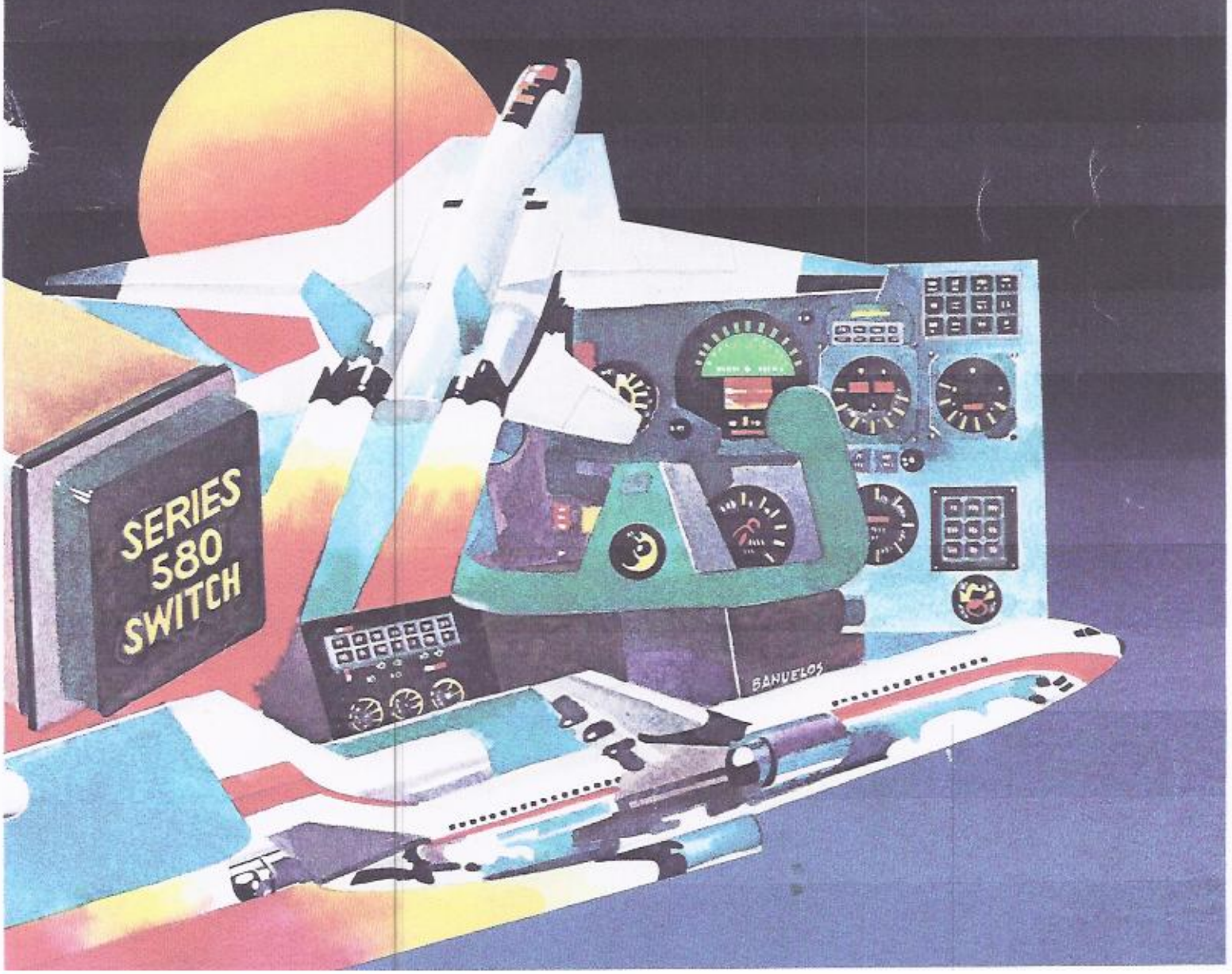
EATON

AEROSPACE & COMMERCIAL CONTROLS DIVISION

SERIES 580 & 581 SUNLIGHT READABLE AVIONICS SWITCHES



MSC SERIES 580 & 581 Born to be Airborne

The MSC Series 580 Family was created specifically for use in the cockpits of military and commercial aircraft.

Since our goal was to supply a lighted pushbutton switch that would be more than merely suitable for airborne applications, we came to you for advice.

Designed by a Panel of Panel Experts

We asked you, the people who manufacture avionics and other aircraft panel equipment, to advise us on the problems and needs in the cockpit regarding lighted pushbutton switches.

Our extensive survey was illuminating.

And the end result is a product that probably couldn't be better if you designed it yourself. Because you did, in a sense.

A Weighty Problem Resolved

It was no surprise to learn that weight was a chief concern among airborne equipment suppliers.

But the degree of our success in solving the problem might surprise you.

The maximum weight of the Series 580 switch is just 0.565 ounces (16 grams).

This is by far the lowest weight of any two pole double throw lighted pushbutton switch with four lamps.

Ahead with Room to Spare

Our survey confirmed that panel space is expensive real estate.

And the space behind the front panel isn't exactly low rent either.

That's why the Series 580 and 581 is so small.

At 0.75-inches square, no other 4-lamp pushbutton switch takes up less panel area.

And at less than 1 inch in depth, not including terminals, the Series 580 is less than half as deep as comparable units.

In short, it cuts your space problems in half and leaves twice as much room for the behind-the-scenes components of your system.

Take data storage components, for instance. Think how many bytes of information you could fit into the space each Series 580 or 581 switch saves.

Outshines the Sun

Direct sunlight has been known to cause two kinds of problems with lighted displays and pushbutton switches.

It can make lighted displays unreadable, and unlighted displays readable.

In other words, direct sunlight can cause an energized display to appear blank, and it can cause a false image to be reflected from an unenergized display.

The Series 580 and 581 overcome both serious problems. Characters on their face are easily readable in direct sunlight, regardless of display color—red, amber, white, green or blue. And no disturbing false images are reflected; a dead face is maintained at all times until the unit is energized.

The sunlight readability and non-ghosting characteristics of the Series 580 and 581 can be demonstrated in both the cockpit and the laboratory.

The conditions encountered in the cockpit when direct sunlight strikes the panel are simulated on the ground in the following manner.

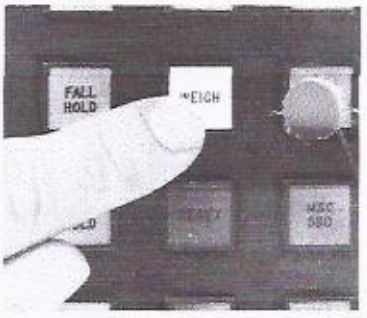
Intense light is directed at a reflective standard and adjusted until the reflected light equals 10,000 foot candles as measured by a calibrated photometer.

Then the reflective standard is replaced by the switch, and photometer measurements are taken at points in the legend area and background area. Measurements within the legend area are taken during both the energized and unenergized models.

In order to be truly sunlight readable, the legend energized contrast ratio C_{ON} and the legend unenergized contrast ratio C_{OFF} must meet the specifications stated in Mil-S-22885 using the following formula:

$$C_{ON} = \frac{\text{legend} - \text{background}}{\text{background}}$$

$$C_{OFF} = \frac{\text{legend} - \text{background}}{\text{background}}$$



How to use this Catalog

This catalog describes each of the standard and optional elements of the Series 580 and 581 switches and indicators. To determine the type of unit you need, simply select the codes that define your choice of each element. The selected codes, written together, become the part number you will use when ordering. A sample of a typical part number is shown with callouts identifying what each code means and a page number in this catalog that describes the element.

An alternate simplified method of ordering is available where you can order a complete unit using only a four digit Specification Sheet number. This number is assigned to a specific customer and maintained by Master Specialties Company. Consult your MSC representative for details.

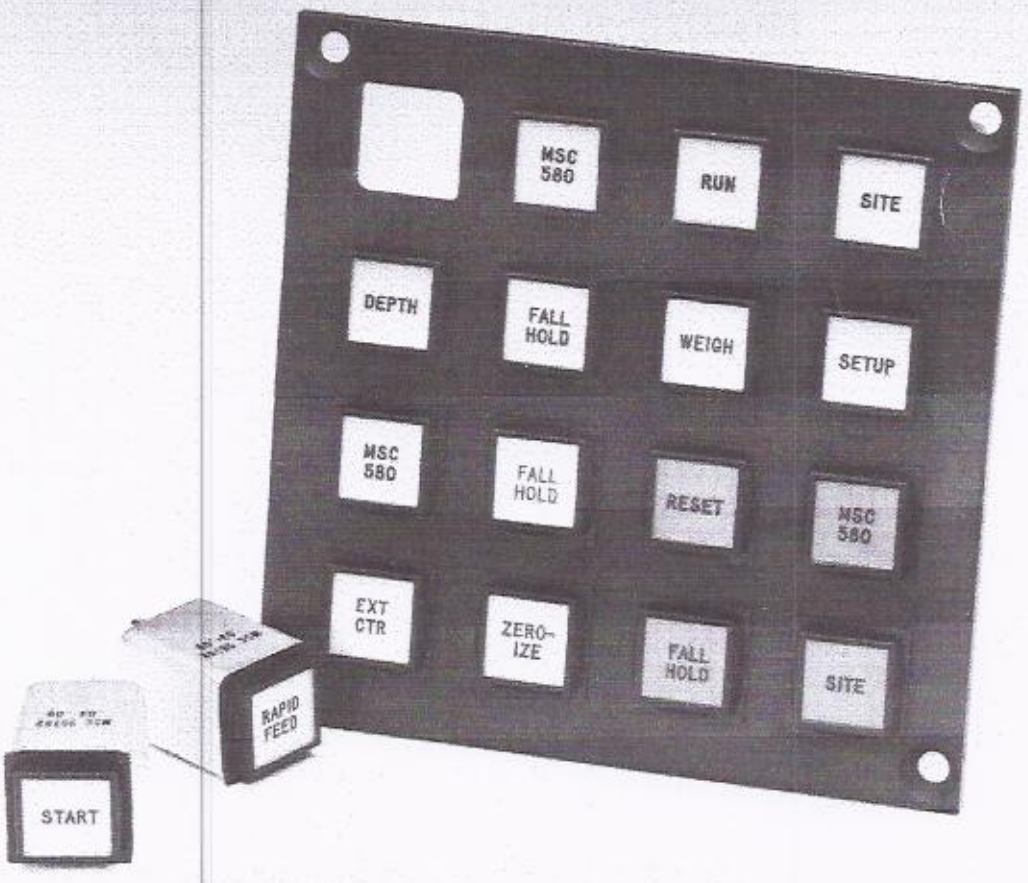
(581)	(02)	(A1)	(B1)	(C1)	(F4)	(L5)	(N2)	(RG),	16	ON/OFF
580	22	A1	B1	C1	F4	L5	N2	(RG),	16	ON/OFF

- 580 — Model Number
- 22 — Basic Unit Variations: 580—Page 4; 581—Page 8
- A1 — Basic Unit: 580—Page 5; 581—Page 9
- B1 — Terminals: 580—Page 4; 581—Page 8
- C1 — Lamp Circuit: 580—Page 4; 581—Page 8
- F4 — Lamps: 580 & 581—Page 4
- L5 — Lens Type: 580 & 581—Page 5
- N2 (RG), — Lens Configurations: 580 & 581—Page 5
- 16 ON/OFF — Legend Configurations: 580 & 581—Page 5

SERIES 580

- Sunlight Readable
- Short Length
- Low Weight
- Variety of Terminations
- Variety of Lens Styles
- Drip Proof
- RFI
- Indicating Alternate Action
- Momentary Action
- Indicator Only
- Front Relampable

QPL MIL-S-22885/100



580 22 A1B1C1 F8 L5 N2 (RG), 16 ON/OFF

Basic Unit and Variations

The ordering code identifying the basic unit and its variations consists of a five digit number. The first three digits merely denote that it is a Series 580 unit. The next two digits specify the panel thickness range, sealed or unsealed with positive index pin or positive retention hinge.

Panel thickness from .030" to .093"
01 Positive indexing pin
02 Positive retention hinge
03 Positive indexing pin with drip proof seals
04 Positive retention hinge with drip proof seals
Panel thickness from .094" to .124"
11 Positive indexing pin
12 Positive retention hinge
13 Positive indexing pin with drip proof seals
14 Positive retention hinge with drip proof seals
Panel thickness .125" to .187"
21 Positive indexing pin
22 Positive retention hinge
23 Positive indexing pin with drip proof seals
24 Positive retention hinge with drip proof seals
Panel thickness from .188" to .250"
31 Positive indexing pin
32 Positive retention hinge
33 Positive indexing pin with drip proof seals
34 Positive retention hinge with drip proof seals

Mounting

The basic unit is supplied with an anodized housing and single mounting sleeve for panel thicknesses from .032" to .250". Consult factory for additional panel thicknesses.

Drip Proof Seals

The Series 580 is offered with an integral silicon rubber capsule seal and a neoprene rubber coated metal panel seal.

Positive Indexing Pin and Positive Retention

The Series 580 is available with a positive indexing pin which ensures the proper placement of the lamp capsule during relamping. Also available is a positive retention hinge which prevents the complete removal of the lamp capsule.

580 22 A1B1C1 F8 L5 N2 (RG), 16 ON/OFF

Basic Unit, Terminals, Lamp Circuit

The Series 580 is available in one and two pole momentary or alternate action units, or as an indicator only. See Table 1 for ordering codes.

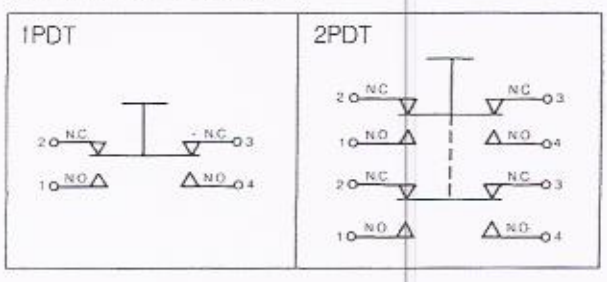
Momentary Action Switch 1 PDT or 2 PDT

Depressing front lens transfers switch contacts so long as the front lens is held down. Removing actuating force returns switch contacts to their normal position and front lens returns to its retracted position.

Alternate Action Switch 1 PDT or 2 PDT

Combines capability of both indication and switching. Depressing front lens transfers switch contacts, and they remain transferred even after the actuating force is removed. The front lens remains in the down position. Depressing the front lens again returns the switch contacts to their normal position.

Form Z Switch Action



Indicator

The basic unit may be ordered without a switch mechanism for applications requiring indication only.

580 22 A1B1C1 F8 L5 N2 (RG), 16 ON/OFF

Lamp Types

The Series 580 uses four T-1" midget flange based incandescent lamps which are available in 5, 12, 14, and 28 volts.

	DESIGN VOLTS	DESIGN AMPS	MSCP ± 15%	DESIGN WATTS
F1[3,4,6]	5.0	.06	.05	.30
F3[3,6]	5.0	.021	.034	.11
F4[1,5]	28.0	.024	.15	.67
F5	12.0	.03	.10	.36
F6[1,5]	14.0	.04	.15	.56
F8[2,6]	5.0	.06	.15	.30
F9[5]	28.0	.016	.072 ±25%	.45

1 CAUTION: When using high wattage lamps, additional heat sinking and air flow must be provided. Also matrix mounting is not recommended.
2 Recommended lamp for L5 lens configuration (SRL).
3 Not recommended for high ambient light levels.
4 U.S. MIL STD: MS24515
5 Only for use with extended 581 version.
6 All 5 volt lamps have nickel-plated bases.

580 22 A1B1C1 F8 H1 L5 N2 (RG), 16 ON/OFF

The Series 580 is available with an RFI screen. To order the 580 with RFI, merely add an "H1" after the lamp callout.

580 22 A1B1C1 F8 L5 N2 (RG), 16 ON/OFF

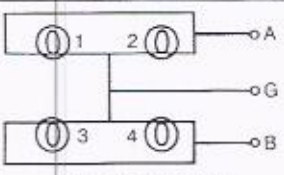
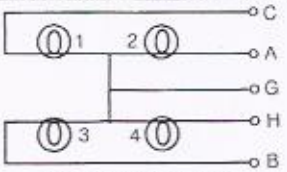
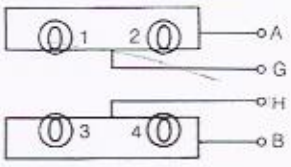
Lens Types

L1—Lens Type 1—Lighted Letters: Engraved letters appear white on a black background until illuminated and then letters appear in color, background remains black.
L2—Lens Type 2—Lighted Background: Engraved letters appear black on a white background until illuminated and then background appears in color, letters remain black.
L3—Lens Type 3—Hidden Message Lighted Letters: Engraved letters are not legible until illuminated and then letters appear in color, background remains black.
L4—Lens Type 4—Hidden Message Lighted Background: Engraved letters are not legible until illuminated and then background appears in color, letters remain black.
L5—Lens Type 5—Sunlight Readable: Letters are not legible until illuminated and then letters appear in color, background remains black. When illuminated, lighted letters are readable in direct sunlight.
L6—Lens Type 6—Colored Background: Engraved letters appear black against a colored background until illuminated and then background appears in lighted color, letters remain black.

Lens or Color Filter Removal

The display lens and associated color filter assembly can be removed which allows for easy changing or cleaning. After freeing the lamp capsule assembly, and the metal lens retainer, the display lens and color filter can be removed. Field replacement of the color filter assembly can only be made on an unsealed unit.

Table I 580 Series basic units

TYPE OF BASIC UNIT	PART NUMBER BY LAMP CIRCUIT		
	 LAMP CIRCUIT 1(C1)	 LAMP CIRCUIT 2 (C2)	 LAMP CIRCUIT (C3)
INDICATOR			
WITH P.C.B. TERMINALS	A0B5C1	A0B5C2	A0B5C3
WITH SOLDER TERMINALS	A0B6C1	A0B6C2	A0B6C3
HIGH CURRENT SWITCHES			
1PDT MOM P.C.B. TERM.	A1B1C1	A1B1C2	A1B1C3
1PDT MOM SOLDER TERM.	A1B3C1	A1B3C2	A1B3C3
2PDT MOM P.C.B. TERM.	A2B1C1	N/A	A2B1C3
2PDT MOM SOLDER TERM.	A2B3C1	N/A	A2B3C3
1PDT ALT P.C.B. TERM.	A3B1C1	N/A	N/A
1PDT ALT SOLDER TERM.	A3B3C1	N/A	N/A
2PDT ALT P.C.B. TERM.	A4B1C1	N/A	N/A
2PDT ALT SOLDER TERM.	A4B3C1	N/A	N/A
LOW CURRENT SWITCHES			
1PDT MOM P.C.B. TERM.	A1B2C1	A1B2C2	A1B2C3
1PDT MOM SOLDER TERM.	A1B4C1	A1B4C2	A1B4C3
2PDT MOM P.C.B. TERM.	A2B2C1	N/A	A2B2C3
2PDT MOM SOLDER TERM.	A2B4C1	N/A	A2B4C3
1PDT ALT P.C.B. TERM.	A3B2C1	N/A	N/A
1PDT ALT SOLDER TERM.	A3B4C1	N/A	N/A
2PDT ALT P.C.B. TERM.	A4B2C1	N/A	N/A
2PDT ALT SOLDER TERM.	A4B4C1	N/A	N/A

580 22 A1B1C1 F8 L5 **N2(RG), 16 ON/OFF**

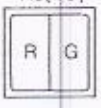
Lens Configuration

From the illustrations below select the lens configuration you need (Example N2). The letters in brackets indicate what color filters are necessary and their position when a multiple split lens is ordered.

N1(R)

N2(RG)

N3(RG)



N11(AGR)

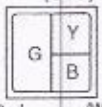
N12(YGR)

(A)viation yellow

N13(ABR)

(B)lue (G)reen

N14(GYB)



(R)ed (W)hite

N15(RABG)

(Y)ellow Not on L5

580 22 A1B1C1 F8 L5 N2(RG), **16 ON/OFF**

Legend Configuration

The part number code for a legend, when required, should follow the display lens code, since it indicates the legend configuration and legend wording.

To order a legend first choose the appropriate legend configuration number.

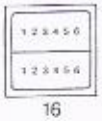
Horizontal Rows of Letters (6 characters or spaces per row .093" high)

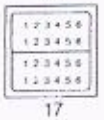

12


13

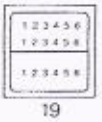

14


15


16


17


18


19

Vertical Splits, Horizontal Rows of Letters (3 characters per row .093" high)


20


21


22


24


25


26


28


29

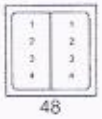

30

Vertical Rows of Letters (4 characters or spaces per row .093" high)


44


45


46

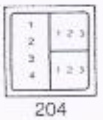

48

Three Way Splits and Four Way Split (.093" high)


52

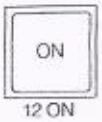

60


100


204


212

Once the legend configuration has been specified it will be necessary to write out the actual legend information required, using commas between rows of characters and a diagonal slash to indicate where a split is. When specifying a split the order to which the words would be written is upper left, upper right, lower left, and lower right as viewed from the front panel.



12 ON

16 ON/OFF

14 READY,TO,GO

204 1/2/3

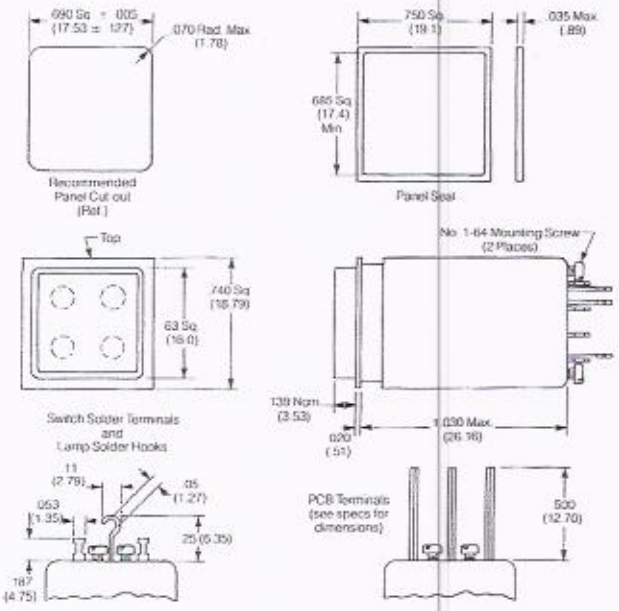
Specifications

Environmental

Vibration:	15 G's at 10 to 2000Hz (per Mil-Std-202, method 204, Cond B)
Shock:	75 G's (per Mil-Std-202, Method 213, Cond B)
Salt Spray:	(per Mil-Std-202, Method 101, Cond A)
Operating Temperature Range:	—55 °C to + 85 °C
Non-Operating Temperature Range:	–55°C to +85°C
Drip Proof:	Per Mil-Std-108

Mechanical

Weight:	16 grams maximum
Mounting:	Panel thickness from .030" to .250" using an anodized mounting sleeve. Contact factory for additional panel thicknesses.
Switch Terminals:	PCB: .020 × .030" gold plated (B1 and B2) Solder Terminal: single turret gold plated (B3 and B4)
Lamp Terminals:	PCB: .025" × .025" gold plated (B1, B2, B5) Solder Terminal: solder hook gold plated (B6)
Actuation Force:	2.0 lbs to 5.0 lbs (unsealed unit)
Actuation Travel:	.125" ± .025
Switch Contacts:	Movable and stationary: Silver, gold plated, or gold flashed
Mechanical Life:	100,000 cycles
Electrical Life:	50,000 cycles
Switch Configuration:	Form Z



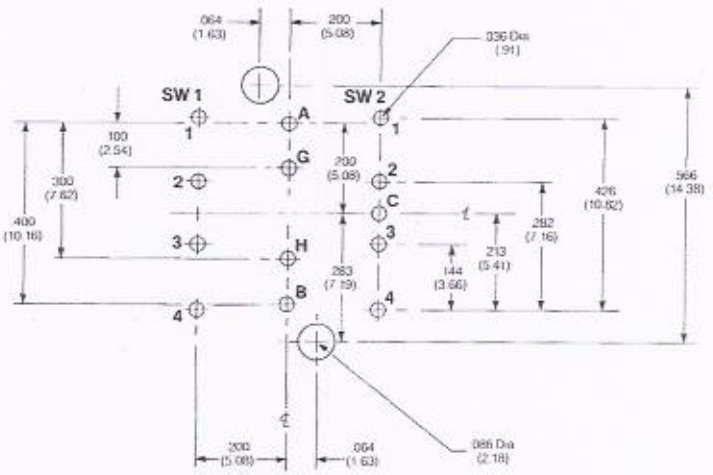
Electrical Switch Contact Ratings

B1 & B3 Silver (High Current)	
28 VDC at Sea Level	NO or NC
RESISTIVE load	8 amperes
INDUCTIVE load	5 amperes
MOTOR load	5 amperes
LAMP load	1 ampere
28 VDC at 80,000 feet	NO or NC
RESISTIVE load	8 amperes
INDUCTIVE load	5 amperes
LAMP load	0.5 amperes
110 VAC at Sea Level	NO or NC
RESISTIVE load	7 amperes
INDUCTIVE load	4 amperes
LAMP load	2 amperes
B2 & B4 Gold (Low Current)	
28 VDC at Sea Level	NO or NC
RESISTIVE load	5 amperes
INDUCTIVE load	3 amperes
28 VDC at 80,000 ft	NO or NC
RESISTIVE load	5 amperes
INDUCTIVE load	3 amperes
Low level rating: .01A @ .03 VDC or A.C. peak	

Dielectric—1000 VRMs min at Sea Level
Insulation Resistance—1000 megohms, min.

Dimensions

Dimensions are in inches.
Tolerances on decimals: X ± .1 (2.54)
XX ± .03 (.76)
XXX ± .010 (.25)
( ) = millimeters



Circuit Number		SW1 1	2	3	4	A	G	H	B	C	SW2 1	2	3	4
A0B5C1						•	•		•					
A1B1C1	A3B1C1	•	•	•	•	•	•		•					
A1B2C1	A3B2C1													
A2B1C1	A4B1C1	•	•	•	•	•	•		•		•	•	•	•
A2B2C1	A4B2C1													
A0B5C2						•	•	•	•	•				
A1B1C2	A1B2C2	•	•	•	•	•	•	•	•	•				
A0B5C3						•	•	•	•					
A1B1C3	A1B2C3	•	•	•	•	•	•	•	•					
A2B1C3	A2B2C3	•	•	•	•	•	•	•	•		•	•	•	•

QPL

MIL-S-22885/101A

SERIES 581

- Matrix Mountable
- Low Weight & Short Length
- Sunlight Readable
- Extended Lamp Capsule Unit
- 28 Volt Lamp Applications
- Night Vision Compatible Lenses
- LED Lighting
- Two Color Full Display
- Drip Proof
- RFI
- Variety of Terminations
- Form C Switch Arrangement
- Variety of Lens Styles
- [illegible]
- [illegible]

Series 581 Features

The Series 581 was designed to provide "true" matrix mounting. Switches can be mounted in a variety of matrix types and sizes and can be removed without disturbing behind panel wiring.

The Series 581 has other features that enhance its basic design. The following describes the various types of 581s and their major added features.

581 Standard Length Type I

Length = 1.03" behind panel depth
Solder or PCB Terminations
Form C switch action

581 Standard Length Type II

Length = 1.20" behind panel depth
Solder, PCB, or Matrix Terminations
Form C switch action

581 Extended Length Type I

Length = 1.33" behind panel depth
Solder or PCB Terminations
Use with 28 volt lamps
Night Vision Lens System (consult factory)
LED lamp capsule (consult factory)
Two Color full display lamp capsule (consult factory)
Form C switch action

581 Extended Length Type II

Length = 1.50" behind panel
Solder, PCB, or Matrix Terminations
Use with 28 volt lamps
Night Vision Lens System (consult factory)
LED lamp capsule (consult factory)
Two Color Full display lamp capsule (consult factory)
Expanded lamp terminal capability
Form C switch action

581 32 A1B1C1 F4 L5 N2 (RG), 16 ON/OFF

Basic Unit and Variations

The ordering code identifying the basic unit and variations of the Series 581 consists of the first five digits. As with the 580 the first three digits indicate the model number. The next two digits indicate whether the unit is either an extended length or standard length. Also, the RFI callout is included in these two numbers. In the Series 581 one sleeve is used for all panel thickness and all 581s are included with positive retention hinges for lamp capsule retention.

581 Standard Length Type I
11 unsealed
12 sealed
13 unsealed with RFI
14 sealed with RFI
581 Standard Length Type II
21 unsealed
22 sealed
23 unsealed with RFI
24 sealed with RFI
581 Extended Length Type I
31 unsealed
32 sealed
33 unsealed with RFI
34 sealed with RFI
581 Extended Length Type II
41 unsealed
42 sealed
43 unsealed with RFI
44 sealed with RFI

Mounting

The Series 581 is supplied with a mounting sleeve that is capable of fitting panel thickness from .030 to .250.

Drip Proof Seals

Since the basic difference between the 580 and 581 is in the housing, the same Drip Proof seals are used.

Positive Retention Hinge

The Series 581 comes standard with a positive retention hinge which prevents the complete removal of the lamp capsule during relamping.

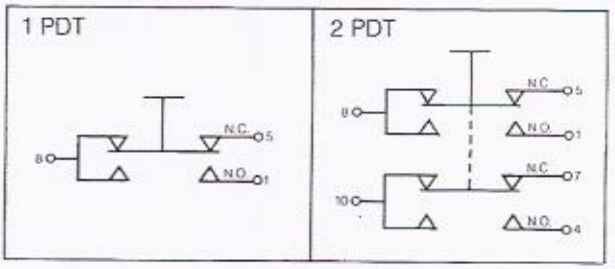
581 32 A1B1C1 F4 L5 N2 (RG), 16 ON/OFF

Basic Unit, Terminals, Lamp Circuit

The 581 is available in one and two pole momentary or indicating alternate switch actions. See Table 2 for ordering codes.

The 581 differs from the 580 in that the switch action for the 581 is a Form C configuration.

Form C Switch



581 32 A1B1C1 F4 L5 N2 (RG), 16 ON/OFF

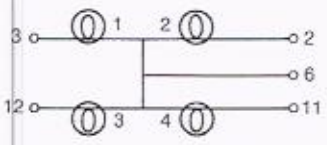
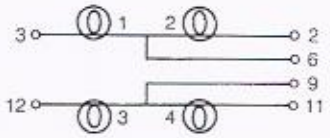
Lamp, Lens Type, Legend Configuration

Because of the similarities to the Series 580, the ordering codes for lamps, legend type, and legend configurations can be derived from the Series 580. See Pages 4 and 5.

QPL

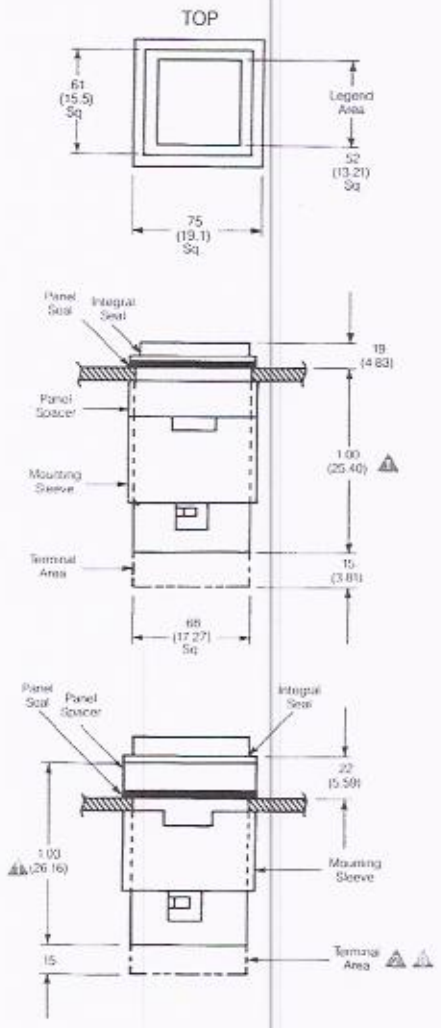
The Series 581 can be ordered per MIL-S-22885/101 and /102. To order a QPL Switch, insert an "H" in the part number between the Model Number (581) and the basic unit variation, for example 581H32A1B1C1F4L5. Not all 581 Part Numbers are available as QPL items.

Table 2 581 Series basic units

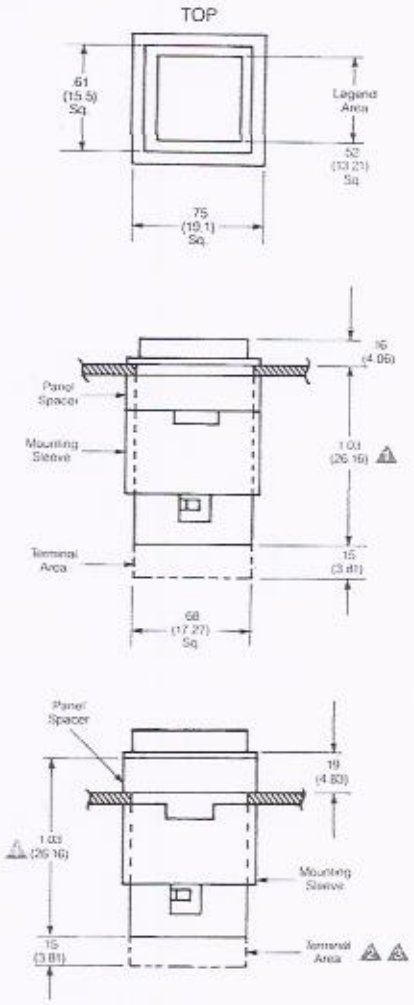
TYPE OF BASIC UNIT	PART NUMBER BY LAMP CIRCUIT			
	 LAMP CIRCUIT 1 (C1)		 LAMP CIRCUIT 3 (C3)	
LENGTH AVAIL. STD or EXT	**TYPE I** 1.03" or 1.33"	**TYPE II** 1.20" or 1.50"	**TYPE I** 1.03" or 1.33"	**TYPE II** 1.20" or 1.50"
INDICATOR				
PCB	A0B5C1	A0B12C1	A0B5C3	A0B12C3
SOLDER	A0B6C1	A0B15C1	A0B6C3	A0B15C3
MATRIX	N/A	A0B9C1	N/A	A0B9C3
HIGH CURRENT (SILVER)				
1PDT MOM PCB	A1B1C1	A1B10C1	A1B1C3	A1B10C3
1PDT MOM SOLDER	A1B3C1	A1B13C1	A1B3C3	A1B13C3
1PDT MOM MATRIX	N/A	A1B7C1	N/A	A1B7C3
2PDT MOM PCB	A2B1C1	A2B10C1	A2B1C3	A2B10C3
2PDT MOM SOLDER	A2B3C1	A2B13C1	A2B3C3	A2B13C3
2PDT MOM MATRIX	N/A	A2B7C1	N/A	A2B7C3
1PDT ALT PCB	A3B1C1	A3B10C1	N/A	A3B10C3
1PDT ALT SOLDER	A3B3C1	A3B13C1	N/A	A3B13C3
1PDT ALT MATRIX	N/A	A3B7C1	N/A	A3B7C3
2PDT ALT PCB	A4B1C1	A4B10C1	N/A	A4B10C3
2PDT ALT SOLDER	A4B3C1	A4B13C1	N/A	A4B13C3
2PDT ALT MATRIX	N/A	A4B7C1	N/A	A4B7C3
LOW CURRENT (GOLD)				
1PDT MOM PCB	A1B2C1	A1B11C1	A1B2C3	A1B11C3
1PDT MOM SOLDER	A1B4C1	A1B14C1	A1B4C3	A1B14C3
1PDT MOM MATRIX	N/A	A1B8C1	N/A	A1B8C3
2PDT MOM PCB	A2B2C1	A2B11C1	A2B2C3	A2B11C3
2PDT MOM SOLDER	A2B4C1	A2B14C1	A2B4C3	A2B14C3
2PDT MOM MATRIX	N/A	A2B8C1	N/A	A2B8C3
1PDT ALT PCB	A3B2C1	A3B11C1	N/A	A3B11C3
1PDT ALT SOLDER	A3B4C1	A3B14C1	N/A	A3B14C3
1PDT ALT MATRIX	N/A	A3B8C1	N/A	A3B8C3
2PDT ALT PCB	A4B2C1	A4B11C1	N/A	A4B11C3
2PDT ALT SOLDER	A4B4C1	A4B14C1	N/A	A4B14C3
2PDT ALT MATRIX	N/A	A4B8C1	N/A	A4B8C3

Dimensional Specifications Type I

Series 581 Type I Sealed



Series 581 Type I Unsealed



Notes:

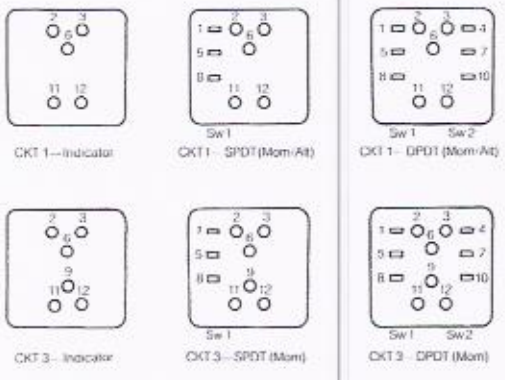
⚠ For extended unit add 0.300" to dimension shown.

⚠ Terminals for printed circuit board shall be .030 diameter for lamp circuit and .030 x .020 blade for switch.

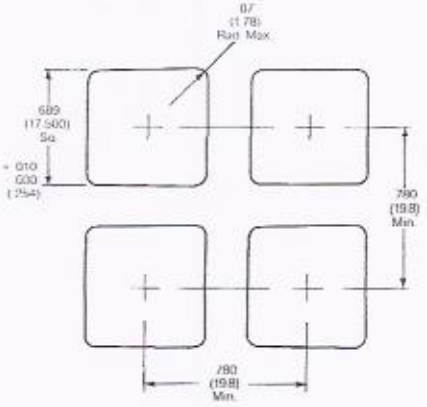
⚠ Terminals for solder shall be single turret, .050 diameter for lamp circuit and .05 x .02 blade for switch.

⚠ Dimensions are in inches. Unless otherwise specified, tolerances are ± .010 for three place decimals and ± .03 for two place decimals.

Terminal Identification—Type I (Rear View)

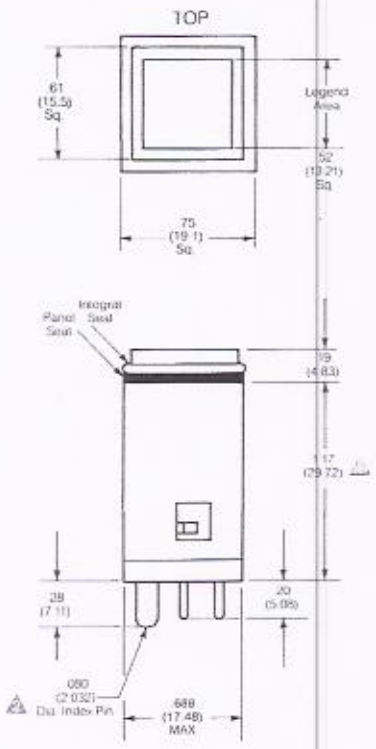


Recommended Panel Cutout for Individual Mount—Type I & Type II Solder and PCB Terminations.

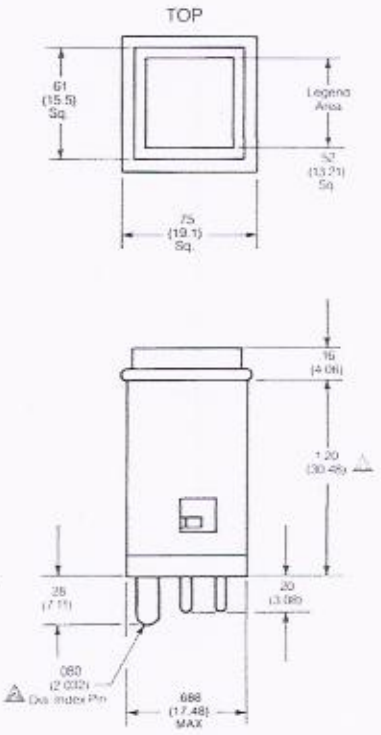


Dimensional Specifications Type II

Series 581 Type II Sealed



Series 581 Type II Unsealed

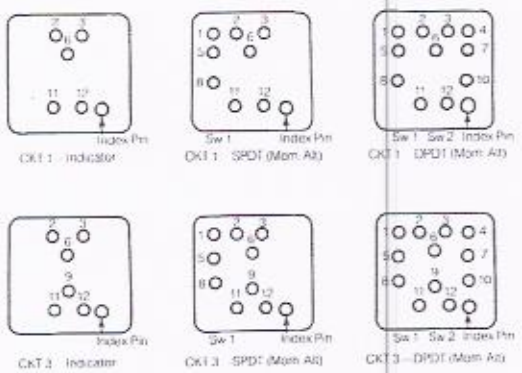


Notes:

- For extended unit add 0.300" to dimension shown
- Not included on Type II solder terminal units
- Terminals for printed circuit board shall be .030 diameter.
- Terminals for solder shall be single turret .050 diameter.
- Terminals for matrix plug-in shall be .040 diameter.

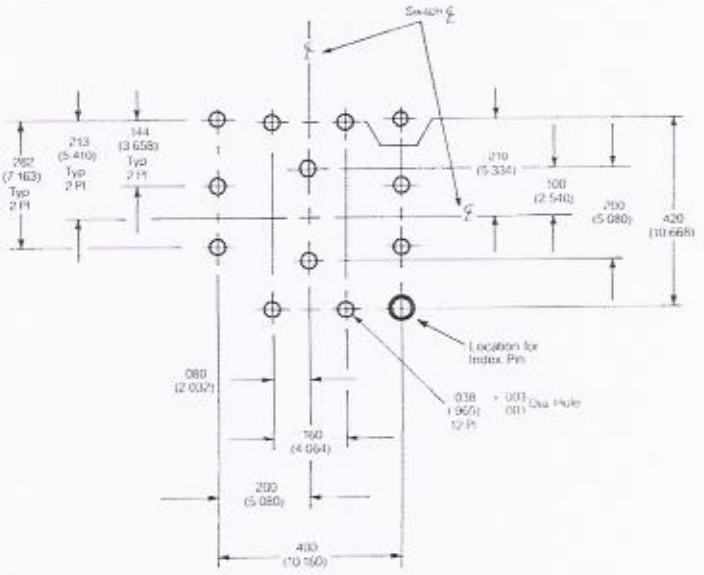
Mounting Sleeve and Spacer is included on solder and PCB type units

Terminal Identification—Type II (Rear View),



Recommended Printed Circuit Board Layout

Rear View



Notes:

1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are ± .010 for three place decimals and ± .03 for two place decimals.

Specifications

Housing:	Aluminum Alloy
Finish:	Chemical Film, per MIL-C-5541.
Mounting Sleeve:	Aluminum Alloy 5052-0.
Finish:	Chemical Film, per MIL-C-5541.
Weight:	Type I: 18 grams maximum (standard) 21 grams maximum (extended). Type II: 21 grams maximum (standard) 24 grams maximum (extended).
Temperature Characteristic:	−55°C to +85°C operating −55°C to +85°C nonoperating
Vibration Grade:	3 Axes (10-2000Hz). 15g per MIL-STD-202 Method 204 Condition B
Operating Characteristics:	Actuation force: 1 to 5 pounds. Actuation travel: .125 ± .025.
Pushbutton Extraction Force:	2 to 5 pounds.
Shock:	75 G (MIL-STD-202, Method 213, Test Condition B).
Thermal Shock: per MIL-STD-202 Method 107 Condition A	During high temperature portion of thermal shock test, all four lamps shall be energized with full rated voltage. Total lamp wattage shall not exceed 1.2 watts.
Dripproof Test: per MIL-STD-108	When specified, test in accordance with MIL-S-22885. There shall be no leakage of water through the panel and pushbutton seals as determined by visual examination and the dielectric withstanding voltage test.
Electrical Ratings: per MIL-S-22885 / 101	See Table Below. Following electrical endurance switches which are tested at the rated inductive load shall only be required to operate the circuit.
Low Level Life:	Applicable for gold contact switches. 50,000 cycles.
Marking:	Per MIL-STD-130.
Mounting Torque:	16 inch oz. ± 4 inch oz.
RFI Shielding: per MIL-S-22885 Para 4.8.32.1	When speficied switches shall be equipped with an RFI screen, Resistance between the mounting sleeve and the RFI screen shall be measured in accordance with Method 307 of MIL-STD-202 and shall not exceed 1 ohm.

ELECTRICAL RATINGS—SILVER CONTACTS (HIGH CURRENT) ⚠

LOAD	Sea Level, 28 Vdc	70,000 Feet, 28 Vdc
	NO or NC	NO or NC
	(Amperes, max.)	(Amperes, max.)
RESISTIVE	5.0	5.0
INDUCTIVE	3.0	2.0
LAMP	1.0	—

ELECTRICAL RATINGS—GOLD CONTACTS (LOW CURRENT) ⚠

LOAD	Sea Level, 28 Vdc	70,000 Feet, 28 Vdc
	(Amperes, max.)	(Amperes, max.)
RESISTIVE	1	1
INDUCTIVE	0.5	0.5

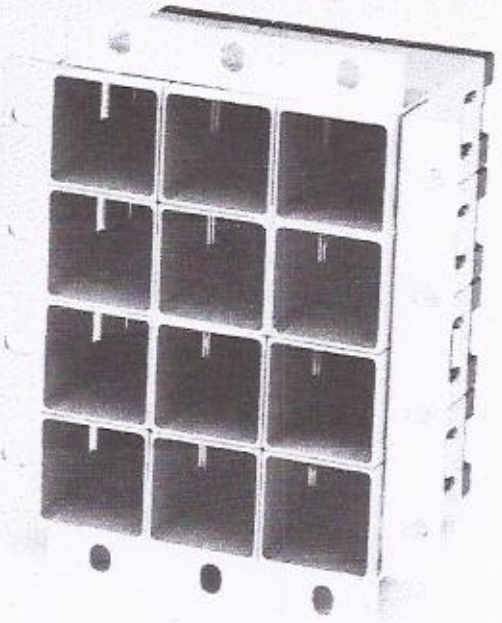
⚠ Contacts are silver, gold flash for solderability and to prevent silver tarnish.

⚠ Contacts are silver, gold plated for low current applications.

581 MATRICES

QPL
MIL-S-24317/11A

- Frame Type
- Flange Type
- RFI
- Moisture Proof
- Variety of Sizes
- Low Weight



Series 581 Matrices

The Series 581 Matrices are modular units that can have any number of channels into which a Series 581 Type II units with connector terminals can be plugged in. The maximum square matrix is 5 × 5; maximum rectangular matrix is 5 × 10. Consult the factory for specific size requirements not shown.

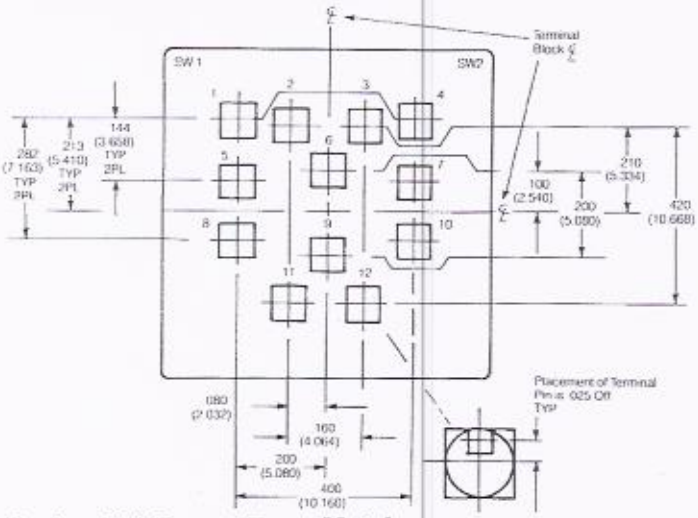
Ready to Wire with Crimp-Type PCB, or Wire Wrap Terminals

A variety of insertable terminals are available to wire the connector block at the rear of each channel in the matrix.

PART NUMBER	TERMINAL TYPE
581-921	Wire Wrap/PCB
581-914	Wire Wrap
581-915	Wire Wrap
581-920	Crimp

Once a terminal has been installed it is easily removed by using a removal tool. Removal tool part number is 581-922 for terminal type 581-921, -914,and -915.

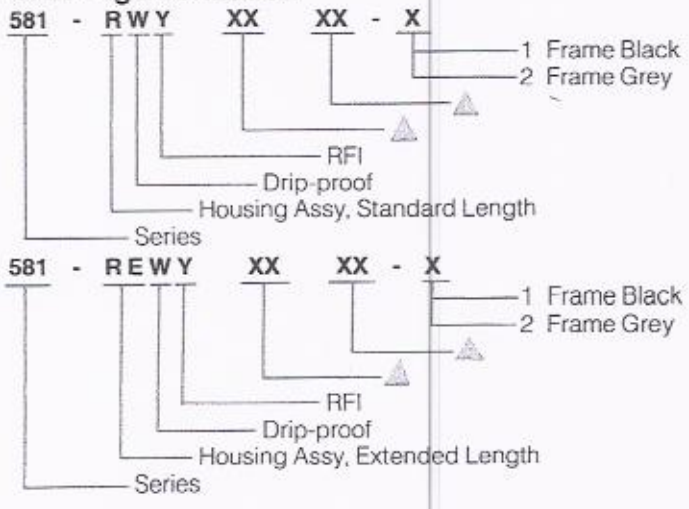
Connector Block Rear View



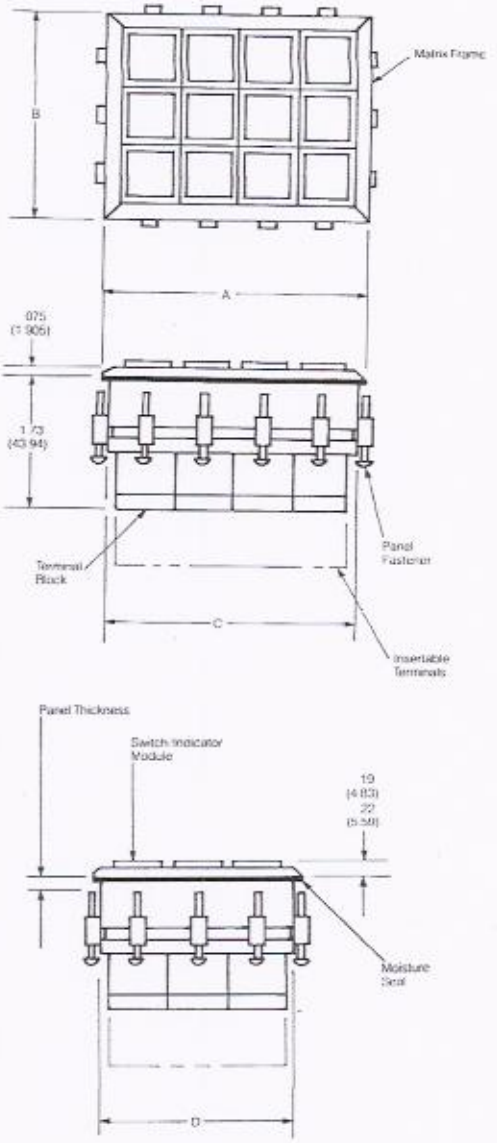
Series 581 Frame Type Matrix

The Frame Type Matrix is a front mount type which uses fasteners that are slipped into the slots on the matrix frame. They are available for either the standard or extended length 581 Type II units and are available with RFI shielding, moisture seal and a variety of frame colors. Consult factory for specific frame color requirements not shown.
Panel thickness range is from .030" to .250".

Ordering Information



△ Number of units in a vertical row (2 digits).
△ Number of units in a horizontal row (2 digits).



NUMBER OF STATIONS	DIMENSIONS MATRIX ±.020(.51) A	B	RECOMMENDED PANEL CUTOUT +.030 −.000 (.76) C	D	NUMBER OF FASTENERS PER SIDE
1	1.150 (29.21)	1.150 (29.21)	.985 (25.02)	.985 (25.02)	1
2	1.908 (48.46)	1.908 (48.46)	1.740 (44.20)	1.740 (44.20)	2
3	2.663 (67.64)	2.663 (67.64)	2.495 (63.37)	2.495 (63.37)	3
4	3.418 (86.82)	3.418 (86.82)	3.250 (82.55)	3.250 (82.55)	4
5	4.173 (106.00)	4.173 (106.00)	4.005 (101.73)	4.005 (101.73)	5
6	4.928 (125.17)	4.928 (125.17)	4.760 (120.90)	4.760 (120.90)	6
7	5.683 (144.35)	5.683 (144.35)	5.515 (140.08)	5.515 (140.08)	7
8	6.438 (163.53)	6.438 (163.53)	6.270 (159.26)	6.270 (159.26)	8
9	7.193 (182.70)	7.193 (182.70)	7.025 (178.44)	7.025 (178.44)	9
10	7.948 (201.88)	7.948 (201.88)	7.780 (197.61)	7.780 (197.61)	10

Series 581 Flange Type Matrix

The Flange Type Matrix is a rear mount unit for applications using edge-lit panels. A variety of panel thicknesses are available as shown below. Consult factory for other panel sizes.

PANEL THICKNESS

.190 .125 .090 .063

Ordering Information

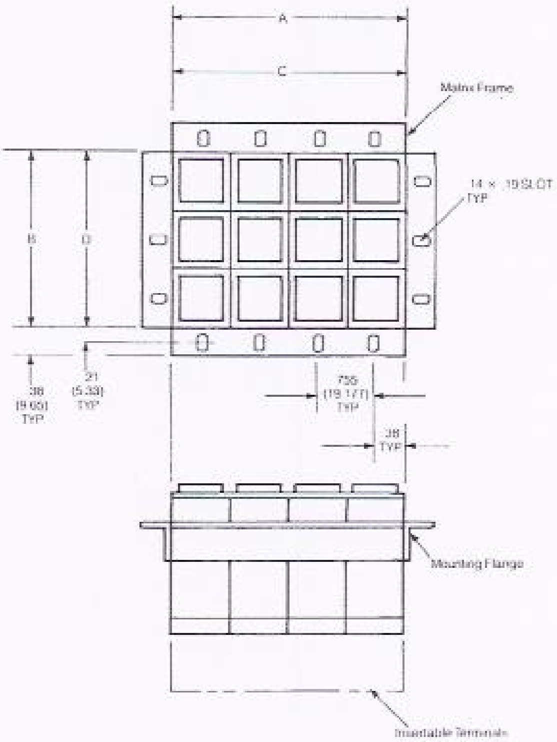
581 - RX XX XX - X

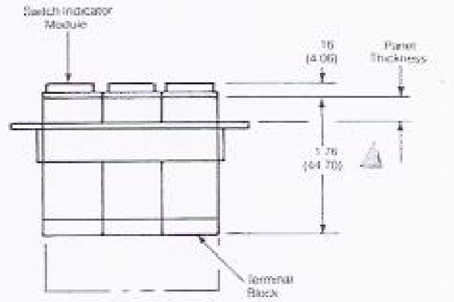
- X — Panel Thickness
- XX — △ (2)
- XX — △ (1)
- RX — Matrix Assy, Standard Length
- 581 — Series

581 - REX XX XX - X

- X — Panel Thickness
- XX — △ (2)
- XX — △ (1)
- REX — Matrix Assy, Extended Length
- 581 — Series

△ Number of units in a vertical row (must be 2 digits).
△ Number of units in a horizontal row (must be 2 digits).





△ Standard length 1.76"; Extended length 2.06"

NUMBER OF STATIONS	DIMENSIONS			
	MATRIX ±.015 (.38)		RECOMMENDED PANEL CUTOUT $^{+.030}_{-.000}$ (.76)	
	A	B	C	D
1	.755 (19.18)	.755 (19.18)	.775 (19.69)	.775 (19.69)
2	1.510 (38.35)	1.510 (38.35)	1.530 (38.86)	1.530 (38.86)
3	2.265 (57.53)	2.265 (57.53)	2.285 (58.04)	2.285 (58.04)
4	3.020 (76.71)	3.020 (76.71)	3.040 (77.22)	3.040 (77.22)
5	3.775 (95.89)	3.775 (95.89)	3.795 (96.39)	3.795 (96.39)
6	4.530 (115.06)	4.530 (115.06)	4.550 (115.57)	4.550 (115.57)
7	5.285 (134.24)	5.285 (134.24)	5.305 (134.75)	5.305 (134.75)
8	6.040 (153.42)	6.040 (153.42)	6.060 (153.92)	6.060 (153.92)
9	6.795 (172.59)	6.795 (172.59)	6.815 (173.10)	6.815 (173.10)
10	7.55 (191.77)	7.550 (191.77)	7.570 (192.28)	7.570 (192.28)

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