



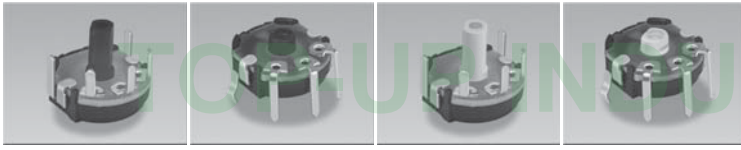
# TOP-UP

## Potentiometer Wire Wound



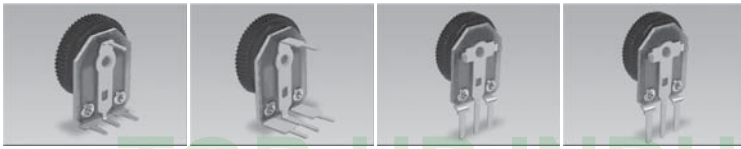
**8mm Size Micro Potentiometers**

**Page**



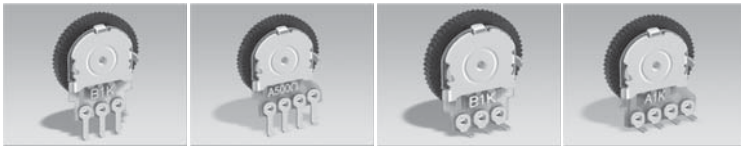
**17**

**8mm Size Thin Micro Potentiometers**



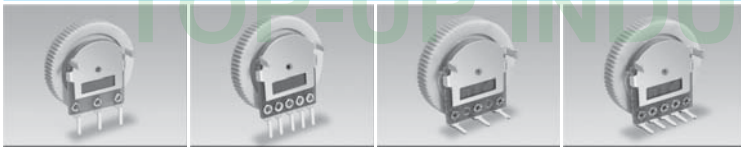
**19**

**6mm Size Thin Micro Potentiometers**



**22**

**10mm Size Thin Micro Potentiometers**



**23**



**24**

**9mm Size Snap-in Insulated Shaft Potentiometers**



**28**



**29**



**30**

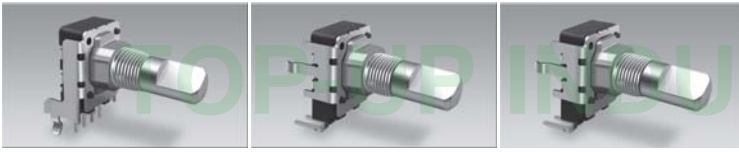
**7mm & 9mm Size Long Life Potentiometers**



**31**

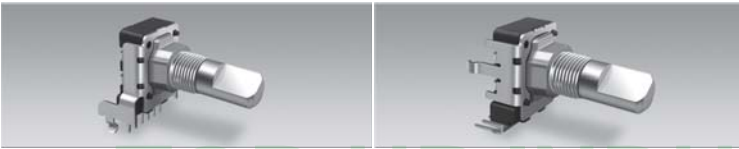
**11mm Size Metal Shaft, Multi-Ganged Potentiometers**

**Page**



**33**

**12mm Size Metal Shaft, Multi-Ganged Potentiometers**



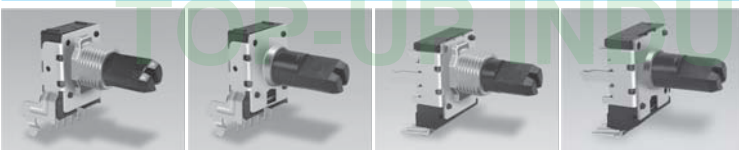
**34**

**11mm Size Snap-in Insulated Shaft Potentiometers**



**39**

**12mm Size Snap-in Insulated Shaft Potentiometers**

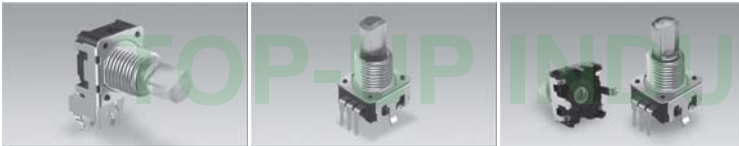


**40**



**With Replaceable LEDs**

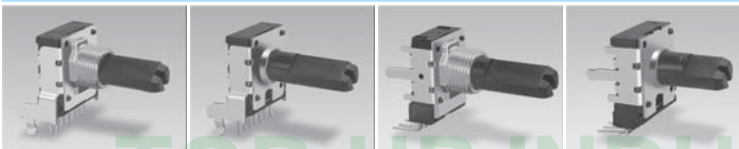
**41**



**With Luminous Shaft**

**42**

**14mm Size Snap-in Insulated Shaft Potentiometers**



**With Insulated Shaft**

**43**

**8mm Size Metal Shaft, Multi-Ganged Potentiometers**



**45**

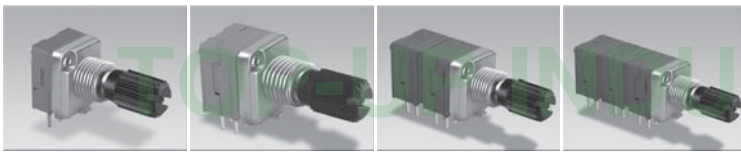


**46**



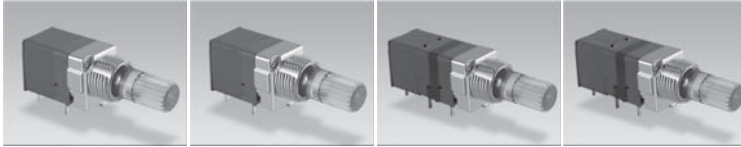
**9mm Size Metal Shaft, Multi-Ganged Potentiometers**

**Page**



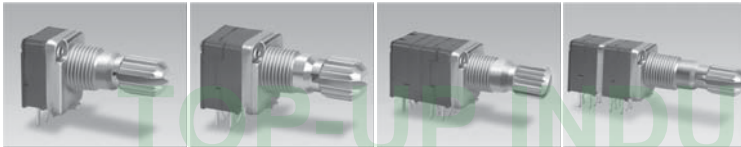
**With Insulated Shaft**

**51**

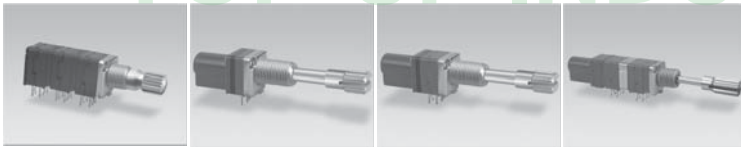


**With Luminous Shaft**

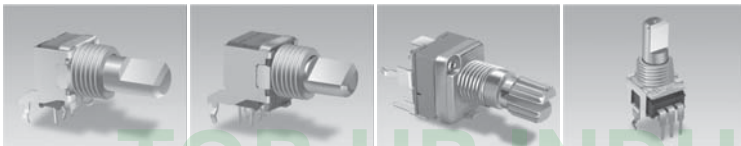
**52**



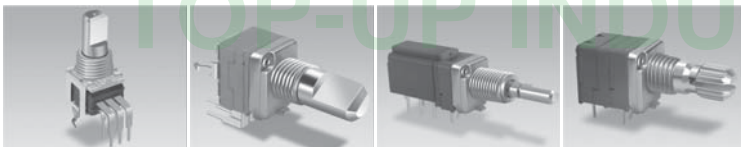
**53**



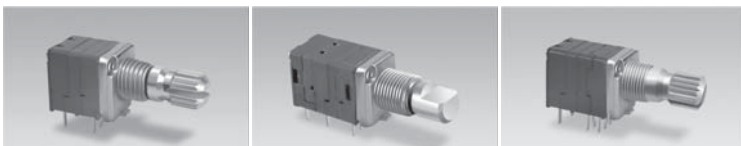
**54**



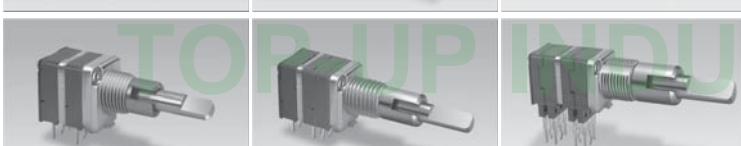
**55**



**56**



**57**

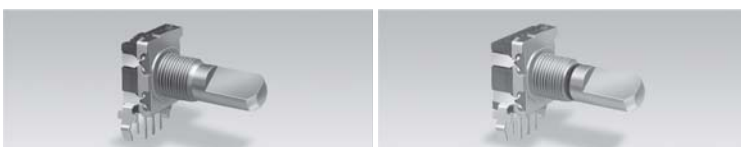


**58**



**59**

**11mm Size Metal Shaft Potentiometers**



**61**

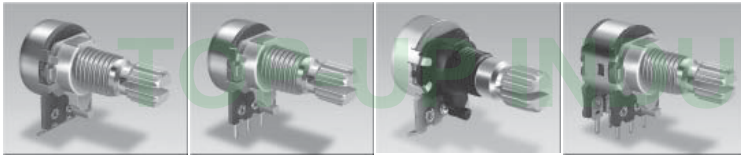


**62**

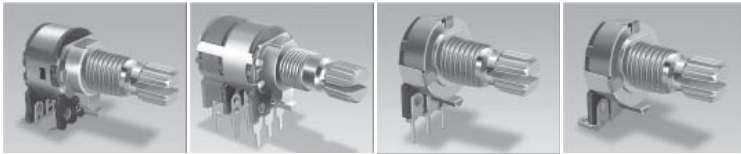


**12mm Size Metal Shaft Potentiometers**

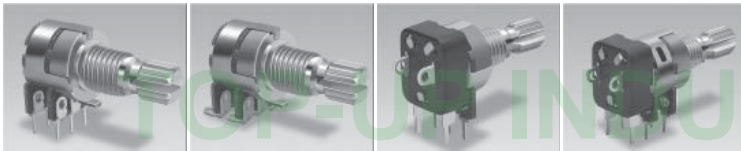
**Page**



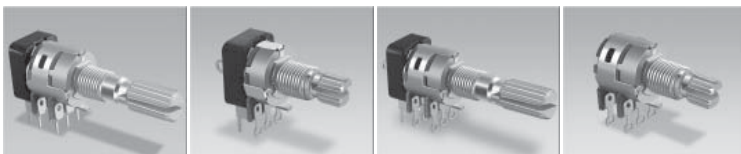
**65**



**66**

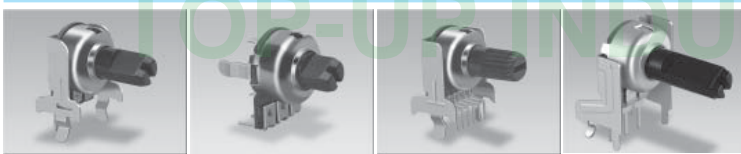


**67**

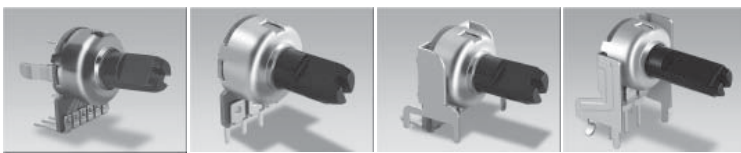


**68**

**12mm Size Potentiometers**



**72**



**73**



**74**



**75**



**76**

**13mm Size Long Life potentiometer**



**78**

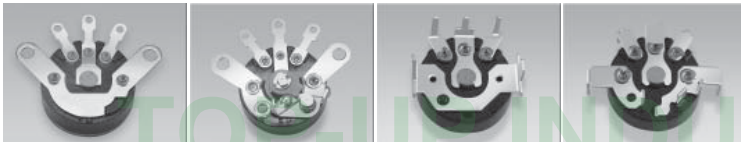
**10mm Size Molded Case Potentiometers**

**Page**

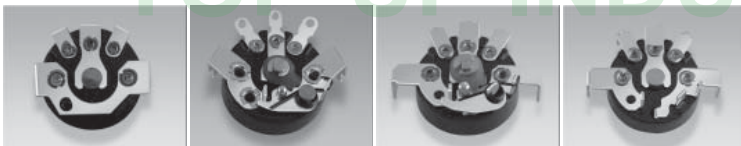


**81**

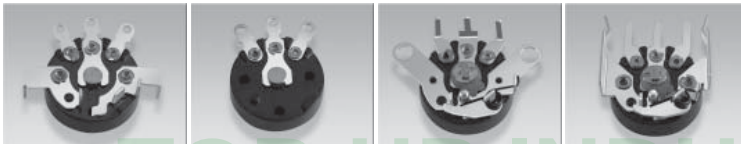
**12mm Size Molded Case Potentiometers**



**82**



**83**



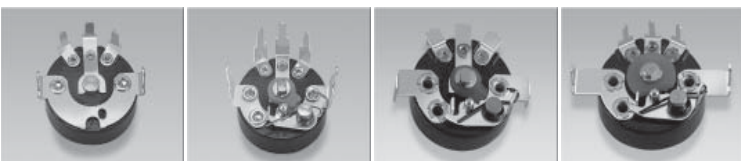
**84**

**12 , 16mm Size Molded Case Potentiometers**



**85**

**16mm Size Molded Case Potentiometers**



**86**



**87**

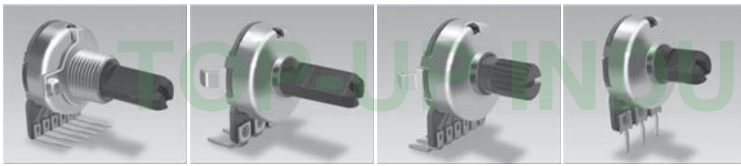
**16mm Size Insulated Shaft Potentiometers**



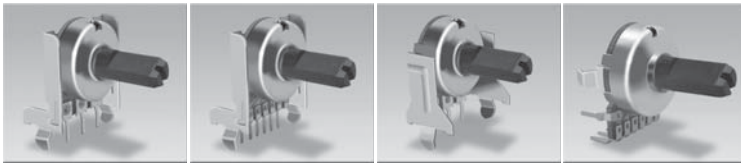
**91**

**16mm Size Insulated Shaft Potentiometers**

**Page**

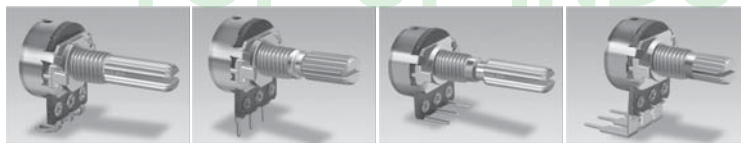


**92**

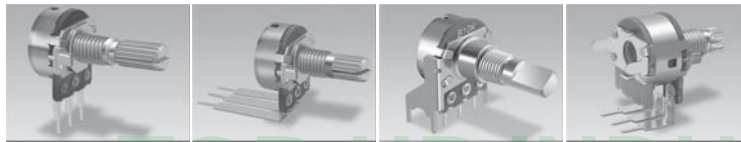


**93**

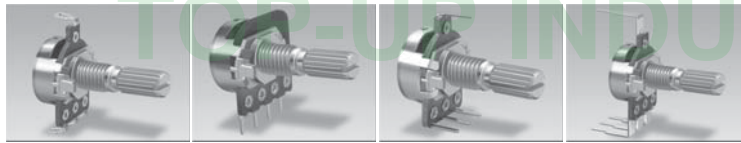
**16mm Size Potentiometers**



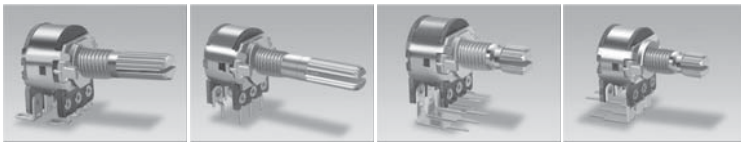
**99**



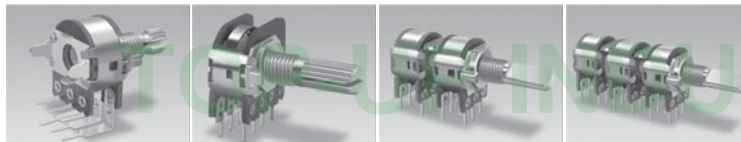
**100**



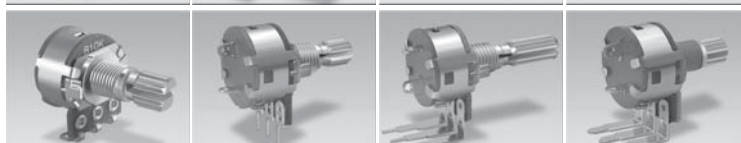
**101**



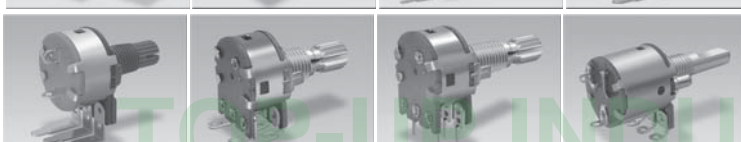
**102**



**103**



**104**



**105**



**106**

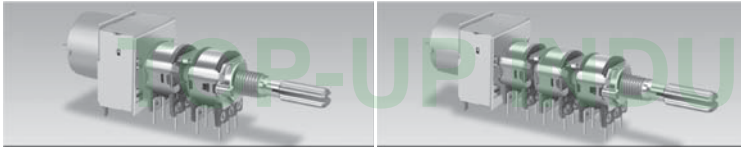


**107**



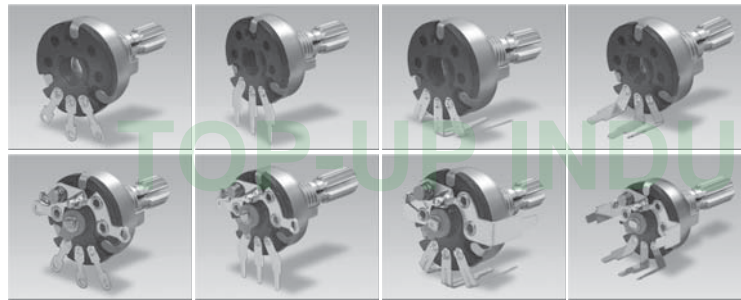
**16mm Size Potentiometers**

**Page**



**108**

**17mm Size Metal Shaft Potentiometers**



**112**

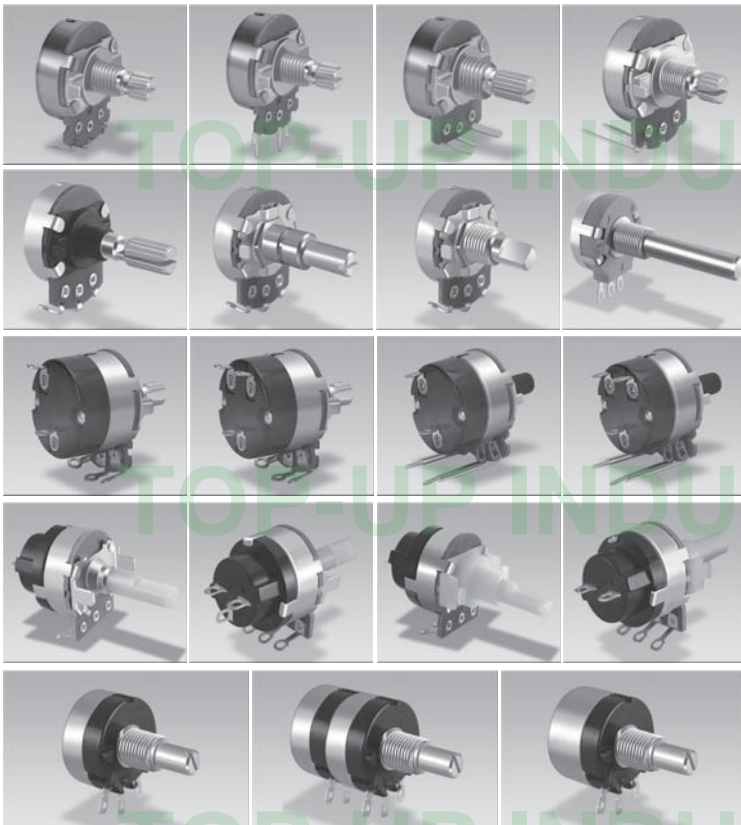
**113**

**20mm & 22mm Size Potentiometers**



**117**

**24mm Size Potentiometers**



**118**

**119**

**120**

**121**

**122**

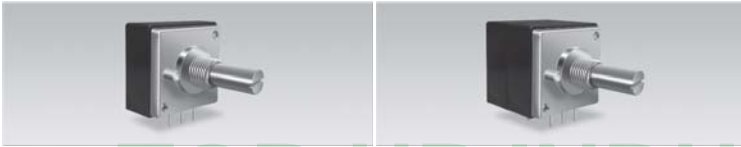
**24mm Size Potentiometers**

Page



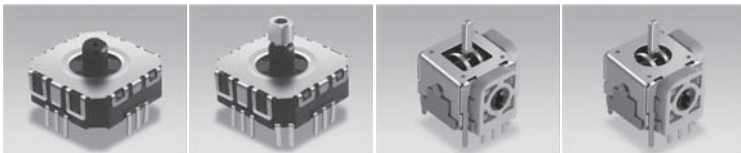
**123**

**27mm Size Metal Shaft Potentiometers**

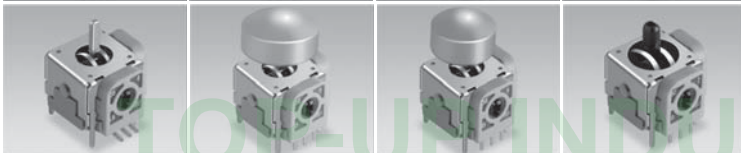


**125**

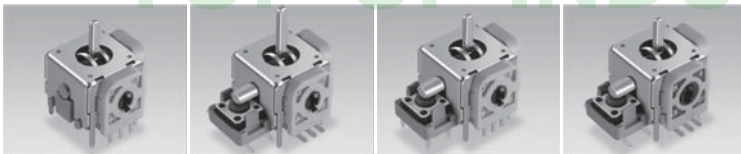
**Stick Controller**



**128**



**129**

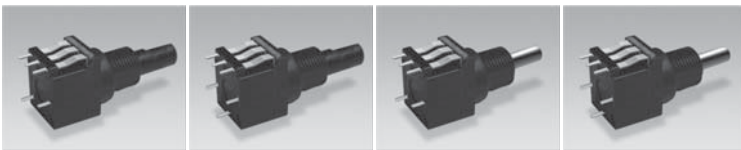


**130**



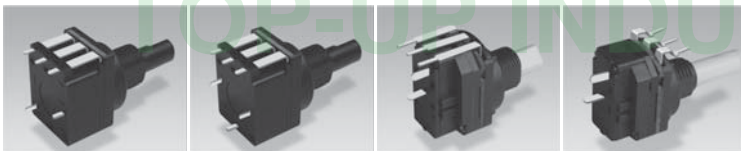
**131**

**12mm Size Dimmer SW. Potentiometers**



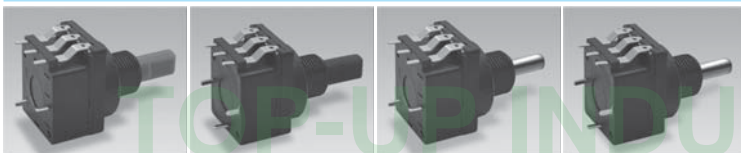
**135**

**16mm Size Dimmer SW. Potentiometers**



**136**

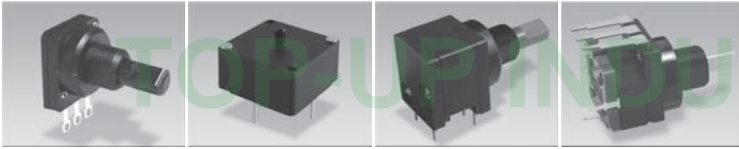
**17mm Size Dimmer SW. Potentiometers**



**137**

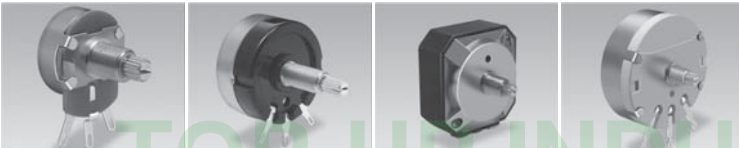
**17mm Size Dimmer SW. Potentiometers**

**Page**

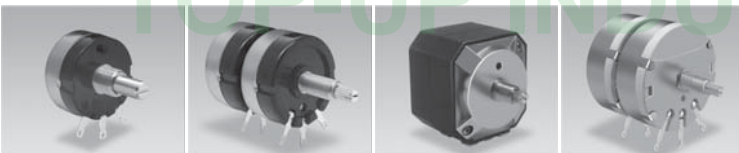


**138**

**Wire Wound Potentiometers (WW Series)**



**141**

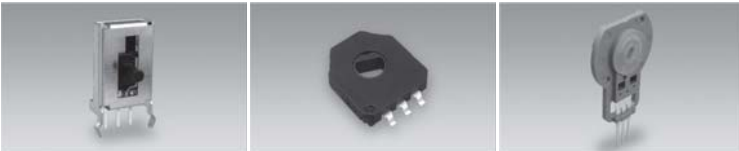


**142**



**143**

**Position Sensor**



**144**

**Position Sensor / Encoder (15RS Series)**



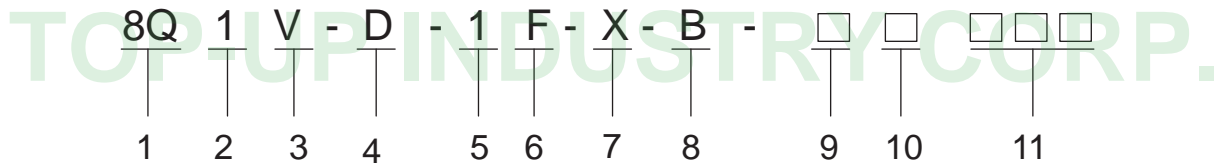
**146**

TOP-UP INDUSTRY CORP.

TOP-UP INDUSTRY CORP.



## 8Q Series Code Explanation



1. Product Lines of 8Q ( 8mm Size Micro Potentiometers, Insulated Shaft )

2. Number of Unit:

1 —Single Unit

2 —Dual Unit

3. Vertical Type (V)

4. Type of Terminal (See Drawing 1)

(Drawing 1)

Vertical	Terminal	Terminal	Terminal
	C (P.C.B Type)	D (P.C.B Type)	D1 (P.C.B Type)

Remark: If the terminal is different from standard type, special code will be advised on request.

5. Shaft Length

L	Type of Shaft	
1	F -Type	
4.5		

(Drawing 2)

6. Type of Shaft: (See Drawing 2)

7. Type of Circuit

Single-shaft, single-unit	Single-shaft, single-unit (with tap)	Single-shaft, dual-unit	Single-shaft, dual-unit resistance taper JIS C
X	Y	X	Y

8. Color of Shaft

Code	B	W
Color	Black	White

9. Type of Taper (See Taper Chart Page 220)

10. Resistance Value

11. Serial No.

## 8mm SIZE MICRO POTENTIOMETERS

### P.C.B Mounting Hole Detail

#### 1. 8 mm Vertical Type And Back-To-Back Mounting Type

<p>Single shaft, single unit</p> <p>Viewed from mounting side</p>	<p>Single shaft, single unit (with tap)</p> <p>Viewed from mounting side</p>	<p>Single shaft, single unit (back-to-back mounting type)</p> <p>Viewed from shaft side</p>
<p>Single shaft, dual unit</p> <p>Viewed from mounting side</p>	<p>Single shaft, dual unit resistance taper JIS C</p> <p>Viewed from mounting side</p>	<p>Single shaft, dual unit (back-to-back mounting type)</p> <p>Viewed from shaft side</p>

#### 8mm Size Micro Potentiometers

Application	8 mm size		
	Single unit	Dual unit	
Mechanical characteristics	Total rotational angle	200±10°	
	Rotational torque	10~100 gf . cm(reflow type 5~100 gf.cm)	
	Rotation stopper strength	1 kgf.cm	
	Push pull strength	1 kgf max.	
Electrical characteristics	Total resistance	5, 10, 20, 50, 100 (kΩ)	
	Total resistance tolerance	±30%	
	Rated power	0.03W	
	Max. operating voltage	*1 50VAC	50VAC
		20VDC	
	Resistance taper	A, B, C, D(JIS)	
	Residual resistance	Nominal total resistance	Residual resistance
		R ≥ 50kΩ	0.1% max. of total resistance
		50kΩ > R > 10kΩ 10kΩ ≥ R	30kΩ max. 20kΩ max.
	Maximum attenuation level	Nominal total resistance	Attenuation level
R ≥ 100kΩ		90dB min.	
100kΩ > R ≥ 50kΩ		80dB min.	
For volume	50kΩ > R ≥ 10kΩ	70dB min.	
	10kΩ > R ≥ 5kΩ	60dB min.	
Druability	Rotational life	10,000 cycles	

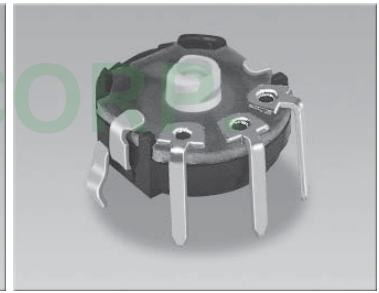
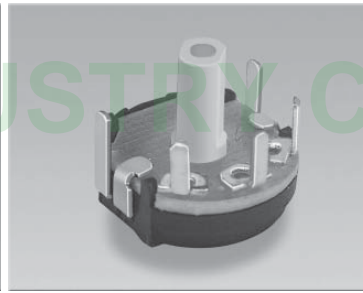
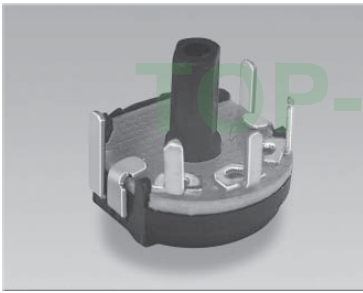
Note:\* The 8 mm size single-unit potentiometer with tap does not support DC applications.

**8Q1V-C**

**8Q1V-D**

**8Q2V-C**

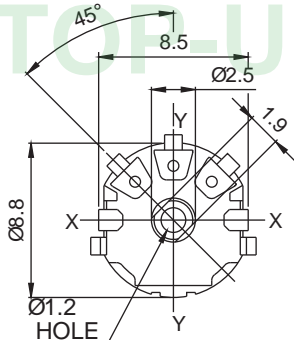
**8Q2V-D**



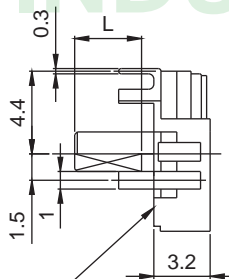
Outline Drawing

Features individual specifications

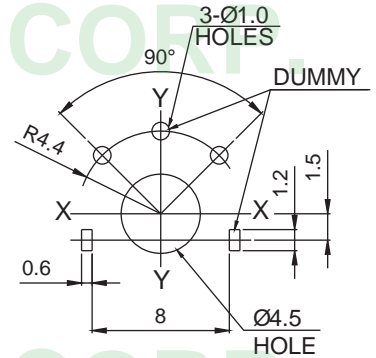
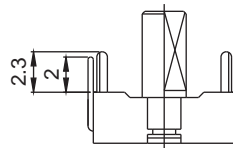
**8Q1V-C**  
**8Q2V-C**



SHAFT SHOWN IN FULL C. C. W POSITION

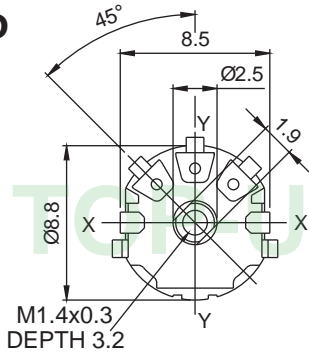


MOUNTING SURFACE

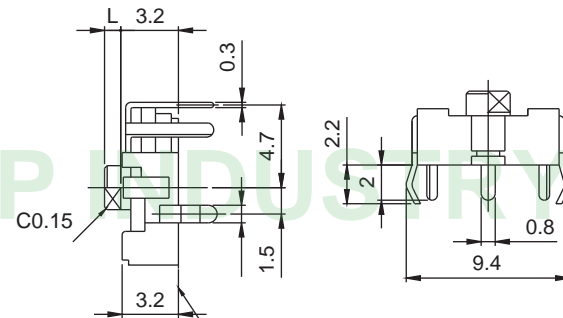


P.W.B MOUNTING DETAIL

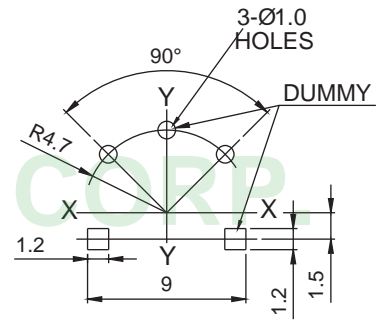
**8Q1V-D**  
**8Q2V-D**



SHAFT SHOWN IN FULL C. C. W POSITION



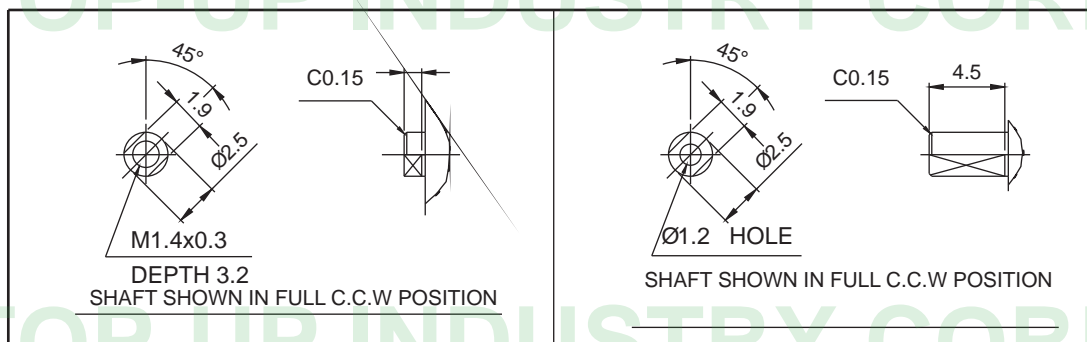
MOUNTING SURFACE



P.W.B MOUNTING DETAIL

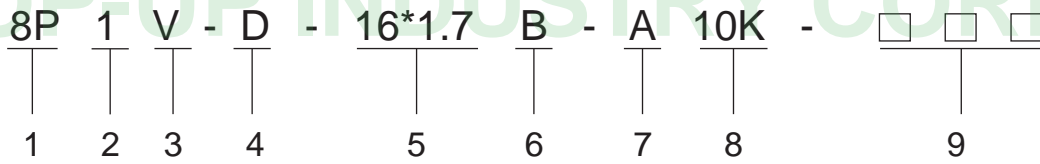
FLAT SHAFT STYLE

Unit:mm





## 8P Series Code Explanation



1. Product Lines of 8P ( 8mm Size Thin Micro Potentiometers, Insulated Shaft )

2. Number of Unit

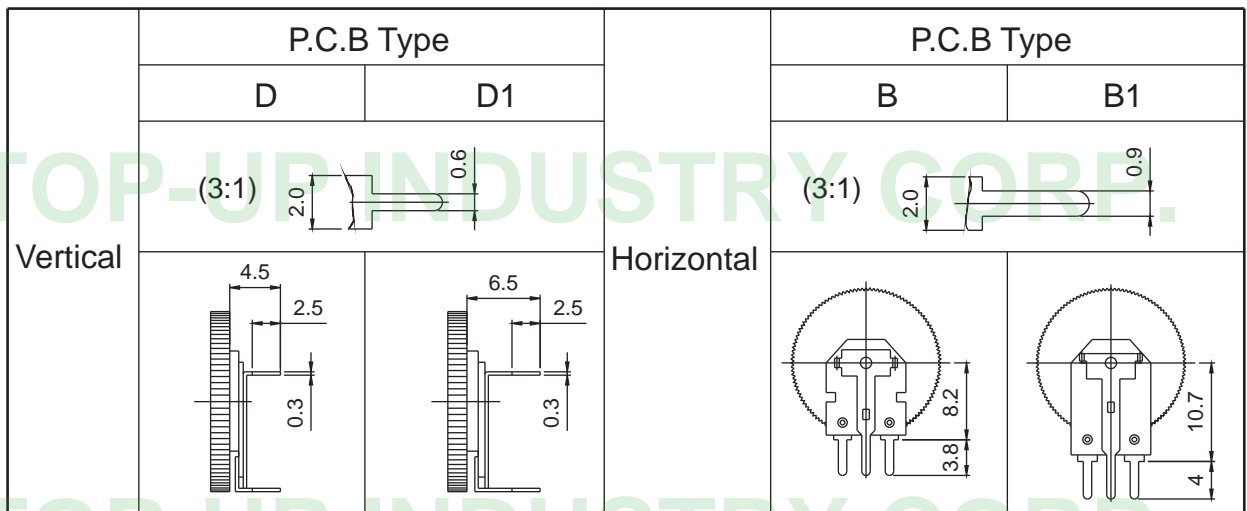
1 — Single Unit

2 — Dual Unit

3. Horizontal(H) Type or Vertical (V) Type

4. Type of Terminal ( See Drawing 1 )

( Drawing 1 )



Remark : If the terminal is different from standard type , special code will be advised on request.

5. Outside Diameter \* Thickness ( See Drawing 2-1 )

( Drawing 2-1 )

	Ø	10	12	15	16	20
	T	1.7	2.0	0.9	1.7	3.0
	Code	D	E	C	B	A
	Θ	60-6°	30-12°	100-3.6°	120-3°	144-2.5°

6. Axis Teeth Angle : ( See Drawing 2-2 )

( Drawing 2-2 )

7. Type of Taper ( See Taper chart Page 220 )

8. Resistance Value

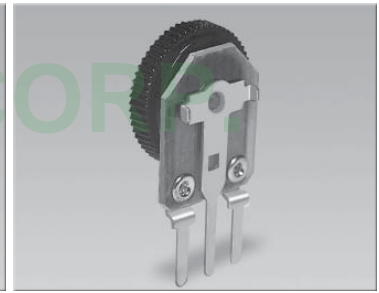
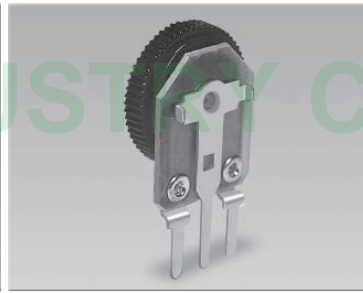
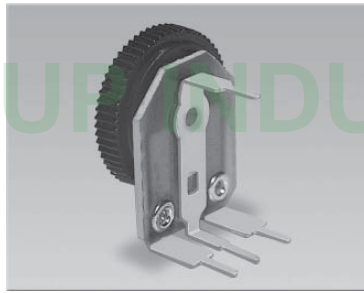
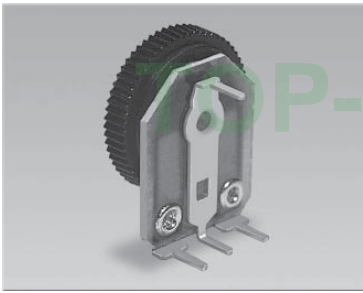
9. Serial No.

**8P1V-D**

**8P1V-D1**

**8P1H-B**

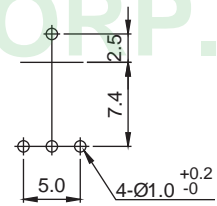
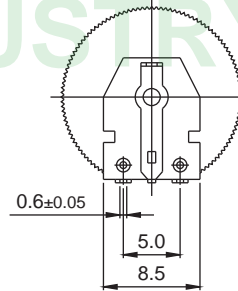
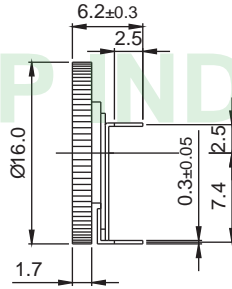
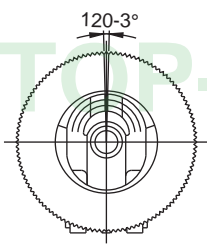
**8P1H-B1**



Outline Drawing

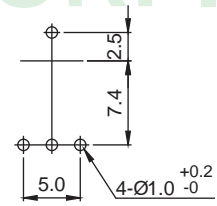
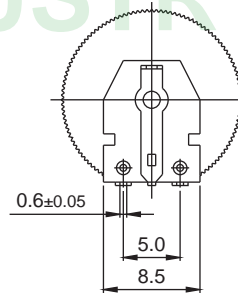
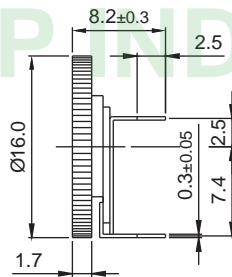
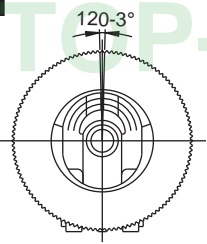
Features individual specifications

**8P1V-D**



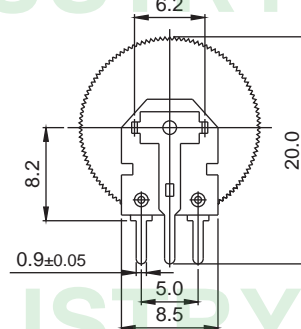
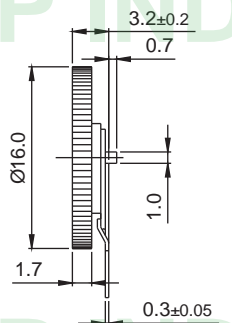
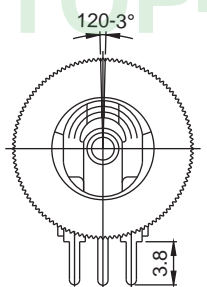
P .C. B MOUNTING DETAIL

**8P1V-D1**



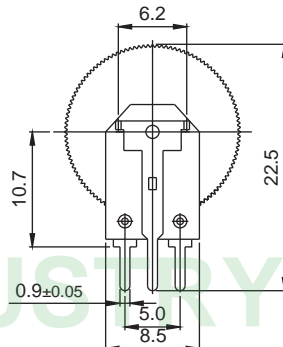
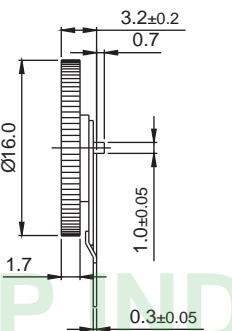
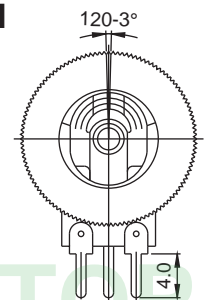
P .C. B MOUNTING DETAIL

**8P1H-B**



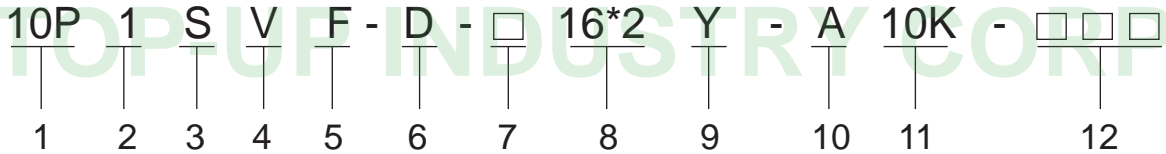
P .C. B MOUNTING DETAIL

**8P1H-B1**

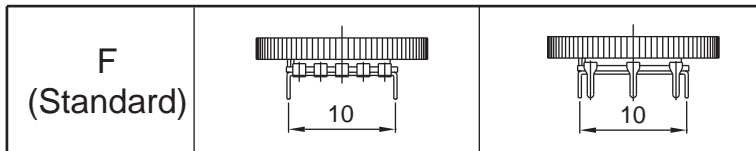


P .C. B MOUNTING DETAIL

## 6P , 10P Series Code Explanation



- Product Lines of 6P , 10P (6mm ,10mm Size Thin Micro Potentiometers, Insulated Shaft )
- Number of Unit  
 1 – Single Unit  
 2 – Dual Unit
- Switch : S - With Switch ( Only 10P Dual Unit )
- Horizontal (H) Type or Vertical (V) Type (See Drawing 1)
- Type of Frame



- Type of Terminal (See Drawing 1)

B (P.C.B Type)		D(P.C.B Type)	
Horizontal		Vertical	
Single Unit	Dual Unit	Single Unit	Dual Unit

Remark: If the terminal is different from standard type, special code will be advised on request.

- Color of Shaft

Blank-Black (Standard Type)

Code	Blank	I	IV	DG
Color	Black	Dark White	Ivory	Dark Gray

- Outside Diameter \* Thickness (See Drawing 2-1)

(Drawing 2-1)

(8)	(5)	No.									
			1	2	3	5	6	4	7	8	9
(9)		10P	∅ 16	14	18	16.8	17	19.5	20	16	16
		T	1, 2, 2.5, 2.8							2	2.8
6P		∅	10.5			10.3			9.5		
		T	1.2			1.4			1.65		

- Axis Teeth Angle (See Drawing 2-2)

Code	Y	X	Z
$\theta$	72-5°	90-4°	30-6°

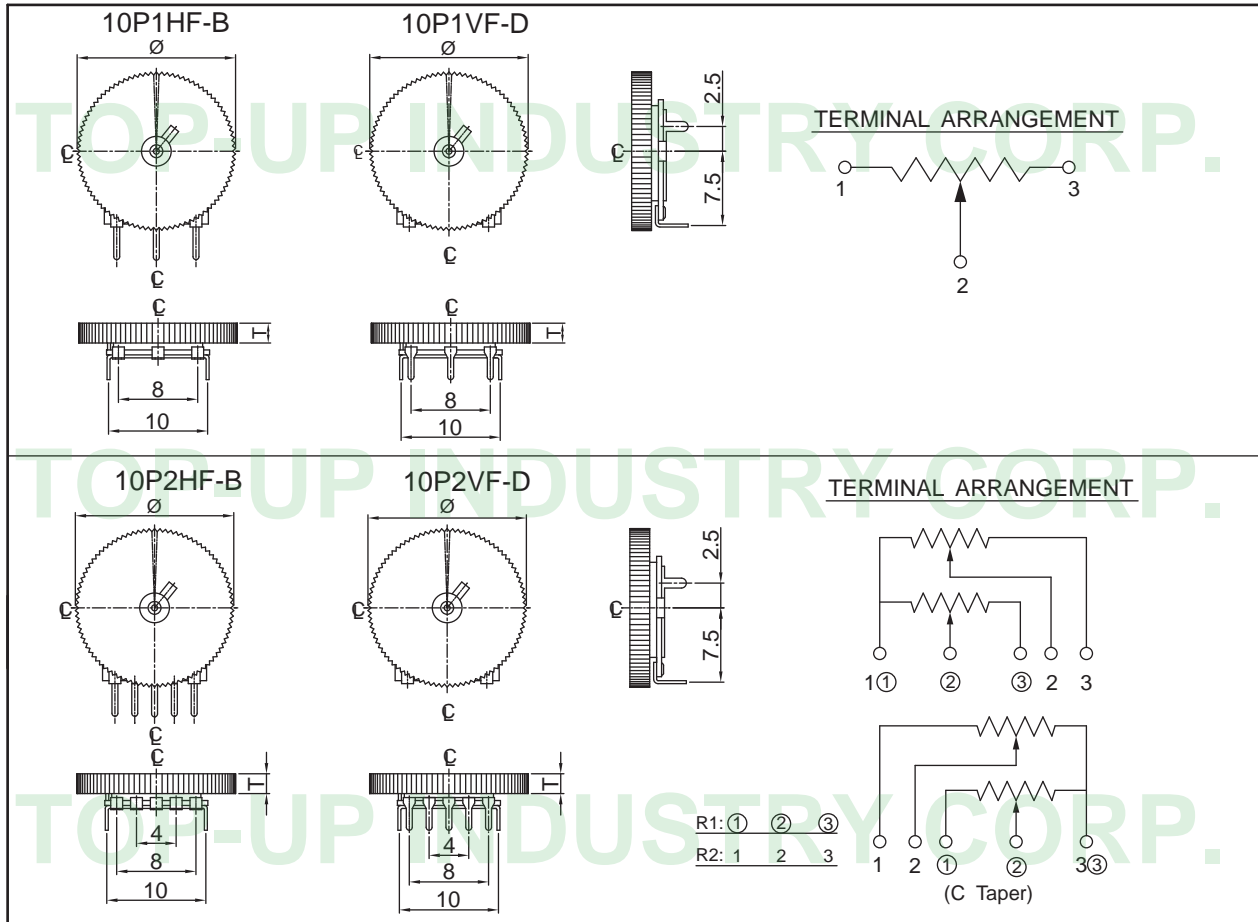
- Type of Taper (See Taper Chart Page 220)

- Resistance Value

- Serial No.

(Drawing 2-2)





**Mechanical Characteristics:**

Total rotational angle	270°±5°
Rotation torque	1~10mN.m (10~100gf.cm)
Push pull strength	10N(1kg)
Rotation stopper strength	5N(0.5kg)

**Electrical Characteristics:**

Total resistance	5KΩ -250KΩ
Total resistance tolerance	±20%
Resistance taper	A, B, C
Rated power	Curve B: 0.03W Other than B: 0.02W
Max. operating voltage	Curve B: 50V Other than B: 50V
Residual resistance	Between terminal 1-2:10Ω Between terminal 2-3:10Ω
Insulation resistance	More than 100MΩ at DC 100V
Withstand voltage	AC 100V(1 minute)
Gang error	-40dB to 0dB ≧ ±3dB

**Durability:**

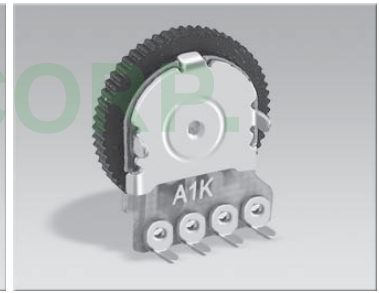
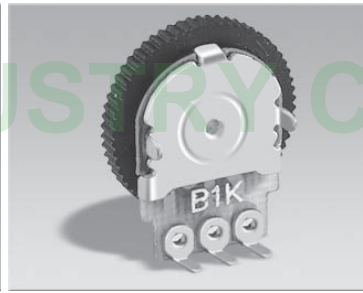
Rotational life	10,000 cycles
-----------------	---------------

**6P2HF-B**

**6P2HF-B(1)**

**6P2VF-D**

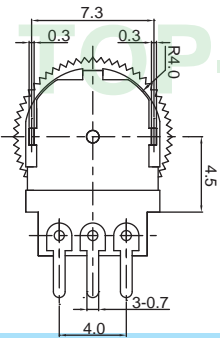
**6P2VF-D(1)**



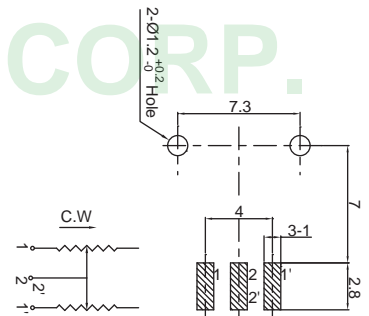
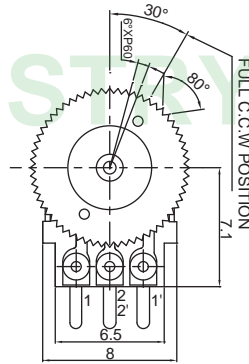
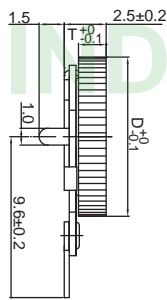
Outline Drawing

Features individual specifications

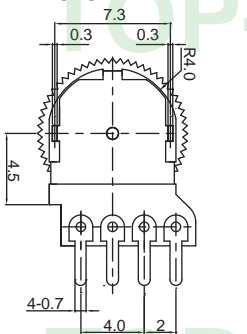
**6P2HF-B**



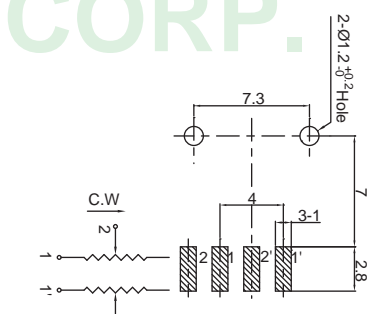
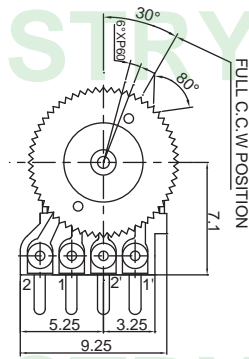
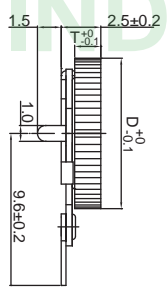
T	1.4	1.65
D	10.3	9.5



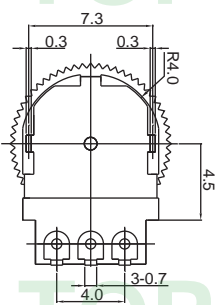
**6P2HF-B(1)**



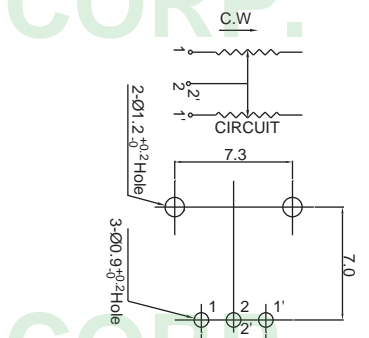
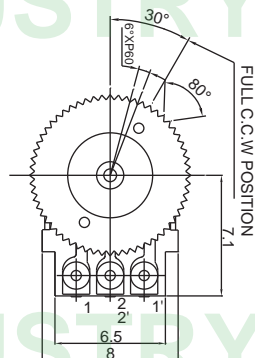
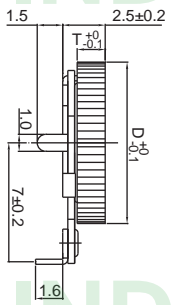
T	1.4	1.65
D	10.3	9.5



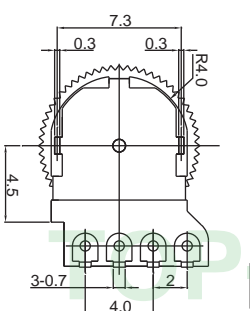
**6P2VF-D**



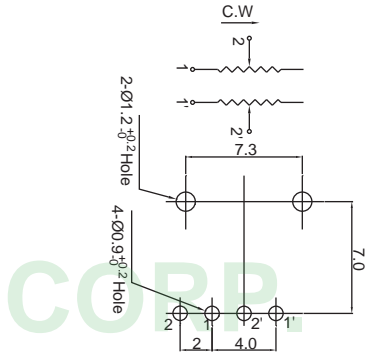
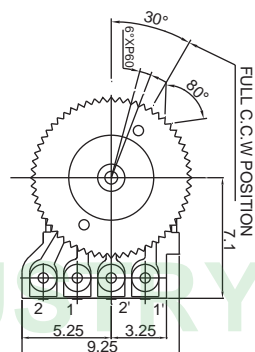
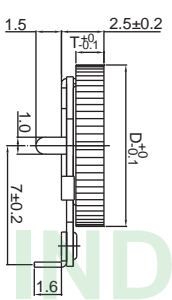
T	1.4	1.65
D	10.3	9.5



**6P2VF-D(1)**



T	1.4	1.65
D	10.3	9.5

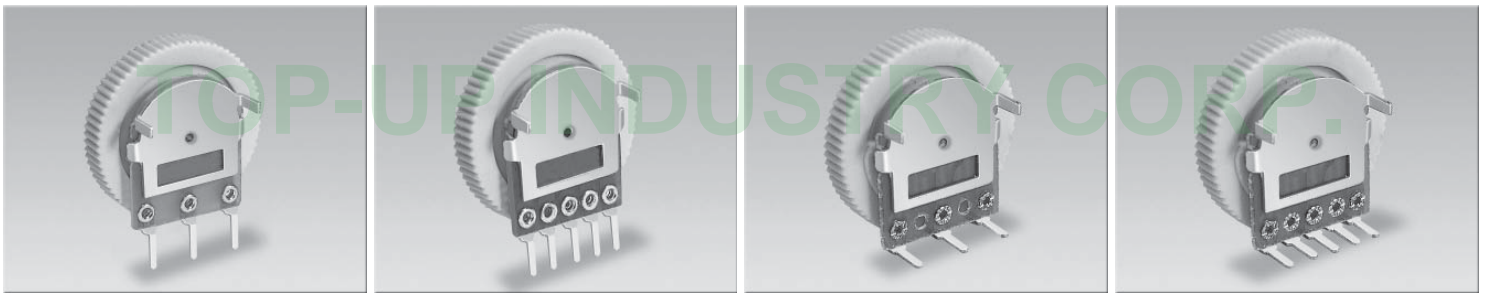


**10P1HF-B**

**10P2HF-B**

**10P1VF-D**

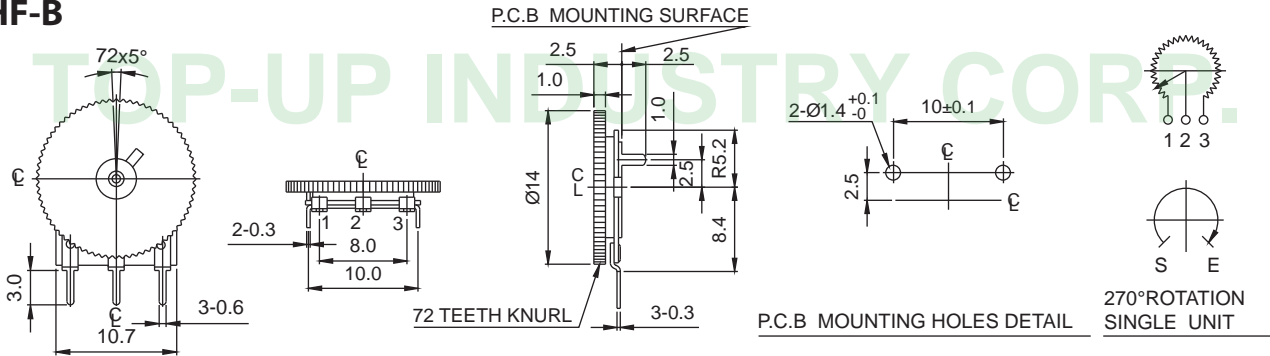
**10P2VF-D-14\*1Y**



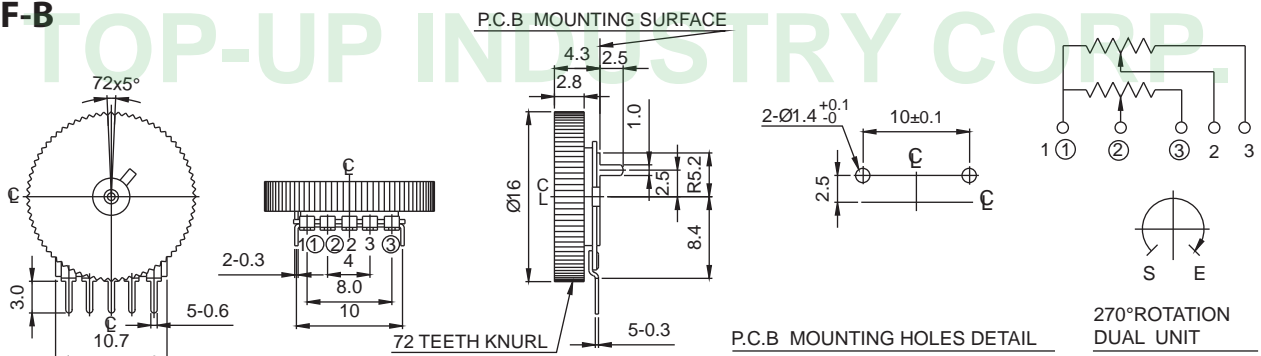
Outline Drawing

Features individual specifications

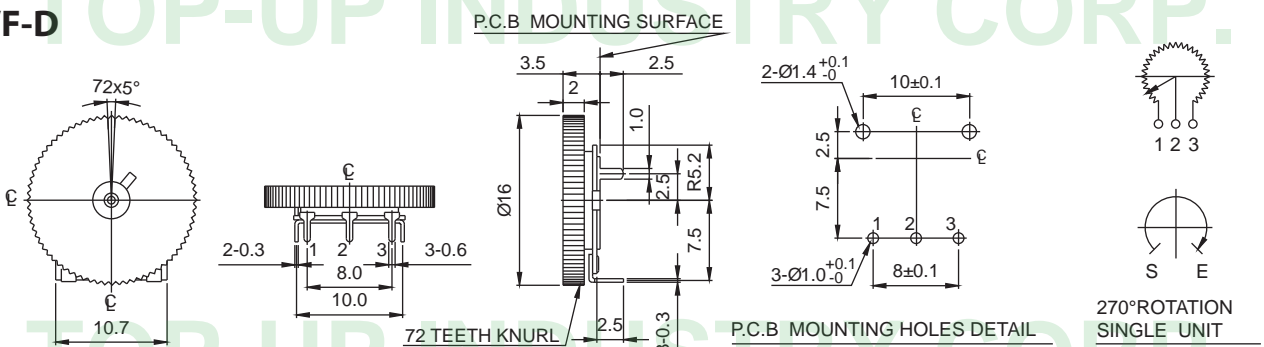
**10P1HF-B**



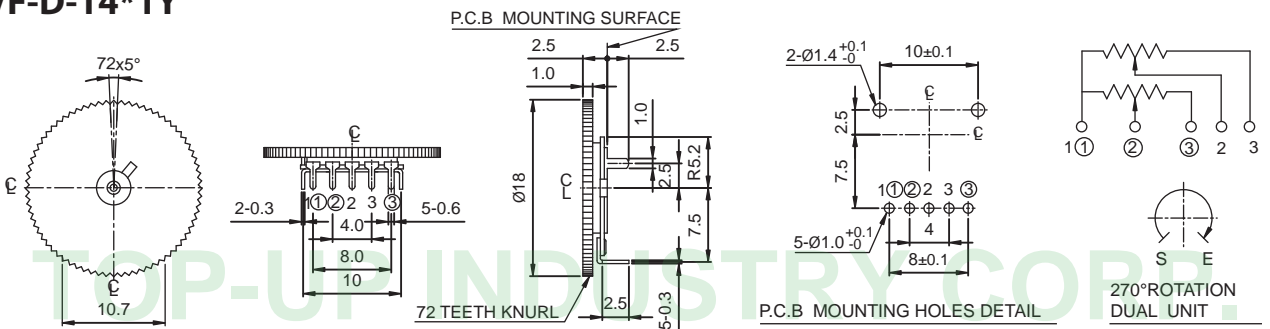
**10P2HF-B**



**10P1VF-D**



**10P2VF-D-14\*1Y**

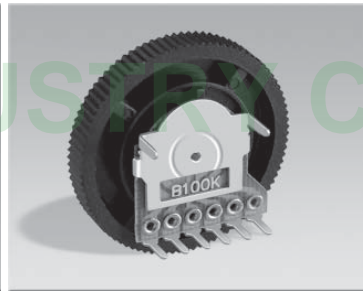
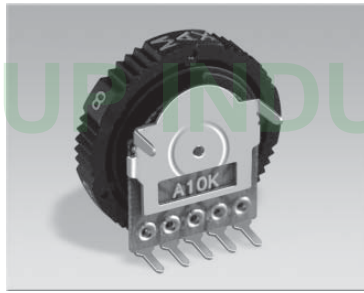
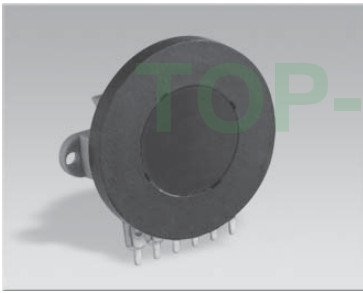


**10P2SHF-B**

**10P2VF-D-16\*2.8Z**

**10P2VF-D16**

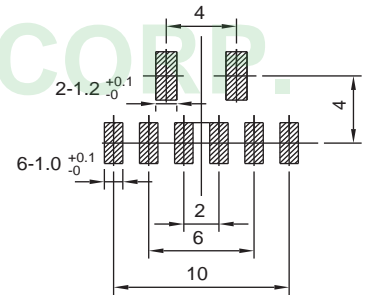
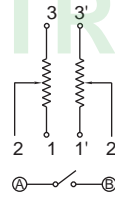
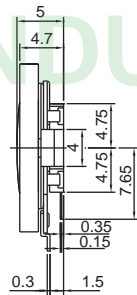
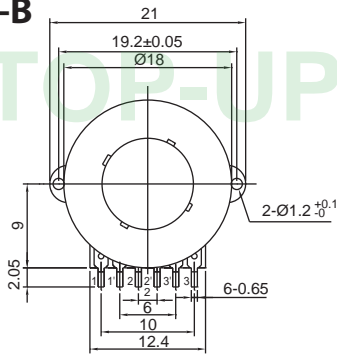
**10P2SVF-D**



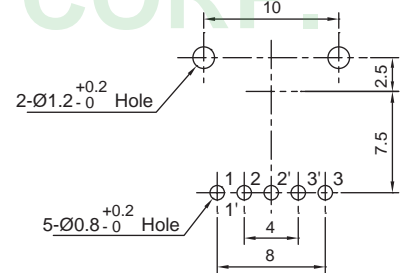
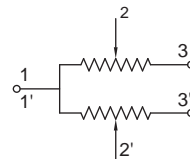
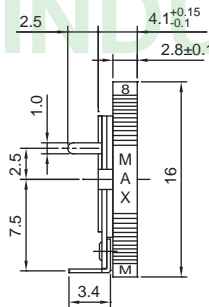
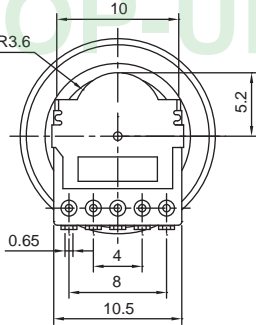
Outline Drawing

Features individual specifications

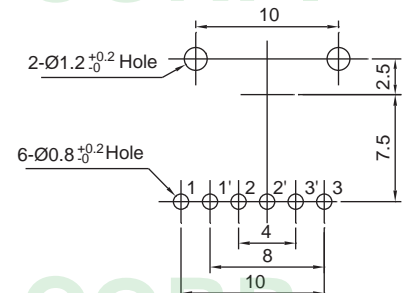
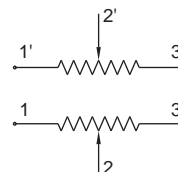
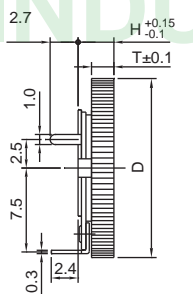
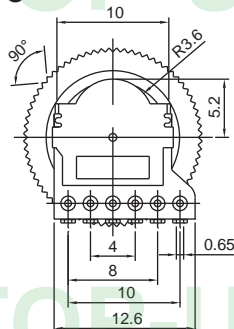
**10P2SHF-B**



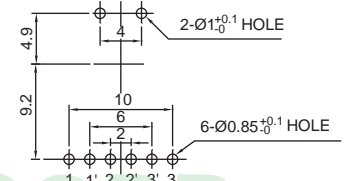
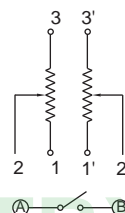
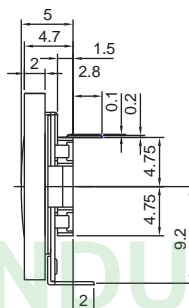
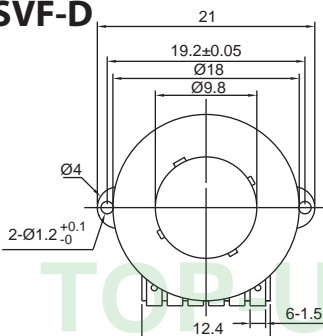
**10P2VF-D-16\*2.8Z**



**10P2VF-D16**

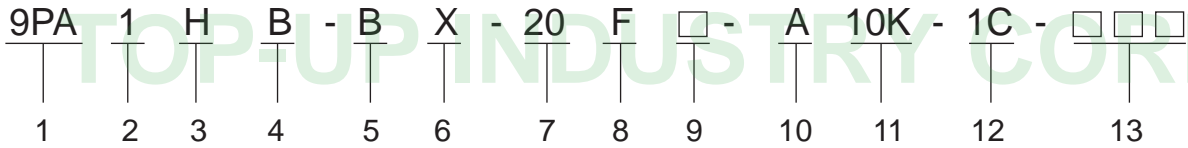


**10P2SVF-D**





## 9P Series Code Explanation



1. Product Lines of 9P ( Snap-in Insulated Shaft , 9mm Size ):

Please refer to the Frame Code (LB) shown as Drawing 2

2. Number of Unit

1 — Single Unit

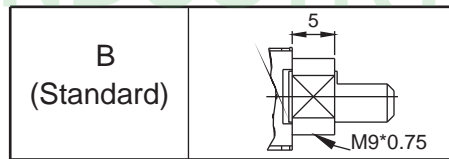
2 — Dual Unit

3. Horizontal (H) Type or Vertical (V) Type (See Drawing 2)

4. Bushing

With Bushing - B

Without Bushing - Blank



(Drawing 1)

5. Type of Terminal (see Drawing 2)

6. Mounting Height (H) (See Drawing 2)

(Drawing 2)

B (P.C.B Type)										D (P.C.B Type)									
Single Unit (Without bushing)																			
Horizontal							Vertical												
LB	0.8	1.6	5.0	H	6.5	10	12.5	LB	/	LB	4.5	0.8	1.6	5.0					
Code	PC	PB	PA	Code	W	X	Y	Code	PN	Code	PD	PC	PB	PA					
Dual Unit (Without bushing)										Single Unit (With bushing)									
Horizontal					Vertical					Vertical		Horizontal							
LB	4.5	0.8	1.6	5.0	H	6.5	10	12.5	LB	4.5	0.8	1.6	5.0	B	5.0	H	6.5	10	12.5
Code	PD	PC	PB	PA	Code	W	X	Y	Code	PD	PC	PB	PA			Code	W	X	Y

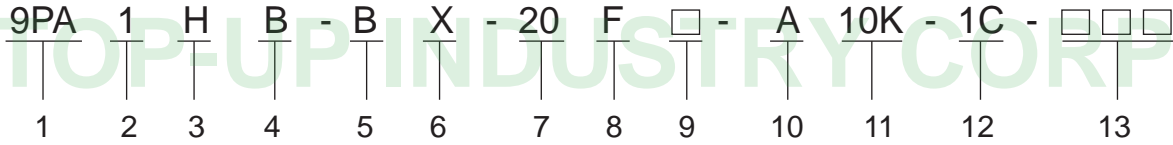
Remark: If the terminal is different from standard type, special code will be advised on request.

7. Shaft Length "L" (See Drawing 3)

8. Type of Shaft (See Drawing 3)

9. Color of Shaft: B - Blank , G-Dove Gray (See Drawing 3)

## 9P Series Code Explanation



- 10. Type of Taper (See Taper Chart Page 220)
- 11. Resistance Value
- 12. Number of Clicks: Blank-None, 1C-Center Click
- 13. Serial No.

(Drawing 3)

Single Unit													
Horizontal						Vertical							
K - Type						KA - Type							
L	15	20	25	30	35	L	20	25	30	35			
T	6	7	7	7	7								
Shaft Color	B	Blank				Shaft Color	G	Gray					
KX - Type						F - Type							
L	9.5	15	20			L	15	20	25	30			
T	/	6	7			F	6	7	12	12			
Shaft Color	B	Blank				Shaft Color	B	Blank					
Dual Unit													
Horizontal						Vertical							
K - Type						F - Type							
L	15	20				L	15	20	25	30			
T	6	7				F	6	7	12	12			
Shaft Color	B	Blank				Shaft Color	B	Blank					

## 9mm, SIZE SNAP-IN INSULATED SHAFT POTENTIOMETERS

### Common Specifications

#### 1. Mechanical Characteristics

Application	Single-unit block	Dual unit
Total rotational angle	280±5°	280±5°
	300±5°	
Rotational torque	10~80 gf. cm	
Rotation stopper strength	3 kgf. cm	
Pull-push strength	5 kgf max.	
Shaft inclination Measured at the tip of the shaft	Within 0.35mm	
Shaft wobble	0.8xL/20mm p-p max.	

#### 2. Electrical Characteristics

Application	Single-unit	Dual unit
Total rotational angle	500Ω~1MΩ	5Ω~250KΩ
Total resistance to lerrance	±20%	±30%
Resistance taper	A, B, C, D, E, K, W	A, B, C, D
Rated power	0.05W	0.03W
Max. operating voltage	50V AC	50V AC
	20V DC	For A.C. only
Residual resistance	$R \leq 1k$	30Ω max.
	$1k\Omega < R \leq 100k\Omega$	100Ω max.
	$5k\Omega < R \leq 100k\Omega$	300Ω max.
	$100k\Omega < R \leq 500k$	500Ω max.
For volume	$500k\Omega < R \leq 1M\Omega$	1kΩ max.
Slide noise	Less than 100mV	
Gang error		Within 3dB at -40 to 0dB
Insulation resistance	100MΩ min. at 250V DC	
Withstand voltage	For 1 minute or more at 250V AC	

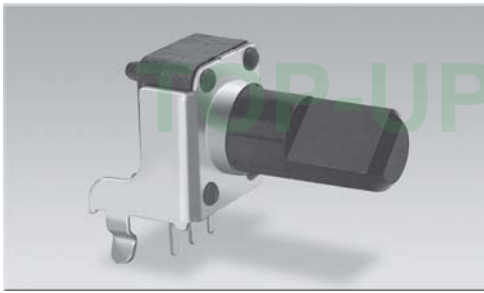
#### 3. Durability

Rotational life	5,000 cycle	10,000 cycles
-----------------	-------------	---------------

#### Maximum Attenuation Level And Insertion Loss

Resistance range	Maximum attenuation level
$5\Omega < R \leq 10k$	60dB min.
$10k\Omega < R \leq 50k$	70dB min.
$50k\Omega < R \leq 100k$	80dB min.
$100k\Omega \leq R$	90dB min.

**9PB1H-BW**



Outline Drawing

**9PC1H-BX**

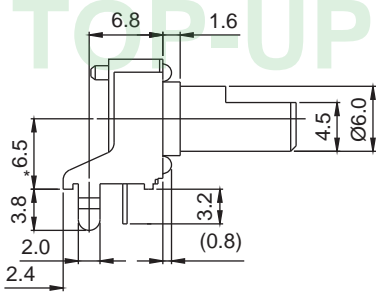


Features individual specifications

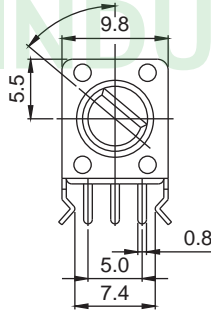
**9PC1H-BY**



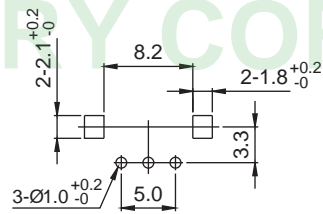
**9PB1H-BW**



MOUNTING HEIGHTS H=6.5 ONLY



SHAFT SHOWN IN FULL C.C.W POSITION



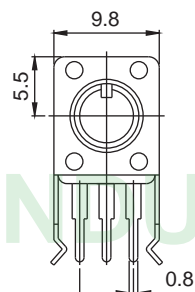
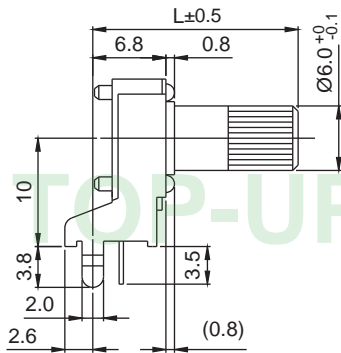
P.C.B MOUNTING HOLES DETAIL

NOTE: AVAILABLE MOUNTING HEIGHTS (H): 6.5mm, 10mm, 12.5mm

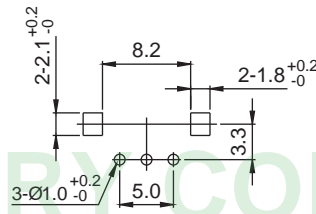


280° ROTATION  
SINGLE UNIT

**9PC1H-BX**



SHAFT SHOWN AT CENTER POSITION



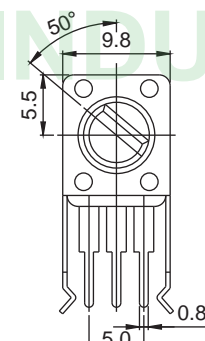
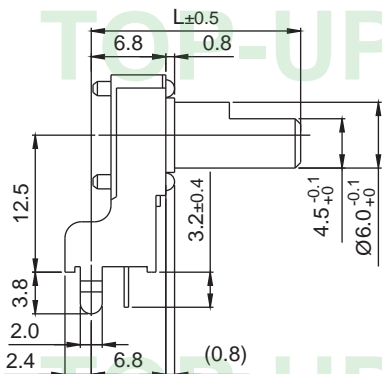
P.C.B MOUNTING HOLES DETAIL

NOTE: AVAILABLE MOUNTING HEIGHTS (H): 6.5mm, 10mm, 12.5mm

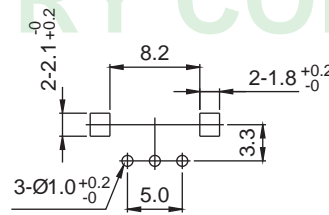


280° ROTATION  
SINGLE UNIT

**9PC1H-BY**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL

NOTE: AVAILABLE MOUNTING HEIGHTS (H): 6.5mm, 10mm, 12.5mm



280° ROTATION  
SINGLE UNIT

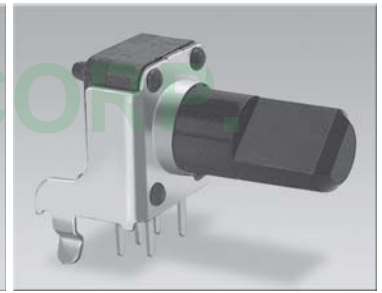
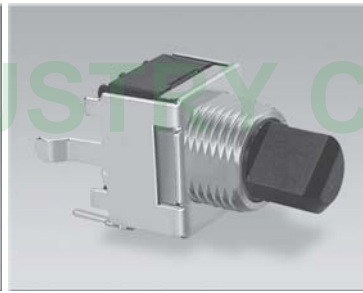
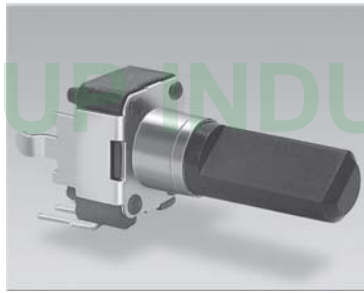


**9PA1V-D-□FT**

**9PA1V-D**

**9P1VB-D**

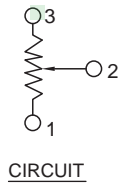
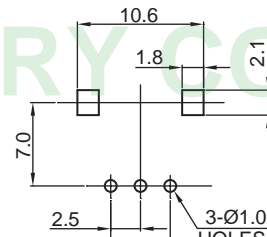
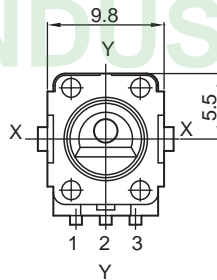
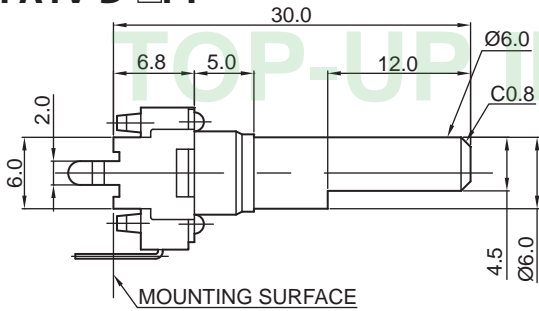
**9PB2H-B□**



Outline Drawing

Features individual specifications

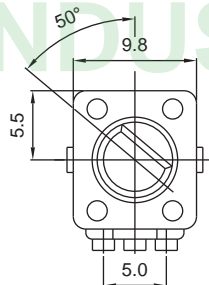
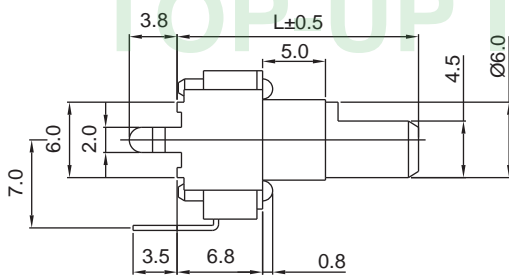
**9PA1V-D-□FT**



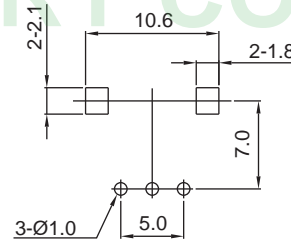
CIRCUIT

P.C.B MOUNTING HOLES DETAIL

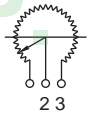
**9PA1V-D**



SHAFT SHOWN IN FULL C.C.W POSITION

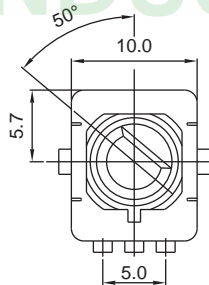
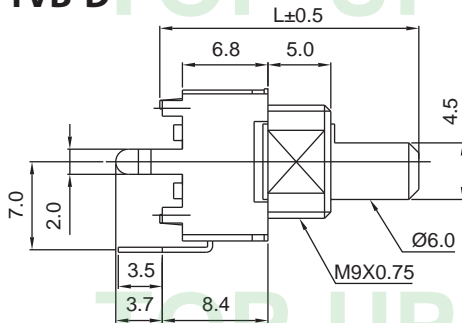


P.C.B MOUNTING HOLES DETAIL

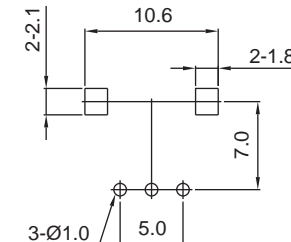


280° ROTATION SINGLE UNIT

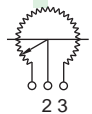
**9P1VB-D**



SHAFT SHOWN IN FULL C.C.W POSITION

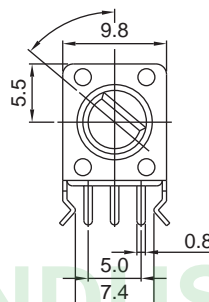
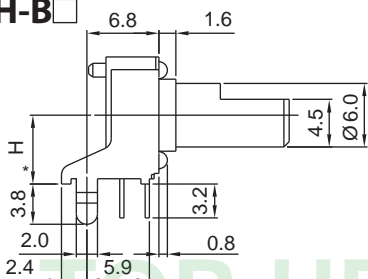


P.C.B MOUNTING HOLES DETAIL

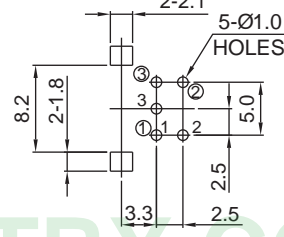


280° ROTATION SINGLE UNIT

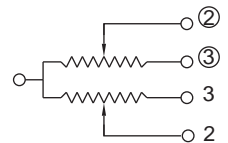
**9PB2H-B□**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL

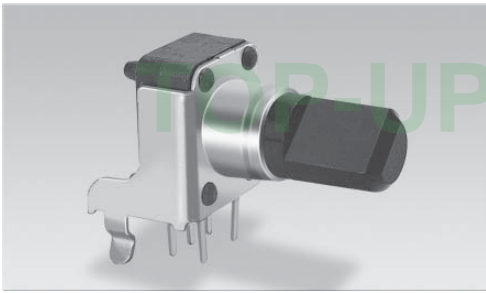


280° ROTATION DUAL UNIT

MOUNTING HEIGHTS H=6.5 ONLY

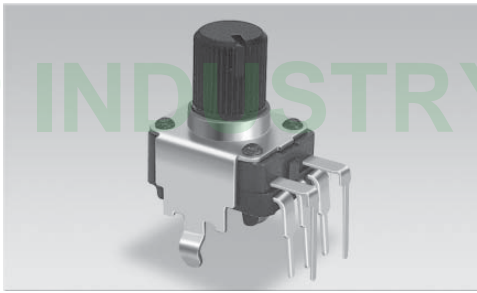
Code	W	X	Y
H	6.5	10	12.5

**9PD2H-B**



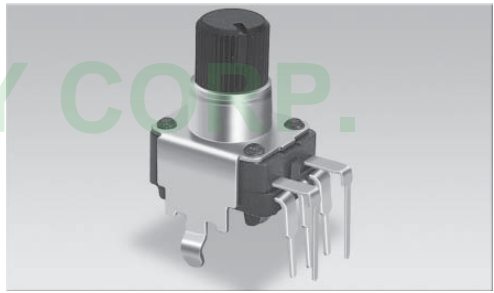
Outline Drawing

**9PB2V-D**

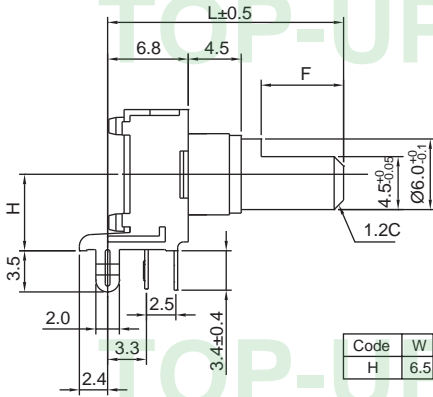


Features individual specifications

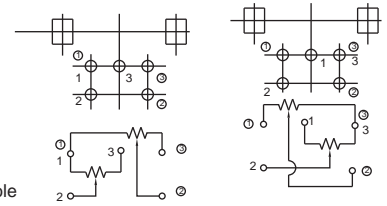
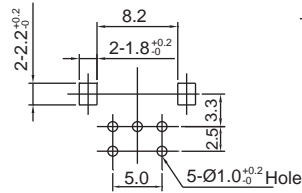
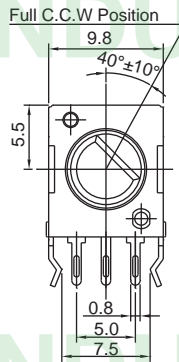
**9PA2V-D**



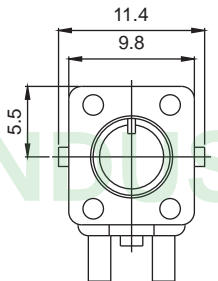
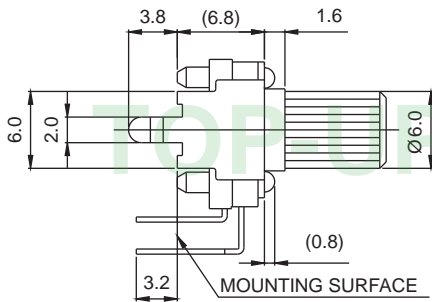
**9PD2H-B**



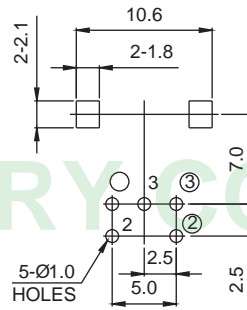
Code	W	X	Y
H	6.5	10	12.5



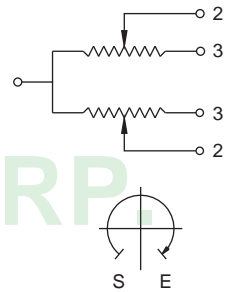
**9PB2V-D**



SHAFT SHOWN AT CENTER POSITION

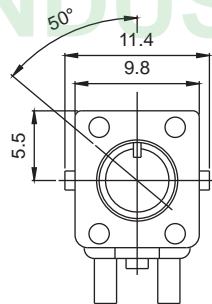
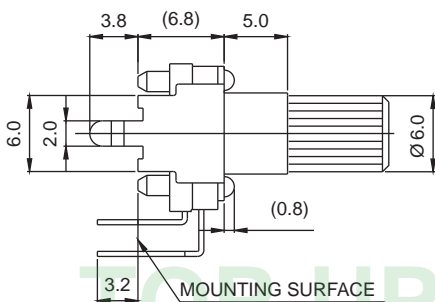


P.C.B MOUNTING HOLES DETAIL

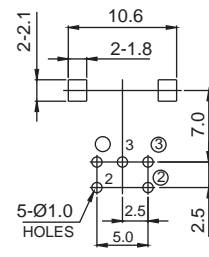


280° ROTATION DUAL UNIT

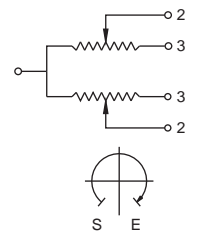
**9PA2V-D**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



280° ROTATION DUAL UNIT

**7PR1VB-D-HF**

**9PR1VB-D**

**9PR1VB-D1**

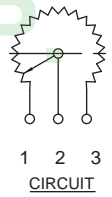
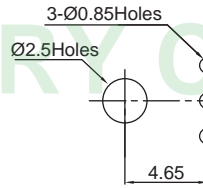
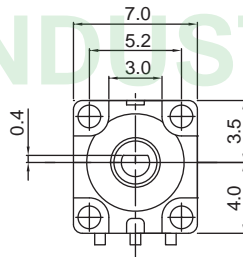
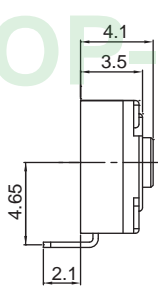
**9PM1VF-D**



Outline Drawing

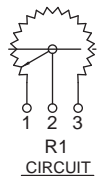
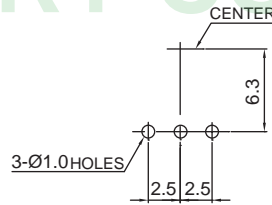
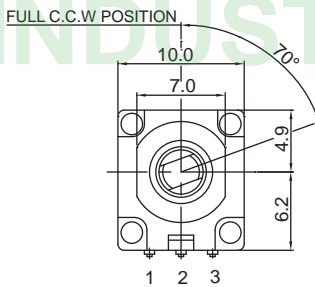
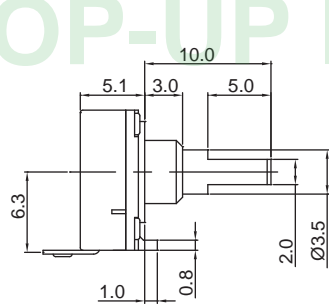
Features individual specifications

**7PR1VB-D-HF**

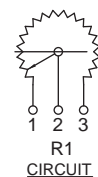
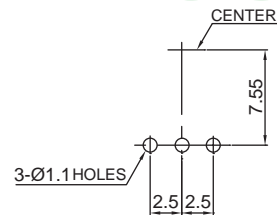
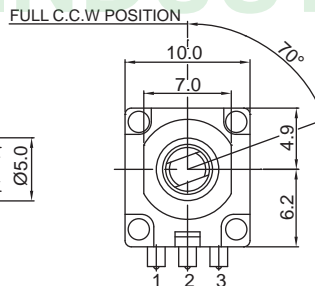
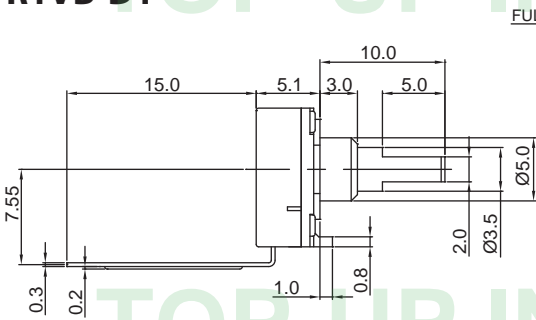


CODE	BLANK	1	2	3
ANGLE	180°	200°	280°	310°

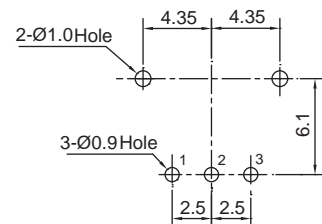
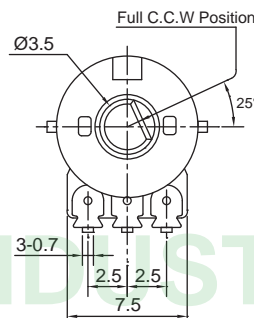
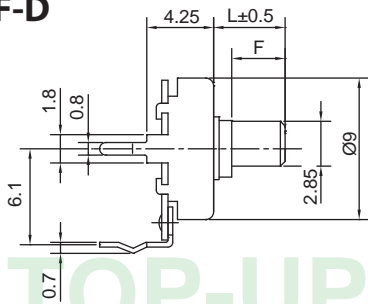
**9PR1VB-D**



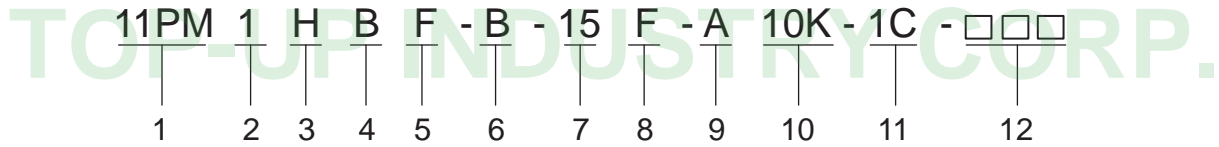
**9PR1VB-D1**



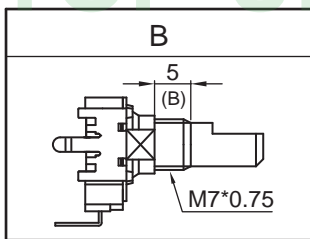
**9PM1VF-D**



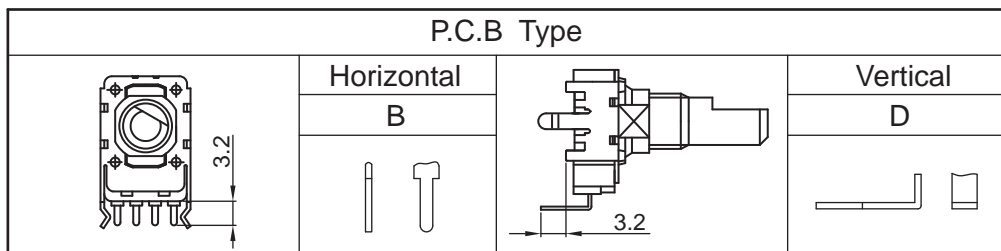
## 11PM,12PM Series Code Explanation



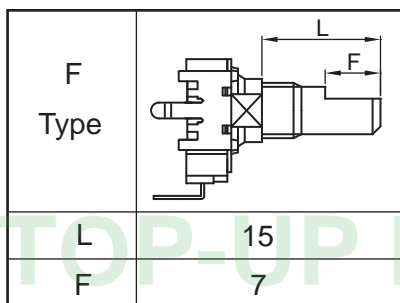
1. Product Lines of 11PM, 12PM ( Metal Shaft 11mm, 12mm Size)
2. Number of Unit : 1 – Single Unit 2 – Dual Unit
3. Horizontal (H) Type or Vertical (V) Type
4. Type of Bushing



5. Type of Frame "F"
6. Type of Terminal



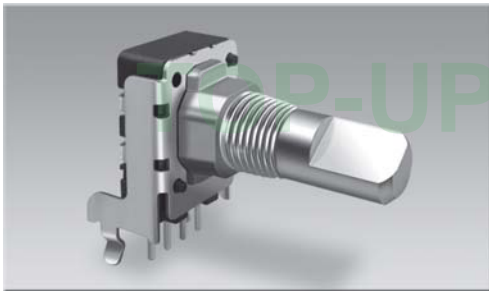
7. Shaft Length "L"
8. Shaft Type



9. Type of Taper
10. Resistance Value
11. Number of clicks
12. Serial No.

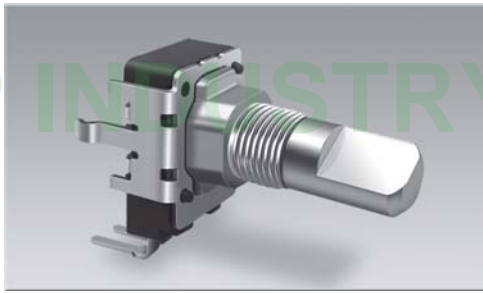


**11PM1HBF-D**



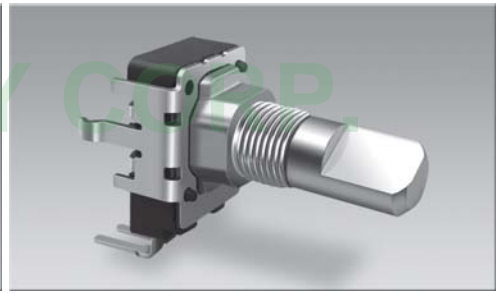
Outline Drawing

**11PM1VBF-D**

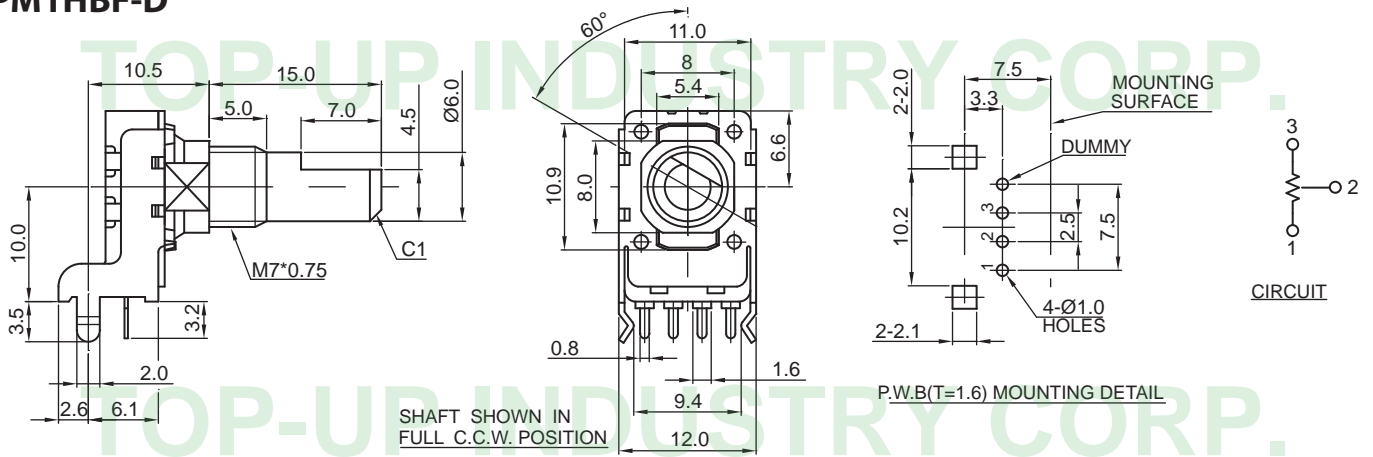


Features individual specifications

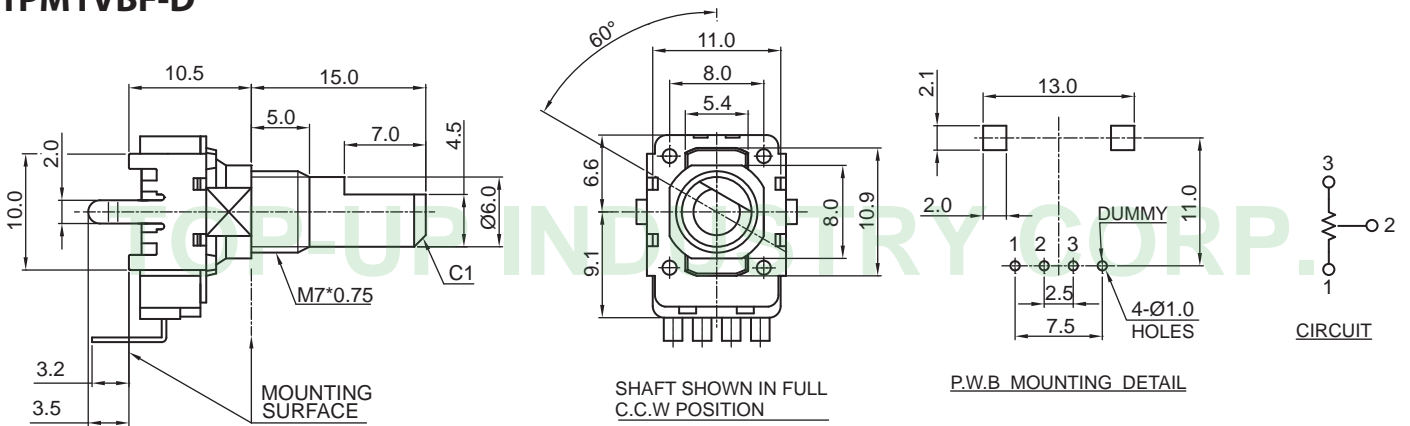
**11PM2VBF-D**



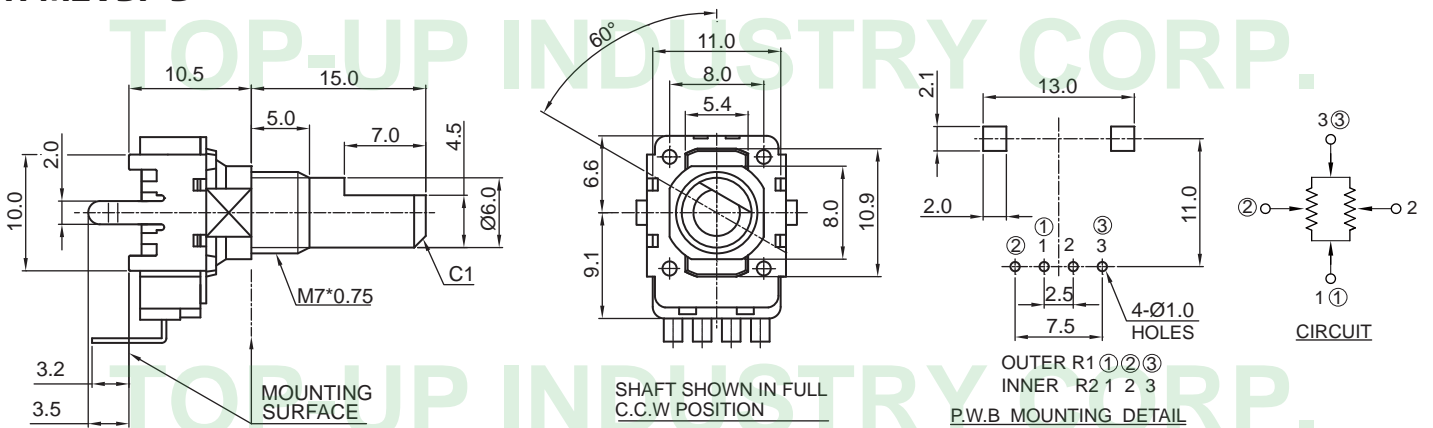
**11PM1HBF-D**



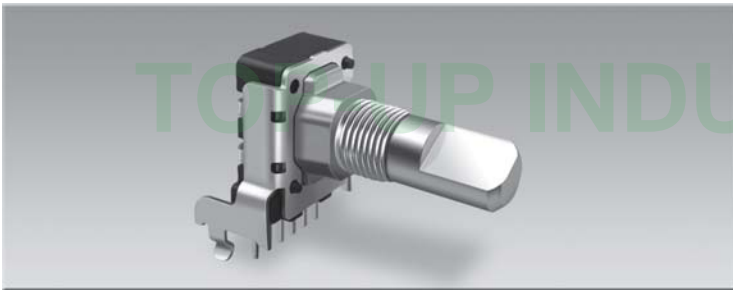
**11PM1VBF-D**



**11PM2VBF-D**

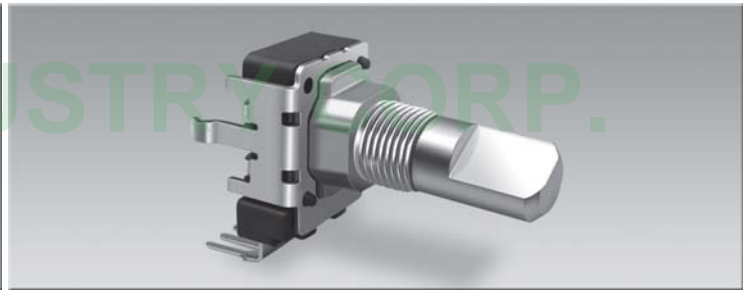


**12PM2HBF-B**



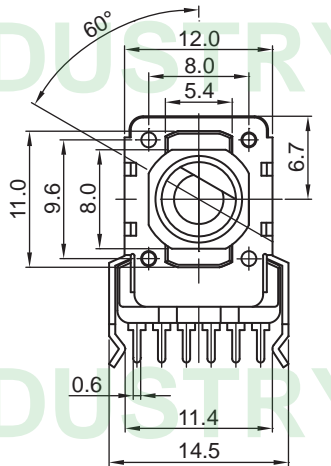
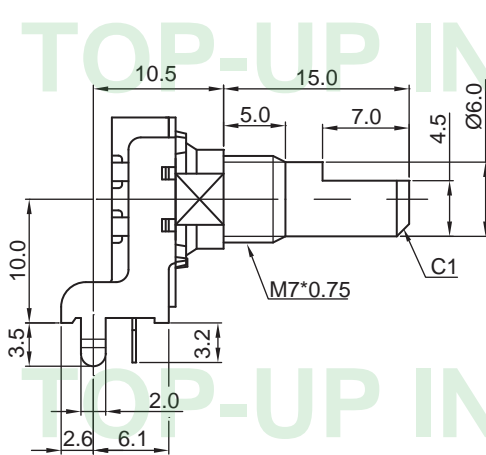
Outline Drawing

**12PM2VBF-D**

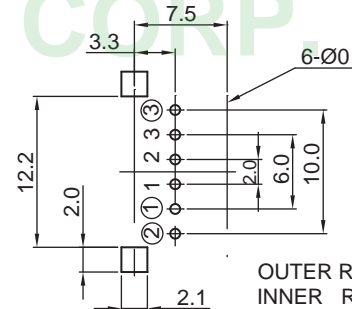


Features individual specifications

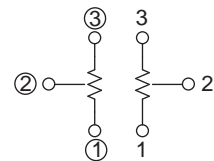
**12PM2HBF-B**



SHAFT SHOWN IN FULL C.C.W. POSITION

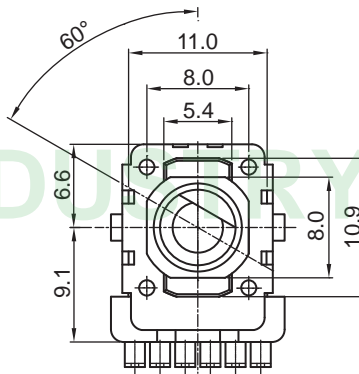
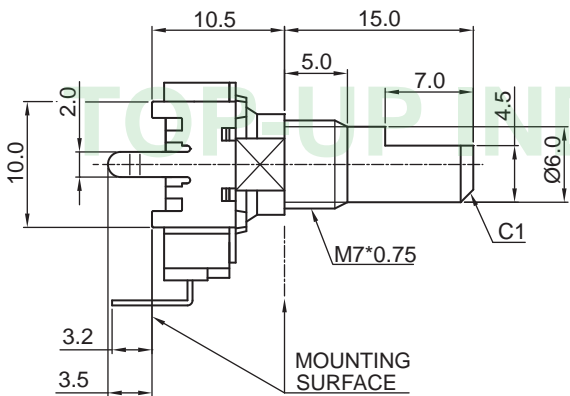


P.W.B MOUNTING DETAIL

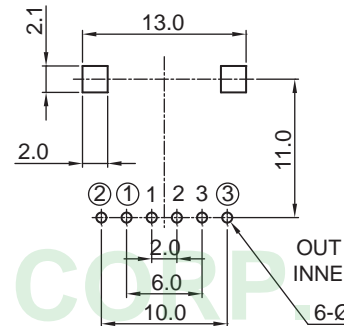


CIRCUIT

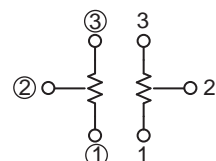
**12PM2VBF-D**



SHAFT SHOWN IN FULL C.C.W. POSITION

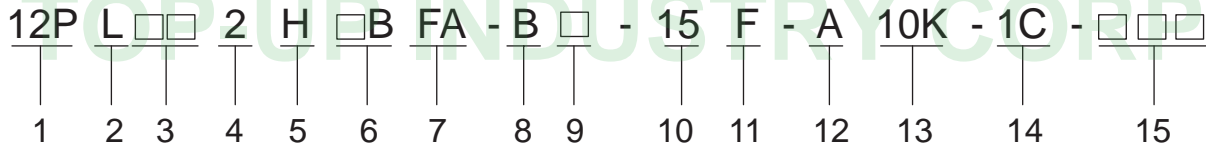


P.W.B MOUNTING DETAIL



CIRCUIT

## 11,12,14P Series Code Explanation



1. Product Lines of 11P, 12P, 14P ( Snap-in Insulated Shaft , 11mm, 12mm, 14mm Size)
2. With " LED " ( Only 12P Series )
3. LED Color ( Only 12P Series )

Single Color	Code Color	B Blue	R Red	O Orange	A Darkorange	L Lawngreen	W White
Dual Color	Code Color	BL Blue Lawngreen		RL Red Lawngreen		BO Blue Orange	

4. Number of Unit : 1 – Single Unit 2 – Dual Unit  
 11mm Size — Only Single Unit  
 12mm Size — Single and Dual Unit  
 14mm Size — Only Dual Unit

(Drawing 1)

5. Horizontal (H) Type or Vertical (V) Type
6. Type of Bushing

Without LED	With LED	
B	B	5B

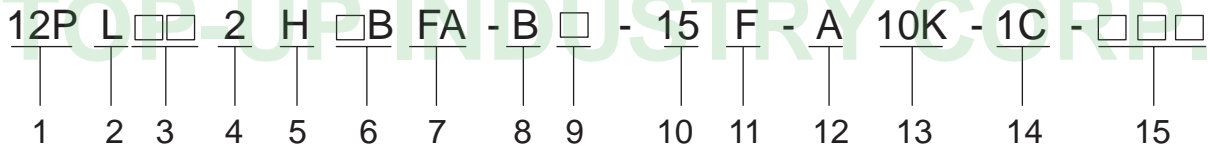
Horizontal			Vertical		
Code	F	FA	Code	F	FA
H	10	12.5	LB	8.1	11.5

7. Type of Frame "F" (See Drawing 1)
8. Type of Terminal

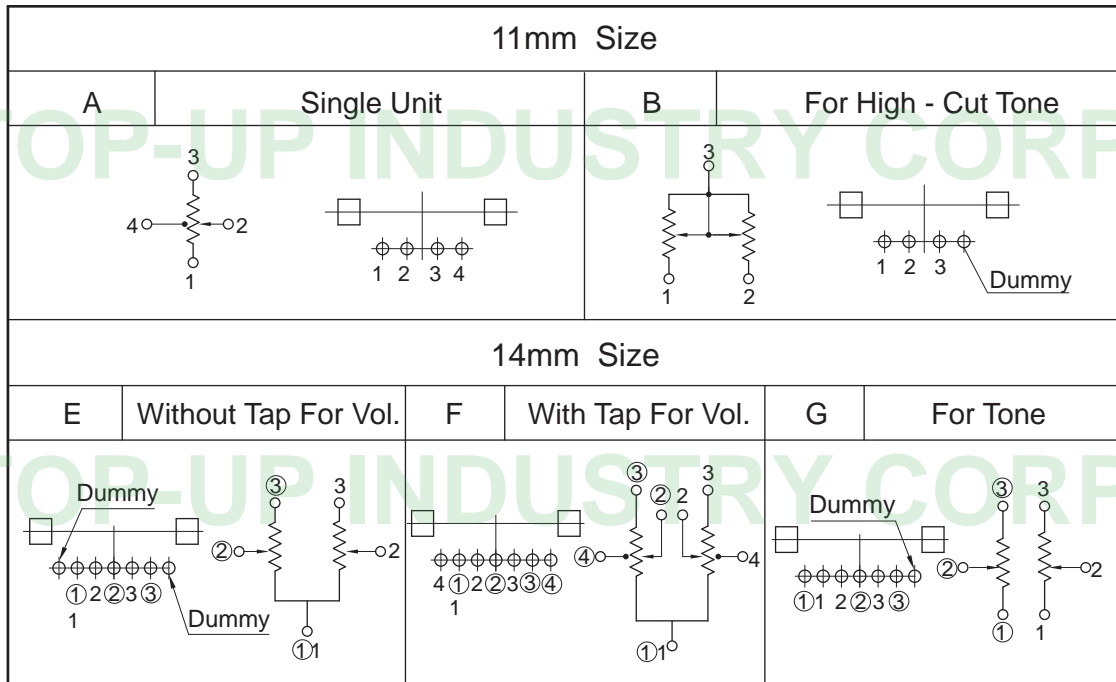
B ,B1 (P.C.B Type )		D (P.C.B Type )			
11mm Size		12mm Size		14mm Size	
B	B1	B	B1	B	B1
4.2 0.8 1.6	5.6 0.8 1.6	4.2 0.6	5.6 0.6	3.2 0.7	5.6 0.7

Remark: If the terminal is different from standard type, Special Code will be advised on request.

## 11,12,14P Series Code Explanation



### 9. Circuit explanation



### 10. Shaft Length "L"

### 11. Shaft Type

F Type				
	L	12.5   15   17.5   20   22.5   25   30	L	20   22.5   25   27.5   30
F	7   7   12   12   12   12   12	F	7   7   7   7   7	
K Type				
	KT Type (Transparent)	L	15	L

### 12. Type of Taper (See Taper Chart Page 220)

### 13. Resistance Value

### 14. Number of clicks

### 15. Serial No.



## 11mm, 12mm, 14mm, SIZE SNAP-IN INSULATED SHAFT POTENTIOMETERS

### Common Specifications

#### 1.Mechanical Characteristics

Application	11 mm size		12,14 mm size
	Single-unit	For high -cut tone	Dual unit
Total rotational angle	300±5°		300±5°
Rotational torque	30~200 gf.cm		30~200 gf.cm
Rotation stopper strength	Without bushing 5 kgf.cm with bushing 6 kgf.cm		6 kgf.max.
Pull-push strength	8 kgf max.		8 kgf.max.
Shaft inclination Measured at the tip of the shaft	Within 0.35mm		Within 0.35mm
Shaft wobble	Without bushing 0.7xL/20mm p-p max. With bushing 0.7xL/30mm p-p max.		Without bushing 0.7xL/20mm p-p max. With bushing 0.7xL/30mm p-p max.
Bushing nut tightening strength	10 kgf.cm max.		10 kgf. cm max.

#### 2.Electrical Characteristics

Application	11 mm size		12,14 mm size
	Sine-unit	For high -cut tone	Dual unit
Total rotational angle	5kΩ ~500kΩ	5kΩ ~500kΩ	5kΩ~500kΩ
Total resistance to lerrance	±20%	±20%	±20%
Resistance taper	A, B, C, D, E, K, W	A, B, D	A, B, C, D, E, K, W, M, N
Rated power	0.05W	Max.operating current 1mA.AC	0.05W
Max. operating voltage	50V AC 20V DC	50V AC For A.C. only	50V AC For A.C. only

**Note:**11 mm Size High-cut tone for Total resistance is measured when the shaft is turn fully CW.

11mm, 12mm, 14mm, SIZE SNAP-IN INSULATED SHAFT POTENTIOMETERS

3. Electrical Characteristics

Application	11 mm size		12,14 mm size
	Single-unit	For high -cut tone	Dual unit
Residual resistance	$R \leq 10k\Omega$ 20 $\Omega$ max. $10k\Omega < R \leq 50k\Omega$ 30 $\Omega$ max. $50k\Omega < R \leq 500k\Omega$ 300 $\Omega$ max. 0.1% max. of total resistance	* 2 $5k\Omega < R \leq 50k\Omega$ 100 $\Omega$ max. $50k\Omega < R \leq 100k\Omega$ 200 $\Omega$ max. $100k\Omega < R \leq 250k\Omega$ 500 $\Omega$ max.	$R \leq 30k\Omega$ 30 $\Omega$ max. $30k\Omega < R \leq 500k\Omega$ 0.1% max. of total resistance
For volume		$250k\Omega < R \leq 500k\Omega$ 1k $\Omega$ max.	5 $\Omega$ max (12mm only)
Slide noise	Less than 100mV		
Gang error			For volume control within 3dB at -40 to 0dB For tone control within 2dB at center
Insulation resistance	100M $\Omega$ min. at 500V DC	100M $\Omega$ min. at 250V DC	
Withstand voltage	For 1 minute or more at 500V AC	For 1 minute or more at 300V AC	

4. Durability

Rotational life	15,000 cycles	10,000 cycles	15,000 cycles
-----------------	---------------	---------------	---------------

Notes:

1. For volume control, measurement is made at max. attenuation and insertion loss. For specifications, see max. attenuation and insertion loss.
2. Potentiometers of dual -unit type and for high -cut tone use are for the exclusive use of alternating current. hence avoid using the potentiometer in the circuit where DC voltage is constantly applied.

Maximum Attenuation Level And Insertion Loss

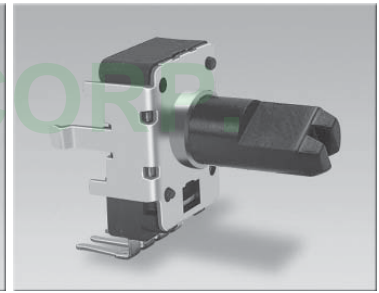
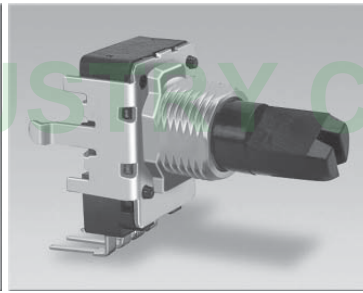
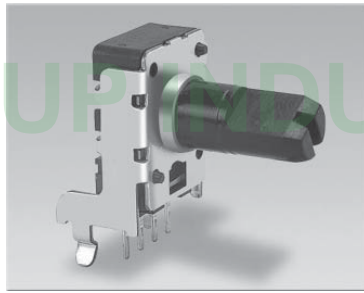
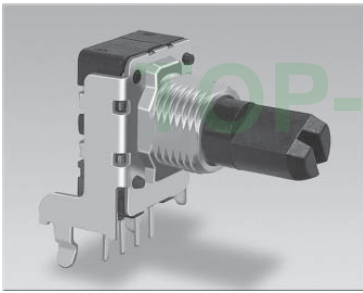
Resistance range	Maximum attenuation level		Insertion loss
	11mm Size	12,14mm Size	
$5\Omega < R \leq 10k\Omega$	60dB min.	60dB min.	0.1dB max.
$10k\Omega < R \leq 50k\Omega$	70dB min.	70dB min.	
$50k\Omega < R \leq 100k\Omega$	80dB min.	80dB min.	
$100k\Omega \leq R$	90dB min.	90dB min.	

**11P1HBF-B**

**11P1HF-B**

**11P1VBF-D**

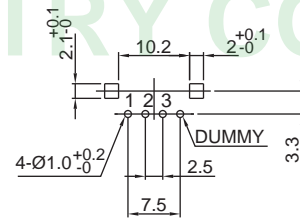
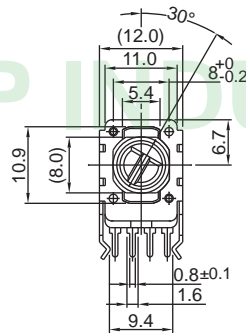
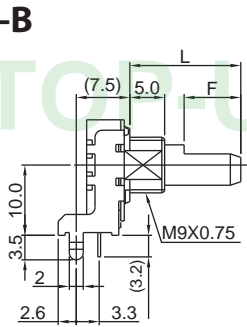
**11P1VF-D**



Outline Drawing

Features individual specifications

**11P1HBF-B**

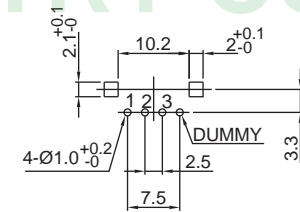
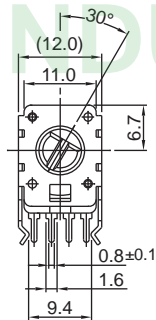
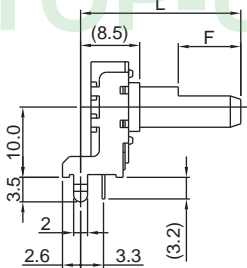


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION SINGLE UNIT

**11P1HF-B**

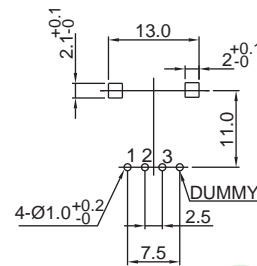
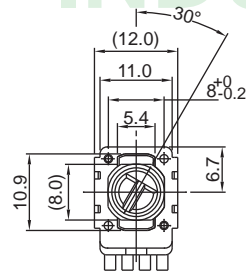
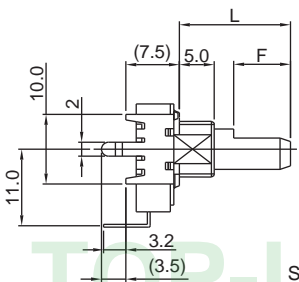


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION SINGLE UNIT

**11P1VBF-D**

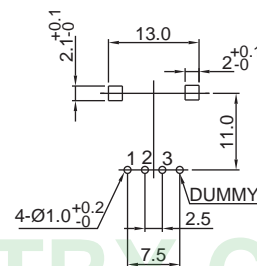
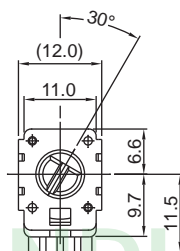
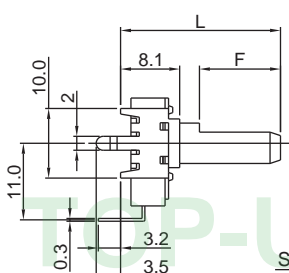


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION SINGLE UNIT

**11P1VF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

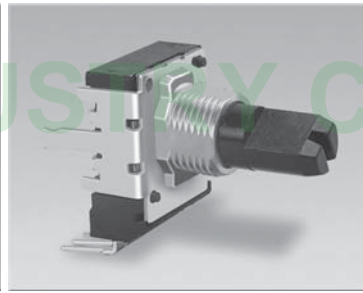
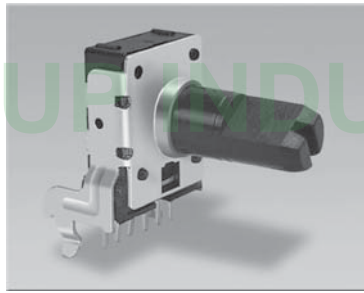
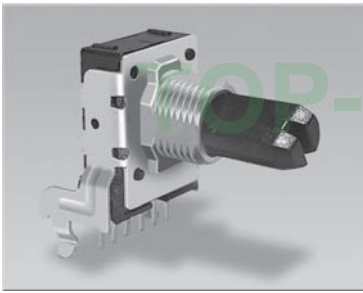
300° ROTATION SINGLE UNIT

**12P2HBF-B**

**12P2HF-B**

**12P2VBF-D**

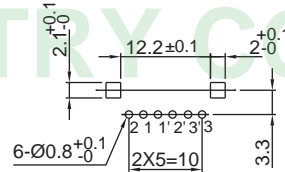
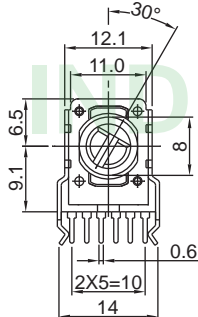
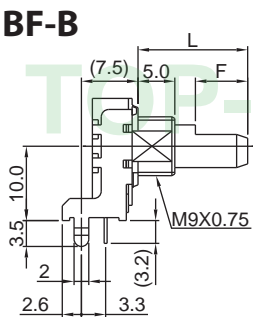
**12P2VF-D**



Outline Drawing

Features individual specifications

**12P2HBF-B**

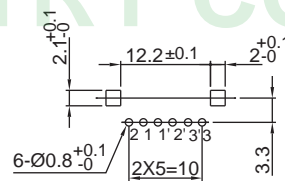
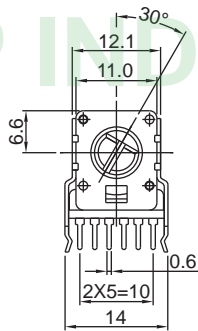
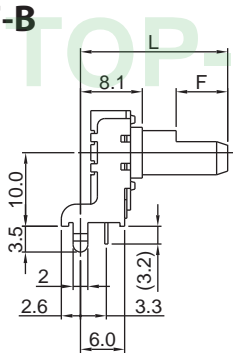


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION DUAL UNIT

**12P2HF-B**

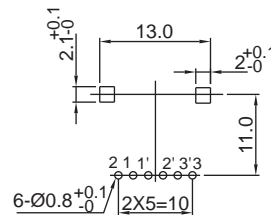
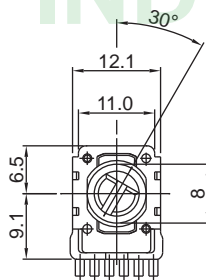
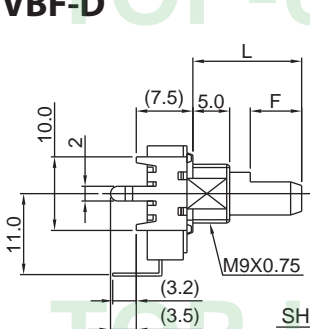


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION DUAL UNIT

**12P2VBF-D**

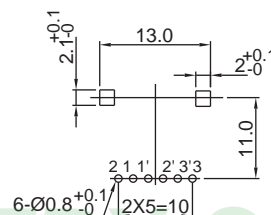
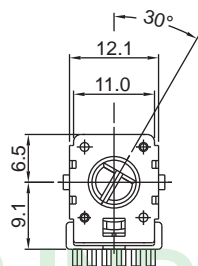
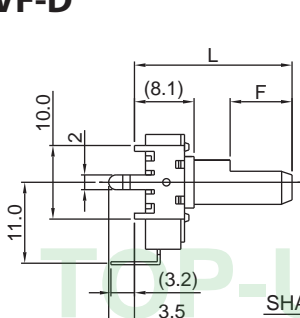


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION DUAL UNIT

**12P2VF-D**

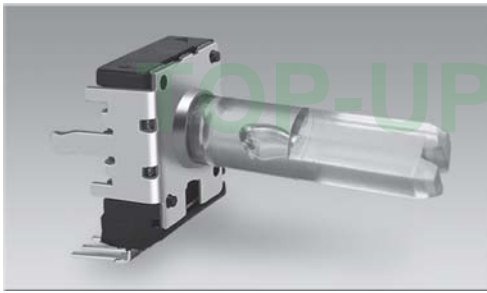


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

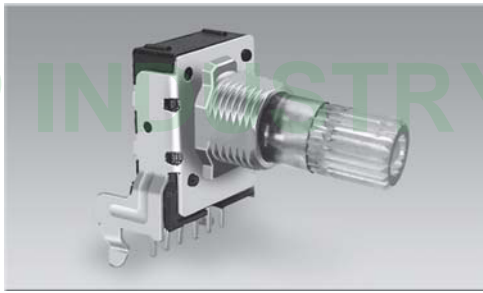
300° ROTATION DUAL UNIT

**12P2VF-D-□FT**



Outline Drawing

**12PL□1H5BF-B**

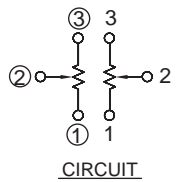
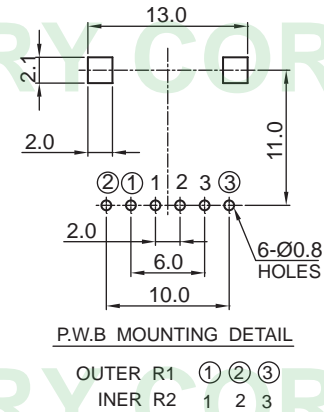
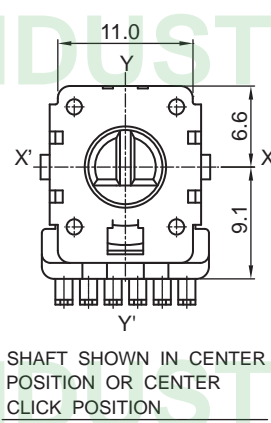
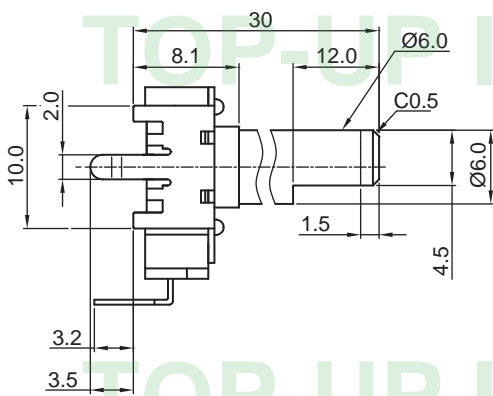


Features individual specifications

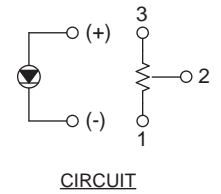
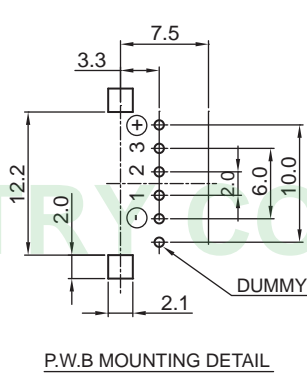
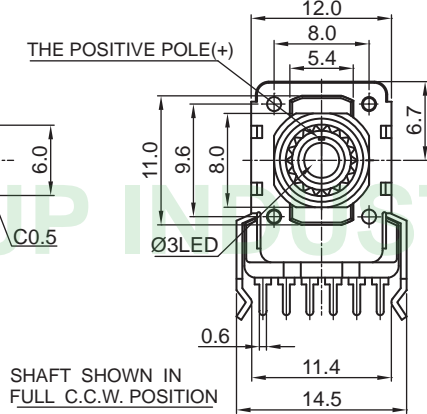
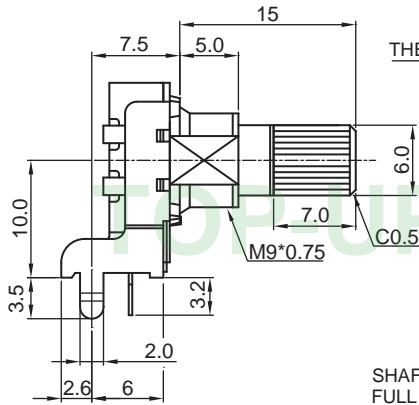
**12PL□□1VFA-D**



**12P2VF-D-□FT**



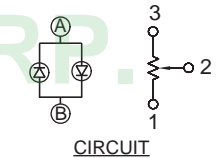
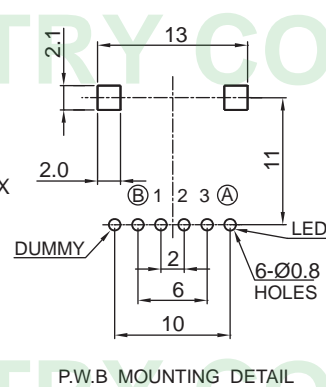
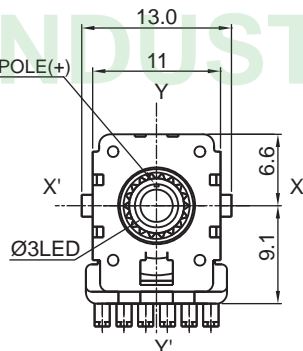
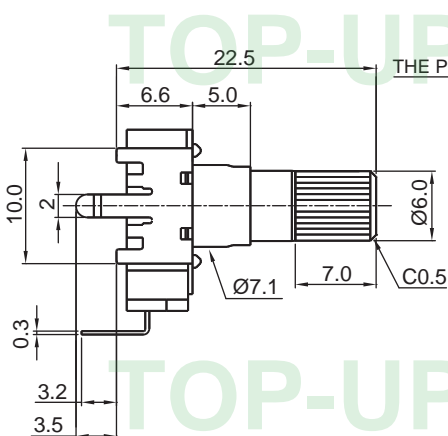
**12PL□1H5BF-B**



CODE	COLOR
O	ORANGE
B	BLUE
R	RED
L	LAWNGREEN
A	DARKORANGE
W	WHITE

LED COLOR

**12PL□□1VFA-D**

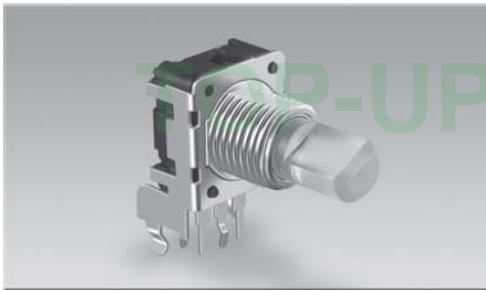


CODE	LED COLOR	A	B
RL	RED	+	-
	LAWNGREEN	-	+
BL	BLUE	+	-
	LAWNGREEN	-	+
BO	BLUE	+	-
	ORANGE	-	+

LED COLOR

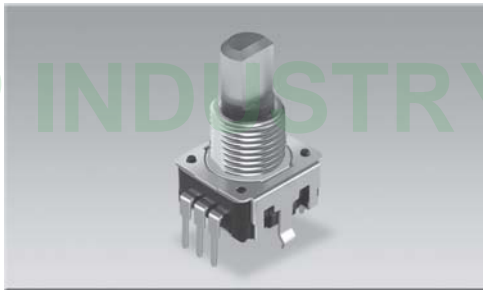


**12PL□1HBF-B**



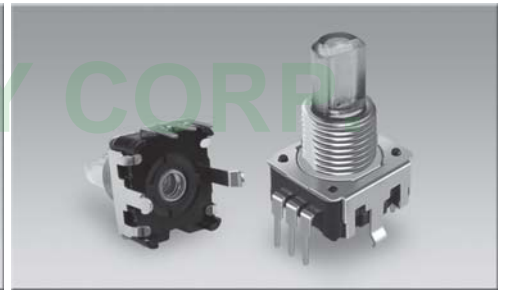
Outline Drawing

**12PL□1VBF-D**

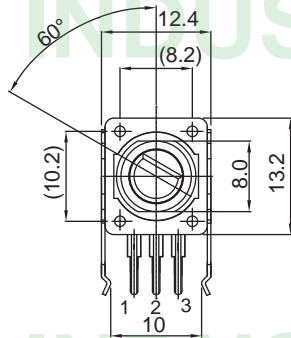
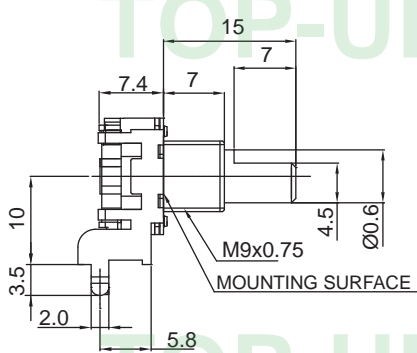


Features individual specifications

**12P1VBF-D-□FHT**



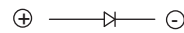
**12PL□1HBF-B**



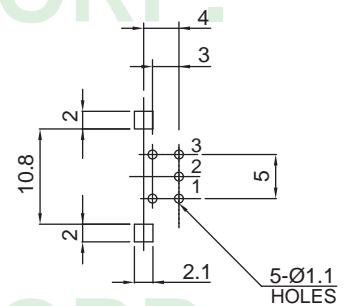
SHAFT SHOWN IN FULL  
C.C.W POSITION

LED COLOR:

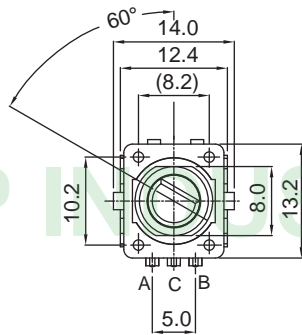
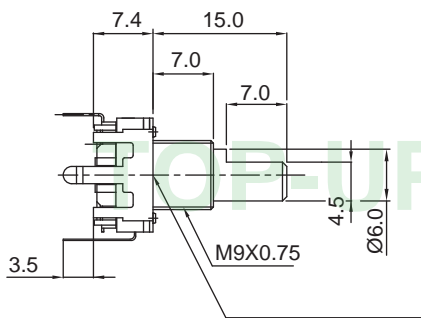
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN



LED CIRCUIT DIAGRAM



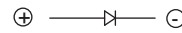
**12PL□1VBF-D**



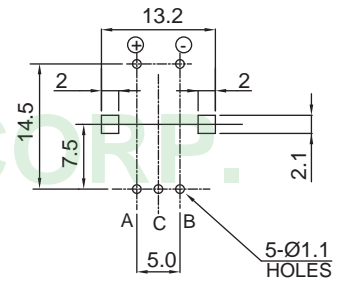
SHAFT SHOWN IN FULL  
C.C.W POSITION

LED COLOR:

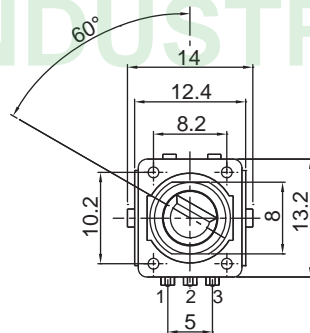
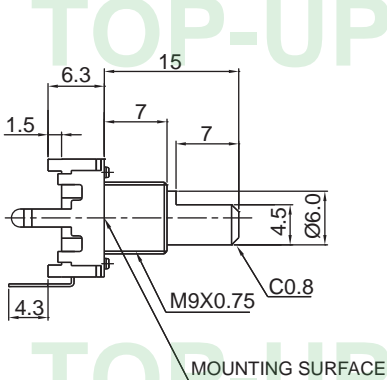
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN



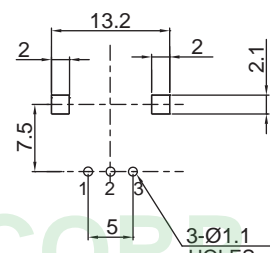
LED CIRCUIT DIAGRAM



**12P1VBF-D-□FHT**



SHAFT SHOWN IN FULL  
C.C.W POSITION

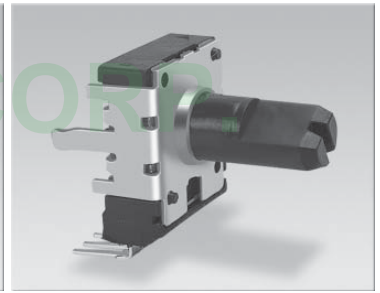
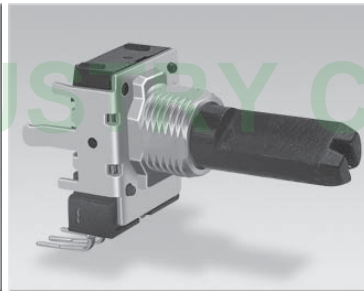
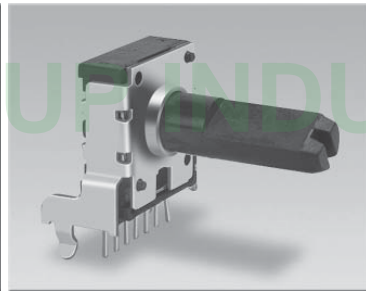
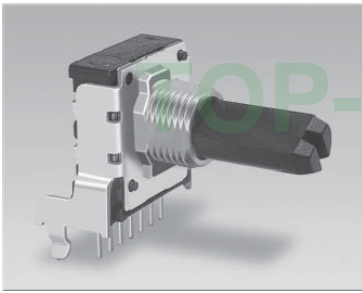


**14P2HBF-B**

**14P2HF-B**

**14P2VBF-D**

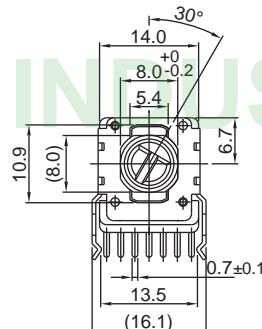
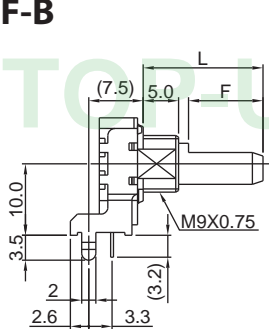
**14P2VF-D**



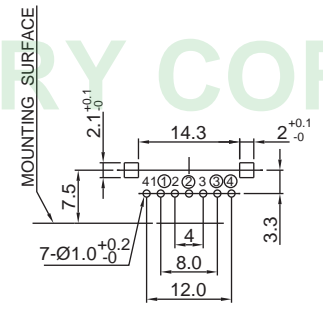
Outline Drawing

Features individual specifications

**14P2HBF-B**



SHAFT SHOWN IN FULL C.C.W POSITION

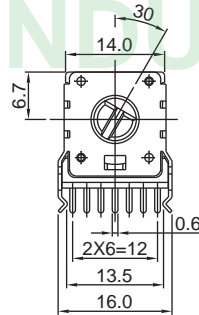
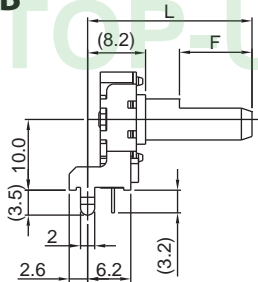


P.C.B MOUNTING HOLES DETAIL

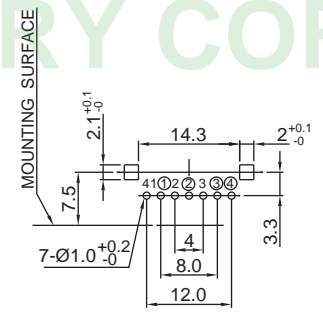


300° ROTATION  
DUAL UNIT

**14P2HF-B**



SHAFT SHOWN IN FULL C.C.W POSITION

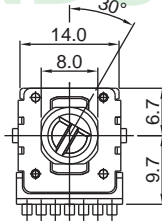
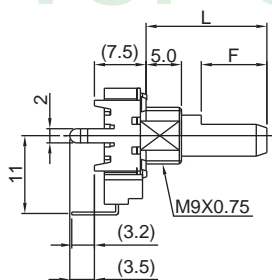


P.C.B MOUNTING HOLES DETAIL

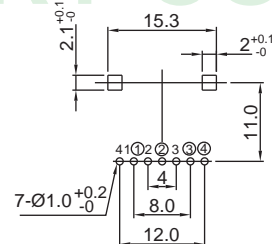


300° ROTATION  
DUAL UNIT

**14P2VBF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

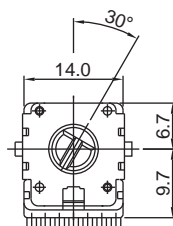
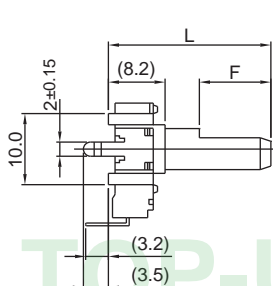


P.C.B MOUNTING HOLES DETAIL

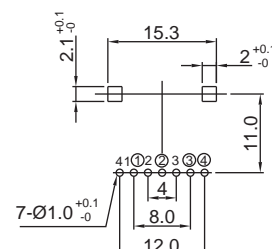


300° ROTATION  
DUAL UNIT

**14P2VF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

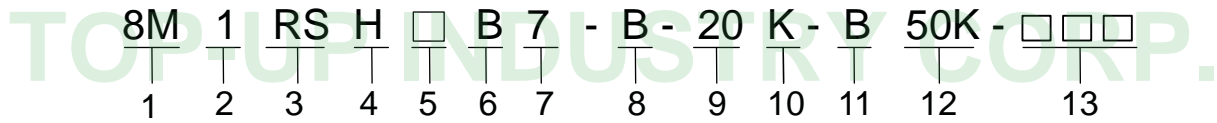


P.C.B MOUNTING HOLES DETAIL

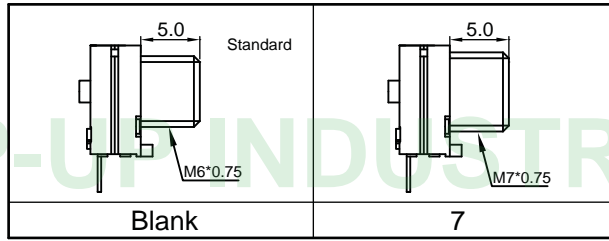


300° ROTATION  
DUAL UNIT

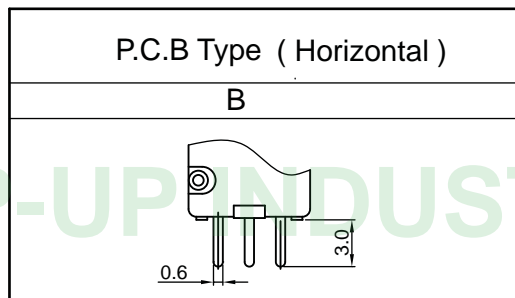
## 8M Series Code Explanation



1. Product Lines of 8M
2. Number of Unit : 1 — Single Unit 2 — Dual Unit,.....
3. Type of Switch  
 RS— " Rotary Type "
4. Horizontal(H) Type or Vertical(V) Type
5. Bushing Length : Blank -5mm(Standard Type)
6. With Bushing : "B" (Standard Type)
7. Bushing Diameter : Blank-Standard Bushing



### 8. Type of Terminal



### 9. Shaft Length

### 10. Type of Shaft

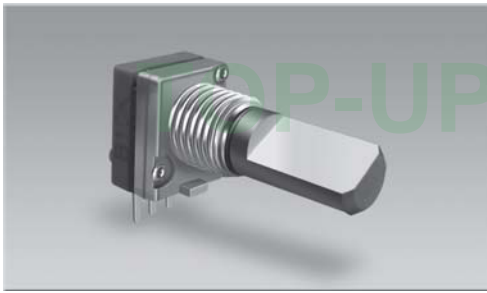
F - Type			S - Type		
Code	10F	15F7	15	Code	10S
L	10	15	15	L	10
F	4	7	8		

### 11. Type of Taper (See Taper Chart Page 220)

### 12. Resistance Value

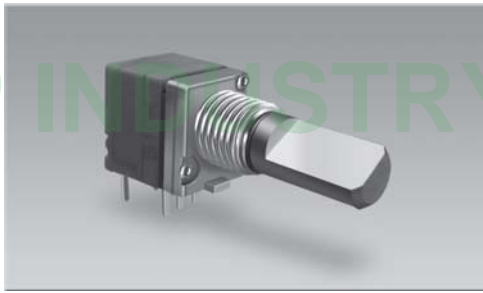
### 13. Serial No.

**8M1HB-B**



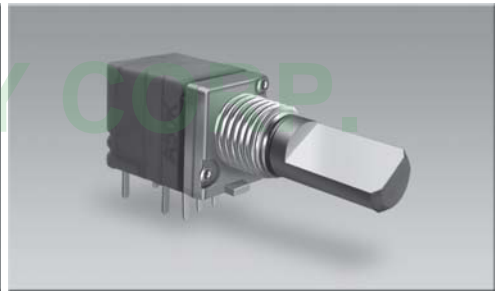
Outline Drawing

**8M1RSHB-B**

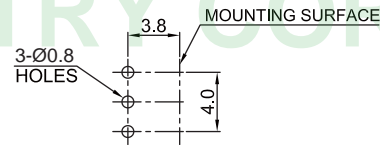
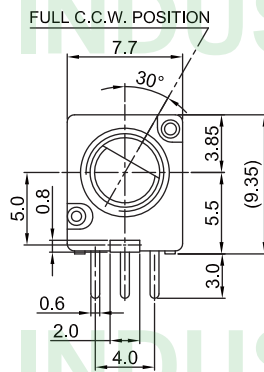
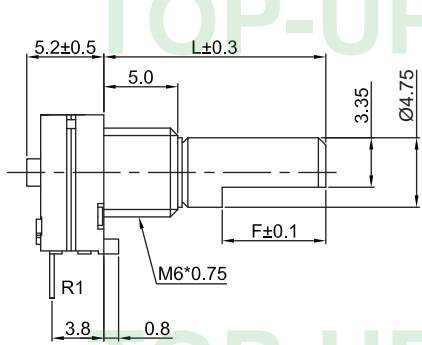


Features individual specifications

**8M2RSHB-B**



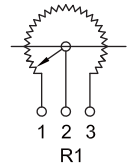
**8M1HB-B**



MOUNTING HOLE DETAIL

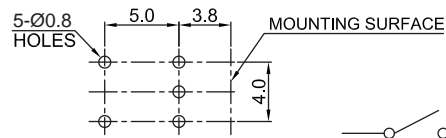
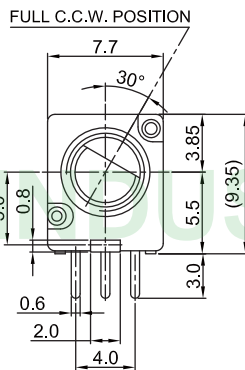
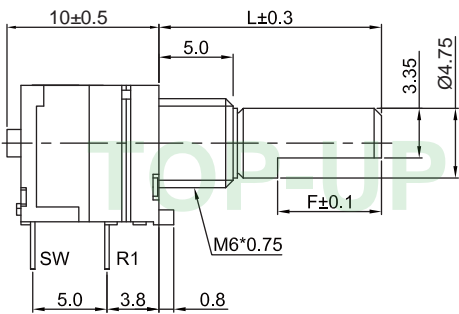
SHAFT LENGTH:

CODE	10F	15F
L	10	15
F	4	8



CIRCUIT

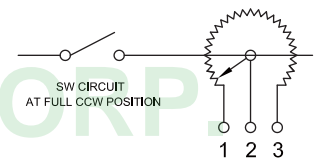
**8M1RSHB-B**



MOUNTING HOLE DETAIL

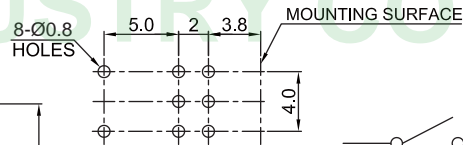
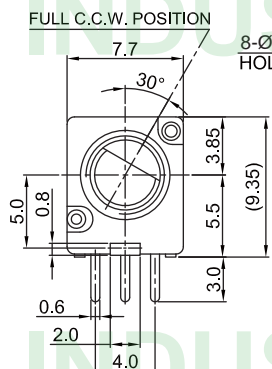
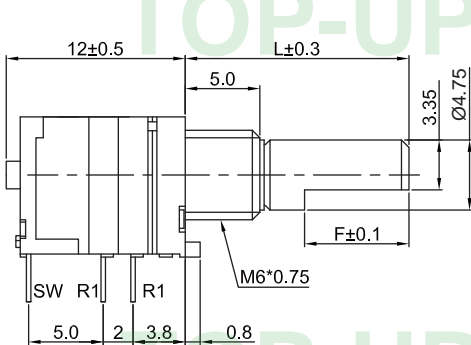
SHAFT LENGTH:

CODE	15F7	15F
L	15	15
F	7	8



CIRCUIT

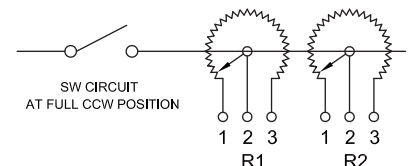
**8M2RSHB-B**



MOUNTING HOLE DETAIL

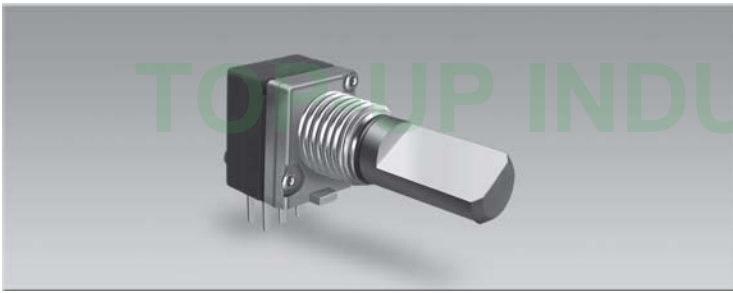
SHAFT LENGTH:

CODE	15F7	15F
L	15	15
F	7	8



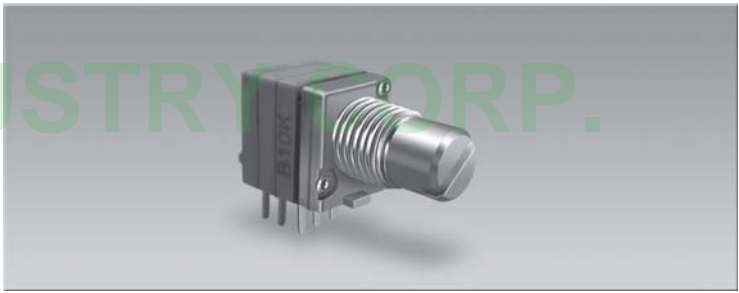
CIRCUIT

**8M2HB7-B**



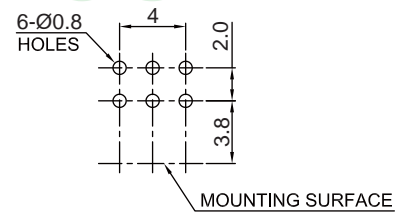
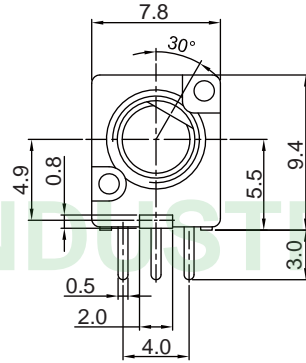
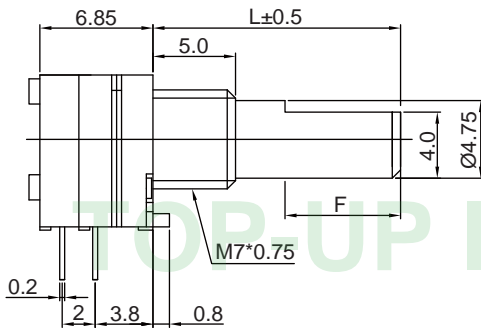
Outline Drawing

**8M3HB7-B**



Features individual specifications

**8M2HB7-B**

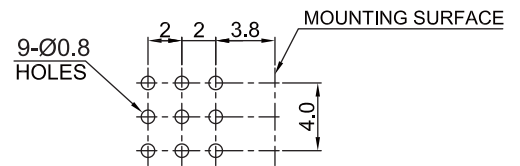
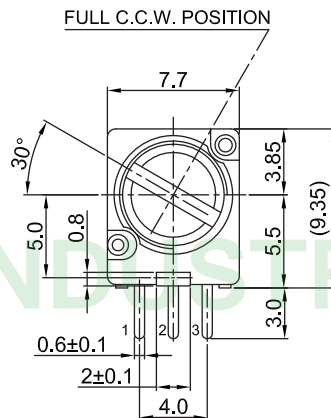
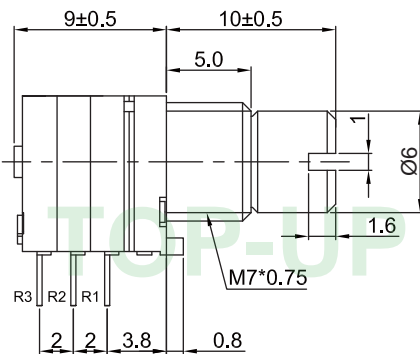


MOUNTING HOLE DETAIL

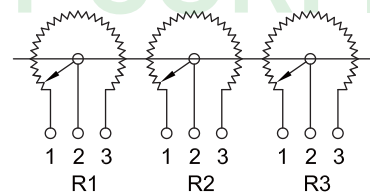
SHAFT LENGTH:

CODE	15F	18F	20F
L	15	18	20
F	7	9	12

**8M3HB7-B**



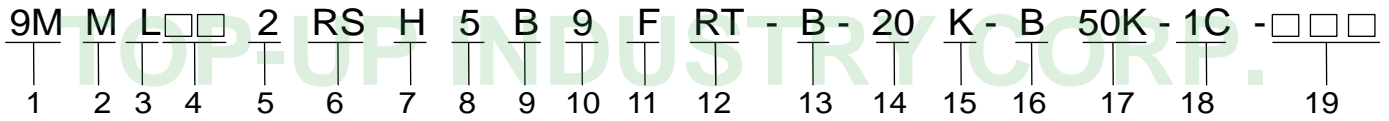
MOUNTING HOLE DETAIL



CIRCUIT



## 9M Series Code Explanation



1. Product Lines of 9M ( Metal Shaft, 9mm Multi-Ganged Series )

2. Type of Dual Shaft

3. With " LED "

4. LED Color

Code	O	B	R	G
Color	Orange	Blue	Red	Green

5. Number of Unit : 1 — Single Unit 2 — Dual Unit,.....

6. Type of Switch

RS — " Rotary Type "

MS — " Momentary Push Type "

PS — " Push-Push Type (With Push-Lock)"

PPS — " Push on , Push off Type "

NS — " Pull -On Type "

FS — " Pull-Off Type "

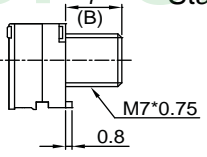

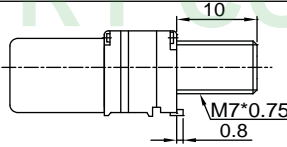

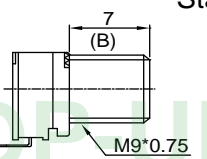

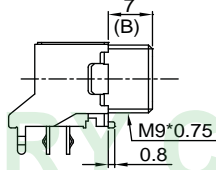
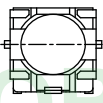
Code	MS / PPS	MSD / PPSD
Switch Travel	1.5mm	0.5mm

7. Horizontal(H) Type or Vertical(V) Type

8. Bushing Length : Blank -7mm(Standard Type) , 9 - 9mm

9. With Bushing : "B" (Standard Type)

10. Bushing Diameter : Blank-Standard Bushing (See Drawing 1) ( Drawing 1)

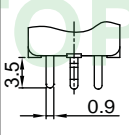
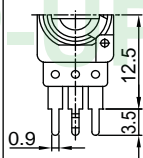
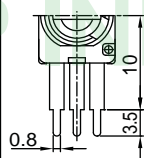
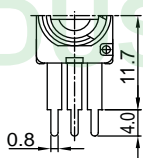
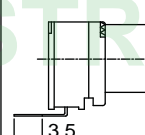
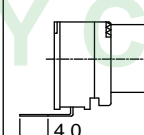
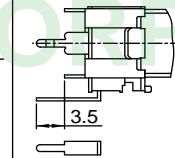
Without Bracket Series		Other Type	Without Bracket "PS" Series	
Standard	(B)		Standard	(B)
		5.0		
		10.0	With Bracket Series	
		5.0		
		10.0		

11. With Frame: "F"

12. With Tap: RT -Right Tap, CT -Center Tap .....

13. Type of Terminal

( Drawing 2)

P.C.B Type						
Without Bracket						With Bracket
Horizontal				Vertical		Vertical
B	B1	B2	B3	D	D1	D
						

14. Shaft Length (See Drawing 3)

15. Type of Shaft (See Drawing 3)

16. Type of Taper (See Taper Chart Page 220)

17. Resistance Value

18. Number of Clicks : Blank -None, 1C - Center Click , 11C - 11 Clicks

19. Serial No.

## 9M Series Code Explanation

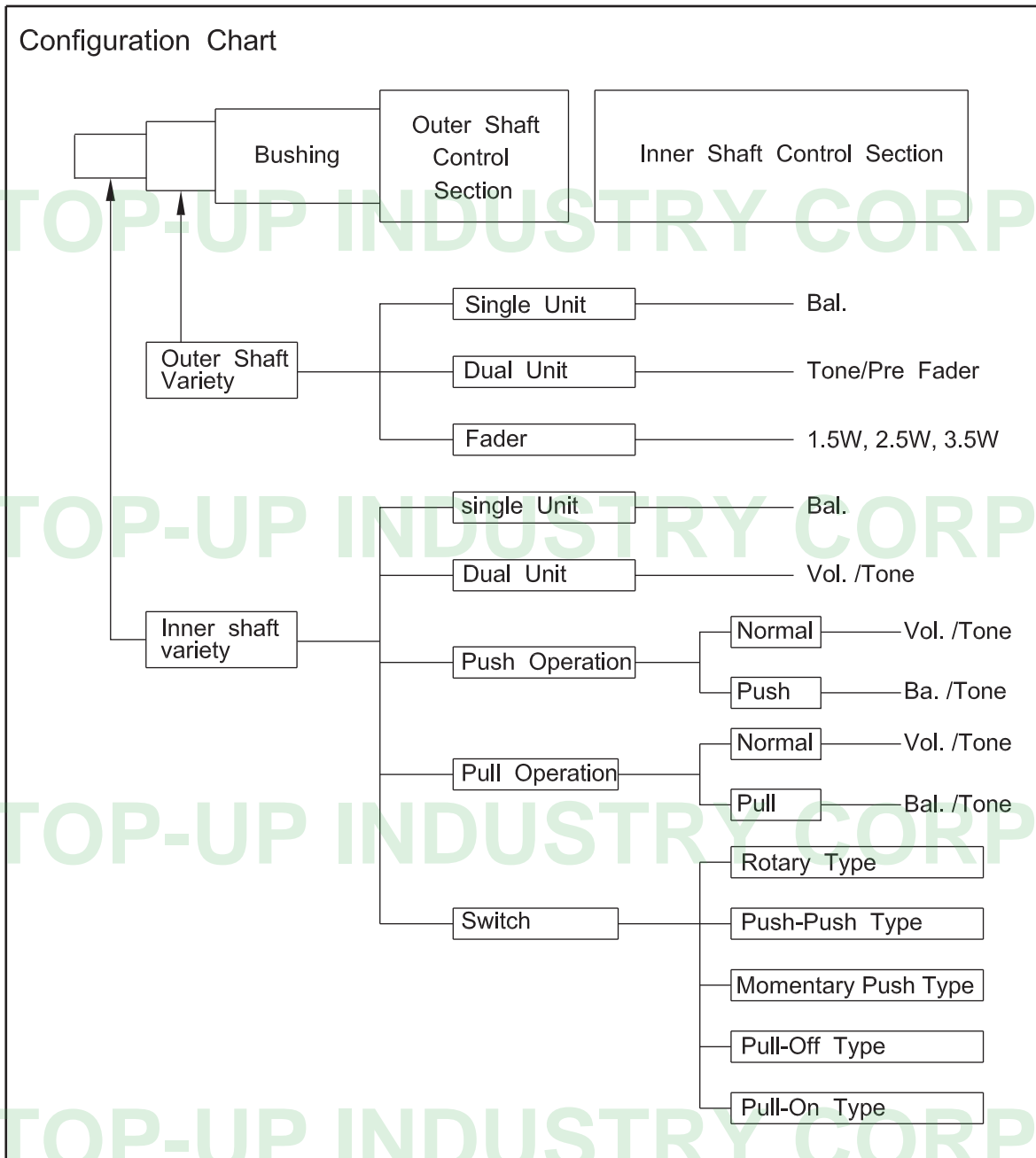
( Drawing 3 )

Single Shaft Dimensions and Styles (Without Bracket)																									
K - Type					F - Type																				
<p>KNURL 18 TEETH SHAFT SLOT IS OPTIONAL ANGLE M7X0.75 Ø6</p>					<p>M7X0.75 Ø6 60° SHAFT SHOWN IN FULL C.C.W POSITION</p>																				
L	B	T	M	T1	L	15	20	25	30																
15	5	5	1	7	B	5	7	10	10																
20	7	10	1	11	F	7	12	12	12																
25	10	12	2	11																					
30	10	12	4	14																					
35	10	12	4	14																					
H - Type																									
<p>M7X0.75 Ø6 60° SHAFT SHOWN IN FULL C.C.W POSITION</p>					<table border="1"> <tr> <td>L</td><td>15</td><td>20</td><td>25</td><td>30</td> </tr> <tr> <td>B</td><td>5</td><td>7</td><td>10</td><td>10</td> </tr> </table>					L	15	20	25	30	B	5	7	10	10						
L	15	20	25	30																					
B	5	7	10	10																					
Shaft Dimensions and Styles With Push-Lock Mechanism																									
F - Type																									
<p>M7X0.75 Ø6 60° SHAFT SHOWN IN FULL C.C.W POSITION</p>					<table border="1"> <tr> <td>L</td><td>B</td><td>A</td><td>F</td> </tr> <tr> <td>25</td><td>10</td><td>(5.7)</td><td>4.5</td> </tr> <tr> <td>30</td><td>10</td><td>(10.7)</td><td>7</td> </tr> <tr> <td>35</td><td>10</td><td>(10.7)</td><td>12</td> </tr> </table>					L	B	A	F	25	10	(5.7)	4.5	30	10	(10.7)	7	35	10	(10.7)	12
L	B	A	F																						
25	10	(5.7)	4.5																						
30	10	(10.7)	7																						
35	10	(10.7)	12																						
Dual Shaft Dimensions and Styles (Without Bracket)																									
K - Type					F - Type																				
<p>KNURL 18 TEETH M9X0.75 Ø6 Ø8</p>					<p>M7X0.75 Inne-shaft : Ø3.5 outer-shaft : Ø6 Inne-shaft : Ø6 outer-shaft : Ø8</p>																				
L	L1	B	T	T1	L	L1	B	T	T1																
15	10	5	8	9	15	10	5	4	7																
20	15	7	8	9	20	15	7	5	8																
25	20	10	8	9	25	20	10	5	8																
30	25	10	8	9	30	25	10	5	8																

# 9M Series Code Explanation

( Drawing 3)

Single Shaft Dimensions and Styles (With Frame )						
F - Type						
	L	12.5	15	17.5	20	25
	B	5	5	5	7	7
	F	7	7	7	12	12



**9mm SERIES (WITH FRAME)**

**Products Specifications**

**Mechanical Characteristics**

Total rotational angle	300±5°
Rotational torque	20~250gf·cm
Detent torque	Rotational torque +2~20mN·m 20~200 gf·cm
Rotation stopper strength	5kgf·cm
Push pull strength	8kgf max

**Electrical Characteristics**

Total resistance	5, 10, 20, 50, 100, 250(KΩ)
Total resistance tolerance	±20%
Rated power	0.05W
Maximum operating voltage	50VAC 5VDC
Resistance taper	A, B, C, D, E, K, W
Insulation resistance	100MΩ min. 250VDC
Withstand voltage	1 minute 100VAC

**Durability**

Rotational life	15,000 cycles
-----------------	---------------

**9mm SERIES (WITHOUT FRAME)**

**Mechanical Characteristic:**

Total rotational angle	300°±5°
Rotational torque	10~200gf.cm
Shaft stopper strength	≥ 4kgf.cm
Push & pull strength	≥ 10kgf.cm
shaft inclination	≤ 0.35mm
Shaft wobble (mm p-p)	Within (0.7xL/30)mm p-p L=Shaft Length
Switch working angle	≤0.5mm(push on switch) ≤ 50°(rotary power switch)
Switch working torque	≤1.2kgf.cm(push on switch) ≤ 500gf.cm(rotary power switch)

**Electrical Characteristic:**

Total resistance & tolerance	500Ω < R < 1MΩ :±20%, other:±30%	
Resistance taper	Refer to Standard Resistance Taper	
Power rating	≤ 0.05W	
Max. operating voltage	50V AC 10V DC	
Rotational noise	≤ 100mV	
Insulation resistance	≥ 100mΩ at DC 250V	
Withstanding voltage	1 minute at AC 250V	
Tracking error (Stereo)	For volume control	Within 4.5dB at -40~0dB
	For tone control	Within 2dB at 50% position

**Durability:**

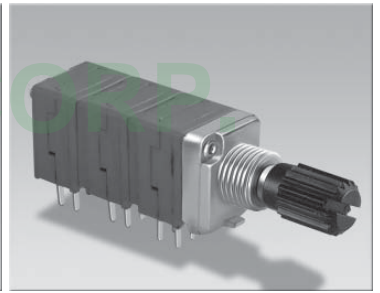
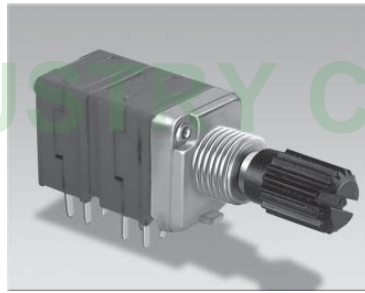
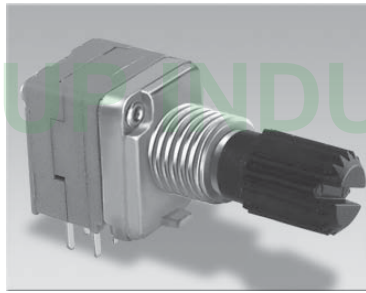
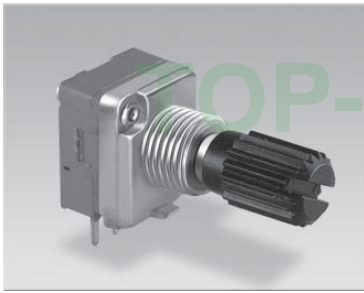
Rotation life	≥ 10,000 cycles
---------------	-----------------

**9MP1HB-B**

**9MP2HB-B**

**9MP4HB-B**

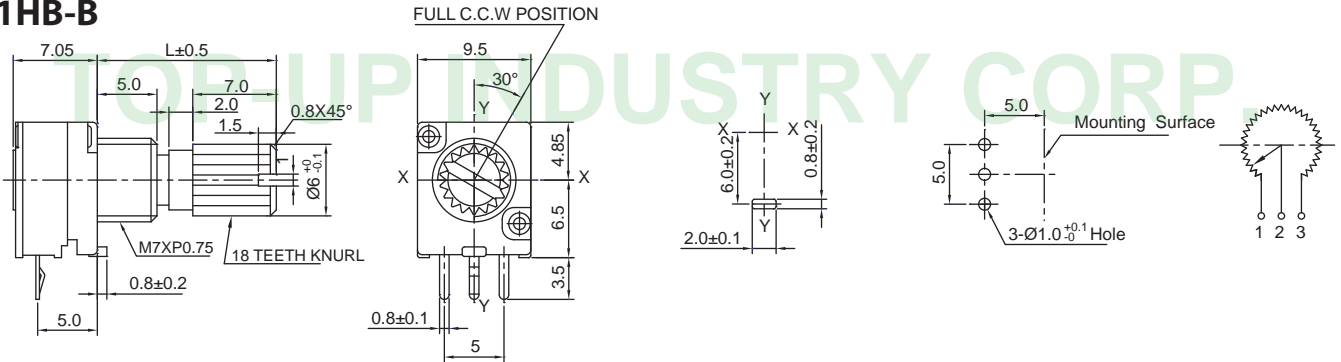
**9MP6HB-B**



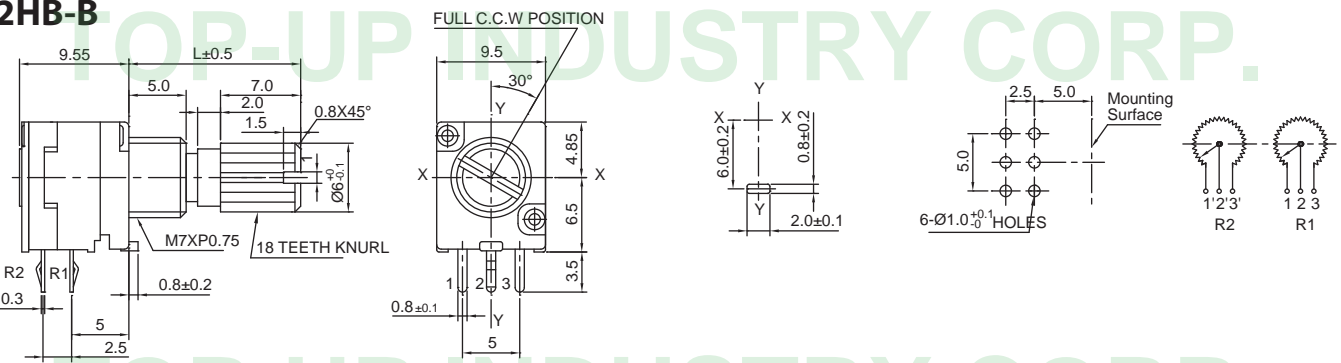
Outline Drawing

Features individual specifications

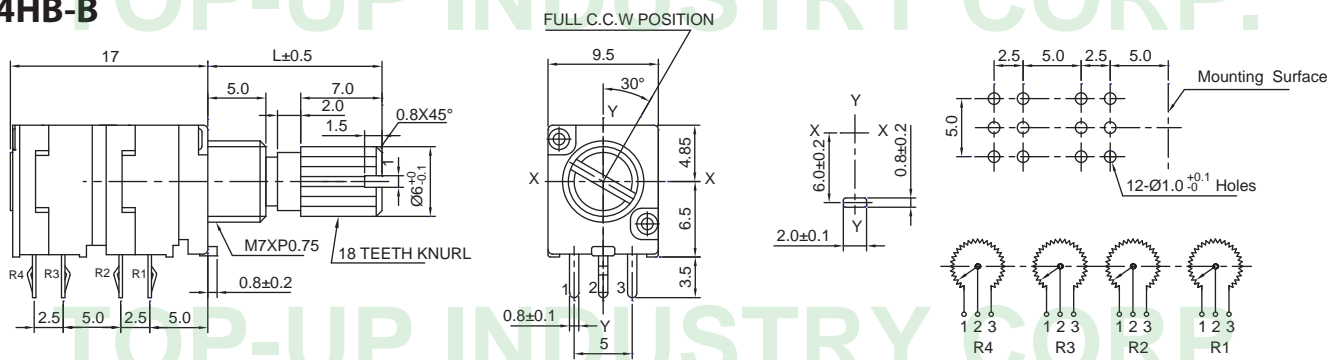
**9MP1HB-B**



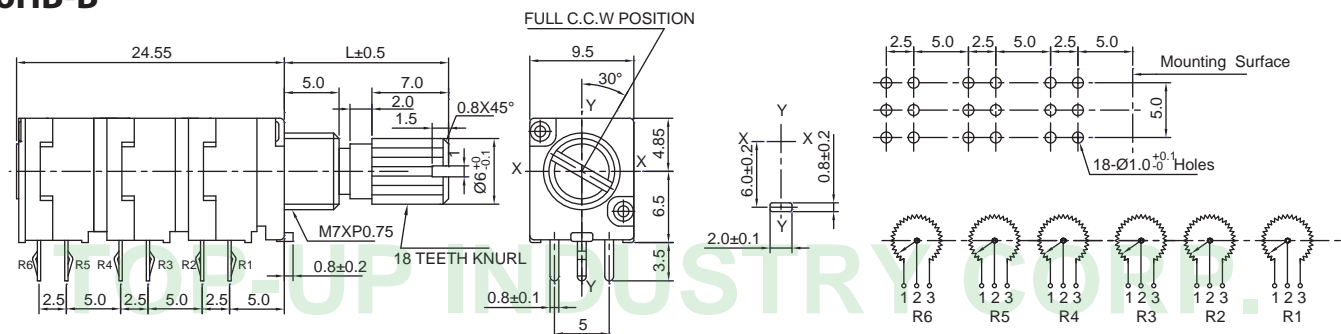
**9MP2HB-B**



**9MP4HB-B**

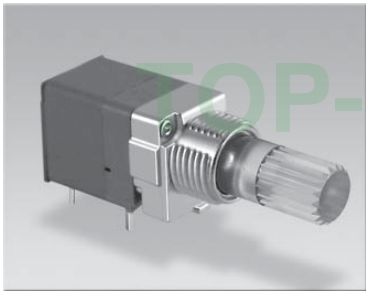


**9MP6HB-B**



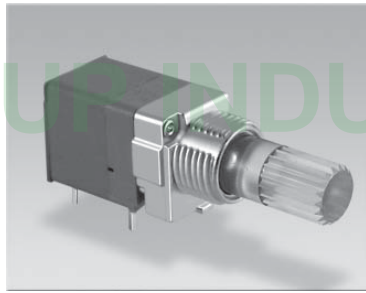


**9ML□1H5B9-B**

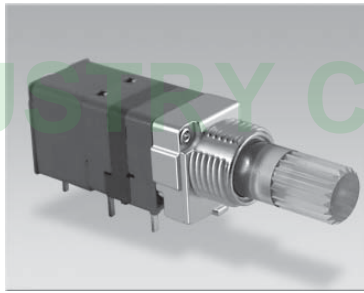


Outline Drawing

**9ML□□1H5B9-B**

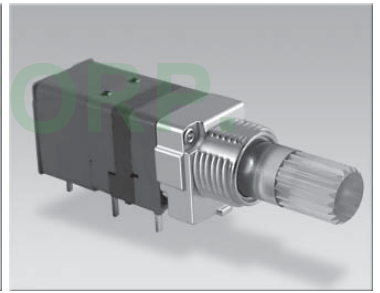


**9ML□ 1RSH5B9-B**

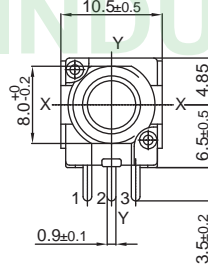
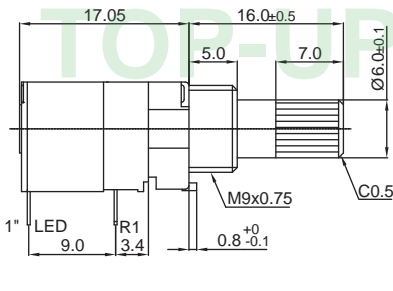


Features individual specifications

**9ML□□1RSH5B9-B**

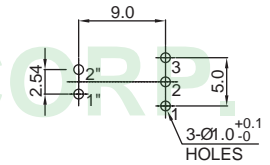


**9ML□1H5B9-B**

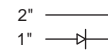


LED COLOR:

CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

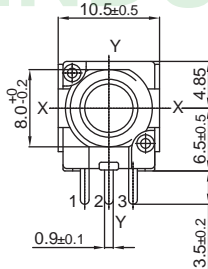
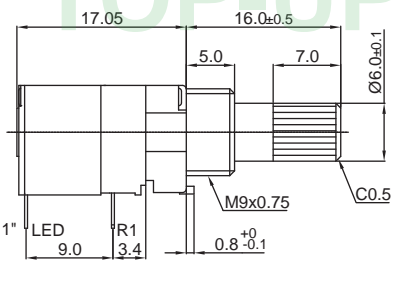


P.W.B MOUNTING DETAIL  
 TOLERANCES±0.1  
 VIEWED FROM MOUNTING SIDE



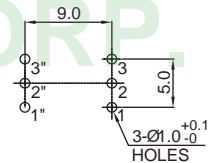
LED CIRCUIT DIAGRAM

**9ML□□1H5B9-B**

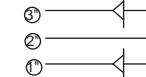


LED COLOR:

CODE	COLOR:	TERMINAL
O	ORANGE	① ②
B	BLUE	③ ②
R	RED	
G	GREEN	

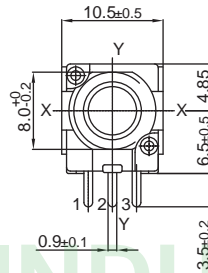
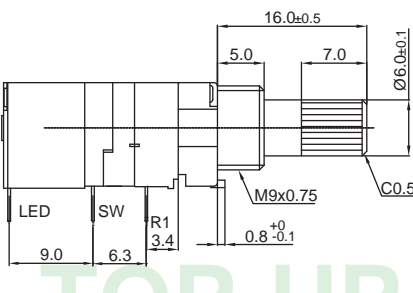


P.W.B MOUNTING DETAIL  
 TOLERANCES±0.1  
 VIEWED FROM MOUNTING SIDE



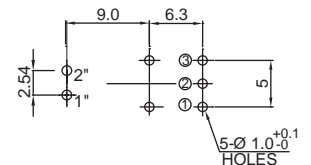
LED CIRCUIT DIAGRAM

**9ML□ 1RSH5B9-B**



LED COLOR:

CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

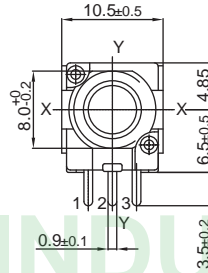
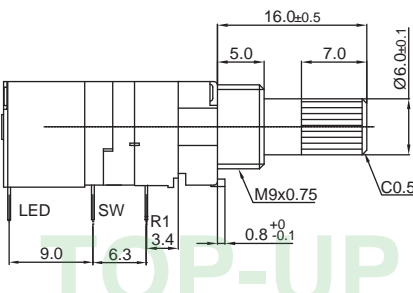


P.C.B MOUNTING HOLES DETAIL



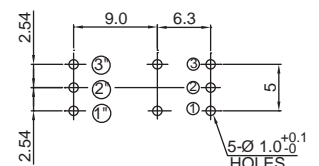
LED CIRCUIT DIAGRAM

**9ML□□1RSH5B9-B**



LED COLOR:

CODE	COLOR:	TERMINAL
O	ORANGE	① ②
B	BLUE	③ ②
R	RED	
G	GREEN	



P.C.B MOUNTING HOLES DETAIL



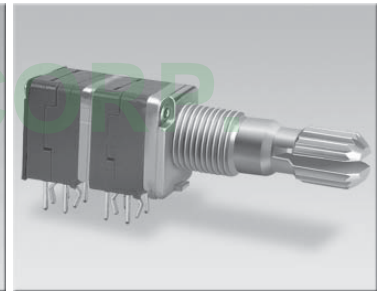
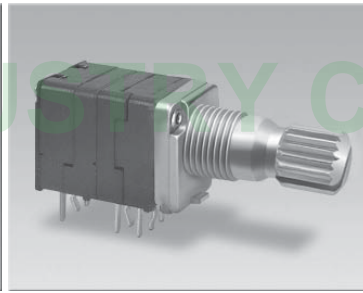
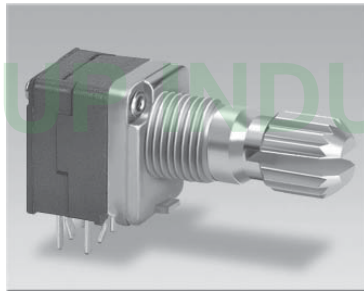
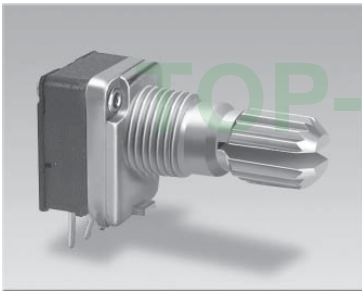
LED CIRCUIT DIAGRAM

**9M1HB-B**

**9M2HB-B**

**9M3HB-B**

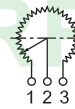
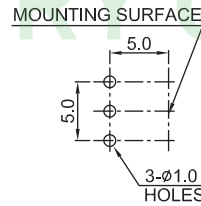
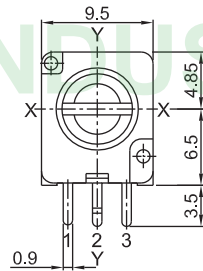
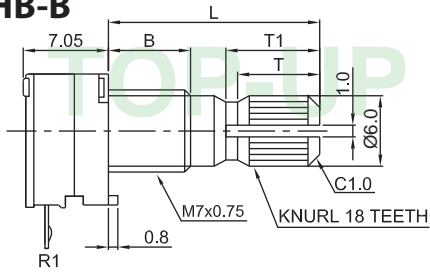
**9M4HB-B**



Outline Drawing

Features individual specifications

**9M1HB-B**

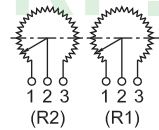
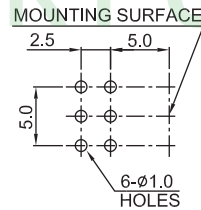
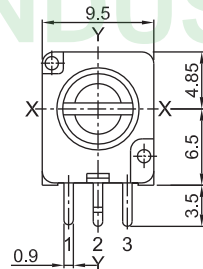
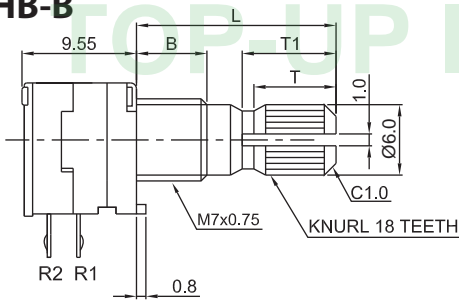


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION SINGLE UNIT

**9M2HB-B**



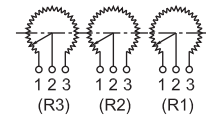
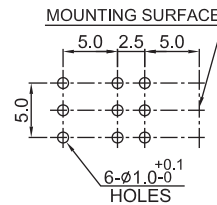
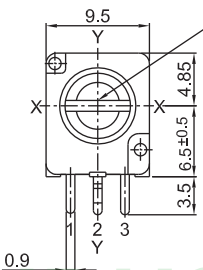
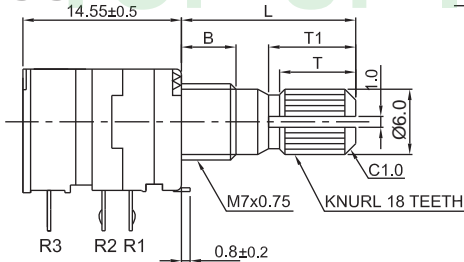
SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION DUAL UNIT

**9M3HB-B**

SHAFT SLOT IS OPTIONAL ANGLE

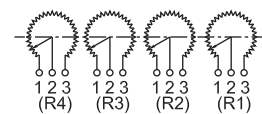
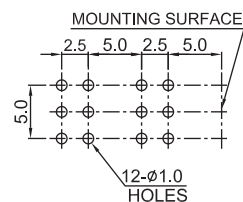
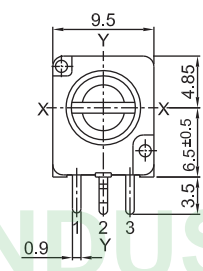
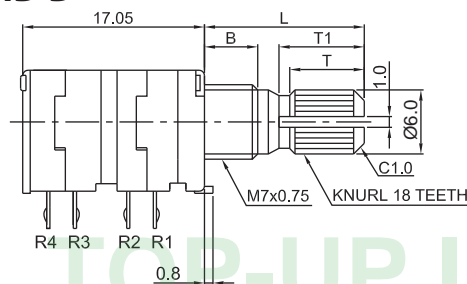


300° ROTATION

SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING DETAIL TOLERANCES ±0.1 VIEWED FROM MOUNTING SIDE

**9M4HB-B**



300° ROTATION

SHAFT SHOWN IN

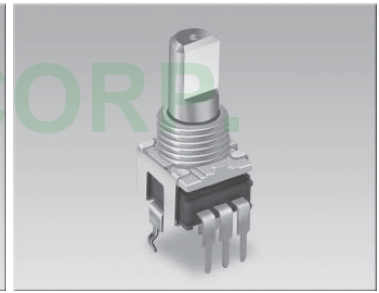
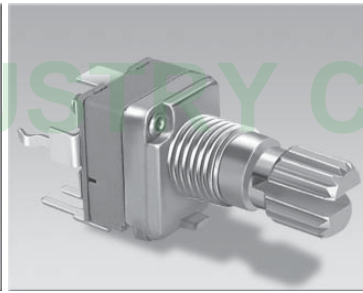
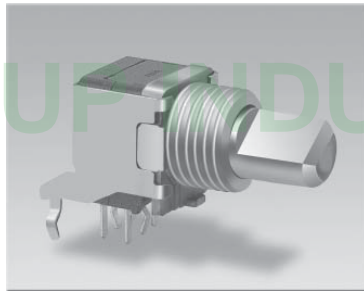
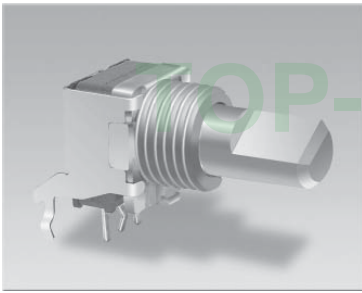


**9M1HBF-B**

**9M2HBF-B**

**9M1V5BBF-D**

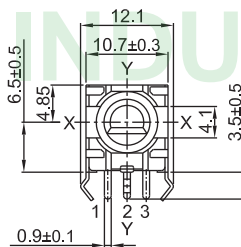
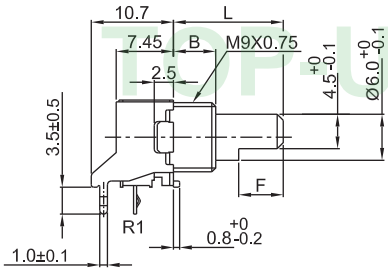
**9M1VBF-D**



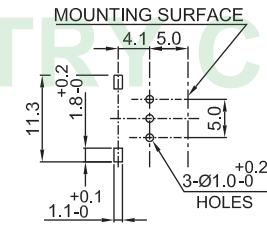
Outline Drawing

Features individual specifications

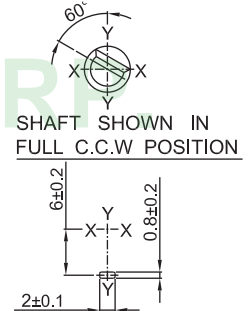
**9M1HBF-B**



SHAFT SHOWN IN CENTER POSITION

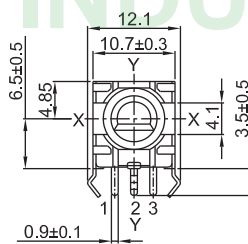
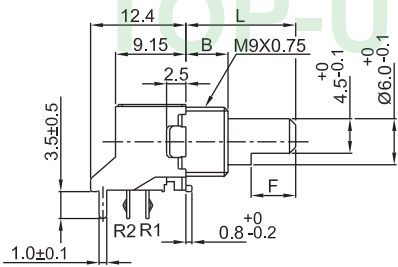


P.C.B MOUNTING DETAIL VIEWED FROM MOUNTING SIDE (TOLERANCE ±0.1)

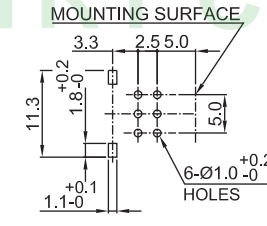


LOCATING LUG DETAIL

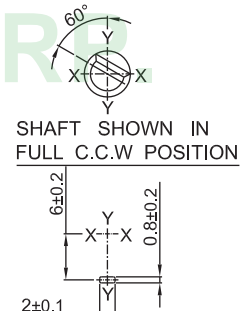
**9M2HBF-B**



SHAFT SHOWN IN CENTER POSITION

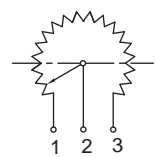
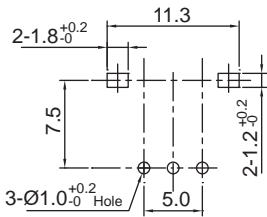
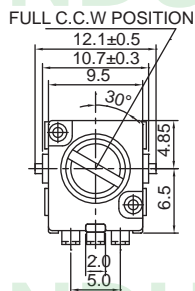
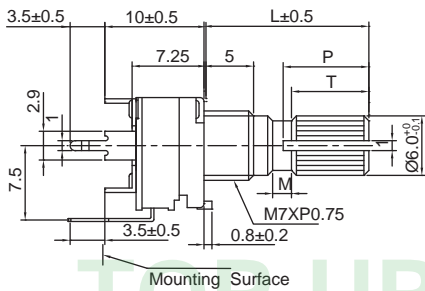


P.C.B MOUNTING DETAIL VIEWED FROM MOUNTING SIDE (TOLERANCE ±0.1)

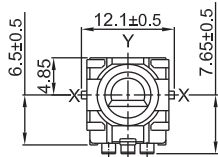
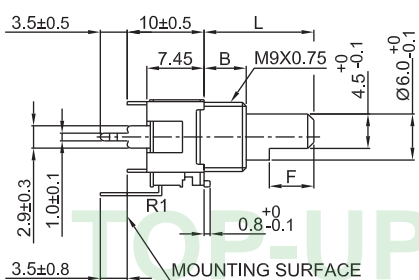


LOCATING LUG DETAIL

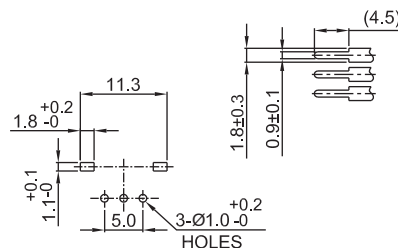
**9M1V5BBF-D**



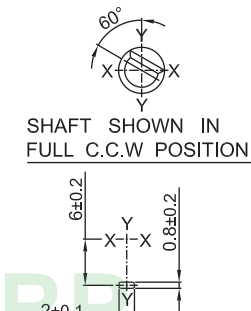
**9M1VBF-D**



SHAFT SHOWN IN CENTER POSITION



P.C.B MOUNTING DETAIL VIEWED FROM MOUNTING SIDE (TOLERANCE ±0.1)



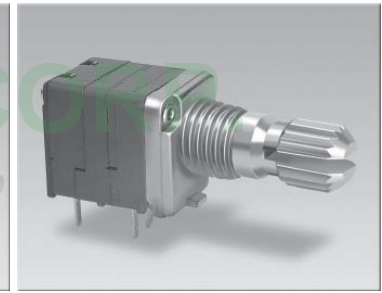
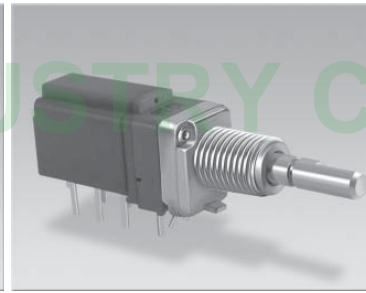
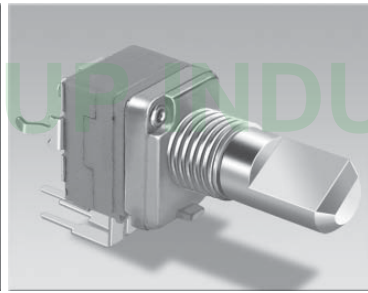
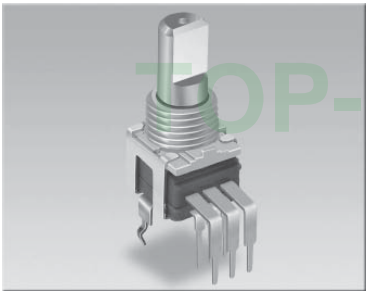
LOCATING LUG DETAIL

**9M2VBF-D**

**9M2V5BB-D**

**9M1PPSHB-B**

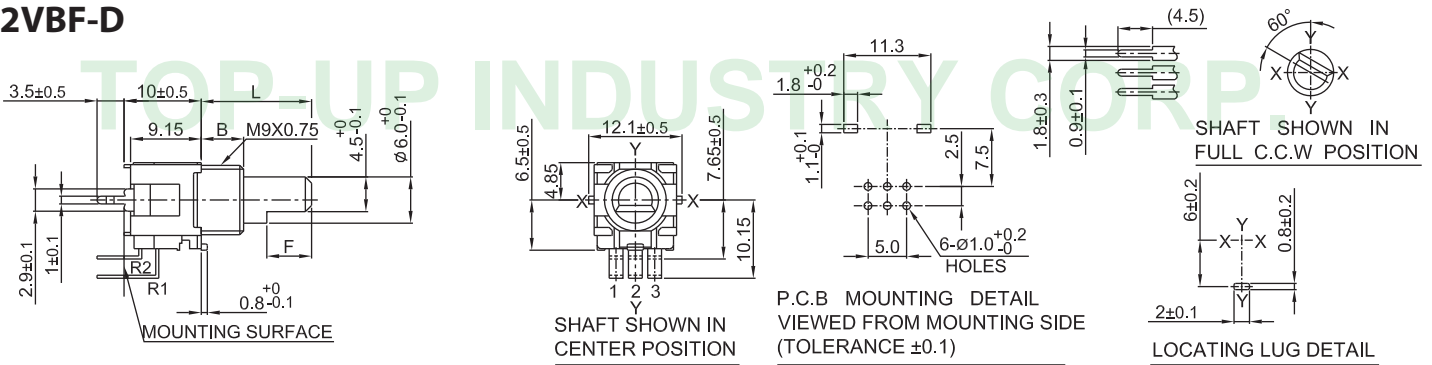
**9M1RSHB-B**



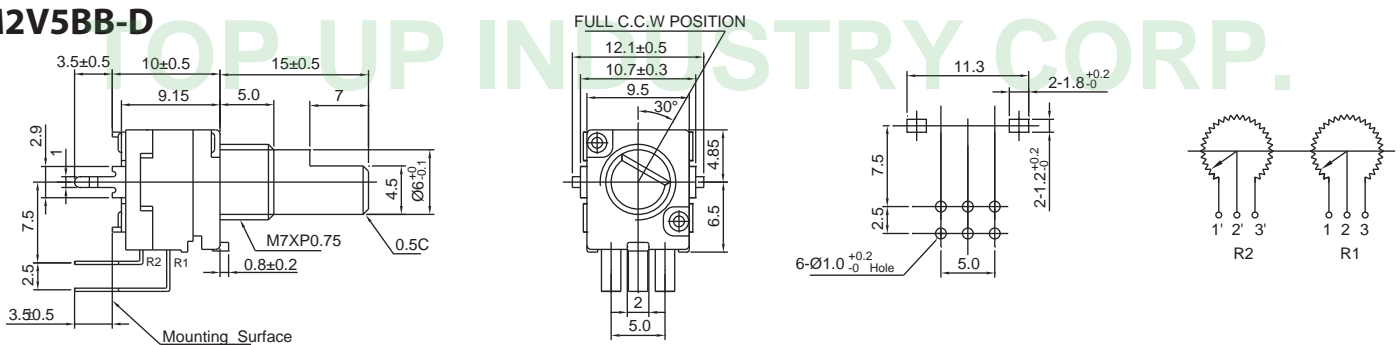
Outline Drawing

Features individual specifications

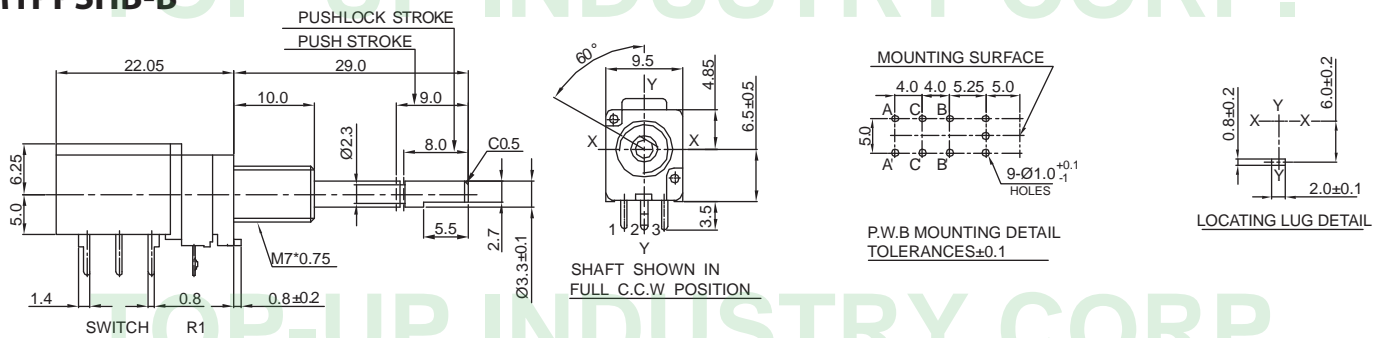
**9M2VBF-D**



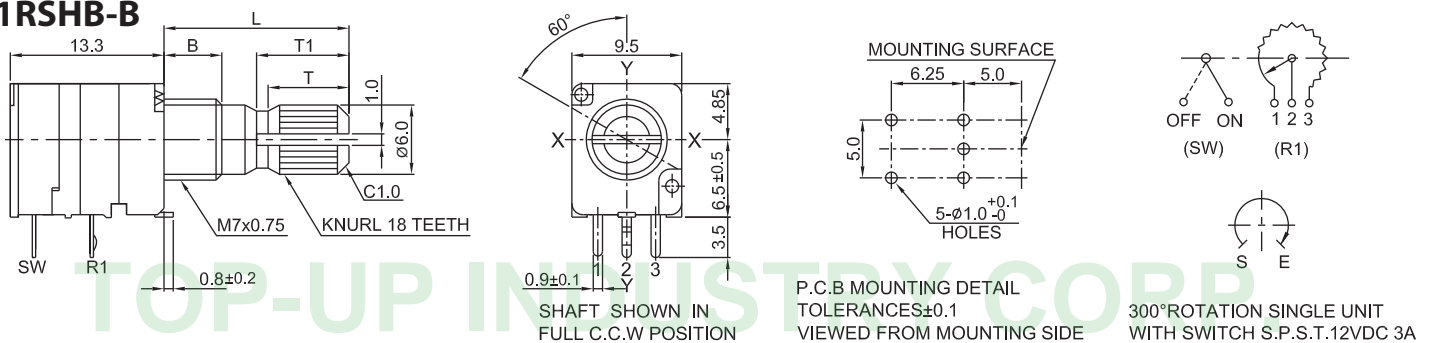
**9M2V5BB-D**



**9M1PPSHB-B**

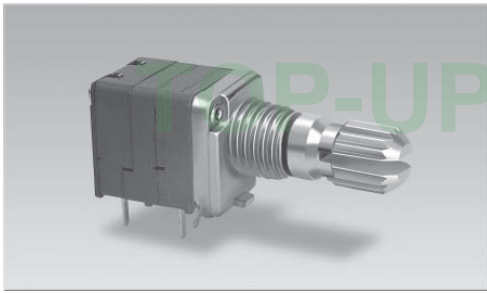


**9M1RSHB-B**



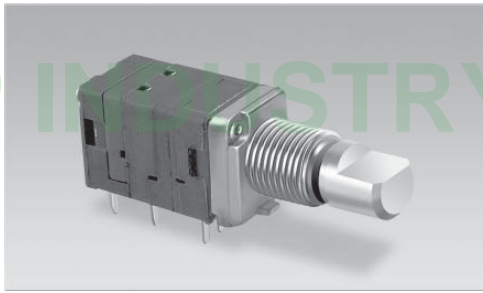


**9M1MSHB-B**



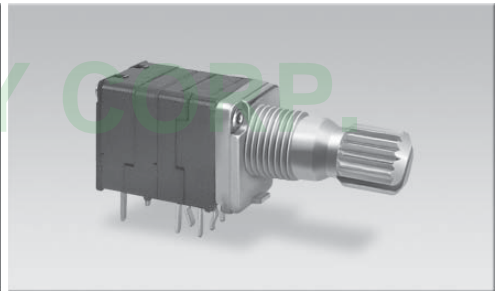
Outline Drawing

**9M1MRSDHB-B**

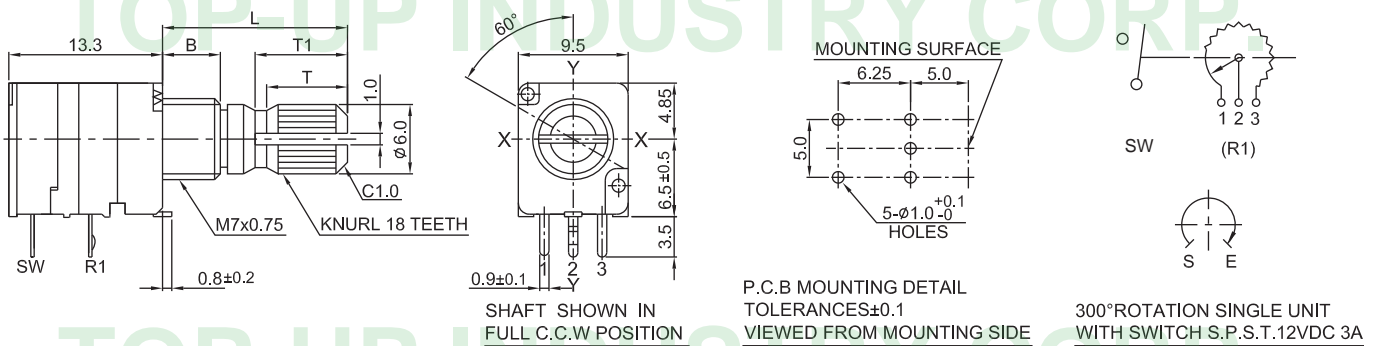


Features individual specifications

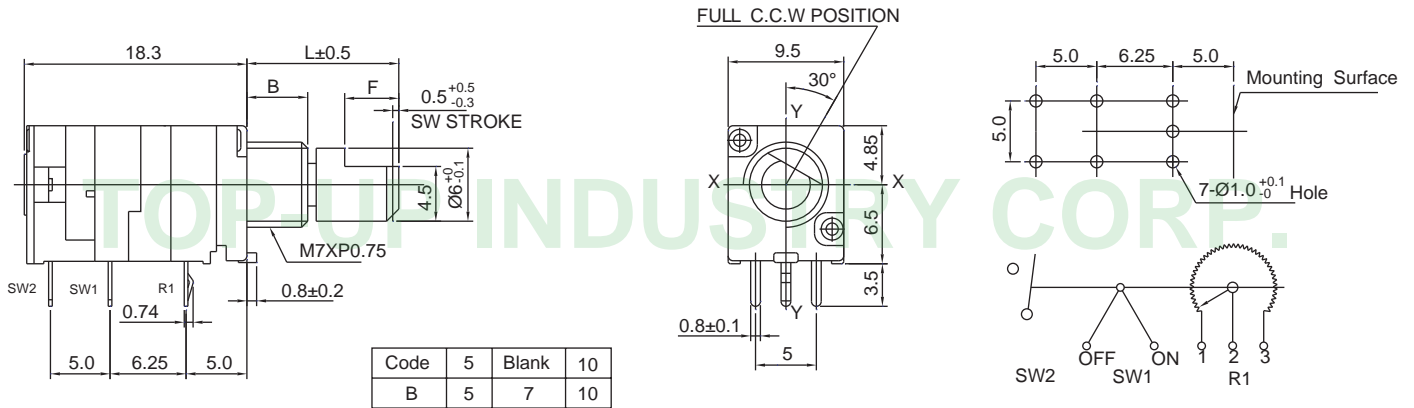
**9M2RSHB-B**



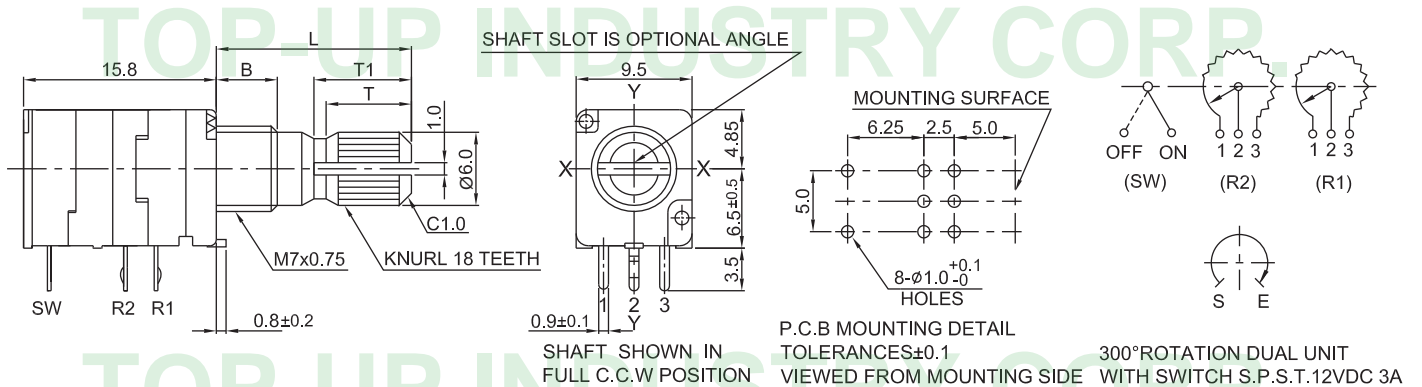
**9M1MSHB-B**



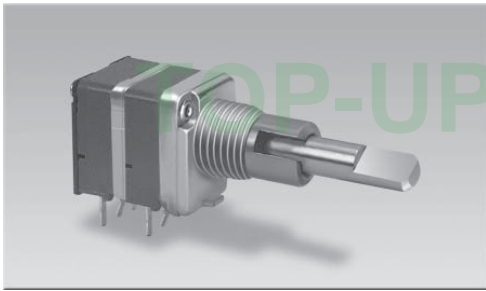
**9M1MRSDHB-B**



**9M2RSHB-B**

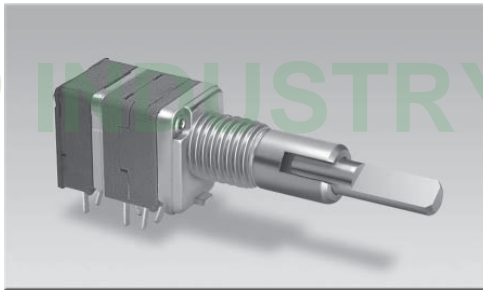


**9MM2H□B-B**



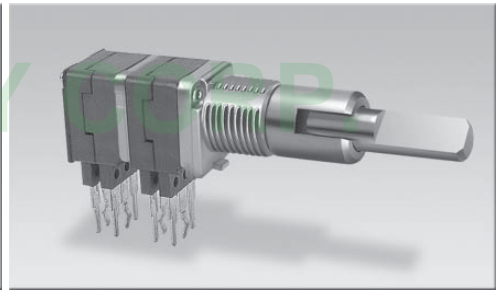
Outline Drawing

**9MM3H□B-B**

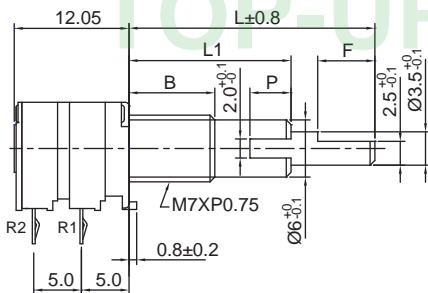


Features individual specifications

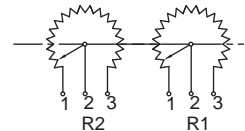
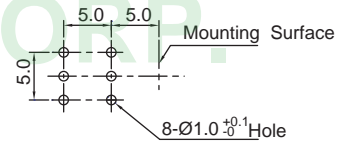
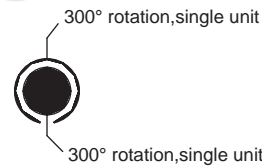
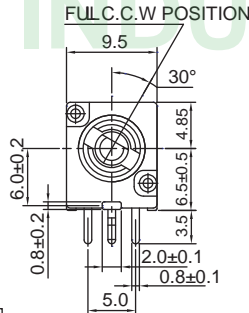
**9MM4H□B-B**



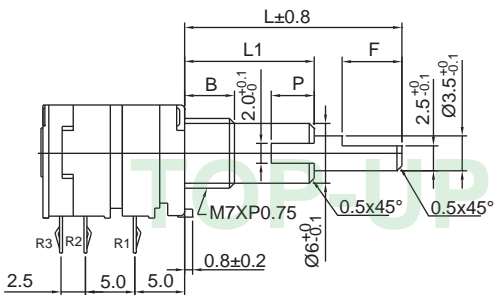
**9MM2H□B-B**



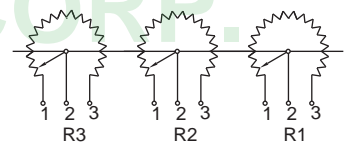
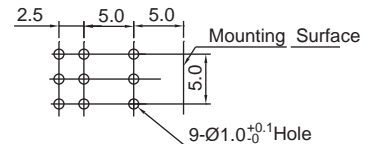
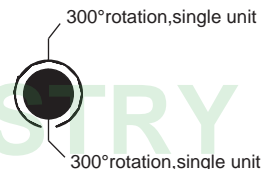
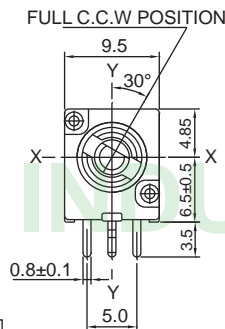
Code	5	Blank	10
B	5	7	10



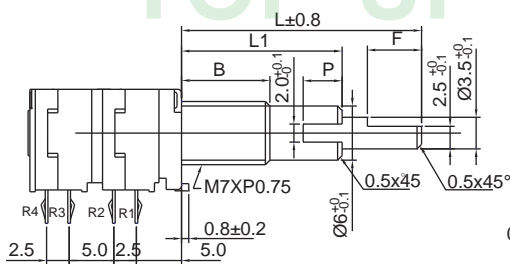
**9MM3H□B-B**



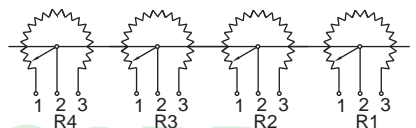
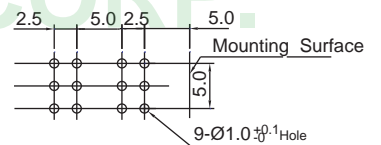
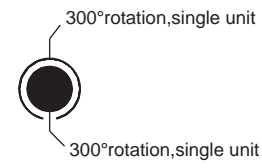
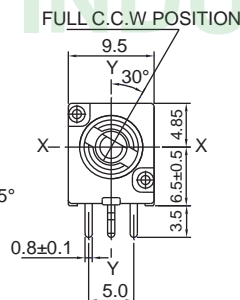
Code	5	Blank	10
B	5	7	10



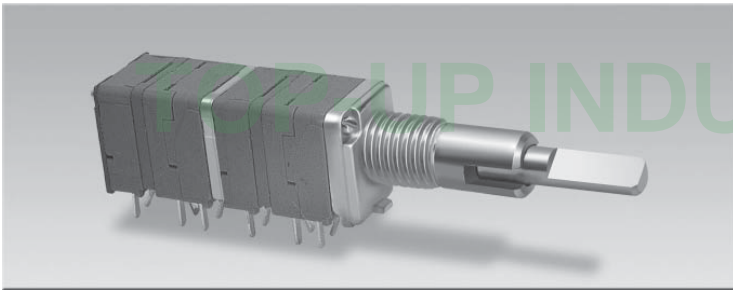
**9MM4H□B-B**



Code	5	Blank	10
B	5	7	10

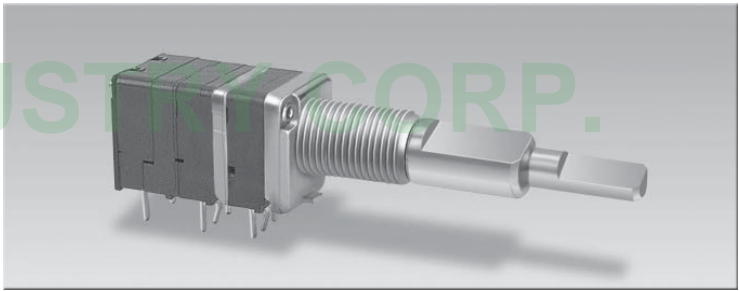


**9MM6HB-B**



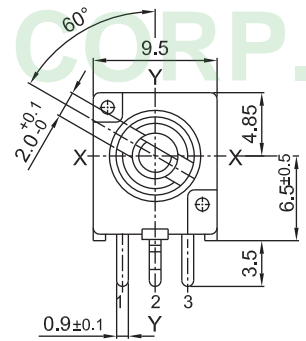
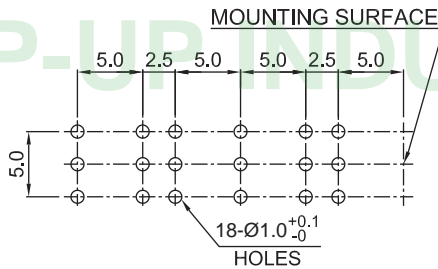
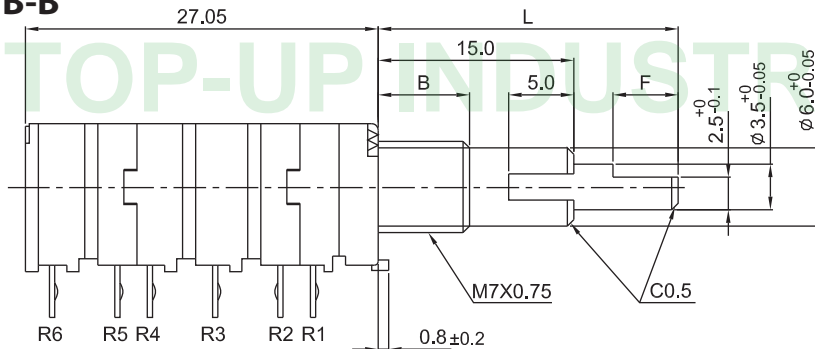
Outline Drawing

**9MM2RSHB-B**

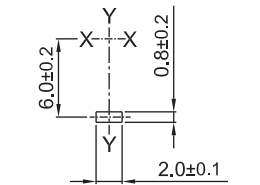


Features individual specifications

**9MM6HB-B**

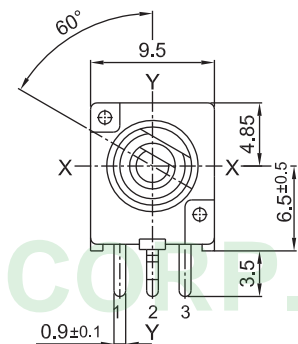
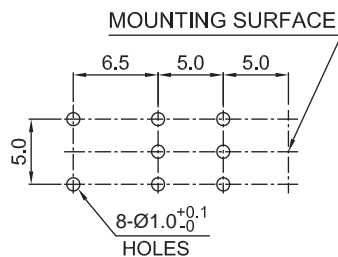
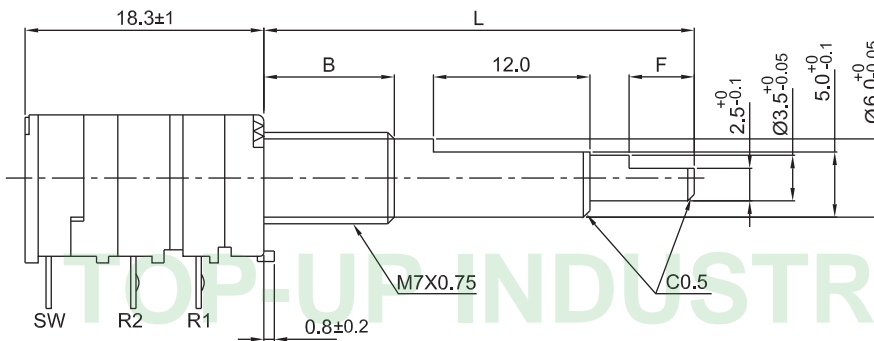


INNER, OUTER SHOWN IN FULL C.C.W POSITION

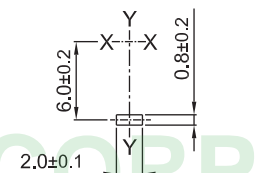


LOCATING LUG DETAIL

**9MM2RSHB-B**

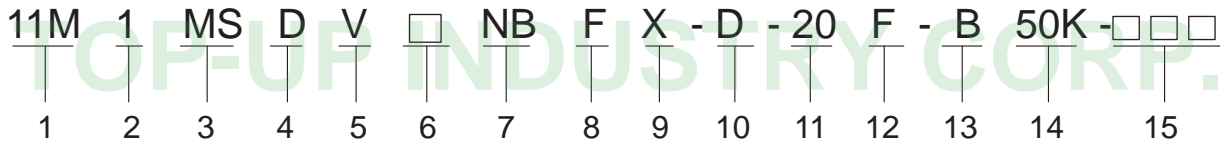


INNER, OUTER SHOWN IN FULL C.C.W POSITION



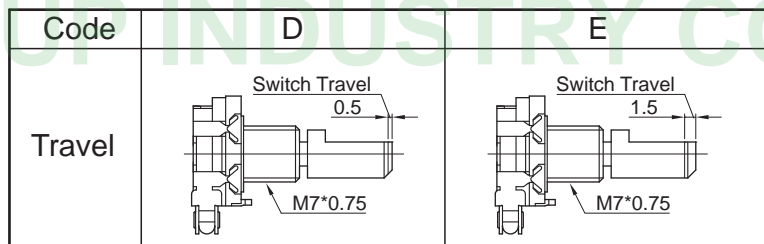
LOCATING LUG DETAIL

## 11M Series Code Explanation



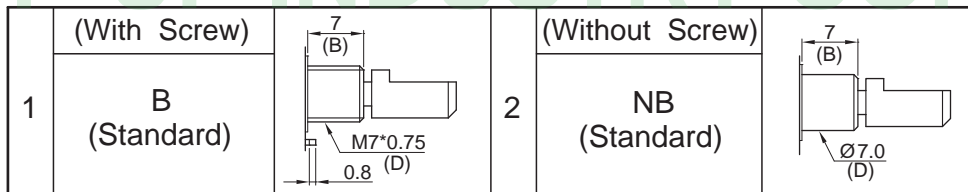
1. Product Lines of 11M ( 11mm Metal Shaft Series )
2. Number of Unit : 1 — Single Unit
3. Type of Switch : MS — "Momentary push type"
4. Switch Travel

( Drawing 1 )



5. Horizontal Type (H) or Vertical Type (V)
6. Bushing Length : Blank- 7mm (Standard Type)
7. Type of Bushing

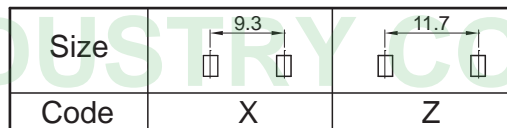
( Drawing 2 )



8. With Frame: "F"

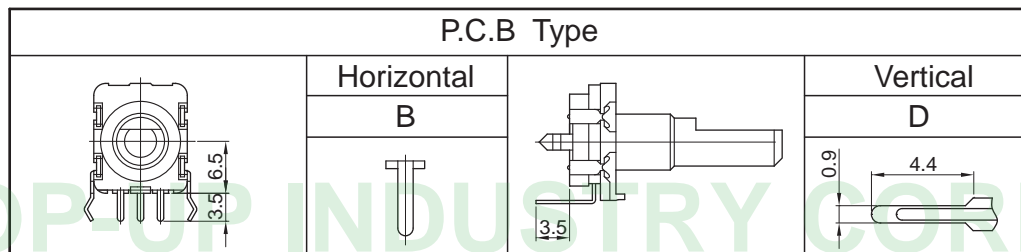
9. Frame Size ( See Drawing 3 )

( Drawing 3 )



10. Type of Terminal

( Drawing 4 )



11. Shaft Length ( See Drawing 5 )

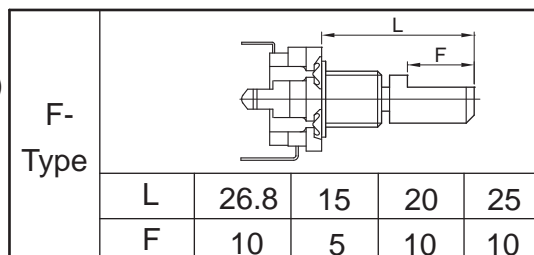
12. Type of Shaft ( See Drawing 5 )

13. Type of Taper

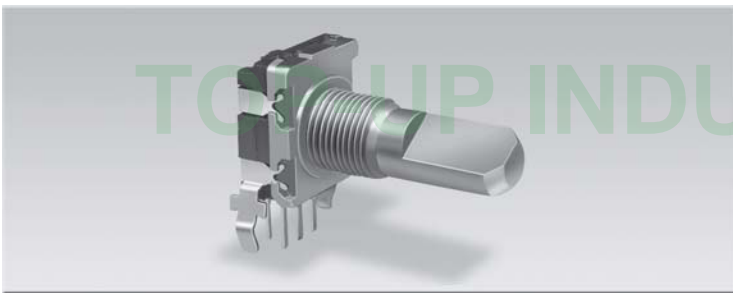
14. Resistance Value

15. Serial No.

( Drawing 5 )

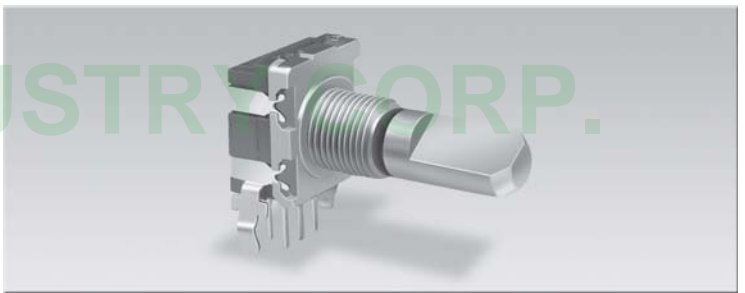


**11M1HBFZ-B**



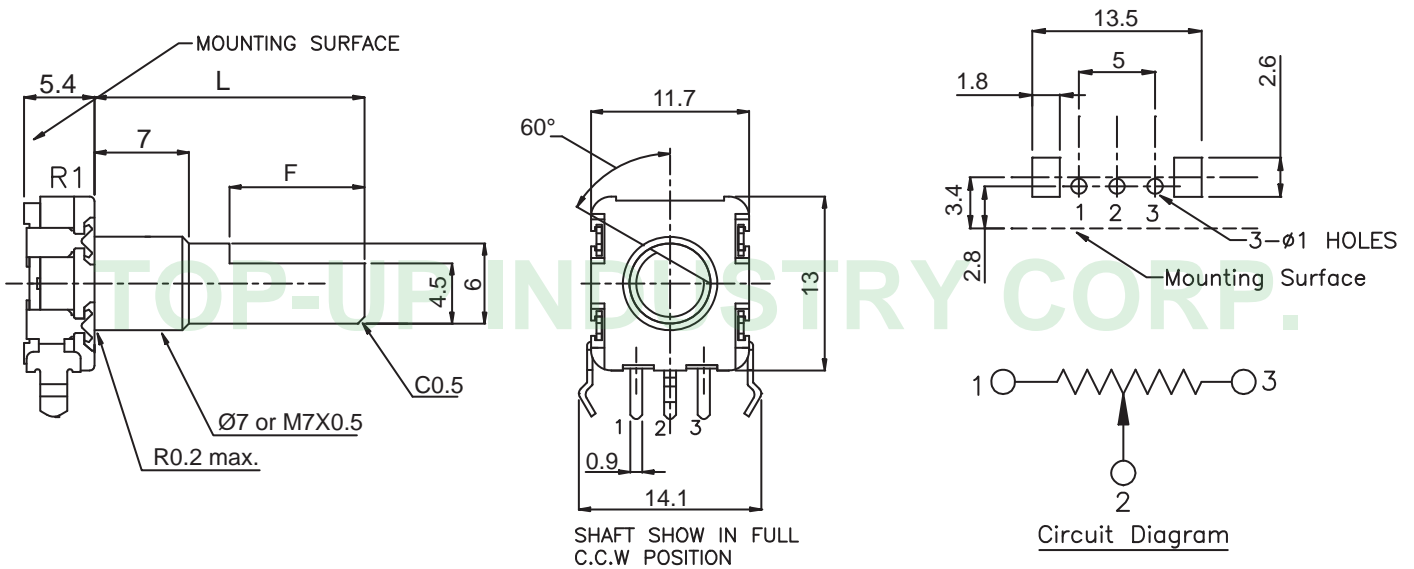
Outline Drawing

**11M1MSDHBZFZ-B**

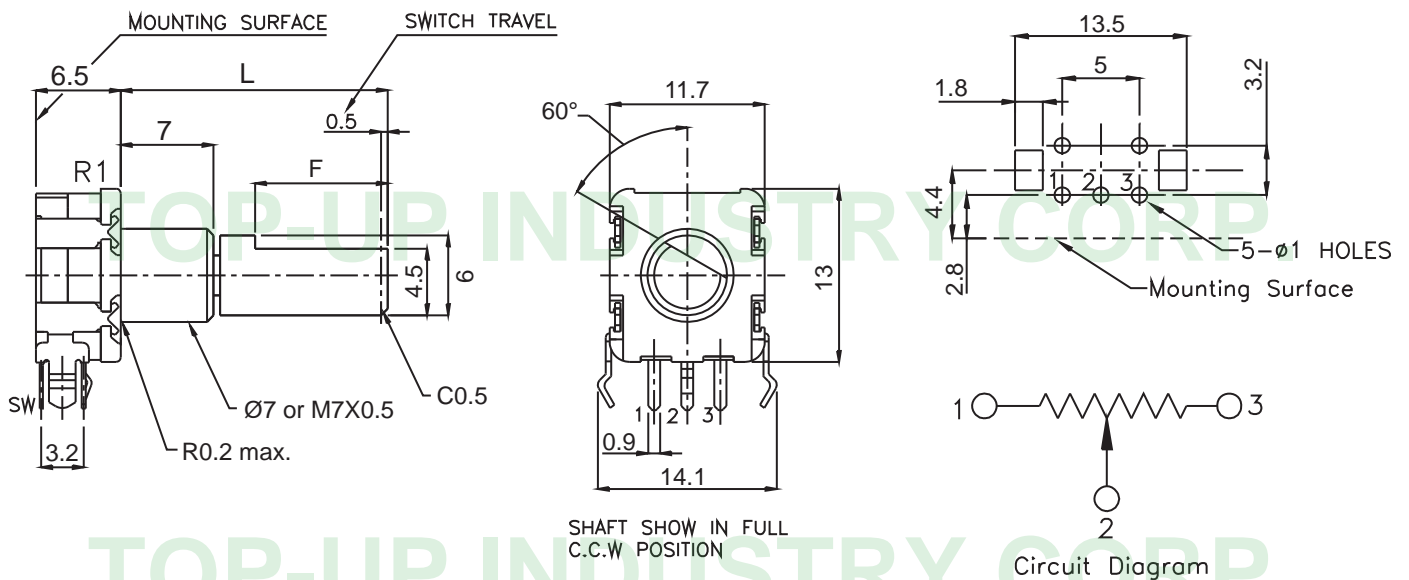


Features individual specifications

**11M1HBFZ-B**

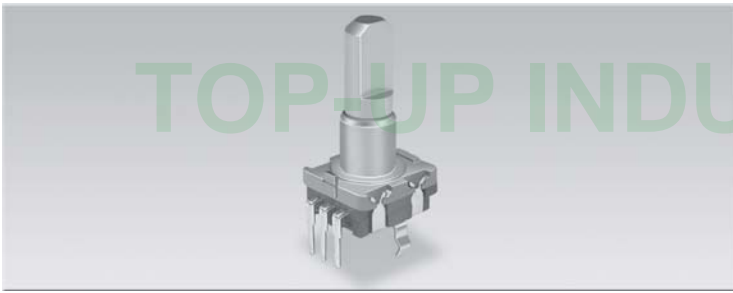


**11M1MSDHBZFZ-B**



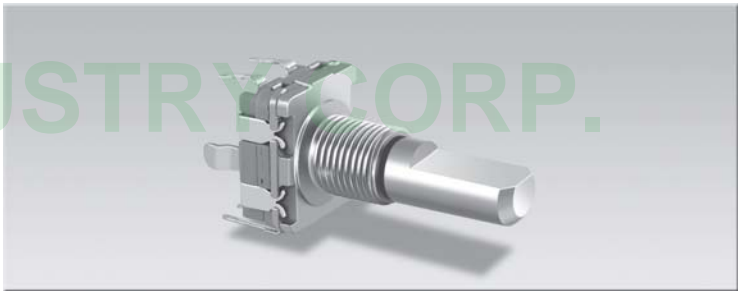


**11M1VNBFX-D**



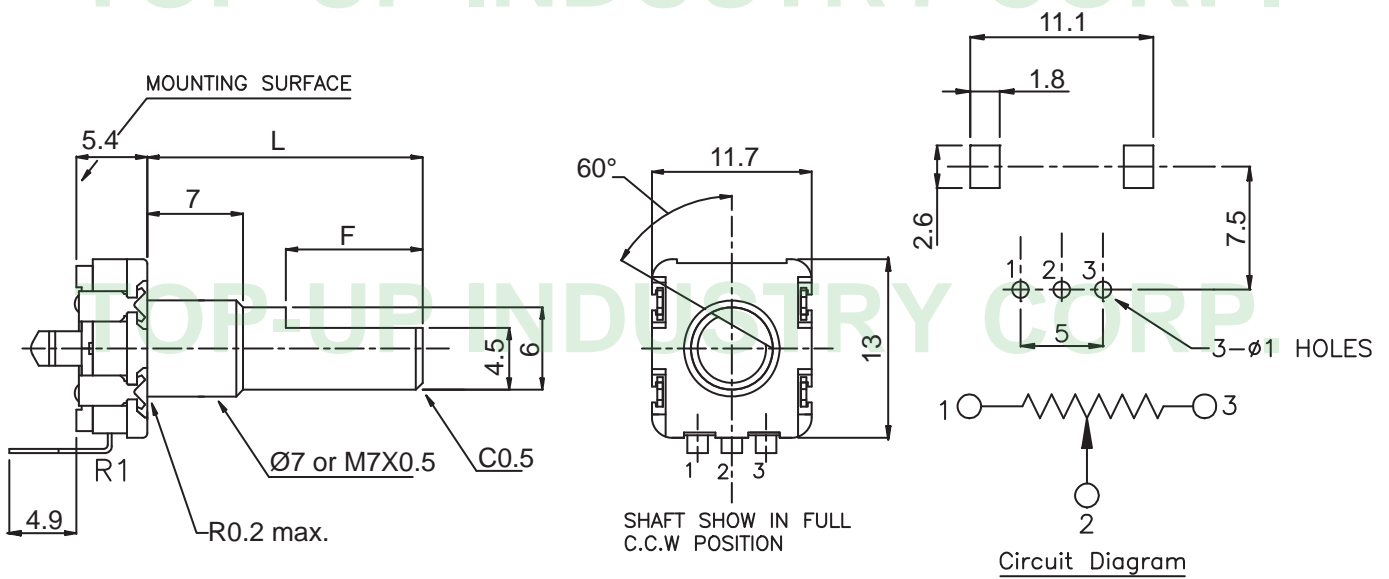
Outline Drawing

**11M1MSDVBFX-D**

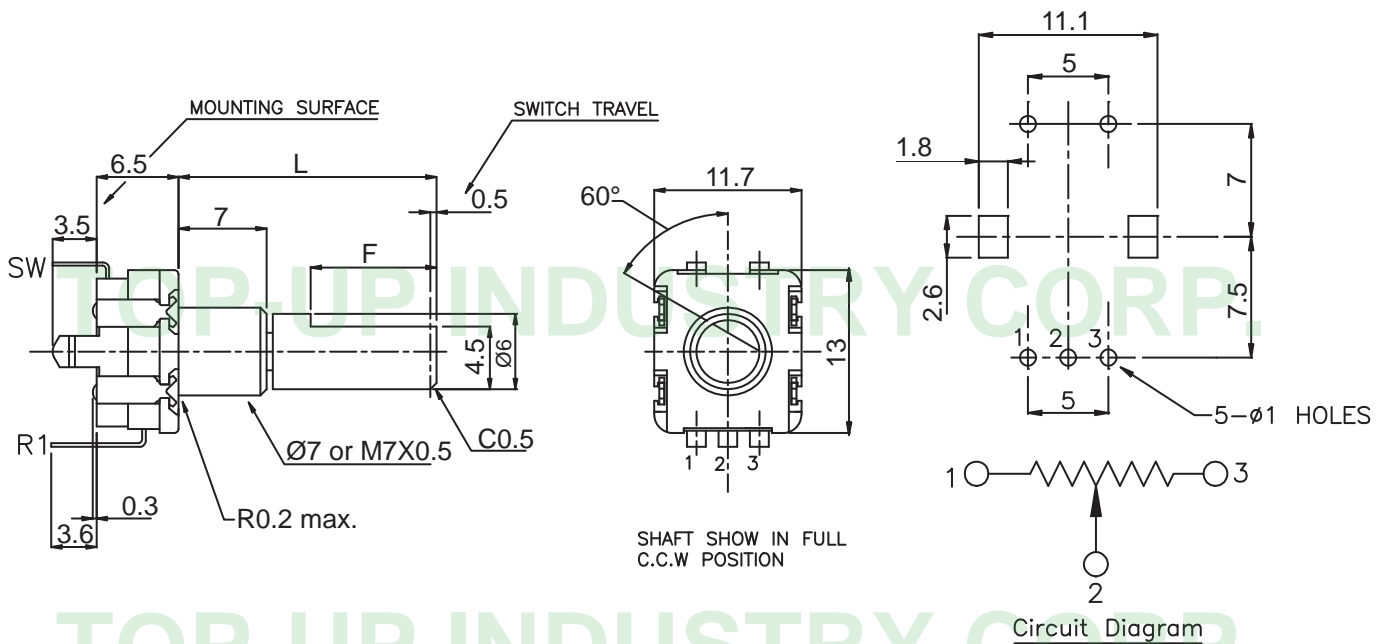


Features individual specifications

**11M1VNBFX-D**



**11M1MSDVBFX-D**

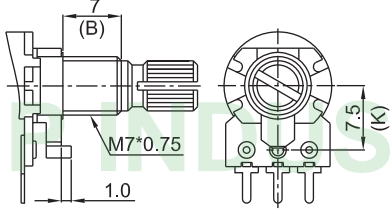
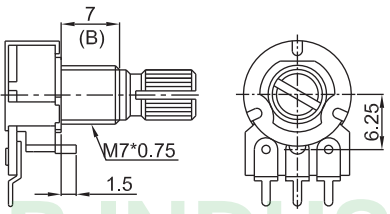


## 12M Series Code Explanation

12M 1 S H 6.7 GB A - A - 20 K - A 10K - 1C - □□□

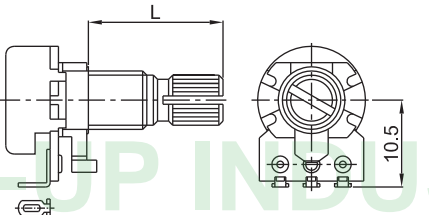
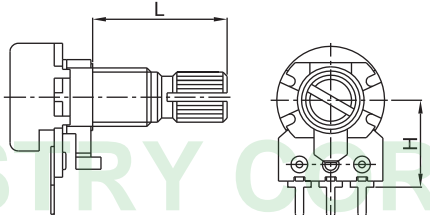
1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. Product lines of 12M (12mm Size Metal Shaft)
2. Number of Unit
  - 1— Single Unit
  - 2— Dual Unit
3. Switch : Blank - Without Switch ( Standard Type ) , S-With Switch
4. Horizontal (H) Type of Vertical (V) Type
5. Bushing Length : Blank-Standard ( See Drawing 1 )
6. Type of Bushing

1	With Screw		Other Type	(B)	5	7	5
	B (Standard)			(K)	7.5	6	6
Bushing Code			5B BK 5BK				
2	With Screw		Other Type	(B)	6.7		
	GB (Standard)						

( Drawing 1 )

7. Bushing Material : Blank-Zinc Alloy ( Standard type ) , A-Aluminum Alloy  
C-Copper Alloy , P-Plastic
8. Type of Terminal ( See Drawing 2 )
9. Shaft Length " L " ( See Drawing 2 )
10. Type of Shaft ( See Drawing 2 )
11. Type of Taper ( See Taper Chart Page 220 )
12. Resistance Value
13. Number of Clicks : ( Blank-None , 1C- Center Click )
14. Serial No.

Bushing Type B With Screw	A (Solder Lug Type)	B (P.C.B Type)
	Single Unit	Single Unit
		

(Drawing 2)

## 12M Series Code Explanation

12M 1 S H 6.7 GB A - A - 20 K - A 10K - 1C - □ □ □

1 2 3 4 5 6 7 8 9 10 11 12 13 14

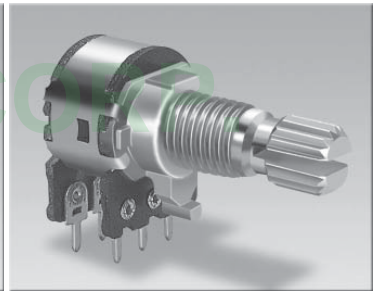
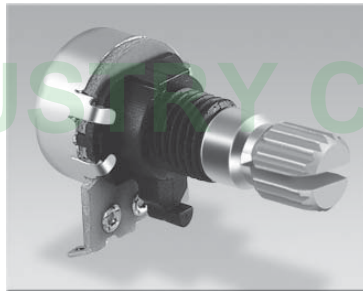
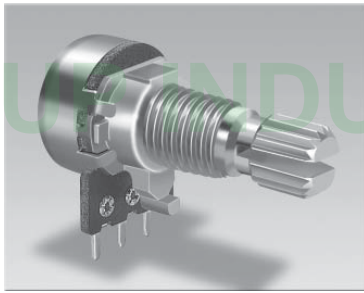
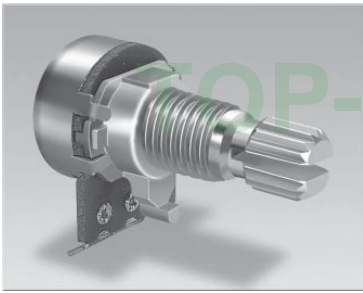
Bushing Type B With Screw	Dual Unit				Dual Unit							
				H	10	12.5	14.5					
				Terminal	B	B1	B2					
Bushing Type GB With Screw	B (P.C.B Type)								( Drawing 2 )			
			Single Unit			Dual Unit						
	A (Solder Lug Type)				B (P.C.B Type)							
	Single Unit				Single Unit							
Dual Unit				Dual Unit								
Type of Shaft	K - Type				F - Type				S - Type			
	L	15	20	25	L	15	20	25	L	15	20	25
	T	6	8	12	F	7	12	12	L	15	20	25
M	1	2	4									

**12M1H□B-A**

**12M1H□B-□**

**12M1H□BP-A**

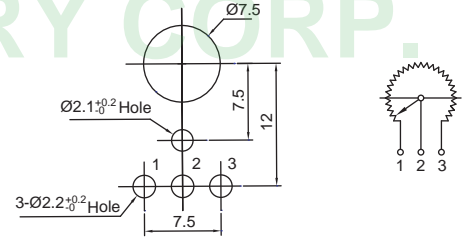
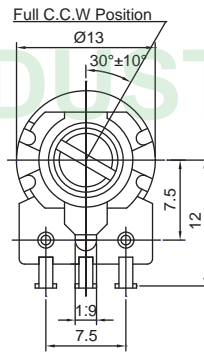
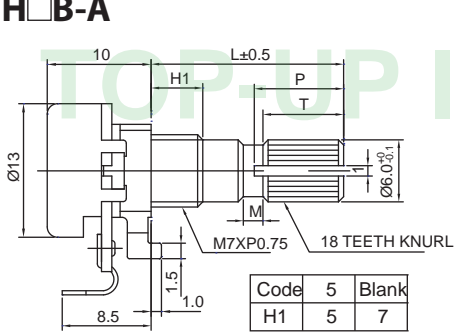
**12M2H□B-□**



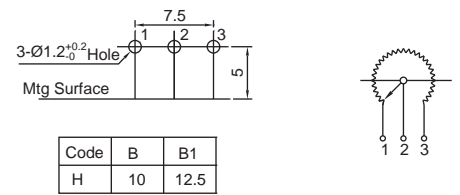
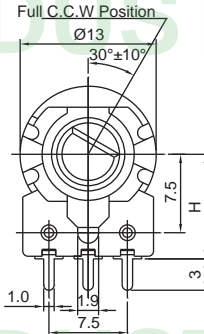
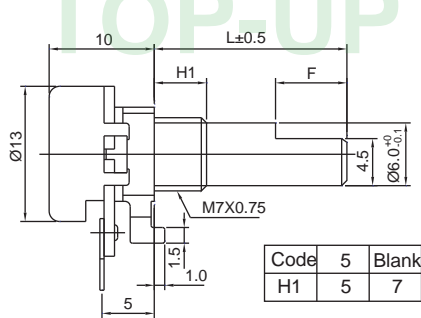
Outline Drawing

Features individual specifications

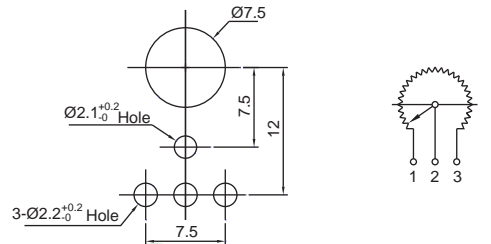
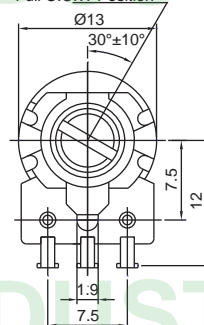
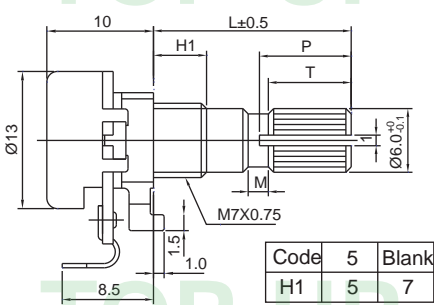
**12M1H□B-A**



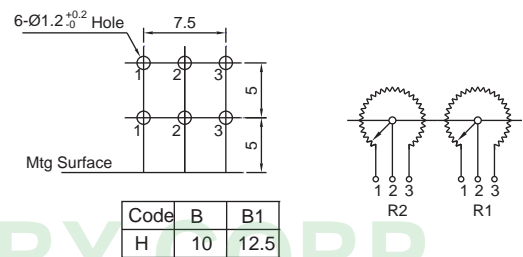
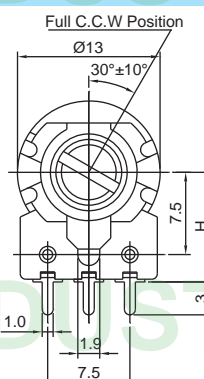
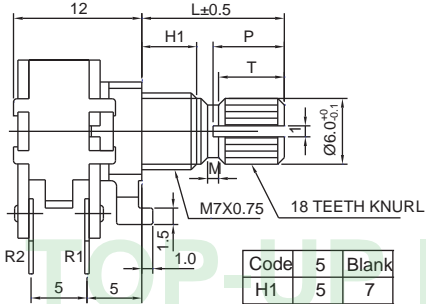
**12M1H□B-□**



**12M1H□BP-A**



**12M2H□B-□**

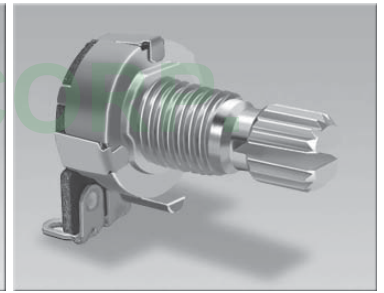
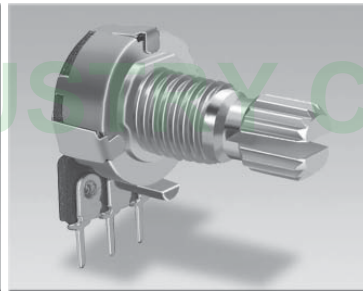
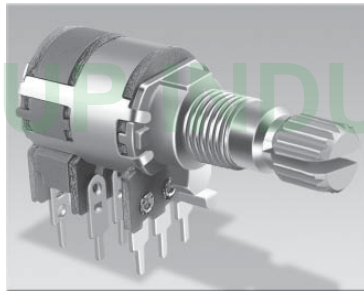
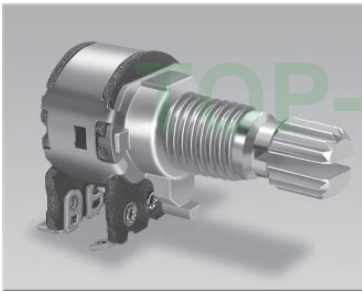


**12M2H□B-A**

**12M2SH□B-□**

**12M1HGB-□**

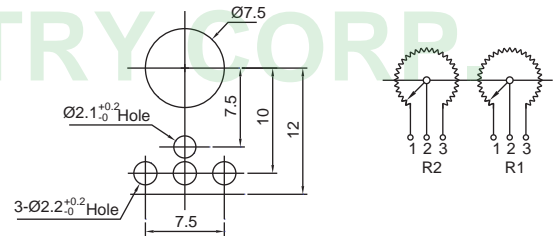
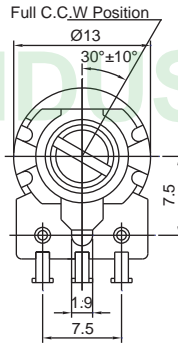
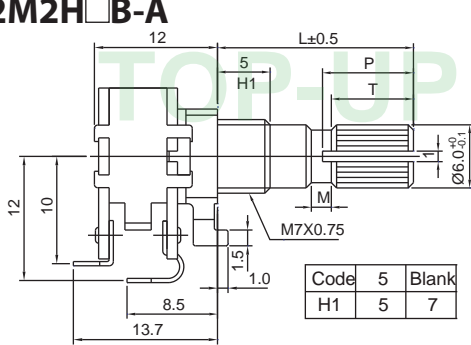
**12M1HGB-A**



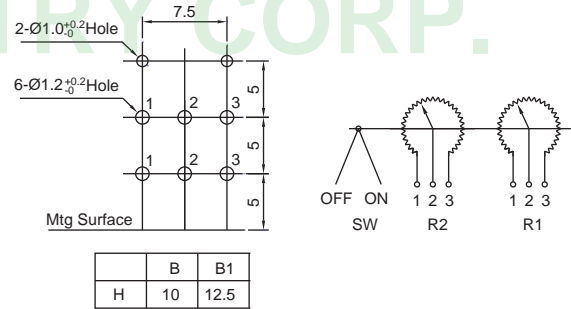
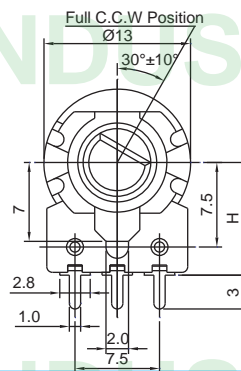
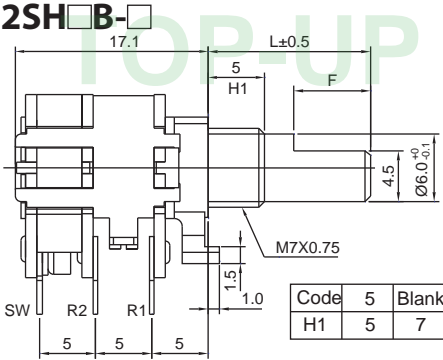
Outline Drawing

Features individual specifications

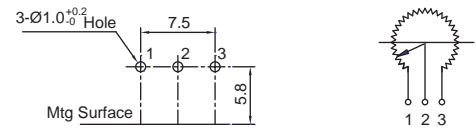
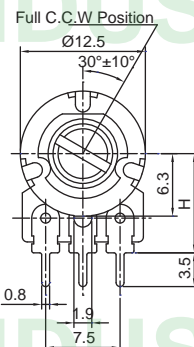
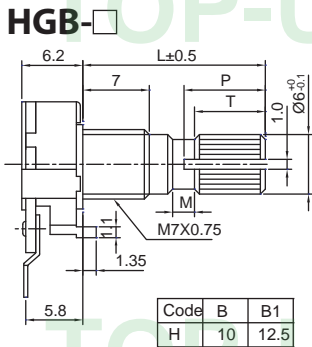
**12M2H□B-A**



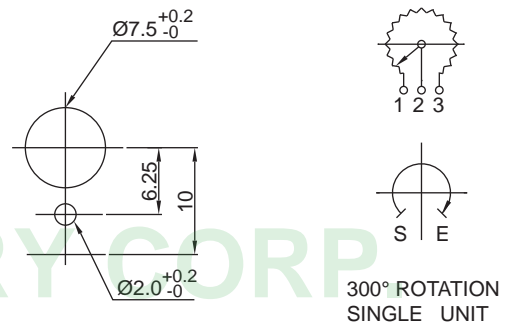
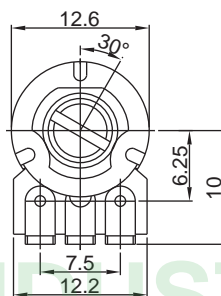
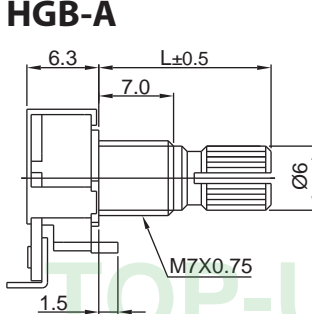
**12M2SH□B-□**



**12M1HGB-□**



**12M1HGB-A**



SHAFT SHOWN IN FULL C.C.W POSITION

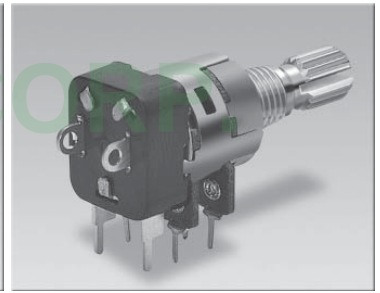
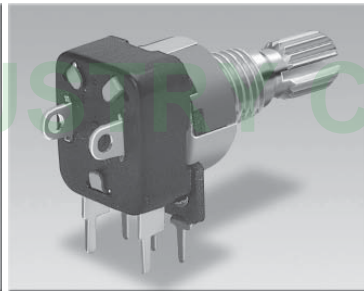
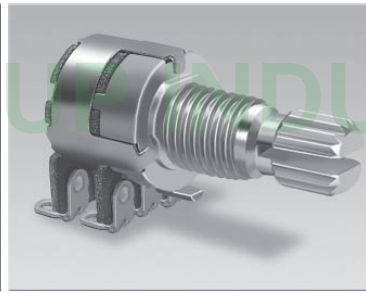
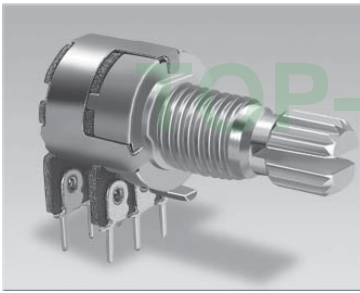


**12M2HGB-□**

**12M2HGB-A**

**12M1SHGB-□**

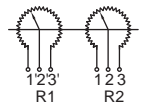
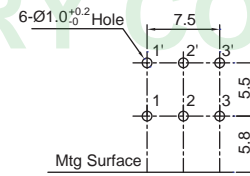
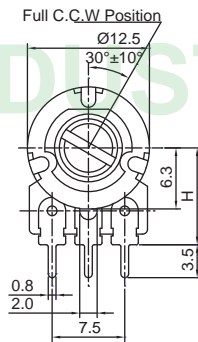
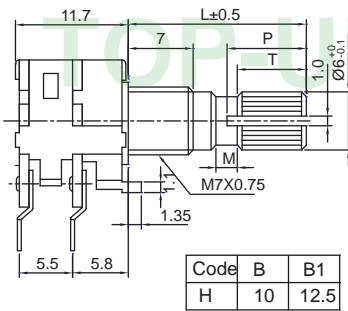
**12M2SHGB-□**



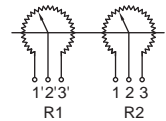
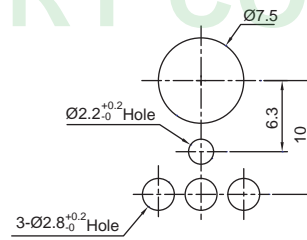
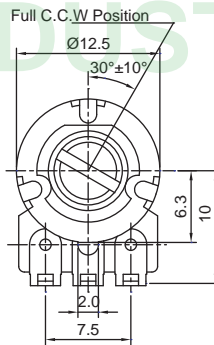
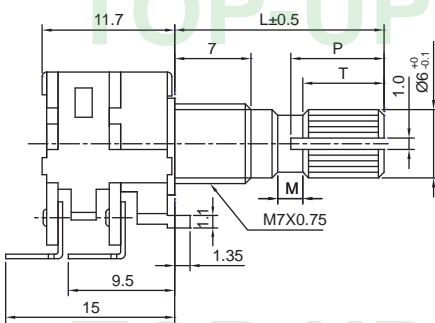
Outline Drawing

Features individual specifications

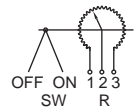
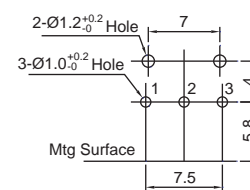
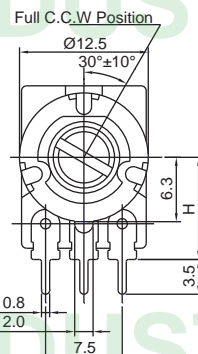
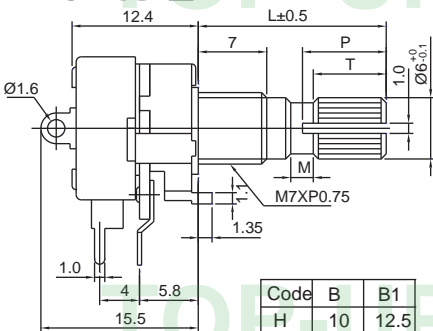
**12M2HGB-□**



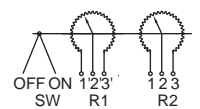
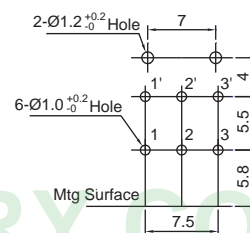
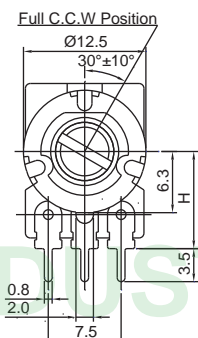
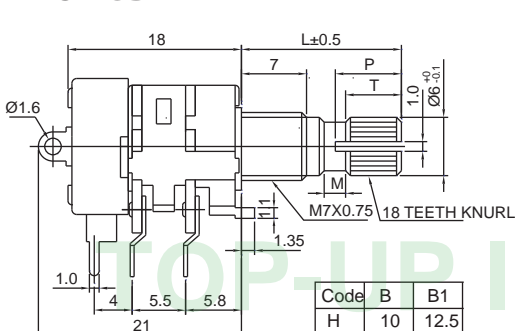
**12M2HGB-A**



**12M1SHGB-□**



**12M2SHGB-□**

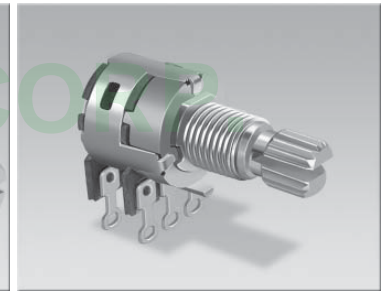
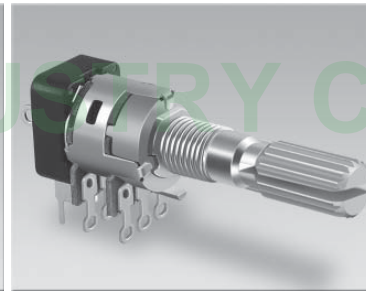
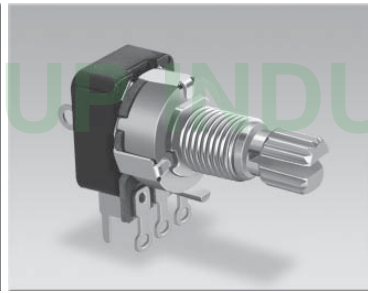
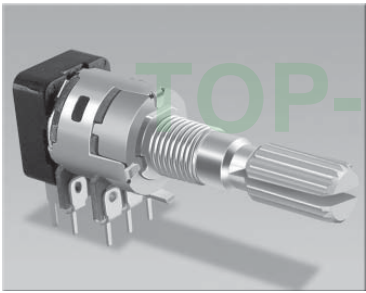


**12M2NSHGB-B**

**12M1SHGB-A**

**12M2SHGB-A**

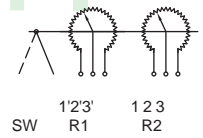
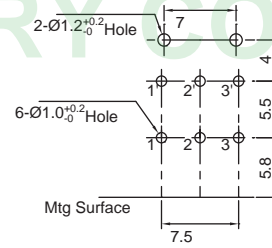
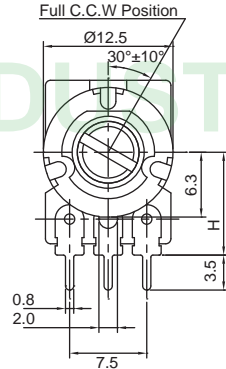
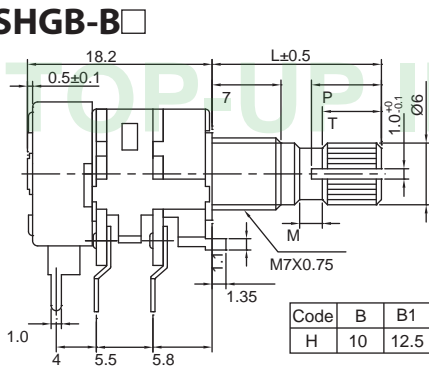
**12M2HGB-A(1)**



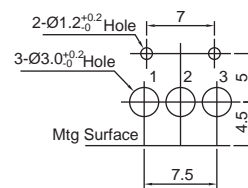
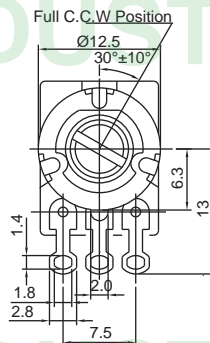
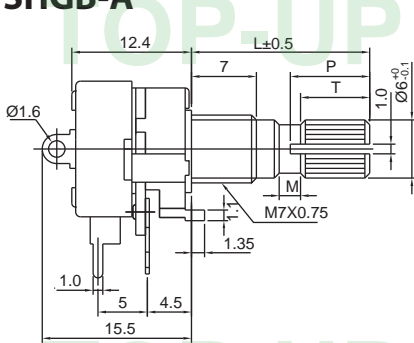
Outline Drawing

Features individual specifications

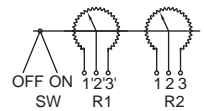
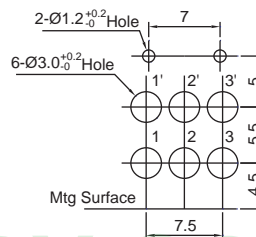
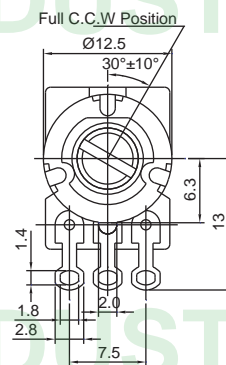
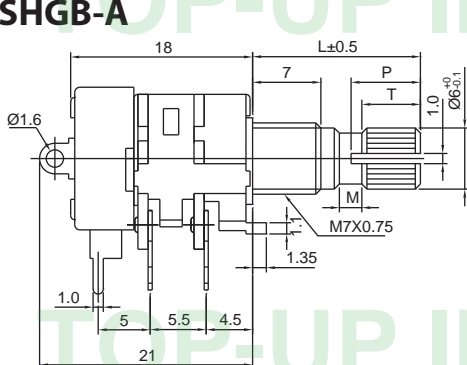
**12M2NSHGB-B**



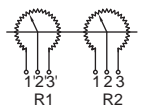
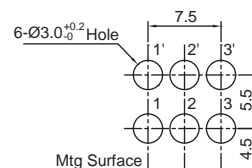
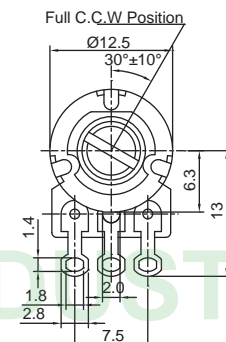
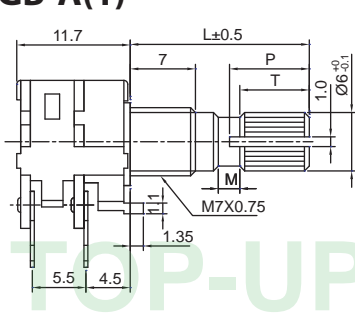
**12M1SHGB-A**



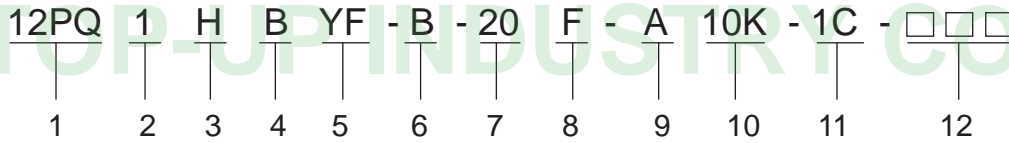
**12M2SHGB-A**



**12M2HGB-A(1)**



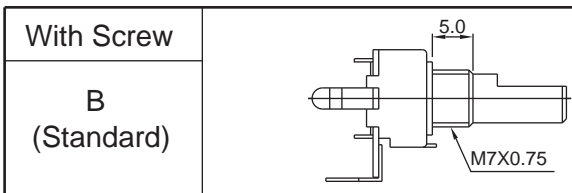
# 12PR, 12PQ, 12MR Series Code Explanation



- Product Lines of 12PR, 12PQ, 12MR  
 ( Snap-in Insulated Shaft , 12mm Size, 12PR and 12PQ Series )  
 ( Metal Shaft , 12mm Size, 12MR Series )
- Number of Unit: 1 — Single Unit 2 — Dual Unit
- Horizontal (H) Type or Vertical (V) Type ( Drawing 3)
- With Bushing (Only 12MR Series) (Drawing 2)
- Type of Frame (See Drawing 1) (Drawing 1)

12PQ Series	Horizontal		Vertical	
	F - Type	YF - Type	F - Type	NF - Type

- Type of Terminal (See Drawing 3)
- Shaft Length "L" (See Drawing 3)
- Type of Type (See Drawing 3)
- Type of Taper (See Taper Chart Page 220)
- Resistance Value
- Number of Clicks : Blank - None, 1C -Center Click (Drawing 2)
- Serial No. ( Drawing 3)



12PR Series			
Vertical		Horizontal	
Single Unit	Dual Unit	Single Unit	Dual Unit

To Be Continued

# 12PR, 12PQ, 12MR Series Code Explanation

( Drawing 3 )

12MR Series																																																																														
D (P.C.B Type)																																																																														
Vertical							Single Unit			Dual Unit																																																																				
12PQ Series																																																																														
D (P.C.B Type)						B (P.C.B Type)																																																																								
Vertical						Horizontal																																																																								
Single Unit						Single Unit																																																																								
F - Type						K - Type																																																																								
KB - Type																																																																														
<table border="1"> <thead> <tr> <th>Model</th> <th>L</th> <th>15</th> <th>17</th> <th>20</th> <th>25</th> <th>30</th> <th>41</th> <th>Model</th> <th>L</th> <th>10</th> <th>12</th> <th>15</th> <th>20</th> <th>25</th> <th>36</th> </tr> </thead> <tbody> <tr> <td>12PR2VF-D</td> <td>F</td> <td>4.85</td> <td>7</td> <td>7</td> <td>8</td> <td>12</td> <td>12</td> <td>12PR1VF-D</td> <td>F</td> <td>4.85</td> <td>7</td> <td>7</td> <td>8</td> <td>12</td> <td>12</td> <td></td> </tr> <tr> <td>12PQ1VNF-D</td> <td>T</td> <td>5</td> <td></td> <td>7</td> <td>12</td> <td>12</td> <td></td> <td>12PQ1HF-B</td> <td>T</td> <td>5</td> <td></td> <td>10</td> <td>12</td> <td>12</td> <td></td> </tr> <tr> <td>12PQ1VF-D</td> <td>T1</td> <td></td> <td></td> <td>7</td> <td>10</td> <td>12</td> <td>12</td> <td></td> <td>T1</td> <td></td> <td></td> <td>7</td> <td>10</td> <td>12</td> <td>12</td> </tr> </tbody> </table>														Model	L	15	17	20	25	30	41	Model	L	10	12	15	20	25	36	12PR2VF-D	F	4.85	7	7	8	12	12	12PR1VF-D	F	4.85	7	7	8	12	12		12PQ1VNF-D	T	5		7	12	12		12PQ1HF-B	T	5		10	12	12		12PQ1VF-D	T1			7	10	12	12		T1			7	10	12	12
Model	L	15	17	20	25	30	41	Model	L	10	12	15	20	25	36																																																															
12PR2VF-D	F	4.85	7	7	8	12	12	12PR1VF-D	F	4.85	7	7	8	12	12																																																															
12PQ1VNF-D	T	5		7	12	12		12PQ1HF-B	T	5		10	12	12																																																																
12PQ1VF-D	T1			7	10	12	12		T1			7	10	12	12																																																															

## 12mm SIZE SNAP-IN INSULATED SHAFT POTENTIOMETERS

### Mechanical Characteristic

Total rotational angle	300°±5°
Rotational torque	20 ~ 200gf.cm
Detent position	Center detent only
Detent slip out force	Rotational torque + 30 ~ 100gf.cm
Shaft stopper strength	≥ 4kgf.cm
Push& pull strength	≥ 5kgf.cm
Shaft inclination	≤ 0.35mm
Shaft wobble (mm p-p)	Within(0.7xL/20)mm p-p Max. L=Shaft Length

### Electrical Characteristic

Total resistance & tolerance	500Ω <R <1MΩ : ±20%, other : ±30%	
Resistance taper	Refer to Standard Resistance Taper	
Power rating	≤ 0.05W	
Max. operating voltage	50V AC 20V DC	
Rotational noise	≤ 47 mV	
Insulation resistance	≥ 100MΩ at DC 250V	
Withstanding voltage	1 minute at AC 250V	
Tracking error (Stereo)	For volume control	Within 3dB at -40 ~ 0dB
	For tone control	Within 2dB at 50% position

### Durability

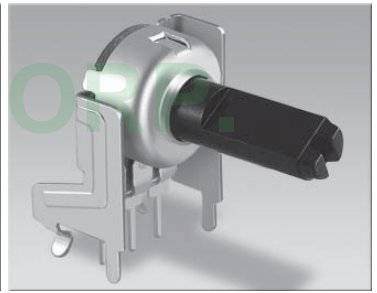
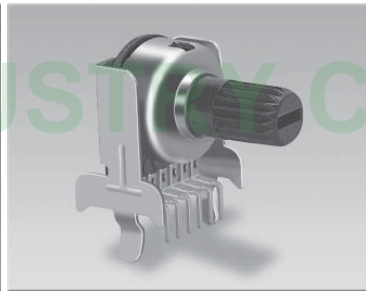
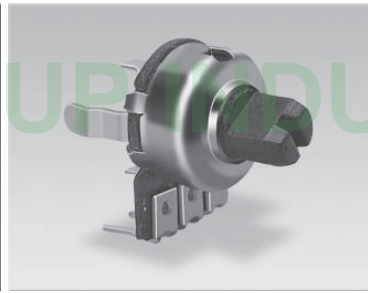
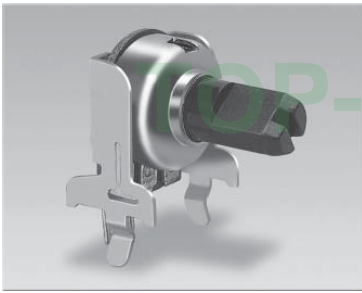
Rotation life	≥ 10,000 cycles(special : 100,000 cycles.)
---------------	--

**12PR1HF-B**

**12PR1VF2-D**

**12PR2HF-B**

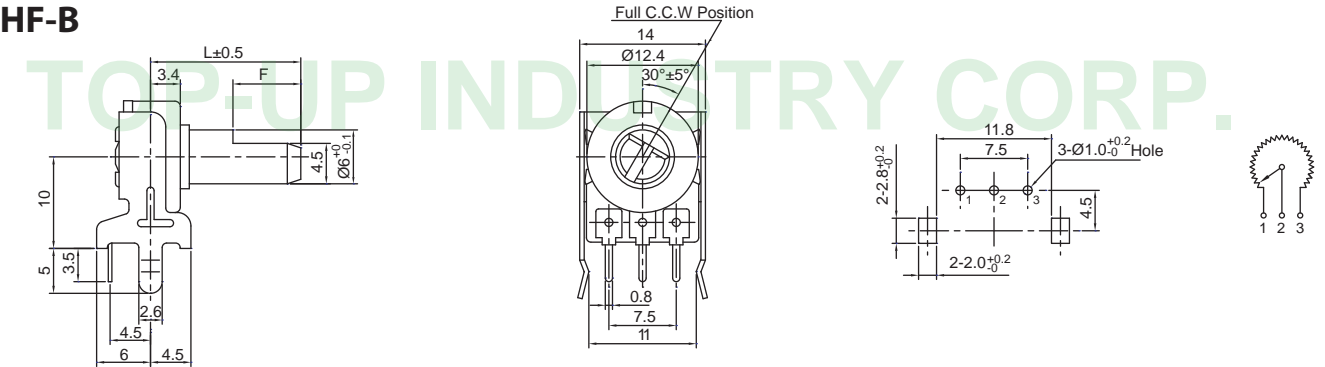
**12PR2HEF-B**



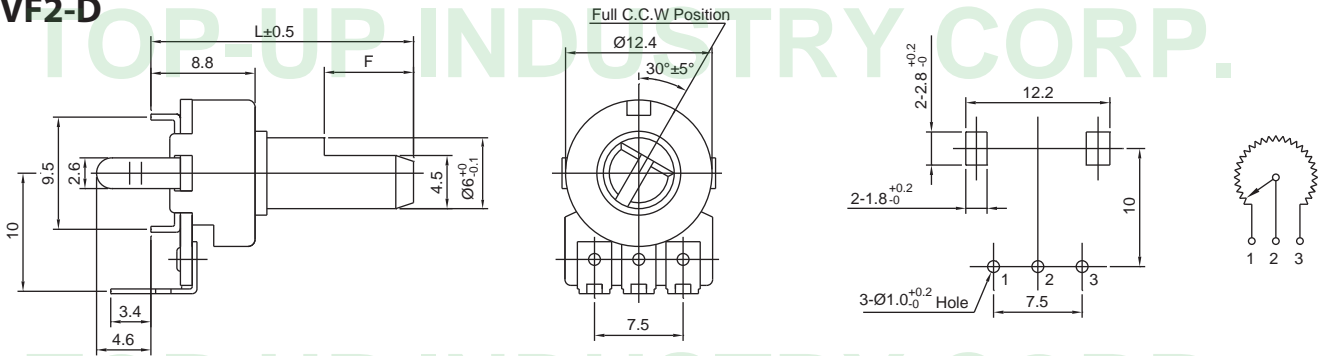
Outline Drawing

Features individual specifications

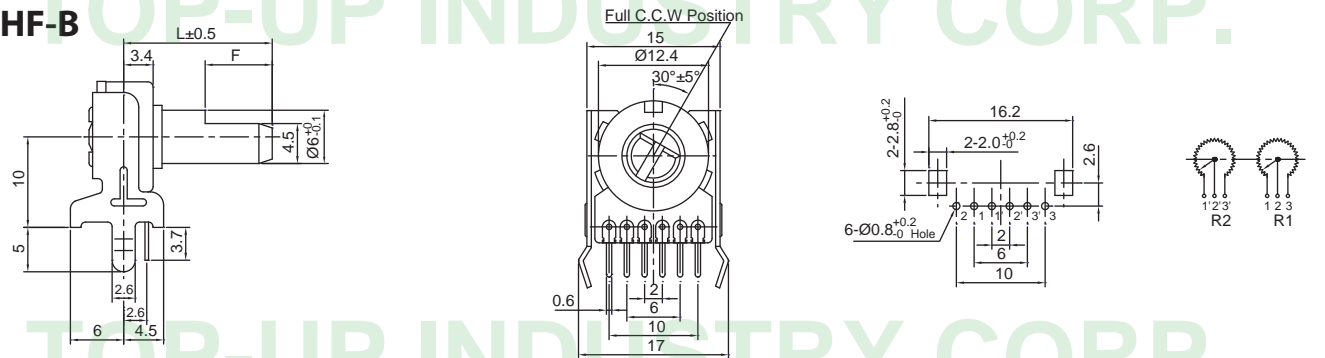
**12PR1HF-B**



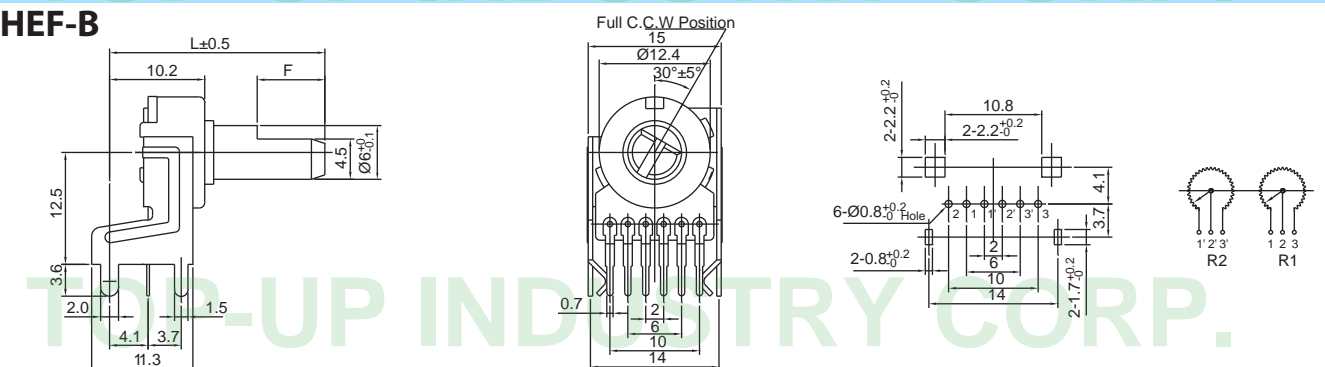
**12PR1VF2-D**



**12PR2HF-B**



**12PR2HEF-B**



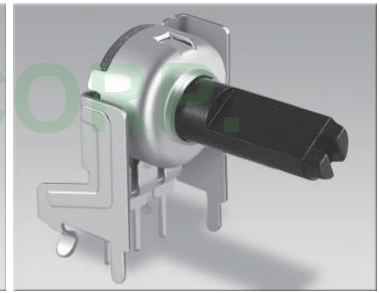
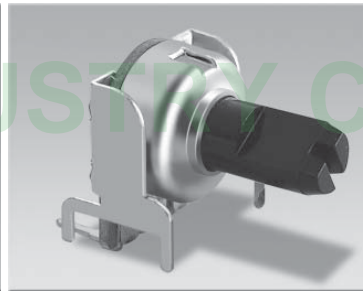
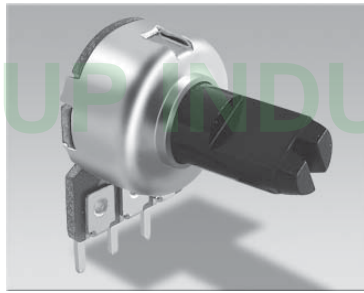
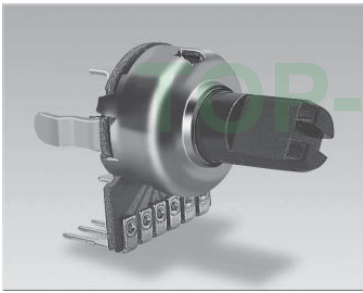


**12PR2VF-D**

**12PR1H-B**

**12PR1VCF-D**

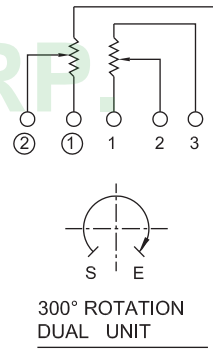
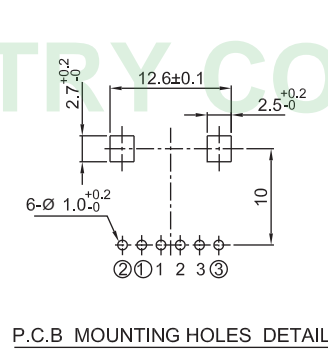
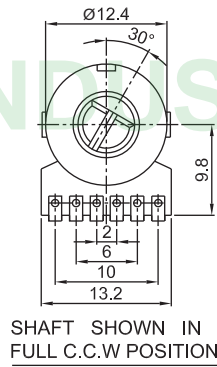
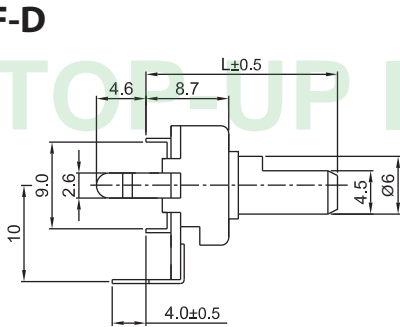
**12PR1HEF-B**



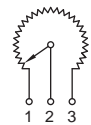
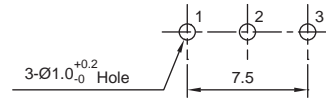
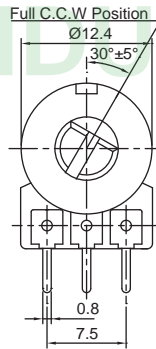
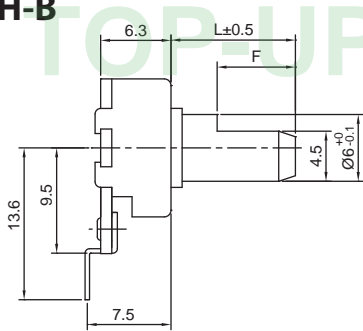
Outline Drawing

Features individual specifications

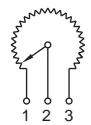
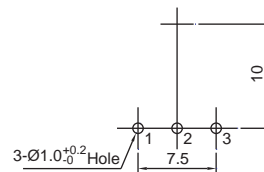
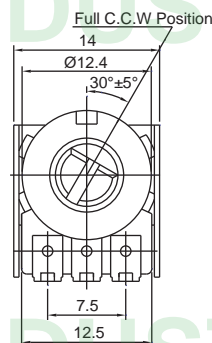
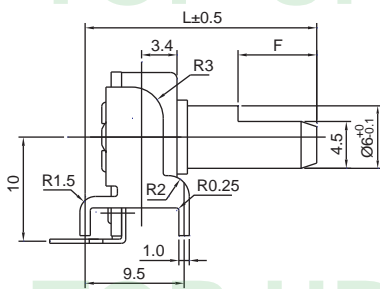
**12PR2VF-D**



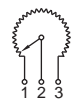
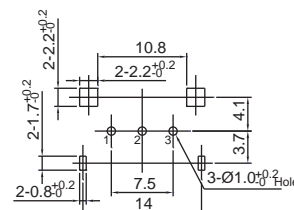
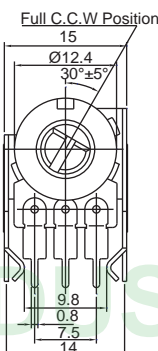
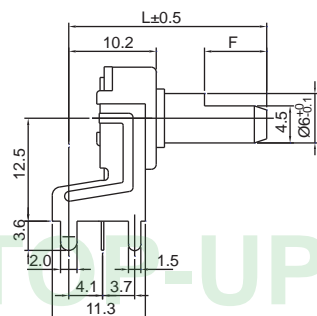
**12PR1H-B**



**12PR1VCF-D**



**12PR1HEF-B**

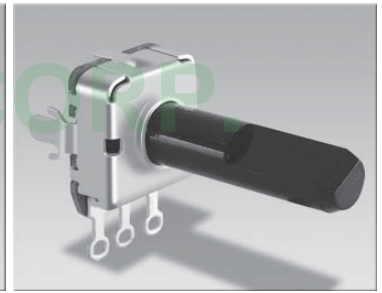
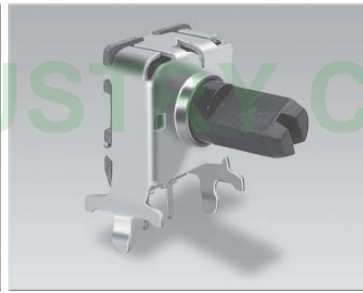
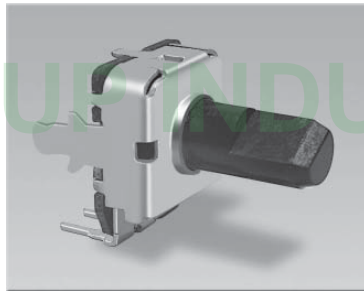
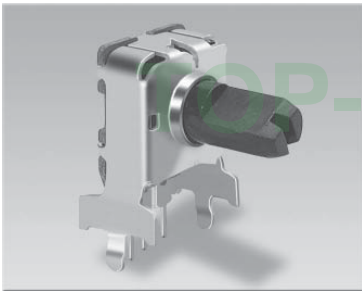


**12PQ1HYF-B**

**12PQ1VF-D**

**12PQ1HF-B**

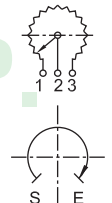
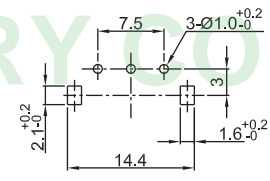
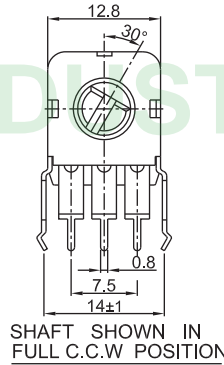
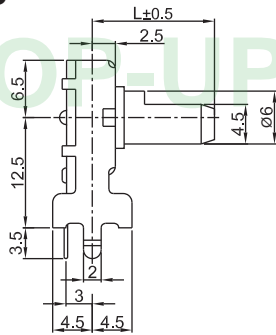
**12PQ1VF-A**



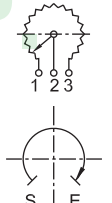
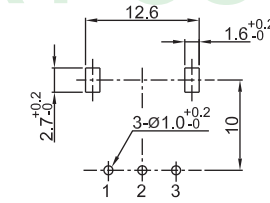
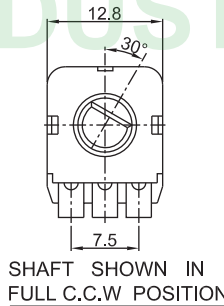
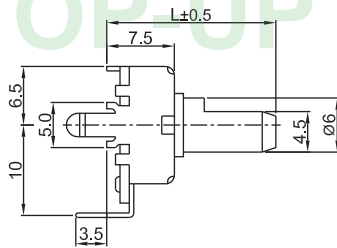
Outline Drawing

Features individual specifications

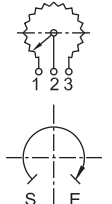
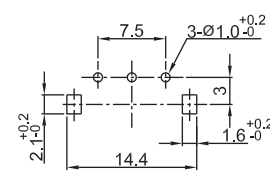
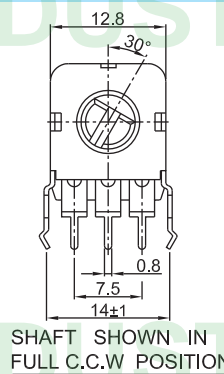
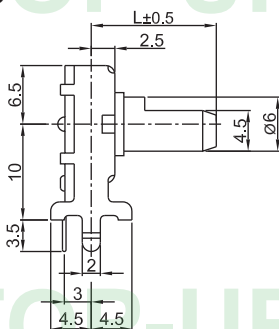
**12PQ1HYF-B**



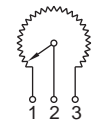
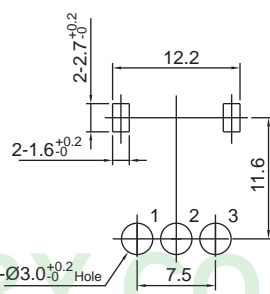
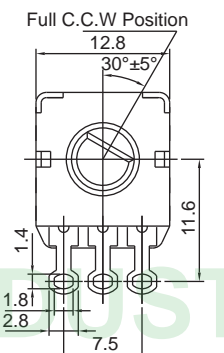
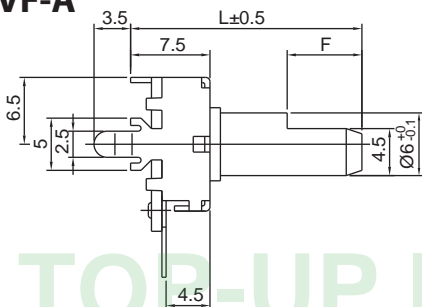
**12PQ1VF-D**



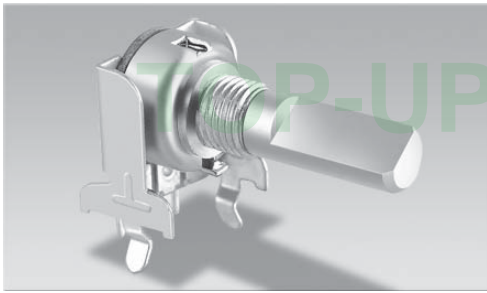
**12PQ1HF-B**



**12PQ1VF-A**

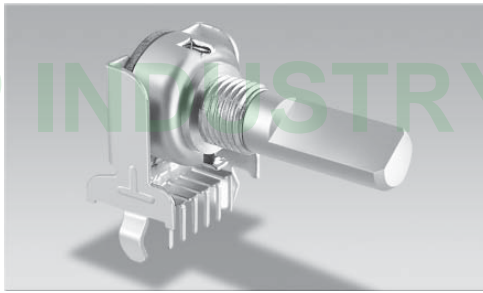


**12MR1HBF-B**



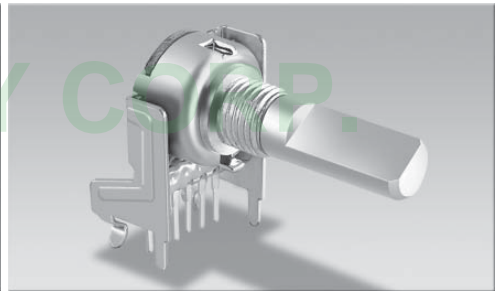
Outline Drawing

**12MR2HBF-B**

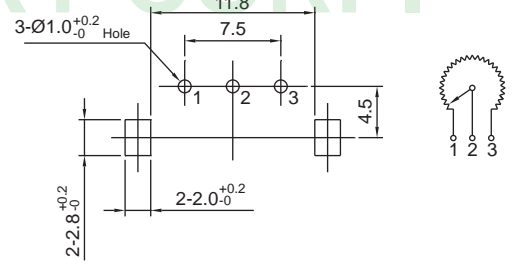
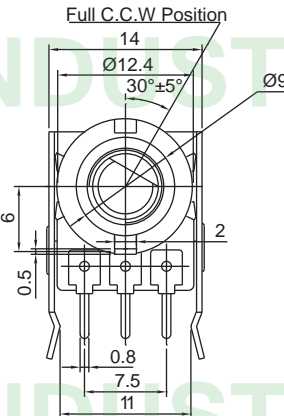
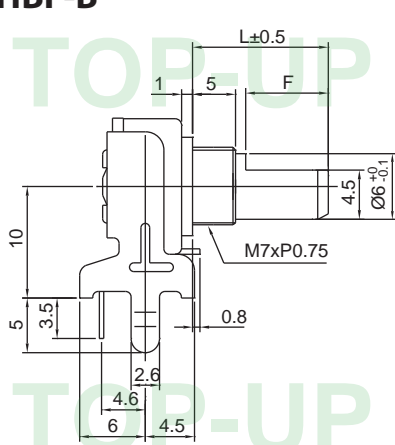


Features individual specifications

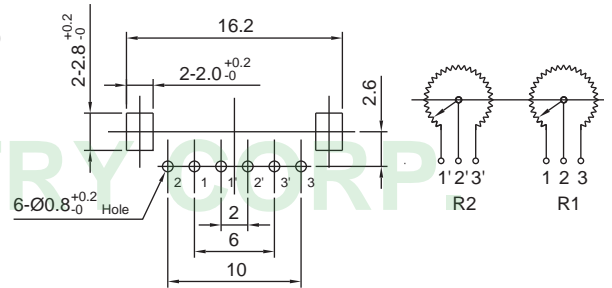
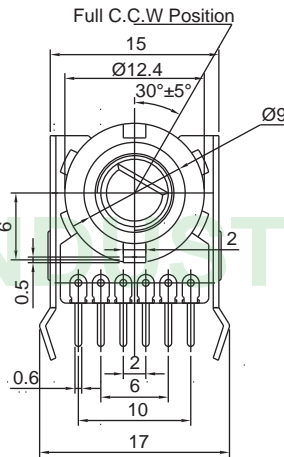
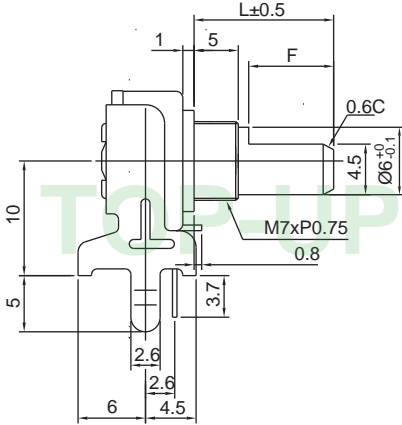
**12MR2HBEF-B**



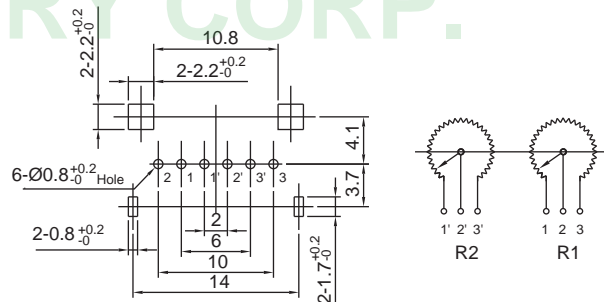
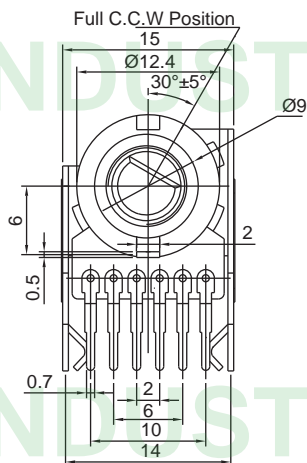
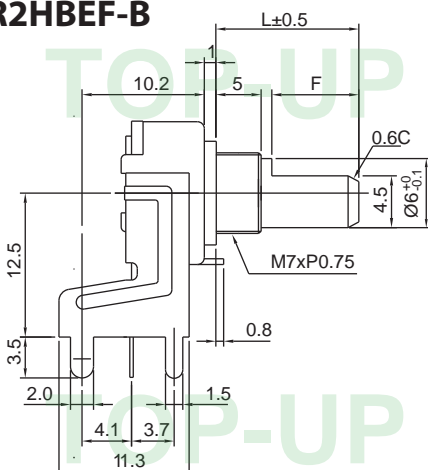
**12MR1HBF-B**



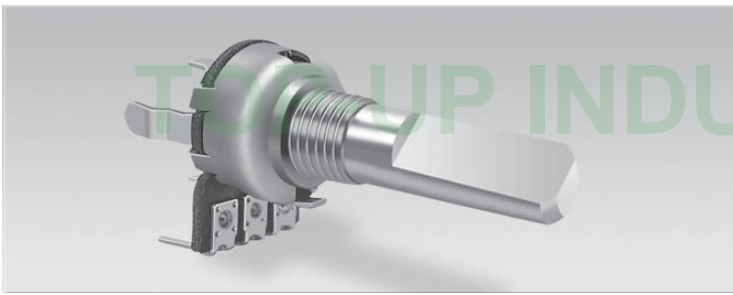
**12MR2HBF-B**



**12MR2HBEF-B**

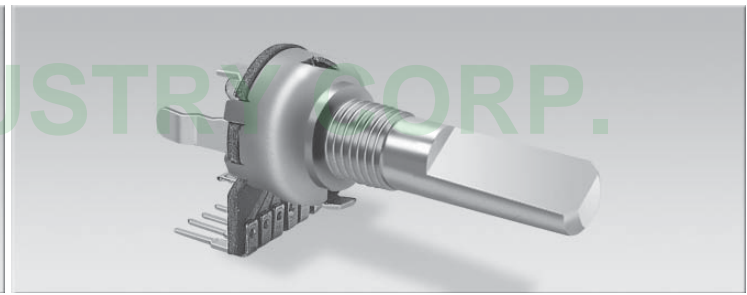


**12MR1VBF-D**



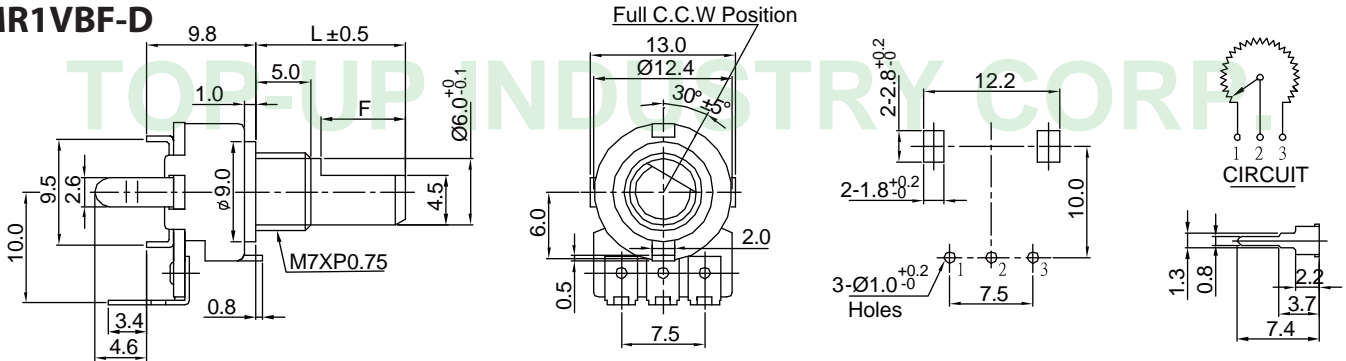
Outline Drawing

**12MR2VBF-D**

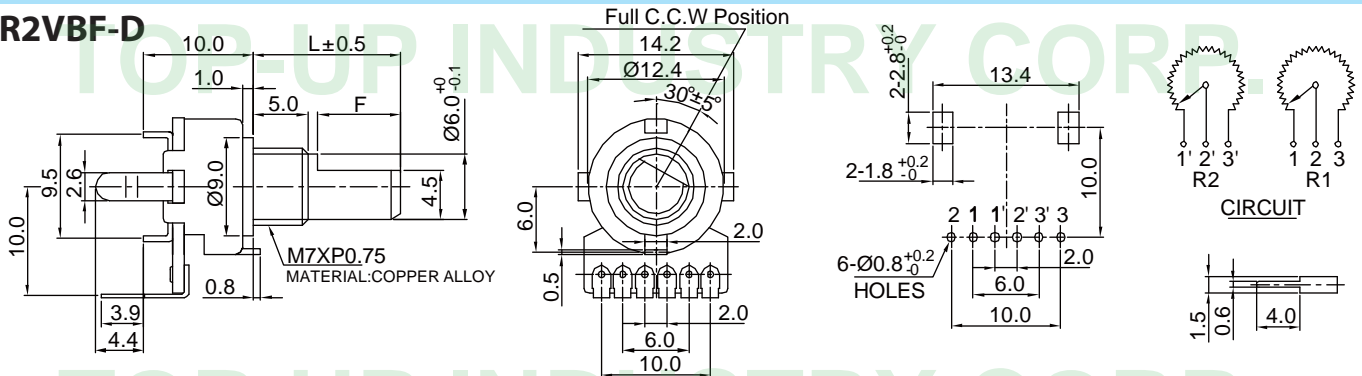


Features individual specifications

**12MR1VBF-D**



**12MR2VBF-D**



**12mm SIZE METAL SHAFT POTENTIOMETERS**

**Mechanical Characteristics:**

Total rotational angle	300°±10°
Rotational torque	2~20mN.m (20~204gf.cm)
Rotation stopper strength	0.3N.m (3kgf.cm)
Push pull strength	80N (8kgf) max.
Click torque	5~30mN.m (51~305gf.cm)

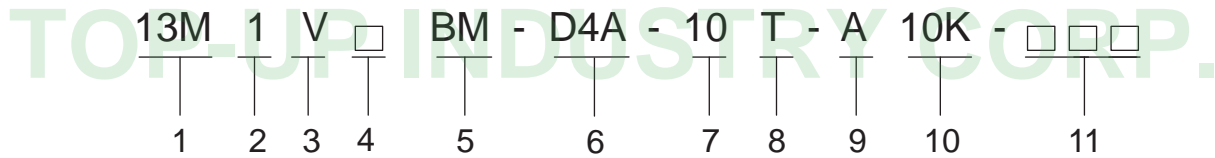
**Electrical Characteristics:**

Total resistance	B:5KΩ ~1KΩ other than B:5KΩ ~500Ω
Total resistance tolerance	±20% more than 1MΩ±30%
Rated power	B:0.08W other than B:0.04W
Max. operating voltage	B:150 AC other than B:100 AC
Resistance taper	A, B, C
Residual resistance	R ≥ 250KΩ 0.1% max. of total resistance 250KΩ > R > 10KΩ 20Ω max. 10KΩ ≥ R 10Ω max.
Insulation resistance	More than 50MΩ at DC 500V
Gang error	-40dB to 0dB 3dB max.

**Durability:**

Rotational life	15,000 cycles
-----------------	---------------

## 13M Series Code Explanation



1. Product lines of 13M (13mm Size Metal Shaft)
2. Number of Unit  
1— Single Unit
3. Vertical (V) Type
4. Bushing Length : Blank-Standard ( See Drawing 1)
5. Type of Bushing ( Drawing 1)

Without Screw		Bushing Length (B)	1	3.0
B (Standard)		Bushing Code	1B	B
With Screw		Bushing Length (BM)	5.5	5.0
MB (Standard)		Bushing Code	5.5BM	BM

6. Type of Terminal ( See Drawing 2 ) ( Drawing 2 ) ( Drawing 3 )

D ( P.C.B Type )	
Code	DA D1A D3A D4A D D1 D2 D3
H	4.8 4.8 4.8 4.8 5.4 5.4 5.4 5.4
L	8.5 8.3 19.7 6.6 8.5 20 10 19.4

F - Type	
T - Type	

7. Shaft Length
8. Type of Shaft ( See Drawing 3 )
9. Type of Taper (See Taper Chart Page 220)
10. Resistance Value
11. Serial No.

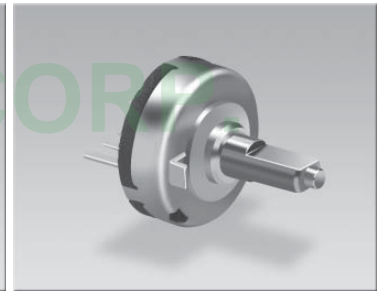
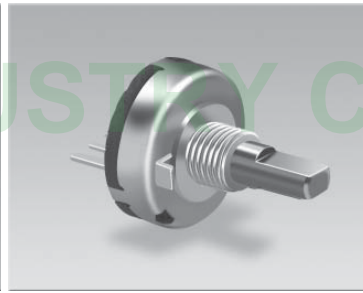
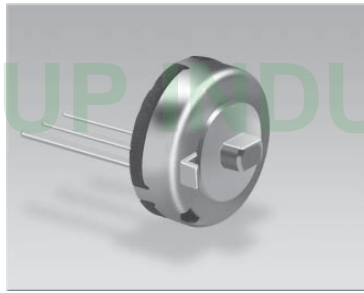
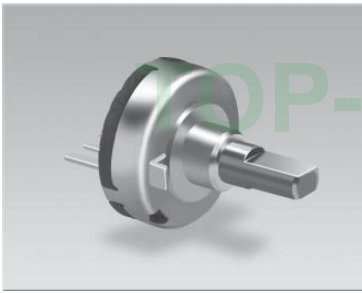


**13M1VB-DA**

**13M1V-D3A**

**13M1VBM-D4A**

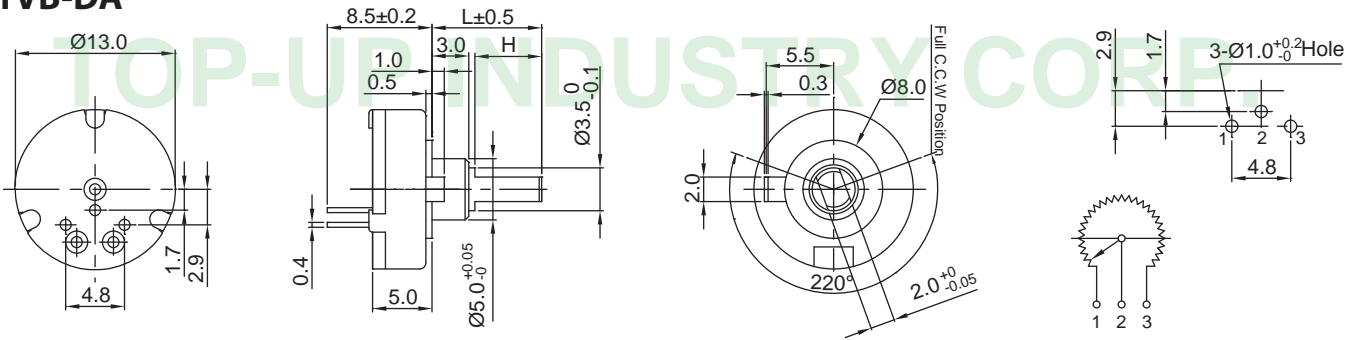
**13M1V1BN-DA**



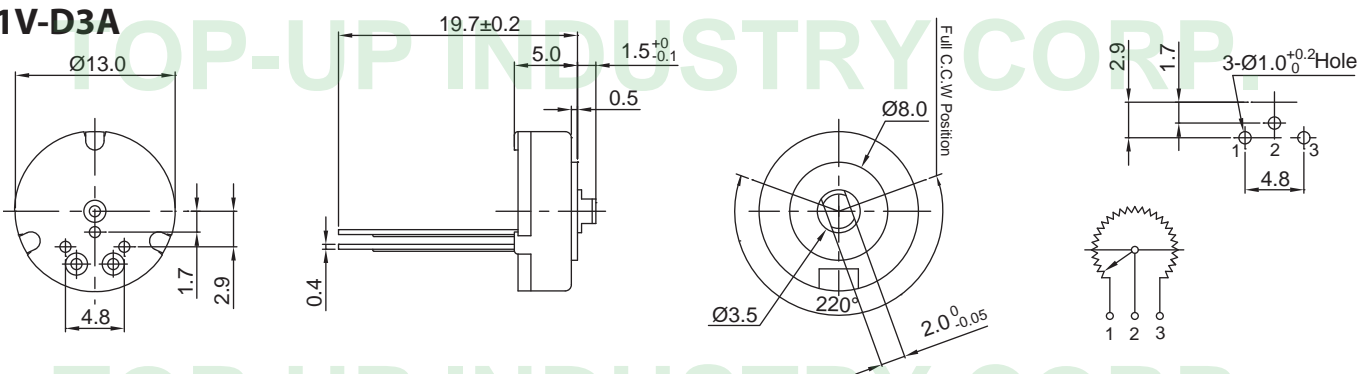
Outline Drawing

Features individual specifications

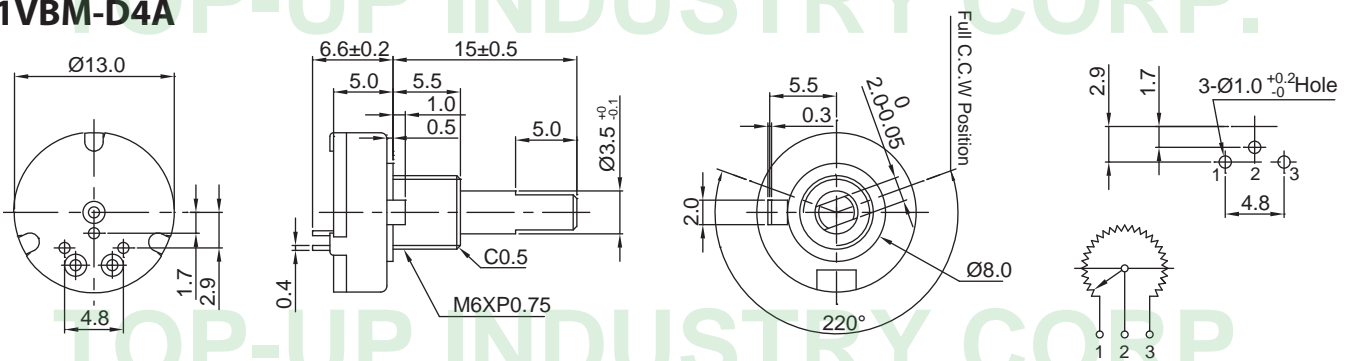
**13M1VB-DA**



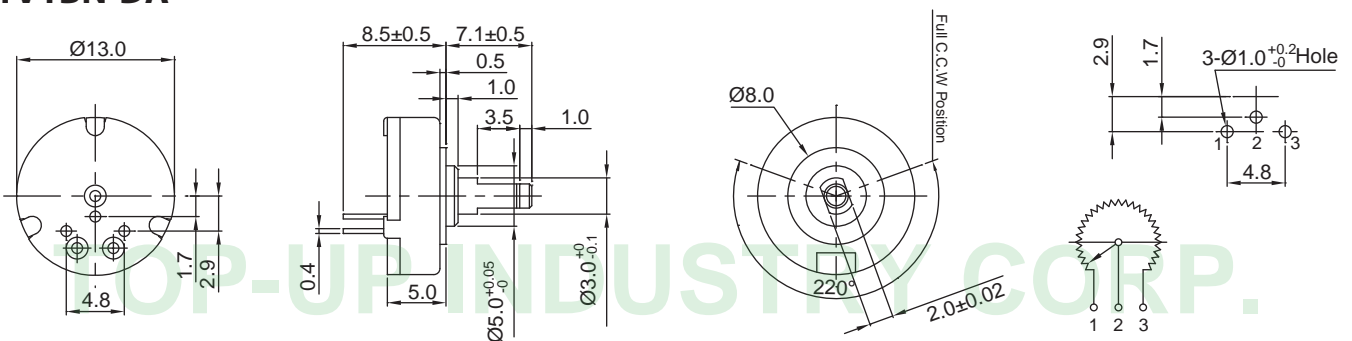
**13M1V-D3A**



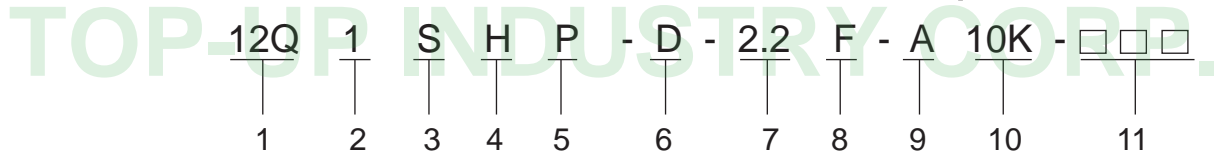
**13M1VBM-D4A**



**13M1V1BN-DA**



## 10Q ,12Q, 16Q Series Code Explanation

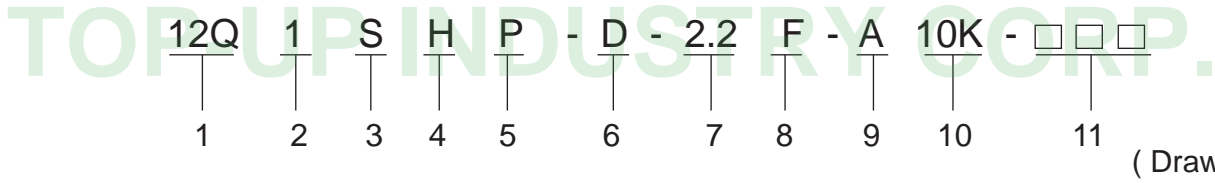


1. Product Lines of 10Q ,12Q & 16Q( 10mm , 12mm , 16mm Size Molded Case Potentiometers )
2. Number of Unit ( 1 Single Unit )
3. Switch: S -With Switch, Blank -Without Switch
4. Horizontal (H) Type or Vertical (V) Type
5. With Pillar
6. Type of Terminal ( See Drawing 1 )
7. Shaft Length "L" ( See Drawing 2 )
8. Type of Shaft ( See Drawing 2 ) (Drawing 2)

10Q Series								
R-Type			F-Type			S-Type		
L	A	D	L	A	D	L	A	D
1.0~5.0	2.2	Ø3.5	1.0~5.0	2.2	Ø3.5	3.0~5.0	2.2	Ø3.5
12Q Series								
R-Type			F-Type			S-Type		
L	A	D	L	A	D	L	A	D
1.0~7.0	2.2	Ø3.5	1.0~7.0	2.2	Ø3.5	3.0~5.0	2.2	Ø3.5
16Q Series ( F - Type )								
L	A	D						
1.0~5.0	2.4	Ø4.0						

9. Type of Taper ( See Taper Chart Page 220 )
10. Resistance value
11. Serial No.

# 10Q ,12Q, 16Q Series Code Explanation



( Drawing 1 )

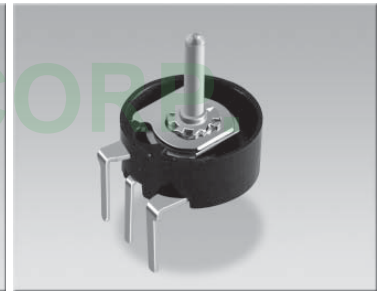
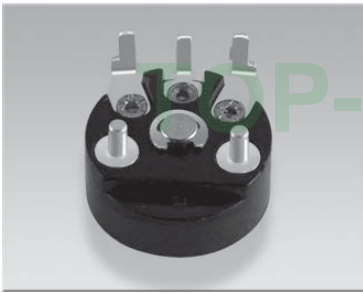
10Q Series																																																						
D ( P.C.B Type )																																																						
<table border="1"> <thead> <tr> <th>Code</th> <th>D</th> <th>D1</th> <th>D2</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>4.6</td> <td>4.6</td> <td>4.3</td> </tr> <tr> <td>H</td> <td>6.2</td> <td>9.5</td> <td>9.2</td> </tr> </tbody> </table>			Code	D	D1	D2	W	4.6	4.6	4.3	H	6.2	9.5	9.2																																								
Code	D	D1	D2																																																			
W	4.6	4.6	4.3																																																			
H	6.2	9.5	9.2																																																			
Horizontal						Vertical																																																
12Q Series																																																						
Without Switch			With Switch			Without Switch			With Switch																																													
A ( Solder Lug Type )			B ( P.C.B Type )			D ( P.C.B Type )			D ( P.C.B Type )																																													
						<table border="1"> <thead> <tr> <th>Code</th> <th>D</th> <th>D1</th> <th>D2</th> <th>D3</th> <th>D4</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>15</td> <td>12.1</td> <td>13.5</td> <td>13.4</td> <td>13.5</td> </tr> <tr> <td>W</td> <td>6.5</td> <td>6.5</td> <td>7</td> <td>6.5</td> <td>6.75</td> </tr> </tbody> </table>			Code	D	D1	D2	D3	D4	H	15	12.1	13.5	13.4	13.5	W	6.5	6.5	7	6.5	6.75	<table border="1"> <thead> <tr> <th>Code</th> <th>D</th> <th>D1</th> <th>D2</th> <th>D3</th> <th>D4</th> <th>D5</th> <th>D6</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>15</td> <td>12.6</td> <td>17</td> <td>12.5</td> <td>13.5</td> <td>13.5</td> <td>16.4</td> </tr> <tr> <td>W</td> <td>6.7</td> <td>6.5</td> <td>9</td> <td>6.6</td> <td>6.75</td> <td>7</td> <td>6.5</td> </tr> </tbody> </table>				Code	D	D1	D2	D3	D4	D5	D6	H	15	12.6	17	12.5	13.5	13.5	16.4	W	6.7	6.5	9	6.6	6.75	7	6.5
Code	D	D1	D2	D3	D4																																																	
H	15	12.1	13.5	13.4	13.5																																																	
W	6.5	6.5	7	6.5	6.75																																																	
Code	D	D1	D2	D3	D4	D5	D6																																															
H	15	12.6	17	12.5	13.5	13.5	16.4																																															
W	6.7	6.5	9	6.6	6.75	7	6.5																																															
16Q Series																																																						
Without Switch			With Switch			Without Switch			With Switch																																													
A ( Solder Lug Type )			B ( P.C.B Type )			D ( P.C.B Type )			D ( P.C.B Type )																																													
						<table border="1"> <thead> <tr> <th>Code</th> <th>D</th> <th>D1</th> <th>D2</th> <th>D3</th> <th>D4</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>16.7</td> <td>17.2</td> <td>17.4</td> <td>16.5</td> <td>16.5</td> </tr> <tr> <td>W</td> <td>10.1</td> <td>10</td> <td>9</td> <td>8</td> <td>9</td> </tr> </tbody> </table>			Code	D	D1	D2	D3	D4	H	16.7	17.2	17.4	16.5	16.5	W	10.1	10	9	8	9	<table border="1"> <thead> <tr> <th>Code</th> <th>D</th> <th>D1</th> <th>D2</th> <th>D3</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>H</td> <td>16.7</td> <td>22.5</td> <td>17.4</td> <td>16.5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>W</td> <td>10.1</td> <td>8</td> <td>9</td> <td>8</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Code	D	D1	D2	D3				H	16.7	22.5	17.4	16.5				W	10.1	8	9	8			
Code	D	D1	D2	D3	D4																																																	
H	16.7	17.2	17.4	16.5	16.5																																																	
W	10.1	10	9	8	9																																																	
Code	D	D1	D2	D3																																																		
H	16.7	22.5	17.4	16.5																																																		
W	10.1	8	9	8																																																		

**10Q1VP-D**

**10Q1VP-D1**

**10Q1V-D1**

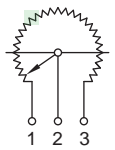
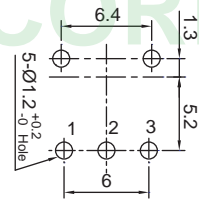
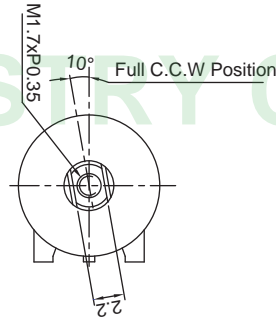
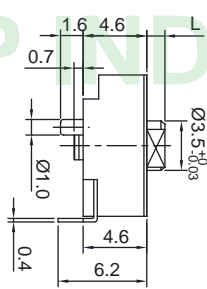
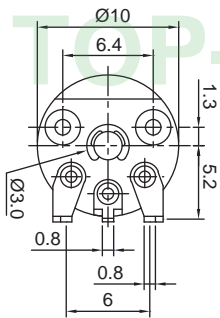
**10Q1VP-D2**



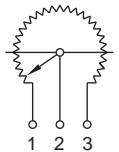
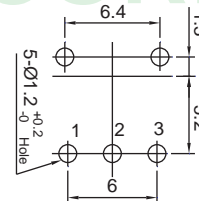
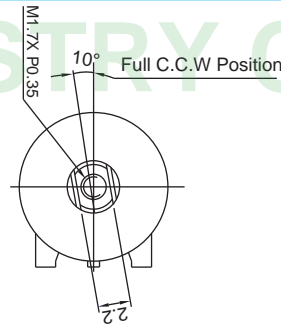
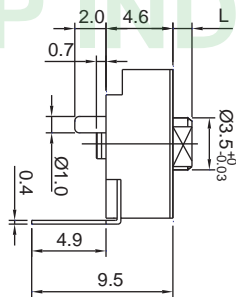
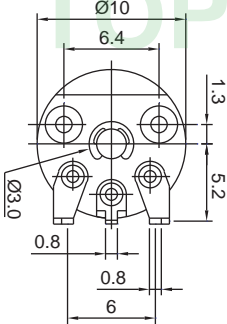
Outline Drawing

Features individual specifications

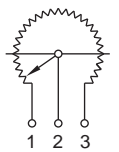
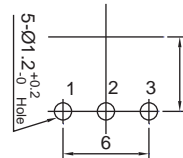
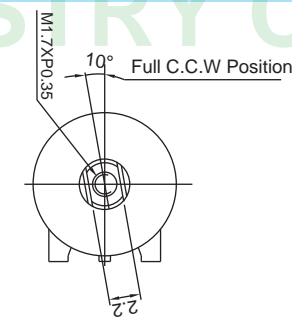
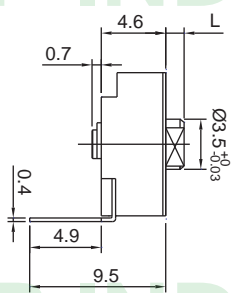
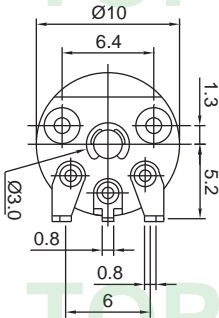
**10Q1VP-D**



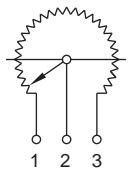
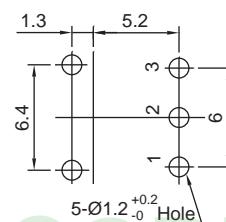
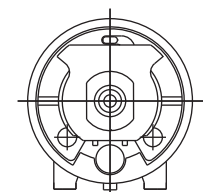
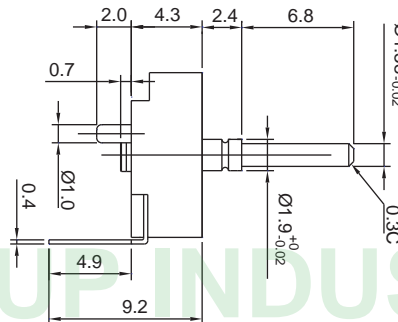
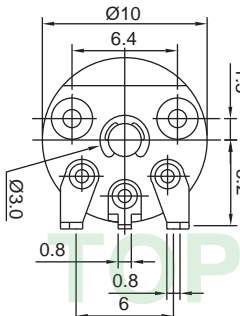
**10Q1VP-D1**

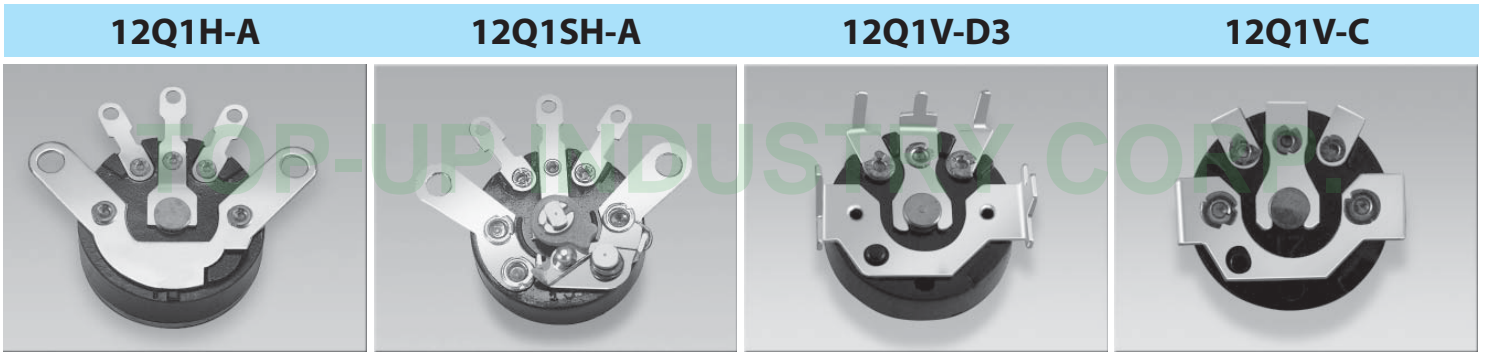


**10Q1V-D1**



**10Q1VP-D2**

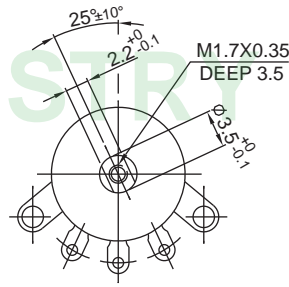
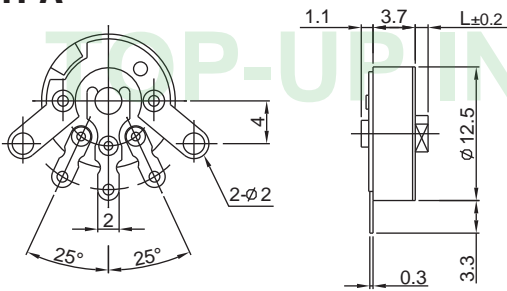




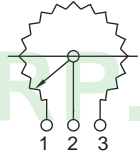
Outline Drawing

Features individual specifications

**12Q1H-A**

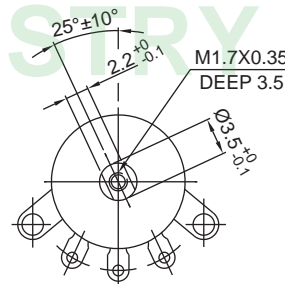
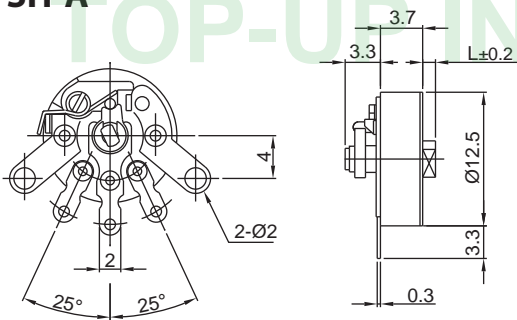


SHAFT SHOWN IN FULL C.C.W POSITION

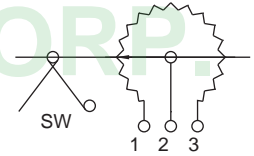


230° ROTATION SINGLE UNIT

**12Q1SH-A**

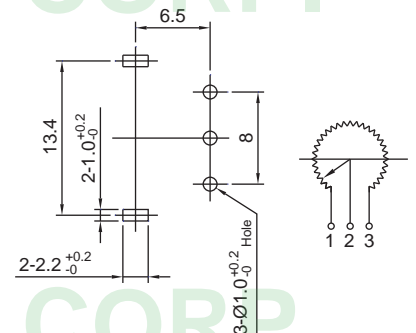
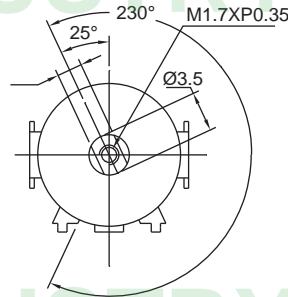
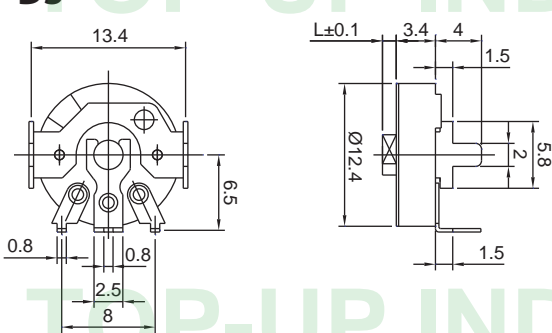


SHAFT SHOWN IN FULL C.C.W POSITION

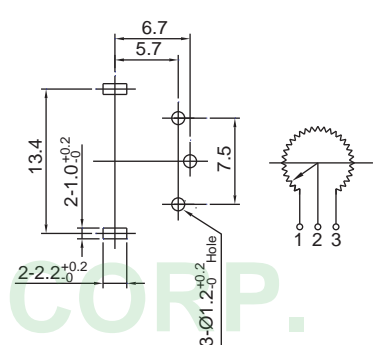
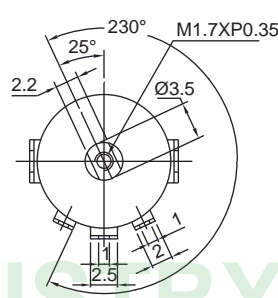
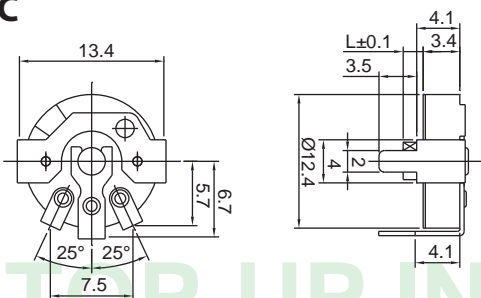


230° ROTATION SINGLE UNIT WITH SWITCH S.P.S.T.12VDC.0.5 A

**12Q1V-D3**



**12Q1V-C**



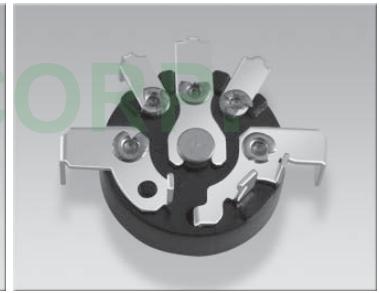
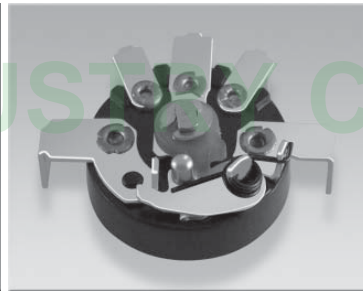
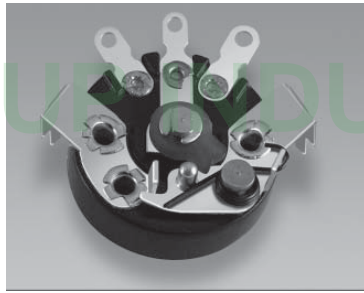
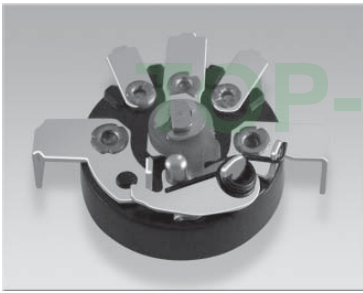


**12Q1V-□**

**12Q1SH-A(1)**

**12Q1SV-C1**

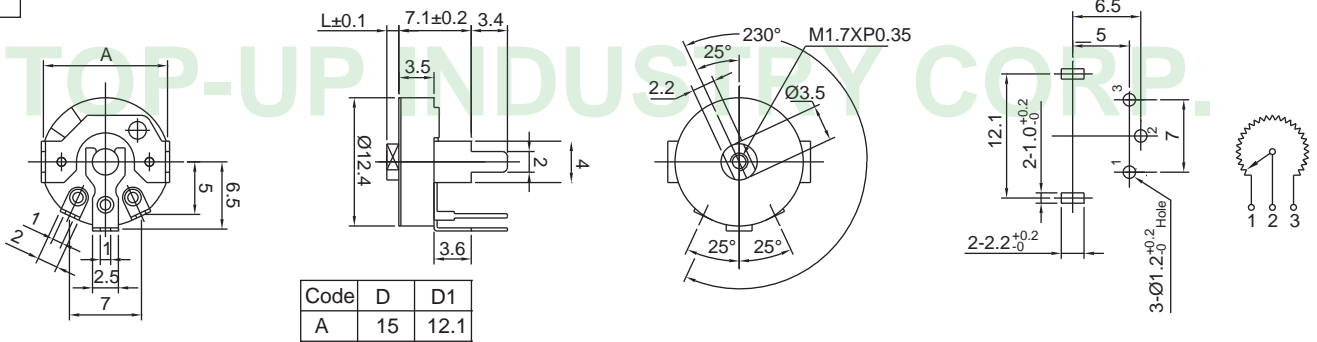
**12Q1V-C1**



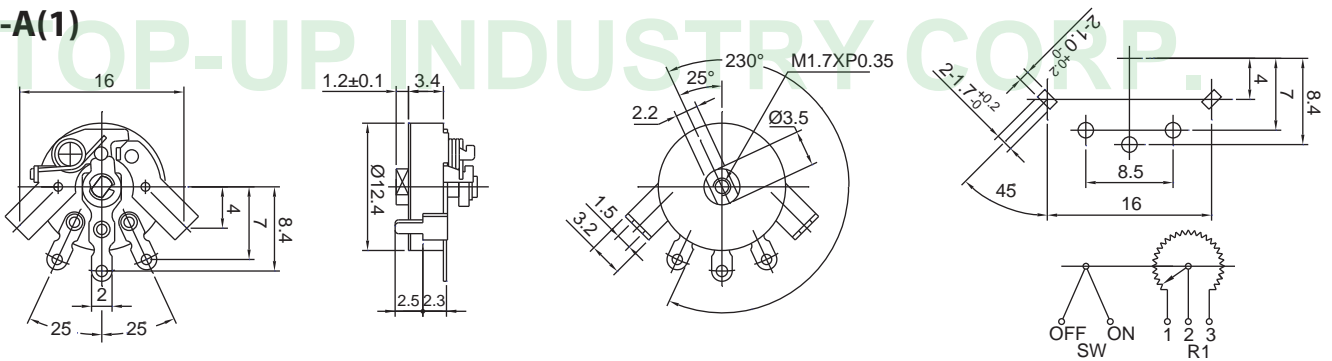
Outline Drawing

Features individual specifications

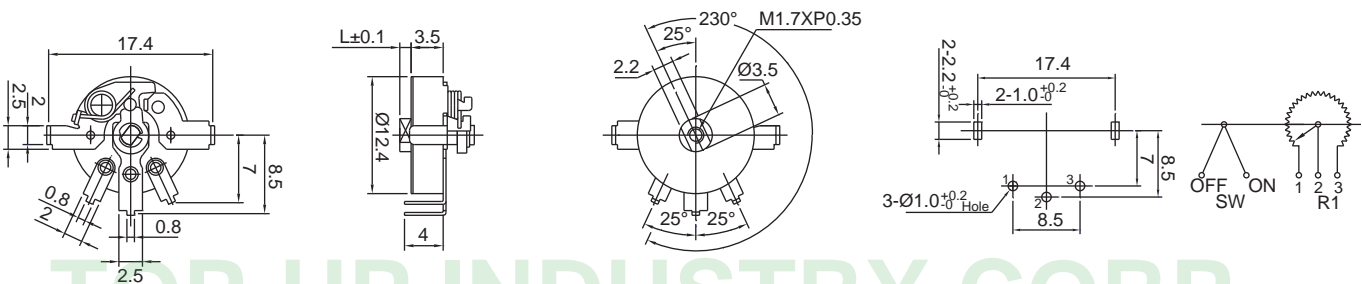
**12Q1V-□**



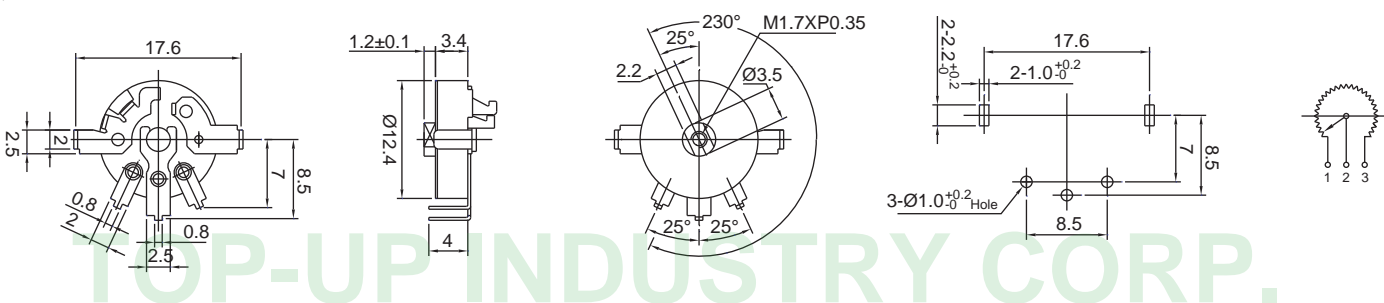
**12Q1SH-A(1)**



**12Q1SV-C1**



**12Q1V-C1**



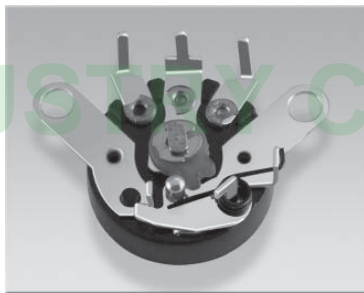
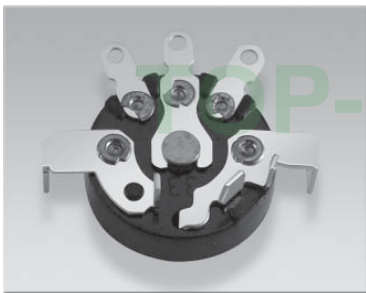


**12Q1H-A(1)**

**12Q1H-A(2)**

**12Q1SV-D6**

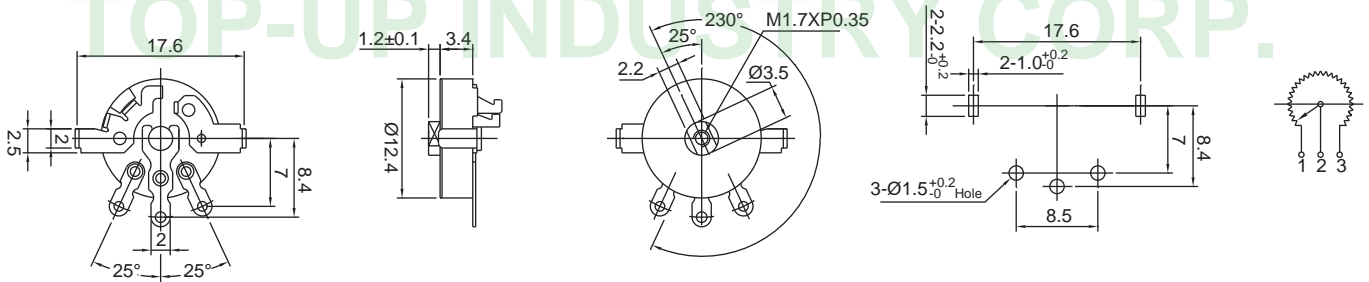
**12Q1SH-B**



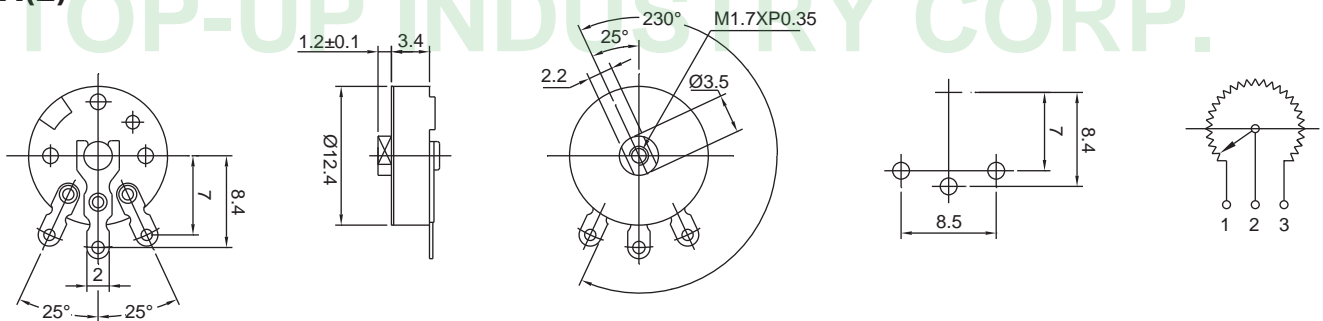
Outline Drawing

Features individual specifications

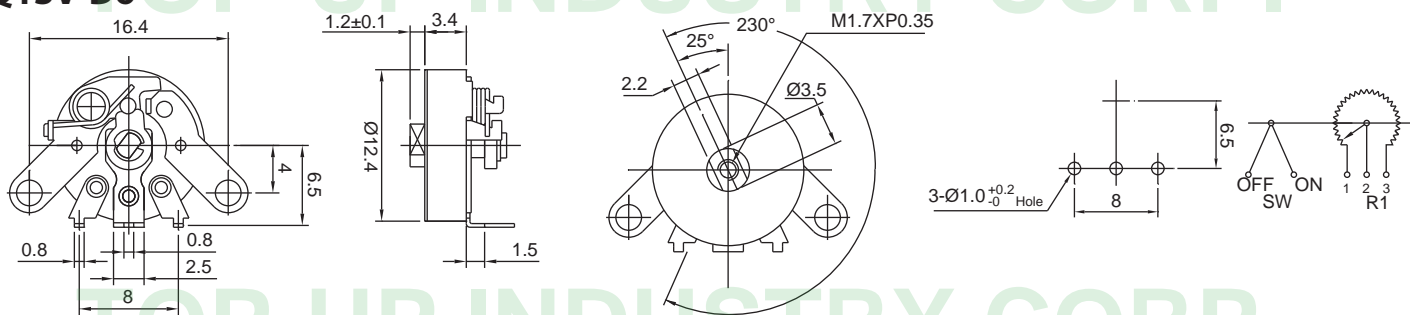
**12Q1H-A(1)**



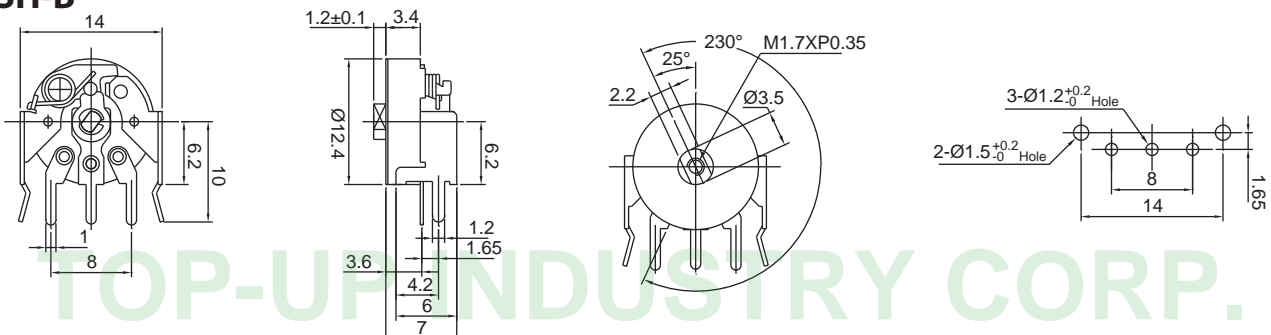
**12Q1H-A(2)**



**12Q1SV-D6**



**12Q1SH-B**

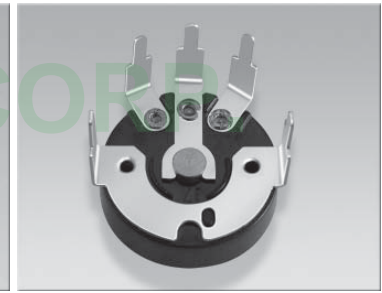
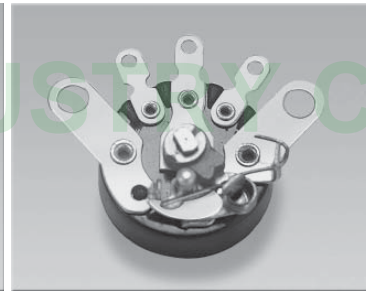
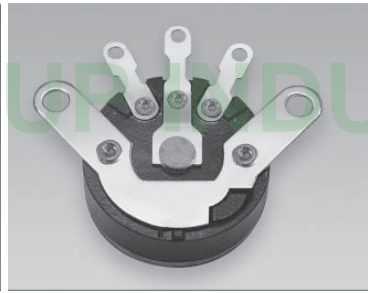
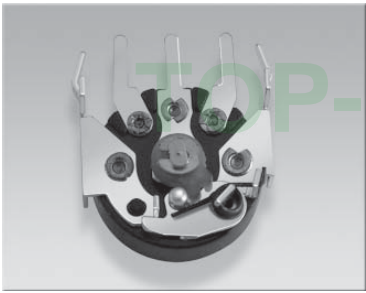


**12Q1SH-B(1)**

**16Q1H-A**

**16Q1SH-A**

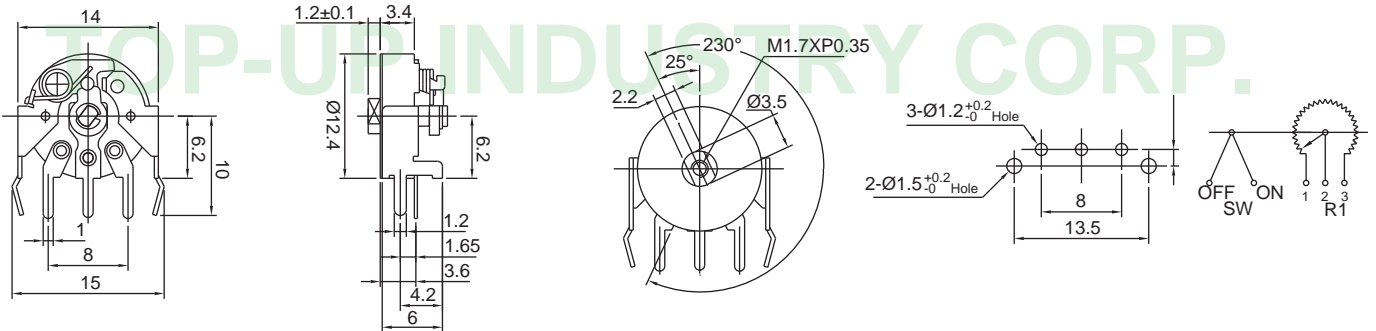
**16Q1V-D3**



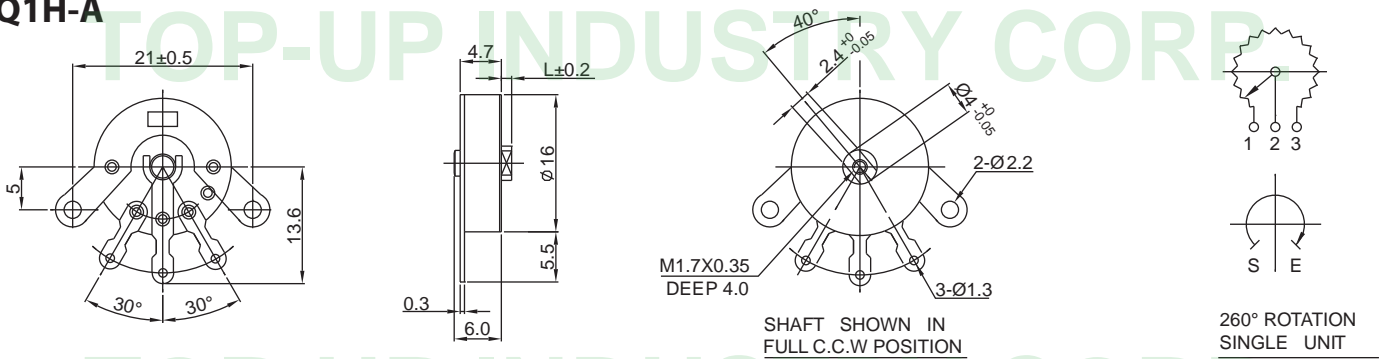
Outline Drawing

Features individual specifications

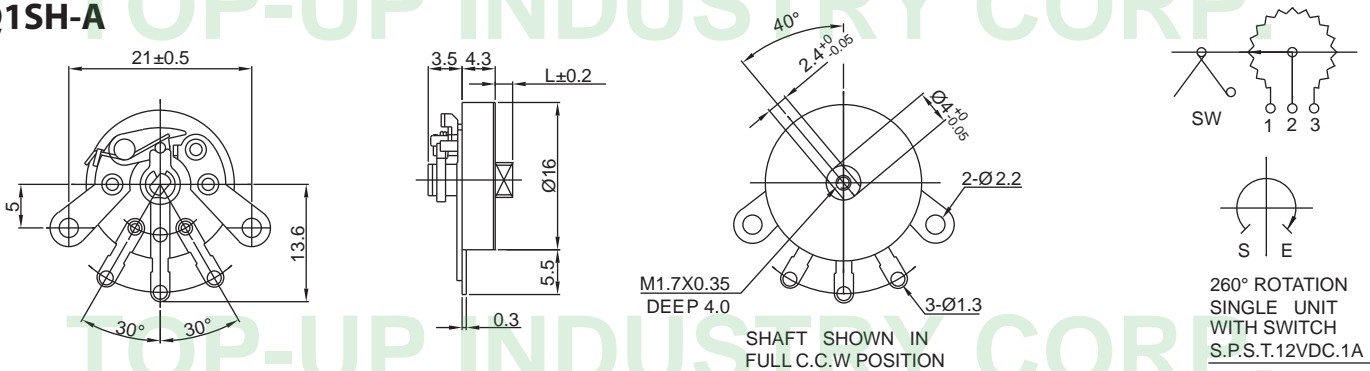
**12Q1SH-B(1)**



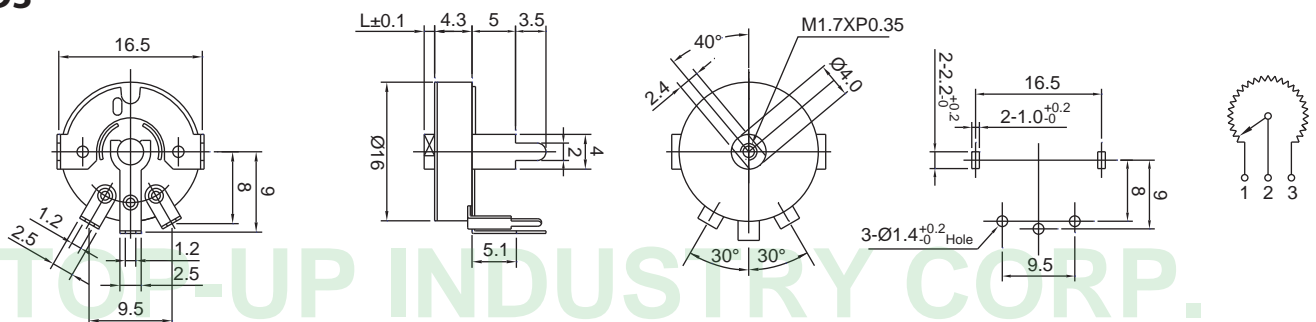
**16Q1H-A**



**16Q1SH-A**



**16Q1V-D3**

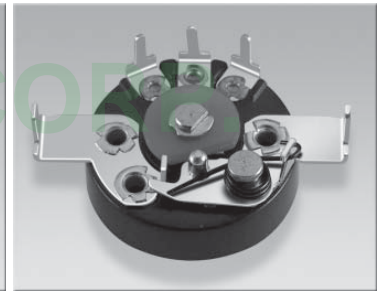
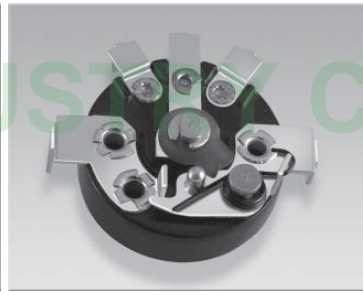
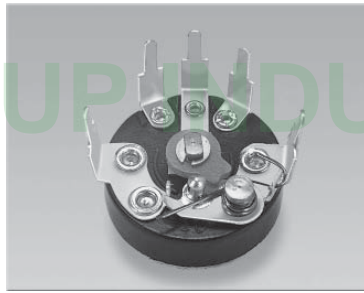
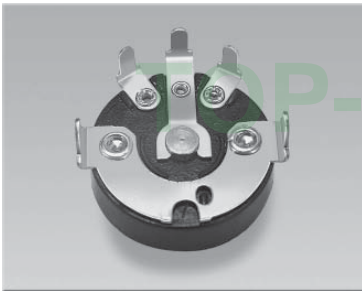


**16Q1V-D1**

**16Q1SV-D2**

**16Q1SV-C**

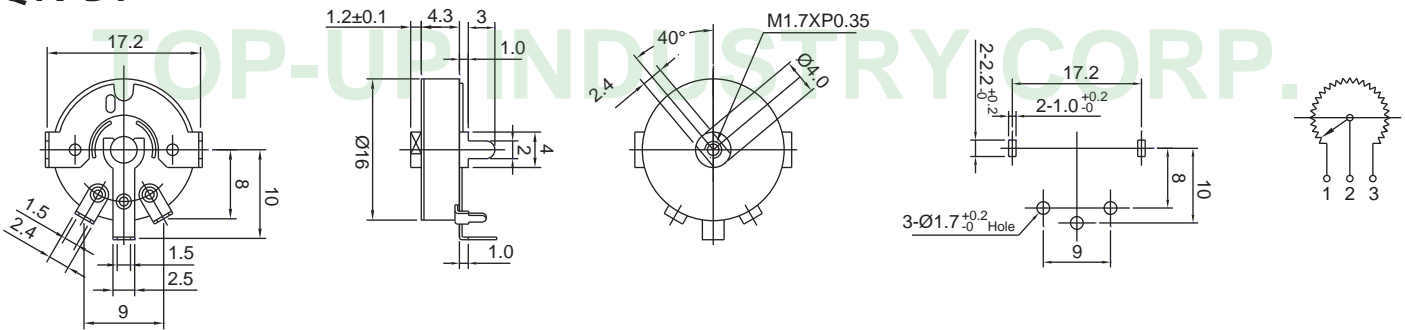
**16Q1SV-D1**



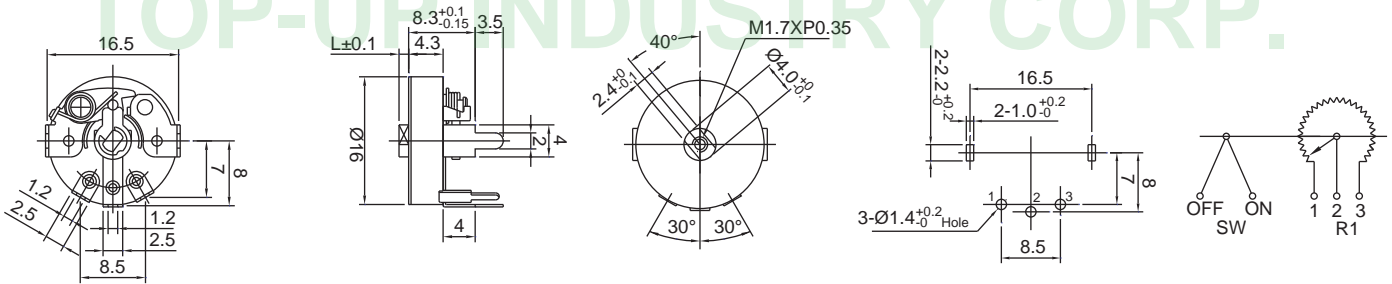
Outline Drawing

Features individual specifications

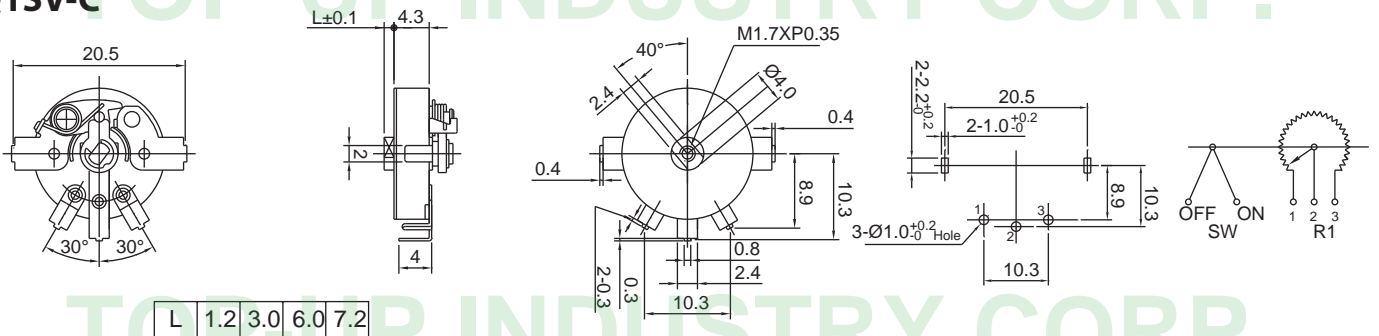
**16Q1V-D1**



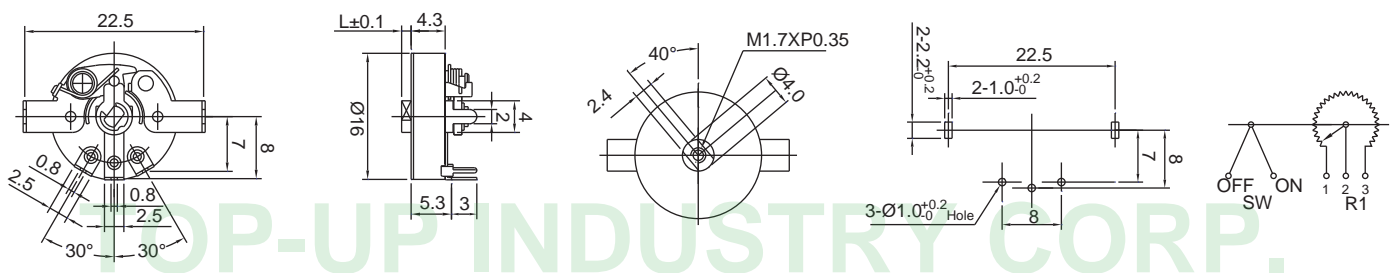
**16Q1SV-D2**



**16Q1SV-C**



**16Q1SV-D1**

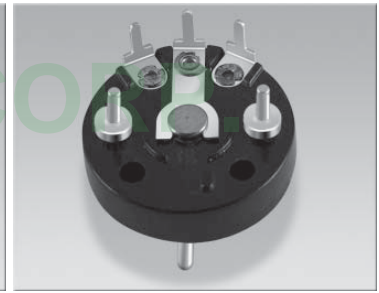
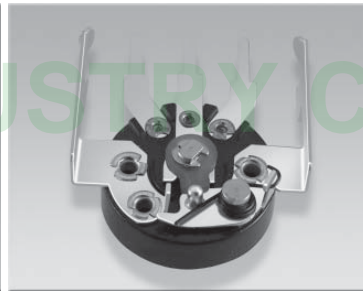
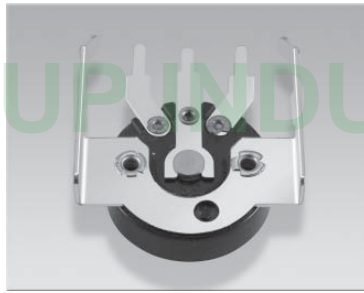
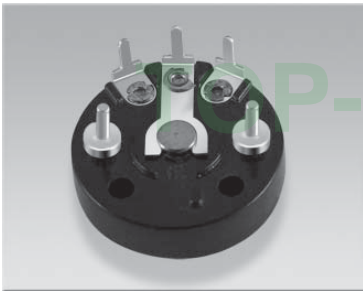


**16Q1VP-D1**

**16Q1H-B**

**16Q1SH-B**

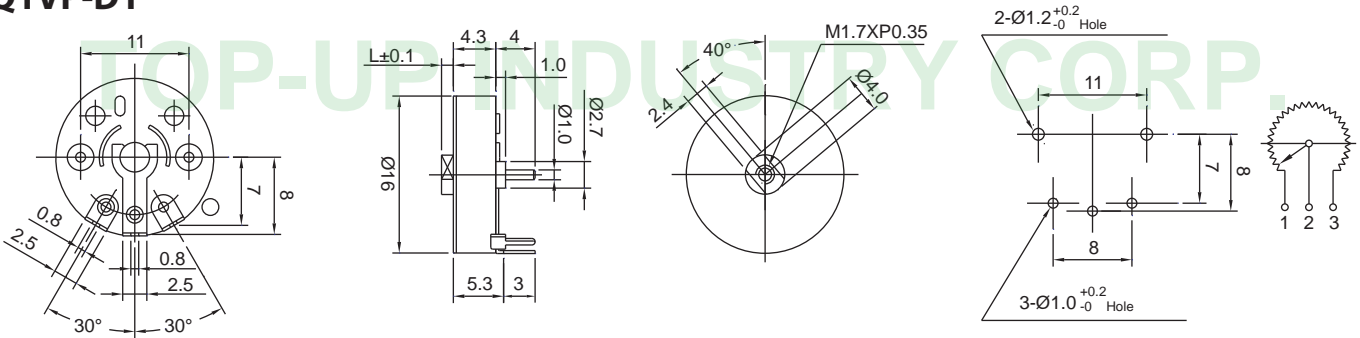
**16Q1VP-D1(1)**



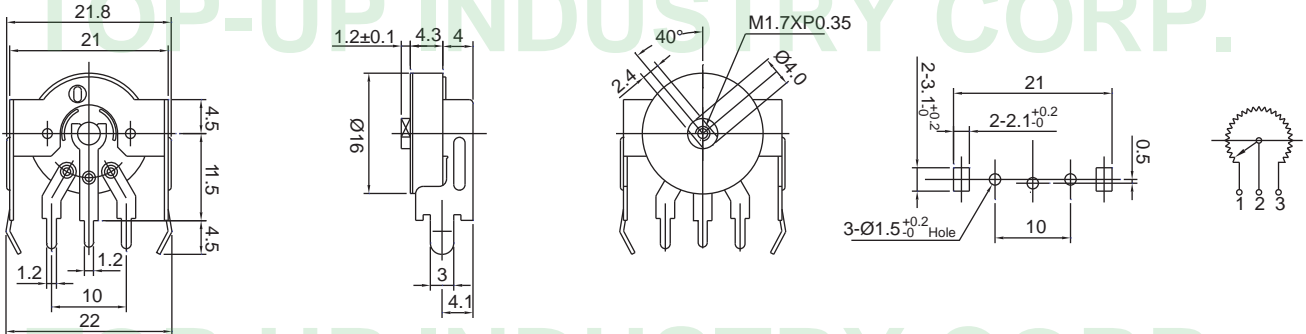
Outline Drawing

Features individual specifications

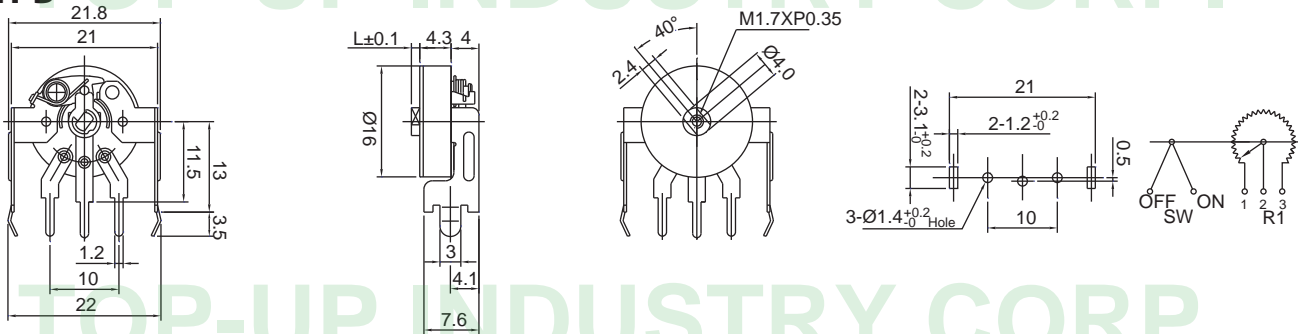
**16Q1VP-D1**



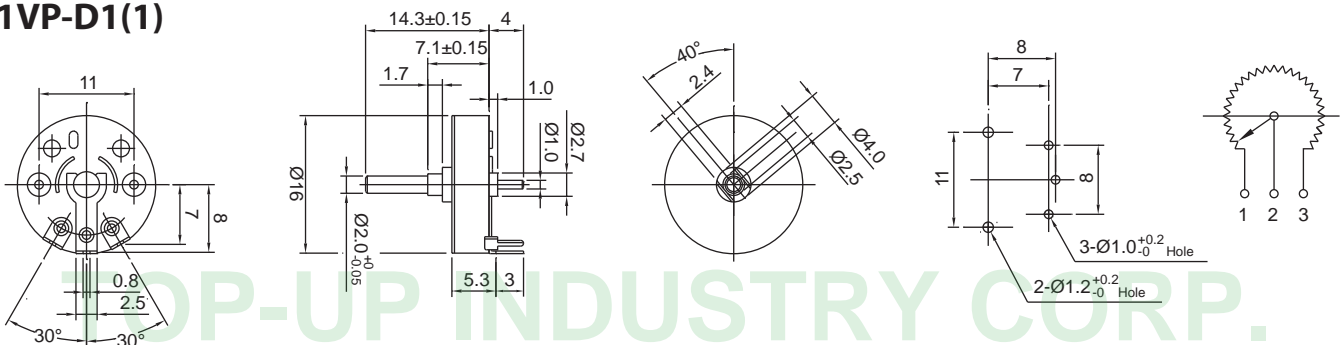
**16Q1H-B**



**16Q1SH-B**



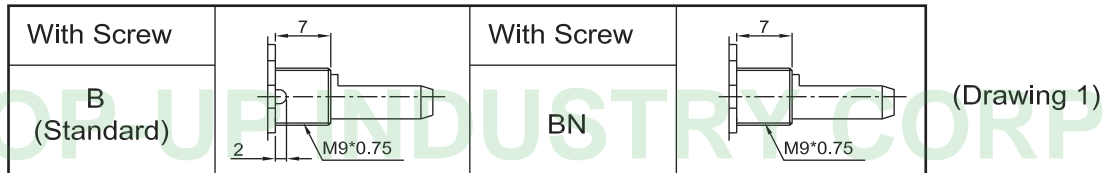
**16Q1VP-D1(1)**



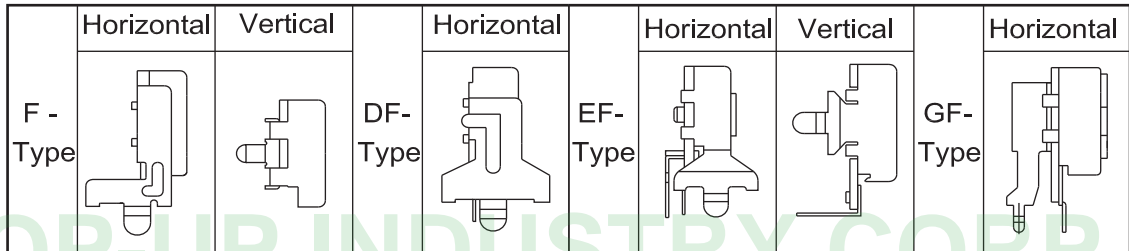
## 16PR Series Code Explanation

16PR 1 H B DF LT - B - 15 K - B 50K - 1C - □□□  
 1 2 3 4 5 6 7 8 9 10 11 12 13

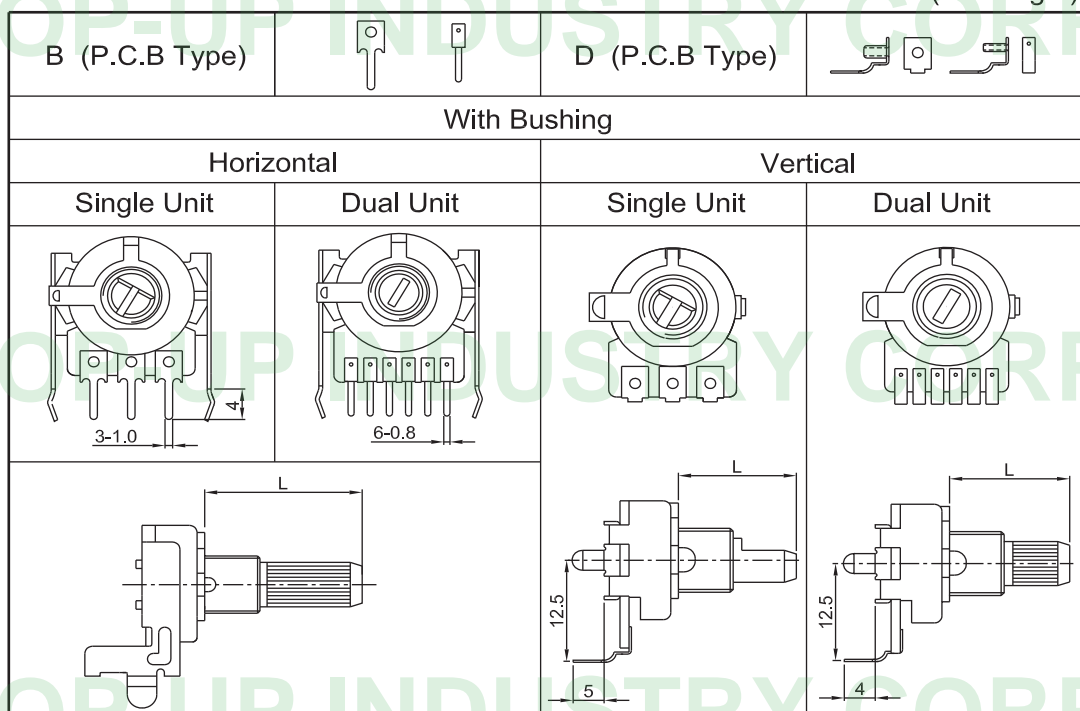
1. Product Lines of 16PR ( 16mm Size Insulated Shaft Potentiometers )
2. Number of Unit : 1 — Single Unit 2 — Dual Unit
3. Horizontal (H) Type or Vertical (V) Type (See Drawing 3)
4. Bushing Type



5. Type of Frame: "F", "DF", "EF", "GF" (See Drawing 2) (Drawing 2)



6. With Tap: LT -Left Tap
7. Type of Terminal (See Drawing 3)
8. Shaft Length (See Drawing 3)
9. Type of Shaft (See Drawing 3)
10. Type of Taper (See Taper Chart Page 220)
11. Resistance Value
12. Number of Clicks: Blank - None, 1C - Center Click
13. Serial No.



To Be Continued



# 16PR Series Code Explanation

(Drawing 3)

		Without Bushing															
		Horizontal					Vertical										
		C (P.C.B Type)					B (P.C.B Type)										
		With Bushing					Without Bushing										
		Vertical					Horizontal										
		Dual Unit					Single Unit										
F - Type																	
K - Type																	
Model		16PR1H-B					16PR1HF-B 16PR2HF-B					16PR1HDF-B					
Size	L	10	15	20	25	30	18.5	23.6	28.5	33.5	38.5	13.6	18.6	23.6	28.6	33.6	38.8
	F	7	12	12	12	12	7	12	12	12	12	7	12	12	12	12	9
	T	8	12	12	12	12	8	12	12	12	12	8	12	12	12	12	
Model		16PR1VF-D 16PR2VF-D					16PR1HBF-B		16PR1VBF-D		16PR2HBF-B 16PR2VBF-D 16PR2VB-C						
Size	L	20	25	30	35	40	15		20		25					30	
	F	7	12	12	12	12	8		12		12					12	
	T	8	12	12	12	12			12		12					12	



## 16mm SIZE SNAP-IN INSULATED SHAFT POTENTIOMETERS

### 1. Mechanical Characteristics

Total rotational angle	300 ±5°
Rotational torque	20 ~ 200 gf · cm
Rotation stopper strength	6 kgf · cm
Push-pull strength	8 kgf · cm
Shaft inclination Measured at the tip of the shaft	Within 0.35mm
Shaft wobble	0.7 XL/30mm P-P max. with 500 gf · cm
Bushing nut tightening strength	10 kgf · cm max.

### 2. Electrical Characteristics

Total resistance	5, 10, 0, 50, 100, 200, 250, 500 (kΩ )
Total resistance tolerance	±20%
Resistance taper	A, B, C, D, E, K, M, N, W
Rated power	0.05W
Max. operating voltage	50V AC
Residual resistance * For volume control	$R \leq 30 \text{ k}\Omega$ 40Ω max. $300\text{k}\Omega < R \leq 500\text{k}\Omega$ 0.1% max. to total resistance
Insulation resistance	100MΩ min. at 250V DC
Withstand voltage	300V AC
Gang error	For volume                      For tone -40dB to 0dB 3dB max.      20dB max. at 50% rotation angle

For volume control, measurement is made at max. attenuation and insertion loss.

### 3. Electrical Characteristics

Resistance range	Maximum attenuation level	Insertion loss
$5\text{k}\Omega \leq R < 10\text{k}\Omega$	60dB Min.	0.1dB Max.
$10\text{k}\Omega \leq R < 50\text{k}\Omega$	70dB Min.	
$50\text{k}\Omega \leq R < 100\text{k}\Omega$	80dB Min.	
$100\text{k}\Omega \leq R$	90dB Min.	

### 4. Durability

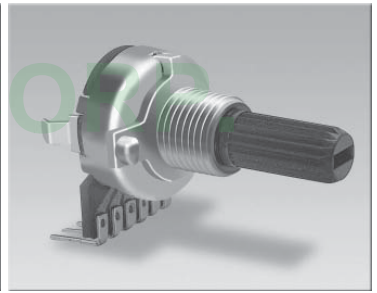
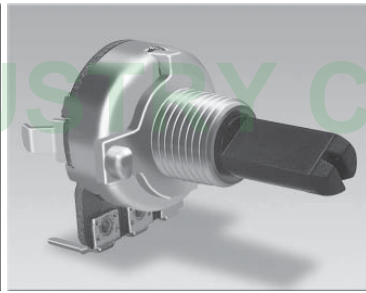
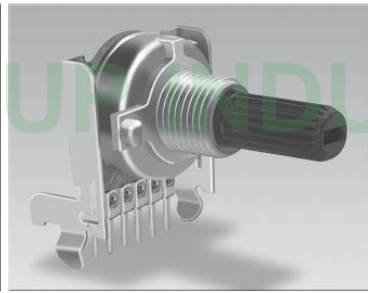
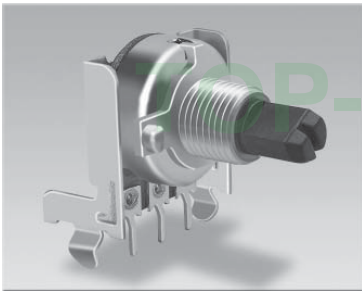
Rotational life	15,000 cycles
-----------------	---------------

**16PR1HBF-B**

**16PR2HBF-B**

**16PR1VBF-D**

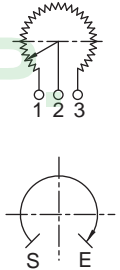
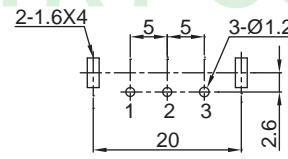
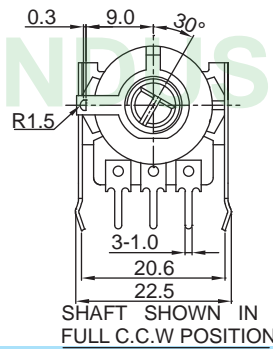
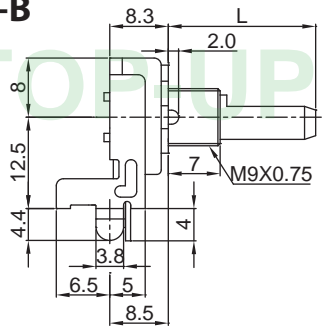
**16PR2VBF-D**



Outline Drawing

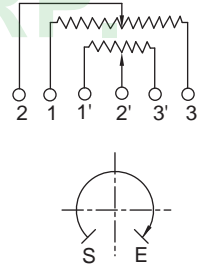
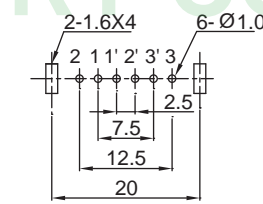
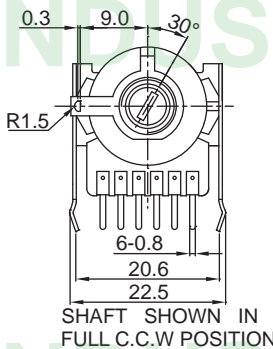
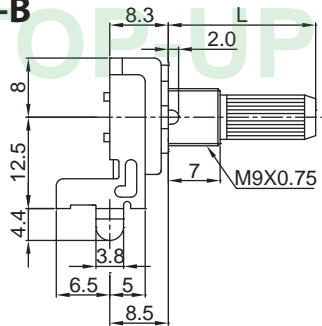
Features individual specifications

**16PR1HBF-B**



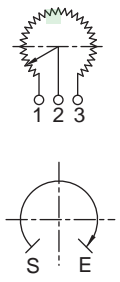
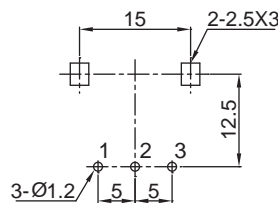
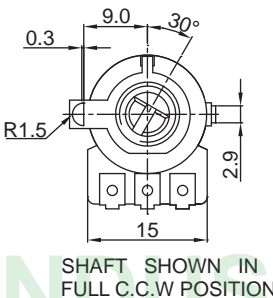
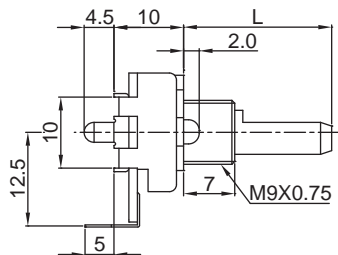
280° ROTATION SINGLE UNIT

**16PR2HBF-B**



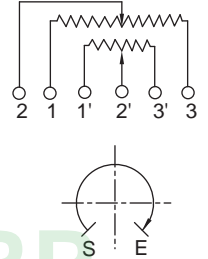
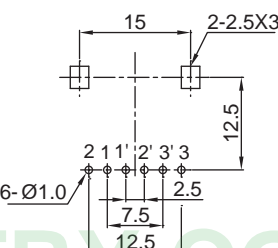
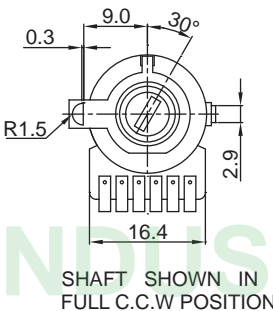
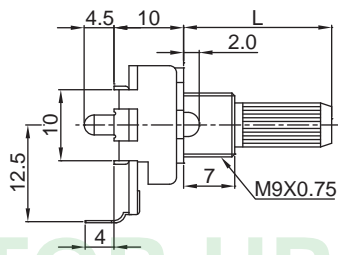
280° ROTATION DUAL UNIT

**16PR1VBF-D**



280° ROTATION SINGLE UNIT

**16PR2VBF-D**



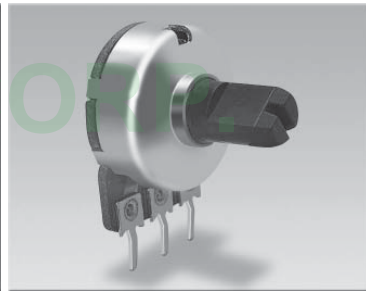
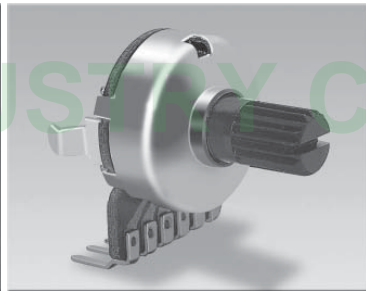
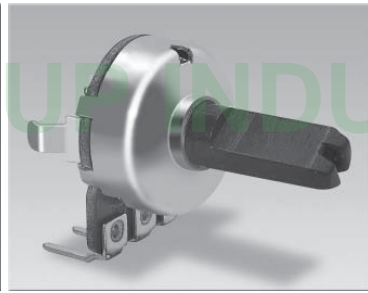
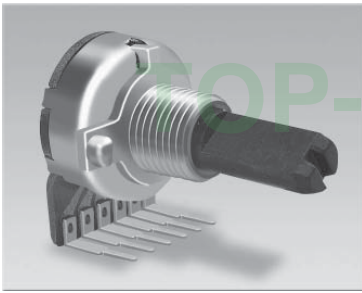
280° ROTATION DUAL UNIT

**16PR2VB-C**

**16PR1VF-D**

**16PR2VF-D**

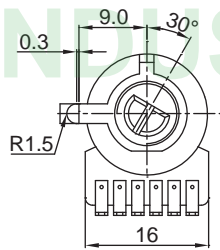
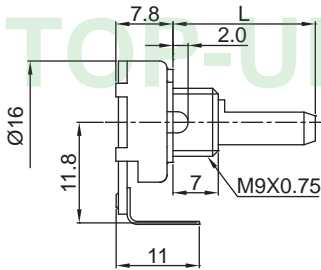
**16PR1H-B**



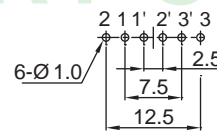
Outline Drawing

Features individual specifications

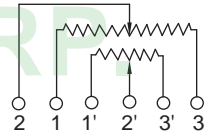
**16PR2VB-C**



SHAFT SHOWN IN FULL C.C.W POSITION

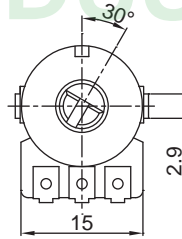
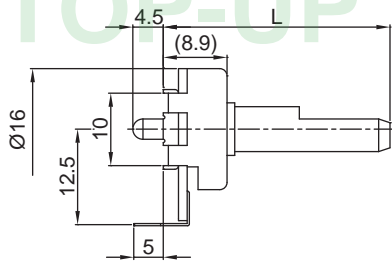


P.C.B MOUNTING HOLES DETAIL  
 TERMINAL HEIGHTS (H): 7mm, 11mm.

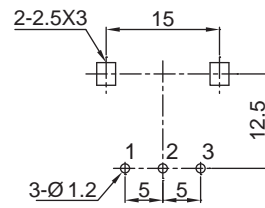


280° ROTATION DUAL UNIT

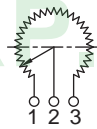
**16PR1VF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

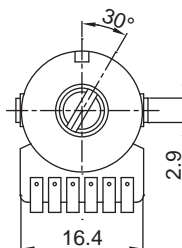
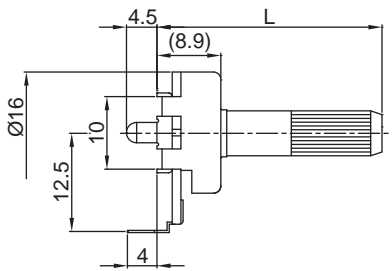


P.C.B MOUNTING HOLES DETAIL

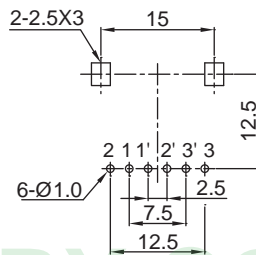


280° ROTATION SINGLE UNIT

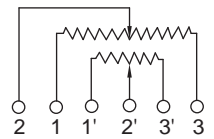
**16PR2VF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

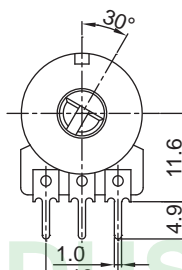
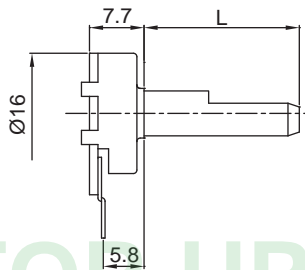


P.C.B MOUNTING HOLES DETAIL

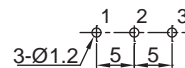


280° ROTATION DUAL UNIT

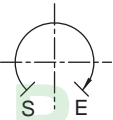
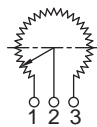
**16PR1H-B**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



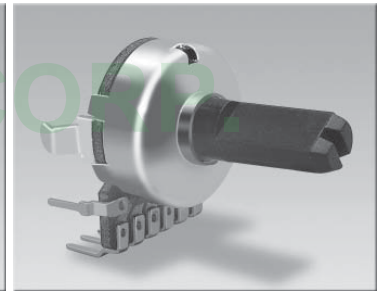
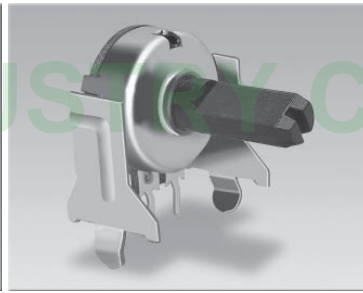
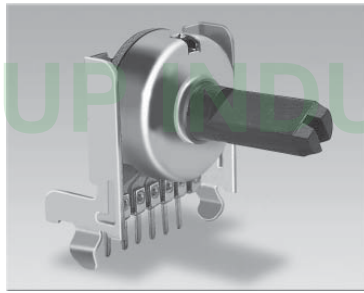
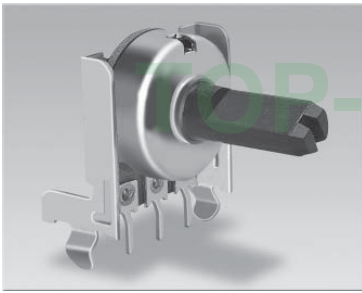
280° ROTATION SINGLE UNIT

**16PR1HF-B**

**16PR2HF-B**

**16PR1HDF-B**

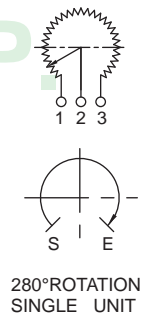
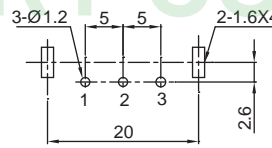
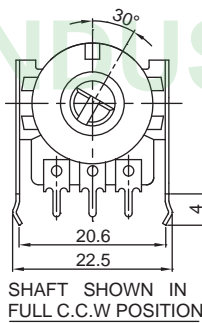
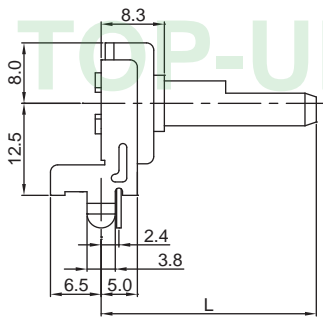
**16PR2VFLT-D**



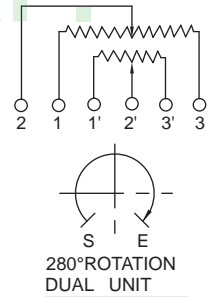
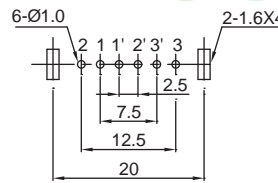
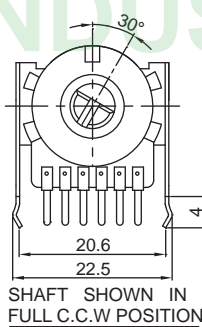
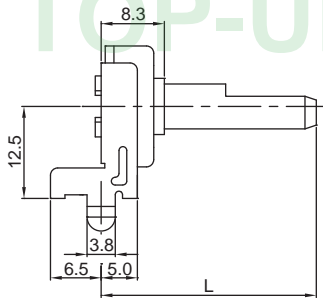
Outline Drawing

Features individual specifications

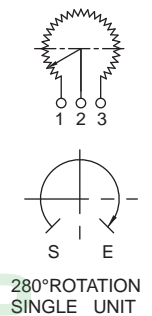
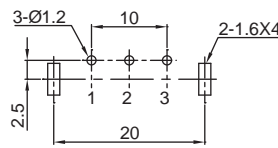
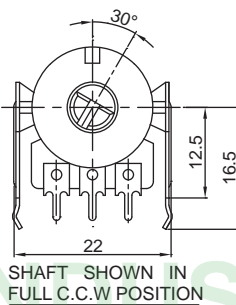
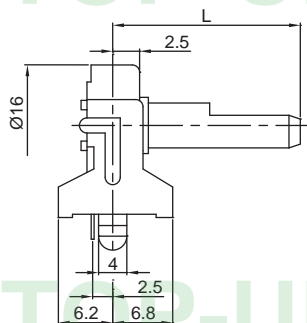
**16PR1HF-B**



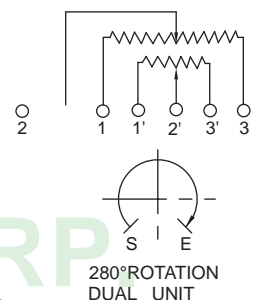
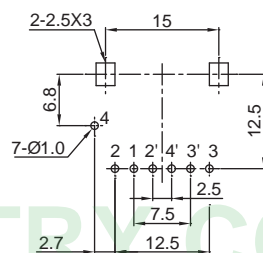
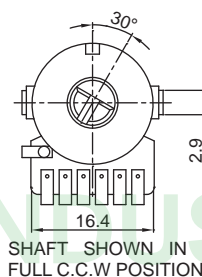
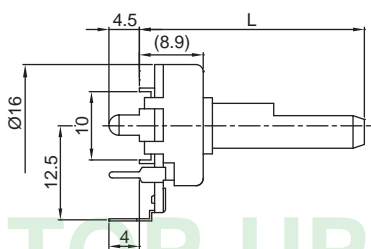
**16PR2HF-B**



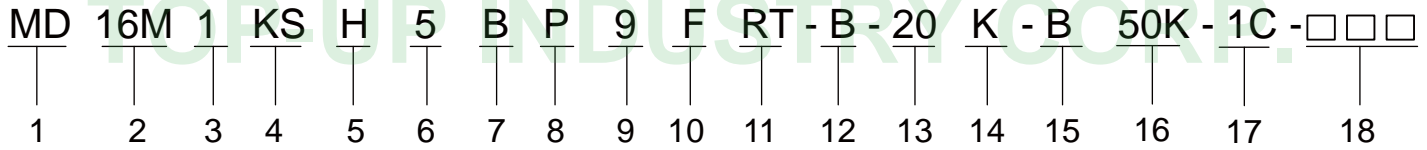
**16PR1HDF-B**



**16PR2VFLT-D**



## 16M Series Code Explanation



1. With Moter-Driven
2. Product Lines of 16M & 16P  
 16M— Metal Shaft, 16mm Size Series  
 16P— Insulated Shaft, 16mm Size Series

3. Number of Unit  
 1 — Single Unit  
 2 — Dual Unit ,.....

4. Type of Switch

( Drawing 1 )

<b>S</b>	<b>KS</b>	<b>AS</b>	<b>BS</b>
<b>LS</b>	<b>GS</b>	<b>CS</b>	<b>DS</b>

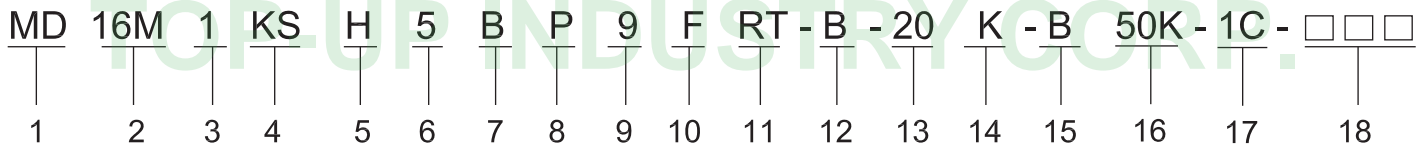
5. Horizontal (H) Type or Veritical (V) Type
6. Bushing Length
7. Bushing Type (See Drawing 2)
8. Bushing Material : Blank -Zinc Alloy (Standard Type)  
 A -Aluminum Alloy , P -Plastic Alloy , C -Copper Alloy

9. Bushing Diameter

( Drawing 2 )

1	<b>B</b> (With Screw)		Other type	(B)	7	5	10	26
			(D)	M7*0.75		M9*0.75		
2	<b>NB</b> (Without Screw)		With Motor-Driven Series					
	<b>B</b> (with Screw)							

## 16M Series Code Explanation



10. With Frame : "F"

11. With Tap

UT — Up Tap , RT — Right Tap

12. Type of Terminal

P.C.B Type																										
Horizontal								Vertical																		
B								D																		
Code	B	B1	B2	B3	B4	B5	B6	Code	D	D1	D2	D3	D4	D5	D6	D7	D8	Code	D	D1	D2	D3	D4	D5	D6	
H	12.5	18	22	12.5	18	22	18.5	Single Unit	H	16.2	16.2	14	13.5	12.7	13	15.7	15.2	12	Dual Unit	H	16		18			15.7
P	3.5	3.5	3.5	4.0	4.0	4.0	3.5	G	10.7	21.1	11.1	12	9.2	9.3	14.5	13	8.9	G	11.1			12.3			14.5	
								P	5		5	4	4.5	4.5	3.5	3.4	8.5	P	5			4			3.5	
Solder Lug Type								P.C.B Type																		
Horizontal								Vertical																		
A								C																		
								Single Unit	Code	C	C1	C2	C3	C4	Dual Unit	Code	C	C1	C2	C3						
								H	10.9	11.5	13	11.7	12	H	10.9	11.5	13	12.5								
								P	3.0	4.0	4.0	3.0	P	3.0	4.0	4.0	3.0									

13. Shaft Length "L" (See Drawing 4)

( Drawing 3 )

14. Type of Shaft (See Drawing 4)

15. Type of Taper (See Taper Chart Page 220)

16. Resistance Value

17. Number of Clicks : Blank -None

1C -Center Click

11C -11 Position Click

21C -21 Position Click

41C -41 Position Click

18. Serial No.



## 16M Series Code Explanation

MD 16M 1 KS H 5 B P 9 F RT - B - 20 K - B 50K - 1C - □ □ □

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

( Drawing 4 )

KM - Type ( Zinc Alloy )								K - Type ( Aluminum Alloy )									
F - Type								FD - Type									
S - Type								R - Type									
B:5m/m								B:6.5m/m									
Shaft - Type	L	10	15	20	25	30	35	40	Shaft - Type	L	10	15	20	25	30	35	40
K	T1	3.5	6.5	11	14	14	14	14	K(M)	T1	2.4	6.5	11	14	14	14	14
	T	3.2	6	10	12	12	12	12		T	2.2	6	10	12	12	12	12
	M	0.5	1	2	4	4	4	4		M	0.5	1	2	4	4	4	4
F	F	4	7	12	14	14	14	14	F	F	2.5	7	12	14	14	14	14
R . S	L	10	15	20	25	30	35	40	R . S	L	10	15	20	25	30	35	40

## 16mm SIZE METAL SHAFT POTENTIOMETERS

### Mechanical Characteristic:

Total rotational angle	300°±5°
Rotational torque	20~200gf.cm
Detent position	Center detent or 11, 24, 41 position clicks
Detent slip out force	Rotational torque +30~100gf.cm
Shaft stopper strength	≥ 6kgf.cm
Shaft wobble(mm p-p)	Within (0.7XL/30)mm p-p Max.L=Shaft Length

### Electrical Characteristic:

Total resistance & tolerance	500Ω < R < 1MΩ : ±20%, other : ±30%	
Resistance taper	Refer to Standard Resistance Taper	
Power rating	Linear taper 0.2W; Other taper 0.1W	
Max. operating voltage	Linear taper 200V; Other taper 150V	
Rotational noise	≤ 47mV	
Insulation resistance	≥ 100MΩ at DC 500V	
Withstanding voltage	1 minute at AC 500V	
Tracking error (Stereo)	For volume control	Within 3dB at -40 ~ 0dB
	For tone control	Within 2dB at 50% Position
Tracking error (Multi gangs)	For volume control	Within 3dB at -40~0dB (Special ≤ Within 1.5dB at -60 ~ 0dB)

### Durability:

Rotational life	≥ 10,000 cycles (special: 1,000K cycles)
-----------------	--

# 16mm SIZE ROTARY MOTOR-DRIVEN POTENTIOMETERS

## Common Specifications

### 1. Mechanical Characteristics

Items		Series	(16mm size)																																	
			Single shaft	Dual shaft																																
Total rotation angle			300±3°	300±5°																																
Rotational torque			30 to 250 gf . cm																																	
Detent torque	Center detent		Rotational torque + (30 to 300) gf . cm																																	
	11 detent		—																																	
	21 detent	100 to 500	—																																	
	31 detent	gf . cm	—																																	
	41 detent		—																																	
Stop strength			9kgf . cm	6kgf . cm																																
Push pull strength			10kgf max.																																	
Shaft wobble			The shaft wobble at the position of 5mm from the top when a load of a gf is applied to said position after mounting the bushing shall be B mm P-P max.																																	
			<table border="1"> <thead> <tr> <th>Shaft length (mm)</th> <th>15</th> <th>20</th> <th>25</th> <th>30</th> <th>35</th> <th>40</th> <th>45</th> </tr> </thead> <tbody> <tr> <td>Thrust A (gf)</td> <td>1000</td> <td>670</td> <td>500</td> <td>400</td> <td>340</td> <td>290</td> <td>250</td> </tr> <tr> <td>Single and outer shafts B (mm P-P)</td> <td>0.14</td> <td>0.2</td> <td>0.27</td> <td>0.34</td> <td>0.4</td> <td>0.47</td> <td>0.54</td> </tr> <tr> <td>Inner shaft B (mm P-P)</td> <td>—</td> <td>—</td> <td>0.4</td> <td>0.5</td> <td>0.6</td> <td>0.7</td> <td>0.8</td> </tr> </tbody> </table>		Shaft length (mm)	15	20	25	30	35	40	45	Thrust A (gf)	1000	670	500	400	340	290	250	Single and outer shafts B (mm P-P)	0.14	0.2	0.27	0.34	0.4	0.47	0.54	Inner shaft B (mm P-P)	—	—	0.4	0.5	0.6	0.7	0.8
Shaft length (mm)	15	20	25	30	35	40	45																													
Thrust A (gf)	1000	670	500	400	340	290	250																													
Single and outer shafts B (mm P-P)	0.14	0.2	0.27	0.34	0.4	0.47	0.54																													
Inner shaft B (mm P-P)	—	—	0.4	0.5	0.6	0.7	0.8																													
Bushing nut tightening strength			12kgf max.																																	
Detent angle			<table border="1"> <thead> <tr> <th>No.of detents</th> <th>Center-detent</th> <th>11 detents</th> <th>21 detents</th> <th>31 detents</th> <th>41 detents</th> </tr> </thead> <tbody> <tr> <td>Angle</td> <td>150±3°</td> <td>30±2°</td> <td>15±3°</td> <td>10±2°</td> <td>7.5±2°</td> </tr> </tbody> </table>		No.of detents	Center-detent	11 detents	21 detents	31 detents	41 detents	Angle	150±3°	30±2°	15±3°	10±2°	7.5±2°																				
No.of detents	Center-detent	11 detents	21 detents	31 detents	41 detents																															
Angle	150±3°	30±2°	15±3°	10±2°	7.5±2°																															
			Both ends ±3°																																	

### 2. Electrical Characteristics

Items		Series	16mm size
Total resistance range(kΩ)			1, 5, 10, 20, 50, 100, 200, 250, 500, 1000, 2000
Total resistance tolerance			±20%
Resistance taper			A, B, C, D, E, K, W, RD, M, N
Power rating			B taper: 0.1W Other than B taper: 0.05W
Max.operating voltage	For AC use		150V AC
	For DC use		*20V DC
For general residual resistance use			10Ω max.
Maximum attenuation level for volume control			5kΩ ≤ R < 10kΩ 70dB min. 10kΩ ≤ R < 50kΩ 80dB min. 50kΩ ≤ R < 100kΩ 90dB min. 100kΩ ≤ R 100dB min.
Insertion loss for volume control			0.1dB max.
Gang error	For volume		-40dB to 0dB 3dB max.
	For tone		2dB max. at 50% rotation angle
Slider noise			47mV max. according to JIS-C6443
Insulation resistance			100MΩ min. at 500V DC
Withstand voltage			1 minute at 500V AC

### 3. Durability Characteristics

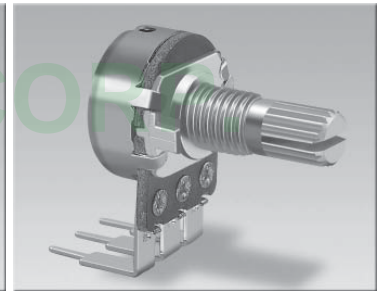
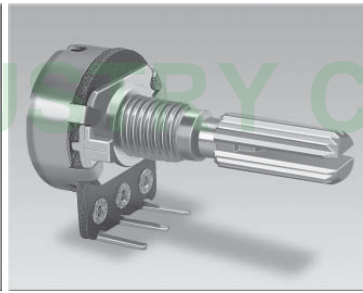
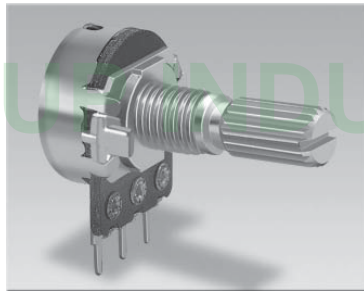
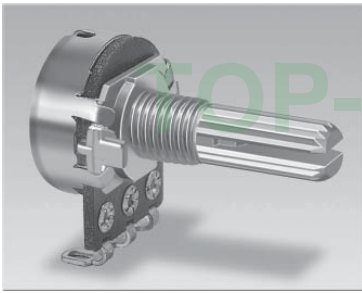
Rotational life	15,000 cycles
-----------------	---------------

**16M1HB-A**

**16M1HB-B**

**16M1VB-C**

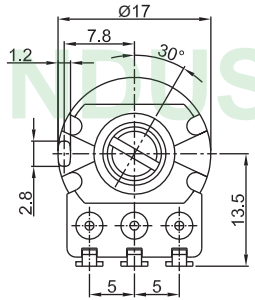
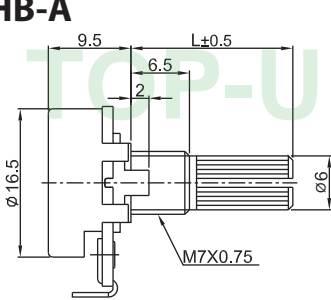
**16M1VB-D**



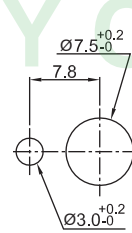
Outline Drawing

Features individual specifications

**16M1HB-A**

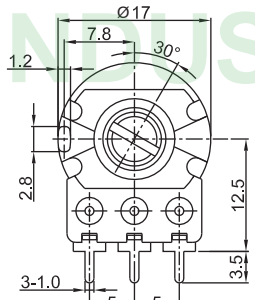
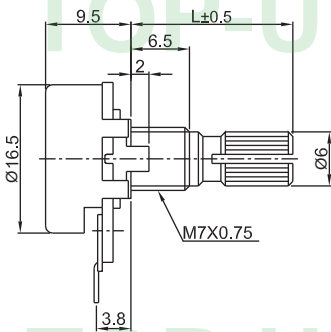


SHAFT SHOWN IN FULL C.C.W POSITION

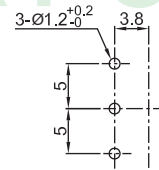


300° ROTATION SINGLE UNIT

**16M1HB-B**



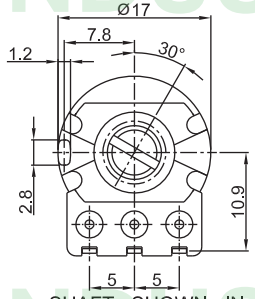
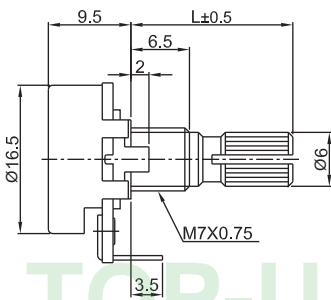
SHAFT SHOWN IN FULL C.C.W POSITION



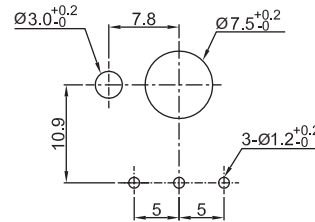
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

**16M1VB-C**



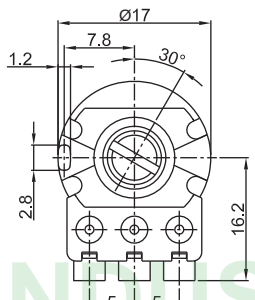
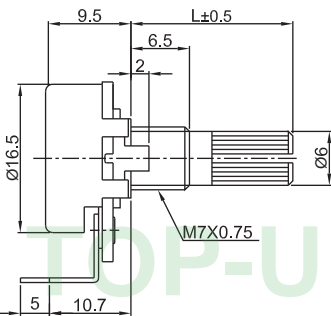
SHAFT SHOWN IN FULL C.C.W POSITION



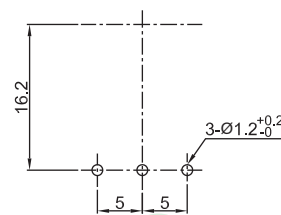
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

**16M1VB-D**



SHAFT SHOWN IN FULL C.C.W POSITION



300° ROTATION SINGLE UNIT

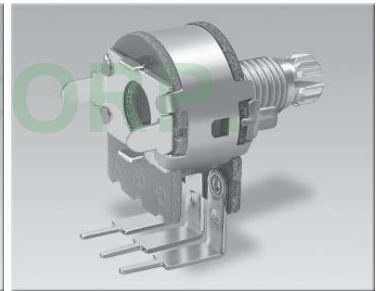
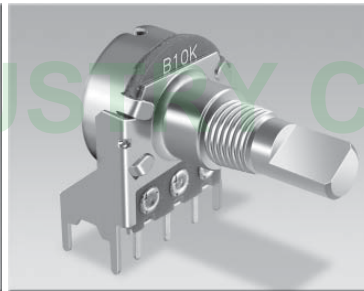
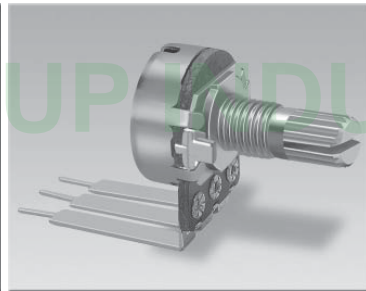
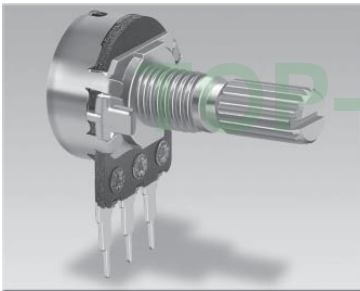
P.C.B MOUNTING HOLES DETAIL

**16M1HB-B2**

**16M1VB-D1**

**16M1H5.5BCFA-B3**

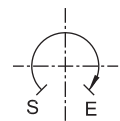
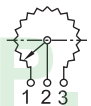
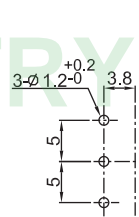
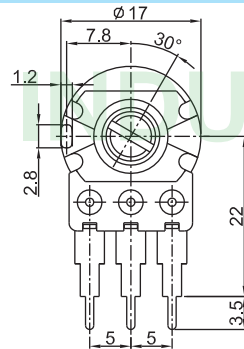
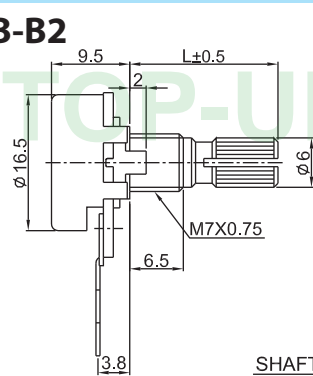
**16M1VBF-D**



Outline Drawing

Features individual specifications

**16M1HB-B2**

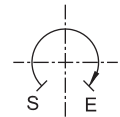
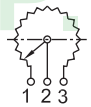
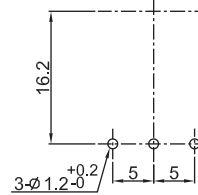
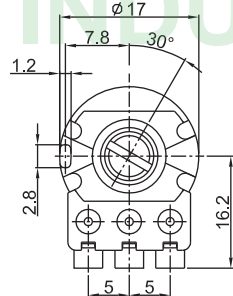
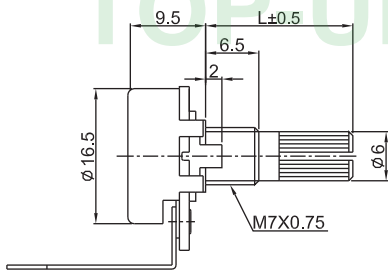


300° ROTATION  
SINGLE UNIT

SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

**16M1VB-D1**

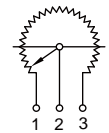
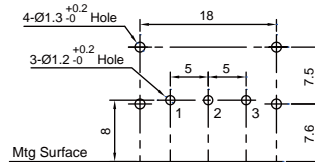
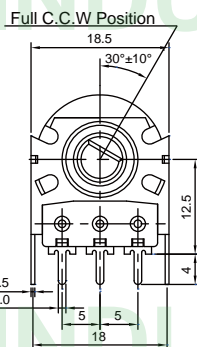
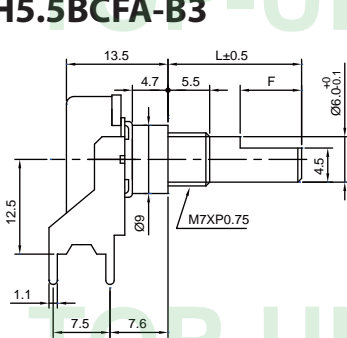


300° ROTATION  
SINGLE UNIT

SHAFT SHOWN IN FULL C.C.W POSITION

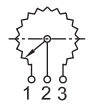
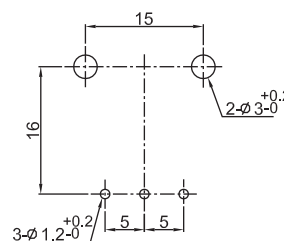
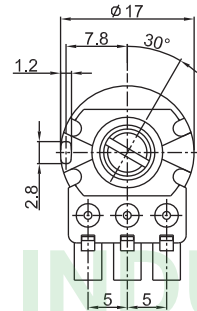
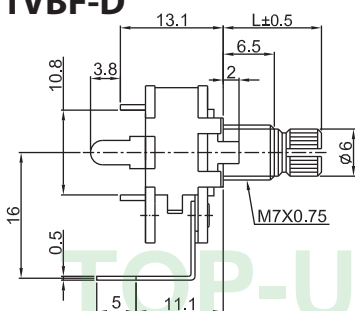
P.C.B MOUNTING HOLES DETAIL

**16M1H5.5BCFA-B3**



300° ROTATION  
SINGLE UNIT

**16M1VBF-D**



300° ROTATION  
SINGLE UNIT

SHAFT SHOWN IN FULL C.C.W POSITION

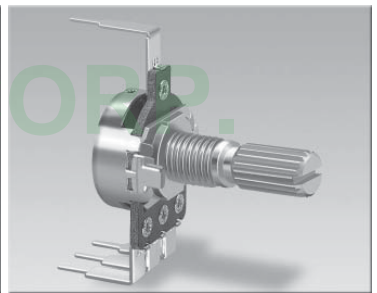
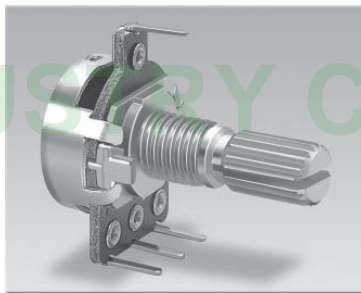
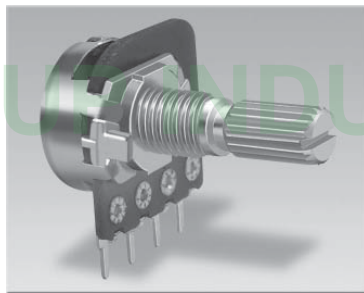
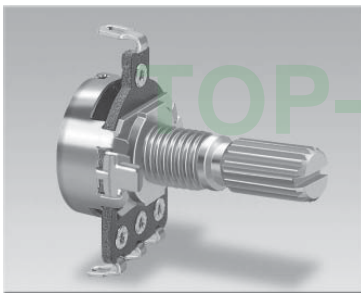
P.C.B MOUNTING HOLES DETAIL

**16M1HBUT-A**

**16M1HBRT-B**

**16M1VBUT-C**

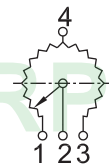
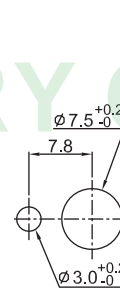
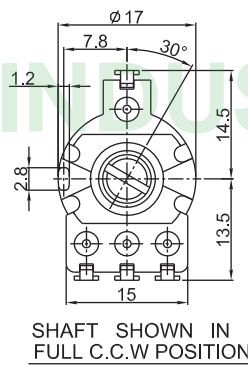
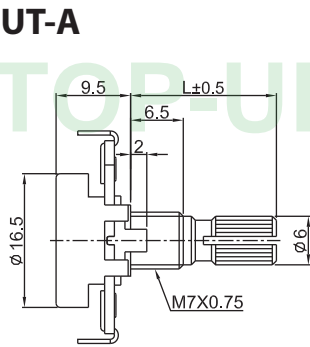
**16M1VBUT-D2**



Outline Drawing

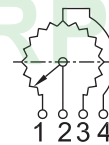
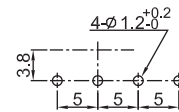
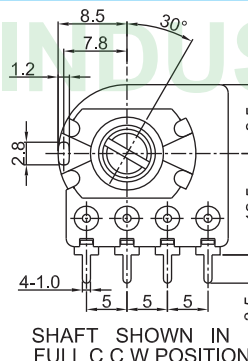
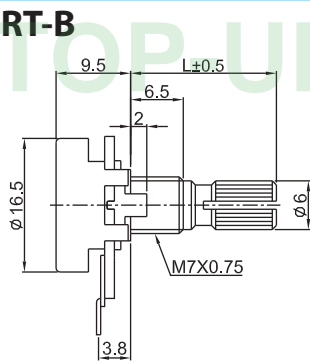
Features individual specifications

**16M1HBUT-A**



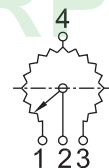
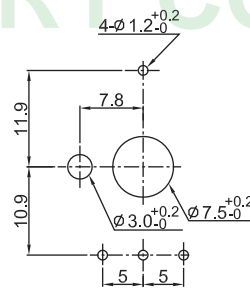
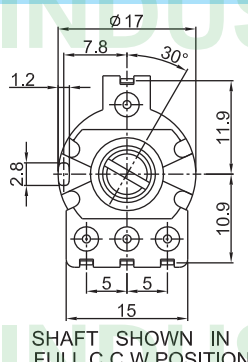
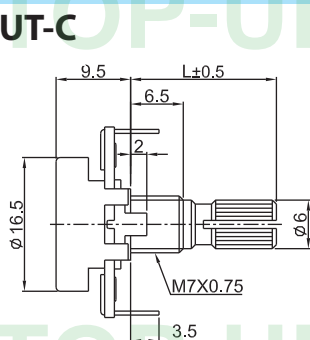
300° ROTATION SINGLE UNIT

**16M1HBRT-B**



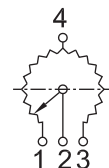
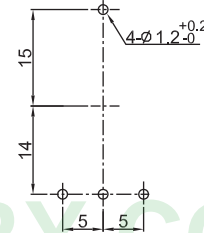
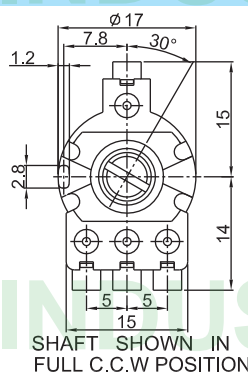
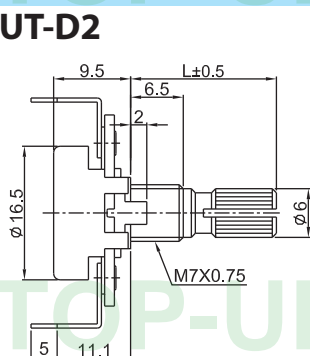
300° ROTATION SINGLE UNIT

**16M1VBUT-C**



300° ROTATION SINGLE UNIT

**16M1VBUT-D2**



300° ROTATION SINGLE UNIT

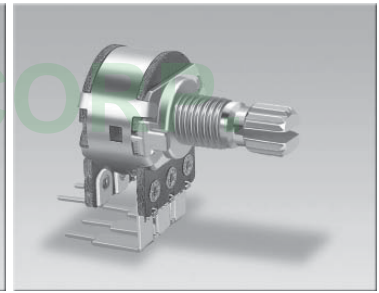
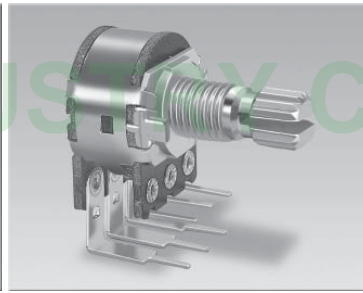
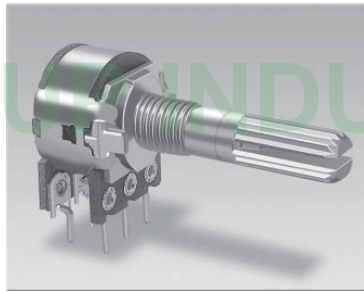
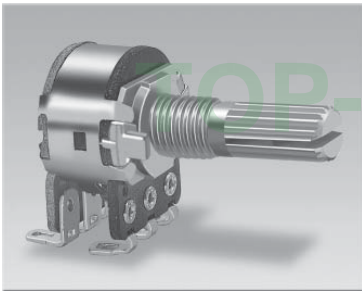


**16M2HB-A**

**16M2HB-B**

**16M2VB-C**

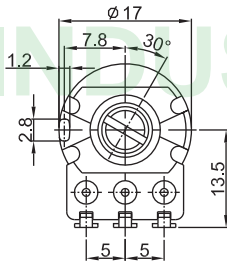
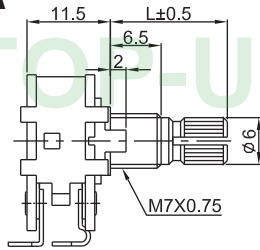
**16M2VB-D**



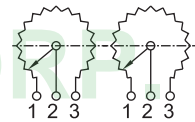
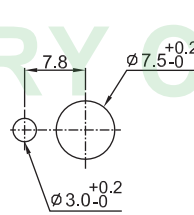
Outline Drawing

Features individual specifications

**16M2HB-A**

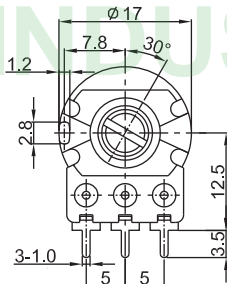
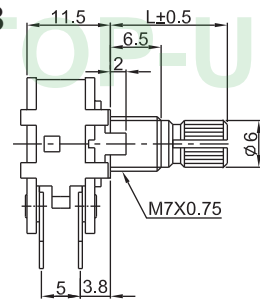


SHAFT SHOWN IN FULL C.C.W POSITION



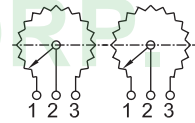
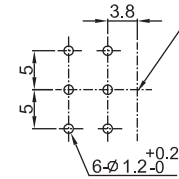
300° ROTATION DUAL UNIT

**16M2HB-B**



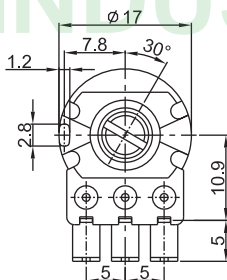
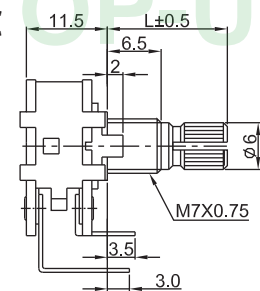
SHAFT SHOWN IN FULL C.C.W POSITION

MOUNTING SURFACE

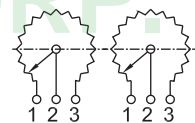
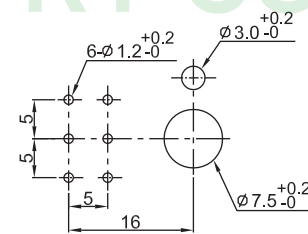


300° ROTATION DUAL UNIT

**16M2VB-C**

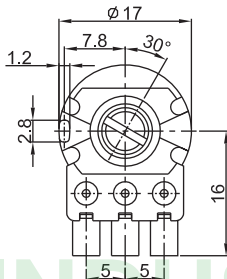
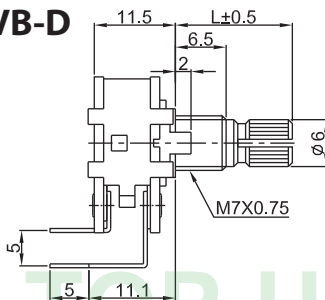


SHAFT SHOWN IN FULL C.C.W POSITION

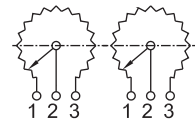
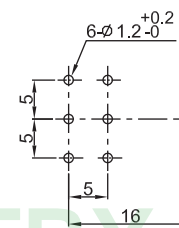


300° ROTATION DUAL UNIT

**16M2VB-D**



SHAFT SHOWN IN FULL C.C.W POSITION



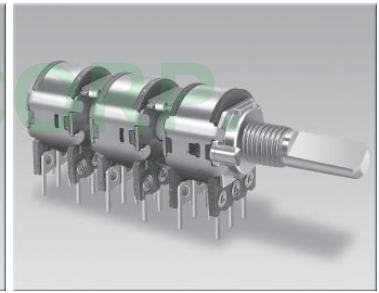
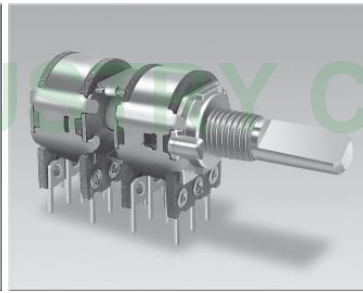
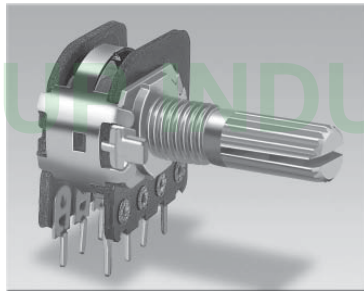
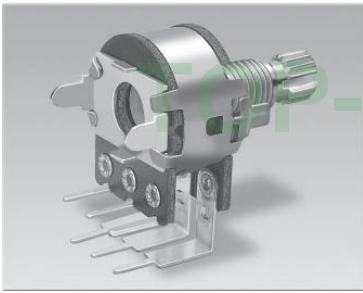
300° ROTATION DUAL UNIT

**16M2VBF-D**

**16M2HBRT-B**

**16M4HB-B3**

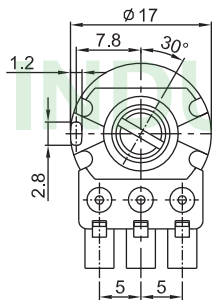
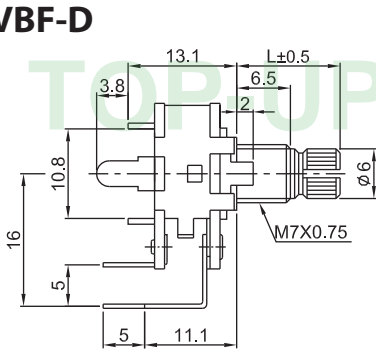
**16M6HB-B3**



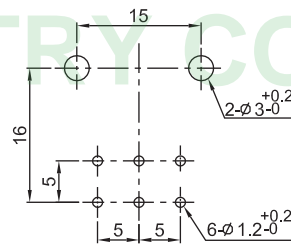
Outline Drawing

Features individual specifications

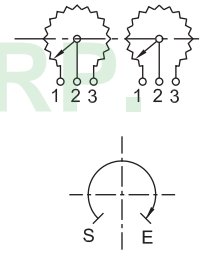
**16M2VBF-D**



SHAFT SHOWN IN FULL C.C.W POSITION

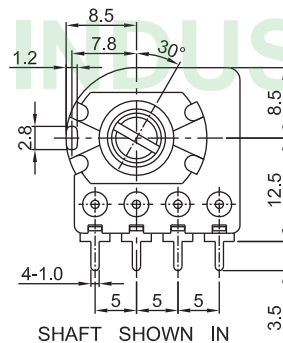
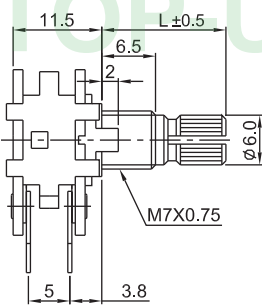


P.C.B MOUNTING HOLES DETAIL

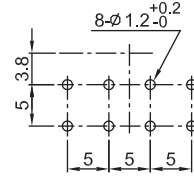


300° ROTATION DUAL UNIT

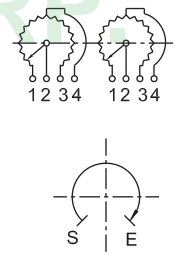
**16M2HBRT-B**



SHAFT SHOWN IN FULL C.C.W POSITION

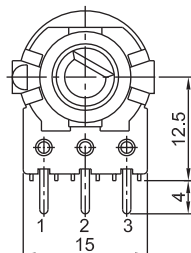
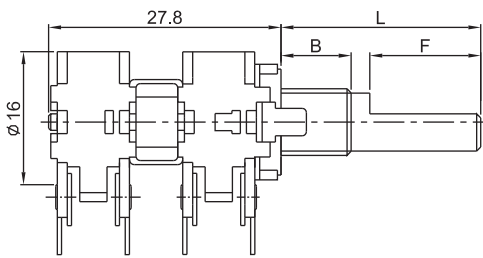


P.C.B MOUNTING HOLES DETAIL

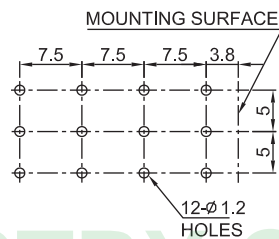


300° ROTATION DUAL UNIT

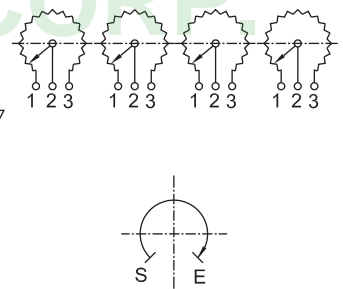
**16M4HB-B3**



SHAFT SHOWN IN FULL C.C.W POSITION

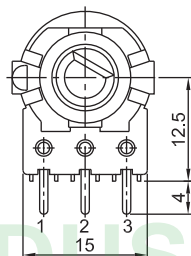
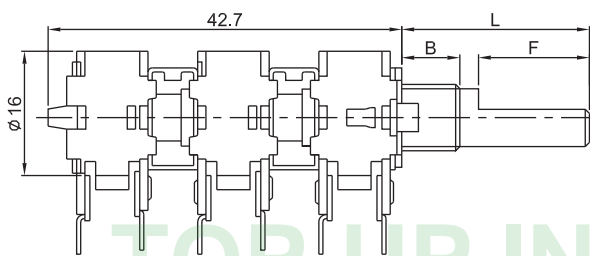


P.C.B MOUNTING HOLES DETAIL

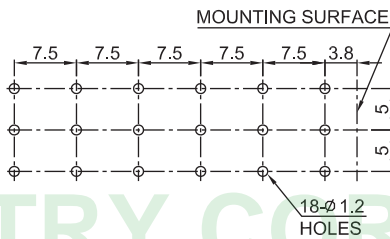


300° ROTATION MULTI-GANGED

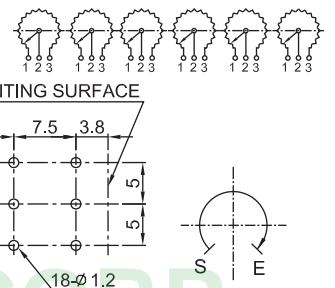
**16M6HB-B3**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



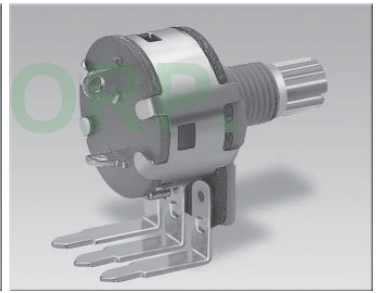
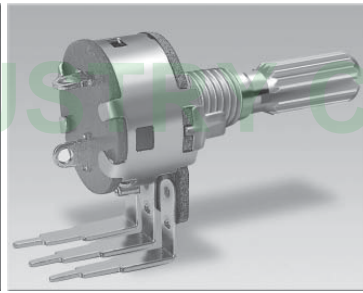
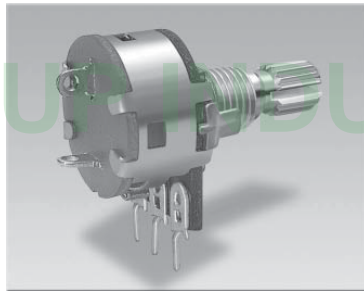
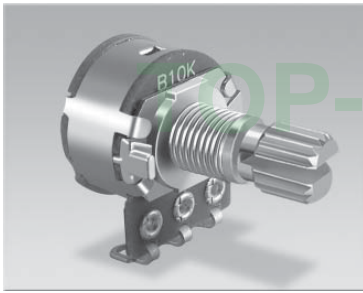
300° ROTATION MULTI-GANGED

**16M1KSHB-A**

**16M1KSHB-B3**

**16M1KSVB-D1**

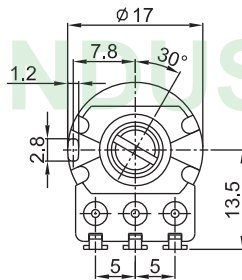
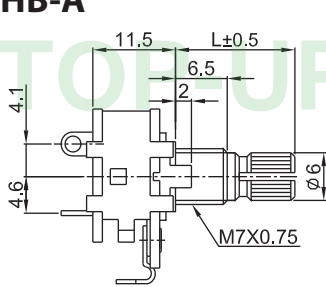
**16M1KSVBP-D2**



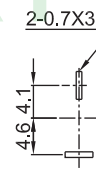
Outline Drawing

Features individual specifications

**16M1KSHB-A**



SHAFT SHOWN IN FULL C.C.W POSITION

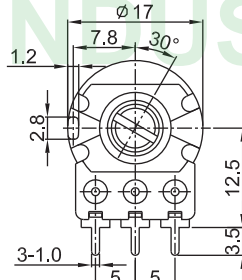
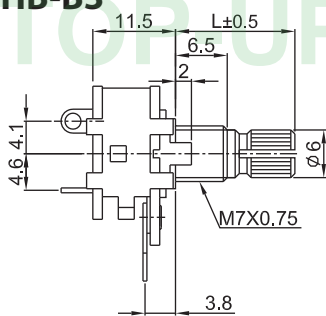


P.C.B MOUNTING HOLES DETAIL

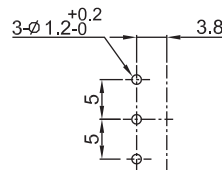


300° ROTATION SINGLE UNIT

**16M1KSHB-B3**



SHAFT SHOWN IN FULL C.C.W POSITION

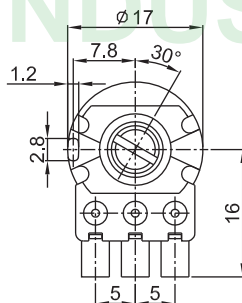
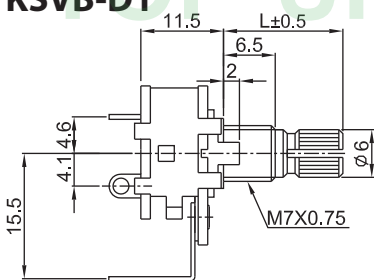


P.C.B MOUNTING HOLES DETAIL

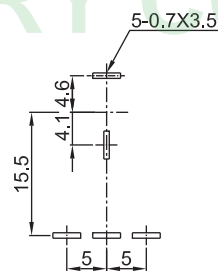


300° ROTATION SINGLE UNIT

**16M1KSVB-D1**



SHAFT SHOWN IN FULL C.C.W POSITION

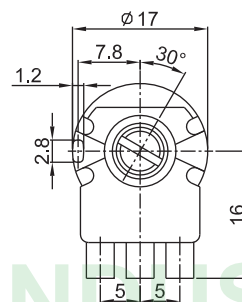
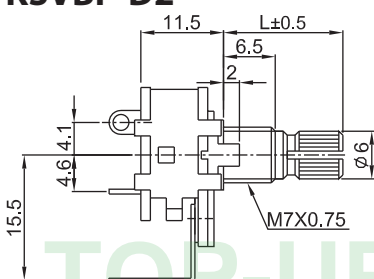


P.C.B MOUNTING HOLES DETAIL

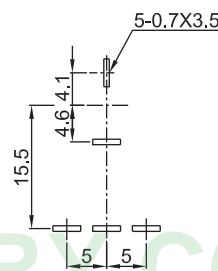


300° ROTATION SINGLE UNIT

**16M1KSVBP-D2**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



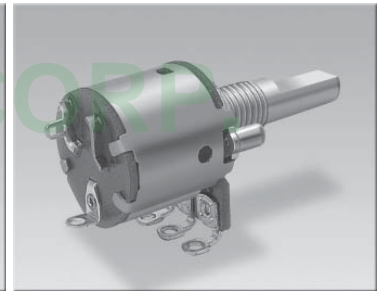
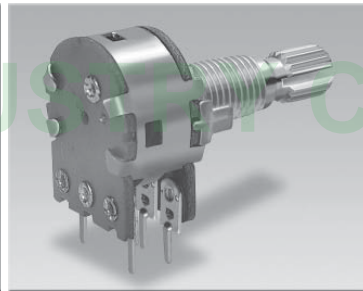
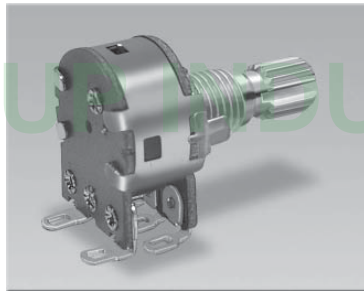
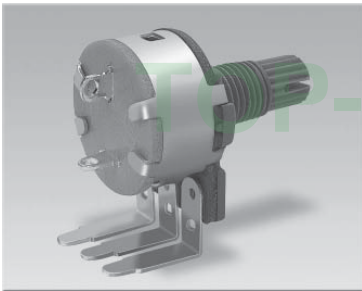
300° ROTATION SINGLE UNIT

**16P1KSVBP-D2**

**16M1SHB-A**

**16M1SHB-B3**

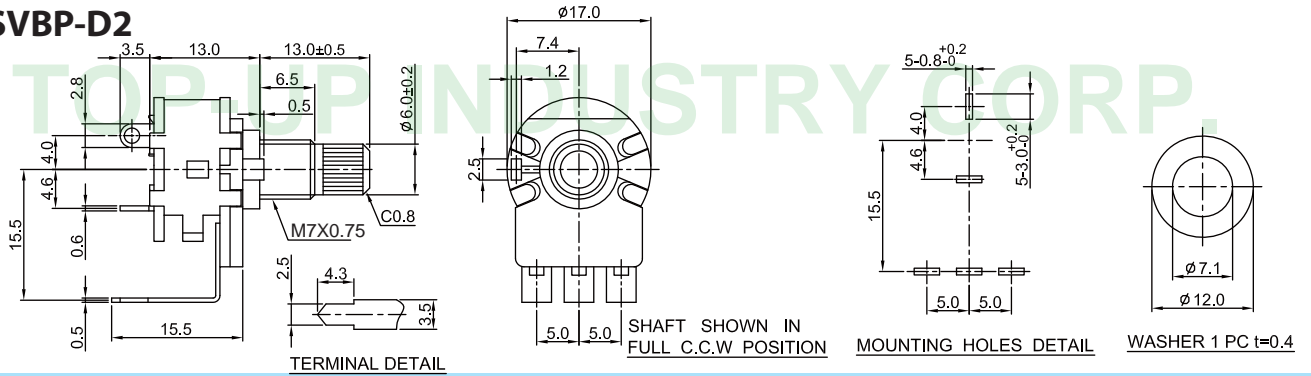
**16M1ASH7B-A**



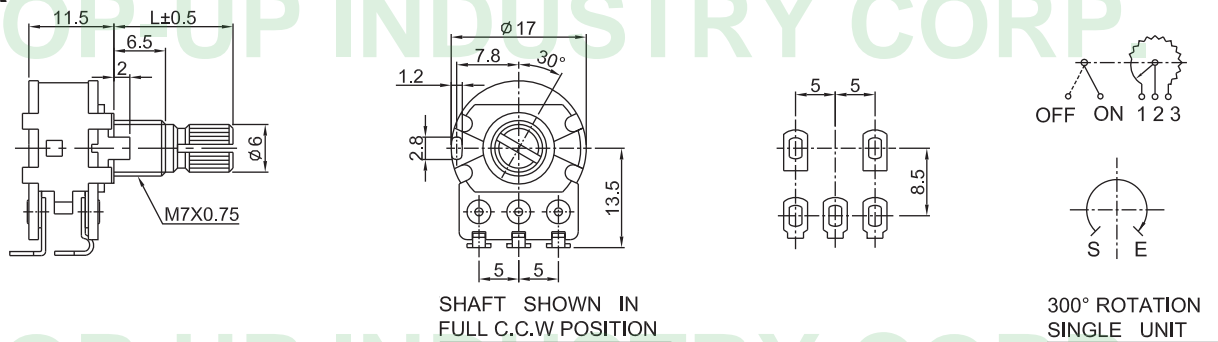
Outline Drawing

Features individual specifications

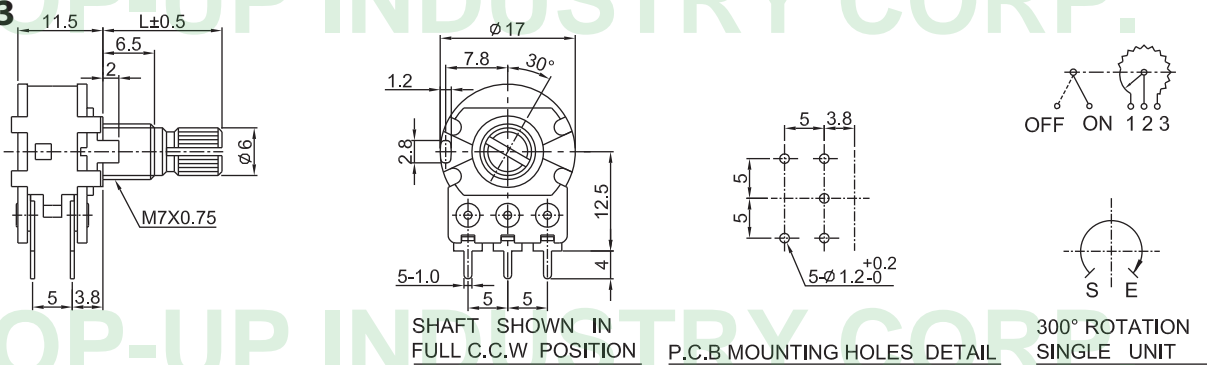
**16P1KSVBP-D2**



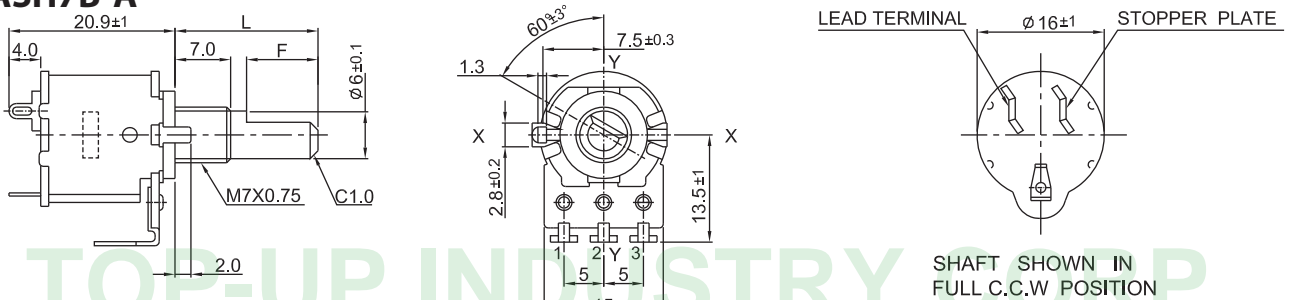
**16M1SHB-A**



**16M1SHB-B3**



**16M1ASH7B-A**

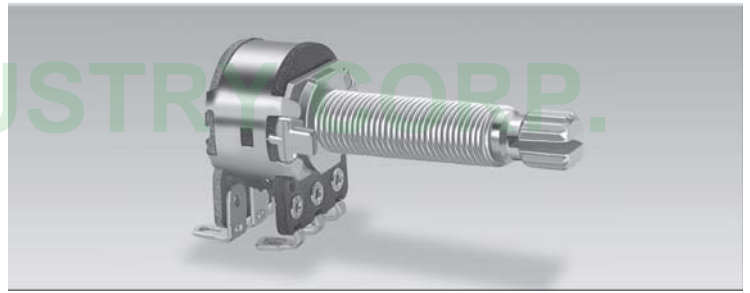
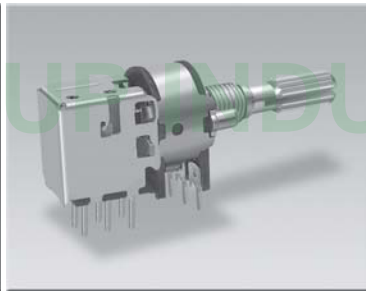
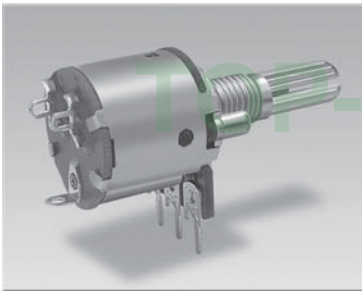


NOTE: WITHSTAND VOLTAGE, DC 30V 3A

**16M1BSH7B-B**

**16M1LSH7BF-B3**

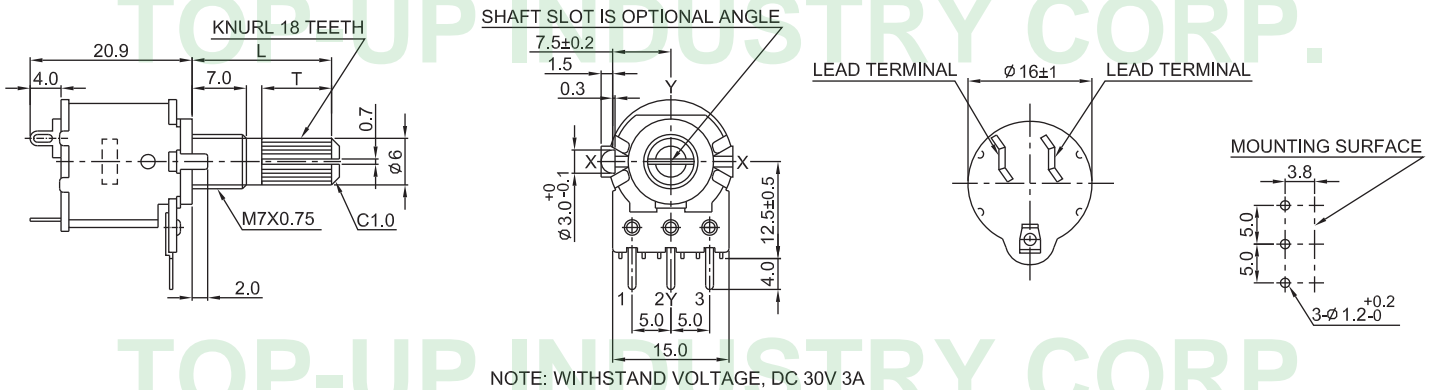
**16M1SH26B-A**



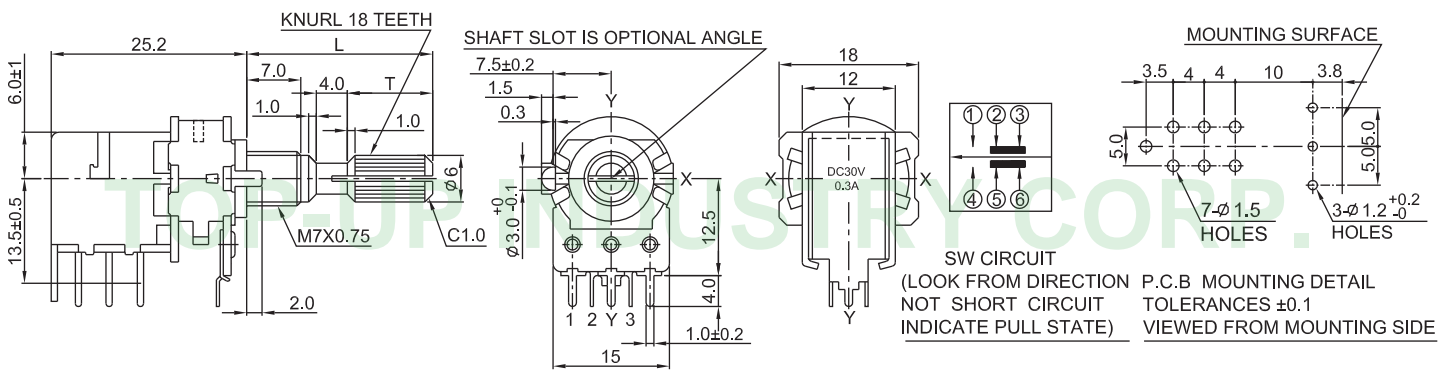
Outline Drawing

Features individual specifications

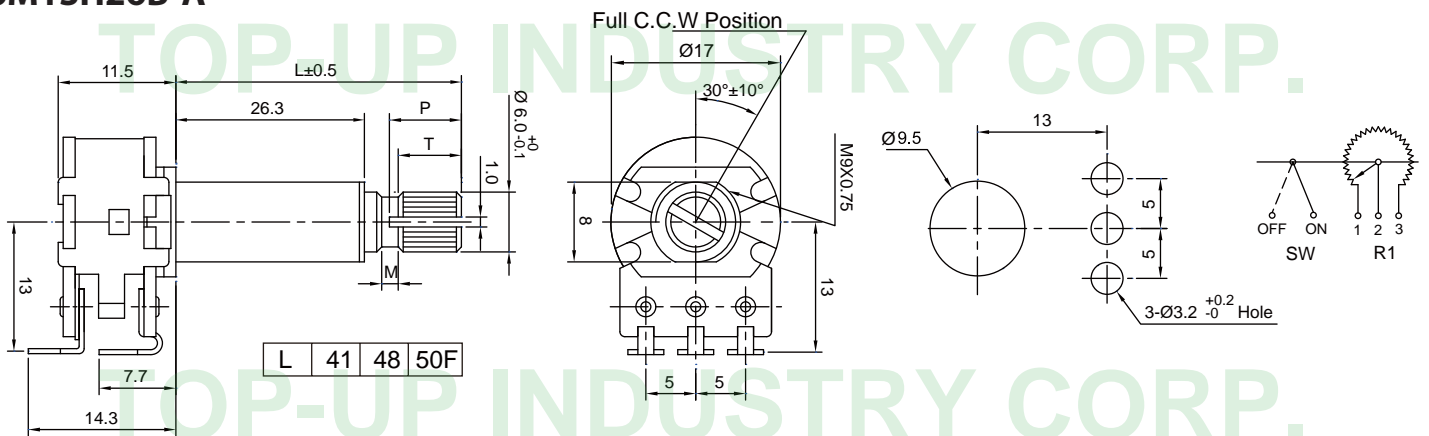
**16M1BSH7B-B**



**16M1LSH7BF-B3**



**16M1SH26B-A**



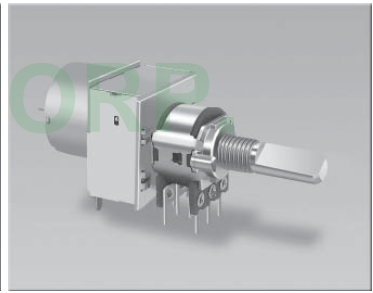
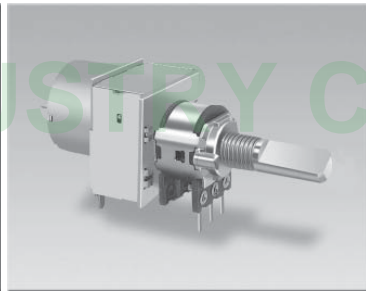
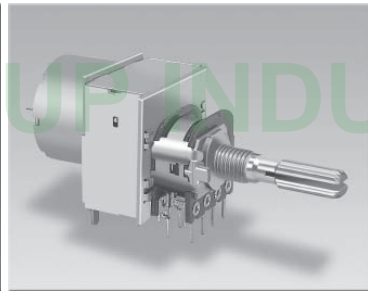
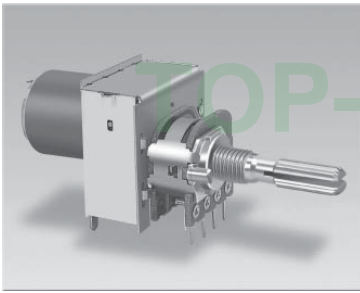


**MMD16M1HBRT-B3**

**MMD16M2HBRT-B3**

**MD16M1HB-B3**

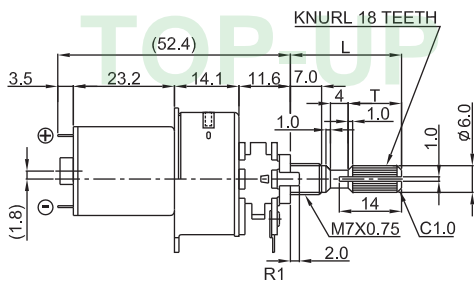
**MD16M2HB-B3**



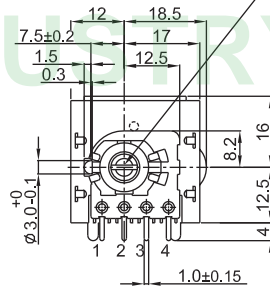
Outline Drawing

Features individual specifications

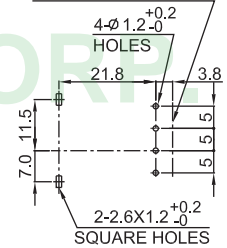
**MMD16M1HBRT-B3**



SHAFT SLOT IS OPTIONAL ANGLE

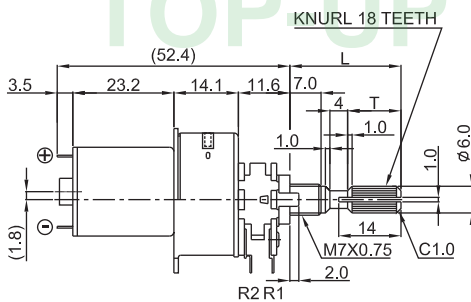


MOUNTING SURFACE

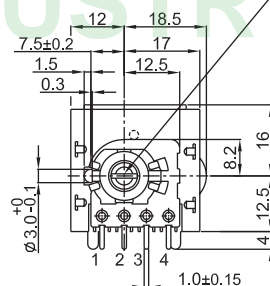


P.W.B MOUNTING DETAIL  
 TOLERANCES ±0.1  
 VIEWED FROM MOUNTING SIDE

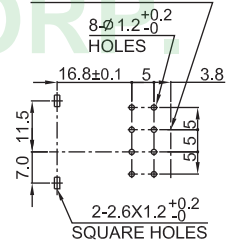
**MMD16M2HBRT-B3**



SHAFT SLOT IS OPTIONAL ANGLE

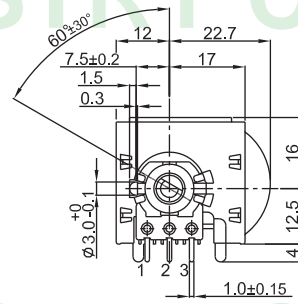
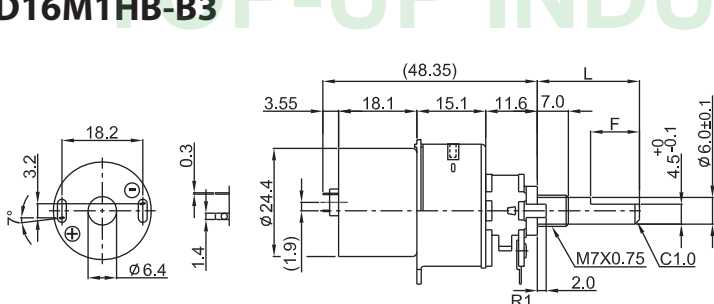


MOUNTING SURFACE

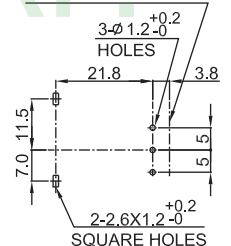


P.W.B MOUNTING DETAIL  
 TOLERANCES ±0.1  
 VIEWED FROM MOUNTING SIDE

**MD16M1HB-B3**

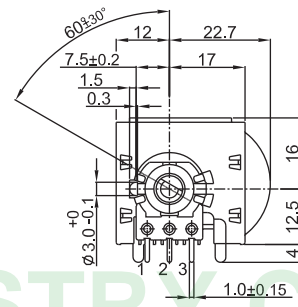
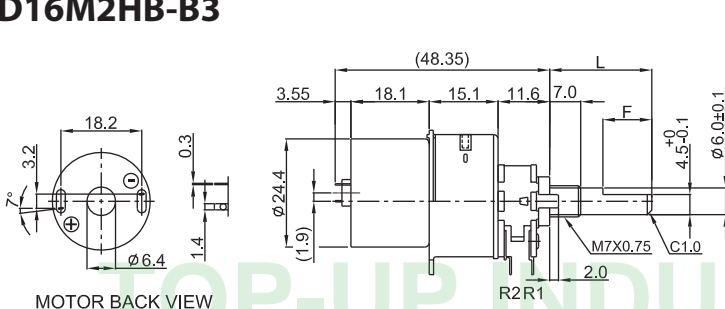


MOUNTING SURFACE

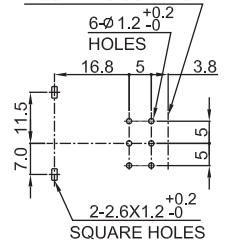


P.W.B MOUNTING DETAIL  
 TOLERANCES ±0.1  
 VIEWED FROM MOUNTING SIDE

**MD16M2HB-B3**



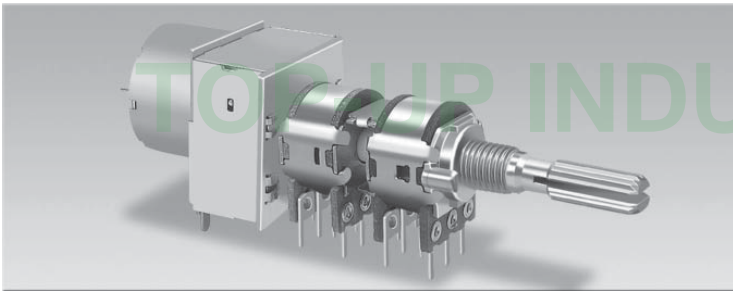
MOUNTING SURFACE



P.W.B MOUNTING DETAIL  
 TOLERANCES ±0.1  
 VIEWED FROM MOUNTING SIDE

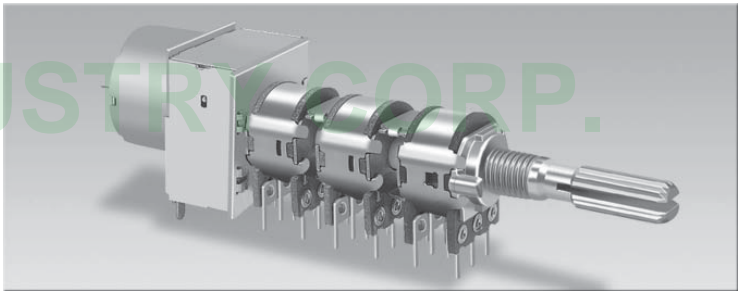


**MD16M4HB-B3**



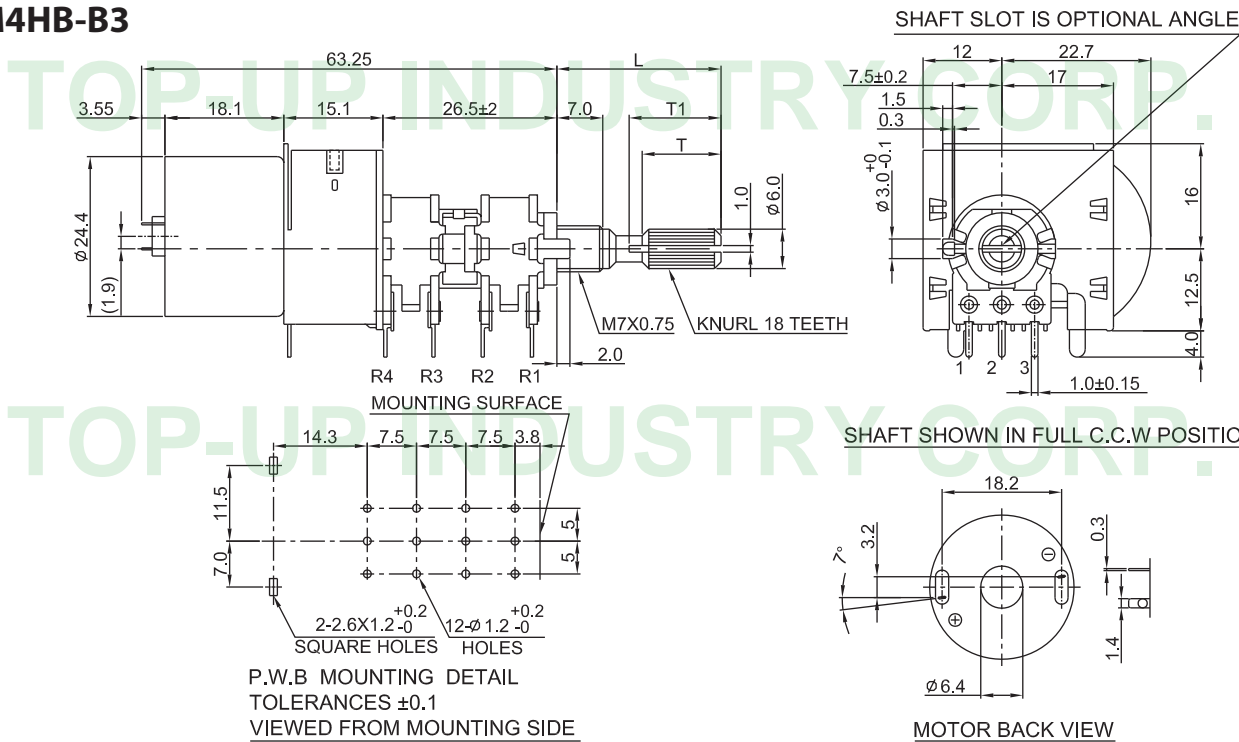
Outline Drawing

**MD16M6HB-B3**

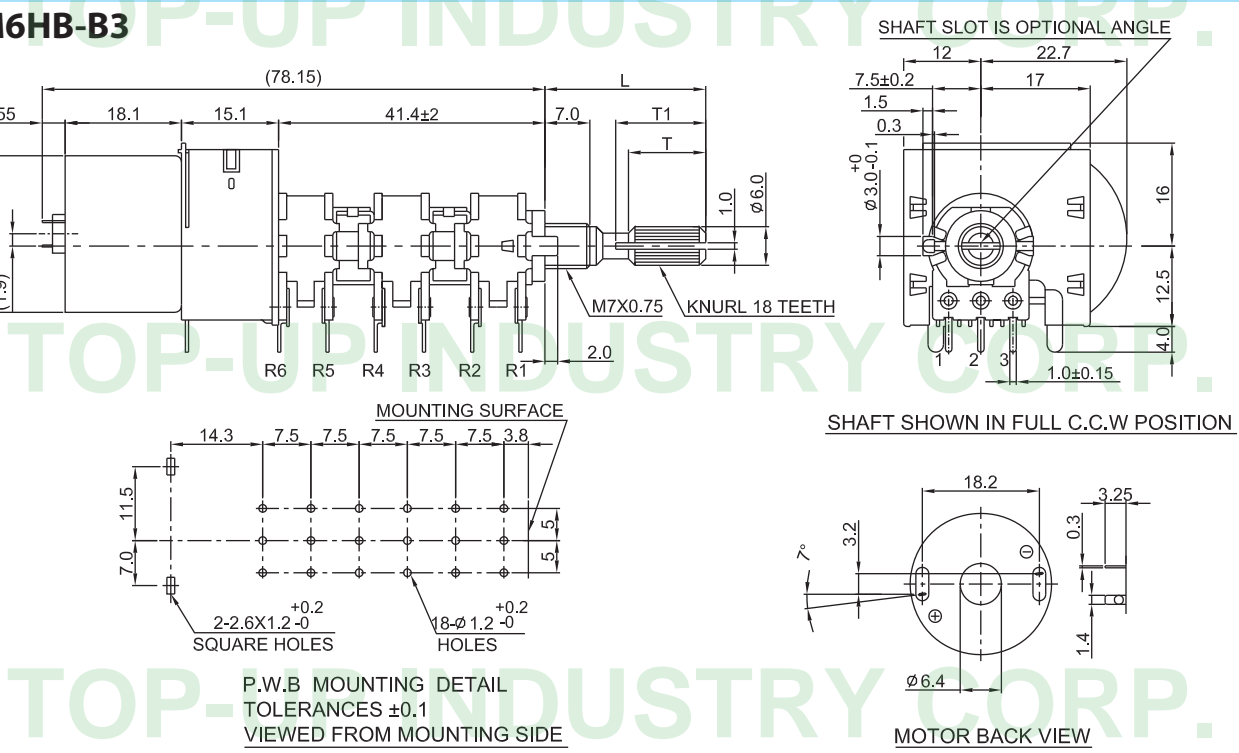


Features individual specifications

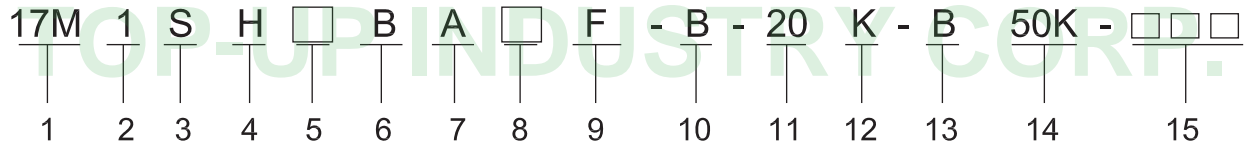
**MD16M4HB-B3**



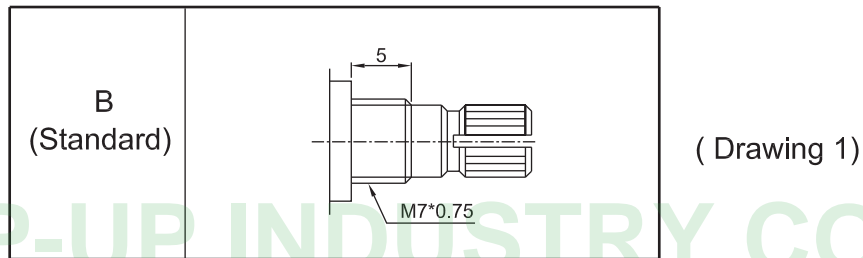
**MD16M6HB-B3**



## 17M Series Code Explanation



1. Product Lines of 17M ( 17mm Size Metal Shaft Potentiometer )
2. Number of Unit : 1 — Single Unit
3. Switch Type : "S"
4. Horizontal(H) Type or Vertical(V) Type
5. Bushing Length: Blank -5mm (Standard Type)
6. Bushing Type (See Drawing 1)



7. Bushing Material : Blank -Znic Alloy , A -Aluminum Alloy
8. Bushing Diameter ( Standard M7)
9. With Frame : "F" ( Only without Switch Series )
10. Type of Terminal (See Drawing 3)
11. Shaft Length "L" (See Drawing 2)
12. Type of Shaft (See Drawing 2)
13. Type of Taper (See Taper Chart Page 220)
14. Resistance Value
15. Serial No. ( Drawing 2)

K - Type						KM - Type					
B: 5m/m											
Shaft-Type	L	10	15	20	25	Shaft-Type	L	15	20		
K	T1	3.5	6.5	11	14	KM	T	8	13		
	T	3.2	6	10	12						
	M	0.5	1	2	4						

# 17M Series Code Explanation

( Drawing 2 )

F - Type				
	Flowing Drawing:			
	F(standard)	FD	FG	FH
F-type	L	15	20	25
	F	7	12	12

Type of Terminal

( Drawing 3 )

Without Switch														
Solder Lug Type				P.C.B Type										
Horizontal				Vertical										
Terminal-Type	A	B		Terminal-Type	C	C1	D	D1	D2	D3	D4			
H	13.5	10		H	11	11.5	10.5	8.0	7.8		7.5			
Terminal Detail				Terminal Detail	F	8	8	12	12.5	11.2	12.5			
With Switch														
Solder Lug type				P.C.B Type										
Horizontal				Vertical										
Terminal-Type	A	B	B1	Terminal-Type	C	C1	D	D1	D2	D3	D4	D5	D6	D7
L	20.5	20.5		L	21.5	22.1	20.5	16	16.5	15.3	16.5		21.4	19.5
H	13.5	10		H	11	11.5	10.5	7.8	7.8	7.8	7.5		8.65	11.5
				F(similar above)	8	7.5	12.5	12.5	11.2	11.2	12.5		12.7	15.5
				T(similar above)	4	4.5								

## 17mm SIZE METAL SHAFT POTENTIOMETERS

### Mechanical Characteristic:

Total rotational angle	260°±5°
Rotational torque	20 ~ 200gf.cm
Shaft stopper strength	≥ 4kgf.cm
Shaft wobble (mm p-p)	Within (0.7xL/30)mm p-p Max. L=Shaft Length
Switch working angle	40°±5°
Switch working torque	70~400gf.cm

### Electrical Characteristic:

Total resistance & tolerance	500Ω < R < 1MΩ : ±20%, other : ±30%
Resistance taper	Refer to Standard Resistance Taper
Power rating	Linear taper 0.1W ; Other taper 0.05W
Max. operating voltage	Linear taper 200V ; Other taper 150V
Rotational noise	≤ 47mV
Insulation resistance	≥ 50MΩ at DC 500V
Withstanding voltage	12V/DC, 1A
Switch power rating	1 minute at AC 500V
Switch contact resistance	≤ 100mΩ

### Durability:

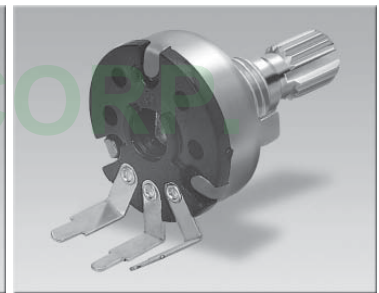
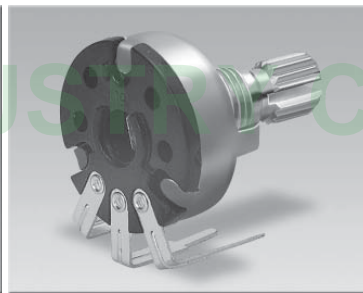
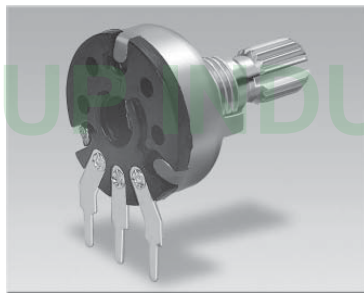
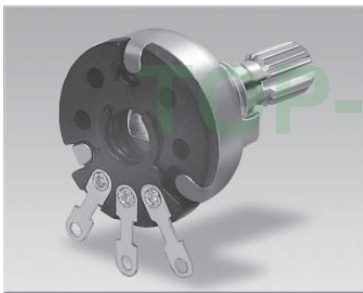
Rotation life	≥ 10,000 cycles
---------------	-----------------

**17M1HB-A**

**17M1HB-B**

**17M1VB-C**

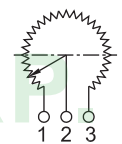
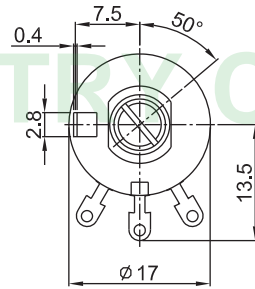
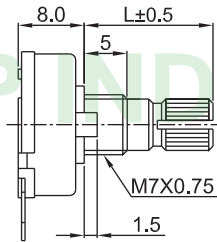
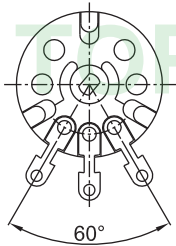
**17M1VB-D**



Outline Drawing

Features individual specifications

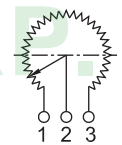
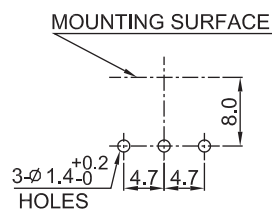
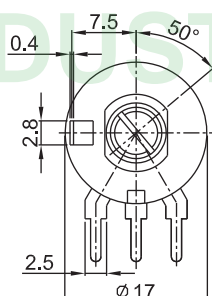
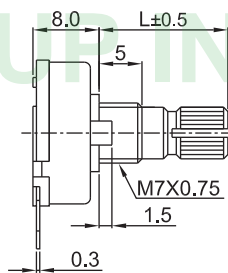
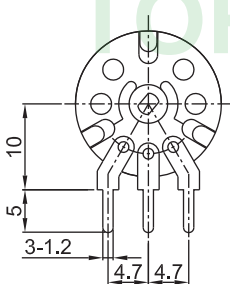
**17M1HB-A**



SHAFT SHOWN IN FULL C.C.W POSITION

260° ROTATION SINGLE UNIT

**17M1HB-B**

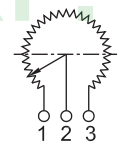
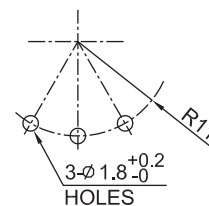
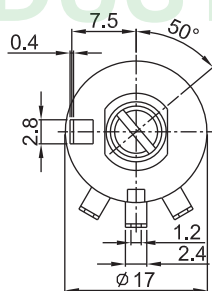
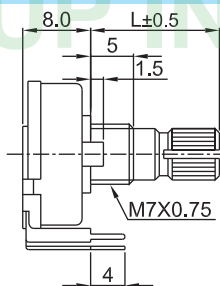
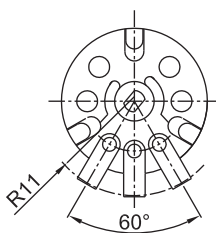


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

260° ROTATION SINGLE UNIT

**17M1VB-C**

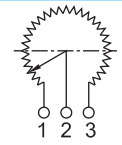
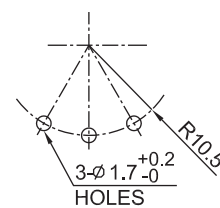
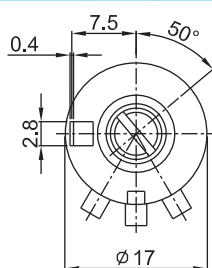
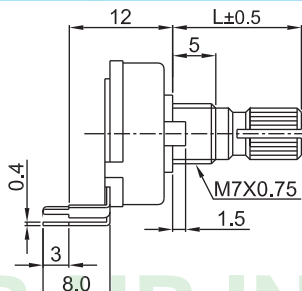
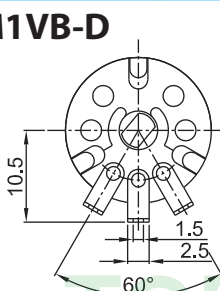


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

260° ROTATION SINGLE UNIT

**17M1VB-D**



SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

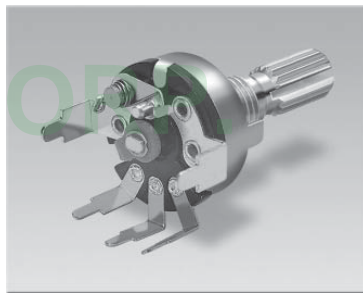
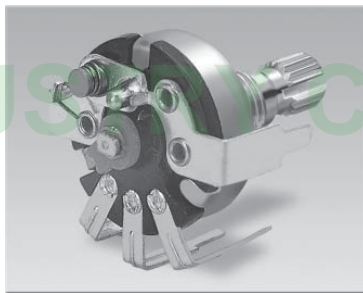
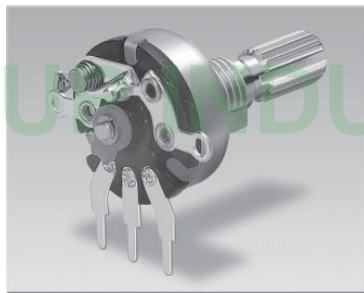
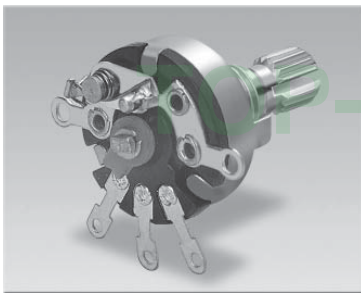
260° ROTATION SINGLE UNIT

**17M1SHB-A**

**17M1SHB-B**

**17M1SVB-C**

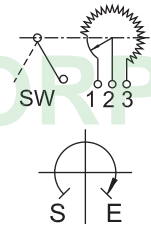
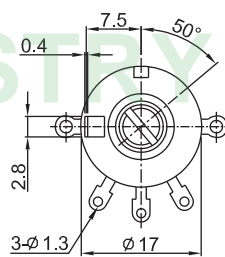
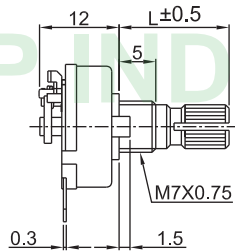
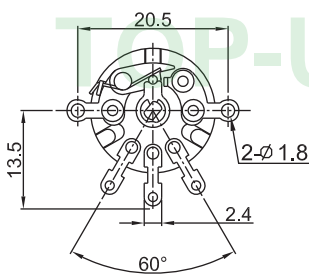
**17M1SVB-D**



Outline Drawing

Features individual specifications

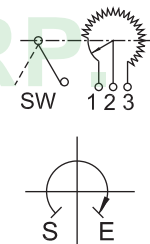
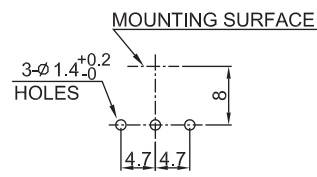
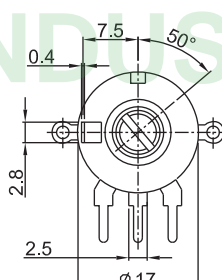
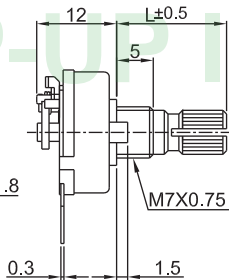
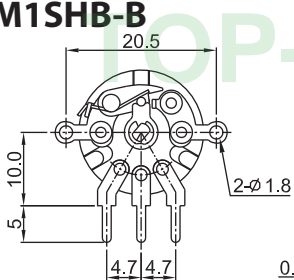
**17M1SHB-A**



SHAFT SHOWN IN  
FULL C.C.W POSITION

260° ROTATION  
SINGLE UNIT  
WITH SWITCH  
S.P.S.T. 12VDC,1A

**17M1SHB-B**

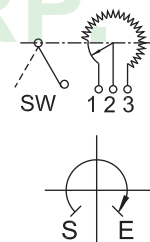
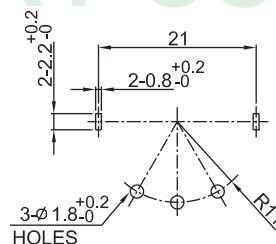
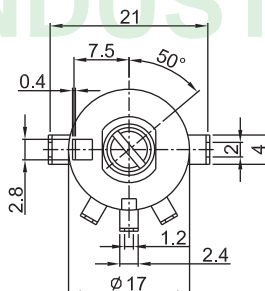
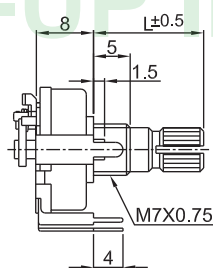
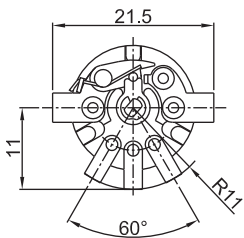


SHAFT SHOWN IN  
FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

260° ROTATION  
SINGLE UNIT  
WITH SWITCH  
S.P.S.T. 12VDC,1A

**17M1SVB-C**

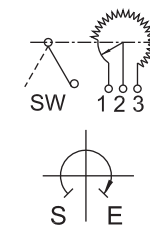
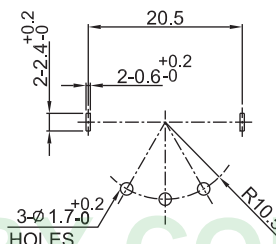
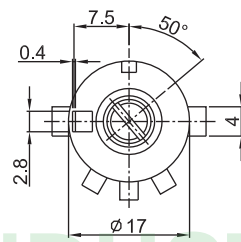
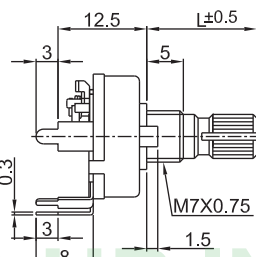
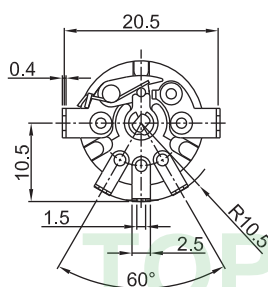


SHAFT SHOWN IN  
FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

260° ROTATION  
SINGLE UNIT  
WITH SWITCH  
S.P.S.T. 12VDC,1A

**17M1SVB-D**



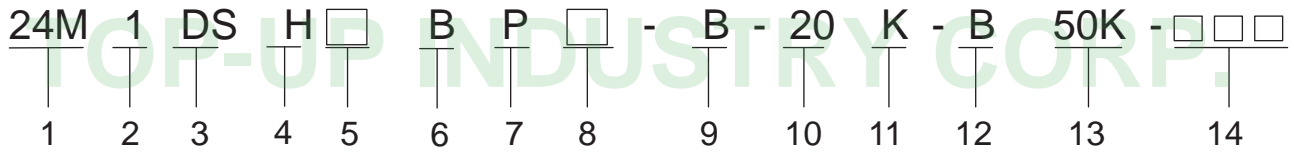
SHAFT SHOWN IN  
FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

260° ROTATION  
SINGLE UNIT  
WITH SWITCH  
S.P.S.T. 12VDC,1A



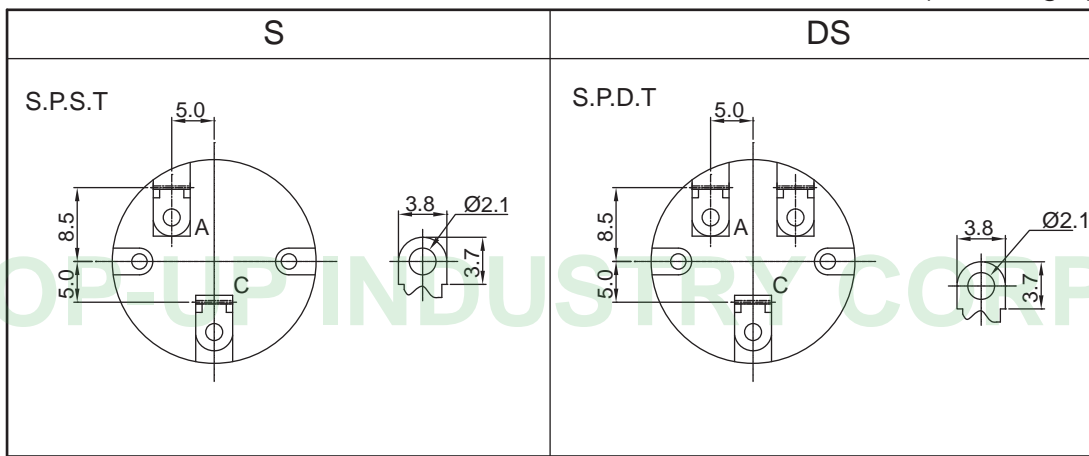
## 20MD, 22M, 24M, 24MJ, 24MD & 24P Series Code Explanation



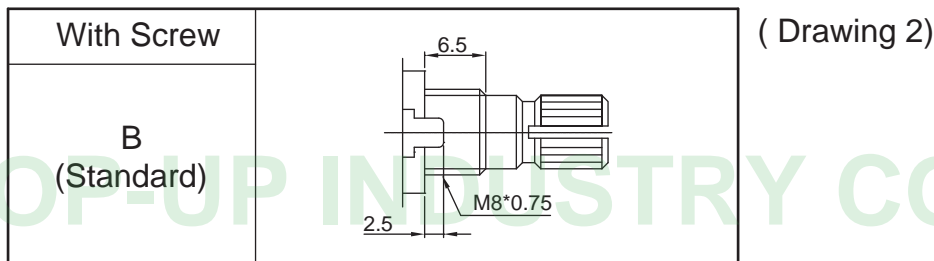
- Product Lines of 20MD, 22M, 24M, 24MJ, 24MD, 24P  
 20MD,22M,24M, 24MJ,24MD — Metal Shaft  
 24P — Insulated Shaft

- Number of Unit: 1 Single Unit, 2 Dual Unit

- Type of Switch (Drawing 1)



- Horizontal (H) Type or Vertical (V) Type
- Bushing Length : Blank - 6.5mm (Standard Type)
- With Bushing (See Drawing 2)
- Bushing Material: Blank -Zinc Alloy, A - Alumunum Alloy, P - Plastic Alloy  
 C - Copper Alloy
- Bushing Diameter: Blank - M8 (Standard Type), 9 - M9



- Type of Terminal (See Drawing 3)
- Shaft Length (See Drawing 4)
- Type of Shaft (See Drawing 4)
- Type of Taper (See Taper Chart Page 220)
- Resistance Value
- Serial No.

## 20MD, 22M, 24M, 24MJ, 24MD & 24P Series Code Explanation

Type of Terminal ( Drawing 3)

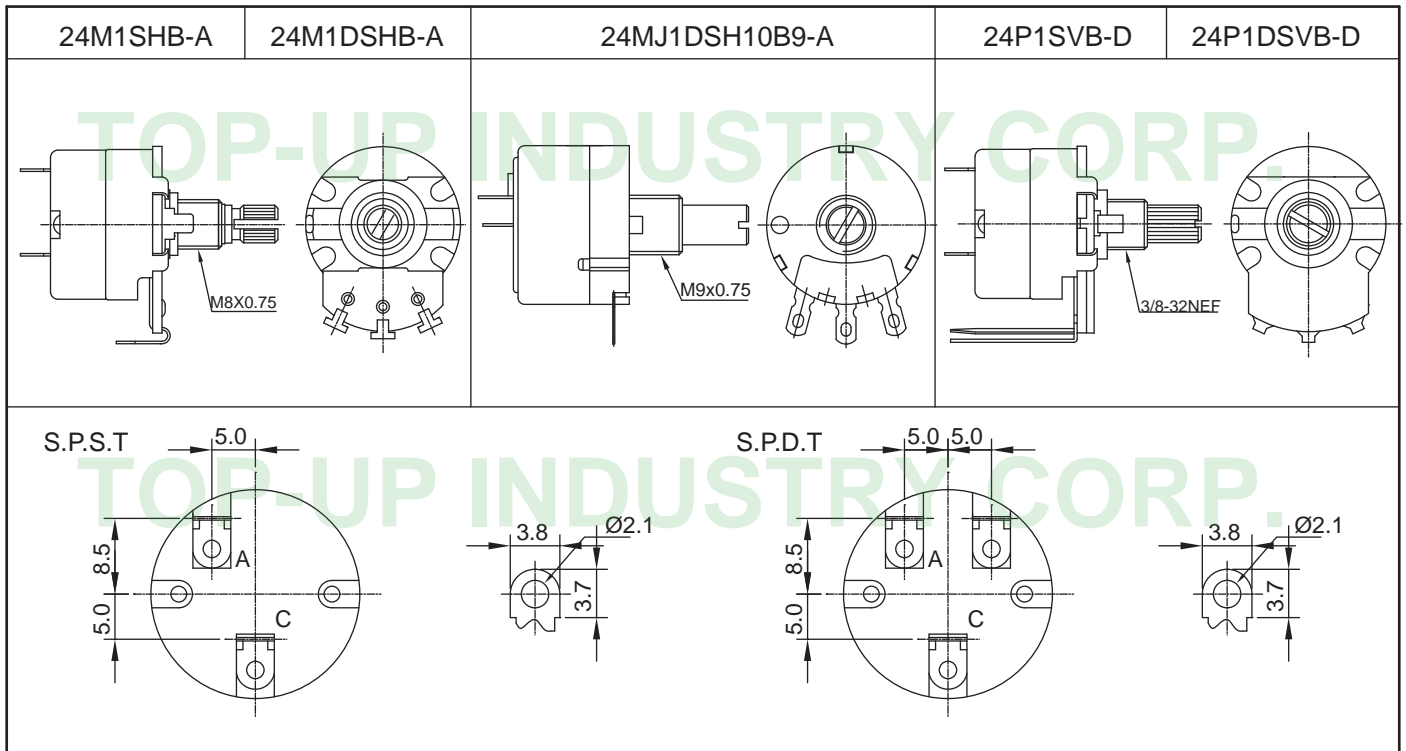
Horizontal		Vertical								
Solder Lug Type (A)		P.C.B Type (B)		P.C.B Type (C)		P.C.B Type (D)				
Terminal -Type	A					B			C	D
	A	A1		A2	A3					
Terminal Detail										

Type of Shaft (Drawing 4)

K - Type								R - Type				S - Type									
Shaft-Type	L	10	15	20	25	30	35	40	R & S				L	10	15	20	25	30	35	40	
K	T1	2.4	6.5	11	14	14	14	14													
	T	2.2	6	10	12	12	12	12													
	M	0.5	1	2	4	4	4	4													
F - Type																					
								F(Standard)		FD	FG	4	FH								
								F - Type		L	10	15	20	25	30	35	40				
										F	2.5	7	12	14	14	14	14				

Carbon Element Printed Circuit Style

No Printed Circuit Type	Printed Circuit A Type	Printed Circuit B Type



**Mechanical characteristics:**

Total rotational angle	300°±5°
Potational torque	2~20mN.m (20~200gf.cm)
Rotation stopper strength	0.6N.m(6kgf.cm)
Switch working angle	50°±10°

**Electrical characteristics:**

Total resistance	10KΩ ~1MΩ
Total resistance tolerance	±20% (more than 1MΩ ±30%)
Rated power	Curve B:0.5W Other than B:0.25W
Max. operating voltage	Curve B:500V Other than B:250V
Resistance taper	A, B
Residual resistance	R ≥ 250KΩ 0.1% max. of total resistance 250KΩ > R > 10KΩ 20Ω max. 10KΩ ≥ R 10Ω max.
Insulation resistance	More than 100MΩ at DC 500V
Withstand voltage	1 minute at AC 500V
Switch contact resistance	Less than 300MΩ

**Durability:**

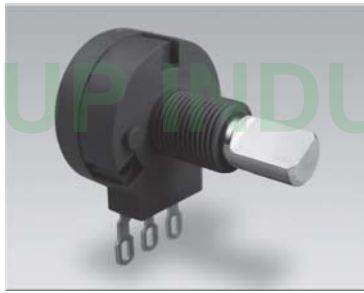
Rotational life	10,000 cycles
-----------------	---------------

**20MD1H10B9-A**

**20MD1H10BP9-A**

**22M1V7B10-D**

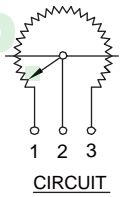
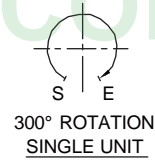
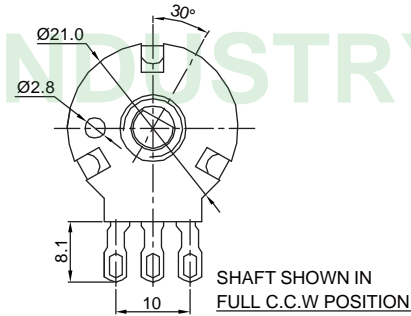
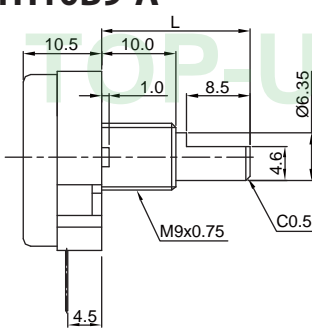
**22M1V7BP10-D**



Outline Drawing

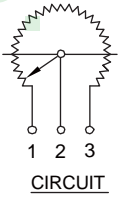
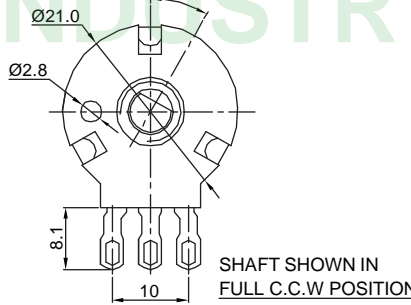
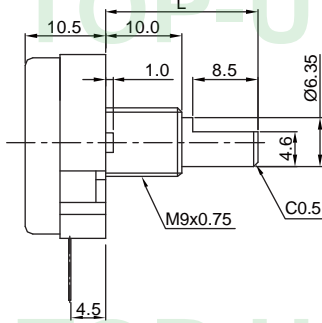
Features individual specifications

**20MD1H10B9-A**



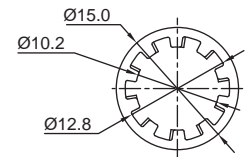
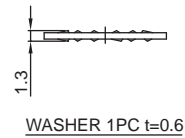
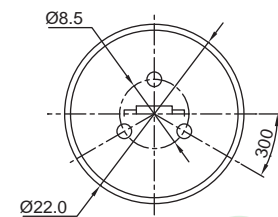
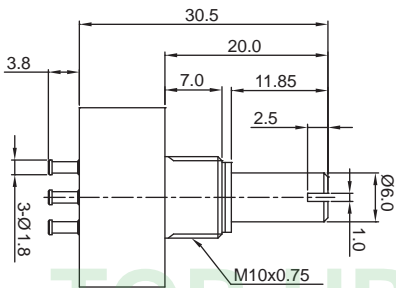
MODEL	15F	20F	25F	30F
L	15	20	25	30

**20MD1H10BP9-A**

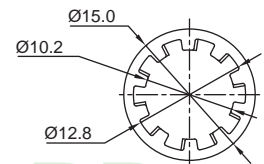
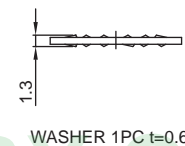
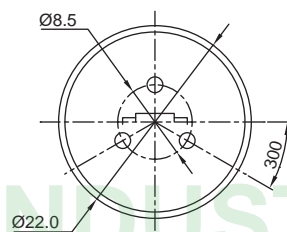
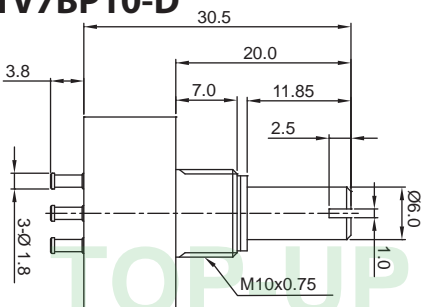


MODEL	15F	20F	25F	30F
L	15	20	25	30

**22M1V7B10-D**



**22M1V7BP10-D**

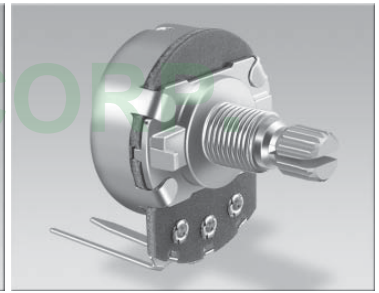
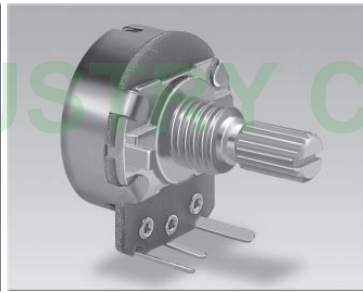
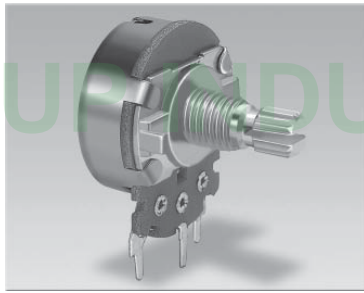
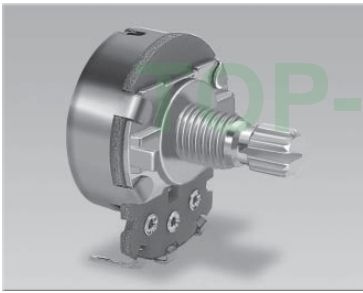


**24M1HB-A**

**24M1HB-B**

**24M1VB-C**

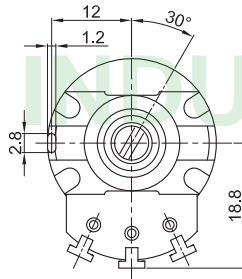
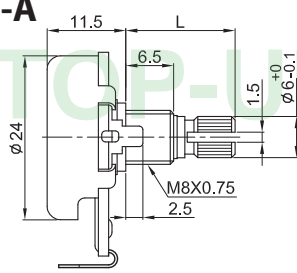
**24M1VB-D**



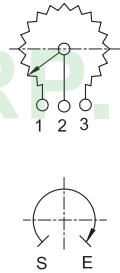
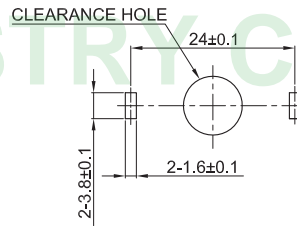
Outline Drawing

Features individual specifications

**24M1HB-A**

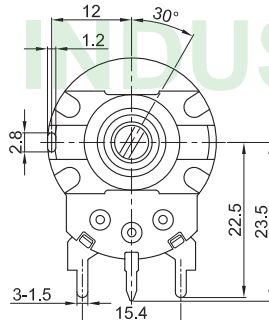
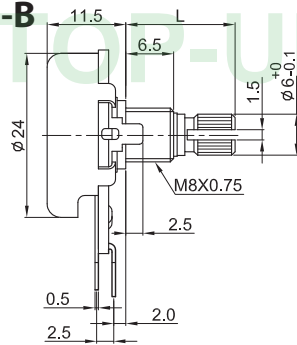


SHAFT SHOWN IN FULL C.C.W POSITION

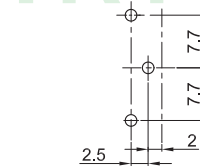


300° ROTATION SINGLE UNIT

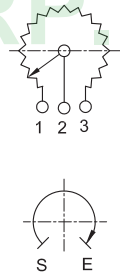
**24M1HB-B**



SHAFT SHOWN IN FULL C.C.W POSITION

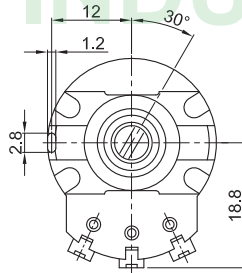
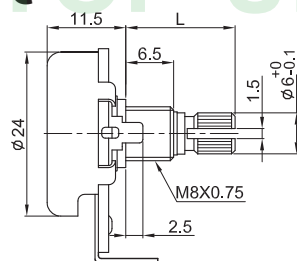


P.C.B. MOUNTING HOLES DETAIL

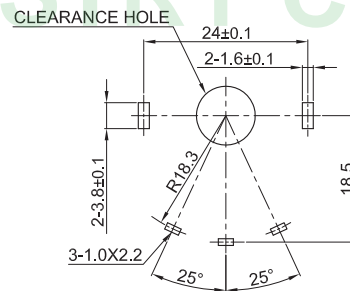


300° ROTATION SINGLE UNIT

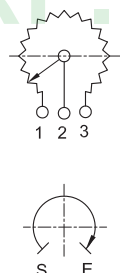
**24M1VB-C**



SHAFT SHOWN IN FULL C.C.W POSITION

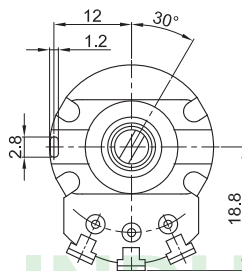
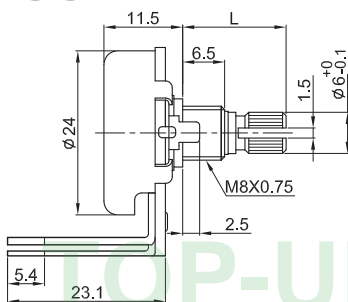


P.C.B. MOUNTING HOLES DETAIL

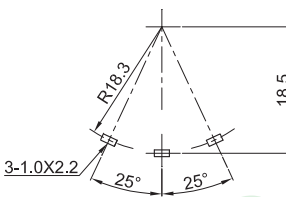


300° ROTATION SINGLE UNIT

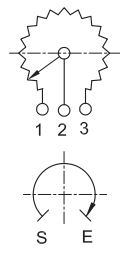
**24M1VB-D**



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B. MOUNTING HOLES DETAIL



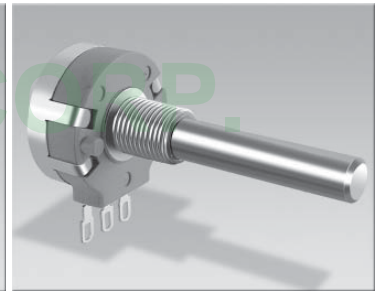
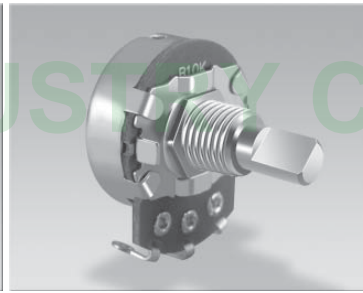
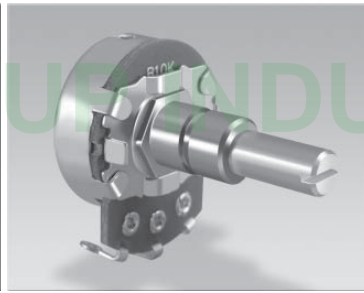
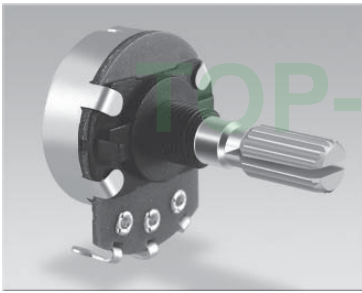
300° ROTATION SINGLE UNIT

**24M1HBP-A**

**24M1H11.7NBC-A**

**24M1H9.55BC3-A**

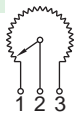
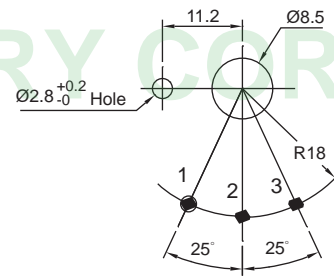
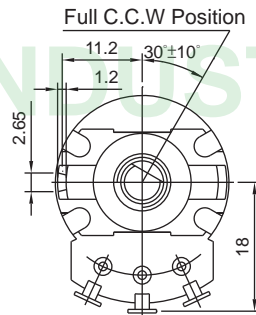
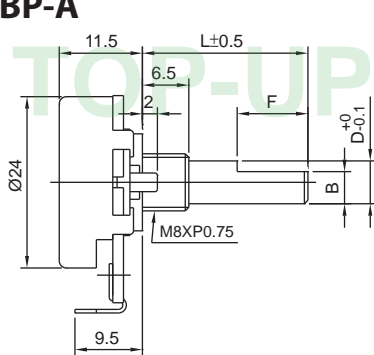
**24M1H10B9-A3**



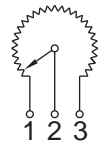
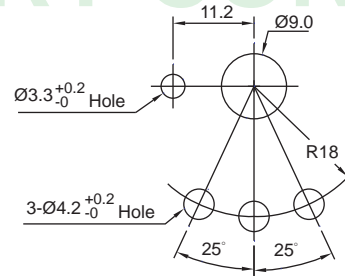
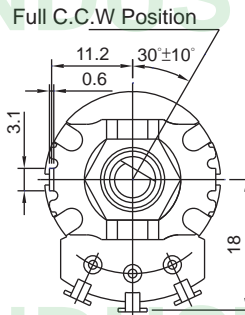
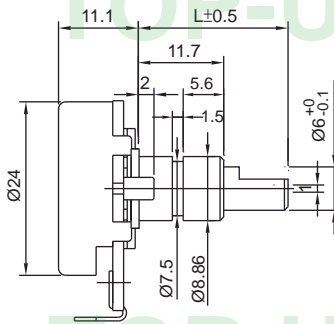
Outline Drawing

Features individual specifications

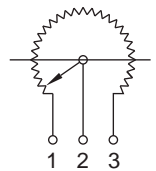
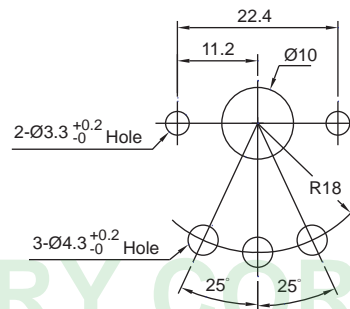
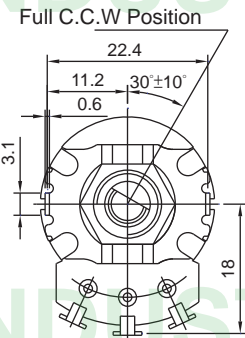
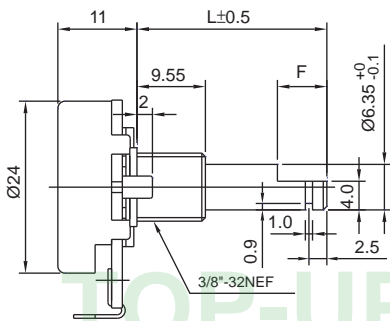
**24M1HBP-A**



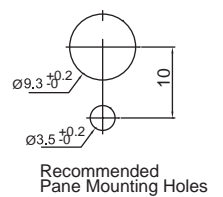
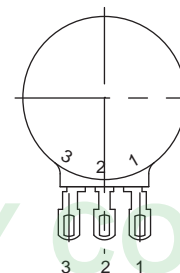
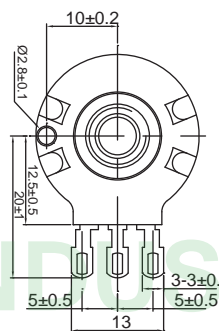
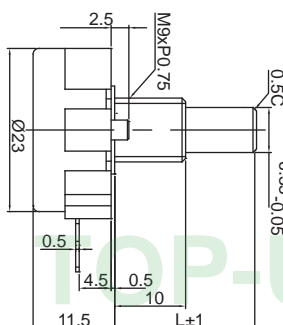
**24M1H11.7NBC-A**



**24M1H9.55BC3-A**



**24M1H10B9-A3**



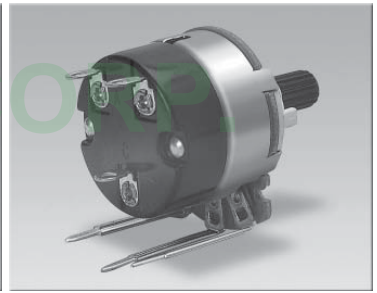
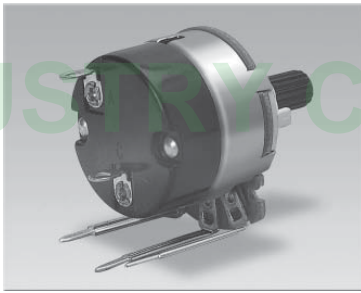
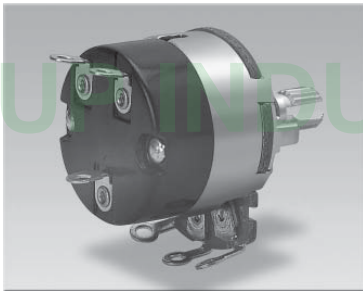


**24M1SHB-A**

**24M1DSHB-A**

**24P1SVB-D**

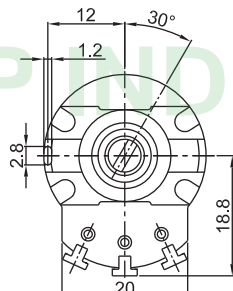
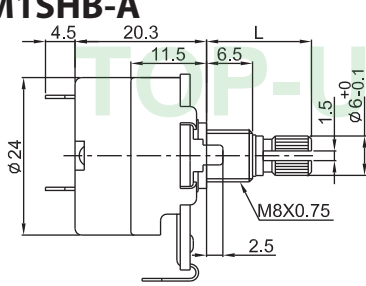
**24P1DSVB-D**



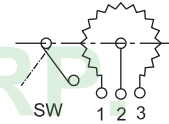
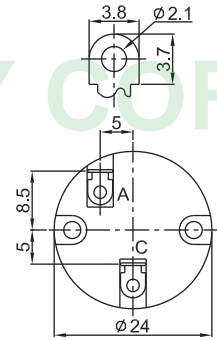
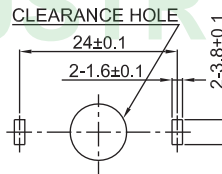
**Outline Drawing**

**Features individual specifications**

**24M1SHB-A**

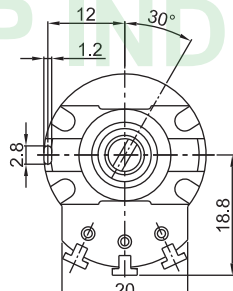
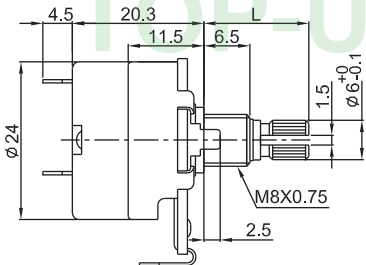


SHAFT SHOWN IN FULL C.C.W POSITION

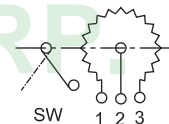
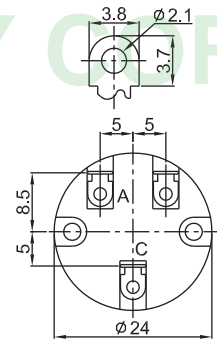
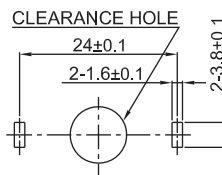


300° ROTATION SINGLE UNIT WITH ROTARY SW. S.P.S.T. 125VAC. 1A

**24M1DSHB-A**

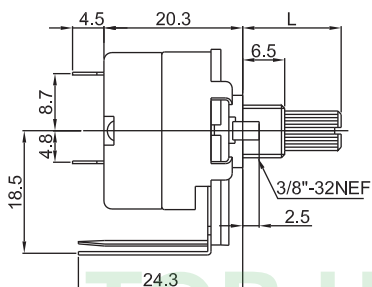


SHAFT SHOWN IN FULL C.C.W POSITION

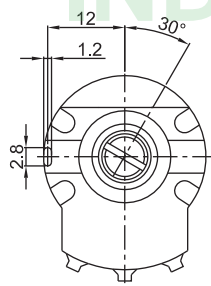


300° ROTATION SINGLE UNIT WITH ROTARY SW. S.P.D.T. 125VAC. 1A

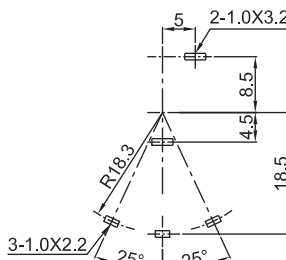
**24P1SVB-D**



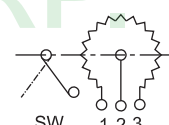
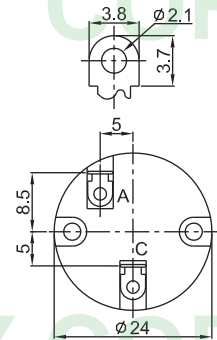
BUSHING: 3/8"-32NEF ONLY



SHAFT SHOWN IN FULL C.C.W POSITION

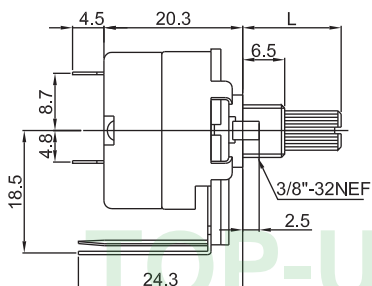


P.C.B MOUNTING HOLES DETAIL

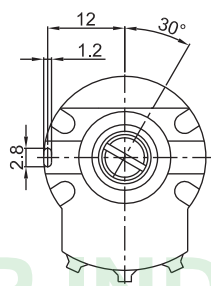


300° ROTATION SINGLE UNIT WITH ROTARY SW. S.P.S.T. 125VAC. 1A

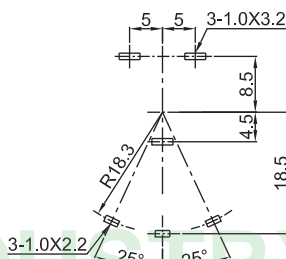
**24P1DSVB-D**



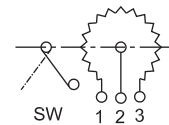
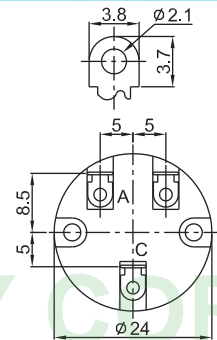
BUSHING: 3/8"-32NEF ONLY



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



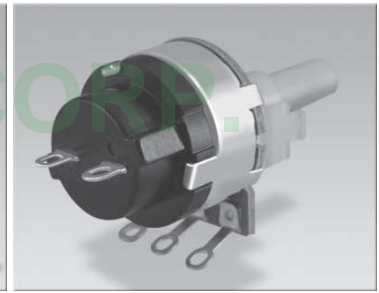
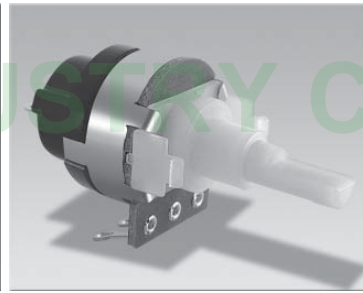
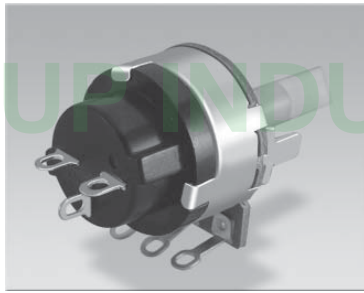
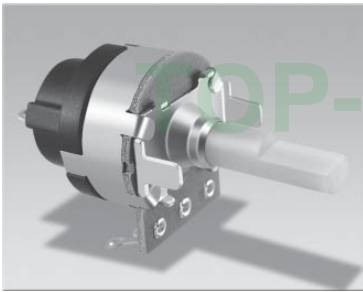
300° ROTATION SINGLE UNIT WITH ROTARY SW. S.P.D.T. 125VAC. 1A

**24P1PSHF-A**

**24P1PDSHF-A**

**24P1PSHNBFA**

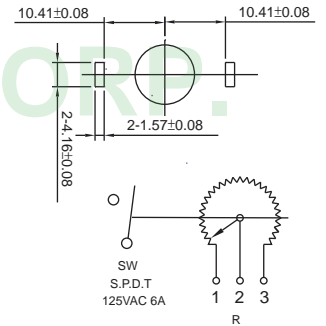
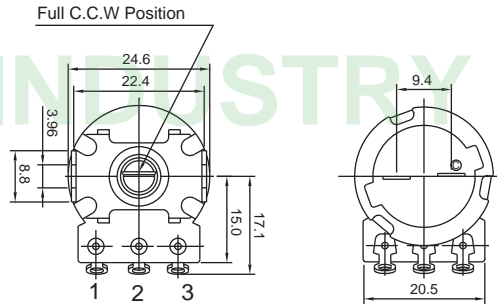
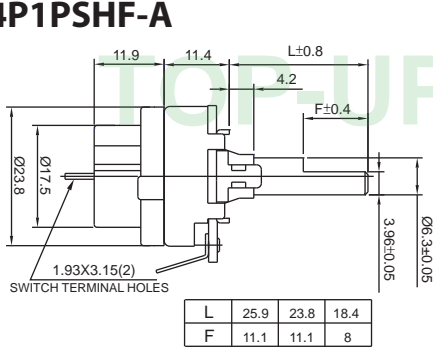
**24P1PDSHNBFA**



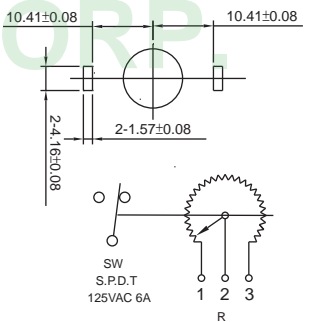
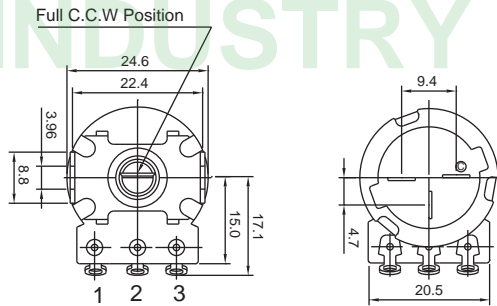
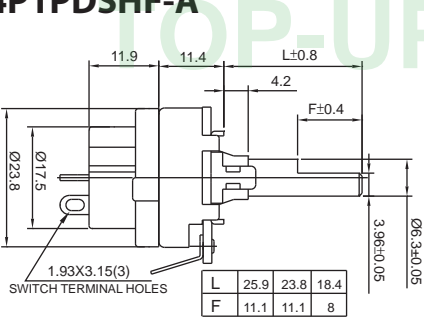
Outline Drawing

Features individual specifications

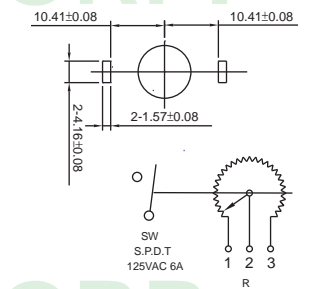
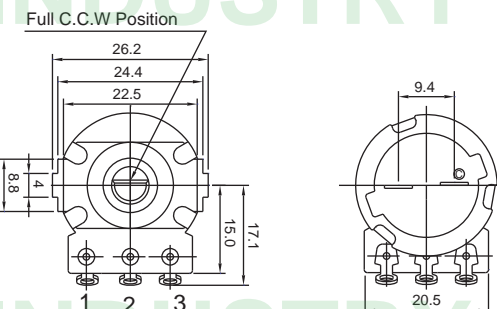
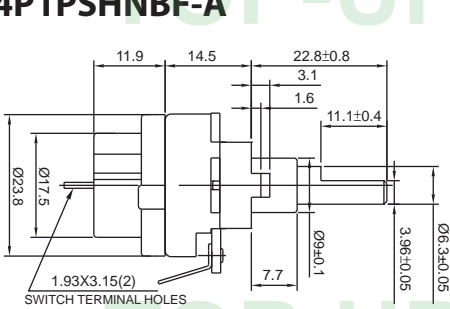
**24P1PSHF-A**



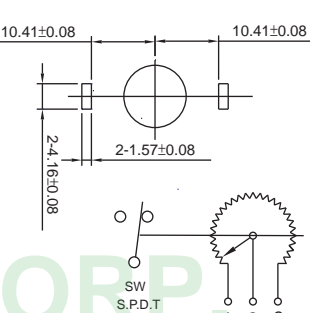
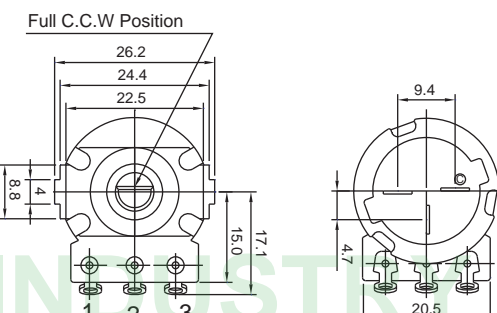
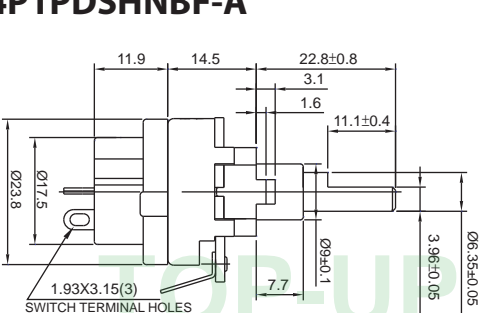
**24P1PDSHF-A**



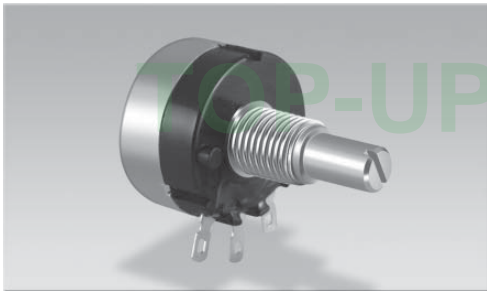
**24P1PSHNBFA**



**24P1PDSHNBFA**

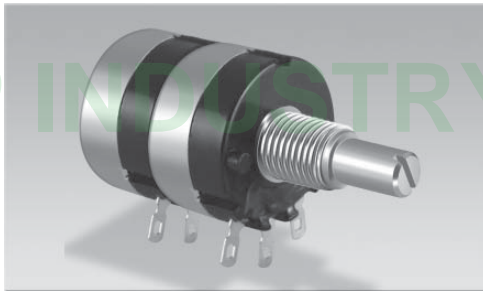


**24MJ1H10B9-A**



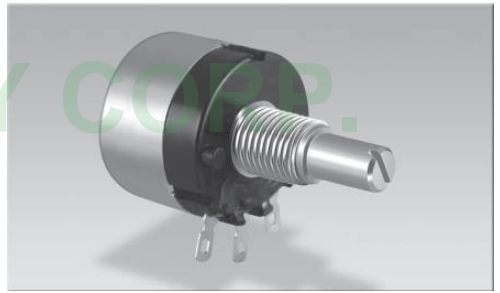
Outline Drawing

**24MJ2H10B9-A**

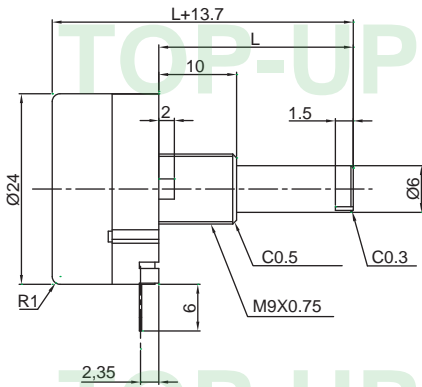


Features individual specifications

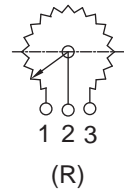
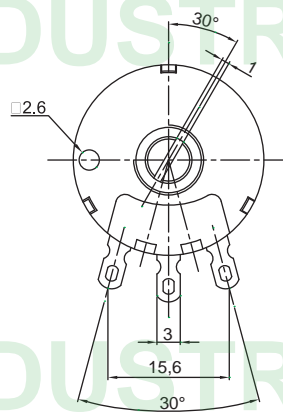
**24MJ1DSH10B9-A**



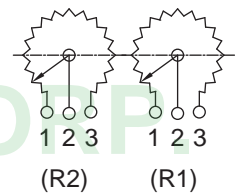
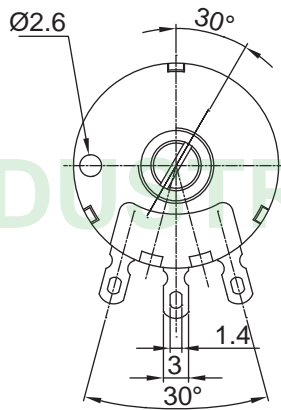
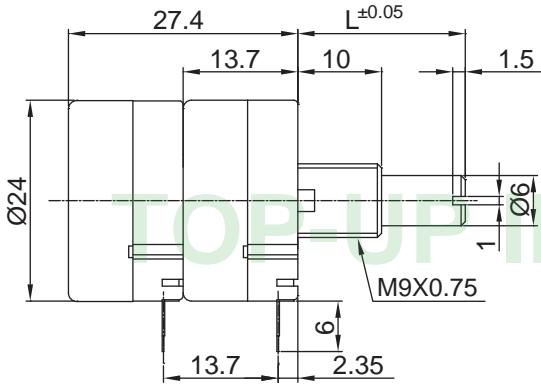
**24MJ1H10B9-A**



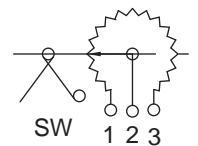
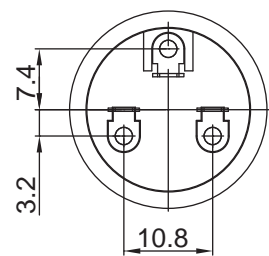
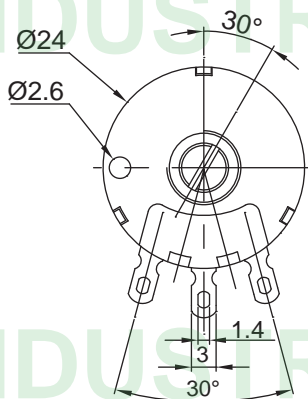
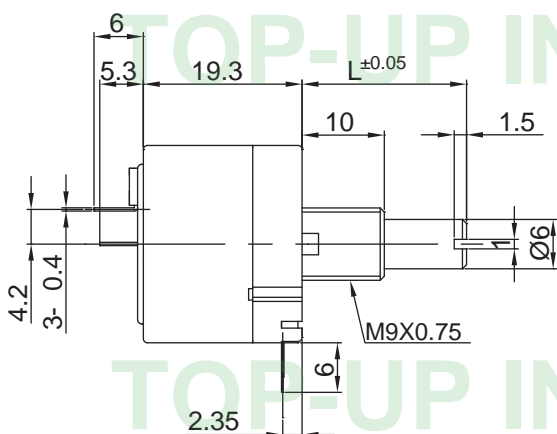
SHAFT SHOWN IN FULL C.C.W. POSITION



**24MJ2H10B9-A**



**24MJ1DSH10B9-A**



**24MD1H10B9-A**



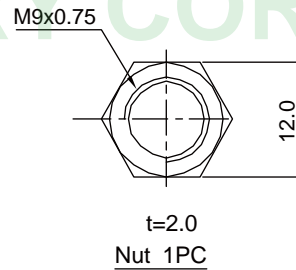
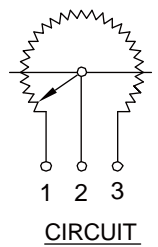
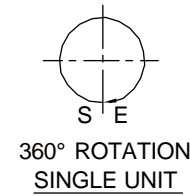
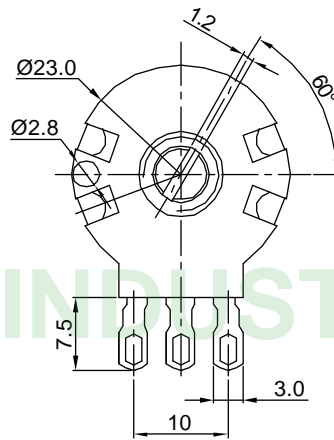
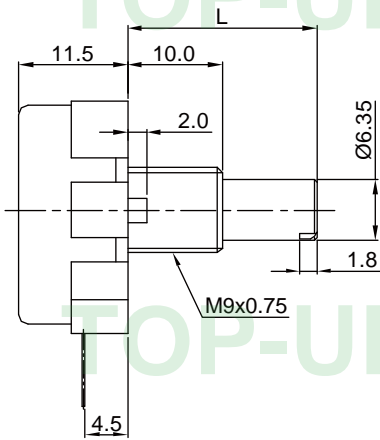
Outline Drawing

**24MD1H10BP9-A**



Features individual specifications

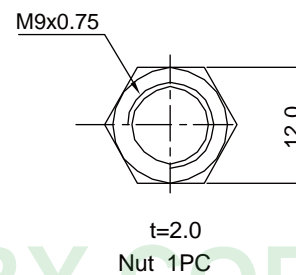
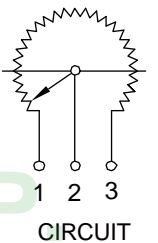
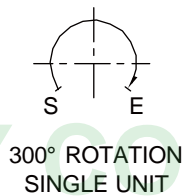
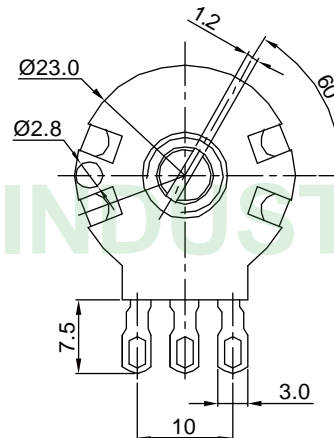
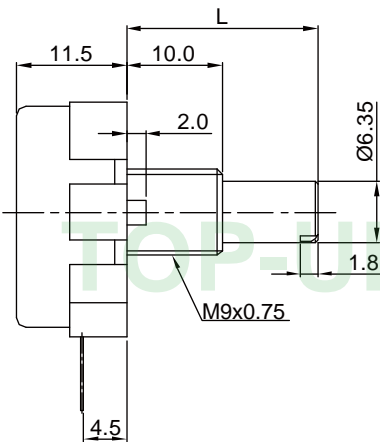
**24MD1H10B9-A**



MODEL	15S	20S	21S	25S	30S
L	15	20	21	25	30

SHAFT SHOWN IN  
FULL C.C.W POSITION

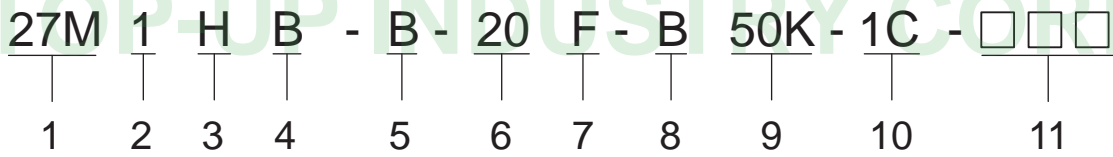
**24MD1H10BP9-A**



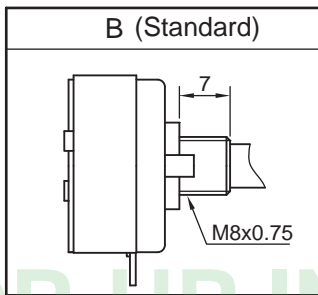
MODEL	15S	20S	21S	25S	30S
L	15	20	21	25	30

SHAFT SHOWN IN  
FULL C.C.W POSITION

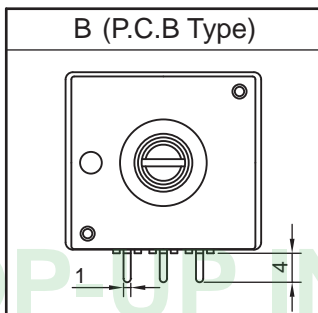
## 27M Series Code Explanation



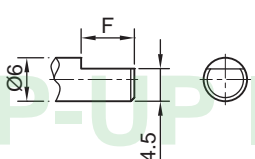
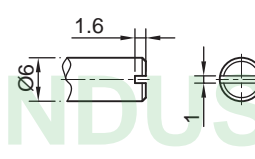
1. Product Lines of 27M
2. Number of Unit : 1 — Single Unit    2 — Dual Unit,.....
3. Horizontal(H) Type
4. Type of Bushing



5. Type of Terminal



6. Shaft Length
7. Type of Shaft

F - Type					S - Type				
									
L	15	20	25	30	L	15	20	25	30
F	7	12	12	12					

8. Type of Taper (See Taper Chart Page 220)
9. Resistance Value
10. Number of Clicks : Blank -None,    1C - Center Click ,    41C - 41 Clicks
11. Serial No.

**27M1HB-B**



Outline Drawing

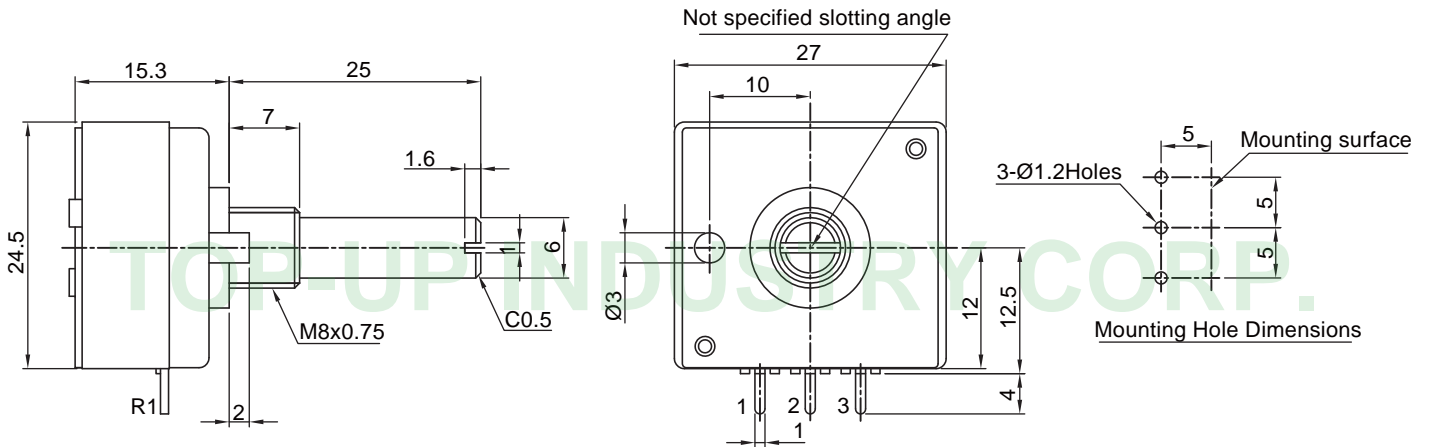
**27M2HB-B**



Features individual specifications

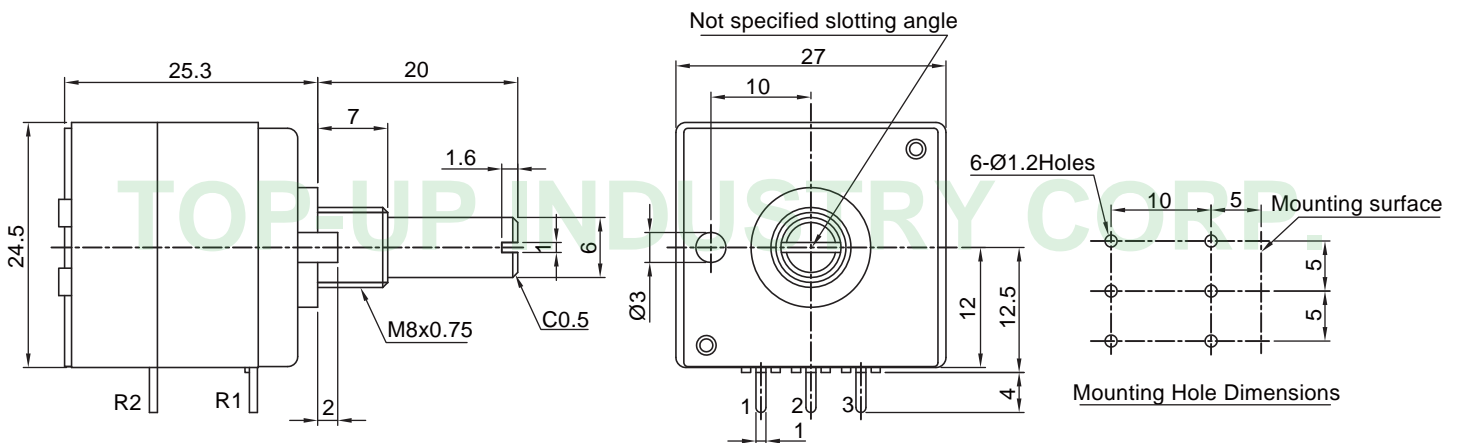
**27M1HB-B**

TOP-UP INDUSTRY CORP.



**27M2HB-B**

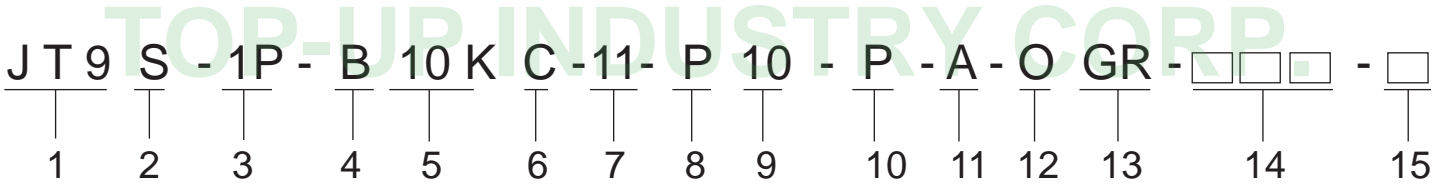
TOP-UP INDUSTRY CORP.



TOP-UP INDUSTRY CORP.



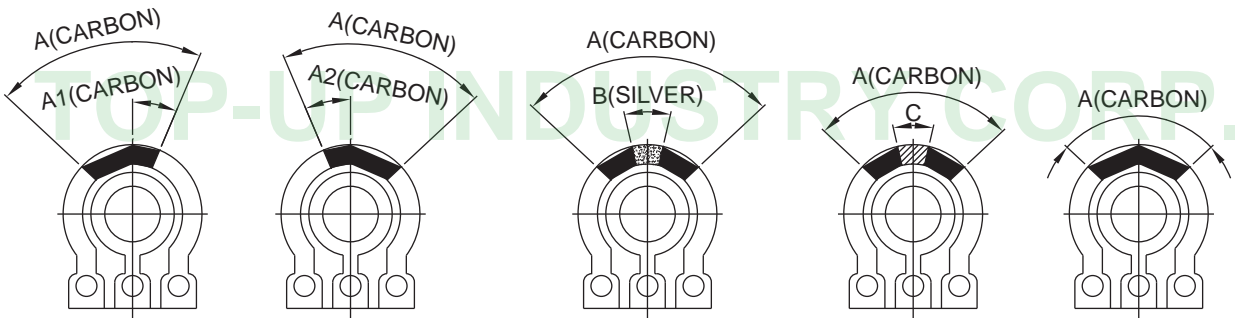
## JT Series Code Explanation



1. Product Lines of JT
2. Switch : Blank-Without Switch , S-With Switch
3. Code
4. Type of Taper (See Taper Chart Page 220)
5. Resistance Value
6. Resistance Tolerance Code

Code	Blank	b	c
Resistance Tolerance	±20%	±10%	±15%

### 7. Carbon Angle



ANGLE		CODE.
A	A1	NO.
25°	6°	36
20°	3°	23

ANGLE		CODE.
A	A2	NO.
25°	6°	37
20°	3°	24
20°	0°	21
20°	40°	2

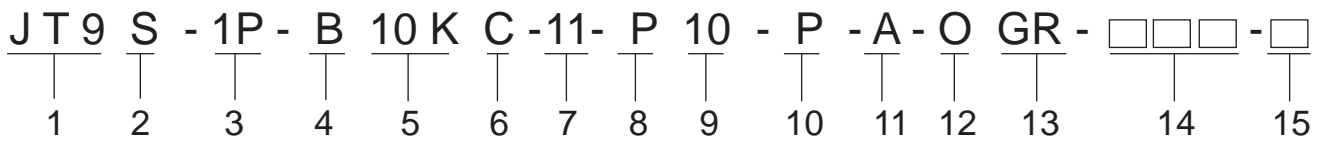
ANGLE		CODE.
A	B	NO.
60°	6°	1
38°	6°	3
38°	8°	4
50°	6°	5
53°	6°	6
45°	3°	7
32°	3°	8
53°	8°	9
45°	5°	10
30°	6°	11
50°	8°	12
85°	8°	13
100°	8°	14
80°	10°	15

ANGLE		CODE.
A	B	NO.
60°	10°	16
25°	6°	17
50°	3°	18
45°	15°	19
40°	6°	20
25°	12°	22
35°	6°	26
40°	3°	30
47°	3°	32
70°	6°	33
28°	6°	34
35°	8°	35
32°	6°	37

ANGLE		CODE.
A	C	NO.
35°	8°	38
45°	5°	28
40°	12°	31
45°	12°	25
38°	8°	27
60°	5°	29

ANGLE	20°	25°	28°	30°	32°	33.5°
	35°	38°	40°	45°	50°	53°
	60°	65°	70°	90°	95°	120°
	147°	180°	300°			

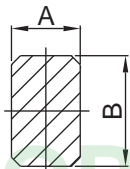
# TOP-UP INDUSTRY CORP. JT Series Code Explanation



8. Lever Material ( Blank - Metal , P - Insulated , C - Copper )

9. Lever length ( Blank - 7.2 )

10. Lever Type



( Metal Lever )

Code	M	N	P
A	1.19 <sup>+0</sup> <sub>-0.03</sub>	1.10 <sup>+0.02</sup> <sub>-0.03</sub>	1.15 <sup>+0</sup> <sub>-0.05</sub>
B	1.80±0.03	1.80±0.03	1.85 <sup>+0</sup> <sub>-0.07</sub>

11. Type of Terminal ( Blank - P.C.B , A - Solder , T - SMT )

12. VR Case Color: (O-Orange Y-Yellow B-Black G-Green)

13. Bottom Basic Color: (GR-Grey B-Black W-White)

14. Serial No.

15. Switch life , Stick Controller Life , Operating force of lever

A Switch life : 1—100,000 Cycles ; 2—500,000 Cycles

B Stick Controller Life : 1—1,000,000 Cycles ; 2—500,000 Cycles ; 3—100,000 Cycle

C Operating force of Lever : 1—160±40gf ( Standard ) ; 2—220±40gf ; 3—110±40gf

With Switch

Code	Blank	B	D	F	G
	A1+B1+C1	A1+B3+C1	A2+B2+C2	A1+B1+C2	A1+B2+C2

Without Switch

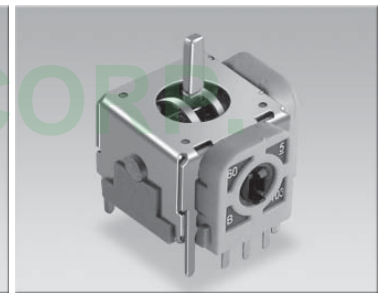
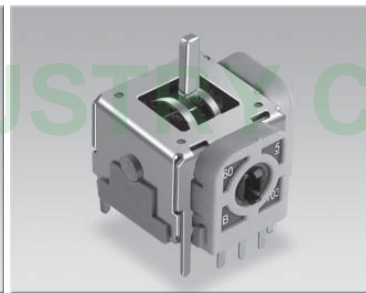
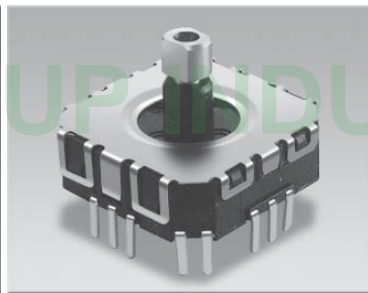
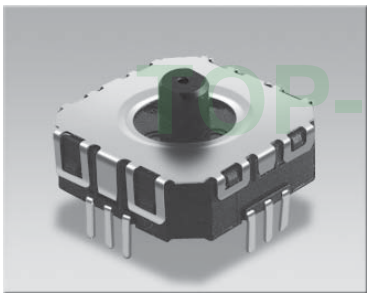
Code	Blank	B	H
	B1+C1	B3+C1	B1+C3

**JT8P-3.2T**

**JT8PS-6.6T**

**JT9-1**

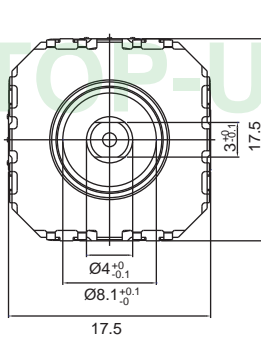
**JT9-2**



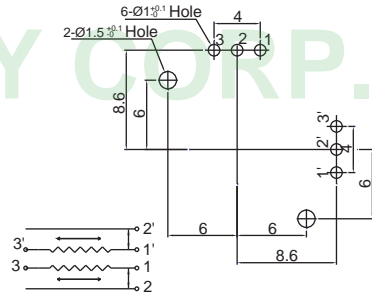
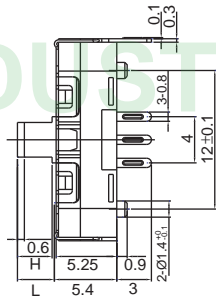
Outline Drawing

Features individual specifications

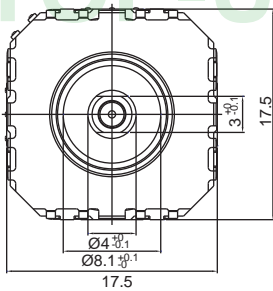
**JT8P-3.2T**



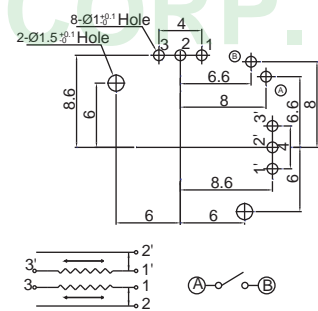
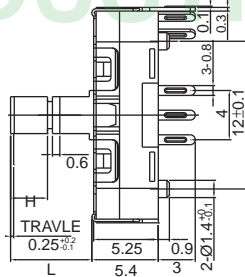
L	3.2
H	3



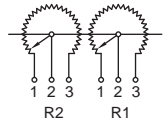
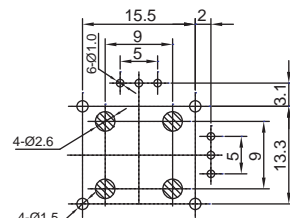
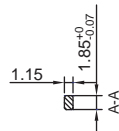
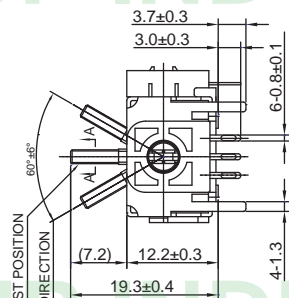
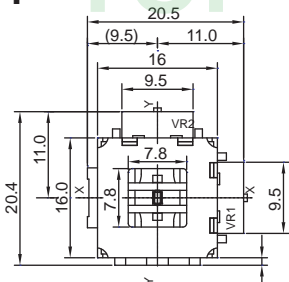
**JT8PS-6.6T**



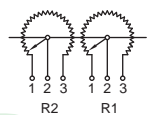
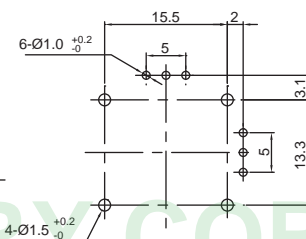
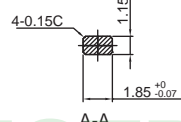
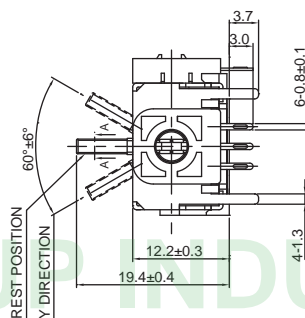
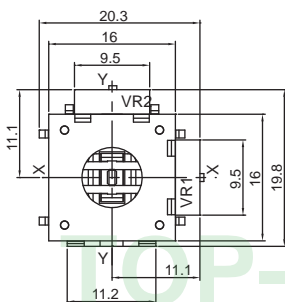
L	6.6
H	3



**JT9-1**



**JT9-2**

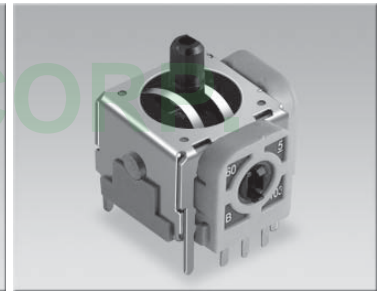
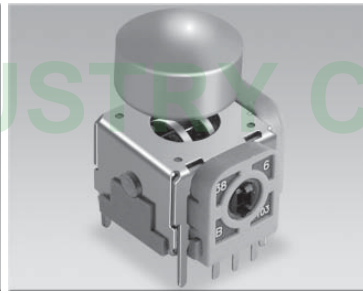
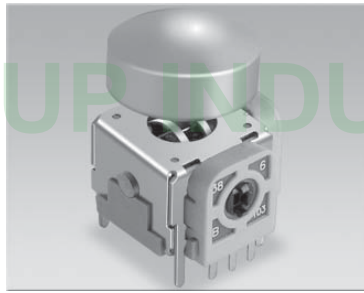
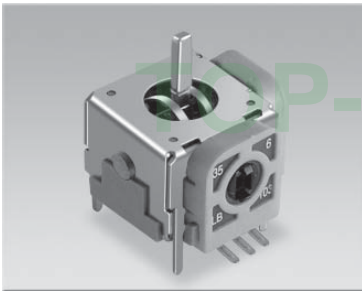


**JT9-3**

**JT9-4**

**JT9-5**

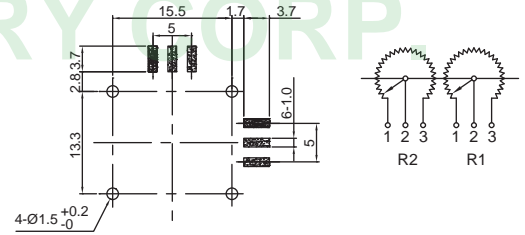
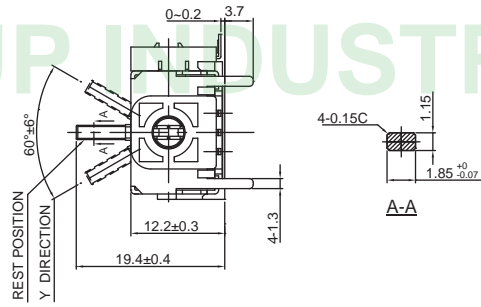
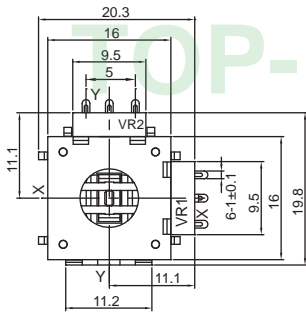
**JT9-6**



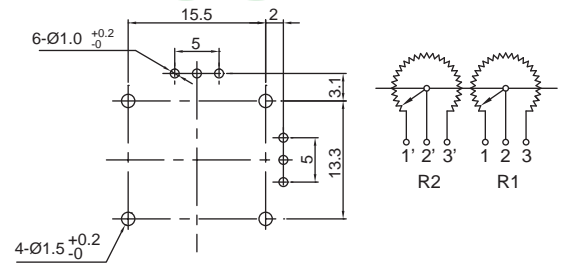
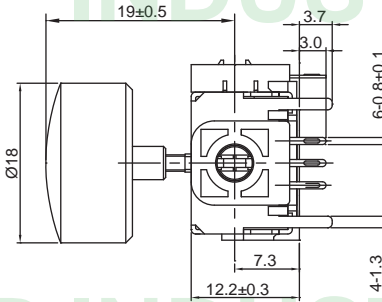
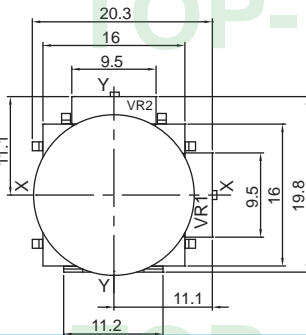
Outline Drawing

Features individual specifications

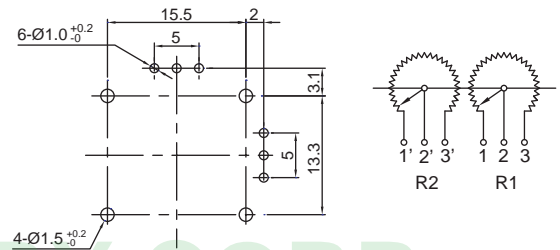
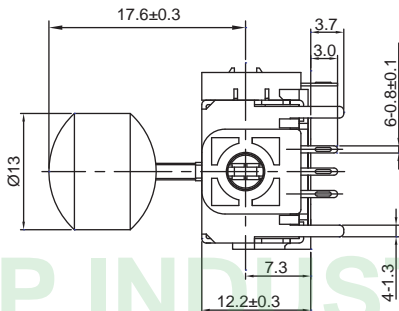
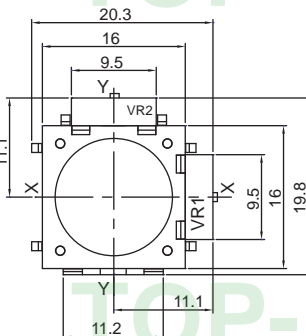
**JT9-3**



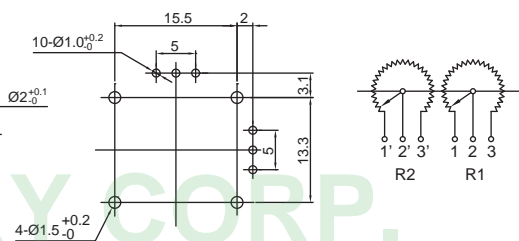
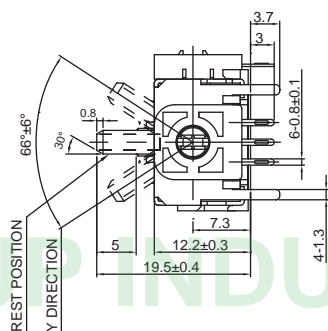
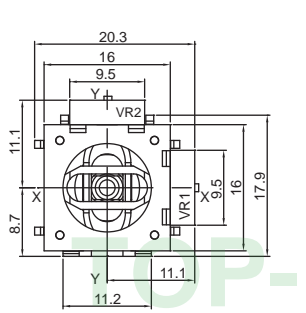
**JT9-4**



**JT9-5**



**JT9-6**

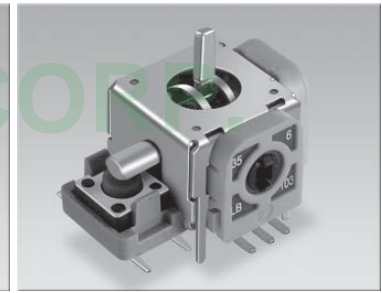
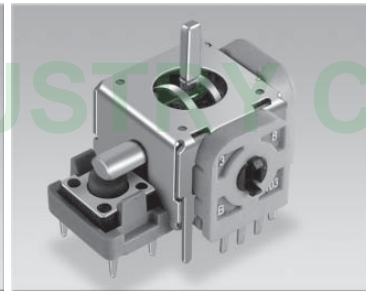
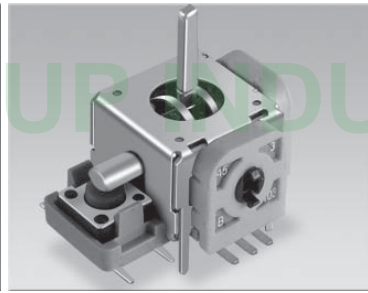
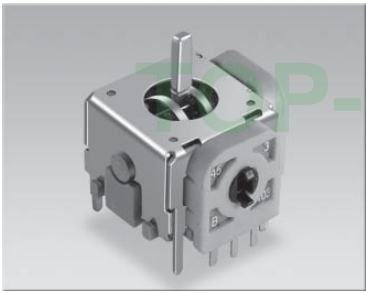


**JT9M**

**JT9MS-1**

**JT9MS-2**

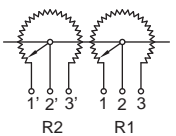
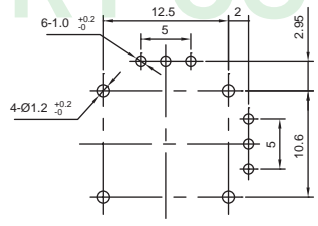
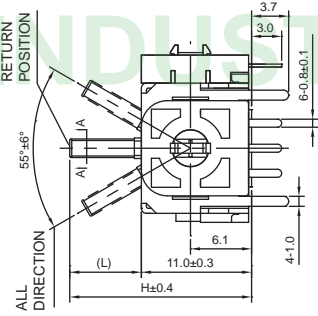
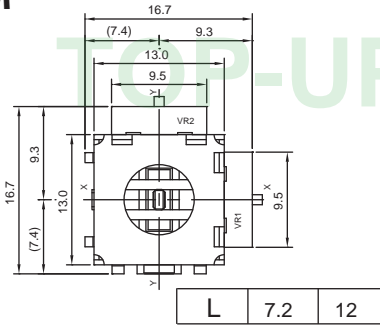
**JT9S-1**



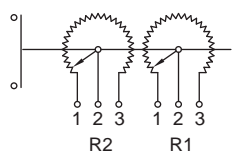
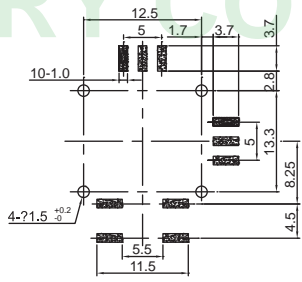
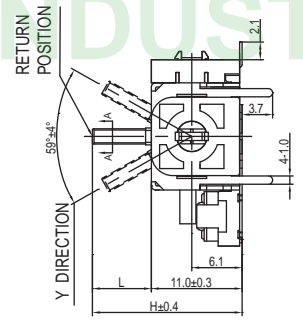
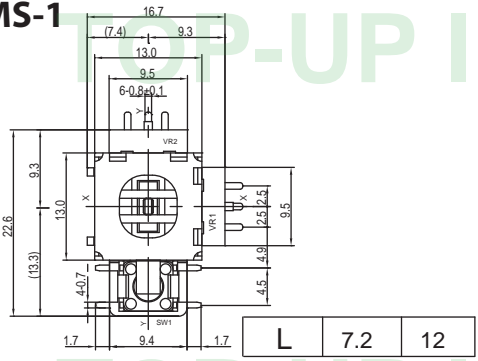
Outline Drawing

Features individual specifications

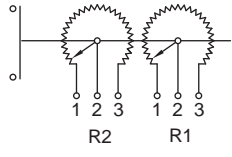
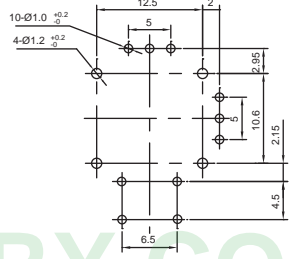
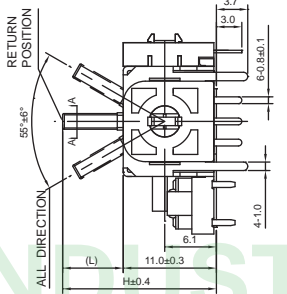
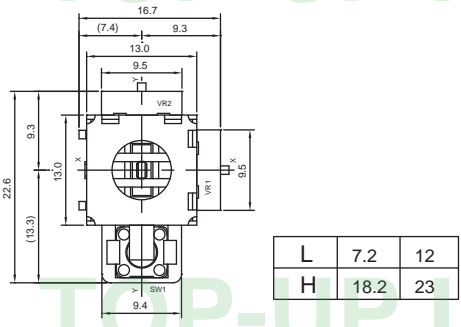
**JT9M**



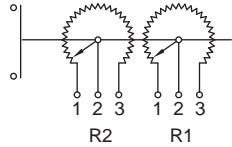
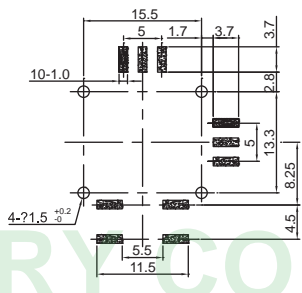
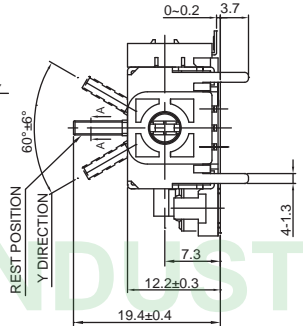
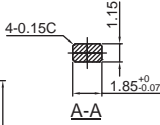
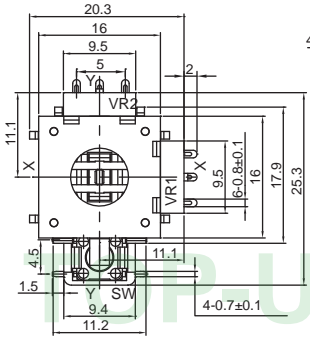
**JT9MS-1**



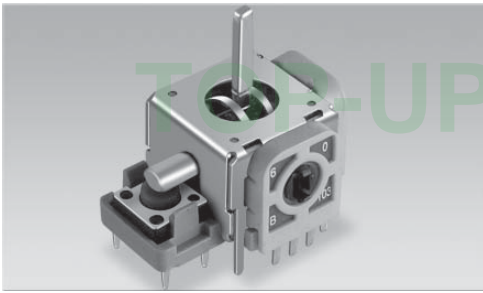
**JT9MS-2**



**JT9S-1**

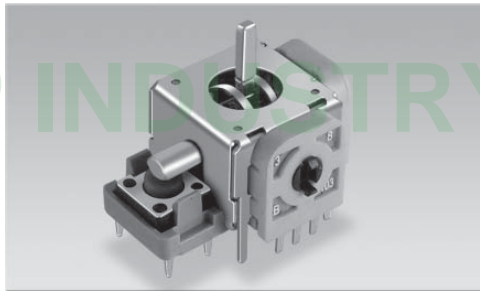


**JT9S-2**



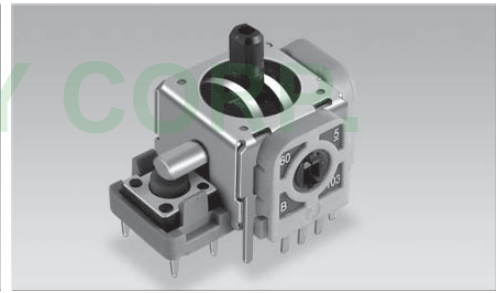
Outline Drawing

**JT9S-3**

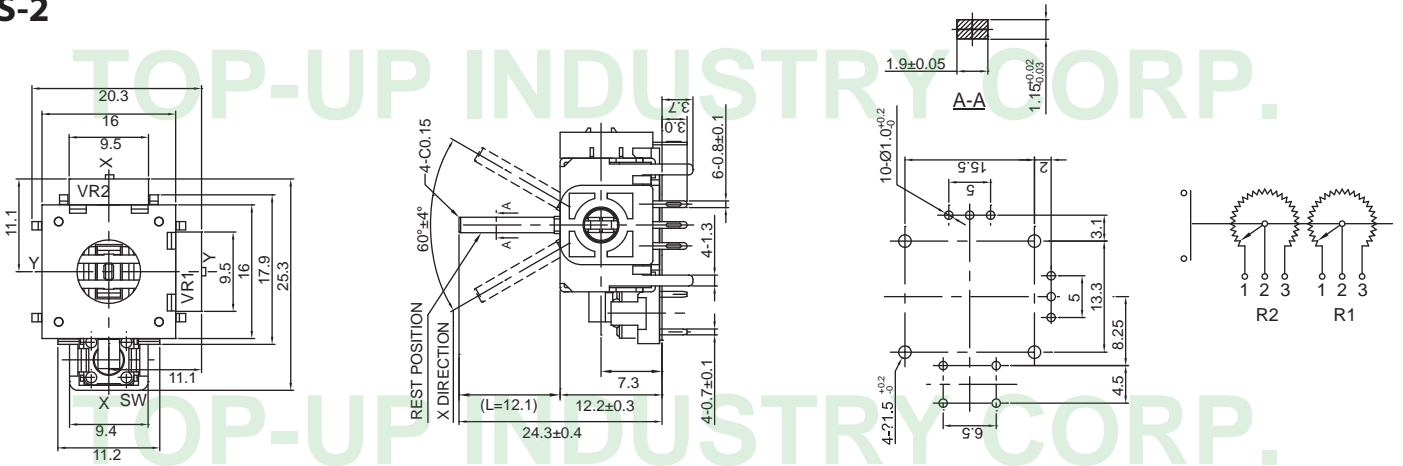


Features individual specifications

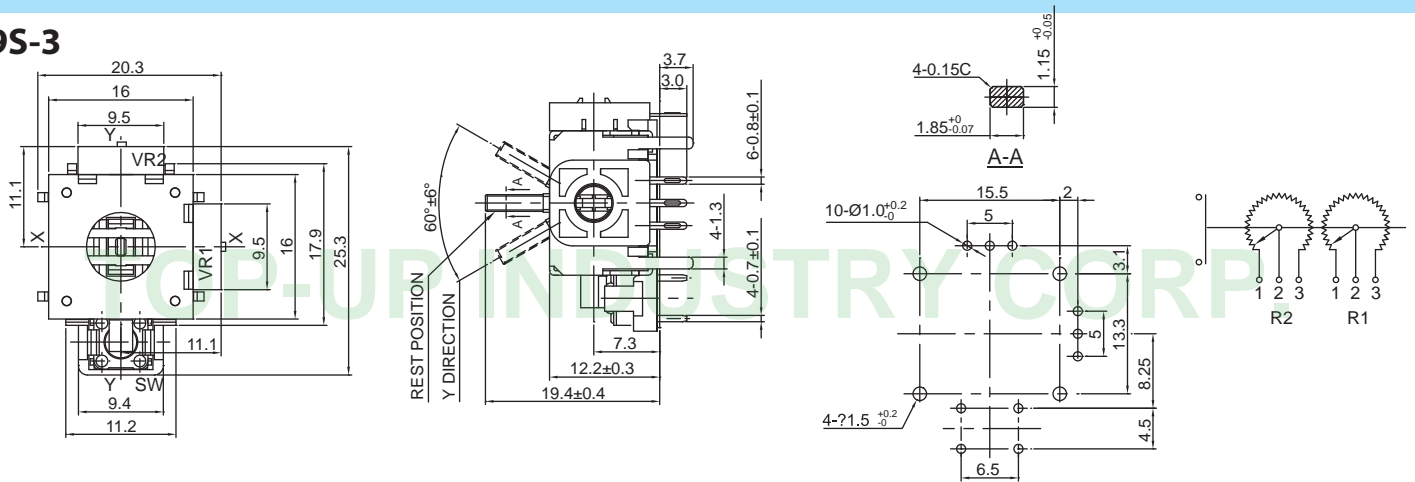
**JT9S-4**



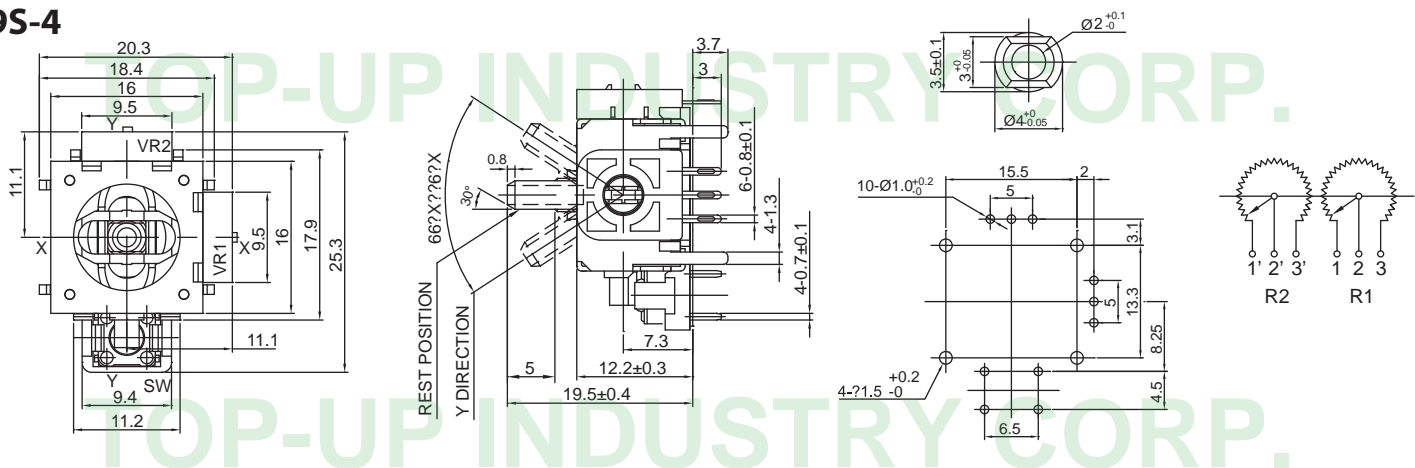
**JT9S-2**



**JT9S-3**

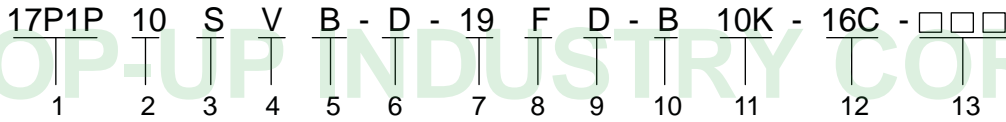


**JT9S-4**





## 12P1P(R),16P1P(R),17P1P(R), 17M1P(R), 17M1X Series Code Explanation



### 1. Product Lines

- 12P1P — 12mm Size Single Unit, Insulated Shaft With Dimmer SW.(Without Lock Push Type) Potentiometers
- 12P1R — 12mm Size Single Unit, Insulated Shaft With Dimmer SW.(Rotary Type) Potentiometers
- 16P1P — 16mm Size Single Unit, Insulated Shaft With Dimmer SW.(Without Lock Push Type) Potentiometers
- 16P1R — 16mm Size Single Unit, Insulated Shaft With Dimmer SW.(Rotary Type) Potentiometers
- 17P1P — 17mm Size Single Unit, Insulated Shaft With Dimmer SW.(Without Lock Push Type) Potentiometers
- 17P1R — 17mm Size Single Unit, Insulated Shaft With Dimmer SW.(Rotary Type) Potentiometers
- 17M1P — 17mm Size Single Unit, Metal Shaft With Dimmer SW.(Without Lock Push Type) Potentiometers
- 17M1R — 17mm Size Single Unit, Metal Shaft With Dimmer SW.(Rotary Type) Potentiometers
- 17M1X — 17mm Size Single Unit, Metal Shaft With Dimmer SW.(Without Lock Push Type) Potentiometers

### 2. Switch Rating

( Drawing 1 )

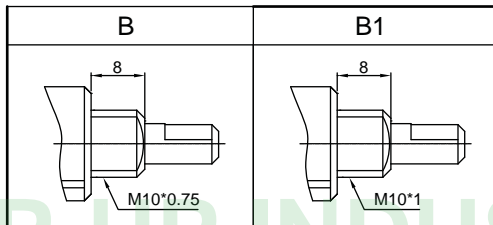
	12P1R, 16P1R, 17P1R, 17M1R	17P1P, 17M1P	17P1X, 17M1X
Code	4	10	2
Rating	4A 250V A.C	10A 250V A.C	2A 250V D.C

### 3. With Switch

### 4. Vertical Type " V " ; Horizontal Type "H"

### 5. Bushing Type

( Drawing 2 )



### 6. Type of Terminal (See Drawing 5)

### 7. Shaft Length "L" (See Drawing 3)

### 8. Type of Shaft (See Drawing 3)

( Drawing 3 )

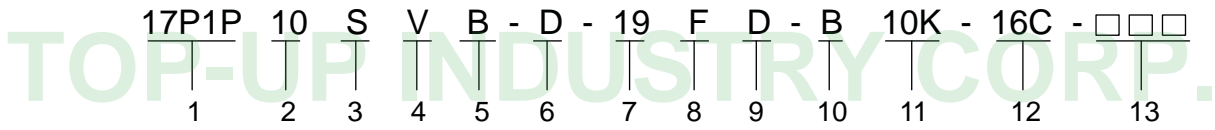
Shaft -Type	F (Insulated Shaft)		R (Metal or Insulation Shaft)		
Dimensions					
	L	19    17	L	15.5    17.75    19	
	F	8    8			
	FA Type: D=Ø6.35		RA Type: D=Ø6.0		

### 9. Shaft Color

( Drawing 4 )

Code	B	D	L	Y	G	A	R	W
Color	Black	Dark Blue	Light Blue	Yellow	Green	Ash	Red	White

## 12P1P(R),16P1P(R),17P1P(R), 17M1P(R), 17M1X Series Code Explanation



10. Type of Taper (See Taper Chart Page 220)

11. Resistance Value

12. Number of Clicks: Blank- None, 16C- 16 Position Click

13. Serial No.

( Drawing 5 )

12P1R	16P1R	12P1P	16P1P
Vertical			
P.C.B Terminal ( D Type )			
17P1R , 17M1R		17P1P, 17M1P	
Vertical		Vertical	
P.C.B Terminal ( D Type )		P.C.B Terminal ( D1 Type )	
17P1R	17P1P	17M1P	
Vertical	Vertical	Vertical	
P.C.B Terminal ( DD Type )	P.C.B Terminal ( DA Type )	P.C.B Terminal ( DR Type )	
17M1X			17P1R
Vertical	Horizontal		
P.C.B Terminal (D2 Type)	P.C.B Terminal (B Type)	P.C.B Terminal (UB Type)	P.C.B Terminal (B Type)

## 17P1P Series, 17P1R Series Potentiometers

### Mechanical Characteristics:

Total rotational angle	300°±5°
Shaft stopper strength	3.5Kgf.cm
Bushing mount strength	8Kgf.cm MIN.
Detent position	18°±2° expt both end of 18°±6°(16 detents)
Detent torque	300 gf.cm MAX.

### Electrical Characteristics:

Total resistance	Nominal total resistance ±20%
Power rating	B taper:0.1W other:0.05W
Rated voltage	350V D.C
Resistance taper	A, B, C, D, E, K, W, RD
Residual resistance	10Ω MAX.
Slider noise	47mV MAX.
Insulation resistance	100MΩ MIN. at DC 500V
Withstand voltage	1 minute at AC 500V between terminal and case

### Durability:

Rotational life	10,000 cycles
-----------------	---------------

## 17PIP10SVB Series Switch Specifications

### Mechanical Characteristics:

Switch operating method	Push type
Switch contact arrangement	SPDT
Switching stroke	3±0.5mm
Switch operating force	2Kgf MAX.
Switch operating life	40,000 cycles

### Electrical characteristics:

Switch rating	10A 250V A.C
Switch contact resistance	Initial:20mΩ MAX. at DC 5V 1A
Switch withstand voltage	A.C 1000V between terminals of open contacts for 1 minute A.C 3000V between terminals and case for 1 minute
Switch insulation resistance	500MΩ MIN. at DC 500V

## 17P1RSVB Series Switch Specifications

### Mechanical Characteristics:

Switch operating method	Rotary type
Switch contact arrangement	SPST
Switching angle	50°MAX.
Switch operating force	800 gf.cm MAX.
Switch operating life	40,000 cycles

### Electrical Characteristics:

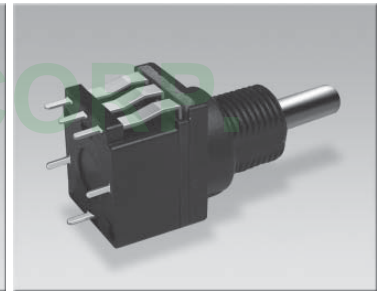
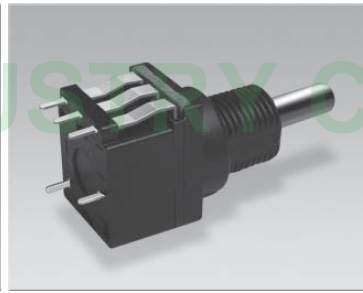
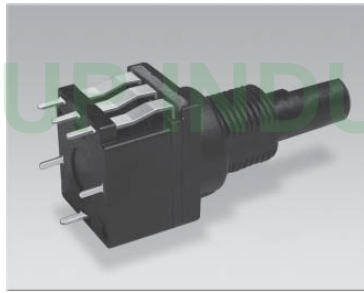
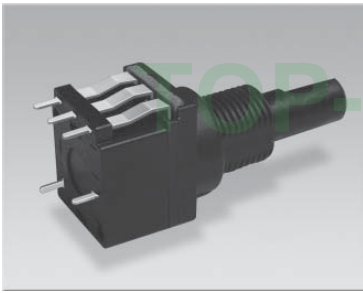
Switch rating	4A 250V A.C
Surge rating	20A (0.01sec)
Switch contact resistance	Initial:20mΩ MAX. at DC 5V 1A
Switch withstand voltage	A.C 1000V between terminals of open contacts for 1 minute A.C 3000V between terminals and case for 1 minute
Switch insulation resistance	500MΩ MIN. at DC 500V

**12P1R4SVB-D**

**12P1P10SVB-D**

**12M1R4SVB-D**

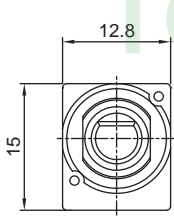
**12M1P10SVB-D**



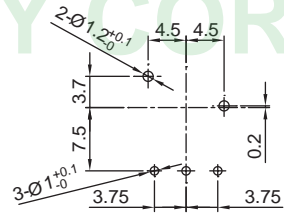
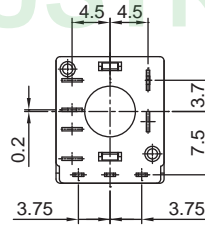
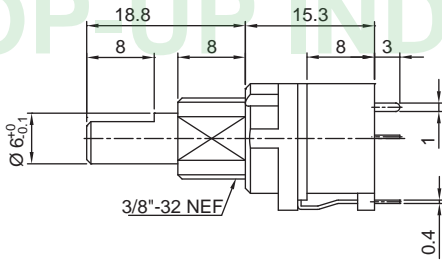
Outline Drawing

Features individual specifications

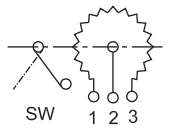
**12P1R4SVB-D**



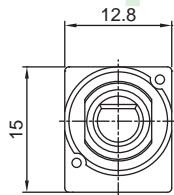
SHAFT SHOWN IN FULL C.C.W. POSITION



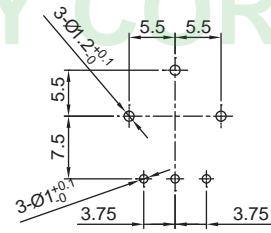
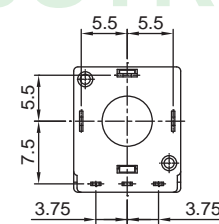
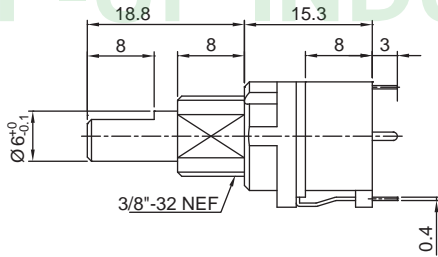
P.C.B. MOUNTING HOLE DETAIL



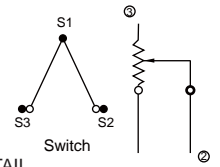
**12P1P10SVB-D**



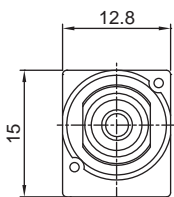
SHAFT SHOWN IN FULL C.C.W. POSITION



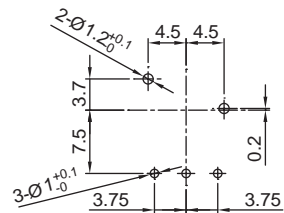
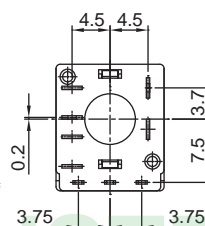
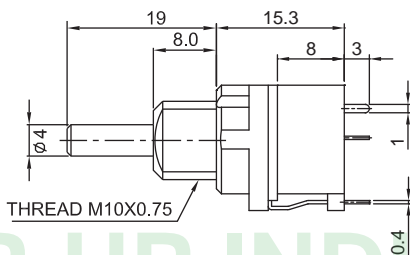
P.C.B. MOUNTING HOLE DETAIL



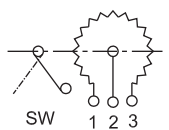
**12M1R4SVB-D**



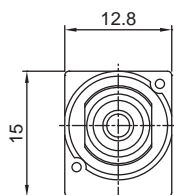
SHAFT SHOWN IN FULL C.C.W. POSITION



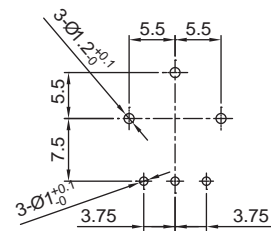
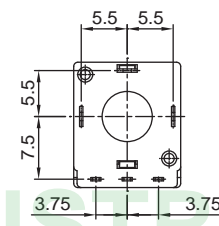
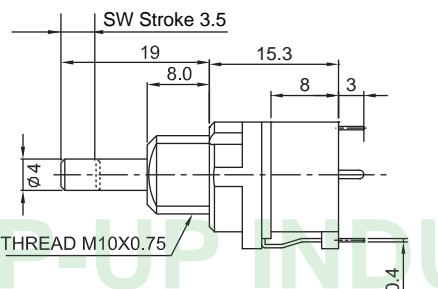
P.C.B. MOUNTING HOLE DETAIL



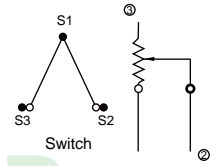
**12M1P10SVB-D**



SHAFT SHOWN IN FULL C.C.W. POSITION



P.C.B. MOUNTING HOLE DETAIL

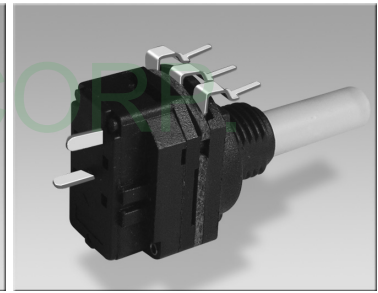
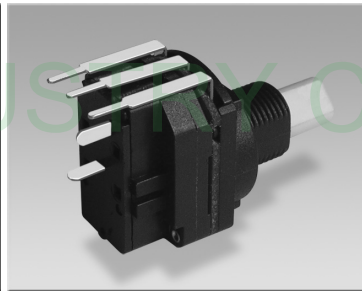
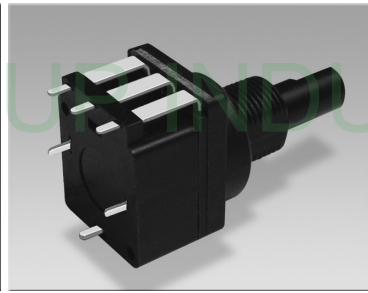
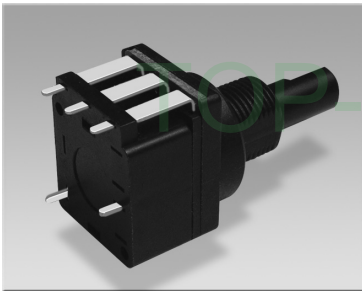


**16P1R4SVB-D**

**16P1P10SVB-D**

**16P1R4SVB-D3**

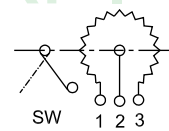
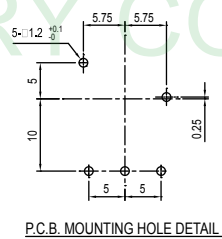
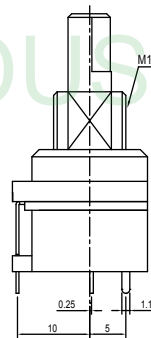
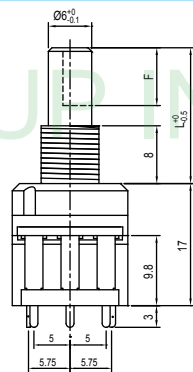
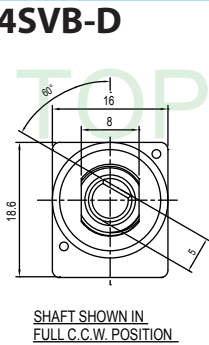
**16P1P10SVB-CD**



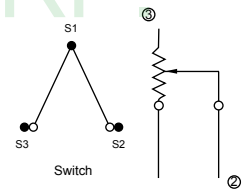
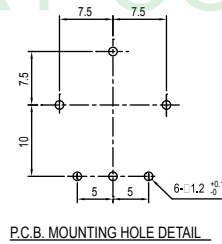
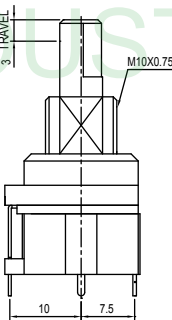
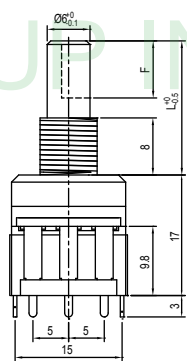
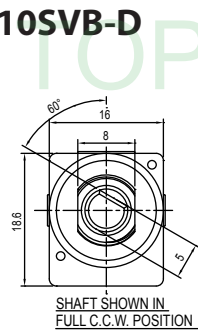
Outline Drawing

Features individual specifications

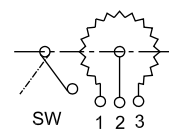
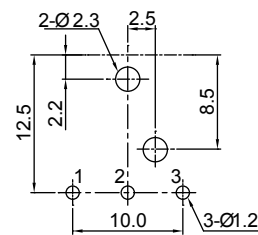
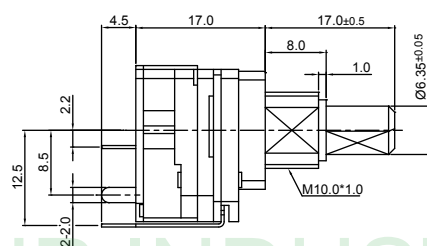
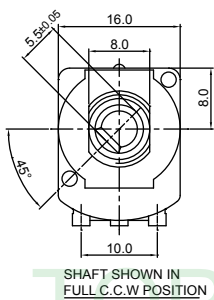
**16P1R4SVB-D**



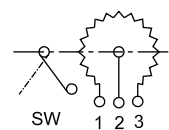
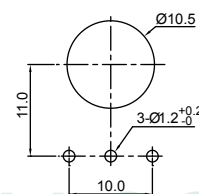
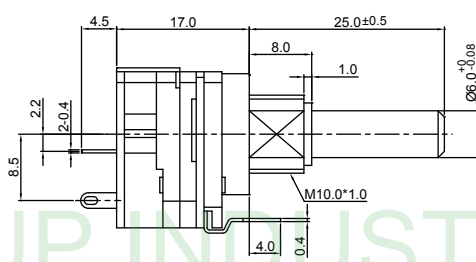
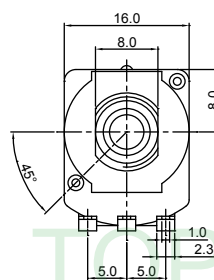
**16P1P10SVB-D**



**16P1R4SVB-D3**



**16P1P10SVB-CD**

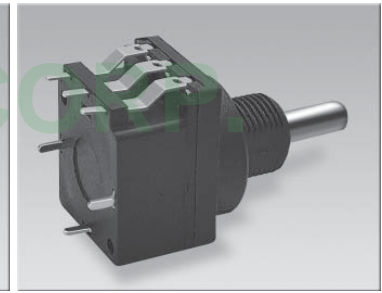
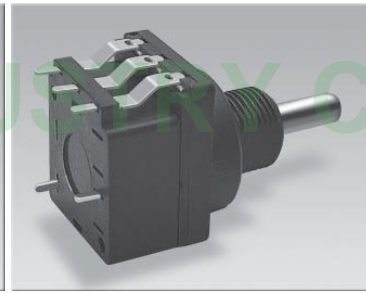
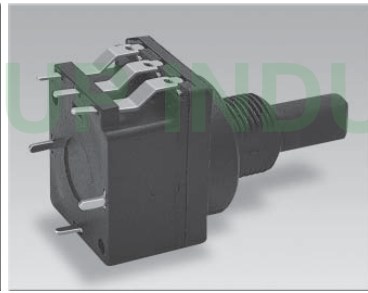
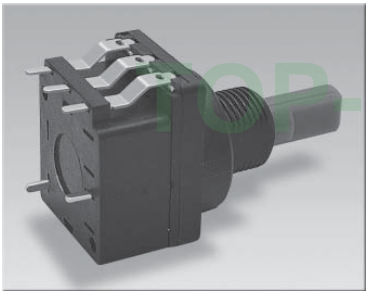


**17P1R4SVB-D**

**17P1P10SVB-D**

**17M1R4SVB-D**

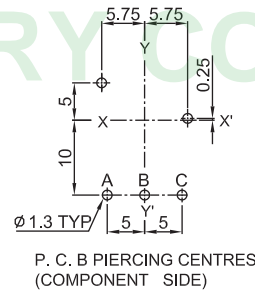
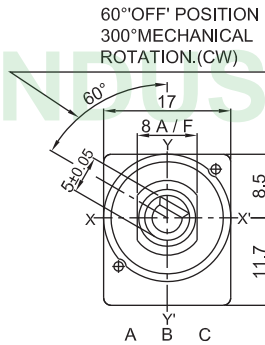
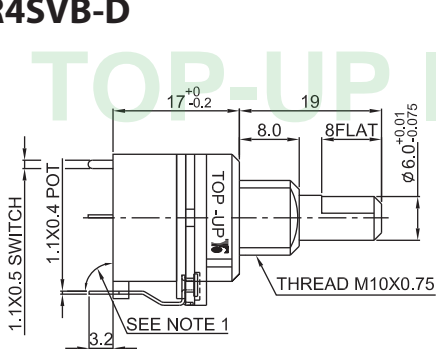
**17M1P10SVB-D**



Outline Drawing

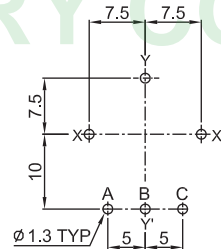
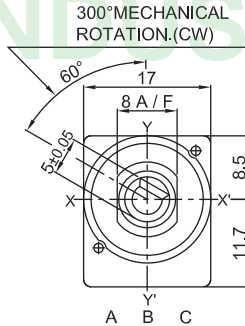
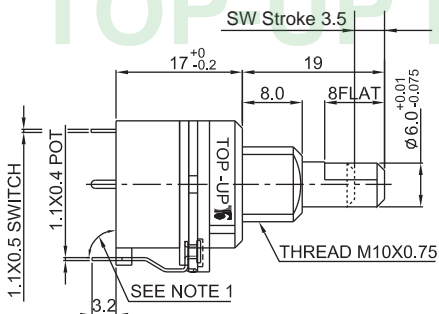
Features individual specifications

**17P1R4SVB-D**



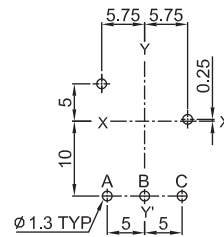
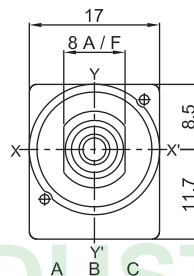
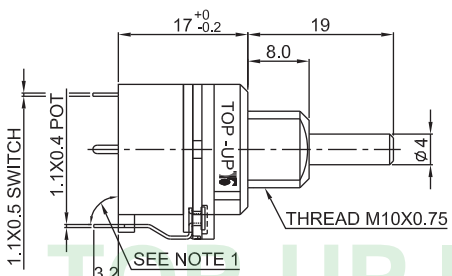
P. C. B PIERCING CENTRES (COMPONENT SIDE)

**17P1P10SVB-D**



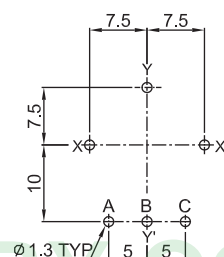
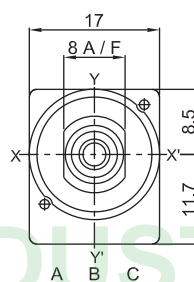
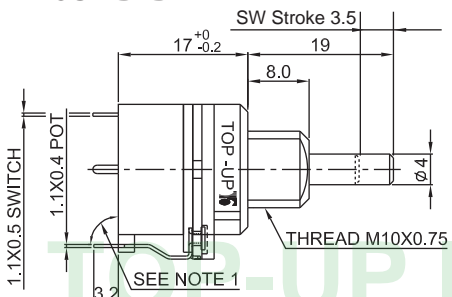
P. C. B PIERCING CENTRES (COMPONENT SIDE)

**17M1R4SVB-D**



P. C. B PIERCING CENTRES (COMPONENT SIDE)

**17M1P10SVB-D**



P. C. B PIERCING CENTRES (COMPONENT SIDE)

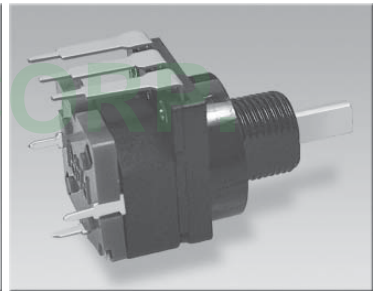
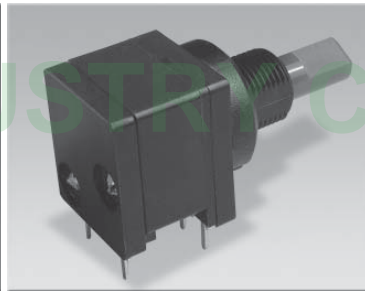
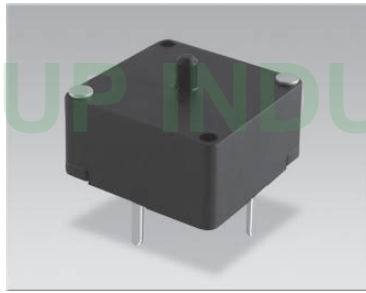
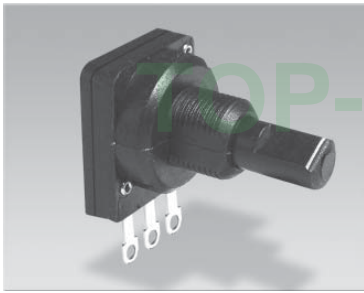


**17P1HB-A**

**17P1PRF20-10-6H**

**17P1R4SHB-B**

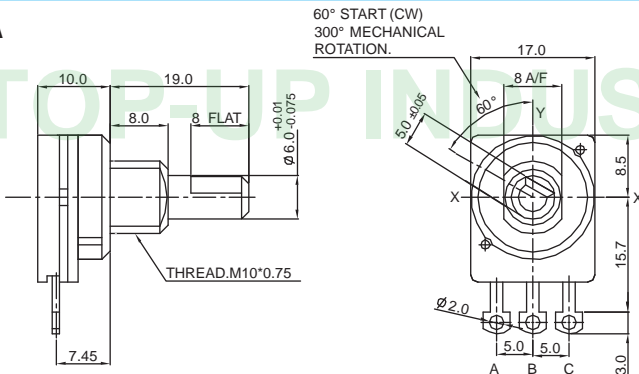
**17M1X2SVB-D2**



Outline Drawing

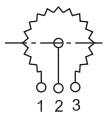
Features individual specifications

**17P1HB-A**

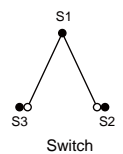
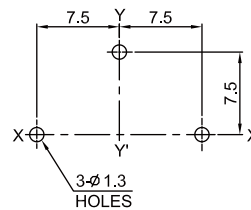
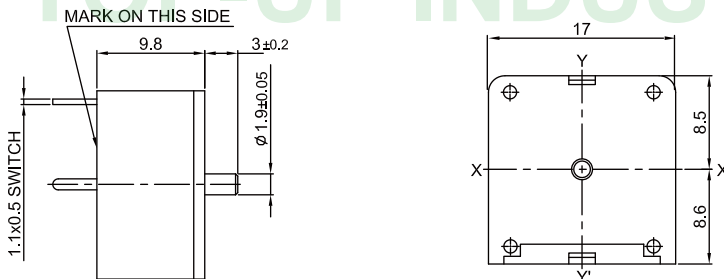


- NOTES: 1.ALL SOLDER PINS MUST BE AT 90°±1° TO BASE  
 2.IDENTIFICATION COLOURS:-  
 BUSH- BLACK  
 SWITCH BODY- BLACK

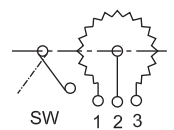
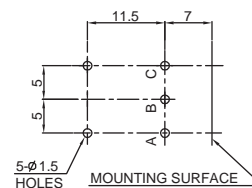
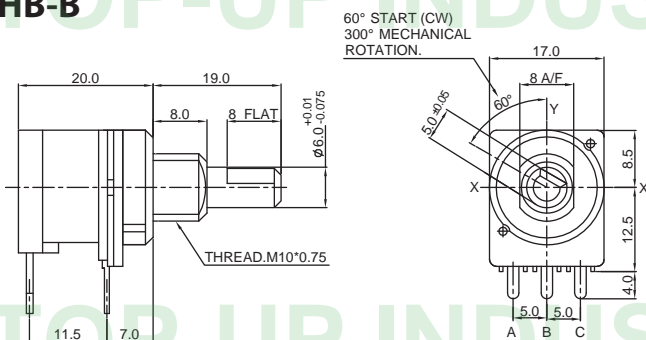
SYMBOL	SPINDLE COLOR
G	GREEN
D	DARK BLUE



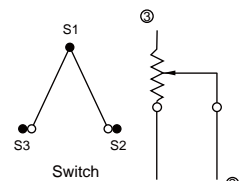
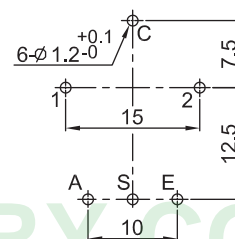
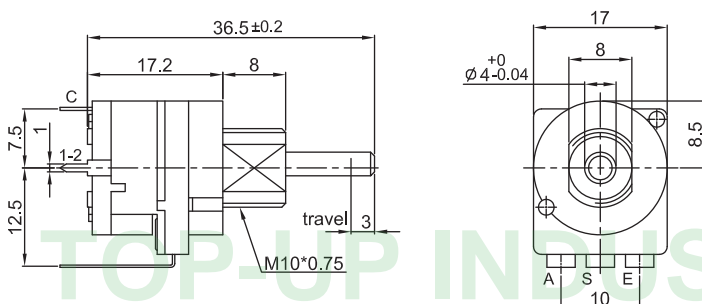
**17P1PRF20-10-6H**



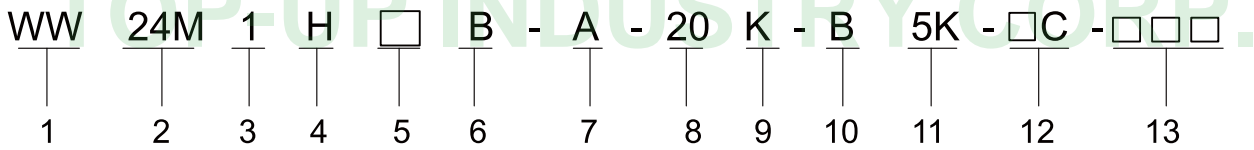
**17P1R4SHB-B**



**17M1X2SVB-D2**



## WW Series POT. Code Explanation



1. Product Lines of WW - Wire Wound Potentiometer

2. Series

22M— Metal Shaft, 22mm Size Series Wire Wound Potentiometer

24M— Metal Shaft, 24mm Size Series Wire Wound Potentiometer

28M— Metal Shaft, 28mm Size Series Wire Wound Potentiometer

40M— Metal Shaft, 40mm Size Series Wire Wound Potentiometer

50M— Metal Shaft, 50mm Size Series Wire Wound Potentiometer

60M— Metal Shaft, 60mm Size Series Wire Wound Potentiometer

3. Number of Unit : 1 - Single Unit , 2- Dual unit

4. Horizontal ( H ) Type or Vertical ( V ) Type

5. Bushing Length

6. Bushing Type

Model	WW24M Series	WW40M Series	WW50M Series	WW60M Series																																			
B (Standard)																																							
	<table border="1"> <tr> <td>other type</td> <td>L</td> <td>16</td> <td>19.5</td> <td>20</td> <td>25</td> </tr> <tr> <td>B</td> <td>9</td> <td>10.5</td> <td>12</td> <td>6.5</td> <td></td> </tr> </table>	other type	L	16	19.5	20	25	B	9	10.5	12	6.5		<table border="1"> <tr> <td>other type</td> <td>L</td> <td>30</td> <td>33</td> </tr> <tr> <td>B</td> <td>19</td> <td>20</td> <td></td> </tr> </table>	other type	L	30	33	B	19	20		<table border="1"> <tr> <td>other type</td> <td>L</td> <td>30</td> <td>40</td> </tr> <tr> <td>B</td> <td>20</td> <td>30</td> <td></td> </tr> </table>	other type	L	30	40	B	20	30		<table border="1"> <tr> <td>other type</td> <td>L</td> <td>16</td> <td>30</td> </tr> <tr> <td>B</td> <td>10</td> <td>19</td> <td></td> </tr> </table>	other type	L	16	30	B	10	19
other type	L	16	19.5	20	25																																		
B	9	10.5	12	6.5																																			
other type	L	30	33																																				
B	19	20																																					
other type	L	30	40																																				
B	20	30																																					
other type	L	16	30																																				
B	10	19																																					
BL																																							
	<table border="1"> <tr> <td>other type</td> <td>(B)</td> <td>6.5</td> <td>10.5</td> </tr> <tr> <td>(D)</td> <td colspan="3">3/8*32NEF.(Code:3)</td> </tr> </table>	other type	(B)	6.5	10.5	(D)	3/8*32NEF.(Code:3)																																
other type	(B)	6.5	10.5																																				
(D)	3/8*32NEF.(Code:3)																																						

7. Type of Terminal

Horizontal		Horizontal	
A (Solder Lug Type)		A (Solder Lug Type)	

8. Shaft Length

9. Type of Shaft

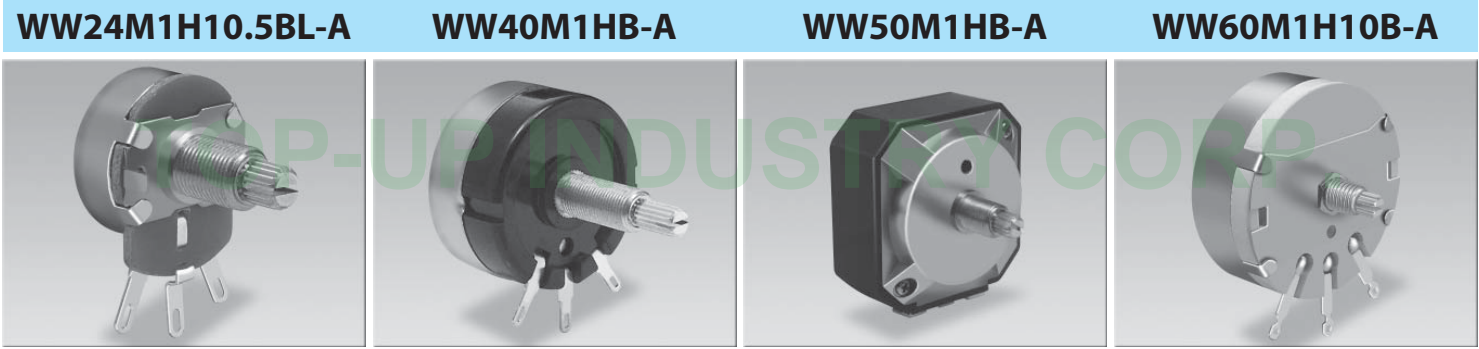
## WW Series POT. Code Explanation

WW 24M 1 H □ B □ - A - 20 K - B 5K - □ C - □ □ □

1 2 3 4 5 6 7 8 9 10 11 12 13 14

KM - Type		K- Type		
KMT - Type		KT- Type		
S - Type		SB- Type		
R - Type		RB- Type		
F - Type				
(C.C.W)	F(standard)	FD	FG	FH
(C.W)	FW	FBW		

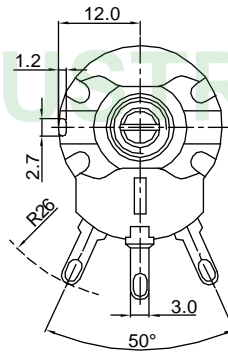
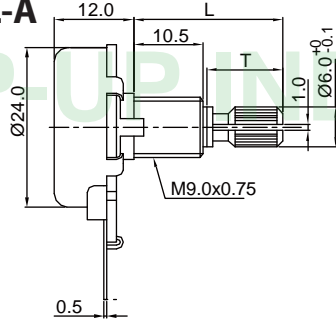
10. Type of Taper (See Taper Chart Page 220)
11. Resistance Value
12. Number of Clicks : Blank - None
13. Serial No.



Outline Drawing

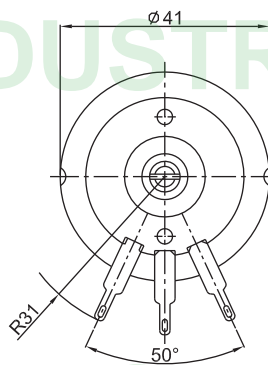
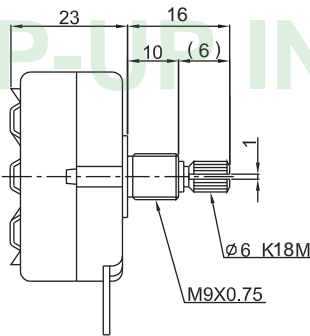
Features individual specifications

**WW24M1H10.5BL-A**



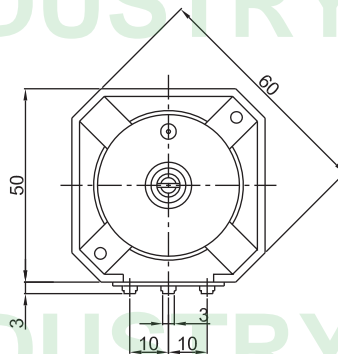
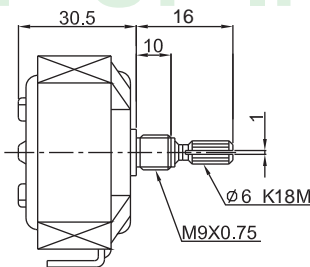
RESISTANCE RANGE	5Ω-5KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	5W

**WW40M1HB-A**



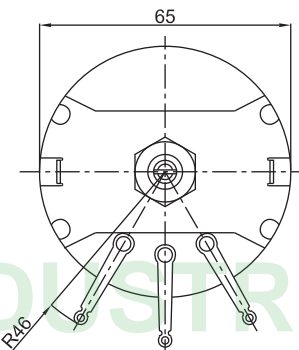
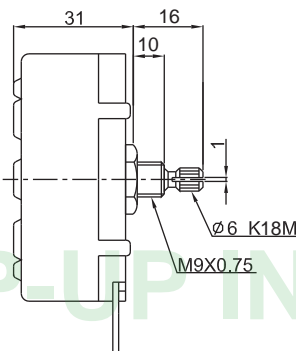
RESISTANCE RANGE	5Ω-3KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

**WW50M1HB-A**

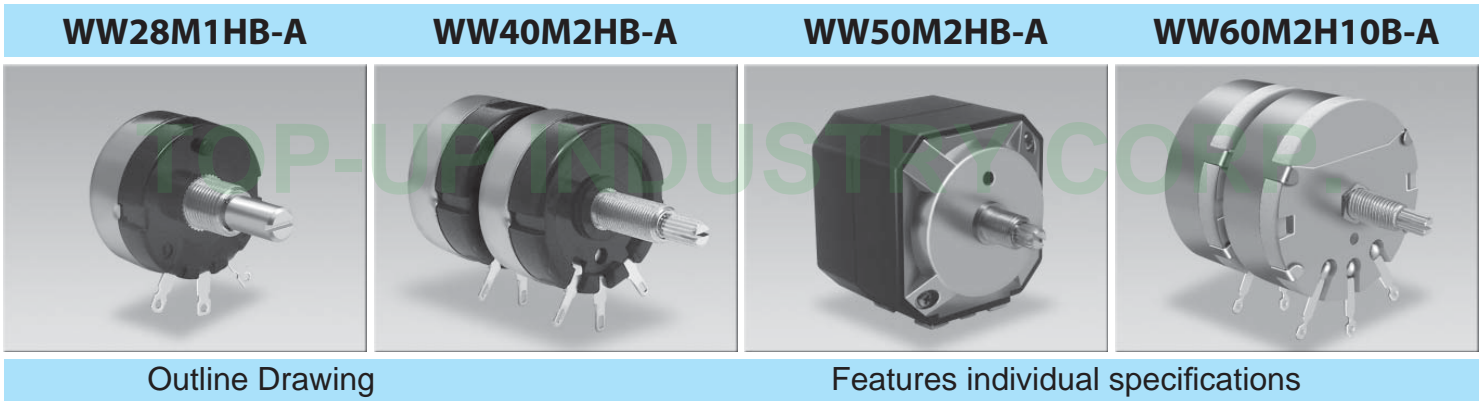


RESISTANCE RANGE	5Ω-50Ω
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	290°±5°
POWER RATING	30W

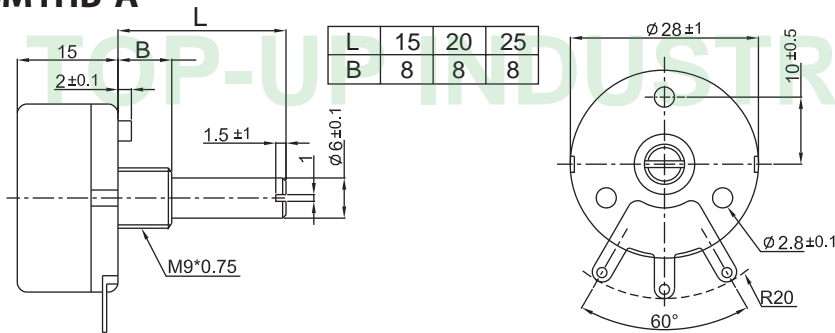
**WW60M1H10B-A**



RESISTANCE RANGE	5Ω-50Ω
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

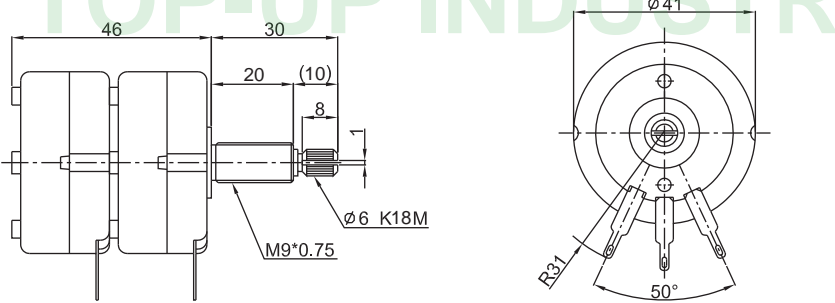


**WW28M1HB-A**



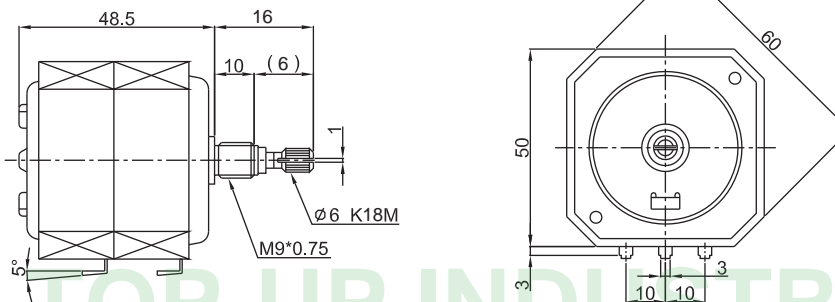
RESISTANCE RANGE	5Ω~5KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	1.5W

**WW40M2HB-A**



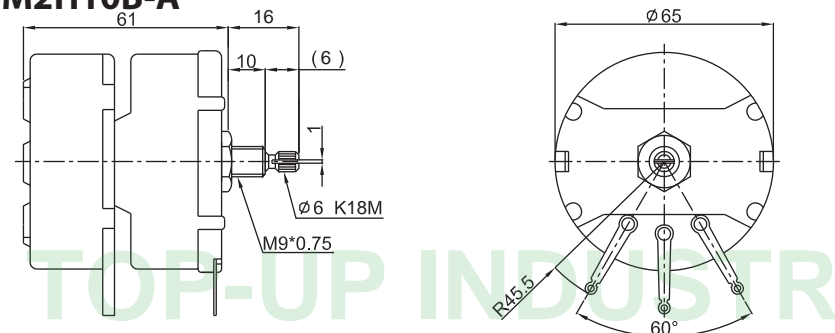
RESISTANCE RANGE	5Ω~3KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

**WW50M2HB-A**



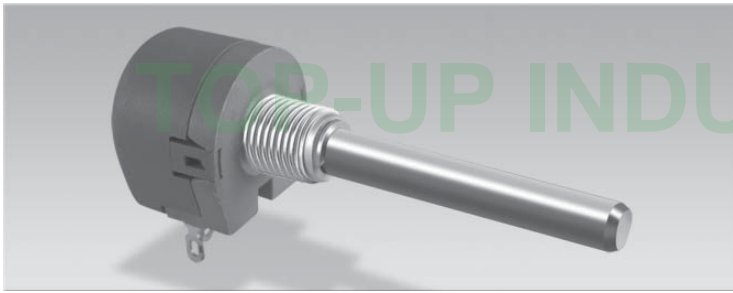
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

**WW60M2H10B-A**



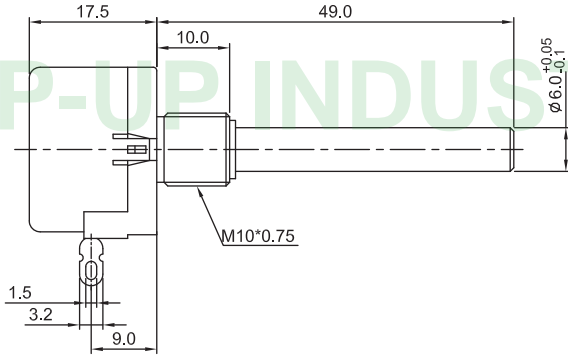
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

**WW22M1HB-A**

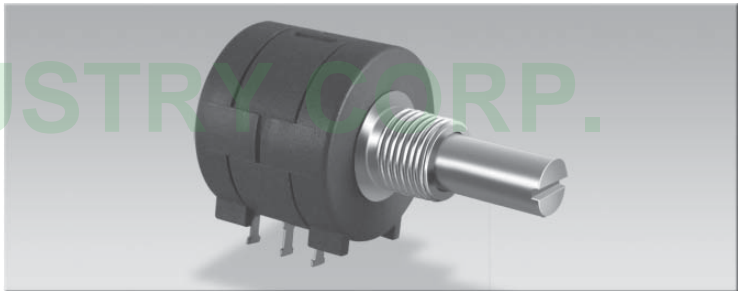


Outline Drawing

**WW22M1HB-A**

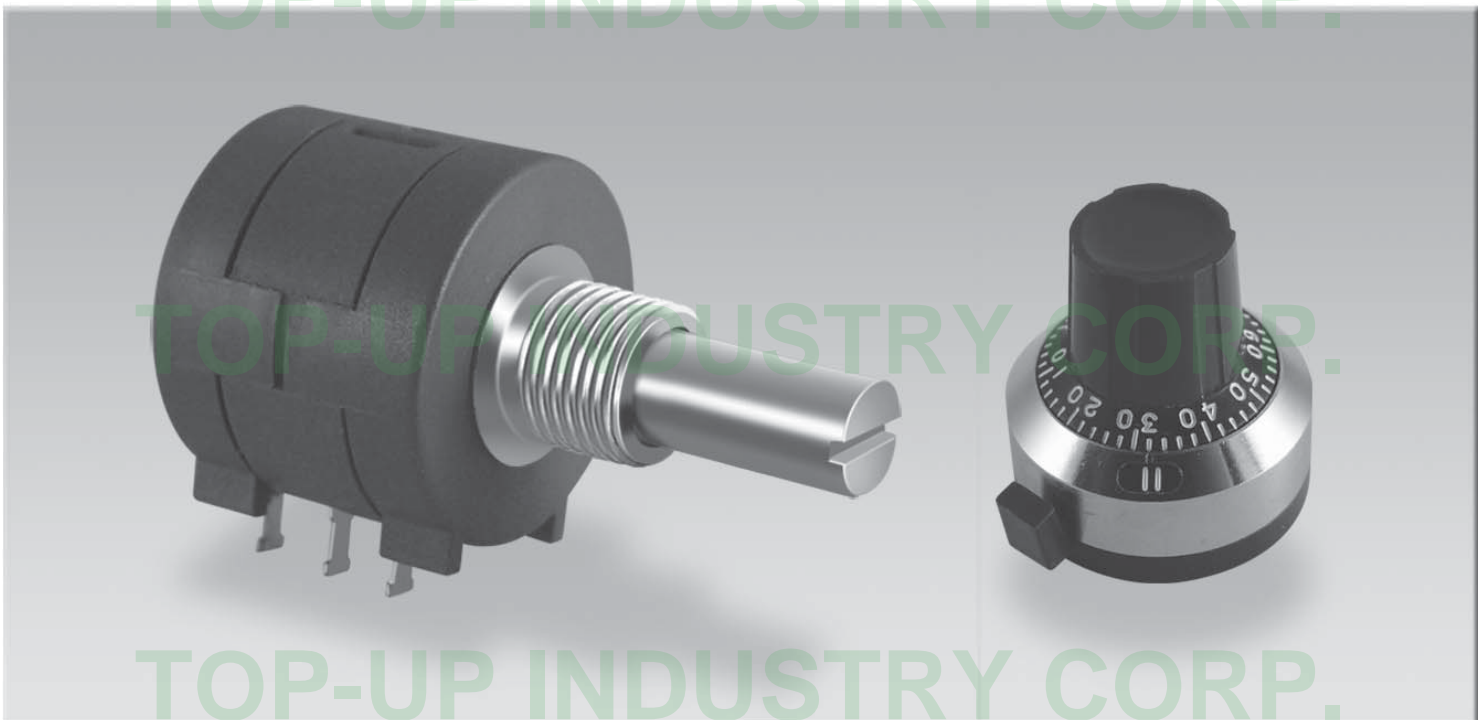
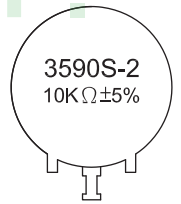
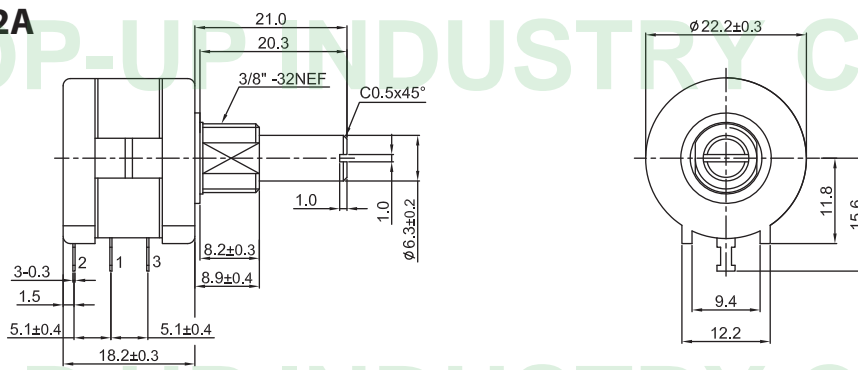


**TP-WW3590S-2A**



Features individual specifications

**TP-WW3590S-2A**





**8SL10AHF2-B**

Sensor



Outline Drawing

**11SR1-T**

Sensor



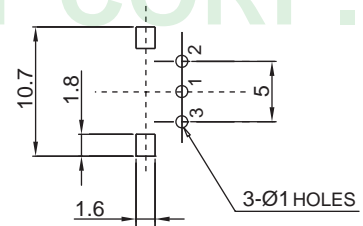
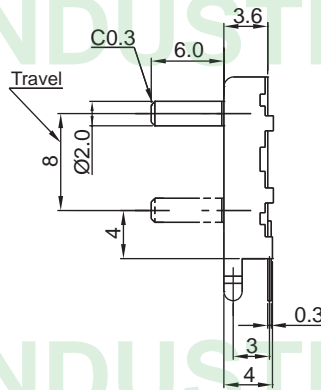
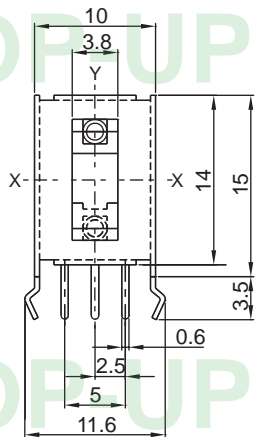
Features individual specifications

**28SR1V-B**

Sensor

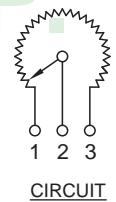
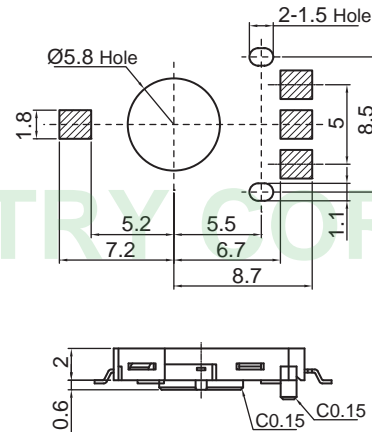
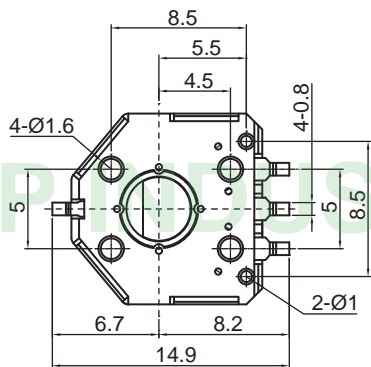
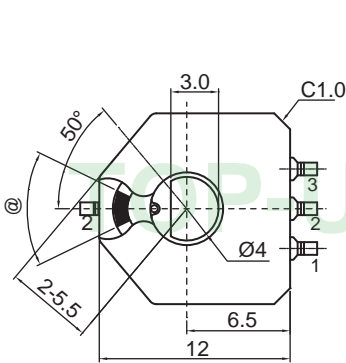


**8SL10AHF2-B**

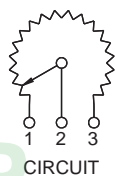
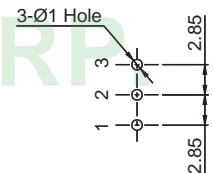
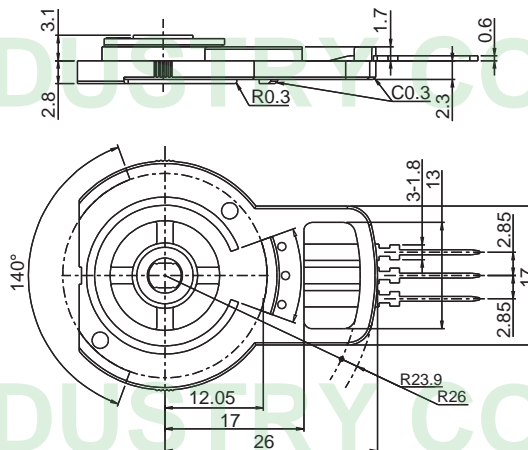
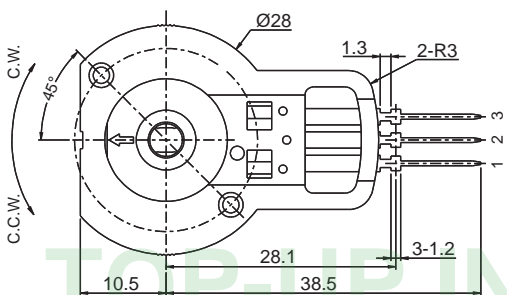


P.W.B. MOUNTING DETAIL  
 VIEWED FROM MOUNTING SIDE

**11SR1-T**



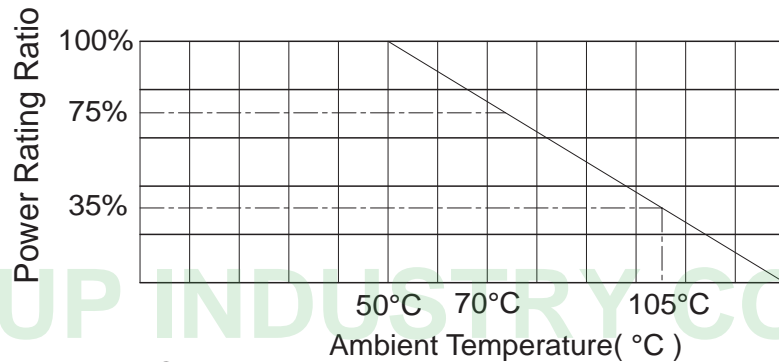
**28SR1V-B**



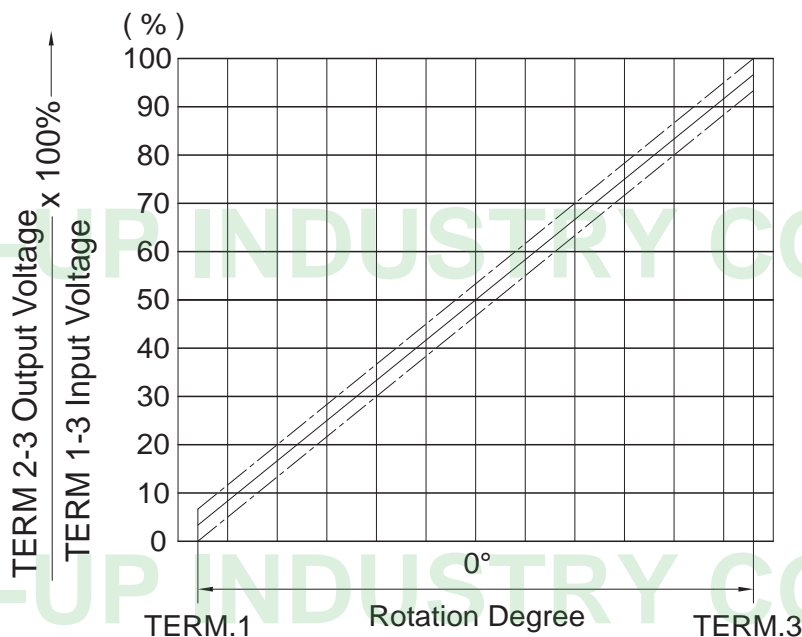
15RS Series Position Sensor  
 Common Specifications

Items	Specifications
Total Resistance ( $\Omega$ )	10K , 100K
Total Resistance Tolerance	$\pm 30\%$
Rated Power ( W )	0.15W @ 50°C
Linearity ( Absolute )	$\pm 3\%$
Taper	Linear
Mechanical Life ( Without Load )	100,000 Cycles
Operating Temperature Range ( °C )	-40 ~ +85
Rotational Torque ( gf-cm )	100 Max.
Max Voltage	DC 250V
Mechanical Angle	360° Endless
Electrical Angle	340° $\pm$ 10°

Power Rating Curve :

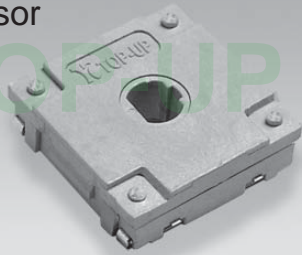


Reference Characteristic Curve



**15RS-TU**

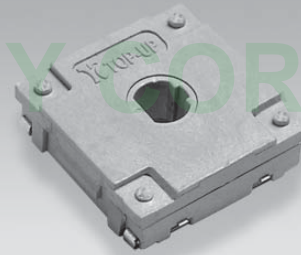
Position Sensor



Outline Drawing

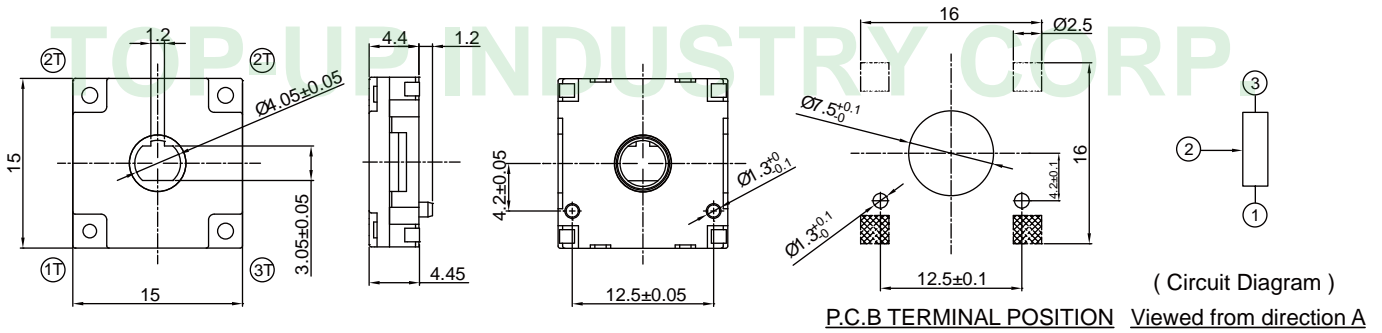
**EC15-SMT**

Encoder

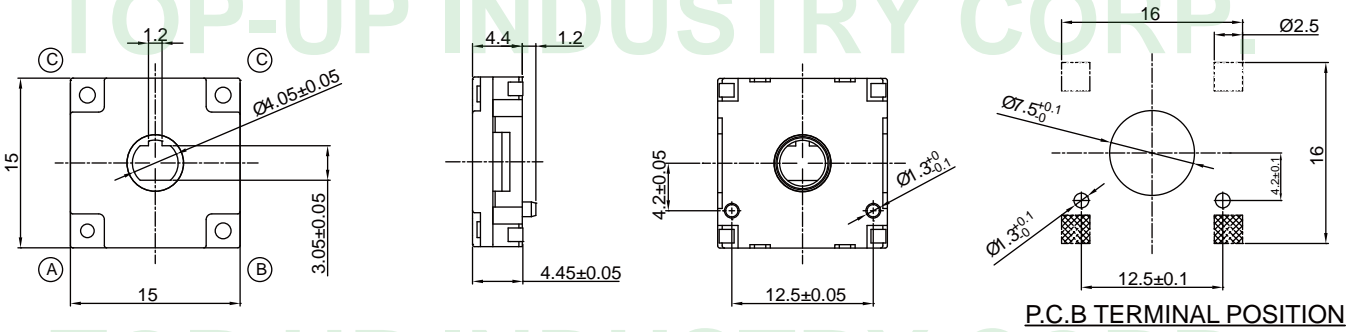


Features individual specifications

**15RS-TU**



**EC15-SMT**

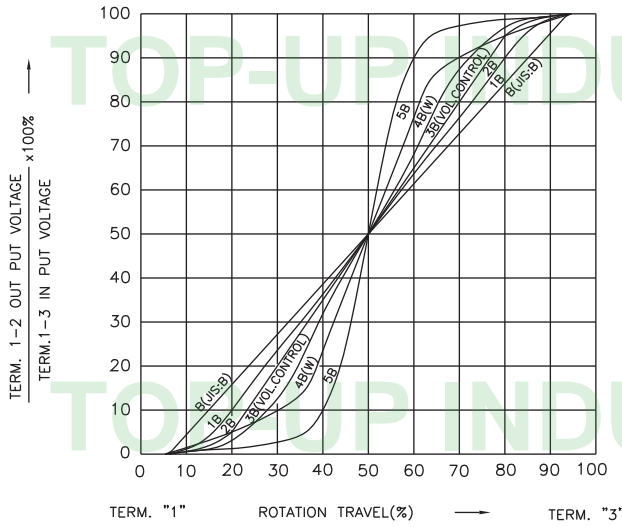


EC15 Series Encoder

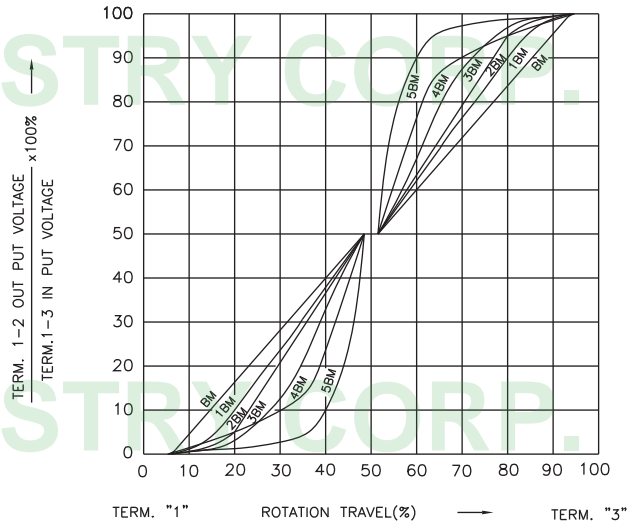
Common Specifications

Items	Specifications
Pulse	3
Number of Detent	—
Phase Difference ( msec )	≧ 14
Chattering ( msec )	≧ 3
Insulation Resistance	DC250V 100MΩ MIN
Dielectric Strength	50V AC 1 min
Torque ( gf.cm )	40gf.cm MAX
Rotational Life ( Cycle )	15,000

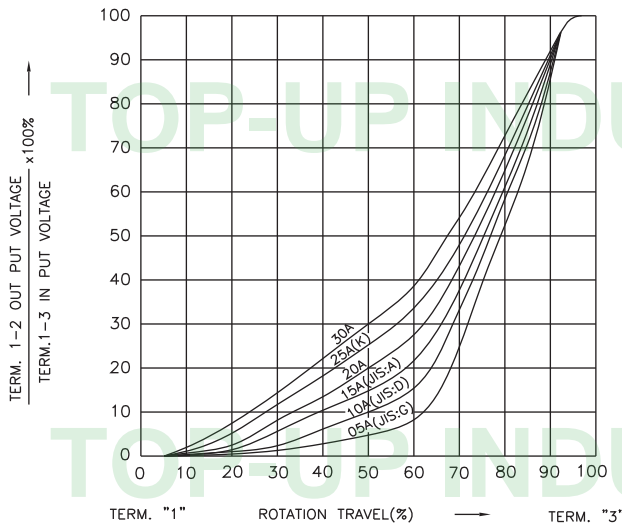
TAPERS B SERIES



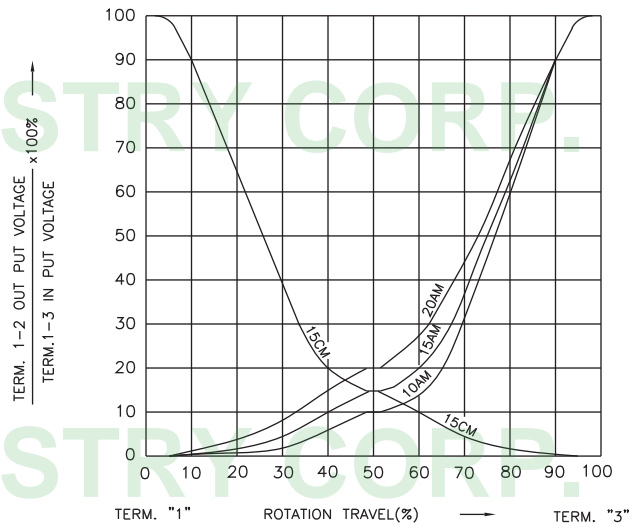
TAPERS B WITH 50% TAP



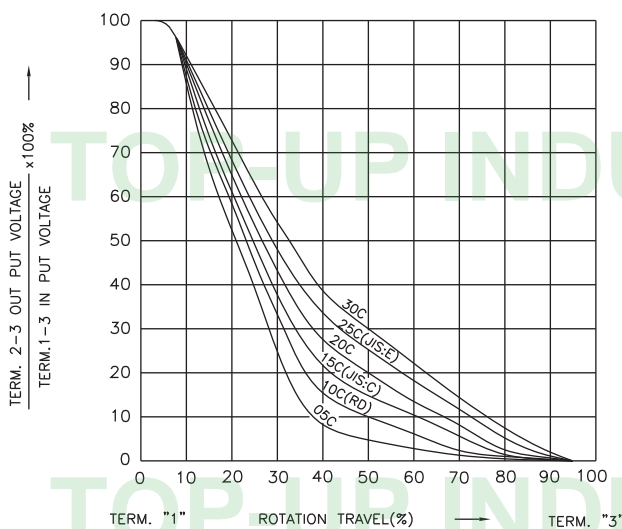
TAPERS A SERIES



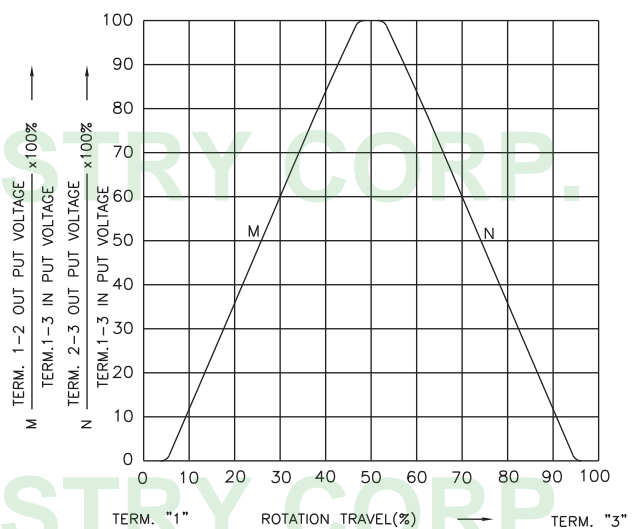
TAPERS A & C WITH 50% TAP



TAPERS C SERIES



TAPER M & N







**TOP-UP INDUSTRY CORP.**


[www.globalsources.com/topup.co](http://www.globalsources.com/topup.co)

[www.top-up.com.tw](http://www.top-up.com.tw)

8F, NO. 189, YUAN AN RD., TAOYUAN TAIWAN R.O.C.

 886-3-3380787(REP)

 886-3-3380767

 [sales@top-up.com.tw](mailto:sales@top-up.com.tw)

 [top-up.1](https://www.skype.com/top-up.1)