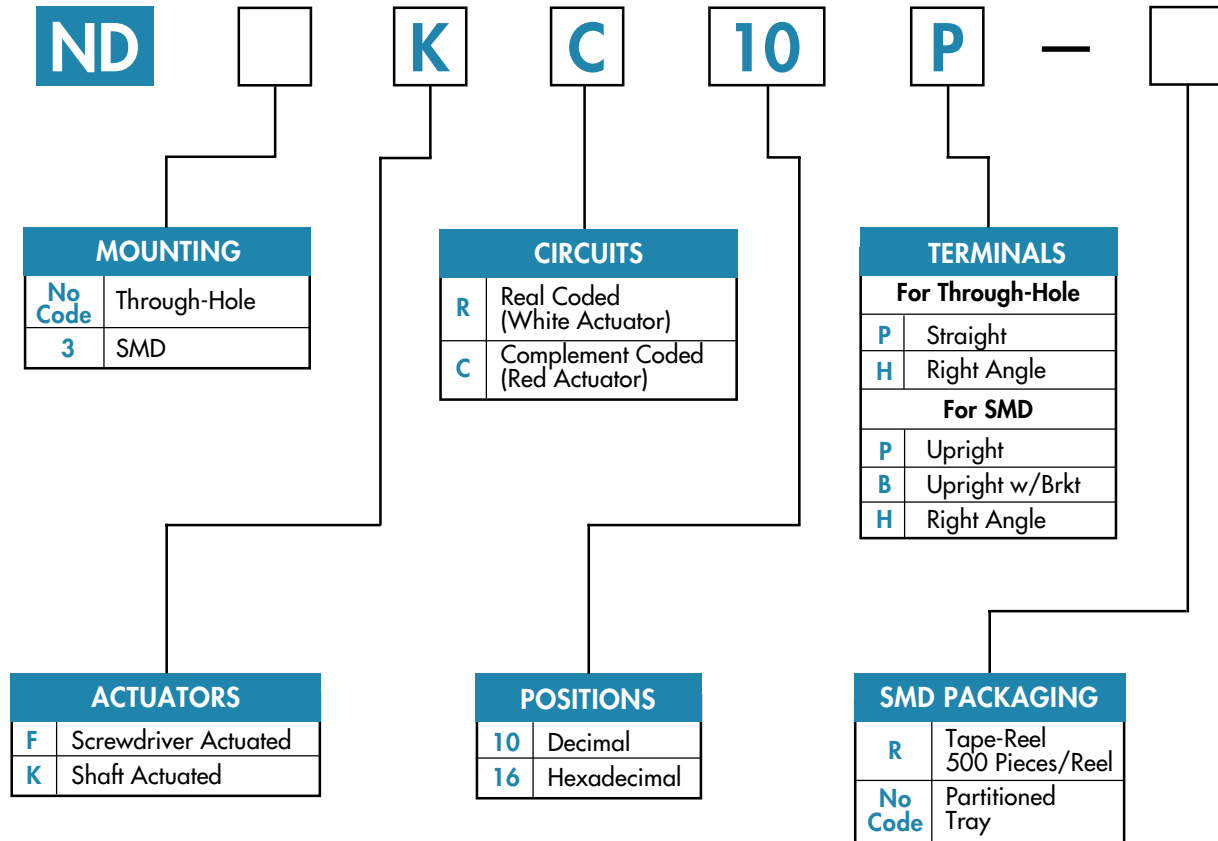




# Series ND

8mm Washable DIP Rotary Switches

## TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**NDKC10P**





### GENERAL SPECIFICATIONS

#### Electrical Capacity (Resistive Load)

<b>Switching Rating:</b>	100mA @ 5V DC
<b>Nonswitching Rating:</b>	100mA @ 50V DC

#### Other Ratings

<b>Contact Resistance:</b>	80 milliohms maximum for circuit; 30 milliohms maximum for contact point
<b>Insulation Resistance:</b>	1,000 megohms minimum @ 250V DC
<b>Dielectric Strength:</b>	250V AC minimum
<b>Mechanical Life:</b>	20,000 detent operations minimum
<b>Electrical Life:</b>	20,000 detent operations minimum

Note: A detent operation is one actuator position operation or stepping.  
20,000 detent operations = 1,250 cycles for hexadecimal devices or  
2,000 cycles for decimal devices. A cycle is one 360° rotation.

<b>Nominal Operating Torque:</b>	.061 kgf/cm (.846 oz/in)
<b>Contact Timing:</b>	Nonshorting (break-before-make)

#### Materials & Finishes

<b>Actuator:</b>	Glass fiber reinforced polyamide
<b>Housing:</b>	Glass fiber reinforced polyamide
<b>O-ring:</b>	Nitrile butadiene rubber
<b>Base:</b>	Glass fiber reinforced polyamide
<b>Movable Contact:</b>	Beryllium copper with gold plating over nickel
<b>Stationary Contacts:</b>	Brass with gold plating over nickel
<b>Terminals:</b>	Brass with gold plating over nickel

#### Environmental Data

<b>Operating Temp Range:</b>	-25°C through +75°C (-13°F through +167°F) for ND; -25°C through +85°C (-13°F through +185°F) for ND3
<b>Humidity:</b>	90 ~ 95% humidity for 96 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>	50g acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

#### Installation

<b>Soldering Time &amp; Temperature:</b>	For ND: 3 seconds @ 350°C manual solder or 5 seconds @ 270°C solder pot For ND3: 3 seconds @ 350°C manual solder or See Supplement Index (page Z1) for automated SMT methods.
<b>Process Seal:</b>	See <a href="#">Supplement Index</a> for specific processing data.

#### Standards & Certifications

<b>Flammability Standards:</b>	UL 94V-0 rated housing & base
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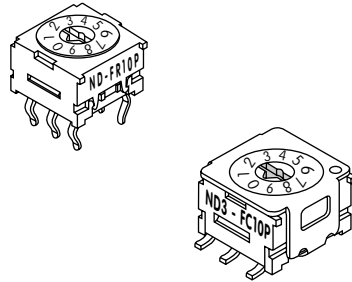


# Series ND

8mm Washable DIP Rotary Switches

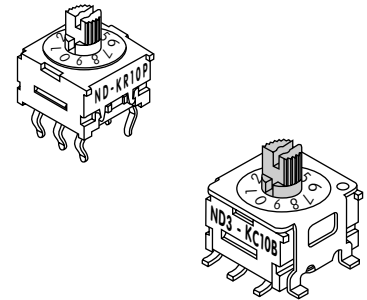
## ACTUATORS

### F Screwdriver Actuated



Actuator colors:  
white for real coded &  
red for complement coded.

### K Shaft Actuated



Actuator colors:  
white for real coded &  
red for complement coded.

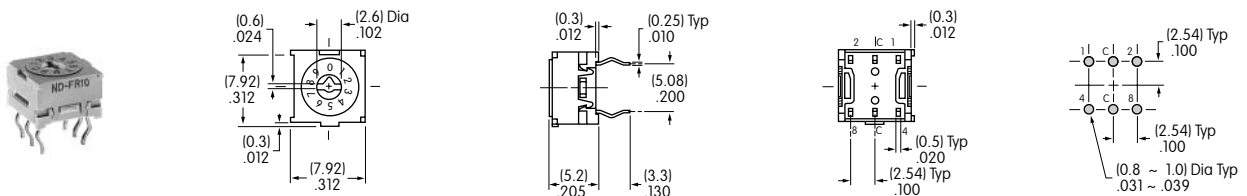
Actuators are fully rotational in either direction.

## TRUTH TABLES (CIRCUITS & POSITIONS)

Terminal No. (Output)	Actuator Position ● = on	10 Decimal									16 Hexadecimal																		
		0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
<b>R</b> Real Coded Model Numbers: NDFR, NDKR, ND3FR, ND3KR	1		●		●		●		●		●		●		●		●		●		●		●		●		●		●
	2			●	●			●	●					●	●			●	●					●	●			●	●
	4					●	●	●	●							●	●	●	●						●	●	●	●	
	8									●	●									●	●	●	●					●	●
<b>C</b> Complement Coded Model Numbers: NDFC, NDKC, ND3FC, ND3KC	1	●		●		●		●		●		●		●		●		●		●		●		●		●		●	
	2	●	●			●	●			●	●			●	●			●	●			●	●			●	●		
	4	●	●	●	●					●	●			●	●					●	●			●	●			●	●
	8	●	●	●	●	●	●	●	●					●	●	●	●	●					●	●	●	●			●

## TYPICAL SWITCH DIMENSIONS

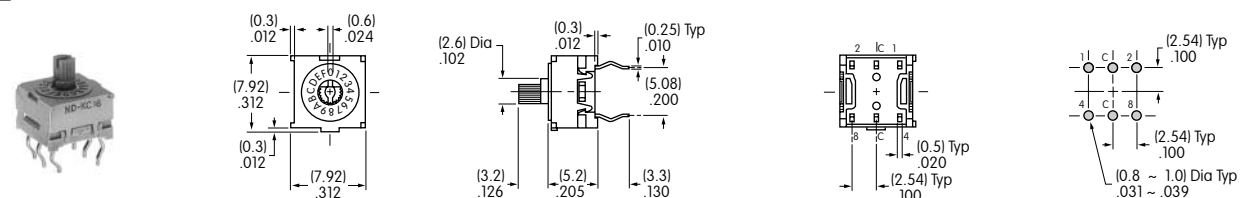
### P Screwdriver Actuated • Straight PC • Through-Hole



NDFR10P

Terminal numbers not on switch.

### P Shaft Actuated • Straight PC • Through-Hole

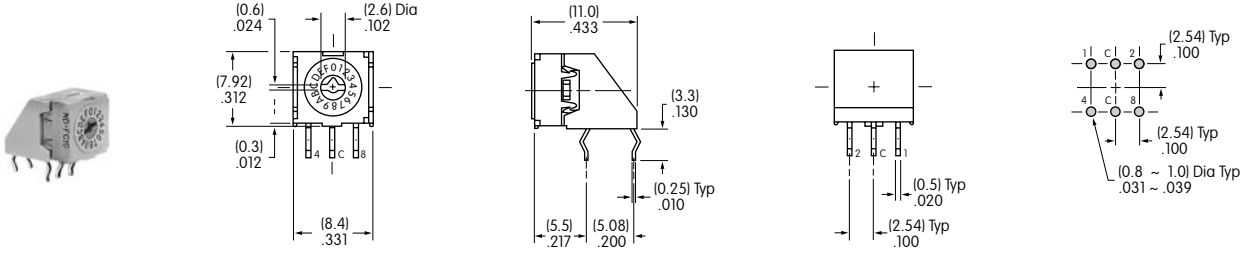


NDKC16P

Terminal numbers not on switch.

## TYPICAL SWITCH DIMENSIONS

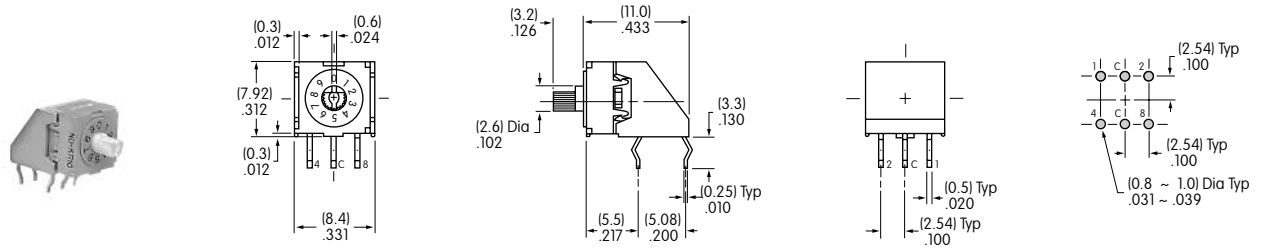
### H Screwdriver Actuated • Right Angle PC • Through-Hole



ND3C16H

Terminal numbers on terminal cover.

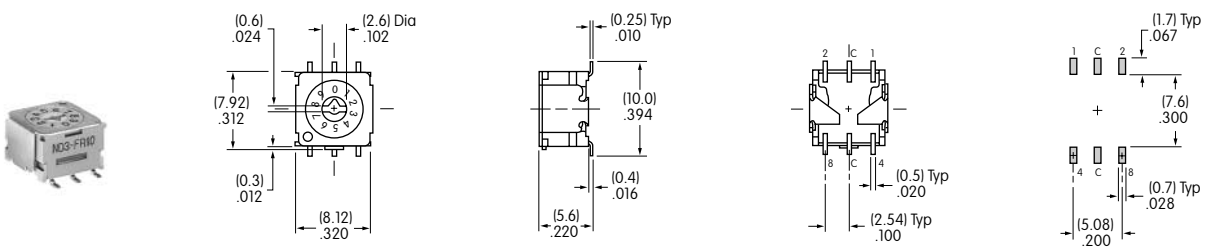
### H Shaft Actuated • Right Angle PC • Through-Hole



ND3R10H

Terminal numbers on terminal cover.

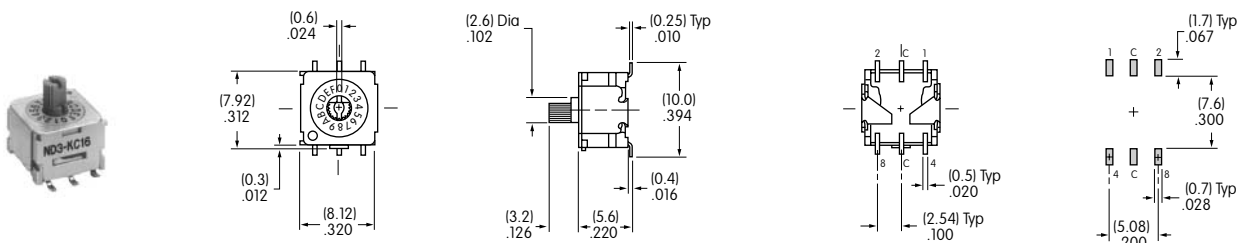
### P Screwdriver Actuated • Upright SMD



ND3FR10P

Terminal numbers not on switch.

### P Shaft Actuated • Upright SMD



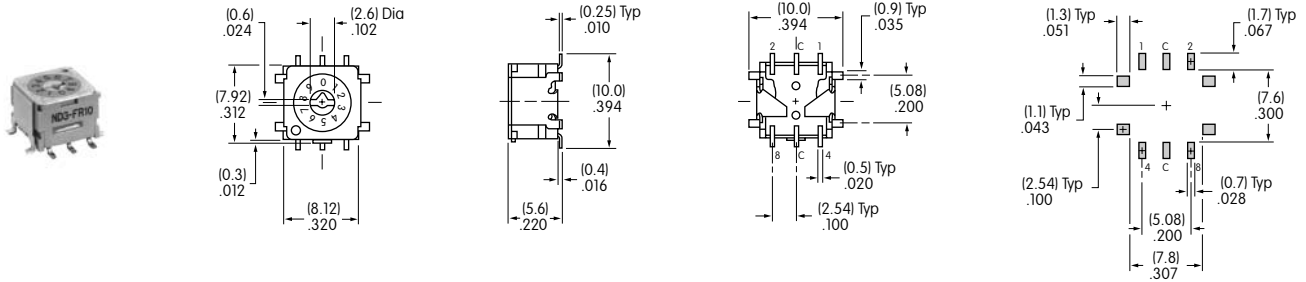
ND3KC16P

Terminal numbers not on switch.



### TYPICAL SWITCH DIMENSIONS

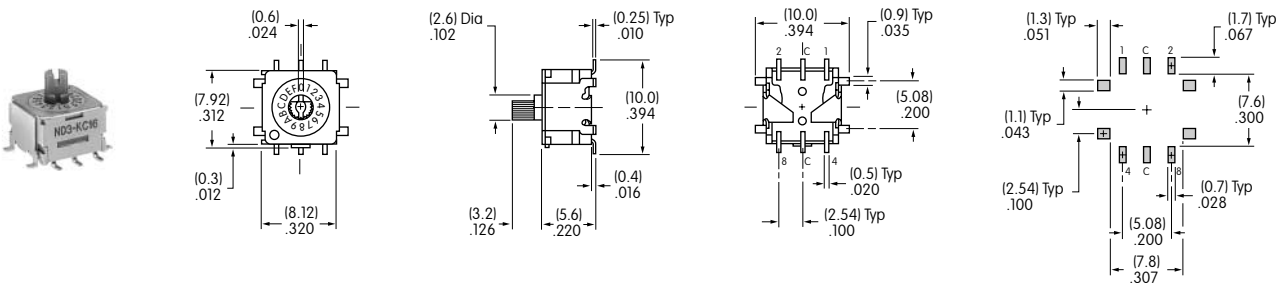
#### **B** Screwdriver Actuated • Upright SMD Bracket



ND3FR10B

Terminal numbers not on switch.

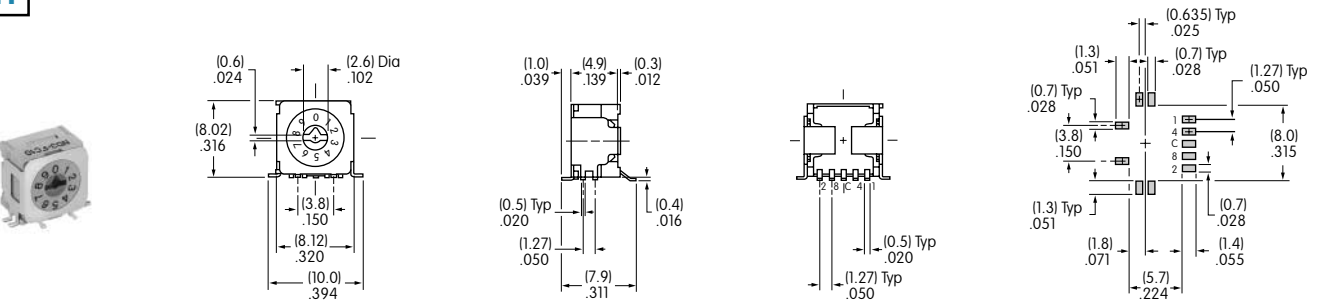
#### **B** Shaft Actuated • Upright SMD Bracket



ND3KC16B

Terminal numbers not on switch.

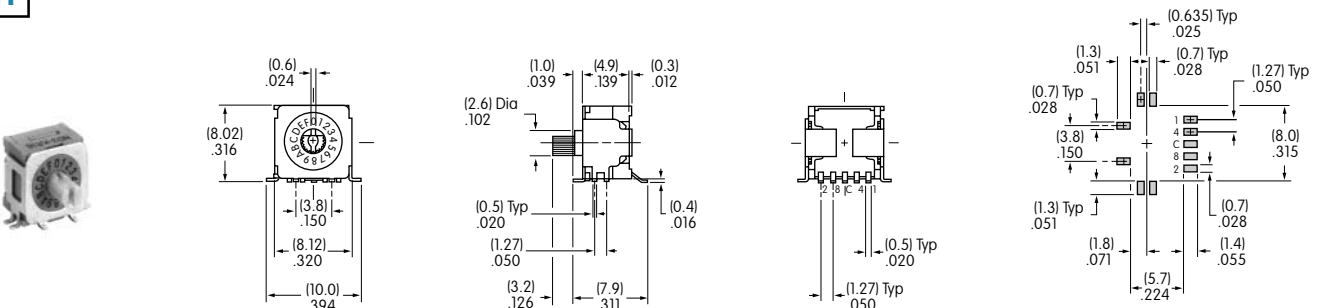
#### **H** Screwdriver Actuated • Right Angle SMD



ND3FC10H

Terminal numbers not on switch.

#### **H** Shaft Actuated • Right Angle SMD



ND3KR16H

Terminal numbers not on switch.



### PACKAGING FOR SURFACE MOUNT DEVICES

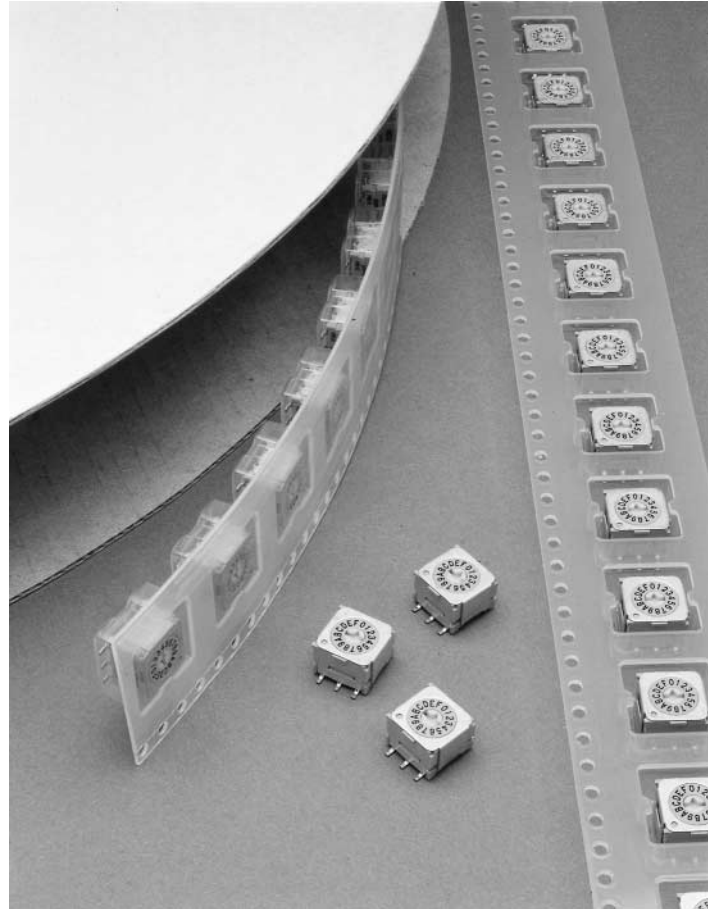
#### Tape-Reel Packaging

R

##### Tape-Reel Packaging for Upright & Right Angle

Switches must be ordered in 500-piece increments when tape-reel packaging is selected.

This packaging meets EIA-481-2 Standard for "16mm and 24mm Embossed Carrier Taping of Surface Mount Components for Automatic Handling."

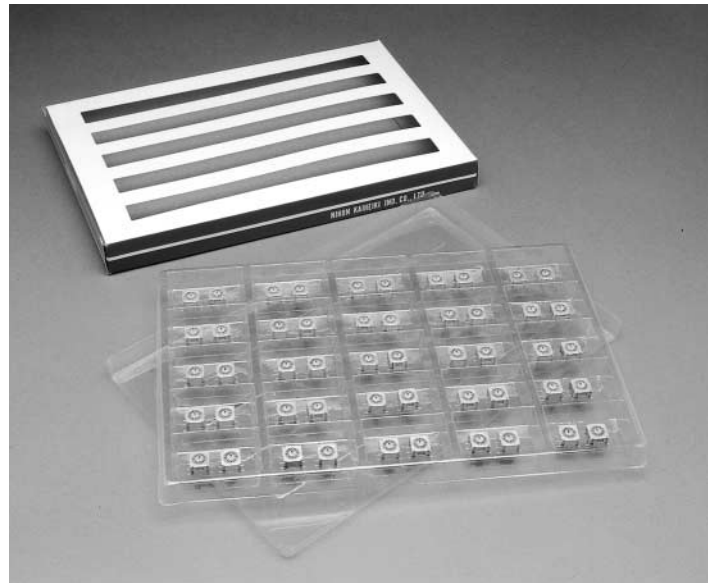


#### Tray Packaging

No  
Code

##### Partitioned Tray for Upright & Right Angle Any Quantity

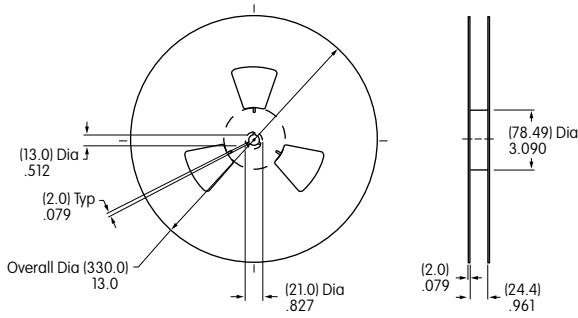
If the ND3 is ordered in less than 500-piece increments, the switches are packaged in a partitioned tray. No code is required.



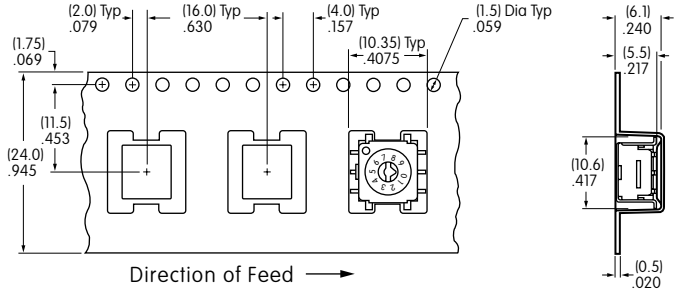
### PACKAGING FOR SURFACE MOUNT DEVICES (CONTINUED)

#### For Upright & Upright with Bracket (codes P & B with F Actuator)

Each tape-reel of 550 pockets contains 500 switches  
 Minimum Leader Length: 230mm (9.05") Minimum Trailer Length: 160mm (6.30")



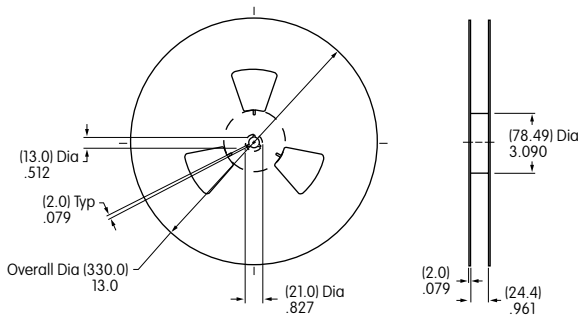
Reel Dimensions



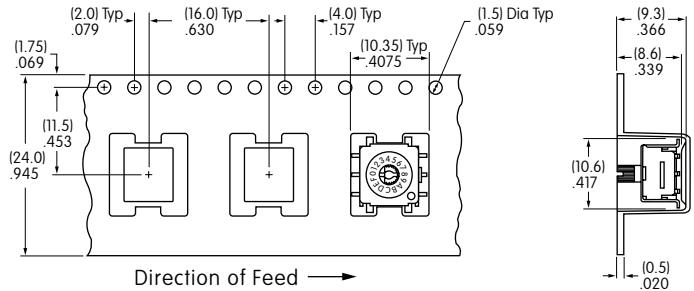
Tape Dimensions

#### For Upright & Upright with Bracket (codes P & B with K Actuator)

Each tape-reel of 530 pockets contains 500 switches  
 Minimum Leader Length: 230mm (9.05") Minimum Trailer Length: 160mm (6.30")



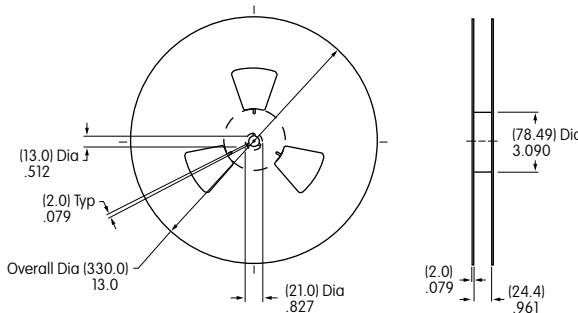
Reel Dimensions



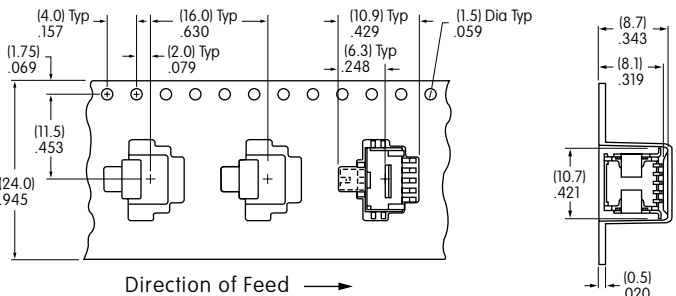
Tape Dimensions

#### For Right Angle (code H with F or K Actuator)

Each tape-reel of 550 pockets contains 500 switches  
 Minimum Leader Length: 230mm (9.05") Minimum Trailer Length: 160mm (6.30")



Reel Dimensions



Tape Dimensions