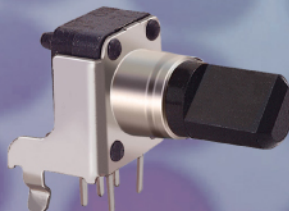
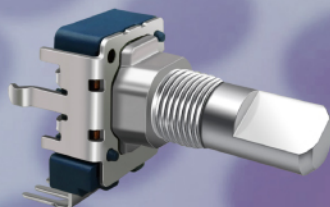
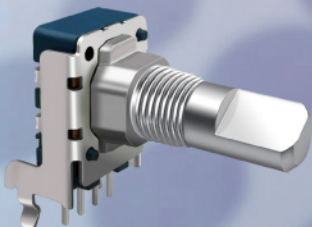


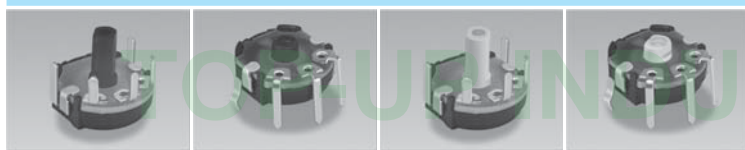
TOP-UP

Potentiometer Wire Wound



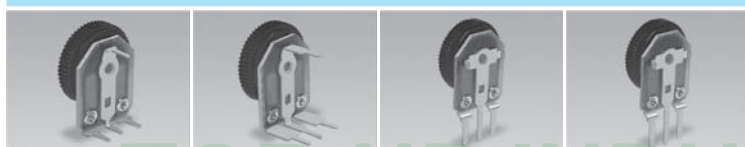
8mm Size Micro Potentiometers

Page



17

8mm Size Thin Micro Potentiometers



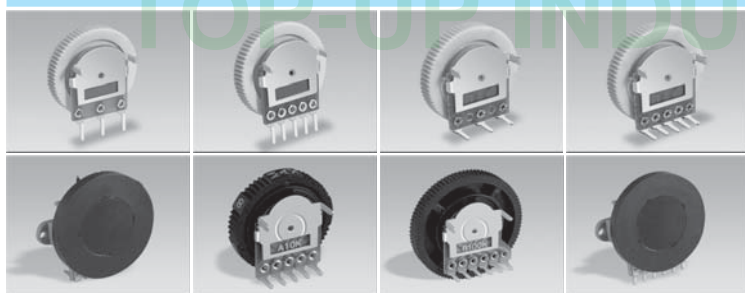
19

6mm Size Thin Micro Potentiometers



22

10mm Size Thin Micro Potentiometers



23

24

9mm Size Snap-in Insulated Shaft Potentiometers



28

29

30

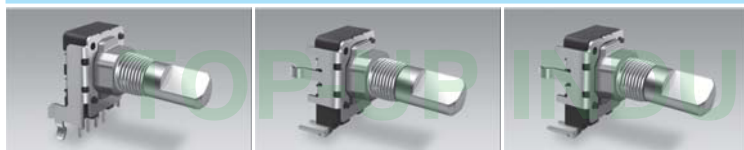
7mm & 9mm Size Long Life Potentiometers



31

11mm Size Metal Shaft, Multi-Ganged Potentiometers

Page



33

12mm Size Metal Shaft, Multi-Ganged Potentiometers



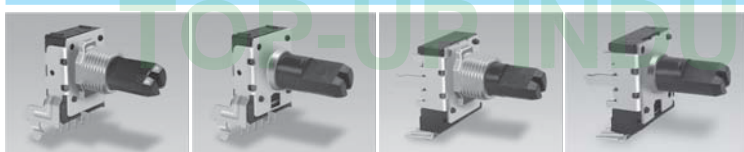
34

11mm Size Snap-in Insulated Shaft Potentiometers



39

12mm Size Snap-in Insulated Shaft Potentiometers

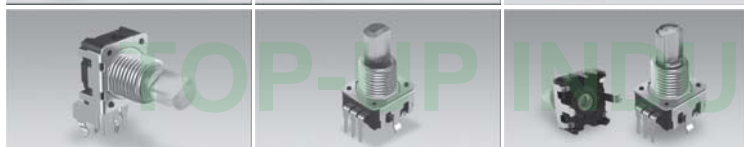


40



With Replaceable LEDs

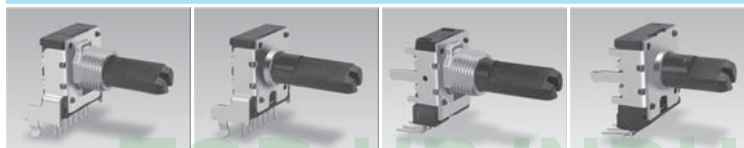
41



With Luminous Shaft

42

14mm Size Snap-in Insulated Shaft Potentiometers



With Insulated Shaft

43

8mm Size Metal Shaft, Multi-Ganged Potentiometers



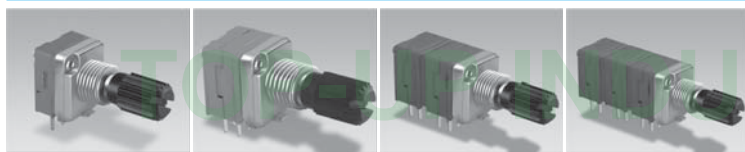
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46

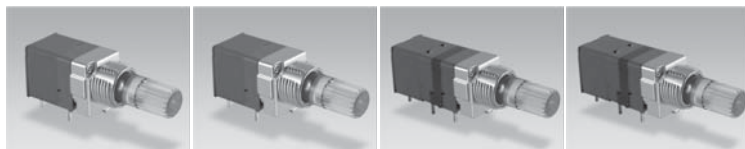
9mm Size Metal Shaft, Multi-Ganged Potentiometers

Page



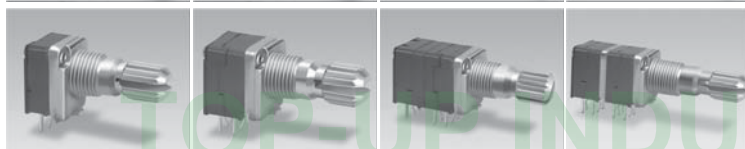
With Insulated Shaft

51

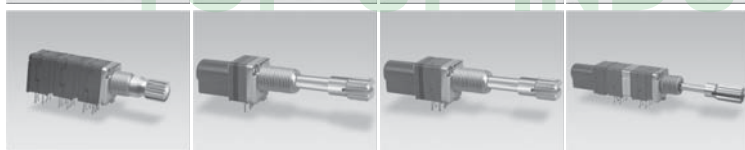


With Luminous Shaft

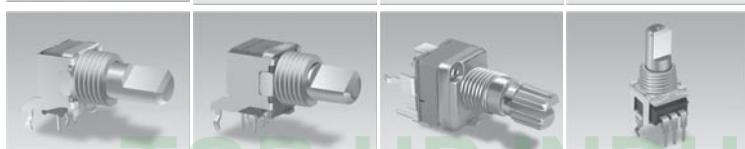
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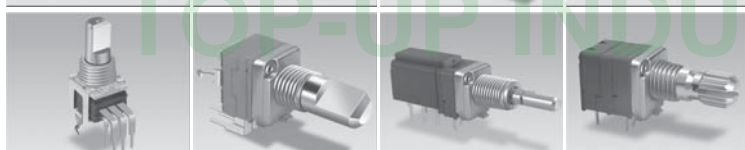
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54



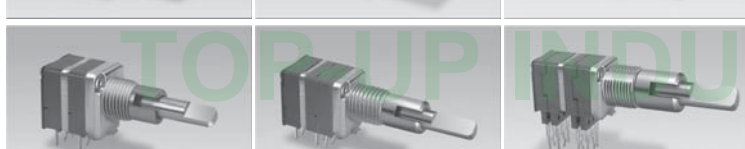
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56



57

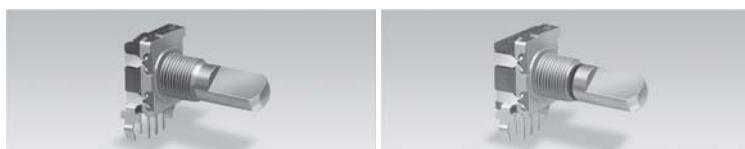


58



59

11mm Size Metal Shaft Potentiometers



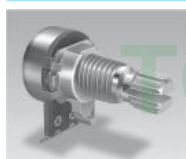
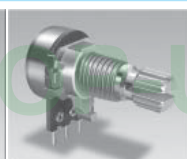
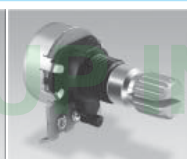
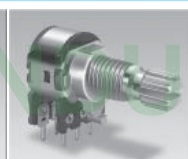
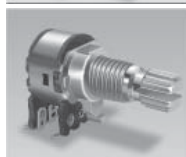
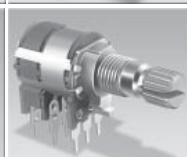


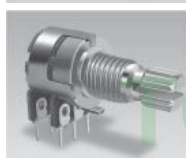
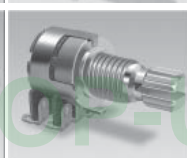
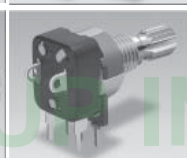
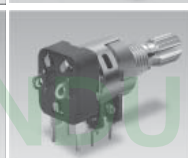
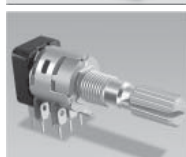

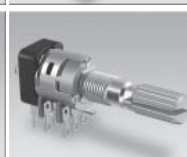

61






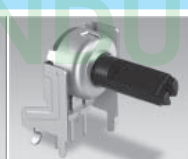
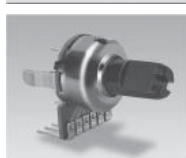

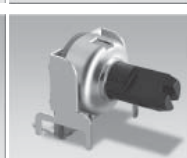






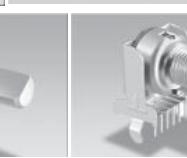


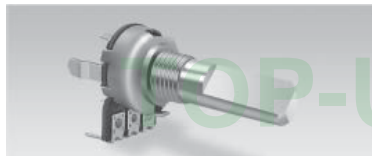
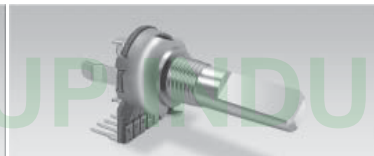
62

12mm Size Metal Shaft Potentiometers


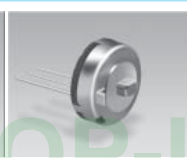


Page

				65
				66
				67
				68

12mm Size Potentiometers

				72
				73
				74
				75
				76

13mm Size Long Life potentiometer

				78
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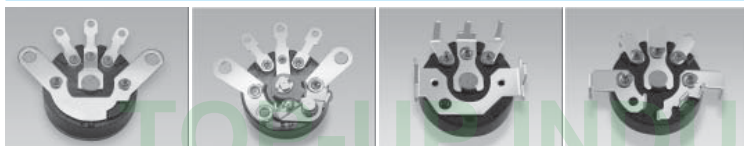
10mm Size Molded Case Potentiometers

Page

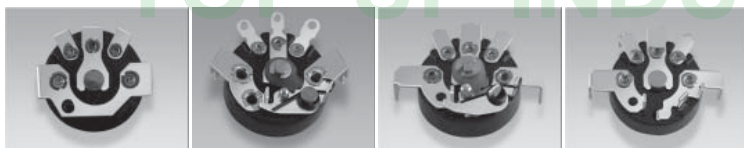


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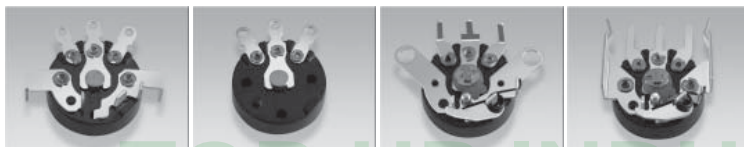
12mm Size Molded Case Potentiometers



82



83



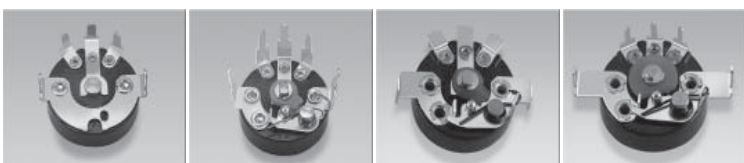
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12, 16mm Size Molded Case Potentiometers

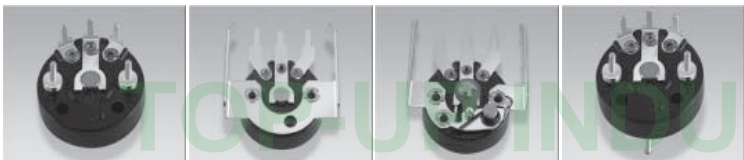


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16mm Size Molded Case Potentiometers

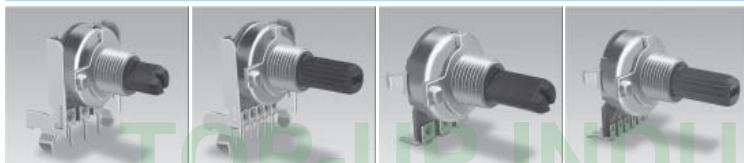


86



87

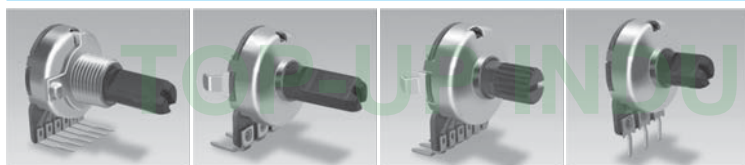
16mm Size Insulated Shaft Potentiometers



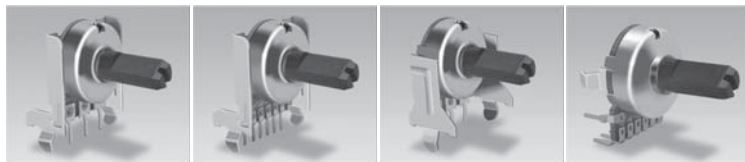
91

16mm Size Insulated Shaft Potentiometers

Page

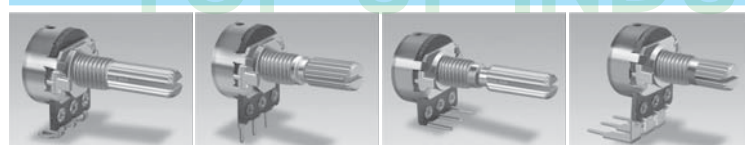


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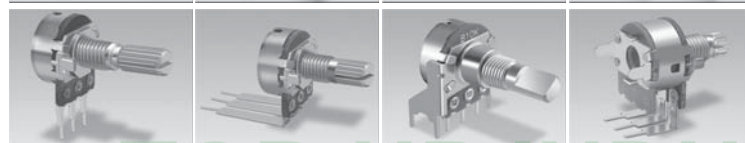


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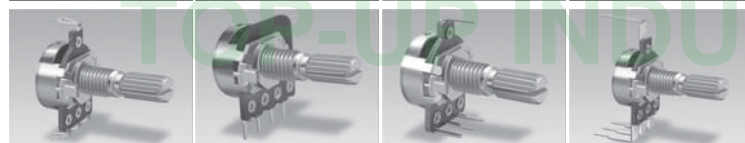
16mm Size Potentiometers



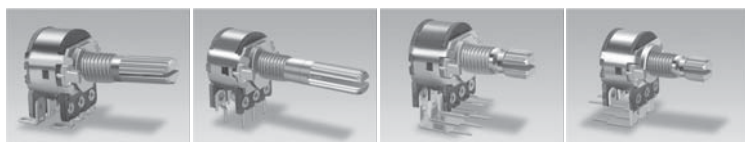
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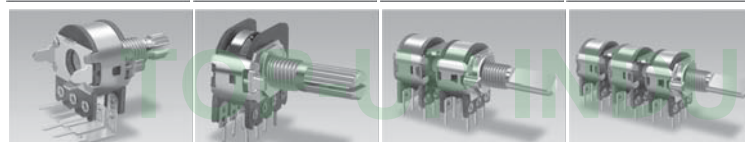
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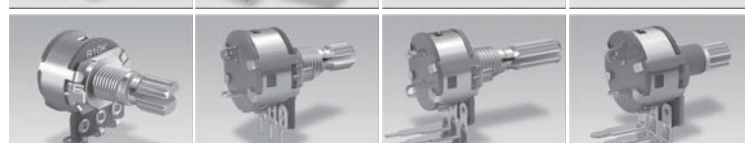
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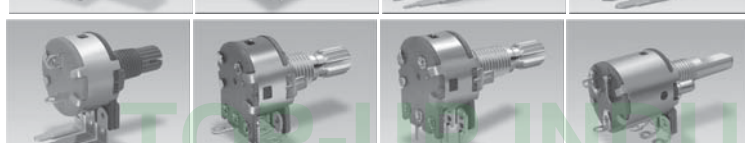
102



103



104



105



106



107

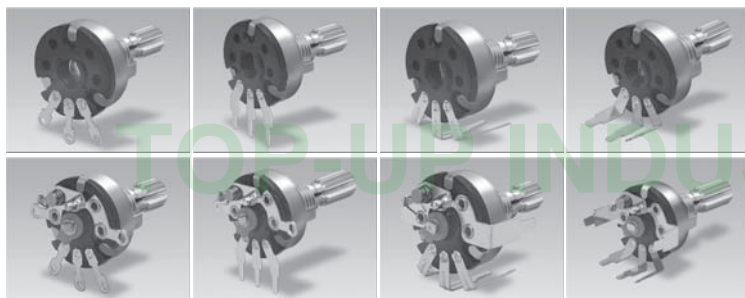
16mm Size Potentiometers

Page



108

17mm Size Metal Shaft Potentiometers



112

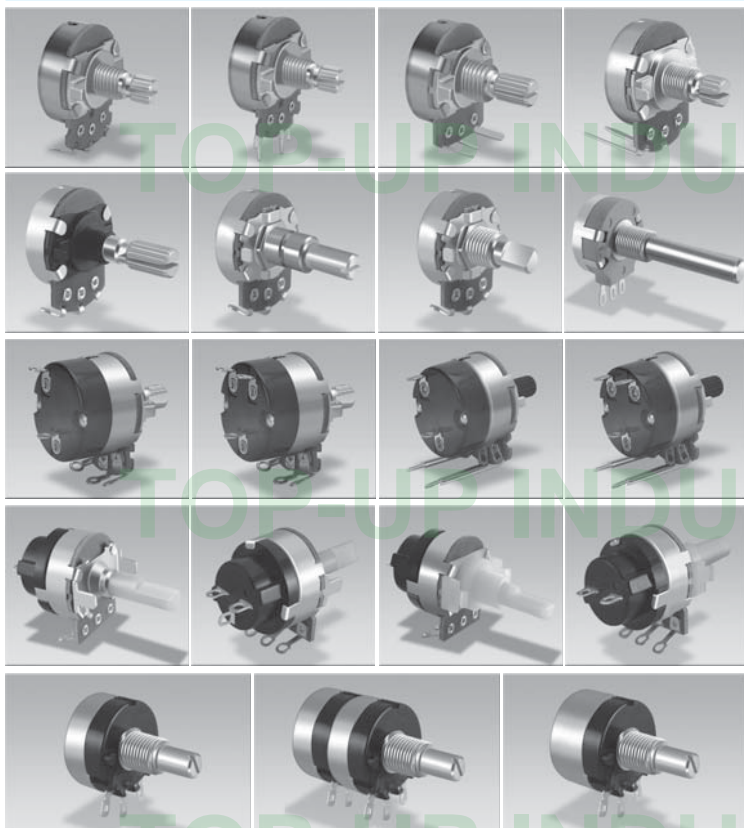
113

20mm & 22mm Size Potentiometers



117

24mm Size Potentiometers



118

119

120

121

122

24mm Size Potentiometers

Page



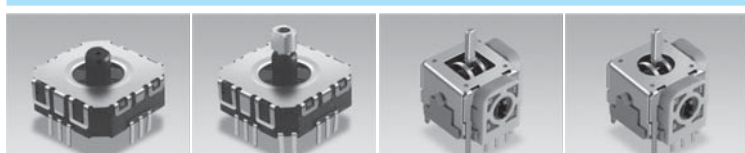
123

27mm Size Metal Shaft Potentiometers

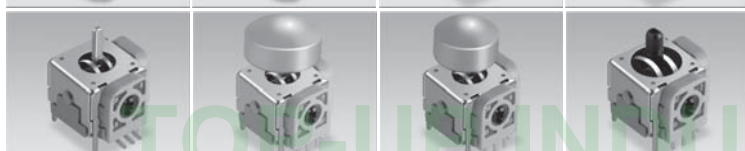


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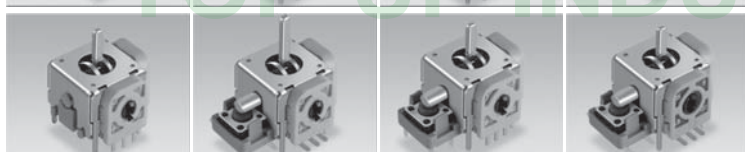
Stick Controller



128



129

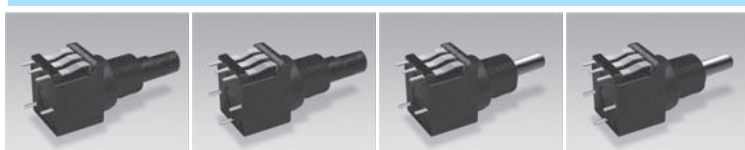


130



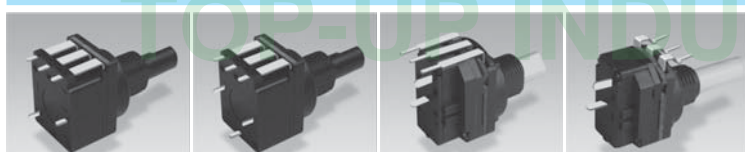
131

12mm Size Dimmer SW. Potentiometers



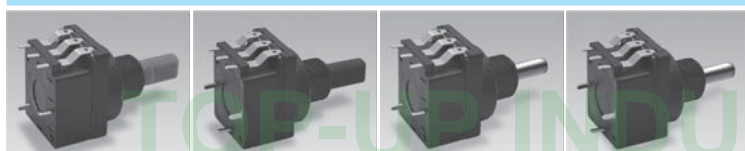
135

16mm Size Dimmer SW. Potentiometers



136

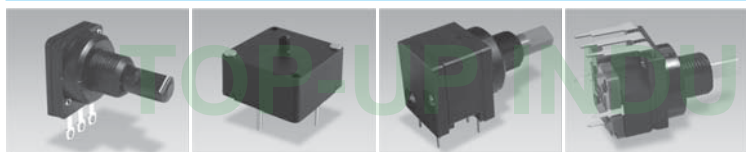
17mm Size Dimmer SW. Potentiometers



137

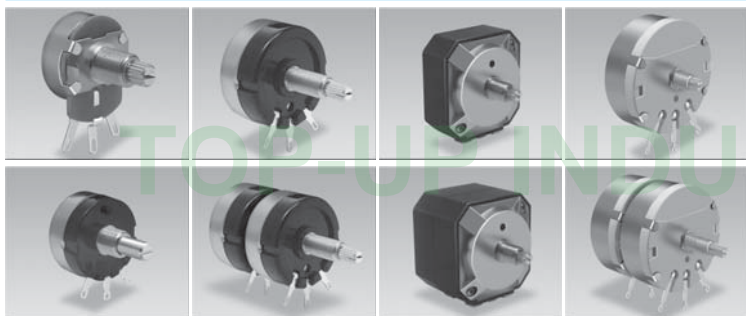
17mm Size Dimmer SW. Potentiometers

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)

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

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

5. Shaft Length

L	Type of Shaft
1	
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

Single shaft, single unit	Single shaft, single unit (with tap)	Single shaft, single unit (back-to-back mounting type)
<p>Viewed from mounting side</p>	<p>Viewed from mounting side</p>	<p>Viewed from shaft side</p>
Single shaft, dual unit	Single shaft, dual unit resistance taper JIS C	Single shaft, dual unit (back-to-back mounting type)
<p>Viewed from mounting side</p>	<p>Viewed from mounting side</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 20VDC	50VAC
	Resistance taper	A, B, C, D(JIS)	
	Residual resistance	Nominal total resistance R ≥ 50kΩ 50kΩ > R > 10kΩ 10kΩ ≥ R	Residual resistance 0.1% max. of total resistance 30kΩ max. 20kΩ max.
	Maximum attenuation level	Nominal total resistance R ≥ 100kΩ 100kΩ > R ≥ 50kΩ	Attenuation level 90dB min. 80dB min.
	For volume	50kΩ > R ≥ 10kΩ 10kΩ > R ≥ 5kΩ	70dB min. 60dB min.
Druability	Rotational life	10,000 cycles	

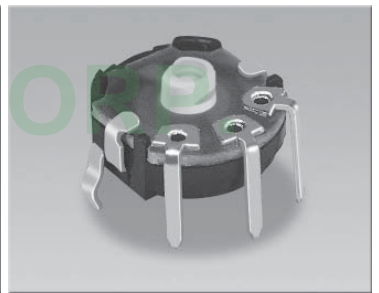
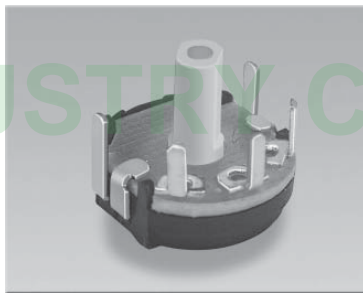
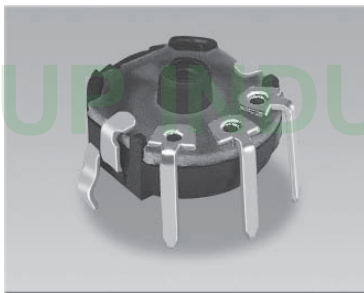
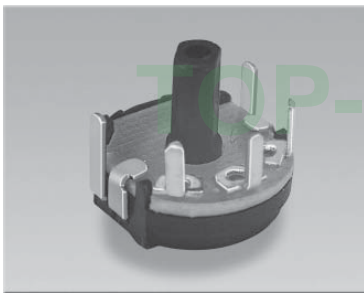
Note:* The 8 mm size single-unit potentiometer with tap does not support DC applications.

8Q1V-C

8Q1V-D

8Q2V-C

8Q2V-D

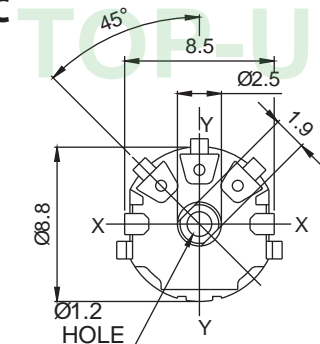


Outline Drawing

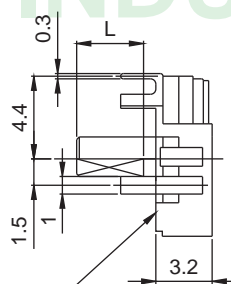
Features individual specifications

8Q1V-C

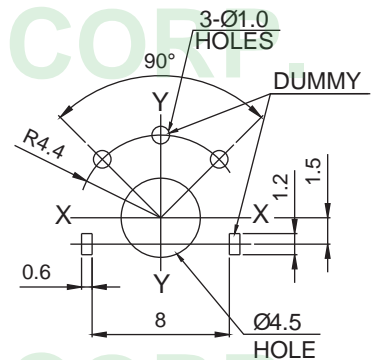
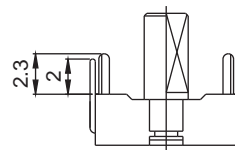
8Q2V-C



SHAFT SHOWN IN FULL C. C. W POSITION



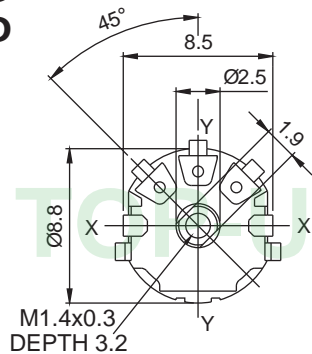
MOUNTING SURFACE



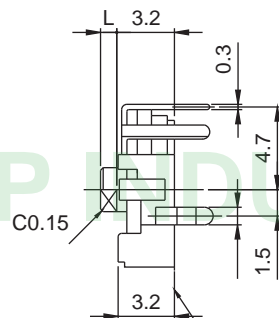
P.W.B MOUNTING DETAIL

8Q1V-D

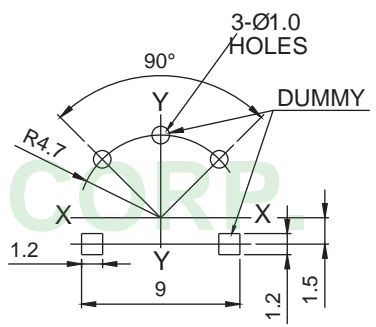
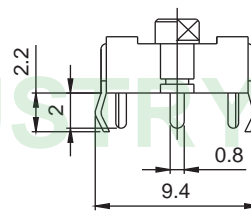
8Q2V-D



SHAFT SHOWN IN FULL C. C. W POSITION



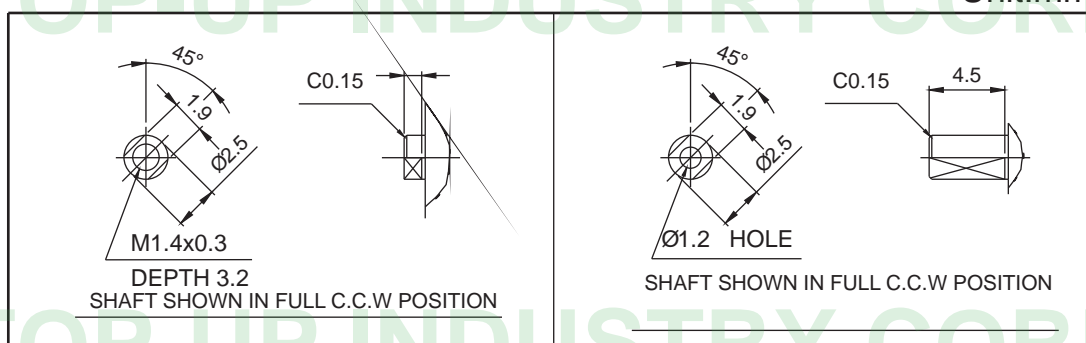
MOUNTING SURFACE



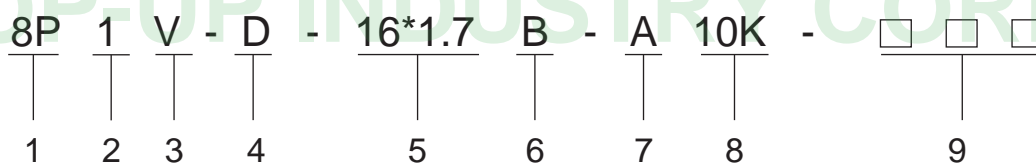
P.W.B MOUNTING DETAIL

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

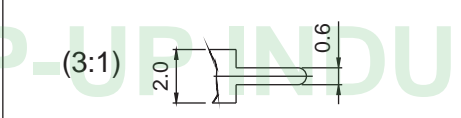
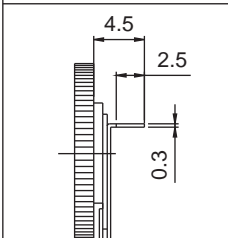
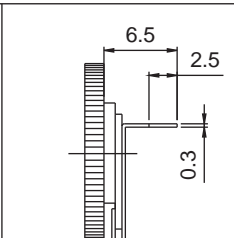
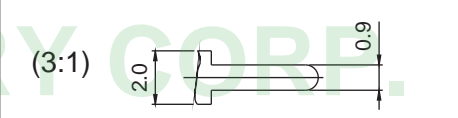
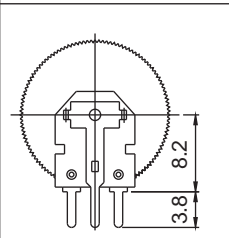
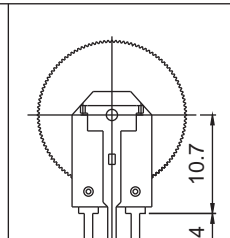
1 —Single Unit

2 —Dual Unit

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

4. Type of Terminal (See Drawing 1)

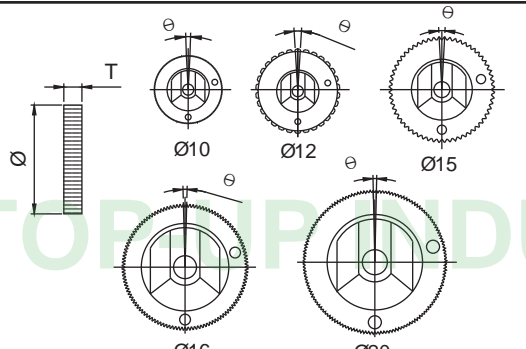
(Drawing 1)

Vertical	P.C.B Type	
	D	D1
		
		
Horizontal	P.C.B Type	
	B	B1
		
		

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

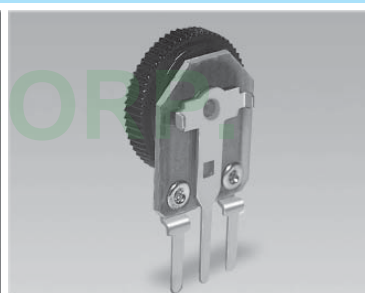
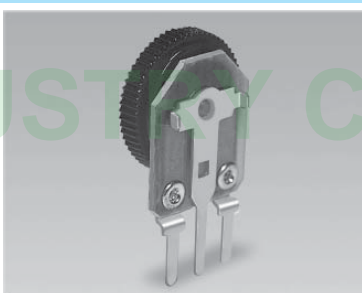
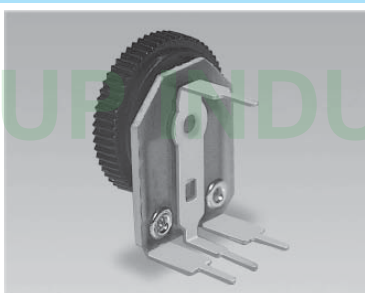
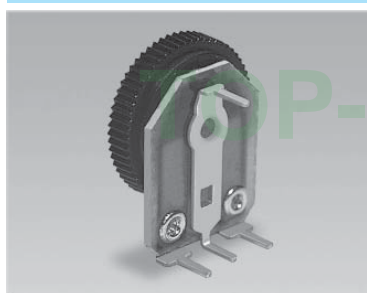
9. Serial No.

8P1V-D

8P1V-D1

8P1H-B

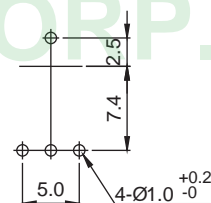
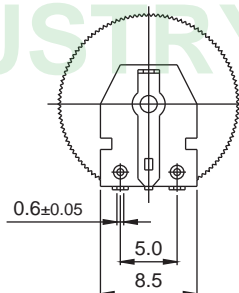
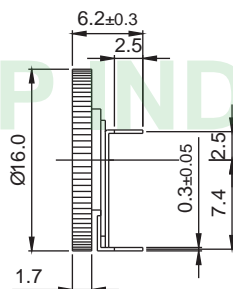
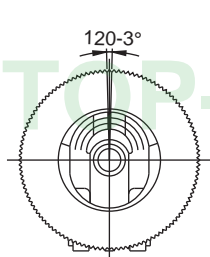
8P1H-B1



Outline Drawing

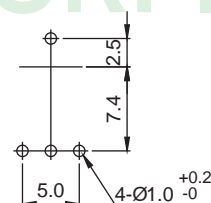
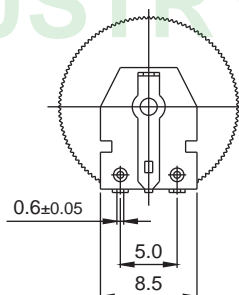
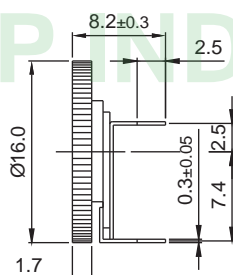
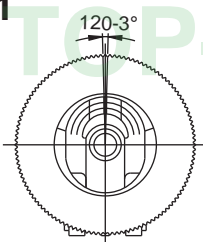
Features individual specifications

8P1V-D



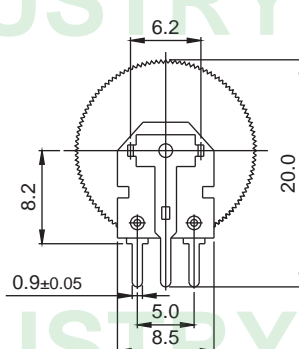
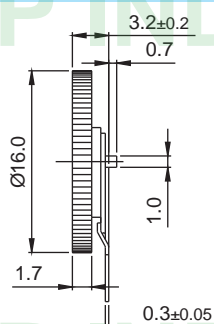
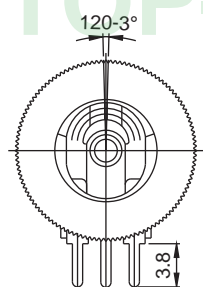
P.C.B MOUNTING DETAIL

8P1V-D1



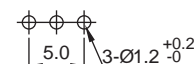
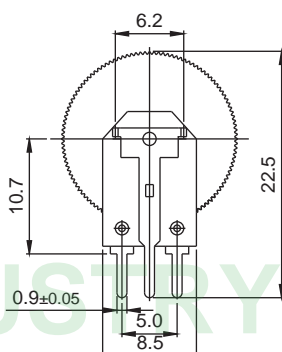
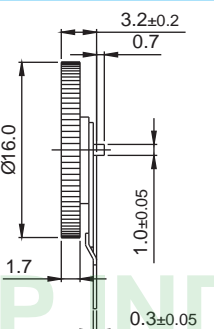
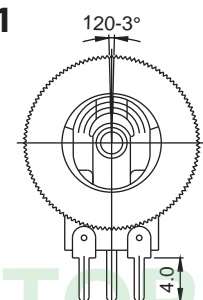
P.C.B MOUNTING DETAIL

8P1H-B



P.C.B MOUNTING DETAIL

8P1H-B1



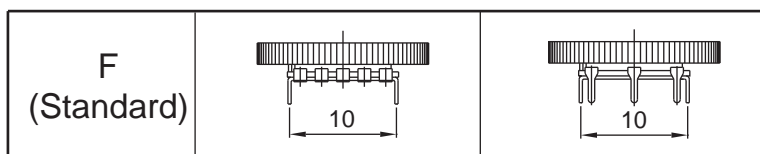
P.C.B MOUNTING DETAIL

6P , 10P Series Code Explanation

10P 1 S V F - D - □ 16*2 Y - A 10K - □ □ □

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

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



6. 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.

7. Color of Shaft

Blank-Black (Standard Type)

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

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

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

9. Axis Teeth Angle (See Drawing 2-2)

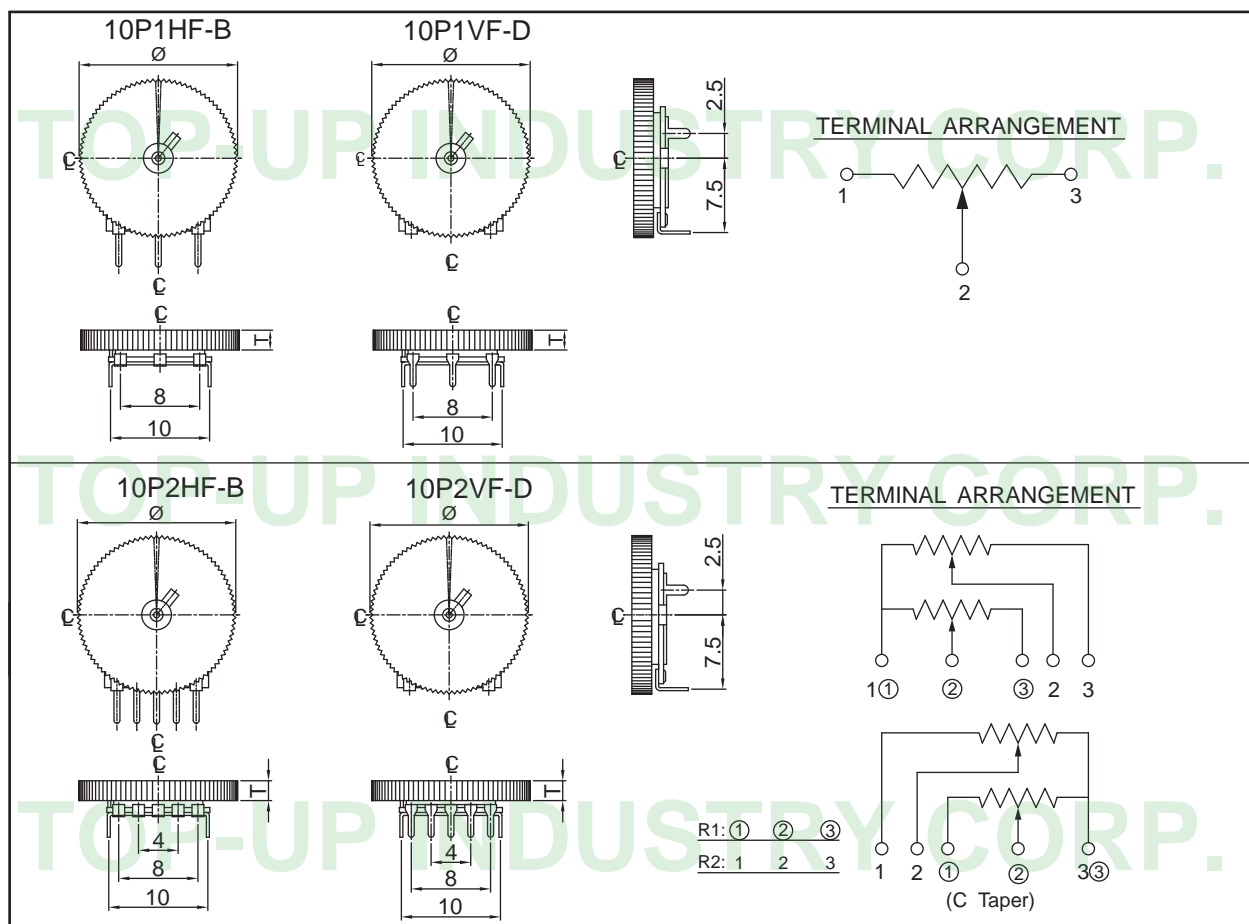
Code	Y	X	Z
θ	72-5°	90-4°	30-6°

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

11. Resistance Value

12. 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:

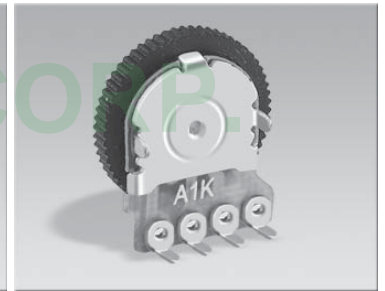
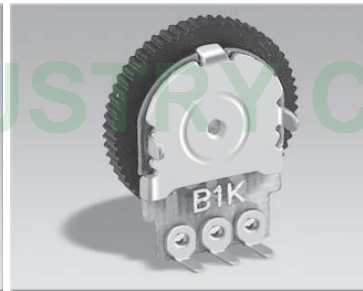
Rotational life	10,000 cycles
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6P2HF-B

6P2HF-B(1)

6P2VF-D

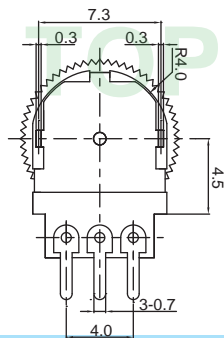
6P2VF-D(1)



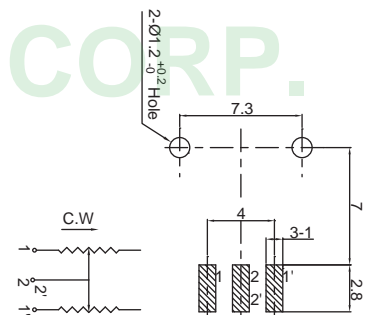
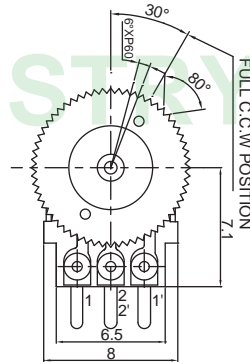
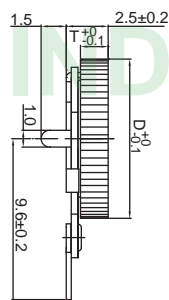
Outline Drawing

Features individual specifications

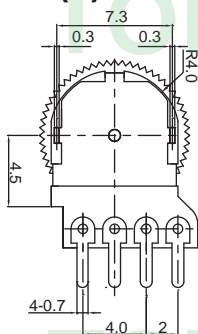
6P2HF-B



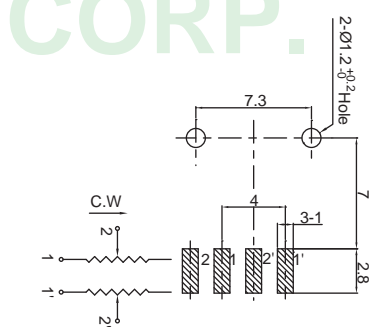
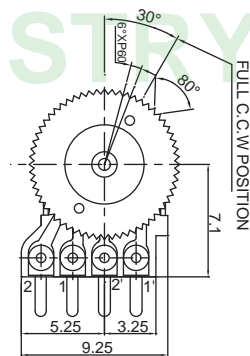
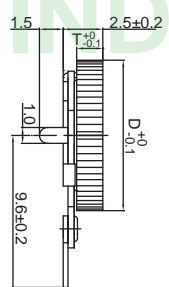
T	1.4	1.65
D	10.3	9.5



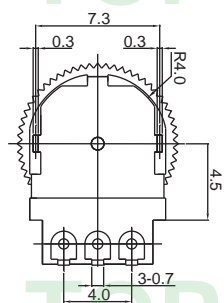
6P2HF-B(1)



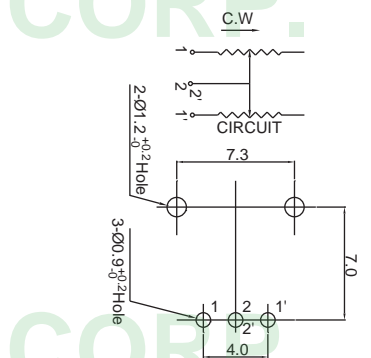
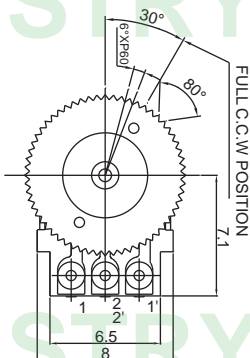
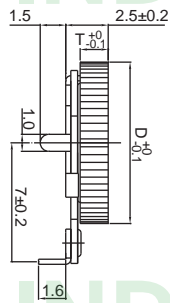
T	1.4	1.65
D	10.3	9.5



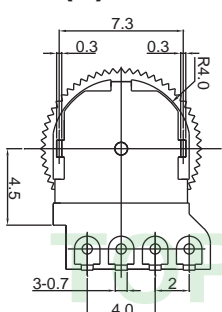
6P2VF-D



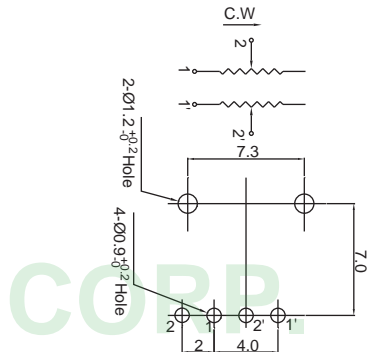
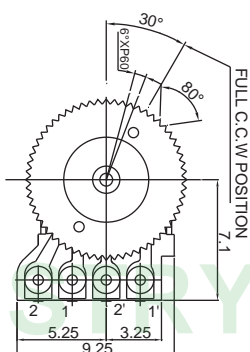
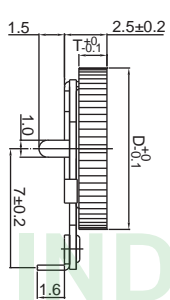
T	1.4	1.65
D	10.3	9.5



6P2VF-D(1)



T	1.4	1.65
D	10.3	9.5

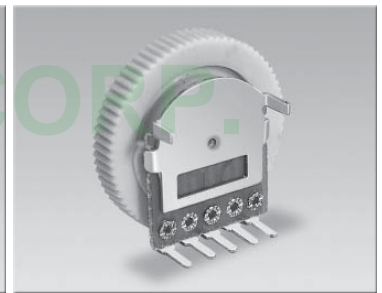
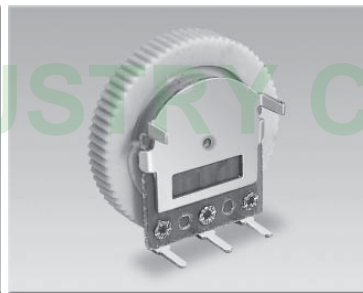
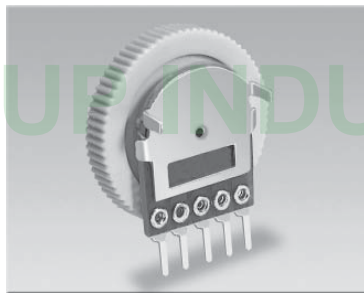
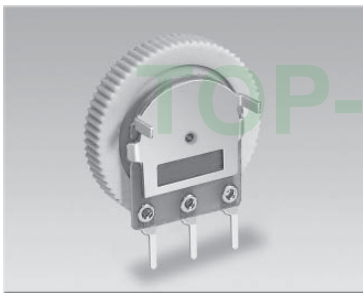


10P1HF-B

10P2HF-B

10P1VF-D

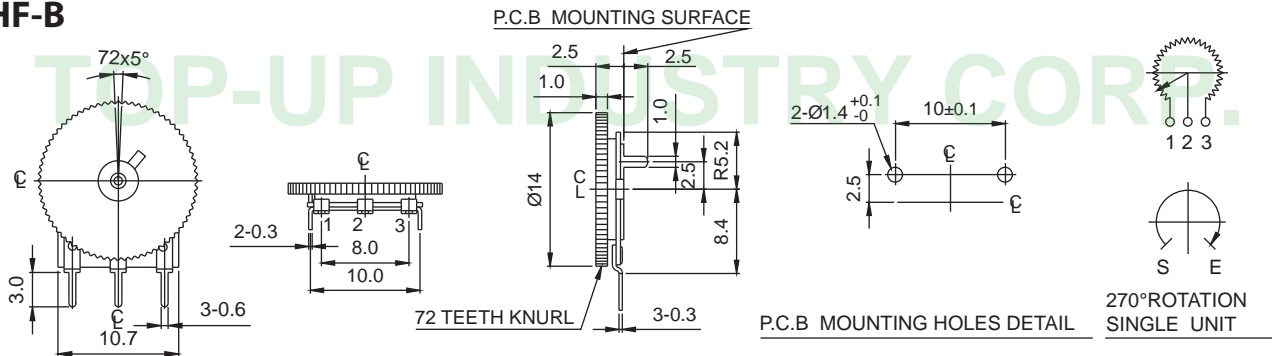
10P2VF-D-14*1Y



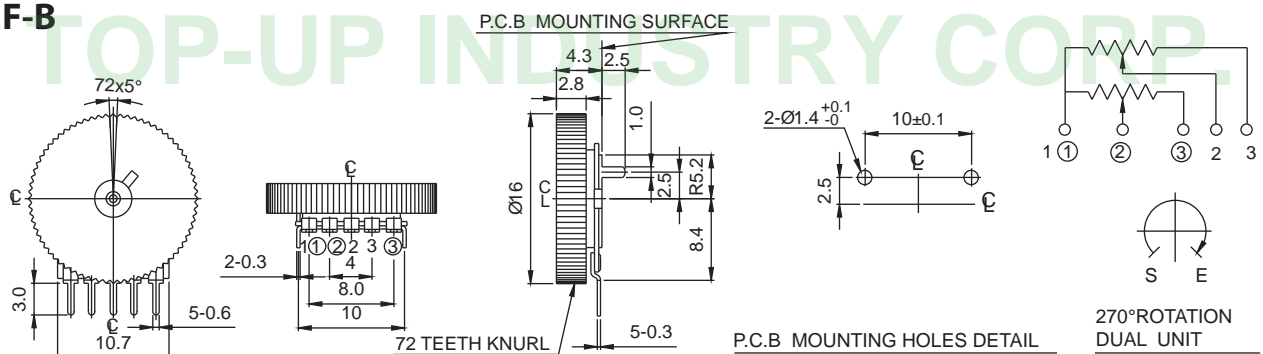
Outline Drawing

Features individual specifications

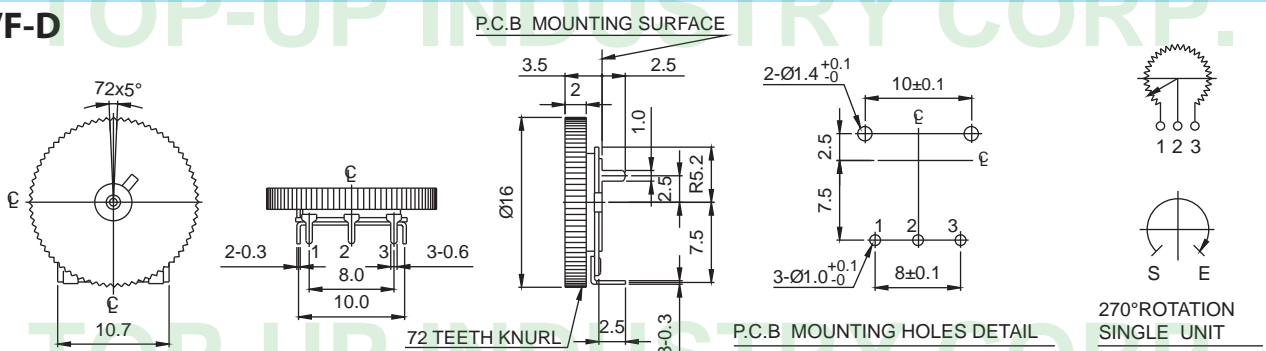
10P1HF-B



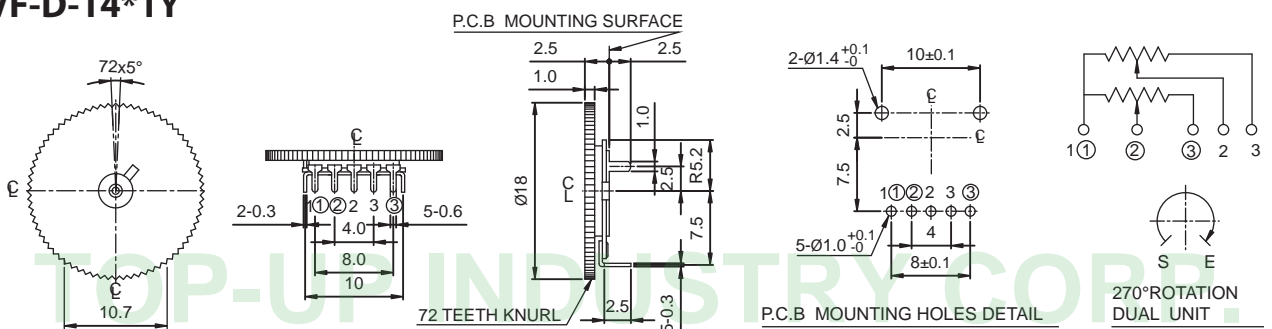
10P2HF-B



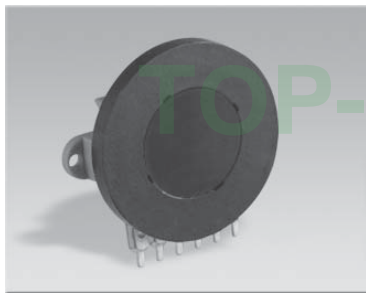
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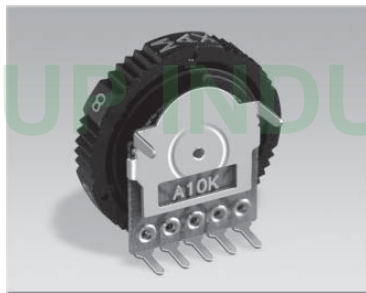
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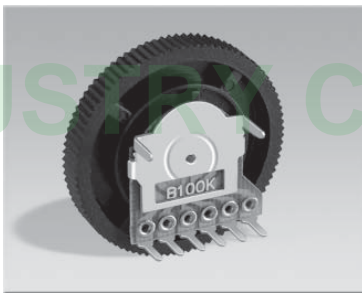
10P2SHF-B



10P2VF-D-16*2.8Z



10P2VF-D16



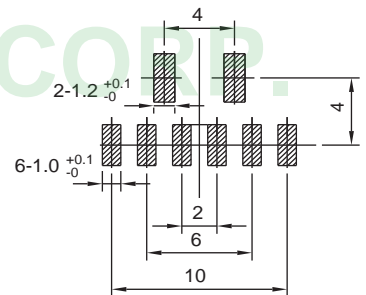
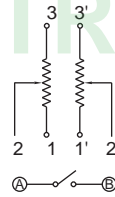
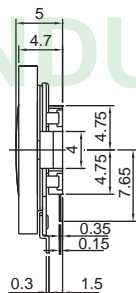
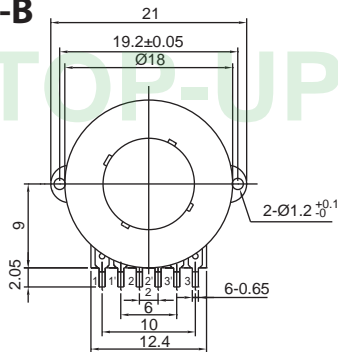
10P2SVF-D



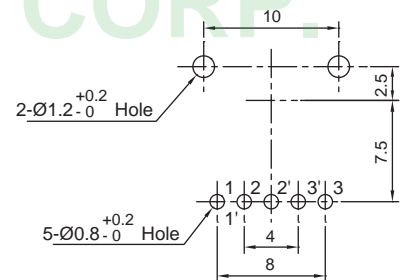
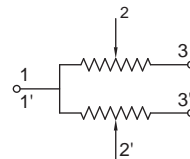
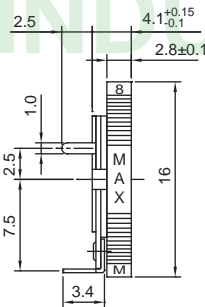
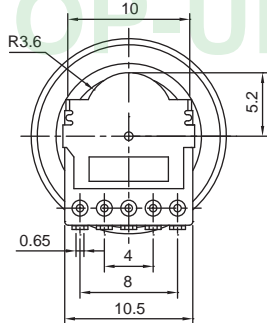
Outline Drawing

Features individual specifications

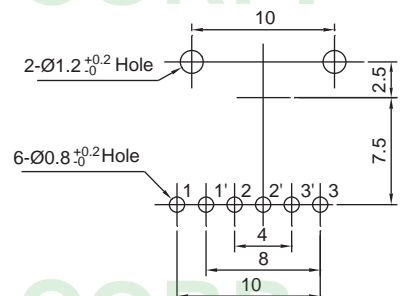
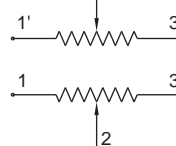
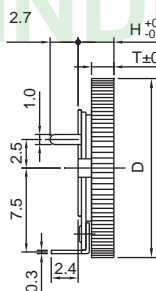
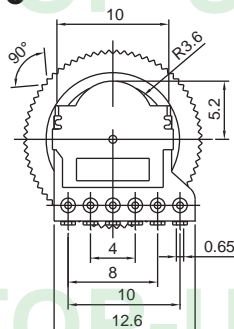
10P2SHF-B



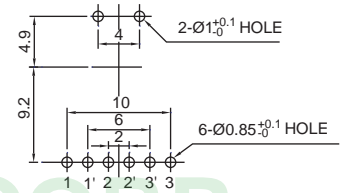
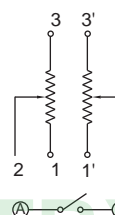
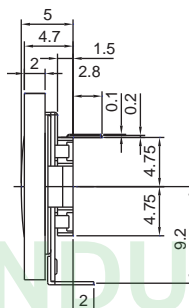
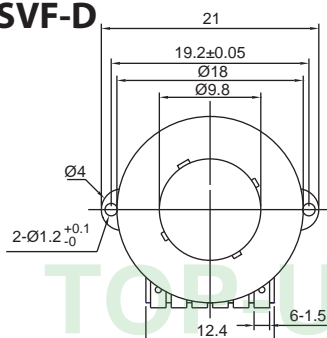
10P2VF-D-16*2.8Z



10P2VF-D16



10P2SVF-D



9P Series Code Explanation

9PA 1 H B - B X - 20 F - A 10K - 1C -

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

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

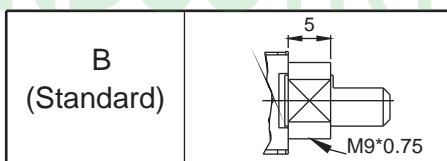
2 — Dual Unit

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

- #### 4. Bushing

With Bushing - B

Without Bushing - Blank



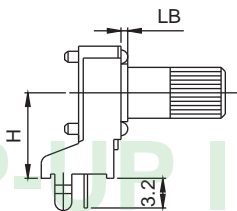
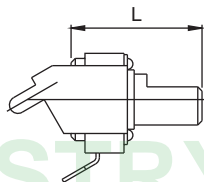
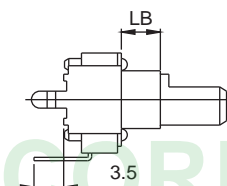
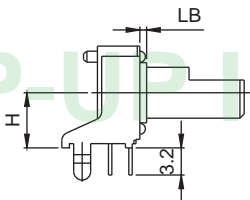
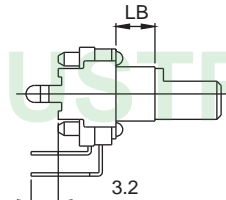
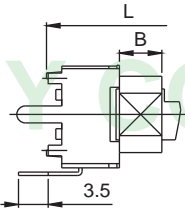
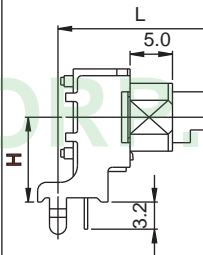


(Drawing 1)

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

9PA	1	H	B	-	B	X	-	20	F	□	-	A	10K	-	1C	-	□	□	□
1	2	3	4		5	6		7	8	9		10	11		12		13		

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.
	$500k\Omega < R \leq 1M\Omega$	1kΩ max.
For volume		
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	

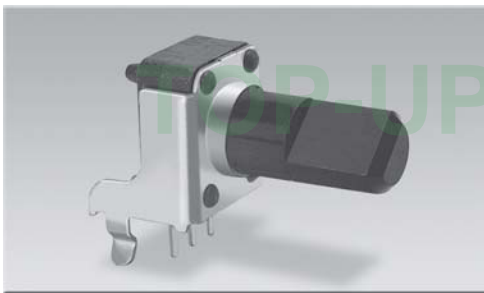
3. Durability

Rotational life	5,000 cycle	10,000 cycles
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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

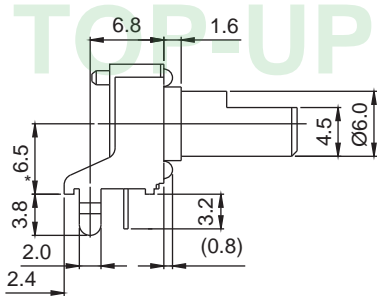


Features individual specifications

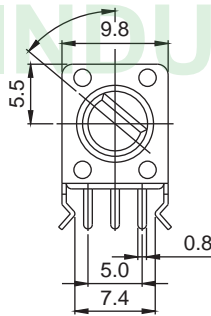
9PC1H-BY



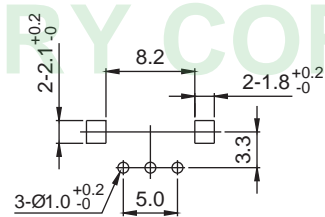
9PB1H-BW



MOUNTING HEIGHTS H=6.5 ONLY



SHAFT SHOWN IN FULL C.C.W POSITION



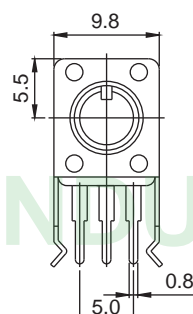
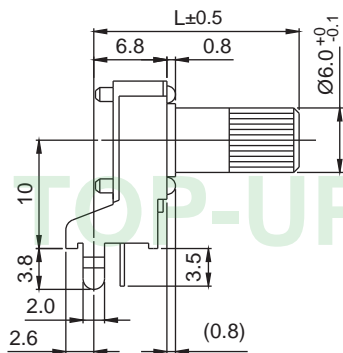
P.C.B MOUNTING HOLES DETAIL

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

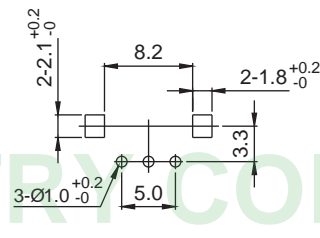


280°ROTATION
SINGLE UNIT

9PC1H-BX



SHAFT SHOWN AT CENTER POSITION



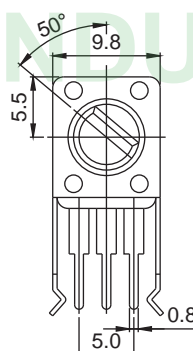
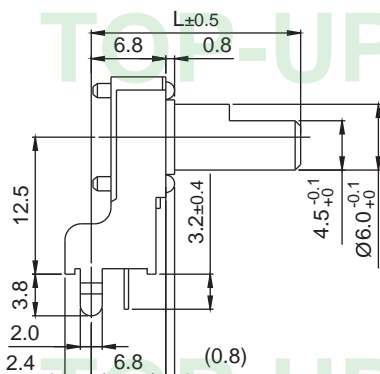
P.C.B MOUNTING HOLES DETAIL

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

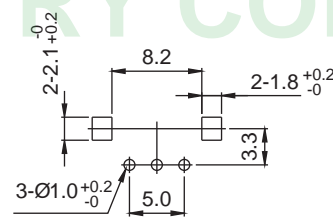


280°ROTATION
SINGLE UNIT

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



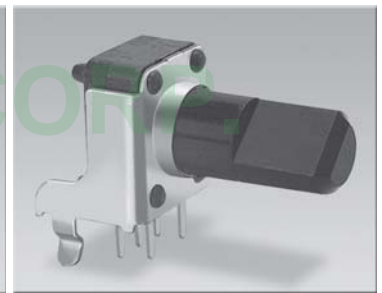
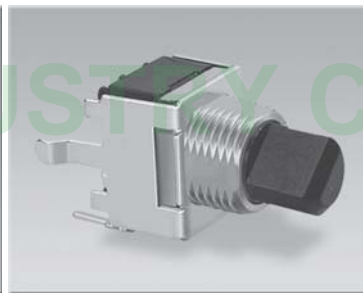
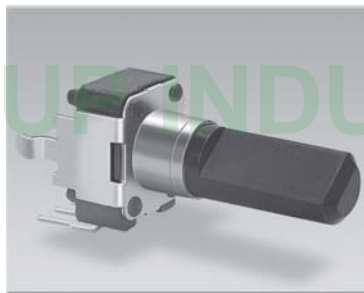
280°ROTATION
SINGLE UNIT

9PA1V-D-□FT

9PA1V-D

9P1VB-D

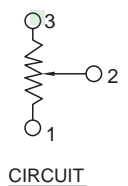
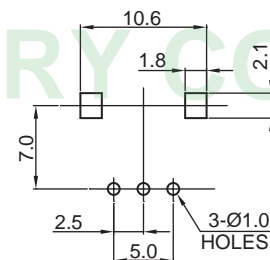
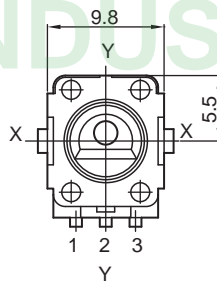
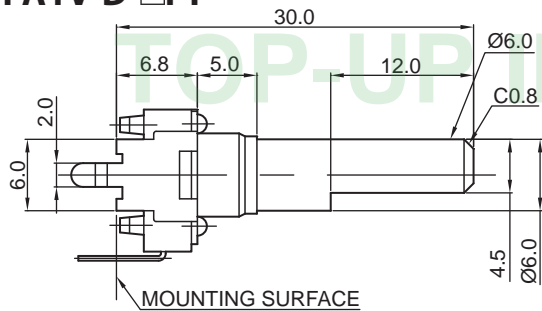
9PB2H-B□



Outline Drawing

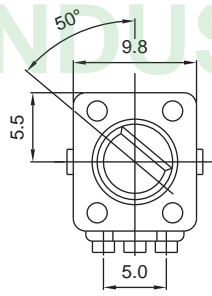
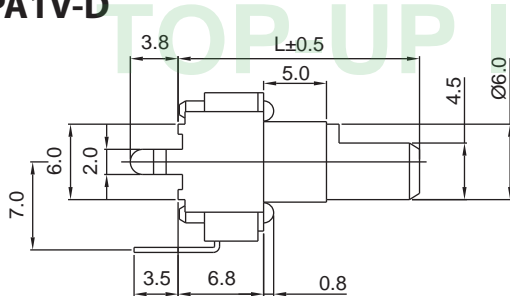
Features individual specifications

9PA1V-D-□FT

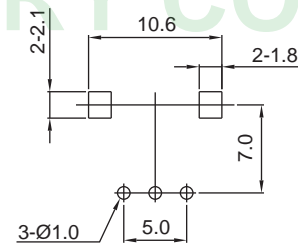


P.C.B MOUNTING HOLES DETAIL

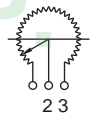
9PA1V-D



SHAFT SHOWN IN FULL C.C.W POSITION

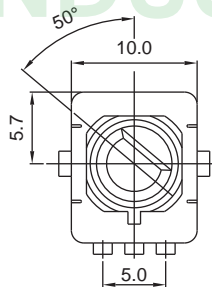
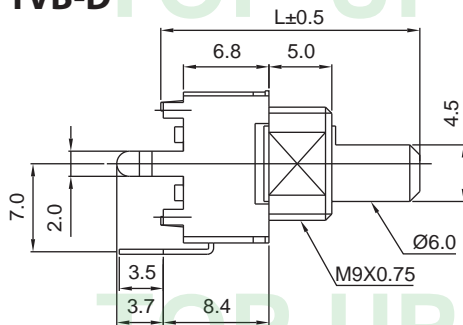


P.C.B MOUNTING HOLES DETAIL

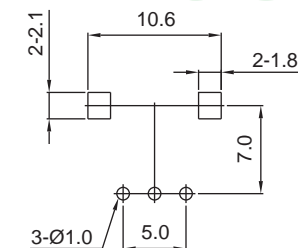


280° ROTATION SINGLE UNIT

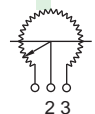
9P1VB-D



SHAFT SHOWN IN FULL C.C.W POSITION

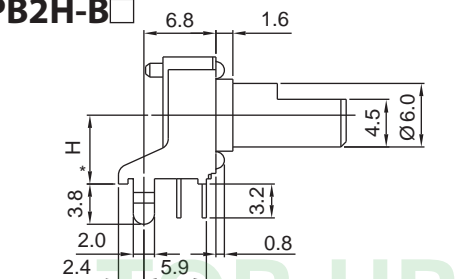


P.C.B MOUNTING HOLES DETAIL



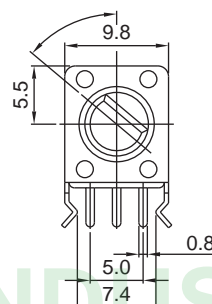
280° ROTATION SINGLE UNIT

9PB2H-B□

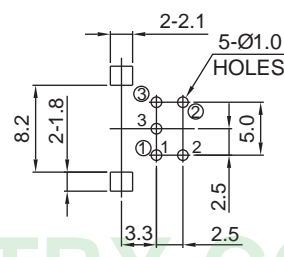


MOUNTING HEIGHTS H=6.5 ONLY

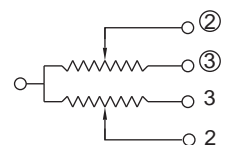
Code	W	X	Y
H	6.5	10	12.5



SHAFT SHOWN IN FULL C.C.W POSITION

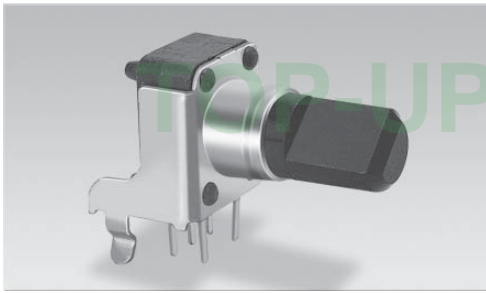


P.C.B MOUNTING HOLES DETAIL



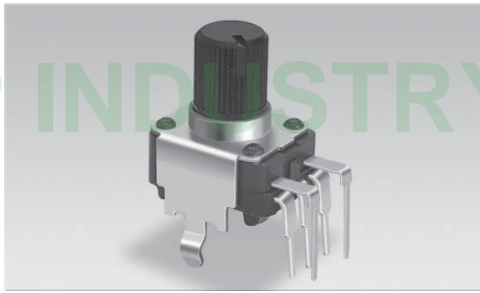
280° ROTATION DUAL UNIT

9PD2H-B□



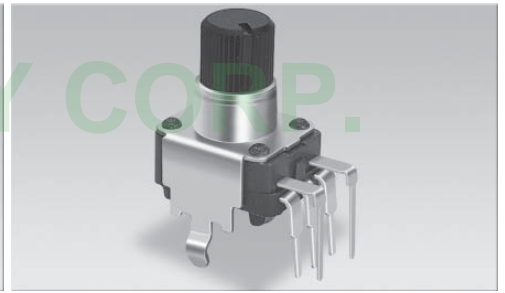
Outline Drawing

9PB2V-D

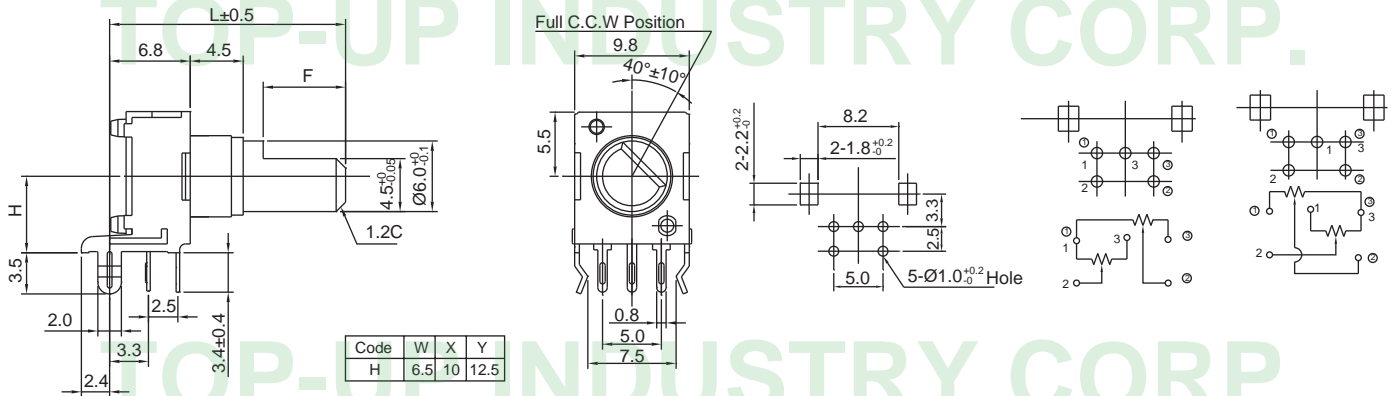


Features individual specifications

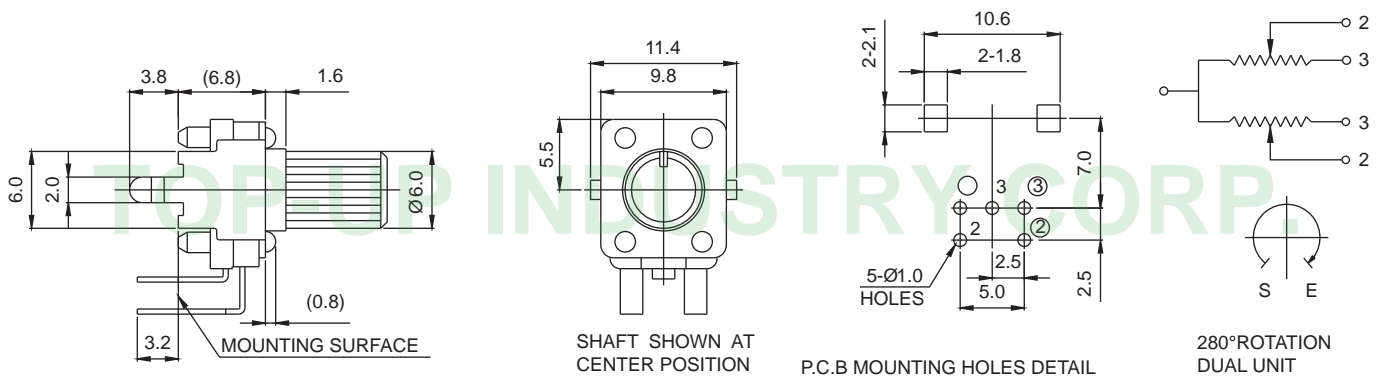
9PA2V-D



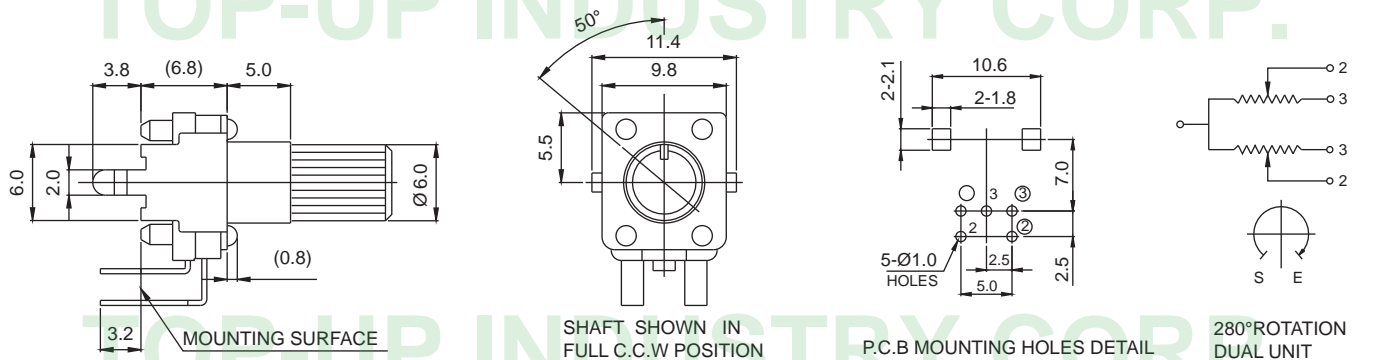
9PD2H-B□



9PB2V-D



9PA2V-D



7PR1VB-D-HF

9PR1VB-D

9PR1VB-D1

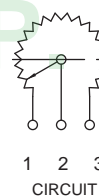
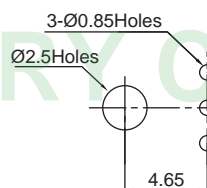
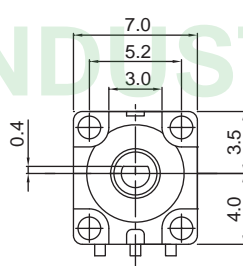
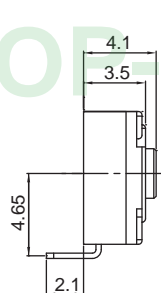
9PM1VF-D



Outline Drawing

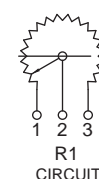
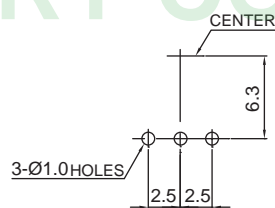
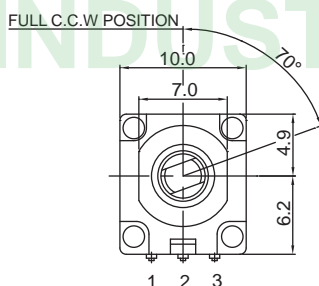
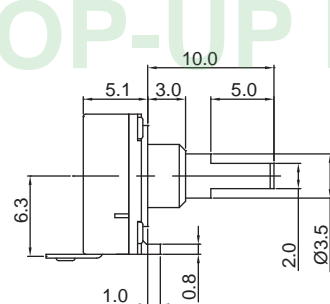
Features individual specifications

7PR1VB-D-HF

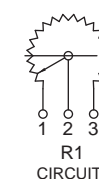
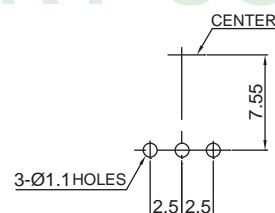
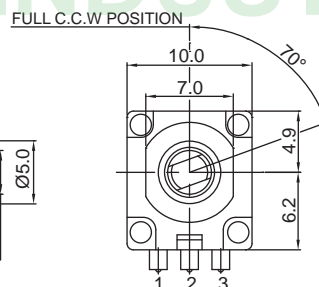
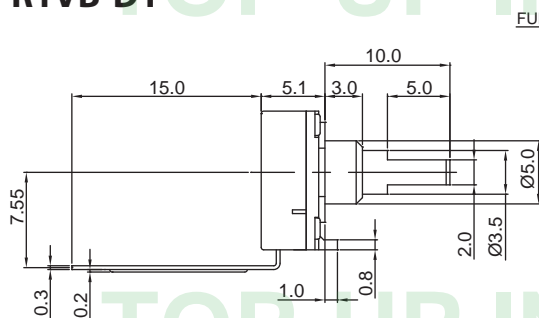


CODE	BLANK	1	2	3
ANGLE	180°	200°	280°	310°

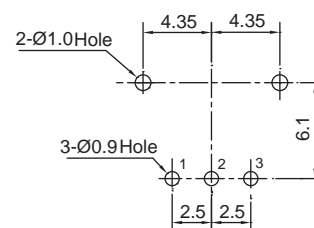
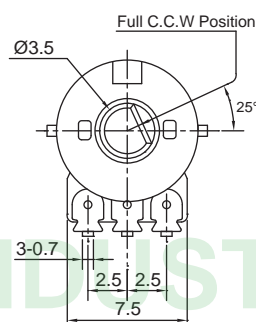
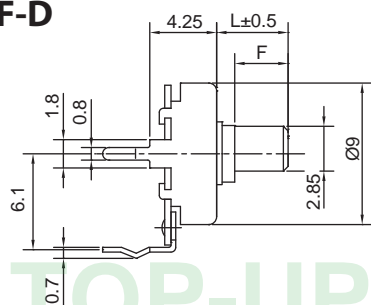
9PR1VB-D



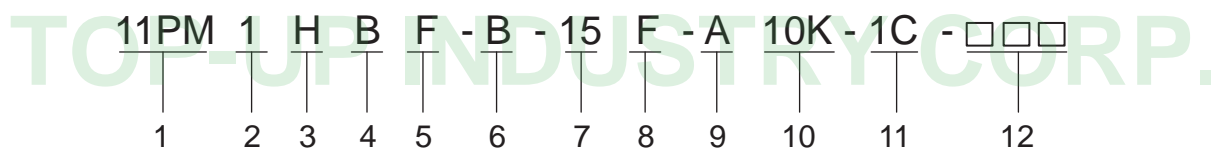
9PR1VB-D1



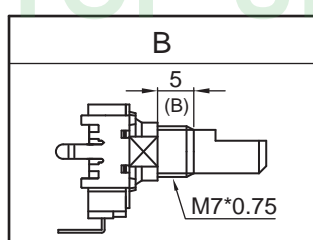
9PM1VF-D



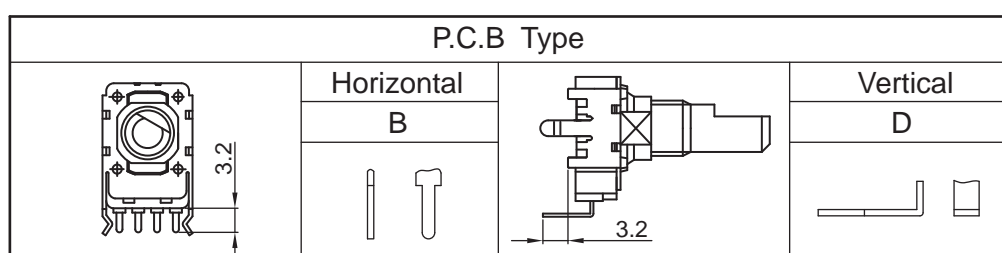
11PM,12PM Series Code Explanation



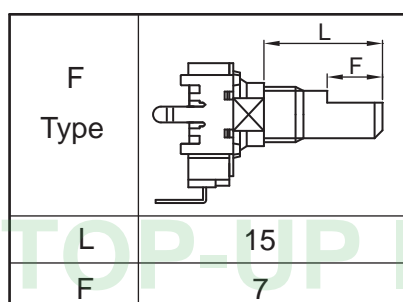
1. Product Lines of 11PM, 12PM (Metal Shaft 11mm, 12mm Size)
2. Number of Unit : 1 – Single Unit 2 – Dual Unit
3. Horizontal (H) Type or Vertical (V) Type
4. Type of Bushing



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

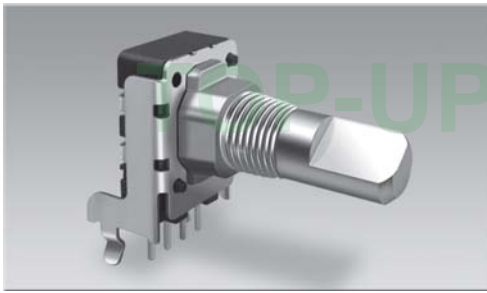


7. Shaft Length "L"
8. Shaft Type



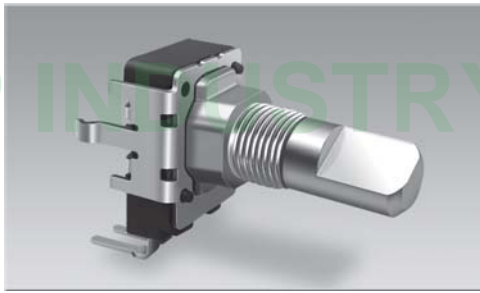
9. Type of Taper
10. Resistance Value
11. Number of clicks
12. Serial No.

11PM1HBF-D



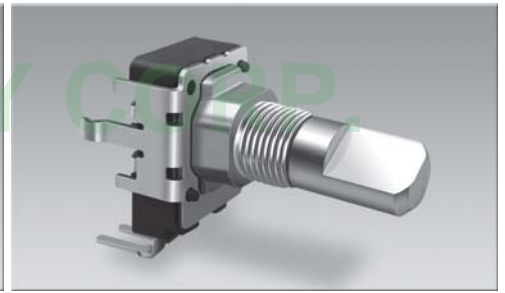
Outline Drawing

11PM1VBF-D

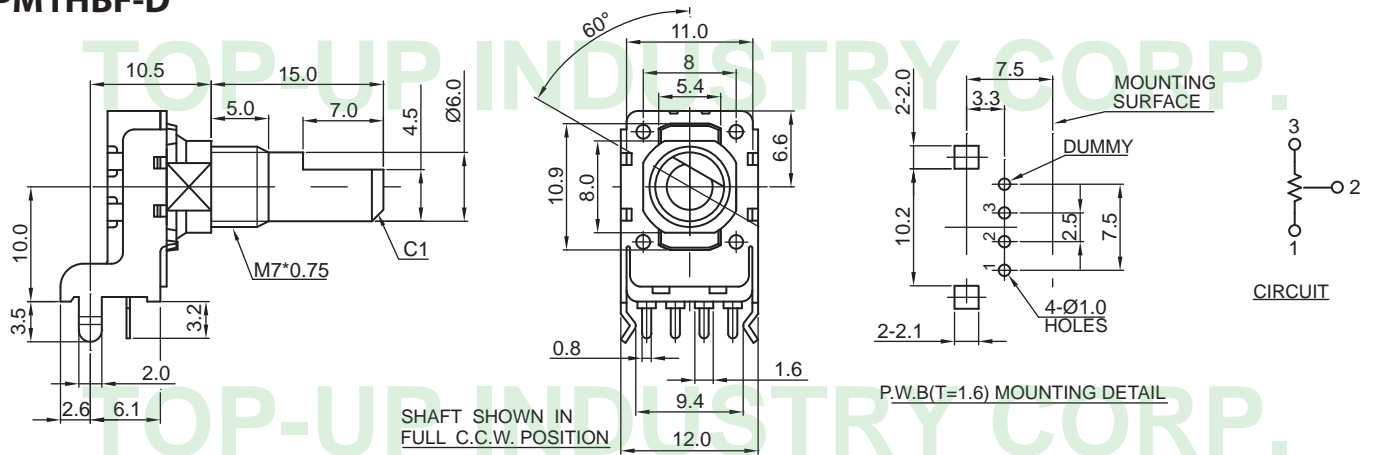


Features individual specifications

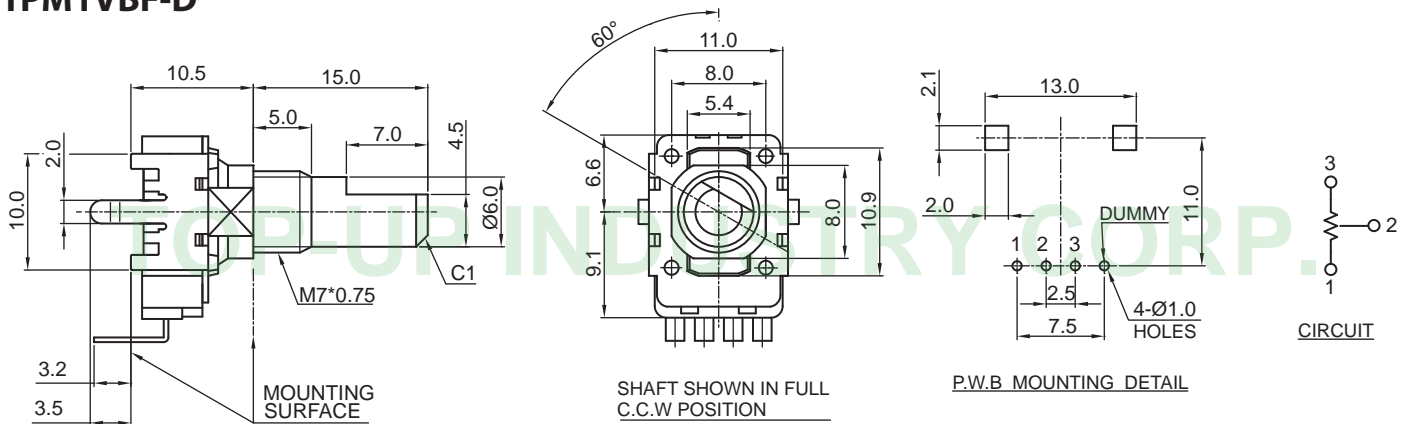
11PM2VBF-D



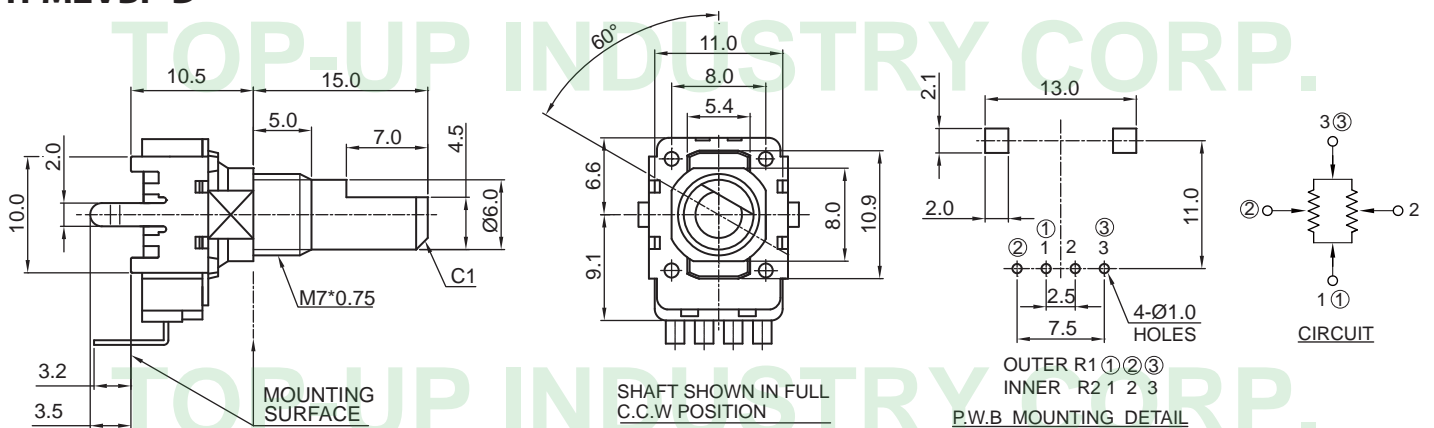
11PM1HBF-D



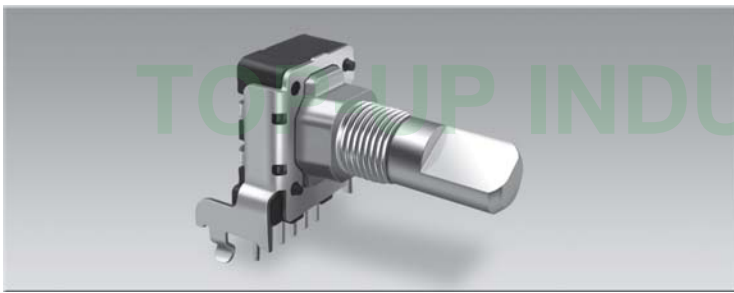
11PM1VBF-D



11PM2VBF-D



12PM2HBF-B



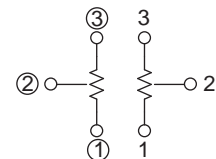
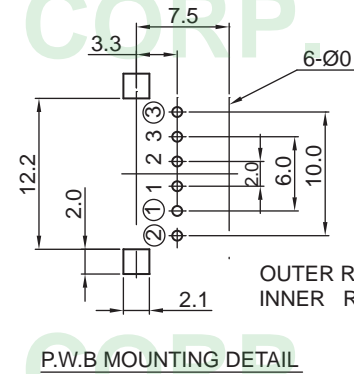
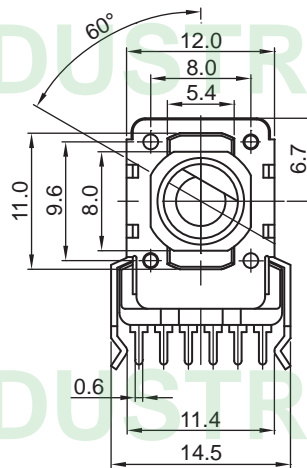
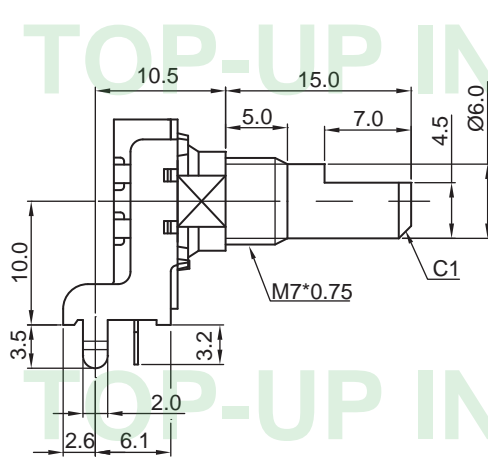
Outline Drawing

12PM2VBF-D



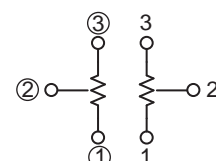
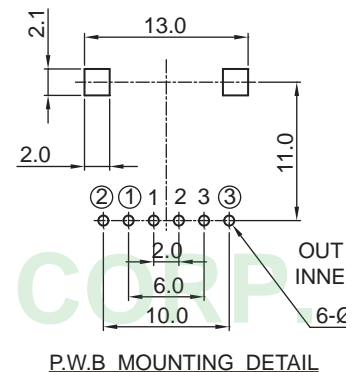
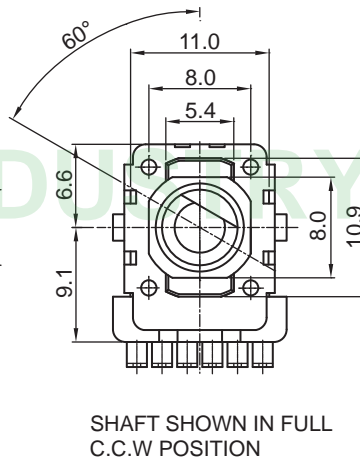
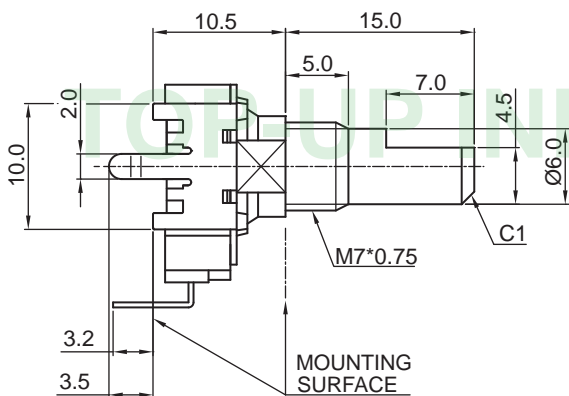
Features individual specifications

12PM2HBF-B



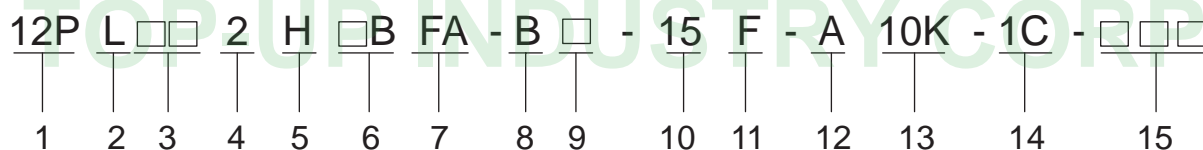
CIRCUIT

12PM2VBF-D



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





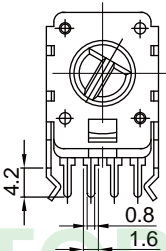
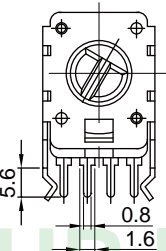
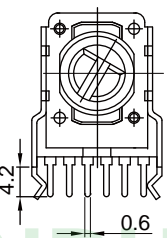
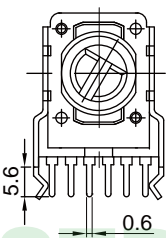
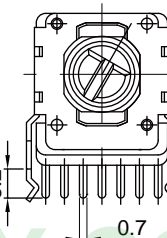
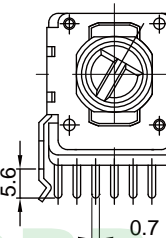
6. Type of Bushing

Without LED	With LED	
B	B	5B

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

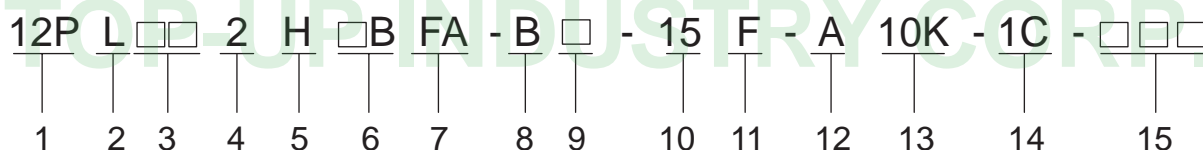
7. Type of Frame "F" (See Drawing 1)

8. Type of Terminal

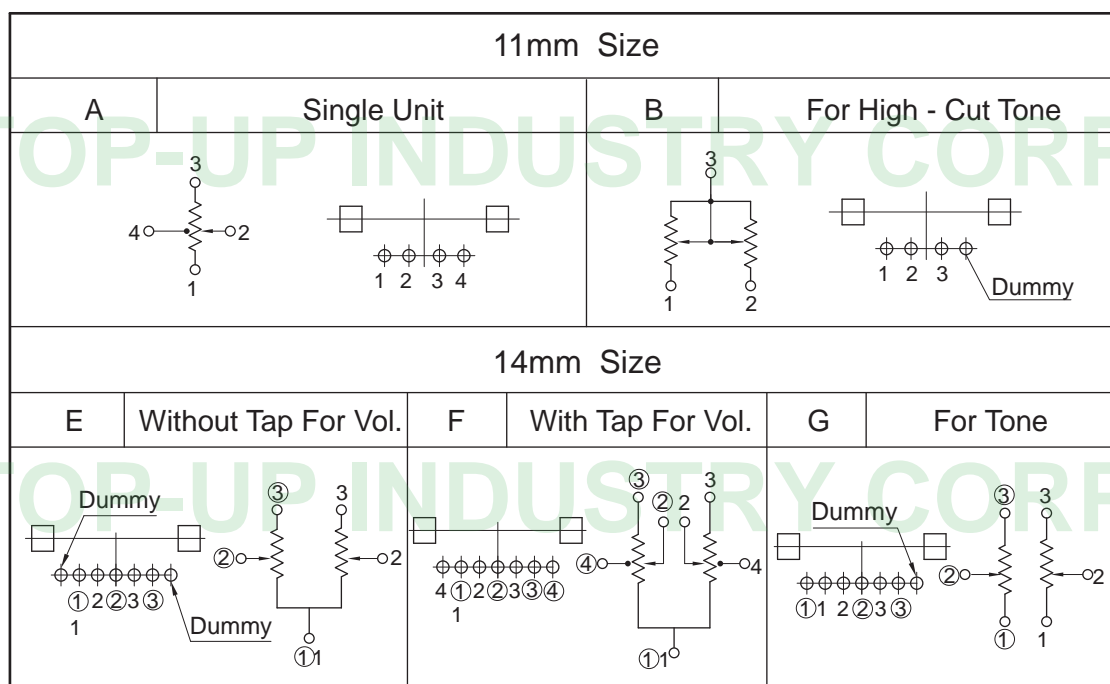
B ,B1 (P.C.B Type)		 		D (P.C.B Type)		 	
11mm Size		12mm Size		14mm Size			
B	B1	B	B1	B	B1		
							

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 22.5

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 hight -cut tone	Dual unit
Total rotational angle	5kΩ ~500kΩ	5kΩ ~500kΩ	5kΩ~500kΩ
Total resistance to larence	±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 Ω max. $10k\Omega < R \leq 50k\Omega$ 30 Ω max. $50k\Omega < R \leq 500k\Omega$ 300 Ω max. 0.1% max. of total resistance	* 2 $5k\Omega < R \leq 50k\Omega$ 100 Ω max. $50k\Omega < R \leq 100k\Omega$ 200 Ω max. $100k\Omega < R \leq 250k\Omega$ 500 Ω max. $250k\Omega < R \leq 500k\Omega$ 1k Ω max.	$R \leq 30k\Omega$ 30 Ω max. $30k\Omega < R \leq 500k\Omega$ 0.1% max. of total resistance
For volume			5 Ω 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 Ω min. at 500V DC	100M Ω 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

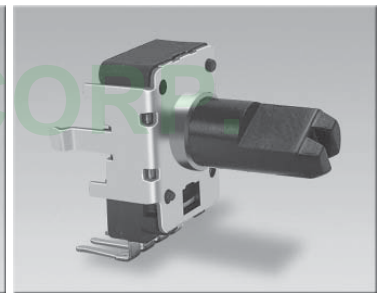
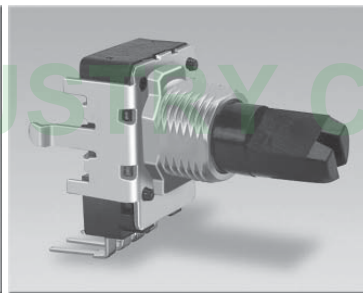
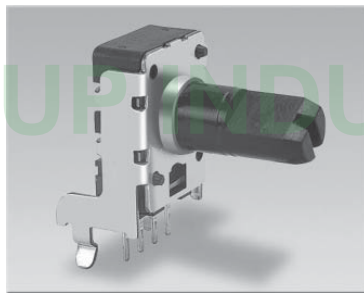
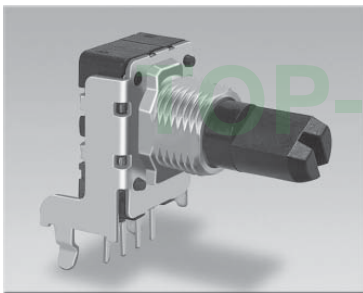
Resistance range	Maximum attenuation level		Insertion loss
	11mm Size	12,14mm Size	11, 12, 14, mm size
$5\Omega < R \leq 10k\Omega$	60dB min.	60dB min.	0.1dB max.
$10k\Omega < R \leq 50k\Omega$	70dB min.	70dB min.	
$50k\Omega < R \leq 100k\Omega$	80dB min.	80dB min.	
$100k\Omega \leq R$	90dB min.	90dB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

11P1HBF-B

11P1HF-B

11P1VBF-D

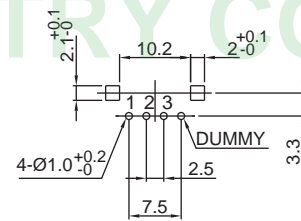
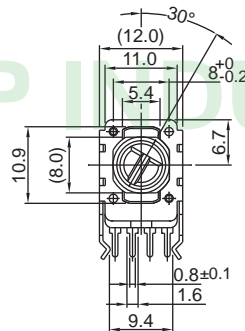
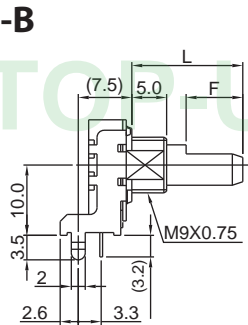
11P1VF-D



Outline Drawing

Features individual specifications

11P1HBF-B

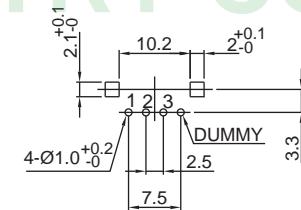
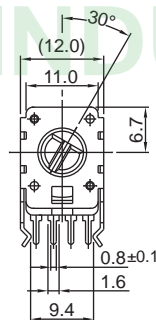
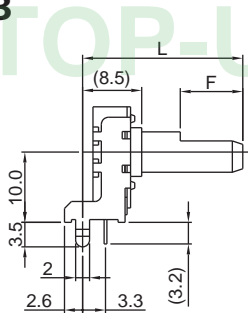


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION
SINGLE UNIT

11P1HF-B

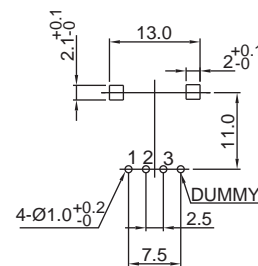
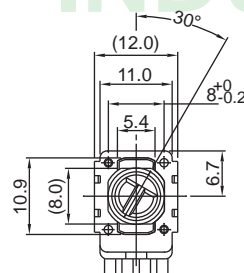
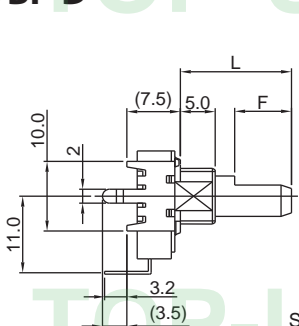


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION
SINGLE UNIT

11P1VBF-D

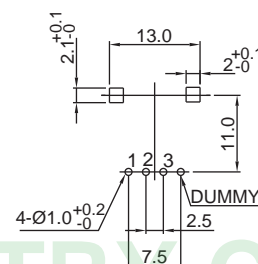
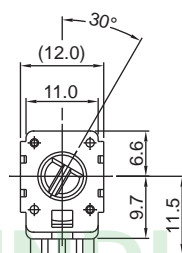
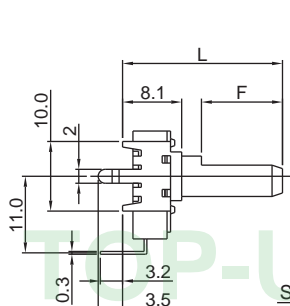


SHAFT SHOWN IN FULL C.C.W POSITION

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

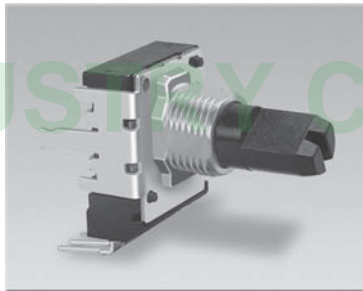
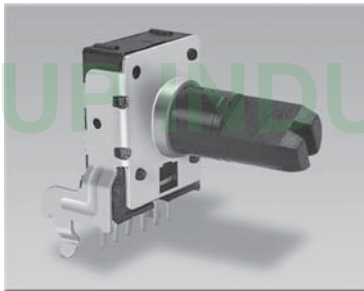
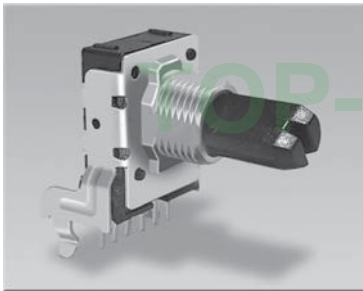
300° ROTATION
SINGLE UNIT

12P2HBF-B

12P2HF-B

12P2VBF-D

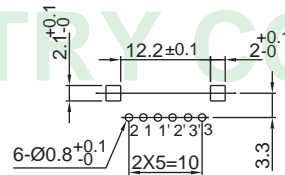
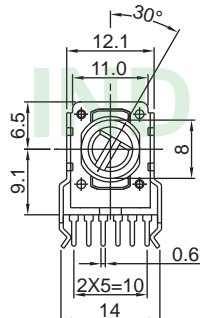
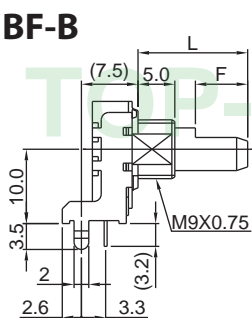
12P2VF-D



Outline Drawing

Features individual specifications

12P2HBF-B

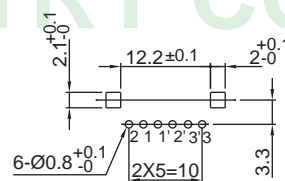
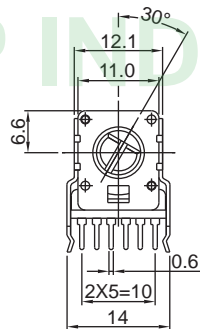
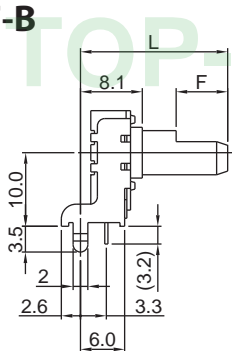


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION
DUAL UNIT

12P2HF-B

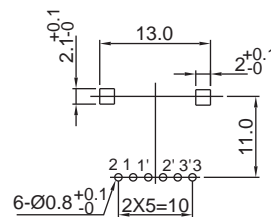
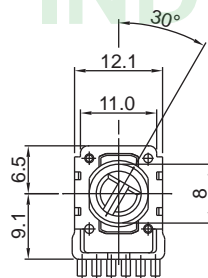
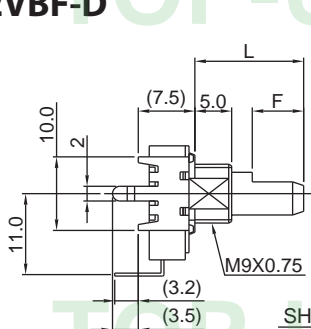


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300° ROTATION
DUAL UNIT

12P2VBF-D

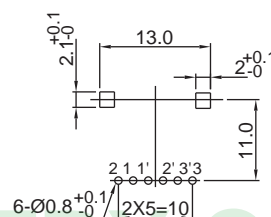
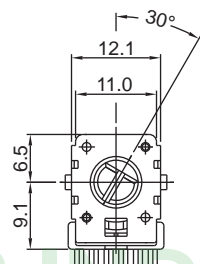
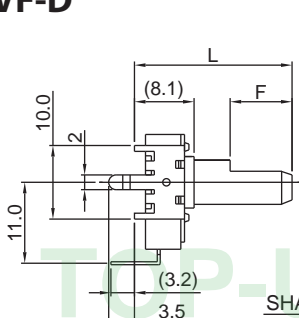


SHAFT SHOWN IN FULL C.C.W POSITION

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

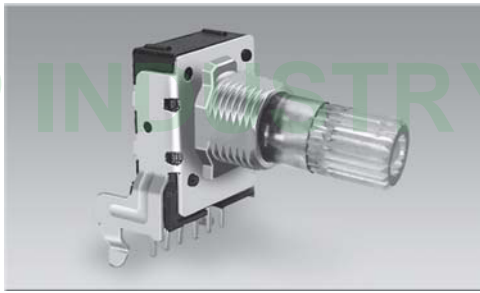
300° ROTATION
DUAL UNIT

12P2VF-D-□FT



Outline Drawing

12PL□1H5BF-B

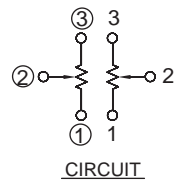
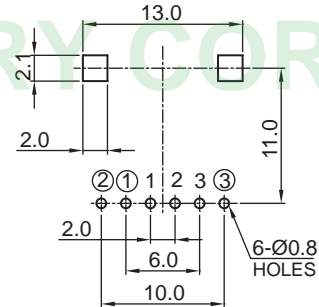
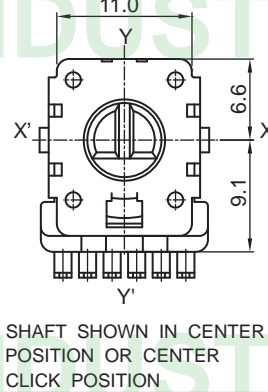
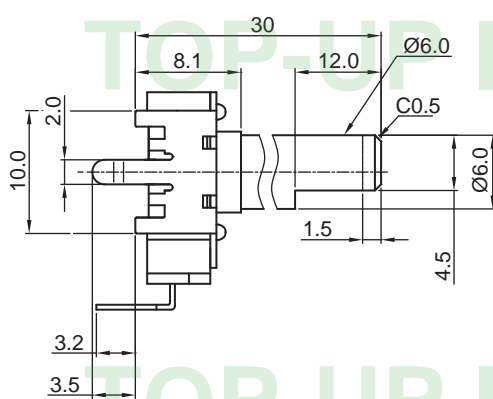


Features individual specifications

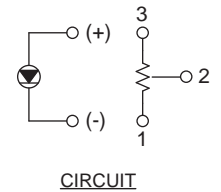
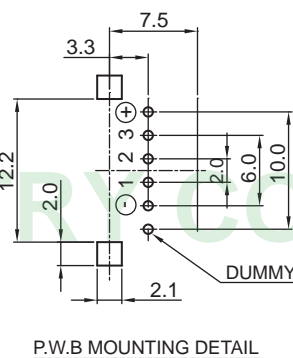
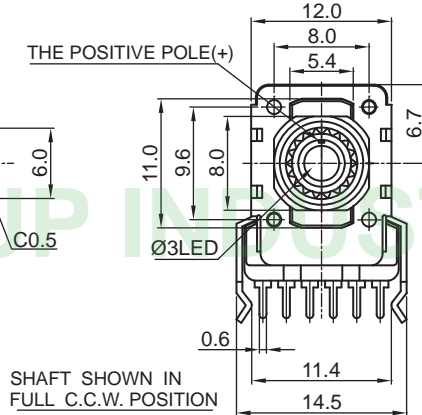
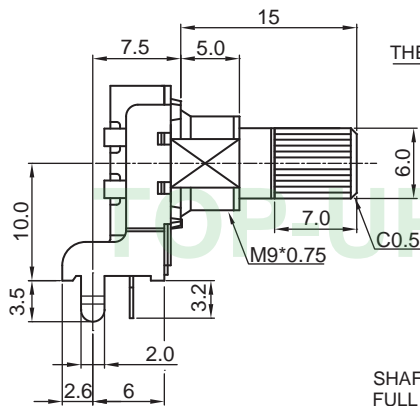
12PL□□1VFA-D



12P2VF-D-□FT



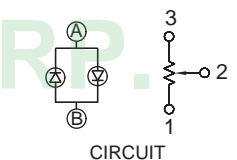
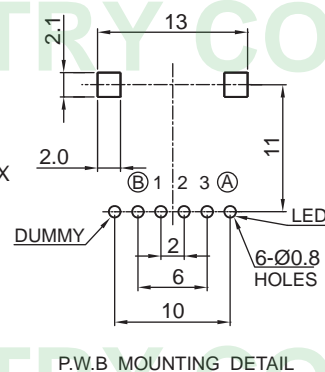
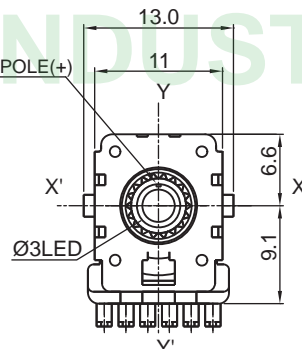
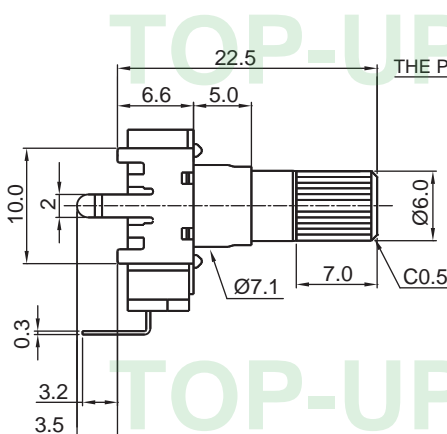
12PL□1H5BF-B



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

LED COLOR

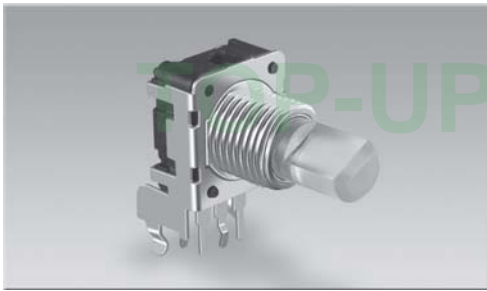
12PL□□1VFA-D



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

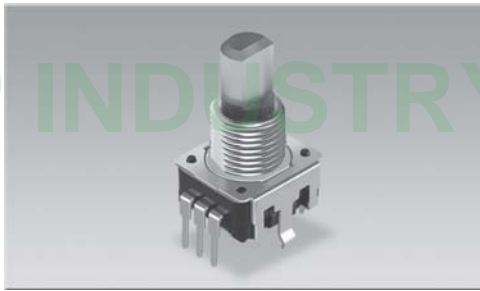
LED COLOR

12PL□1HBF-B



Outline Drawing

12PL□1VBF-D

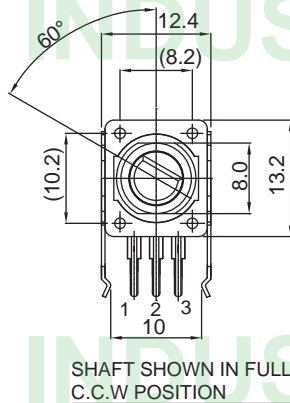
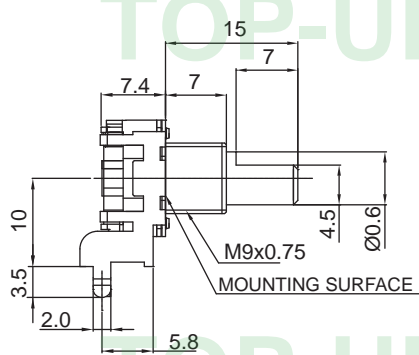


Features individual specifications

12P1VBF-D-□FHT

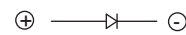


12PL□1HBF-B

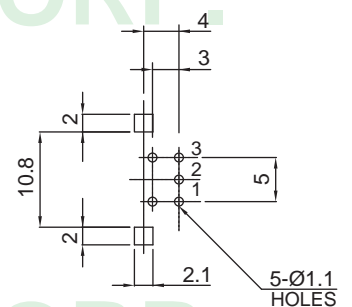


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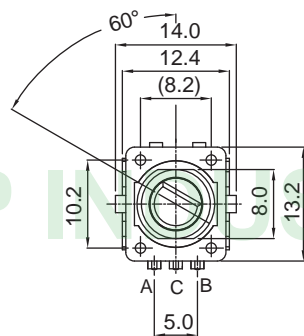
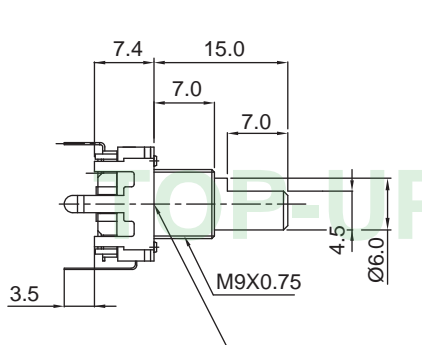
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN



LED CIRCUIT DIAGRAM

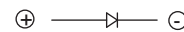


12PL□1VBF-D

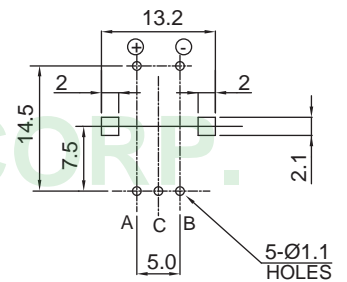


LED COLOR:

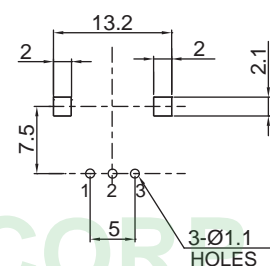
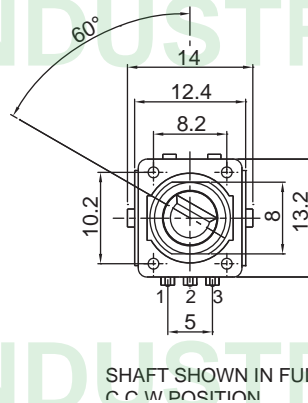
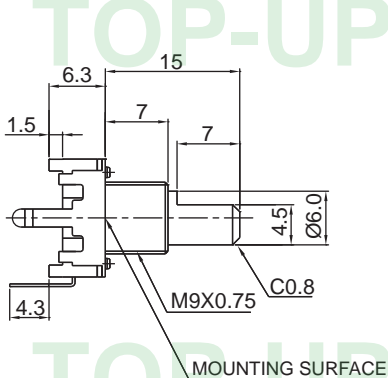
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN



LED CIRCUIT DIAGRAM



12P1VBF-D-□FHT

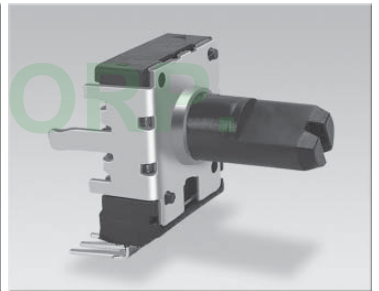
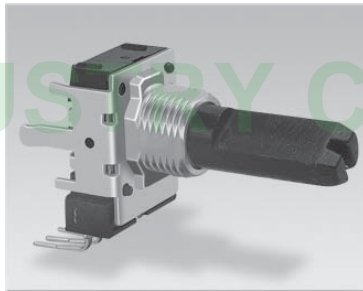
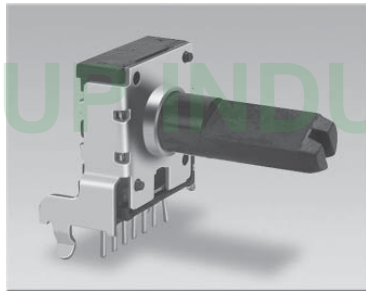
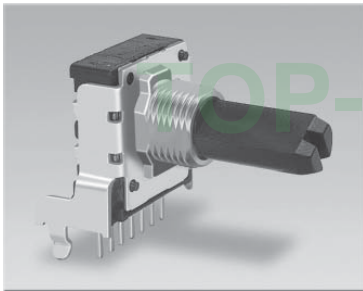


14P2HBF-B

14P2HF-B

14P2VBF-D

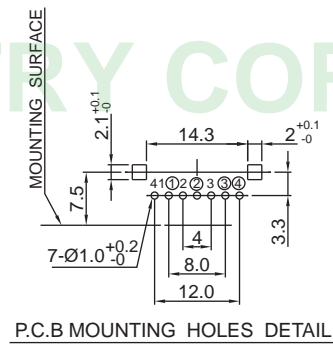
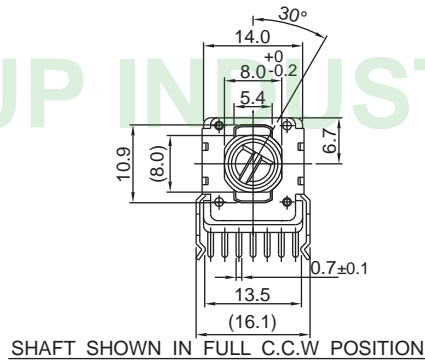
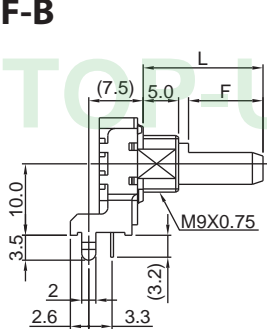
14P2VF-D



Outline Drawing

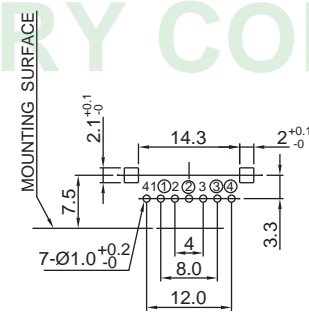
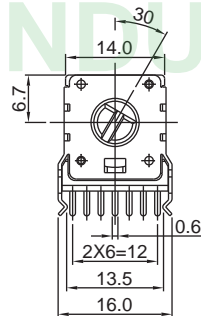
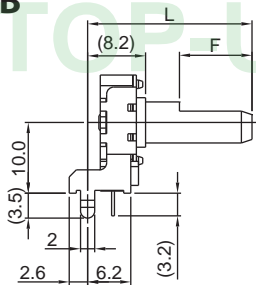
Features individual specifications

14P2HBF-B



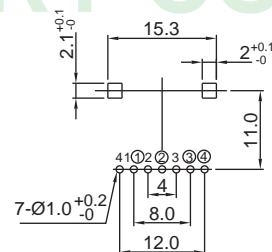
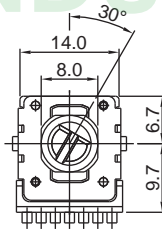
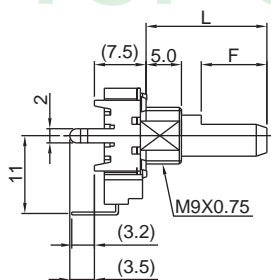
300° ROTATION
DUAL UNIT

14P2HF-B



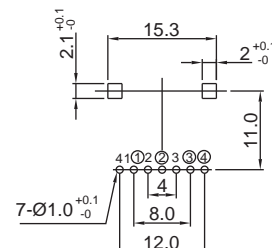
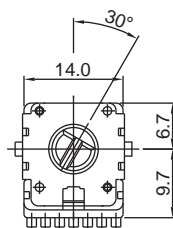
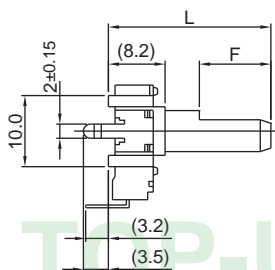
300° ROTATION
DUAL UNIT

14P2VBF-D



300° ROTATION
DUAL UNIT

14P2VF-D



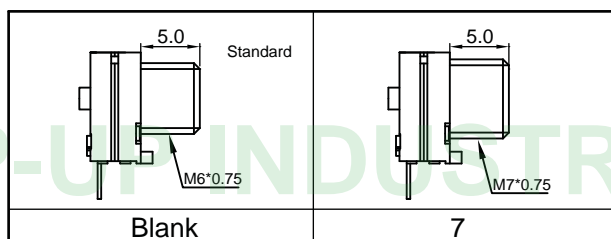
300° ROTATION
DUAL UNIT

8M Series Code Explanation

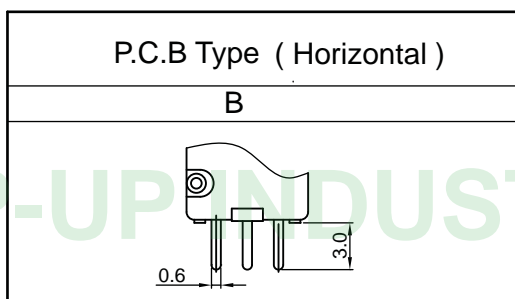
8M 1 RS H □ B 7 - B - 20 K - B 50K - □ □ □

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

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



- Type of Terminal

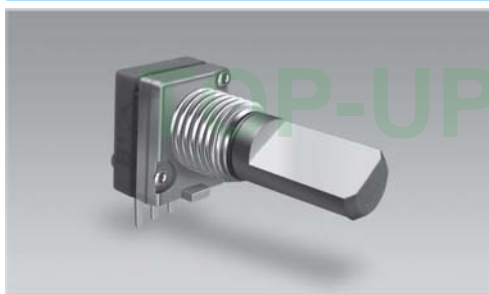


- Shaft Length
- Type of Shaft

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

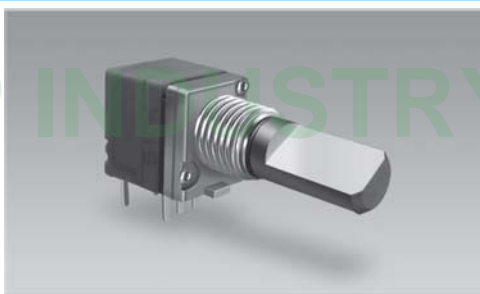
- Type of Taper (See Taper Chart Page 220)
- Resistance Value
- Serial No.

8M1HB-B



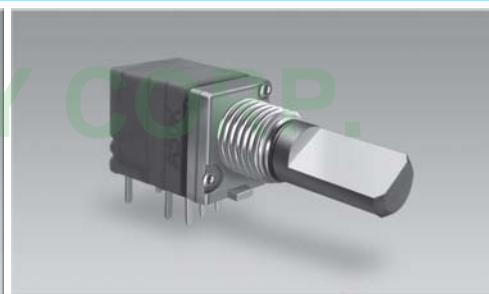
Outline Drawing

8M1RSHB-B

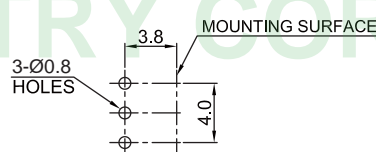
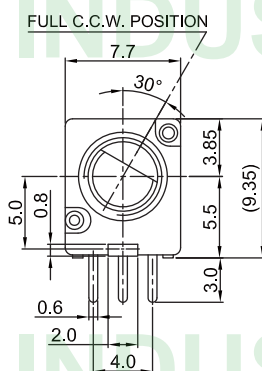
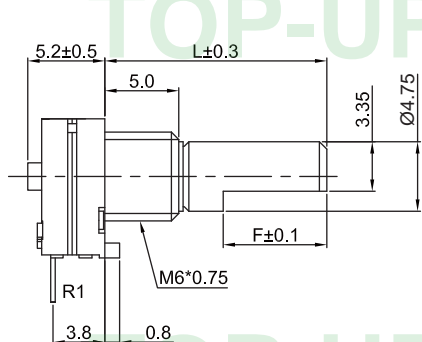


Features individual specifications

8M2RSHB-B



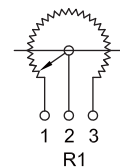
8M1HB-B



MOUNTING HOLE DETAIL

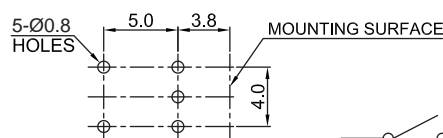
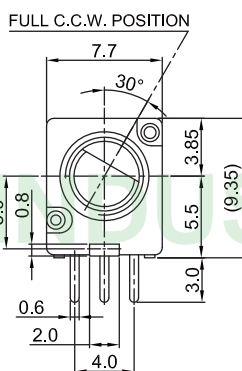
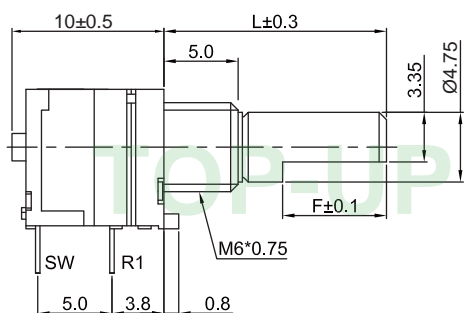
SHAFT LENGTH:

CODE	10F	15F
L	10	15
F	4	8



CIRCUIT

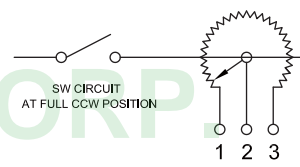
8M1RSHB-B



MOUNTING HOLE DETAIL

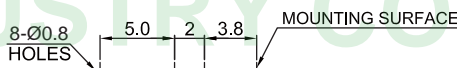
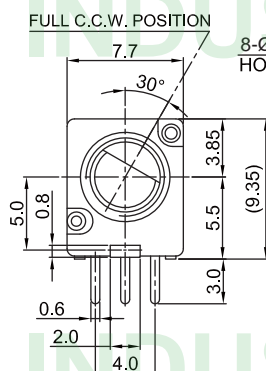
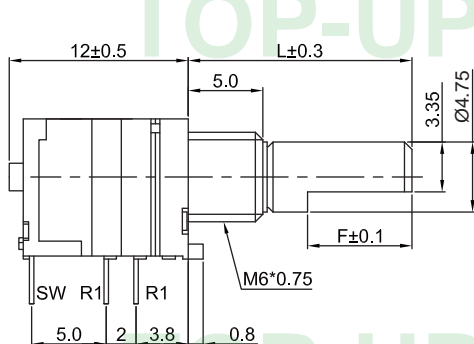
SHAFT LENGTH:

CODE	15F7	15F
L	15	15
F	7	8



CIRCUIT

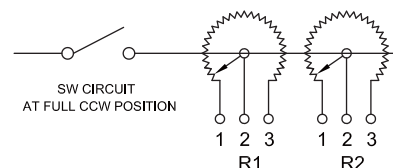
8M2RSHB-B



MOUNTING HOLE DETAIL

SHAFT LENGTH:

CODE	15F7	15F
L	15	15
F	7	8



CIRCUIT

8M2HB7-B



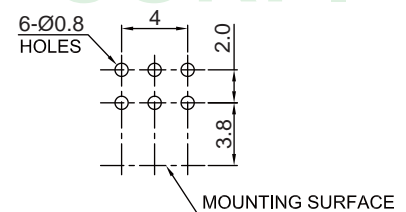
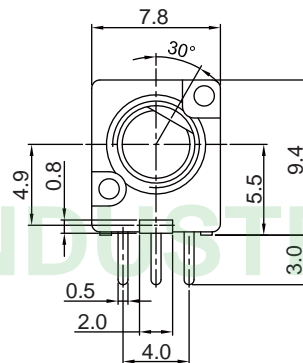
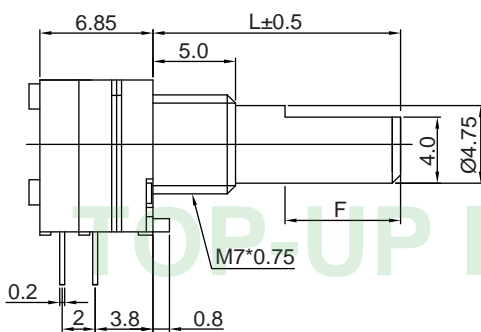
Outline Drawing

8M3HB7-B



Features individual specifications

8M2HB7-B

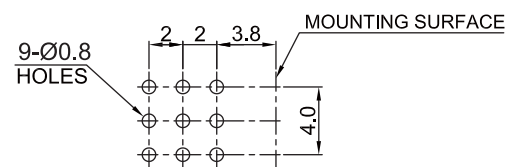
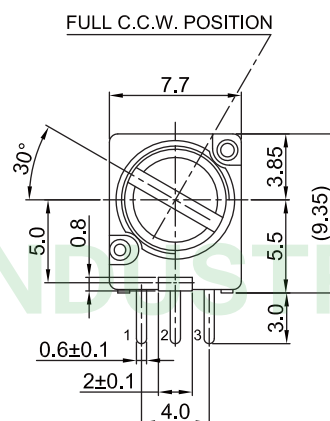
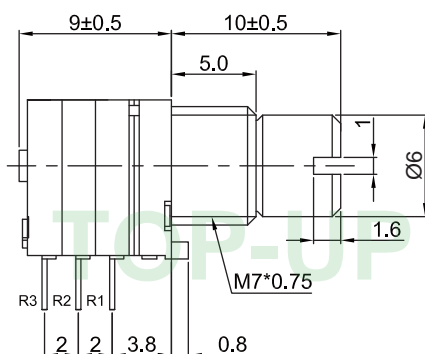


MOUNTING HOLE DETAIL

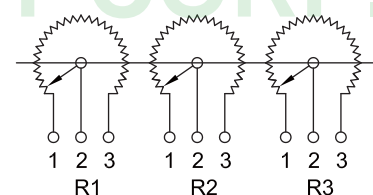
SHAFT LENGTH:

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

8M3HB7-B



MOUNTING HOLE DETAIL



CIRCUIT

9M Series Code Explanation

9M M L ☐ ☐ 2 RS H 5 B 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 19

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 "

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

NS — " Pull -On Type "

FS — " Pull-Off Type "

MS — " Momentary Push Type "

PPS — " Push on , Push off Type "

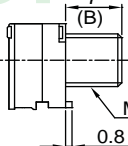
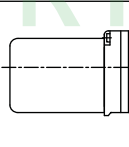
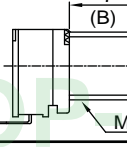
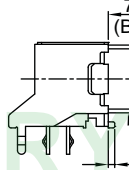
Code	MS / PPS	MSD / PPSD
Switch Travel	1.5mm	0.5mm

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)

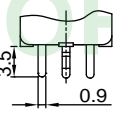
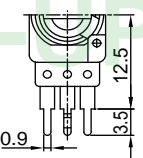
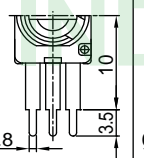
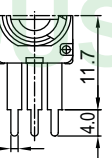
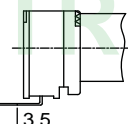
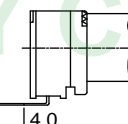
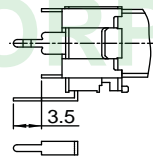
Without Bracket Series		Without Bracket "PS" Series	
 <p>Standard</p> <p>7 (B)</p> <p>M7*0.75</p> <p>0.8</p>	Other Type	 <p>Standard</p> <p>10</p> <p>M7*0.75</p> <p>0.8</p>	Other Type
	(B)		(B)
	5.0		5.0
	10.0		10.0
 <p>Standard</p> <p>7 (B)</p> <p>M9*0.75</p>	Other Type	 <p>Standard</p> <p>7 (B)</p> <p>M9*0.75</p> <p>0.8</p>	Other Type
	(B)		(B)
	5.0		5.0
	10.0		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
						
3.5 0.9	12.5 3.5 0.9	10 3.5 0.8	11.7 4.0 0.8	3.5	4.0	3.5

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)

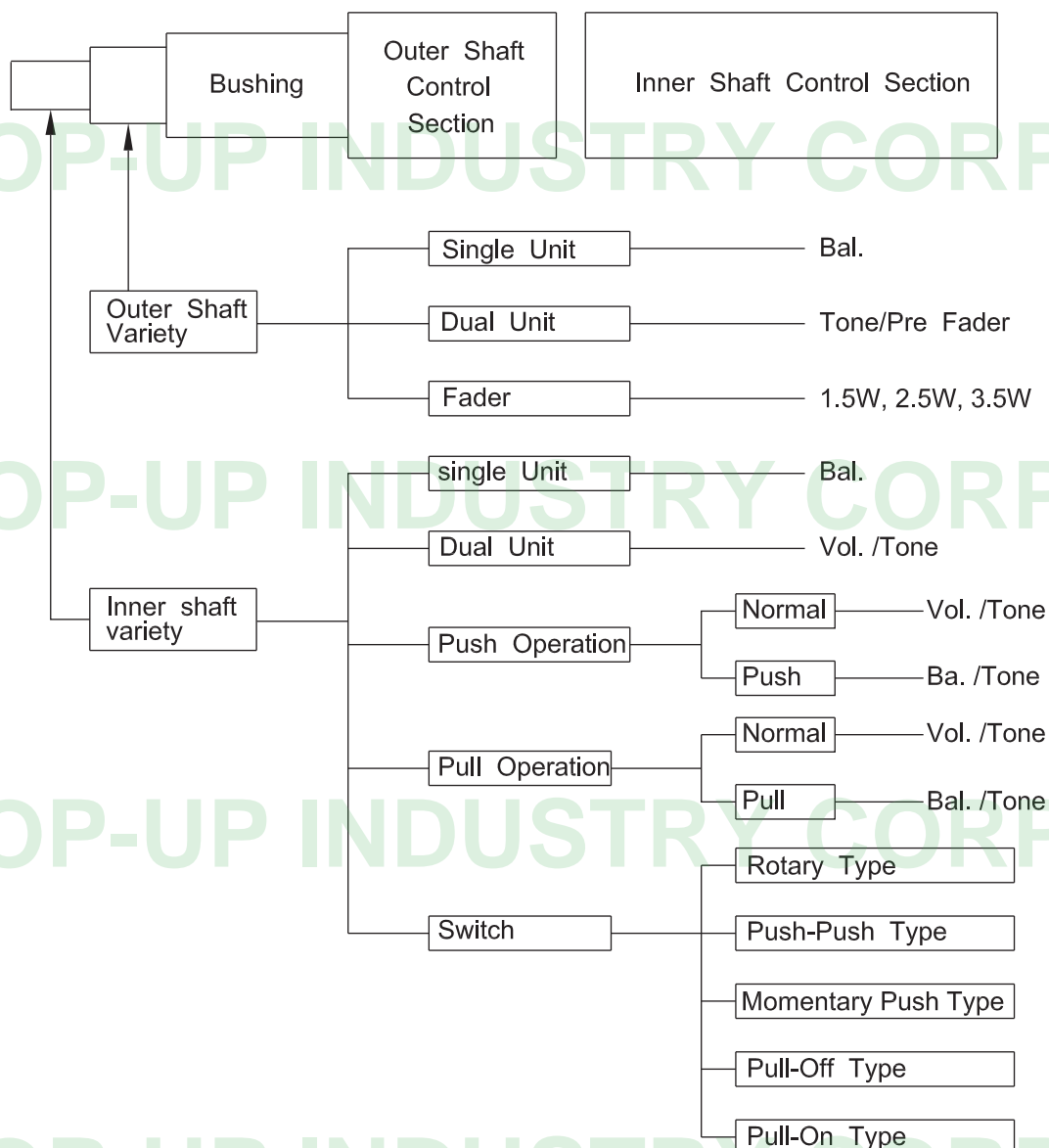
Single Shaft Dimensions and Styles (Without Bracket)									
K - Type					F - Type				
L	B	T	M	T1	L	15	20	25	30
15	5	5	1	7	B	5	7	10	10
20	7	10	1	11	F	7	12	12	12
25	10	12	2	11					
30	10	12	4	14					
35	10	12	4	14					
H - Type									
					L	15	20	25	30
					B	5	7	10	10
Shaft Dimensions and Styles With Push-Lock Mechanism									
F - Type									
					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				
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

Configuration Chart



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:

Electrical Characteristics		
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:

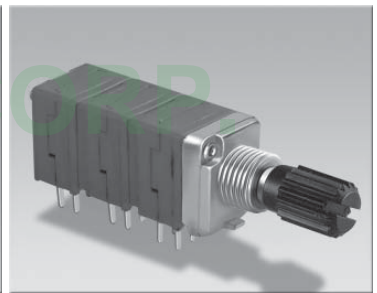
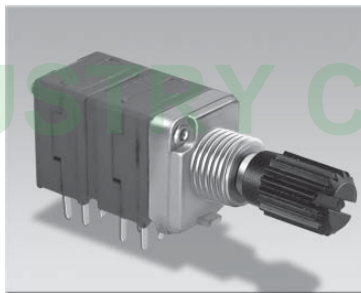
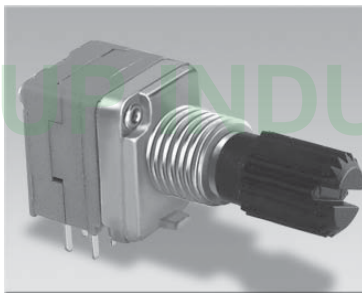
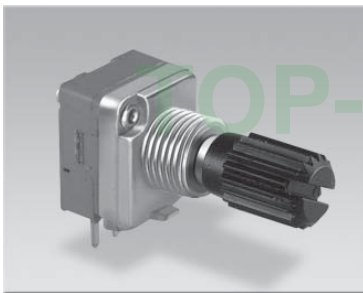
Rotation life	≥ 10,000 cycles
---------------	-----------------

9MP1HB-B

9MP2HB-B

9MP4HB-B

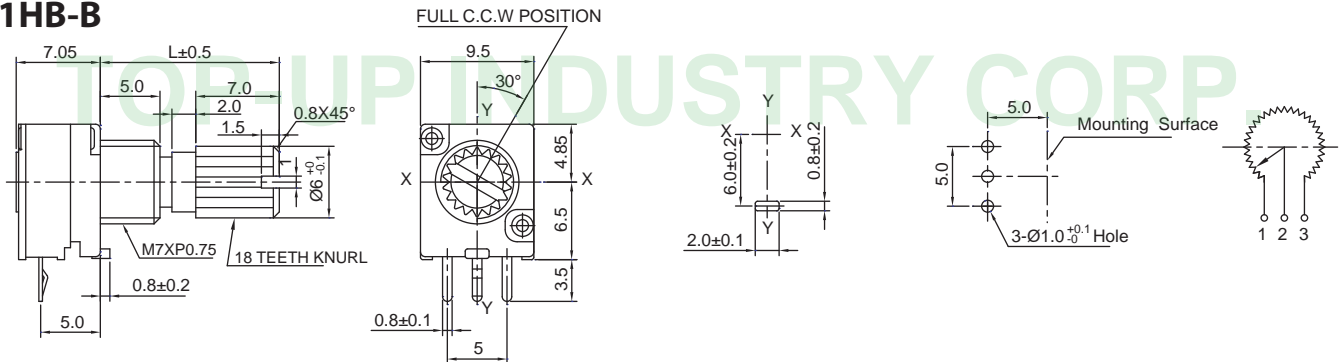
9MP6HB-B



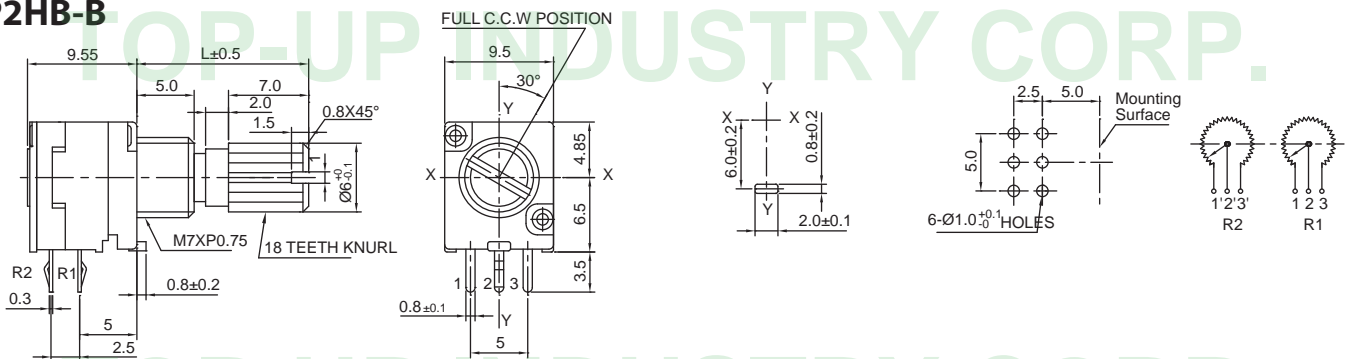
Outline Drawing

Features individual specifications

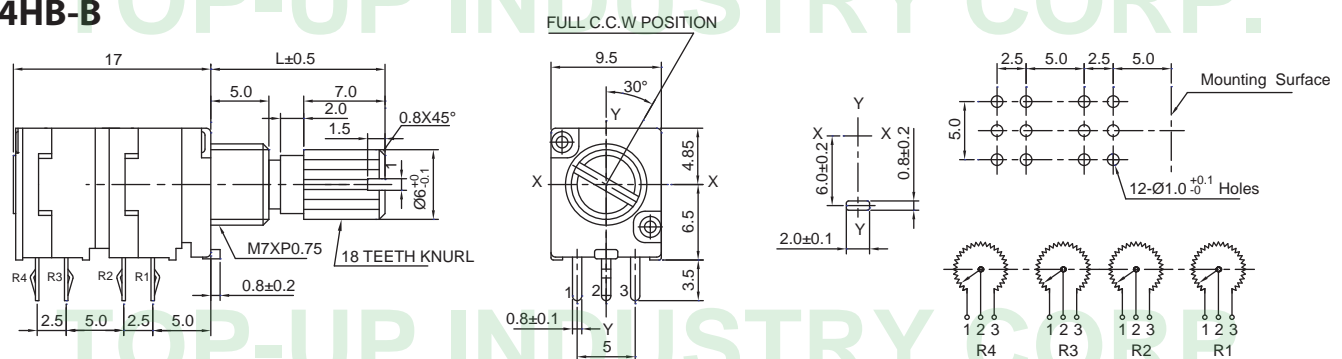
9MP1HB-B



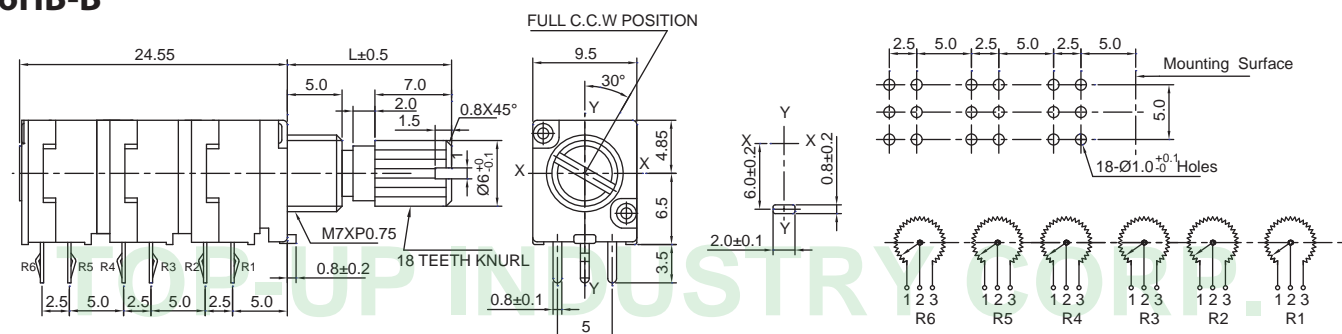
9MP2HB-B



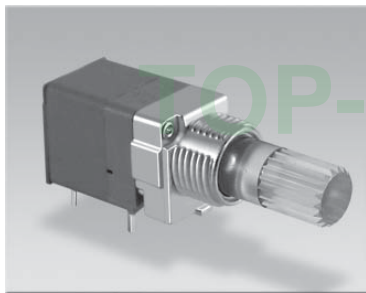
9MP4HB-B



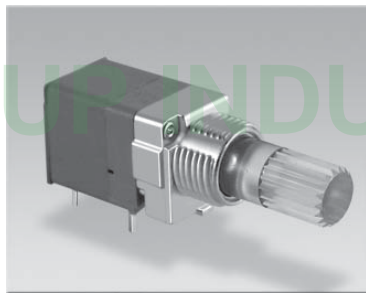
9MP6HB-B



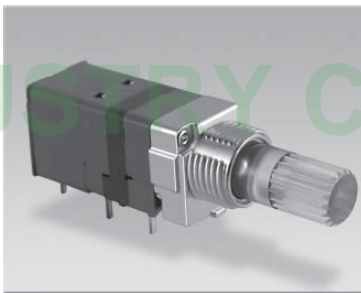
9ML□1H5B9-B



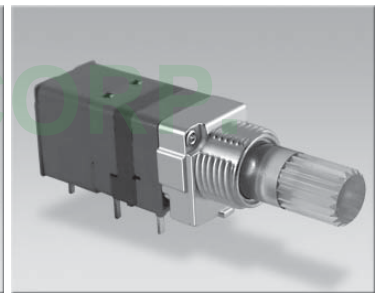
9ML□□1H5B9-B



9ML□ 1RSH5B9-B



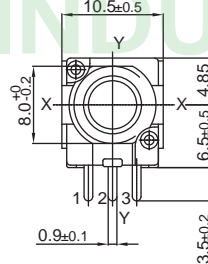
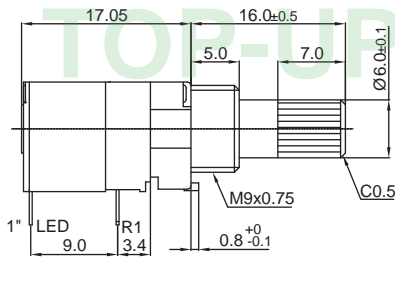
9ML□□1RSH5B9-B



Outline Drawing

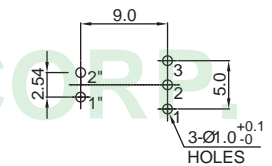
Features individual specifications

9ML□1H5B9-B

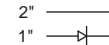


LED COLOR:

CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

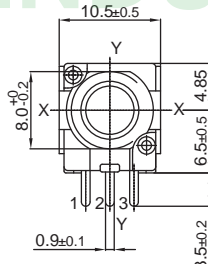
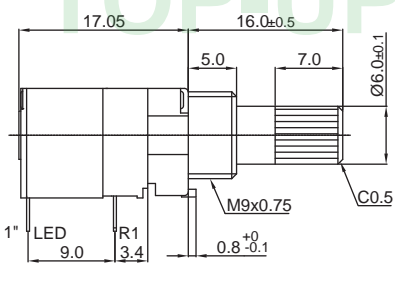


P.W.B MOUNTING DETAIL
TOLERANCES±0.1
VIEWED FROM MOUNTING SIDE



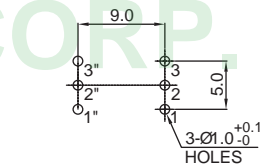
LED CIRCUIT DIAGRAM

9ML□□1H5B9-B

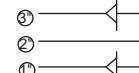


LED COLOR:

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

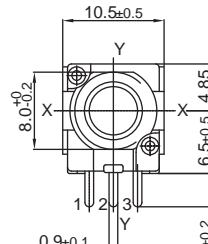
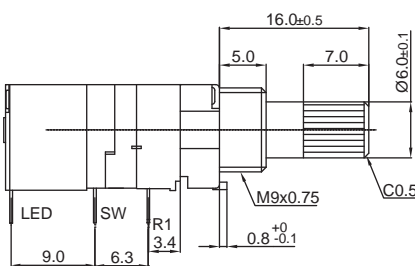


P.W.B MOUNTING DETAIL
TOLERANCES±0.1
VIEWED FROM MOUNTING SIDE



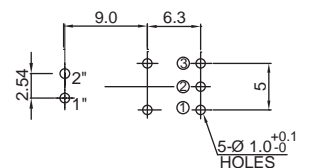
LED CIRCUIT DIAGRAM

9ML□ 1RSH5B9-B



LED COLOR:

CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

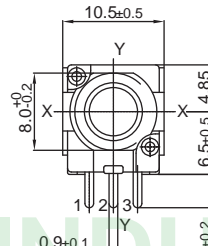
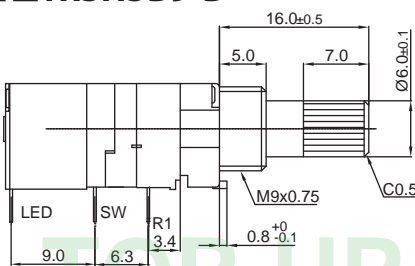


P.C.B MOUNTING HOLES DETAIL



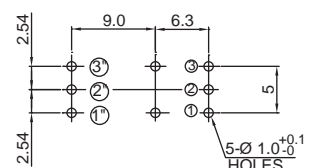
LED CIRCUIT DIAGRAM

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



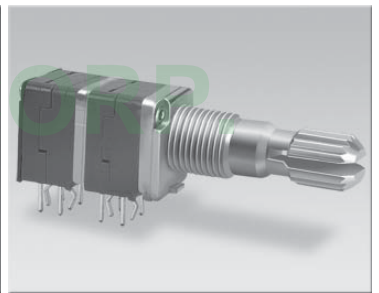
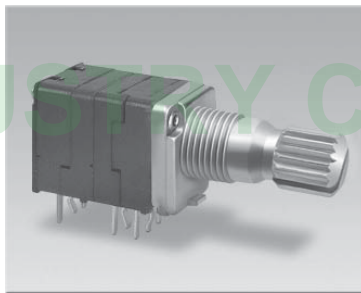
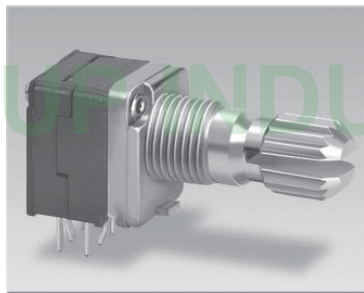
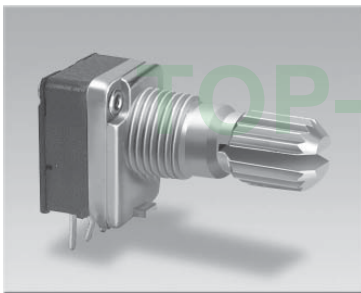
LED CIRCUIT DIAGRAM

9M1HB-B

9M2HB-B

9M3HB-B

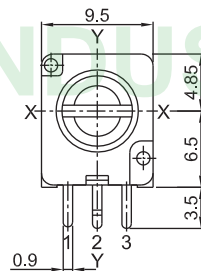
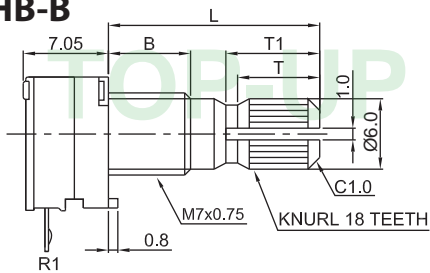
9M4HB-B



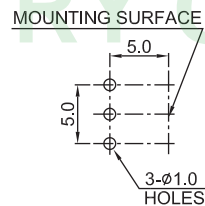
Outline Drawing

Features individual specifications

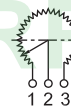
9M1HB-B



SHAFT SHOWN IN
FULL C.C.W POSITION

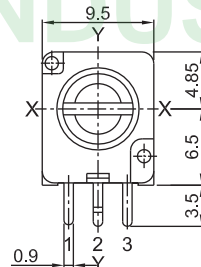
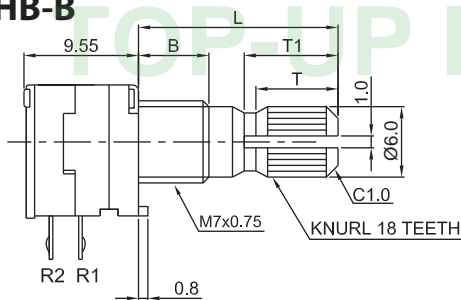


P.C.B MOUNTING HOLES DETAIL

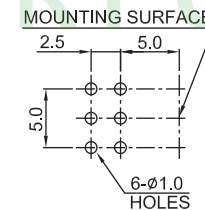


300° ROTATION SINGLE UNIT

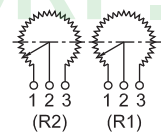
9M2HB-B



SHAFT SHOWN IN
FULL C.C.W POSITION

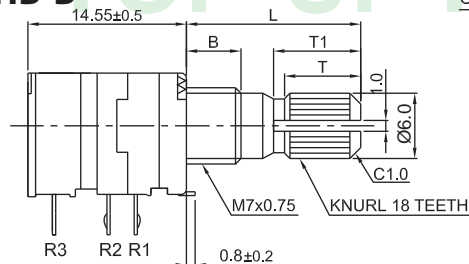


P.C.B MOUNTING HOLES DETAIL

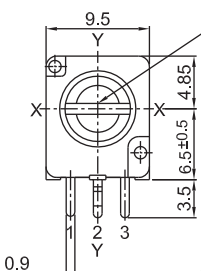


300° ROTATION DUAL UNIT

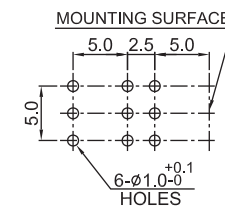
9M3HB-B



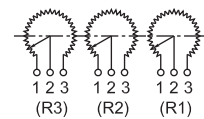
SHAFT SLOT IS OPTIONAL ANGLE



SHAFT SHOWN IN
FULL C.C.W POSITION

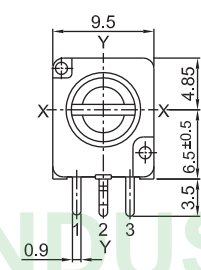
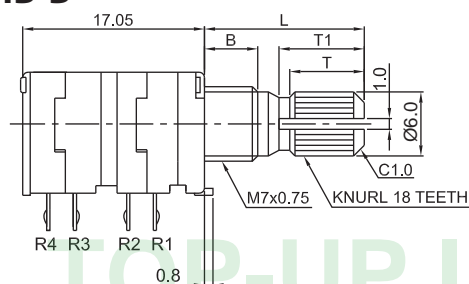


P.C.B MOUNTING DETAIL
TOLERANCES ±0.1
VIEWED FROM MOUNTING SIDE

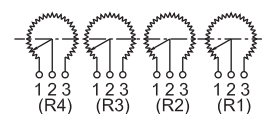
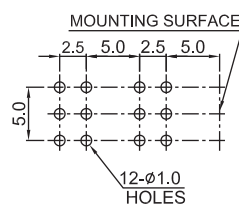


300° ROTATION

9M4HB-B



SHAFT SHOWN IN



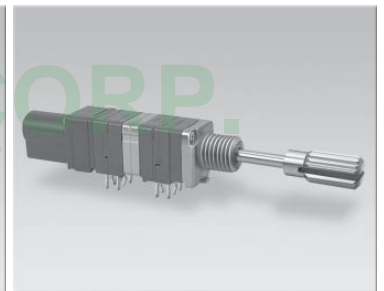
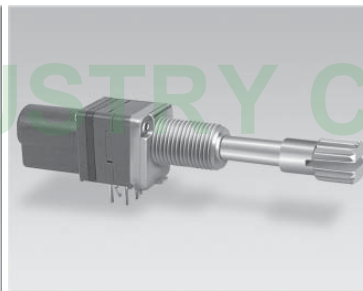
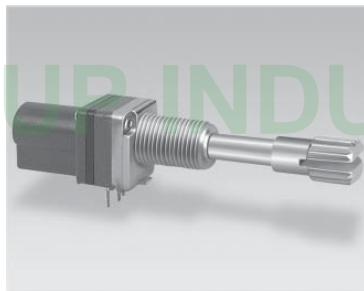
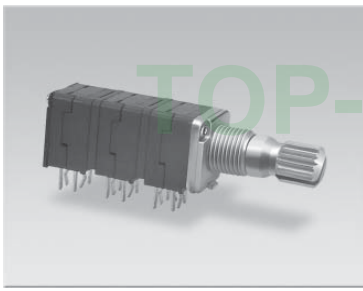
300° ROTATION

9M6HB-B

9M1PSHB-B

9M2PSHB-B

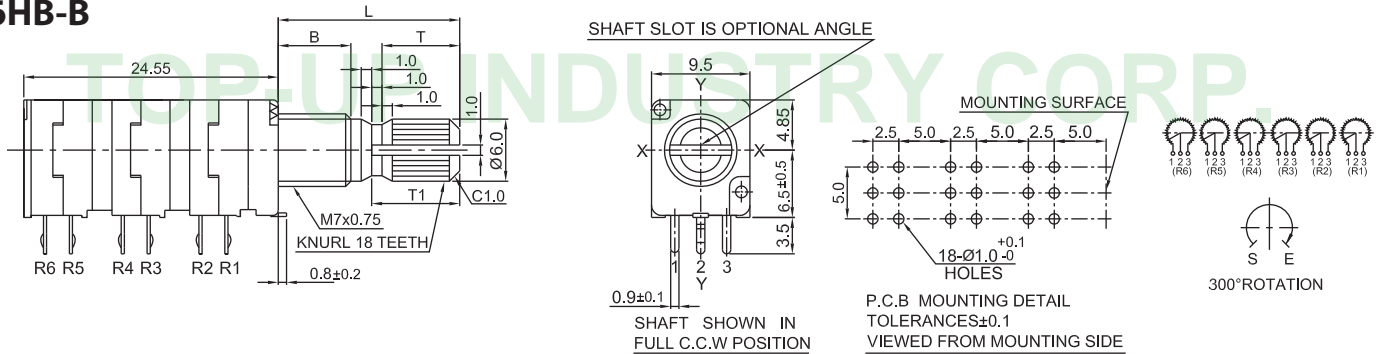
9M4PSHB-B



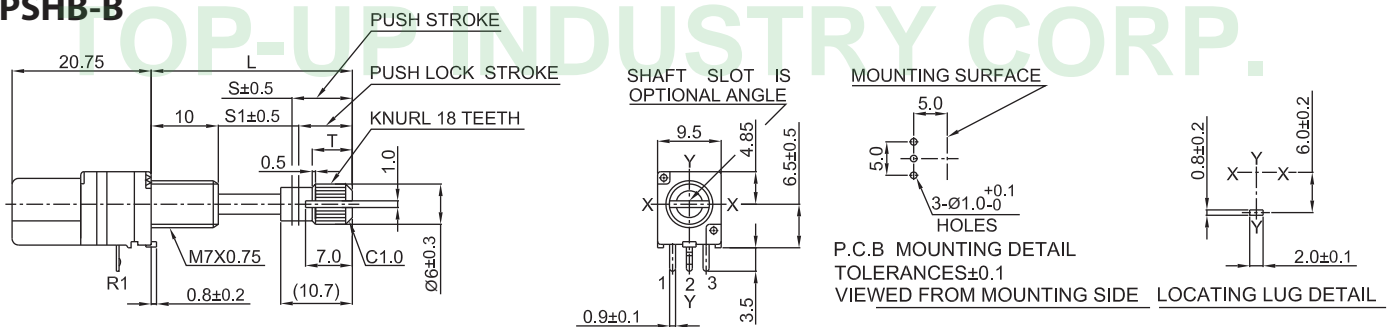
Outline Drawing

Features individual specifications

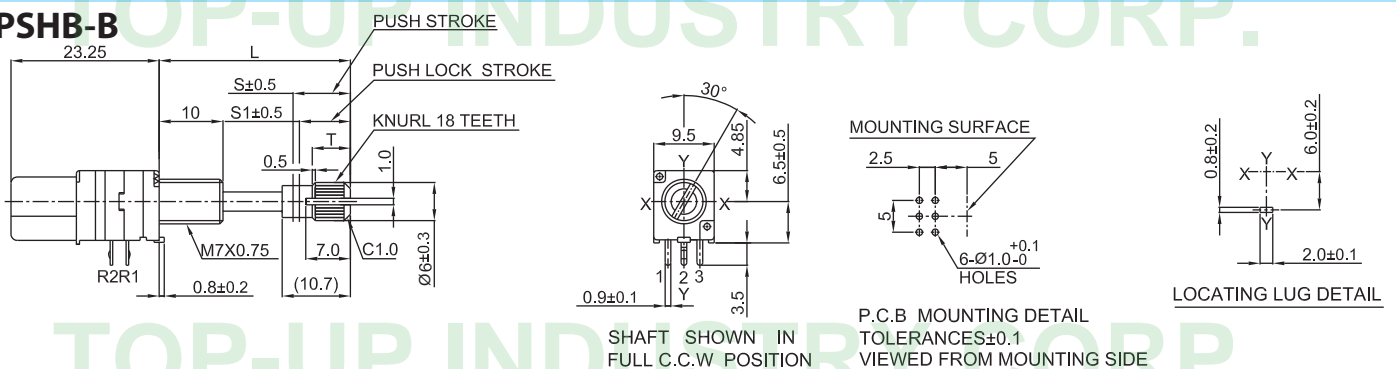
9M6HB-B



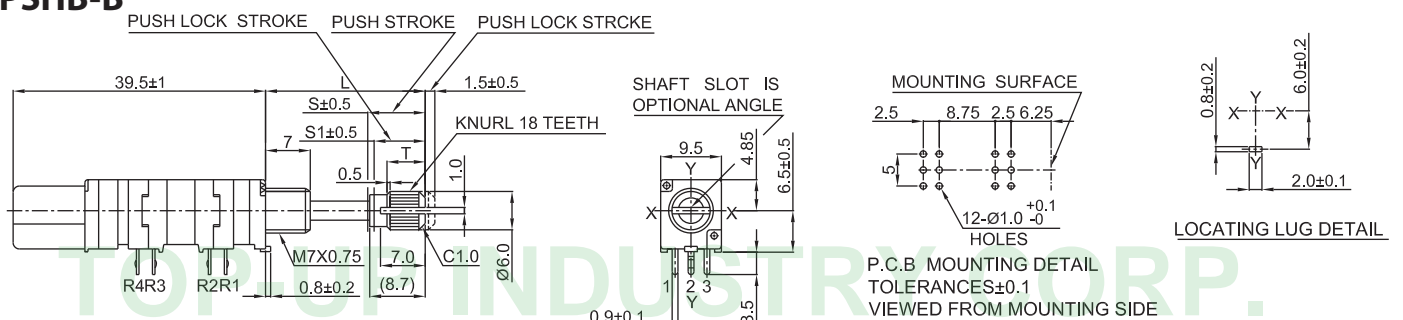
9M1PSHB-B



9M2PSHB-B



9M4PSHB-B

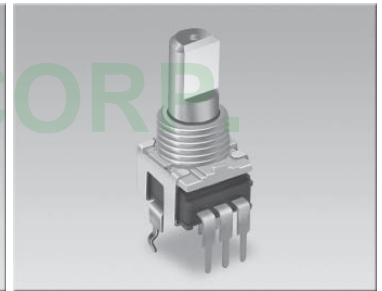
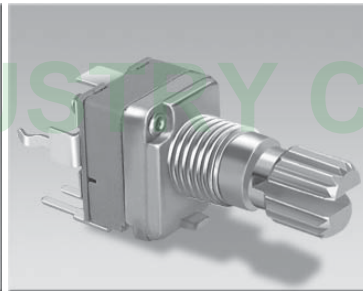
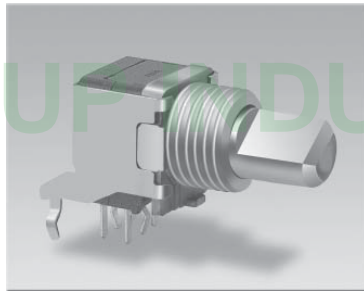
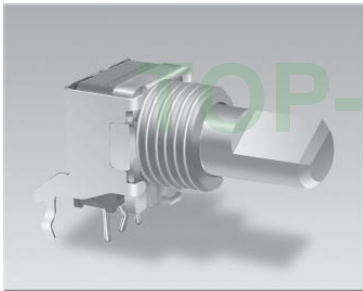


9M1HBF-B

9M2HBF-B

9M1V5BBF-D

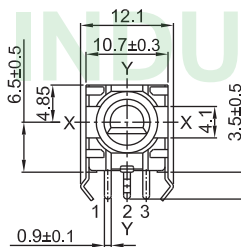
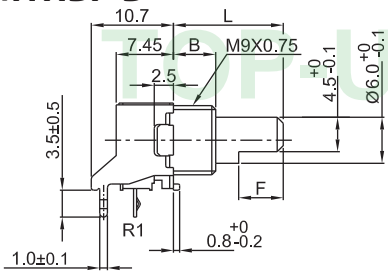
9M1VBF-D



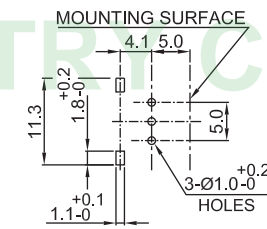
Outline Drawing

Features individual specifications

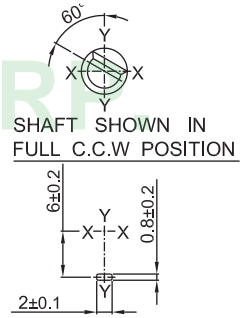
9M1HBF-B



SHAFT SHOWN IN CENTER POSITION

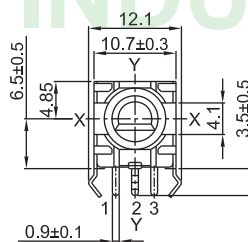
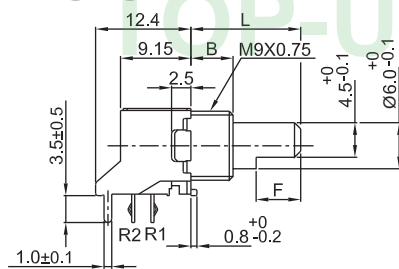


P.C.B MOUNTING DETAIL VIEWED FROM MOUNTING SIDE (TOLERANCE ±0.1)

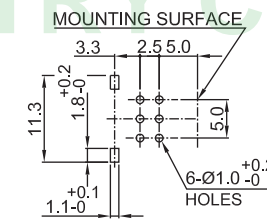


LOCATING LUG DETAIL

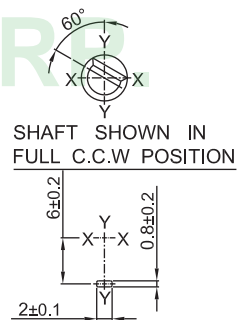
9M2HBF-B



SHAFT SHOWN IN CENTER POSITION

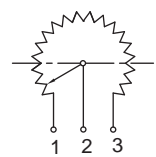
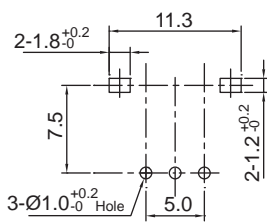
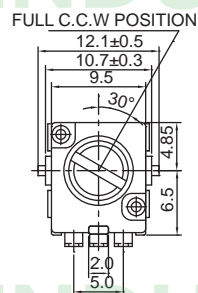
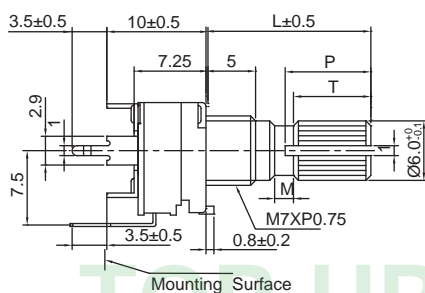


P.C.B MOUNTING DETAIL VIEWED FROM MOUNTING SIDE (TOLERANCE ±0.1)

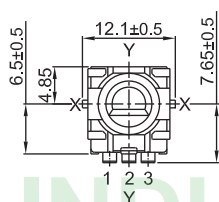
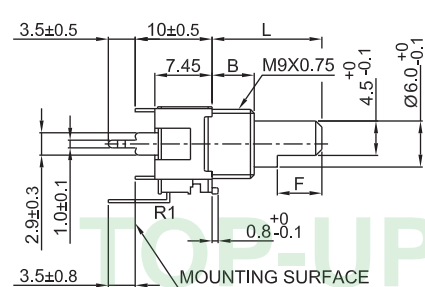


LOCATING LUG DETAIL

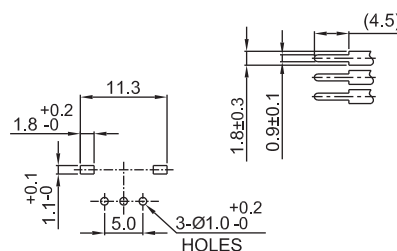
9M1V5BBF-D



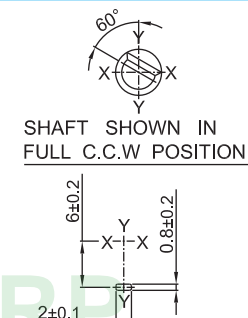
9M1VBF-D



SHAFT SHOWN IN CENTER POSITION



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



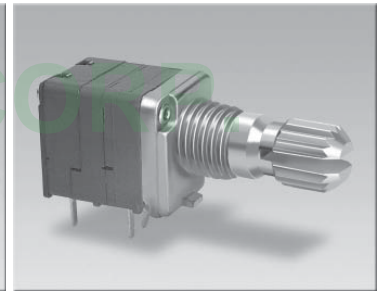
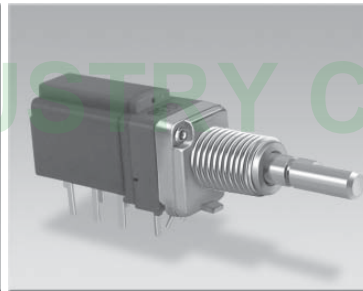
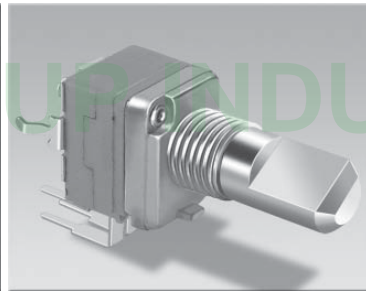
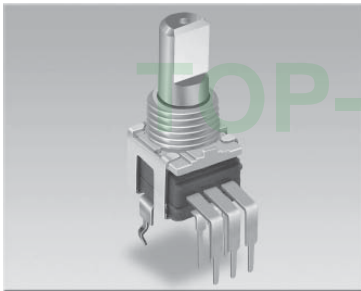
LOCATING LUG DETAIL

9M2VBF-D

9M2V5BB-D

9M1PPSHB-B

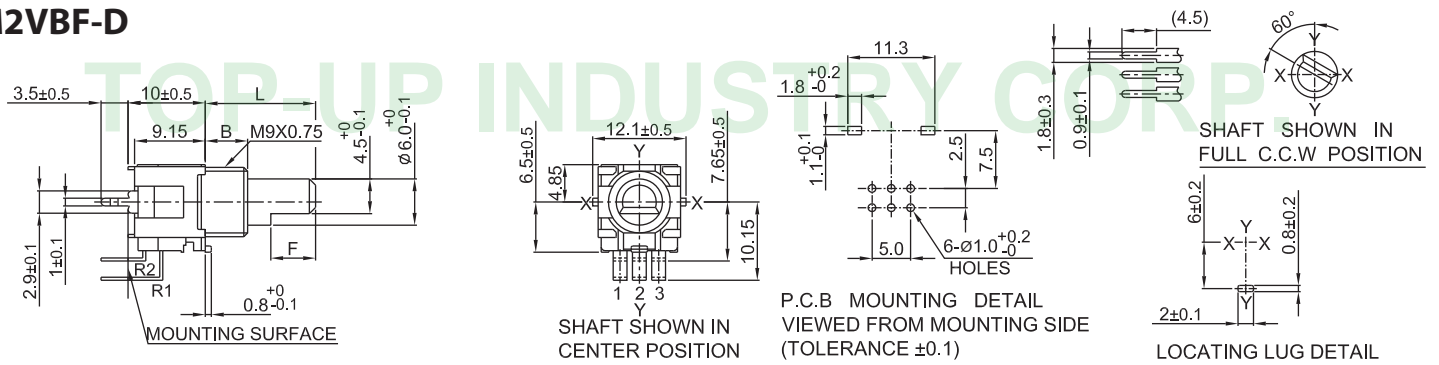
9M1RSHB-B



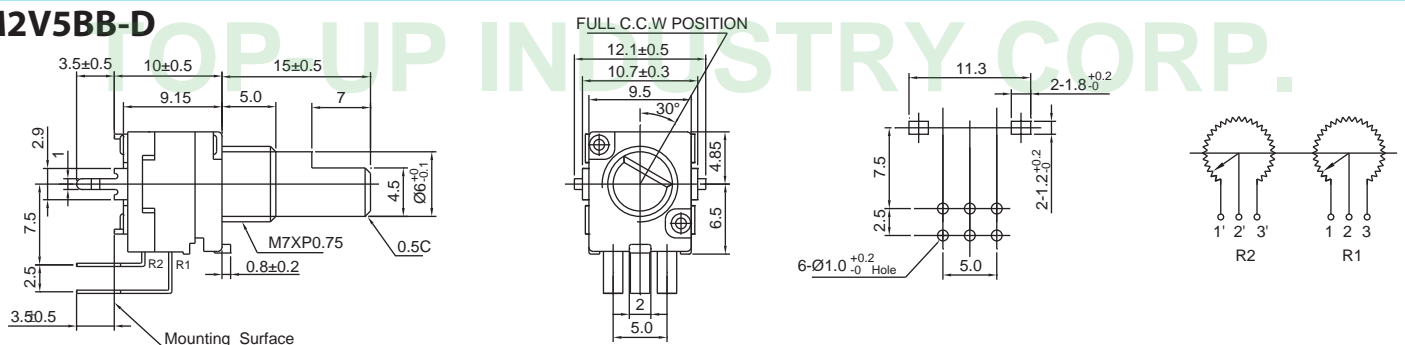
Outline Drawing

Features individual specifications

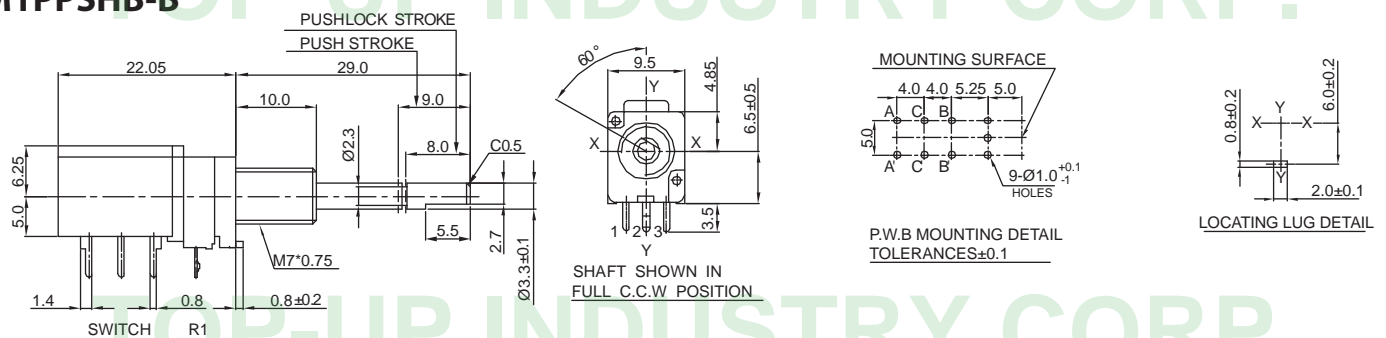
9M2VBF-D



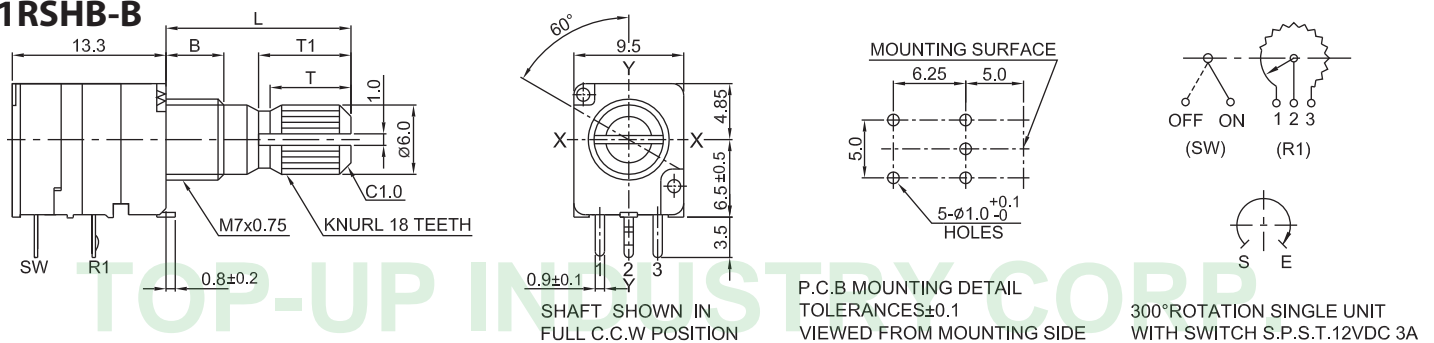
9M2V5BB-D



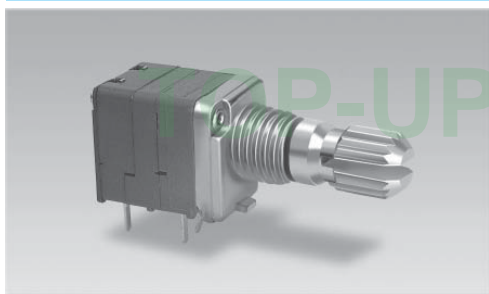
9M1PPSHB-B



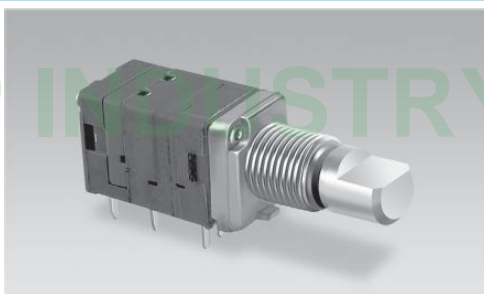
9M1RSHB-B



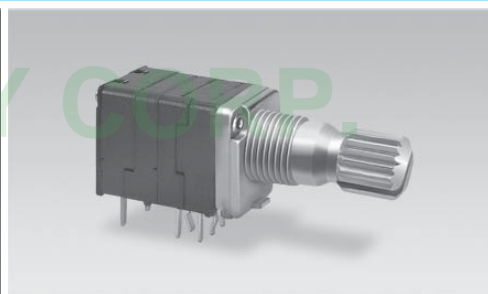
9M1MSHB-B



9M1MRSDHB-B



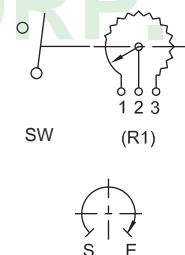
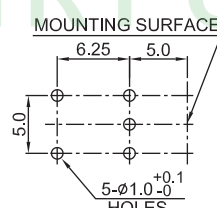
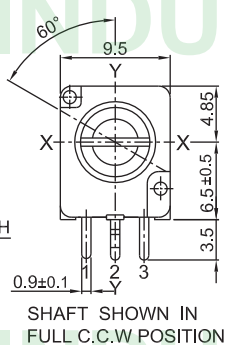
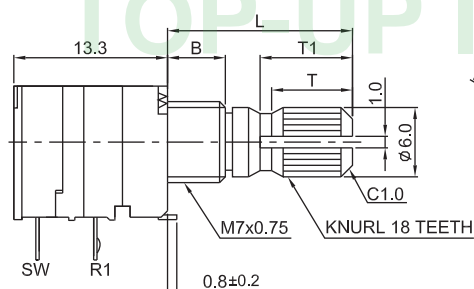
9M2RSHB-B



Outline Drawing

Features individual specifications

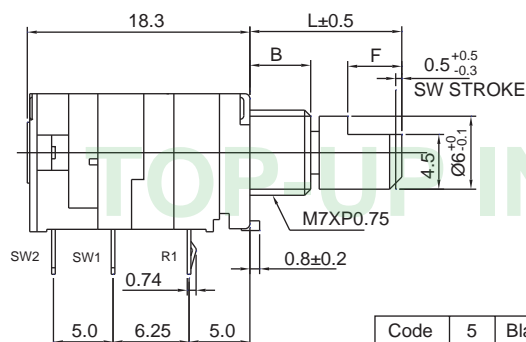
9M1MSHB-B



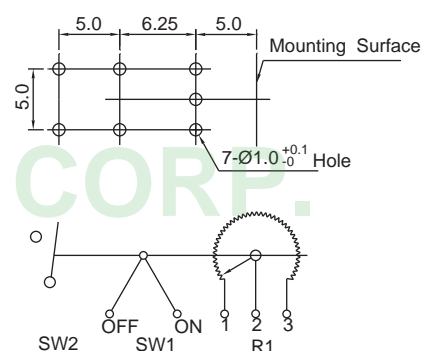
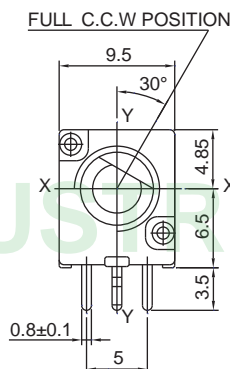
P.C.B MOUNTING DETAIL
TOLERANCES ± 0.1
VIEWED FROM MOUNTING SIDE

300°ROTATION SINGLE UNIT
WITH SWITCH S.P.S.T.12VDC 3A

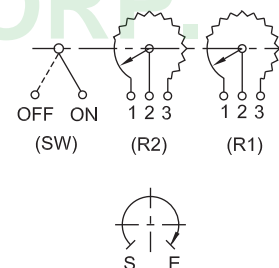
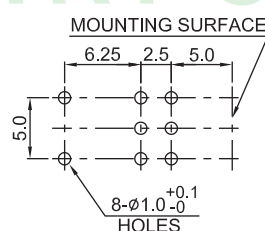
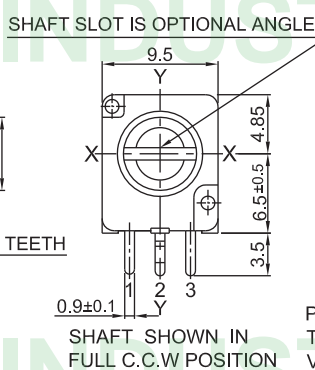
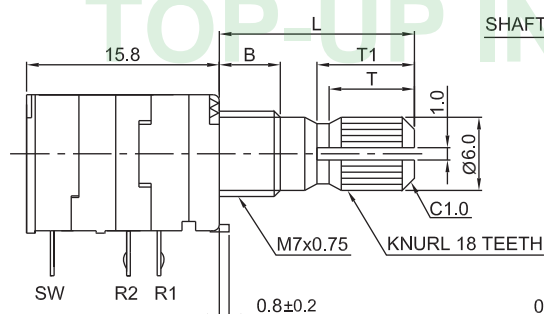
9M1MRSDHB-B



Code	5	Blank	10
B	5	7	10



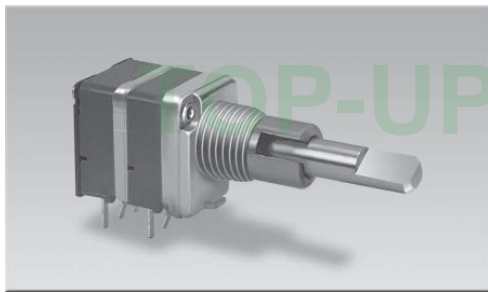
9M2RSHB-B



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

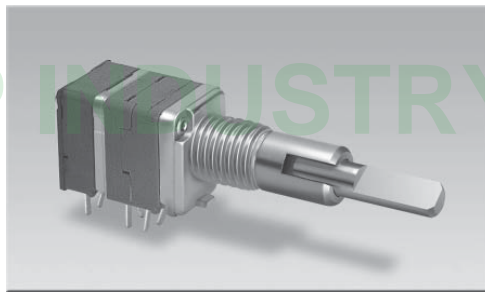
300° ROTATION DUAL UNIT
WITH SWITCH S.P.S.T. 12VDC 3A

9MM2H□B-B



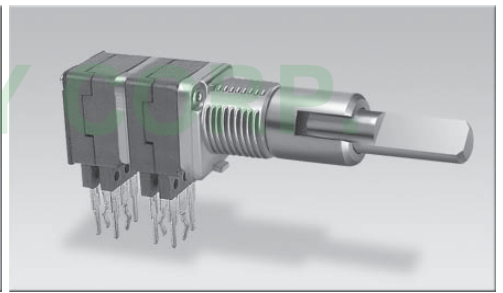
Outline Drawing

9MM3H□B-B

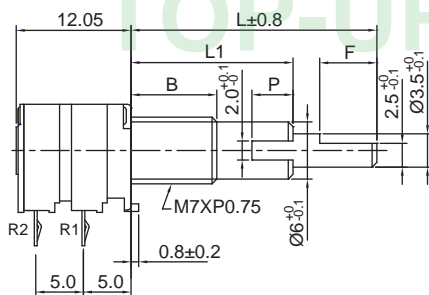


Features individual specifications

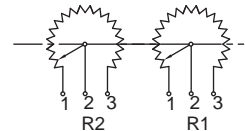
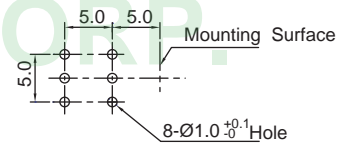
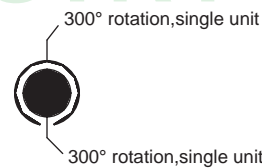
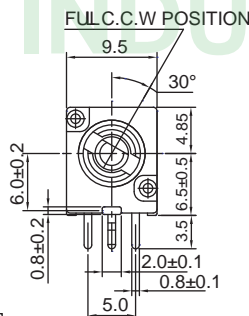
9MM4H□B-B



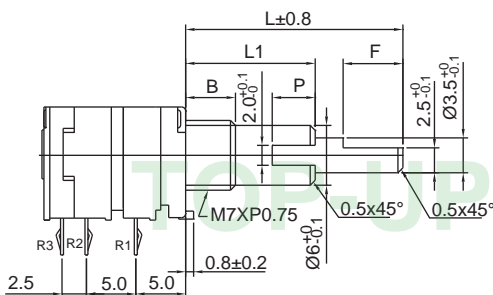
9MM2H□B-B



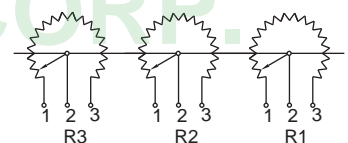
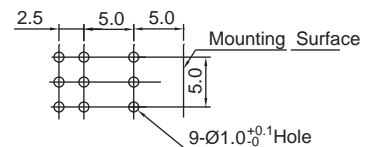
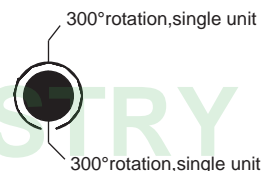
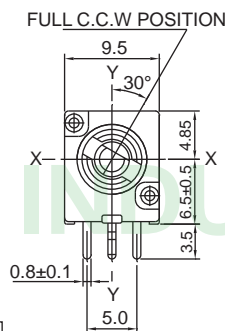
Code	5	Blank	10
B	5	7	10



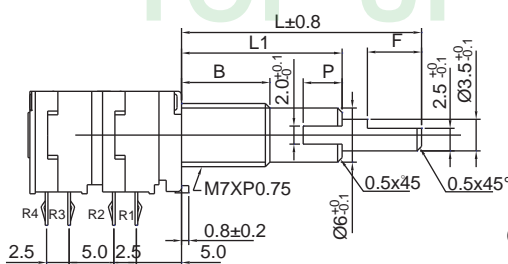
9MM3H□B-B



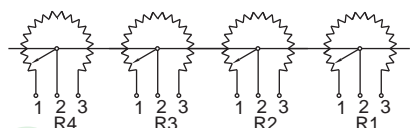
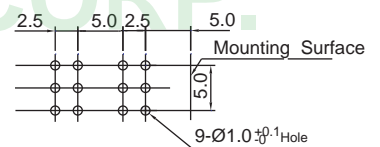
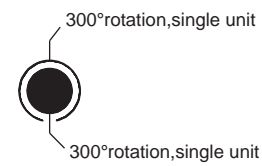
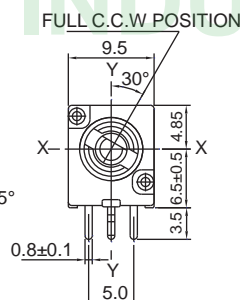
Code	5	Blank	10
B	5	7	10



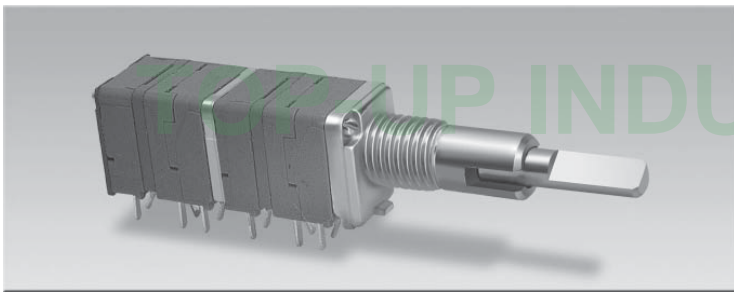
9MM4H□B-B



Code	5	Blank	10
B	5	7	10

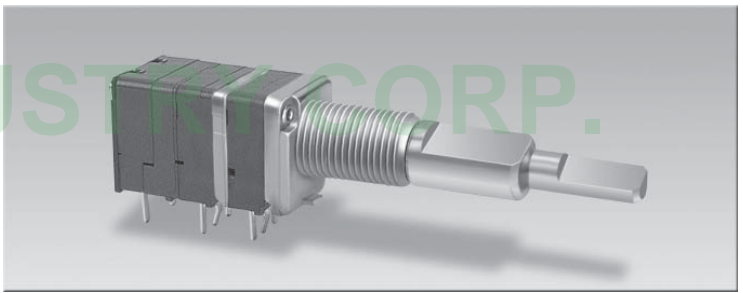


9MM6HB-B



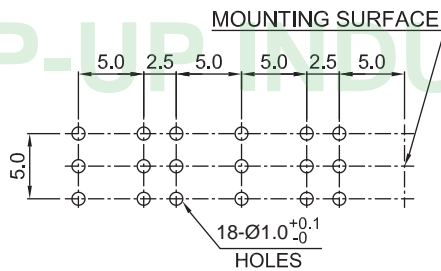
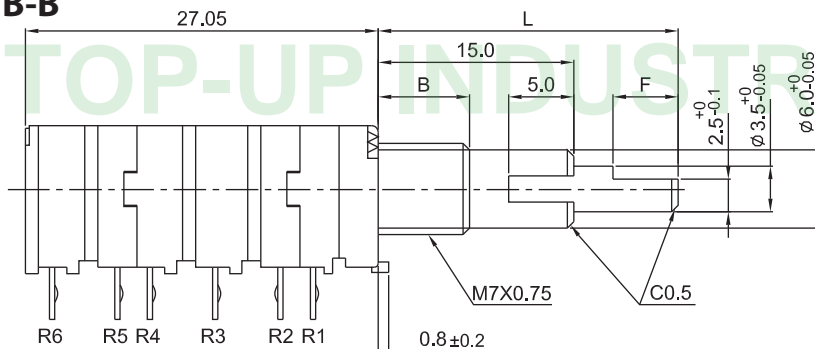
Outline Drawing

9MM2RSHB-B

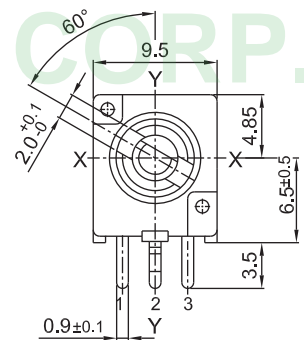


Features individual specifications

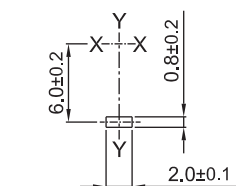
9MM6HB-B



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

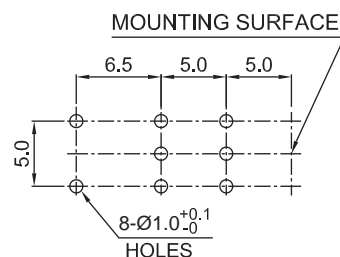
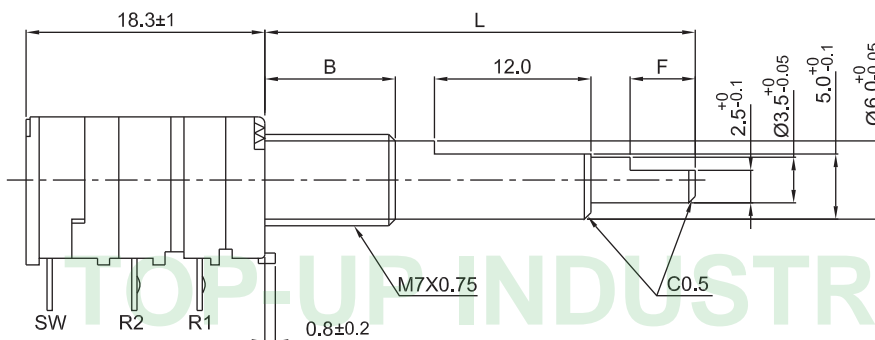


INNER, OUTER SHOWN IN
FULL C.C.W POSITION

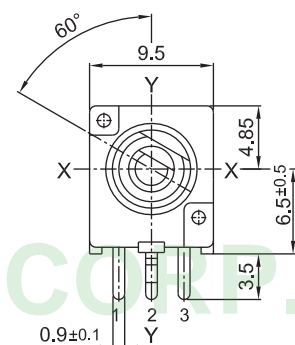


LOCATING LUG DETAIL

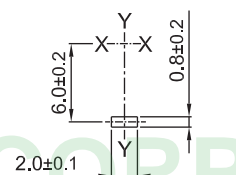
9MM2RSHB-B



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



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



LOCATING LUG DETAIL

11M Series Code Explanation

11M	1	MS	D	V	<input type="checkbox"/>	NB	F	X	-	D	-	20	F	-	B	50K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					

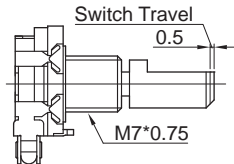
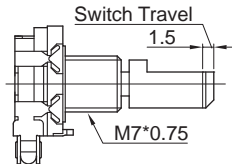
1. Product Lines of 11M (11mm Metal Shaft Series)

2. Number of Unit : 1 — Single Unit

3. Type of Switch : MS — "Momentary push type"

4. Switch Travel

(Drawing 1)

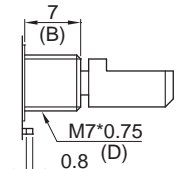
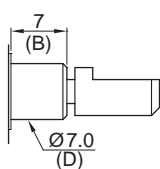
Code	D	E
Travel		

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

6. Bushing Length : Blank- 7mm (Standard Type)

7. Type of Bushing

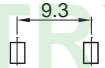
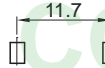
(Drawing 2)

1	(With Screw)		2	(Without Screw)	
	B (Standard)			NB (Standard)	

8. With Frame: "F"

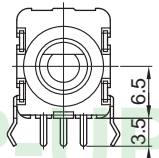
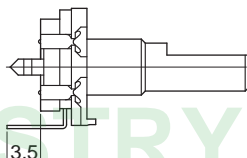

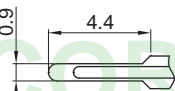
9. Frame Size (See Drawing 3)

(Drawing 3)

Size		
Code	X	Z

10. Type of Terminal

(Drawing 4)

P.C.B Type			
	Horizontal		Vertical
	B		D
			

11. Shaft Length (See Drawing 5)

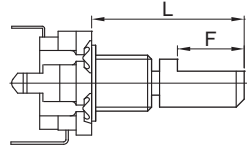
12. Type of Shaft (See Drawing 5)

13. Type of Taper

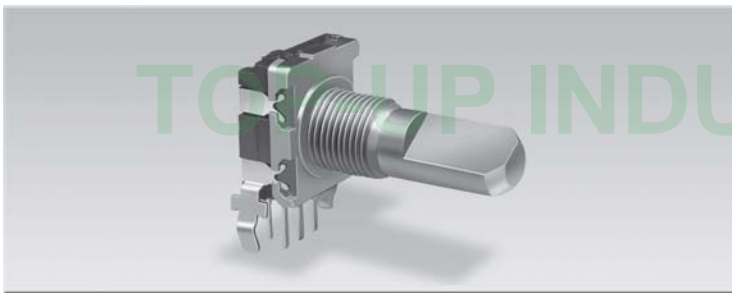
14. Resistance Value

15. Serial No.

(Drawing 5)

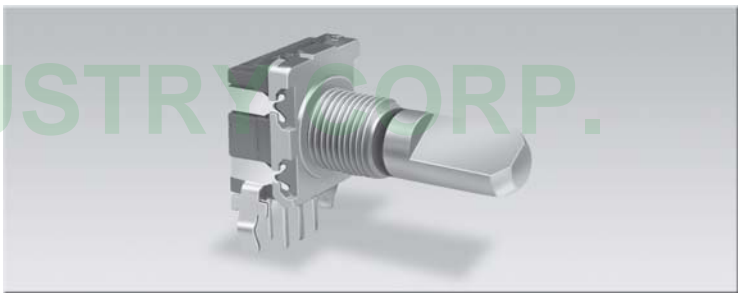
F-Type					
	L	26.8	15	20	25
	F	10	5	10	10

11M1HBFZ-B



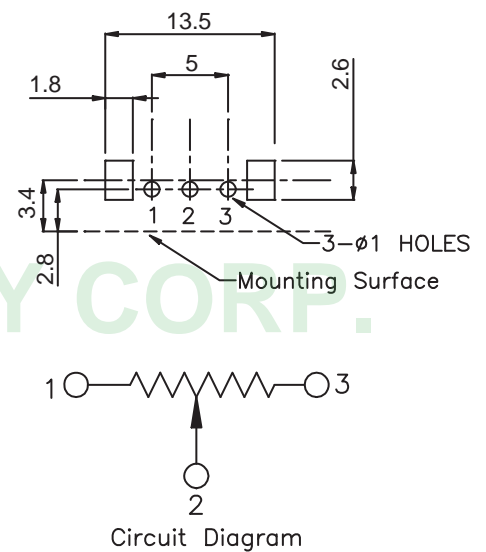
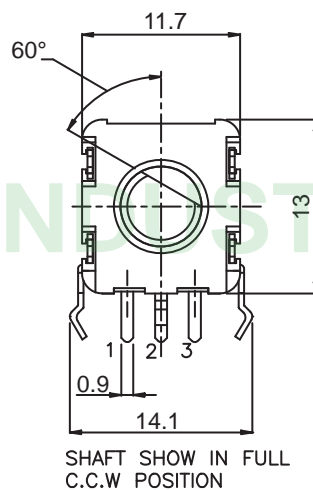
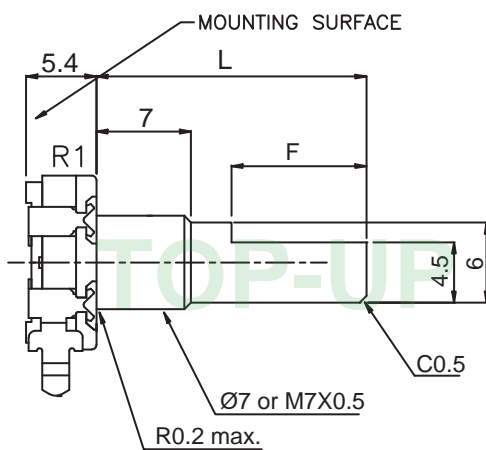
Outline Drawing

11M1MSDHBZFZ-B

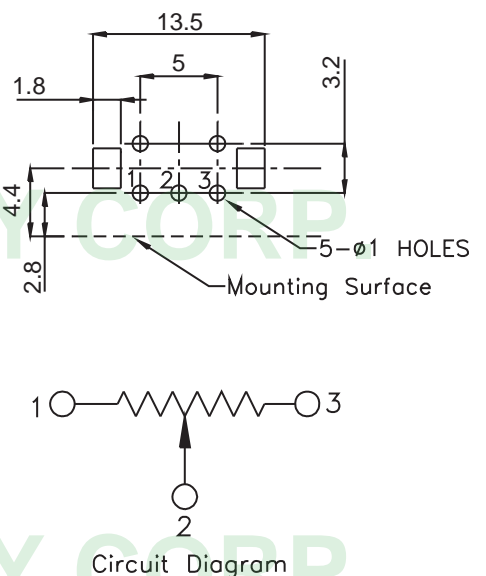
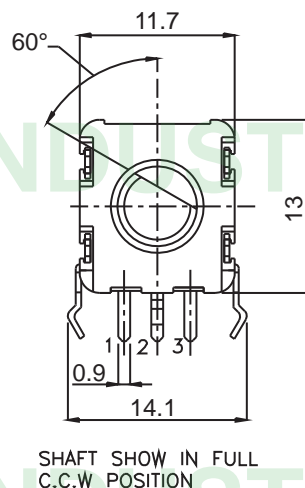
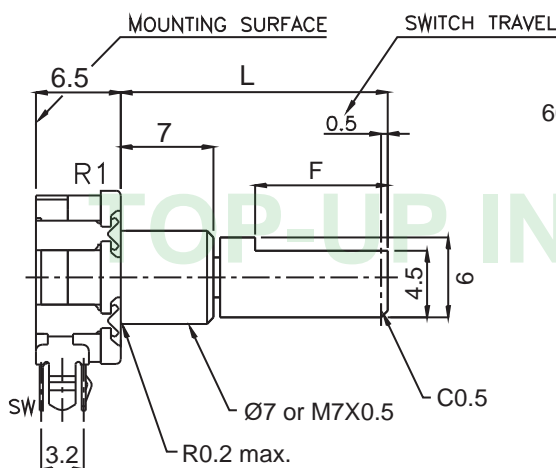


Features individual specifications

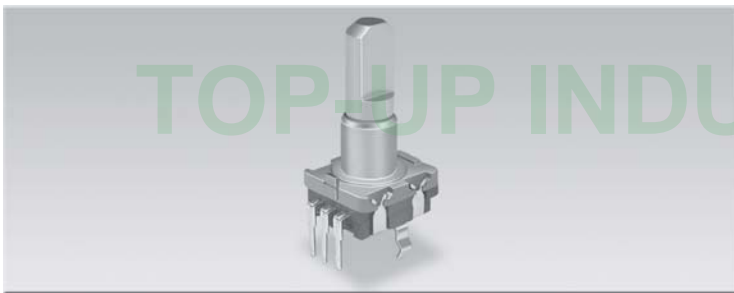
11M1HBFZ-B



11M1MSDHBZFZ-B

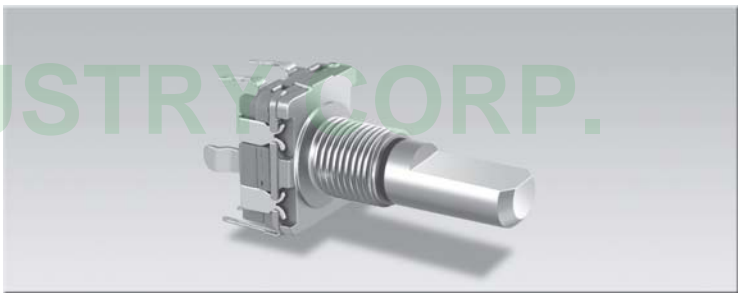


11M1VNBFX-D



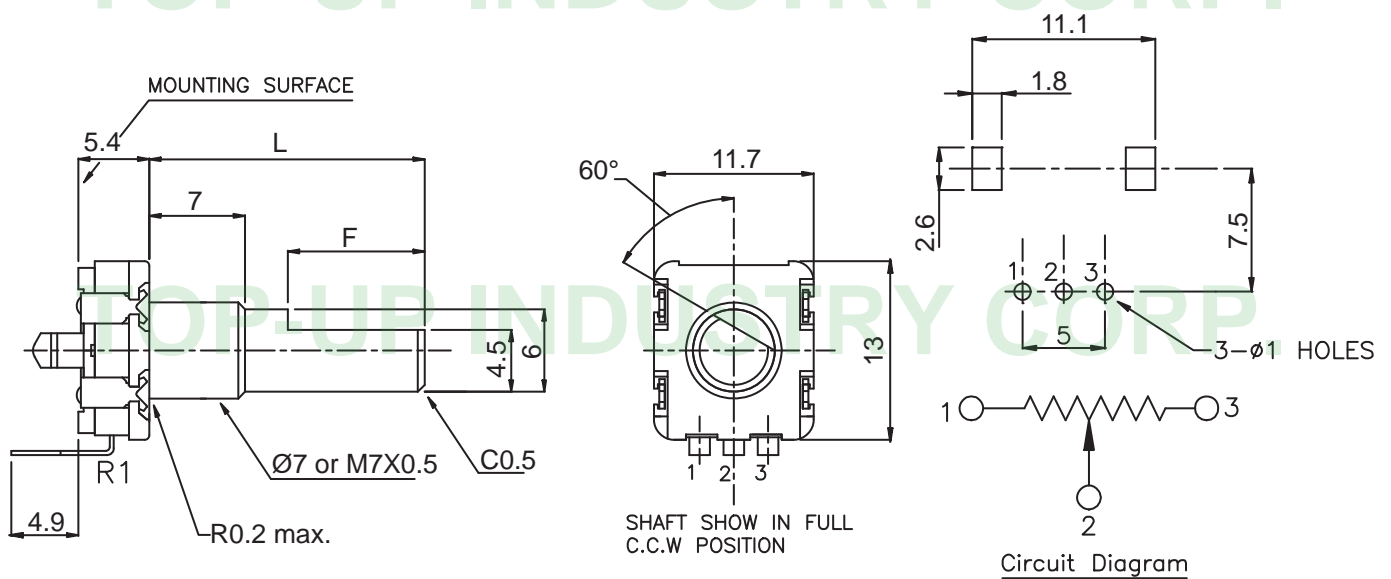
Outline Drawing

11M1MSDVBFX-D

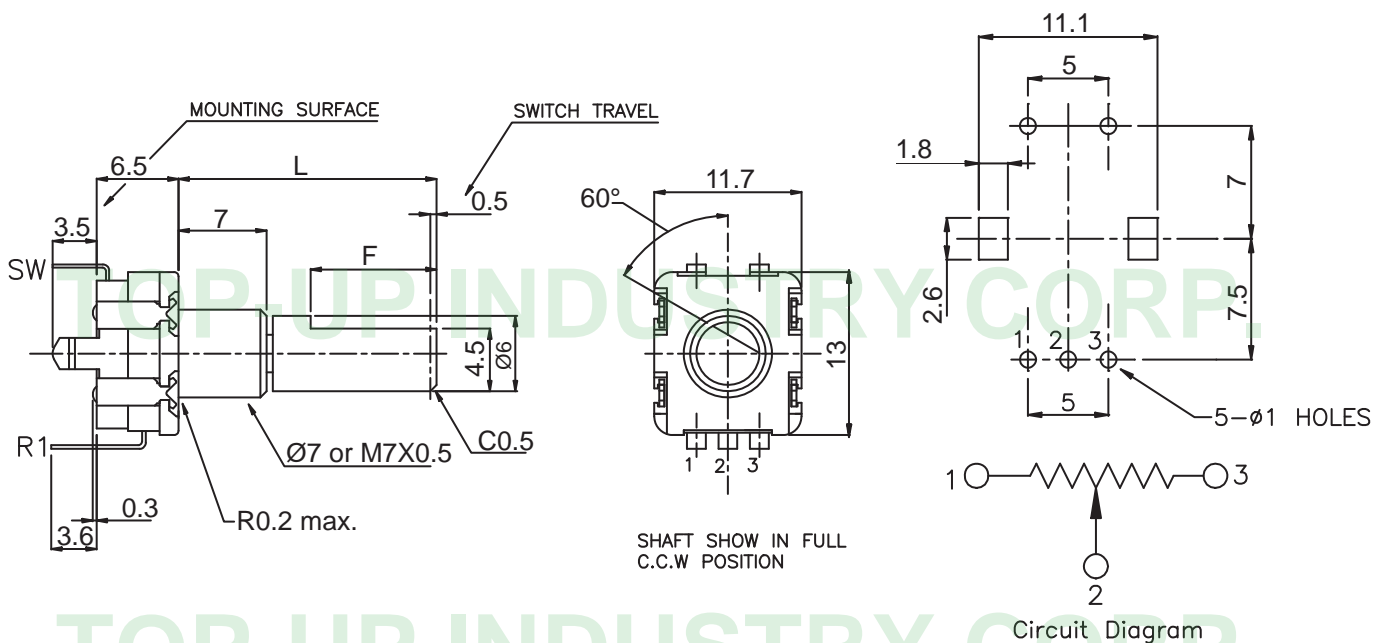


Features individual specifications

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

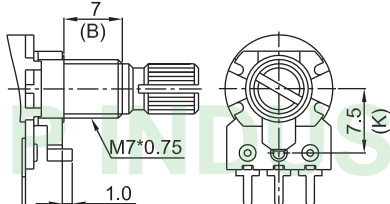
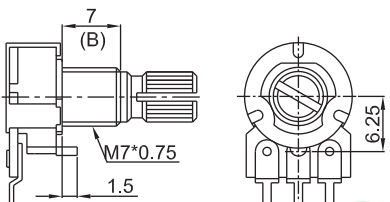
2— Dual Unit

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)						

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)

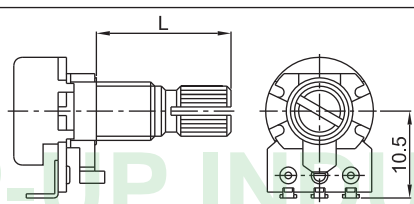
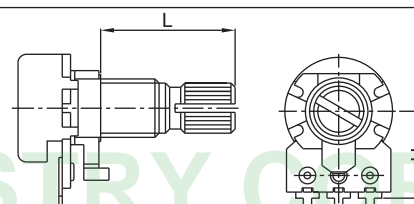
10. Type of Shaft (See Drawing 2)

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

12. Resistance Value

13. Number of Clicks : (Blank-None , 1C- Center Click)

14. Serial No.

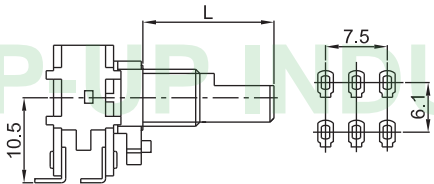
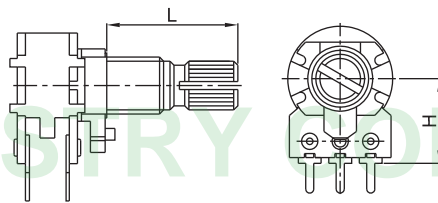
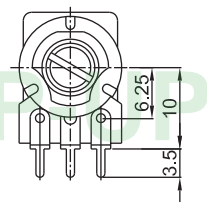
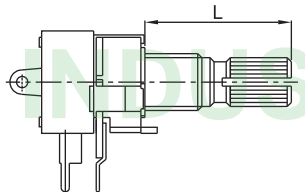
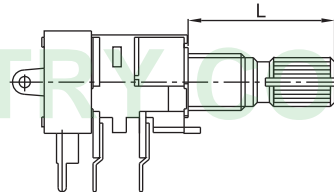
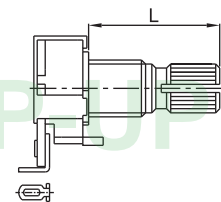
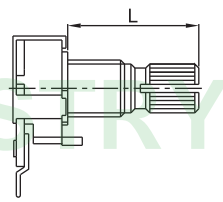
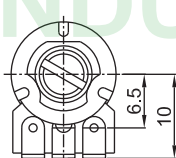
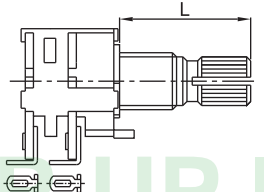
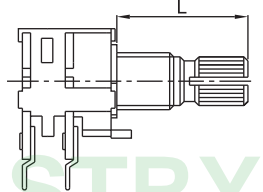
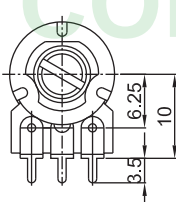
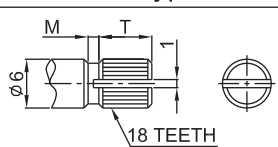
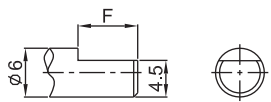
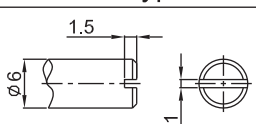
Bushing Type B With Screw	A (Solder Lug Type)	B (P.C.B Type)
	Single Unit	Single Unit
		

(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)											
			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				
M		1	2	4								

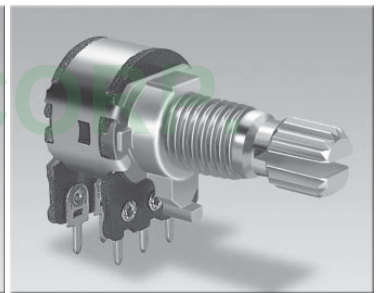
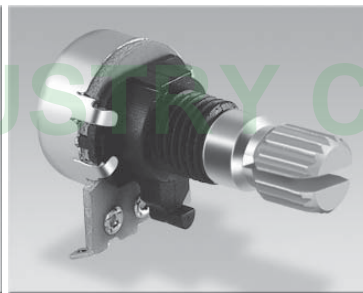
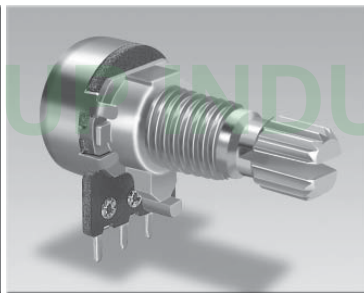
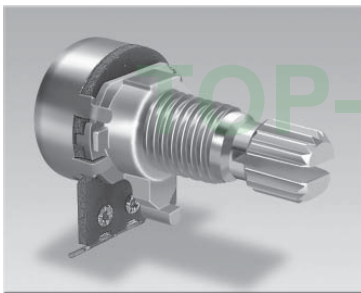
(Drawing 2)

12M1H□B-A

12M1H□B-□

12M1H□BP-A

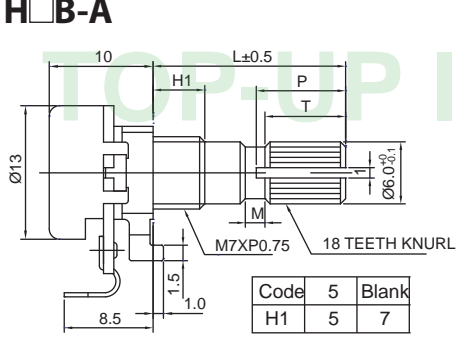
12M2H□B-□



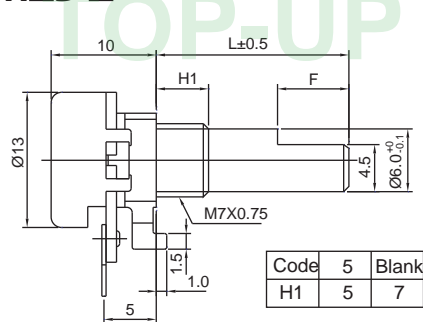
Outline Drawing

Features individual specifications

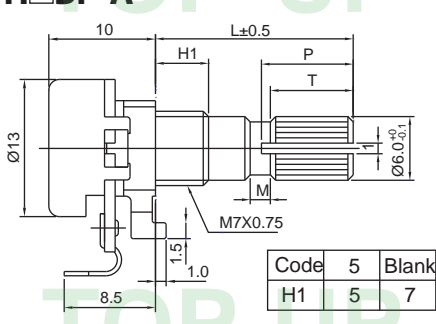
12M1H□B-A



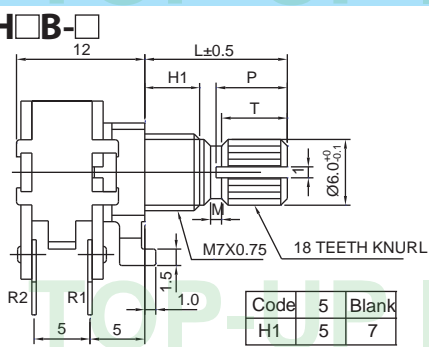
12M1H□B-□



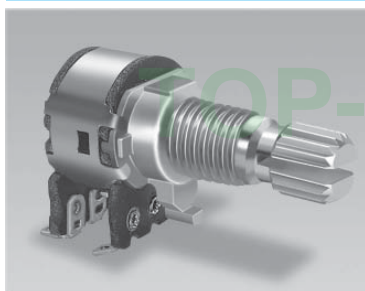
12M1H□BP-A



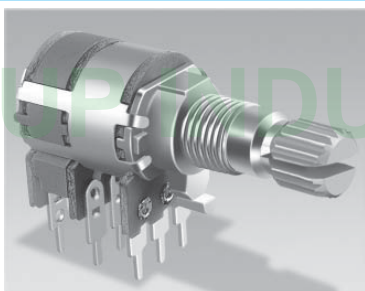
12M2H□B-□



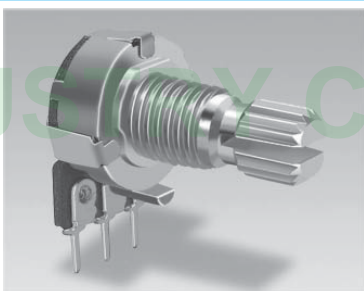
12M2H□B-A



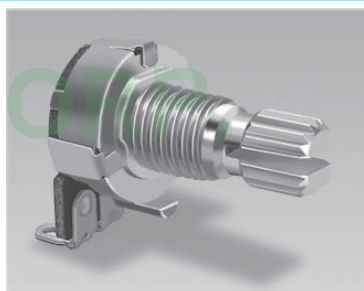
12M2SH□B-□



12M1HGB-□



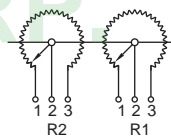
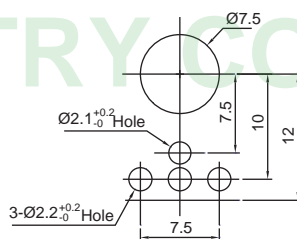
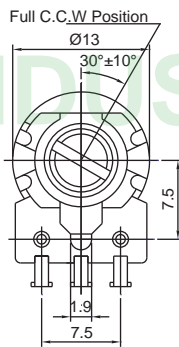
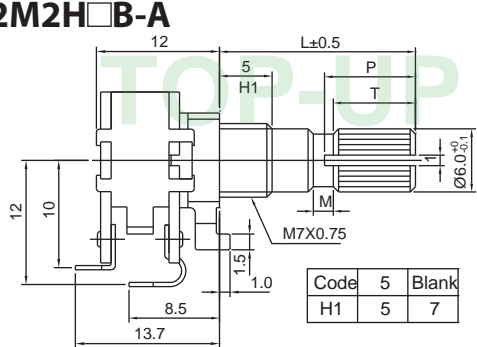
12M1HGB-A



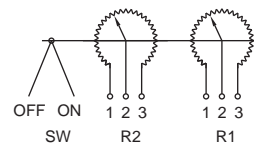
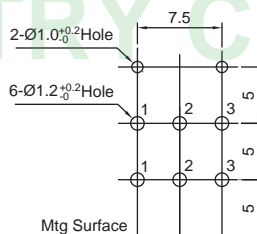
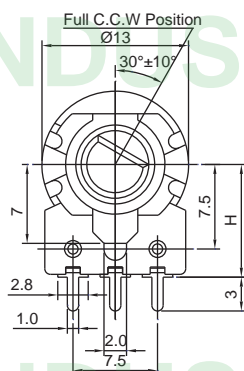
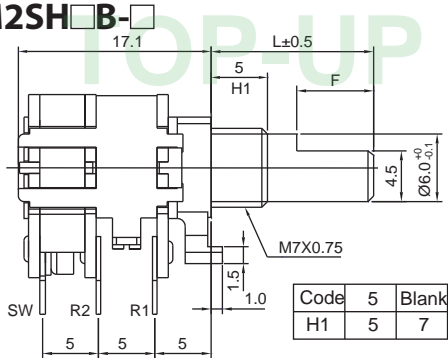
Outline Drawing

Features individual specifications

12M2H□B-A

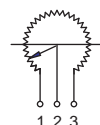
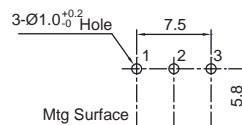
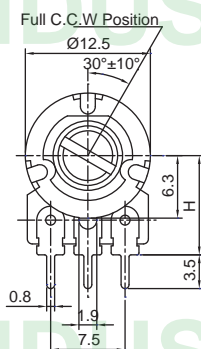
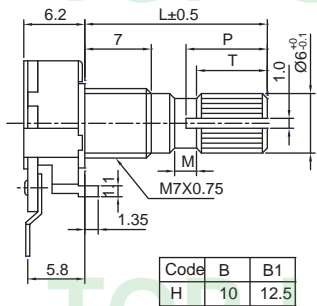


12M2SH ☐ B- ☐

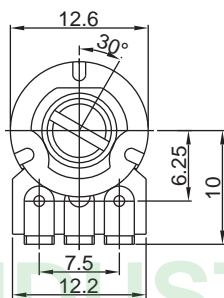
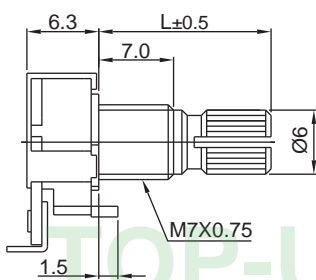


	B	B1
H	10	12.5

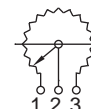
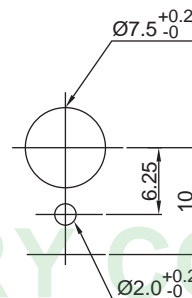
12M1HGB-



12M1HGB-A



SHAFT SHOWN IN
FULL C.C.W POSITION



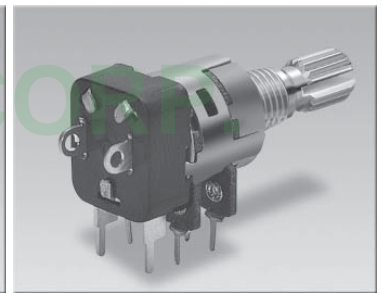
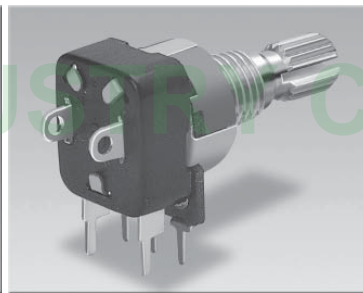
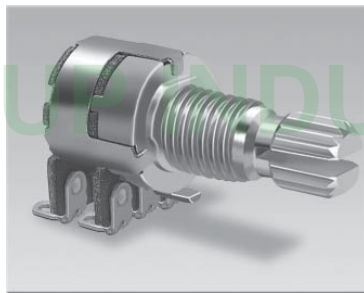
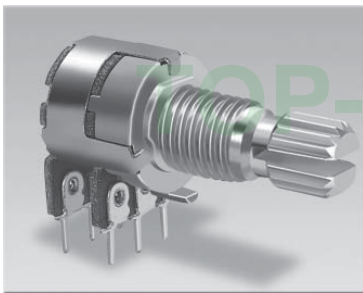
300° ROTATION
SINGLE UNIT

12M2HGB-□

12M2HGB-A

12M1SHGB-□

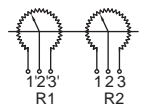
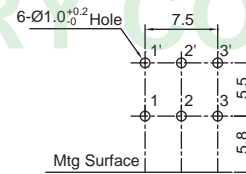
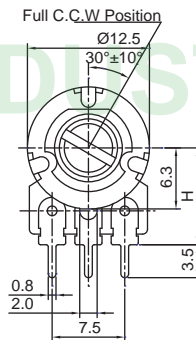
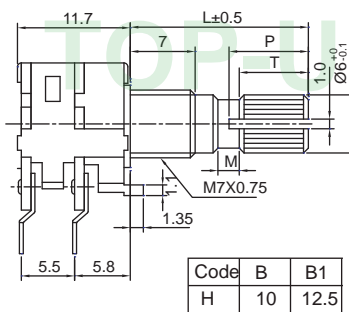
12M2SHGB-□



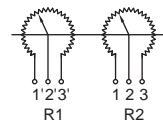
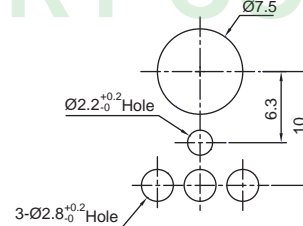
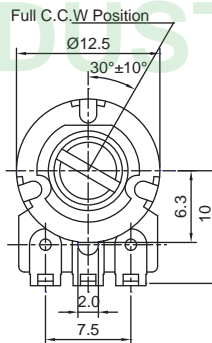
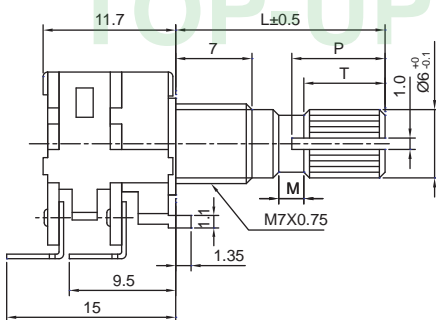
Outline Drawing

Features individual specifications

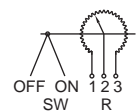
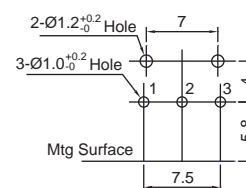
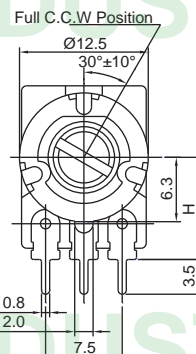
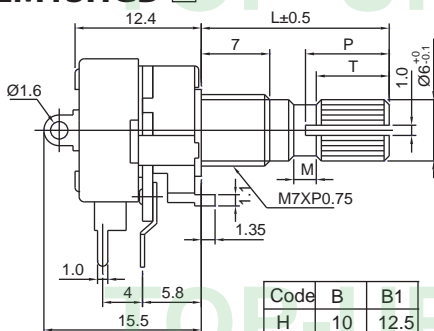
12M2HGB-□



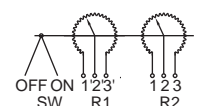
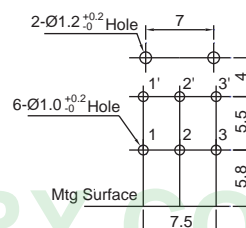
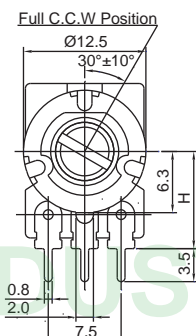
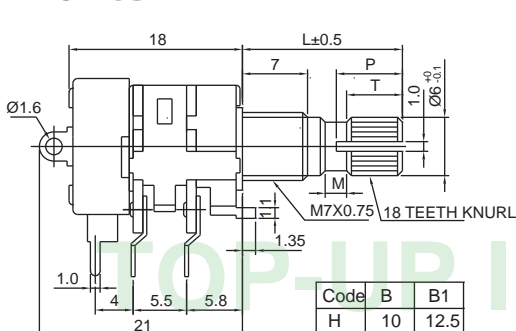
12M2HGB-A



12M1SHGB-□



12M2SHGB-□

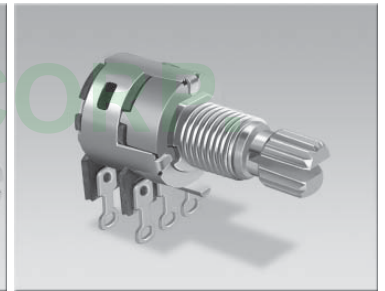
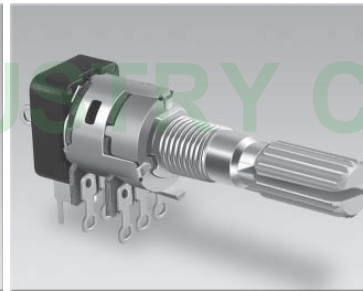
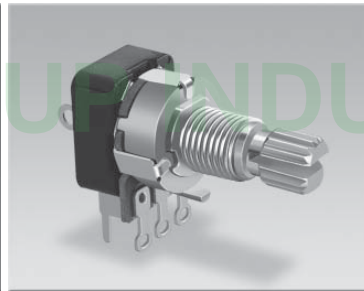
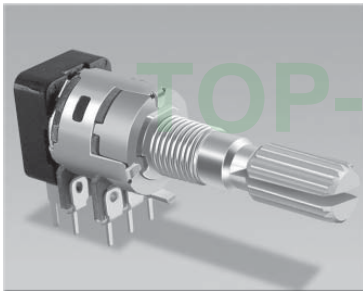


12M2NSHGB-B

12M1SHGB-A

12M2SHGB-A

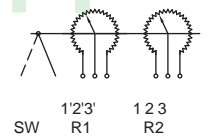
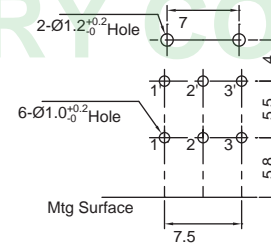
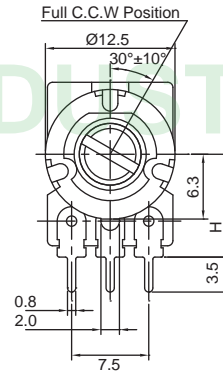
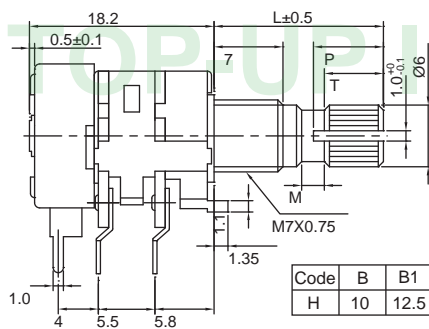
12M2HGB-A(1)



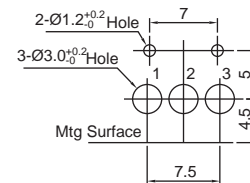
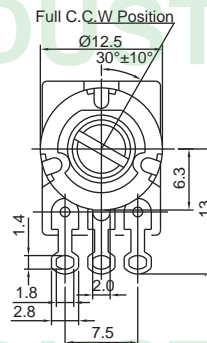
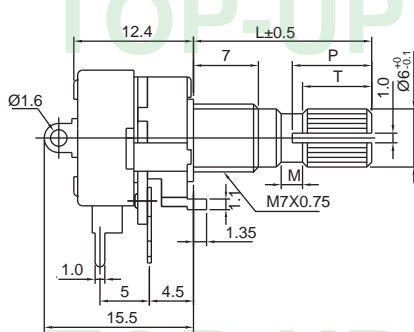
Outline Drawing

Features individual specifications

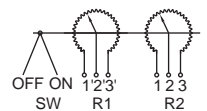
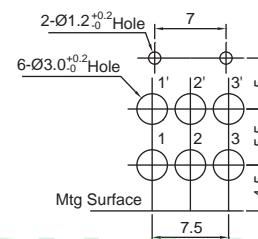
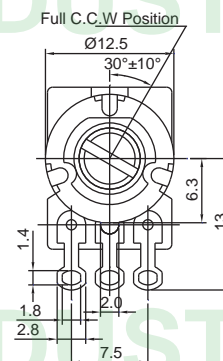
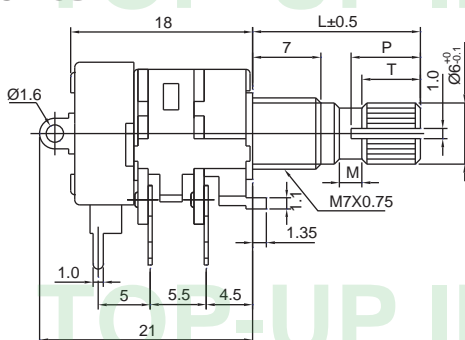
12M2NSHGB-B



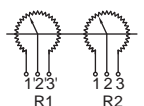
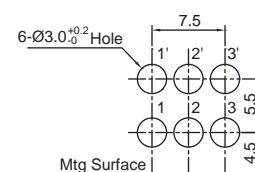
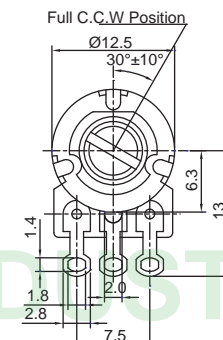
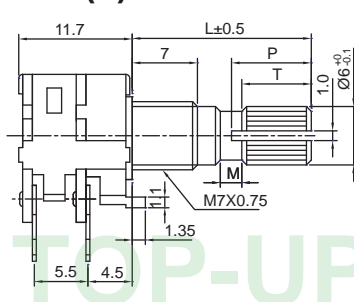
12M1SHGB-A



12M2SHGB-A



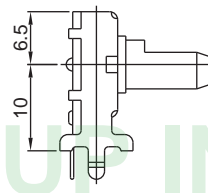
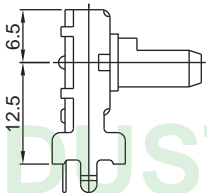
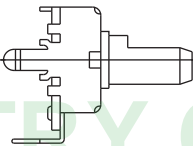
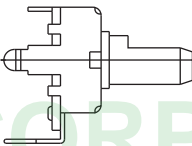
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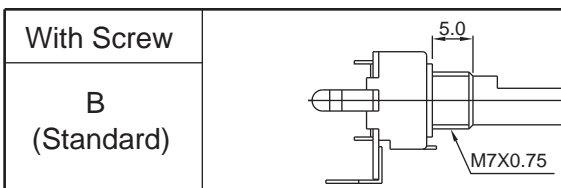
12PR, 12PQ, 12MR Series Code Explanation

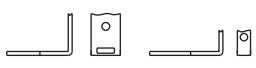

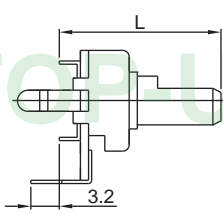
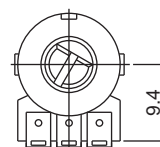
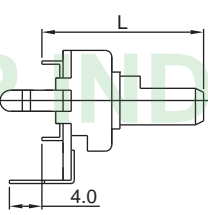
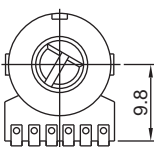
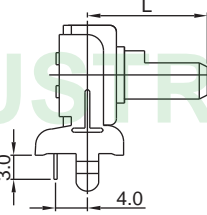
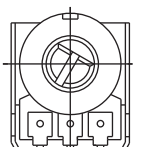
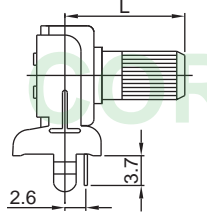
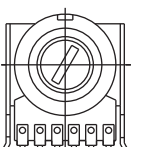
12PQ	1	H	B	YF	-	B	-	20	F	-	A	10K	-	1C	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5	6	7	8	9	10	11	12						

- 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)

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
- Serial No.



12PR Series			
D (□P.C.B□)		B (□P.C.B□)	
Vertical		Horizontal	
Single Unit	Dual Unit	Single Unit	Dual Unit
 	 	 	 

To Be Continued

12PR, 12PQ, 12MR Series Code Explanation

(Drawing 3)

12MR Series															
Vertical	D (P.C.B Type)														
						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															
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

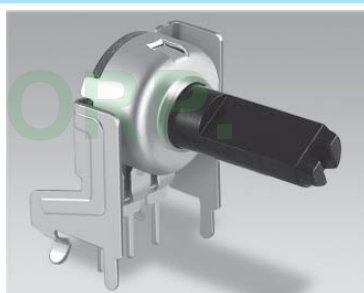
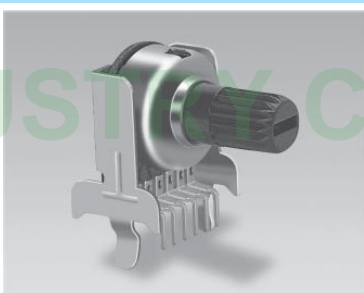
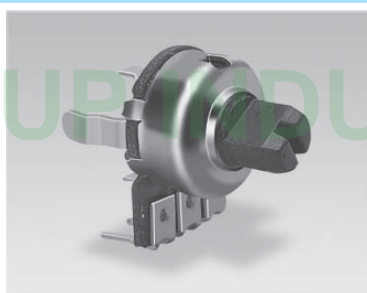
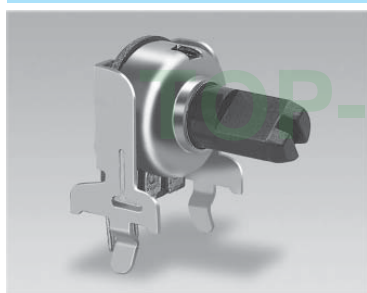
Rotation life	≥ 10,000 cycles(special : 100,000 cycles.)
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12PR1HF-B

12PR1VF2-D

12PR2HF-B

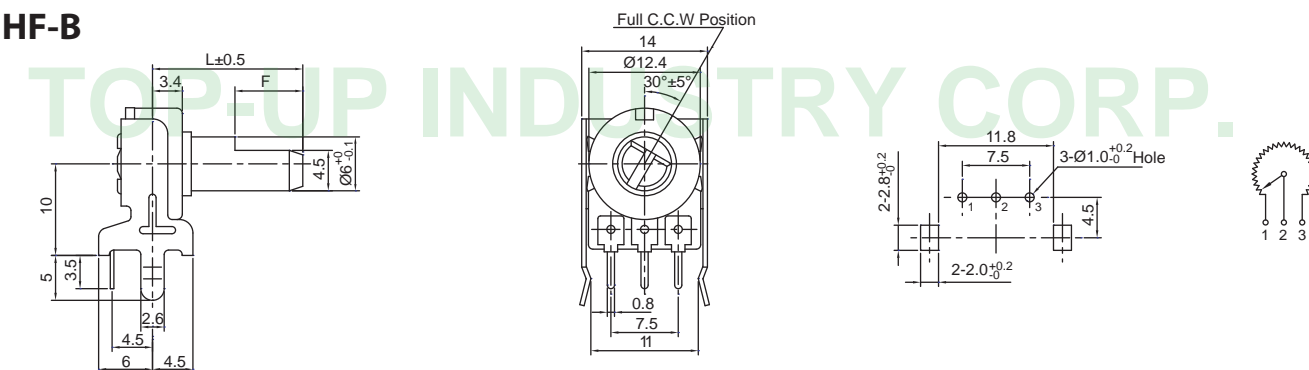
12PR2HEF-B



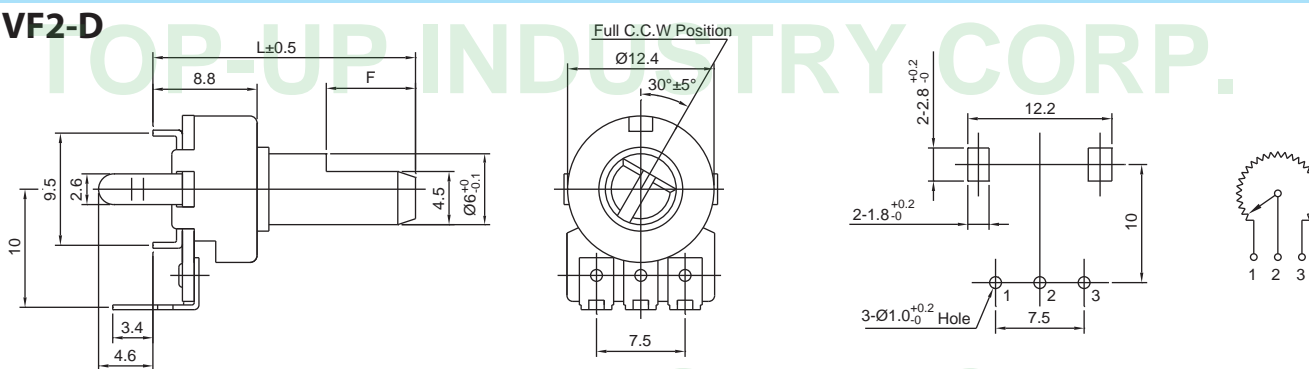
Outline Drawing

Features individual specifications

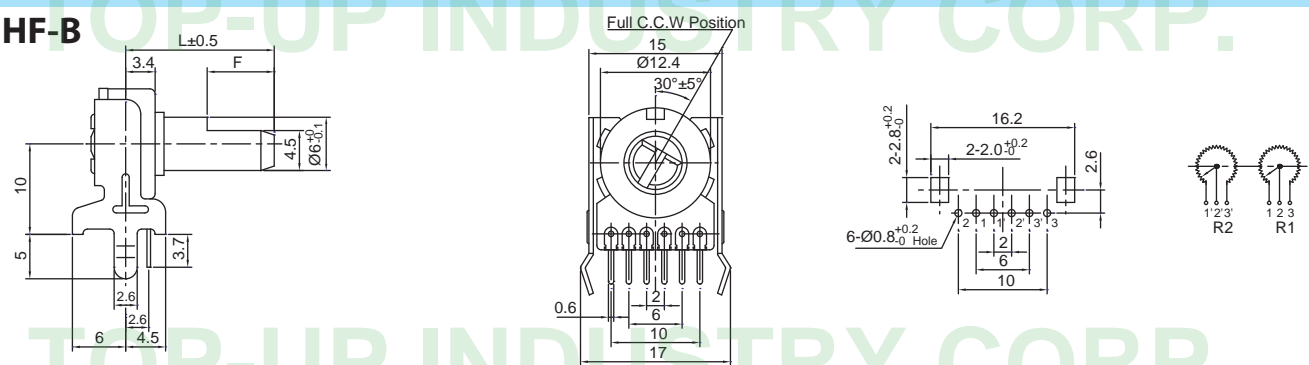
12PR1HF-B



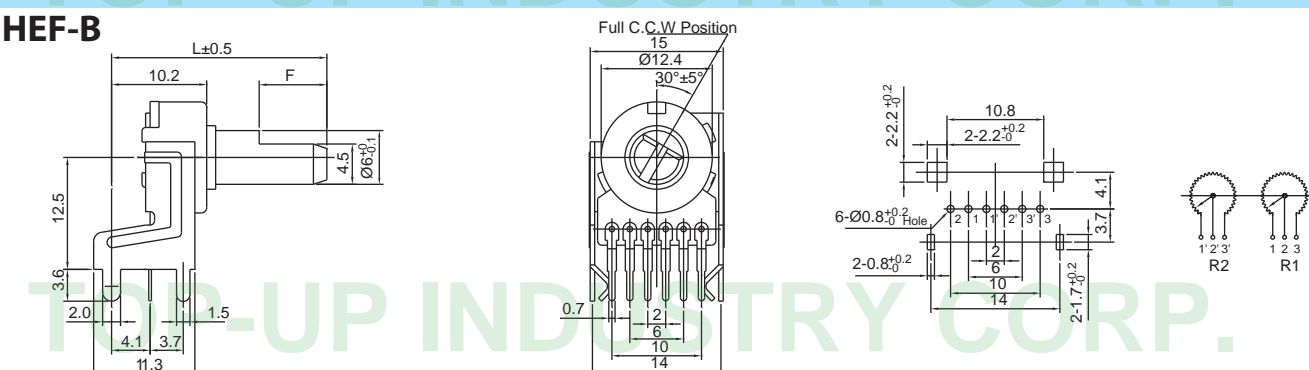
12PR1VF2-D



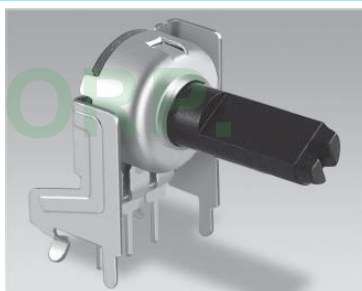
12PR2HF-B



12PR2HEF-B



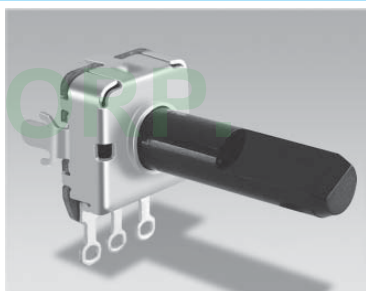
12PR1HEF-B



Features individual specifications

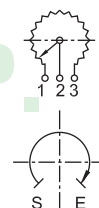
300° ROTATION
DUAL UNIT

12PQ1VF-A



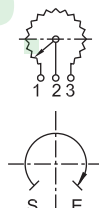
Features individual specifications

Technical drawing of the 1000 series ball bearing. The side view shows a width of 6.5 and a shoulder height of 2.5. The cross-sectional view shows an outer diameter of 7.5, an inner diameter of 3, and a bore tolerance of $+0.2/-0.0$. The drawing also shows the internal balls and cage structure.



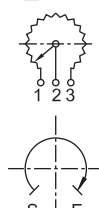
300° ROTATION
SINGLE UNIT

Technical drawing of a 1/2 inch diameter bolt. The drawing shows a side view of the bolt with the following dimensions: a length of 7.5, a total length of $L \pm 0.5$, a diameter of 12.8, and a 30° angle at the base of the head.



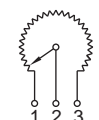
300° ROTATION
SINGLE UNIT

HF-B

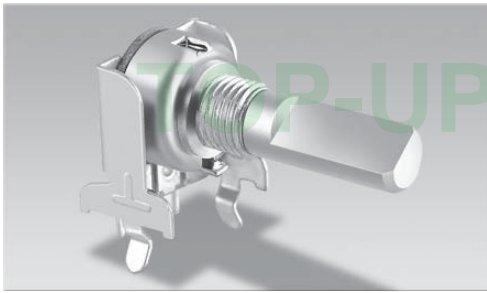


300° ROTATION
SINGLE UNIT

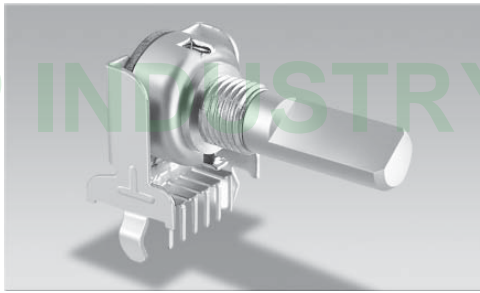
Figure 1: Dimensions of the 1000 Series. The figure shows two views of a component. The top view shows a rectangular part with a total width of 3.5, a central slot width of 7.5, and a distance from the left edge to the start of the slot labeled $L \pm 0.5$. The distance from the end of the slot to the right edge is labeled F . The bottom view shows a trapezoidal profile with a top width of 12.8, a bottom width of 12.2, and a height of $2.7^{+0.2}_{-0}$. The side angle is $30^\circ \pm 5^\circ$. A note indicates "Full C.C.W Position".



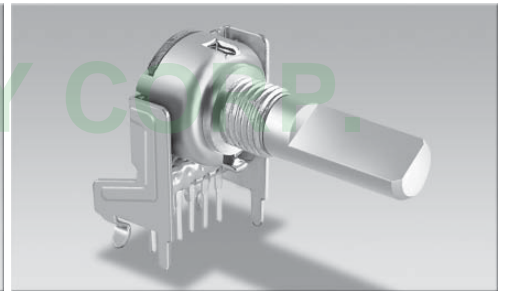
12MR1HBF-B



12MR2HBF-B



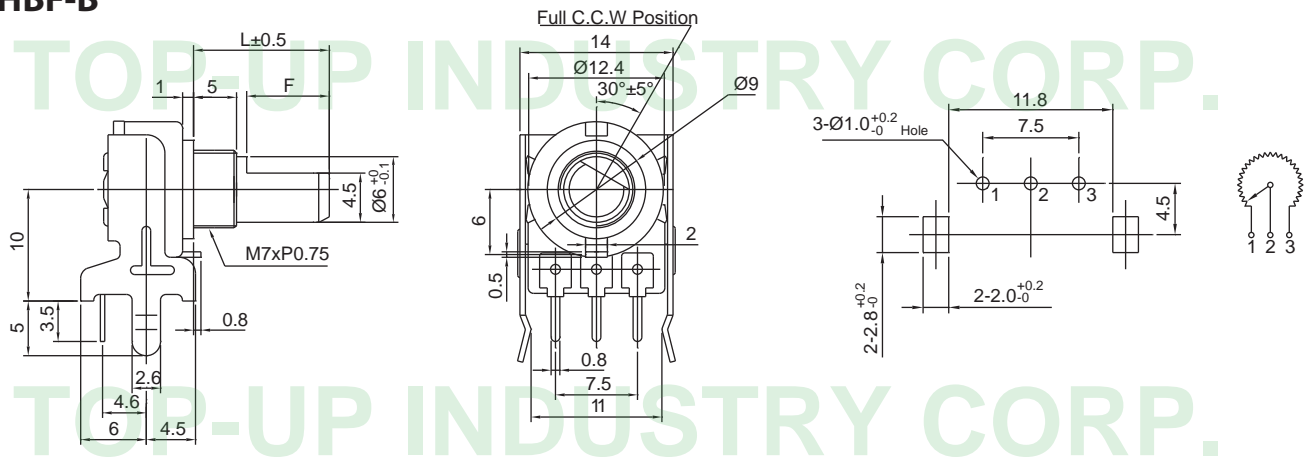
12MR2HBEF-B



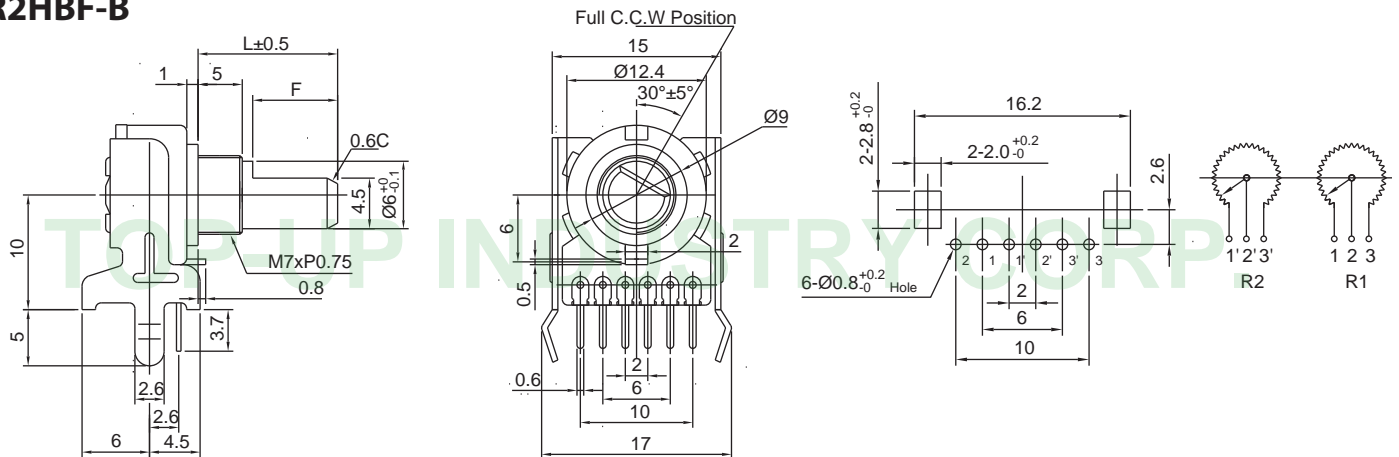
Outline Drawing

Features individual specifications

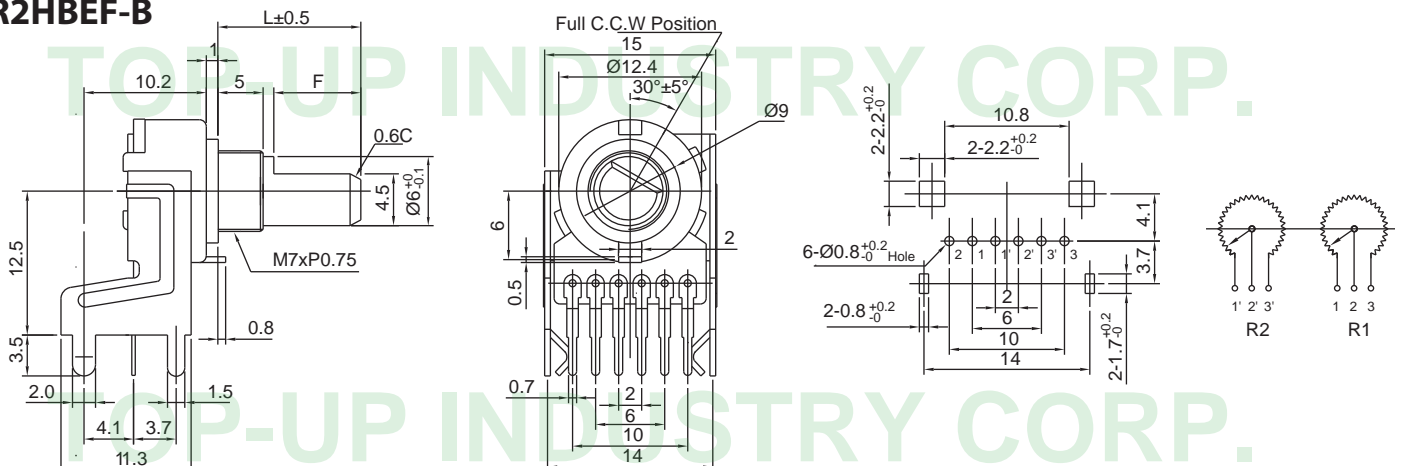
12MR1HBF-B



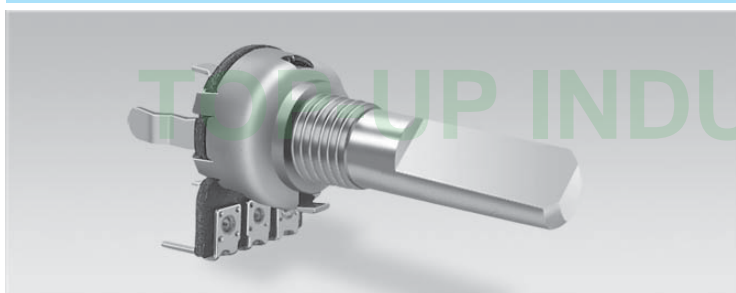
12MR2HBF-B



12MR2HBEF-B

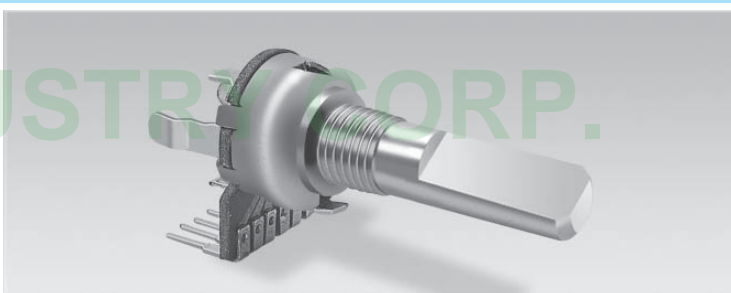


12MR1VBF-D



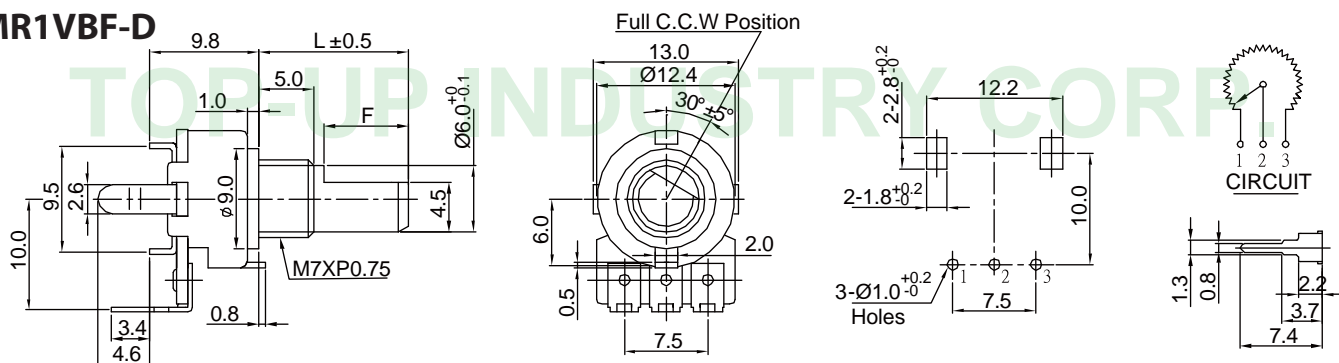
Outline Drawing

12MR2VBF-D

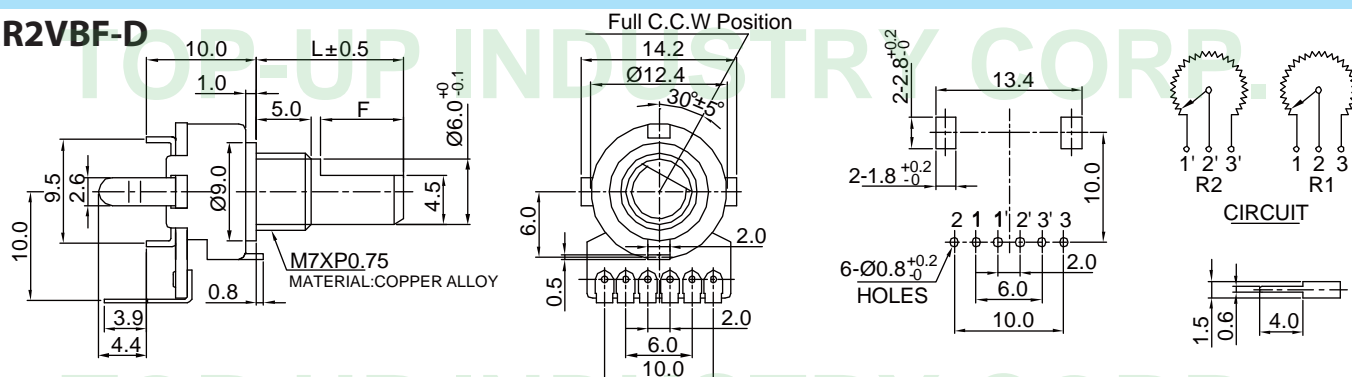


Features individual specifications

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)

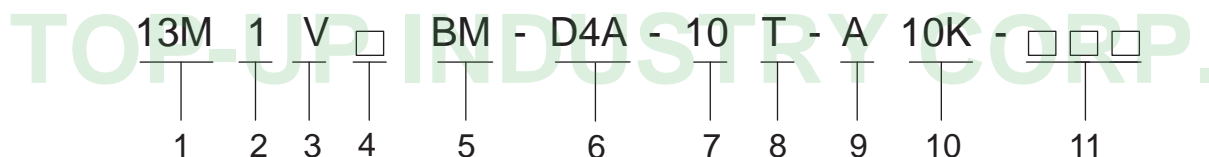
Electrical Characteristics:

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

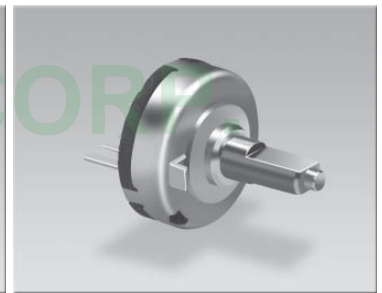
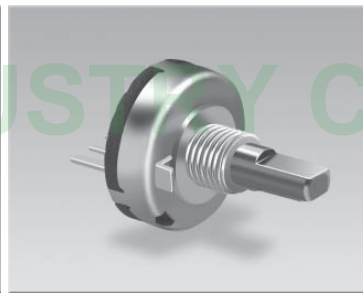
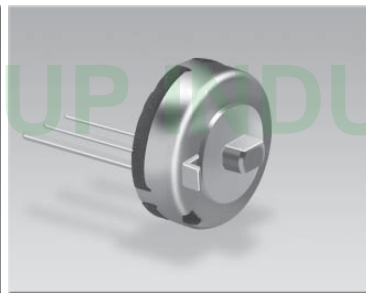
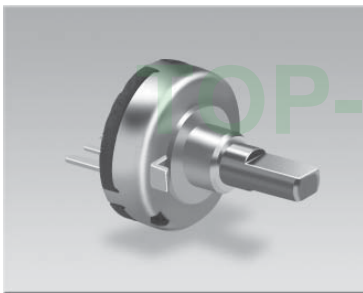
11. Serial No.

13M1VB-DA

13M1V-D3A

13M1VBM-D4A

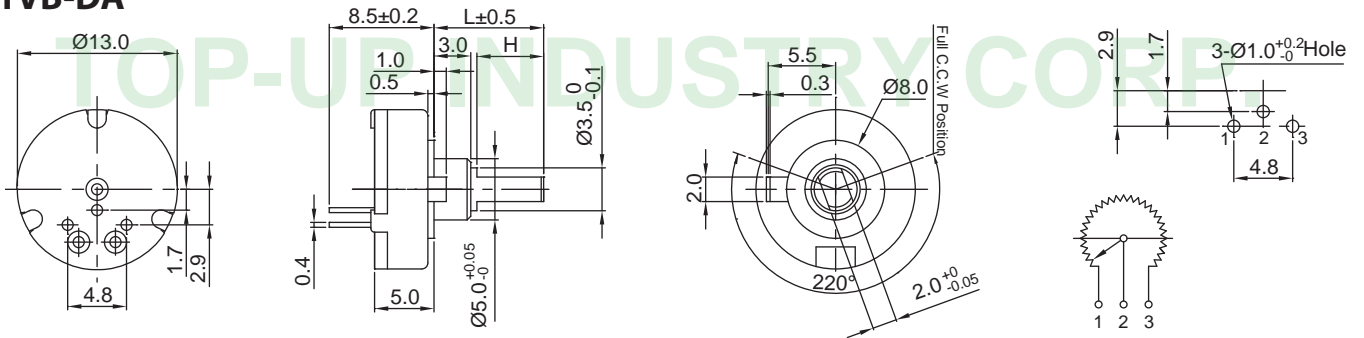
13M1V1BN-DA



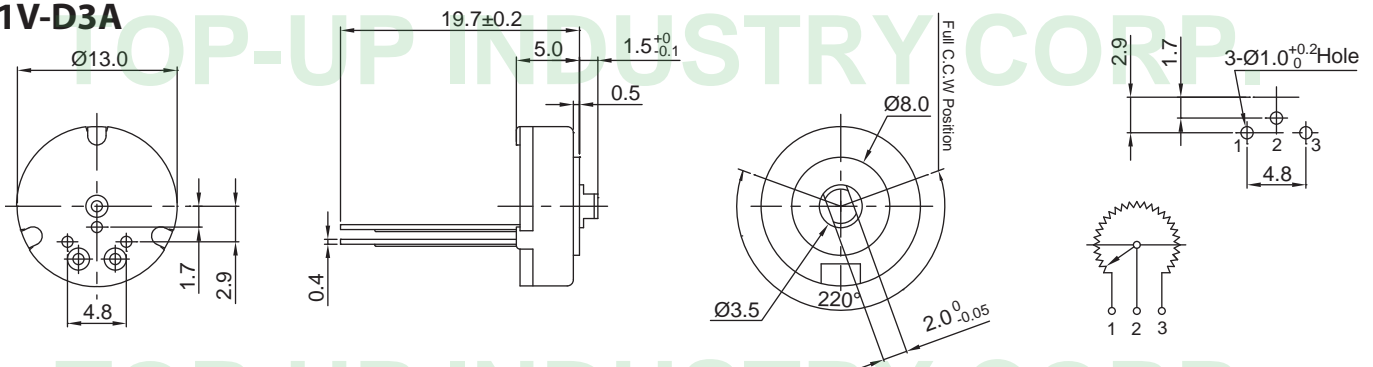
Outline Drawing

Features individual specifications

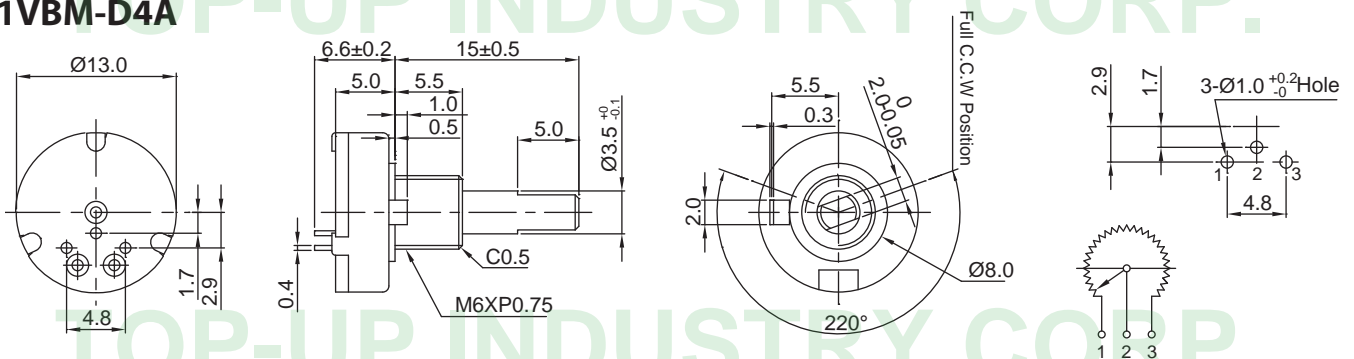
13M1VB-DA



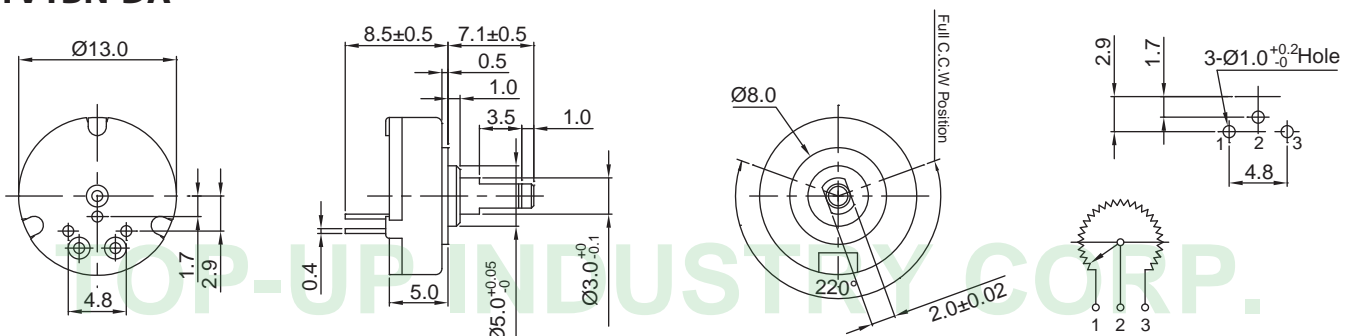
13M1V-D3A



13M1VBM-D4A



13M1V1BN-DA



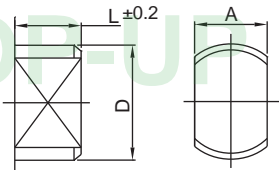
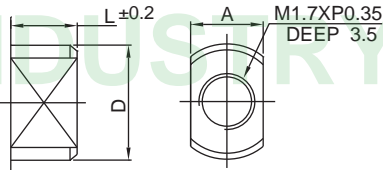
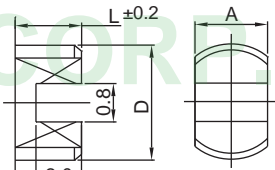
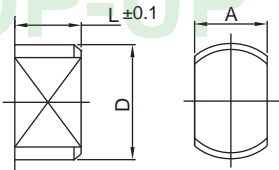
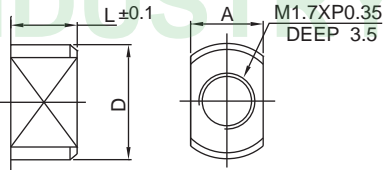
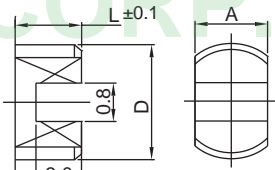
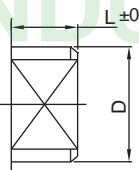
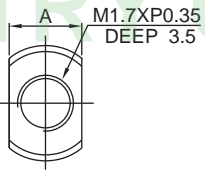
10Q ,12Q, 16Q Series Code Explanation

12Q 1 S H P - D - 2.2 F - A 10K - □ □ □

1 2 3 4 5 6 7 8 9 10 11

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)

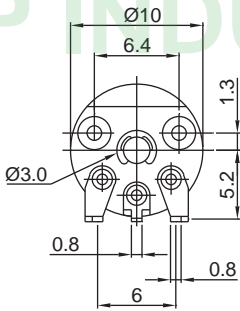
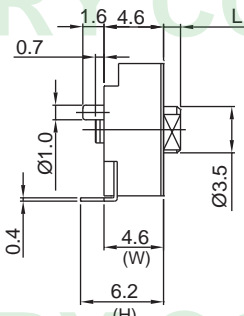
10Q Series								
R-Type			F-Type			S-Type		
								
L	A	D	L	A	D	L	A	D
1.0~5.0	2.2	Ø3.5	1.0~5.0	2.2	Ø3.5	3.0~5.0	2.2	Ø3.5
12Q Series								
R-Type			F-Type			S-Type		
								
L	A	D	L	A	D	L	A	D
1.0~7.0	2.2	Ø3.5	1.0~7.0	2.2	Ø3.5	3.0~5.0	2.2	Ø3.5
16Q Series (F - Type)								
								
L	A	D						
1.0~5.0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

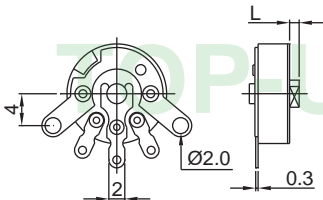
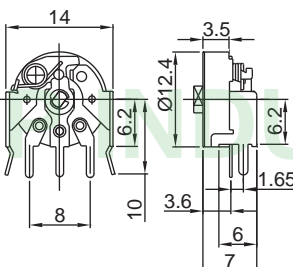
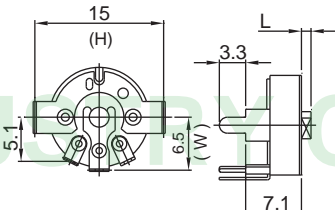
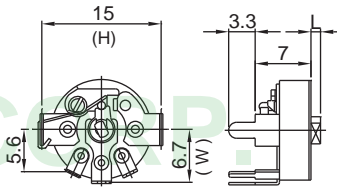
9. Type of Taper (See Taper Chart Page 220)
10. Resistance value
11. Serial No.

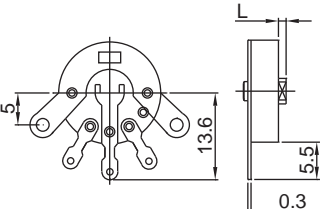
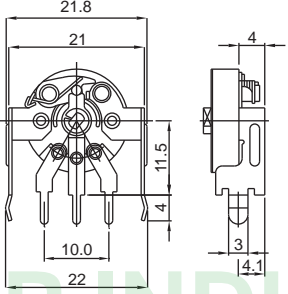
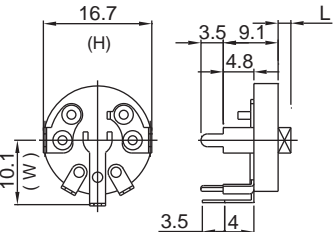
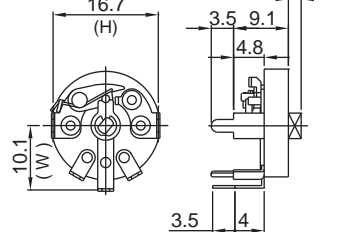
10Q ,12Q, 16Q Series Code Explanation

12Q 1 S H P - D - 2.2 F - A 10K - □ □ □

1 2 3 4 5 6 7 8 9 10 11 (Drawing 1)

10Q Series												
D (P.C.B Type)												
												
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)			
															
Code	D	D1	D2	D3	D4	Code	D	D1	D2	D3	D4	D5	D6		
H	15	12.1	13.5	13.4	13.5	H	15	12.6	17	12.5	13.5	13.5	16.4		
W	6.5	6.5	7	6.5	6.75	W	6.7	6.5	9	6.6	6.75	7	6.5		

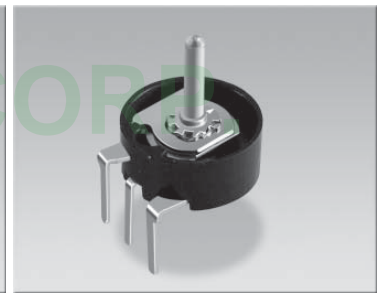
16Q Series													
Without Switch				With Switch				Without Switch				With Switch	
A (Solder Lug Type)				B (P.C.B Type)				D (P.C.B Type)				D (P.C.B Type)	
													
Code	D	D1	D2	D3	D4	Code	D	D1	D2	D3			
H	16.7	17.2	17.4	16.5	16.5	H	16.7	22.5	17.4	16.5			
W	10.1	10	9	8	9	W	10.1	8	9	8			

10Q1VP-D

10Q1VP-D1

10Q1V-D1

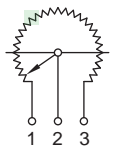
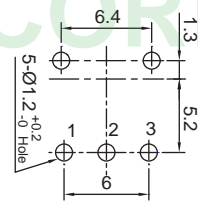
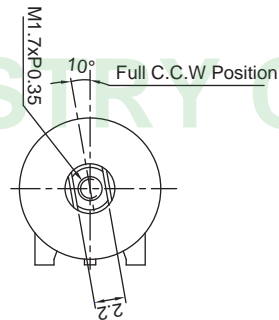
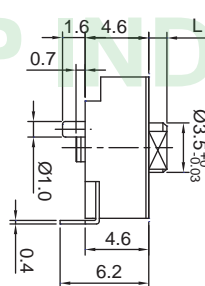
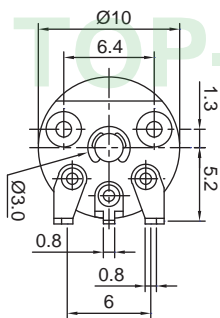
10Q1VP-D2



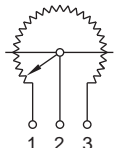
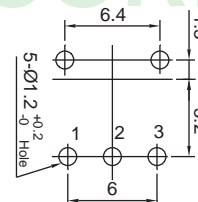
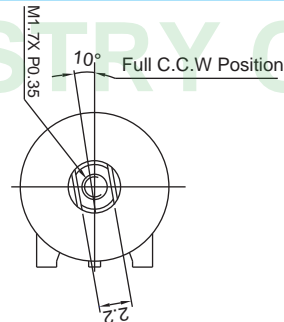
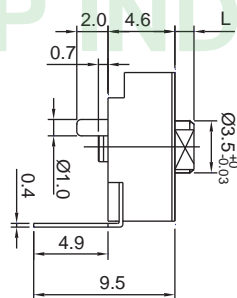
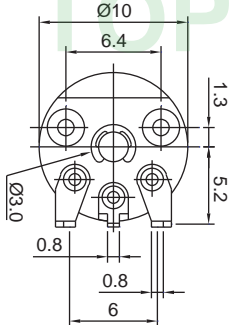
Outline Drawing

Features individual specifications

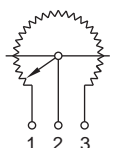
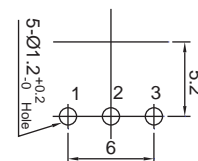
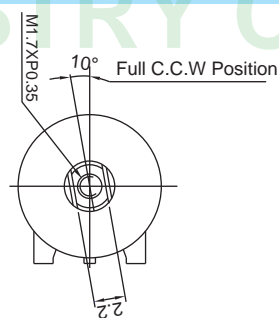
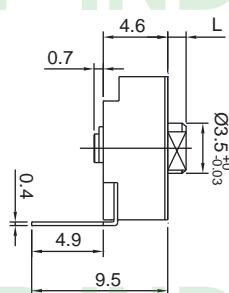
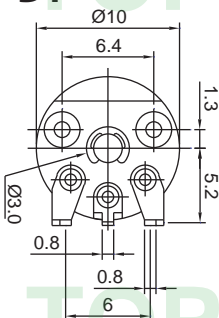
10Q1VP-D



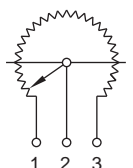
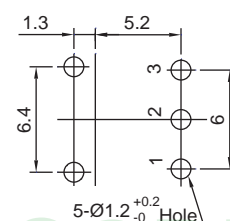
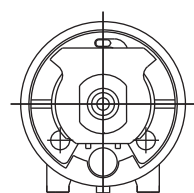
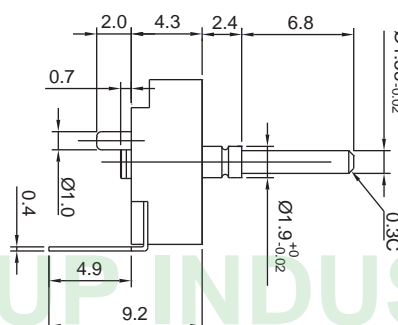
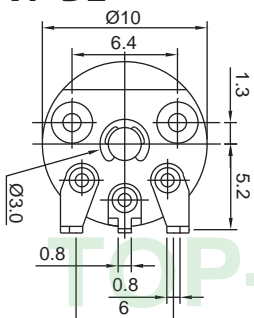
10Q1VP-D1



10Q1V-D1



10Q1VP-D2

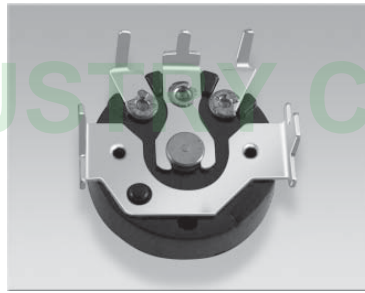
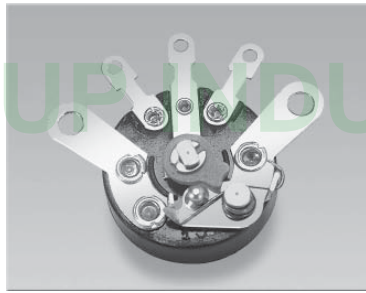
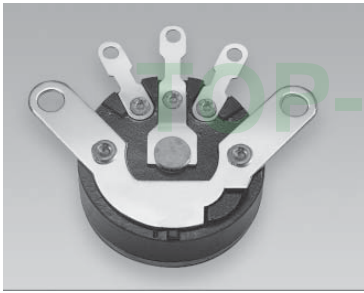


12Q1H-A

12Q1SH-A

12Q1V-D3

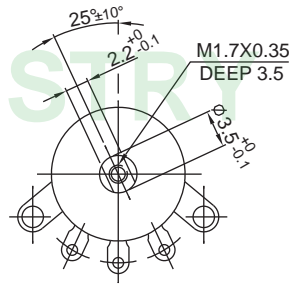
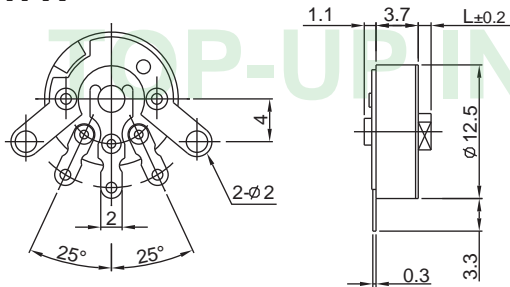
12Q1V-C



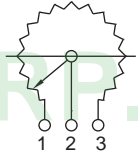
Outline Drawing

Features individual specifications

12Q1H-A

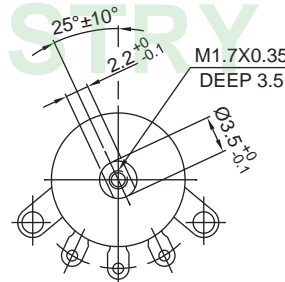
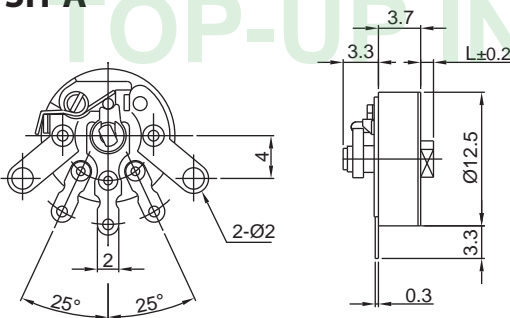


SHAFT SHOWN IN FULL C.C.W POSITION

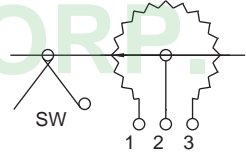


230° ROTATION SINGLE UNIT

12Q1SH-A

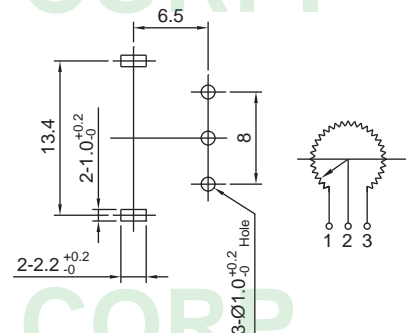
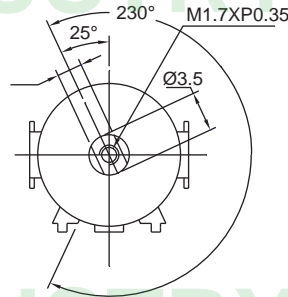
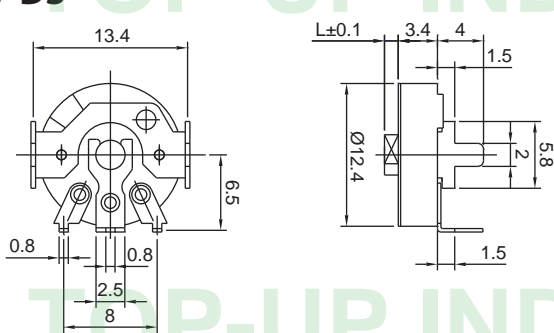


SHAFT SHOWN IN FULL C.C.W POSITION

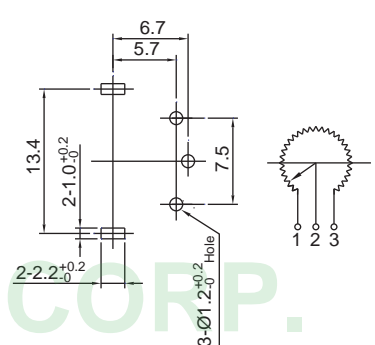
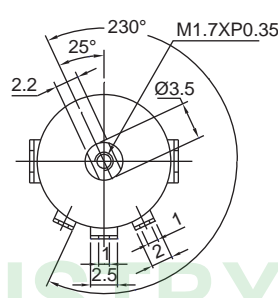
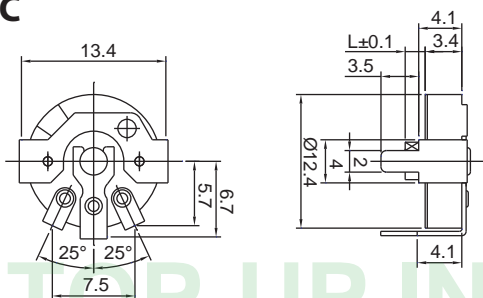


230° ROTATION SINGLE UNIT WITH SWITCH S.P.S.T.12VDC.0.5 A

12Q1V-D3



12Q1V-C

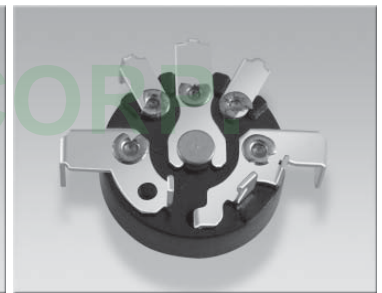
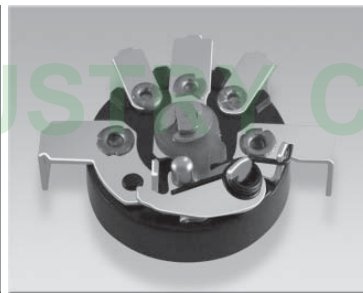
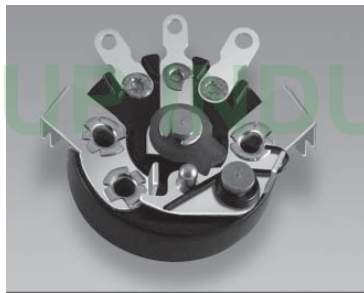
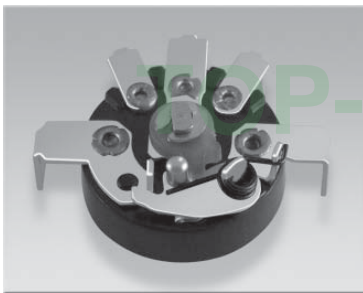


12Q1V-□

12Q1SH-A(1)

12Q1SV-C1

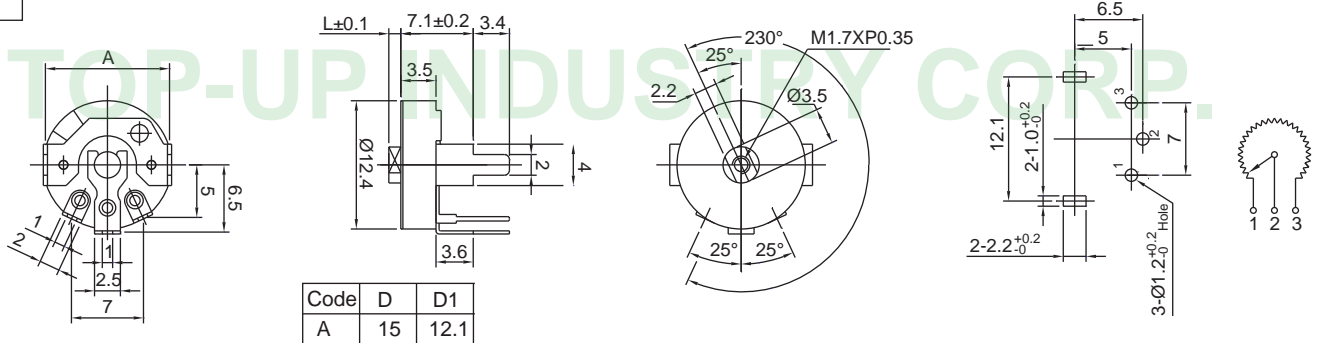
12Q1V-C1



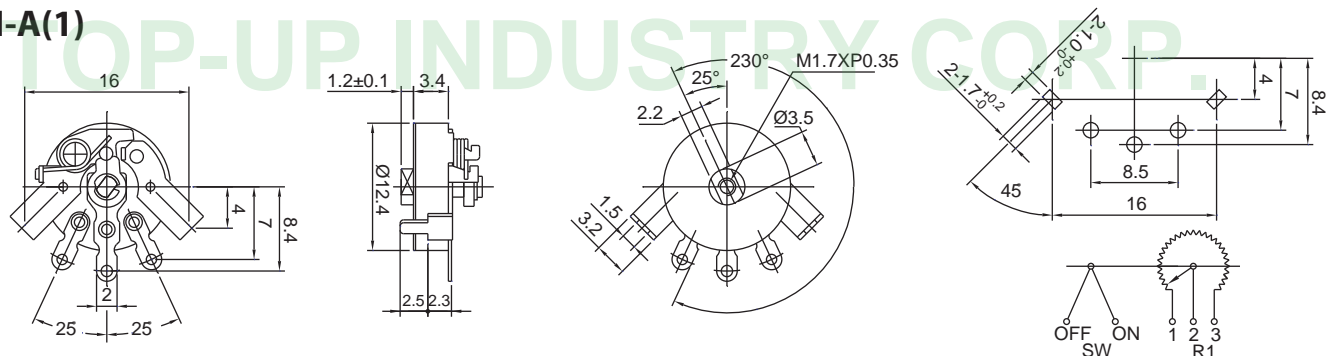
Outline Drawing

Features individual specifications

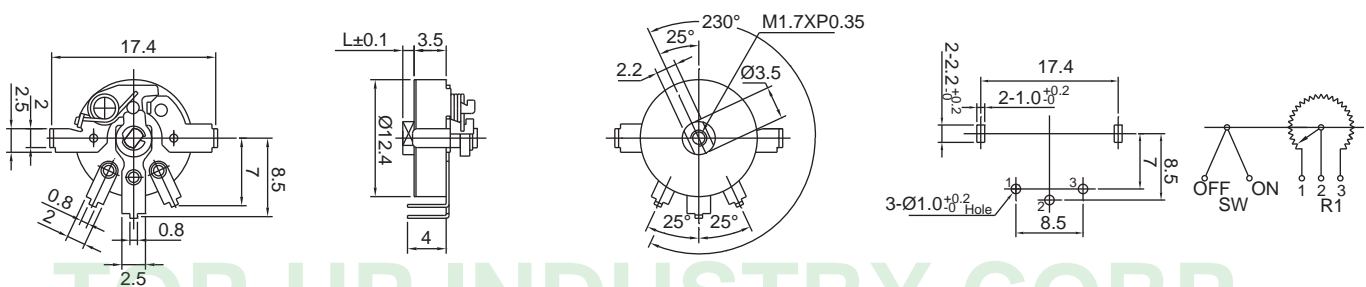
12Q1V-□



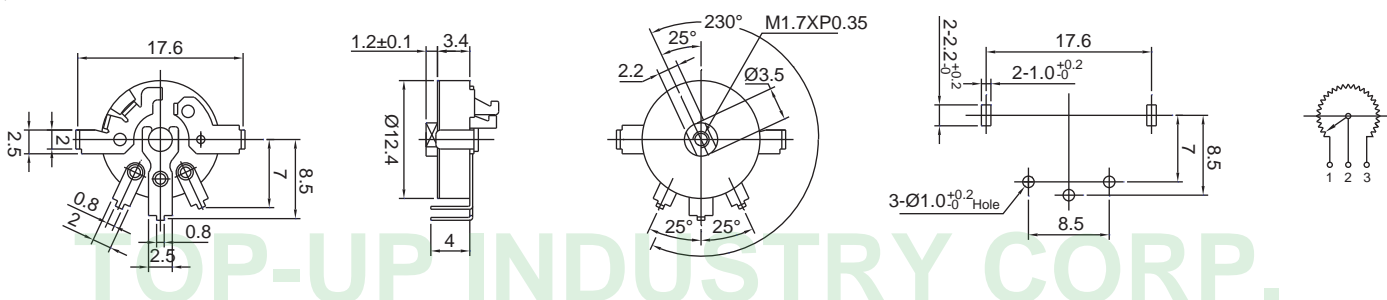
12Q1SH-A(1)



12Q1SV-C1



12Q1V-C1

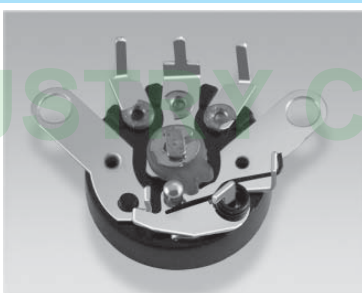


12Q1H-A(1)

12Q1H-A(2)

12Q1SV-D6

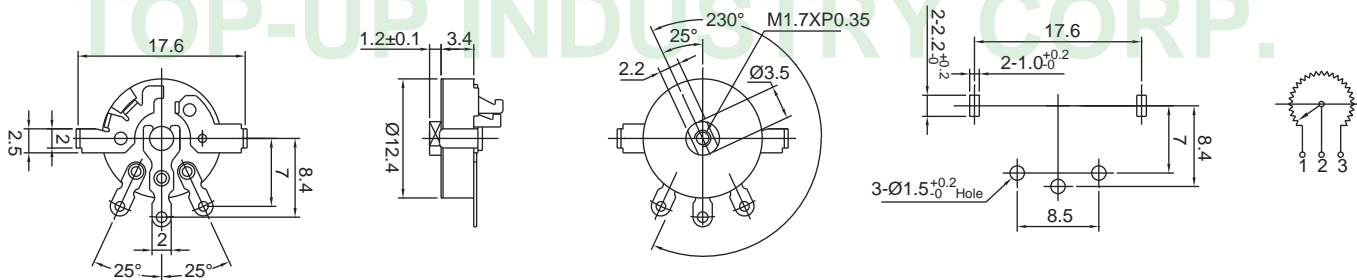
12Q1SH-B



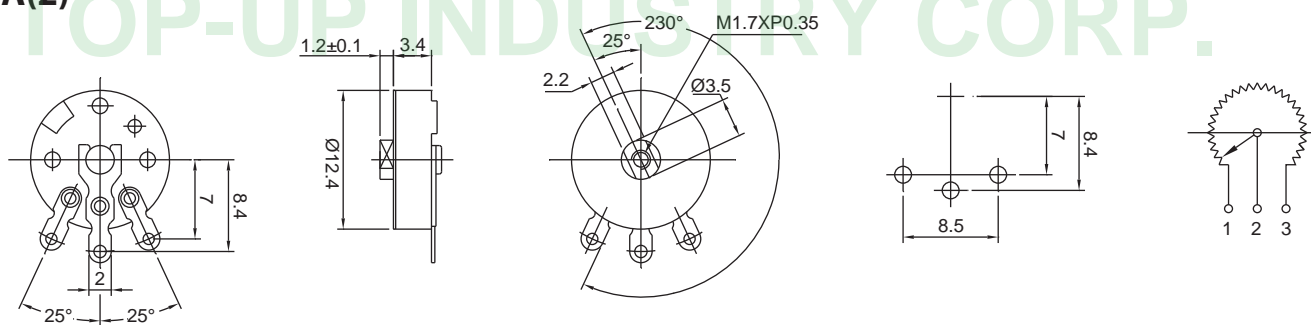
Outline Drawing

Features individual specifications

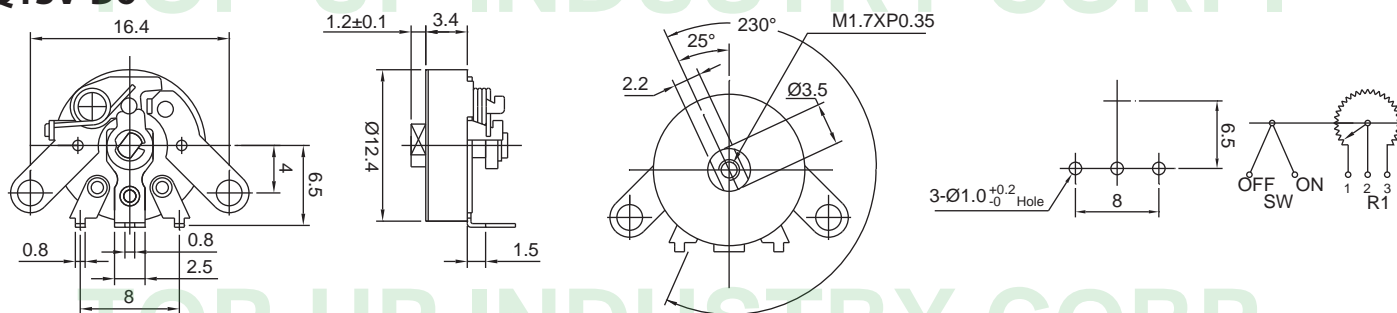
12Q1H-A(1)



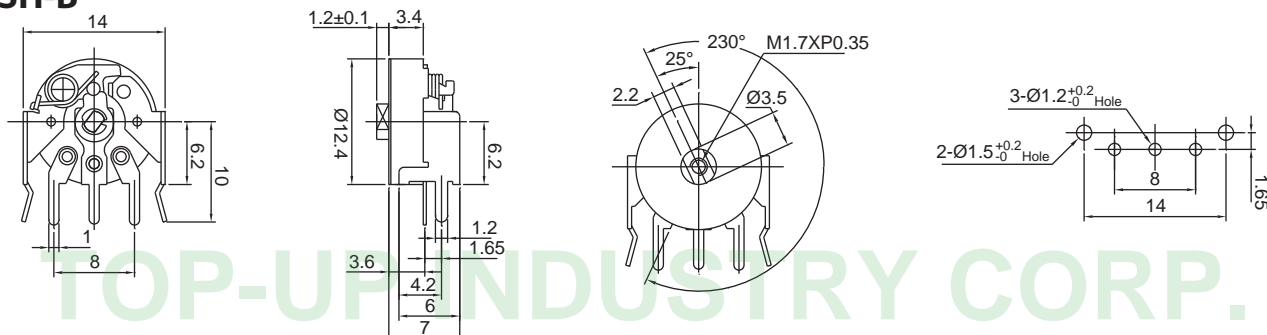
12Q1H-A(2)



12Q1SV-D6



12Q1SH-B

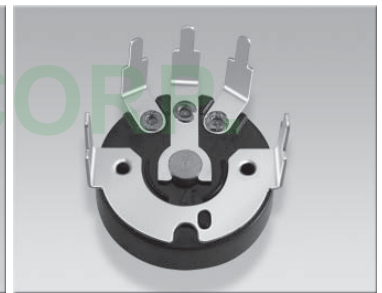
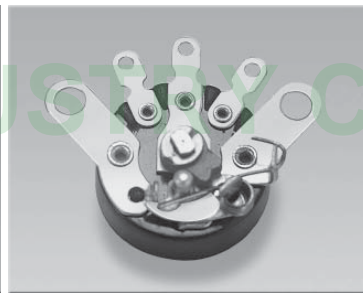
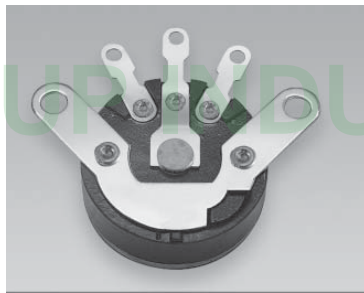


12Q1SH-B(1)

16Q1H-A

16Q1SH-A

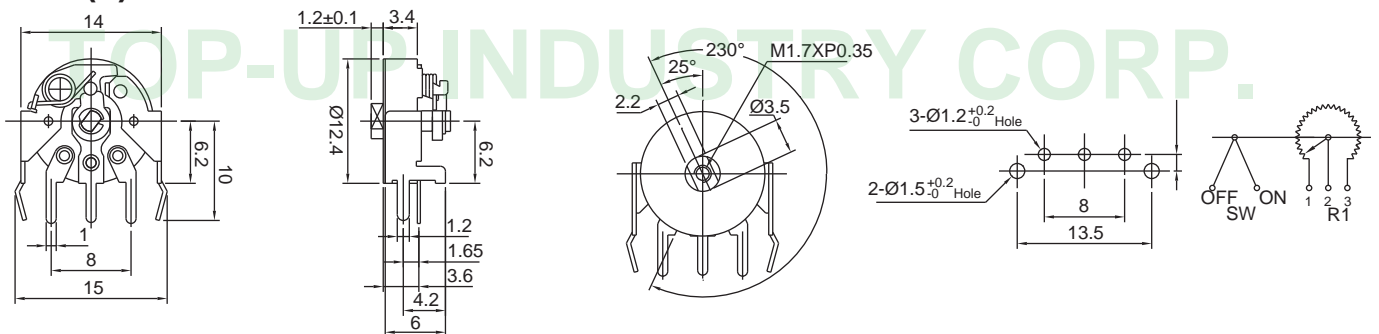
16Q1V-D3



Outline Drawing

Features individual specifications

12Q1SH-B(1)

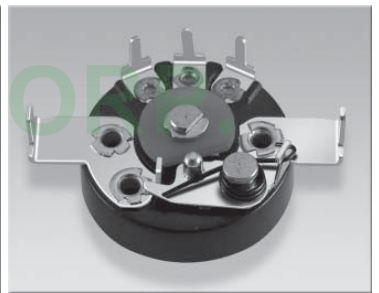
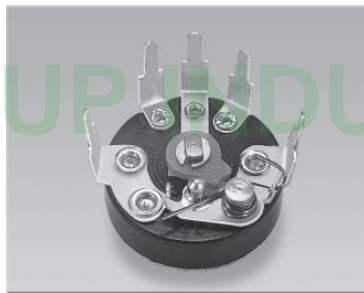
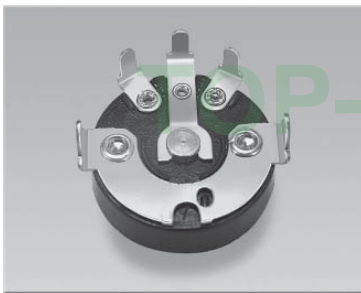


16Q1V-D1

16Q1SV-D2

16Q1SV-C

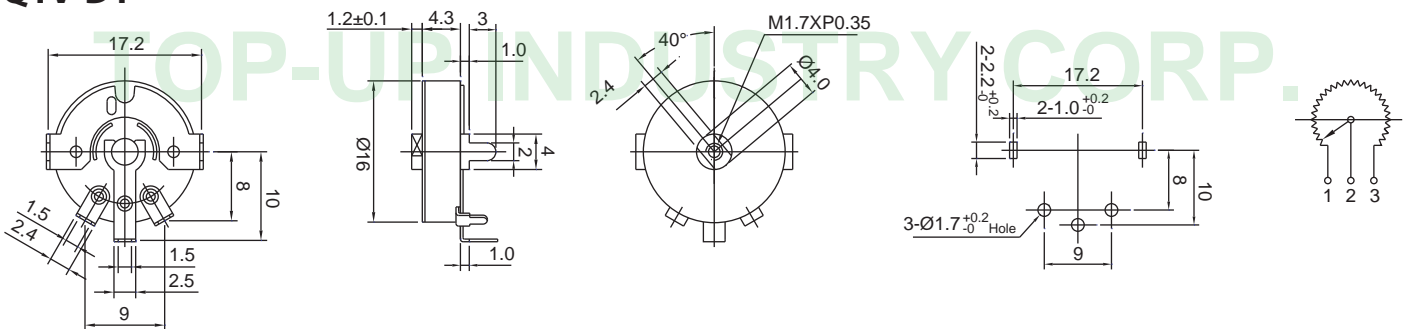
16Q1SV-D1



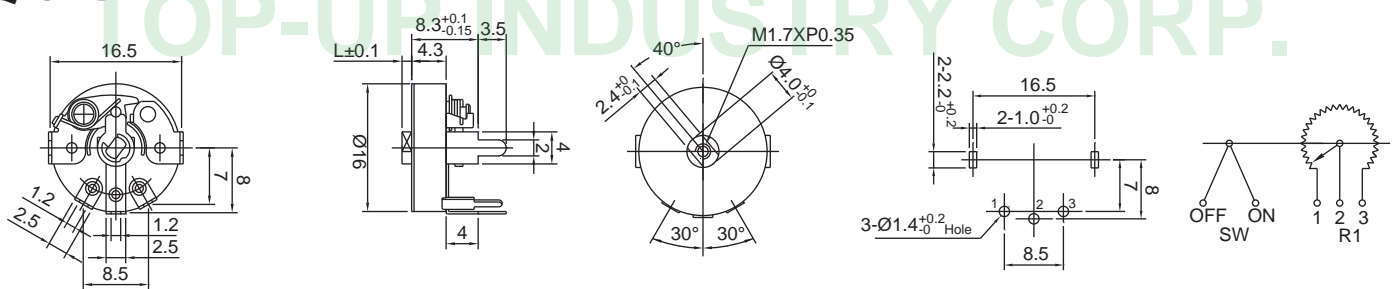
Outline Drawing

Features individual specifications

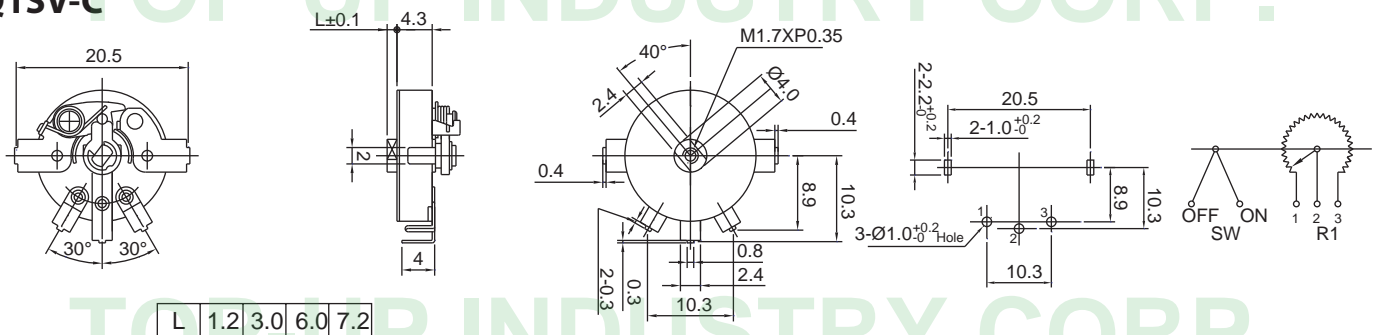
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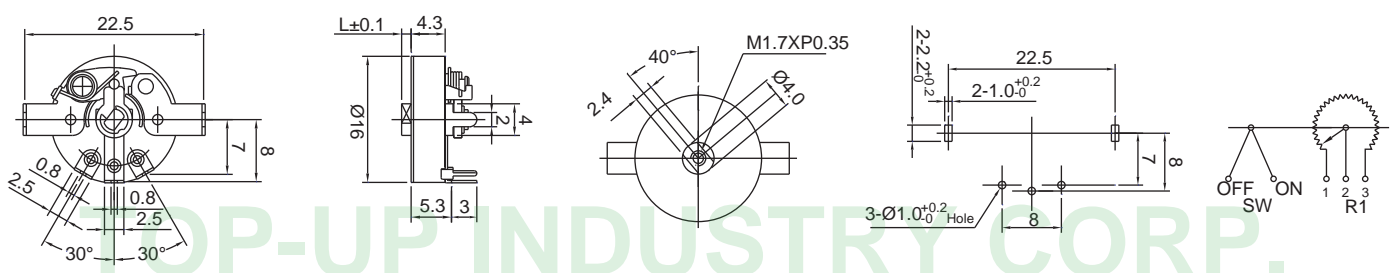
16Q1SV-D2



16Q1SV-C



16Q1SV-D1

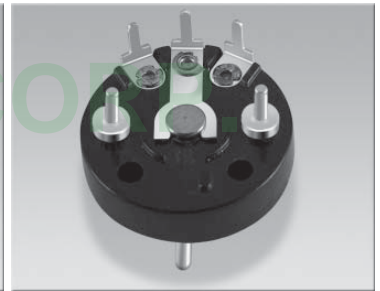
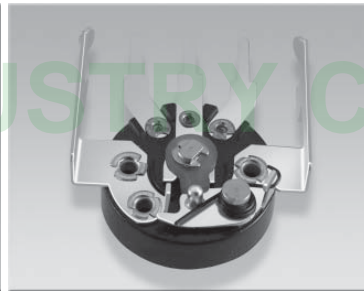
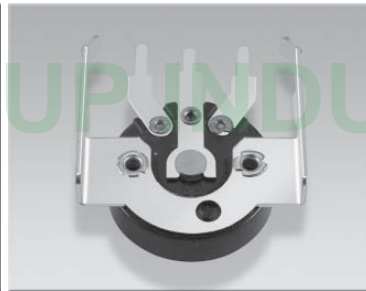
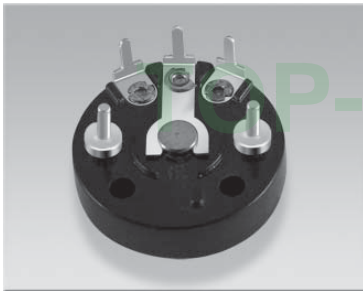


16Q1VP-D1

16Q1H-B

16Q1SH-B

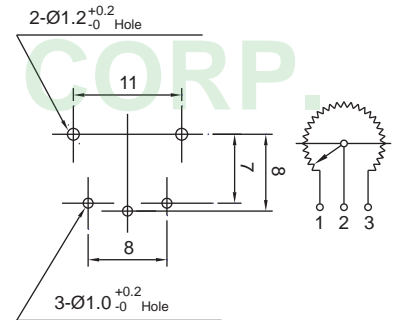
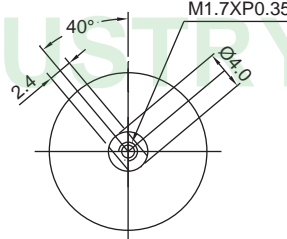
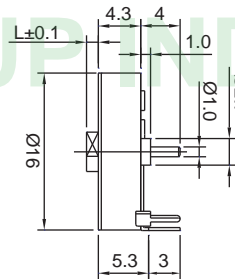
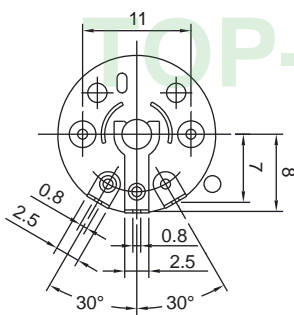
16Q1VP-D1(1)



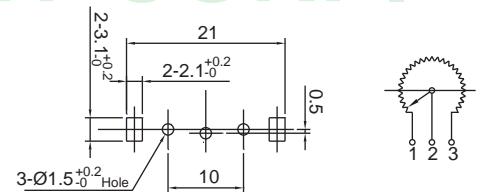
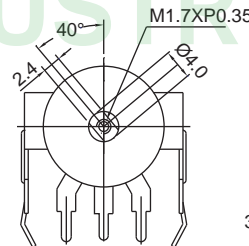
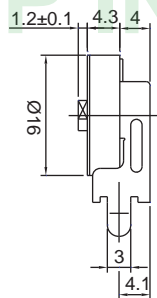
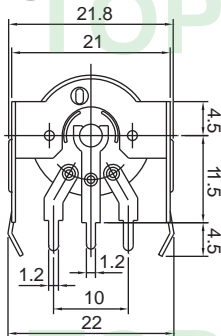
Outline Drawing

Features individual specifications

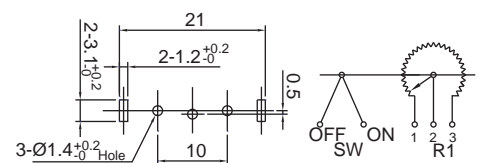
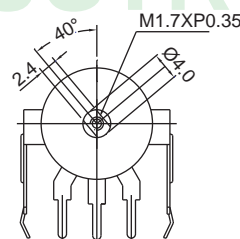
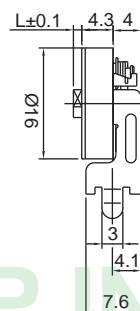
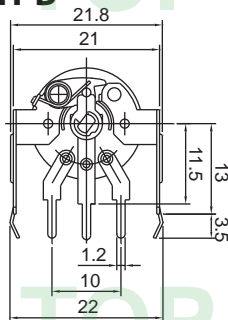
16Q1VP-D1



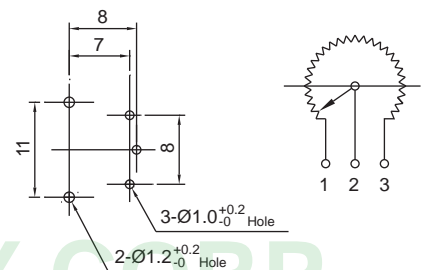
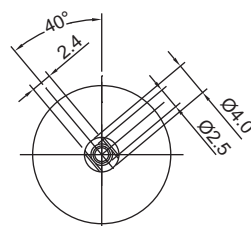
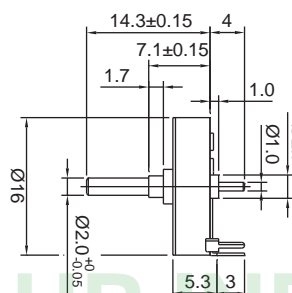
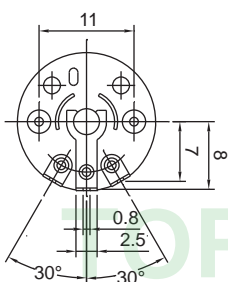
16Q1H-B



16Q1SH-B



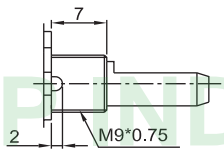
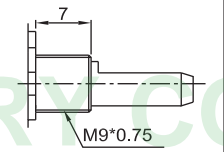
16Q1VP-D1(1)



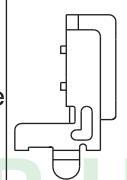
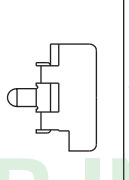
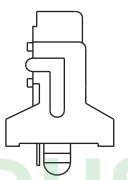
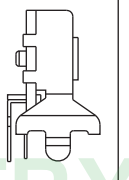
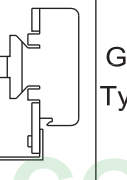
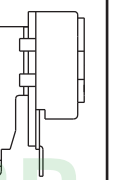
16PR Series Code Explanation

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






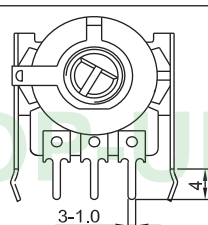
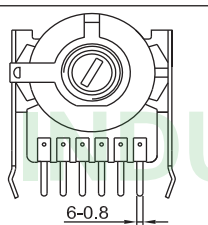
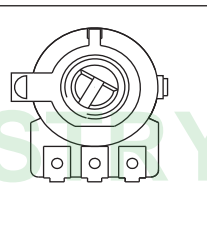
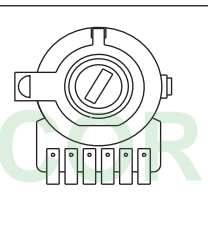
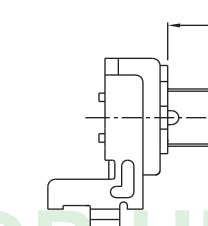
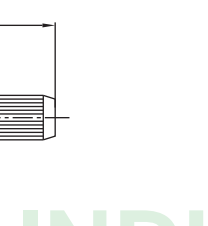
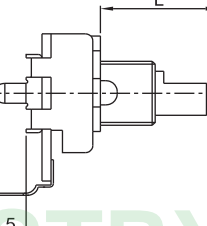
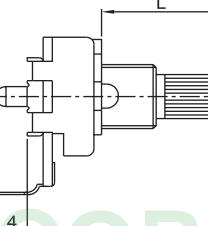
1. Product Lines of 16PR (16mm Size Insulated Shaft Potentiometers)
2. Number of Unit : 1 — Single Unit 2 — Dual Unit
3. Horizontal (H) Type or Vertical (V) Type (See Drawing 3)
4. Bushing Type

With Screw		With Screw		(Drawing 1)
B (Standard)		BN		

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

	Horizontal	Vertical		Horizontal		Horizontal	Vertical		Horizontal
F - Type			DF - Type		EF - Type			GF - Type	

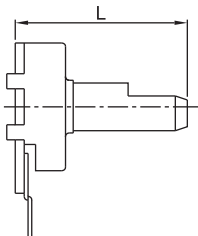
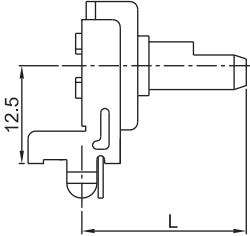
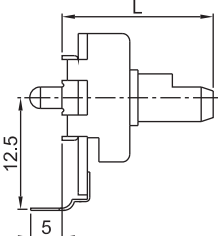
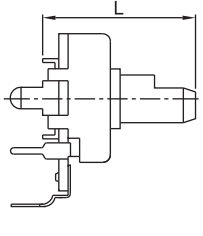


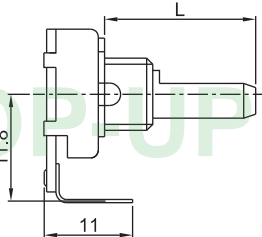
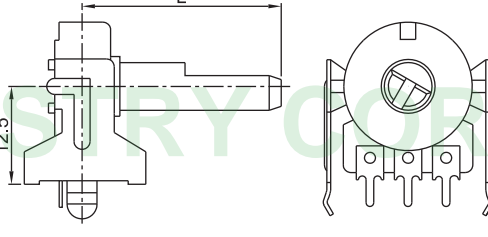
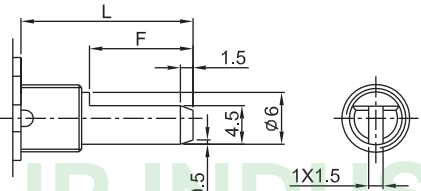
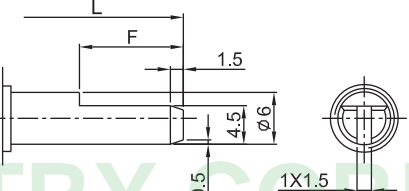
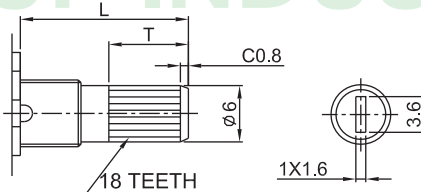
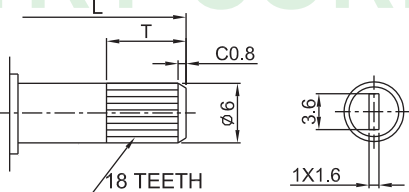
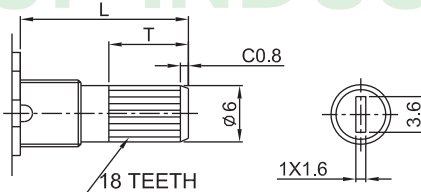
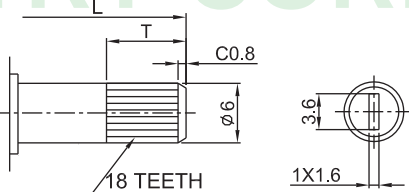
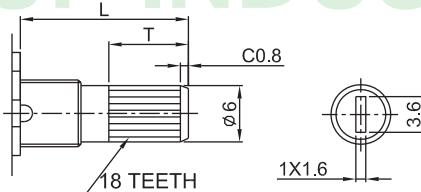
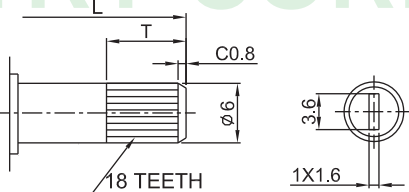
6. With Tap: LT -Left Tap
7. Type of Terminal (See Drawing 3)
8. Shaft Length (See Drawing 3)
9. Type of Shaft (See Drawing 3)
10. Type of Taper (See Taper Chart Page 220)
11. Resistance Value
12. Number of Clicks: Blank - None, 1C - Center Click
13. Serial No.

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

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 Size	16PR1H-B					16PR1HF-B 16PR2HF-B					16PR1HDF-B						
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	18.8	
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 Size	16PR1VF-D 16PR2VF-D					16PR1HBF-B 16PR2HBF-B					16PR1VBF-D 16PR2VBF-D					16PR2VB-C	
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 (k Ω)
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	$R \leq 30 \text{ k}\Omega$ 40 Ω max. 300k Ω < $R \leq 500\text{k}\Omega$ 0.1% max. to total resistance
Insulation resistance	100M Ω 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
5k $\Omega \leq R < 10\text{k}\Omega$	60dB Min.	0.1dB Max.
10k $\Omega \leq R < 50\text{k}\Omega$	70dB Min.	
50k $\Omega \leq R < 100\text{k}\Omega$	80dB Min.	
100k $\Omega \leq R$	90dB Min.	

4. Durability

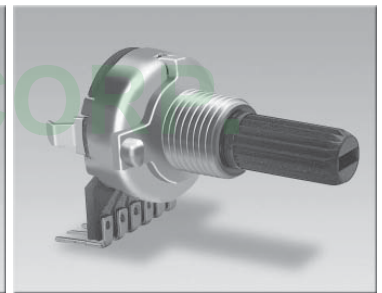
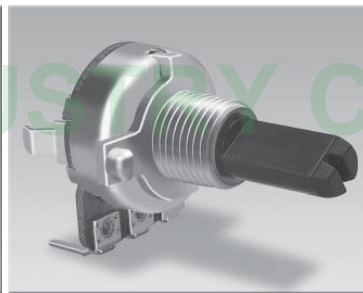
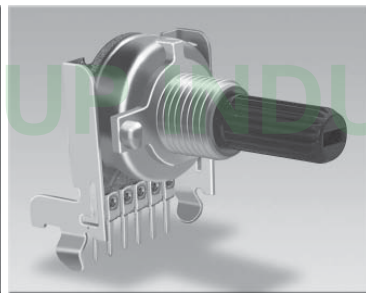
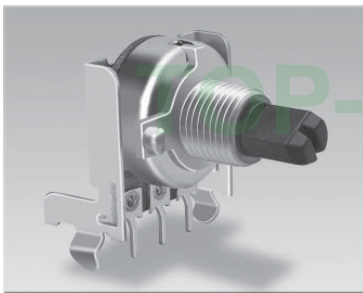
Rotational life	15,000 cycles
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16PR1HBF-B

16PR2HBF-B

16PR1VBF-D

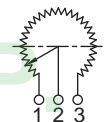
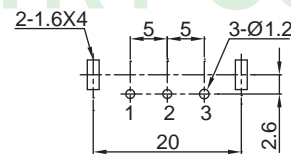
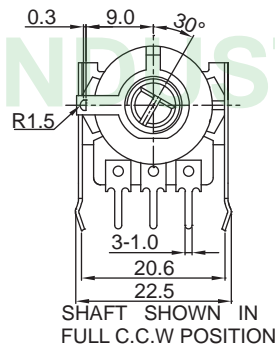
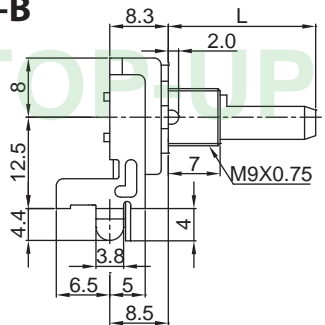
16PR2VBF-D



Outline Drawing

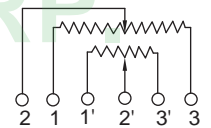
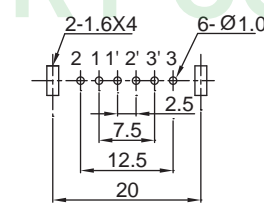
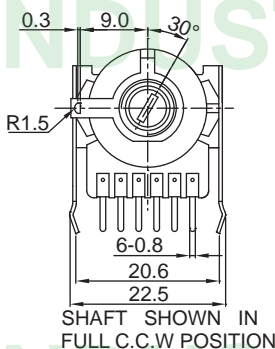
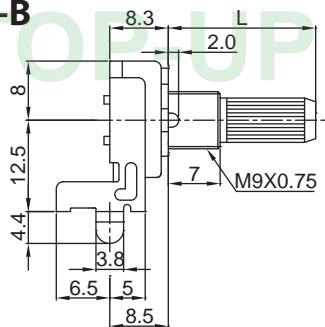
Features individual specifications

16PR1HBF-B



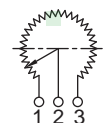
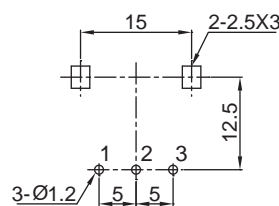
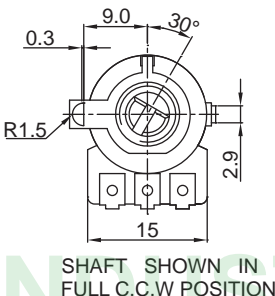
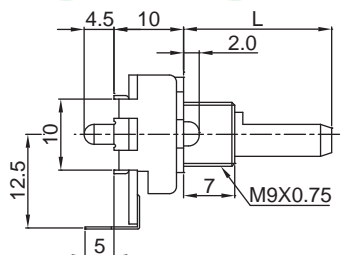
280° ROTATION SINGLE UNIT

16PR2HBF-B



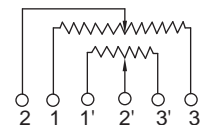
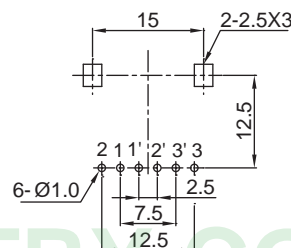
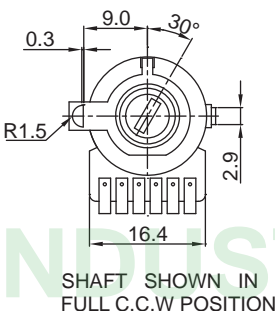
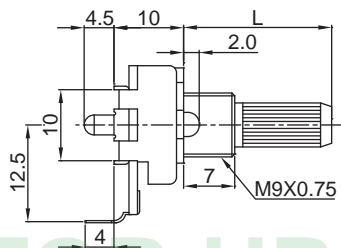
280° ROTATION DUAL UNIT

16PR1VBF-D



280° ROTATION SINGLE UNIT

16PR2VBF-D



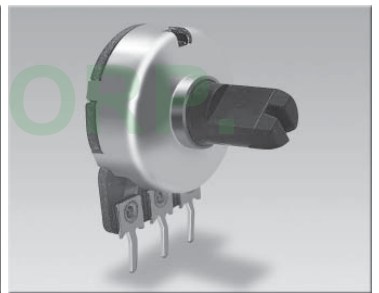
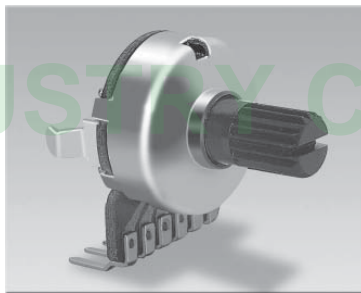
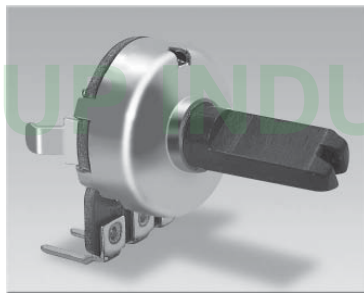
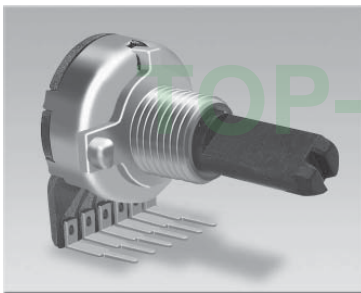
280° ROTATION DUAL UNIT

16PR2VB-C

16PR1VF-D

16PR2VF-D

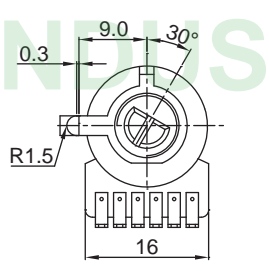
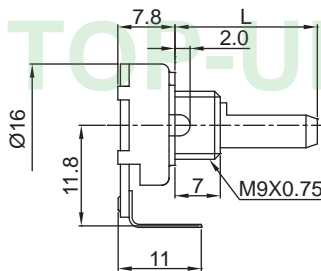
16PR1H-B



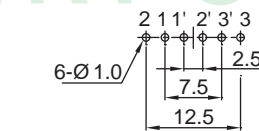
Outline Drawing

Features individual specifications

16PR2VB-C

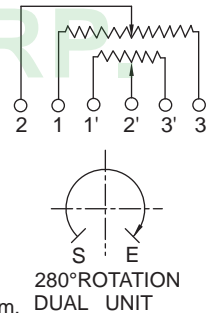


SHAFT SHOWN IN FULL C.C.W POSITION



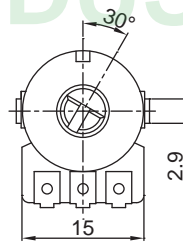
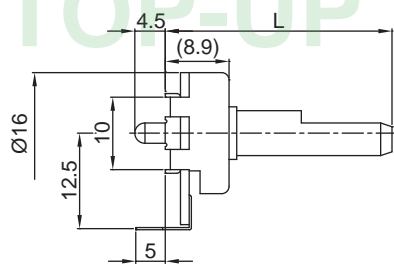
P.C.B MOUNTING HOLES DETAIL

TERMINAL HEIGHTS (H): 7mm, 11mm.

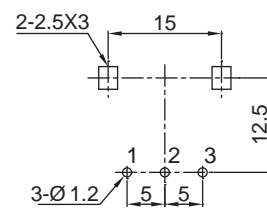


280° ROTATION DUAL UNIT

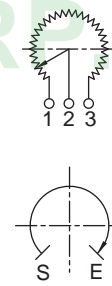
16PR1VF-D



SHAFT SHOWN IN FULL C.C.W POSITION

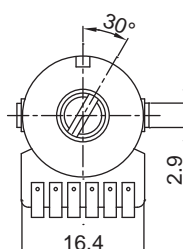
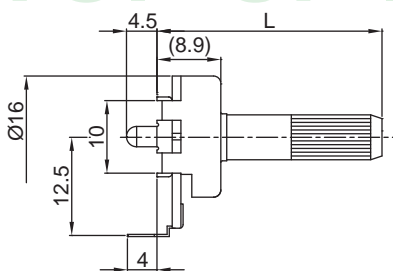


P.C.B MOUNTING HOLES DETAIL

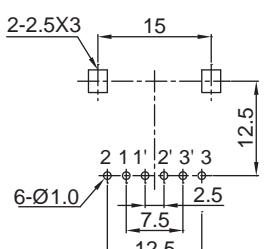


280° ROTATION SINGLE UNIT

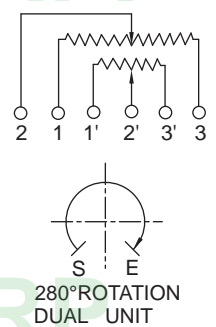
16PR2VF-D



SHAFT SHOWN IN FULL C.C.W POSITION

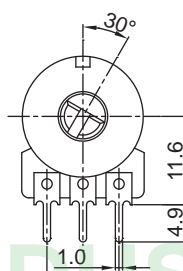
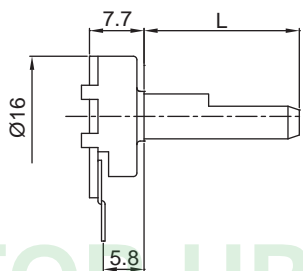


P.C.B MOUNTING HOLES DETAIL

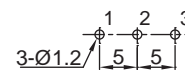


280° ROTATION DUAL UNIT

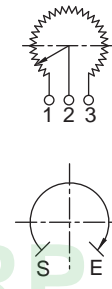
16PR1H-B



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



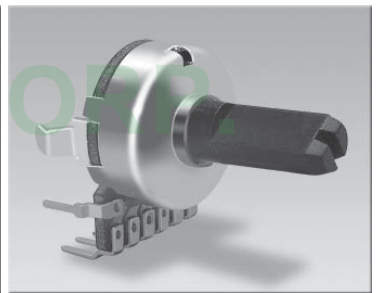
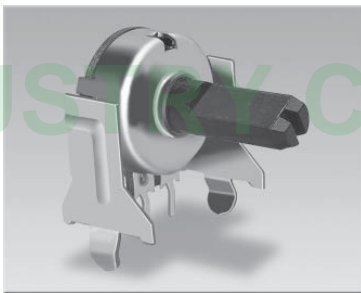
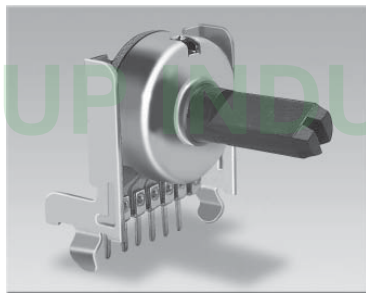
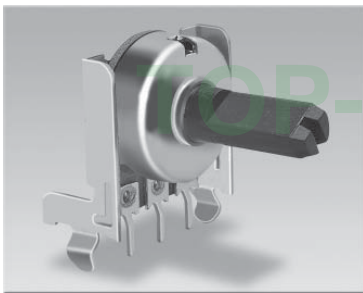
280° ROTATION SINGLE UNIT

16PR1HF-B

16PR2HF-B

16PR1HDF-B

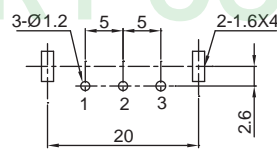
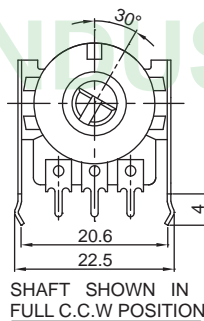
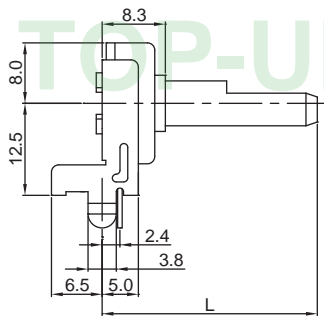
16PR2VFLT-D



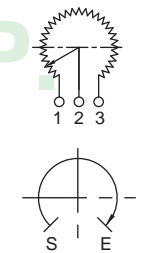
Outline Drawing

Features individual specifications

16PR1HF-B

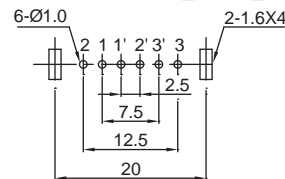
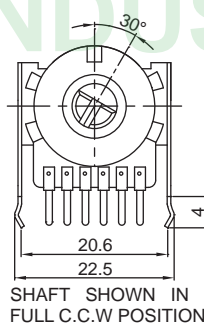
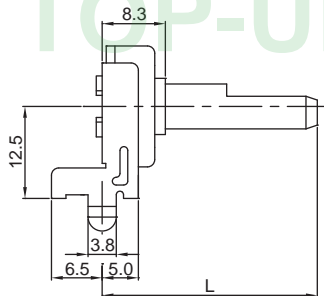


P.C.B MOUNTING HOLES DETAIL

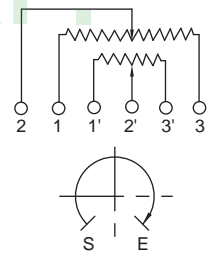


280° ROTATION SINGLE UNIT

16PR2HF-B

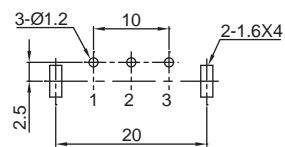
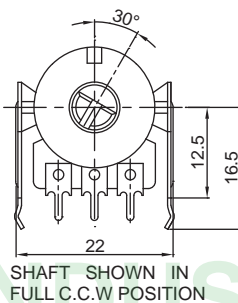
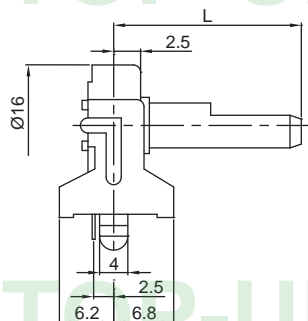


P.C.B MOUNTING HOLES DETAIL

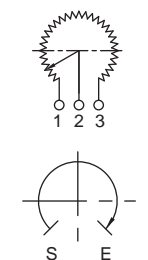


280° ROTATION DUAL UNIT

16PR1HDF-B

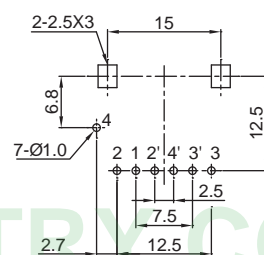
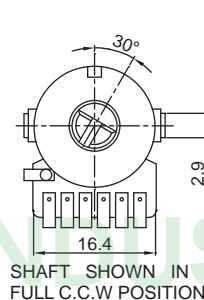
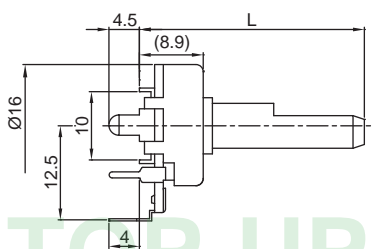


P.C.B MOUNTING HOLES DETAIL

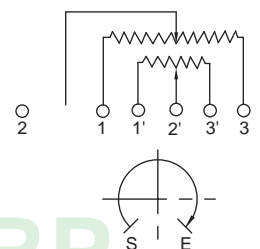


280° ROTATION SINGLE UNIT

16PR2VFLT-D



P.C.B MOUNTING HOLES DETAIL



280° ROTATION DUAL UNIT

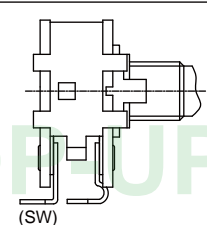
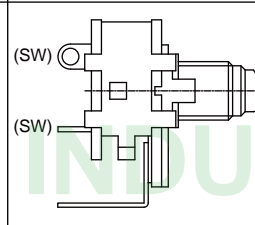
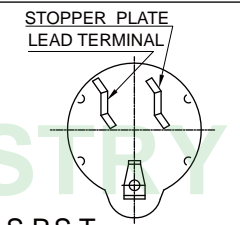
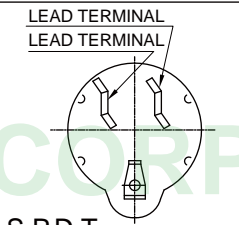
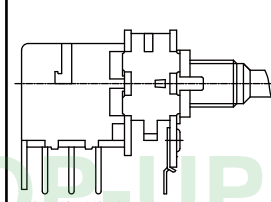
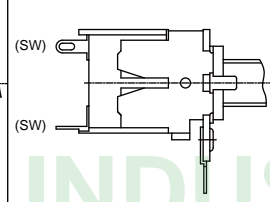
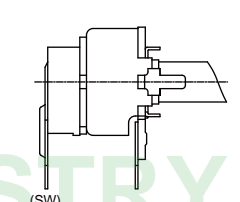
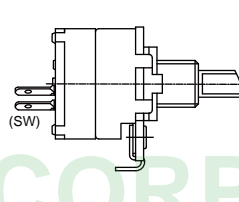
16M Series Code Explanation

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

1. With Motor-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

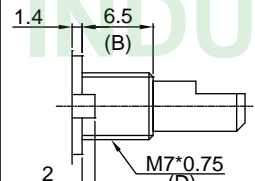
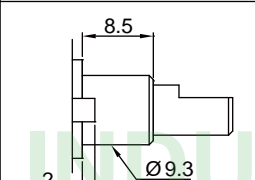
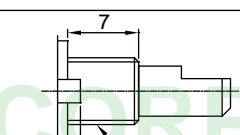
(Drawing 1)

S	KS	AS	BS
			
LS	GS	CS	DS
			

5. Horizontal (H) Type or Vertical (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 (With Screw)		Other type	(B)	7	5	10	26
				(D)	M7*0.75		M9*0.75	
2	NB (Without Screw)		3	With Motor-Driven Series				
				B (with Screw)				

16M Series Code Explanation

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

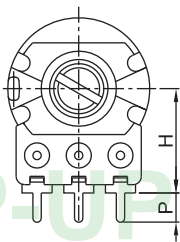
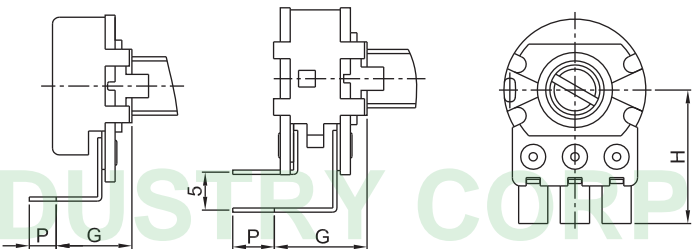
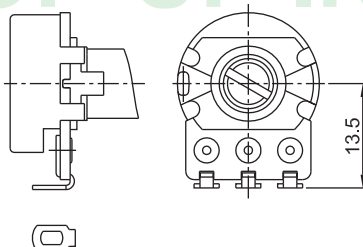
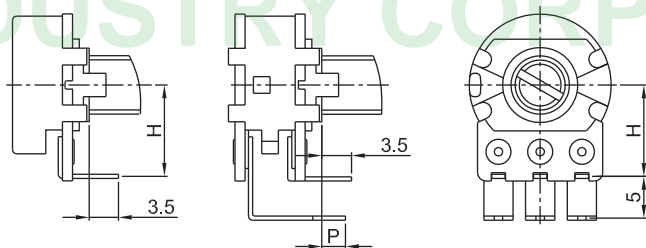
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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	Single Unit	Code	D	D1	D2	D3	D4	D5	D6	D7	D8	Dual Unit	Code	D	D1	D2	D3	D4	D5	D6	
H	12.5	18	22	12.5	18	22	18.5		H	16.2	16.2	14	13.5	12.7	13	15.7	15.2	12		H	16				18			15.7
G	10.7	21.1	11.1	12	9.2	9.3	14.5		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	3.5	3.5	3.5	4.0	4.0	4.0	3.5		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	Dual Unit							Code	C	C1	C2	C3				
	H	10.9	11.5	13	11.7	12		H	10.9	11.5	13	12.5	Dual Unit							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	Dual Unit							P	3.0	4.0	4.0	3.0				
														Dual Unit														

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

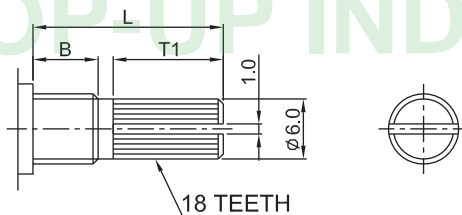
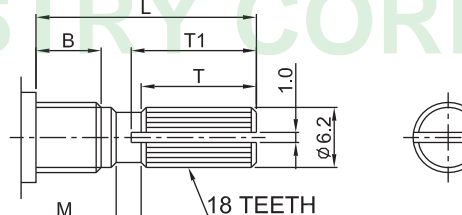
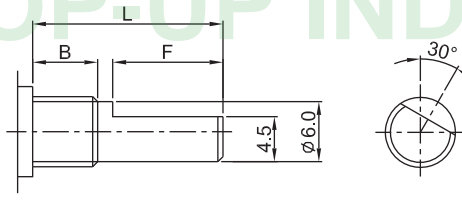
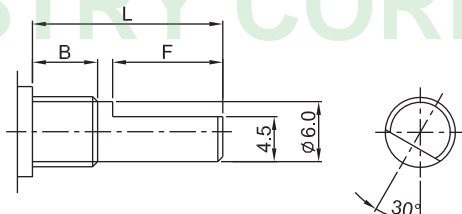
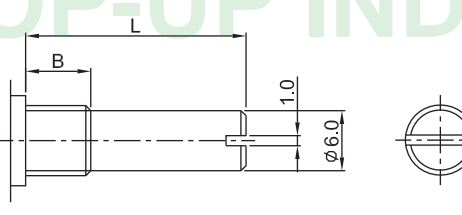
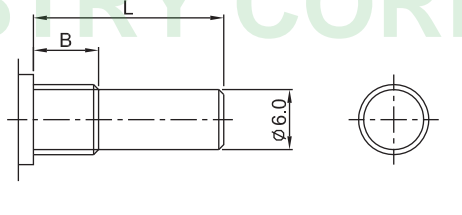
41C -41 Position Click

18. Serial No.

16M Series Code Explanation

MD	16M	1	KS	H	5	B	P	9	F	RT - B -	20	K - B	50K - 1C -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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)
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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	100 to 500 gf . cm	_____																																	
	21 detent		_____																																	
	31 detent		_____																																	
	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><tr><td>Shaft length (mm)</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td><td>45</td></tr><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></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><tr><td>No.of detents</td><td>Center-detent</td><td>11 detents</td><td>21 detents</td><td>31 detents</td><td>41 detents</td></tr><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></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

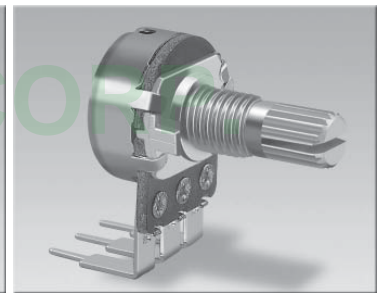
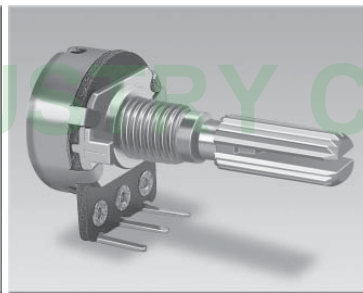
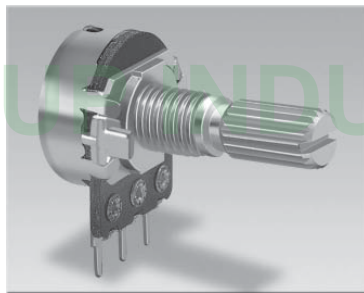
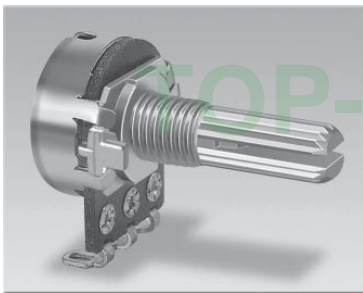
Rotational life	15,000 cycles
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16M1HB-A

16M1HB-B

16M1VB-C

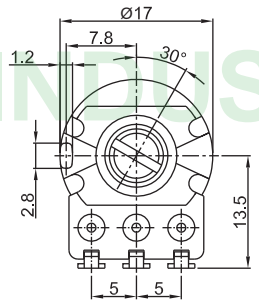
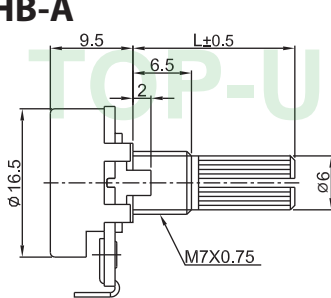
16M1VB-D



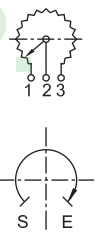
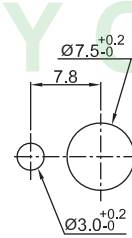
Outline Drawing

Features individual specifications

16M1HB-A

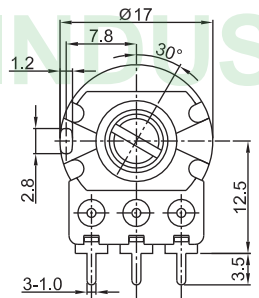
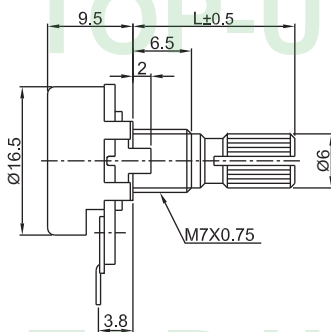


SHAFT SHOWN IN FULL C.C.W POSITION

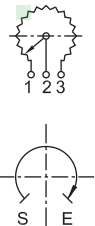
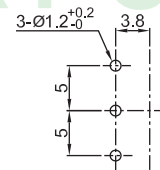


300° ROTATION SINGLE UNIT

16M1HB-B



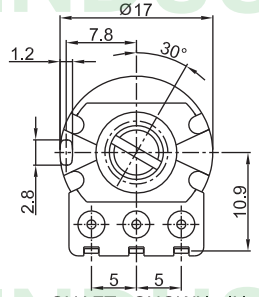
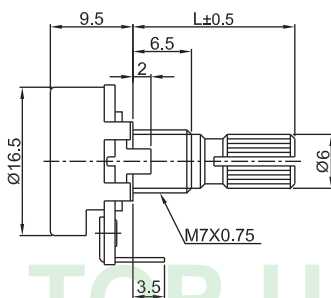
SHAFT SHOWN IN FULL C.C.W POSITION



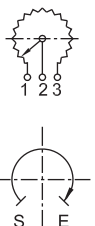
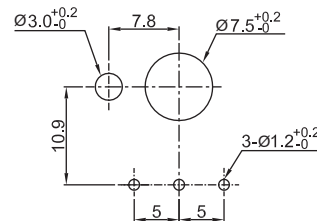
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

16M1VB-C



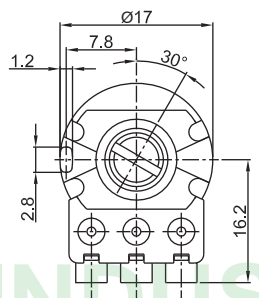
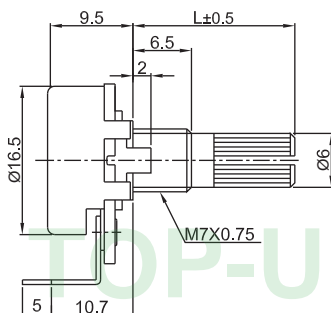
SHAFT SHOWN IN FULL C.C.W POSITION



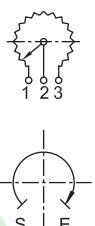
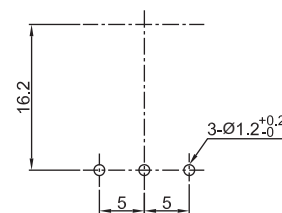
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

16M1VB-D



SHAFT SHOWN IN FULL C.C.W POSITION



300° ROTATION SINGLE UNIT

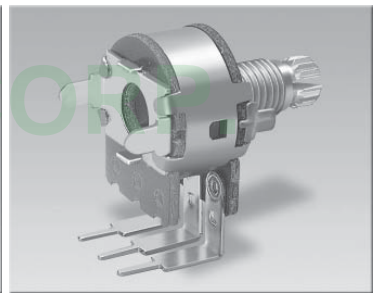
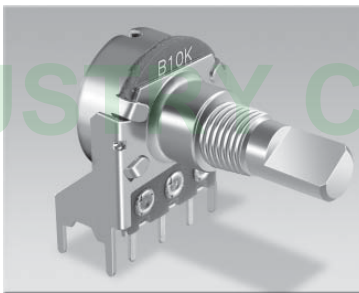
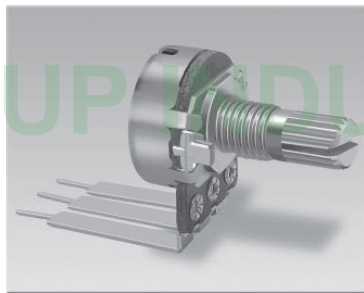
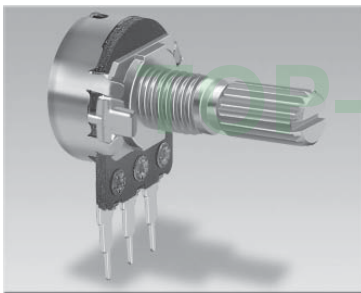
P.C.B MOUNTING HOLES DETAIL

16M1HB-B2

16M1VB-D1

16M1H5.5BCFA-B3

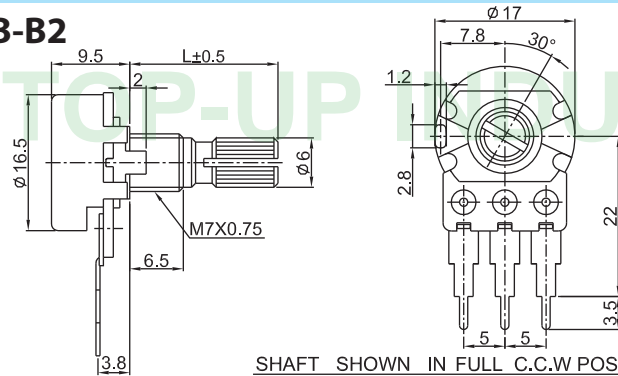
16M1VBF-D



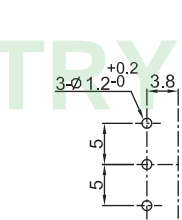
Outline Drawing

Features individual specifications

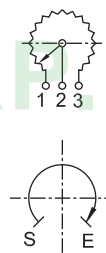
16M1HB-B2



SHAFT SHOWN IN FULL C.C.W POSITION

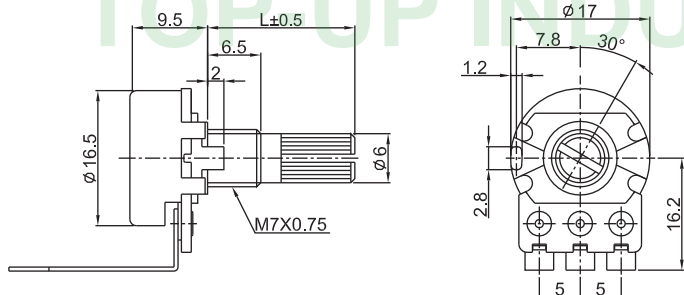


P.C.B MOUNTING HOLES DETAIL

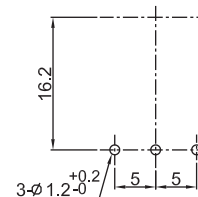


300° ROTATION
SINGLE UNIT

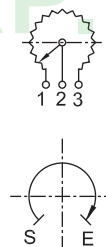
16M1VB-D1



SHAFT SHOWN IN FULL C.C.W POSITION

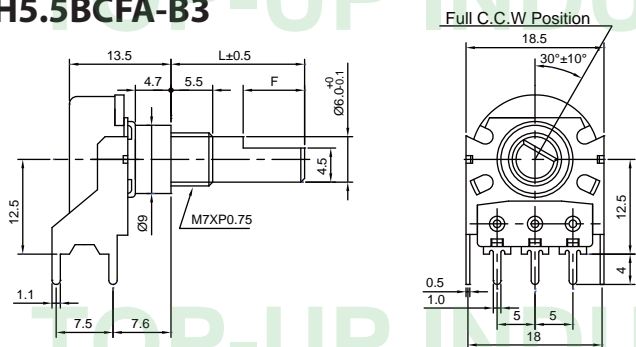


P.C.B MOUNTING HOLES DETAIL

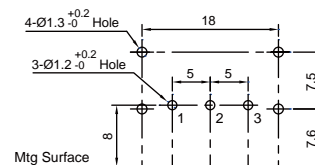


300° ROTATION
SINGLE UNIT

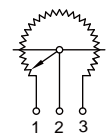
16M1H5.5BCFA-B3



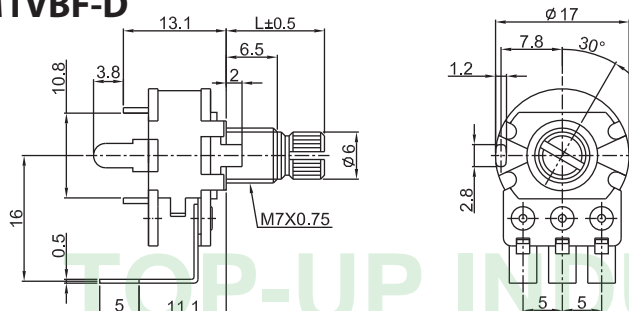
Full C.C.W Position



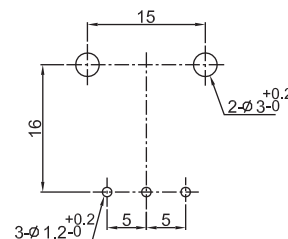
Mtg Surface



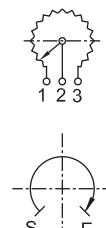
16M1VBF-D



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



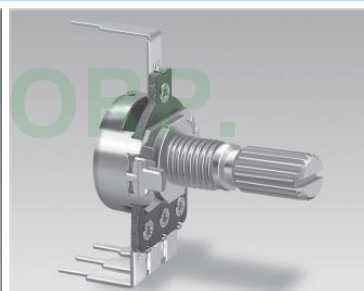
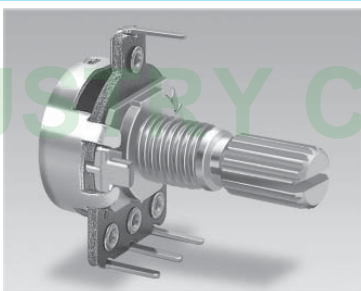
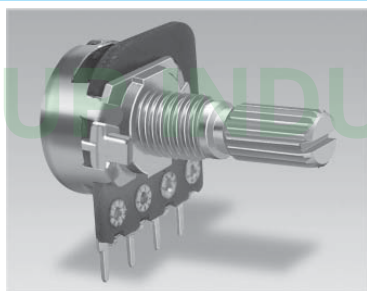
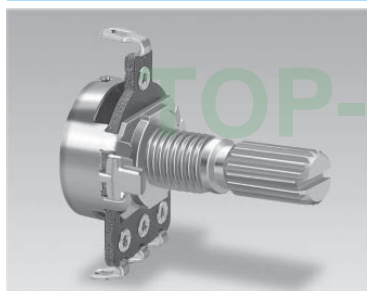
300° ROTATION
SINGLE UNIT

16M1HBUT-A

16M1HBRT-B

16M1VBUT-C

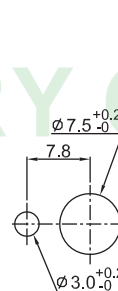
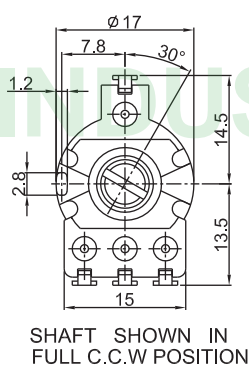
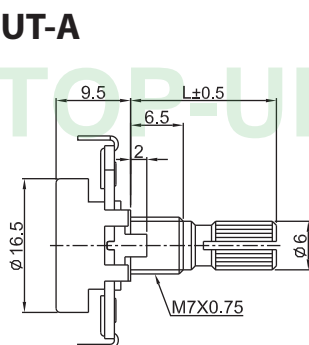
16M1VBUT-D2



Outline Drawing

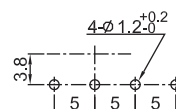
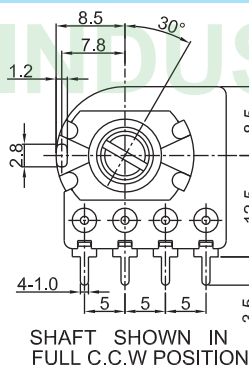
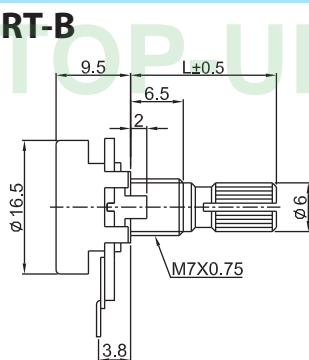
Features individual specifications

16M1HBUT-A



300° ROTATION
SINGLE UNIT

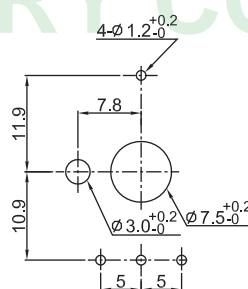
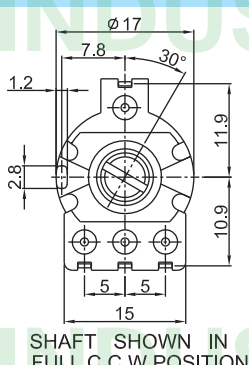
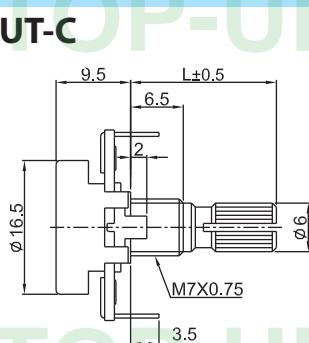
16M1HBRT-B



300° ROTATION
SINGLE UNIT

P.C.B. MOUNTING HOLES DETAIL

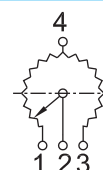
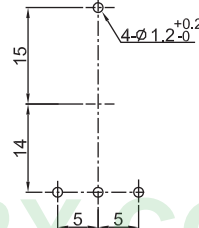
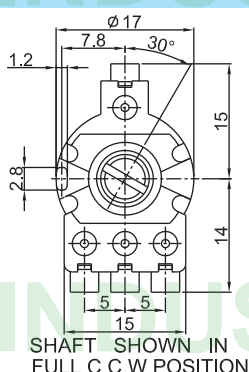
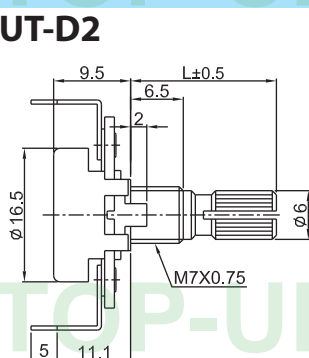
16M1VBUT-C



300° ROTATION
SINGLE UNIT

P.C.B. MOUNTING HOLES DETAIL

16M1VBUT-D2



300° ROTATION
SINGLE UNIT

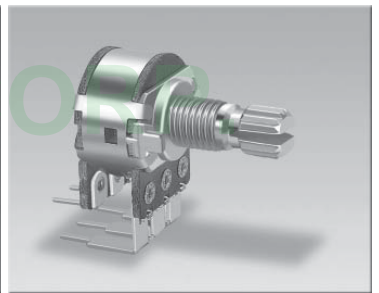
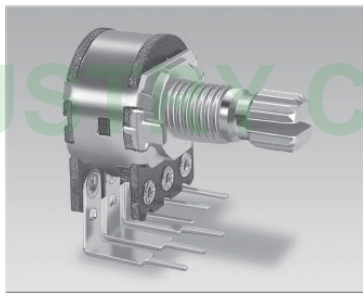
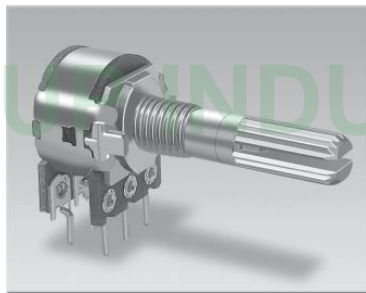
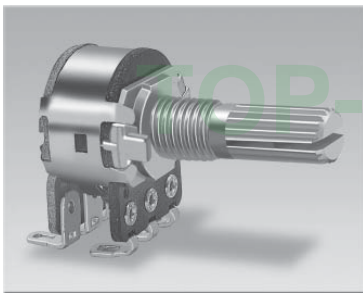
P.C.B. MOUNTING HOLES DETAIL

16M2HB-A

16M2HB-B

16M2VB-C

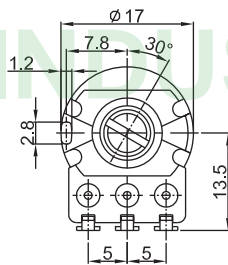
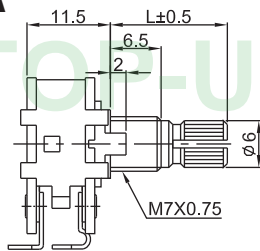
16M2VB-D



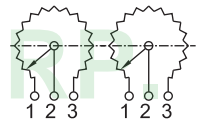
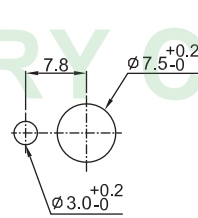
Outline Drawing

Features individual specifications

16M2HB-A

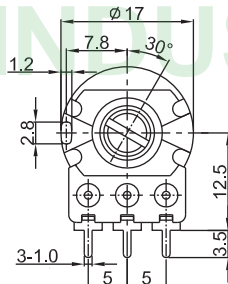
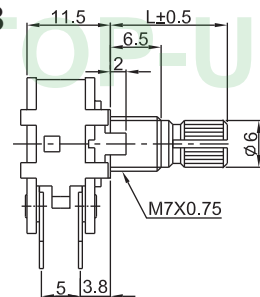


SHAFT SHOWN IN
FULL C.C.W POSITION

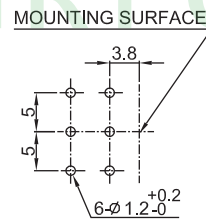


300° ROTATION
DUAL UNIT

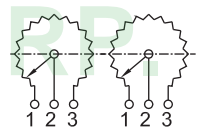
16M2HB-B



SHAFT SHOWN IN
FULL C.C.W POSITION

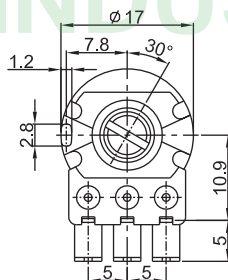
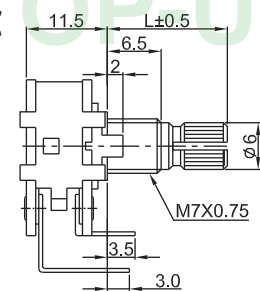


P.C.B MOUNTING HOLES DETAIL

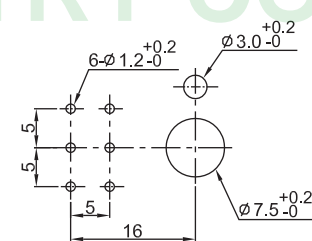


300° ROTATION
DUAL UNIT

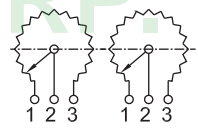
16M2VB-C



SHAFT SHOWN IN
FULL C.C.W POSITION

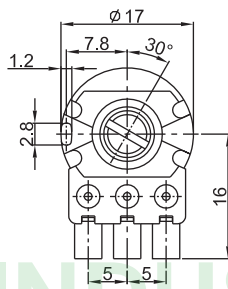
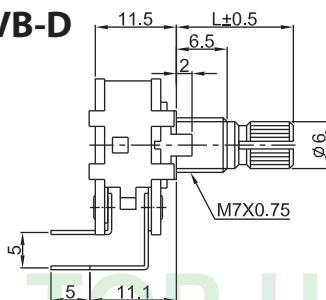


P.C.B MOUNTING HOLES DETAIL

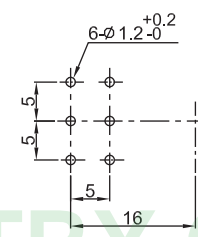


300° ROTATION
DUAL UNIT

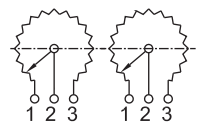
16M2VB-D



SHAFT SHOWN IN
FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



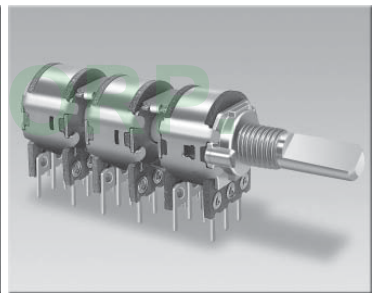
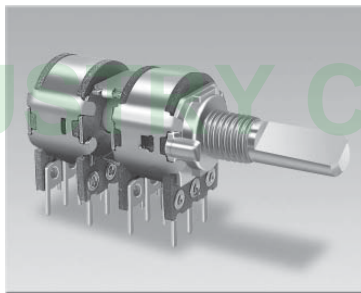
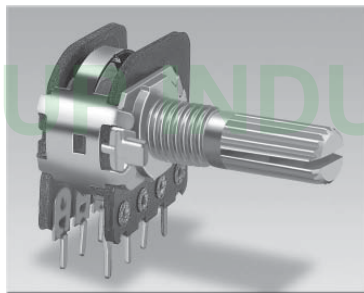
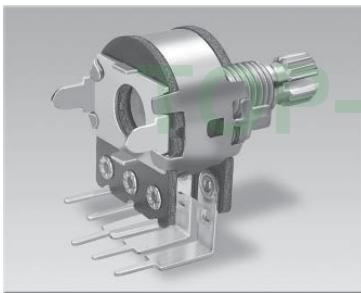
300° ROTATION
DUAL UNIT

16M2VBF-D

16M2HBRT-B

16M4HB-B3

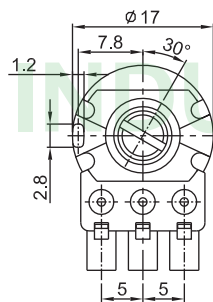
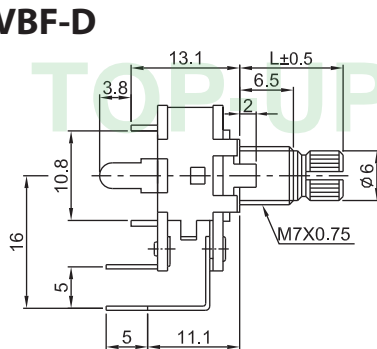
16M6HB-B3



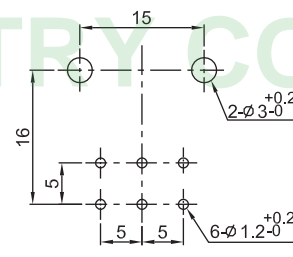
Outline Drawing

Features individual specifications

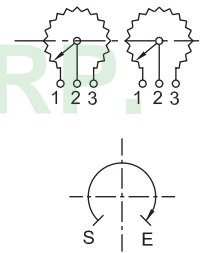
16M2VBF-D



SHAFT SHOWN IN
FULL C.C.W POSITION

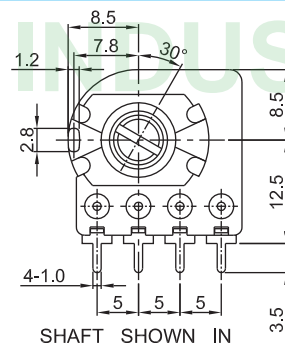
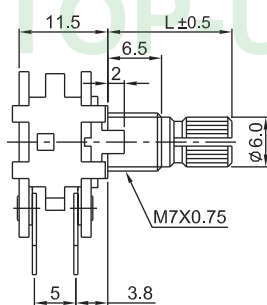


P.C.B MOUNTING HOLES DETAIL

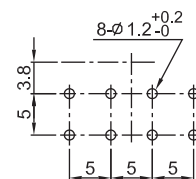


300° ROTATION
DUAL UNIT

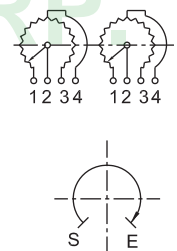
16M2HBRT-B



SHAFT SHOWN IN
FULL C.C.W POSITION

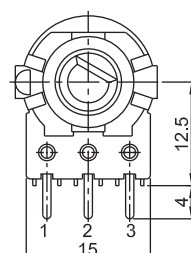
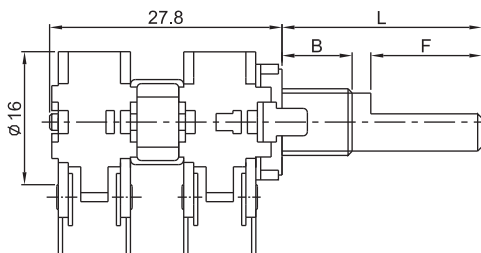


P.C.B MOUNTING HOLES DETAIL

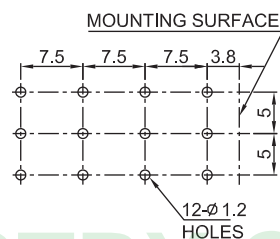


300° ROTATION
DUAL UNIT

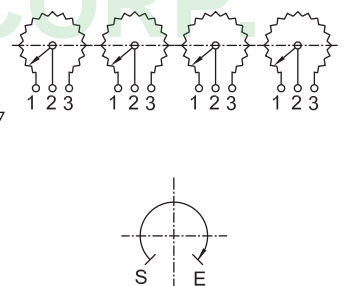
16M4HB-B3



SHAFT SHOWN IN
FULL C.C.W POSITION

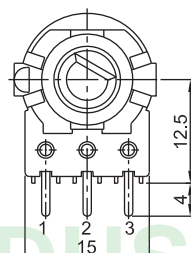
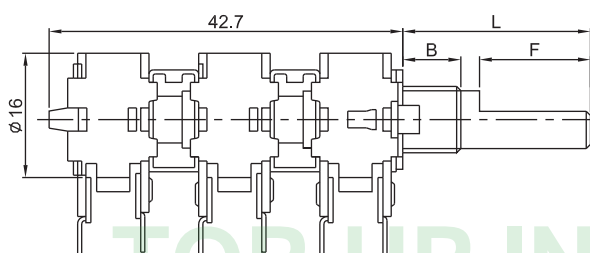


P.C.B MOUNTING HOLES DETAIL

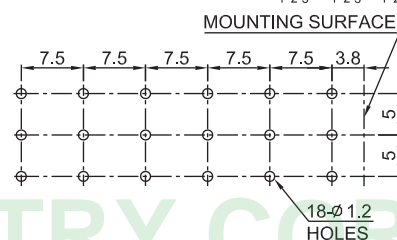


300° ROTATION
MULTI-GANGED

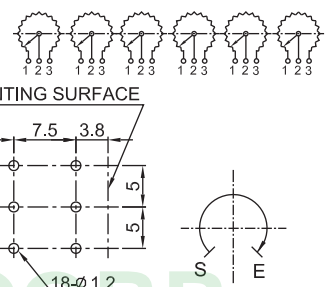
16M6HB-B3



SHAFT SHOWN IN
FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



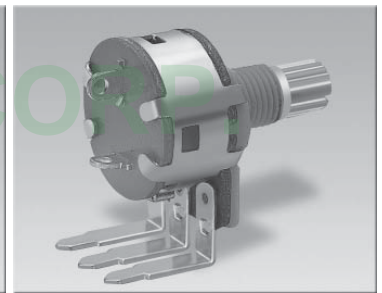
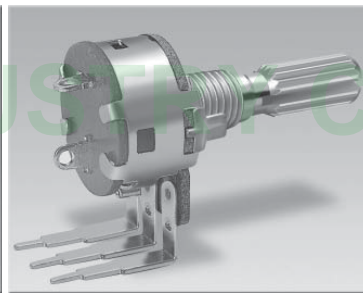
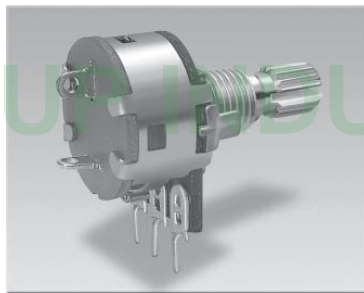
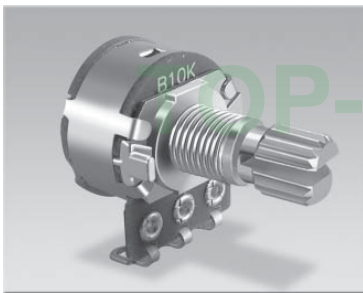
300° ROTATION
MULTI-GANGED

16M1KSHB-A

16M1KSHB-B3

16M1KSVB-D1

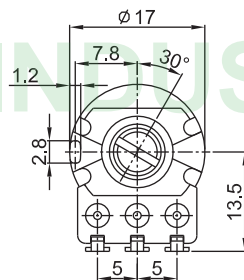
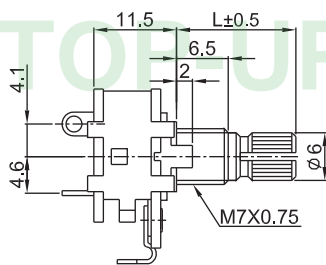
16M1KSVBP-D2



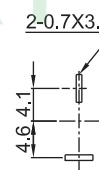
Outline Drawing

Features individual specifications

16M1KSHB-A



SHAFT SHOWN IN FULL C.C.W POSITION

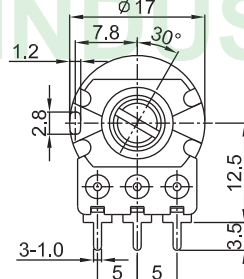
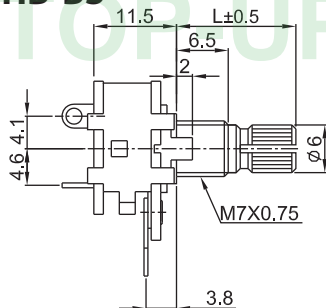


P.C.B MOUNTING HOLES DETAIL

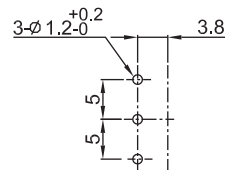


300° ROTATION SINGLE UNIT

16M1KSHB-B3



SHAFT SHOWN IN FULL C.C.W POSITION

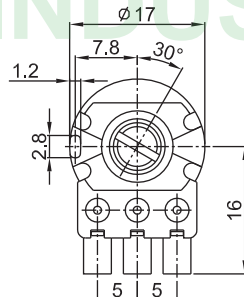
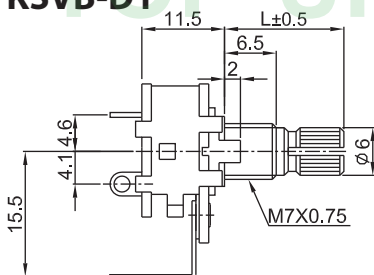


P.C.B MOUNTING HOLES DETAIL

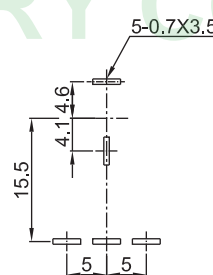


300° ROTATION SINGLE UNIT

16M1KSVB-D1



SHAFT SHOWN IN FULL C.C.W POSITION

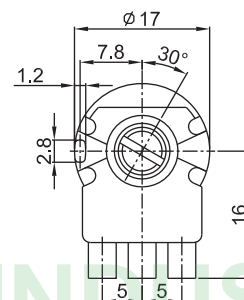
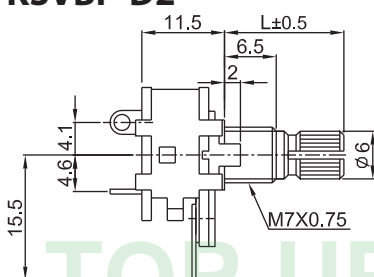


P.C.B MOUNTING HOLES DETAIL

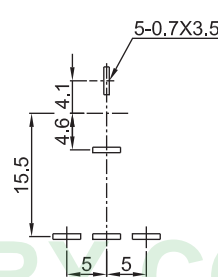


300° ROTATION SINGLE UNIT

16M1KSVBP-D2



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



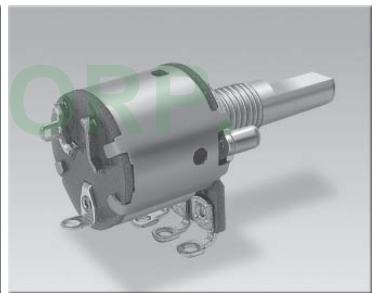
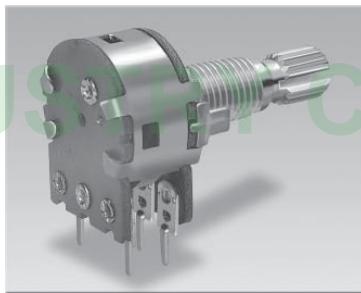
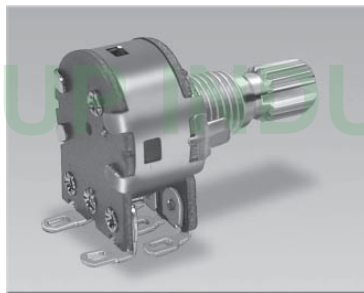
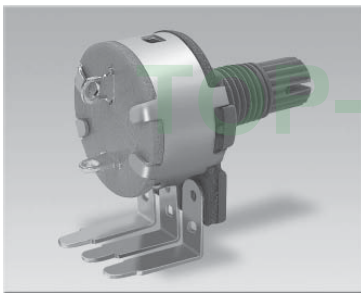
300° ROTATION SINGLE UNIT

16P1KSVBP-D2

16M1SHB-A

16M1SHB-B3

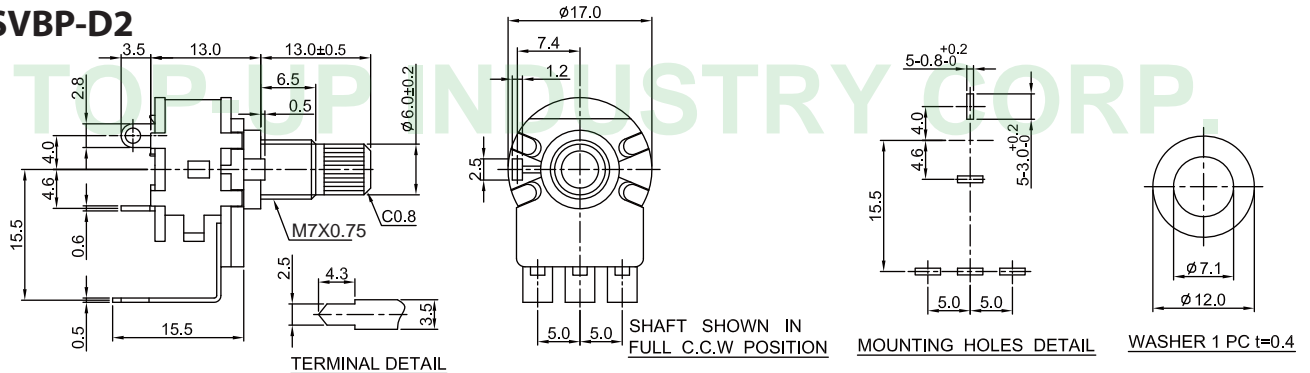
16M1ASH7B-A



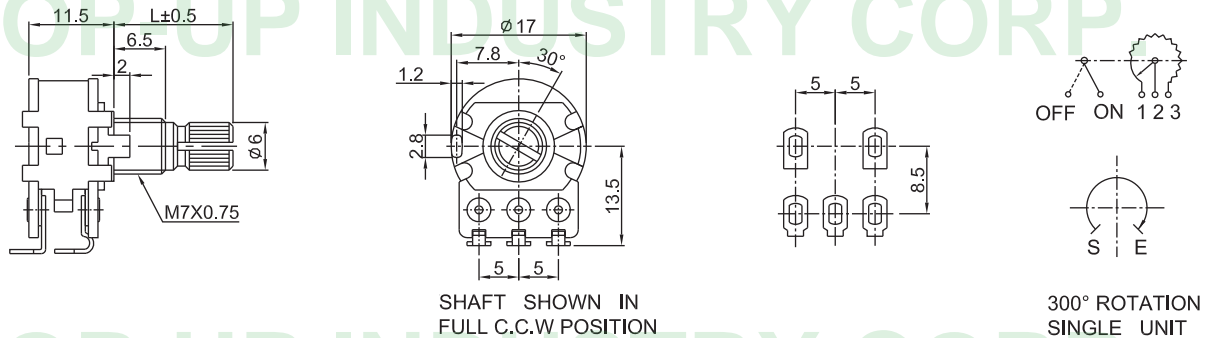
Outline Drawing

Features individual specifications

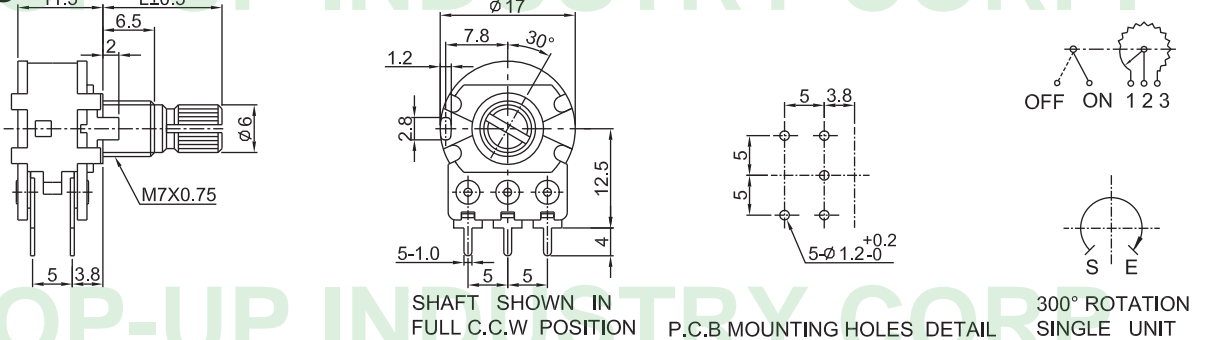
16P1KSVBP-D2



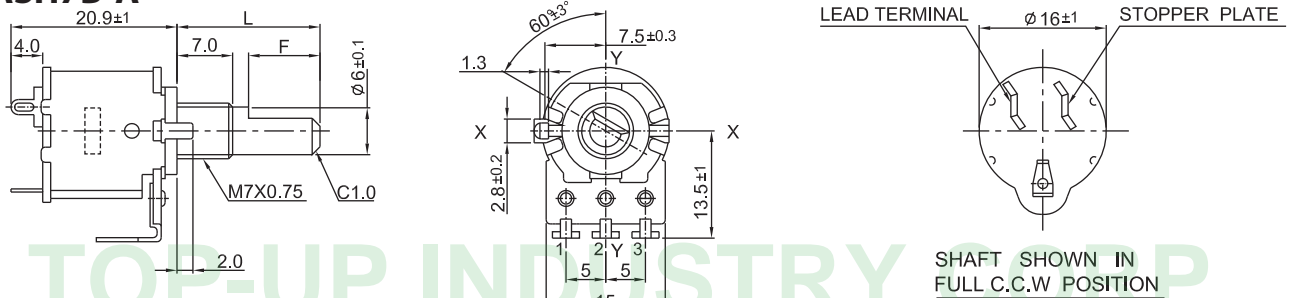
16M1SHB-A



16M1SHB-B3



16M1ASH7B-A

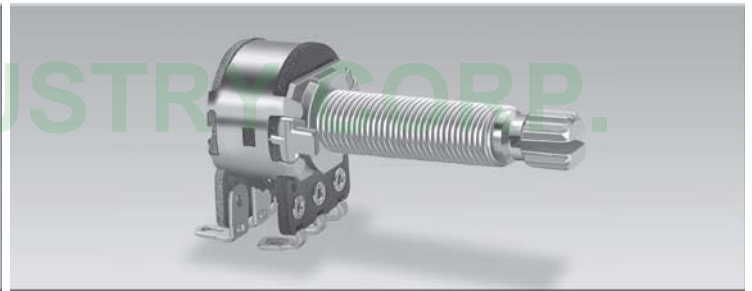
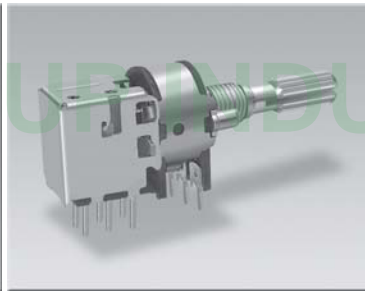
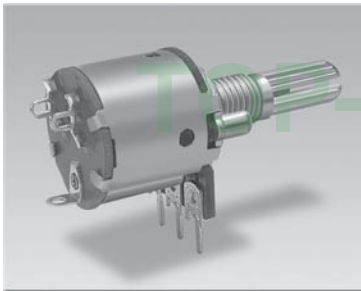


NOTE: WITHSTAND VOLTAGE, DC 30V 3A

16M1BSH7B-B

16M1LSH7BF-B3

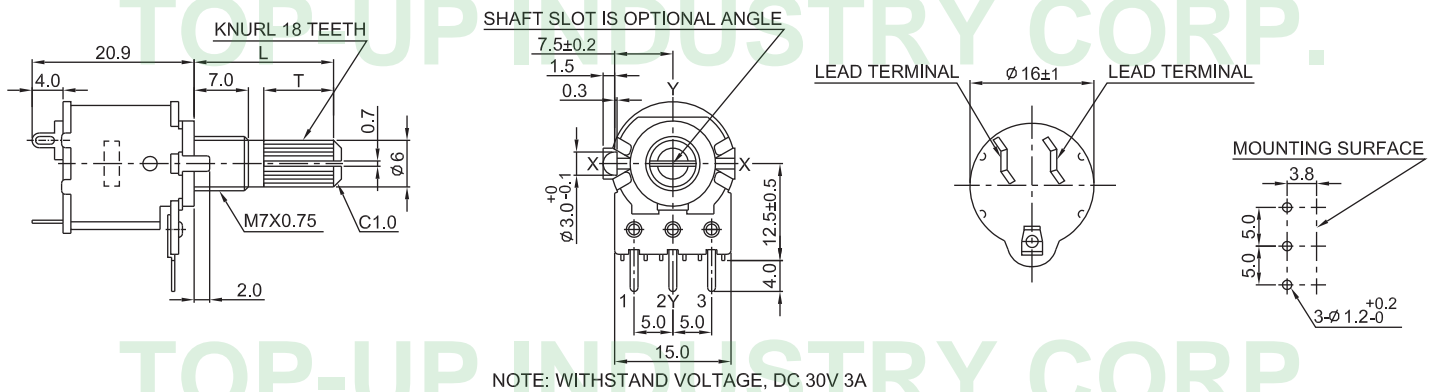
16M1SH26B-A



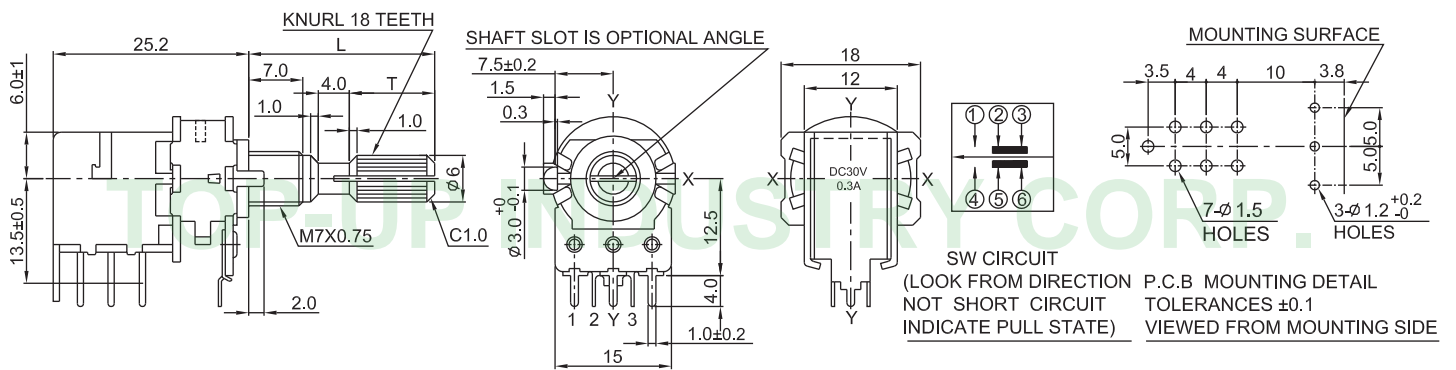
Outline Drawing

Features individual specifications

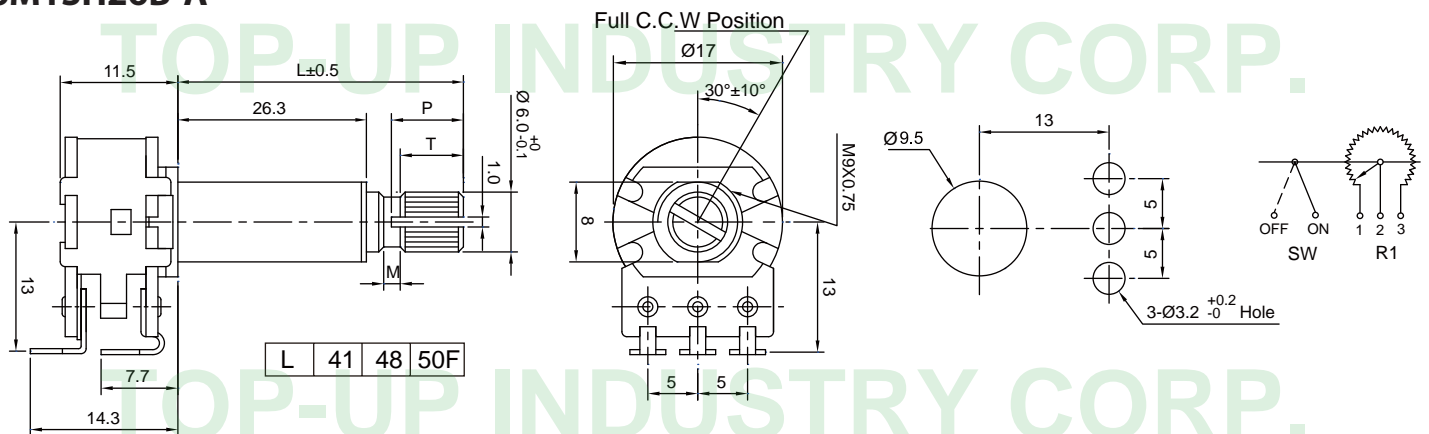
16M1BSH7B-B



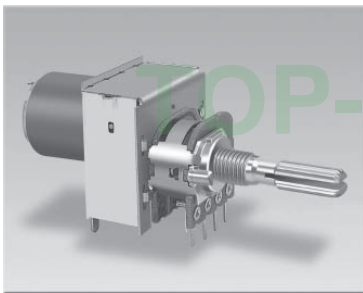
16M1LSH7BF-B3



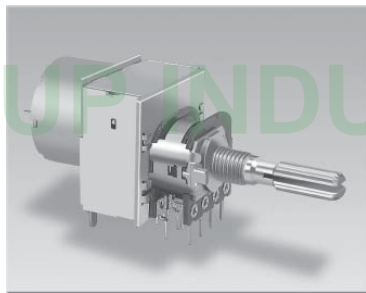
16M1SH26B-A



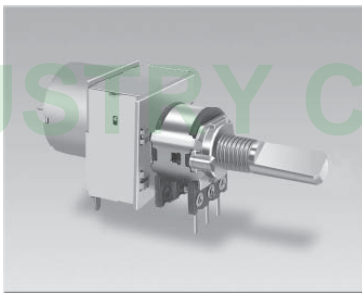
MMD16M1HBRT-B3



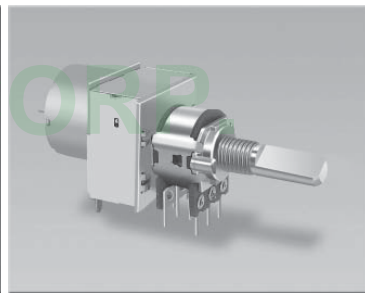
MMD16M2HBRT-B3



MD16M1HB-B3



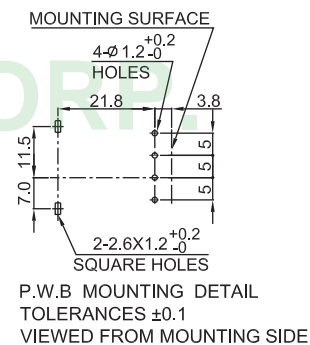
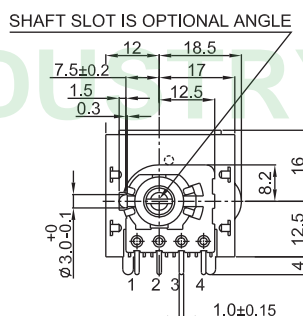
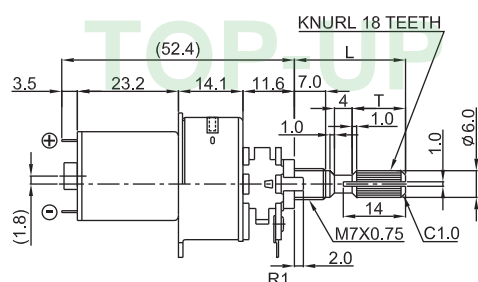
MD16M2HB-B3



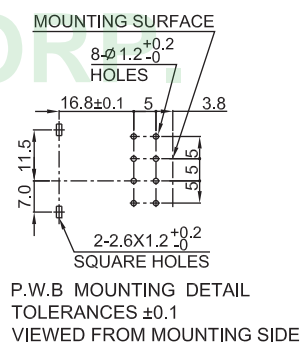
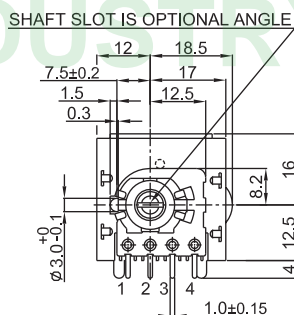
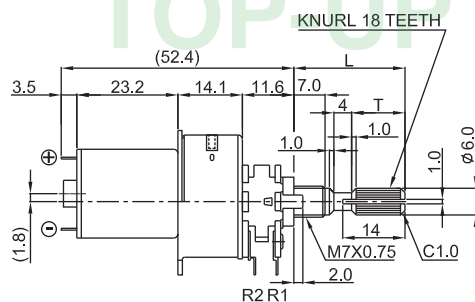
Outline Drawing

Features individual specifications

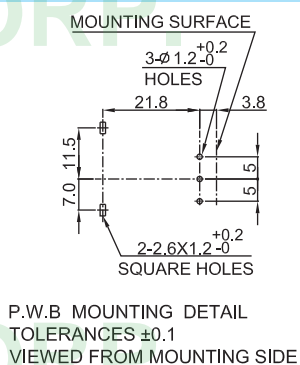
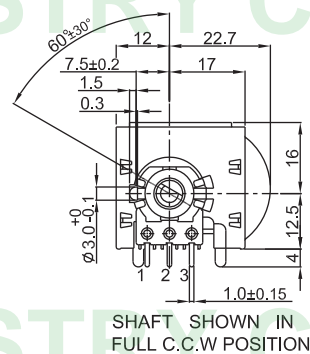
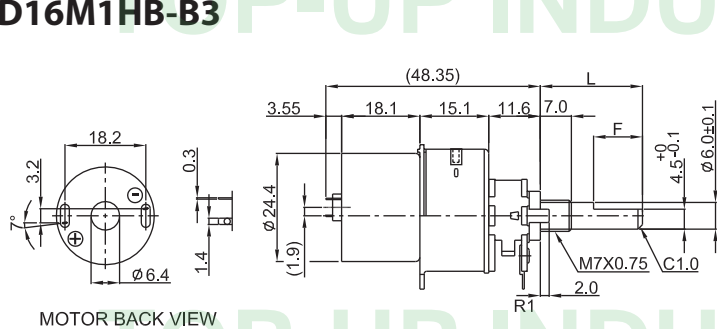
MMD16M1HBRT-B3



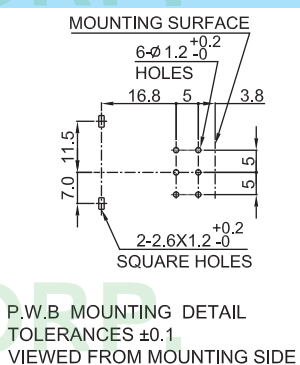
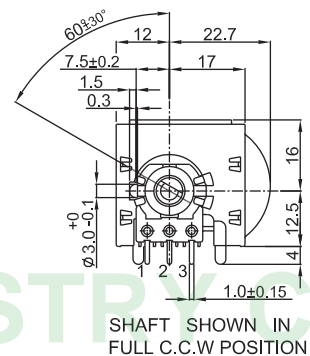
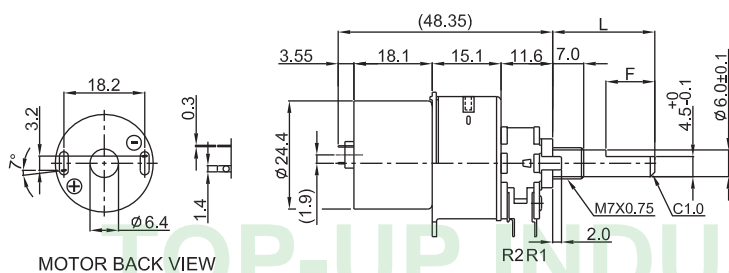
MMD16M2HBRT-B3



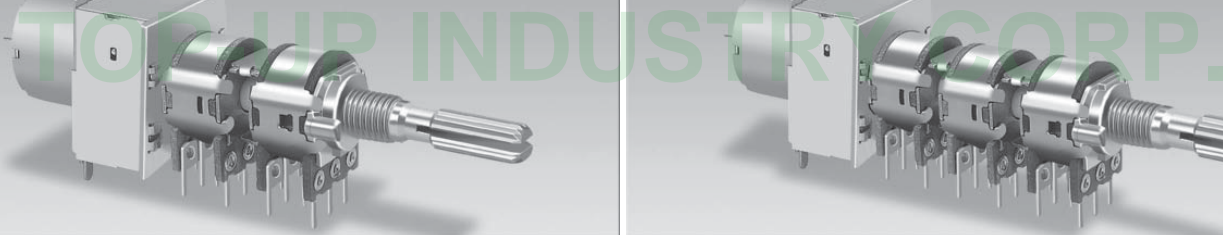
MD16M1HB-B3



MD16M2HB-B3

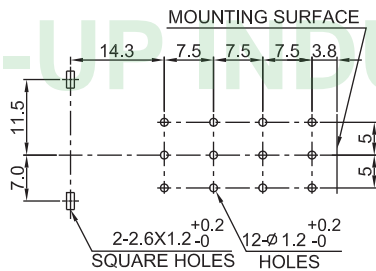
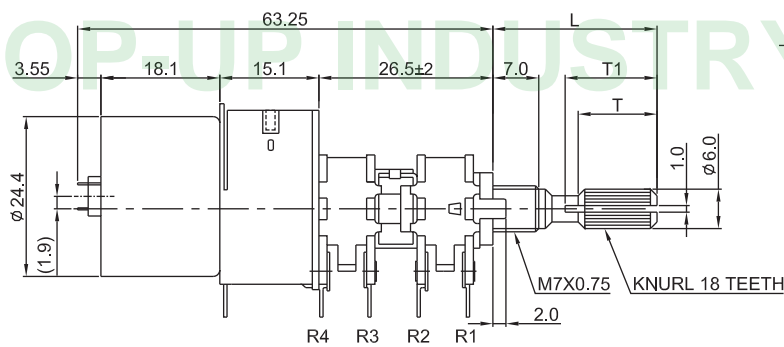


MD16M4HB-B3

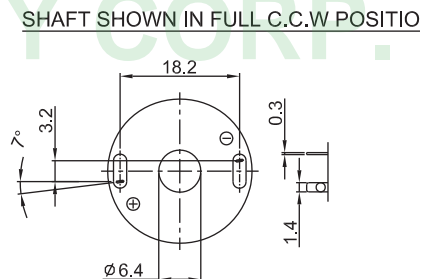
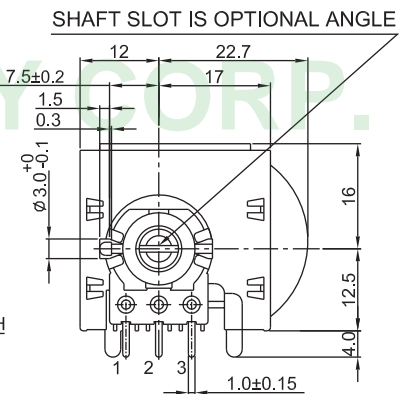


Outline Drawing

MD16M4HB-B3

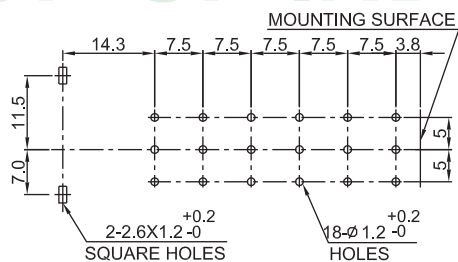
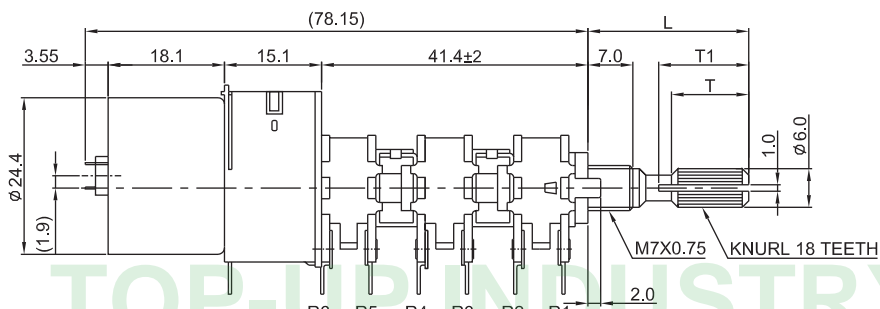


P.W.B MOUNTING DETAIL
TOLERANCES ± 0.1
VIEWED FROM MOUNTING SIDE

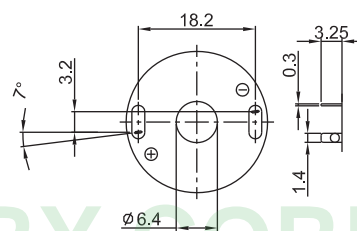
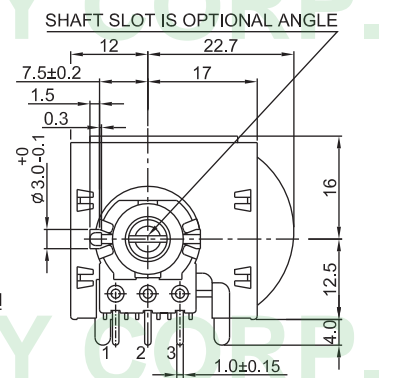


MOTOR BACK VIEW

MD16M6HB-B3



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

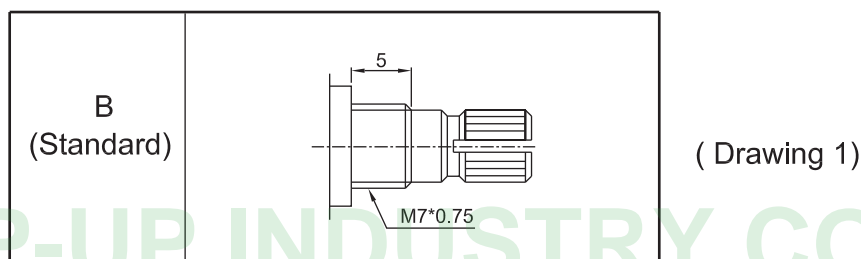


MOTOR BACK VIEW

17M Series Code Explanation

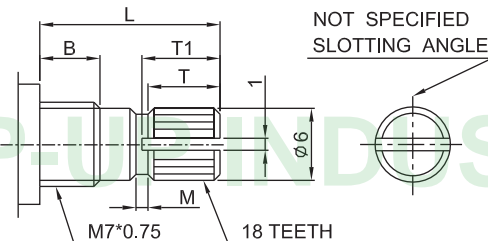
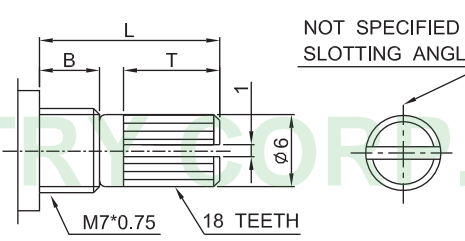
17M	1	S	H		B	A		F	-	B	-	20	K	-	B	50K	-			
1	2	3	4	5	6	7	8	9	10	11	12	13	14			15				

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)



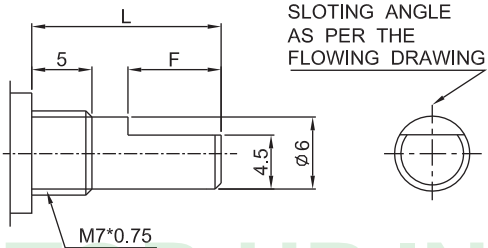
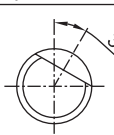


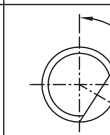
7. Bushing Material : Blank -Zinc Alloy , A -Aluminum Alloy
8. Bushing Diameter (Standard M7)
9. With Frame : "F" (Only without Switch Series)
10. Type of Terminal (See Drawing 3)
11. Shaft Length "L" (See Drawing 2)
12. Type of Shaft (See Drawing 2)
13. Type of Taper (See Taper Chart Page 220)
14. Resistance 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						

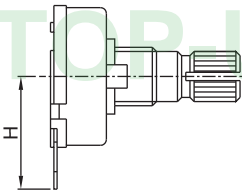
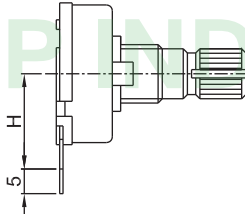
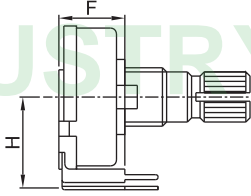
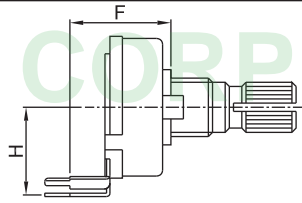











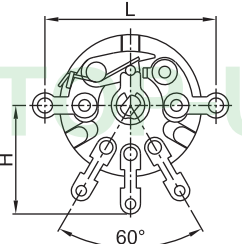
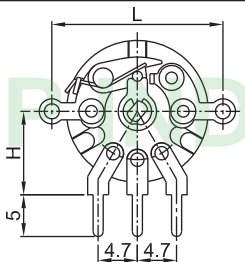
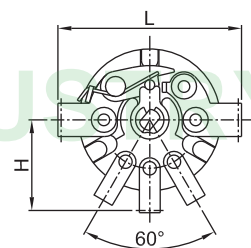
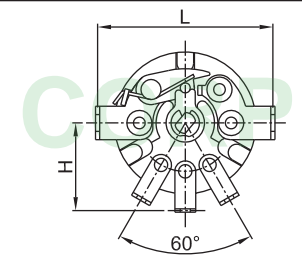
17M Series Code Explanation

(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					F	8	8	12	12.5	11.2		12.5			
					Terminal Detail										
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:

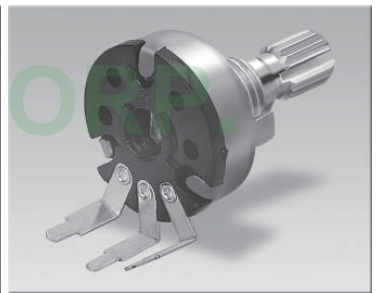
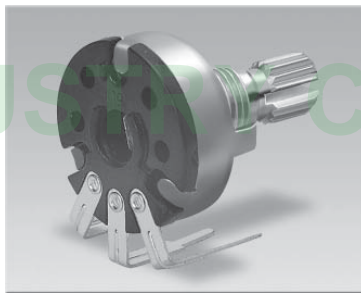
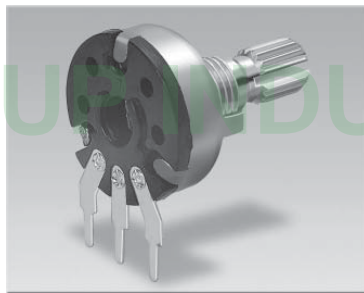
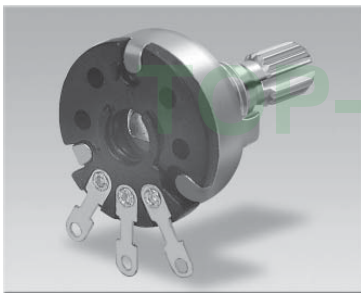
Rotation life	≥ 10,000 cycles
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17M1HB-A

17M1HB-B

17M1VB-C

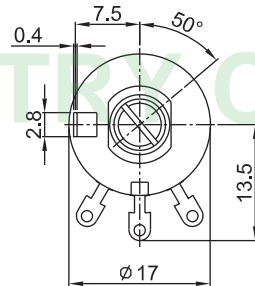
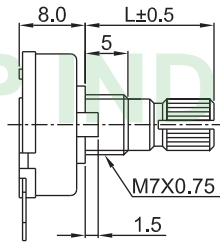
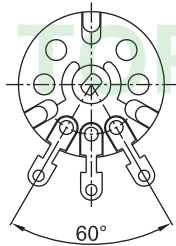
17M1VB-D



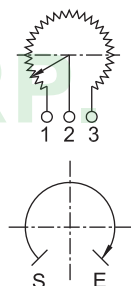
Outline Drawing

Features individual specifications

17M1HB-A

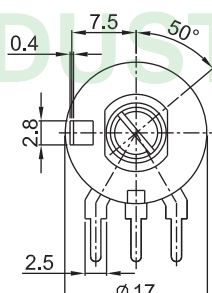
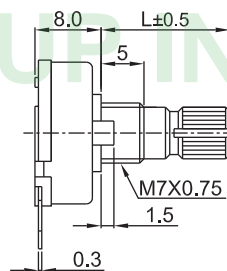
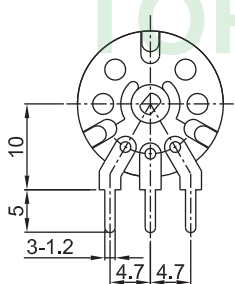


SHAFT SHOWN IN
FULL C.C.W POSITION

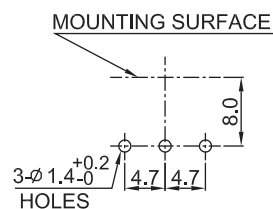


260° ROTATION
SINGLE UNIT

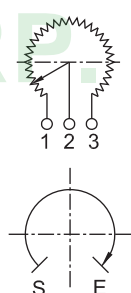
17M1HB-B



SHAFT SHOWN IN
FULL C.C.W POSITION

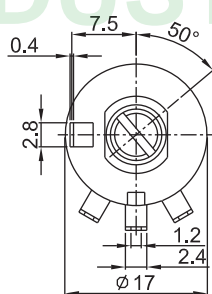
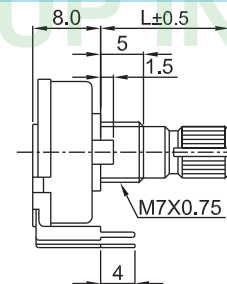
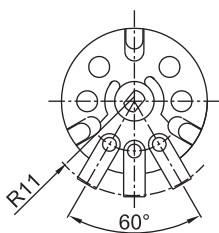


P.C.B MOUNTING HOLES DETAIL

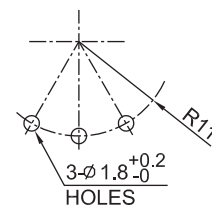


260° ROTATION
SINGLE UNIT

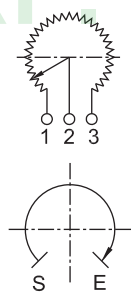
17M1VB-C



SHAFT SHOWN IN
FULL C.C.W POSITION

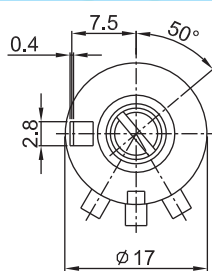
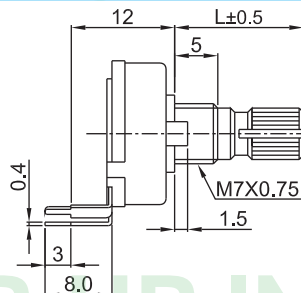
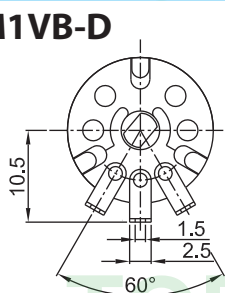


P.C.B MOUNTING HOLES DETAIL

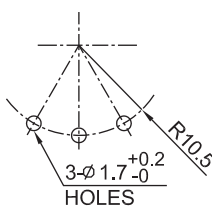


260° ROTATION
SINGLE UNIT

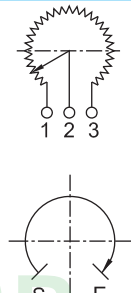
17M1VB-D



SHAFT SHOWN IN
FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



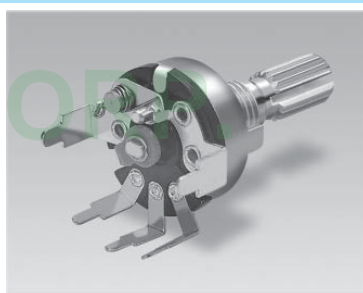
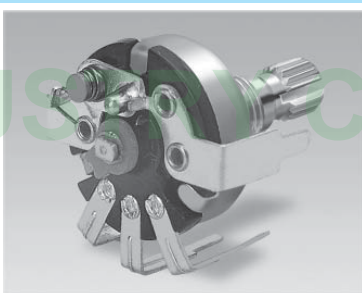
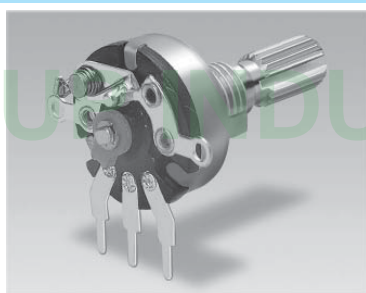
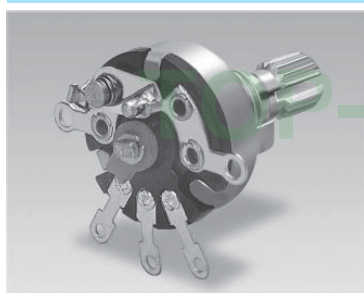
260° ROTATION
SINGLE UNIT

17M1SHB-A

17M1SHB-B

17M1SVB-C

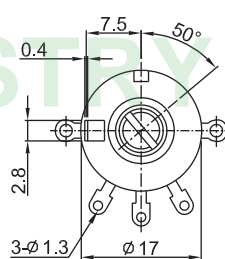
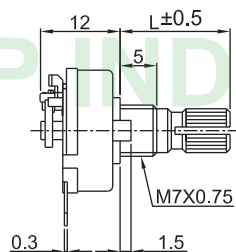
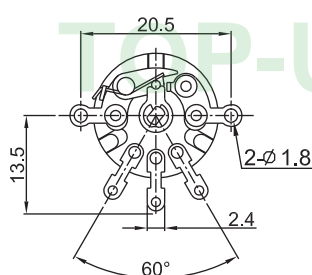
17M1SVB-D



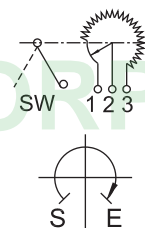
Outline Drawing

Features individual specifications

17M1SHB-A

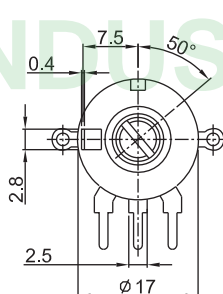
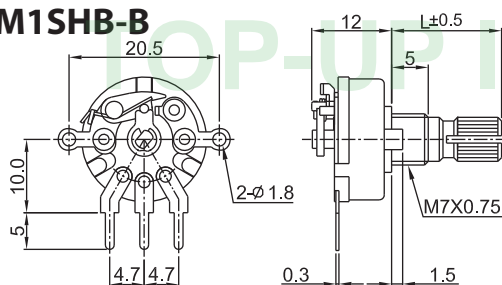


SHAFT SHOWN IN
FULL C.C.W POSITION

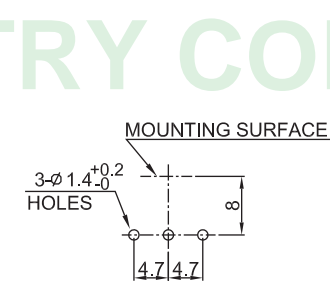


260° ROTATION
SINGLE UNIT
WITH SWITCH
S.P.S.T. 12VDC,1A

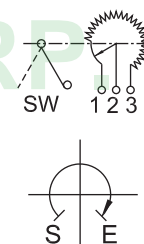
17M1SHB-B



SHAFT SHOWN IN
FULL C.C.W POSITION

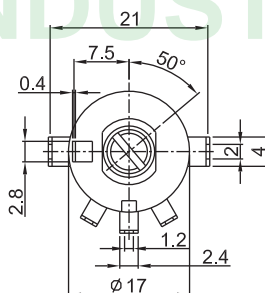
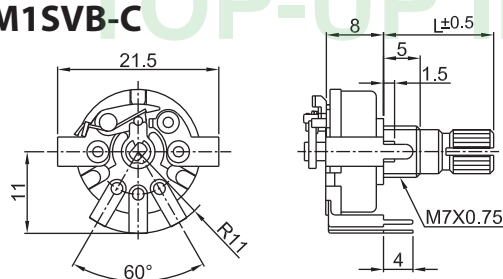


P.C.B MOUNTING HOLES DETAIL

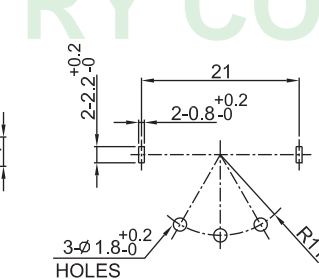


260° ROTATION
SINGLE UNIT
WITH SWITCH
S.P.S.T. 12VDC,1A

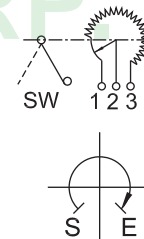
17M1SVB-C



SHAFT SHOWN IN
FULL C.C.W POSITION

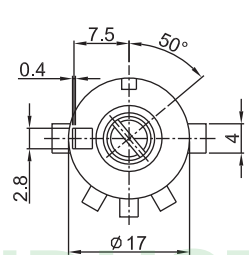
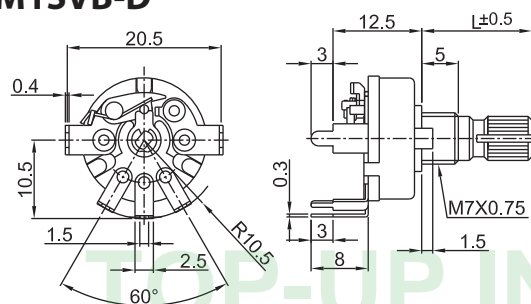


P.C.B MOUNTING HOLES DETAIL

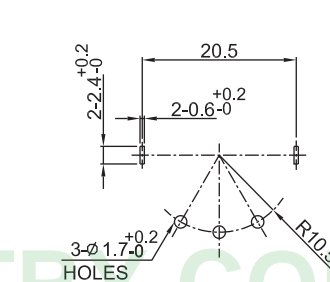


260° ROTATION
SINGLE UNIT
WITH SWITCH
S.P.S.T. 12VDC,1A

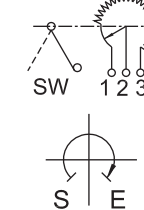
17M1SVB-D



SHAFT SHOWN IN
FULL C.C.W POSITION

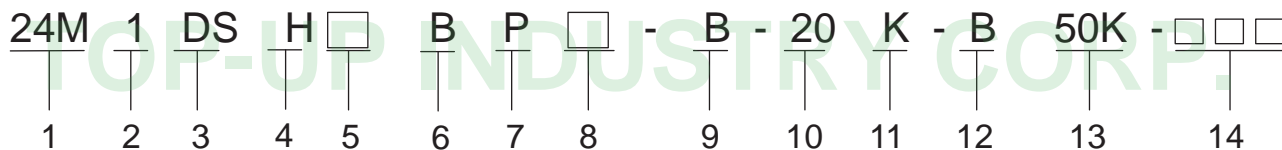


P.C.B MOUNTING HOLES DETAIL



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

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



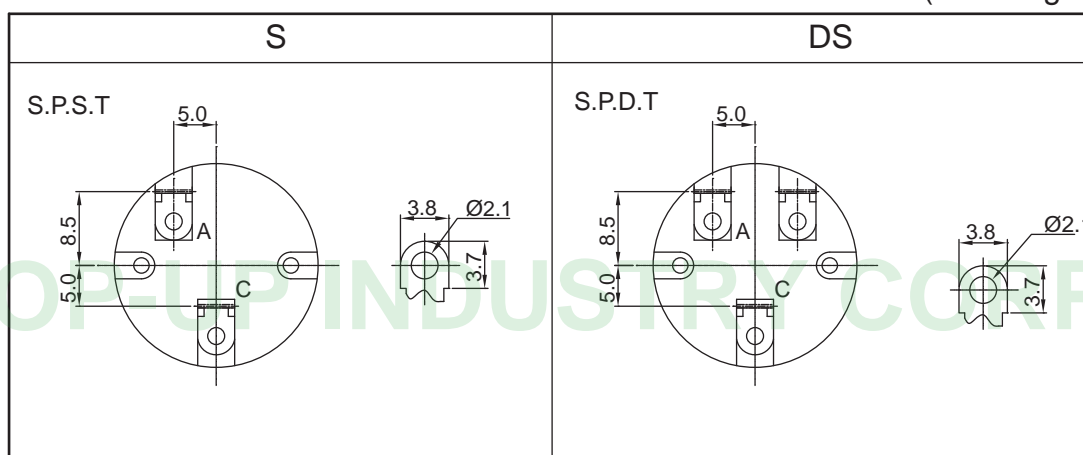
1. Product Lines of 20MD, 22M, 24M, 24MJ, 24MD, 24P

20MD, 22M, 24M, 24MJ, 24MD — Metal Shaft

24P — Insulated Shaft

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

3. Type of Switch (Drawing 1)



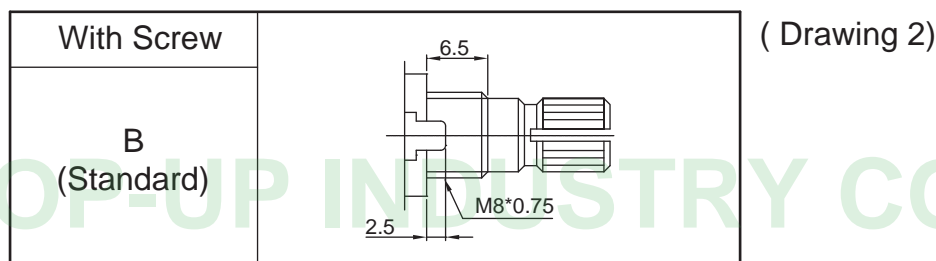
4. Horizontal (H) Type or Vertical (V) Type

5. Bushing Length: Blank - 6.5mm (Standard Type)

6. With Bushing (See Drawing 2)

7. Bushing Material: Blank - Zinc Alloy, A - Aluminum Alloy, P - Plastic Alloy, C - Copper Alloy

8. Bushing Diameter: Blank - M8 (Standard Type), 9 - M9



9. Type of Terminal (See Drawing 3)

10. Shaft Length (See Drawing 4)

11. Type of Shaft (See Drawing 4)

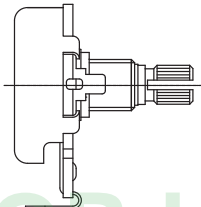
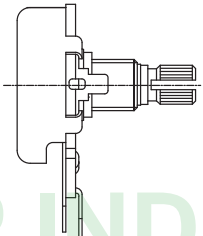
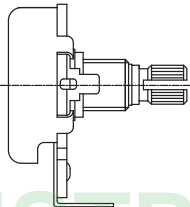
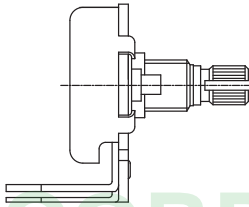
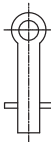


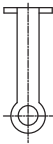
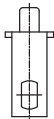

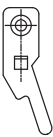




12. Type of Taper (See Taper Chart Page 220)

13. Resistance Value

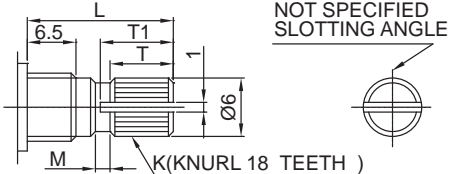
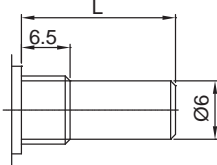
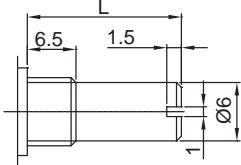
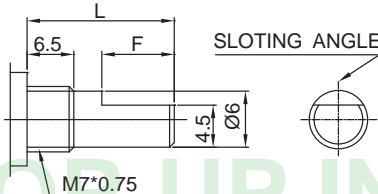



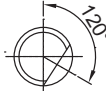
14. Serial No.

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

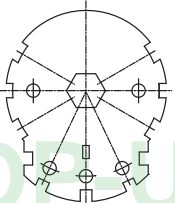
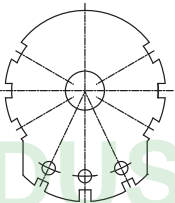
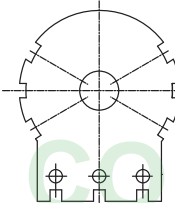
Type of Terminal (Drawing 3)

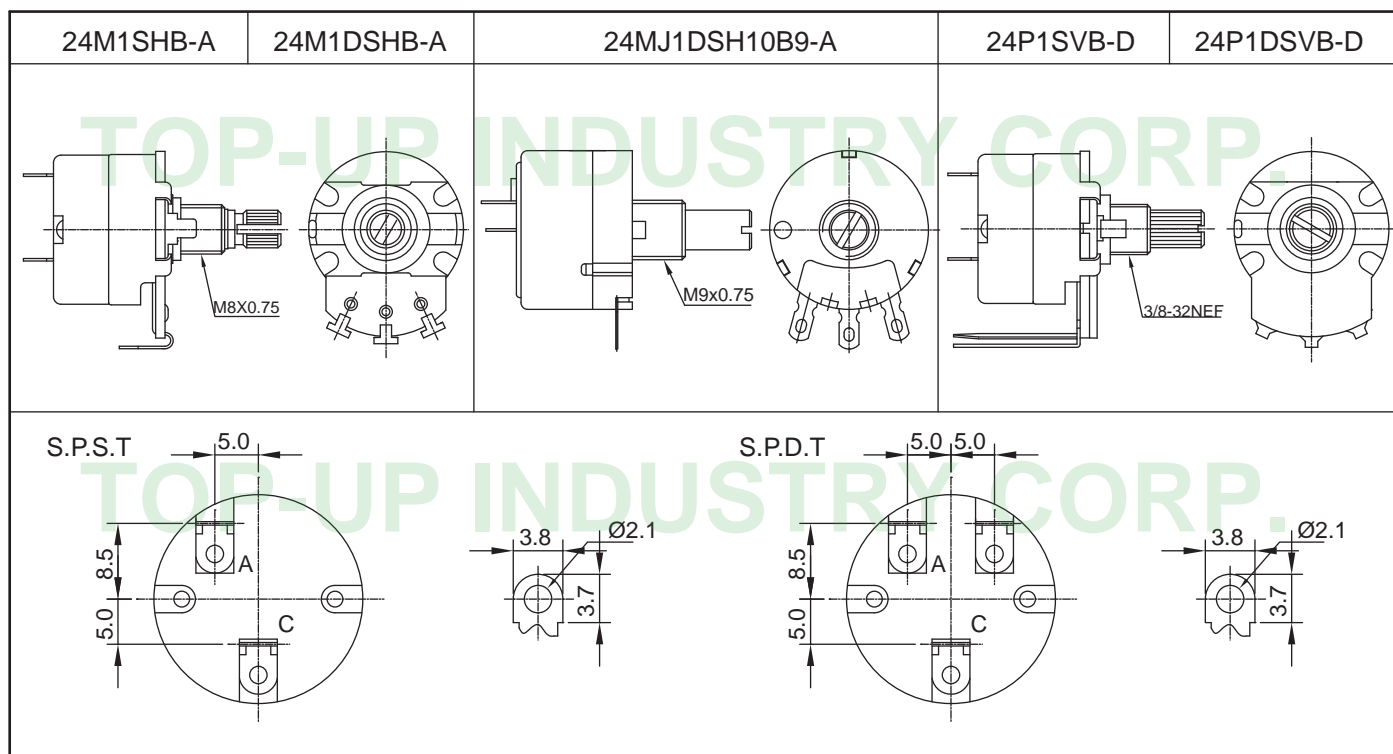
Horizontal							Vertical				
Solder Lug Type (A)		P.C.B Type (B)			P.C.B Type (C)		P.C.B Type (D)				
											
Terminal -Type	A					B			C	D	
	A	A1		A2	A3						
Terminal Detail											

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		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	$R \geq 250K\Omega$ 0.1% max. of total resistance $250K\Omega > R > 10K\Omega$ 20Ω max. $10K\Omega \geq R$ 10Ω max.
Insulation resistance	More than 100MΩ at DC 500V
Withstand voltage	1 minute at AC 500V
Switch contact resistance	Less than 300MΩ

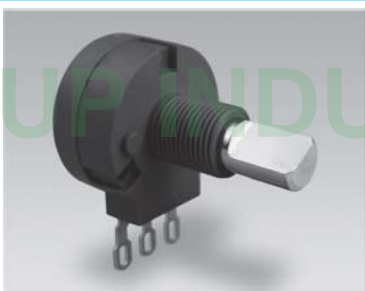
Durability:

Rotational life	10,000 cycles
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20MD1H10B9-A



20MD1H10BP9-A



22M1V7B10-D



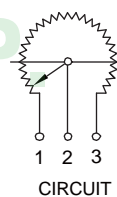
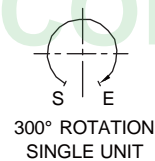
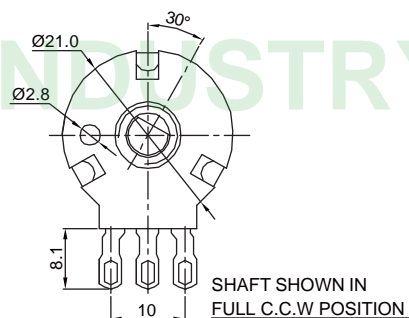
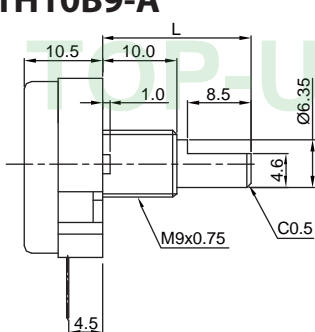
22M1V7BP10-D



Outline Drawing

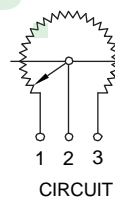
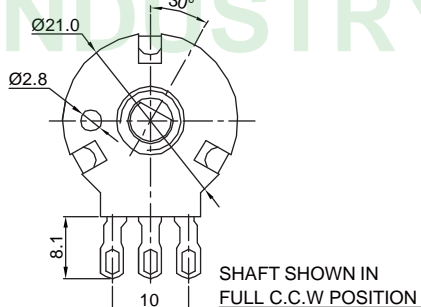
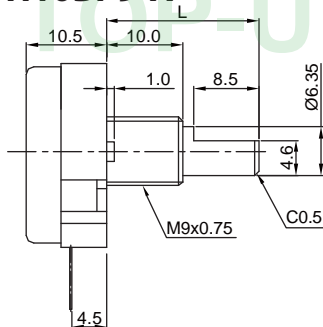
Features individual specifications

20MD1H10B9-A



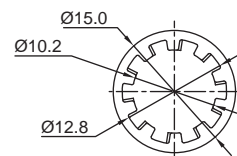
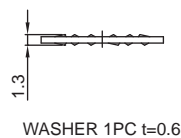
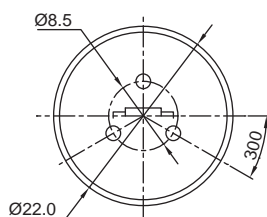
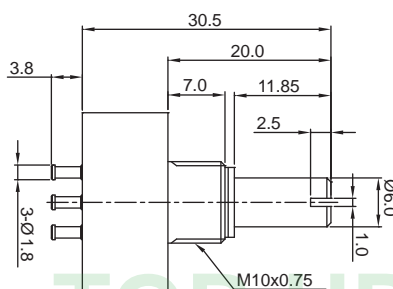
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L	15	20	25	30

20MD1H10BP9-A

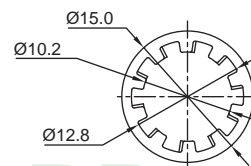
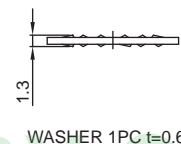
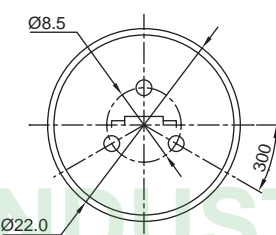
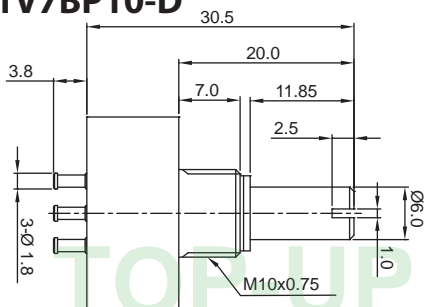


MODEL	15F	20F	25F	30F
L	15	20	25	30

22M1V7B10-D



22M1V7BP10-D

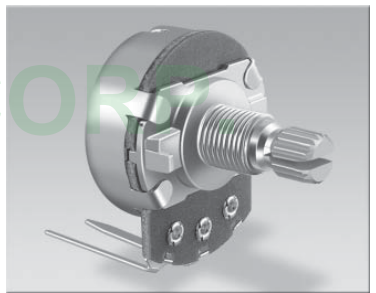
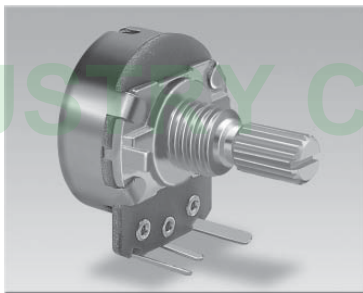
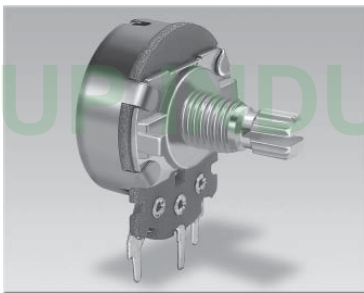
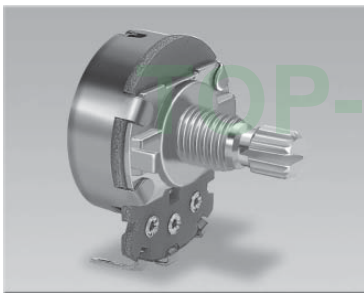


24M1HB-A

24M1HB-B

24M1VB-C

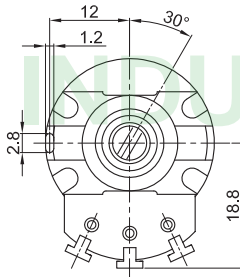
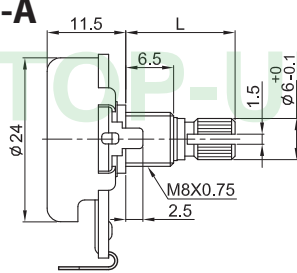
24M1VB-D



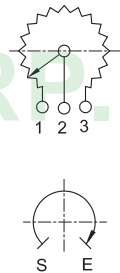
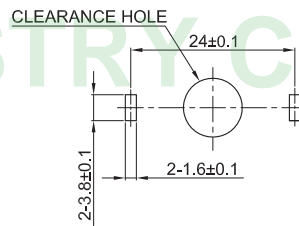
Outline Drawing

Features individual specifications

24M1HB-A

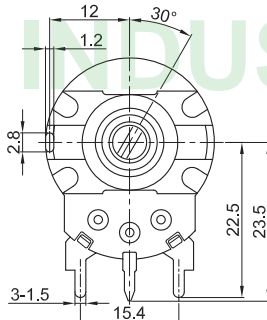
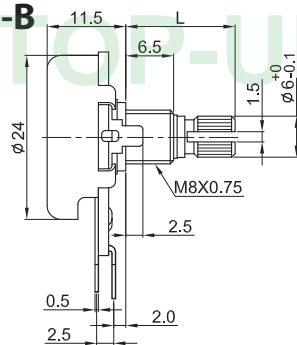


SHAFT SHOWN IN FULL C.C.W POSITION

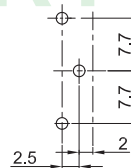


300° ROTATION SINGLE UNIT

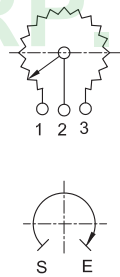
24M1HB-B



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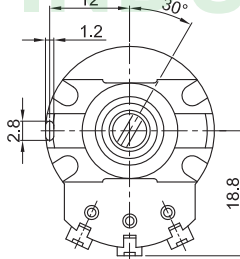
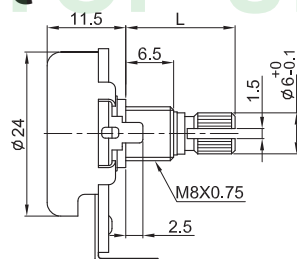


P.C.B MOUNTING HOLES DETAIL

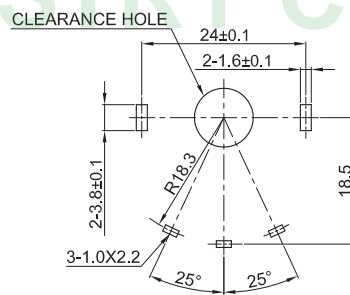


300° ROTATION SINGLE UNIT

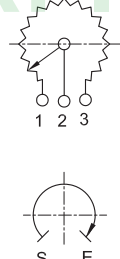
24M1VB-C



SHAFT SHOWN IN FULL C.C.W POSITION

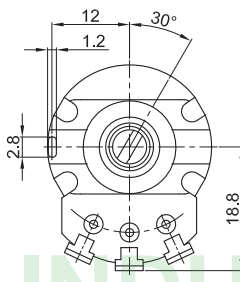
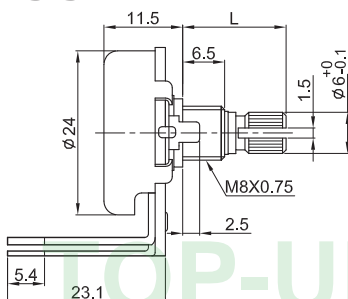


P.C.B MOUNTING HOLES DETAIL

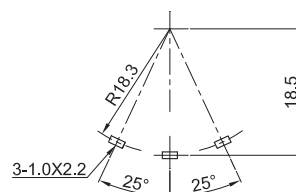


300° ROTATION SINGLE UNIT

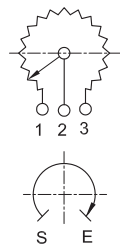
24M1VB-D



SHAFT SHOWN IN FULL C.C.W POSITION

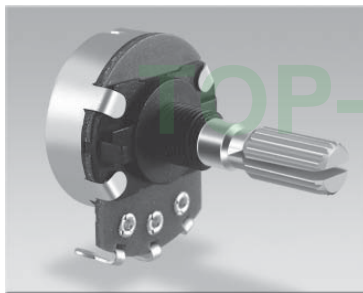


P.C.B MOUNTING HOLES DETAIL

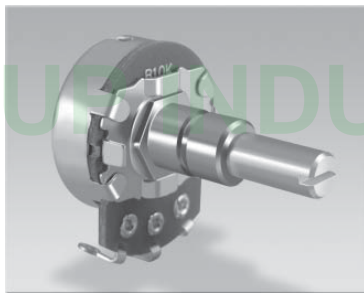


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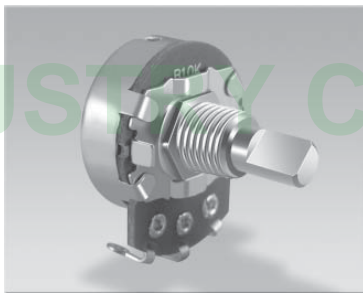
24M1HBP-A



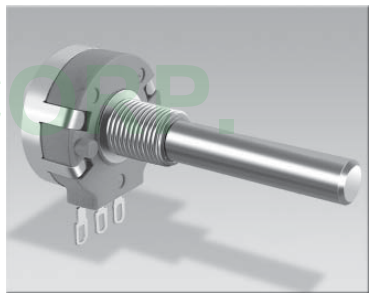
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24M1H9.55BC3-A



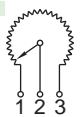
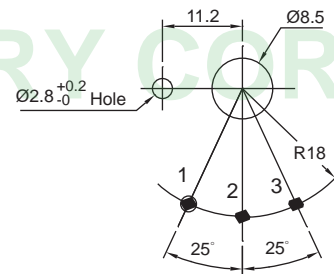
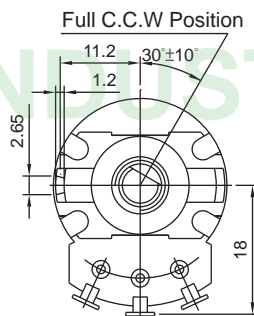
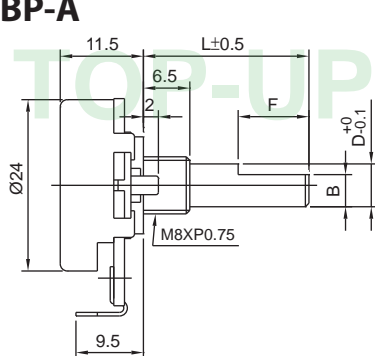
24M1H10B9-A3



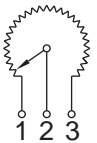
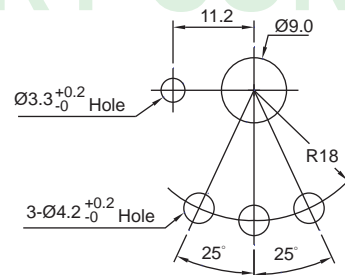
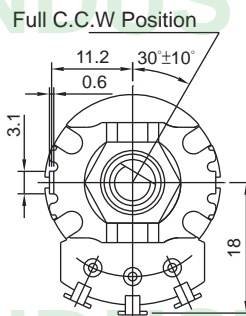
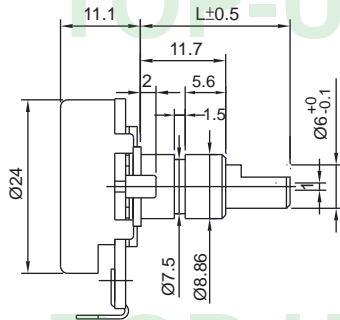
Outline Drawing

Features individual specifications

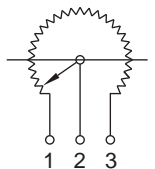
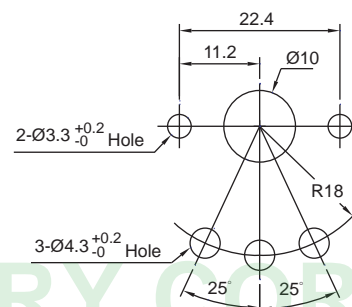
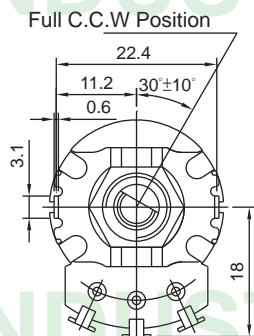
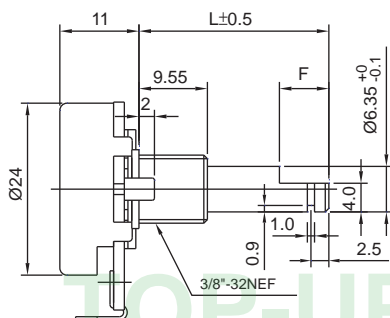
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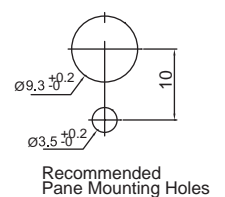
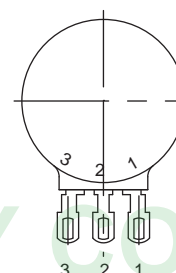
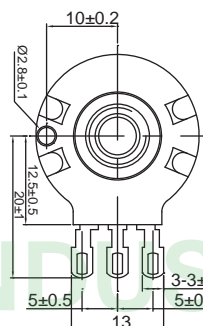
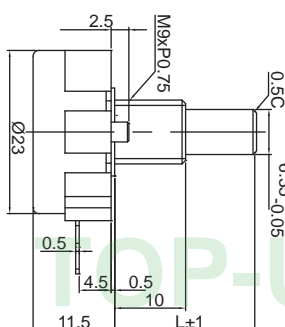
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24M1H9.55BC3-A



24M1H10B9-A3



Recommended Panel Mounting Holes

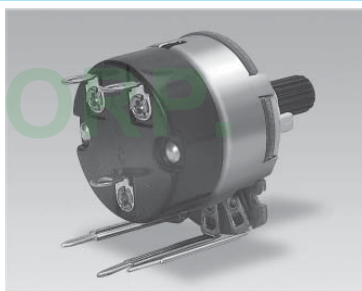


24M1SHB-A

24M1DSHB-A

24P1SVB-D

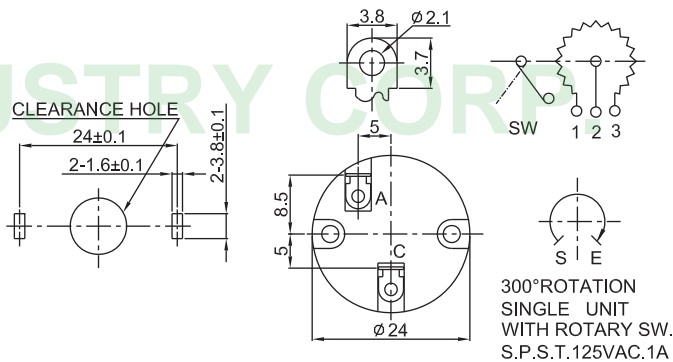
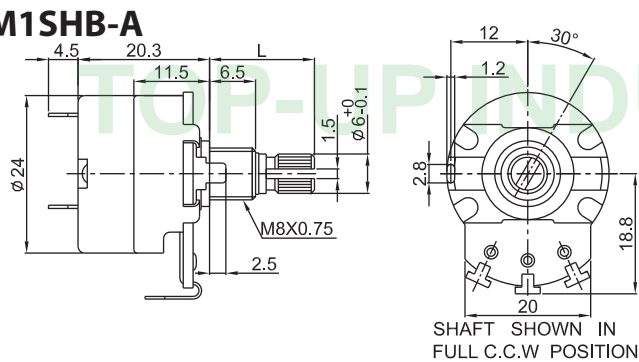
24P1DSVB-D



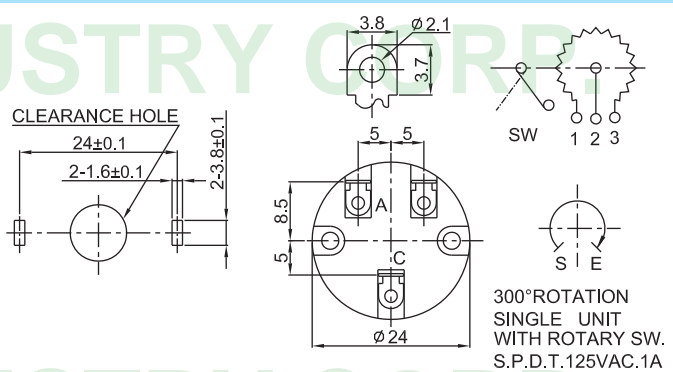
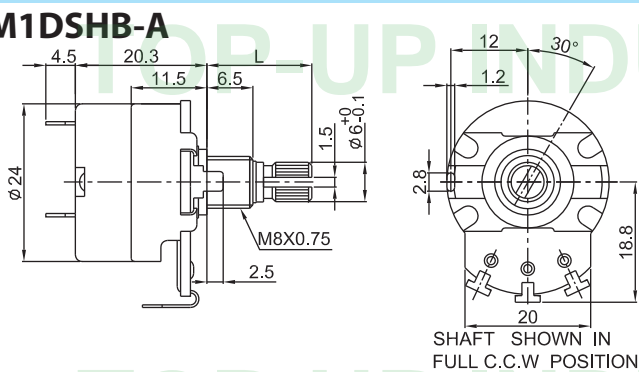
Outline Drawing

Features individual specifications

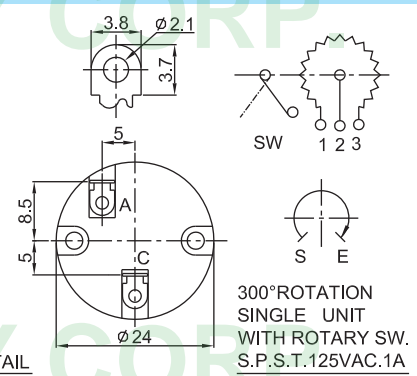
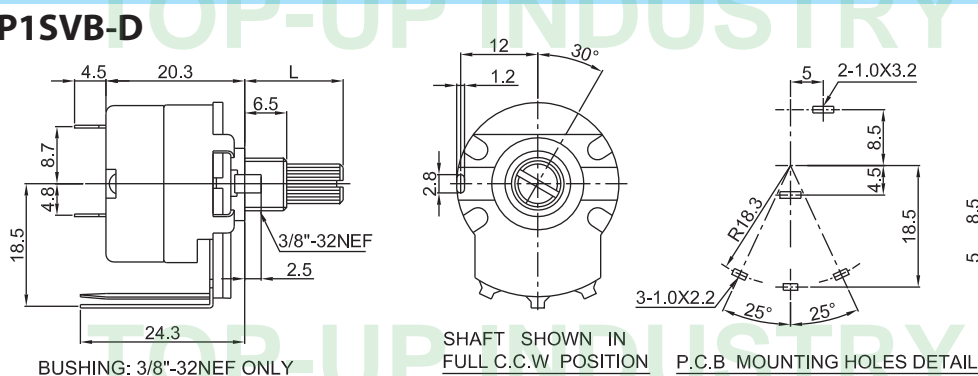
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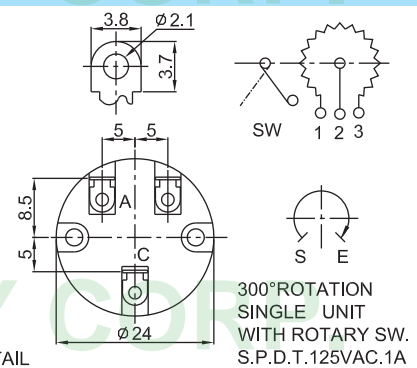
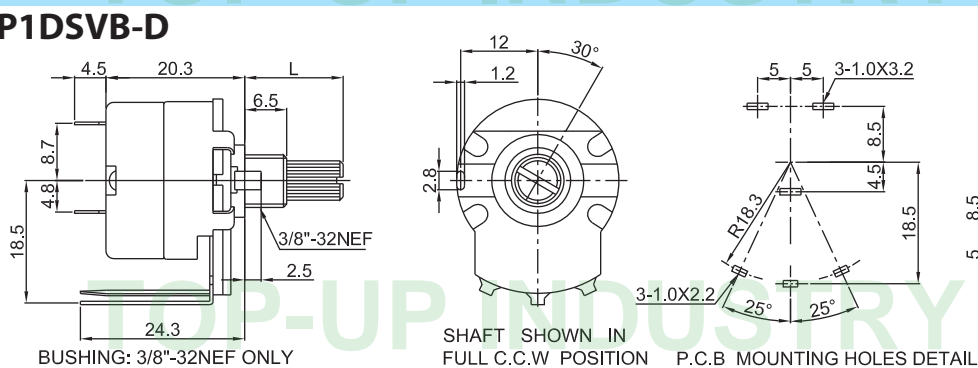
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24P1SVB-D



24P1DSVB-D

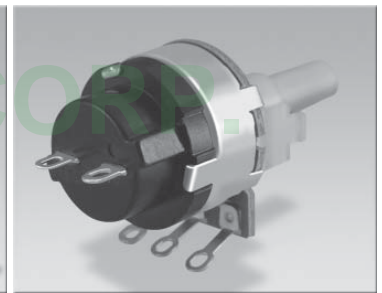
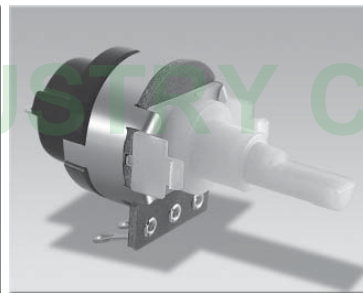
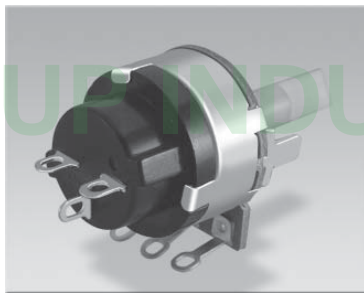
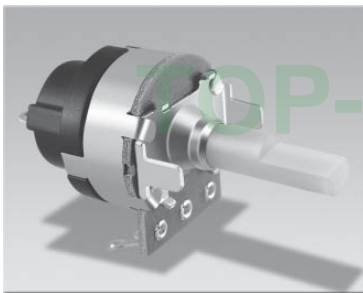


24P1PSHF-A

24P1PDSHF-A

24P1PSHNBFA-A

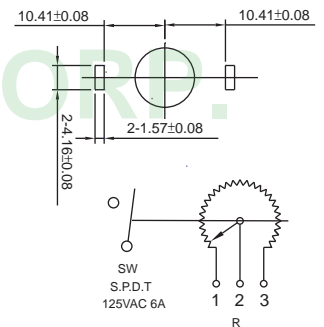
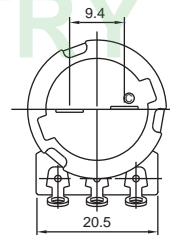
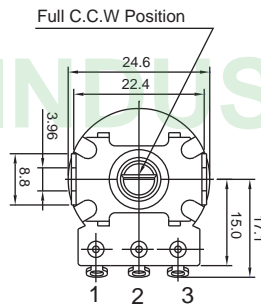
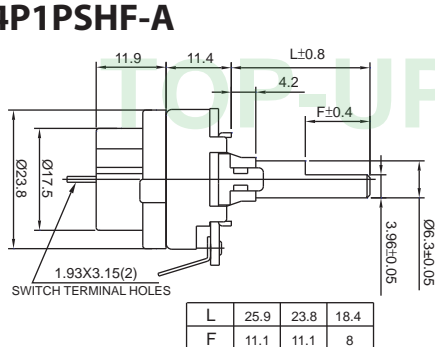
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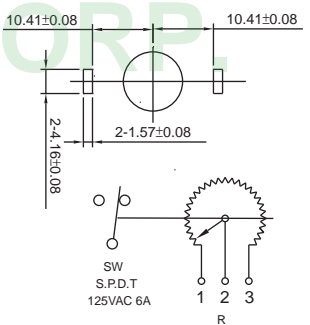
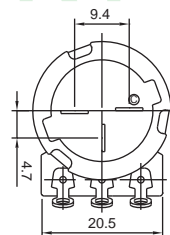
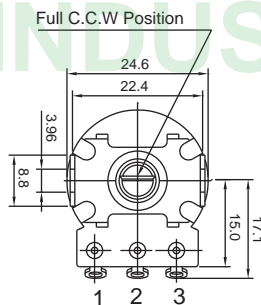
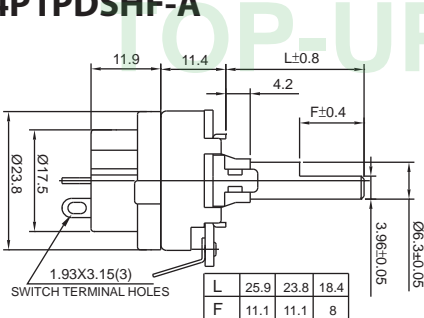
Outline Drawing

Features individual specifications

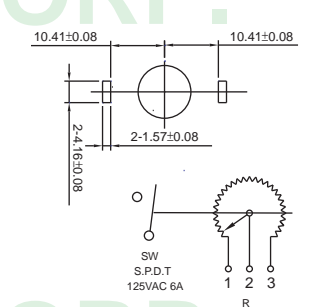
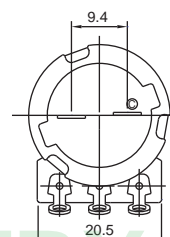
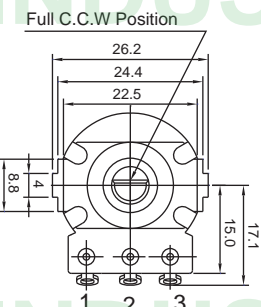
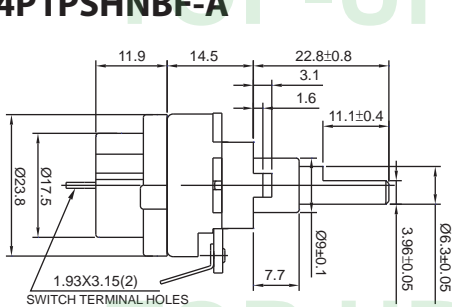
24P1PSHF-A



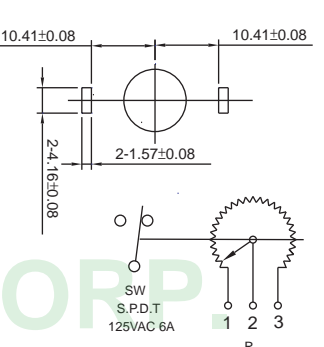
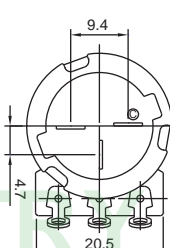
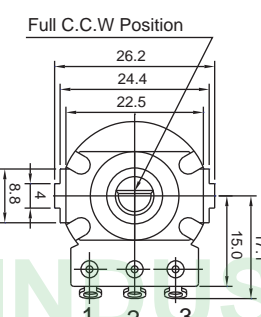
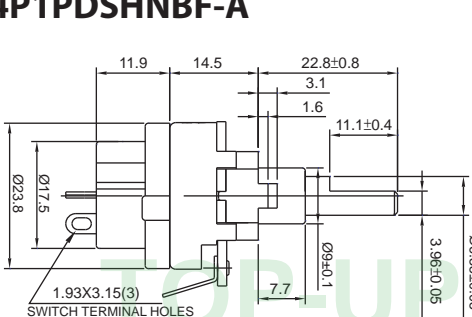
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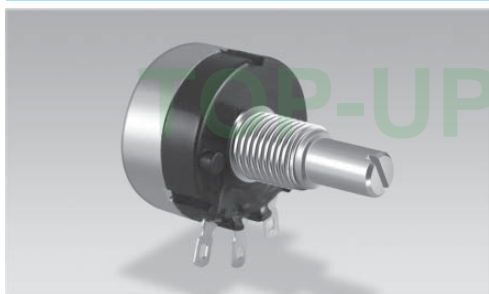
24P1PSHNBFA-A



24P1PDSHNBFA-A

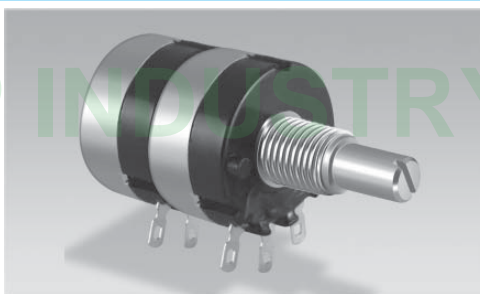


24MJ1H10B9-A



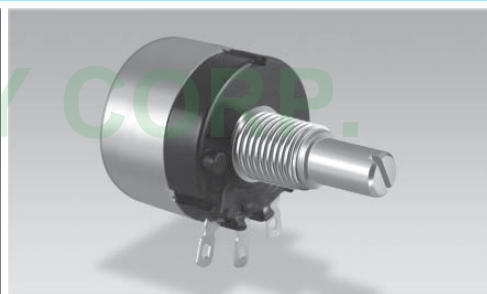
Outline Drawing

24MJ2H10B9-A

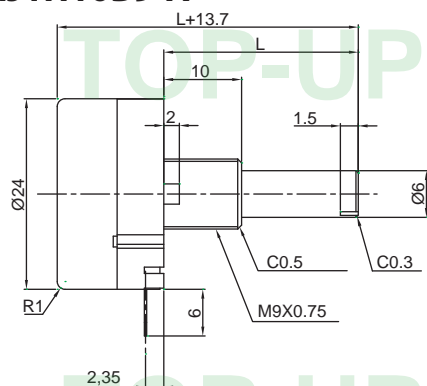


Features individual specifications

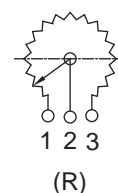
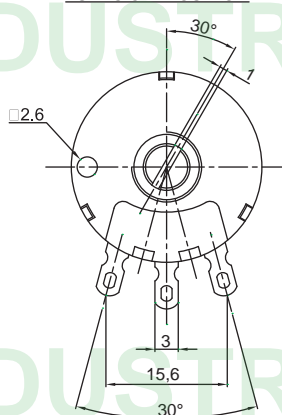
24MJ1DSH10B9-A



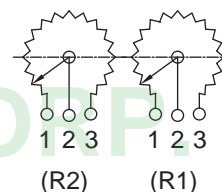
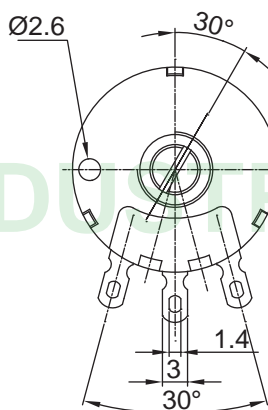
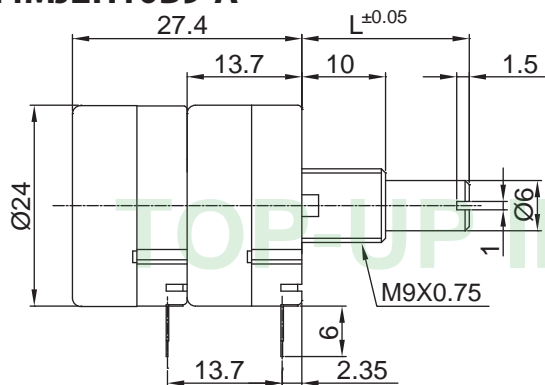
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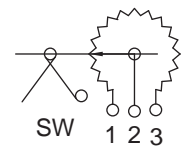
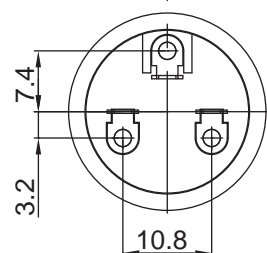
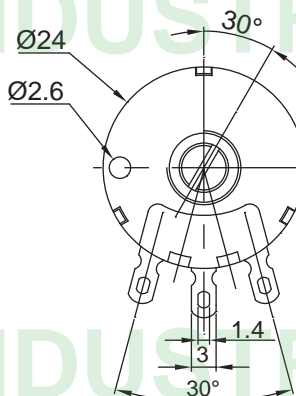
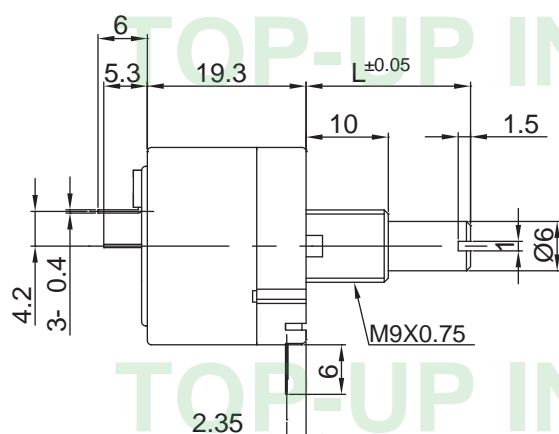
SHAFT SHOWN IN
FULL C.C.W. POSITION



24MJ2H10B9-A



24MJ1DSH10B9-A



24MD1H10B9-A



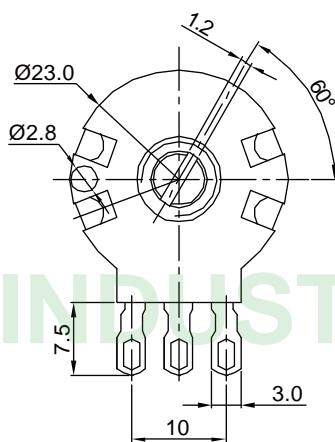
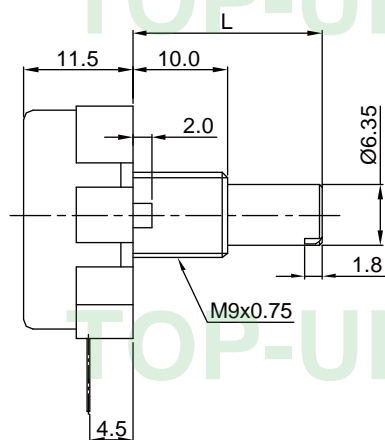
Outline Drawing

24MD1H10BP9-A

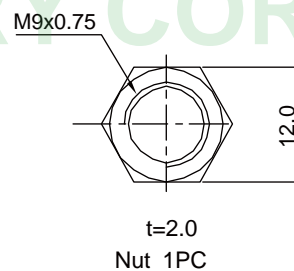
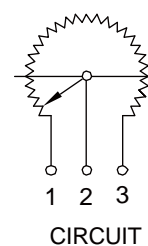
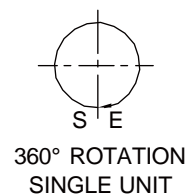


Features individual specifications

24MD1H10B9-A

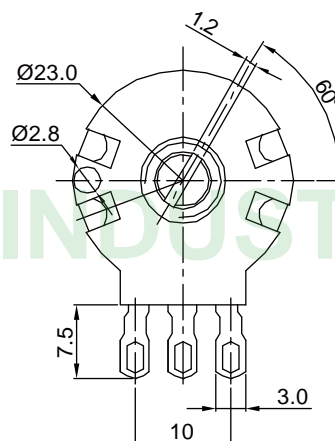
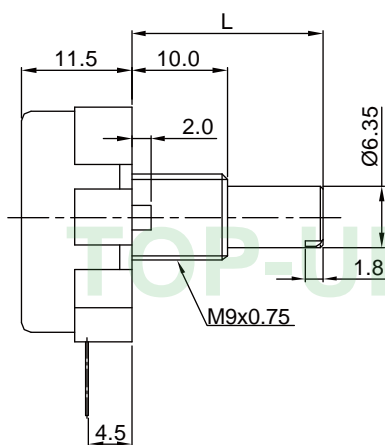


SHAFT SHOWN IN
FULL C.C.W POSITION

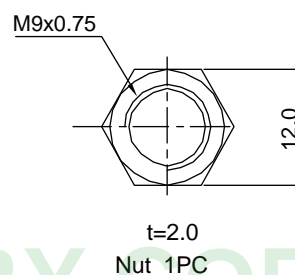
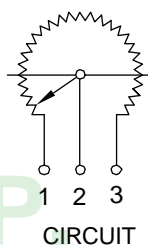
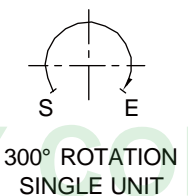


MODEL	15S	20S	21S	25S	30S
L	15	20	21	25	30

24MD1H10BP9-A



SHAFT SHOWN IN
FULL C.C.W POSITION



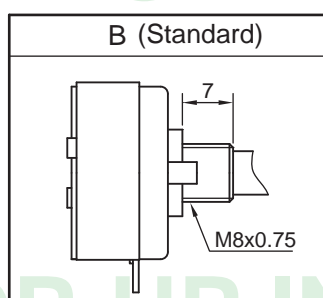
MODEL	15S	20S	21S	25S	30S
L	15	20	21	25	30

27M Series Code Explanation

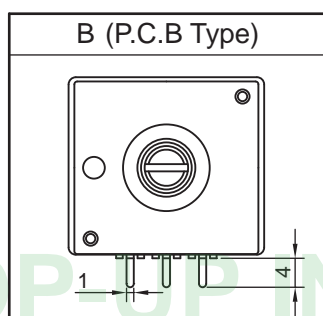
27M 1 H B - B - 20 F - B 50K - 1C - □ □ □

1 2 3 4 5 6 7 8 9 10 11

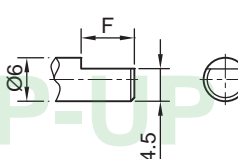
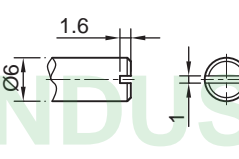
1. Product Lines of 27M
2. Number of Unit : 1 — Single Unit 2 — Dual Unit,.....
3. Horizontal(H) Type
4. Type of Bushing



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



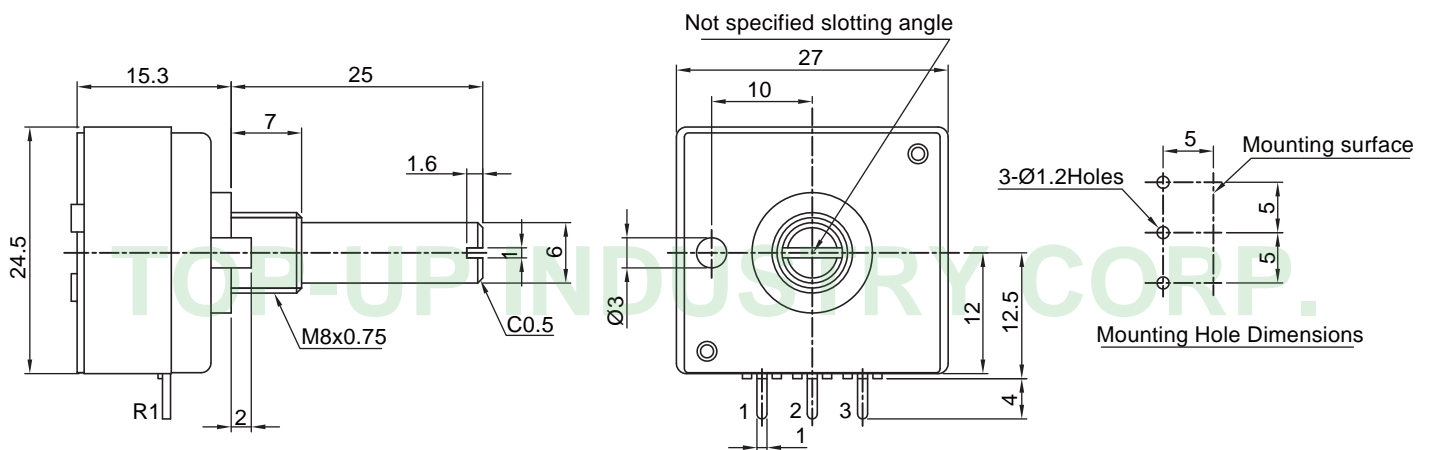
Outline Drawing

27M2HB-B

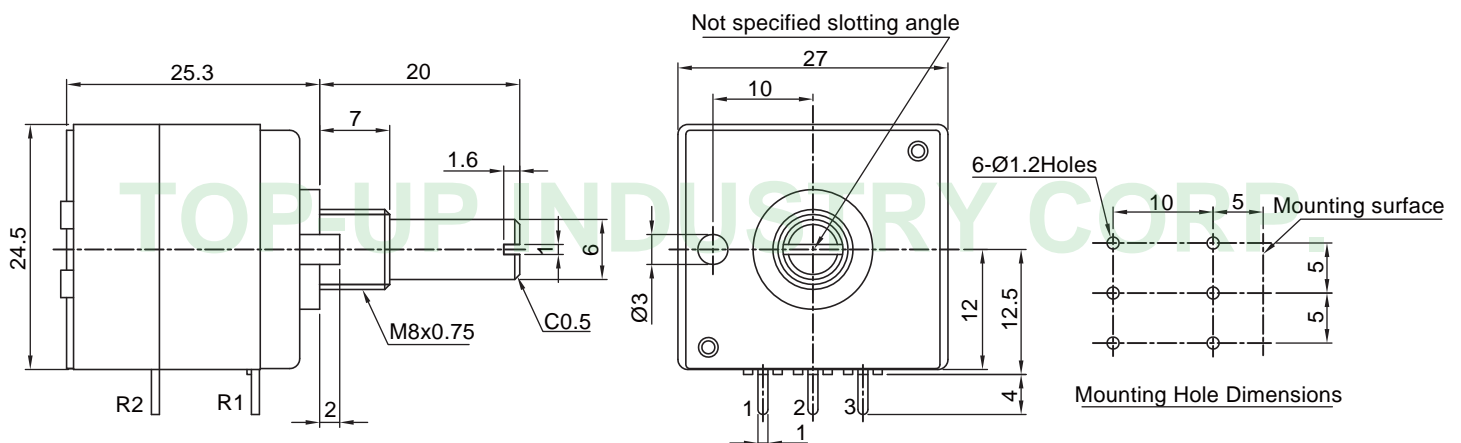


Features individual specifications

27M1HB-B



27M2HB-B



JT Series Code Explanation

J T 9 S - 1 P - B 10 K C - 11 - P 10 - P - A - O GR - -

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

1. Product Lines of JT

2. Switch : Blank-Without Switch , S-With Switch

3. Code

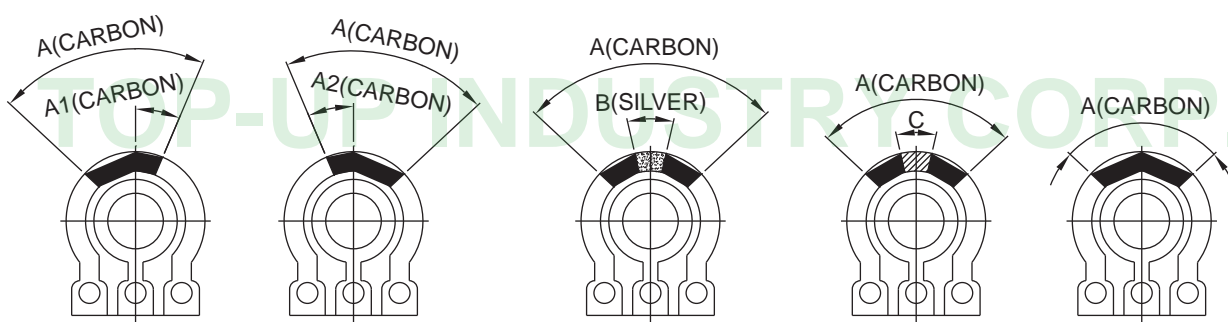
4. Type of Taper (See Taper Chart Page 220)

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°
A	35°	38°	40°	45°	50°	53°
A	60°	65°	70°	90°	95°	120°
A	147°	180°	300°			

TOP-UP INDUSTRY CORP. JT Series Code Explanation

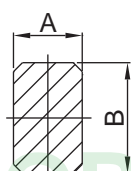
J T 9 S - 1 P - B 10 K C - 11 - P 10 - P - A - O GR - -

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

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 ⁺⁰ _{-0.03}	1.10 ^{+0.02} _{-0.03}	1.15 ⁺⁰ _{-0.05}
B	1.80±0.03	1.80±0.03	1.85 ⁺⁰ _{-0.07}

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

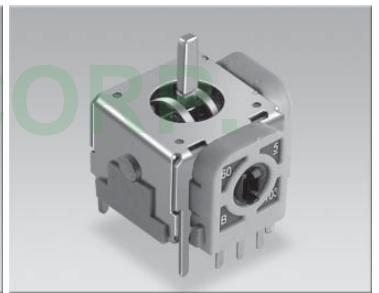
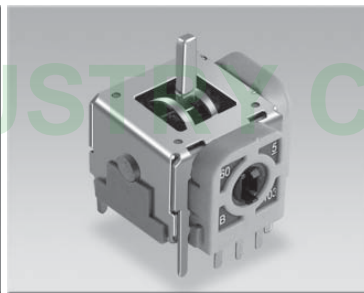
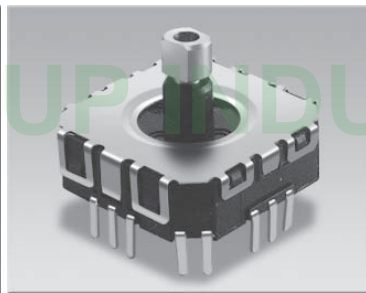
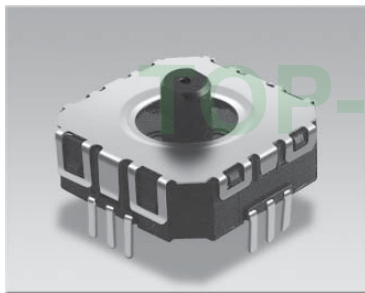
Code	Blank	B	H
	B1+C1	B3+C1	B1+C3

JT8P-3.2T

JT8PS-6.6T

JT9-1

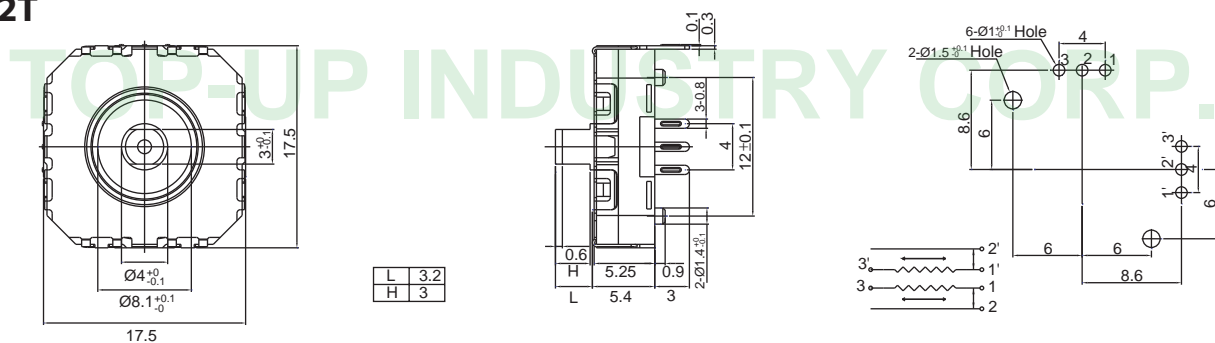
JT9-2



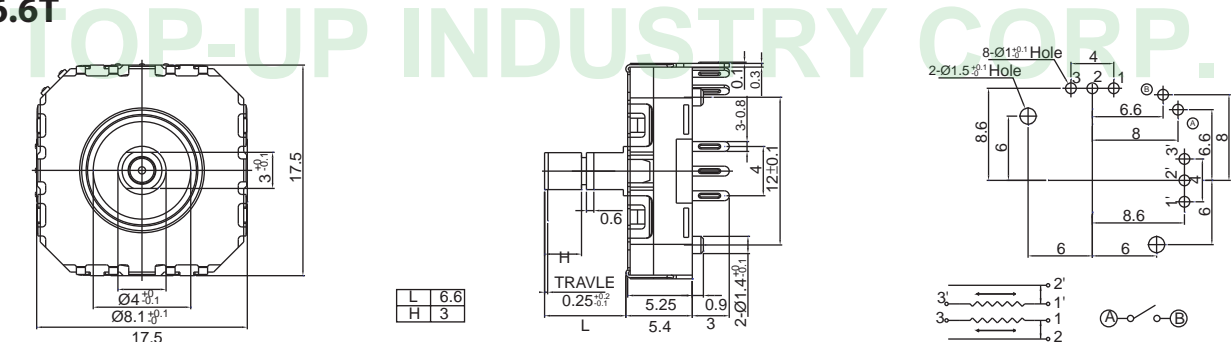
Outline Drawing

Features individual specifications

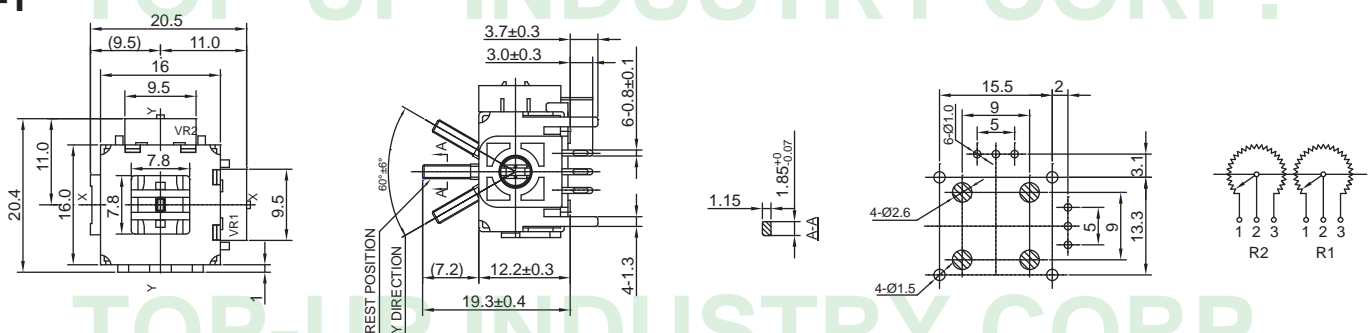
JT8P-3.2T



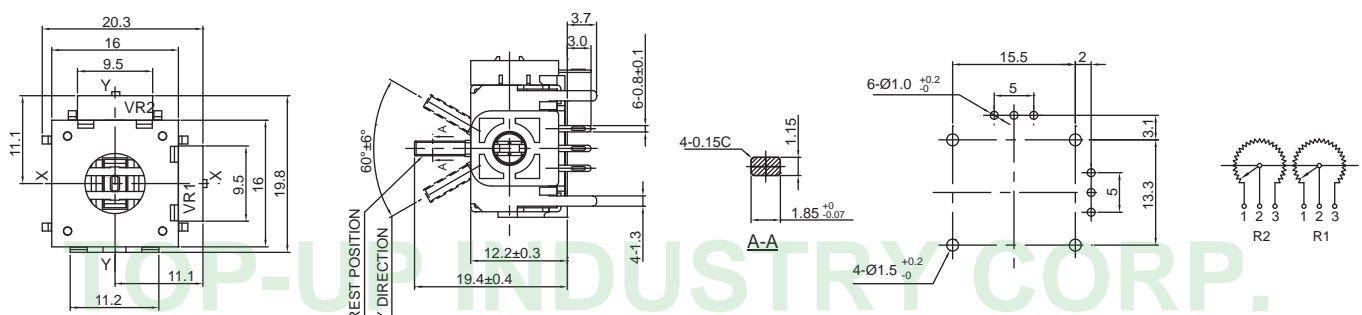
JT8PS-6.6T



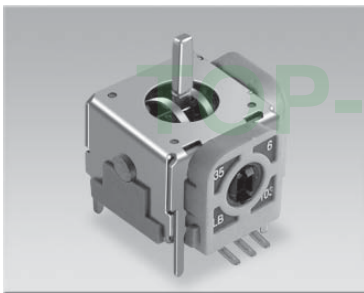
JT9-1



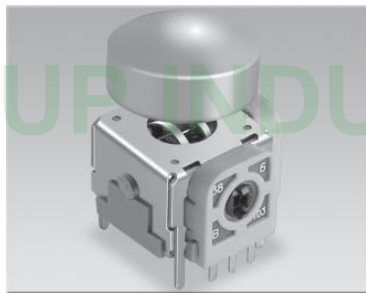
JT9-2



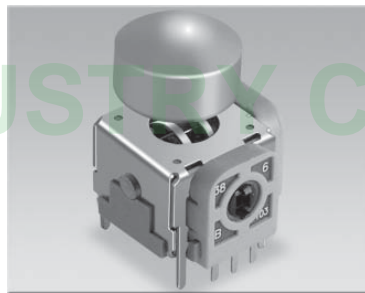
JT9-3



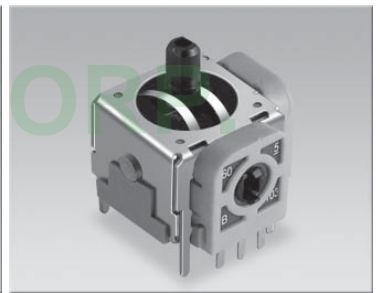
JT9-4



JT9-5



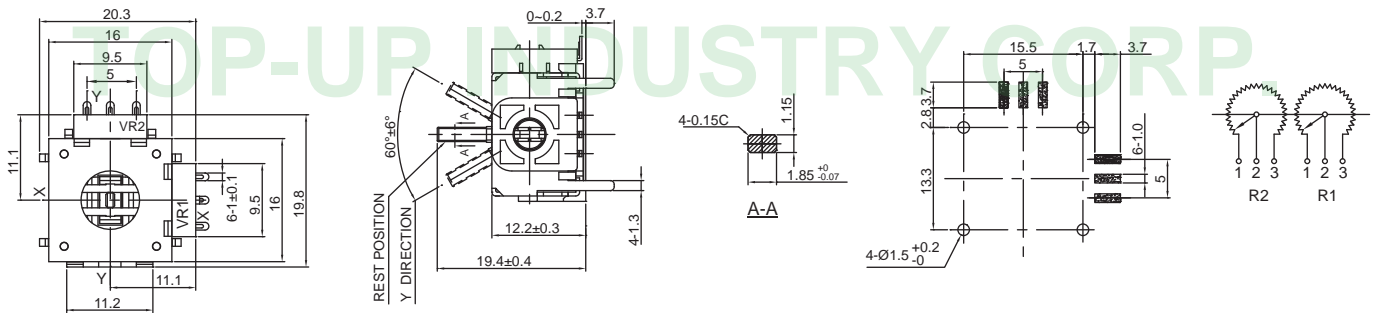
JT9-6



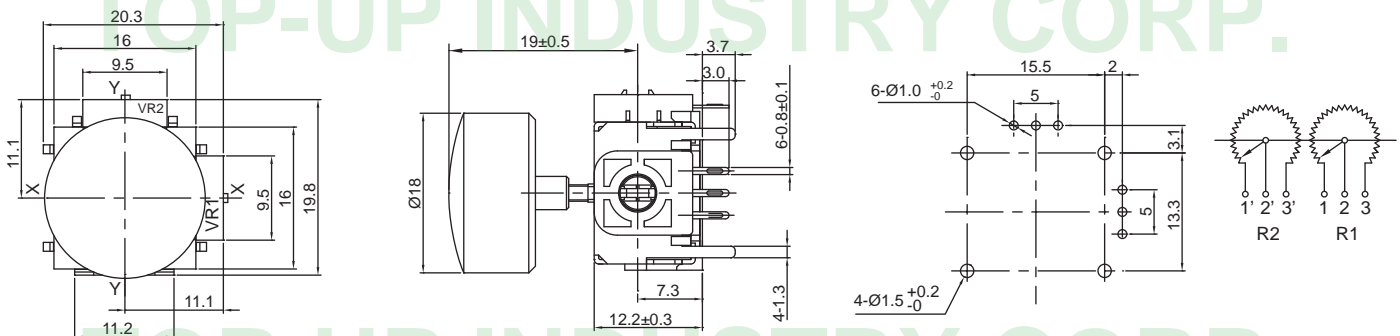
Outline Drawing

Features individual specifications

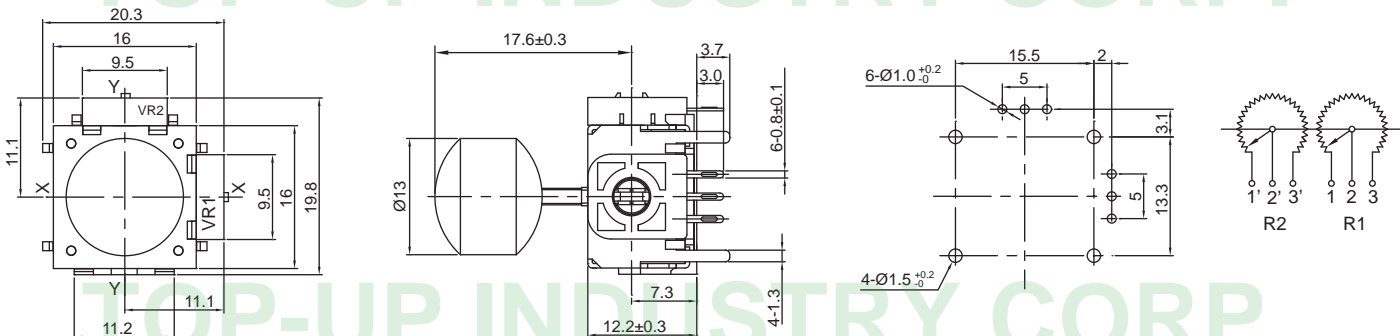
JT9-3



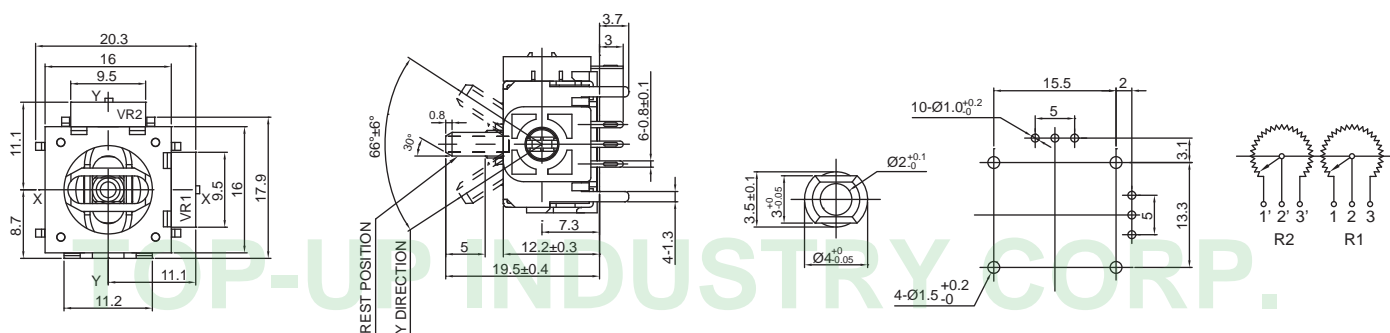
JT9-4



JT9-5



JT9-6

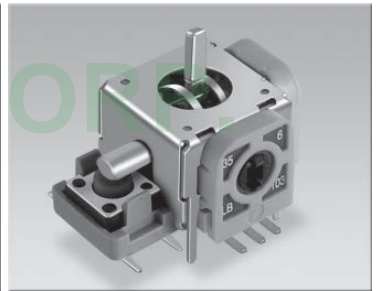
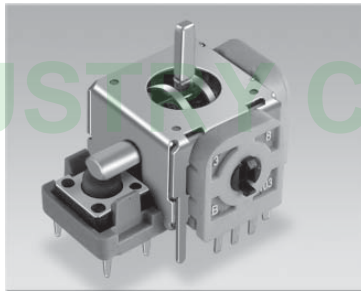
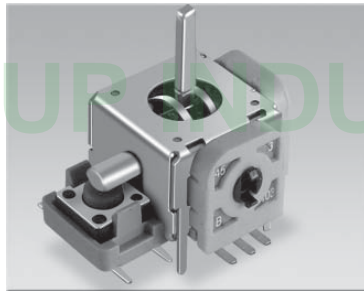
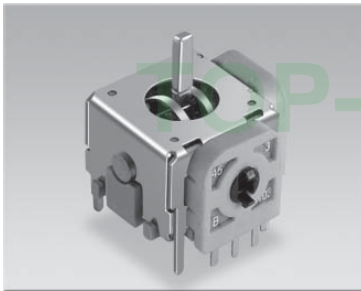


JT9M

JT9MS-1

JT9MS-2

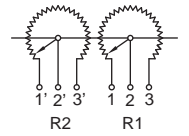
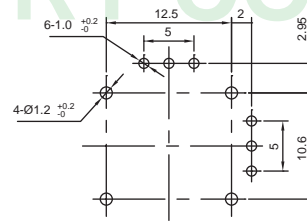
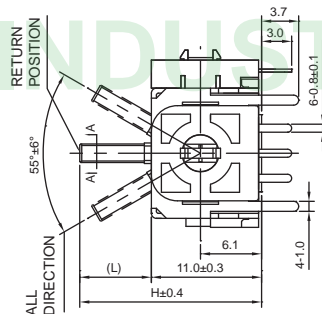
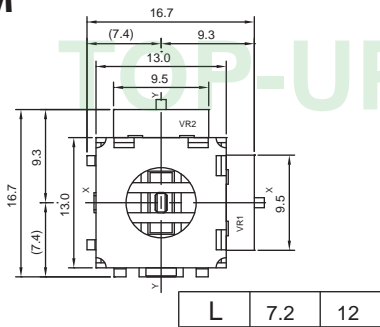
JT9S-1



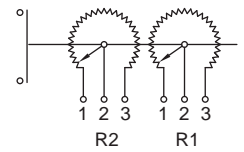
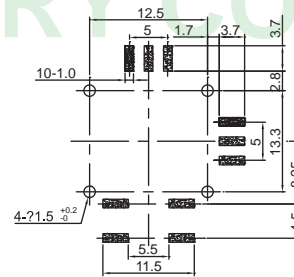
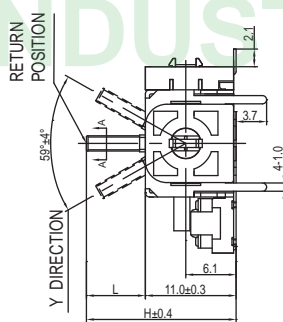
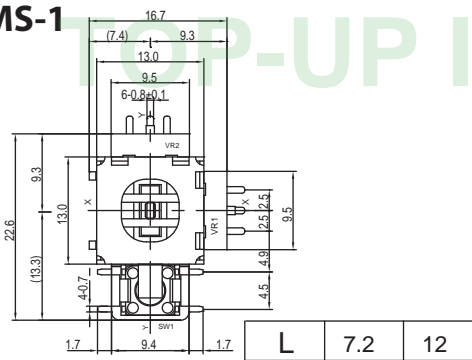
Outline Drawing

Features individual specifications

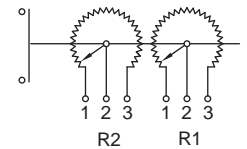
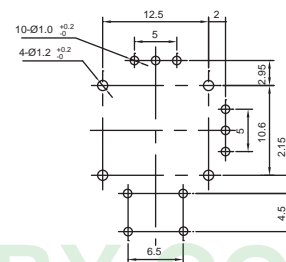
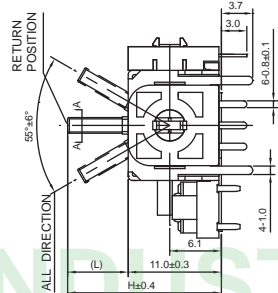
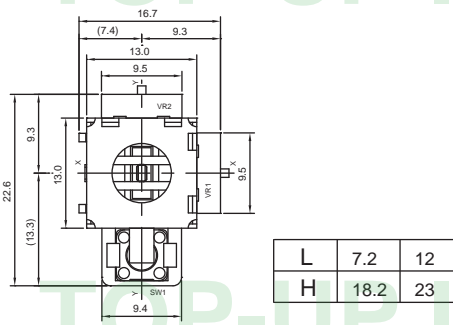
JT9M



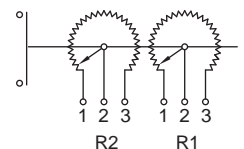
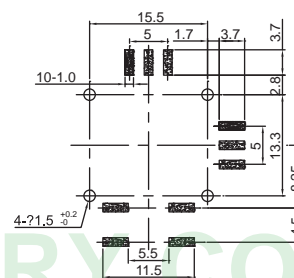
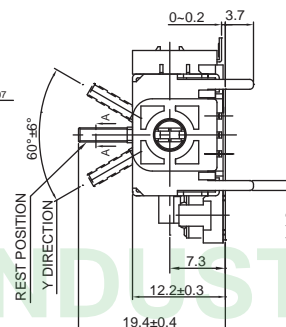
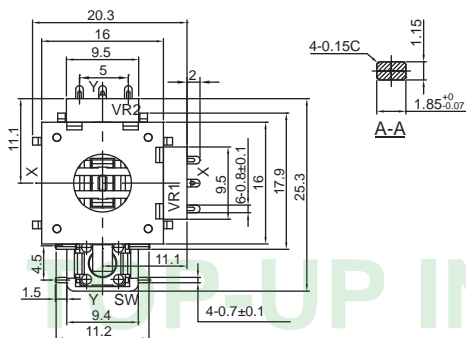
JT9MS-1



JT9MS-2



JT9S-1



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

17P1P 10 S V B - D - 19 F D - B 10K - 16C - □□□
1 2 3 4 5 6 7 8 9 10 11 12 13

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)

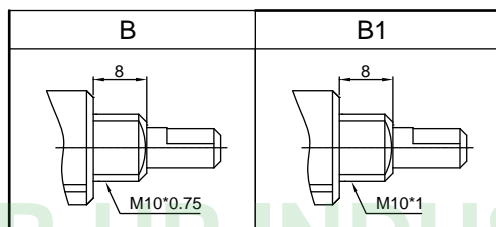
	12P1R, 16P1R, 17P1R, 17M1R	17P1P, 17M1P	17P1X, 17M1X
Code	4	10	2
Rating	4A 250V A.C	10A 250V A.C	2A 250V D.C

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
	F	8	8			19
	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

17P1P 10 S V B - D - 19 F D - B 10K - 16C - □□□
1 2 3 4 5 6 7 8 9 10 11 12 13

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	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:

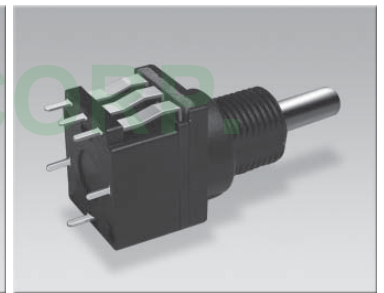
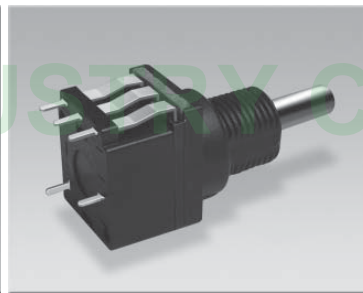
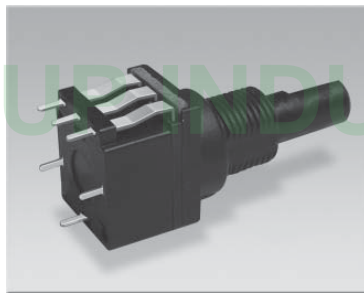
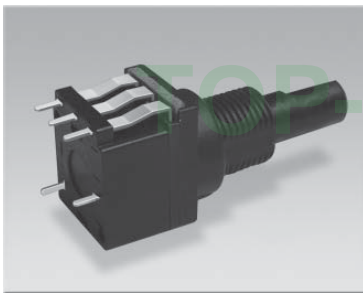
Switch rating	4A 250V A.C
Surge rating	20A (0.01sec)
Switch contact resistance	Initial:20mΩ MAX. at DC 5V 1A
Switch withstand voltage	A.C 1000V between terminals of open contacts for 1 minute A.C 3000V between terminals and case for 1 minute
Switch insulation resistance	500MΩ MIN. at DC 500V

12P1R4SVB-D

12P1P10SVB-D

12M1R4SVB-D

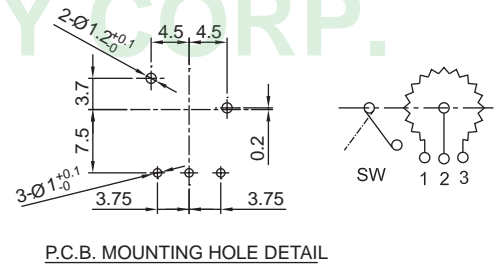
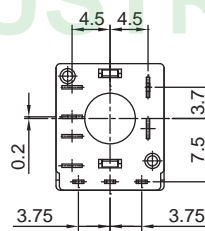
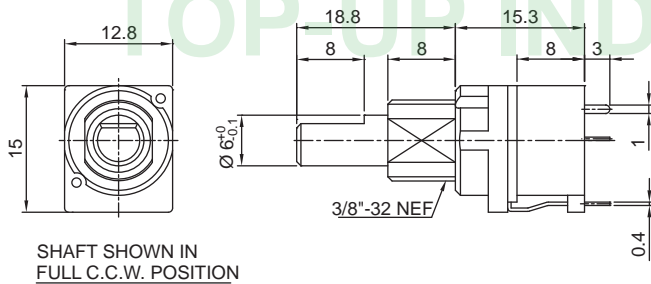
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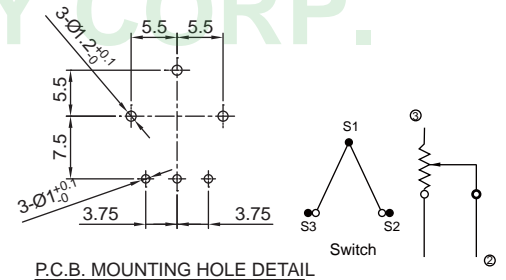
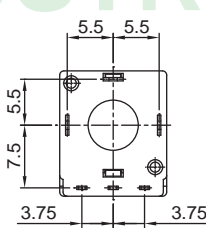
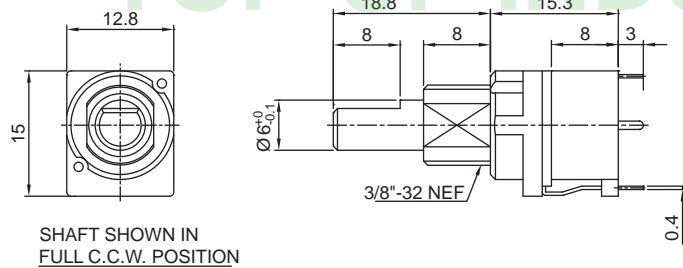
Outline Drawing

Features individual specifications

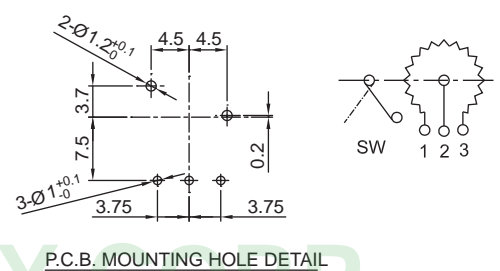
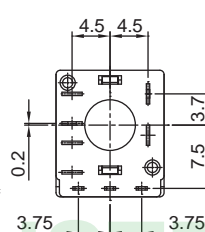
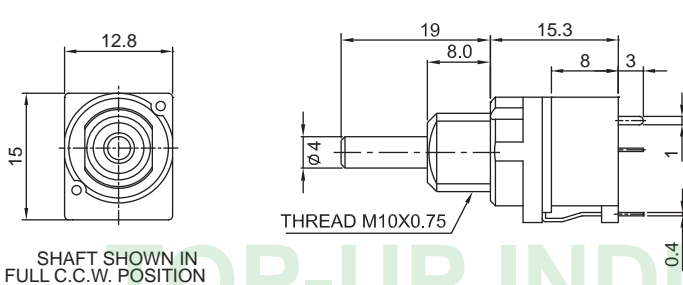
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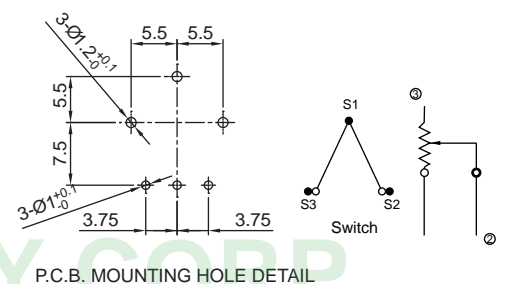
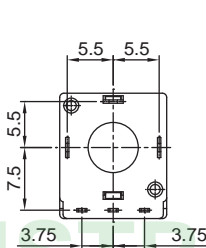
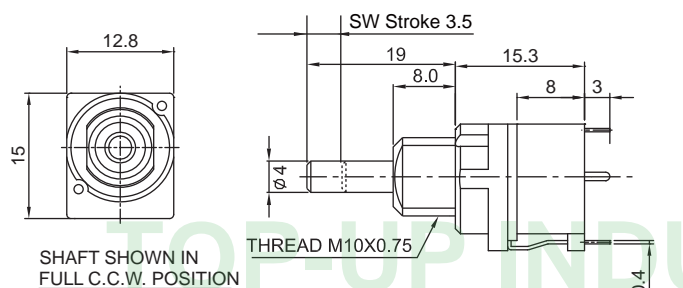
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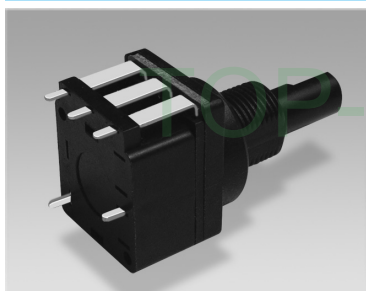
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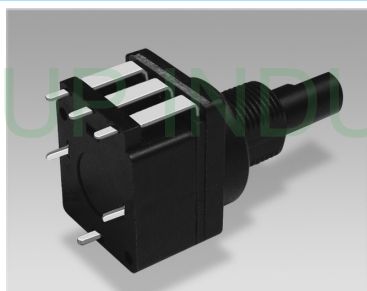
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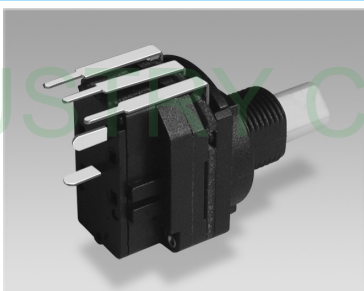
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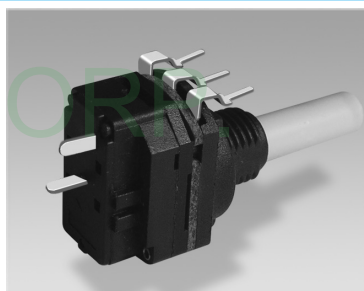
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16P1R4SVB-D3



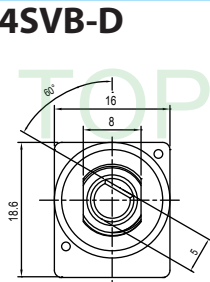
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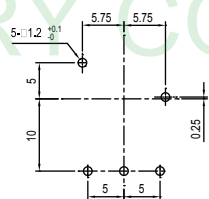
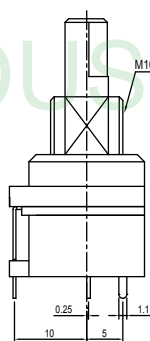
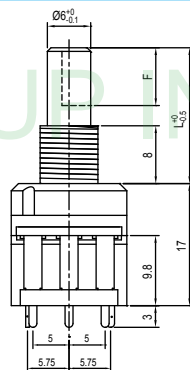
Outline Drawing

Features individual specifications

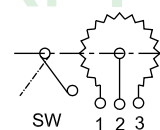
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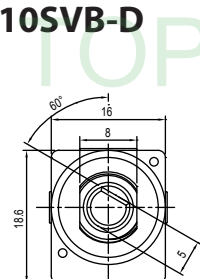
SHAFT SHOWN IN
FULL C.C.W. POSITION



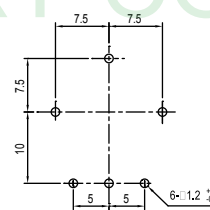
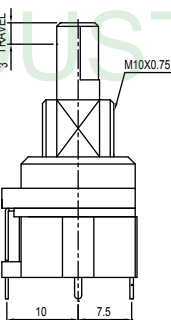
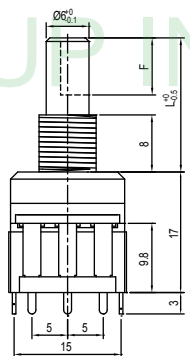
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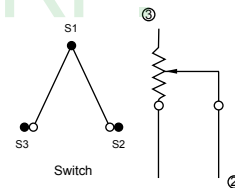
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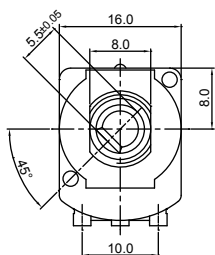
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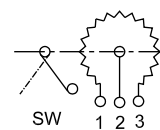
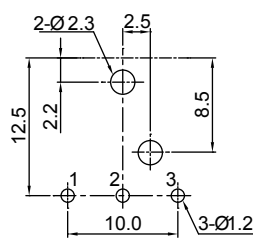
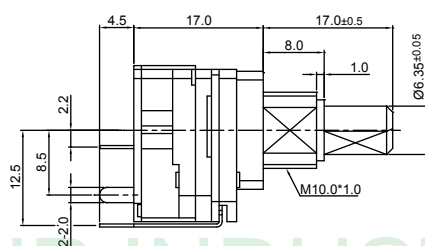
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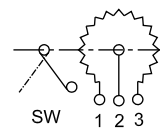
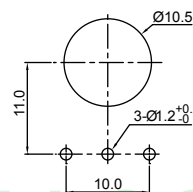
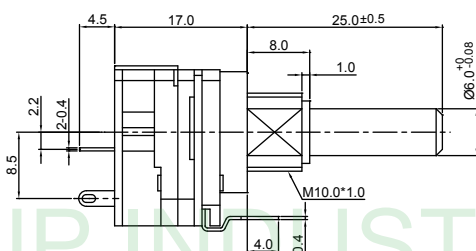
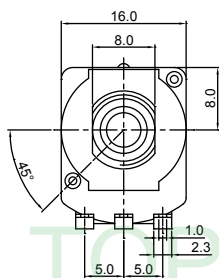
16P1R4SVB-D3



SHAFT SHOWN IN
FULL C.C.W POSITION



16P1P10SVB-CD

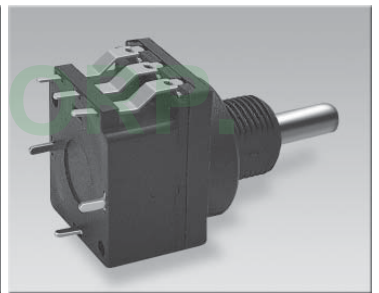
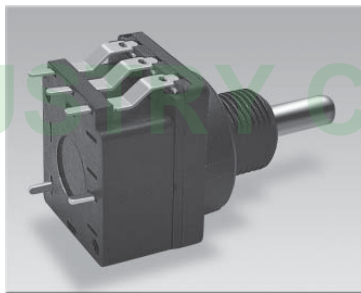
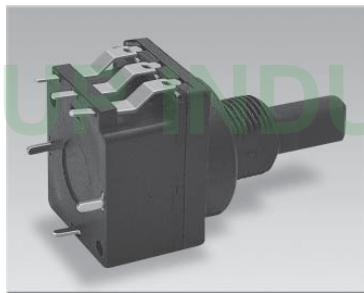
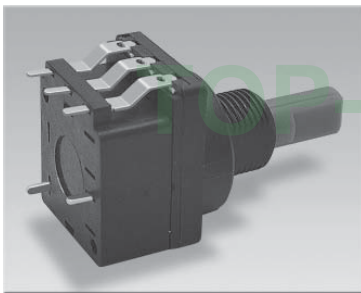


17P1R4SVB-D

17P1P10SVB-D

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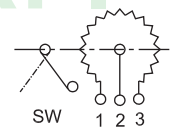
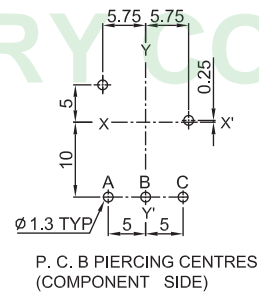
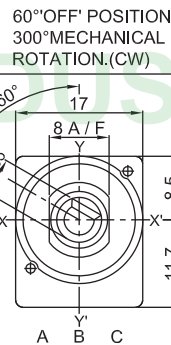
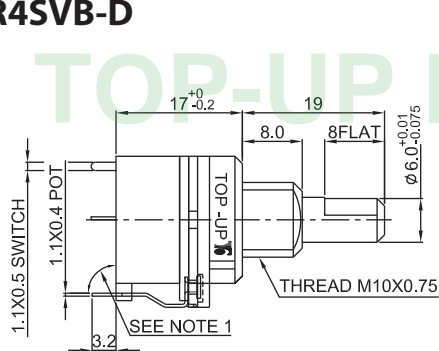
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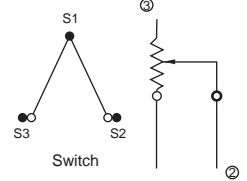
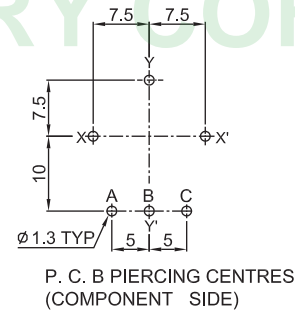
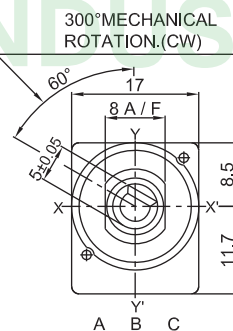
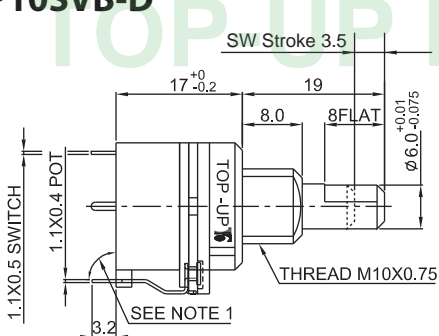
Outline Drawing

Features individual specifications

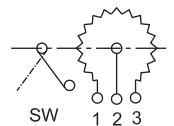
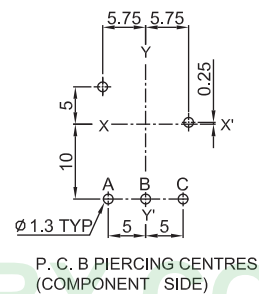
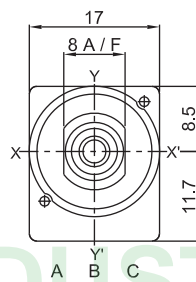
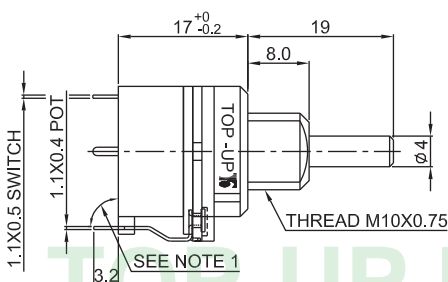
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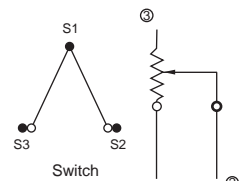
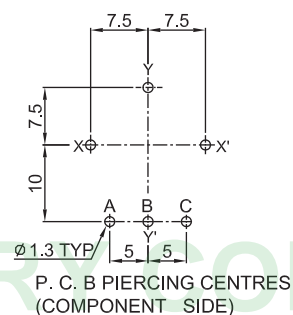
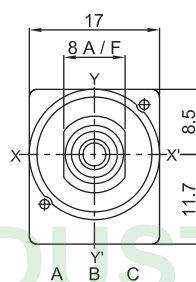
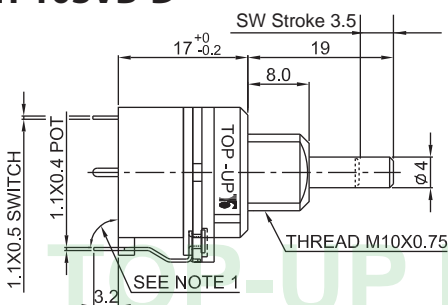
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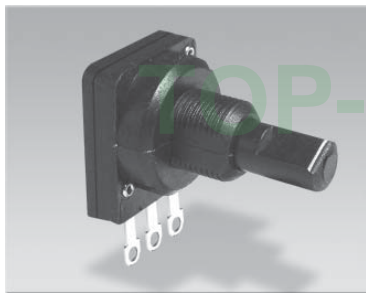
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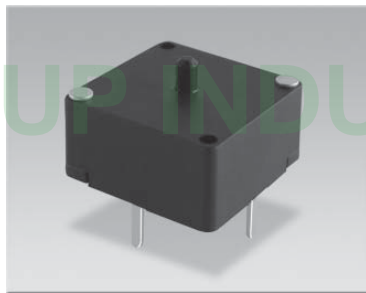
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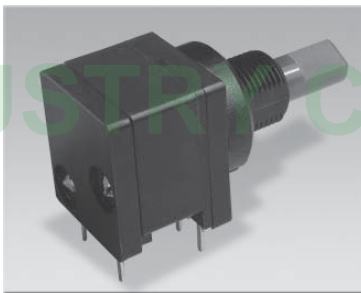
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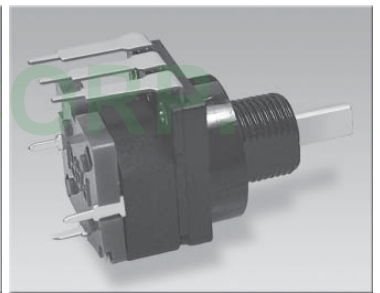
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17P1R4SHB-B



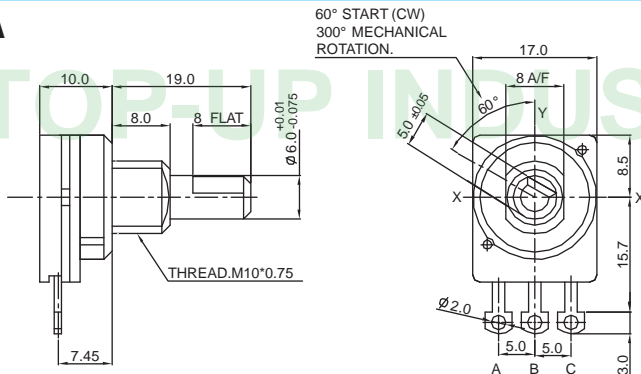
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Outline Drawing

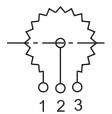
Features individual specifications

17P1HB-A

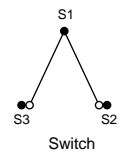
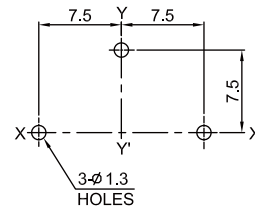
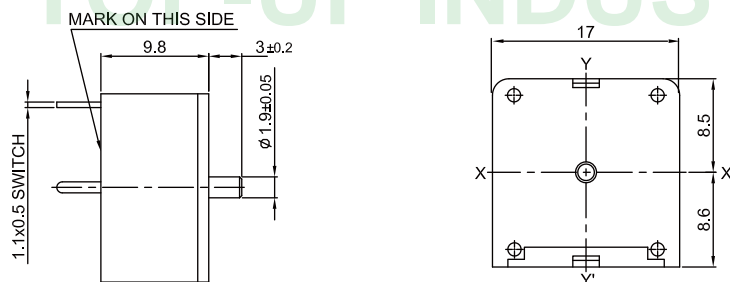


- NOTES: 1. ALL SOLDER PINS MUST BE AT $90^\circ \pm 1^\circ$ TO BASE
2. IDENTIFICATION COLOURS:-
BUSH- BLACK
SWITCH BODY- BLACK

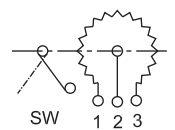
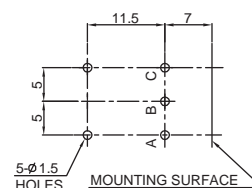
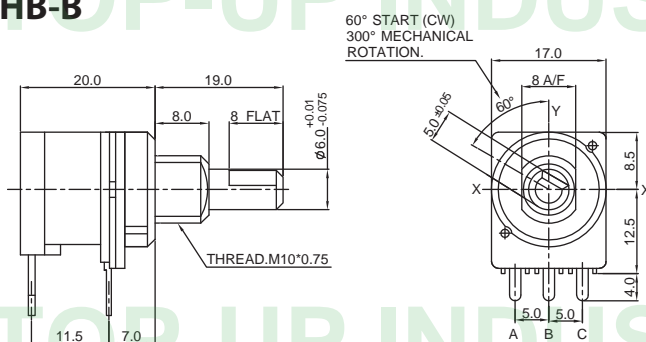
SYMBOL	SPINDLE COLOR
G	GREEN
D	DARK BLUE



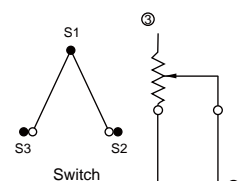
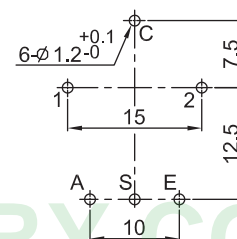
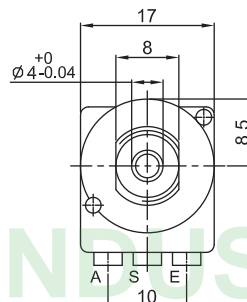
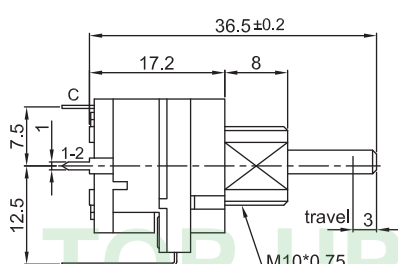
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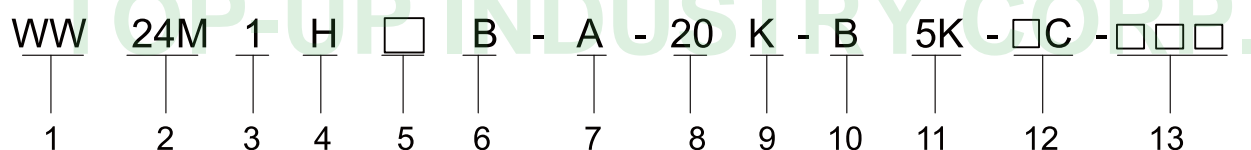
17P1R4SHB-B



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

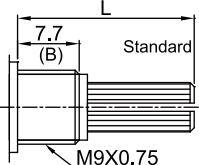
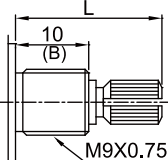
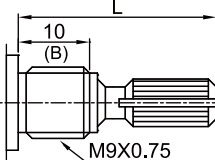
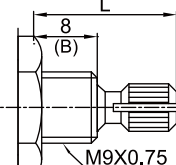
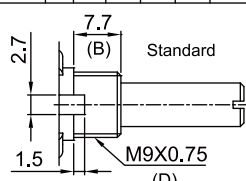
60M — Metal Shaft, 60mm Size Series Wire Wound Potentiometer

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

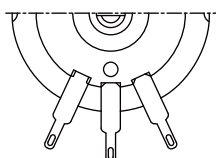
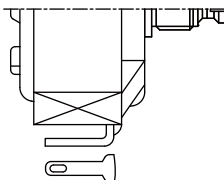
4. Horizontal (H) Type or Vertical (V) Type

5. Bushing Length

6. Bushing Type

Model	WW24M Series	WW40M Series	WW50M Series	WW60M Series																																							
B (Standard)																																											
	<table><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><tr><td>other type</td><td>L</td><td>30</td><td>33</td><td></td></tr><tr><td>B</td><td>19</td><td>20</td><td></td><td></td></tr></table>	other type	L	30	33		B	19	20			<table><tr><td>other type</td><td>L</td><td>30</td><td>40</td><td></td></tr><tr><td>B</td><td>20</td><td>30</td><td></td><td></td></tr></table>	other type	L	30	40		B	20	30			<table><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><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)	

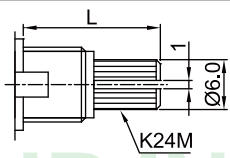
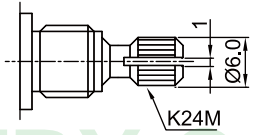
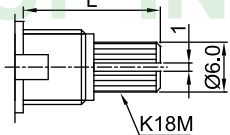
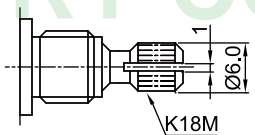
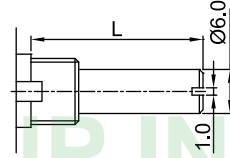
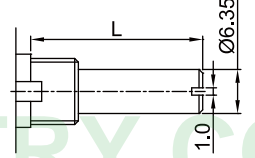
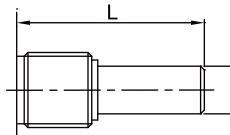
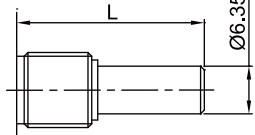
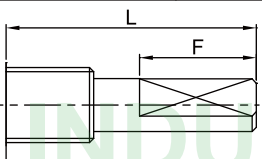
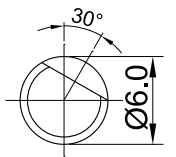
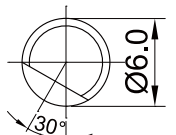
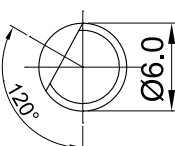
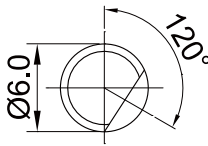
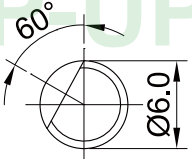
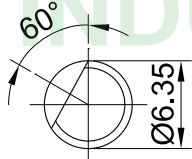
8. Shaft Length

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

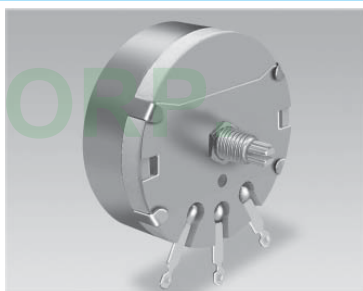
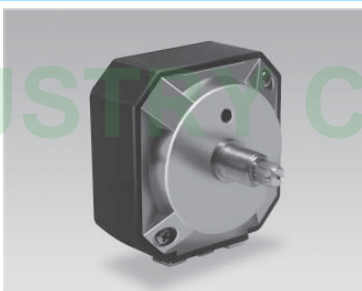
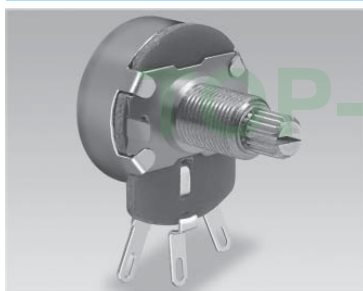
13. Serial No.

WW24M1H10.5BL-A

WW40M1HB-A

WW50M1HB-A

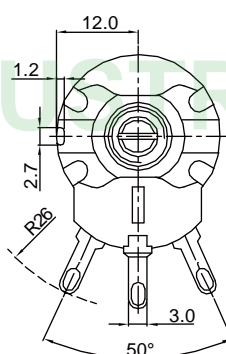
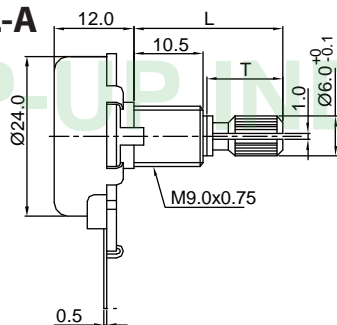
WW60M1H10B-A



Outline Drawing

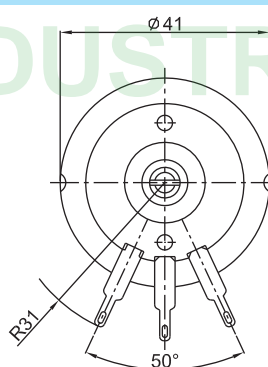
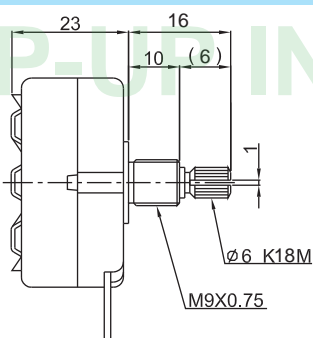
Features individual specifications

WW24M1H10.5BL-A



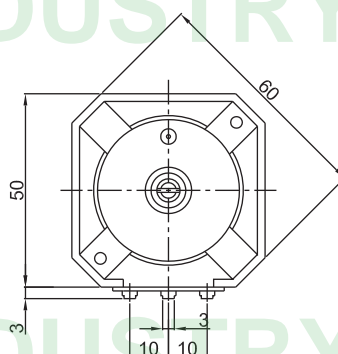
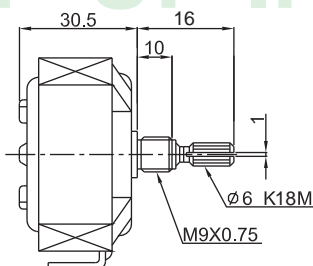
RESISTANCE RANGE	5Ω~5KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	5W

WW40M1HB-A



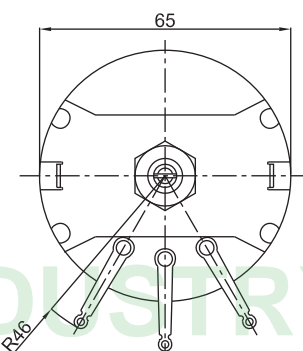
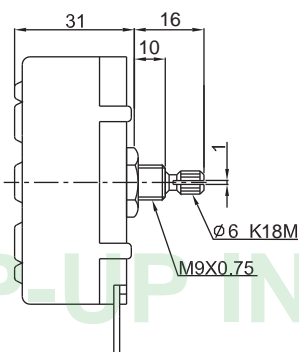
RESISTANCE RANGE	5Ω~3KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

WW50M1HB-A



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

WW60M1H10B-A



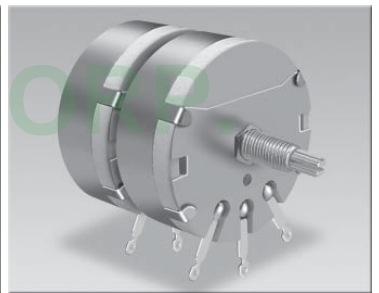
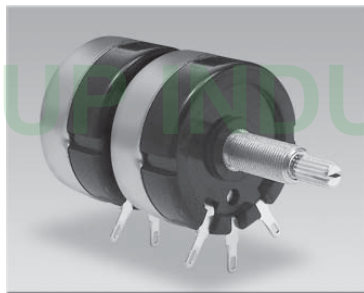
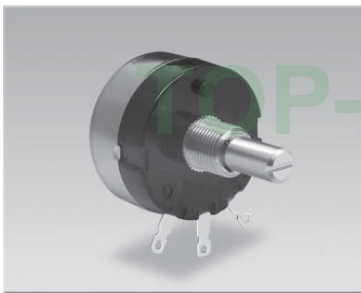
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW28M1HB-A

WW40M2HB-A

WW50M2HB-A

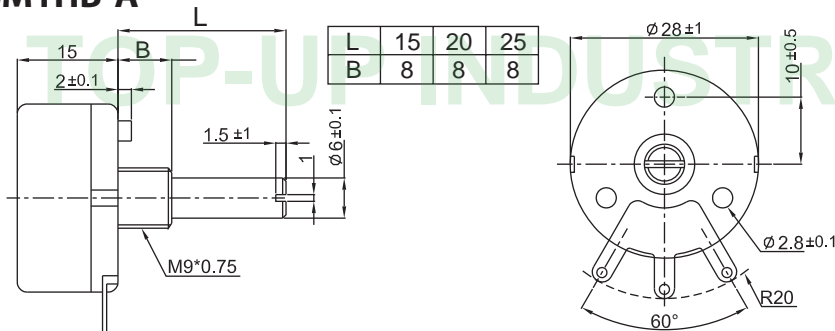
WW60M2H10B-A



Outline Drawing

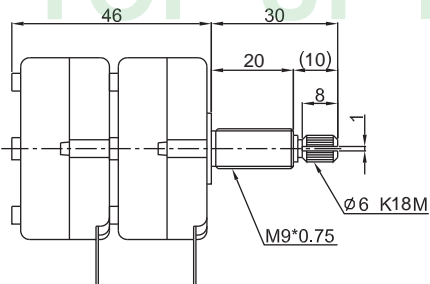
Features individual specifications

WW28M1HB-A



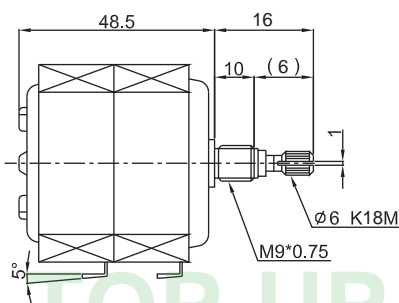
RESISTANCE RANGE	5Ω~5KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	1.5W

WW40M2HB-A



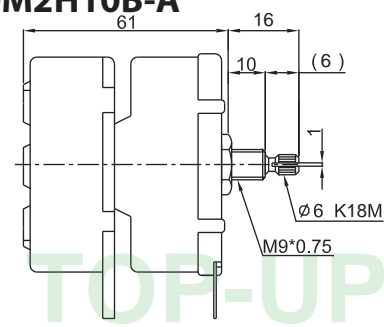
RESISTANCE RANGE	5Ω~3KΩ
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

WW50M2HB-A



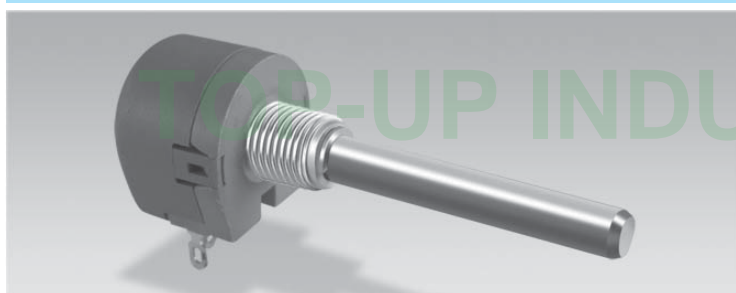
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW60M2H10B-A



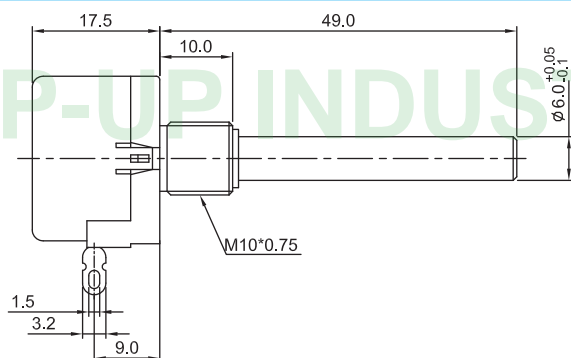
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOLERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW22M1HB-A

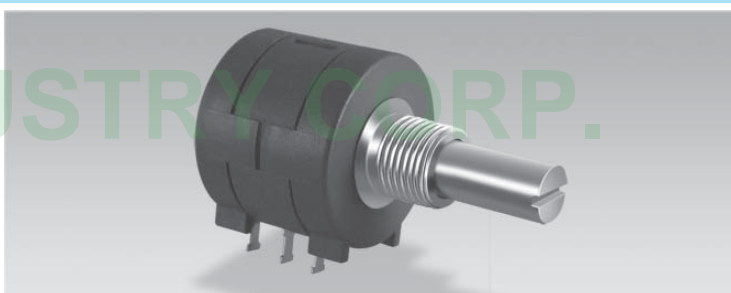


Outline Drawing

WW22M1HB-A

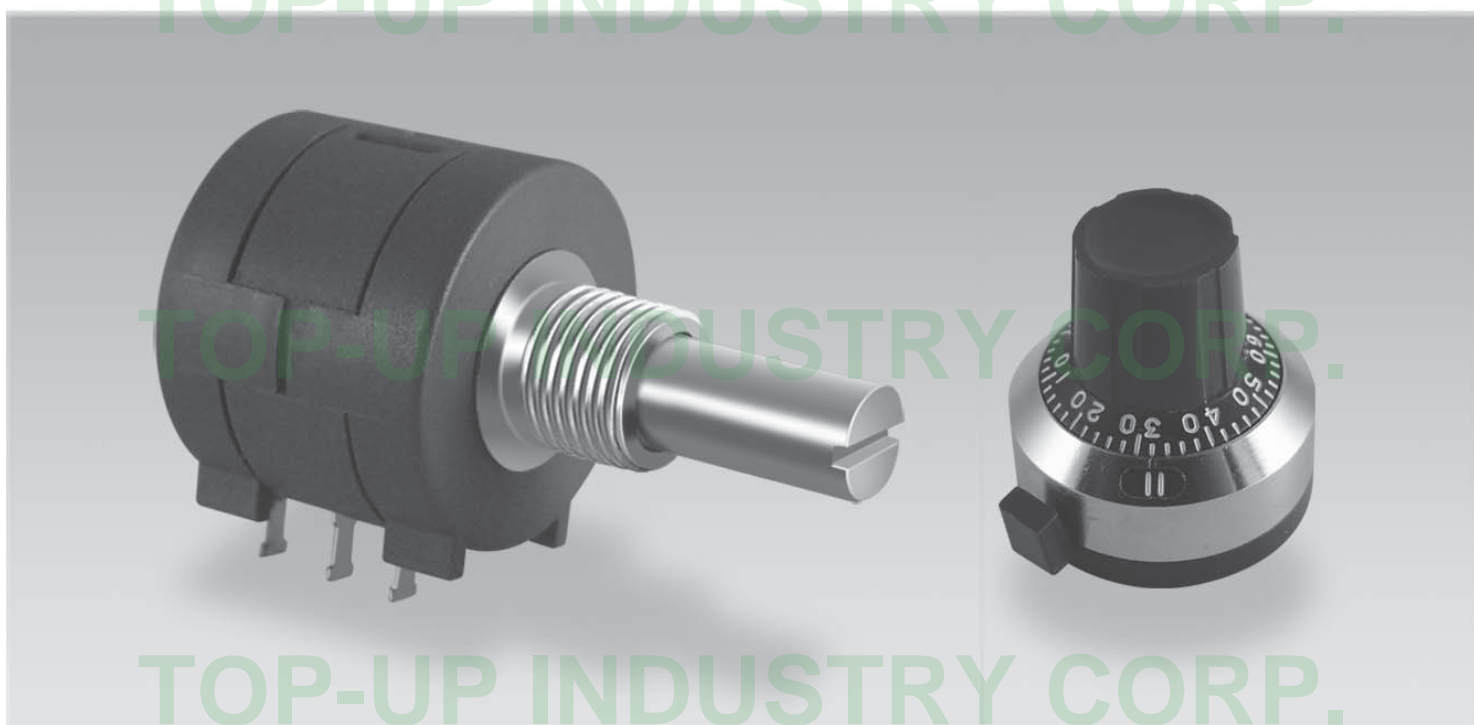
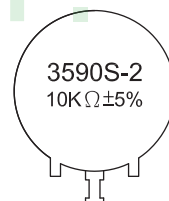
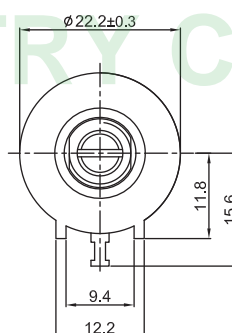
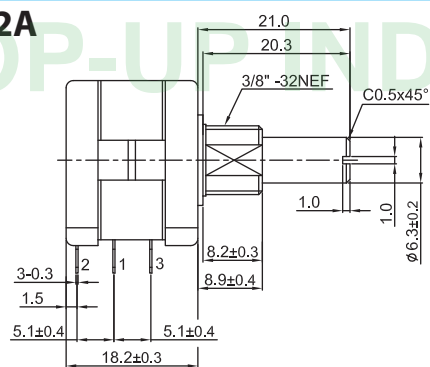


TP-WW3590S-2A



Features individual specifications

TP-WW3590S-2A



8SL10AHF2-B

Sensor



Outline Drawing

11SR1-T

Sensor



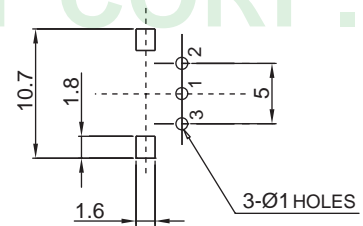
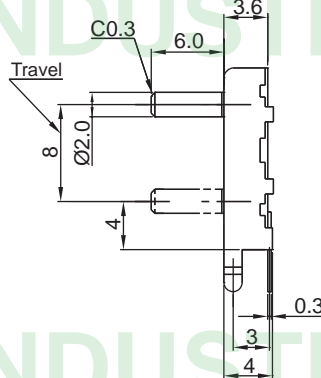
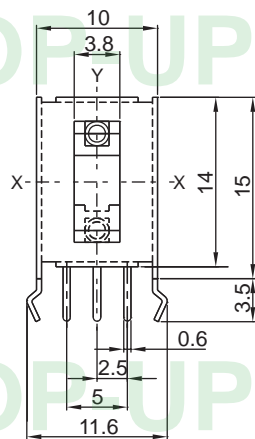
Features individual specifications

28SR1V-B

Sensor

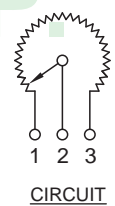
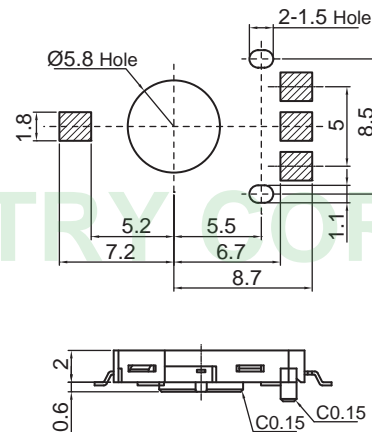
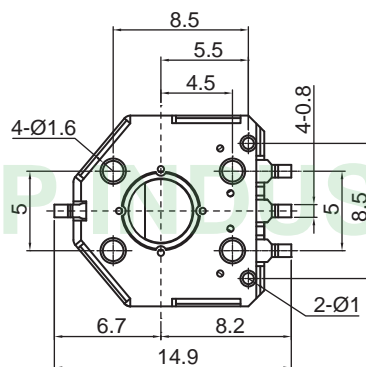
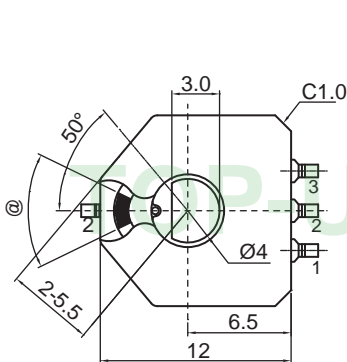


8SL10AHF2-B

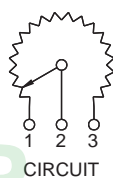
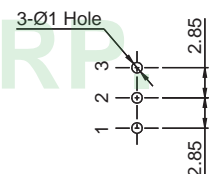
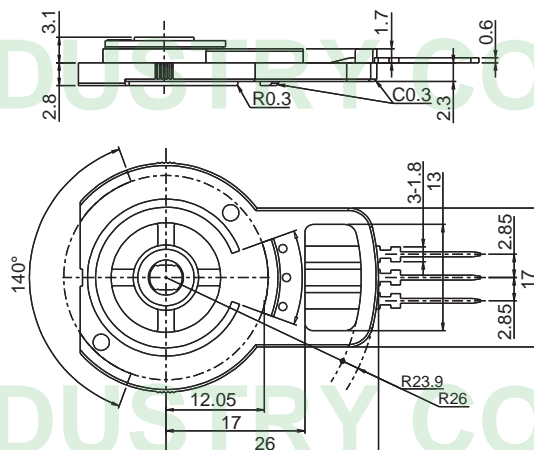
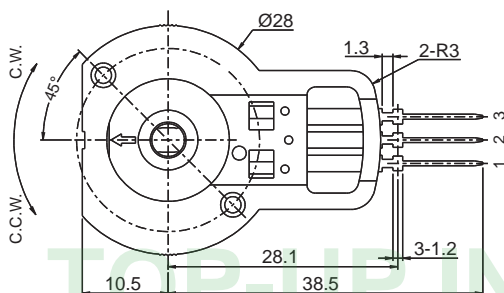


P.W.B. MOUNTING DETAIL
VIEWED FROM MOUNTING SIDE

11SR1-T



28SR1V-B

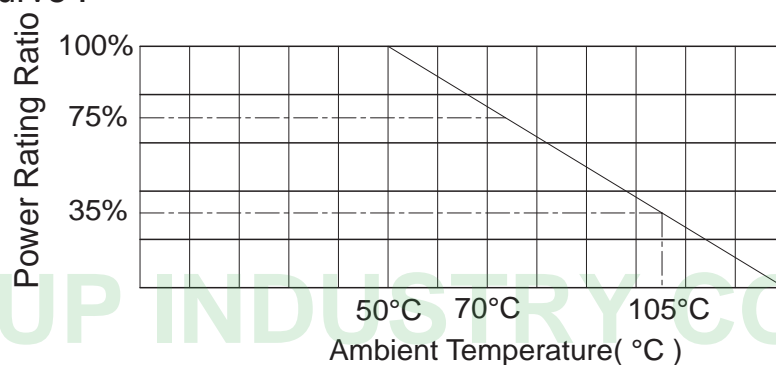


15RS Series Position Sensor

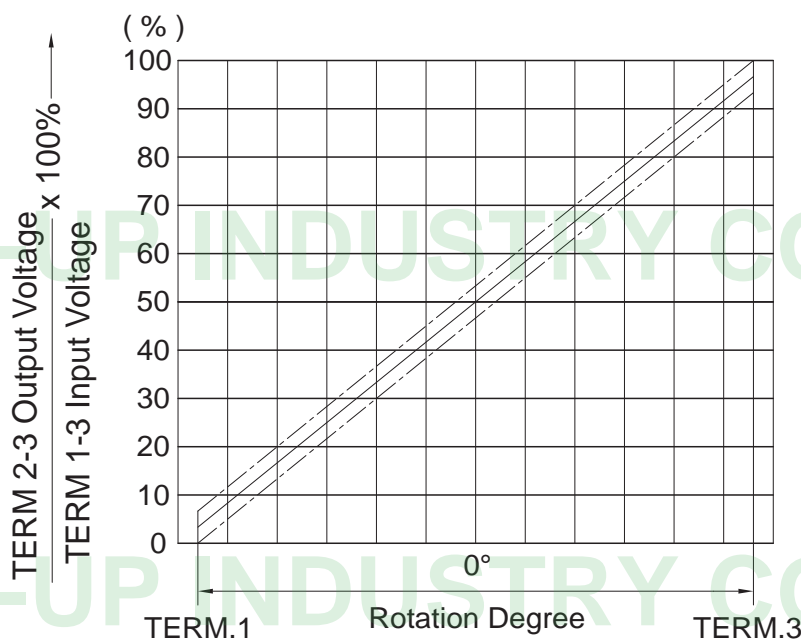
Common Specifications

Items	Specifications
Total Resistance (Ω)	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° $\pm 10^\circ$

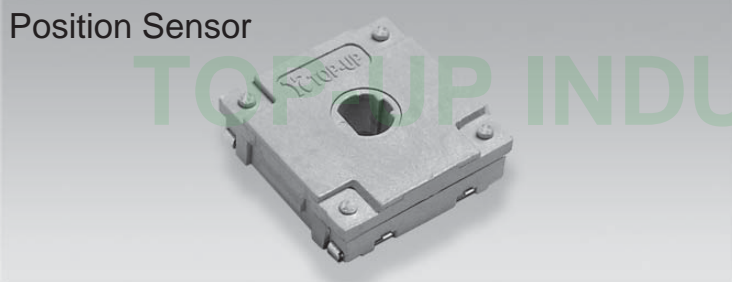
Power Rating Curve :



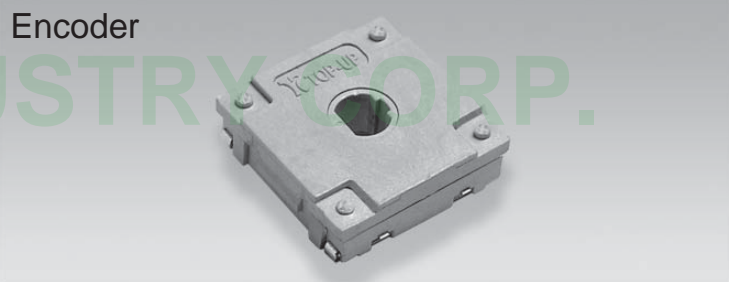
Reference Characteristic Curve



15RS-TU



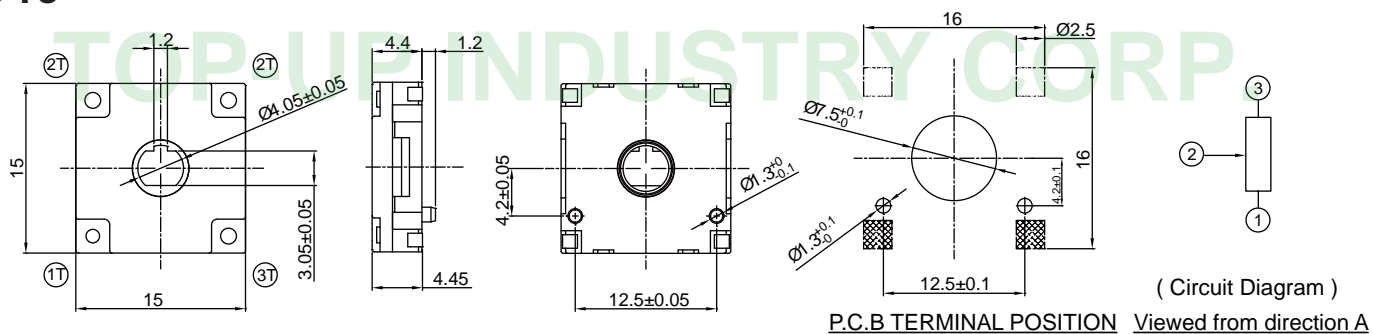
EC15-SMT



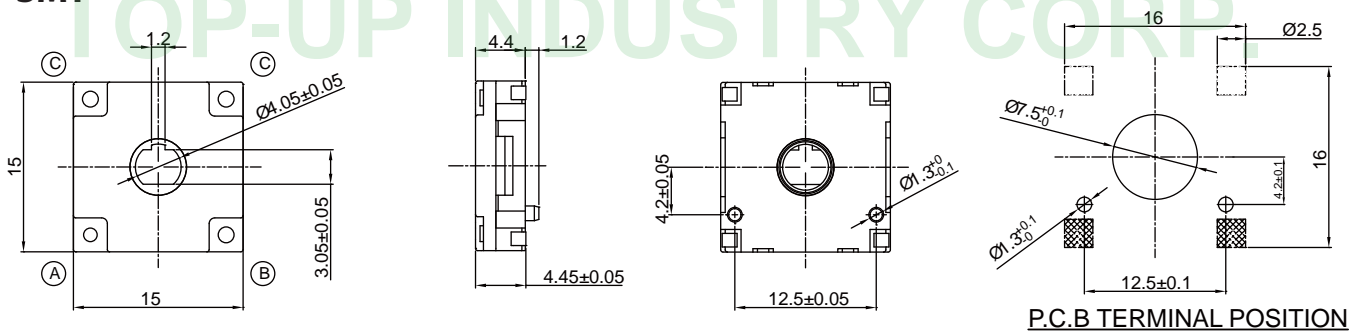
Outline Drawing

Features individual specifications

15RS-TU



EC15-SMT

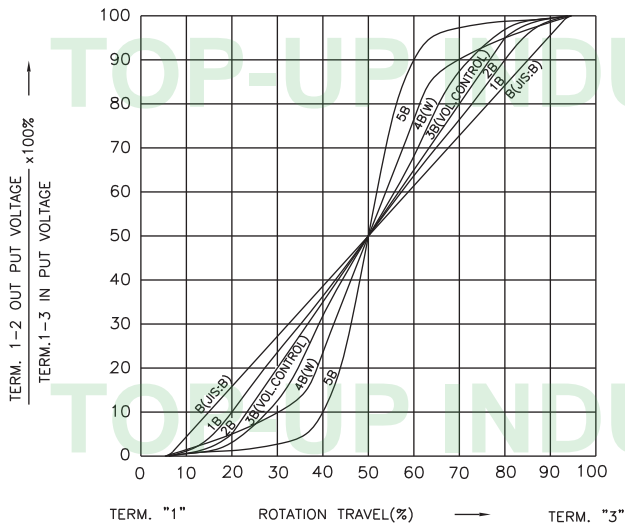


EC15 Series Encoder

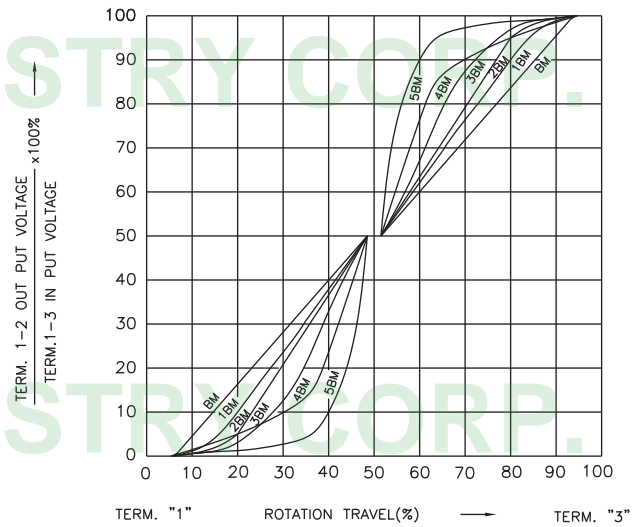
Common Specifications

Items	Specifications
Pulse	3
Number of Detent	_____
Phase Difference (mesc)	≥ 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

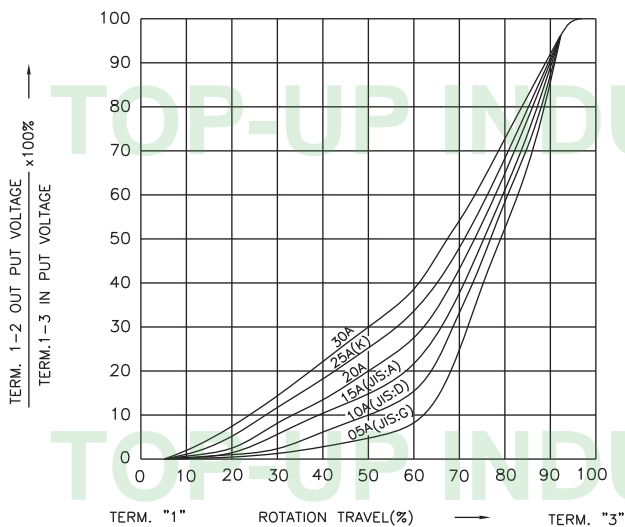
TAPERS B SERIES



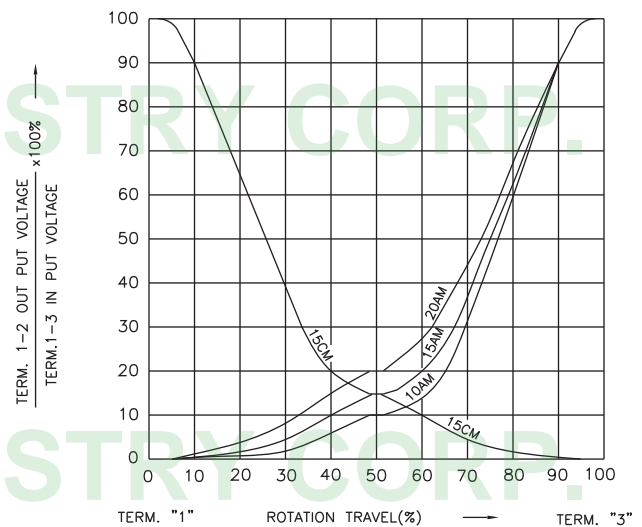
TAPERS B WITH 50% TAP



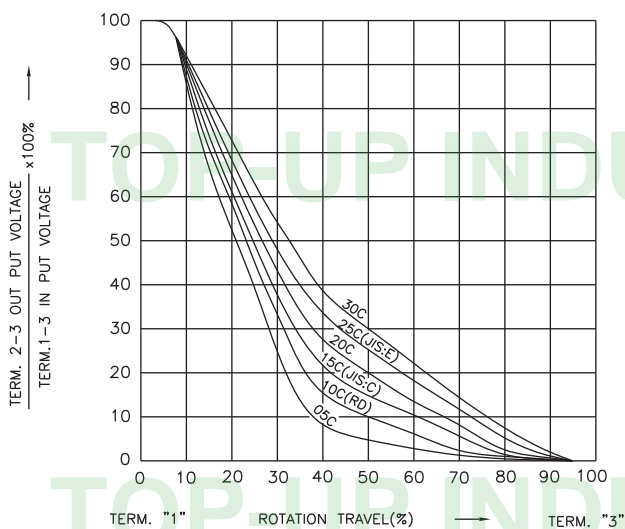
TAPERS A SERIES



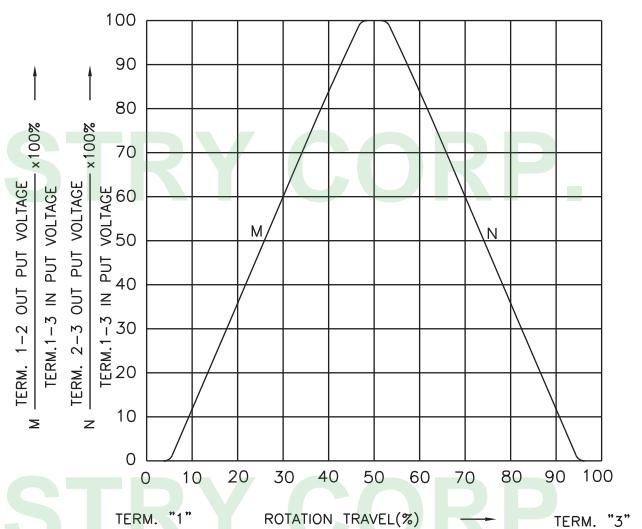
TAPERS A & C WITH 50% TAP



TAPERS C SERIES



TAPER M & N







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