

Membrane Switches

MEMBRANE SWITCHES & GRAPHIC OVERLAYS WITH PICTURE-PERFECT PERFORMANCE

Since 1933, Douglas Corporation has been meeting the exacting demands of the world's leaders in the appliance, electronic, automotive and other industries.

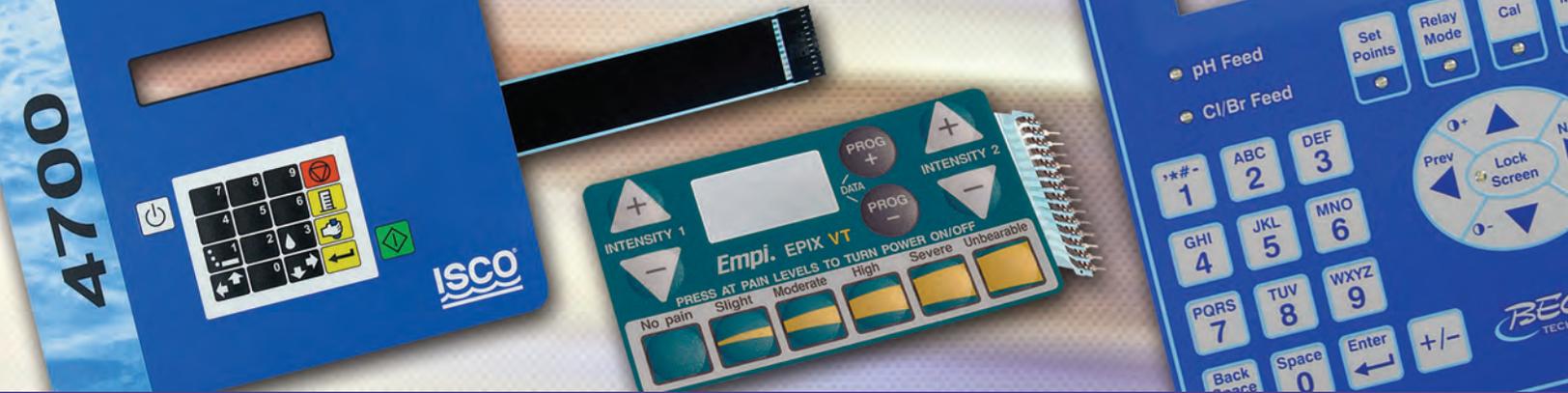
Today's environment of "Zero Defects," ISO, SPC, JIT delivery and other management concepts, all geared toward premium products delivered on time, demands quality. That's why Douglas has developed company-wide practices which assure uncompromised production excellence on every program we're awarded. That means you can expect perfection in all facets of production...even down to color, finish and surface texture match.

We live and breathe precision. Whether your switch project involves a multi-tasking circuit design, backlighting, assembly and surface mounted components or precise print registration—our skilled people put their knowledge to work everyday in an environment of total quality control at each stage of the process.



DOUGLAS
CORPORATION





Precision Switch Technology...Customized and Complete

WE PROVIDE:

- ▶ Custom design expertise.
- ▶ Single source manufacturing.
- ▶ Assembly of surface mount components/circuit boards/backplates.
- ▶ Multi-tasking switch pattern designs.
- ▶ Custom molded boxes, bezels and frames with switch installation.
- ▶ Precise color matching and repeatability.
- ▶ Water resistant designs to Nema 4.
- ▶ 100% function testing of all circuits in-house.
- ▶ Fiber optic or electroluminescent backlighting.

SPECIFICATIONS:

Specifications will vary depending on materials, construction and circuitry. Please consult Douglas Engineering for specific characteristics.

Electrical

- ▶ Operating Voltage: 0-30 VDC.
- ▶ Operating Current: 100 MA Max.
- ▶ Operating Contact Resistance: Less than 100 OHMS typical (measured at the connector).
- ▶ Contact Bounce: Less than 10 Milliseconds typical.
- ▶ Conductors: Printed silver conductive inks or carbon blend. (PC board assemblies available).
- ▶ RFI and Static Shielding available in most configurations.

Mechanical

- ▶ Life Expectancy: Douglas guarantees 1,000,000 actuations per switch position or 12 months.
- ▶ Actuation Force: 2 - 12 oz. range available—depending on customer specification. (4 - 8 oz. is considered medium actuation force for non-tactile configuration).
- ▶ Switch Travel: .005" to .030" typical.
- ▶ Overall Thickness: .020" to .050" typical.

Environmental

- ▶ Storage Temperature: -40° C (-40° F) to +70° C (158° F).
- ▶ Storage Altitude: Sea level to 40,000 feet.
- ▶ Operating Temperature and Altitude: Variable depending on customer requirements (can be designed to operate in most environments).
- ▶ Humidity: No delamination after 24 hours at 85° C and 85% RH.
- ▶ The specifications above are general. For information on more specific applications, contact one of Douglas Corporation's design engineers.



DESIGN CONSIDERATIONS:

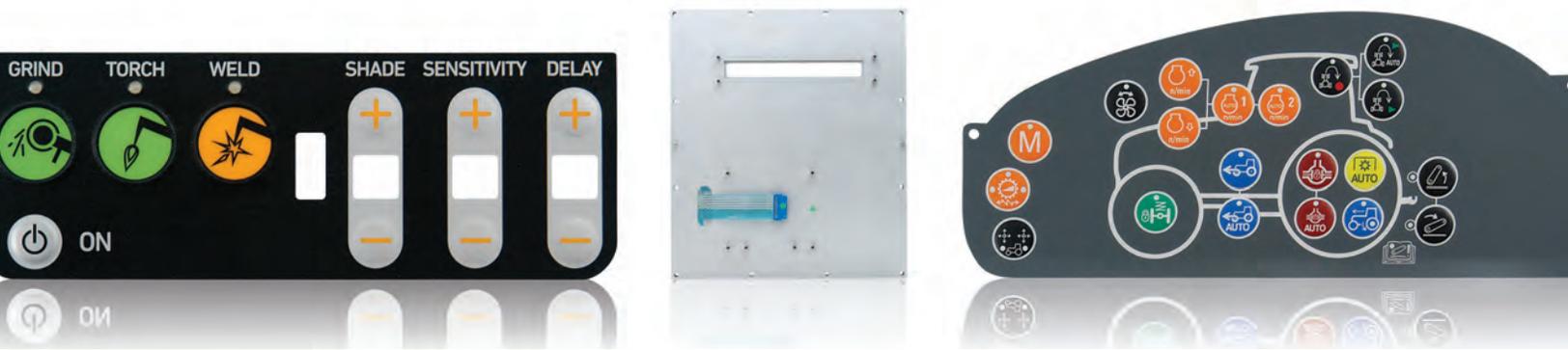
Design freedom begins when you integrate membrane switches into your product. Because no single configuration can always meet your requirements, we will tailor your switch to fit the application and your specifications.

- ▶ **Materials:** Depending on the application and environmental requirements, polyester and polycarbonates are commonly used. Thickness ranges are .007" to .010". Blended materials and UV hardcoat surfaces are additional options.
- ▶ **Selective Texturing:** For hardcoats as well as aesthetic enhancement of the graphic overlay.
- ▶ **Embossing:** Embossing of the key pads for key location can be achieved by full key pad embossment or rim embossment.
- ▶ **Windows:** Transparent and deadfront display windows for viewing LCD and LED displays.
- ▶ **Termination:** Tail termination is accomplished by snap fit connectors, solder tabs, or exposed silver tabs (.100" centers typical).
- ▶ **Tactile Feedback:** Stainless steel domes range from 8-12mm. Poly domes are embossed onto a polyester layer or circuitry.
- ▶ **Shielding:** Shielding from EMI/RFI can be accomplished by a layer of metallized polyester or by screening a layer of selective graphite ink.
- ▶ **Backlighting:** Douglas offers several options for the various information readout devices available to fit customer requirements.
- ▶ **Panel Cutouts:** Die cut holes and access for mechanical switches may be incorporated into membrane switch designs.
- ▶ **Back-Plates and Printed Circuit Boards:** Available as a finished assembly with Douglas membrane switches.
- ▶ **Environmental Design:** Applications subject to various degrees of moisture or high humidity are engineered and constructed accordingly.
- ▶ **Graphic Design and Engineering Assistance:** Full service art and engineering departments are ready to provide complete or partial assistance in the aesthetic design of graphic overlays and the engineering of correct switch construction for your application.

QUOTATION REQUEST:

The more information supplied regarding application, requirements and environment, the more accurate our quotation will be.

- ▶ Switch application.
- ▶ Quantities required for prototypes and production.
- ▶ Material requirements.
- ▶ Graphic overlay material, polycarbonate or polyester.
- ▶ Overlay finish requirement.
- ▶ Number of colors to be printed on graphic overlay.
- ▶ Overall dimensions or prints.
- ▶ Embossing requirements.
- ▶ Type of termination required and tail length.
- ▶ Dome type, if tactile feel is needed.
- ▶ Pinout requirements.
- ▶ Other special requirements.



ISO 14001:2004, ISO 9001:2008 and ISO/TS 16949:2009 Certified

WE INVITE YOUR INQUIRY

Whether you want to review vendors for an existing program, or you want to investigate options for something entirely new, please call us. We will be happy to answer any questions over the phone.

If you're at the drawing stage, send us a file so we can be more specific. Then, when you want, we will advise our local representative of your particular needs and arrange a personal meeting at your convenience.



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