

# DATA SUPPORT

## CROSS REFERENCE LIST

Stock No.	Manufacturer's Part No.
265-2057	770-210.212
265-2063	770-210.313
265-2085	770-210.414
265-2091	770-210.515
265-2108	770-210.222
265-2114	770-210.323
265-2120	770-210.424
265-2142	770-210.525
265-2158	770-210.0

# There is a difference

**I**n the world of membrane switching systems, there are three distinct types of construction that greatly affect the quality, dependability, and operating life of the switches.

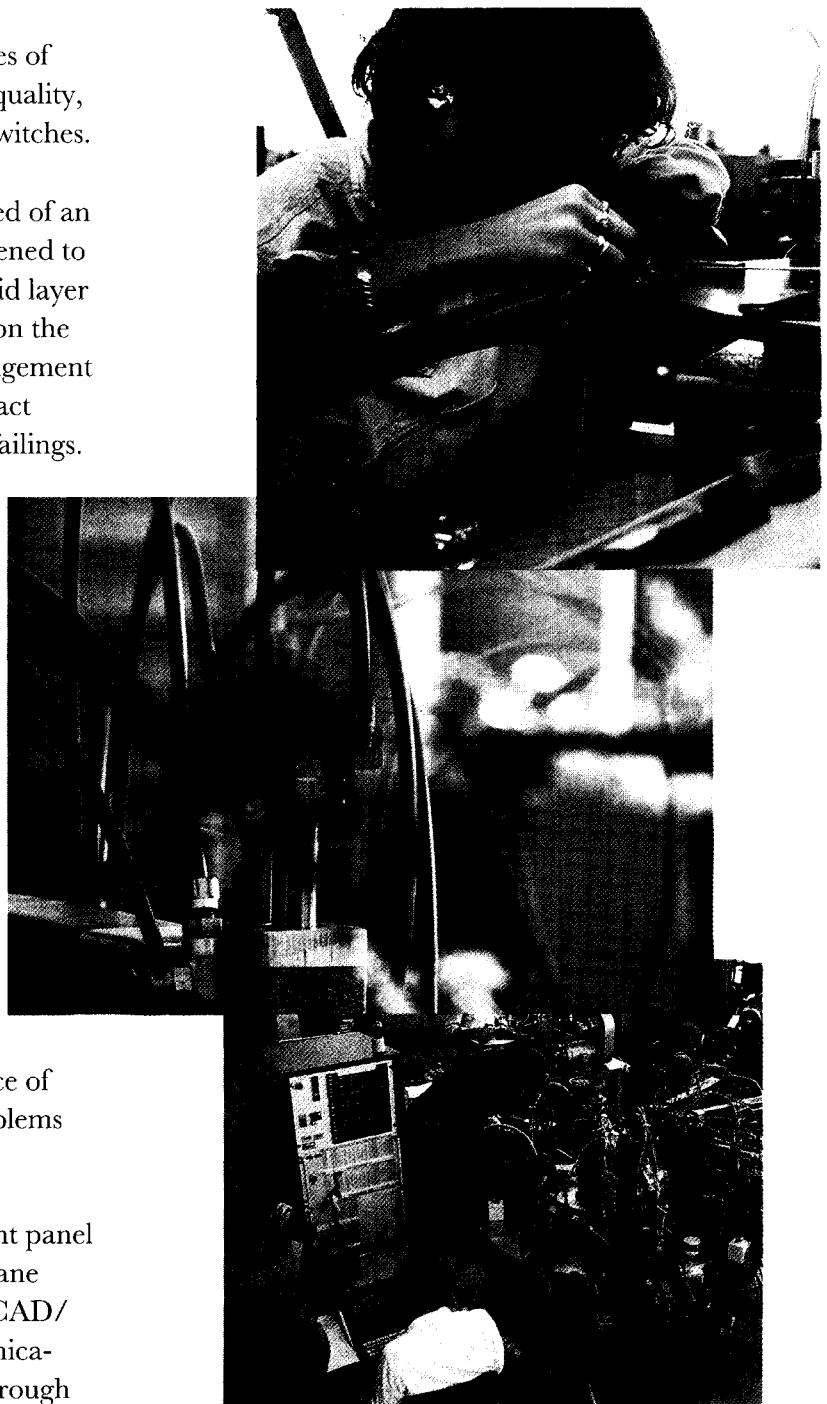
**Type I** membrane switches are composed of an upper flexible film with contacts silk screened to the underside separated from a lower rigid layer with similar screened contacts. Pressure on the upper film makes the contact. This arrangement suffers from lack of tactile feel, high contact resistance, inability to repair, and other failings.

**Type II** devices employ a metal or plastic dome between the upper and lower layers that snaps when deformed by pressure, offering a tactile feel to indicate switch closure. The dome limits switch lifetime and does not eliminate other Type I problems.

**Type III** membrane switch systems, pioneered by EAO's MSS 70, use high-quality snap-action switch mechanisms featuring full-key illumination combined with advanced membrane overlays and support systems. They offer the proven advantages of discrete switching components, the modern front-panel appearance of membrane systems, and none of the problems associated with Type I and II devices.

EAO facilities are ready to turn your front panel requirement into an outstanding membrane switch system. Beginning with in-house CAD/CAM design which offers direct communications to your engineering department, through proven manufacturing techniques, and extensive quality testing, your project receives the attention that can only be offered by providers of the world's finest switching products. And EAO has earned complete ISO 9001 certification.

Please use the enclosed "Quotation Request" to find out how EAO can meet your most exacting membrane switching requirements.



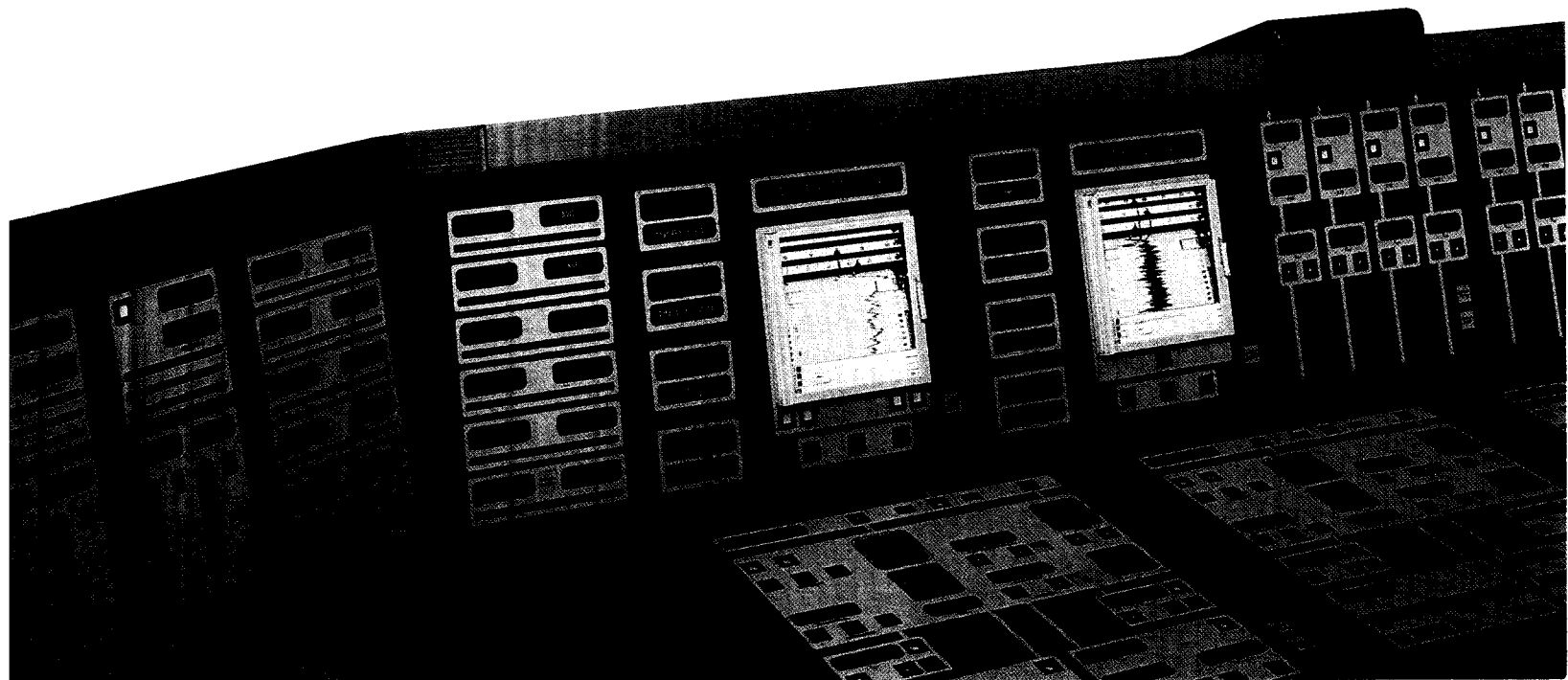
*Switch production in EAO's modern plant (above) assures users of high-quality, trouble-free products. Large process control console (right) uses MSS 70 membrane panels for clean design and reliable operation.*

# To serve your needs

The combination of reliable snap-acting switch and indicator elements with membrane front panel construction offers significant benefits to users. Unique advantages of MSS 70 membrane switch systems resulting from individual switching elements include the following:

- The proven design of high quality switch and indicator elements used in the membrane assembly means years of trouble-free service.
- Only individual switching elements can provide the smooth yet distinct tactile feel that indicates positive operation of each individual membrane key.
- A consistently low key force is required to activate the switching elements. In addition, contact bounce is maintained at  $\leq 1$  millisecond. These optimum operating parameters result in reduced operator fatigue.
- Developments in switch element design provide excellent overall illumination of the entire membrane key. No other membrane system can offer full-key illumination for subdued or full daylight viewing.
- Unlike conventional membrane systems, individual switch elements continue to operate reliably even when the overlay film has been damaged.
- Individual switch elements may be replaced if necessary; impossible to accomplish with conventional membranes.
- Contact resistance of the switching elements is very low ( $\leq 100 \text{ m}\Omega$ ) compared to the several ohms to hundreds of ohms resistance that is common with printed Type I and II contacts.
- Gold contacts assure consistent switching with no change in characteristics as is sometimes experienced when silver contacts tarnish in humid and corrosive atmospheres.
- Switch element lenses are available in colors to enhance the LED illumination. Round and square lens shapes match key designs.
- The lens also serves to fill the membrane key space so there is no "dead area" problem to overcome as is often the case when using large keys and/or dome actuators.
- Both sides of the printed circuit board backplane used in EAO membrane assemblies may be supplied with a variety of active and passive components including display panels, display drivers, and ICs. Panels are designed as complete drop-in modules.

EAO MSS 70 membrane switch systems offer the advantages of discrete component switches combined with the aesthetic appeal of fully illuminated keys, contemporary graphics, and outstanding tactile feel.



# The complete panel

Construction of an EAO MSS 70 membrane switch system is optimized for your specific application. Individual requirements are translated into good design and attractive styling so that each unique drop-in assembly will present a cost effective solution.

Panels are fabricated in a three-part process, as shown in the illustration at right. First, switch and indicator elements with lenses are fixed on a printed circuit board backplane. This PCB may contain additional components, displays, and connectors.

A front plate made of aluminum, steel, or plastic material is cut out for switch and indicator lenses, status indicators, and other displays. Threaded studs and standoffs are used to attach the two boards at the correct distance.

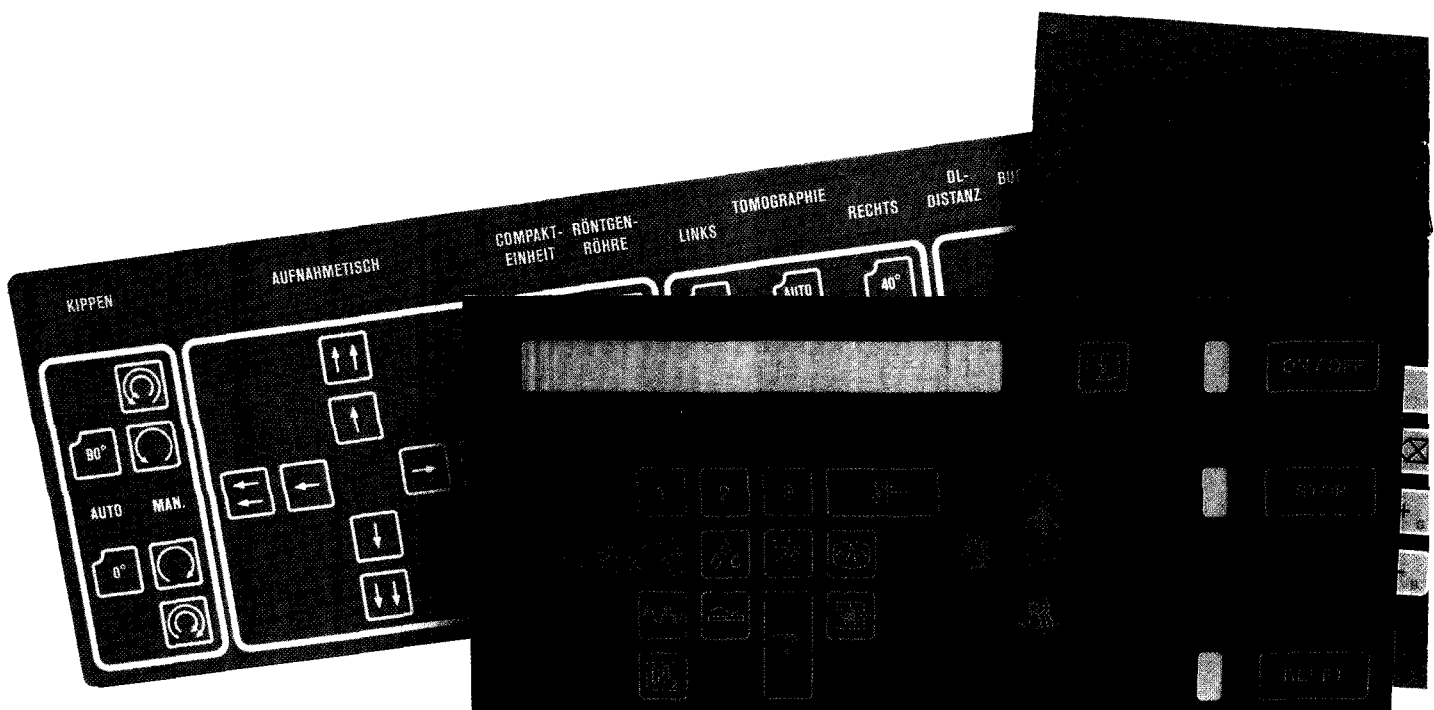
A polyester overlay film with clear or tinted windows for switch and indicator lenses, LEDs, and other displays is prepared by reverse-side silk screening for scratch and abrasion resistance. In addition to the basic overlay color, graphics and type legends can be applied in a variety of colors. EAO uses the worldwide Pantone® Matching System to assure correct color selection. Adhesive bonding of the overlay

film to the frontplate completes the assembly. Clear areas of the membrane film can be supplied with illumination filters for enhanced color contrast. Pad, edge, or pin embossing of the key surfaces aid in defining and locating keys.

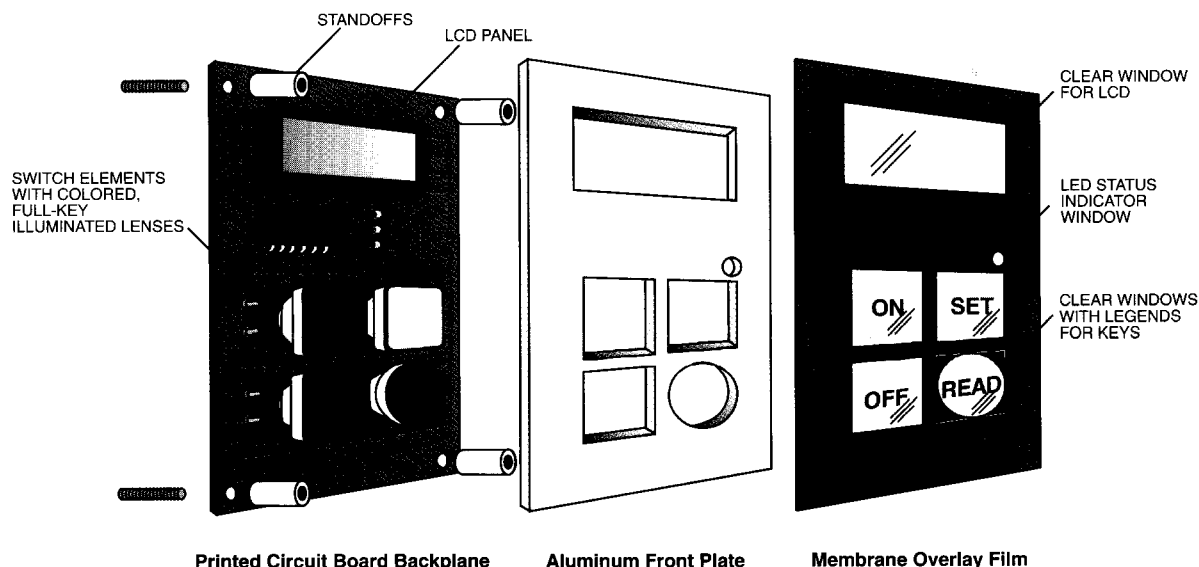
The chemically-resistant, easy-to-clean membrane surface seals the front of the panel against dust, liquids, and vapors. Each individual switch and indicator element is sealed to IP 65 (equivalent to NEMA 4 & 13) and additional edge sealing is possible when mounting the panels.

MSS 70 components (described on page 6) consist of two main parts: a switch or indicator element and a lens. Illuminated units include a red, yellow, green, or orange multi-chip LED. When used with a matching color lens, the components provide a strong and even distribution of light over the entire lens area for full-key illumination. An additional white lens is available to give a strong contrast from non-illuminated white to a brightly illuminated color.

EAO offers fast, informed service and knowledgeable assistance in the design and preparation of membrane switching panels. Contact an EAO Switch Corp. representative for additional information, component pricing, or a quotation on a complete panel.



## Exploded view of membrane switch panel assembly



## Selected options

In addition to an unlimited array of panel designs, EAO MSS 70 membrane switch systems offer many design options to enhance appearance and improve functionality.

**Display windows** can be provided in the overlay film for LCD, LED, fluorescent, or other types of panel displays. They can be clear, colored, or textured for anti-glare applications.

**Deadfront keys** that remain blank until illuminated from behind are useful for warning displays or to reduce clutter.

**Embossing** raises or outlines the key area to improve switch definition and to aid in finding keys under low-light situations.

**Replaceable legends** provide flexibility for foreign language versions, user-definable key functions, and changing parameters. Graphics and type are inserted between the frontplate and the overlay.

**Textures** applied to the overlay film aid both appearance and function. Matte, semi-matte, and heavily textured surfaces define and highlight keys, groups of keys, or specific design elements. UV hardcoating can provide scratch-resistant glossy surfaces.

**Shielding** of membrane switch panels protects against RFI, EMI, or ESD. Methods, which include metalized polymers, conductive mesh, and grounding, vary with the panel.

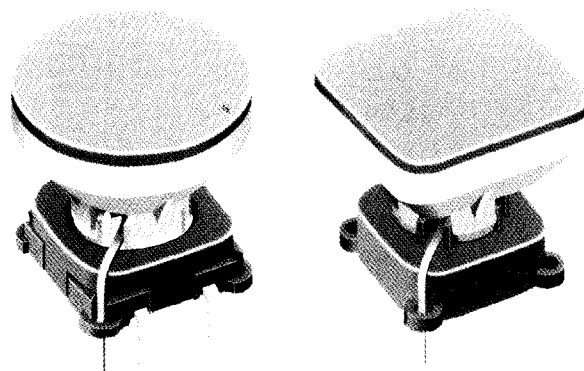
**Connectors** of all types including 20-pin dual-row headers, Sub-D, Faston, and screw terminals are available to interface the complete EAO membrane panel with other sub-systems.



*A selection of membrane panels shows the variety of keyboard designs possible.*

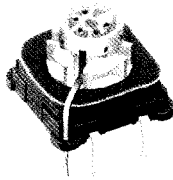
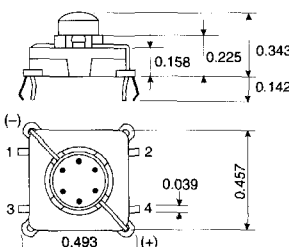
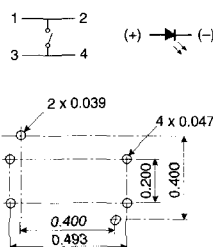

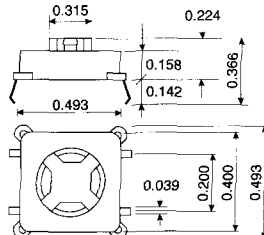
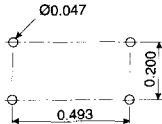
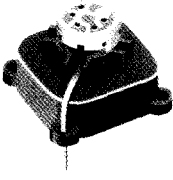
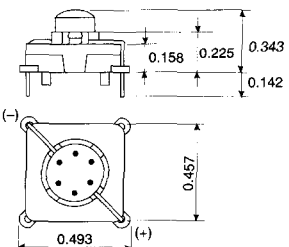
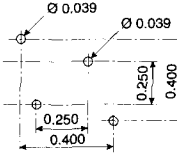

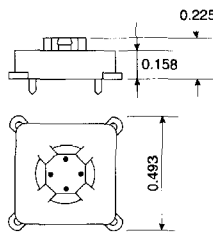
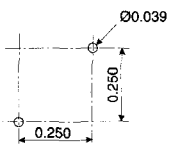
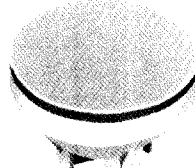
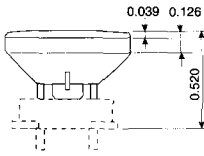
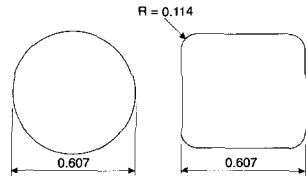
# MSS 70 components

You may wish to assemble individual MSS 70 components into a membrane or discrete-type switch rather than having EAO Switch Corp. provide a complete drop-in panel. Switch and indicator elements, with and without LEDs, and lenses are available for this purpose and for membrane panel replacement parts. Full-key illumination components come complete with multichip LEDs; single element LEDs are available on request.



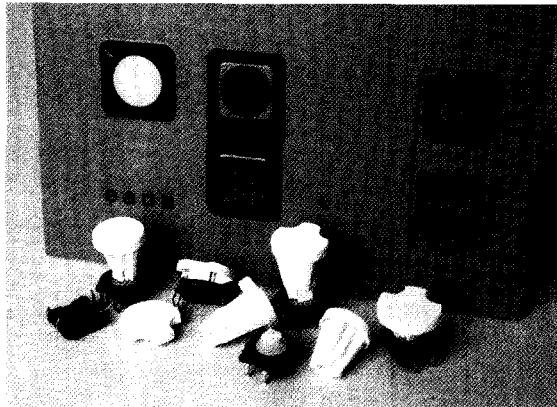
*Assembled switch element with LED and round lens is shown on the left; assembled indicator element with LED and square lens on the right.*

## Components for full-key illumination

Description	Part Number	Dimensions	Mounting Information																		
Switch element with LED 	770-210.2 red 770-210.3 orange 770-210.4 yellow 770-210.5 green																				
Switch element 	792-851.342																				
Indicator element with LED 	770-810.2 red 770-810.3 orange 770-810.4 yellow 770-810.5 green																				
Indicator element 	792-800.042																				
Lenses 	<table><tr><th>Round</th><th>Square</th><th>Color</th></tr><tr><td>770-911.2</td><td>770-921.2</td><td>red</td></tr><tr><td>770-911.3</td><td>770-921.3</td><td>orange</td></tr><tr><td>770-911.4</td><td>770-921.4</td><td>yellow</td></tr><tr><td>770-911.5</td><td>770-921.5</td><td>green</td></tr><tr><td>770-911.9</td><td>770-921.9</td><td>white</td></tr></table>	Round	Square	Color	770-911.2	770-921.2	red	770-911.3	770-921.3	orange	770-911.4	770-921.4	yellow	770-911.5	770-921.5	green	770-911.9	770-921.9	white		
Round	Square	Color																			
770-911.2	770-921.2	red																			
770-911.3	770-921.3	orange																			
770-911.4	770-921.4	yellow																			
770-911.5	770-921.5	green																			
770-911.9	770-921.9	white																			

## Components for status LEDs

A special switch element and solid lenses with cutouts for installation of status LEDs are available when full-key illumination is not required. The solid lenses can be ordered in several different heights allowing different front panel-to-PC board distances.



Description	Part Number		Dimensions	Mounting Information
Switch element	770-201.0			
Solid lens with two cutouts for status LEDs	770-910.0	9.2 mm		
	770-911.0	13.2 mm		
	770-912.0	22.7 mm		
Solid lens with no cutouts for LEDs	770-910.0	9.2 mm		
	770-911.0	13.2 mm		
	770-912.0	22.7 mm		

## Specifications

### Switch Element

Contact material	gold
Contact bounce	≤1 msec
Contact resistance, new	≤100 mΩ
after 500,000 cycles	≤200 mΩ
Voltage	42 VDC max.
Current	50 mA max.
Power	2 VA (resistive) max.
Life (operations)	>5-million
Actuating force	4 N ± 1.5
Travel	
part no. 792-851.342	0.020 in.
part no. 770-201.0	0.016 in.
Max. insulation voltage	500 VAC/1 min
Insulation resistance	≥1000 MΩ
Operating temperature	-4 to +158°F -20 to +70°C
Storage temperature	-22 to +176°F -30 to +80°C

### Complete Assembly

Overlay material	polyester
Front protection	IP 65 (NEMA 4 and 13)
Chemical resistance	available on request

**Full-key illumination available only with EAO membranes.**

