19.68] [134.75]	1.530 5.305 [38.86] [134.75]	2.285 5.305 [58.04] [134.75]	3.040 5.305 [77.22] [134.75]	3.795 5.305 [96.39] [134.75]	4.550 5.305 [115.57] [134.75]	5.305 5.305 [134.75] [134.75]	6.060 5.305 [153.92] [134.75]	6.815 5.305 [173.10] [134.75]	7.570 5.305 [192.28] [134.75]
8	.775 6.060 [19.68] [153.92]	1.530 6.060 [38.86] [153.92]	2.285 6.060 [58.04] [153.92]	3.040 6.060 [77.22] [153.92]	3.795 6.060 [96.39] [153.92]	4.550 6.060 [115.57] [153.92]	5.305 6.060 [134.75] [153.92]	6.060 6.060 [153.92] [153.92]	6.815 6.060 [173.10] [153.92]	7.570 6.060 [192.28] [153.92]
9	.775 6.815 [19.68] [173.10]	1.530 6.815 [38.86] [173.10]	2.285 6.815 [58.04] [173.10]	3.040 6.815 [77.22] [173.10]	3.795 6.815 [96.39] [173.10]	4.550 6.815 [115.57] [173.10]	5.305 6.815 [134.75] [173.10]	6.060 6.815 [153.92] [173.10]	6.815 6.815 [173.10] [173.10]	7.570 6.815 [192.28] [173.10]
10	.775 7.570 [19.68] [192.28]	1.530 7.570 [38.86] [192.28]	2.285 7.570 [58.04] [192.28]	3.040 7.570 [77.22] [192.28]	3.795 7.570 [96.39] [192.28]	4.550 7.570 [115.57] [192.28]	5.305 7.570 [134.75] [192.28]	6.060 7.570 [153.92] [192.28]	6.815 7.570 [173.10] [192.28]	7.570 7.570 [192.28] [192.28]

Table 13.

SERIES 584 ROD MOUNT HARDWARE

The rod mount system allows for units to be mounted in the smallest allowable space by using a system of rods and plates to hold the switch/indicator units together and fasten them to the mounting panel.

584-RELMxxxx-.xxx

Codes		
584-RELM0303-.125	Matrix length	Use RELM for basic units
584-RELM 0 303-.125	No. of units per horizontal row	Two digits
584-RELM03 0 3-.125	No. of units per vertical row	Two digits
584-RELM0303-. 125	Panel thickness	Std sizes: 0.063 (1.6), 0.090 (2.3), 0.125 (3.2)

584-RELMxxxx-.xxx Dimensions

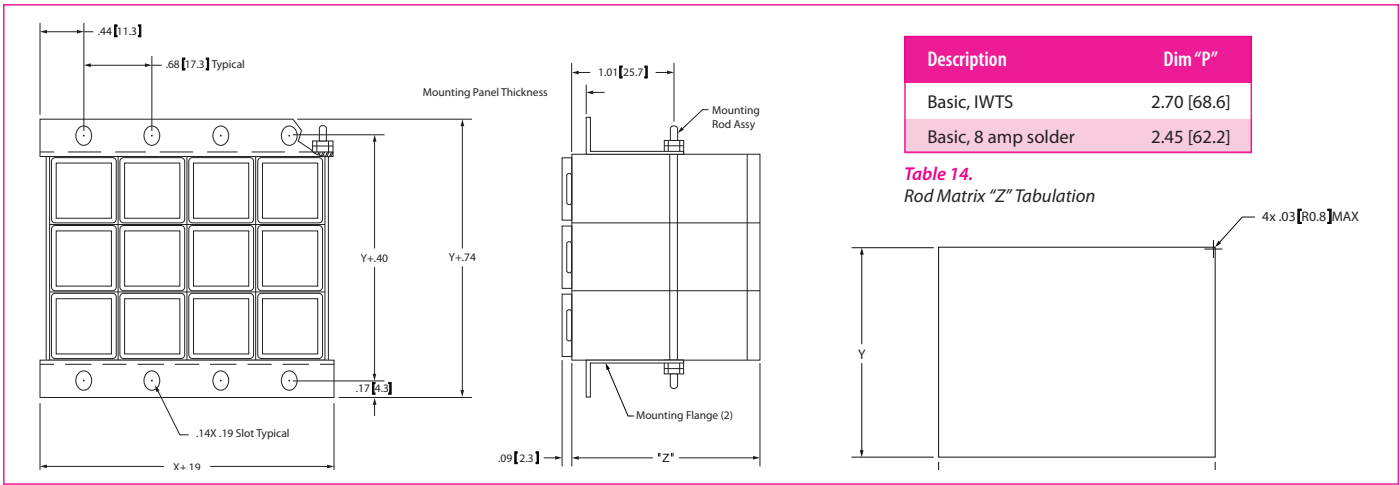


Figure 28
Rod Mount Matrix

ROD MOUNT MATRIX PANEL CUTOUT SIZES

X (HORIZ) ▸	1		2		3		4		5		6	
Nº. OF STATIONS	PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT		PANEL CUTOUT	
Y (VERT) ▾	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y	DIM X	DIM Y
1	.700	.700	1.380	.700	2.060	.700	2.740	.700	3.420	.700	4.100	.700
	[17.78]	[17.78]	[35.05]	[17.78]	[52.32]	[17.78]	[69.60]	[17.78]	[86.87]	[17.78]	[104.14]	[17.78]
2	.700	1.380	1.380	1.380	2.060	1.380	2.740	1.380	3.420	1.380	4.100	1.380
	[17.78]	[35.05]	[35.05]	[35.05]	[52.32]	[35.05]	[69.60]	[35.05]	[86.87]	[35.05]	[104.14]	[35.05]
3	.700	2.060	1.380	2.060	2.060	2.060	2.740	2.060	3.420	2.060	4.100	2.060
	[17.78]	[52.32]	[35.05]	[52.32]	[52.32]	[52.32]	[69.60]	[52.32]	[86.87]	[52.32]	[104.14]	[52.32]
4	.700	2.740	1.380	2.740	2.060	2.740	2.740	2.740	3.420	2.740	4.100	2.740
	[17.78]	[69.60]	[35.05]	[69.60]	[52.32]	[69.60]	[69.60]	[69.60]	[86.87]	[69.60]	[104.14]	[69.60]
5	.700	3.420	1.380	3.420	2.060	3.420	2.740	3.420	3.420	3.420	4.100	3.420
	[17.78]	[86.87]	[35.05]	[86.87]	[52.32]	[86.87]	[69.60]	[86.87]	[86.87]	[86.87]	[104.14]	[86.87]
6	.700	4.100	1.380	4.100	2.060	4.100	2.740	4.100	3.420	4.100	4.100	4.100
	[17.78]	[104.14]	[35.05]	[104.14]	[52.32]	[104.14]	[69.60]	[104.14]	[86.87]	[104.14]	[104.14]	[104.14]

Table 15

Spare Parts

Capsule	584 (See Pages 13-16)
Body	584 (See Pages 12-16)
Mounting Hardware	584 (See Page 13)
Panel Seal and Retainer, Black	584-515-1
Panel Seal and Retainer, Stainless Steel	584-515-2
Frame Matrix Fastener	584-526
8 amp, M39029/22-192 Connector Block w/ Strain Relief	584-527

Accessories

Connector Pin, 8A, M39029/22-192, Crimp Style, 1 ea.	58A-111-1
Connector Pin, 8A, M39029/22, 25 ct	58A-111-2
Connector Pin, 8A, M39029/1-100, Crimp Style, 1 ea.	58A-110-1
Connector Pin, 8A, M39029/1-100, 25 ct	58A-110-2
Connector Pin, 8A, M39029/1-101, Crimp Style, 1 ea.	58A-110-3
Connector Pin, 8A, M39029/1-101, 25 ct	58A-110-4
Clear Plastic Switchguard	58A-104
Wire Switchguard, Black	58A-105-1
Wire Switchguard, Red	58A-105-2

Installation and Removal Tools

Lamp Capsule Removal Tool	58T-101
Connector Pin Crimp Tool, for M39029/1	58T-109-1
Connector Pin Crimp Tool, for M39029/22	58T-109-2
Connector Pin Removal Tool	58T-104
Connector Block Removal Tool	58T-107
Torque Screwdriver	58T-106

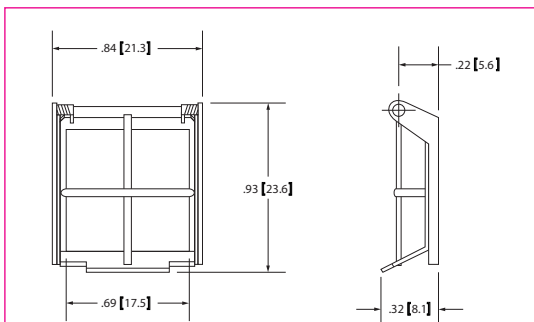


Figure 29
Wire Switch Guard
Not for use with Matrices

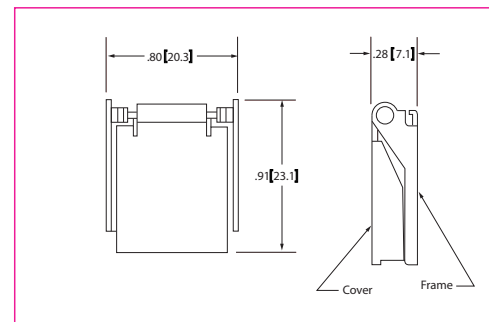
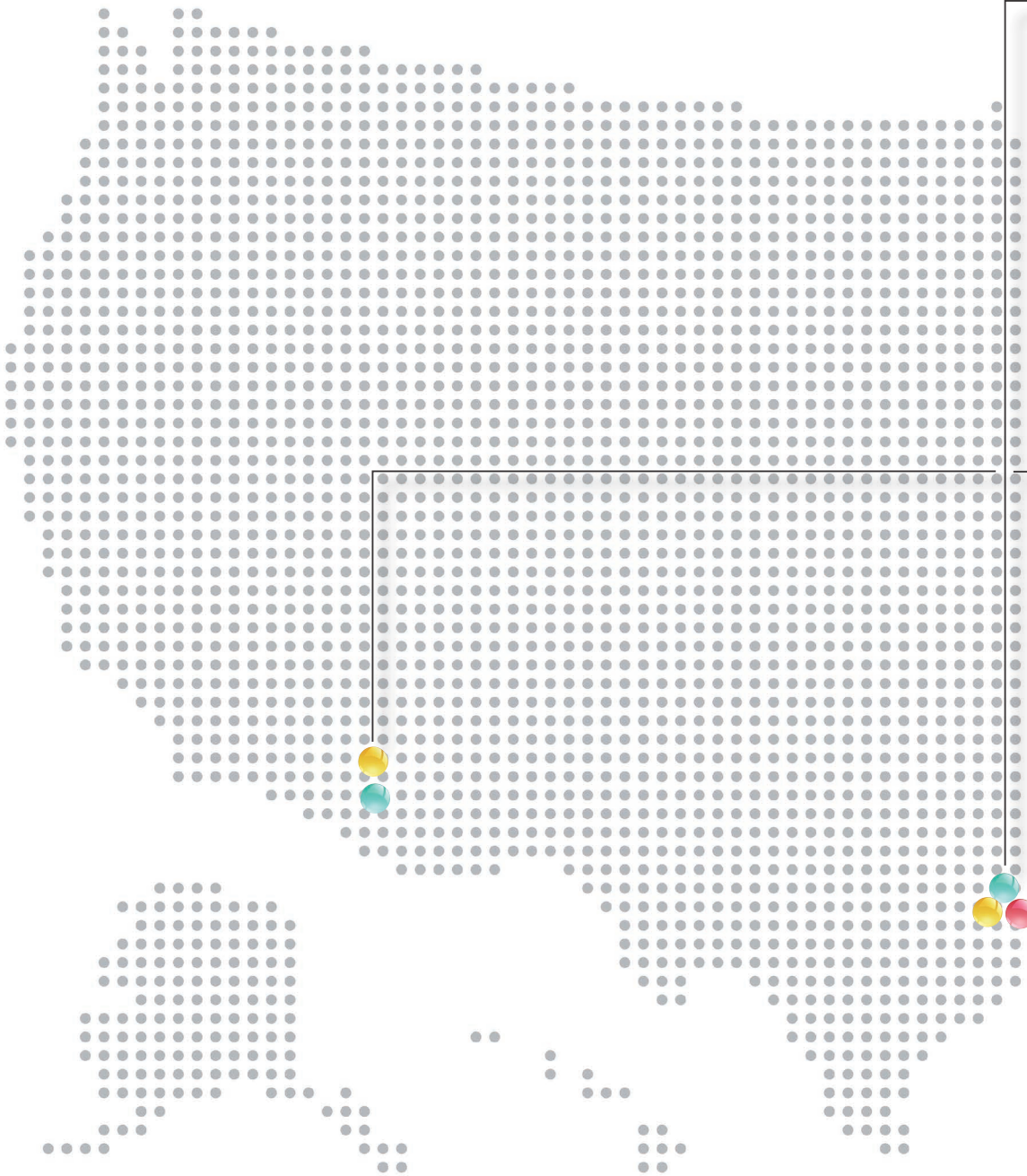





Figure 30
Clear Plastic Switch Guard
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