

# KP Series RGB Expansion



# General Specifications

## Electrical Capacity (Resistive Load)

Low Level: 100mA maximum @ 12V DC

## Other Ratings

<b>Contact Resistance:</b>	200 milliohms maximum
<b>Insulation Resistance:</b>	100 megohms minimum @ 250V DC
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts for 1 minute minimum 1,500V AC minimum between contacts & case for 1 minute minimum
<b>Mechanical Life:</b>	5,000,000 operations minimum;
<b>Electrical Life:</b>	5,000,000 operations minimum
<b>Nominal Operating Force:</b>	<b>KP01:</b> 1.9N maximum for Tactile & Nontactile models (at center of cap) <b>KP02:</b> 1.6N maximum for Tactile, Nontactile & Tactile/Audible models (at center of cap)
<b>Travel:</b>	<b>KP01:</b> Pretravel .122" (3.1mm); Overtravel .055" (1.4mm); Total Travel .177" (4.5mm) <b>KP02:</b> Pretravel .091" (2.3mm); Overtravel .047" (1.2mm); Total Travel .138" (3.5mm)

## Materials & Finishes

<b>Plunger/Upper Housing:</b>	Polyacetal
<b>Lower Housing:</b>	Glass fiber reinforced PBT (UL94V-0)
<b>Movable Contact:</b>	Stainless steel with gold plating
<b>Stationary Contacts:</b>	Gold over copper alloy
<b>Switch Terminals:</b>	Brass with tin plating

## Environmental Data

<b>Operating Temperature Range:</b>	-25°C through +50°C (-13°F through +122°F)
<b>Humidity:</b>	90 - 95% humidity for 240 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	51G (500m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

Cap Installation Force : 50.0N maximum downward force on actuator

## PCB Processing

<b>Soldering:</b>	Wave Soldering. Preheat Temperature: 140°C @ 60 seconds; Peak Temperature: 270°C @ 11 seconds; Thickness of PCB: 1.6mm; Cycles: 2 Manual Soldering. 410°C @ 4 seconds for 2 cycles
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

**Flammability Standards:** UL94V-0 lower housing

The KP Series pushbuttons have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

KP series offers a complete switch solution for all broadcast panel needs, including the newest line of RGB LED options with four terminals.

Distinct, long total travel of .177" (4.5mm) for KP01 or shorter stroke of .138" (3.5mm) for KP02.

The super bright RGB LED provides vibrant full color spectrum in unlimited color combinations.

Unique actuation guide gives positive indication of circuit transfer as well as smooth and silent operation.

Choices of tactile, nontactile or tactile/audible actuation.

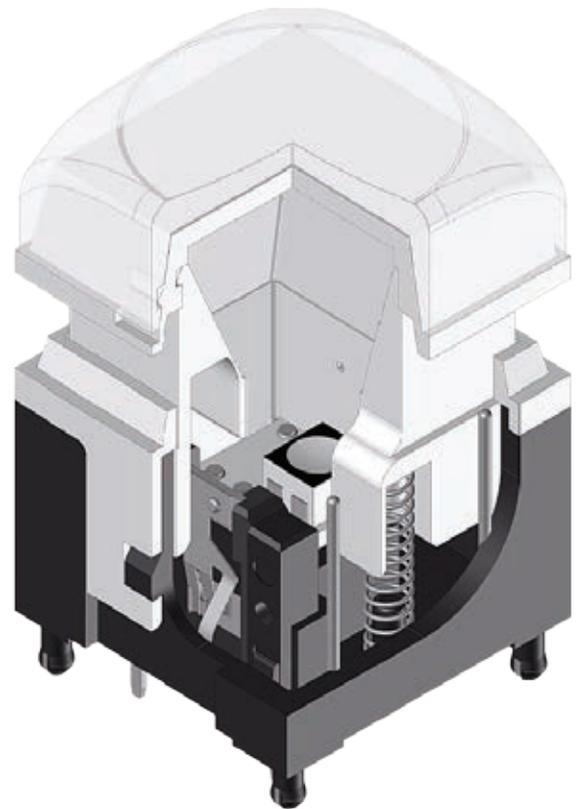
Compact design with height of .906" (23.0mm) from PC board to top of cap. (Same height as programmable SmartSwitch™.)

Flat, sculptured or home key square caps in three common sizes for design flexibility in audio/video applications.

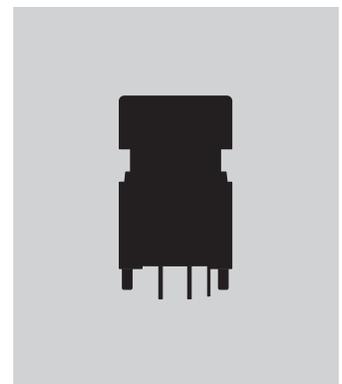
Twin contacts with gold plating assure high reliability and long life of 5,000,000 operations minimum.

Improved profile for soldering specifications.

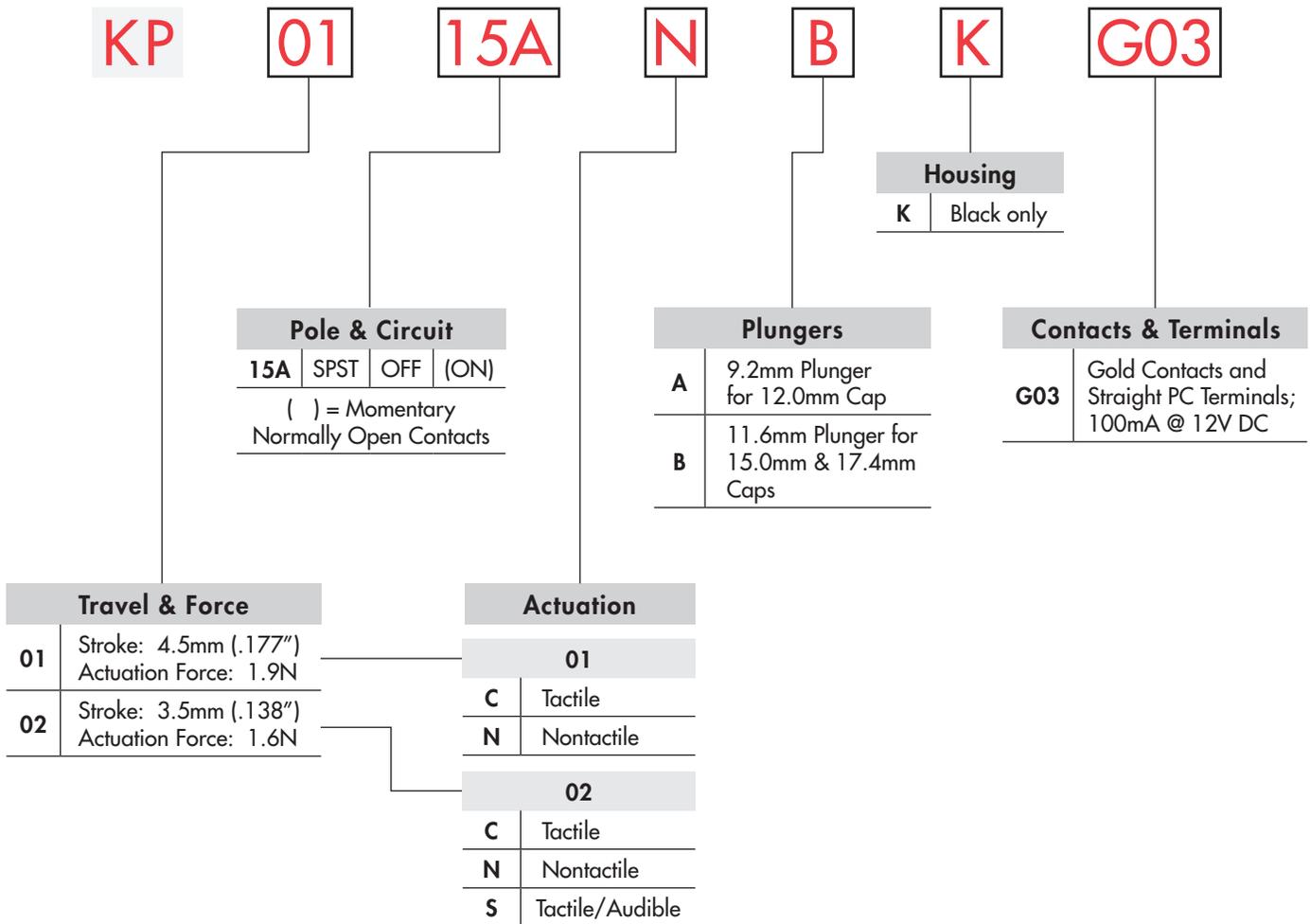
Custom legends are available.



Actual Size



### TYPICAL SWITCH

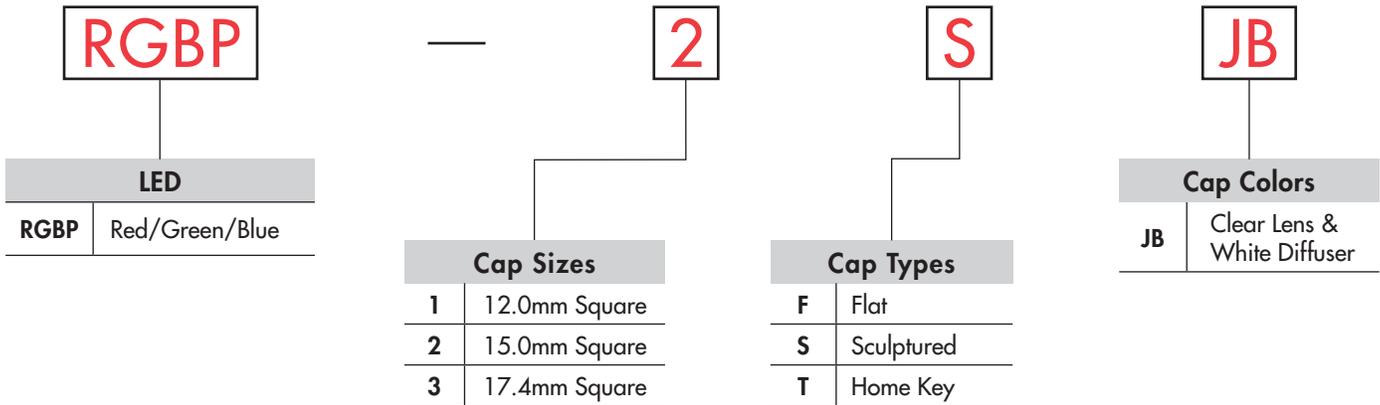


### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**KP0115ANBK G03RGBP-2SJB**



## ORDERING EXAMPLE



## POLE & CIRCUIT

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematic
		Normal	Down	Normal	Down	
SP	KP0115A KP0215A	OFF	(ON)	Normally Open	1-1a	SPST 

Note: Switch terminals "1" & "1a" are actually marked on the switch.

## ACTUATION

## HOUSING

- C** Tactile  
KP01 or KP02
- N** Nontactile  
KP01 or KP02
- S** Tactile/Audible  
KP02 only
- K** Black only

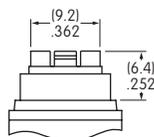
## CONTACTS, TERMINALS, & RATING

- G03** Gold Contacts
- Straight PC Terminals
- 100mA @ 12V DC

## PLUNGERS

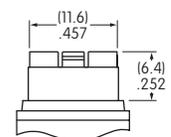
- A** 9.2mm Plunger  
for 12.0mm Cap

9.2mm Plunger is designed with a narrower neck to hold the 12.0mm Cap.



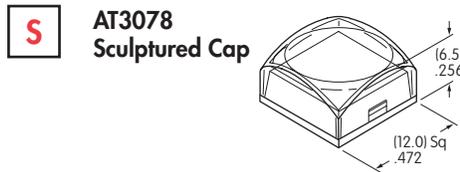
- B** 11.6mm Plunger  
for 15.0mm & 17.4mm Caps

11.6mm Plunger is designed with a wider neck to hold both the 15.0mm and 17.4mm Caps.

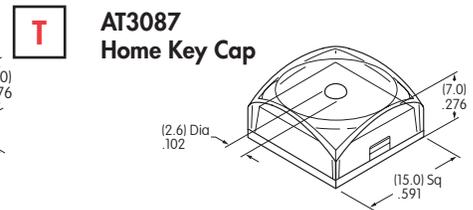
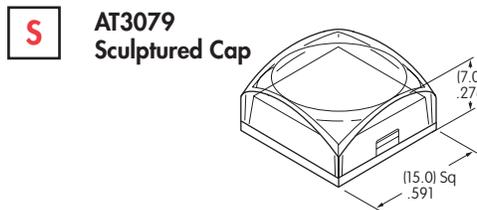


## CAP TYPES & COLORS

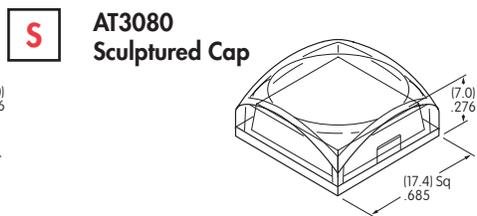
**1** 12.0mm Square Used on A Plunger



**2** 15.0mm Square Used on B Plunger



**3** 17.4mm Square Used on B Plunger



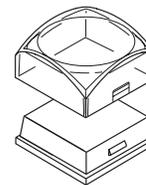
**JB** Lens & Diffuser Colors Available:

Clear/White

Materials & Finishes: Lens - Polycarbonate with glossy finish

Diffuser - Polycarbonate with textured finish

Optional Protective Guard AT4170 available; contact factory.



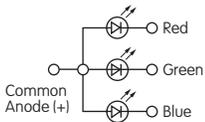
Clear Lens

White Diffuser

## RGB LED SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. LEDs are an integral part of the switch and not available separately. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula shown here.

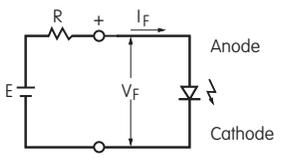
	Color	RGBP			Unit
		Red	Green	Blue	
Maximum Forward Current	$I_{FM}$	50	30	30	mA
Typical Forward Current	$I_F$	15	16	10	mA
*Forward Voltage	$V_F$	2.0	2.9	2.9	V
Power Peak Dissipation	$P_D$	100	80	80	mW
Maximum Reverse Voltage	$V_{RM}$	5	5	5	V
Dominant Wavelength	$\lambda_d$	620	525	467	nm
Current Reduction Rate Above 45°C	$\Delta_{IF}$	0.75	0.25	**0.22	mA/°C
Ambient Temperature Range		-25 ~ +50			°C



**RGBP**

$$R = \frac{E - V_F}{I_F}$$

Where: R = Resistor Value (Ohms)  
 E = Source Voltage (V)  
 $V_F$  = Forward Voltage (V)  
 $I_F$  = Forward Current (A)

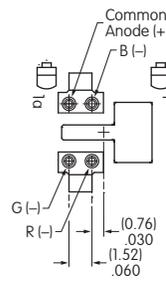
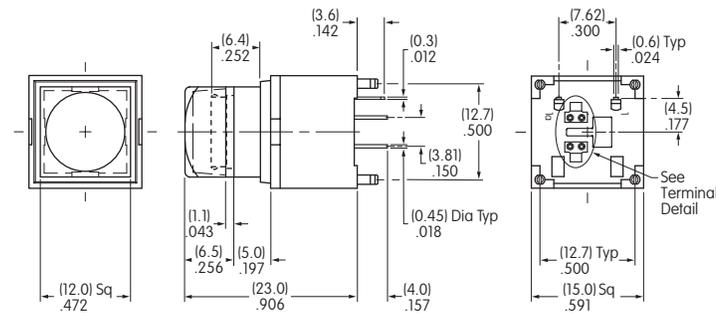


Note: For applications that require white illumination, contact factory.

\*Forward Voltage ( $V_F$ ) and Dominant Wavelength ( $\lambda_d$ ) are Typical Value measured by Typical Forward Current ( $I_F$ ).

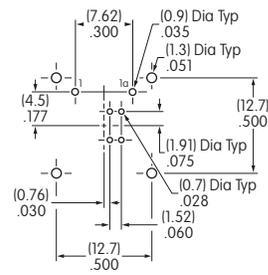
\*\*Current Reduction Rate ( $\Delta_{IF}$ ) Above 40°C

## TYPICAL SWITCH DIMENSIONS

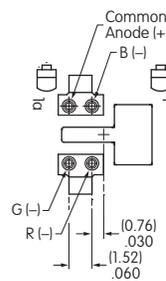
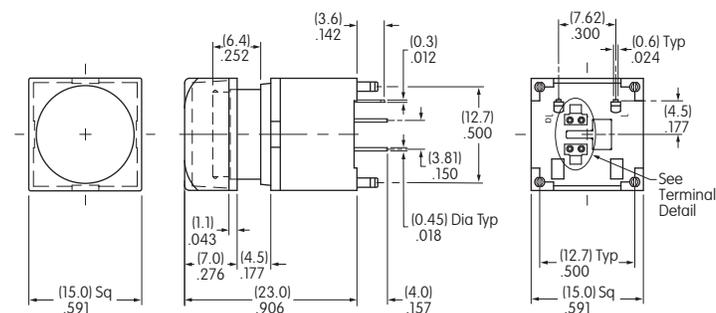


Terminal Detail

### 12.0mm Square Cap

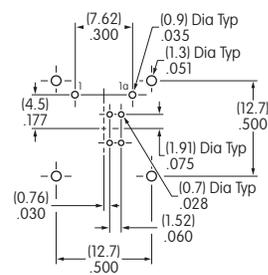


KP0115ACAKG03RGBP-1SJB

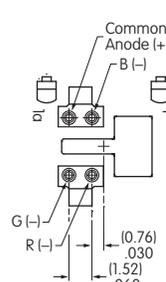
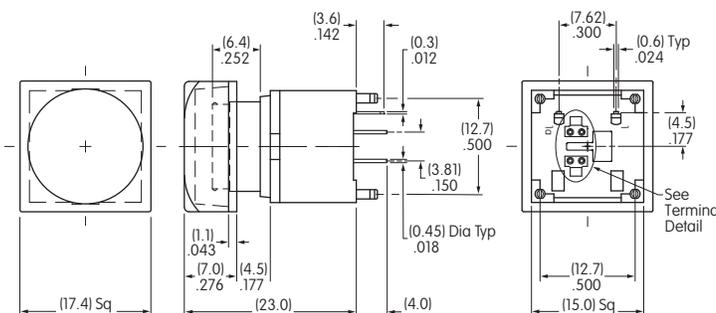


Terminal Detail

### 15.0mm Square Cap

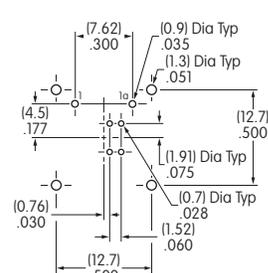


KP0115ANBKG03RGBP-2SJB



Terminal Detail

### 17.4mm Square Cap



KP0115ANBKG03RGBP-3SJB

## ASSEMBLY INSTRUCTIONS FOR SQUARE CAPS



### Cap Orientation

As shown in the accompanying illustration, the cap and plunger are designed with tabs and notches to assure proper orientation of the cap on the switch.

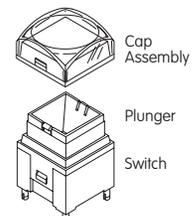
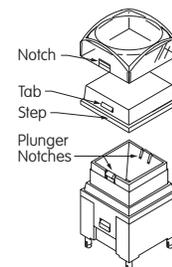
### Removal of Cap Assembly & Separation of Lens & Diffuser



Holding the switch tightly, pull the cap off the switch. Once the cap assembly is released from the plunger, the lens and diffuser can be separated. Pry up the lens with fingernail or flat tip screwdriver inserted at the step on the diffuser.

### Installation or Replacement of Cap

After aligning notches with tabs, join the lens and diffuser. Hold the switch tightly without touching the terminals. Firmly press the cap onto the plunger by applying pressure from one side to the other until both are snapped together.



## LEGENDS

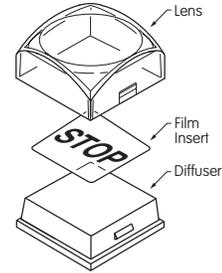
NKK Switches can provide custom legends for caps. Contact factory for more information.

### Suggested Printable Areas for KP Lens

#### Recommended Methods:

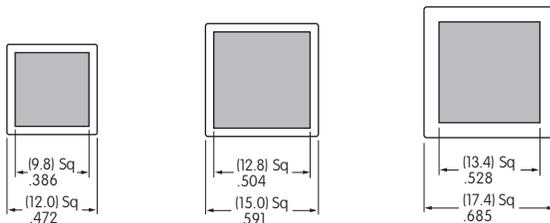
Laser Etch on clear lens, Screen Print on flat lens.  
Laser Print on film insert.  
Epoxy based ink is recommended.

Printing on Diffuser  
is not advisable.

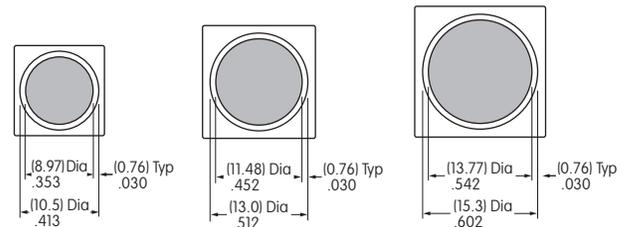


Shaded areas are suggested printable areas for Lens.

Flat Cap Lens



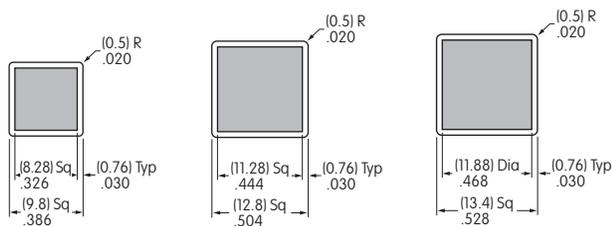
Sculptured Cap Lens



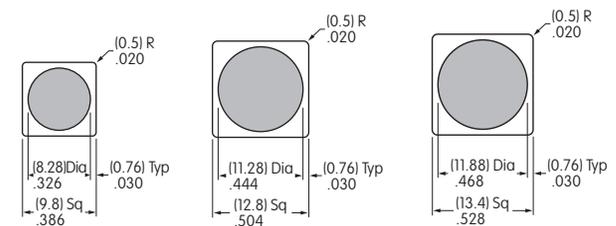
### Suggested Printable Areas for KP Film Insert

Shaded areas are suggested printable areas for Film Insert.

Flat Cap Film Inserts



Sculptured or Home Key Cap Film Inserts



**Film Insert Material and Thickness:** Clear Polyester; 4 mil (100µ) maximum thickness

**Effective Date** May 2017

**NKK**  
SWITCHES

<http://www.nkkswitches.com> • 1.877.2BUYNKK (228.9655)  
7850 East Gelding Drive • Scottsdale, AZ 85260 • Telephone 480.991.0942 • Fax 480.998.1435