Manual Switches
Pushbutton Switches

FEATURES
- Compact size
- Up to 4-poles
- Sealed versions

TOUCH FEEDBACK SWITCHES

ORDER GUIDE
Momentary and alternate action switches.

Button Color	No. of SPDT Circuits 2 Mom. Action	2 Alt. Action	4 Mom. Action	4 Alt. Action
Black	2PB11-T2	82PB19-T2	—	84PB19-T2
	2PB732-T2 (M8805/23-001)	—	4PB714-T2 (M8805/23-003)	—
Red	2PB12-T2	82PB21-T2	—	—
	2PB717-T2 (M8805/23-002)	—	4PB717-T2 (M8805/23-004)	—
Green	2PB273-T2	82PB22-T2	—	—

SHORT TRAVEL SWITCHES

ORDER GUIDE
Momentary action switches.

Button	No. of SPDT Circuits 2	3
Black	2PB7	3PB7

These switches resemble the touch-feedback design, but have a flexible leaf actuator for lower operating force and shorter button travel.

PANEL SEALED SWITCHES

An elastomer seal is bonded between actuating plunger and button collar. An O-ring seals the button assembly to the panel front.

Two-piece design enables button to be mounted separately. After switch unit is wired, it snaps into place from behind panel.

ORDER GUIDE
Momentary action switches.

Button Color	Collar Type	No. of SPDT Circuits 1	2
Black	Hex	1PB4	2PB4
Black	Round	1PB42	—
Red	Round	1PB43	2PB43

ELECTRICAL RATINGS

(Except 15PB and 700PB)
30 VDC: 5 amps, res., sea level or 50,000 ft.; 3 amps, ind., sea level; 2.5 amps ind., 50,000 ft; 24 amps, max. inrush.
UL and CSA rating for basic switches: 5 amps, 125 or 250 VAC.

Manual Switches

PB Series

Pushbutton Switches

WATERTIGHT SWITCH

ORDER GUIDE
Momentary action switches.
Has knurled chrome-finished facenut.

Button Color	No. of SPDT Circuits 2
Black	2PB901-T2

Facenut-to-panel, button-to-facenut, and bushing-to-facenut, sealing helps prevent entry of water from behind panel, up and over bushing wall. Switch units potted in corrosion resistant metal enclosure. Meets submergence requirements of MIL-STD-108 (up to 10 PSI water pressure for one hour).

HERMETICALLY SEALED SWITCHES

These pushbuttons are equipped with HM hermetically sealed switch units, which have metal-to-metal fusion around the cover, actuator base, and mounting holes. Terminals are sealed glass-to-metal.

Vapor-proof construction enables use in damp locations without condensation on contacts. External parts corrosion resistant per MIL-S-8805. Meets explosion-proof requirements of MIL-S-8805.

ORDER GUIDE
Momentary action switches.

Button Color	No. of SPDT Circuits 2	4
Black	702PB1	704PB1

MINIATURE SIZE SWITCHES

1PB5

15PB2

ORDER GUIDE
Momentary action switches.

Button	No. of SPDT Circuits 1	2
Steel*	1PB5	—
White Plastic	—	15PB2

* Steel button enables use under hinged plates or paddle levers, in addition to manual operation.

ELECTRICAL RATINGS — 700PB and 15PB

700PB (With hermetically sealed switch units):
28 VDC and 115 VAC, 400 HZ: 3 amps, ind., 5 amps, res.

15PB:
30 VDC and 115 VAC: 2 amps, ind., 5 amps. res.; 1.0 amp, lamp load.

1PB5

250 VAC: 5 amps.

30 VDC: 5 amps, res., sea level or 50,000 ft.; 3 amps, ind., sea level; 2.5 amps ind., 50,000 ft.; 24 amps, max. inrush.

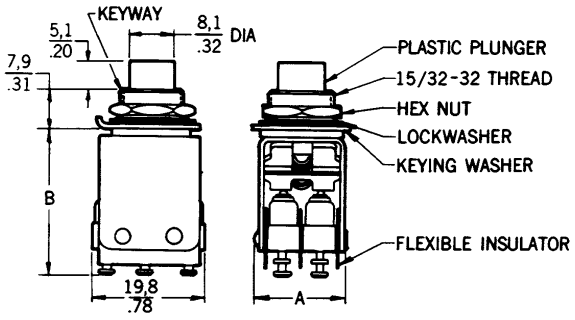
Manual Switches

PB Series

Pushbutton Switches

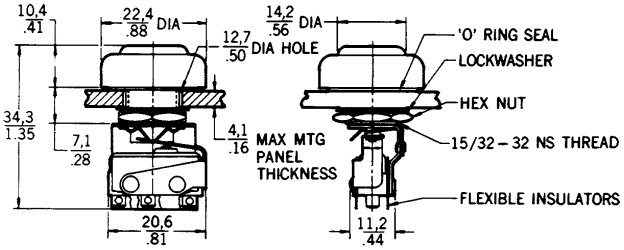
MOUNTING DIMENSIONS (For reference only)

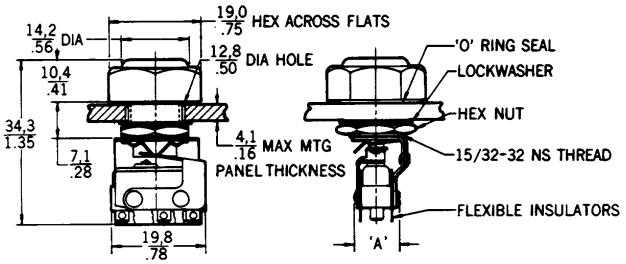
Touch Feedback Switches



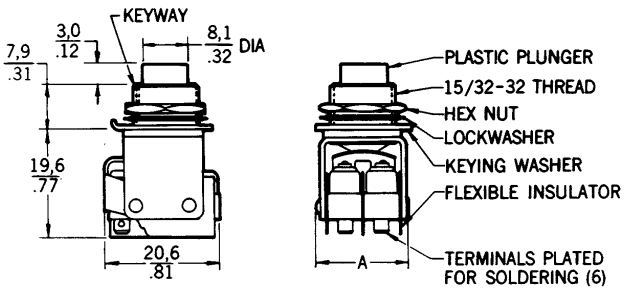
		2-Pole	4-Pole
Dim. "A" (max.)	Mom.	16,8/.66	30,0/1.18
	Alt. Act.	17,3/.68	30,5/1.20
Dim. "B"	Mom.	26,7/1.05	26,7/1.05
	Alt. Act.	33,0/1.34	33,0/1.34

Panel Sealed Switches





Short Travel Switches



	2-Pole	3-Pole
Dim. "A" (max.)	17,0/.67	23,8/.94

	1-Pole	2-Pole
Dim. "A" (max.)	11,7/.46	17,0/.67

Key: 0,0 = mm / 0.00 = inches

Pushbuttons

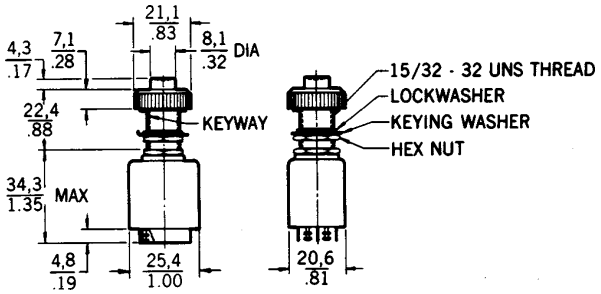
Manual Switches

PB Series

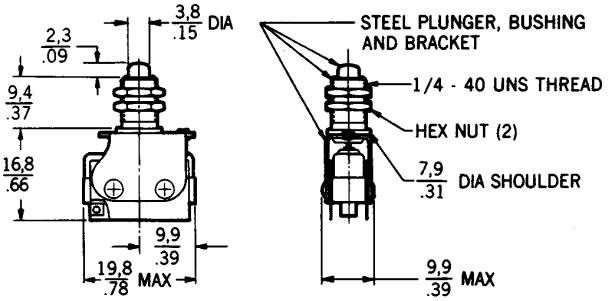
Pushbutton Switches

MOUNTING DIMENSIONS (For reference only)

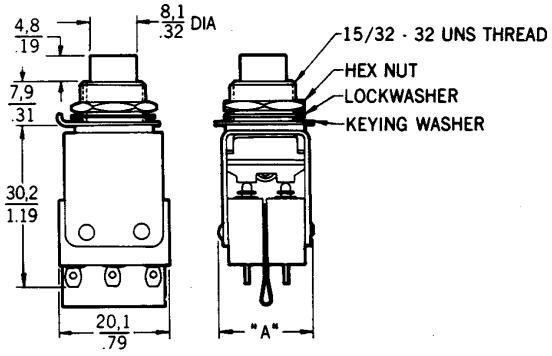
Watertight Switch

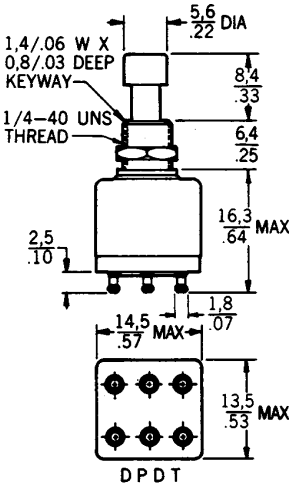


Miniature Size Switches



Hermetically Sealed Switches





Mounting hardware includes: hexnut, lockwasher, and keying washer.

	2-Pole	4-Pole
Dim. "A" (max.)	16,8/.66	30,0/1.18

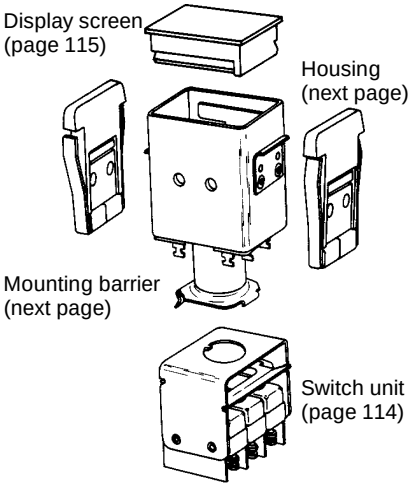
Key: 0,0 = mm / 0.00 = inches

Manual Switches

Series 2

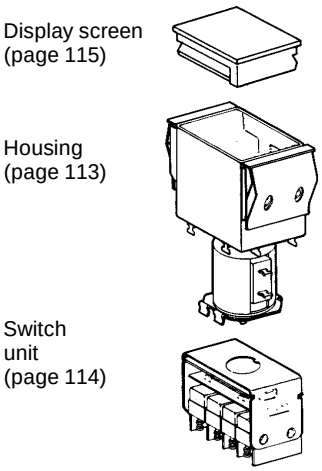
Pushbutton Switches and Indicators

BARRIER MOUNT



Mounting barriers attach to either the long or short sides of the housing. They have spring clips which grip the panel. Mounting barriers also separate display screens to protect against inadvertent operation. Multiple units can be attached together in a strip and snapped into a panel slot; or they can be mounted individually.

FLANGE MOUNT



Flange mount units have mounting clips ready-attached to the housing. They can be individually installed or replaced; and enable use of an overlay panel, if desired. Groupings can be separated by optional spacing barriers.

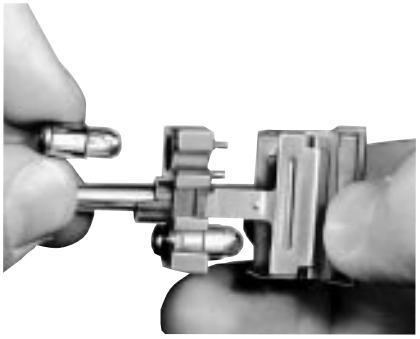
MODULES ASSEMBLE EASILY

All modules are ordered as separate items which snap together for easy assembly.

FEATURES

- Easy-to-assemble modules provide thousands of display/control combinations
- Up to 4 incandescent lamps
- 1, 2, 3, or 4-section display
- Transmitted or projected color
- Integral hold-in coil option provides remote released contacts. Pull-in coils (flange mount only) enable remote actuation
- Switch guard accessory.

CHANGE LAMPS OR FILTERS FROM PANEL FRONT

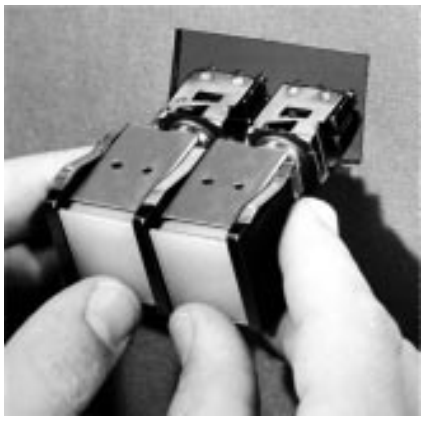


Without tool. Remove display screen/lampholder assembly from 2C200 operator-indicator (or 2F200 indicator). Unit is keyed to maintain proper orientation when replacing. Use only flange base T-1¾ lamps with 2C200 and 2F200 devices.

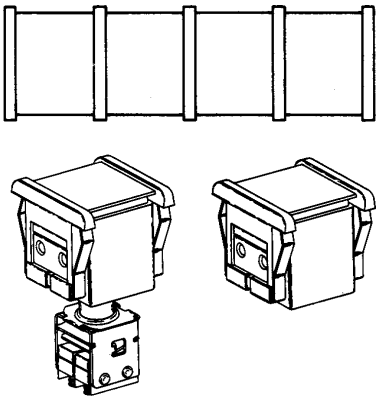
LAMPS AND FILTERS

Order lamps and filters for projected color from page 117.

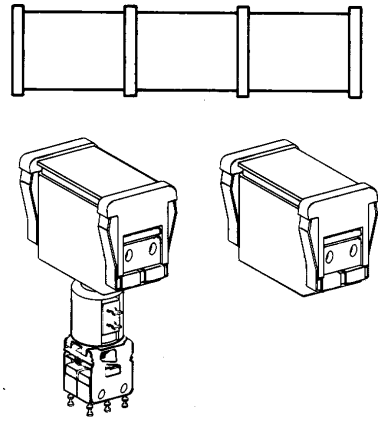
Pushbuttons



Barriers on long sides



Barriers on short sides



BARRIER MOUNT MODULES

Barrier mount assemblies are identical in panel appearance. Operator-indicator housings have spring clips for attaching switch modules. This feature is not provided with indicator housings.

Barriers are necessary for mounting. They can be specified for attachment to the long or short side of the housing, as stated in the order guides.

BARRIER MOUNT HOUSING ORDER GUIDE

See ''Application Data'' for typical bailing circuits for coil-equipped modules.

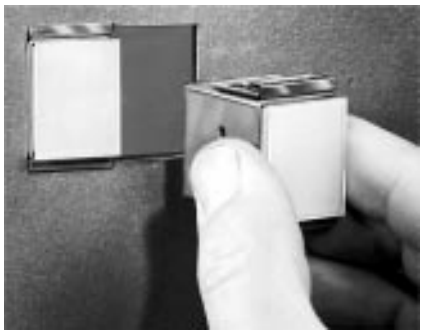
Barriers Attach On:	No. of Lamp Sockets	Tool Not Required	
		Operator-Indicator	Indicator Only
Long Sides of Housing	2 (A & C) 4 (A-D)	2C207 2C209	
Short Sides of Housing	2 (A & C) 4 (A-D)	2C201 2C203	2F203

MOUNTING BARRIER ORDER GUIDE

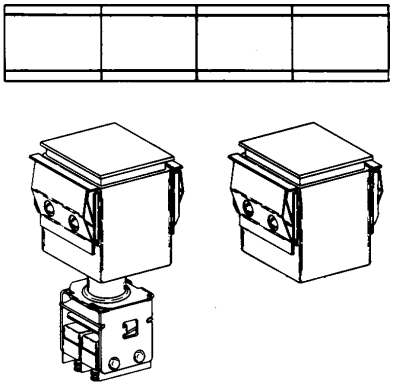
For strip mounting, specify one more barrier than the number of units in the group.

Mounting Barrier Type	For Panel Thickness	Catalog Listings	
		Gray	Black
Attach to Long Sides	.06-.19 in. (1,52-4,83 mm)	2B2	2B4
Attach to Short Sides	.06-.19 in. (1,52-4,83 mm)	2B1	2B3

Note: Panels .19 in. (1,52 mm) thick require the .06-.19 in. (1,52-4,83 mm) type barriers.



Flanges on long sides



FLANGE MOUNT MODULES

Flange mount assemblies are identical in panel appearance. Operator-indicator housings have spring clips for switch modules attachment (not provided with indicator housings).

Barriers are not required, since the panel mounting clips are ready-attached to flange sides of the housings. However, spacing barriers can be used for color-coding. They also aid in preventing inadvertent operation of two screens with one push.

Mounting dimensions on page 120.

FLANGE MOUNT HOUSING ORDER GUIDE

See ‘‘Application Data’’ for typical bailing circuits for coil-equipped modules.

Flanges On:	No. of Lamp Sockets	Tool Not Required	
		Operator-Indicator	Indicator Only
Long Sides of Housing	2 (A & C) 4 (A-D)	2C204 2C206	2F206

SPACING BARRIER ORDER GUIDE

For .06-31 in. (1,5-7,9 mm) thick panels.

Spacing Barrier Type	Catalog Listings	
	Gray	Black
For Long Flange Housing	2B9	2B18

Manual Switches

Series 2

Pushbutton Switches and Indicators

SWITCH MODULES

Interchangeable type 2D switch modules attach to spring clips on the bottom of operator-indicator housings. There is a wide selection of circuitry, electrical ratings, operating actions and terminations.

For mounting dimensions, see page 121.

SM SUBMINIATURE MULTI-SPDT SWITCH MODULES

Momentary action

Alternate action

SM switch modules offer a choice of two momentary action styles, one with a pronounced touch-feedback, the other with low operating force for rapid repeat actuation. Also available with alternate-action and combination momentary/alternate action modules. Extra length turret solder terminals.

ELECTRICAL RATING

Silver contacts:
30 VDC: 5 amps res. sea level or 50,000 ft, 3 amps ind. sea level, 2.5 amps 50,000 ft. Max. inrush, 24 amps.
UL and CSA rating for basic switch: 5 amps, 125 or 250 VAC.

Gold contacts:
30 VDC: 0.5 amp ind., 1 amp res., sea level and 50,000 ft. Max. inrush, 2 amps.

SM SWITCH MODULE ORDER GUIDE

No. of SPDT Circuits	Momentary Action Touch-Feedback Type Silver Contacts	Alternate Action Low Force Type Silver Contacts
1	2D100	2D118
2	2D2	2D26
4	2D9	2D33

V3 COMPACT SPDT/DPDT SWITCH MODULES

V3 switch modules have screw terminals with lockwashers. Quick-connect terminals (not shown) are also available. When used with short-flange operator indicators, add spacing barriers to prevent interference.

ELECTRICAL RATING

30 VDC: 10 amps ind.* sea level, 6 amps ind.,* 50,000 ft. Motor load, 6 amps.** UL and CSA rating for basic switch: 10 amps, ⅓ Hp, 125 or 250 VAC; ½ amp, 125 VDC; ¼ amp, 250 VDC.

* Inductive currents in accordance with AN3179.
** Motor load rating based on starting current.

V3 SWITCH MODULE ORDER GUIDE

No. of SPDT Circuits	Momentary Action
1	2D70
2	2D72

Manual Switches

Series 2

Pushbutton Switches and Indicators

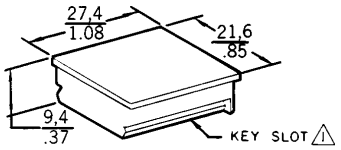
ONE-PIECE DISPLAY SCREEN OPTIONS

Single-section

These translucent solid color display screens are single-section/one piece construction

SINGLE-SECTION/ ONE-PIECE SCREENS ORDER GUIDE

	Standard
Red	2A1
Yellow	2A2
Green	2A3
White	2A5



⚠ KEY SLOT FACES SIDE OF HOUSING SHOWING CATALOG LISTING (ABOVE LAMP TERMINALS "A" AND "B")

THREE-PIECE DISPLAY SCREEN OPTIONS

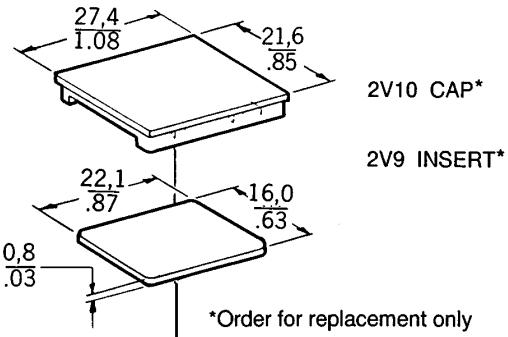
Single-section

These screens have transparent colored or colorless caps, transparent colorless legend inserts and translucent colored bases.

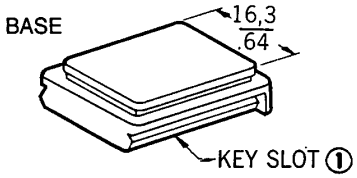
SINGLE-SECTION/THREE-PIECE SCREENS ORDER GUIDE

Color	Colorless Caps
Red	2A81
Yellow	2A82
Green	2A85
White	2A70
Amber	2A114

NOTE:
Add **–L** to catalog listing if button is to be legended.



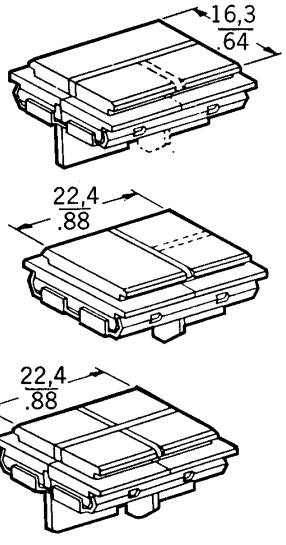
*Order for replacement only



① Key slot faces side of housing showing catalog listing (above lamp terminals "A" and "B")

TWO, THREE AND FOUR-SECTION DISPLAY SCREENS

Dotted lines show 3-section base configuration



Silicone rubber baffles prevent light spillage from one section to another. Screen caps and legend inserts are transparent colorless. Bases are translucent colored.

For more information on 2, 3, and 4-section display screens, contact the MICRO SWITCH Application Center.

Honeywell

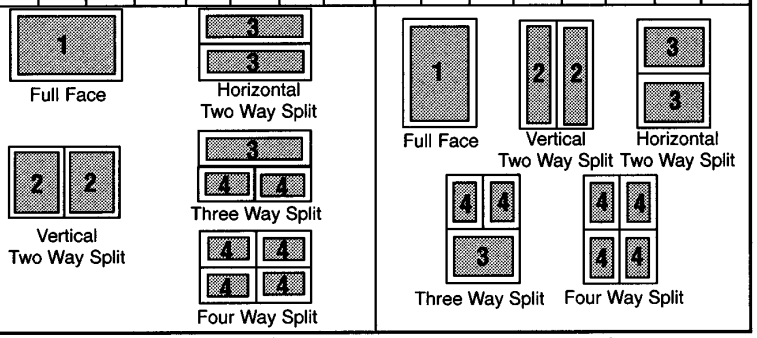
Series 2A, 2L and 2W Legend Order Sheet

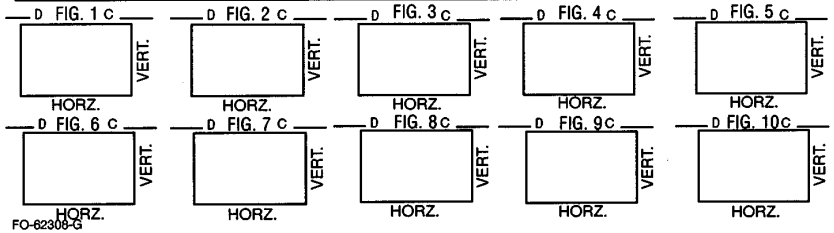
ACCOUNT NO. 126-035

1. Complete ORDER SHEET for EACH NEW or REPEAT ORDER.
2. For each different legend, fill in a Diagram below as follows:
   a. Determine proper oreintation of the legend (HORIZONTAL or VERTICAL).
   b. For SPLIT SCREEN ORDER, draw line(s) to show where the split occurs and indicate BASE COLOR for each section.
   c. PRINT or TYPE the required legend in the diagrams provided.
   d. Fill in QUANTITY and FIGURE NO, in the columns to the right.
   e. Indicate keyed corner on all 2L listings.

Form No Shaded Area	HORIZONTAL								VERTICAL							
	1		2		3		4		1		2		3		4	
TYPE SIZE	MAX. CHAR /LINE	MAX. LINES /AREA	MAX. CHAR. /LINE	MAX. LINES /AREA	MAX. CHAR /LINE	MAX. LINES /AREA	MAX. CHAR /LINE	MAX. LINES /AREA	MAX. CHAR. /LINE	MAX. LINES /AREA	MAX. CHAR. /LINE	MAX. LINES /AREA	MAX. CHAR. /LINE	MAX. LINES /AREA	MAX. CHAR. /LINE	MAX. LINES /AREA
5/64	12	5	6	5	12	2	6	2	8	6	4	6	8	3	4	3
7/64	9	4	4	4	9	2	4	2	6	5	3	5	6	2	3	2
9/64	7	3	3	3	7	1	3	1	5	4	2	4	5	2	2	2
13/64	5	2	2	2	5	1	2	1	3	3	1	3	3	1	1	1
5/16	3	1	1	1	3	1	1	1	2	2	1	2	2	1	1	1

LEGEND AREAS





FO-62309-G

Catalog Listing		
Customer P.O. No.	Customer Dwg. No.	
MICRO SWITCH Sales Order	Line Number	Schedule No.

Customer: _____

Address: _____

(state) (city)

Quantity Ordered	Fig No.	Size	Ink Color BLK	Ink Color WHT	Customer Part Number

NOTE: Round, three and four-way splits are not available on 2W Series Display Screens. Only black and white type is available.

Modified Gothic lettering (A thru Z). numerals (0 thru 9) and Symbols below available in 5/64, 7/64, 9/64, 13/64 and 5/16.

A3
Modified Gothic

STANDARD SYMBOLS AVAILABLE

.	,	:	;	!	?	'	_	"	/	(	)	*	&	
$	¢	#	%	°	+	-	±	÷	x	=	≠	>	<	
→	↑	↓	←	C_R	1/4	1/2	3/4	1/3	2/3	@	∞			

(Signature) _____ (Date) _____

LEGEND INFORMATION

Honeywell MICRO SWITCH Division provides legend service on the inserts supplied with three-piece screens only. To specify your needs, add -**L** to the catalog listings (example: 2A81-L) and use Legend Order Sheet (Form FO-62308), shown on facing page. Reproduce it on your office copier.

On any one insert, only one size of type is provided in either black or white. After legending, the insert is assembled to the display screen. The type face used is ''Modified Gothic''.

LAMPS

T-1¾ incandescent lamps are available from MICRO SWITCH in 28 volt versions.

Use of neon lamps is not recommended. Light output is approximately 30% of an incandescent lamp. Also, a neon lamp will not illuminate blue or green filters or display screens due to the absence of these colors from the neon light spectrum.

LAMP POLICY

The 28 volt lamps are offered as a convenience to customers. Honeywell MICRO SWITCH Division does not extend any warranty as to such lamps, and cannot guarantee to provide lamps from specific manufacturers. Any technical or quality questions regarding such lamps should be directed to the lamp manufacturer.

COLOR FILTERS FOR PROJECTED COLOR

Projected color is achieved by using white buttons and color filters over clear lamps. When lamps are lighted, white button takes on color projected by the filters.

Filters used with type 2C200 and 2F200 housings (no-tool relamping) slip over lamp sockets in lampholder.

MIL-S-22885 ASSEMBLED DEVICES

Pushbutton switches and indicators can be ordered as assembled devices from a single MIL-S-22885 part number. Designated Series 2W, they are available for flange mounting and have the no-tool relamping feature. For ordering information, refer to MICRO SWITCH Catalog 80.

SCREEN/LEGEND COLORS

The chart below shows recommended display screen and legend color combinations for optimum legibility.

Screen Color	Legend Lettering	
	Black	White
Red		x
Green		x
Yellow	x	
Amber	x	x
White	x	

LAMP ORDER GUIDE

Catalog Listing	Base Style	Type No.	Rating			Life/Voltage†	
			Volts	Amps	Life in Hours	Volts	Expected Life (Hrs.)
2E1	Flange	327	28	.040	1000	24.0 26.0 30.0	7,500 2,800 400

† These are experimental continuous life test results supplied by a lamp manufacturer for reference only. Intermittent operation may reduce these figures as much as 50%. Ratings are based on median values of current and life.

Wattage should not exceed 2.4 watts (2 lamps) per switch, for continuous illumination.

FILTER ORDER GUIDE

Filter Style	Red	Green	Amber	White*
For Type 2C200 and 2F200 Housings	2G12	2G14	2G16	2G17

* Has blue tint to compensate for high yellow content of incandescent lamps at low voltages.

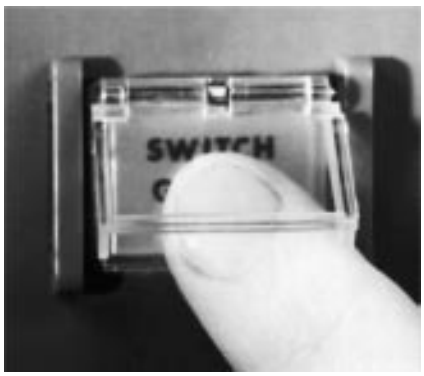
Manual Switches

Series 2

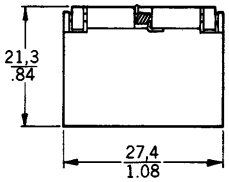
Pushbutton Switches and Indicators

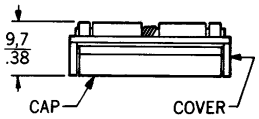
SWITCH GUARD ACCESSORY
A hinged cover on the switch guard helps avoid inadvertent operation of the display screen. It is installed in place of the transparent slide-on cap furnished with three-piece screen. Note: When used with pull-in coil devices, specify the 2C200 operator-indicator housings which have the no-tool relamping feature.

Barrier mount assembly with guard installed. (Can also be used with all flange mount units.)



Guard requires a ‘‘lift-to-push’’ response to operate switch normally.





Key: 0,0 = mm / 0.00 = inches

Order Catalog Listing **2H20**

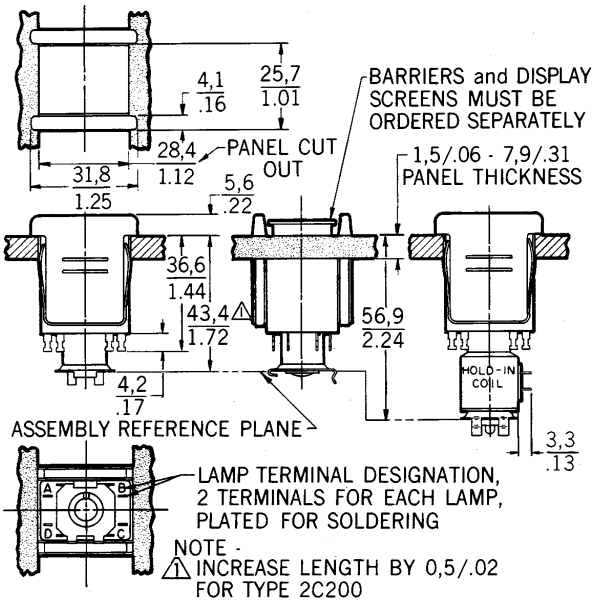
Manual Switches

Series 2

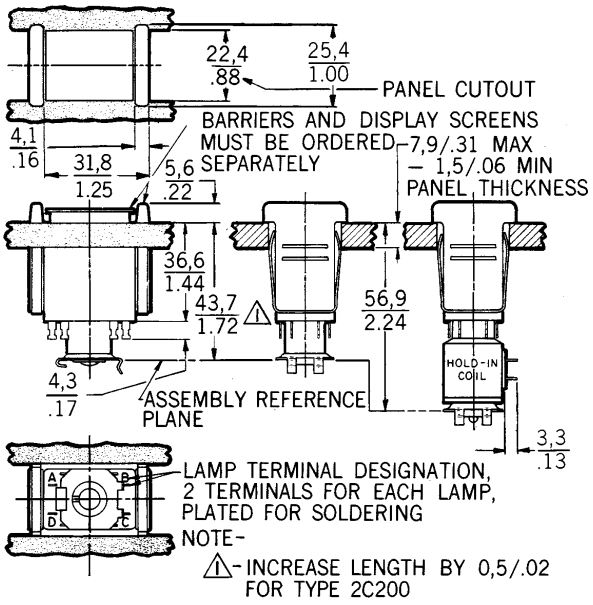
Pushbutton Switches and Indicators

MOUNTING DIMENSIONS (For reference only)

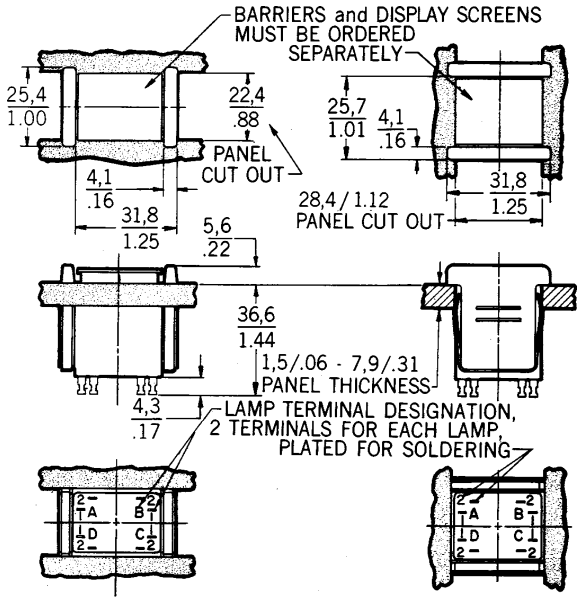
Long barrier operator-indicators



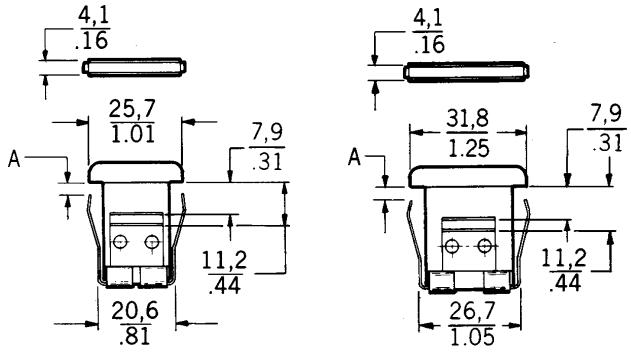
Short barrier operator-indicators



Short barrier indicators **Long barrier indicators**



Mounting barriers



A	Panel Thickness
1,5/.06 4,6/.18	1,5-4,81/.06-.19 4,8-7,9/.19-.31

Length Of Panel Cutout*

Type of Indicator or Operator-Indicator		Number of Units						
		1	2	3	4	5	6	7
Short Barrier	mm	36,09	68,00	99,87	131,72	163,60	195,48	227,36
	in.	1.421	2.677	3.932	5.186	6.441	7.696	8.951
Long Barrier	mm	30,00	55,78	81,58	106,34	133,12	159,90	184,68
	in.	1.181	2.196	3.212	4.226	5.241	6.256	7.271

* Nominal dimensions, ±0,25 mm/0.10 in. (In 5% of the cases, the cutout will be undersized for the build-up of assembled units and will require enlargement.

Pushbuttons

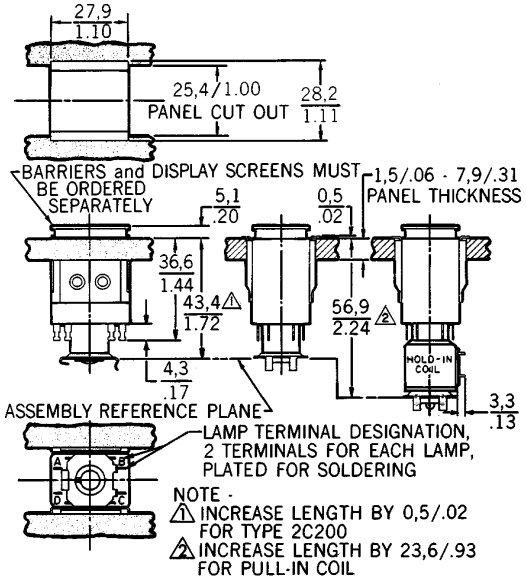
Manual Switches

Series 2

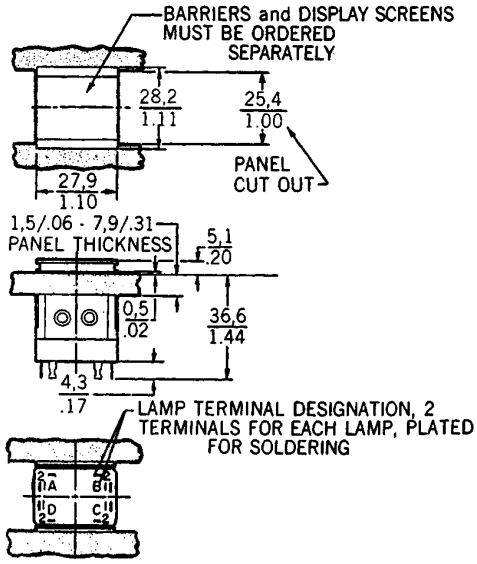
Pushbutton Switches and Indicators

MOUNTING DIMENSIONS (For reference only)

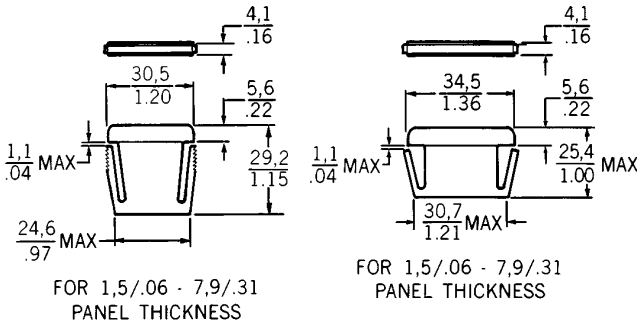
Long flange operator-indicators



Long flange indicators



Spacing barriers



Key: 0,0 = mm / 0.00 = inches.

Length Of Panel Cutout*

Add 4,19 mm/.165 in. to length for each optional spacing barrier used.

Type of Indicator or Operator-Indicator		Number of Units						
		1	2	3	4	5	6	7
Long Flange	mm	27,94	55,75	83,57	111,36	139,17	166,98	194,77
	in.	1.1	2.195	3.290	4.384	5.479	6.574	7.668

*Nominal dimensions, ±0,25 mm/0.10 in. (In 5% of the cases, the cutout will be undersized for the build-up of assembled units and will require enlargement.

Manual Switches

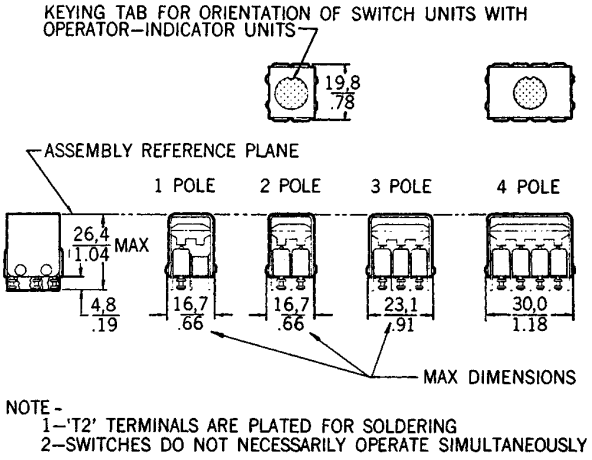
Series 2

Pushbutton Switches and Indicators

MOUNTING DIMENSIONS (For reference only)

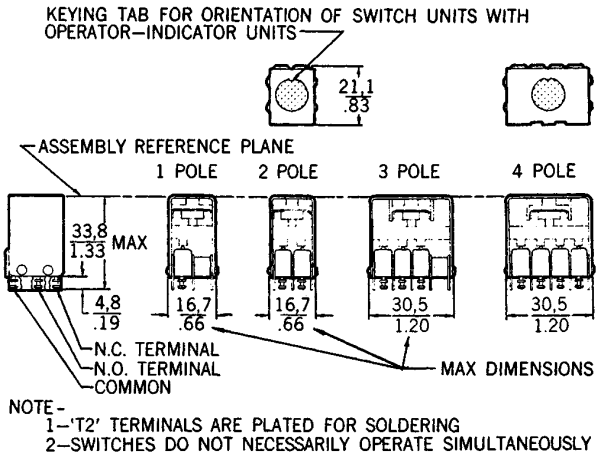
SM Switch Modules

Momentary



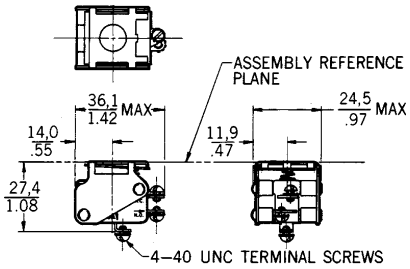
NOTE -
1–'T2' TERMINALS ARE PLATED FOR SOLDERING
2–SWITCHES DO NOT NECESSARILY OPERATE SIMULTANEOUSLY

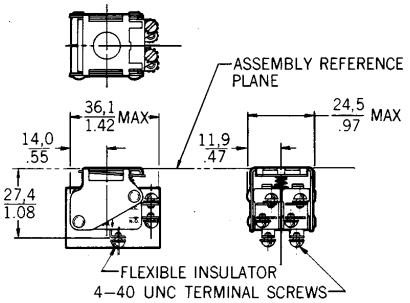
Alternate-Action



NOTE -
1–'T2' TERMINALS ARE PLATED FOR SOLDERING
2–SWITCHES DO NOT NECESSARILY OPERATE SIMULTANEOUSLY

V3 Switch Modules





Pushbuttons

Manual Switches

DM Series

Pushbutton Switches

SWITCHES WITH SNAP-ON BUTTONS

With button ''A''

With button ''B''

SPDT

DPDT

FEATURES

- Attractive, rugged snap-in panel mount design — easy installation.
- Snap-on or integral pushbuttons.
- Choice of momentary, alternate, push-pull and pull-to-cheat operation.
- Quick-connect terminals.
- Expected mechanical life: 1 million operations, 95% survival.
- Temperature range: –35° to +180°F (–37° to 82°C)
- UL recognized, (E12252) CSA certified (LR4442).

Three different styles of snap-on buttons can be used with the DM switches shown above. There is a choice of momentary or alternate-action, and single or double-pole circuitry.

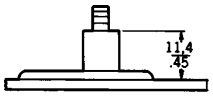
SWITCH ORDER GUIDE

Switches have gray faceplates. Buttons are not included.

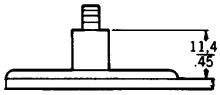
Circuitry	Momentary Action
SPDT	3DM1
DPDT	4DM1

Order buttons separately or ready-installed on switches from the order guide below.

SPDT



DPDT

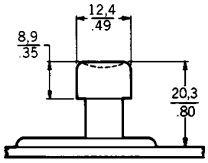
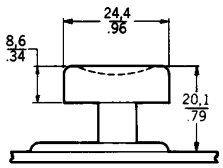


ELECTRICAL RATING

UL and CSA rating: 10 amps, 1/2 Hp, 125, 250 or 277 VAC.

SWITCH/BUTTON ORDER GUIDE

Switches have gray faceplates.

Button Style	Button Color	Button Only	Momentary Action 3DM1 (SPDT) and Button	Momentary Action 4DM1 (DPDT) and Button	Alternate Action 2003DM1 (SPDT) and Button
 A	Black	31PA1	13DM1-A1	14DM1-A1	
	Red		13DM1-A2	14DM1-A2	
 B	Black	31PA3	13DM1-B1	14DM1-B1	
	Red	31PA4	13DM1-B2	—	2013DM1-B2

Manual Switches

Series 4

Pushbutton Switches and Indicators

Bezel on all sides

Barriers on short sides

Barriers on long sides

Barrier on one short side

Barriers on one long side

FEATURES

- Provides distinctive color display whether lighted or unlighted.
- Convenient front panel mounting and relamping, without tools.
- Matching indicators.
- Locked button option discourages tampering.
- Choice of transmitted color, projected color, or dead front display.
- UL recognized, CSA certified.

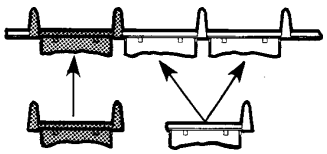
MOUNTING

Snap-in mounting. Switch or indicator is easily inserted into the cutout. Mounting clips grip the panel. No tools are needed.

Housings with a full bezel can be front panel or sub-panel mounted, individually or in strips.

Barrier type housings are normally mounted top-of-panel in strips, but can also be individually mounted. Barriers can be on either the short or long housing sides.

The drawing shows how housings with a barrier on one side are used in a strip of two or more units. The first has a barrier on two sides, while all other units have a barrier on one side, and butt against each other.



Barriers on both sides. Barriers on one side.

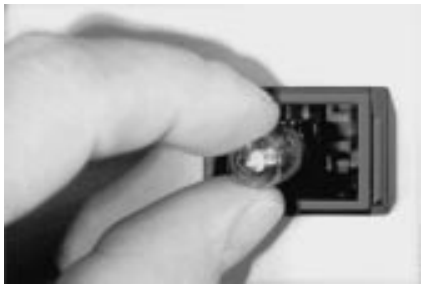
Button

Incandescent Lamp

Housing

RELAMPING

1. Lamps and legends can be changed from panel front. When button is removed, lamp is extracted from its socket and retained in button.



2. Ease of lamp replacement. After the inoperative lamp is automatically removed with the button, the new lamp is inserted without the use of tools.

ELECTRICAL RATINGS

5-amp silver contacts —
5 amps res., 3 amps ind., 30 VDC.
UL code L-4: 5 amps, 250 VAC

10-amp silver contacts —
UL code L-285; 10 amps, ⅙ Hp, 125 or 250 VAC.

Gold contacts —
1 amp res., 0.5 amp, ind., 30 VDC
UL code L-22: 1 amp, 125 VAC

Gold alloy contacts —
0.1 amp, res., 30 VDC;
1 amp, 125 VAC.

LOCKED BUTTON OPTION

Series 4 can be furnished with a locked button option for use in areas accessible to the public, where tampering and vandalism are problems. The housing has a special mounting clip with built-in button retainer. This mounting clip must be removed from behind panel to allow button removal. Button movement during switch operation is unaffected by locked button feature. (These units cannot be relamped from front of panel.)

Manual Switches

Series 4

Pushbutton Switches and Indicators

SWITCH HOUSING ORDER GUIDE

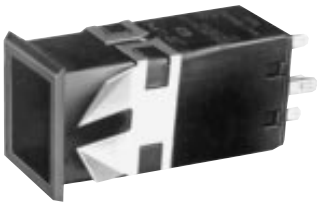
Order buttons separately from page 116.

4A11B — **AA** — **11**

Switch Housing Style (Black)
4A11B Bezel: all sides Mtg. clips: long sides
4A12B Bezel: all sides Mtg. clips: short sides
4A31B Barriers: long sides Mtg. clips: long sides
4A32B Barriers: long sides Mtg. clips: short sides
4A33B Barrier: one long side Mtg. clips: long sides
4A34B Barrier: one long side Mtg. clips: short sides
4A21B Barriers: short sides Mtg. clips: long sides
4A22B Barriers: short sides Mtg. clips: short sides
4A23B Barrier: one short side Mtg. clips: long sides
4A24B Barrier: one short side Mtg. clips: short sides
With Housing Provision for Locked Button
4A13B Bezel: all sides Mtg. clips: long sides
4A25B Barriers: short sides Mtg. clips: long sides
4A26B Barrier: one short side Mtg. clips: long sides
4A35 Barriers: long sides Mtg. clips: long sides
4A36 Barrier: one long side Mtg. clips: long sides

Switching Element			
		Terminals	
Electrical Data	Action	.110 QC	PC*
1-Pole (SPDT), 5 a. silver contacts	Momentary	**AA**	**AD**
	Alt. Action	**BA**	**BD**
2-Pole (DPDT), 5 a. silver contacts	Momentary	**EA**	**ED**
	Alt. Action	**FA**	**FD**
1-Pole (SPDT), gold contacts	Momentary	**CA**	**CD**
	Alt. Action	**DA**	**CD**
2-Pole (DPDT), gold contacts	Momentary	**GA**	**GD**
	Alt. Action	**HA**	**HD**
1-Pole (SPDT), 10 a. silver contacts	Momentary	**LA**	
	Alt. Action	**MA**	
2-Pole (DPDT), 10 a. silver contacts	Momentary	**NA**	
	Alt. Action	**PA**	
1-Pole (SPDT), gold alloy contacts	Momentary	**QA**	
	Alt. Action	**RA**	
2-Pole (DPDT), gold alloy contacts	Momentary	**TA**	
	Alt. Action	**VA**	

Incandescent Illumination
11 No lamp, has lamp socket for T-3¼ wedge base lamps.
21 #161 12-volt T-3¼ lamp.
31 #656 or 152 28-volt T-3¼ lamp
91 Unlighted, no lamp socket.



Example:
4A11BAA11
Black switch housing with a bezel on all sides, mounting clips on long sides, 1-pole momentary-action 5-amp silver contacts, 110″ quick-connect/solder terminals, and a T-3¼ lamp socket.

MOUNTING CLIP ORIENTATION

Mounting clips on the **long sides** of the housing are specified when individually mounted or when the long sides of strip mounting housings parallel the long sides of the panel cutout slot. The most secure mounting is achieved when the mounting clips are on the long sides.

Mounting clips on the **short sides** of the housing are specified when short sides of strip mounted housings parallel the long sides of the panel cutout slot.

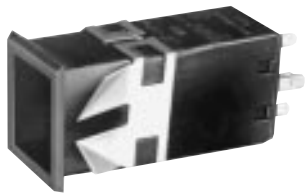
INDICATOR ORDER GUIDE

Order buttons separately from page 107.

4C11B **11**

Indicator Housing Style (Black)		
	Terminals	
Description	**.110 Q.C.**	**P.C.**
Bezel: all sides Mtg. clips: long sides	**4C11B**	**4D11B**
Bezel: all sides Barriers: short sides	**4C12B**	**4D12B**
Barriers: short sides Mtg. clips: long sides	**4C21B**	**4D21B**
Barriers: short sides Mtg. clips: short sides	**4C22B**	**4D22B**
Barrier: one short side Mtg. clips: long sides	**4C23B**	**4D23B**
Barrier: one short side Mtg. clips: short sides	**4C24B**	**4D24B**
Barriers: long sides Mtg. clips: long sides	**4C31B**	**4D31B**
Barriers: long sides Mtg. clips: short sides	**4C32B**	**4D32B**
Barrier: one long side Mtg. clips: long sides	**4C33B**	**4D33B**
Barrier: one long side Mtg. clips: short sides	**4C34B**	**4D34B**
With Housing Provision for Locked Button		
Bezel: all sides Mtg. clips: long sides	**4C13B**	**4D13B**
Barriers: short side Mtg. clips: long sides	**4C25B**	**4D25B**
Barrier: one short side Mtg. clips: long sides	**4C26B**	**4D26B**
Barriers: long sides Mtg. clips: long sides	**4C35B**	**4D35B**
Barrier: one long side Mtg. clips: long sides	**4C36B**	**4D36B**

Incandescent Illumination
11 No lamp, has lamp socket for T-3¼ wedge base lamps.
21 #161 12-volt T-3¼ lamp.
31 #656 or 152 28-volt T-3¼ lamp
91 Unlighted, no lamp socket.



Example:
4C11B11
Black indicator housing with a bezel on all sides, mounting clips on long sides, 110″ quick-connect/solder terminals, and a socket for a T-3¼ lamp.

MOUNTING CLIP ORIENTATION

Mounting clips on the **long sides** of the housing are specified when individually mounted or when the long sides of strip mounted housings parallel the long sides of the panel cutout slot. The most secure mounting is achieved when the mounting clips are on the long sides.

Mounting clips on the **short sides** of the housing are specified when short sides of strip mounted housings parallel the long sides of the panel cutout slot.

HOW TO ORDER ASSEMBLED SWITCHES OR INDICATORS

With lamp assembled:
To order a lamp assembled, enter the appropriate ILLUMINATION Code Number, as shown in the lamp chart on the next page. Example: 4A11BBA**12** is furnished with a 6-volt lamp installed.

With button assembled:
To order a button assembled in the housing, add the code letters for BUTTON TYPE, DISPLAY COLOR, and LEGEND (page 60) to the housing listing. Example: 4A11BBA12**AGN** is furnished with a green transmitted-color unlegended button assembled in the housing (and with a 6-volt lamp installed).

Manual Switches

Series 4

Pushbutton Switches and Indicators

BUTTON ORDER GUIDE

4B1

Button With Metal Shell*

4B2
Both button and metal shell provided.

Button With Metal Shell, With Provision for Locked Button*

4B3
Both button and metal shell provided.

Button Without Metal Shell

4B1
Button only. (without metal shell). For replacement purposes only.

*To be ordered with switch.

A

Button Type

A
Transmitted color. 5 sides lighted. 1-piece translucent button.

B
Projected color 5 sides lighted. Translucent white button & color insert.

C
Dead front, 5 sides lighted. Transparent black button & translucent color insert

D
Dead front, Only face lighted. Transparent black button & translucent color insert.

E
Transmitted color. 5 sides lighted. Transparent colorless button & translucent color insert. U, N, or K type only.

F
Transmitted color. Only face lighted. Transparent colorless button & color insert. U, N or K type only.

G
Same as type "A" except .250″ higher

G

Display Color

B
Std. Blue

G
Std. Green

R
Std. Red

S
Transparent Black (Unlighted applications only)

Y
Std. Yellow

W
Std. White (Do not use with Type B button)

A
Std. Amber (For use with Type A or G button only)

N

Legend (Legend Order Sheet must accompany all orders for legended buttons)

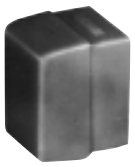
U
No legend, button (incl. insert) unassembled. (For customer who does own legending.) Use with any button except 4B1A—

N
No legend, button assembled. (For applications not requiring legends.) Use with any button.

L
Legend on button only, button assembled. (For customer who prefers to have MICRO SWITCH provide legending.) Use with any button except E and F.

K
Legend on insert only, button assembled. (for C, D, E and F button types.)

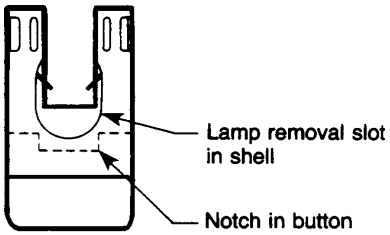
J
Legends on both *button and insert,* button assembled. Use with C & D button types



Button

Button and metal shell

Example:
4B1AGN
Green (transmitted color) unlegended button. (If the button shell is also desired, substitute 4B2 for 4B1.)



Note: legended button should be assembled as shown above, with button notch keyed to lamp removal slot in shell. This will reduce possibility of lamp droppage when button is removed from the housing. Buttons are legended in this manner.

LEGENDING

Pad printed legends
Use Legend Order Sheet FO-63039 (see page 110) to specify pad printed legends. Reproduce it on your office copier. Legends are oversprayed for maximum durability.

Film legends
Film legends are not supplied by MICRO SWITCH. However, this service is readily available from commercial sources or may be provided through your in-house capabilities. The film should be polyester to withstand lamp heat and must be precision cut, per the dimensions shown on the next page, to insure proper alignment.

The film fits into a small undercut on the face of the button insert. The film is held securely when the outer button and insert are snapped together. (Note: It is difficult to disassemble for legend changes without damaging the parts.)

Button and insert should be snapped together prior to being assembled to the button shell.

LAMP ORDER GUIDE

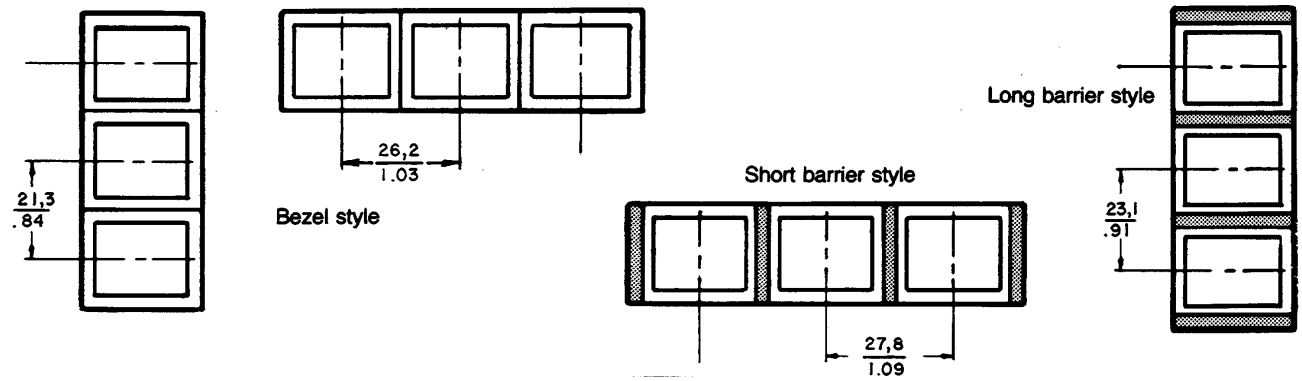
Catalog Listing	Illum. Code	Incandescent Lamp Description
4Z221	21	#161 12-volt (T-3¼)
4Z231	31	#656 or #152 28-volt (T-3¼)

LAMP DATA

Following data was compiled from manufacturers' specifications and is provided for reference only.

Illum. Code	Industry Lamp No.	Design Volts	Incandescent Lamp Specifications			
21	161	14	Socket volts Amps MSCP Life (hrs. avg.)	14.0 .19 1.0 4,000	12.0 .17 .60 25,000	11.0 .16 .4 26,500
31	656 or 152	28	Socket volts Amps MSCP Life (hrs. avg.)	28.0 .06 .65 5,000	27.0 .057 .52 7,500	26.0 .054 .49 10,000

MOUNTING CENTERS FOR STRIP MOUNT



PANEL CUTOUT FOR STRIP MOUNT

	Housing Style	Dimensions +0,38 +.015 −0,00 −.000	
		Width	Length
Short Sides Abutting	Full Bezel	79″ (20,1 mm)	[No. of units x 1.03″ (26,2 mm)] - .05″ (1,4 mm)
	Short Barrier	79″ (20,1 mm)	[No. of units x 1.09″ (27,8 mm)] - .12″ (3,0 mm)
Long Sides Abutting	Full Bezel	.98″ (24,8 mm)	[No. of units x .84″ (21,3 mm)] - .05″ (1,4 mm)
	Long Barrier	.98″ (24,8 mm)	[No. of units x .91″ (23,1 mm)] - .12″ (3,0 mm)

REPLACEMENT PARTS

MOUNTING CLIPS ORDER GUIDE

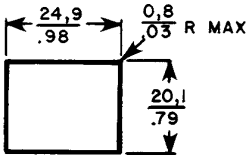
Catalog Listing	Description
4Z31	For long sides
4Z32	For short sides

* Each housing requires tqo long or short mounting clips.

METAL SHELL ORDER GUIDE

Catalog Listing	Description
4Z41	For type 4B1 buttons
4Z42	For type 4B3 buttons

PANEL CUTOUT FOR INDIVIDUAL MOUNT (any housing style)

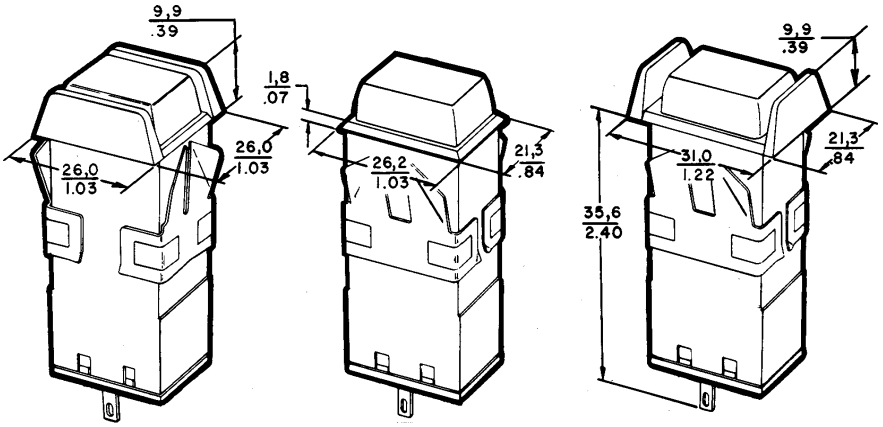


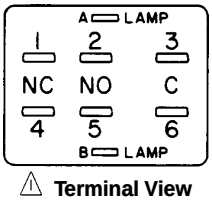
Manual Switches

Series 4

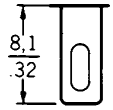
Pushbutton Switches and Indicators

MOUNTING DIMENSIONS (For reference only)

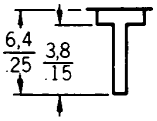




⚠ **Terminal View**



.110 QC terminal



Printed circuit terminal

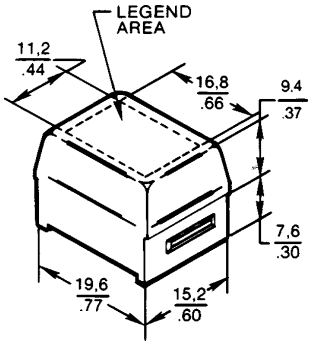
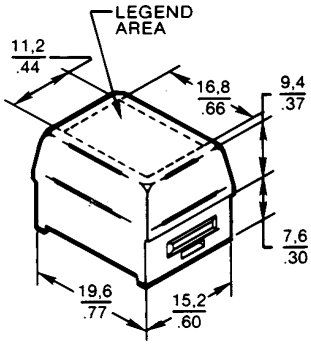
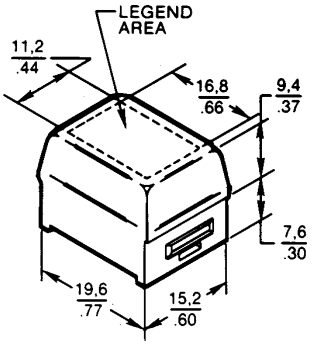
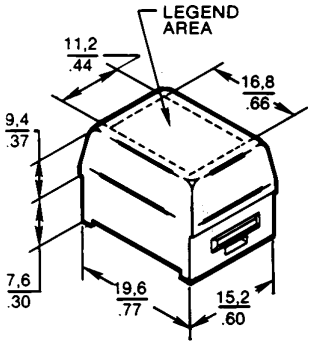
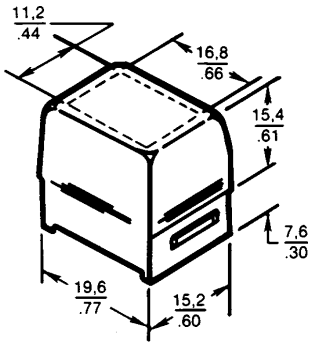
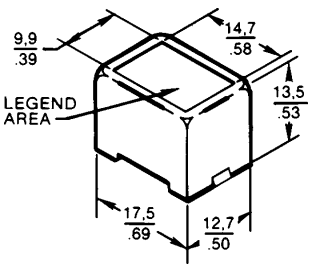
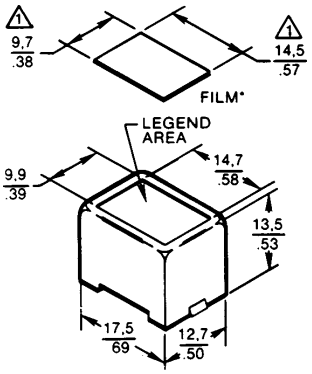
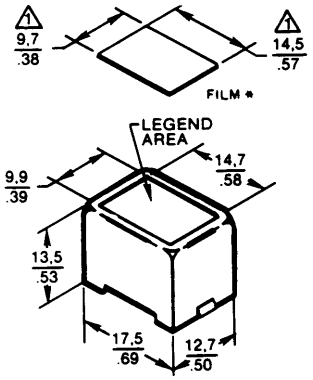
Panel thickness: .040-.200 in. (1,02-5,08 mm)

Key: 0,0 = mm / 0.00 = inches

⚠ For proper legend orientation, Series 4 switch when viewed from front of panel, should have terminals 1 and 3 up for Figures 1 & 3 and to the right for Figures 2 and 4. (Figures 1-4 on Legend Order Sheet next page.)

Quick-connect terminals are .110″ (2,8 mm) wide by .020″ (0,5 mm) thick. The slot is .130″ (3,3 mm) long by .048″ (1,2 mm). Printed circuit terminals are: Lamp — .025 (0,6 mm) by .020″ (0,5 mm): Switch — .025″ (0,6 mm) square.

All terminals are plated to permit soldering.

Type A Button (5 sides lighted)	Type B Button (5 sides lighted)	Type C & E Buttons (5 sides lighted)	Type D & F Buttons (Only face lighted)
 Translucent Colored Button	 Translucent White Button	 Transparent Button Type C-Black Type-E Colorless	 Transparent Button Type D-Black Type F-Colorless
Type G Button (5 sides lighted)			
 Translucent Colored Button	 Transparent Colored Insert	 Translucent Colored Insert	 Opaque Black Insert With Translucent Colored Face

±.005/0,13

*Thickness: .004″ to .007″/0,1 to 0,18 (Film furnished by customer)

Pushbuttons

Honeywell

"Series 4" Legend Order Sheet

ACCOUNT NO. _____

1. Determine if legend is to be applied to outer button shell, or to button insert.
2. Select oppropriate Fig. No. from Chart "A" or "B", and enter on legend order chart.
3. Place √ in appropriate "TYPE SIZE" column *(refer to CHART "C" for examples).*
4. Place √ in BLACK or WHITE legend color column.
5. Indicate quantity desired.
6. Fill in legend description. *(DO NOT EXCEED MAXIMUM NUMBER OF LINES OR*

Catalog Listing **4**		
Customer P.O. No.	Customer Dwg. No.	
MICRO SWITCH Sales Order	Line Number	Schedule No.

Customer: _____

Address: _____

(state) (city)

A Button: Legend on Top Surface

Legend Area	Type Size	Fig. 1				Fig. 2			
		Without An "M" or "W"		With An "M" or "W"		Without An "M" or "W"		With An "M" or "W"	
		Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area
Fig. 1	5/64	9	4	9	4	7	5	6	5
Fig. 2	7/64	7	3	6	3	5	4	4	4
	9/64	6	2	5	2	4	3	4	3
	13/64	4	1	3	1	3	2	2	2
	5/16	2	1	2	1	2	1	1	1

B Button Insert: Legend on Top Surface

Legend Area	Type Size	Fig. 1				Fig. 4			
		Without An "M" or "W"		With An "M" or "W"		Without An "M" or "W"		With An "M" or "W"	
		Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area	Max. Char. /Line	Max. Lines /Area
Fig. 3	5/64	7	3	7	3	4	4	4	4
Fig. 4	7/64	5	2	5	1	3	3	3	3
	9/64	5	1	5	1	3	2	2	2
	13/64	3	1	2	1	2	2	1	2
	5/16	2	1	1	1	1	1	1	1

C

Modified Gothic lettering (A thru Z). numerals (0 thru 9) and Symbols below available in 5/64, 7/64, 9/64, 13/64 and 5/16.

A3
Modified Gothic

STANDARD SYMBOLS AVAILABLE

.	,	:	;	!	?	'	_	"	/	(	)	*	&
$	¢	#	%	°	+	-	±	÷	x	=	≠	>	<
→	↑	↓	←	C_R	1/4	1/2	3/4	1/3	2/3	@	∞		

D

SPECIAL LEGENDS

NOTE: Use this area to show special Legend Locations or Configurations NOT shown above. NON-STANDARD legends will involve additional charges and increased delivery time.

Fig. "A"

Fig. "B"

LEGEND ORDER CHART

Customer Part No	Fig No	Type Size REF. Chart A or B					Ink Color		Button Qty	Legend Description Do Not Exceed Maximum Number of Lines or Characters Sequence: Left-to-Right or Top-to-Bottom				
		5/64	7/64	9/64	13/64	5/16	Black	White		1st Line	2nd Line	3rd Line	4th Line	5th Line

FO-63039-B

_____ (Signature) _____ (Date)

OBSOLETE

Manual Switches

SLP1 Series

Low-Profile Pushbutton Panels

FEATURES/BENEFITS

- Designed and manufactured to meet the specific needs of your application – including these feature options:
  - Custom layout.
  - Wide selection of button sizes and colors – capable of replacement from the panel front.
  - Full-face lighted buttons.
  - Legend service on buttons.
  - Can be furnished wired-only or with built-in interface electronics.
  - Provision for including lighted message displays.
  - Termination direct to PC board.
  - Custom enclosures available.
- Tactile feedback of switching action.
- Low-cost installation – complete assembly is furnished ready to attach with mounting screws. Mass termination to plug-in connector saves wiring time.
- Low energy contacts – compatible with microprocessors and other low level logic circuitry.
- Advanced construction and manufacturing processes reflect the MICRO SWITCH commitment to high quality, reliability, and performance.

These low-profile pushbutton panels combine the latest advancements in conductive rubber switching technology and pushbuttons in a custom package, tailored to your requirements. They meet the needs for reliable manual switching in applications that do not normally require high speed thruput.

Featuring .100 inch (2,4 mm) high buttons and a .505 inch (12,8 mm) panel frame depth, their low profile easily adapts to your system's styling and package size requirements. Your design can include a provision for digital readouts, CRTs, LCDs and other solid state lighted message displays, encoders, microprocessors, etc. – which can be either assembled by you or MICRO SWITCH.

TYPICAL APPLICATIONS

- Marine Control Panels
- Instrumentation
- Banking Machines
- Office Copiers
- Test Equipment
- Vending Machines
- Medical Monitoring and Diagnostic Devices
- Telecommunications Equipment
- Hand-Held Controllers
- Programmable Controllers
- Security Entrance Control
- Industrial Controls

SPECIFICATIONS

Environmental	
Operating Temperature	–40°C to 65°C (–40° to 149°F)
Storage Temperature	–40°C to 70°C (–40° to 158°F)
Altitude	–100 to 50,000 ft.
Vibration	MIL-STD-202F, Method 204, Condition A – frequency to 500 cycles: .06 in. double amplitude or 10 G's and a frequency range of 10 to 500 cycles.
Shock	MIL-STD-202F, Method 213B, Condition A – 50 G's, 1/2 sine, 11 millisecond pulse.
Sulphur Atmosphere	Withstands a sulphur atmosphere at 80% RH. 60°C (140°F) for 10 days
Steady State Humidity	MIL-STD-202F, Method 103B, Condition B – 90-95% RH at 40°C for 96 hours. Insulation resistance will not be less than 10 megohmns min.
Mechanical	
Travel (nominal)	1,3 mm (.05 in.)
Operating Force (typical)	125 grams (4.4 oz. approx.)
Operating Life	10 x 10^6 operations, 95% survival.
Force deflection (nominal)	Peak force, 125 grams (4.4 oz. approx.); Drop-off force, 60 grams (2.1 oz. approx.) (See force deflection curve chart.)
Electrical	
Contact Rating	30 mA @ 12 VDC, .500 sec. contact duration
Closed Circuit Resistance	500 ohms max. over life.
Open Circuit Resistance	10 megohmns min.
Contact Disturbance Time	10 millisec. max. at 2 lbs. (8,9 Newtons) full overtravel force, when mechanically actuated at 4 in. (10,6 mm) sec. plunger velocity.
Capacitance	Less than 20 picofarads per station.
Circuitry	X-Y or common bus.
LED	Vf Forward Voltage: 5V
	If Forward Current: 30 mA typ.
	Vr Reverse Voltage: 4V

Manual Switches

SLP1 Series

Low-Profile Pushbutton Panels

SLP1 ORDER GUIDE (All possible combinations may not be available.)

SLP1	3	2	A	12	—	27

SLP Series
SLP1

Circuitry
2-XY
3-Common Bus

Lighting
0-Unlighted
1-Red LEDs
2-Green LEDs
3-Yellow LEDs
4-Combination of LEDs

Legend
A-No Legend
B-Legended Black ink[2]
C-Legended White ink[2]
D-Legended Black and White ink[2]

Matrix
4-1×4
12-3×4
16-4×4
20-4×5

Button Color[1]

Unlighted	Lighted
-**10** Gray	-**25** Red
-**11** White	-**26** Yellow
-**12** Red	-**27** Green
-**13** Yellow	-**28** White
-**14** Green	-**29** Clear
-**15** Green (matches lighted green)	
-**16** Blue	
-**18** Black	

[1] Factory will assign non-standard LED and button colors and combinations. Complete SLP Custom Order Sheet.
[2] SLP Custom Order Sheet must accompany order.

Example:
SLP132A12-27 Common bus circuitry, green LEDS, no legend, 3×4 with green buttons.

INDIVIDUAL BUTTON CATALOGING

SLP51	A	20	—	G

Button Style
SLP51-Unlighted
SLP52-Lighted

Open Field
A

Legending
10-No legend
20-Legended Black ink[1]
21-Legended White ink[2]

Color

Unlighted	Lighted
–R Red	**–R** Red
–G Green	**–U** Green
–U Green (matches lighted green)	**–Y** Yellow
–Y Yellow	**–W** White
–B Blue	
–W White	
–K Black	
–A Gray	

[1] SLP Custom Order Sheet must accompany order.

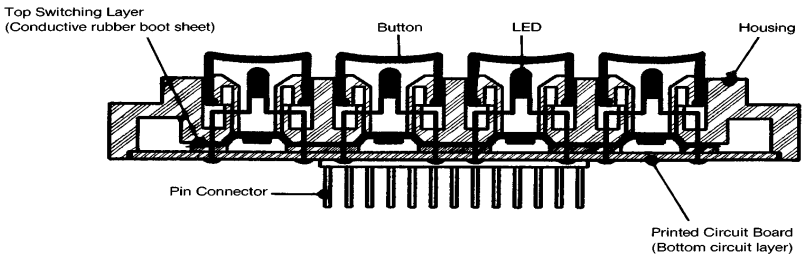
Example: **SLP51A20-G**
Green unlighted button legended with black ink.

CONSTRUCTION

The top switching layer is a conductive rubber boot sheet (see cutaway drawing). When force is applied to a button, contact is made between the boot and the bottom circuit layer on a printed circuit board. The boots impart an excellent tactile feedback (see force deflection curve chart).

A molded plastic housing, with panel slots for buttons and mounting holes in each corner, is placed over all components and ultrasonically welded to the printed circuit board. Interface circuitry can be easily added to the PCB by the user or furnished built-in.

CUTAWAY VIEW



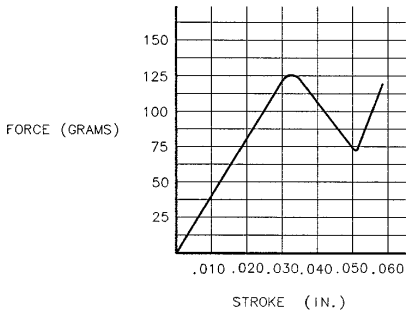
ILLUMINATION

Full face button lighting is provided by red, green, and yellow LEDs. (LED colors should be the same as the button they illuminate.) The standard SLP1 offering is for use under general office lighting conditions, which is usually about 80 foot candles. (LEDs with less brightness can be provided.)

TERMINATION

A header type connector provides termination directly from the printed circuit board. Products shown here have straight exit headers (see mounting dimension drawings). Right angle exit header connectors can also be furnished. Connector pins are .025 inch (0,64mm) square, on .100 inch (2,54 mm) centers, by .318 inch long. Suitable for use with vast array connector manufacturers' standard products.

Force Deflection Curve



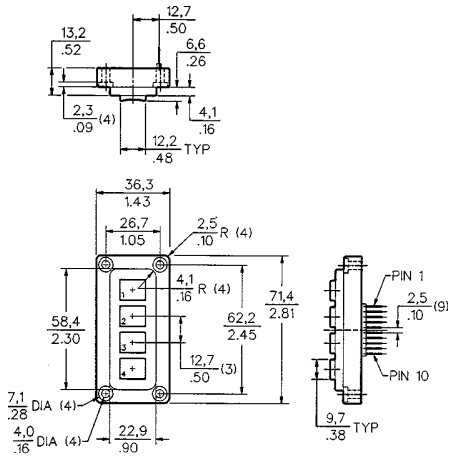
Pushbutton Panels

Manual Switches

SLP1 Series

Low-Profile Pushbutton Panels

1 X 4 PANEL



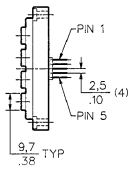
Note: Connector pins are .418 in./10,6 mm long.

LIGHTED

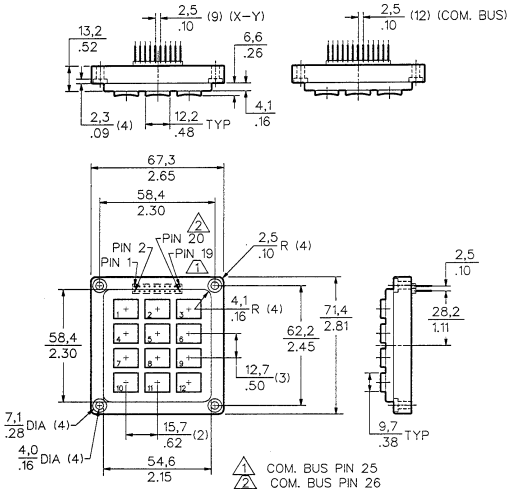
Station No.s	With C, Bus Sw. Cktry. Switch Pins:	LED Pins: Pos. Neg.
1	3-8	1-5
2	4-8	2-5
3	6-8	10-5
4	7-8	9-5

NON-LIGHTED

Station No.	Switch Pins
1	1-5
2	2-5
3	3-5
4	4-5



3 X 4 PANEL



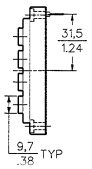
Note: Connector pins are .418 in./10,6 mm long.

LIGHTED

Station Nos.	With X-Y Sw. Cktry. Switch Pins:	With X-Y Sw. Cktry. LED Pins: Pos. Neg.	With C. Bus Cktry. Switch Pins:	With C. Bus Cktry. LED Pins: Pos. Neg.
1	6-7	1-8	9-10	1-12
2	6-9	15-8	9-14	21-12
3	6-10	19-8	9-20	25-12
4	11-7	2-8	9-7	2-12
5	11-9	16-8	9-11	22-12
6	11-10	20-8	9-18	26-12
7	12-7	3-8	9-6	3-12
8	12-9	13-8	9-13	19-12
9	12-10	17-8	9-17	23-12
10	14-7	4-8	9-8	4-12
11	14-9	5-8	9-15	5-12
12	14-10	18-8	9-16	24-12

NON-LIGHTED

Station Nos.	With X-Y Cktry. Switch Pins:	With C. Bus Ckty. Switch Pins:
1	4-5	4-13
2	4-6	8-13
3	4-7	12-13
4	3-5	3-13
5	3-6	7-13
6	3-7	11-13
7	2-5	2-13
8	2-6	6-13
9	2-7	10-13
10	1-5	1-13
11	1-6	5-13
12	1-7	9-13

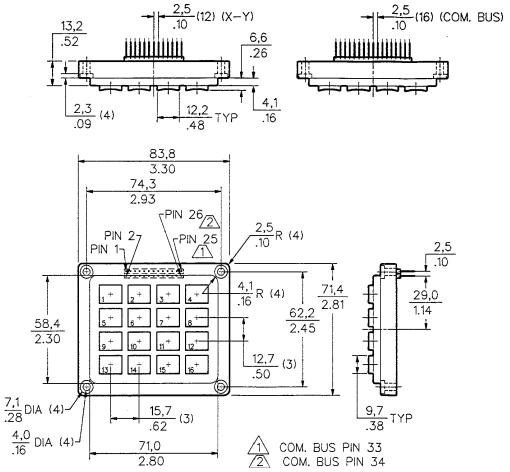


Manual Switches

SLP1 Series

Low-Profile Pushbutton Panels

4 x 4 PANEL



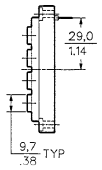
Note: Connector pins are .418 in./10,6 mm long.

LIGHTED

Station Nos.	With X-Y Sw. Cktry. Switch Pins:	With X-Y Sw. Cktry. LED Pins: Pos. Neg.	With C. Bus Sw. Cktry. Switch Pins:	With C. Bus Sw. Cktry. LED Pins: Pos. Neg.
1	15-9	2-10	3-27	2-5
2	15-12	5-10	11-27	10-5
3	15-13	21-10	24-27	31-5
4	15-16	26-10	28-27	34-5
5	18-9	1-10	4-27	1-5
6	18-12	7-10	9-27	13-5
7	18-13	6-10	23-27	12-5
8	18-16	25-10	25-27	33-5
9	17-9	3-10	6-27	7-5
10	17-12	14-10	16-27	18-5
11	17-13	24-10	26-27	22-5
12	17-16	22-10	21-27	32-5
13	20-9	4-10	17-27	8-5
14	20-12	11-10	20-27	15-5
15	20-13	8-10	19-27	14-5
16	20-16	19-10	30-27	29-5

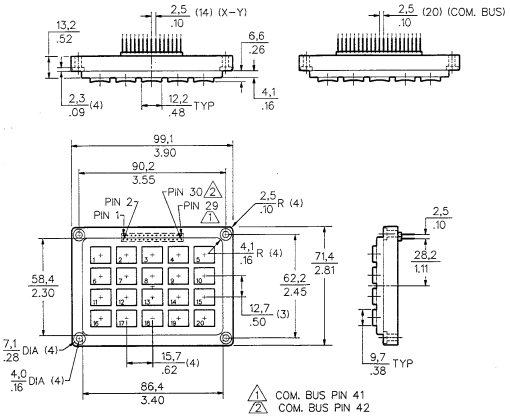
NON-LIGHTED

Station Nos.	With X-Y Cktry. Switch Pins:	With C. Bus Cktry. Switch Pins:
1	3-2	4-17
2	3-6	8-17
3	3-7	12-17
4	3-8	16-17
5	5-2	3-17
6	5-6	7-17
7	5-7	11-17
8	5-8	15-17
9	4-2	2-17
10	4-6	6-17
11	4-7	10-17
12	4-8	14-17
13	1-2	1-17
14	1-6	5-17
15	1-7	9-17
16	1-8	13-17



Pushbutton Panels

5 X 4 PANEL



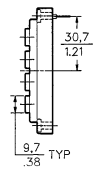
Note: Connector pins are .418 in./10,6 mm long.

LIGHTED 5 x 4 PANEL

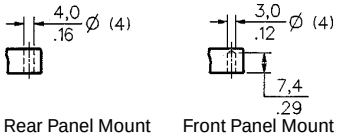
Station Nos.	With X-Y Sw. Cktry. Switch Pins:	With X-Y Sw. Cktry. LED Pins: Pos. Neg.	With C. Bus Cktry. Switch Pins:	With C. Bus Cktry. LED Pins: Pos. Neg.
1	15-7	3-23	3-38	7-28
2	15-8	2-23	8-38	2-28
3	15-13	1-23	22-38	1-28
4	14-21	29-23	32-38	41-28
5	15-26	30-23	37-38	33-28
6	19-7	4-23	4-38	10-28
7	19-8	9-23	15-38	11-28
8	19-13	18-23	21-38	19-28
9	19-21	25-23	31-38	30-28
10	19-26	28-23	40-38	29-28
11	17-7	5-23	5-38	9-28
12	17-8	11-23	17-38	13-28
13	17-13	16-23	24-38	20-28
14	17-21	20-23	36-38	25-28
15	17-26	27-23	42-38	34-28
16	14-7	6-23	6-38	12-28
17	14-8	10-23	18-38	14-28
18	14-13	12-23	23-38	16-28
19	14-21	22-23	35-38	26-28
20	14-26	24-23	39-38	27-28

NON-LIGHTED

Station Nos.	With X-Y Cktry. Switch Pins:	With C. Bus Cktry. Switch Pins:
1	4-5	4-21
2	4-6	8-21
3	4-7	12-21
4	4-8	16-21
5	4-9	20-21
6	3-5	3-21
7	3-6	7-21
8	3-7	11-21
9	3-8	15-21
10	3-9	19-21
11	2-5	2-21
12	2-6	6-21
13	2-7	10-21
14	2-8	14-21
15	2-9	18-21
16	1-5	1-21
17	1-6	5-21
18	1-7	9-21
19	1-8	13-21
20	1-9	17-21



NOTE:
In addition to the recessed mounting hole style shown, units can be furnished with straight thru-holes for rear panel mounting or blind holes for front panel mounting (see drawings below).



Rear Panel Mount Front Panel Mount

Manual Switches

SLP1 Series

Custom Low-Profile Pushbutton Panels

MODULAR SWITCH DESIGN PROVIDES CUSTOM FLEXIBILITY

This new modular switch design incorporates the same basic construction features as the MICRO SWITCH SLP pushbutton panel, plus gives you the flexibility of specifying any switch matrix configuration.

Standard buttons are .583-inch square. Other button sizes can be furnished to suit your application needs.

The modular switch construction features good ergonomics with positive tactile feedback which imparts a good feel of the switching action, and compatibility with microprocessors and other low-level logic circuitry.

The addition of a polyurethane sheet, enables the SLP modular switch to meet water spray and dust sections of NEMA 12.

HOW TO SPECIFY CUSTOM ARRAYS

Use the SLP Custom Order Sheet to specify your desired button layout, button colors, LED colors (unless buttons are to be unlighted), and legend sizes and colors (unless the buttons are to be unlegended).

A copy of the order sheet is on the next two pages. Reproduce it on your office copier or request copies of form FO-64419.

Note: To enhance the display when the buttons are to be lighted by LEDs, the buttons should be either the same color as the LEDs or white buttons.

APPLICATION ASSISTANCE

Our field engineer/factory team will be happy to work with you every step of the way—through concept, design, and manufacturing—to help insure your custom package has a quality appearance and performs just the way you want it. Contact the 800 number.

PANEL SEAL ACCESSORY

SLP 3 × 4 array with panel seal.

Elastomer silicon seals fit over SLP panels to help protect their circuitry and behind panel components from contaminants that might enter through the switch. *See photo.* The seal is positioned between rear mounted units and the user's mounting panel. When properly installed, it meets NEMA 13, providing a degree of protection against dust, spraying of water, oil, detergent, and non-corrosive coolant. (Installation instructions furnished with seals.)

Silicon has good natural resistance to ultraviolet light and no UV inhibitors are required. This material has been thoroughly evaluated for chemical resistance. For further information, contact the 800 number. Use of the seal does not lessen operating life.

Note:
SLP panels with thru-hole mounting are recommended for use with the panel seal. Sealing is most effective when mounting screws are torqued to 6±1.5 in./lbs.

ORDER GUIDE – PANEL SEALS

Array	Catalog Listing
1×4	SLP61-4
3×4	SLP61-12
4×4	SLP61-16
5×4	SLP61-20

SLP Custom Order Sheet

Instructions

1. Fill in desired legends for the appropriate button layout. (Leave blank any buttons which are not to be legended.)

   To determine if a given legend will fit, add the decimals shown for each letter (or number) under the desired type size in the Legending Capacity Table. In all cases, the total must not exceed .450.

   EXAMPLE: The legend **START** specified in 7/64 type size consists of: **S**(.086) + **T**(.087) + **A**(.086) + **R**(.095) + **T**(.087), for a total of **.441**. Since the total does not exceed .450, this legend will fit.

   The 5/64 type size can be used for one-line or two-line legends. All other type sizes are used for one-line legends only. Legends will be centered on buttons.

2. Fill in the desired button colors, LED colors (unless button is to be unlighted), legend sizes and legend colors (unless button is to be unlegended). See button layouts for station reference numbers.
   Use only the number of lines for the appropriate button layout.

   EXAMPLE: A 1 x 4 would have station no. lines 1-4 filled out.

   LED colors are red, green, and yellow.

   Standard button colors are red, green, yellow, white, gray, and blue. When buttons are to be lighted by LEDs, buttons should be either the same color as the LEDs or white buttons.

   Standard legend colors are black and white.

3. Submit a separate legend sheet for each SLP catalog listing.

Catalog Listing **SLP**		
Customer P.O. No.	Customer Dwg. No.	
MICRO SWITCH Sales Order	Line Number	Schedule No.

Customer: _____

Address: _____

_____
(city) (state)

Sheet prepared by: _____

Phone No.: _____

Legends are applied by the pad printing process. Shown at right are examples of the standard typeface.

5/64
A-Z 0-9
7/64
A-Z 0-9
9/64
A-Z 0-9
13/64
A-Z 0-9

Legending Capacity Table

Legend	5/64	7/64	9/64	13/64	Legend	5/64	7/64	9/64	13/64
A	.070	.086	.097	0.152	S	.069	.086	.097	0.153
B	.079	.096	.108	0.162	T	.069	.087	.097	0.142
C	.080	.096	.108	0.162	U	.084	.106	0.123	0.179
D	.080	.105	0.122	0.171	V	.070	.087	.098	0.147
E	.070	.086	.097	0.153	W	.102	0.121	0.143	0.211
F	.069	.081	.096	0.142	X	.069	.085	.097	0.147
G	.079	.095	.105	0.171	Y	.069	.086	.097	0.145
H	.079	.106	0.122	.180	Z	.069	.081	.086	0.142
I	.034	.042	.054	.072	1	.069	.087	.098	0.142
J	.060	.072	.087	0.119	2	.070	.087	.095	0.142
K	.079	.095	.109	0.161	3	.068	.086	.095	0.142
L	.070	.081	.097	0.142	4	.070	.086	.097	0.142
M	.100	0.121	0.143	0.210	5	.070	.087	.097	0.141
N	.081	.106	0.123	0.181	6	.070	.087	.097	0.143
O	.080	.106	0.122	0.171	7	.070	.087	.097	0.141
P	.070	.087	.107	0.150	8	.070	.087	.097	0.142
Q	.080	.107	0.122	0.171	9	.070	.087	.097	0.142
R	.079	.095	.106	0.161	0	.070	.087	.096	0.142

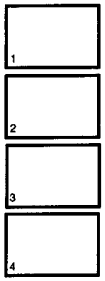
FO-64419-B

Honeywell

SLP Legend Order Sheet

1 x 4 Button Layout

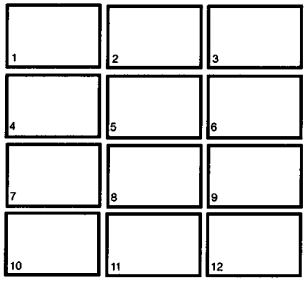
1. Fill in desired legends.



Stations numbered for reference only.

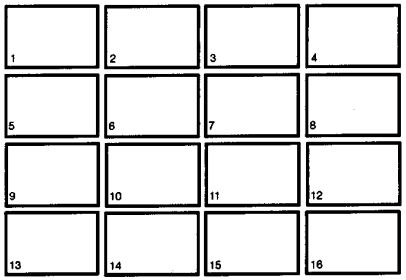
3 x 4 Button Layout

1. Fill in desired legends.



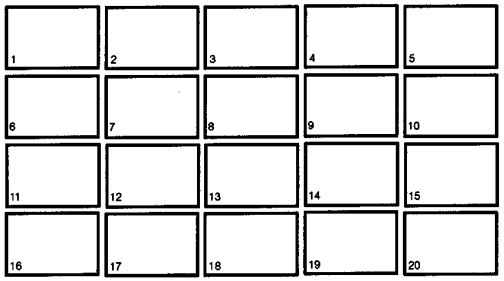
Stations numbered for reference only.

4 x 4 Button Layout



Stations numbered for reference only.

5 x 4 Button Layout



Stations numbered for reference only.

2. Fill in desired legends, LEDs and legends; and legend size.

Station No.	Button Color	LED Color	Legend Color	Legend Size
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

F0-64419-B - Pg2

SLP 51/52 Button Legending Order Guide

INSTRUCTIONS:

1. Fill in desired legends on the order chart below. To determine if a given legend will fit, add the decimals shown for each letter (or number) under the desired type size in the Ledging Capacity Table. In all cases, the total must not exceed .450 for Fig. 2 or .350 for Fig 1.

   Example: The legend **START** specified in 7/64 type size consists of: **S**(.086) + **T**(.087) + **A**(.086) + **R**(.095) + **T**(.087), for a totoal of **.441.** Since the total does not exceed .450, this legend will fit.
2. Fill in the catalog listing - one listing per sheet.
3. Check proper Fig. #, Type Size and Type Color.
4. Fill in quantity required for each legend.

NOTES:

1. Legends will be centered within button.
2. Legends will be pad printed and oversprayed with a protective, clear material.

Button Type	Figure	Maximum Lines/Area				
		5/64	7/64	9/64	13/64	
A	1	3	2	2	1	
A	2	2	1	1	1	

SPECIAL LEGENDS

NOTE: Use this area to show special Legend Locations or Configurations NOT shown to the left. NON-STANDARD legends will involve additional charges and increased delivery time.

Fig. "A" | Fig. "B"

Catalog Listing SLP5__ –		
Customer P.O. No.	Customer Dwg. No.	
MICRO SWITCH S.O. Number	Line Number	Schedule No.

Customer: _____

Address: _____

_____ (city) _____ (state)

Sheet prepared by: _____

Phone Number: _____

LEGENDING CAPACITY TABLE

LEGEND	5/64	7/64	9/64	13/64	LEGEND	5/64	7/64	9/64	13/64
A	.070	.086	.097	.152	1	.069	.087	.098	.142
B	.079	.096	.108	.162	2	.070	.087	.095	.142
C	.080	.096	.108	.162	3	.068	.086	.095	.142
D	.080	.105	.122	.171	4	.070	.086	.097	.142
E	.070	.086	.097	.153	5	.070	.087	.097	.141
F	.069	.081	.096	.142	6	.070	.087	.097	.143
G	.079	.095	.105	.171	7	.070	.087	.097	.141
H	.079	.106	.122	.180	8	.070	.087	.097	.142
I	.034	.042	.054	.072	9	.070	.087	.097	.142
J	.060	.072	.087	.119	0	.070	.087	.096	.142
K	.079	.095	.109	.161	$	.069	.086	.097	.145
L	.070	.081	.097	.142	¢	.069	.091	.107	.142
M	.100	.121	.143	.210	#	.080	.105	.122	.171
N	.081	.106	.123	.181	%	.084	.137	.164	.233
O	.080	.106	.122	.171	+	.064	.110	.120	.180
P	.070	.087	.107	.150	-	.035	.106	.117	.183
Q	.080	.107	.122	.171	±	.064	.139	.168	.250
R	.079	.095	.106	.161	÷	.079	.139	.166	.250
S	.069	.086	.097	.153	=	.084	.126	.140	.207
T	.069	.087	.097	.142	≠	.084	.139	.168	.250
U	.084	.106	.123	.179	>	.112	.139	.156	.251
V	.070	.087	.098	.147	<	.112	.139	.156	.251
W	.102	.121	.143	.211	X	.069	.140	.166	.250
X	.069	.085	.097	.147	)	.050	.062	.073	.097
Y	.069	.086	.097	.145	(	.050	.062	.073	.097
Z	.069	.081	.086	.142	&	.081	.097	.108	.170
					*	.054	.089	.102	.123
					.	.035	.042	.052	.072

LEGEND ORDER CHART

Customer Part #	Fig #	Type Size				Legend Color		Button Qty.	Legend Description		
		5/64	7/64	9/64	13/64	BLK	WHT		1st Line	2nd Line	3rd Line

FO-64479-A

Pushbutton Panels

Manual Switches OBSOLETE SN/SD Series

Hall Effect Keyboards/Modules

SD HALL EFFECT KEYBOARDS

MICRO SWITCH SD Series Hall effect keyboards meet high performance, custom design, full-travel keyboard needs. They're unsurpassed for switch speed, reliability and accuracy. Modular construction allows flexibility in keyboard layout and size.

Hall effect keyboards are offered in standard profile and low profile, sealed or unsealed, in standard arrays, and in custom arrays tailored to fit the user's specific application. Hall effect keyboards are capable of handling very high throughput applications.

A sealed version of the Hall effect keyboard (101SD29-2E-S-H) designed for harsh duty industrial environments meets NEMA 4 and 13 water/moisture resistance standards.

Request Product Sheets:
26SD – 84-02506
32SD – 84-02502
63SD – 84-02504
101SD – 84-02501
12/16SD – 84-02607

SN/SD HALL EFFECT KEYSWITCH MODULES

SN and SD Series keyswitch modules are ideal for building custom arrays, such as keyboards, control/switch panels, and switch matrices. Lighted display options are available.

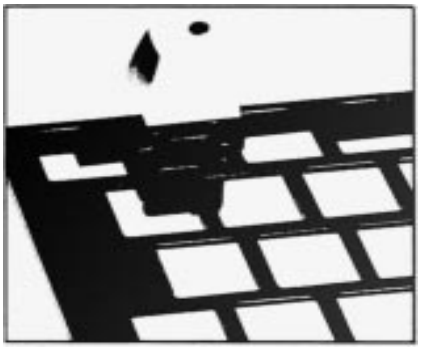
SN modules are available in types that can be either snap-in panel mounted or mounted directly to printed circuit boards without additional mounting or support hardware. Request Product Sheet 84-02508.

SD modules have a lower profile than SN. They securely mount in a metal grid plate which provides support and enhances good keytop alignment between stations and rows. Request Product Sheet 84-02505.

SN PC Board Mount

SN Snap-in Panel Mount

SD Grid Plate Mount



For further information on Hall effect keyboards, keytops, and modules, contact your nearest MICRO SWITCH sales office. Or call 1-800-537-6945.

Honeywell

Manual Switches

Sealed Toggle Switches

NT Series/Flat Base

FEATURES

- Completely sealed switching chamber
- IP67/IP68
- NEMA 3, 3R, 4, 13
- 2- or 3-position maintained and momentary action
- Flat base with quick connect terminals – mating connectors are available
- Spring-loaded actuating mechanism provides excellent tactile feedback
- UL recognized, File E12252, Vol. 1, Section 44
- CSA certified, CE certified
- Optional panel stand-off with O-ring panel seal

TYPICAL APPLICATIONS

- Industrial equipment
- Military and commercial aviation
- Construction equipment
- Test instruments
- Agricultural machinery
- Process control
- Medical instrumentation

GENERAL INFORMATION

Honeywell NT Series toggle switches meet the need for a rugged, cost-effective toggle switch. Quality construction features include a seal between the toggle lever and bushing, and between the cover and case. These switches can be used where panels are subject to splashes, hosedowns, or outdoor environments. Complete sealing of the switching chamber enables NT toggles to comply with UL 508, paragraph 13.3 hosedown test. They will also withstand exposure to heavy accumulations of early morning dew that may condense on the control panel in cabs of vehicles left outdoors overnight. The "Easy Start" threaded bushing enables quick alignment of the mounting nut to decrease the chance of cross threading. The panel stand-off with O-ring feature available on some listings eliminates the need for behind-the-panel hardware, provides a uniform panel height, and provides a panel-to-cover seal.

UL AND CSA ELECTRICAL RATINGS

Rating Code	Electrical rating
L192	10 amps, 125, 250, 277 Vac; ¼ Hp, 125 Vac; ½ Hp, 250, 277 Vac; 3 amps, 125 Vac "L"
L191	15 amps, 125, 250, 277 Vac; ½ Hp, 125 Vac; 1 Hp, 250, 277 Vac; 5 amps, 125 Vac "L"

ELECTRICAL RATINGS

Elect. Rating Code	28 Volts DC			115 Vdc	250 Vdc	115 Vac, 60 Hz & 400 Hz			230 Vac
	Ind.	Res.	Lamp	Res.	Res.	Ind.	Res.	Lamp	Res
1	12	20	5	0.75	0.5	10	15	3	6
2	10	15	4	0.75	0.5	7	15	2	6
3	15	20	7	0.75	0.5	15	15	4	6
4	10	18	5	0.75	0.5	8	11	2	6

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Manual Switches

Sealed Toggle Switches

NT Series/Flat Base

NT 2-POSITION ORDER GUIDE

No. of poles	Circuits Made with Toggle At:			Elect. Rating Code	Catalog Listing Toggle Q-C
	Keyway Position	Opposite Keyway	UL Rating Code		
1	OFF	2-3	L191	1	31NT91-2
	1-2	2-3	L191	1	31NT91-3
	OFF**	2-3	L192	2	31NT91-4
	1-2**	OFF	L192	2	31NT91-6
	1-2**	2-3	L192	2	31NT91-8
2	OFF	2-3, 5-6	L191	3	32NT91-2
	1-2, 4-5	2-3, 5-6	L191	3	32NT91-3
	OFF**	2-3, 5-6	L192	4	32NT91-4
	1-2, 4-5**	OFF	L192	4	32NT91-6
	1-2, 4-5**	2-3, 5-6	L192	4	32NT91-8

** These positions are momentary. All others are maintained.

NT 2-POSITION ORDER GUIDE • PANEL STAND-OFF FEATURE

No. of poles	Circuits Made with Toggle At:			Elect. Rating Code	Catalog Listing Toggle Q-C
	Keyway Position	Opposite Keyway	UL Rating Code		
1	OFF	2-3	L191	1	631NT91-2 631NT91-3 631NT91-4 631NT91-6 631NT91-8
2	OFF	2-3, 5-6	L191	3	632NT91-2
	1-2, 4-5	2-3, 5-6	L191	3	632NT91-3 632NT91-4
	1-2, 4-5**	OFF	L192	4	632NT91-6 632NT91-8

** These positions are momentary. All others are maintained.Pick up Keyway Position / Opposite Keyway, etc from standard listings above that do not have the panel stand-off feature.

MATING CONNECTORS ORDER GUIDE

Description	Catalog listing
2-pole connector	19PA168-NT
1-pole connector, same package size as 2-pole connector	19PA169-NT

NT 3-POSITION ORDER GUIDE

No. of poles	Circuits made with toggle at:			UL Rating Code	Elect. Rating Code	Catalog Listing Toggle Q-C
	Keyway Position	Center Position	Opposite Keyway			
1	1-2	OFF	2-3	L191	1	31NT91-1
	1-2**	OFF	2-3	L192	2	31NT91-5
	1-2**	OFF	2-3**	L192	2	31NT91-7
	NONE***	OFF	2-3	L191	1	31NT91-21
	NONE***	1-2	2-3	L191	1	31NT91-31
	NONE***	1-2	2-3**	L192	2	31NT91-51
	1-2**	OFF	NONE***	L192	2	31NT91-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	32NT91-1
	1-2, 4-5**	OFF	2-3, 5-6	L192	4	32NT91-5
	1-2, 4-5**	OFF	2-3, 5-6**	L192	4	32NT91-7
	NONE***	OFF	2-3, 5-6	L191	3	32NT91-21
	NONE***	1-2, 4-5	2-3, 5-6	L191	3	32NT91-31
	NONE***	1-2, 4-5	2-3, 5-6**	L192	4	32NT91-51
	1-2, 4-5**	OFF	NONE***	L192	4	32NT91-61
	1-2, 4-5	2-3, 5-6	2-3, 5-6	L191	3	32NT91-12
	1-2, 4-5	1-2, 5-6	2-3, 5-6	L191	3	32NT91-10
	1-2, 4-5**	1-2, 5-6	2-3, 5-6	L192	4	32NT91-50
	1-2, 4-5**	1-2, 5-6	2-3, 5-6**	L192	4	32NT91-70

** These positions are momentary. All others are maintained.

*** Toggle lever is blocked from these positions. Toggle becomes 2-position, with center being one extreme position.

NT 3-POSITION ORDER GUIDE • PANEL STAND-OFF FEATURE

No. of poles	Circuits made with toggle at:			UL Rating Code	Elect. Rating Code	Catalog Listing Toggle Q-C
	Keyway Position	Center Position	Opposite Keyway			
1	1-2**	OFF	2-3**	L192	2	631NT91-7 631NT91-1 631NT91-5
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	632NT91-1
	1-2, 4-5**	OFF	2-3, 5-6	L192	4	632NT91-5
	1-2, 4-5**	OFF	2-3, 5-6**	L192	4	632NT91-7 632NT91-70

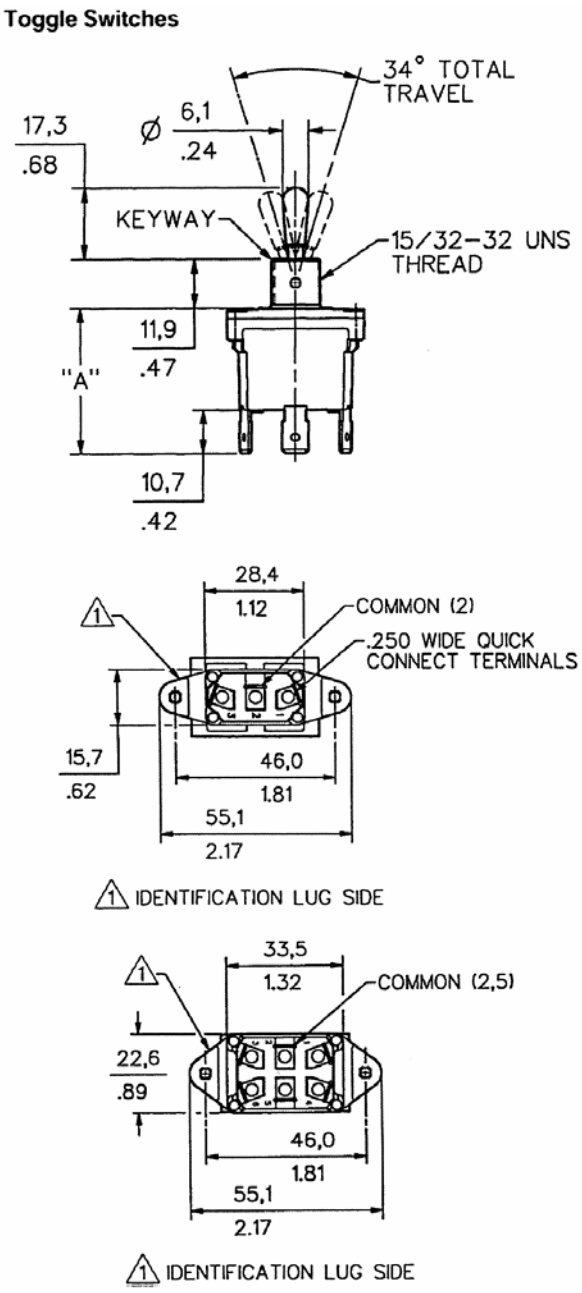
** These positions are momentary. All others are maintained

Manual Switches

Sealed Toggle Switches

NT Series/Flat Base

MOUNTING DIMENSIONS
For reference only mm/in



WARRANTY/REMEDY
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**
Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.
For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:
1-800-537-6945 USA
1-800-737-3360 Canada
1-815-235-6847 International

FAX
1-815-235-6545 USA

INTERNET
www.honeywell.com/sensing
info.sc@honeywell.com

Honeywell

Sensing and Control
Honeywell
11 West Spring Street
Freeport, Illinois 61032
005420-2-EN IL50 GLO 1103 Printed in USA

Honeywell

Manual Switches

Sealed Toggle Switches

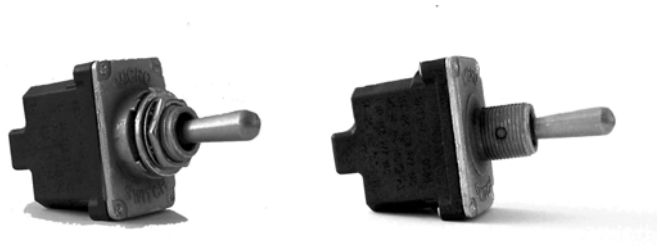
NT Series/Step Base

FEATURES

- Completely sealed switching chamber
- IP67/IP68
- NEMA 3, 3R, 4, 13
- Step-design case provides added space between terminals to prevent shorting
- 1, 2, or 4-pole circuitry
- Spring-loaded actuating mechanism provides excellent tactile feedback
- UL recognized, File E12252, Vol. 1, Section 44 CSA certified, CE certified
- Optional panel stand-off with O-ring panel seal

TYPICAL APPLICATIONS

- Industrial equipment
- Military and commercial aviation
- Construction equipment
- Test instruments
- Agricultural machinery
- Process control
- Medical instrumentation



GENERAL INFORMATION

Honeywell NT Series toggle switches meet the need for a rugged, cost-effective toggle switch. Quality construction features include a seal between the toggle lever and bushing, and between the cover and case. These switches can be used where panels are subject to splashes, hosedowns, or outdoor environments. Complete sealing of the switching chamber enables NT toggles to comply with UL 508, paragraph 13.3 hosedown test. They will also withstand exposure to heavy accumulations of early morning dew that may condense on the control panel in cabs of vehicles left outdoors overnight. The “Easy Start” threaded bushing enables quick alignment of the mounting nut to decrease the chance of cross threading. The panel stand-off with O-ring feature available on some listings eliminates the need for behind-the-panel hardware, provides a uniform panel height, and provides a panel-to-cover seal.

UL AND CSA ELECTRICAL RATINGS

Rating Code	Electrical rating
L192	10 amps, 125, 250, 277 Vac; ¼ Hp, 125 Vac; ½ Hp, 250, 277 Vac; 3 amps, 125 Vac “L”
L191	15 amps, 125, 250, 277 Vac; ½ Hp, 125 Vac; 1 Hp, 250, 277 Vac; 5 amps, 125 Vac “L”

ELECTRICAL RATINGS

Elect. Rating Code	28 Volts DC			115 Vdc	250 Vdc	115 Vac, 60 Hz & 400 Hz			230 Vac
	Ind.	Res.	Lamp	Res.	Res.	Ind.	Res.	Lamp	Res
1	12	20	5	0.75	0.5	10	15	3	6
2	10	15	4	0.75	0.5	7	15	2	6
3	15	20	7	0.75	0.5	15	15	4	6
4	10	18	5	0.75	0.5	8	11	2	6

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

NT 2-POSITION ORDER GUIDE

No. of Poles	Circuits made with toggle at:		UL Rating Code	Elect. Rating Code	Standard Lever		
					Termination Style		
	Keyway Position	Opposite Keyway			Screw	Solder	Q-C
1	OFF	2-3	L191	1	1NT1-2	11NT1-2	1NT91-2
	1-2	2-3	L191	1	1NT1-3	11NT1-3	1NT91-3
	OFF*	2-3	L192	2	1NT1-4	11NT1-4	1NT91-4
	1-2*	OFF	L192	2	1NT1-6	11NT1-6	1NT91-6
	1-2*	2-3	L192	2	1NT1-8	11NT1-8	1NT91-8
2	OFF	2-3, 5-6	L191	3	2NT1-2	12NT1-2	2NT91-2
	1-2, 4-5	2-3, 5-6	L191	3	2NT1-3	12NT1-3	2NT91-3
	OFF*	2-3, 5-6	L192	4	2NT1-4	12NT1-4	2NT91-4
	1-2, 4-5*	OFF	L192	4	2NT1-6	12NT1-6	2NT91-6
	1-2, 4-5*	2-3, 5-6	L192	4	2NT1-8	12NT1-8	2NT91-8
4	OFF	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-2	14NT1-2	4NT91-2
	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-3	14NT1-3	4NT91-3
	OFF*	2-3, 5-6, 8-9, 11-12	L192	6	4NT1-4	14NT1-4	4NT91-4
	1-2, 4-5, 7-8, 10-11*	OFF	L192	6	4NT1-6	14NT1-6	4NT91-6
	1-2, 4-5, 7-8, 10-11*	2-3, 5-6, 8-9, 11-12	L192	6	4NT1-8	14NT1-8	4NT91-8

* These positions are momentary. All others are maintained.

NT 2-POSITION ORDER GUIDE • PANEL STAND-OFF FEATURE

No. of Poles	Circuits Made with Toggle At:		UL Rating Code	Elect. Rating Code	Standard Lever
	Keyway Position	Opposite Keyway			Screw
1	OFF	2-3	L191	1	61NT1-2
	1-2	2-3	L191	1	61NT1-3
	1-2*	OFF	L192	2	61NT1-6
	1-2*	2-3	L192	2	61NT1-8
2	OFF	2-3, 5-6	L191	3	62NT1-2
	1-2, 4-5	2-3, 5-6	L191	3	62NT1-3
	1-2, 4-5*	OFF	L192	4	62NT1-6
	1-2, 4-5*	2-3, 5-6	L192	4	62NT1-8

* These positions are momentary. All others are maintained.

NT 3-POSITION ORDER GUIDE

No. of Poles	Circuits Made with Toggle At:			UL Rating Code	Elect. Rating Code	Standard Lever Termination Style		
	Keyway Position	Center Position	Opposite Keyway			Screw	Solder	Q-C
1	1-2	OFF	2-3	L191	1	1NT1-1	11NT1-1	1NT91-1
	1-2*	OFF	2-3	L192	2	1NT1-5	11NT1-5	1NT91-5
	1-2*	OFF	2-3*	L192	2	1NT1-7	11NT1-7	1NT91-7
	NONE**	OFF	2-3	L191	1	1NT1-21	11NT1-21	1NT91-21
	NONE**	1-2	2-3	L191	1	1NT1-31	11NT1-31	1NT91-31
	NONE**	1-2	2-3*	L192	2	1NT1-51	11NT1-51	1NT91-51
	1-2*	OFF	NONE**	L192	2	1NT1-61	11NT1-61	1NT91-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	2NT1-1	12NT1-1	2NT91-1
	1-2, 4-5*	OFF	2-3, 5-6	L192	4	2NT1-5	12NT1-5	2NT91-5
	1-2, 4-5	OFF	2-3, 5-6*	L192	4	2NT1-7	12NT1-7	2NT91-7
	NONE*	OFF	2-3, 5-6	L191	3	2NT1-21	12NT1-21	2NT91-21
	NONE**	1-2, 4-5	2-3, 5-6	L191	3	2NT1-31	12NT1-31	2NT91-31
	NONE**	1-2, 4-5	2-3, 5-6*	L192	4	2NT1-51	12NT1-51	2NT91-51
	1-2, 4-5*	OFF	NONE**	L192	4	2NT1-61	12NT1-61	2NT91-61
	1-2, 4-5	2-3, 4-5	2-3, 5-6	L191	3	2NT1-12	12NT1-12	2NT91-12
	1-2, 4-5	1-2, 5-6	2-3, 5-6	L191	3	2NT1-10	12NT1-10	2NT91-10
	1-2, 4-5*	1-2, 5-6	2-3, 5-6	L192	4	2NT1-50	12NT1-50	2NT91-50
	1-2, 4-5	1-2, 5-6	2-3, 5-6*	L192	4	2NT1-70	12NT1-70	2NT91-70
4	1-2, 4-5, 7-8, 10-11	OFF	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-1	14NT1-1	4NT91-1
	1-2, 4-5, 7-8, 10-11*	OFF	2-3, 5-6, 8-9, 11-12	L192	6	4NT1-5	14NT1-5	4NT91-5
	1-2, 4-5, 7-8, 10-11*	OFF	2-3, 5-6, 8-9, 11-12*	L192	6	4NT1-7	14NT1-7	4NT91-7
	NONE*	OFF	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-21	14NT1-21	4NT91-21
	NONE**	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-31	14NT1-31	4NT91-31
	NONE**	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12*	L192	6	4NT1-51	14NT1-51	4NT91-51
	1-2, 4-5, 7-8, 10-11*	OFF	NONE**	L192	6	4NT1-61	14NT1-61	4NT91-61
	1-2, 4-5, 7-8, 10-11	2-3, 4-5, 7-8, 11-12	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-12	14NT1-12	4NT91-12
	1-2, 4-5, 7-8, 10-11	2-3, 4-5	2-3, 5-6, 8-9, 11-12	L191	5	4NT1-10	14NT1-10	4NT91-10
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5, 7-8, 11-12	2-3, 5-6, 8-9, 11-12	L192	6	4NT1-50	14NT1-50	4NT91-50
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5	2-3, 5-6, 8-9, 11-12*	L192	6	4NT1-70	14NT1-70	4NT91-70

* These positions are momentary. All others are maintained.

** Toggle lever is blocked from these products. Toggle becomes 2-position, with center being one extreme position.

NT 3-POSITION ORDER GUIDE • PANEL STAND-OFF FEATURE

No. of Poles	Circuits Made with Toggle At:			UL Rating Code	Elect. Rating Code	Termination
	Keyway Position	Center Position	Opposite Keyway			Screw
1	1-2	OFF	2-3	L191	1	61NT1-1
	1-2*	OFF	2-3*	L192	2	61NT1-7
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	62NT1-1
	1-2, 4-5	OFF	2-3, 5-6*	L192	4	62NT1-7

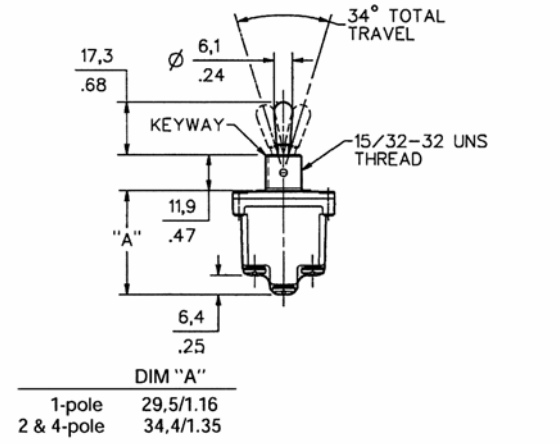
* These positions are momentary. All others are maintained.

Manual Switches

Sealed Toggle Switches

NT Series/Step Base

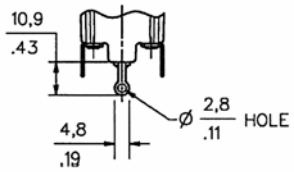
MOUNTING DIMENSIONS
For reference only mm/in



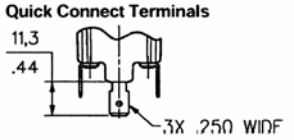
DIM "A"	
1-pole	29,5/1.16
2 & 4-pole	34,4/1.35

NOTES:
1. Pull-to-unlock levers have 10,7/42 dia. knob
2. Locking ring, lockwasher, 2 hexnuts and terminal screws are furnished unassembled.

Solder Terminals

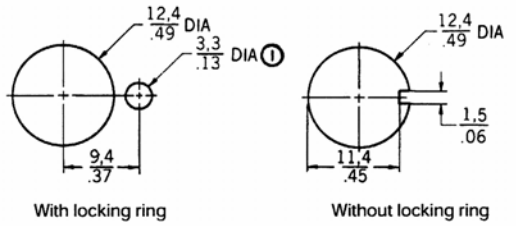


Quick Connect Terminals



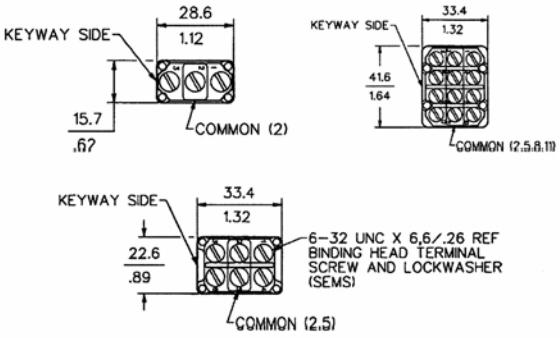
Bushing mounting torque is 10–15 in./lbs.
Terminal screw mounting torque is 5 in./lbs. max.

Panel cutout



Note:
① 1,4/.06 MIN DEEP TO ACCOMMODATE LOCKING RING. 15PA87 PANEL SEAL REQUIRES BLIND HOLE TO INSURE SEAL INTEGRITY

Terminal Circuit Identification



WARRANTY/REMEDY
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**
Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.
For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:
1-800-537-6945 USA
1-800-737-3360 Canada
1-815-235-6847 International

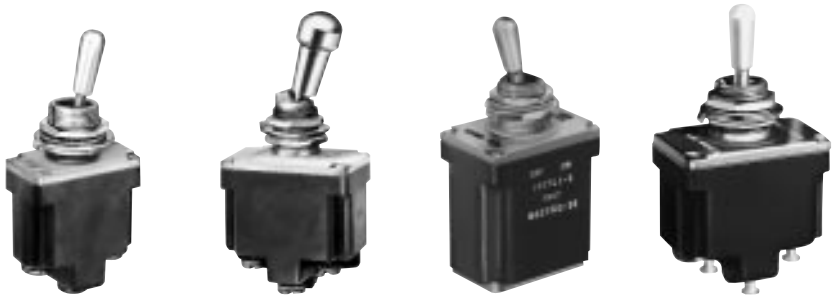
FAX
1-815-235-6545 USA

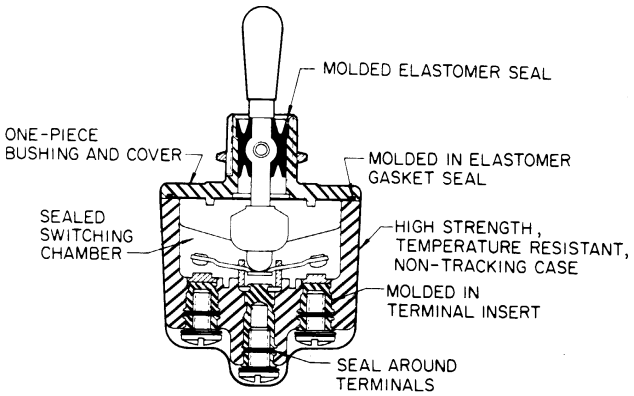
INTERNET
www.honeywell.com/sensing
info.sc@honeywell.com

Honeywell

Sensing and Control
Honeywell
11 West Spring Street
Freeport, Illinois 61032
005421-2-EN IL50 GLO 1103 Printed in USA

Environment-Sealed Toggle Switches





FEATURES
- Qualified to MIL-S-3950
- Environment-proof sealing
- 1, 2, and 4 pole circuitry
- Standard and pull to unlock levers
- 2 and 3 position, maintained, and momentary toggle action
- Temperature range: −85°F to +160°F (−65°C to +71°C)
- Screw, turret solder, and IWTS terminals available
- UL recognized
- Colored tab levers available

CONSTRUCTION
TLs have high strength, temperature resistant, non-tracking case material and silver cadmium oxide contacts. Gold contacts are also available.

ACTUATOR OPTIONS
Standard toggle lever operates on a direct action spring loaded toggle mechanism to provide excellent tactile feedback in both the momentary and maintained toggle positions. The toggle lever is approximately .68 in. (16mm) long and has a non-glare matte nickel plated finish.

Pull-to-unlock toggle levers prevent accidental toggle movement. The knobbed toggle lever must be pulled out approximately .09 in. (2,3mm) to change positions. Thirteen different locking configurations are available. This lever style also has a non-glare matte nickel finish.

ELECTRICAL RATINGS In Amperes

Rating Code*	28 Volts DC			115 VDC	250 VDC	115 Volts AC 60 & 400 Hz			230 VAC
	Ind.	Res.	Lamp	Res.	Res.	Ind.	Res.	Lamp	Res.
1	12	20	5	0.75	0.5	10	15	3	6
2	10	15	4	0.75	0.5	7	15	2	6
3	15	20	7	0.75	0.5	15	15	4	6
4	10	18	5	0.75	0.5	8	11	2	6
5	12	20	5	0.75	0.5	15	15	4	6
6	10	18	4	0.75	0.5	8	11	2	6

UL AND CSA ELECTRICAL RATINGS

Rating Code*	Electrical Rating
L192	10 amps-125, 250, 277 VAC; ¼ HP-125 VAC; ½ HP-250, 277 VAC 3 amps-125 VAC ''L''
L191	15 amps-125, 250, 277 VAC; ½ HP-125 VAC; 1 HP-250, 277 VAC 5 amps-125 VAC ''L''

* Referred to in order guides.

Application Note: Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. TL switches use silver cadmium oxide contact. If you have specific questions, contact the MICRO SWITCH Application Center at 1-800-537-6945.

Environment-Sealed Toggle Switches

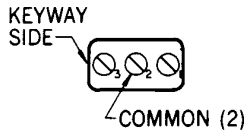
TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications are referred to in the order guides to indicate which circuits are made in each toggle position (i.e., 1-2 refers to circuit closure through terminals 1 and 2).

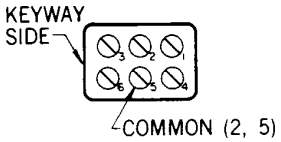
SPECIAL CIRCUITRIES

Catalog listings with -10, -50, and -70 suffix numbers shown in the order guides have special ''On-On-On'' circuits, as illustrated. TLs with -12 suffix are the same as -50 except the keyway position is maintained, and in the center position circuits 2-3 and 4-5 are made; -72 is the same as -50 except that the opposite keyway position is momentary, and in the center position circuits 2-3 and 4-5 are made.

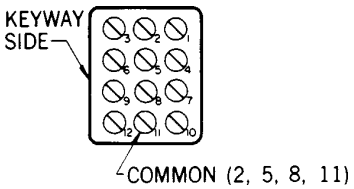
One pole



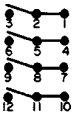
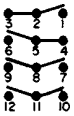
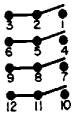
Two pole



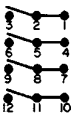
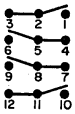
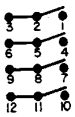
Four pole



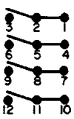
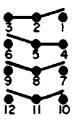
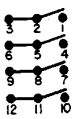
-10 CIRCUITRY

No. of Poles	Keyway Side Maint. Position	Center Maint. Position	Opposite Keyway Maint. Position
2			
4			

-50 CIRCUITRY

No. of Poles	Keyway Side Mom. Position	Center Maint. Position	Opposite Keyway Maint. Position
2			
4			

-70 CIRCUITRY

No. of Poles	Keyway Side Mom. Position	Center Maint. Position	Opposite Keyway Mom. Position
2			
4			

Environment-Sealed Toggle Switches

TL 2-POSITION ORDER GUIDE

	No. of Poles	Circuit(s) Made With Toggle At: Keyway Position	Opposite Keyway	Page 39 Electrical Rating Code	UL/CSA Rating Code	Standard Toggle Catalog Listing	Military Number	Pull-to-Unlock Toggle Locking Configuration Add Suffix to Standard Toggle Listing	Military Number**
	1	OFF	2-3	1	L191	1TL1-2	MS24523-22	D, F, G	MS24658-22
		OFF*	2-3	2	L192	1TL1-4	MS24523-29	F	MS24658-29
		1-2*	OFF	2	L192	1TL1-6	MS24523-30	F	MS24658-30
		1-2	2-3	1	L191	1TL1-3	MS24523-23	D, F, G	MS24658-23
		1-2*	2-3	2	L192	1TL1-8	MS24523-26	F	MS24658-26
	2	OFF	2-3, 5-6	3	L191	2TL1-2	MS24524-22	D, F, G	MS24659-22
		OFF*	2-3, 5-6	4	L192	2TL1-4	MS24524-29	F	MS24659-29
		1-2, 4-5*	OFF	4	L192	2TL1-6	MS24524-30	F	MS24659-30
		1-2, 4-5	2-3, 5-6	3	L191	2TL1-3	MS24524-23	D, F, G	MS24659-23
		1-2. 4-5*	2-3, 5-6	4	L192	2TL1-8	MS24524-26	F	MS24659-26
	4	OFF	2-3, 5-6 8-9, 11-12	5	L191	4TL1-2	MS24525-22	D, F, G	MS24660-22
		OFF*	2-3, 5-6 8-9, 11-12	6	L192	4TL1-4	MS24525-29	F	MS24660-29
		1-2, 4-5 7-8, 10-11*	OFF	6	L192	4TL1-6	MS24525-30	F	MS24660-30
		1-2, 4-5 7-8, 10-11	2-3, 5-6 8-9, 11-12	5	L191	4TL1-3	MS24525-23	D, F, G	MS24660-23
		1-2, 4-5* 7-8, 10-11	2-3, 5-6 8-9, 11-12	6	L192	4TL1-8	MS24525-26	F	MS24660-26

* These positions only are momentary. All others are maintained.
** Also add the appropriate suffix letter to the Military number.

PULL-TO-UNLOCK OPTION

When ordering pull-to-unlock toggle listings, add the suffix letter shown in the chart below to the standard toggle listing and the MS number. For example, to order a 1TL1-1 pull-to-unlock toggle switch with the lever locked in the center position, add the letter **E**; i.e., 1TL1-1**E**, MS-24658-21**E.**

LOCKING CONFIGURATIONS

A	B	D	E	F	G	H
						
Locked In Three Positions	Locked In Center and Extreme Position (Keyway Side)	Locked Out Of Center Position	Locked In Center Position	Locked In Extreme Position (Opposite Keyway)	Locked In Extreme Position (Keyway Side)	Locked Out Of Center And Extreme Position (Keyway Side)

J	K	L	M	N	P
					
Locked Out Of Center And Extreme Position (Opposite Keyway)	Locked In Center And Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Keyway Side)	Locked Out Of And Into Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Opposite Keyway)	Locked Out Of And Into Extreme Position (Keyway Side)

Environment-Sealed Toggle Switches

TL 3-POSITION ORDER GUIDE

	No. of Poles	Circuit(s) Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Page 39 Elec. Rating Code	UL/CSA Rating Code	Standard Toggle Catalog Listing	Military Number***	Pull-to-Unlock Toggle Locking Configuration Add Suffix to Standard Toggle Listing	Military Number***
	1	1-2	OFF	2-3	1	L191	1TL1-1	MS24523-21	ALL TYPES	MS24658-21
		1-2*	OFF	2-3	2	L192	1TL1-5	MS24523-31	E, F, K, L, M, N	MS24658-31
		1-2*	OFF	2-3*	2	L192	1TL1-7	MS24523-27	E, L, N	MS24658-27
		None**	OFF	2-3	1	L191	1TL1-21	MS24523-24	E, F, K, M	MS24658-24
		None**	1-2	2-3	1	L192	1TL1-31	MS24523-33	E, F, K, M	MS24658-33
		None**	1-2	2-3*	2	L192	1TL1-51	MS24523-32	E	MS24658-32
		1-2*	OFF	None**	2	L192	1TL1-61	MS24523-28	E	MS24658-28
	2	1-2, 4-5	OFF	2-3, 5-6	3	L191	2TL1-1	MS24524-21	ALL TYPES	MS24659-21
		1-2, 4-5*	OFF	2-3, 5-6	4	L192	2TL1-5	MS24524-31	E, F, K, L, M, N	MS24659-31
		1-2, 4-5*	OFF	2-3, 5-6*	4	L192	2TL1-7	MS24524-27	E, L, N	MS24659-27
		None**	OFF	2-3, 5-6	3	L191	2TL1-21	MS24524-24	E, F, K, M	MS24659-24
		None**	1-2, 4-5	2-3, 5-6	3	L191	2TL1-31	MS24524-33	E, F, K, M	MS24659-33
		None**	1-2, 4-5	2-3, 5-6*	4	L192	2TL1-51	MS24524-32	E	MS24659-32
		1-2, 4-5*	OFF	None**	4	L192	2TL1-61	MS24524-28	E	MS24659-28
		1-2, 4-5	1-2, 5-6	2-3, 5-6	3	L191	2TL1-10	MS27407-4	ALL TYPES	MS27408-4
		1-2, 4-5*	1-2, 5-6	2-3, 5-6	4	L192	2TL1-50	MS27407-5	E, F, K, L, M, N	MS27408-5
		1-2, 4-5*	1-2, 5-6	2-3, 5-6*	4	L192	2TL1-70	MS27407-6	E, L, N	MS27408-6
	4	1-2, 4-5 7-8, 10-11	OFF	2-3, 5-6 8-9, 11-12	5	L191	4TL1-1	MS24525-21	ALL TYPES	MS24660-21
		1-2, 4-5 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12	6	L192	4TL1-5	MS24525-31	E, F, K, L, M, N	MS24660-31
		1-2, 4-5 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12*	6	L192	4TL1-7	MS24525-27	E, L, N	MS24660-27
		None**	OFF	2-3, 5-6 8-9, 11-12	5	L191	4TL1-21	MS24525-24	E, F, K, M	MS24660-24
		None**	1-2, 4-5 7-8, 10-11	2-3, 5-6 8-9, 11-12	5	L191	4TL1-31	MS24525-33	E, F, K, M	MS24660-33
		None**	1-2, 4-5 7-8, 10-11	2-3, 5-6 8-9, 11-12*	6	L192	4TL1-51	MS24525-32	E	MS24660-32
		1-2, 4-5 7-8, 10-11*	OFF	None**	6	L192	4TL1-61	MS24525-28	E	MS24660-28
		1-2, 4-5 7-8, 10-11	2-3, 4-5	2-3, 5-6 8-9, 11-12	5	L191	4TL1-10	—	ALL TYPES	—
		1-2, 4-5 7-8, 10-11*	2-3, 4-5 7-8, 11-12	2-3, 5-6 8-9, 11-12	6	L192	4TL1-50	MS27406-2	E, F, K, L, M, N	MS27409-2
		1-2, 4-5 7-8, 10-11*	2-3, 4-5	2-3, 5-6 8-9, 11-12*	6	L192	4TL1-70	—	E, L, N	—
		1-2, 4-5 7-8, 10-11	2-3, 4-5 7-8, 11-12	2-3, 5-6 8-9, 11-12	5	L191	4TL1-12	MS27406-1	ALL TYPES	MS27409-1
		1-2, 4-5 7-8, 10-11*	2-3, 4-5 7-8, 11-12	2-3, 5-6 8-9, 11-12*	6	L192	4TL1-72	MS27406-3	E, L, N	MS27409-3

* These positions only are momentary. All others are maintained.
** Toggle lever is blocked from these positions. Toggle becomes two position, with center being one extreme position.
*** Also add appropriate suffix letter to the Military Number.

SOLDER TURRET TERMINAL VERSION

HOW TO ORDER

11TL, 12TL, and 14TL type switches with solder turret terminals are qualified to MIL-S-3950. They have the same circuitry and electrical ratings as their 1TL, 2TL, and 4TL counterparts. For example, 11TL1-2 is the same as 1TL1-2, except it has solder turret terminals instead of screw terminals. The complete MS drawing numbers are shown in data sheet 204.

Circuitry	Type	Std. Lever	Lever Lock
One Pole	11TL	MS27734	MS27737
Two Pole	12TL	MS27735	MS27738
Four Pole	14TL	MS27736	MS27739

Manual Switches

Environment-Sealed Toggle Switches/IWTS

GENERAL INFORMATION
IWTS (Integrated Wire Termination System) provides you with a reliable, completely serviceable unit which meets MIL-S-3950 requirements. IWTS improves maintainability since wiring bundles need not be disturbed. Leads are quickly and easily assembled or removed with an insert-extract tool.

A unique three-rib (grommet style) elastomer seal protects the lead connections without potting. There are no exposed metal terminals.

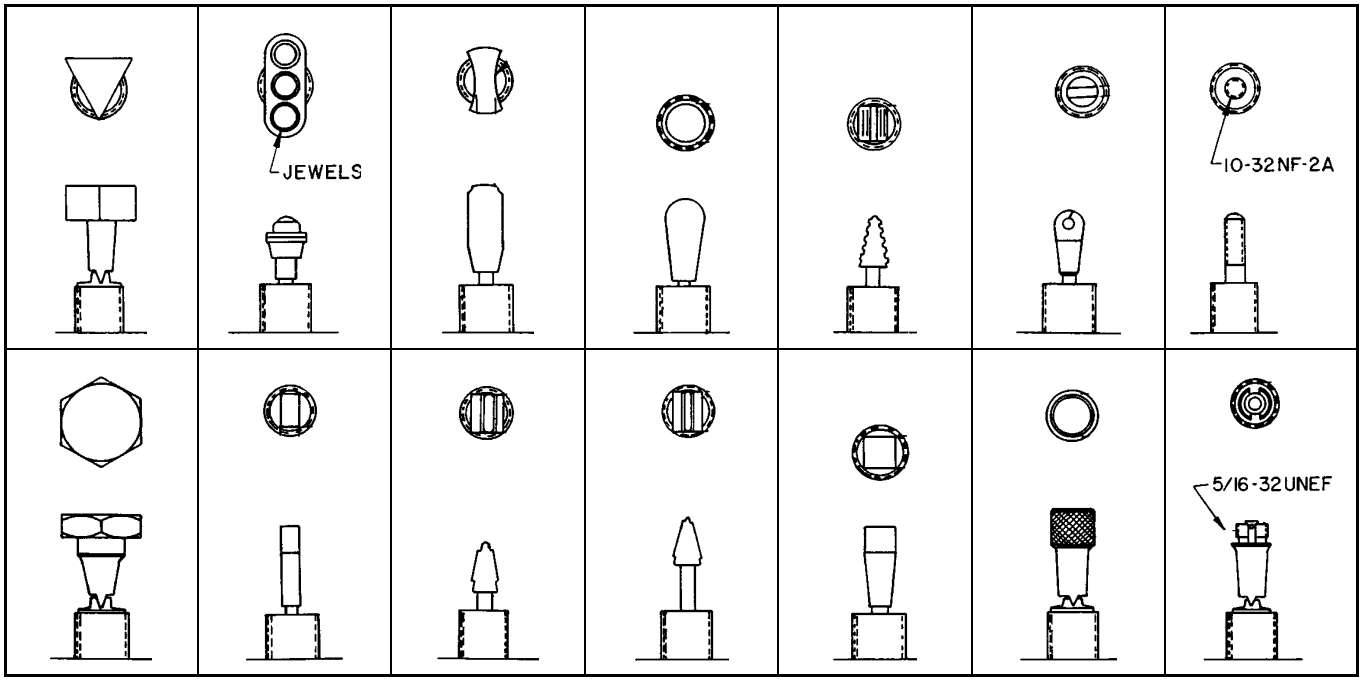
Versions are available that will accept No. 16 wire with M39029/1-102 contact pins or No. 20 wire with M39029/1-101 contact pins. Connections are resistant to shock, vibration, and high pulling force.

TYPICAL APPLICATIONS
- Military and civilian aircraft and marine navigational equipment
- Command and control systems
- Radar and air defense systems
- Test, ground support, and training equipment
- Tanks, armored personnel carriers, and other military vehicles

POSSIBLE VARIATIONS
In addition to the contact arrangements shown in the order guide, IWTS switches can be furnished with all the Series TL combinations shown in order guides on the previous pages.

Pull-to-unlock toggle lever versions can be made available. Contact the 800 number.

SPECIAL TL LEVERS
Some of the lever variations available for TL toggle switches are shown below. They can also have the same colored tab levers furnished with TW toggle switches. For further information, contact the 800 number.



TL 2-POSITION VERSIONS WITH IWTS TERMINATION ORDER GUIDE

	No. Poles	Circuit(s) Made With Toggle At: Keyway Position	Opposite Keyway	Page 39 Electrical Rating Code	UL/CSA Rating Code	No. 16 Termination Catalog Listing	MIL Part No.	No. 20 Termination Catalog Listing	MIL Part No.
	1	OFF	2-3	1	L191	101TL1-2	MS27722-22	101TL2-2	MS27784-22
		OFF*	2-3	2	L192	101TL1-4	MS27722-29	101TL2-4	MS27784-29
		1-2*	OFF	2	L192	101TL1-6	MS27722-30	101TL2-6	MS27784-30
		1-2	2-3	1	L191	101TL1-3	MS27722-23	101TL2-3	MS27784-23
		1-2*	2-3	2	L192	101TL1-8	MS27722-26	101TL2-8	MS27784-26
	2	OFF	2-3, 5-6	3	L191	102TL1-2	MS27723-22	102TL2-2	MS27785-22
		OFF*	2-3, 5-6	4	L192	102TL1-4	MS27723-29	102TL2-4	MS27785-29
		1-2, 4-5*	OFF	4	L192	102TL1-6	MS27723-30	102TL2-6	MS27785-30
		1-2, 4-5	2-3, 5-6	3	L191	102TL1-3	MS27723-23	102TL2-3	MS27785-23
		1-2, 4-5*	2-3, 5-6	4	L192	102TL1-8	MS27723-26	102TL2-8	MS27785-26
	4	OFF	2-3, 5-6 8-9, 11-12	5	L191	104TL1-2	MS27724-22	104TL2-2	MS27786-22
		OFF*	2-3, 5-6 8-9, 11-12	6	L192	104TL1-4	MS27724-29	104TL2-4	MS27786-29
		1-2, 4-5 7-8, 10-11*	OFF	6	L192	104TL1-6	MS27724-30	104TL2-6	MS27786-30
		1-2, 4-5 7-8, 10-11	2-3, 5-6 8-9, 11-12	5	L191	104TL1-3	MS27724-23	104TL2-3	MS27786-23
		1-2, 4-5 7-8, 10-11*	2-3, 5-6 8-9, 11-12	6	L192	104TL1-8	MS27724-26	104TL2-8	MS27786-26

TL 3-POSITION VERSIONS WITH IWTS TERMINATION ORDER GUIDE

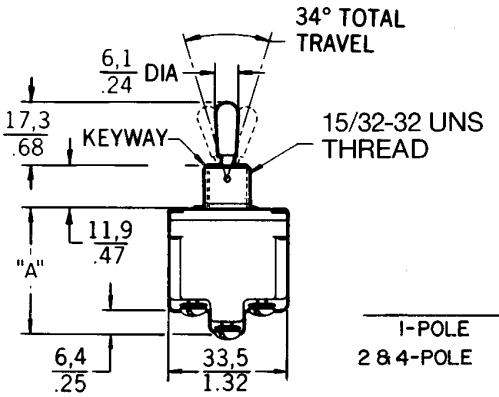
	No. Poles	Circuit(s) Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Electrical Rating Code	UL/CSA Rating Code	No. 16 Termination Catalog Listing	MIL Part No.	No. 20 Termination Catalog Listing	MIL Part No.
	1	1-2	OFF	2-3	1	L191	101TL1-1	MS27722-21	101TL2-1	MS27784-21
		1-2*	OFF	2-3	2	L192	101TL1-5	MS27722-31	101TL2-5	MS27784-31
		1-2*	OFF	2-3*	2	L192	101TL1-7	MS27722-27	101TL2-7	MS27784-27
	2	1-2, 4-5	OFF	2-3, 5-6	3	L191	102TL1-1	MS27723-21	102TL2-1	MS27785-21
		1-2, 4-5*	OFF	2-3, 5-6	4	L192	102TL1-5	MS27723-31	102TL2-5	MS27785-31
		1-2, 4-5*	OFF	2-3, 5-6*	4	L192	102TL1-7	MS27723-27	102TL2-7	MS27785-27
	4	1-2, 4-5 7-8, 10-11	OFF	2-3, 5-6 8-9, 11-12	5	L191	104TL1-1	MS27724-21	104TL2-1	MS27786-21
		1-2, 4-5 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12	6	L192	104TL1-5	MS27724-31	104TL2-5	MS27786-31
		1-2, 4-5 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12*	6	L192	104TL1-7	MS27724-27	104TL2-7	MS27786-27

* These positions only are momentary. All others are maintained.

Environment-Sealed Toggle Switches

MOUNTING DIMENSIONS (For reference only)

Standard toggle lever

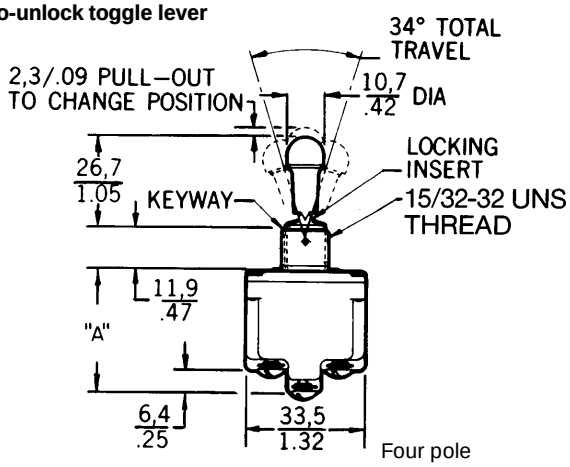


One pole

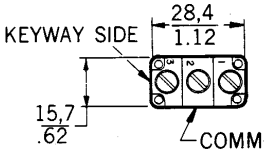
	DIM. "A"
1-POLE	29,5 / 1.16
2 & 4-POLE	34,4 / 1.35

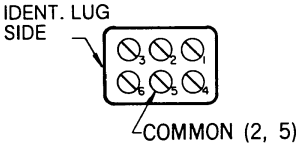
Two pole

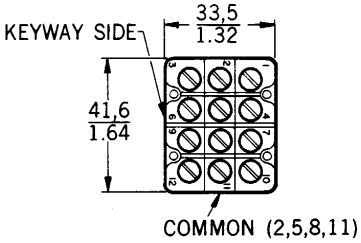
Pull-to-unlock toggle lever



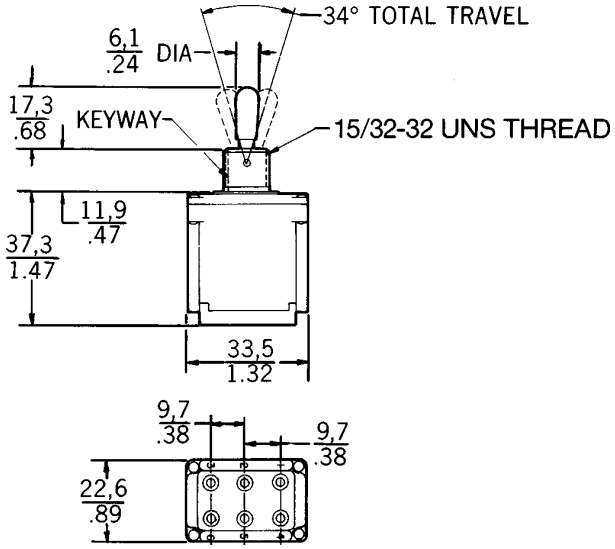
Four pole







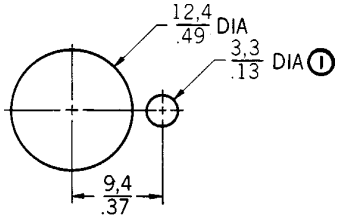
Standard toggle lever, IWTS termination



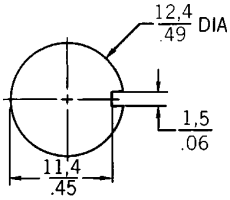
Note:
Terminal screws and mounting hardware (locking ring, lockwasher, and two hexnuts) are furnished unassembled.

Key: 0,0 = mm / 0.00 = inches

Panel cutout



With locking ring



Without locking ring

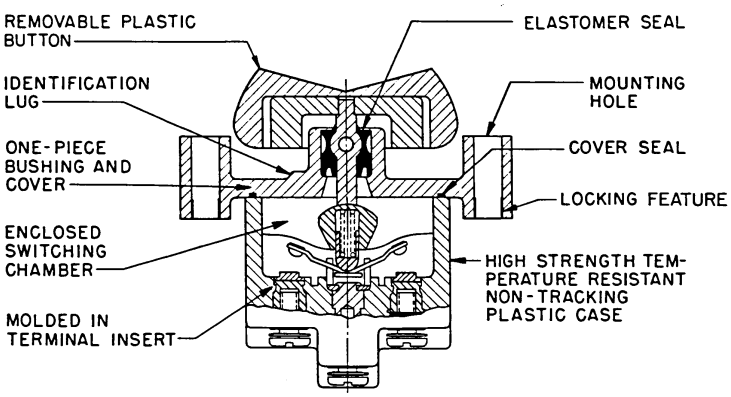
Note:
1,4/.06 Min deep to accommodate locking ring. (15PA87 panel seal requires blind hole to insure seal integrity.)

Manuals

Manual Switches

TP Series

Environment-Sealed Rocker Switches



FEATURES

- 2 and 3 position pushbutton action
- Various button colors
- 1, 2, and 4 pole circuitry
- Flush panel and above panel mounting
- Temperature range is from –65°F to +160°F (–54°C to +71°C)
- UL recognized, CSA certified

CONSTRUCTION

Above panel mounting gives a distinct button appearance. Flush panel mounting presents a low button profile.

TERMINAL CIRCUIT IDENTIFICATION

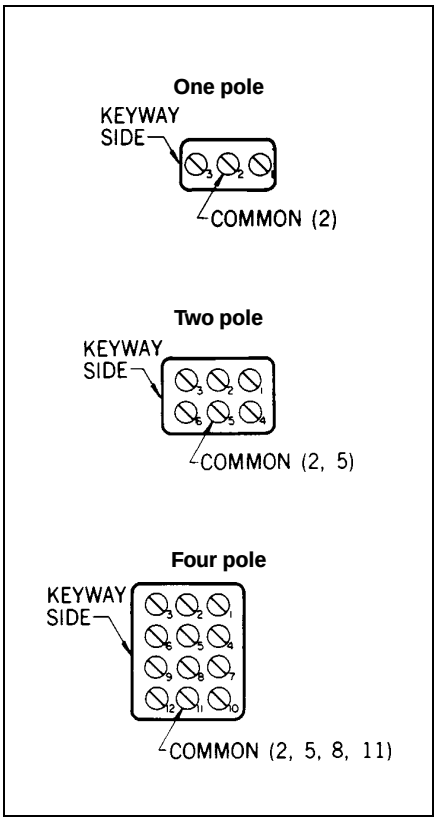
Terminal identifications are referred to in the order guides to indicate which circuits are made in each toggle position (i.e., 1-2 indicates circuit closure through terminals 1 and 2).

ELECTRICAL RATINGS (In amperes)

Elec. Rating Code	28 Volts DC			115 VDC	250 VDC	115 Volts AC 60 & 400 HZ			230 VAC
	Ind.	Res.	Lamp	Res.	Res.	Ind.	Res.	Lamp	Res.
1	15	20	5	0.75	0.5	10	15	3	6
2	10	15	4	0.75	0.5	7	15	2	6
3	15	20	7	0.75	0.5	15	15	4	6
4	10	18	5	0.75	0.5	8	11	2	6
5	12	20	5	0.75	0.5	15	15	4	6
6	10	18	4	0.75	0.5	8	11	2	6

UL/CSA Rating Code	Electrical Rating
L192	10 amps-125, 250, 277 VAC; ¼ Hp-125 VAC; ½ Hp-250, 277 VAC 3 Amps-125 VAC ''L''
L191	15 amps-125, 250, 277 VAC: ½ Hp-125 VAC; 1Hp-250, 277 VAC 5 amps-125 VAC ''L''

Application Note: Honeywell MICRO SWITCH does *not* recommend the use of silver cadium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. TP switches use silver cadmium oxide contacts. If you have specific questions,contact the MICRO SWITCH Application Center at 1-800-537-6945.



Manual Switches
Environment-Sealed Rocker Switches

Typical two-pole flush panel translucent button switch

Typical one-pole above panel transparent button switch

BUTTON OPTIONS
Buttons are removable and interchangeable. They measure .87″ × 1.46″ (22,1 × 37,1 mm).

Transparent (colorless plastic) buttons accept under-the-surface legend inserts for station and function identification. **Legend inserts are not furnished.** Insert legending can be done by your local supplier.

Translucent (white plastic) buttons have a clear appearance.

Colored (opaque plastic) buttons are excellent for color coding switch functions.

LEGENDING
MICRO SWITCH provides hot stamp legending on the button face. Use TP Legend Order Sheet FO-53730 (page 49) to specify your needs. Additional copies are available from your nearest MICRO SWITCH Sales Office. (MICRO SWITCH does not provide legending service on legend inserts.)

Translucent and opaque buttons may also be engraved and filled by the user.

SWITCHES WITHOUT BUTTONS
To order switches without buttons, convert catalog listings shown in the order guides. Substitute **TP7** for TP4 and TP16 above panel mounted switches; substitute **TP8** for TP201 and TP12 flush panel mounted switches. Order buttons separately from the chart below.

BUTTON ORDER GUIDE

Color	Catalog Listing
Translucent	12PA6
Transparent	12PA4
White*	12PA5-W
Yellow*	12PA5-Y
Black*	12PA5-BK
Green*	12PA5-G
Red*	12PA5-R
Blue*	12PA5-BL

* Opaque

TP 2-POSITION ORDER GUIDE Furnished with buttons.

No. of Poles	Circuits Made With Button At:		UL/CSA Rating Code	Elec. Rating Code	Catalog Listings			
					Flush Panel		Above Panel	
	Ident. Lug Position	Opposite Ident. Lug			Translucent Button	Transparent Button	Translucent Button	Transparent Button
1	OFF	2-3	L191	1	1TP201-2	1TP12-2	1TP216-2	1TP4-2
	OFF*	2-3	L192	2	1TP201-4	1TP12-4	1TP216-4	1TP4-4
	1-2*	OFF	L192	2	1TP201-6	1TP12-6	1TP216-6	1TP4-6
	1-2	2-3	L191	1	1TP201-3	1TP12-3	1TP216-3	1TP4-3
	1-2*	2-3	L192	2	1TP201-8	1TP12-8	1TP216-8	1TP4-8
2	OFF	2-3, 5-6	L191	3	2TP201-2	2TP12-2	2TP216-2	2TP4-2
	OFF*	2-3, 5-6	L192	4	2TP201-4	2TP12-4	2TP216-4	2TP4-4
	1-2,4-5*	OFF	L192	4	2TP201-6	2TP12-6	2TP216-6	2TP4-6
	1-2,4-5	2-3, 5-6	L191	3	2TP201-3	2TP12-3	2TP216-3	2TP4-3
	1-2,4-5*	2-3, 5-6	L192	4	2TP201-8	2TP12-8	2TP216-8	2TP4-8
4	OFF	2-3, 5-6, 8-9, 11-12	L191	5	4TP201-2	4TP12-2	—	4TP4-2
	OFF*	2-3, 5-6, 8-9, 11-12	L192	6	4TP201-4	4TP12-4	4TP216-4	4TP4-4
	1-2, 4-5, 7-8, 10-11*	OFF	L192	6	4TP201-6	4TP12-6	—	—
	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	5	4TP201-3	4TP12-3	4TP216-3	4TP4-3
	1-2, 4-5, 7-8, 10-11*	2-3, 5-6, 8-9, 11-12	L192	6	4TP201-8	4TP12-8	4TP216-8	—

* These positions only are momentary. All others are maintained.

Environment-Sealed Rocker Switches

TP 3-POSITION ORDER GUIDE Furnished with buttons.

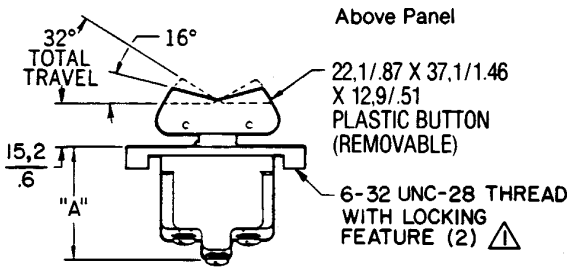
No. of Poles	Circuits Made With Button At:			UL/CSA Rating Code	Elec. Rating Code	Catalog Listings			
						Flush Panel		Above Panel	
	Ident. Lug Position	Center Position	Opposite Lug Position			Translucent Button	Transparent Button	Translucent Button	Transparent Button
1	1-2	OFF	2-3	L191	1	1TP201-1	1TP12-1	1TP216-1	1TP4-1
	1-2*	OFF	2-3	L192	2	1TP201-5	1TP12-5	1TP216-5	1TP4-5
	1-2*	OFF	2-3*	L192	2	1TP201-7	1TP12-7	1TP216-7	1TP4-7
	NONE**	OFF	2-3*	L191	1	1TP201-21	1TP12-21	—	1TP4-21
	NONE**	1-2	2-3	L191	1	1TP201-31	1TP12-31	—	1TP4-31
	NONE**	1-2	2-3*	L192	2	1TP201-51	1TP12-51	1TP216-51	1TP4-51
	1-2*	OFF	NONE**	L192	2	1TP201-61	1TP12-61	1TP216-61	1TP4-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	2TP201-1	2TP12-1	2TP216-1	2TP4-1
	1-2, 4-5*	OFF	2-3, 5-6	L192	4	2TP201-5	2TP12-5	2TP216-5	2TP4-5
	1-2, 4-5*	OFF	2-3, 5-6*	L192	4	2TP201-7	2TP12-7	2TP216-7	2TP4-7
	NONE**	OFF	2-3, 5-6	L191	3	2TP201-21	2TP12-21	2TP216-21	2TP4-21
	NONE**	1-2, 4-5	2-3, 5-6	L191	3	2TP201-31	2TP12-31	2TP216-31	2TP4-31
	NONE**	1-2, 4-5	2-3, 5-6*	L192	4	2TP201-512	2TP12-512	2TP216-512	2TP4-512
	1-2, 4-5*	OFF	NONE**	L192	4	2TP201-61	2TP12-61	2TP216-61	2TP4-61
	1-2, 4-5	1-2, 5-6	2-3, 5-6	L191	3	2TP201-10†	2TP12-10†	2TP216-10†	2TP4-10†
	1-2, 4-5*	1-2, 5-6	2-3, 5-6	L192	4	2TP201-50†	2TP12-50†	2TP216-50†	2TP4-50†
	1-2, 4-5*	1-2, 5-6	2-3, 5-6*	L192	4	2TP201-70†	2TP12-70†	2TP216-70†	2TP4-70†
4	1-2, 4-5, 7-8, 10-11	OFF	2-3, 5-6 8-9, 11-12	L191	5	4TP201-1	4TP12-1	4TP216-1	4TP4-1
	1-2, 4-5 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12	L192	6	4TP201-5	4TP12-5	—	4TP4-5
	1-2, 4-5, 7-8, 10-11*	OFF	2-3, 5-6 8-9, 11-12*	L192	6	4TP201-7	4TP12-7	4TP216-7	4TP4-7
	NONE**	OFF	2-3, 5-6, 8-9, 11-12	L191	5	4TP201-21	4TP12-21	4TP216-21	4TP4-21
	NONE**	1-2, 4-5 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	5	4TP201-31	—	4TP216-31	4TP4-31
	NONE**	1-2, 4-5 7-8, 10-11	2-3, 5-6 8-9, 11-12*	L192	6	4TP201-51	—	4TP216-51	4TP4-51
	1-2, 4-5, 7-8, 10-11*	OFF	NONE**	L192	6	4TP201-61	4TP12-61	4TP216-61	4TP4-61
	1-2, 4-5, 7-8, 10-11	2-3, 4-5	2-3, 5-6, 8-9, 11-12	L191	5	4TP201-10†	4TP12-10†	—	4TP4-10†
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5 7-8, 11-12	2-3, 5-6, 8-9, 11-12	L192	6	4TP201-50†	4TP12-50†	4TP216-50†	4TP4-50†
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5	2-3, 5-6, 8-9, 11-12*	L192	6	4TP201-70†	4TP12-70†	4TP216-70†	4TP4-70†

* These positions only are momentary. All others are maintained.
** Operator is blocked from these positions. Switch becomes two position, with center being one extreme position.
† Special on-on-on circuitry. See page 40.

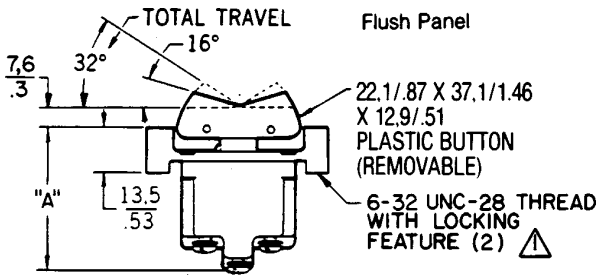
This Page Intentionally Left Blank

Environment-Sealed Rocker Switches

MOUNTING DIMENSIONS (For reference only)



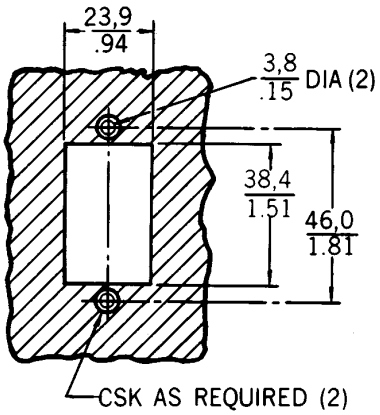
	DIM. "A"
1-POLE	29,5 / 1.16
2 & 4-POLE	34,4 / 1.35



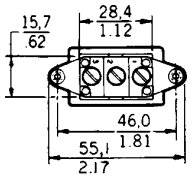
	DIM. "A"
1-POLE	36,8 / 1.45
2 & 4-POLE	41,7 / 1.64

⚠ 4-POLE HAS 6-32 UNC-28 THREAD LOCKNUT

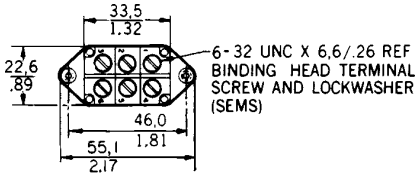
Panel cutout



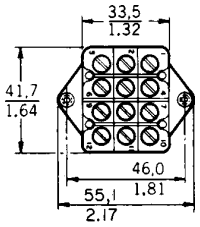
One pole



Two pole



Four pole



Key: 0,0 = mm / 0.00 = inches

Miniature Toggle Switches

11TW Standard toggle lever
15⁄32″ bushing

1TW Standard unsealed toggle lever
¼″ bushing

12TW Pull-to-unlock toggle lever
15⁄32″ bushing

2TW101 Standard sealed toggle lever
¼″ bushing

FEATURES

- Qualified to MIL-S-83731
- Save space and weight
- SPDT and DPDT circuitry
- Choice of ¼″ or 15⁄32″ bushings
- 15⁄32″ bushing has lever seal
- Pull-to-unlock option on 15⁄32″ bushing
- UL recognized
- Temperature range: –85°F to +160°F (–65°C to +71°C)
- Sealed bushing versions

GENERAL INFORMATION

Molded-in terminals are plated for soldering. There is positive return on momentary versions. All switches come with a lockwasher, a keying washer, and two hexnuts. Special ''on-on-on'' circuitries, similar to those shown for TL, are also available for TW.

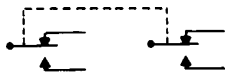
ELECTRICAL RATINGS

Volts	Amperes		
	Resistive	Inductive	Lamp
30 VDC	5	2	1
115 VAC	5	2	1
UL Code 117	5 amps @ 125 VAC		

CIRCUITRY

1[1] Single Pole Double Throw

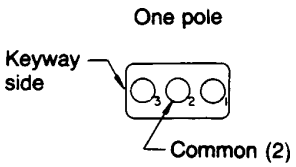
2[1] Two Single Pole Double Throw Circuits

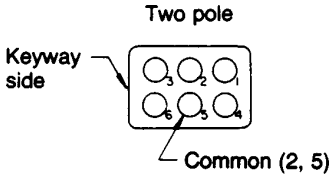


[1] Refer to order guides.

TERMINAL CIRCUIT IDENTIFICATIONS

Terminal identifications are referred to in the Ordering Charts to indicate which circuits are made in each toggle position (i.e., ''1-2'' reference indicates circuit closure through terminals 1 and 2).





Manuals

TW 2-POSITION ORDER GUIDES

Switches with 15⁄32″ Bushings

No. Poles	Circuits Made With Toggle At: Keyway Position	Opposite Keyway	Sealed Standard Toggle: Catalog Listing	Military No.	Sealed Pull-to-Unlock Toggle**: Add Suffix to Standard Listing	Military No.**
1	OFF	2-3 ON	11TW1-2	MS27718-22-1	D, F, G	MS27720-22-1
1	2-1 ON	2-3 ON	11TW1-3	MS27718-23-1	D, F, G	MS27720-23-1
1	2-1 ON*	2-3 ON	11TW1-8	MS27718-26-1	F	MS27720-26-1
2	OFF	2-3 & 5-6 ON	12TW1-2	MS27719-22-1	D, F, G	MS27721-22-1
2	2-1 & 5-4 ON	2-3 & 5-6 ON	12TW1-3	MS27719-23-1	D, F, G	MS27721-23-1
2	2-1 & 5-4 ON*	2-3 & 5-6 ON	12TW1-8	MS27719-26-1	F	MS27721-26-1

* These positions are momentary. All others are maintained.
** Also add appropriate suffix letter to the Military Number.

Switches with ¼″ Bushings

No. Poles	Circuits Made With Toggle At: Keyway Position	Opposite Keyway	Unsealed Standard Toggle: Catalog Listing	Military No.	Sealed Standard Toggle: Catalog Listing
1	OFF	2-3 ON	1TW1-2	MS27716-22-1	1TW101-2
1	2-1 ON	2-3 ON	1TW1-3	MS27716-23-1	1TW101-3
1	2-1 ON*	2-3 ON	1TW1-8	MS27716-26-1	1TW101-8
2	OFF	2-3 & 5-6 ON	2TW1-2	MS27717-22-1	2TW101-2
2	2-1 & 5-4 ON	2-3 & 5-6 ON	2TW1-3	MS27717-23-1	2TW101-3
2	2-1 & 5-4 ON*	2-3 & 5-6 ON	2TW1-8	MS27717-26-1	2TW101-8

* These positions are momentary. All others are maintained.

TW 3-POSITION ORDER GUIDES

Switches with 15⁄32″ Bushings

No. Poles	Circuits Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Sealed Standard Toggle: Catalog Listing	Military No.	Sealed Pull-to-Unlock Toggle: Add Suffix to Standard Listing	Military No.**
1	2-1 ON	OFF	2-3 ON	11TW1-1	MS27718-21-1	ALL	MS27720-21-1
1	2-1 ON*	OFF	2-3 ON	11TW1-5	MS27718-31-1	E, F, K, L, M, N	MS27720-31-1
1	2-1 ON*	OFF	2-3 ON*	11TW1-7	MS27718-27-1	E, L, N	MS27720-27-1
2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	12TW1-1	MS27719-21-1	ALL	MS27721-21-1
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	12TW1-5	MS27719-31-1	E, F, K, L, M, N	MS27721-31-1
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	12TW1-7	MS27719-27-1	E, L, N	MS27721-27-1

* These positions only are momentary. All others are maintained.
** Also add appropriate suffix letter to the Military Number.

Switches with ¼″ Bushings

No. Poles	Circuits Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Unsealed Standard Toggle: Catalog Listing	Military No.	Sealed Standard Toggle: Catalog Listing
1	2-1 ON	OFF	2-3 ON	1TW1-1	MS27716-21-1	1TW101-1
1	2-1 ON*	OFF	2-3 ON	1TW1-5	MS27716-31-1	1TW101-5
1	2-1 ON*	OFF	2-3 ON*	1TW1-7	MS27716-27-1	1TW101-7
2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	2TW1-1	MS27717-21-1	2TW101-1
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	2TW1-5	MS27717-31-1	2TW101-5
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	2TW1-7	MS27717-27-1	2TW101-7

* These positions are momentary. All others are maintained.

Miniature Toggle Switches (IWTS)

LOCKING CONFIGURATIONS
When ordering pull-to-unlock toggle listings, add the suffix letter shown in this chart to the standard toggle catalog listing and the Military Approval number.

A	B	D	E	F	G	H
						
Locked In Three Positions	Locked In Center and Extreme Position (Keyway Side)	Locked Out Of Center Position	Locked In Center Position	Locked In Extreme Position (Opposite Keyway)	Locked In Extreme Position (Keyway Side)	Locked Out Of Center And Extreme Position (Keyway Side)

J	K	L	M	N	P
					
Locked Out Of Center And Extreme Position (Opposite Keyway)	Locked In Center And Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Keyway Side)	Locked Out Of And Into Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Opposite Keyway)	Locked Out Of And Into Extreme Position (Keyway Side)

WITH IWTS TERMINATION
- 15⁄32″ bushing has lever seal
- One or two pole circuitry
- Accepts #20 wire using M39029/1-101 contact pins
- Connections resist shock, vibration, and high pulling force

TW 2-POSITION ORDER GUIDE — IWTS TERMINATION

No. Poles	Circuits Made With Toggle At: Keyway Position	Opposite Keyway	Standard Toggle Catalog Listing	Pull-to-Unlock Toggle Add Suffix to Standard Listing
1	2-1 ON	2-3 ON	111TW1-3	D, F, G
1	2-1 ON*	2-3 ON	111TW1-8	F
2	2-1 & 5-4 ON	2-3 & 5-6 ON	112TW1-3	D, F, G
2	2-1 & 5-4 ON*	2-3 & 5-6 ON	112TW1-8	F

TW 3-POSITION ORDER GUIDE — IWTS TERMINATION

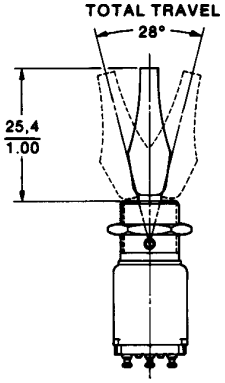
No. Poles	Circuits Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Standard Toggle Catalog Listing	Pull-to-Unlock Toggle Add Suffix to Standard Listing
1	2-1 ON	OFF	2-3 ON	111TW1-1	ALL
1	2-1 ON*	OFF	2-3 ON	111TW1-5	E, F, K, L, M, N
1	2-1 ON*	OFF	2-3 ON*	111TW1-7	E, L, N
2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	112TW1-1	ALL
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	112TW1-5	E, F, K, L, M, N
2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	112TW1-7	E, L, N

* These positions only are momentary. All others are maintained.

Manual Switches

TW Series

Miniature Toggle Switches



WITH COLORED TAB LEVERS

- Available in seven colors
- Affords attractive front-of-panel appearance for graphic display and functional identify
- Levers made to withstand temperatures up to 160°F (71°C)
- Switches furnished with decorative knurled nut, a lockwasher, a keying washer, and a hex nut
- 15⁄32″ bushing/sealed lever
- Available in IWTS termination versions

TW ORDER GUIDE

To order, combine the basic (function) listing from Table 1 with the desired lever color suffix from Table 2.

TABLE 1 — TOGGLE POSITION AND CONTACT ARRANGEMENT

Positions	No. Poles	Circuits Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	Basic Listing Color Suffix See Table 2
2	1	OFF	NONE	2-3 ON	11TW19-2— — — —
2	1	2-1 ON	NONE	2-3 ON	11TW19-3— — — —
2	1	2-1 ON*	NONE	2-3 ON	11TW19-8— — — —
2	2	OFF	NONE	2-3 & 5-6 ON	12TW19-2— — — —
2	2	2-1 & 5-4	NONE	2-3 & 5-6 ON	12TW19-3— — — —
2	2	2-1 & 5-4*	NONE	2-3 & 5-6 ON	12TW19-8— — — —
3	1	2-1 ON	OFF	2-3 ON	11TW19-1— — — —
3	1	2-1 ON*	OFF	2-3 ON	11TW19-5— — — —
3	1	2-1 ON*	OFF	2-3 ON*	11TW19-7— — — —
3	2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	12TW19-1— — — —
3	2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	12TW19-5— — — —
3	2	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	12TW19-7— — — —

* These positions only are momentary. All others are maintained.

TABLE 2 — TAB LEVER COLORS

Tab Lever Color	White	Black	Blue	Red	Green	Orange	Light Gray
Color suffix	A001	A002	A003	A004	A005	A006	A007

TW SWITCHES WITH SPECIAL CIRCUITRIES ORDER GUIDE

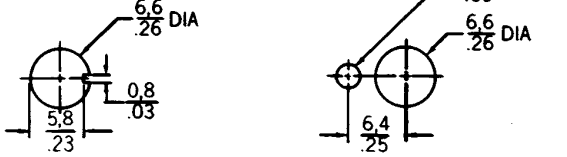
All 2-pole 3-position TW switches are available with special ''on-on-on'' – **10,** – **50,** – **70** circuitry options as shown below.

2-Pole 3-Position Switches			Sealed Standard Toggle		Unsealed Std. Toggle	Sealed Tab Lever
Circuits Made With Toggle At:			15/32″ bushing	1/4″ bushing	1/4″ bushing	15/32″ bushing
Keyway Position	Center Position	Opposite Keyway	Catalog Listing	Catalog Listing	Catalog Listing	Catalog Listing
2-1 & 5-4 ON	2-1 & 5-6 ON	2-3 & 5-6 ON	12TW1-**10**	2TW101-**10**	2TW1-**10**	12TW19-**10**————
2-1 & 5-4 ON*	2-1 & 5-6 ON	2-3 & 5-6 ON	12TW1-**50**	2TW101-**50**	2TW1-**50**	12TW19-**50**————
2-1 & 5-4 ON*	2-1 & 5-6 ON	2-3 & 5-6 ON*	12TW1-**70**	2TW101-**70**	2TW1-**70**	12TW19-**70**————

* These positions are momentary. All others are maintained.

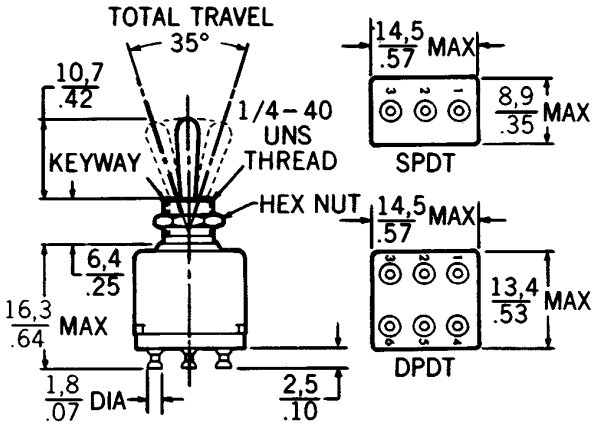
MOUNTING DIMENSIONS (For reference only)

Mounting detail for ¼″ bushing switches

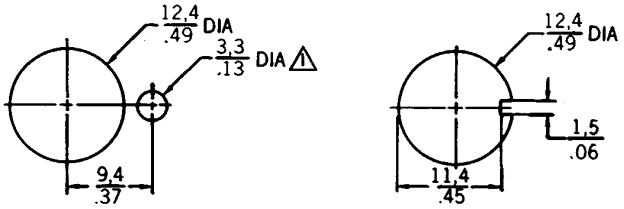


Without locking ring | With locking ring

Dimensions for ¼″ bushing switches



Mounting detail for 15⁄32″ bushing switches



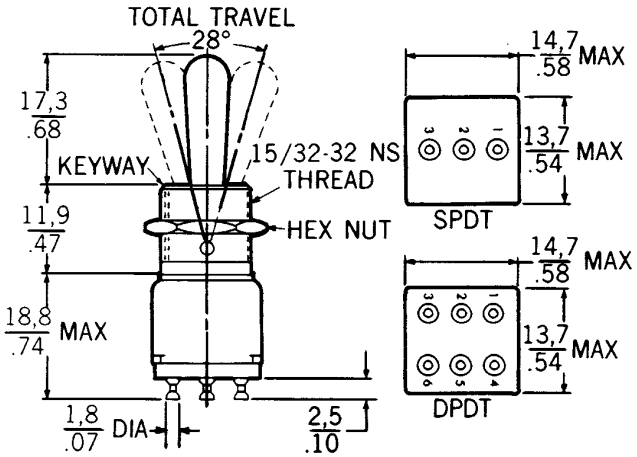
With locking ring | Without locking ring

Note: ⚠ 1,1/.05 MIN. DEEP TO ACCOMMODATE LOCKING RING. FOR SWITCHES USING PANEL SEAL, DO NOT ALLOW THRU HOLE MOUNTING.

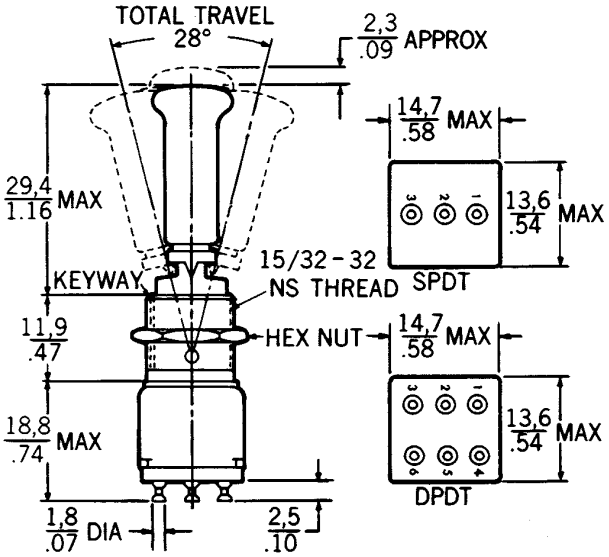
Key: 0,0 = mm / 0.00 = inches

Dimensions for 15⁄32″ switches

Standard toggle lever



Pull-to-unlock toggle lever



Manuals

Manual Switches
Toggle Switches

TS Series

2-pole shown

FEATURES
- 2 or 3-position, momentary and maintained action
- 1 and 2-pole circuitry
- Rated up to 15 amps
- Lever-to-bushing seal
- Solder, screw, or quick-connect terminals
- UL recognized, CSA certified

Colored tab levers and special ''on-on-on'' circuitry can also be furnished.

TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications in the order guides indicate which circuits are made in each position (i.e., 1-2 indicates circuit closure through terminals 1 and 2).

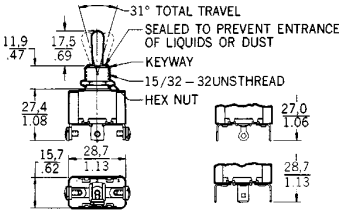
ELECTRICAL RATINGS

Rating Code	UL/CSA Rating
L192	10 Amps, 125, 250, 277 VAC ¼ HP, 125 VAC ½ HP, 250, 277 VAC 3 Amps, 125 VAC ''L''
L191	15 Amps, 125, 250, 277 VAC ½ HP, 125 VAC 1 HP, 250, 277 VAC 5 Amps, 125 VAC (L)

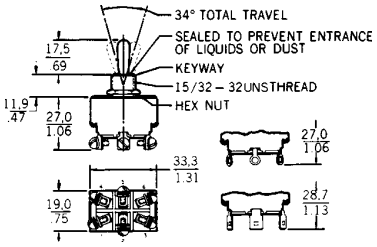
NOTE: Application Note on Page 57 applies to TS switches.

MOUNTING DIMENSIONS

1-pole



2-pole



TS 2-POSITION ORDER GUIDE

No. Of Poles	Circuit(s) Made With Toggle At: Keyway Position	Opposite Keyway	UL/CSA Rating Code	Screw Terminals	Solder Terminals	Quick-Connect Terminals
1	OFF	2-3 ON	L191	11TS15-2	11TS115-2	11TS95-2
	2-1 ON	2-3 ON	L191	11TS15-3	11TS115-3	11TS95-3
	OFF*	2-3 ON	L192	11TS15-4		11TS95-4
	2-1 ON*	OFF	L192	11TS15-6	11TS115-6	11TS95-6
	2-1 ON*	2-3 ON	L192	11TS15-8	11TS115-8	
2	OFF	2-3 & 5-6 ON	L191	12TS15-2	12TS115-2	12TS95-2
	2-1 & 5-4 ON	2-3 & 5-6 ON	L191	12TS15-3	12TS115-3	12TS95-3
	OFF*	2-3 & 5-6 ON	L192	12TS15-4		
	2-1 & 5-4 ON*	OFF	L192	12TS15-6		
	2-1 & 5-4 ON*	2-3 & 5-6 ON	L192	12TS15-8	12TS115-8	

TS 3-POSITION ORDER GUIDE

No. Of Poles	Circuit(s) Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	UL/CSA Rating Code	Screw Terminals	Solder Terminals	Quick-Connect Terminals
1	2-1 ON	OFF	2-3 ON	L191	11TS15-1	11TS115-1	11TS95-1
	2-1 ON*	OFF	2-3 ON	L192	11TS15-5	11TS115-5	11TS95-5
	2-1 ON*	OFF	2-3 ON*	L192	11TS15-7	11TS115-7	11TS95-7
2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	L191	12TS15-1	12TS115-1	12TS95-1
	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	L192	12TS15-5	12TS115-5	12TS95-5
	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	L192	12TS15-7		12TS95-7
	2-1 & 5-4 ON	2-1 & 5-6 ON	2-3 & 5-6 ON	L191	—		12TS95-10

* Marked toggle positions are momentary. All other positions are maintained.

Manual Switches
Toggle Switches

TS Series

2-pole shown

FEATURES
- 2 or 3-position, momentary and maintained action
- 1 and 2-pole circuitry
- Rated up to 15 amps
- Lever-to-bushing seal
- Solder, screw, or quick-connect terminals
- UL recognized, CSA certified

Colored tab levers and special ''on-on-on'' circuitry can also be furnished.

TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications in the order guides indicate which circuits are made in each position (i.e., 1-2 indicates circuit closure through terminals 1 and 2).

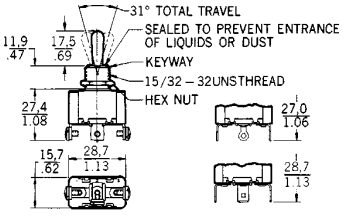
ELECTRICAL RATINGS

Rating Code	UL/CSA Rating
L192	10 Amps, 125, 250, 277 VAC ¼ HP, 125 VAC ½ HP, 250, 277 VAC 3 Amps, 125 VAC ''L''
L191	15 Amps, 125, 250, 277 VAC ½ HP, 125 VAC 1 HP, 250, 277 VAC 5 Amps, 125 VAC (L)

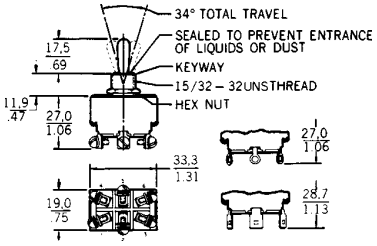
NOTE: Application Note on Page 57 applies to TS switches.

MOUNTING DIMENSIONS

1-pole



2-pole



TS 2-POSITION ORDER GUIDE

No. Of Poles	Circuit(s) Made With Toggle At: Keyway Position	Opposite Keyway	UL/CSA Rating Code	Screw Terminals	Solder Terminals	Quick-Connect Terminals
1	OFF	2-3 ON	L191	11TS15-2	11TS115-2	11TS95-2
	2-1 ON	2-3 ON	L191	11TS15-3	11TS115-3	11TS95-3
	OFF*	2-3 ON	L192	11TS15-4		11TS95-4
	2-1 ON*	OFF	L192	11TS15-6	11TS115-6	11TS95-6
	2-1 ON*	2-3 ON	L192	11TS15-8	11TS115-8	
2	OFF	2-3 & 5-6 ON	L191	12TS15-2	12TS115-2	12TS95-2
	2-1 & 5-4 ON	2-3 & 5-6 ON	L191	12TS15-3	12TS115-3	12TS95-3
	OFF*	2-3 & 5-6 ON	L192	12TS15-4		
	2-1 & 5-4 ON*	OFF	L192	12TS15-6		
	2-1 & 5-4 ON*	2-3 & 5-6 ON	L192	12TS15-8	12TS115-8	

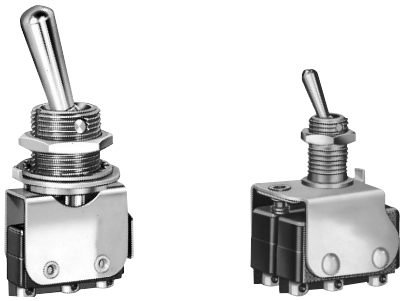
TS 3-POSITION ORDER GUIDE

No. Of Poles	Circuit(s) Made With Toggle At: Keyway Position	Center Position	Opposite Keyway	UL/CSA Rating Code	Screw Terminals	Solder Terminals	Quick-Connect Terminals
1	2-1 ON	OFF	2-3 ON	L191	11TS15-1	11TS115-1	11TS95-1
	2-1 ON*	OFF	2-3 ON	L192	11TS15-5	11TS115-5	11TS95-5
	2-1 ON*	OFF	2-3 ON*	L192	11TS15-7	11TS115-7	11TS95-7
2	2-1 & 5-4 ON	OFF	2-3 & 5-6 ON	L191	12TS15-1	12TS115-1	12TS95-1
	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON	L192	12TS15-5	12TS115-5	12TS95-5
	2-1 & 5-4 ON*	OFF	2-3 & 5-6 ON*	L192	12TS15-7		12TS95-7
	2-1 & 5-4 ON	2-1 & 5-6 ON	2-3 & 5-6 ON	L191	—		12TS95-10

* Marked toggle positions are momentary. All other positions are maintained.

Toggle Switch Assemblies

6AT SERIES



FEATURES

- 2-position, momentary and maintained action.
- 1, 2 or 3 SPDT precision basic switches.
- Short behind-panel depth.
- Choice of ¼ or 15⁄32-inch bushings.
- Silver or gold contacts.
- UL recognized, CSA certified basic switches.

ELECTRICAL RATINGS — Basic Switches

	UL/CSA Rating	30 VDC Rating		
		Load	Amps	
			Sea Level	50,000 ft.
Silver Contacts	5 amps, 125-250 VAC	Inductive Resistive Max. Inrush	3 5 24	2.5 5 24
Gold Contacts	1 amp, 125 VAC	Inductive Resistive Max. Inrush	0.5 1 2	0.5 1 2

2-POSITION ORDER GUIDE

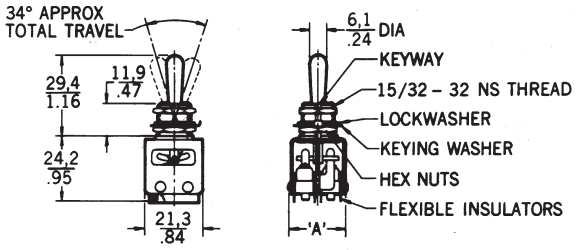
Mounting Style	Toggle Lever Position		Number of Poles	Types Contacts	Solder Terminals	"T" Terminals	"T2" Terminals
	Keyway	Opposite Keyway					
¼″ Bushing With Key Tab	Maint.	Maint.	1	Silver	6AT2	6AT2-T 6AT68-T*	6AT2-T2 6AT68-T2*
				Gold	6AT23		6AT23-T2
			2	Silver	6AT3	6AT3-T	6AT3-T2
				Gold	—	6AT13-T	6AT13-T2
			3	Silver	6AT501	6AT501-T	
¼″ Bushing Without Key Tab	Maint.	Maint.	1	Silver	6AT1	6AT1-T	6AT1-T2
				Gold			6AT56-T2
			2	Silver	6AT4	—	6AT4-T2
¼″ Bushing With Key Washer	Maint.	Maint.	1	Silver		6AT201-T	
			2	Gold			6AT231-T2
15⁄32″ Bushing With Key Washer	Maint.	Maint.	1	Silver	6AT6	6AT6-T	6AT6-T2
				Gold	6AT17		6AT17-T2
			2	Silver	6AT7	6AT7-T	
				Gold	6AT42		6AT42-T2
			3	Silver	6AT10	6AT10-T	6AT10-T2
				Gold	6AT18		6AT18-T2

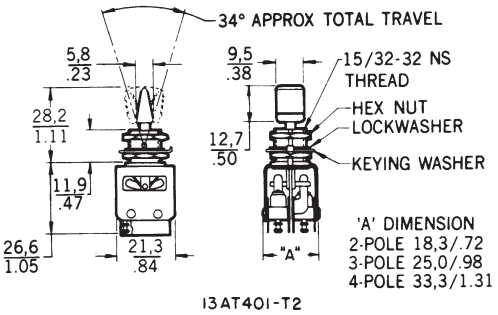
* Extra long toggle lever (.67″/17,0 mm).

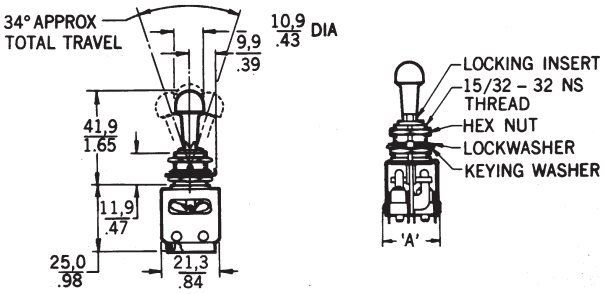
Toggle Switch Assemblies

MOUNTING DIMENSIONS (For reference only)

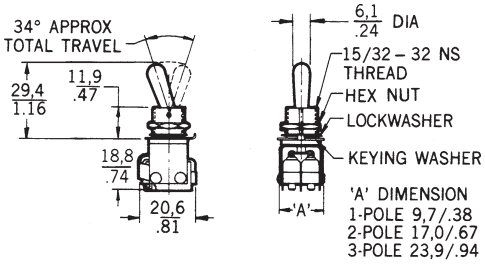
13/23AT

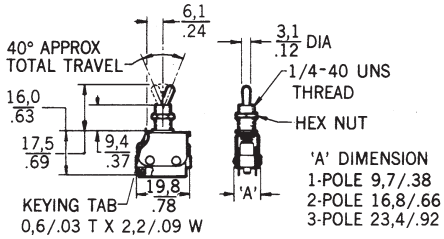






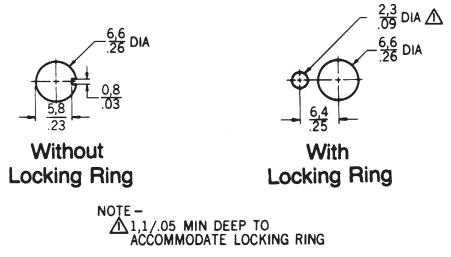
6AT



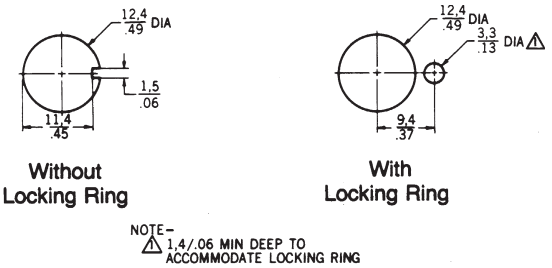


PANEL CUTOUTS

¼" Bushing



15⁄32" Bushing



Bushing mounting torque is 10–15 in./lbs.

NOTE—
64AT300, 66AT300, and 68AT300 (M8805/98) listings have a bushing seal and MS25196 panel seal.

Manual Switches

23AT Series

Toggle Switch Assemblies

Standard lever

Tab lever

Pull-to-unlock lever

FEATURES

- 2 or 3-position, momentary and maintained action.
- 2, 3 or 4 SPDT precision basic switches.
- Standard toggle, tab, or pull-to-unlock levers.
- Silver or gold contacts.
- 15/32-inch bushing.
- UL recognized, CSA certified basic switches.
- Lever-to-bushing seal option.

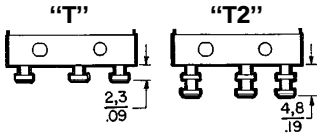
ELECTRICAL RATINGS — Basic Switches

	UL/CSA Rating	30 VDC Rating		
			Amps	
		Load	Sea Level	50,000 ft.
Silver Contacts	5 amps, 125-250 VAC	Inductive Resistive Max. Inrush	3 5 24	2.5 5 24
Gold Contacts	1 amp, 125 VAC	Inductive Resistive Max. Inrush	0.5 1 2	0.5 1 2

PULL-TO-UNLOCK TOGGLE LEVERS

As a guard against accidental operation, pull-to-unlock toggle levers must be pulled .090 inch/2,3 mm (approx.) to change positions. A chart showing the 13 locking configurations and their catalog listing suffix code letters is shown on the following page.

TERMINALS



AT 2-POSITION ORDER GUIDE

Toggle Lever Position		No. of Poles/ Switches	Type Contacts	Solder Terminals	Standard Lever "T" Terminals	"T2" Terminals	Tab Lever "T2" Terminals	Pull-To-Unlock Lever Solder Terminals (Add locking letter to catalog listings below)	
Keyway	Opposite Keyway								
Maint.	Maint.	2	Silver	23AT1	23AT1-T	23AT1-T2	23AT402-T2	23AT1-	Locking letters: D, F, or G
			Gold	23AT11		23AT11-T2		23AT11-	
		3	Silver	23AT2	23AT2-T	23AT2-T2		23AT2-	
			Gold	23AT12		23AT12-T2		23AT12-	
		4	Silver	23AT3	23AT3-T	23AT3-T2		23AT3-	
			Gold	23AT8					
Mom.	Maint.	2	Silver	23AT4	23AT4-T	23AT4-T2	23AT403-T2		
			Gold	23AT19					
		3	Silver	23AT5					
			Gold						
		4	Silver	23AT6		23AT6-T2			
			Gold						

AT MIL-S-8805/26 VERSIONS ORDER GUIDE

Toggle Lever Position		No. of Poles/ Switches	Type Contacts	Standard Lever "T2" Terminals		Tab Lever "T2" Terminals	
Keyway	Opposite Keyway			Catalog Listing	Military No.	Catalog Listing	Military No.
Maint.	Maint.	2	Silver	23AT73-T2	M8805/26-001	23AT473-T2	M8805/26-003
		4	Silver	23AT74-T2	M8805/26-002	23AT474-T2	M8805/26-004

Manuals

Toggle Switch Assemblies

AT 3-POSITION ORDER GUIDE

Toggle Lever Position			No. of Poles/ Switches	Type Contacts	Standard Lever			Tab Lever "T2" Terminals	Pull-To-Unlock Lever Solder Terminals (Add locking letter to cat. listings below)	
Keyway	Center	Opposite Keyway			Solder Terminals	"T" Terminals	"T2" Terminals			
Maint.	Maint.	Maint.	2	Silver	13AT2	13AT2-T	13AT2-T2	13AT402-T2	13AT2-	Locking letters: All types
				Gold	13AT18	13AT18-T				
			3	Silver	13AT5				13AT5-	
			4	Silver	13AT9		13AT9-T2	13AT409-T2	13AT9-	
				Gold	13AT29					
Mom.	Maint.	Mom.	2	Silver	13AT1	13AT1-T	13AT1-T2	13AT401-T2	13AT1-	Locking letters: E, L, or N
				Gold	13AT26			13AT423-T2		
			3	Silver	13AT4			13AT413-T2		
			4	Silver	13AT8		13AT8-T2		13AT8-	
				Gold						
Maint.	Maint.	Mom.	2	Silver	13AT3	13AT3-T	13AT3-T2	13AT403-T2	13AT3-	Locking letters: E, G, B, L, P or N
				Gold						
			4	Silver	13AT10			13AT410-T2	13AT10-	

AT MIL-S-8805/26 VERSIONS ORDER GUIDE

Toggle Lever Position			No. of Poles/ Switches	Type Contacts	Standard Lever "T2" Terminals		Tab Lever "T2" Terminals	
Keyway	Center	Opposite Keyway			Catalog Listing	Military No.	Catalog Listing	Military No.
Mom.	Maint.	Mom.	2	Silver	13AT271-T2	M8805/26-005	13AT471-T2	M8805/26-006
			3	Silver			13AT474-T2	M8805/26-012
Maint.	Maint.	Maint.	2	Silver	13AT272-T2	M8805/26-007	13AT472-T2	M8805/26-008
			3	Silver	13AT275-T2	M8805/26-013		
Maint.	Maint.	Mom.	2	Silver	13AT273-T2	M8805/26-009	13AT473-T2	M8805/26-010

LEVER-TO-BUSHING SEAL OPTION

A splash type lever-to-bushing seal can be provided to help prevent the entrance of moisture and dust behind the panel, or into the contact area.

HERMETICALLY SEALED BASIC SWITCH OPTION

AT's with 15⁄32″ bushings can be furnished with HM or HS hermetically sealed basic switches, which have metal-to-metal fusion around the cover, actuator base and mounting holes. Terminals are sealed glass-to-metal. For more information, contact your MICRO SWITCH Sales Office.

Shown with HM basic switches

LOCKING CONFIGURATIONS

When ordering pull-to-unlock toggle listings, add the suffix letter shown in this chart to the standard toggle catalog listing and the Military Approval number.

A	B	D	E	F	G	H
						
Locked In Three Positions	Locked In Center and Extreme Position (Keyway Side)	Locked Out Of Center Position	Locked In Center Position	Locked In Extreme Position (Opposite Keyway)	Locked In Extreme Position (Keyway Side)	Locked Out Of Center And Extreme Position (Keyway Side)

J	K	L	M	N	P
					
Locked Out Of Center And Extreme Position (Opposite Keyway)	Locked In Center And Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Keyway Side)	Locked Out Of And Into Extreme Position (Opposite Keyway)	Locked Out Of Extreme Position (Opposite Keyway)	Locked Out Of And Into Extreme Position (Keyway Side)

Manual Switches

60AT Series

Toggle Switch Assemblies

Standard lever

Pull-to-unlock lever

FEATURES

- Compact multi-pole design conserves space and weight
- 2, 4, 6, or 8 SPDT precision basic switches
- 2 or 3-position, momentary and maintained action
- 15/32″ bushing
- Standard or pull-to-unlock toggle levers
- MIL-S-8805/98 qualified versions

PULL-TO-UNLOCK OPTION

As a guard against accidental operation, pull-to-unlock levers must be pulled .090 in./2,3 mm (approx.) to change positions. See chart on facing page which shows locking configurations and locking letter suffix codes which are referred to in the order guides.

Note: To order replacements for the resilient white caps which are screwed onto 60AT locking levers, specify Catalog Listing **15PA90-6W.**

ELECTRICAL RATINGS — Basic Switches (in amperes)

Load	Sea Level			50,000 Ft.		
	28 VDC	115 VAC* 400 Hz	250 VAC 60 Hz	28 VDC	115 VAC* 400 Hz	250 VAC 60 Hz
Resistive	7	7	7	7	7	7
Inductive	4**	7	7	2.5**	7	7
Motor	4	3.3	3.3	4	3.3	3.3
Lamp	2.5	2	2	2.5	2	2

Inrush: 20 amps * 75% power factor. ** Use AN31796 inductor.

C = common, **NC** = normally closed, **NO** = normally open. **Numbers** = basic switch designations.

AT 2-POSITION ORDER GUIDE

No. of Poles/ Switches	Circuits Made With Toggle At:				Standard Lever Catalog Listing		Pull-To-Unlock Lever Suffix (Add locking letter to cat. listings)
	Keyway Position		Opposite Keyway		With MIL-S-6743 Basic Switches	With MIL-S-8805/4 Basic Switches	
	C-NC	C-NO	C-NC	C-NO			
2	1, 2 1, 2* 1, 2	— — —	— — —	1, 2 1, 2 1, 2*	62AT11-3 62AT11-8 62AT11-82	62AT22-3 62AT22-8 62AT22-82	D, G F G
4	1, 2	3, 4	3, 4	1, 2	64AT11-3	64AT22-3	D, F, G
6	1, 2, 3	4, 5, 6	4, 5, 6	1, 2, 3	66AT11-3	66AT22-3	D, F, G
8	1, 2, 3, 4	5, 6, 7, 8	5, 6, 7, 8	1, 2, 3, 4	68AT11-3	68AT22-3	D, F, G

AT MIL-S-8805/98 VERSIONS (WITH BUSHING AND PANEL SEALS) ORDER GUIDE

No. of Poles/ Switches	Circuits Made With Toggle At:				Standard Lever Version	
	Keyway Position		Opposite Keyway			
	C-NC	C-NO	C-NC	C-NO	Catalog Listing	Military No.
4	1, 2	3, 4	3, 4	1, 2	64AT300-3	M8805/98-015
6	1, 2, 3	4, 5, 6	4, 5, 6	1, 2, 3	66AT300-3	M8805/98-046
8	1, 2, 3, 4	5, 6, 7, 8	5, 6, 7, 8	1, 2, 3, 4	68AT300-3	M8805/98/077

* Momentary positions. All others are maintained.

Toggle Switch Assemblies

60AT SERIES 3-POSITION ORDER GUIDE

C = common, **NC** = normally closed, **NO** = normally open.
Numbers = basic switch designations.

No. of Poles/ Switches	Circuits Made With Toggle At:						Standard Lever Catalog Listing With MIL-S-6743 Basic Switches	Standard Lever Catalog Listing With MIL-S-8805/4 Basic Switches	Pull-To-Unlock Lever Suffix (Add locking letter to cat. listings)
	Keyway Position		Center Position		Opposite Keyway				
	C-NC	C-NO	C-NC	C-NO	C-NC	C-NO			
2	1	2	1, 2	—	2	1	62AT11-1	62AT22-1	All Types
4	1, 2	3, 4	All	—	3, 4	1, 2	64AT11-1	64AT22-1	All Types
	1, 2	3, 4	All	—	3, 4*	1, 2*	64AT11-514	64AT22-514	B, E, G, L, N, P
	1, 2*	3, 4*	All	—	3, 4	1, 2	64AT11-5	64AT22-5	E, F, K, L, M, N
	1, 2*	3, 4*	All	—	3, 4*	1, 2*	64AT11-7	64AT22-7	E, L, N
6	1, 2, 3	4, 5, 6	All	—	4, 5, 6	1, 2, 3	66AT11-1	66AT22-1	All Types
	1, 2, 3*	4, 5, 6*	All	—	4, 5, 6	1, 2, 3	66AT11-5	66AT22-5	E, F, K, L, M, N
	1, 2, 3*	4, 5, 6*	All	—	4, 5, 6*	1, 2, 3*	66AT11-7	66AT22-7	E, L, N
	1, 2, 3	4, 5, 6	All	—	4, 5, 6*	1, 2, 3*	66AT22-514	66AT22-514	B, E, G, L, N, P
8	1, 2, 3, 4	5, 6, 7, 8	All	—	5, 6, 7, 8	1, 2, 3, 4	68AT11-1	68AT22-1	All Types
	1, 2, 3, 4*	5, 6, 7, 8*	All	—	5, 6, 7, 8	1, 2, 3, 4	68AT11-5	68AT22-5	E, F, K, L, M, N
	1, 2, 3, 4*	5, 6, 7, 8*	All	—	5, 6, 7, 8*	1, 2, 3, 4*	68AT11-7	68AT22-7	E, L, N
	1, 2, 3, 4	5, 6, 7, 8	All	—	5, 6, 7, 8*	1, 2, 3, 4*	68AT11-514	68AT22-514	B, E, G, L, N, P

60AT MIL-S-8805/98 Versions (With bushing and panel seals)

No. of Poles/ Switches	Circuits Made With Toggle At:						Standard Lever Version (Pull-to-unlocks listed below order guide)	
	Keyway Position		Center Position		Opposite Keyway			
	C-NC	C-NO	C-NC	C-NO	C-NC	C-NO	Catalog Listing	Military No.
4	1, 2	3, 4	All	—	3, 4	1, 2	64AT300-1	M8805/98-001
	1, 2*	3, 4*	All	—	3, 4	1, 2	64AT300-5	M8805/98-019
	1, 2*	3, 4*	All	—	3, 4*	1, 2*	64AT300-7	M8805/98-026
6	1, 2, 3	4, 5, 6	All	—	4, 5, 6	1, 2, 3	66AT300-1	M8805/98-032
	1, 2, 3*	4, 5, 6*	All	—	4, 5, 6	1, 2, 3	66AT300-5	M8805/98-050
	1, 2, 3*	4, 5, 6*	All	—	4, 5, 6*	1, 2, 3*	66AT300-7	M8805/98-057
8	1, 2, 3, 4	5, 6, 7, 8	All	—	5, 6, 7, 8	1, 2, 3, 4	68AT300-1	M8805/98-063
	1, 2, 3, 4*	5, 6, 7, 8*	All	—	5, 6, 7, 8	1, 2, 3, 4	68AT300-5	M8805/98-081
	1, 2, 3, 4*	5, 6, 7, 8*	All	—	5, 6, 7, 8*	1, 2, 3, 4*	68AT300-7	M8805/98-092

*Momentary postions. All others are maintained.

60AT MIL-S-8805/98 Pull-to-Unlock Versions (With bushing and panel seals)

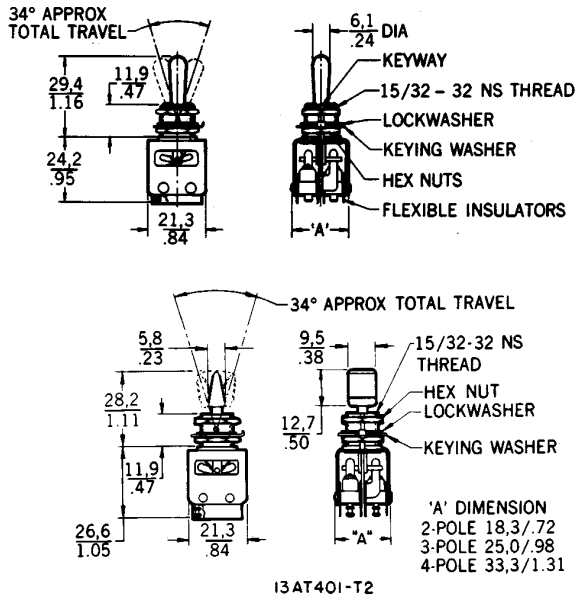
These switches have the same circuitry as their companion standard lever catalog listings in the MIL-S-8805/98 order guides. Example: 64AT300-1 has the same circuitry as 64AT300-1**A.** (Refer to locking chart on page 53.) Note: It is not necessary to add locking letter suffixes to M8805/98 military numbers.

Cat. Listing	Military No.	Cat. Listing	Military No.	Cat. Listing	Military No.	Cat. Listing	Military No.
64AT300-1A	M8805/98-002	64AT300-5M	M8805/98-024	66AT300-3F	M8805/98-048	68AT300-1K	M8805/98-072
-1B	-003	-5N	-025	-3G	-049	-1L	-073
-1D	-004	64AT300-7E	M8805/98-027	66AT300-5E	-051	-1M	-074
-1E	-005	-7L	-028	-5F	-052	-AN	-075
-1F	-006	-7N	-029	-5K	-053	-1P	-076
-1G	-007			-5L	-054	68AT300-3D	M8805/98-078
-1H	-008	66AT300-1A	M8805/98-033	-5M	-055	-3F	-079
-1J	-009	-1B	-034	-5N	-056	-3G	-080
-1K	-010	-1D	-035	66AT300-7E	M8805/98-058	68AT300-5E	-082
-1L	-011	-1E	-036	-7L	-059	-5F	-083
-1M	-012	-1F	-037	-7N	-060	-5K	-084
-1N	-013	-1G	-038			-5L	-085
-1P	-014	-1H	-039	68AT300-1A	M8805/98-064	-5M	-086
64AT300-3D	M8805/98-016	-1J	-040	-1B	-065	-5N	-087
-3F	-017	-1K	-041	-1D	-066	68AT300-7E	-089
-3G	-018	-1L	-042	-1E	-067	-7L	-090
64AT300-5E	M8805/98-020	-1M	-043	-1F	-068	-7N	-091
-5F	-021	-1N	-044	-1G	-069		
-5K	-022	-1P	-045	-1H	-070		
-5L	-023	66AT300-3D	M8805/98-047	-1J	-071		

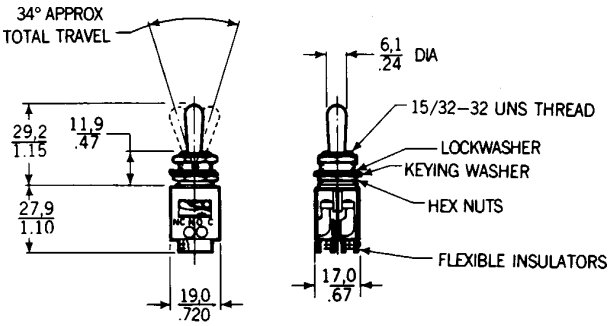
Toggle Switch Assemblies

MOUNTING DIMENSIONS (For reference only)

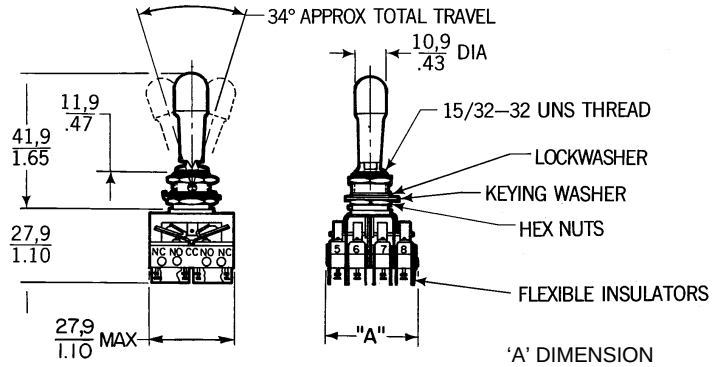
13/23AT



62AT



64/66/68AT

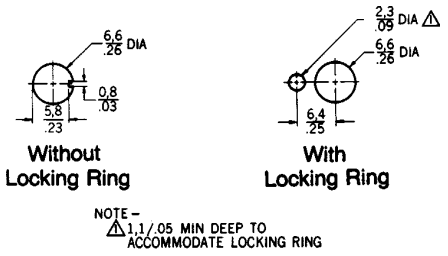


'A' DIMENSION

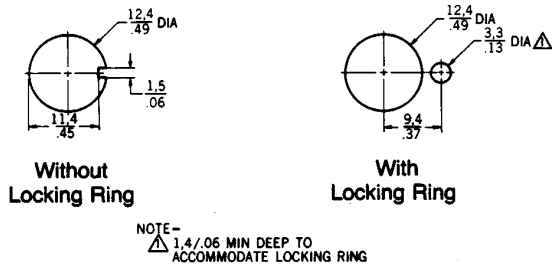
4-POLE 17,0/.67
6-POLE 23,6/.93
8-POLE 29,7/1.17

PANEL CUTOUTS

¼" Bushing



15/32" Bushing



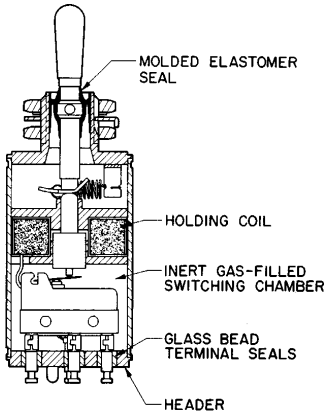
NOTE—
64AT300, 66AT300, and 68AT300 (M8805/98) listings have a bushing seal and MS25196 panel seal.

Manuals

Manual Switches

ET Series

Magnetically Held Toggle Switches



FEATURES

- Most listings qualified to MIL-S-5594
- Environment-proof sealing
- 2 and 3 position magnetically maintained toggle action
- Standard, tab, and pull-to-unlock levers
- Turret, leadwire, and screw terminals
- Temperature range: –85°F to +160°F (–65°C to +71°C)

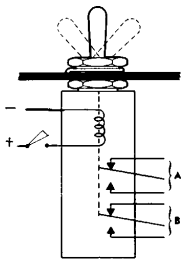
PRINCIPLE OF OPERATION

A holding coil in ET toggle switches replaces mechanical holding mechanisms to maintain the toggle in an operate position. The toggle is released by breaking the coil circuit.

When the hold in coil circuit is open, the ET functions as a momentary contact switch. When the coil is energized (through remote contacts), the toggle lever will be held (maintained) in the operate position. De-energizing the coil causes the lever to snap back to the unoperated position. The lever can also be released manually (overridden).

Note: The solenoid has a hold in capacity only. It will not pull the toggle lever into an operating position from an unoperated position.

Two position. The illustration above shows the operating sequence for an ET with one SPDT circuit. (1) circuit closed manually; (2) energized solenoid holds switch circuit closed; and (3) remote control breaks solenoid circuit, releases the toggle, and opens the switch circuit. (In ETs with two SPDT circuits, both circuits transfer when the lever is operated.)



Three position. ETs with two SPDT circuits have a magnetic hold in capability in both directions from center. When the lever is in the center position, the circuitry is as shown in the illustration above. When the lever is moved to one extreme position, switch (A) circuit is transferred and switch (B) circuit is unchanged. In the other extreme position, switch (B) circuit is tranferred while switch (A) circuit is unchanged.

ELECTRICAL RATINGS

Rating Code	Voltage	Amperage					
		Sea Level (Sealed)			65,000 ft		
		Res.	Ind.	Motor	Res.	Ind.	Motor
A	28 DC	4	2.5	4	4	2	4
B	28 DC	4	3	4	4	2.5	4
C	28 DC	7	2	—	5	1.5	—

Manual Switches

ET Series

Magnetically Held Toggle Switches

Toggles

Standard

Pull-to-unlock

Push-to-unlock

Tab

TOGGLE TYPES

Standard — Tapered matte finish stainless steel.

Pull-to-unlock — Prevents accidental actuation; must be pulled out to change positions.

Push-to-unlock — Guards against accidental operation. The toggle must be depressed approximately .100 inch before it can be moved to either extreme position. Energizing the coil causes the extreme positions to be electrically maintained until the coil circuit is broken.

Tab — Paddle-shaped clear anodized aluminum tab.

Terminals

Turret

Leadwire

Screw

TERMINAL TYPES

Turret — Plated for easy solder connection of up to #14 wire.

Leadwire — No. 20 wire per MIL-W-5086, marked per MIL-W-5088. Standard length of six feet. Leadwire ends are stripped. Other material and lengths can be furnished. Contact your nearest MICRO SWITCH Sales Office for further information.

Screw–Four 48UNF x .188 (ref.) long round head screws with lockwashers. Separated by molded phenolic barriers.

CIRCUIT OPERATION

Circuitry	Two-Position Toggle Circuit Made With Toggle At:		Turret Terminals Three-Position Toggle Circuit Made With Toggle At:			Leaded Terminals Three-Position Toggle Circuit Made With Toggle At:		
	Keyway* Position	Opposite Keyway	Keyway* Position	Center Position	Opposite Keyway*	Keyway* Position	Center Position	Opposite Keyway*
SPDT	1-3	1-2	—	—	—	—	—	—
DPDT	1-3, 4-6	1-2, 4-5	1-3, 4-5	1-2, 4-5	1-2, 4-6	1-2, 4-5	1-3, 4-5	1-3, 4-6

* These positions are magnetically held when coil is energized, and momentary when coil is not energized.

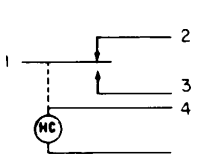
CIRCUIT OPERATION

Screw Terminals Three-Position Toggle Circuit Made With Toggle At:		
Keyway* Position	Center Position	Opposite Keyway*
1-2 MADE 3-4 OPEN	1-2 OPEN 3-4 OPEN	1-2 OPEN 3-4 MADE

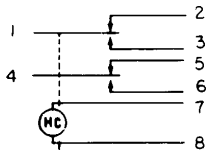
* These positions are magnetically held when coil is energized, and momentary when coil is not energized.

CIRCUITRY

Single-pole Double-throw



Double-pole Double-throw



Manuals

Manual Switches

ET Series

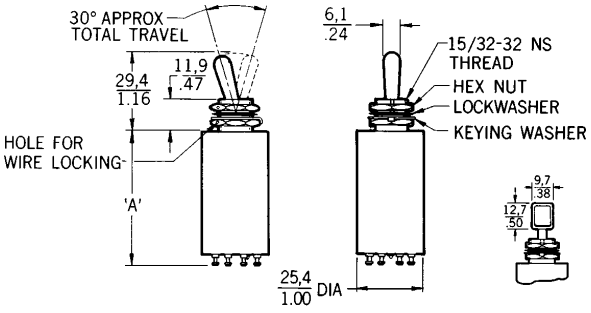
Magnetically Held Toggle Switches

ET ORDER GUIDE

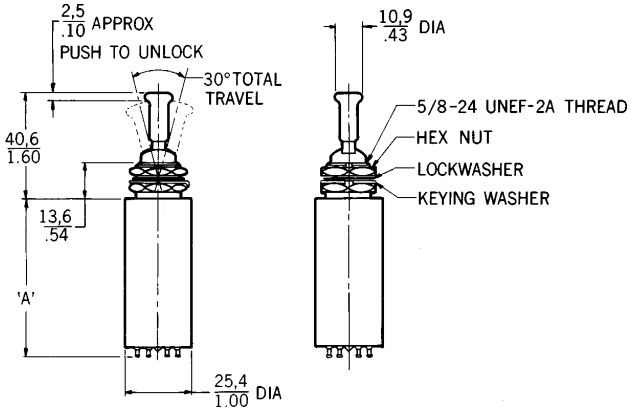
Circuitry	No. of Toggle Positions	Lever Type	Terminals	Elec. Rating Code Page 72	Max. Weight grams	Max. Weight ounces	Max. Dimension A mm	Max. Dimension A inches	Catalog Listing
SPDT	2	Standard	Leadwire (90″ from Keyway)	B	241	8.5	51,6	2.03	25ET61-6 (M5594/1-1)
	2	Standard	Solder Turret	B	113	4.0	47,5	1.87	25ET61-T (M5594/1-2)
	2	Standard	Screw	B	113	4.0	61,2	2.41	25ET61-S (M5594/1-3)
	2	Tab Lever	Leadwire in line with Keyway	B	241	8.5	51,6	2.03	25ET62-6 (M5594/1-4)
	2	Standard	Leadwire (180″ from Keyway)	B	241	8.5	51,6	2.03	25ET63-6 (M5594/1-5)
	2	Standard	Leadwire (90″ from Keyway)	B	241	8.5	51,6	2.03	25ET64-6 (M5594/1-6)
DPDT	2	Standard	Solder Turret	A	113	4.0	47,5	1.87	26ET61-T (M5594/2-1)
	2	Standard	Solder Turret	A	113	4.0	47,5	1.87	26ET65-T (M5594/2-2)
	3	Standard	Solder Turret	C	113	4.0	58,7	2.28	27ET61-T (M5594/3-1)
	3	Pull-to-unlock	Solder Turret	C	113	4.0	58,7	2.28	27ET61-T-E (M5594/6-1E)
	3	Push-to-unlock	Solder Turret	C	113	4.0	58,7	2.28	27ET51-T
	3	Pull-to-unlock	Solder Turret	C	113	4.0	58,7	2.28	27ET61-T-M (M5594/6-1M)

MOUNTING DIMENSIONS (For reference only)

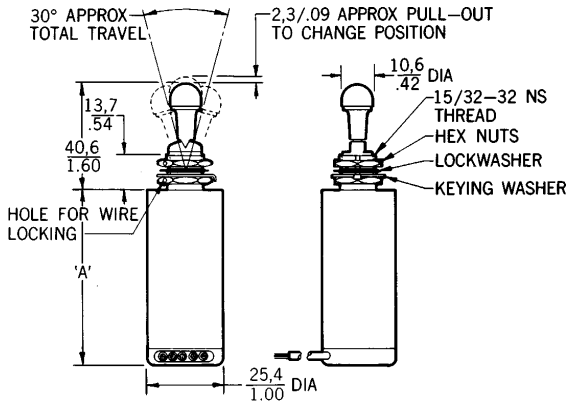
Standard and tab toggle levers



Push-to-unlock toggle lever



Pull-to-unlock toggle lever



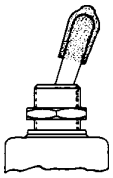
Key: 0,0 = mm / 0.00 = inches

LOCKING CONFIGURATION

E	M
	
Locked In Center Position	Locked Out Of And Into Extreme Position (Opposite Keyway)

Manual Switches
Toggle Accessories

TOGGLE LEVER SLEEVES
Colored plastic lever sleeves are ordered by adding suffix letters which denote the desired color to the basic catalog listing.

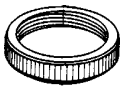
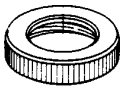


ORDER GUIDE

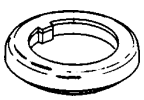
Toggle Switch Type		Basic Catalog Listing	Color Suffix					
			Blue	Black	White	Green	Yellow	Red
AT with ¼″ bushing	Short lever	15PA90-1	BL	BK	W	G	Y	R
	Long lever	15PA90-3			W			R
AT, TL, TK, TS, TW, ET with 15/32″ bushing and standard lever		15PA90-4	BL	BK	W	G	Y	R

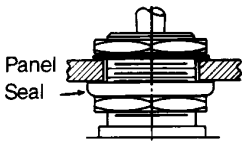
Example: 15PA90-1R
Red sleeve fits ¼ in. bushing AT's with short levers.

DECORATIVE MOUNTING NUT ORDER GUIDE

Style	Description	Bushing Size	Catalog Listing
 A	Knurled Nut (Bright Nickel)	¼″	19PA5-1
		15/32″	19PA6-1
	(Black Finish)	15/32″	19PA6-4
 B	Knurled Capnut (Bright Nickel)	15/32″	19PA6-2
 C	Hex Nut (Black Finish)	¼″	19PA5-3
		15/32″	19PA6-3
 D	Tapered Nut (Chrome Finish)	15/32″	19PA6-5
 E	Hex Nut (Chrome Finish)	¼″	19PA104-TW

PANEL SEAL





For use with 15/32 in. bushing toggle switches,this corrosion resistant steel cupwasher has a silicone elastomer lining and keying tab for sealing the bushing keying slot. Use in panels up to .125 in./31,8 mm thick.

Catalog Listing	Military No.
15PA87	—
15PA195-TL	M5423/16-01
15PA258	M5423/16-01

LEVER/PANEL SEAL

For use with standard lever toggle switches with 15/32 in. bushings. Consists of a silicone elastomer seal boot and panel seal bonded to a hex nut.

Catalog Listing	10PA4

Manuals

Manual Switches

EPM Series

Sealed Pushbutton Switches

FEATURES

- High-intensity LEDs indicate status changes – brilliant color display can be distinguished even under high ambient lighting conditions
- Soft-glow LED backlighted legends for low ambient viewing
- Rugged sealed construction withstands effects of shock and vibration – provides dependable switching/lighted display in severe environment applications
- Designed to comply with MIL-S-22885
- Suitable for use in NEMA 4 and 13 enclosures
- Low travel (.030 in. max.), with tactile feedback for definite feel of switching action
- Front-of-panel, hard mounting
- Compact size
- Field-replaceable legends
- UL recognized, CSA certified, and MIL-S-8805 qualified basic switches
- EPM22 electronic control and EPM32 power duty switching for electrical flexibility
- Matching EPM41 indicators for uniform panel appearance
- Choice of two housing styles:
  Type **C**: Standard sealed EPM housings
  Type **B**: Enhanced sealed EPM housings with IR filters for vehicle lighting security, designed to MIL-STD-461 (EMI shielding), NBC compliance per AR70-71

EPM Series Sealed Pushbutton Switches meet high-performance needs for rugged, compact size sealed switches that are exposed to water, oil, cleaning solvents, and many industrial chemicals. They provide long, reliable operating life under conditions of high shock and vibration in severe environment applications.

In addition to being built to stand up to demanding environments, EPM switches adhere to good human factors principles. The design combines low travel with high tactile feedback and meets arctic glove requirements. Raised barriers on the bezel enhance finger positioning and help prevent inadvertent operation of two abutting units at one push. Lighted display options provide further application versatility.

LED ILLUMINATION

Long-life LEDs enable reliable illumination. They resist effects of shock and vibration, reducing service and maintenance requirements. (Unlighted versions are also available.)

The following lighting functions can be furnished: High-intensity display using two LEDs to create a brilliant light signal that can be distinguished under high ambient conditions, and/or a pair of LEDs which softly backlight the legend for viewing under low ambient conditions.

There is a choice of red, green or yellow LEDs. Matching indicators, which provide lighted display only, complement the switches to help present a uniform panel design.

ELECTRICAL FLEXIBILITY

EPM switches can be furnished with one or two SPDT basics. EPM22 electronic control switches handle up to 1 amp, EPM32 power duty switches up to 7 amps.

EASY TO INSTALL

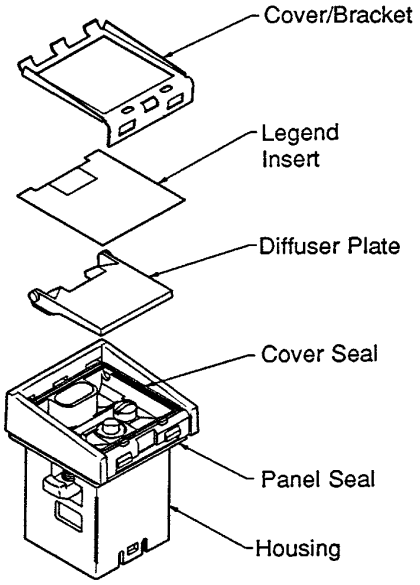
Front panel hard-mounting is quick and easy. Only a screwdriver is needed to tighten the swing-out mounting lugs, which securely lock and seal the unit in the panel. Though the cover/bracket simply snaps onto the housing, it has inherent tamper resistance. The cover can be removed intentionally with a small screwdriver (or other tool) to add or change legends.

EPM's ¾-inch square panel cutout on 1-inch centers is suited to row, column, or matrix arrays.

CONSTRUCTION

Insert can be furnished with or without legends. If legends are to be backlighted, darker colors are recommended for the insert. Black provides maximum contrast in lighted legend displays.

Diffuser plates specified for lighted legend devices are coated on the underside for even illumination. When unlighted legends are specified, diffuser plates are molded from opaque plastic and are not interchangeable with those used for lighted legends.



Manuals

Sealed Pushbutton Switches

SPECIFICATIONS

Environmental	Operating Temperature	−40 to 85°C (−40 to 185°F)
	Storage Temperature	−54 to 85°C (−65 to 185°C)
	Seals	Viton bezel-to-panel gasket seal and neoprene cover seal
	Protection	NEMA 4 and 13
Mechanical	Total Travel	.030 in. (0,76 mm) max.
	Operating Force	20 to 60 oz. (5,56 to 16,7 N) typical
Electrical	Contact arrangement	1 or 2 SPDT
	Electrical rating	EPM22/24 switches – 28 VDC: .5 amp ind., 1 amp res. (sea level or 50,000 ft.), 2 amps max. inrush. 1 amp, 125 VAC (UL code L22).
		EPM32/34 switches – 28 VDC: 4 amps ind., 7 amps res. (sea level), 2.5 amps ind., 4 amps res. (50,000 ft). 115 VAC, 60 Hz: 7 amps res. or ind. (sea level).

EPM22/32 SWITCHES WITH SINGLE INDICATOR ORDER GUIDE

EPM22B	Y	R	6	AC	L
Housing Type and Switch Contacts	**Legend Color**[1]	**Hi-Intensity Indicator Color**	**Switch and LED Terminals**	**Circuitry Code**	**Insert Type**
Standard Type C Sealed Housing: **EPM22C** (Gold Contacts) **EPM32C** Silver Contacts	**R** Red **Y** Yellow **G** Green **X** No LED	**R** Red **Y** Yellow **G** Green **X** No LED	**2** Printed Circuit **6** Hook style LED terminals and solder T2 switch terminals	**AC** 1-Pole **BC** 2-Pole (All are momentary action)	**L** Legended insert. Use Legend Order Sheet FO-43973 to designate insert color and legend. **X** No insert furnished.[2] Unlegended insert:[1] **B** Blue **R** Red **Y** Yellow **G** Green **W** White **K** Black
Enhanced Type **B** Sealed Housing, with IR filters, EMI shielding & NBC compliance: **EPM22B** (Gold Contacts) **EPM32B** (Silver Contacts					

1. When specifying Legend Color (**R, Y, G**), the insert Type suffix letter must be either: **L** (legended insert), or **X** (no insert furnished).
2. To order insert separately, see EPM95 order guide.

Example: EPM22BYR6ACL
Enhanced Type **B** sealed housing, gold contacts; high-intensity single indicator red lighted display and yellow legend backlighting, hook style LED terminals and solder T2 switch terminals; 1-pole circuitry, momentary action, furnished with legended insert, as specified in FO-43973.

Manual Switches
Sealed Pushbutton Switches

EPM24B **Y** **D** **6** **AC** **L**

Housing Type and Switch Contacts	Legend Color[1]	Hi-Intensity Indicator Colors			Switch and LED Terminals	Circuitry Code	Insert Type
		Color Code	Upper LED	Lower LED			
Standard Type **C** Sealed Housing: **EPM24C** (Gold Contacts) **EPM34C** (Silver Contacts)	**R** Red **Y** Yellow **G** Green **X** No LED	**R**	Red	Red	**2** Printed Circuit	**AC** 1-Pole	**L** Legended insert.
Enhanced Type **B** Sealed Housing, incl. IR filters, EMI shielding & NBC compliance: **EPM24B** (Gold Contacts **EPM34B** (Silver Contacts)		**Y**	Yellow	Yellow	**6** Hook style LED terminals and solder T2 switch terminals	**BC** 2-Pole (All are momentary action)	Use Legend Order Sheet FO-43973 to designate insert color and legend.
		G	Green	Green			**X** No insert furnished.[2]
		F	Red	Green			Unlegended Insert:[1]
		A	Yellow	Green			**B** Blue
		B	Yellow	Red			**R** Red
		C	Green	Yellow			**G** Green
		D	Green	Red			**W** White
		E	Red	Yellow			**K** Black

1. When specifying Legend Color (**R, Y, G**), the insert Type suffix letter must be either: **L** (legended insert), or **X** (no insert furnished).
2. To order insert separately, see EPM97 order guide.

Example: EPM24BYD6ACL
Enhanced Type **B** sealed housing, gold contacts; yellow legend backlighting; high-intensity dual indicator green/red lighted display; hook style LED terminals and solder T2 switch terminals; 1-pole momentary action, furnished with legended insert, as specified in FO-43973.

EPM41B **Y** **R** **2** **L**

Housing Type and Switch Contacts	Legend Color[1]	Hi-Intensity Indicator Color	LED Terminals	Insert Type
Standard Type C Sealed Housing: **EPM41C**	**R** Red **Y** Yellow **G** Green **X** No LED	**R** Red **Y** Yellow **G** Green **X** No LED	**2** Printed Circuit	**L** Legended insert.
Enhanced Type **B** Sealed Housing with IR filters, EMI shielding & NBC compliance: **EPM41B**			**6** Hook style	Use Legend Order Sheet FO-43973 to designate insert color and legend.
				X No insert furnished.[2]
				Unlegended Insert:[1]
				B Blue
				R Red
				Y Yellow
				G Green
				W White
				B Black

1. When specifying Legend Color (**R, Y, G**), the insert Type suffix letter must be either: **L** (legended insert), or **X** (no insert furnished).
2. To order insert separately, see EPM95 order guide.

Example: EPM41BYR2L
Enhanced Type **B** sealed housing; high-intensity single indicator red lighted display and yellow legend backlighting, printed circuit LED and switch terminals; furnished with legended insert, as specified in FO-43973.

EPM44 DUAL INDICATORS (NO SWITCHES) ORDER GUIDE

EPM44B **Y** **D** **2** **L**

Housing Type and Switch Contacts	Legend Color[1]	Hi-Intensity Dual Indicator Colors			LED Terminals	Legend Insert Type
		Color Code	Upper LED	Lower LED		
Standard Type **C** Sealed Housing: **EPM44C**	**R** Red	**R**	Red	Red	**2** Printed Circuit	**L** Legended insert.
Enhanced Type **B** Sealed Housing, incl. IR filters, EMI shielding & NBC compliance: **EPM44B**	**Y** Yellow	**Y**	Yellow	Yellow	**6** Hook style	Use Legend Order Sheet FO-43973 to designate insert color and legend.
	G Green	**G**	Green	Green		**X** No insert furnished.[2]
	X No LED	**F**	Red	Green		Unlegended Insert:[1]
		A	Yellow	Green		**B** Blue
		B	Yellow	Red		**R** Red
		C	Green	Yellow		**G** Green
		D	Green	Red		**W** White
		E	Red	Yellow		**K** Black

1. When specifying Legend Color (**R, Y, G**), the insert Type suffix letter must be either: **L** (legended insert), or **X** (no insert furnished).
2. To order insert separately, see EPM97 order guide.

Example: EPM44BYD2L
Enhanced Type **B** sealed housing; yellow legend backlighting; high-intensity dual indicator green/red display; printed circuit LED and switch terminals; furnished with legended insert, as specified in FO-43973.

HOW TO ORDER INSERTS SEPARATELY

Legended inserts: To order inserts legended by MICRO SWITCH as separate items, order Catalog Listing EPM94, and use Legend Order Sheet to specify the insert color and desired legend. **Unlegended inserts:** Use order guide below to order inserts without legends.

EPM95 UNLEGENDED INSERTS ORDER GUIDE

Unlegended inserts can be furnished with or without a display window for hi-intensity LED lighting.

	Inserts for Type **B** Housings:		Inserts For Type **C** Housings:	
Color	With window	Without window	With window	Without window
Blue	EPM95BBW	EPM95BBN	EPM95CBW	EPM95CBN
Green	EPM95BGW	EPM95BGN	EPM95CGW	EPM95CGN
Red	EPM95BRW	EPM95BRN	EPM95CRW	EPM95CRN
White	EPM95BWW	EPM95BWN	EPM95CWW	EPM95CWN
Yellow	EPM95BYW	EPM95BYN	EPM95CYW	EPM95CYN
Black	EPM95BKW	EPM95BKN	EPM95CKW	EPM95CKN
Gray	EPM95BPW	EPM95BPN	EPM95CPW	EPM95CPN

EPM97 INSERTS FOR DUAL INDICATOR DEVICES

	Inserts for Type **B** Housings:		Inserts For Type **C** Housings:	
Color	With window	Without window	With window	Without window
Blue	EPM97BBW	EPM97BBN	EPM97CBW	EPM97CBN
Green	EPM97BGW	EPM97BGN	EPM97CGW	EPM97CGN
Red	EPM97BRW	EPM97BRN	EPM97CRW	EPM97CRN
White	EPM97BWW	EPM97BWN	EPM97CWW	EPM97CWN
Yellow	EPM97BYW	EPM97BYN	EPM97CYW	EPM97CYN
Black	EPM97BKW	EPM97BKN	EPM97CKW	EPM97CKN
Gray	EPM97BPW	EPM97BPN	EPM97CPW	EPM97CPN

Honeywell

EPM Series – Legend Order Sheet

MICRO SWITCH

Instructions:

1. Enter complete **catalog listing** at right. (Only one catalog listing per legend order sheet).

Below

2. Enter **quantity** for this order and indicate est. annual use.
3. Enter **style**. (Be consistent with catalog listing in regard to lighted and non-lighted legends and high intensity LED.
4. and 5. Enter **area(s)** and print **legend(s)** corresponding to proper area(s). (Do not exceed the maximum number of characters per area).
6. Designate **legend color** for each legend. (If legends are to be lighted, color must be translucent. If legends are not to be lighted, indicate either black or white).
7. Designate **character size** for each area. (Be consistent with available sizes for style entered. If a special legend is desired, contact MICRO SWITCH for assistance.
8. Enter **background color** (letter) using chart below:

R - Red	B - Blue	W - White
Y - Yellow	K - Black	*Special - Contact MICRO SWITCH
G - Green	P - Gray	

Internal Use Only: Job Number:
Station Number: Parylene Coat?:
Reference P/N:

Catalog Listing **EPM**

Customer P.O. No.	Customer Drawing No.	
MICRO SWITCH Sales Order	Line No.	Sched.

Customer:
Address:
Prepared by:
Phone:

Non-lighted Legends - without high intensity LED Display

Style 1 — ←Area A, ←Area B, ←Area C — Character Size: 1/8"

Style 2 — Area Approx. 5/8" Square

Lighted or Non-Lighted-Without Indicator LED Display:

Style 3 — ←Area D — Character Size: 1/4", 3/16", 1/8"

Style 4 — ←Area E, ←Area F — Character Size: 3/16"

Style 5 — ←Area G, ←Area H — Character Size: 1/8"

Style 6 — Area Approx. 3/8" x 5/8"

Lighted or Non-Lighted-With Indicator LED Display:

Style 7 — ←Area J — Character Size: 1/4", 3/16", 1/8"

Style 8 — ←Area K, ←Area L — Character Size: 3/16"

Style 9 — ←Area M, ←Area N — Character Size: 1/8"

Style 10 — Area Approx. 3/8" x 5/8"

***Special Legends** - Non-standard characters will require additional cost and extended delivery time. Contact MICRO SWITCH (artwork needed).

Lighted or Non-Lighted - Dual Indicator LED Display:

Style 11 — ←Area O — Character Size: 1/4", 3/16", 1/8"

Style 12 — ←Area P, ←Area Q — Character Size: 3/16"

Style 13 — ←Area R, ←Area S — Character Size: 1/8"

Style 14 — Area Approx. 3/8" x 5/8"

Style 13 — ←Area T, ←Area U, ←Area V — Character Size: 1/8"

Quantity This Order	Quantity Est. Annual	Style	Area(s)	Legend - Max Characters/Area 1/4"-3, 3/16"-4, 1/8"-7 Using only one "M" or "W"	Legend Color Lighted Trans	Legend Color Lighted Black	Legend Color Lighted White	Legend Color Unlighted	Character Size 1/4"	Character Size 3/16"	Character Size 1/8"	Character Size Special	Background Color

FO-43973-C

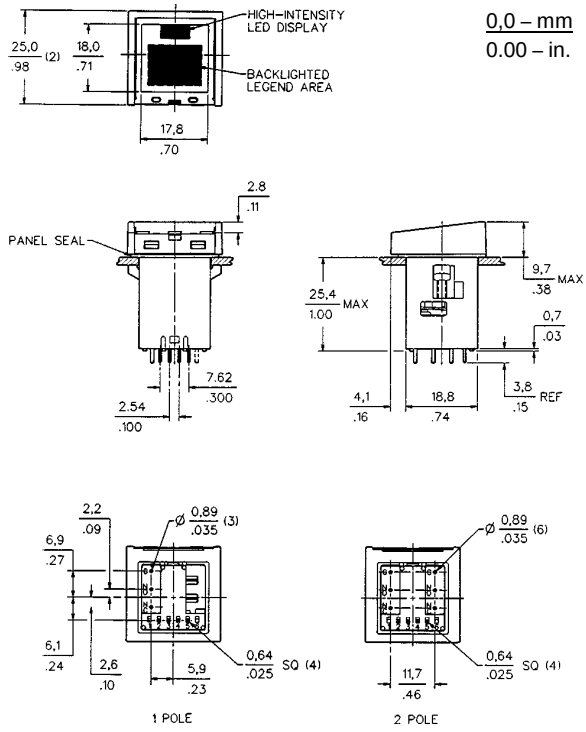
Manuals

Manual Switches

EPM Series

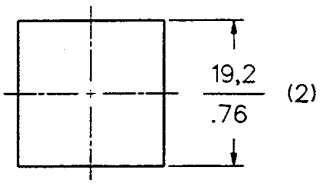
Sealed Pushbutton Switches

MOUNTING DIMENSIONS (For reference only)



0,0 – mm
0.00 – in.

Panel Cutout

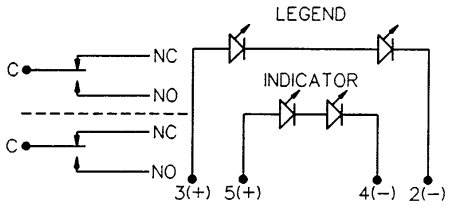


Panel thickness: .063 to .189 in. (1,6 to 4,8 mm)

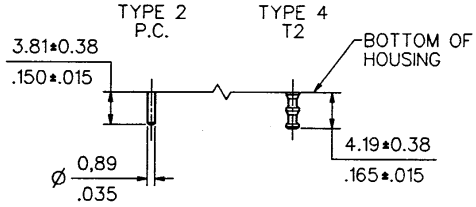
Center-to-center: 1 in. (25,4 mm) rows or columns

Circuit Diagram

Switch Circuitry LED Circuitry



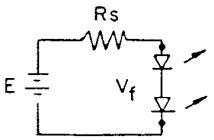
Terminal Detail



Notes:
1. LED terminals are Type 2 – PC only.
2. Mounting torque: 2 to 2½ in.–lbs.

LED Application Data

External resistors should be added to maintain the LED current at 30 mA max., 20 mA typical. A minimum of 10 VDC open circuit voltage with an appropriate series resistance be used to drive the LEDs. This minimized the effect of temperature (current variation) on forward voltage of the LEDs. The example below illustrates a simple DC circuit and the equation used to determine the value of the series resistance.



$$R_S = \frac{E - V_F}{I_F}$$

Where: R_S = Series Resistance
E = Supply
V_F = Forward Voltage of LED
I_F = Circuit Current

Example: $R_S = \frac{10 - 4.4}{.020} = 280$ ohms

For: E = 10 volts
V_F = 4.4 volts
I_F = .020 amp

Characteristics: LED forward voltage @ .020 mA, V_F: Red, 4.4; yellow, 4.4; green, 4.6.

Manual Switches

Sealed Rocker Switches

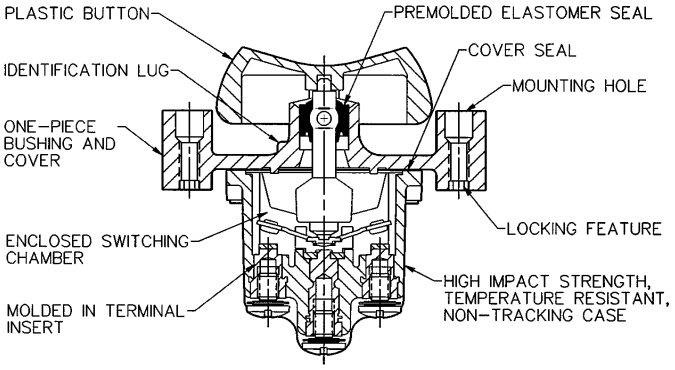
NR Series

GENERAL INFORMATION

MICRO SWITCH NR Series Rocker Switches meet severe environment application needs for a rugged, cost-effective manual switch. They combine the advantages of toggle switch circuit versatility with pushbutton control.

Quality construction features include a premolded elastomer seal between the actuator and bushing and an elastomer cover/case gasket seal. Also, the terminal inserts are molded into the high impact strength thermoplastic case.

Complete sealing of the switching chamber enables compliance with UL 508, paragraph 13.3 hosedown test. These switches can be used where panels are subjected to periodic splash and washdowns, such as are common to food and beverage equipment. They will also withstand exposure to heavy accumulations of eary morning dew that may condense on the control panel in cabs of vehicles left outdoors overnight.



Above Panel Mount **Flush Panel Mount**

12PA ROCKER ORDER GUIDE

Note: These listings are used to specify rockers only.

Rocker Color	Catalog Listing
White	12PA12-W
Red	12PA12-R
Yellow	12PA12-Y
Black	12PA12-BK
Green	12PA12-G
Blue	12PA12-BL

FEATURES

- Completely sealed switching chamber
- Colored removable rockers
- Flush-panel or above-panel mounting
- Step-design case provides added space between terminals to help prevent shorting
- 1, 2 or 4-pole circuitry
- 2 or 3 positions, maint./mom. action
- Spring-loaded actuating mechanism provides excellent tactile feedback
- High impact strength, non-tracking case enhances electrical stability
- Temperature range: −40 to 71°C (−40 to 160°F)
- UL Recognized

ELECTRICAL RATINGS

L191: 15 amps, 125, 250, 277 VAC; ½ Hp, 125 VAC; 1 Hp, 250, 277 VAC; 5 amps, 125 VAC ''L''

L192: 10 amps, 125, 250, 277 VAC; ¼ Hp, 125 VAC; ½ Hp, 250, 277 VAC; 3 amps, 125 VAC ''L''

HOW TO ORDER

1. **To order flush panel mount switches *without rockers,*** specify the listings in the NR order guides.

2. **To specify above-panel mount switches, *without rockers,*** change the **1** (after ''NR'') in 1NR**1,** 11NR**1,** 2NR**1,** 12NR**1**, 4NR**1**, and 14NR**1** listings in the NR order guides to **4**. Example: 1NR**1**-2W converts to 1NR**4**-2W, 11NR**1**-2W to 11NR**4**-2W.

   For 1NR91, 2NR91, and 14NR91 listings add **4** (after the ''NR'') to specify the above panel mount version. Example: 1NR91-2W becomes 1NR**4**91-2W.

3. **To order rockers separately,** specify listings in the 12PA order guide.

4. **To specify rockers furnished with switches,** add the appropriate suffix letter to the switch listings, e.g., **W**=White, **R**=Red, **Y**=Yellow, **BK**=Black, **G**=Green, **BL**=Blue. Example: 1NR1-2 with a white rocker is 1NR1-2**W**.

Application Note: Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. NR switches use silver cadmium oxide contacts. If you have questions, contact the MICRO SWITCH Application Center at 1-800-537-6945.

Manual Switches

NR Series

Sealed Rocker Switches

NOTE: Catalog listings in the order guides below do not include rocker operators. See ''How to Order.''

NR 2-POSITION FLUSH-PANEL MOUNT ROCKERS ORDER GUIDE

No. of Poles	Circuits Made With Rocker At:			Termination Style		
	Ident. Lug Position	Opposite Lug Position	UL Rating Code	Screw	Solder	Q-C
1	OFF	2-3	L191	1NR1-2	11NR1-2	1NR91-2
	1-2	2-3	L191	1NR1-3	11NR1-3	1NR91-3
	OFF*	2-3	L192	1NR1-4	11NR1-4	1NR91-4
	1-2*	OFF	L192	1NR1-6	11NR1-6	1NR91-6
	1-2*	2-3	L192	1NR1-8	11NR1-8	1NR91-8
2	OFF	2-3, 5-6	L191	2NR1-2	12NR1-2	2NR91-2
	1-2, 4-5	2-3, 5-6	L191	2NR1-3	12NR1-3	2NR91-3
	OFF*	2-3, 4-6	L192	2NR1-4	12NR1-4	2NR91-4
	1-2, 4-5*	OFF	L192	2NR1-6	12NR1-6	2NR91-6
	1-2, 4-5*	2-3, 4-6	L192	2NR1-8	12NR1-8	2NR91-8
4	OFF	2-3, 5-6, 8-9, 11-12	L191	4NR1-2	14NR1-2	4NR91-2
	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	4NR1-3	14NR1-3	4NR91-3
	OFF*	2-3, 5-6, 8-9, 11-12	L192	4NR1-4	14NR1-4	4NR91-4
	1-2, 4-5, 7-8, 10-11*	OFF	L192	4NR1-6	14NR1-6	4NR91-6
	1-2, 4-5, 7-8, 10-11*	2-3, 5-6, 8-9, 11-12	L192	4NR1-8	14NR1-8	4NR91-8

NR 3-POSITION FLUSH-PANEL MOUNT ROCKERS ORDER GUIDE

No. of Poles	Circuits Made With Toggle At:				Termination Style		
	Ident. Lug Position	Center Positon	Opposite Lug Position	UL Rating Code	Screw	Solder	Q-C
1	1-2	OFF	2-3	L191	1NR1-1	11NR1-1	1NR91-1
	1-2*	OFF	2-3	L192	1NR1-5	11NR1-5	1NR91-5
	1-2*	OFF	2-3*	L192	1NR1-7	11NR1-7	1NR91-7
	NONE**	OFF	2-3	L191	1NR1-21	11NR1-21	1NR91-21
	NONE**	1-2	2-3	L191	1NR1-31	11NR1-31	1NR91-31
	NONE**	1-2	2-3*	L192	1NR1-51	11NR1-51	1NR91-51
	1-2*	OFF	NONE**	L192	1NR1-61	11NR1-61	1NR91-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	2NR1-1	12NR1-1	2NR91-1
	1-2, 4-5*	OFF	2-3, 5-6	L192	2NR1-5	12NR1-5	2NR91-5
	1-2, 4-5*	OFF	2-3, 5-6*	L192	2NR1-7	12NR1-7	2NR91-7
	NONE*	OFF	2-3, 5-6	L191	2NR1-21	12NR1-21	2NR91-21
	NONE**	1-2, 4-5	2-3, 5-6	L191	2NR1-31	12NR1-31	2NR91-31
	NONE**	1-2, 4-5	2-3, 5-6*	L192	2NR1-51	12NR1-51	2NR91-51
	1-2, 4-5*	OFF	NONE**	L192	2NR1-61	12NR1-61	2NR91-61
	1-2, 4-5	1-2, 4-5	2-3, 5-6	L191	2NR1-12	12NR1-12	2NR91-12
	1-2, 4-5*	1-2, 5-6	2-3, 5-6	L192	2NR1-50	12NR1-50	2NR91-50
	1-2, 4-5*	1-2, 5-6	2-3, 5-6*	L192	2NR1-70	12NR1-70	2NR91-70
4	1-2, 4-5, 7-8, 10-11	OFF	2-3, 5-6, 8-9, 11-12	L191	4NR1-1	14NR1-1	4NR91-1
	1-2, 4-5, 7-8, 10-11*	OFF	2-3, 5-6, 8-9, 11-12	L192	4NR1-5	14NR1-5	4NR91-5
	1-2, 4-5, 7-8, 10-11*	OFF	2-3, 5-6, 8-9, 11-12*	L192	4NR1-7	14NR1-7	4NR91-7
	NONE*	OFF	2-3, 5-6, 8-9, 11-12	L191	4NR1-21	14NR1-21	4NR91-21
	NONE**	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12	L191	4NR1-31	14NR1-31	4NR91-31
	NONE**	1-2, 4-5, 7-8, 10-11	2-3, 5-6, 8-9, 11-12*	L192	4NR1-51	14NR1-51	4NR91-51
	1-2, 4-5, 7-8, 10-11*	OFF	NONE**	L192	4NR1-61	14NR1-61	4NR91-61
	1-2, 4-5, 7-8, 10-11	2-3, 4-5, 7-8, 11-12	2-3, 5-6, 8-9, 11-12	L191	4NR1-12	14NR1-12	4NR91-12
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5, 7-8, 11-12	2-3, 5-6, 8-9, 11-12	L192	4NR1-50	14NR1-50	4NR91-50
	1-2, 4-5, 7-8, 10-11*	2-3, 4-5	2-3, 5-6, 8-9, 11-12*	L192	4NR1-70	14NR1-70	4NR91-70

* These positions are momentary. All others are maintained.
** Toggle lever is blocked from these products. Toggle becomes 2-position, with center being one extreme position.

TERMINAL CIRCUIT IDENTIFICATION

Terminal identification numbers referenced in the order guides are molded into the switch base.

These numbers indicate which circuits are made in each rocker position (e.g. **''1-2''** refers to circuit closure through terminals **1** and **2**).

Manual Switches

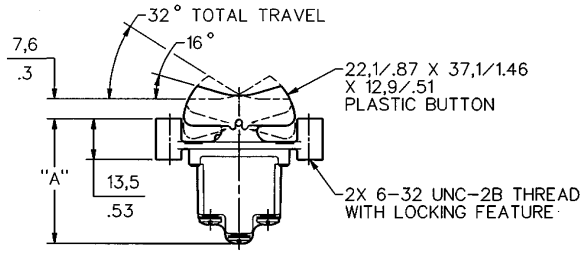
NR Series

Seated Rocker Switches

MOUNTING DIMENSIONS
(For reference only)

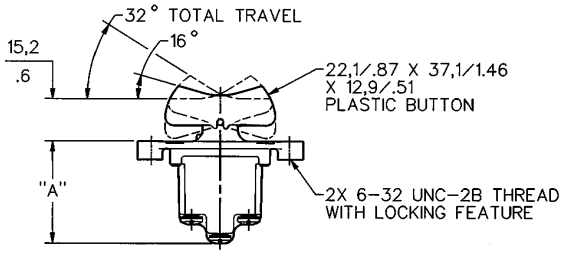
Key: 0,0 = mm / 0.00 = inches

Flush Panel



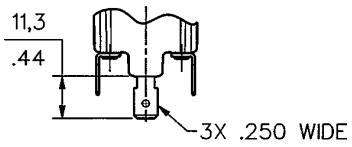
	DIM "A"
1-POLE	36,8/1.45
2 & 4-POLE	41,7/1.64

Above Panel

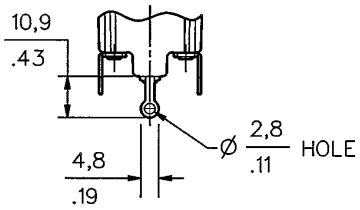


	DIM "A"
1-POLE	29,5/1.16
2 & 4-POLE	34,4/1.35

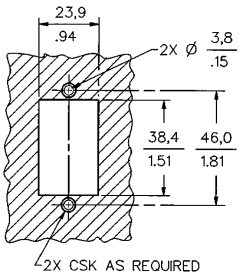
Quick Connect Terminals



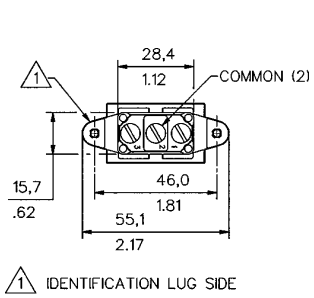
Solder Terminals

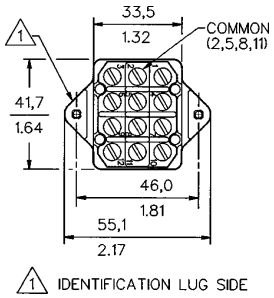


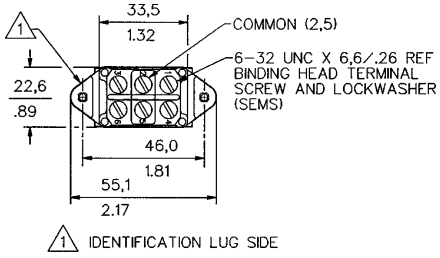
Panel Cutout



Terminal Circuit Identification







Manual Switches

NT/NR Series

Flat Base Sealed Toggles and Rockers

UL AND CSA ELECTRICAL RATINGS

Rating Code*	Electrical Rating
L192	10 amps, 125, 250, 277 VAC; ¼ Hp, 125 VAC; ½ Hp, 250, 277 VAC; 3 amps, 125 VAC "L"
L191	15 amps, 125, 250, 277 VAC; ½ Hp, 125 VAC; 1 Hp, 250, 277 VAC; 5 amps, 125 VAC "L"

ELECTRICAL RATINGS

In Amperes

Rating Code	28 Volts DC			115 VDC	250 VDC	115 Volts AC 60 & 400 Hz			230 VAC
	Ind.	Res.	Lamp	Res.	Res.	Ind.	Res.	Lamp	Res.
1	12	20	5	0.75	0.5	10	15	3	6
2	10	15	4	0.75	0.5	7	15	2	6
3	15	20	7	0.75	0.5	15	15	4	6
4	10	18	5	0.75	0.5	8	11	2	6

Application Note: Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. NT/NR switches use silver cadmium oxide contacts. If you have specific questions, contact the MICRO SWITCH Application Center at 1-800-537-6945.

FEATURES

- Sealed switching chamber
- 1 or 2-pole circuitry
- 2 or 3 position maintained and momentary action
- Flat base with quick-connect terminals – mating connectors are available
- Brightly colored removable rockers
- Spring-loaded actuating mechanism provides tactile feedback
- High impact strength, non-tracking case enhances electrical stability
- Temperature range: –40 to 71°C (–40 to 160°F)
- UL Recognized, File E12252, vol. 1, section 44
- CSA Certified, File LR4442

GENERAL INFORMATION

MICRO SWITCH NT Series toggle switches and NR Series rocker switches are designed to meet severe environment application needs for rugged, cost-effective manual switches. These flat base style products are identical to the stepped base style in construction and features. The flat base allows for PC board or connector use for easy wiring/connection. The flat base NT toggle switches and NR rocker switches are provided with quick-connect (spade) termination. Mating connectors are available.

TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications are referenced in the order guides to indicate which circuits are made in each toggle position (e.g. **"1-2"** refers to circuit closure through terminals **1** and **2**).

Manual Switches

NT Series

Flat Base Sealed Toggles

NT 2-POSITION ORDER GUIDE

No. of Poles	Circuits Made At: Keyway Position	Circuits Made At: Opposite Keyway	UL Rating Code	Electrical Rating Code	Catalog Listing Toggle Q-C
1	OFF	2-3	L191	1	31NT91-2
	1-2	2-3	L191	1	31NT91-3
	OFF**	2-3	L192	2	31NT91-4
	1-2**	OFF	L192	2	31NT91-6
	1-2**	2-3	L192	2	31NT91-8
2	OFF	2-3, 5-6	L191	3	32NT91-2
	1-2, 4-5	2-3, 5-6	L191	3	32NT91-3
	OFF**	2-3, 4-6	L192	4	32NT91-4
	1-2, 4-5**	OFF	L192	4	32NT91-6
	1-2, 4-5**	2-3, 4-6	L192	4	32NT91-8

NT 3-POSITION ORDER GUIDE

No. of Poles	Circuits Made At: Keyway Position	Circuits Made At: Center Position	Circuits Made At: Opposite Keyway	UL Rating Code	Electrical Rating Code	Catalog Listing Toggle Q-C
1	1-2	OFF	2-3	L191	1	31NT91-1
	1-2**	OFF	2-3	L192	2	31NT91-5
	1-2**	OFF	2-3**	L192	2	31NT91-7
	NONE***	OFF	2-3	L191	1	31NT91-21
	NONE***	1-2	2-3	L191	1	31NT91-31
	NONE***	1-2	2-3**	L192	2	31NT91-51
	1-2**	OFF	NONE***	L192	2	31NT91-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	3	32NT91-1
	1-2, 4-5**	OFF	2-3, 5-6	L192	4	32NT91-5
	1-2, 4-5**	OFF	2-3, 5-6**	L192	4	32NT91-7
	NONE***	OFF	2-3, 5-6	L191	3	32NT91-21
	NONE***	1-2, 4-5	2-3, 5-6	L191	3	32NT91-31
	NONE***	1-2, 4-5	2-3, 5-6**	L192	4	32NT91-51
	1-2, 4-5**	OFF	NONE***	L192	4	32NT91-61
	1-2, 4-5	1-2, 4-5	2-3, 5-6	L191	3	32NT91-12
	1-2, 4-5**	1-2, 5-6	2-3, 5-6	L192	4	32NT91-50
	1-2, 4-5**	1-2, 5-6	2-3, 5-6**	L192	4	32NT91-70

** These positions are momentary. All others are maintained.
*** Toggle lever is blocked from these positions. Toggle becomes 2-position, with center being one extreme position.

MATING CONNECTORS ORDER GUIDE

Description	Catalog Listing
2-pole connector	19PA168-NT
1-pole connector, same package size as 2-pole connector	19PA169-NT

Manual Switches

NR Series

Flat Base Sealed Rockers

NR 2-POSITION ORDER GUIDE

No. of Poles	Circuits Made At: Keyway Position	Opposite Keyway	UL Rating Code	Catalog Listing Rocker* Q-C
1	OFF	2-3	L191	31NR91-2
	1-2	2-3	L191	31NR91-3
	OFF**	2-3	L192	31NR91-4
	1-2**	OFF	L192	31NR91-6
	1-2**	2-3	L192	31NR91-8
2	OFF	2-3, 5-6	L191	32NR91-2
	1-2, 4-5	2-3, 5-6	L191	32NR91-3
	OFF**	2-3, 4-6	L192	32NR91-4
	1-2, 4-5**	OFF	L192	32NR91-6
	1-2, 4-5**	2-3, 4-6	L192	32NR91-8

NR 3-POSITION ORDER GUIDE

No. of Poles	Circuits Made At: Keyway Position	Center Position	Opposite Keyway	UL Rating Code	Catalog Listing Rocker* Q-C
1	1-2	OFF	2-3	L191	31NR91-1
	1-2**	OFF	2-3	L192	31NR91-5
	1-2**	OFF	2-3**	L192	31NR91-7
	NONE***	OFF	2-3	L191	31NR91-21
	NONE***	1-2	2-3	L191	31NR91-31
	NONE***	1-2	2-3**	L192	31NR91-51
	1-2**	OFF	NONE***	L192	31NR91-61
2	1-2, 4-5	OFF	2-3, 5-6	L191	32NR91-1
	1-2, 4-5**	OFF	2-3, 5-6	L192	32NR91-5
	1-2, 4-5**	OFF	2-3, 5-6**	L192	32NR91-7
	NONE***	OFF	2-3, 5-6	L191	32NR91-21
	NONE***	1-2, 4-5	2-3, 5-6	L191	32NR91-31
	NONE***	1-2, 4-5	2-3, 5-6**	L192	32NR91-51
	1-2, 4-5**	OFF	NONE***	L192	32NR91-61
	1-2, 4-5	1-2, 4-5	2-3, 5-6	L191	32NR91-12
	1-2, 4-5**	1-2, 5-6	2-3, 5-6	L192	32NR91-50
	1-2, 4-5**	1-2, 5-6	2-3, 5-6**	L192	32NR91-70

* Does not include rocker button. Order separately from chart.
** These positions are momentary. All others are maintained.
*** Toggle lever is blocked from these positions. Toggle becomes 2-position, with center being one extreme position.

MATING CONNECTORS ORDER GUIDE

Description	Catalog Listing
2-pole connector	19PA168-NT
1-pole connector, same package size as 2-pole connector	19PA169-NT

ELECTRICAL RATING

L191: 15 amps, 125, 250, 277 VAC; ½ Hp, 125 VAC; 1 Hp, 250, 277 VAC; 5 amps, 125 VAC ''L''

L192: 10 amps, 125, 250, 277 VAC; ¼ Hp, 125 VAC; ½ Hp, 250, 277 VAC; 3 amps, 125 VAC ''L''

TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications are referenced in the order guides to indicate which circuits are made in each toggle position (e.g., **''1-2''** refers to circuit closure through terminals **1** and **2**).

Top specify above-panel mount rockers: add **4** (after the ''NR'') to specify the above panel version. Example: 31NR91-5 becomes 31NR**4**91-5.

ROCKER BUTTONS ORDER GUIDE

Rocker Color	Catalog Listing
White	12PA12-W
Red	12PA12-R
Yellow	12PA12-Y
Black	12PA12-BK
Green	12PA12-G
Blue	12PA12-BL

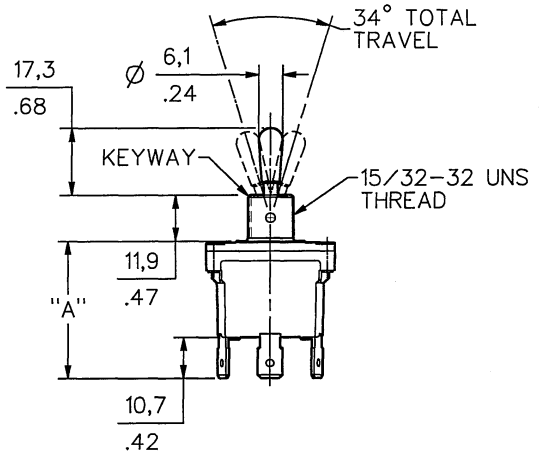
Manual Switches

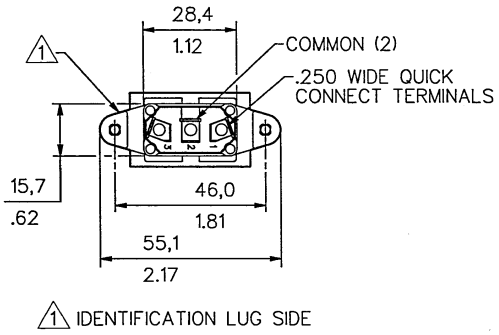
NT/NR Series

Flat Base Sealed Toggles and Rockers

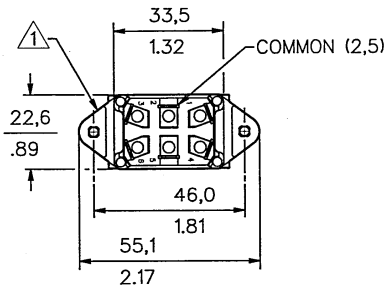
MOUNTING DIMENSIONS (For reference only)

Toggle Switches



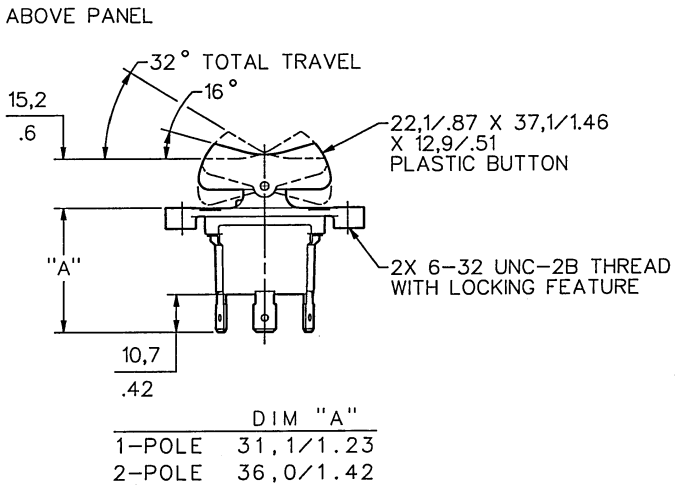


1 IDENTIFICATION LUG SIDE



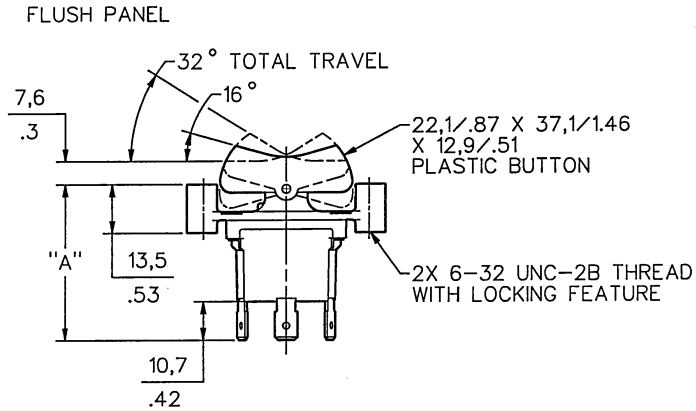
1 IDENTIFICATION LUG SIDE

Rocker Switches, Above Panel



DIM "A"	
1-POLE	31,1/1.23
2-POLE	36,0/1.42

Rocker Switches, Flush Panel



DIM "A"	
1-POLE	38,4/1.52
2-POLE	43,3/1.71

Honeywell

87940 Series

Push-Pull Switch

DESCRIPTION

The Honeywell push-pull switch is a robust, environmentally sealed, sliding contact switch incorporating two circuits with multiple combinations. The sliding contacts provide positive contact closure and opening when the switch knob is operated. The switch is available as a dual circuit switch. Contact closures are available with both circuits closed in the push position, or both circuits closed the pull position, or alternate closure, one closed and one open.

Also available is an option of a single circuit switch for high volume sales. The dual o-ring design protects the contact chamber by isolating it from any moisture or any other contaminant.

Replacement for sealed and unsealed:

- PTO switches
- Park brake switches
- Most push-pull switch applications
- Emergency stop switches

FEATURES

- Moisture and contaminant resistant
- Designed for severe temperatures
- Vibration resistant
- Sliding contacts
- Knob available in a variety of colors
- IP67 sealing available
- UL file E219293

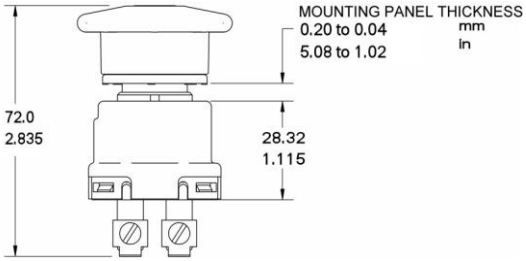
POTENTIAL APPLICATIONS

- Construction
- Agricultural
- Marine
- Material handling
- Machine tools
- Mining
- Military vehicles
- Lawn and garden
- Heavy equipment

ORDER GUIDE

Catalog Listing	Description
87941	2 NO circuits in push
87943	1 NO and 1 NC circuits in push
87944	2 NC circuits in push

DIMENSIONS



SPECIFICATIONS

Maximum design electrical load	20 A @ 12 Vdc to 14 Vdc 10 A @ 24 Vdc
Operating temperature extremes	-40 °C to 100 °C [-40 °F to 212 °F]
Endurance test cycle life at design electrical load	25,000 cycles
Standard electrical connection	Screw terminals

⚠ WARNING

RISK TO LIFE OR PROPERTY

- Never use this product for an application involving serious risk to life or property without ensuring that the system as a whole has been designed to address the risks, and that this product is properly rated and installed for the intended use within the overall system.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com
Internet: www.honeywell.com/sensing
Phone and Fax:

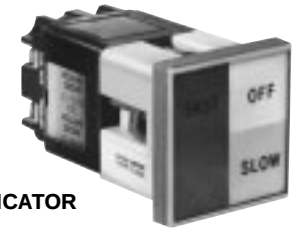
Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

Sensing and Control
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
www.honeywell.com

Honeywell

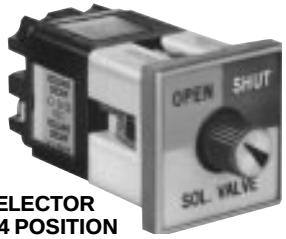
006161-4-EN IL50 GLO Printed in USA
June 2009

Multi-Light Oiltight Controls

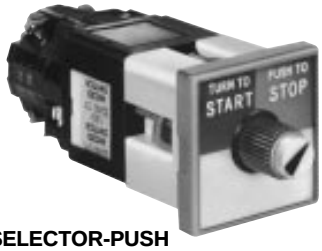


INDICATOR

PUSHBUTTON



SELECTOR
2-3-4 POSITION



SELECTOR-PUSH
2-3-4 POSITION

MULTI-LIGHT OILTIGHT CONTROLS

CMC square, multi-light controls are ideal for process control panels. They are available with selector, pushbutton, and selector-push actuators, and mechanical or electronic duty contact blocks.

- Indicators, pushbuttons, selectors, and selector-push units
- Mechanical and electronic duty contact blocks
- Contact blocks tandem mount behind operator
- More circuitry control than with any other control by using four plunger adapter kit
- Legend plates with legending in square or diagonal formats
- Bright, lighted displays with good contrast for easy identification
- Square shape is compatible with other panel controls
- Rotary cam-actuated contact blocks
- NEMA 13, oiltight and dusttight
- CSA certified no. LR57326
- UL listed file no. E37138

TABLE OF CONTENTS

Multi-Light Oiltight Controls

CMC Series

Indicators and Pushbuttons

- Suitable for use in NEMA 13 enclosures.

Indicator

- Four lighted quadrants
- Two or four transformers, 120 or 240 VAC
- Jumpers available for low voltage applications.
- Resistor boards available for 24V or 48V supply
- Each lamp individually controlled
- Cover plates, color inserts, and legend plates are ordered separately.

Pushbutton

- Actuate up to four 2-plunger contact blocks in any combination
- Lighted and unlighted versions available
- Two or four transformers, 120 or 240 VAC
- Jumpers available for low voltage applications
- Resistor boards available for 24V or 48V supply
- Each lamp individually controlled.
- Cover plates, color inserts, and legend plates are ordered separately

INDICATOR CATALOG LISTING

908AAA--

PUSHBUTTON CATALOG LISTING

909AAA--
Gray Button

909BAA--
Black Button

ORDER GUIDE

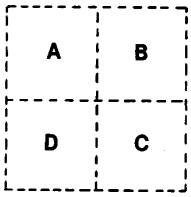
Complete the last two blanks of the catalog listing with the terminal number, which is colored in the table at the right.

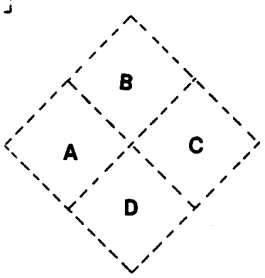
Order incandescent cover plate, color inserts, and legend plate separately from page 12.

Order LED lamps and color inserts separately.
6VAC/DC - Page 14
24VAC/DC - Page 15

Contact blocks may be ordered separately from page 4.

QUADRANT AREAS





908AAA--, 909AAA--, 909BAA--
67 —Unlighted
FOUR TERMINAL UNITS use with 2 lamps
95 —120 VAC transformers (2) and No. 755 lamps in quadrants A & B, nothing in quads C & D
96 —120 VAC transformers (2) and No. 755 lamps in quadrants C & D, nothing in quads A & B
97 —Line voltage jumpers in quadrants A & B, no lamps, nothing in quads C & D. Can be used with incandescent or LED bulbs.
98 —Line voltage jumpers in quadrants C & D, no lamps, nothing in quads A & B. Can be used with incandescent or LED bulbs.
38 —120 VAC transformers (2) in quadrants A & B. Quadrants C & D unlighted. For use with 6 volt LED lamps and color inserts. Order from page 14.
FIVE TERMINAL UNITS use with 4 lamps
01 —120 VAC transformers (4) and (4) No. 755 lamps
02 —240 VAC transformers (4) and (4) No. 755 lamps
03 —Line voltage jumpers (4)—Less lamps[1]. Can be used with incandescent or LED bulbs.
40 —48 volt resistors (4) and (4) No. 1819 lamps
05 —24 volt resistors (4) and (4) No. 756 lamps
15 —120 VAC transformers (4). For use with 6 volt LED lamps and color inserts. Order from page 14.
16 —240 VAC transformers (4). For use with 6 volt LED lamps and color inserts. Order from page 14.
EIGHT TERMINAL UNITS use with 4 lamps
51 —120 VAC transformers (4) and (4) No. 755 lamps
52 —240 VAC transformers (4) and (4) No. 755 lamps
53 —Line voltage jumpers (4) less lamps[1]. Can be used with incandescent or LED bulbs.
90 —48 volt resistors (4) and (4) No. 1819 lamps
50 —24 volt resistors (4) and (4) No. 756 lamps
55 —120 VAC transformers (4). For use with 6 volt LED lamps and color inserts. Order from page 14.
56 —240 VAC transformers (4). For use with 6 volt LED lamps and color inserts. Order from page 14.

[1] See Page 23 for 2-28 volt lamp recommendations.
Contact MICRO SWITCH Branch Office for combinations of lamp voltages in one unit.

Multi-Light Oiltight Controls

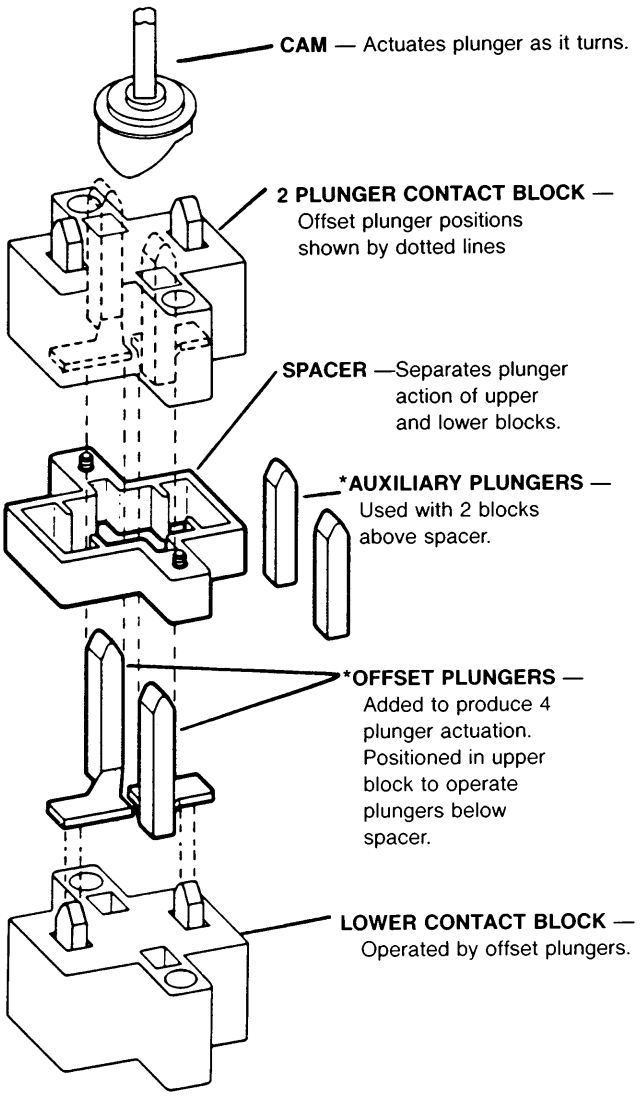
CMC Series

Four Plunger Adapter Kit

- Exclusive four plunger actuation for selector and selector-push units.
- Affords more circuit sequencing possibilities by using all four points on the cam.
- Any combination of heavy duty and electronic duty contact blocks (up to four) may be used per operator.

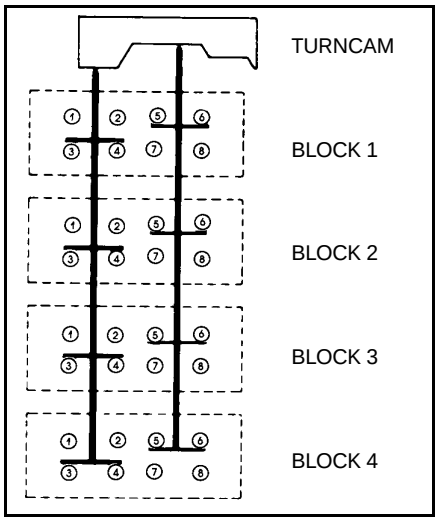
Catalog Listing
PTCA

* 4 Plunger Adapter Kit (Catalog Listing PTCA) includes two sets of auxiliary and offset plungers. One set is .200 inch longer than the other set in order to match the variation in 2-circuit and 4-circuit block depth.

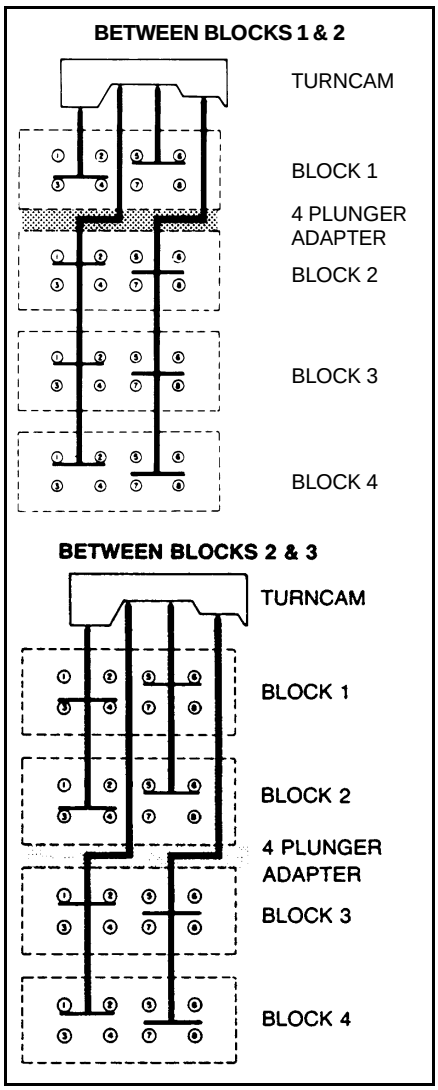


CIRCUIT SEQUENCING CONTROL COMPARISON

2 PLUNGER ACTUATION



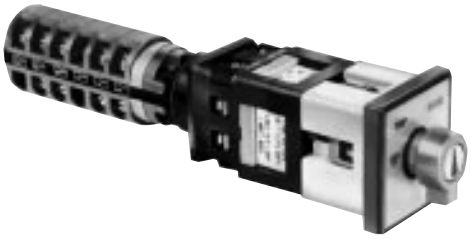
4 PLUNGER ACTUATION



Multi-Light Oiltight Controls

CMC Series

Rotary Contact Blocks



ELECTRICAL INTERRUPTING RATINGS (amperes)
The electrical ratings are 600 VAC, 250 VDC and 20 amperes continuous carry or 180 amperes for three seconds.

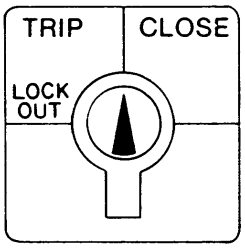
MECHANICAL MEMORY
A special cam and slip clutch (M210) can be specified to provide mechanical memory.

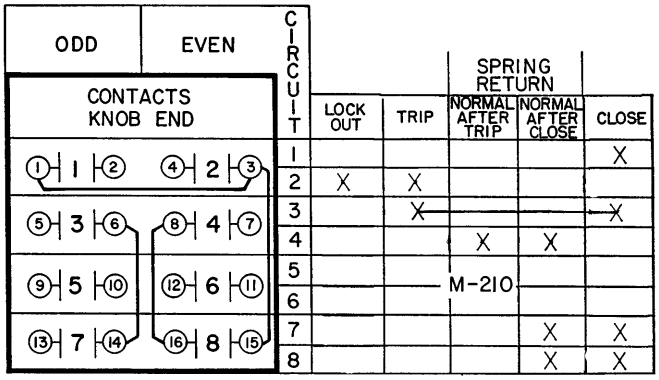
920/921 CMC ROTARY CAM-ACTUATED CONTACT BLOCKS

- Up to 12 positions available
- Controls up to 24 circuits
- Positive detent between positions
- Mechanical memory stages

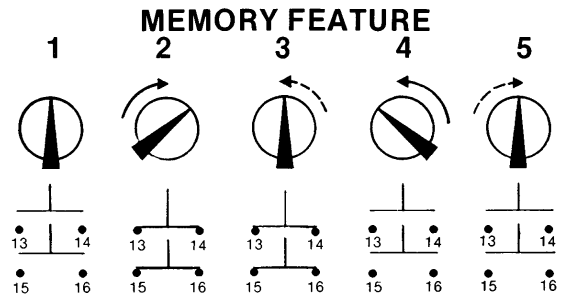
The 920/921 CMC series are highly versatile rotary cam-actuated contact blocks available with CMC selectors. These contact blocks are ideal for applications requiring a large number of contacts actuated simultaneously by one device. They are designed for control circuits in applications such as instrumentation and power generation.

Drawing A





Drawing B



Drawing A represents a three position selector with spring return from both directions. Circuits 7 and 8 - contacts, 13-14 and 15-16 are the slip (mechanical memory) contacts. M210 is the slip clutch. Drawing B is a simplified explanation of how mechanical memory works.

1. In the center position step 1, contacts 13-14 and 15-16 are open. The switch (drawing A) is in the normal after TRIP position.
2. Step 2 shows the contact closures as the knob is rotated clockwise to the CLOSE position, (13-14 and 15-16 close).
3. Step 3 illustrates that the contacts remain closed after the selector knob spring-returns to the center position.
4. In step 4, the knob is rotated counterclockwise to the TRIP position, opening contacts 13-14 and 15-16.
5. This state is maintained after the knob spring-returns to center, step 5.

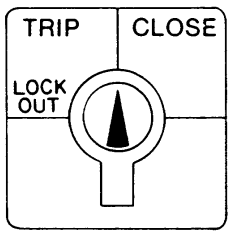
Multi-Light Oiltight Controls

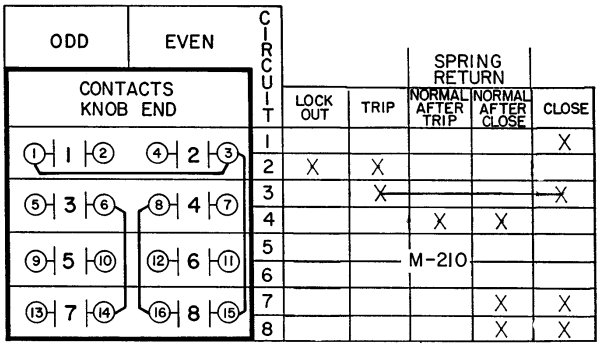
CMC Series

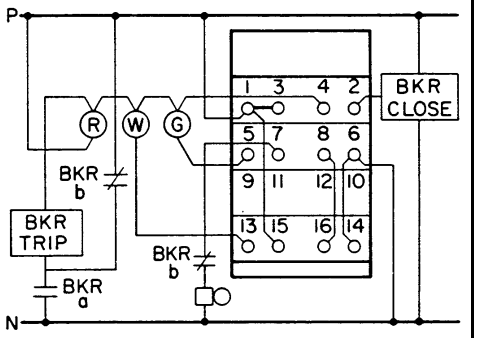
Rotary Contact Blocks

TYPICAL APPLICATION 920 CMC (LOCKOUT)

Circuit Breaker Control Switch with Lockout

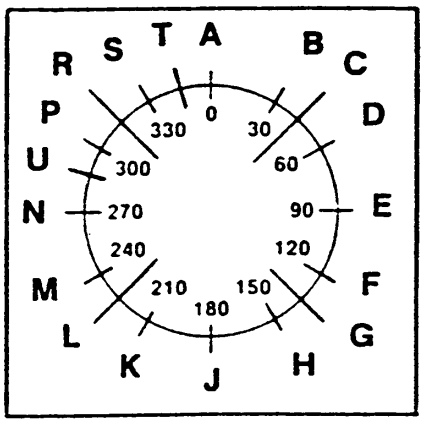






For identification ONLY
Do not build catalog listings from this information. See next page for ordering information.

Number of Positions	Degrees Between Position	Selector Action	Lamp Service	Start Position Orientation	Switching Stage Type
Selector 920 __	_	_	_	_	____
A Two Position	**A** 30°	**A** Maintained	**01**	**A** 0°	Four Digit Number
B Three Position	**B** 45°		**02**	**B** 30°	Assigned by Freeport
C Four Position	**C** 60°	**B** CW Spring Return	**05**	**C** 45°	
D Five Position	**D** 90°	**C** CCW Spring Return	**40**	**D** 60°	
E Six Position	**E** Various	**D** CW & CCW Spring Return	**50**	**E** 90°	
F Seven Position		**E** CW & CCW Spring Return and Lockout	**51**	**F** 120°	
G Eight Position		**F** CW Spring Return and Lockout	**52**	**G** 135°	
H Nine Position			**90**	**H** 150°	
J Ten Position				**J** 180°	
K Eleven Position			**03**	**K** 210°	
L Twelve Position			**53**	**L** 225°	
				M 240°	
			67	**N** 270°	
				P 300°	
			95	**R** 315°	
			96	**S** 330°	
				T 345°	
			97	**U** 285°	
			98		



POSITIONS

Selector-Push 921

Multi-Light Oiltight Controls

CMC Series

Selector - Push Units

CMC SELECTORS

- Suitable for use in NEMA 13 enclosures.
- Accepts 4 plunger adapter kit

Example:

911 **A** **G**

Operator

911 —Grey knob
914 —Black knob

Selector Action

2 Position	3 Position	4 Position
A – Pos. 1, 2 **E** – Pos. 2, 3 **H** – Pos. 3, 4 **L** – Pos. 4, 1	**B** – Pos. 1, 2, 3 **F** – Pos. 2, 3, 4 **J** – Pos. 3, 4, 1 **M** – Pos. 4, 1, 2	**C** – Pos. 1, 2, 3, 4 no stop **D** – Pos. 1, 2, 3, 4 stop between 1 and 4 **G** – Pos. 2, 3, 4, 1 stop between 2 and 1 **K** – Pos. 3, 4, 1, 2 stop between 3 and 2 **N** – Pos. 4, 1, 2, 3 stop between 3 and 4
U – Pos. 9, 12 o'clock **V** – Pos. 12, 3 o'clock **W** – Pos. 3, 6 o'clock **X** – Pos. 6, 9 o'clock	**P** – Pos. 9, 12, 3 o'clock **R** – Pos. 12, 3, 6 o'clock **S** – Pos. 3, 6, 9 o'clock **T** – Pos. 6, 9, 12 o'clock	**Y** – Pos. 9, 12, 3, 6 o'clock. No. stop. **Z** – Pos. 9, 12, 3, 6 o'clock. Stop between 6 and 9

Turn Cam Configuration

Insert the turn cam comfiguration code from the shaded area of the chart below.

1. Match your circuit requirements in one cam code column in the chart below. *

2. Develop the catalog listing of the unit, including the shaded letters of the cam code configuration selected in step 1 from the chart below.

3. Consider position number 1 as the furthest counter-clockwise device position. Order contact block(s) and adapter kit as indicated in the left hand column of the cam code selection chart.

CAM CODE SELECTION CHART *

''X'' — Circuit Closure
''O'' — Circuit Open

	Number of Positions:		2-Positions						3-Positions				4-Positions	
	Turn Cam:	Configuration:	B	J	G	G	G	R	L	K	G	A	R	L
		Orientation:	3	1	1	3	1	1	1	4	1	1	1	1
		Push Cam Code:	YA	TC	BB	FB	TB	FB	MA	ED	MC	MD	BC	VB
		Device Positions:	1 2	1 2	1 2	1 2	1 2	1 2	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3 4	1 2 3 4
Contact[1,2] block	Terminal	Condition												
PTC**C**	1-2	Free	O X	X O	O X	X X	O X	X X	X O O	X X O	O X X	X O O	X X X X	X O O O
		Depress	O O	O O	O X	X O	O X	O X	X O O	X X O	O O X	O O O	O X X X	O O O O
	3-4	Free	O O	O O	X O	O O	X O	O O	O O O	O O O	X O O	O O X	O O O O	O O O O
		Depress	X X	X X	X O	O X	X O	O O	O O X	O O X	X O O	O X X	X O O O	X O O O
	5-6	Free	X O	X O	X X	O X	X X	X X	O O X	O O X	X X O	O X X	X X X X	O O X O
		Depress	O O	X O	X O	O X	O O	X O	O O X	O O X	X O O	O X O	X X O X	O O O O
	7-8	Free	O X	O O	O O	X O	O O	O O	O O O	O O O	O O X	X O O	O O O O	O O O O
		Depress	O X	O X	O X	X O	X X	O X	X O O	X O O	O O X	X O O	O O X O	O O X O
4-Plunger Adapter Kit[3] PTC**A**			**For circuits below — Use 4 plunger adapter kit and at least 1 block from above**											
PTC**C**	1-2	Free	—	O X	X O	—	X O	X X	O X O	O X X	X O X	X X O	X X X X	O X O O
		Depress	—	O O	O O	—	O O	O O	O X O	O X X	O O O	X O O	X O X X	O O O O
	3-4	Free	X O	O O	O X	—	O X	O O	—	—	O X O	O O O	O O O O	O O O O
		Depress	X X	X X	X X	—	X X	X X	—	—	O X O	O O X	O X O O	O X O O
	5-6	Free	X X	O X	—	X O	X X	—	—	X O O	X X X	O O X	X X X X	O O O X
		Depress	O O	O X	—	O O	X O	—	—	X O O	O X O	O O X	X X X O	O O O O
	7-8	Free	O O	O O	—	O X	O O	—	O O O	O O O	—	O X O	O O O O	O O O O
		Depress	X O	X O	—	X X	O X	—	O X O	O X O	—	X X O	O O O X	O O O X

Notes:

[1] Order contact blocks separately from page 4. Only PTCC contact blocks are charted. All other contact block alternatives may be substituted for portions of PTCC circuitry.

[2] Contact block PTCB, with its location arrow aligned with the operator, provides the circuitry equivalent to 1-2 and 7-8 of the PTCC block. When PTCB is reversed (turned 180°), so location arrows do not align with operator, the circuitry obtained is equivalent to 3-4 and 5-6 of the PTCC block. PTCD with arrows aligned, provides same circuit as 7-8 of PTCC block. When reversed (arrows not aligned), the circuit obtained is equivalent to 3-4 of PTCC block. PTCE with arrows aligned, provides same circuit as 1-2 of PTCC block. When reversed (arrows not aligned), the circuit obtained is equivalent to 5-6 of PTCC block.

[3] PTCA is explained on page 5.

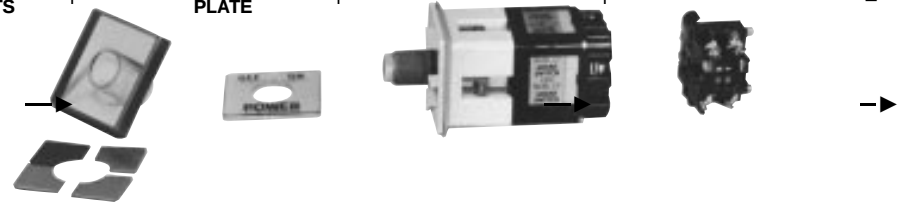
[4] Use up to 4 contact blocks with maintained forms and up to 2 with spring return forms.

Multi-Light Oiltight Controls

CMC Series

Selector-Push Units

COVER PLATE INSERTS + LEGEND PLATE + OPERATOR + BLOCKS = COMPLETE UNIT



A

Operator Function
A – Maintained **B** – Clockwise spring return from left (2 and 3 pos) **C** – Counterclockwise spring return from right (2 and 3 pos) **D** – Clockwise and counterclockwise spring return to center from left and right (3 pos) **F** – Uni-rotational clockwise (4 pos. only, no stop)

01

Lamp Terminals and Service		
67 – Unlighted **4 Terminal** **95** – (2) 120 V transformers and (2) No. 755 lamps in quadrants A & B only. **96** – (2) 120 V transformers and (2) No. 755 lamps in quadrants C & D only. **97** – (2) line voltage jumpers in quadrants A & B. No lamps. **98** – (2) line voltage jumpers in quadrants C & D. No lamps. Line voltage jumper versions can use incandescent or LED lamps.	**5 Term.**	**8 Term.**
	01	**51** (4) 120 V trans. and (4) No. 755 lamps
	02	**52** (4) 240 V trans. and (4) No. 755 lamps
	05	**50** (4) 24 V resistors. (4) No. 756 lamps
	40	**90** (4) 48 V resistors. (4) No. 1819 lamps
	03	**53** (4) line voltage jumpers. No lamps.

LED Lamp Terminals and Service		
4 Terminal **38** – (2) 120 V transformers in quadrants A & B **97** – (2) line voltage jumpers in quadrants A & B. No LED. **98** – (2) line voltage jumpers in quadrants C & D. No LED. Order LEDs, color inserts and covers from pages 14-15.	**5 Term.**	**8 Term.**
	15	**55** (4) 120V transf.
	16	**56** (4) 240 V transf.
	03	**53** (4) line voltage jumpers. No LED.

1

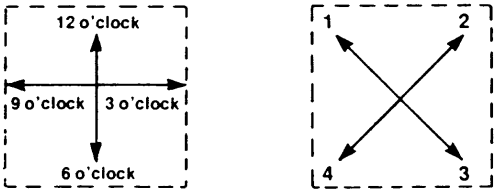
TurnCam Orientation
Insert the cam orientation code from the shaded area of the chart on the facing page.

BB

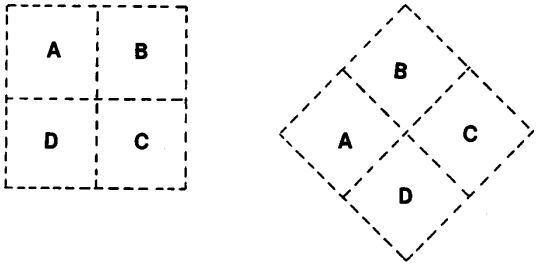
Push Cam Code
Insert the push cam code from the shaded area of the chart on the facing page.

Order cover plates, color inserts, and legend plates separately from page 12.

DEVICE POSITIONS



QUADRANT AREAS



*This chart lists only a few of the unlimited number of the switch versions available. Contact your nearest MICRO SWITCH Branch Office or Authorized Distributor for those not shown.

Definition:
Spring return is the direction the knob is turned by the internal spring force when the operator releases the knob. For example, on a two position clockwise spring return device, the knob is turned from position 2 to position 1 by the operator. When the operator releases the knob, it spring returns to position 2 in a clockwise direction.

Multi-Light Oiltight Controls

CMC Series

Selector Units

CMC SELECTORS

- Suitable for use in NEMA 13 enclosures.
- Accepts 4 plunger adapter kit

Example:

910 **A** **E**

Operator

910 —Grey knob
913 —Black knob

Selector Action

2 Positions	3 Positions	4 Positions
A —Pos. 1, 2 **E** —Pos. 2, 3 **H** —Pos. 3, 4 **L** —Pos. 4, 1	**B** —Pos. 1, 2, 3 **F** —Pos. 2, 3, 4 **J** —Pos. 3, 4, 1 **M** —Pos. 4, 1, 2	**C** —Pos. 1, 2, 3, 4 no stop **D** —Pos. 1, 2, 3, 4 stop between 1 and 4 **G** —Pos. 2, 3, 4, 1 stop between 2 and 1 **K** —Pos. 3, 4, 1, 2 stop between 3 and 2 **N** —Pos. 4, 1, 2, 3 stop between 3 and 4
U —Pos. 9, 12 o'clock **V** —Pos. 12, 3 o'clock **W** —Pos. 3, 6 o'clock **X** —Pos. 6, 9 o'clock	**P** —Pos. 9, 12, 3 o'clock **R** —Pos. 12, 3, 6 o'clock **S** —Pos. 3, 6, 9 o'clock **T** —Pos. 6, 9, 12 o'clock	**Y** —Pos. 9, 12, 3, 6 o'clock. No. stop. **Z** —Pos. 9, 12, 3, 6 o'clock. Stop between 6 and 9

Cam

Insert cam code from chart below.

1. Match your circuit requirements in one cam code column in the chart below. *

2. Develop the catalog listing of the unit, including the shaded letters of the cam code configuration selected in step 1 from the chart below.

3. Consider position number 1 as the furthest counter-clockwise device position. Order contact block(s) and adapter kit as indicated in the left hand column of the cam code selection chart.

CAM CODE SELECTION CHART *

"X" — Circuit Closure
"O" — Circuit Open

		2-Pos.		3-Position				4-Position			
	Cam:	**E**	**E⁵**	**D**	**G**	**F**	**H**	**H**	**A**	**F**	**G**
Turn Cam:	**Orientation:**	**1**	**2**	**1**	**3**	**1**	**4**	**1**	**2**	**2**	**1**
Contact[1] Block	**Device Positions:**	1 2	1 2	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	Terminals										
PTC**C**	1-2 (NC)	X O	O X	X O O	X X O	O X O	O X O	X O O O	O O X X	X O X O	O X X X
	3-4 (NO)	O X	X O	O O X	O O X	X O O	O O X	O X O O	O X O O	O O O X	X O O O
	5-6 (NC)	X O	O X	O O X	O X X	O X O	O O O	O O X O	X X O O	X O X O	X X O X
	7-8 (NO)	O X	X O	X O O	X O O	O O X	X O O	O O O X	O O O X	O X O O	O O X O
PTC**B**	1-2 (NC)	X O	O X	X O O	X X O	O X O	O X O	X O O O	O O X X	X O X O	O X X X
	3-4 (NO)	O X	X O	X O O	X O O	O O X	X O O	O O O X	O O O X	O X O O	O O X O
Rev. PTC**B**	3-4 (NO)	O X	X O	O O X	O X X	X O O	O O X	O X O O	O X O O	O O O X	X O O O
	1-2 (NC)	X O	O X	O O X	O X X	O X O	O O O	O O X O	X X O O	X O X O	X X O X
4-Plunger Adapter Kit PTC**A**[2]		**For circuits below — Use 4 plunger adapter kit and at least 1 block from above**									
PTC**C**	1-2 (NC)			O X O	X X X	X O X			X O O X	O X O X	X O X X
	3-4 (NO)			O O O	O O O	O X O			O O X O	X O O O	O X O O
	5-6 (NC)			O O O	X O X	X O X			O X X O	O X O X	X X X O
	7-8 (NO)			O X O	O X O	O O O			X O O O	O O X O	O O O X
PTC**B**	1-2 (NC)			O X O	X X X	X O X			X O O X	O X O X	X O X X
	3-4 (NO)			O X O	O X O	O O O			X O O O	O O X O	O O O X
Rev. PTC**B**	3-4 (NO)				O O O	O X O			O O X O	X O O O	O X O O
	1-2 (NC)				X O X	X O X			O X X O	O X O X	X X X O

Notes:

[1] Order contact blocks separately from page 4. Alternative contact blocks are shown also. When alternative contact blocks are used, their sequencing is the same as their portion of contact block PTCC.

[2] Adapter kit PTCA requires contact blocks *both* before and after the adapter spacer. Up to two blocks may be added *both* before and after the adapter. PTCA is explained on page 5.

[3] Contact block PTCB may be mounted with its location arrow and that of the operator aligned or reversed; i.e., the block may be turned 180° so location arrows do not match.

[4] Use up to 4 contact blocks with maintained forms and up to 2 with spring return forms.

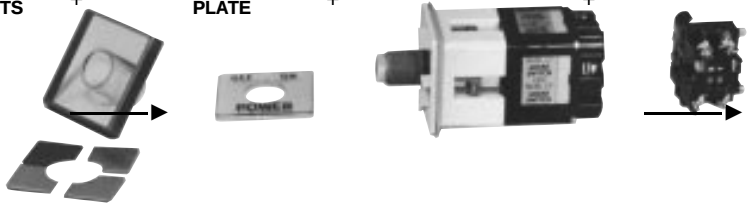
[5] For use with 2 position clockwise spring return selector only.

Multi-Light Oiltight Controls

CMC Series

Selector Units

COVER PLATE INSERTS + LEGEND PLATE + OPERATOR + BLOCKS = COMPLETE UNIT



A

Operator[3,4] Function
A – Maintained
B – Clockwise spring return from left (2 and 3 pos)
C – Counterclockwise spring return from right (2 and 3 pos)
D – Clockwise and counterclockwise spring return to center from left and right (3 pos)
F – Uni-rotational clockwise (4 pos. only, no stop)

01

Lamp Terminals and Service	5 Term.	8 Term.
67 – Unlighted **4 Terminal**	**01**	**51**
95 – (2) 120 V transformers and (2) No. 755 lamps in quadrants A & B only.	(4) 120 V trans. and (4) No. 755 lamps	
96 – (2) 120 V transformers and (2) No. 755 lamps in quadrants C & D only.	**02**	**52**
97 – (2) line voltage jumpers in quadrants A & B. No lamps.	(4) 240 V trans. and (4) No. 755 lamps	
98 – (2) line voltage jumpers in quadrants C & D. No lamps.	**05**	**50**
Line voltage jumper versions can use incandescent or LED lamps.	(4) 24 V resistors.(4) No. 756 lamps	
	40	**90**
	(4) 48 V resistors.(4) No. 1819 lamps	
	03	**53**
	(4) line voltage jumpers. No lamps.	

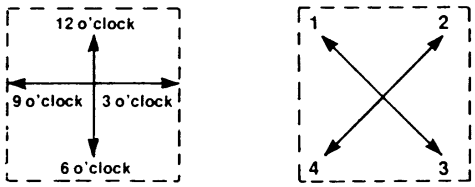
LED Lamp Terminals and Service	5 Term.	8 Term.
4 Terminal	**15**	**55**
38 – (2) 120 V transformers in quadrants A & B	(4) 120V transf.	
97 – (2) line voltage jumpers in quadrants A & B. No LED.	**16**	**56**
	(4) 240 V transf.	
98 – (2) line voltage jumpers in quadrants C & D. No LED.	**03**	**53**
	(4) line voltage jumpers. No LED.	
Order LEDs, color inserts and covers from pages 14-15.		

1

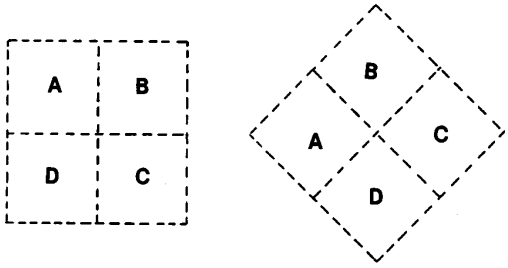
Cam Orientation
Insert the cam orientation code from the shaded area of the chart on the facing page. The area is labeled orientation and it must be from the same column as the cam.

Order cover plates, color inserts, and legend plates separately from page 12.

DEVICE POSITIONS



QUADRANT AREAS



* This chart lists only a few of the unlimited number of switch versions available. Contact your nearest MICRO SWITCH Branch Office or Authorized Distributor for those not shown.

Definition:
Spring return is the direction the knob is turned by the internal spring force when the operator releases the knob. For example, on a two position clockwise spring return device, the knob is turned from position 2 to position 1 by the operator. When the operator releases the knob, it spring returns to position 2 in a clockwise direction.

FO-62098-F

COORDINATED MANUAL CONTROL ORDER SHEET for CMC LEGEND PLATES

GUIDE to ARRANGEMENT of LEGENDS and CATALOG LISTINGS

Additional forms available from any MICRO SWITCH Branch Office. Specify FO-62098-F

CUSTOMER P. O. NO.

INSTRUCTIONS:
1. Extend lines to show QUADRANT (S) DIVISIONS.
2. Print REQUIRED legends in the diagrams below. *(Diagrams are ACTUAL size.)*
3. Fill in LETTER SIZE. *(9/64", 13/64", or 5/16")*
4. Check lettering *(BLACK or WHITE)* by *QUADRANT.
5. Fill in CATALOG LISTING and QUANTITY.

*A B / D C *B / A C / D

(QUADRANT LAYOUTS)

CUSTOMER ______

ADDRESS ______

CITY and STATE ______

SHADED AREAS for FREEPORT USE ONLY			
S.W.O. NO. 1	TR C 2	C O 4	SCHED. DATE
S. O. NO. 5	ACCOUNT NO. 126-031 8		COMP. DATE

NOTE: Legends will be CENTERED within *QUADRANT(S) Specified.

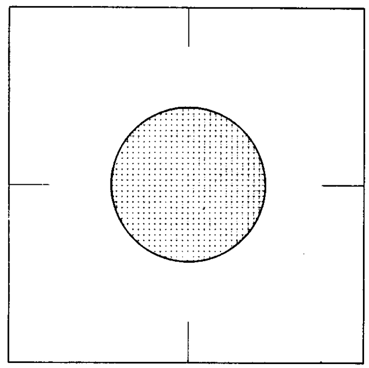
INDICATOR DIAGRAMS
907 AUS

← Use One Diagram in EACH Section →

OPERATOR DIAGRAMS
907 BUS

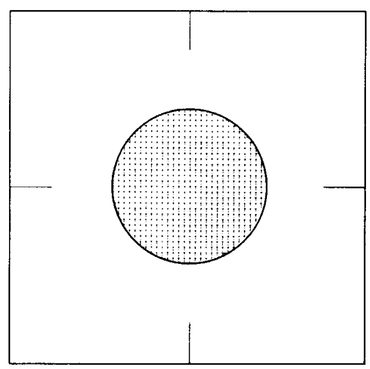
*QUADRANT	LETTER SIZE	BLACK	WHITE
A			
B			
C			
D			

CATALOG LISTING		PRODUCT CODE 3	
ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9



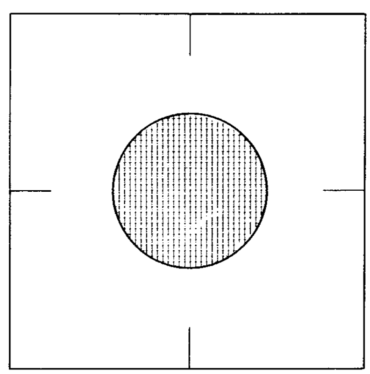
*QUADRANT	LETTER SIZE	BLACK	WHITE
A			
B			
C			
D			

CATALOG LISTING		PRODUCT CODE 3	
ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9



*QUADRANT	LETTER SIZE	BLACK	WHITE
A			
B			
C			
D			

CATALOG LISTING		PRODUCT CODE 3	
ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9



COMPLETED BY:

______ (Signature) ______ (Date) *Page* ____ *of* ____

Legend Plates

Three type sizes are offered in either black or white lettering for custom legends on blank legend plates. A guide to legend area character counting is shown in the chart below. Stay within the limits spelled out in the chart for number of lines and characters.

To order custom legend plates, Form 62098 is provided on page 22. See example of a completed form on page 17.

CATALOG LISTINGS

Indicator	Operator-Indicator
907 AUS	907 BUS

LEGEND STYLE AND SIZES

Sizes available in full capital alphabetic and numeric characters are:

9/64 .141″ 3,57mm A1 13/64 .203″ 5,16mm A1 5/16 .313″ 7.94mm A1

Characters available are:
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
. , ’ # / ( ) + – ’’ % &
0 1 2 3 4 5 6 7 8 9
½ ¼ ¾ ⅓ ⅔

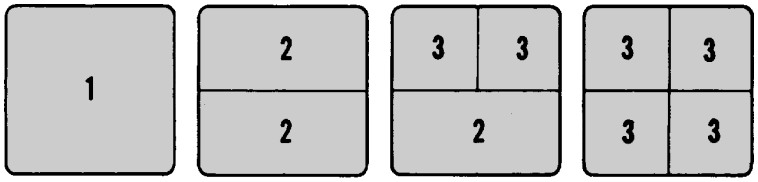
Additional characters available only in .141 (3,57) and .203 (5,16) sizes are:
* — ° → ∞ ‘‘ ’’ ⅛ ⅜ ⅝ ⅞
I II III IV V VI VII VIII IX X
Na Cl H_2O O_2

CUSTOM LEGEND AREAS

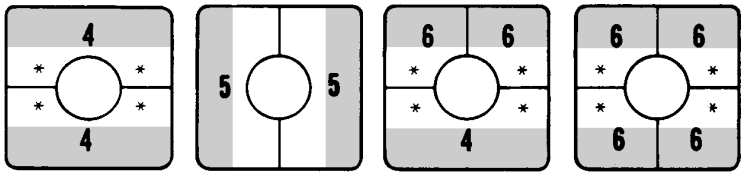
Form Number in Shaded Area	Letter Height	Max. No. of Characters Per Line (Include Spaces)	Max. No. of Lines of Each Shaded Area	Max. Total Caracters Per Shaded Area
1	9/64	19	7	133
	13/64	13	6	78
	5/16	8	4	32
2	9/64	19	3	57
	13/64	13	3	39
	5/16	8	2	16
3	9/64	9	3	27
	13/64	6	3	18
	5/16	3	2	6
4	9/64	19	2*	38
	13/64	13	2*	26
	5/16	8	1	8
5	9/64	12	1	12
	13/64	8	1	8
	5/16	5	1	5
6	9/64	9	2*	18
	13/64	6	2*	12
	5/16	3	1	3
7	9/64	9	1	9
		7	2	14
	13/16	6	1	6
	Indicators Only	4	2	8
	5/16 Indicators Only	4	1	4
8	9/64	7	1	7
		5	2	10
	13/64	4	1	4

The shaded areas shown below indicate the selections available for division of the legend display area. After determining the form number, read the letter size, maximum number of characters and lines from the chart on the left.

INDICATORS 907 AUS



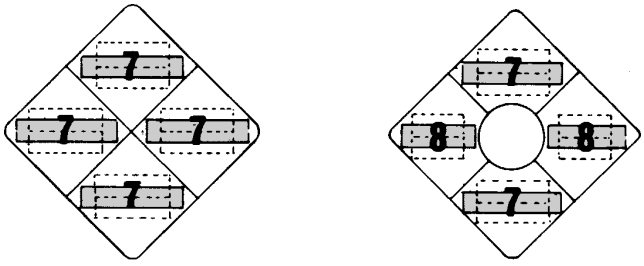
OPERATOR-INDICATORS 907 BUS



INDICATORS 907 AUS

OPERATOR-INDICATORS 907 BUS

DIAGONAL LEGEND PLATES



NOTE: 2 LINE LEGENDS ARE 2 LETTERS SHORTER PER LINE THAN SINGLE LINE LEGENDS

*Legend plate areas 4 and 6 will accept a third line. Maximum number of characters is 5 for 9/64″ and 3 for 13/64″ where marked.

Legend Order Sheet

Completed Sample

FO-62098-F

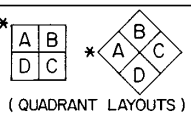
COORDINATED MANUAL CONTROL ORDER SHEET for CMC LEGEND PLATES

GUIDE to ARRANGEMENT of LEGENDS and CATALOG LISTINGS

Additional forms available from any MICRO SWITCH Branch Office. Specify FO-62098-F

CUSTOMER P.O. NO.

INSTRUCTIONS: 1. Extend lines to show QUADRANT(S) DIVISIONS.
2. Print REQUIRED legends in the diagrams below. *(Diagrams are ACTUAL size.)*
3. Fill in LETTER SIZE. *(9/64", 13/64", or 5/16")*
4. Check lettering *(BLACK or WHITE)* by *QUADRANT.
5. Fill in CATALOG LISTING and QUANTITY.



(QUADRANT LAYOUTS)

CUSTOMER ABC Co.

ADDRESS 100 N. 1st St.

CITY and STATE Nowhere, NV 89502

SHADED AREAS for FREEPORT USE ONLY			
S.W.O. NO. 1	TR C2	C O4	SCHED. DATE
S.O. NO. 5	ACCOUNT NO. 126-031 8		COMP. DATE

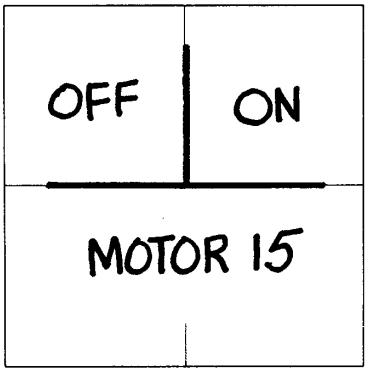
NOTE: Legends will be CENTERED within *QUADRANT(S) Specified.

INDICATOR DIAGRAMS
907 AUS

Use One Diagram in EACH Section

OPERATOR DIAGRAMS
907 BUS

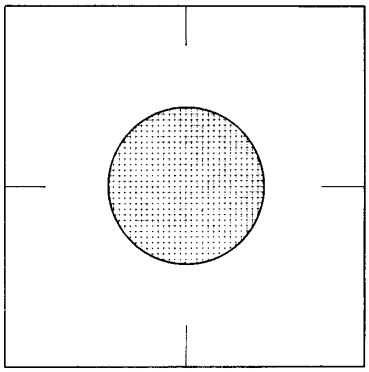
Row 1



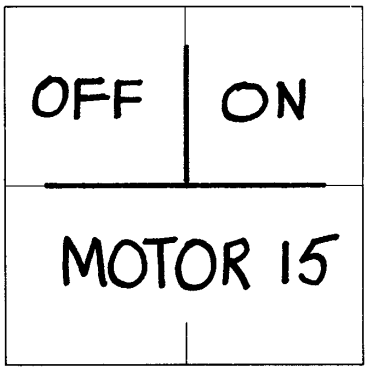
*QUADRANT	LETTER SIZE	BLACK	WHITE
A	13/64		✓
B	13/64		✓
C	13/64	✓	
D	13/64	✓	

CATALOG LISTING	PRODUCT CODE 3
907 AUS	

ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9
			2



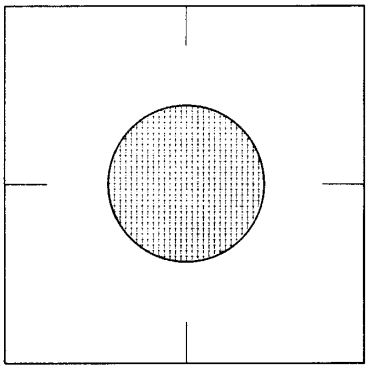
Row 2



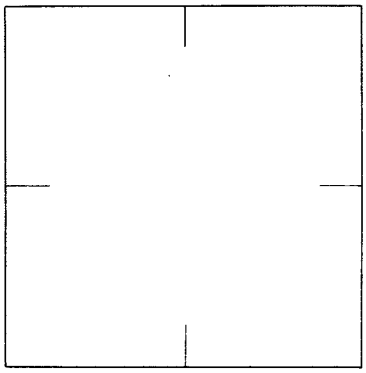
*QUADRANT	LETTER SIZE	BLACK	WHITE
A	5/16		✓
B	5/16		✓
C	5/16	✓	
D	5/16	✓	

CATALOG LISTING	PRODUCT CODE 3
907 AUS	

ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9
			2



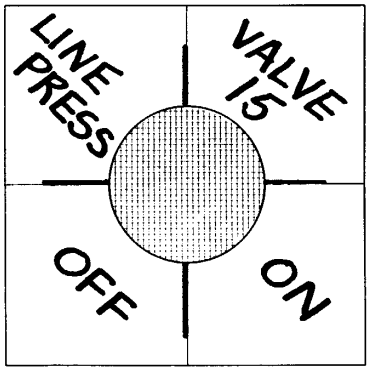
Row 3



*QUADRANT	LETTER SIZE	BLACK	WHITE
A	9/64		✓
B	9/64		✓
C	9/64		✓
D	9/64		✓

CATALOG LISTING	PRODUCT CODE 3

ITEM NO.	LINE NO. 6	SCHED. NO. 7	QUANTITY 9
			10



COMPLETED BY:

(Signature) (Date)

Page ____ of ____

Multi-Light Oiltight Controls

CMC Series

Specification Sheet

Custom circuit control for selector and selector-push units

For assistance in determining your circuit requirements for selector and selector-push units, fill out a CMC Specification Sheet (shown here) and submit it to the MICRO SWITCH Application Center, or Fax to (815) 235-6545. Your circuit requirements will be analyzed, and the form will be returned to you filled out.

The completed form will include a catalog listing of the unit that will provide the control you require along with contact block catalog listings. The completed form will also include contact block terminal connections for wiring the circuits you specified. Additional forms (FO-62783-B) are available on request.

Follow these steps to fill out a Specification Sheet: (Refer to the example on this page.)

1. Mark an ''X'' where a circuit is to be closed under ''Device Position.'' The form may be used for any 2, 3, or 4 position unit. Cross out the unused position columns.

   1.1 For selector-push units, mark an ''X'' where circuit is closed in either (or both) the FREE and DEPRESS condition in each Device Position.

   1.2 For selectors, there is no DEPRESS knob function, and the DEPRESS lines should be crossed out.

2. Note under ''Circuit'' if any circuits are to be controlled with electronic duty contact blocks. Heavy duty contact blocks will be specified unless otherwise noted.

3. Indicate choice of construction details; i.e., 120 or 240 volt transformers, low voltage jumpers, 24 or 48 volt resistors. Check whether 4, 5, or 8 terminal construction is desired, maintained or spring return action, and other control specifications, if applicable.

NOTE: For 125VDC applications, use line voltage jumpers with customer supplied externally mounted dropping resistors. Lamp supply voltage must not exceed 28 volts.

CUSTOMER: ABC Company, 100 N. 1st Street, Anywhere, USA 89502

PROJECT:

UNIT OR TAG NO: HS-234-A

REMARKS:
1. Fill in type of control, lamp information, position requirements, contact block type, packing instructions and legend plate information.
2. Mark an "X" where a circuit is to be closed under "DEVICE POSITION". Cross out the unused position columns. (Applies to all CMC units except Indicators).
3. For Selector-Push units, mark with an "X" where circuit is closed in either (or both) the FREE and DEPRESS condition in each Device Position.
4. For Selectors there is no DEPRESS function. Cross out the DEPRESS lines.
5. For Pushbuttons, there is just one Device Position. Cross out positions 2, 3, and 4.

TYPE OF CONTROL: ☐ Indicator ☐ Pushbutton ☐ Selector ☒ Selector-push; KNOB ☒ Gray ☐ Black; ☐ Unlighted Unit

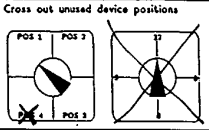
LAMP SUPPLY VOLTAGE: 120 VAC Trans. ☐ #755 ☒ L.E.D. / 240 VAC Trans. ☐ #755 ☐ L.E.D. / 24 VAC/DC ☐ #T5¾/Res. ☐ L.E.D. / ☐ 48 VAC/DC w/resistor & #1819 / ☐ Line voltage jumpers; No lamps or LED's

Lamp Terminals ☐ 4 ☒ 5 ☐ 8

4 Position Units — ☐ Without Stops ☐ With Stop between Pos. ___ and Pos. ___

2 or 3 Position Units ☐ Maintained ☐ Spring return (check one) ☐ From left (cw) ☐ From right (ccw) ☒ From left and right

Cross out unused device positions



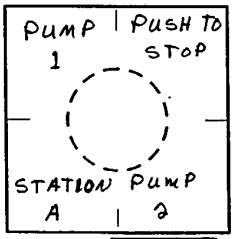
CONTACT BLOCK TYPE: ☒ Heavy duty (check one) ☐ Gold ☒ Silver ☐ Electronic duty (check one) ☐ Gold ☐ Silver

PACKING INSTRUCTIONS: ☐ 1. Individual components ☐ 2. Box and tag only * ☒ 3. Assemble, test, box and tag *

CIRCUIT		DEVICE POSITION 1	2	3	4	TERMINALS	BLOCK
1	Free	X					
	Depress	X					
2	Free		X	X			
	Depress			X			
3	Free			X			
	Depress			X			
4	Free	X	X				
	Depress	X					
5	Free						
	Depress						
6	Free						
	Depress						
7	Free						
	Depress						
8	Free						
	Depress						

NOTE: P = Parallel Wiring S = Series Wiring

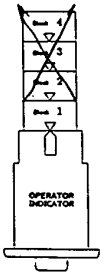
LEGEND PLATE (SHOW LEGEND DESIRED)



LEGEND NOTE: Extend lines to show Quadrant(s) Divisions. Legends will be centered within **Quadrant(s) specified

**Quadrant	CMC Legend Size	Black	White	Insert Color
A	9/64	X		Y
B	7		X	R
C	7	X		Y
D	7	X		W

COLOR CODE: A - Amber, B - Blue, G - Green, K - Black, R - Red, W - White, Y - Yellow



CATALOG LISTING	PRICE
Operator and/or indicator	
Block 1	
Block 2	
Block 3	
Block 4	
Adapter Kit	
Cover Plate and Inserts	
Legend	
Packaging & Tagging	
TOTAL PRICE *	

QUADRANT LAYOUT: ** A B C D; ** A B D C

Circle Cover Plate Edge Color: Gray, Chrome, Black, Unpainted, Red, White

CATALOG LISTING *

S.W.O. NO.	TR	C	SCHED DATE	LINE NO.	PRODUCT CODE
	C 3	O 4		6	8

S.O. NO.	ACCOUNT NO.	COMP. DATE	ITEM NO.	SCED. NO.	QUANTITY
6	126-288 8			7	9

COMPLETED BY: R. M. Olson (SIGNATURE) (DATE) Page __ of __

Multi-Light Oiltight Controls

CMC Series

Specification Sheet

CUSTOMER:

PROJECT:

UNIT OR TAG NO:

TYPE OF CONTROL
- ☐ Indicator
- ☐ Pushbutton
- ☐ Selector
- ☐ Selector-push

KNOB ☐ Gray ☐ Black

☐ Unlighted Unit

LAMP SUPPLY VOLTAGE
- 120 VAC Trans. ☐ #755 ☐ L.E.D.
- 240 VAC Trans. ☐ #755 ☐ L.E.D.
- 24 VAC/DC ☐ #756/Res. ☐ L.E.D.
- ☐ 48 VAC/DC w/resistor & #1819
- ☐ Line voltage jumpers; No lamps or LED's

Lamp Terminals ☐ 4 ☐ 5 ☐ 8

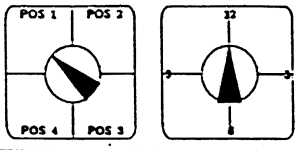
4 Position Units — Without Stops
☐ With Stop between Pos. ____ and Pos. ____

REMARKS:

1. Fill in type of control, lamp information, position requirements, contact block type, packing instructions and legend plate information.
2. Mark an "X" where a circuit is to be closed under "DEVICE POSITION". Cross out the unused position columns. (Applies to all CMC units except Indicators).
3. For Selector-Push units, mark with an "X" where circuit is closed in either (or both) the FREE and DEPRESS condition in each Device Position.
4. For Selectors there is no DEPRESS function. Cross out the DEPRESS lines.
5. For Pushbuttons, there is just one Device Position. Cross out positions 2, 3, and 4.

2 or 3 Position Units
- ☐ Maintained
- ☐ Spring return (check one)
  - ☐ From left (cw)
  - ☐ From right (ccw)
  - ☐ From left and right

Cross out unused device positions



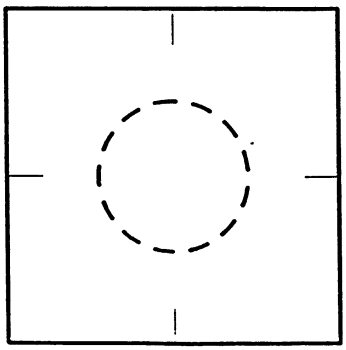
CONTACT BLOCK TYPE
- ☐ Heavy duty (check one)
  - ☐ Gold ☐ Silver
- ☐ Electronic duty (check one)
  - ☐ Gold ☐ Silver

PACKING INSTRUCTIONS
- ☐ 1. Individual components
- ☐ 2. Box and tag only *
- ☐ 3. Assemble, test, box and tag *

CIRCUIT	DEVICE POSITION 1	2	3	4	TERMINALS	BLOCK
1 Free						
1 Depress						
2 Free						
2 Depress						
3 Free						
3 Depress						
4 Free						
4 Depress						
5 Free						
5 Depress						
6 Free						
6 Depress						
7 Free						
7 Depress						
8 Free						
8 Depress						

NOTE: P = Parallel Wiring S = Series Wiring

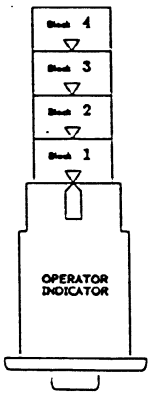
LEGEND PLATE
(SHOW LEGEND DESIRED)



LEGEND NOTE:
Extend lines to show Quadrant(s) Divisions. Legends will be centered within **Quadrant(s) specified

** Quadrant	CMC Legend Size	Black	White	Insert Color
A				
B				
C				
D				

COLOR CODE:
- A – Amber
- B – Blue
- G – Green
- K – Black
- R – Red
- W – White
- Y – Yellow



CATALOG LISTING	PRICE
Operator and/or indicator	
Block 1	
Block 2	
Block 3	
Block 4	
Adapter Kit	
Cover Plate and Inserts	
Legend	
Packaging & Tagging	
TOTAL PRICE *	

QUADRANT LAYOUT

** A | B / D | C

Circle Cover Plate Edge Color
Gray
Chrome
Black
Unpainted
Red
White

CATALOG LISTING *

S.W.O. NO. (1)	TR (2)	C (4)	SCHED DATE	LINE NO. (6)	PRODUCT CODE (3)
	C	O			

S.O. NO. (5)	ACCOUNT NO. (8)	COMP. DATE	ITEM NO.	SCED. NO. (7)	QUANTITY (9)
	126-288				

COMPLETED BY: _____ (SIGNATURE) _____ (DATE) Page ___ of ___

Multi-Light Oiltight Controls

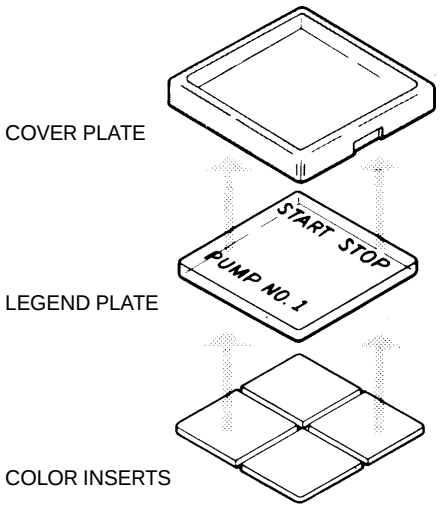
CMC Series

Cover Plates, Color Inserts, and Legend Plates

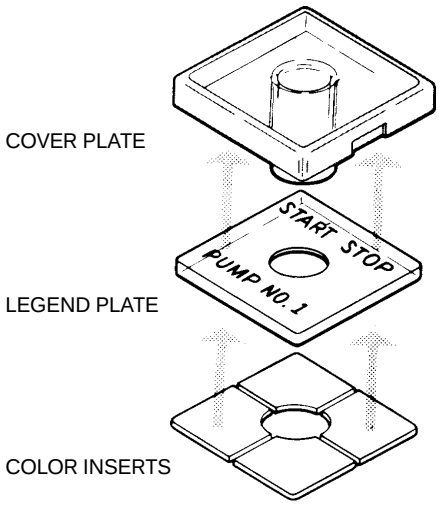
FAST ASSEMBLY LEGEND DISPLAY

The four selected color inserts snap into the legend plate. This sub-assembly then snaps into the cover plate to complete the front-of-panel assembly.

FOR INDICATORS



FOR OPERATOR INDICATORS



COVER PLATES AND COLOR INSERTS

Cover plates and color inserts are offered together in one package under a single catalog listing. The four color inserts can be positioned in any of the four quarters of the total display area.

Any color combination you desire is included in this chart. The chart is arranged in the following order: 4 same colors, 3 + 1 colors, 2 + 2 colors, 2 + 1 + 1 colors, and 1 + 1 + 1 + 1 colors.

The cover plates listed in the tables have a gray painted edge. Plates with edges other than gray may be ordered by substituting any of the following four digits in place of the first four digits in the tables. Example: 906A — gray edge or 906E — black edge. Listings are completed from the next page.

Edge Color	Indicator	Operator-Indicator
Gray	906A_ _	906B_ _
Chrome	906C_ _	906D_ _
Black	906E_ _	906F_ _
Unpainted	906G_ _	906H_ _
Red	906J_ _	906K_ _
White	906N_ _	906P_ _

CMC LEGEND PLATES

Legend plates are transparent plastic parts on which word messages are displayed.

BLANK PLATES

Blank legend plates are available for customers preferring to do their own hot stamping, etching, engraving, or silk screening of legend plates. Drafting mylar or film positives can also be positioned on the legend plate for custom panel appearance.

LEGENDED

Legend plates are offered with lettering positioned horizontally, vertically, or diagonally — in combinations of black and white lettering — in combinations of three different type sizes — and the message the customer specifies. (See character count chart, page 16.) These plates are ordered on Custom Legend Form on page 22.

See completed sample page 17.

LEGEND CONTRAST

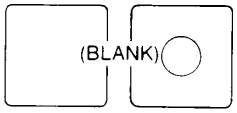
For maximum visibility in both the lighted and unlighted condition, the chart below is recommended as a guide.

Color Snap in Inserts	Legend Lettering	
	White	Black
Amber	X	X
Blue	X	
Green	X	
Red	X	
White		X
Yellow		X

BLANK LEGEND PLATES

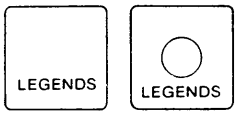
INDICATOR OPERATOR

907AYY100 **907BYY100**



LEGENDED PLATES

907AUS **907BUS**



Multi-Light Oiltight Controls

CMC Series

Gray Cover Plate and Color Insert Color Guide / Incandescent Lamps

COLOR CODE: A—Amber B—Blue G—Green R—Red W—White Y—Yellow K—Black

Cover Plate & Color Inserts For Indicator Units Only	Color Code	Cover Plate & Color Inserts For Operator Indicator Units
906 AAF	AAAA	906 BAF
906 AAD	BBBB	906 BAD
906 AAC	GGGG	906 BAC
906 AAA	RRRR	906 BAA
906 AAE	WWWW	906 BAE
906 AAB	YYYY	906 BAB
906 AEH	AAAB	906 BEH
906 AEK	AAAG	906 BEK
906 AEJ	AAAR	906 BEJ
906 AED	AAAW	906 BED
906 AFG	AAAY	906 BFG
906 AFD	BBBA	906 BFD
906 AFC	BBBG	906 BFC
906 AFA	BBBR	906 BFA
906 AEE	BBBW	906 BEE
906 AFB	BBBY	906 BFB
906 AEZ	GGGA	906 BEZ
906 AEX	GGGB	906 BEX
906 AEG	GGGR	906 BEG
906 AEY	GGGW	906 BEY
906 AEW	GGGY	906 BEW
906 AER	RRRA	906 BER
906 AEP	RRRB	906 BEP
906 AEO	RRRG	906 BEO
906 AEC	RRRW	906 BEC
906 AEN	RRRY	906 BEN
906 AEM	WWWA	906 BEM
906 AEF	WWWB	906 BEF
906 AEA	WWWG	906 BEA
906 AEL	WWWR	906 BEL
906 AEB	WWWY	906 BEB
906 AFE	YYYA	906 BFE
906 AEU	YYYB	906 BEU
906 AET	YYYG	906 BET
906 AES	YYYR	906 BES
906 AEV	YYYW	906 BEV
906 ABN	AABB	906 BBN
906 ABM	AAGG	906 BBM
906 ABL	AARR	906 BBL
906 ABP	AAWW	906 BBP
906 AJF	AAKK	906 BJF
906 ABQ	AAYY	906 BBQ
906 ABH	BBGG	906 BBH
906 ABC	BBRR	906 BBC
906 ABK	BBWW	906 BBK
906 AJD	BBKK	906 BJD
906 ABF	BBYY	906 BBF
906 ABB	GGRR	906 BBB
906 ABJ	GGWW	906 BBJ
906 AJC	GGKK	906 BJC
906 ABE	GGYY	906 BBE
906 ABD	RRWW	906 BBD
906 AJA	RRKK	906 BJA
906 ABA	RRYY	906 BBA
906 AJE	WWKK	906 BJE
906 ABG	WWYY	906 BBG
906 AJB	YYKK	906 BJB
906 AGZ	AABG	906 BGZ
906 AGX	AABR	906 BGX
906 AGY	AABW	906 BGY
906 AHL	AABY	906 BHL
906 ADG	AAGR	906 BDG
906 ADW	AAGW	906 BDW
906 AHK	AAGY	906 BHK
906 ADX	AARW	906 BDX
906 AHJ	AARY	906 BHJ
906 AHM	AAWY	906 BHM
906 AGV	BBAG	906 BGV
906 AGS	BBAR	906 BGS
906 AGW	BBAW	906 BGW
906 AHF	BBAY	906 BHF
906 AGR	BBGR	906 BGR
906 AGU	BBGW	906 BGU
906 ADS	BBGY	906 BDS
906 ADR	BBRW	906 BDR
906 AGP	BBRY	906 BGP

Cover Plate & Color Inserts For Indicator Units Only	Color Code	Cover Plate & Color Inserts For Operator Indicator Units
906 AGT	BBWY	906 BGT
906 AGN	GGAB	906 BGN
906 ADU	GGAR	906 BDU
906 AGO	GGAW	906 BGO
906 AHG	GGAY	906 BHG
906 AGK	GGBR	906 BGK
906 ADV	GGBW	906 BDV
906 AGL	GGBY	906 BGL
906 ADT	GGRW	906 BDT
906 ADN	GGRY	906 BDN
906 AGM	GGWY	906 BGM
906 AGE	RRAB	906 BGE
906 AGC	RRAG	906 BGC
906 AGF	RRAW	906 BGF
906 AHH	RRAY	906 BHH
906 ADL	RRBG	906 BDL
906 AGD	RRBW	906 BGD
906 ADZ	RRBY	906 BDZ
906 AGB	RRGW	906 BGB
906 ADO	RRGY	906 BDO
906 AGA	RRWY	906 BGA
906 ADY	WWAB	906 BDY
906 ADH	WWAG	906 BDH
906 ADF	WWAR	906 BDF
906 AHE	WWAY	906 BHE
906 ADK	WWBG	906 BDK
906 ADM	WWBR	906 BDM
906 ADE	WWBY	906 BDE
906 ADB	WWGR	906 BDB
906 ADD	WWGY	906 BDD
906 ADA	WWRY	906 BDA
906 AHC	YYAB	906 BHC
906 AHB	YYAG	906 BHB
906 AHA	YYAR	906 BHA
906 AHD	YYAW	906 BHD
906 ADP	YYBG	906 BDP
906 ADJ	YYBR	906 BDJ
906 AGJ	YYBW	906 BGJ
906 ADC	YYGR	906 BDC
906 AGH	YYGW	906 BGH
906 AGG	YYRW	906 BGG
906 AKF	KKYG	906 BKF
906 AKG	KKYB	906 BKG
906 AKH	KKYW	906 BKH
906 AKJ	KKYA	906 BKJ
906 AKK	KKGB	906 BKK
906 AKL	KKGW	906 BKL
906 AKM	KKGA	906 BKM
906 AKN	KKBW	906 BKN
906 AKP	KKBA	906 BKP
906 AKR	KKWA	906 BKR
906 AKA	KKRY	906 BKA
906 AKB	KKRG	906 BKB
906 AKC	KKRB	906 BKC
906 AKD	KKRW	906 BKD
906 AKE	KKRA	906 BKE
906 ACF	ABGR	906 BCF
906 ACJ	ABGW	906 BCJ
906 ACN	ABGY	906 BCN
906 ACH	ABRW	906 BCH
906 ACL	ABRY	906 BCL
906 ACP	ABWY	906 BCP
906 ACG	AGRW	906 BCG
906 ACK	AGRY	906 BCK
906 ACO	AGWY	906 BCO
906 ACM	ARWY	906 BCM
906 ACD	BGRW	906 BCD
906 ACA	BGRY	906 BCA
906 ACE	BGWY	906 BCE
906 ACC	BRWY	906 BCC
906 ACB	GRWY	906 BCB

Additional variations with black inserts are available.

Multi-Light Oiltight Controls

CMC Series

LED Cover Plates and Color Inserts

Cover plates, LEDs, and color inserts are offered together in one package under a single catalog listing. The four color inserts can be positioned in any of the four quarters of the total display area.

The cover plates listed in the tables have a gray painted edge. Plates with edges other than gray may be ordered by substituting any of the adjacent four digits in place of the first four digits in the tables. Example: 905A — gray edge or 905E — black edge.

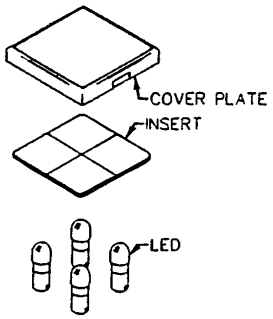
Edge Color	Indicator	Operator-Indicator
Gray	905A _ _ _	905B _ _ _
Chrome	905C _ _ _	905D _ _ _
Black	905E _ _ _	905F _ _ _
Unpainted	905G _ _ _	905H _ _ _
Red	905J _ _ _	905K _ _ _
White	905N _ _ _	905P _ _ _

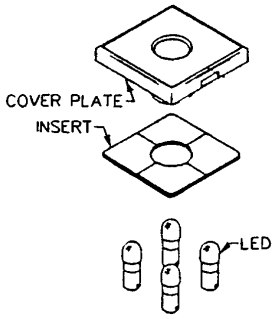
6 VAC/VDC LEDs, GRAY COVER PLATE AND COLOR INSERT ORDER GUIDE

COLOR CODE: G—Green R—Red W—White Y—Yellow K—Black

Cover Plate & Color Inserts For Indicator Units Only	Color Code	Cover Plate & Color Inserts For Operator Indicator Units
905 AAA1	RRRR	905 BAA1
905 AAB1	YYYY	905 BAB1
905 AAC1	GGGG	905 BAC1
905 ABA1	RRYY	905 BBA1
905 ABB1	RRGG	905 BBB1
905 ABD1	RRWW	905 BBO1
905 ABE1	YYGG	905 BBE1
905 ABG1	YYWW	905 BBG1
905 ABJ1	GGWW	905 BBJ1
905 ACB1	RGYW	905 BCB1
905 ADA1	RYWW	905 BDA1
905 ADB1	RGWW	905 BDB1
905 ADC1	RYYG	905 BDC1
905 ADD1	YGWW	905 BDD1
905 ADN1	RYGG	905 BDN1
905 ADO1	RRYG	905 BDO1
905 ADT1	RGGW	905 BDT1
905 AEA1	GWWW	905 BEA1
905 AEB1	YWWW	905 BEB1
905 AEC1	RRRW	905 BEC1
905 AEG1	RGGG	905 BEG1
905 AEL1	RWWW	905 BEL1
905 AEN1	YRRR	905 BEN1
905 AEO1	GRRR	905 BEO1
905 AES1	RYYY	905 BES1
905 AET1	GYYY	905 BET1
905 AEV1	YYYW	905 BEV1
905 AEW1	YGGG	905 BEW1
905 AEY1	GGGW	905 BEY1
905 AFK1	GGGK	905 BFK1
905 AFL1	RKKK	905 BFL1
905 AGA1	RRYW	905 BGA1
905 AGB1	RRGW	905 BGB1
905 AGG1	RYYW	905 BGG1
905 AGH1	GYYW	905 BGH1
905 AGM1	YGGW	905 BGM1
905 AHN1	YYGK	905 BHN1
905 AHO1	YGGK	905 BHO1
905 AHP1	GGWK	905 BHP1
905 AHQ1	RWWK	905 BHQ1
905 AHS1	GWWK	905 BHS1
905 AHT1	RGGK	905 BHT1
905 AHY1	YYWK	905 BHY1

Cover Plate & Color Inserts For Indicator Units Only	Color Code	Cover Plate & Color Inserts For Operator Indicator Units
905 AJA1	RRKK	905 BJA1
905 AJB1	YYKK	905 BJB1
905 AJC1	GGKK	905 BJC1
905 AKA1	RYKK	905 BKA1
905 AKB1	RGKK	905 BKB1
905 AKD1	RKKW	905 BKD1
905 AKE1	YGKK	905 BKE1
905 AKH1	RKKW	905 BKH1
905 AKL1	GKKW	905 BKL1
905 ALH1	RGWK	905 BLH1
905 ALN1	RGYK	905 BLN1
905 ALQ1	YKWW	905 BLQ1





Above listings include gray cover plate, 4 color inserts and one to four 6 VAC/DC LEDs for all lighted quadrants. (R,G,Y). Black (K) and White (W) color inserts are normally not lighted so LEDs are not included.

LED Cover Plates and Color Inserts

Cover plates, LEDs, and color inserts are offered together in one package under a single catalog listing. The four color inserts can be positioned in any of the four quarters of the total display area.

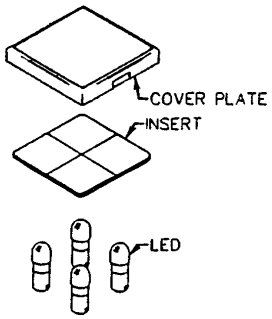
The cover plates listed in the tables have a gray painted edge. Plates with edges other than gray may be ordered by substituting any of the adjacent four digits in place of the first four digits in the tables. Example: 905A — gray edge or 905E — black edge.

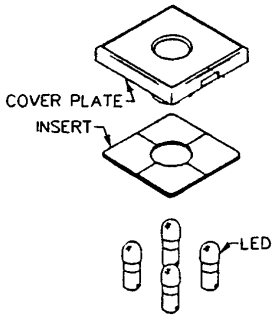
Edge Color	Indicator	Operator-Indicator
Gray	905A _ _ _	905B _ _ _
Chrome	905C _ _ _	905D _ _ _
Black	905E _ _ _	905F _ _ _
Unpainted	905G _ _ _	905H _ _ _
Red	905J _ _ _	905K _ _ _
White	905N _ _ _	905P _ _ _

24 VAC/VDC LEDs, GRAY COVER PLATE AND COLOR INSERT ORDER GUIDE

COLOR CODE: G—Green R—Red W—White Y—Yellow K—Black

Cover Plate & Color Inserts For Indicator Units Only	Color Code	Cover Plate & Color Inserts For Operator Indicator Units
905 AAA2	RRRR	905 BAA2
905 AAB2	YYYY	905 BAB2
905 AAC2	GGGG	905 BAC2
905 ABA2	RRYY	905 BBA2
905 ABB2	RRGG	905 BBB2
905 ABD2	RRWW	905 BBD2
905 ABE2	YYGG	905 BBE2
905 ABG2	YYWW	905 BBG2
905 ABJ2	GGWW	905 BBJ2
905 ACB2	RGYW	905 BCB2
905 ADA2	RYWW	905 BDA2
905 ADB2	RGWW	905 BDB2
905 ADC2	RYYG	905 BDC2
905 ADD2	YGWW	905 BDD2
905 ADN2	RYGG	905 BDN2
905 ADO2	RRYG	905 BDO2
905 ADT2	RGGW	905 BDT2
905 AEA2	GWWW	905 BEA2
905 AEB2	YWWW	905 BEB2
905 AEC2	RRRW	905 BEC2
905 AEG2	RGGG	905 BEG2
905 AEL2	RWWW	905 BEL2
905 AEN2	YRRR	905 BEN2
905 AEO2	GRRR	905 BEO2
905 AES2	RYYY	905 BES2
905 AET2	GYYY	905 BET2
905 AEV2	YYYW	905 BEV2
905 AEW2	YGGG	905 BEW2
905 AEY2	GGGW	905 BEY2
905 AFK2	GGGK	905 BFK2
905 AFL2	RKKK	905 BFL2
905 AGA2	RRYW	905 BGA2
905 AGB2	RRGW	905 BGB2
905 AGG2	RYYW	905 BGG2
905 AGH2	GYYW	905 BGH2
905 AGM2	YGGW	905 BGM2
905 AHN2	YYGK	905 BHN2
905 AHO2	YGGK	905 BHO2
905 AHP2	GGWK	905 BHP2
905 AHQ2	RWWK	905 BHQ2
905 AHS2	GWWK	905 BHS2
905 AHT2	RGGK	905 BHT2
905 AHY2	YYWK	905 BHY2
905 AJA2	RRKK	905 BJA2
905 AJB2	YYKK	905 BJB2
905 AJC2	GGKK	905 BJC2
905 AKA2	RYKK	905 BKA2
905 AKB2	RGKK	905 BKB2
905 AKD2	RKKW	905 BKD2
905 AKE2	YGKK	905 BKE2
905 AKH2	RKKW	905 BKH2
905 AKL2	GKKW	905 BKL2
905 ALH2	RGWK	905 BLH2
905 ALN2	RGYK	905 BLN2
905 ALQ2	YKWW	905 BLQ2





Above listings include gray cover plate, 4 color inserts and one to four 24 VAC/DC LEDs for all lighted quadrants. (R,G,Y). Black (K) and White (W) color inserts are normally not lighted so LEDs are not included.

Multi-Light Oiltight Controls

CMC Series

Replacement Parts

Cover Plates		
Indicators	**Color**	**Operator-Indicators**
986 AAB 01	Gray	986 AAB 02
986 AAB 03	Black	986 AAB 04
986 AAB 05	Unpainted	986 AAB 06
986 AAB 09	Red	986 AAB 10
986 AAB 13	White	986 AAB 14
986 AAB 07	Chrome	986 AAB 08

Bulk Packed Cover Plates for Indicators Cover plates for 20 CMC indicators are offered.	**Bulk Packed Cover Plates for Operator-Indicators** Plates for 40 CMC operator-indicators are offered.
Specify in multiples of 20	**Specify in multiples of 40**
986 AAB 01-BP	986 AAB 02-BP
986 AAB 03-BP	986 AAB 04-BP
986 AAB 05-BP	986 AAB 06-BP
986 AAB 09-BP	986 AAB 10-BP
986 AAB 13-BP	986 AAB 14-BP
986 AAB 07-BP	986 AAB 08-BP

Individual Color Inserts for Incandescent
Each insert covers ¼ of total display — four required per CMC unit.

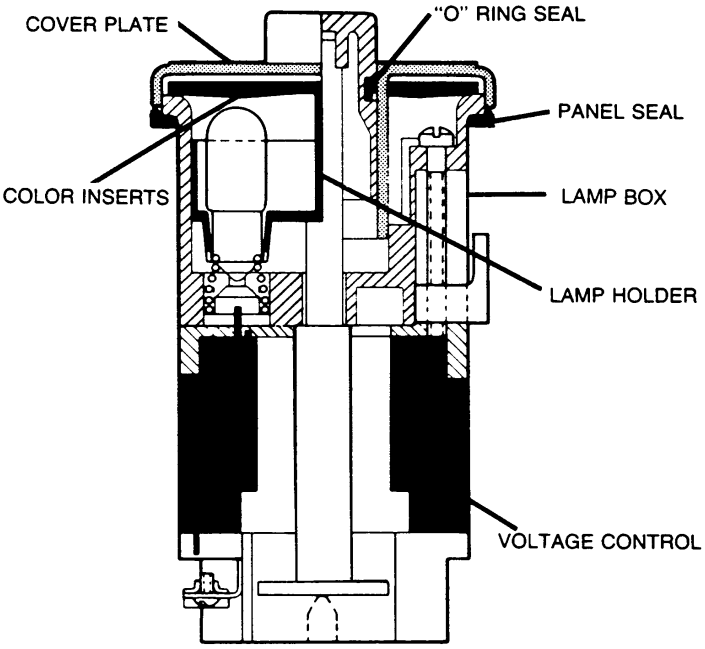
Indicators	Color	Operator-Indicators
986 AAA 01	Red	986 AAA 02
986 AAA 03	Yellow	986 AAA 04
986 AAA 05	Green	986 AAA 06
986 AAA 07	Blue	986 AAA 08
986 AAA 09	White	986 AAA 10
986 AAA 11	Amber	986 AAA 12
986 AAA 13	Black[3]	986 AAA 14

Bulk Packed for Indicators Individual color inserts (one color) for 5 CMC indicators are offered.	**Bulk Packed for Operator-Indicators** Color inserts (one color) for 10 CMC operator-indicators are offered.
Specify in multiples of 20	**Specify in multiples of 40**
986 AAA---BP	986 AAA---BP
Insert number of color above.	

Individual Color Inserts for LEDs		
Indicators	**Color**	**Operator-Indicators**
985AAA01	Red	985AAA02
985AAA03	Yellow	985AAA04
985AAA05	Green	985AAA06
986AAA09	White[2]	986AAA10
986AAA13	Black[3]	986AAA14

REPLACEMENT LAMPS

Industry No. Description	Voltage	Catalog Listing
755	6	PTZ40
756	12	PTZ66
1819	24	PTZ67
LED, Red	6VAC/DC	PTZ69
LED, Green	6VAC/DC	PTZ70
LED, Yellow	6VAC/DC	PTZ68
LED, Red	24VAC/DC	PTZ78
LED, Green	24VAC/DC	PTZ79
LED, Yellow	24VAC/DC	PTZ71



"O" Ring Seal For operator-indicators only
986 BAA 04

Panel Seal For all units
986 BAA 03

Lamp Holder	
908 Indicator Only	**909 thru 914 Operator-Indicators**
986 BAA 05	986 BAA 06

Voltage Control For Lamp Individual Units
986 BAA 01
120 VAC transformer
986 BAA 02
240 VAC transformer
986 BAA 07
Low voltage jumper
986 BAA 08
48 volt resistor
986 BAA 14
24V resistor

Lamp Box Without Lamp Hardware		
910 Selector Series	**911 Selector-Push Series**	**908 Indicators**
986 BAA 24	986 BAA 25	986 BAA 27

Knobs[1]		
Replacement Knob Packet For	**910 Series Gray Knob**	**913 Series Black Knob**
Selector, Positions 1-2-3-4	986BAA15	986BAA20
Selector, Positions 9-12-3-6 o'clock	986BAA17	986BAA22
Replacement Knob Packet For	**911 Series Gray Knob**	**914 Series Black Knob**
Selector-push, Position 1-2-3-4	986BAA16	986BAA21
Selector-push, Positions 9-12-3-6 o'clock	986BAA18	986BAA23

Notes: 1, Knob packets include knob, shaft, and O-ring seal.
2, White inserts not recommended for illumination by LEDs.
3, Black inserts not suitable for illumination.

Multi-Light Oiltight Controls

CMC Series

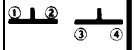
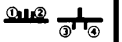
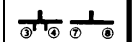
Contact Blocks

- PTC heavy duty and electronic duty contact blocks
- Tandem mounting in any combination up to four contact blocks per operator. (Two blocks on spring return devices.)
- Exclusive four plunger adapter kit may be used with selector and selector-push units for greater circuit flexibility.

HEAVY DUTY UL/CSA Listed

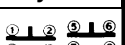
Heavy duty contact blocks contain fine silver, butting-type contacts. Terminals are angled 30° for easy screwdriver access to terminal screws. Screws contain self-lifting pressure plates for easy wiring. Holds bare wires of 12 to 16 gauge, either singly or two wires of same or adjacent size. Crimp on spade or ring lugs can be used. Base of contact block has marked pad for pencil identification of the control from back of panel.

TWO CIRCUIT BLOCKS ORDER GUIDE

Butting Contacts			Silver Catalog Listing	Gold Plated Catalog Listing
	Description	Symbol		
	1 NC-1 NO		PTC**B**	PTC**T**
	1 NO		PTC**D**	
	1 NC		PTC**E**	
	1 NO-1 NO		PTC**F**	
	1 NC-1 NC		PTC**G**	
For AC use only. For use with 909 pushbuttons.	Overlapping LONC-ECNO		PTC**J**	
For other applications contact MICRO SWITCH.	Sequencing ECNO-NO		PTC**K**	

LO = late opening EC = early closing

FOUR CIRCUIT BLOCKS ORDER GUIDE

Butting Contacts			Silver Catalog Listing	Gold Plated Catalog Listing
	Description	Symbol		
	2NC-2NO		PTC**C**	PTC**W**
	1 NC 1 NO		PTC**H**	
	1 NC 1 NO		PTC**U**	

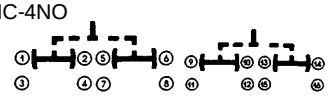
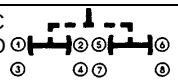
ELECTRICAL RATINGS

Continuous Current 10 Amps. Carry	AC Volts 35% Power Factor				DC Volts Inductive Load	
	120	240	480	600	125	250
Normal Inrush Current in Amps.	60	30	15	12	—	—
Normal Break Current in Amps.	6	3	1.5	1.2	2.2	0.55

ELECTRONIC DUTY

Electronic duty contact blocks contain sliding contacts for reliable operation on electrical loads where thermal cleaning action is not present. These blocks are offered with silver contacts for low energy applications or gold contacts for solid state millivolt and milliamp dry circuits. Terminals are combination .187 x .021 inch quick connect plated for soldering.

SILVER **GOLD**

Sliding Contacts		Silver Catalog Listing	Gold Catalog Listing
Description	Symbol		
4NC-4NO		PTC**L**	PTC**P**
2NC 2NO	 (Left half of 2 plunger version.)	PTC**M**	PTC**R**
2NC (Right half 2NO of 2 plunger version.)		PTC**N**	PTC**S**

ELECTRICAL RATINGS

Standard Duty Sliding Silver Contacts				
Continuous Current 5 Amps. Carry	AC Volts 35% Power Factor		DC Volts Inductive Load	
	120	220	125	250
Normal Inrush Current in Amps.	30	15	—	—
Normal Break in Amps.	3	1.5	1.1	.5

Gold Contacts	
Maximum Volts	Maximum Resistive Loads in Amps.
28 VDC	1 Amp. Resistive
125 VAC	.5 Amp Resistive
Initial contact resistance—.006 ohm average	

Accessories

Not all of the accessories listed here are available from MICRO SWITCH. Be sure to order from the suggested manufacturer for each accessory.

COLOR FILTERS FOR LAMPS

For use over type lamps as furnished with CMC transformer units. Projects color indicated when used with white color inserts and high ambient light level lamps shown at right.

Manufacturer	Color Lamp Filters		
	Amber	Red	Green
APM, Englewood, N.J.	1813/8 A-2	1813/8 R-4	1813/8 G-1

LAMP INFORMATION

120 VAC and 240 VAC transformer units are equipped with four T-3 1/4 #755 lamps. The #755 lamp has a 6.3 volt rating and is readily obtainable from all industrial or automotive supply companies. These same units will accommodate the #1847 lamp. Replacement #755 lamps can be ordered as PTZ40.

24 volt or 48 volt resistor units are supplied with lamps. 48 volt units are equipped with GE #1819 lamps rated at 28 volts. 24 volt units are equipped with #756 lamps rated at 14 volts. Replacement #756 lamps can be ordered as PTZ66 and #1819 lamps can be ordered at PTZ67.

CMC units containing line voltage jumpers are not supplied with lamps. These units are designed for use with any 5 through 28 volt lamp listed.

If a lamp other than those listed is used, the lamp must be limited to 1 watt per quadrant.

T–3¼ LAMP INFORMATION

Lamp Type	Voltage	Current Amps	Life (Hrs)	Ambient Light Level	
				Medium 5-25 FT—C	High 24 FT—C and Up
1850	5.0	.09	1,500	X	
756	14.0	.08	15,000	X	
1819	28.0	.04	2,500	X	
1847	6.3	.15	5,000		X
47	6.3	.15	3,000		X
755	6.3	.15	20,000		X

T–3¼ LED INFORMATION

LED Color	Voltage V AC/DC	Current Amps (Nominal)	Luminous Intensity (MCD)
White/Yellow	6	.06	75
White/Yellow	24	.02	75
Green	6	.06	75
Green	24	.02	75
Red	6	.06	85
Red	24	.02	85

MCD – Millicandlea

QUICK CONNECTORS

Available from suppliers shown (not sold by MICRO SWITCH)

FOR ELECTRONIC DUTY CONTACT BLOCKS (Either silver or gold contacts)

Manufacturer	Range of Wire Size	Straight—No Insulation	Flag
AMP	20-16	42452-1 or 42452-2	42486-1 or 42800-1
AMP	18-14	62016-2	

ENCLOSURES FOR CMC

Numerous panel manufacturers build cabinets, panelboards or enclosures for use with CMC. Your local MICRO SWITCH Branch Office or Authorized Distributor can assist you with information on local availability of enclosures.

PANEL PUNCH FOR CMC

A 2″ (50,8mm) square panel punch (Greenlee Model 731M) for CMC is manufactured by Greenlee Tool Co., Rockford, Illinois. Use in conjunction with a Greenlee No. 7646 hydraulic punch driver.

HOLE PLUG

Contains Oiltight Seal
2.25″ (57,2mm) + 2.25″ (57,2mm)
986CAA01 Gray

SWITCH GUARD

Guard consists of cover plate and transparent cover. Switch cannot be operated when cover guard is closed helping prevent accidental operation. Guard can be used on 909, 910 and 911 series operators. Extends 1.52 in. (38,5 mm) from panel.

Catalog Listing 986DAA01

Multi-Light Oiltight Controls

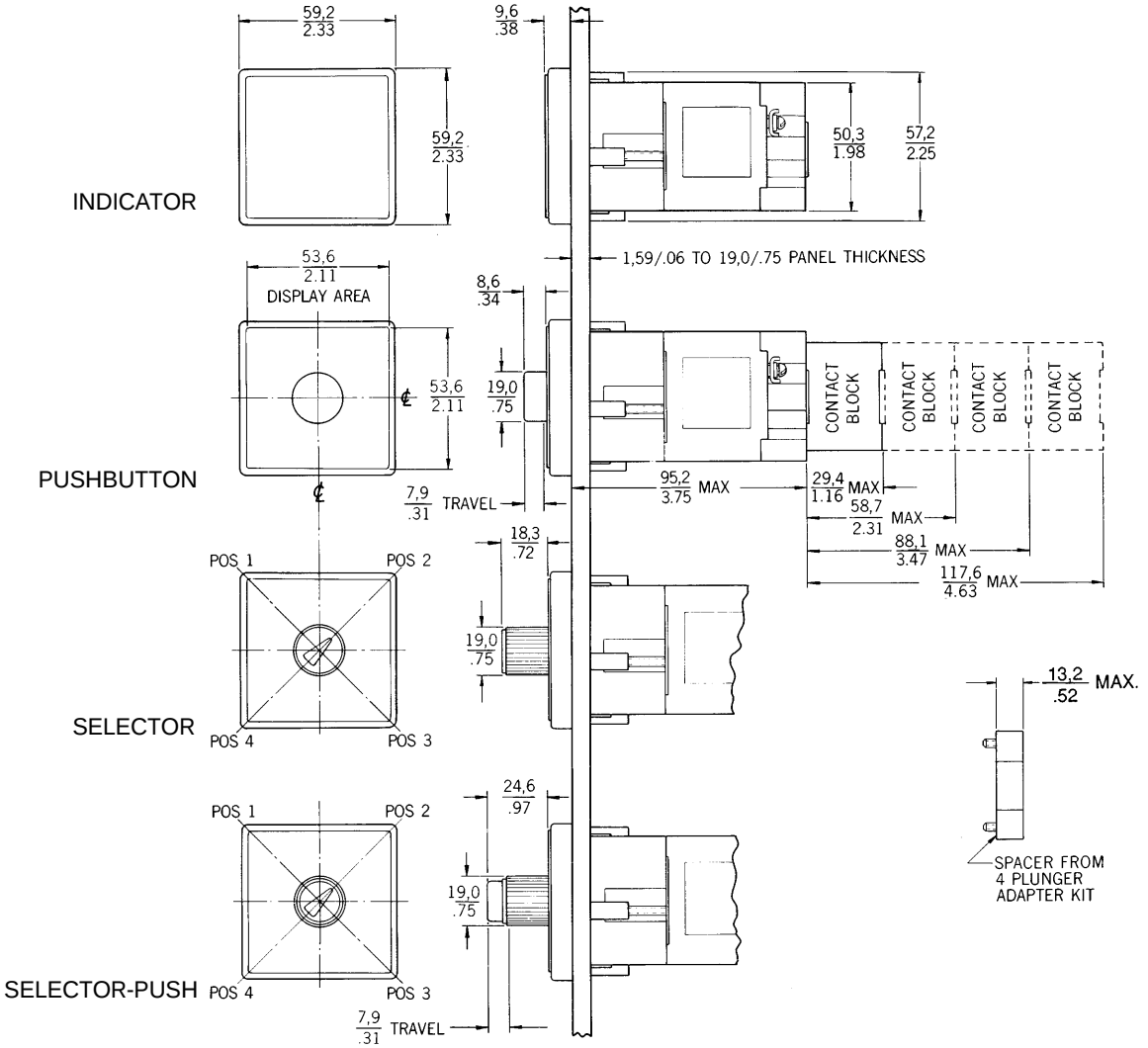
CMC Series

Mounting Dimensions

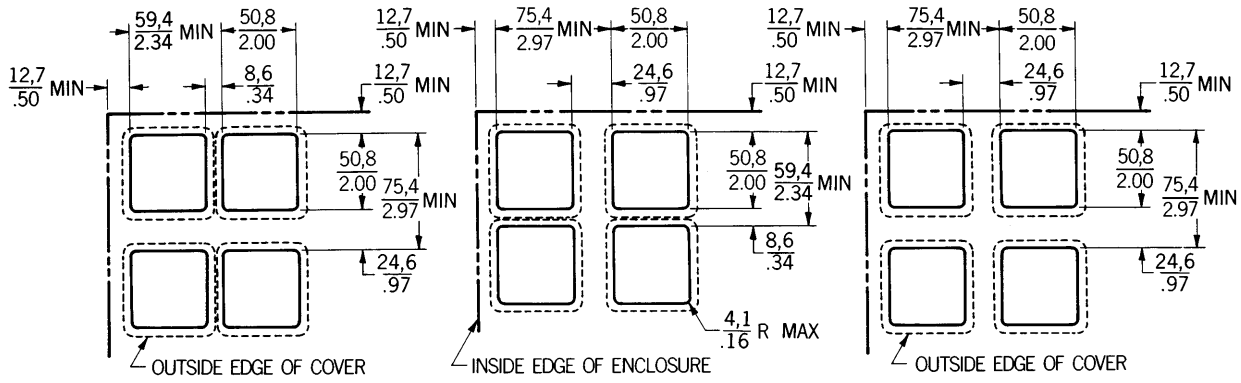
Note: The location arrow on the contact block must be lined up with the arow on the operator, except as noted for the PTCB block on the ordering pages.

CMC WEIGHT

Indicators and operator-indicators (includes cover plate, legend plate, and color inserts). With transformers — 14 oz. max.
Without transformers — 7½ oz. max.
Contact blocks — 2 oz. each.
4-Plunger Adapter Kit — 1 oz.



PANEL CUTOUT RECOMMENDATIONS



HORIZONTAL MOUNTING
5 TERMINAL CONSTRUCTION

VERTICAL MOUNTING
5 TERMINAL CONSTRUCTION

HORIZONTAL or VERTICAL
8 TERMINAL CONSTRUCTION