# CUI INC

**SERIES:** ACZ11

**DESCRIPTION:** mechanical incremental encoder

## ELECTRICAL SPECIFICATIONS

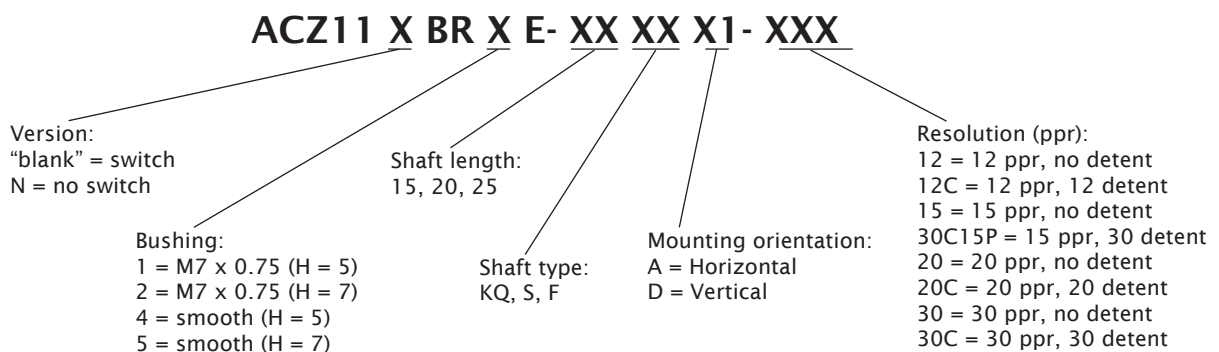| parameter | conditions/description |
|---|---|
| output waveform | square wave |
| output signals | A, B phase |
| current consumption | 10 mA |
| output phase difference | T1, T2, T3, T4 ≥ 3.5 ms @ 60 rpm (see output waveform) |
| supply voltage | 5 V dc max. |
| output resolution | 12, 15, 20, 30 ppr |
| switch rating | 12 V dc, 50 mA (ACZ11BRXE models only) |
| insulation resistance | 300 V dc, 100 MΩ |
| withstand voltage | 300 V ac |

## MECHANICAL SPECIFICATIONS

| parameter | conditions/description | min | nom | max | units |
|---|---|---|---|---|---|
| shaft load | axial | | | 8 | kgf |
| rotational torque | with detent click | 60 | 140 | 220 | gf·cm |
| | without detent click | 60 | 80 | 100 | gf·cm |
| push switch operational force | (ACZ11BRXE models only) | 300 | | 900 | gf·cm |
| push switch life | (ACZ11BRXE models only) | | | 50,000 | cycles |
| rotational life | | | | 30,000 | cycles |

## ENVIRONMENTAL SPECIFICATIONS

| parameter | conditions/description | min | nom | max | units |
|---|---|---|---|---|---|
| operating temperature | | -10 | | 65 | ˚C |
| storage temperature | | -40 | | 75 | ˚C |
| humidity | | 85 | | | % RH |
| vibration | 0.75 mm max. travel for 2 hours | 10 | | 55 | Hz |

## PART NUMBER KEY

### ACZ11 X BR X E- XX XX X1- XXX

Version:
"blank" = switch
N = no switch

Bushing:
1 = M7 x 0.75 (H = 5)
2 = M7 x 0.75 (H = 7)
4 = smooth (H = 5)
5 = smooth (H = 7)

Shaft length:
15, 20, 25

Shaft type:
KQ, S, F

Mounting orientation:
A = Horizontal
D = Vertical

Resolution (ppr):
12 = 12 ppr, no detent
12C = 12 ppr, 12 detent
15 = 15 ppr, no detent
30C15P = 15 ppr, 30 detent
20 = 20 ppr, no detent
20C = 20 ppr, 20 detent
30 = 30 ppr, no detent
30C = 30 ppr, 30 detent

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## SHAFT OPTIONS



| KQ type | S type | F type |
| --- | --- | --- |

switch travel for ACZ11BRXE only

**H=5**

|  | 15KQ | 20KQ | 25KQ |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |
| I | 7 | 10 | 12 |

**H=7**

|  | 15KQ | 20KQ | 25KQ |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |
| I | 5 | 8.5 | 10 |

**H=5**

|  | 15S | 20S | 25S |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |

**H=7**

|  | 15S | 20S | 25S |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |

**H=5**

|  | 15F | 20F | 25F |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |
| F | 8 | 12 | 12 |

**H=7**

|  | 15F | 20F | 25F |
| --- | --- | --- | --- |
| L | 15 | 20 | 25 |
| F | 8 | 12 | 12 |
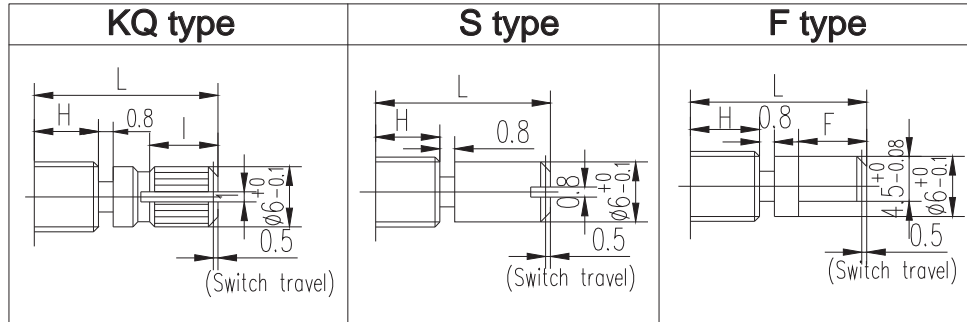
**BUSHING**

|  | Condition | H |
| --- | --- | --- |
| 1 | M7-P0.75 | 5 |
| 2 | M7-P0.75 | 7 |
| 4 | smooth | 5 |
| 5 | smooth | 7 |

## OUTPUT WAVEFORM



CH A (Pins A & C)
CH B (Pins B & C)

T1 T2 T3 T4
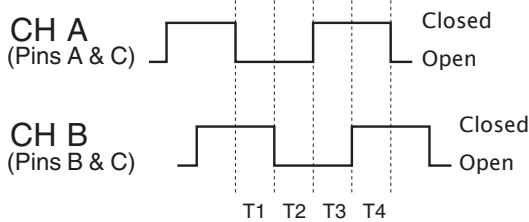
CW direction (@ 60 rpm)

## DETENT POSITIONS

### Model 12C & 20C



CH A (Pins A & C)
CH B (Pins B & C)
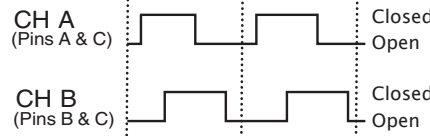
CW direction →

### Model 15P30C



CH A (Pins A & C)
CH B (Pins B & C)
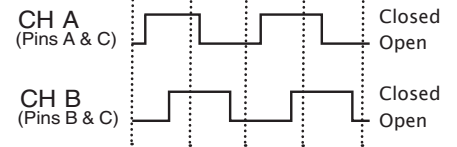
CW direction →

## SLIDING NOISE

t = Masking time to avoid chatter (5mS) V₁ = V₂ = 1V max.



ON   OFF   ON

Sliding Direction ——————
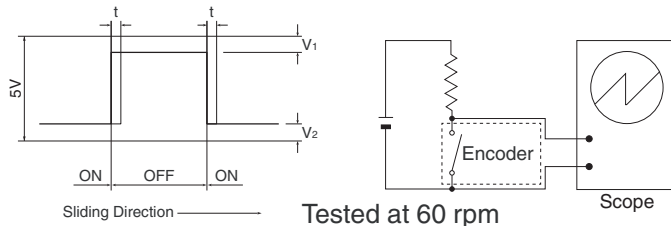
Tested at 60 rpm

## SUGGESTED FILTER



R1, R2, R3, R4 = 10kΩ
C1, C2 = 0.01μF

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**CUI** INC
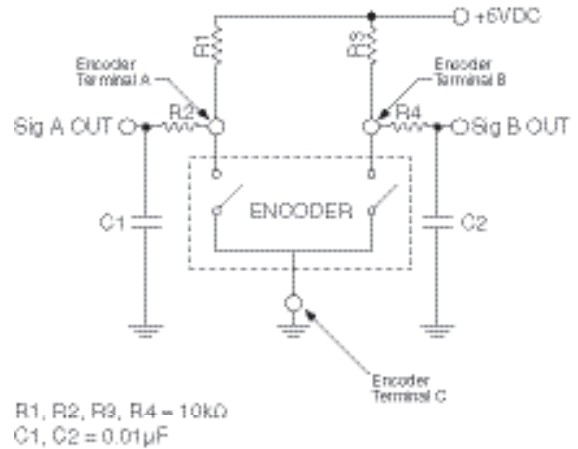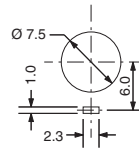
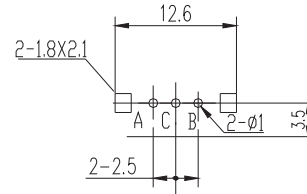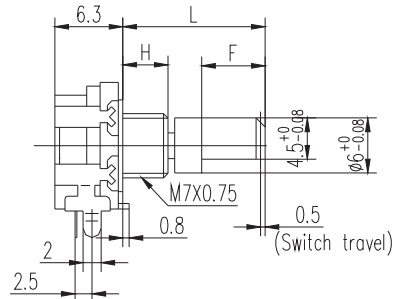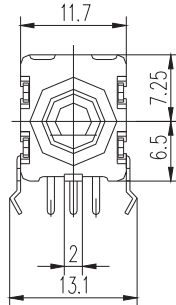**SERIES:** ACZ11          **DESCRIPTION:** mechanical incremental encoder
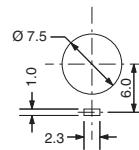
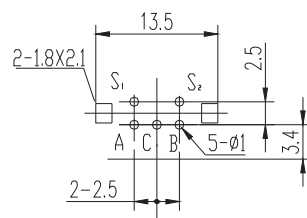## MECHANICAL DRAWING (horizontal)

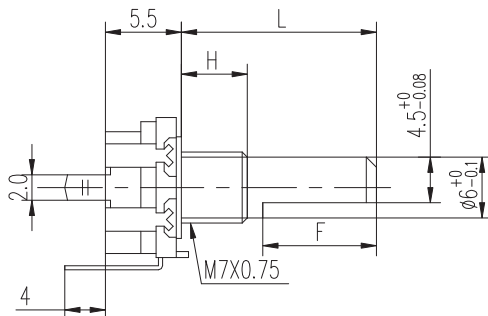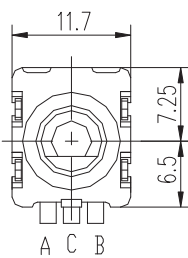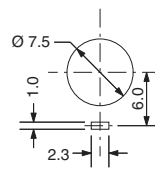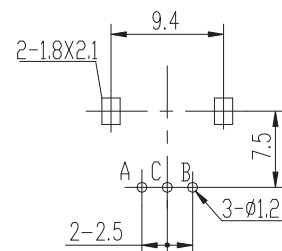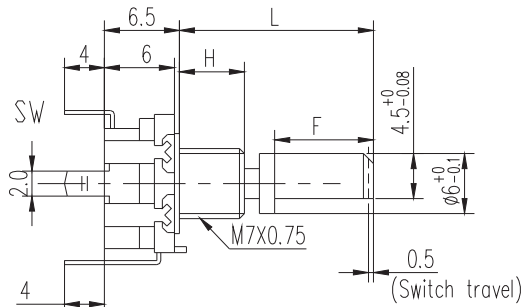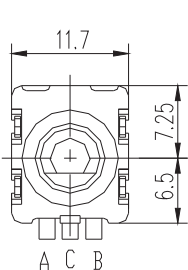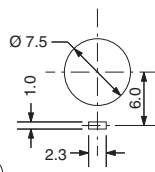ACZ11NBRXE
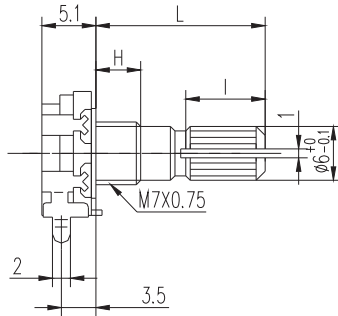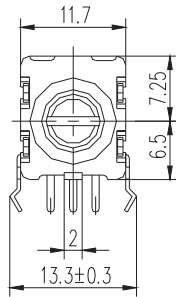


PANEL CUT-OUT

PCB LAYOUT

ACZ11BRXE



PANEL CUT-OUT

PCB LAYOUT

## MECHANICAL DRAWING (vertical)

ACZ11NBRXE



PANEL CUT-OUT

PCB LAYOUT

ACZ11BRXE



PANEL CUT-OUT

PCB LAYOUT