Aerospace Controls Division

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.

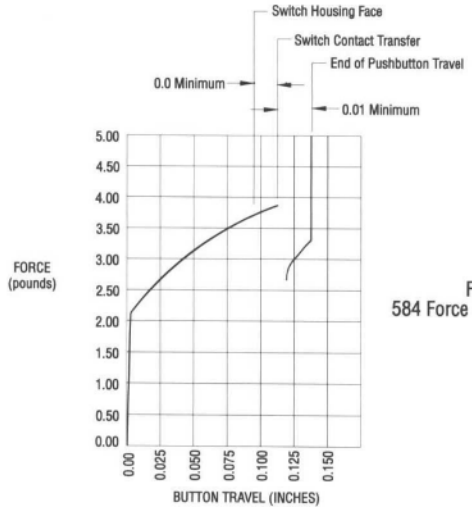


Figure 1
584 Force vs. Button Travel

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.

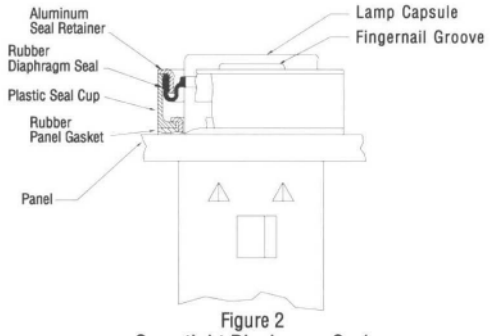


Figure 2
Spraytight Diaphragm Seal

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.

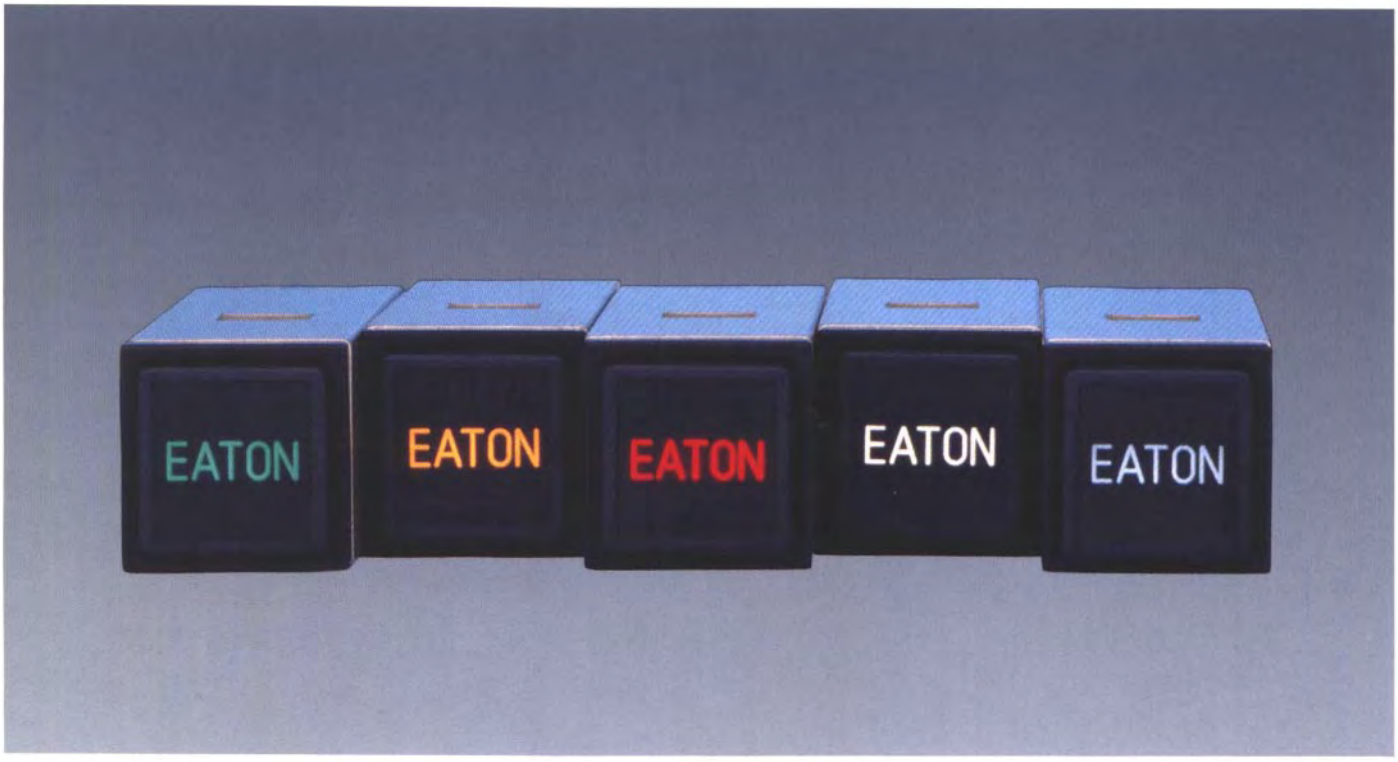
The trade-offs for using a LED light source include lower light output and limited color offerings. Also, the actual life and luminance of LEDs is temperature dependent with a 10% reduction in display luminance expected after 10,000 hours of operation.

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

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.

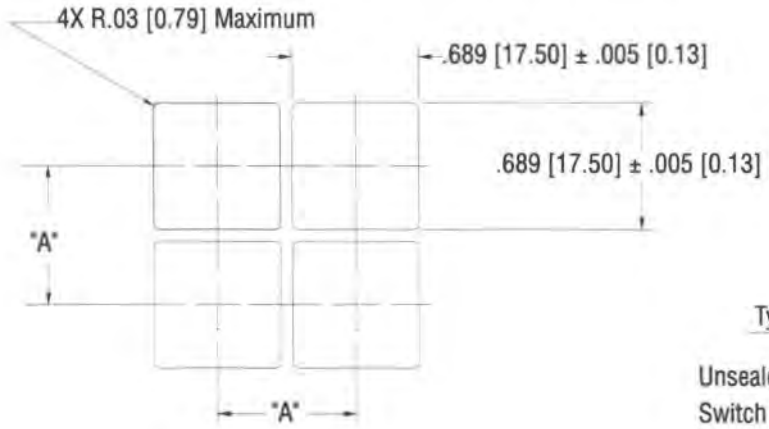
To calculate the actual behind panel depth for your application, subtract the thickness of the panel, the thickness of spacers used above panel and 0.030 inches for the drip-proof panel seal, if required, from the length of unit listed below. Weights listed are for switches with T-1 lamps.

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



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

Figure 4
Recommended Panel Cutout

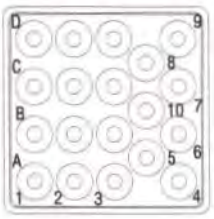


Figure 5
8 Amp IWTS Terminations

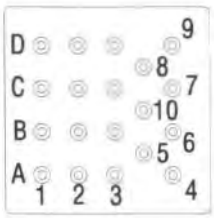


Figure 6
8 Amp Terminations

Styles
Solder
Plug-in
PCB (shown)

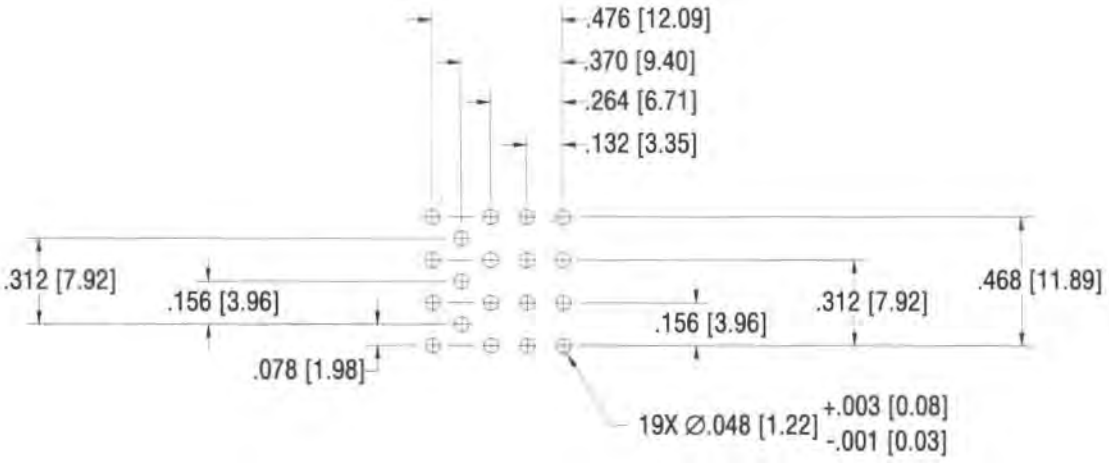


Figure 7
8 Amp Termination PCB Layout

Dimensional Specifications

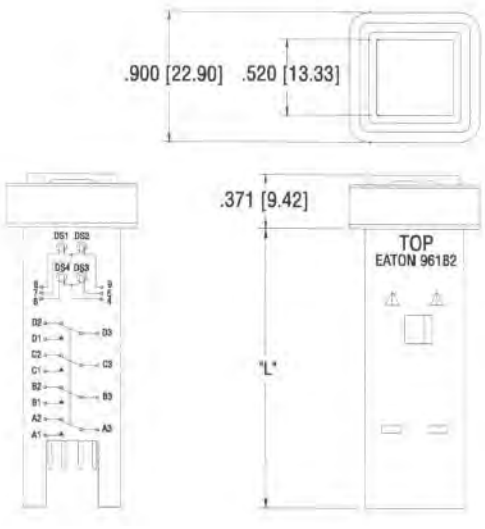


Figure 8
Spraytight Seal

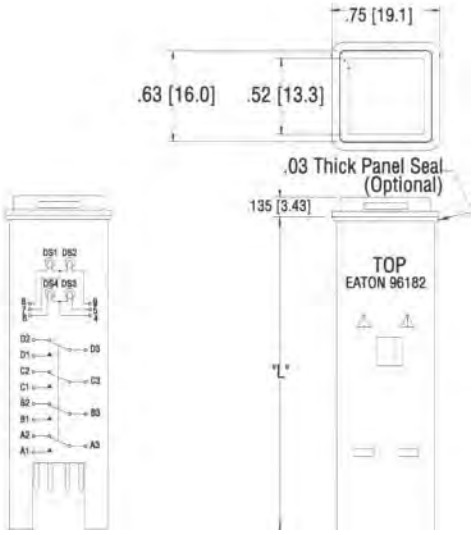


Figure 9
Dust Resistant or Dripproof Seal

Plug-in Termination

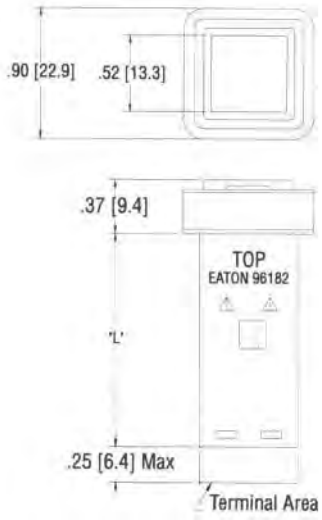


Figure 10
Spray Tight Seal

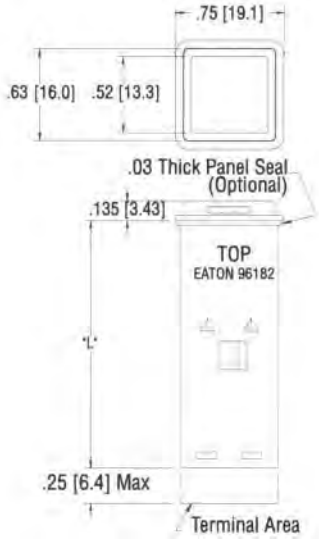


Figure 11
Dust Resistant or Dripproof Seal

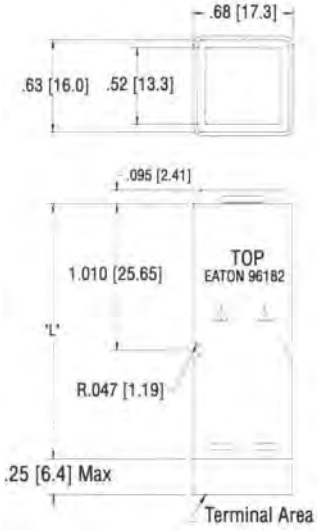


Figure 12
Rod Mount

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

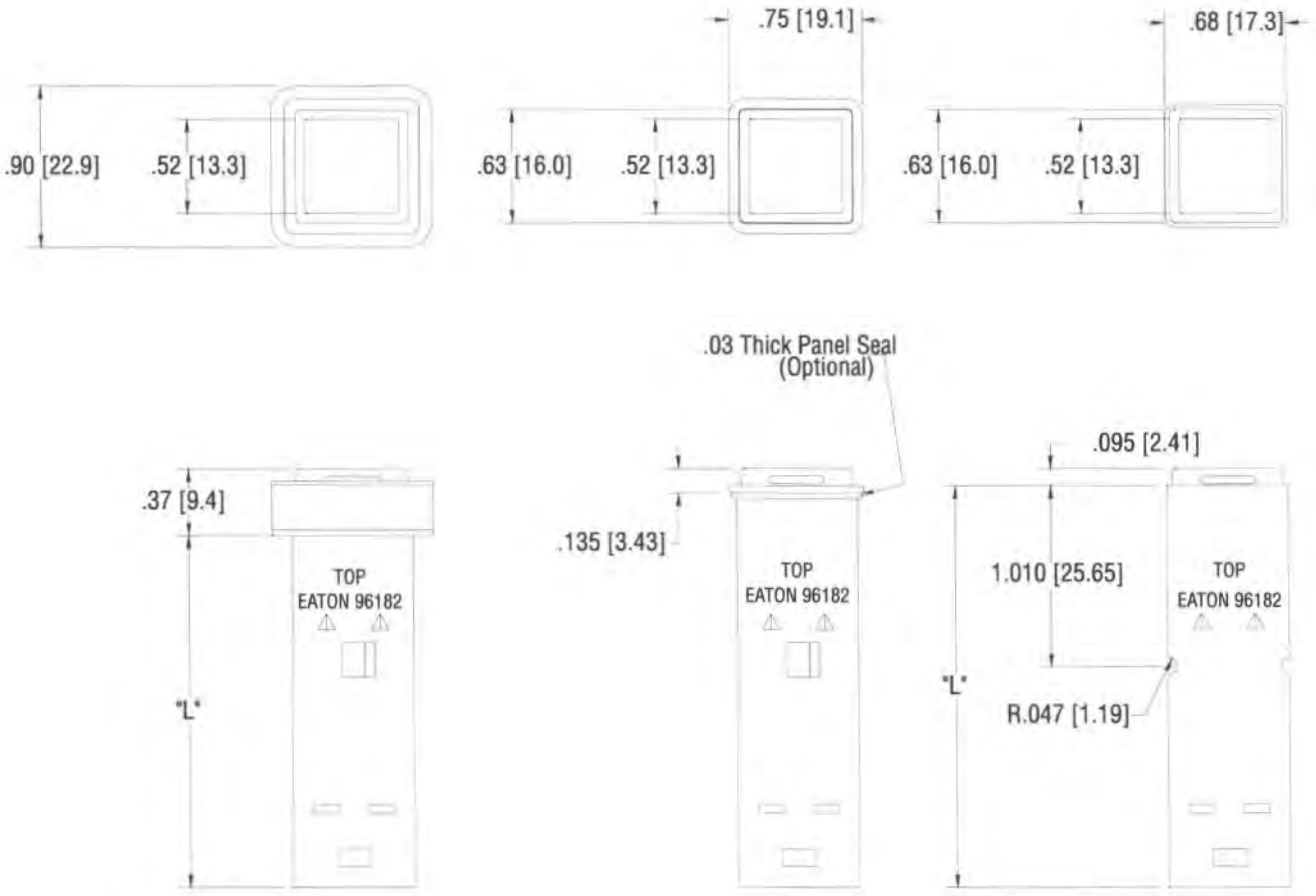


Figure 13 — Spraytight Seal

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 Ratings[1]

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

584 Low Level Rating[1]

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

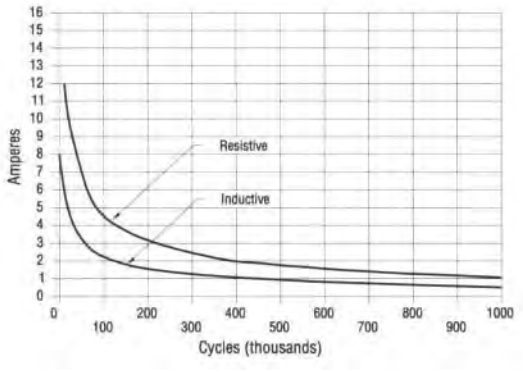


Figure 16
Typical 584 Switch Life vs. Electrical Load

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 nni2 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.

Electrical Specifications

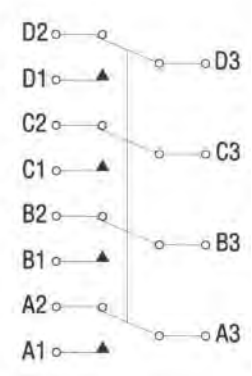


Figure 17
4PDPT Switch

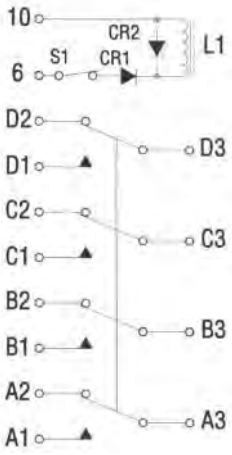


Figure 18
4PDPT Switch with
Alternate Holding Coil

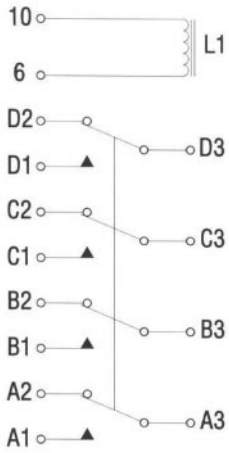


Figure 19
4PDPT Switch with
Momentary Holding Coil

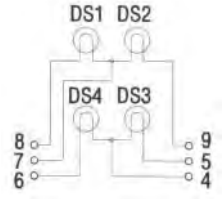


Figure 20
C1 Four Lamp Separate Power & Ground
Not available with holding coil devices, see C2 or C3.

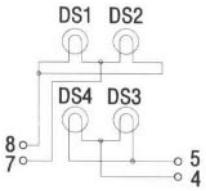


Figure 21
C2 Two Lamp Common Power & Ground

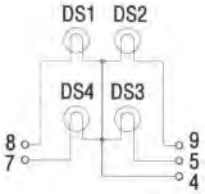


Figure 22
C3 Four Lamp Separate Power & Common Ground
Not available with 5 amp termination holding coil.

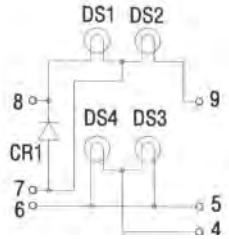


Figure 23
C4 Four Lamp Common Power & Separate Grounds with Suppressor Diode. Not available with holding coil devices, see C2 or C3.

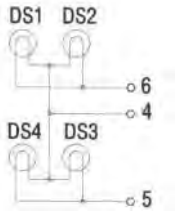


Figure 24
C5 Two Lamp Common Power & Four Lamp Common Ground

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 sevice center.

	With light source not energized		**With light source energized**		
Display Type	Legend	Background	Legend	Background	Description
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.

	Display Type 1		Display Type 2 & 6		Display Type 40	
Color	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	Termi-nation	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	22-26 AWG	B0
		M39029/72-393	Wire Wrap	
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	22-26 AWG	B4
		M39029/1-101	20-24 AWG	
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	22-26 AWG	B9
		M39029/1-101	20-24 AWG	

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 recommened.
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 Grin	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'	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

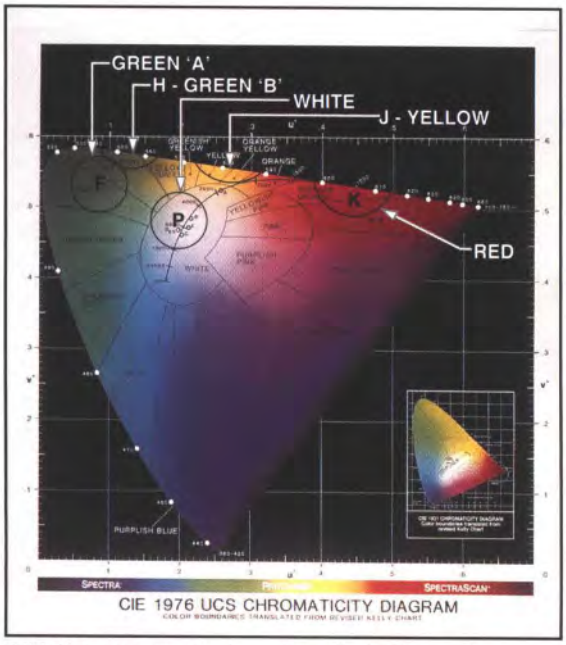
Color	U'	v'	r'	NVIS Luminance	Fast Jet G/R	Helo G/R	Fast Jet NVG Gain	Sunlight Readable Luminance	**Code**
Green A	.088	.543	.037	10.1	230	1600	.387	>200 fL	**F**
Green B	.131	.623	.057	0.1	230	2600	.618	>200 fL	**H**
Yellow	.274	.622	.083	15.0	180	80	.910	>200 fL	**J**
Red	.450	.550	.060	15.0	120	25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

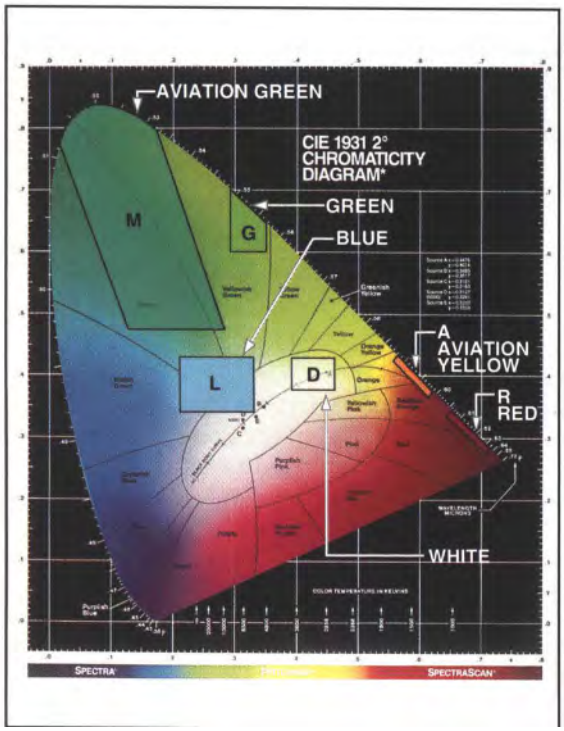
1. All NVIS colors meet the requirements of MIL-L-85762 and current UK military specifications. NVIS white was developed for the UK market. The U.S. military specification does not have a white requirement at this time.
2. Luminance values are for full and half displays. Quarter displays have a 110 fL 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	0
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 row2	Letters per Half Row3	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**

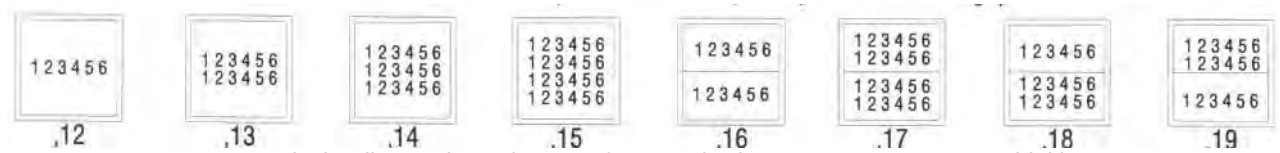
1. Default letter style and height. Allows two rows of text per half (N2) display, larger heights only allow one row of text.
2. Average for a full width N1 or N2 display. Each legend will vary based on the actual letters used.
3. Average for a half width N3. N11, N12. N13. N14 or N15 display. Each legend will vary based on the actual letters used.
4. 15% wider character strokewidth. Recommended for better off-angle viewing.

Legend Configuration Codes

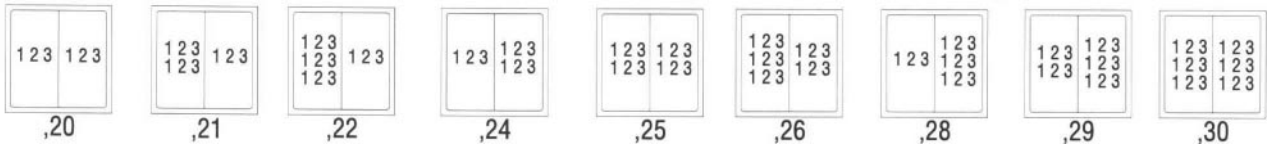
58411A4B5C1D2F4L5N2(GR),P12.**16** ON/OFF

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.

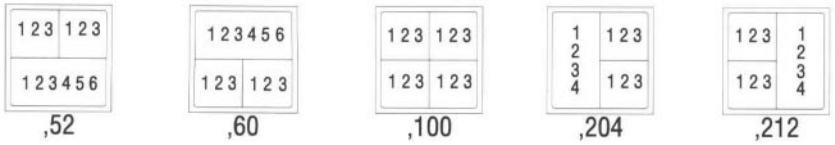
Horizontal Rows of Letters (6 characters or spaces per row 0.093" high)



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

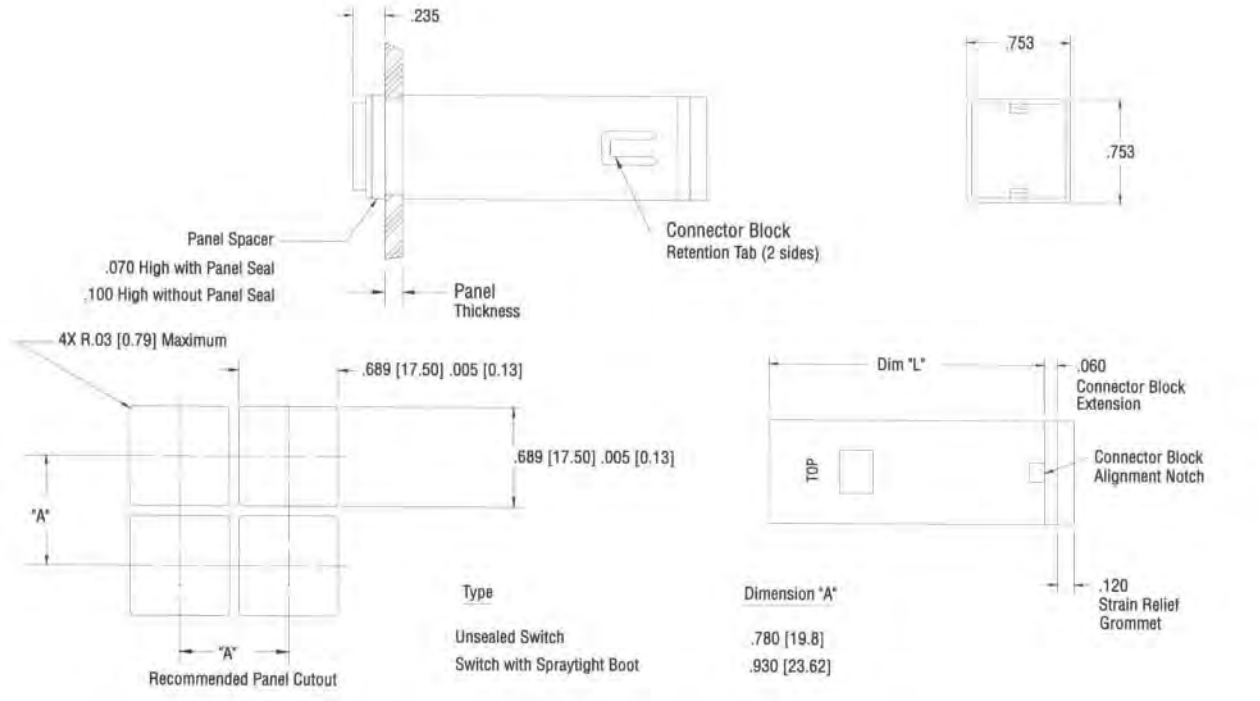
58411A4B5C1 D2F4L5N2(GR).P12,16 **ON/OFF**

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 lft 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

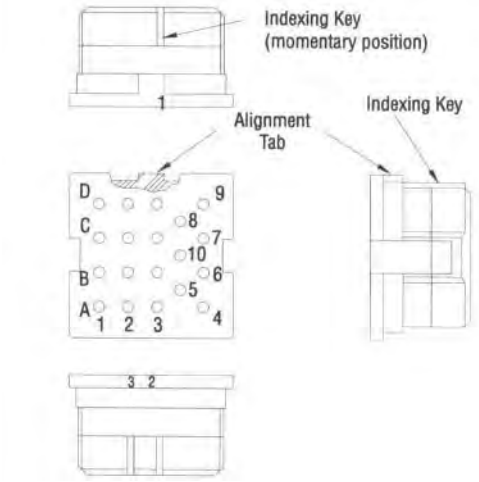
Basic Mounting Sleeve 584-R5-XXX, 584-RE5 for M39029/22-192 Connector Pins continued

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

Dimension "L" by Dash Number	Code					
	584-R5	584-RD5	584-RDH5	584-RE5	584-REH5	584-RH5
-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

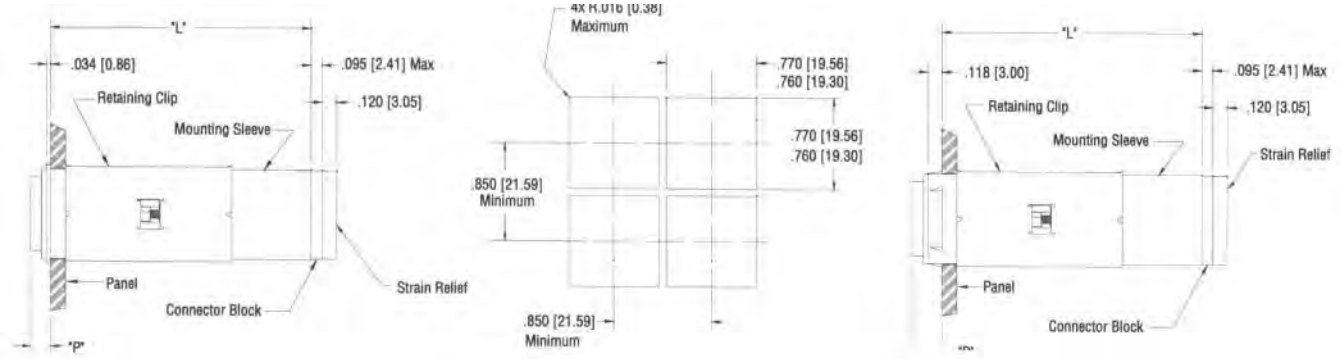


Key Slot Position	Type of Device
1	Momentary Switch
2	Alternate Switch
3	Indicator
1&2	Alternate Switch W/Holding Coil
1&3	Momentary Switch W/Holding Coil
2&3	Not used

Series 584 Snap-On Mounting Sleeves with Connector Block

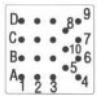
Snap-On Mounting Sleeves 584-R6-XXX, 584-RE6-XXX for M39029/22-192 Connector Pins

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 ± .010 [.25] & Dash No.			
				.030 [0.76] .250 [6.35]	.060 [1.52] .220 [5.58]	.090 [2.28] .190 [4.82]	.125 [3.17] .150 [3.81]
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

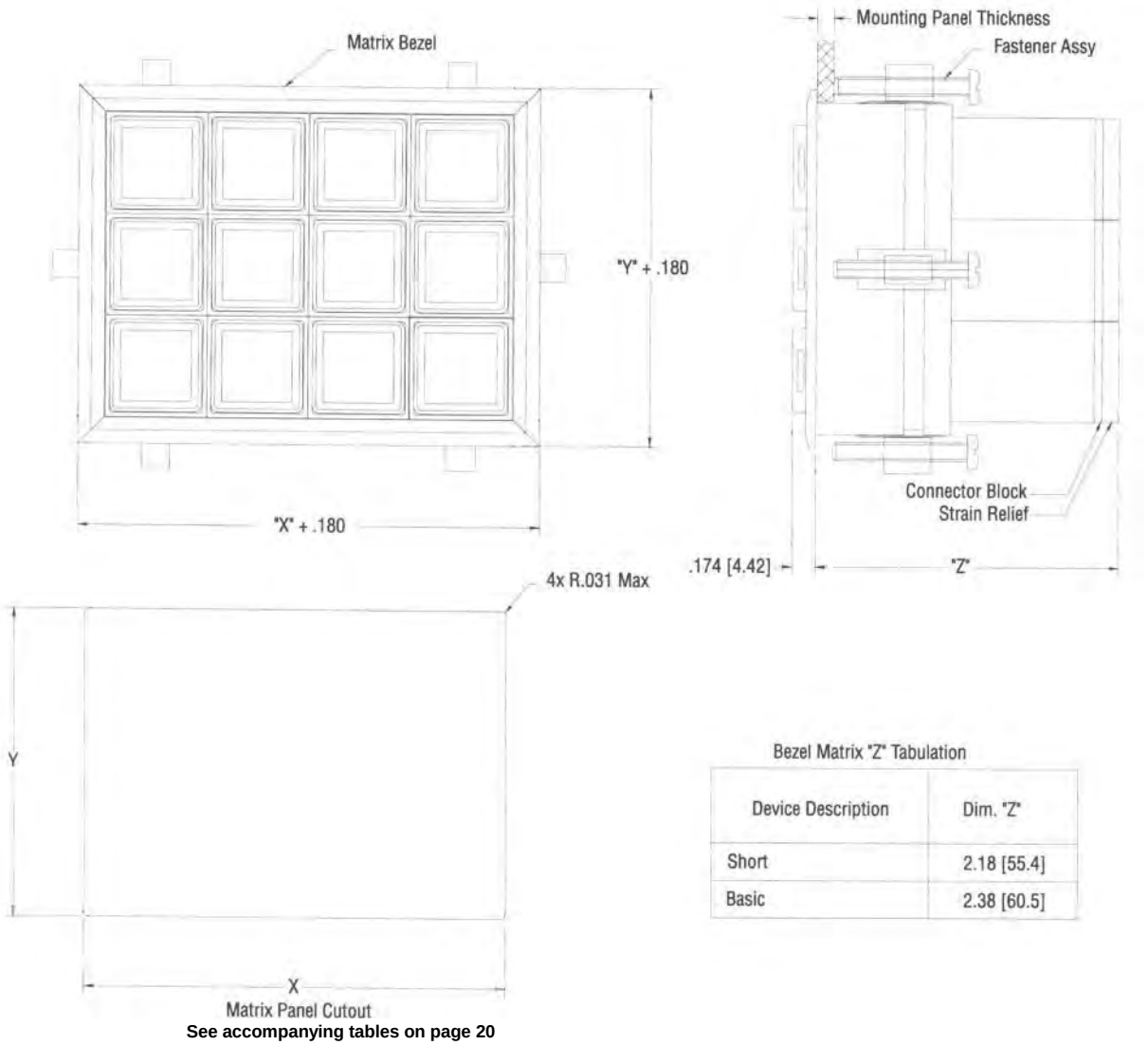
Series 584 matrices are modular units in which switches and indicators can be mounted. The maximum square matrix is 5 X 5 and the maximum rectangular matrix is 5 X 10. Contact factory customer service center for information on other configurations. Wire terminals and installation tools are listed on 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-**REWY**0203-1	Matrix length	Use **REWY** for basic units, **RWY** for short
584-REWY**02**03-1	No. of units per horizontal row	Two digits
584-REWY02**03**-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]

See accompanying tables on page 20

Bezel Matrix Dimensions continued

Bezel Matrix Panel Cutout Sizes

X(Horiz) → No. of Stations	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	
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 [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]

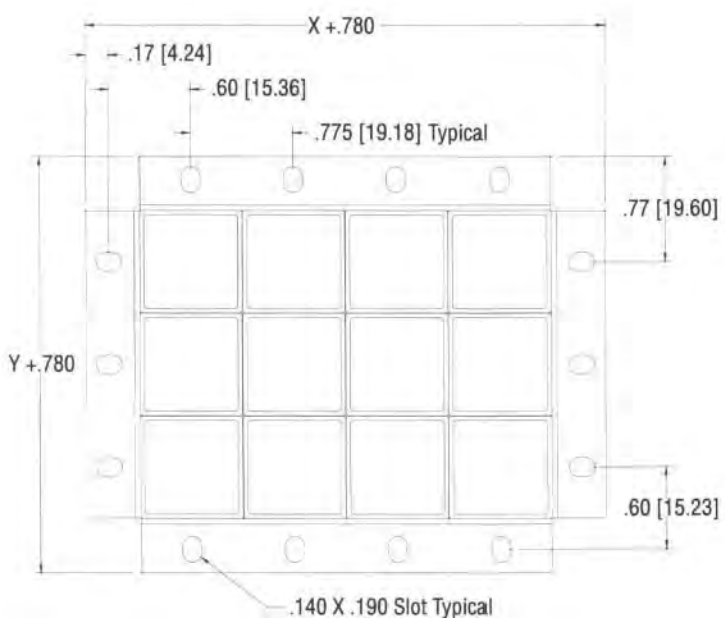
Flange Matrix 584-REXxxxx-.xxx

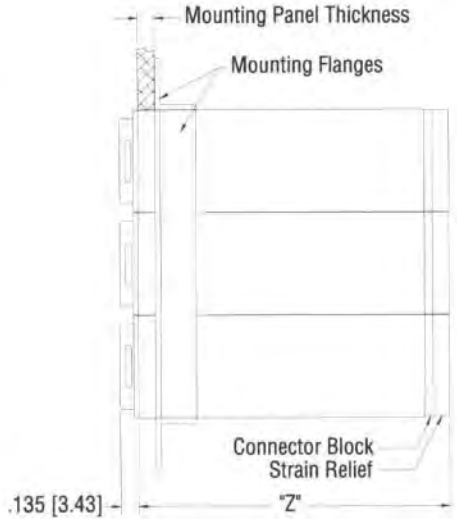
The flange matrix mounts from the rear of the panel and is secured with screws (not included). Flange mount matrices are RFI compatible, but are not supplied in drip-proof or diaphragm seal versions. Matrix selection must be coordinated with switch length. Letters in the part number are omitted if the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

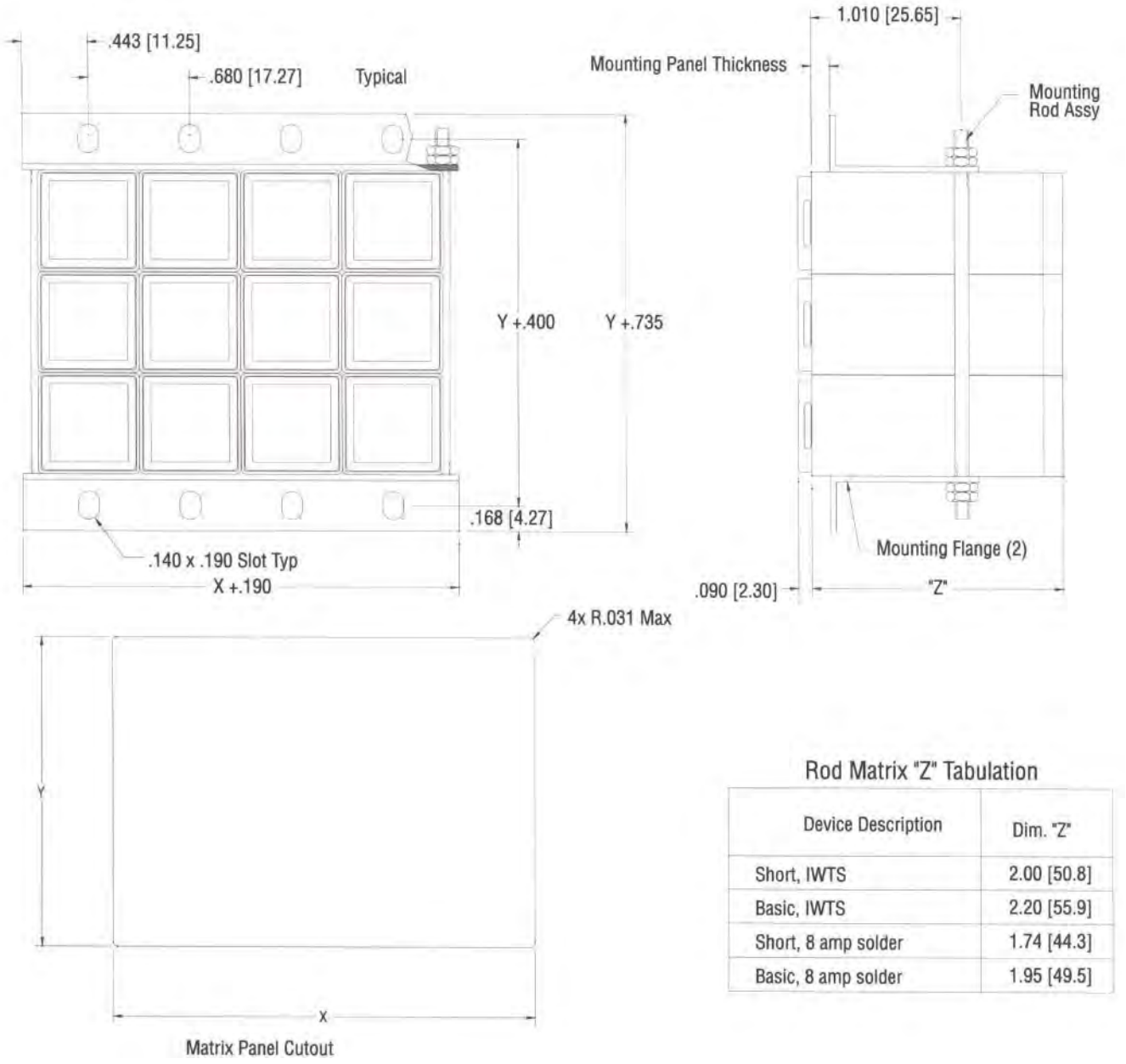
Series 584 Rod Mount Hardware

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-REMxxxx-.xxx Dimensions continued

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 (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 Pink 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

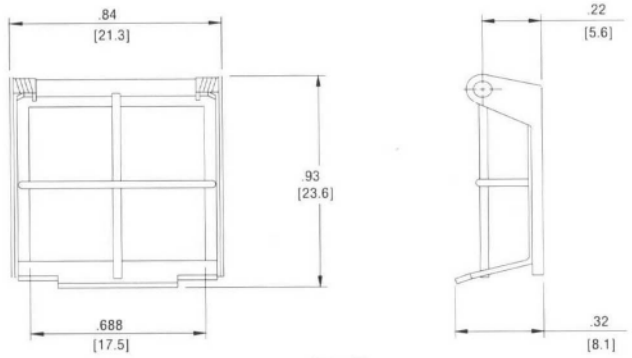


Figure 25
Wire Switch Guard
Not For Use With Matrices

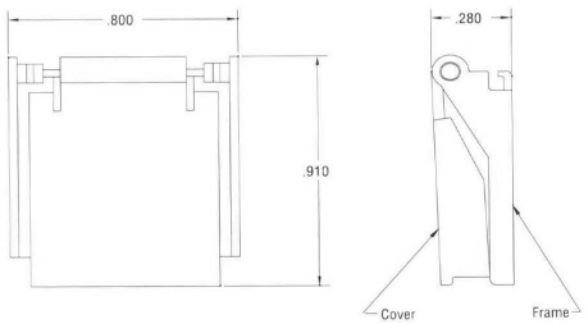


Figure 26
Clear Plastic Switch Guard
Not For Use With Matrices

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