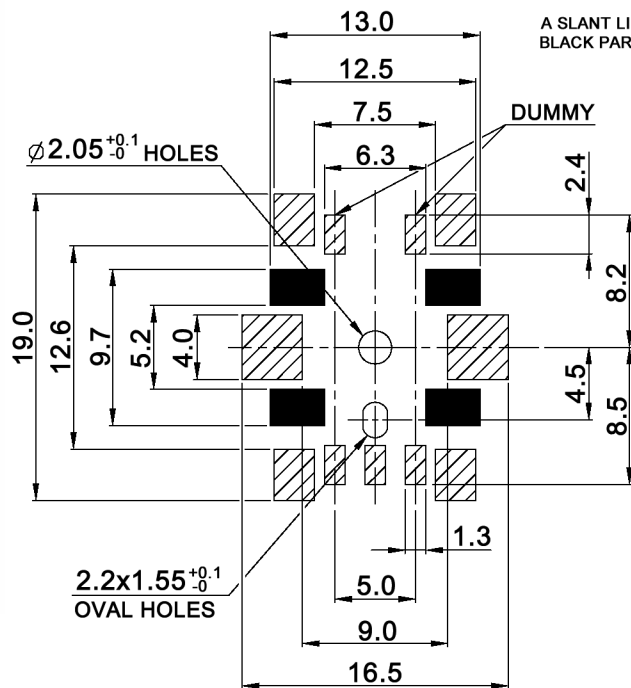
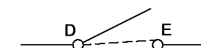


P.C.B. MOUNTING
(TOLERANCE ± 0.1)
VIEWED FROM MOUNTING SIDE



A SLANT LINE PART SHOWS THE SOLDER LAND.
BLACK PART: DO NOT SOLDER AND NO WIRING FOR ELECTRICAL CONTACT.

CIRCUIT DIAGRAM

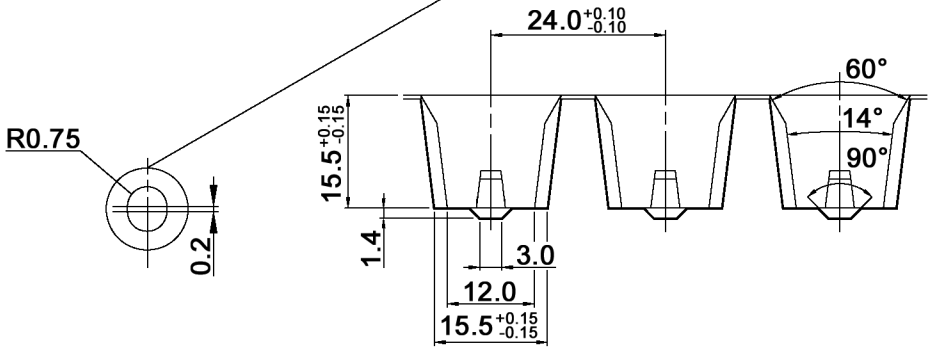
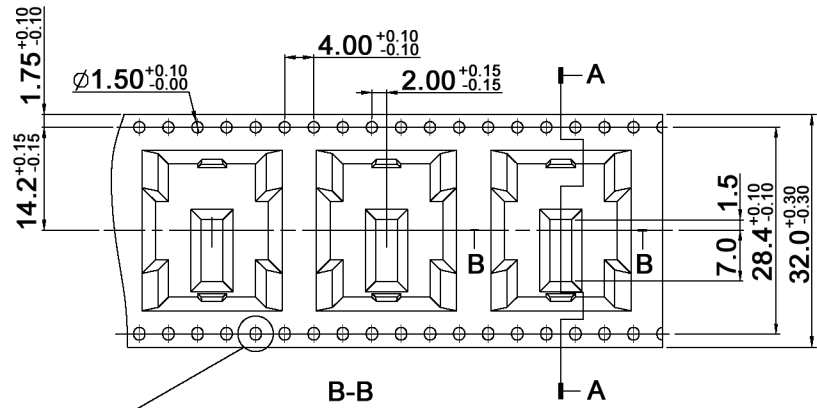
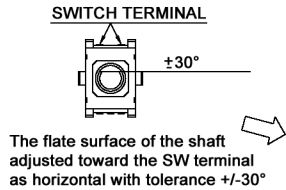
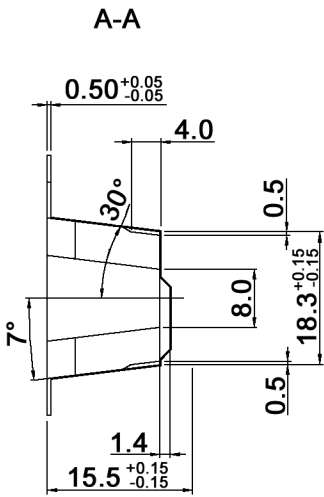


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Tolerances: <10: $\pm 0.3\text{mm}$ 10-100: $\pm 0.5\text{mm}$			Date	Name	MERPS11-15110T	
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Packaging:



Packaging unit: 160 pcs. / reel
10 sprocket hole pitch cumulative tolerance +/-0.2mm
Camber not to exceed 1mm in 100mm
Pocket position relative to sprocket hole measured as true position
of pocket, not pocket hole
Material: polystyrene, black
Compliance: RohS II (2011/65/EU)

Tolerances: <10: ±0.3mm 10-100: ±0.5mm			Date 08/15	Name dr	MERPS11-15110T	
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General

1.1 Application

This specification applies to 11mm size rotary encoder (incremental) for microscopic current circuits used in electronic equipment.

1.2 Standard atmospheric conditions

Unless otherwise specified the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature:	15 to 35 °C
Relative humidity:	25 to 85 %
Air pressure:	860 to 1060 hPa

1.3 Temperature range

For operation:	-40 to +85 °C
For storage:	-40 to +85 °C

Electrical characteristics of Encoder (Pushbutton characteristics see end of document)

2.1 Resolution

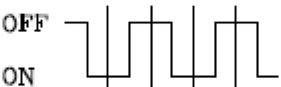
Number of pulses in 360° rotation:	15 (2 detents per pulse)
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2.2 Output signal format

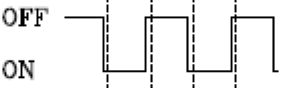
Signals A and B are phase-different, broken line is for detent positions.

Rotation clockwise

Terminal A - C

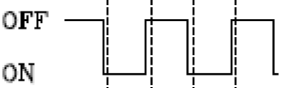


Terminal B - C

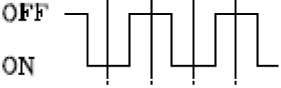


Rotation counter clockwise

Terminal A - C



Terminal B - C

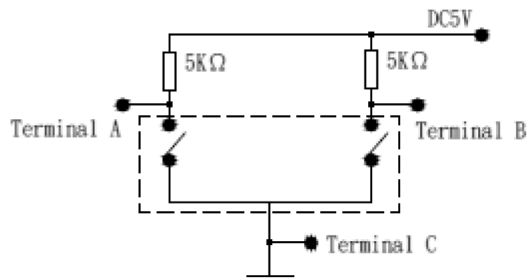


2.3 Switching characteristics

Measurements shall be made at a rotation speed of 360°/s and the following schematic:

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2.4 Sliding noise

In the following, ON-area is defined by voltage ≤ 1.5 V, OFF-area by voltage ≥ 3.5 V.

2.4.1 Chattering

Chattering is specified by the signal's passage time from 3.5 V to 1.5 V (time t_1) and from 1.5 V to 3.5 V (time t_3)

Chattering t_1, t_3 : ≤ 2 ms

2.4.2 Bounce

Bounce is specified by the period of time the voltage change exceeds 1.5V in ON area (time t_2). When t_2 is ≤ 1 ms it is considered as part of chattering.

If the time period between 2 bounces is ≤ 1 ms, the 2 bounces count as 1.

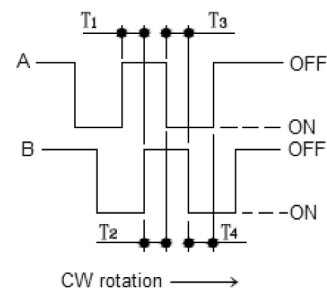
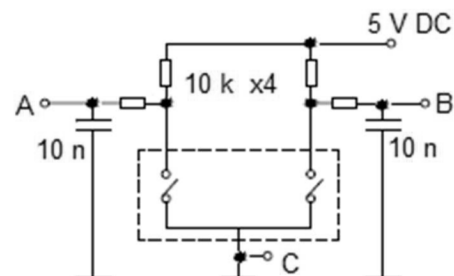
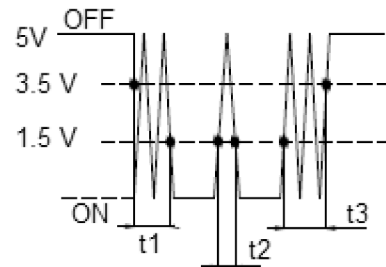
Bounce t_2 : ≤ 2 ms

2.4.3. Sliding noise

The voltage change in OFF area: ≥ 3.5 V

Note:

To avoid chattering a masking time for t_1 and t_2 is recommended in signal processing equipment as well as RC-filter as shown in the schematic. Masking time and RC components should be defined according to actual operation environment.



2.5 Phase difference

Measurement shall be made under constant shaft rotation speed of 360°/s

Phase difference: $\Delta T \geq 4$ ms

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2.6 Insulation resistance

Resistance is determined at 250 V DC and measured between terminals and bushing

Resistance: $\geq 100\text{ M}\Omega$

2.7 Dielectric strength

Time is determined at 300 V AC or 360 V AC and a leakage current $\leq 1\text{ mA}$. There shall be no damage, arc or breakdown.

Dielectric strength: 1 min (300 V), 2 s (360 V)

2.8 Rating 5V DC, 10 mA

Mechanical

3.1 total rotational angle: 360° (endless)

3.2 detent torque: $1 \pm 0.7\text{ Ncm}$

3.3 detents per turn/step angle: 30 detents, angle $12^\circ \pm 3^\circ$

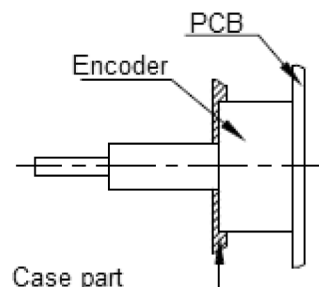
3.4 Push-pull strength of shaft: 100 N for 10 s

3.5 Shaft wobble at 5 N to the tip: $\leq 0.55\text{ mm}$

3.6 rotation play in detent position: $\leq 5^\circ$

Note:

Consider to fix the encoder by case parts in addition to solder joints



4.1 rotational life

Determined by applying 500 cycles per hour. 1 cycle is 360° CW rotation followed by 360° CCW rotation. Detent torque must remain within $+10\%/ -30\%$ of specified value. t_1 , t_2 , t_3 must remain $\leq 3\text{ ms}$, spec chapter 2 and 3.1 and 3.3 to 3.6 are valid.

Rotational life: 100 000 cycles

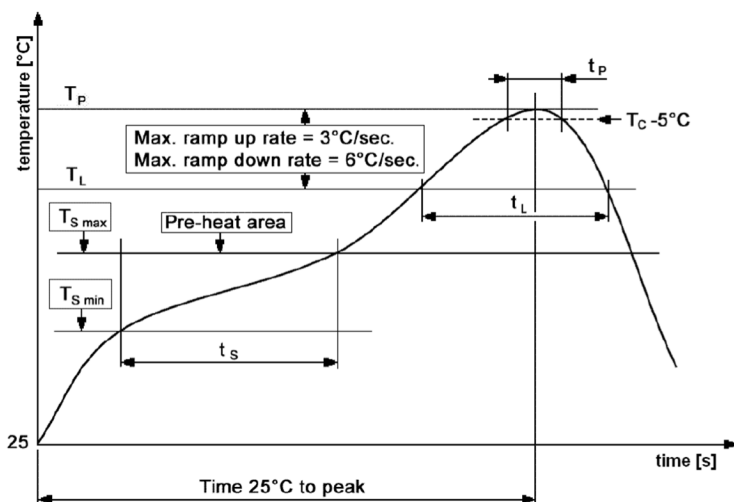
Soldering

5.1. Reflow soldering

Soldering should be done by IR-reflow oven, single pass. Limitations:

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$T_P = 260^{\circ}\text{C}$
 $t_P = 10\text{sec. max.}$

$T_L = 217^{\circ}\text{C}$
 $t_L = 90\text{sec. max.}$

$T_{S\text{ max}} = 200^{\circ}\text{C}$
 $T_{S\text{ min}} = 150^{\circ}\text{C}$
 $t_S = 120\text{sec. max.}$

Pushbutton Switch Characteristics

- 6.1 Contact resistance determined by voltage drop: ≤ 100 mΩ
- 6.2 Bounce during a speed of 1 cycle per second: ≤ 10 ms
- 6.3 Insulation resistance: see 2.6
- 6.4 Dielectric strength: see 2.7
- 6.5 Rating: see 2.8
- 7.1 Switch function: SPST, momentary ON
- 7.2 Switch travel: 0.5 +0/-0.3 mm
- 7.3 Actuation force: 3.5 N ± 1 N

8.1 Mechanical life

Mechanical life is determined at approx. 50 operations per second , contact resistance remains ≤ 200 mΩ, chapter 6.1. to 6.4 and 71 to 7.3 are valid

Mechanical life: 100 000 cycles

Compliance: RohS II (2011/65/EU)

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