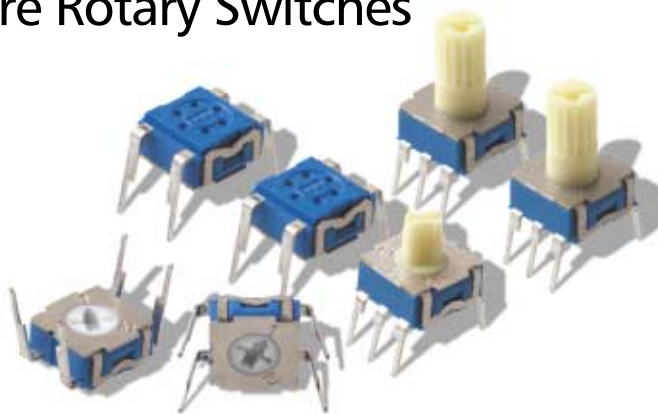


RTE02 and RTE03 Miniature Rotary Switches



RTE02 and RTE03 are two types of a subminiature rotary changeover switch to be mounted on PC boards. PC pins are in a 2.54 mm (0.100) grid.

RTE02 with 2 positions

RTE03 with 3 positions

- 3 operation versions:
 - screw driver slot without shaft
 - knurled plastic shaft with $\varnothing 4.0$ mm ($\varnothing 0.157$) \times 7.5 mm s(0.295) and screw driver slot
 - button in red, green or black
- 2 operation directions:
 - from top (in ordering code: N)
 - from the bottom through the PC board (in ordering code: R, e.g. RTE02R)
- Only N version with screw driver slot for automatic insertion
- Can be wave soldered, resistant to flux soldering
- Cleaning by immersion in a solvent with or without ultrasonic or by water spray
- Optionally without or with ground terminal against electrostatical discharge
- Optionally gold (G) or silver (S) contacts
- Stop after position 2 of RTE02 and after position 3 of RTE03

General features

- Mounted on PC board by pins and ground terminal
- Terminal size: 0.3 \times 0.5 mm (0.0118 \times 0.0197)
- Delivered in tubes of 65 pieces for automatic insertion
- Tin-plated terminals

Application

The RTE02 and RTE03 switches are especially designed for telephone bell tune selection, or working mode selection.

Their small size also permits all applications on PCB's to save space (computer, instrumentation, security systems etc.).

Mechanical data	RTE02	RTE03
Number of positions	2	3
Angle between 2 positions	120°	2 \times 60°
Actuating torque	2 Ncm \pm 50%	2 Ncm \pm 50%
Mechanical stop resistance	> 10 Ncm	> 10 Ncm
Mechanical life test (indexations)	1500	1500

Electrical data		Silver	Gold	Silver	Gold
Operating		2 pos	2 pos	3 pos	3 pos
Switching voltage	maximum	50 V DC	30 V DC	50 V DC	30 V DC
	minimum	2 V DC	20 mV DC	2 V DC	20 mV DC
Switching current	maximum	100 mA	100 mA	100 mA	100 mA
	minimum	1 mA	10 μA/	1 mA	10 μA/
	under		5 V DC		5 V DC
Maximum switching power		0.5 W	0.3 W	0.5 W	0.3 W
Contact resistance (measured at 50 mV – 10 mA)					
	Initial	< 50 mΩ		< 50 mΩ	
	After endurance	< 100 mΩ		< 100 mΩ	
Dielectric strength between contacts		500 V RMS		500 V RMS	
Insulation resistance between 2 contacts					
(measured at 100 V DC)		> 10 ⁴ MΩ		> 10 ⁴ MΩ	
(after 21 days RH)		> 10 ³ MΩ		> 10 ³ MΩ	
Electrical endurance at max. switching power		1500 indexations		1500 indexations	
Capacitance between contacts		< 5 pF		< 5 pF	

Environmental data		
Operating temperature		– 25°C to + 85°C
Storage temperature		– 40°C to + 85°C
Damp heat resistance		21 days at 40°C, 93% RH
Salt mist resistance		96 hours
Industrial environment		H ₂ S, SO ₂
Vibration, shock		According to NFC 20700
Self-extinguishability	Housing	UL 94 – V0 blue in silver (S) version, black in gold (G) version
	Actuator	UL 94 – HB

Soldering and cleaning recommended process:

- Fluxing of the copper side of PCB
 - Pre-heating at about 85°C
 - Wave soldering 260°C/2 sec.
 - Cooling up to ambient temperature
 - Eventual cleaning by immersion in a solvent, such as trichloro-trifluorethan with or without ultrasonics
- Please contact us for other processes.

Automatic insertions (N version with screw driver slot)

RTE can be inserted on following automatic machines:

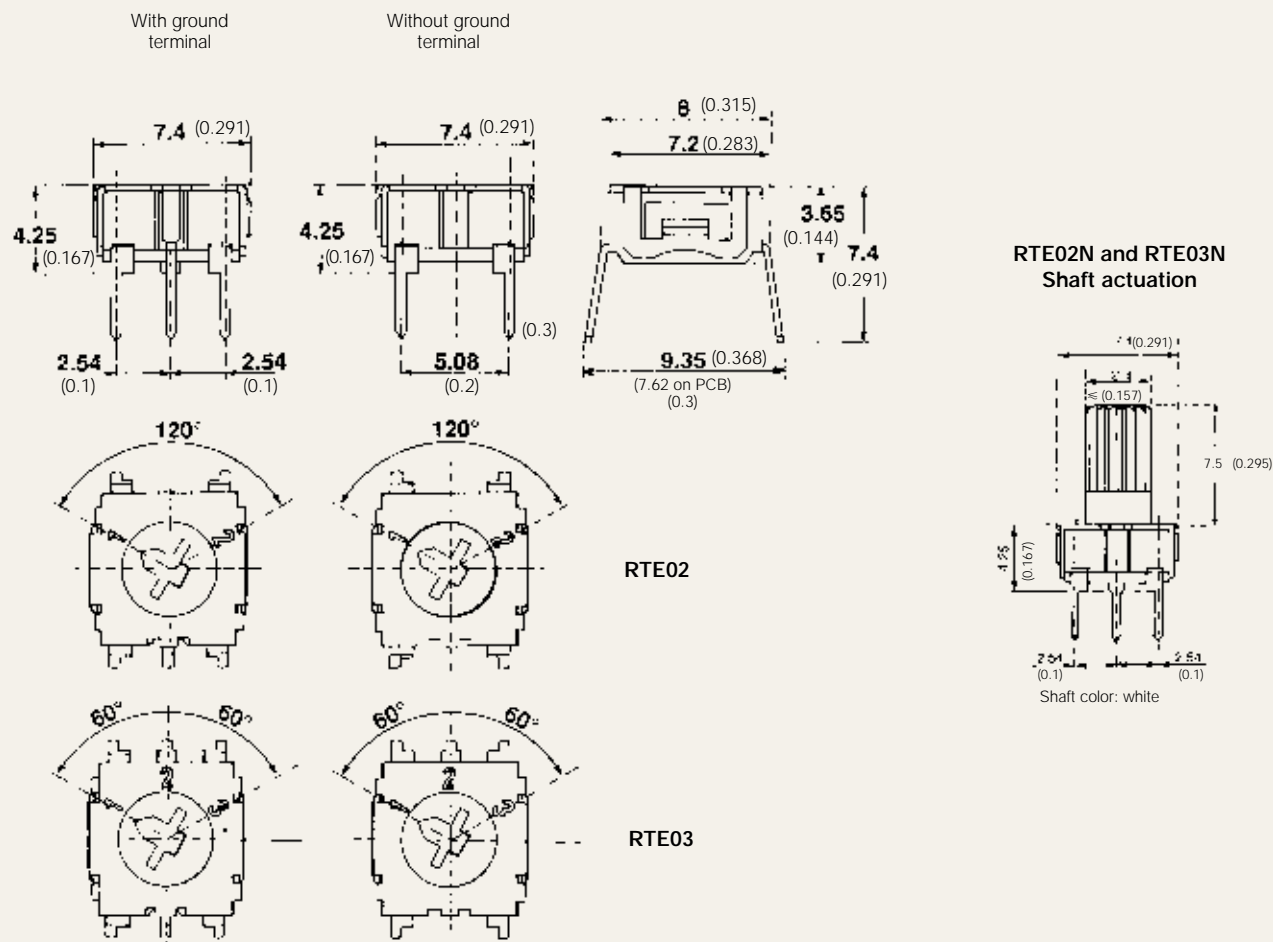
- UNIVERSAL: Unimodule (1 head) or Multimodule (2 heads)

Ordering code: see page F-7.

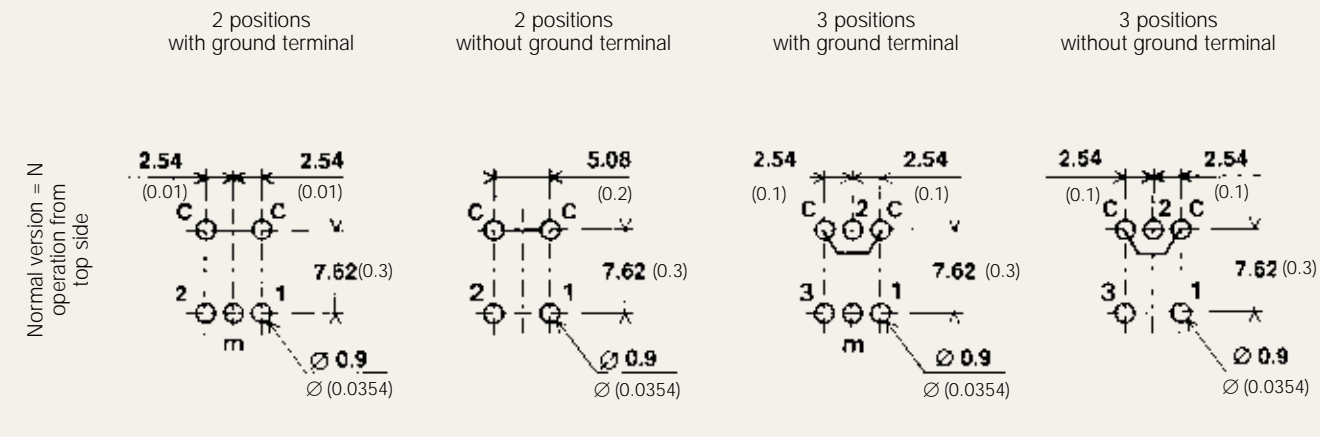
RTE02 and RTE03 Miniature Rotary Switches

Dimensional Drawings

RTE02 and RTE03 Actuation from top side (N)



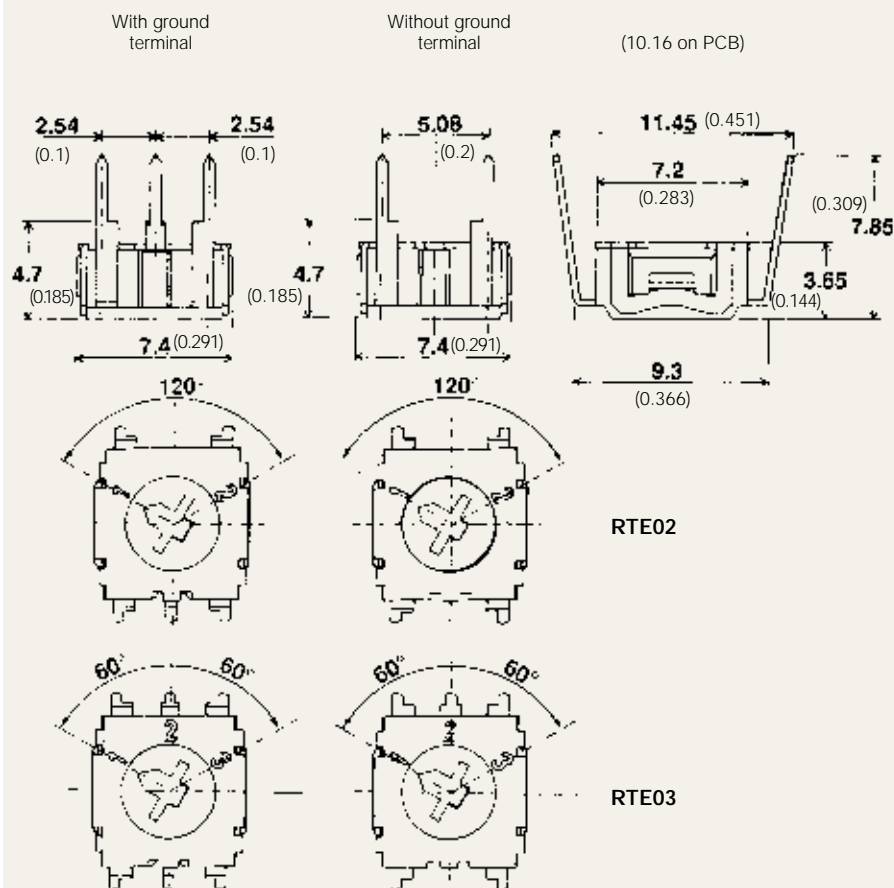
PC Board mounting (seen components side)



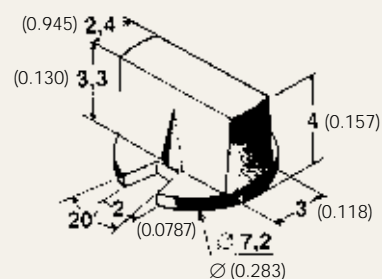
RTE02 and RTE03 Miniature Rotary Switches

Dimensional Drawings

RTE02 and RTE03 Actuation from bottom side (R)

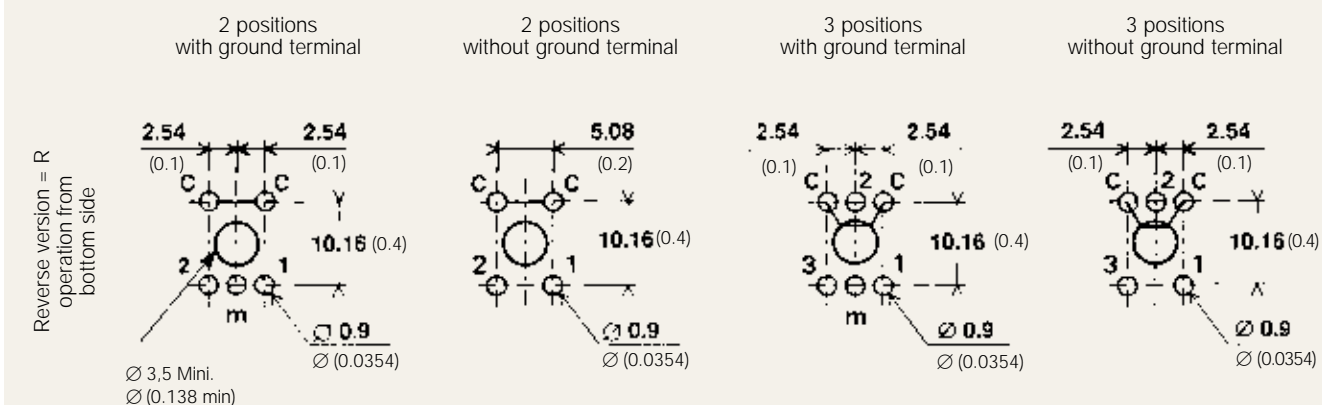


Button for the normal versions RTE02N and RTE03N/N, not for R)



Available colors:
- Red
- Green
- Black

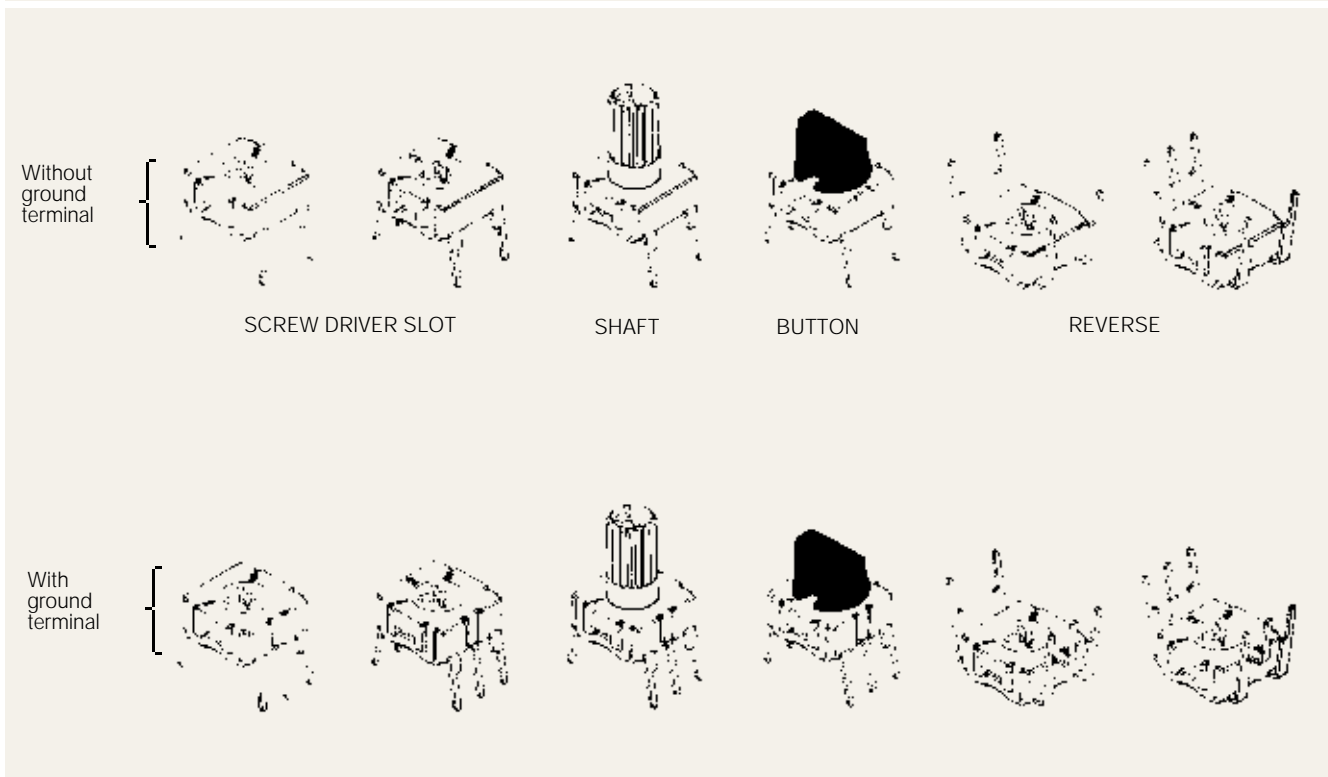
PC Board layout (seen components side)



Ø in PC Board for screw driver operation must be 3.5 mm

RTE02 and RTE03 Miniature Rotary Switches RTE10 and RTE16 Miniature Rotary Switches

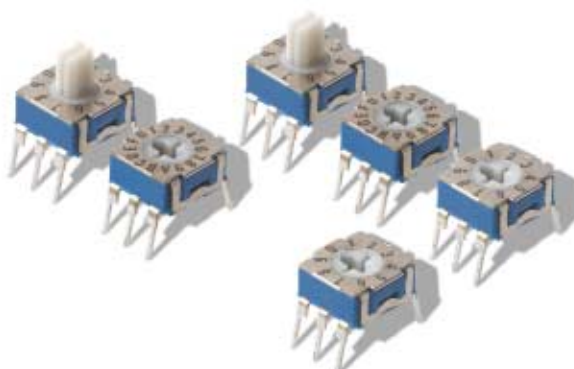
Available versions



Ordering code		1	2	3	4	5	6	7
		Example: RTE 10 1 0 N 2 1						
1	Designation: RTE	→	↑	↑	↑	↑	↑	↑
2	Types: 02 = 2 positions, 03 = 3 positions, 10 = decimal code, 16 = hexadecimal code	→	↑	↑	↑	↑	↑	↑
3	Ground terminal: 0 = without, 1 = with, not available for the vertical version (V)	→	↑	↑	↑	↑	↑	↑
4	Actuation: 0 = screw driver slot, no shaft 1 = shaft Ø 4 mm (Ø 0.157 inch), 7.5 mm (0.295 inch) long, screwdriver slot 2 = actuator for button, button to be ordered and delivered separately	→	↑	↑	↑	↑	↑	↑
5	Operating direction: N = normal, from top side R = reverse, from bottom through a PC board or a panel V = vertical, side actuation, only RTE10 and RTE16	→	↑	↑	↑	↑	↑	↑
6	Codes: 0 = none for RTE02 and RTE03, 1 = binary code for RTE10, 2 = binary code complement for RTE10, 3 = gray code for RTE10, 4 = hexadecimal code for RTE16	→	↑	↑	↑	↑	↑	↑
7	Contact plating: 1 = silver, only RTE02 and RTE03 3 = gold, all types	→	↑	↑	↑	↑	↑	↑

Ordering code for RTE buttons; supplied bulk		1	2	3
		Example: BTN RTE 40		
1	Button: BTN	→	↑	↑
2	Designation: RTE	→	↑	↑
3	Color: 40 = red, 50 = green, 90 = black	→	↑	↑

RTE10 and RTE16 Miniature Rotary Switches



RTE10 and RTE16 are two coded types of a subminiature rotary switch to be mounted on PC boards. PC pins are in a 2.54 mm (0.100 inch) grid. RTE10 with decimal code, RTE16 with hexadecimal code.

- 3 operation versions:
 - screw driver slot without shaft
 - knurled plastic shaft with $\varnothing 4.0$ mm ($\varnothing 0.157$) \times 7.5 mm (0.295) and screw driver slot
 - button in red, green or black
- Only version with screw driver slot for automatic insertion
- Can be wave soldered, resistant to flux soldering
- Cleaning by immersion in a solvent with or without ultrasonic or by water spray
- Optionally without or with ground terminal against electrostatic discharge
- Gold contacts, tin plated

Applications

- RTE10 is specially designed for direct binary coding with 10 positions and RTE16 for hexadecimal coding with 16 positions
- RTE10 versions with binary code complement or Gray code are also available
- Its small size makes it particularly suitable for all applications on PC boards where it is necessary to save space (computers, instruments, telecom, security, etc)

Characteristics

- Dimensions of terminals: 0.3 \times 0.5 mm (0.0118 \times 0.0197)
- Positioning by metallic indexing
- Marked on top face
- Packing for delivery: tubes of 65 pieces for automatic insertion

Automatic insertion

RTE with screw driver slot can be inserted on following automatic machines:

- UNIVERSAL: Unimod (1 head), or Multimode (2 heads)

Mechanical data	RTE10	RTE16
Number of positions	10	16
Angle between 2 positions	36°	22.5°
Actuating torque	$\cong 1.5$ Ncm \pm 50%	$\cong 1.5$ Ncm \pm 50%
Mechanical stop resistance	without	without
Mechanical life test (indexations)	20 000	20 000

Electrical data			
Operating		10 pos	16 pos
Switching voltage	maximum	30 V DC	30 V DC
	minimum	20 mV DC	20 mV DC
Switching current	maximum	100 mA	100 mA
	minimum	10 μ A/5 V DC	10 μ A/5 V DC
Maximum switching power		0.3 W	0.3 W
Contact resistance (measured at 50 mV – 10 mA)			
	Initial	$\cong 100$ m Ω	$\cong 100$ m Ω
	After endurance	$\cong 150$ m Ω	$\cong 150$ m Ω
Dielectric strength between contacts		300 V rms	300 V rms
Insulation resistance between 2 contacts (measured at 100 V DC)			
	(after 21 days RH)	$> 10^{10}$ Ω	$> 10^{10}$ Ω
		$> 10^9$ Ω	$> 10^9$ Ω
Electrical endurance at max. switching power		20 000 indexations	20 000 indexations
Capacitance between contacts		$\cong 5$ pF	$\cong 5$ pF

Environmental data		
Operating temperature		– 25°C to + 85°C
Storage temperature		– 40°C to + 85°C
Damp heat resistance		21 days at 40°C, 93% RH
Salt mist resistance		96 hours at 35°C
Industrial environment		H ₂ S, SO ₂
Vibrations, shocks		According to NFC 20700
Self-extinguishability	Housing (blue)	UL 94 – VO
	Actuator	UL 94 – HB

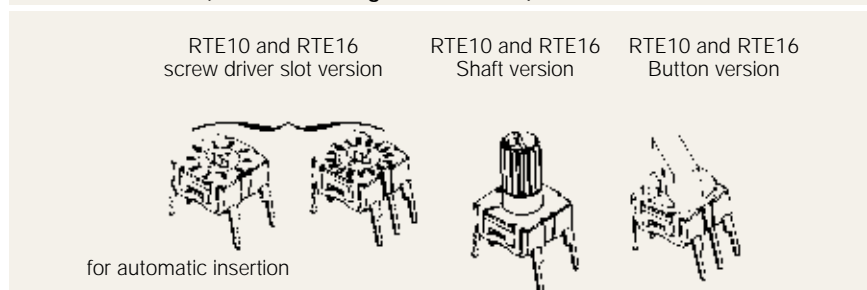
Soldering and cleaning

Resinous flux:

- Fluxing of PCB under side
- Pre-heating 85°C
- Wave soldering 260°C/2 sec.
- Cooling up to ambient temperature
- Immersion cleaning in solvent (trichlo-trifluorethan with or without ultrasound)
- Consult with us for other soldering and cleaning processes

Please contact us for other processes.

Available versions (without or with ground terminal)



Ordering code: see page F-7.



Cannon

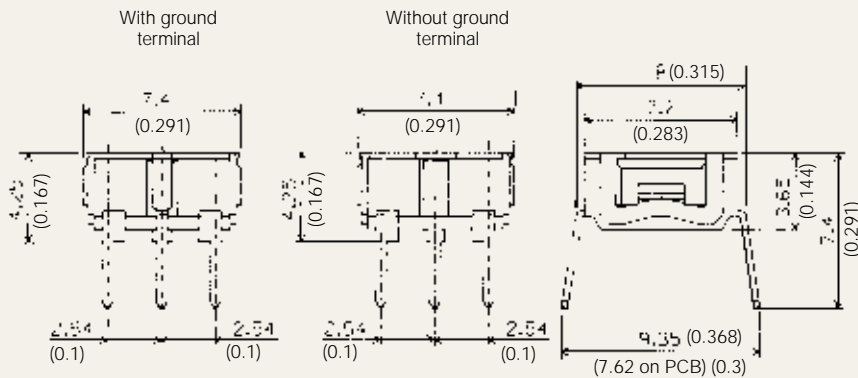
Dimensions are shown in mm (inch)
Dimensions subject to change

www.ittcannon.com

RTE10 and RTE16 Miniature Rotary Switches

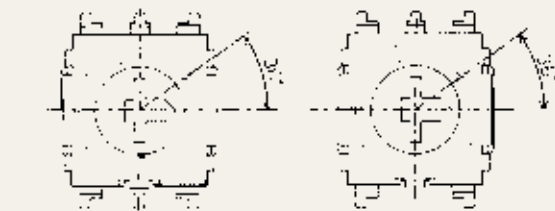
Dimensional Drawings

RTE10 and RTE16 screw driver slot version

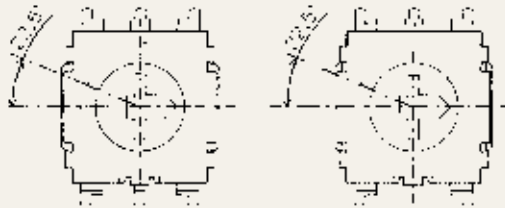


RTE10

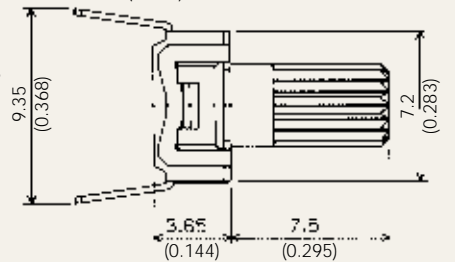
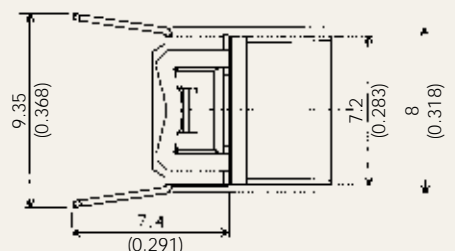
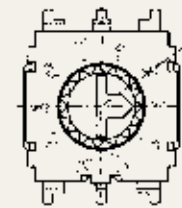
RTE10 – Button version



RTE16



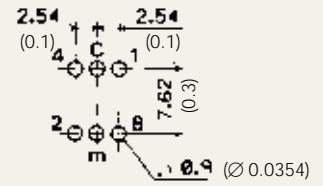
RTE10 – Shaft version



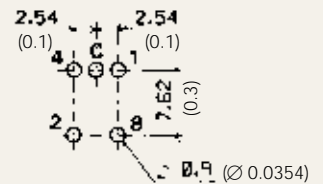
Note: For shaft and button details see RTE02 or RTE03

PC Board layout (seen components side)

RTE10 or RTE16 with ground terminal



RTE10 or RTE16 without ground terminal



Truth table

RTE16
Hexadecimal Code

	C	1	2	4	8
0	X				
1	X	X			
2	X		X		
3	X	X	X		
4	X			X	
5	X	X		X	
6	X		X	X	
7	X	X	X	X	
8	X				X
9	X	X			X
10	X		X		X
11	X	X	X		X
12	X			X	X
13	X	X		X	X
14	X		X	X	X
15	X	X	X	X	X

RTE10
Direct Binary Code

	C	1	2	4	8
0	X				
1	X	X			
2	X		X		
3	X	X	X		
4	X			X	
5	X	X		X	
6	X		X	X	
7	X	X	X	X	
8	X				X
9	X	X			X

RTE10
Complement
Binary Code

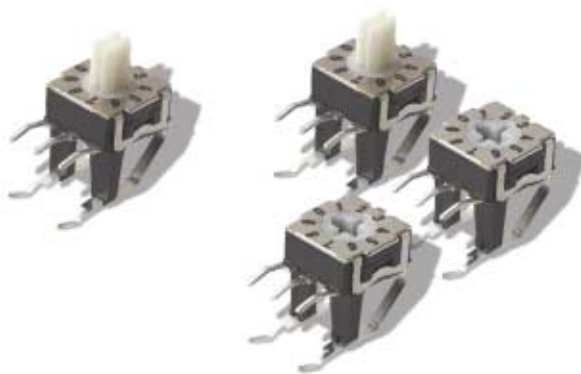
	C	1	2	4	8
0	X	X	X	X	X
1	X		X	X	X
2	X	X		X	X
3	X			X	X
4	X	X	X		X
5	X		X		X
6	X	X			X
7	X	X	X	X	X
8	X	X	X	X	
9	X		X	X	

RTE10
Gray Code

	C	1	2	3	4
1	X				
2	X	X			
3	X	X	X		
4	X		X		
5	X		X	X	
6	X	X	X	X	
7	X	X		X	
8	X			X	
9	X			X	X
10	X	X		X	X

Note: the advantage of the Gray Code is that you change only one digit at the time.

RTEV Miniature Rotary Switch with Vertical Operation



To complete the RTE product range family, a vertical version is now available. The main advantage of this RTE vertical is the P.C.B. mounting providing a direct actuation from a front panel.

Main features

- 4.5 mm from the P.C.B. to shaft axis
- Available with button, screw driver or knob shaft
- 2 types: RTE10V and RTE16V
- Manual insertion
- Bulk packed of 250 pieces
- Same electrical and mechanical characteristics as standard versions of RTE10 and RTE16
- No ground terminal available.

Truth table

RTE16 Hexadecimal Code						RTE10 Direct Binary Code					
	C	1	2	4	8		C	1	2	4	8
0	X					0	X				
1	X	X				1	X	X			
2	X		X			2	X		X		
3	X	X	X			3	X	X	X		
4	X			X		4	X			X	
5	X	X		X		5	X	X		X	
6	X		X	X		6	X		X	X	
7	X	X	X	X		7	X	X	X	X	
8	X				X	8	X				X
9	X	X			X	9	X	X			X
10	X		X		X						
11	X	X	X		X						
12	X			X	X						
13	X	X		X	X						
14	X		X	X	X						
15	X	X	X	X	X						

RTE10 Complement Binary Code						RTE10 Gray Code					
	C	1	2	4	8		C	1	2	3	4
0	X	X	X	X	X	1	X				
1	X		X	X	X	2	X	X			
2	X	X		X	X	3	X	X	X		
3	X			X	X	4	X		X		
4	X	X	X		X	5	X		X	X	
5	X		X		X	6	X	X	X	X	
6	X	X			X	7	X	X		X	
7	X				X	8	X			X	
8	X	X	X	X		9	X		X	X	
9	X		X	X		10	X	X	X	X	

Note: the advantage of the Gray Code is that you change only one digit at the time.

Note: the advantage of the Gray Code is that you change only one digit at the time.

Mechanical data	RTE10V	RTE16V
Number of positions	10	16
Angle between 2 positions	36°	22.5°
Actuating torque	≅ 1.5 Ncm ± 50%	≅ 1.5 Ncm ± 50%
Mechanical stop resistance	without	without
Mechanical life test (indexations)	20 000	20 000

Electrical data		
Operating	10 positions	16 positions
Switching voltage	maximum	30 V DC
	minimum	20 mV DC
Switching current	maximum	100 mA
	minimum	10 µA/5 V DC
Maximum switching power	0.3 W	0.3 W
Contact resistance (measured at 50 mV – 10 mA)		
	Initial	≅ 100 mΩ
	After endurance	≅ 150 mΩ
Dielectric strength between contacts	300 V rms	300 V rms
Insulation resistance between 2 contacts (measured at 100 V DC)		
		> 10 ¹⁰ Ω
	(after 21 days RH)	> 10 ⁹ Ω
Electrical endurance at max. switching power	20 000 indexations	20 000 indexations
Capacitance between contacts	≅ 5 pF	≅ 5 pF

Environmental data		
Operating temperature	– 25°C to + 85°C	
Storage temperature	– 40°C to + 85°C	
Damp heat resistance	21 days at 40°C, 93% RH	
Salt mist resistance	96 hours at 35°C	
Industrial environment	H ₂ S, SO ₂	
Vibrations, shocks	According to NFC 20700	
Self-extinguishability	Housing (blue)	UL 94 – VO
	Actuator	UL 94 – HB

Soldering and cleaning/Resinous flux:

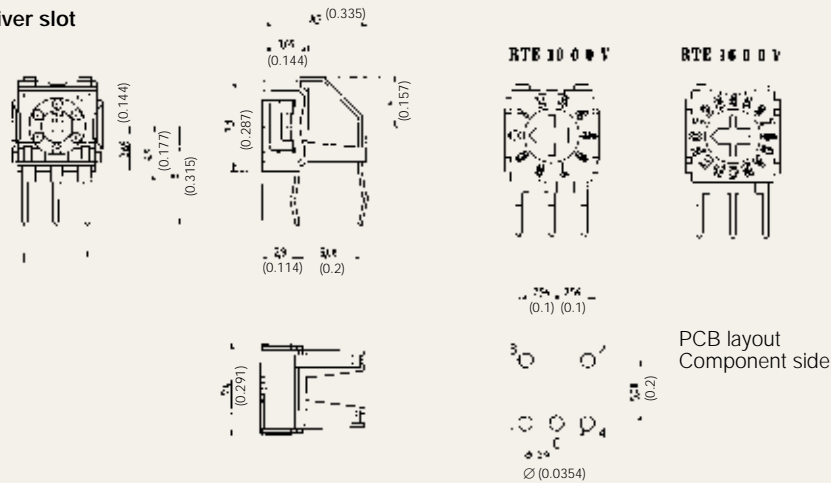
- Fluxing of PCB under side
- Pre-heating 85°C
- Wave soldering 260°C/2 sec.
- Cooling up to ambient temperature
- Immersion cleaning in solvent (trichlorotrifluoroethane with or without ultrasound)
- Consult with us for other soldering and cleaning processes

Ordering code		1	2	3	4	5	6	7
		RTE	10	0	1	V	1	3
1	Designation: RTE		↑		↑		↑	↑
2	Types: 10 (decimal code), 16 (hexadecimal code)	→		↑		↑		↑
3	Ground terminal: 0 (without)		→		↑		↑	
4	Actuation: 0 (screw driver slot), 1 (shaft ≤ 4 mm (≤ 0.157 inch) long, screwdriver slot), 2 (actuator for button, button to be ordered and delivered separately)		→		↑		↑	
5	Operating direction: V (vertical, side actuation)		→		↑		↑	
6	Codes: 1 (binary code for RTE10), 2 (binary code complement for RTE10), 3 (grey code for RTE10), 4 (hexadecimal code for RTE16)		→		↑		↑	
7	Contact material: 3 (RTE10 and RTE16 only available with gold contacts)		→		↑		↑	

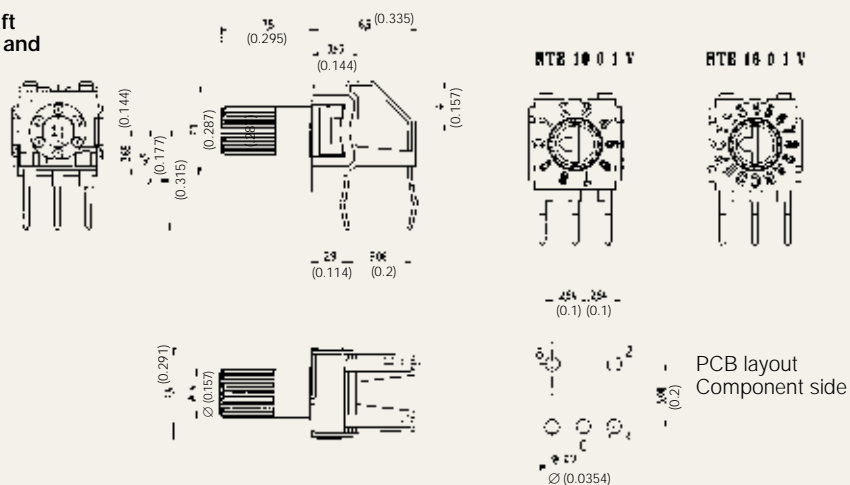
RTEV Miniature Rotary Switch with Vertical Operation

Dimensional Drawings

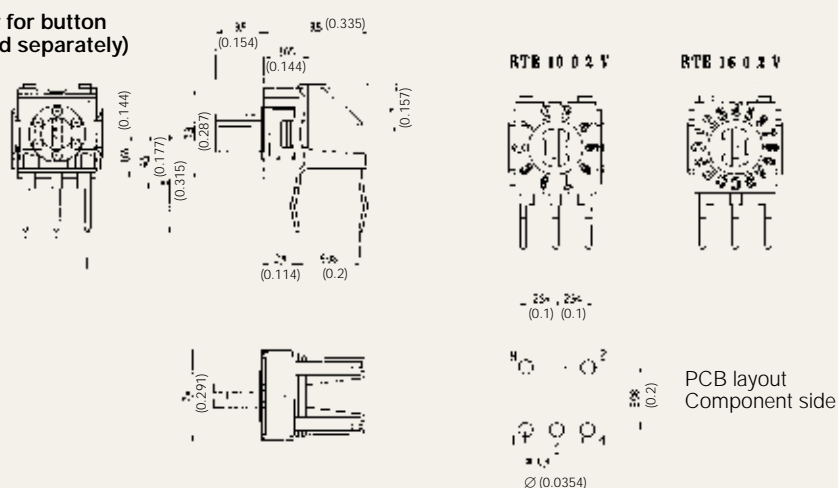
RTE-V with screw driver slot



**RTE-V with long shaft
Ø 4 mm (0.157 inch) and
screw driver slot**



**RTE-V with actuator for button
(button to be ordered separately)**



RTE Miniature Rotary Switch for SMT



The subminiature Rotary switches RTE 02, 03, 10 and 16 positions are available with G type terminals, to facilitate surface mounting on PCB's.

The tape and reel packaging allows an automatic mounting process with standard pick and place machines.

Its small size makes the RTE family particularly suitable for all coding applications on PC Boards where it is necessary to save space.

Main features

- Same mechanical and electrical data as the thru hole version
- Two different types of actuators available: screw driver slot and axis for button
- Hexadecimal code: RTE 16
- Binary or Gray code: RTE 10
- Change-over: RTE 02 and RTE 03
- Totally washable and sealed
- Suitable for infra-red reflow soldering processes
- Gold contacts RTE 10, 16
- Gold or Silver contacts RTE 02, 03
- Tin plated terminals

Main Applications

- Timers
- Alarm systems
- Domestic applications
- Automotive
- Industrial processes
- Instrumentation
- Security Systems

Mechanical data

See the detailed catalog pages starting on F-4 for RTE02, RTE03, RTE10 and RTE16

Electrical data

See the detailed catalog pages starting on F-4 for RTE02, RTE03, RTE10 and RTE16

Environmental data

See the detailed catalog pages starting on F-4 for RTE02, RTE03, RTE10 and RTE16

Soldering Conditions

Infra red reflow soldering -	According to CECC 00 802
Pre-heating:	Temperature 130°C 60S
Heating	Temperature 215°C with a peak of 260°C during 10S
Manual soldering:	Temperature 260°C 5S
Cleaning:	Washable according to EIA-RS448-2 test and IP-67

Packaging

RTE are delivered on continuous tape in reel:
width 16 mm and external diameter 330 mm

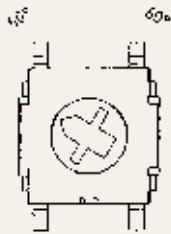
Actuator for screw driver	1250 pieces per reel
Actuator for button	750 pieces per reel

Ordering code		1	2	3	4	5	6	7
		Example: RTE 10 0 0 G 2 3						
1	Designation: RTE	→	↑	↑	↑	↑	↑	↑
2	Types: 02 = 2 positions 03 = 3 positions 10 = decimal code 16 = hexadecimal code	→	↑	↑	↑	↑	↑	↑
3	Ground terminal: 0 (without)	→	↑	↑	↑	↑	↑	↑
4	Actuation: 0 = screw driver slot, no shaft 2 = actuator for button, button to be ordered & delivered separately	→	↑	↑	↑	↑	↑	↑
5	Operating direction: G = surface mount "G wing" type	→	↑	↑	↑	↑	↑	↑
6	Codes: 0 = none for RTE02 & RTE03 1 = binary code for RTE10 2 = binary code complement for RTE10 3 = gray code for RTE10 4 = hexadecimal code for RTE16	→	↑	↑	↑	↑	↑	↑
7	Contact material: 1 = silver, only RTE02 & RTE03 3 = gold, all types	→	↑	↑	↑	↑	↑	↑

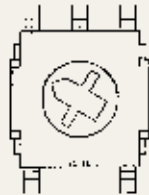
RTE Miniature Rotary Switches for SMT

Dimensional Drawings

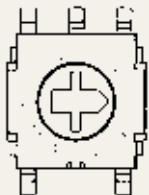
RTE 02 00 G 03



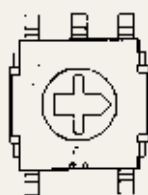
RTE 03 00 G 03



RTE 10 00 G 33



RTE 16 00 G 43



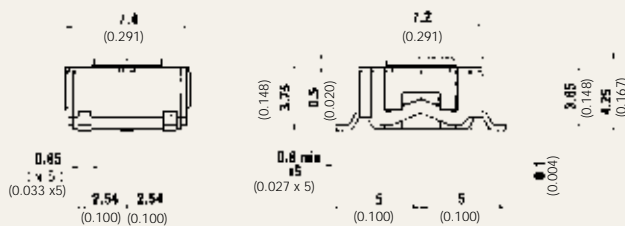
RTE 10 02 G 13



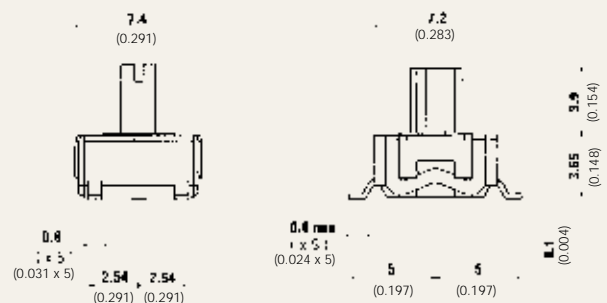
RTE 16 02 G 43



Screwdriver slot version

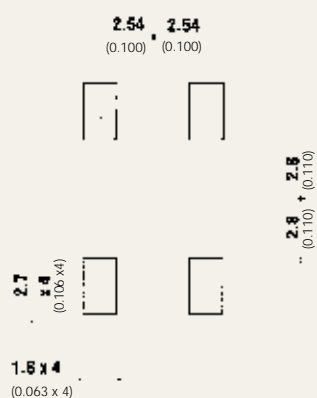


Actuator version



PC Board Mounting (seen components side)

RTE 02



RTE 03 / 10 / 16

