Encoders

Through shaft Encoder

List of Varieties

Series		EC05E	EC10E
Photo			
Dimensions		5mm size	10mm size
Output		Incremental (Two phase A and B)	
Number of detent		12	12 24
Number of pulse		12	
Operating temperature range		-30℃ to +85℃	-5℃ to +45℃ -40℃ to +85℃
Operating life		100,000 cycles	
Electrical performance	Ratings	0.55mA 5.5V DC	1mA 5V DC
	Max./min. operating current (Resistive load)	0.55mA/–	–
	Insulation resistance	50MΩ min. 50V DC	
	Voltage proof	50V AC for 1 minute	
Mechanical performance	Detent torque	1.6±1.3mN·m	–
Automotive		–	●

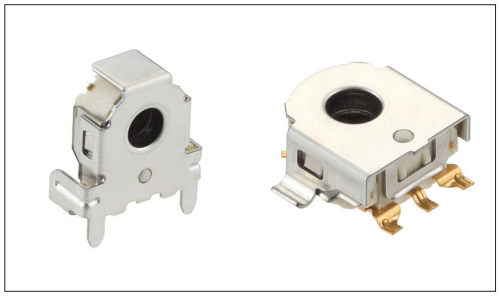
⚠Note

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

Encoders Through shaft Encoder

5mm Size Hollow Shaft Type
EC05E Series

Compact design featuring Drum Cord™ technology.



- Output signal:Two phase A and B
- Ratings:0.55mA 5.5V DC
- Operating life:100,000 cycles

Applications:Mobile:Headsets, wearables,Notebooks, peripherals
Energy_Industrial:Robots, drones
Game:Home handheld consoles,Virtual/augmented reality
Healthcare:Healthcare equipment,Nursing care equipment,
Analysis, test equipment

■ Product List

Products No.	Control part orientation	Detent torque	Mount height	Number of detent	Number of pulse	Automotive	Drawing No.
EC05E1220202	Horizontal	1.6±1.3mN·m	4.5mm	12	12	—	1
EC05E1220203	Horizontal	1.6±1.3mN·m	4.5mm	12	12	—	2
EC05E1220401	Vertical	1.6±1.3mN·m	—	12	12	—	3

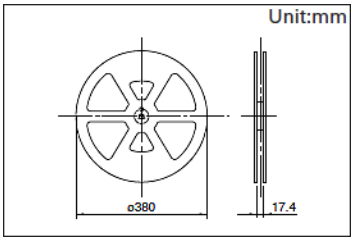
⚠Note

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).

■ Packing Specifications

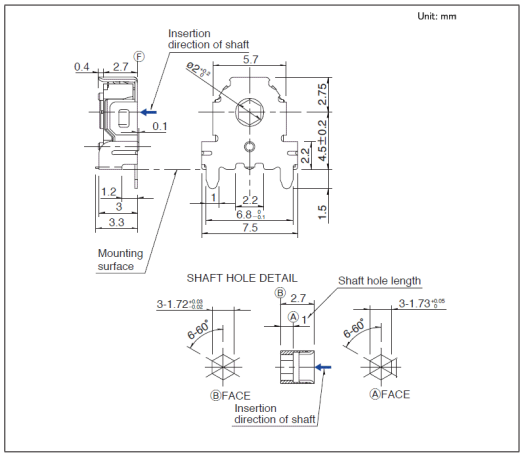
Taping

Products No.	Number of packages(pcs.)			Tape width (mm)	Export package measurements (mm)
	1 reel	1 case / Japan	1 case / export packing		
EC05E1220202 EC05E1220203	1,000	4,000	8,000	16	485 x 410 x 246
EC05E1220401	2,000	8,000	16,000	16	485 x 410 x 246

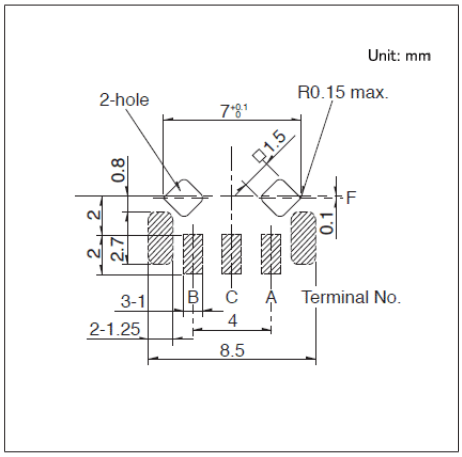


Drawing No.1

■ Dimensions



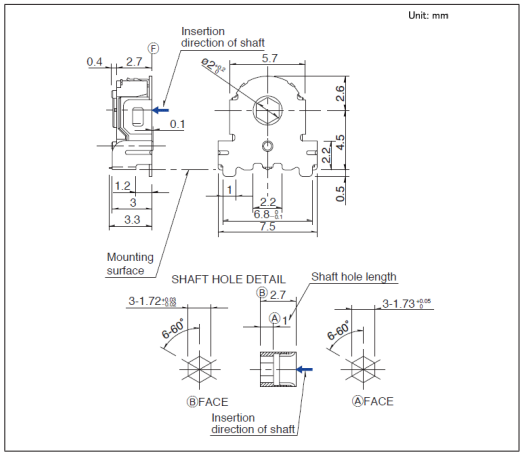
■ Mounting Hole and Land Dimensions



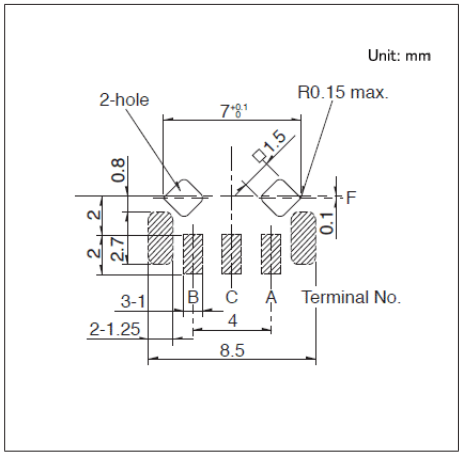
Viewed from mounting side,
shaded area indicated soldering land.

Drawing No.2

■ Dimensions



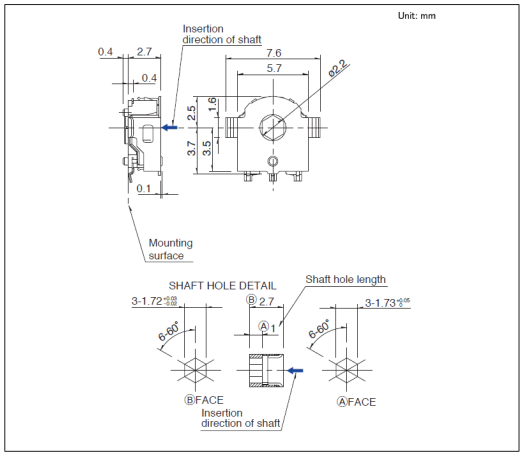
■ Mounting Hole and Land Dimensions



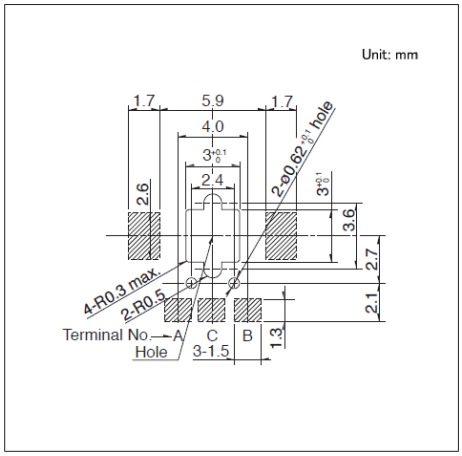
Viewed from mounting side,
shaded area indicated soldering land.

Drawing No.3

■ Dimensions



■ Mounting Hole and Land Dimensions

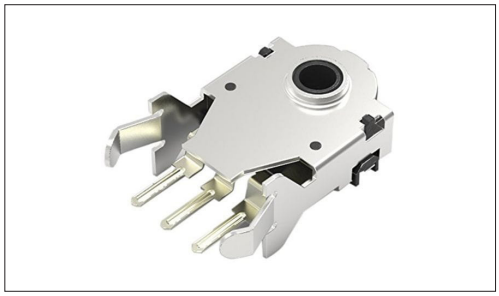


Viewed from mounting side,
shaded area indicated soldering land.

Encoders | Through shaft Encoder

10mm Size Hollow Shaft Type
EC10E Series

Unique through-shaft design achieving miniaturization and long life.



Automotive

- Output signal:Two phase A and B
- Ratings:1mA 5V DC
- Operating life:100,000 cycles

Applications:Mobile:Notebooks, peripherals
Energy_Industrial:Robots, drones
Game:Home handheld consoles
Automotive:Navigation/audio systems, HVAC,Steering

■ Product List

Products No.	Control part orientation	Detent torque	Mount height	Number of detent	Number of pulse	Automotive	Drawing No.
EC10E1220505	Horizontal	5±3mN·m	7.0mm	24	12	●	1
EC10E1220501	Horizontal	5±3mN·m	9.0mm	24	12	●	2
EC10E1220503	Horizontal	5±3mN·m	11.0mm	24	12	●	3
EC10E1260502	Horizontal	6±3mN·m	7.0mm	12	12	●	4
EC10E1260507	Horizontal	6±3mN·m	11.0mm	24	12	●	5

⚠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. Please contact us for automotive use products.

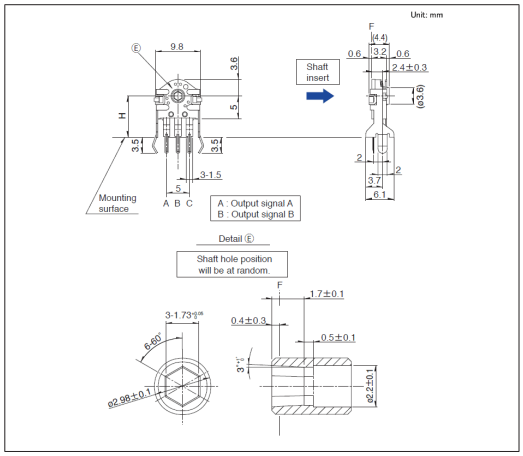
■ Packing Specifications

Bulk

Number of packages(pcs.)		Export package measurements (mm)
1 case / Japan	1 case / export packing	
3,200	3,200	374 x 254 x 166

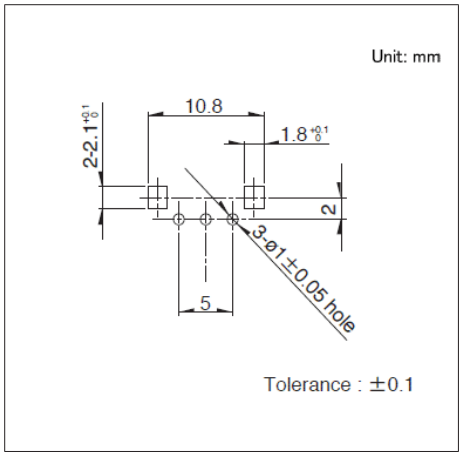
Drawing No.1

■ Dimensions



Mount height H = 7mm

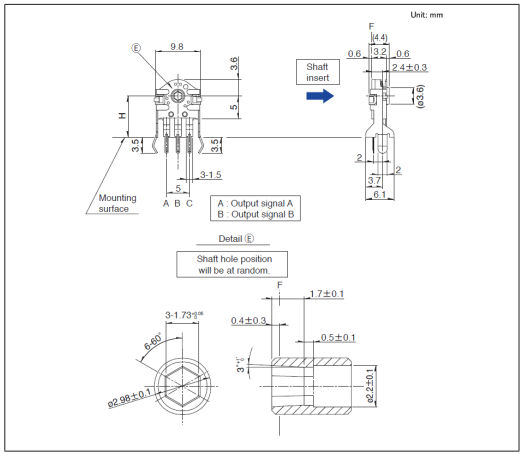
■ Mounting Hole Dimensions



Viewed from mounting side

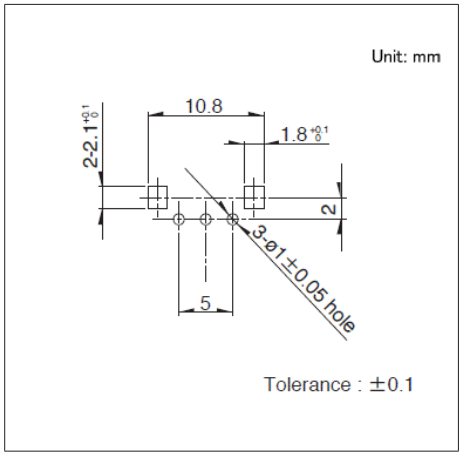
Drawing No.2

■ Dimensions



Mount height H = 9mm

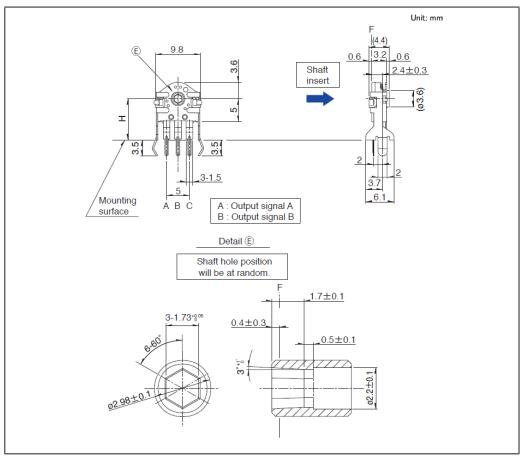
■ Mounting Hole Dimensions



Viewed from mounting side

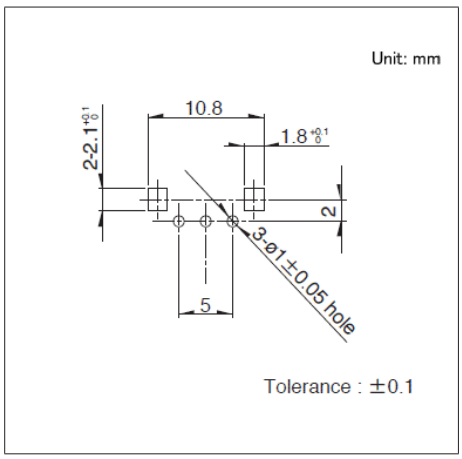
Drawing No.3

■ Dimensions



Mount height H = 11mm

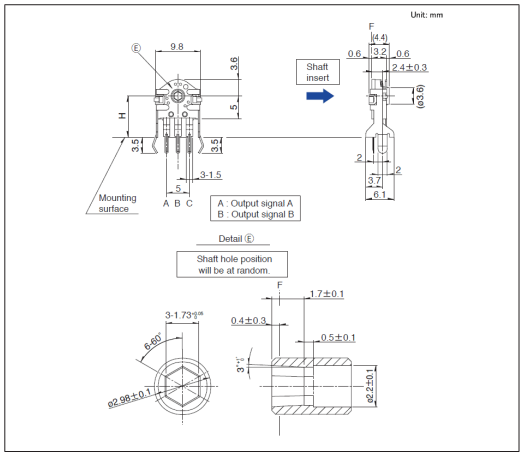
■ Mounting Hole Dimensions



Viewed from mounting side

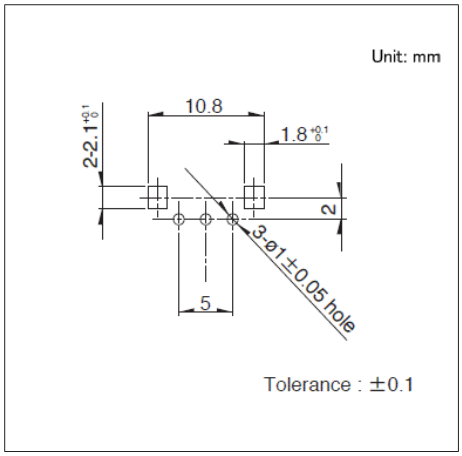
Drawing No.4

■ Dimensions



Mount height H = 7mm

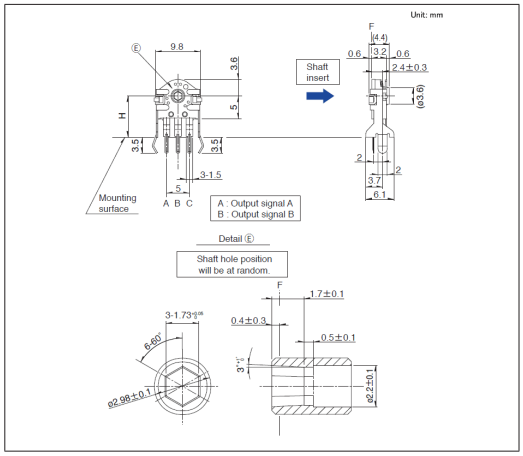
■ Mounting Hole Dimensions



Viewed from mounting side

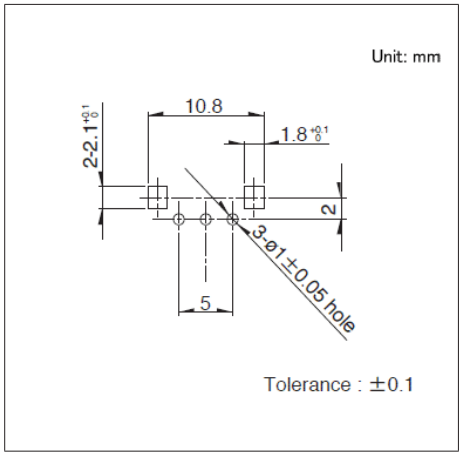
Drawing No.5

■ Dimensions



Mount height H = 11mm

■ Mounting Hole Dimensions



Viewed from mounting side

Encoders / Soldering Conditions

■ Reference for Manual Soldering

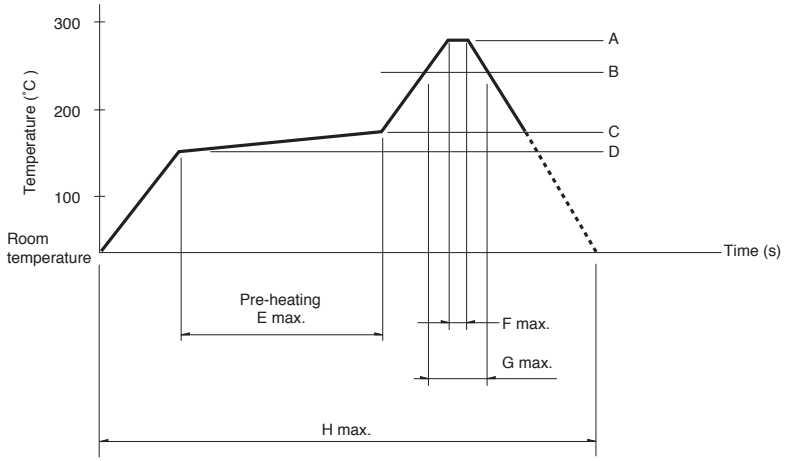
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11E, EC11M, EC12D, EC12E, EC18A, EC21A, EC28A, EC35A, EC35AH, EC40A, EC50A, EC21C, EC28C, EC35CH	350℃ max.	3s max.	1 time

■ Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surfacetemperature	Heating time	Soldering temperature	Soldering time	
EC09E, EC111, EC11E, EC11M, EC18A, EC21A, EC28A, EC35A, EC35AH, EC50A	100℃ max.	2 min. max.	260±5℃	5±1s	2 times max.
EC10E, EC12D, EC12E	100℃ max.	1 min. max.	260±5℃	3±1s	2 times max.
EC40A	110℃ max.	1 min. max.	260℃ max.	10s max.	1 time

■ Example of Reflow Soldering Condition

Temperature profile



Series	A	B	C	D	E	F	G	H	No. of reflows
EC05E	250℃ min.	230℃ min.	180℃	150℃	60s to 120s	—	30s to 40s	—	2 times max.
EC21C	230℃ to 245℃	220℃	200℃	150℃	60s to 120s	—	25s to 60s	300s max.	1 time max.
EC28C, EC35CH	260℃	230℃	180℃	150℃	2 min. min.	3s	40s	230s max.	1 time max.

⚠Note

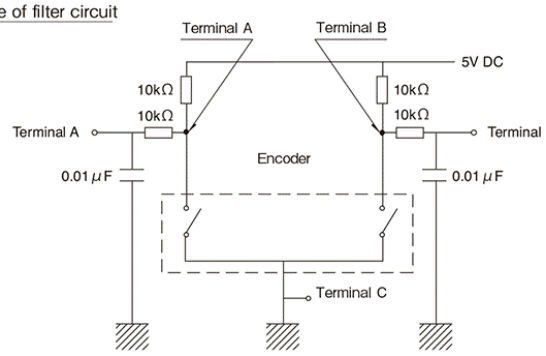
1. When using an infrared reflow oven, solder may sometimes not be applied. Be sure to use a hot air reflow oven or a type that uses infrared rays in combination with hot air.
2. The temperatures given above are the maximum temperatures at the terminals of the encoder when employing a hot air reflow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

Encoders / Cautions

Pulse count process

With respect to pulse count design of encoders, operational speed, sampling time, and masking time, etc. should be taken into consideration. Be sure to confirm these factors before using the encoder. For your pulse count design, consider adding C/R filters on your circuit as shown below.

Example of filter circuit

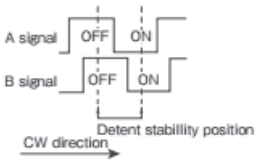


(Example of circuit for use)

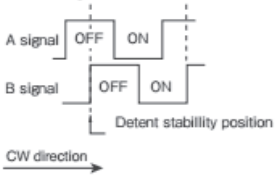
Output Specifications

Depending on the product, output at encoder detent positions can be specified either for both signals A and B, or for signal A only. Specifications vary according to the number of detents and other factors.

Example where both signal A and B output can be specified



Example where only signal A output can be specified



※On / off status of signal B at detent stability point is not specified

Dew Condensation

Do not use this product where dew or water drops might occur on the pattern surface of the encoder, etc. Insulation deterioration or shorting may occur.

Usage Environment

Use of the encoders in a dusty environment may lead the dusts entering through the openings and cause imperfect contact or malfunction. Take this into account for set design. Corrosive gas if generated by peripheral parts of a set, malfunction such as imperfect contact may occur. Thorough investigation shall be required before hand.

Operation

The encoders will be break if you apply a greater stress than that specified. Take great care not to let the encoders be subject to greater stress than specified.

Looseness of the Shaft

When long shafts are being employed, the looseness (deviation) tends to grow in proportion to the shaft length. Checking shaft looseness under actual operational conditions is recommended.

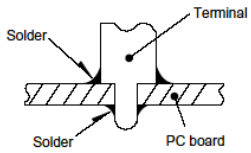
Installation

Insert these encoders to the specified mounting surface and mount them horizontally. If not mounted horizontally, these encoders will malfunction. Tighten the mounting screws by applying the specified torque. Tightening with larger torque than the specified one will result in malfunction or breakage of screws. Protect small and thin encoders from external forces in the set mounting process.

Encoders / Cautions

Soldering

1. To avoid potential contact issues, please do not solder wires to the top surface of the printed circuit board as shown in the diagram.
   Solder all metal lugs into a substrate before use.



2. Appling load to terminals during soldering under certain conditions may cause deformation and electrical property degradation.
3. Avoid use of water-soluble soldering flux, since it may corrode the switches.
4. Check and conform to soldering requirements under actual mass production conditions.
5. When soldering twice, wait until the first soldered portion cools to normal temperature. Continuous heating will deform the external portions, loosen or dislodge terminals, or may deteriorate their electrical characteristics.
6. Flux from around and above the PC board should not adhere to the switches.
7. After mounting the switches, if you intend to put the board into an oven in order to harden adhesive for other parts, please consult with Alps Alpine.
8. If you use a through-hole PC board or a PC board thinner or thicker than the recommendation, here may be greater heat stress. Verify the soldering conditions thoroughly before use.
9. Solder the switches with detent at the detent position. Soldering switches fixed at the center of the detent may deform the detent mechanisms.
10. No washing.

Use of Chemicals

Since synthetic resins such as polycarbonate are being used as the material for the insulated type shafts, avoid using this product under gassy environments containing such chemicals as ammonia, amines, alkaline water solutions, aromatic hydrocarbons, ketones, esters and halogenated hydrocarbons, especially under intensive gas environments.

Operation at Low Temperature

When these products are expected to be used under low temperature environments such as applications for car radios and car stereos, we can customize them for easier and more smooth rotary movements. When placing orders, indicate whether the low temperature specification is necessary or not.

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.