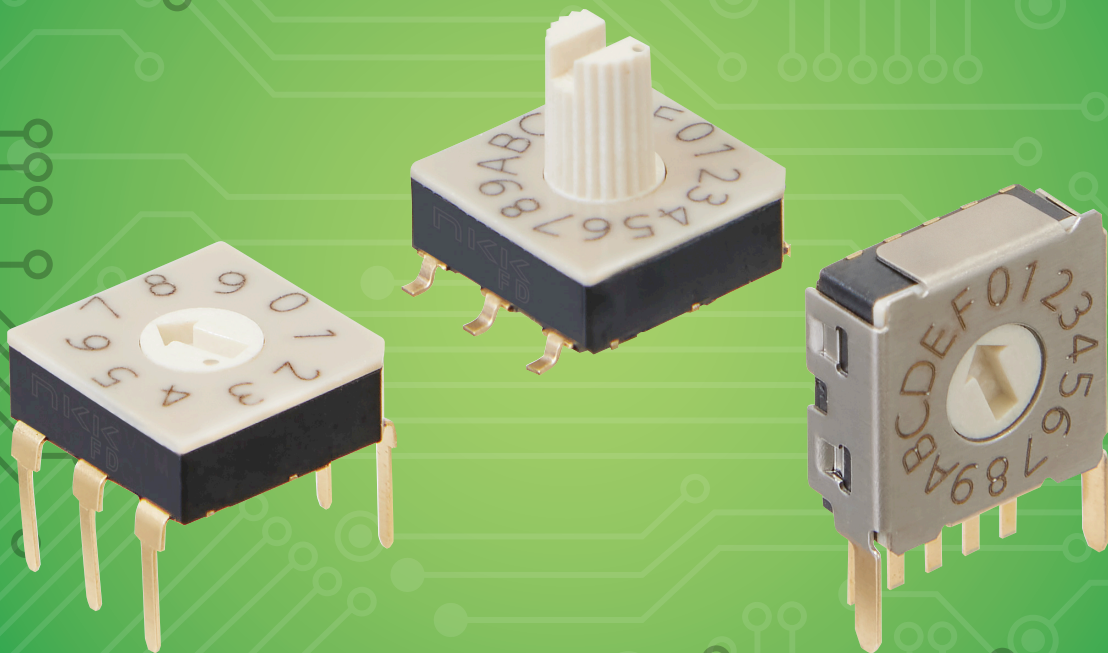


新商品

CONTACT No. 408

NKK
SWITCHES
Innovation Driving Quality

7.2mm 和 7.7mm 方形旋转开关，
高度 3.1mm 至 3.3mm，
适用于高密度安装



FD01 系列 / FD02 系列

直线 PC / SMT

超薄 DIP 旋转开关

NKK SWITCHES CHINA CO.,LTD.

NKK SWITCHES HONG KONG CO.,LTD.

7.2mm 和 7.7mm 方形旋转开关， 高度 3.1mm 至 3.3mm，适用于高密度安装

英寸端子间距

适用于带英寸端子间距的 PCB (FD01)

节省空间型设计

紧凑型尺寸 (方形 7.2mm 和 7.7mm, 高度 3.1mm 至 3.3mm), 允许高密度安装并节省空间等优点。

耐热树脂

耐热树脂, 适合回流焊 (FD02)

操作便捷可靠

内置的金属弹簧保证了便捷、可靠的操作。

鸥翼式配置

鸥翼式配置, 适用于焊后检查 (FD02)

高可靠性触点

活动触点组件分布均匀, 确保操作时的连接顺畅。镀金触点实现触点的高可靠性。

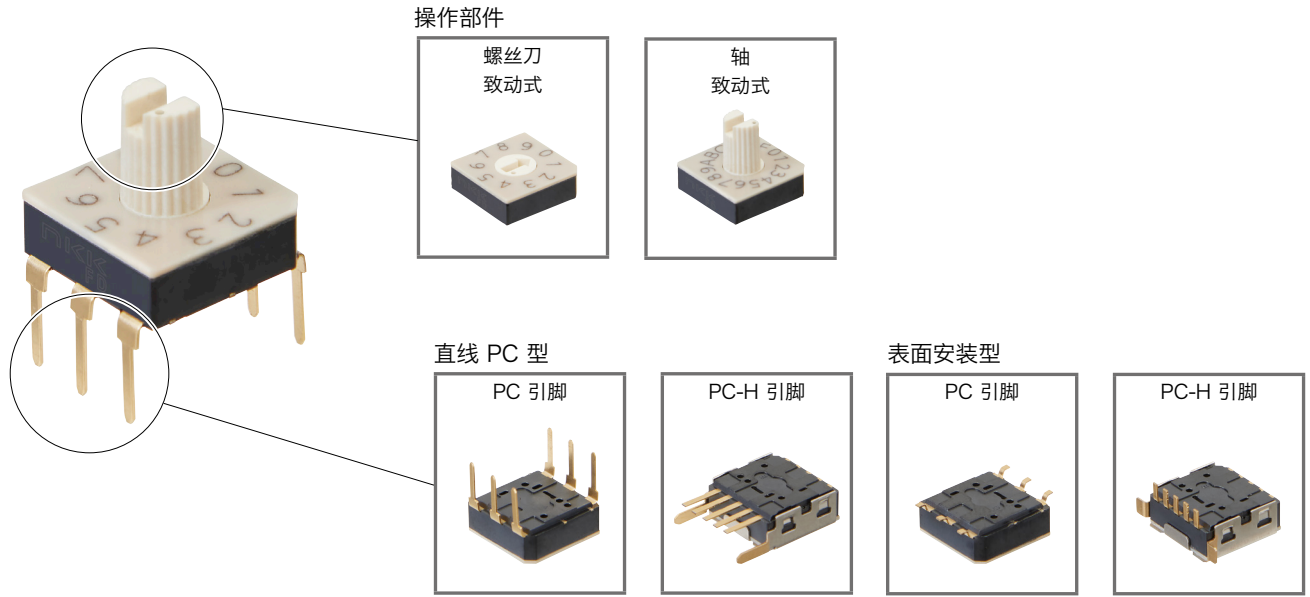
► 一般规格

一般规格			
额定值 (电阻性负载)	最大 0.4VA, 最大 20V, AC/DC	工作温度范围	-25°C 至 +85°C
接触电阻	最大 100mΩ (20mV, 10 mA 时)	焊料耐热性	FD01 系列 ▶使用烙铁时: B 级 ▶使用焊料浴时: B 级
绝缘电阻	250V DC, 最小 1GΩ		FD02 系列 ▶使用烙铁时: B 级 ▶使用回流时: A 级
绝缘强度	250V AC, 至少 1 分钟		参考附录中的处理数据说明。
机械寿命	至少 10000 次操作		
电气寿命	至少 10000 次操作		

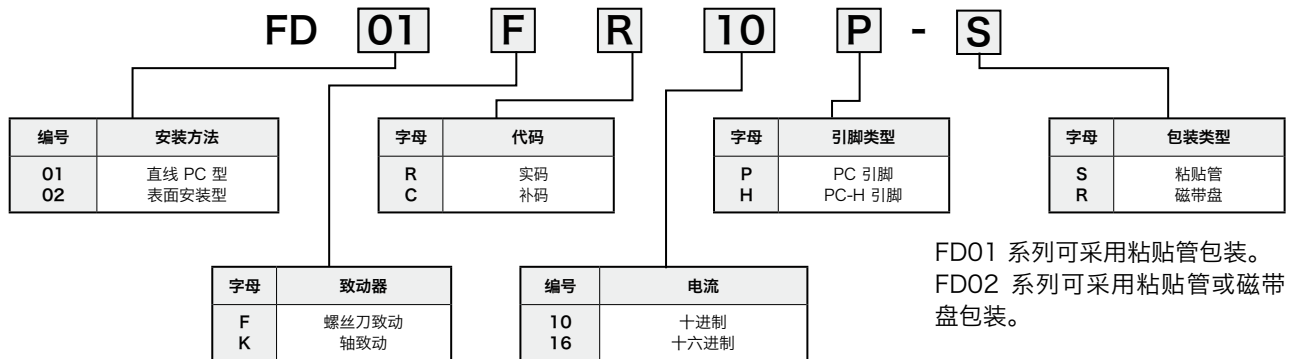
⚠ 每个额定值/性能值均通过独立检测而获得。因此, 在复杂条件下不能保证获得相同结果。关于检测条件和判断标准, 请参考全线目录。

		真值表(电路和位置) ●表示与 C(公共)的连接。																															
型号	位置	FD01FR16P				FD01FR16H				FD01KR16P				FD01FC16P				FD01FC16H															
		FD02FR16P				FD02FR16H				FD02KR16P				FD02FC16P				FD02FC16H															
代码	位置	FD01FR10P				FD01FR10H				FD01KR10P				FD01FC10P				FD01FC10H															
		FD02FR10P				FD02FR10H				FD02KR10P				FD02FC10P				FD02FC10H															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
代码	1		●		●		●		●		●		●		●		●	●		●		●		●		●		●		●		●	
	2			●	●			●	●				●	●				●	●				●	●				●	●				
	4					●	●	●	●						●	●	●	●	●							●	●	●	●				
	8										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		R: 前端 (实) 码												C: 后端 (补) 码																			

▶ 种类



▶ 典型订购示例



▶轴致动型仅适用于带有“实码”和“PC 引脚”的型号。

▶ 发售日期

2024 年 2 月 8 日

FD01 系列 超薄 DIP 旋转开关



螺丝刀致动式

PC 引脚类型

▶订购时，请在产品代码后缀中注明包装类型代码。

<p>FD01FR10P (实码) FD01FC10P (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr><th colspan="2">致动器类型</th></tr> <tr><th>实码</th><th>补码</th></tr> <tr><td></td><td></td></tr> </table>	致动器类型		实码	补码			<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型								
实码	补码							
<p>FD01FR16P (实码) FD01FC16P (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr><th colspan="2">致动器类型</th></tr> <tr><th>实码</th><th>补码</th></tr> <tr><td></td><td></td></tr> </table>	致动器类型		实码	补码			<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型								
实码	补码							

PC-H 引脚类型

▶订购时，请在产品代码后缀中注明包装类型代码。

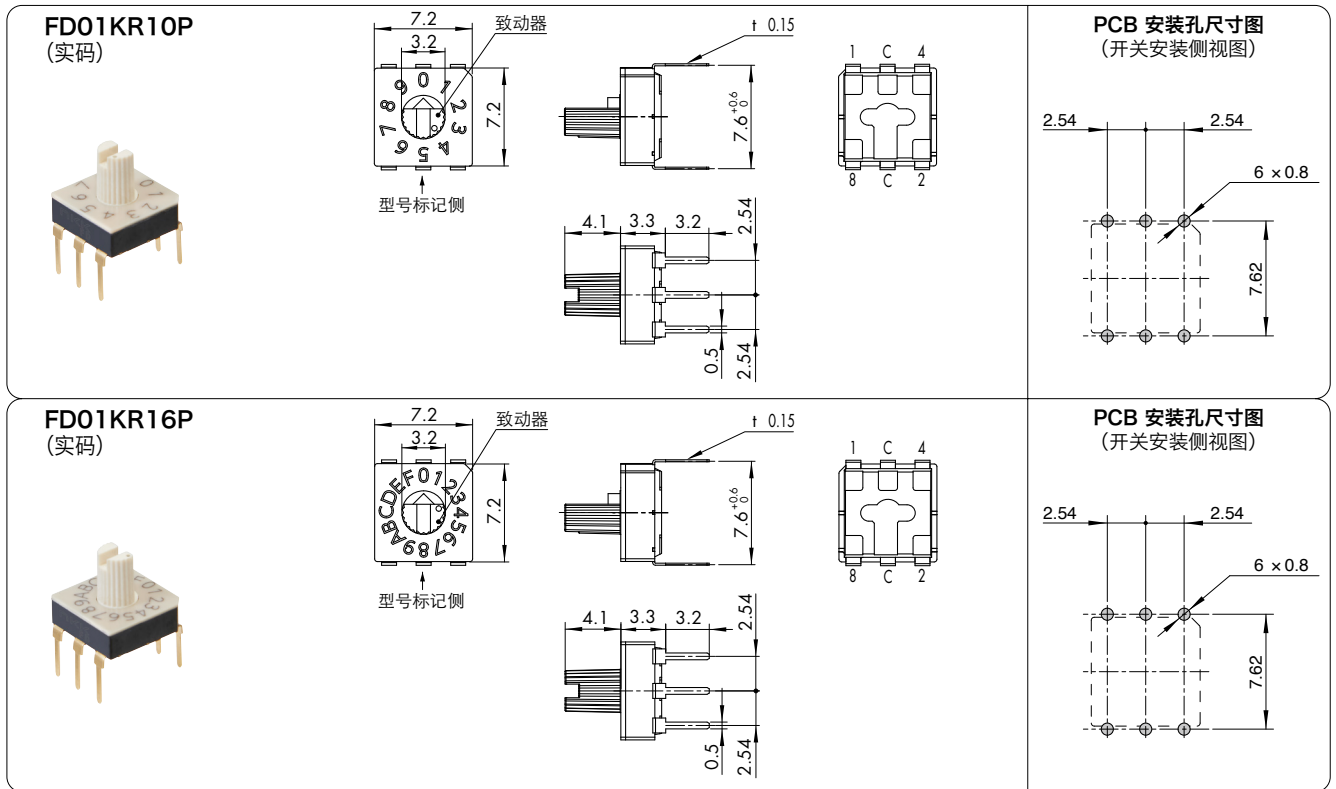
<p>FD01FR10H (实码) FD01FC10H (补码)</p>	<p>型号标记侧</p> <p>致动器</p> <table border="1"> <tr><th colspan="2">致动器类型</th></tr> <tr><th>实码</th><th>补码</th></tr> <tr><td></td><td></td></tr> </table>	致动器类型		实码	补码			<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型								
实码	补码							
<p>FD01FR16H (实码) FD01FC16H (补码)</p>	<p>型号标记侧</p> <p>致动器</p> <table border="1"> <tr><th colspan="2">致动器类型</th></tr> <tr><th>实码</th><th>补码</th></tr> <tr><td></td><td></td></tr> </table>	致动器类型		实码	补码			<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型								
实码	补码							

FD01 系列 超薄 DIP 旋转开关

▶ 轴致动式

PC 引脚类型

▶ 订购时，请在产品代码后缀中注明包装类型代码。



▶ 操作说明

焊接

在焊接时确保位置设置如下。请注意，装运时位置要如此设置。

FD01FR10P, FD01FR16P, FD01FR10H,
FD01FR16H, FD01KR10P, FD01KR16P : 位置 0
FD01FC10P, FD01FC10H : 位置 7
FD01FC16P, FD01FC16H : 位置 F

请勿清洗整个开关

焊接之后，使用含酒精的清洗液去除PCB一侧的焊剂。

安装

谨慎操作，避免对触点施加外力(例如，导致焊接后 PCB 翘曲)。

FD02 系列 超薄 DIP 旋转开关



► 螺丝刀致动式

PC 引脚类型

► 订购时，请在产品代码后缀中注明包装类型代码。

<p>FD02FR10P (实码)</p>	<p>FD02FC10P (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr> <th colspan="2">致动器类型</th> </tr> <tr> <td>实码</td> <td>补码</td> </tr> <tr> <td></td> <td></td> </tr> </table>	致动器类型		实码	补码				<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型										
实码	补码									
<p>FD02FR16P (实码)</p>	<p>FD02FC16P (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr> <th colspan="2">致动器类型</th> </tr> <tr> <td>实码</td> <td>补码</td> </tr> <tr> <td></td> <td></td> </tr> </table>	致动器类型		实码	补码				<p>引脚平整度</p> <p>引脚平整度不超过 0.1</p>
致动器类型										
实码	补码									

PC-H 引脚类型

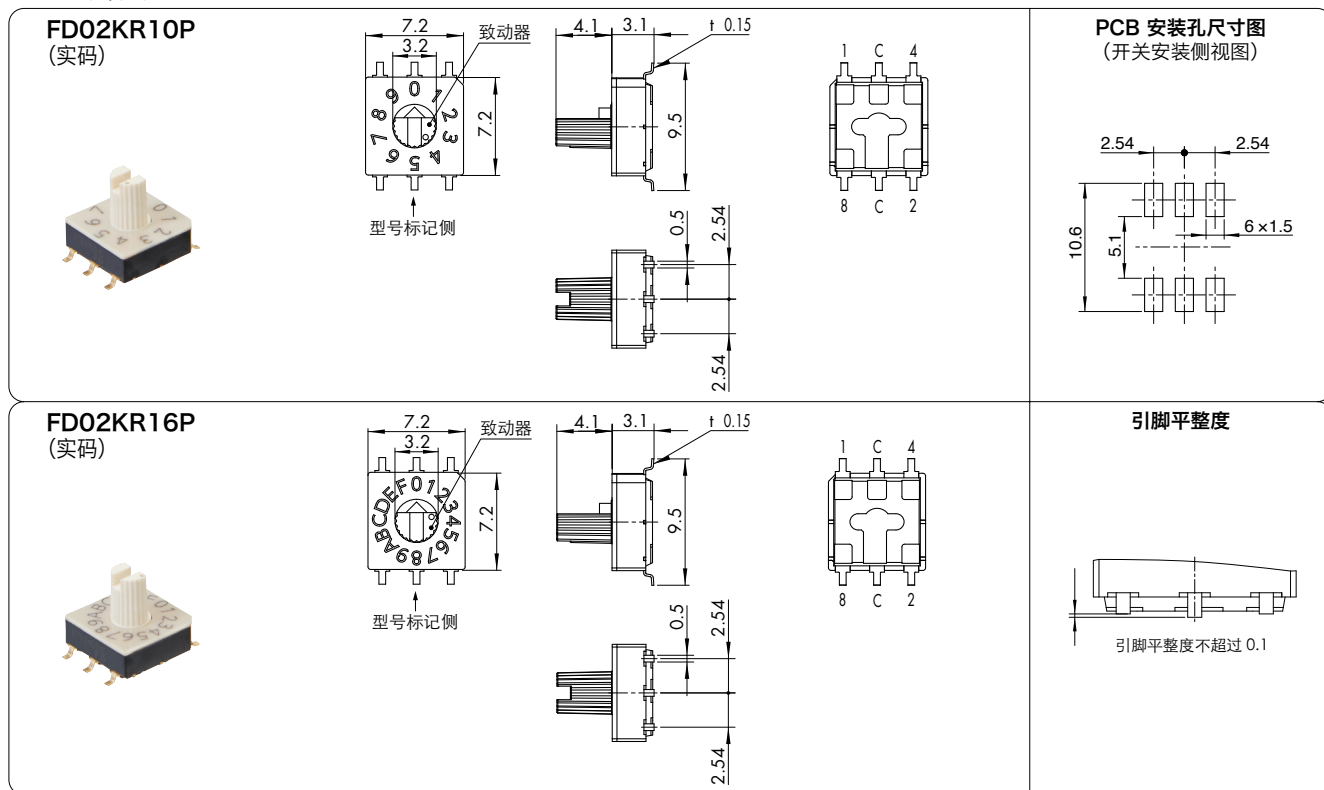
► 订购时，请在产品代码后缀中注明包装类型代码。

<p>FD02FR10H (实码)</p>	<p>FD02FC10H (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr> <th colspan="2">致动器类型</th> </tr> <tr> <td>实码</td> <td>补码</td> </tr> <tr> <td></td> <td></td> </tr> </table>	致动器类型		实码	补码				<p>PCB 安装孔尺寸图 (开关安装侧视图)</p>
致动器类型										
实码	补码									
<p>FD02FR16H (实码)</p>	<p>FD02FC16H (补码)</p>	<p>致动器</p> <p>型号标记侧</p> <table border="1"> <tr> <th colspan="2">致动器类型</th> </tr> <tr> <td>实码</td> <td>补码</td> </tr> <tr> <td></td> <td></td> </tr> </table>	致动器类型		实码	补码				<p>引脚平整度</p> <p>引脚/安装板平整度不超过 0.1</p>
致动器类型										
实码	补码									

▶ 轴致动式

PC 引脚类型

▶ 订购时，请在产品代码后缀中注明包装类型代码。



▶ 操作说明

焊接

在焊接时确保位置设置如下。请注意，装运时位置要如此设置。

FD02FR10P, FD02FR16P, FD02FR10H,
FD02FR16H, FD02KR10P, FD02KR16P : 位置 0
FFD02FC10P, FD02FC10H : 位置 7
FD02FC16P, FD02FC16H : 位置 F

请勿清洗整个开关。

焊接之后，使用含酒精的清洗液去除PCB一侧的焊剂。

安装

谨慎操作，避免对触点施加外力（例如，导致焊接后 PCB 翘曲）。

► 包装类型

FD01 系列可采用粘贴管包装。

FD02 系列可采用粘贴管或磁带盘包装。

包装类型后缀代码

粘贴管：-S

磁带盘：-R

粘贴管包装

FD01：PC 和 PC-H 引脚类型，每管 60 件

FD02：PC 引脚类型，每管 60 件，PC-H 引脚类型，每管 45 件

磁带盘包装

FD02：F 型 PC 引脚类型，每卷 1000 件

F 型 PC-H 引脚类型，每卷 500 件

K 型 PC 引脚类型，每卷 500 件

粘贴管规格	
FD01FR10P-S, FD01FC10P-S, FD01FR16P-S, FD01FC16P-S 	FD01FR10H-S, FD01FC10H-S, FD01FR16H-S, FD01FC16H-S
FD01KR10P-S, FD01KR16P-S 	FD02FR10P-S, FD02FC10P-S, FD02FR16P-S, FD02FC16P-S
FD02FR16H-S, FD02FC10H-S, FD02FR16H-S, FD02FC16H-S 	FD02KR10P-S, FD02KR16P-S

磁带盘规格	
FD02FR10P-R, FD02FC10P-R, FD02FR16P-R, FD02FC16P-R 	FD02FR10H-R, FD02FC10H-R, FD02FR16H-R, FD02FC16H-R
FD02KR10P-R, FD02KR16P-R 	

※ 关于价格请咨询本公司销售部。

※ 关于记载的各种规格，有时会发生变更，恕不事先告知，敬请谅解。最新规格请向本公司负责人员确认。

NKK SWITCHES CHINA CO., LTD. 恩楷楷(上海)开关有限公司

NKK SWITCHES HONG KONG CO., LTD.

10 位 16 位 8421 手指拨码开关 DIP 超薄型旋转编码开关 FD01-FR16 编码器

PCB 安装编码开关型号：

FD01FC10H-S ; FD01FC10P-S ; FD01FC16H-S ; FD01FC16P-S ;

FD01FR10H-S ; FD01FR10P-S ; FD01FR16H-S ; FD01FR16P-S ;

FD01KR10P-S ; FD01KR16P-S ; FD01FC10H ; FD01FC10P ;

FD01FC16H ; FD01FC16P ; FD01FR10H ; FD01FR10P ;

FD01FR16H ; FD01FR16P ; FD01KR10P ; FD01KR16P ;

FD01-FC10 ; FD01-FC ; FD01-FC16 ; FD01-FC10H-ST ; FD01-FC10P-ST ;

FD01-FC16H-ST ; FD01-FC16P-ST ; FD01-FR10 ; FD01-FR ; FD01-FR16 ;

FD01-FR10H-ST ; FD01-FR10P-ST ; FD01-FR16H-ST ; FD01-FR16P-ST ;

FD01-KR10 ; FD01-KR16 ; FD01-KR ; FD01-KR10P-ST ; FD01-KR16P-ST ;

SMT 贴片安装表面贴装

FD02FC10H-R ; FD02FC10P-R ; FD02FC10P-S ; FD02FC16H-R ;

FD02FC16P-R ; FD02FR10H-R ; FD02FR10P-R ; FD02FR10P-S ;

FD02FR16H-R ; FD02FR16H-S ; FD02FR16P-R ; FD02FR16P-S ;

FD02KR10P-R ; FD02KR10P-S ; FD02KR16P-R ; FD02FC10H ;

FD02FC10P ; FD02FC16H ; FD02FC16P ; FD02FR10H ;

FD02FR10P ; FD02FR16H ; FD02FR16H ; FD02FR16P ;

FD02KR10P ; FD02KR16P ; FD02-FC10 ; FD02-FC ; FD02-FC16 ;

FD02-FC10H-TP ; FD02-FC10P-TP ; FD02-FC10P-ST ; FD02-FC16H-TP ;

FD02-FC16P-TP ; FD02-FR10 ; FD02-FR ; FD02-FR16 ;

FD02-FR10H-TP ; FD02-FR10P-TP ; FD02-FR10P-ST ; FD02-FR16H-TP ;

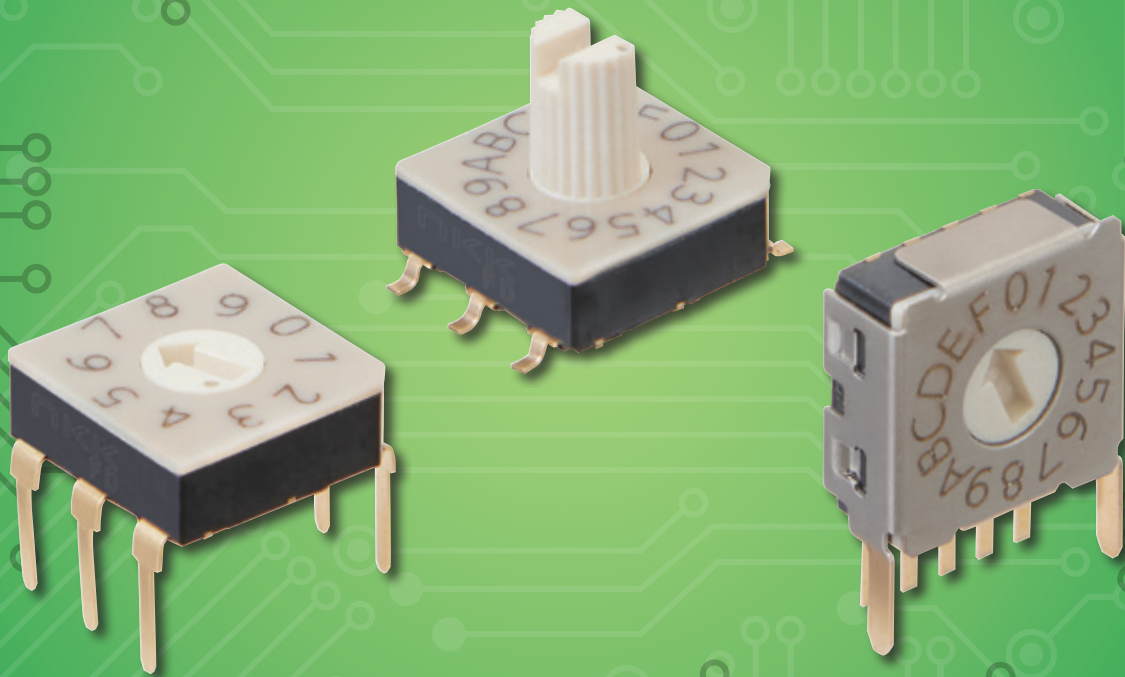
FD02-FR16H-ST ; FD02-FR16P-TP ; FD02-FR16P-ST ; FD02-KR10 ;

FD02-KR ; FD02-KR16 ; FD02-KR10P-TP ; FD02-KR10P-ST ; FD02-KR16P-TP ;

Series FD01 & FD02

Ultra-Thin DIP Rotary Switches

Through-Hole & Surface Mount



Compact 7.2mm & 7.7mm Square
Low Profile 3.1 - 3.3mm

General Specifications

Electrical Capacity (Resistive Load)

Rating: 0.4VA maximum, 20V maximum, AC/DC

Other Ratings

Contact Resistance: 100 milliohms maximum (at 20mV, 10mA)
Insulation Resistance: 250V DC, 1 GΩ minimum
Dielectric Strength: 250V AC minimum for 1 minute minimum
Mechanical Life: 10,000 operations minimum
Electrical Life: 10,000 operations minimum
Nominal Operating Torque: 0.002Nm ± 0.02Nm

Materials & Finishes

Rotor: LCP resin
Case Cover & Base: PPS resin
O-ring: Fluoro rubber
Movable Contacts: Corson alloy with gold plating
Terminals: Brass with gold plating

Environmental Data

Operating Temperature Range: -25°C through +85°C (-13°F through +185°F)

PCB Processing

Wave Soldering: Preheat temperature: 110°C @ 40 seconds maximum
 Peak temperature: 270°C @ 6 seconds maximum; Cycles: 2

Reflow Soldering (FD02 Series): Preheat temperature: 180° ~ 200°C @ 2 minutes maximum
 Heating temperature: 230°C @ 60 seconds maximum
 Peak temperature: 250°C; Cycles: 2

Manual Soldering: 390°C @ 4 seconds maximum; Cycles: 2

Series FD01	Series FD02
During soldering process, set the switch to the following position: FD01FR10P, FD01FR16P, FD01FR10H, FD01FR16H, FD01KR10P, FD01KR16P: 0 position; FD01FC10P, FD01FC10H: 7 position; FD01FC16P, FD01FC16H: F position	During soldering process, set the switch to the following position: FD02FR10P, FD02FR16P, FD02FR10H, FD02FR16H, FD02KR10P, FD02KR16P: 0 position; FD02FC10P, FD02FC10H: 7 position; FD02FC16P, FD02FC16H: F position

Cleaning: These devices are not process sealed. Hand clean locally using alcohol based solution.

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
R Real Coded Model Numbers: FD01FR, FD01KR, FD02FR, FD02KR	1		●		●		●		●		●		●		●		●		●		●		●		●		●
	2			●	●			●	●				●	●			●	●			●	●			●	●	
	4					●	●	●	●					●	●	●	●				●	●	●	●			
	8								●	●									●	●	●	●	●	●	●	●	●
C Complement Coded Model Numbers: FD01FC, FD02FC	1	●		●		●		●		●		●		●		●		●		●		●		●		●	
	2	●	●			●	●			●	●			●	●			●	●			●	●			●	●
	4	●	●	●	●					●	●	●	●							●	●	●	●				
	8	●	●	●	●	●	●	●						●	●	●	●	●	●								

Terminal numbers are actually on the switch.

Distinctive Characteristics

Compact dimensions of 7.2mm (.283") or 7.7mm (.303") square, with a height of 3.1 to 3.3mm (.122" to .130"), accommodates high density mounting.

Internal construction incorporating metal springs promotes smooth, crisp operation.

Reaction force is evenly distributed by movable contact components, ensuring consistent connection. Advanced contact reliability is achieved through gold plated contacts.

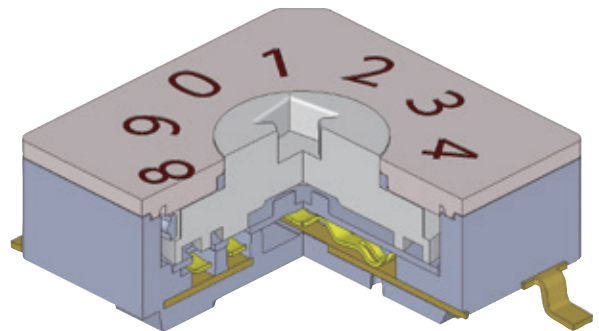
Heat resistant resin used for Series FD02 body maintains switch reliability through vapor phase and infrared convection reflow soldering.

Series FD01 features through-hole terminals with .100 inch terminal grid spacing.

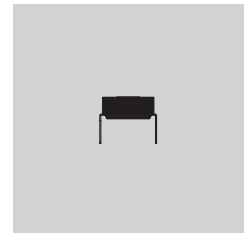
Surface mount (gull wing) terminals on Series FD02 provide mechanical stability during soldering and simplified solder joint inspection.

Packaging in tape-reel for Series FD02 meets EIA-481-D Standard.

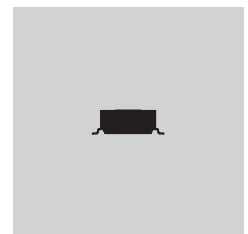
Remarkably precise coplanarity: all considered surfaces lying between two parallel planes are a maximum distance apart of .0039" (0.1 mm).



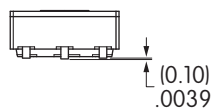
Actual Size: FD01



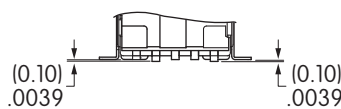
Actual Size: FD02



Series FD02 Surface Mount Coplanarity

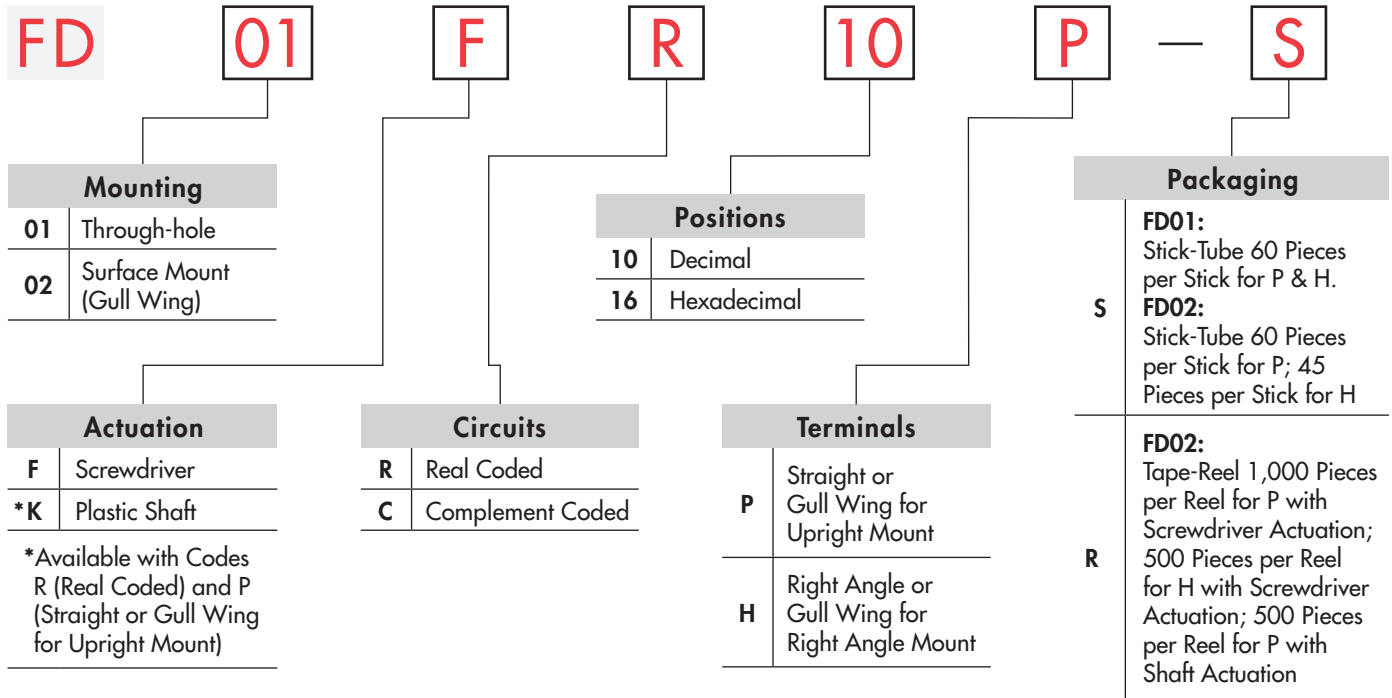


For Upright



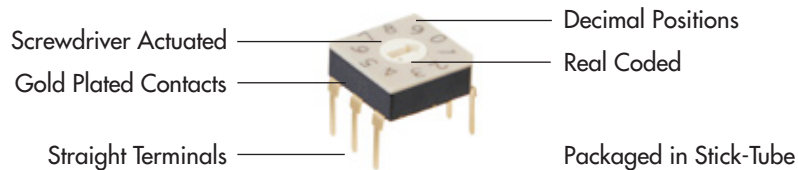
For Right Angle

TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

FD01FR10P-S



ACTUATION

F Screwdriver Actuated
Adjusted with flat tipped screwdriver



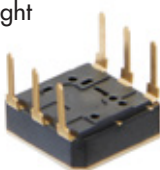
K Shaft Actuated
Adjusted by hand or with flat tipped screwdriver



Actuators are fully rotational in either direction.

TERMINALS

P Straight or Gull Wing for Upright Mount
Straight



Gull Wing



H Right Angle or Gull Wing for Right Angle Mount
Right Angle



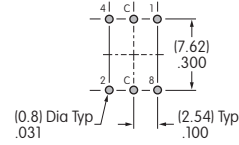
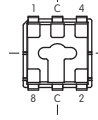
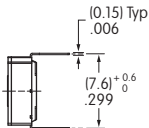
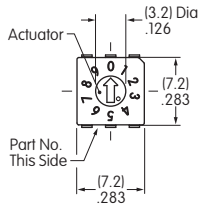
Gull Wing



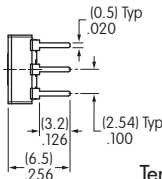
TYPICAL SWITCH DIMENSIONS

Screwdriver Actuated • Decimal • Straight

FD01FR10P
Real Coded



FD01FC10P
Complement
Coded

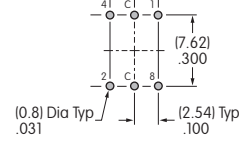
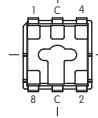
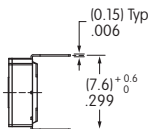
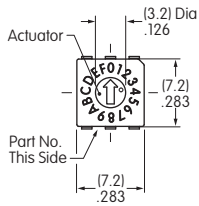


Terminal numbers are not on switch.

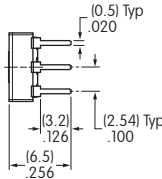
FD01FR10P

Screwdriver Actuated • Hexadecimal • Straight

FD01FR16P
Real Coded



FD01FC16P
Complement
Coded

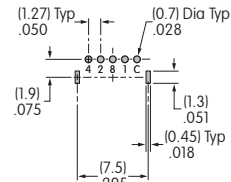
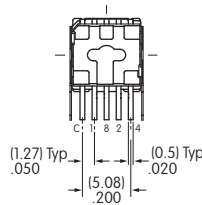
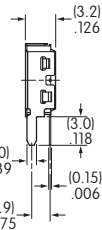
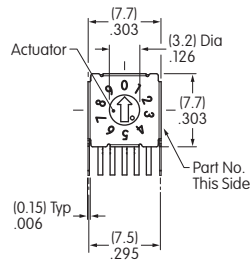


Terminal numbers are not on switch.

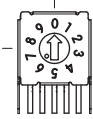
FD01FR16P

Screwdriver Actuated • Decimal • Right Angle

FD01FR10H
Real Coded



FD01FC10H
Complement
Coded

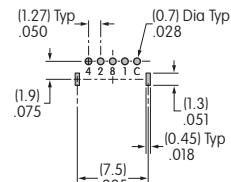
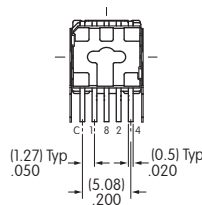
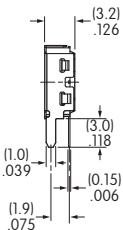
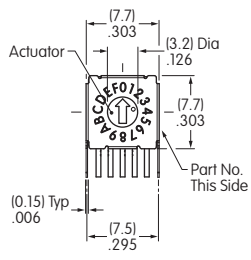


Terminal numbers are not on switch.

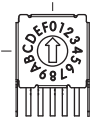
FD01FR10H

Screwdriver Actuated • Hexadecimal • Right Angle

FD01FR16H
Real Coded



FD01FC16H
Complement
Coded



Terminal numbers are not on switch.

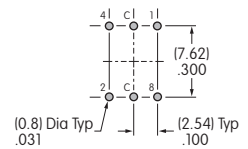
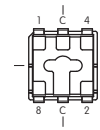
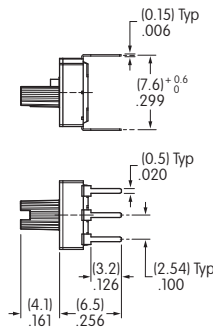
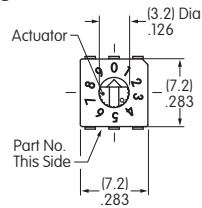
FD01FR16H

TYPICAL SWITCH DIMENSIONS

Shaft Actuated • Decimal • Straight



Real Coded



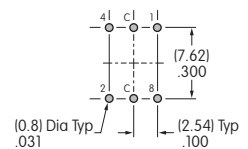
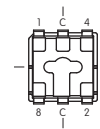
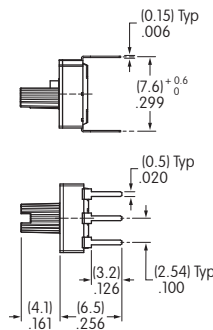
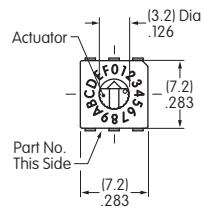
FD01KR10P

Terminal numbers are not on switch.

Shaft Actuated • Hexadecimal • Straight



Real Coded



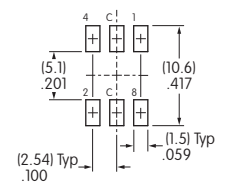
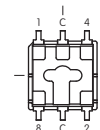
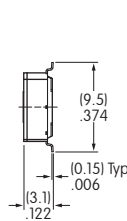
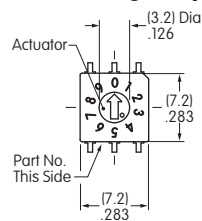
FD01KR16P

Terminal numbers are not on switch.

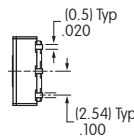
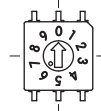
Screwdriver Actuated • Decimal • Gull Wing • Upright



FD02FR10P
Real Coded



FD02FC10P
Complement
Coded



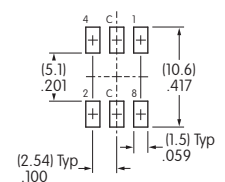
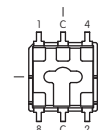
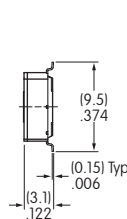
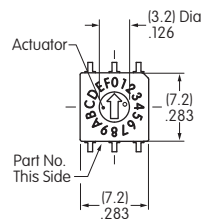
FD02FR10P

Terminal numbers are not on switch.

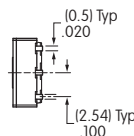
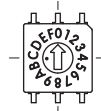
Screwdriver Actuated • Hexadecimal • Gull Wing • Upright



FD02FR16P
Real Coded



FD02FC16P
Complement
Coded



FD02FR16P

Terminal numbers are not on switch.

TYPICAL SWITCH DIMENSIONS

FD02FR10H Real Coded

FD02FC10H Complement Coded

Screwdriver Actuated • Decimal • Gull Wing • Right Angle

Actuator (7.7) .303 (3.2) Dia .126 (7.7) .303 (0.15) Typ .006 Part No. This Side

(3.2) .126 (0.15) Typ .006

(1.5) .059 (1.27) Typ .050 (9.9) .390 (1.25) .049 (4.2) .165 (0.5) Typ .020

(5.08) .200 (1.27) .050 (0.76) Typ .030 (1.9) .075 (3.5) .138 (5.0) .197 (10.6) .417 (2.0) .079

Terminal numbers are not on switch. **FD02FR10H**

FD02FR16H Real Coded

FD02FC16H Complement Coded

Screwdriver Actuated • Hexadecimal • Gull Wing • Right Angle

Actuator (7.7) .303 (3.2) Dia .126 (7.7) .303 (0.15) Typ .006 Part No. This Side

(3.2) .126 (0.15) Typ .006

(1.5) .059 (1.27) Typ .050 (9.9) .390 (1.25) .049 (4.2) .165 (0.5) Typ .020

(5.08) .200 (1.27) .050 (0.76) Typ .030 (1.9) .075 (3.5) .138 (5.0) .197 (10.6) .417 (2.0) .079

Terminal numbers are not on switch. **FD02FR16H**

Real Coded

Shaft Actuated • Decimal • Gull Wing • Upright

Actuator (3.2) Dia .126 (7.2) .283 (7.2) .283 (0.15) Typ .006 Part No. This Side

(9.5) .374 (0.15) Typ .006 (4.1) .161 (3.1) .122 (0.5) Typ .020 (2.54) Typ .100

(5.1) .201 (10.6) .417 (1.5) Typ .059 (2.54) Typ .100

Terminal numbers are not on switch. **FD02KR10P**

Real Coded

Shaft Actuated • Hexadecimal • Gull Wing • Upright

Actuator (3.2) Dia .126 (7.2) .283 (7.2) .283 (0.15) Typ .006 Part No. This Side

(9.5) .374 (0.15) Typ .006 (4.1) .161 (3.1) .122 (0.5) Typ .020 (2.54) Typ .100

(5.1) .201 (10.6) .417 (1.5) Typ .059 (2.54) Typ .100

Terminal numbers are not on switch. **FD02KR16P**

PACKAGING

S**Stick-Tube****FD01**

Each stick-tube contains 60 switches for straight or right angle.

FD02

Each stick-tube contains 60 switches for upright or 45 switches for right angle.

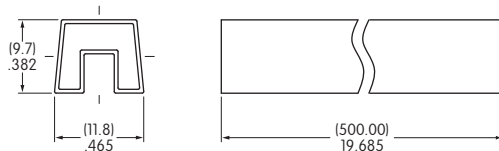
R**Tape-Reel****FD02**

Each tape-reel contains 1,000 switches for screwdriver actuated with upright.

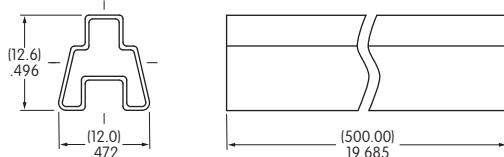
Each tape-reel contains 500 switches for screwdriver actuated with right angle.

Each tape-reel contains 500 switches for shaft actuated with upright.

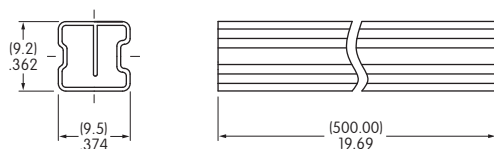
FD01FR10P-S, FD01FC10P-S, FD01FR16P-S, FD01FC16P-S



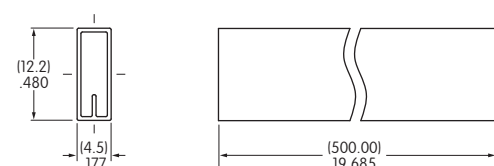
FD01KR10P-S, FD01KR16P-S



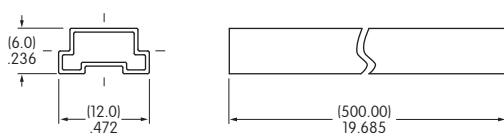
FD02FR10H-S, FD02FC10H-S, FD02FR16H-S, FD02FC16H-S



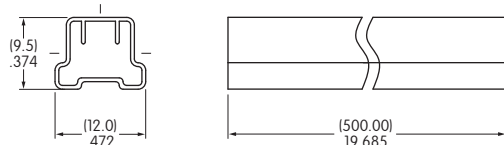
FD01FR10H-S, FD01FC10H-S, FD01FR16H-S, FD01FC16H-S



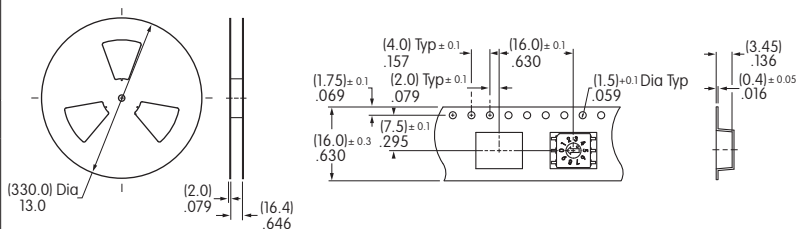
FD02FR10P-S, FD02FC10P-S, FD02FR16P-S, FD02FC16P-S



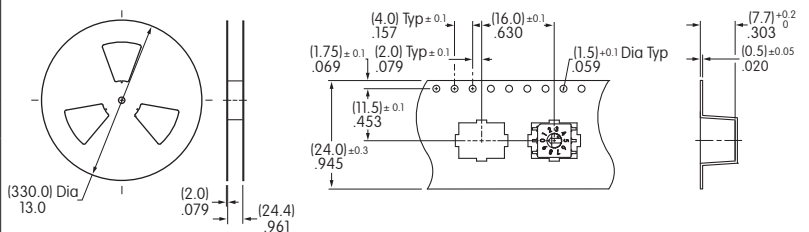
FD02KR10P-S, FD02KR16P-S



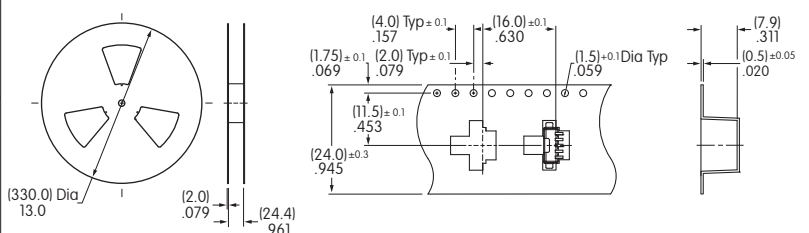
FD02FR10P-R, FD02FC10P-R, FD02FR16P-R, FD02FC16P-R



FD02KR10P-R, FD02KR16P-R



FD02FR10H-R, FD02FC10H-R, FD02FR16H-R, FD02FC16H-R



Effective Date January 2024

NIKK
SWITCHES