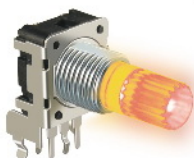
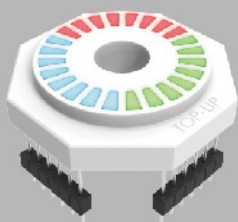


TOP-UP Catalogue - Aldinet

1. Index.....	1
2. Potentiometer Catalogue	2

TOP-UP INDUSTRY CORP.

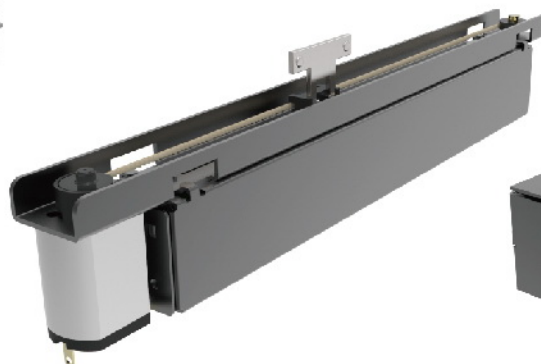
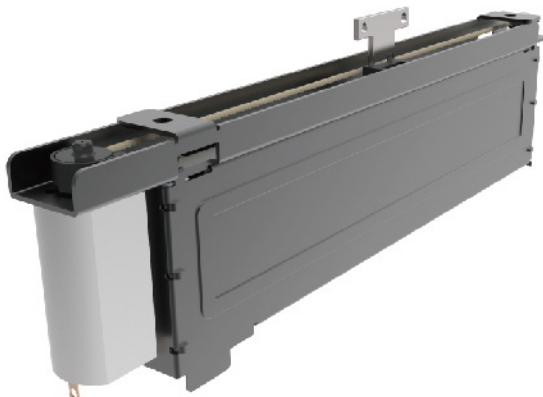
● Switch on your world.



● Encoder
Potentiometer
Contactless Pot.

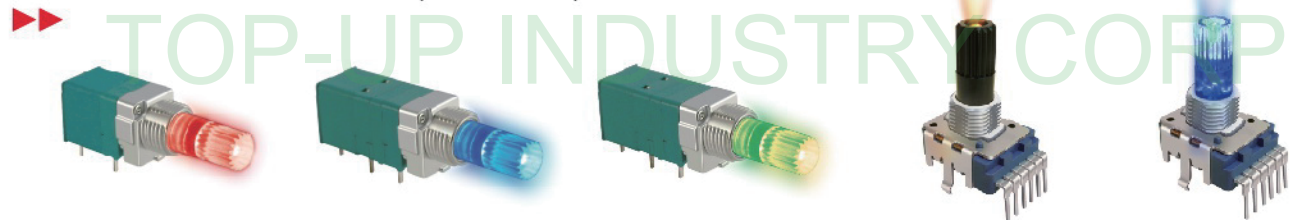
OEM&ODM
RGB LED Indicators

Contactless Encoder

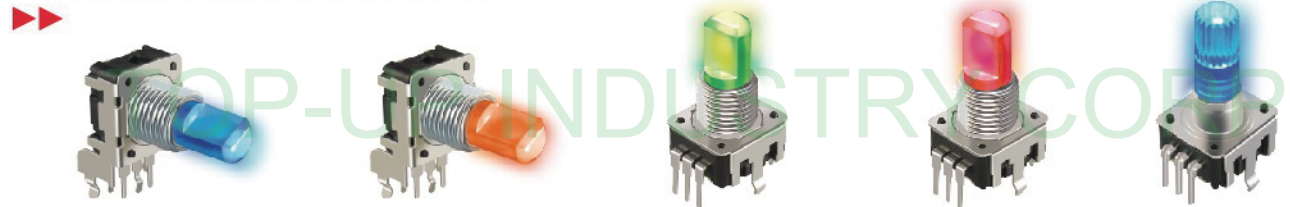


Illuminated Type

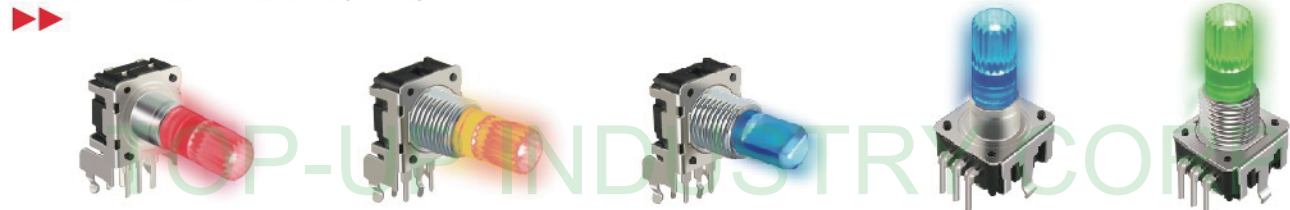
Potentiometer with LED series (9mm & 12mm)



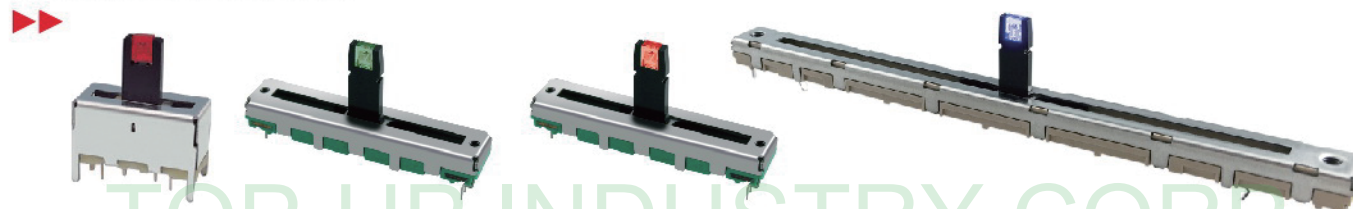
Potentiometer with LED series (12mm)



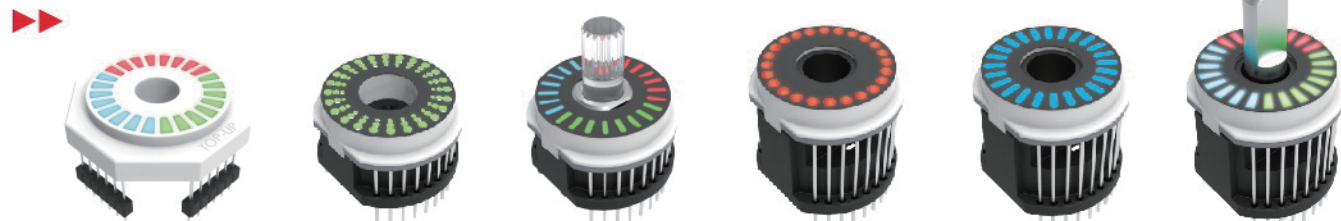
Encoder with LED series (12mm)



Slide Pot. with LED series

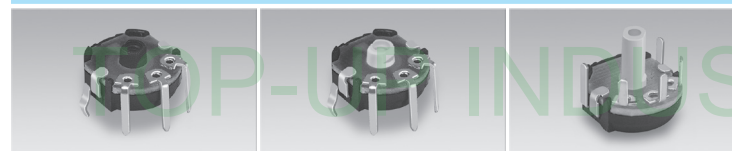


LED Indicator Circle series



With LED Series

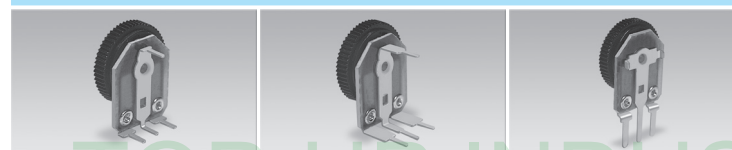
8mm Size Micro Potentiometers



Page

19

8mm Size Thin Micro Potentiometers



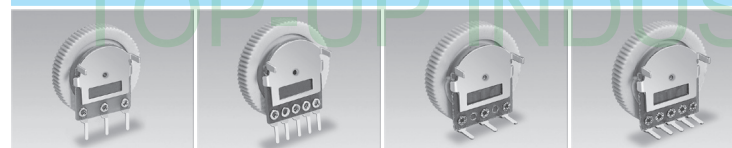
21

6mm Size Thin Micro Potentiometers

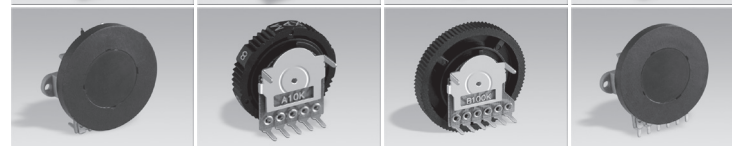


24

10mm Size Thin Micro Potentiometers

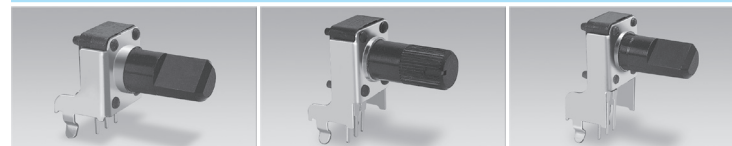


25

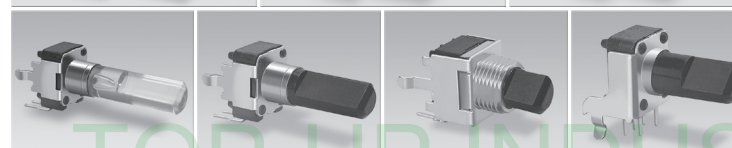


26

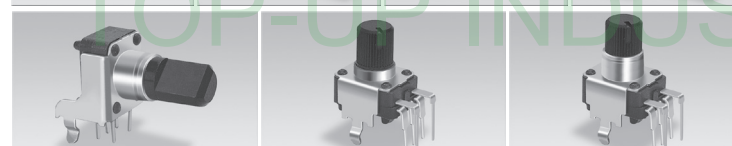
9mm Size Snap-in Insulated Shaft Potentiometers



30

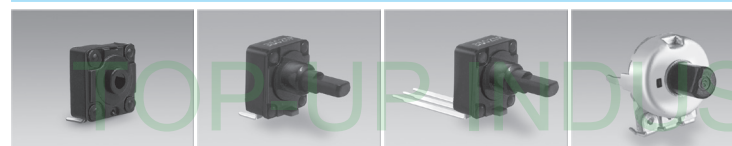


31



32

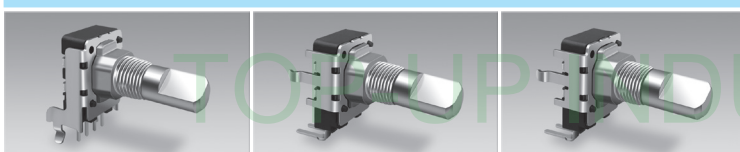
7mm & 9mm Size Long Life Potentiometers



33

11mm Size Metal Shaft, Multi-Ganged Potentiometers

Page



35

12mm Size Metal Shaft, Multi-Ganged Potentiometers



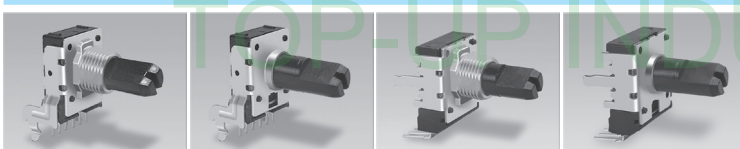
36

11mm Size Snap-in Insulated Shaft Potentiometers



39

12mm Size Snap-in Insulated Shaft Potentiometers



40



With Replaceable LEDs

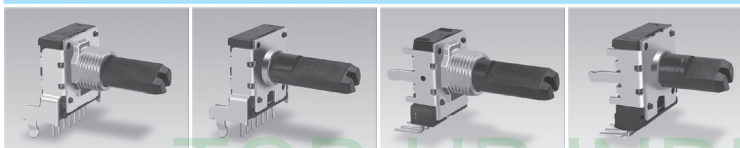
41



With Luminous Shaft

42

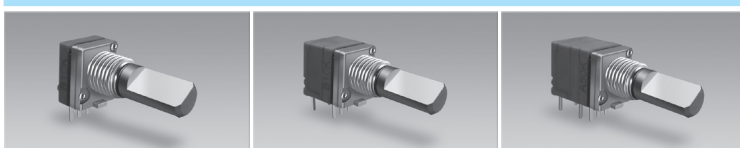
14mm Size Snap-in Insulated Shaft Potentiometers



With Insulated Shaft

43

8mm Size Metal Shaft, Multi-Ganged Potentiometers



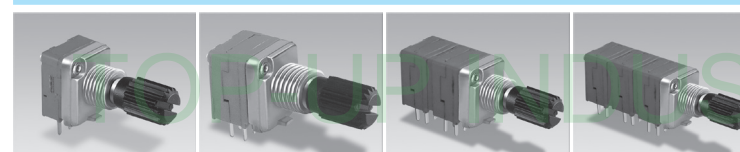
45



46

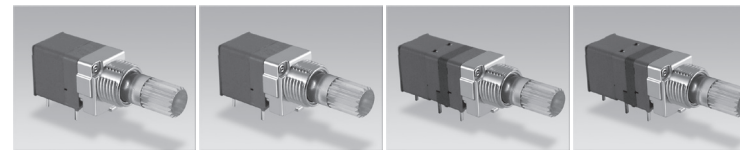
9mm Size Metal Shaft, Multi-Ganged Potentiometers

Page



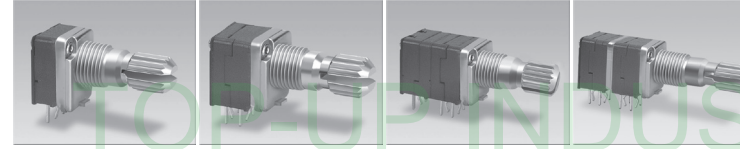
With Insulated Shaft

51

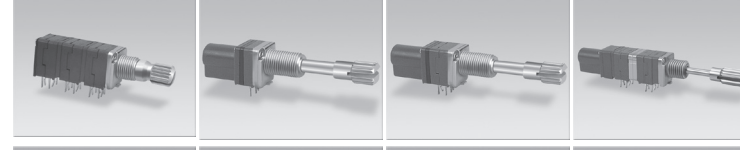


With Luminous Shaft

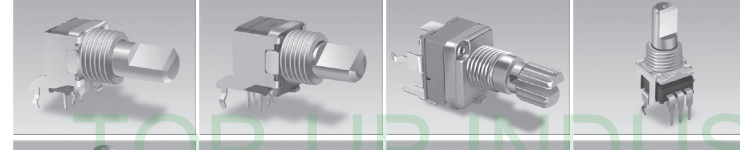
52



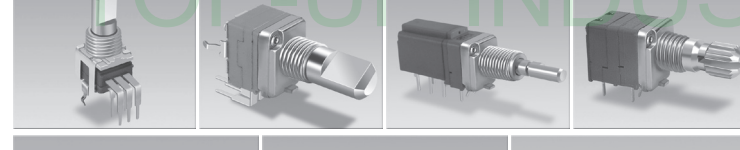
53



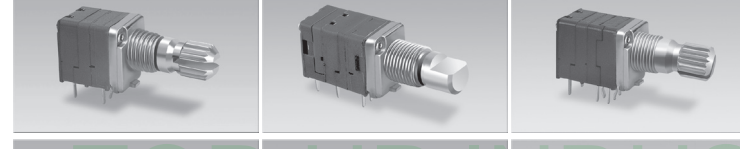
54



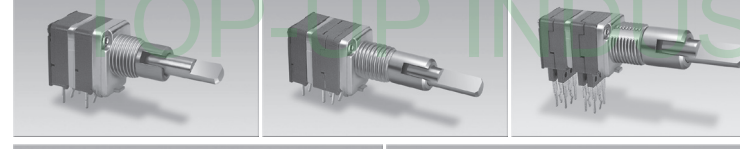
55



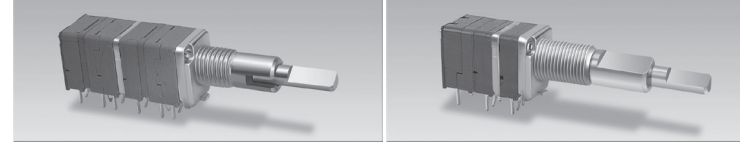
56



57

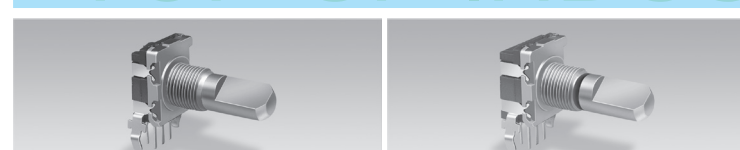


58



59

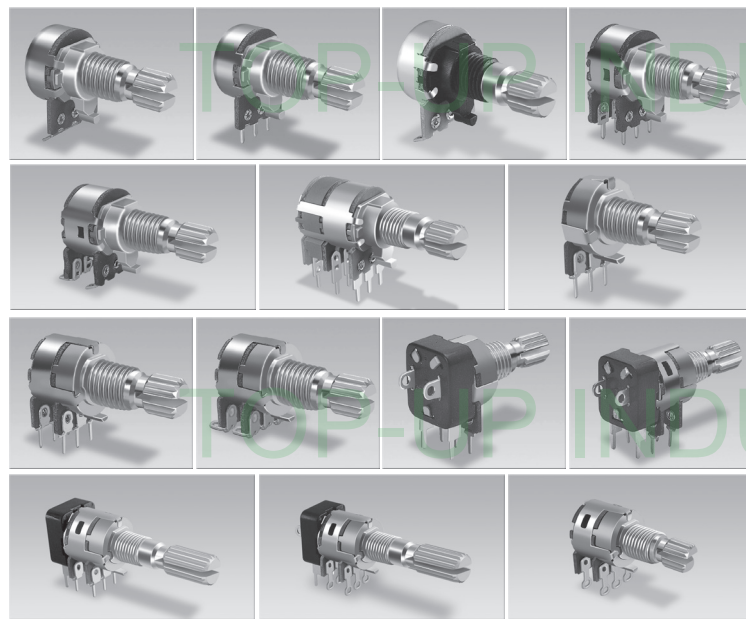
11mm Size Metal Shaft Potentiometers



61

12mm Size Metal Shaft Potentiometers

Page



64

65

66

67

12mm Size Potentiometers



71

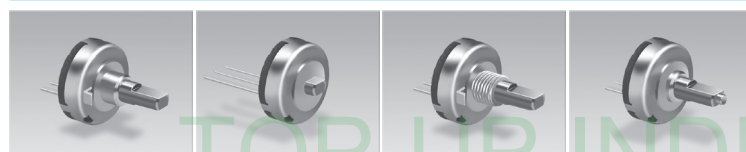
72

73

74

75

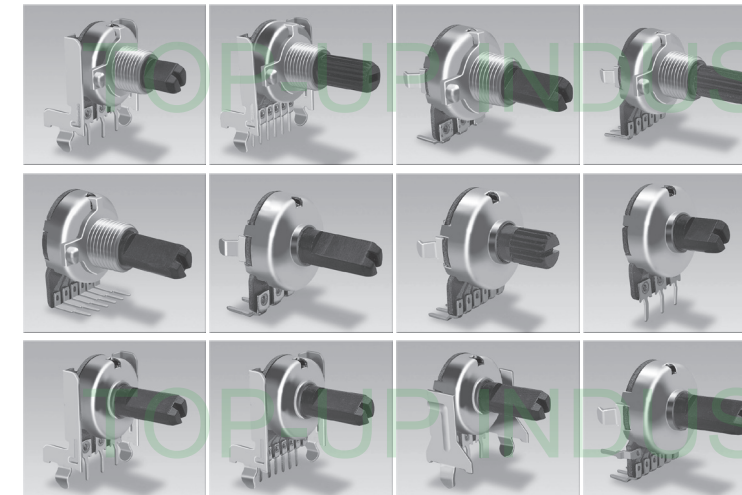
13mm Size Long Life potentiometer



77

16mm Size Insulated Shaft Potentiometers

Page

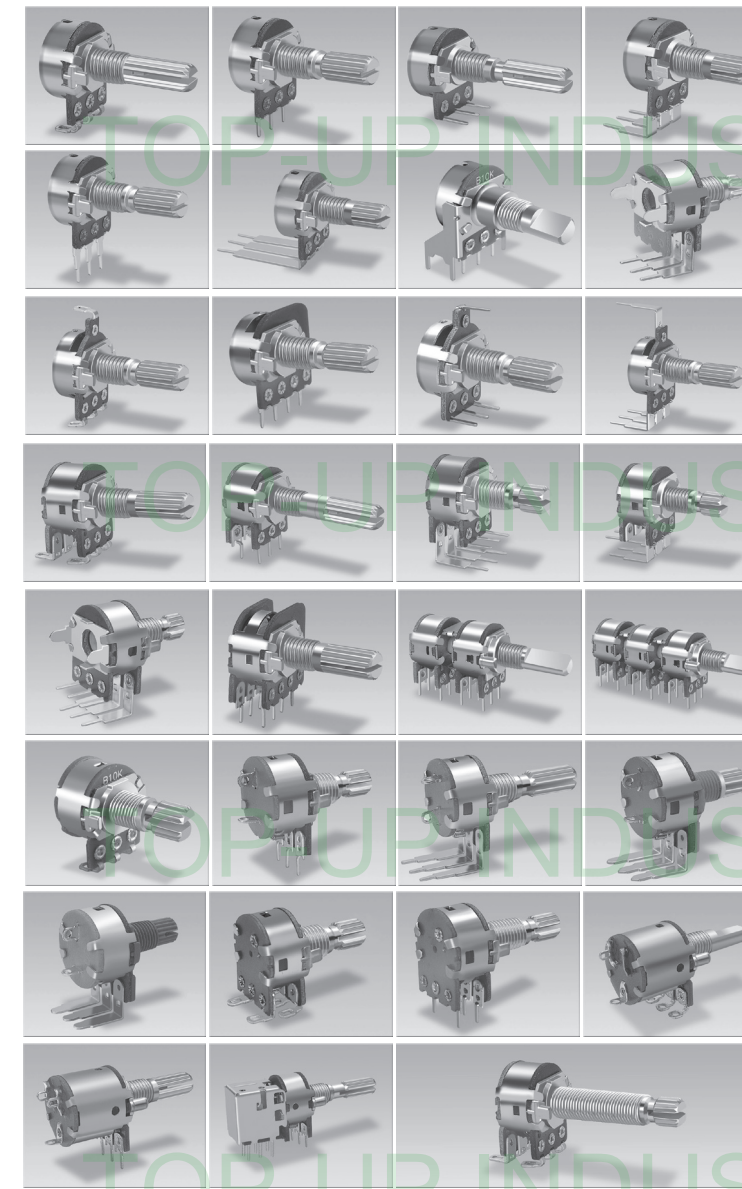


81

82

83

16mm Size Potentiometers



89

90

91

92

93

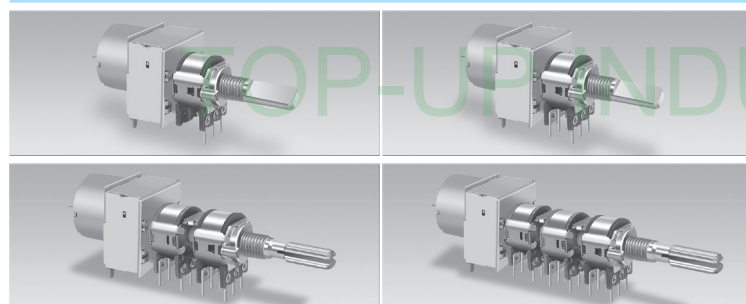
94

95

96

16mm Size Potentiometers

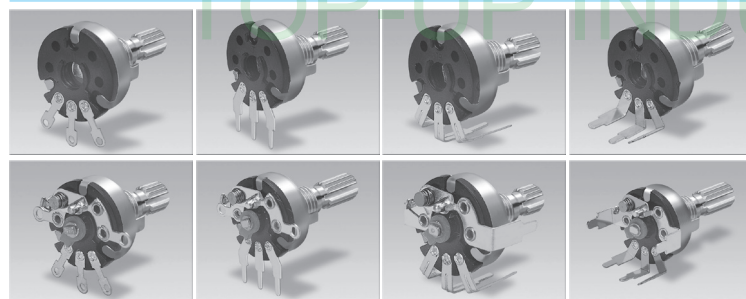
Page



97

98

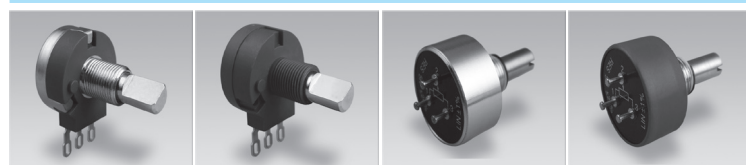
17mm Size Metal Shaft Potentiometers



102

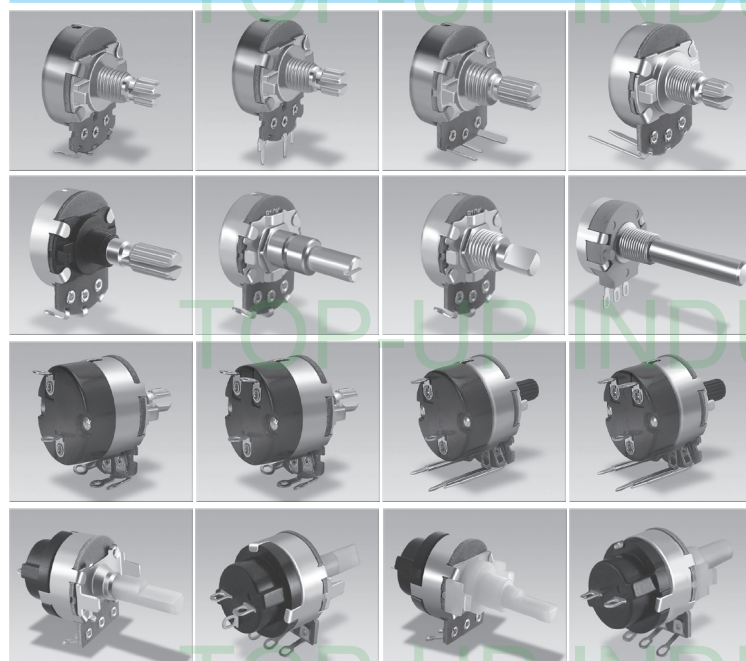
103

20mm & 22mm Size Potentiometers



107

24mm Size Potentiometers



108

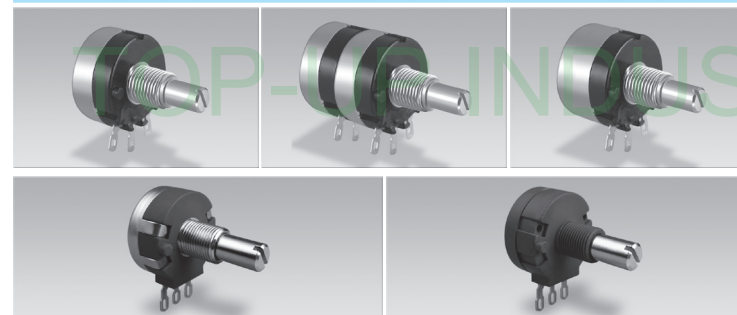
109

110

111

24mm Size Potentiometers

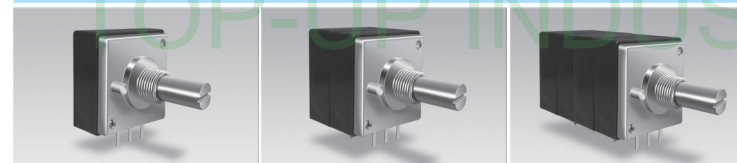
Page



112

113

27mm Size Metal Shaft Potentiometers



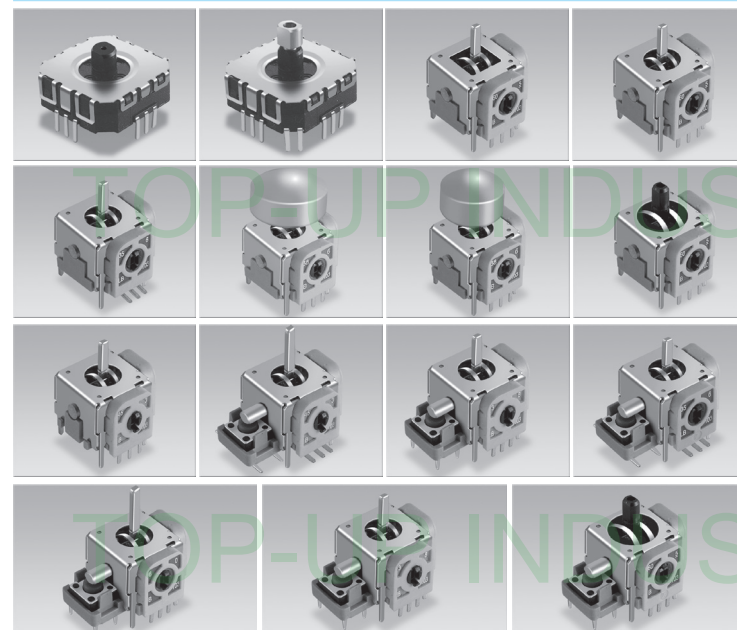
115

Hollow Potentiometers



117

Stick Controller



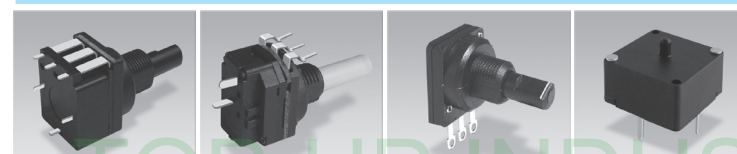
120

121

122

123

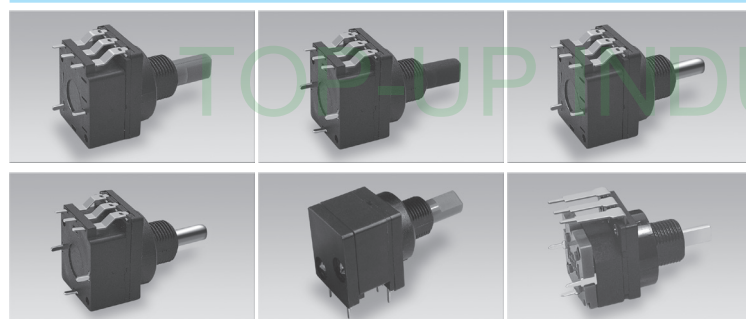
16mm & 17mm Size Dimmer SW. Potentiometers



127

17mm Size Dimmer SW. Potentiometers

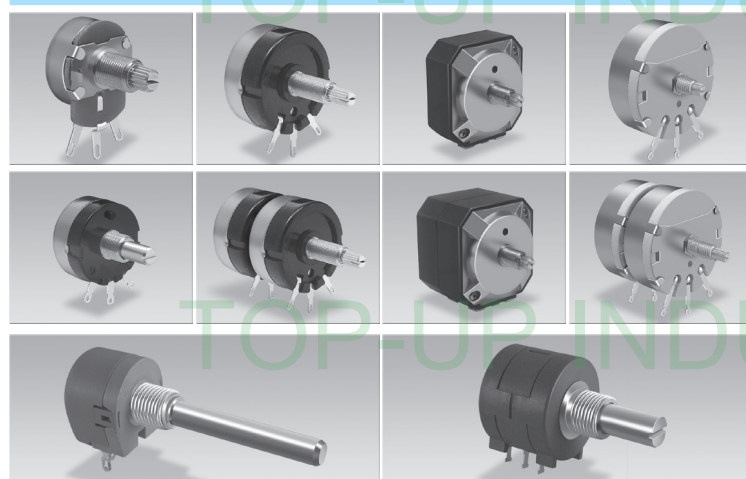
Page



128

129

Wire Wound Potentiometers (WW Series)

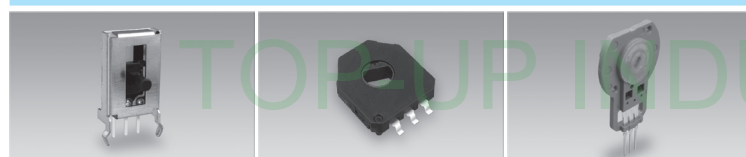


132

133

134

Position Sensor



135

Position Sensor / Encoder (15RS Series)



137

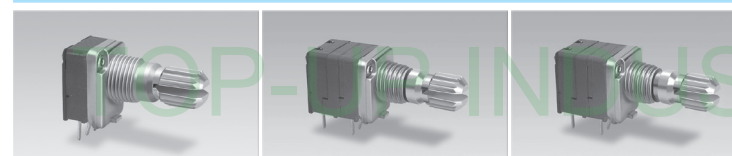
8mm Size Metal Shaft Encoder



138

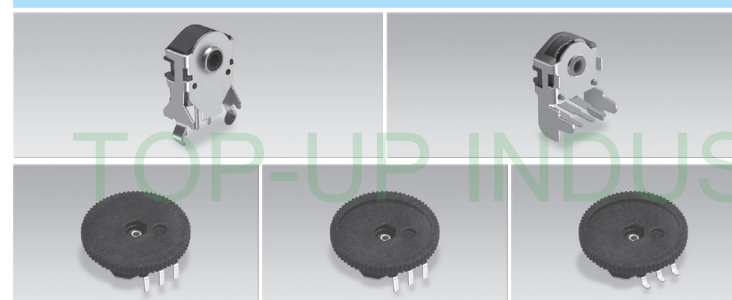
9mm Size Metal Shaft Encoder

Page



140

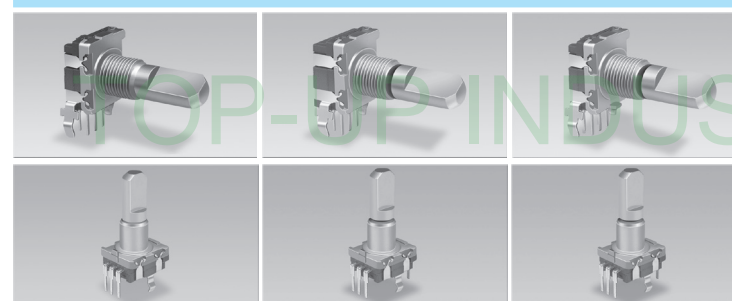
Rotary Encoders



142

143

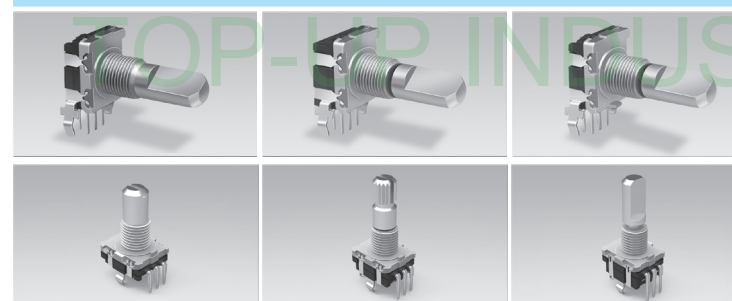
11mm Size Low-Profile (General Purpose) Encoders



146

147

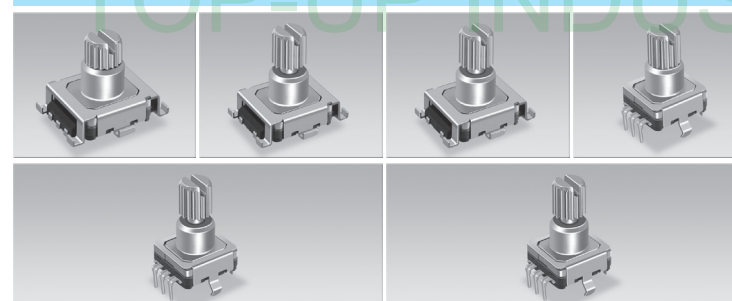
11mm Size Water-Proof Encoder (IPX7)



150

151

11mm Size Low-Profile (General Purpose) Encoders

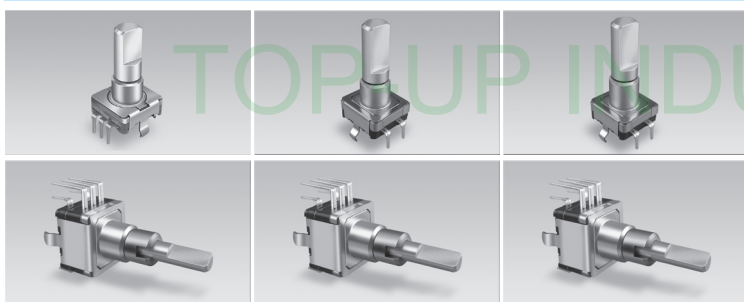


154

155

11mm Size Low-Profile (General Purpose) Encoders

Page



156

157

12mm Size Low-Profile (General Purpose) Encoders



161

162

163

Luminous Shaft W/Single LED

164

Luminous Shaft W/Single LED & SW

165

Luminous Shaft W/Dual LEDs & SW

166

Luminous Shaft W/RGB LEDs & SW

167

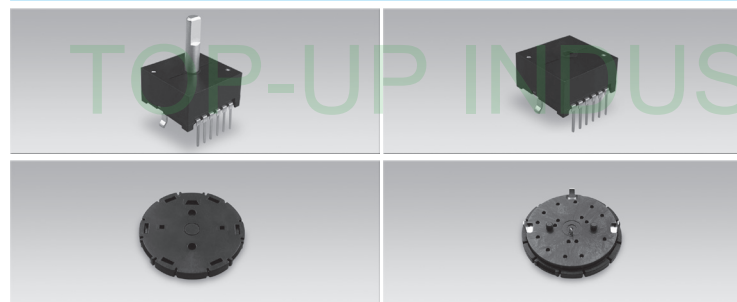
16mm Low-Profile (General Purpose) Encoders



169

20mm Size Gray Code Encoders

Page



171

172

Hollow Shaft Encoders



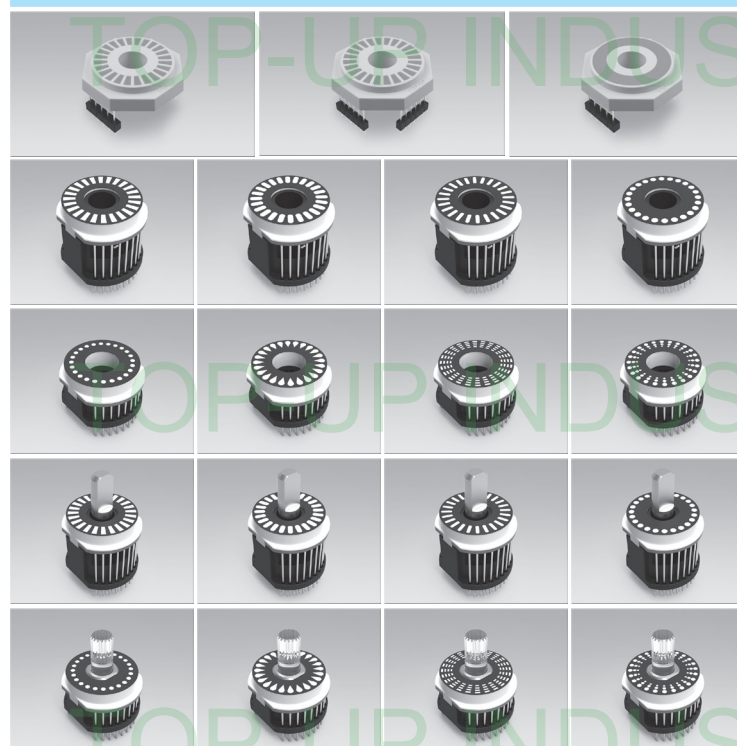
174

175

176

177

20mm & 23mm LED Indicator Circle



179

180

181

LED CCL W/ EC 11mm

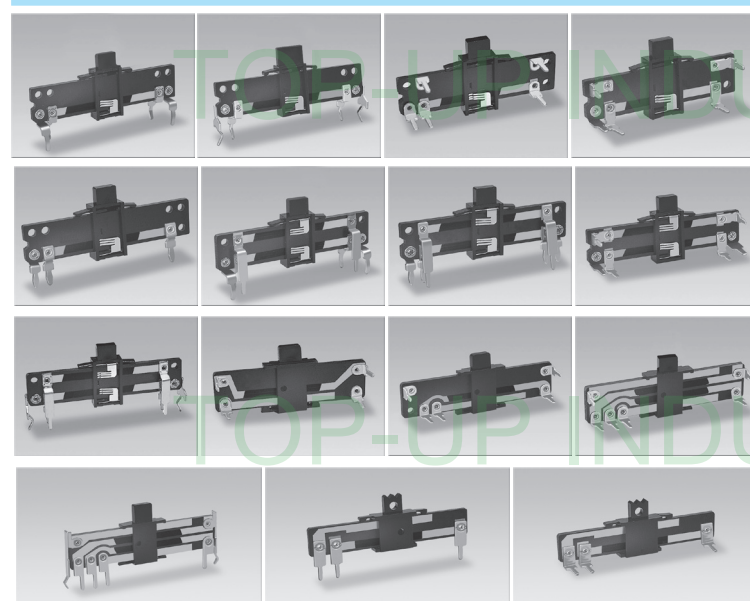
182

LED CCL W/ LED EC 12mm

183

Slim Type Slide Potentiometer (J Series)

Page



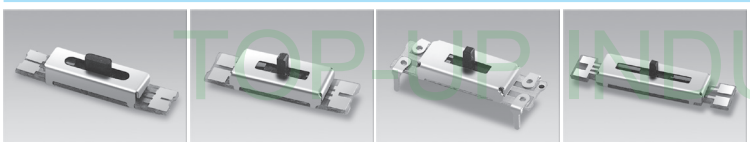
187

188

189

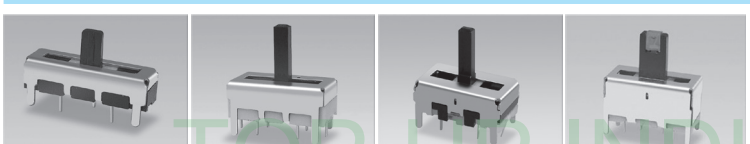
190

Miniature Type Slide Potentiometers (TE , TQ Series)



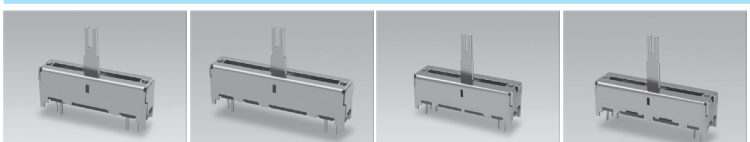
192

Miniature Type Slide Potentiometers (TE , TQ Series)



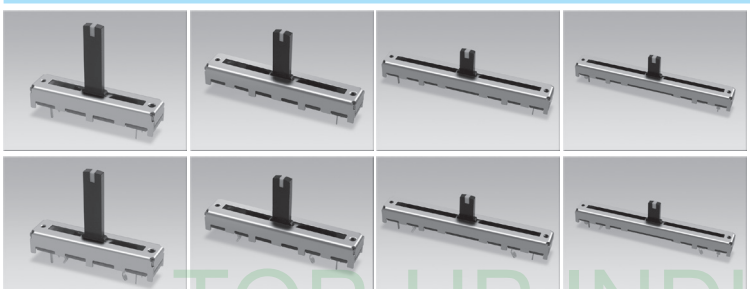
193

Standard Type Slide Potentiometers (TU Series)



194

Standard Type Slide Potentiometers (LA Series)

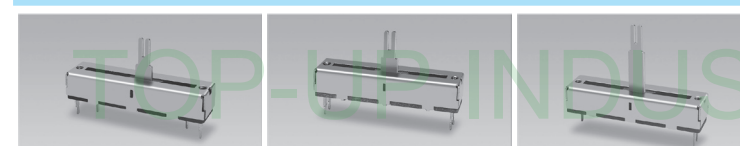


196

197

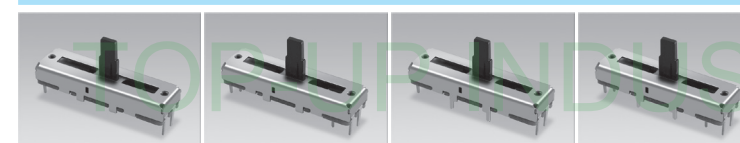
Standard Type Slide Potentiometers (TM Series)

Page

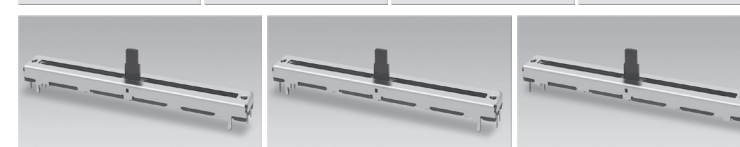


199

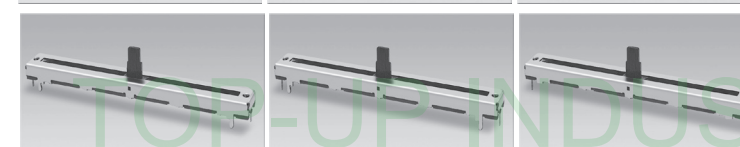
Standard Type Slide Potentiometers (LP , LD Series)



203

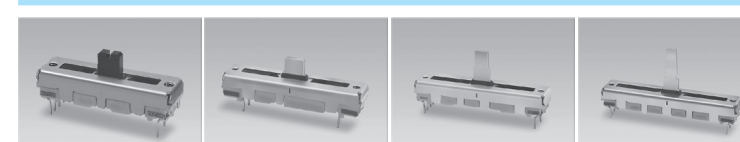


204

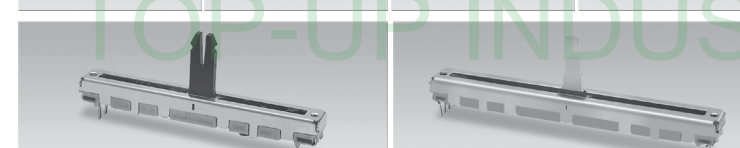


205

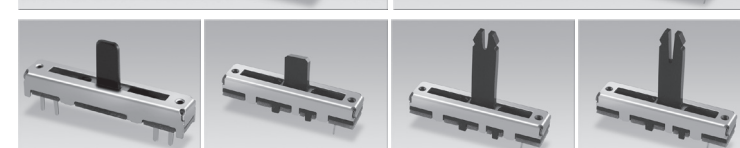
Standard Type Slide Potentiometers (AP Series)



208



209



210

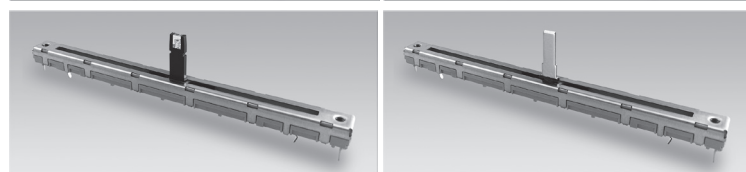
Standard Type Slide Potentiometers (AP Series)

Page



With Luminous Lever

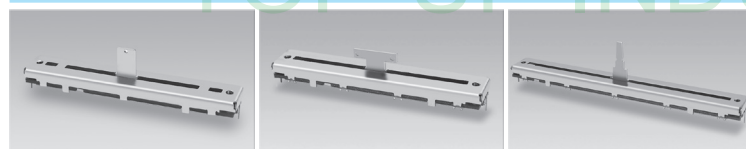
211



With Luminous Lever

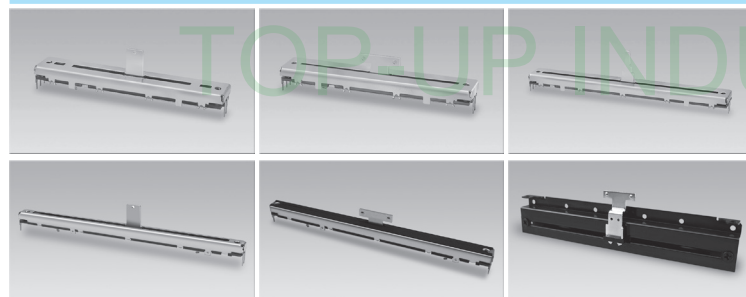
212

Standard Type Slide Potentiometers (AM, AN Series)



214

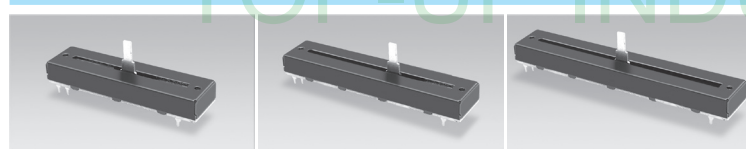
Special Low-Profile Master Type Slide Potentiometers (AM, AN Series)



215

216

Special Rail Type Slide Potentiometers (RF Series)



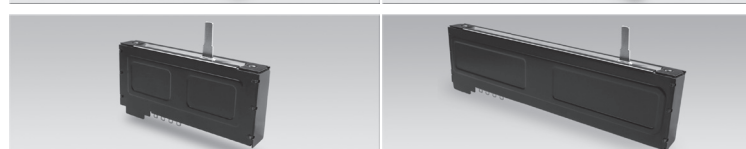
218



219



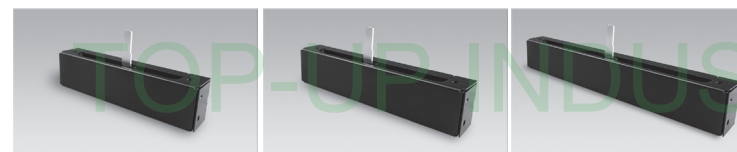
220



221

Standard Type Slide Potentiometers (AP Series)

Page



222

Special Motorized Type Slide Potentiometers (AM/RF Series)



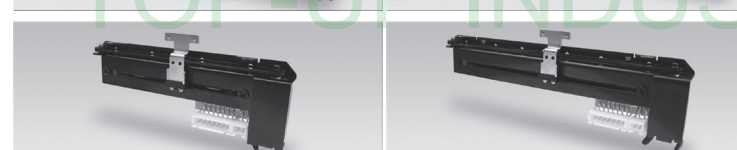
224



225



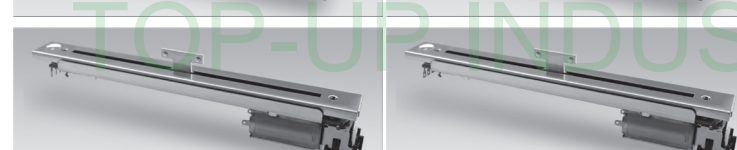
226



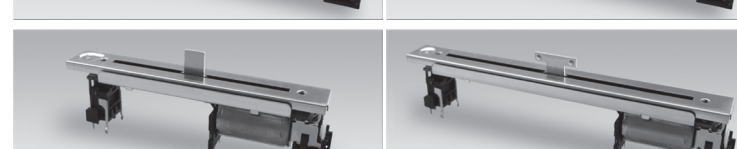
227



228



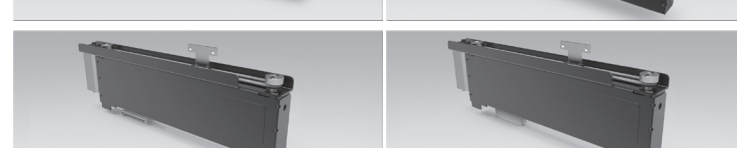
229



230



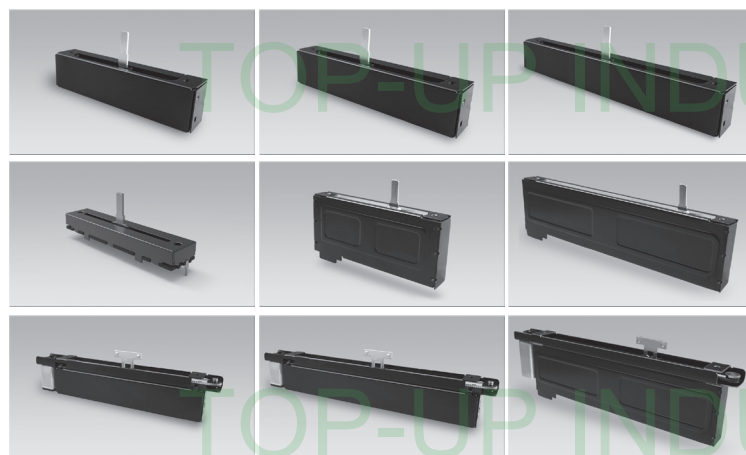
231



232

Contactless Fader (MSS / MSL / MSRF Series)

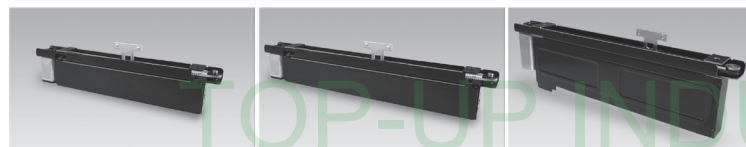
Page



234

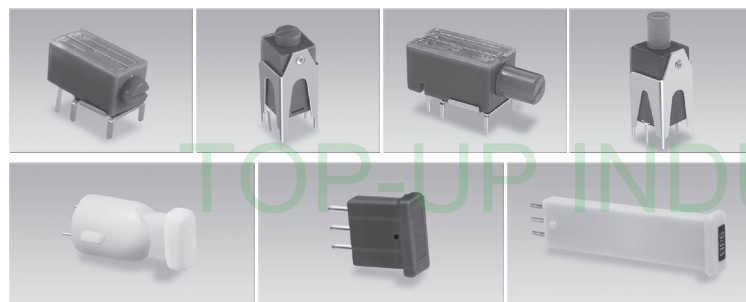


235



236

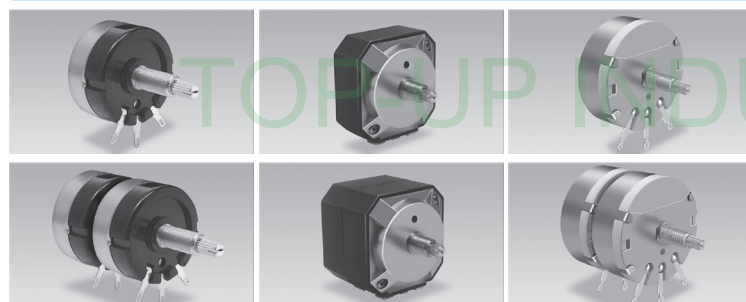
Attenuator



238

239

Wire Wound Attenuator Series (AT Series)



241

242

243

Taper Chart Page

8Q Series Code Explanation

8Q 1 V - D - 1 F - X - B -

1 2 3 4 5 6 7 8 9 10 11

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	F
4.5	-Type

(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 Last Page)
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

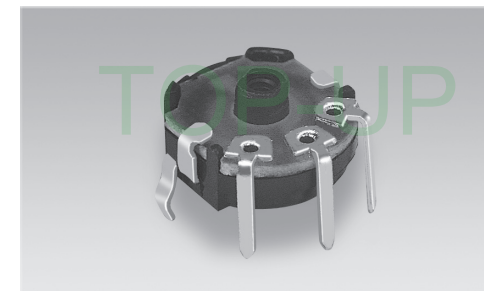
Single shaft, single unit	Single shaft, single unit (with tap)	Single shaft, single unit (back-to-back mounting type)
Viewed from mounting side	Viewed from mounting side	Viewed from shaft side
Single shaft, dual unit	Single shaft, dual unit resistance taper JIS C	Single shaft, dual unit (back-to-back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

8mm Size Micro Potentiometers

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

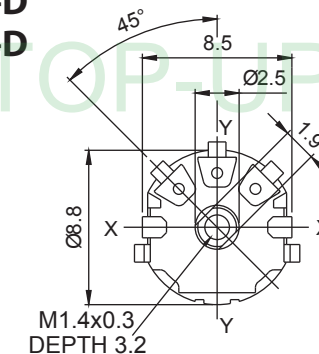
Note: * The 8 mm size single-unit potentiometer with tap does not support DC applications.

8Q1V-D



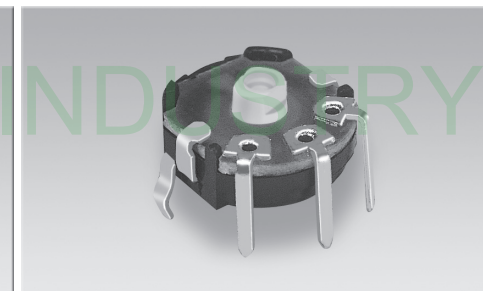
Outline Drawing

8Q1V-D
8Q2V-D



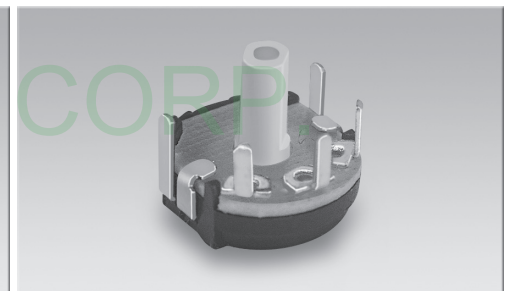
SHAFT SHOWN IN FULL C. C. W POSITION

8Q2V-D

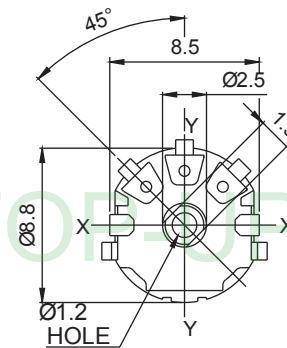


Features individual specifications

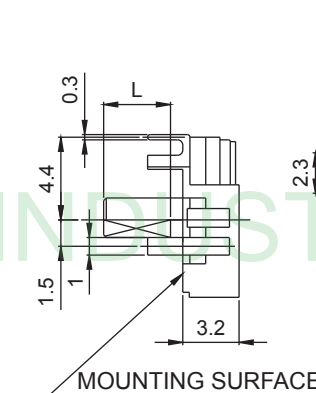
8Q2V-C



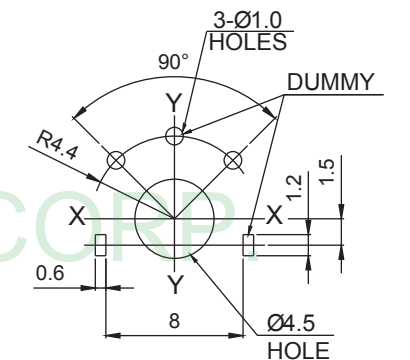
8Q2V-C



SHAFT SHOWN IN FULL C. C. W POSITION



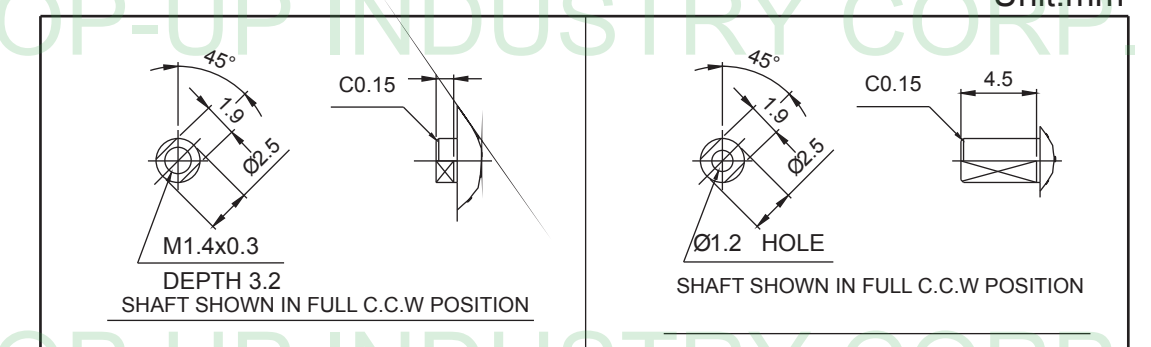
MOUNTING SURFACE



P.W.B MOUNTING DETAIL

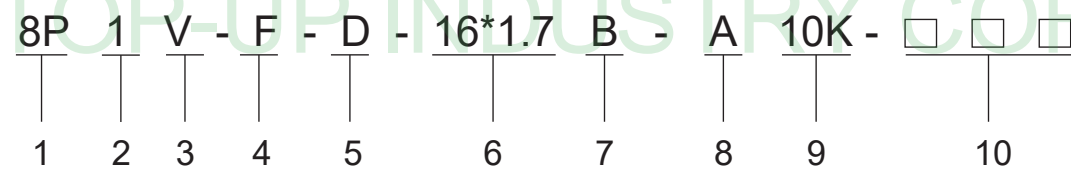
FLAT SHAFT STYLE

Unit:mm



SHAFT SHOWN IN FULL C.C.W POSITION

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. With Frame
5. Type of Terminal (See Drawing 1)

(Drawing 1)

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

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

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

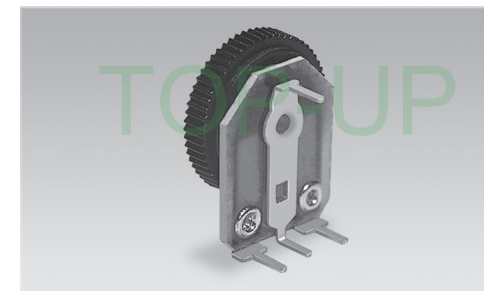
(Drawing 2-1)

	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°

7. Axis Teeth Angle : (See Drawing 2-2)
8. Type of Taper (See Taper Chart Last Page)
9. Resistance Value
10. Serial No.

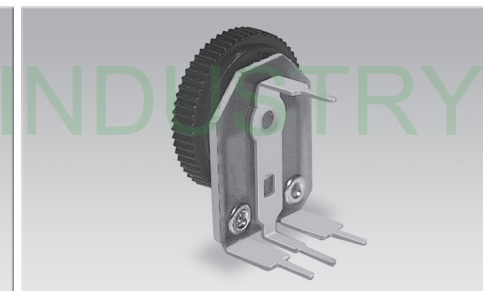
(Drawing 2-2)

8P1V-D



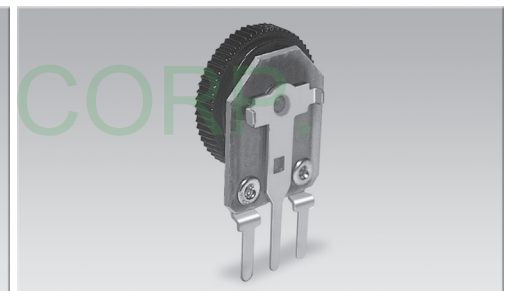
Outline Drawing

8P1V-D1

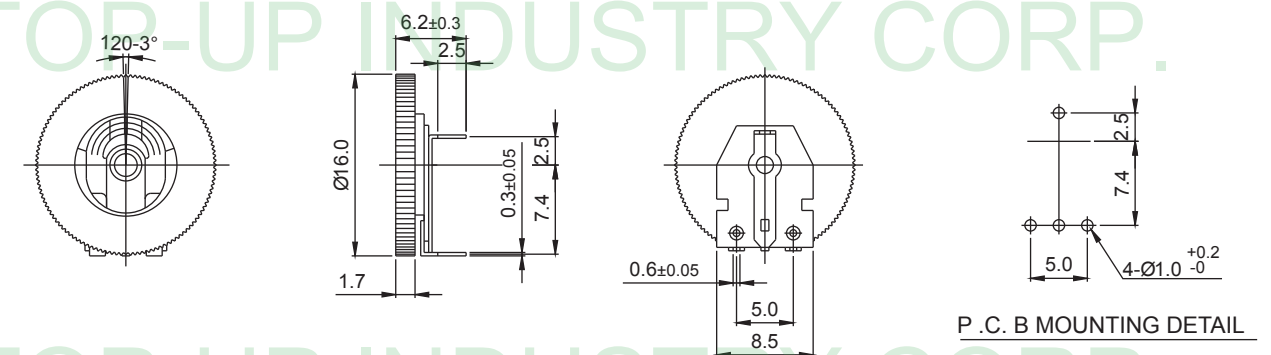


Features individual specifications

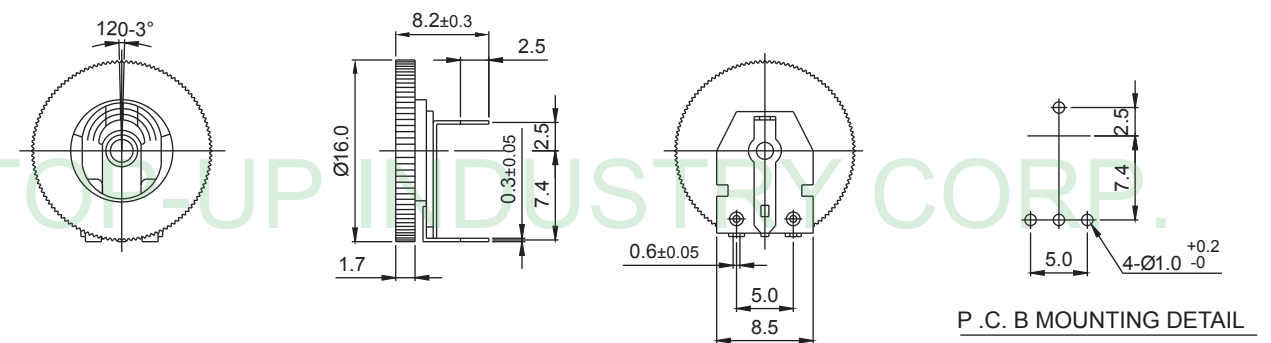
8P1H-B



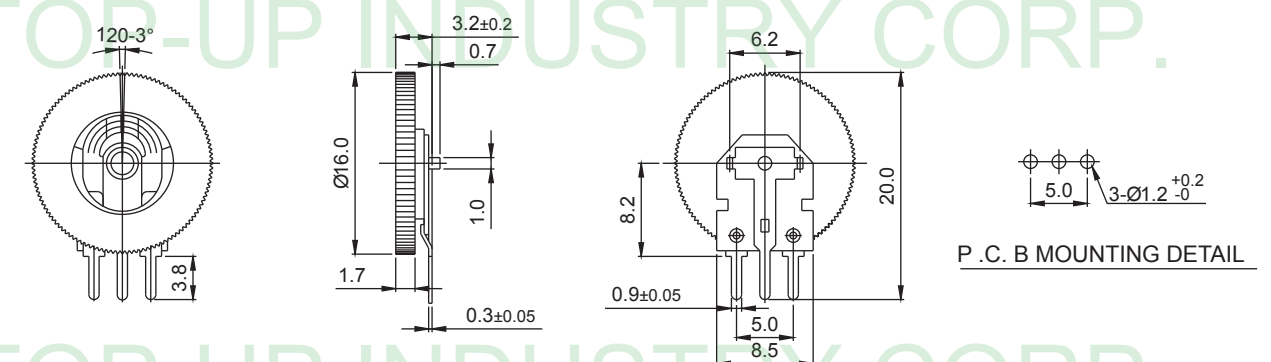
8P1V-D



8P1V-D1



8P1H-B

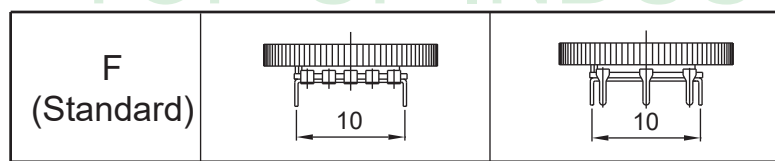


6P , 10P Series Code Explanation

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)	
(9)			

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

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

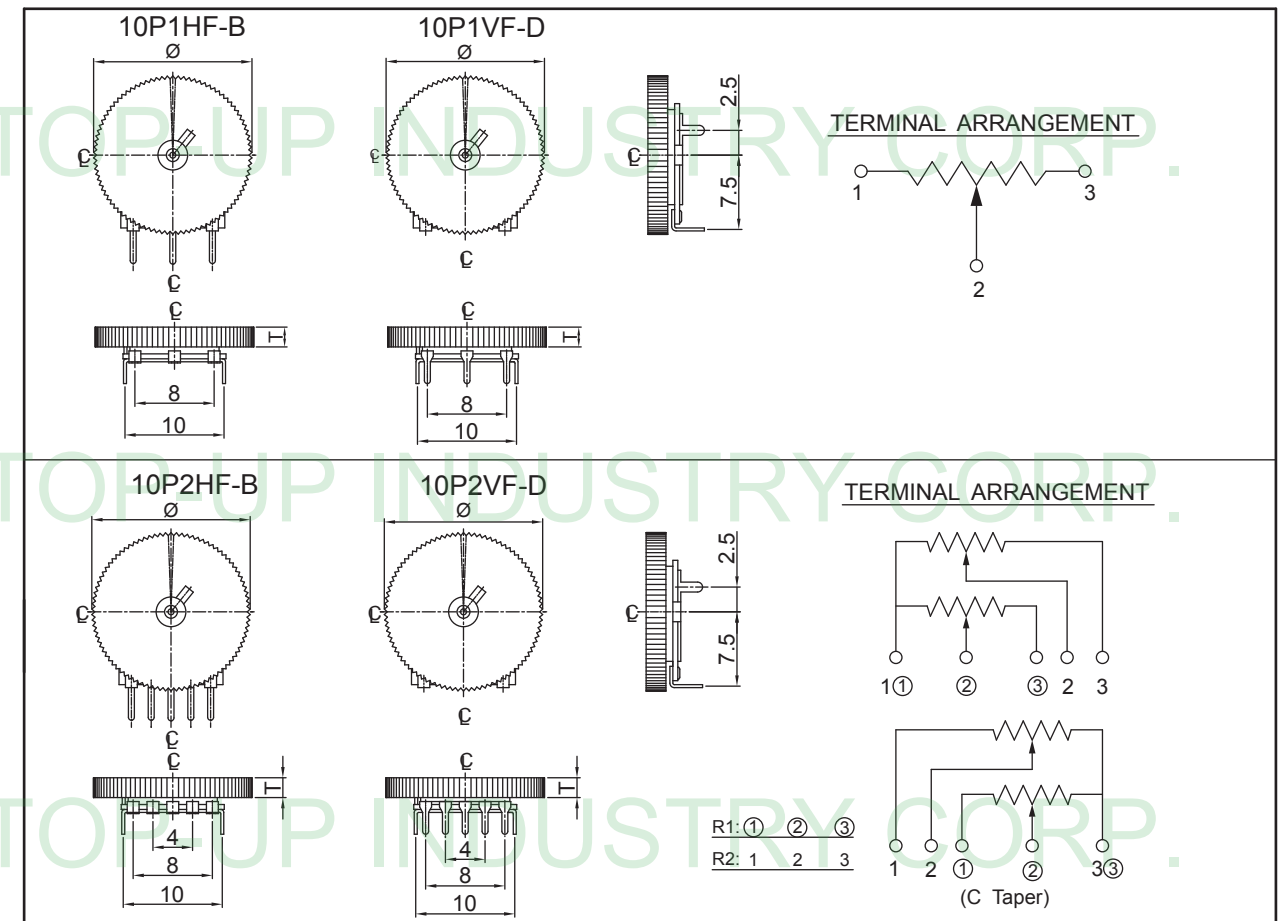
Code	Y	X	Z
θ	72-5°	90-4°	30-6°

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

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:

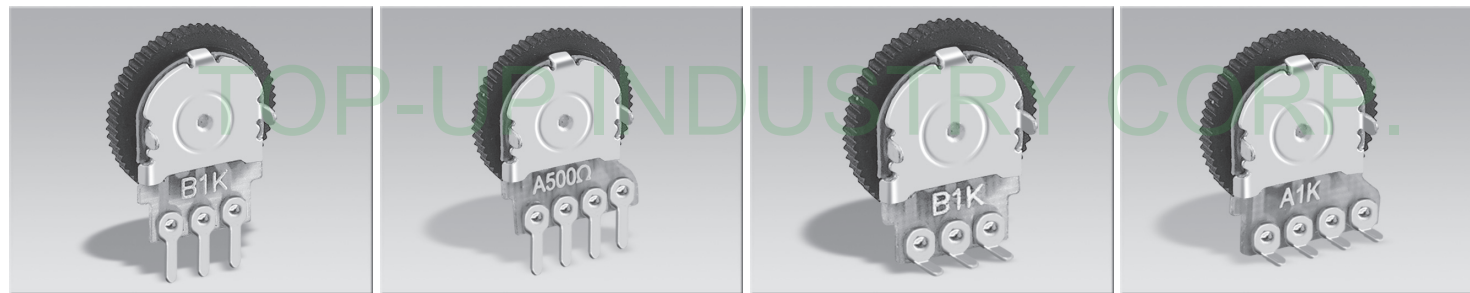
Rotational life	10,000 cycles
-----------------	---------------

6P2HF-B

6P2HF-B(1)

6P2VF-D

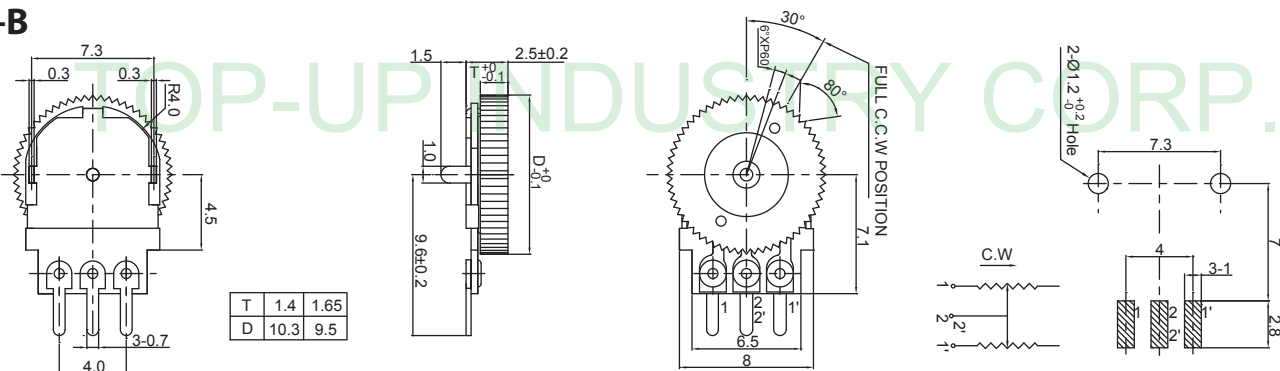
6P2VF-D(1)



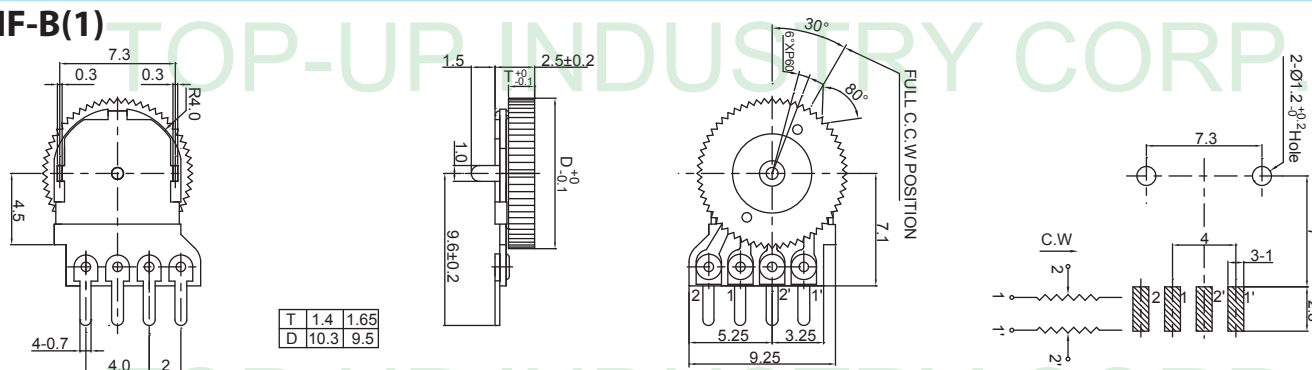
Outline Drawing

Features individual specifications

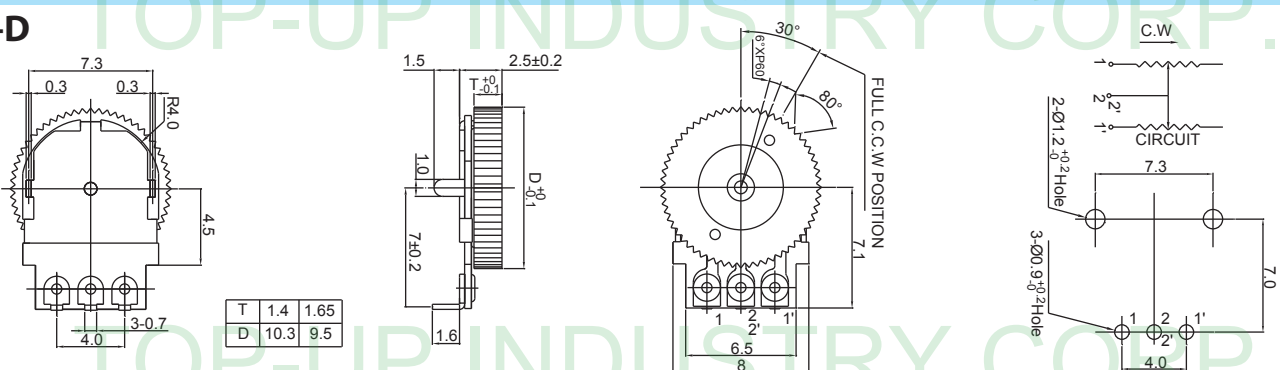
6P2HF-B



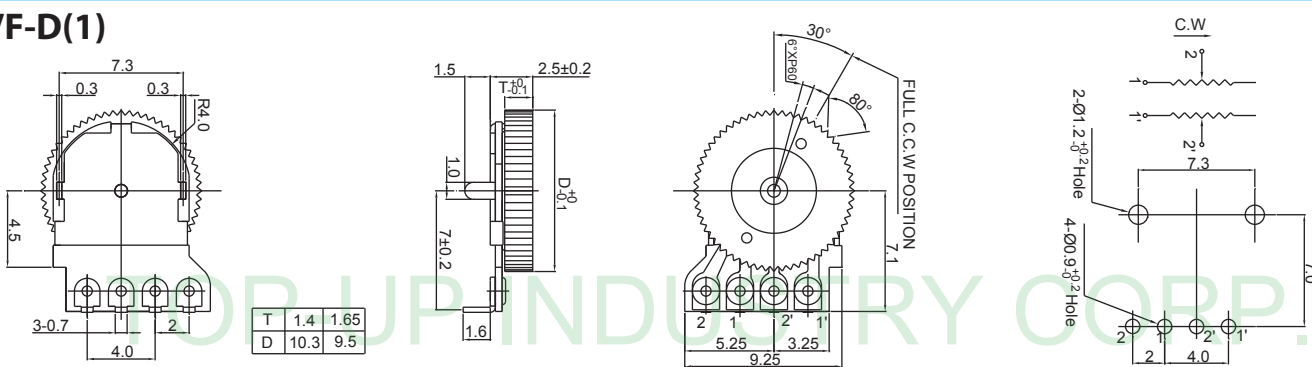
6P2HF-B(1)



6P2VF-D



6P2VF-D(1)

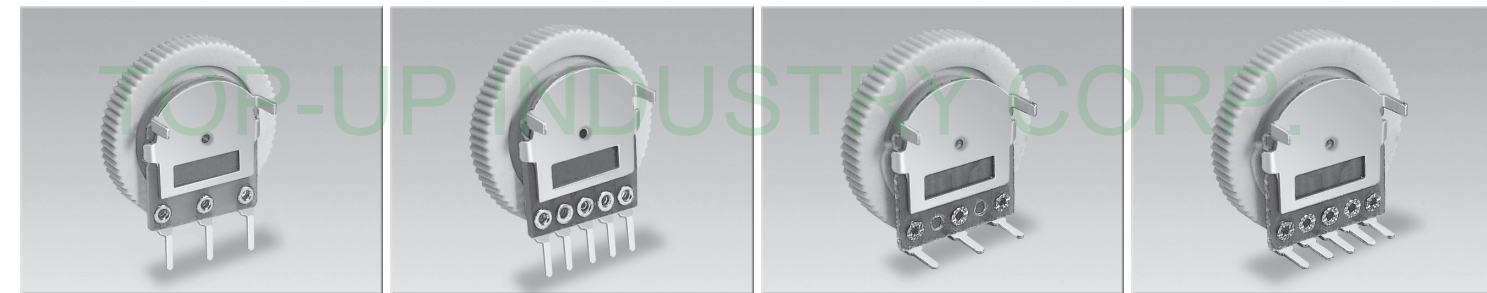


10P1HF-B

10P2HF-B

10P1VF-D

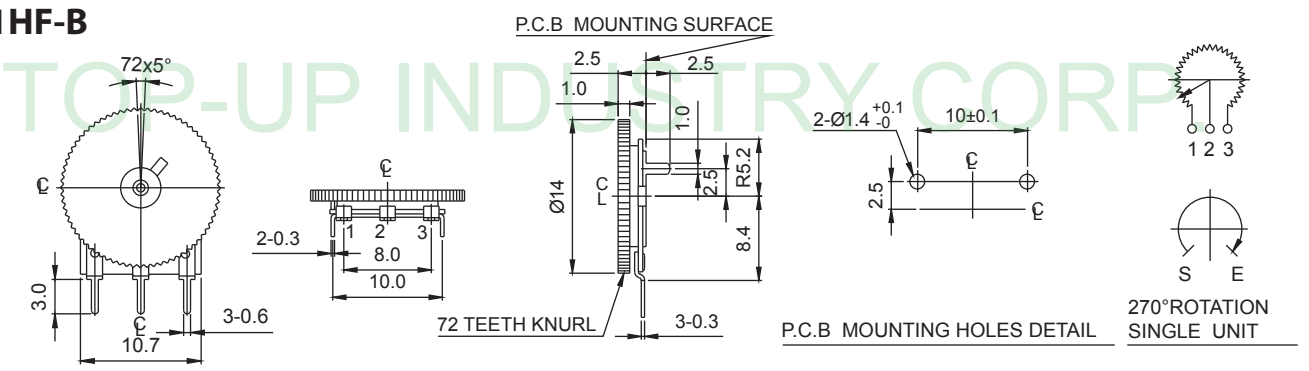
10P2VF-D-14*1Y



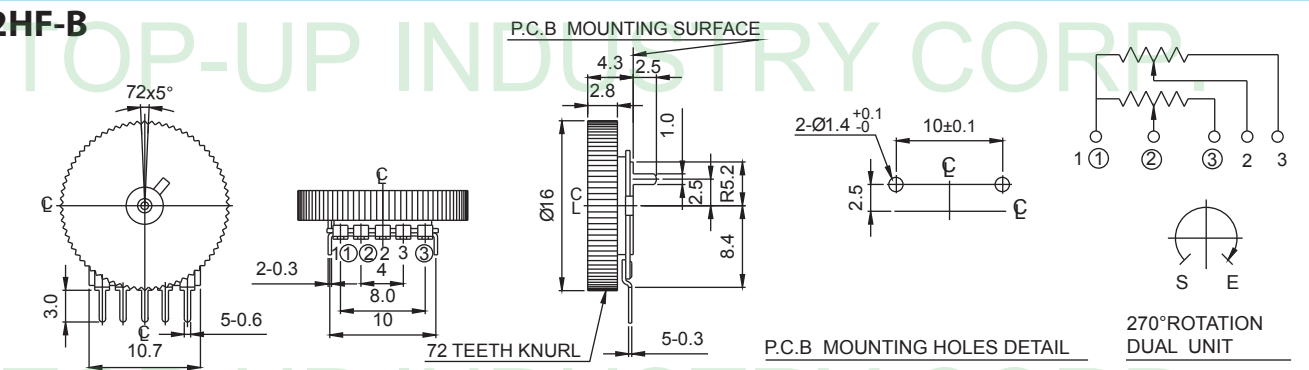
Outline Drawing

Features individual specifications

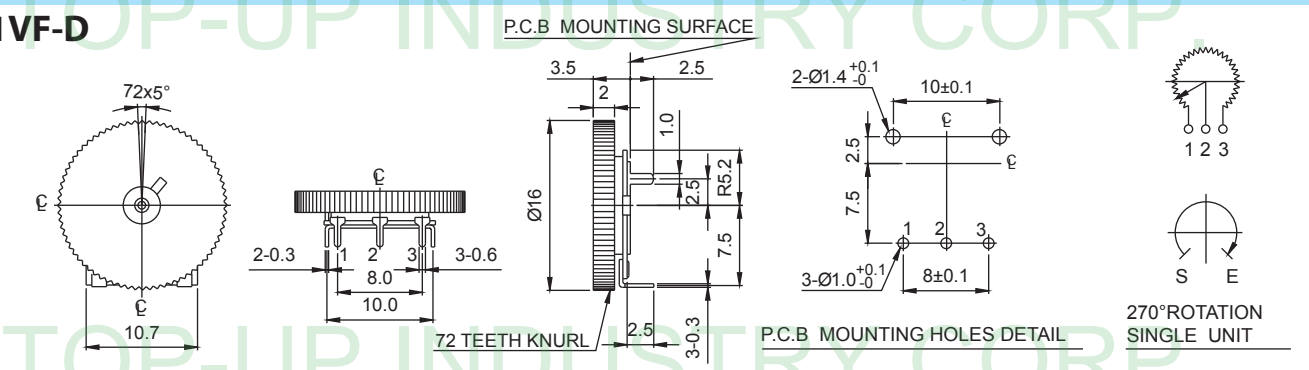
10P1HF-B



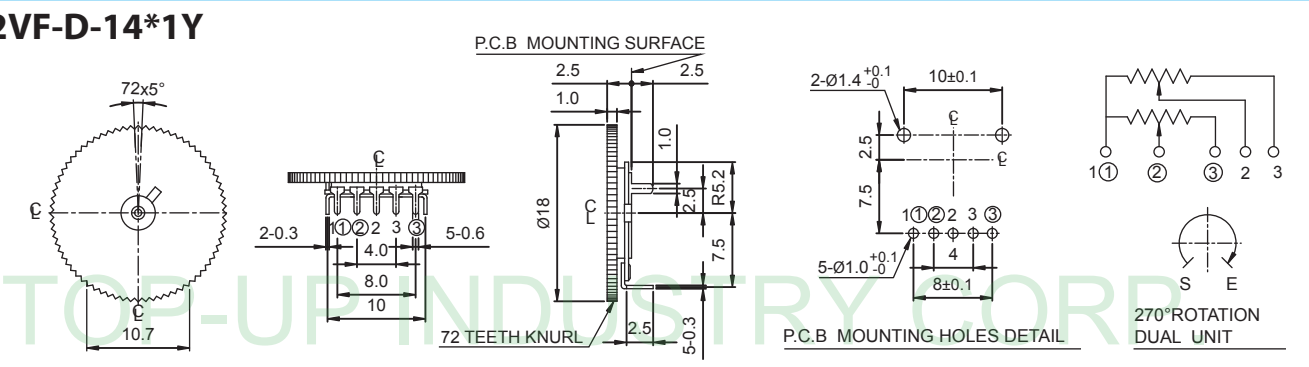
10P2HF-B



10P1VF-D



10P2VF-D-14*1Y

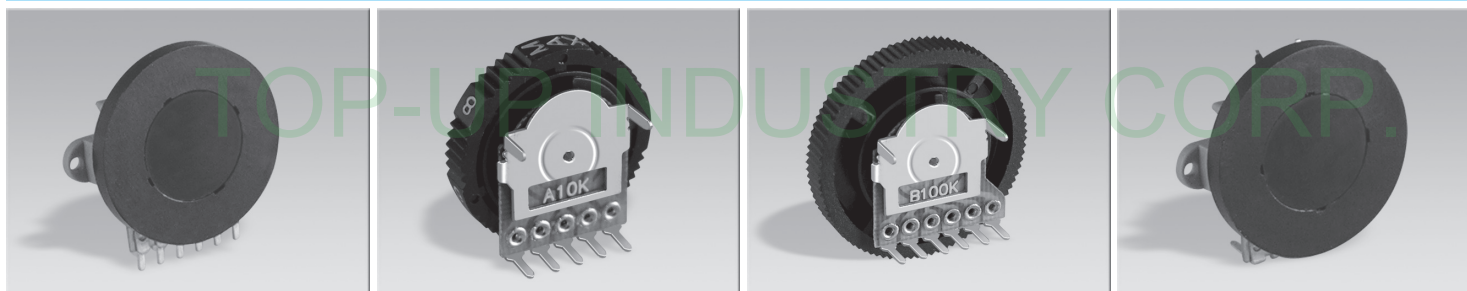


10P2SHF-B

10P2VF-D-16*2.8Z

10P2VF-D16

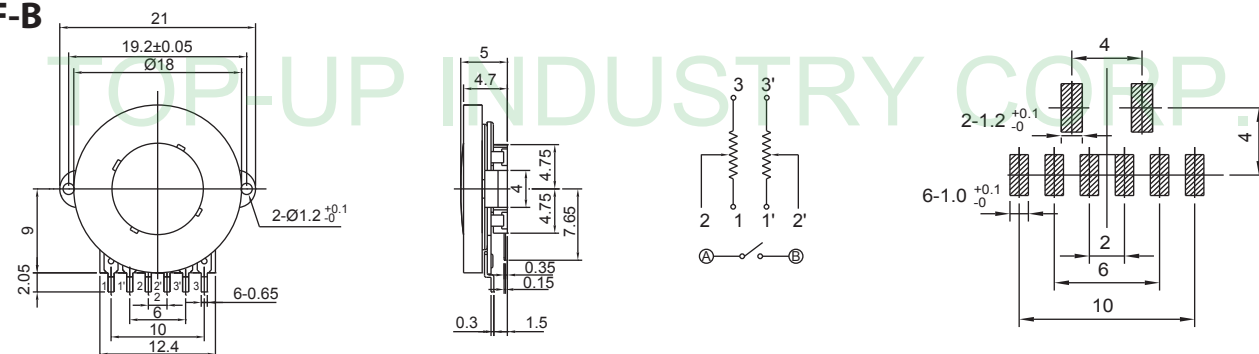
10P2SVF-D



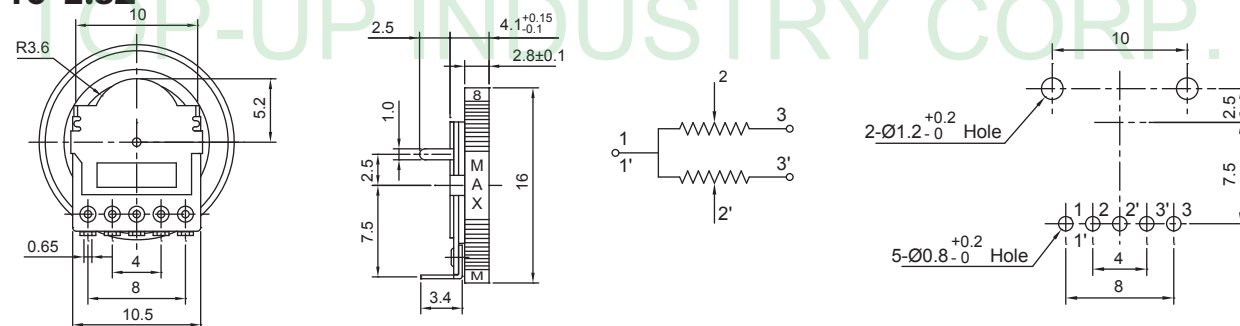
Outline Drawing

Features individual specifications

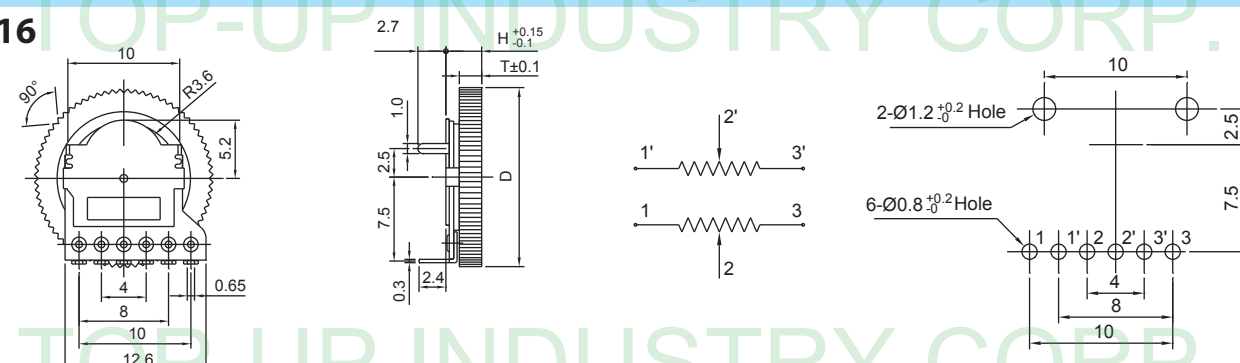
10P2SHF-B



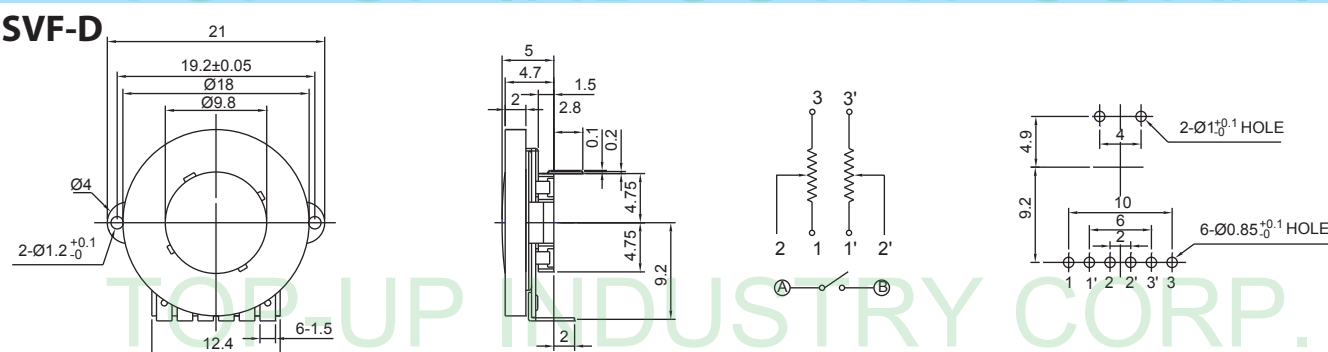
10P2VF-D-16*2.8Z



10P2VF-D16



10P2SVF-D



9P Series Code Explanation

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): PA, PB, PC
Please refer to the Frame Code (LB) shown as Drawing 2

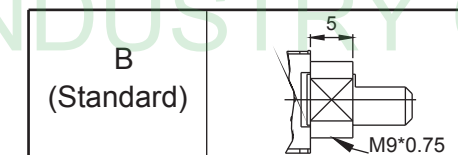
2. Number of Unit : 1 - Single Unit , 2 - Dual Unit

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)

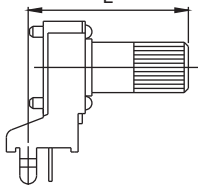
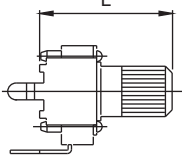
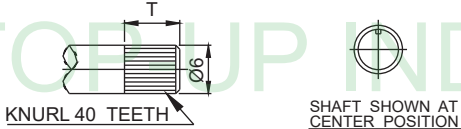
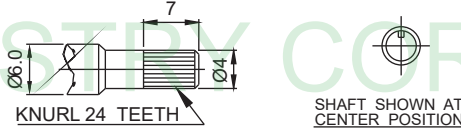
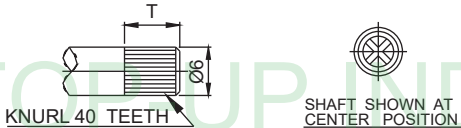
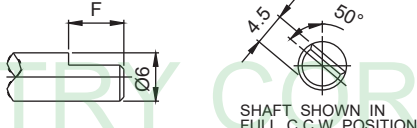
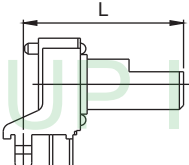
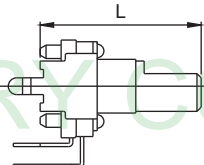
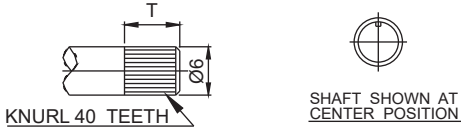
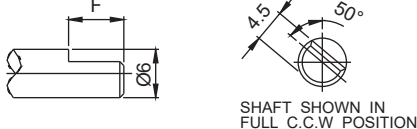
9. Color of Shaft: B - Blank , G-Dove Gray (See Drawing 3)

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 Last Page)
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 larence	±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≤1k	30Ω max.
	1kΩ <R ≤100kΩ	100Ω max.
	5kΩ <R ≤100kΩ	300Ω max.
	100kΩ <R ≤500k	500Ω max.
For volume	500kΩ<R ≤1MΩ	1kΩ max.
Slide noise	Less than 100mV	
Gang error		Within 3dB at-40 to 0dB
Insulation resistance	100MΩ min. at 250V DC	
Withstand voltage	For 1 minute or more at 250V AC	

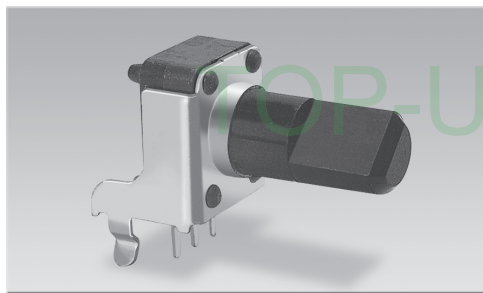
3.Durability

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

Maximum Attenuation Level And Insertion Loss

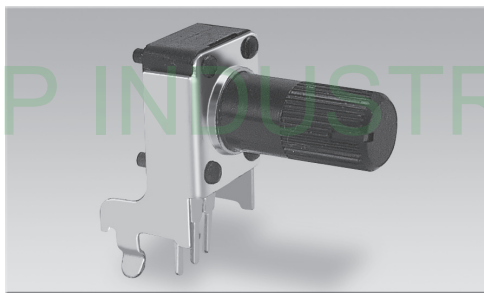
Resistance range	Maximum attenuation level
5Ω<R ≤10k	60dB min.
10kΩ<R ≤50k	70dB min.
50kΩ<R ≤100k	80dB min.
100kΩ≤R	90dB min.

9PB1H-BW



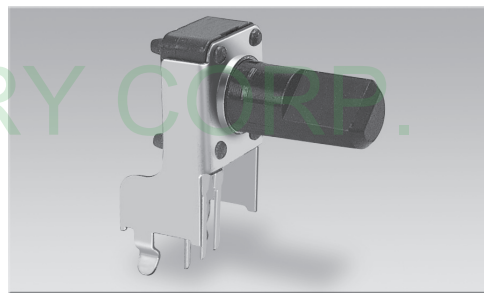
Outline Drawing

9PC1H-BX

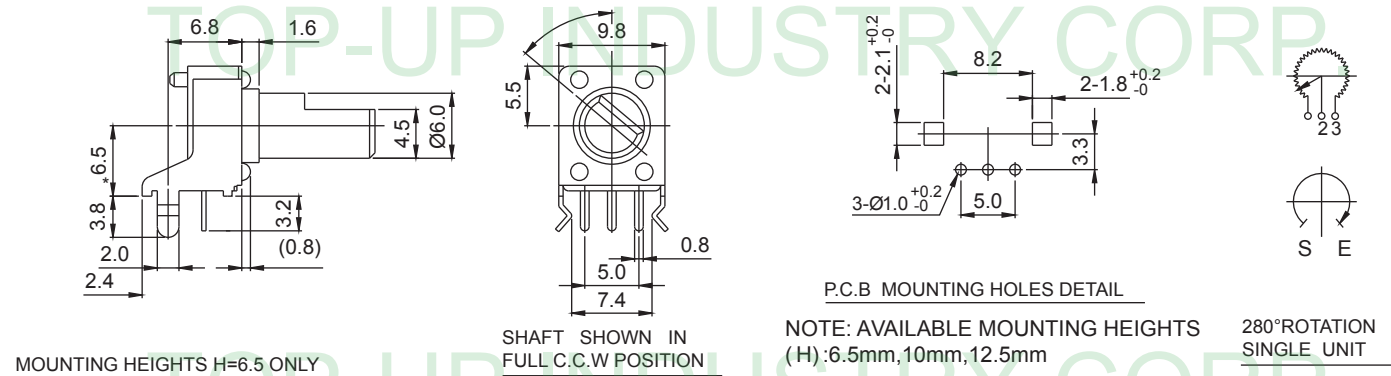


Features individual specifications

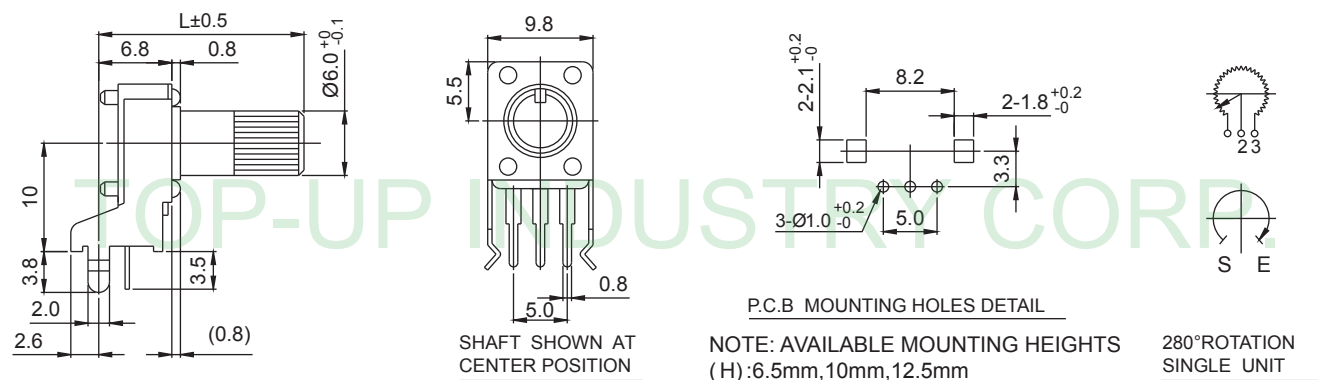
9PC1H-BY



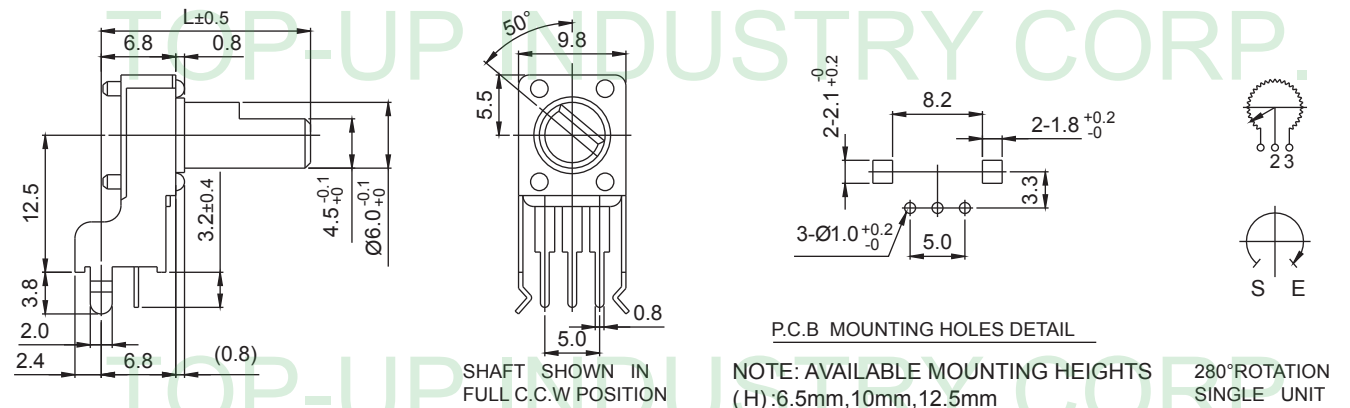
9PB1H-BW



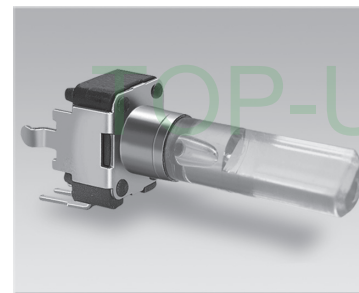
9PC1H-BX



9PC1H-BY

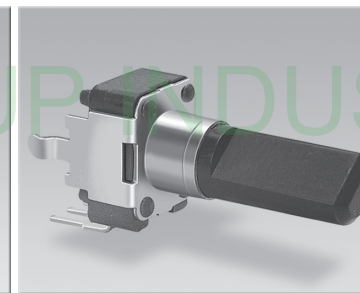


9PA1V-D-□FT

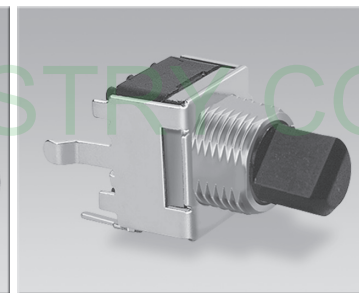


Outline Drawing

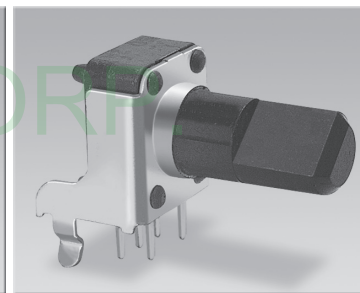
9PA1V-D



9P1VB-D

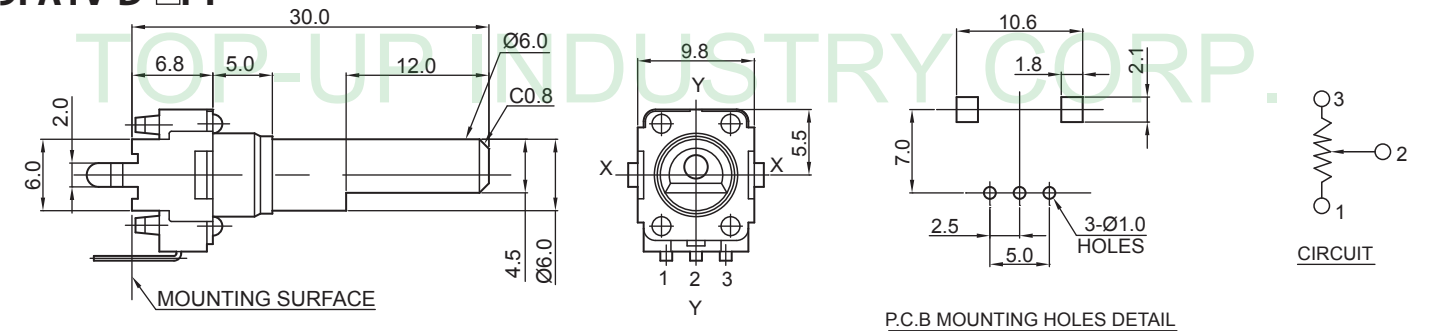


9PB2H-B□

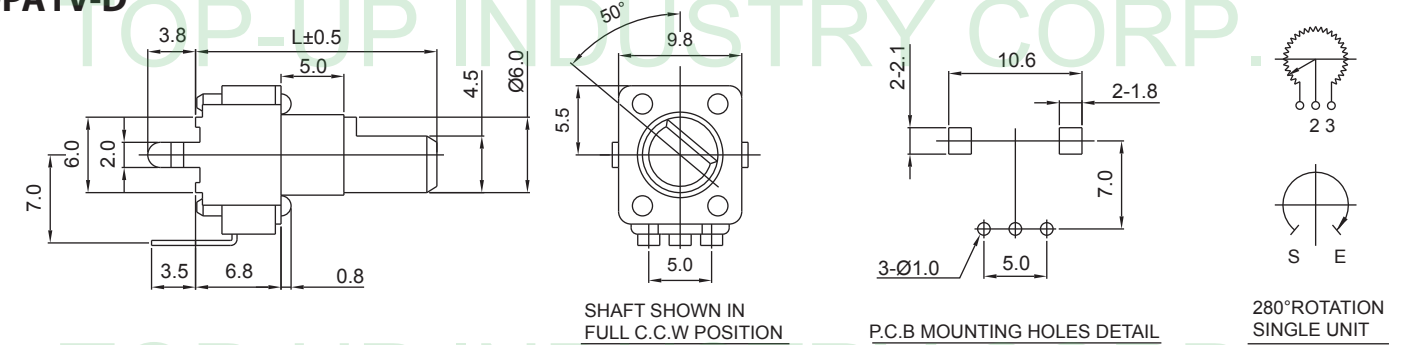


Features individual specifications

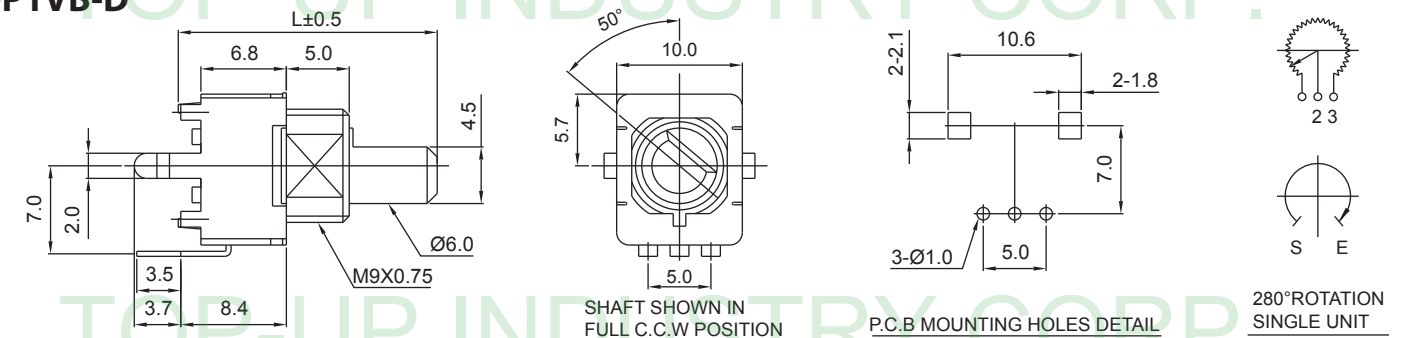
9PA1V-D-□FT



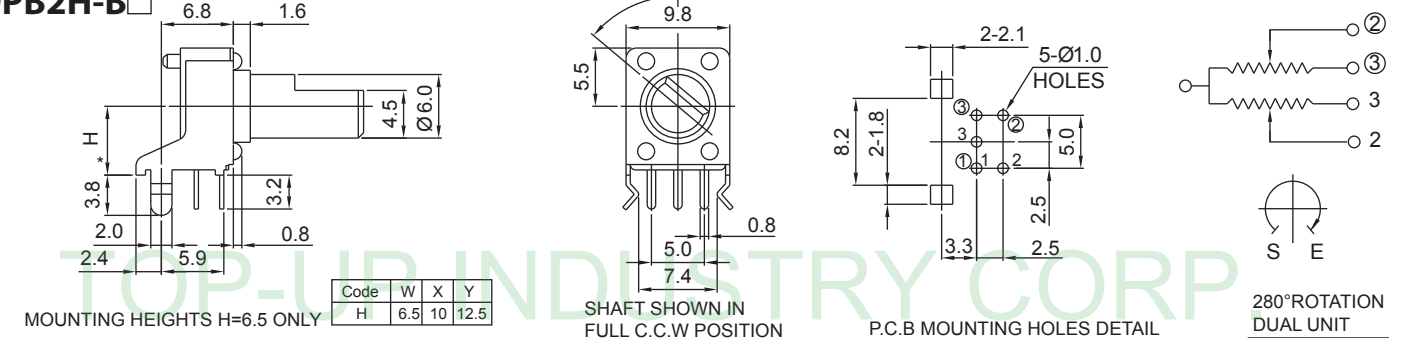
9PA1V-D



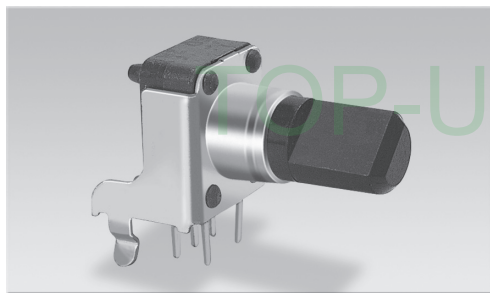
9P1VB-D



9PB2H-B□

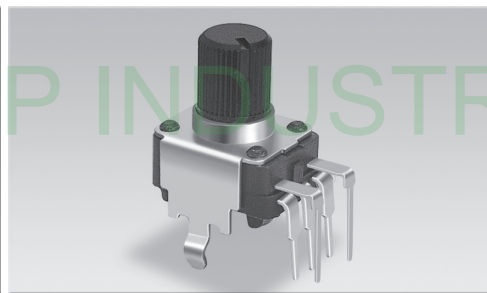


9PD2H-B□



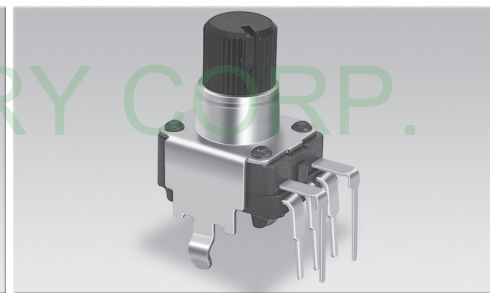
Outline Drawing

9PB2V-D

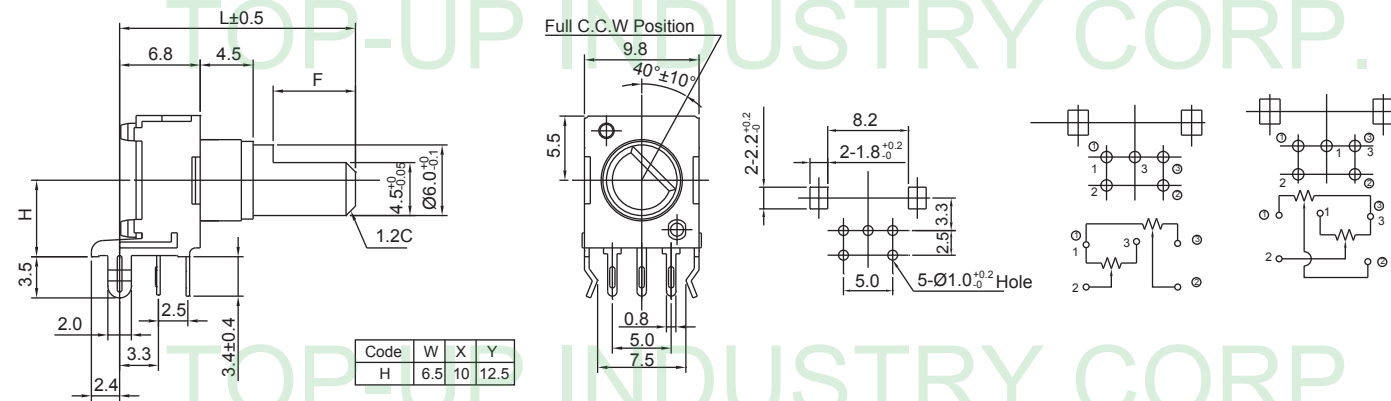


Features individual specifications

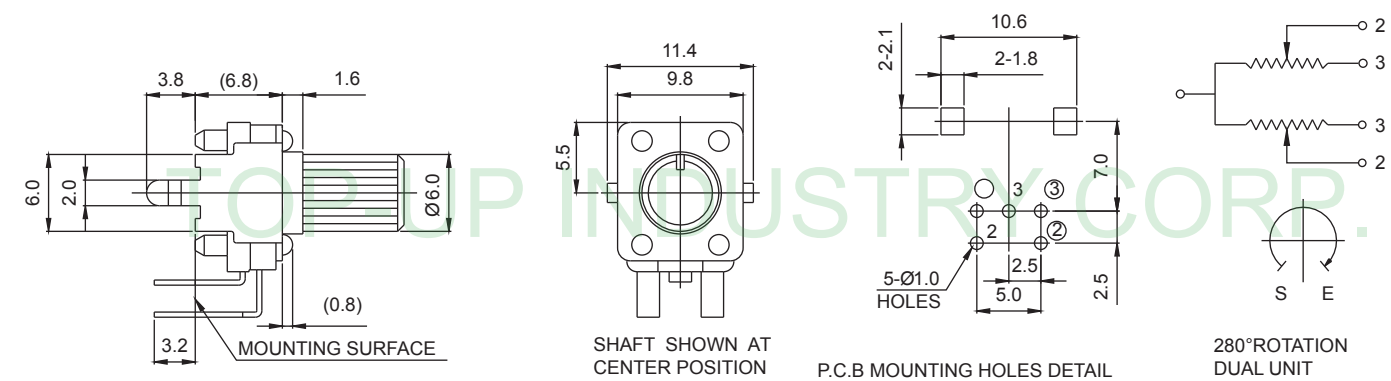
9PA2V-D



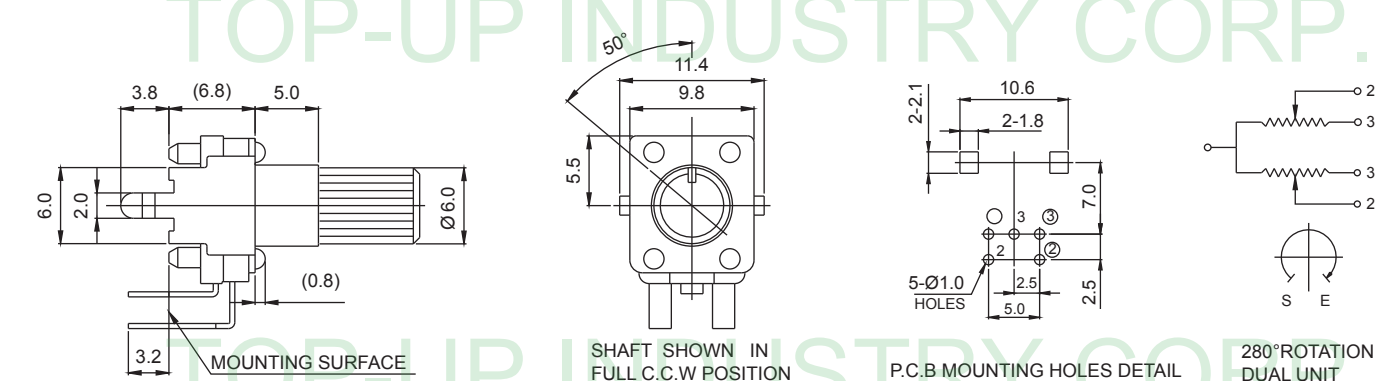
9PD2H-B□



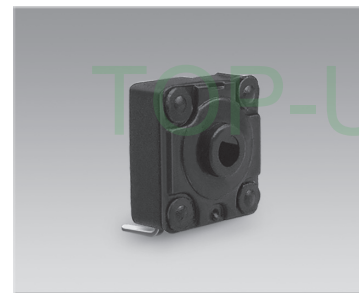
9PB2V-D



9PA2V-D

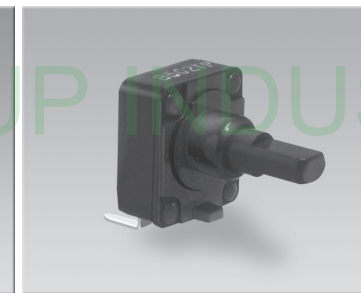


7PR1VB-D-HF



Outline Drawing

9PR1VB-D



9PR1VB-D1

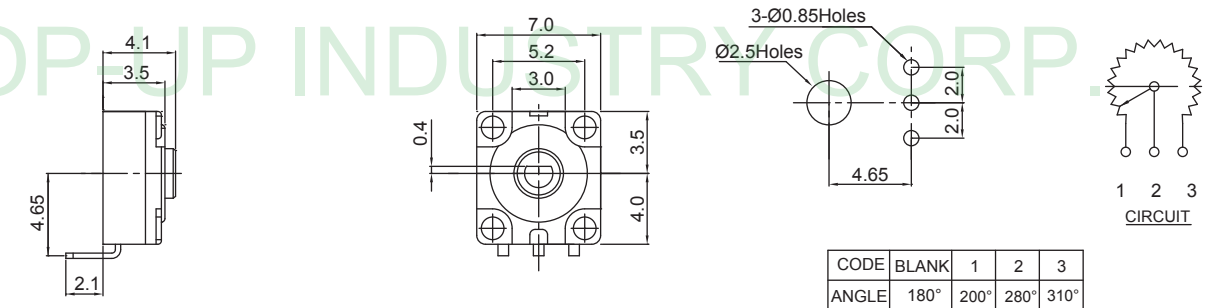


9PM1VF-D

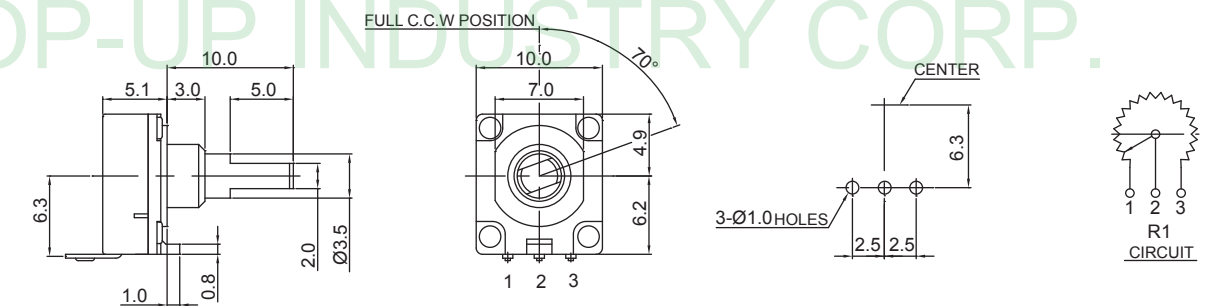


Features individual specifications

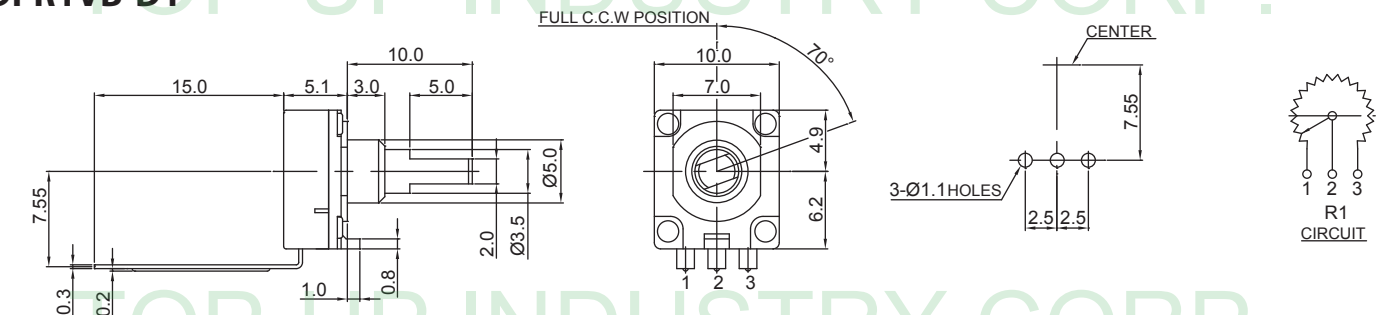
7PR1VB-D-HF



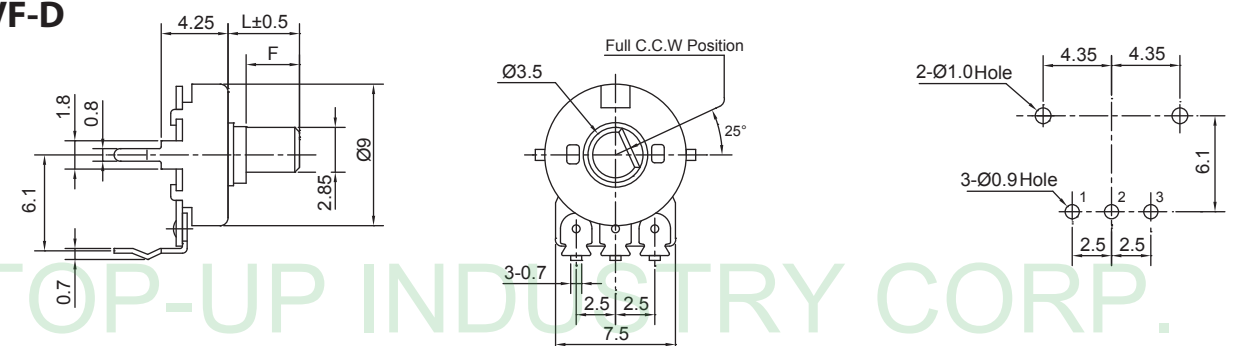
9PR1VB-D



9PR1VB-D1



9PM1VF-D

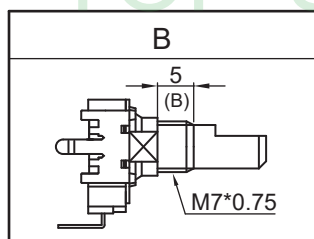


11PM,12PM Series Code Explanation

11PM 1 H B F - B - 15 F - A 10K - 1C - □□□

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

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

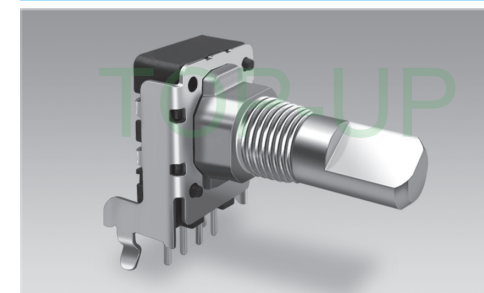
P.C.B Type				
	Horizontal			Vertical
	B			D
				

7. Shaft Length "L"
8. Shaft Type

F Type	L		
	15	20	25
F	7	12	12

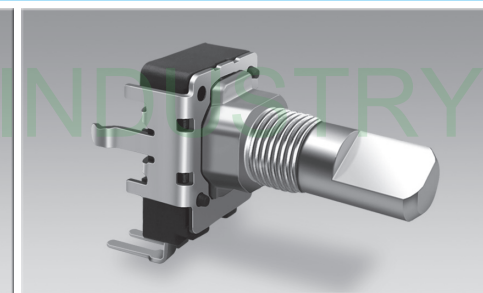
9. Type of Taper (See Taper Chart Last Page)
10. Resistance Value
11. Number of clicks
12. Serial No.

11PM1HBF-D



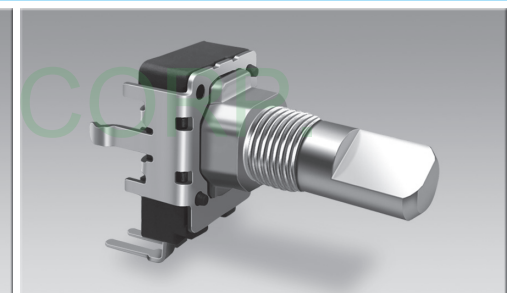
Outline Drawing

11PM1VBF-D

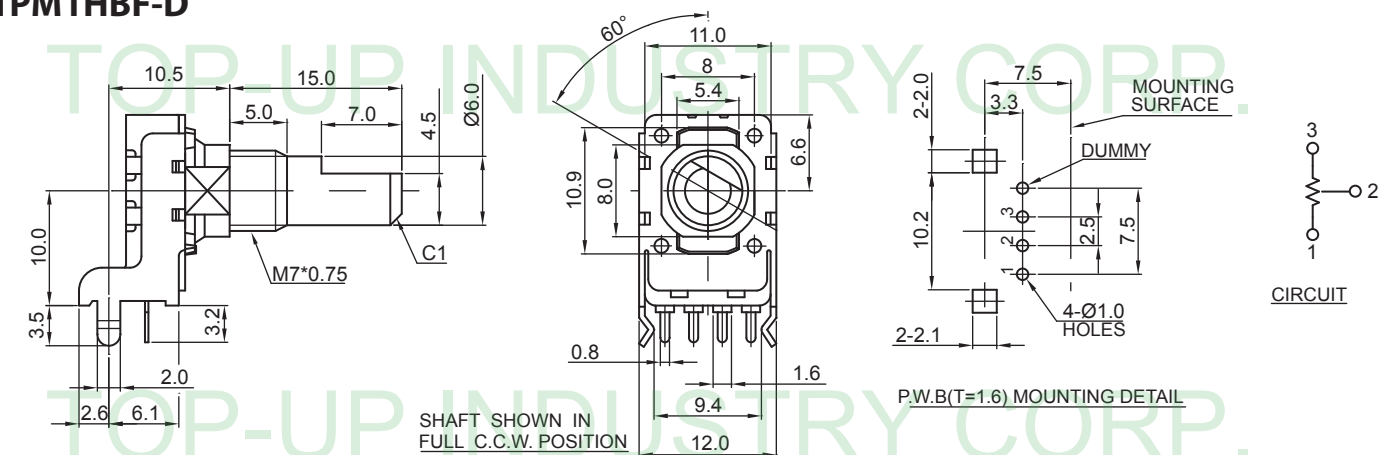


Features individual specifications

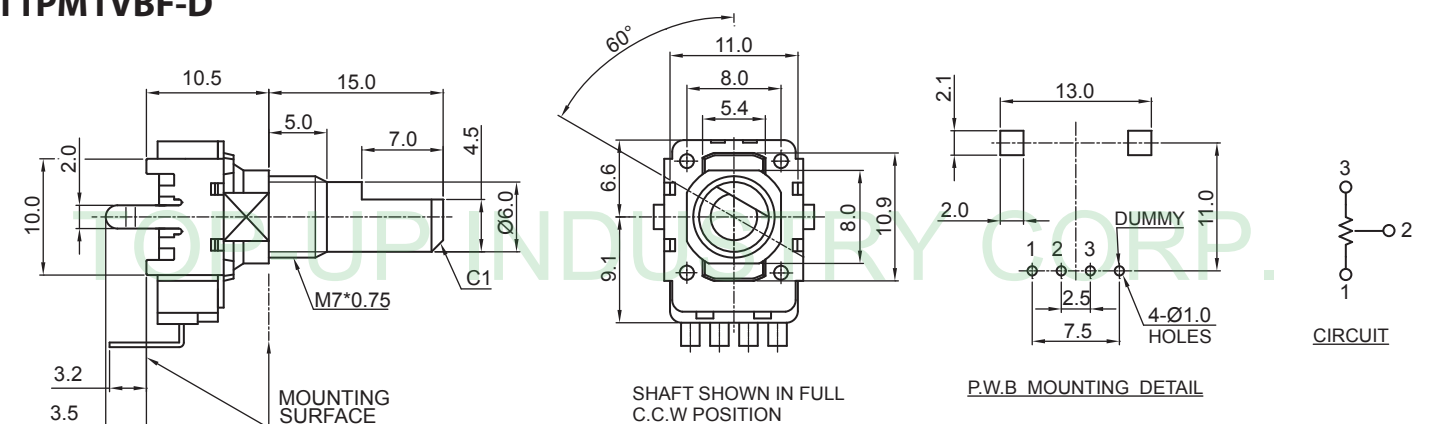
11PM2VBF-D



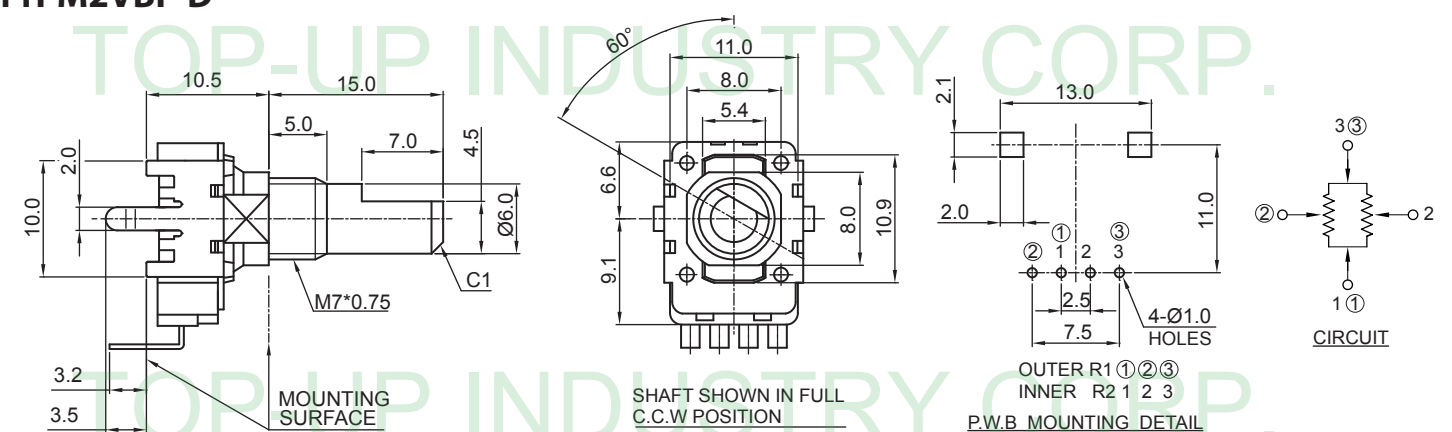
11PM1HBF-D



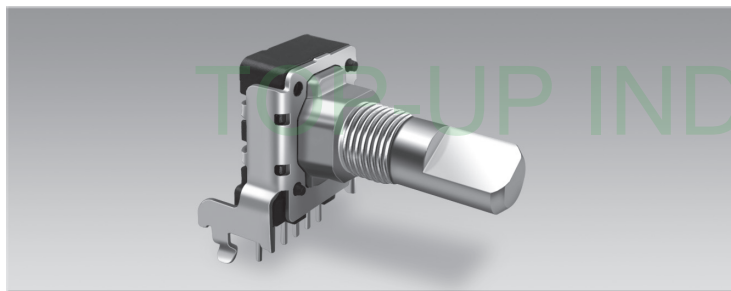
11PM1VBF-D



11PM2VBF-D

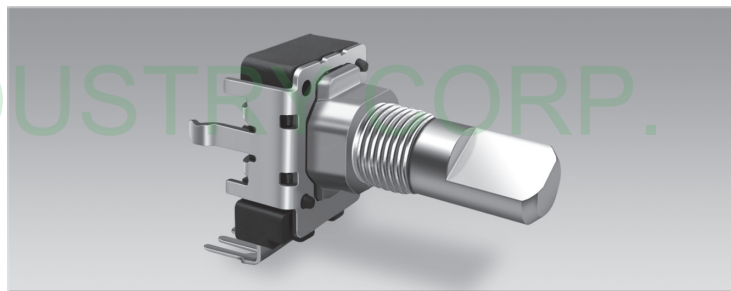


12PM2HBF-B



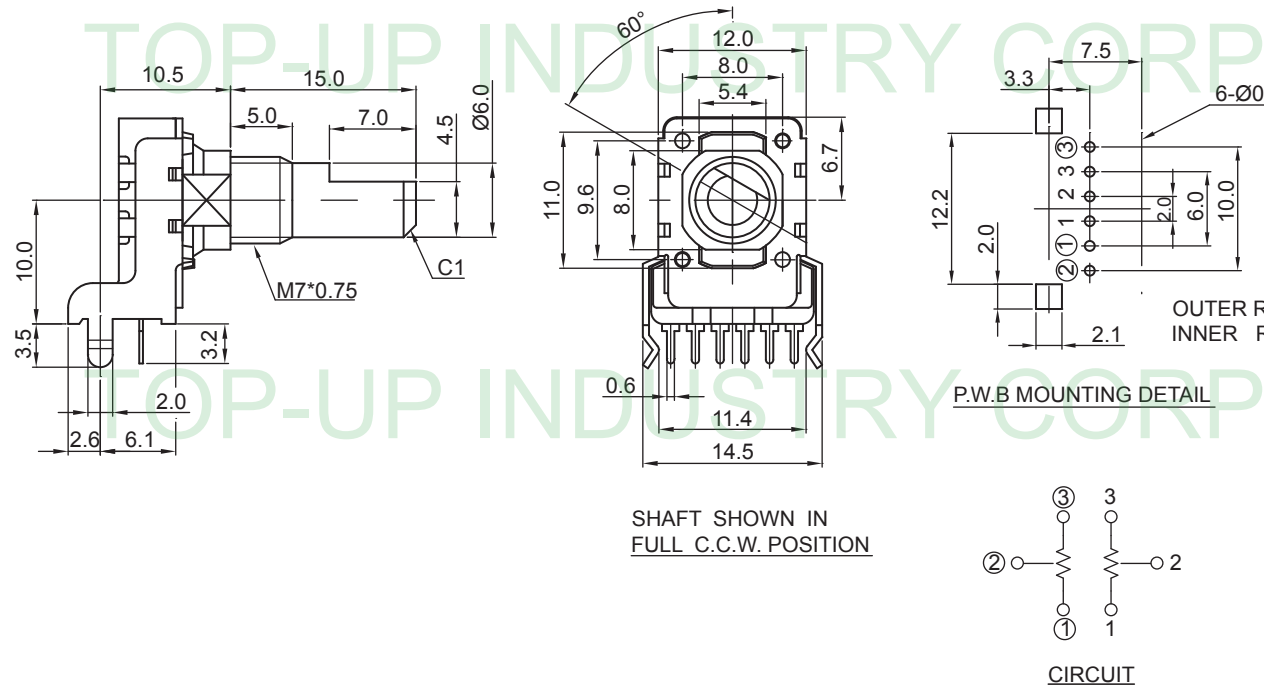
Outline Drawing

12PM2VBF-D

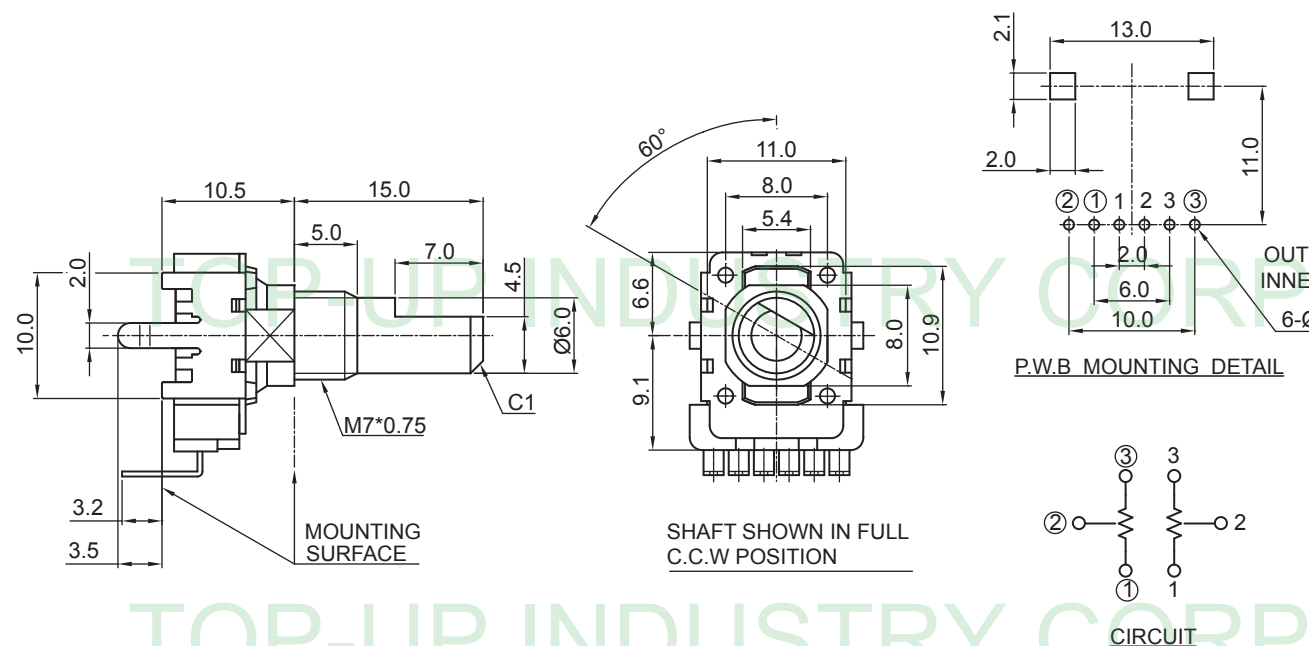


Features individual specifications

12PM2HBF-B



12PM2VBF-D



11,12,14P Series Code Explanation

12P L ☐ ☐ SD 2 H ☐ B FA - B ☐ - 15 F - A 10K - 1C - ☐ ☐

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

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

4. With Switch : SD — Travel 0.5mm , SE — Travel 1.5mm
5. Number of Unit : 1— Single Unit 2— Dual Unit
- 11mm Size — Single and Dual Unit (360°)
- 12mm Size — Single and Dual Unit
- 14mm Size — Only Dual Unit

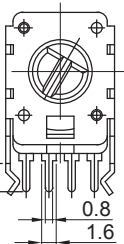
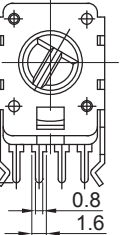
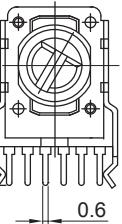
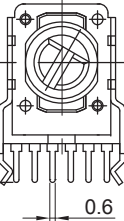
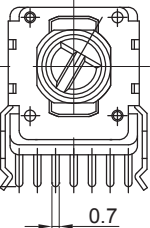
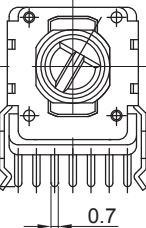
(Drawing 1)

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

Without LED	With LED	
B	B	5B
M9*0.75	M9*0.75	M9*0.75

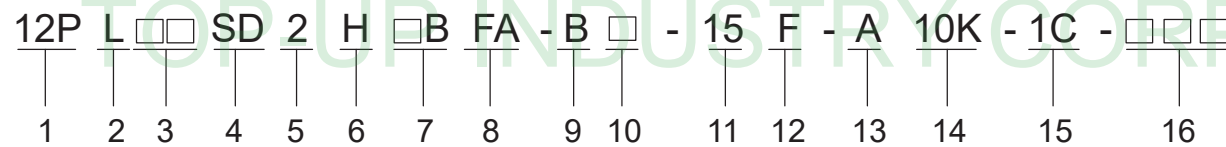
Horizontal			Vertical		
Code	F	FA	Code	F	FA
H	10	12.5	LB	8.1	11.5

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

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

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

11,12,14P Series Code Explanation

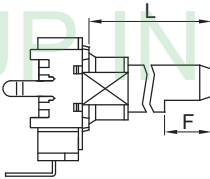
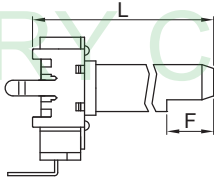
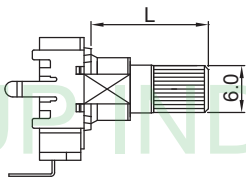
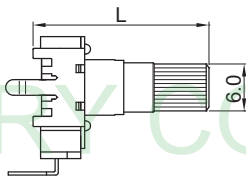


10 Circuit explanation

11mm Size			
A	Single Unit	B	Single Unit
C	For High-Cut Tone		
14mm Size			
E	Without Tap For Vol.	F	With Tap For Vol.
G	For Tone		

11. Shaft Length "L"

12. Shaft Type

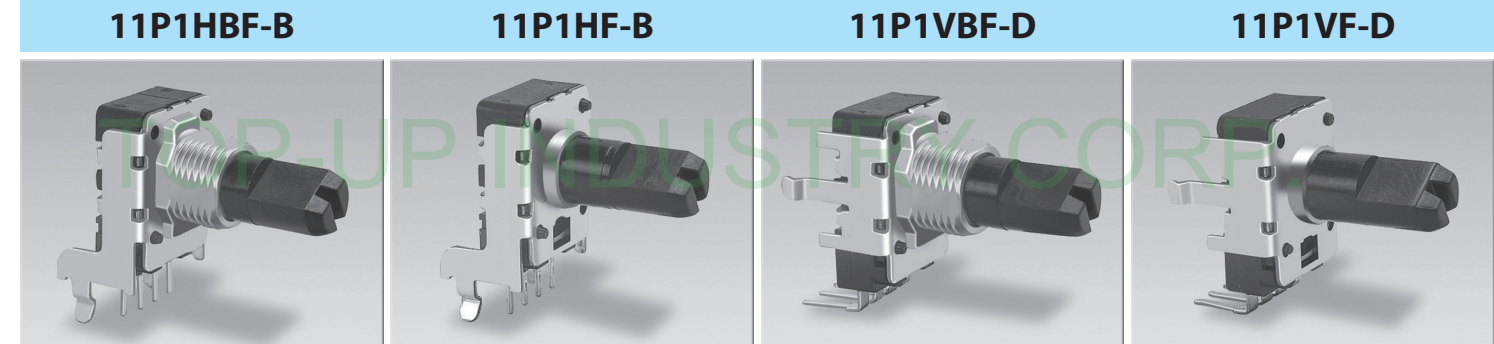
F Type															
L	12.5	15	17.5	20	22.5	25	30		L	20	22.5	25	27.5	30	
F	7	7	12	12	12	12	12		F	7	7	7	7	7	
K Type															
KT Type (Transparent)															
L	15								L	22.5					

13. Type of Taper (See Taper Chart Last Page)

14. Resistance Value

15. Number of clicks

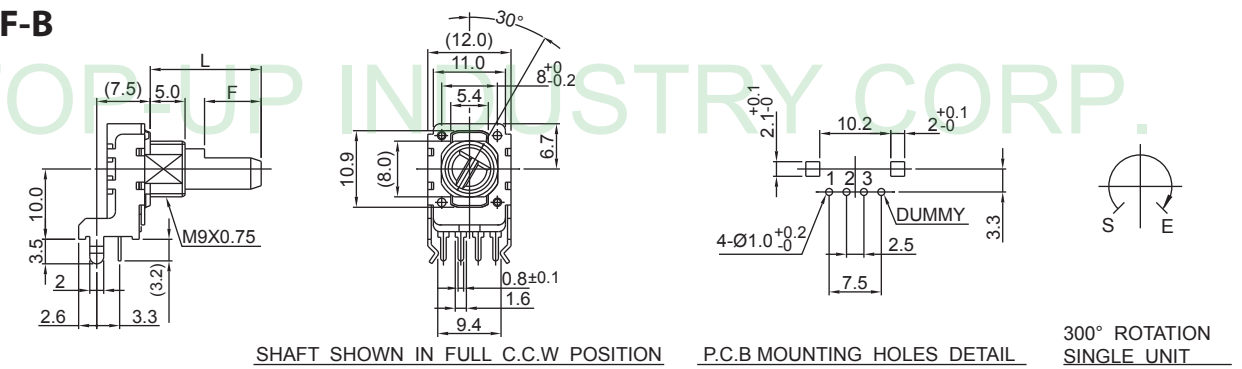
16. Serial No.



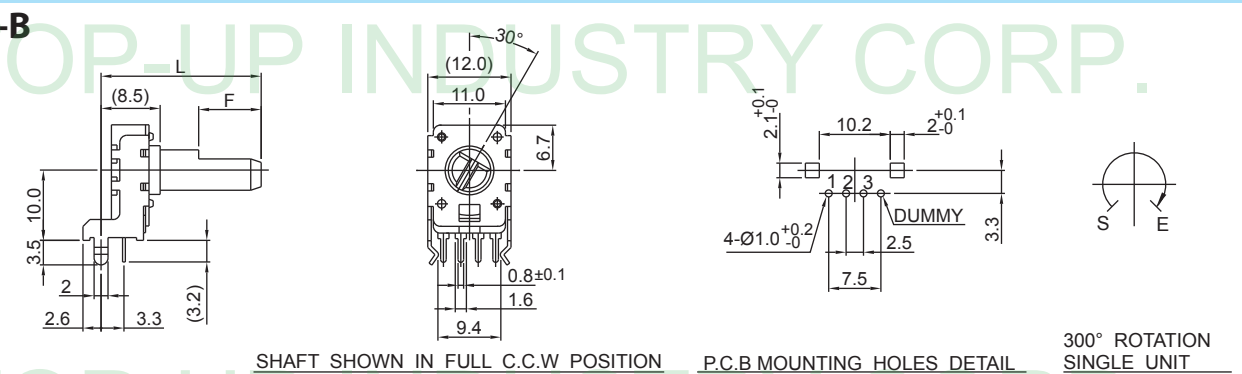
Outline Drawing

Features individual specifications

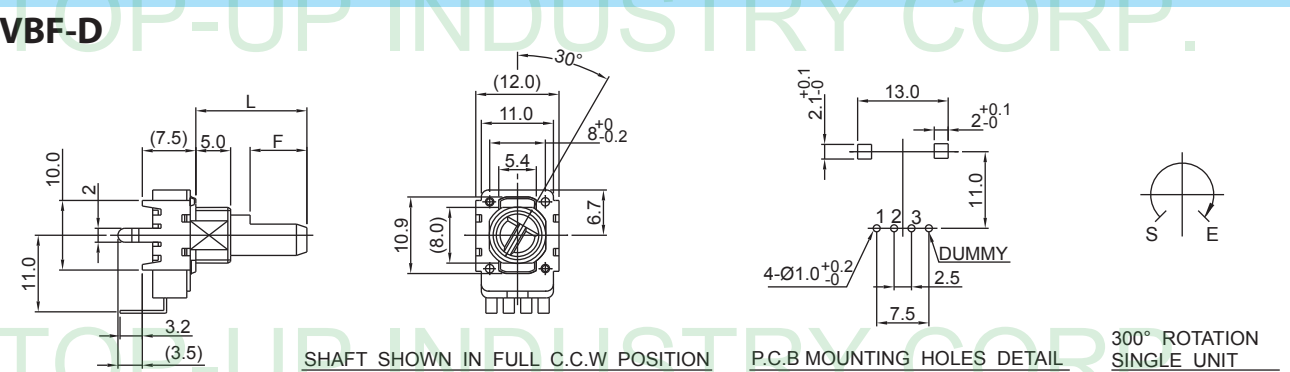
11P1HBF-B



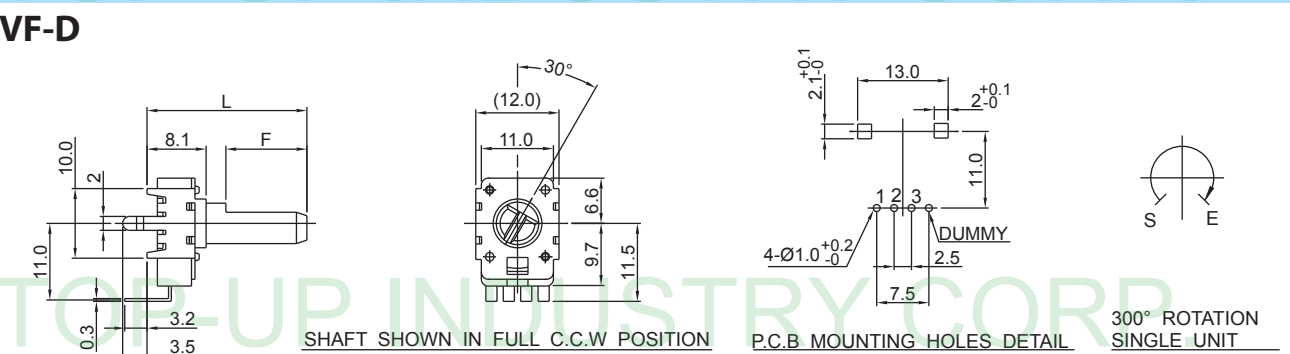
11P1HF-B



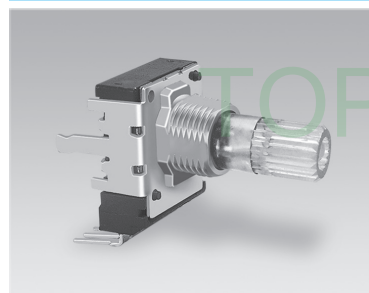
11P1VBF-D



11P1VF-D

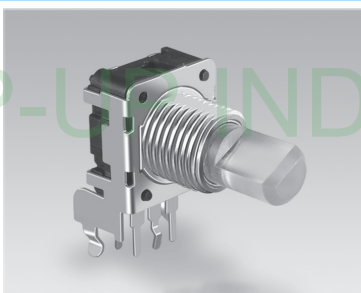


12PL□□1V5BF-D

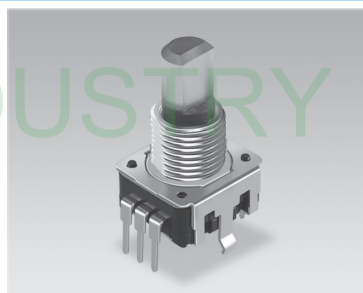


Outline Drawing

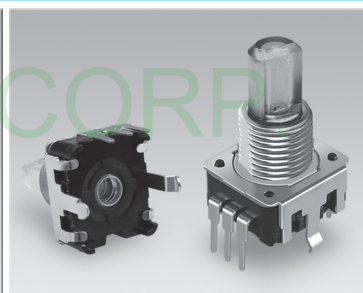
12PL□1HBF-B



12PL□1VBF-D

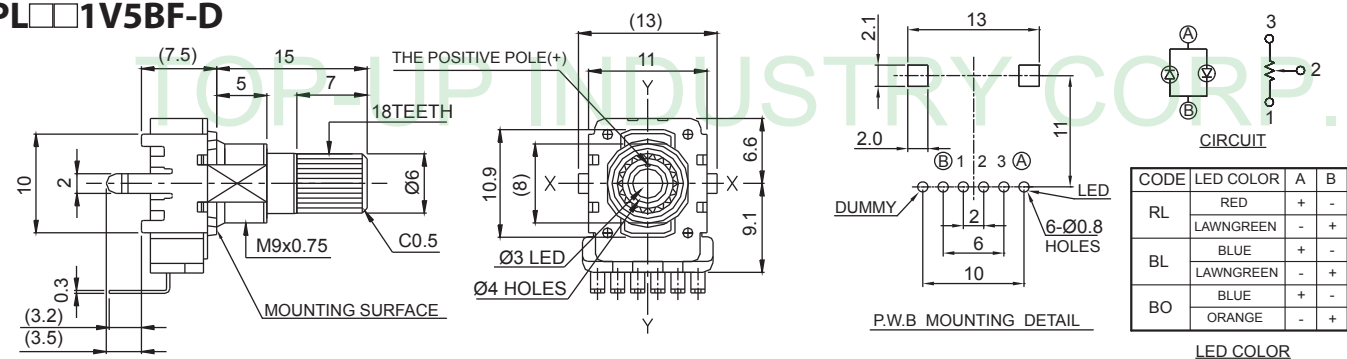


12P1VBF-D-□FHT

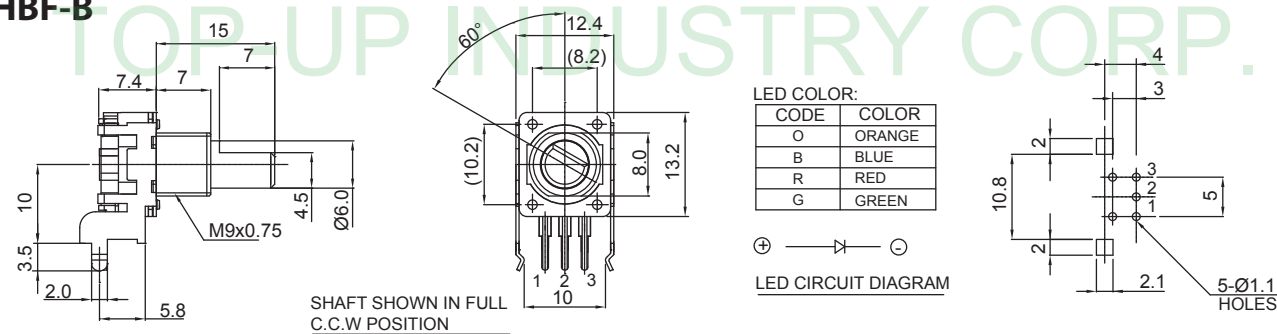


Features individual specifications

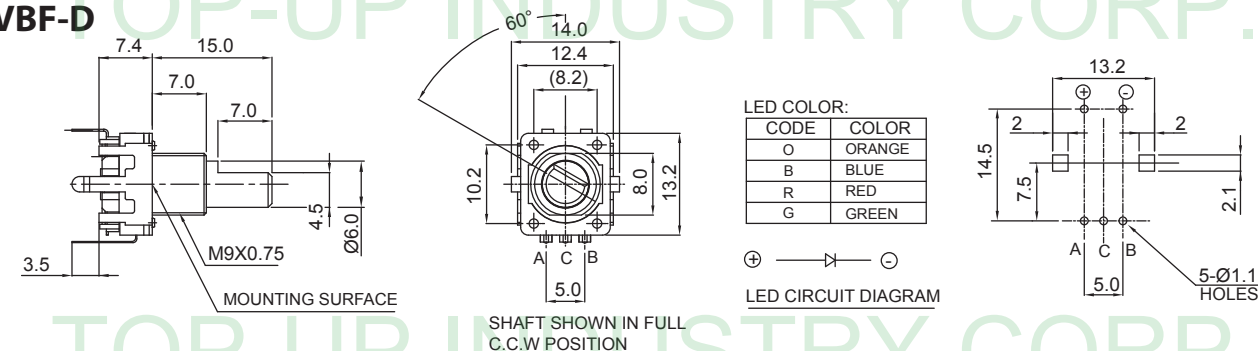
12PL□□1V5BF-D



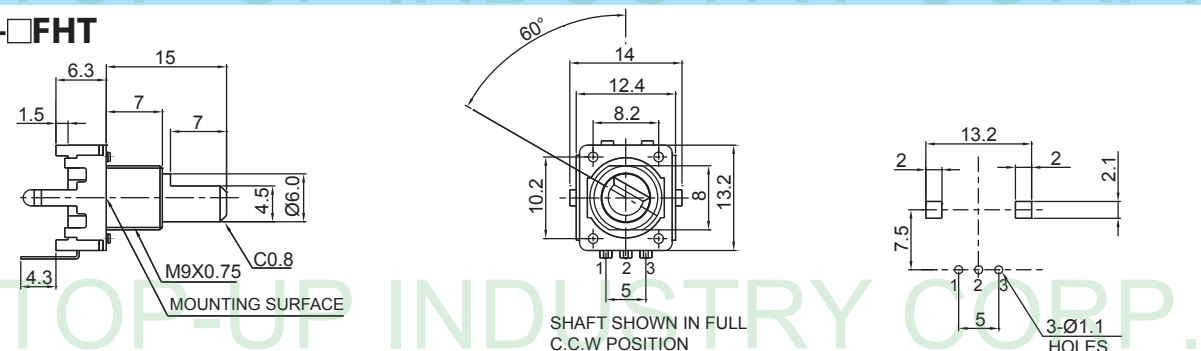
12PL□1HBF-B



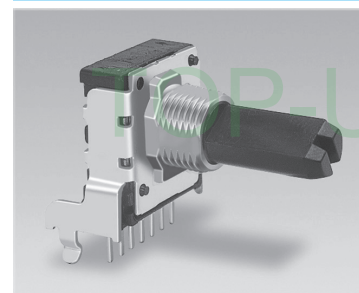
12PL□1VBF-D



12P1VBF-D-□FHT

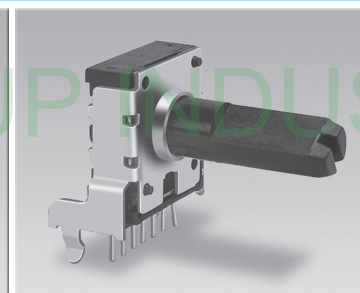


14P2HBF-B

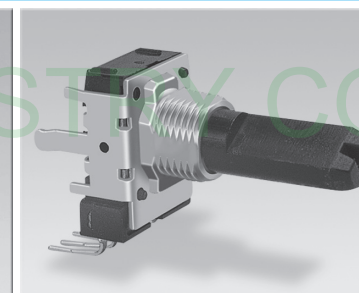


Outline Drawing

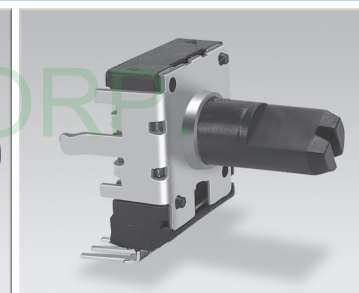
14P2HF-B



14P2VBF-D

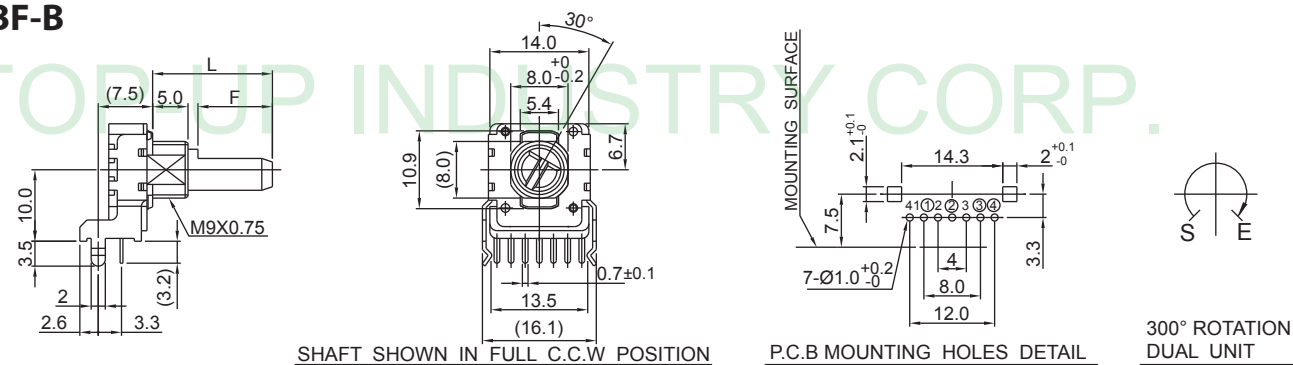


14P2VF-D

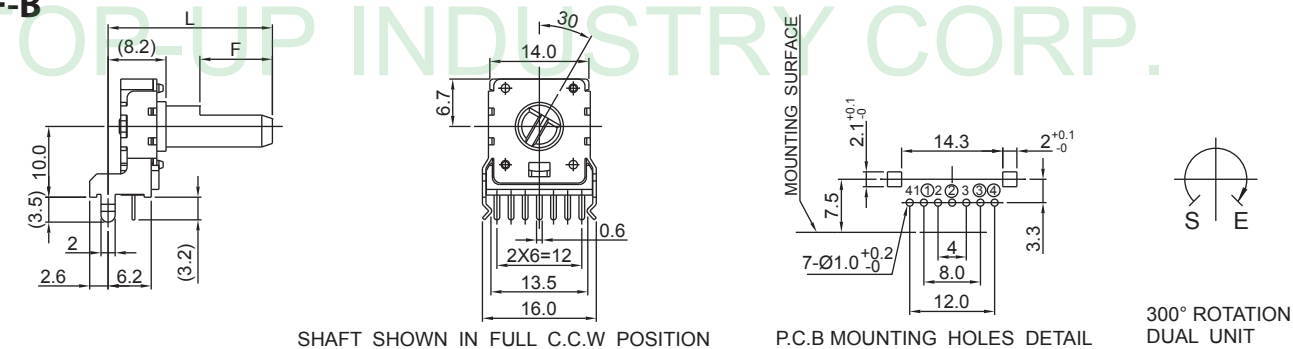


Features individual specifications

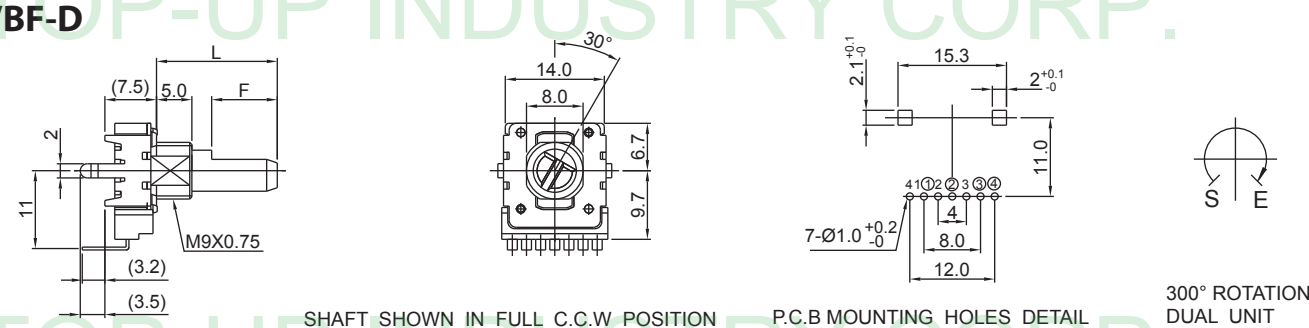
14P2HBF-B



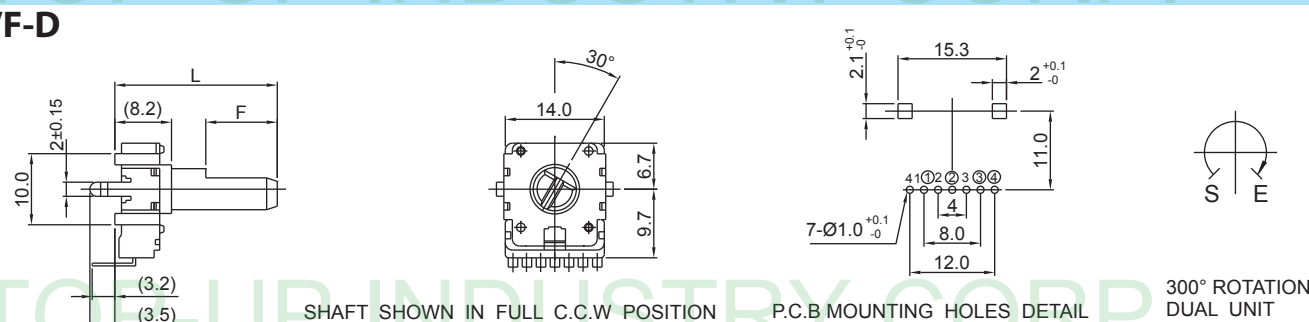
14P2HF-B



14P2VBF-D



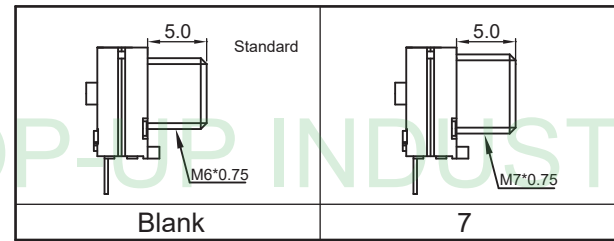
14P2VF-D



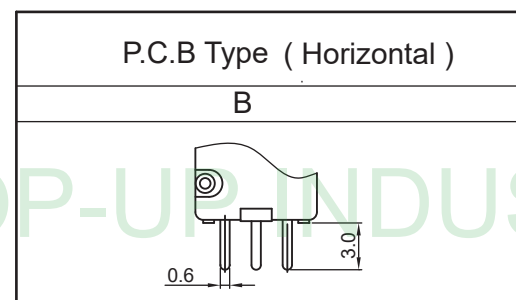
8M Series Code Explanation

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



8. Type of Terminal



9. Shaft Length

10. Type of Shaft

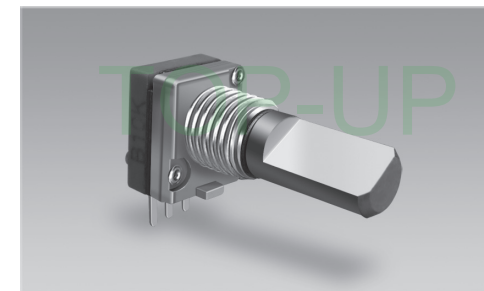
F - Type				S - Type			
Code	10F	15F7	15	Code	10S		
L	10	15	15	L	10		
F	4	7	8				

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

12. Resistance Value

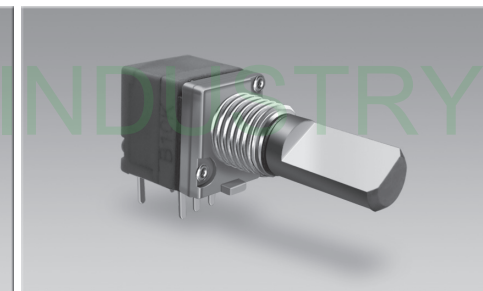
13. Serial No.

8M1HB-B



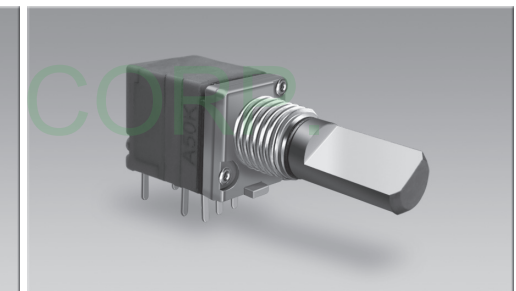
Outline Drawing

8M1RSHB-B

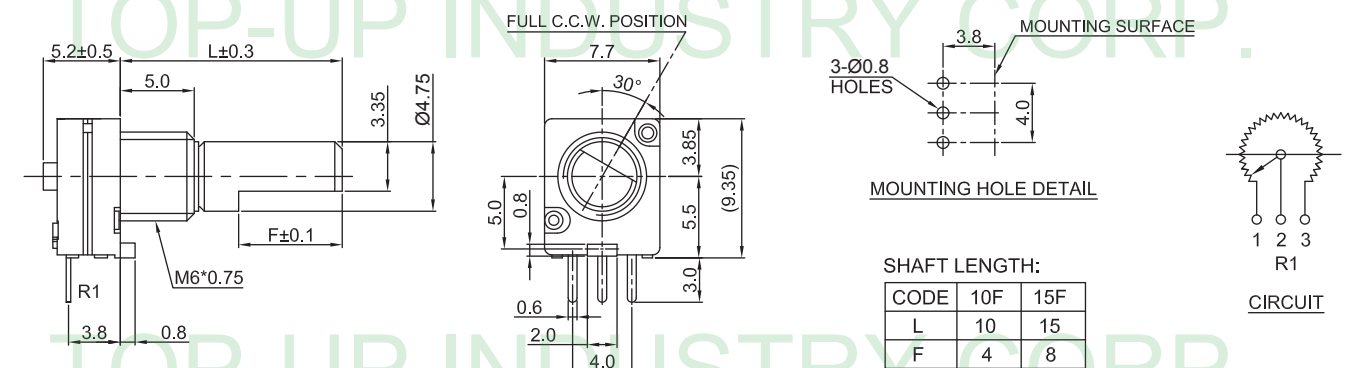


Features individual specifications

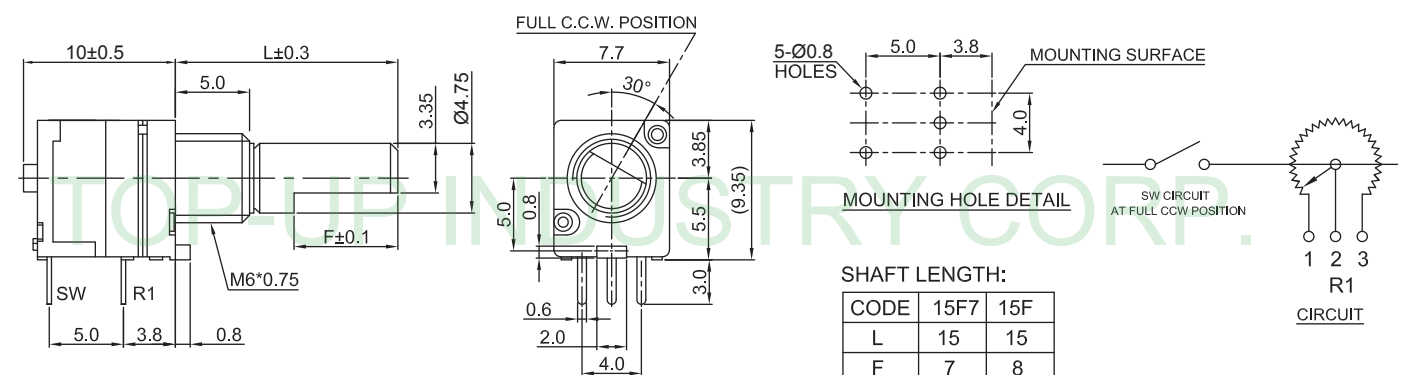
8M2RSHB-B



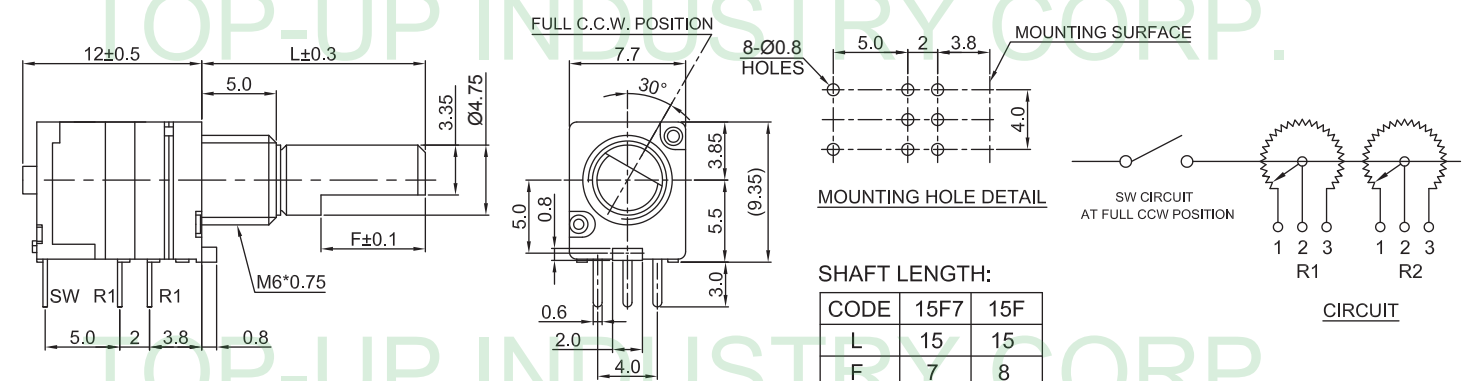
8M1HB-B



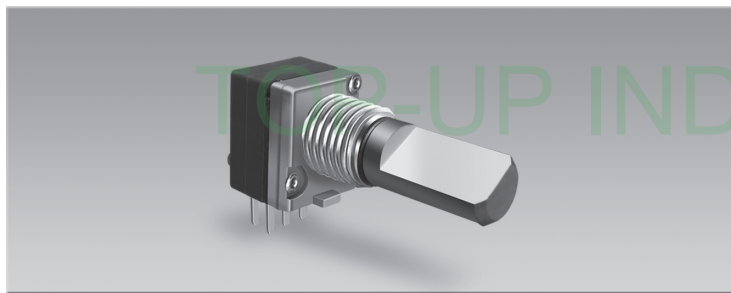
8M1RSHB-B



8M2RSHB-B

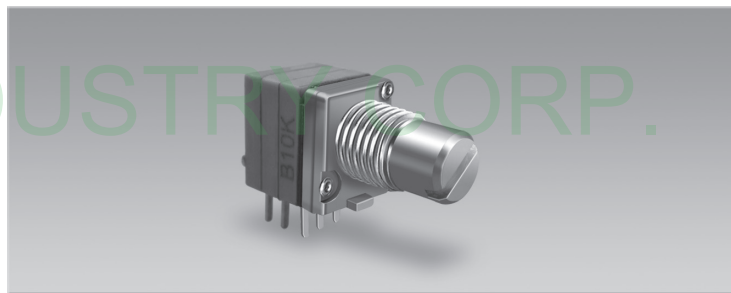


8M2HB7-B



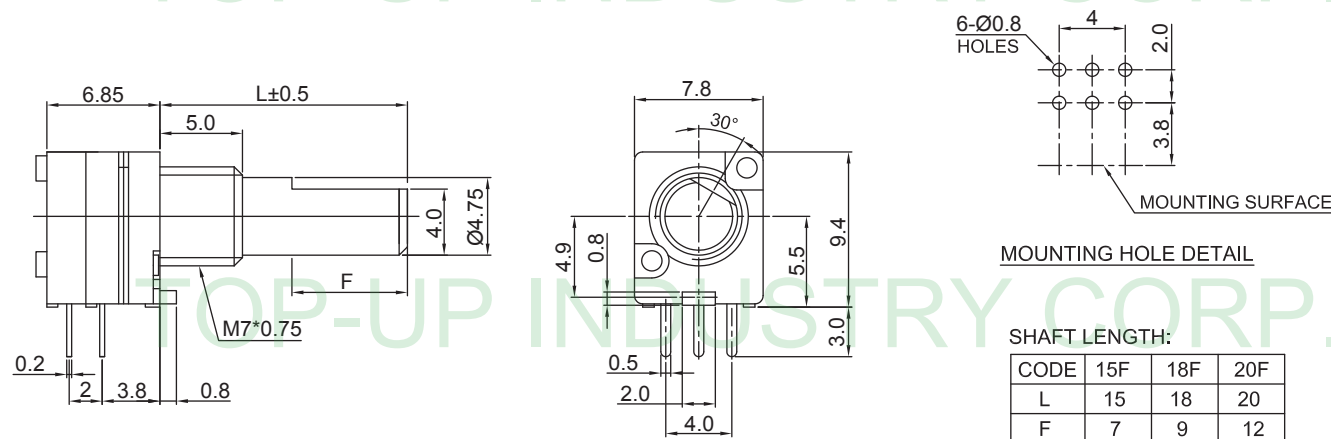
Outline Drawing

8M3HB7-B

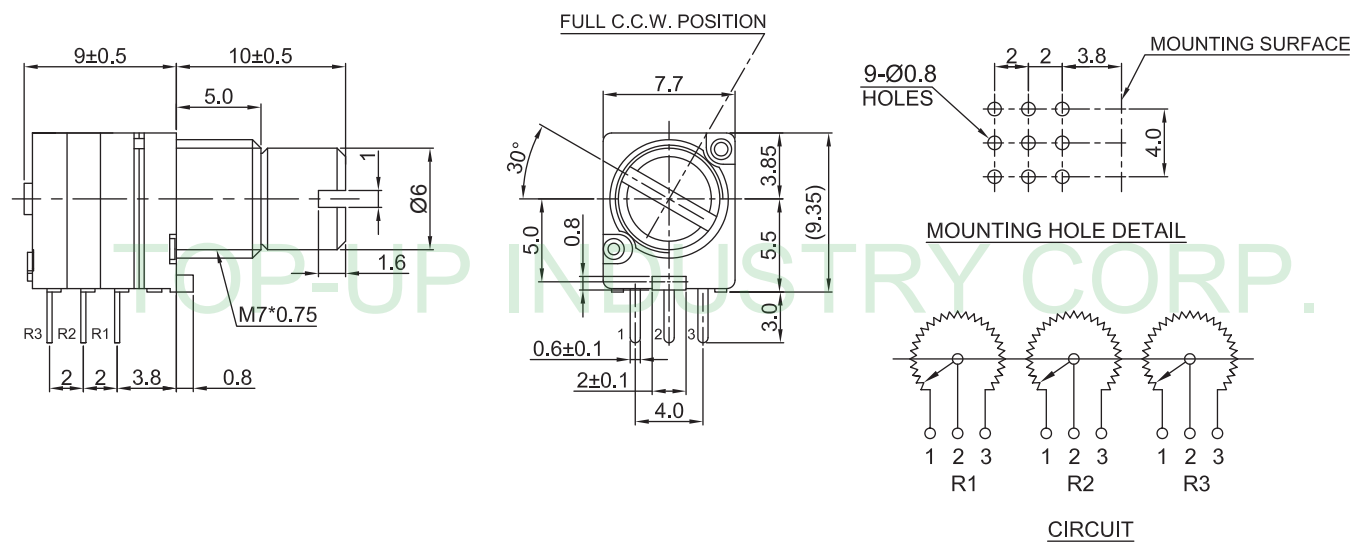


Features individual specifications

8M2HB7-B



8M3HB7-B



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

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	
Standard	Other Type	Standard	Standard
(B)	(B)	10	10
M7*0.75	5.0	M7*0.75	5.0
0.8	10.0	0.8	10.0
Standard		With Bracket Series	
Standard	Other Type	Standard	Standard
(B)	(B)	7	7
M9*0.75	5.0	M9*0.75	5.0
0.8	10.0	0.8	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	D	D1	D	
3.5	12.5	10	3.5	4.0	3.5	
0.9	0.9	0.8	0.8	0.8	0.8	

14. Shaft Length (See Drawing 3)

15. Type of Shaft (See Drawing 3)

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

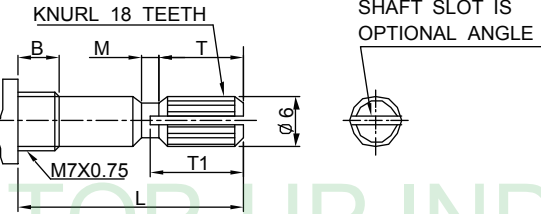
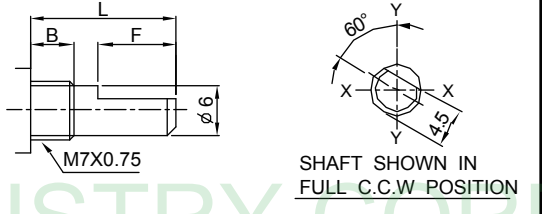
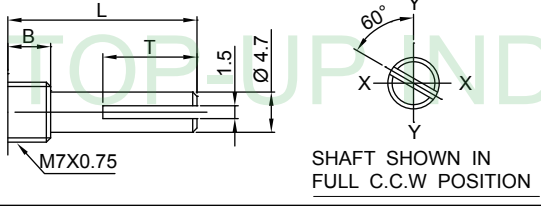
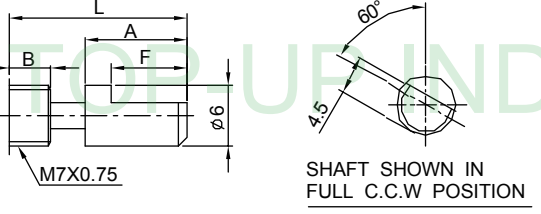
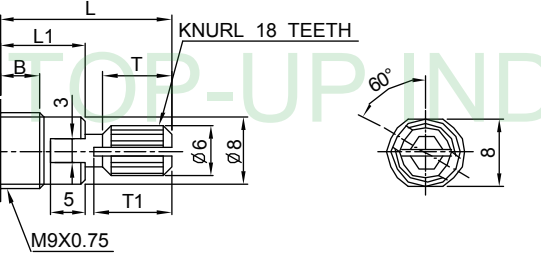
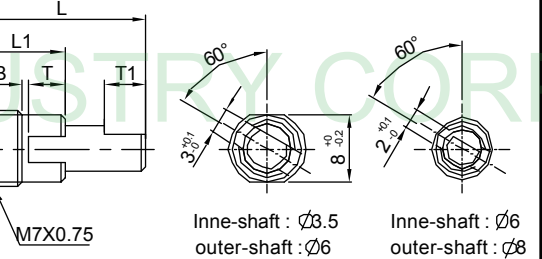
17. Resistance Value

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

19. Serial No.

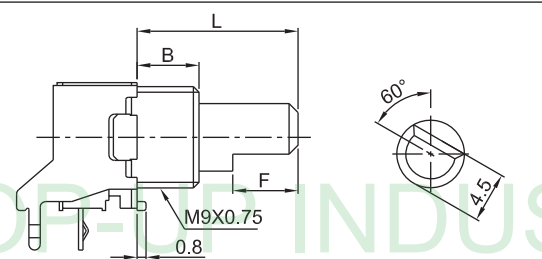
9M Series Code Explanation

(Drawing 3)

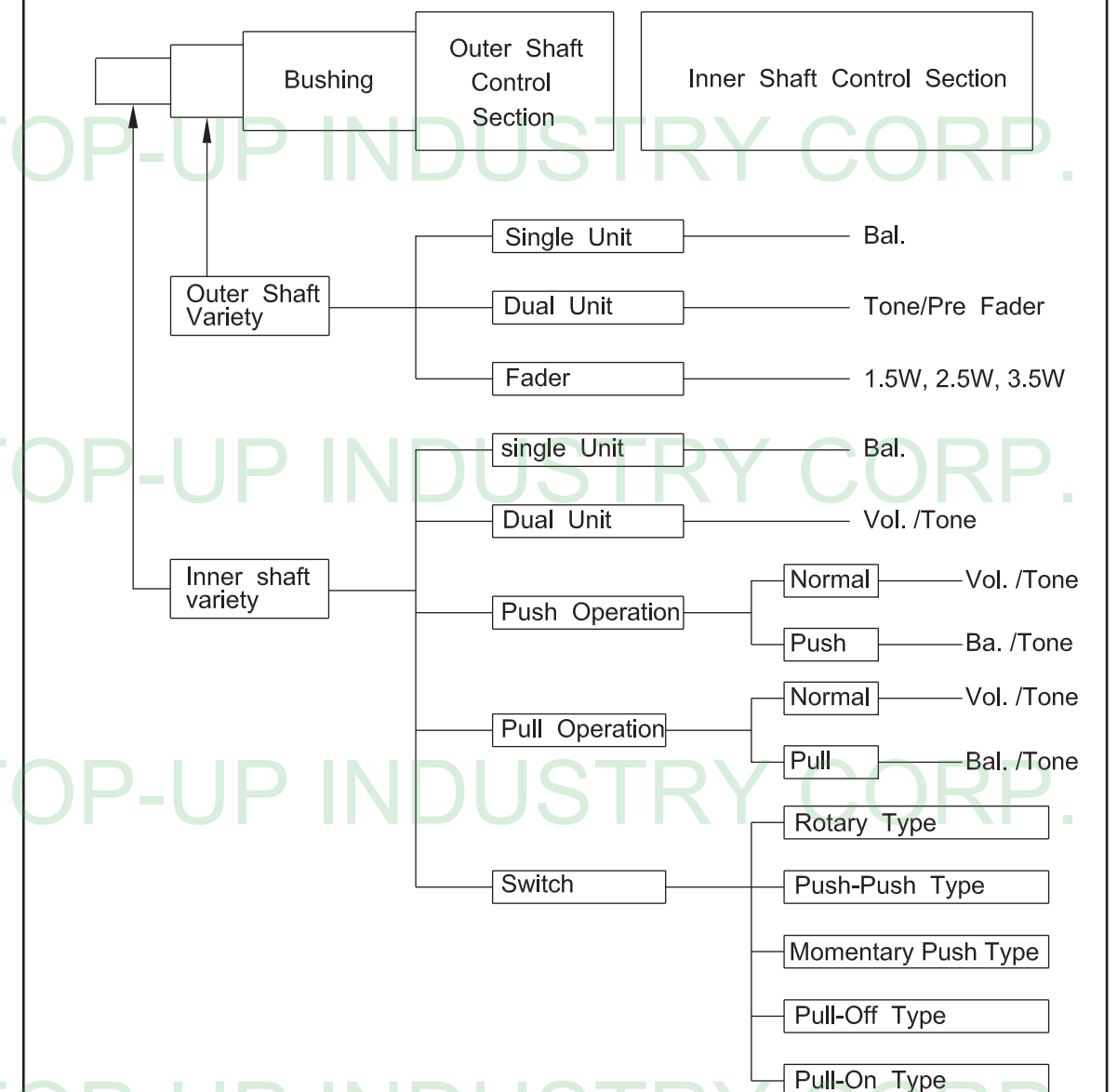
Single Shaft Dimensions and Styles (Without Bracket)				
K - Type				
				
L	B	T	M	T1
15	5	5	1	7
20	7	10	1	11
25	10	12	2	11
30	10	12	4	14
35	10	12	4	14
F - Type				
				
L	15	20	25	30
B	5	7	10	10
F	7	12	12	12
H - Type				
				
L	15	20	25	30
B	5	7	10	10
T	7	11	11	11
Shaft Dimensions and Styles With Push-Lock 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				
				
L	L1	B	T	T1
15	10	5	8	9
20	15	7	8	9
25	20	10	8	9
30	25	10	8	9
F - Type				
				
L	L1	B	T	T1
15	10	5	4	7
20	15	7	5	8
25	20	10	5	8
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)

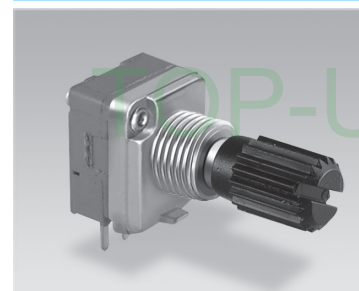
Electrical Characteristic:

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

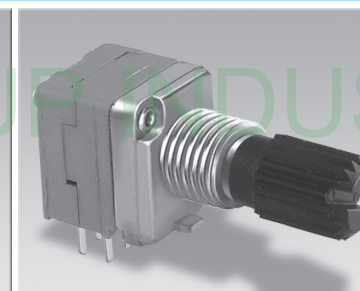
Durability:

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

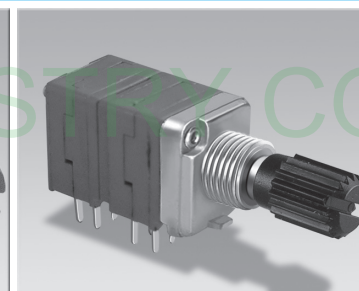
9MP1HB-B



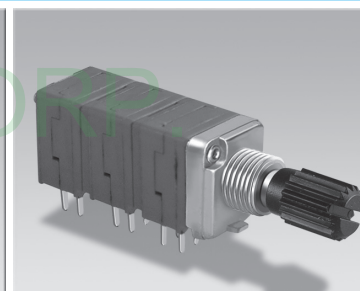
9MP2HB-B



9MP4HB-B



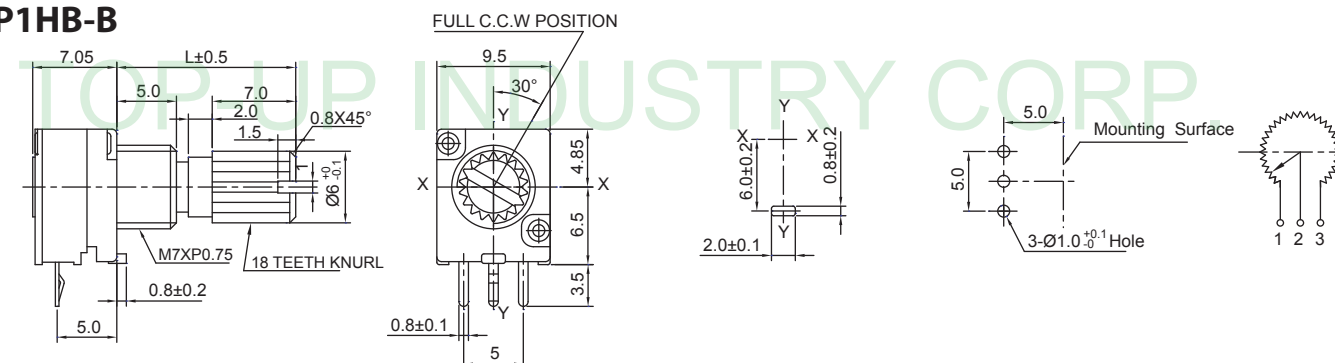
9MP6HB-B



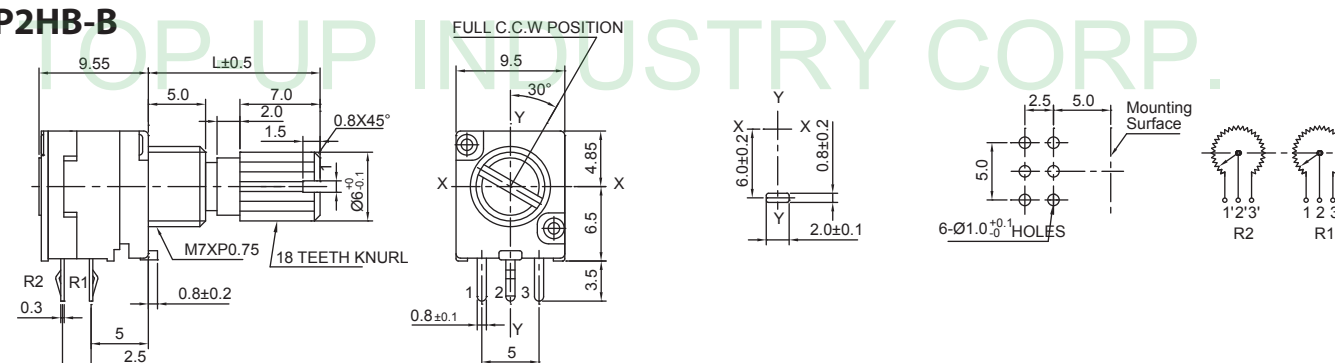
Outline Drawing

Features individual specifications

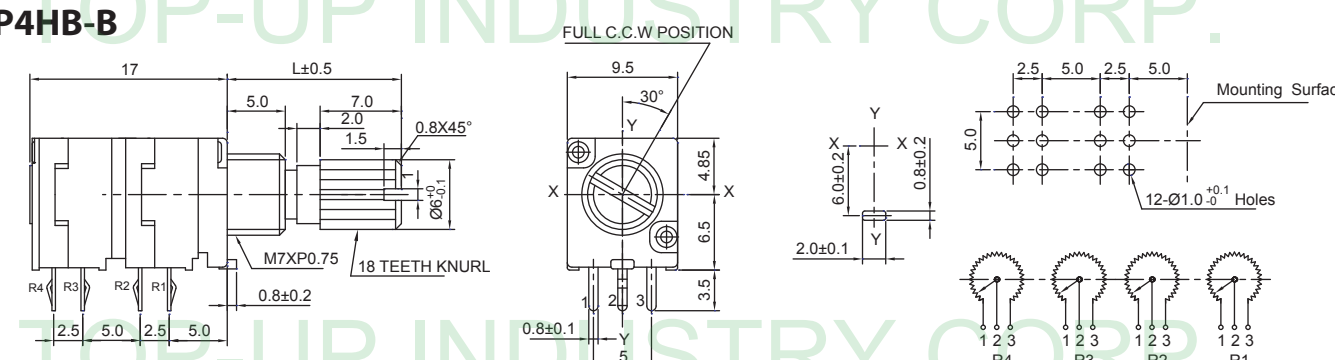
9MP1HB-B



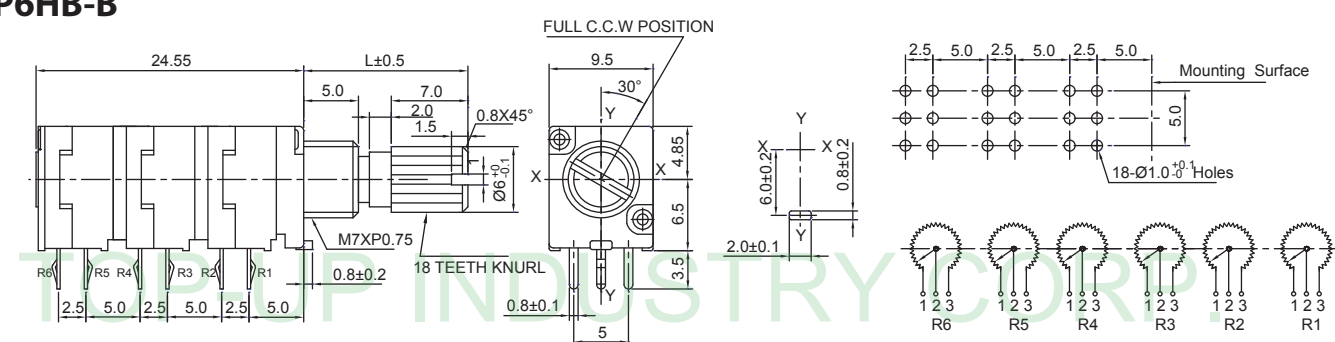
9MP2HB-B



9MP4HB-B



9MP6HB-B

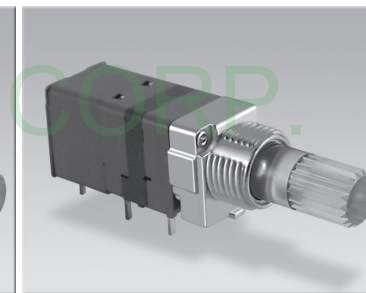
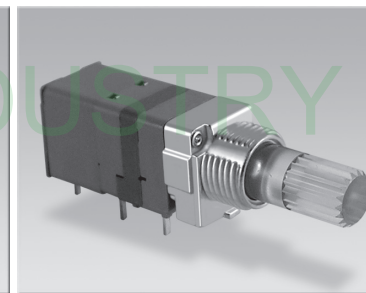
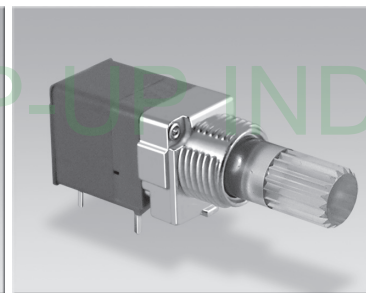
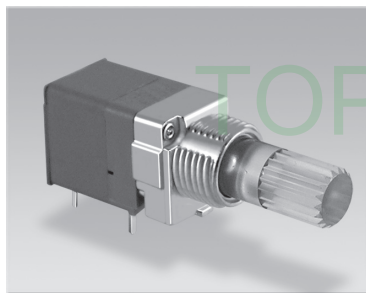


9ML□1H5B9-B(LED)

9ML□□1H5B9-B

9ML□1RSH5B9-B

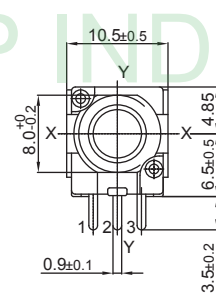
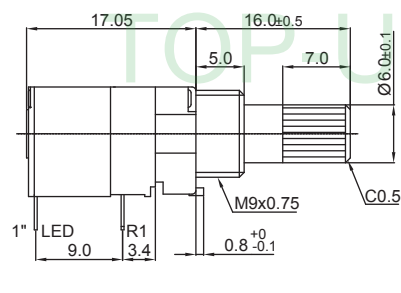
9ML□□1RSH5B9-B



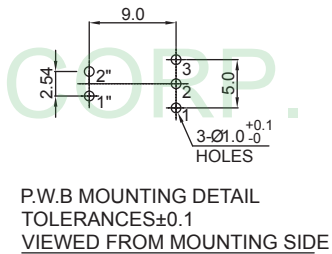
Outline Drawing

Features individual specifications

9ML□1H5B9-B(LED)

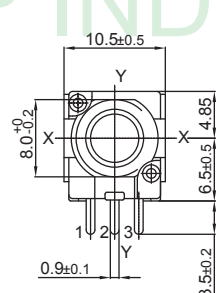
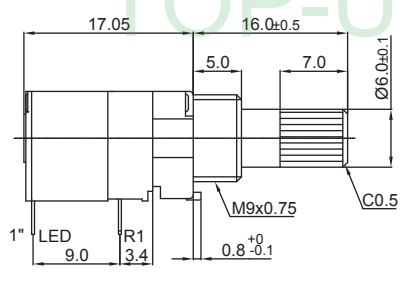


LED COLOR:	
CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

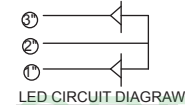
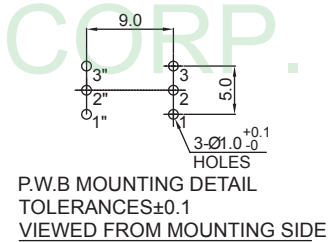


LED CIRCUIT DIAGRAM

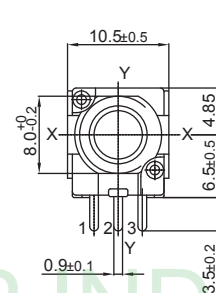
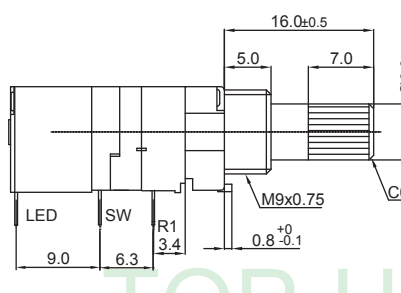
9ML□□1H5B9-B(LED)



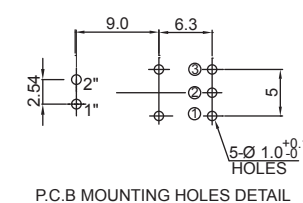
LED COLOR:		
CODE	COLOR:	TERMINAL
O	ORANGE	① ②
B	BLUE	③ ②
R	RED	
G	GREEN	



9ML□1RSH5B9-B(LED)

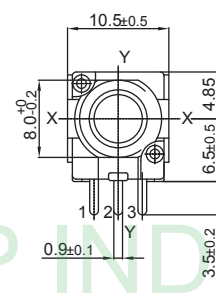
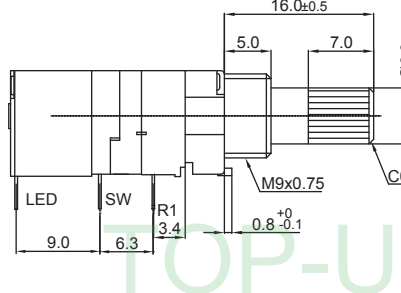


LED COLOR:	
CODE	LED COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN

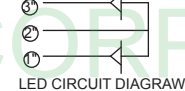
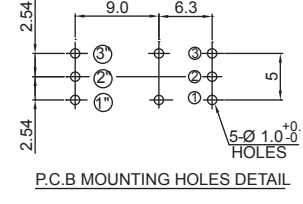


LED CIRCUIT DIAGRAM

9ML□□1RSH5B9-B(LED)



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

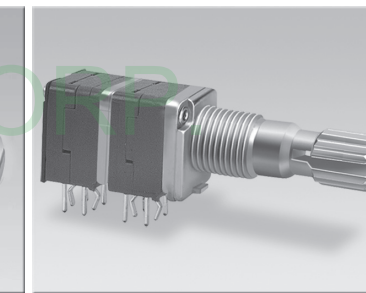
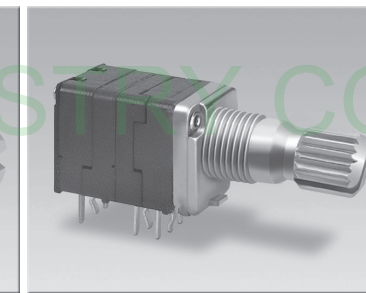
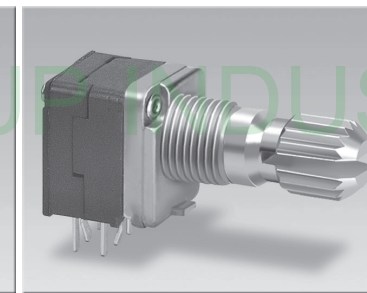
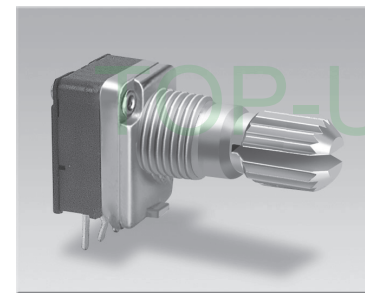


9M1HB-B

9M2HB-B

9M3HB-B

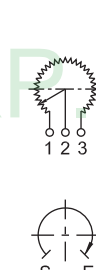
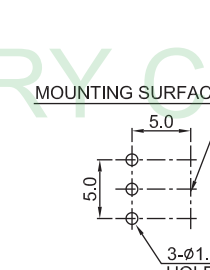
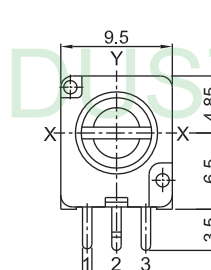
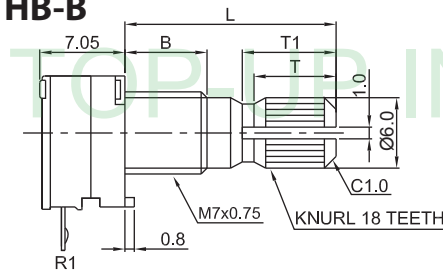
9M4HB-B



Outline Drawing

Features individual specifications

9M1HB-B

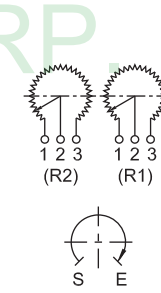
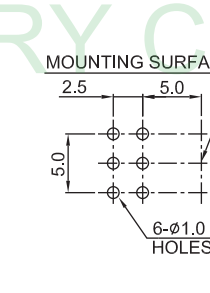
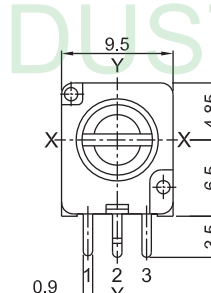
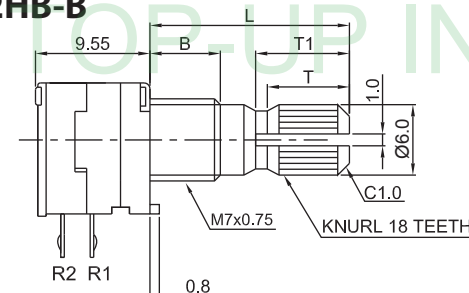


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300°ROTATION SINGLE UNIT

9M2HB-B

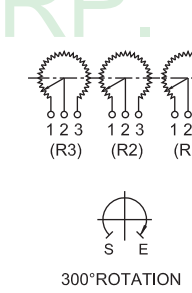
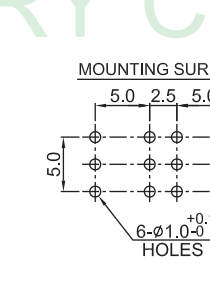
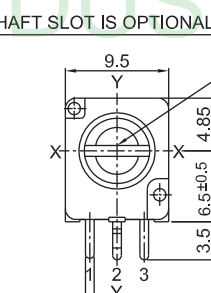
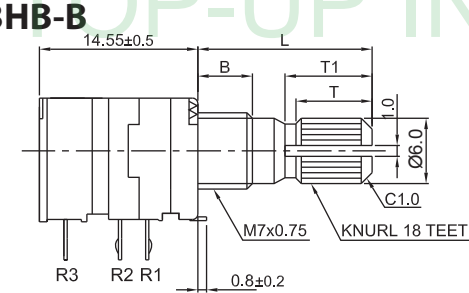


SHAFT SHOWN IN FULL C.C.W POSITION

P.C.B MOUNTING HOLES DETAIL

300°ROTATION DUAL UNIT

9M3HB-B

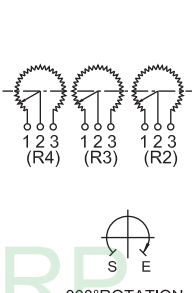
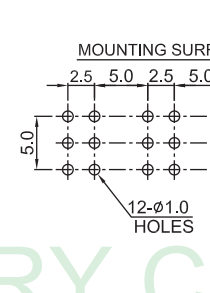
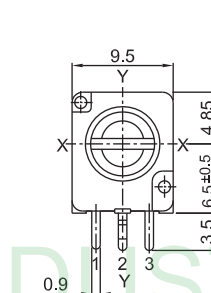
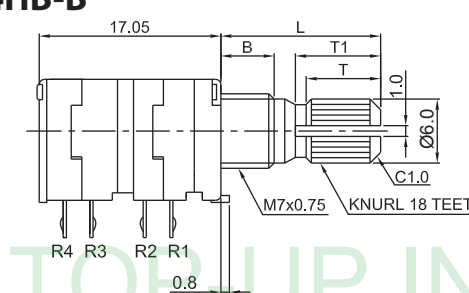


SHAFT SHOWN IN FULL C.C.W POSITION

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

300°ROTATION

9M4HB-B



SHAFT SHOWN IN

300°ROTATION

Features individual specifications

[illegible]

Technical drawing of the PSHB-B component, showing side, shaft, and mounting details.

Side View:

- Overall length: 20.75
- Distance from end to start of push stroke: L
- Push stroke length: $S \pm 0.5$
- Distance from end to start of push lock stroke: 10
- Push lock stroke length: $S1 \pm 0.5$
- Knurl 18 teeth
- Distance from end to start of knurl: 0.5
- Knurl width: 1.0
- Thread: M7X0.75
- Distance from end to start of thread: 7.0
- Thread length: C1.0
- Overall diameter: $\varnothing 6 \pm 0.3$
- Radius: R1
- Distance from end to start of thread: 0.8 ± 0.2
- Distance from end to start of thread: (10.7)

Shaft View:

- Shaft slot is optional angle
- Slot width: 9.5
- Slot depth: 4.85
- Slot position: 6.5 ± 0.5
- Slot width: 0.9 $\pm$ 0.1
- Slot depth: 3.5
- Slot width: 1
- Slot depth: 2
- Slot width: 3
- Slot depth: Y

Mounting Surface:

- Mounting surface
- Distance from end to start of mounting surface: 5.0
- Distance from end to start of mounting surface: 5.0
- Distance from end to start of mounting surface: 3- $\varnothing 1.0 \pm 0.1$
- Holes

P.C.B. Mounting Detail:

- Tolerances ± 0.1
- Viewed from mounting side
- Locating lug detail
- Distance from end to start of mounting surface: 0.8 $\pm$ 0.2
- Distance from end to start of mounting surface: 6.0 $\pm$ 0.2
- Distance from end to start of mounting surface: 2.0 $\pm$ 0.1

2PSHB-B

Technical drawing of the 2PSHB-B connector, showing four views: side view, shaft view, P.C.B. mounting detail, and locating lug detail.

Side View: Shows the connector profile with dimensions: 23.25, 10, $S \pm 0.5$, $S1 \pm 0.5$, T , 0.5, 1.0, 7.0, $C1.0$, $\varnothing 6 \pm 0.3$, $M7 \times 0.75$, $R2R1$, and 0.8 ± 0.2 . Labels include PUSH STROKE, PUSH LOCK STROKE, and KNURL 18 TEETH.

Shaft View: Shows the shaft end with dimensions: 30°, 9.5, 4.85, 6.5 ± 0.5 , 3.5, 0.9 ± 0.1 , and 1. Labels include X, Y, and 1, 2, 3.

P.C.B. MOUNTING DETAIL: Shows the mounting surface with dimensions: 2.5, 5, 5, $6 - \varnothing 1.0 \pm 0.1$ HOLES, and 6.0 ± 0.2 . Tolerances are ± 0.1 .

LOCATING LUG DETAIL: Shows the locating lug with dimensions: 0.8 ± 0.2 , 6.0 ± 0.2 , 2.0 ± 0.1 , and X, Y.

SHAFT SHOWN IN FULL C.C.W. POSITION

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

[illegible]

Features individual specifications

PMTHBF-B

SHAFT SHOWN IN CENTER POSITION

MOUNTING SURFACE

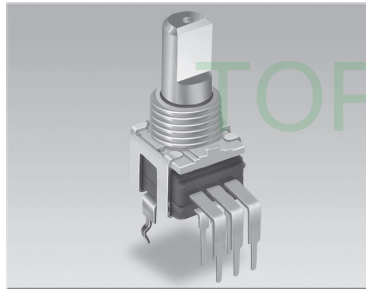
SHAFT SHOWN IN FULL C.C.W POSITION

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

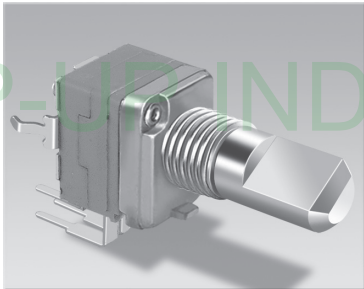
LOCATING LUG DETAIL

[illegible][illegible]

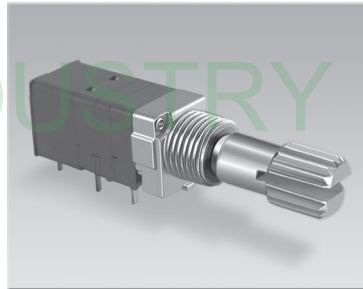
9M2VBF-D



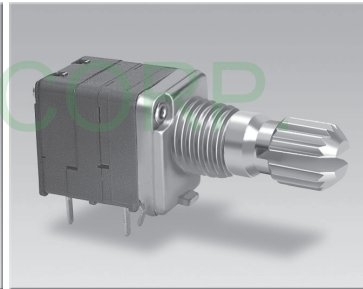
9M2V5BB-D



9M1PPSHB-B



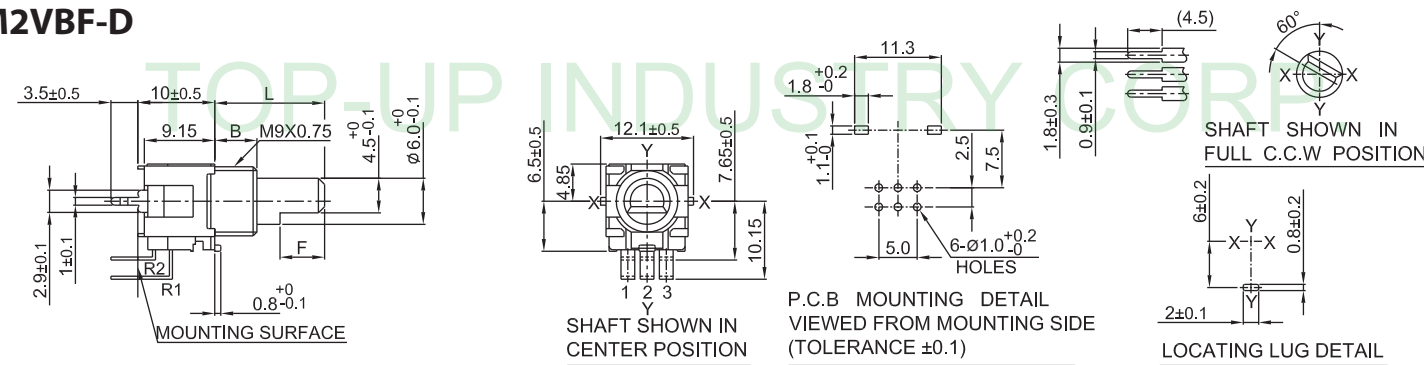
9M1RSHB-B



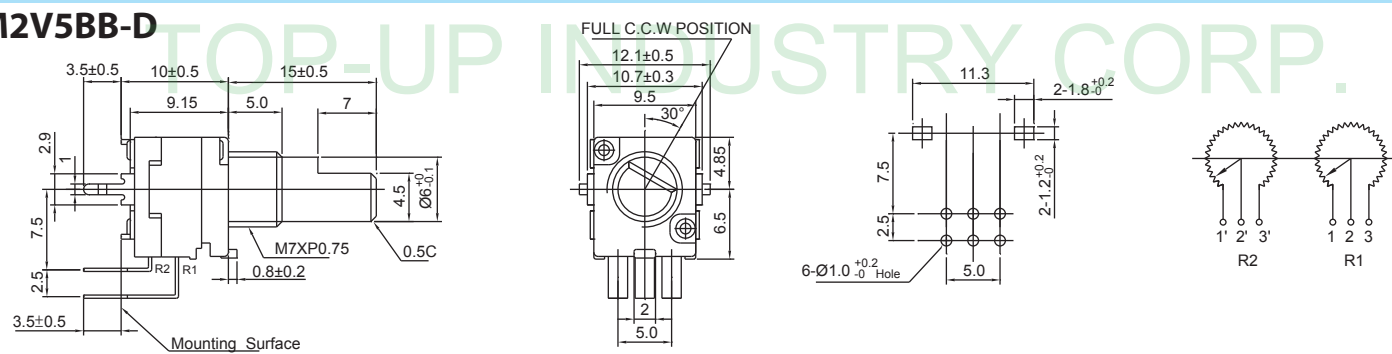
Outline Drawing

Features individual specifications

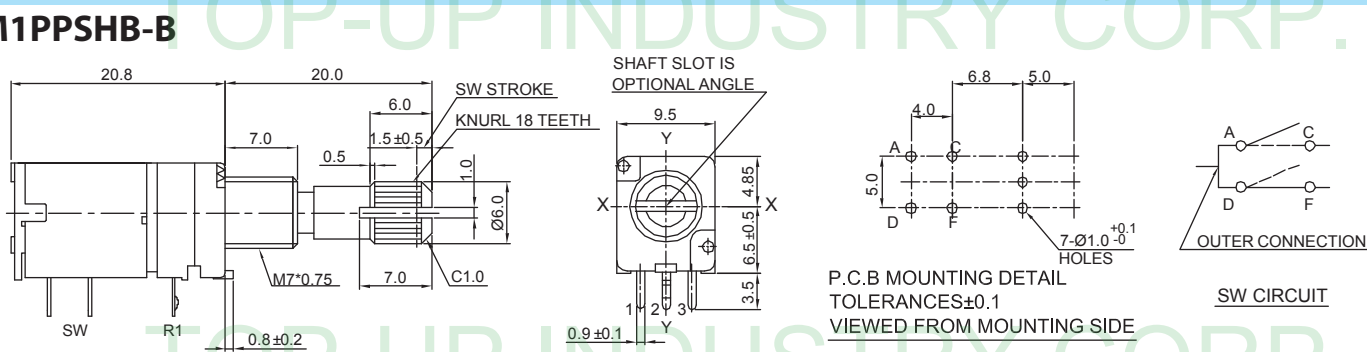
9M2VBF-D



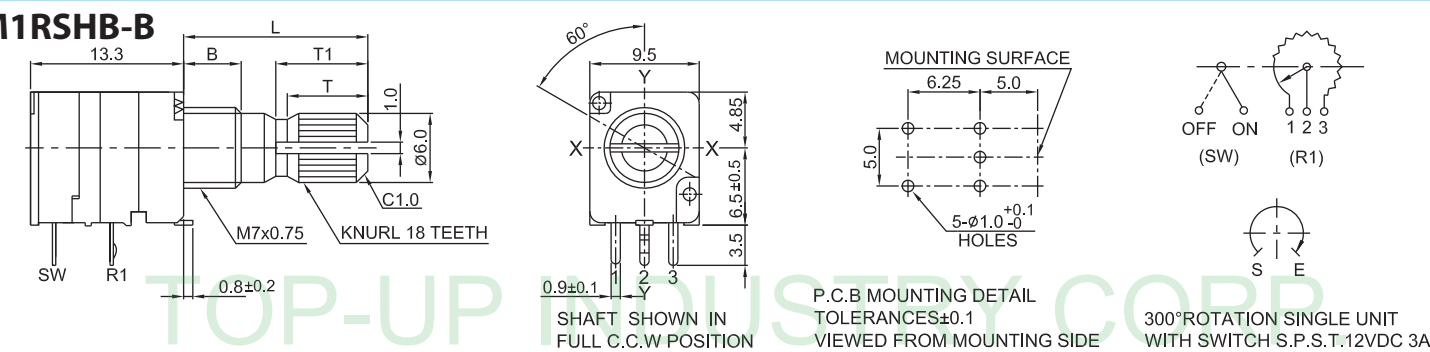
9M2V5BB-D



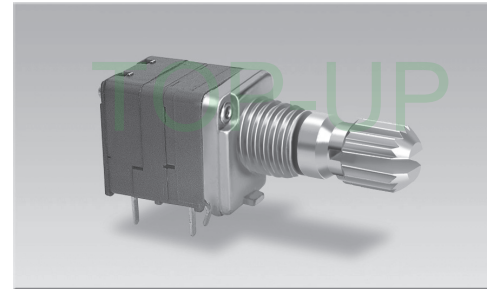
9M1PPSHB-B



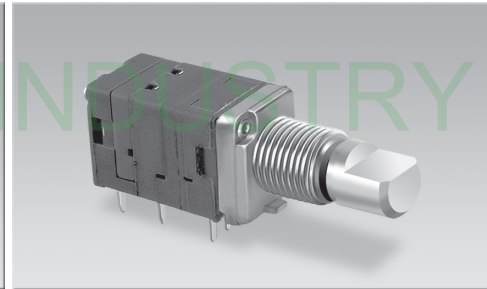
9M1RSHB-B



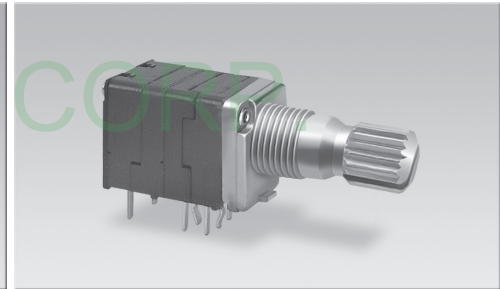
9M1MSHB-B



9M1MRSDHB-B



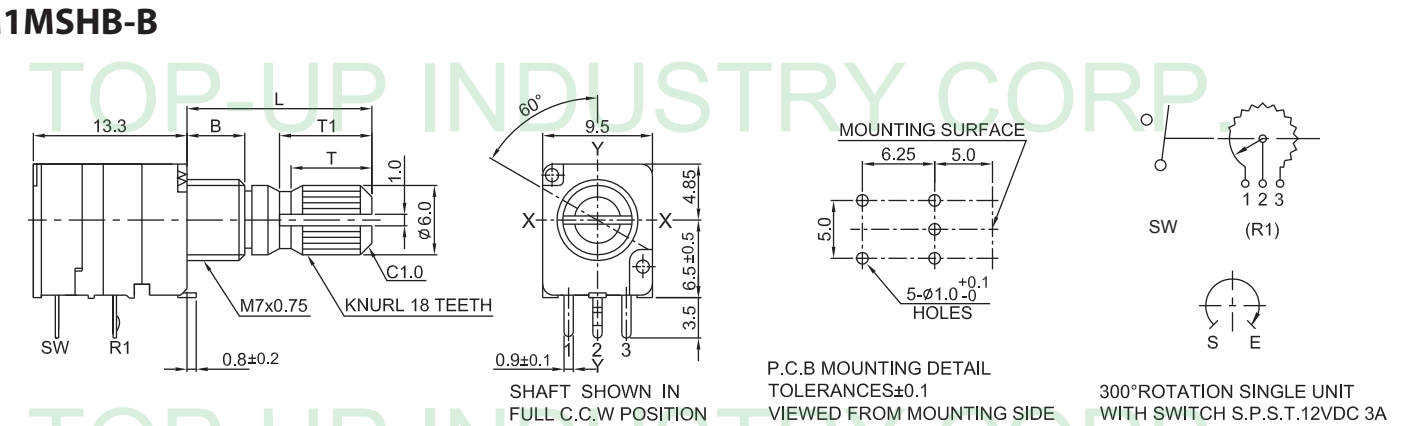
9M2RSHB-B



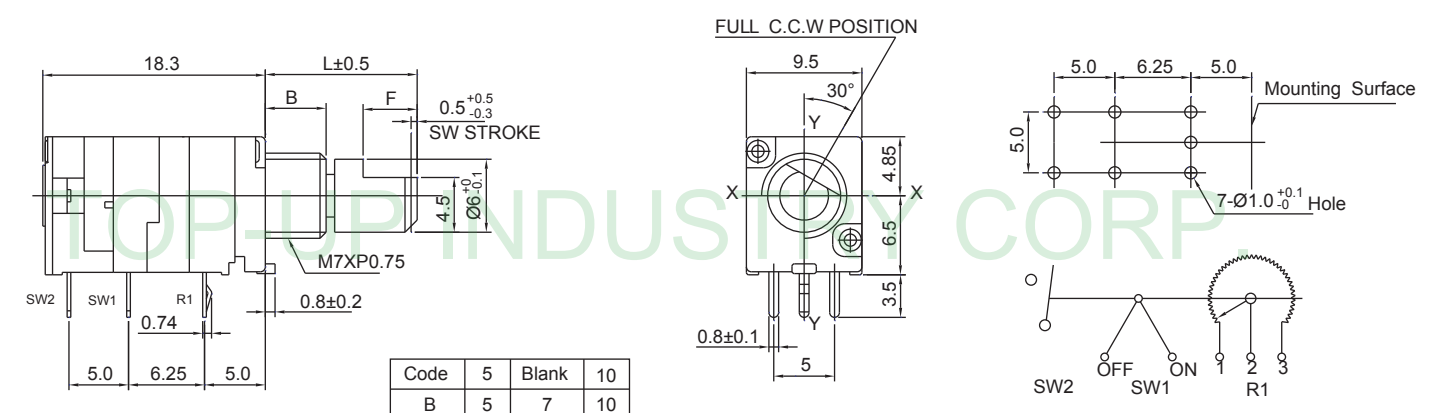
Outline Drawing

Features individual specifications

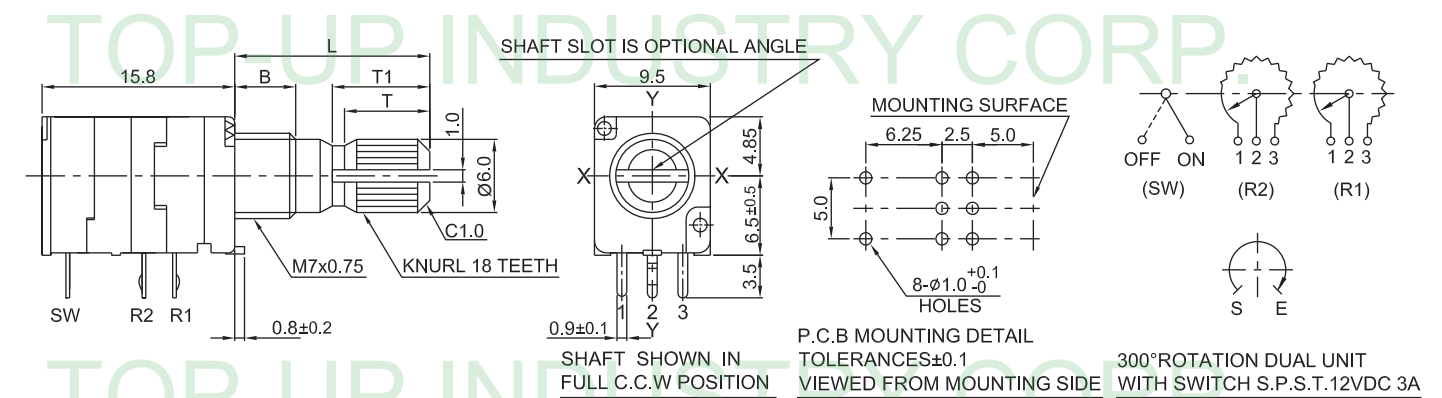
9M1MSHB-B



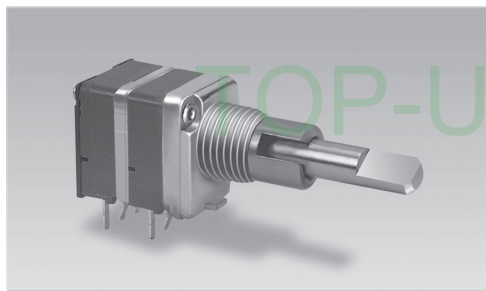
9M1MRSDHB-B



9M2RSHB-B

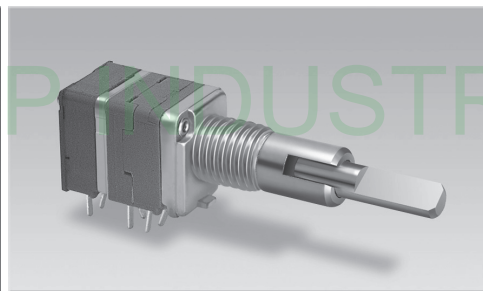


9MM2H□B-B



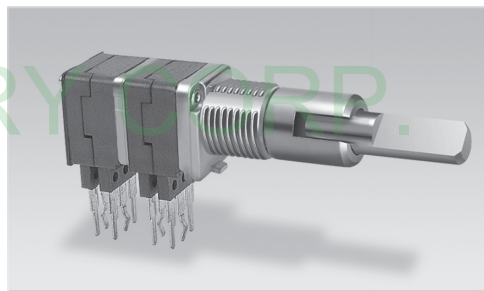
Outline Drawing

9MM3H□B-B

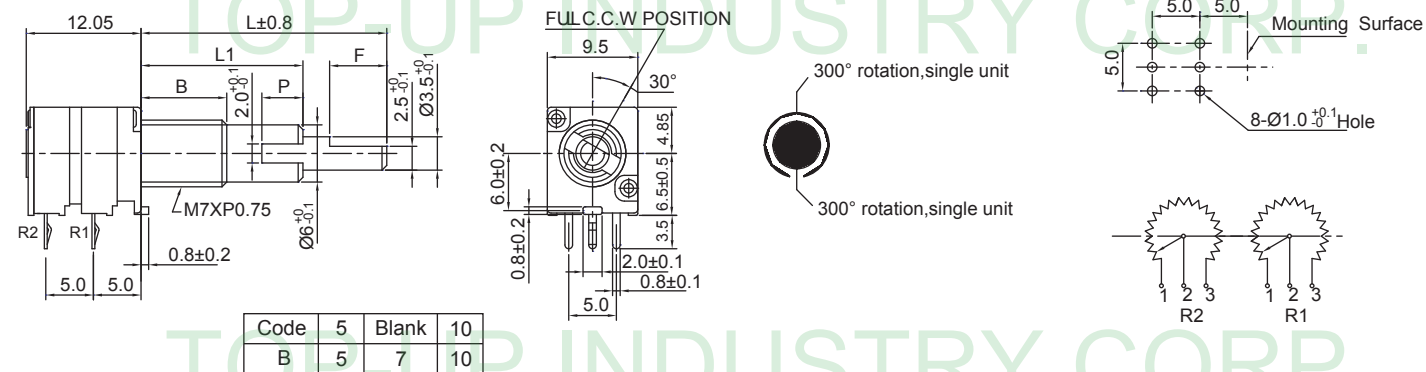


Features individual specifications

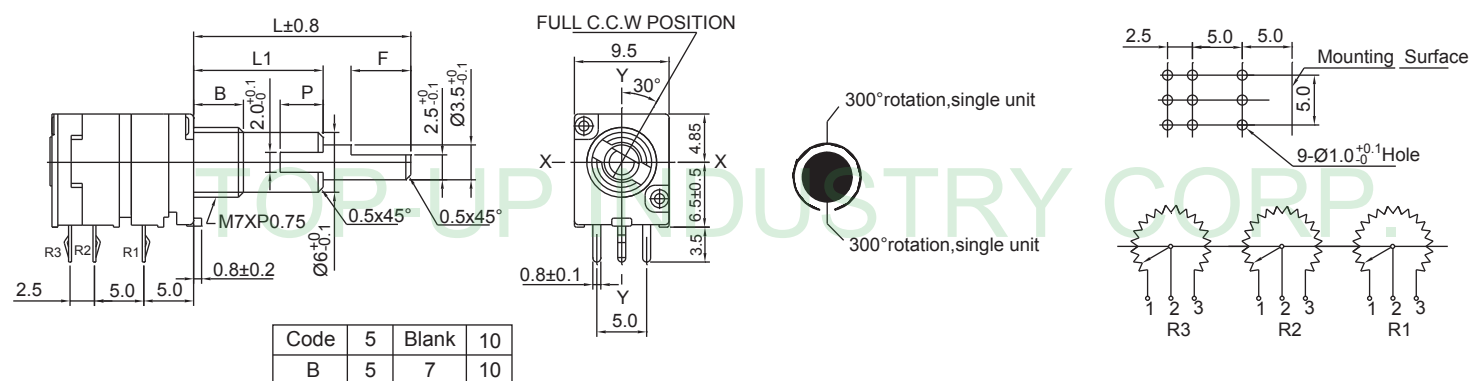
9MM4H□B-B



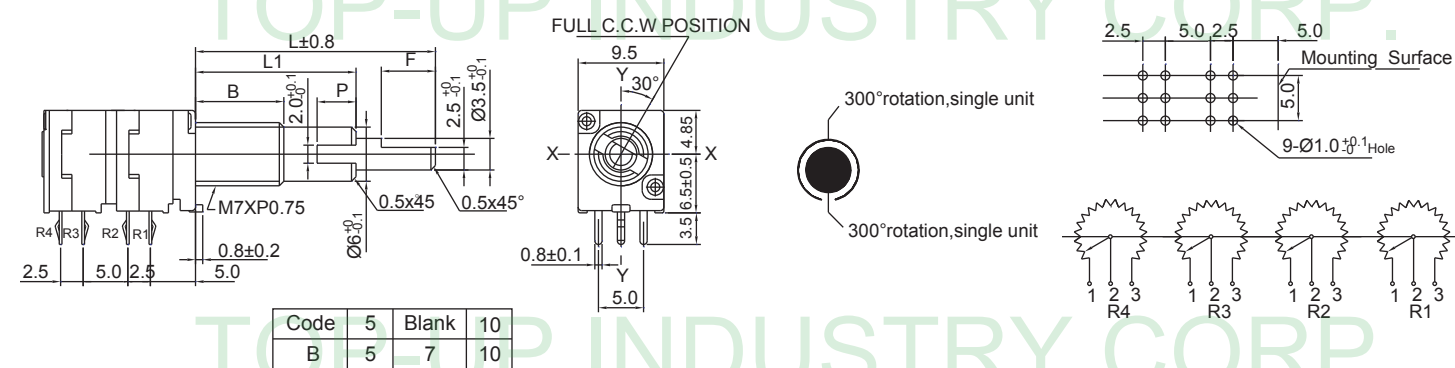
9MM2H□B-B



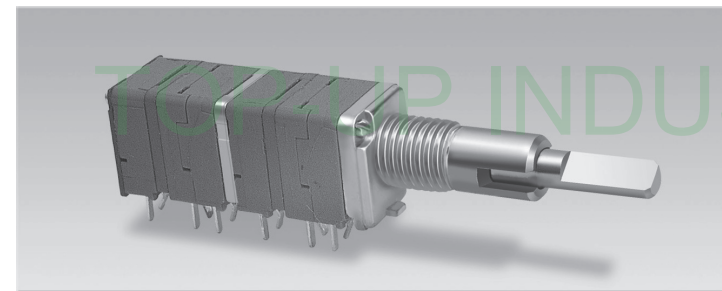
9MM3H□B-B



9MM4H□B-B

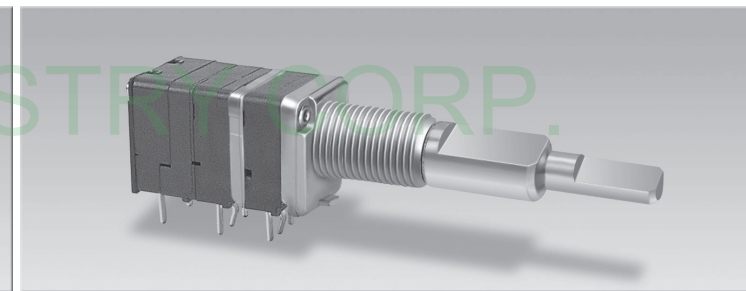


9MM6HB-B



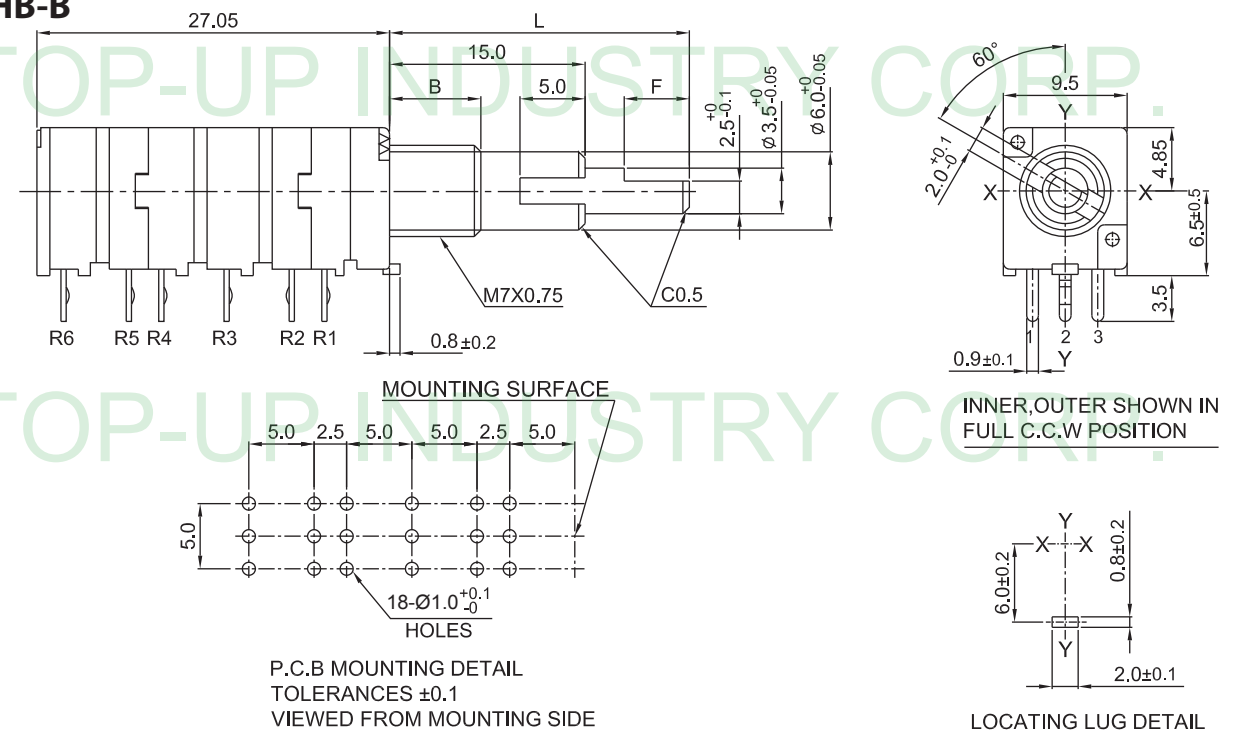
Outline Drawing

9MM2RSHB-B

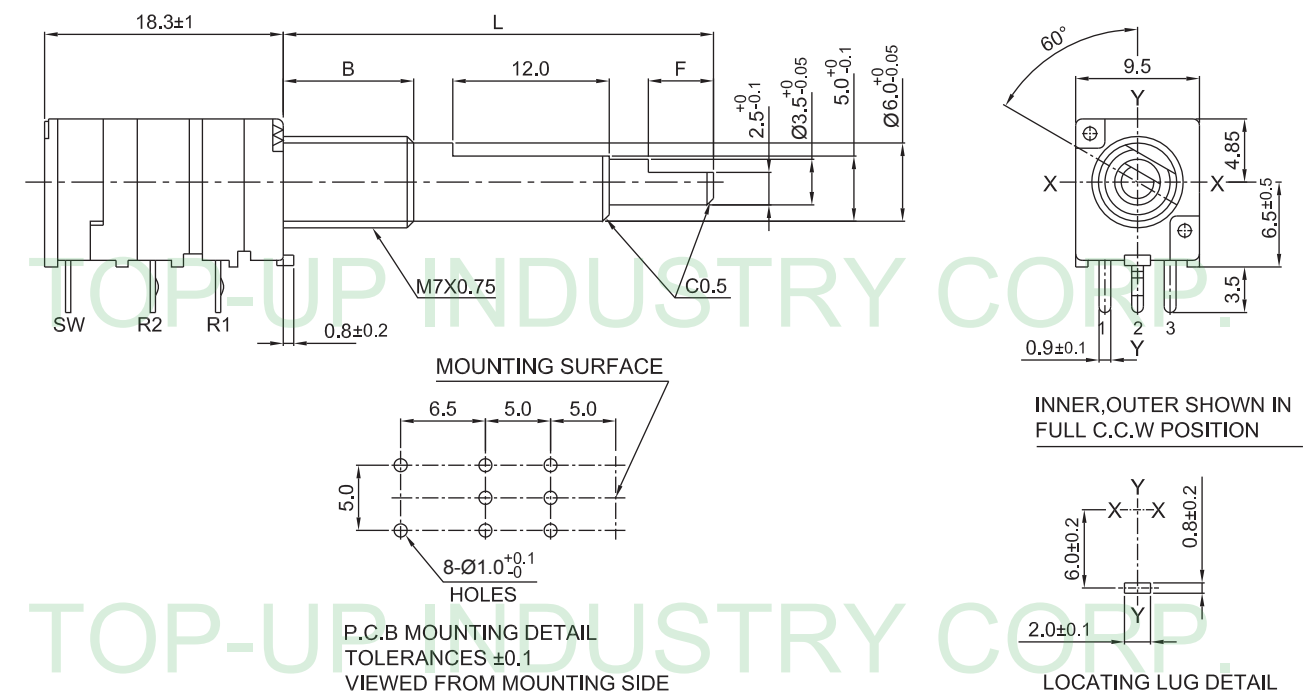


Features individual specifications

9MM6HB-B



9MM2RSHB-B

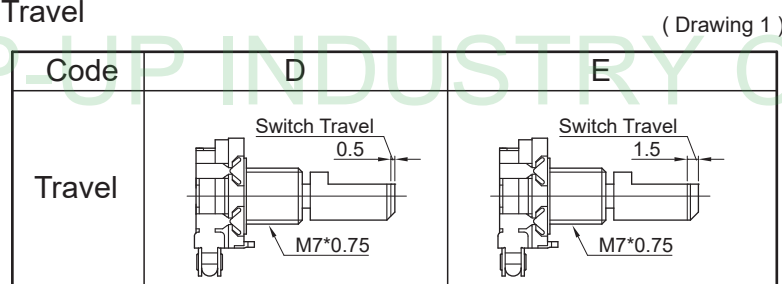


11M Series Code Explanation

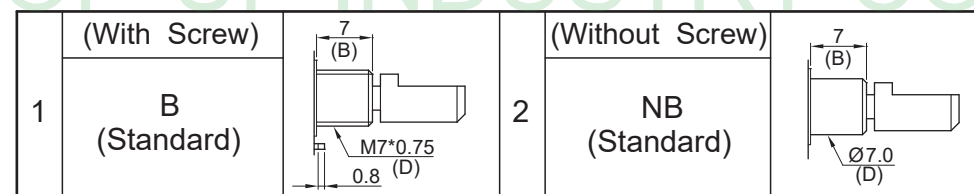
11M 1 MS D V NB F X - D - 20 F - B 50K -

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

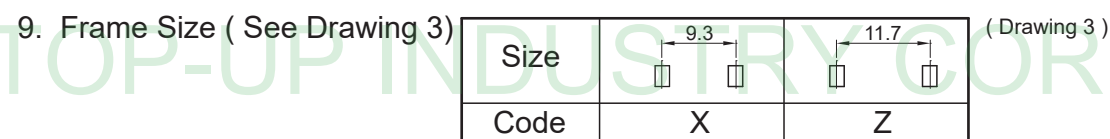
- Product Lines of 11M (11mm Metal Shaft Series)
- Number of Unit : 1 — Single Unit
- Type of Switch : MS—"Momentary push type"
- Switch Travel



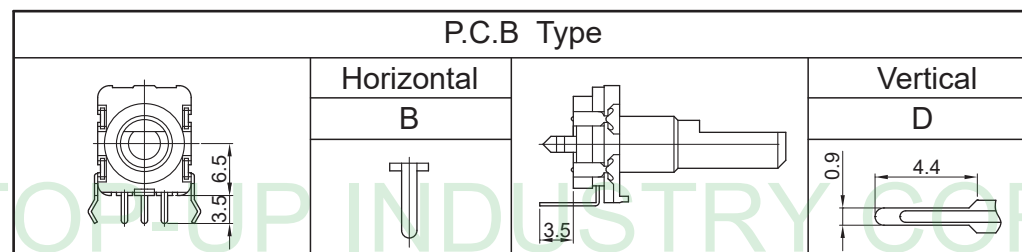
- Horizontal Type (H) or Vertical Type (V)
- Bushing Length : Blank- 7mm (Standard Type)
- Type of Bushing



- With Frame: "F"



- Type of Terminal



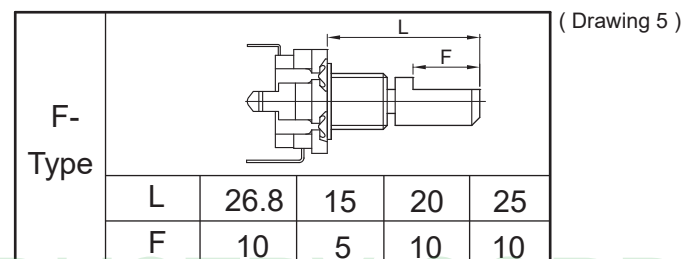
- Shaft Length (See Drawing 5)

- Type of Shaft (See Drawing 5)

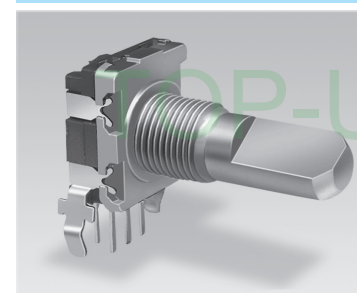
- Type of Taper (See Last Page)

- Resistance Value

- Serial No.

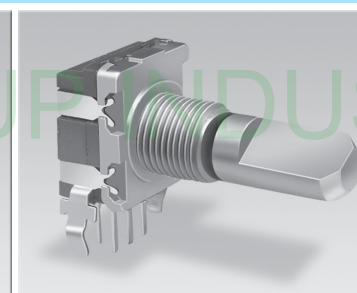


11M1HBFZ-B

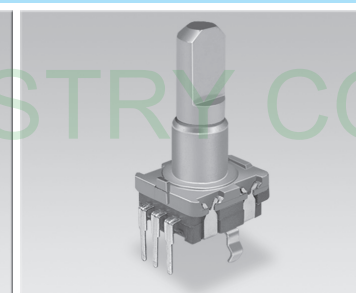


Outline Drawing

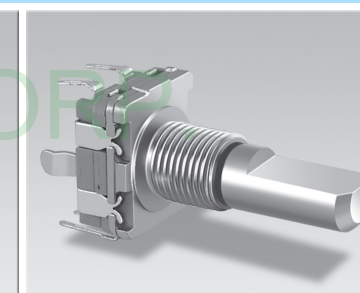
11M1MSDHBFX-B



11M1VNBFX-D

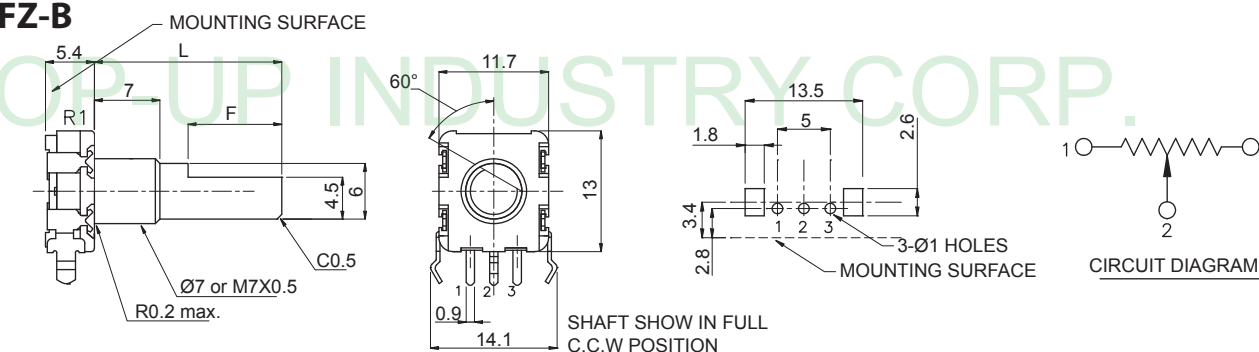


11M1MSDVBFX-D

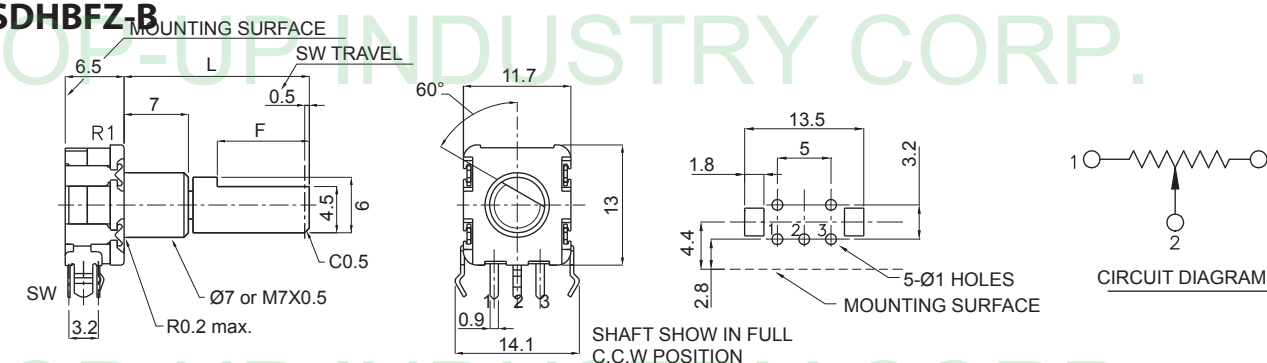


Features individual specifications

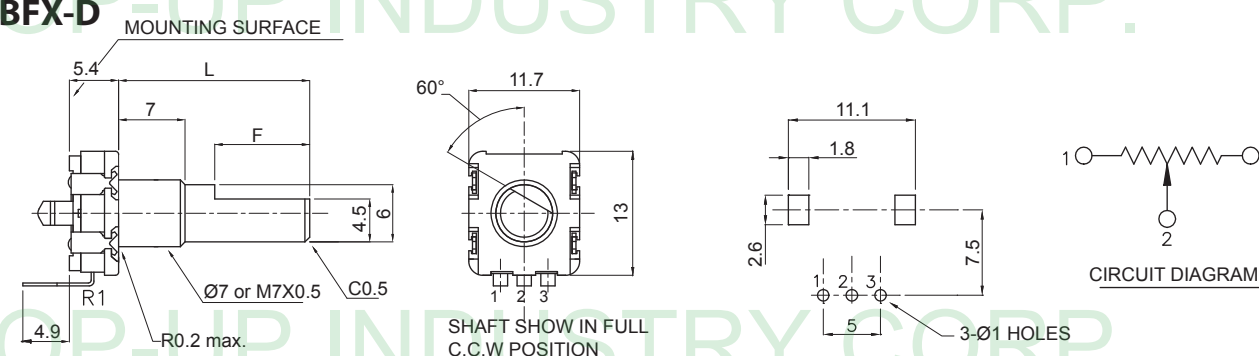
11M1HBFZ-B



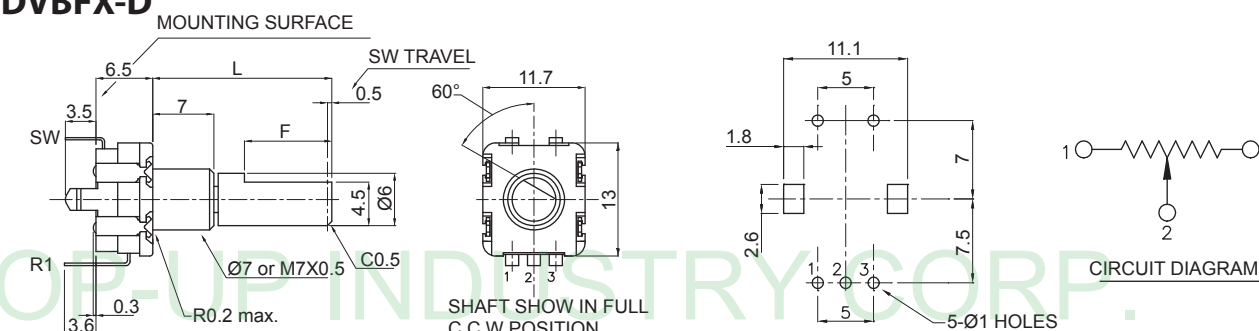
11M1MSDHBFX-B



11M1VNBFX-D



11M1MSDVBFX-D

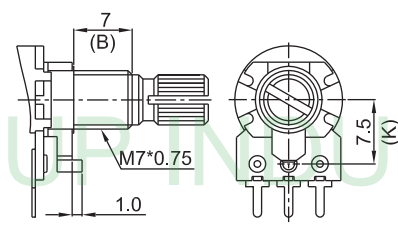
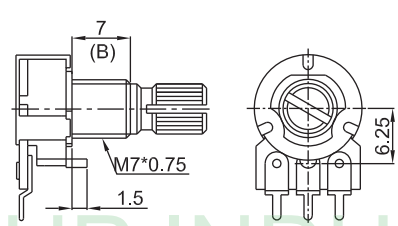


12M Series Code Explanation

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

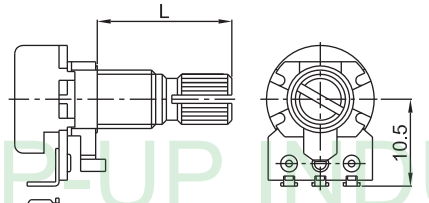
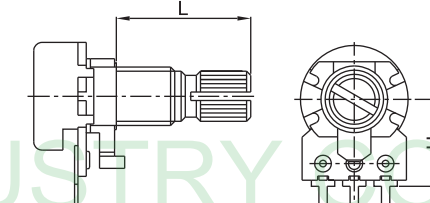
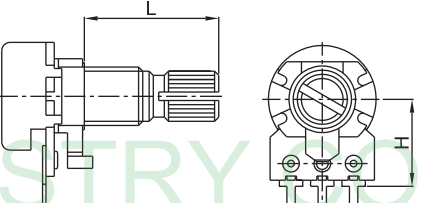
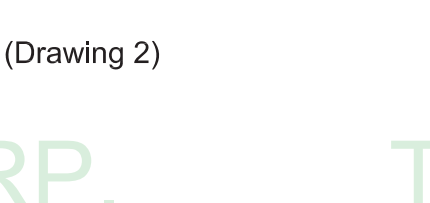
1 2 3 4 5 6 7 8 9 10 11 12 13 14

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

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

(Drawing 1)

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

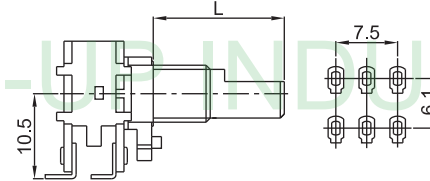
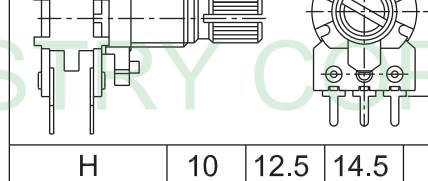
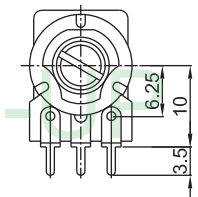
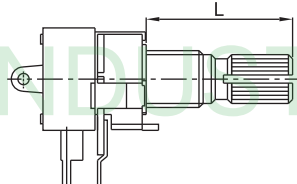
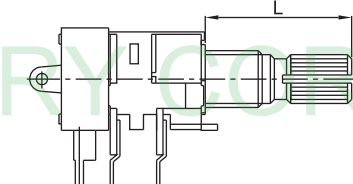
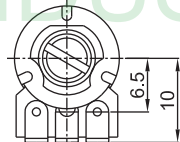
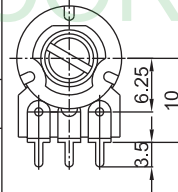
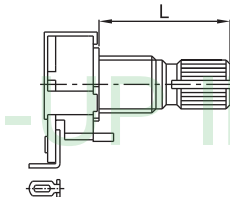
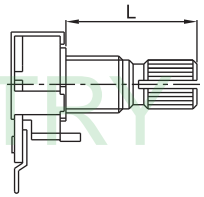
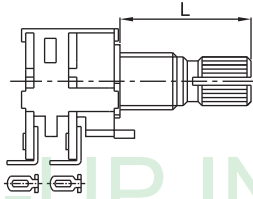
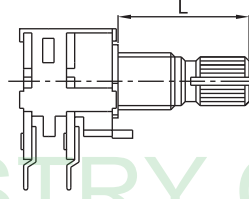
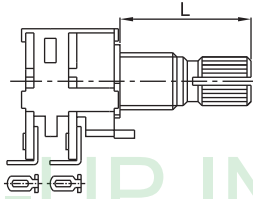
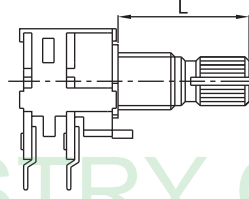
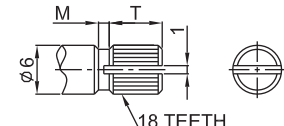
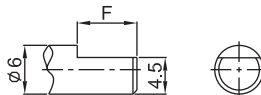
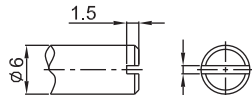
Bushing Type B With Screw	A (Solder Lug Type)		B (P.C.B Type)	
	Single Unit		Single Unit	
				

(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

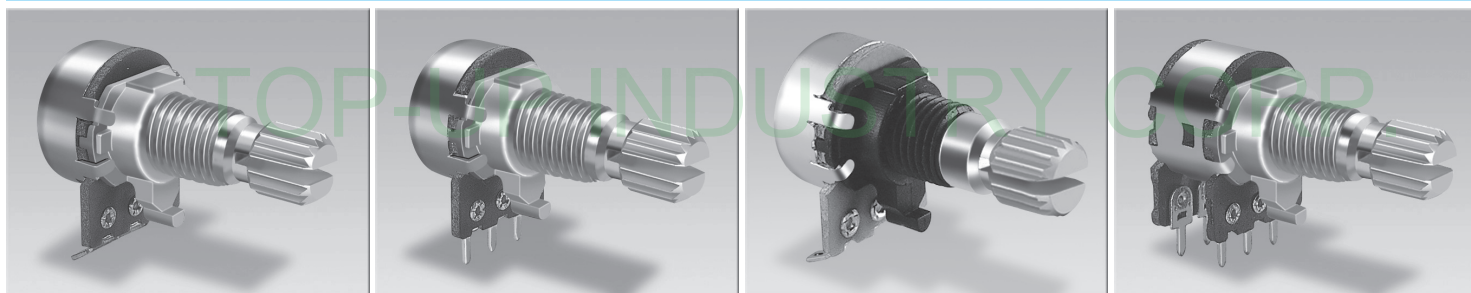
Bushing Type B With Screw	Dual Unit				Dual Unit								
													
	H		10	12.5	14.5	Terminal		B	B1	B2			
Bushing Type GB With Screw	B (P.C.B Type)												
		Single Unit				Dual Unit							
													
	A (Solder Lug Type)					B (P.C.B Type)							
	Single Unit						Single Unit						
													
	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									

12M1H□B-A

12M1H□B-□

12M1H□BP-A

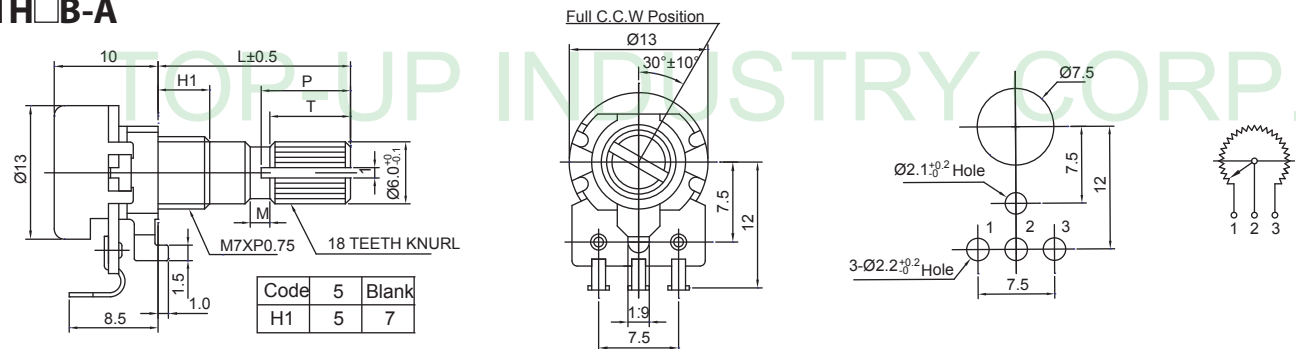
12M2H□B-□



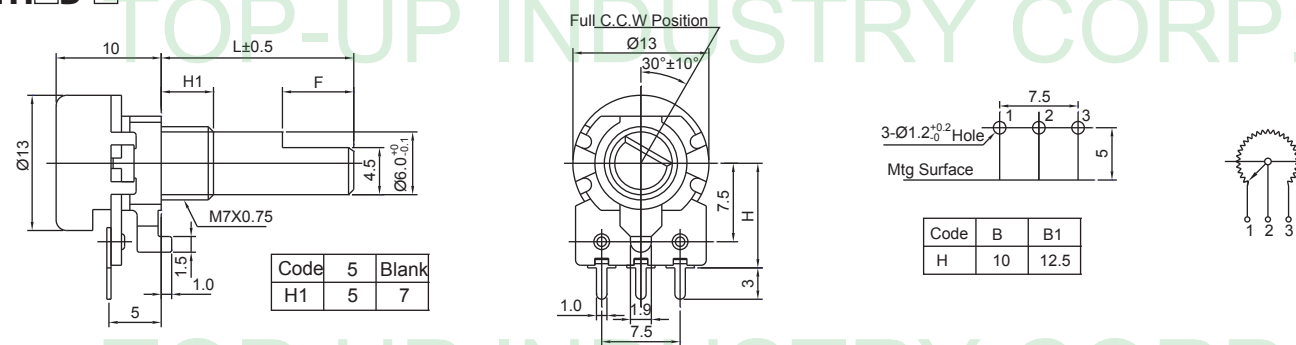
Outline Drawing

Features individual specifications

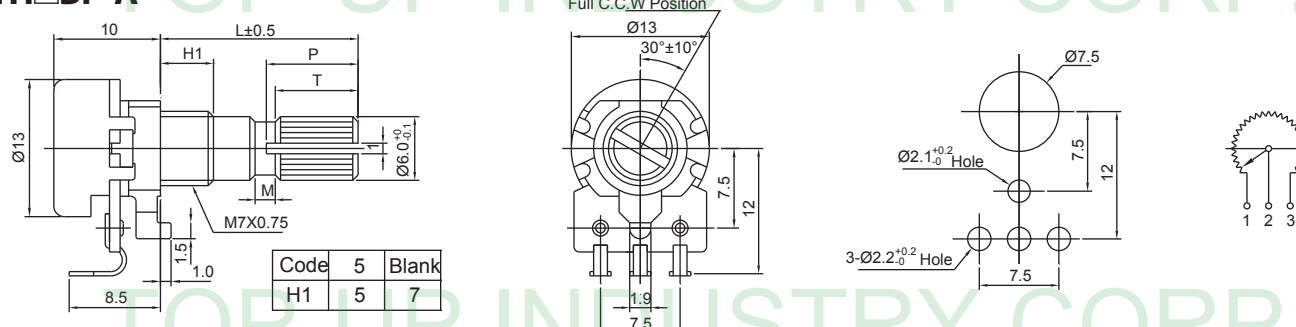
12M1H□B-A



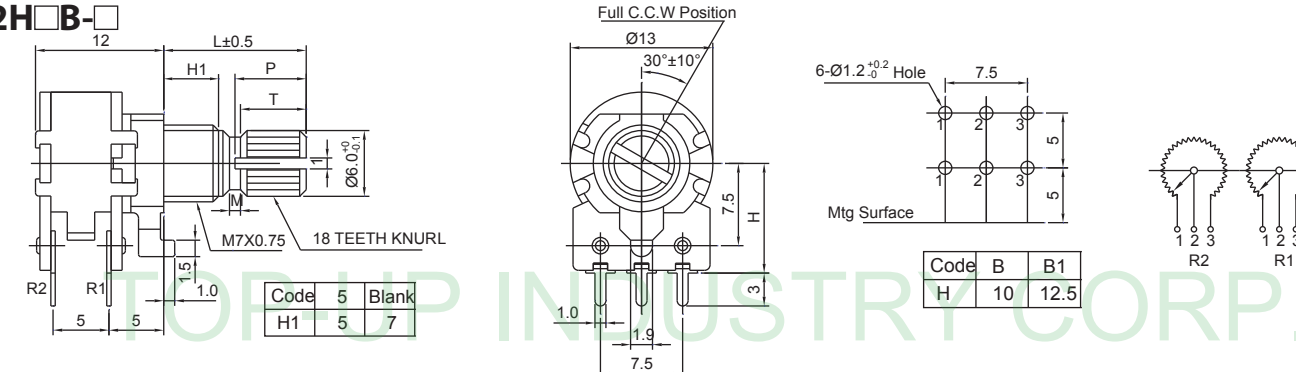
12M1H□B-□



12M1H□BP-A



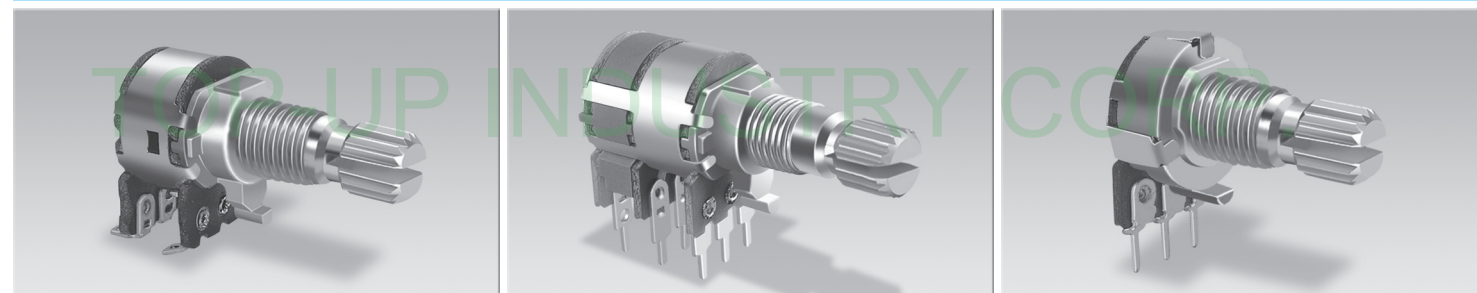
12M2H□B-□



12M2H□B-A

12M2SH□B-□

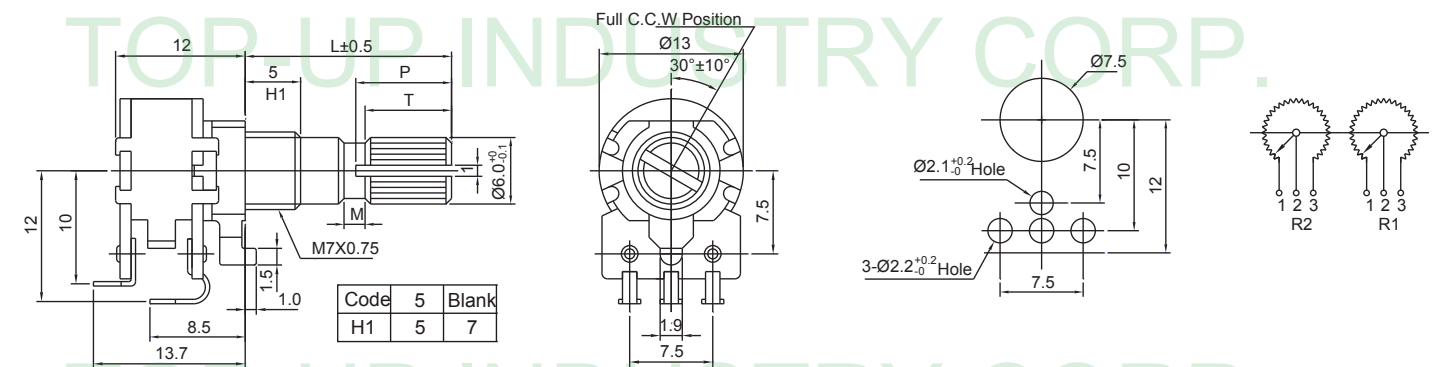
12M1HGB-□



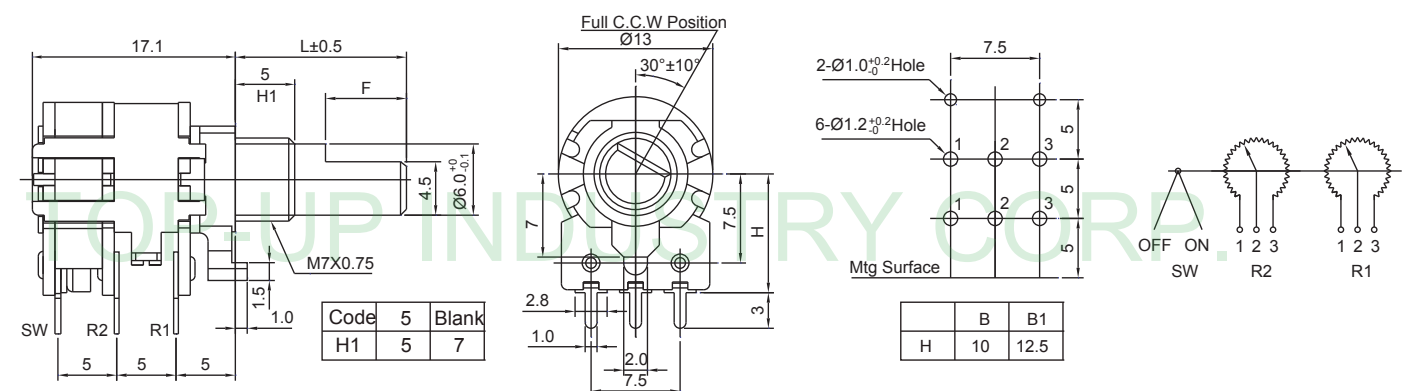
Outline Drawing

Features individual specifications

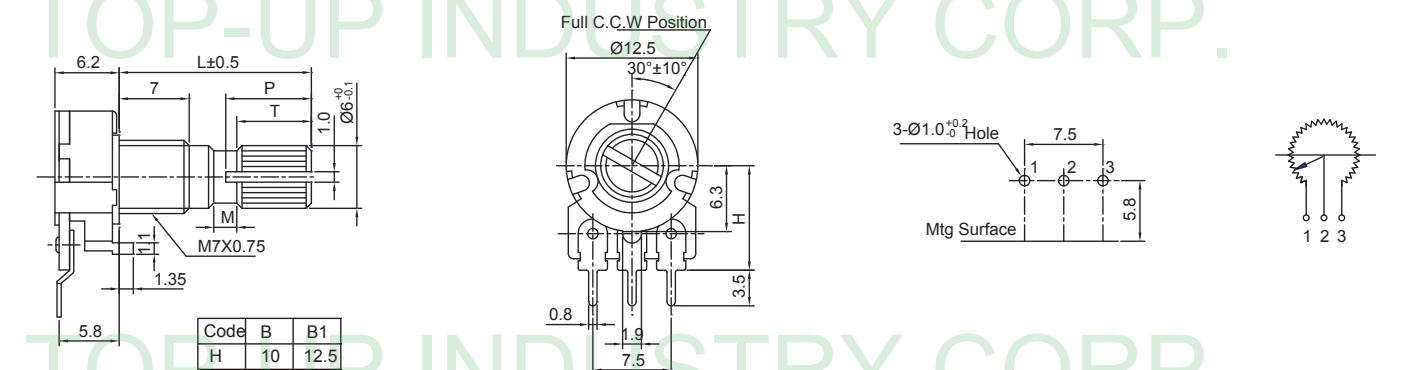
12M2H□B-A



12M2SH□B-□



12M1HGB-□

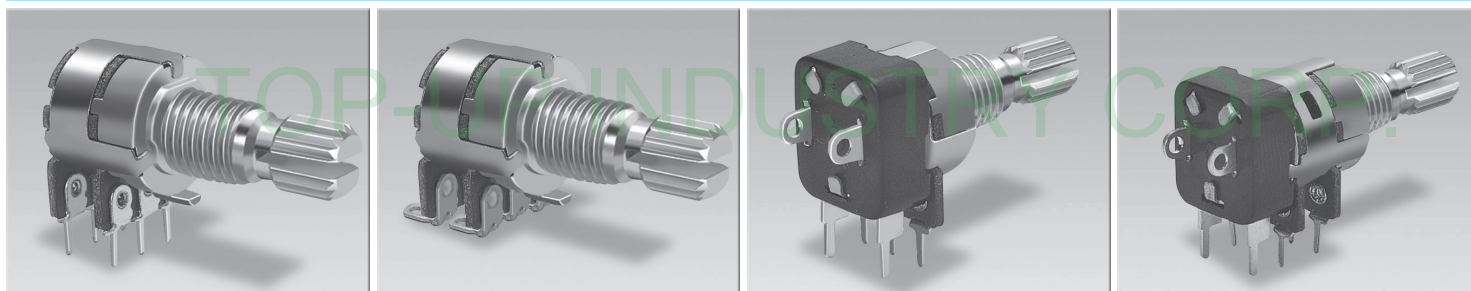


12M2HGB-□

12M2HGB-A

12M1SHGB-□

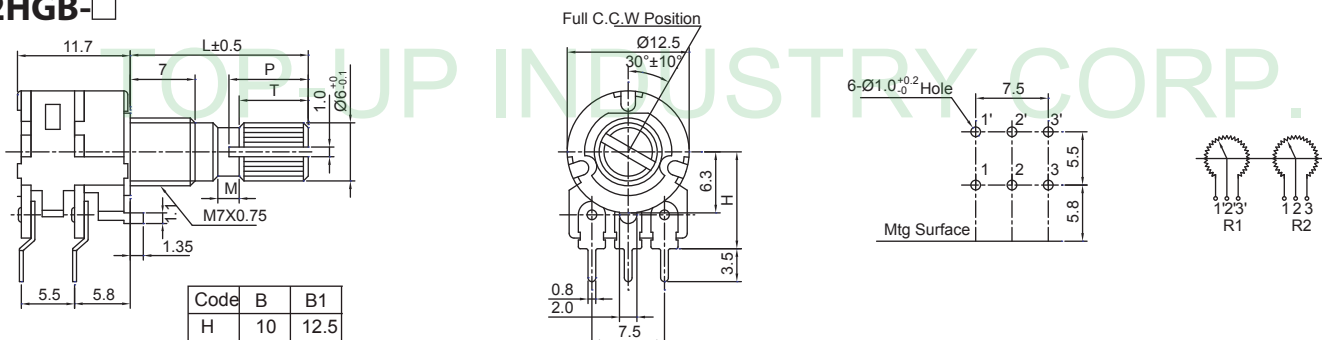
12M2SHGB-□



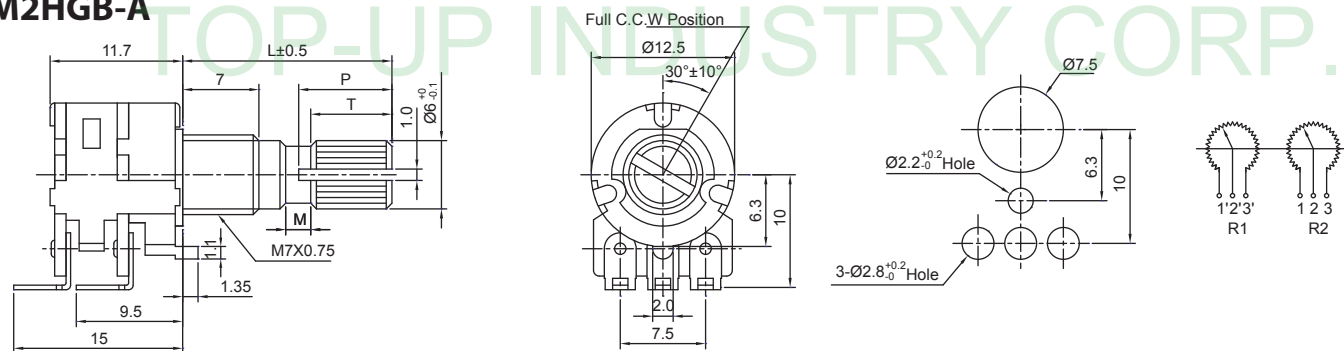
Outline Drawing

Features individual specifications

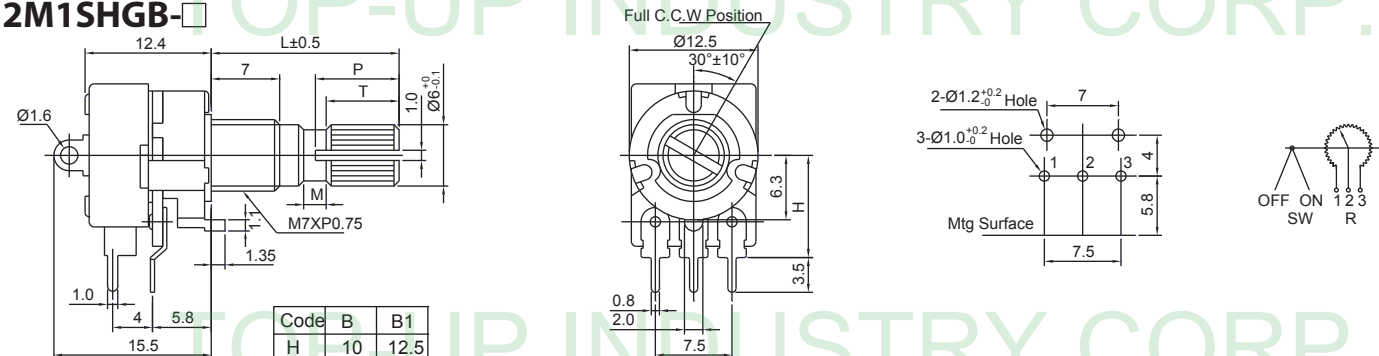
12M2HGB-□



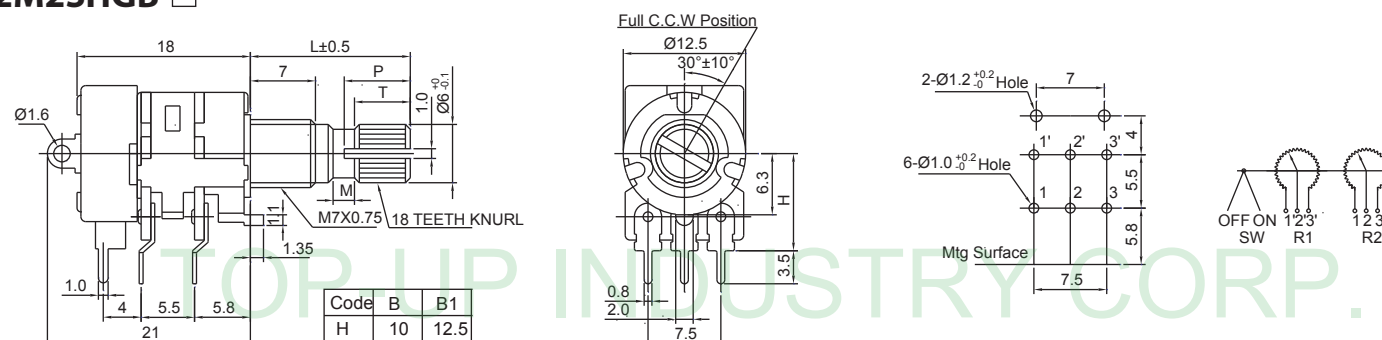
12M2HGB-A



12M1SHGB-□



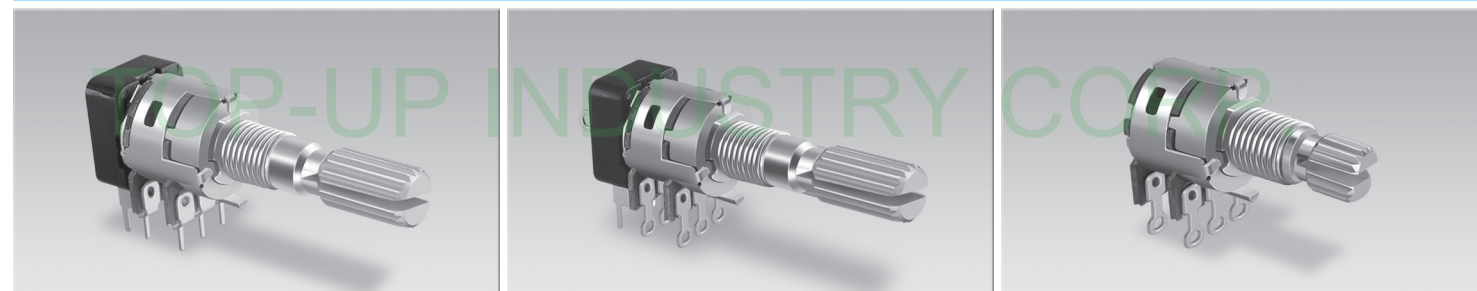
12M2SHGB-□



12M2NSHGB-B□

12M2SHGB-A

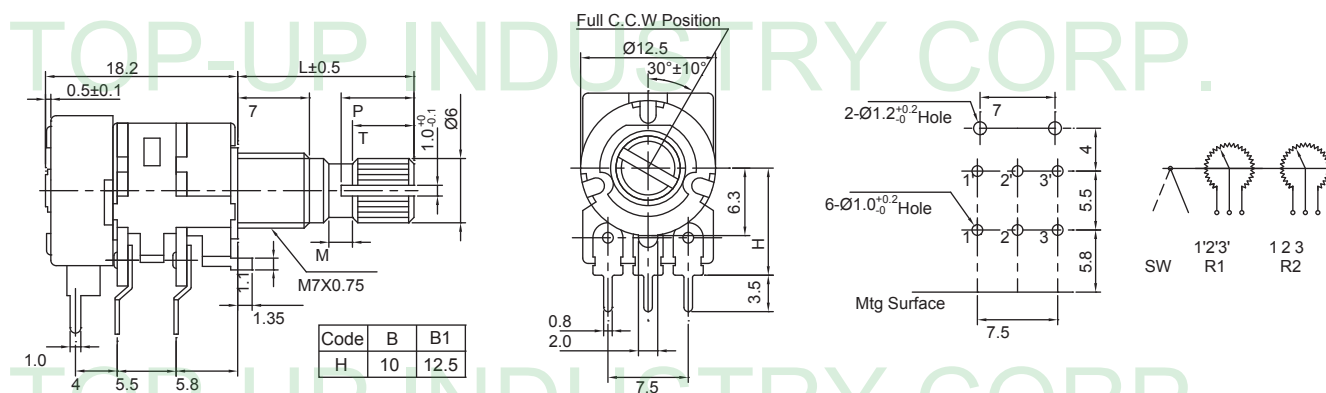
12M2HGB-A(1)



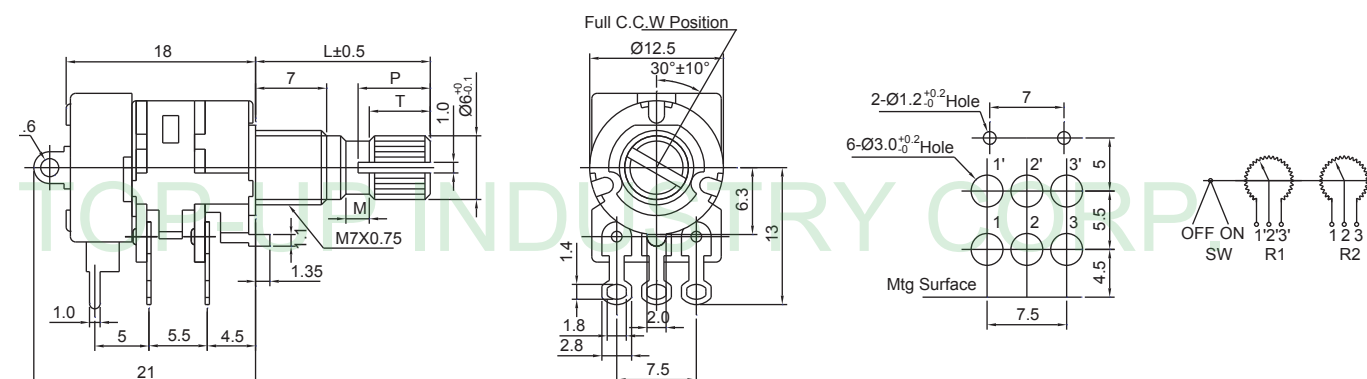
Outline Drawing

Features individual specifications

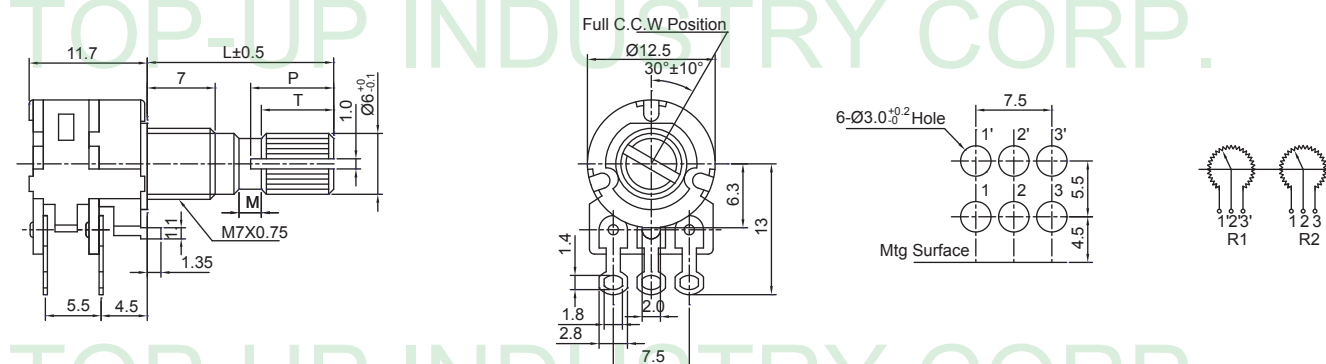
12M2NSHGB-B□



12M2SHGB-A



12M2HGB-A(1)



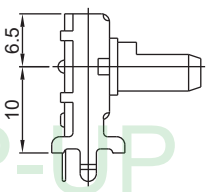
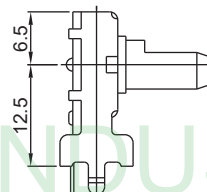
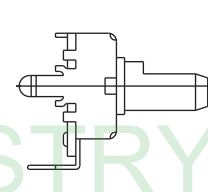
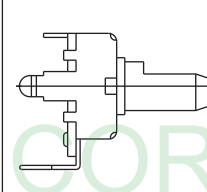
12PR, 12PQ, 12MR Series Code Explanation

12PQ 1 H B YF - B - 20 F - A 10K - 1C - □ □ □

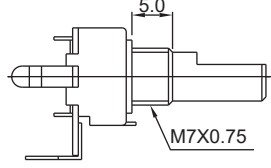
1 2 3 4 5 6 7 8 9 10 11 12

- 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)

(Drawing 1)

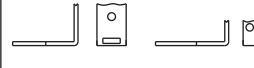
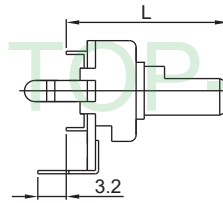
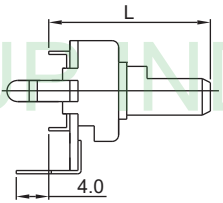
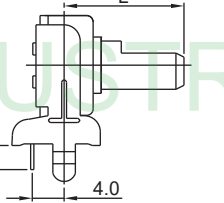
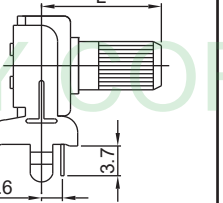
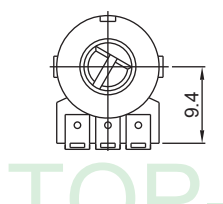
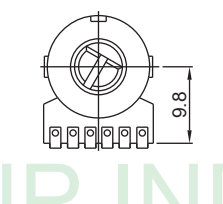
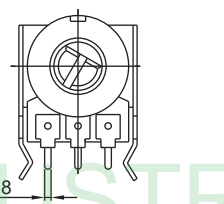
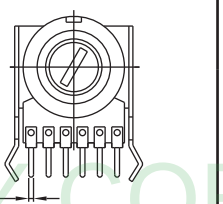
12PQ Series	Horizontal		Vertical	
	F - Type	YF - Type	F - Type	NF - Type
				

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

With Screw	
B (Standard)	

(Drawing 2)

(Drawing 3)

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

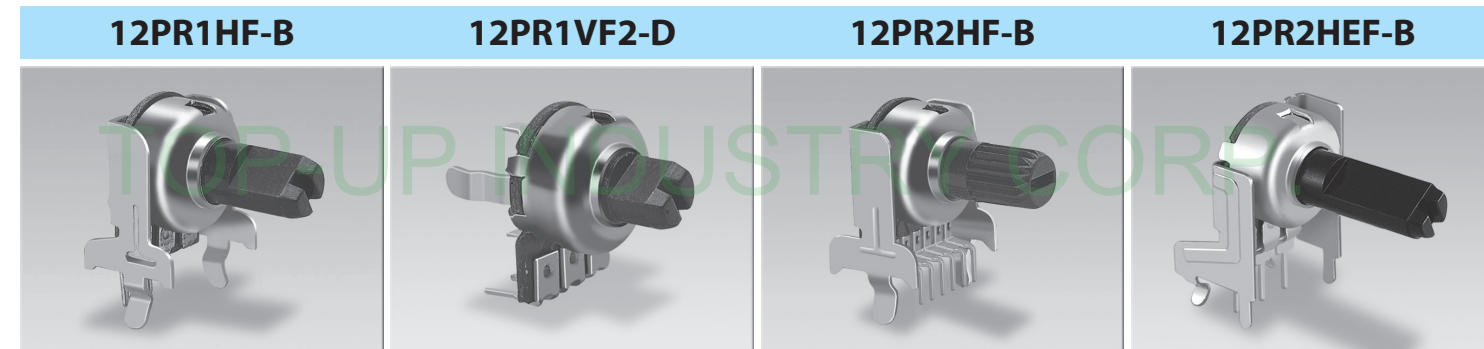
Total rotational angle	300°±5°
Rotational torque	20 ~ 200gf.cm
Detent position	Center detent only
Detent slip out force	Rotational torque + 30 ~ 100gf.cm
Shaft stopper strength	≥ 4kgf.cm
Push& pull strength	≥ 5kgf.cm
Shaft inclination	≤ 0.35mm
Shaft wobble (mm p-p)	Within(0.7xL/20)mm p-p Max. L=Shaft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

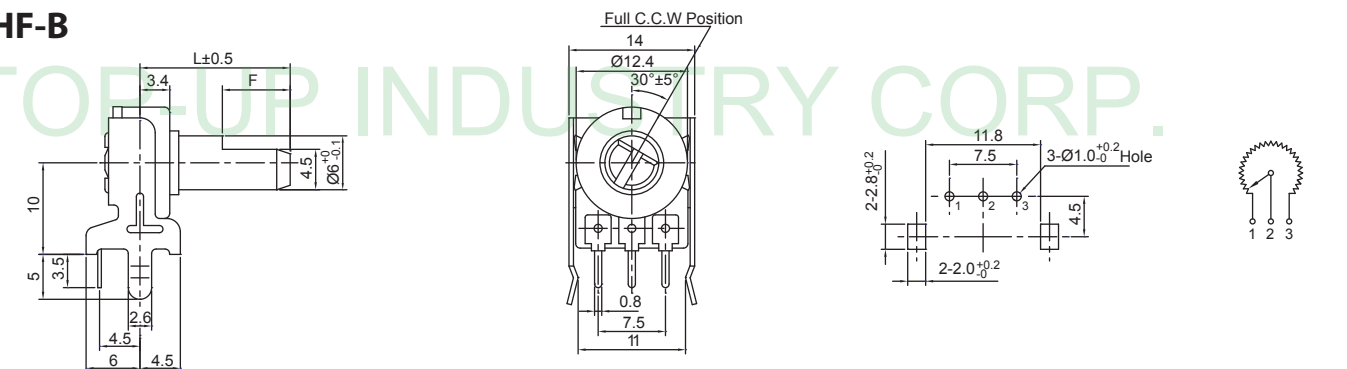
Rotation life	≥ 10,000 cycles(special : 100,000 cycles.)
---------------	--



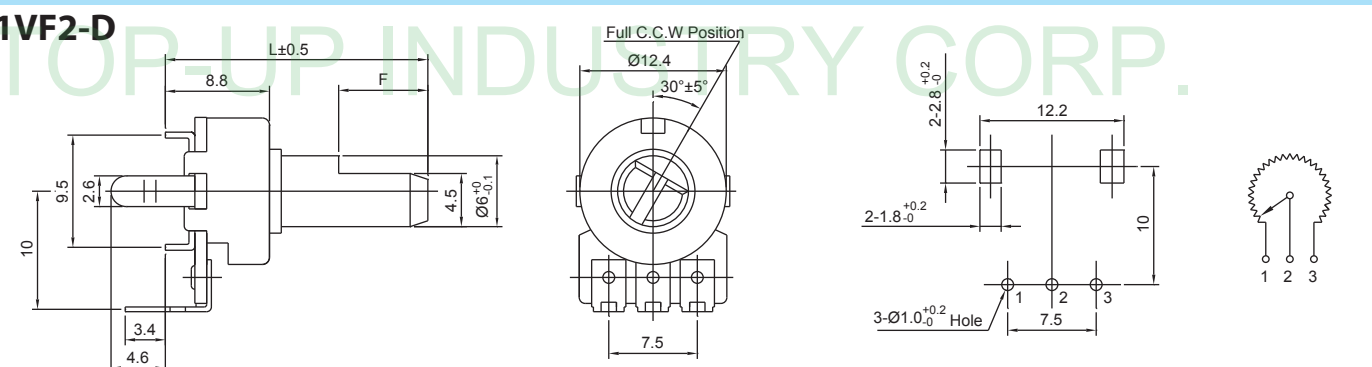
Outline Drawing

Features individual specifications

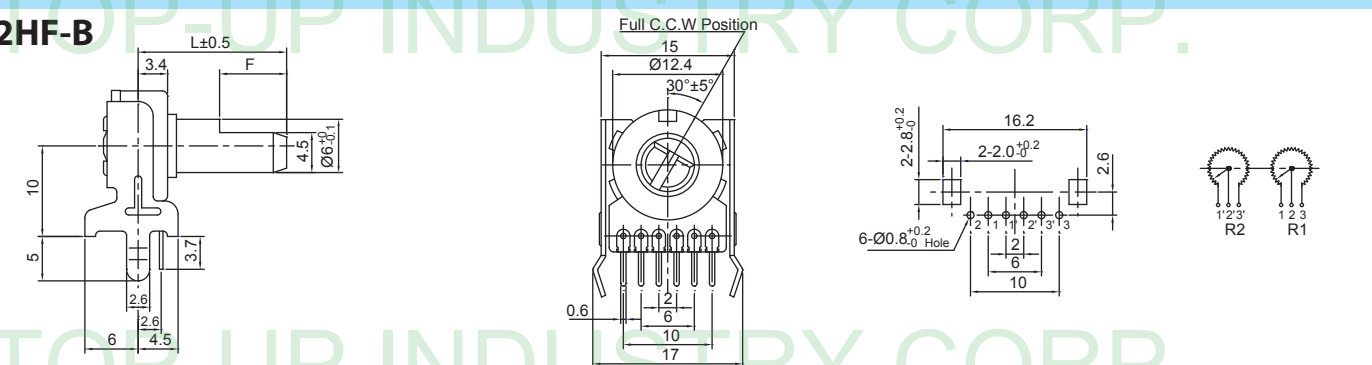
12PR1HF-B



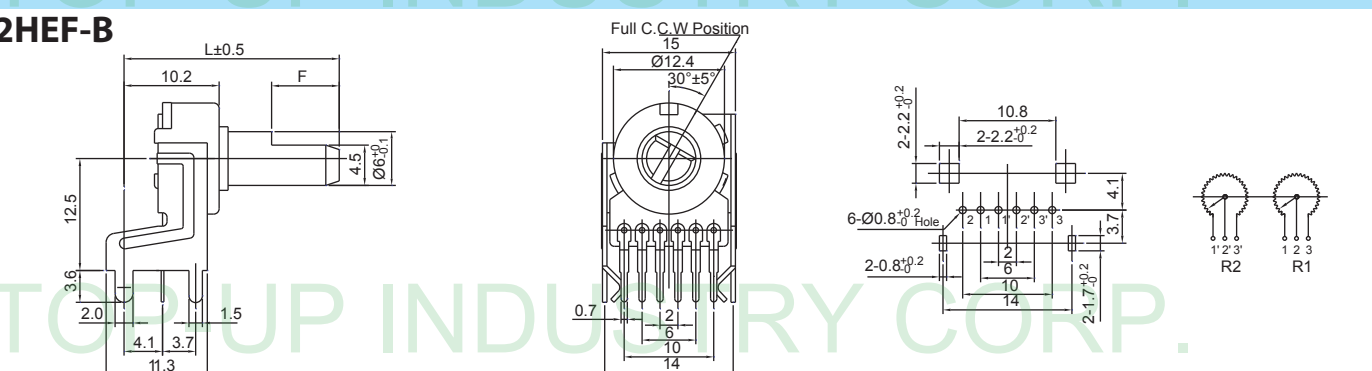
12PR1VF2-D



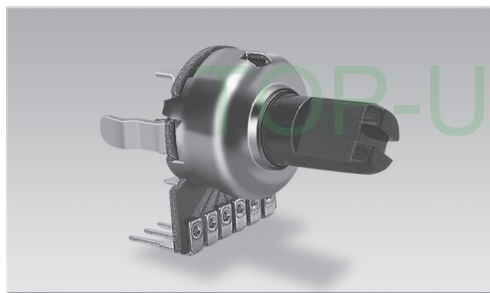
12PR2HF-B



12PR2HEF-B

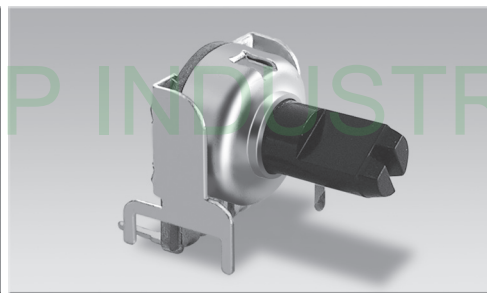


12PR2VF-D



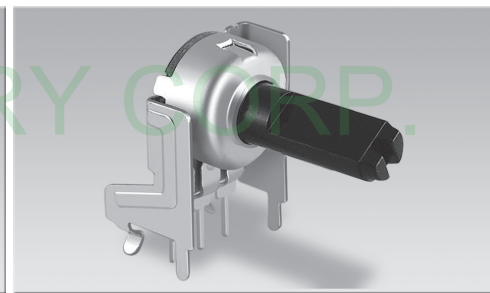
Outline Drawing

12PR1VCF-D

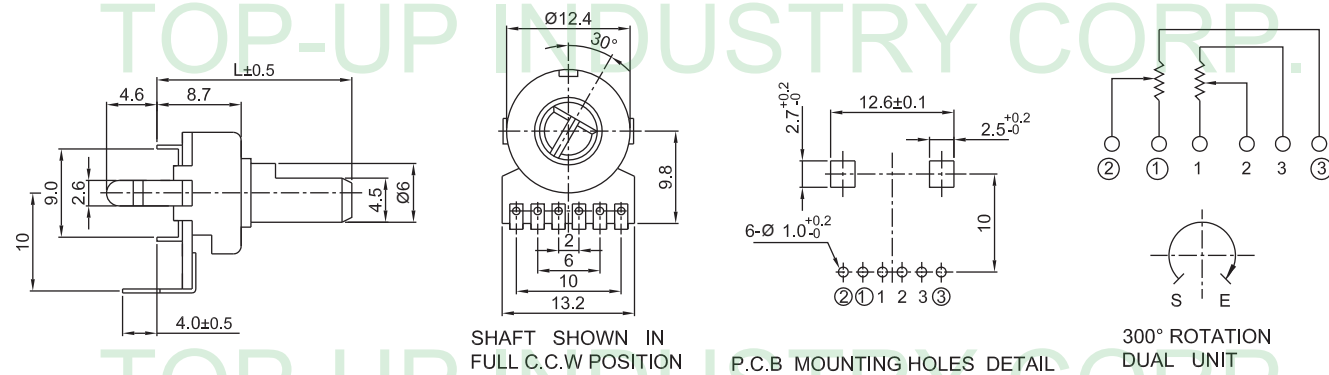


Features individual specifications

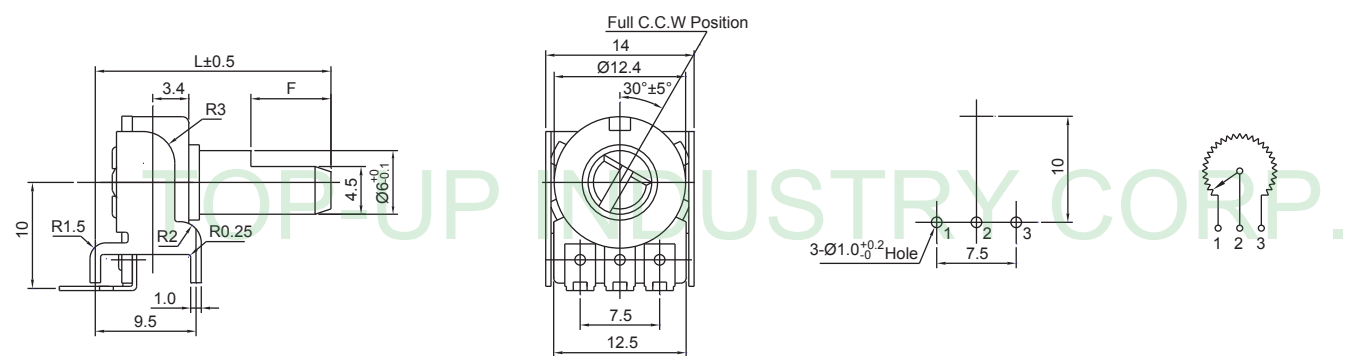
12PR1HEF-B



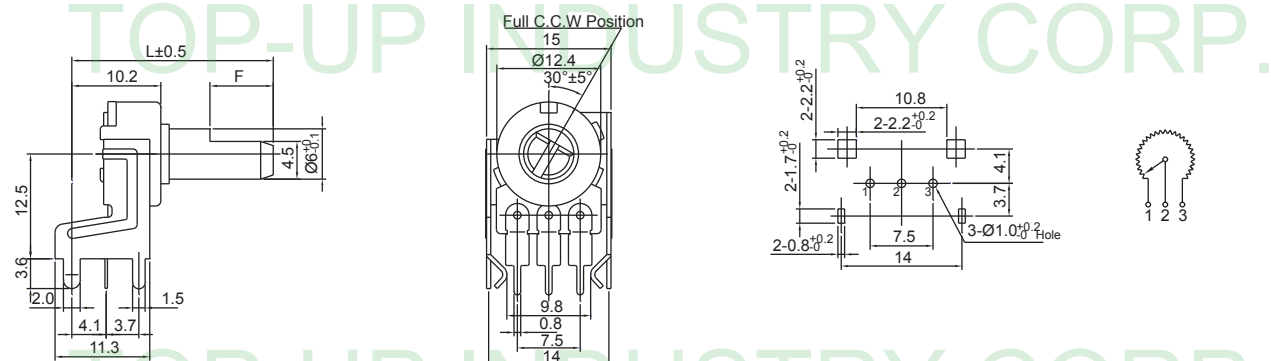
12PR2VF-D



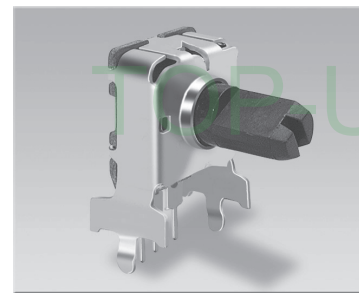
12PR1VCF-D



12PR1HEF-B

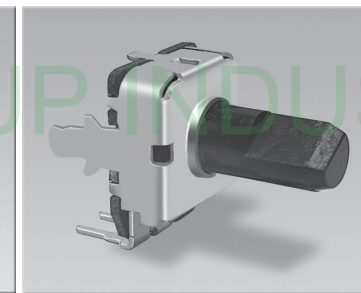


12PQ1HYF-B

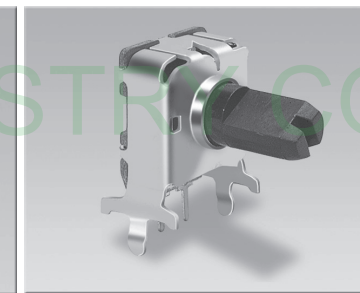


Outline Drawing

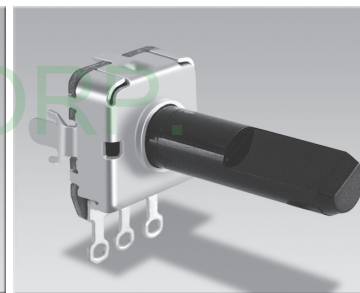
12PQ1VF-D



12PQ1HF-B

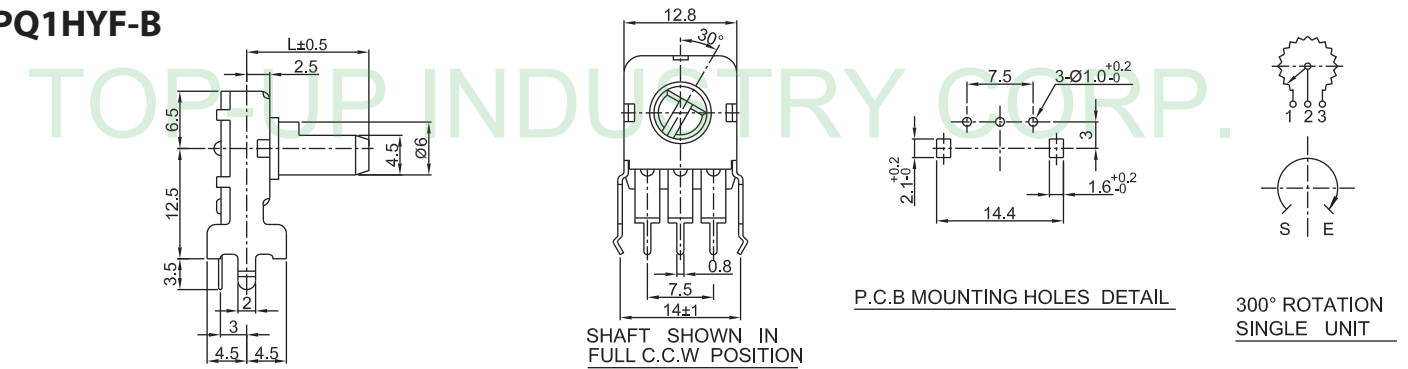


12PQ1VF-A

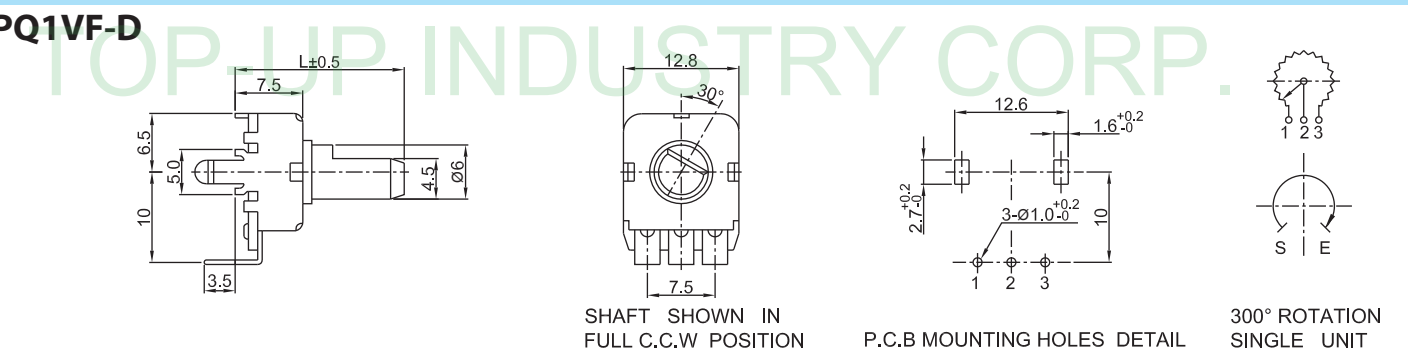


Features individual specifications

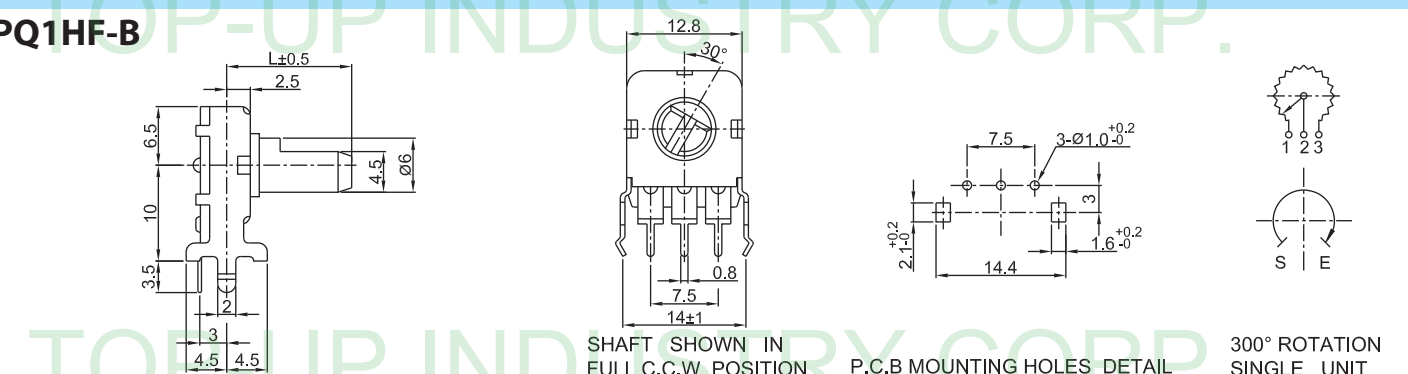
12PQ1HYF-B



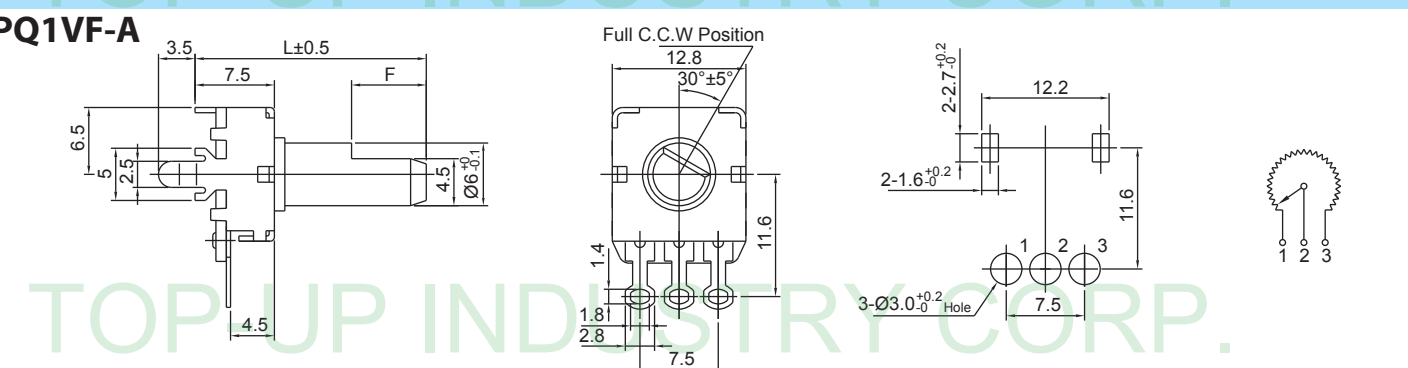
12PQ1VF-D



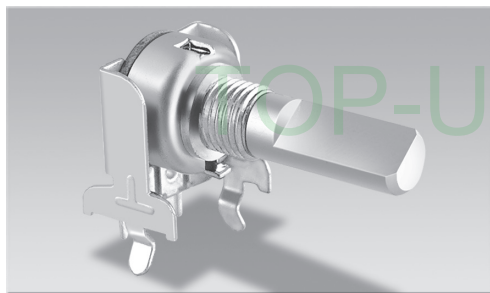
12PQ1HF-B



12PQ1VF-A

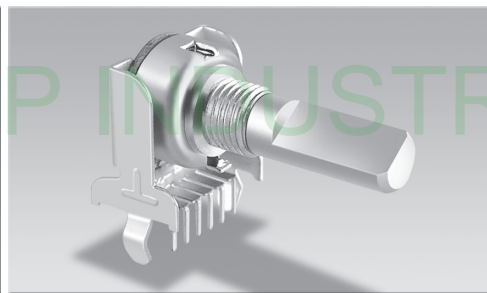


12MR1HBF-B



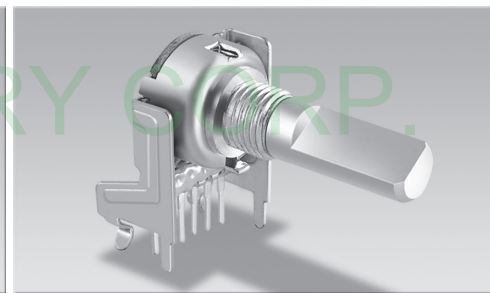
Outline Drawing

12MR2HBF-B

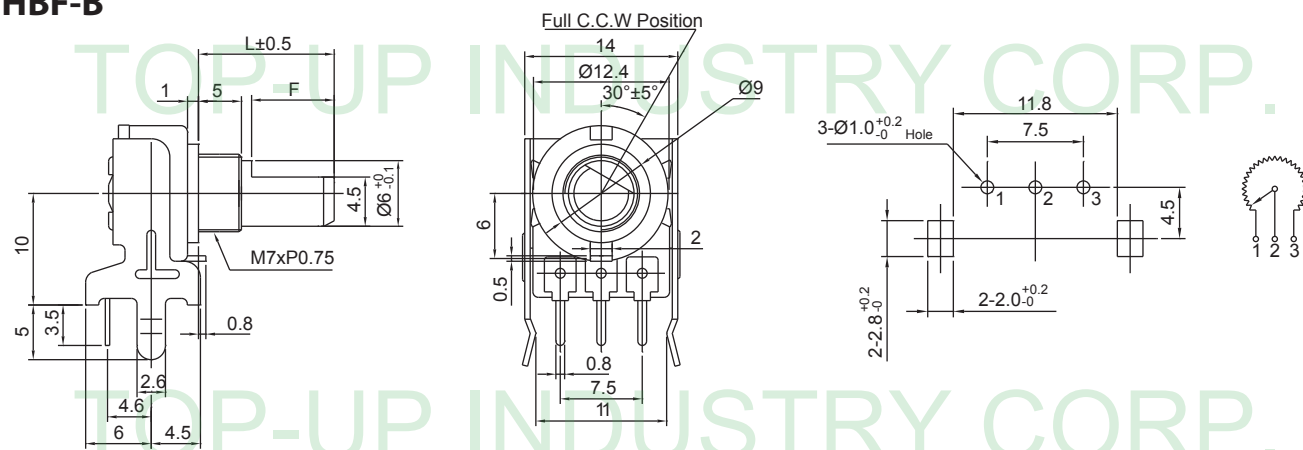


Features individual specifications

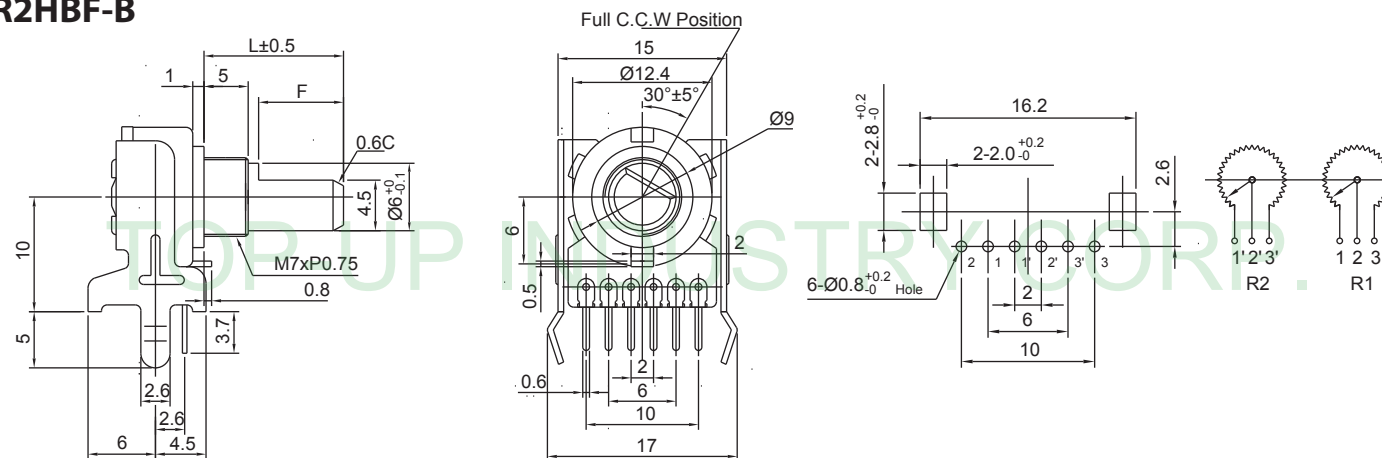
12MR2HBEF-B



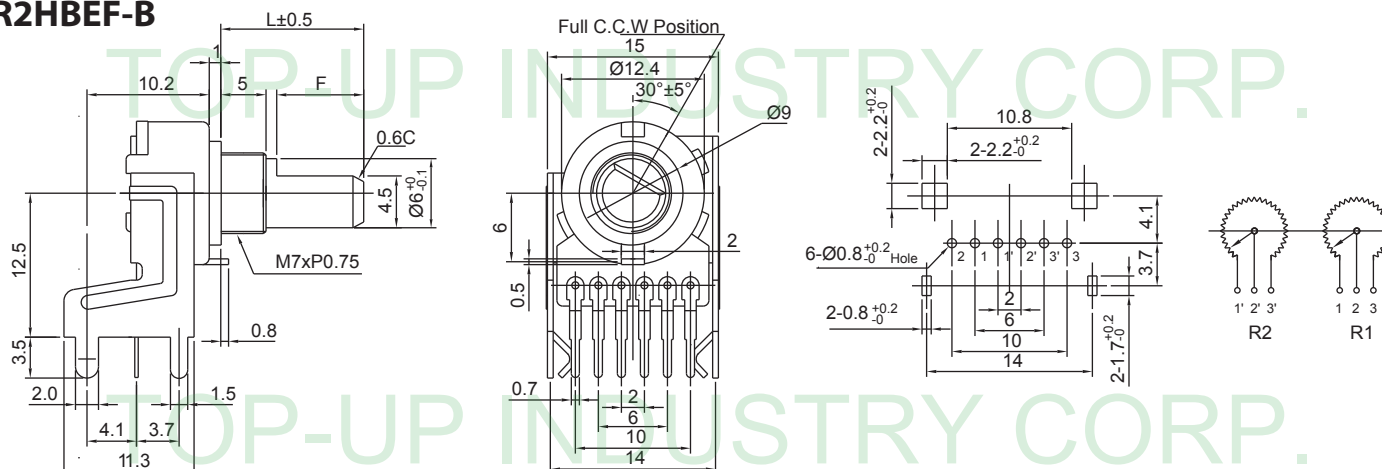
12MR1HBF-B



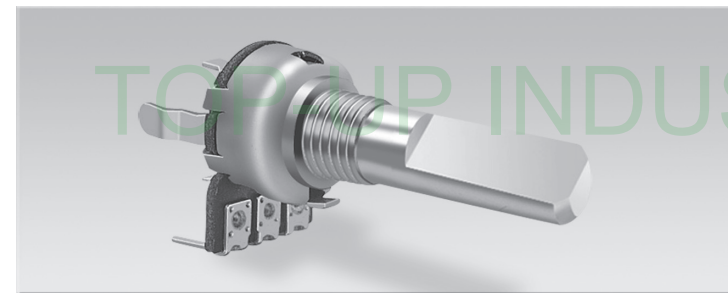
12MR2HBF-B



12MR2HBEF-B

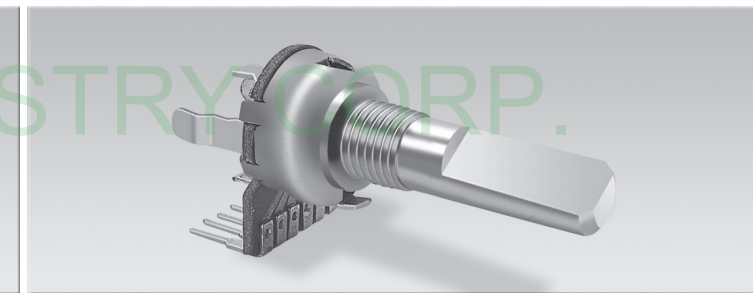


12MR1VBF-D



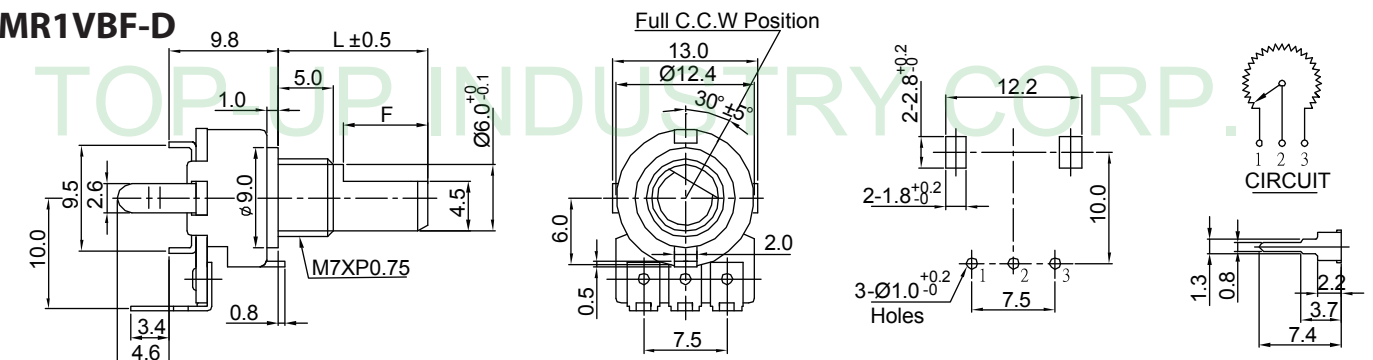
Outline Drawing

12MR2VBF-D

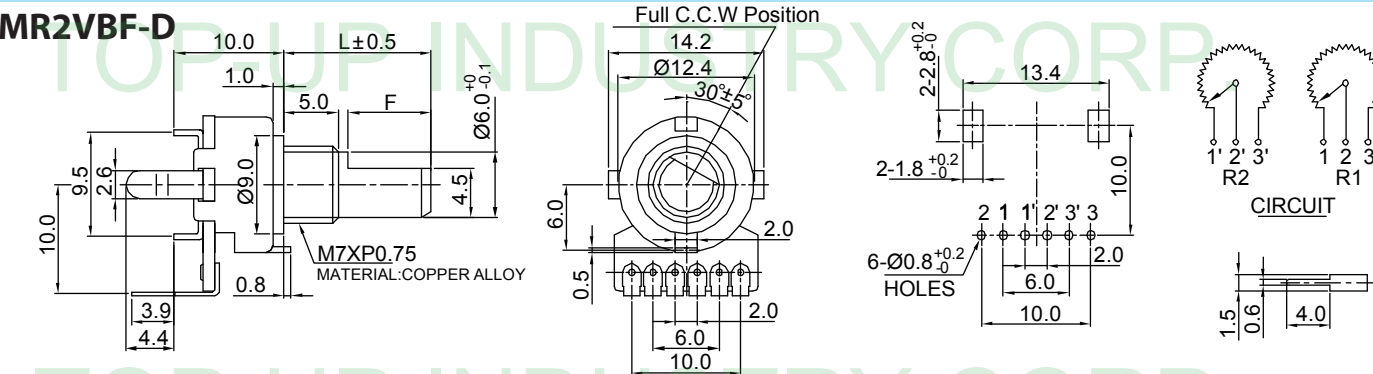


Features individual specifications

12MR1VBF-D



12MR2VBF-D



12mm SIZE METAL SHAFT POTENTIOMETERS

Mechanical Characteristics:

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

Electrical Characteristics:

Total resistance	B:5K Ω ~1K Ω other than B:5K Ω ~500 Ω
Total resistance tolerance	$\pm 20\%$ more than 1M Ω $\pm 30\%$
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 $\geq$ 250K Ω 0.1% max. of total resistance 250K Ω > R > 10K Ω 20 Ω max. 10K Ω $\geq$ R 10 Ω max.
Insulation resistance	More than 50M Ω at DC 500V
Gang error	-40dB to 0dB 3dB max.

Durability:

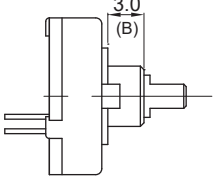
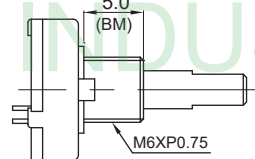
Rotational life	15,000 cycles
-----------------	---------------

13M Series Code Explanation

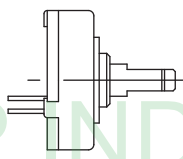
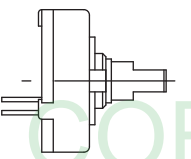
13M 1 V □ BM N - D4A - 10 T - A 10K - □ □ □

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

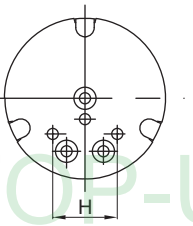
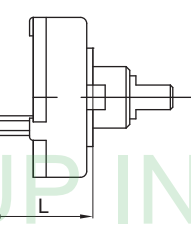
- Product lines of 13M (13mm Size Metal Shaft)
- Number of Unit
1— Single Unit
- Vertical (V) Type
- Bushing Length : Blank-Standard (See Drawing 1)
- Type of Bushing

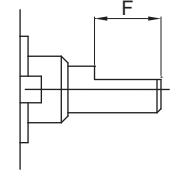
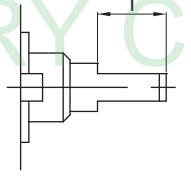
Without Screw		(Drawing 1)	
B (Standard)		Bushing Length (B)	1 3.0
		Bushing Code	1B B
With Screw BM (Standard)		Bushing Length (BM)	5.5 5.0
		Bushing Code	5.5BM BM

- Type of Stopper

Without Stopper	With Stopper
N 	Blank 

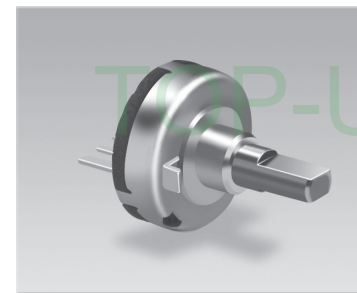
- Type of Terminal (See Drawing 2)

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	8.3 8.5 19.7 6.6 8.5 20 10 19.4

F - Type	T - Type
	

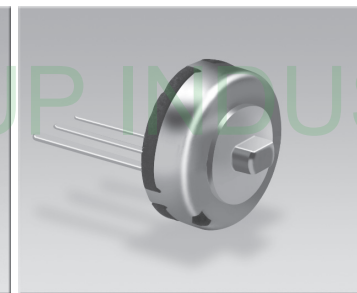
- Shaft Length (Drawing 2)
- Type of Shaft (See Drawing 3)
- Type of Taper (See Taper Chart Last Page)
- Resistance Value
- Serial No.

13M1VB-D1A

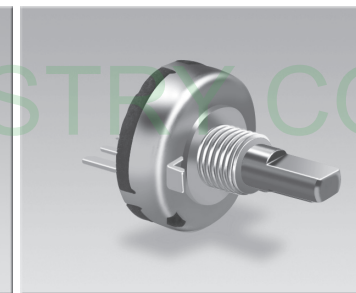


Outline Drawing

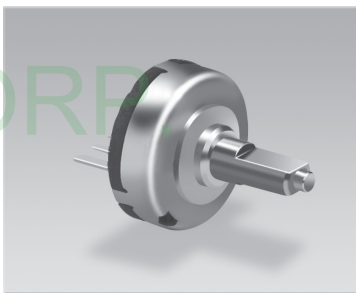
13M1V-D3A



13M1VBM-D4A

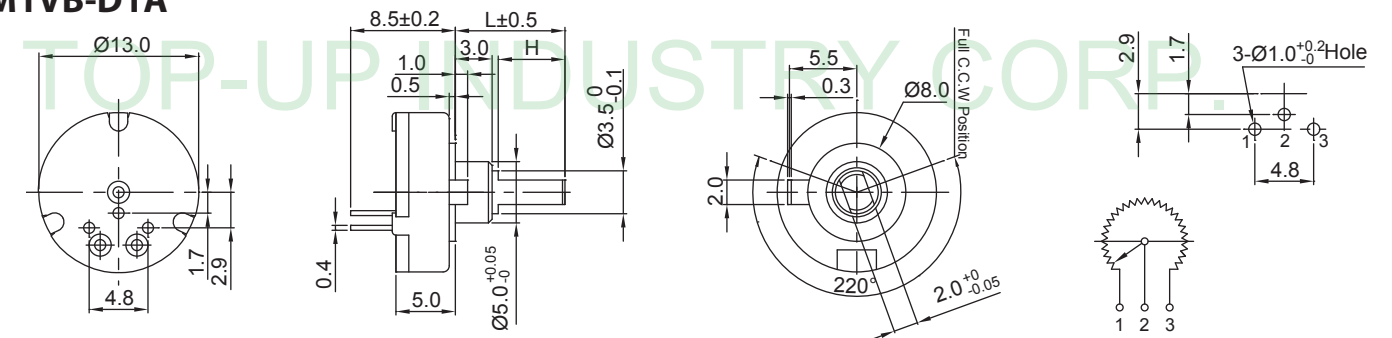


13M1V1BN-DA

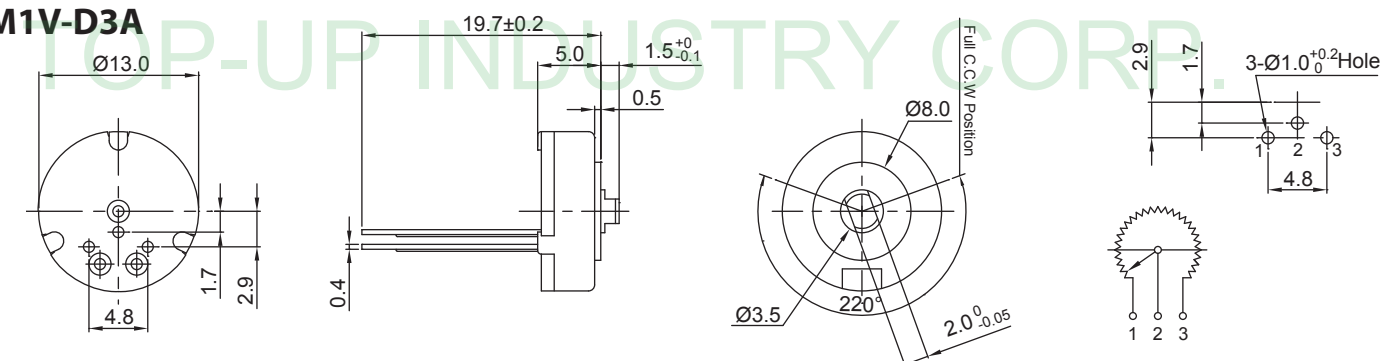


Features individual specifications

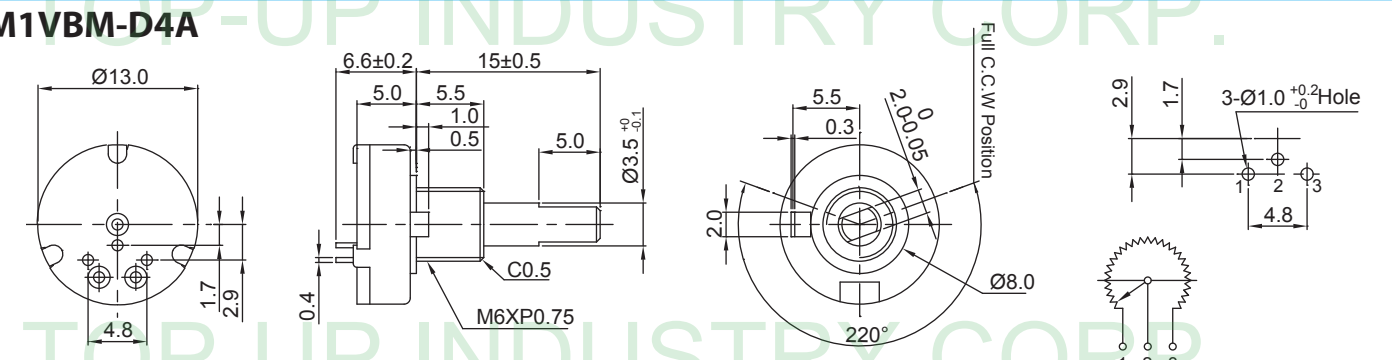
13M1VB-D1A



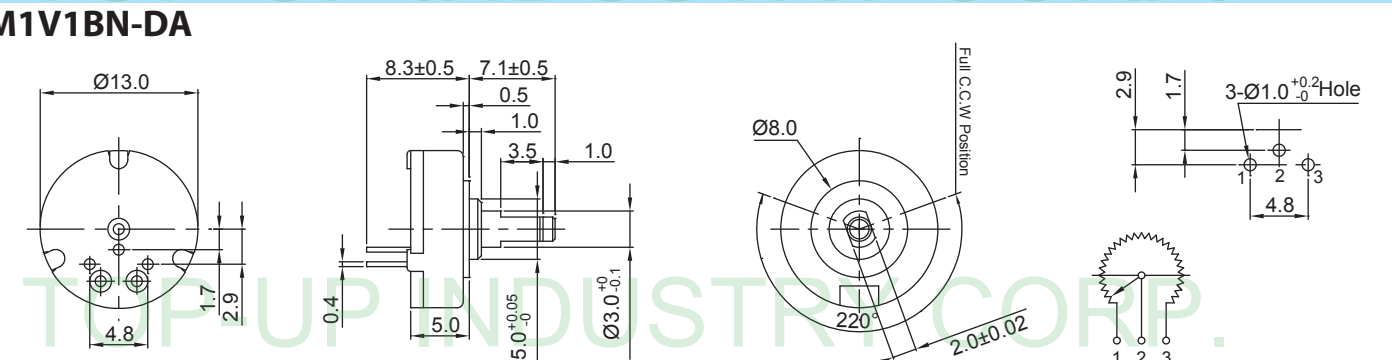
13M1V-D3A



13M1VBM-D4A



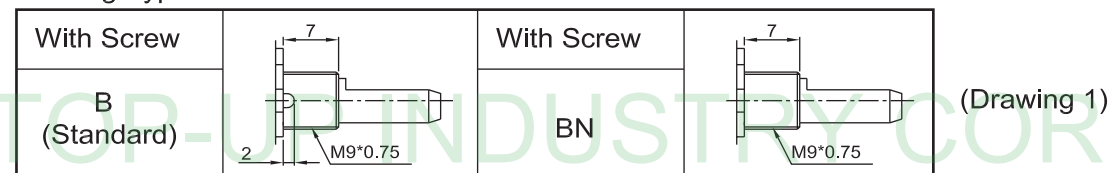
13M1V1BN-DA



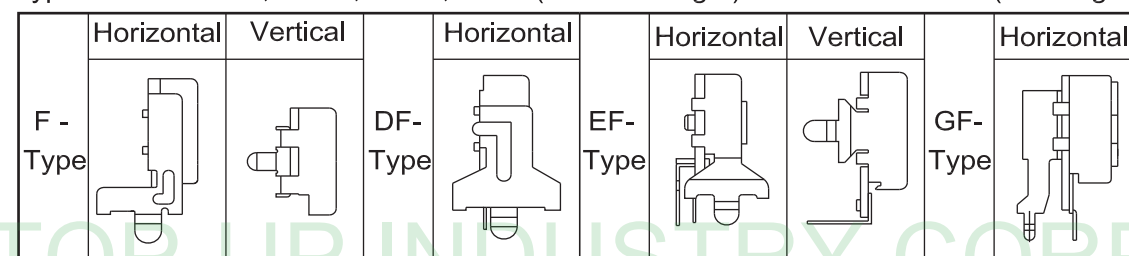
16PR Series Code Explanation

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

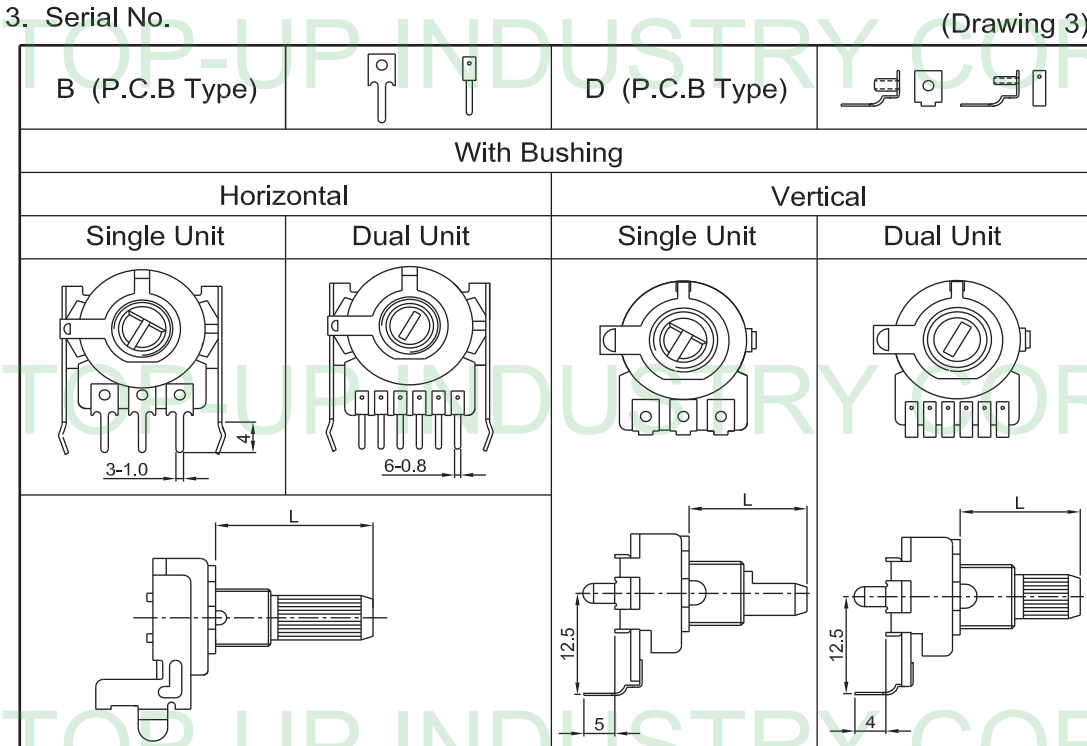
1. Product Lines of 16PR (16mm Size Insulated Shaft Potentiometers)
2. Number of Unit : 1 — Single Unit 2 — Dual Unit
3. Horizontal (H) Type or Vertical (V) Type (See Drawing 3)
4. Bushing Type



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



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



To Be Continued

16PR Series Code Explanation

(Drawing 3)

		Without Bushing															
		Horizontal					Vertical										
C (P.C.B Type)							B (P.C.B Type)										
		With Bushing					Without Bushing										
		Vertical					Horizontal										
		Dual Unit					Single Unit										
F - Type																	
K - Type																	
Model 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		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 -40dB to 0dB 3dB max. For tone 20dB max. at 50% rotation angle

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

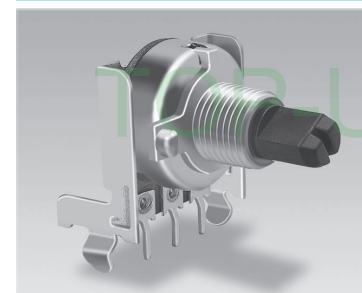
3. Electrical Characteristics

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

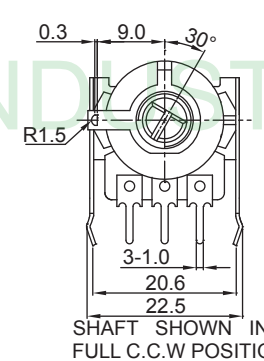
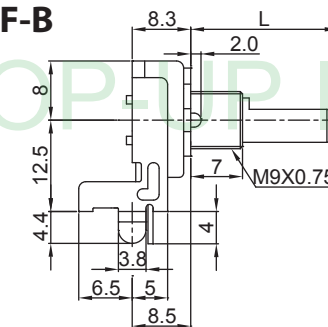
Rotational life	15,000 cycles
-----------------	---------------

16PR1HBF-B

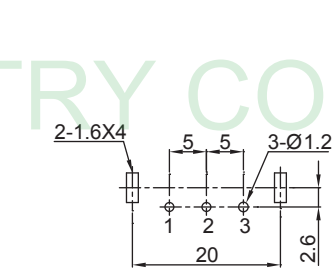


Outline Drawing

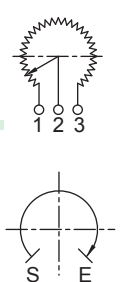
16PR1HBF-B



SHAFT SHOWN IN FULL C.C.W POSITION

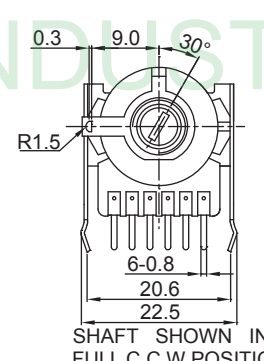
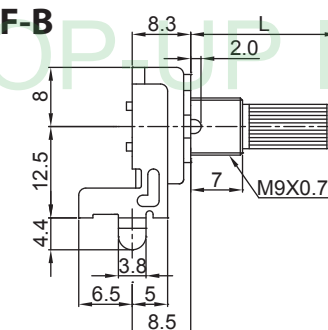


P.C.B MOUNTING HOLES DETAIL

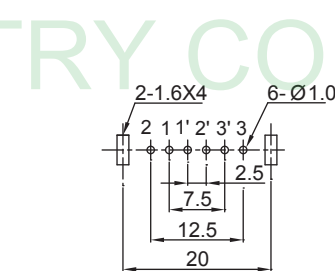


280° ROTATION SINGLE UNIT

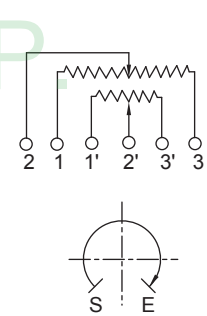
16PR2HBF-B



SHAFT SHOWN IN FULL C.C.W POSITION

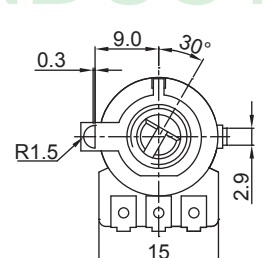
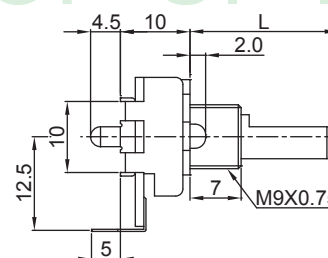


P.C.B MOUNTING HOLES DETAIL

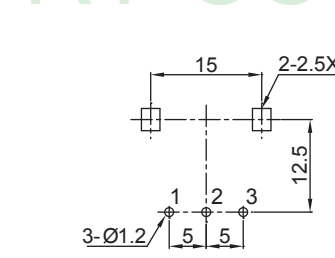


280° ROTATION DUAL UNIT

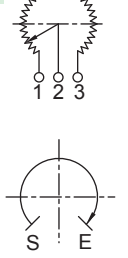
16PR1VBF-D



SHAFT SHOWN IN FULL C.C.W POSITION

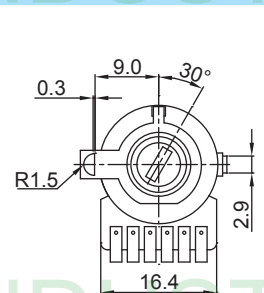
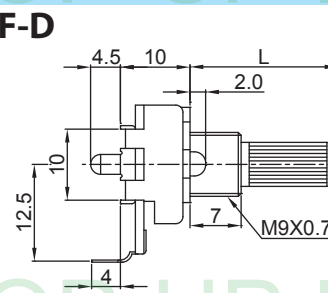


P.C.B MOUNTING HOLES DETAIL

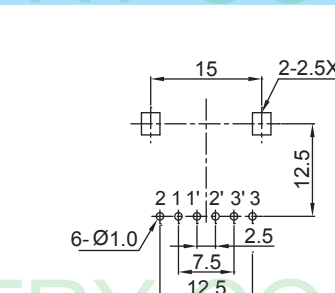


280° ROTATION SINGLE UNIT

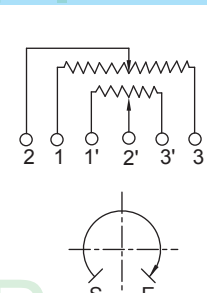
16PR2VBF-D



SHAFT SHOWN IN FULL C.C.W POSITION



P.C.B MOUNTING HOLES DETAIL



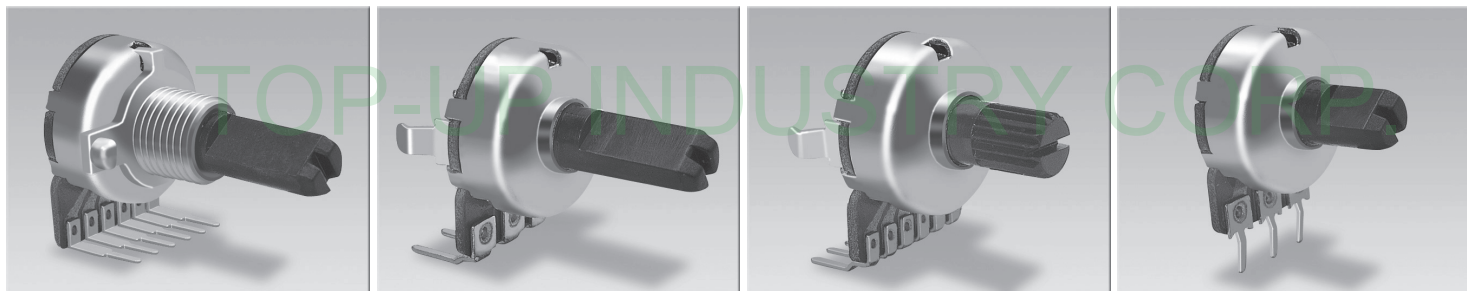
280° ROTATION DUAL UNIT

16PR2VB-C

16PR1VF-D

16PR2VF-D

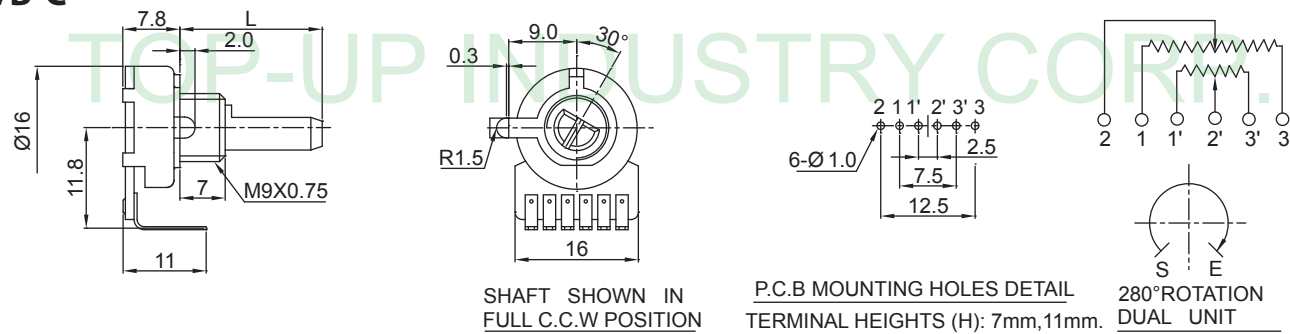
16PR1H-B



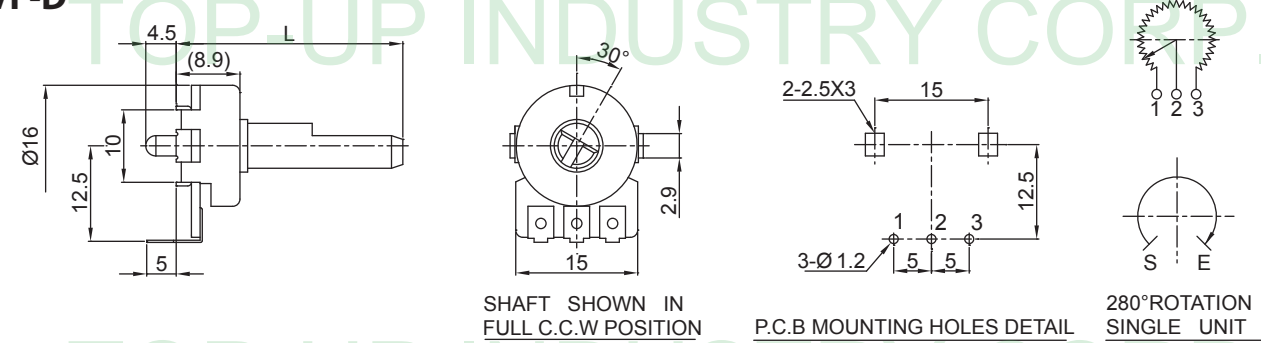
Outline Drawing

Features individual specifications

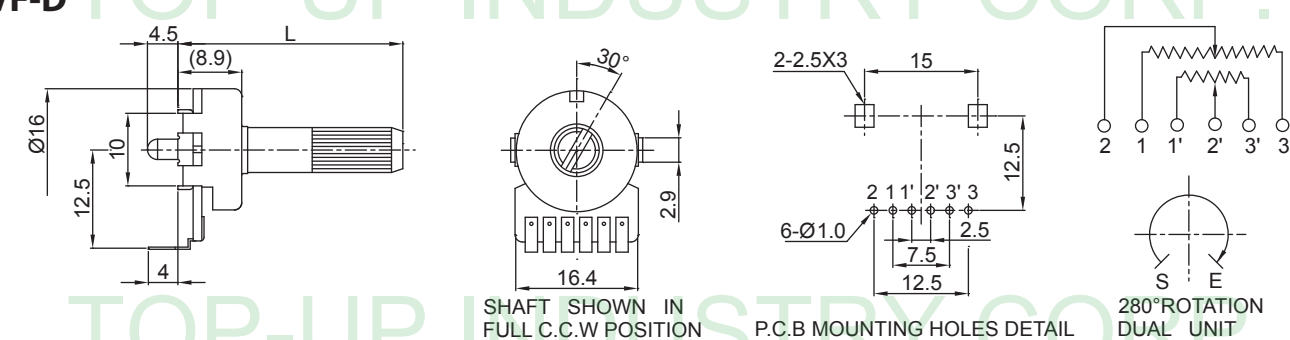
16PR2VB-C



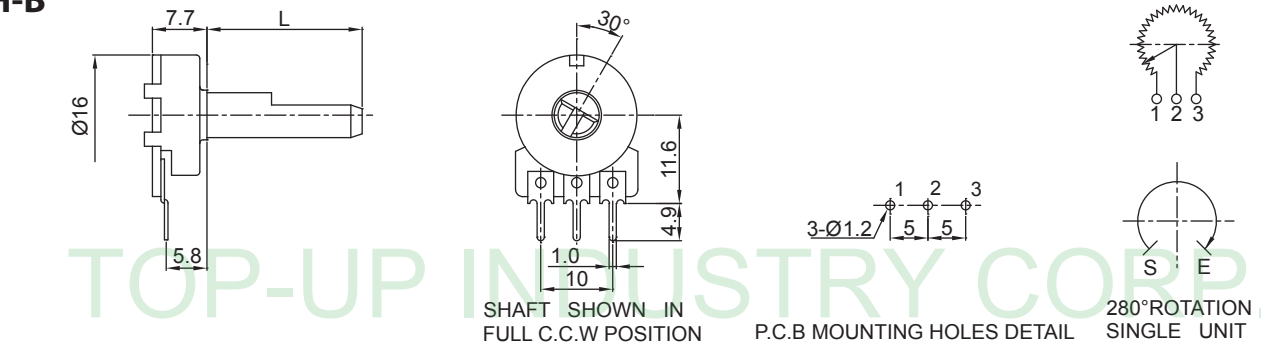
16PR1VF-D



16PR2VF-D



16PR1H-B

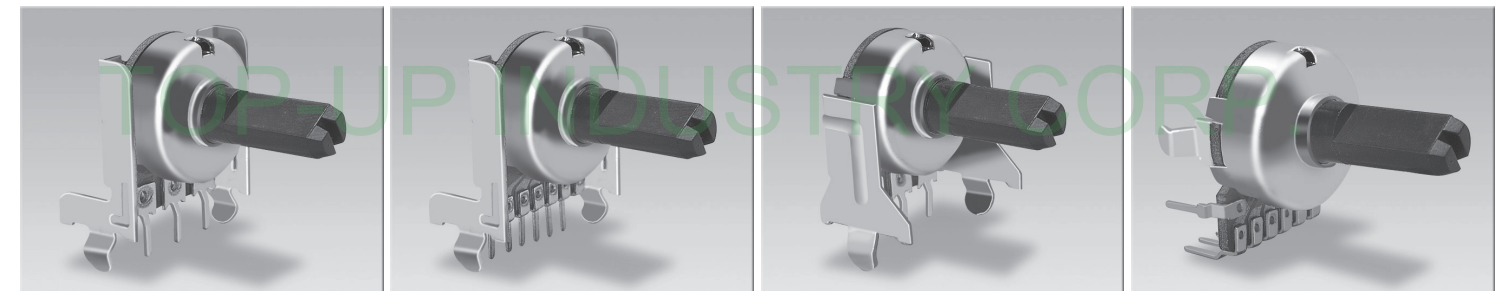


16PR1HF-B

16PR2HF-B

16PR1HDF-B

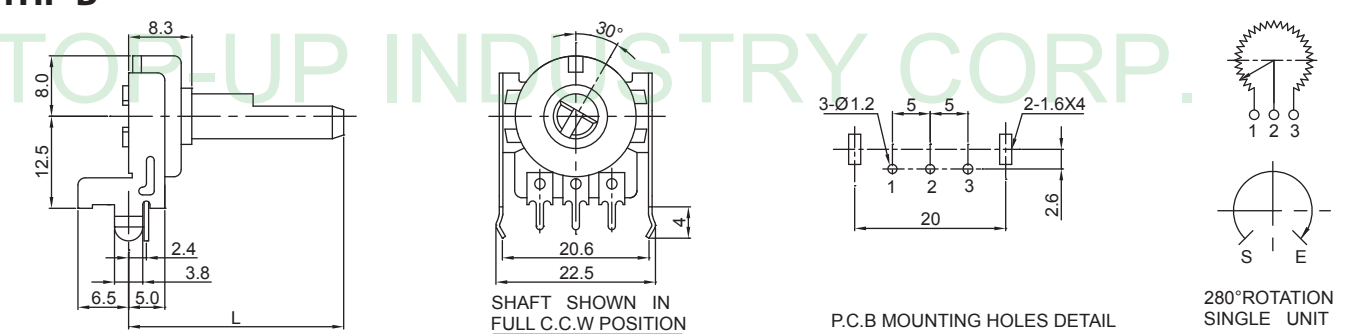
16PR2VFLT-D



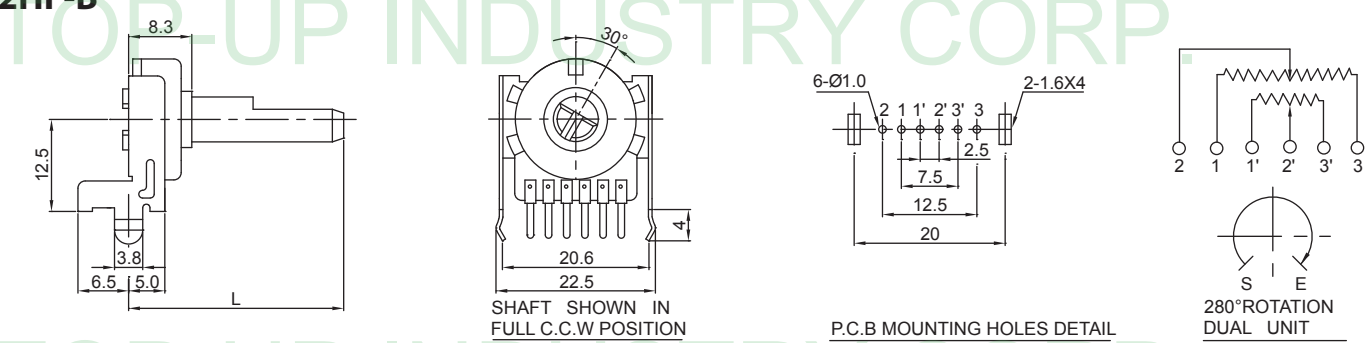
Outline Drawing

Features individual specifications

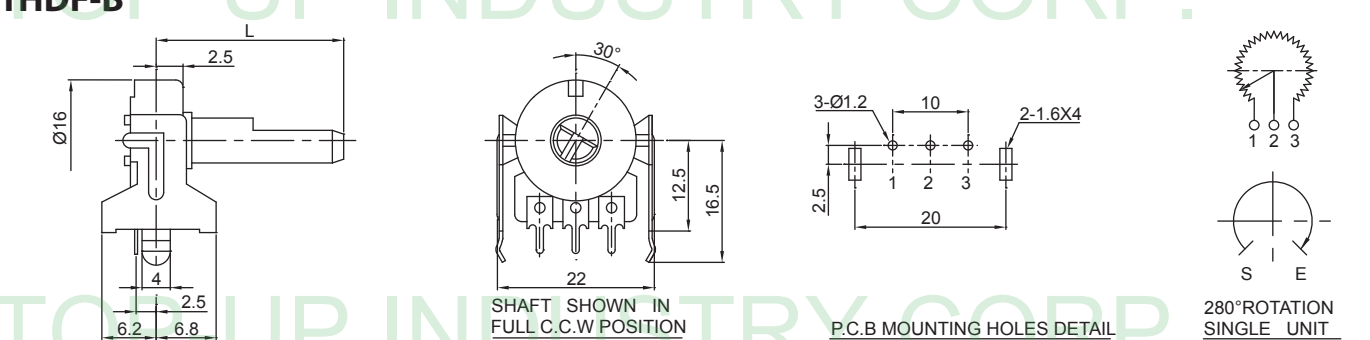
16PR1HF-B



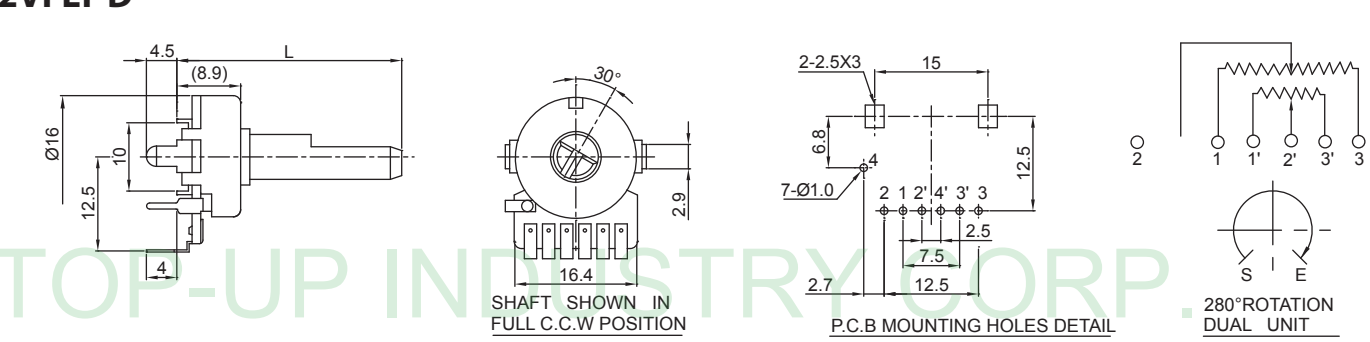
16PR2HF-B



16PR1HDF-B



16PR2VFLT-D



16M Series Code Explanation

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

- With Motor-Driven
- Product Lines of 16M & 16P
16M— Metal Shaft, 16mm Size Series
16P— Insulated Shaft, 16mm Size Series
- Number of Unit
1— Single Unit
2— Dual Unit ,.....
- Type of Switch (Drawing 1)

S	KS	AS	BS
LS	GS	CS	DS

- Horizontal (H) Type or Vertical (V) Type
- Bushing Length
- Bushing Type (See Drawing 2)
- Bushing Material : Blank -Zinc Alloy (Standard Type)
A -Aluminum Alloy , P -Plastic Alloy , C -Copper Alloy

- 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)	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

- With Frame : "F"
- With Tap
UT — Up Tap , RT — Right Tap
- Type of Terminal

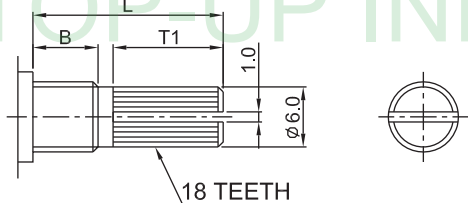
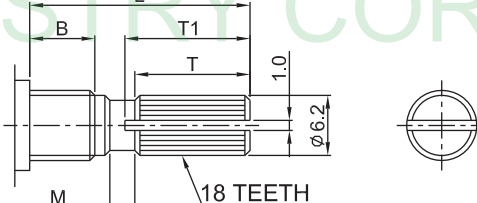
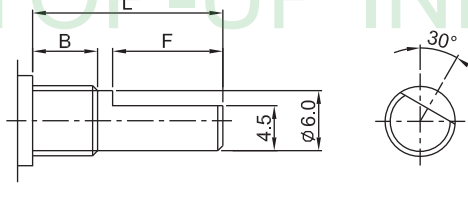
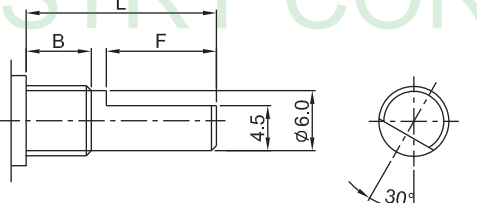
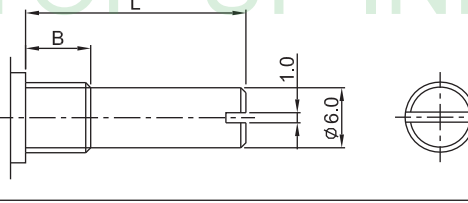
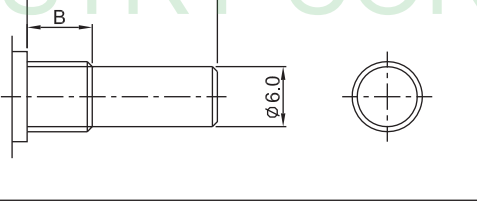
P.C.B Type	
Horizontal B	Vertical D
Code B B1 B2 B3 B4 B5 B6	Code D D1 D2 D3 D4 D5 D6 D7 D8
Single Unit H 12.5 18 22 12.5 18 22 18.5	Single Unit H 16.2 14 13.5 12.7 13 15.7 15.2 12
G 10.7 11.1 12 9.2 9.3 14.5 13 8.9	G 11.1 12.3 14.5
P 3.5 3.5 3.5 4.0 4.0 4.0 3.5	P 5 5 4 4.5 4.5 3.5 3.4 8.5
Solder Lug Type	
Horizontal A	Vertical C
Code A A1 A2 A3 A4	Code C C1 C2 C3
Single Unit H 10.9 11.5 13 11.7 12	Single 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

- Shaft Length "L" (See Drawing 4)
- Type of Shaft (See Drawing 4)
- Type of Taper (See Taper Chart Last Page)
- Resistance Value
- Number of Clicks : Blank -None
1C -Center Click 11C -11 Position Click
21C -21 Position Click 41C -41 Position Click
- Serial No.

16M Series Code Explanation

MD	16M	1	KS	H	5	B	P	9	F	RT	B	20	K	B	50K	1C			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		

(Drawing 4)

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

16mm SIZE METAL SHAFT POTENTIOMETERS

Mechanical Characteristic:

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

Electrical Characteristic:

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

Durability:

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

16mm SIZE ROTARY MOTOR-DRIVEN POTENTIOMETERS

Common Specifications

1. Mechanical Characteristics

Series		(16mm size)	
Items		Single shaft	Dual shaft
Total rotation angle		300±3°	300±5°
Rotational torque		30 to 250 gf . cm	
Detent torque	Center detent	Rotational torque + (30 to 300) gf . cm	
	11 detent	—	
	21 detent	100 to 500 gf . cm	
	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.	
		Shaft length (mm)	
		Thrust A (gf)	
		Single and outer shafts B (mm P-P)	
		Inner shaft B (mm P-P)	
Bushing nut tightening strength		12kgf max.	
Detent angle		No.of detents	Center-detent
		Angle	150±3°
		11 detents	30±2°
		21 detents	15±3°
		31 detents	10±2°
		41 detents	7.5±2°
		Both ends ±3°	

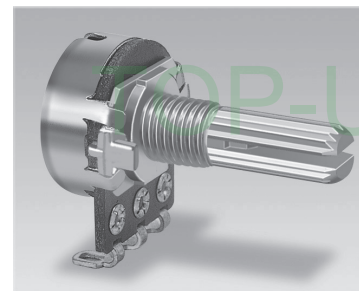
2. Electrical Characteristics

Series		16mm size
Total resistance range(k Ω)		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		1 Ω max.
Maximum attenuation level for volume control		5k Ω ≤ R < 10k Ω 70dB min.
		10k Ω ≤ R < 50k Ω 80dB min.
		50k Ω ≤ R < 100k Ω 90dB min.
		100k Ω ≤ 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		100M Ω min. at 500V DC
Withstand voltage		1 minute at 500V AC

3. Durability Characteristics

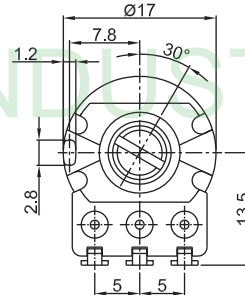
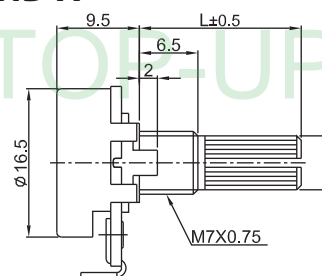
Rotational life	15,000 cycles
-----------------	---------------

16M1HB-A

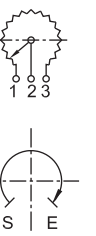
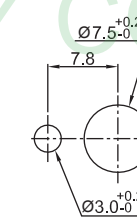


Outline Drawing

16M1HB-A

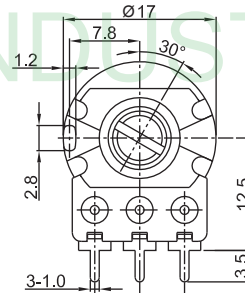
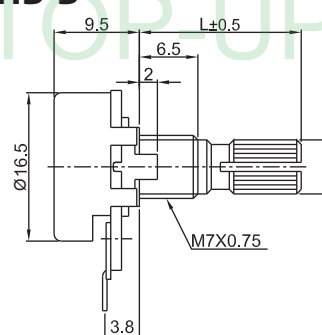


SHAFT SHOWN IN FULL C.C.W POSITION

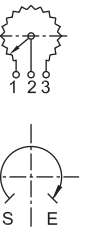
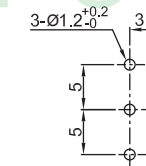


300° ROTATION SINGLE UNIT

16M1HB-B



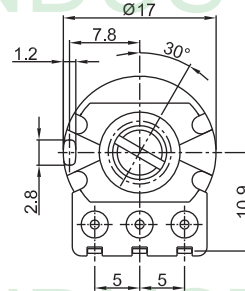
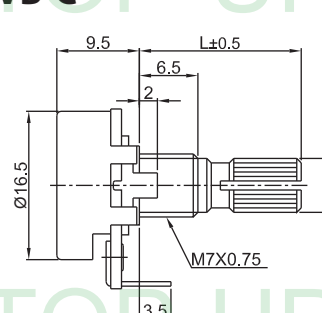
SHAFT SHOWN IN FULL C.C.W POSITION



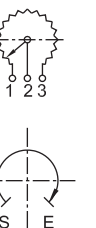
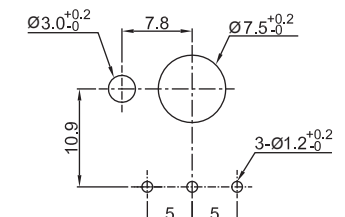
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

16M1VB-C



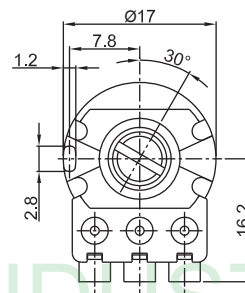
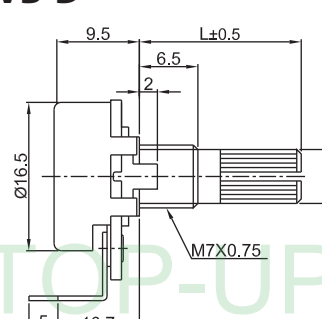
SHAFT SHOWN IN FULL C.C.W POSITION



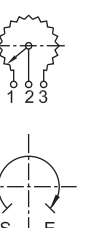
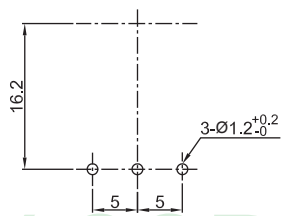
300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

16M1VB-D

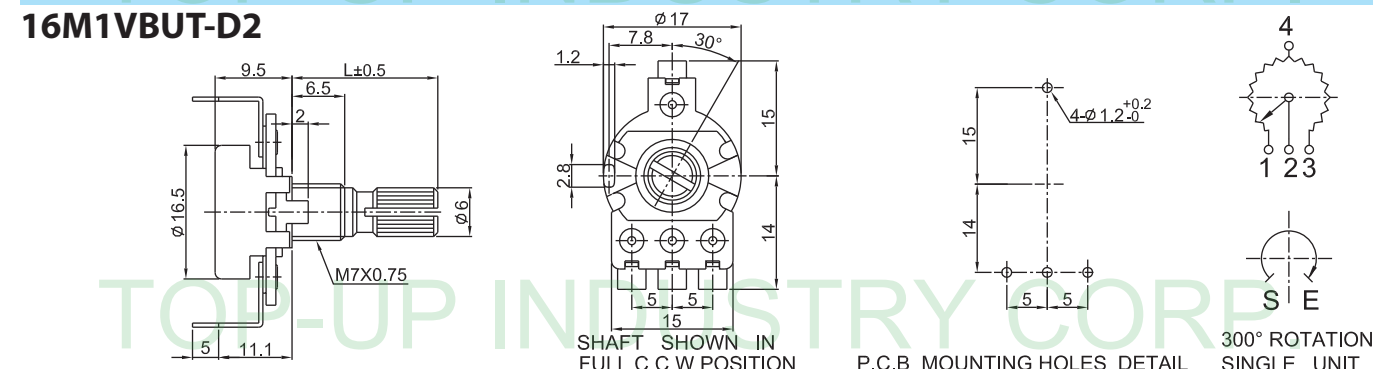
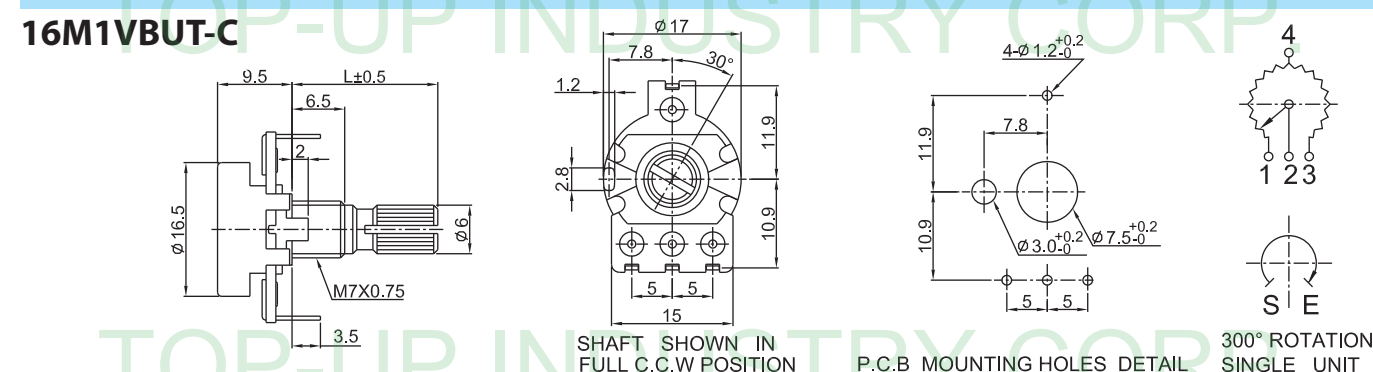
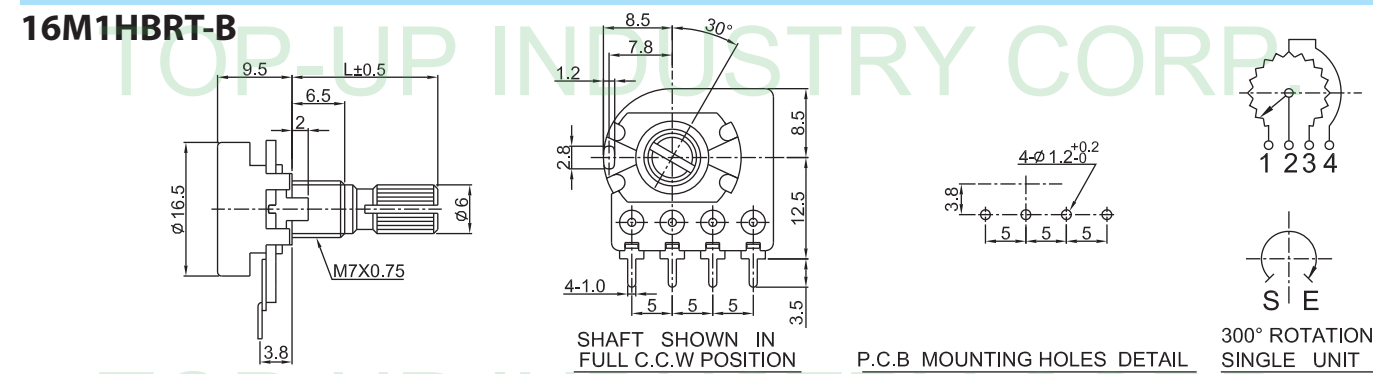
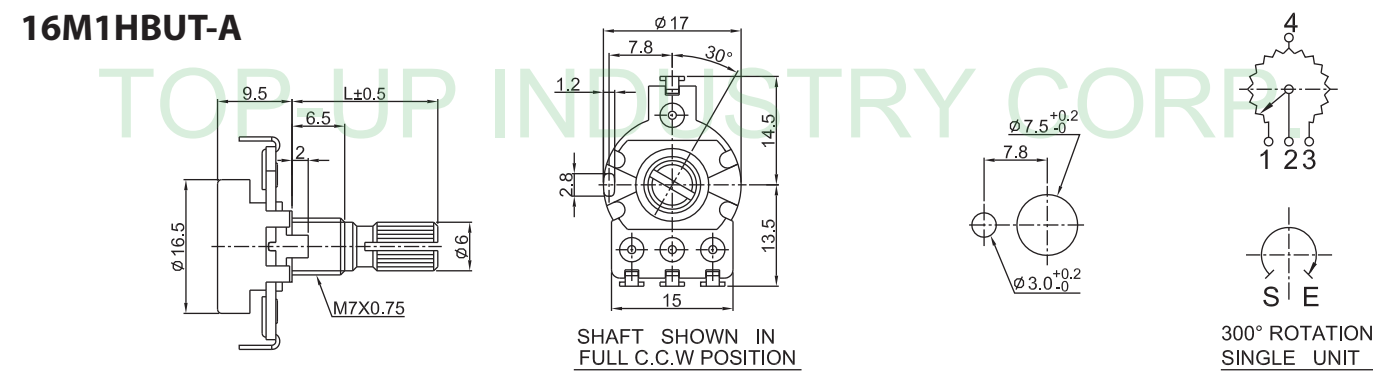
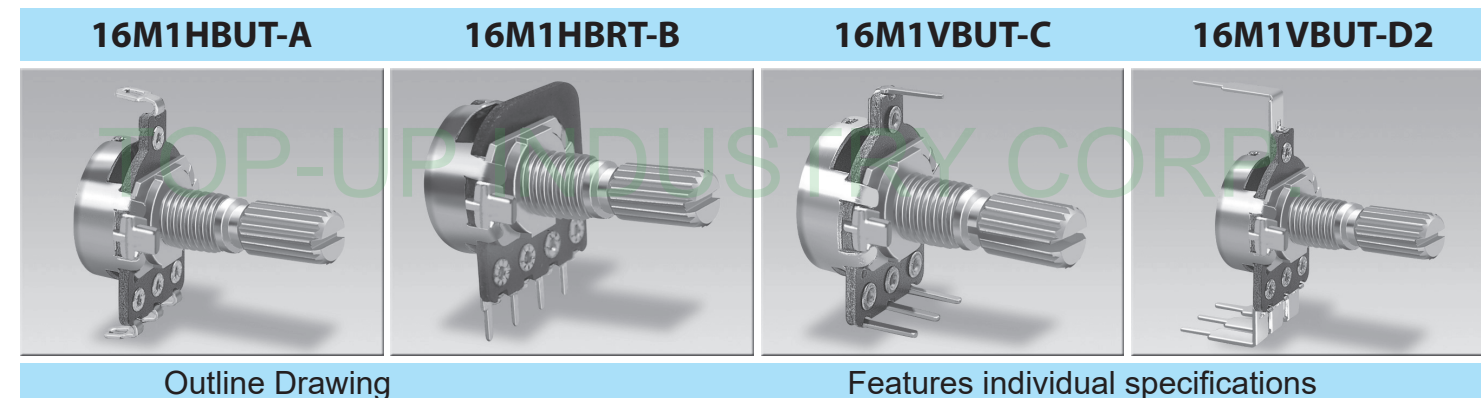
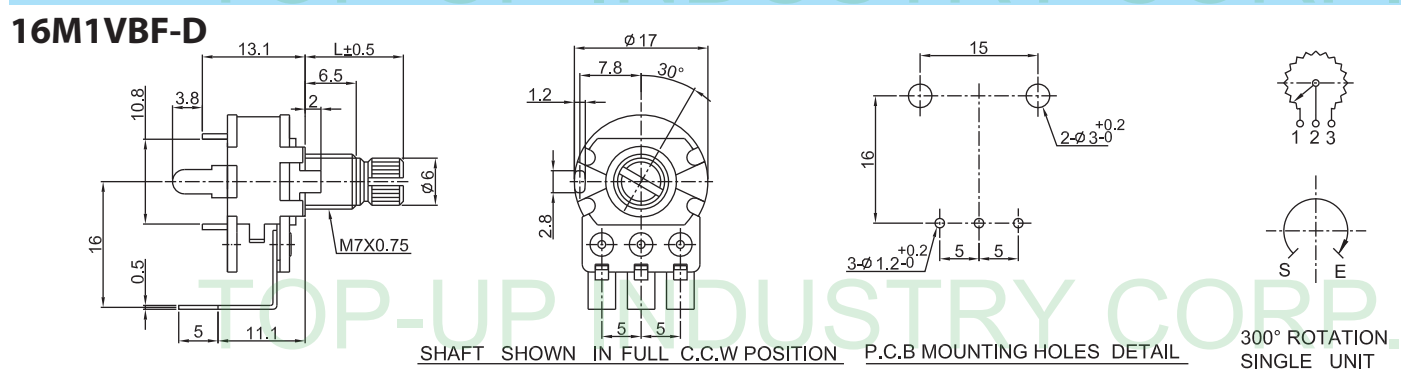
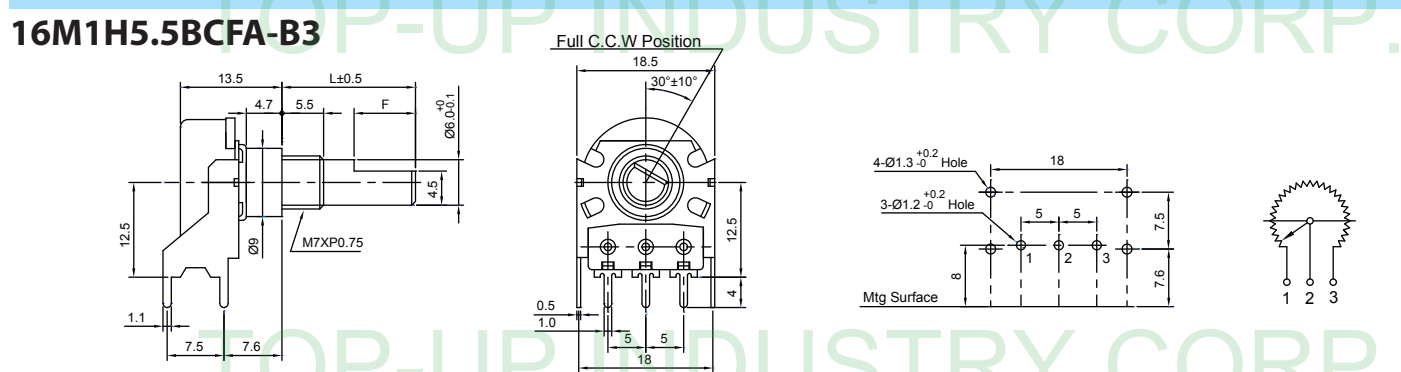
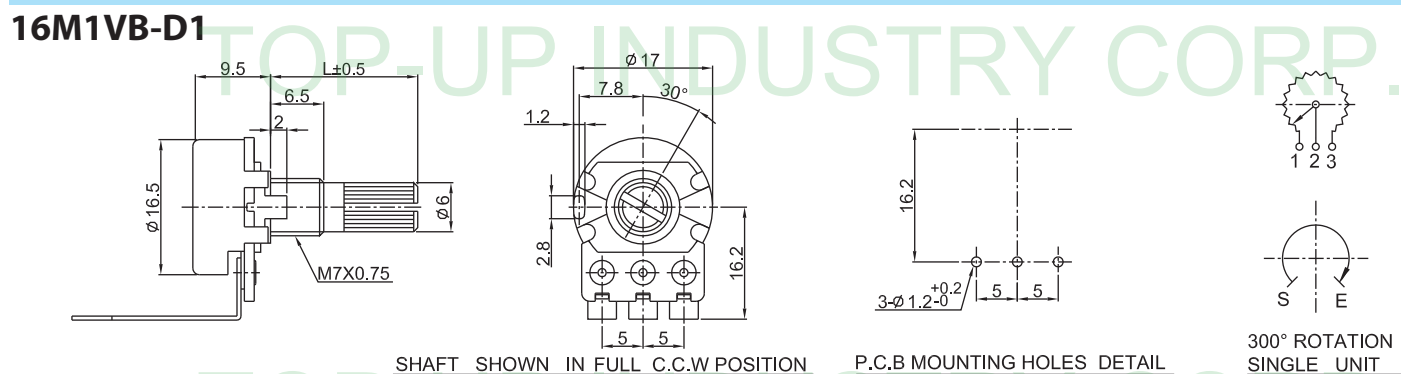
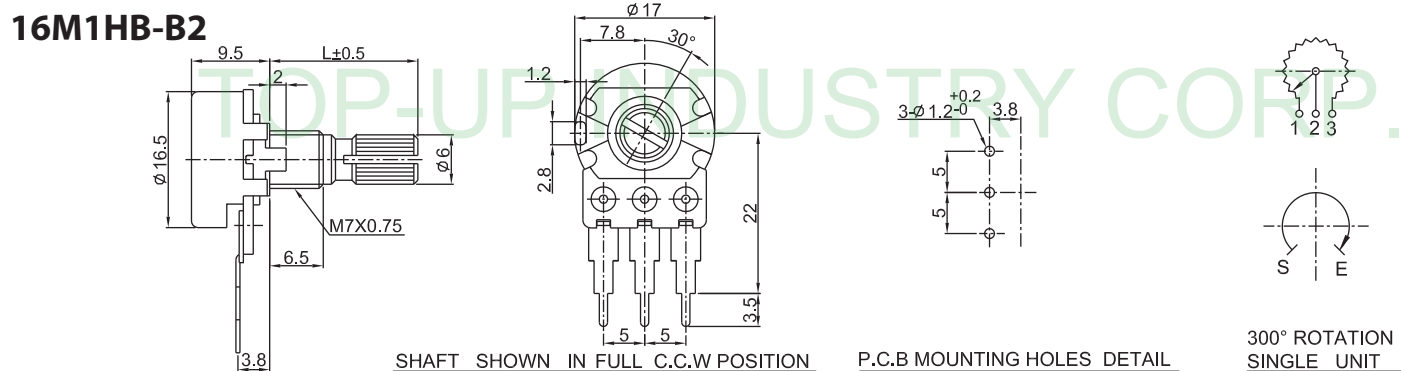
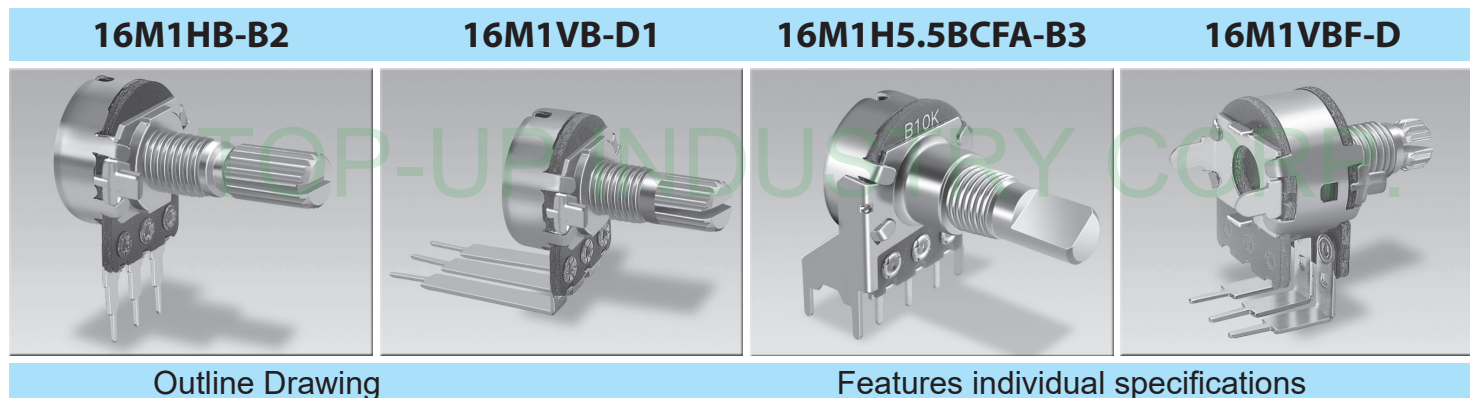


SHAFT SHOWN IN FULL C.C.W POSITION



300° ROTATION SINGLE UNIT

P.C.B MOUNTING HOLES DETAIL

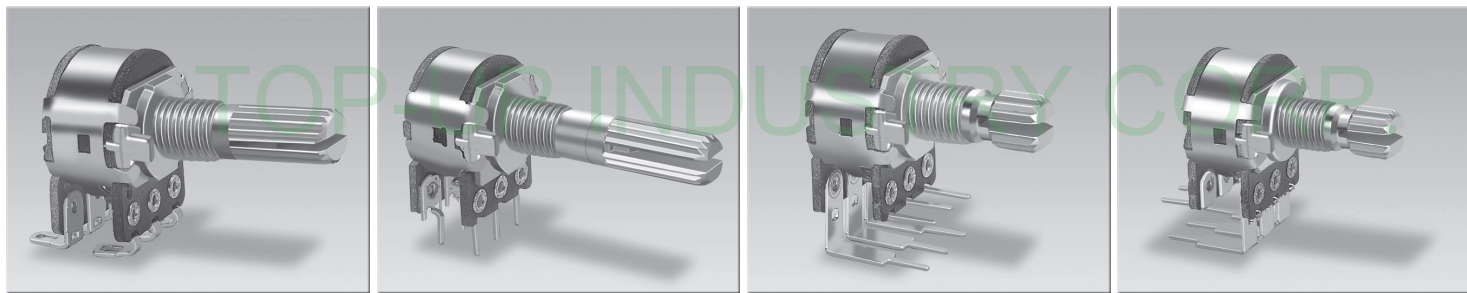


16M2HB-A

16M2HB-B

16M2VB-C

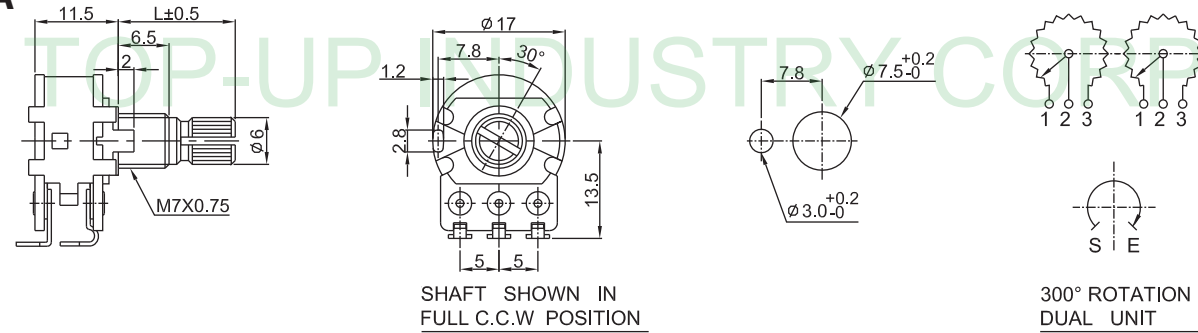
16M2VB-D



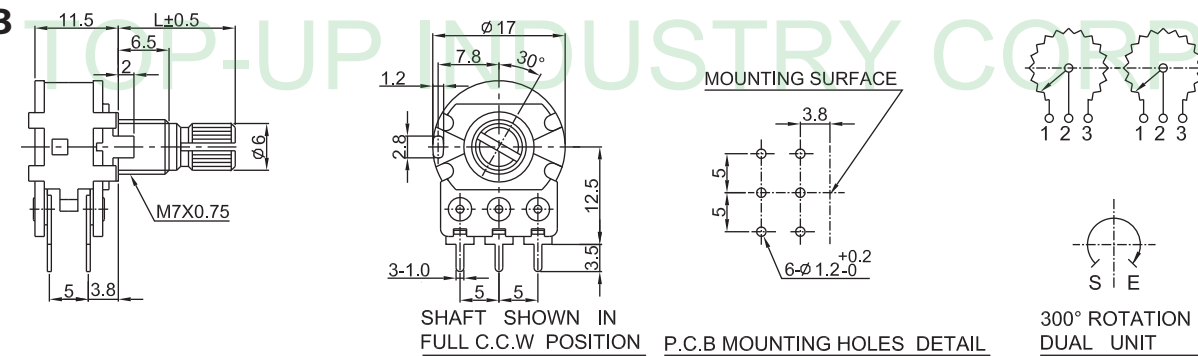
Outline Drawing

Features individual specifications

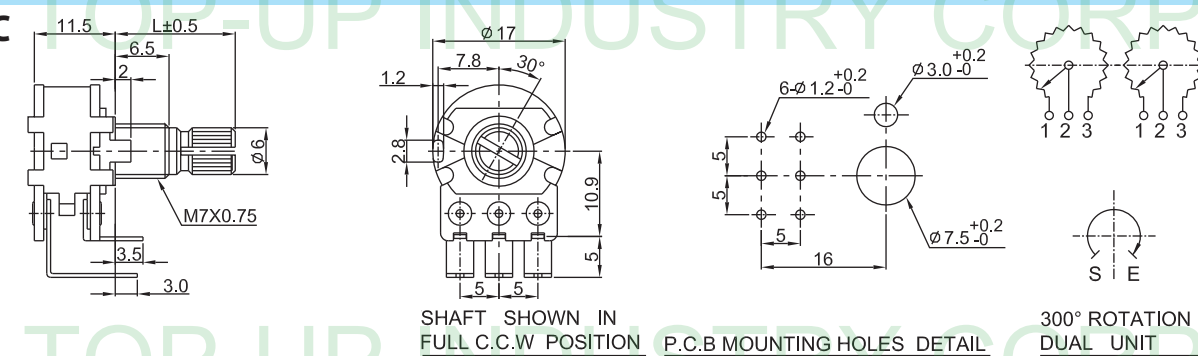
16M2HB-A



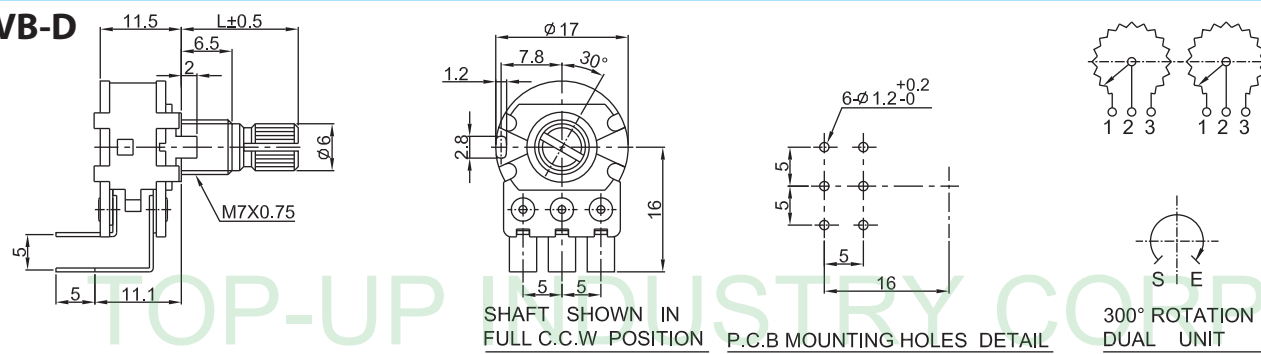
16M2HB-B



16M2VB-C



16M2VB-D

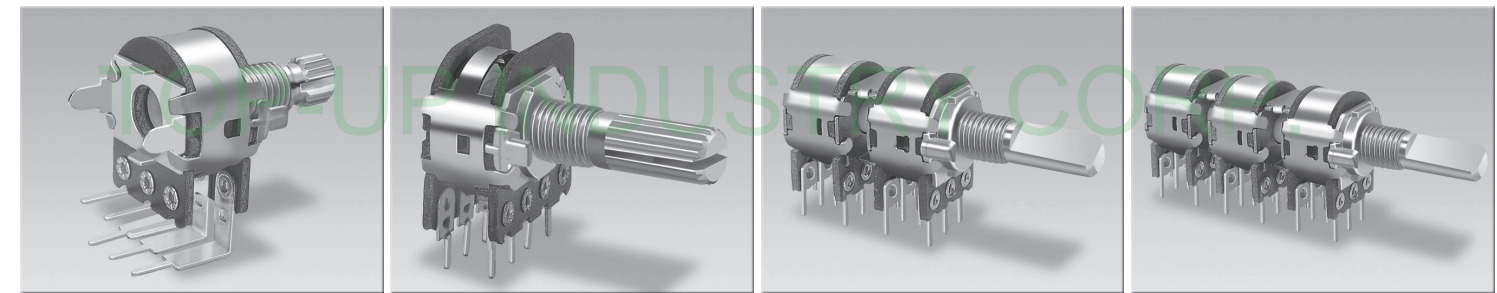


16M2VBF-D

16M2HBRT-B

16M4HB-B3

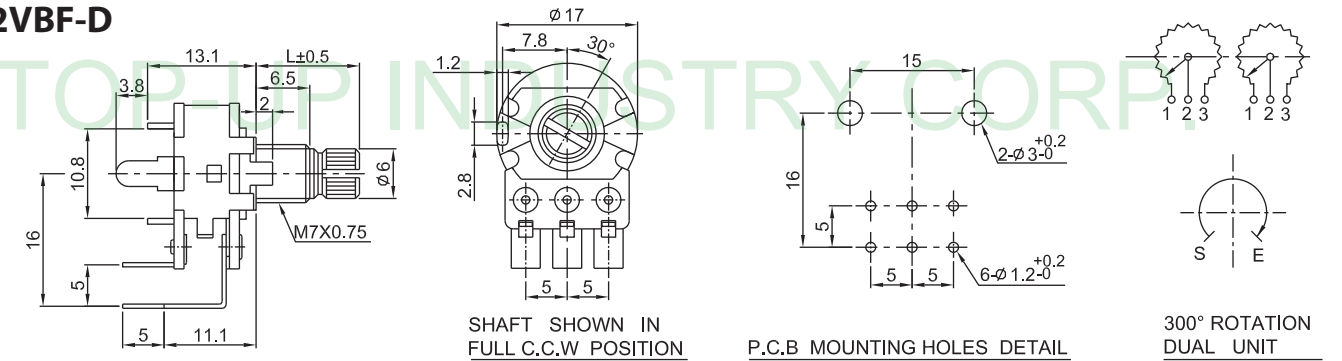
16M6HB-B3



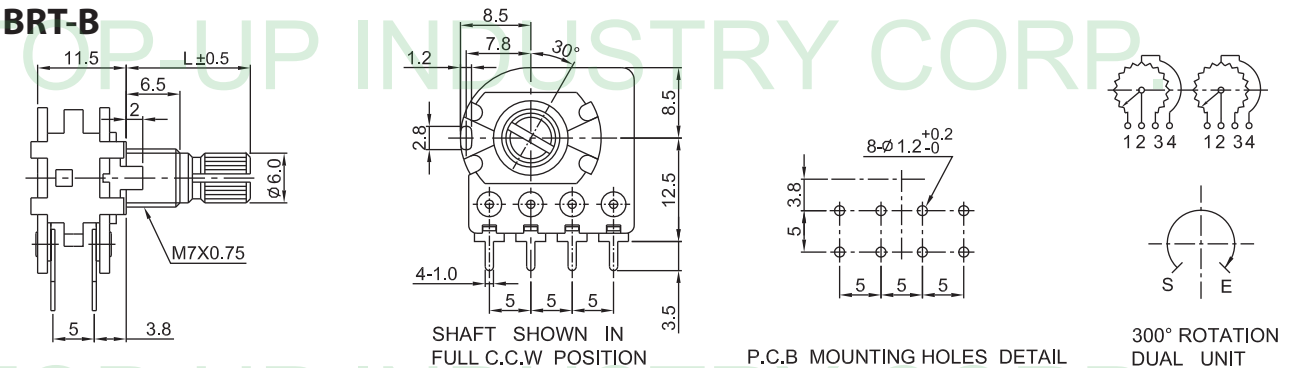
Outline Drawing

Features individual specifications

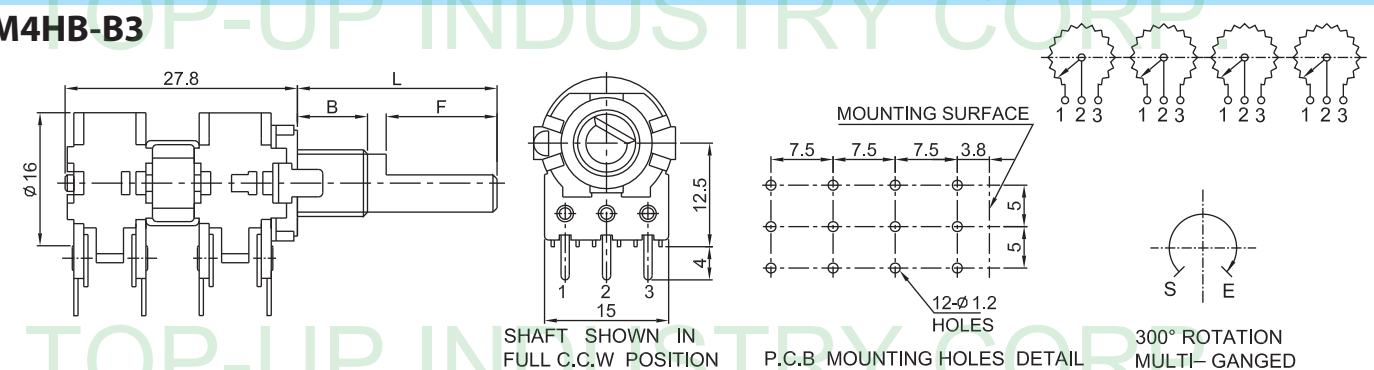
16M2VBF-D



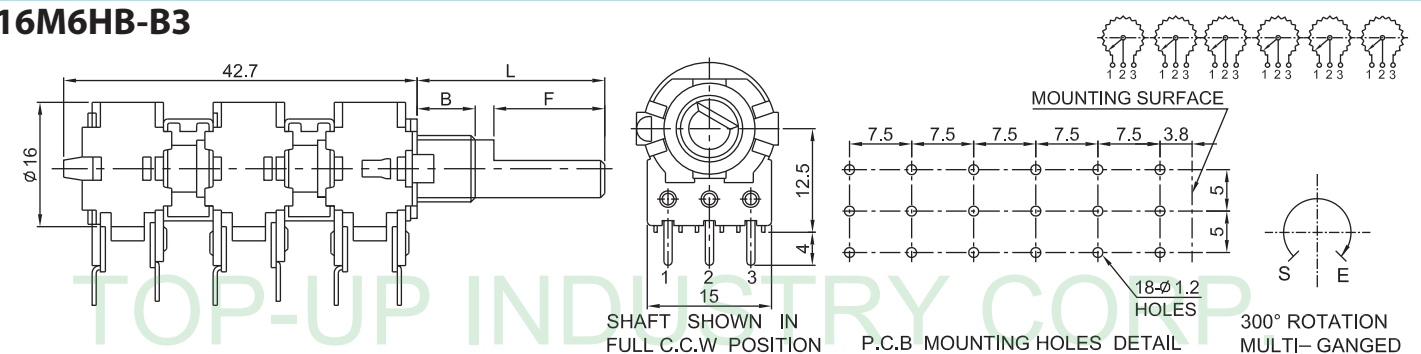
16M2HBRT-B



16M4HB-B3



16M6HB-B3

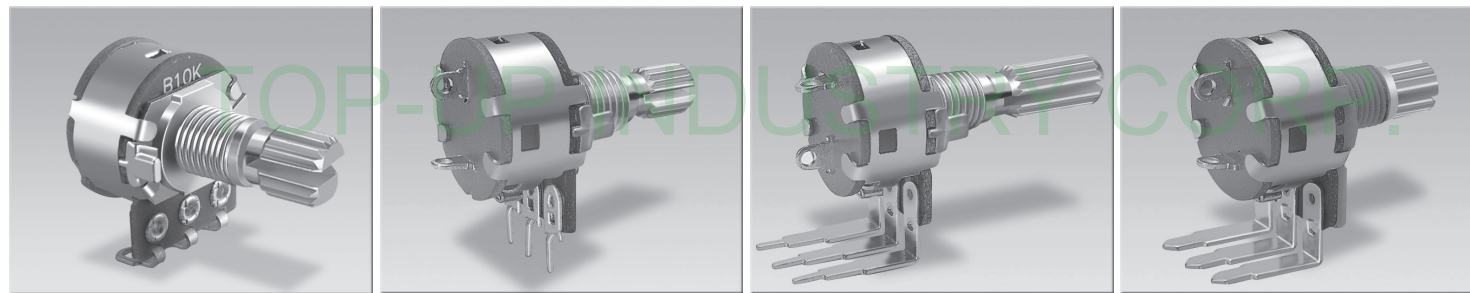


16M1KSHB-A

16M1KSHB-B3

16M1KSVB-D1

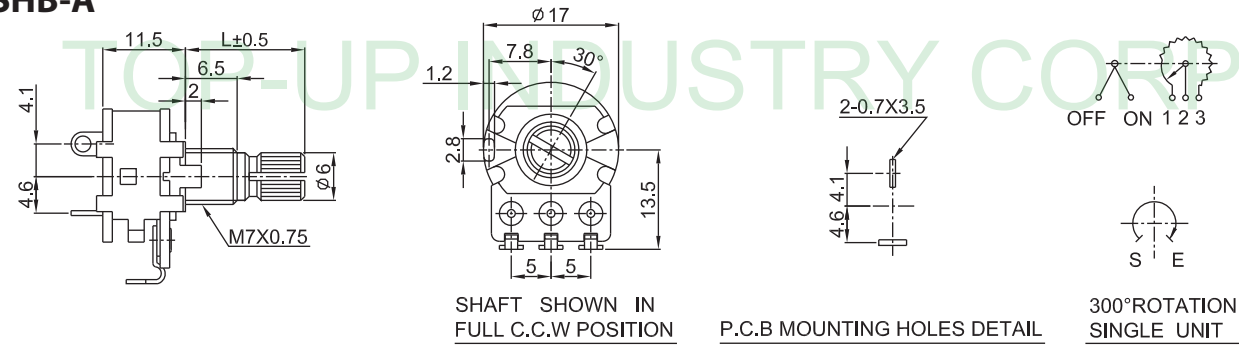
16M1KSVBP-D2



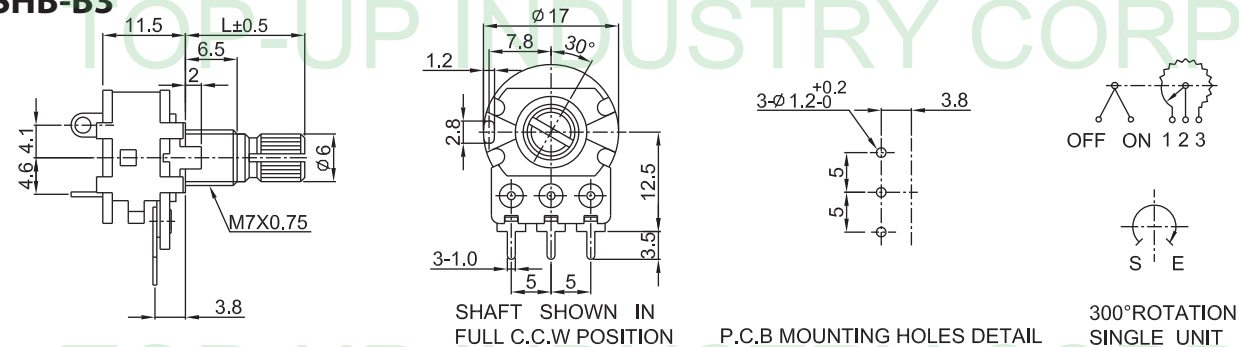
Outline Drawing

Features individual specifications

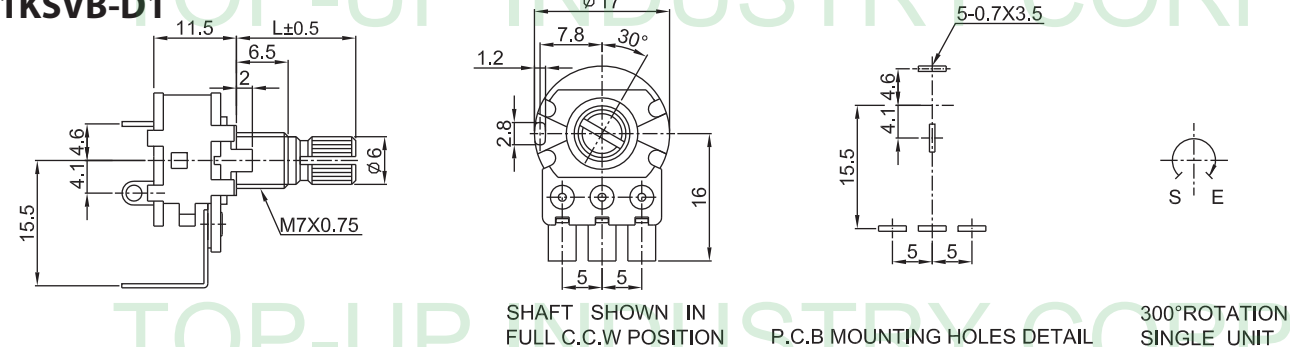
16M1KSHB-A



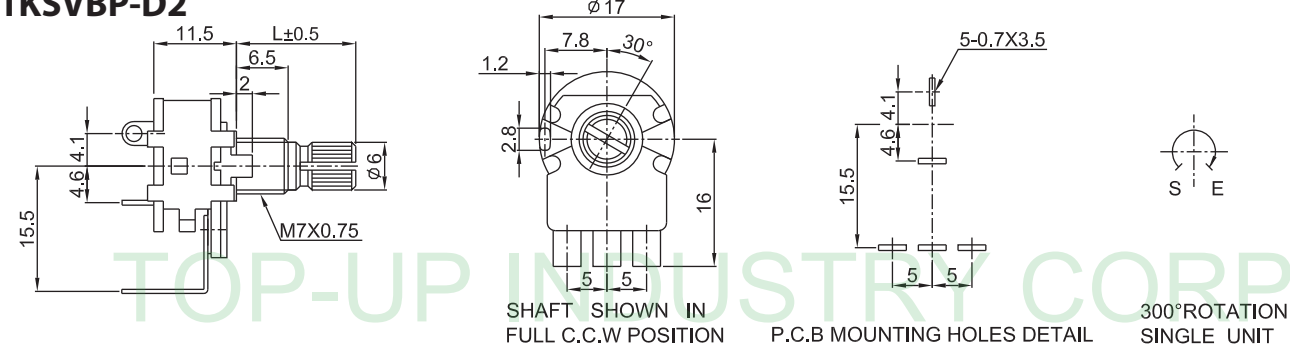
16M1KSHB-B3



16M1KSVB-D1



16M1KSVBP-D2

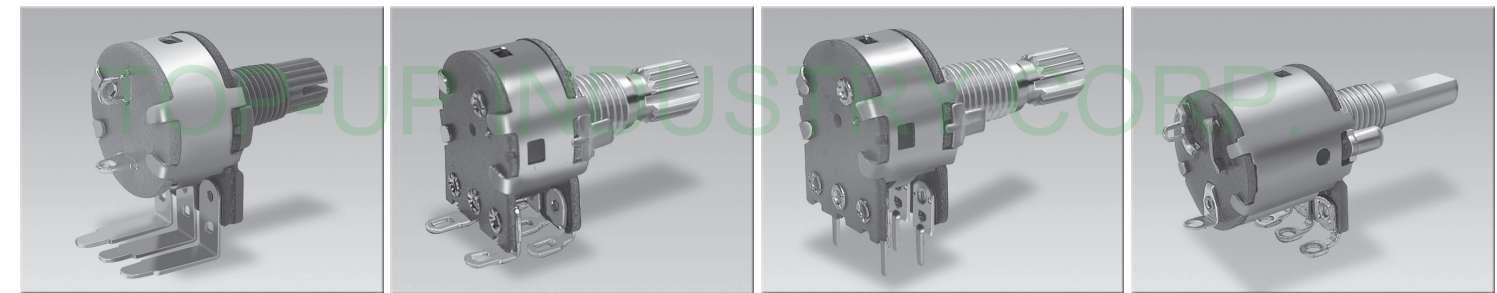


16P1KSVBP-D2

16M1SHB-A

16M1SHB-B3

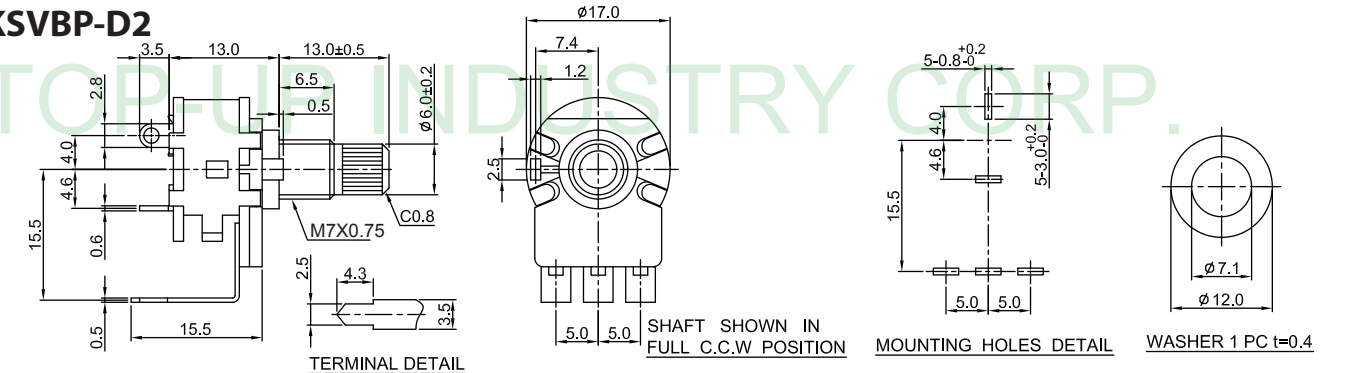
16M1ASH7B-A



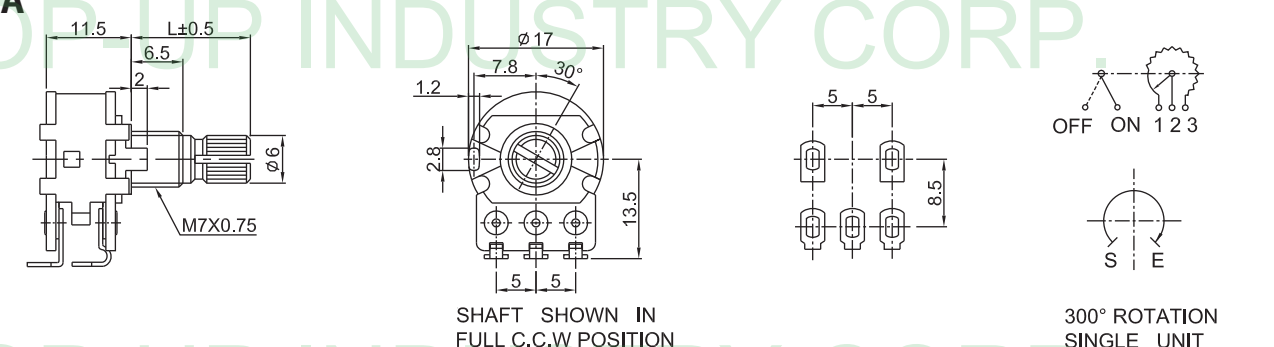
Outline Drawing

Features individual specifications

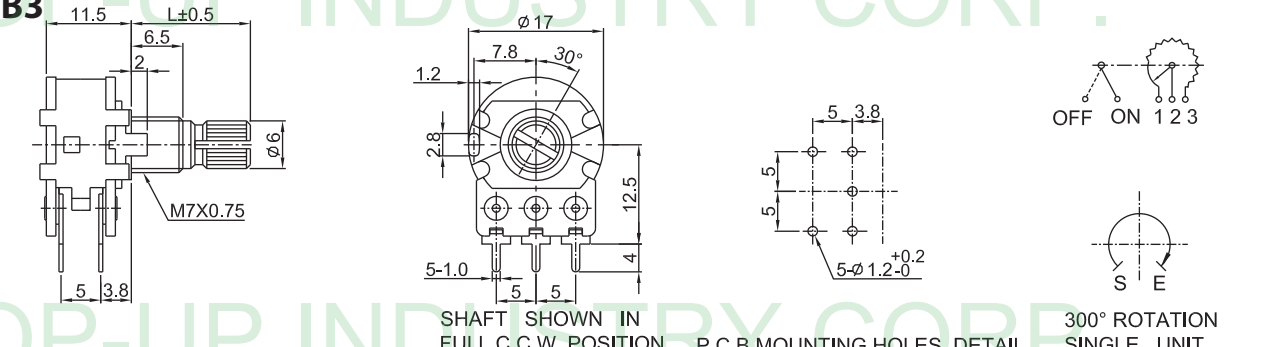
16P1KSVBP-D2



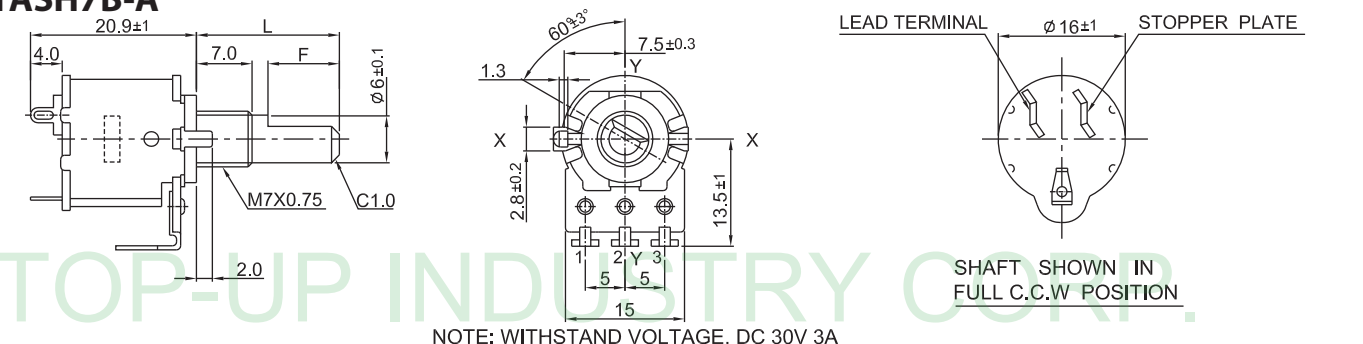
16M1SHB-A



16M1SHB-B3



16M1ASH7B-A

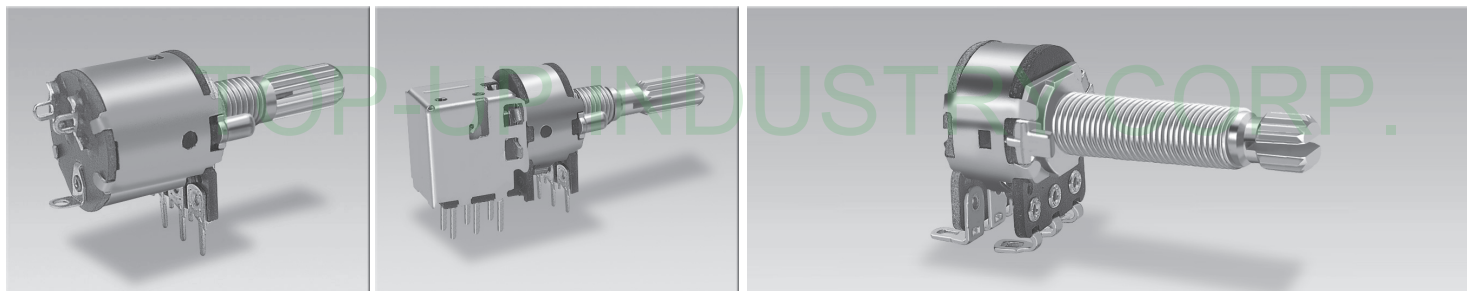


NOTE: WITHSTAND VOLTAGE, DC 30V 3A

16M1BSH7B-B

16M1LSH7BF-B3

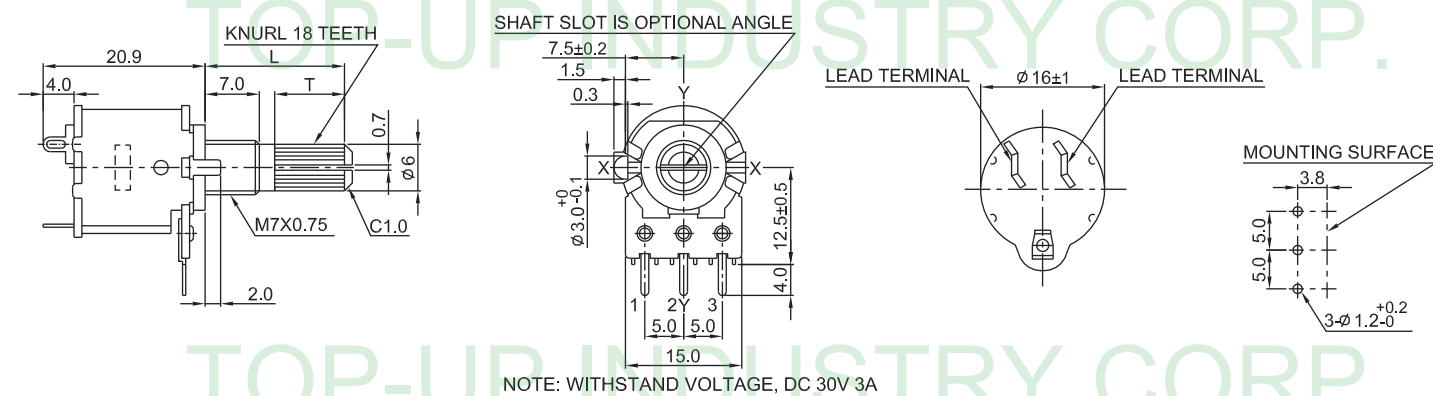
16M1SH26B-A



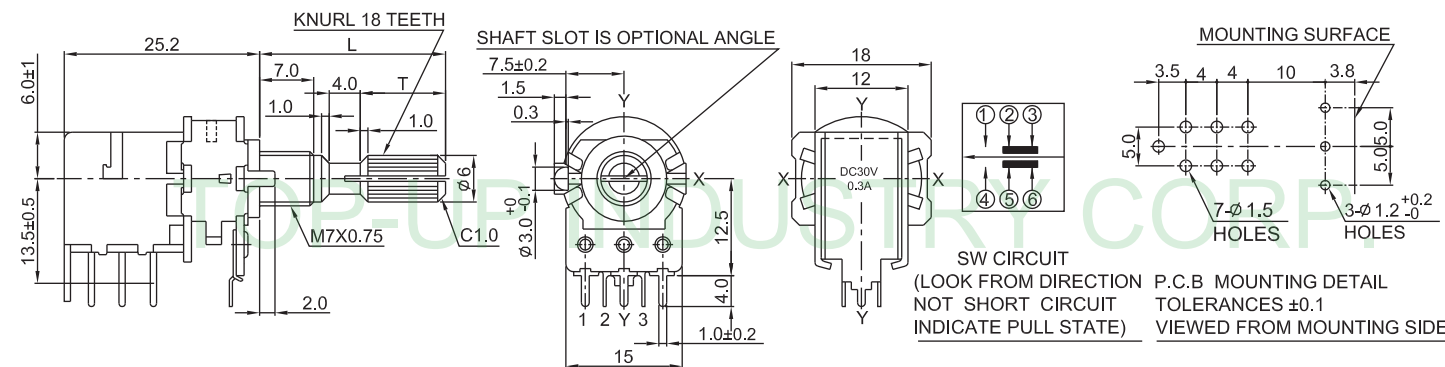
Outline Drawing

Features individual specifications

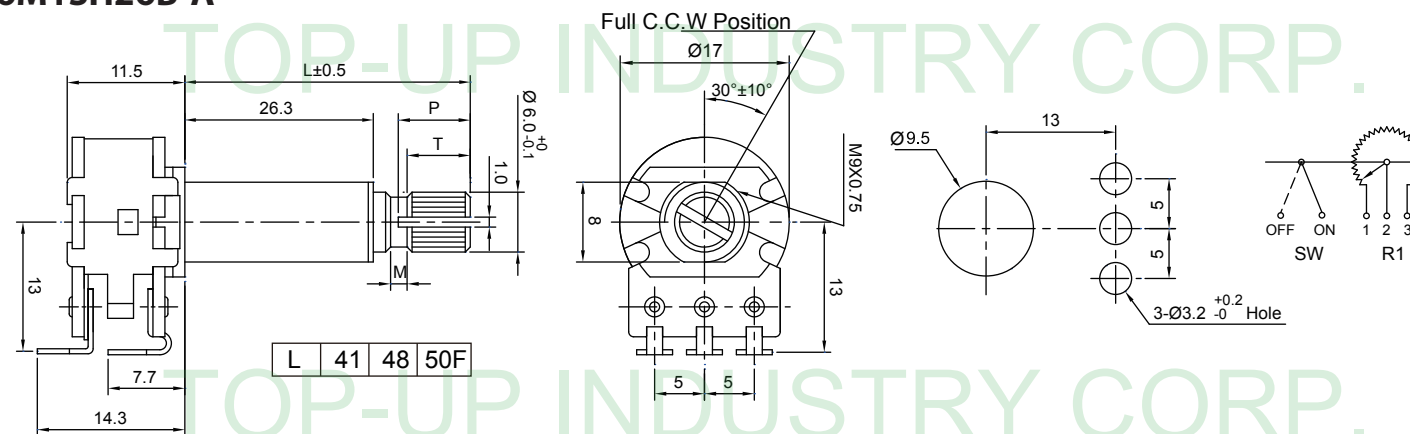
16M1BSH7B-B



16M1LSH7BF-B3

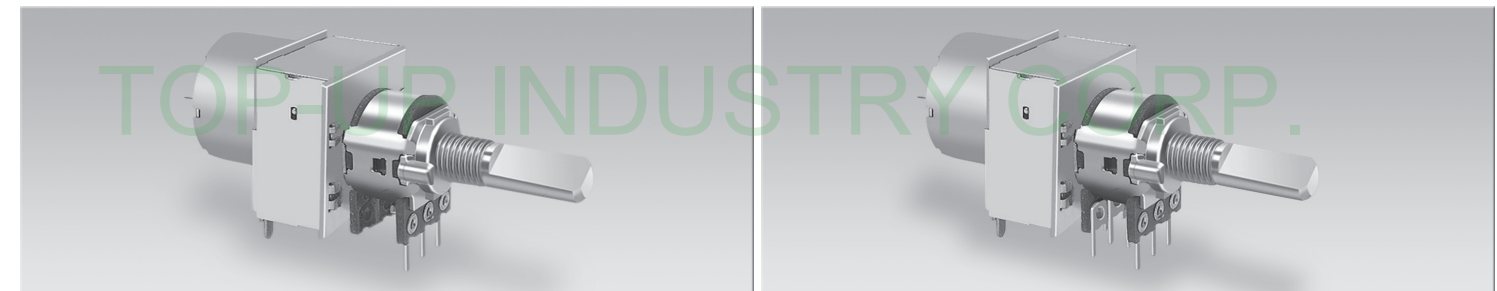


16M1SH26B-A



MD16M1HB-B3

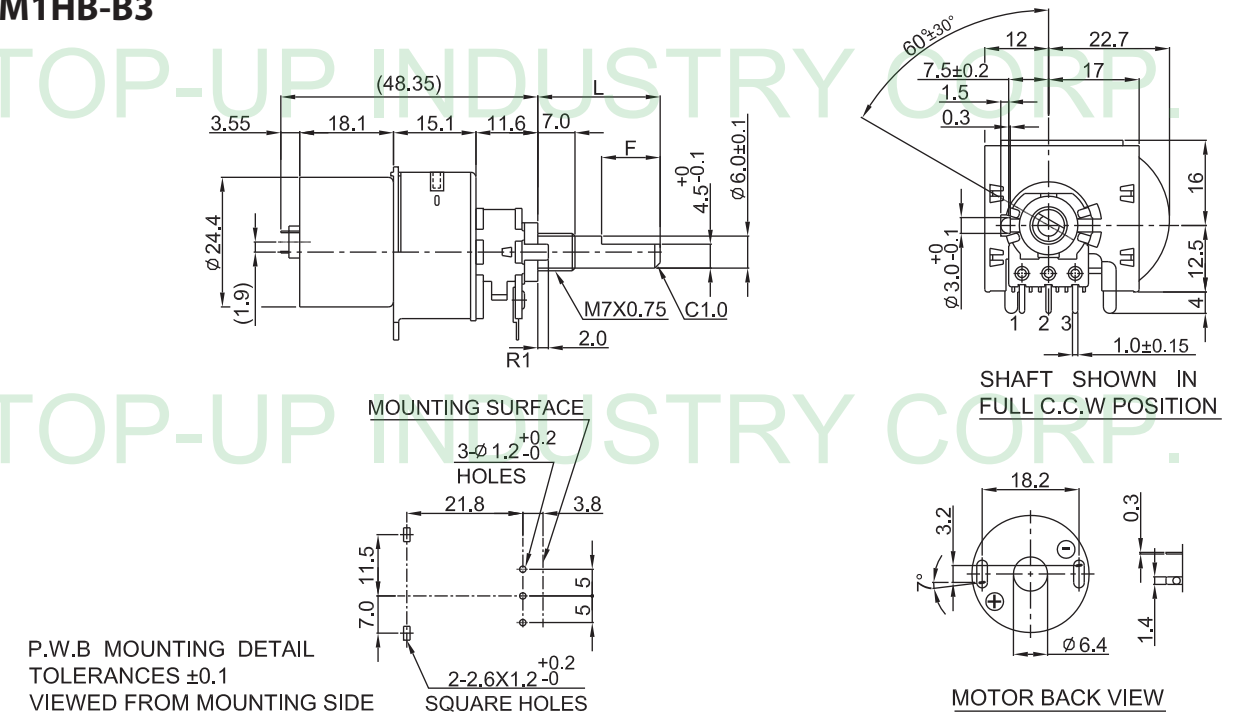
MD16M2HB-B3



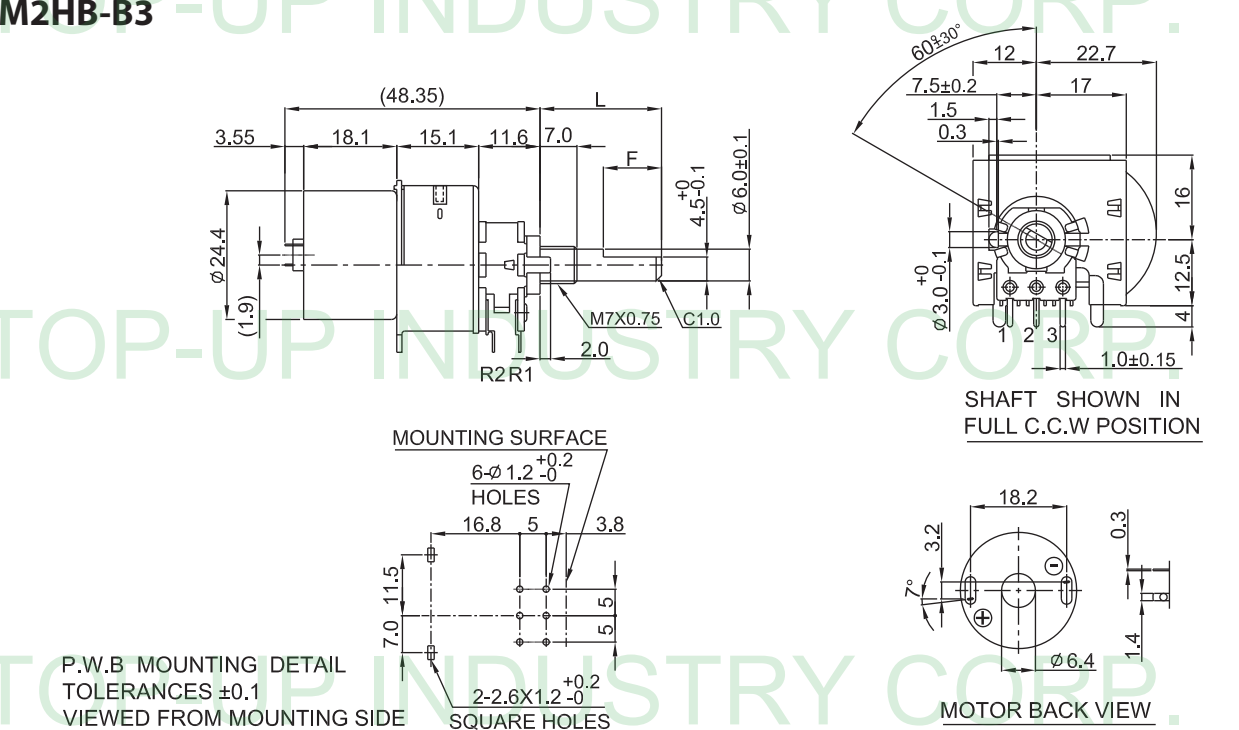
Outline Drawing

Features individual specifications

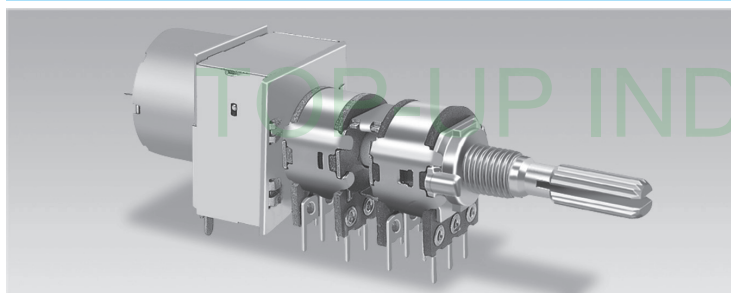
MD16M1HB-B3



MD16M2HB-B3

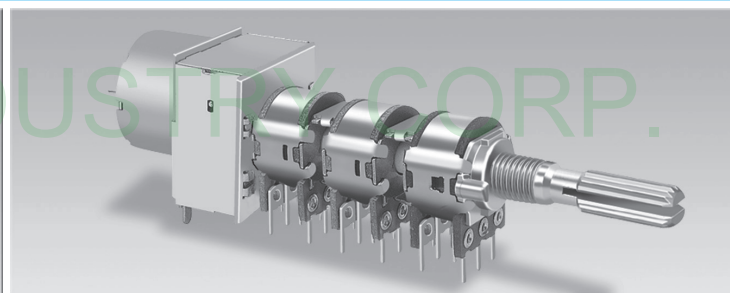


MD16M4HB-B3



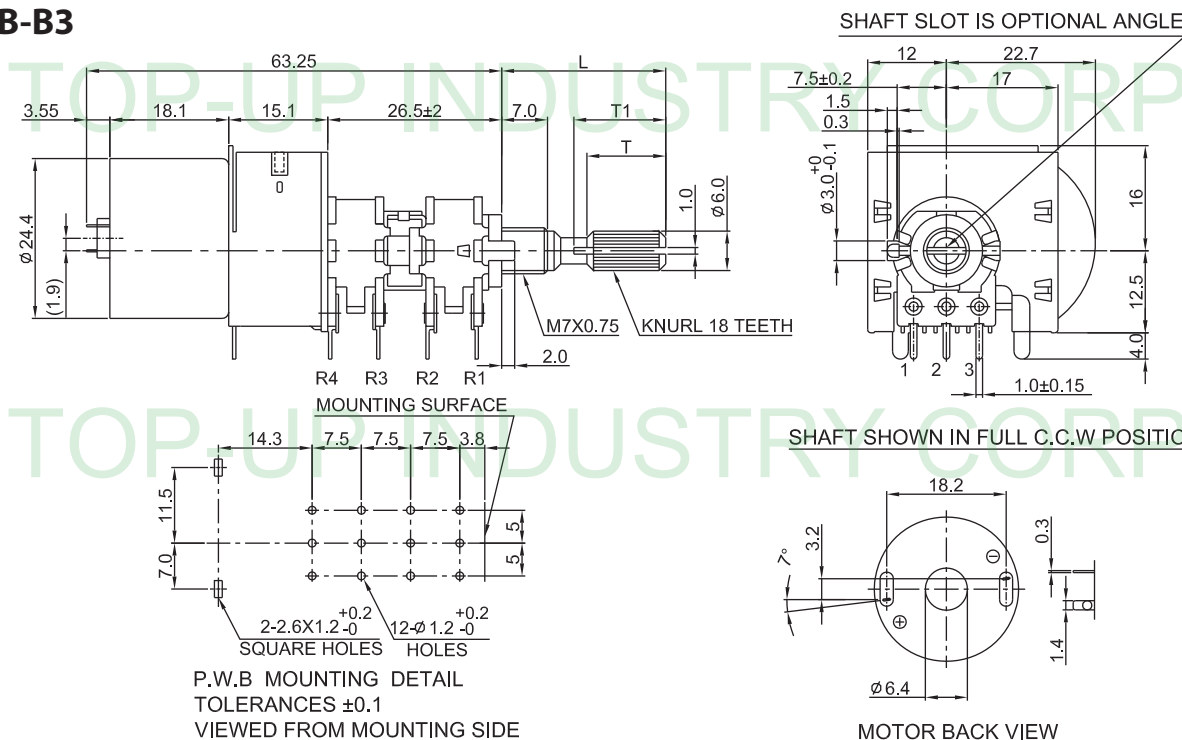
Outline Drawing

MD16M6HB-B3

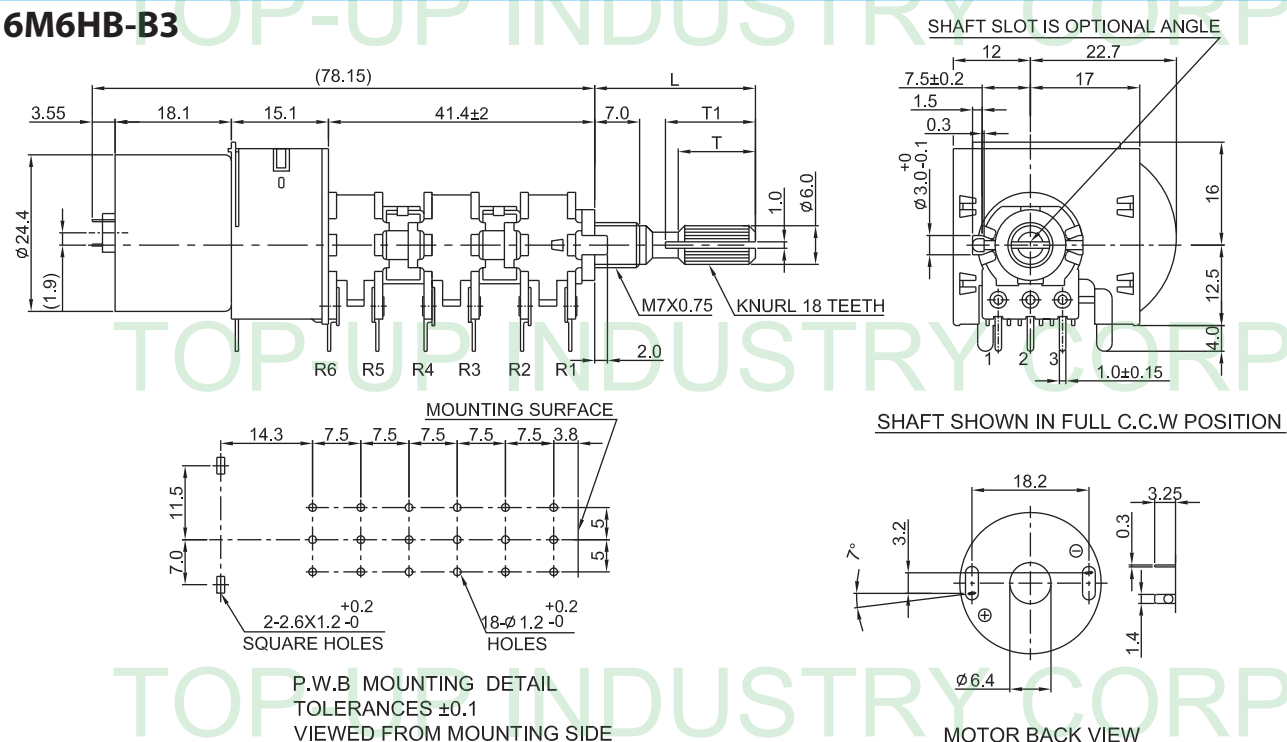


Features individual specifications

MD16M4HB-B3



MD16M6HB-B3

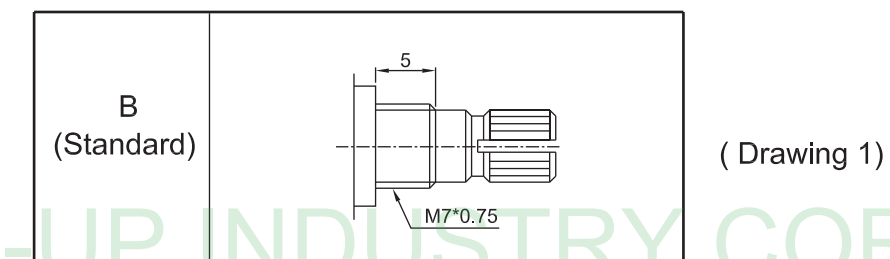


17M Series Code Explanation

17M 1 S H B A F - B - 20 K - B 50K -

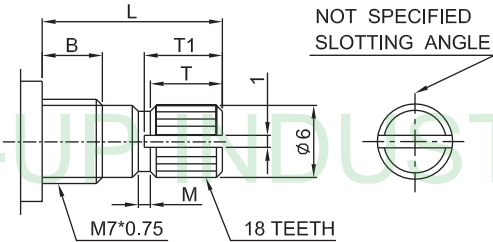
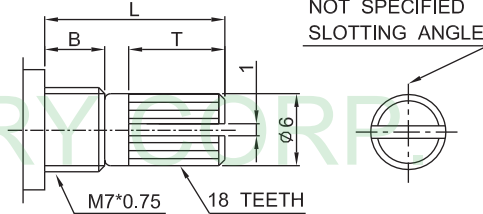
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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)



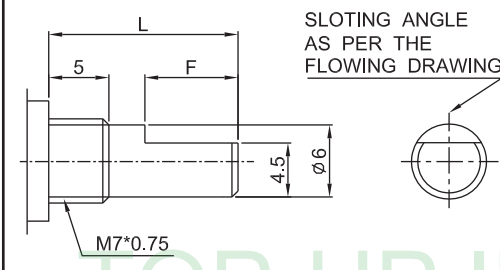
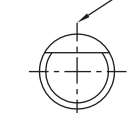
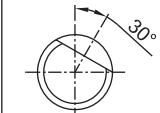
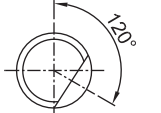
7. Bushing Material : Blank -Zinc Alloy , A -Aluminum Alloy
8. Bushing Diameter (Standard M7)
9. With Frame : "F" (Only without Switch Series)
10. Type of Terminal (See Drawing 3)
11. Shaft Length "L" (See Drawing 2)
12. Type of Shaft (See Drawing 2)
13. Type of Taper (See Taper Chart Last Page)
14.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

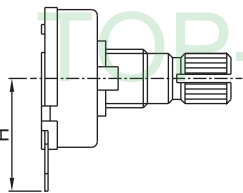
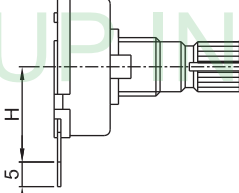
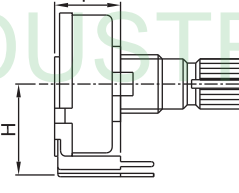
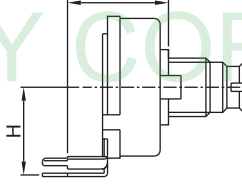
17M Series Code Explanation

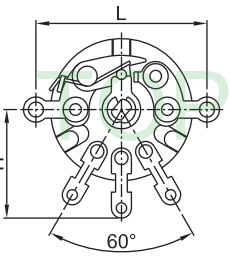
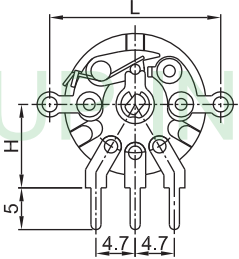
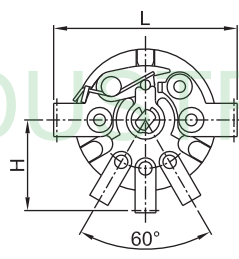
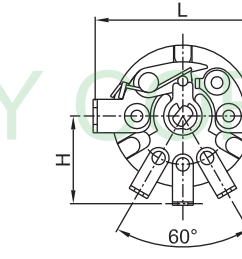
(Drawing 2)

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
Rotaional noise	≤ 47mV
Insulation resistance	≥ 50MΩ at DC 500V
Withstanding voltage	12V/DC, 1A
Switch power rating	1 minute at AC 500V
Switch contact resistance	≤ 100mΩ

Durability:

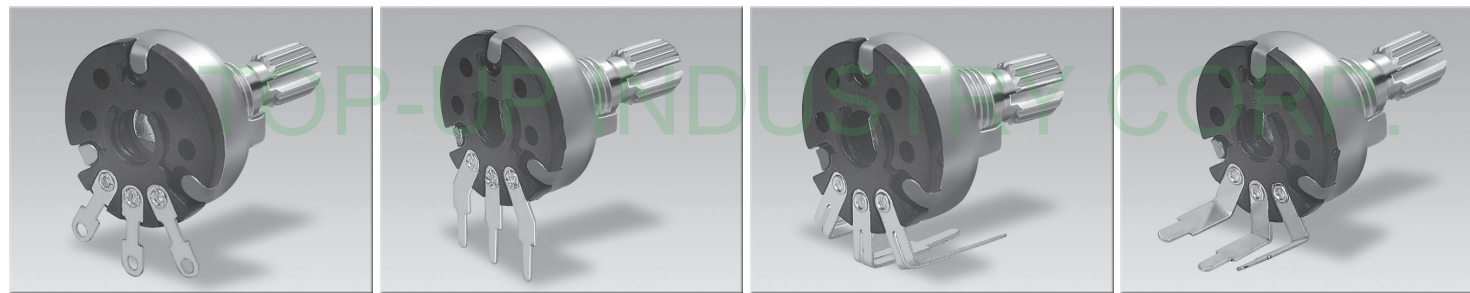
Rotation life	≥ 10,000 cycles
---------------	-----------------

17M1HB-A

17M1HB-B

17M1VB-C

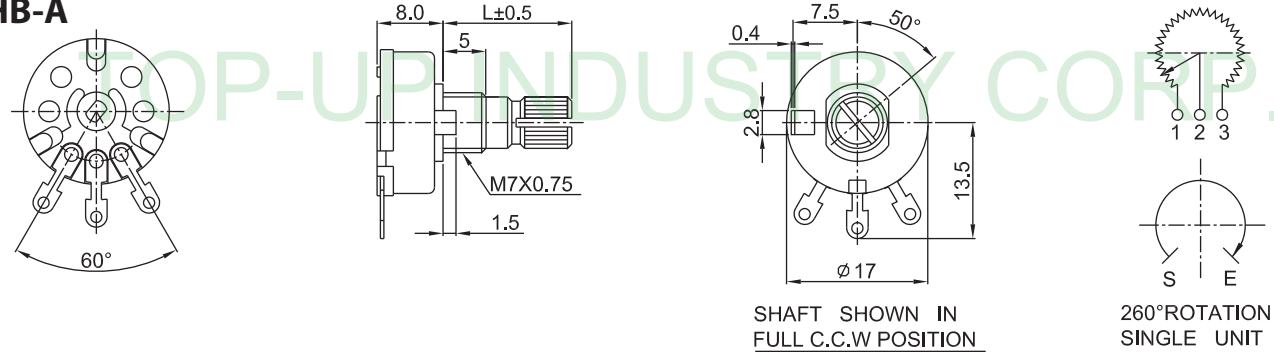
17M1VB-D



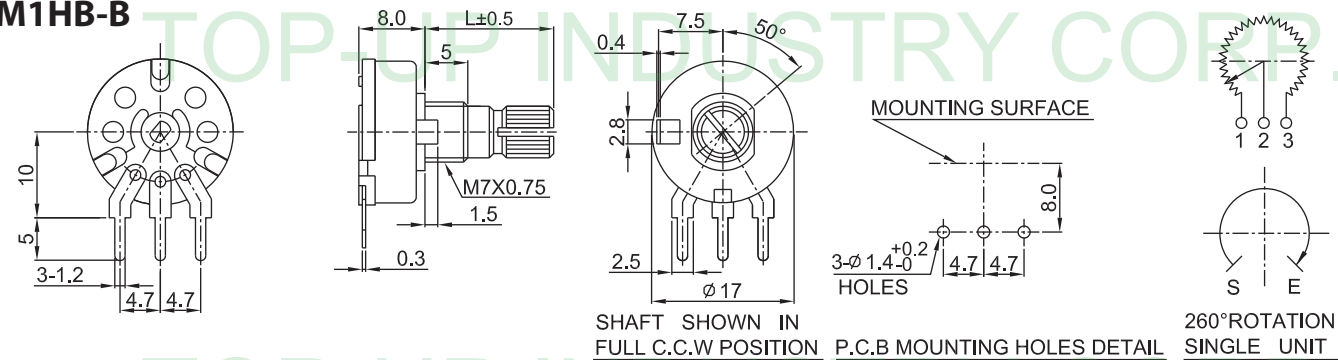
Outline Drawing

Features individual specifications

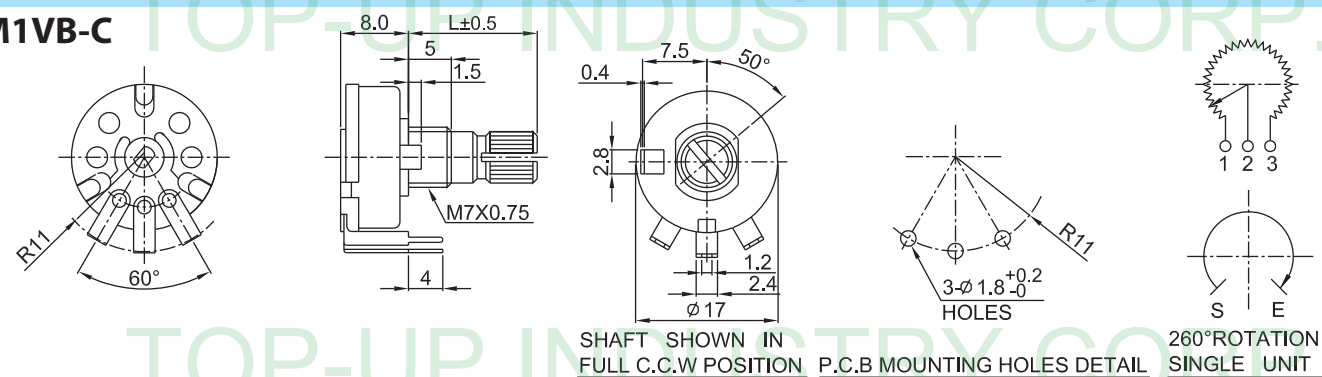
17M1HB-A



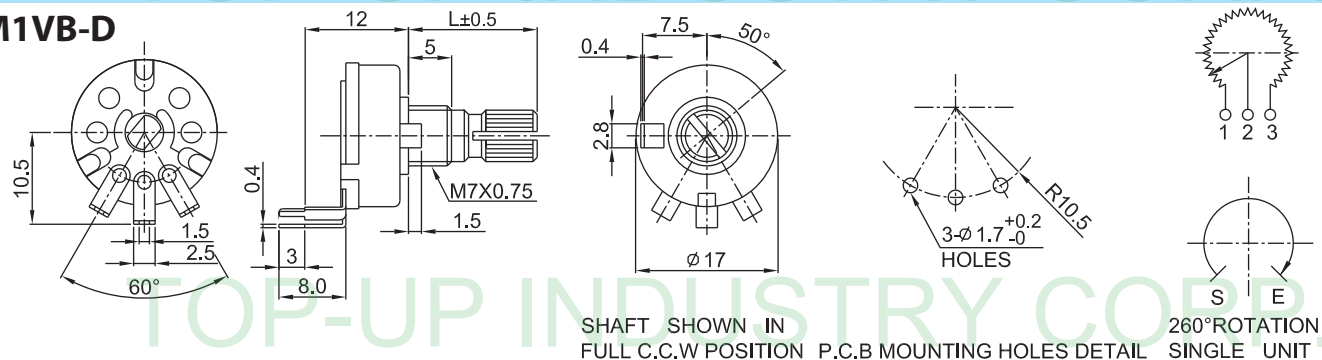
17M1HB-B



17M1VB-C



17M1VB-D

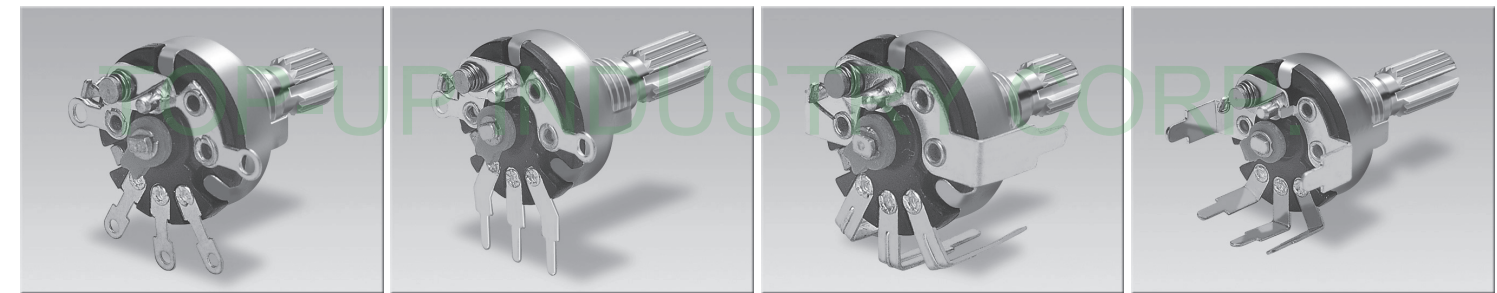


17M1SHB-A

17M1SHB-B

17M1SVB-C

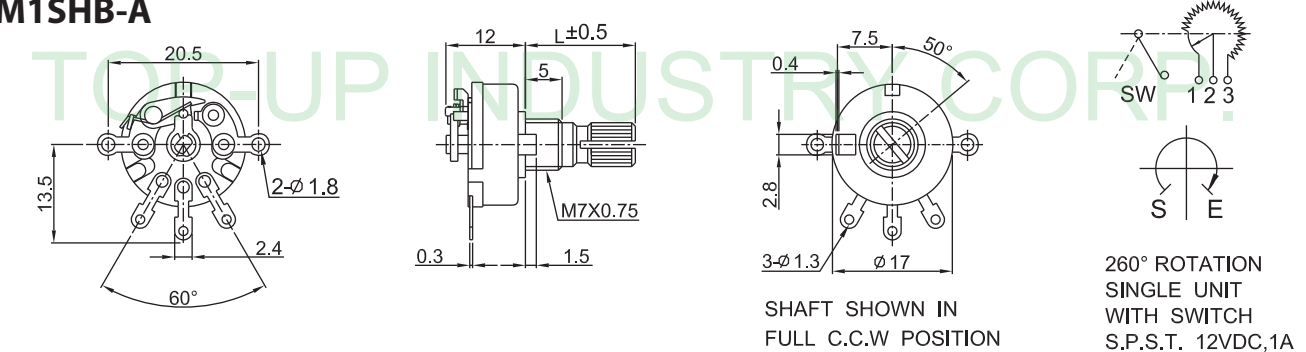
17M1SVB-D



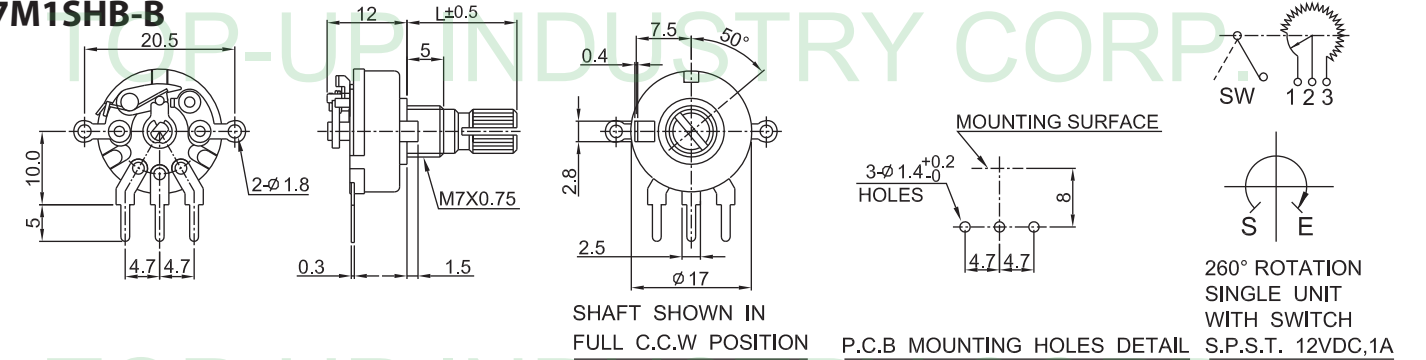
Outline Drawing

Features individual specifications

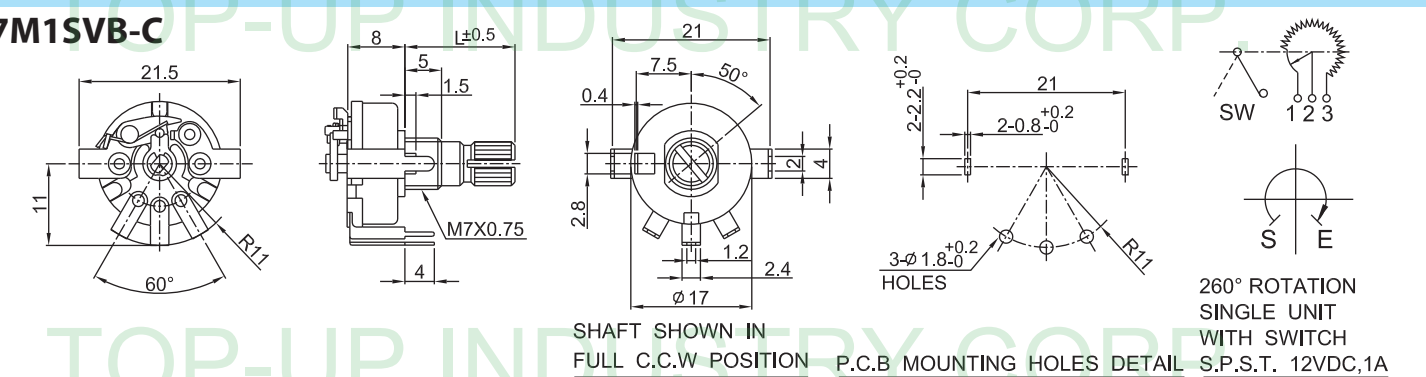
17M1SHB-A



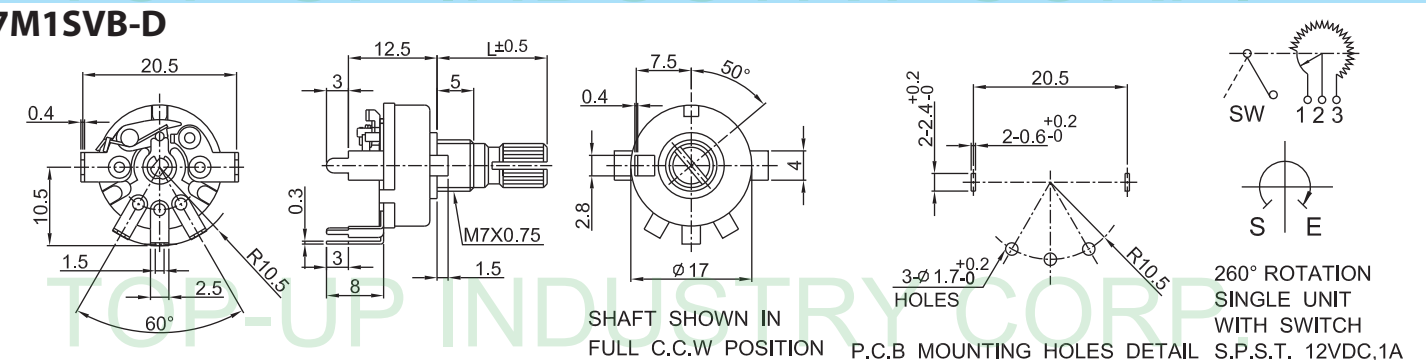
17M1SHB-B



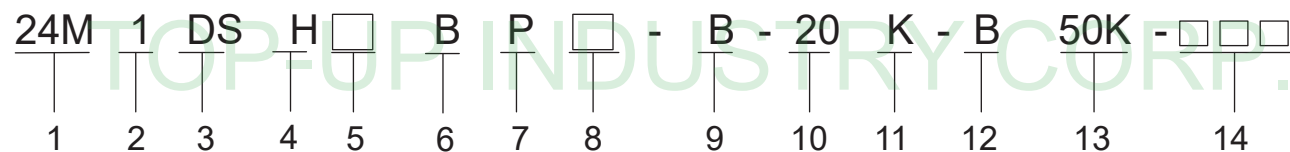
17M1SVB-C



17M1SVB-D



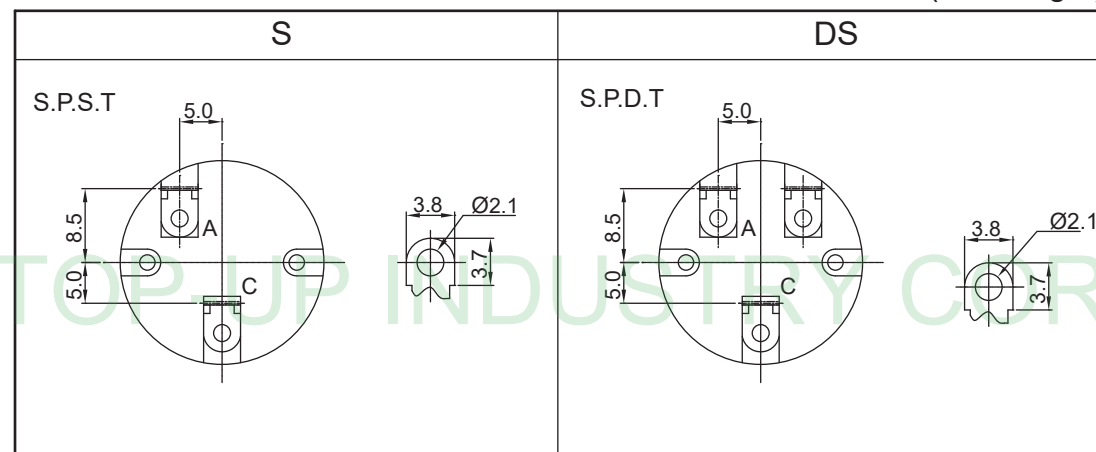
20MD, 22M, 24M, 24MJ, 24MD & 24P Series Code Explanation



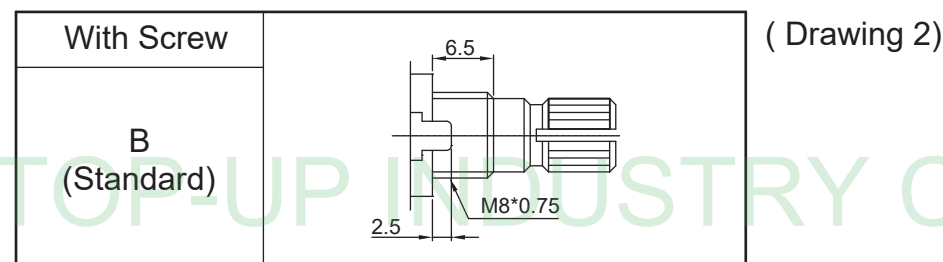
- Product Lines of 20MD, 22M, 24M, 24MJ, 24MD, 24P
20MD, 22M, 24M, 24MJ, 24MD — Metal Shaft
24P — Insulated Shaft

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

- Type of Switch (Drawing 1)



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



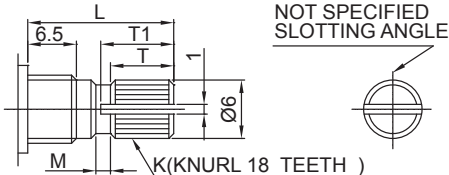
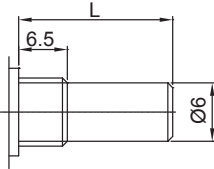
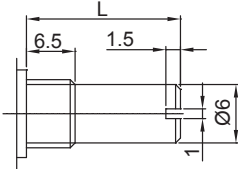
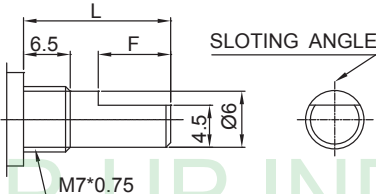
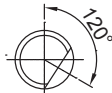
- Type of Terminal (See Drawing 3)
- Shaft Length (See Drawing 4)
- Type of Shaft (See Drawing 4)
- Type of Taper (See Taper Chart Last Page)
- Resistance Value
- Serial No.

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

Type of Terminal (Drawing 3)

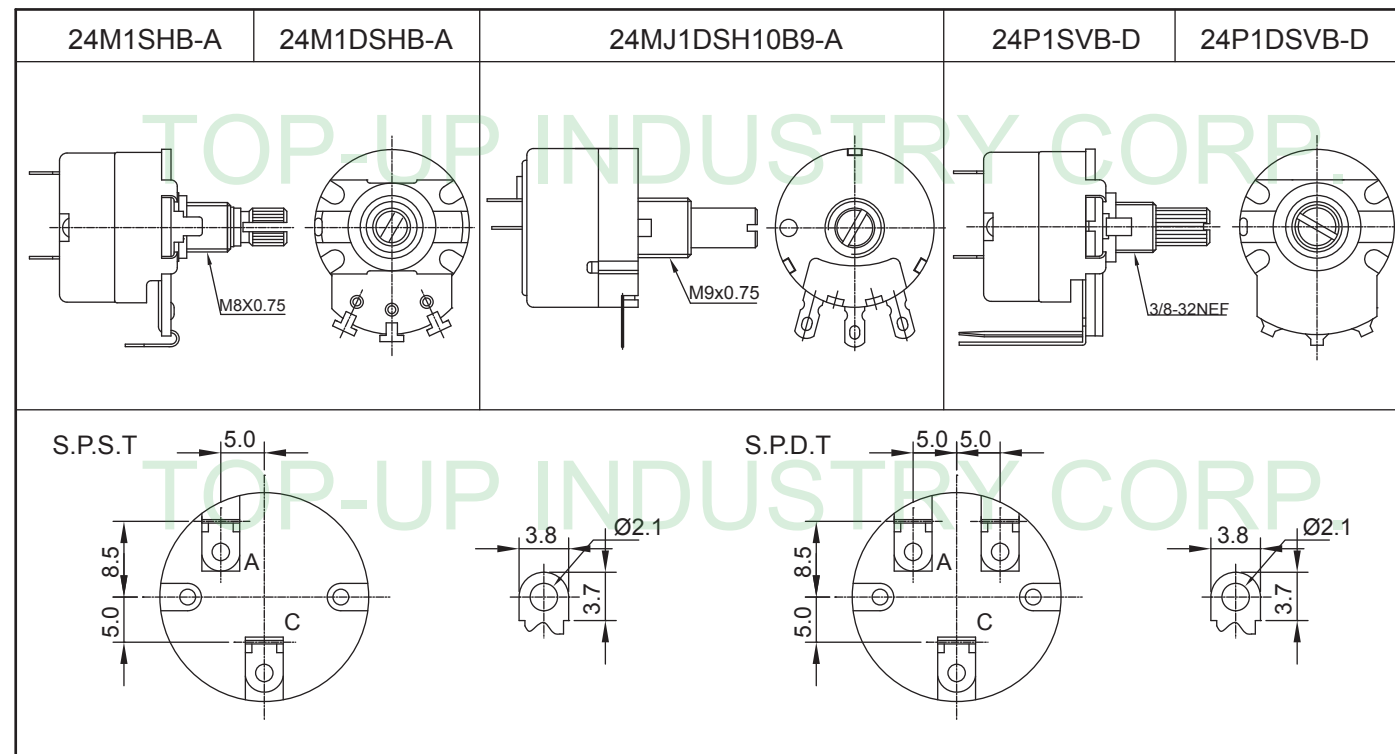
Horizontal				Vertical			
Solder Lug Type (A)		P.C.B Type (B)		P.C.B Type (C)		P.C.B Type (D)	
Terminal Type	A	A1 A2 A3			B		C D
Terminal Detail							

Type of Shaft (Drawing 4)

K - Type									R - Type				S - Type					
																		
Shaft-Type	L	10	15	20	25	30	35	40										
K	T1	2.4	6.5	11	14	14	14	14	R & S	L	10	15	20	25	30	35	40	
	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:

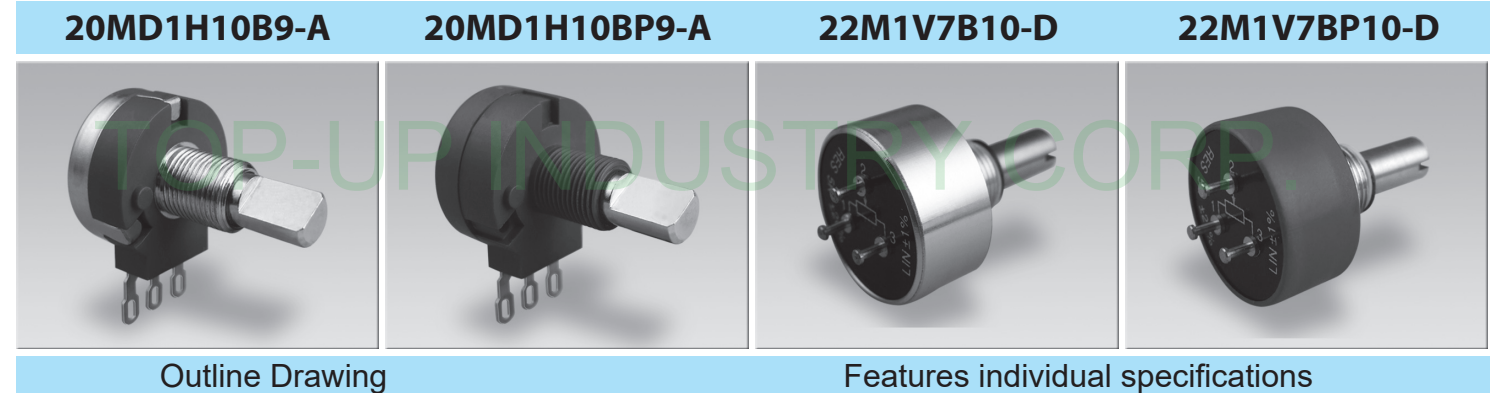
Total rotational angle	300°±5°
Potational torque	2~20mN.m (20~200gf.cm)
Rotation stopper strength	0.6N.m(6kgf.cm)
Switch working angle	50°±10°

Electrical characteristics:

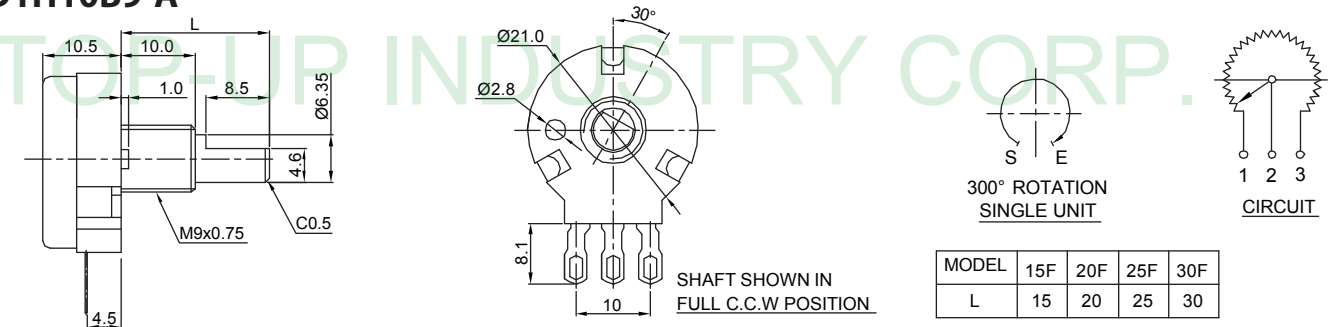
Total resistance	10KΩ ~1MΩ
Total resistance tolerance	±20% (more than 1MΩ ±30%)
Rated power	Curve B:0.5W Other than B:0.25W
Max. operating voltage	Curve B:500V Other than B:250V
Resistance taper	A, B
Residual resistance	$R \geq 250K\Omega$ 0.1% max. of total resistance $250K\Omega > R > 10K\Omega$ 20Ω 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:

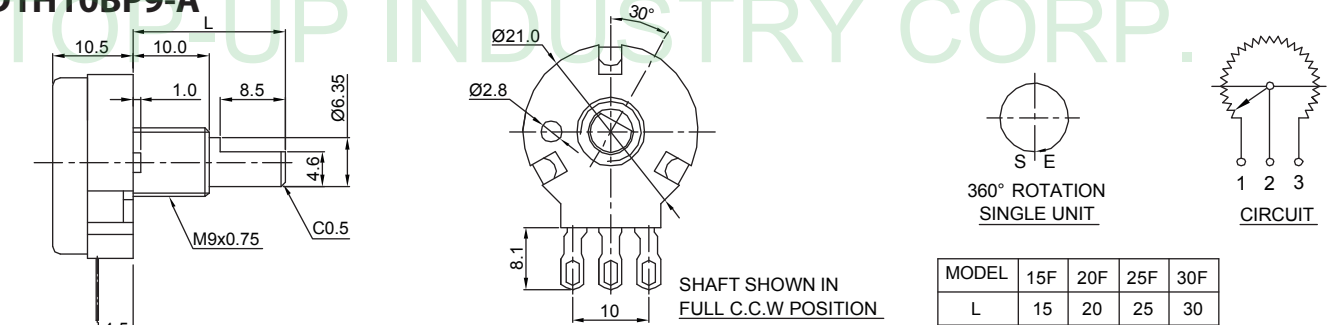
Rotational life	10,000 cycles
-----------------	---------------



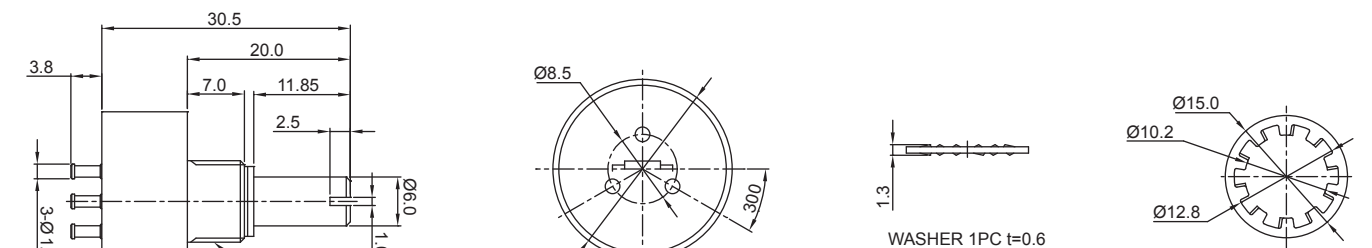
20MD1H10B9-A



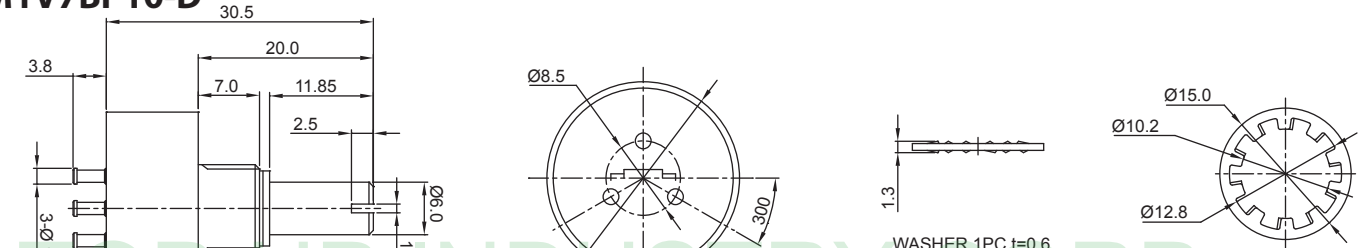
20MD1H10BP9-A



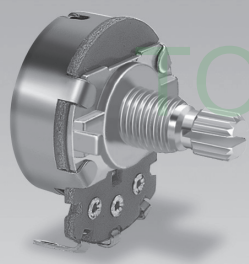
22M1V7B10-D



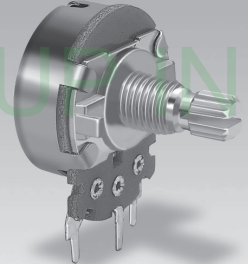
22M1V7BP10-D



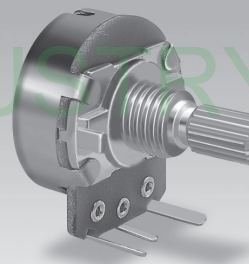
24M1HB-A



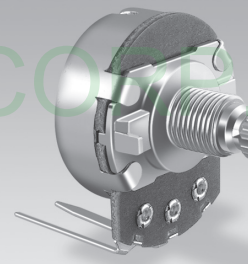
24M1HB-B



24M1VB-C

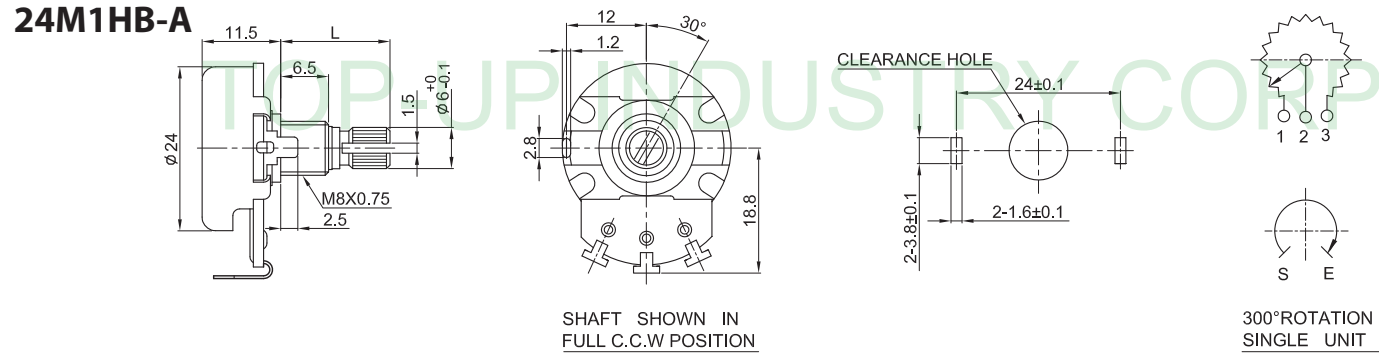


24M1VB-D

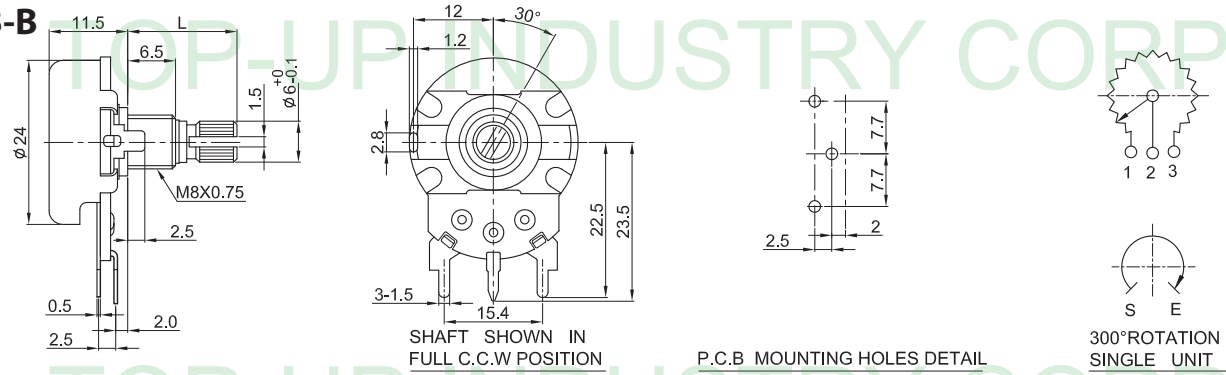


Outline Drawing

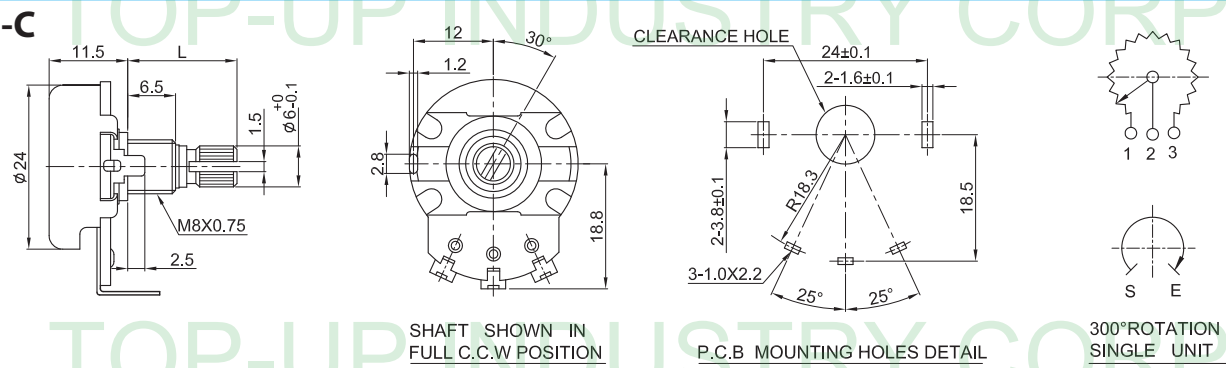
Features individual specifications



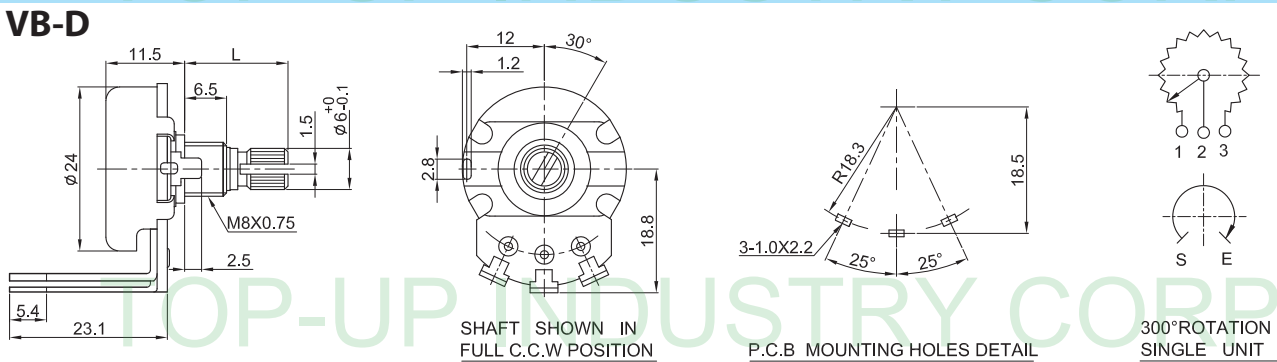
24M1HB-B



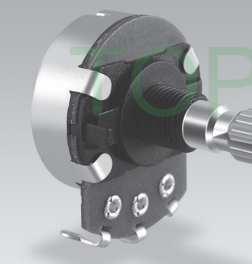
24M1VB-C



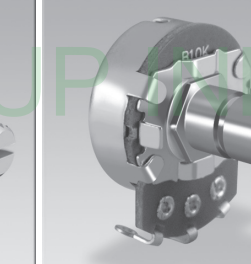
24M1VB-D



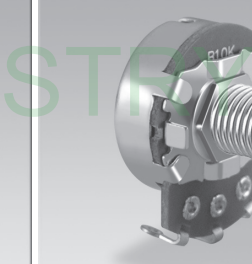
24M1HBP-A



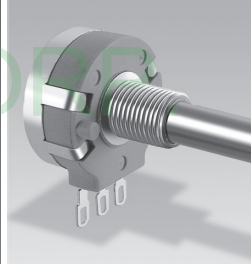
24M1H11.7NBC-A



24M1H9.55BC3-A

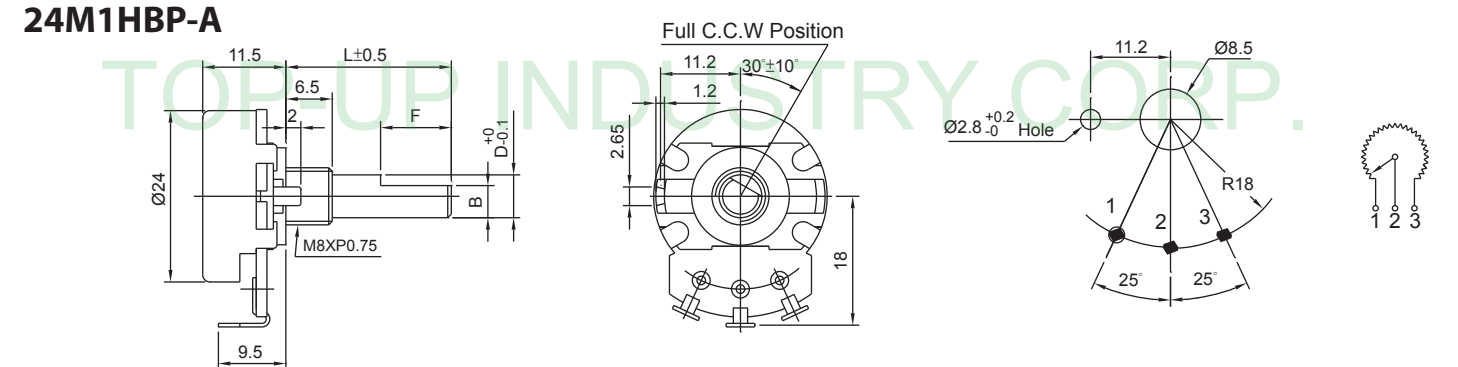


24M1H10B9-A3

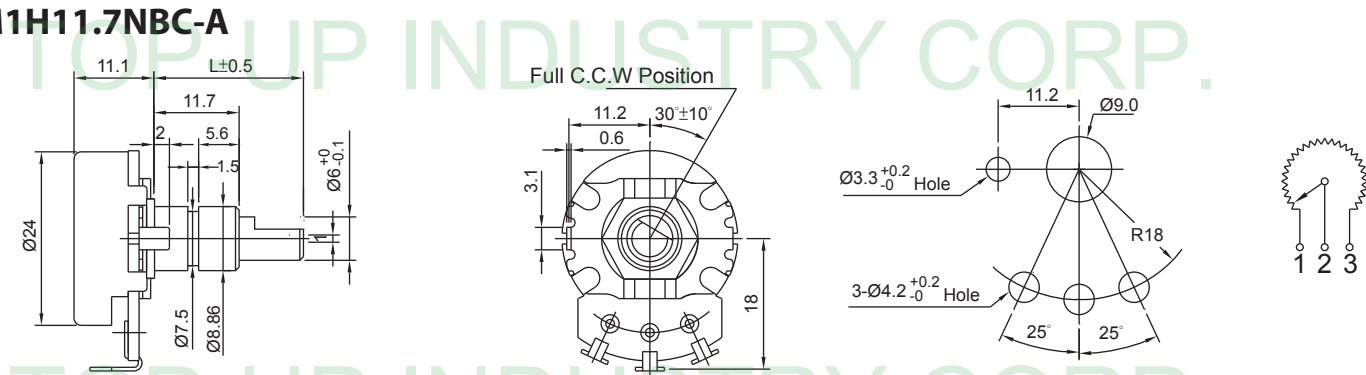


Outline Drawing

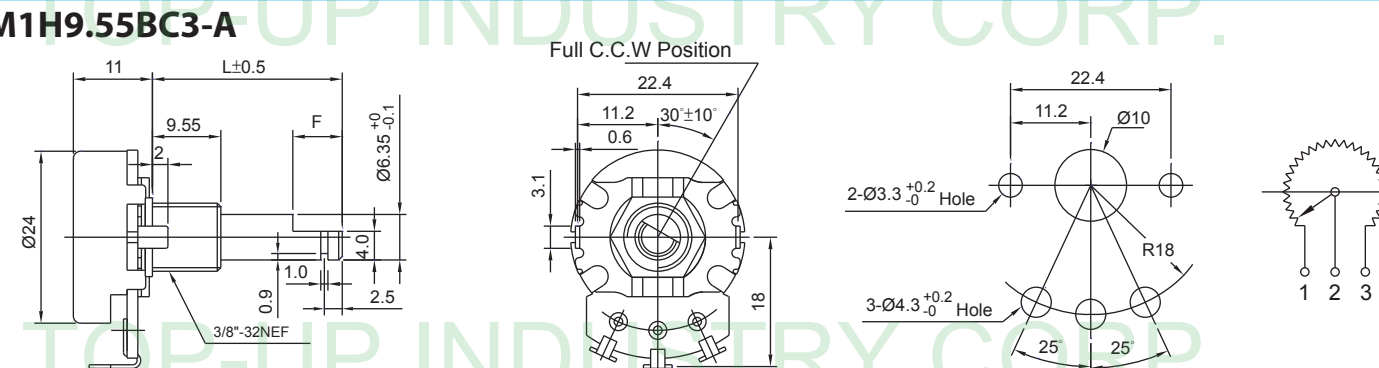
Features individual specifications



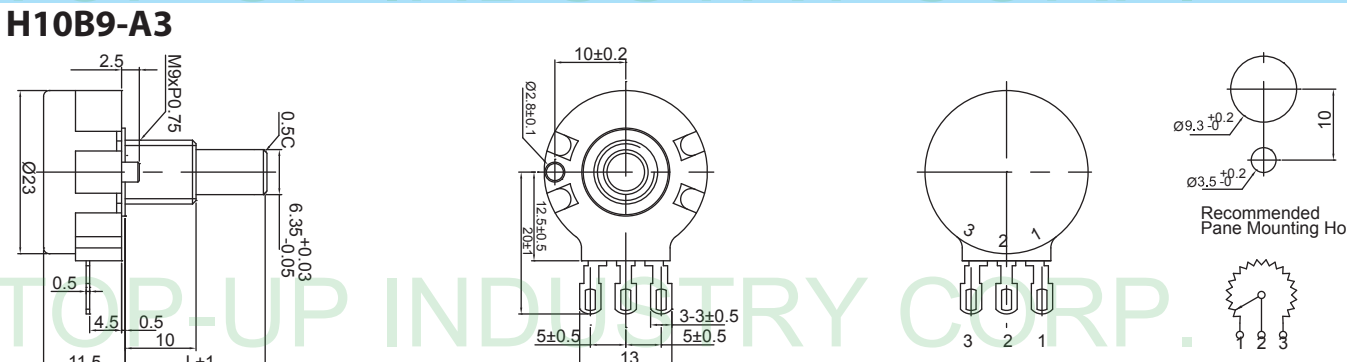
24M1H11.7NBC-A



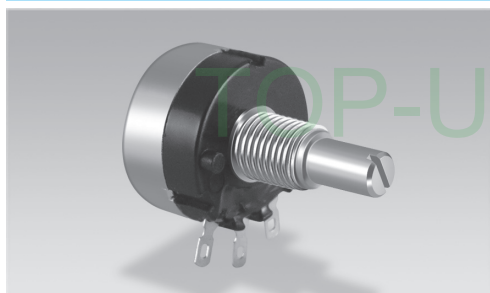
24M1H9.55BC3-A



24M1H10B9-A3

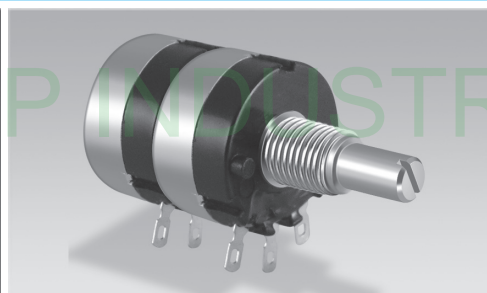


24MJ1H10B9-A



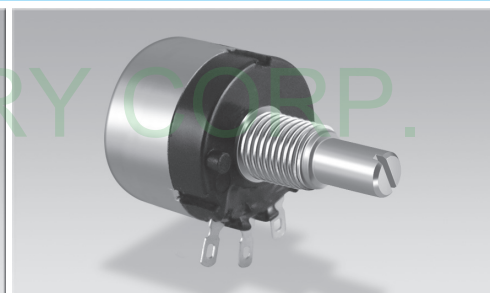
Outline Drawing

24MJ2H10B9-A

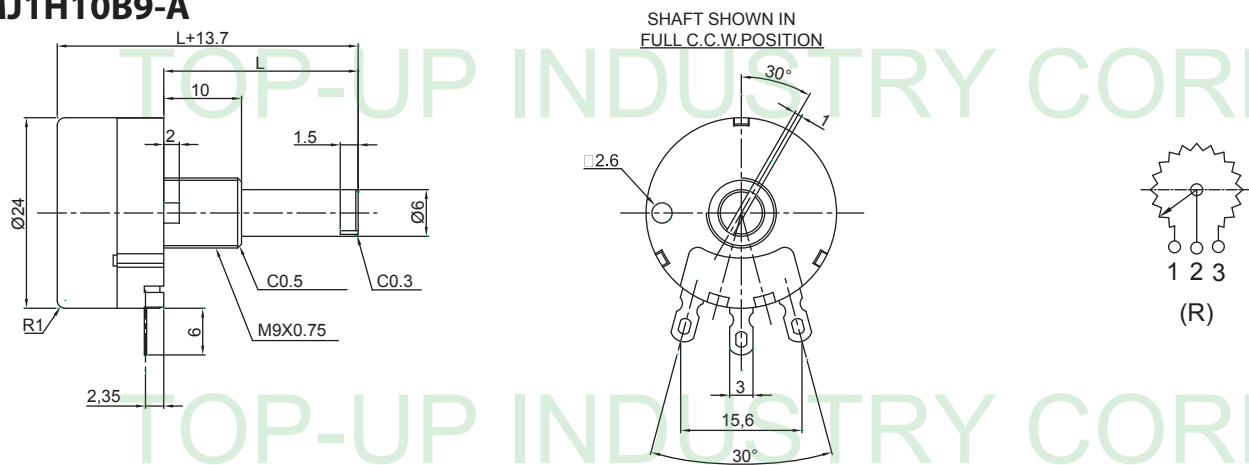


Features individual specifications

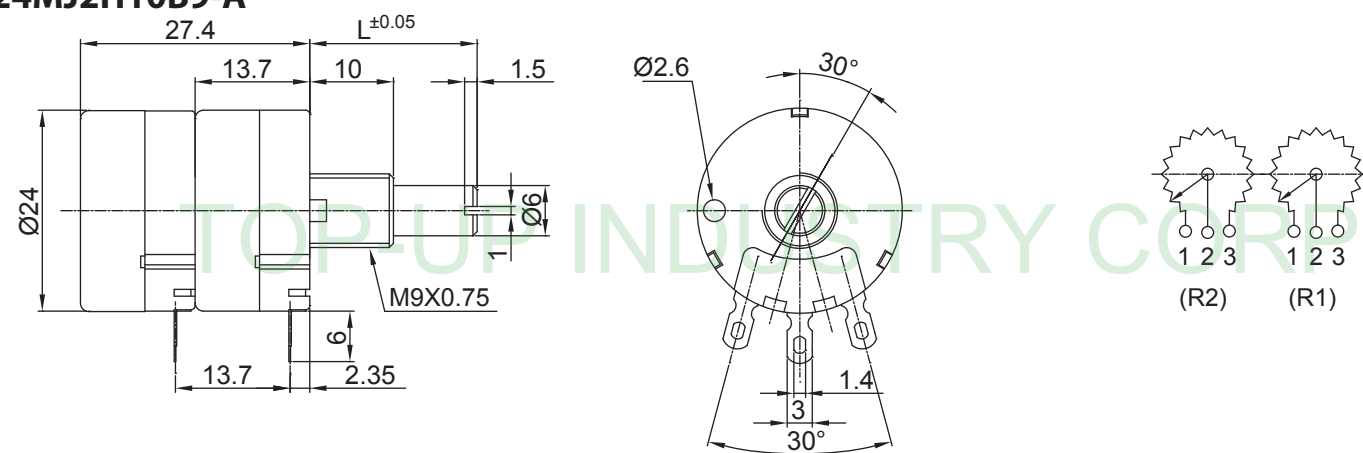
24MJ1DSH10B9-A



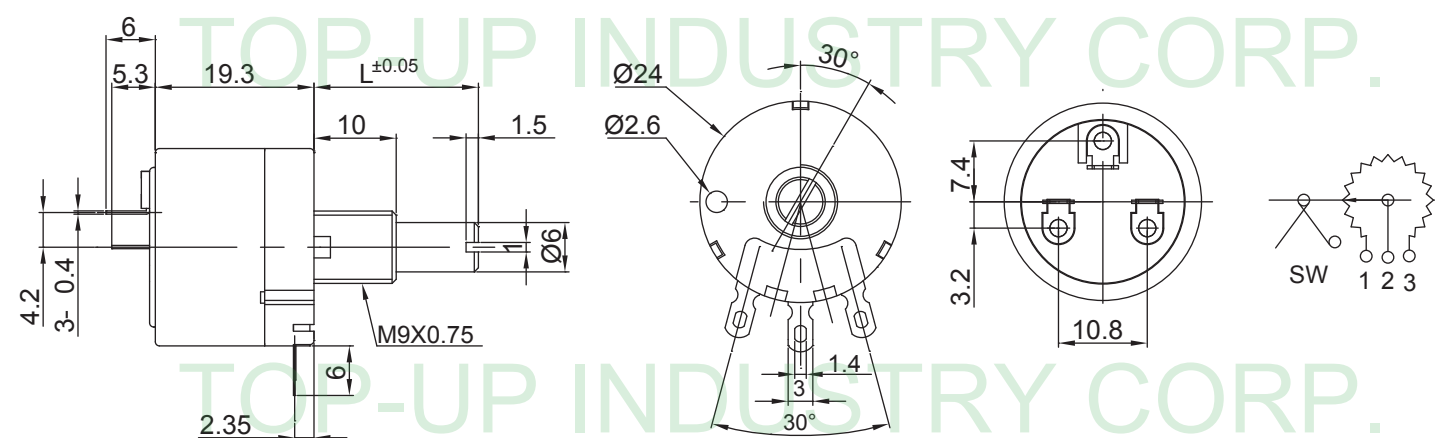
24MJ1H10B9-A



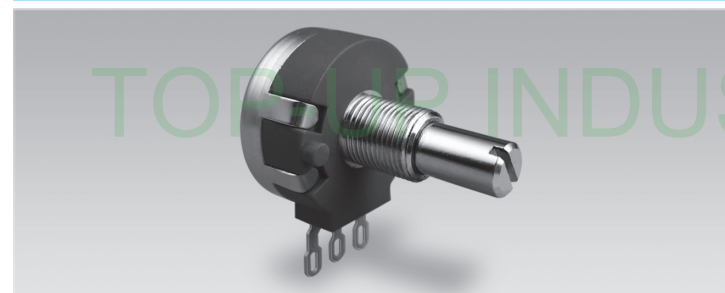
24MJ2H10B9-A



24MJ1DSH10B9-A

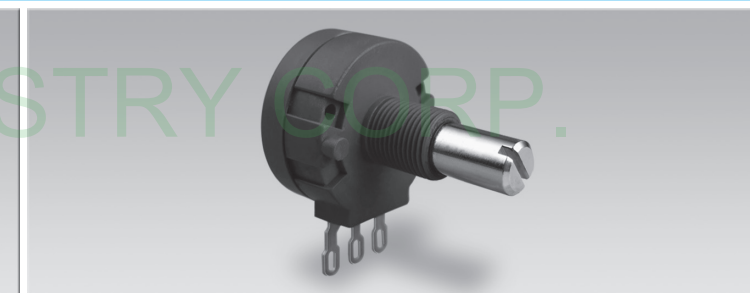


24MD1H10B9-A



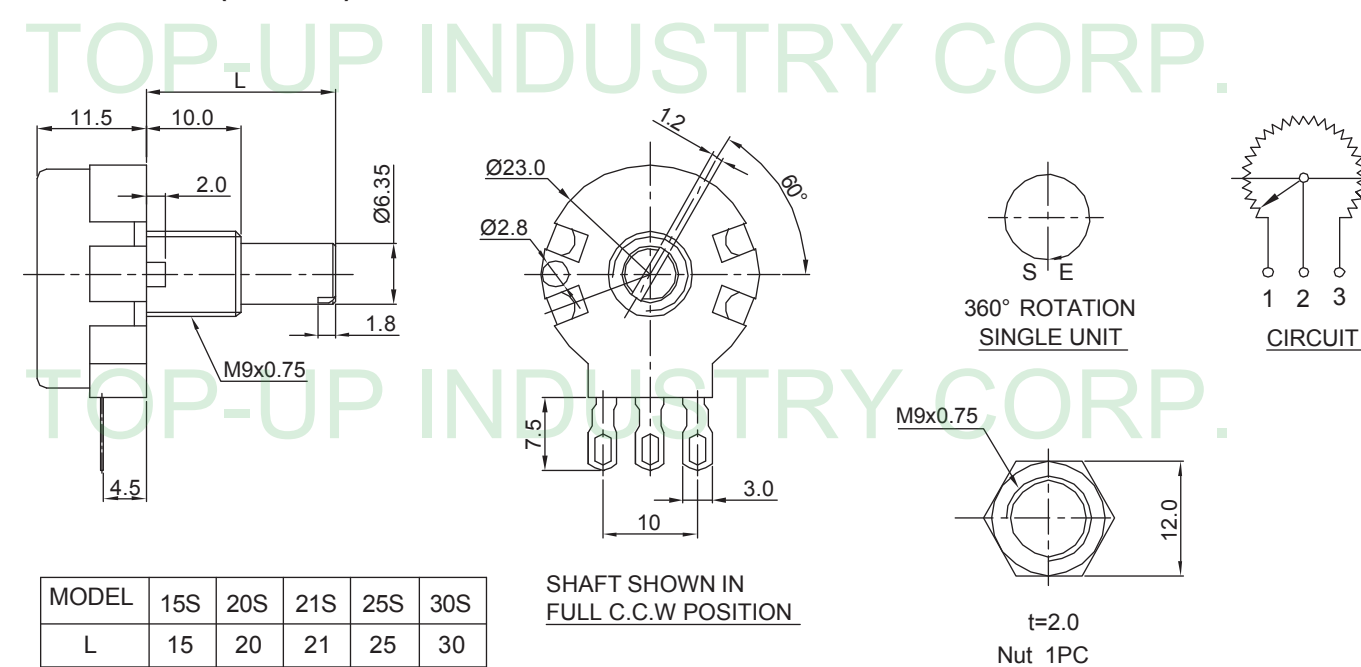
Outline Drawing

24MD1H10BP9-A

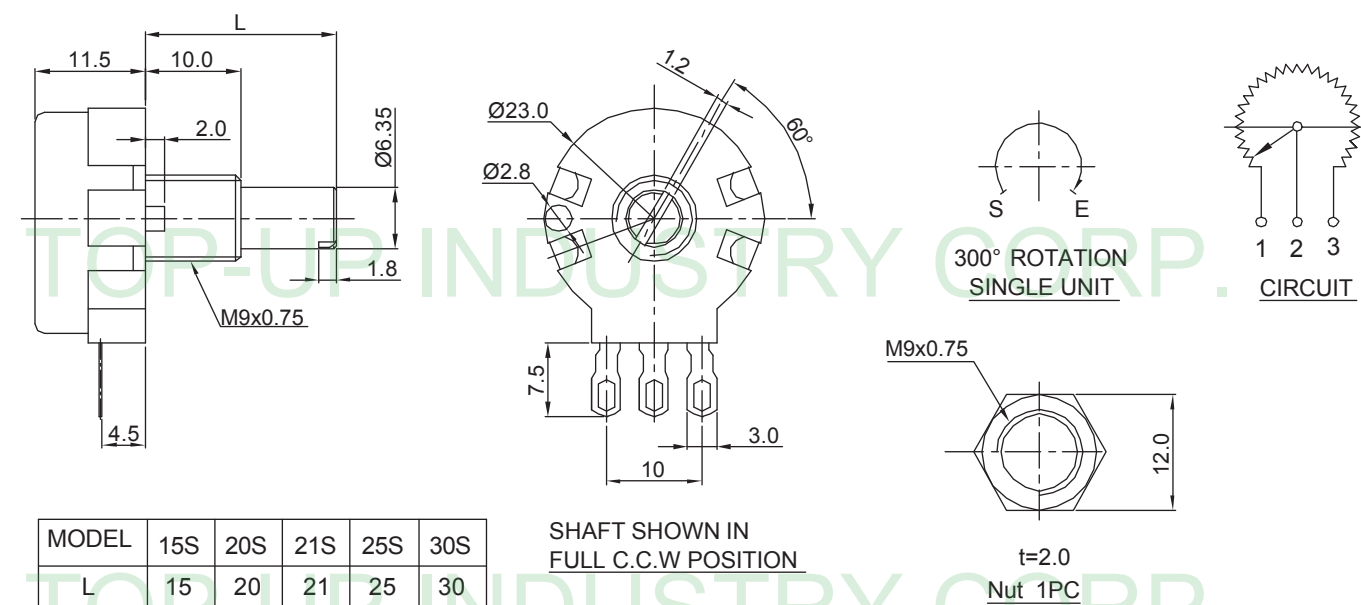


Features individual specifications

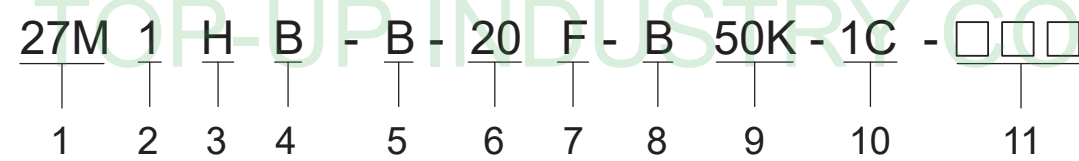
24MD1H10B9-A(300°/360°)



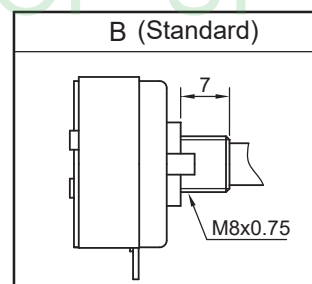
24MD1H10BP9-A(300°/360°)



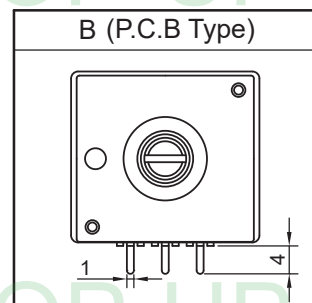
27M Series Code Explanation



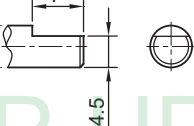
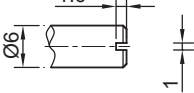
1. Product Lines of 27M
2. Number of Unit : 1 — Single Unit 2 — Dual Unit,.....
3. Horizontal(H) Type
4. Type of Bushing



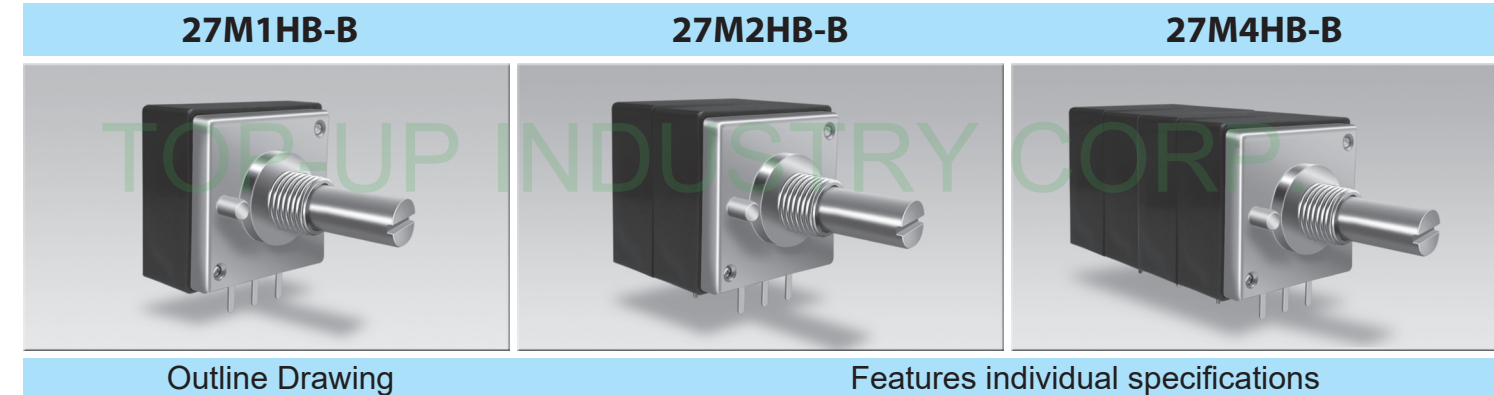
- ## 5. Type of Terminal



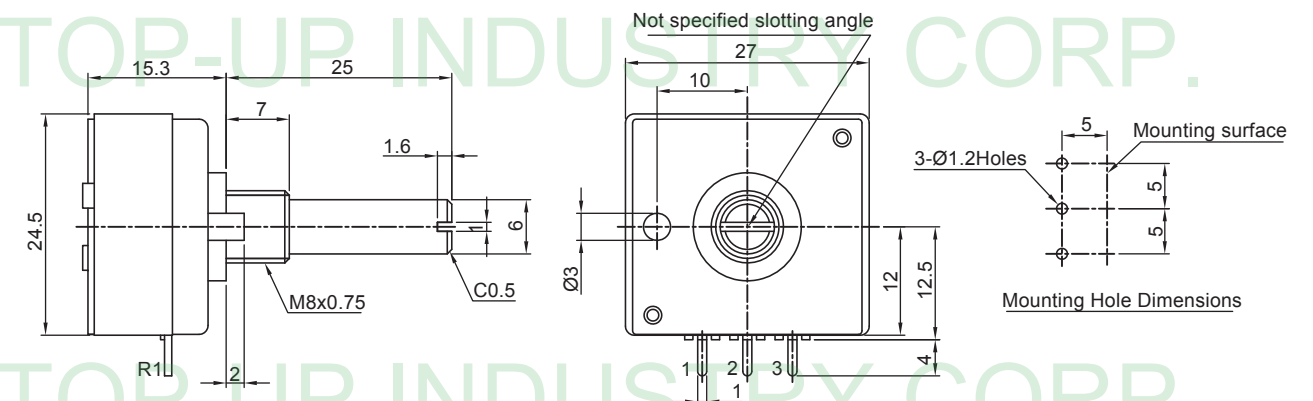
6. Shaft Length
7. Type of Shaft

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

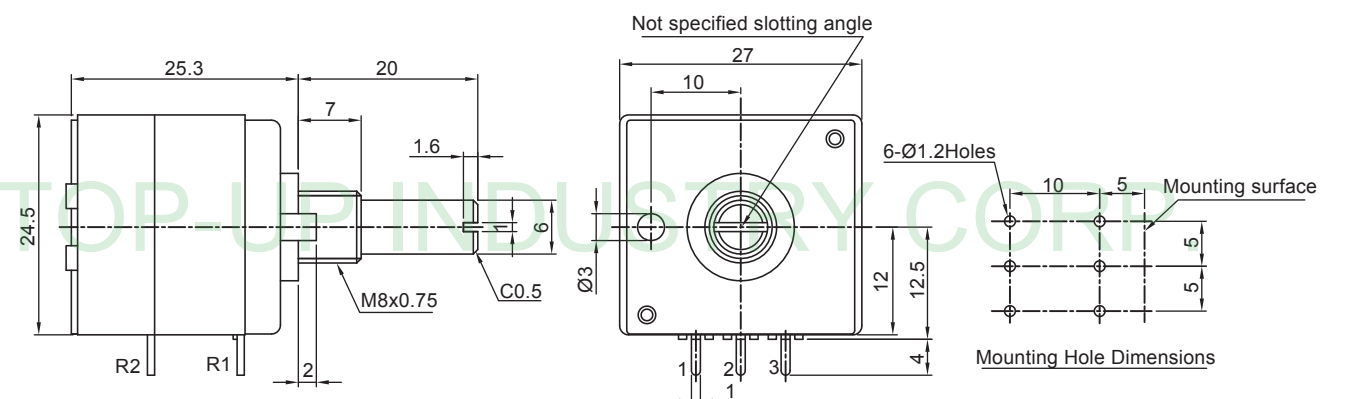
8. Type of Taper (See Taper Chart Last Page)
9. Resistance Value
10. Number of Clicks : Blank -None, 1C - Center Click , 41C - 41 Clicks
11. Serial No.



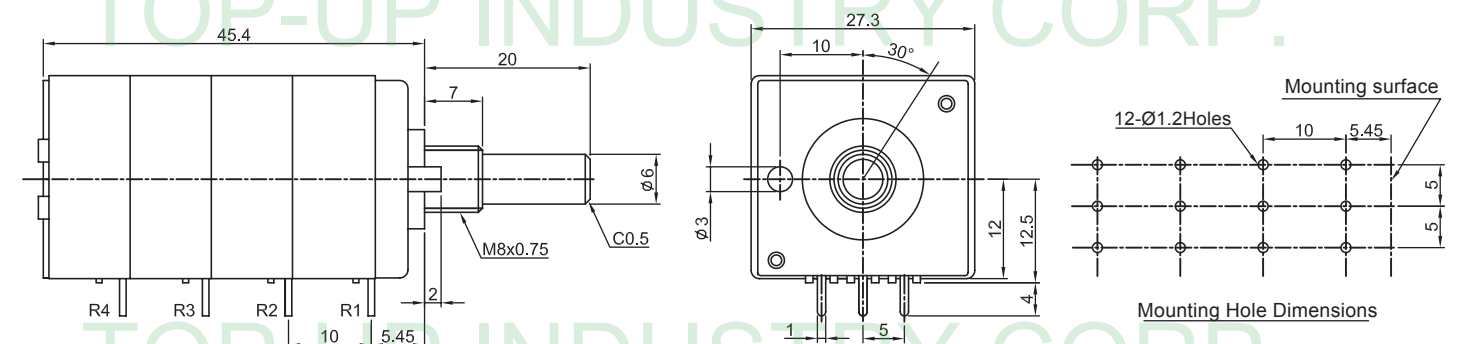
27M1HB-B



27M2HB-B



27M4HB-B



PH39 L ☐ R F 00 - D - 9 K - B - 10K - ☐ - 5C - ☐☐☐



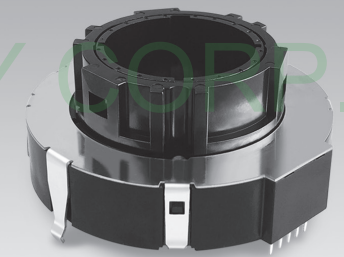
- ### 3. LED Color



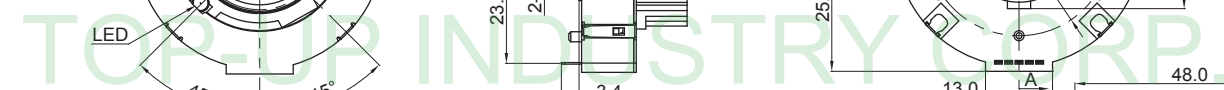
9. Shaft Body Color



TOP UP INDUSTRY CO., LTD.



Features individual specifications



JT Series Code Explanation

J T 9 S - 1P - 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

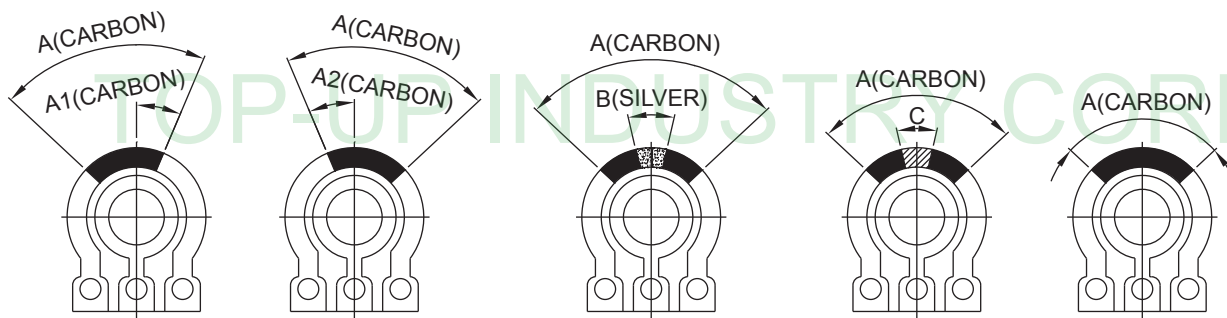
4. Type of Taper (See Taper Chart Page 248)

5. Resistance Value

6. Resistance Tolerance Code

Code	Blank	a	b	c
Resistance Tolerance	±20%	±30%	±10%	±15%

7. Carbon Angle



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

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

ANGLE	A	B	CODE. NO.
60°	6°		1
38°	6°		3
38°	8°		4
50°	6°		5
53°	6°		6
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	A	B	CODE. 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	A	C	CODE. 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°
	60°	65°	70°	90°	95°	120°
	147°	180°	300°			

JT Series Code Explanation

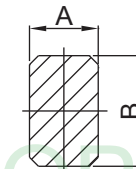
J T 9 S - 1P - B 10 K C - 11- P 10 - P - A - O GR - -

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



(Only Metal Lever Type)

Code	M	N	P	O
A	1.19 ⁺⁰ _{-0.03}	1.10 ^{+0.02} _{-0.03}	1.15 ⁺⁰ _{-0.05}	1.15 ^{+0.02} _{-0.03}
B	1.80 ^{+0.03}	1.80 ^{+0.03}	1.85 ⁺⁰ _{-0.07}	1.90 ^{+0.05}

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

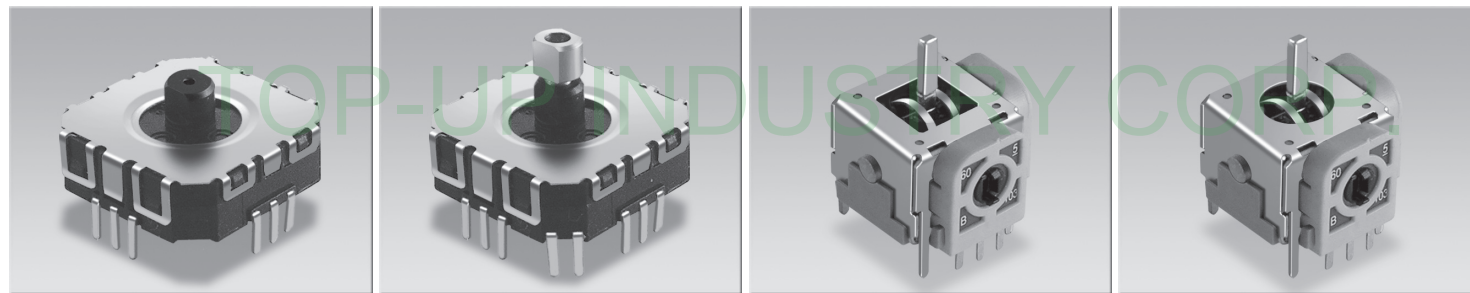
Code	Blank	B	H
	B1+C1	B3+C1	B1+C3

JT8P-3.2T

JT8PS-6.6T

JT9-1PS-□-P

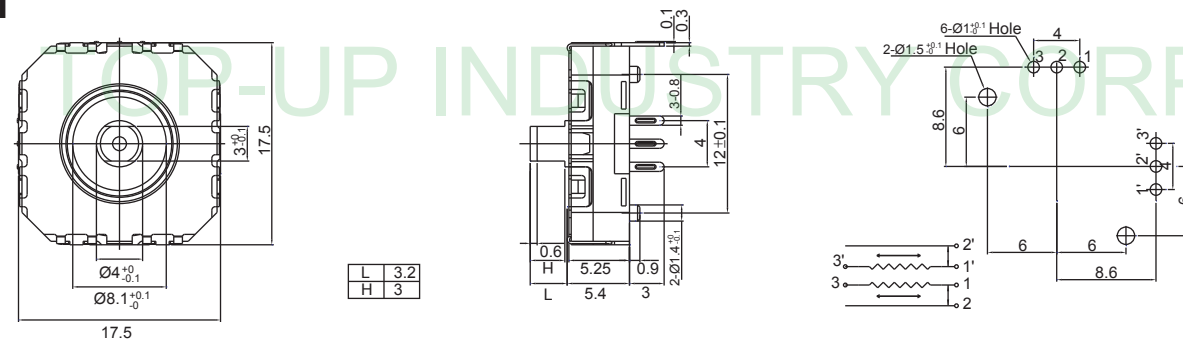
JT9-1P-□-P



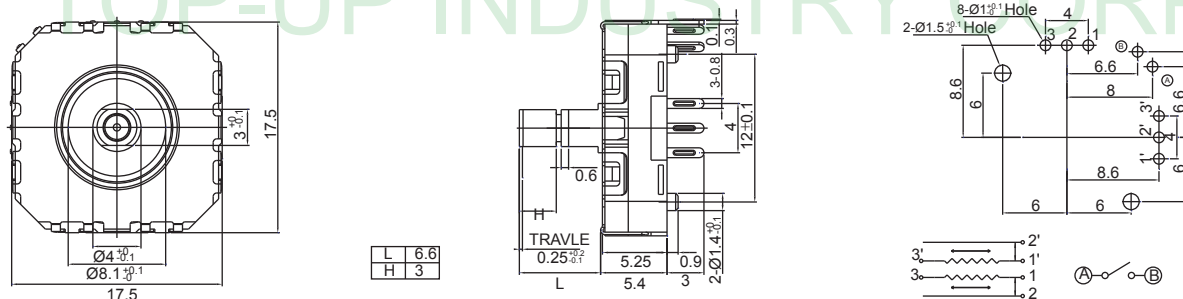
Outline Drawing

Features individual specifications

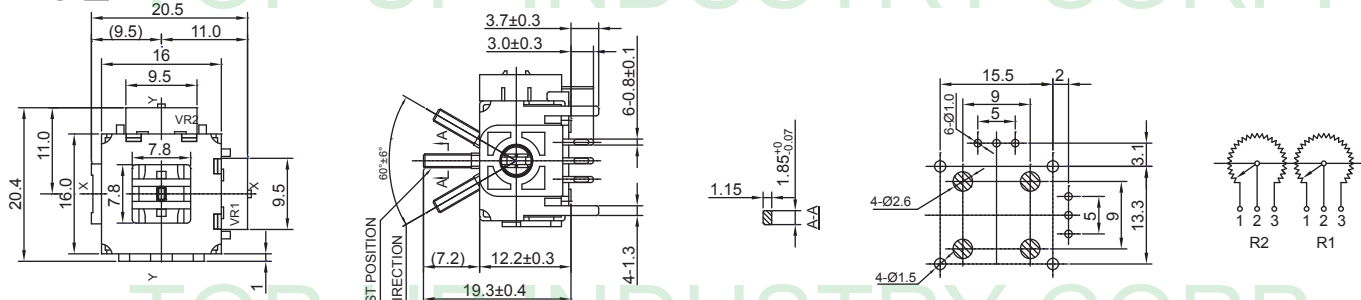
JT8P-3.2T



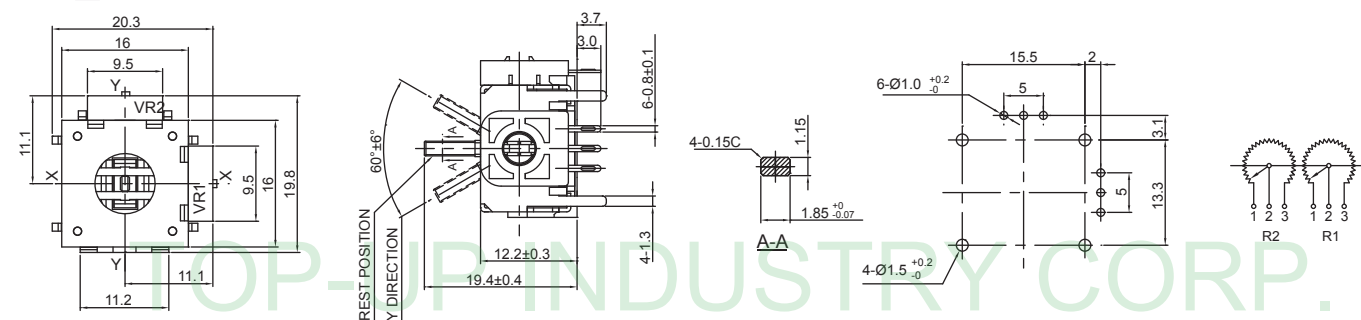
JT8PS-6.6T



JT9-1PS-□-P



JT9--1P-□-P

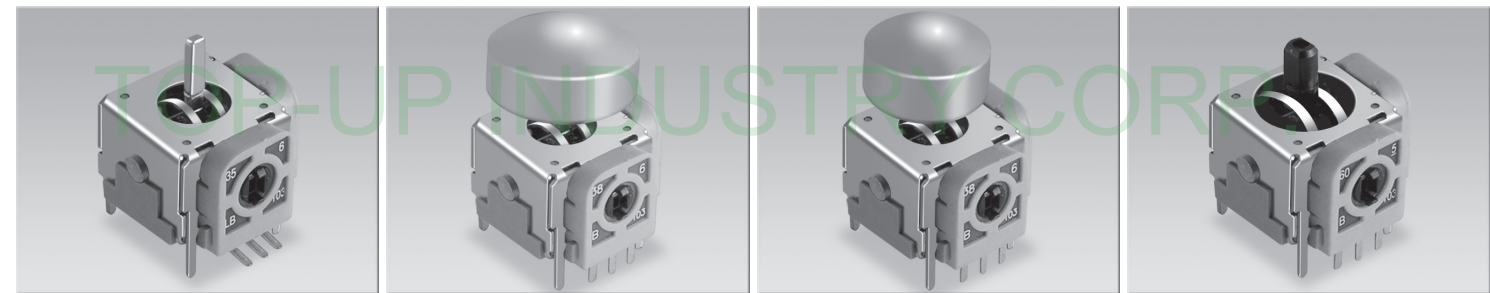


JT9-1P-□-P-T

JT9-1P-□-C14.1-18

JT9-1P-□-C12.7-13

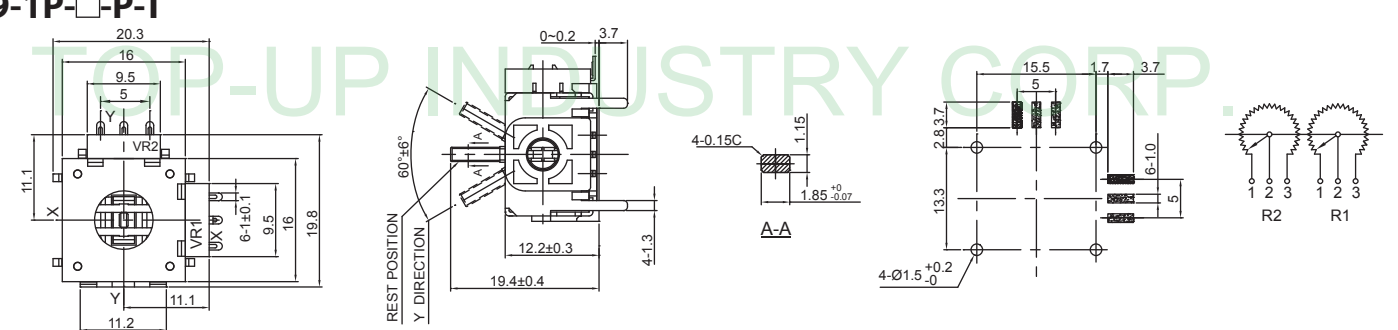
JT9-1P-□-P7.3



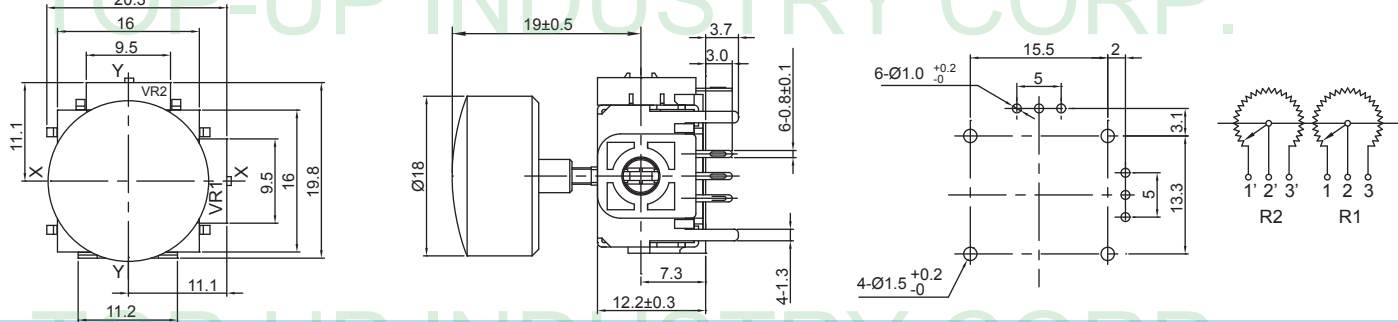
Outline Drawing

Features individual specifications

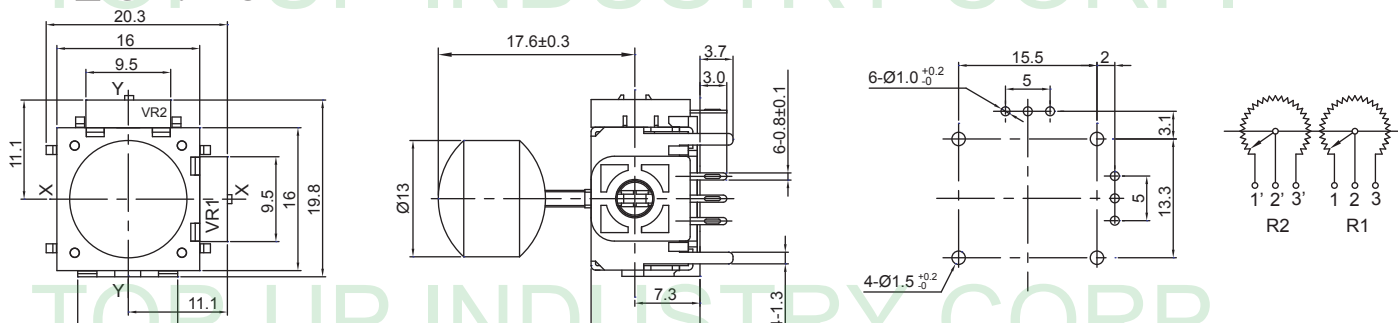
JT9-1P-□-P-T



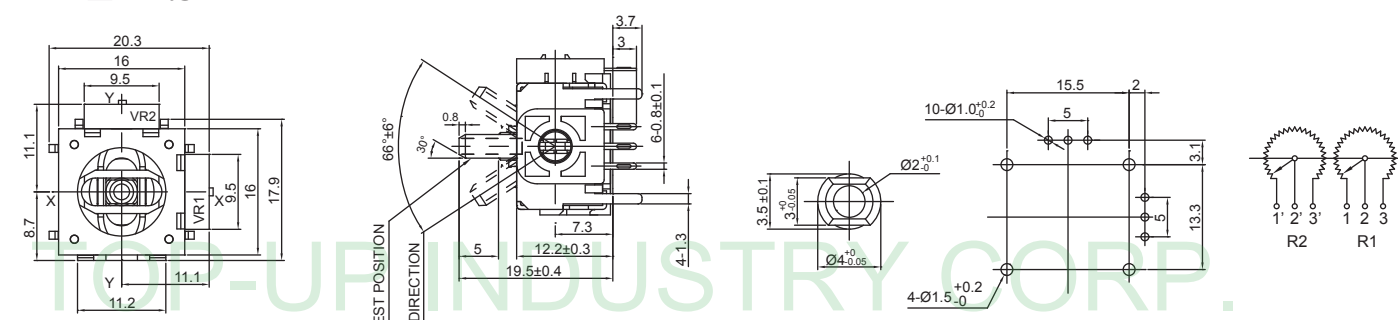
JT9-1P-□-C14.1-18



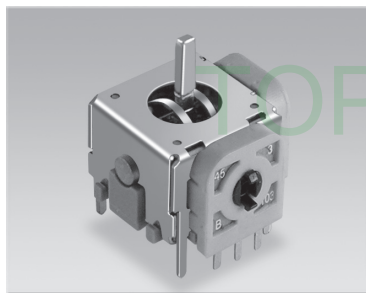
JT9-1P-□-C12.7-13



JT9--1P-□-P7.3

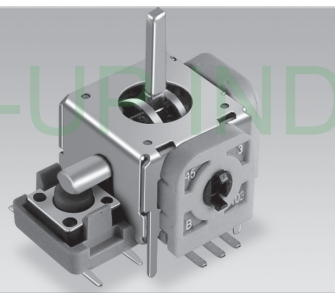


JT9M-1P-□-□P

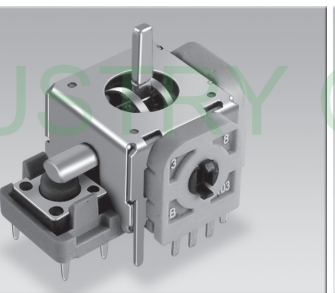


Outline Drawing

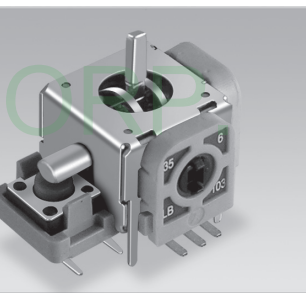
JT9MS-1P-□-□P-T



JT9MS-1P-□-□P

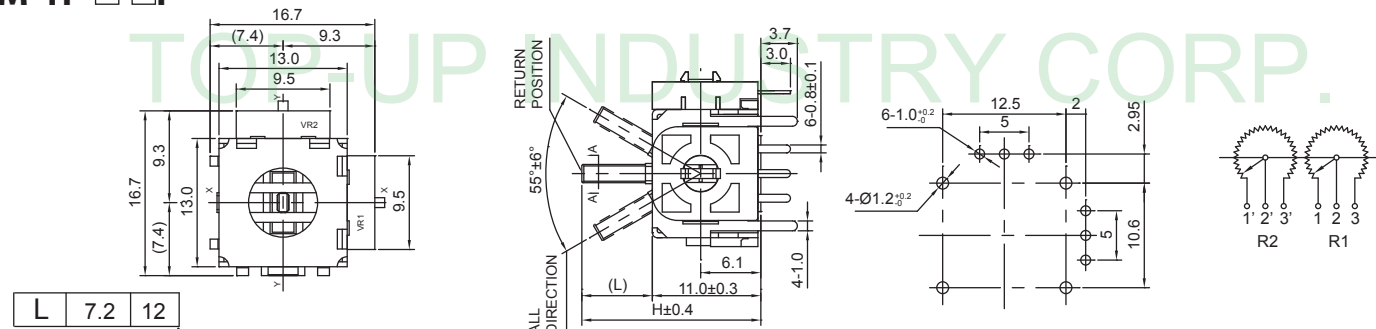


JT9S-1P-□-P-T

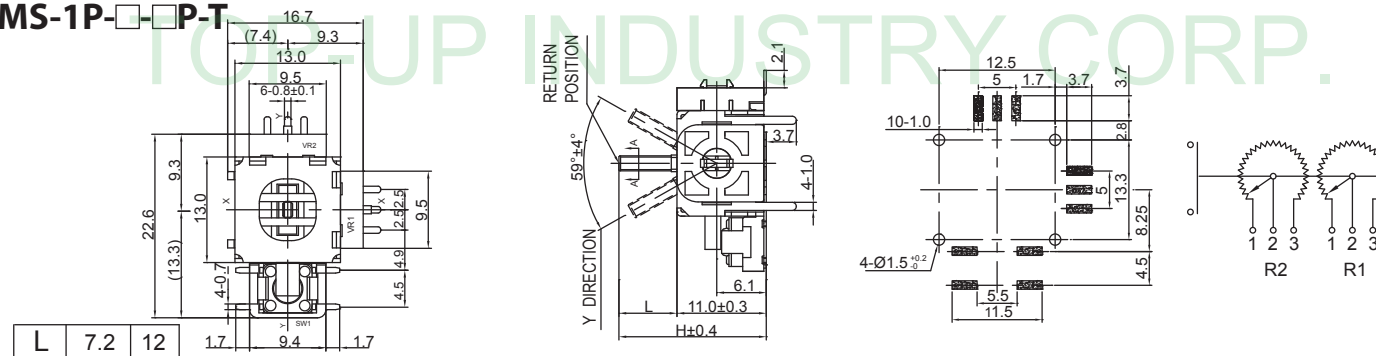


Features individual specifications

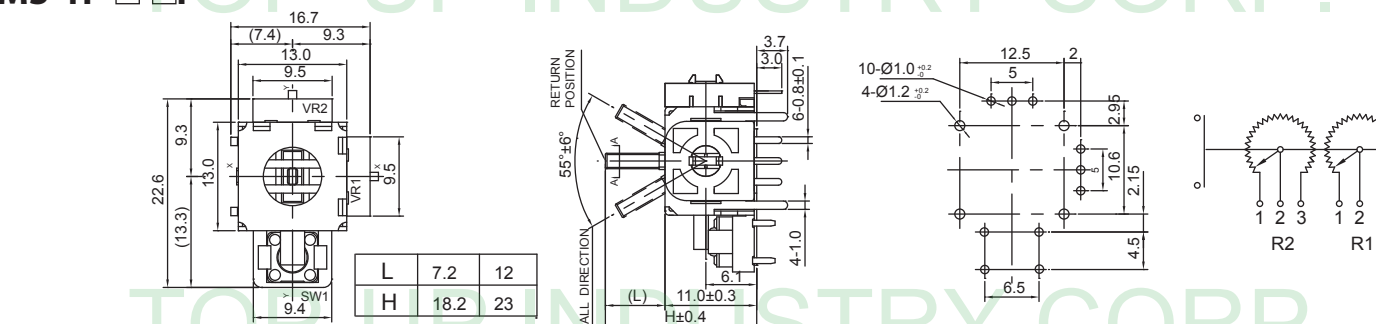
JT9M-1P-□-□P



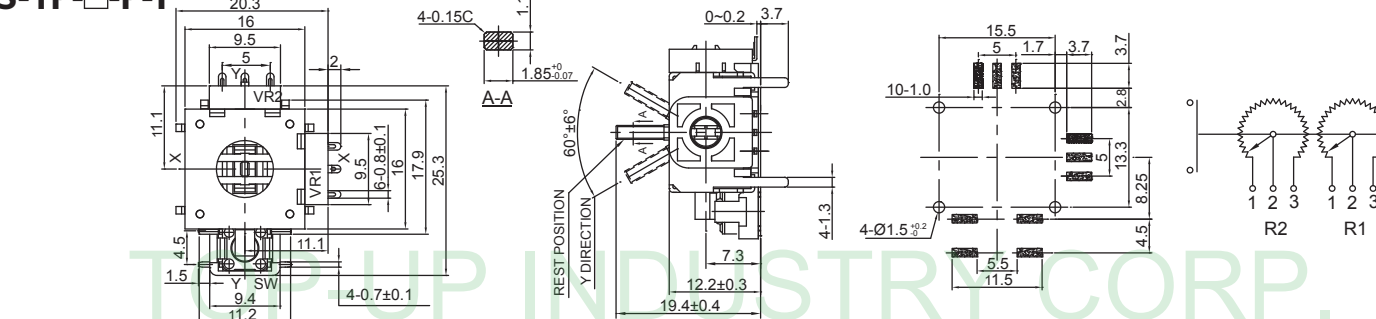
JT9MS-1P-□-□P-T



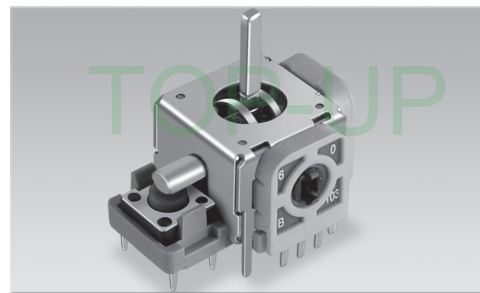
JT9MS-1P-□-□P



JT9S-1P-□-P-T

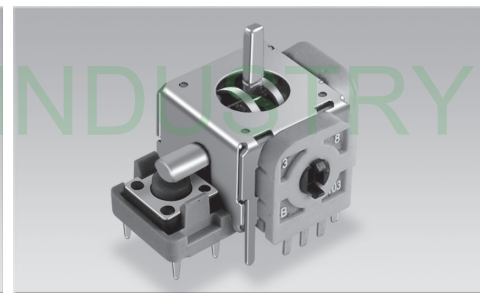


JT9S-1P-□-12.1-O

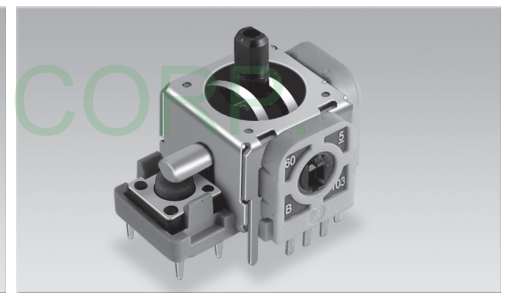


Outline Drawing

JT9S-1P-□-P

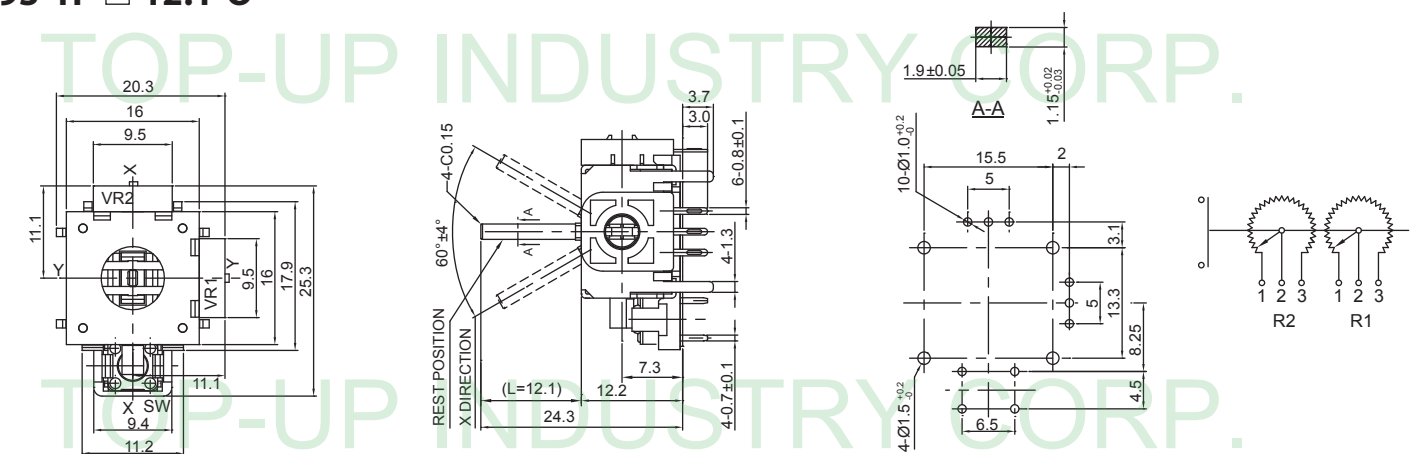


JT9S-1P-□-P7.3

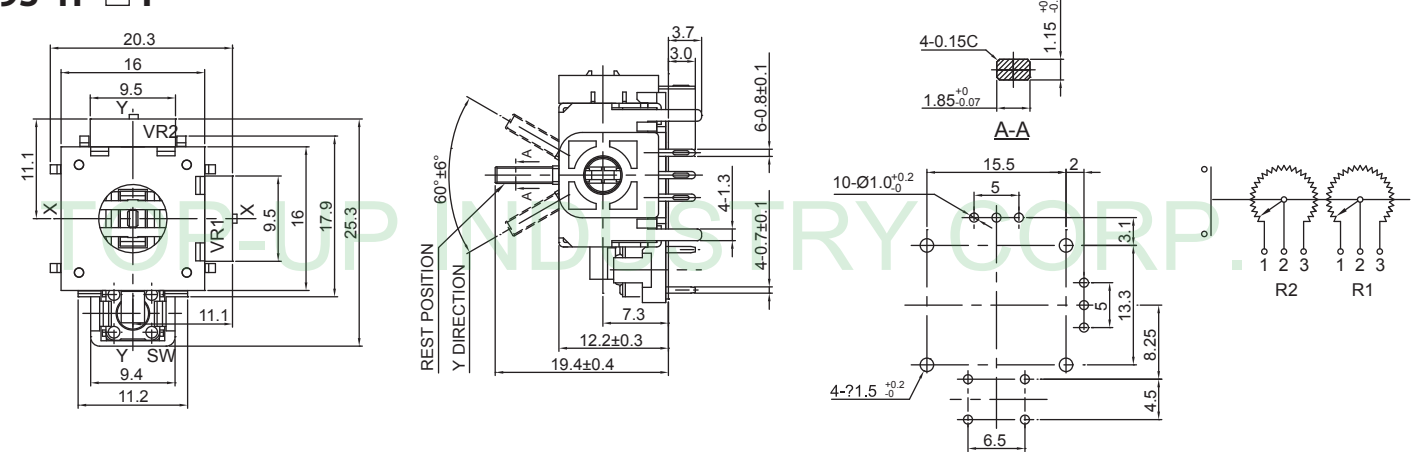


Features individual specifications

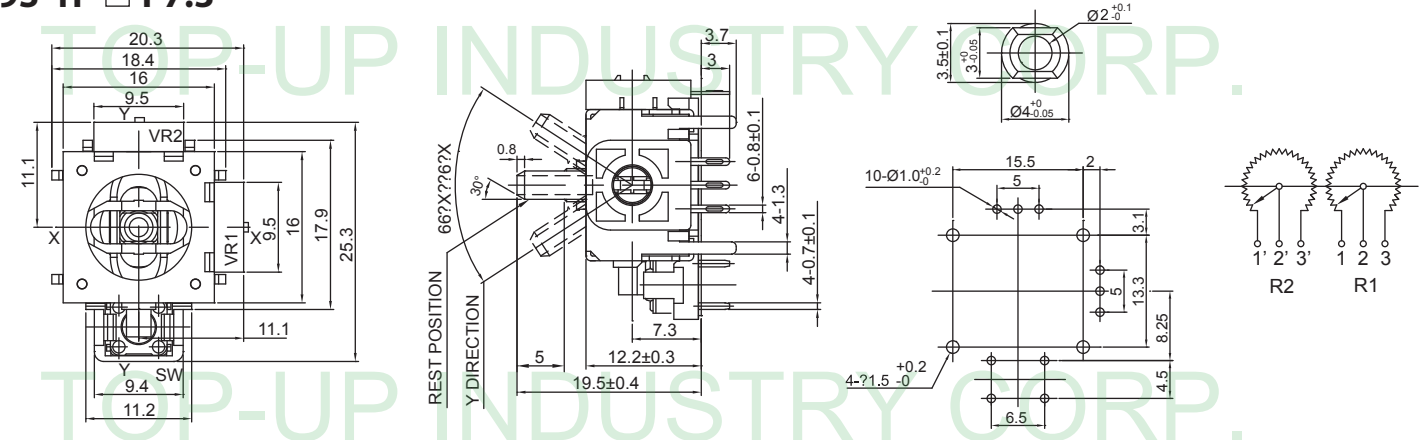
JT9S-1P-□-12.1-O



JT9S-1P-□-P



JT9S-1P-□-P7.3



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

- 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)

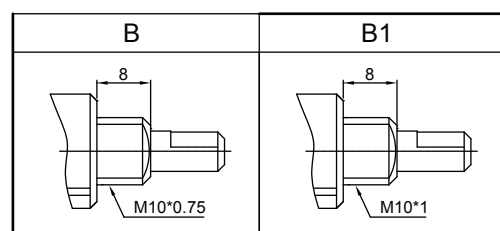
	16P1R, 17P1R, 17M1R	17P1P, 17M1P	17P1X, 17M1X
Code	4	10	2
Rating	4A 250V A.C	10A 250V A.C	2A 250V D.C

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

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 Last Page)

11. Resistance Value

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

13. Serial No.

(Drawing 5)

16P1R		16P1P	
Vertical		Vertical	
P.C.B Terminal (D Type)		P.C.B Terminal (D Type)	
17P1R, 17M1R		17P1P, 17M1P	17M1P
Vertical		Vertical	Vertical
P.C.B Terminal (D Type)		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)

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
-----------------	---------------

17P1P10SVB 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 A.C 1000V between terminals of open contacts for 1 minute A.C 3000V between terminals and case for 1 minute
Switch withstand voltage	500MΩ MIN. at DC 500V

17P1RSVB Series Switch Specifications

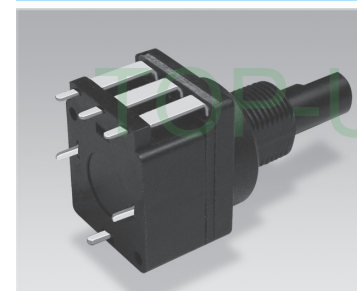
Mechanical Characteristics:

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

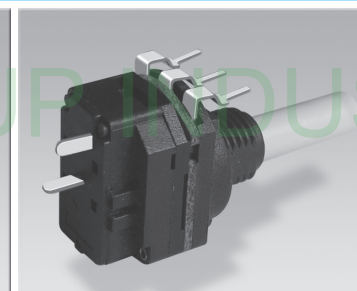
Electrical Characteristics:

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

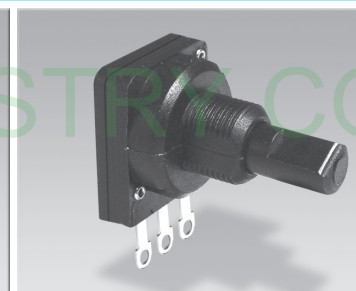
16P1P10SVB-D



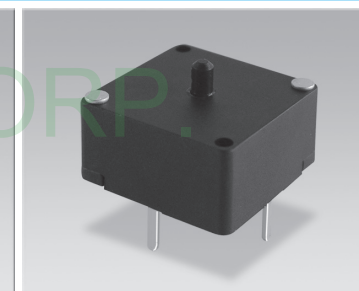
16P1P10SVB-CD



17P1HB-A



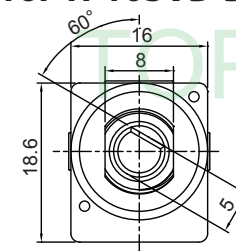
17P1PRF20-10-6H



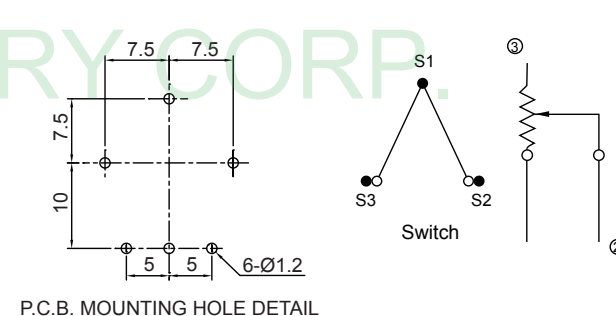
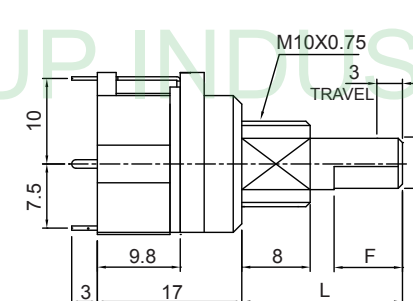
Outline Drawing

Features individual specifications

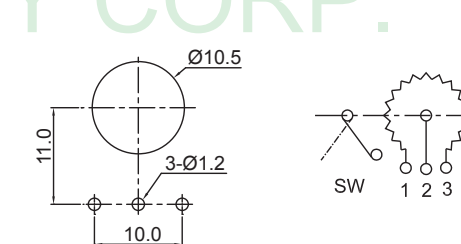
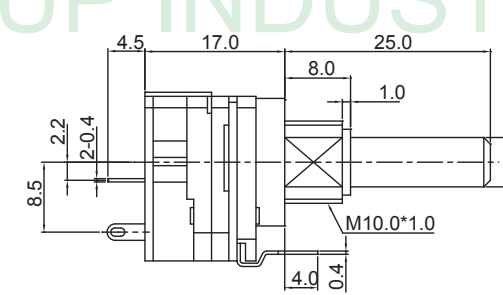
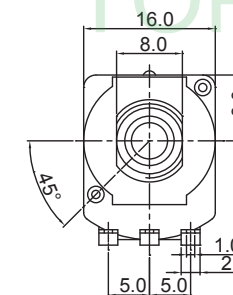
16P1P10SVB-D



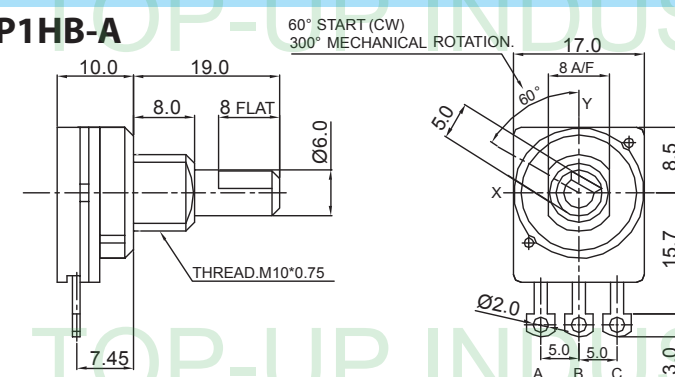
SHAFT SHOWN IN
FULL C.C.W. POSITION



16P1P10SVB-CD

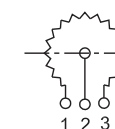


17P1HB-A

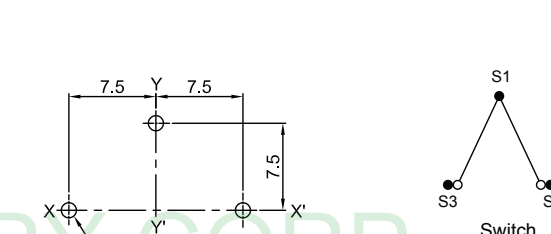
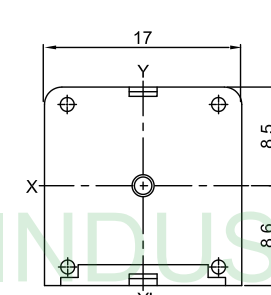
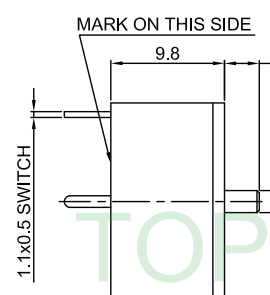


NOTES: 1.ALL SOLDER PINS MUST BE
AT 90°±1° TO BASE
2.IDENTIFICATION COLOURS:-
BUSH- BLACK
SWITCH BODY- BLACK

SYMBOL	SPINDLE COLOR
G	GREEN
D	DARK BLUE



17P1PRF20-10-6H



Features individual specifications

Features individual specifications

[illegible]

Technical drawings of the 1X0.5 Switch, including side, top, and wiring views.

Side View: Shows the switch assembly with dimensions: 1.1X0.5 POT, 1.1X0.5 SWITCH, 17^{+0/-0.2}, 19, 8.0, 8 FLAT, 8^{+0.01/-0.075}, and THREAD M10X0.75. A note points to the switch mechanism: SEE NOTE 1.

Top View: Shows the circular base with dimensions: 300° MECHANICAL ROTATION (CW), 60°, 17, 8 A/F, 5^{+0.05/-0.05}, 8.5, 11.7, and 8 FLAT. The base is divided into three sections labeled A, B, and C.

Wiring Diagram: Shows the electrical connections. The switch is connected to a 300V AC source. The switch has three terminals: S1, S2, and S3. S1 is connected to the 300V source. S2 and S3 are connected to a common switch point. The switch is labeled "Switch".

The technical drawings include:

- Side View (Left):** Shows the profile of the component with dimensions 20, 19, 8, 8 FLAT, and Ø6.0. The bottom feature is labeled "THREAD.M10*0.75".
- Top View (Middle):** A circular view showing a 60° START (CW) 300° MECHANICAL ROTATION. Dimensions include 17, 8 A/F, 60°, Y, X, 8.5, 12.5, 4, 5.0, and 5.0.
- Mounting View (Right):** A rectangular view showing the mounting surface with dimensions 11.5, 7, 5, 5, 5-Ø1.5 HOLES, and MOUNTING SURFACE. It also includes a switch symbol SW and numbered terminals 1, 2, 3.

1.1X0.5 SWITCH

17⁺⁰_{-0.2}

19

8.0

TOP-UP

THREAD M10X0.75

1.1X0.4 POT

3.2

SEE NOTE 1

17

8 A/F

Y

X

8.5

11.7

A B C

5.75 5.75

Y

X

0.25

5

10

5

5

1.3 TYP

P. C. B PIERCING CENTRES
(COMPONENT SIDE)

SW

1 2 3

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

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)				
	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				
	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 	

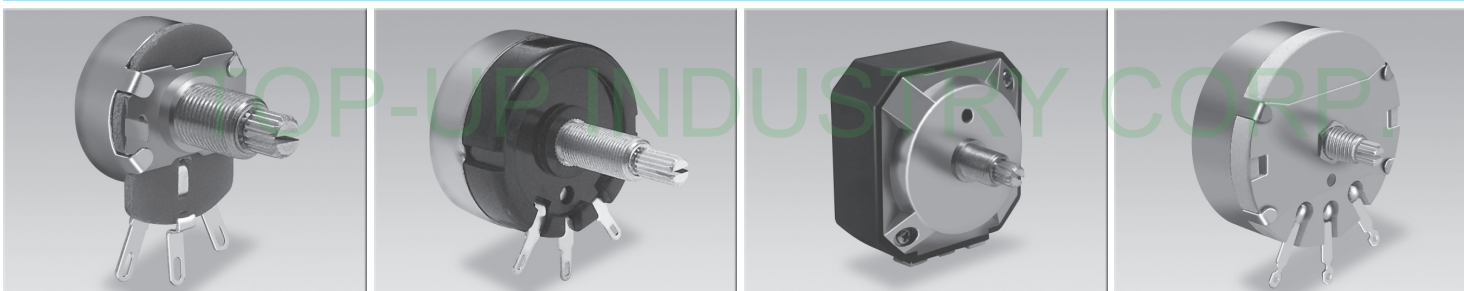
10. Type of Taper (See Taper Chart Last Page)
11. Resistance Value
12. Number of Clicks : Blank - None
13. Serial No.

WW24M1H10.5BL-A

WW40M1HB-A

WW50M1HB-A

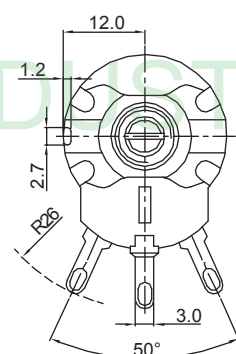
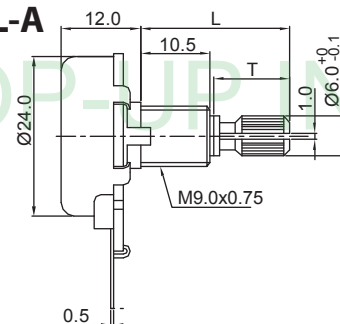
WW60M1H10B-A



Outline Drawing

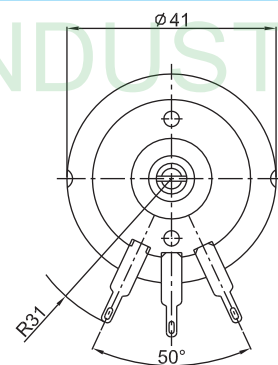
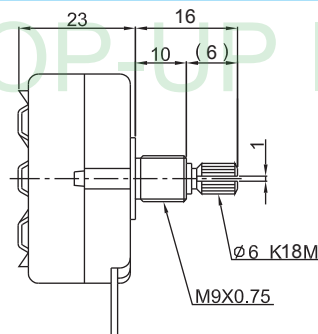
Features individual specifications

WW24M1H10.5BL-A



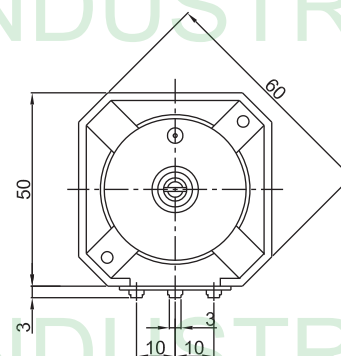
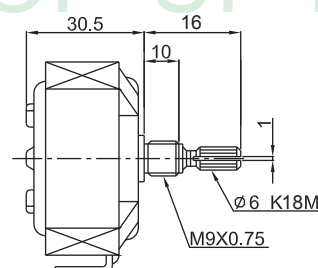
RESISTANCE RANGE	5Ω~5KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	5W

WW40M1HB-A



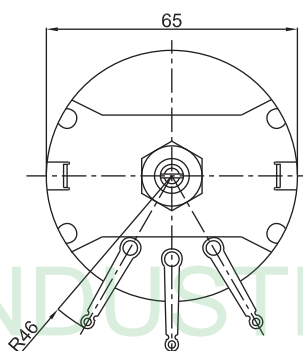
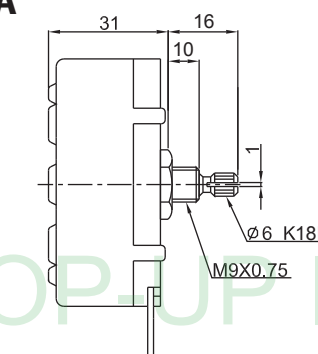
RESISTANCE RANGE	5Ω~3KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

WW50M1HB-A



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

WW60M1H10B-A



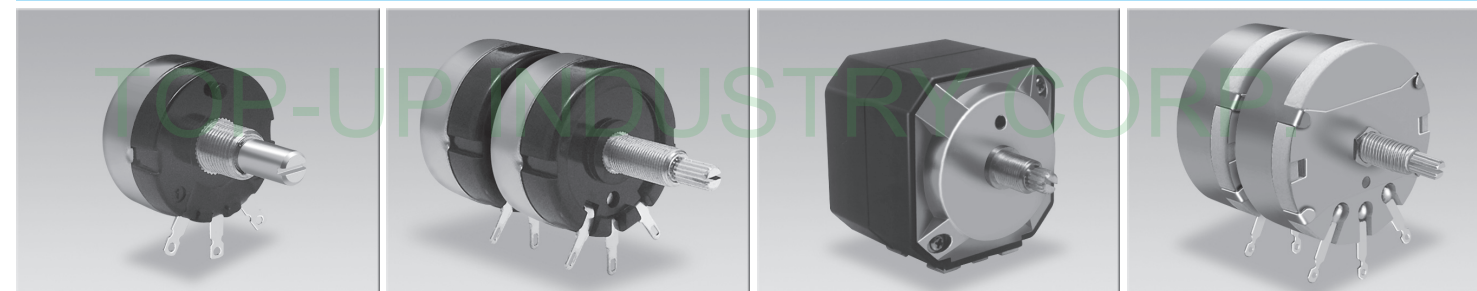
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW28M1HB-A

WW40M2HB-A

WW50M2HB-A

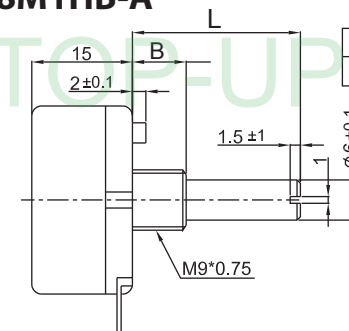
WW60M2H10B-A



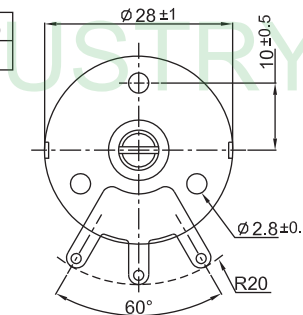
Outline Drawing

Features individual specifications

WW28M1HB-A

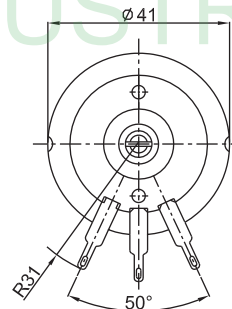
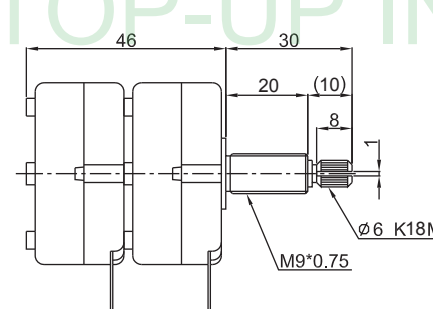


L	15	20	25
B	8	8	8



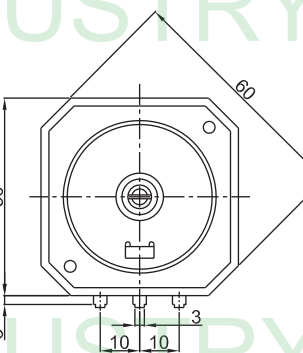
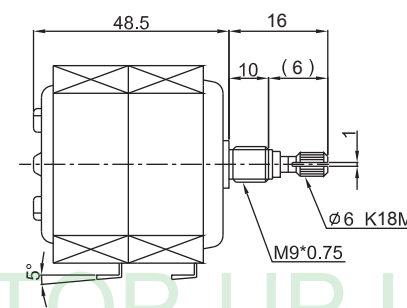
RESISTANCE RANGE	5Ω~5KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	1.5W

WW40M2HB-A



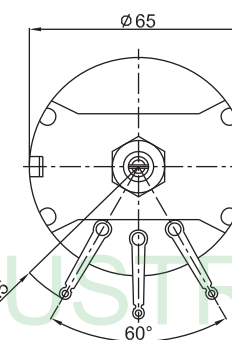
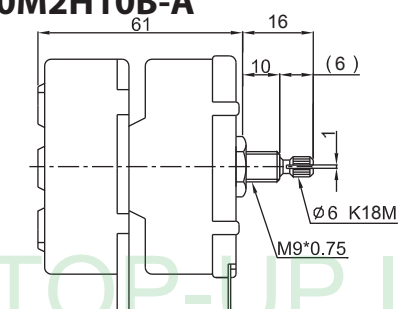
RESISTANCE RANGE	5Ω~3KΩ
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	15W

WW50M2HB-A



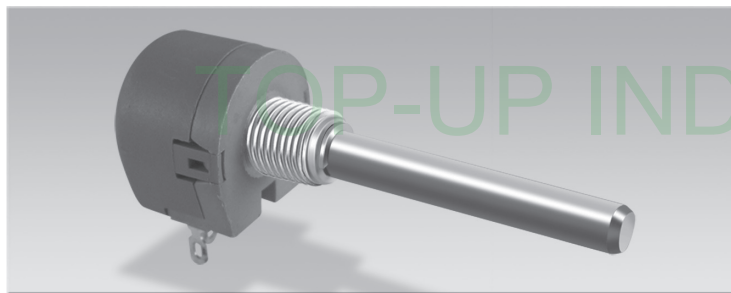
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW60M2H10B-A



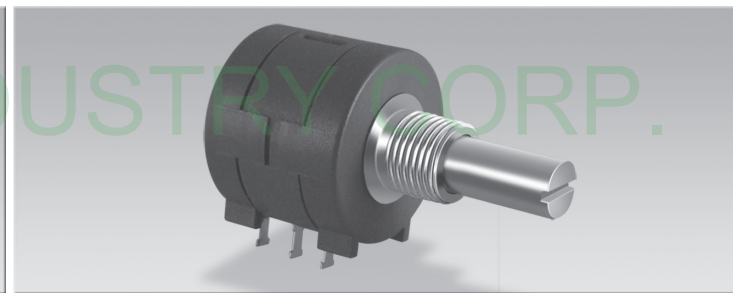
RESISTANCE RANGE	5Ω~50Ω
RESISTANCE TOIERANCE	±20%
RESISTANCE TAPER	B
ROTATING ANGLE	300°±5°
POWER RATING	50W

WW22M1HB-A



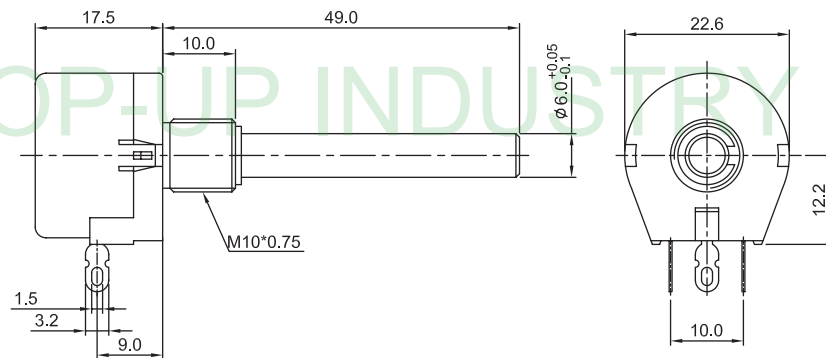
Outline Drawing

TP-WW3590S-2A

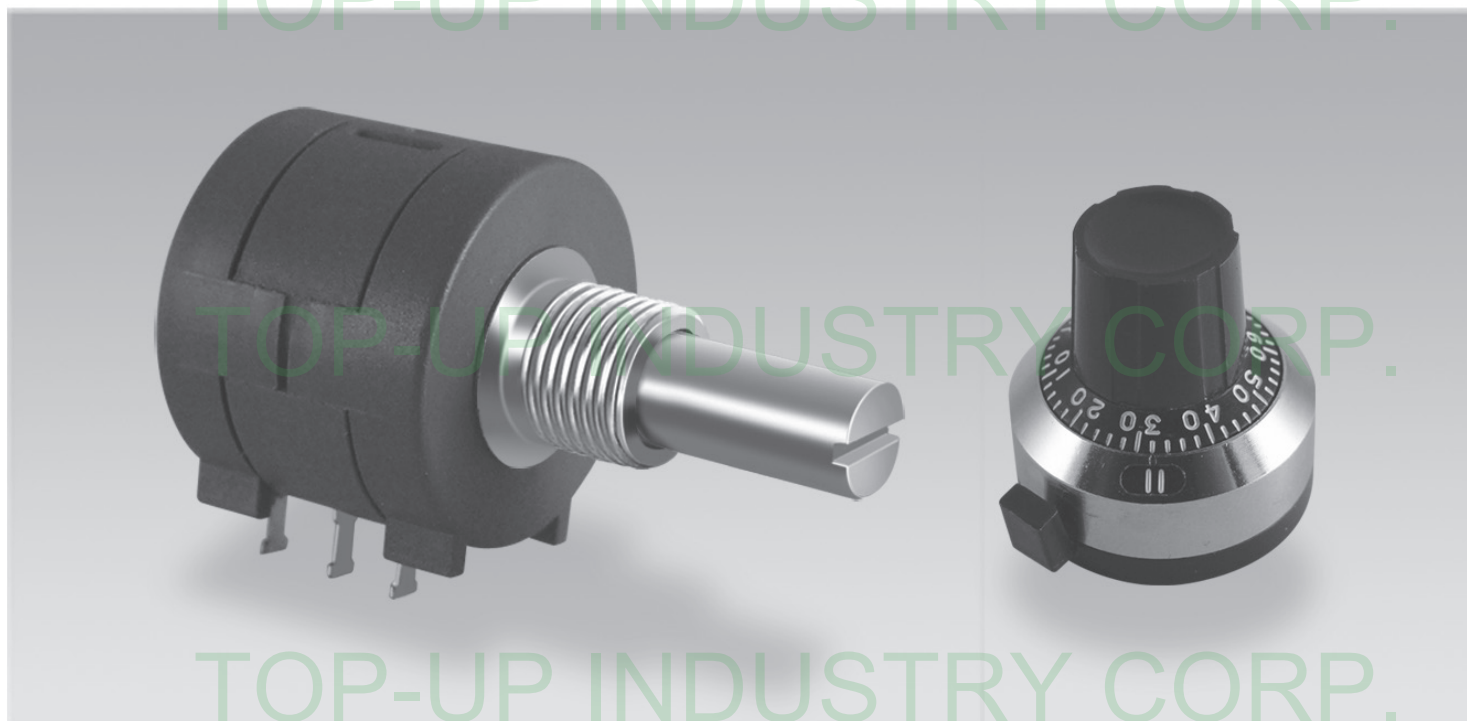
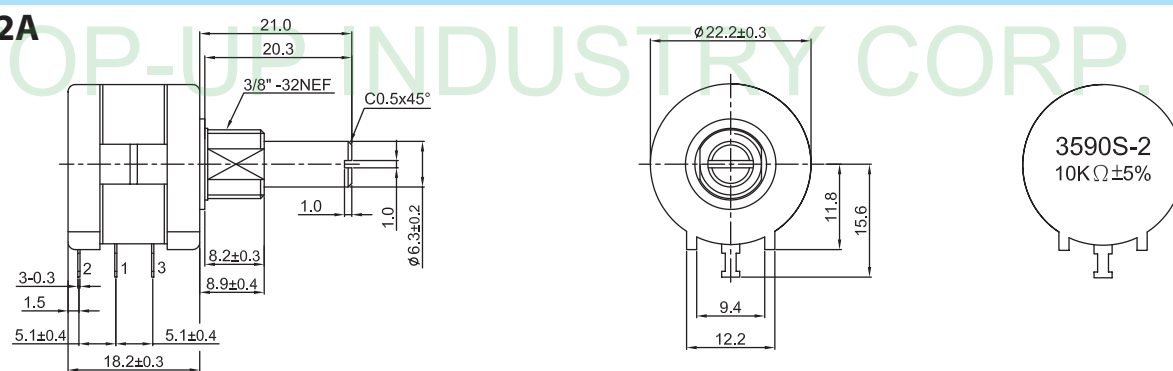


Features individual specifications

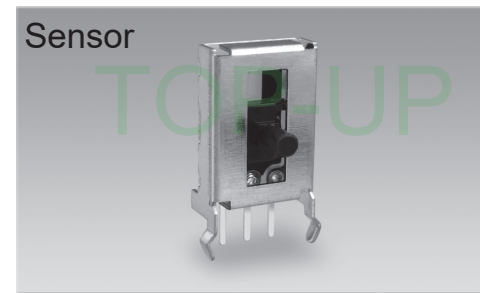
WW22M1HB-A



TP-WW3590S-2A

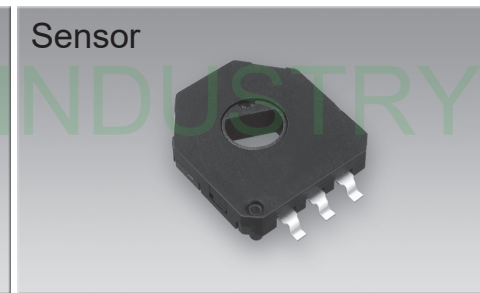


8SL10AHF2-B



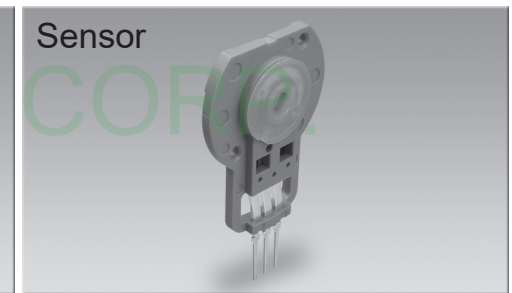
Outline Drawing

11SR1-T

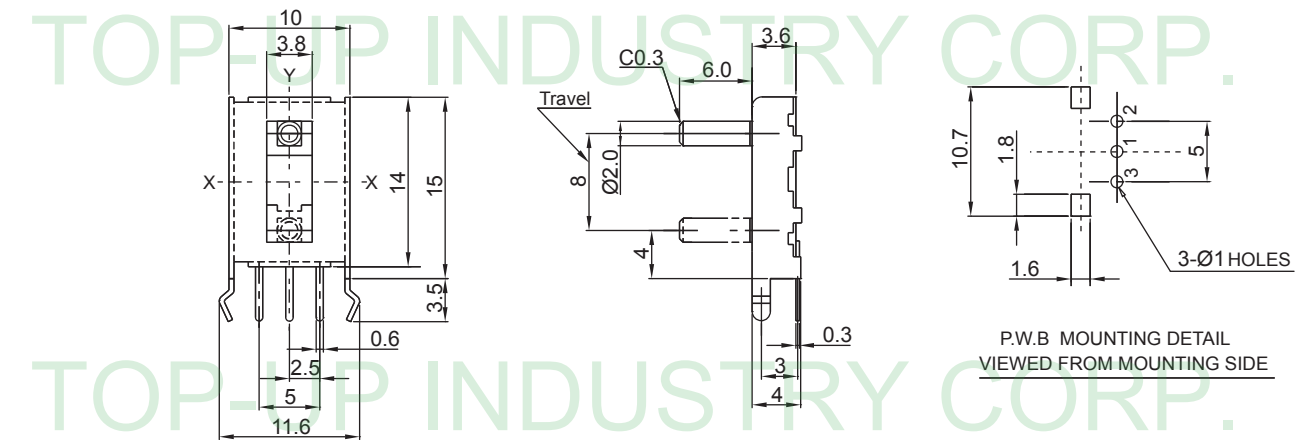


Features individual specifications

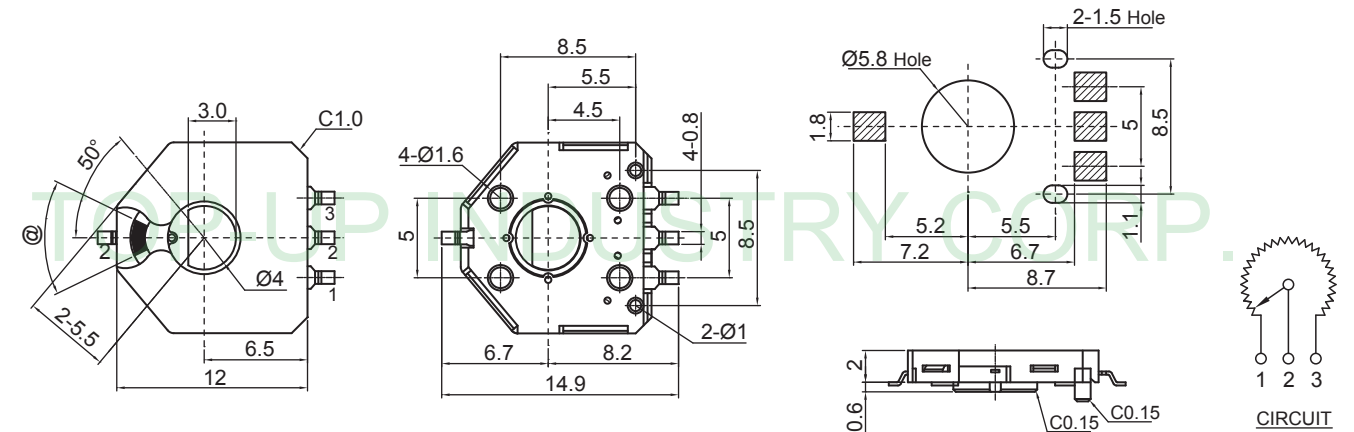
28SR1V-B



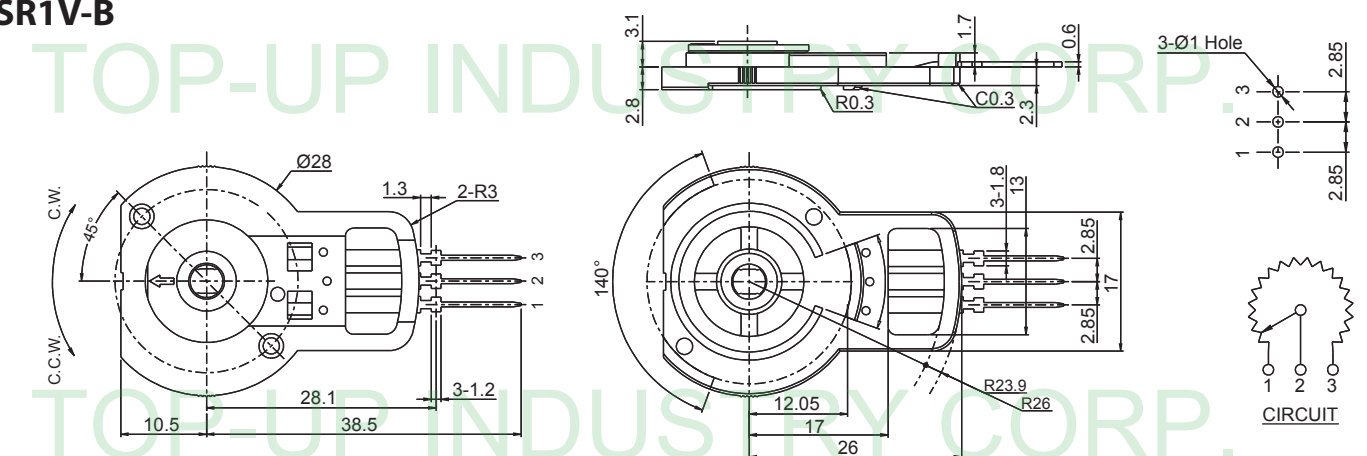
8SL10AHF2-B



11SR1-T



28SR1V-B

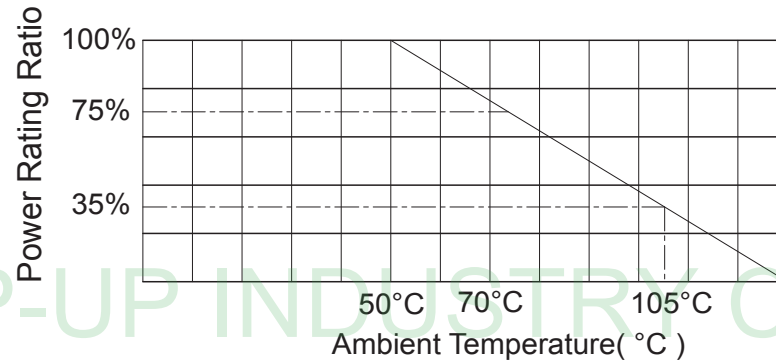


15RS Series Position Sensor

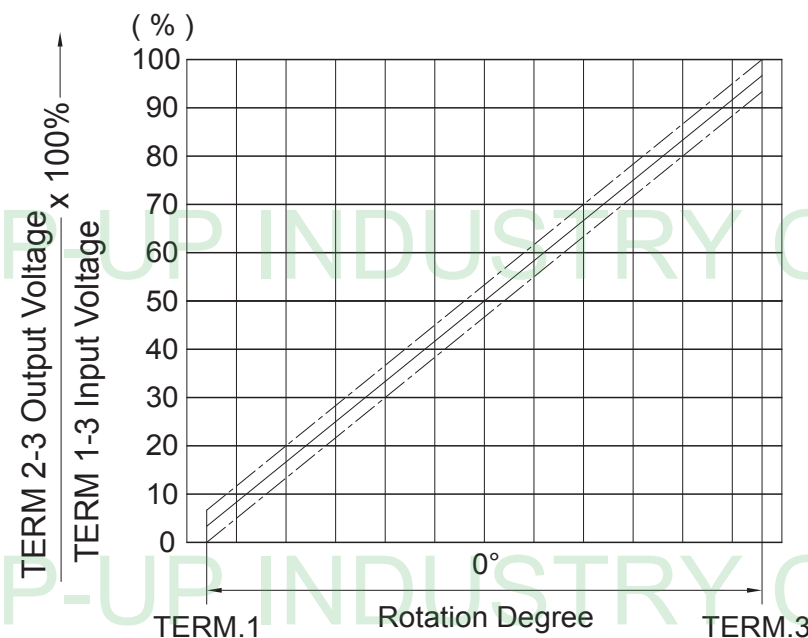
Common Specifications

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 :

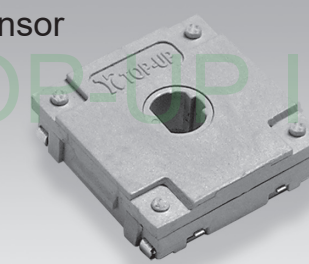


Reference Characteristic Curve



15RS-TU

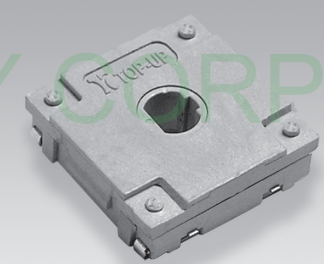
Position Sensor



Outline Drawing

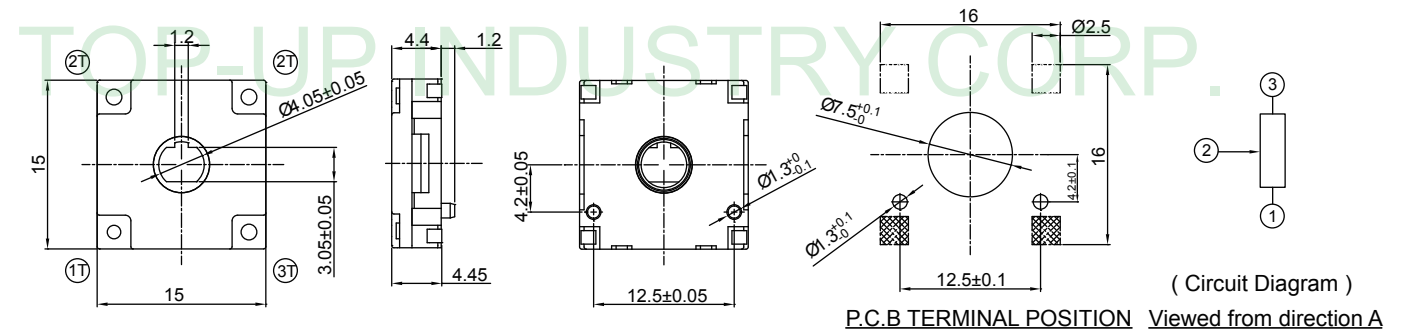
EC15-SMT

Encoder

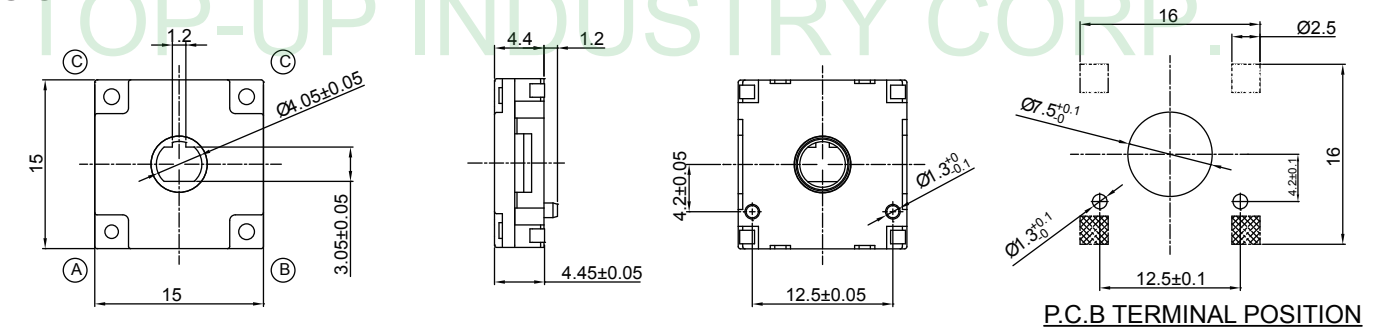


Features individual specifications

15RS-TU



EC15-SMT

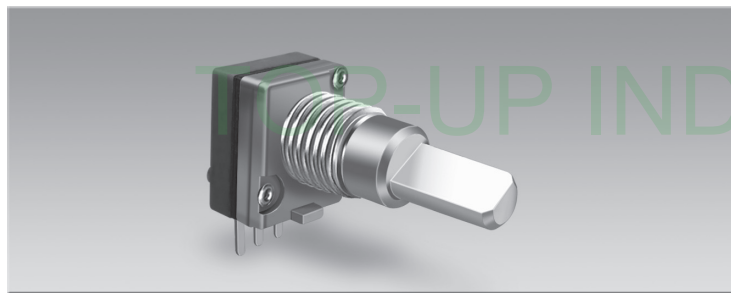


EC15 Series Encoder

Common Specifications

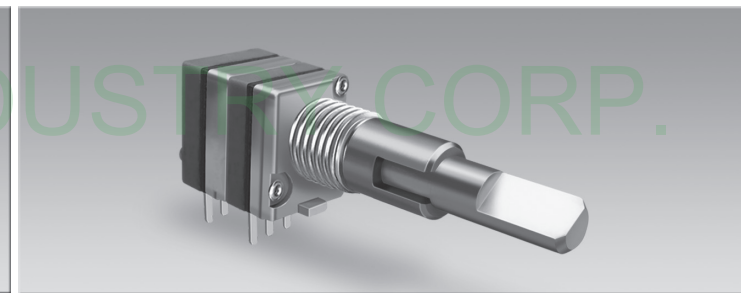
Items	Specifications		
Pulse	3	6	12
Number of Detent	0	0	0
Phase Difference (msec)	14	14	4
Chattering (msec)	3	3	3
Sliding noise (msec)	2	2	2
Insulation Resistance	DC 50V 100M Ω MIN		
Dielectric Strength	50V AC 1 min		
Torque (gf.cm)	30gf.cm MAX		
Rotational Life (Cycle)	30,000		

EC08M1H5B-B



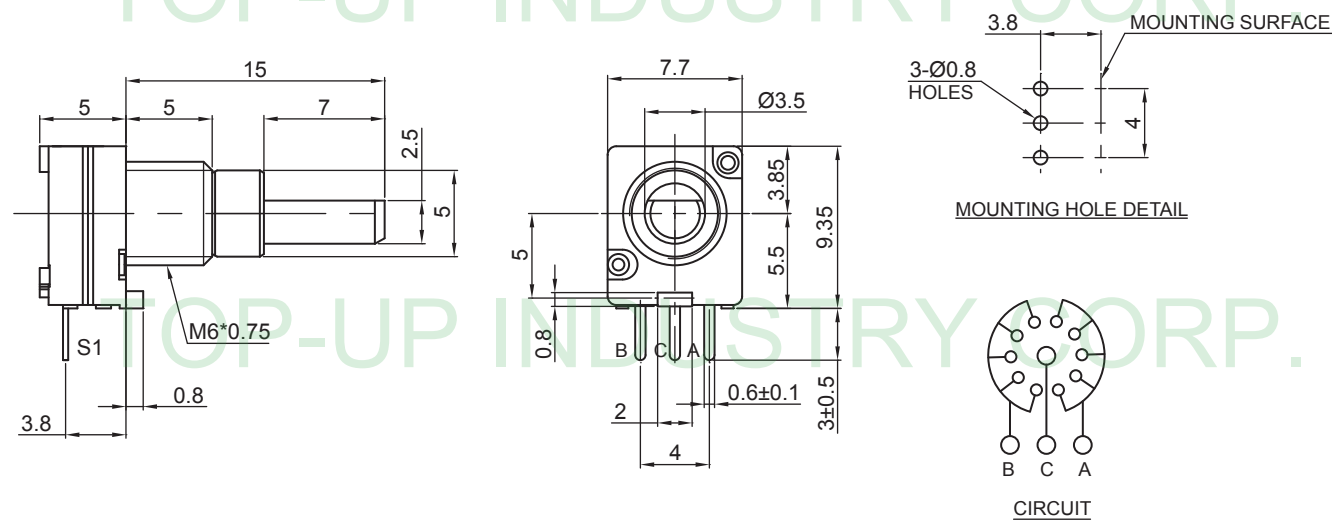
Outline Drawing

EC08MM2H5B-B

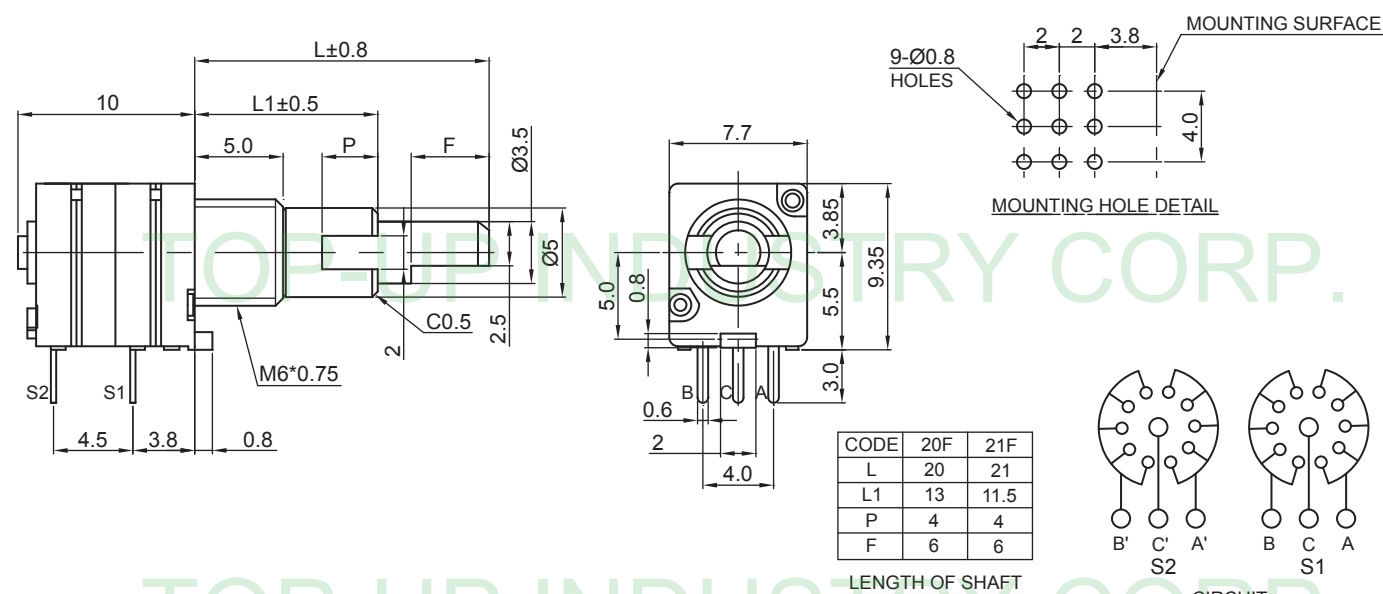


Features individual specifications

EC08M1H5B-B



EC08MM2H5B-B



EC09M Series Code Explanation

EC09M	S	D	H		B	-B-	20	K	-	15	-	30C	-			
1	2	3	4	5	6	7	8	9	10	11	12					

1. Product Lines of EC09M (9mm Metal Shaft Encoder)
2. Switch : S- With Switch; Blank- Without Switch
3. Switch Travel

Code	D	E
Travel		

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

(With Screw)				
B (Standard)				
Other type	B	5	7	10
	D	M7*0.75		

7. Type of Terminal (B - P.C.B Type)
8. Shaft Length
9. Type of Shaft

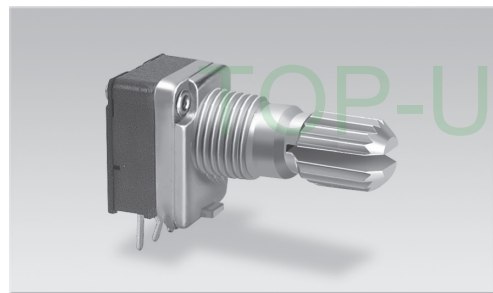
K - Type						F - Type						S- Type					
B: 5mm	B: 7mm	B: 10mm				B: 5mm	B: 7mm	B: 10mm				B: 5mm	B: 7mm	B: 10mm			
L 15	L 20	L 25	L 30	L 35	L 40	L 15	L 20	L 25	L 30	L 35	L 40	L 15	L 20	L 25	L 30	L 35	L 40
T 7	T 12	T 12	T 12	T 12	T 12	F 7	F 12	F 12	F 12	F 12	F 12	L 15	L 20	L 25	L 30	L 35	L 40

10. Output Pulse : 15 - 15Pulse

Pulse No.	12 Pulses	12 Pulses	15 Pulses
Detent NO.	12C	24C	30C

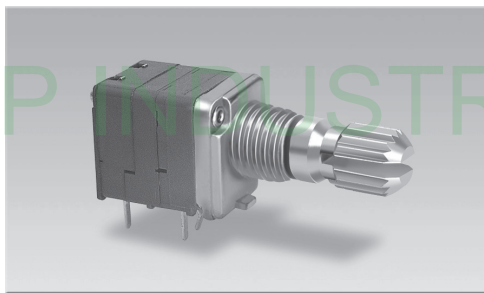
11. Number of Detent : Blank- None, 30C - 30 Detent
12. Series No.

EC09MHB-B



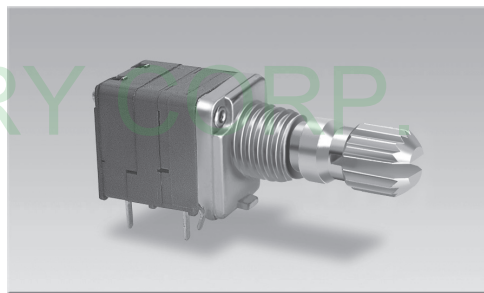
Outline Drawing

EC09MSDHB-B

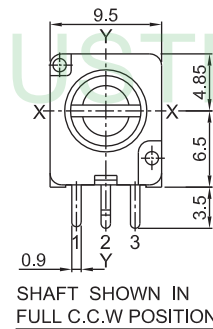
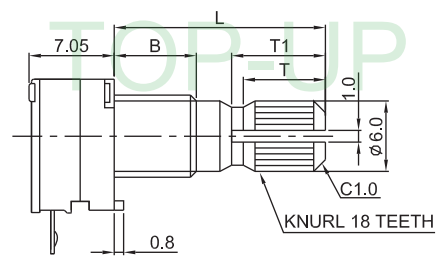


Features individual specifications

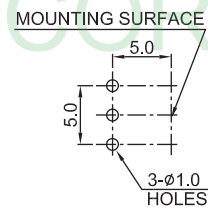
EC09MSEHB-B



EC09MHB-B

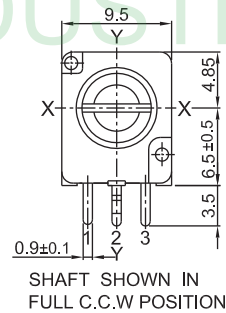
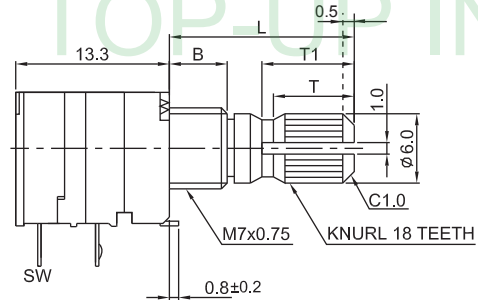


SHAFT SHOWN IN FULL C.C.W POSITION

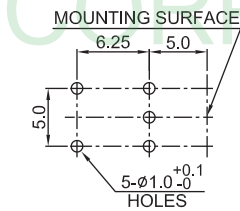


P.C.B MOUNTING HOLES DETAIL

EC09MSDHB-B

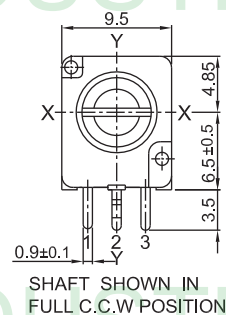
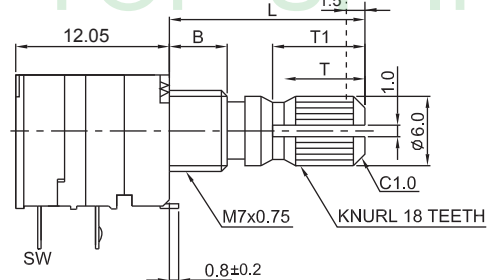


SHAFT SHOWN IN FULL C.C.W POSITION

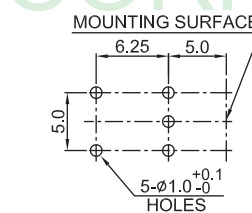


P.C.B MOUNTING DETAIL TOLERANCES±0.1 VIEWED FROM MOUNTING SIDE

EC09MSEHB-B



SHAFT SHOWN IN FULL C.C.W POSITION



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

Common Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf·cm)	Rotational life (cycle)
12	12	3	5	5	250V DC 100MΩ MIN	300V AC 1 min	150±80	30,000
	24	3	5	5			150±80	
15	30	3	5	5			150±50	

Switch Specifications

Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch (mm)	Operating force (gf)	Operating life (cycle)
DC 5V 10 mA	100mΩ	250V DC 100MΩ MIN	300V AC 1 min	PUSH ON	0.5 1.5	400+400/-200	20,000

EC10mm Series Code Explanation

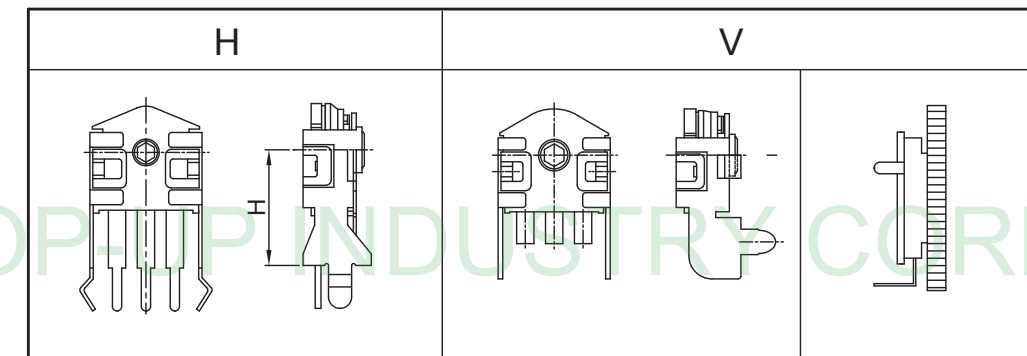
EC10F	H	9	F	B	16*1.6		-12	24C	
1	2	3	4	5	6	7	8	9	10

1. Product Lines

EC10F — 10mm Size Rotary Encoder

EC10J — 10mm Size With Teeth Type Rotary Encoder

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



3. Mounting Height(H) : 5mm,7mm, 9mm,11mm (only EC10FH Series)

4. With Frame: "F"

5. Type Of Terminal

	P.C.B type		SMD type	
	Horizontal	Vertical	SMT	
	B	D		
	1.5 0.8	0.8		

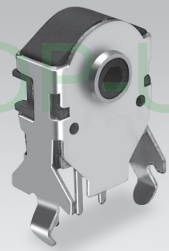
6. Shaft Diameter*Shaft Thickness (Only For EC10J Series)

7. Knob Angle (Only For EC10J Series)

8. Output Pulse: 12 - 12Pluse

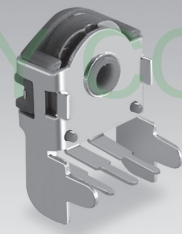
Pulse NO.	12 Pulses
Detent NO.	24C

EC10FH9F1-B



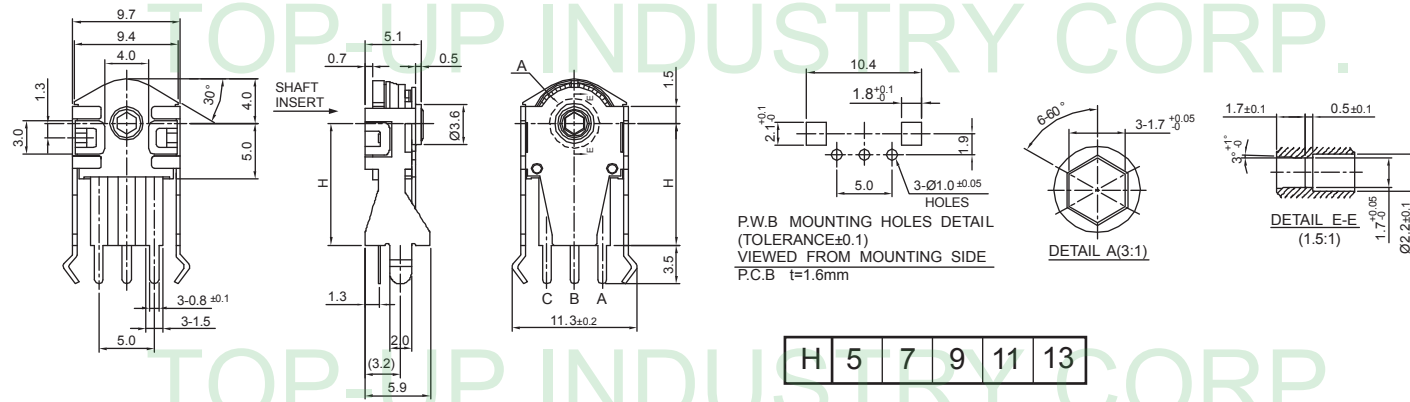
Outline Drawing

EC10FVF-D

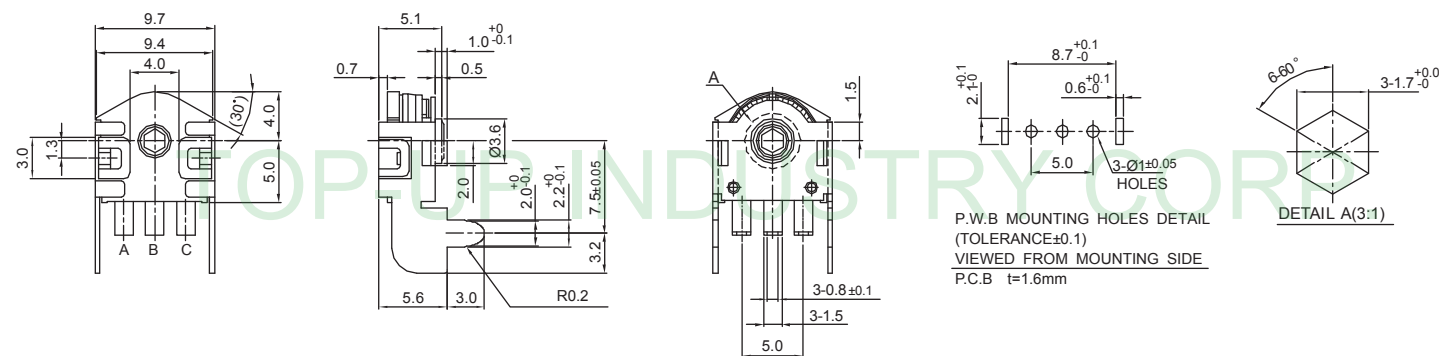


Features individual specifications

EC10FH9F1-B



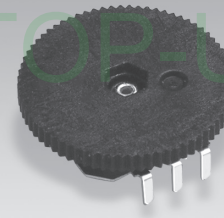
EC10FVF-D



Products Specifications

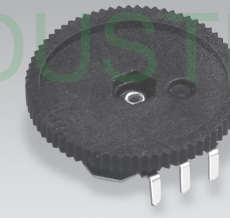
Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf•cm)	Rotational life (cycle)
12	0	4 min.	5 max.	5 max.	50V DC 50MΩ MIN	50V AC	50gf•cm Max.	100,000
	24					1 min	10~50	

EC10JVF-D-16*1.6



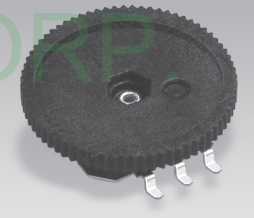
Outline Drawing

EC10JVF-D-16*2.2

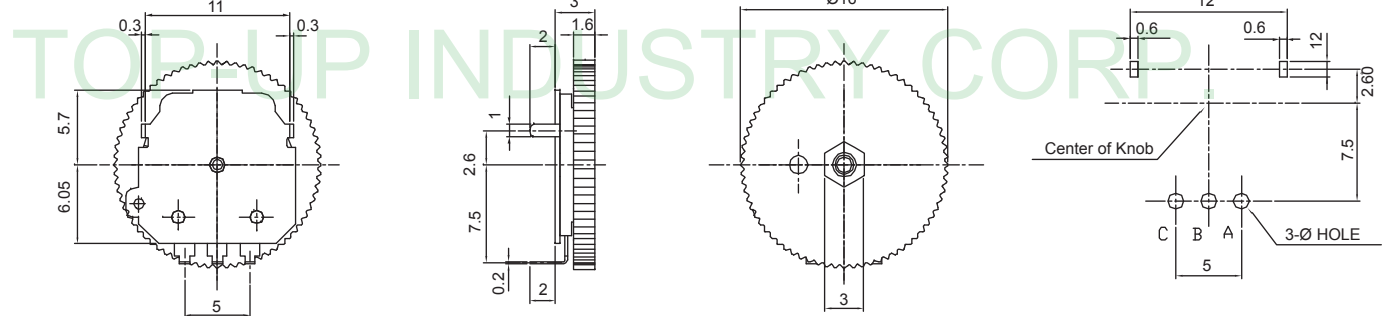


Features individual specifications

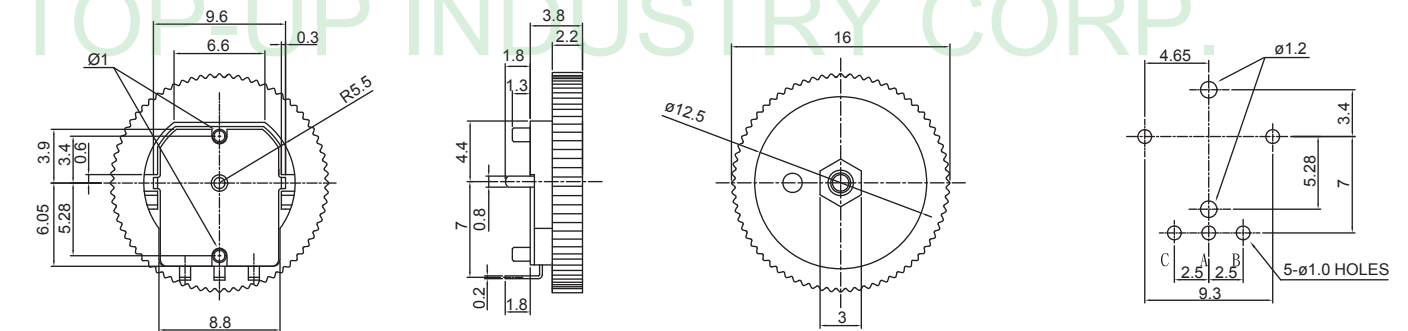
EC10JF-SMT-16*2.2



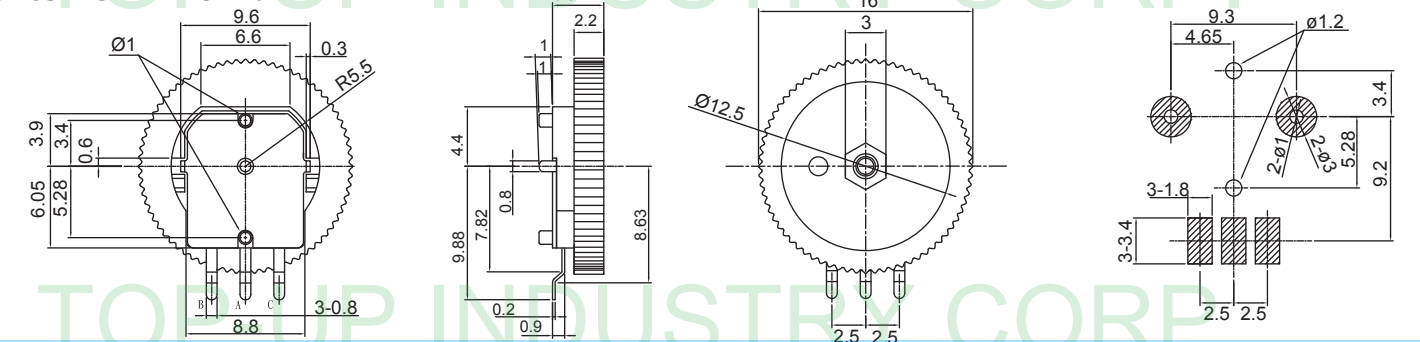
EC10JVF-D-16*1.6



EC10JVF-D-16*2.2



EC10JF-SMT-16*2.2



Common Specifications

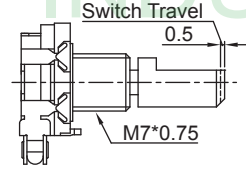
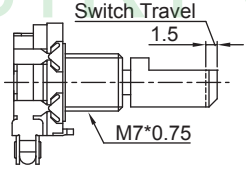
Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Rotational torque (gf•cm)	Rotational life (cycle)
12	0	4	8	8	50V DC 50MΩ MIN	50V AC 1 min	60 MAX.	10,000

EC11M Series Code Explanation

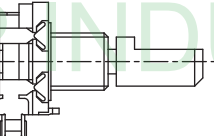
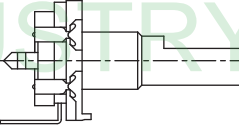
EC11M S D V ☐ NB N A F X - D - 20 K - 20 - 20C - ☐ ☐ ☐

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

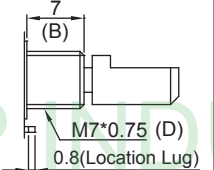
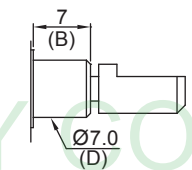
- Product Lines of EC11M (11mm Metal Shaft Encoder)
- Switch : S- With Switch; Blank- Without Switch
- Switch Travel

Code	D	E
Travel		

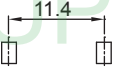
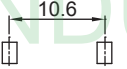
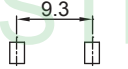
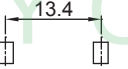
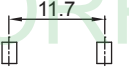
- Horizontal Type (H) or Vertical Type (V)

Code	H	V
Horizontal or Vertical		

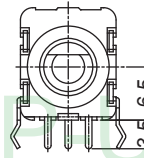
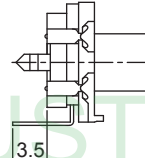
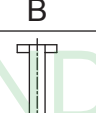
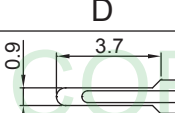
- Bushing Length : Blank- 7mm (Standard Type)
- Type of Bushing

1	(With Screw)		(Without Screw)	
	B (Standard)		NB (Standard)	
	Other type	B 5 9 D M7*0.75	Other type	B 3.5 5 10 D Ø7.0

- Location Lug: Blank - Whit Lug, N - Whitout Lug
- Bushing Material: Blank-Aluminum Alloy, A-Zinc Alloy
- With Frame: "F"
- Frame Size

Size					
Code	V	W	X	Y	Z

- Type of Terminal

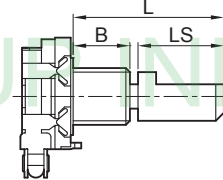
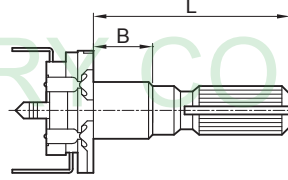
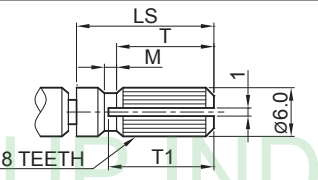
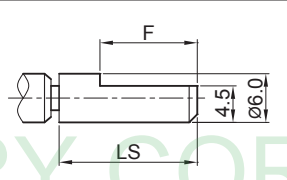
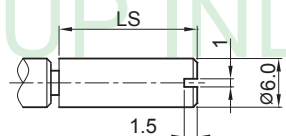
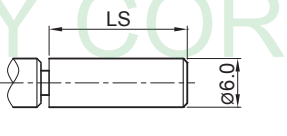
P.C.B Type			
	Horizontal		Vertical
	B		D
			

EC11M Series Code Explanation

EC11M S D V ☐ NB N A F X - D - 20 K - 20 - 20C - ☐ ☐ ☐

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

- Shaft Length (See Drawing 1)
- Type of Shaft (See Drawing 1)

			
K - Type		F - Type	
			
B: 5mm		B: 7mm	
L	15 20 25 30	L	15 20 25 30
LS	9.65 14.65 19.65 24.65	LS	7.65 12.65 17.65 22.65
T	6 10 12 14	T	5 9 10 12
M	1 1 2 4	M	0.5 1 2 4
T1	7 11 11 14	T1	5.5 10 11 14
S- Type		R- Type	
			
B: 5mm		B: 7mm	
L	15 20 25 30	L	15 20 25 30
LS	9.65 14.65 19.65 24.65	LS	7.65 12.65 17.65 22.65

- Output Pulse : 15 - 15Pulse

Pulse No.	8 Pulses	15 Pulses	16 Pulses	20 Pulses
Detent NO.	16C	30C	16C	20C

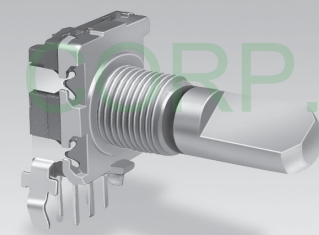
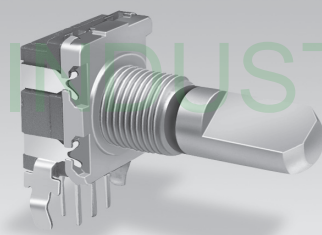
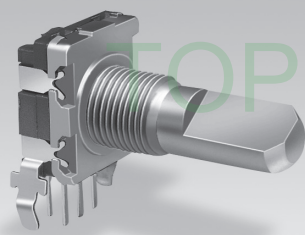
- Number of Detent : Blank- None, 16C - 16 Detent

- Series No.

EC11MHBZFZ-B

EC11MSDHBZFZ-B

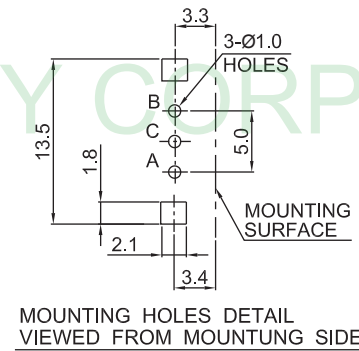
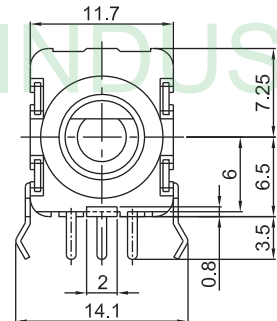
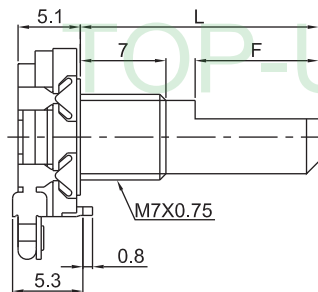
EC11MSEHBZFZ-B



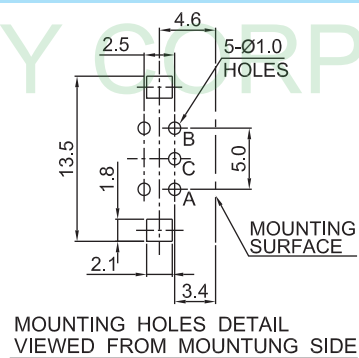
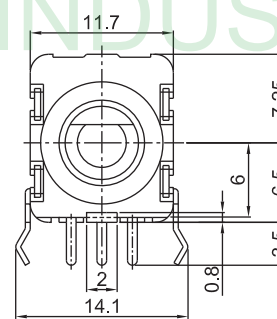
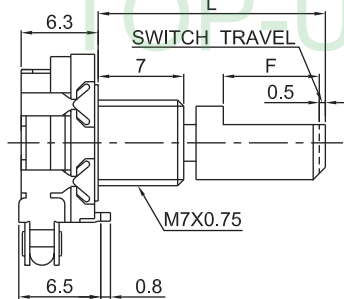
Outline Drawing

Features individual specifications

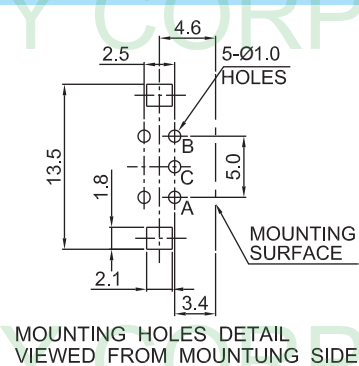
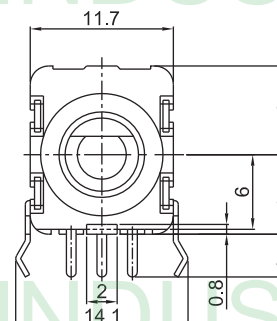
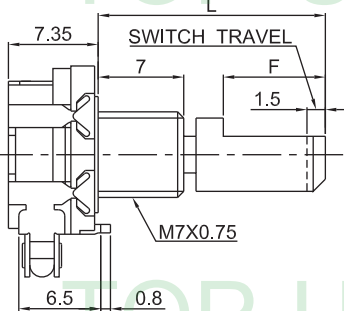
EC11MHBZFZ-B



EC11MSDHBZFZ-B



EC11MSEHBZFZ-B



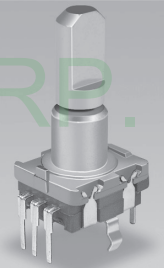
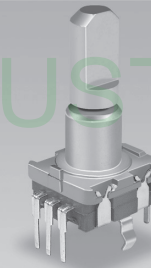
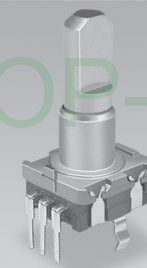
Products Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf.cm)	Rotational life (cycle)
8	0 16	6	3	3	250VDC 100MΩ MIN	300V AC 1 min	30~200 (0 DETENT: 50gf.cm max.)	15,000
15	0 30	6	2	2				
16	0 16	4	3	3				
20	0 20	4	2	2				

EC11MVNBFX-D

EC11MSDVNBFX-D

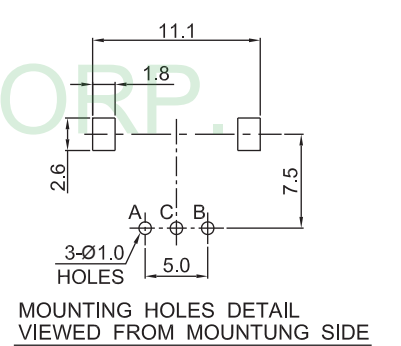
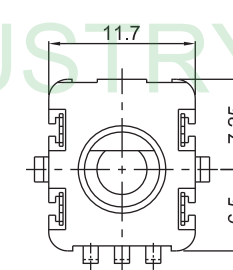
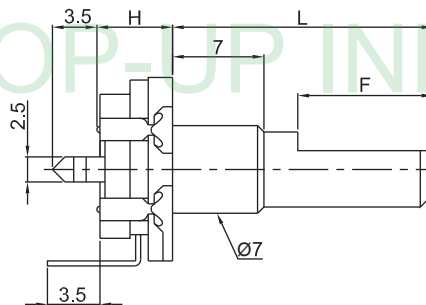
EC11MSEVNBFX-D



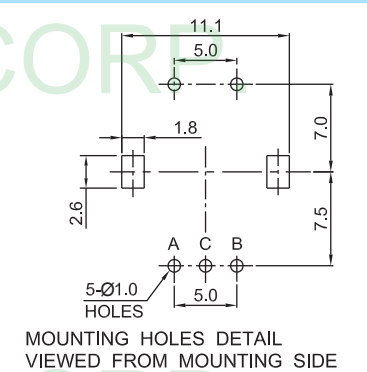
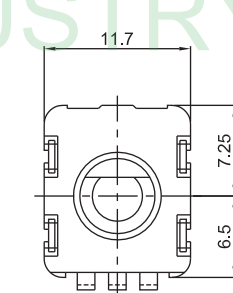
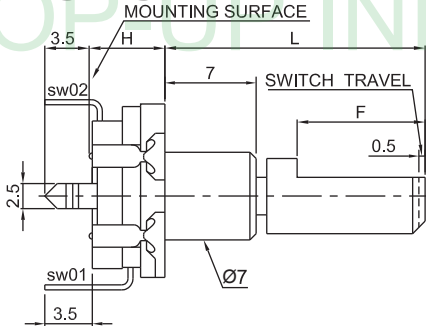
Outline Drawing

Features individual specifications

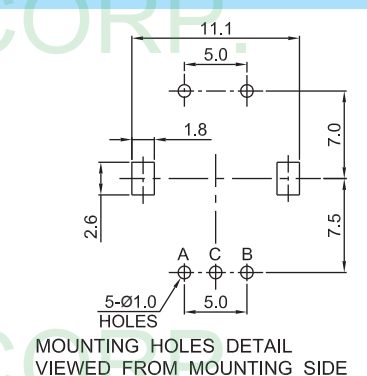
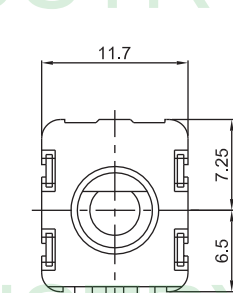
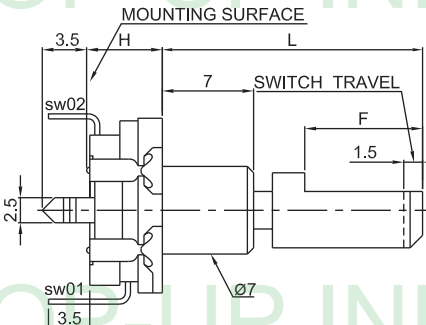
EC11MVNBFX-D



EC11MSDVNBFX-D



EC11MSEVNBFX-D



Switch Specifications

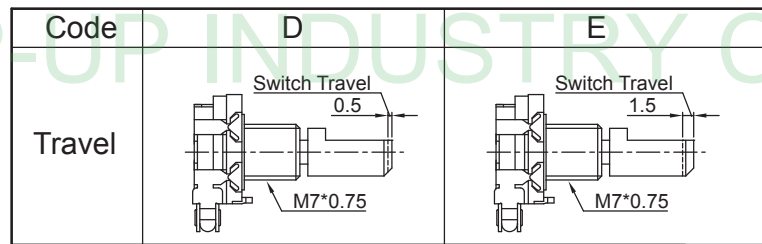
Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch (mm)	Operating force (gf)	Operating life (cycle)
DC 5V 10mA	100mΩ	250V DC 100mΩ MIN	300V AC 1 min	PUSH ON	0.5	600±300	20,000
					1.5	400±200	

EC11MW Series Code Explanation

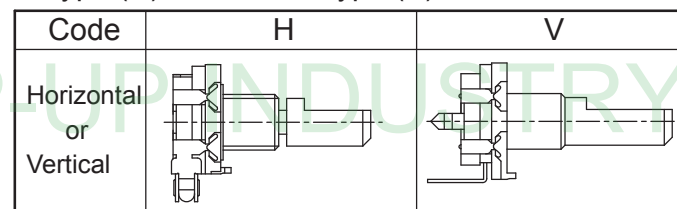
EC11MW S D V ☐ NB A F X - D - 20 K - 20 - 20C - ☐ ☐ ☐

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

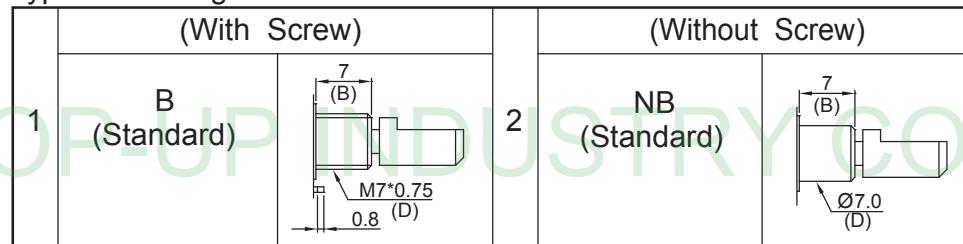
- Product Lines of EC11MW (11mm Size Water-Proof Encoder IPX7)
- Switch : S- With Switch; Blank- Without Switch
- Switch Travel



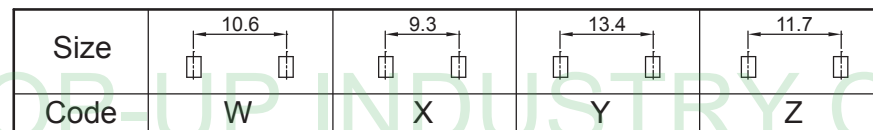
- Horizontal Type (H) or Vertical Type (V)



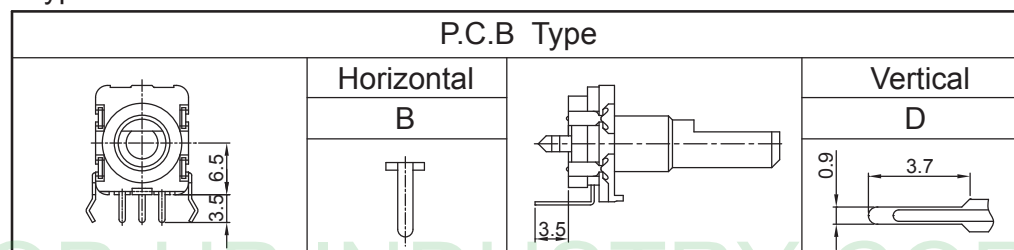
- Bushing Length : Blank- 7mm (Standard Type)
- Type of Bushing



- Bushing Material: Blank-Aluminum Alloy, A-Zinc Alloy
- With Frame: "F"
- Frame Size



- Type of Terminal

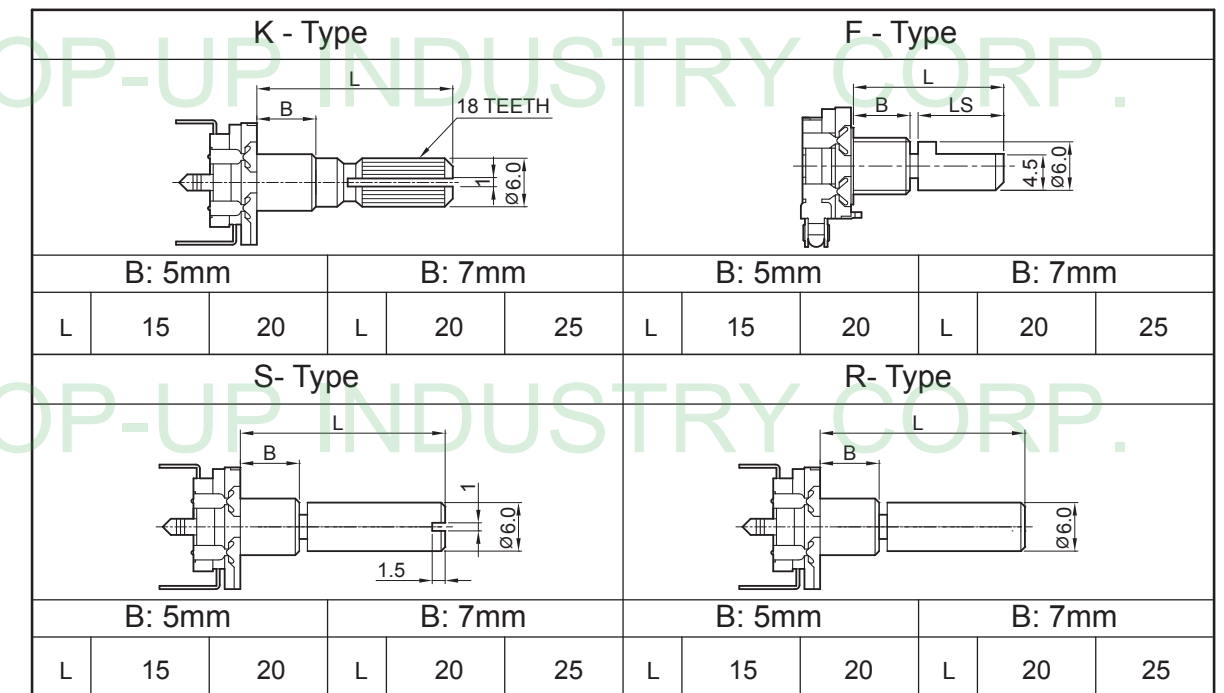


EC11MW Series Code Explanation

EC11MW S D V ☐ NB A F X - D - 20 K - 20 - 20C - ☐ ☐ ☐

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

- Shaft Length (See Drawing 1)
- Type of Shaft (See Drawing 1)



(Drawing 1)

- Output Pulse : 15 - 15Pulse

Pulse No.	8 Pulses	15 Pulses	16 Pulses	20 Pulses
Detent NO.	16C	30C	16C	20C

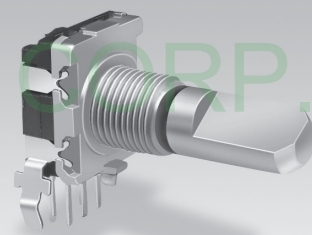
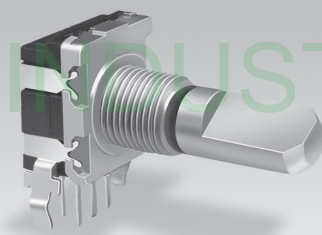
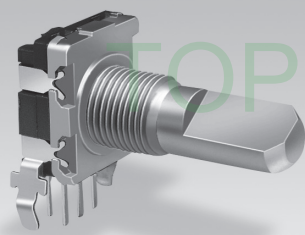
- Number of Detent : Blank- None, 16C - 16 Detent

- Series No.

EC11MWHBFZ-B

EC11MWSHBFZ-B

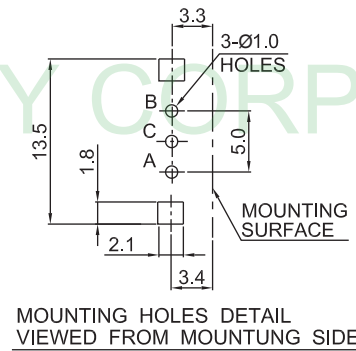
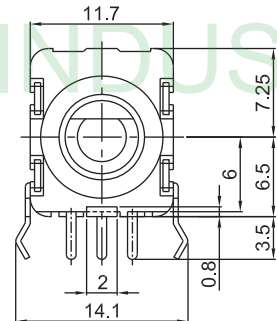
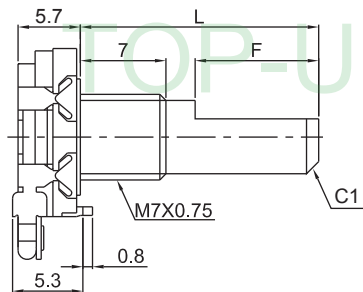
EC11MWSEHBFZ-B



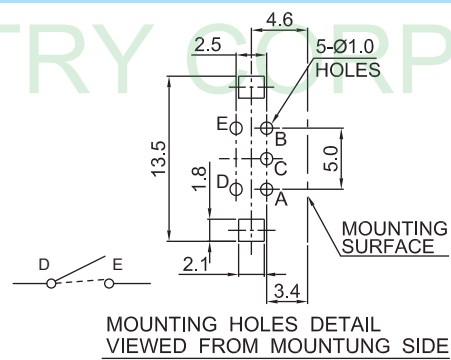
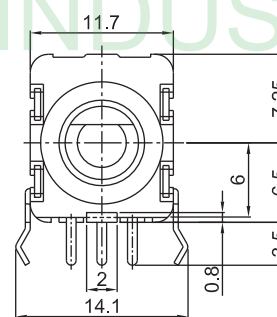
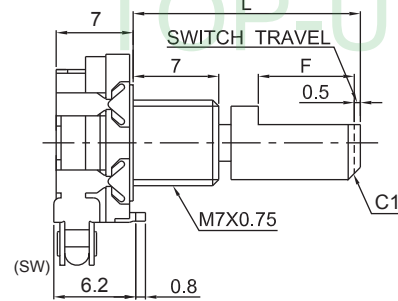
Outline Drawing

Features individual specifications

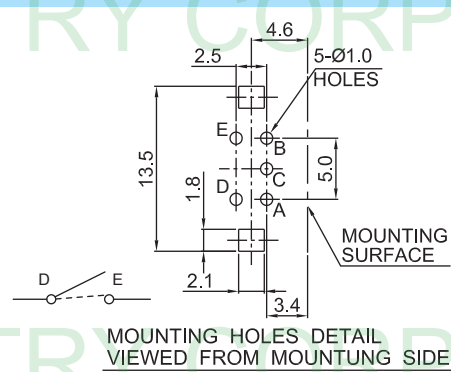
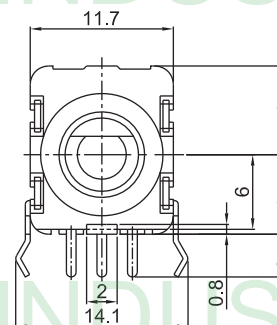
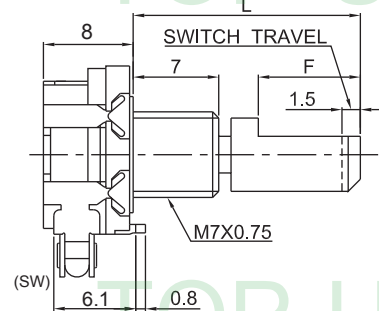
EC11MWHBFZ-B



EC11MWSHBFZ-B



EC11MWSEHBFZ-B



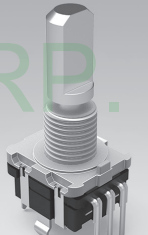
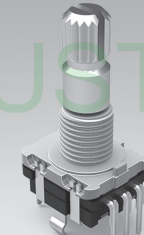
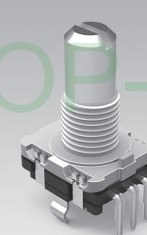
Products Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf.cm)	Rotational life (cycle)
8	0 16	6	3	3	250VDC 100MΩ MIN	300V AC 1 min	10~80 (0 DETENT: 50gf.cm max.)	15,000
15	0 30	6	2	2				1,000,000
16	0 16	4	3	3				
20	0 20	4	2	2				

EC11MWVBFX-D

EC11MWSHVBFX-D

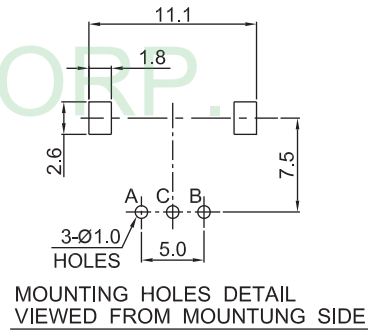
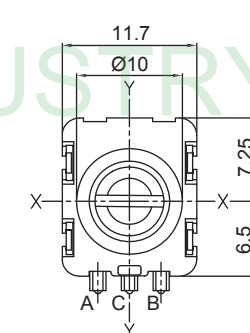
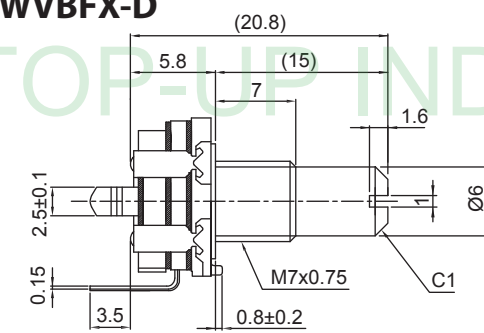
EC11MWSEVBFX-D



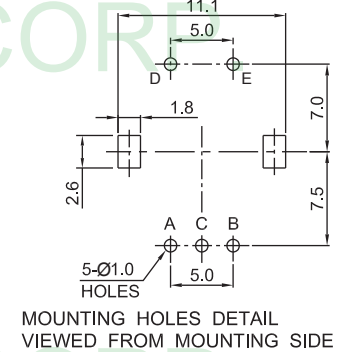
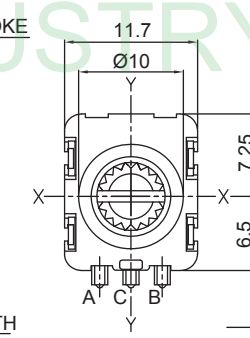
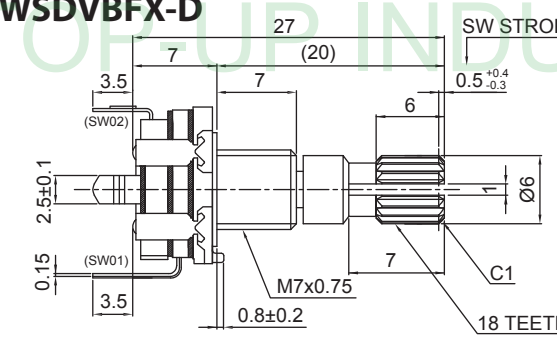
Outline Drawing

Features individual specifications

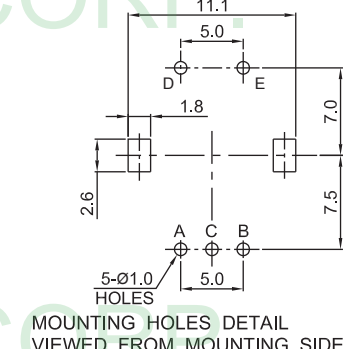
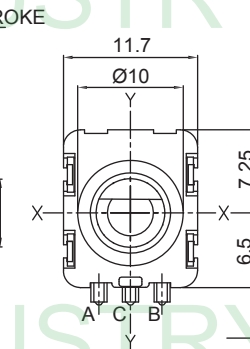
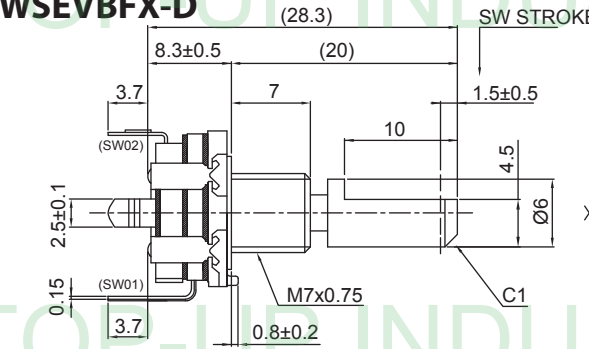
EC11MWVBFX-D



EC11MWSHVBFX-D



EC11MWSEVBFX-D



Switch Specifications

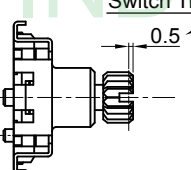
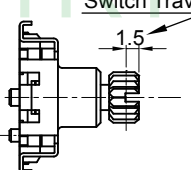
Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch (mm)	Operating force (gf)	Operating life (cycle)
DC 5V 10mA	100mΩ	250V DC 100mΩ MIN	300V AC 1 min	PUSH ON	0.5	600±300	20,000
					1.5	400±200	

EC11LM Series Code Explanation

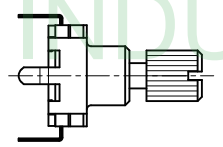
EC11LM S D V 5 NB F - D - 20 K - 10 - 30C - □ □ □

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

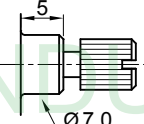
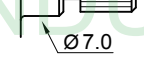
- Product Lines of EC11LM(11mm Slim Type Encoder)
ER11LM(11mm Self-Return Rotary Switch)
- Switch : S- With Switch; Blank- Without Switch
- Switch Travel

Code	D	E
Travel		

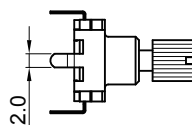
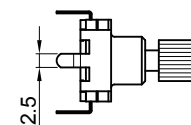
- Vertical Type (V)

Code	V
Vertical	

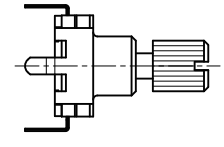
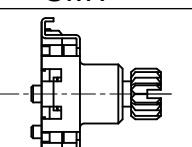
- Bushing Length
- Type of Bushing

(Without Screw)	
NB (Standard)	

- Type of Frame

F	F1
	

- Type of Terminal

P.C.B Type	SMD Type
Vertical	SMT
	

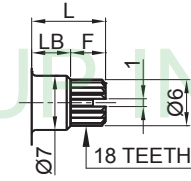
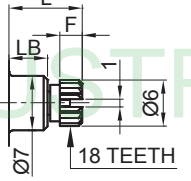
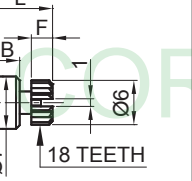
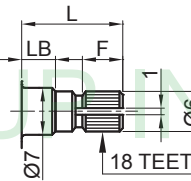
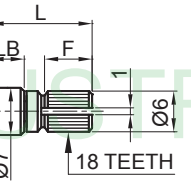
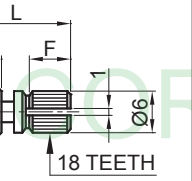
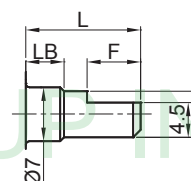
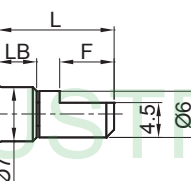
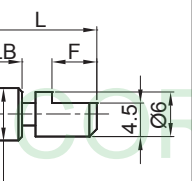
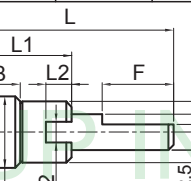
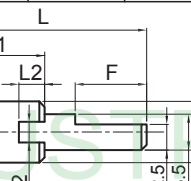
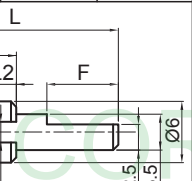
- Shaft Length

EC11LM Series Code Explanation

EC11LM S D V 5 NB F - D - 20 K - 10 - 30C - □ □ □

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

- Type of Shaft

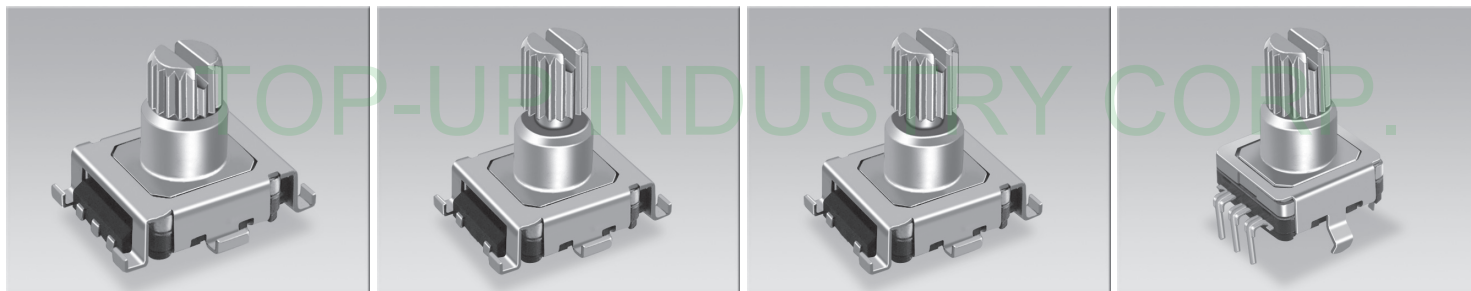
	Without Switch	0.5mm Switch Stroke	1.5mm Switch Stroke
K (Zinc Diecast)			
	L LB F	L LB F	L LB F
	9.5 5 4.5	9.5 5 2.9	9.5 5 2.9
K1 (Aluminum)			
	L LB F	L LB F	L LB F
	15 5 8	15 5 7	15 5 6
F Type			
	L LB F	L LB F	L LB F
	15 5 7	15 5 7	15 5 7
HF Type (Dual-shaft)			
	L LB F L1 L2	L LB F L1 L2	L LB F L1 L2
	20 5 7 10 2.5 or 4	20 5 7 10 2.5 or 4	20 5 7 10 2.5 or 4

- Output Pulse : 15 - 15 Pulse

- Number of Detent: Blank- None, 30C -30 Detent

- Series No.

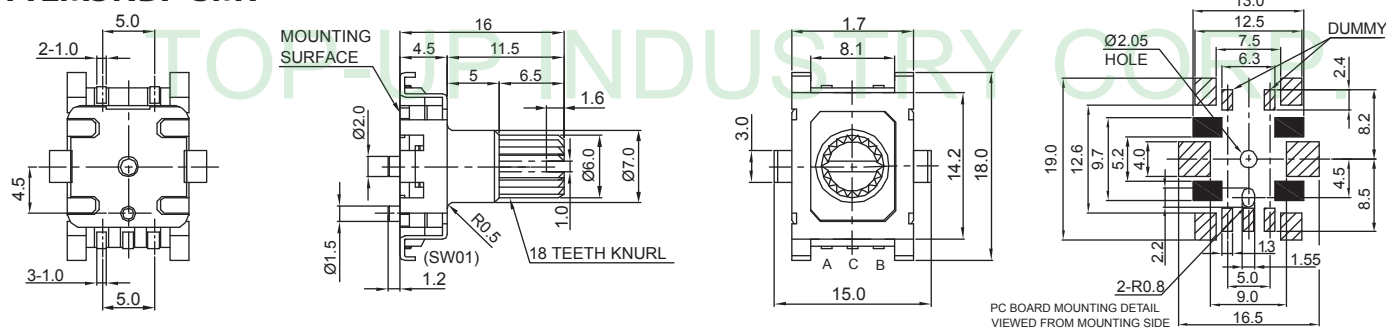
EC11LM5NBF-SMT EC11LMSD5NBF-SMT EC11LMSE5NBF-SMT EC11LMV5NBF-D



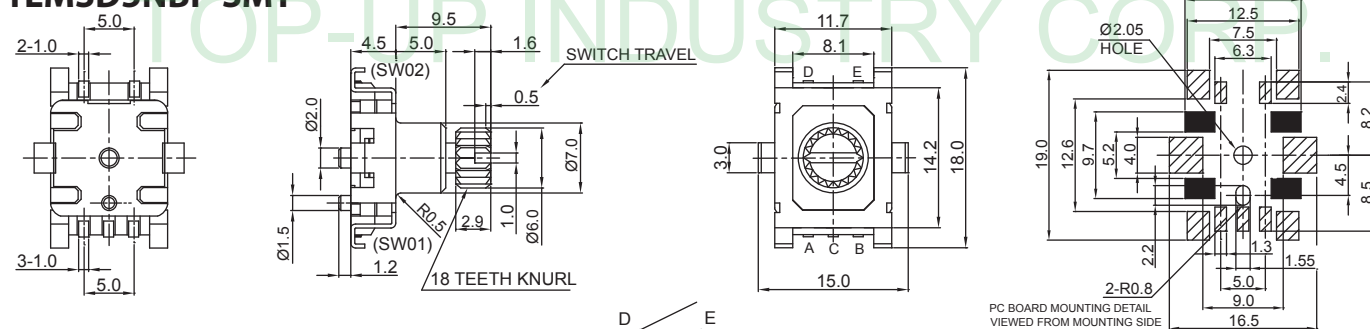
Outline Drawing

Features individual specifications

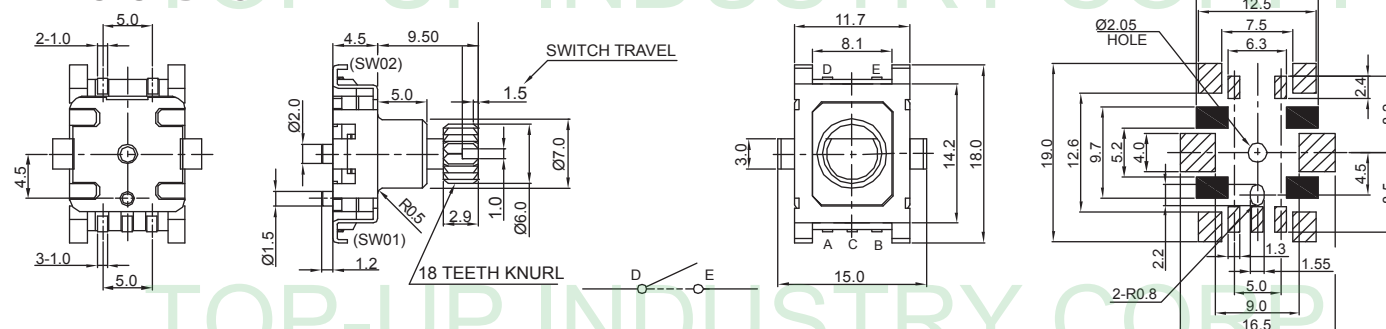
EC11LM5NBF-SMT



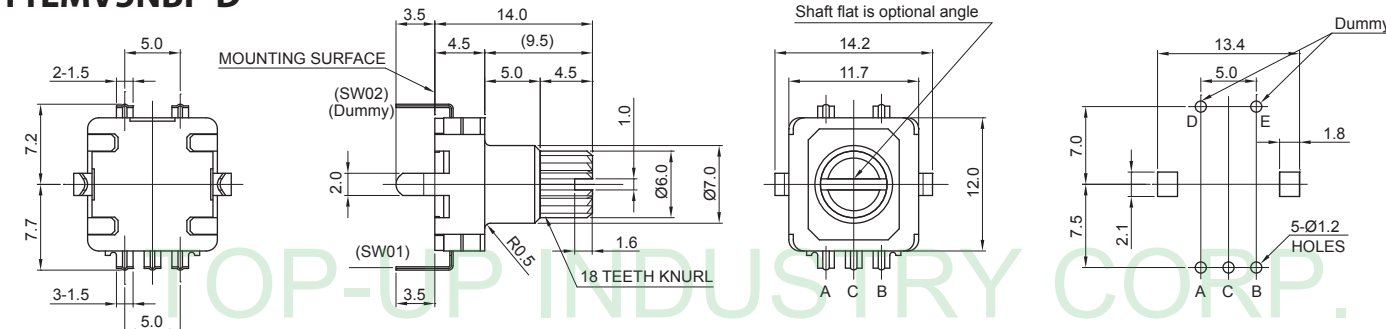
EC11LMSD5NBF-SMT



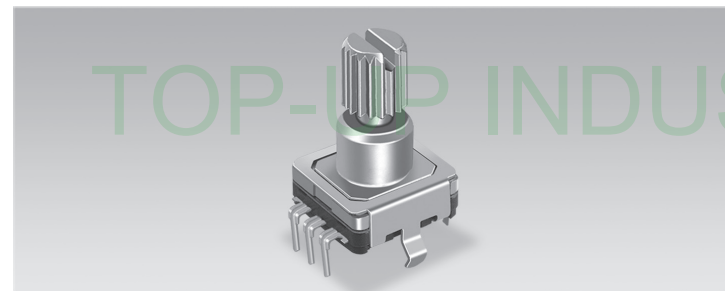
EC11LMSE5NBF-SMT



EC11LMV5NBF-D

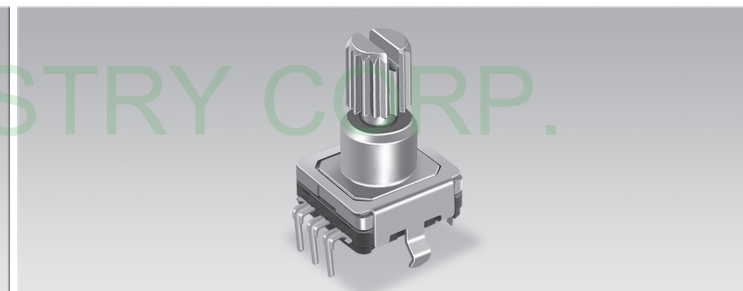


EC11LMSDV5NBF-D



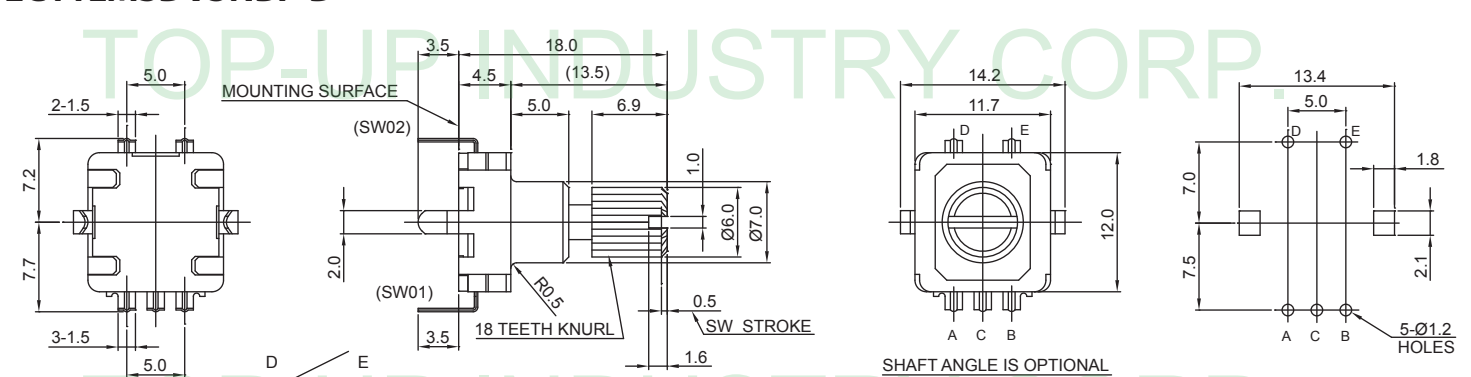
Outline Drawing

EC11LMSEV5NBF-D

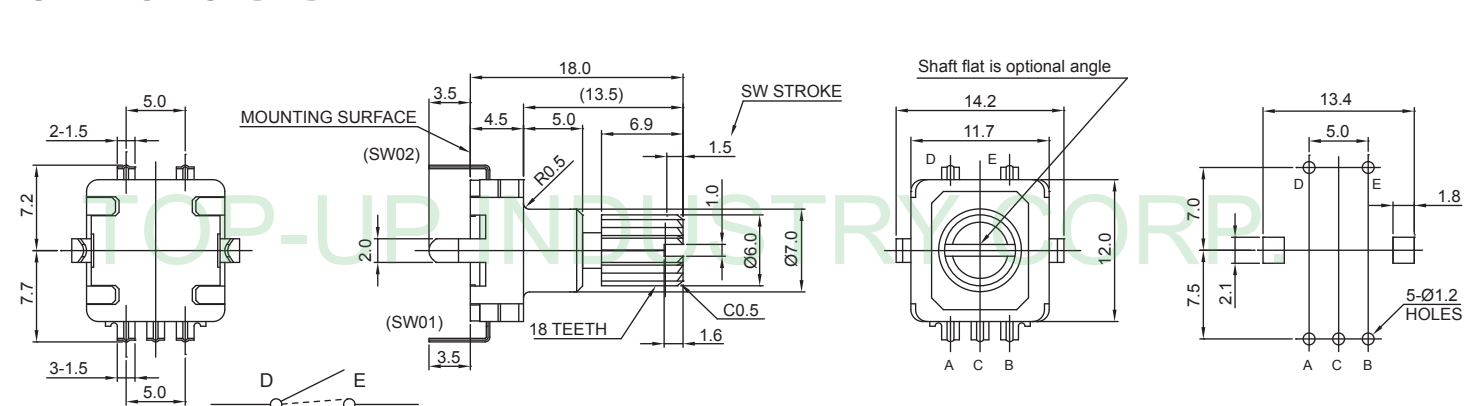


Features individual specifications

EC11LMSDV5NBF-D



EC11LMSEV5NBF-D



Products Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf·cm)	Rotational life(cycle)
15	0 30	4	2	2	250V DC 100MΩ MIN	300V AC 1 min	50gf·cm Max 100±70	15,000

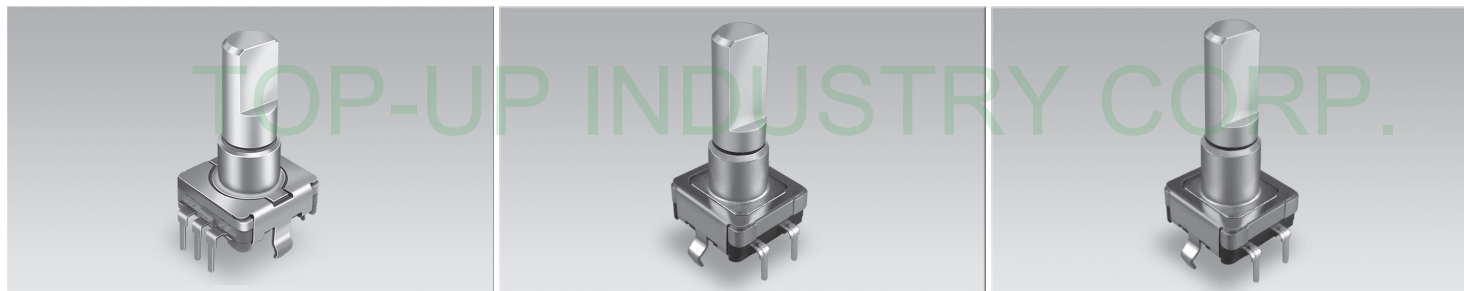
Switch Specifications

Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch(mm)	Operating force(gf)	Operating life(cycle)
DC 5V 10 mA	100mΩ	250V DC 100MΩ MIN	300V AC 1 min	PUSH ON	0.5 1.5	350±100 400±200	20,000

EC11LMSDV5NBF1-D

ER11LMSD5NBF-D

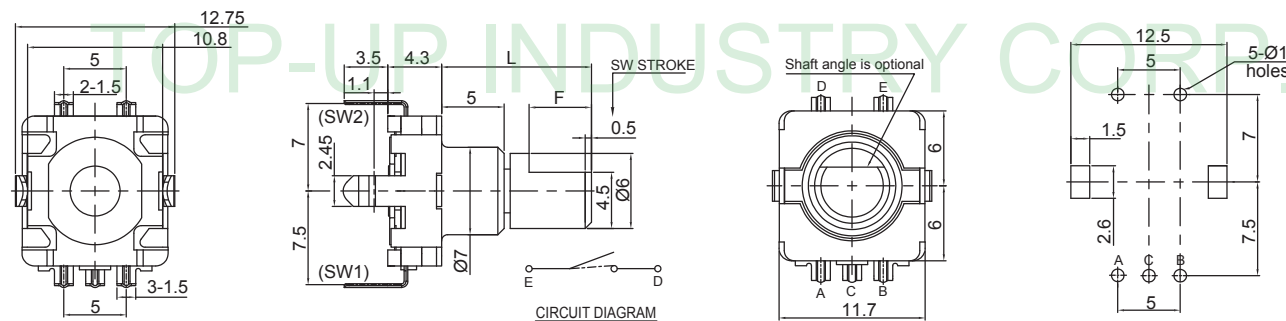
ER11LMSDNBF-D



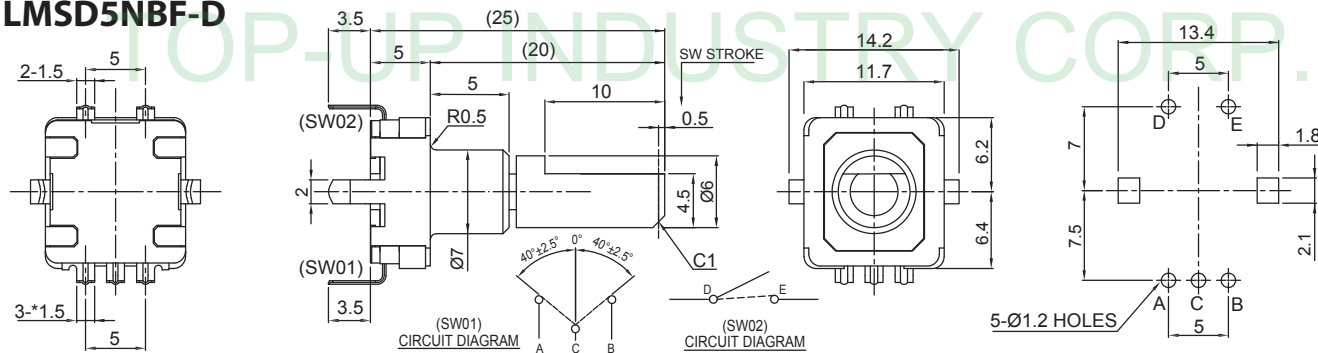
Outline Drawing

Features individual specifications

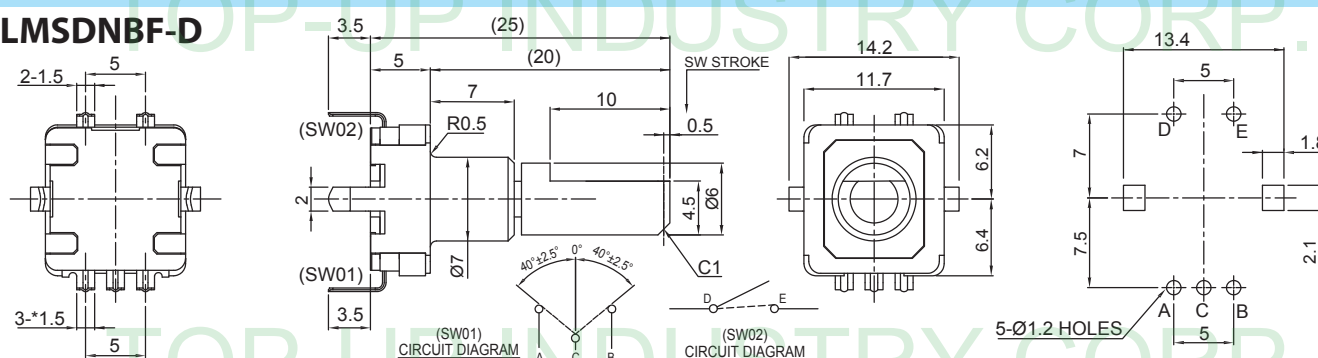
EC11LMSDV5NBF1-D



ER11LMSD5NBF-D



ER11LMSDNBF-D



Common Specifications

Rating	Change Over Angle	Contact resistance	Insulation resistance	Dielectric strength	Torque (gf.cm)	Rotational life(cycle)
DC 5V 10 mA	20~40°	100mΩ	250V DC 100MΩ MIN	300V AC 1 min	200±100	15,000

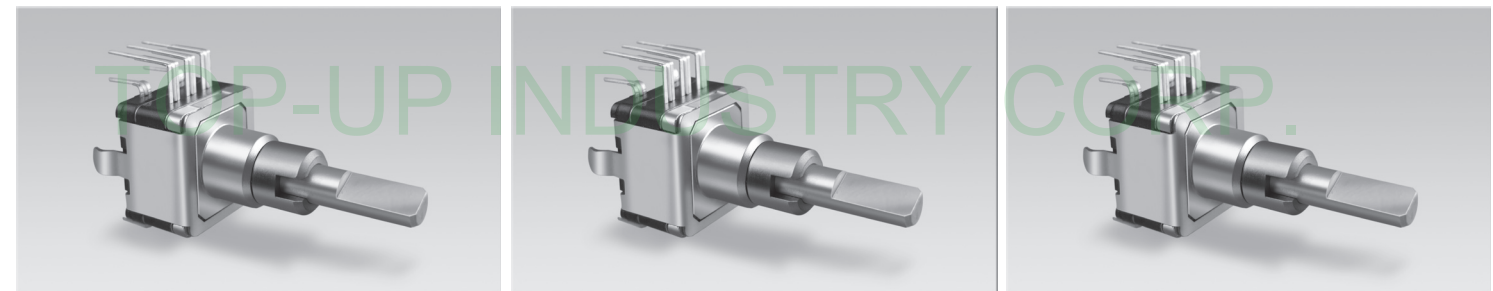
Switch Specifications

Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch(mm)	Operating force(gf)	Operating life(cycle)
DC 5V 10 mA	100mΩ	250V DC 100MΩ MIN	300V AC 1 min	PUSH ON	0.5	350±100	20,000

EC11LMV5NBF1-D-□HF

EC11LMSDV5NBF1-D-□HF

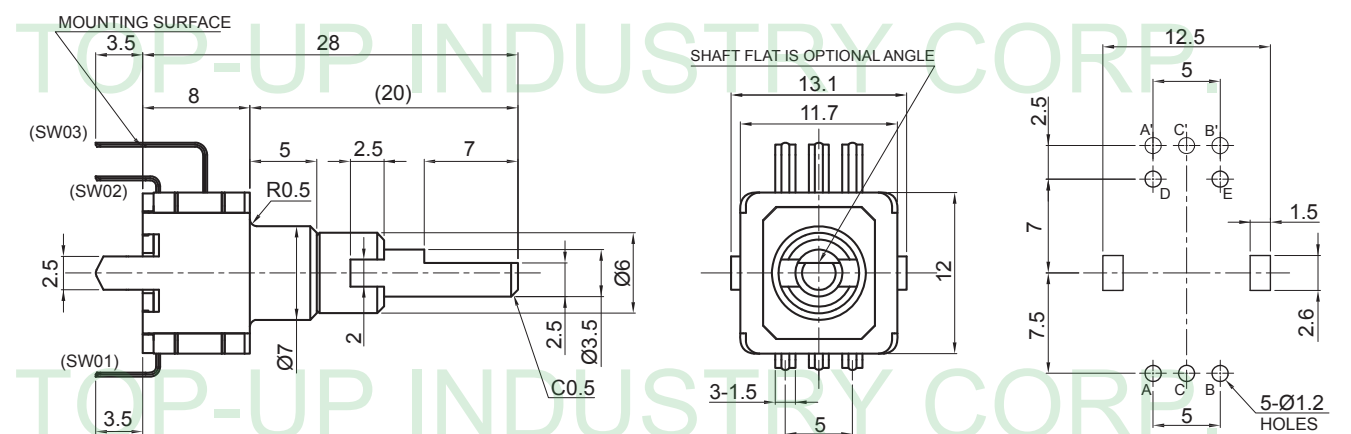
EC11LMSEV5NBF1-D-□HF



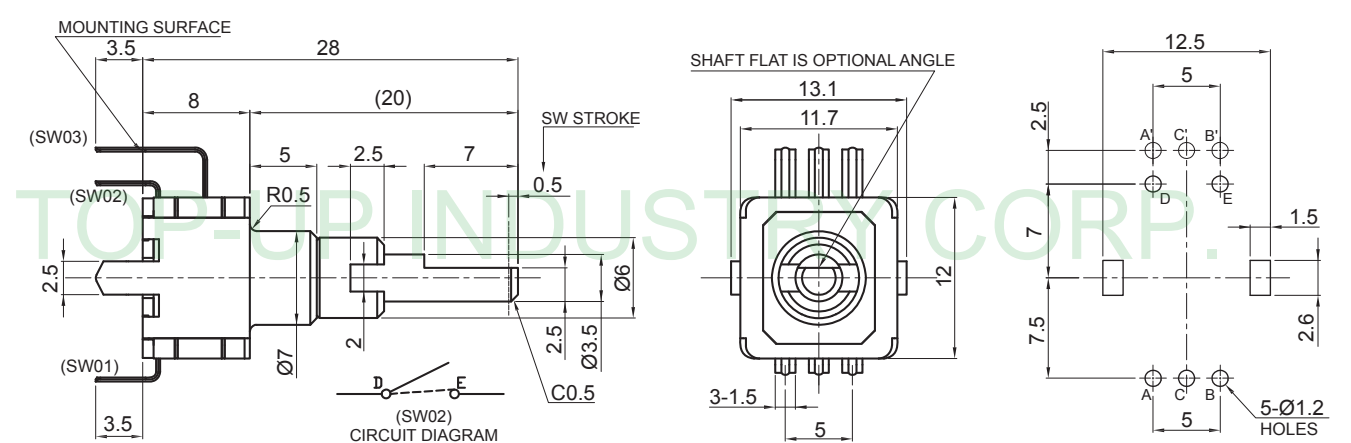
Outline Drawing

Features individual specifications

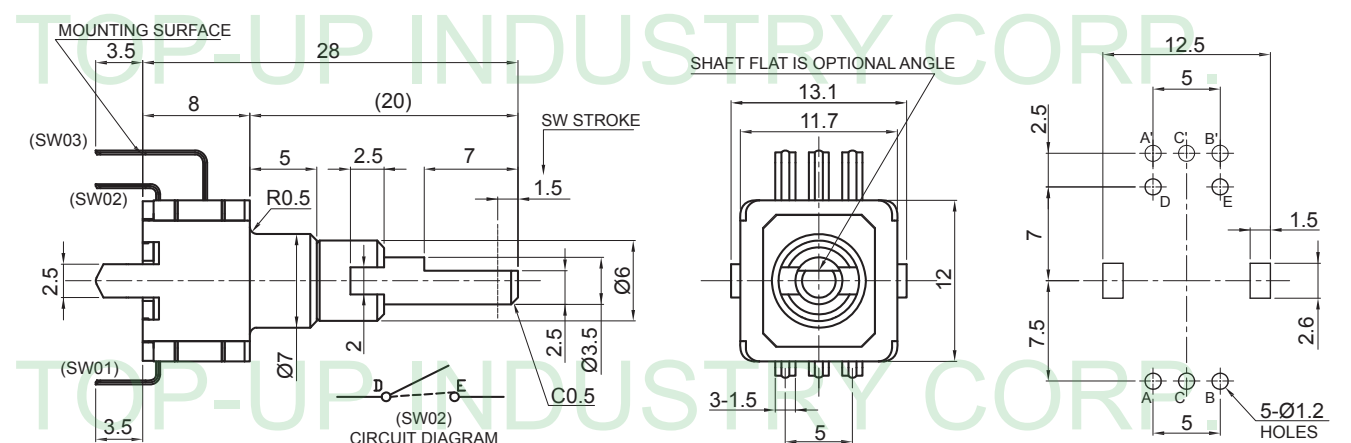
EC11LMV5NBF1-D-□HF



EC11LMSDV5NBF1-D-□HF



EC11LMSEV5NBF1-D-□HF



EC12P Series Code Explanation

EC12P L ☐☐ S D V B F A - D - 20 F T - 12 - 12C - ☐☐☐
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1. Product Lines of EC12P (12mm Insulated Shaft Encoder)

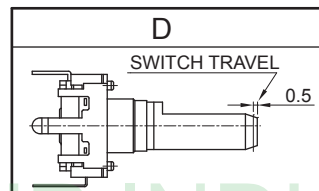
2. With " LED "

3. LED Color

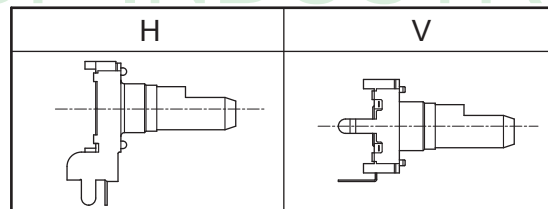
Single Color	Code	B	R	O	D	G	L	W
Color		Blue	Red	Orange	Darkorange	Green	Lawngreen	White
Dual Color	Code	BG	BO	GR	RG	GO		
	Color	Blue Green	Blue Orange	Green Red	Red Green	Green Orange		
	Code	BR	WR					
Triple Color	Code	RGB						
	Color	Red Green Blue						

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

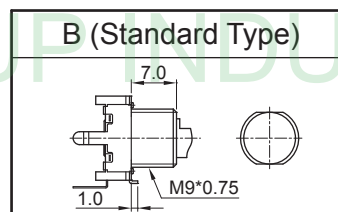
5. Switch Travel



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



7. With Bushing : Blank- Without Bushing ; B- with Bushing



8. With Frame: "F"

Frame Size (Snap-in)	Horizontal	Vertical
	14.8	13.2

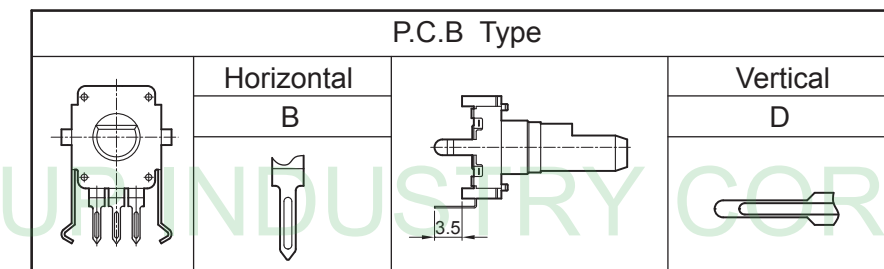
9. "LB" Length: Blank-5mm (Standard Type)

Horizontal	Vertical		
Standard	Standard	A	C

EC12P Series Code Explanation

EC12P L ☐☐ S D V B F A - D - 20 F T - 12 - 12C - ☐☐☐
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

10. Type of Terminal



11. Shaft Length

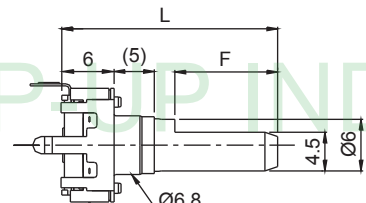
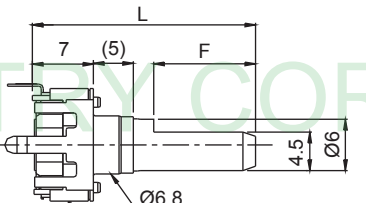
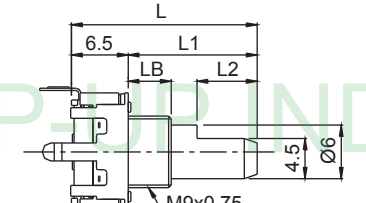
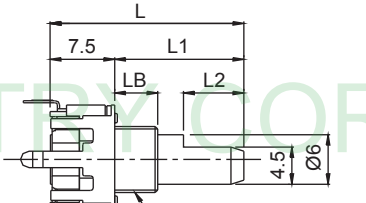
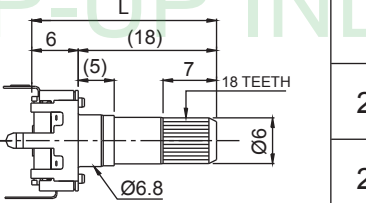
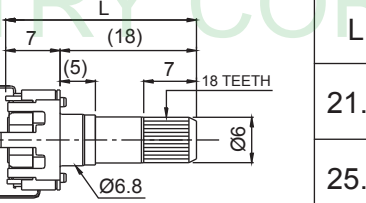
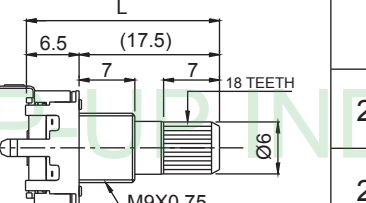
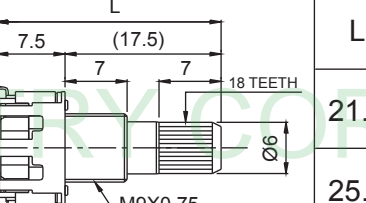
12. Type of Shaft (LED Type See Drawing 1)

F - Type									
With Bushing (W/O Switch)									
	L	17.5	20	25	30	L	15	17.5	20
	F	5	7	12	12	F	3	5	7
Without Switch									
	L	17.5	20	25	30	L	15	17.5	20
	F	5	7	12	12	F	3	5	7
K - Type									
With Bushing									
	L	25				L	20	25	
	K	7				K	7	7	

EC12P Series Code Explanation

EC12P L □ □ S D V B F A - D - 20 F T - 12 - 12C - □ □ □

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

With Single color LED						With two & three colors of LED & 0.5mm Switch Stroke					
F - Type											
Without						Without					
	L	17.5	20	25	30		—	L	18.8	21.3	26.3
F	5	7	12	12	—	F	5	7	12	12	—
With Bushing						With Bushing					
	L	17.5	20	25	30		—	L	18.8	21.3	26.3
LB	5	5	5	7	—	LB	5	5	5	7	—
L1	11	13.5	18.5	23.5	—	L1	11	13.5	18.5	23.5	—
L2	5	7	12	12	—	L2	5	7	12	12	—
K - Type											
Without						Without					
	L						L				
	20						21.3				
					24					25.3	
With Bushing						With Bushing					
	L						L				
	20						21.3				
					24					25.3	

13. Shaft Color : T - Transparent , Blank - Black

(Drawing 1)

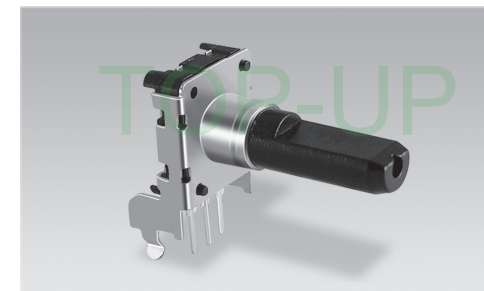
14. Output Pulse : 12 - 12Pulse

15. Number of Detents : Blank- None , 12 - 12C

16. Serial No.

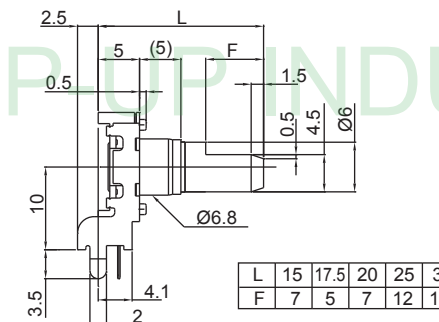
Pulse NO.	12 Pulses	24 Pulses
Decent NO.	12C	24C

EC12PHF-B

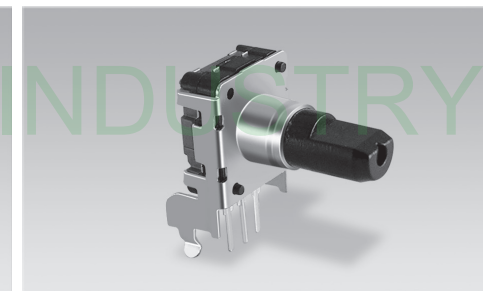


Outline Drawing

EC12PHF-B

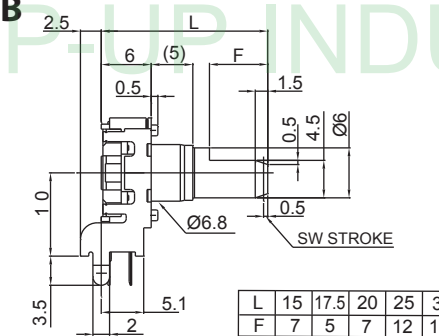


EC12PSDHF-B

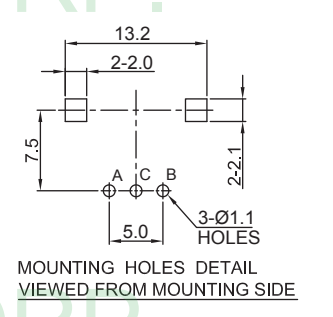
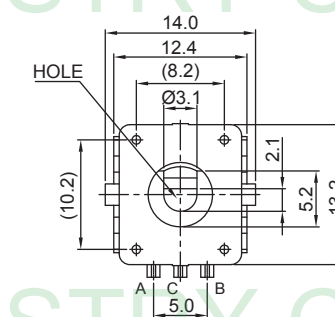
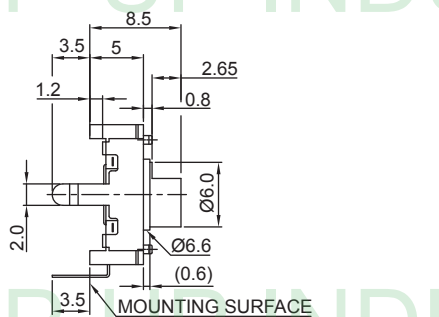


Features individual specifications

EC12PSDHF-B



EC12PVFA-D



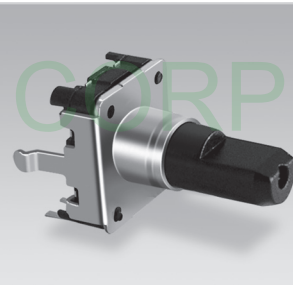
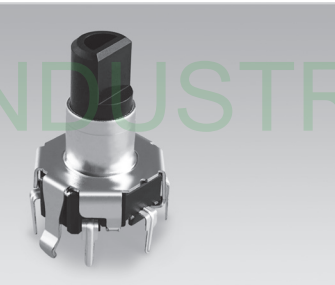
Products Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf·cm)	Rotational life (cycle)
12	0	4	3	2	250V DC 100MΩ MIN	300V AC 1 min	30~200 (0 DETENT: 50gf·cm max)	30,000
	12							
	24							
24	0	3.5	3	2				
	24							

EC12PVF-D-□FT

EC128PSDVF-D

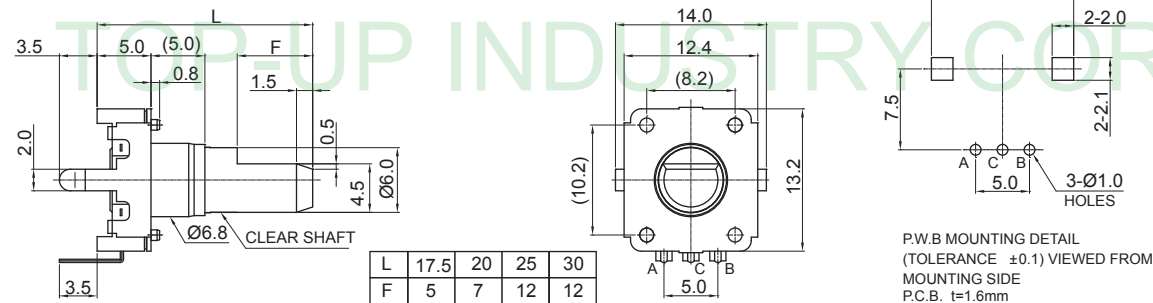
EC12PVF-D



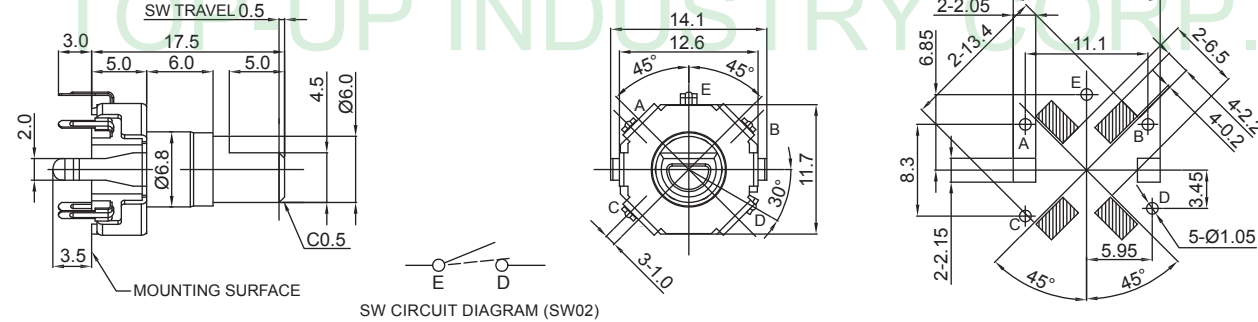
Outline Drawing

Features individual specifications

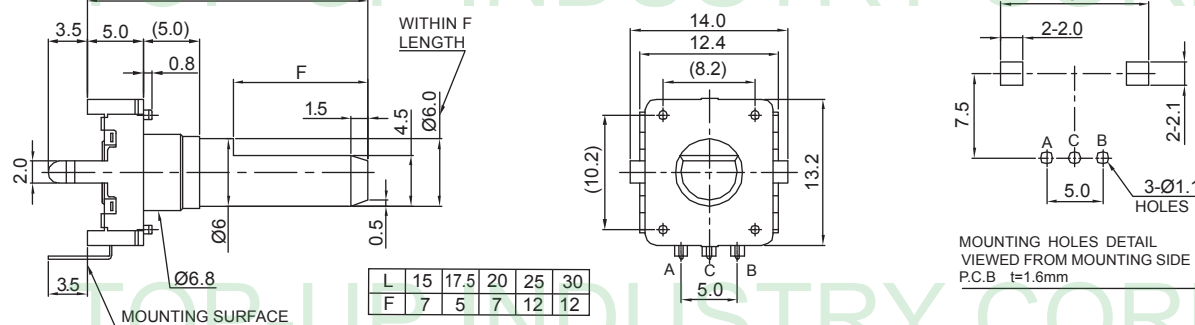
EC12PVF-D-□FT



EC128PSDVF-D



EC12PVF-D



Switch Specifications

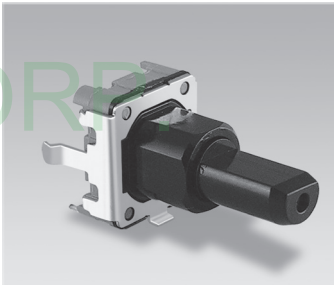
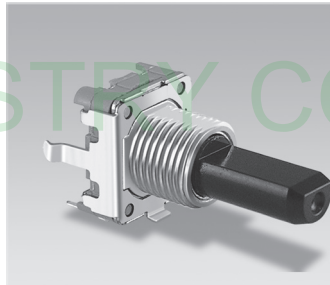
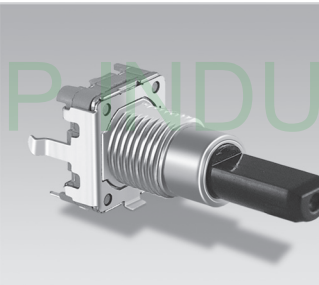
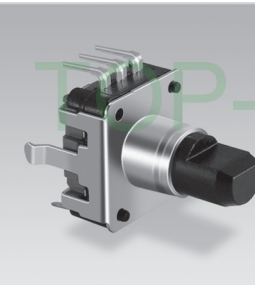
Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch (mm)	Operating force (gf)	Operating life (cycle)
DC 5V 10mA	100mΩ	250V DC 100MΩ MIN	300V AC 1 min	PUSH ON	0.5	300 ⁺¹⁵⁰ -100	20,000

EC12PSDVF-D

EC12PV12BF-D

EC12PVBFB-D1

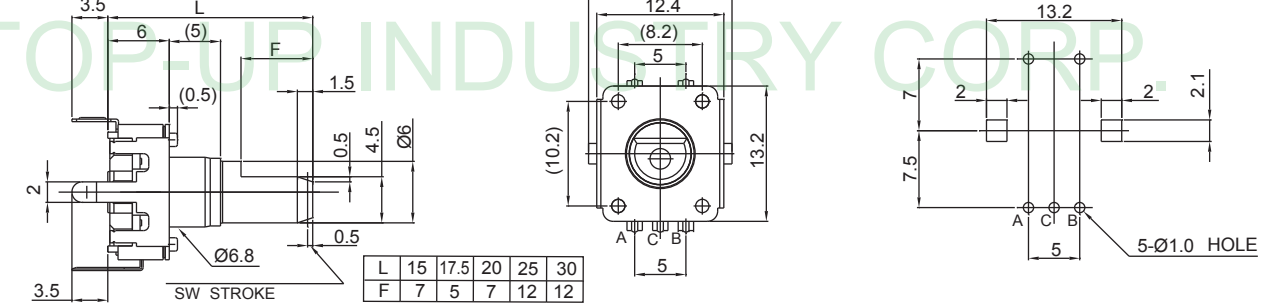
EC12PVBPF-D



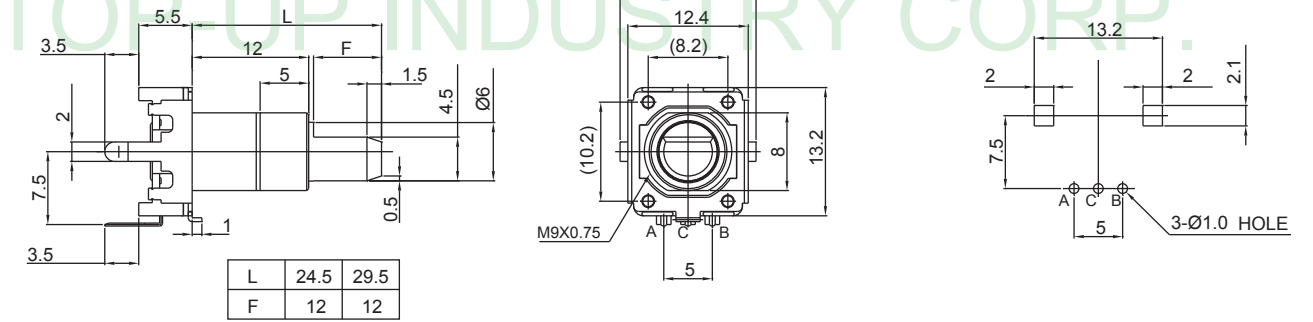
Outline Drawing

Features individual specifications

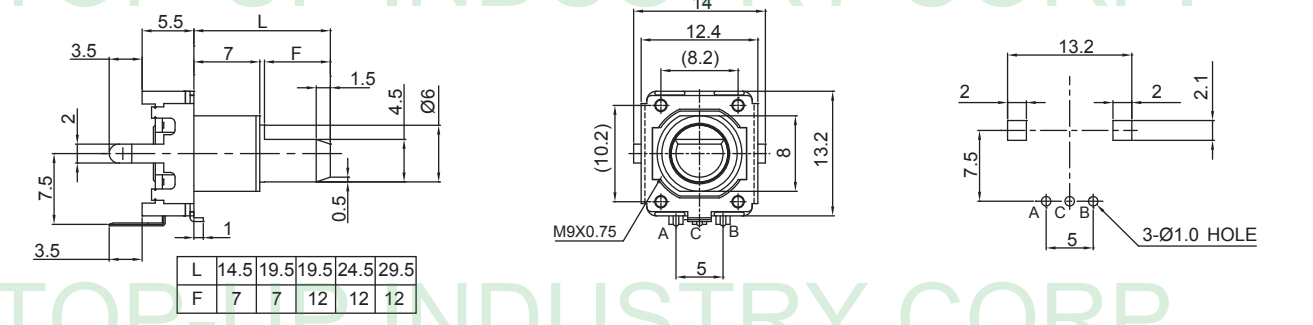
EC12PSDVF-D



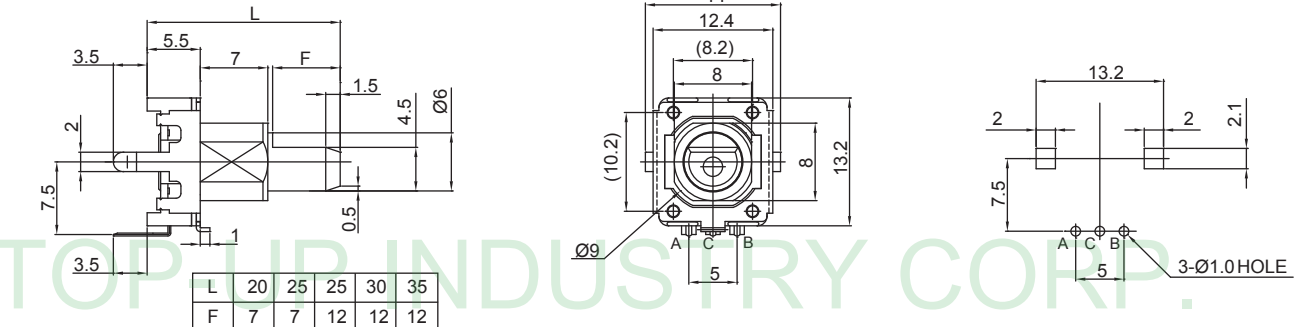
EC12PV12BF-D



EC12PVBFB-D1



EC12PVBPF-D

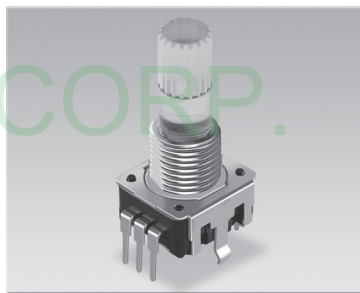
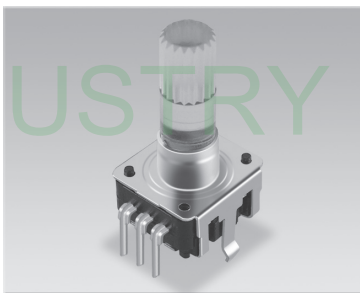
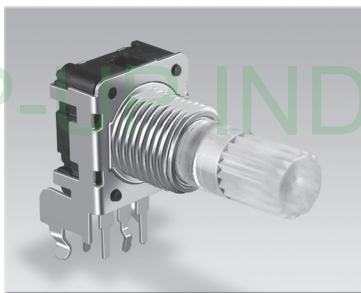
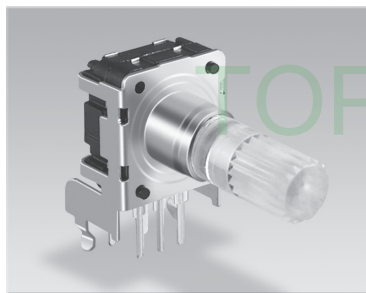


EC12PL□HF-B

EC12PL□HBF-B

EC12PL□VF-D

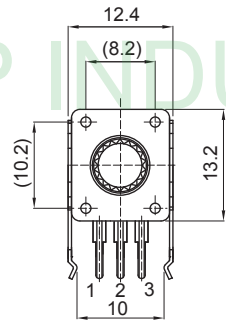
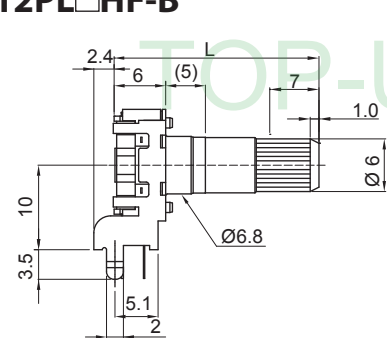
EC12PL□VBF-D



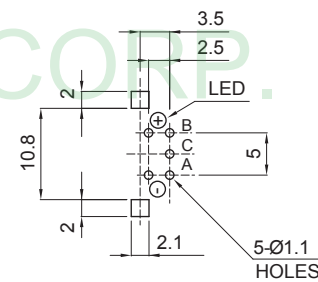
Outline Drawing

Features individual specifications

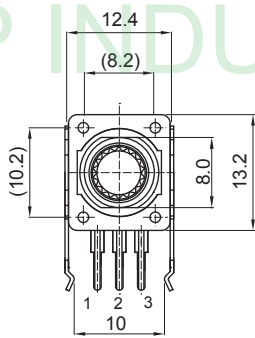
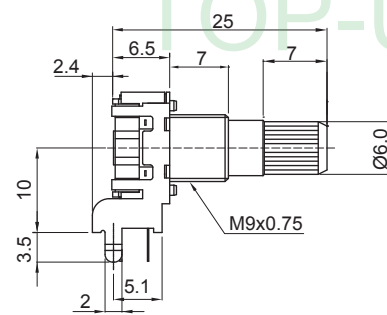
EC12PL□HF-B



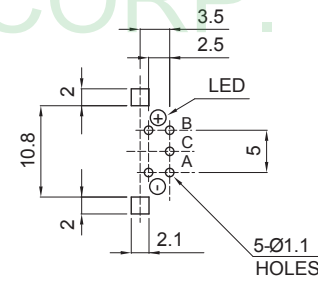
LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



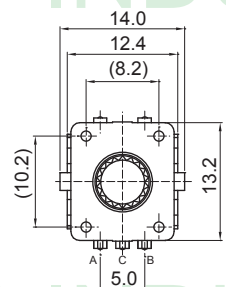
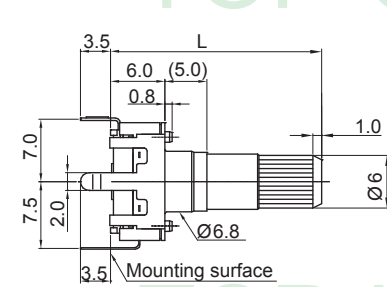
EC12PL□HBF-B



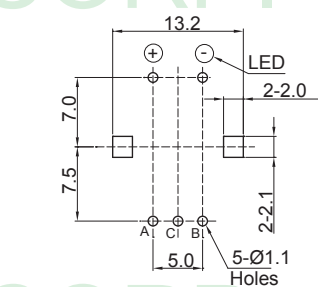
LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



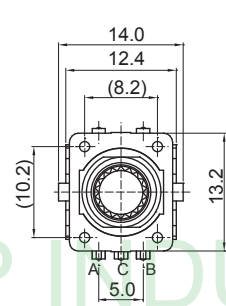
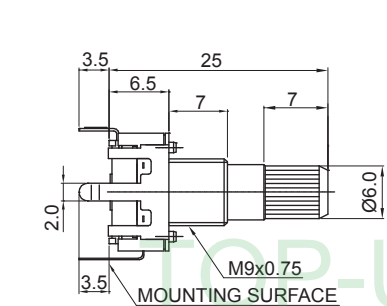
EC12PL□VF-D



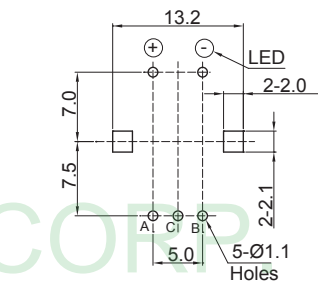
LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



EC12PL□VBF-D



LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE

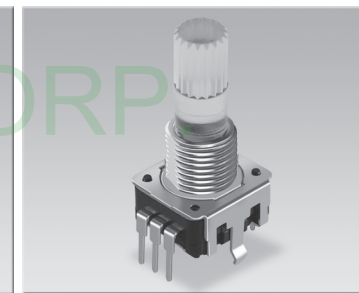
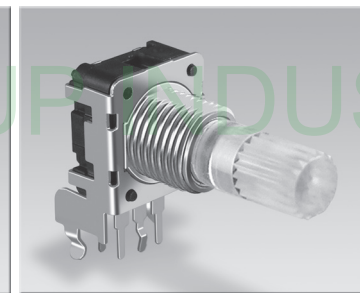
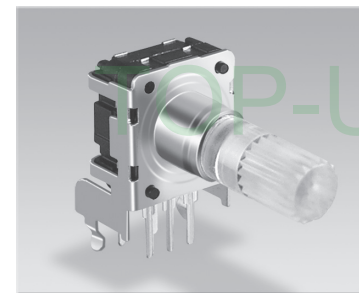


EC12PL□SDHF-B

EC12PL□SDHBF-B

EC12PL□SDVF-D

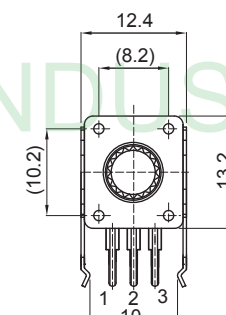
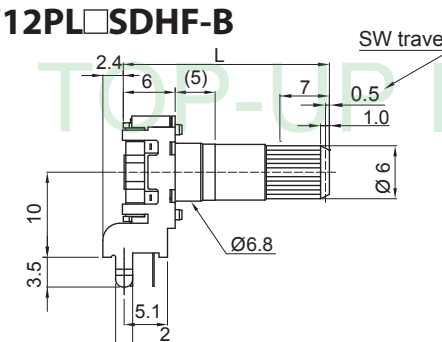
EC12PL□SDVBF-D



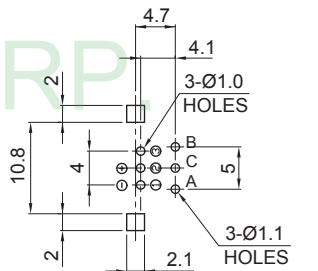
Outline Drawing

Features individual specifications

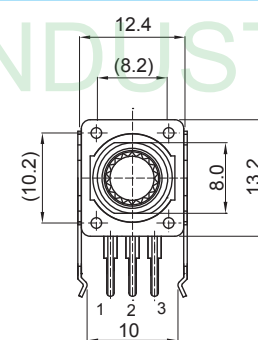
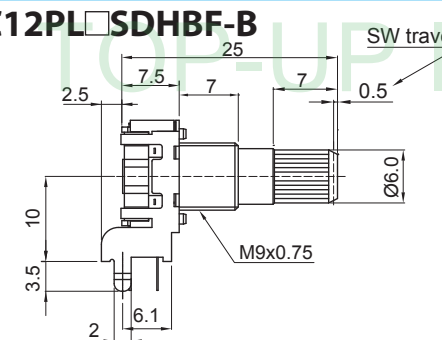
EC12PL□SDHF-B



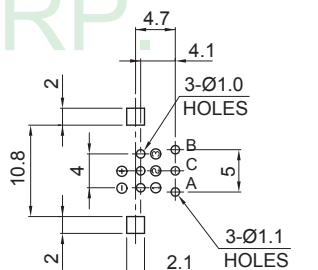
LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



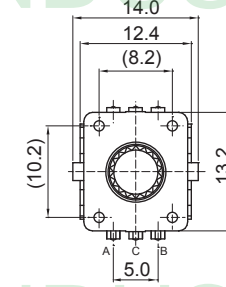
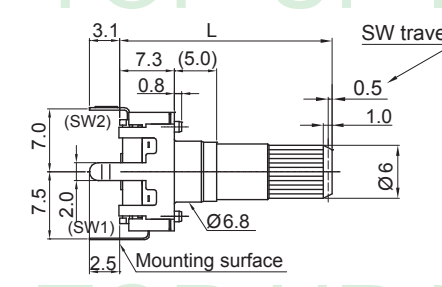
EC12PL□SDHBF-B



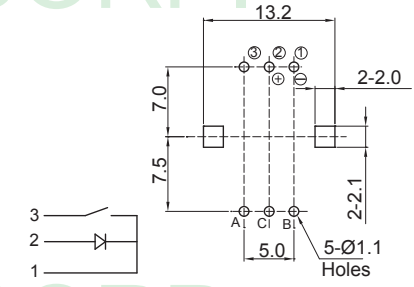
LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



EC12PL□SDVF-D

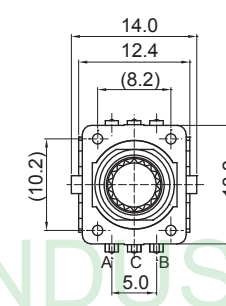
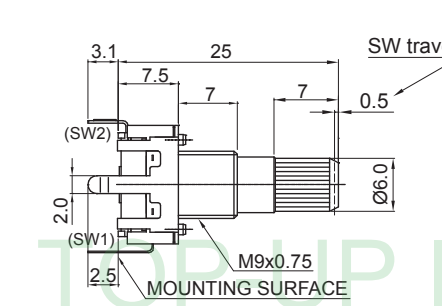


LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE

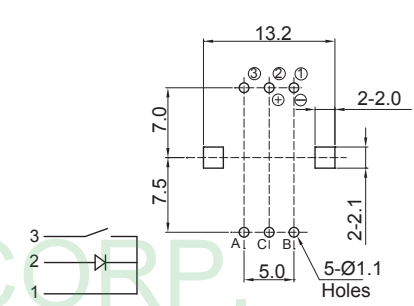


CIRCUIT DIAGRAM

EC12PL□SDVBF-D



LED COLOR:	
CODE	COLOR
O	ORANGE
B	BLUE
R	RED
G	GREEN
W	WHITE
L	LAWNGREEN
D	DARKORANGE



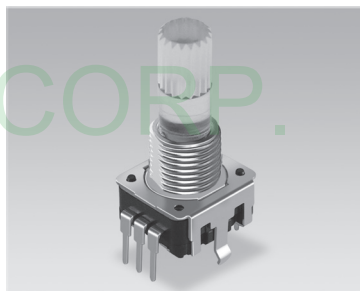
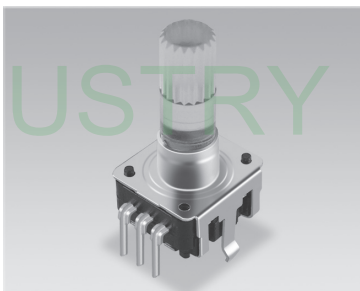
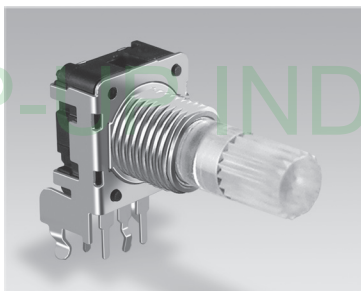
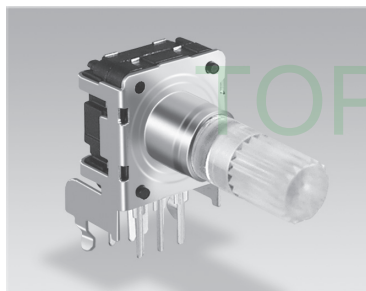
CIRCUIT DIAGRAM

EC12PL SDHF-B

EC12PL SDHBF-B

EC12PL SDVF-D

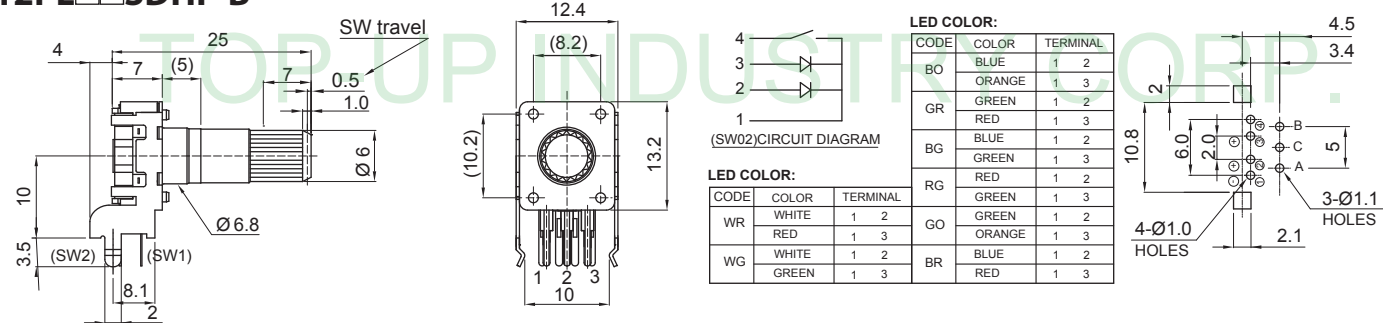
EC12PL SDVBF-D



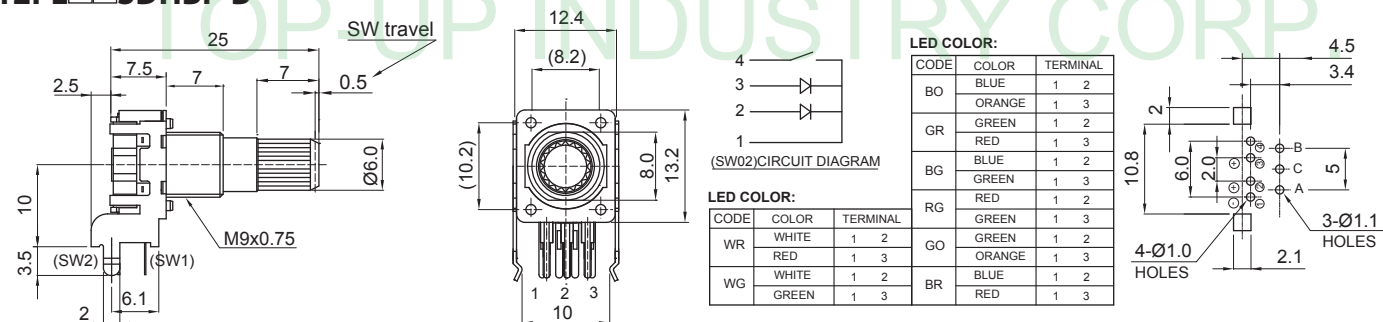
Outline Drawing

Features individual specifications

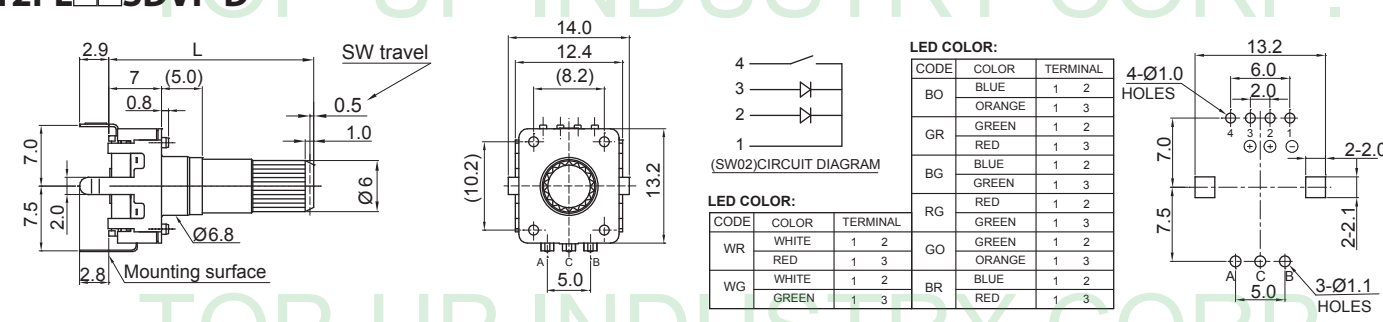
EC12PL SDHF-B



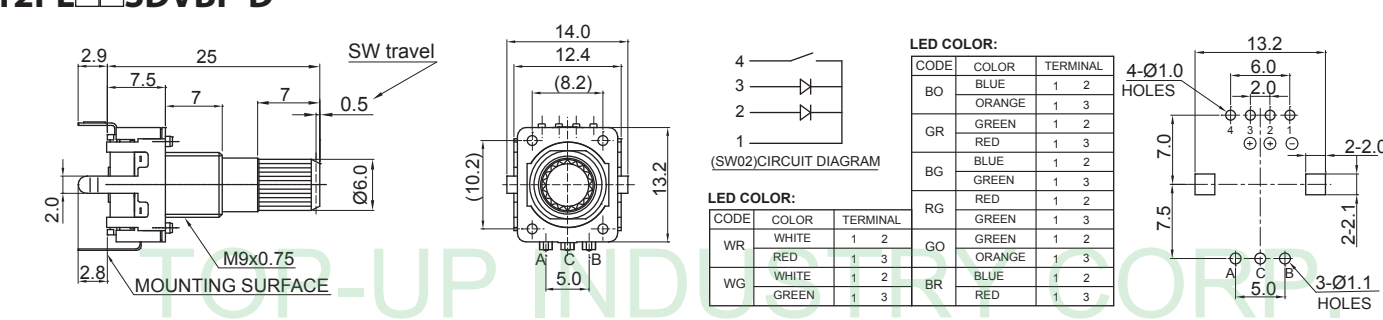
EC12PL SDHBF-B



EC12PL SDVF-D



EC12PL SDVBF-D

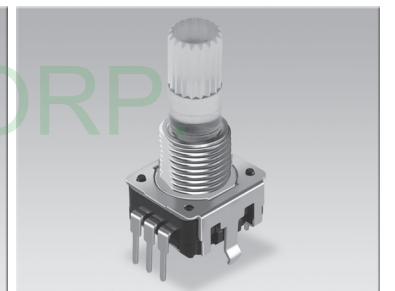
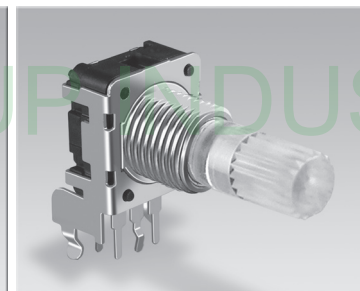
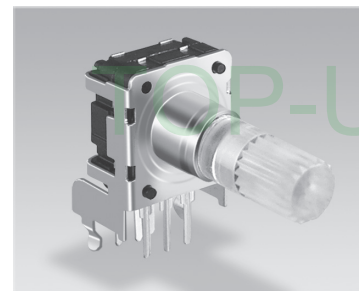


EC12PLRGBSDHF-B

EC12PLRGBSDHBF-B

EC12PLRGBSDVF-D

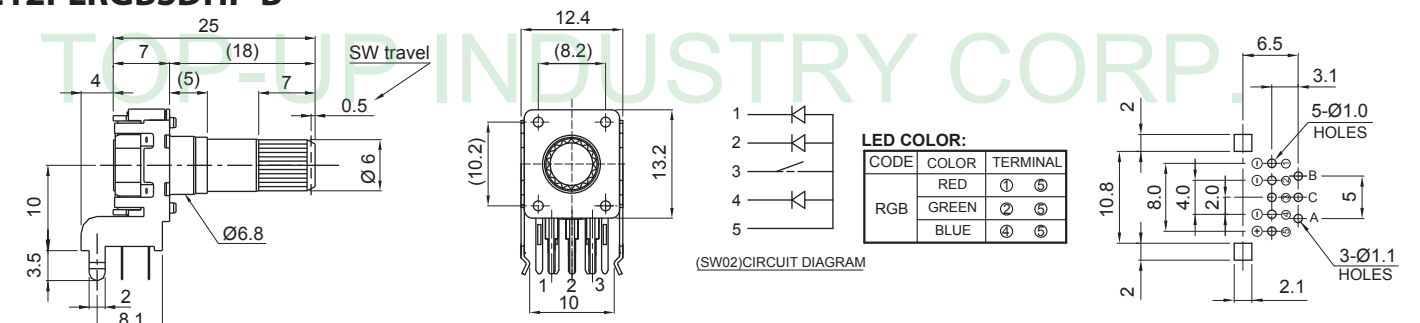
EC12PLRGBSDVBF-D



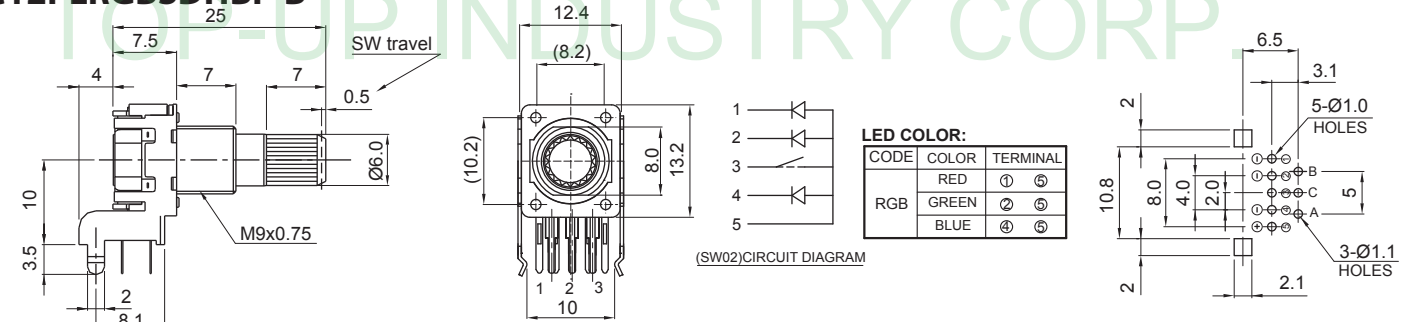
Outline Drawing

Features individual specifications

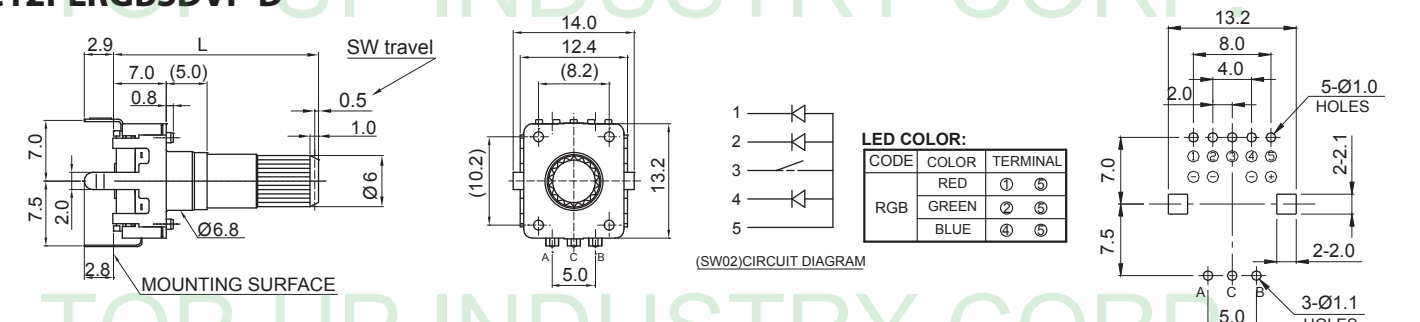
EC12PLRGBSDHF-B



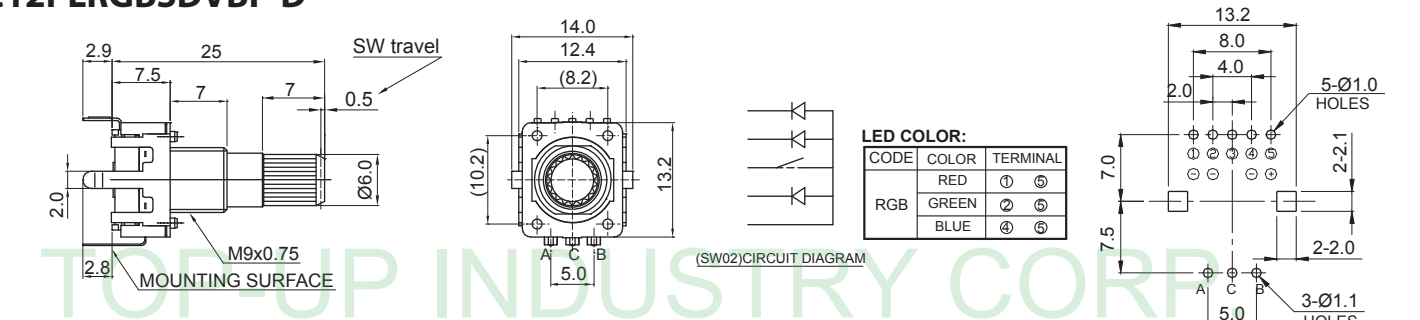
EC12PLRGBSDHBF-B



EC12PLRGBSDVF-D



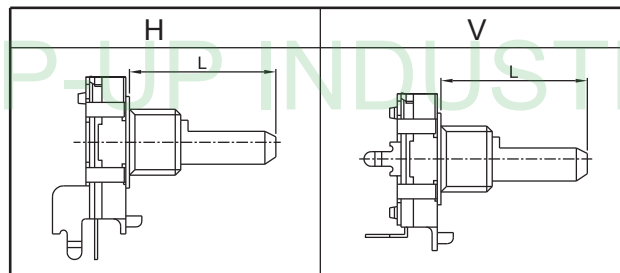
EC12PLRGBSDVBF-D



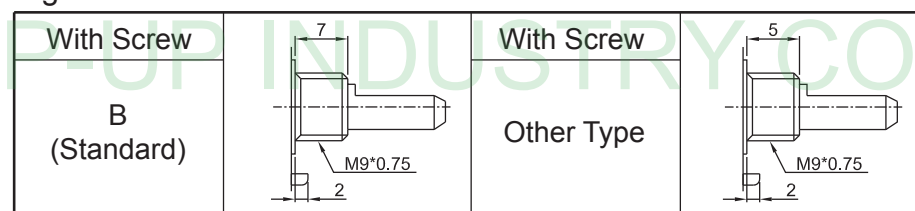
EC16P Series Code Explanation

EC16P S H 5 B F - B - 20 F - 24 - □ C - □ □ □
1 2 3 4 5 6 7 8 9 10 11 12

1. Product Lines of EC16P (16mm Insulated Shaft Encoder)
EC16M (16mm Metal Shaft Encoder)
2. With Switch : S
3. Horizontal (H) Type or Vertical (V) Type



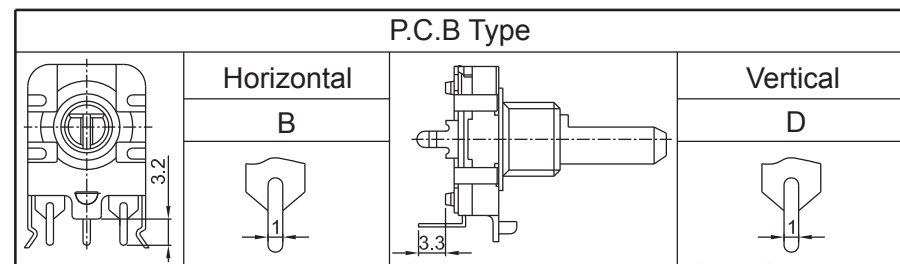
4. Bushing Length : Keep Blank On Code if it's Standard Type With 7mm.
5. With Bushing



6. With Frame : F

Frame Size (Snap-in)	Horizontal	Vertical
	18.4	16.8

7. Type of Terminal



8. Shaft Length
9. Type of Shaft

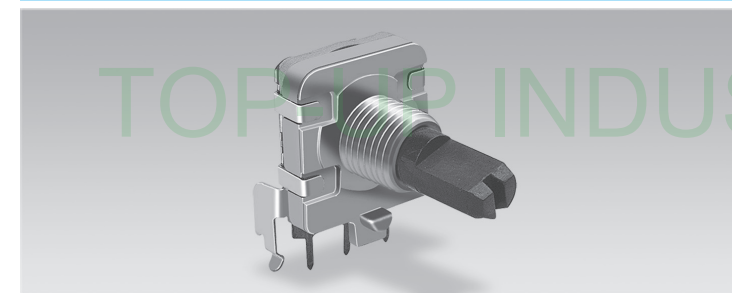
F Type	L	15	20	25
	F	7	12	12

10. Output Pulse

Pulse No.	Code	12	24
	Pulse	12 Pulses	24 Pulses

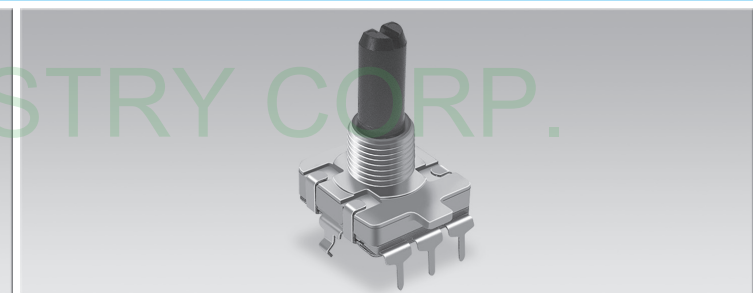
11. Number of Clicks : Blank - None, 1C - Center Click
12. Serial No.

EC16PHBF-B



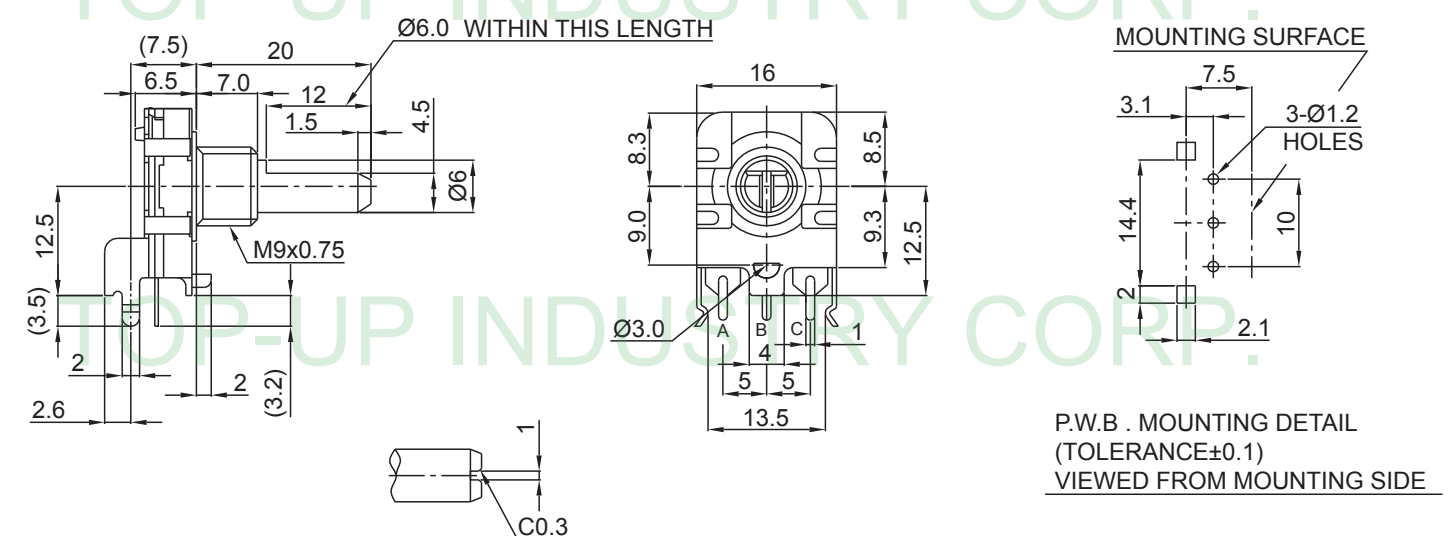
Outline Drawing

EC16PVBF-D

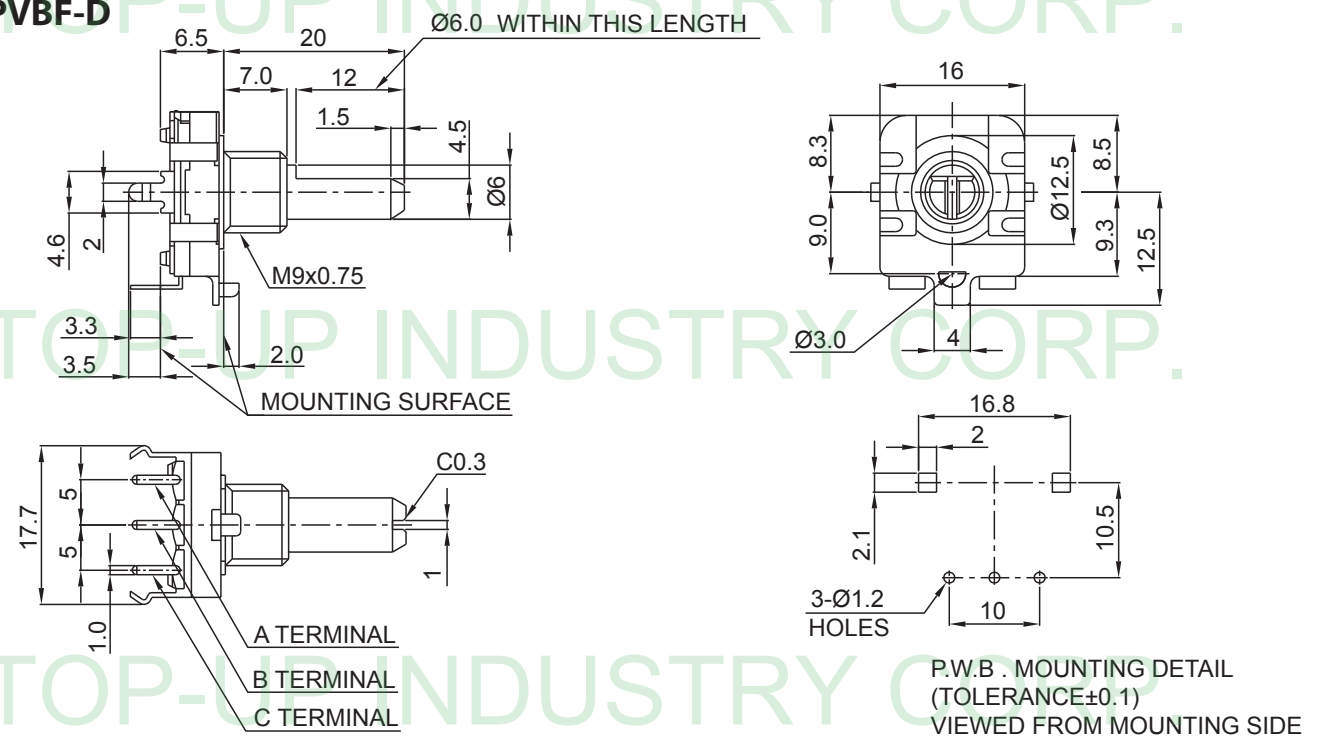


Features individual specifications

EC16PHBF-B



EC16PVBF-D

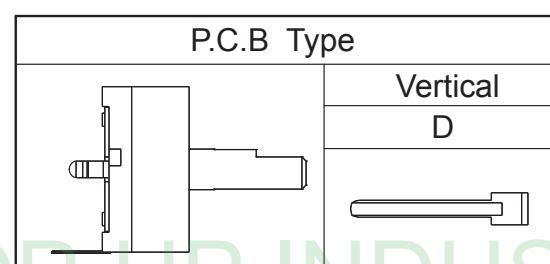


EC20M Series Code Explanation

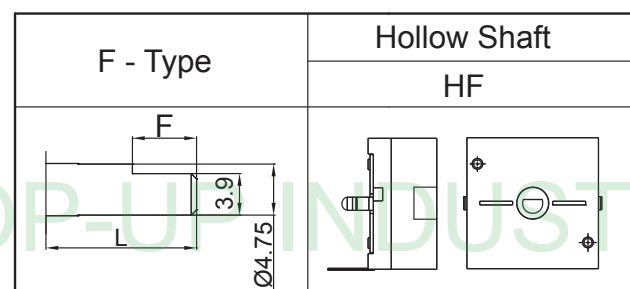
EC20M SD V F - D - 14 F - 16C - □ □ □

1 2 3 4 5 6 7 8 9

1. Product Lines of EC20M , EC20P
2. Switch: SD — 0.3mm
3. Vertical Type (V)
4. With Frame: "F"
5. Type of Terminal



6. Shaft Length
7. Type of Shaft

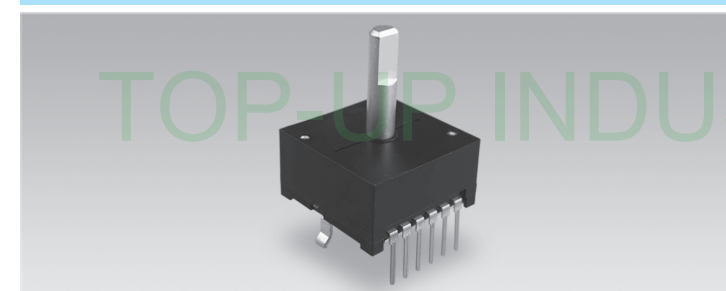


8. Number of Detent : 16C - 16 Detents
9. Series No.

Products Line

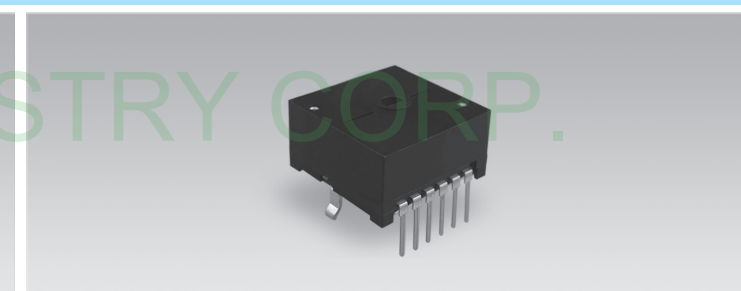
Rotational angle	Number of Positions	Detent angle	Contact resistance	Dielectric strength	Insulation resistance	Operating force	Rotational life (cycle)
360°	16	22.5°	1Ω MAX	A.C 100V 1 min	100MΩ MIN	400±100gf	15,000
360°	24	15°					

EC20MVF-D-14F (Gray Code)



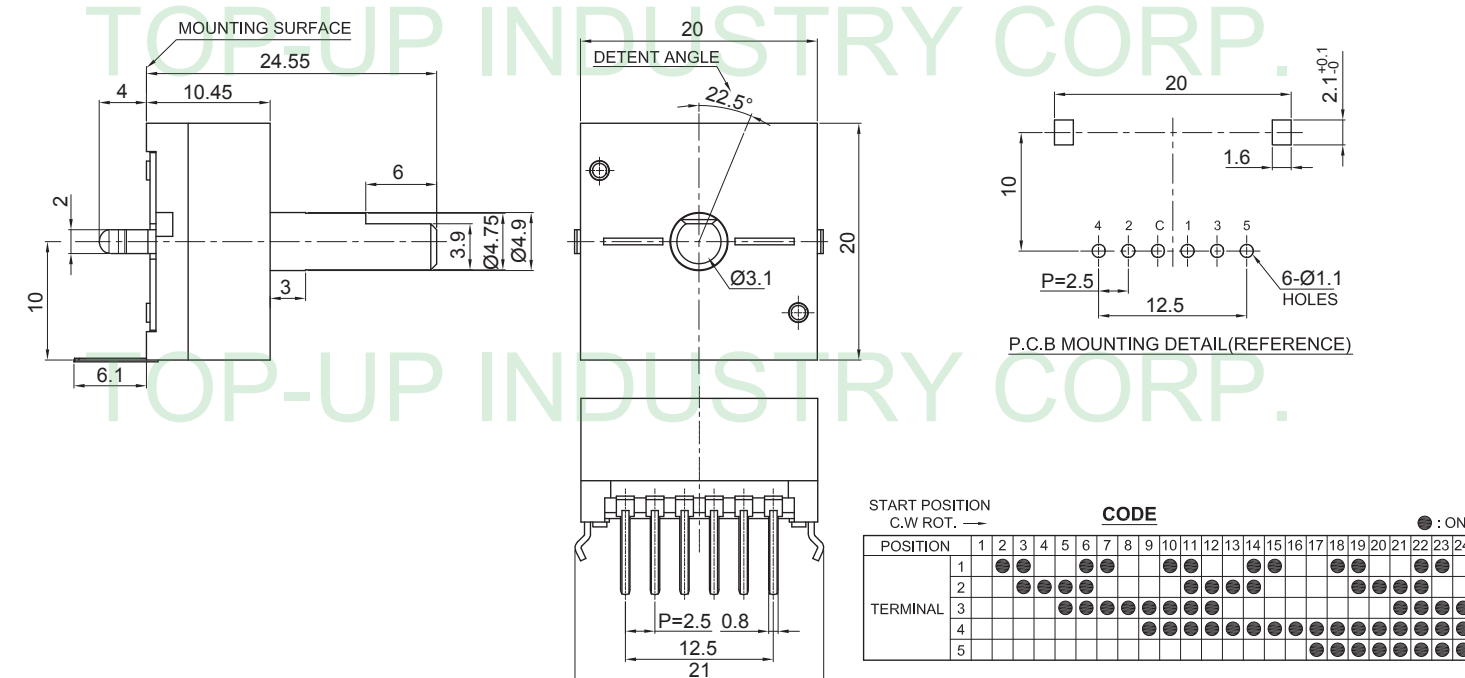
Outline Drawing

EC20MVF-D-HF (Gray Code)

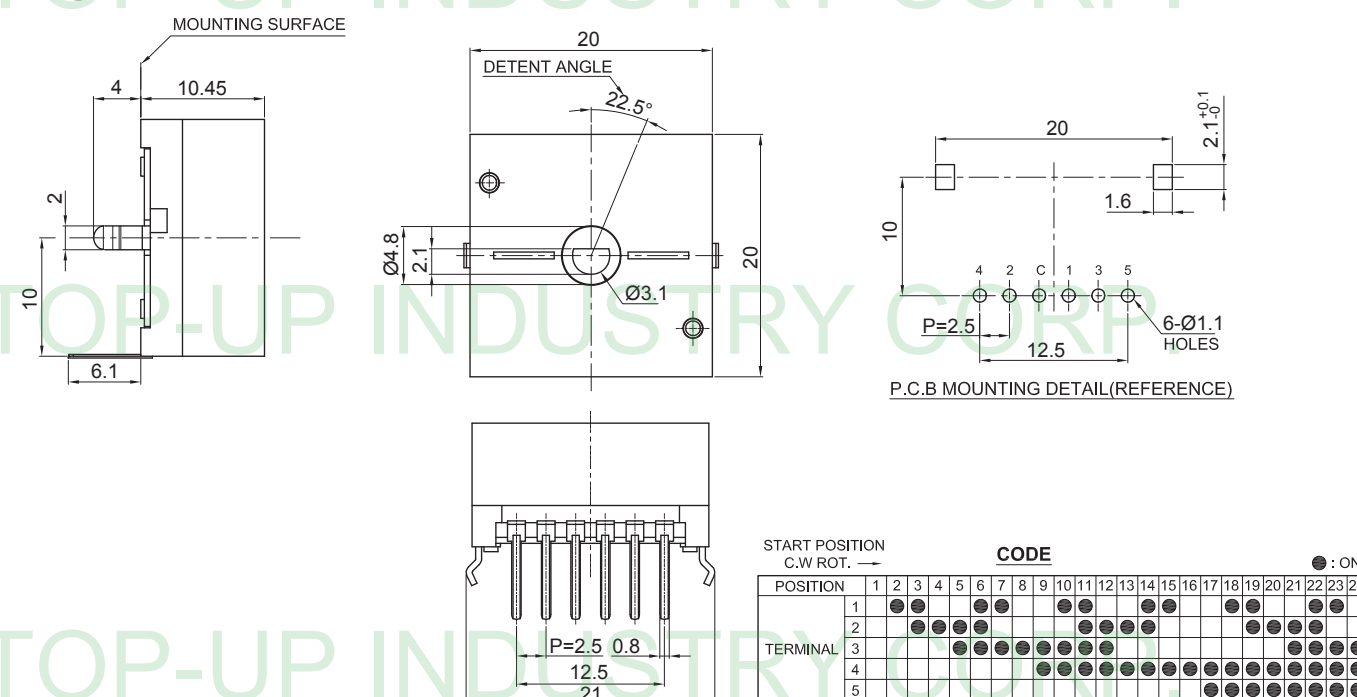


Features individual specifications

EC20MVF-D-14F



EC20MVF-D-HF

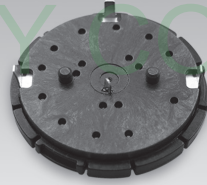


EC20PSDVF-D

Front

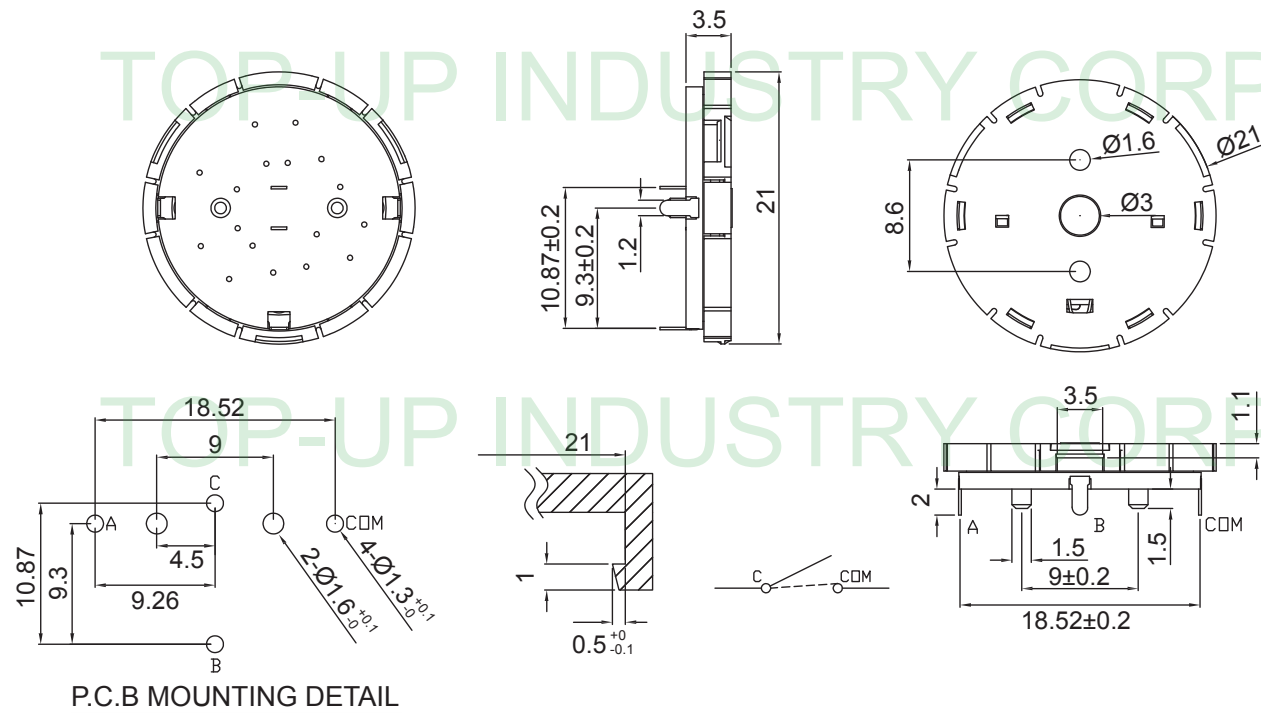


Back



Outline Drawing

Features individual specifications



P.C.B MOUNTING DETAIL

► FEATURE & APPLICATIONS

- Provides high-level operation feeling.
- With push-on switch
- Compact and slim
- Long life and high reliability
- Most suitable for all controls of compact and low profile electronic equipment.
- Air conditioners, flat panel TV, remote controllers and various electronics.

Common Specifications

Pulse	Number of detent	Phase difference (msec)	Chattering (msec)	Sliding noise (msec)	Insulation resistance	Dielectric strength	Detent torque (gf·cm)	Rotational life (cycle)
12	24	4	5	3	100V DC 100MΩ MIN	100V AC 1 min	60 Max	100,000

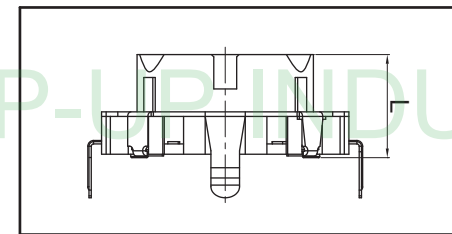
Switch Specifications

Rating	Contact resistance	Insulation resistance	Dielectric strength	Contact arrangement	Travel of switch (mm)	Operating force (gf)	Operating life (cycle)
DC 5V 10 mA	300mΩ	250V DC 100MΩ MIN	300V AC 1 min	PUSH ON	0.3	220±50	1,000,000

EH21 Series Code Explanation

EH21 R F 00 - D - 9 K - 15 - 30C - □ □ □
1 2 3 4 5 6 7 8 9 10

1. Product Lines of Hollow Encoder (EH21/EH25/EH28/EH33/EH35/EH43)
2. Round Type
3. With Frame: "F"
4. Serial No.
5. Type of Terminal
6. Mounting Height

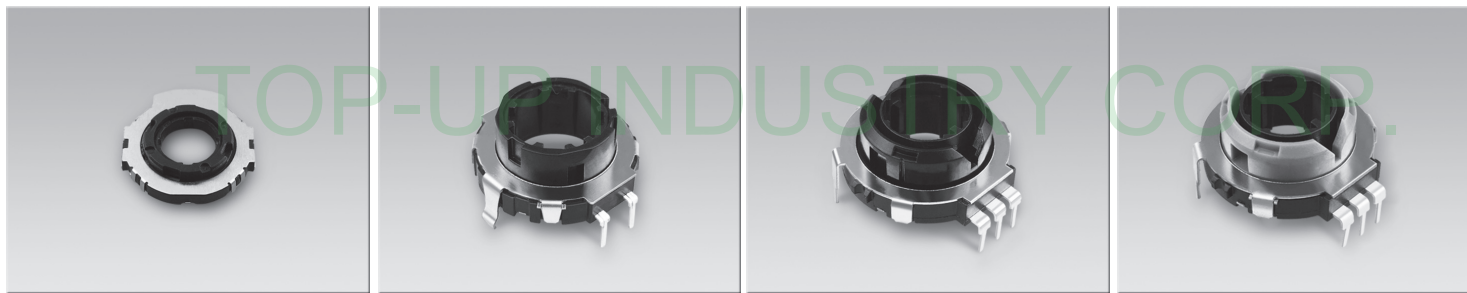


7. Body Color
8. Output Pulse : 15 - 15Pulse
9. Number of Decent : Blank- None , 30 -30C

Pulse NO.	9 Pulses	10 Pulses	15 Pulses
Decent NO.	18C	20C	30C

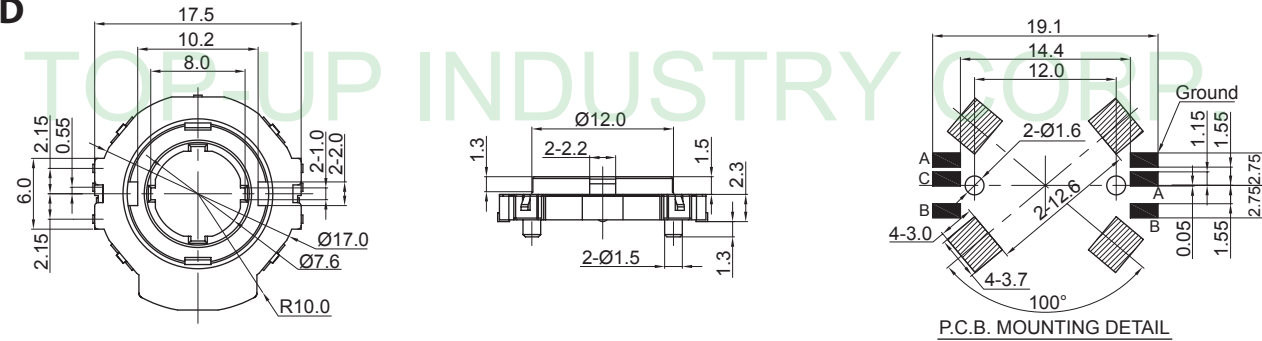
10. Serial No.

EH25RF11-D

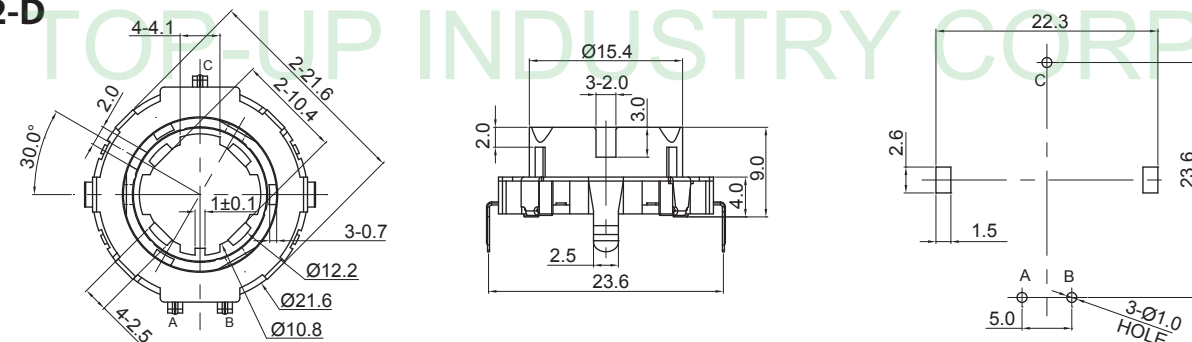


Features individual specifications

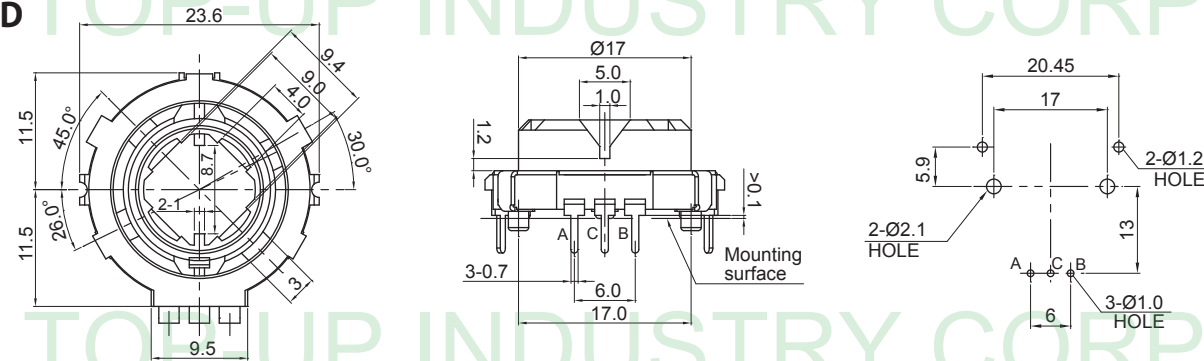
EH18R12-D



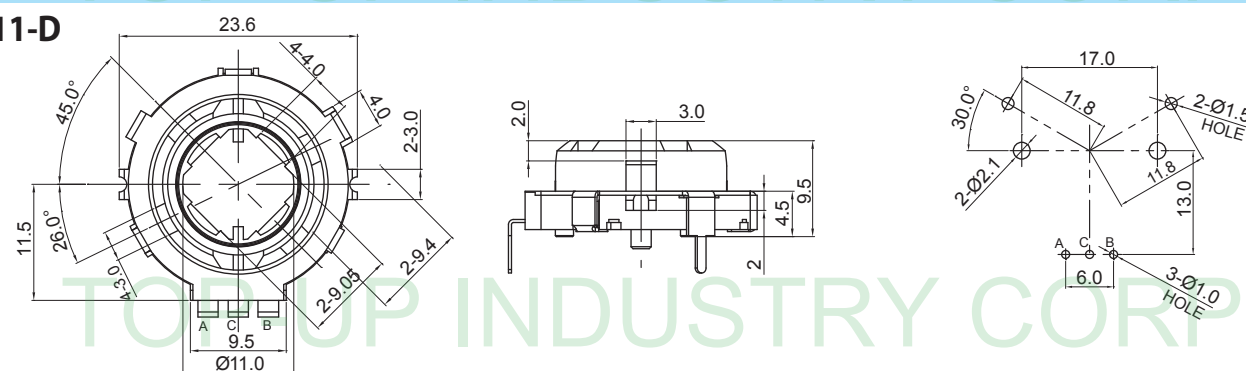
EH21RF12-D



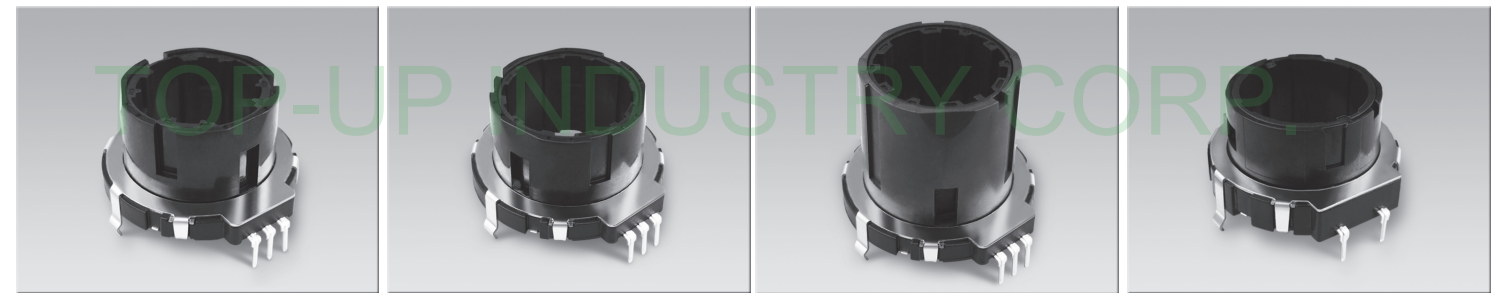
EH25RF00-D



EH25RF11-D

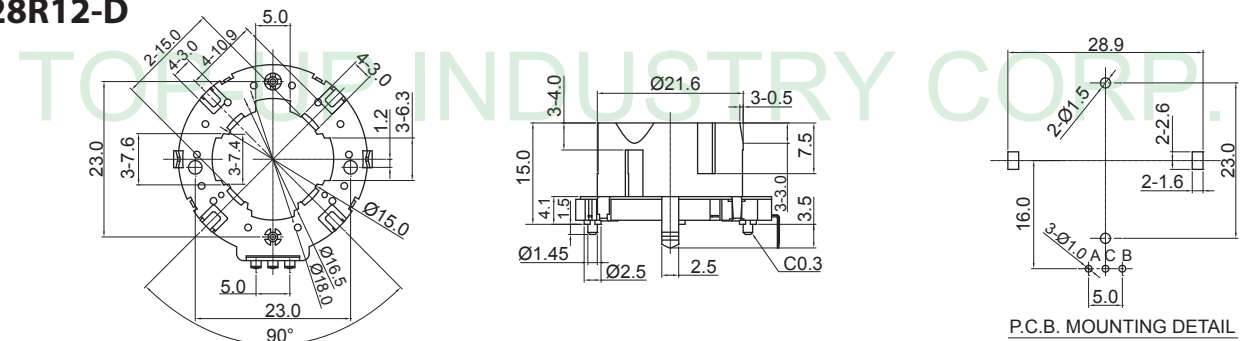


EH28RF32-D

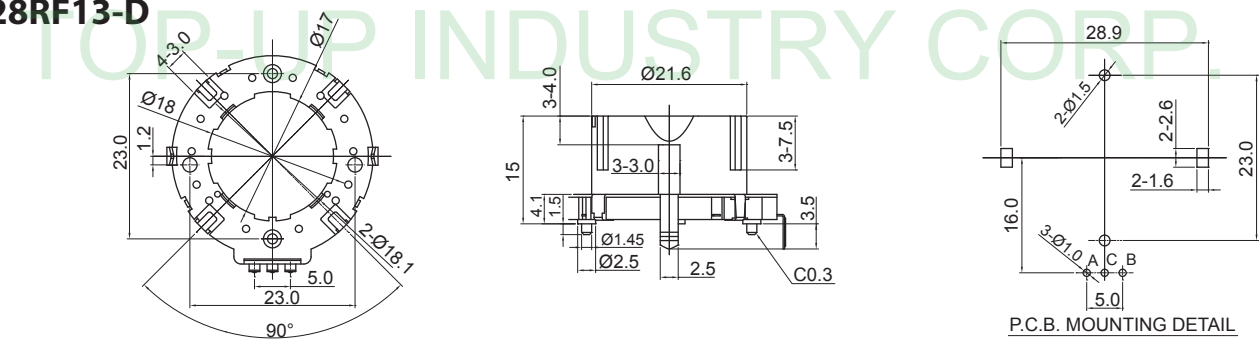


Features individual specifications

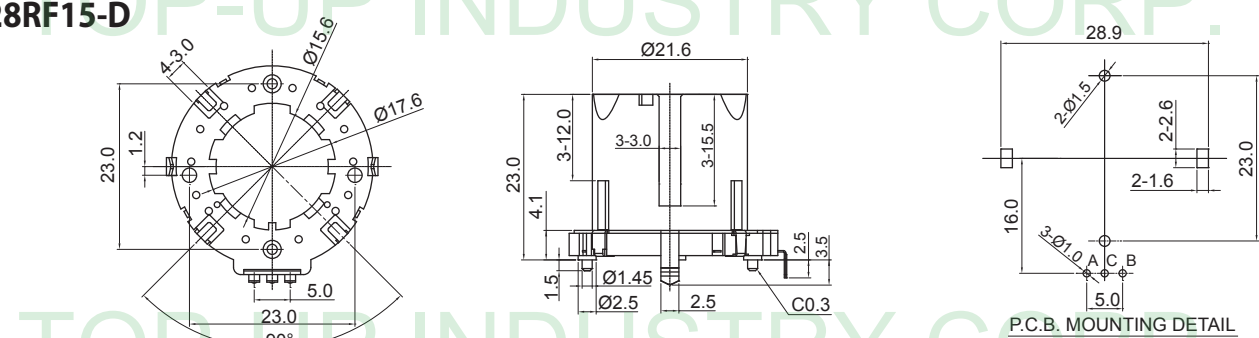
EH28R12-D



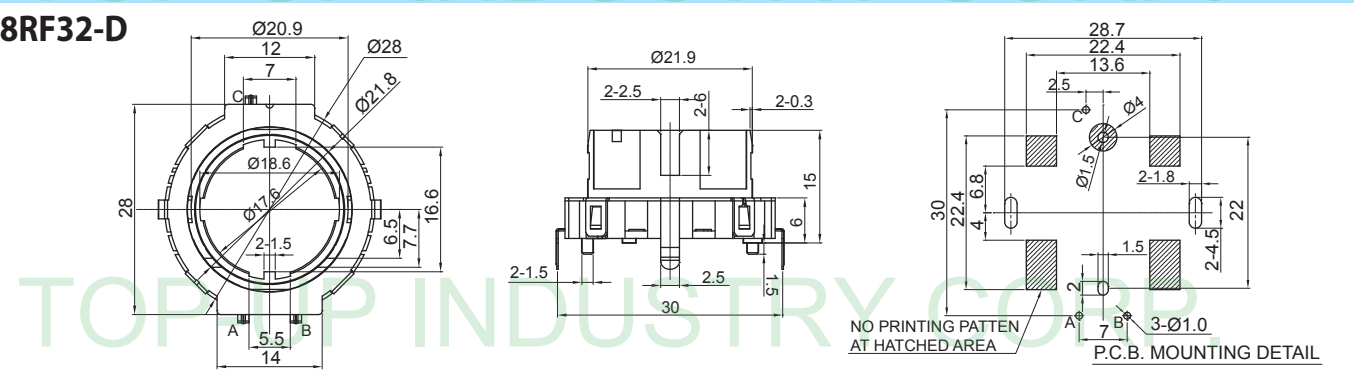
EH28RF13-D



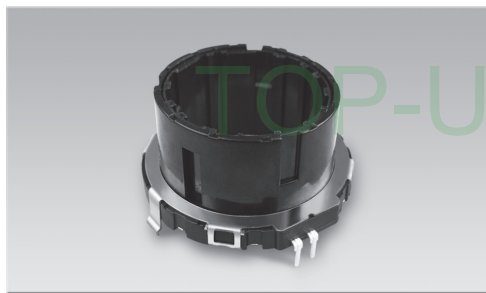
EH28RF15-D



EH28RF32-D

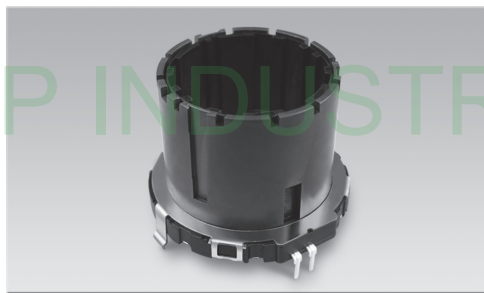


EH35RF12-D



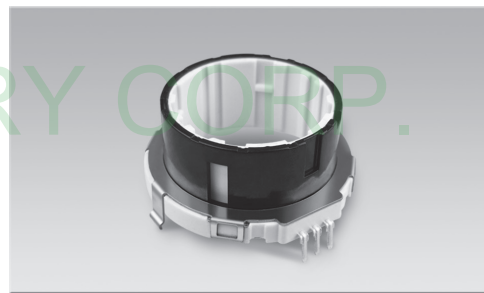
Outline Drawing

EH35RF23-D

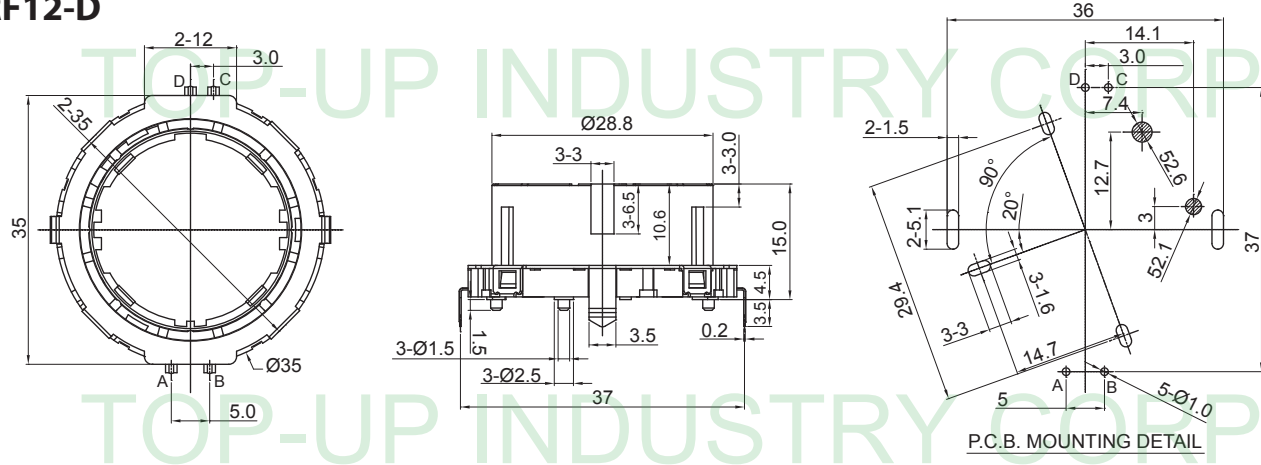


Features individual specifications

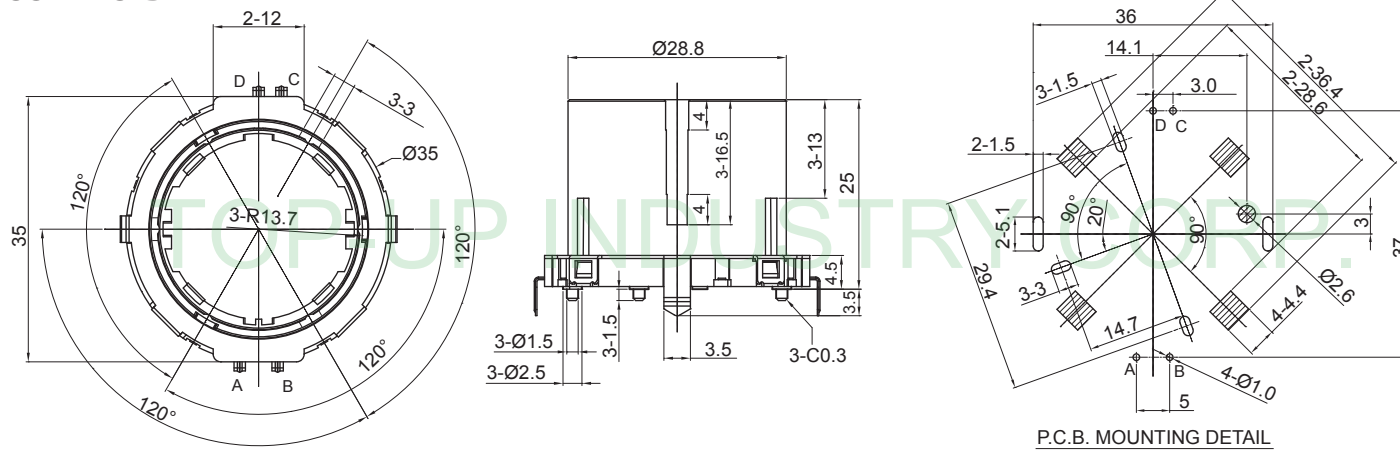
EH35RF32-D



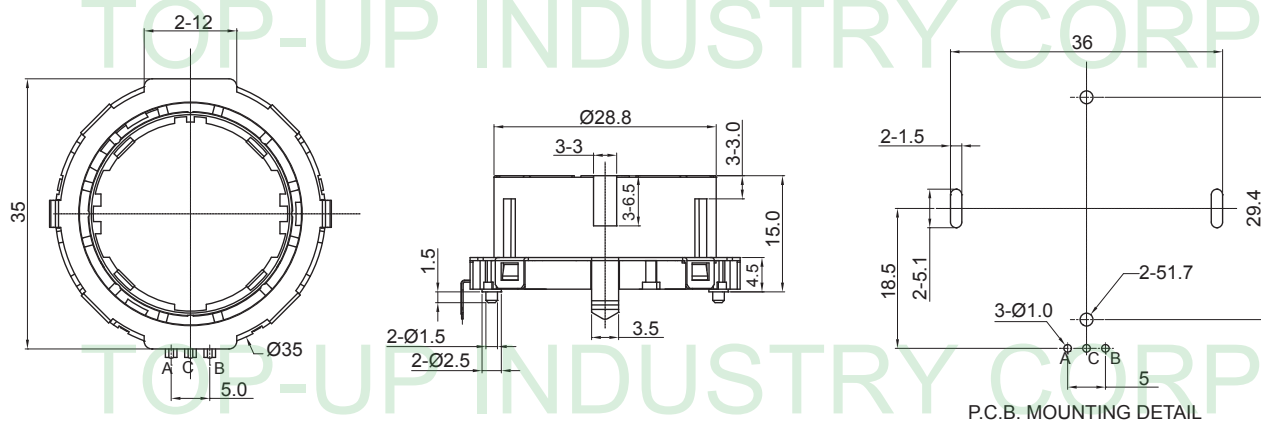
EH35RF12-D



EH35RF23-D



EH35RF32-D

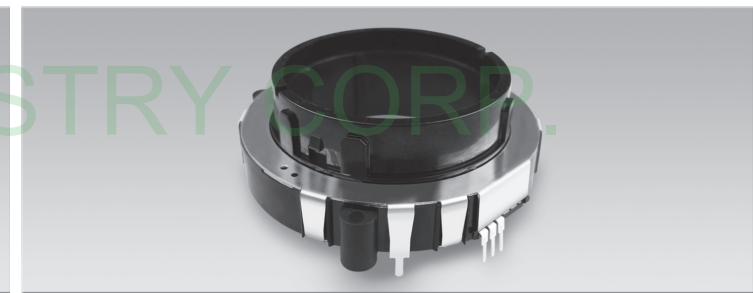


EH43RF12-D



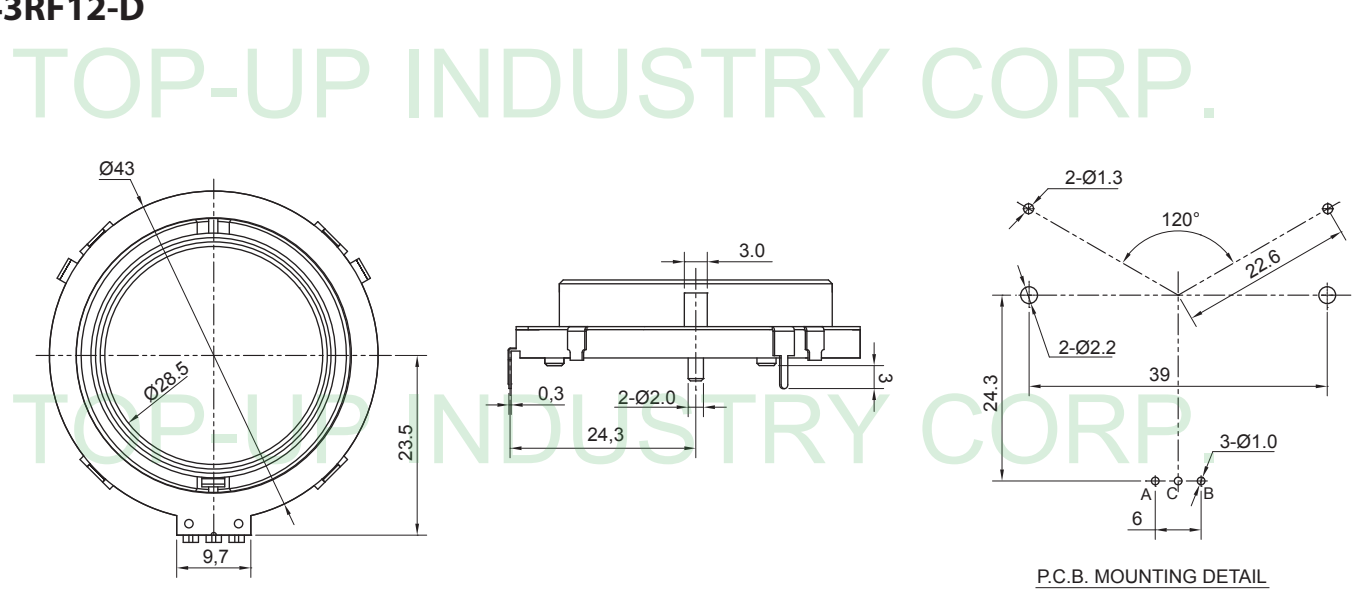
Outline Drawing

EH60RF12-D

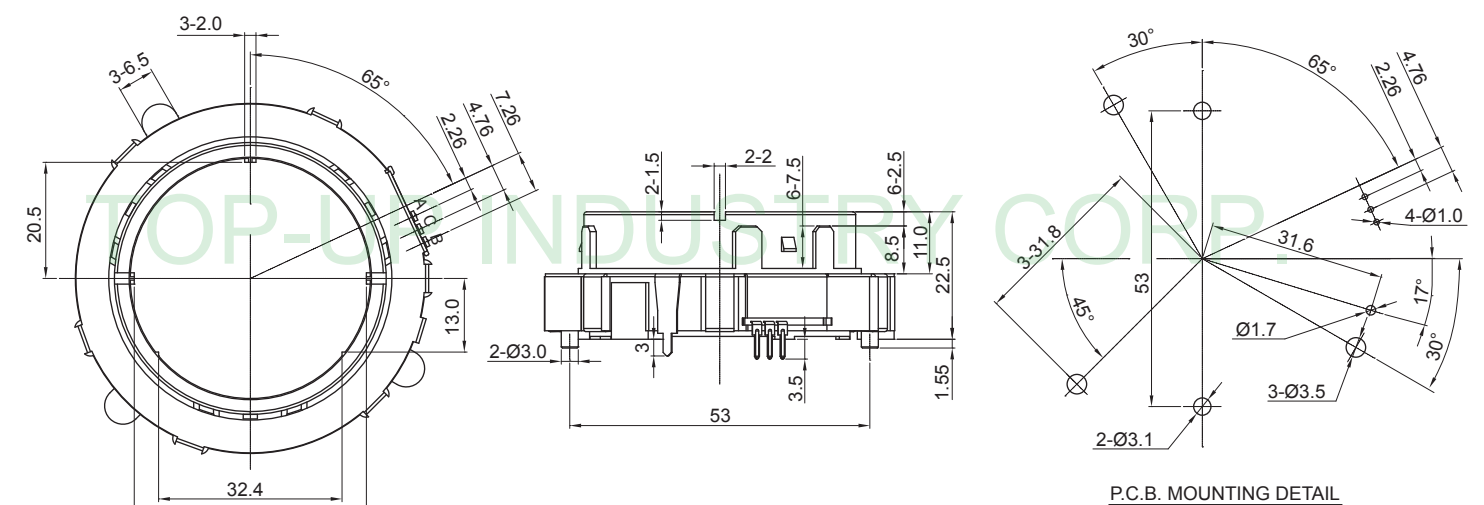


Features individual specifications

EH43RF12-D



EH60RF12-D

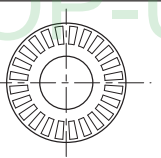
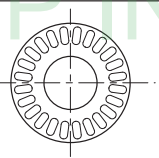
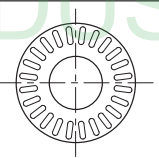
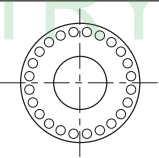
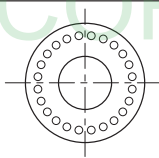
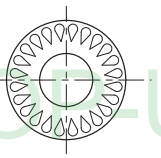
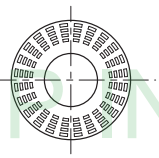
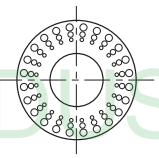
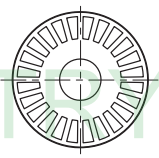
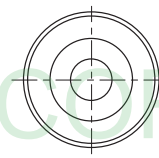


LED-CCL Series Code Explanation

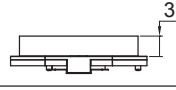
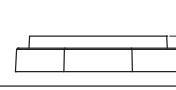
23CCL - A24 - 2 - M7 - □ D - RGB - B - □ □ □

1 2 3 4 5 6 7 8

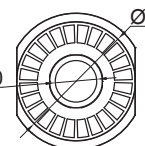
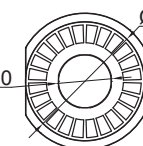
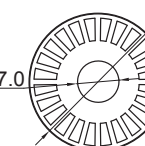
1. Product Lines of 20CCL & 23CCL
2. Windows Type: A24 – A Type 24 Windows

20CCL Series.				
A	B	C	D	E
				
20CCL Series.			23CCL Series.	
F	G	H	A	AB
				

3. LED-CCL Height:

20CCL	23CCL
	
3.4	2.0

4. Bushing Size:

20CCL	20CCL	23CCL
		
M7	M9	M7

5. Type of Terminal and Length :

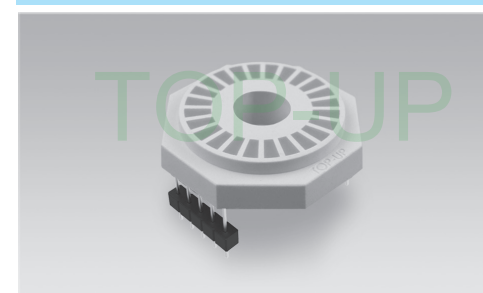
D	1D	D
20CCL - 20mm	20CCL - 12.6mm	23CCL - 11.4mm

6. LED Color :

Code	RGB	R	G	B	Y	W
Color	RGB	Red	Green	Blue	Yellow	White

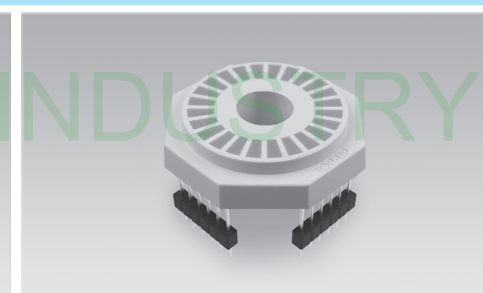
7. Panel Color: 20CCL - B - Black ; 23CCL - W - White
8. Series No.
9. Can be used with Encoder EC11M Series & EC12PL(W/LED RGB) Series.

23CCL-A24-M7



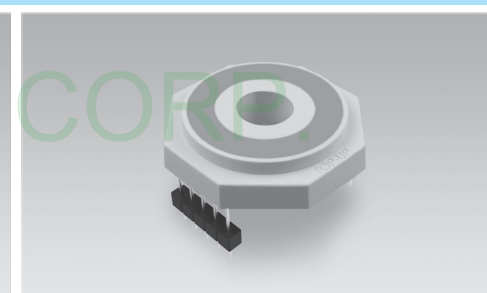
Outline Drawing

23CCL-A24-M7 (RGB)

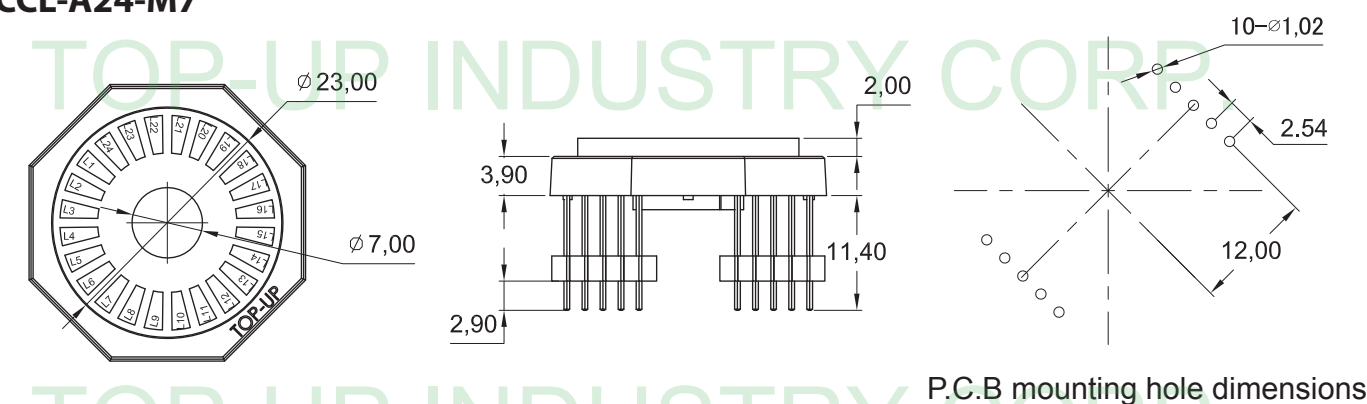


Features individual specifications

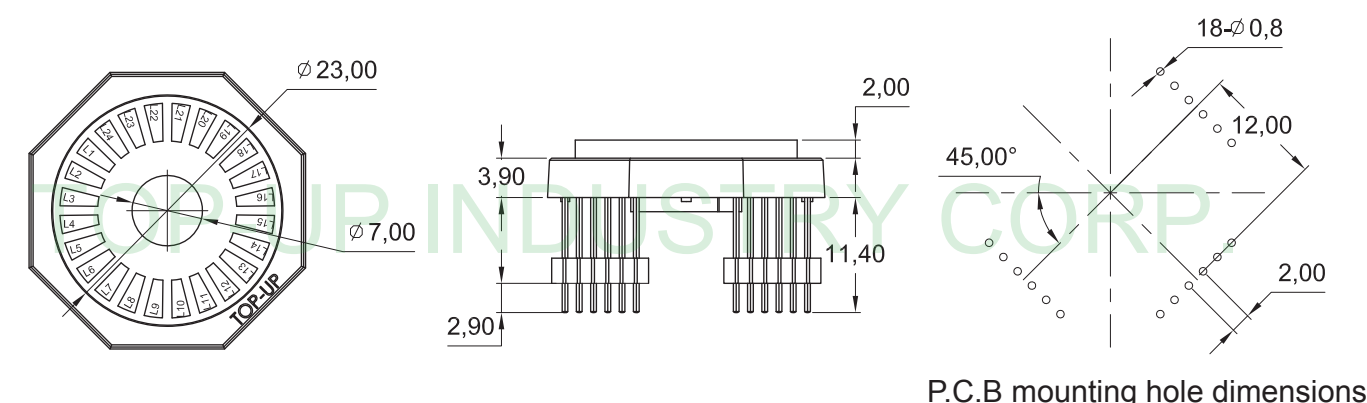
23CCL-AB-M7



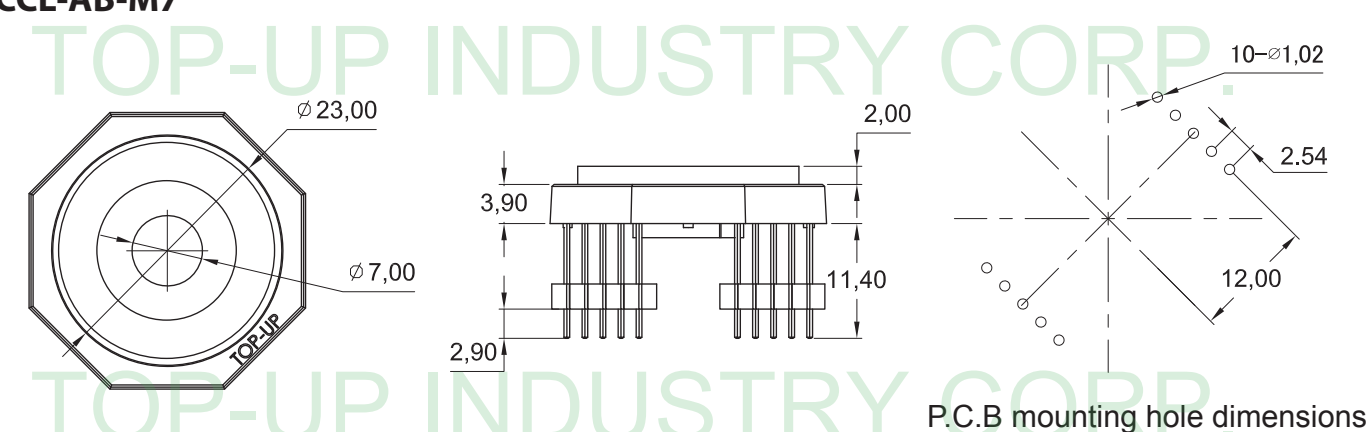
23CCL-A24-M7



23CCL-A24-M7 (RGB)



23CCL-AB-M7

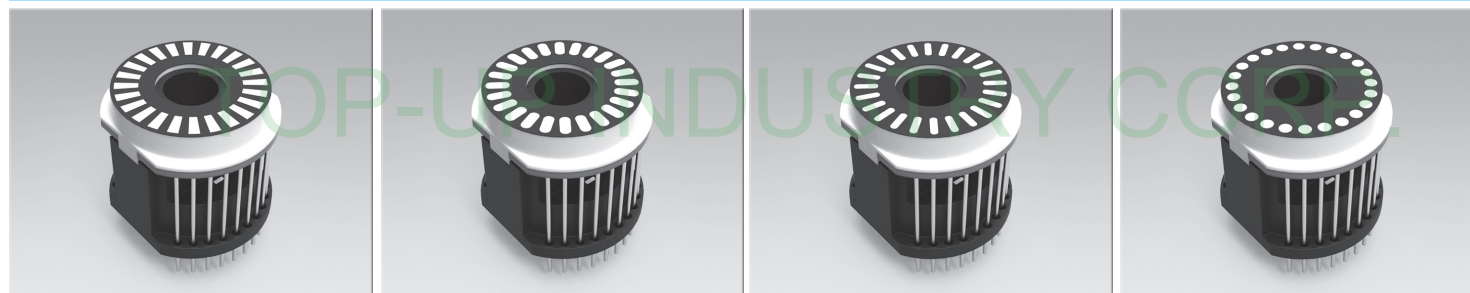


20LED-CCL-A24

20LED-CCL-B24

20LED-CCL-C24

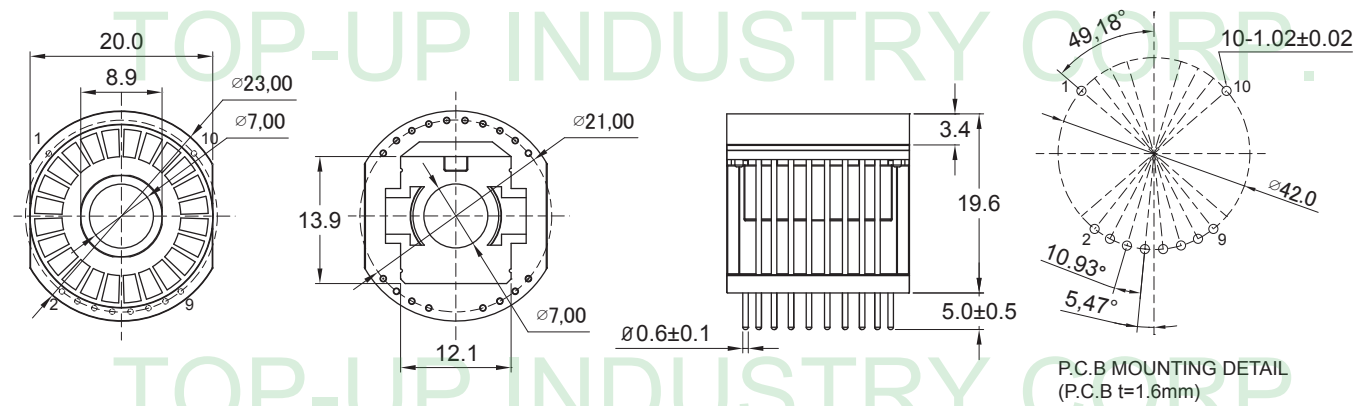
20LED-CCL-D24



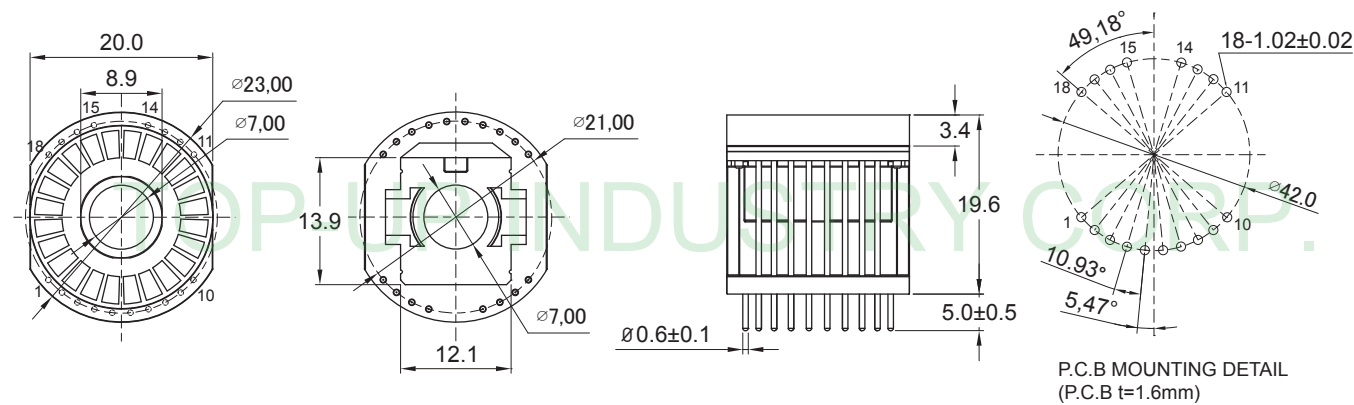
Outline Drawing

Features individual specifications

20LED-CCL-□24(Single Color)



20LED-CCL-□24(RGB Color)

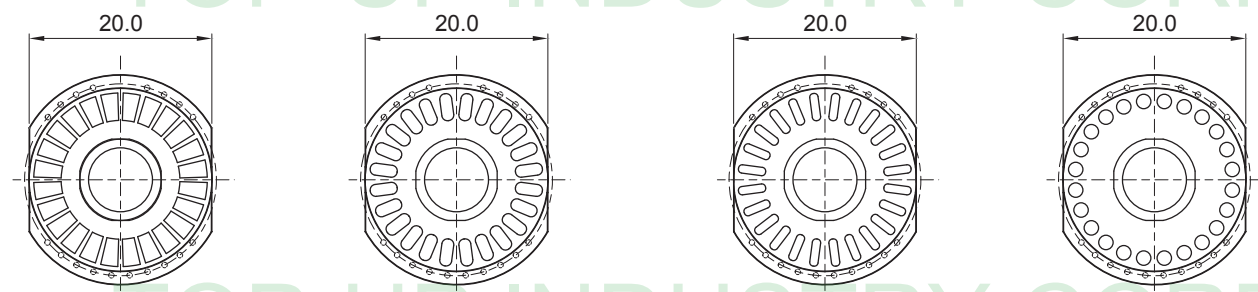


20LED-CCL-A24

20LED-CCL-B24

20LED-CCL-C24

20LED-CCL-D24

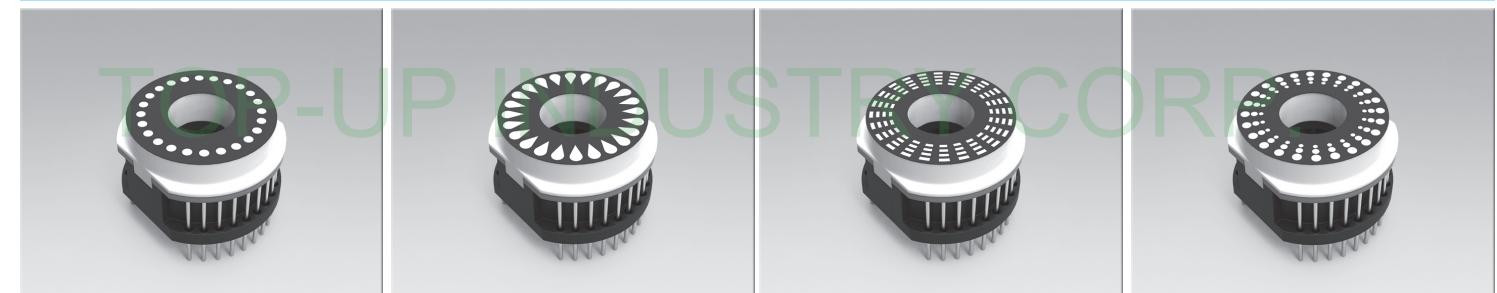


20LED-CCL-E24-M9

20LED-CCL-F24-M9

20LED-CCL-G24-M9

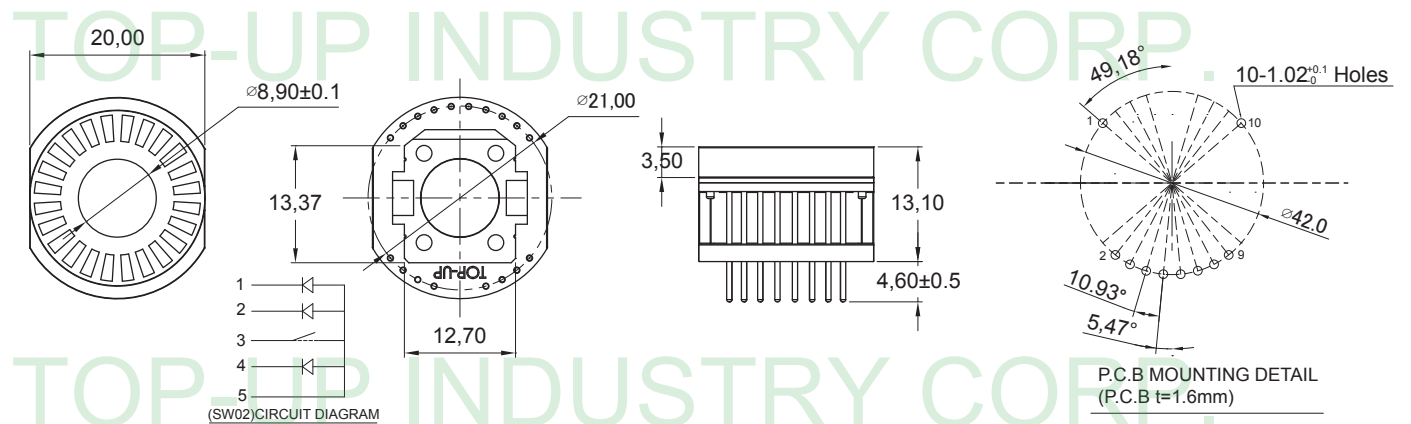
20LED-CCL-H24-M9



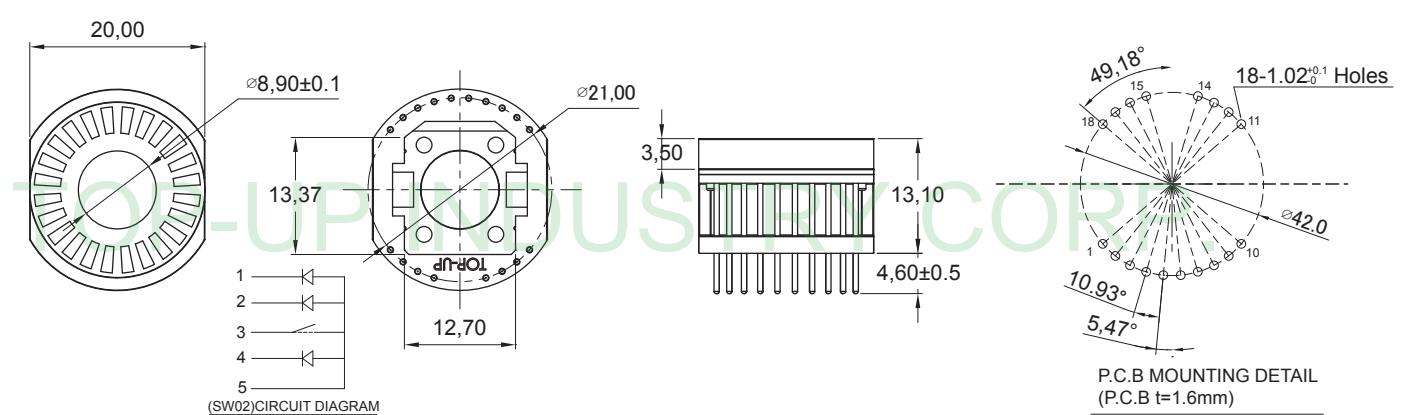
Outline Drawing

Features individual specifications

20LED-CCL-□24-M9(Single Color)



20LED-CCL-□24-M9(RGB Color)

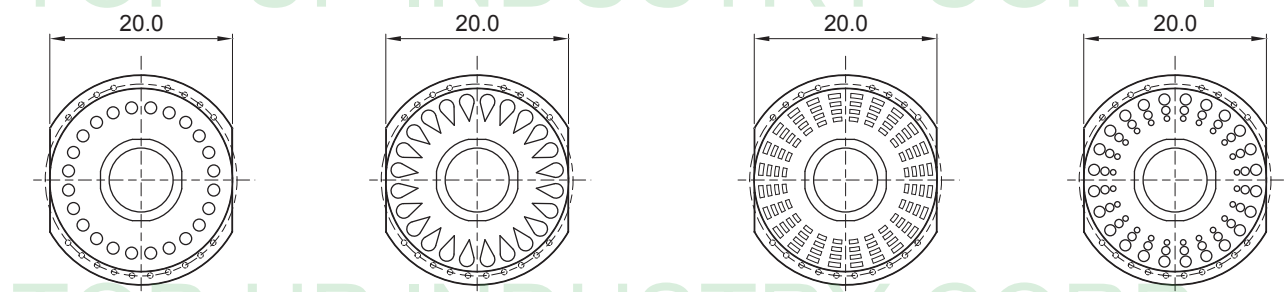


20LED-CCL-E24

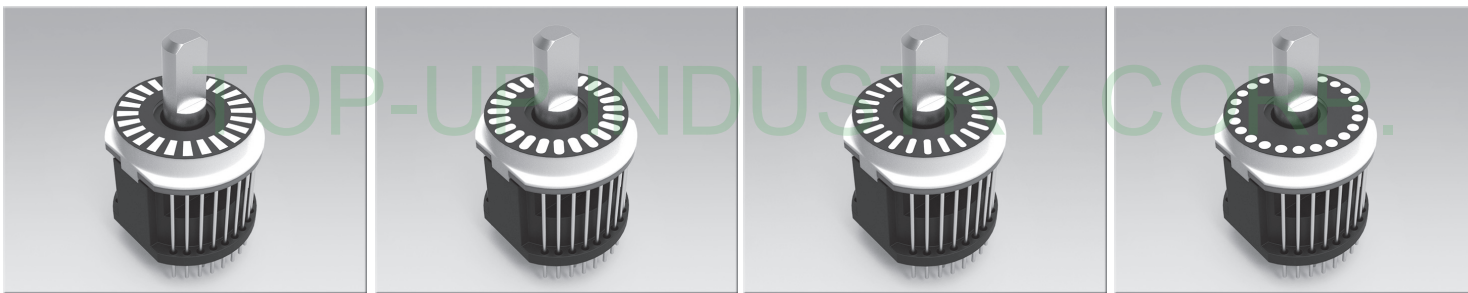
20LED-CCL-F24

20LED-CCL-G24

20LED-CCL-H24



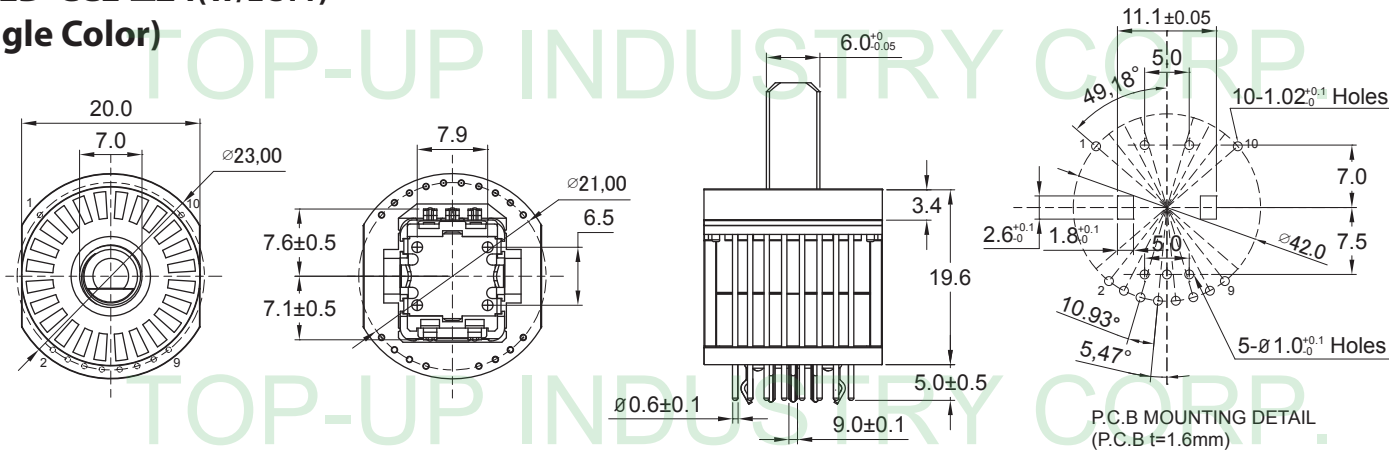
20LED-CCL-A24(EC11) 20LED-CCL-B24(EC11) 20LED-CCL-C24(EC11) 20LED-CCL-D24(EC11)



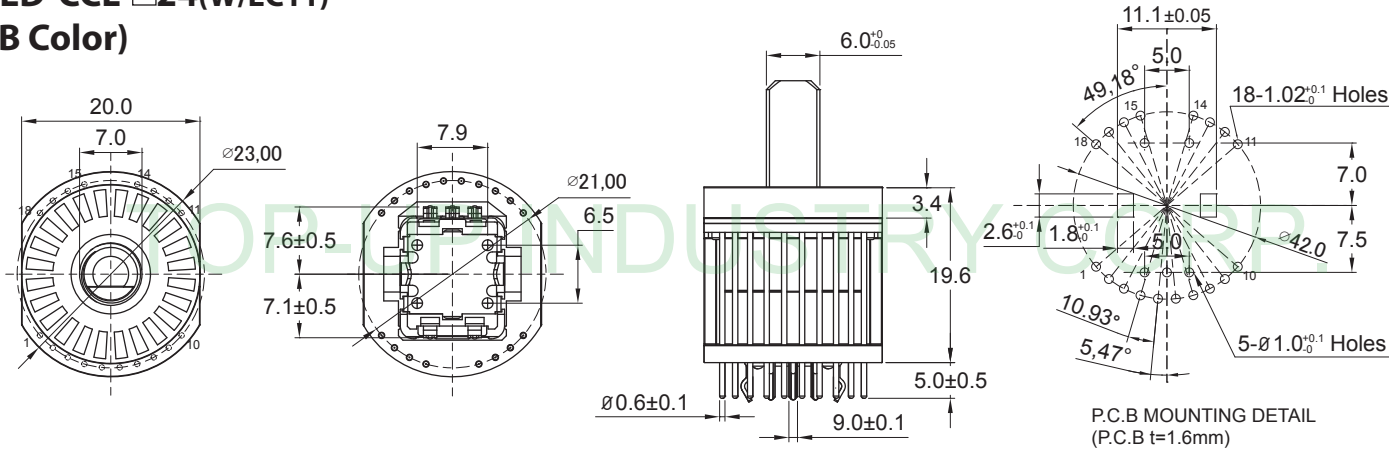
Outline Drawing

Features individual specifications

20LED-CCL-□24(W/EC11)
(Single Color)



20LED-CCL-□24(W/EC11)
(RGB Color)

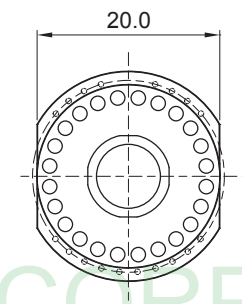
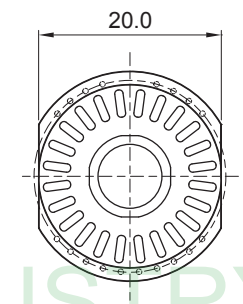
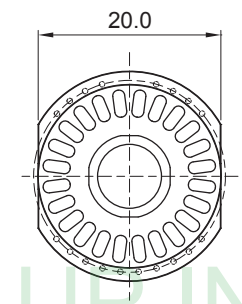
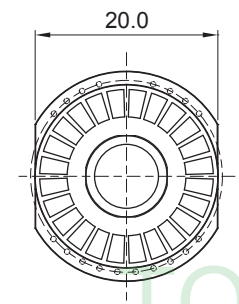


20LED-CCL-A24

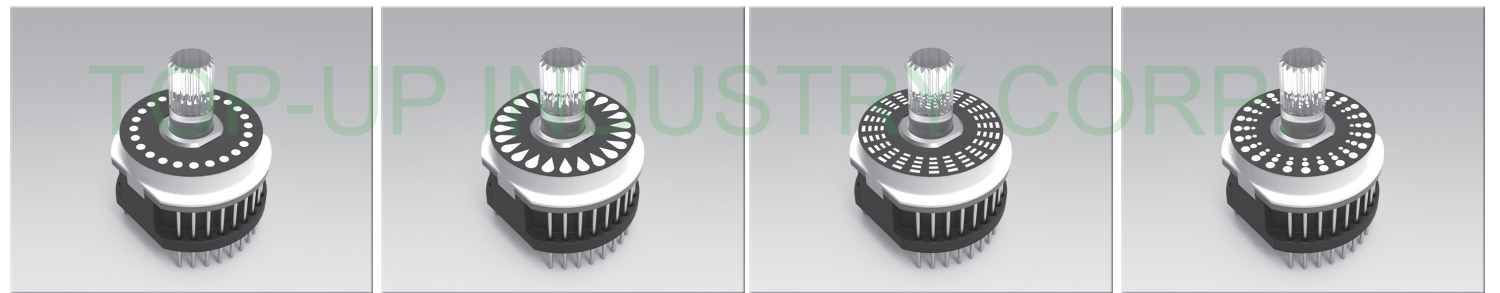
20LED-CCL-B24

20LED-CCL-C24

20LED-CCL-D24



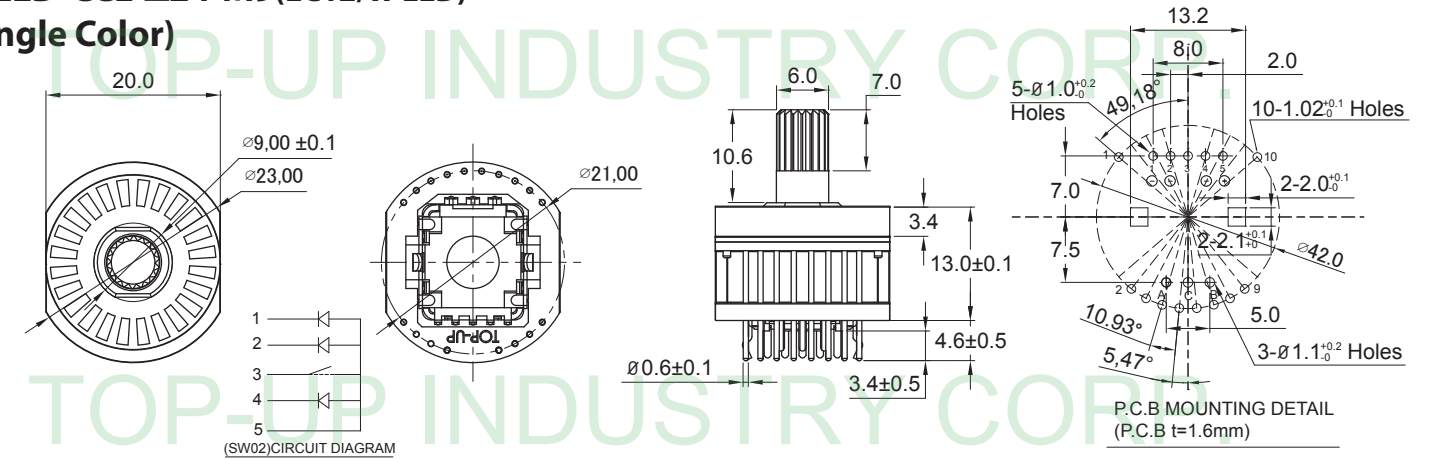
20LED-CCL-E24(EC12) 20LED-CCL-F24(EC12) 20LED-CCL-G24(EC12) 20LED-CCL-H24(EC12)



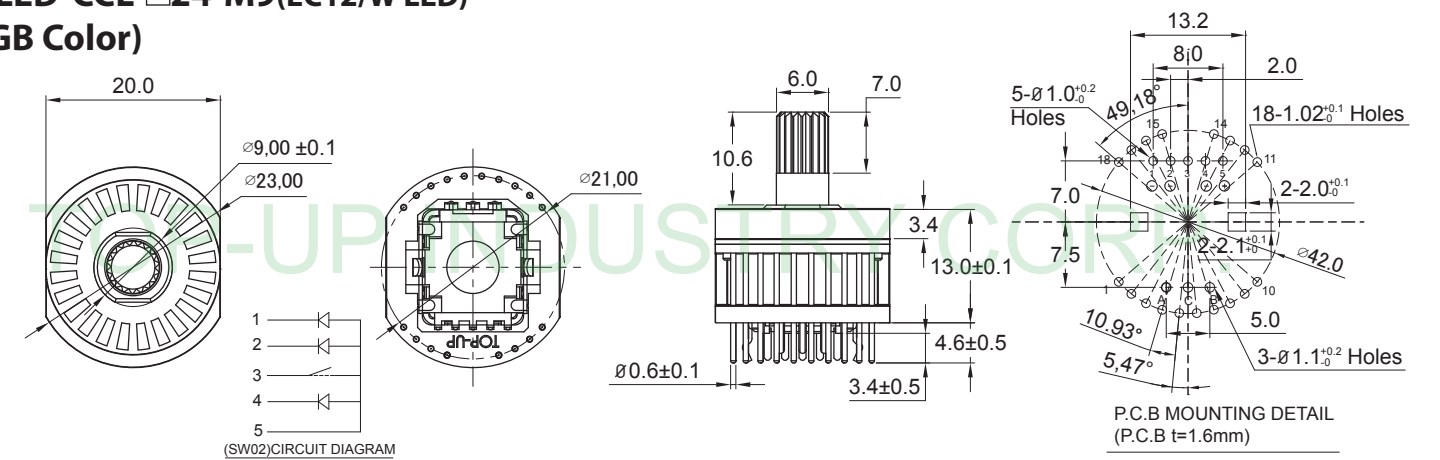
Outline Drawing

Features individual specifications

20LED-CCL-□24-M9(EC12/W LED)
(Single Color)



20LED-CCL-□24-M9(EC12/W LED)
(RGB Color)

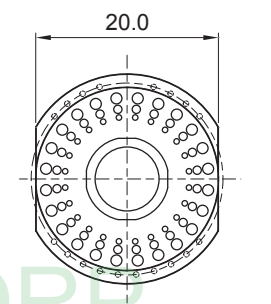
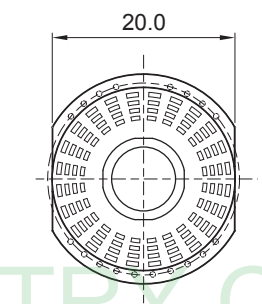
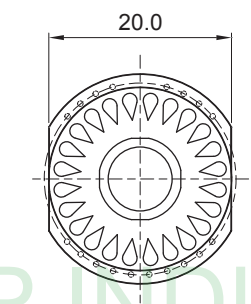
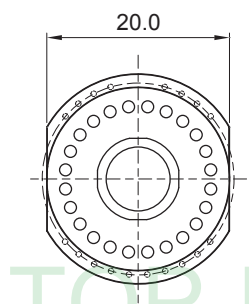


20LED-CCL-E24

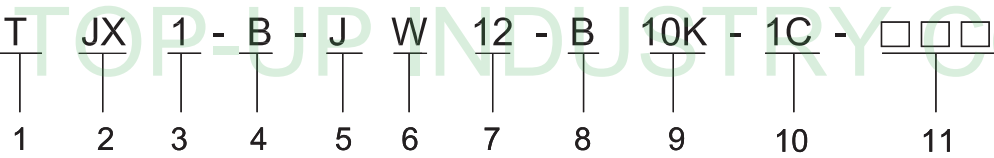
20LED-CCL-F24

20LED-CCL-G24

20LED-CCL-H24



J Series Code Explanation



- 1. T: Travel of Sliding (10mm, 15mm, 20mm, 25mm are available)
- 2. Product Lines of J
Without Case Type Slide Potentiometers : JX Series; JY Series; JZ Series; JW Series
- 3. Number of Unit
1 — Single Unit
2 — Dual Unit
- 4. Type of Terminal

P.C.B Type																	
JX Series																	
Single Unit																	
B		B1		B2		C											
Dual Unit						C1											
						<table><tr><th>Terminal</th><th>C1</th><th>C2</th><th>C3</th></tr><tr><td>K</td><td>3.5</td><td>6.3</td><td>9.3</td></tr></table>				Terminal	C1	C2	C3	K	3.5	6.3	9.3
Terminal	C1	C2	C3														
K	3.5	6.3	9.3														

JY Series						JZ Series																														
B		C		C1		B		C																												
		<table><tr><th>Terminal</th><th>C</th><th>C1</th><th>C2</th><th>C3</th></tr><tr><td>K</td><td>2.5</td><td>2.2</td><td>4.6</td><td>3.25</td></tr><tr><td>G</td><td>2.5</td><td>3</td><td>3</td><td>3</td></tr></table>		Terminal	C	C1	C2	C3	K	2.5	2.2	4.6	3.25	G	2.5	3	3	3					<table><tr><th>Terminal</th><th>C</th><th>C1</th><th>C2</th></tr><tr><td>K</td><td>2.5</td><td>2.2</td><td>4.6</td></tr><tr><td>G</td><td>2.5</td><td>3</td><td>3</td></tr></table>		Terminal	C	C1	C2	K	2.5	2.2	4.6	G	2.5	3	3
Terminal	C	C1	C2	C3																																
K	2.5	2.2	4.6	3.25																																
G	2.5	3	3	3																																
Terminal	C	C1	C2																																	
K	2.5	2.2	4.6																																	
G	2.5	3	3																																	

Electrical Characteristics:

Total resistance	500 Ω to 1M Ω						
Resistance tolerance	$\pm 20\%$						
Resistance taper	A, B, C, D, W						
Rated wattage	Taper \ Travel		15mm	20mm	30mm	45mm	60mm
	B	Single	0.05	0.1	0.2	0.25	0.2
		Dual	0.025	0.05	0.1	0.125	0.2
	Except B	Single	0.025	0.1	0.1	0.125	0.1
		Dual	0.012	0.025	0.05	0.06	0.1
Rated voltage	B		100	200	200	200	200
	Except B		50	150	150	150	150
Insulation resistance	500 Ω to 1M Ω						
Dielectric	1 min. at 250V AC						

Mechanical Characteristics:

Operating force	10~120gf.cm
Lever stop strength	3kg/60 SEC(2mm point from mounting surface)
Lever wobble	1.6mm Max(both sides)
Click slip-out force (Only center click)	Operating force+20~150gf.cm

Durability

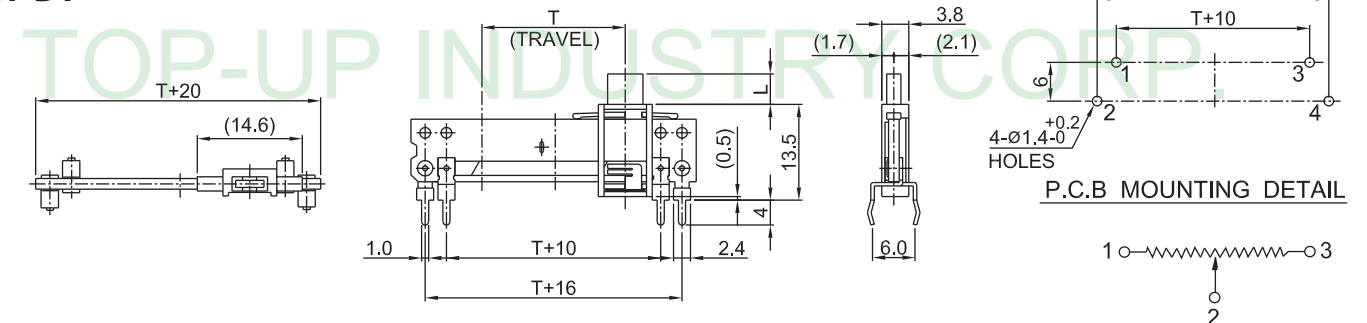
Sliding life	10,000 cycles
--------------	---------------

Number Of Click(detent)

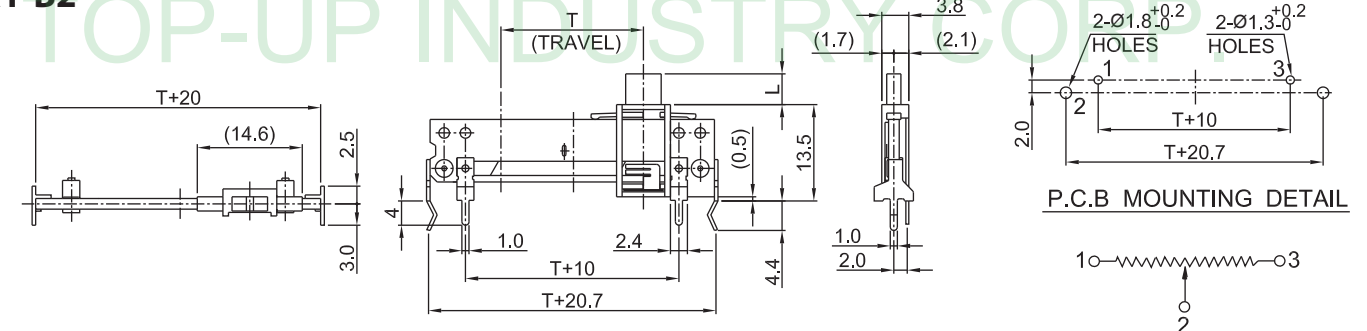
Click (detent)	Model
Center click	Series
3. Click (3C)	None
7. Click (7C)	None
11. Click (11C)	None

TJX1-B1	TJX1-B2	TJX1-C1	TJX1-C
			
Outline Drawing		Features individual specifications	

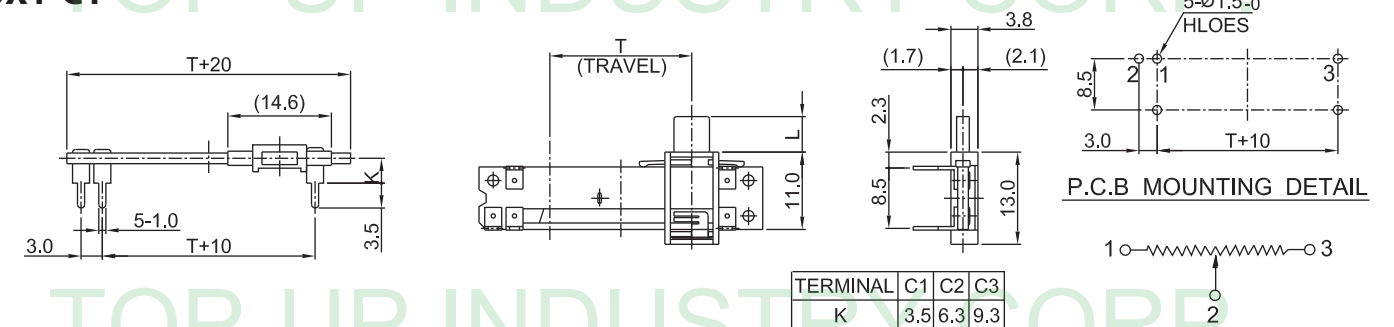
TJX1-B1



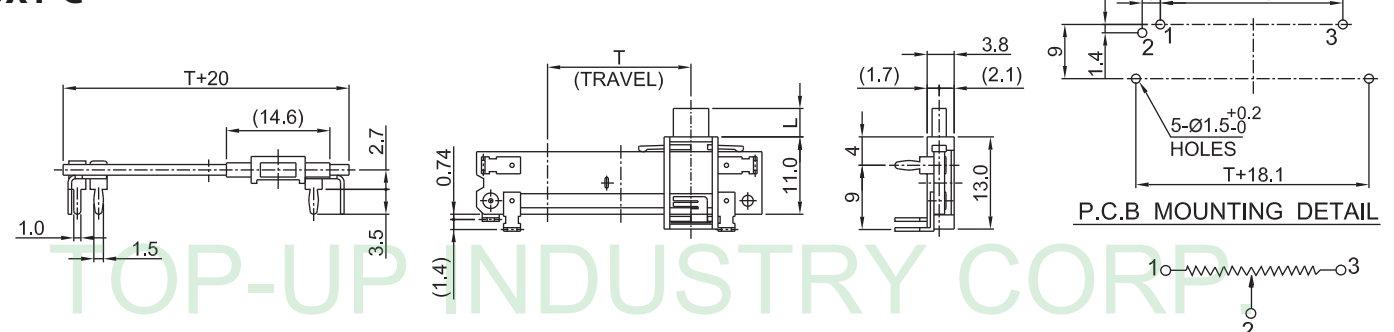
TJX1-B2



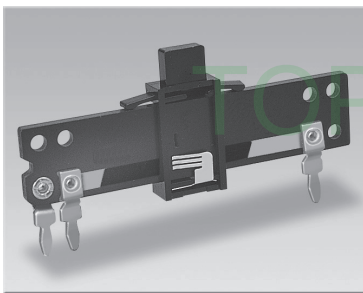
TJX1-C1



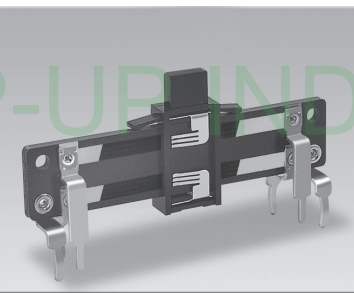
TJX1-C



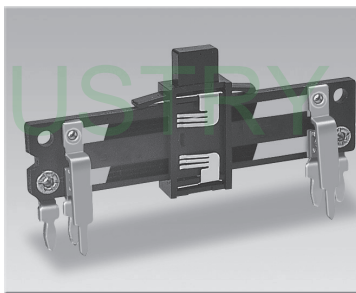
TJX1-B



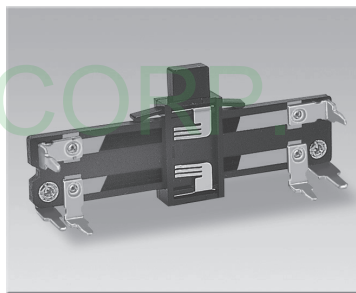
TJX2-B1



TJX2-B



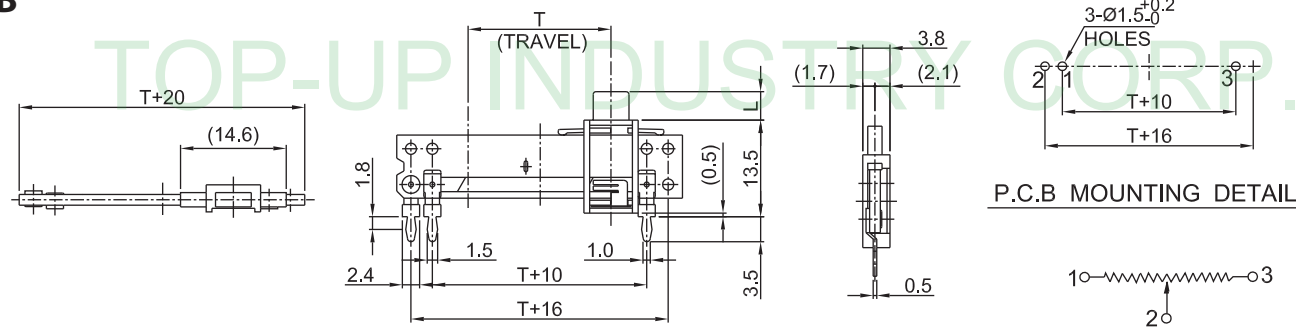
TJX2-C



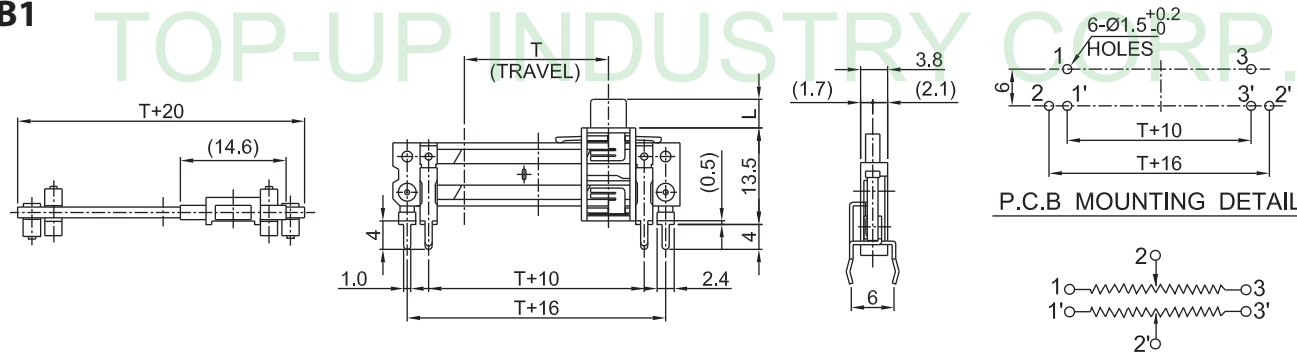
Outline Drawing

Features individual specifications

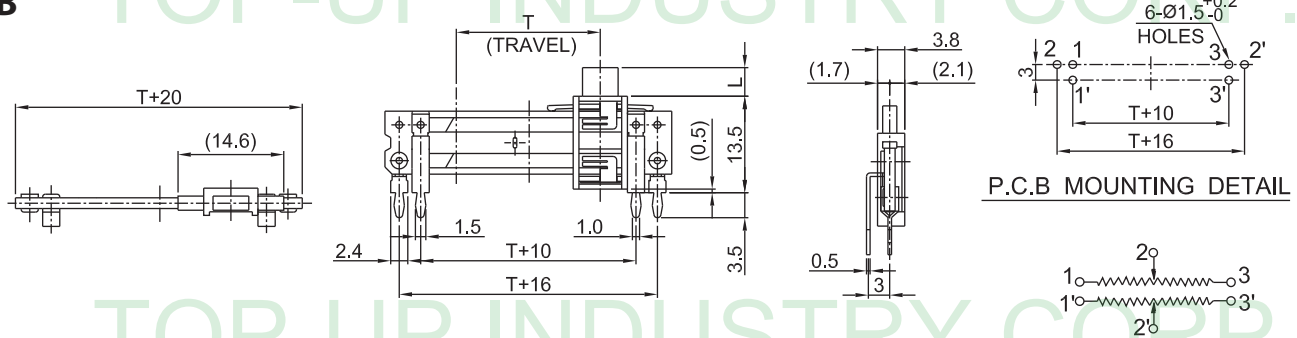
TJX1-B



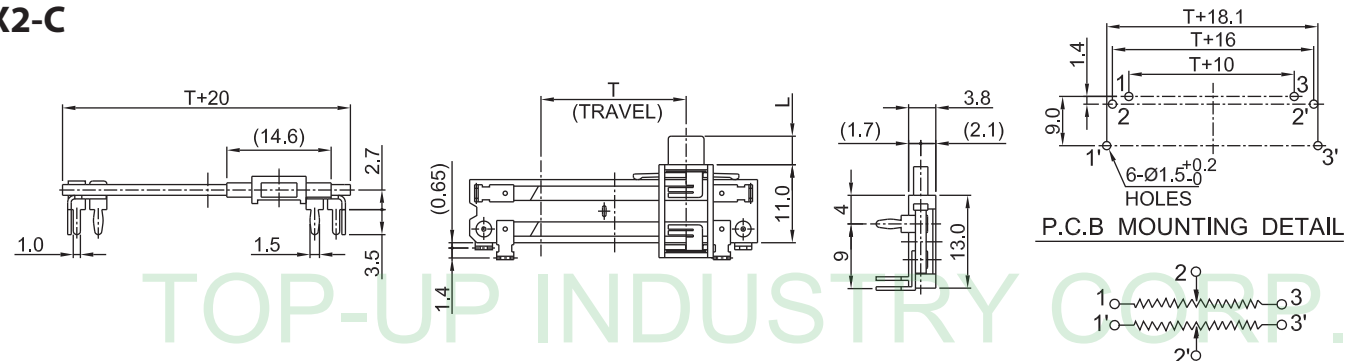
TJX2-B1



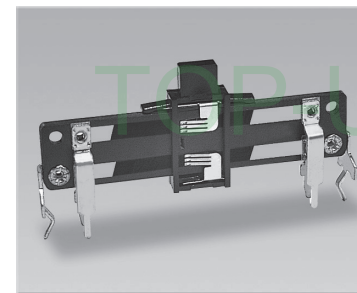
TJX2-B



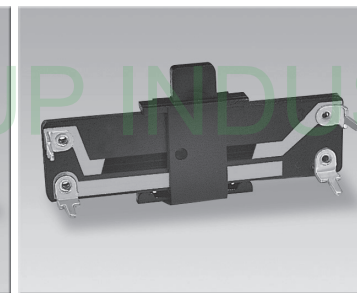
TJX2-C



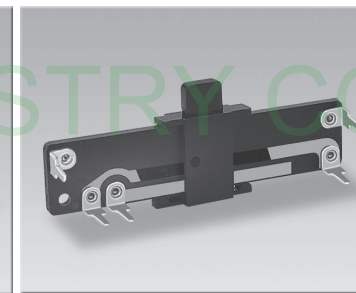
TJX2-B2



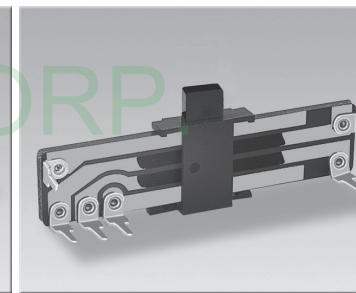
TJY1-C



TJZ1-C



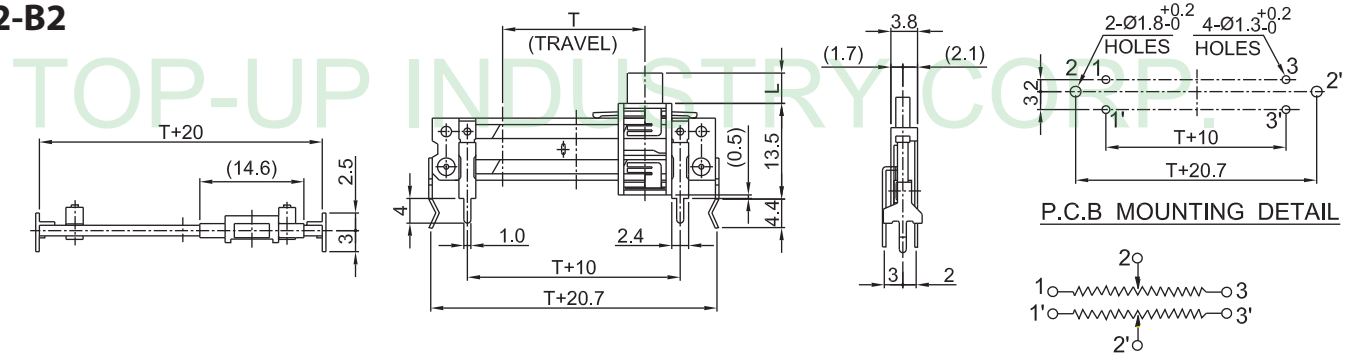
TJZ2-C



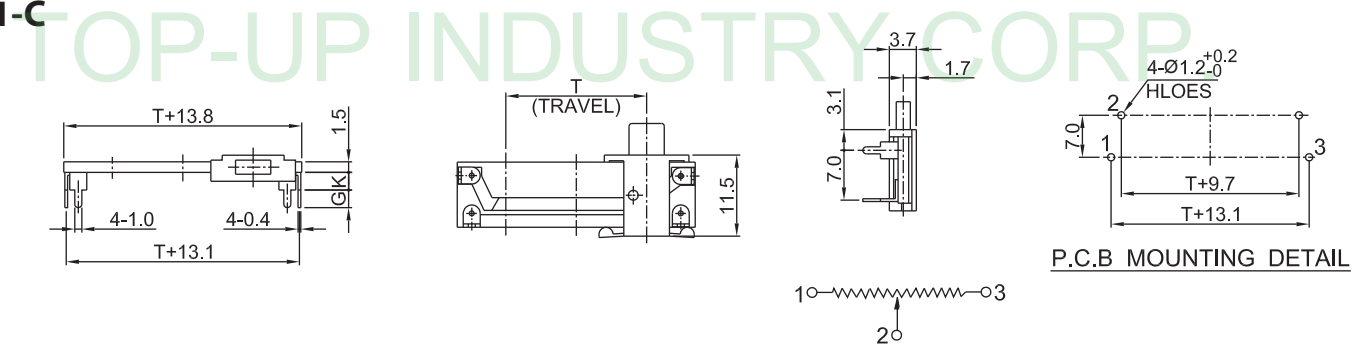
Outline Drawing

Features individual specifications

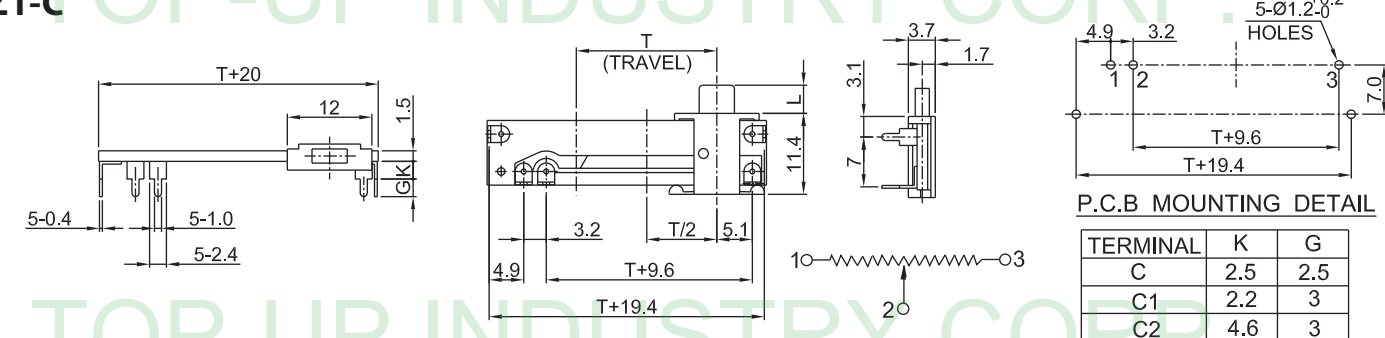
TJX2-B2



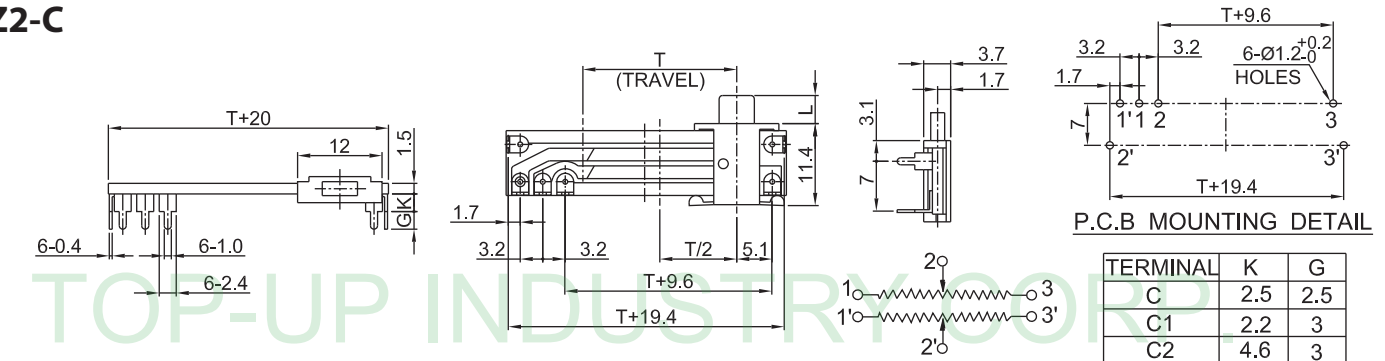
TJY1-C



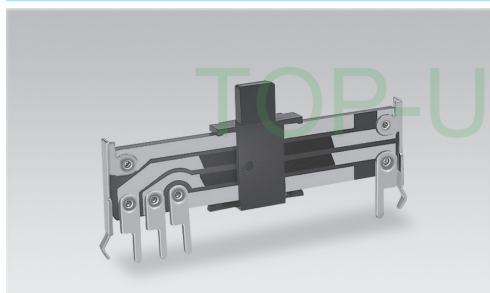
TJZ1-C



TJZ2-C

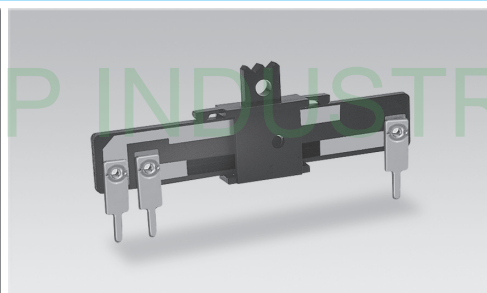


TJZ2-B



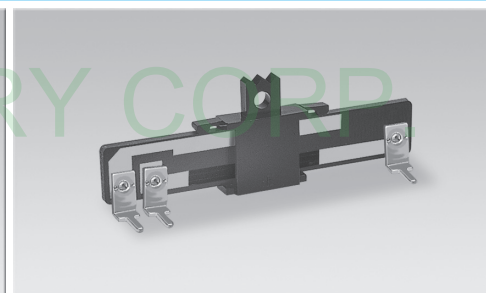
Outline Drawing

TJW1-B

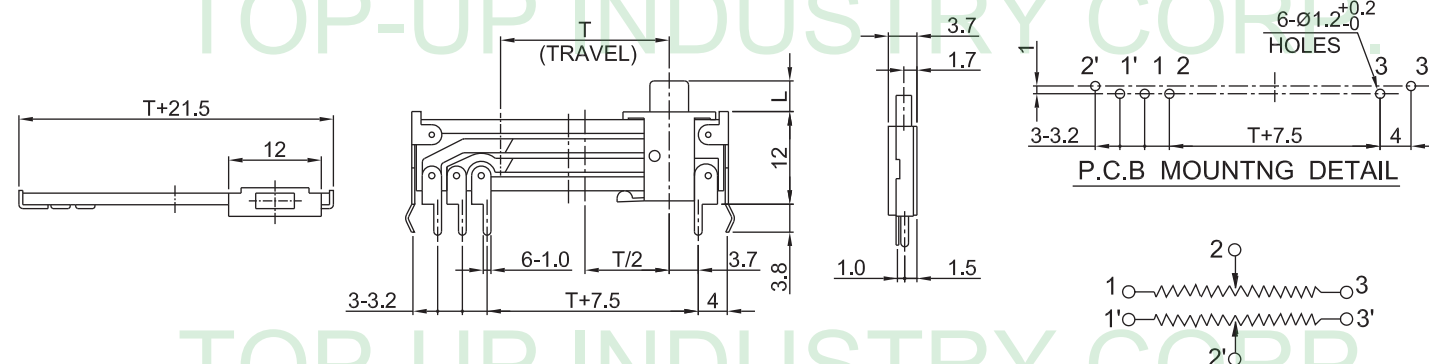


Features individual specifications

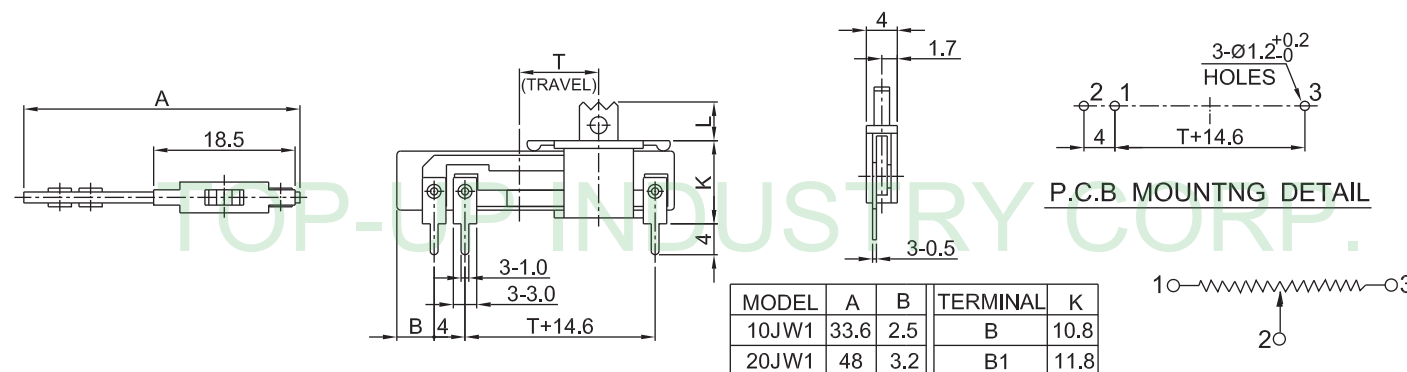
TJW1-C



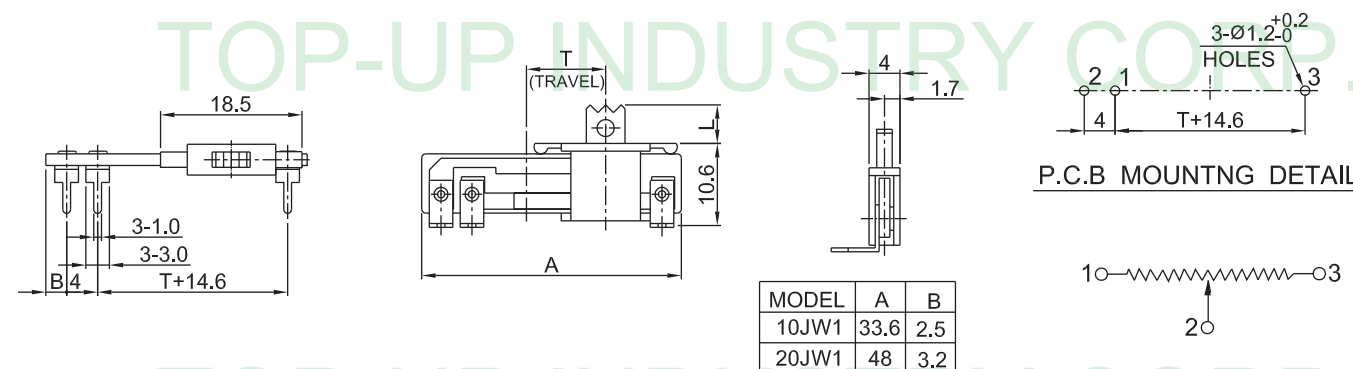
TJZ2-B



TJW1-B



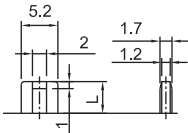
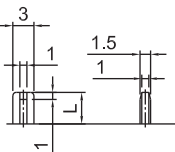
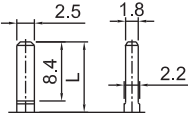
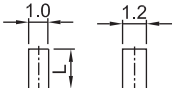
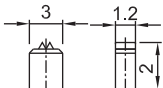
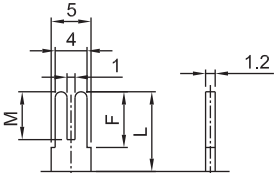
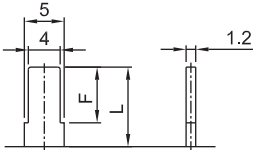
TJW1-C



TE, TQ, TX, TU Series Code Explanation

10	TE	1	F	B	H1	P	5	A	10K	1C			
1	2	3	4	5	6	7	8	9	10	11	12		

- Travel of Sliding
- Product Lines
With Case Type Slide Potentiometers : TE Series; TQ Series; TX Series; TU Series
- Number of Unit
1 — Single Unit
2 — Dual Unit
- Type of Metal case " F " - Case With Supporting Foot
- Type of Terminal
B — P.C.B Type Terminal
- Type of Slide Lever

Insulated Lever Type															
Model	20TX1			10TE1F			10TE2F			5TQ1					
Lever -Type	H			H1			C			C2 E					
Dimensions															
Length(L)	4.5			4.5	5	10	10			2.2	2.3	2.4	2.0		
Metal Lever Type															
Model	TU Series														
Lever -Type	CH1						C1								
Dimensions															
	L	10	12	15	20	25	L	10	15	20	25				
	F	7	10	10	10	10	F	7	10	10	10				
	M	6	7	7	7	7	F	7	10	10	10				

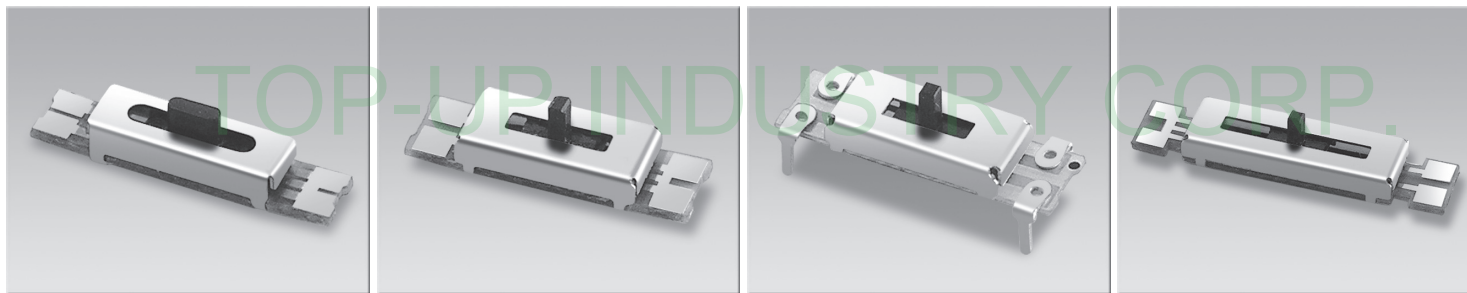
- Lever Material : P -Insulated Lever ; M - Metal Lever (Drawing 1)
- Lever Length (See Drawing 1)
- Type of Taper (See Taper Chart Last Page)
- Resistance Value
- Number of Clicks: Blank - None, 1C- Center Click
- Serial No.

4TQG2

5TQ2

4TQ2-B

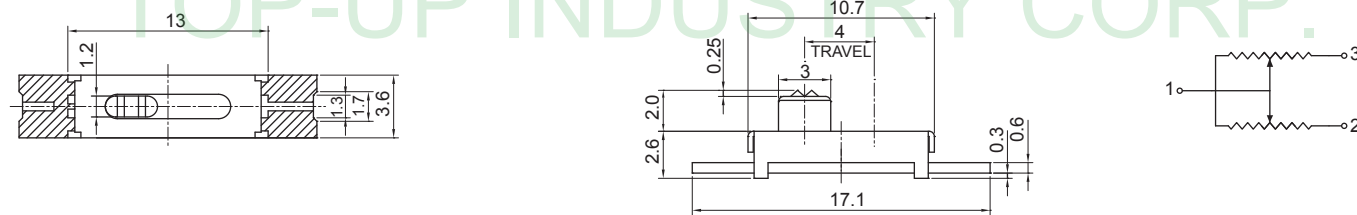
10TQ2



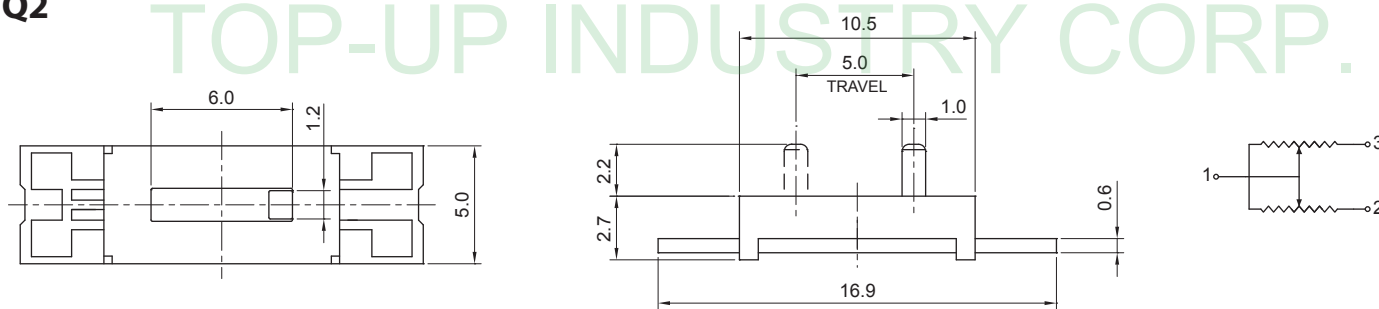
Outline Drawing

Features individual specifications

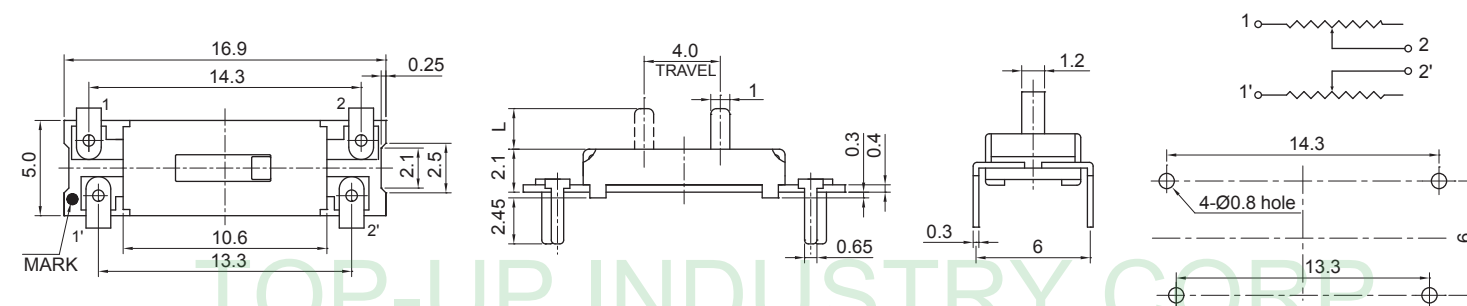
4TQG2



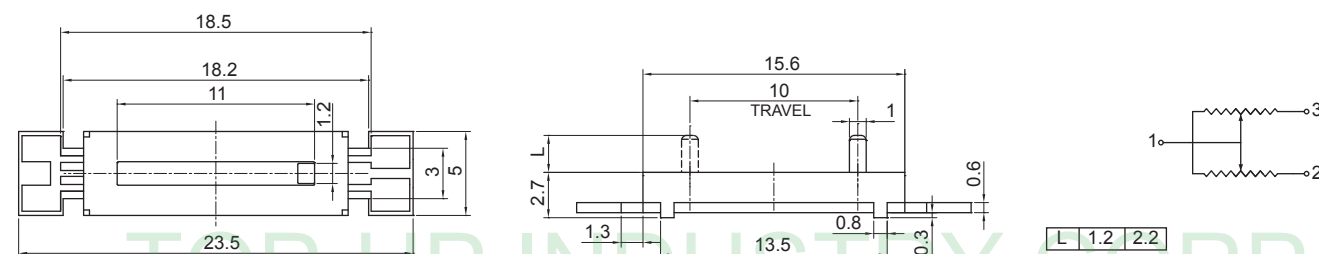
5TQ2



4TQ2-B



10TQ2

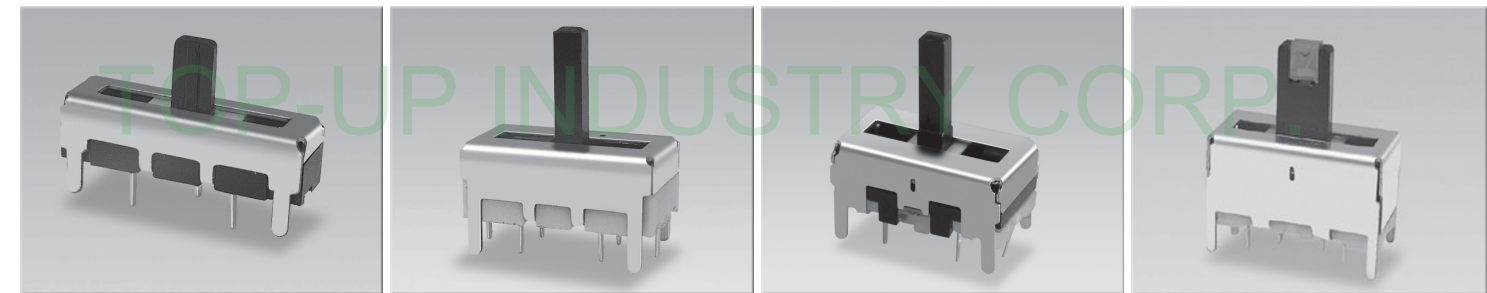


10TE1F-B

10TE2F-B

10TE2F-BN

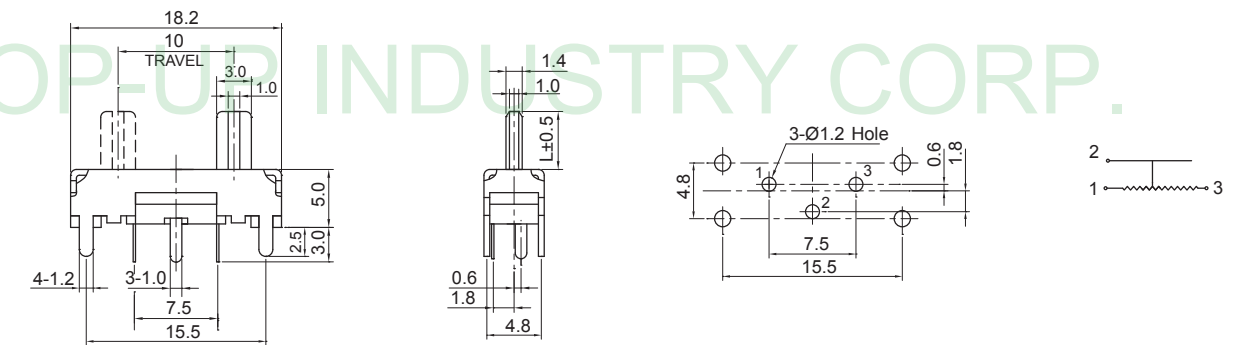
10TE2F-B-L



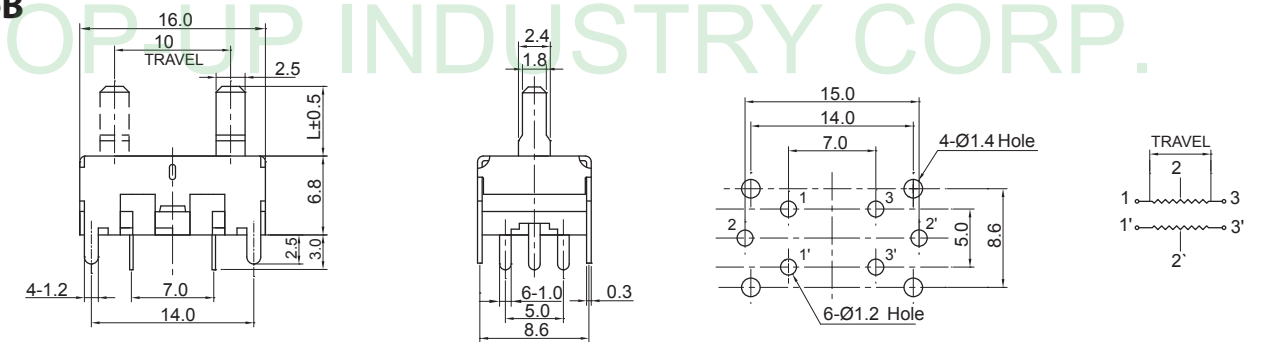
Outline Drawing

Features individual specifications

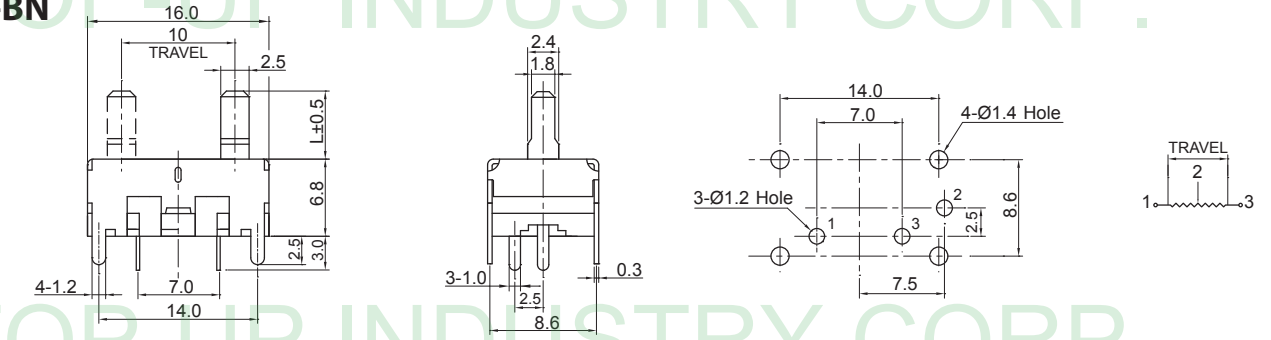
10TE1F-B



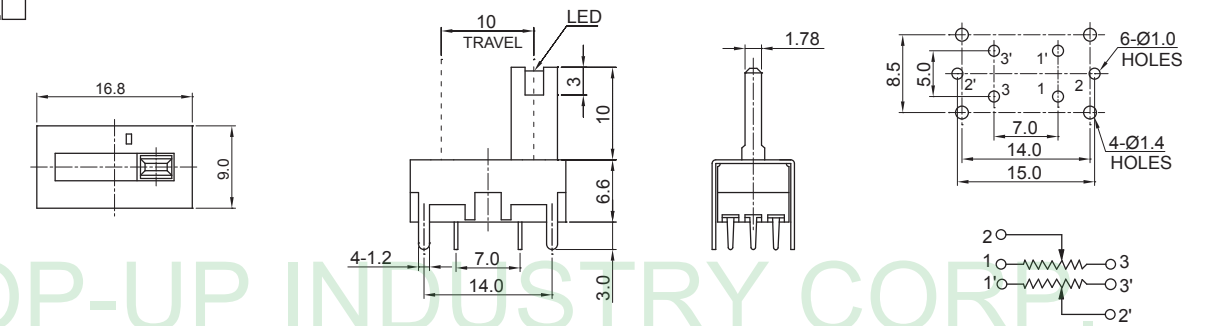
10TE2F-B



10TE2F-BN



10TE2F-B-L

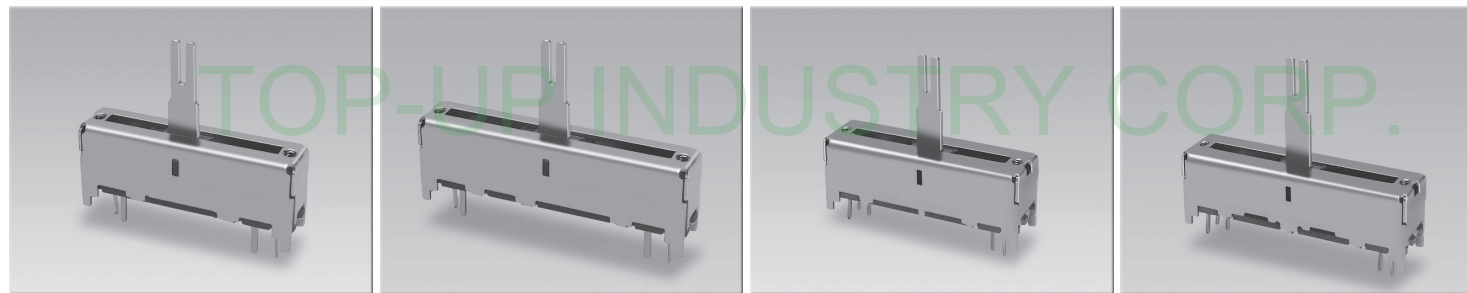


20TU1F-B

30TU1F-B

20TU2F-B

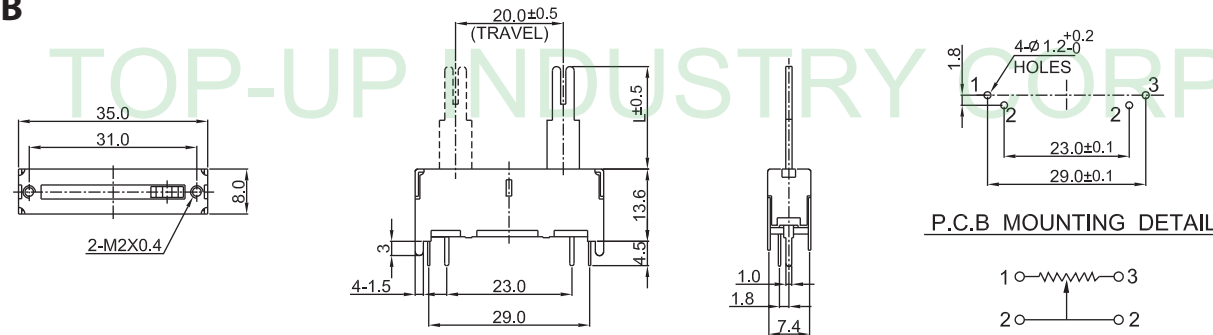
30TU2F-B



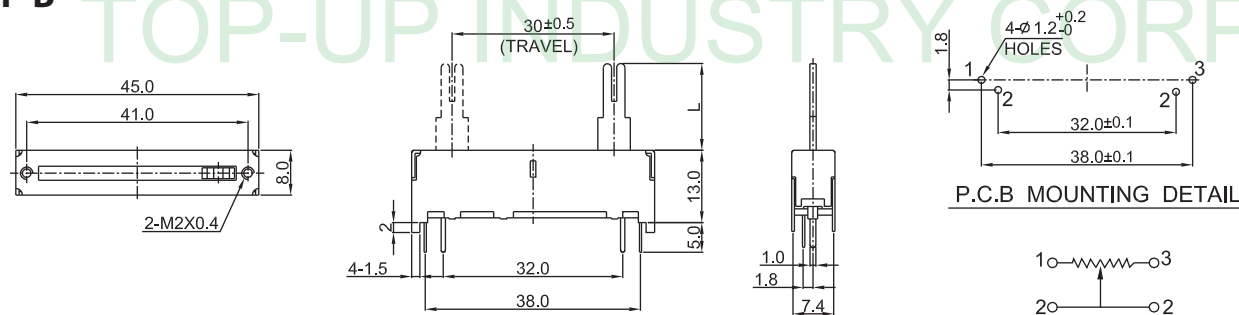
Outline Drawing

Features individual specifications

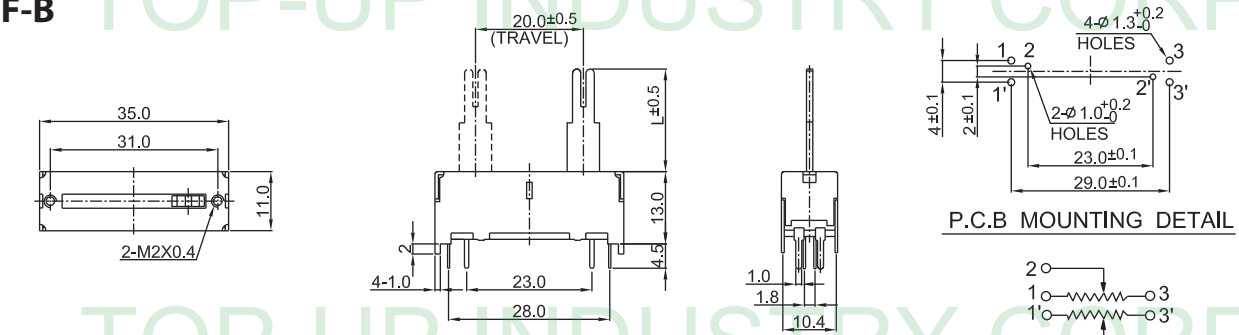
20TU1F-B



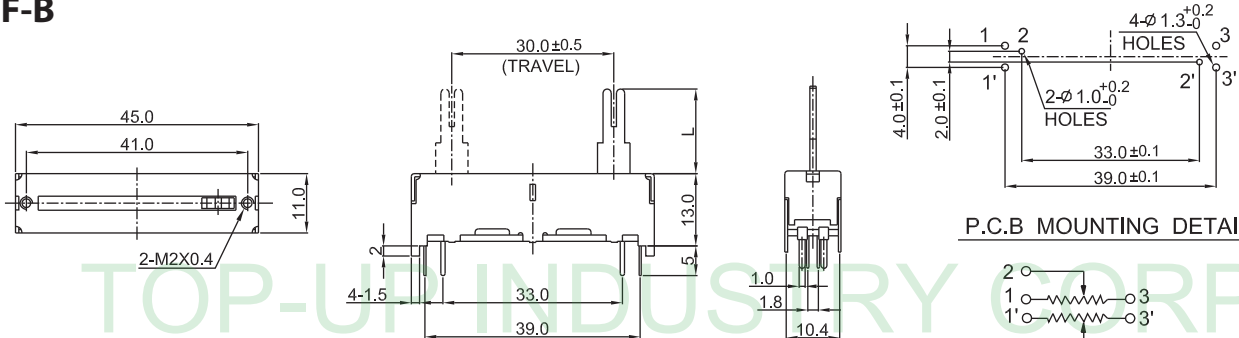
30TU1F-B



20TU2F-B



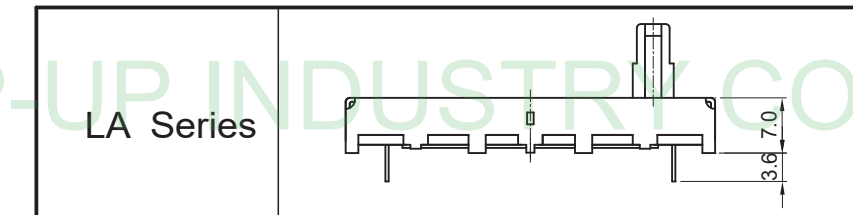
30TU2F-B



LA Series Code Explanation

T	LA	1	B	-	B	-	J	W	P	15	-	A	10K	-	DC	-	□	□	□
1	2	3	4		5		6	7	8	9		10	11		12				13

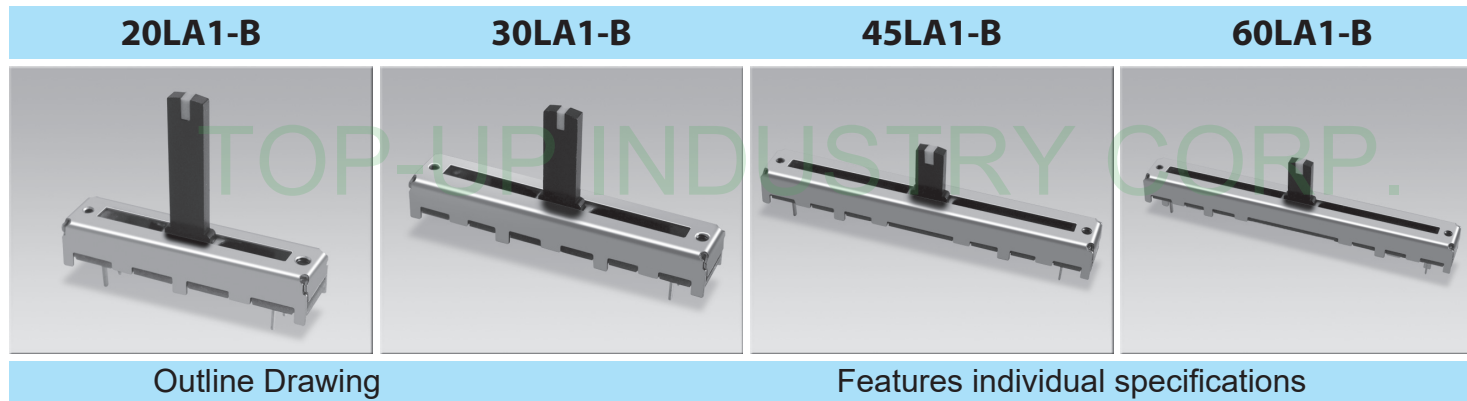
1. T — Travel of Sliding (20, 30, 45, 60mm are available)
2. Product Lines of LA (With Case Type Slide Potentiometers)



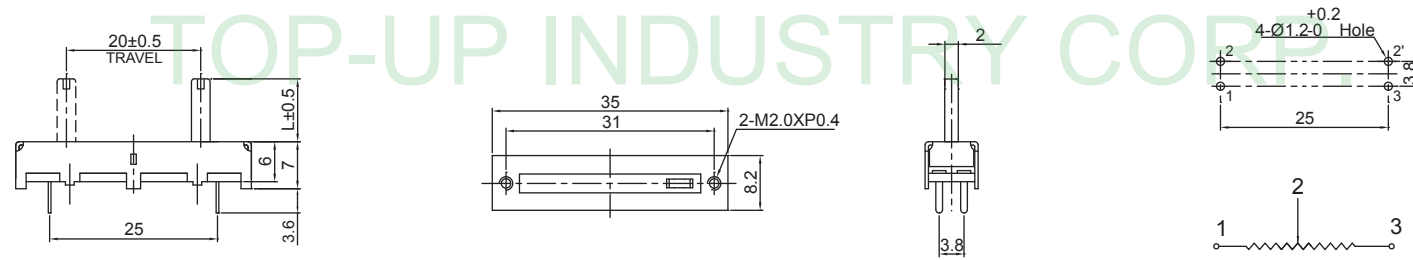
3. Number of Unit : 1 - Single Unit
4. Snap-in Frame : Blank - Without Frame ; B - With Frame
5. Type of Terminal : B - P.C.B Type
6. Type of Slide Lever (Drawing 1)

Lever -Type	J (Insulated Lever)	A (Insulated Lever)	C (Insulated Lever)	
Dimensions				
Length (L)	10 15 20	5 15	10 15	
Lever -Type	C1 (Metal Lever)	CH1 (Metal Lever)	D1 (Metal Lever)	B1 (Metal Lever)
Dimensions				
Length(L)	L 10 15 20 25 17.3 F 7 10 10 10 10	L 10.4	L 10 15 20 F 7 10 10	L 10 15

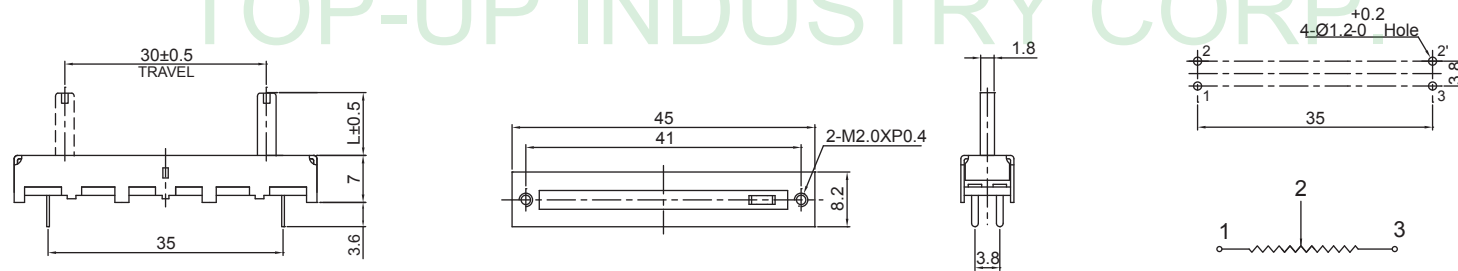
7. Indicator Color of Lever Type " J " : R - Red , G - Green , O - Orange , W - White
8. Lever Material : M - Metal Lever ; P - Insulated Lever
9. Lever Dimensions (See Drawing 1)
10. Type of Taper (See Taper Chart Last Page)
11. Resistance Value
12. DC — With Dust Cover
13. Serial No.



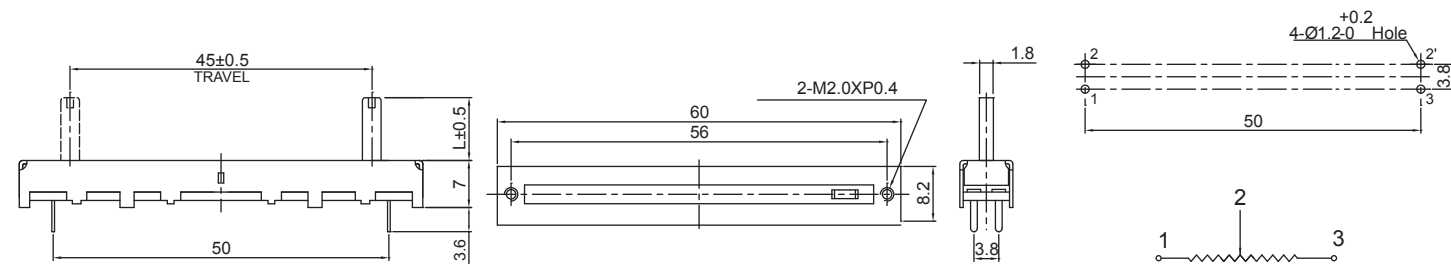
20LA1-B



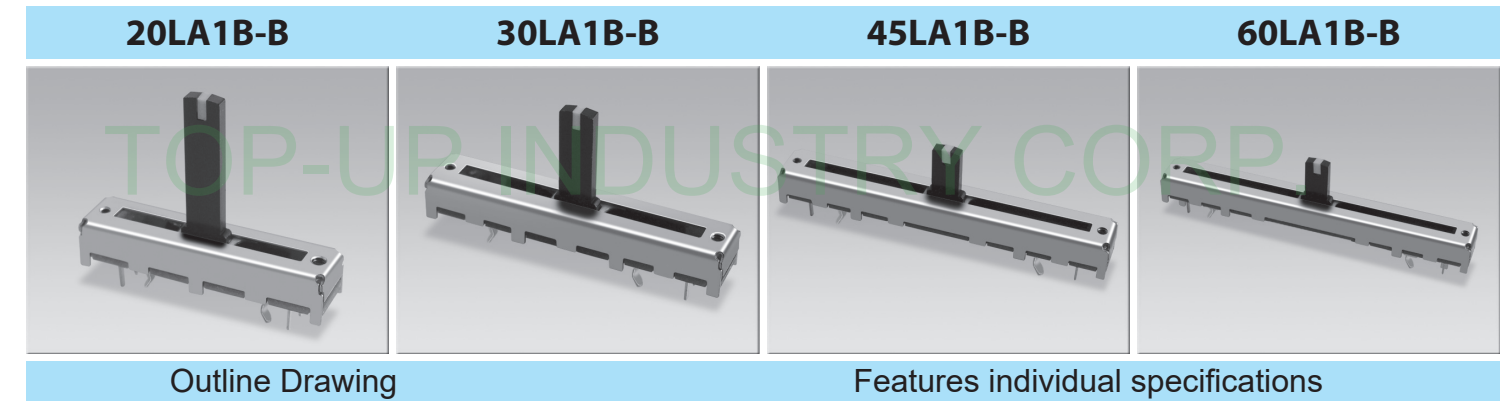
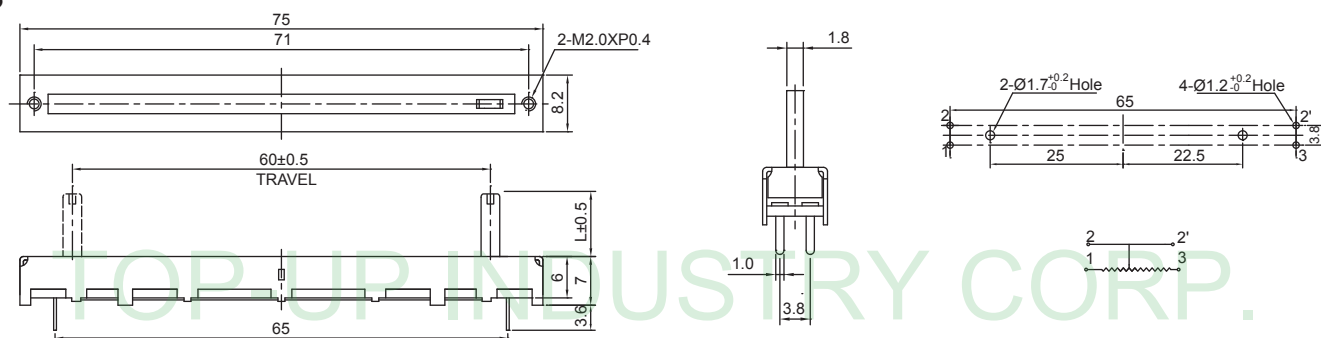
30LA1-B



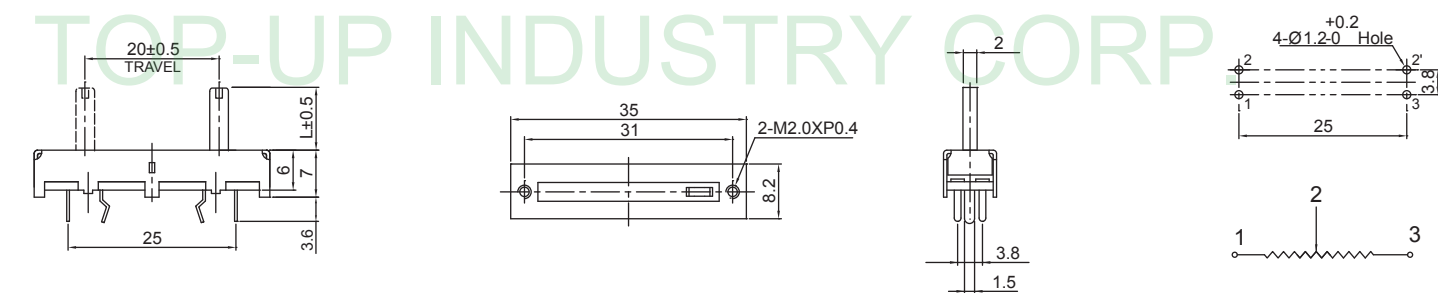
45LA1-B



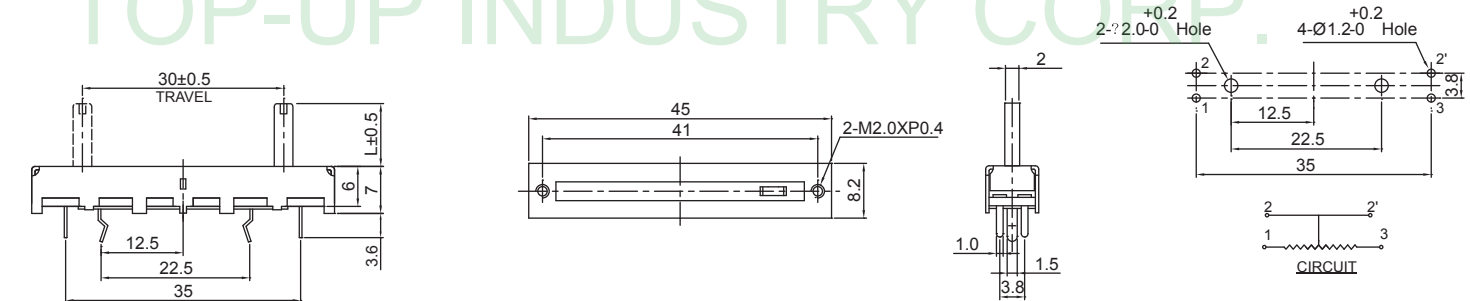
60LA1-B



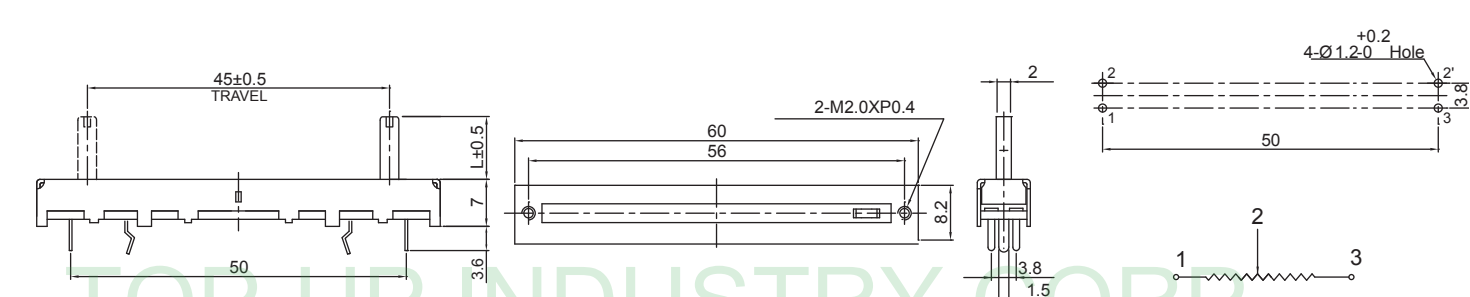
20LA1B-B



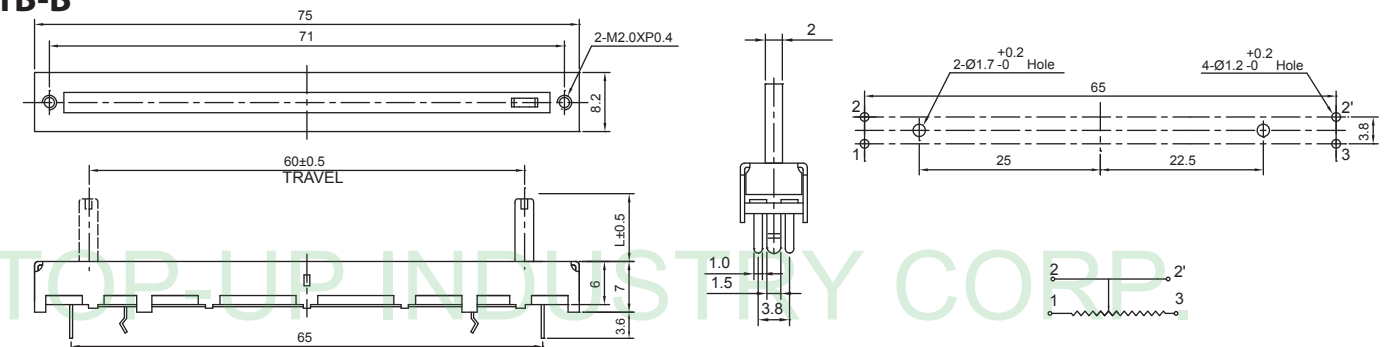
30LA1B-B



45LA1B-B



60LA1B-B

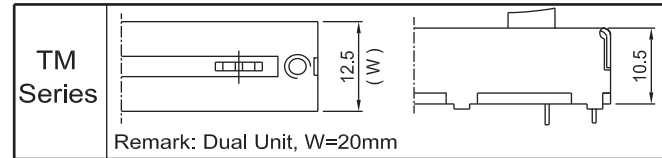


TM Series Code Explanation



Remark:

- Travel of Sliding
- Product Lines of TM Series
With Case Type Slide Potentiometers
- Option: Based On Terminal Position
(TMA Series, TMB Series, TMC Series , TMK Series)



(Drawing 1)

30TMA1-B 	30TMB1-B1
30TMC1-B 	30TMK2-B

4. Number of Unit

- Single Unit
- Dual Unit

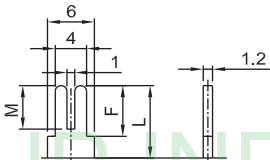
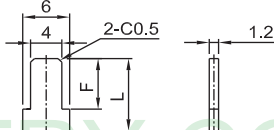
5. Type of Terminal

(Drawing 2)

Terminal -Type	P.C.B Type		Solder Lug Type
	B	B1	A
Dimensions			

6. Type of Slide Lever

Metal Type

Lever -Type	CH2						C3				
Dimensions											
	L	10	12	15	20	25	L	10	15	20	25
	F	7	10	10	10	10	F	7	10	10	10
	M	6	7	7	7	7					

7. Lever Material (M -Metal Lever)

8. Lever Length (See Drawing 3)

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

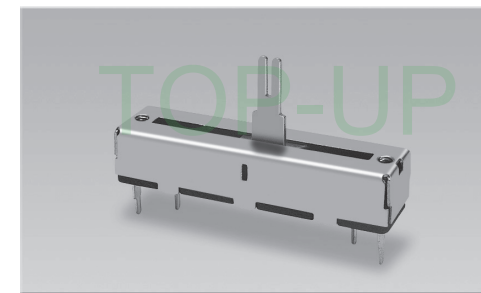
10. Resistance Value

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

12. Serial No.

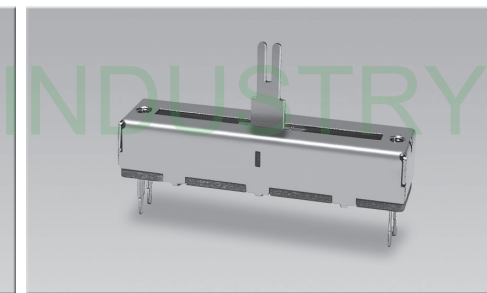
(Drawing 3)

30TMA1-B



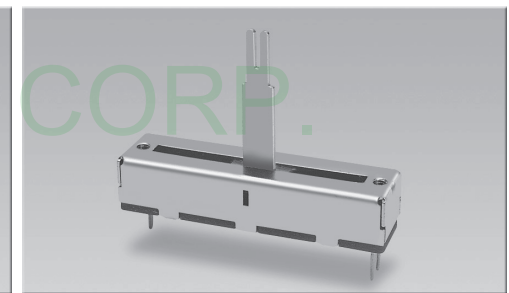
Outline Drawing

30TMB1-B

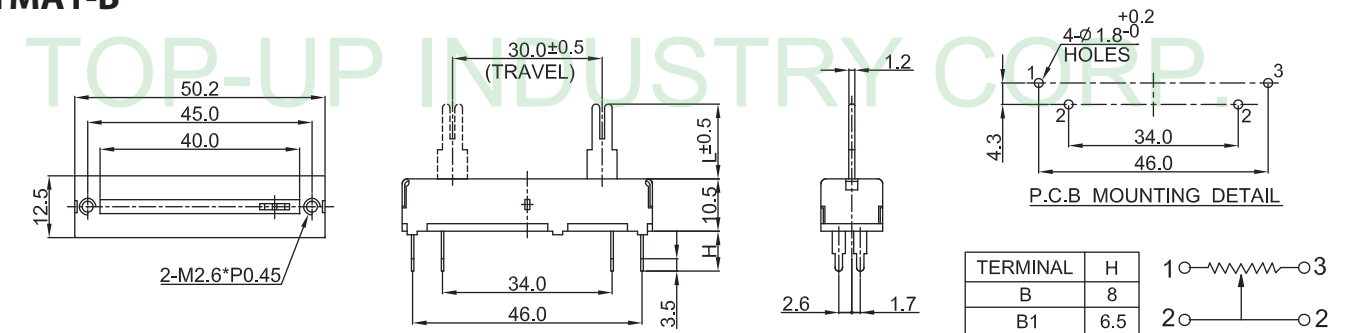


Features individual specifications

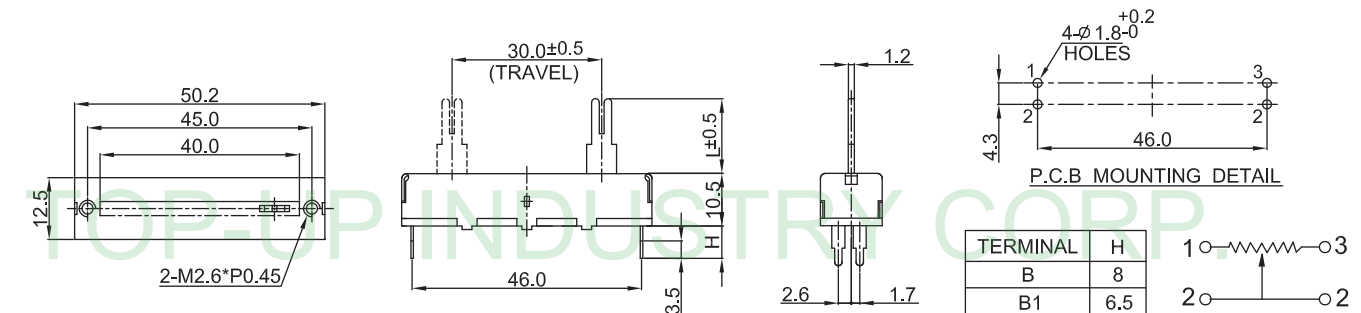
30TMC1-B



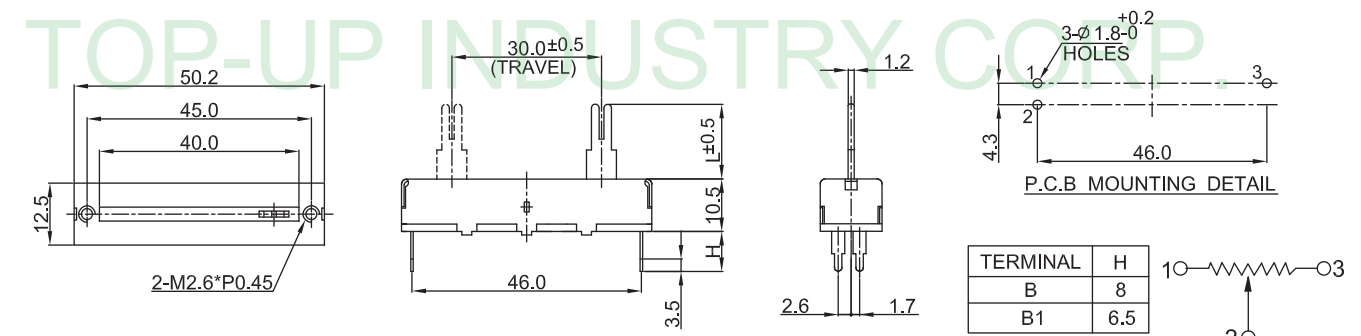
30TMA1-B



30TMB1-B



30TMC1-B



LP , LD Series Code Explanation

T	LP	1	A	B	CH1	M	10.4	A	10K	1C	DC	□□□
1	2	3	4	5	6	7	8	9	10	11	12	13

1. T — Travel of Sliding (15, 20, 30, 45, 60, 100mm are available)

2. Product Lines of LP , LD

With Case Type Slide Potentiometers : LP, LD Series

3. Number of Unit

1 — Single Unit

2 — Dual Unit

LP Series	
LD Series	

4. Type of Metal Case : A- TLP1(2)A-B ; B-TLP1(2)B-B; C- TLP1(2)C-B

TLP1(2)A-B	TLP1(2)B-B <table border="1"> <tr> <td>Code</td><td>B</td><td>B1</td></tr> <tr> <td>H</td><td>3.5</td><td>4.0</td></tr> </table>	Code	B	B1	H	3.5	4.0	TLP1(2)C-B
Code	B	B1						
H	3.5	4.0						
TLD1(2)A-B	TLD1(2)C-B							

5. Type of Terminal : B - P.C.B Type

6. Type of Slide Lever (See Drawing 2)

7. Slide Lever Material : M - Metal Lever ; P - Insulated Lever

8. Lever Length (See Drawing 2)

9. Type of Taper (See Taper Chart Last page)

10. Resistance Value

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

12. With dust cover : DC

13. Serial No.

(Drawing 1)

LP Series Code Explanation

T	LP	1	A	B	CH1	M	10.4	A	10K	1C	DC	□□□
1	2	3	4	5	6	7	8	9	10	11	12	13

(Drawing 2)

Metal Lever Type												
Lever -Type	CH1				D1				C1			
Dimensions												
	L	10.4			L	10.4	15	20	25	L	10	15
	F	7			F	7	10	10	10	F	7	10
Insulated Lever Type												
Lever -Type	C				B				CA			
Dimensions												
	L	5	10	12.5	15	18	20		L	10		
	F	0	5	5	5	5	5		L	5	10	

P.C.B Mounting Hole Detail

H	
6.5	8

MODE	T	A	B	C	D	E	F	G
15LP1A-B 15LP1B-B 15LP1C-B 15LP2A-B 15LP2B-B 15LP2C-B	15	30	26	17.8	20.2	28.5	18	
20LP1A-B 20LP1B-B 20LP1C-B 20LP2A-B 20LP2B-B 20LP2C-B	20	35	31	22.8	25.2	33.5	23	
30LP1A-B 30LP1B-B 30LP1C-B 30LP2A-B 30LP2B-B 30LP2C-B	30	45	41	32.8	35.2	43.5	33	
45LP1A-B 45LP1B-B 45LP1C-B 45LP2A-B 45LP2B-B 45LP2C-B	45	60	56	47.8	50.2	58.5	48	
60LP1A-B 60LP1B-B 60LP1C-B 60LP2A-B 60LP2B-B 60LP2C-B	60	75	71	62.8	65.2	73.5	63	
100LP1A-B 100LP1B-B 100LP1C-B 100LP2A-B 100LP2B-B 100LP2C-B	100	117	112.5	104.6	107	115.2		20

STANDARD TYPE SLIDE POTENTIOMETERS(LP SERIES)

Electrical Characteristics:

Total resistance			1K Ω ~1M Ω						
Total resistance tolerance			$\pm$ 20%(more than 1M Ω $\pm$ 30%)						
Resistance taper			A,B,C,D,K,W,RD						
Insulation resistance			100M Ω min. at 250V DC.						
Withstand voltage			AC 300V(1 minute)						
Rated power(W)	Taper	Travel	15mm	20mm	30mm	45mm	60mm	100mm	
		Single	0.05	0.1	0.2	0.25	0.2	0.25	
	B	Dual	0.025	0.05	0.1	0.125	0.2	0.2	
		Except B	Single	0.025	0.05	0.1	0.125	0.1	0.125
			Dual	0.012	0.025	0.05	0.06	0.1	0.1
Max.operating voltage (AC V)	B	Single	100	200	200	200	200	200	
		Dual	100	100	200	200	200	200	
	Except B	Single	50	150	150	150	150	150	
		Dual	50	50	150	150	150	150	
Gang error	Application		Measuring range				Specification		
	Volume control			-40~0				3dB	
				-30~0 (20mm travel)				4dB	
	Tone control		At taper measuring point (only 50% for taper W)				2dB		

Residual resistance	Total resistance	10KΩ	50KΩ	100KΩ	200KΩ	500KΩ	1MΩ
	Between terminals 1~2	10Ω	10Ω	10Ω	20Ω	20Ω	20Ω
	Between terminals 2~3	10Ω	10Ω	20Ω	20Ω	50Ω	50Ω

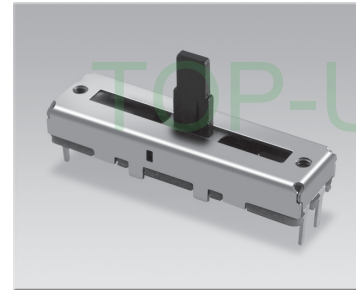
Mechanical Characteristics:

Operating force	0.3~2.5N(30~250gf)
Stopper strength	50N(5kgf) measuring point=5mm
Lever wobble	2(2*L)/20 mm max.(L:lever length both side)
Bending moment	25mN.m(250gf.cm)
Push pull strength	50N(5kgf)
Lever deviation	0.5 max.(one side)
Click slip-out force	0.2~2N(20~200gf)

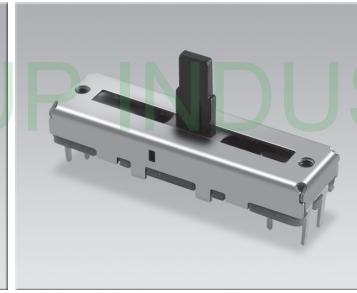
Durability:

Sliding life	15,000 cycles
--------------	---------------

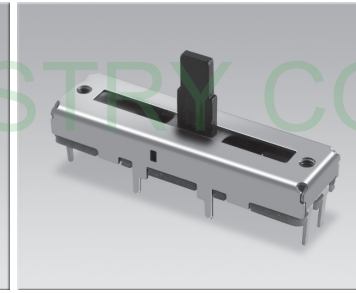
20LD1C-B



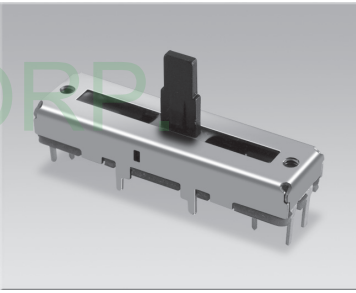
20LD2C-B



20LD1A-B



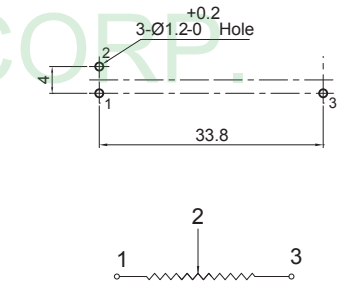
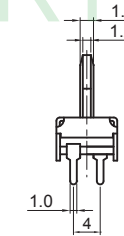
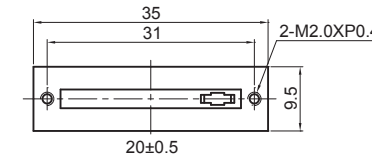
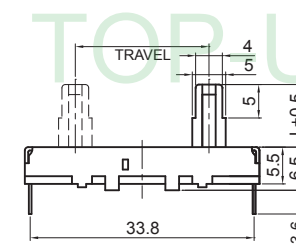
20LD2A-B



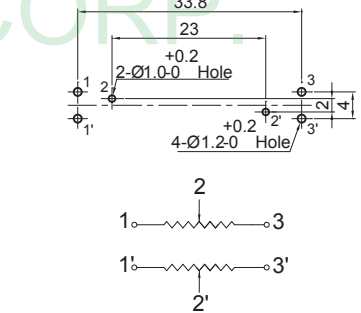
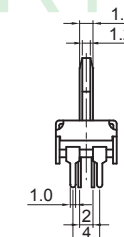
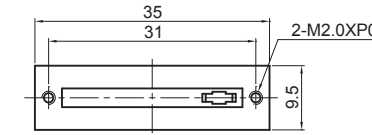
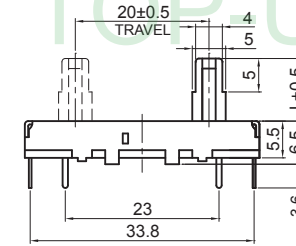
Outline Drawing

Features individual specifications

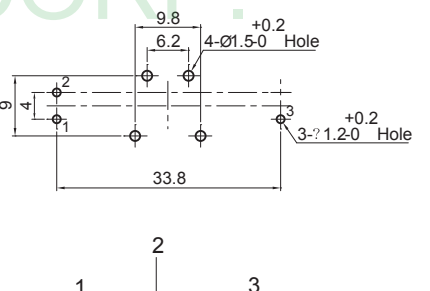
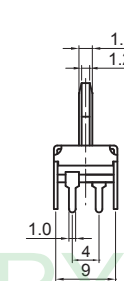
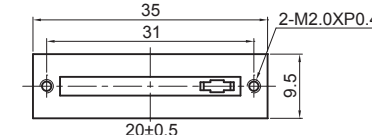
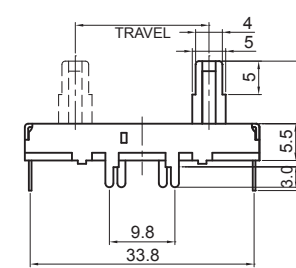
20LD1C-B



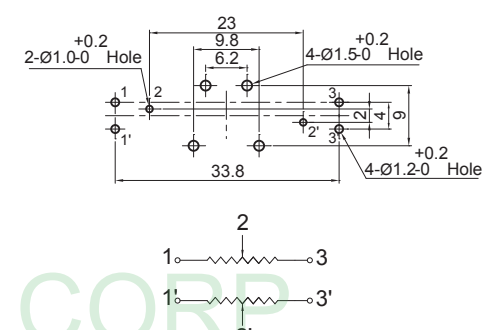
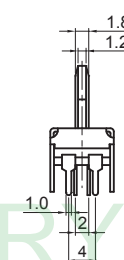
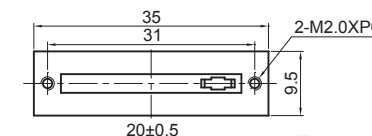
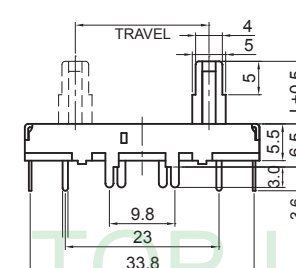
20LD2C-B



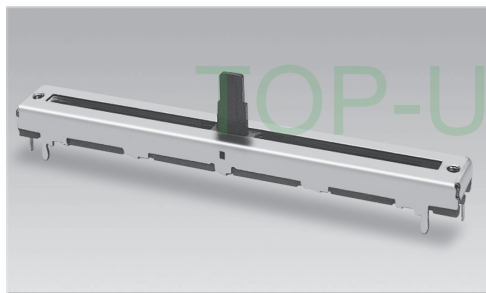
20LD1A-B



20LD2A-B

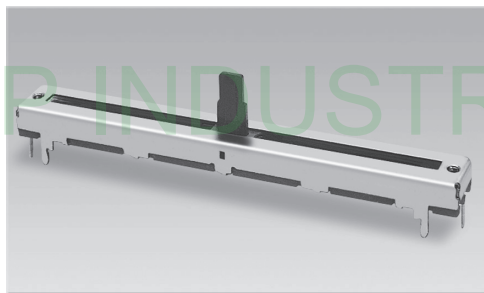


TLP1A-B



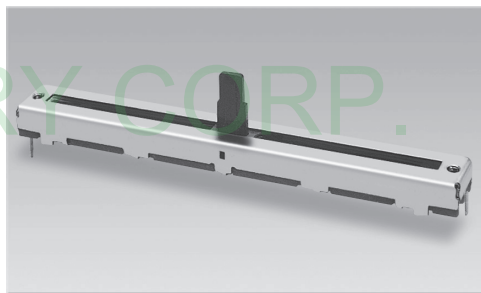
Outline Drawing

TLP1B-B

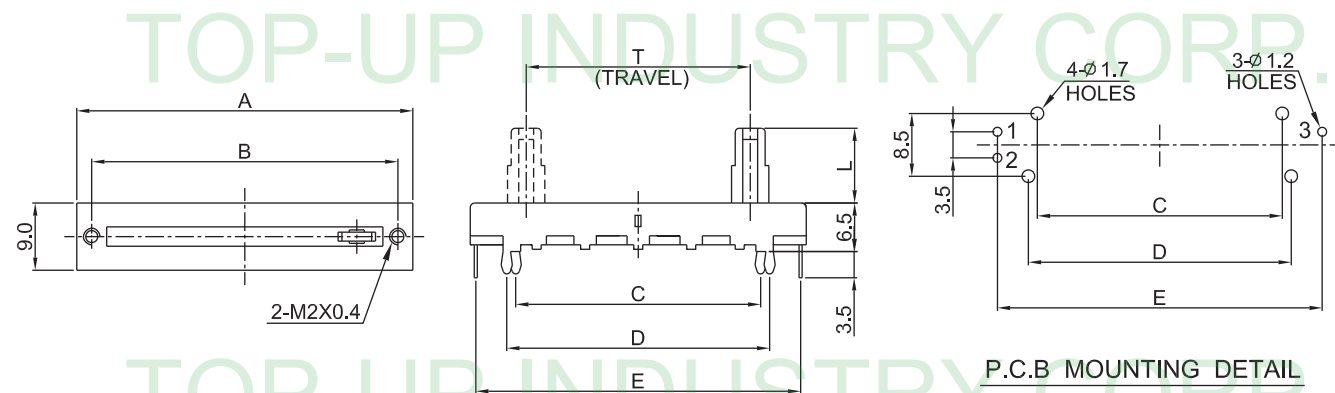


Features individual specifications

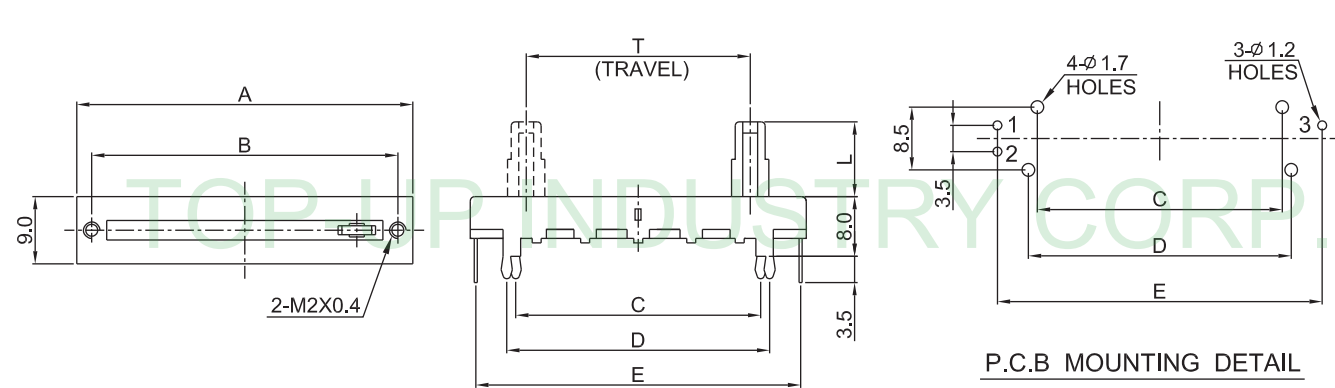
TLP1C-B



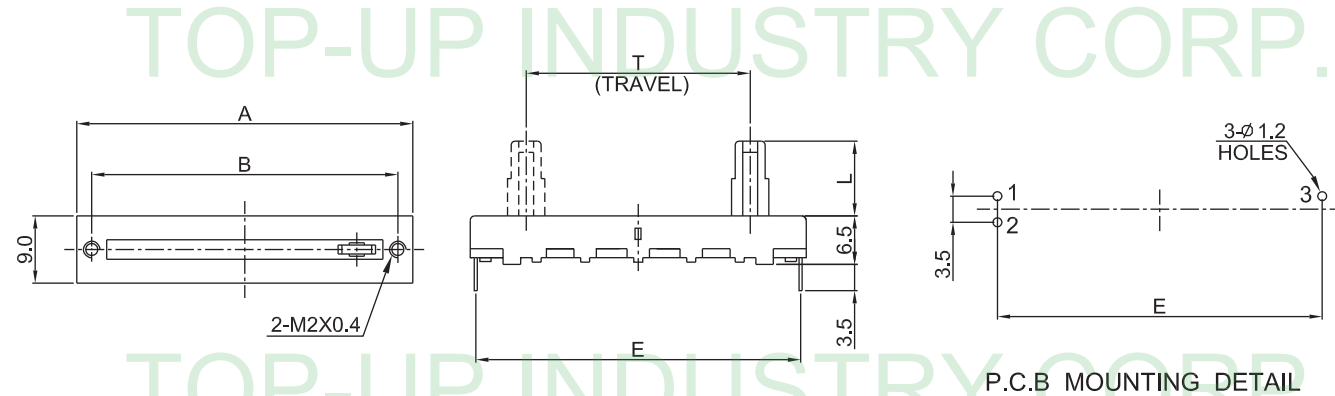
TLP1A-B



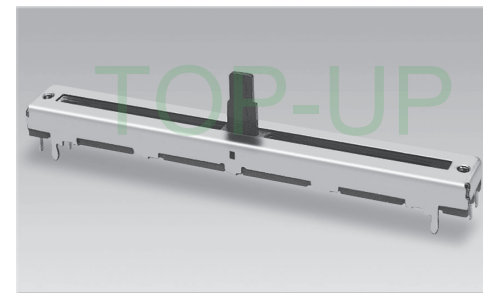
TLP1B-B



TLP1C-B

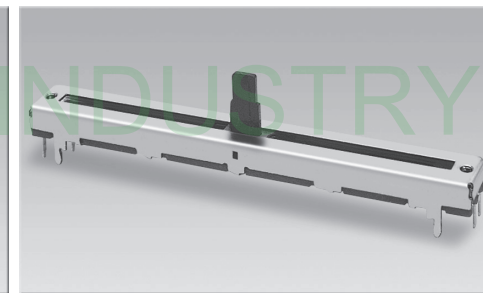


TLP2A-B



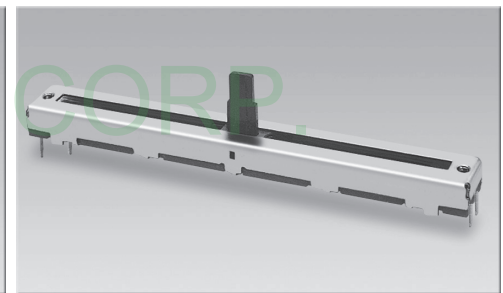
Outline Drawing

TLP2B-B

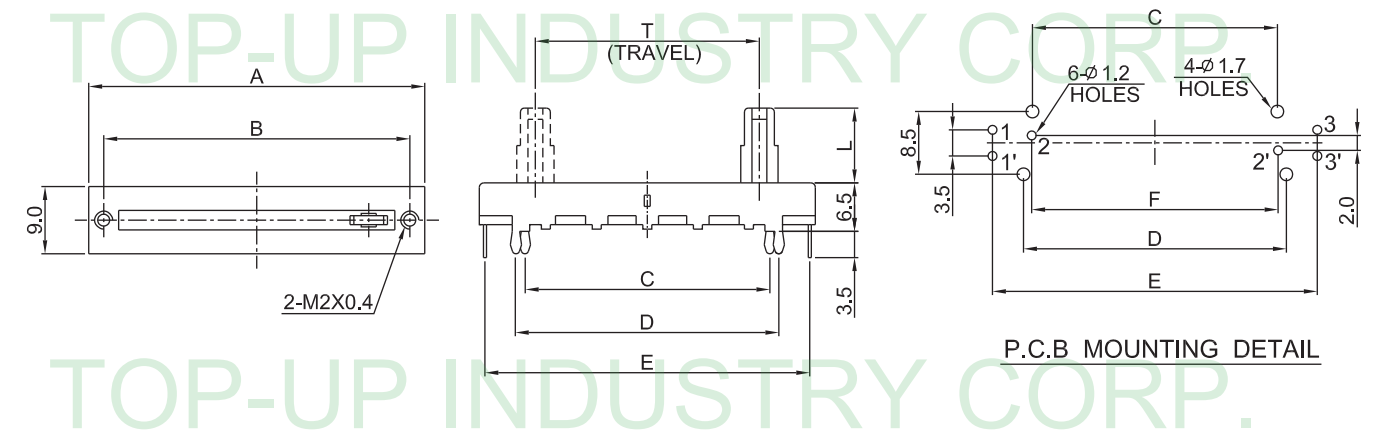


Features individual specifications

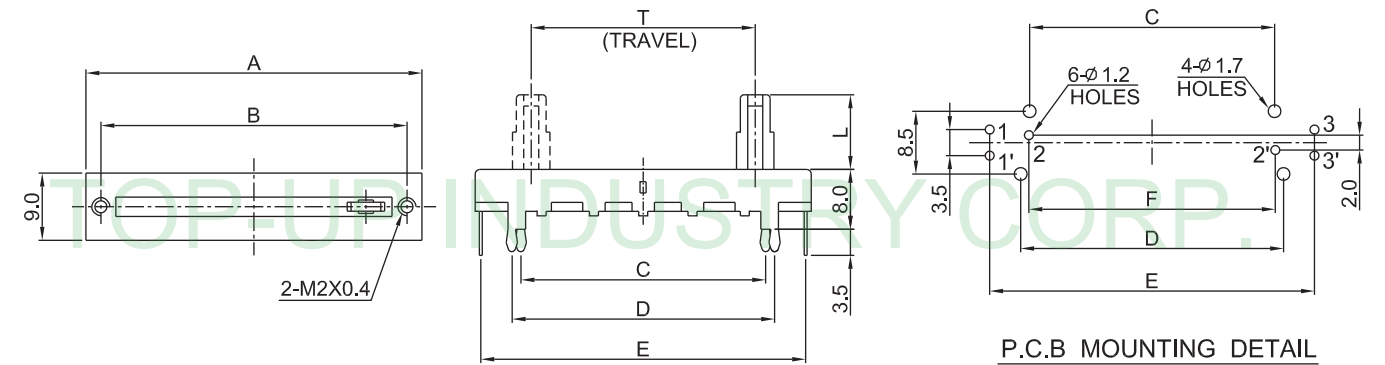
TLP2C-B



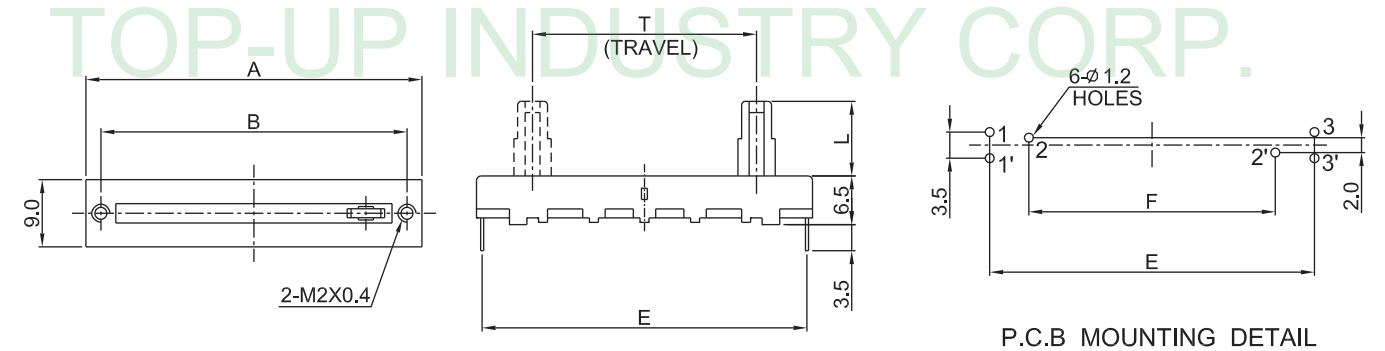
TLP2A-B



TLP2B-B



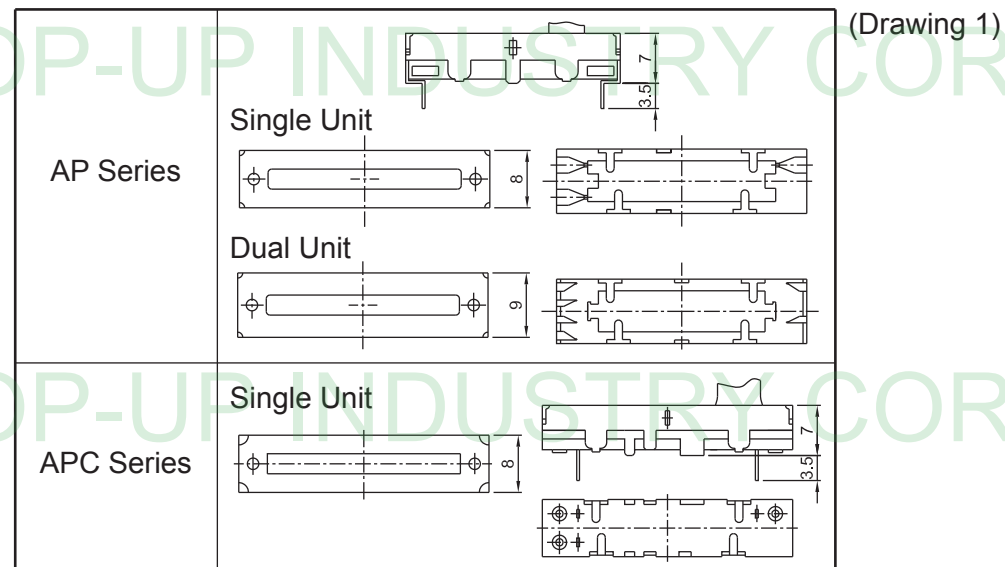
TLP2C-B



AP , APC Series Code Explanation

T	APC	2	B	-	B	-	J	W	M	15	-	T	-	A	10K	-	1C	-			
1	2	3	4		5		6	7	8	9		10		11	12		13		14		

1. T — Travel of Sliding (15, 20, 25, 30, 45, 60, 100mm are available)
2. Product Lines of AP and APC (With Case Type Slide Pot.)



3. Number of Unit : 1 - Single Unit ; 2 - Dual Unit
4. Snap-in Frame : Blank - Without Frame ; B - With Frame
5. Type of Terminal : B - P.C.B Type ; 3B - With LED P.C.B Type
6. Type of Slide Lever (See Drawing 2)

Metal Lever	4	6	9-1	9-2
Dimensions				
Length (L)	15 20 25	15 20 25	10	5
Metal Lever	9-10	9-F0		
Dimensions				
Length (L)	10	8.5		

AP , APC Series Code Explanation

T	APC	2	B	-	B	-	J	W	M	15	-	T	-	A	10K	-	1C	-			
1	2	3	4		5		6	7	8	9		10		11	12		13		14		

6. Slide Lever Type

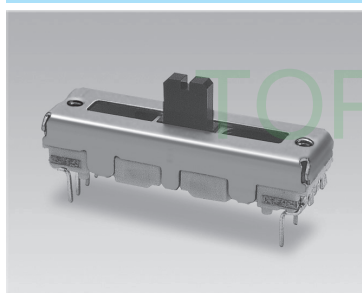
Special Lever Styles and Dimensions

(Drawing 2)

Lever -Type	B (Insulated Lever)	C (Insulated Lever)	J (Insulated Lever)	L (Insulated Lever)
Dimensions				
Length (L)	10 15 20	10 15 —	10 15 20	15 19 —
Lever -Type	S (Insulated Lever)	J-1 (Insulated Lever)	A (Insulated Lever)	A1 (Insulated Lever)
Dimensions				
Length (L)	7.2	5	10 15 20	18 19.5 —

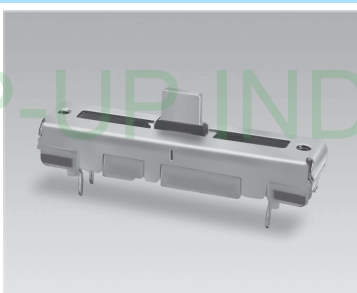
7. Indicator Color of Lever Type " J " : R - Red , G - Green , O - Orange , W - White
Type " L " : R - Red , G - Green....(RT - Red LED Transparent Colloid Color)
8. Lever Material : M - Metal Lever ; P - Insulated Lever
9. Lever Dimensions (See Drawing 2)
10. With tap : Blank - None , With tap - T
11. Type of Taper (See Taper Chart Last Page)
12. Resistance Value
13. Number of Clicks : Blank - None , 1C - Center Click
14. Serial No.

15AP2-B

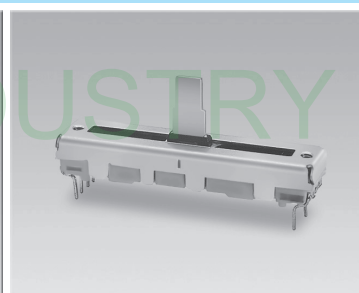


Outline Drawing

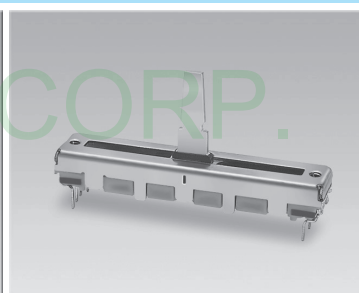
20AP1-B



25AP2-B

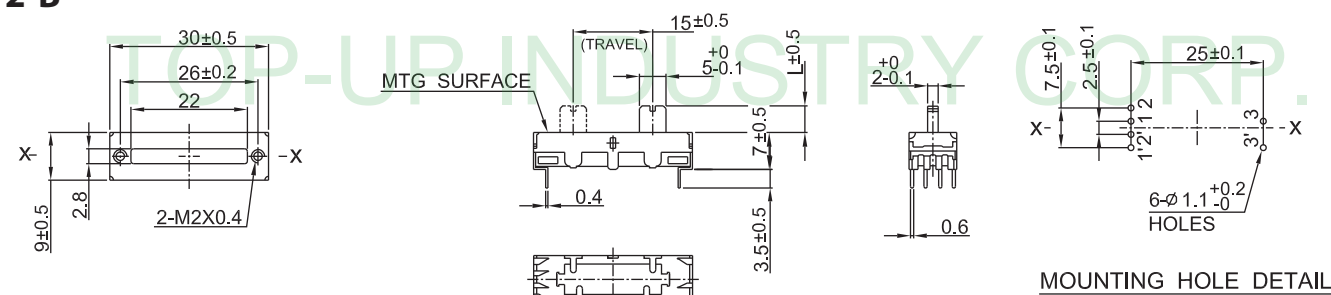


30AP2-B

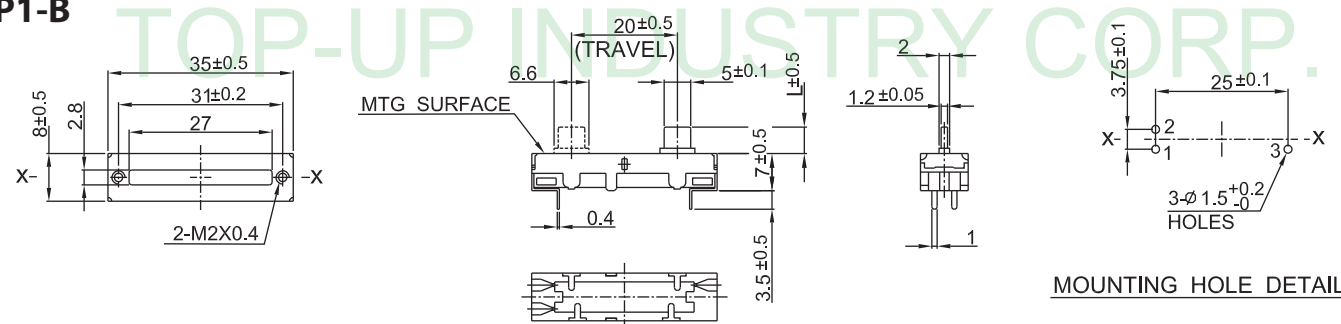


Features individual specifications

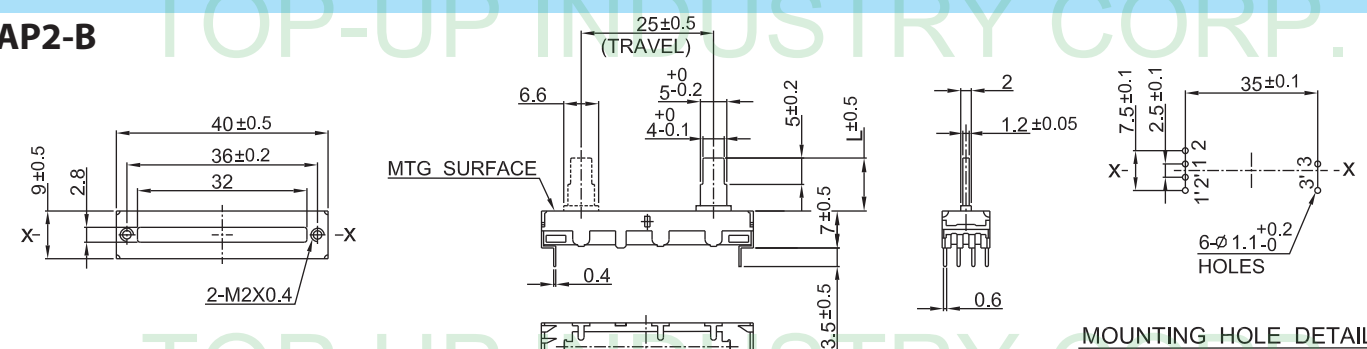
15AP2-B



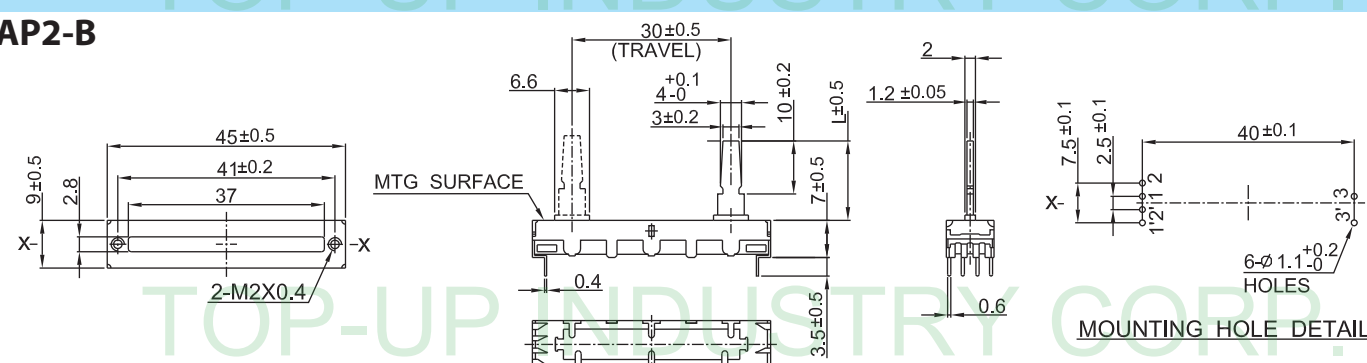
20AP1-B



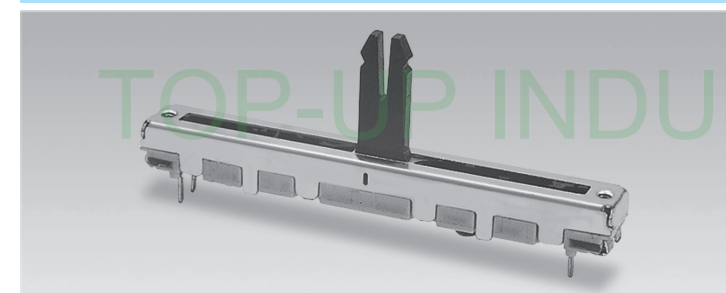
25AP2-B



30AP2-B

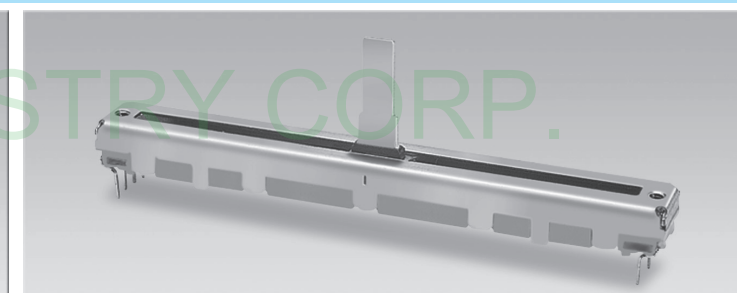


45AP1-B



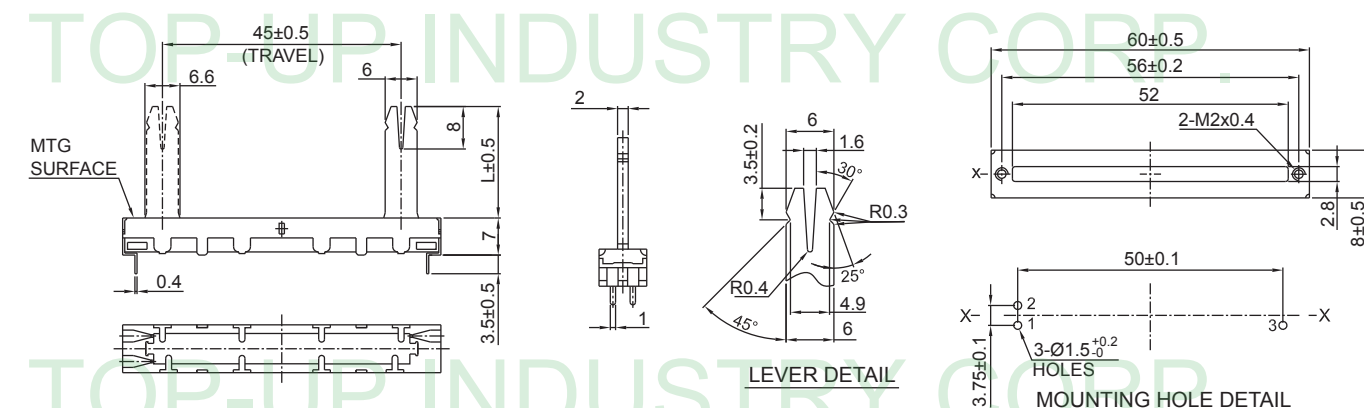
Outline Drawing

60AP2-B

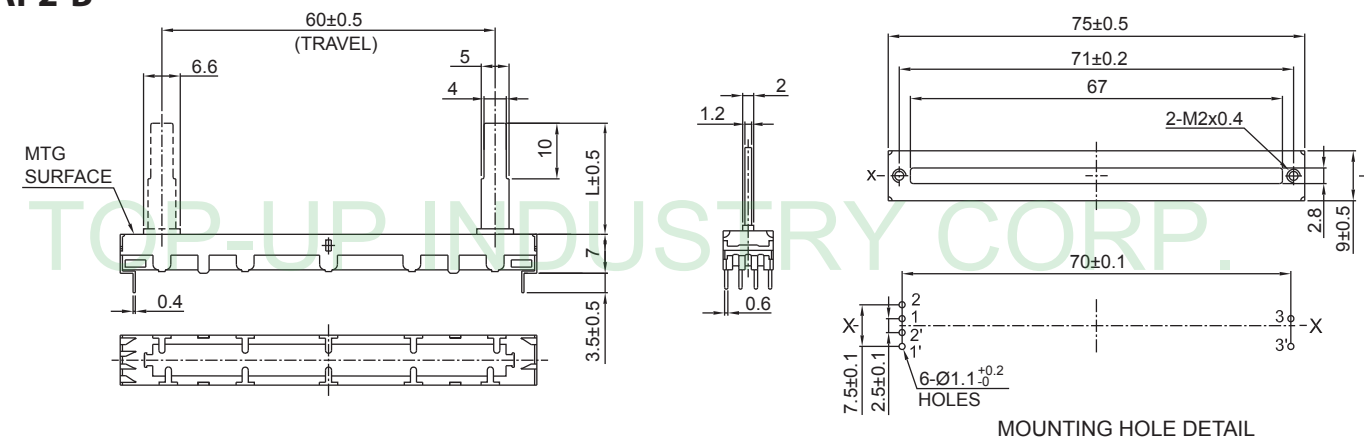


Features individual specifications

45AP1-B

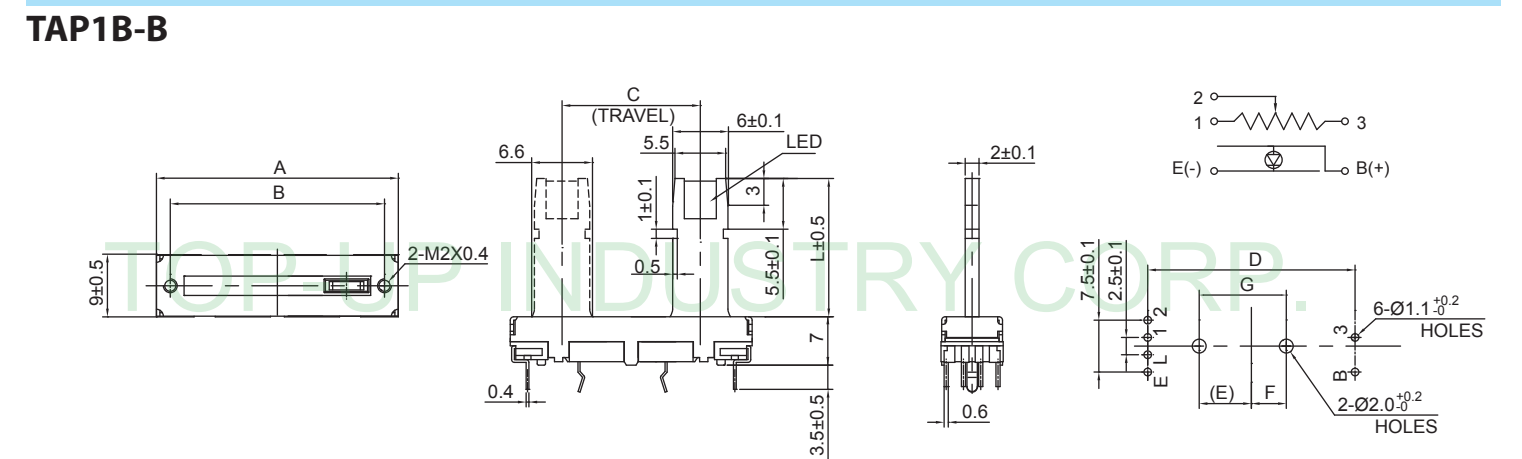
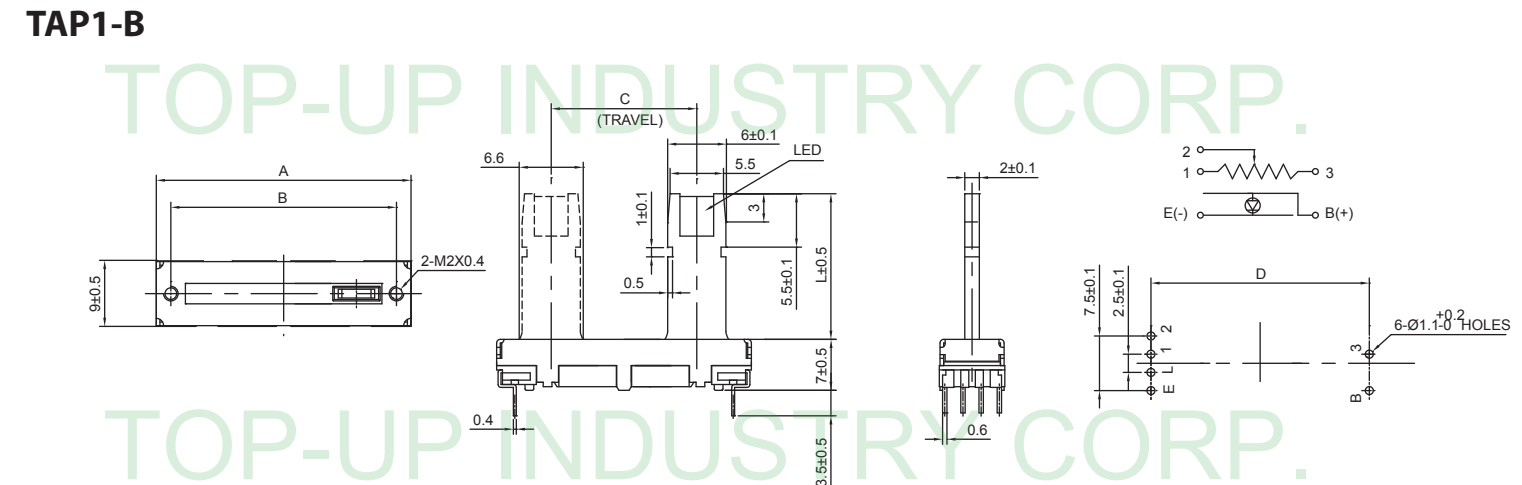
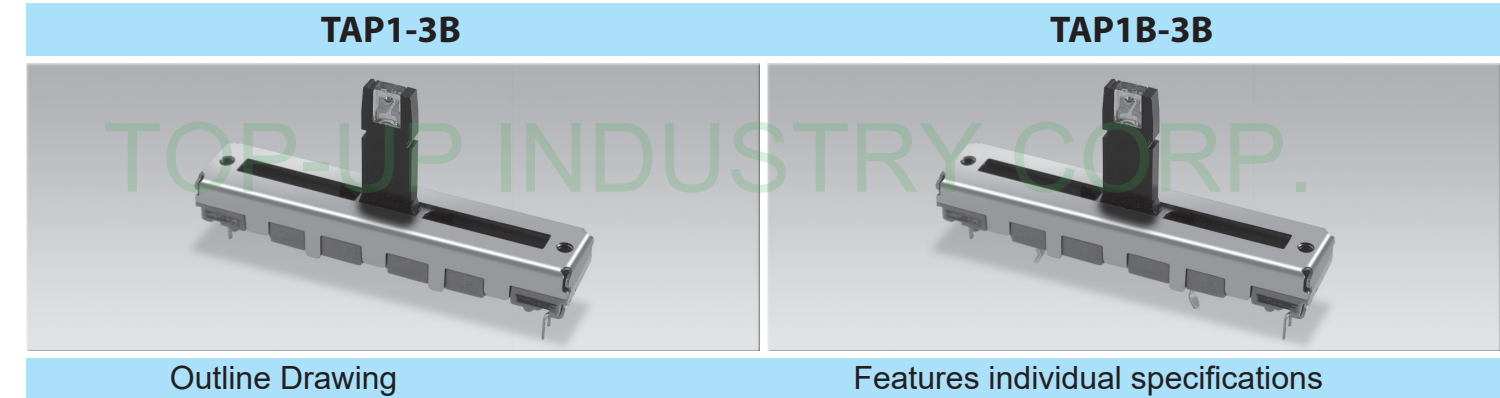
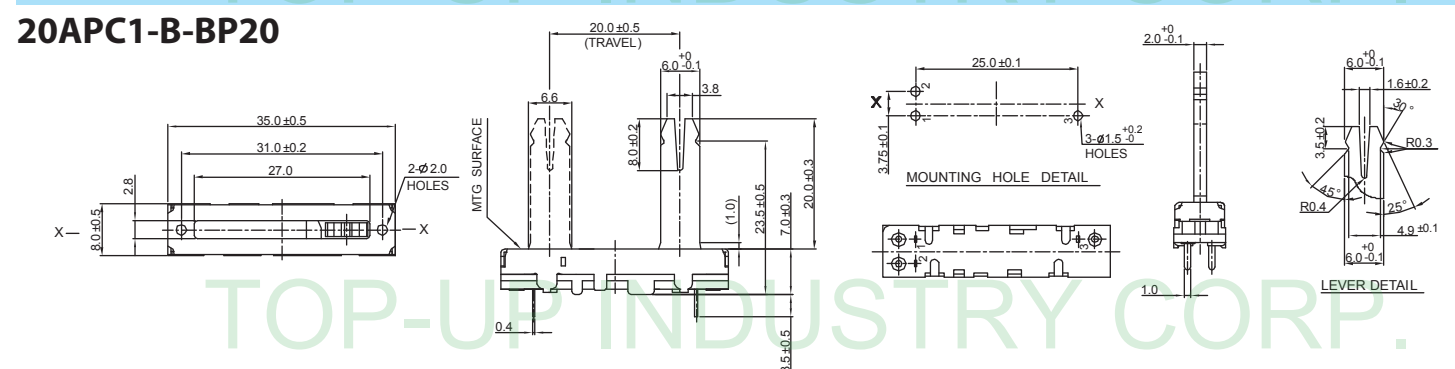
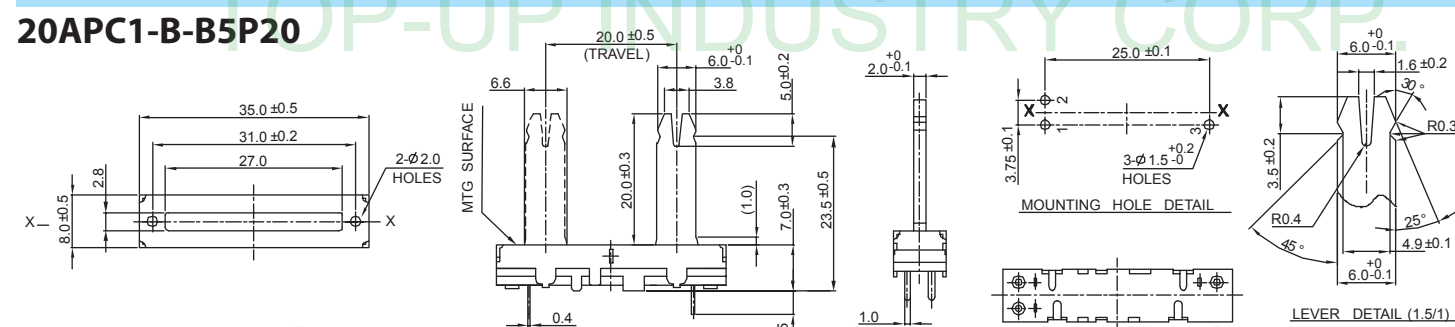
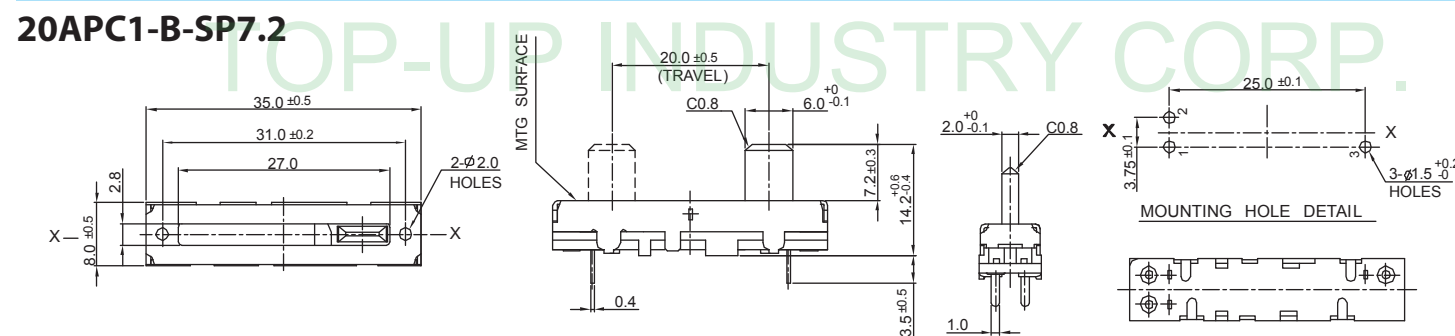
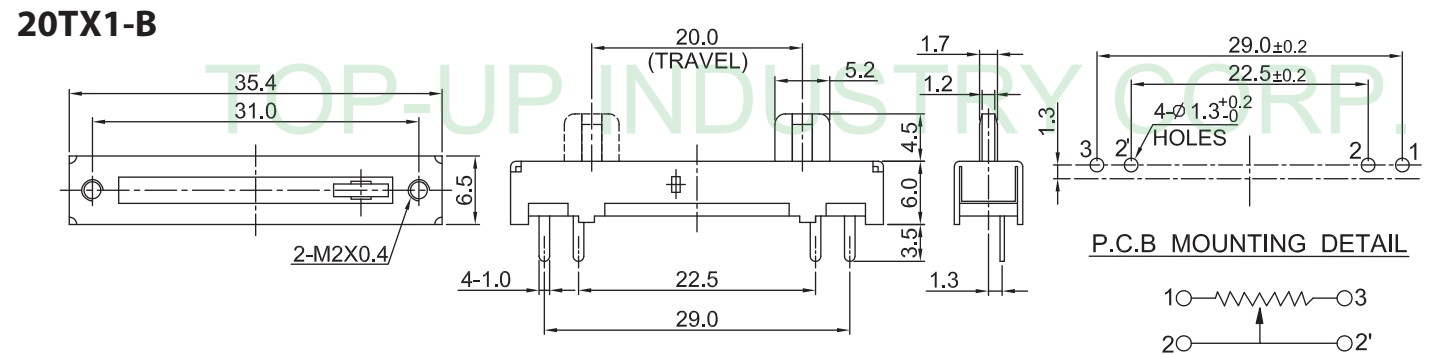
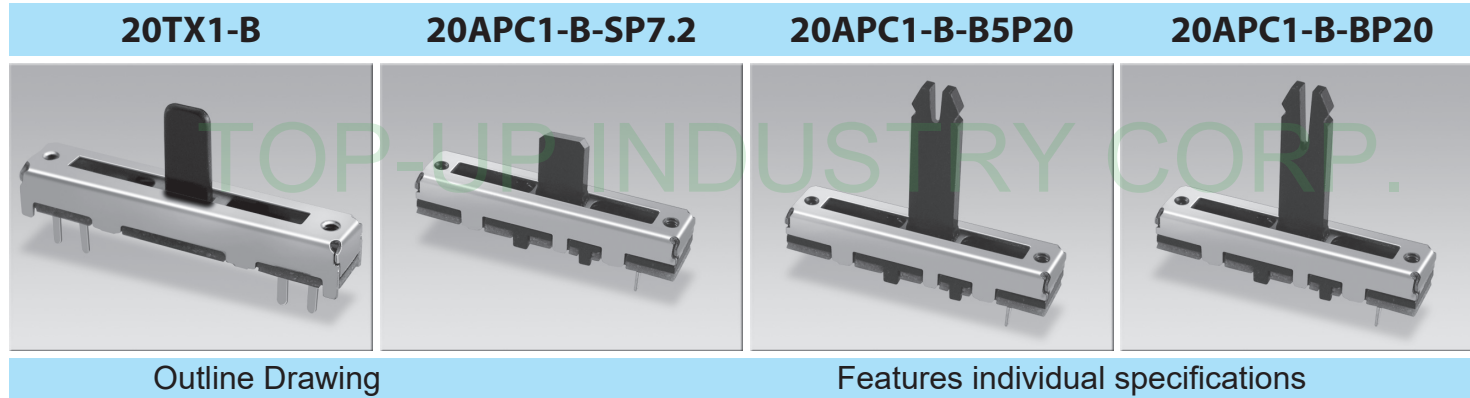


60AP2-B



Common Specifications

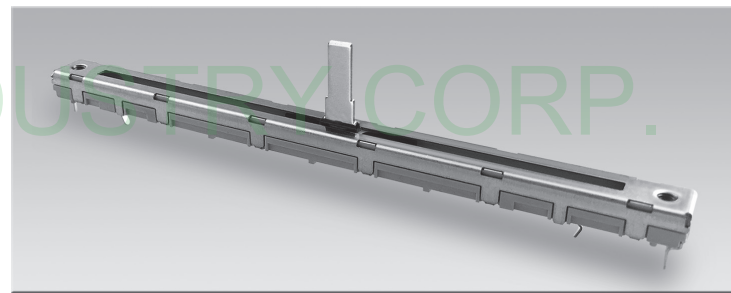
Characteristics	Specification	
Operating temperature range	-10°C to +70°C	
Operating force	10 ~ 80 gf	30 ~ 250 gf
Total resistance (KΩ)	5, 10, 20, 50, 100, 250, 500	
Total resistance tolerance	±20%	
Resistance taper	A, B, C	
Sliding service life	15,000 cycles	



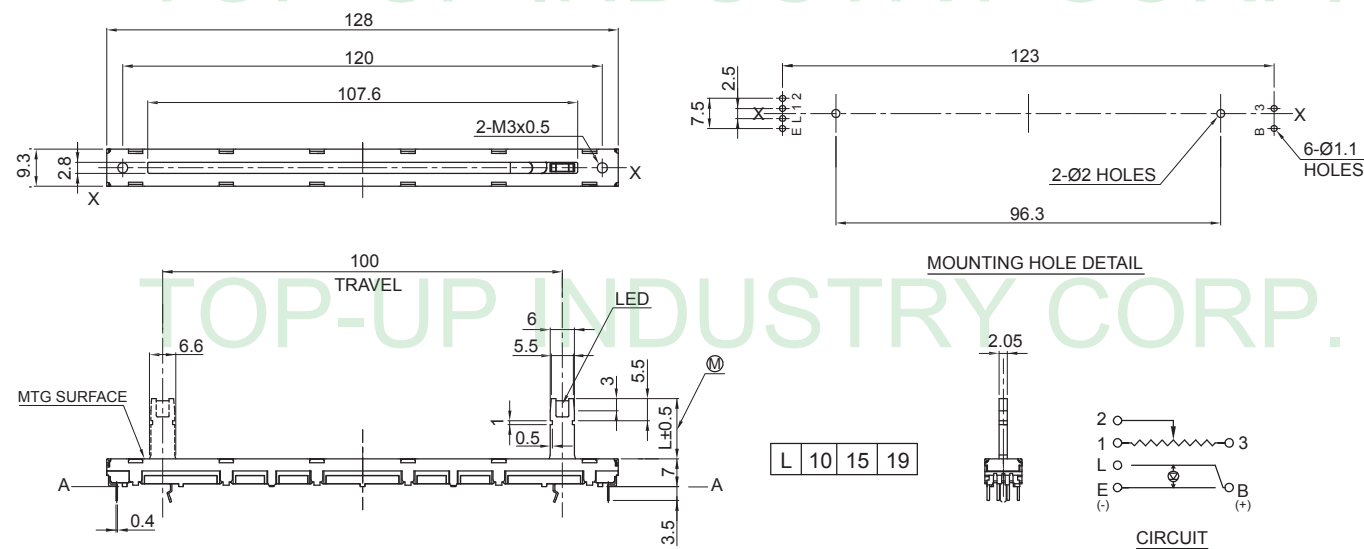
LED Color : Red / Green / Blue / Orange

MODEL		A	B	C	D	E	F	G	FRAME TYPE	METAL SHAFT		
										TYPE	L-Type	
20AP1-B	20AP1B-B	35	31	20	30	7.5	5	12.5		DIMENSIONS		
30AP1-B	30AP1B-B	45	41	30	40	12.5	10	22.5				
45AP1-B	45AP1B-B	60	56	45	55	17.5	15	32.5				
60AP1-B	60AP1B-B	75	71	60	70	25	22.5	47.5				
										LENGTH	L	15 19

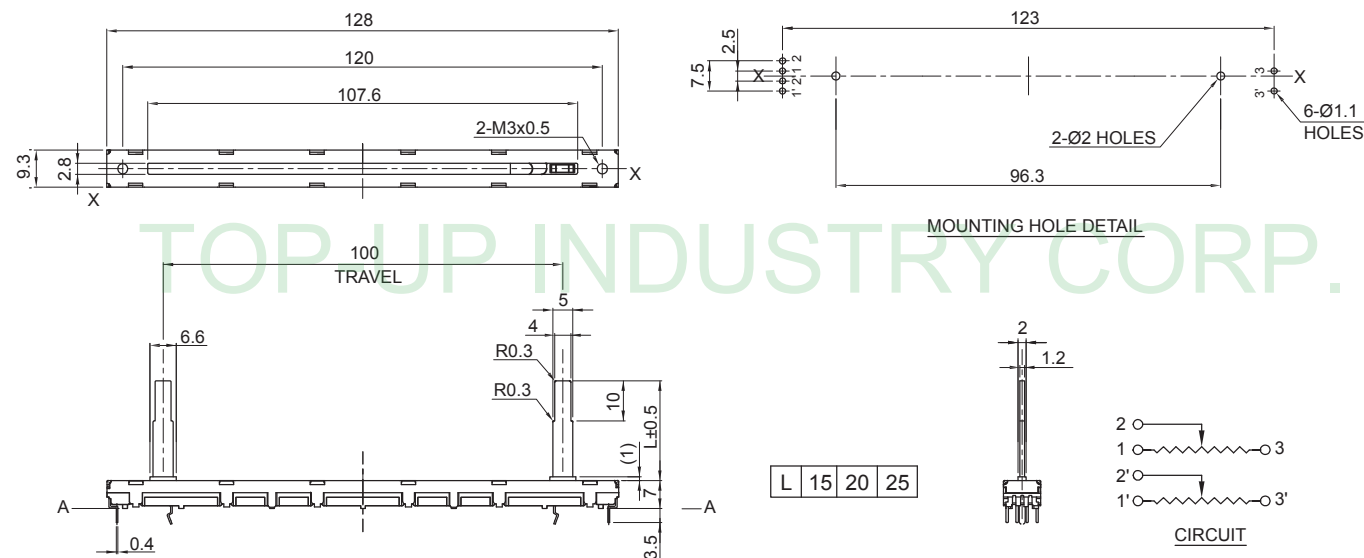
100AP2B-B



Features individual specifications



STRY COR



AM, AN Series Code Explanation

T AM 2 B - B - 1 M 12 - A 10K - 1C -

1. T — Travel of Sliding
(45 , 60 , 100mm are available)
2. Product Lines
With Case Type Slide Potentiometers :
AM Series
AN Series
3. Number of Unit
1 — Single Unit
2 — Dual Unit
4. Snap-in Frame
5. Type of Terminal "B" - P.C.B Type ; "

AM Series	
AN Series	
	Blank - Without Frame B - With Frame

B (Printed Wiring Terminal)	A (Lead Wiring Terminal)
 Technical drawing of Printed Wiring Terminal B. It shows a side view of a U-shaped terminal with a flat base. The base width is dimensioned as 2.1. The height of the terminal body is dimensioned as 3.5. A small dimension of 1 is indicated for the thickness of the base.	 Technical drawing of Lead Wiring Terminal A. It shows a side view of a terminal with a circular hole in the center. The diameter of the hole is dimensioned as 2.5.

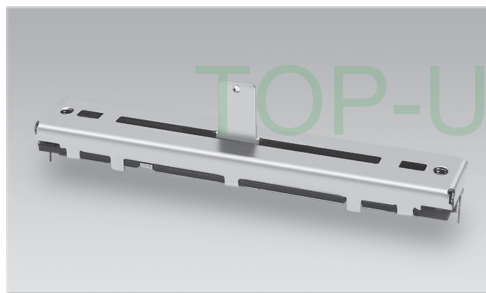
6. Slide Lever Type (Metal Lever)

Lever -Type	1	2	3	4	5
Dimensions					
Length (L)	12	8	13.5	15	17.5

Lever -Type	6	9-1	9-2	C2
Dimensions				
Length (L)	15	10	8.2	14

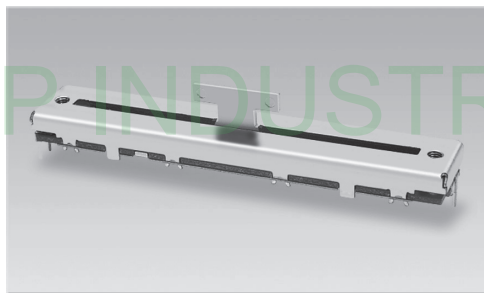
7. Lever Material : " M " - Metal Lever
8. Lever Length " L "
9. Type of Taper (See Taper Chart Last Page)
10. Resistance Value
11. Number of Clicks : Blank - None , 1C - Center Click
12. Serial No.

45AM1B-B



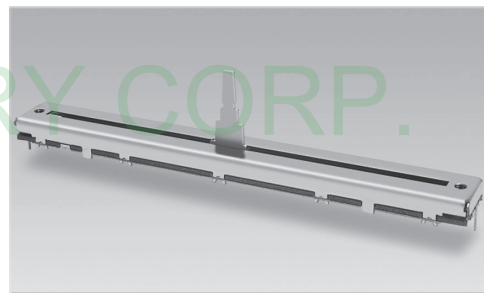
Outline Drawing

60AM1B-B

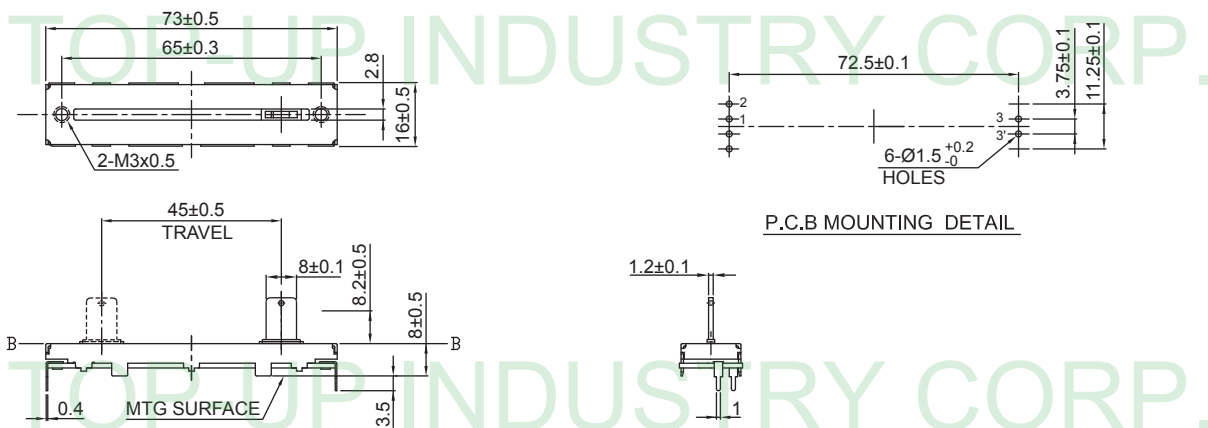


Features individual specifications

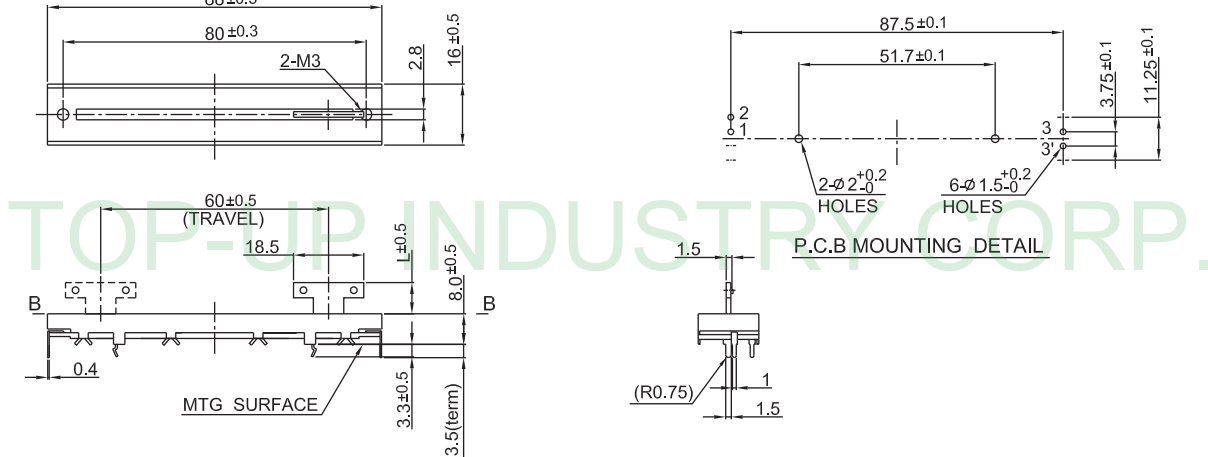
100AM1B-B



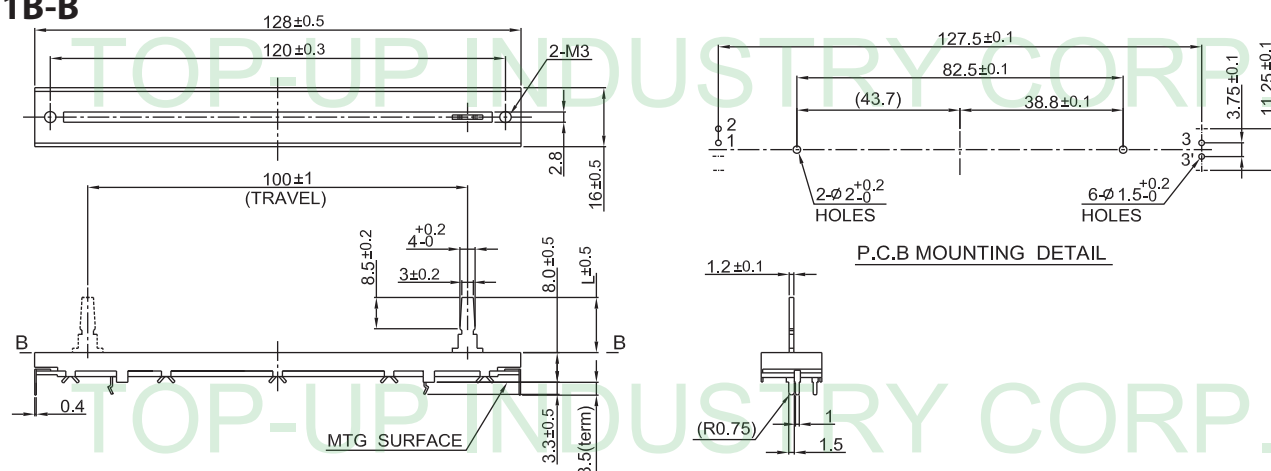
45AM1B-B



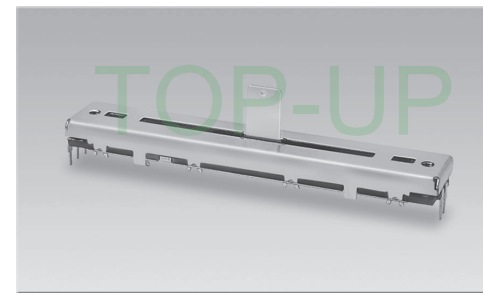
60AM1B-B



100AM1B-B

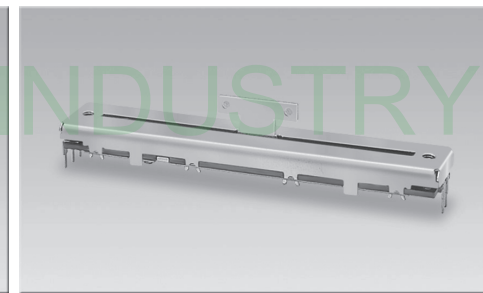


45AM2B-B



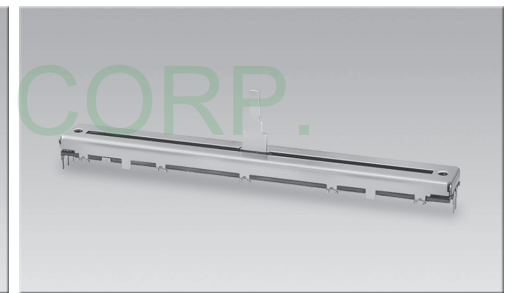
Outline Drawing

60AM2B-B

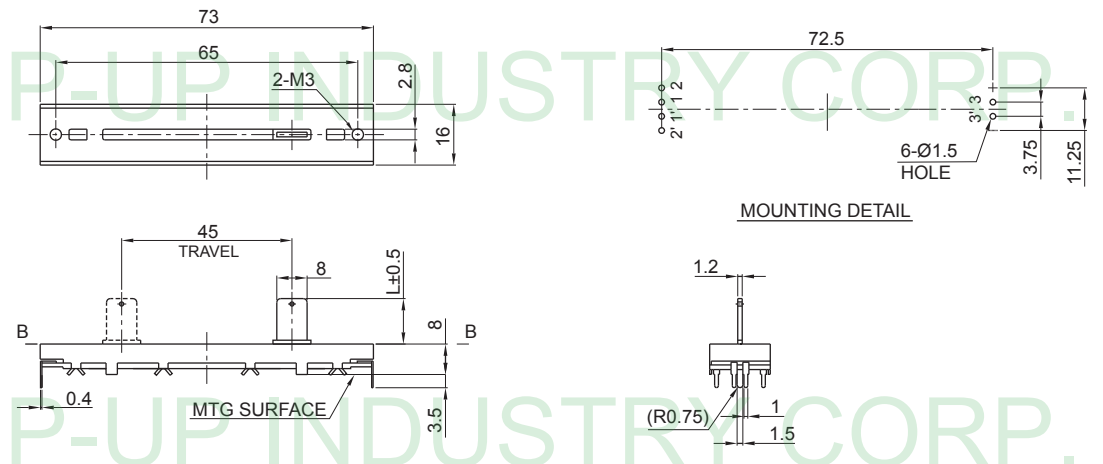


Features individual specifications

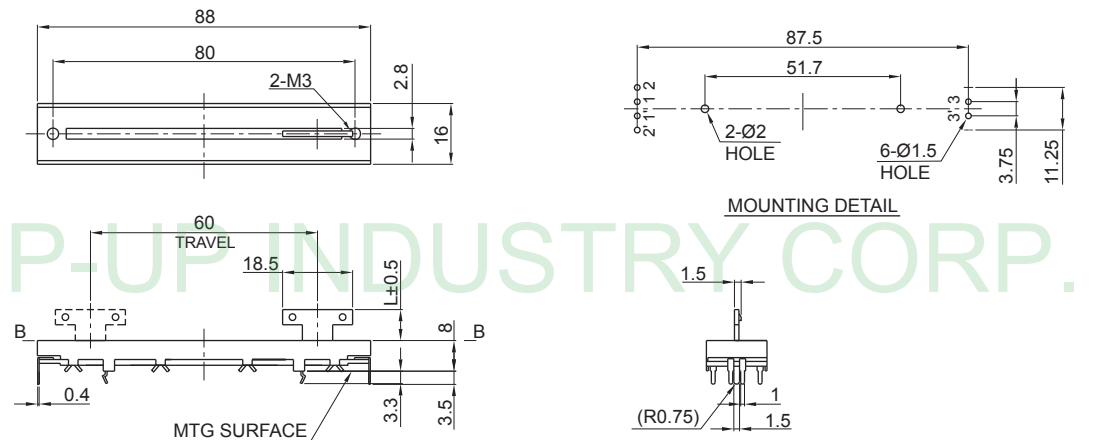
100AM2B-B



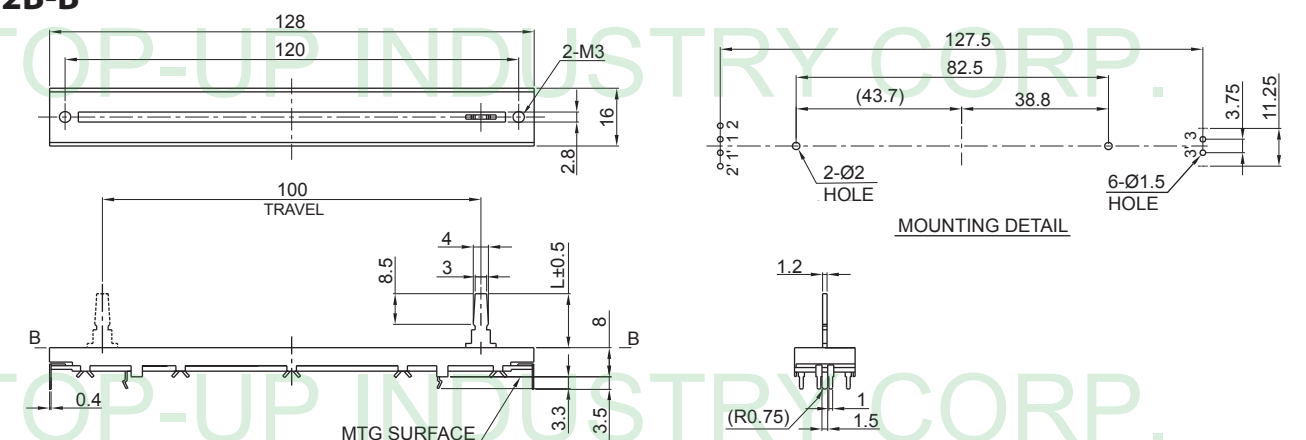
45AM2B-B

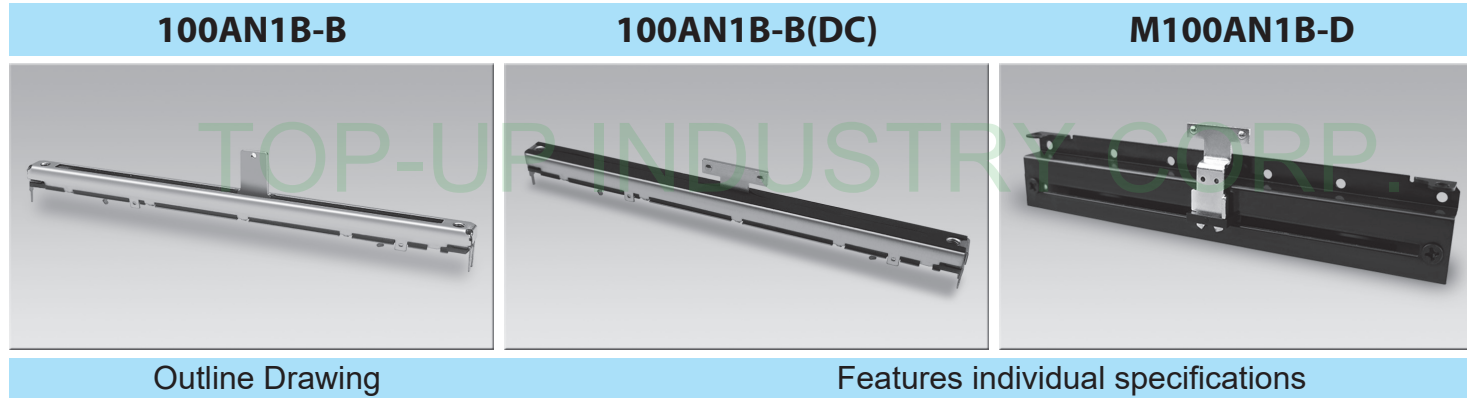


60AM2B-B

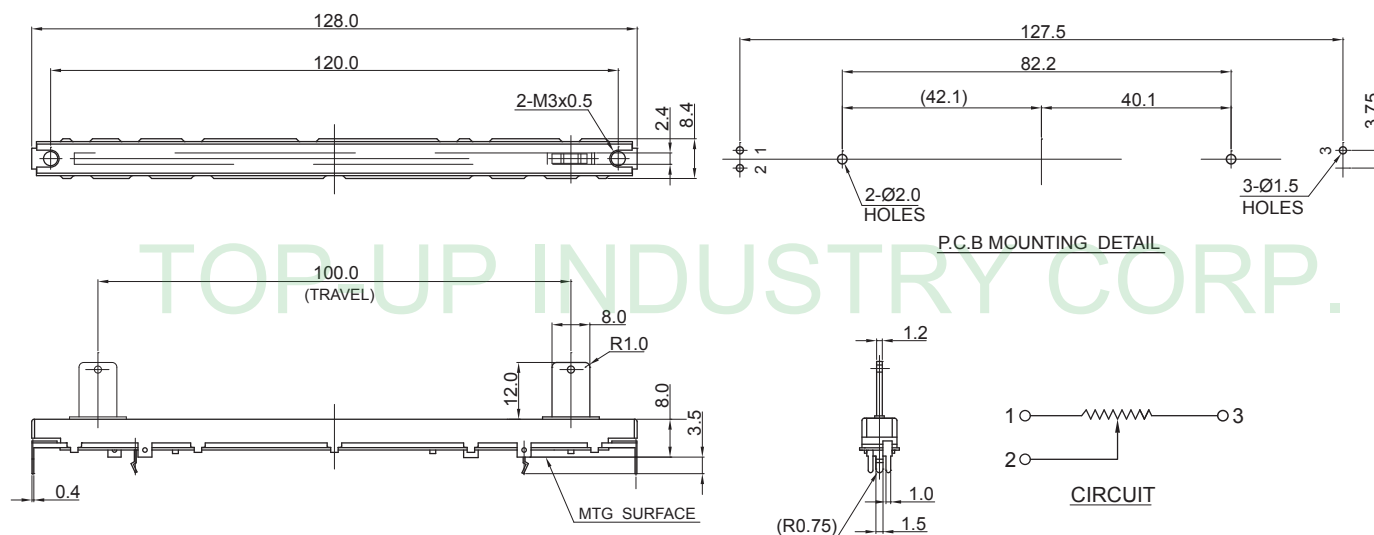


100AM2B-B

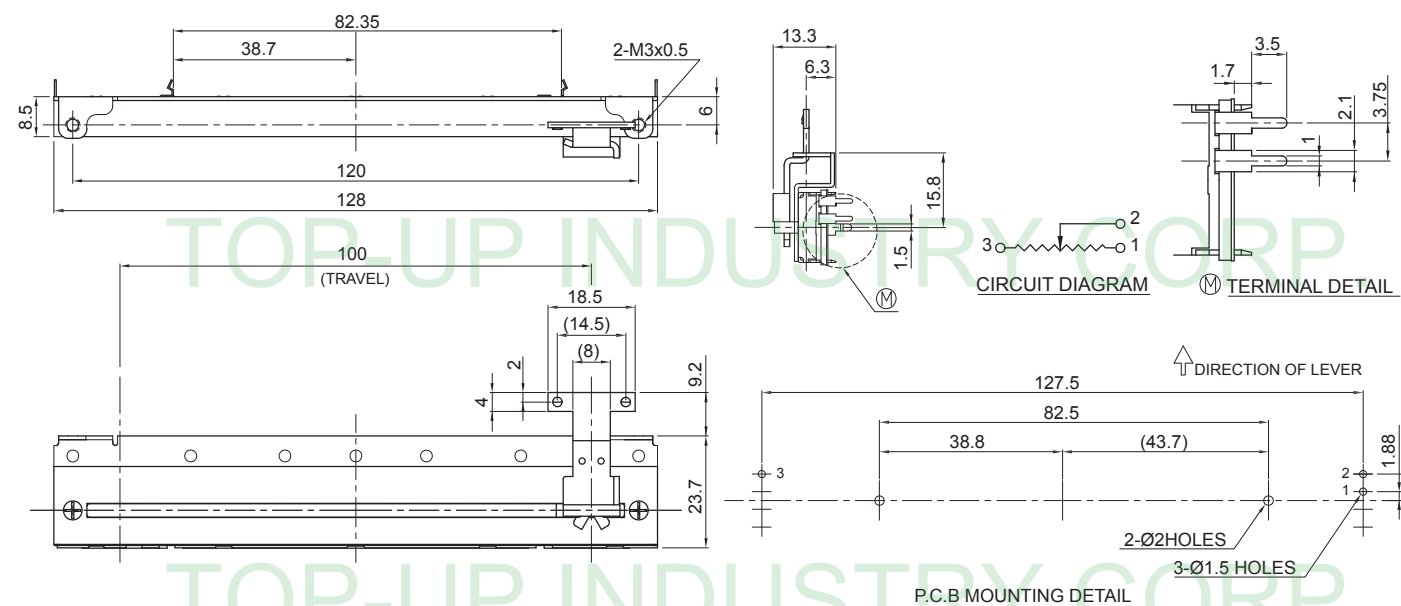




100AN1B-B
100AN1B-B(DC)



M100AN1B-D



RF Series Code Explanation

45 RF B 2 TS - B - C1 M 20 - A 10K - 1C - □ □ □

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

- Travel of Sliding (45 mm are available)
- Product Lines
With Case Type Slide Potentiometers : RF Series — Soft Feeling Type
- RFT Series; RFK Series; RFB Series

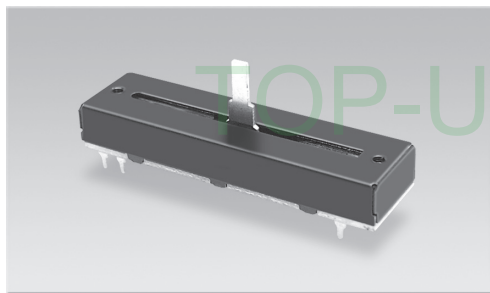
45RFT2-B	45RFK2-A
45RFB2-B	45RFZ2-A

- Number of Unit : 1 - Single Unit ; 2 - Dual Unit
- With Tap & Switch : T - Tap ; S - Switch ; TS - Tap & Switch
- Type of Terminal : (B - P.C.B Type) (A-Solder Lug Type)

B (P.C.B Type)	A (Solder Lug Type)	C (Connector Type)

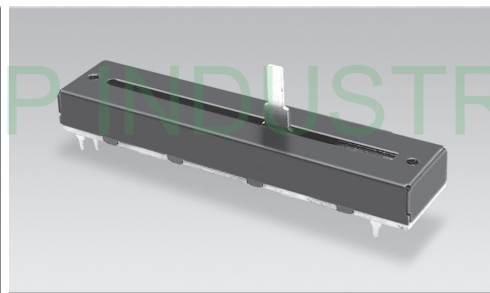
- Type of Slide Lever (See Drawing 1)
- Lever Material : M - Metal Lever
- Lever Length "L " (See Drawing 1)
- Type of Taper (See Taper Chart Last Page)
- Resistance Value
- Number of Clicks : Blank - None , 1C - Center Click
- Serial No.

45RFT2-B



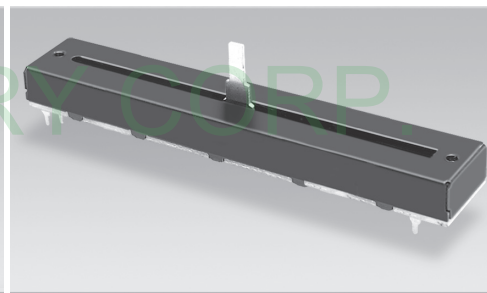
Outline Drawing

60RFT2-B

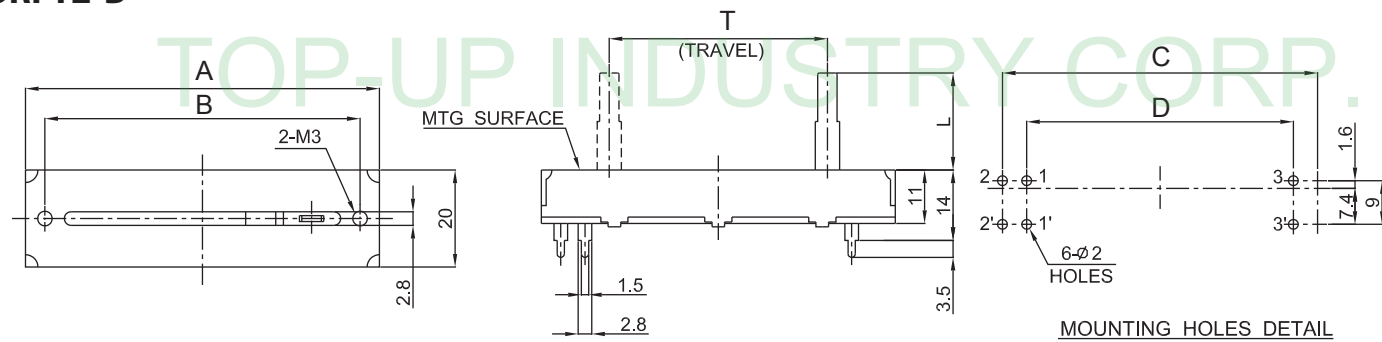


Features individual specifications

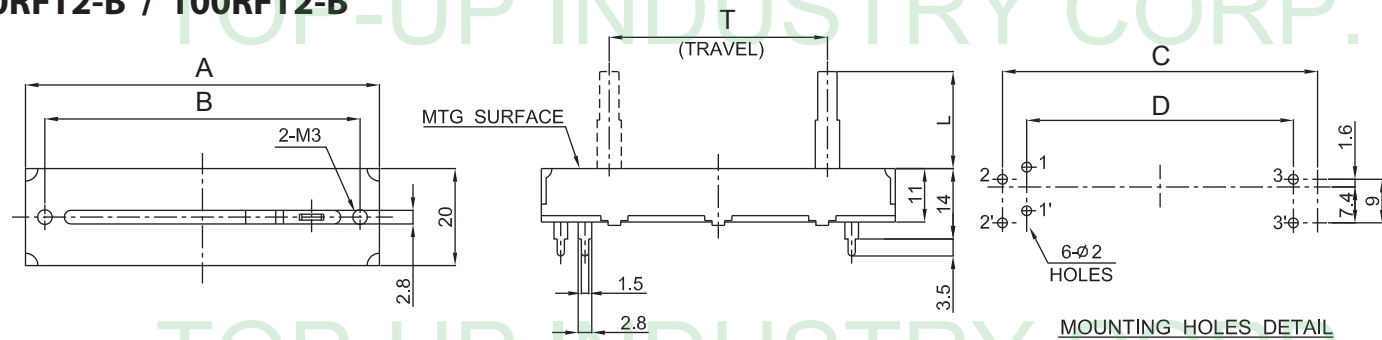
100RFT2-B



45RFT2-B



60RFT2-B / 100RFT2-B

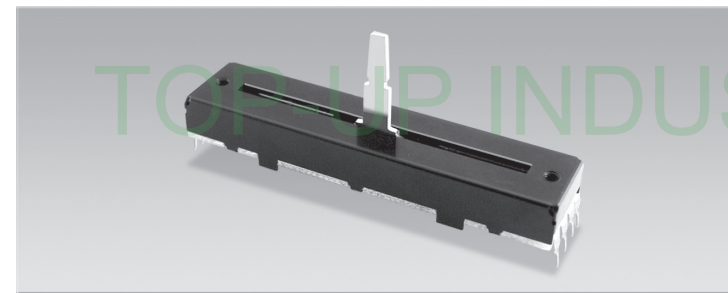


Model	Dimensions	T	A (T+28)	B (T+20)	C (T+20)	D (T+10)
45RFT		45	73	65	65	55
60RFT		60	88	80	80	70
100RFT		100	128	120	120	110

Metal Lever

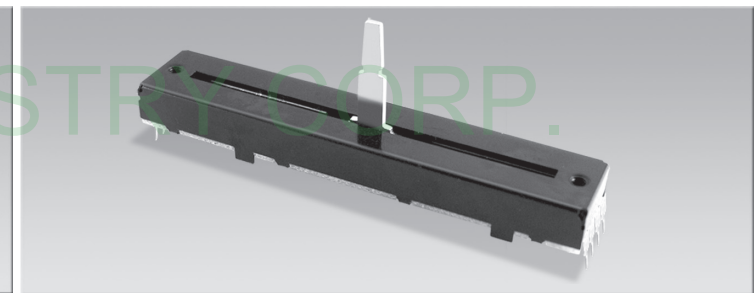
RFT C1 TYPE	RFT D2 TYPE	RFT & RFK 9-2	RFK C1 TYPE
L 15 20 25	L 15 20	L 8.2	L 15 20

45RFB2-B/45RFB2-B1

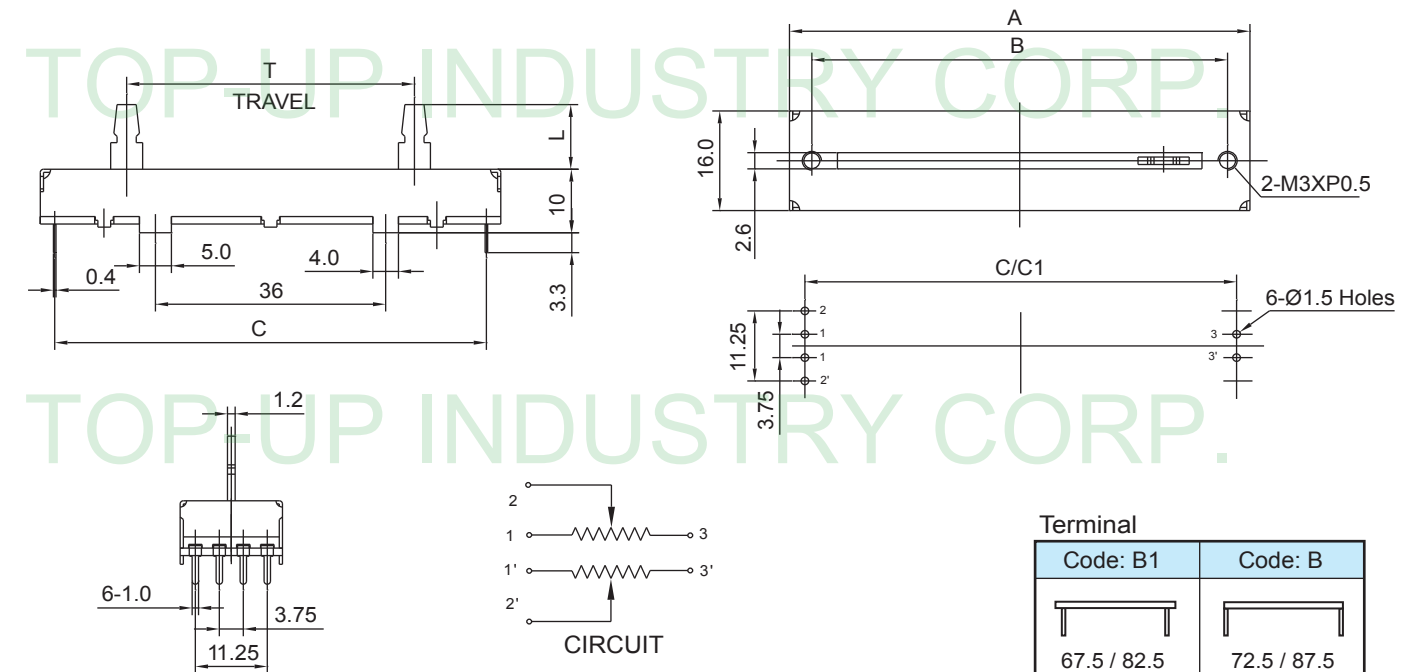


Outline Drawing

60RFB2-B/60RFB2-B1



Features individual specifications



Terminal	Code: B1	Code: B
	67.5 / 82.5	72.5 / 87.5

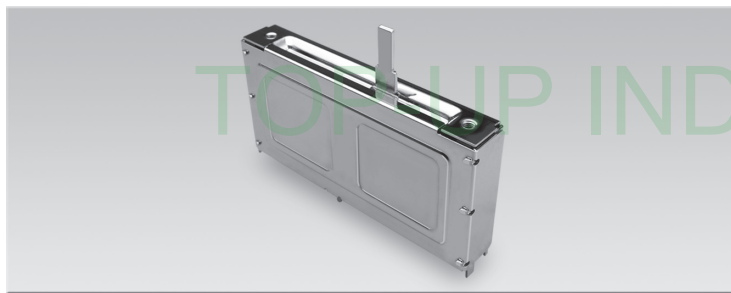
Model	Dimensions	T	A (T+28)	B (T+20)	C (T+27.5)	C1 (T+22.5)
45		45	73	65	72.5	67.5
60		60	88	80	87.5	82.5
100		100	128	120	127.5	—

Metal Lever

RFB

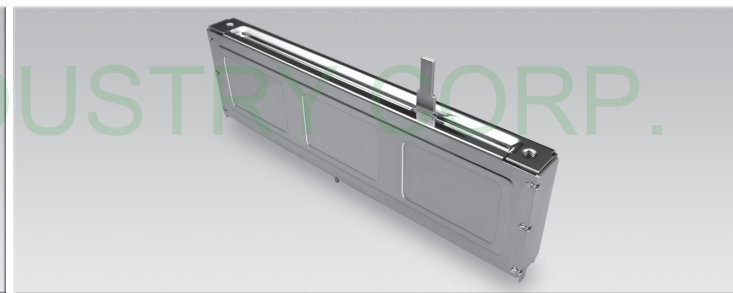
B1 TYPE	D2 TYPE	C4 TYPE
L 12	L 13 15 20	L 15 16.8 20 25

45RFK2-A



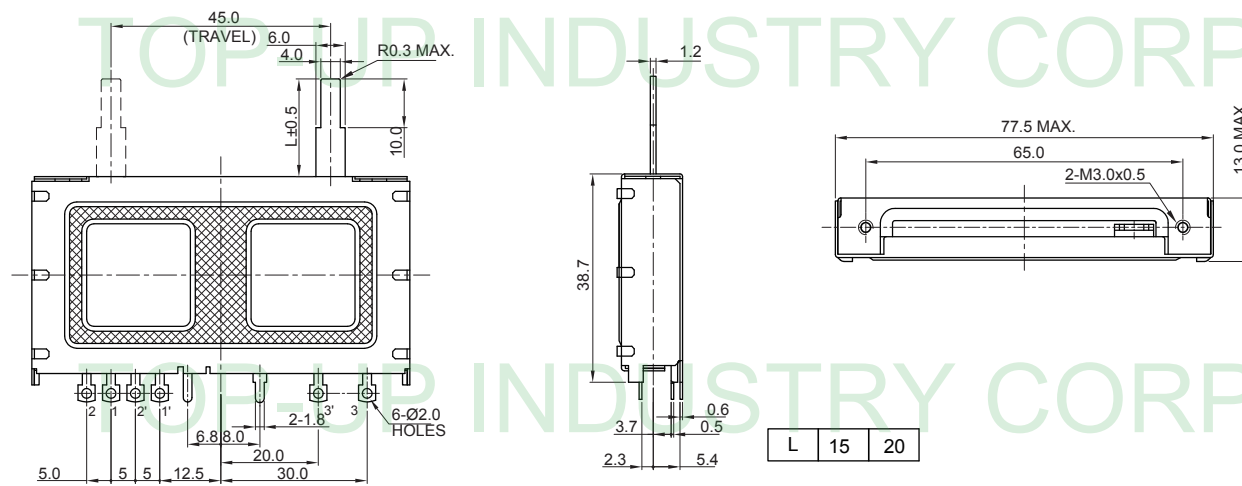
Outline Drawing

100RFK2-A

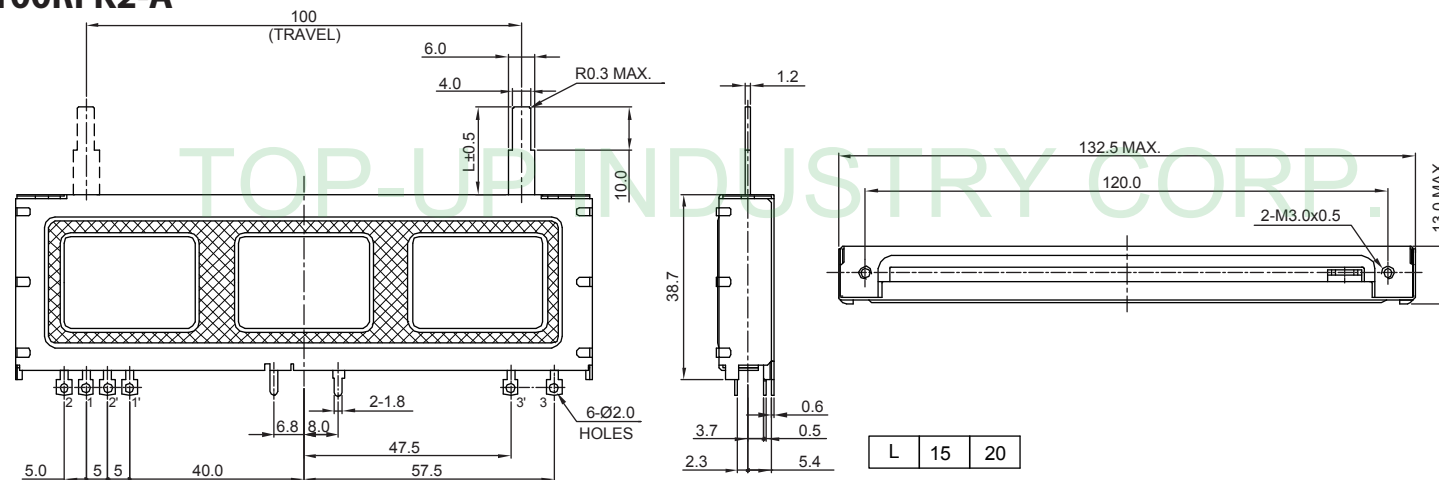


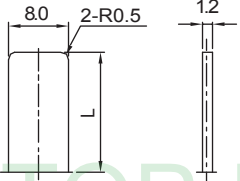
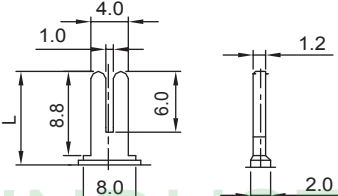
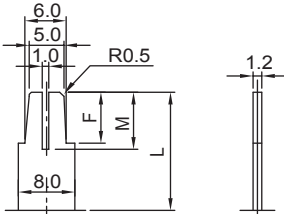
Features individual specifications

45RFK2-A

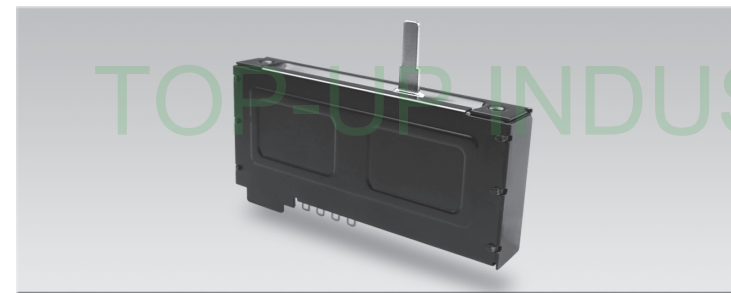


100RFK2-A



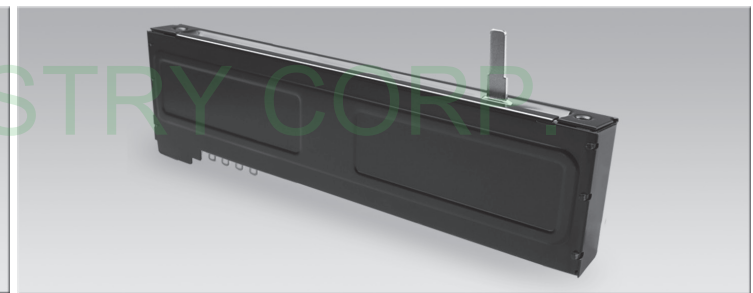
Other Metal Lever												
B2 TYPE					CH TYPE				AH TYPE			
												
L	8	10	13	20	L	13	15	20	L	16	20	25
									F	11	10	10
									M	11	12	12

45RFZ2-A



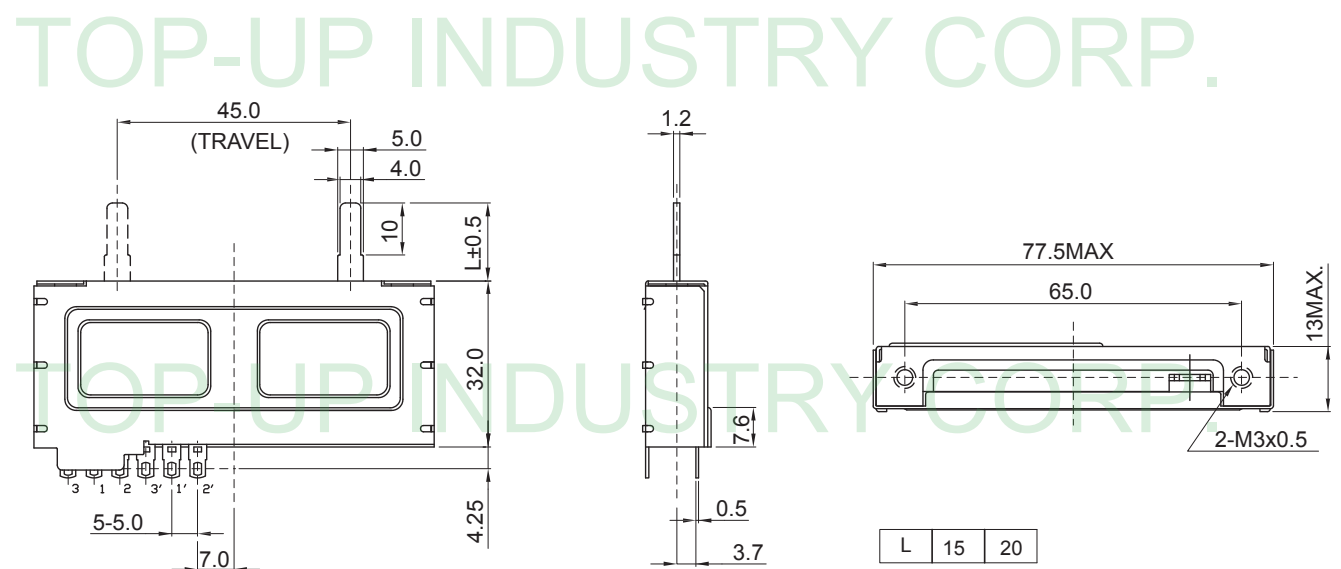
Outline Drawing

100RFZ2-A

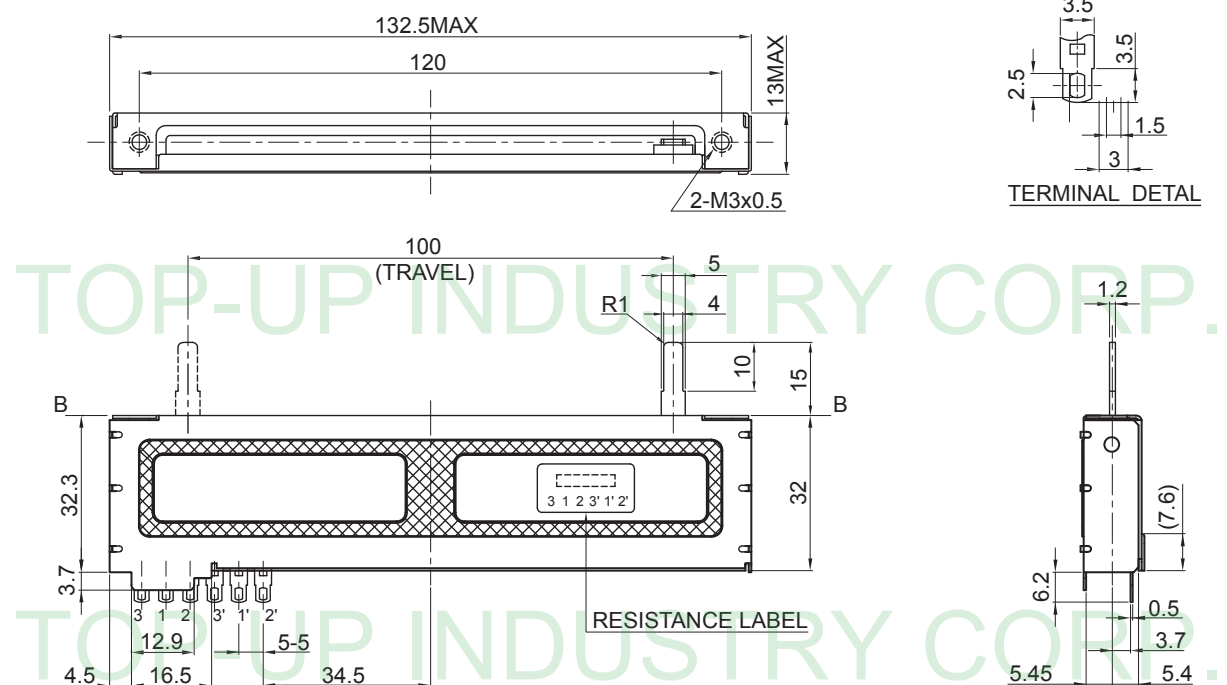


Features individual specifications

45RFZ2-A



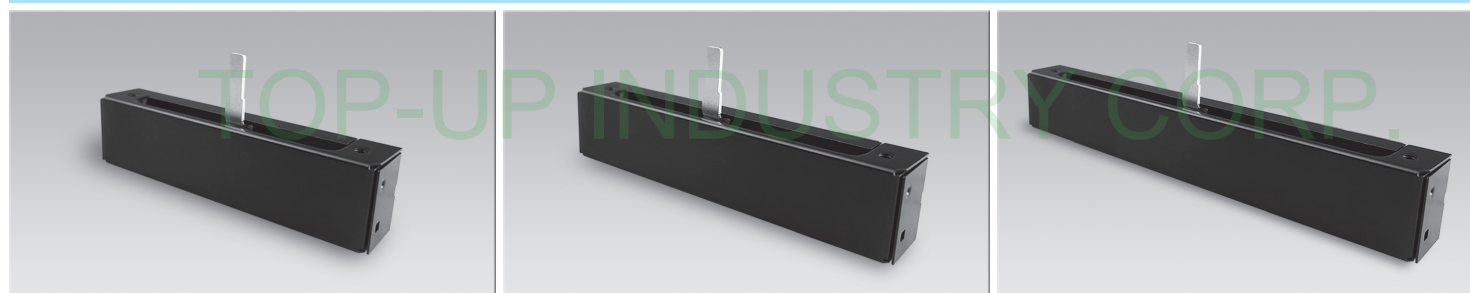
100RFZ2-A



45RFF2-C

60RFF2-C

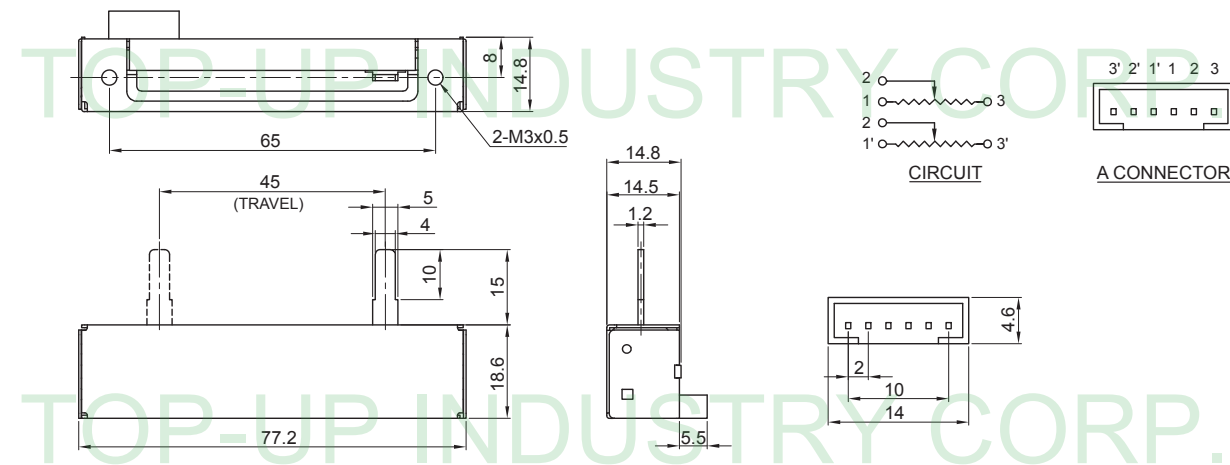
100RFF2-C



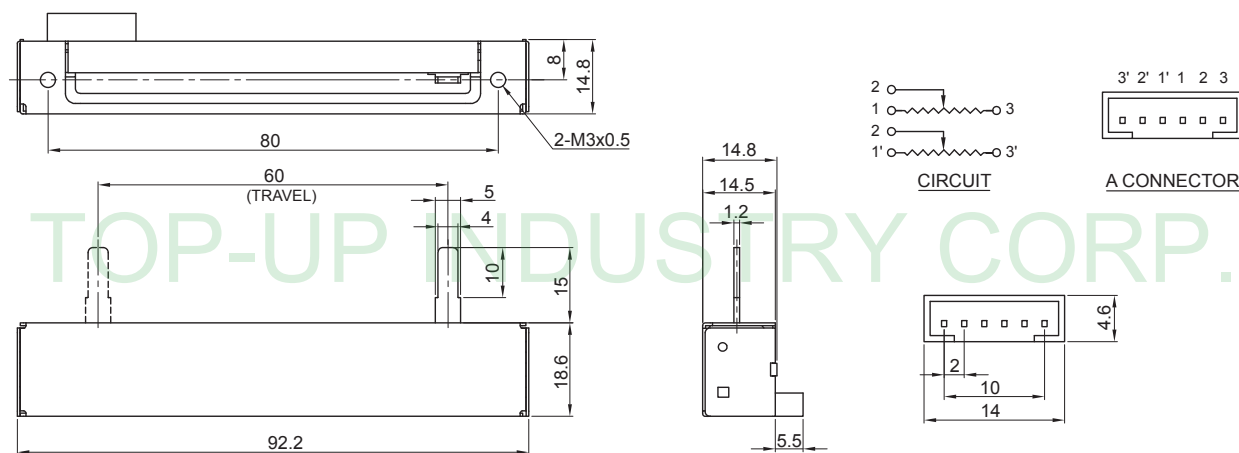
Outline Drawing

Features individual specifications

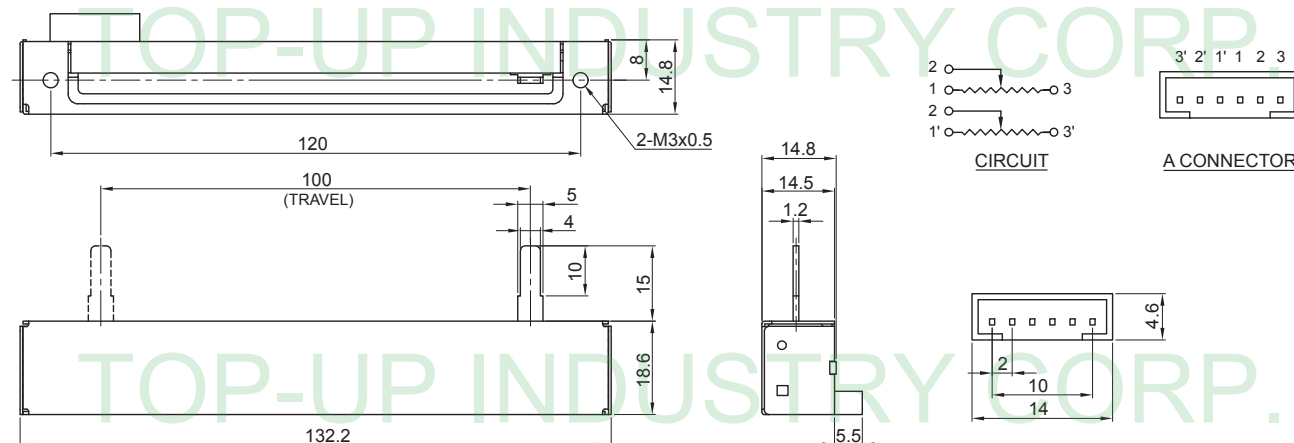
45RFF2-C



60RFF2-C



100RFF2-C



M□AM/MD□AM/MR□RF Series Code Explanation

MD	100	AM	2	B	C	-D	N	-9-2	M	8.2	-A	10K	-□□□
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1. MD — With Motor Driven MR — With Motor Driven And Rail
M — Without Motor Driven MDS — With Motor Driven, Motor Frame Short
2. Travel of Sliding (60 , 100mm are available)
3. Product Lines of AM / AMF / AMZ / RF / RFZ / RFF
4. Number of Unit
1 — Single Unit 2 — Dual Unit,.....
5. Snap-in Frame
Blank - Without Frame
B - With Frame
6. With Connector C — Only AM / RF Type C1— Horizontal Type (90°)
C3 — Vertical Type (Pin 180°) C4 — Vertical Type (Pin 90°)

7. Type of Terminal "D" - P.C.B Type

D (Printed Wiring Terminal)	A (Solder Lug Type)	C (Connector Type of RFZ & RFF)

8. Without Touch sense track

9. Slide Lever Type

Lever -Type	9-2
Dimensions	
Length (L)	8.2 9.2

10. Lever Material : " M " - Metal Lever

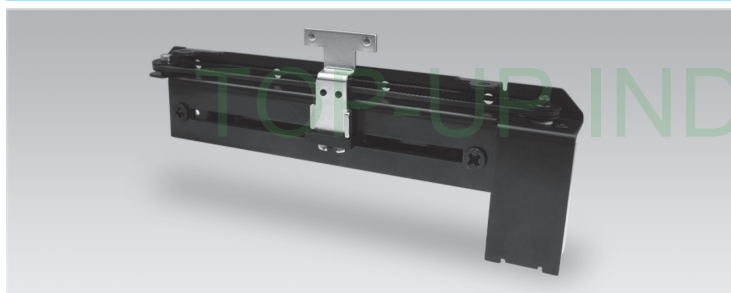
11. Lever Length " L "

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

13. Resistance Value

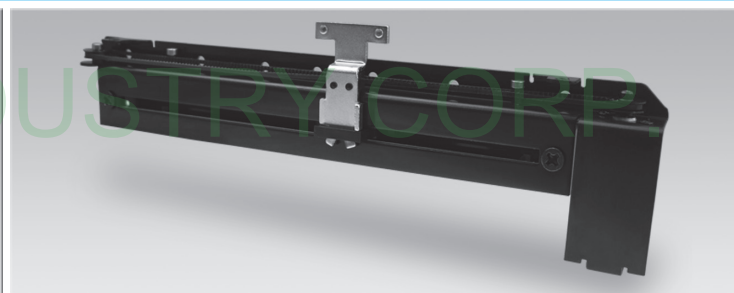
14. Serial No.

MD60AM1B-D



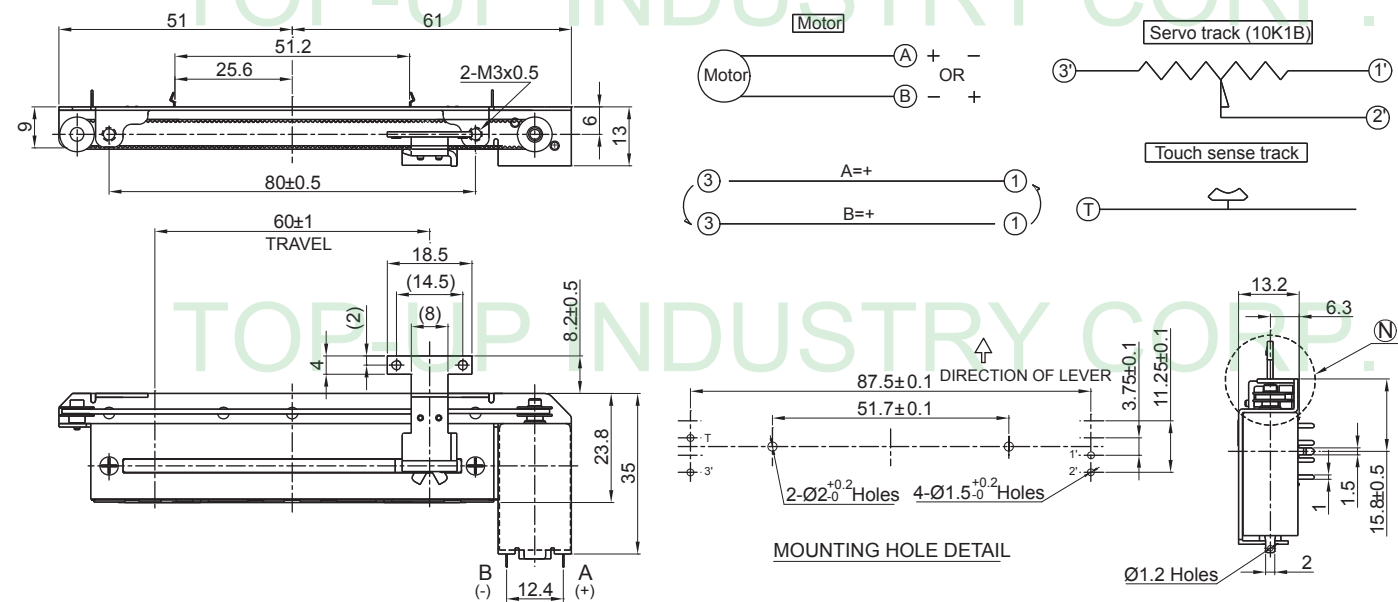
Outline Drawing

MD100AM1B-D

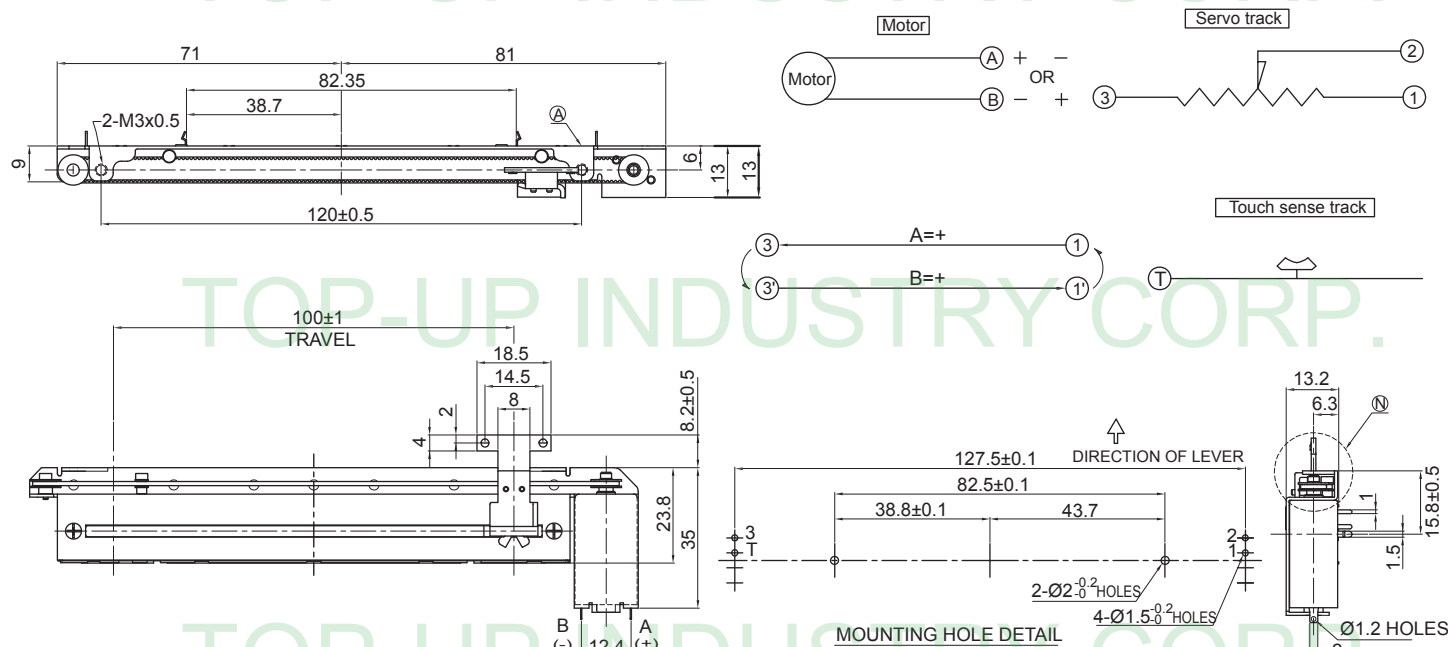


Features individual specifications

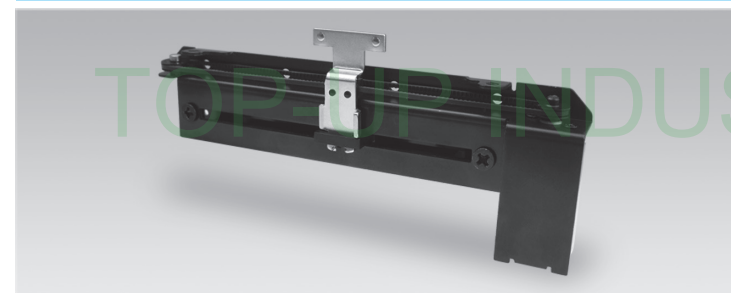
MD60AM1B-D



MD100AM1B-D

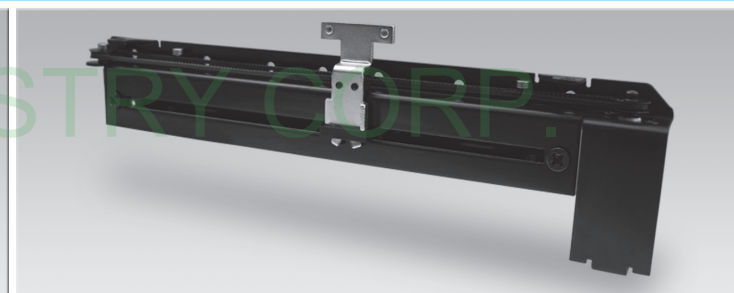


MD60AM2B-D / MR60RF2B-D



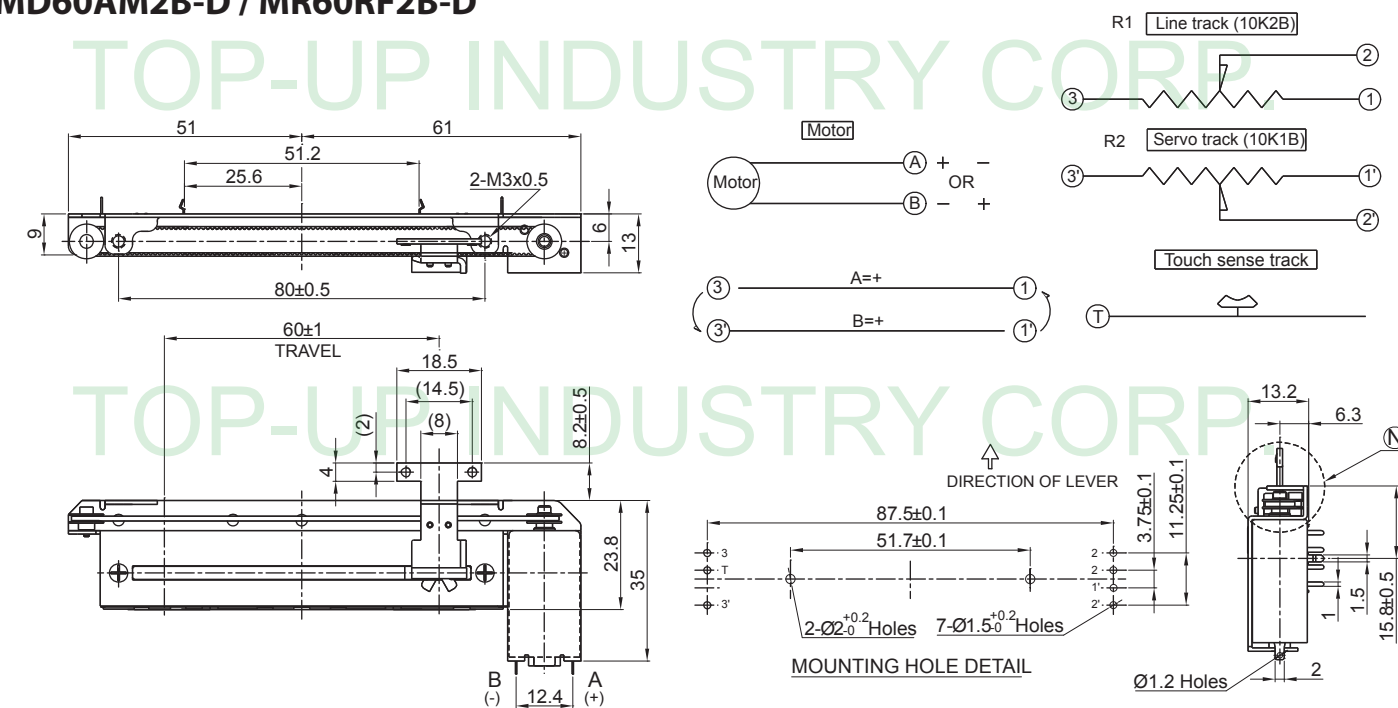
Outline Drawing

MD100AM2B-D / MR100RF2B-D

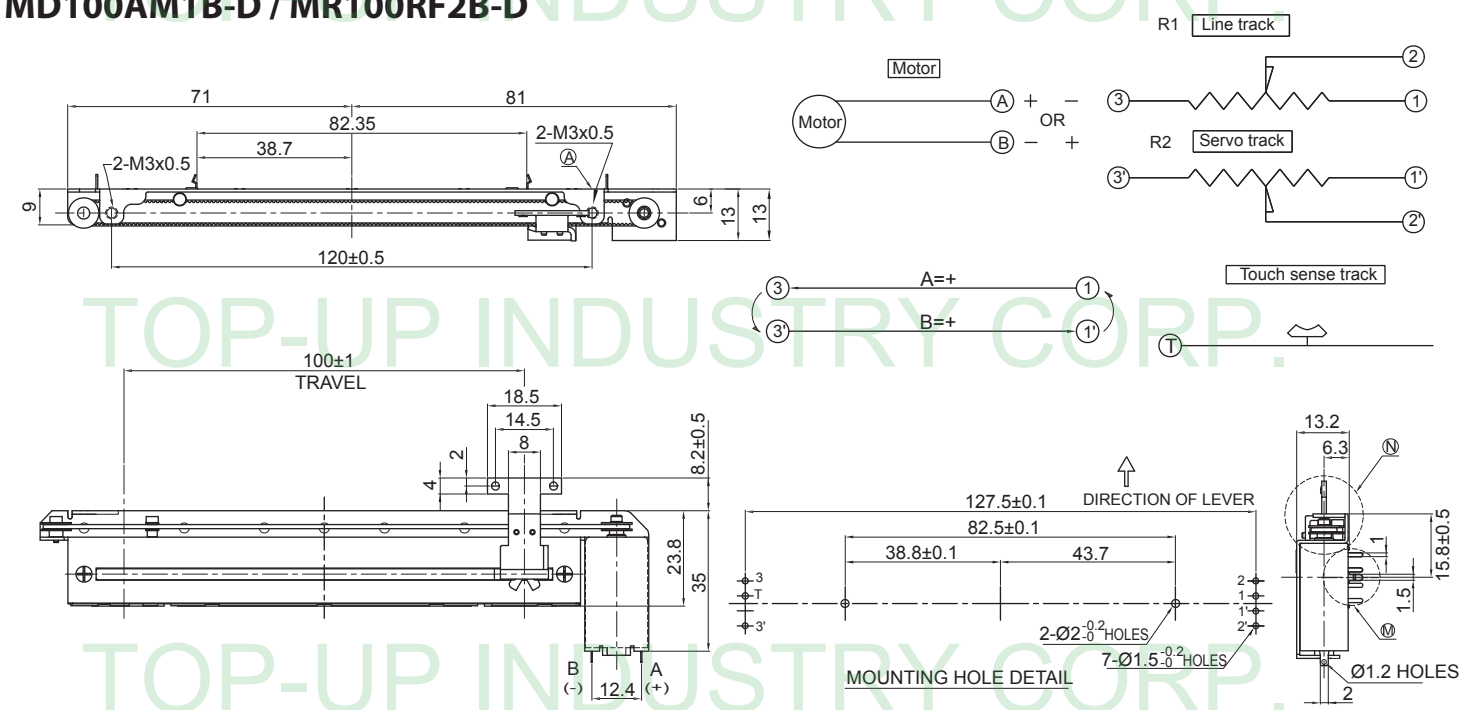


Features individual specifications

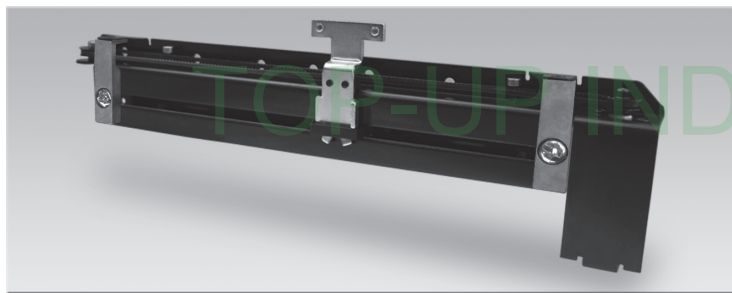
MD60AM2B-D / MR60RF2B-D



MD100AM1B-D / MR100RF2B-D

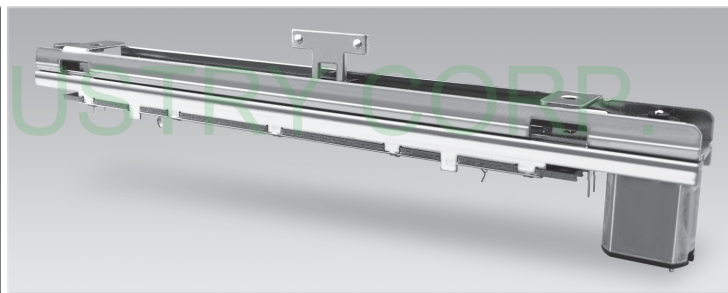


MD100AMZ1B-D



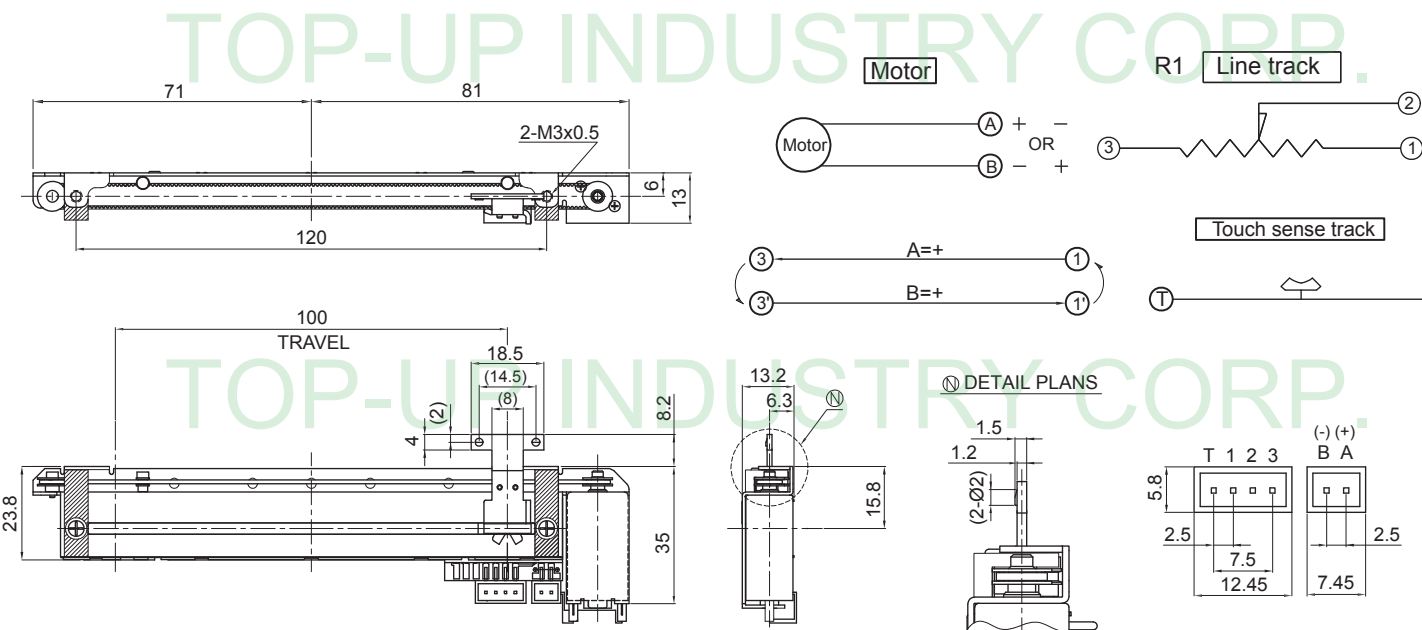
Outline Drawing

MD100AMF1B-D

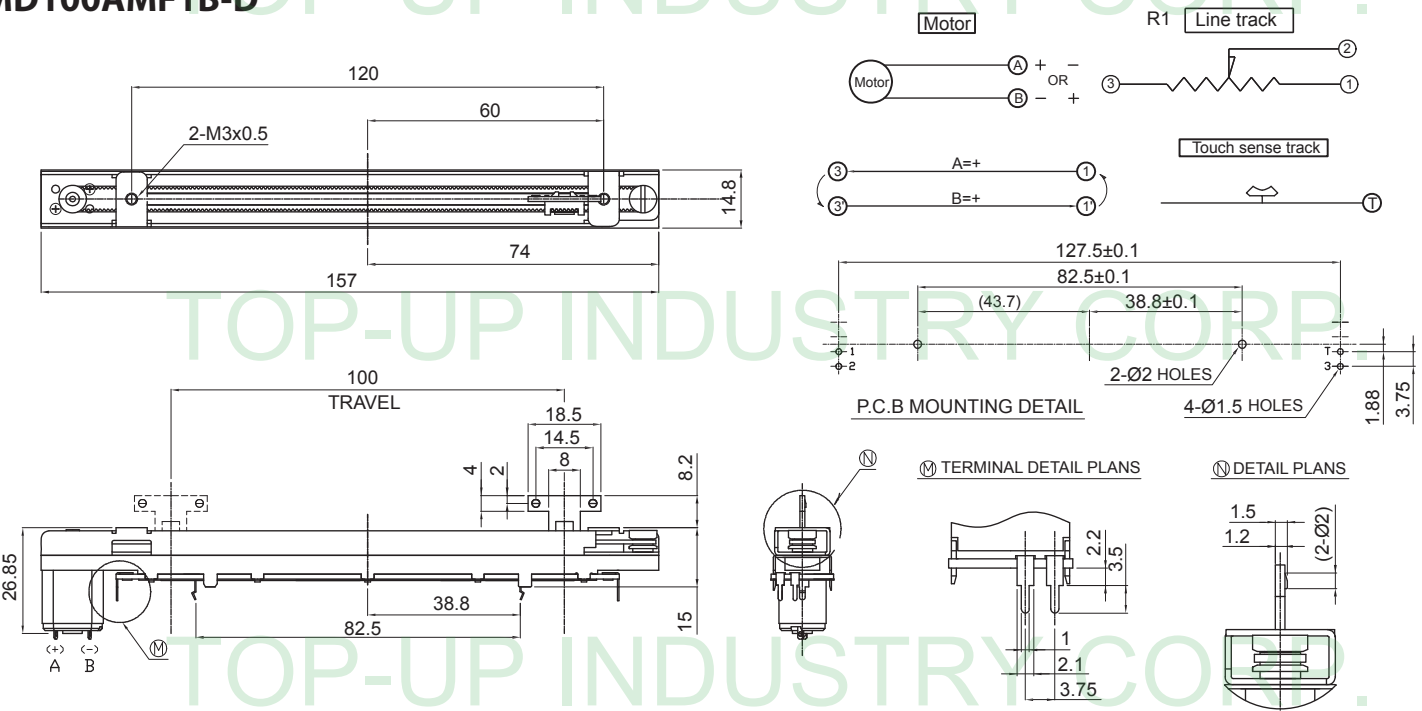


Features individual specifications

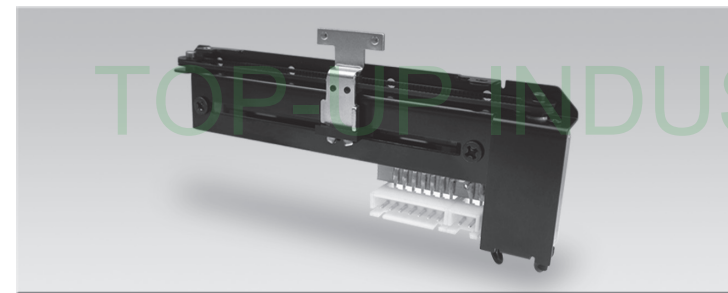
MD100AMZ1B-D



MD100AMF1B-D

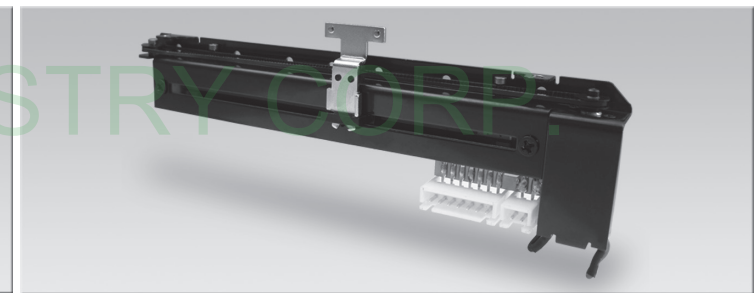


MD60AM2C-D / MR60RF2C-C



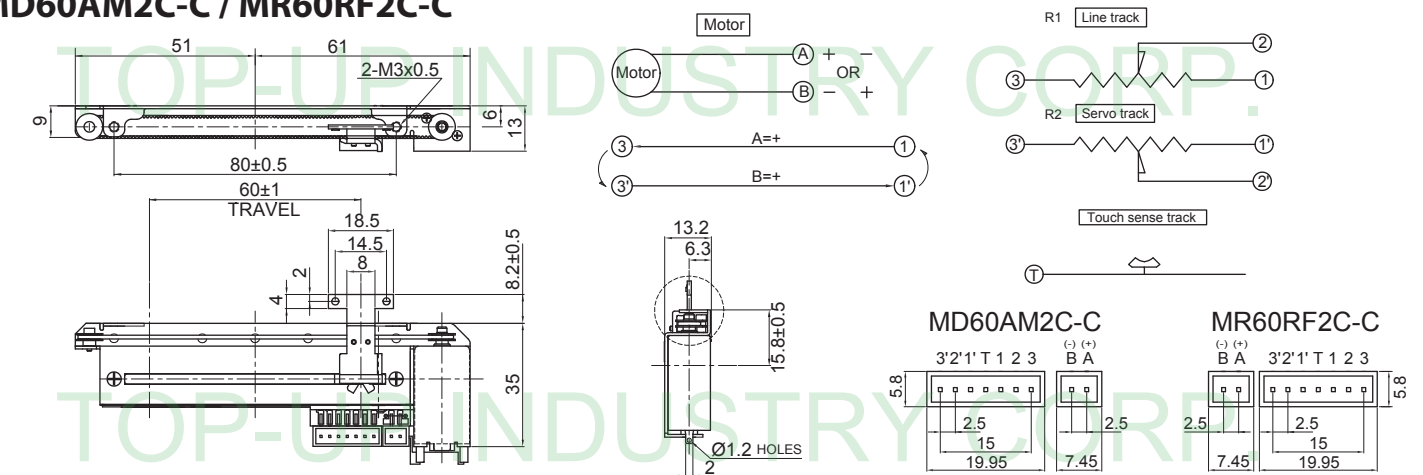
Outline Drawing

MD100AM2C-D / MR100RF2C-C

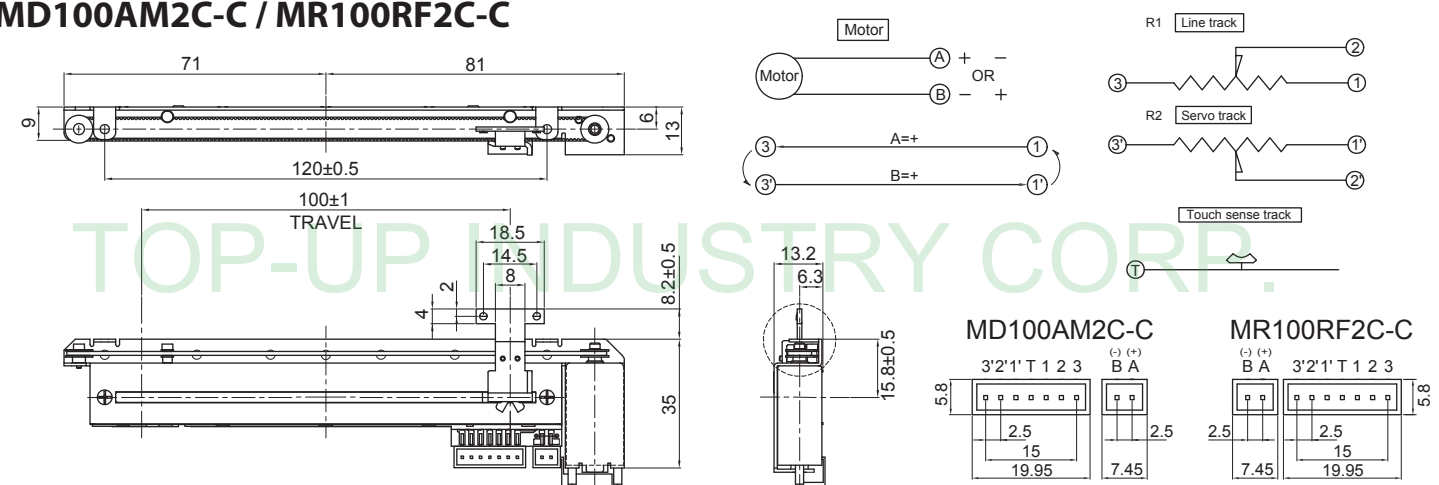


Features individual specifications

MD60AM2C-C / MR60RF2C-C

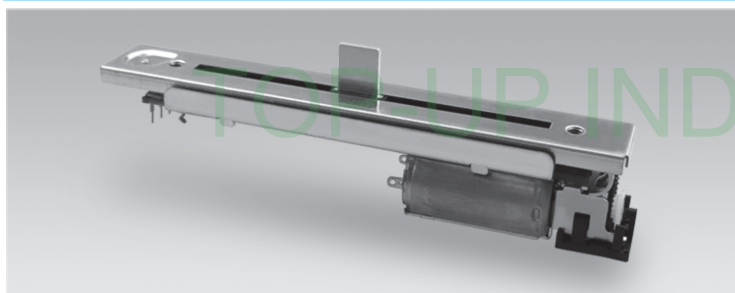


MD100AM2C-C / MR100RF2C-C



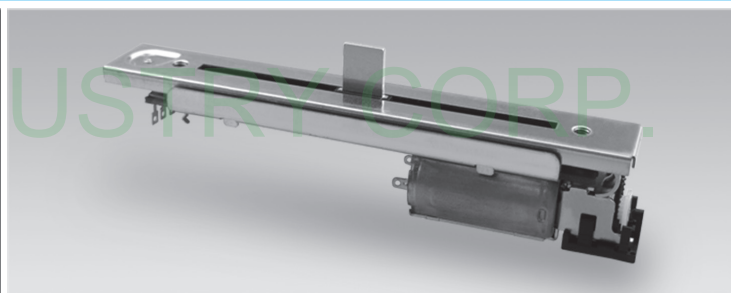
Characteristics	Specification
Operating temperature range	-10°C to +70°C
Operating force	30 ~ 130 gf
Stopper strength	5 Kg / 10 sec
Lever push-pull strength	5 Kg / 10 sec
Lever wobble (mm)	2 (2xL/25) (Both sides)
Lever deviation (mm)	0.5 max. (One side)
Solder heat resistance	Lower than 260°C for less than 5 seconds
Total resistance (KΩ)	5、10、20、50、100、250、500
Total resistance tolerance	±20%
Resistance taper	A,B,C
Insulation resistance	100MΩ min. 250V DC
Voltage proof	1 minute 250V AC
Sliding service life	50,000 cycles
Rated voltage	10V D.C
Maximum current	400~800mA

MDD60AM1B-D



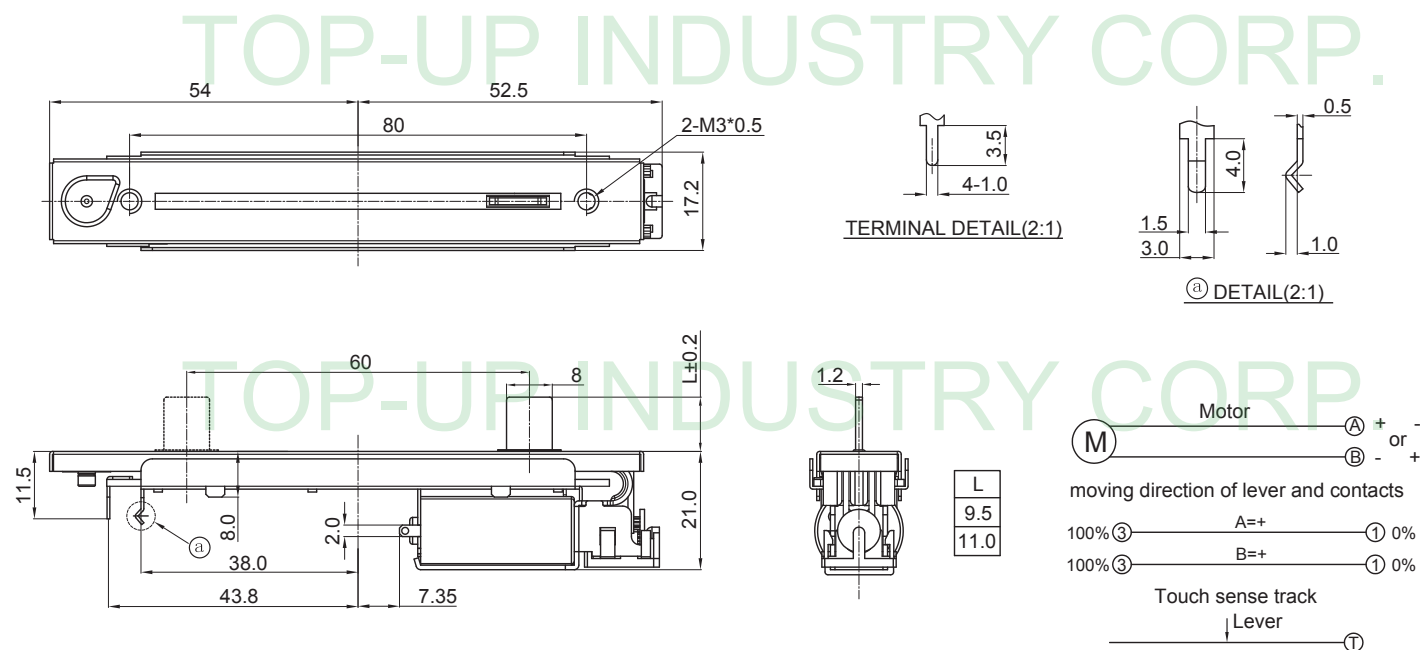
Outline Drawing

MDD60AM1B-A

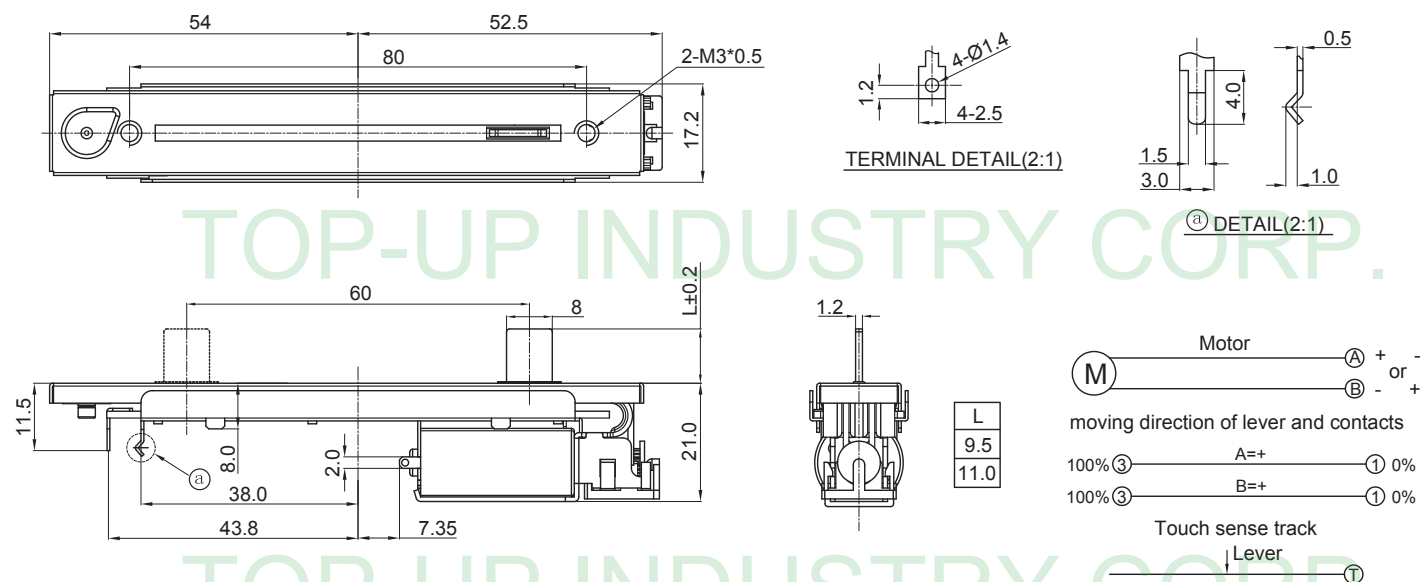


Features individual specifications

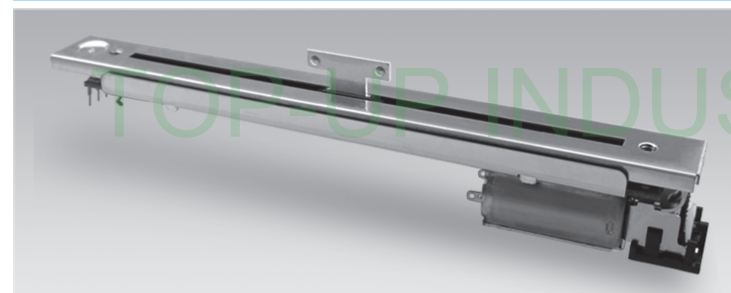
MDD60AM1B-D



MDD60AM1B-A

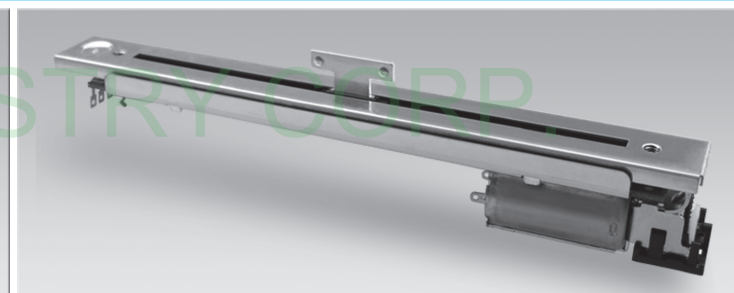


MDD100AM1B-D



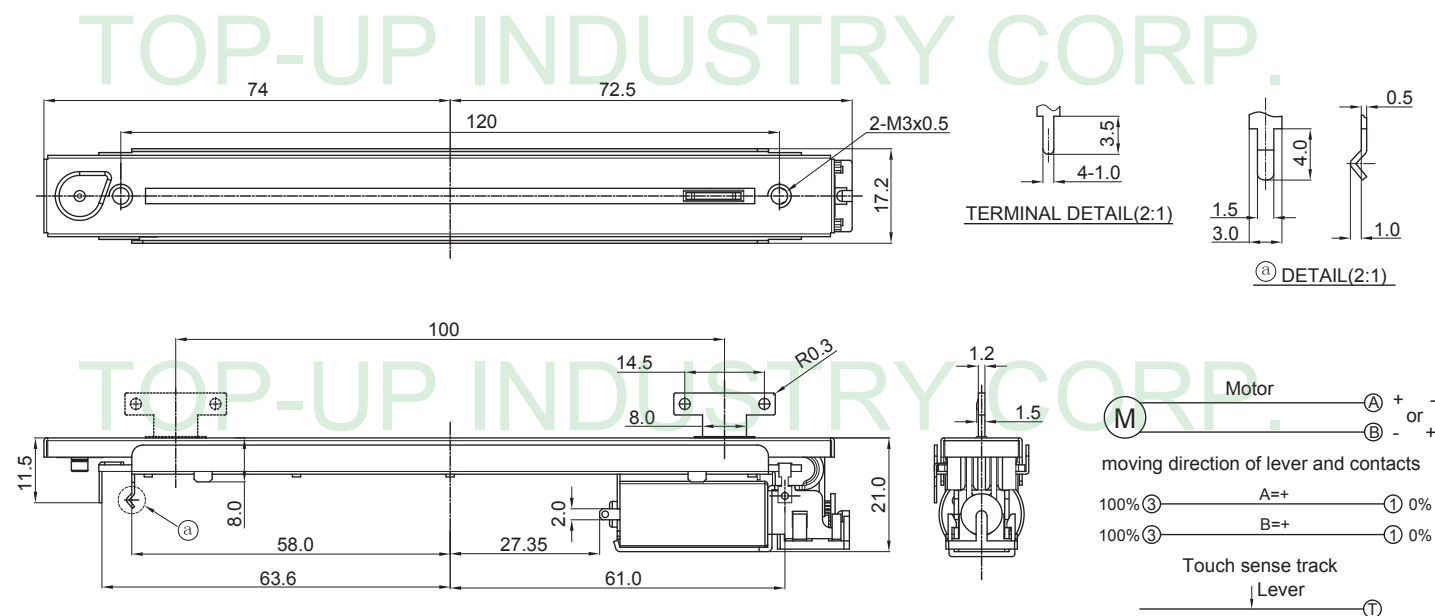
Outline Drawing

MDD100AM1B-A

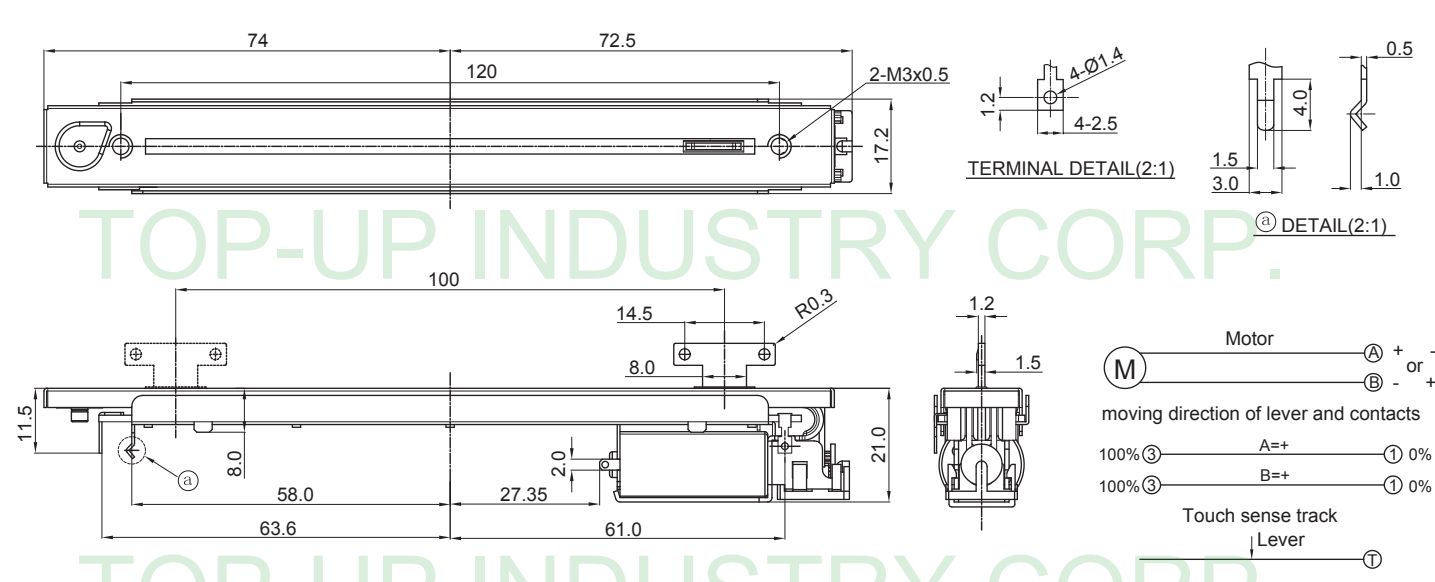


Features individual specifications

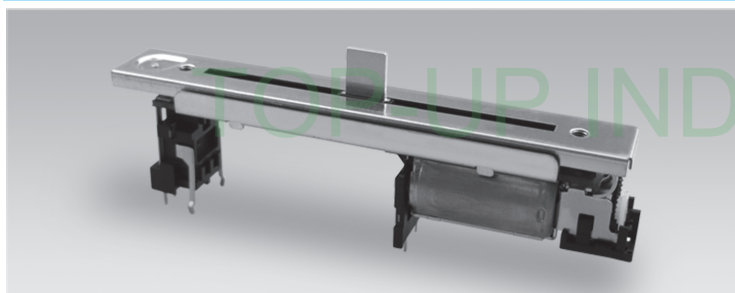
MDD100AM1B-D



MDD100AM1B-A

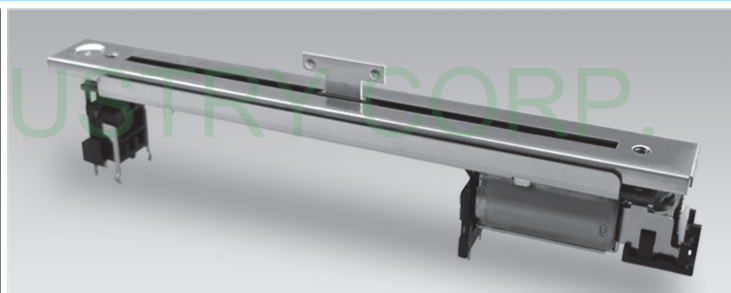


MDD60AM1-D



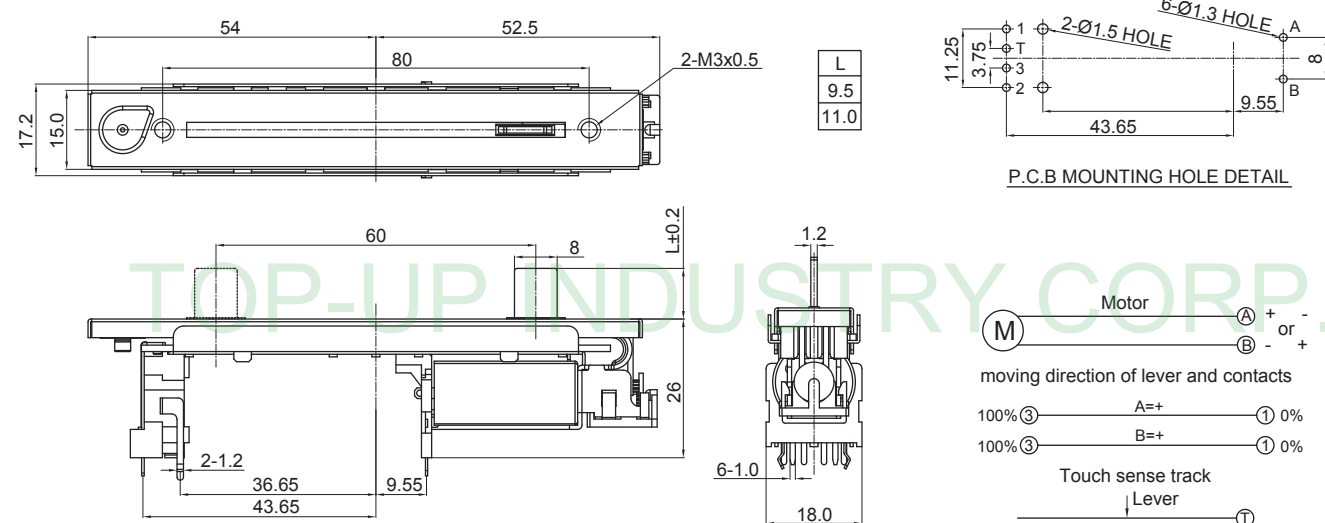
Outline Drawing

MDD100AM1-D

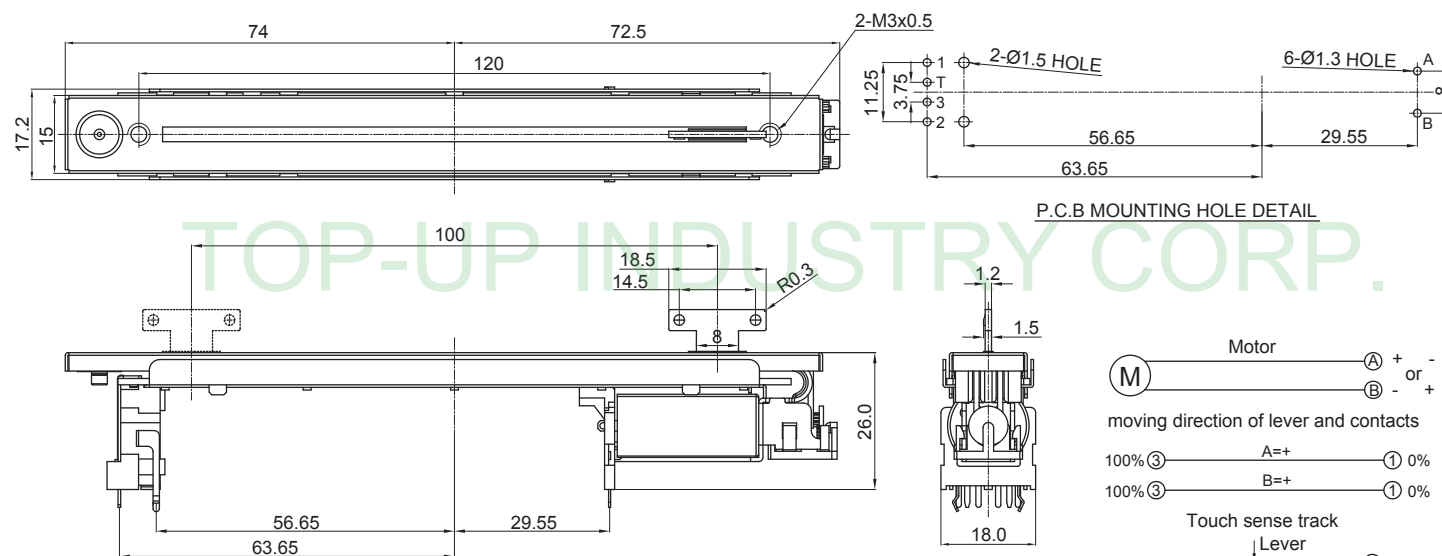


Features individual specifications

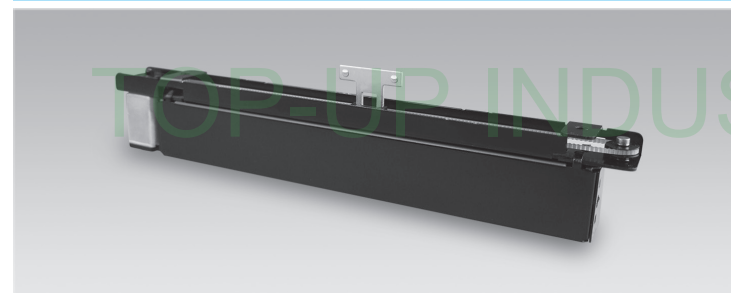
MDD60AM1-D



MDD100AM1-D

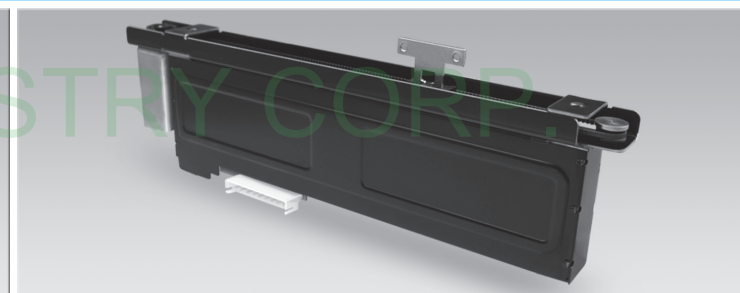


MD100RFF2C-C



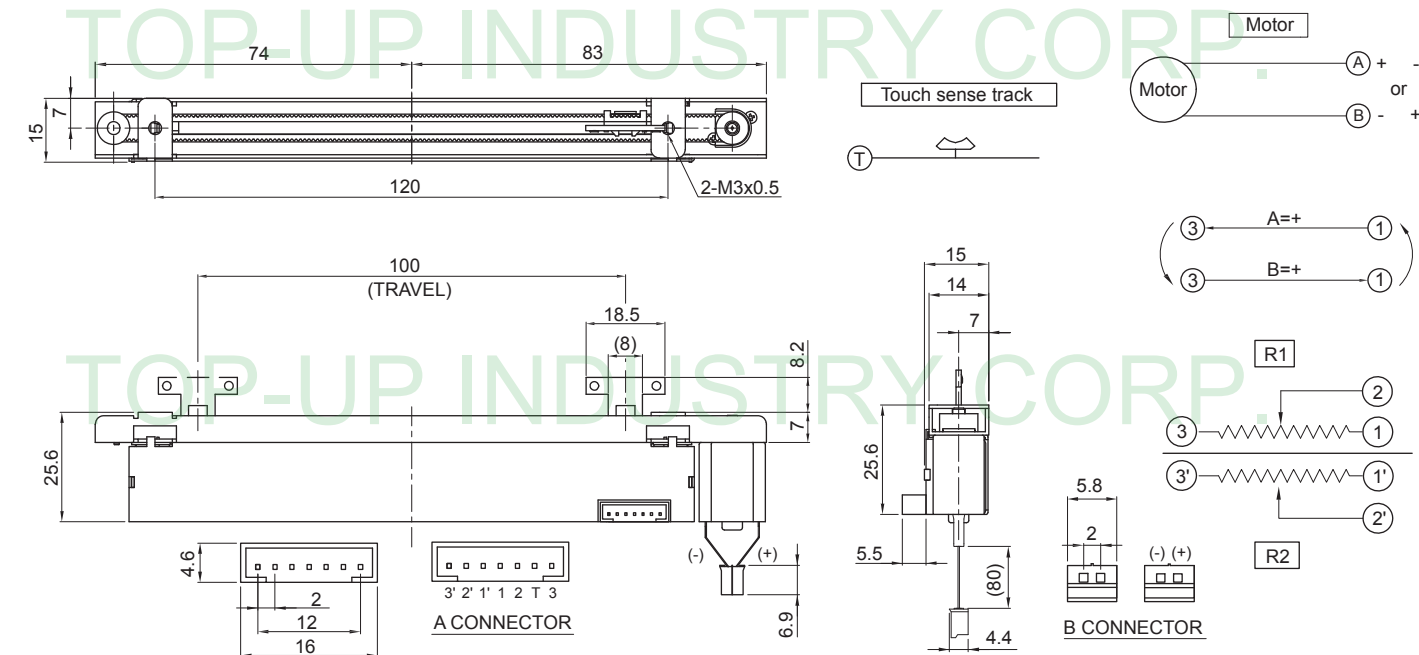
Outline Drawing

MD100RFZ2C-C

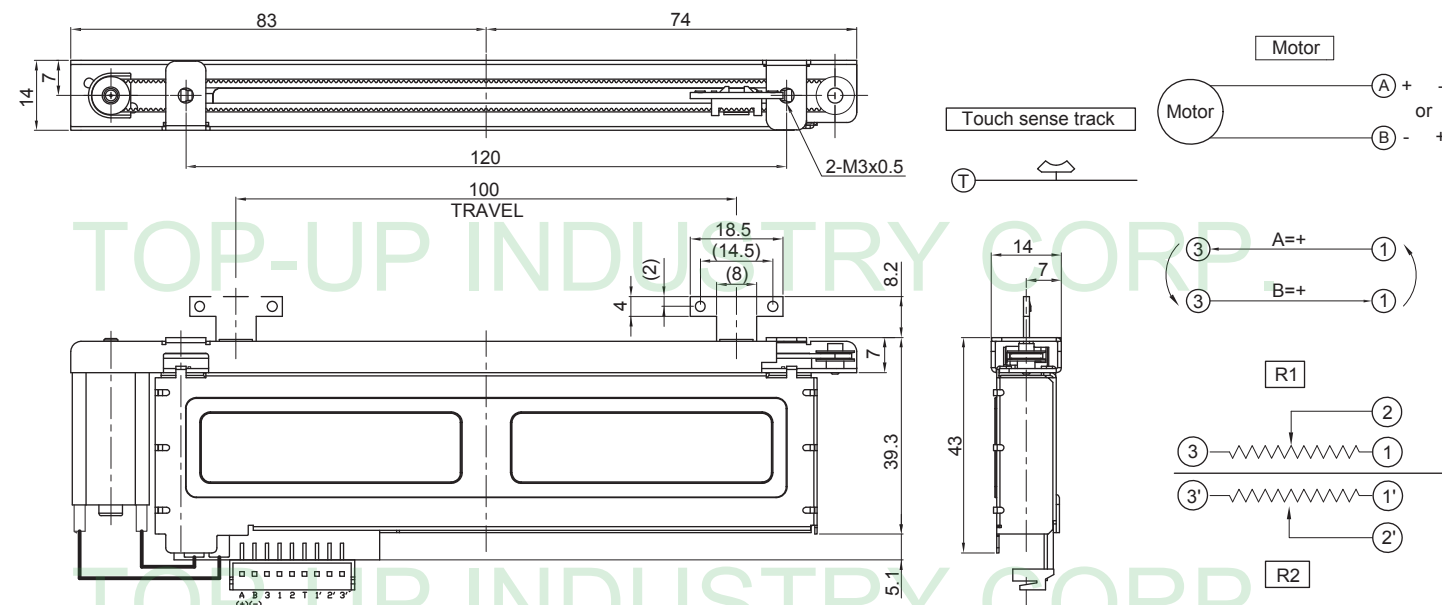


Features individual specifications

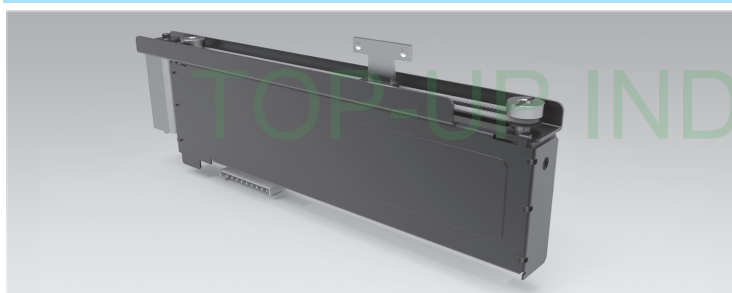
MD100RFF2C-C



MD100RFZ2C-C

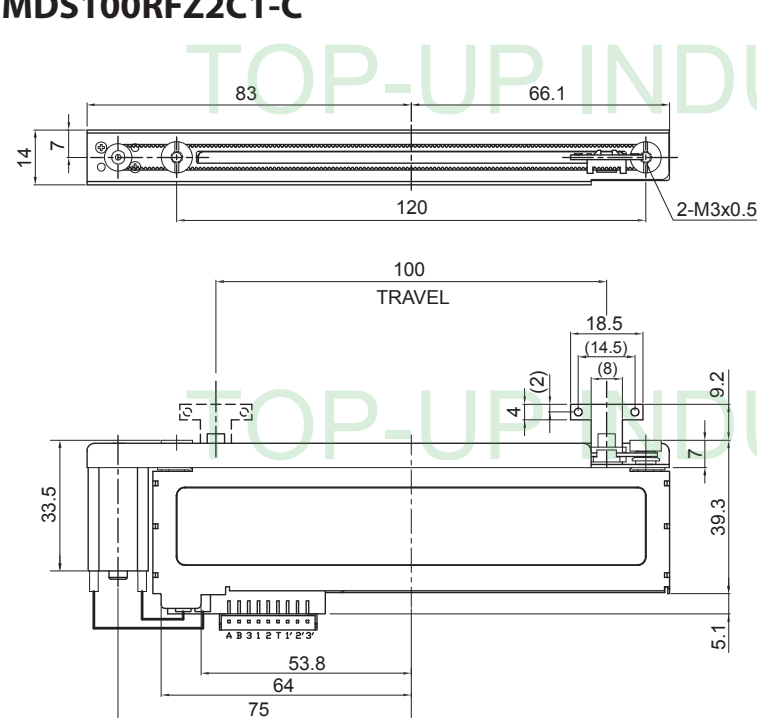


MDS100RFZ2C1-C

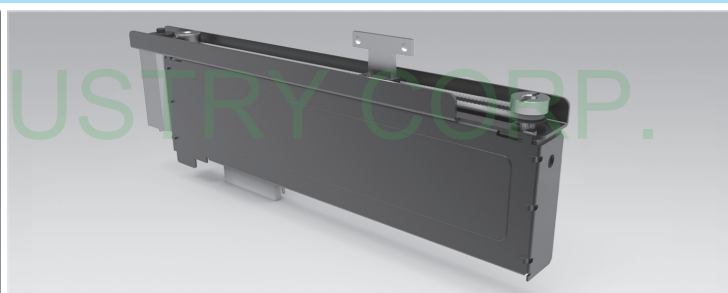


Outline Drawing

MDS100RFZ2C1-C

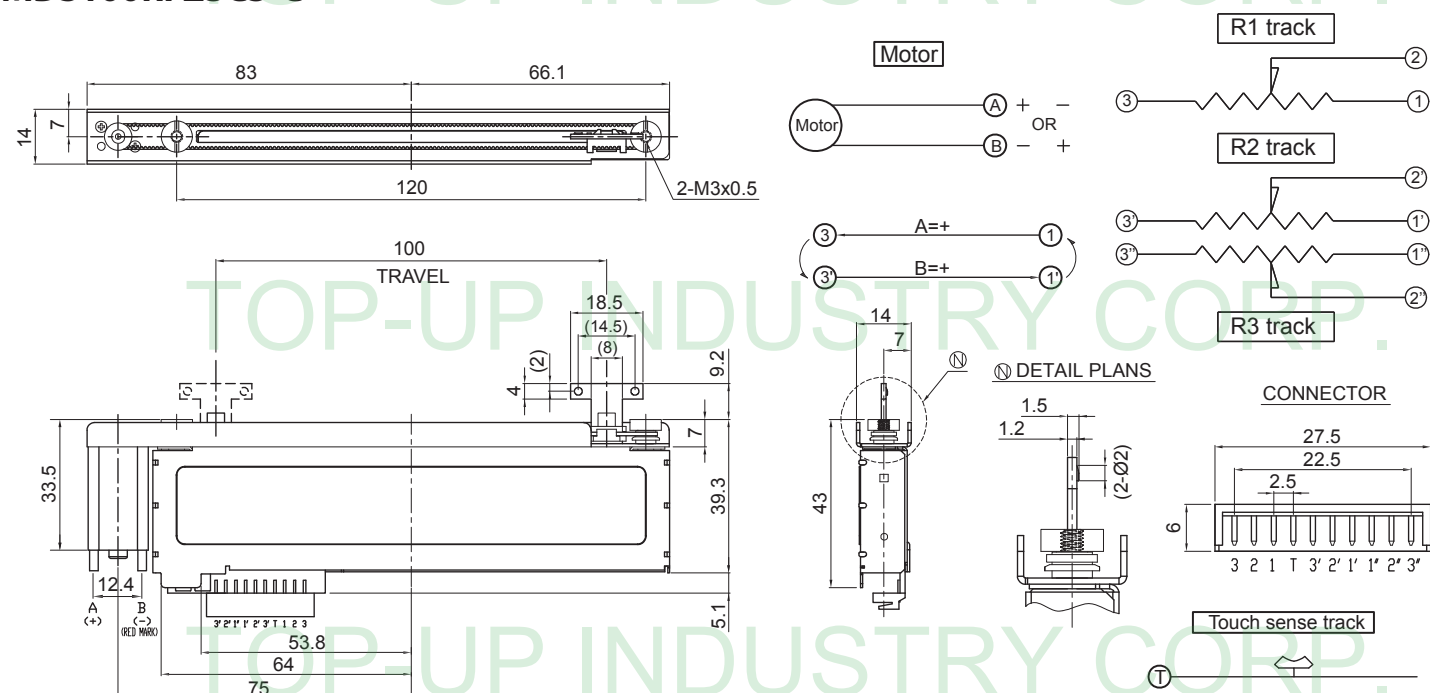


MDS100RFZ3C3-C



Features individual specifications

MDS100RFZ3C3-C



Non-Contact MS Series Code Explanation

MD	100	M	SL	2	-	CV	-	T1M	-	2A	-	A	B	-	N	-						
1	2	3	4	5		6		7		8		9	10		11		12					

1. MD — With Motor Driven (Only 60 , 100mm are available)

2. Travel of Sliding (45 , 60 , 100mm are available)

3. Non-Contact Type : " M " - Magnetic , " C " - Capacitance

4. Series : SL , SS and SRF Series.

5. Number for Output

1 — 1 Output 2 — 2 Output

6. Type of Terminal : CV - Connector Vertical Type (180°)

CH - Connector Horizontal Type (90°)

B - PCB Terminal

7. Slide Lever Type : " M " - Metal Lever , " P " - Plastic Lever

Lever -Type	T1	T2	C1		
Dimensions					
Length (L)	8.2	9.2	15	20	25

8. Output Type : " V " - Analog Output , " D " - Digital Output

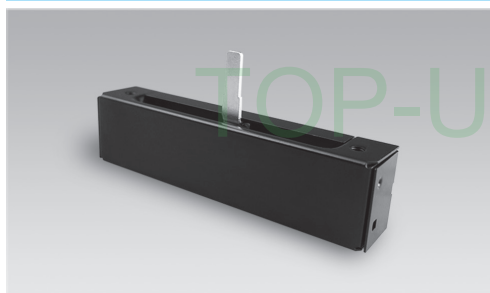
9. Type of Taper (See Taper Chart Last Page)

10. Touch Type : " N " - Non Touch
" A " - Air Touch (Non-Contact Touch)
" B " - Brush Touch
" AN " - Air Touch (No Function)

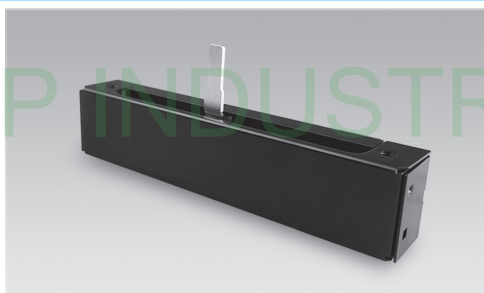
11. Flow Code

12. Serial No.

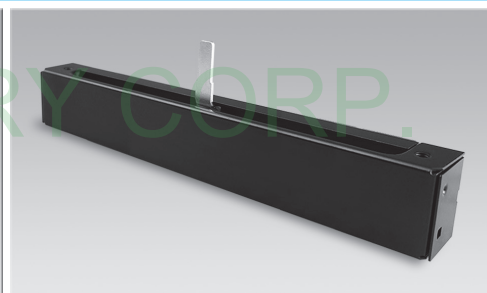
45MSS2-CV



60MSS2-CV



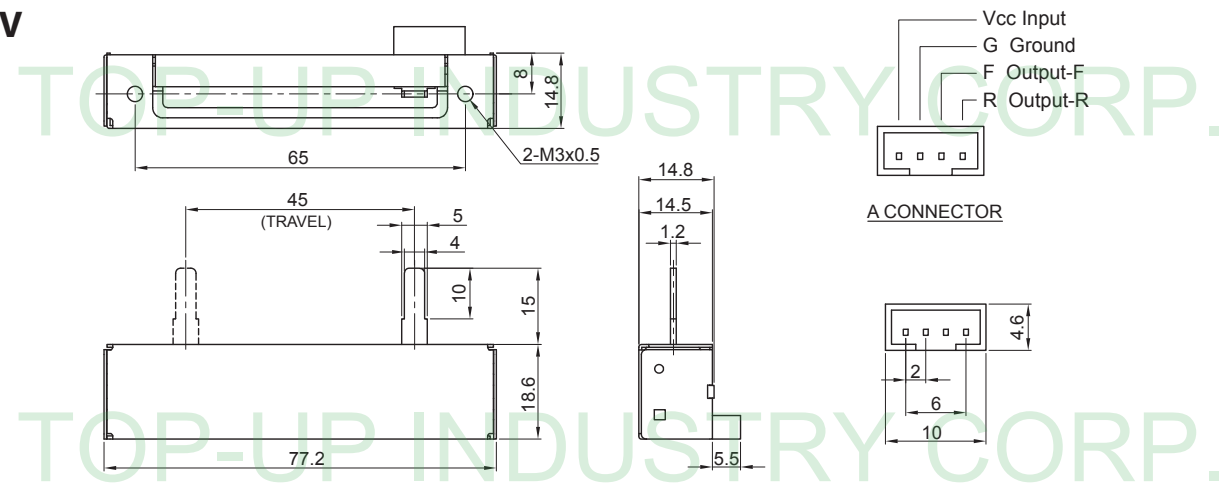
100MSS2-CV



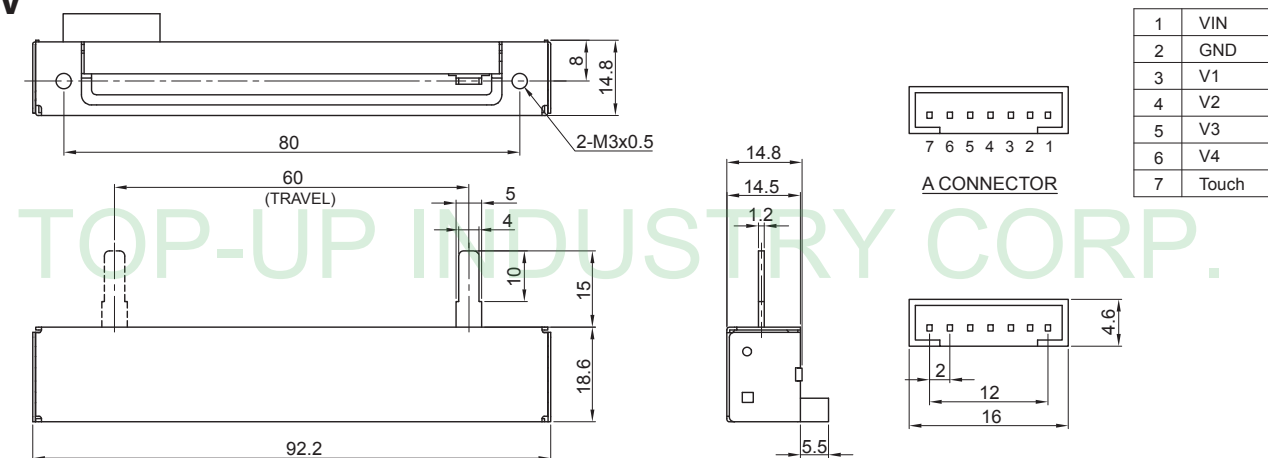
Outline Drawing

Features individual specifications

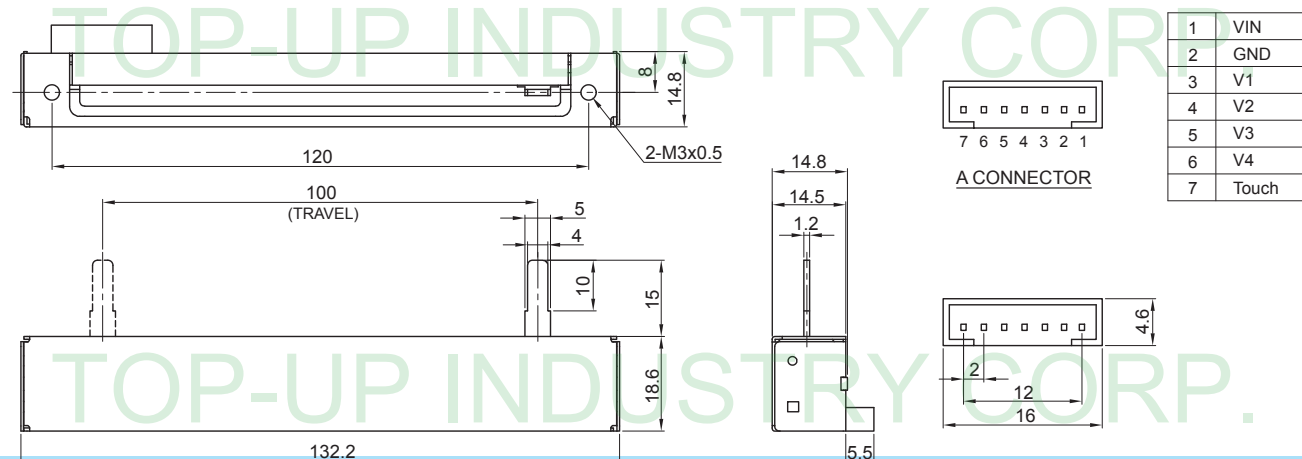
45MSS2-CV



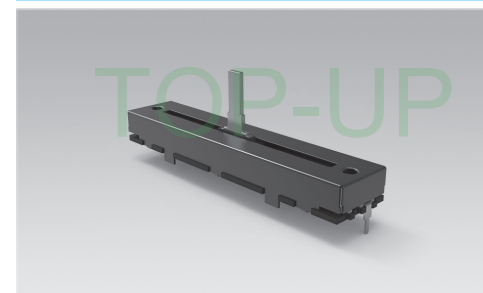
60MSS2-CV



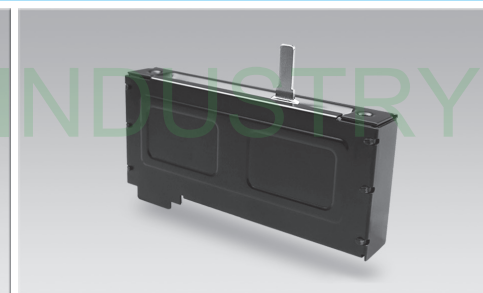
100MSS-CV



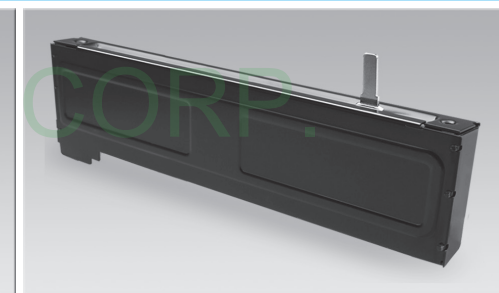
45MSRF1-B



45MSL2-CV



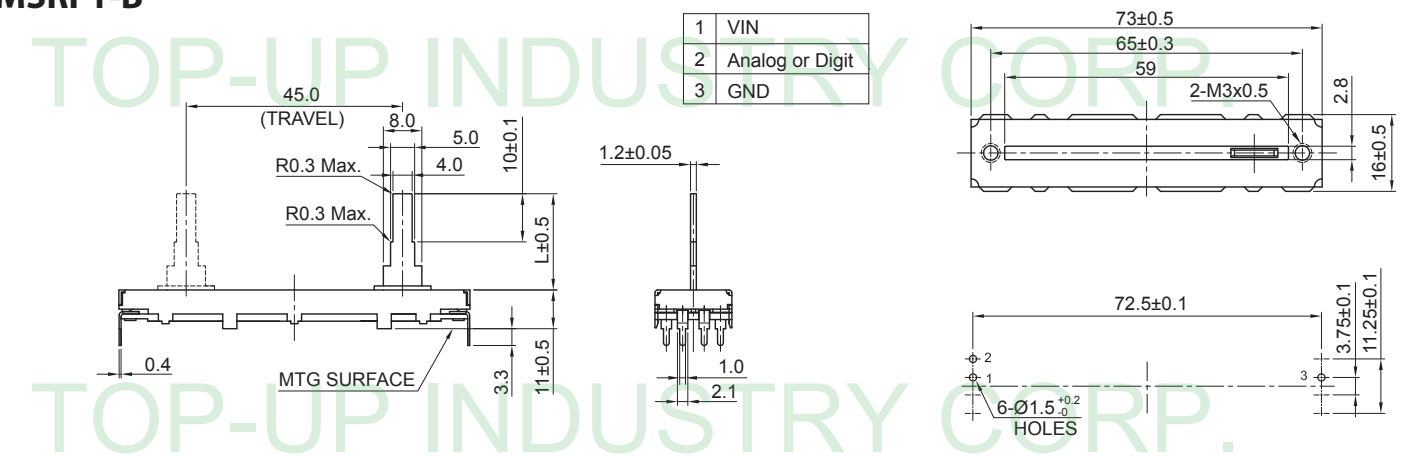
100MSL2-CV



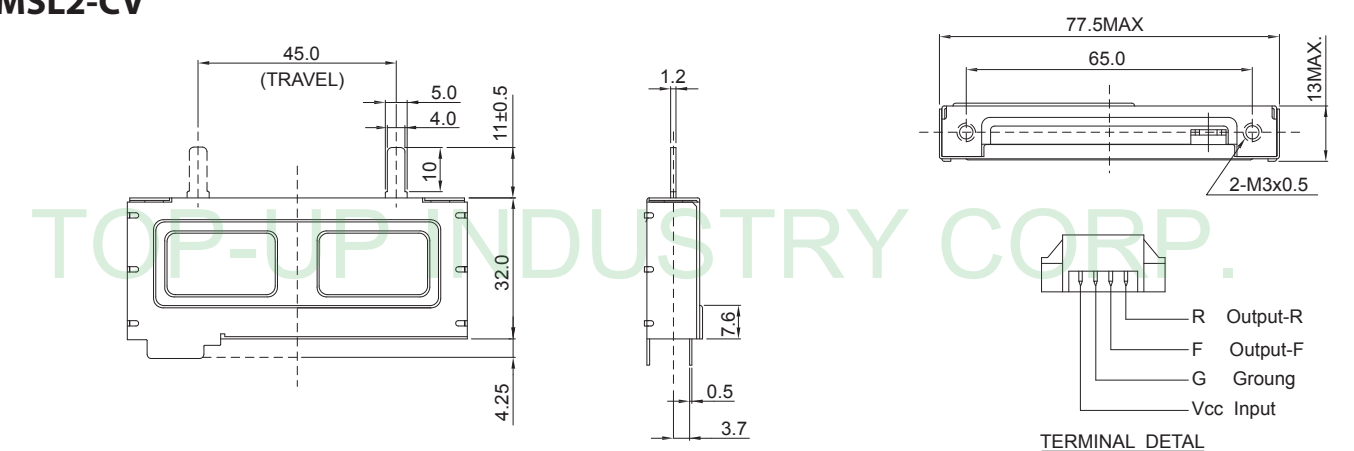
Outline Drawing

Features individual specifications

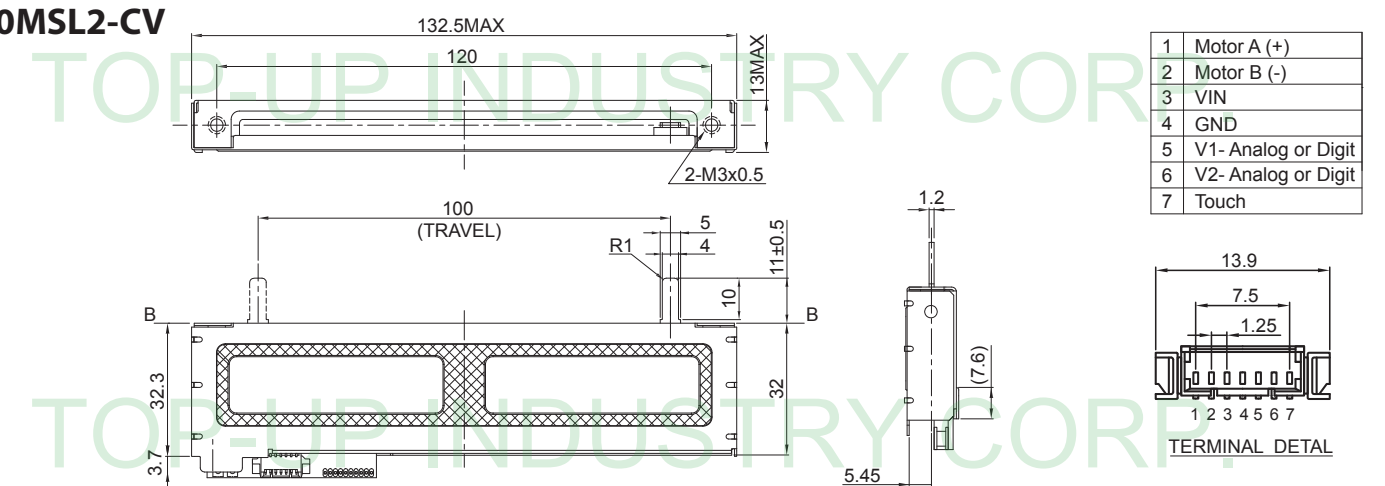
45MSRF1-B



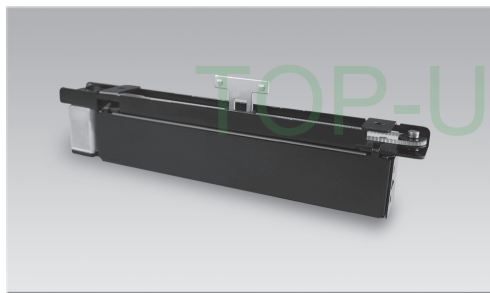
45MSL2-CV



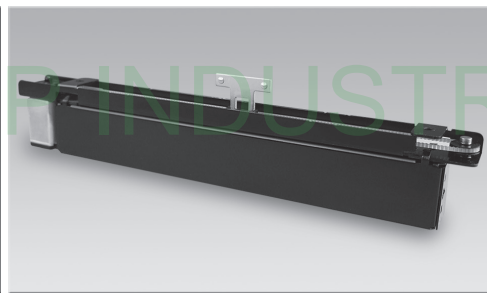
100MSL2-CV



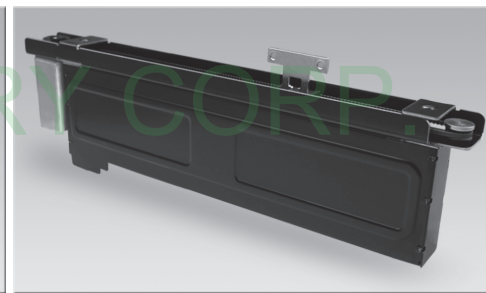
MD60MSS2-CV



MD100MSS2-CV



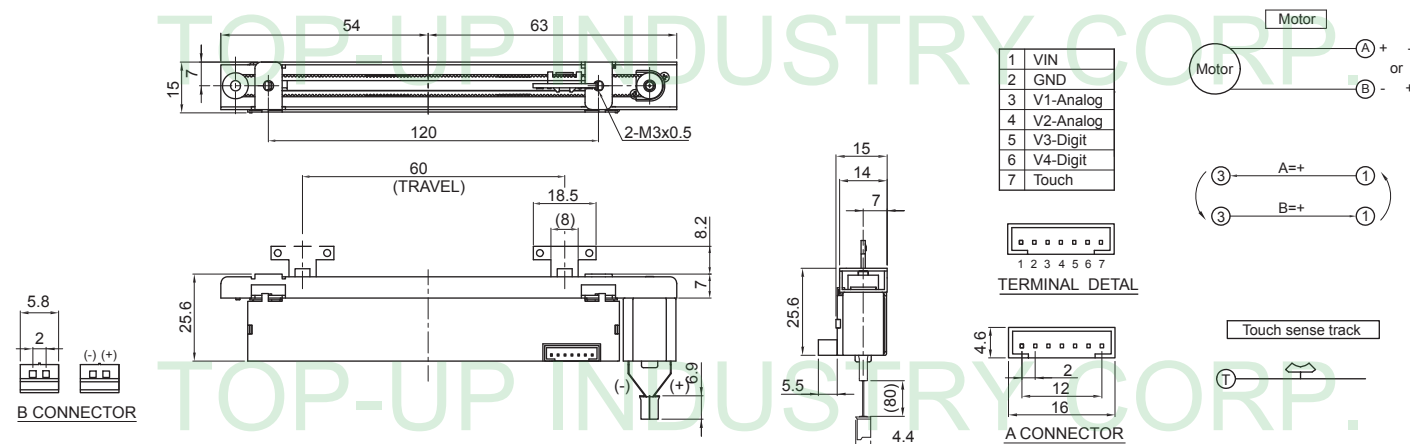
MD100MSL2-CV



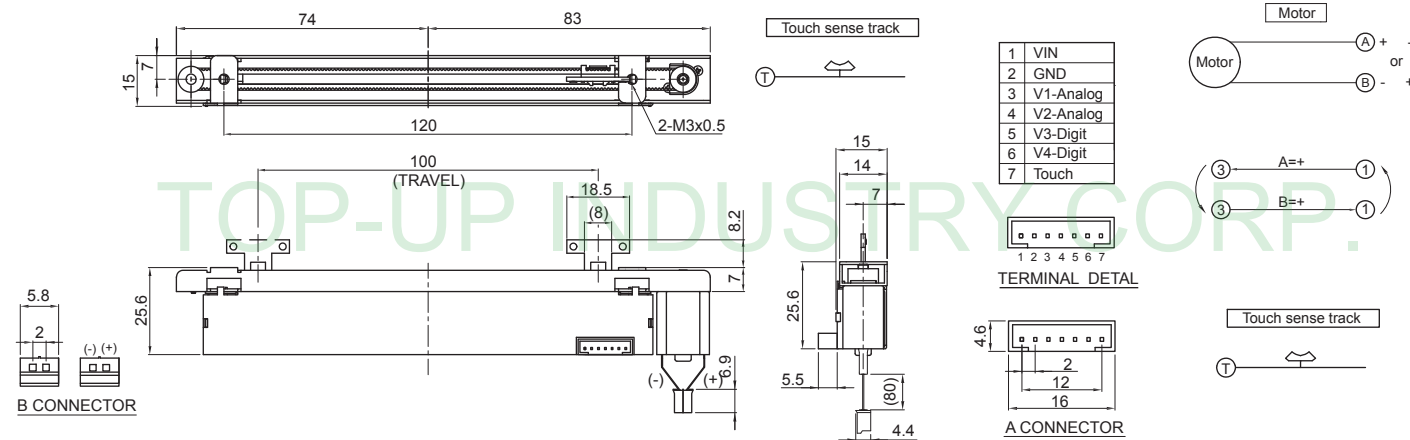
Outline Drawing

Features individual specifications

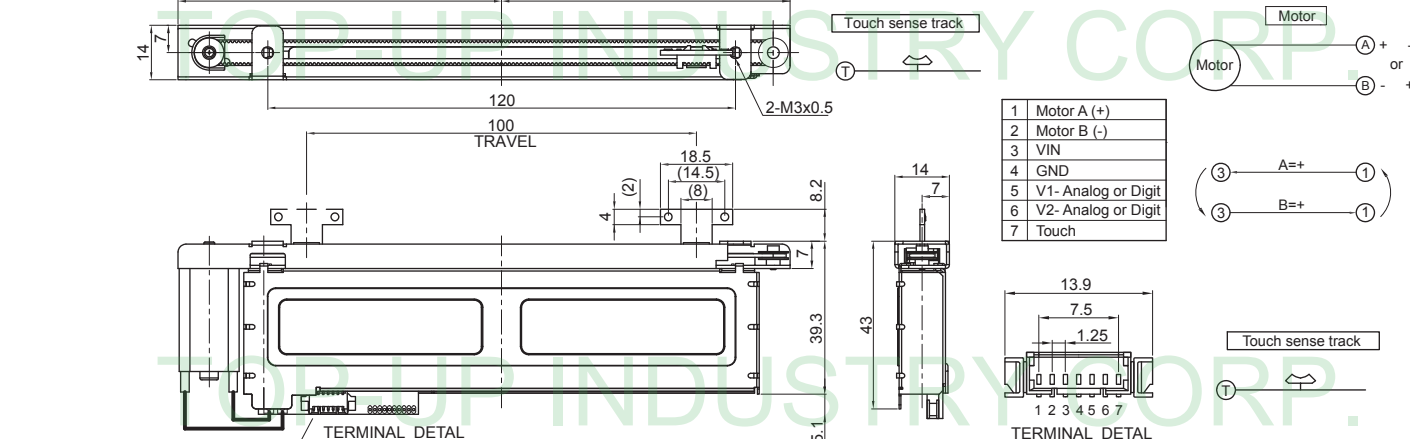
MD60MSS2-CV



MD100MSS2-CV



MD100MSL-CV



AT	Series	Code	Explanation
----	--------	------	-------------

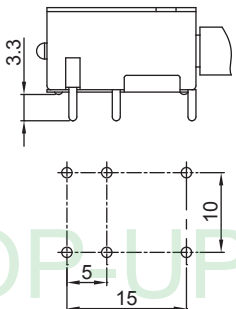
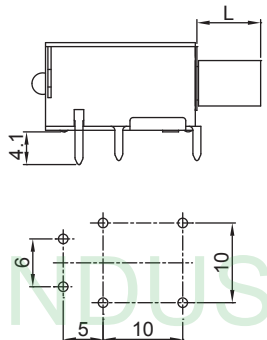
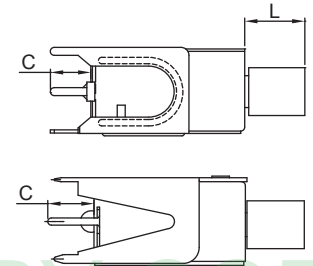
AT10P H F - B - 16 S R G - 3.5 Y - 20 -

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

1. Product Lines (AT10P— Insulated Shaft , 10mm Size Rotary Attenuators)
4. Horizontal (H) Type or Vertical (V) Type
3. Type of Frame: "F" , "ZF" , "NF" , "YF"

Horizontal			Vertical	
F - Type	ZF - Type	NF - Type	F - Type	YF - Type
				

- #### 4. Type of Terminal

Horizontal		Vertical										
B	B1	D										
												
		<table><tr><th>Terminal</th><th>D</th><th>D1</th><th>D2</th><th>D3</th></tr><tr><td>C</td><td>5.0</td><td>9.0</td><td>26</td><td>5.8</td></tr></table>	Terminal	D	D1	D2	D3	C	5.0	9.0	26	5.8
Terminal	D	D1	D2	D3								
C	5.0	9.0	26	5.8								

5. Shaft Length "L"
6. Type of Shaft

S - Type					SA - Type		K - Type			K1 - Type			
L	3	8	9	16	24	L	8	L	9		L	11	16

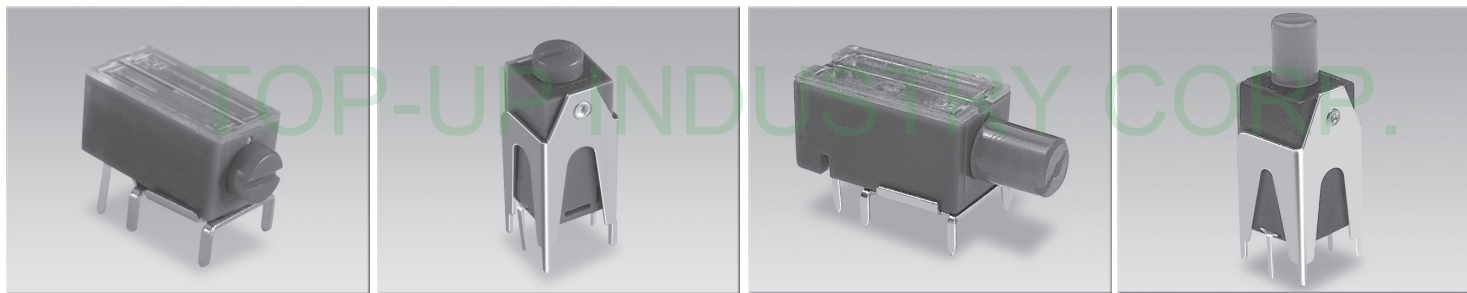
7. Shaft Color (R -Red, Y -Yellow, U -Blue and B -Black are available)
8. Case Color (B -Black; G -Green; U -Blue are available)
9. Total Rotation Turns: 3.5 turns ; 4 turns ; 6 turns
10. Endless (Y) ; Non-Endless (N)
11. dB: 20 - Standard Type (Other Type: 10 dB ; 15 dB ; 22dB ; 25 dB)
12. Series No.

AT8PHF-B1

AT8PVYF-D

AT10PHF-B1

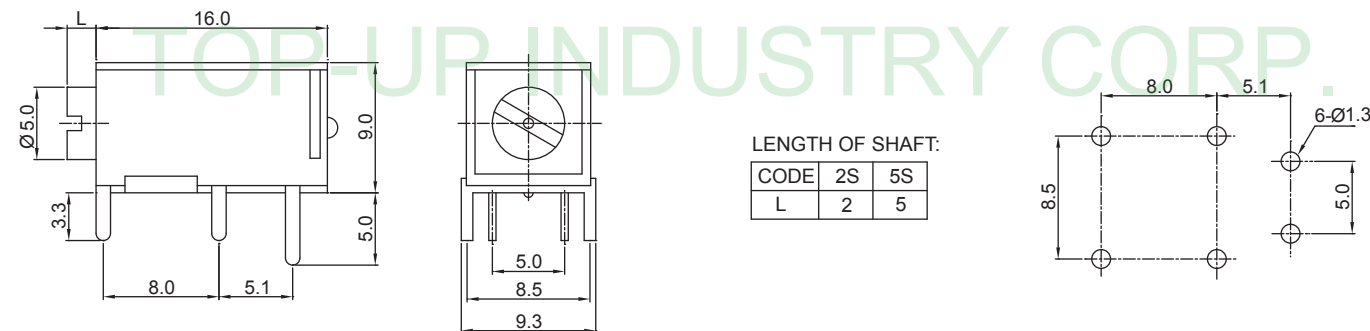
AT10PVYF-D



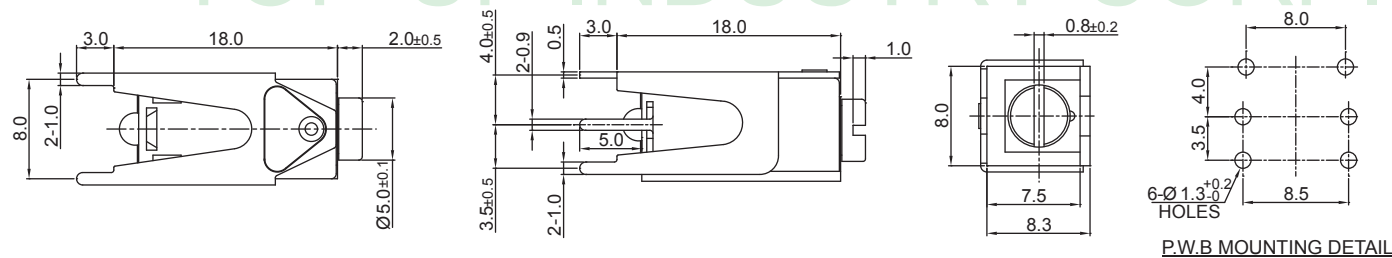
Outline Drawing

Features individual specifications

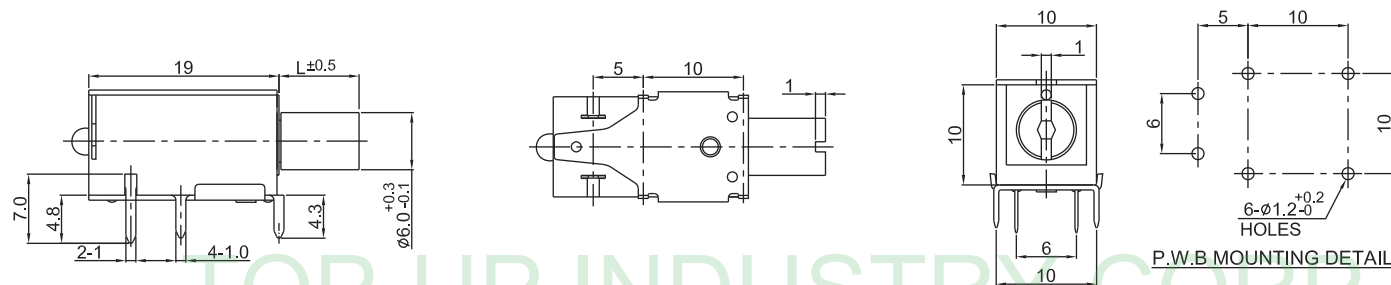
AT8PHF-B1



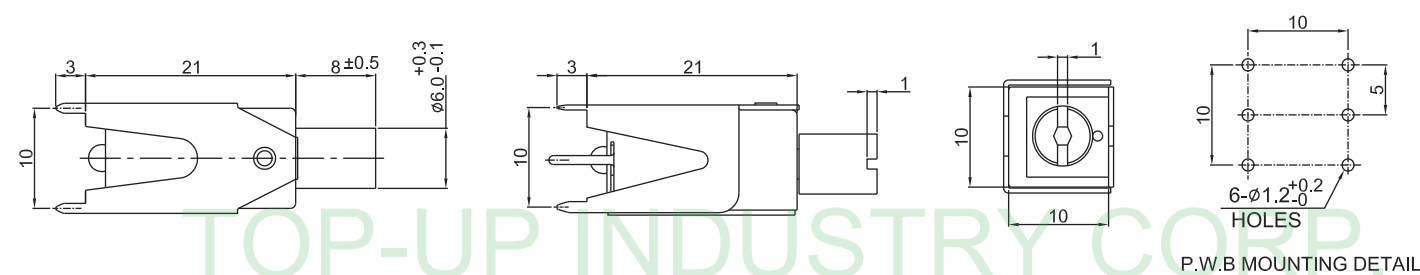
AT8PVYF-D



AT10PHF-B1



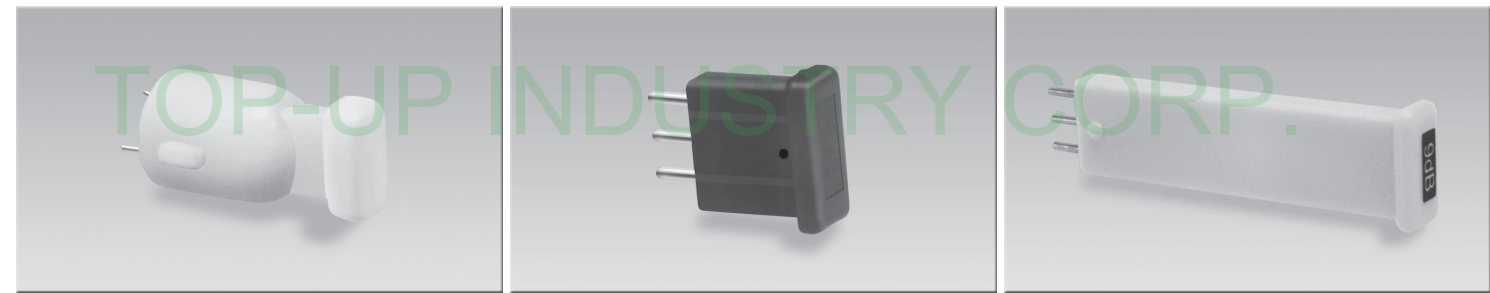
AT10PVYF-D



FAT-A

FAT-B

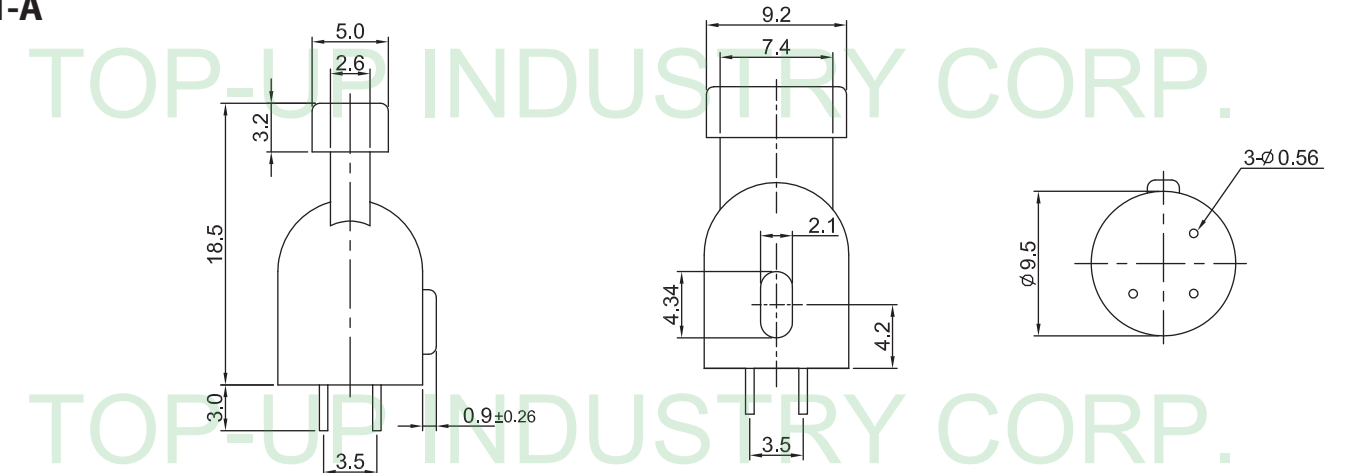
FAT-C



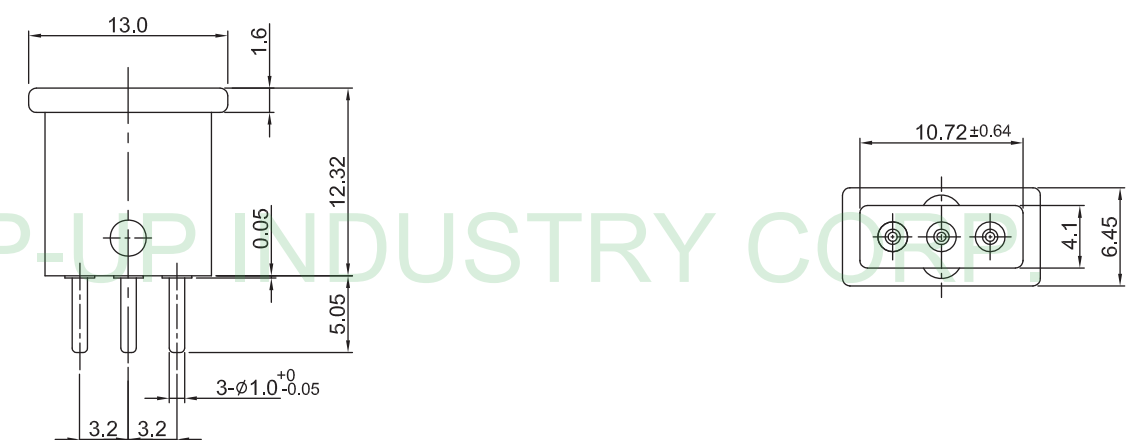
Outline Drawing

Features individual specifications

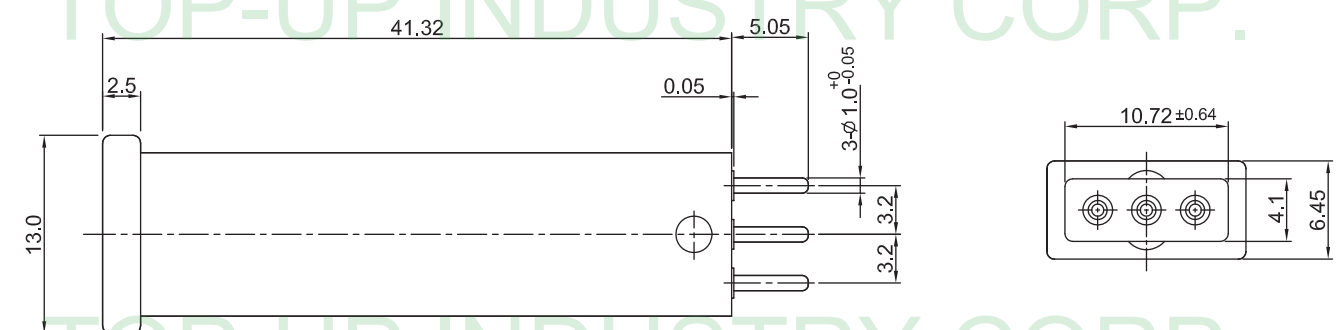
FAT-A



FAT-B



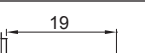
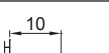
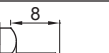
FAT-C



AT Series	Code	Explanation
100	100	100
101	101	101
102	102	102
103	103	103
104	104	104
105	105	105
106	106	106
107	107	107
108	108	108
109	109	109
110	110	110
111	111	111
112	112	112
113	113	113
114	114	114
115	115	115
116	116	116
117	117	117
118	118	118
119	119	119
120	120	120
121	121	121
122	122	122
123	123	123
124	124	124
125	125	125
126	126	126
127	127	127
128	128	128
129	129	129
130	130	130
131	131	131
132	132	132
133	133	133
134	134	134
135	135	135
136	136	136
137	137	137
138	138	138
139	139	139
140	140	140
141	141	141
142	142	142
143	143	143
144	144	144
145	145	145
146	146	146
147	147	147
148	148	148
149	149	149
150	150	150
151	151	151
152	152	152
153	153	153
154	154	154
155	155	155
156	156	156
157	157	157
158	158	158
159	159	159
160	160	160
161	161	161
162	162	162
163	163	163
164	164	164
165	165	165
166	166	166
167	167	167
168	168	168
169	169	169
170	170	170
171	171	171
172	172	172
173	173	173
174	174	174
175	175	175
176	176	176
177	177	177
178	178	178
179	179	179
180	180	180
181	181	181
182	182	182
183	183	183
184	184	184
185	185	185
186	186	186
187	187	187
188	188	188
189	189	189
190	190	190
191	191	191
192	192	192
193	193	193
194	194	194
195	195	195
196	196	196
197	197	197
198	198	198
199	199	199

AT 40M 1 H B - A - 20 K - 2/15 - C

1. Product Lines of AT Series (AT — Wire Wound Attenuators)
2. Series 40M — Metal Shaft, 40mm Size Series Wire Wound Attenuators
 50M — Metal Shaft, 50mm Size Series Wire Wound Attenuators
 60M — Metal Shaft, 60mm Size Series Wire Wound Attenuators
3. Number of Unit : 1 - Single Unit , 2-Dual Unit
4. Horizontal (H) Type or Vertical (V) Type
5. Bushing Length
6. Bushing Type

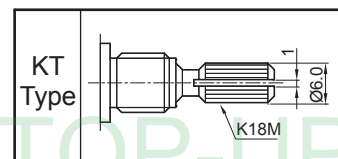
	Model	AT40M Series	AT50M Series	AT60M Series
Single Unit	B (Standard)	 10 M9X0.75	 10 M9X0.75	 8 M9X0.75
Dual Unit	B (Standard)	 19 M9X0.75	 10 M9X0.75	 8 M9X0.75

7. Type of Terminal

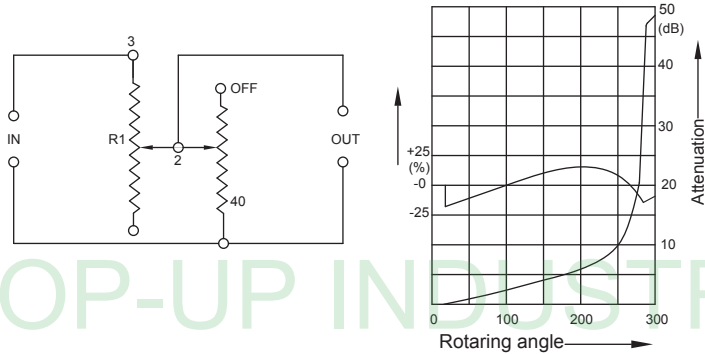
Horizontal		Horizontal	
A (Solder Lug Type)		A (Solder Lug Type)	

8. Shaft Length

9. Type of Shaft



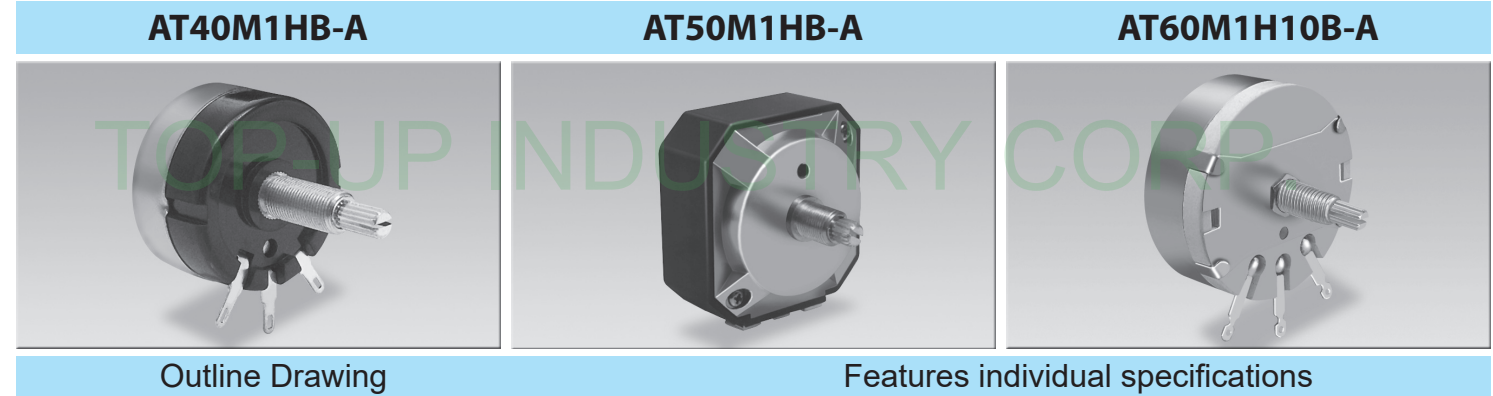
10. Attenuation / Power Rating : 2/15-2dB ,15W for more information, please see the list as below



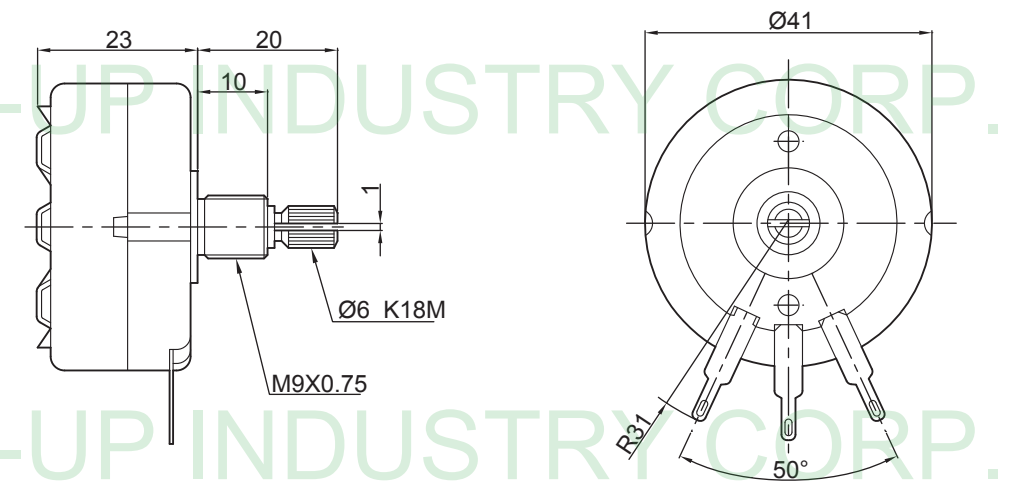
TYPE	POWER RATING
AT40M1HB-A	2 dB 15W, 6 dB/10W, 12 dB/6W
AT40M2HB-A	2 dB 12W, 6 dB/8W, 12 dB/4W
AT50M1HB-A	2 dB 30W, 6 dB/25W, 12 dB/15W
AT50M2HB-A	2 dB 25W, 6 dB/20W, 12 dB/10W
AT60M1HB-A	2 dB 50W, 6 dB/35W, 12 dB/25W
AT60M2HB-A	2 dB 40W, 6 dB/25W, 12 dB/15W

Network	L
Impedance	4Ω~8Ω
Impedance tolerance	±25%
Attenuation	0-40dB
Rotaring angle	300°±5°

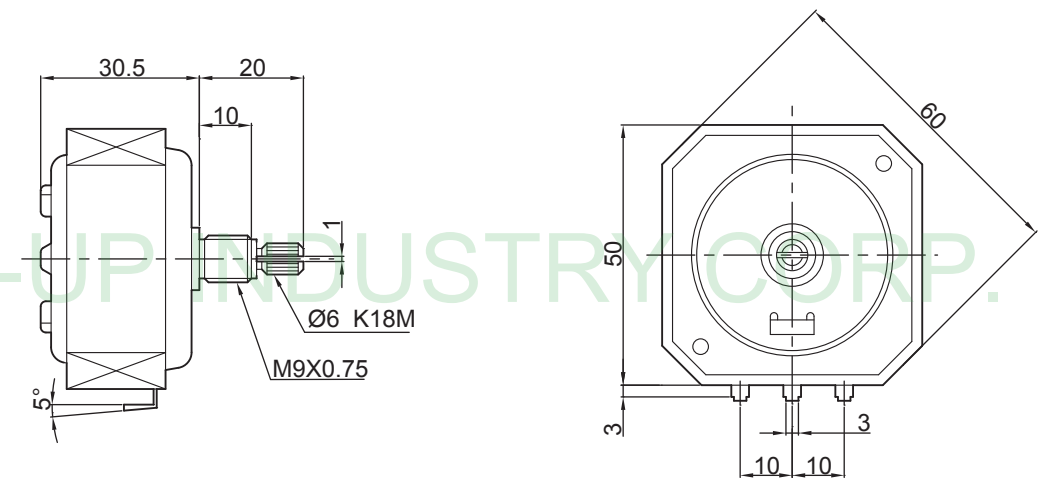
11. Number of Clicks : Blank - None
12. Serial No.



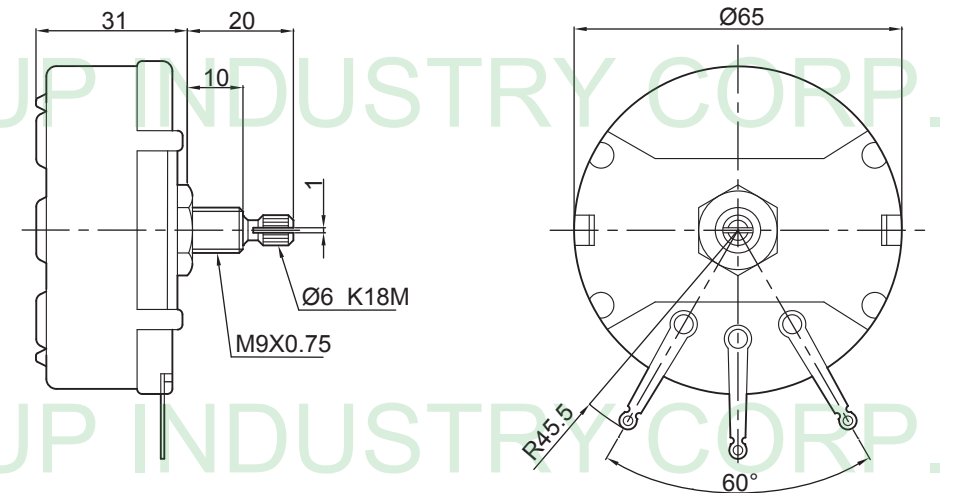
AT40M1HB-A



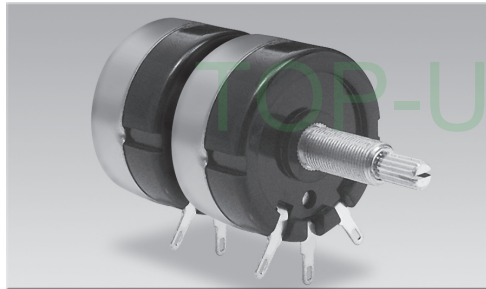
AT50M1HB-A



AT60M1H10B-A

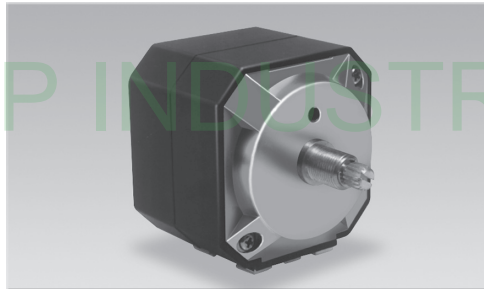


AT40M2HB-A



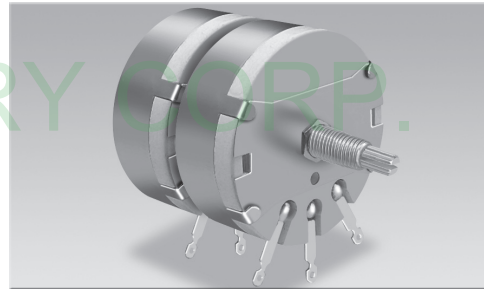
Outline Drawing

AT50M2HB-A

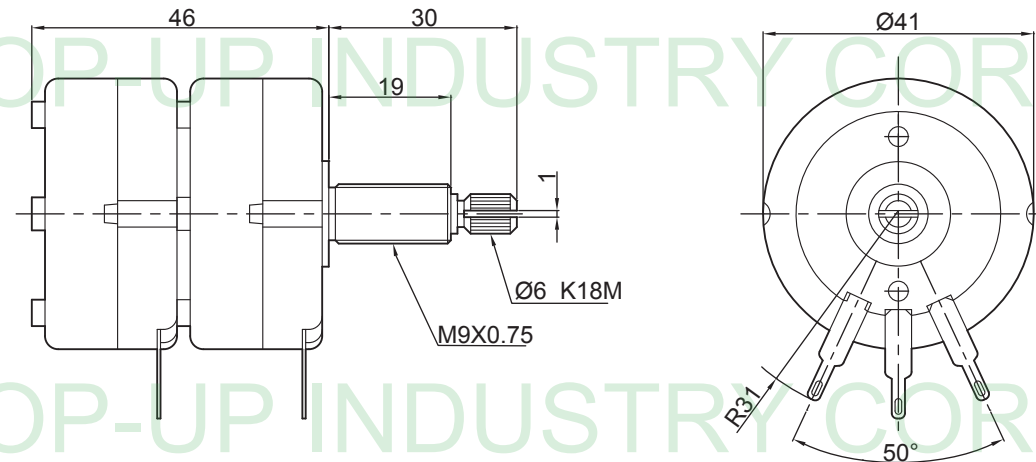


Features individual specifications

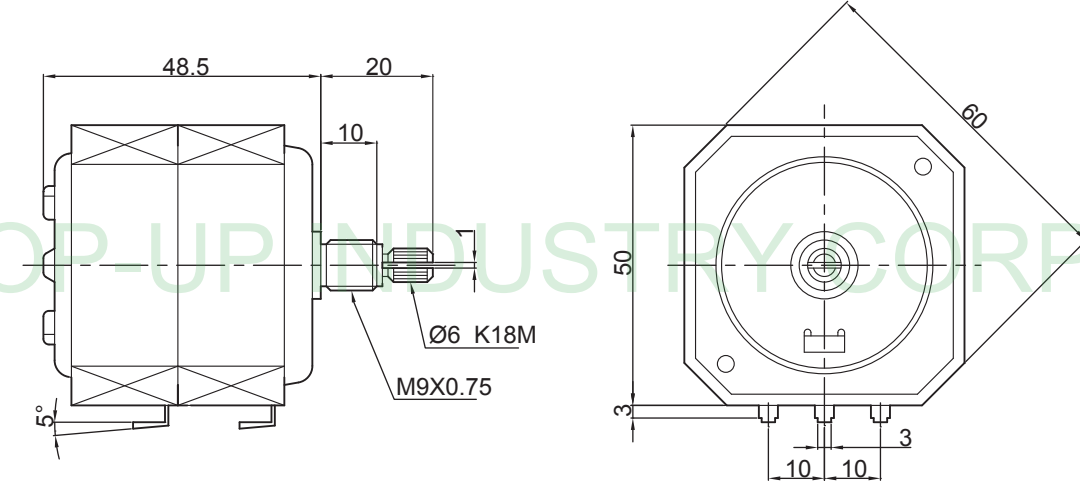
AT60M2H10B-A



AT40M2HB-A



AT50M2HB-A



AT60M2H10B-A

