






Resistive Position Sensors

List of Varieties

Series		RDC50	RDC90	RD6R1A	RDC10	RD7
Photo						
Control part orientation		Horizontal Vertical	Vertical	—	Vertical	Horizontal Vertical
Type		Rotary			Linear	
Terminal style		Insertion Reflow	Reflow	Connector terminal	Insertion	
Dimensions (mm)		11.0×3.9×13.5 11.0×12.0×2.2 11.0×12.0×2.75 11.0×12.0×3.5	11.0×13.7×3.2	20.6×32.5×3.6	6.5×17.3×2.1 6.9×23.5×2.9 6.9×31.5×2.9 6.9×41.5×2.9 6.9×56.5×3.0 6.9×96.7×3.45	9.0×15.8×3.7 10.0×5.0×15 10.0×5.0×19.0 10.0×15.0×4.5 10.0×18.0×5.0
Total resistance		4.7kΩ 10kΩ	3.3kΩ 10kΩ	3.8kΩ	10kΩ	2.2kΩ 4.7kΩ 5kΩ 10kΩ
Effective electrical range		150° 333.3°	80° 260°	320°	—	
Linearity guarantee range		140° 320°	60° 244°	310°	9.2mm 12mm 20mm 30mm 45mm 85mm	6mm 7mm 9mm
Linearity		±2%	±3%	±2%	±0.5% ±1%	±1%
Operating force		—			0.25N max.	2N max.
Rotational torque		2mN·m max.		100mN·m	—	
Electrical performance	Total resistance tolerance	±30%		±20%	±30%	±20%
	Rated voltage	5V DC				—
Environmental test	Cold	-40°C 168h			-40°C 240h	-40°C 96h
	Dry heat	120°C 168h		85°C 168h	80°C 240h 85°C 240h 90°C 240h	105°C 96h
	Damp heat	60°C, 90 to 95%RH 96h		80°C, 90 to 95%RH 96h	60°C, 90 to 95%RH 240h	40°C, 90 to 95%RH 96h
Automotive		●	●	●	○	●

 Note

● Indicates applicability to all products in the series, while ○ indicates applicability to some products in the series.

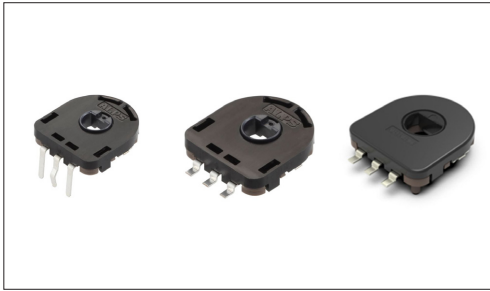
Rotary Type RDC50 Series

Compact, high-precision, and high-heat-resistant design, suitable for all position detection needs.

 Automotive

■ Type: Rotary

Applications: Energy_Industrial: Robots, drones, Industrial equipment
 Healthcare: Healthcare equipment, Nursing care equipment
 Analysis, test equipment: Analysis, test equipment
 Home: Major home appliances, Office equipment
 Audio_TV: Visual, Audio
 Automotive: Navigation/audio systems, HVAC



■ Product List

Products No.	Control part orientation	Mounting method	Linearity guarantee range	Linearity	Total resistance	Operating life (cycles)	Dimensions (mm)	Automotive	Drawing No.
RDC501051A	Vertical	Manual, DIP	320°	±2%	10kΩ	1,000,000	11.0×12.0×3.5	●	1
RDC501052A	Vertical	Manual, DIP	320°	±2%	10kΩ	1,000,000	11.0×12.0×3.5	●	2
RDC502012A	Horizontal	Manual, DIP	320°	±2%	10kΩ	1,000,000	11.0×3.9×13.5	●	3
RDC503051A	Vertical	Reflow	320°	±2%	10kΩ	1,000,000	11.0×12.0×2.75	●	4
RDC503052A	Vertical	Reflow	320°	±2%	10kΩ	1,000,000	11.0×12.0×2.75	●	5
RDC503061A	Vertical	Reflow	140°	±2%	4.7kΩ	1,000,000	11.0×12.0×2.75	●	4
RDC506018A	Vertical	Reflow (Low-profile)	320°	±2%	10kΩ	1,000,000	11.0×12.0×2.2	●	6
RDC506A03A	Vertical	Reflow (Low-profile, Long-life, Without case hole)	320°	±2%	10kΩ	2,000,000	11.0×12.0×2.2	●	7

⚠ Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).

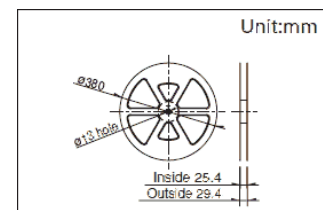
■ Packing Specifications

Tray

Products No.	Number of packages(pcs.)		Export package measurements (mm)
	1 case / Japan	1 case / export packing	
RDC501051A RDC501052A	1,500	3,000	526×370×191
RDC502012A	1,600	1,600	370×280×92

Taping

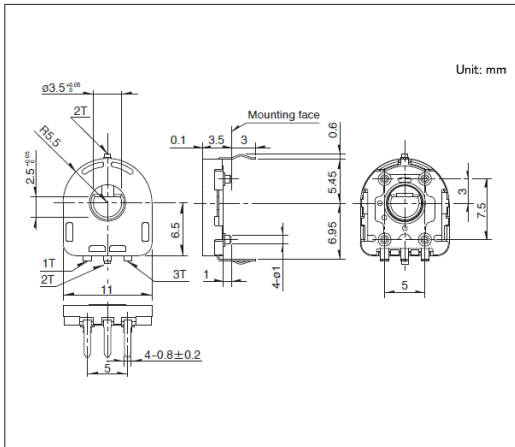
Products No.	Number of packages(pcs.)			Tape width (mm)	Export package measurements (mm)
	1 reel	1 case / Japan	1 case / export packing		
RDC503051A RDC503052A RDC503061A	1,300	3,900	3,900	24	415×407×135
RDC506018A RDC506A03A	1,200	3,600	3,600	24	415×407×135



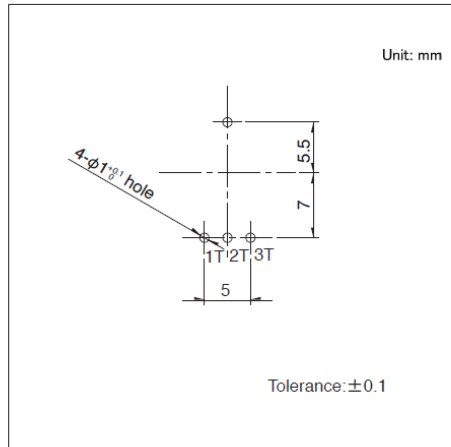
Rotary Type
RDC50 Series

Drawing No.1

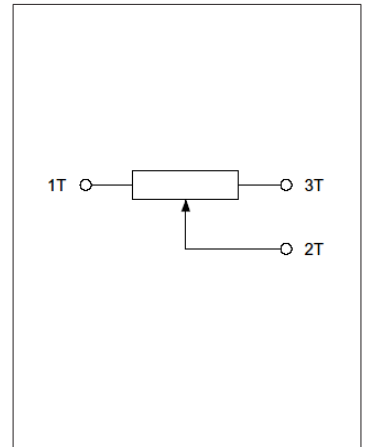
■ Dimensions



■ Mounting Hole Dimensions



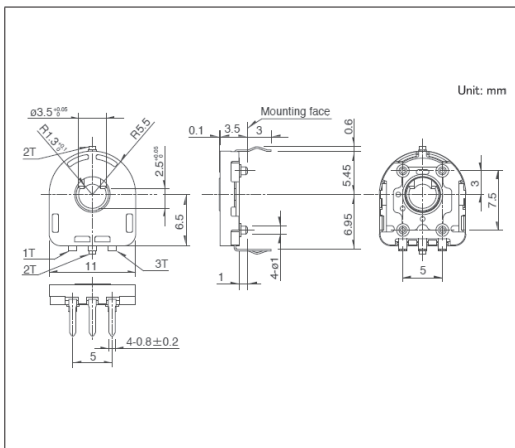
■ Circuit Diagram



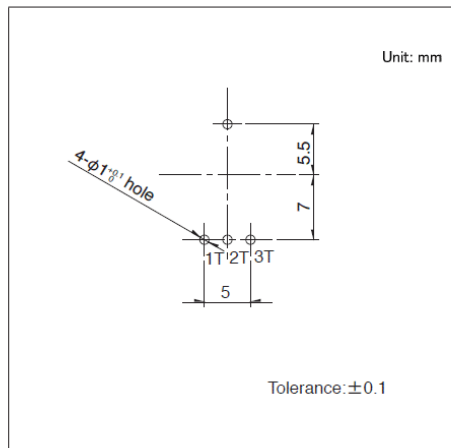
Viewed from mounting side

Drawing No.2

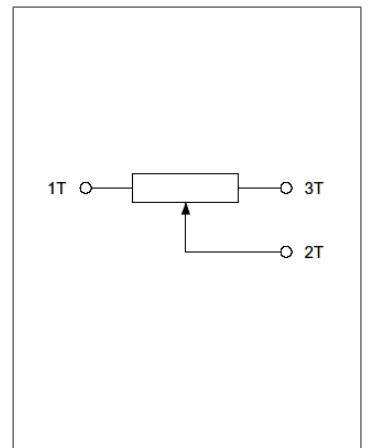
■ Dimensions



■ Mounting Hole Dimensions



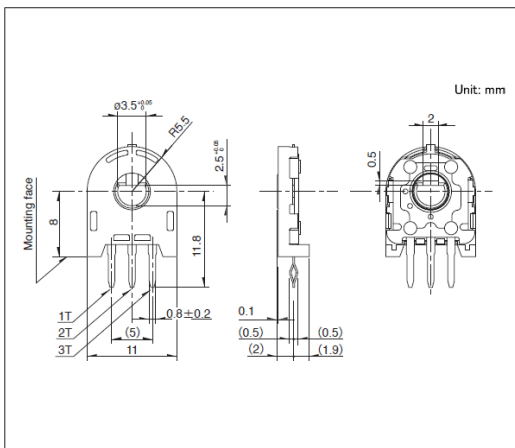
■ Circuit Diagram



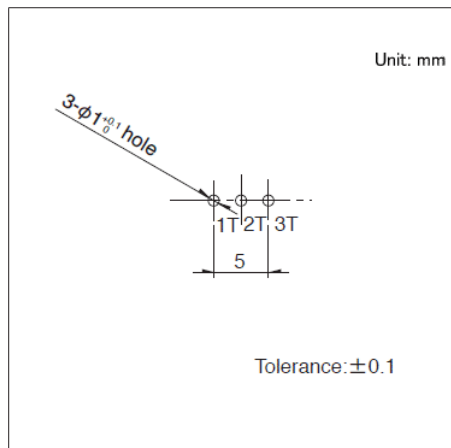
Viewed from mounting side

Drawing No.3

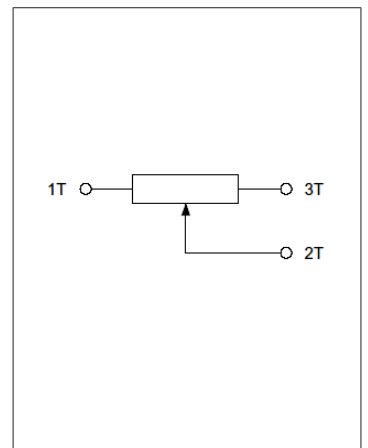
■ Dimensions



■ Mounting Hole Dimensions



■ Circuit Diagram

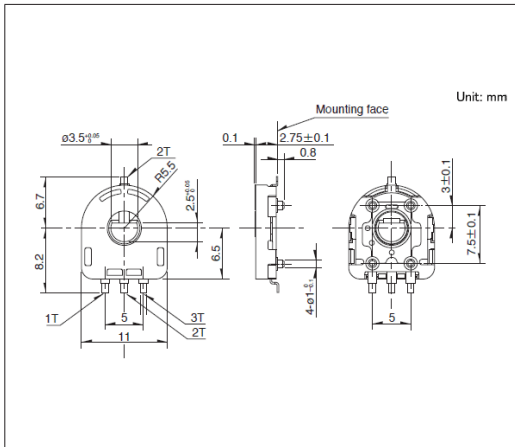


Viewed from mounting side

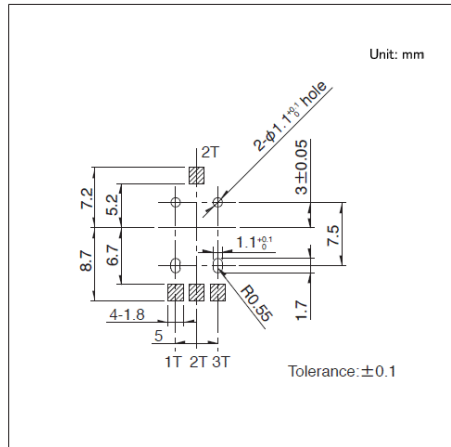
Rotary Type
RDC50 Series

Drawing No.4

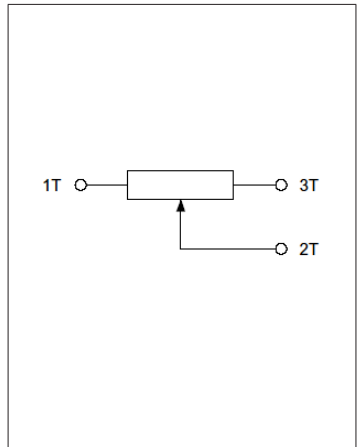
■ Dimensions



■ Mounting Hole Dimensions



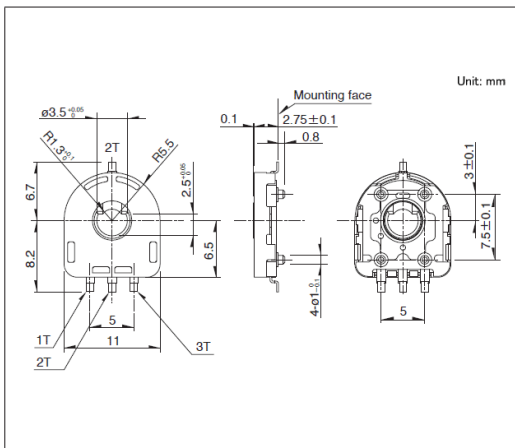
■ Circuit Diagram



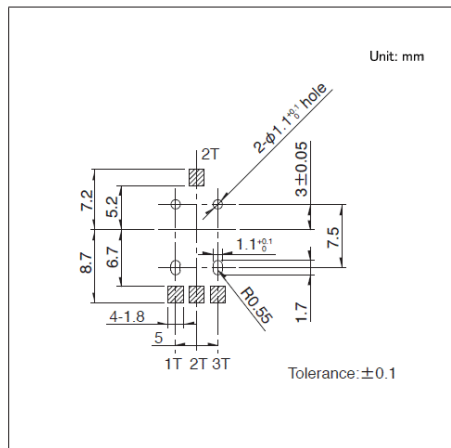
Viewed from mounting side

Drawing No.5

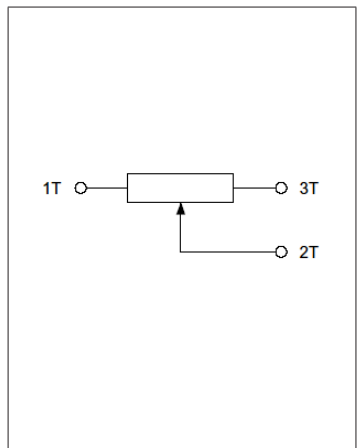
■ Dimensions



■ Mounting Hole Dimensions



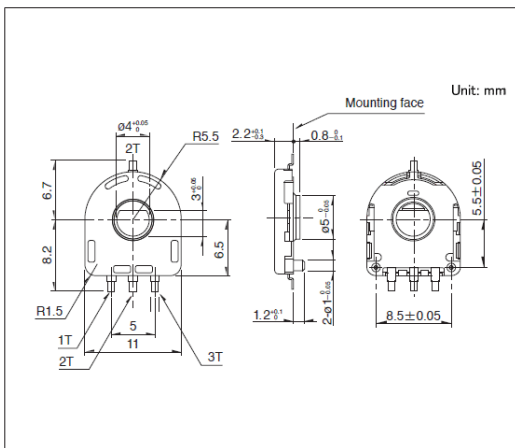
■ Circuit Diagram



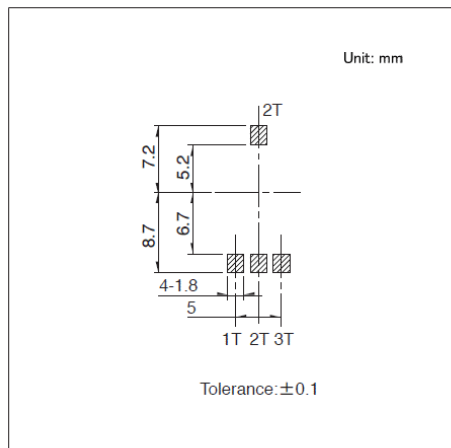
Viewed from mounting side

Drawing No.6

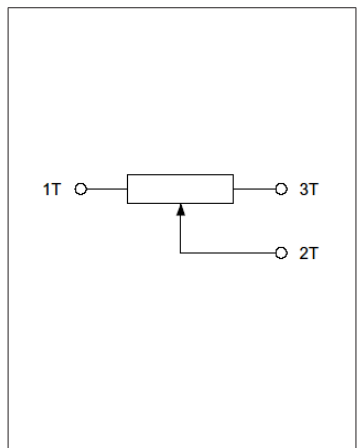
■ Dimensions



■ Land Dimensions



■ Circuit Diagram

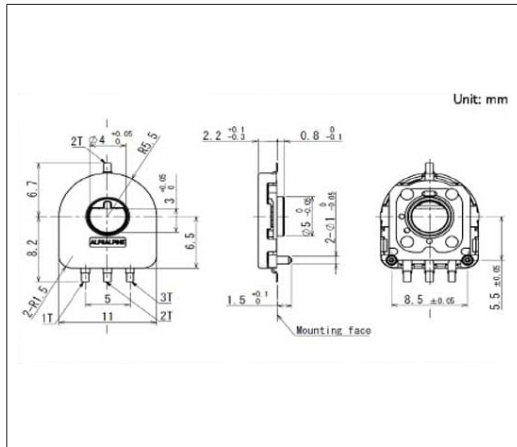


Viewed from mounting side

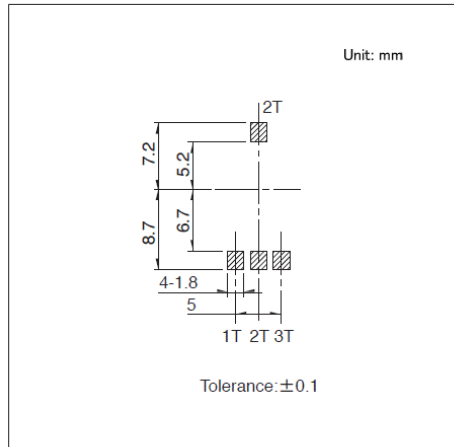
Rotary Type RDC50 Series

Drawing No.7

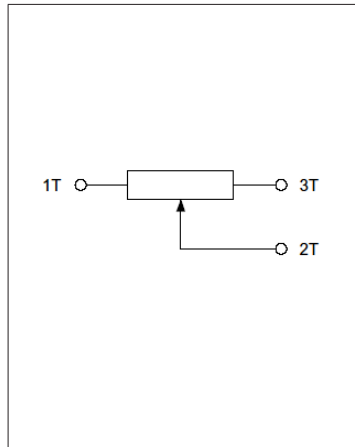
■ Dimensions



■ Land Dimensions



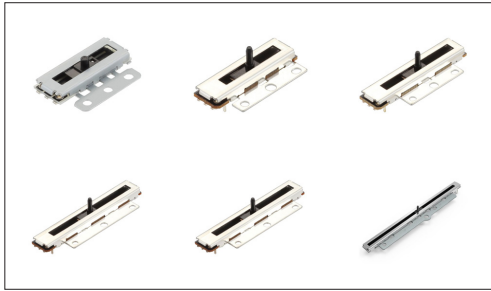
■ Circuit Diagram



Viewed from mounting side

Linear Type RDC10 Series

High-precision ($\pm 0.5\%$ relative linearity) space-saving design, contributing to set miniaturization.



 Automotive

※Please check the product list for compatible products

■ Type: Linear

Applications: Energy_Industrial: Robots, drones
 Game: Home handheld consoles, Virtual/augmented reality
 Healthcare: Healthcare equipment, Analysis, test equipment
 Nursing care equipment: Nursing care equipment
 Home: Major home appliances, Office equipment
 Automotive: Navigation/audio systems, HVAC

■ Product List

Products No.	Control part orientation	Travel (mm)	Linearity guarantee range	Linearity	Total resistance	Operating life (cycles)	Dimensions (mm)	Automotive	Drawing No.
RDC1010A12	Vertical	10	9.2mm	$\pm 0.5\%$	10k Ω	50,000	6.5×17.3×2.1	—	1
RDC1014A09	Vertical	14	12mm	$\pm 0.5\%$	10k Ω	200,000	6.9×23.5×2.9	●	2
RDC1022A05	Vertical	22	20mm	$\pm 0.5\%$	10k Ω	200,000	6.9×31.5×2.9	●	
RDC10320RB	Vertical	32	30mm	$\pm 0.5\%$	10k Ω	200,000	6.9×41.5×2.9	●	
RDC1047A03	Vertical	47	45mm	$\pm 0.5\%$	10k Ω	200,000	6.9×56.5×3.0	●	
RDC1087A01	Vertical	87	85mm	$\pm 1\%$	10k Ω	100,000	6.9×96.7×3.45	—	3

Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).
3. RDC1014, RDC1022, RDC1032 and RDC1047 Series are available in different varieties to product line.

■ Packing Specifications

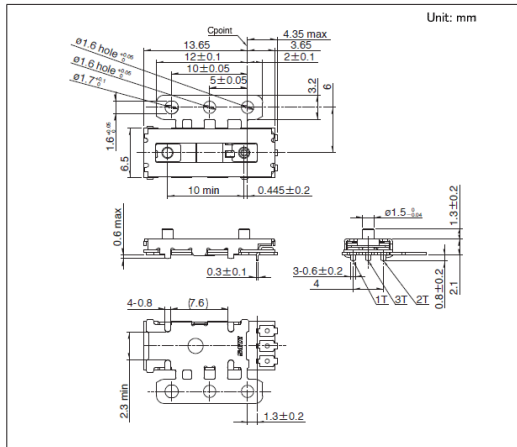
Tray

Products No.	Number of packages (pcs.)		Export package measurements (mm)
	1 case / Japan	1 case / export packing	
RDC1010A12	980	2,940	360×270×230
RDC1014A09	2,400	4,800	508×374×272
RDC1022A05	2,100	4,200	508×374×302
RDC10320RB	900	1,800	540×360×205
RDC1047A03	1,000	2,000	508×374×272
RDC1087A01	540	540	540×360×130

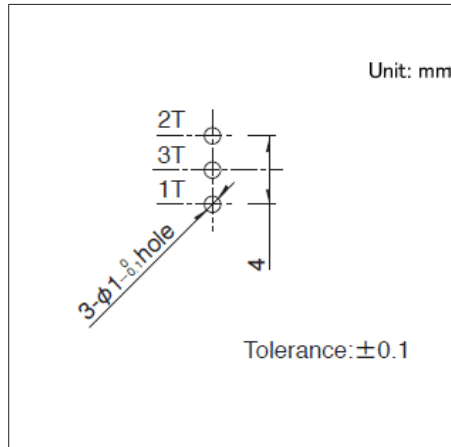
Linear Type
RDC10 Series

Drawing No.1

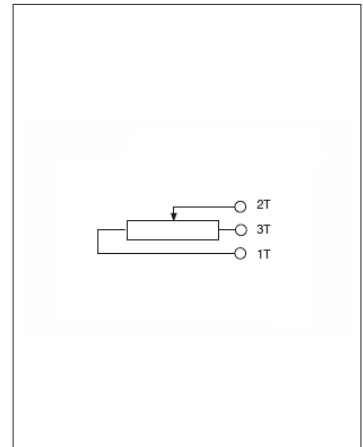
■ Dimensions



■ Mounting Hole Dimensions

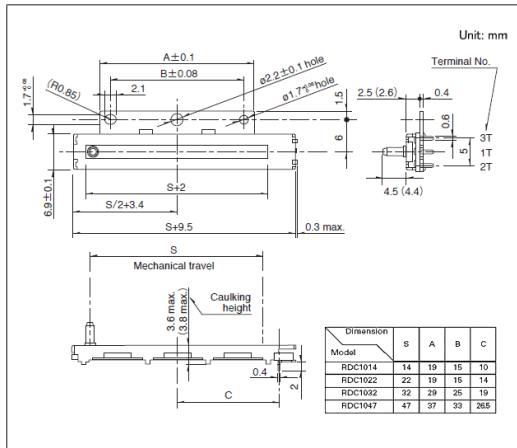


■ Circuit Diagram

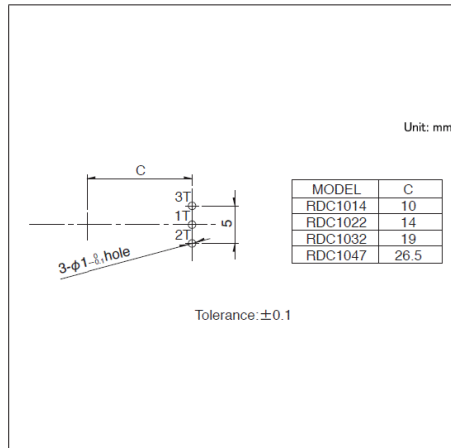


Drawing No.2

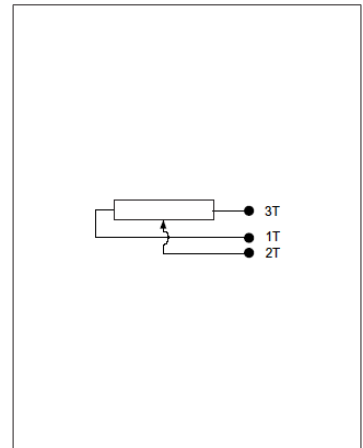
■ Dimensions



■ Mounting Hole Dimensions

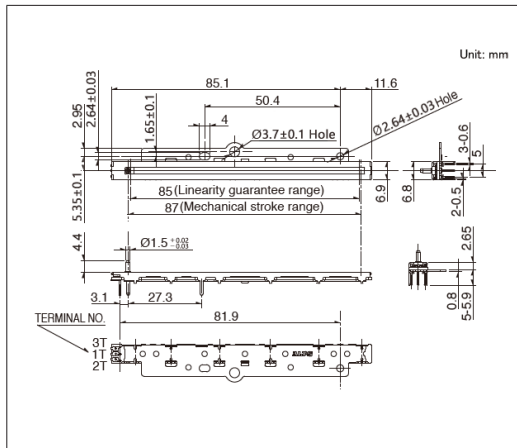


■ Circuit Diagram

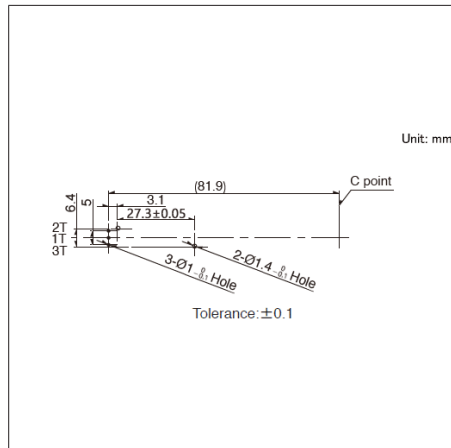


Drawing No.3

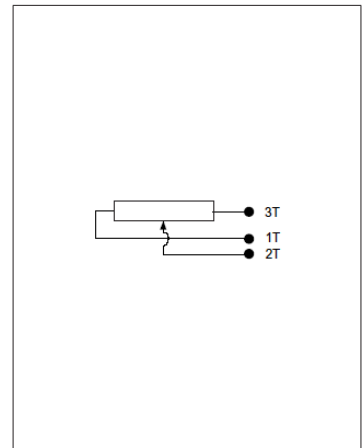
■ Dimensions



■ Mounting Hole Dimensions



■ Circuit Diagram



Linear Type (Exclusively Used to Detect the Angle of Vehicle Head Lights)

RD7 Series

High-precision, space-saving design dedicated to headlight angle detection.


 Automotive

■ Type: Linear

Applications: Automotive: Headlights

■ Product List

Products No.	Control part orientation	Travel (mm)	Linearity guarantee range	Linearity	Total resistance	Operating life (cycles)	Dimensions (mm)	Automotive	Drawing No.
RD708A029A	Horizontal	8	6mm	±1%	4.7kΩ	100,000	10.0×5.0×15	●	1
RD7081015A	Vertical	8	7mm	±1%	5kΩ	100,000	10.0×15.0×4.5	●	2
RD7091008A	Vertical	9	7mm	±1%	5kΩ	100,000	9.0×15.8×3.7	●	3
RD712A028A	Horizontal	12	9mm	±1%	2.2kΩ	100,000	10.0×5.0×19.0	●	4
RD7121008A	Vertical	12	9mm	±1%	10kΩ	100,000	10.0×18.0×5.0	●	5

 Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. For Linearity, various specifications will be available, depending on the applications. Please consult with us when placing your orders.
3. Please place purchase orders per minimum order unit (integer).

■ Packing Specifications

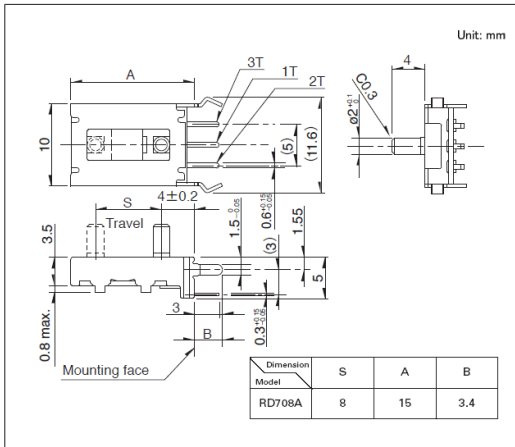
Tray

Products No.	Number of packages(pcs.)		Export package measurements (mm)
	1 case / Japan	1 case / export packing	
RD708A029A RD712A028A	2,000	4,000	527×363×215
RD7081015A	1,500	3,000	507×363×216
RD7091008A	1,800	3,600	508×364×192
RD7121008A	1,800	3,600	507×363×216

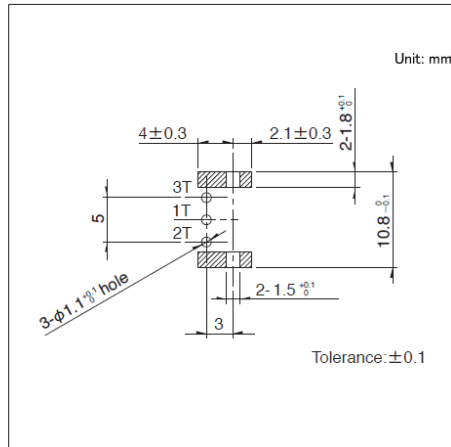
Linear Type (Exclusively Used to Detect the Angle of Vehicle Head Lights)
RD7 Series

Drawing No.1

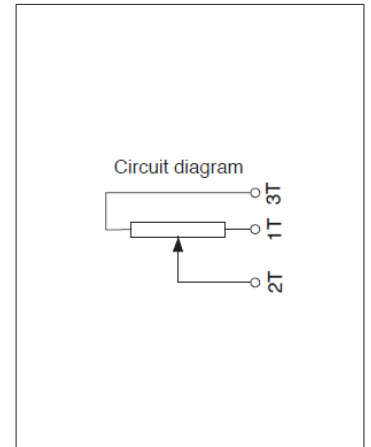
■ Dimensions



■ Mounting Hole Dimensions



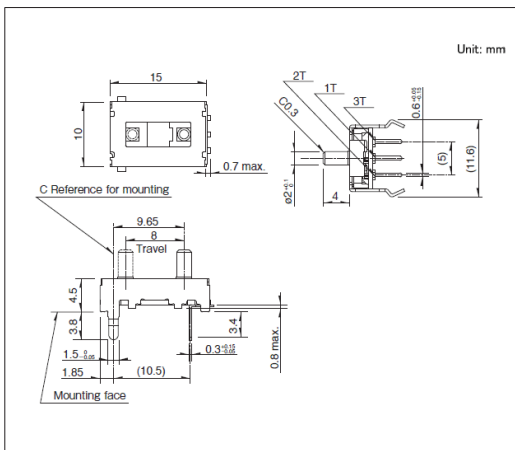
■ Circuit Diagram



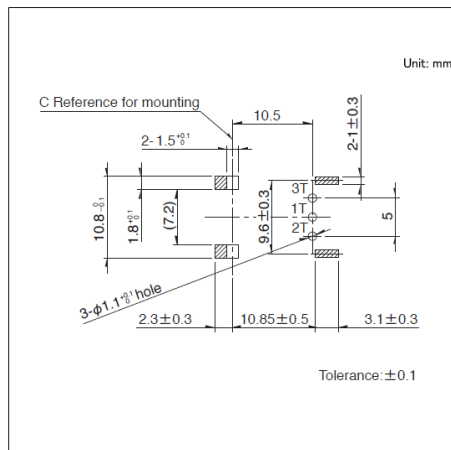
Viewed from mounting side
 Do not wire the shaded area

Drawing No.2

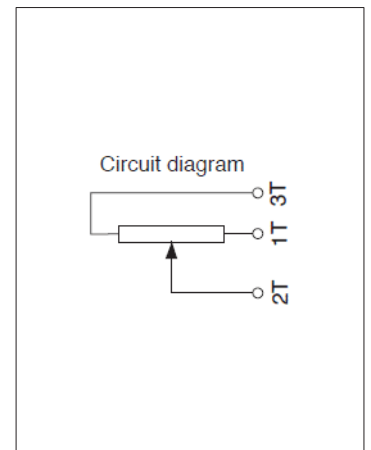
■ Dimensions



■ Mounting Hole Dimensions



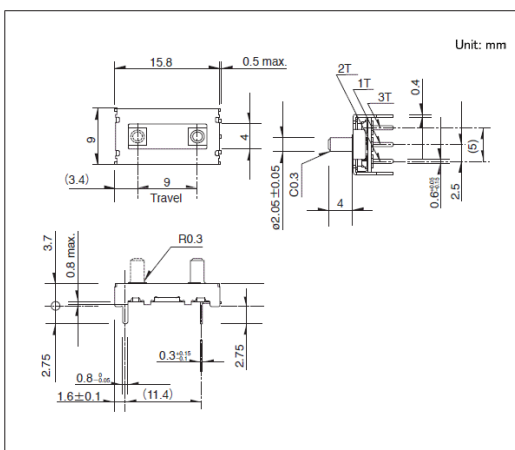
■ Circuit Diagram



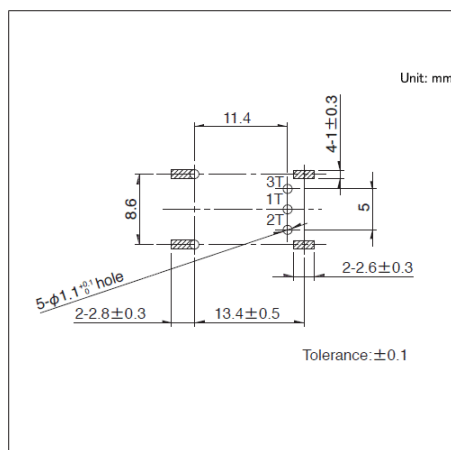
Viewed from mounting side
 Do not wire the shaded area

Drawing No.3

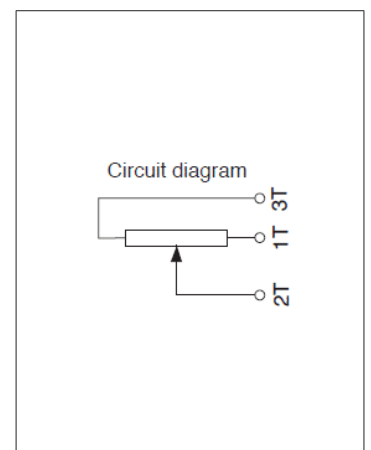
■ Dimensions



■ Mounting Hole Dimensions



■ Circuit Diagram

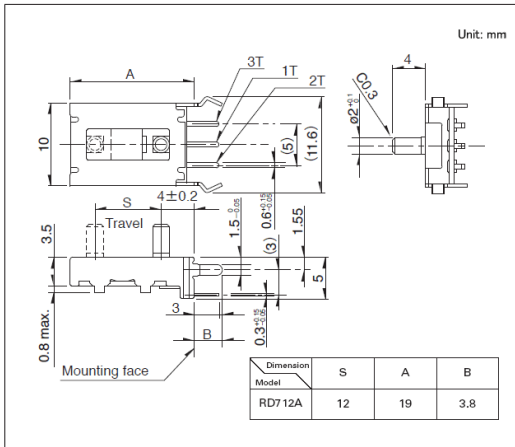


Viewed from mounting side
 Do not wire the shaded area

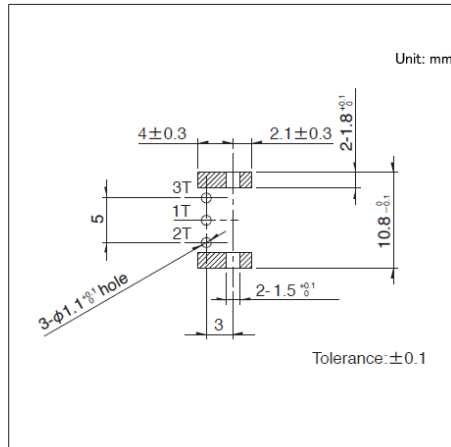
Linear Type (Exclusively Used to Detect the Angle of Vehicle Head Lights)
RD7 Series

Drawing No.4

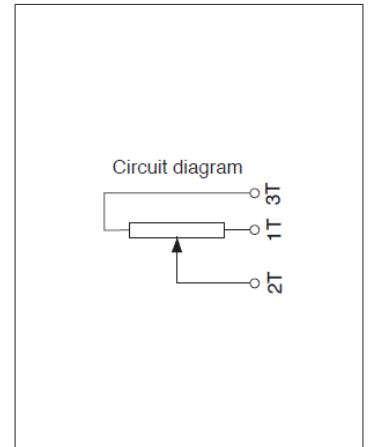
■ Dimensions



■ Mounting Hole Dimensions



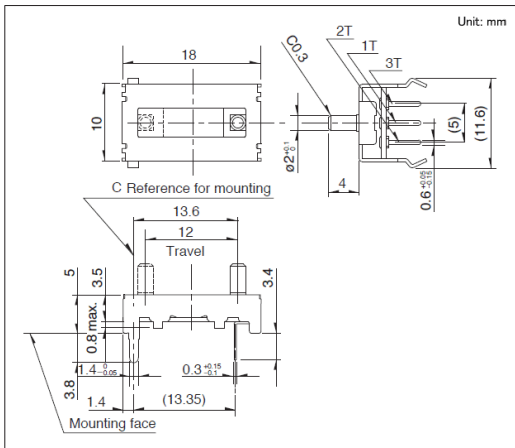
■ Circuit Diagram



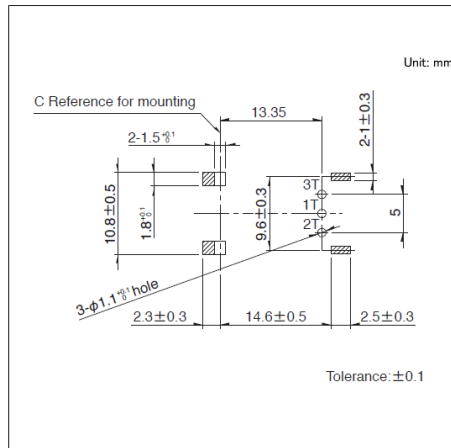
Viewed from mounting side
 Do not wire the shaded area

Drawing No.5

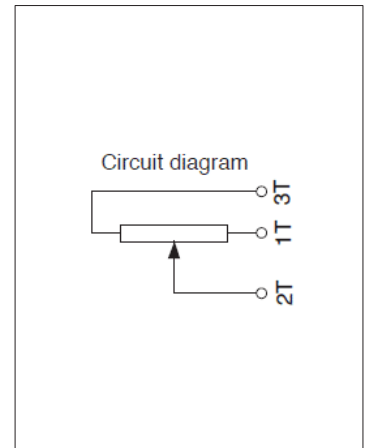
■ Dimensions



■ Mounting Hole Dimensions



■ Circuit Diagram



Viewed from mounting side
 Do not wire the shaded area

Resistive Position Sensors / Soldering Conditions

■ Reference for Manual Soldering

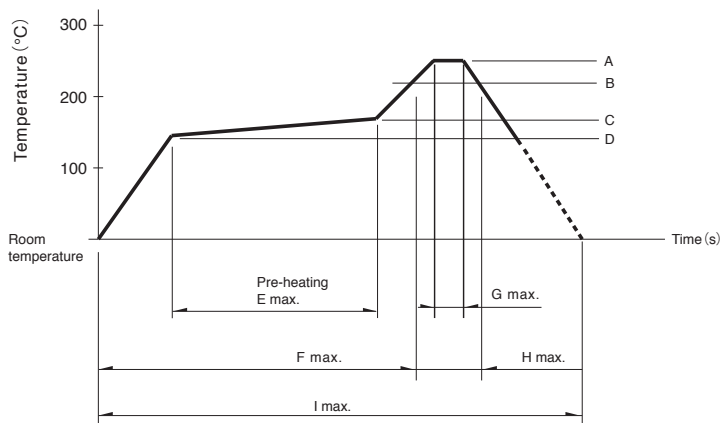
Series	Tip temperature	Soldering time
RDC50, RDC90	350±5°C	3 ⁺¹ ₀ s
RDC10, RD7	350°C max.	3s max.

■ Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surface temperature	Heating time	Soldering temperature	Soldering time	
RDC501, RDC502	100 to 150°C	1 min. max.	260±5°C	10±1s	1 time
RD7	100°C max.	1 min. max.	260°C max.	5s max.	1 time

■ Example of Reflow Soldering Condition

- Cleaning sensors should not be attempted.
- Type of solder to be used Use cream solder that contains 10 to 15 wt % flux.
- Number of solder applications - apply solder only once
- Recommended reflow conditions



Series	A	B	C	D	E	F	G	H	I	No. of reflows
RDC503 RDC506	250°C	230°C	180°C	150°C	2min.	—	5s	40s	4min.	1 time
RDC90	255°C	230°C	—	—	—	2min.	10s	1 min.	4min.	1 time

⚠️ Note

- When using an infrared reflow oven, solder may not always be applied as intended. Be sure to use a hot air reflow oven or a type that uses infrared rays in combination with hot air.
- The temperatures given above are the maximum temperatures at the terminals of the sensor when employing a hot air reflow method. The temperature of the PC board and the surface temperature of the sensor may vary greatly depending on the PC board material, its size and thickness. Ensure that the surface temperature of the sensor does not rise to 250°C or greater.
- Conditions vary to some extent depending on the type of reflow bath used. Be sure to give due consideration to this prior to use.

Resistive Position Sensors / Cautions

Use of Chemicals

The sensors make use of synthetic resins, therefore avoid use in environments where there is a strong presence of gases from chemicals such as ammonia, amines, alkaline aqueous solutions, aromatic hydrocarbons, ketones, esters and halogenated hydrocarbons.

Measures to Deal with Noise Problems

While data is being received from the sensor, on rare occasions, penetrating external noise may cause interference with the outputs.

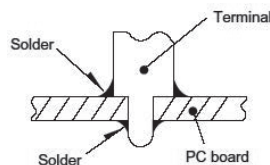
To minimize the probability of this phenomenon pay attention to the following when you program the relevant software

ex)

- Receiving of data should always be repeated a number of times to ensure that you obtain a mean value.
- Have the system determine when/how to invalidate any data received in error.
- When doubt occurs let the system receive the subject data again and reconfirm that you have eliminated the anomaly.

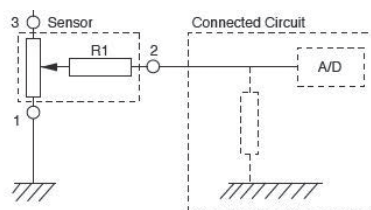
Soldering

Avoid wiring and soldering that causes the solder to seep through to the top of the PC board (as illustrated). This can lead to a contact failure in the terminal section. If solder seepage is unavoidable, please consult with us.



Connection Impedance

Resistive position sensors are constructed in a way that contact resistance ($R1$ below) occurs within the sensor. To reduce the effect of contact resistance ($R1$), set the impedance within the circuit connected to the output terminal to greater than $1M \Omega$.



Dew Condensation

Avoid using the sensor where dew or water vapor might be caused to condense on the surface of the resistor - deterioration of insulation or shorting may occur.

Storage

1. Store the products as delivered, at a normal temperature and humidity, without direct sunshine and corrosive gas ambient. Use them at an earliest possible timing, not later than six months upon receipt.
2. After breaking the seal, keep the products in a plastic bag to shut out ambient air, store them in the same environment as above, and use them up as soon as possible.
3. Do not stack too many switches.