Honeywell

Interactive Catalog Supplements Catalog PDFs

If you need detailed product information, or help choosing the right product for your application, see our Interactive Catalog. Use the Interactive Catalog to access the most complete and up-to-date information available.

The Interactive Catalog provides an extensive collection of product specifications, application data, and technical literature that can be searched based on criteria you select.

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Sensing and Control
Honeywell Inc.
11 West Spring Street
Freeport, IL 61032

www.honeywell.com/sensing

Manual Switches
Miniature Manual Line

FEATURES
- Breadth of line offers complete selection of pushbuttons, rockers, and indicators to accommodate different functions and promote operator efficiency.
- Printed wiring board (PWB) or panel mounted switches, plus multi-unit strip mounting, and single level termination for cost-effective installation.
- Tactile feedback imparts a definite feel of switching action.
- Coordinated appearance enhances panel harmony.
- Illumination by long-life LEDs and incandescent lamps—for lighted display versatility.
- Solid state, electronic control and power duty switching—for electrical versatility.
- Temperature range: –18° to 65°C (0° to 149°F).

DESIGN FREEDOM
Rocker switches are available in the MICRO SWITCH MML Miniature Manual Line. They complement AML pushbuttons and indicators, providing you flexibility and design freedom to answer all your miniature manual control requirements. You can choose the actuator option that matches the switch function and natural habit pattern reflex of the operator. You no longer need to compromise quality, appearance, or human factors considerations, because of size constraints.

The MML pushbutton and indicator offering has also been expanded to include new square forms which are small enough to fit in the tightest places.

MOUNTING FLEXIBILITY
Printed wiring board (PWB) mounted switches can be arranged in individual panel openings or multi-unit strips, in a common panel cutout. Optional support brackets provide added rigidity for standalone PWB mounted devices. Units with bezels and mounting clips can be snap-in mounted from the panel front.

Single level PWB or solder/quick-connect termination throughout makes wiring faster, easier, and more economical. Housings are designed to accommodate washing, before and after wave soldering, to help prevent contamination during printed wiring board installation.

LIGHTED DISPLAY OPTIONS
Pushbuttons and indicators can be full-face illuminated by LEDs or incandescent lamps for high visibility of colors and legends. Inherently rugged, long-life LEDs reduce service and maintenance costs. Also, their low drive and inrush current (30 mA or less) reduces costs of drive circuitry.

Rockers can be furnished with colored lenses for illumination by LEDs or incandescent lamps.

CONTROL VERSATILITY
Solid state pushbutton switches with Hall effect integrated circuits interface directly with microprocessors and other logic level devices. Time-proven for billions of cycles, Hall effect ICs provide the ultimate in reliability.

Electronic control pushbutton or rocker switches, with gold or silver contacts, handle up to 1 amp; power duty switches, up to 6 amps.

Manual Switches
Miniature Manual Line

MML ENHANCES PANEL HARMONY
The attractive clean line design of the total MML offering is coordinated to work in harmony and enhance the visual qualities of your product. MML will help make a good first impression with your customers by blending with other panel components. And also work hard over the long run to maintain operator satisfaction.

HOW TO ORDER
To specify MML catalog listings, refer to the order guides. They are based on a modular cataloging system which gives you the flexibility to choose the combination of feature options that best answers the requirements of your application.

ORDER GUIDES

Solid State Switches
MML11 Pushbutton Switches 58
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MML medical application. Intranvaneous fluid flow controller automatically dispenses fluids for medications, therapy, and nutrition.

MML communications application. Mobile radio control keeps businesses in touch with employees on the road.

MML CHARACTERISTICS

	MML 10 Series	MML 20 Series	MML 30 Series	MML 40 Series
Mechanical Lifetime*				N/A
Pushbuttons–Momentary	1,000,000	250,000	100,000	---
Pushbuttons–Alternate	100,000	100,000	100,000	---
Rockers	100,000	250,000	100,000	---
Electrical Lifetime* **				N/A
Pushbuttons–Momentary	1,000,000	25,000	25,000	---
Pushbuttons–Alternate	100,000	25,000	25,000	---
Rockers	100,000	25,000	25,000	---
Agency Ratings				
UL	File E53576	File E12252	File E12252	File E58932
CSA	File L R4442	File LR4442	File LR4442	File LR4442

* 95% Survival
* * Lifetime at Full Rated Load

MML ELECTRICAL DATA
MML10 SERIES

Electrical Characteristics	Integrated Circuit Function	5-24 VDC Sinking
	Supply Current (Max.)	7 mA (Released) 8 mA (Operated no load)
	Output Voltage (Operated)	0.3 Volt (Sinking 10 mA)
	Output Leakage Current Max. (Released)	5.0 μA
	Switching Time Max. Rise 10% to 90% Fall 90% to 10%	 1.5 μ sec (Sinking 10 mA) 0.5 μ sec (Sinking 10 mA)
	Rated Output Current	10 mA Sinking
Absolute Maximum Ratings	Supply Voltage (V_s)	–28 to +28 VDC
	Voltage Externally Applied to Output	–0.5 Volt min. +28 Volts max. (Off condition)
	Loads to Output	20 mA (Sinking)
	Storage Temperature	–40° to +85°C (–40° to +185°F)
	Operating Temperature	–18° to +65°C (0° to +149°F) and supply voltage of 4.5 to 5.5 VDC

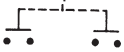
As with all solid state components, performance can be expected to deteriorate as rating limits are approached; however, they will not be damaged unless the limits are exceeded.

MML20 SERIES

Electrical Rating (silver contacts)	**Standard buttons** Up to 1 amp, 125 VAC
	1 piece plunger/lens cap buttons: Black—Up to 1 amp, 125 VAC All others—Up to 0.5 amp, 125 VAC
Electrical Rating Gold Contacts	**All button styles:** Up to 0.25 amp, 30 VDC UL rating—0.10 amp, 30 VDC
	One pole Form C

MML30 SERIES

MML31:

Electrical Rating Silver Contacts	6A @ 125 VAC, 250 VAC; 2A @ 30 VDC; 1A @ 125 VDC ''L''; 1/10 hp @ 125 VAC
Contact Arrangement	1 or 2 poles Form X 

Manuals

LED, INCANDESCENT, OR NON-LIGHTED DISPLAY

PWB Mount

FEATURES

- Hall effect reliability
- Provides low voltage signals that interface with nearly all DC logic
- Accepts one LED or incandescent lamp
- Printed wiring board mounting
- UL recognized, CSA certified
- Bezels and mounting clips, LEDs and legended lenses can be furnished installed or ordered separately

Example: MML11KK3AAKRSDR
Furnished with black bezel; mounting clips (long sides); red LED, and red lens installed.

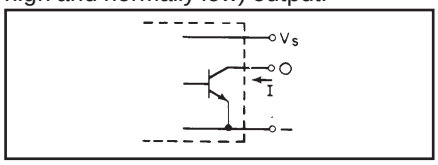
MML11 ORDER GUIDE

Catalog listing codes for switch, less assembled display options

MML11K	A	3	AA
Housing Type (Rectangular)	**Mounting**	**Terminals**	**Circuitry/Action**
MML11K Black housing	**K** Black bezel, mtg. clip/long sides	**3** Printed wiring board	**AA** 5-24 VDC sinking mom. action

Electrical Data	page 56
Strip and matrix mounting	page 71
Mounting dimensions	page 79
PWB pin locations	page 79
LED/receptacle	pages 73/74
Lamp/LED/Lens	pages 75/76

Current Sinking Output
A permanent magnet plunger moves adjacent to the Hall effect integrated circuit to give a digital, current sinking (normally high and normally low) output.



Order display options assembled to switch by adding codes below

K

Plunger
K Black

RS

LED
(Stanley Type)
XX No LED
RS Red*
YS Yellow*
GS Green*

* Permanently installed.

DR

Lens
For LED display:
DR Red
DY Yellow
DG Green

For incandescent or non-lighted display:
LR Red
LY Yellow
LG Green
LW White
LK Black

Leave this space blank,

Legend
20 With Legend

Use Legend Order Sheet FO-74024 to cover each catalog listing (see page 69).

CUSTOMER INSTALLATION:

LED
1. Order LED and receptacle, page 73.
2. Installation instructions, page 74/76.

Incandescent Lamp
1. Order lamp/PWB receptacle or lamp/solder receptacle, page 75.
2. Installation instructions, page 76.

Manuals

Manual Switches
Electronic Control Pushbutton

LED, INCANDESCENT, OR NON-LIGHTED DISPLAY

PWB Mount
(Standard plunger)

Panel Mount
(Standard plunger)

PWB Mount
(One-piece plunger)

FEATURES
- Silver or gold contacts
- Choice of rectangular or square housings
- Accepts one LED or incandescent lamp
- Printed wiring board or snap-in panel mounting
- Bezels and mounting clips, LEDs and legended lenses can be furnished installed or ordered separately
- UL recognized, CSA certified

Example: MML21KK3AAK
Electronic control pushbutton switch with standard plunger; rectangular housing (black); bezel (black); mounting clips on long sides, PWB terminals; 1-pole, momentary action, silver contacts, black plunger.

Example: MML21KK3AAKRSDR
As above, except furnished with red LED and red lens installed.

MML21KK3AAHRSXX20 as above, legended.

MML21 STANDARD PLUNGER SWITCHES ORDER GUIDE

Catalog listing codes for switch, less assembled display options

MML21K | **K** | **3** | **AA**

Housing Type	Mounting		Terminals	Circuitry/Action (Each pole is double throw)	
	Rectangular	Square		Rectangular	Square
MML21K Rectangular Black Housing **MML21H** Square Black Housing	**A** No bezel (PWB mounting) **K** Black bezel, mtg. clip/long sides	**A** No bezel (PWB mounting) **R** Black bezel & mtg. clip	**3** Printed Wiring Board **2** Solder	**Silver Contacts:** **AA** 1 pole, mom. action **AB** 1 pole, alt. action **AC** 2 pole, mom. action **AD** 2 pole, alt. action **Gold Contacts:** **BA** 1 pole, mom. action **BB** 1 pole, alt. action **BC** 2 pole, mom. action **BD** 2 pole, alt. action	**Silver contacts:** **AA** 1-pole, mom. action **AB** 1-pole, alt. action **Gold contacts** **BA** 1-pole, mom. action **BB** 1-pole, alt. action

MML21 ONE PIECE LENS/PLUNGER SWITCHES ORDER GUIDE

Catalog listing codes for switch, less assembled display options

MML21H | **K** | **3** | **AA**

Housing Type	Mounting		Terminals	Circuitry/Action (Each pole is double throw)	
	Rectangular	Square		Rectangular	Square
MML21K Rectangular Black Housing **MML21H** Square Black Housing	**A** No bezel (PWB mounting) **K** Black bezel, mtg. clip/long sides	**A** No bezel (PWB Mounting) **R** Black bezel & mtg. clip	**3** Printed Wiring Board **2** Solder	**Silver Contacts:** **AA** 1 pole, mom. action **AB** 1 pole, alt. action **AC** 2 pole, mom. action **AD** 2 pole, alt. action **Gold Contacts:** **BA** 1 pole, mom. action **BB** 1 pole, alt. action **BC** 2 pole, mom. action **BD** 2 pole, alt. action	**Silver contacts:** **AA** 1-pole, mom. action **AB** 1-pole, alt. action **Gold contacts** **BA** 1-pole, mom. action **BB** 1-pole, alt. action

Electrical Data	page 57
Bezels	page 72
Strip and matrix mounting	page 71
PWB pin locations	page 79

Order display options assembled to switch by adding codes below[3]

K — Plunger Type

K	Black
W	White

RS — LED*

XX	No Led[4]
RS	Red[5]
YS	Yellow[5]
GS	Green[5]

DR — Lens

XX	No Lens

For LED Display		For Incandescent or Unlighted Display	
DR	Red	**LR**	Red
DY	Yellow	**LY**	Yellow
DG	Green	**LG**	Green
		LW	White
		LK	Black

Legend

20
With Legend (Leave Blank if no legend needed

Use Legend Order Sheet FO-74024 to cover each catalog listing. (See page 69.)

CUSTOMER INSTALLATION:

LED
1. Order LED and receptacle, page 73.
2. Installation instructions, page 73/75.

Incandescent Lamp
1. Order lamp/PWB receptacle or lamp/solder receptacle, page 74.
2. Installation instructions, page 75.

Order display options assembled to switch by adding codes below

H — Button Color (One Piece Plunger)

For LED Display		For Incandescent or non-light display	
H	Red	**R**	Red
L	Yellow	**Y**	Yellow
N	Green	**G**	Green
		Z	Black

RS — LED*

XX	No LED[4]
RS	Red[5]
YS	Yellow[5]
GS	Green[5]

Legend

XX20
With Legend (Leave Blank if no legend needed

Use Legend Order Sheet FO-74024 to cover each catalog listing. (See page 69.)

*** Notes:**
1. When an LED is specified in a **rectangular** MML21 listing, MICRO SWITCH will permanently install it in the housing.
2. MICRO SWITCH does **not** permanently install an LED in a **square** MML21 listing. To install an LED in a square housing, order a MML93L or MML93G receptacle and a MML92 LED (see pages 86 and 88).
3. Include four digits (XXXX or XX DR) when a legend is required.
4. For square or rectangular only.
5. For rectangular only.

Manuals

Electronic Control Rocker Switches

LED, INCANDESCENT, OR NON-LIGHTED DISPLAY

PWB Mount

Panel Mount

PWB Mount
(Lighted rocker)

FEATURES

- Accepts one or two LEDs or incandescent lamps which are ordered separately
- Printed wiring board mounting or snap-in panel mounting
- Bezels and mounting clips can be furnished installed or ordered separately
- UL recognized, CSA certified

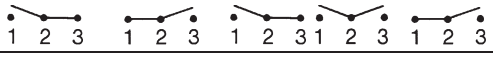
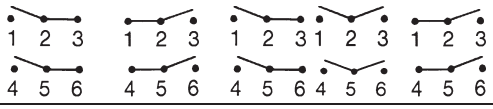
MML24 ORDER GUIDE (Catalog listing for switch, less assembled display options)

MML24K	A	3	AA
Housing Type	**Mounting**	**Terminals**	**Circuitry**
MML24K Black housing	**A** No bezel (PWB mounting) **K** Black bezel, mtg. clip/long sides	**3** Printed wiring board **2** Solder	Insert code letters from Circuitry Chart

Electrical Data	page 57
Bezels	page 72
Strip and matrix mounting	page 71
Mounting dimensions	pages 85/86
PWB pin locations	page 85

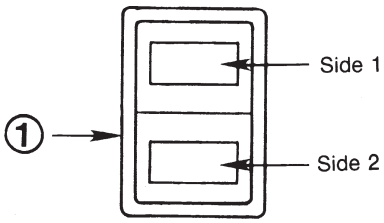
Rockers are permanently installed.

CIRCUITRY

Silver Contacts	Gold Contacts	2-Position	3-Position
AA	BA		
AC	BC		

⚠ The "MICRO SWITCH" identification is shown on this side of the switch housings.

Example: MML24KA3AA01HDRXX
Electronic control rocker switch with black housing, printed wiring board terminals; 1 pole, silver contacts; 2-position, maintained action; one circuit ON in each position; black rocker, red lens for LED display in Side 1 and no lens in Side 2.



OPERATING ACTION

2-Position	**01**	Maint.	None	Maint.
	02	Mom.	None	Maint.
	03	Maint.	None	Mom.
3-Position	**04**	Maint.	Maint.	Maint.
	05	Mom.	Maint.	Mom.
	07	Mom.	Maint.	Maint.

Order display options assembled to switch by adding codes below.

01

Action
Insert code numbers from Operating Action Chart

H

Rocker
- **K** Black rocker, non-lighted
- **H** Black rocker, one lens*
- **F** White rocker, one lens*

* Lighted switches with solder terminals require MML93R receptacle to install lamps or LEDs. See page 76.

DRXX

Lens

Side 1		Side 2	
XX None		**XX** None	
LED display:	Incand. display:	LED display:	Incand. display:
DR Red	**LR** Red	**DR** Red	**LR** Red
DY Yellow	**LY** Yellow	**DY** Yellow	**LY** Yellow
DG Green	**LG** Green	**DG** Green	**LG** Green
	LW White		**LW** White

Leave blank, if legend not desired

Legend
- **20** With legend

Use legend order sheet FO-74193 to cover each catalog listing (see page 70).

CUSTOMER INSTALLATION:

LED
1. Order LED and receptacle, page 73.
2. Installation instructions, pages 74/76.

Incandescent Lamp
1. Order lamp/PWB receptacle or lamp/solder receptacle, page 75.
2. Installation instructions, page 76.

Manuals

Power Duty Pushbutton

NON-LIGHTED DISPLAY

PWB Mount

Panel Mount

FEATURES

- Printed circuit board or snap-in panel mounting
- Bezels and mounting clips, and legended lenses can be furnished installed or ordered separately
- UL recognized, CSA certified.

Example: MML31KK2AAK
Power duty pushbutton switch housing (black); bezel (black) and mounting clips; solder terminals; 1 pole, momentary action; black plunger.

Example: MML31KK2AAKLR
As above, except furnished with red lens.

MML31 ORDER GUIDE

Catalog listing codes for switch, less assembled display options

MML31K	K	2	AA
Housing Type (Rectangular)	**Mounting**	**Terminals**	**Circuitry/Action** (Each pole is single-throw, normally open)
MML31K Black housing, non-lighted	**A** No bezel (PWB mounting) **K** Black bezel, mtg. clip/long sides	**3** Printed wiring board **2** Solder/Quick-connect	**AA** 1 pole, mom. action **AB** 1 pole, alt. action **AC** 2 poles, mom. action **AD** 2 poles, alt. action

Electrical Data	page 57
Bezels	page 72
Strip and matrix mounting	page 71
Mounting dimensions	pages 85/86
PWB pin locations	page 85

Order display options assembled to switch by adding codes below

K

Plunger
K Black

LR

Lens	
LR	Red
LY	Yellow
LG	Green
LW	White
LK	Black

Leave this space blank, if legend not desired

Legend	
20	With Legend

Use Legend Order Sheet FO-74024 to cover each catalog listing (see page 69).

Manual Switches
Indicators/Pushbutton Style

MML41/46 Series

LED OR INCANDESCENT DISPLAY

PWB Mount

Panel Mount

FEATURES

- Accepts one LED or incandescent lamp

MML41 indicators resemble a pushbutton switch with the button in the ''down'' position.

MML41 ORDER GUIDE

Catalog listing codes for indicator, less assembled display options

MML41K

Housing Type (Rectangular)
MML41K Black housing

A

Mounting
A No bezel (PWB mounting only) **K** Black bezel, mtg. clip/long sides

3

Support Posts/Terminals
3 PWB* (''A'' mtg. only) **2** Solder **0** None*** For panel mount and strip/matrix mount

K

Plunger
K Black

Indicators/Flush Mount
MML46

LED OR INCANDESCENT DISPLAY

PWB Mount

Panel Mount

PWB Mount

Panel Mount

FEATURES

- Accepts one or two LEDs or incandescent lamps
- Bezels and mounting clips, LEDs and legended lenses can be furnished installed or ordered separately

MML46 ORDER GUIDE

Catalog listing codes for indicator, less assembled display options

MML46K

Housing Type	
Rectangular* (1 or 2 LEDs or incand. lamps)	**Square*** (1 LED or incand. lamp)
MML46K Black housing	**MML46H** Black housing

A

Mounting	
Rectangular: **A** No bezel (PWB mounting only) **K** Black bezel, mtg. clip/long sides	**Square:** **A** No bezel (PWB mounting only) **R** Black bezel, mounting clips

3

Support Posts
3 PWB (''A'' mtg. only) **2** Solder** **0** None*** For snap-in and strip/matrix mount

** Rectangular housings only.
*** No LEDs allowed.

*** Notes:**

1. When an LED is specified in a **rectangular** MML46 listing, MICRO SWITCH will permanently install it in the housing.
2. MICRO SWITCH does **not** permanently install an LED in a **square** MML46 listing. To install an LED in a square housing, order a MML93L or MML93G receptacle and a MML92 LED (see pages 74 and 76).

Manual Switches
Indicators/Pushbutton Style

Example: MML41KA3K
Pushbutton style indicator housing (black); no bezel; support posts; black plunger.

Example: MML41KA3KRSDR
As above, except furnished with one red LED and red lens.

Electrical Data	page 57
Lenses	page 68
Bezels	page 72
LEDs/Lamps	pages 73/75
Strip and matrix mounting	page 71
Mounting dimensions	pages 80/82/83
PWB pin locations	pages 80/84

Order display options assembled to indicator by adding codes below

RS

LED (Stanley type)
XX None
RS Red
YS Yellow
GS Green

Example: MML46KA3
Indicator housing, rectangular (black); no bezel; support terminals.

Example: MML46KA3RSXXDR20
As above, except furnished with red LED and red lens, with legend.

DR

Lens	
For LED display:	For incandescent or non-lighted display:*
DR Red	**LR** Red
DY Yellow	**LY** Yellow
DG Green	**LG** Green
	LW White
	LK Black

* When ordering incandescent or non lighted display, LED field must be **XX**.

Leave this space blank if legend not desired

Legend
20 With legend
Use Legend Order Sheet FO-74024 to cover each catalog listing (see page 69). Note: If legend is not desired, leave this space blank.

CUSTOMER INSTALLATION:

LED
1. Order LED and receptacle, page 73.
2. Installation instructions, pages 74/76.

Incandescent Lamp
1. Order lamp/PWB receptacle or lamp/solder receptacle, page 75.
2. Installation instructions, page 76.

LED TERMINATION
If LEDs are to be permanently installed by MICRO SWITCH, please indicate by either a **2** (solder) or a **3** (PWB) for the Support Posts listing code. With MICRO SWITCH identification to the rear, the longest lead (+) anode will be to the left, closest to the double-pole circuit or support terminals.

Style 2

Style 3

Manuals

Order display options assembled to indicator by adding codes below

RSXX

LED (Stanley type)			
Available in rectangular housings only.			
XXXX No LED			
One LED*:		Two LEDs:	
RSXX	Red	**RSRS**	Red
YSXX	Yellow	**YSYS**	Yellow
GSXX	Green	**GSGS**	Green

Square housings accept only one LED. Only a two-character LED code is necessary. Example: MML46HR0**XX**DY.

DR

Lens	
For LED display:	For incandescent or non-lighted display:*
DR Red	**LR** Red
DY Yellow	**LY** Yellow
DG Green	**LG** Green
	LW White
	LK Black

* When ordering incandescent or non-lighted display, LED field must be **XXXX.**

Leave this space blank if legend not desired
20

Legend
20 With legend
Use Legend Order Sheet FO-74024 to cover each catalog listing.

Manual Switches

MML51 Series

Button Lenses/Incandescent or Non-lighted Display

MML51 ORDER GUIDE
For standard plunger MML pushbuttons.

MML51E | **20** | **R**

Lens Type	Display/Legend Type	Color
Rectangular Lenses: **MML51E** Switch lens* **MML51G** Indicator lens **Square Lenses:** **MML51C** Switch lens **MML51D**** Indicator lens	**Transmitted Color:** **10** No legend **20** With legend	**R** Red **Y** Yellow **G** Green **W** White **K** Black (Opaque)

* Use MML51E with MML41 rectangular pushbutton style indicators.
** MML51D for use with MML41 square.

Example: MML51E20R
Incandescent or non-lighted display switch lens; red transmitted color, with legend.

LEGENDING
Use the MML Legend Order Sheets on pages 81 and 82 to specify legending.

Button Lenses/LED MML52

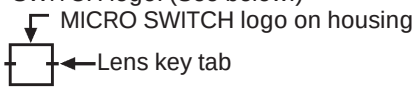
MML52 ORDER GUIDE
For standard plunger MML pushbuttons.

MML52G | **10** | **Y**

Lens Type	Display/Legend Type	Color/ Illumination
Rectangular Lenses: **MML52E** Switch lens, LED display **MML52G*** Indicator lens LED display **Square Lenses:** **MML52C** Switch lens, LED display **MML52D**** Indicator lens, LED display	**Transmitted Color:** **10** No legend **20** With legend	**LED Display:** **R** Red **Y** Yellow **G** Green **C** Clear

* Use MML52E with MML41 rectangular pushbutton style indicators.
** Use MML52D with MML41 square.

Square lenses have tabs on two sides. Before snapping in place, the tabs should be at right angles to the housing side with the MICRO SWITCH logo. (See below.)

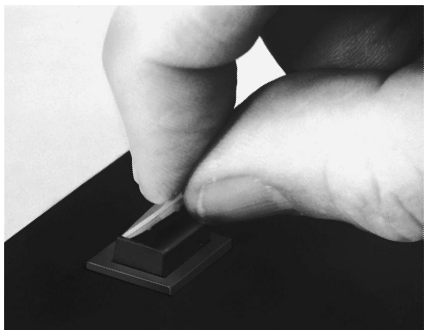


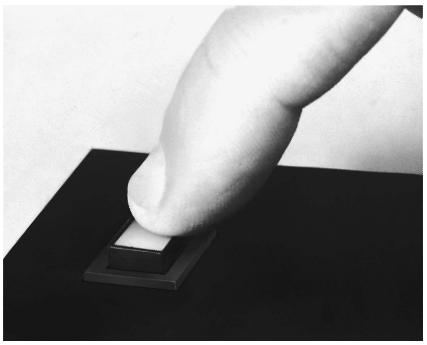
Example: MML52G10Y
LED display indicator lens; yellow transmitted color, no legend.

HOW TO INSTALL LENSES
Keytabs on two sides of the lenses mate with matching button slots.

Rectangular lenses have tabs on the long sides. Seat a long side before snapping in place.

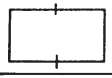
HOW TO INSTALL LENSES


1. Seat lens.


2. Snap in place.

MML Pushbutton/Indicator Lens

Legend Order Guide/Product Specification (PG____of____)

Switch & Indicator Lense Type Orientation		Figure No	Max Lines/Area 5/64	7/64	9/64	13/64	Max Characters/Line 5/64	7/64	9/64	13/64
	C	1	2	1	1	1	3	2	2	1
	D	2	2	1	1	1	4	3	2	2
	E	3	1	1	1	1	6	4	3	2
	G	4	2	1	1	1	7	4	4	3

Note

1. For Proper Legend Orientation, MML housings (when viewed from front of panel) should have "MICRO SWITCH" logo oriented "UP"
2. All legends will be centered within Legend Area.
3. Please use black ink in filling out this form to help us process your order.

LEGEND ORDER CHART

Customer Part No	Fig No	Type Size 5/64	7/64	9/64	13/64	Ink Color Black	White	Button Qty	Legend Description 1st Line	2nd Line

FO-74024-B

(Signature) (Date)

Catalog Listing MML 5 _		
Customer P.O. No.	Customer Dwg. No.	
MICRO SWITCH Sales Order	Line Number	Schedule No.

Customer: _____

Address: _____

(city) (state)

Instructions

1. Fill in appropriate catalog listing - one listing/sheet.
2. Check proper figure #. Type size, Type color.
3. Fill in quantity required.
4. Indicate legends desired — Do not exceed maximums shown in Legend Order Guide.

Hot Stamp Legending

Modified Gothic lettering (A thru Z). numerals (0 thru 9) and Symbols below available in 5/64, 7/64, 9/64, and 13/64.	A3 Modified Gothic

STANDARD SYMBOLS AVAILABLE

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

SPECIAL LEGENDS

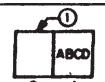
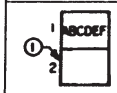
NOTE: Use this area to show special Legend Locations or Configurations NOT shown above. NON-STANDARD legends will involve additional charges and increased delivery time.

Fig. "A" Fig. "B"

Manuals

Honeywell

MML ROCKER LEGEND ORDER GUIDE/PRODUCT SPECIFICATION (PG____of____)

Switch Type & Orientation		Figure No	Max Lines/Area 5/64	7/64	9/64	13/64	Max Characters/Line 5/64	7/64	9/64	13/64
MML 24, 34 .4 x .6 Size		1	2	1	1	1	3	2	2	1
		2	1	1	1	1	3	3	2	1
MML 24, 34 .4 x .6 Size Umbrella and MML 34 .6 x .8 Size		3	3	2	2	1	4	3	3	2
		4	2	1	1	1	6	4	4	2

Note

1. For Proper Legend Orientation, MML housings (when viewed from front of panel) should have "MICRO SWITCH" logo oriented to the left. For other Orientation, indicate the Housing Logo Location in Special Legend Area.
2. All legends will be centered within Legend Area.
3. Please use black ink in filling out this form to help us process your order.

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

Customer: _____

Address: _____

_____

(city) (state)

Instructions

1. Fill in appropriate catalog listing - one listing/sheet.
2. Check proper figure #. Type size, Type color.
3. Fill in quantity required.
4. Indicate legends desired — Do not exceed maximums shown in Legend Order Guide.

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

A3
Modified Gothic

STANDARD SYMBOLS AVAILABLE

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

LEGEND ORDER CHART

Customer Part No	Fig No	Side No	Type Size 5/64	7/64	9/64	13/64	Ink Color Black	White	Button Qty	Legend Description 1st Line	2nd Line

SPECIAL LEGENDS

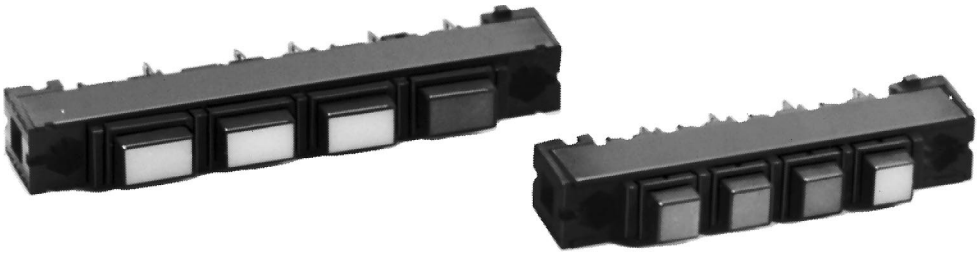
NOTE: Use this area to show special Legend Locations or Configurations NOT shown above. NON-STANDARD legends will involve additional charges and increased delivery time.

Fig. "A" Fig. "B"

FO-74193-B

_____
(Signature)

Strip Mounting Frames



MML61 ORDER GUIDE

MML61K **5**

Orientation/Color
For Rectangular* Housings:
MML61K
Horizontal strip, black
MML61G
Vertical strip, black
For Square Housings
MML61J
Black

* * .4″ x .6″ housings only.

No. of Stations	
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine
10	Ten

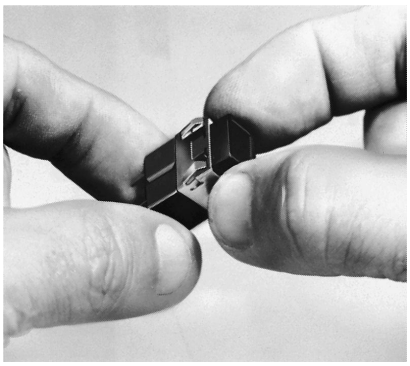
Note: Switches and indicators are ordered as separate items.

FEATURES

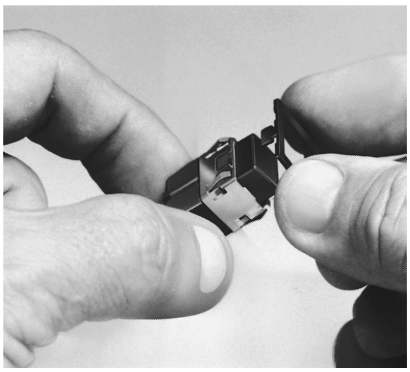
- Provides back of panel or printed wiring board mounting in a multi-unit strip of switches/indicators.
- Devices can be pre-wired prior to installation.
- Holes at each end of frame will accept No. 4 screws.
- Can be used for pushbutton or rocker type switches.

Example: MML61K5
Black 5-station strip mounting frame, horizontal orientation.

Bezels/Mounting Clips



1. Slip mounting clip over top of switch/ indicator housing.



2. Snap bezel onto mounting clip.

Recommended panel thickness for panel mounted units is .050 to .094 in. (1,27 to 2,39 mm).

MML72EEK
(Black switch bezel, mounting clips on long sides)

TO ORDER MOUNTING CLIPS SEPARATELY

For Rectangular Housings:	
MML73EA	(long sides)
MML73EB	(short sides)

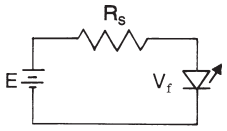
LED APPLICATION INFORMATION

To insure stable conditions, suitable external control of the LED current must be provided. It is recommended that a minimum of 5 VDC open circuit voltage with an appropriate series resistance be used to drive LED devices. This minimizes current variation and its effect on temperature and forward voltage of the LED.

Maximum drive current is 30 mA. Reverse voltage breakdown of the LED's is 4 volts (min.).

Resistor values can be determined by supply voltage or current for LED:

$$R_S = \frac{E - V_f}{I_f}$$



WHERE: R_S = Series Resistance
E = Supply Voltage
V_f = Forward Voltage of LED
I_f = Circuit Current

MML92 ORDER GUIDE

LEDs should be the same color as the lenses they illuminate. They are packed 10 per listing, including stand-off spacers for use when solder terminating to a printed wiring board, per procedure 3 on page 74.

LED Type	Use To Illuminate	Catalog Listing	LED Color	Forward Characteristics Typ. @ 20mA	Max.	LED Manufacturers' Part Numbers
T–1¾	Rectangular button lens				**Stanley:**	
		MML92ERS	Red	1.7 V	2.0 V	ESBR5633
		MML92EGS	Green	2.1 V	2.5 V	ESBG5633
		MML92EYS	Yellow	2.1 V	2.5 V	ESAY5633
					Hewlett Packard:	
		MML92ERH	Red	2.2 V	3.0 V	HLMP-3366
		MML92EGH	Green	2.3 V	3.0 V	HLMP-3568
		MML92EYH	Yellow	2.2 V	3.0 V	HLMP-3466
T–1	Square button lens, MML24 rocker lens rectangular button lens				**Stanley:**	
		MML92HRS	Red	1.7 V	2.0 V	ESBR3901
		MML92HGS	Green	2.1 V	2.5 V	ESPY3901
		MML92HYS	Yellow	2.2 V	2.5 V	ESAY3901
					Hewlett Packard:	
		MML92HRH	Red	2.2 V*	3.0 V	HLMP-1340
		MML92HGH	Green	2.3 V*	3.0 V	HLMP-1540
		MML92HYH	Yellow	2.2 V	3.0 V	HLMP-1440

Long lead: Anode (+). Short lead: Cathode (–).
* @ 25 mA.

MML93 LED PWB RECEPTACLE ORDER GUIDE

LED Type	Use to Illuminate	Catalog Listing
T-1¾	Rectangular button lens or umbrella button lens	MML93K
T-1	Square button lens or MML24 rocker lens	MML93G

MML93 LED SOLDER TERMINAL ORDER GUIDE

LED Type	Use to Illuminate	Catalog Listing
T-1	Square button (base only)	MML93L
T-1	MML24 rocker lens (base only)	MML93R
T-1	Rectangular button (base and terminal)	MML93J

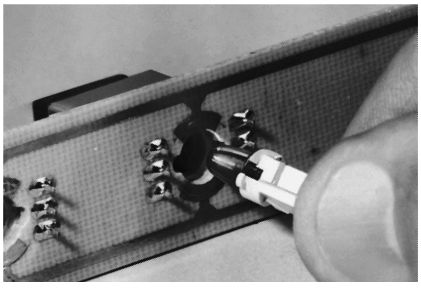
Factory installed. Certain MML switches and indicators can be furnished with LEDs **permanently** factory installed, where specified in the order guides.

User installed. LEDs can also be ordered separately and installed in these products by the user, per the procedures described below.

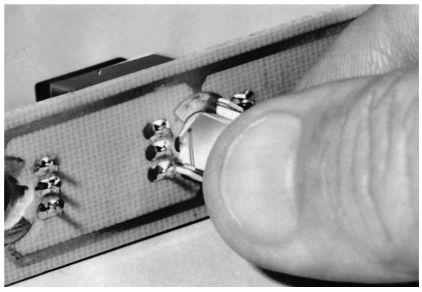
LED INSTALLATION

1. With Printed Wiring Board Receptacle. (MML93K)
PWB receptacle enables T-1 ¾ or T-1 LEDs to be added or replaced from behind the printed wiring board, without soldering. LEDs and receptacles are ordered separately. See page 75.

Printed wiring boards are not supplied.



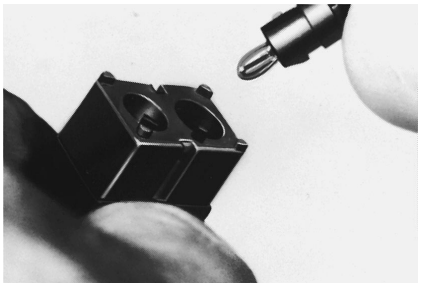
1. Insert the LED/PWB receptacle assembly through a hole in the printed wiring board.



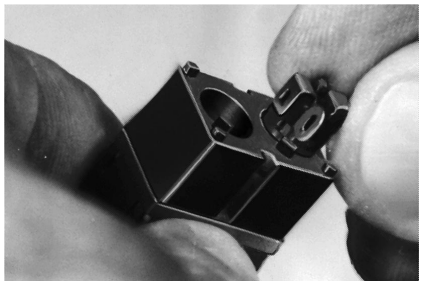
2. A ⅛–turn applied clockwise to the receptacle locks it in the printed wiring board and establishes the electrical connection.

2. With Solder Terminal Receptacle. (MML93J)
This receptacle attaches directly to the rear of panel-mounted units. It enables incandescent lamps to be added or replaced without rewiring. LEDs and receptacles are ordered separately.

This receptacle is for use with all rectangular pushbuttons and MML41 or MML46 rectangular indicators only.



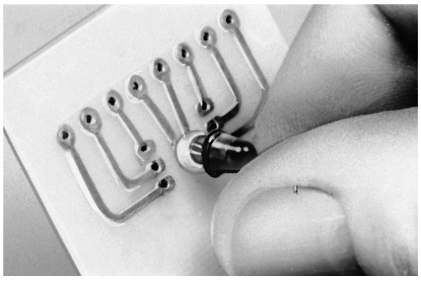
1. Insert solder terminal receptacle into hole in base of panel mount unit.



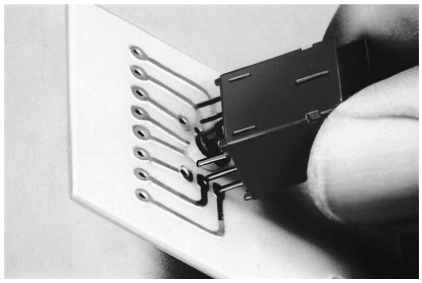
2. A ⅛–turn clockwise applied to the receptacle locks it in the base.

3. By Soldering To Printed Wiring Board.
In this procedure, the housing is mounted on the printed wiring board after the T-1 ¾ LED has been seated.

This procedure can be used with any MML having PWB terminals.

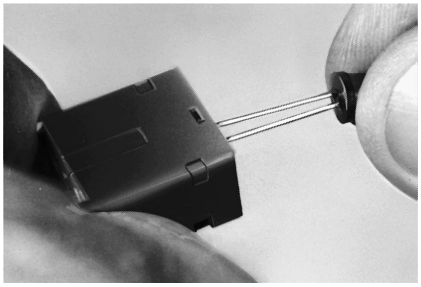


1. Assemble stand-off spacer to LED terminals and seat on printed wiring board.

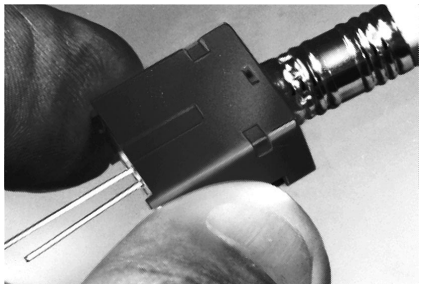


2. Seat housing on printed wiring board, with LED projecting into hole at the base of the housing.

4. By Soldering to Printed Wiring Board or Leadwire (MML44 indicators only).
T-1 ¾ LEDs are added to MML44 indicators via a procedure which is unique to this product. The LED is inserted from the top of the housing with the leadwires protruding through the housing base.



1. Assemble LED to MML44 indicator, with the LED terminals protruding through assembly slot in the middle of housing base.



2. Use pencil eraser to snap LED securely in place.

Incandescent Lamp Assemblies

MML91 LAMP/PWB RECEPTACLE ORDER GUIDE

Lamp Type	Use To Illuminate	Voltage	Catalog Listing Incl. Lamp & PWB Receptacle	Industry Lamp No.
T-1 ① (unbased)	**Rectangular** button lens	**5** 28	MML91C MML91DC	715 6838
T-1 ② (bi-pin)	Square button lens and MML24 rocker lens	5 28	MML91E MML91DE	7715 7839

Notes:
① To order PWB receptacle separately, specify **MML93H.**
② To order PWB receptacle separately, specify **MML93G.**

MML91 LAMP/SOLDER RECEPTACLE ORDER GUIDE

Lamp Type	Use To Illuminate	Voltage	Catalog Listing Incl. Lamp & Solder Receptacle	Industry Lamp No.
T–1 ③ (bi-pin)	**Rectangular** button lens	**5** 28	MML91D MML91DD	7715 7839

Lamp Type	Use To Illuminate	Voltage	Catalog Listing ④ Solder Receptacle	T-1 (Unbased) Lamp Only	Industry Lamp No.
T-1 (unbased)	**Square** button lens	**5** 28	MML93L MML93L	MML91A MML91DA	715 6838
T-1 (unbased)	MML24 rocker lens	5 28	MML93R MML93R	MML91A MML91DA	715 6838

Notes:
③ To order solder receptacles separately, specify **MML93J.**
④ Order solder receptacles and T-1 lamp listings for complete assembly.

LED/Incandescent Lamp Receptacles

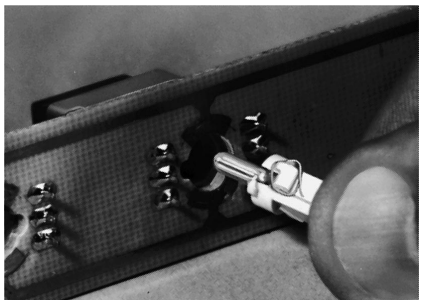
User installed. Certain MML switches and indicators will accept incandescent lamps, where specified in the order guides. These lamps are ordered separately and installed by the user, per the procedures described below.

LAMP INSTALLATION

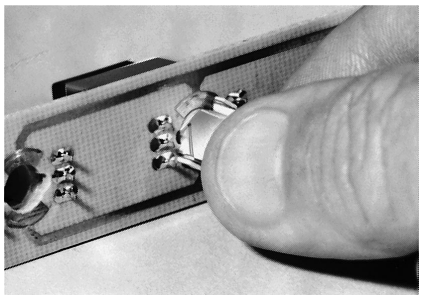
1. With Printed Wiring Board Receptacle for MML93G and MML93H only.
Use PWB receptacles to permit lamps to be added or replaced from behind the printed wiring board, without soldering.

These receptacles are for use with rectangular pushbuttons, square pushbuttons and MML24 rocker lens only.

Printed wiring boards are not supplied.



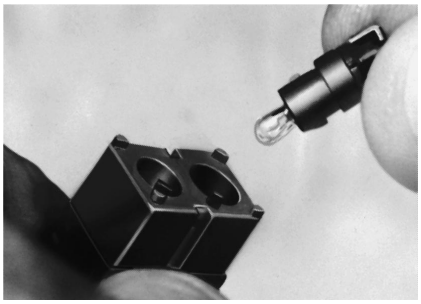
1. Insert the PWB receptacle/ incandescent lamp assembly through a hole in the printed wiring board.



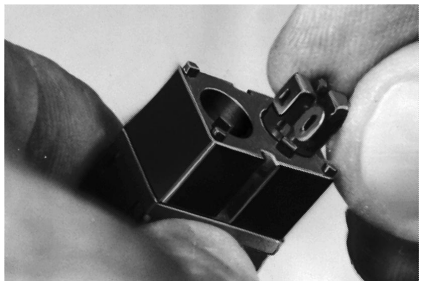
2. A ⅛–turn applied clockwise to the receptacle locks it in the printed wiring board and establishes the electrical connection.

2. With Solder Terminal Receptacle for MML93J bi-pin only
This receptacle attaches directly to the rear of panel-mounted units. It enables lamps to be added or replaced without rewiring.

This receptacle is for use with all rectangular pushbuttons and MML41 or MML46 rectangular indicators only.



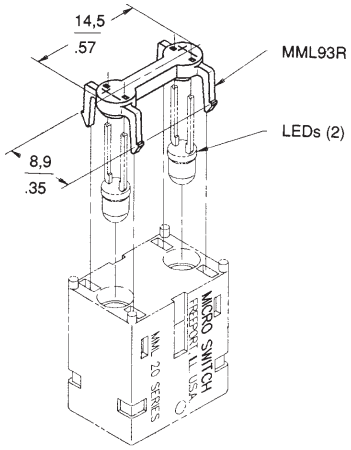
1. Insert solder terminal receptacle into hole in base of panel mount unit.

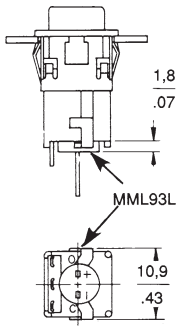


2. A ⅛–turn clockwise applied to the receptacle locks it in the base.

3. With Solder Terminal Receptacles for MML93L/93R Unbased Only or T-1 LED.
Use the receptacles shown at right to install T–1 LEDs or T–1 unbased lamps in panel-mounted MML21 square pushbutton switches and MML24 rocker switches.

Procedure:
1. Assemble LEDs or lamps to receptacles (leads first).
2. Snap receptacle into slots in housing base.
3. Solder directly to leads.

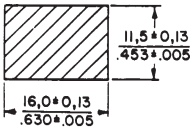




MOUNTING DIMENSIONS (For reference only)

PANEL CUTOUTS FOR PUSHBUTTON SWITCHES AND INDICATORS/RECTANGULAR TYPE

INDIVIDUAL SNAP-IN PANEL MOUNT

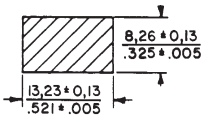


$\frac{1,27 — 2,39}{.050 — .094}$ Panel Thickness

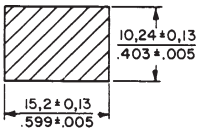
PANEL PUNCH FOR MML SERIES

A panel punch is manufactured by Greenlee-Textron Tool Co., Rockford, IL (815-926-3011).

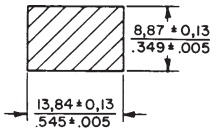
INDIVIDUAL PRINTED WIRING BOARD (PWB) MOUNT



Pushbutton Plunger Thru Panel

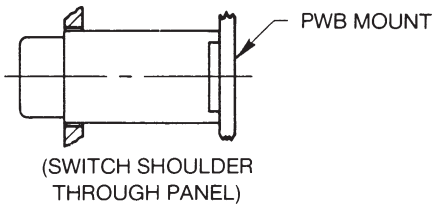


Housing Thru Panel

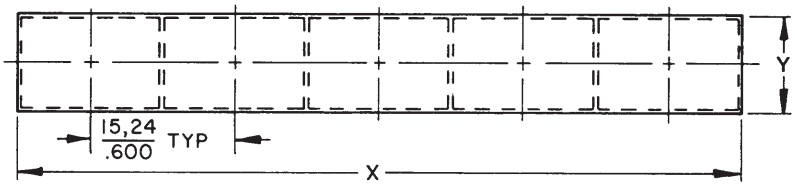


Indicator Lens Thru Panel

MULTI-UNIT PRINTED WIRING BOARD (PWB) MOUNT



Horizontal Mount



Establish tooling holes on X coordinate and use these holes to establish relationship between PWB and Panel

Terminals $\frac{0,20}{.008} \times \frac{0,76}{.030}$

Recommended hole size in PWB $\frac{1,17}{.046}$

N = Number of switches

$X = N\text{-}1 \times \frac{15,24}{.600} + \frac{15,11}{.595}$

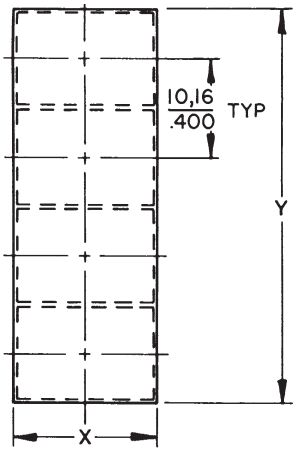
$Y = \frac{10,16}{.400}$

Example: N = 5 Switches

$X = 5\text{-}1 \times \frac{15,24}{.600} + \frac{15,11}{.595}$

$X = \frac{76,07}{2.995}$

Vertical Mount



N = Number of Switches

$Y = N \times \frac{10,16}{.400}$

$X = \frac{15,11}{.595}$

Example: N = 4

$Y = 4 \times \frac{10,16}{.400}$

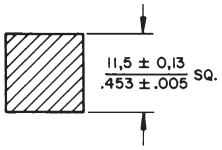
$Y = \frac{40,64}{1,600}$

Manuals

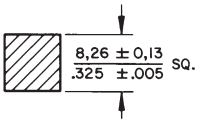
MOUNTING DIMENSIONS (For reference only)

PANEL CUTOUTS FOR PUSHBUTTON SWITCHES AND INDICATORS/SQUARE TYPE

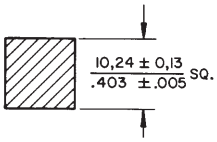
Individual Snap-in Panel Mount



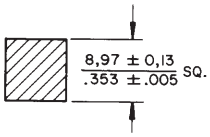
Individual Printed Wiring Board PWB Mount



Pushbutton Plunger Thru Panel



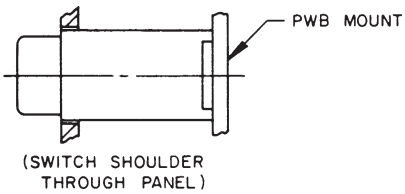
Housing Thru Panel



Indicator Lens Thru Panel

See page 77 for panel punch manufacturer.

MULTI-UNIT PRINTED WIRING BOARD (PWB) MOUNT

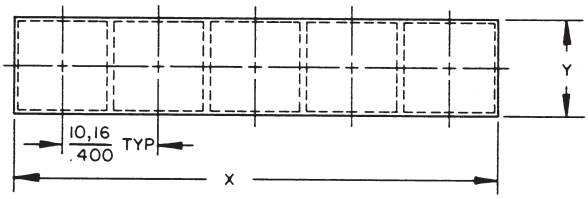


Establish tooling holes on X coordinate and use these holes to establish relationship between PWB and Panel

Terminals $\frac{0,20}{.008}$ x $\frac{0,76}{.030}$

Recommended hole size in PWB $\frac{1,17}{.046}$

Horizontal Mounting



Formula:
N = Number of switches

$X = N \times \frac{10,16}{.400}$

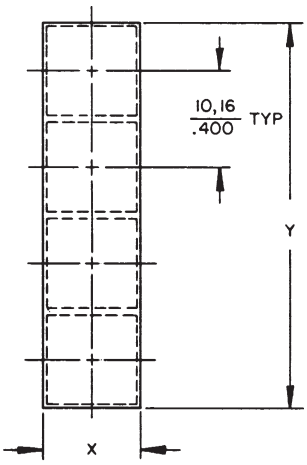
$Y = \frac{10,16}{.400}$

Example: N = 5 Switches

$X = 5 \times \frac{10,16}{.400}$

$X = \frac{50,80}{2.00}$

Vertical Mounting



N = Number of Switches

Formula: $Y = N \times \frac{10,16}{.400}$

$X = \frac{10,16}{.400}$

Example: N = 4

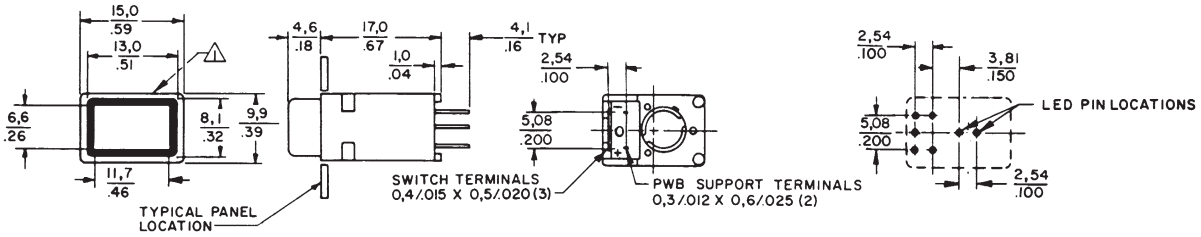
$Y = 4 \times \frac{10,16}{.400}$

$Y = \frac{40,64}{1.600}$

MOUNTING DIMENSIONS (For reference only)

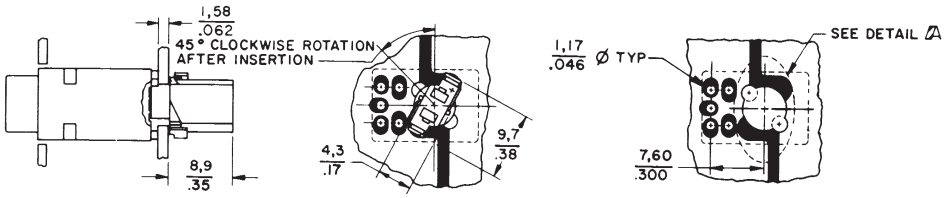
PRINTED WIRING BOARD MOUNT PUSHBUTTON SWITCHES/RECTANGULAR TYPE

MML11 Switches

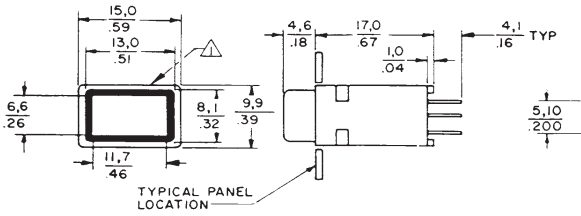


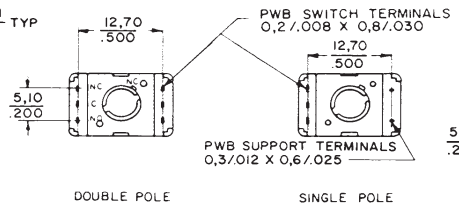
PWB Pin Locations

PWB Receptacle Installed (LED or Incandescent Lamp)

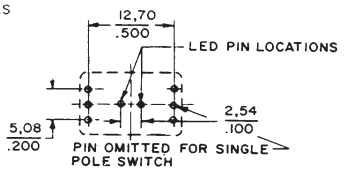


MML21 Switches

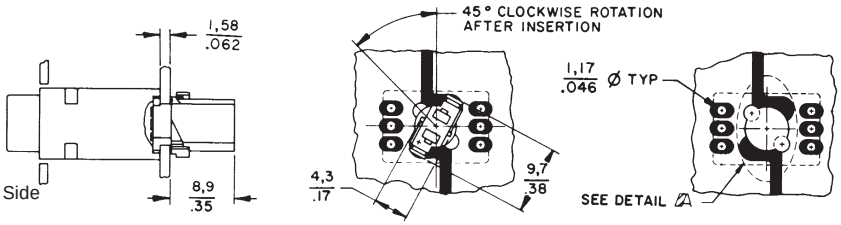




PWB Pin Locations

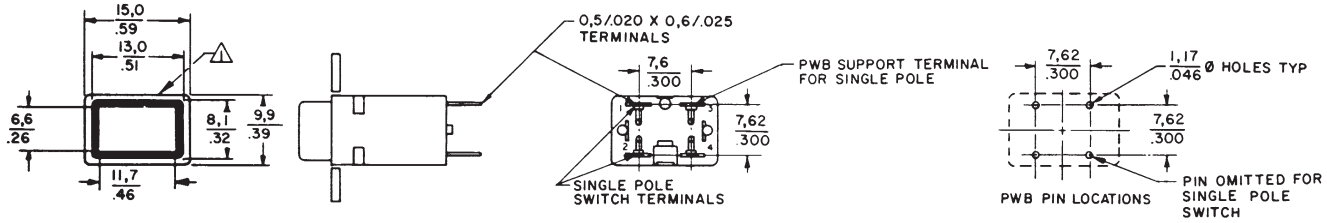


PWB Receptacle Installed (LED or Incandescent Lamp)



Notes:
⚠ MICRO SWITCH Identification This Side
2 – Linear measure mm/IN. or mm/IN.

MML31 Switches



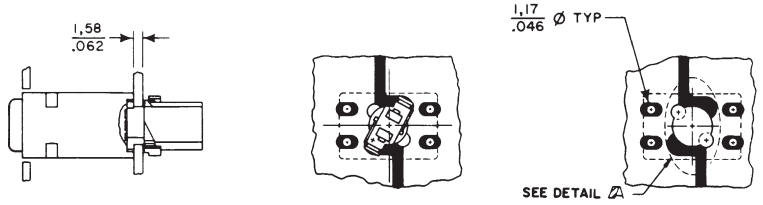
Manuals

MOUNTING DIMENSIONS (For reference only)

PRINTED WIRING BOARD MOUNT INDICATORS/RECTANGULAR TYPE

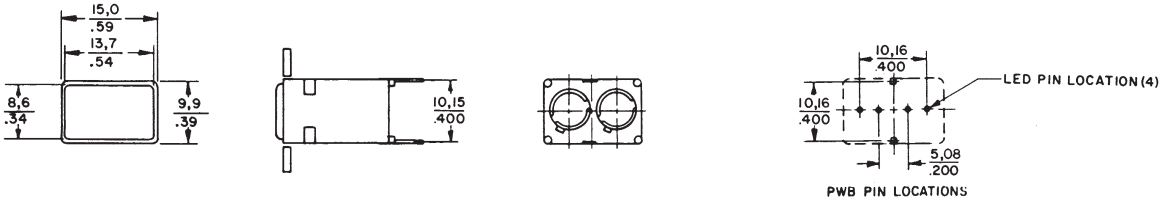
MML41 Indicators

PWB Receptacle Installed (LED or Incandescent Lamp)

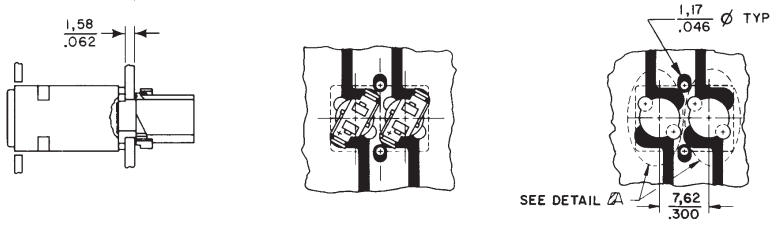


Notes:
⚠ MICRO SWITCH Identification This Side
2 – Linear measure mm/IN. or mm/IN.

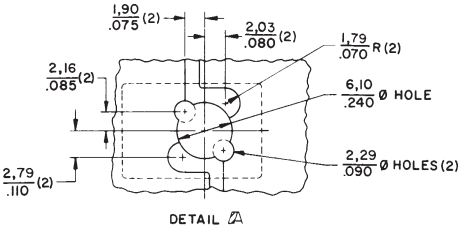
MML46 Indicators



PWB Receptacle Installed (LED or Incandescent Lamp)



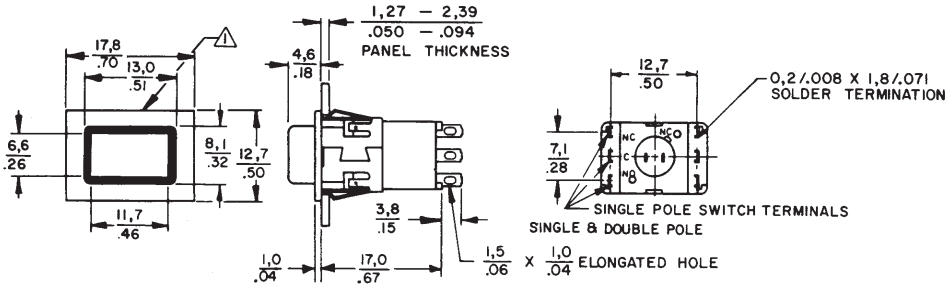
PWB Pad Location For Receptacle (LED or Incandescent Lamp)



MOUNTING DIMENSIONS (For reference only)

PANEL MOUNT PUSHBUTTON SWITCHES/RECTANUGLAR TYPE

MML21 Switches



Solder Receptacle Installed (LED or Incandescent Lamp)

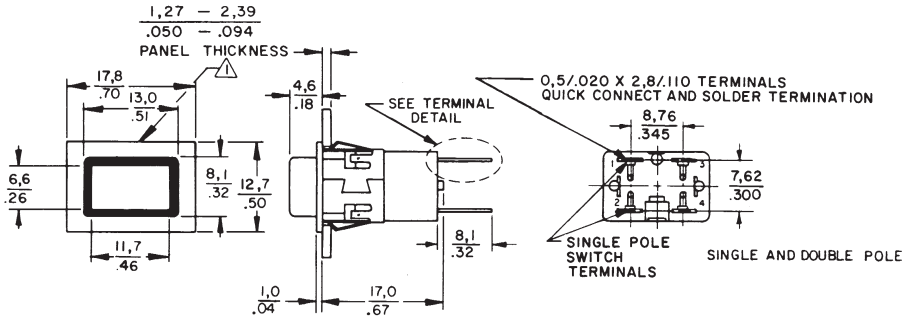
Notes:

⚠1 MICRO SWITCH Identification This Side

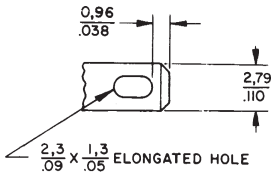
2 – Linear measure mm/IN. or mm/IN.

⚠3 Rotate 45° counter clockwise for removal from switch or indicator

MML31 Switches



Terminal Detail

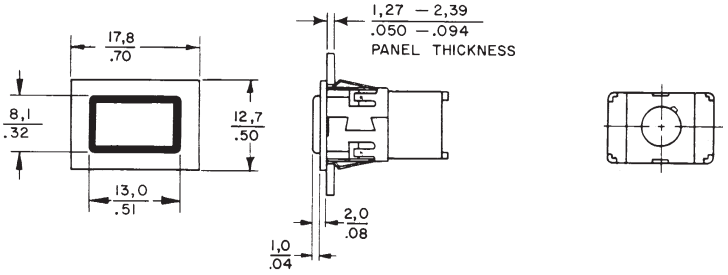


Manuals

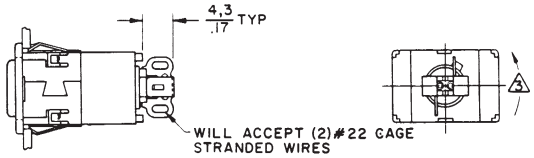
MOUNTING DIMENSIONS (For reference only)

PANEL MOUNT INDICATORS/RECTANGULAR TYPE

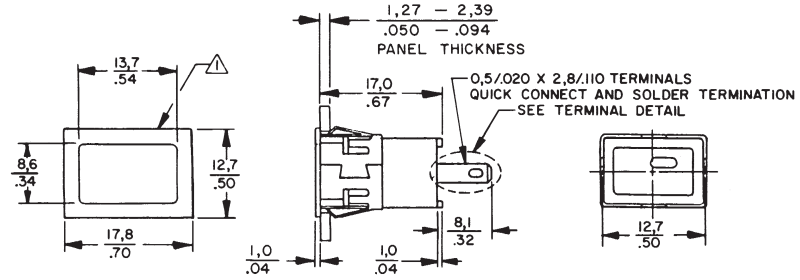
MML41 Indicators



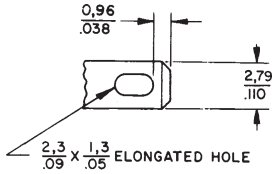
Solder Receptacle Installed (LED or Incandescent Lamp)



MML43 Indicators

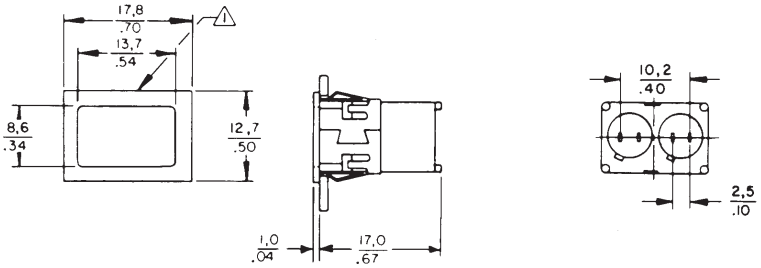


Terminal Detail

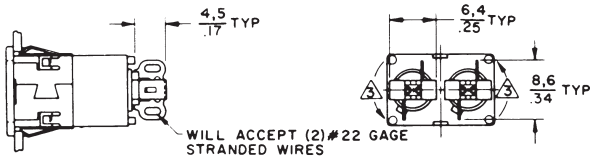


Notes:
⚠ MICRO SWITCH Identification This Side
2 – Linear measure mm/IN. or mm/IN.

MML46 Indicators



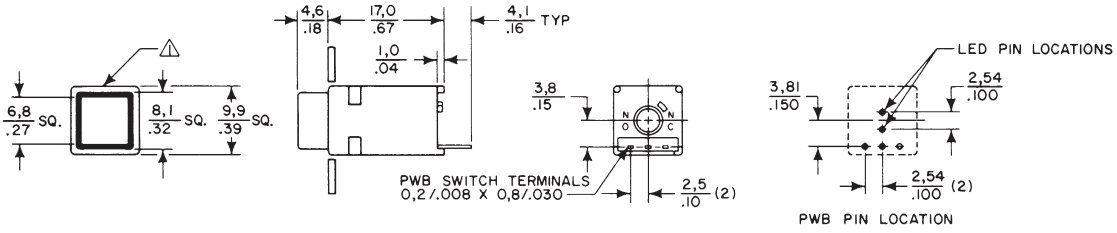
Solder Receptacle Installed (LED or Incandescent Lamp)



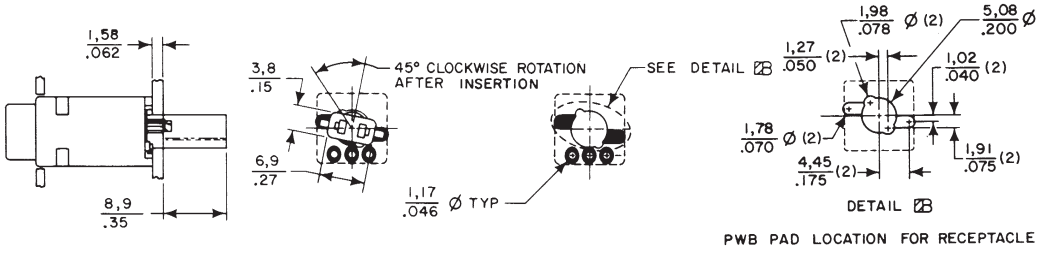
MOUNTING DIMENSIONS (For reference only)

PRINTED WIRING BOARD MOUNT PUSHBUTTON SWITCHES AND INDICATORS/SQUARE TYPE

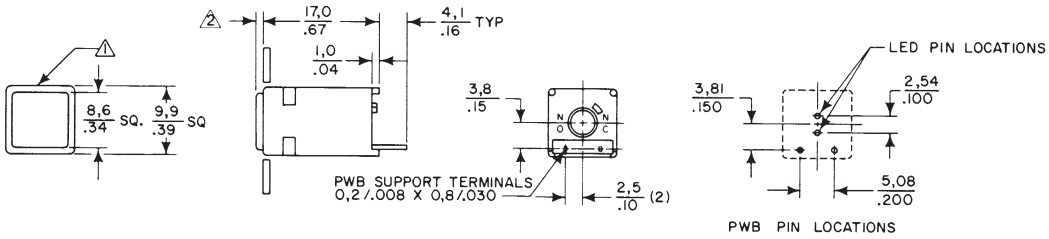
MML21 Switches



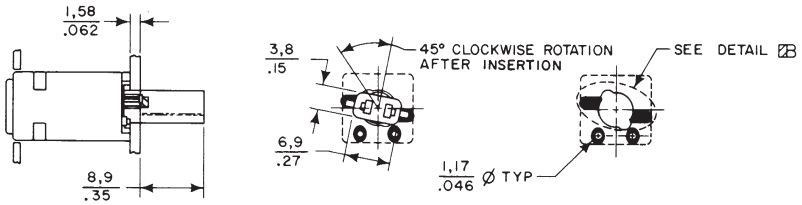
PWB Receptacle Installed (LED or Incandescent Lamp)



MML46 Indicators



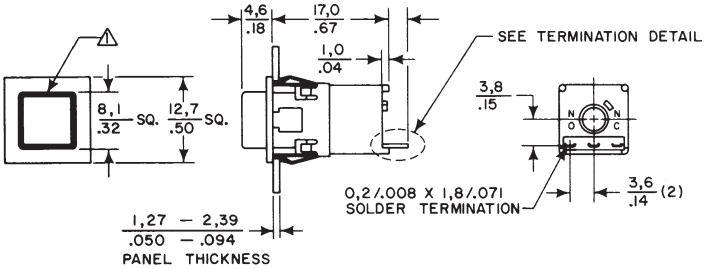
PWB Receptacle Installed (LED or Incandescent Lamp)



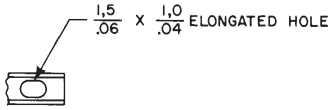
NOTES
⚠ MICRO SWITCH IDENTIFICATION THIS SIDE
⚠ MML41: 2,0/.08
MML46: 1,0/.04
3–LINEAR MEASURE mm/IN OR mm/IN

PANEL MOUNT PUSHBUTTON SWITCHES/SQUARE TYPE

MML21 Switches



Termination Detail



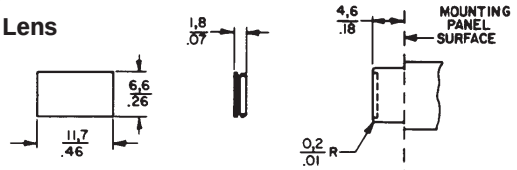
NOTE:
To install LED or lamp, use MML93L receptacle shown on page 76.

Manuals

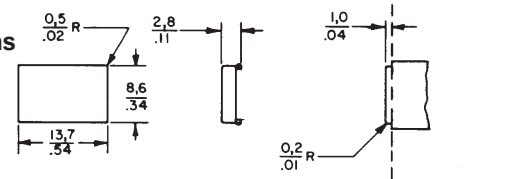
MOUNTING DIMENSIONS (For reference only)

LENSES

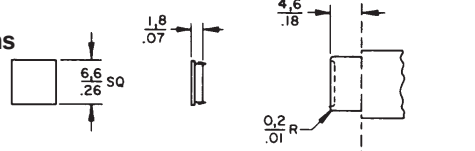
Rectangular Pushbutton Lens



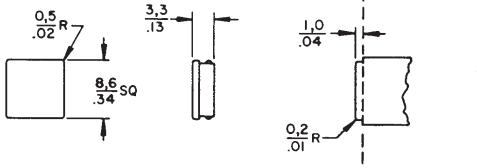
Rectangular Indicator Lens



Square Pushbutton Lens

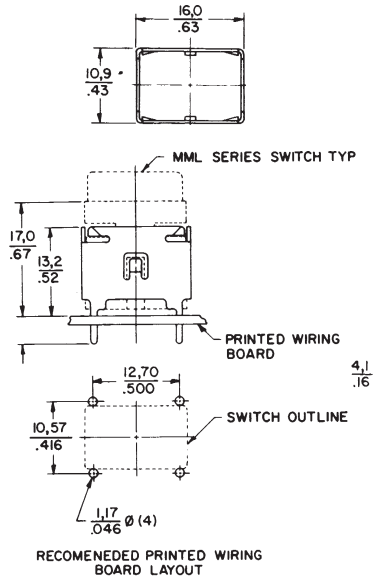


Square Indicator Lens

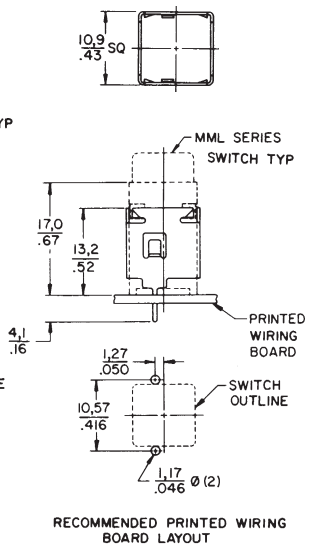


PWB SUPPORT BRACKETS

Rectangular

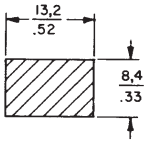


Square

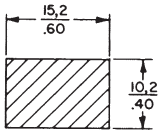


MOUNTING DIMENSIONS (For reference only)

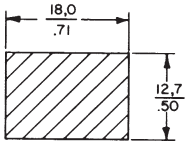
PANEL CUTOUTS FOR PWB MOUNT PADDLE AND ROCKER SWITCHES



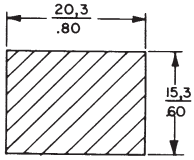
Actuator Thru Panel



Housing Thru Panel



2-Pole MML33, 34 Actuator

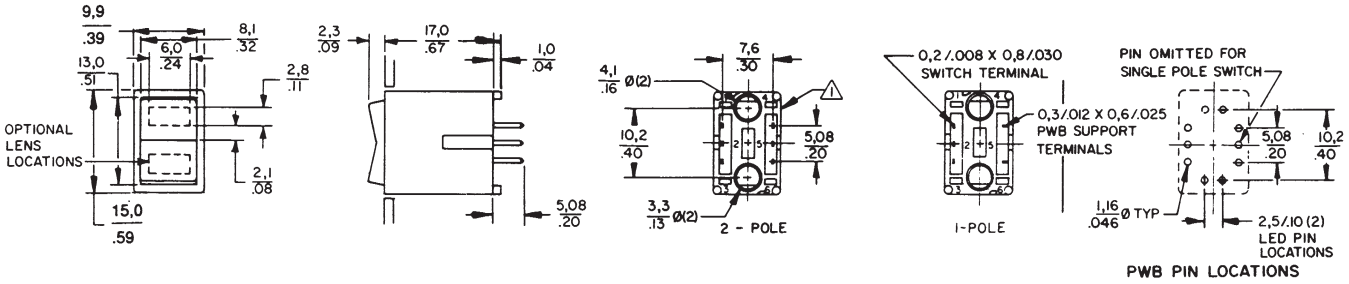


2-Pole MML33, 34 Thru Panel

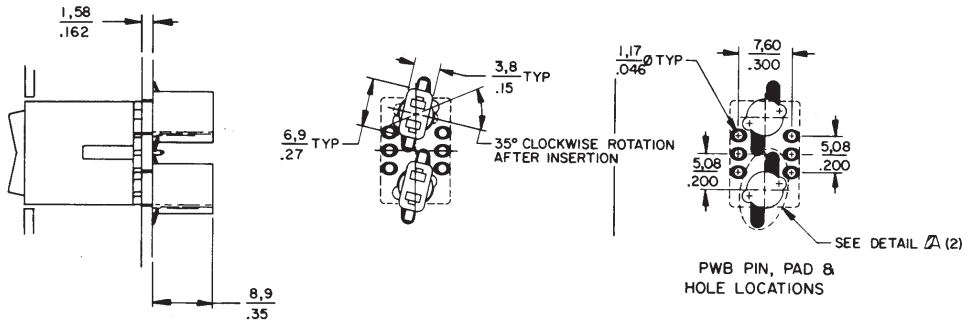
Housing Thru Panel

See page 77 for panel punch manufacturer.

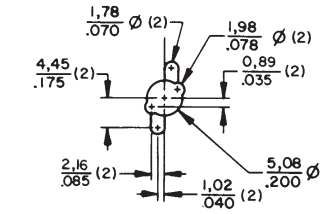
MML24 Rocker Switches



With PWB Receptacle Installed (LED or Incandescent Lamp)



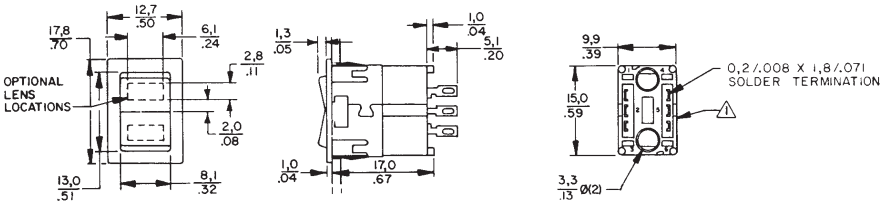
Notes:
⚠ MICRO SWITCH Identification This Side
2 – Linear measure mm/IN. or mm/IN.



MOUNTING DIMENSIONS (For reference only)

PANEL MOUNT ROCKER SWITCHES

MML24 Rocker Switches



Notes:
1 MICRO SWITCH Identification This Side
2 – Linear measure mm/IN. or mm/IN.

NOTE:
To install LED or lamp, use MML93R receptacle shown on page 75.

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

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(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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