

ATTRACTIVE & RUGGED FOR WET & DUSTY ENVIRONMENTS

The OTTO K5 series is a quality, precision switch designed to comply with standards established for appliance, marine (ignition protection) and off-road vehicles along with other demanding applications where rugged rocker switches are required.

K5 series sealed rocker switches snap into industry-standard panel cutouts. Choose illuminated and printed legends, thru-panel drain option and switching compatibility from logic level up to 20 amps.

The K5 series offers a choice of LED, incandescent and neon illumination. Legends can be stamped onto a non-illuminated button, stamped onto an illuminated lens or laser etched into the lens and backlit.

Available in standard and logic level contact ratings, the K5 rockers will fit a wide range of applications. Expect a minimum of 25,000 cycles at a full rated load of 20 amps resistive or 15 amps inductive. 100,000 cycles mechanical. A full complement of switch operation is available including momentary and maintained action in 2 or 3-position switches in SPST, SPDT, SPTT, DPST and DPDT circuit arrangements.

OTTO can provide custom colors upon request. Value-added assemblies with wire leads are also available. Please consult the factory for assistance.

## Features:

- Sealed watertight per IP68S and IP69K
- Snap-in panel mounting into industry standard panel cutout
- Optional panel seal gasket
- LED, neon & incandescent lighting
- 0.250" Quick Connect terminals
- Optional one-piece connector
- Optional terminal barriers
- Logic level up to 20 amp switch
- Configurable Single Pole Triple Throw (SPTT) with external jumpers
- Soft Touch button available
- RoHS compliant



Raised Bars Shown

Standard Characteristics/Ratings:		
<b>ELECTRICAL RATINGS:</b>		
Load	Sea Level @ 28VDC	Sea Level @ 125VAC, 60/400Hz
Resistive	20A	16A
Inductive	15A	15A
Lamp	5A	5A
Motor	0.5HP @ 110VAC	
DWV	1000Vrms except across light terminals	
Logic Level	10mA @ 5VDC, max D.C. logic level ratings (void if logic level load(s) exceeded at any time)	
<b>Electrical Life:</b>	25,000 cycles	
<b>LIGHTING:</b>		
Light Source	Rating	
Incandescent	(VDC) 6V, 12V, 24V	
Neon	(VAC) 125V, 250V	
LED	(VDC) 2V, 6V, 12V, 24V	
<b>Mechanical Life:</b>	100,000 cycles	
<b>Seal:</b>	IP68S and IP69K	
<b>Operating Temp Range:</b>	-40°C to +85°C	
<b>MATERIALS:</b>		
<b>Case:</b>	Thermoplastic	
<b>Button:</b>	Thermoplastic	
<b>Terminals/Contact:</b>	Brass, silver alloy with silver plate, gold flash for logic level	
<b>Terminal Hardware:</b>	K5 series recommended Quick Connect terminals: AMP 60253-2 for 12-16 AWG AMP 42100-2 for 14-18 AWG	
<b>Mounting Hardware:</b>	None provided	



**Ihr offizieller Vertriebspartner**  
**ALDERS electronic GmbH**  
 Arnoldstraße 19  
 47906 Kempen · Germany

+49 2152 8955-0  
 vertrieb@alders.de

# SEALED, ILLUMINATED ROCKER SWITCHES

## SNAP-IN PANEL MOUNTING

### K5 SERIES PART NUMBER CODE

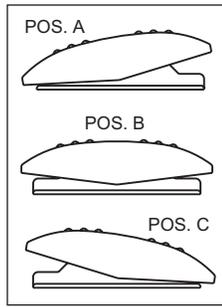
Part Number Code Continued Below

- |  |   |                           |
|--|---|---------------------------|
| <b>K5</b>  | <b>X</b>  | <b>X</b>                  |
| <b>Base Options</b>  | <b>Rocker Color*/Style</b>  | <b>Rocker Features</b>    |
| <b>A.</b> With Keying Pin Only<br>Standard Rating<br>Silver Plate            | <b>A.</b> Black Plastic Rocker<br><b>B.</b> Black "Soft Touch" Rocker | <b>Position "A"</b>       |
| <b>B.</b> Without Barriers or Pin<br>Standard Rating<br>Silver Plate         | <b>C.</b> Red Plastic Rocker<br><b>D.</b> Red "Soft Touch" Rocker     | <b>Position "C"</b>       |
| <b>C.</b> With Terminal<br>Barriers Only<br>Standard Rating<br>Silver Plate  | <b>E.</b> White Plastic Rocker<br><b>F.</b> White "Soft Touch" Rocker | <b>1.</b> No Feature      |
| <b>D.</b> With Keying Pin Only<br>Logic Level Rating<br>Gold Plate           | <b>H.</b> Green Plastic Rocker<br><b>J.</b> Orange Plastic Rocker     | <b>2.</b> Lens            |
| <b>E.</b> Without Barriers or Pin<br>Logic Level Rating<br>Gold Plate        | <b>K.</b> Blue Plastic Rocker<br><b>L.</b> Gray "Soft Touch" Rocker   | <b>3.</b> Raised Bars     |
| <b>F.</b> With Terminal<br>Barriers Only<br>Logic Level Rating<br>Gold Plate | <b>M.</b> Gray Plastic Rocker   | <b>4.</b> Raised Lit Bars |
| <b>G.</b> With Keying Pin Only<br>Standard Rating<br>No Plate                |   |                           |
| <b>H.</b> Without Barrier or Pin<br>Standard Rating<br>No Plate              |   |                           |
| <b>J.</b> With Terminal<br>Barriers Only<br>Standard Rating<br>No Plate      |   |                           |

\*Additional colors available. Contact factory.

- |                        |                        |
|------------------------|------------------------|
| <b>Position "A"</b>    | <b>Position "C"</b>    |
| <b>1A.</b> 3-4         | <b>1C.</b> (3-4)       |
| <b>2A.</b> 3-4/8-9     | <b>2C.</b> (3-4)/(8-9) |
| <b>1B.</b> 3-4         | <b>1D.</b> (3-4)       |
| <b>2B.</b> 3-4/8-9     | <b>2D.</b> (3-4)/(8-9) |
| <b>1E.</b> (3-4)       | <b>1F.</b> 3-4         |
| <b>2E.</b> (3-4)/(8-9) | <b>2F.</b> 3-4/8-9     |
| <b>1G.</b> (3-4)       | <b>1H.</b> 3-4/8-9     |
| <b>2G.</b> (3-4)/(8-9) | <b>1J.</b> 3-4/8-9     |

NOTE: Soft Touch rockers require same color lenses/lit bars for both positions.



- |                              |                     |                     |                     |                |
|------------------------------|---------------------|---------------------|---------------------|----------------|
| <b>Switch Action/Circuit</b> | <b>Position "A"</b> | <b>Position "B"</b> | <b>Position "C"</b> | <b>Circuit</b> |
| <b>1A.</b> 3-4               | NONE                | OFF                 | SPST                |                |
| <b>2A.</b> 3-4/8-9           | NONE                | OFF                 | DPST                |                |
| <b>1B.</b> 3-4               | NONE                | 3-2                 | SPDT                |                |
| <b>2B.</b> 3-4/8-9           | NONE                | 3-2/8-7             | DPDT                |                |
| <b>1C.</b> (3-4)             | NONE                | OFF                 | SPST                |                |
| <b>2C.</b> (3-4)/(8-9)       | NONE                | OFF                 | DPST                |                |
| <b>1D.</b> (3-4)             | NONE                | 3-2                 | SPDT                |                |
| <b>2D.</b> (3-4)/(8-9)       | NONE                | 3-2/8-7             | DPDT                |                |
| <b>1E.</b> (3-4)             | OFF                 | (3-2)               | SPDT                |                |
| <b>2E.</b> (3-4)/(8-9)       | OFF                 | (3-2)/(8-7)         | DPDT                |                |
| <b>1F.</b> 3-4               | OFF                 | 3-2                 | SPDT                |                |
| <b>2F.</b> 3-4/8-9           | OFF                 | 3-2/8-7             | DPDT                |                |
| <b>1G.</b> (3-4)             | OFF                 | 3-2                 | SPDT                |                |
| <b>2G.</b> (3-4)/(8-9)       | OFF                 | 3-2/8-7             | DPDT                |                |

#### Special Circuits

- |                        |                     |                     |                         |
|------------------------|---------------------|---------------------|-------------------------|
| <b>Position "A"</b>    | <b>Position "B"</b> | <b>Position "C"</b> | <b>Special Circuits</b> |
| <b>1H.</b> 3-4/8-9     | 8-9                 | OFF                 | ON/ON/OFF               |
| <b>1J.</b> 3-4/8-9     | 8-9                 | NONE                | ON/ON/NONE              |
| <b>1K.</b> (3-4)/(8-9) | 8-9                 | OFF                 | (ON)/ON/OFF             |
| <b>1L.</b> (3-4)/(8-9) | 8-9                 | NONE                | (ON)/ON/NONE            |
| <b>1M.</b> 3-4/8-9     | 3-2/8-9             | 3-2/8-7             | ON/ON/ON                |
| <b>1N.</b> (3-4)/(8-9) | 3-2/8-9             | 3-2/8-7             | (ON)/ON/ON              |
| <b>1P.</b> (3-4)/(8-9) | 3-2/8-9             | (3-2)/(8-7)         | (ON)/ON/(ON)            |
| <b>2R.</b> 3-4/8-9     | OFF/8-9             | OFF/OFF             | ON/OFF/OFF              |
| <b>2S.</b> (3-4)/8-9   | OFF/8-9             | OFF/OFF             | ON/OFF/OFF              |

NOTE: ( ) denotes momentary action.

- |                            |                       |                             |
|----------------------------|-----------------------|-----------------------------|
| <b>Light Source Type*</b>  | <b>Circuit</b>        | <b>Terminal Connections</b> |
| <b>A.</b> No Illumination  | <b>A.</b> NONE        | <b>NONE</b>                 |
| <b>B.</b> 6V Incandescent  | <b>B.</b> Dep. in "A" | 1(-) & 4(+)                 |
| <b>C.</b> 12V Incandescent | <b>C.</b> Dep. in "C" | 2(+) & 5(-)                 |
| <b>D.</b> 24V Incandescent | <b>D.</b> Ind. in "A" | 1(-) & 6(+)                 |
| <b>E.</b> 125VAC Neon      | <b>E.</b> Ind. in "C" | 5(-) & 10(+)                |
| <b>F.</b> 250VAC Neon      | <b>F.</b> Dep. in "A" | 1(-) & 4(+)                 |
| <b>G.</b> 2V Red LED       | <b>G.</b> Dep. in "A" | 1(-) & 4(+)                 |
| <b>H.</b> 2V Green LED     | <b>H.</b> Ind. in "C" | 5(-) & 10(+)                |
| <b>J.</b> 2V Amber LED     | <b>H.</b> Ind. in "A" | 1(-) & 6(+)                 |
| <b>K.</b> 6V Red LED       | <b>I.</b> Dep. in "C" | 2(+) & 5(-)                 |
| <b>L.</b> 6V Green LED     | <b>J.</b> Dep. in "A" | 1(-) & 4(+)                 |
| <b>M.</b> 6V Amber LED     | <b>K.</b> Ind. in "C" | 5(-) & 10(+)                |
| <b>N.</b> 12V Red LED      | <b>L.</b> Ind. in "A" | 1(-) & 6(+)                 |
| <b>P.</b> 12V Green LED    | <b>M.</b> Dep. in "C" | 2(+) & 5(-)                 |
| <b>Q.</b> 12V Amber LED    | <b>N.</b> Ind. in "A" | 1(-) & 6(+)                 |
| <b>R.</b> 24V Red LED      | <b>O.</b> Ind. in "C" | 5(-) & 10(+)                |
| <b>S.</b> 24V Green LED    |                       |                             |
| <b>T.</b> 24V Amber LED    |                       |                             |

NOTE: Polarity only applies to LED circuits.

\*See appendix for complete voltage/ratings table

NOTE: All code combinations are not feasible. Consult factory for product availability.

### K5 PART NUMBER CODE - CONTINUED FROM ABOVE

- |                               |                      |
|-------------------------------|----------------------|
| <b>X</b>                      | <b>X</b>             |
| <b>Lens Color</b>             | <b>Legend Style</b>  |
| <b>Position "A"</b>           | <b>Position "A"</b>  |
| <b>1.</b> Transparent Red     | <b>ZZ.</b> No Legend |
| <b>2.</b> Transparent Green   |                      |
| <b>3.</b> Transparent Amber ① |                      |
| <b>4.</b> Clear ①             |                      |
| <b>5.</b> Translucent White ② |                      |
| <b>Z.</b> No Lens             |                      |

NOTE: It is not recommended to use green LEDs with translucent white lenses. This will reduce light intensity. Use clear lenses with green LEDs for maximum light intensity.

- ① Recommended for neon lamps.
- ② Special Order: Ultra bright green LEDs to be used with translucent white lens.

- |                      |                      |
|----------------------|----------------------|
| <b>XX</b>            | <b>XX</b>            |
| <b>Legend Style</b>  | <b>Legend Color</b>  |
| <b>Position "A"</b>  | <b>Position "C"</b>  |
| <b>ZZ.</b> No Legend | <b>ZZ.</b> No Legend |

NOTE: For all other legend options, refer to the legend table in the appendix, find the two digit code and enter the code in the appropriate position(s).

STOP HERE for lighted switches without legends.

Example: K5AA331FNH-44

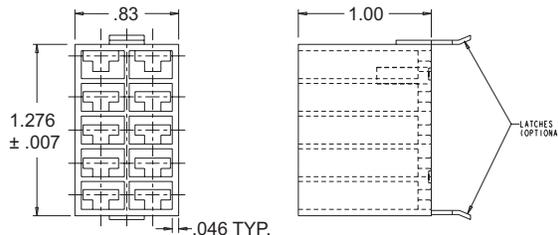
- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| <b>X</b>                             | <b>X</b>                             |
| <b>Legend Color</b>                  | <b>Legend Orientation</b>            |
| <b>Position "A"</b>                  | <b>Position "C"</b>                  |
| <b>1.</b> Red                        | <b>1.</b> Red                        |
| <b>2.</b> Black                      | <b>2.</b> Black                      |
| <b>9.</b> White                      | <b>9.</b> White                      |
| <b>B.</b> Backlight/Daylight White ③ | <b>B.</b> Backlight/Daylight White ③ |
| <b>D.</b> Backlight/Deadfront ③      | <b>D.</b> Backlight/Deadfront ③      |
| <b>Z.</b> No Legend                  | <b>Z.</b> No Legend                  |

③ Only available on Rocker Style "A" & Rocker Features "1" and lens color "Z" for each position.

- |                |                     |                     |
|----------------|---------------------|---------------------|
| <b>X</b>       | <b>Position "A"</b> | <b>Position "C"</b> |
| <b>1. Std.</b> | <b>A</b>            | <b>C</b>            |
| <b>2. 90°</b>  | <b>A</b>            | <b>C</b>            |
| <b>3. 180°</b> | <b>A</b>            | <b>C</b>            |
| <b>4. 270°</b> | <b>A</b>            | <b>C</b>            |

STOP HERE for unlighted switches without legends.

Example: K5AA331BAA



**K5 Connector**  
P/N C801775-2A Without Latches  
P/N C801775-2B With Latches

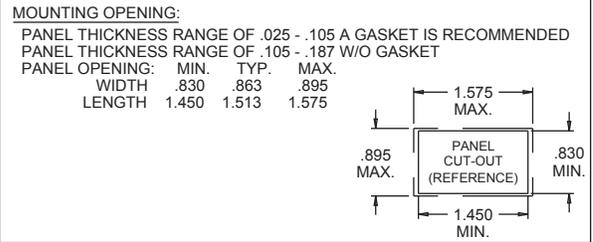
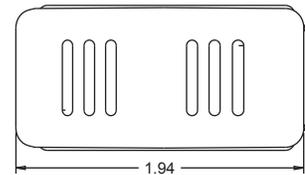
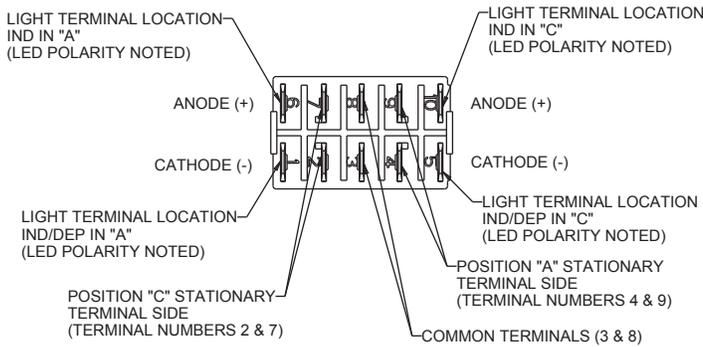
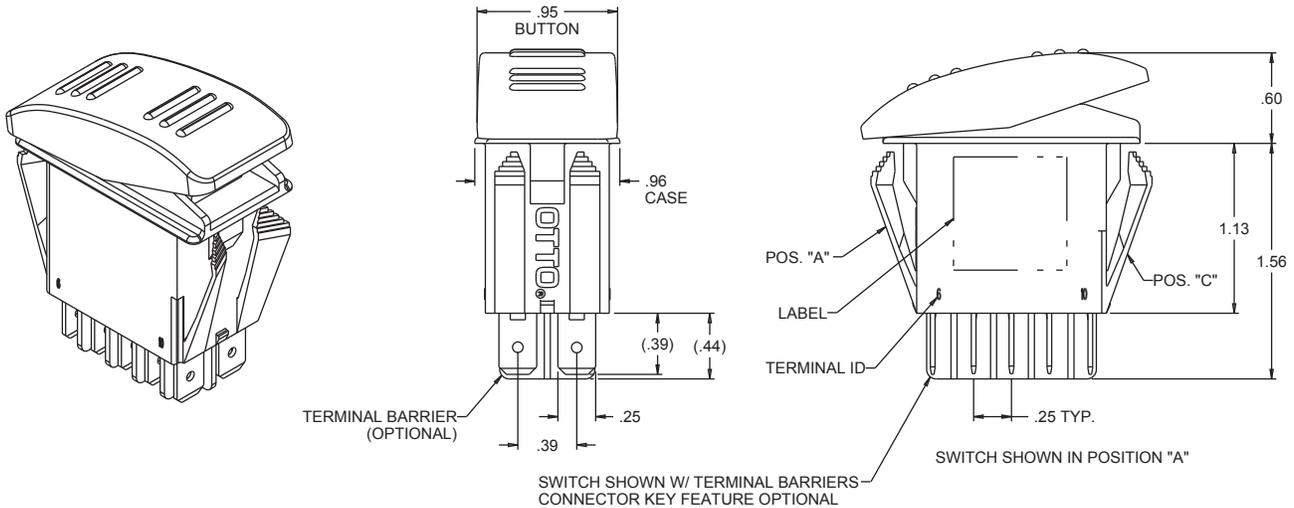
**Recommended Quick Connect Terminals**  
AMP 60253-2 for 12-16 AWG  
AMP 42100-2 for 14-18 AWG

**Panel Seal Gasket**  
P/N C807109

• K5 panel plugs available as shown in Panel Plugs (PP) section.

# SEALED, ILLUMINATED ROCKER SWITCHES

ATTRACTIVE & RUGGED FOR WET & DUSTY ENVIRONMENTS



<p>POS "A"</p>	<p>POS "B"</p>	<p>POS "C"</p>	<p>K5...2A...</p>	<p>K5...2B...</p>	<p>K5...2C...</p>	<p>K5...2D...</p>		
<p>SPECIAL CIRCUIT - ON-ON SCHEMATIC</p>			<p>DPST-ON-NONE-OFF SCHEMATIC</p>			<p>DPDT-ON-NONE-ON SCHEMATIC</p>		
<p>GENERAL SCHEMATIC INFORMATION</p> <p>○—○ INDICATES MAINTAIN ACTION (FIXED POSITION)</p> <p>▼—○ INDICATES MOMENTARY ACTION (AUTOMATIC RETURN POSITION)</p> <p>FOR OTHER LIGHTING SCHEMATICS REPLACE FOLLOWING SYMBOLS:</p> <p> INCANDESCENT (REPLACE RESISTOR &amp; LED)</p> <p> NEON (REPLACE LED)</p>			<p>K5...2E...</p>	<p>K5...2F...</p>	<p>K5...2G...</p>	<p>K5...2BND-Z</p>	<p>K5...2BNC-Z</p>	
			<p>DPDT-(ON)-OFF-(ON) SCHEMATIC</p>	<p>DPDT-ON-OFF-ON SCHEMATIC</p>	<p>DPDT-(ON)-OFF-ON SCHEMATIC</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/DEPENDENT LED IN "A"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/DEPENDENT LED IN "C"</p>	
			<p>K5...2BND-Z</p>	<p>K5...2BNE-Z</p>	<p>K5...2BNF...</p>	<p>K5...2BNG...</p>	<p>K5...2BNH...</p>	<p>K5...2BNJ...</p>
			<p>DPDT-ON-NONE-ON SCHEMATIC W/INDEPENDENT LED IN "A"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/INDEPENDENT LED IN "C"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/DEPENDENT LED IN "A" &amp; "C"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/DEPENDENT LED IN "A" &amp; INDEPENDENT LED IN "C"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/INDEPENDENT LED IN "A" &amp; DEPENDENT LED IN "C"</p>	<p>DPDT-ON-NONE-ON SCHEMATIC W/INDEPENDENT LED IN "A" &amp; "C"</p>

### SNAP-IN PANEL MOUNTING

## Standard Legends Per SAE Specifications

STANDARD LEGENDS PER SAE SPECIFICATIONS								
A1		ANCHOR	K2		UNLOCK	P5		BILGE BLOWER
B1		BATTERY	L1		LIGHT	R1		LIFT
B2		ELECTRIC POWER	L2		MASTER LIGHTING SWITCH	R2		LOWER
C1		AC/COOLING SYSTEMS	L3		HEADLIGHTS	R3		UP
C2		DEHUMIDIFIER	L4		HEADLIGHTS-LOW / DIPPED BEAM	R4		DOWN
C3		HEATER/INTERIOR HEATING	L5		HEADLIGHTS-HIGH / UPPER BEAM	R5		RIGHT
D1		WINDSHIELD DEFROSTER	L6		PARKING LIGHT	R6		LEFT
D2		REAR WINDOW DEFROSTER	L7		WORK LAMP	R7	FWD	FORWARD
D3		MIRROR DEFROSTER	L8		WORK LAMP	R8	REV	REVERSE
E1		ENGINE/START	L9		INTERIOR DOME LIGHT	S1		RADIO
E2		ENGINE/STOP	M1		BEACON	S2		MUTE
E3		ON/START	M2		HAZARD/POSITION LIGHTS	T1		FAST
E4	○	OFF/STOP	M3		CLEARANCE LIGHTS	T2		SLOW
E5	ON	ON	M4		SIDE MARKER LIGHT	T3		TRIM TAB / TRIMMING OPERATION
E6	OFF	OFF	M5		RUNNING LIGHTS (UNDER POWER)	T4		TRANSMISSION
E7		ENGINE ELECTRIC PREHEAT	M6		ANCHOR LIGHT	V1		VENTILATING / AC FAN
E8		ENGINE-GAS INJECTION	M7		RUNNING/ANCHOR LIGHTS	W1		WINDSHIELD WIPER
F1		FRONT FOG LIGHTS	M8		SEARCH LIGHT	W2		WINDSHIELD-WASHER
F2		REAR FOG LIGHTS	M9		LEFT TURN SIGNAL	W3		WINDSHIELD-WASHER/WIPER
G1		FUEL	MA		RIGHT TURN SIGNAL	W4		REAR WINDOW WIPER
H1		HORN	P1		BILGE PUMP #1	W5		REAR WINDOW-WASHER
H2		HORN REAR	P2		BILGE PUMP #2	W6		REAR WINDOW-WASHER/WIPER
K1		LOCK	P3		BILGE PUMP #3	ZZ		NO LEGEND
			P4		BILGE PUMP			

For legends not shown, please consult an OTTO representative.



# LED VOLTAGE/CURRENT RATINGS TABLE

## ROCKER AND ROTARY SWITCH VOLTAGE/CURRENT RATINGS TABLES

### K1, K2, K3P and K4 LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LIGHT SOURCE COLOR	FORWARD CURRENT	TYPICAL FORWARD/ NOMINAL VOLTAGE	MAX. FORWARD VOLTAGE
6 VDC INCANDESCENT	WHITE	.2 AMPS	6 VDC	8 VDC
12 VDC INCANDESCENT	WHITE	.08 AMPS	12 VDC	14 VDC
24 VDC INCANDESCENT	WHITE	.04 AMPS	24 VDC	28 VDC
125 VAC NEON	AMBER	1.9 mA	125 VAC	125 VAC
250 VAC NEON	AMBER	1.9 mA	250 VAC	250 VAC
2 V LED PRODUCTS*	RED	20 mA	1.9 VDC	2.5 VDC
	GREEN	20 mA	2.15 VDC	2.5 VDC
	AMBER	20 mA	1.95 VDC	2.5 VDC
	BLUE	20 mA	3.5 VDC	4.0 VDC
6 V LED PRODUCTS	SEE CHART	20 mA	6 VDC	8 VDC
12 V LED PRODUCTS	SEE CHART	20 mA	12 VDC	14 VDC
24 V LED PRODUCTS	SEE CHART	20 mA	24 VDC	28 VDC

### K3/K5 LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LIGHT SOURCE COLOR	FORWARD CURRENT	TYPICAL FORWARD/ NOMINAL VOLTAGE	MAX. FORWARD VOLTAGE
6 VDC INCANDESCENT	WHITE	.2 AMPS	6 VDC	8 VDC
12 VDC INCANDESCENT	WHITE	.08 AMPS	12 VDC	14 VDC
24 VDC INCANDESCENT	WHITE	.04 AMPS	24 VDC	28 VDC
125 VAC NEON	AMBER	1.9 mA	125 VAC	125 VAC
250 VAC NEON	AMBER	1.9 mA	250 VAC	250 VAC
2 V LED PRODUCTS*	RED	20 mA	2.0 VDC	2.5 VDC
	GREEN	20 mA	2.2 VDC	2.6 VDC
	AMBER	20 mA	2.1 VDC	2.5 VDC
6 V LED PRODUCTS	SEE CHART	20 mA	6 VDC	8 VDC
12 V LED PRODUCTS	SEE CHART	20 mA	12 VDC	14 VDC
24 V LED PRODUCTS	SEE CHART	20 mA	24 VDC	28 VDC

### R2 LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LIGHT SOURCE COLOR	FORWARD CURRENT	TYPICAL FORWARD/ NOMINAL VOLTAGE	MAX. FORWARD VOLTAGE
2 V LED PRODUCTS*	RED	20 mA	2.0 VDC	2.5 VDC
	GREEN	20 mA	2.2 VDC	2.6 VDC
	AMBER	20 mA	2.1 VDC	2.5 VDC
6 V LED PRODUCTS	SEE CHART	20 mA	6 VDC	8 VDC
12 V LED PRODUCTS	SEE CHART	20 mA	12 VDC	14 VDC
24 V LED PRODUCTS	SEE CHART	20 mA	24 VDC	28 VDC

\*Intended for use with external resistor. The "2 volt" switches are intended to have a resistor added in series into the lighting circuit by the customer. To determine the approximate value of the resistor, use the equation below:

$$\text{RESISTOR SIZE} = \frac{\text{POWER SUPPLY VOLTAGE} - \text{LED FORWARD VOLTAGE}}{\text{LED FORWARD CURRENT}}$$

# LED VOLTAGE/CURRENT RATINGS TABLE

## ILLUMINATED PUSHBUTTON SWITCH & INDICATOR LIGHTS VOLTAGE/CURRENT RATINGS TABLES

### LP3, LP5 AND LPL SERIES LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LED COLOR	FORWARD CURRENT	TYP. FORWARD VOLTAGE (DC)	MAX. FORWARD VOLTAGE DC
2V* PRODUCTS	RED	20 mA	1.9V	2.5V
	GREEN	20 mA	2.2V	2.6V
	AMBER			
	BLUE	20 mA	3.3V	4V
	DEEP GREEN			
6V PRODUCTS	ALL COLORS	20 mA	6V	8V
12V PRODUCTS	ALL COLORS	20 mA	12V	14.5V
24V PRODUCTS	ALL COLORS	20 mA	24 V	28.6 V

### LP3S LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LED COLOR	FORWARD CURRENT	TYP. FORWARD VOLTAGE	MAX. FORWARD VOLTAGE
2V* PRODUCTS	RED	20 mA	2 V	2.5 V
	GREEN			
	AMBER			
	BLUE	20 mA	3.2 V	4 V
	DEEP GREEN			
WHITE				
12V PRODUCTS	ALL COLORS	20 mA	12V	14V
24V PRODUCTS	ALL COLORS	20 mA	24 V	28.6 V

### LP7-D and LP9 SERIES LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS

LIGHT SOURCE VOLTAGE CATEGORY	LED COLOR, WAVELENGTH (nm)	FORWARD CURRENT	TYP. FORWARD VOLTAGE	MAX. FORWARD VOLTAGE
2V LIGHTPIPE STYLE	RED (631)	20 mA	2V	2.4V
	GREEN (525)	20 mA	3.2V	3.6V
	AMBER (591)	20 mA	2.1V	2.4V
	BLUE (470)	20 mA	3.3V	3.8V
	WHITE	5 mA	2.9V	3.15V
2V, TRANSLUCENT FULLY ILLUMINATED STYLE	RED (630)	20 mA	1.95V	2.5V
	GREEN (525)	20 mA	3.3V	4.1V
	AMBER (601)	20 mA	2.1V	2.5V
	BLUE (465)	20 mA	3.3V	4V
	WHITE	5 mA	2.85V	3.1V
12V ALL PRODUCTS	ALL COLORS, SAME AS 2V	(20 mA)	12.0V	14.0V

LP9L SERIES LIGHTING VOLTAGE/CURRENT COMPONENTS RATINGS				
LIGHT SOURCE VOLTAGE CATEGORY	LED COLOR, WAVELENGTH (nm)	FORWARD CURRENT	TYP. FORWARD VOLTAGE	MAX. FORWARD VOLTAGE
2V PRODUCTS	RED (631)	20 mA	2V	2.4V
	GREEN (525)	20 mA	3.2V	3.6V
	AMBER (591)	20 mA	2.1V	2.4V
	BLUE (470)	20 mA	3.3V	3.8V
	WHITE	5 mA	2.9V	3.15V
12V PRODUCTS	ALL COLORS, SAME AS 2V	(20 mA)	12.0V	14.0V

\*Intended for use with external resistor. The "2 volt" switches are intended to have a resistor added in series into the lighting circuit by the customer. To determine the approximate value of the resistor, use the equation below:

$$\text{RESISTOR SIZE} = \frac{\text{POWER SUPPLY VOLTAGE} - \text{LED FORWARD VOLTAGE}}{\text{LED FORWARD CURRENT}}$$