

**SERIES:** RIC11 | **DESCRIPTION:** MECHANICAL INCREMENTAL ENCODER**FEATURES**

- multiple shaft options
- different mounting options
- different resolution and detent options

**ELECTRICAL**

| parameter               | conditions/description                                                             | min | typ | max | units      |
|-------------------------|------------------------------------------------------------------------------------|-----|-----|-----|------------|
| power supply            |                                                                                    |     | 5   |     | V          |
| current consumption     | each lead                                                                          | 0.5 |     | 10  | mA         |
|                         | common lead                                                                        | 0.5 | 1   | 10  | mA         |
| output                  | 2-bit quadrature, channel A leads channel B by 90° with counter-clockwise rotation |     |     |     |            |
| output phase difference | $\Delta T \geq 6$ ms @ 60 rpm [see output waveform]                                |     |     |     |            |
| output resolution       | 15, 20 PPR                                                                         |     |     |     |            |
| detent step angle       | 20 detent models                                                                   | 16  | 18  | 20  | °          |
|                         | 30 detent models                                                                   | 10  | 12  | 14  | °          |
| insulation resistance   | at 250 Vdc, for 1 minute between terminals and bushing                             | 100 |     |     | M $\Omega$ |
| dielectric strength     | for 1 minute between terminals and bushing                                         |     | 300 |     | Vac        |

Notes: 1. All specifications measured at 15-35°C, humidity at 25-85%, under 86-106 kPa pressure, unless otherwise noted.

**PUSH SWITCH SPECIFICATIONS**

| parameter             | conditions/description                                 | min | typ    | max | units      |
|-----------------------|--------------------------------------------------------|-----|--------|-----|------------|
| rating                | 5 Vdc, 10 mA [1 mA min]                                |     |        |     |            |
| contact resistance    | voltage step-down test at 5 Vdc, 1 mA                  |     |        | 100 | m $\Omega$ |
| insulation resistance | at 250 Vdc, for 1 minute between terminals and bushing | 100 |        |     | M $\Omega$ |
| dielectric strength   | between terminals and bushing                          |     |        |     | Vac        |
|                       | for 1 minute (leakage current 1 mA)                    |     | 250    |     | Vac        |
|                       | for 2 seconds (leakage current 1 mA)                   |     | 300    |     |            |
| operating push force  |                                                        | 3   | 5      | 7   | N          |
| travel                |                                                        | 0.3 | 0.5    | 0.7 | mm         |
| bounce                | shaft rotated at 1 cycles/s [OFF-ON-OFF]               |     |        | 10  | ms         |
| push switch life      | at 1800~2000 cycles/hour without electrical load       |     | 20,000 |     | cycles     |

MECHANICAL

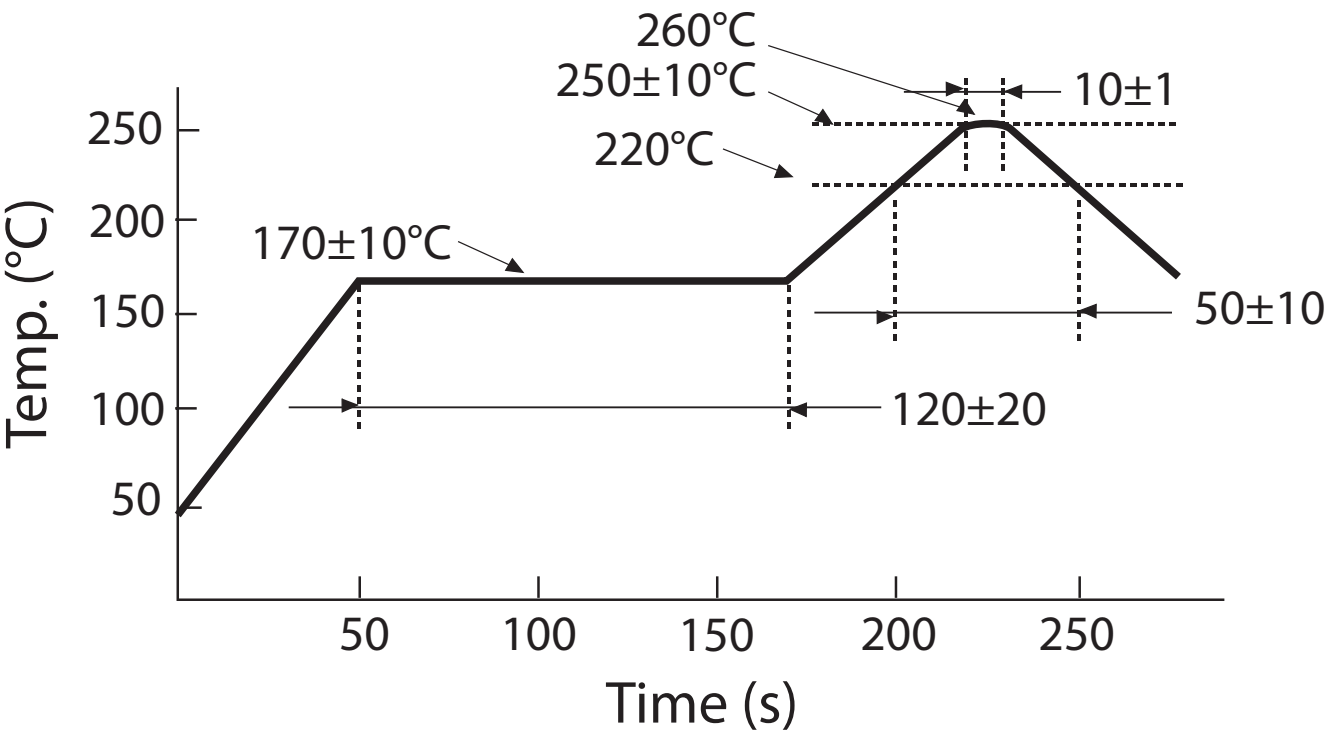
| parameter                       | conditions/description                                                                                      | min | typ     | max | units  |
|---------------------------------|-------------------------------------------------------------------------------------------------------------|-----|---------|-----|--------|
| shaft load                      | pull static load for 20 seconds                                                                             |     | 100     |     | N      |
|                                 | push static load for 10 seconds                                                                             |     | 100     |     | N      |
| rotational torque               |                                                                                                             | 10  | 15      | 20  | mN·m   |
| terminal strength               | a static load of 3 N applied to tip of terminals for 10 s                                                   |     |         |     |        |
| side thrust strength of shaft   | a load of 80 N applied at the point 5 mm from the tip of the shaft perpendicular to the shaft axis for 10 s |     |         |     |        |
| shaft play in rotational wobble | testing by angle board                                                                                      |     |         | 2   | °      |
| shaft play in axial direction   | pull/push load of 0.5 N applied on the shaft                                                                |     |         | 0.2 | mm     |
| rotational life                 | at 600~800 cycles/hour without electrical load                                                              |     | 100,000 |     | cycles |

ENVIRONMENTAL

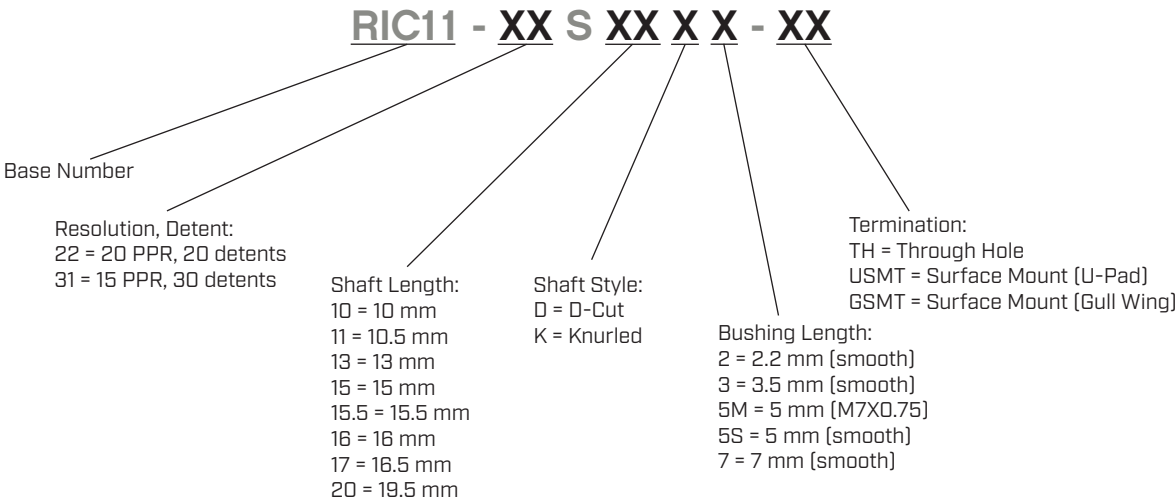
| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 85  | °C    |
| storage temperature   |                        | -40 |     | 85  | °C    |
| RoHS                  | yes                    |     |     |     |       |

SOLDERABILITY

| parameter        | conditions/description                 | min | typ | max | units |
|------------------|----------------------------------------|-----|-----|-----|-------|
| hand soldering   | for maximum 3 seconds                  |     |     | 350 | °C    |
| reflow soldering | only suitable for surface mount models |     | 260 |     | °C    |



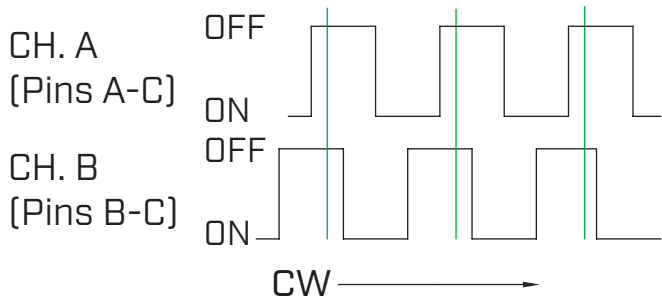
PART NUMBER KEY



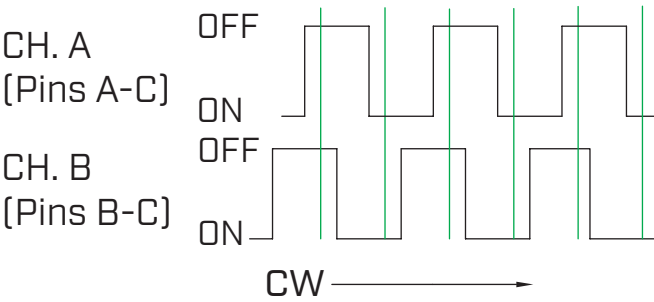
Note: 2. See Shaft Types and Mechanical Drawings for available configurations.

OUTPUT WAVEFORM

20 PPR, 20 Detent Models



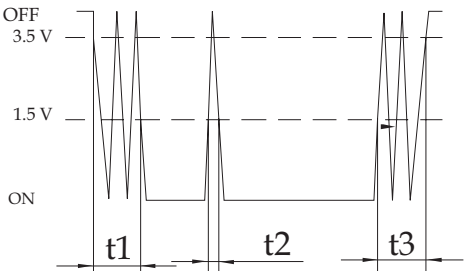
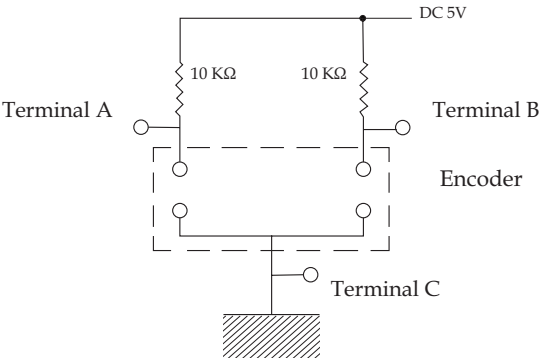
15 PPR, 30 Detent Models



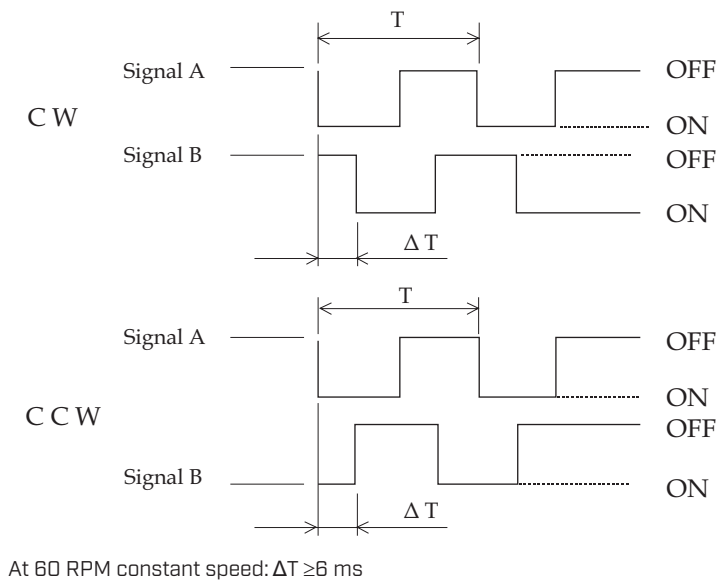
SWITCHING CHARACTERISTICS

| parameter              | conditions/description                                                                                                                                                                                                                                                                              | value         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| chattering             | signal's passage of time from 1.5 V to 3.5 V of each switching position (OFF to ON or ON to OFF)                                                                                                                                                                                                    | t1, t3 ≤ 3 ms |
| sliding noise (bounce) | time of voltage change exceeds 1.5 V in code ON area. When the bounce has code ON time less than 1 ms between chattering [t1 or t3], the voltage change shall be regarded as a part of chattering. When the code ON time between 2 bounces is less than 1 ms, they are regarded as 1 linked bounce. | t2 ≤ 2 ms     |
| sliding noise          | voltage change in code OFF area                                                                                                                                                                                                                                                                     | 3.5 V min     |

Notes: 3. Testing at 60 RPM.  
4. Code OFF: The area which the voltage is 3.5 V or more. Code ON: The area which the voltage is 1.5 V or less.

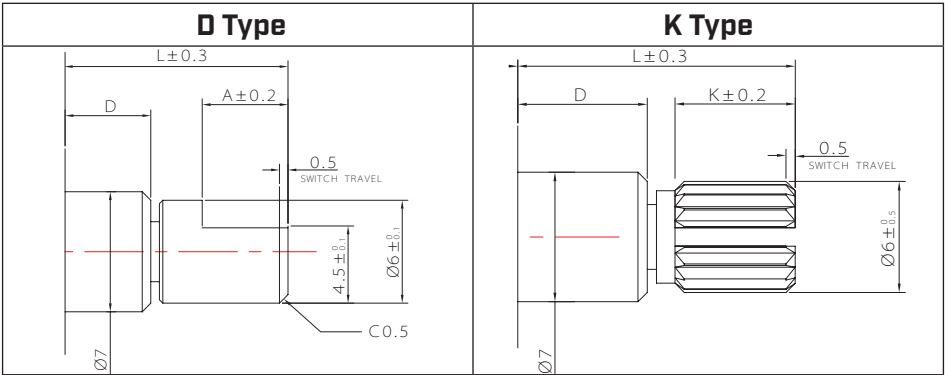


PHASE DIFFERENCE



SHAFT TYPES

units: mm  
tolerance:  
 $X \leq 10.00$ :  $\pm 0.30 \text{ mm}$   
 $10.00 < X \leq 100.00$ :  $\pm 0.50 \text{ mm}$   
unless otherwise noted



| D=5 |     |     |     |
|-----|-----|-----|-----|
|     | 10D | 13D | 16D |
| L   | 10  | 13  | 16  |
| A   | 4   | 5   | 10  |

|   | 10K | 10K | 11K  | 15K |
|---|-----|-----|------|-----|
| D | 2.2 | 3.5 | 5    | 7   |
| L | 10  | 10  | 10.5 | 15  |
| A | 5   | 5   | 3.5  | 6.5 |

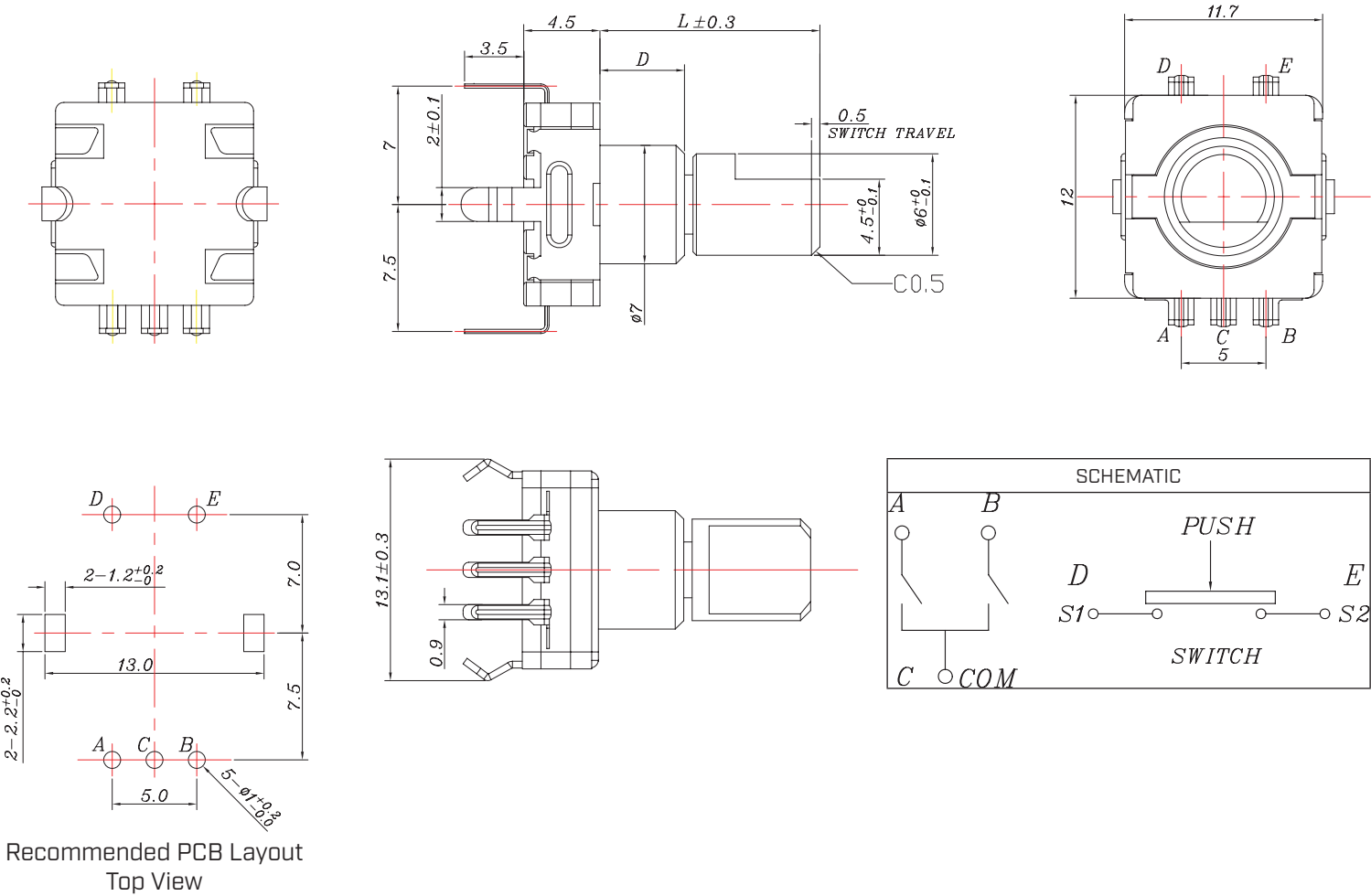
| D=7 |     |       |      |      |
|-----|-----|-------|------|------|
|     | 15D | 15.5D | 17D  | 20D  |
| L   | 15  | 15.5  | 16.5 | 19.5 |
| A   | 7   | 6     | 8    | 11   |



MECHANICAL DRAWING (THROUGH HOLE MODELS)

units: mm  
tolerance:  
X≤10.00: ±0.30 mm  
10.00<X≤100.00: ±0.50 mm  
unless otherwise noted

| DESCRIPTION | MATERIAL            | PLATING/COLOR |
|-------------|---------------------|---------------|
| housing     | PBT                 |               |
| bracket     | SPCC                |               |
| bushing     | zinc alloy          |               |
| shaft       | aluminum/zinc alloy |               |
| terminals   | phosphor copper     |               |

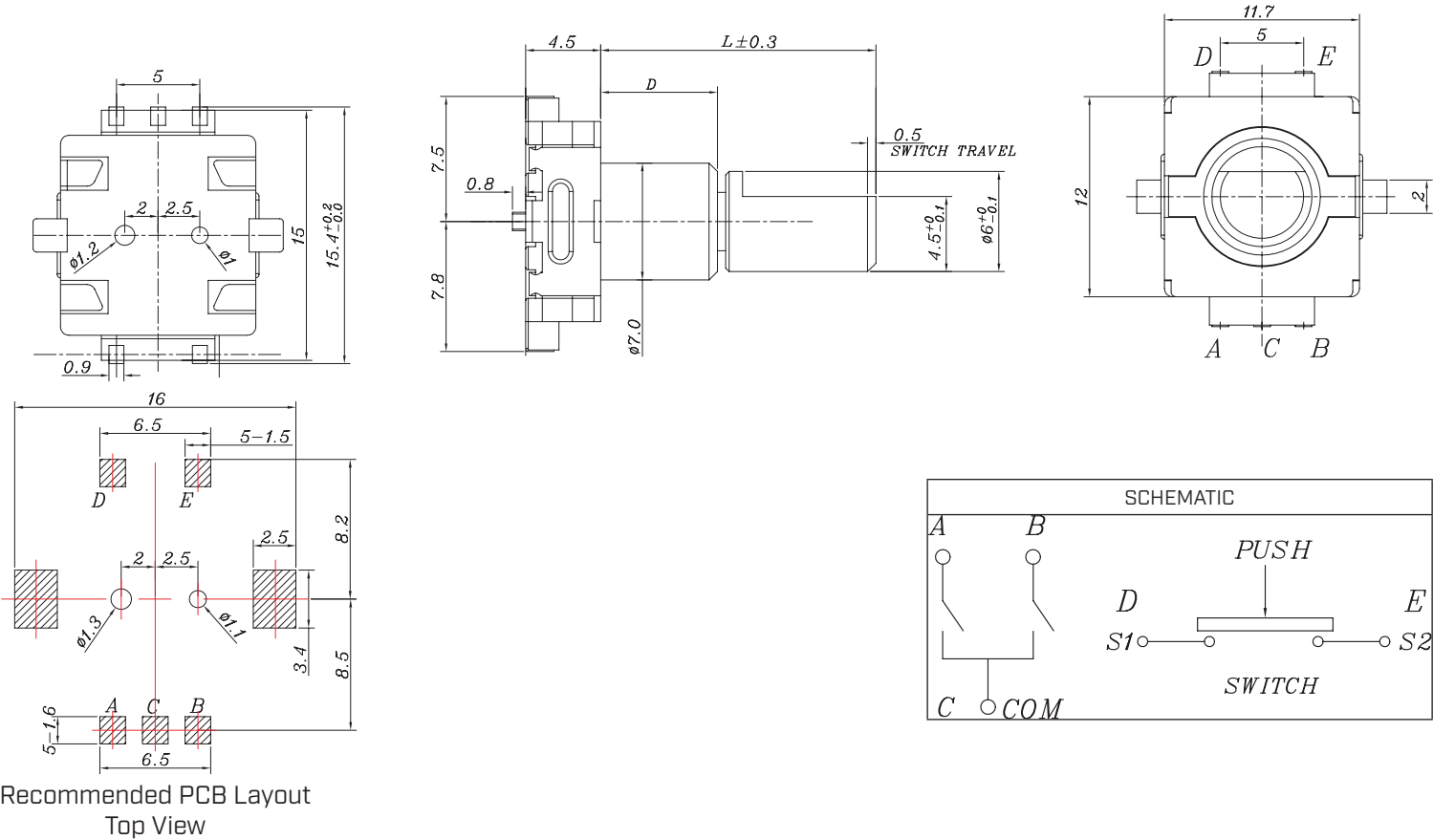




MECHANICAL DRAWING (U SHAPE SMT MODELS)

units: mm  
tolerance:  
X≤10.00: ±0.30 mm  
10.00<X≤100.00: ±0.50 mm  
unless otherwise noted

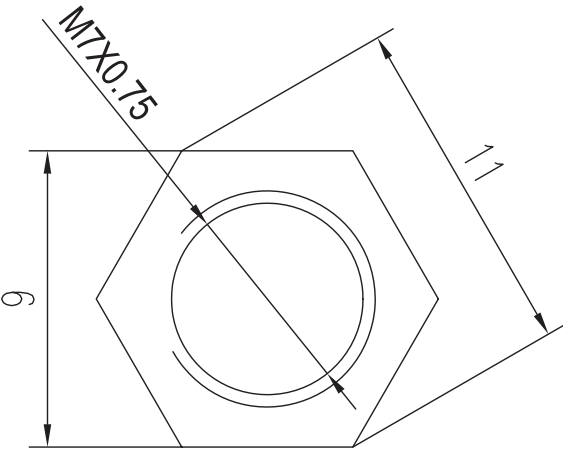
| DESCRIPTION | MATERIAL            | PLATING/COLOR |
|-------------|---------------------|---------------|
| housing     | LCP                 |               |
| bracket     | SPCC                |               |
| bushing     | zinc alloy          |               |
| shaft       | aluminum/zinc alloy |               |
| terminals   | phosphor copper     |               |



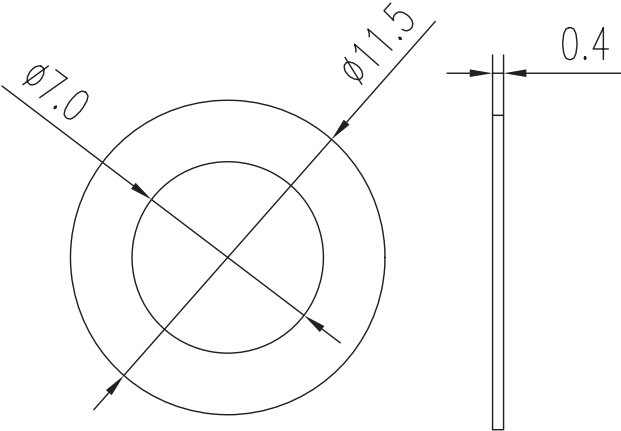
MOUNTING HARDWARE

units: mm

Nut



Washer



## REVISION HISTORY

| rev. | description                       | date       |
|------|-----------------------------------|------------|
| 1.0  | initial release                   | 09/20/2023 |
| 1.01 | CUI Devices rebranded to Same Sky | 09/12/2024 |

The revision history provided is for informational purposes only and is believed to be accurate.



Same Sky offers a one (1) year limited warranty. Complete warranty information is listed on our website.

Same Sky reserves the right to make changes to the product at any time without notice. Information provided by Same Sky is believed to be accurate and reliable. However, no responsibility is assumed by Same Sky for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

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