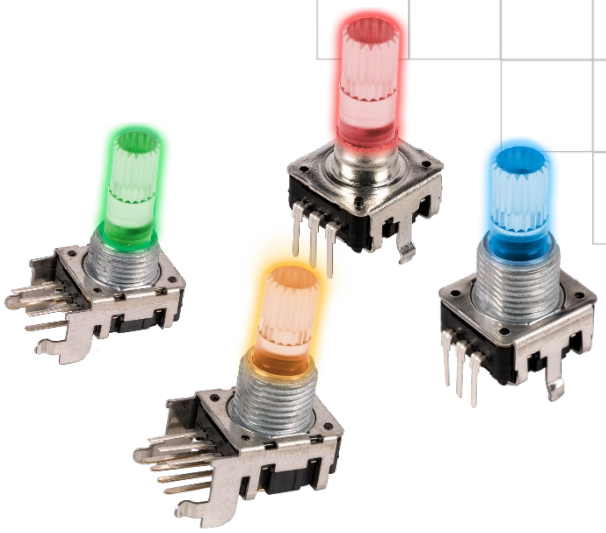
Series 12CE

12mm Rotary Encoder w/Illuminated Shaft

- Compact 12mm package size
- Single, dual and tri-color LED backlit shaft
- Rotational life (30,000 cycles)
- Switch life (20,000 actuations)
- Variety of standard resolutions and detent options



Applications

- Consumer portable electronics
- Commercial appliances
- Instrument amplifiers and guitar effects
- Keyboards and synthesizers
- Communications equipment

Ordering Information

Series	LED Option	Terminal Configuration	Shaft Length	Shaft Trim	Resolution	LED Color	Detent Option
12CE	3	H	20	B	12	T	N

Code	Spec.
H	Vertical/Rear Mount Thread Bushing, PC Pins
K	Vertical/Rear Mount Sleeve Bushing, PC Pins
N	Horizontal/Side Mount Sleeve Bushing, PC Pins, 10mm Height
Y	Horizontal/Side Mount Thread Bushing, PC Pins 10mm Height

Code	Spec.
12	12 PPR
24	24 PPR

Code	Spec.
N	No Detents
12	12 Detents*
24	24 Detents**

*Available w/12 PPR only
**Available w/12 & 24 PPR

Code	Spec.
B	Knurled (18 teeth)
F	Flatted

Code	Spec.
1	1-Color (no switch)
2	2-Color (w/switch)
3	3-Color (w/switch)

Code	Spec.*
15	15 mm
16	16 mm
17	17.5 mm
18	18.5 mm
20	20 mm
21	21 mm
24	24 mm
25	25 mm
26	26 mm

Code	Spec.
1	Red
2	Blue
3	Orange
4	White
5	Green
A	Blue/Orange
B	Green/Red
C	Blue/Green
D	Green/Orange
E	Blue/Red
T	Red/Green/Blue

** See shaft length and trim options (LM) for availability by shaft trim.*

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Encoder Specifications

		Min	Typical	Max	Unit
Voltage Rating	@ 0.5 mA	–	+5.0	–	VDC
Output	2-bit quadrature				
Insulation Resistance	100 MΩ min. @ 250 VDC				
Dielectric Strength	300 VAC for 1 min., no arcing				
Resolution	12 or 24 PPR (pulses per revolution)				
Contact Bounce/Chatter	(See Fig. 1)				
t1, t3	≤ 3 ms				
t2	≤ 2 ms				
Phase Difference	(See Fig. 2)				
12 PPR	ΔT ≥ 4 ms (A leads B by 90° in the CW direction)				
24 PPR	ΔT ≥ 3.5 ms (A leads B by 90° in the CW direction)				
Total Mechanical Travel	360° continuous				
Operating Torque	50 gf-cm (non-detent option only)				
Detent Position					
12 detents	30° ± 3°				
24 detents	15° ± 3°				
Detent Torque	30 to 200 gf-cm				
Detent Position Play	4° max.				
Shaft Wobble	1.0 x L/30mm p-p max.; L = Shaft Length				
Shaft Push-Pull Strength	5 kgf for 10 sec.				
Shaft Static Side Load	2 kgf max.				
Terminal Strength	300 gf max.				
Rotational Life	30,000 cycles @ 600 to 1,000 cycles/hr.				

Switch Specifications

		Min	Typical	Max	Unit
Voltage Rating	@ 10 mA	–	+5.0	–	VDC
Contact Resistance	100 mΩ max.				
Contact Arrangement	SPST Momentary				
Chatter	10 ms max.				
Switch Travel	0.5mm +0 mm / -0.3mm				
Actuation Force	450 gf ± 200 gf				
Insulation Resistance	100 MΩ min. @ 250 VDC				
Dielectric Strength	300 VAC for 1 min., no arcing				
Operating Life	20,000 actuations				
IP Rating	40				
Packaging	Tray. Thread Bushing terminal (Code H , Y) furnish with washer and nut in separate package.				
Weight	3.7 grams				

Environmental

		Min	Typical	Max	Unit
Operating Temperature		-10	–	+70	°C
Storage Temperature		-30	–	+70	°C
Soldering Conditions					
Wave Solder	Preheat: 100°C max for 2 min max; Solder temperature: 260°C ± 5°C for 5 sec max.; No clean foam flux recommended				
Manual Solder	350°C ± 5°C for 3 sec max.; Sn95Ag5 no clean solder				
Wash	Not recommended				
Moisture Sensitivity Level	1				
ESD Classification (HBM)	Not applicable				

All testing is performed at room ambient conditions except as noted. Users should verify device actual performance in their specific applications
This product is compliant to RoHS3 Directive 2015/863 Amendments of Annex II on 31 March 2015, and REACH SVHC Directive EC 1907/2006 Amendments of Annex XIV & Annex XVII on 10 June 2022.
Custom and value-added options available on request. Please contact your sales representative for additional information.

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Electrical Specifications

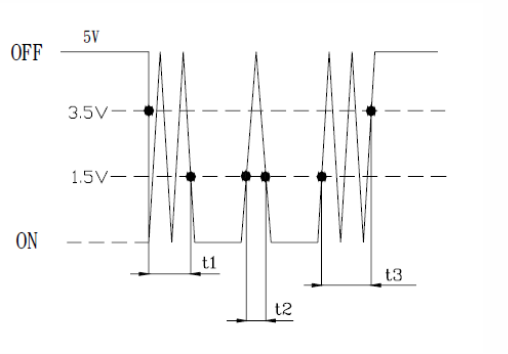


Figure 1: Contact Bounce/Chatter

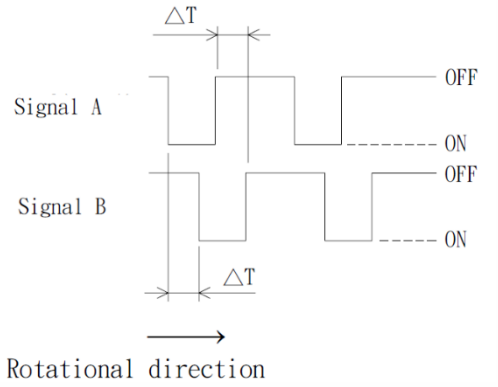


Figure 2: Phase Difference

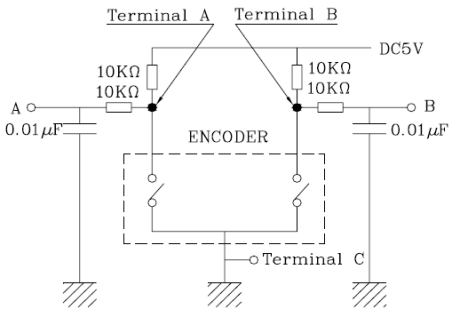
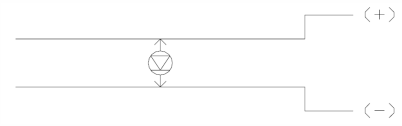
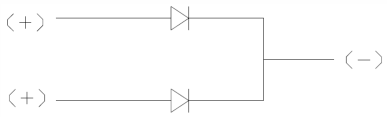


Figure 3: Suggested Filter Circuit

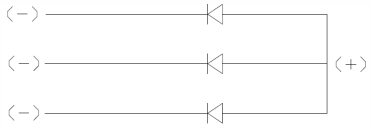
LED Specifications



1 color



2 color



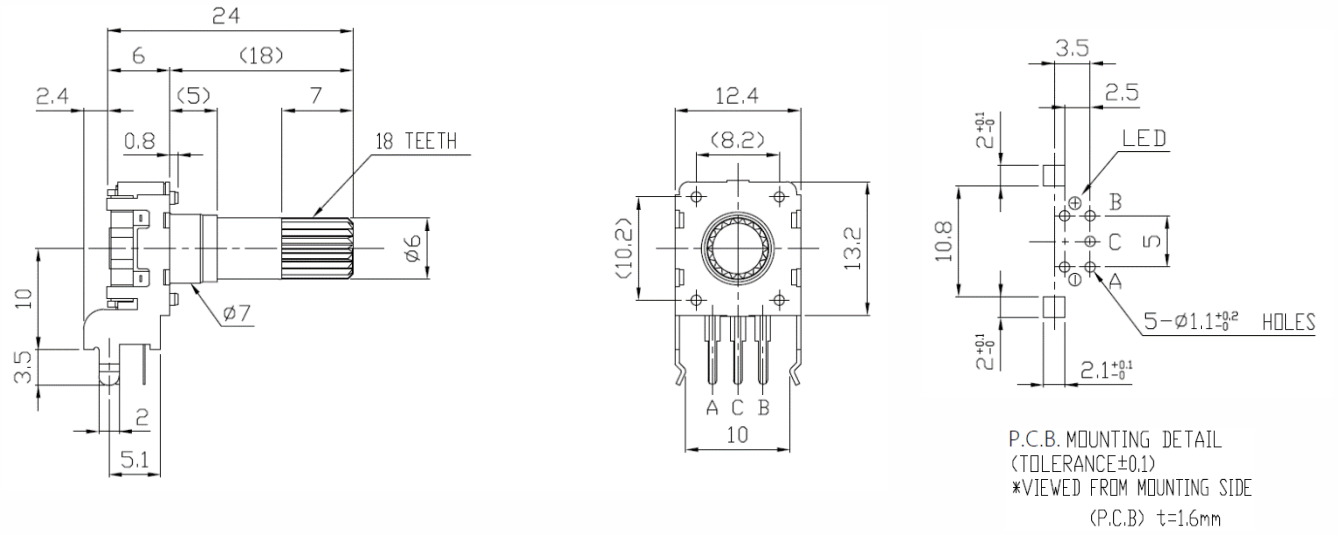
3 color

Emitted Color		Power Dissipation (mW)	DC Forward Current (mA)	Test Condition IF = 20 mA		
				Forward Voltage (V)		
				Minimum	Typical	Maximum
Red		60	30	—	1.8	2.6
Blue		72	20	—	3.2	3.6
Orange		100	30	—	2.1	2.6
White		72	20	—	3.2	3.6
Green		72	20	—	3.2	3.6
Blue/Orange	Blue	72	20	2.7	3.3	3.7
	Orange	60	25	1.7	2.0	2.4
Green/Red	Green	95	25	2..7	3.3	3.7
	Red	60	25	1.7	2.0	2.4
Blue/Green	Blue	75	20	2.7	3.3	3.7
	Green	95	25	2.7	3.3	3.7
Green/Orange	Green	95	25	2.7	3.3	3.7
	Orange	60	25	1.7	2.0	2.4
Blue/Red	Blue	75	20	2.7	—	3.3
	Red	60	25	1.7	—	2.4
Red/Green/Blue	Red	60	25	1.7	2.0	2.4
	Green	110	25	2.7	3.3	3.7
	Blue	110	25	2.7	3.3	3.7

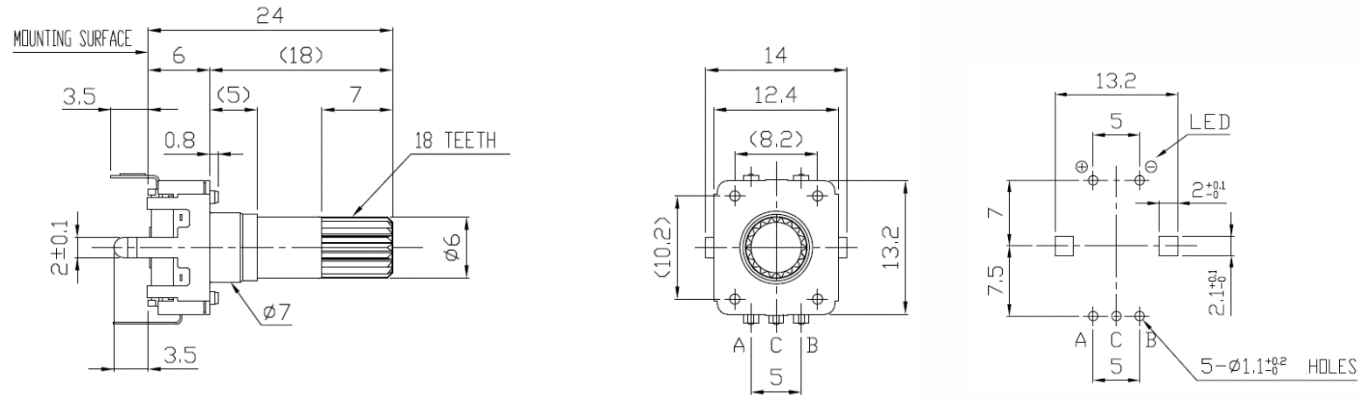
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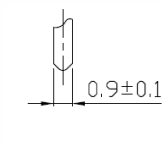
Mechanical Specifications

Series 12CE Horizontal/Side Mount with Sleeve Bushing and 1-Color LED



Series 12CE Vertical/Rear Mount with Sleeve Bushing and 1-Color LED





TERMINAL DETAIL

CIRCUIT DIAGRAM



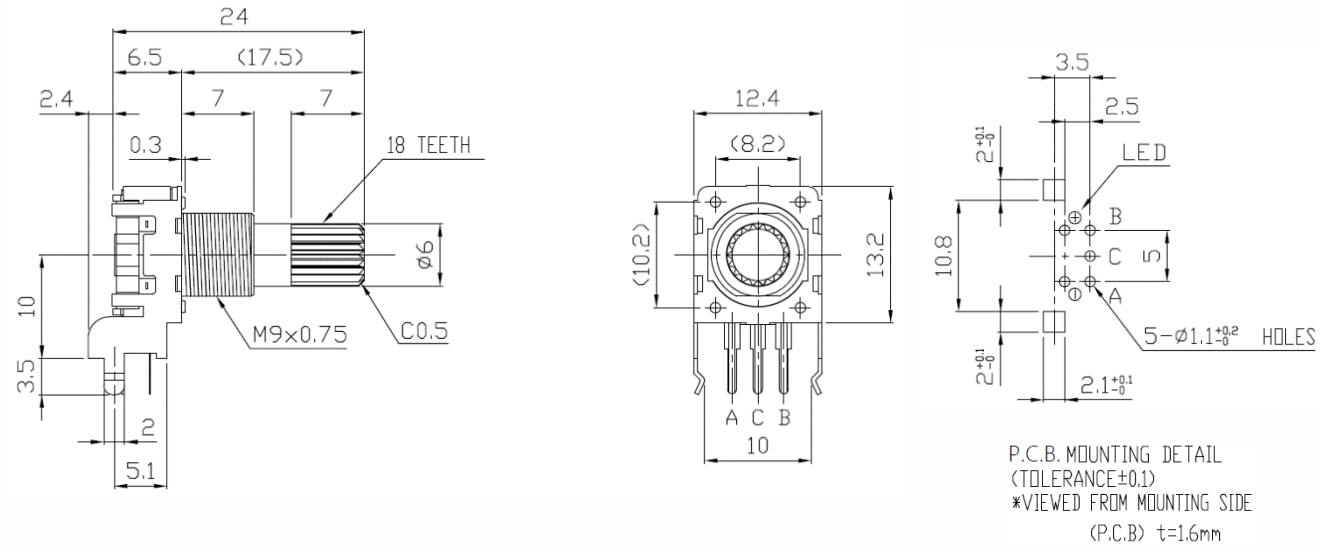
TOLERANCES UNLESS OTHERWISE SPEC	
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10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

Unit: mm

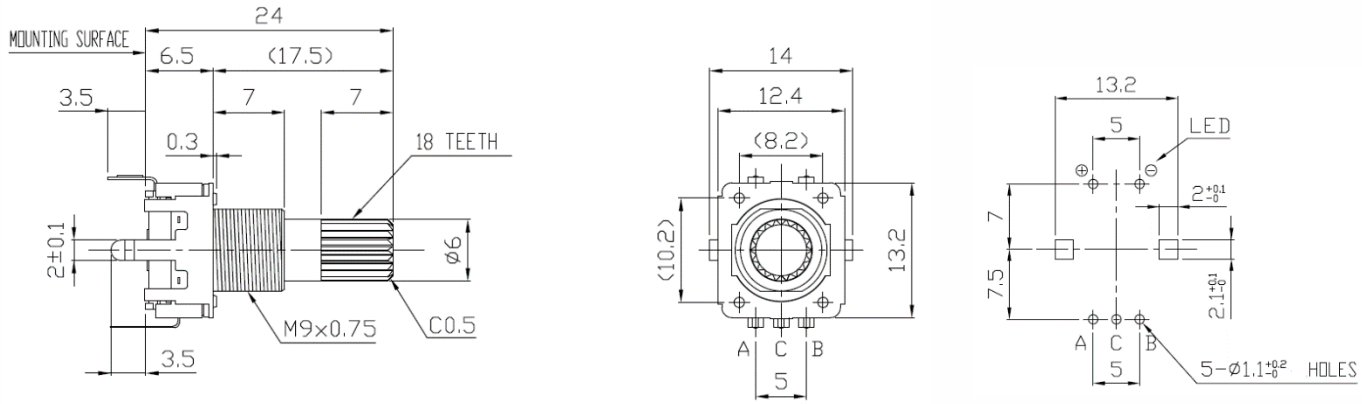
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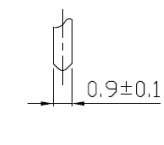
Mechanical Specifications

Series 12CE Horizontal/Side Mount with Threaded Bushing and 1-Color LED



Series 12CE Vertical/Rear Mount with Threaded Bushing and 1-Color LED





CIRCUIT DIAGRAM



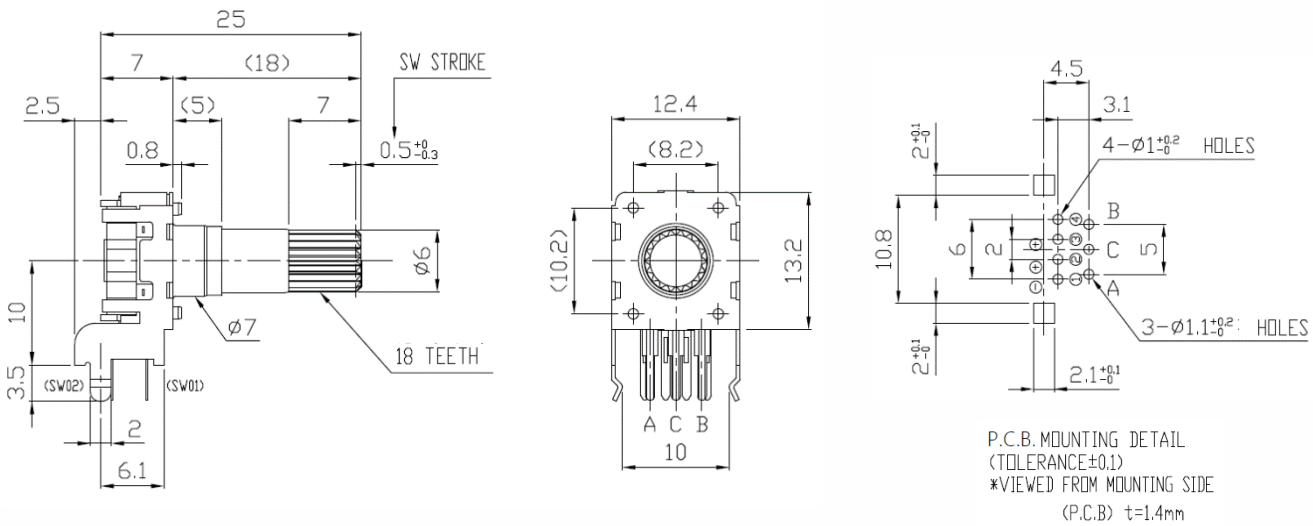
TOLERANCES UNLESS OTHERWISE SPEC	
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10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

Unit: mm

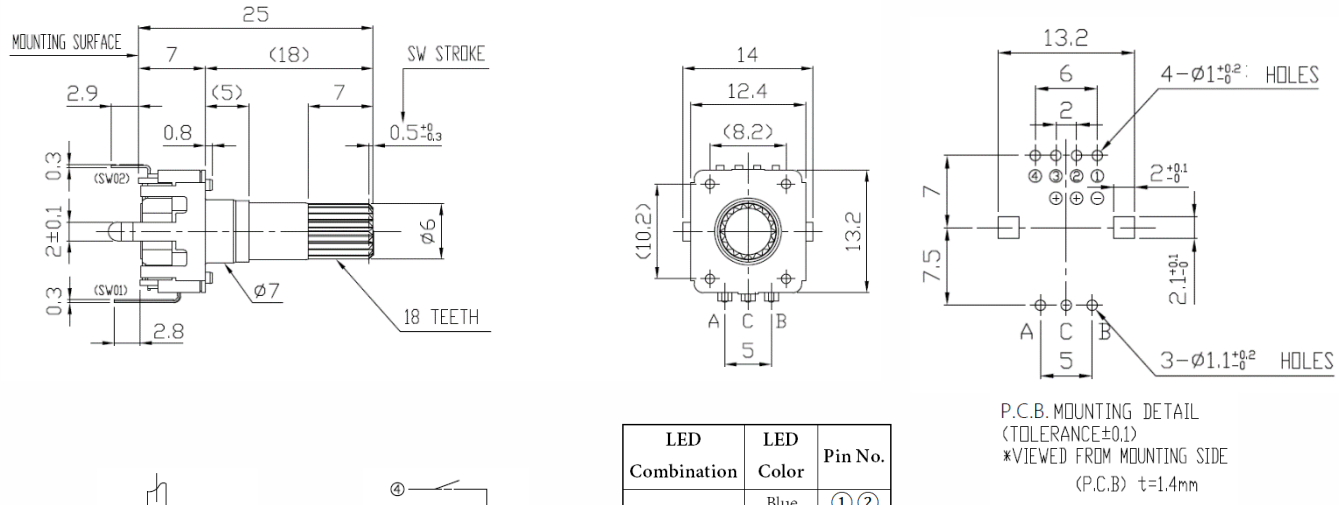
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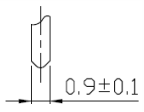
Mechanical Specifications

Series 12CE Horizontal/Side Mount with Sleeve Bushing and 2-Color LED

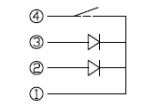


Series 12CE Vertical/Rear Mount with Sleeve Bushing and 2-Color LED





TERMINAL DETAIL



(SW02) LED
CIRCUIT DIAGRAM

LED Combination	LED Color	Pin No.
Blue/Orange	Blue	① ②
	Orange	① ③
Green/Red	Green	① ②
	Red	① ③
Blue/Green	Blue	① ②
	Green	① ③
Green/Orange	Green	① ②
	Orange	① ③
Blue/Red	Blue	① ②
	Red	① ③

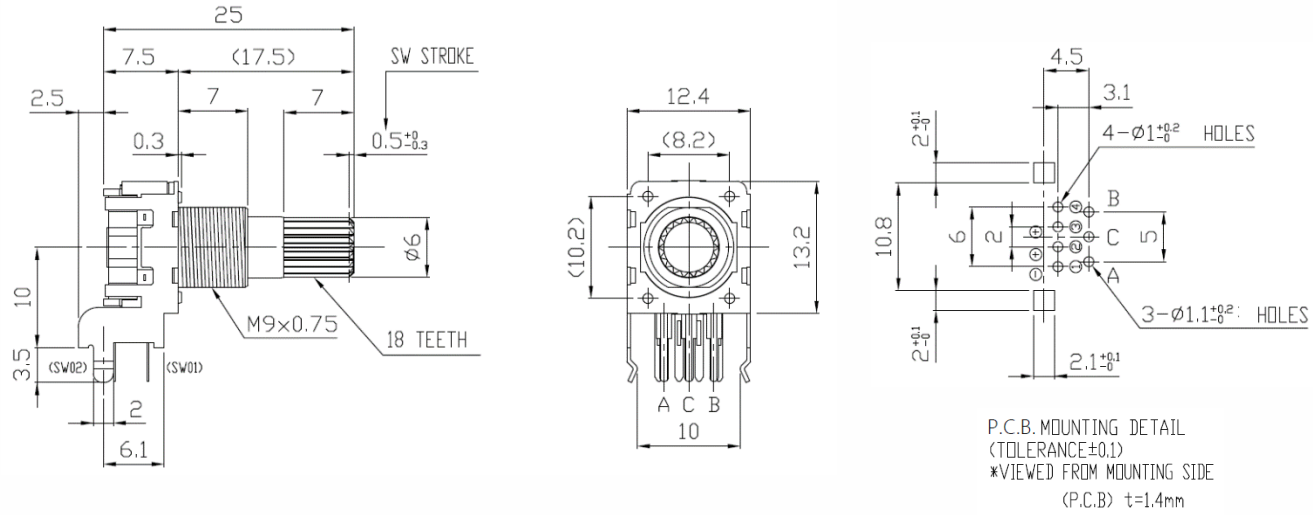
TOLERANCES UNLESS OTHERWISE SPEC	
L ≦ 10	±0.3
10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

Unit: mm

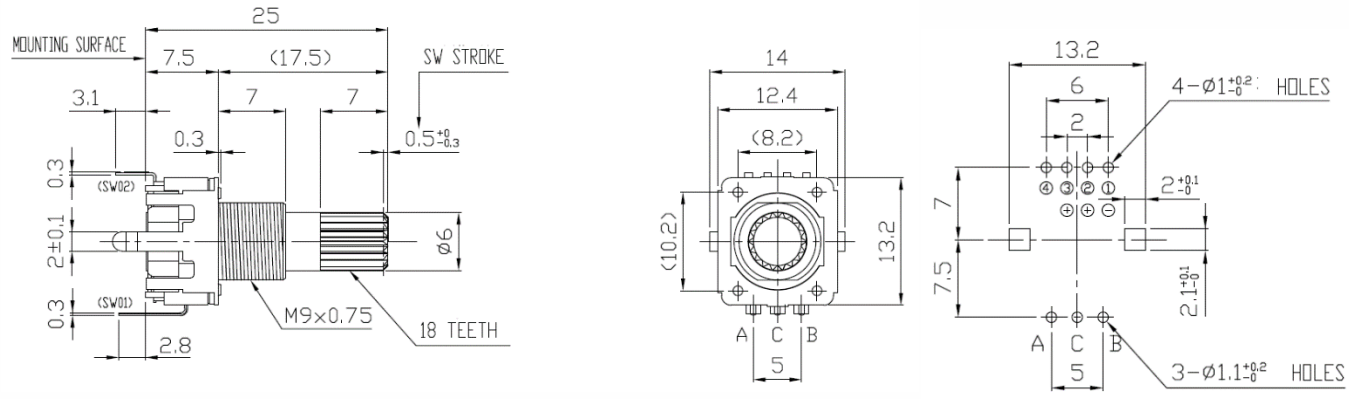
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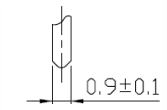
Mechanical Specifications

Series 12CE Horizontal/Side Mount with Threaded Bushing and 2-Color LED

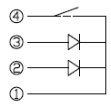


Series 12CE Vertical/Rear Mount with Threaded Bushing and 2-Color LED





TERMINAL DETAIL



(SW02) LED
CIRCUIT DIAGRAM

LED Combination	LED Color	Pin No.
Blue/Orange	Blue	① ②
	Orange	① ③
Green/Red	Green	① ②
	Red	① ③
Blue/Green	Blue	① ②
	Green	① ③
Green/Orange	Green	① ②
	Orange	① ③
Blue/Red	Blue	① ②
	Red	① ③

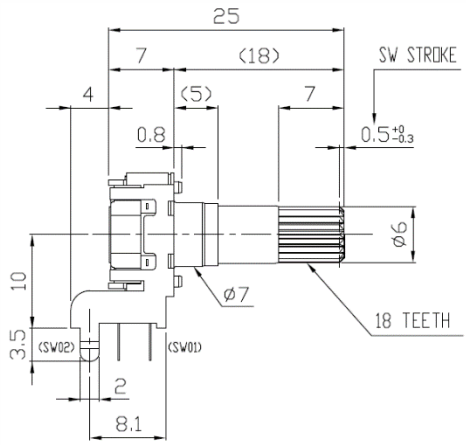
TOLERANCES UNLESS OTHERWISE SPEC	
L ≦ 10	±0.3
10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

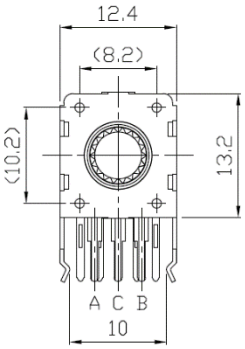
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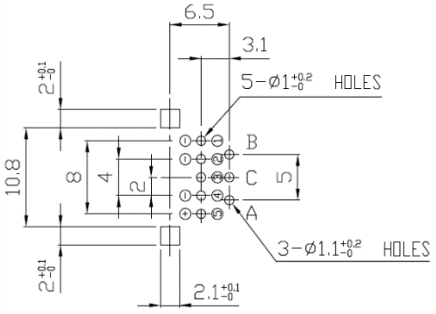
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Mechanical Specifications

Series 12CE Horizontal/Side Mount with Sleeve Bushing and 3-Color LED

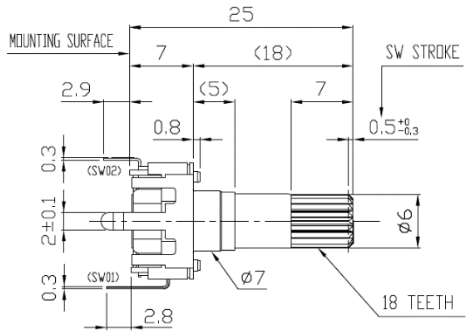


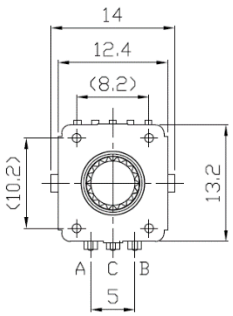


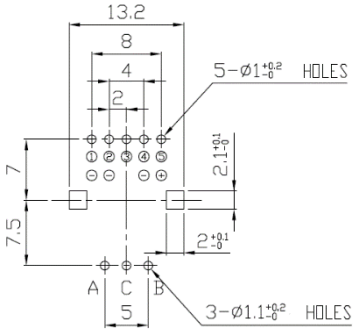


P.C.B. MOUNTING DETAIL
(TOLERANCE±0.1)
*VIEWED FROM MOUNTING SIDE
(P.C.B) t=1.6mm

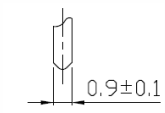
Series 12CE Vertical/Rear Mount with Sleeve Bushing and 3-Color LED



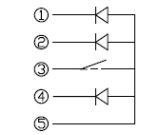




P.C.B. MOUNTING DETAIL
(TOLERANCE±0.1)
*VIEWED FROM MOUNTING SIDE
(P.C.B) t=1.6mm



TERMINAL DETAIL



(SW02) LED
CIRCUIT DIAGRAM

LED Combination	LED Color	Pin No.
Red/Green/Blue	Red	① ⑤
	Green	② ⑤
	Blue	④ ⑤

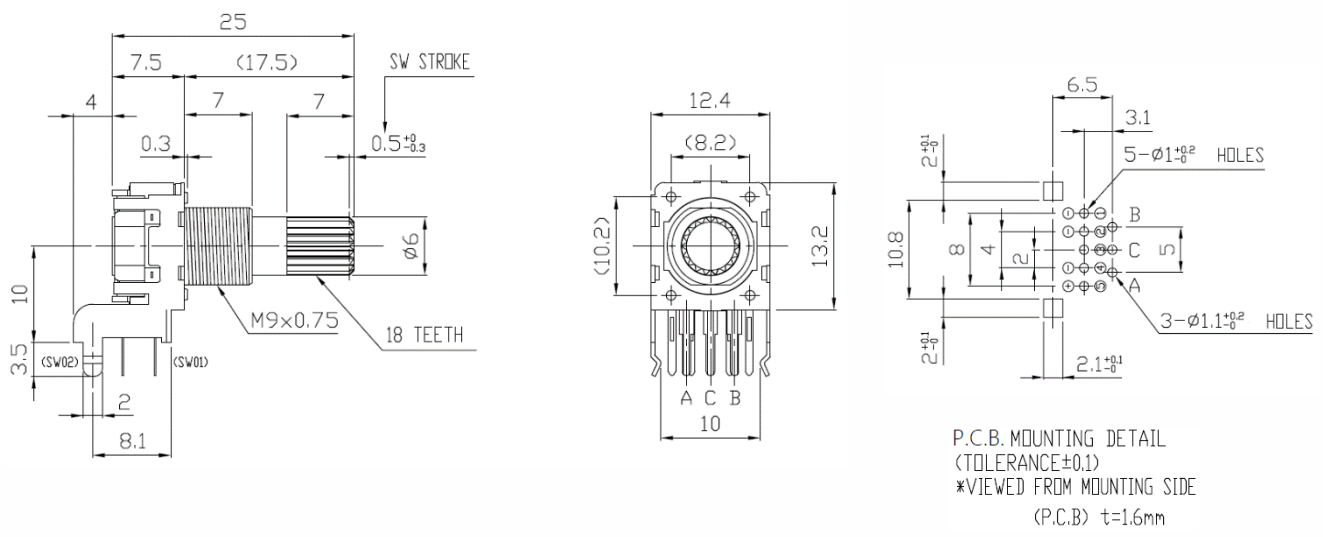
TOLERANCES UNLESS OTHERWISE SPEC	
L ≦ 10	±0.3
10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

Unit: mm

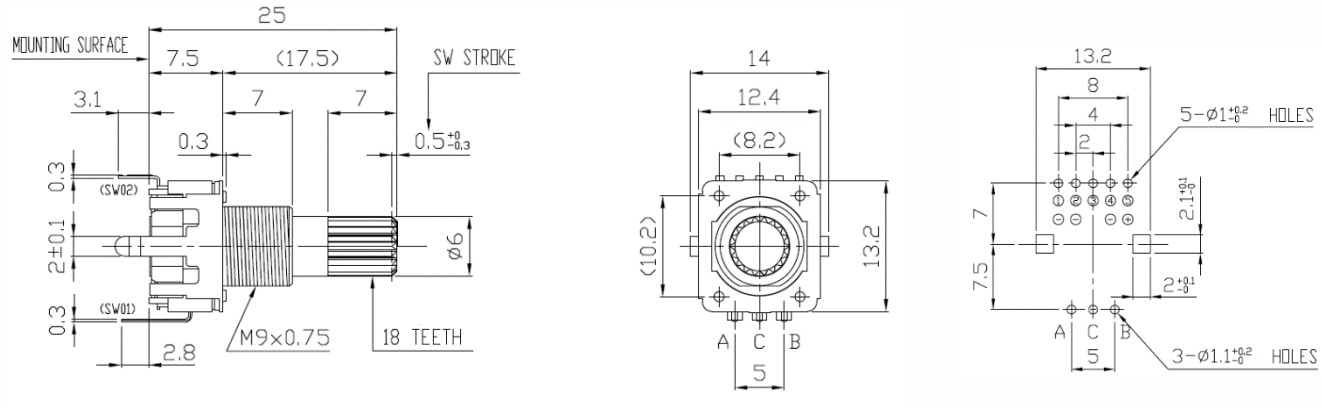
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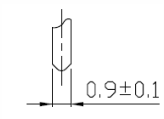
Mechanical Specifications

Series 12CE Horizontal/Side Mount with Threaded Bushing and 3-Color LED

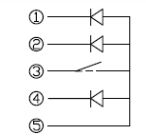


Series 12CE Vertical/Rear Mount with Threaded Bushing and 3-Color LED





TERMINAL DETAIL



(SW02) LED
CIRCUIT DIAGRAM

LED Combination	LED Color	Pin No.
Red/Green/Blue	Red	① ⑤
	Green	② ⑤
	Blue	④ ⑤

TOLERANCES UNLESS OTHERWISE SPEC	
L ≦ 10	±0.3
10 <L ≦ 100	±0.5
100 <L	±0.8
ANGULAR DIMENSION	±5°

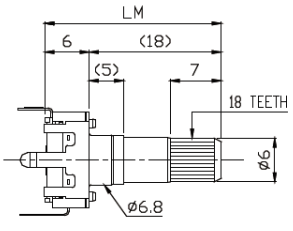
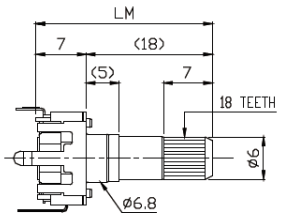
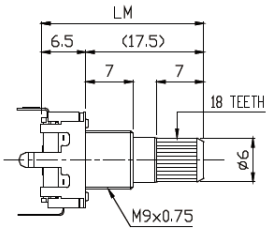
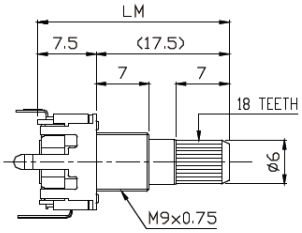
Unit: mm

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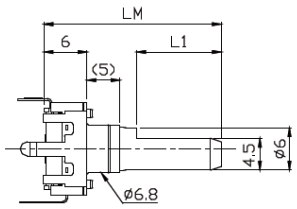
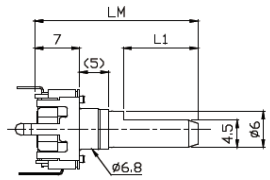
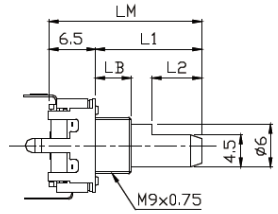
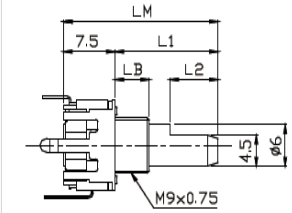
Mechanical Specifications

Series 12CE Shaft Length and Trim Options

Knurled Shaft Trim

Sleeve Bushing Single Color LED	Sleeve Bushing Dual and Tri-Color LED	Threaded Bushing Single Color LED	Threaded Bushing Dual and Tri-Color LED
			
LM	LM	LM	LM
24	25	24	25

Flatted Shaft Trim

Sleeve Bushing Single Color LED		Sleeve Bushing Dual and Tri-Color LED		Threaded Bushing Single Color LED				Threaded Bushing Dual and Tri-Color LED			
											
LM	L1	LM	L1	LM	LB	L1	L2	LM	LB	L1	L2
15	3	16	3	15	5	8.5	3	16	5	8.5	3
17.5	5	18.5	5	17.5	5	11	5	18.5	5	11	5
20	7	21	7	20	5	13.5	7	21	5	13.5	7
25	12	26	12	25	5	18.5	12	26	5	18.5	12

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