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

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

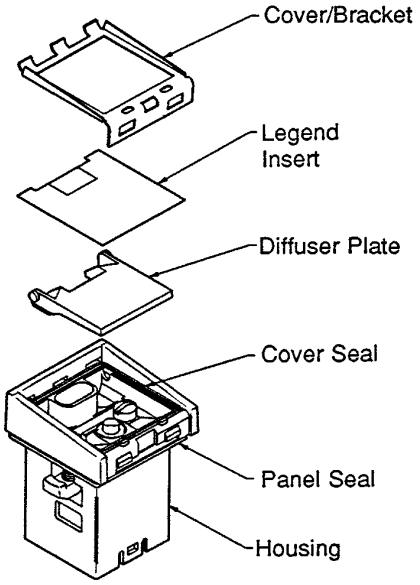
Front panel hard-mounting is quick and easy. Only a screwdriver is needed to tighten the swing-out mounting lugs, which securely lock and seal the unit in the panel. Though the cover/bracket simply snaps onto the housing, it has inherent tamper resistance. The cover can be removed intentionally with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



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.

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

Housing Type and Switch Contacts

Standard Type C Sealed Housing:
EPM24C (Gold Contacts)
EPM34C (Silver Contacts)

Enhanced Type B Sealed Housing, incl. IR filters, EMI shielding & NBC compliance:
EPM24B (Gold Contacts
EPM34B (Silver Contacts)

Legend Color[1]

R Red
Y Yellow
G Green
X No LED

Hi-Intensity Indicator Colors

Color Code	Upper LED	Lower LED
R	Red	Red
Y	Yellow	Yellow
G	Green	Green
F	Red	Green
A	Yellow	Green
B	Yellow	Red
C	Green	Yellow
D	Green	Red
E	Red	Yellow

Switch and LED Terminals

2
Printed Circuit

6
Hook style LED terminals and solder T2 switch terminals

Circuitry Code

AC
1-Pole

BC
2-Pole (All are momentary action)

Insert Type

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
G Green
W White
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

Housing Type and Switch Contacts

Standard Type C Sealed Housing:
EPM41C

Enhanced Type B Sealed Housing with IR filters, EMI shielding & NBC compliance:
EPM41B

Legend Color[1]

R Red
Y Yellow
G Green
X No LED

Hi-Intensity Indicator Color

R Red
Y Yellow
G Green
X No LED

LED Terminals

2
Printed Circuit

6
Hook style

Insert Type

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
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.

Sealed Pushbutton Switches

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**
Standard Type C Sealed Housing: EPM44C	R Red Y Yellow G Green X No LED	Color Code / Upper LED / Lower LED R Red Red Y Yellow Yellow G Green Green F Red Green A Yellow Green B Yellow Red C Green Yellow D Green Red E Red Yellow	2 Printed Circuit 6 Hook style	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 G Green W White K Black
Enhanced Type B Sealed Housing, incl. IR filters, EMI shielding & NBC compliance: EPM44B				

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

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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:

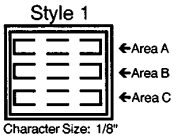
Catalog Listing **EPM**

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

Customer:
Address:
Prepared by:
Phone:

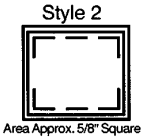
Non-lighted Legends - without high intensity LED Display

Style 1



Character Size: 1/8"

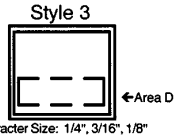
Style 2



Area Approx. 5/8" Square

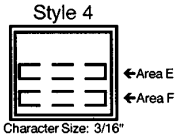
Lighted or Non-Lighted-Without Indicator LED Display:

Style 3



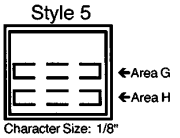
Character Size: 1/4", 3/16", 1/8"

Style 4



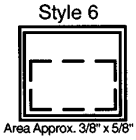
Character Size: 3/16"

Style 5



Character Size: 1/8"

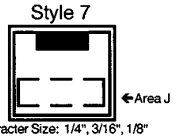
Style 6



Area Approx. 3/8" x 5/8"

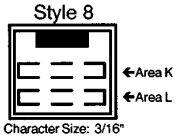
Lighted or Non-Lighted-With Indicator LED Display:

Style 7



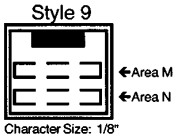
Character Size: 1/4", 3/16", 1/8"

Style 8



Character Size: 3/16"

Style 9



Character Size: 1/8"

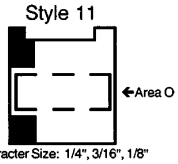
Style 10

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).

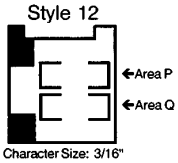
Lighted or Non-Lighted - Dual Indicator LED Display:

Style 11



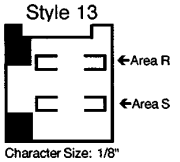
Character Size: 1/4", 3/16", 1/8"

Style 12



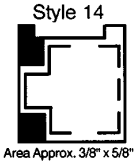
Character Size: 3/16"

Style 13



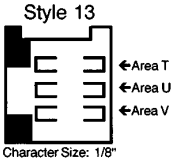
Character Size: 1/8"

Style 14



Area Approx. 3/8" x 5/8"

Style 13



Character Size: 1/8"

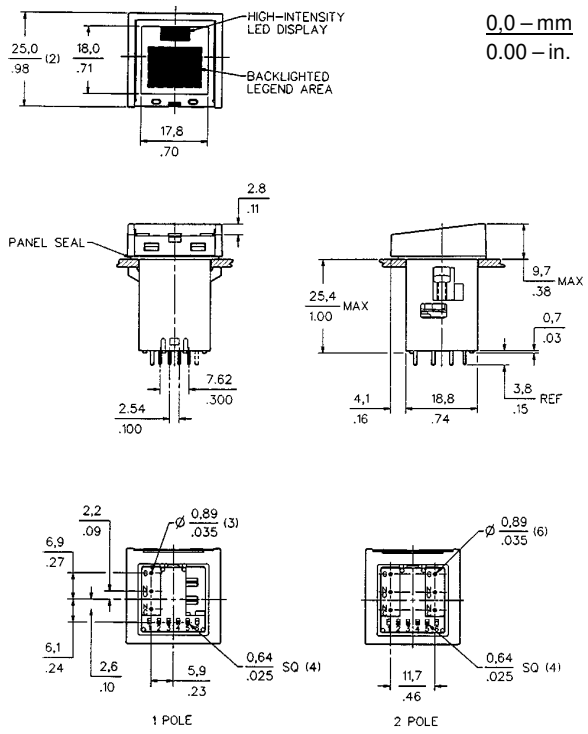
Quantity		Style	Area(s)	Legend - Max Characters/Area	Legend Color Lighted		Unlighted	Character Size				Background Color
This Order	Est. Annual			1/4"-3, 3/16"-4, 1/8"-7 Using only one "M" or "W"	Trans	Black	White	1/4"	3/16"	1/8"	Special	

FO-43973-C

Manuals

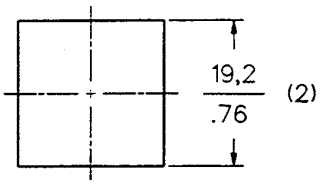
Sealed Pushbutton Switches

MOUNTING DIMENSIONS (For reference only)



0,0 – mm
0.00 – in.

Panel Cutout

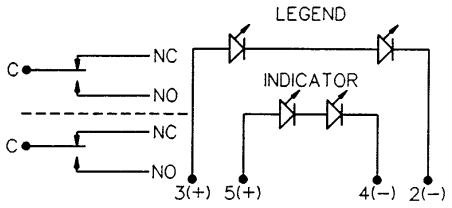


Panel thickness: .063 to .189 in.
(1,6 to 4,8 mm)

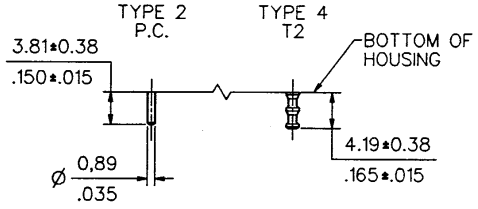
Center-to-center: 1 in. (25,4 mm)
rows or columns

Circuit Diagram

Switch Circuitry LED Circuitry



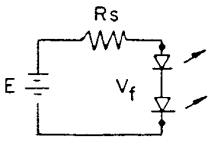
Terminal Detail



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.