

# Series Digilever<sup>®</sup>

QPL approved to MIL-S-22710/24  
 10 dial positions  
 Rear mounted  
 Switch O.D. size 12.19 (.480) wide x  
 40.87 (1.610) high  
 Representatives or factory direct.

When ordering qualified switches in accordance to MIL-S-22710 you must state this requirement on your order for proper processing by the factory.

## DESCRIPTION

The Series 24000 Digilever<sup>®</sup> was engineered to operate in any hostile or inert environment with built-in aerospace quality. It provides fast response, with superior tactile feel and is completely panel-sealed.

The Digilever<sup>®</sup> is a stand-alone switch that can be mounted singly or in groups, with each switch fitted into its own mounting hole. This individualized mounting makes certain that no fluids or contaminants get past the switch and into the control panel.

## FEATURES

- \*Special dial characters
  - Factory installed dial stops
  - Dust protected switch chamber
  - Panel sealed
  - \*RFI shielding
  - Replaceable lighting
  - \*Provisions for mounting components
  - Bi-directional
- \*See switch parameters for details or consult factory.

## SPECIFICATIONS

### MECHANICAL

**Operating force:** 12-36 ounces (positive tactile feel).

**Life:** Over 1,000,000 detent operations. All specifications valid after life cycling.

**Standard color and finish:** Matte black case with satin black dial and white dial markings.

**Dial character height:** .200".

**Weight:** 3/5 ounce (approximately).

### Lighting (optional):

**Lamp size:** T-1 per MS-24515-718.

**Filter color (optional):** clear, red. For others, consult factory.

**Character light intensity:** clear and amber, 2 ± 1 ft. L.; red, 1 ± .5 ft. L.; 115 milliamps lamp current with 5.0 volts applied.

**Switching characteristics:** Multi-common units always non-shorting between commons.

### ELECTRICAL:

**Rated electrical loads:** 28 VAC or 28 VDC at 125 milliamps resistive. Higher ratings available upon special request. Non-switching current 1 amp maximum at rated operating temperature.

**Contact resistance:** Less than 100 milliohms between common and any output terminal. 60 milliohms

maximum change during life of switch.

**Insulation resistance:** 1000 megohms minimum per MIL-STD-202, Method 302, Test Condition A between any two non-connected terminals.

**Dielectric strength:** Per MIL-STD-202, Method 301. 750 VRMS for one minute between any two non-connected terminals; 250 VRMS at reduced barometric pressure.

### ENVIRONMENTAL:

**Moisture resistance:** Per MIL-STD-202, Method 103, a ten-day test at 40° ± 2 °C and 90% to 95% relative humidity. Sample must measure 25 megohms minimum insulation resistance immediately after humidity test.

**Thermal shock:** -65 °C to +85 °C, per MIL-STD-202, Method 107, Test Condition A.

**Operating temperature:** -55°C to +85°C, unlighted, -65°C to +71°C, 5V, -65°C to +65°C, 28V, lighted.

**Shock:** 100 G's, 6 milliseconds, per MIL-STD-202, Method 213, Test Condition I.

**Vibration:** 15 G's at 70-2000 Hz; .06" double amplitude at 0-70 Hz. (Ref: MIL-STD-202, Method 204, Test Condition B.) There shall be no contact opening for more than 1 microsecond (including bounce) during test.

**Explosion proof:** Per MIL-STD-202, Method 109, with test load of 28 VDC @ 125 milliamps resistive.

**Altitude:** 0-70,000 ft.

**Salt spray:** Per MIL-STD-202, Method 101, Test Condition B. Measurements after exposure non-applicable.

**Sand and dust:** Per MIL-STD-202, Method 110, Test Condition B. Operating force not to increase more than 100% of original value.

### MATERIALS:

**Plastic parts:** Thermoplastic (polycarbonate or nylon).

**Printed circuit board:** Laminate per MIL-P-13949, Type GF, plated with nickel per Fed. Spec. QQ-N-290, Class 2, and gold plated per MIL-G-45204, Type II, Class 1.

**Detent spring:** Type 302 stainless steel.

**Contacts:** Precious metal alloy.

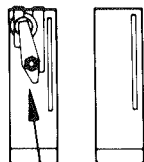
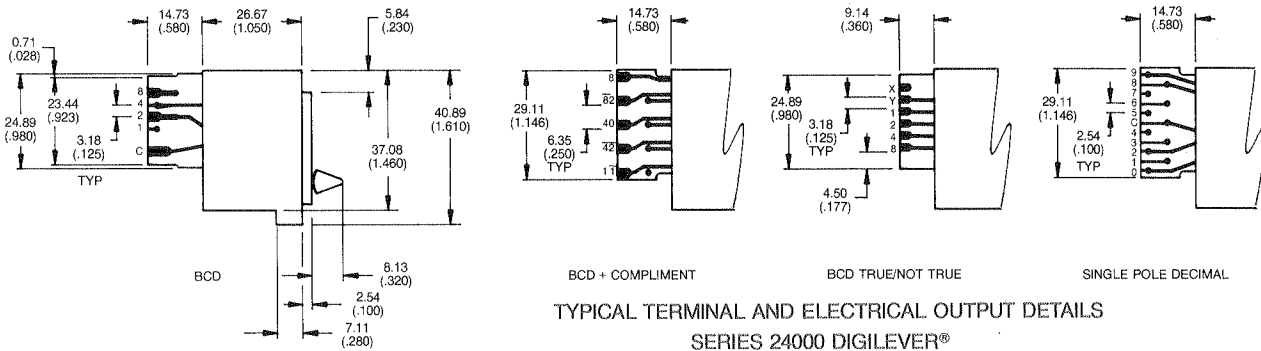
### IMPORTANT NOTICE:

Do not allow flux or cleaning agent to enter switch. Use only 40% isopropyl alcohol in distilled water for cleaning agents. For additional information about recommended cleaning methods, contact Digitran.

TRUTH TABLE CODES SERIES 24000

Truth Tables Positions	001	002	003	004	006	007	008	011	013	014	016	017	021	022	023	024	025	038	039	041	043	047	048	049	050
Code Series	2	8	8	8	8	8	10	10	10	10	10	10	10	10	10	10	10	10	10	12	12	16	16	16	16
• 24 = 24000	•	*	*	*	—	*	•	•	•	•	•	•	—	—	•	—	•	—	—	—	—	—	—	—	—
PC Terminations per Truth Table Code	S	S	S	S	—	S	S	S	S	S	S P W	S	—	—	S	—	S	—	—	—	—	—	—	—	—

\*Octal code achieved by dial stops.

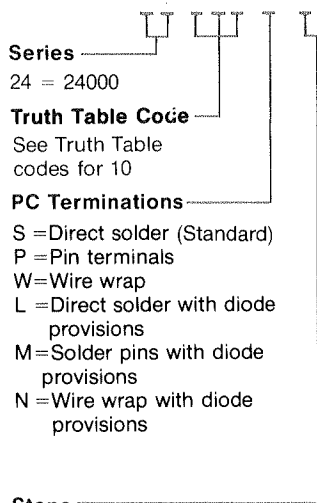


VIEW WITH LAMP ATTACHMENT

How to order standard switch modules\*

All spaces must be filled for a complete part (switch) number

Example: 24/001/W/NS/S/F/O



Lighting\*\*

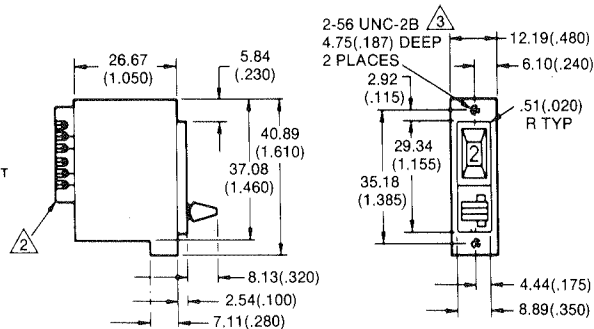
- LAMP VOLTAGE
- O = No Lighting
  - E = Clear 5
  - G = Clear 28
  - H = Red 5
  - K = Red 28
  - Z = Lighting provisions red filter no lamp.
  - Y = Lighting provisions clear filter no lamp.

Color\*\*\*

F = Matte black case, satin black dial, white characters.

Dial Options

- S = Standard dial (See \*\*\*\*)
- C = 0, 5 repeating
- D = 0, 1 repeating



RECOMMENDED PANEL CUTOUT

NOTES:

1. Drawing tolerances: .x = ± .8(.030), .xx = ± .25(.010).
2. For termination details, see drawing of specific module. See truth table for output circuit details.
3. Screw torque should not exceed 25 in.-oz.
4. Prime dimensions are metric.

WINDOW AND CHARACTER DIMENSIONS

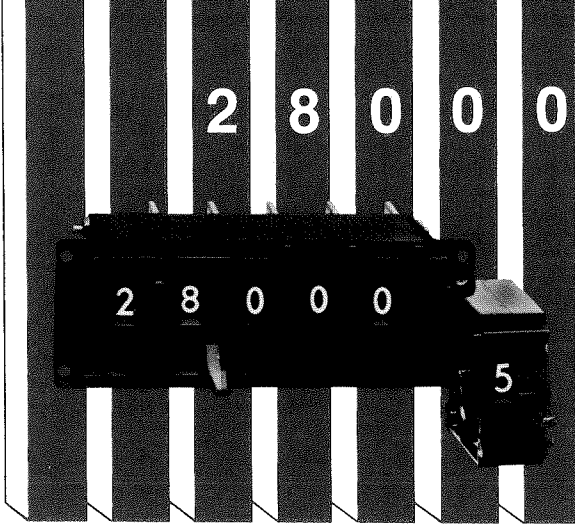
Positions	Window Dimensions		Max character Height	Visual Comparison
	H	W		
10	6.60 (.260)	4.31 (.170)	5.08 (.200)	

3

Character heights cannot be increased from those shown. For maximum usable window width, consult factory.

\*When ordering fully sealed switches consult factory.  
 \*\*When ordering a lighted switch, back lighting is standard. For other positions consult factory.  
 \*\*\*For nonstandard colors and combinations consult factory.  
 \*\*\*\*Standard dial Truth Table 001 for the 24000 is +, - repeating. Standard dial Truth Table 010 through 040 is 0-9.

Notes 1 — For nonstandard switch options and features not covered in the how to order chart, see modified ordering instruction section, page 78, or consult factory.



# Series Minilever®

10 or 12 dial positions  
 Rear mounted  
 Switch O.D. size 12.70 (.500) wide x  
 29.20 (1.15) high  
 Distributor or factory direct

## DESCRIPTION

Series 28000 was engineered especially for up-or-down applications requiring frequent and rapid switch settings. The lever travel is 90°, setting action is smooth with each position providing positive tactile feedback to the operator. Upper or lower viewing windows are provided to simplify readability for most panel viewing angles. The series 28000 Minilever® with its numerous features and options is truly an exceptional Miniswitch®.

## FEATURES

- Factory installed dial stops
- \*Special dial characters
- 12.7 (.500) and 6.35 (.250) spacers
- \*Lighted decimal point on spacers
- 25.4 (1.0) message unit upper window only
- Optional markings on switch case and spacers
- 19.05 (.750) double modules
- \*Provisions for mounting components
- Upper window option
- Available in most popular codes, Off the shelf through distribution
- Field assembly or factory assembled to customer specifications

\*See switch parameters for details or consult factory.

## SPECIFICATIONS

### MECHANICAL

**Operating force:** 4 to 8 ounces.

**Dial character height:** .200" standard single character size. (Double characters or message unit character size slightly smaller. Ask Digitran for details for specific modules.)

**Life:** Over 1,000,000 detent operations.

**Weight:** .50 ounce per module (approximately).

**Standard color and finish:** Switch case, lever and end brackets, matte black. Dial, satin black. Dial marking, white.

### ELECTRICAL:

**Electrical loads:** 28V AC or 28V DC at 50 milliamps. Non-switching current, 1 amp.

**Contact resistance:** Less than 100 milliohms (initial) between common and each output terminal.

**Insulation resistance:** 1000 megohms minimum.

**Dielectric strength:** 500 VRMS.

### ENVIRONMENTAL:

**Shock:** 50 G's per MIL-STD-202, Method 213, Test Condition I.

**Vibration:** 15 G's per MIL-STD-202, Method 204, Test Condition B.

**Operating temperature:** -65 °C to +85 °C.

### MATERIALS:

**Plastic parts:** Thermoplastic (polycarbonate, nylon or teflon).

**Printed circuit board:** Laminate per MIL-P-13949, Type GF, plated with nickel per Fed. Spec. QQ-N-290, Class 2 and gold plated per MIL-G-45204, Type II.

**Contacts:** Precious metal alloy.

**Hardware:** Corrosion protected or corrosion resistant steel.

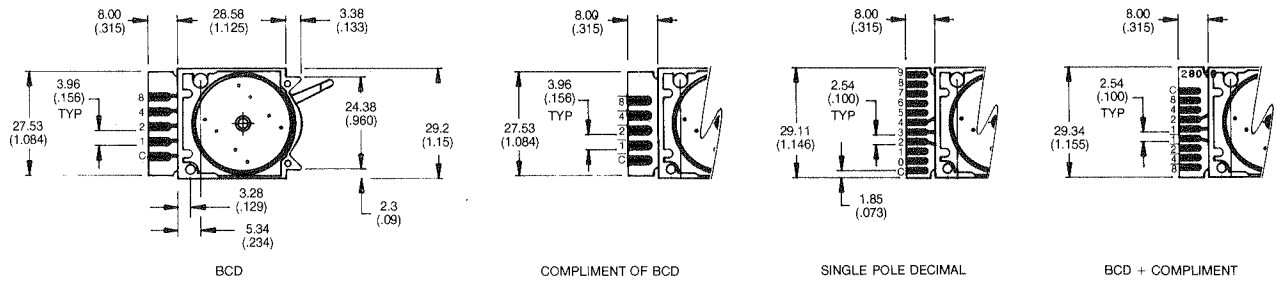
### IMPORTANT NOTICE:

Do not allow flux or cleaning agent to enter switch. Use only 40% isopropyl alcohol in distilled water for cleaning agents. For additional information about recommended cleaning methods, contact Digitran.

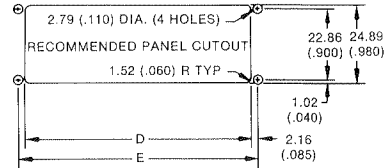
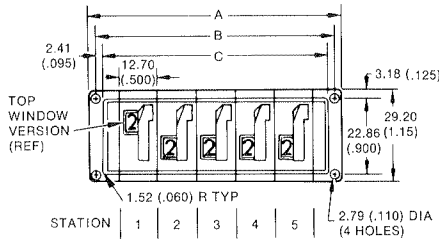
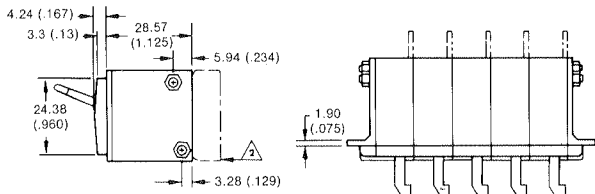
## TRUTH TABLE CODES SERIES 28000

Truth Tables Positions	001 2	002 8	003 8	004 8	006 8	007 8	008 10	011 10	013 10	014 10	016 10	017 10	021 10	022 10	023 10	024 10	025 10	038 10	039 10	041 12	043 12	047 16	048 16	049 16	050 16
Code Series																									
• 28 = 28000	•	*	*	*	—	—	•	•	•	•	•	—	—	•	—	—	•	—	—	•	•	—	—	—	—
PC Terminations per Truth Table Code	S — C —	S — — —	S — — —	S P W C L	— — — —	— — — —	S P W C	S — — —	S P W C L	S P W C	S — — —	— — — —	— — — —	S P W C	— — — —	— — — —	— — — —	— — — —	S — — —	S P W C	— — — —	— — — —	— — — —	— — — —	— — — —

\*Octal code achieved by dial stops.

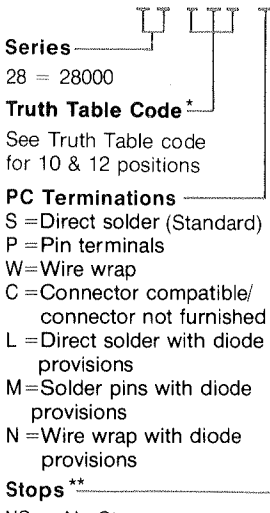


TYPICAL TERMINAL AND ELECTRICAL OUTPUT DETAILS SERIES 28000 MINILEVER®



**How to order standard switch modules**

See page 79 for Assembly Ordering Instructions  
 All spaces must be filled for a complete part (switch) number  
 Example: 28/001/S/NS/S/F/O



- Series**  
28 = 28000
- Truth Table Code** \*
- See Truth Table code for 10 & 12 positions
- PC Terminations**  
 S = Direct solder (Standard)  
 P = Pin terminals  
 W = Wire wrap  
 C = Connector compatible/  
 connector not furnished  
 L = Direct solder with diode provisions  
 M = Solder pins with diode provisions  
 N = Wire wrap with diode provisions
- Stops** \*\*  
 NS = No Stops  
 For stops show first and last position.  
 (i.e. 3 9 the dial will now read 3 through 9)
- Lighting**  
 O = No lighting available
- Color** \*\*\*  
 F = Matte black case, satin black dial, white characters
- Dial Options**  
 S = Standard dial characters  
 B = -, + repeating  
 C = 0, 5 repeating

**RECOMMENDED ASSEMBLY PANEL CUTOUT DIMENSIONS**

Number of Stations	A	B	C	D	E
1	32.0(1.26)	27.7(1.09)	22.9(.90)	23.4(0.92)	27.7(1.09)
2	44.7(1.76)	40.4(1.59)	35.6(1.40)	36.1(1.42)	40.4(1.59)
3	57.4(2.26)	53.1(2.09)	48.3(1.90)	48.8(1.92)	53.1(2.09)
4	70.1(2.76)	65.8(2.59)	61.0(2.40)	61.5(2.42)	65.8(2.59)
5	82.8(3.26)	78.5(3.09)	73.7(2.90)	74.2(2.92)	78.5(3.09)
6	95.5(3.76)	91.2(3.59)	86.4(3.40)	86.9(3.42)	91.2(3.59)
7	108.2(4.26)	103.9(4.09)	99.1(3.90)	99.6(3.92)	103.9(4.09)
8	120.9(4.76)	116.6(4.59)	111.8(4.40)	112.3(4.42)	116.6(4.59)
9	133.6(5.26)	129.3(5.09)	124.5(4.90)	125.0(4.92)	129.3(5.09)
10	146.3(5.76)	142.0(5.59)	137.2(5.40)	137.7(5.42)	142.0(5.59)

**Notes:**

1. Drawing tolerances: .X = ±.8 (.030), .XX = ±.25 (.010).
2. For termination details, see drawing of specific module. See truth table for output circuit details.
3. Prime dimensions are metric.
4. Tolerance of B, D and E dimensions is ±.25 (.010).

**WINDOW AND CHARACTER DIMENSIONS**

Positions	Window Dimensions		Max. character Height	Visual Comparison
	H	W		
10	7.62 (.300)	4.57 (.180)	5.08 (.200)	
12	7.62 (.300)	4.57 (.180)	5.08 (.200)	

**Not all options are available in all series or codes. Some tooling charges may be required.**

\*For upper window option add 500 to code (i.e. code 001 + 500 = 501).  
 \*\*For stops on 12 position modules use the modified ordering instruction section or consult factory.  
 \*\*\*For non-standard colors and combinations consult factory.

Notes 1 — For nonstandard switch options and features not covered in the how to order chart, see modified ordering instruction section, page 78, or consult factory.

Character heights cannot be increased from those shown. For maximum usable window width, consult factory.

# Lever/Toggle Switch Applications

These are basically the same concept in design as the thumbwheel switches: conserving panel space while increasing both setting and reading speed accuracy. They are especially advantageous in applications requiring frequent and rapid switch settings.

Typical applications are:

- Process control
- Marine
- Avionics/Ground support — Military/Commercial
- Geophysical/Oil drilling instrumentation
- Medical

