

# Distinctive Characteristics

Brilliant illumination for highly visible status indication with LEDs and caps in red, green, or amber; subdued illumination for low light requirements with white cap over red, green, or amber LEDs.

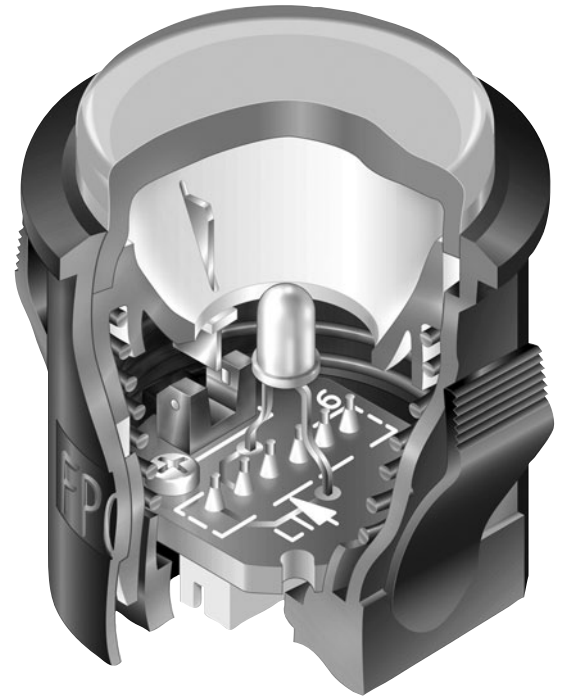
Photo interrupter, rather than contacts, ensures high reliability and long life of 3 million operations minimum.

Rugged construction and smooth actuation allow repeated, rapid actuation force anywhere on cap surface.

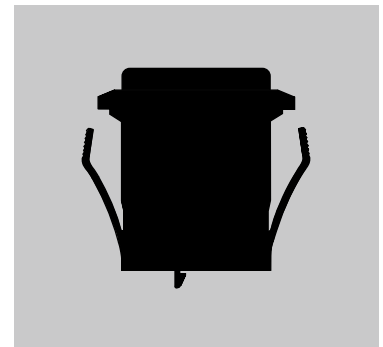
Snap-in mounting for easy installation.

Connector socket with 6 pins for simple connection.

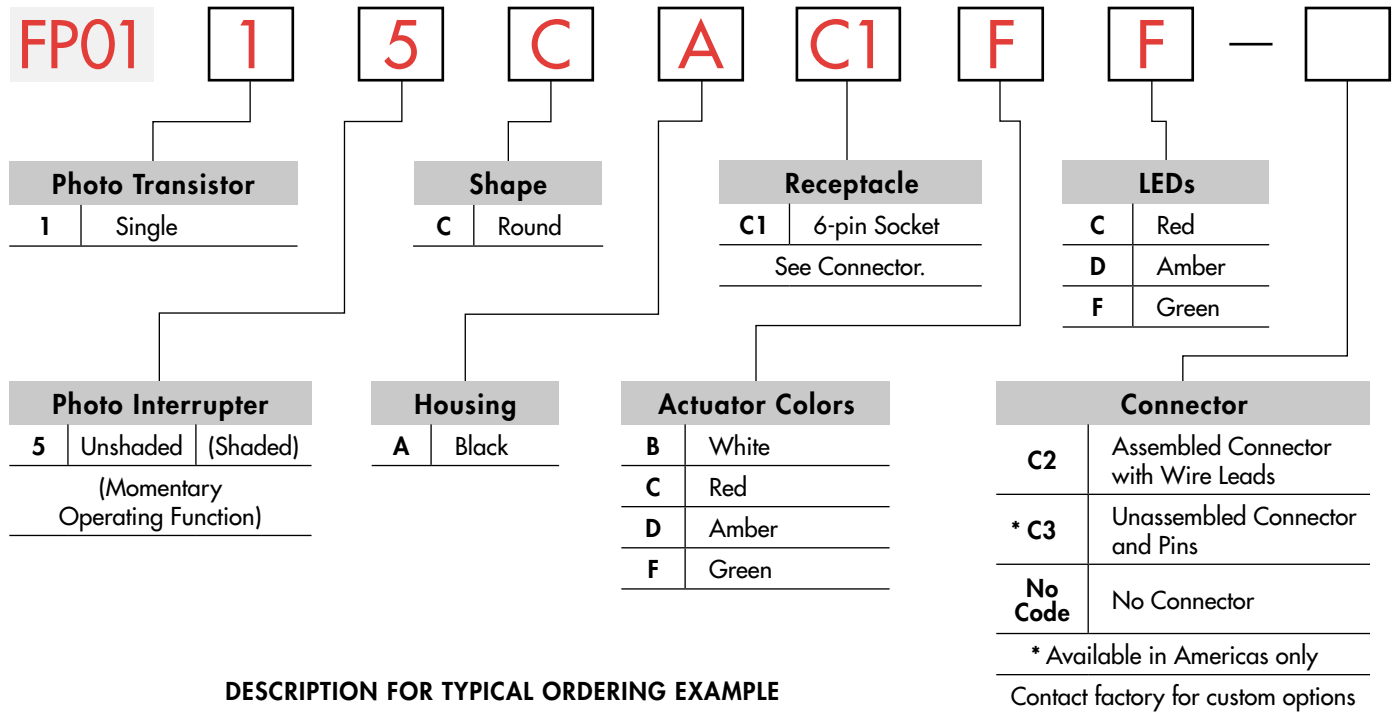
Well suited for gaming and vending machines, as well as equipment exposed to corrosive gases used in environments such as chemical or steel manufacturing plants.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

FP0115CAC1FF



ACTUATOR & INTERRUPTER

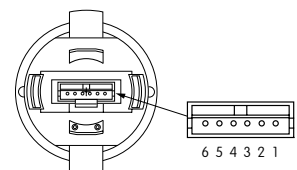
		Actuator Position		Photo Interrupter		Schematics
Model	<b>1</b>	Normal 	Down 	Unshaded <b>5</b>	Shaded Normally Unshaded with Momentary Shaded status	LED connector pins are 5 & 6; interrupter connector pins are 3-4 & 1-2.
FP0115	Single Photo Transistor	When shaded, the photo transistor momentarily activates electrical function which signals the external device to change its state.				

HOUSING SHAPE & COLOR

**C** Round Shape      **A** Black Housing

RECEPTACLE

**C1** 6-pin Socket



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## SWITCH SPECIFICATIONS

	Actuator Up	Actuator Down
Status of Photo Interrupter:	Unshaded	Shaded
Collector Current $I_C$ :	0.8mA minimum	10 $\mu$ A maximum
Status of Photo Transistor:	On	Off
Output Condition of Photo Transistor:	$I_F = 20\text{mA}$ & $V_{CE} = 5\text{V}$	

## MECHANICAL SPECIFICATIONS

Total Travel:	.079" (2.0mm)
Operating Force:	0.75 N (.169 lbf)
Mechanical Life:	3,000,000 operations minimum
Operating Temperature Range:	-25°C through +50°C (-13°F through +122°F)

## MATERIALS

Actuator: Polyacetal    Housing: Polyamide

## PHOTO INTERRUPTER SPECIFICATIONS

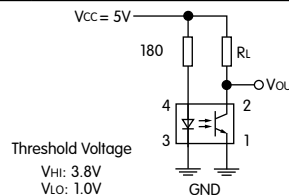
(Temperature @ 25°C)

Electrical & Optical Characteristics	Typical	Maximum	Condition
<b>Input</b>			
Forward Voltage $V_F$ :	1.3V	1.6V	$I_F = 50\text{mA}$
Reverse Current $I_R$ :		10 $\mu$ A	$F_R = 5\text{V}$
<b>Transmission</b>			
Collector-Emitter Saturation Voltage $V_{CE\text{ sat}}$ :		0.4V	$I_F = 20\text{mA}$ & $I_C = 0.1\text{mA}$
<b>Absolute Maximum Ratings</b>			
<b>Input LED</b>		<b>Output Photo Transistor</b>	
Forward Current $I_F$ :	50mA	Collector-Emitter Voltage $V_{CEO}$ :	30V
Reverse Voltage $V_R$ :	5V	Emitter-Collector Voltage $V_{ECO}$ :	4.5V
Power Dissipation $P_D$ :	80mW	Collector Current $I_C$ :	30mA
		Collector Dissipation $P_C$ :	80mW

### Circuit Design Considerations

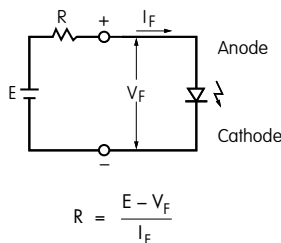
Output of the infrared LED in the photo interrupter decreases approximately 50% after 100,000 hours.

Recommended load resistance (RL) is 40k ~ 120k $\Omega$  for the illustrated circuit.



## LED COLORS & SPECIFICATIONS

LEDs are an integral part of the switch and not available separately. The electrical specifications shown are determined at a basic temperature of 25°C.



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

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

If the source voltage exceeds the rated voltage, a ballast resistor is required.

Single Element LED	Color	<b>C</b> Red	<b>D</b> Amber	<b>F</b> Green
Forward Peak Current	$I_{FM}$	30mA	25mA	25mA
Typical Forward Current	$I_F$	20mA	20mA	20mA
Forward Voltage	$V_F$	1.85V	2.0V	2.25V
Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.38mA /°C	0.28mA /°C	0.40mA /°C
Ambient Temperature Range		-25° ~ +50°C		

ACTUATOR COLORS



White



Red



Amber



Green

CONNECTOR OPTIONS



**AT021**  
Assembled Connector  
with Wire Leads

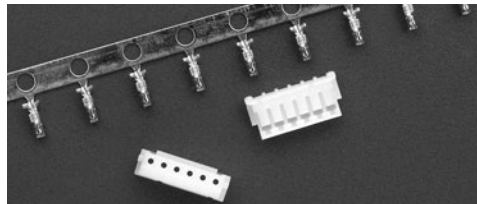
Connector body: JST model ZHR-6  
Crimp connector pins: JST model SZH-002T-P0.5  
Wire leads: 28-26AWG; 12-inch, unstripped;  
Blue for Pin 1



**AT022**  
Unassembled Connector  
and Pins

1 connector and 8 crimp connector pins  
only (no wire leads provided).

Matching wire leads: 28-26AWG

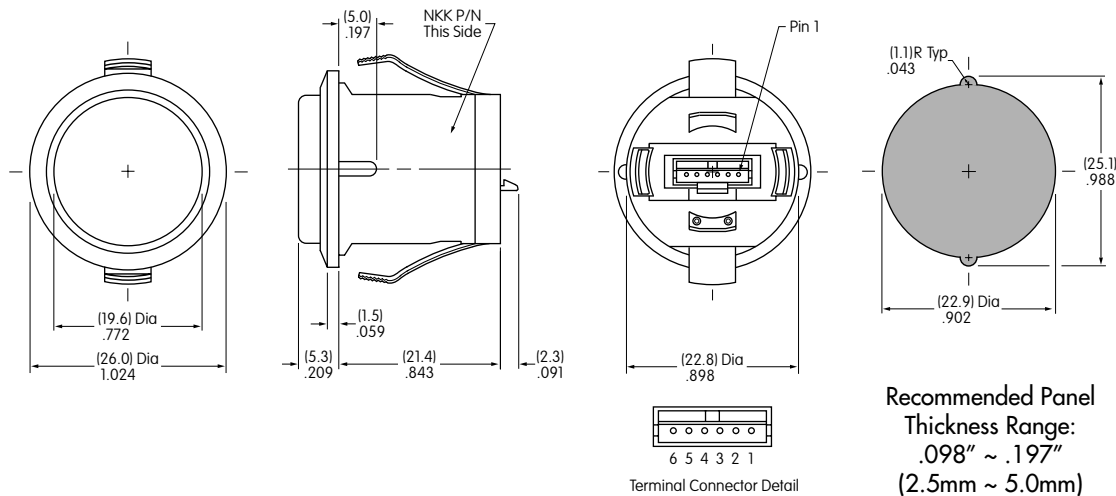


**No Connector**

Recommended connector  
for assembly:  
JST model number ZHR-6

Recommended crimp  
connector pins:  
JST model SZH-002T-P0.5  
for 28-26AWG wire leads  
or SZH-003T-P0.5  
for 32-28AWG wire leads.

TYPICAL SWITCH DIMENSIONS



Recommended Panel  
Thickness Range:  
.098" ~ .197"  
(2.5mm ~ 5.0mm)

FP0115CAC1FF

LEGENDS

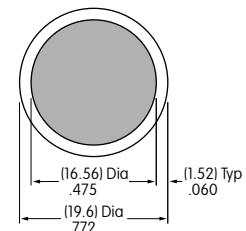
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for FP01 Cap



Recommended Methods:

Screen Print on cap.  
Epoxy based ink is recommended.



Shaded area is printable area.

Toggles  
Rocker  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement