Industrial Automation Catalog Section - U906

Switches & Pilot Devices

LW Series

- Selection Guide
- Pushbuttons, Pilot Lights, Selector & Keylock Switches
- Accessories
- Dimensions
- Instructions

For up-to-date information, or to request a full copy of this catalog, contact us at **www.idec.com** or **800-262-IDEC.**.

Due to continuous product improvements, specifications are subject to change wihtout notice.

Switches & Pilot Devices

LW Series Oiltight Switches and Pilot Devices Ø 7/8" (22mm)

Series Model	LWΔB–	LWΔL–	LW1S–	LW1F	LW1K	LWΔP–
Appearance						
See Page	*A-59*	*A-61*	*A-65*	*A-65*	*A-65*	*A-63*
Operator Type	Non-Illuminated Pushbuttons • Momentary • Maintained	Illuminated Pushbuttons: • Momentary • Maintained • LED/Incan.	Selector Switch: • 2 or 3- position	Illuminated Selector: • 2 or 3- position • LED/Incan.	Key Selector: • 2 or 3- position • Key removable options	Pilot Light • LED/Incan.
Contact Configuration	SPDT, DPDT, 3PDT					—
Contact Ratings	Gold-clad crossbar contacts 30VDC/.1A, 125VAC/.1A resistive					—
	Silver Contacts 30VDC/2A, 125VAC/3A, 250VAC/2A resistive 30VDC/1A, 125VAC/2A,250VAC/1.5A inductive					
Mechanical Life	Momentary: 1,000,000 operations minimum, Maintained: 500,000operations, Selectors: 250,000 operations minimum					
Electrical Life (at rated load)	Momentary: 100,000 (1800 operations/hour) Maintained: 100,000 (900 operations/hour)					—
Degree of Protection (conforming to IEC529)	Oiltight/watertight: IP65					IP65
Termination	• .110" solder/quick connect • PCB(gold contacts only) • M3 screw (2 pole only)					
Approvals	UL Recognized File No.E55996		CSA Certified File No. LR21451		Reg. No. J9551801 TÜV Rheinland	CE

1. Lamps not included in assembled units.
2. Available as assembled or sub-assembled components.

General Information

Information About LED Lamps

Light-emitting diodes (LEDs) are P–N junction semiconductors with mechanisms called "junction electro-luminescence." Application of direct current results in radiation or emission of a monochromatic light.

Different semiconductor materials produce different wavelengths of light as shown below:

Specifications			
	Green	Gallium Phosphide (GaP)	5600 Å
	Yellow	Gallium Arsenide Phosphide (GaAsP)	5800 Å
	Amber	Gallium Arsenide Phosphide (GaAsP)	6300 Å
	Red	Gallium Arsenide Phosphide (GaAsP)	6600Å
	Infrared	Gallium Arsenide (GaAs)	9000 Å

Advantages of Using LEDs

- **LEDs are used when heat generated by incandescent lamps would damage nearby equipment or interfere with a precision process. This is particularly advantageous when multiple lights are grouped.**
- **LEDs can operate at low temperatures which would cause incandescent lamps to fail, since glass cracks during rapid cooling.**
- **LEDs consume 50 times less power than incandescent lamps, thereby reducing energy consumption.**
- **LEDs last 500 times longer than incandescent lamps. LEDs average a million hours (114 years) while incandescent lamps average 2000 hours.**
- **LEDs do not generally "blow out" unless subjected to a severe overvoltage. They exhibit a half-life type dimishment in brightness over time. After 50,000 hours (6 years) of use, IDEC LEDs will retain approximately half of their original intensity.**
- **IDEC's SUPERBRIGHT LEDs have high visibility.**
- **LEDs require little or no maintenance because of long life and high reliability.**

IDEC Recommendations

For optimum results, especially when using switches and pilot lights in operating environments which are conducive to overheating, use IDEC LED illuminated units. Transformers are available for use with incandescent illuminated units, which operate at lower voltages to avoid overheating.

When IDEC's L-120L lamp is used, make sure ambient temperatures do not exceed 30˚C (86˚F). If a lamp from another supplier is used, it should be rated for less than 1.8 watts (15mA at 120V AC), with ambient temperatures as stated above.

Information About Incandescent Lamps

Filament-type incandescent lamps operate within the following parameters.

Light output and life expectancy depend on operating voltage. Light output varies to the 3rd or 4th power of the voltage. Life expectancy varies inversely to the 12th power of voltage. In other words, over-voltage of 5% reduces life expectancy by 50%. Under-voltage of 5% doubles life expectancy at the price of light output efficiency.

Inrush current (initial current through the filament) has an adverse effect on life expectancy. Cold resistance (room temperature) will have a more detrimental effect than hot resistance to inrush current. Life expectancy of incandescent lamps can be maximized by reducing occurrences of cold resistance to inrush current.

Continued intermittent flashing will significantly reduce life expectancy. When using an incandescent lamp with a tungsten filament, flashing will not reduce life expectancy as long as light output does not exceed that of steady burning.

When an incandescent lamp must withstand shock and vibration, use low voltage/high amperage (5–6V/60–120mA) lamps. These lamps have a short, thick filament with a high resonant frequency.

Provide cooling by using a heat sink, particularly when multiple incandescent lamps are grouped or when air circulation is limited. Make sure ambient temperatures do not exceed 100˚C (212˚F) for maximum life of incandescent lamps.

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Comparison: LED vs. Incandescent Lamps

		Superbright LEDs	Incandescent
Characteristics	**Heat Dissipation**	Very Low	High
	Life Expectancy	Very Long	Short
	Reliability	Very High	Low
	Mechanical Strength	Not Susceptible	Susceptible to Shock/Vibration
	Maintenance Required	Negligible	Frequent
	Operation at Low Temps.	Possible	Not Possible
	Inrush Current	Negligible	Very Large
	Voltage Effects on Life	Insignificant	Significant
	Brightness	Slightly Less	Slightly More

Ordering Information

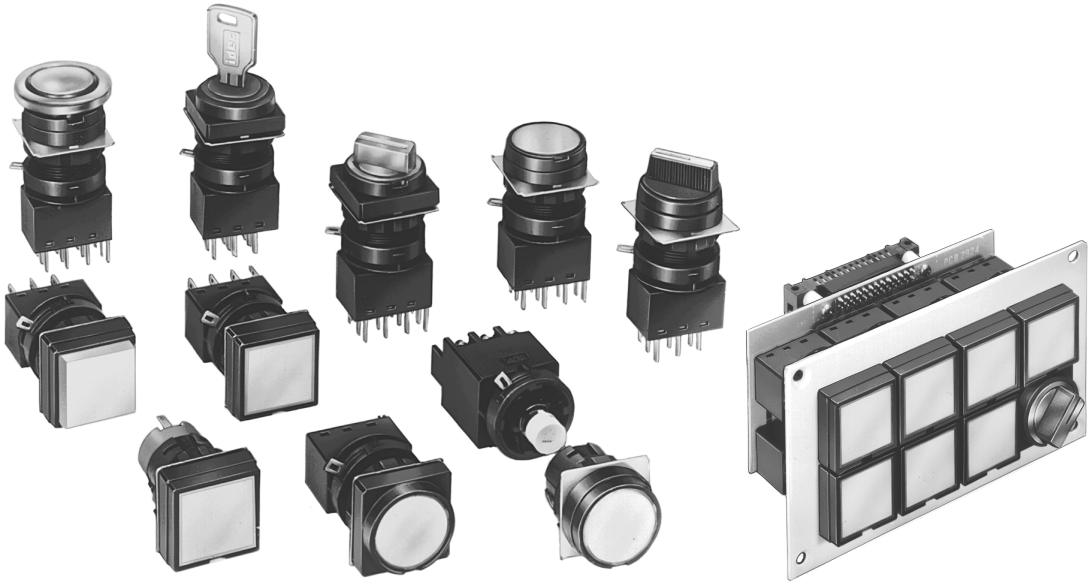
1. IDEC offers assembled and sub-assembled switches and pilot lights for your convenience. In some cases there is a cost difference, with sub-assembled units costing slightly less. Since assembled units are custom made to your order, a couple of days for assembly is added to delivery . To minimize delivery or inventory requirements, it is recommended that switches and pilot lights be ordered as sub-components.
2. When ordering pilot lights or illuminated pushbuttons, make sure to specify the color code in place of the asterisk in the part number, (LED or incandescent lamp included). Spare lamps can be ordered and are listed with sub-assembly components.
3. Accessories, such as locking ring wrench, lens removal tool, and lamp holder, are available to make installation and assembly easier. IDEC recommends using these accessories and is not responsible for damage as a result of using the wrong tool.
4. Marking plates are available for switches and pilot lights which feature a flat lens. Printed mylar (not included) can also be inserted under lens for labeling purposes.
5. Nameplates are available for TW, 7/8" (22mm), HW 7/8" (22mm),and TWTD series, Ø1–13/64" (30mm). For prompt delivery, order standard legends. Custom engraving is also offered for an additional charge.

Installation and Operation

1. Use the appropriate lamp holder to remove or install LED or incandescent lamps. Using pliers will damage the lamp.
2. When mounting switches and pilot lights into a panel, use locking ring wrench.Using pliers or tightening excessively will damage the locking ring.
3. A series, 21/64" (8mm), can be mounted on a panel 0.019" (0.5mm) to 0.236" (6mm) thick.
4. LW 7/8" (22mm), TW, 7/8" (22mm), and TWTD series, Ø1–13/64" (30mm), feature an adjustment ring for mounting on a panel 0.038" (1mm) to 0.236" (6mm) thick. Using a nameplate or an anti-rotation ring adds 0.031" (0.8mm) to the panel thickness.
5. When applicable, solder terminals within 20W/5sec or 260˚/3sec without exerting external force to the terminals. Use a non-corrosive resin liquid flux.
6. The operating voltage for LED units represents a complete DC value. When using a pulsing voltage, such a full-wave rectification, keeppeak currents within the forward current I_f. Peak currents exceeding I_f may shorten the life of the LED lamp.
7. To avoid a short circuit, never connect NO and NC contacts to different voltages or power sources.
8. Optimum performance of TW and TWTD illuminated pushbuttons, selector switches, and pilot lights is obtained with IDEC LED and incandescent lamps.
9. For maximum life of incandescent lamps (approximately 2000 hours), use within the rated operating voltage. If it is necessary to use a higher voltage, keeping ambient temperature below 30˚C (86˚F)will help prolong the life of an incandescent lamp.

If excessive voltage is applied (over 50V), the lamp may blow and the lens holder may pop out.

LW Series — Switches and Pilot Devices: 7/8" (22mm)



LW Series offer flexibility in space-saving package

Key features include:

- *PC board mount, solder or screw terminal*
- *Collective mounting saves space*
- *Non-reflective lens*
- *Highly visible marking plate*
- *Tamper proof construction*
- *Light touch reduces strain*
- *Gold or silver contacts*
- *Removable contacts simplify wiring and facilitate PCB applications*

LW Series switches and pilot lights can be mounted collectively on 1.0" centers. Combined with pcb terminals and locking lever removable contacts, this eases manufacture of pre-fab pushbutton arrays (as pictured). PC Board tracing/soldering of contacts can be done in tandem with panel cutting/operator installation.

All LW series units mount by means of a locking ring that comes on from the rear of the panel, as such they can not be removed from outside the panel and are relatively tamperproof.

Combining the snap action and tactile feel of miniature commercial pushbuttons with the size and ruggedness of industrial pushbuttons, LW pushbuttons are a unique solution to many applications.

Choose from standard silver contacts or low-level gold plated contacts. Terminals available in .110" solder tab, M3 screw, or pcb pins.

UL Recognized
File # E55996

CSA Certified
File No. LR21451

CE

TÜV Rheinland
Registration
No. J9551801

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Specifications

Operating Temperature		–25 to +60°C (without freezing) LED illuminated type: –25 to +50°C
Storage Temperature		–40 to +80°C
Operating Humidity		45 to 85% RH
Contact Resistance		50mΩ maximum (initial value)
Insulation Resistance		100MΩ minimum (500V DC megger)
Dielectric Strength	**Switch Unit**	Between live part and ground: 2,500V AC, 1 minute Between terminals of different poles: 2,500V AC, 1 minute Between terminals of the same pole: 1,000V AC, 1 minute
	Illumination Unit	Between live part and ground: 2,500V AC, 1 minute
Vibration Resistance		Operating extremes: 5 to 55Hz, Amplitude 1.0mm p-p
Shock Resistance		Damage limits: 1,000 m/sec^2 (Approx. 100G) Operating extremes: 100 m/sec^2 (Approx. 10G)
Mechanical Life		Momentary: 1,000,000 operations minimum Maintained: 500,000 operations minimum Selector: 250,000 operations minimum Illuminated Selector: 250,000 operations minimum
Electrical Life		Momentary: 100,000 operations minimum (at 1,800 operations/hour) Maintained/Selector: 100,000 operations minimum (at 900 operations/hour)
Degree of Protection		Watertight/oiltight IP65 (IEC Pub529) (except key selectors)
Insulation Voltage		250VAC/DC
Materials	**Lenses**	polyarylate
	Operators	polyacetate
	Marking Plates	acrylic resin
Terminal Style		.110" Solder tab quick connect PC board terminal (gold contacts only) Screw terminal (DPDT units only)

Contact Ratings

Contact Material	Thermal Current	Contact Rating	Remarks
Gold-clad cross-bar	3A	30VDC/0.1A resistive	Minimum applicable load (reference value): 5V, 1mA AC/DC. (Applicable range is subject to the operating condition and load.)
		125VAC/0.1A resistive	
Silver Contact	5A	30VDC/2A resistive	AC inductive load: PF=0.6 to 0.7, DC inductive load: L/R=7ms maximum.
		30VDC/1A inductive	
		125VAC/3A resistive(50/60Hz)	
		125VAC/2A inductive (50/60Hz)	
		125VDC/0.4A resistive	
		125VDC/0.2A inductive	
		250VAC/2A resistive(50/60Hz)	
		250VAC/1.5A inductive (50/60Hz)	

Lamp Ratings

	Voltage	Current/Wattage
LED	6V AC/DC ±5%	20mA
	12V AC/DC ±10%	20mA
	24V AC/DC ±10%	20mA
	120V AC ±10%	10mA
Incandescent	6.3V AC/DC ±5%	1W
	12V AC/DC ±10%	1W
	24V AC/DC ±10%	1W

UL Recognized
File # E55996

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CE

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LED lamps contains a built-in current-limiting resistor and reverse polarity protection diode.

Non-Illuminated Pushbuttons (Assembled)

Part Numbers: LW1B/LW2B Pushbuttons

Style	Contact Material	Contact	Part Number					
			Momentary			Maintained (Latching)		
			Solder/Tab	PC Board	Screw	Solder/Tab	PC Board	Screw
Round Flush 	Gold	SPDT	LW1B-M1C1-①	LW1B-M1C1V-①	—	LW1B-A1C1-①	LW1B-A1C1V-①	—
		DPDT	LW1B-M1C2-①	LW1B-M1C2V-①	LW1B-M1C2M-①	LW1B-A1C2-①	LW1B-A1C2V-①	LW1B-A1C2M-①
		3PDT	LW1B-M1C3-①	LW1B-M1C3V-①	—	LW1B-A1C3-①	LW1B-A1C3V-①	—
	Silver	SPDT	LW1B-M1C5-①	—	—	LW1B-A1C5-①	—	—
		DPDT	LW1B-M1C6-①	—	LW1B-M1C6M-①	LW1B-A1C6-①	—	LW1B-A1C6M-①
		3PDT	LW1B-M1C7-①	—	—	LW1B-A1C7-①	—	—
Square Flush 	Gold	SPDT	LW2B-M1C1-①	LW2B-M1C1V-①	—	LW2B-A1C1-①	LW2B-A1C1V-①	—
		DPDT	LW2B-M1C2-①	LW2B-M1C2V-①	LW2B-M1C2M-①	LW2B-A1C2-①	LW2B-A1C2V-①	LW2B-A1C2M-①
		3PDT	LW2B-M1C3-①	LW2B-M1C3V-①	—	LW2B-A1C3-①	LW2B-A1C3V-①	—
	Silver	SPDT	LW2B-M1C5-①	—	—	LW2B-A1C5-①	—	—
		DPDT	LW2B-M1C6-①	—	LW2B-M1C6M-①	LW2B-A1C6-①	—	LW2B-A1C6M-①
		3PDT	LW2B-M1C7-①	—	—	LW2B-A1C7-①	—	—
Round Extended 	Gold	SPDT	LW1B-M2C1-①	LW1B-M2C1V-①	—	LW1B-A2C1-①	LW1B-A2C1V-①	—
		DPDT	LW1B-M2C2-①	LW1B-M2C2V-①	LW1B-M2C2M-①	LW1B-A2C2-①	LW1B-A2C2V-①	LW1B-A2C2M-①
		3PDT	LW1B-M2C3-①	LW1B-M2C3V-①	—	LW1B-A2C3-①	LW1B-A2C3V-①	—
	Silver	SPDT	LW1B-M2C5-①	—	—	LW1B-A2C5-①	—	—
		DPDT	LW1B-M2C6-①	—	LW1B-M2C6M-①	LW1B-A2C6-①	—	LW1B-A2C6M-①
		3PDT	LW1B-M2C7-①	—	—	LW1B-A2C7-①	—	—
Square Extended 	Gold	SPDT	LW2B-M2C1-①	LW2B-M2C1V-①	—	LW2B-A2C1-①	LW2B-A2C1V-①	—
		DPDT	LW2B-M2C2-①	LW2B-M2C2V-①	LW2B-M2C2M-①	LW2B-A2C2-①	LW2B-A2C2V-①	LW2B-A2C2M-①
		3PDT	LW2B-M2C3-①	LW2B-M2C3V-①	—	LW2B-A2C3-①	LW2B-A2C3V-①	—
	Silver	SPDT	LW2B-M2C5-①	—	—	LW2B-A2C5-①	—	—
		DPDT	LW2B-M2C6-①	—	LW2B-M2C6M-①	LW2B-A2C6-①	—	LW2B-A2C6M-①
		3PDT	LW2B-M2C7-①	—	—	LW2B-A2C7-①	—	—
Mushroom 	Gold	SPDT	LW1B-M3C1-①	LW1B-M3C1V-①	—	LW1B-A3C1-①	LW1B-A3C1V-①	—
		DPDT	LW1B-M3C2-①	LW1B-M3C2V-①	LW1B-M3C2M-①	LW1B-A3C2-①	LW1B-A3C2V-①	LW1B-A3C2M-①
		3PDT	LW1B-M3C3-①	LW1B-M3C3V-①	—	LW1B-A3C3-①	LW1B-A3C3V-①	—
	Silver	SPDT	LW1B-M3C5-①	—	—	LW1B-A3C5-①	—	—
		DPDT	LW1B-M3C6-①	—	LW1B-M3C6M-①	LW1B-A3C6-①	—	LW1B-A3C6M-①
		3PDT	LW1B-M3C7-①	—	—	LW1B-A3C7-①	—	—

1. In place of ①, specify button color code from table below.
2. For sub-assembly part numbers, see page A-60.
3. For dimensions, see page A-69.
4. For accessories, see page A-68.

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Non-Illuminated Pushbuttons (Sub-Assembled)

Contact Block	+	Operator	+	Button	=	Completed Unit




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Part Numbers: Operators

Style	Part Number	
	Momentary	Maintained
Round 	LW1B-M0	LW1B-A0
Square 	LW2B-M0	LW2B-A0
Mushroom 	LW1B-M0L	LW1B-A0L

Part Numbers: Buttons

Type	Part Number	
	Flush	Extended
Round 	LW1A-B1-①	LW1A-B2-①
Square 	LW2A-B1-①	LW2A-B2-①
Mushroom 	—	LW1A-B3-①

In place of ①, specify Button Color Code from table at right.

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Part Numbers: Contact Blocks

Appearance	Contact Material	Contact	Part Number		
			Solder/Tab	PC Board	Screw
	Gold	SPDT	LW-C1	LW-C1V	—
		DPDT	LW-C2	LW-C2V	LW-C2M
		3PDT	LW-C3	LW-C3V	—
	Silver	SPDT	LW-C5	—	—
		DPDT	LW-C6	—	LW-C6M
		3PDT	LW-C7	—	—

LED and Incandescent Illuminated Pushbuttons (Assembled)

Part Numbers: LW1L/LW2L Illuminated Pushbuttons (LED and Incandescent)

Style	Contact Material	Contact	Part Number					
			Momentary			Maintained (Latching)		
			Solder/Tab	PC Board	Screw	Solder/Tab	PC Board	Screw
Round 	Gold	SPDT	LW1L-M1C10-②	LW1L-M1C10V-②	—	LW1L-A1C10-②	LW1L-A1C10V-②	—
		DPDT	LW1L-M1C20-②	LW1L-M1C20V-②	LW1L-M1C20M-②	LW1L-A1C20-②	LW1L-A1C20V-②	LW1L-A1C20M-②
		3PDT	LW1L-M1C30-②	LW1L-M1C30V-②	—	LW1L-A1C30-②	LW1L-A1C30V-②	—
	Silver	SPDT	LW1L-M1C50-②	—	—	LW1L-A1C50-②	—	—
		DPDT	LW1L-M1C60-②	—	LW1L-M1C60M-②	LW1L-A1C60-②	—	LW1L-A1C60M-②
		3PDT	LW1L-M1C70-②	—	—	LW1L-A1C70-②	—	—
Square 	Gold	SPDT	LW2L-M1C10-②	M1C10V-②	—	LW2L-A1C10-②	LW2L-A1C10V-②	—
		DPDT	LW2L-M1C20-②	M1C20V-②	LW2L-M1C20M-②	LW2L-A1C20-②	LW2L-A1C20V-②	LW2L-A1C20M-②
		3PDT	LW2L-M1C30-②	LW2L-M1C30V-②	—	LW2L-A1C30-②	LW2L-A1C30V-②	—
	Silver	SPDT	LW2L-M1C50-②	—	—	LW2L-A1C50-②	—	—
		DPDT	LW2L-M1C60-②	—	LW2L-M1C60M-②	LW2L-A1C60-②	—	LW2L-A1C60M-②
		3PDT	LW2L-M1C70-②	—	—	LW2L-A1C70-②	—	—
Mushroom 	Gold	SPDT	LW1L-M3C10-②	M1C10V-②	—	LW1L-A3C10-②	LW1L-A3C10V-②	—
		DPDT	LW1L-M3C20-②	LW1L-M3C20V-②	LW1L-M3C20M-②	LW1L-A3C20-②	LW1L-A3C20V-②	LW1L-A3C20M-②
		3PDT	LW1L-M3C30-②	LW1L-M3C30V-②	—	LW1L-A3C30-②	LW1L-A3C30V-②	—
	Silver	SPDT	LW1L-M3C50-②	—	—	LW1L-A3C50-②	—	—
		DPDT	LW1L-M3C60-②	—	LW1L-M3C60M-②	LW1L-A3C60-②	—	LW1L-A3C60M-②
		3PDT	LW1L-M3C70-②	—	—	LW1L-A3C70-②	—	—

1. In place of ②, specify the Lens color code from table below.
2. Lamps must be ordered separately for all illuminated pushbuttons.
3. For marking plate size and engraving area, see page A-73.
4. For sub-assembly part numbers, see page A-62.
5. For dimensions, see page A-69.
5. For accessories, see page A-68.

Part Numbers: Lamps

Type	Voltage	Current	Part Number
LED 	6V AC/DC	20mA	LSTD-6②
	12V AC/DC	20mA	LSTD-1②
	24V AC/DC	20mA	LSTD-2②
	120V AC	10mA	LSTD-H2②
	240V AC ±10%		LSTD-M4②
Incandescent 	6.3V AC/DC, 1W		IS-6
	12V AC/DC, 1W		IS-12
	24V AC/DC, 1W		IS-24

1. In place of ②, specify the Lens/LED color code.
2. The LED contains a current-limiting resistor and reverse polarity protection diode.
3. To order green LED, use color code "G".

② Lens/LED Color Code

Color	Code
Amber	A
Green	GD (LED lenses)* GL (Incandescent lenses) G (LED lamps)
Red	R
Blue	S
White	W
Yellow	Y

* GD is lighter green than GL.

LED and Incandescent Illuminated Pushbuttons (Sub-Assembled)

Contact Block	+	Operator	+	Lamp	+	Lens	=	Completed Unit

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Part Numbers: Operators

Style	Part Number	
	Momentary	Maintained
Round 	LW1L-M0	LW1L-A0
Square 	LW2L-M0	LW2L-A0
Mushroom 	LW1B-M0L	LW1B-A0L

Part Numbers: Lenses

Type	Part Number
	Flush
Round 	LW1A-L1-②
Square 	LW2A-L1-②
Mushroom 	LW1A-L3-②

In place of ②, specify Lens Color Code from table below.

Part Numbers: Contact Blocks

Appearance	Contact Material	Contact	Part Number		
			Solder/Tab	PC Board	Screw
	Gold	SPDT	LW-C10	LW-C10V	—
		DPDT	LW-C20	LW-C20V	LW-C20M
		3PDT	LW-C30	LW-C30V	—
	Silver	SPDT	LW-C50	—	—
		DPDT	LW-C60	—	LW-C60M
		3PDT	LW-C70	—	—

Part Numbers: Lamps

Type	Voltage	Current	Part Number
LED 	6V AC/DC	20mA	LSTD-6②
	12V AC/DC	20mA	LSTD-1②
	24V AC/DC	20mA	LSTD-2②
	120V AC	10mA	LSTD-H2②
	240V AC ±10%		LSTD-M4②
Incandescent 	6.3V AC/DC, 1W		IS-6
	12V AC/DC, 1W		IS-12
	24V AC/DC, 1W		IS-24

1. *In place of ②, specify the LED color code.*
2. *The LED contains a current-limiting resistor and reverse polarity protection diode.*

② LED/Lens Color Code

Color	Code
Amber	A
Green*	GD (LED lenses)* GL (Incandescent lenses) G (LED lamps))
Red	R
Blue	S
White	W
Yellow	Y

* The GD lens is a lighter green than the GL. For green LED, use "G" as color code.

LED and Incandescent Pilot Lights (Assembled)

Part Numbers: LW1P/LW2P Pilot Lights

Type	Style	Part Number		
		Solder/Tab	PC Board	Screw
Removable Terminal Pilot Light	Round 	—	LW1P-1C00V-②	—
	Square 	—	LW2P-1C00V-②	—
Short Body Pilot Light	Round 	LW1P-10-②	—	LW1P-10M-②
	Square 	LW2P-10-②	—	LW2P-10M-②

1. In place of ②, specify the Lens/LED color code from table below.
2. For marking plate size and engraving area, see page A-73.
3. Lamps must be ordered separately, see table below.
4. For sub-assembly part numbers, see page A-64.
5. For dimensions, see page A-69.
6. For accessories, see page A-68.

Part Numbers: Lamps (not included)

Type	Voltage	Current	Part Number
LED 	6V AC/DC	20mA	LSTD-6②
	12V AC/DC	20mA	LSTD-1②
	24V AC/DC	20mA	LSTD-2②
	120V AC	10mA	LSTD-H2②
	240V AC ±10%		LSTD-M4②
Incandescent 	6.3V AC/DC, 1W		IS-6
	12V AC/DC, 1W		IS-12
	24V AC/DC, 1W		IS-24

1. In place of ②, specify the Lens/LED color code.
2. The LED contains a current-limiting resistor and reverse polarity protection diode.
3. To order green LED, use color code "G".

② Lens/LED Color Code

Color	Code
Amber	A
Green	GD (LED lenses)* GL (Incandescent lenses) G (LED lamps)
Red	R
Blue	S
White	W
Yellow	Y

* GD is lighter green than GL.

LED and Incandescent Pilot Lights (Sub-Assembled)

Removable Terminal*	+	Operator	+	Lamp	+	Lens	=	Compleded Unit





A

* Removable terminals are applicable for PCB terminated types only.

Part Numbers: Pilot Light Operators

Style	Termination		
	Solder	PC Board	Screw
Round 	LW1P-00	LW1P-0 †	LW1P-00M
Square 	LW2P-00	LW2P-0 †	LW2P-00M

† Requires LW-C00V removable terminals in addition to operator.

Part Numbers: Lenses

Type	Part Number
Round 	LW1A-P1-②
Square 	LW2A-P1-②

In place of ②, specify Lens/LED Color Code.

Part Numbers: Lamps (LED)

Type	Voltage	Current	Part Number
LED 	6V AC/DC	20mA	LSTD-6②
	12V AC/DC	20mA	LSTD-1②
	24V AC/DC	20mA	LSTD-2②
	120V AC	10mA	LSTD-H2②
	240V AC ±10%		LSTD-M4②
Incandescent 	6.3V AC/DC, 1W		IS-6
	12V AC/DC, 1W		IS-12
	24V AC/DC, 1W		IS-24

1. *In place of ②, specify the LED color code.*
2. *The LED contains a current-limiting resistor and reverse polarity protection diode.*

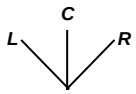
② LED/Lens Color Code

Color	Code
Amber	A
Green*	GD (LED lenses)* GL (Incandescent lenses) G (LED lamps))
Red	R
Blue	S
White	W
Yellow	Y

* The GD lens is a lighter green than the GL.. For green LED, use "G" as color code.

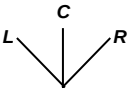
Selector and Keylock Switches (Assembled)

Part Numbers: LW1S Selector Switches

Style	Position	Contact Material	Contact	Part Number		
				Solder/Tab	PC Board	Screw
Round 	90° 2-position maintained 	Gold	SPDT	LW1S-2C1	LW1S-2C1V	—
			DPDT	LW1S-2C2	LW1S-2C2V	LW1S-2C2M
			3PDT	LW1S-2C3	LW1S-2C3V	—
		Silver	SPDT	LW1S-2C5	—	—
			DPDT	LW1S-2C6	—	LW1S-2C6M
			3PDT	LW1S-2C7	—	—
	45° 3-position maintained 	Gold	DPDT	LW1S-3C2	LW1S-3C2V	LW1S-3C2M
			3PDT	LW1S-3C3	LW1S-3C3V	—
		Silver	DPDT	LW1S-3C6	—	LW1S-3C6M
			3PDT	LW1S-3C7	—	—

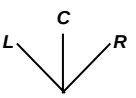
1. *Knob color: Black; Direction al Indication Color: White*
2. *For contact operation, see next page.*
3. *For sub-assembly part numbers, see page A-67.*

Part Numbers: LW1K Keylock Selector Switches

Style	Position	Contact Material	Contact	Part Number		
				Solder/Tab	PC Board	Screw
Round 	90° 2-position maintained 	Gold	SPDT	LW1K-2C1A	LW1K-2C1VA	—
			DPDT	LW1K-2C2A	LW1K-2C2VA	LW1K-2C2MA
			3PDT	LW1K-2C3A	LW1K-2C3VA	—
		Silver	SPDT	LW1K-2C5A	—	—
			DPDT	LW1K-2C6A	—	LW1K-2C6MA
			3PDT	LW1K-2C7A	—	—
	45° 3-position maintained 	Gold	DPDT	LW1K-3C2A	LW1K-3C2VA	LW1K-3C2MA
			3PDT	LW1K-3C3A	LW1K-3C3VA	—
		Silver	DPDT	LW1K-3C6A	—	LW1K-3C6MA
			3PDT	LW1K-3C7A	—	—

1. *Every key selector uses an identical key.*
2. *The key is removable in all positions.*
3. *If a different configuration is required, contact an IDEC representative for more information.*
4. *For contact operation, see next page.*
5. *For sub-assembly part numbers, see page A-67.*

Part Numbers: LW1F LED and Incandescent Illuminated Selector Switches

Style	Position	Contact Material	Contact	Part Numbers		
				Solder/Tab	PC Board	Screw
Round 	90° 2-position maintained 	Gold	SPDT	LW1F-2C10-②	LW1F-2C10V-②	—
			DPDT	LW1F-2C20-②	LW1F-2C20V-②	LW1F-2C20M-②
			3PDT	LW1F-2C30-②	LW1F-2C30V-②	—
		Silver	SPDT	LW1F-2C50-②	—	—
			DPDT	LW1F-2C60-②	—	LW1F-2C60M-②
			3PDT	LW1F-2C70-②	—	—
	45° 3-position maintained 	Gold	DPDT	LW1F-3C20-②	LW1F-3C20V-②	LW1F-3C20M-②
			3PDT	LW1F-3C30-②	LW1F-3C30V-②	—
		Silver	DPDT	LW1F-3C60-②	—	LW1F-3C60M-②
			3PDT	LW1F-3C70-②	—	—

1. *In place of ②, specify color code. See previous page for color codes.*
2. *Lamps must be ordered separately for all illuminated pushbuttons. See previous page.*
3. *For contact operation, see next page.*
4. *For sub-assembly part numbers, see page A-67.*

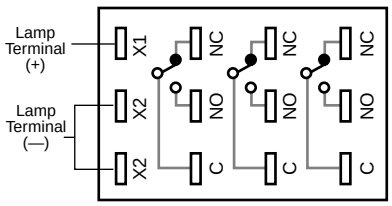
Contact Operations

Contact Operation: Selector and Keylock Switches

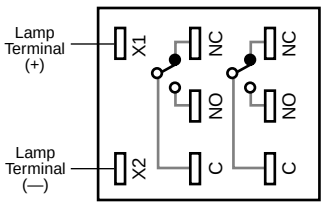
Position	Contact	Operator Position and Contact Position (Top View)		
		Left	Center	Right
90° 2-Position Maintained (L, R)	SPDT	NO NC C	–	NO NC C
	DPDT	Left: NO NC C; Right: NO NC C	–	Left: NO NC C; Right: NO NC C
	3PDT	Left: NO NC C; Center: NO NC C; Right: NO NC C	–	Left: NO NC C; Center: NO NC C; Right: NO NC C
45° 3-Position Maintained (L, C, R)	DPDT	Left: NO NC C; Right: NO NC C	Left: NO NC C; Right: NO NC C	Left: NO NC C; Right: NO NC C
	3PDT	Left: NO NC C; Center: NO NC C; Right: NO NC C	Left: NO NC C; Center: NO NC C; Right: NO NC C	Left: NO NC C; Center: NO NC C; Right: NO NC C

Terminal Arrangements (Bottom View): LW❑L and LW❑B Pushbuttons

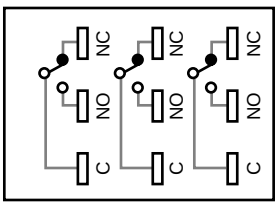
3 pole illuminated



2 pole illuminated



3 pole non-illuminated



SPDT has C, NO and NC only on the center. DPDT has C, NO, and NC only on the right and left.

SPDT has C, NO and NC only on the right. DPDT has C, NO, and NC only on the right and center.

Selectors and Keyswitches (Sub-Assembled)

Contact Block	+	Operator	+	Lens*	=	Compleded Unit




*Lens for illuminated units only

Part Numbers: Operators

Unit	Position	Part Number
Non-Illuminated Selector Switch 	2-position	LW1S-2Y
	3-position	LW1S-3Y
Key Switch 	2-position	LW1K-2A
	3-position	LW1K-3A
Illuminated Selector Switch 	2-position	LW1F-20*
	3-position	LW1F-30*

* Lens must be purchased separately for illuminated units.

Part Numbers: Knob (Lens)

Style	Part Number
Illuminated Selector Switches 	LW1A-F-②

In place of ②, specify LED/Lens Color Code from table below.

Part Numbers: Contact Blocks

Appearance	Style	Contact Material	Contact	Part Number		
				Solder/Tab	PC Board	Screw
	Illuminated Selectors	Gold	SPDT	LW-C10	LW-C10V	—
			DPDT	LW-C20	LW-C20V	LW-C20M
			3PDT	LW-C30	LW-C30V	—
		Silver	SPDT	LW-C50	—	—
			DPDT	LW-C60	—	LW-C60M
			3PDT	LW-C70	—	—
	Non-Illuminated Selectors	Gold	SPDT	LW-C1	LW-C1V	—
			DPDT	LW-C2	LW-C2V	LW-C2M
			3PDT	LW-C3	LW-C3V	—
		Silver	SPDT	LW-C5	—	—
			DPDT	LW-C6	—	LW-C6M
			3PDT	LW-C7	—	—

Part Numbers: Lamps (LED)

Type	Voltage	Current	Part Number
LED 	6V AC/DC	20mA	LSTD-6②
	12V AC/DC	20mA	LSTD-1②
	24V AC/DC	20mA	LSTD-2②
	120V AC	10mA	LSTD-H2②
	240V AC ±10%		LSTD-M4②
Incandescent 	6.3V AC/DC, 1W		IS-6
	12V AC/DC, 1W		IS-12
	24V AC/DC, 1W		IS-24

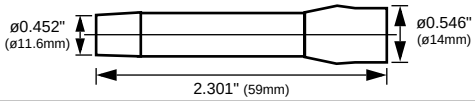
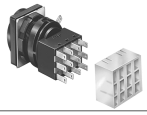
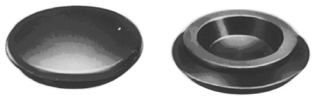
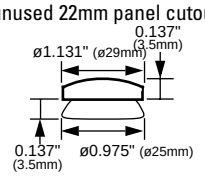
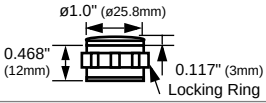
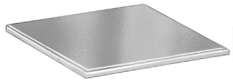
1. *In place of ②, specify the LED color code.*
2. *The LED contains a current-limiting resistor and reverse polarity protection diode.*

② LED/Lens Color Code

Color	Code
Amber	A
Green*	GD (LED lenses)* GL (Incandescent lenses) G (LED lamps))
Red	R
Blue	S
White	W
Yellow	Y

* The GD lens is a lighter green than the GL.. For green LED, use "G" as color code.

Accessories — LW Series

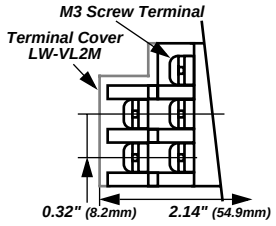
Style	Description/Usage	Part Number
Ring Wrench (optional) 	1. Metallic tool used for tightening the plastic locking ring when installing the LW series on a panel. 2. Tightening torque should not exceed 1.2N-m (12 kgf-cm) when tightening a locking ring.	LW9Z-T1
Lamp Holder Tool (optional) 	Rubber tool used for replacing incandescent or LED lamps installed in illuminated switches and pilot lights and pilot lights 	OR-55
Terminal Cover (for solder tab terminal) 	Nylon cover for pushbuttons and selectors with solder terminals snaps onto contact block. (Insert the lead wires through terminal cover holes before wiring.)	LW-VL2
Terminal Cover (for screw terminal) 	Nylon cover for pushbuttons and selectors for screw terminals snaps onto contact block. (Insert the lead wires through terminal cover holes before wiring.)	LW-VL2M
Terminal Cover (for short body pilot light with solder tab terminal) 	Nylon cover for short body pilot lights with solder terminals.	LW-PVL
Terminal Cover (for short body pilot light with screw terminal) 	Nylon cover for short body pilot lights with screw terminals.	LW-PVLM
Rubber Mounting Hole Plug 	Black rubber plug fills unused 22mm panel cutouts. 	OB-31
Metallic Mounting Hole Plug 	1. Used for plugging unnecessary mounting holes in the panel. Tighten the attached locking ring to a torque of 1.2N-m (12kgf-cm) maximum 2. Degree of Protection: IP66 	LW9Z-BM
Replacement Marking Plates 	White plastic engraving plate for use on all illuminated units (included in each lens). May be used to capture printed mylar insert (not supplied by IDEC) under lens face.	LW9Z-P1-W (round) LW9Z-P2-W (square)
Anti-Rotation Ring 	Prevents rotation of switches in panel. (included with all assembled switches and operators)	LW9Z-L
Replacement Keys 	One pair of keys. (#231)	KG9Z-SK

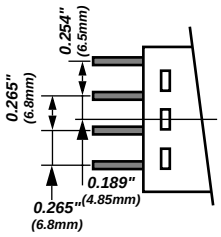
For replacement lamps, see previous page.

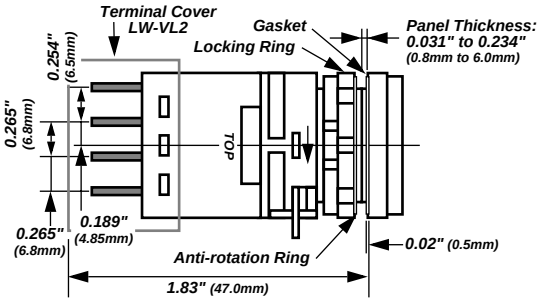
Dimensions Accessories — LW Series

Dimensions: Pushbuttons

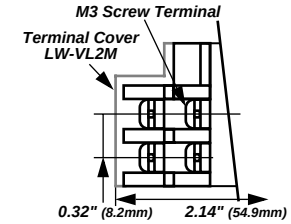
LW❑L & LW❑B: Illuminated & Non-Illuminated Pushbuttons

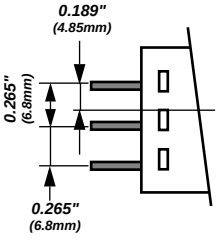


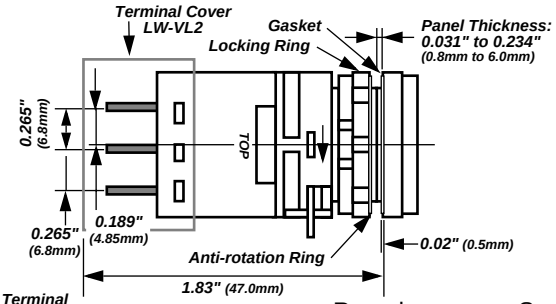




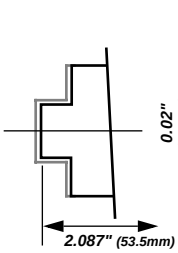
LW❑L



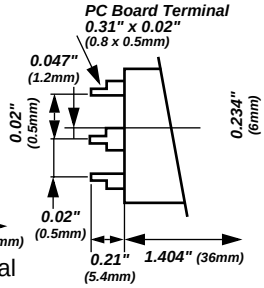




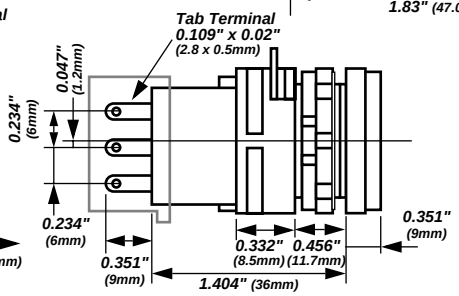
LW❑B



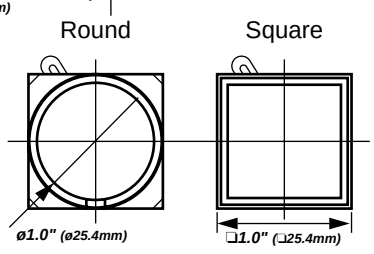
Screw Terminal



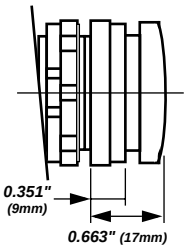
PC Board Terminal



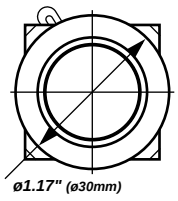
Solder/Tab Terminal



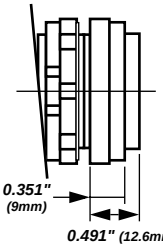
LW❑L



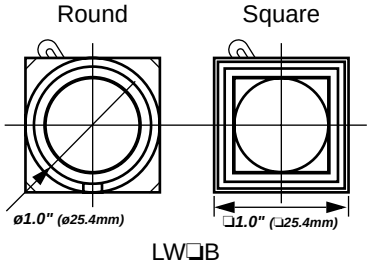
Rear View



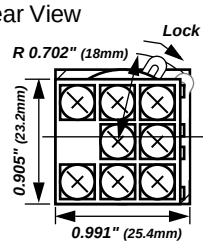
Mushroom



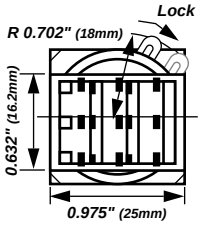
Extended



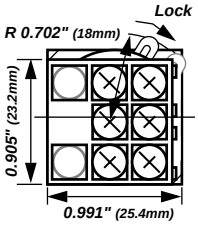
LW❑B



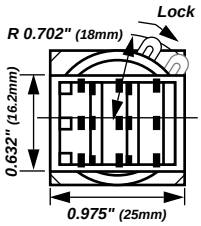
LW❑L Screw Terminal



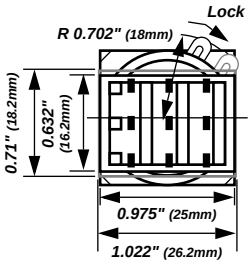
LW❑L PC Board Terminal



LW❑B Screw Terminal



LW❑B PC Board Terminal



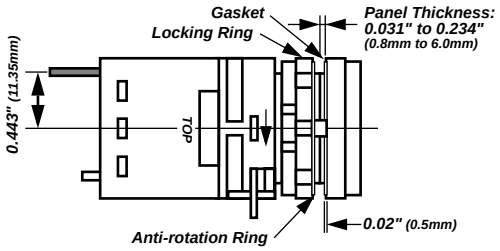
Solder/Tab Terminal

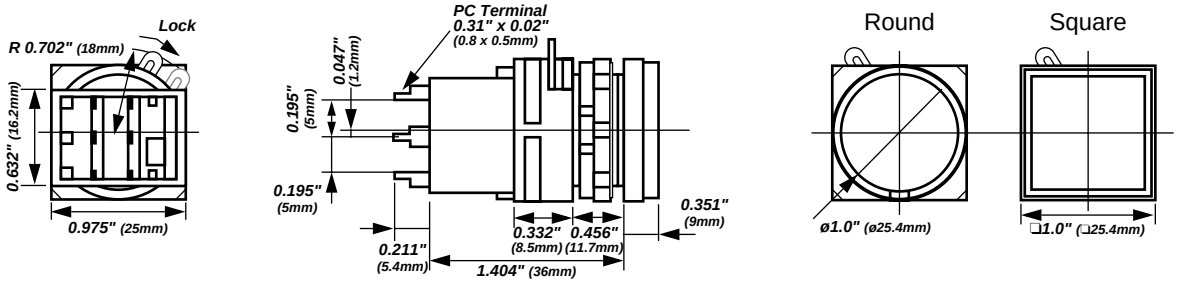
For Panel and Terminal Arrangement PC Board cutouts, see last page of this dimensions section.

Dimensions: Pilot Lights

LW1P/LW2P Pilot Lights

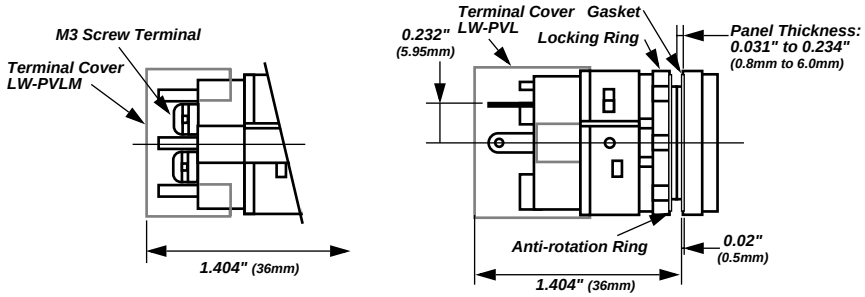
Separate Type

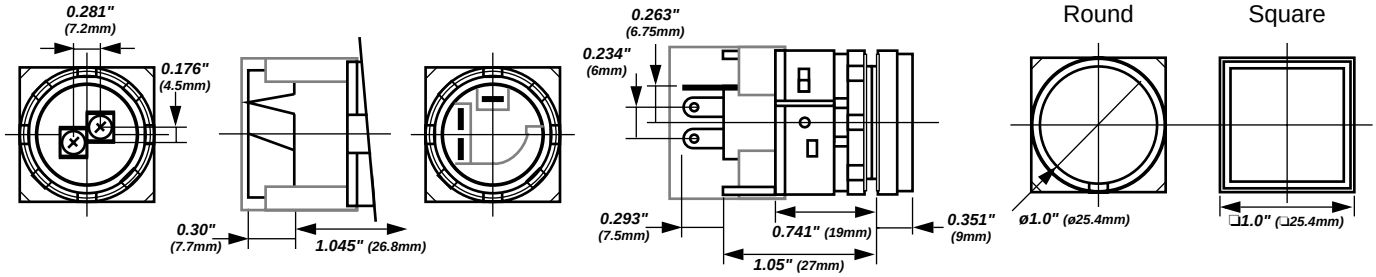




PC Board Terminal

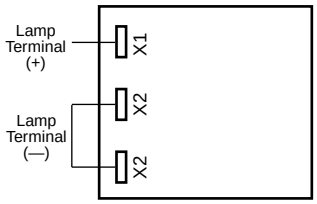
Short Body Type



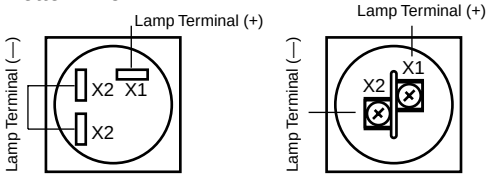


Solder/Tab Terminal

Terminal Arrangement
Separate Type
Bottom View



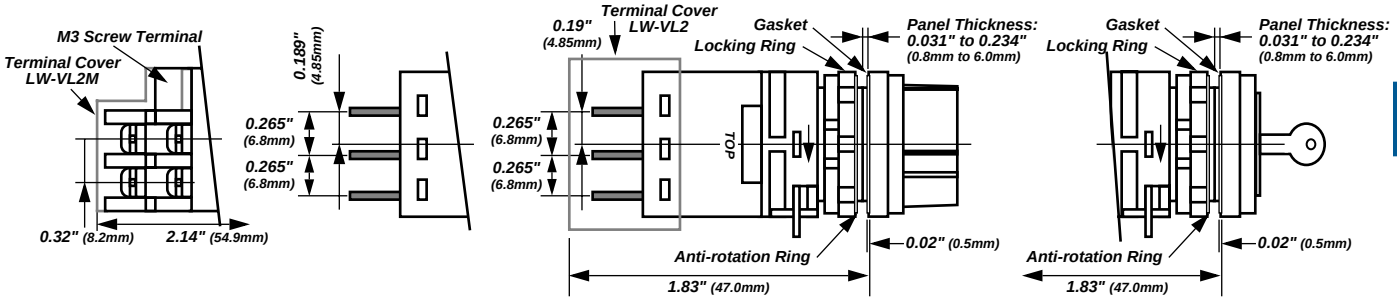
Short Body Type
Bottom View

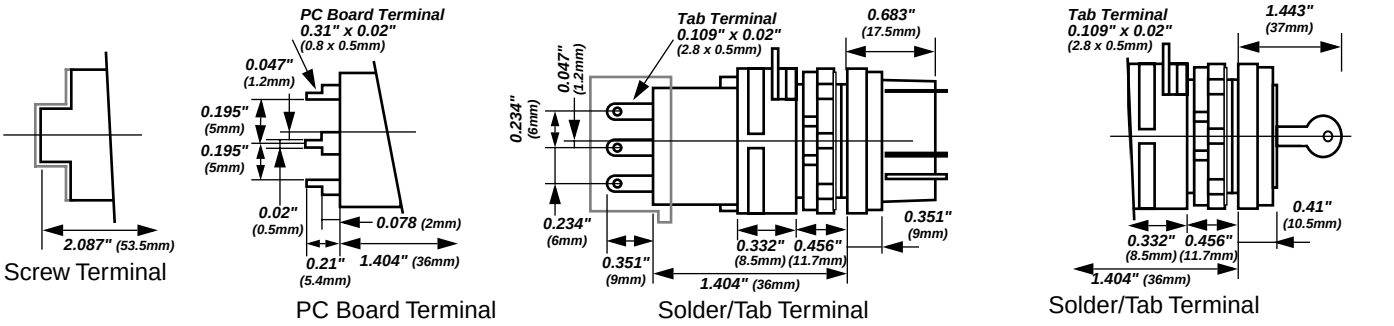


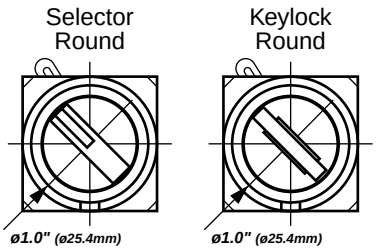
Dimensions: Selector and Keylock Switches

LW1S and LW1K Selector and Keylock Switches

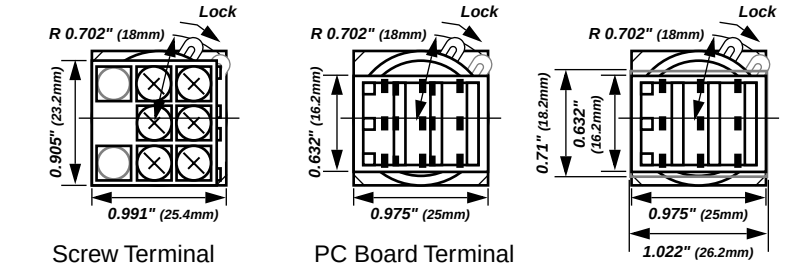
Selector Switches Keylock Switches







Rear View



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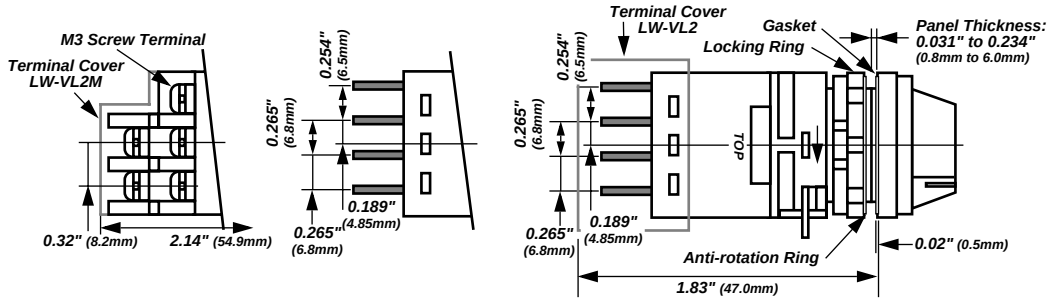
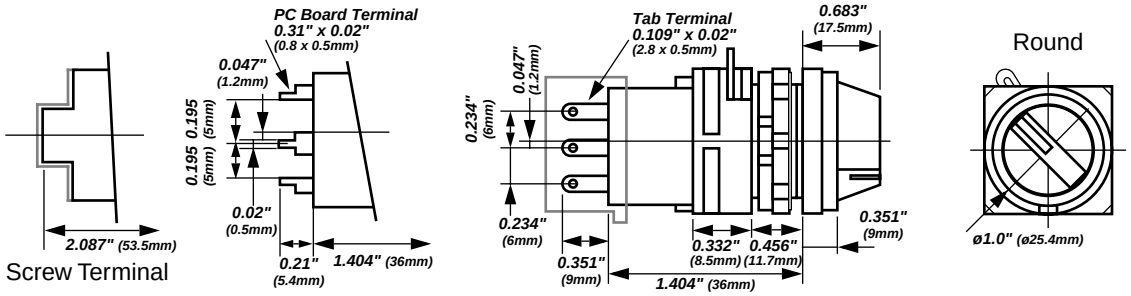
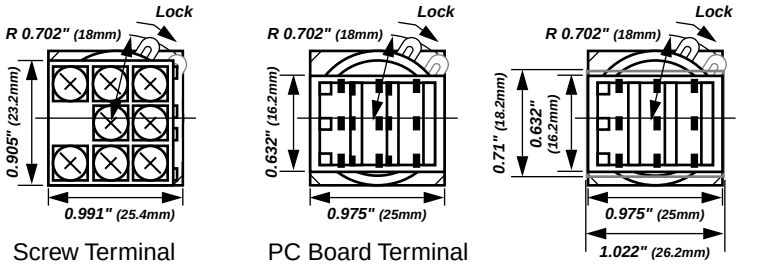
Dimensions: Selector and Keylock Switches, continued and Layouts

LW1F LED and Incandescent Illuminated Selector Switches

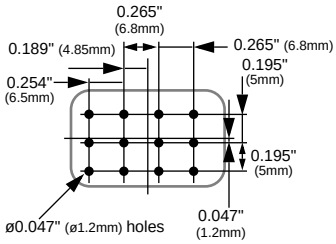




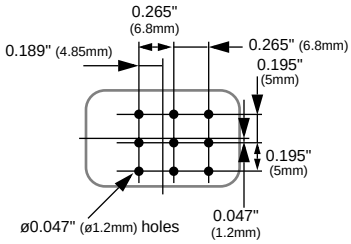


Layouts

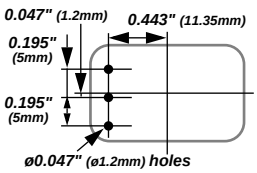
LW❑L PC Board Drilling Layout
PC Board Terminal
Bottom View



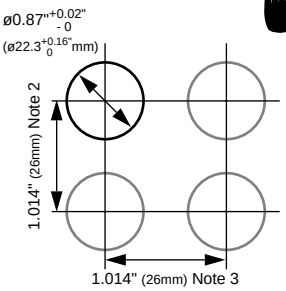
LW❑B PC Board Drilling Layout
PC Board Terminal
Bottom View



Pilot Lights
PC Board Drilling Layout
PC Board Terminal
Bottom View



Mounting Hole Layout

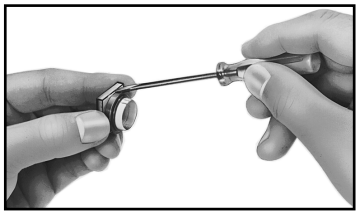


1. *When determining mounting centerlines, allow for easy operation.*
2. *Mushroom (Ø 1.17" (Ø 30mm)) = 1.248" (32mm)*
   Tab terminal = 1.014" (26mm) (with/without terminal cover)
   PC board terminal = 1.014" (26mm)
   Screw terminal = 1.56" (40mm)
3. *Mushroom (Ø 1.17" (Ø 30mm) = 1.248" (32mm)*
   Tab terminal = 1.053" (27mm) (with terminal cover)
   Tab terminal = 1.014" (26mm) (without terminal cover)
   PC board terminal = 1.014" (26mm)
   Screw terminal = 1.014" (26mm)

Replacement of Lens & Marking Plate

Removing
1. Remove the operator (lens, marking plate, and lens holder) by inserting a screwdriver into the recess of the lens through the bezel.

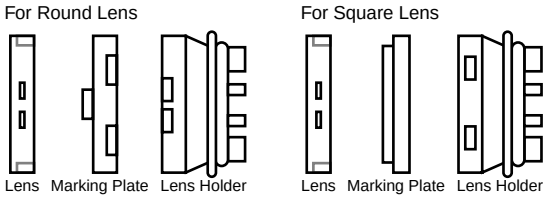
2. Remove the marking plate by pushing the lens from the rear to disengage the latches between the lens and the lens holder, using the screwdriver as shown below.



The translucent filter in the lens holder can not be removed because this filter is sealed to make the unit waterproof and oiltight.

Installing
For round lens types, place the marking plate on the lens holder with the anti-rotation projection engaged and press the lens onto the lens holder to engage the latches. For square lens types, insert the marking plate into the lens, and press the lens onto the lens holder to engage the latches.
Pay attention to the orientation of the marking plate.

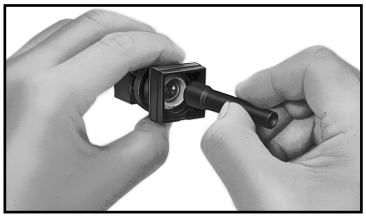
Pay attention to the orientation of the marking plate.



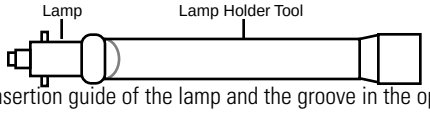
Replacement of Lamps

Lamps can be replaced using the lamp holder tool (OR-55) from the front of the panel. Also by removing the contact block from the operator unit, the lamp can be replaced.

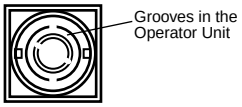
Replacement of Lamps from the Front of the Panel.
(How to Remove)
1. Push and turn the lamp counterclockwise using the side A of the lamp holder tool, and the lamp and the lamp holder can be removed.



(How to Install)
1. Insert the lamp into the lamp holder tool and hold the lamp as in the following illustration.



2. Place the insertion guide of the lamp and the groove in the operator unit in the same direction. Then push the lamp lightly and turn it clockwise.



Replacement of Lamps by Removing the Contact Block
The lamp can be replaced by removing the contact block without using the lamp holder tool.

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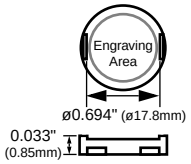
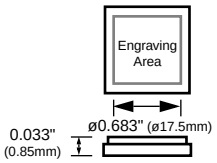
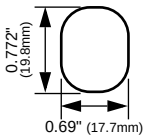
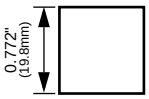
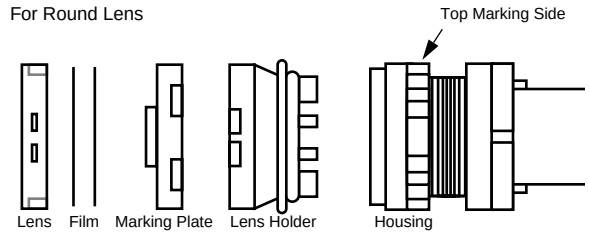
Marking Plates & Films

For LW series illuminated pushbuttons and pilot lights, legends and symbols can be engraved on marking plates, or printed mylar can be inserted under the lens for labelling purposes.

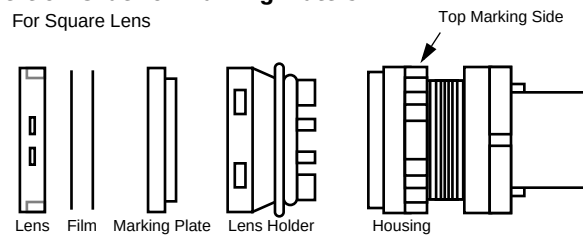
Marking Plate and Marking Film Size

Lens Style	Round Lens	Square Lens
Built-in Marking Plate		
	Engraving must be made on the engraving area within 0.02" (0.5mm) deep. The marking plate is made of white acrylic resin.	
Applicable Marking Film		
	Mylar for printing labels are not included and must be provided and printed by user. Two 0.004" (0.1mm)-thick films or one 0.008" (0.2mm)-thick film can be installed in the lens. Recommended marking film: Mylar	

Insertion Order of Marking Plate & Film



Insertion Order of Marking Plate & Film.



1. Mylar is not included.
2. Pay attention to the orientation of marking plate.

Instructions con't

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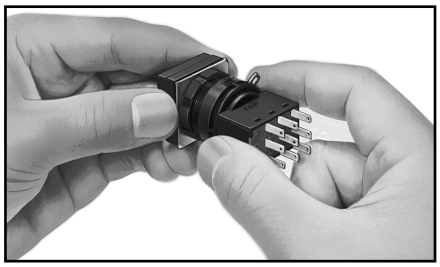
Panel Mounting

Remove the contact block from the operator. Insert the operator into the panel cut-out from the front, then install the contact block to the operator.
Removing the Contact Block
Turn the locking lever on the contact block in the direction opposite to the arrow on the housing. Then the contact block can be removed.
Installing the Contact Block
Insert the contact block, with the TOP markings on the contact block and the operator placed in the same direction. Then lock the units, turning the locking lever in the direction of the arrow.



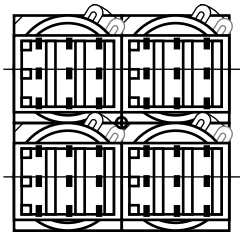
Notes on Mounting

Use the optional Ring Wrench (LW9Z-T1) to mount the operator onto a panel. Tightening torque should not exceed 1.2N-m (12 kgf-cm). Do not use pliers. Excessive tightening will damage the locking ring.

Wiring

1. Solder the terminals within 20W/5 seconds or 260°C/3 seconds without exerting external force to the terminals. While soldering, do not touch the soldering iron to the housing. While wiring, prevent tension from being applied to the terminals. Do not bend or raise the terminals, nor exert excessive force to terminals.
2. Use a non-corrosive resin liquid flux.

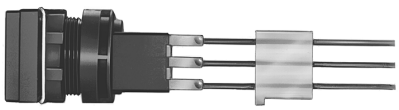
Collective Mounting
As the locking lever can be turned easily from the rear of the units using a screwdriver, the contact blocks can be removed even when mounted collectively.



Notes for Terminal Cover

(Solder/Tab Terminal)
Insert the terminal cover into the contact block with the TOP markings on the contact block and the terminal cover in the same direction.

When wiring, insert the lead wires into the terminal cover holes before wiring.



Notes for Wiring
When installing a terminal cover onto the solder/tab terminal contact block, solder the inside of lamp terminal (toward the switch terminals) and wire.
(Screw Terminal Type)
Install a terminal cover to the control unit before wiring.

1. After wiring, terminal covers cannot be installed.
2. When terminal covers are used, round crimping terminals cannot be used.

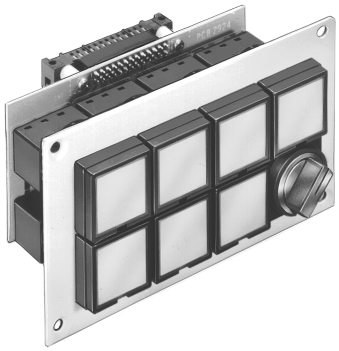
Connection

Positive-lock connector and easy-lock connector are applicable to tab terminals.

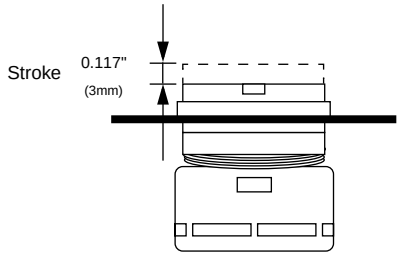
One Board Mounting

Mounting the switches and pilot lights on one PC board offers the following features.
1. Reduced installation labor, easy wiring, space saving, and standardization.
2. Since the contact blocks on the PC board can be removed easily using a locking lever, the LW series switches and pilot lights are easy to maintain.
3. Because the LW series switches and pilot lights require no studs for fastening the control unit to a PC board, special preparation of operation panel is not needed.

For details on one board mounting, contact IDEC.



Light Touch And High Reliability



Operating-force Snap Switching Mechanism