

**1. GENERAL**

1.1. **Scope:** this specification applies to 16mm size low-profile rotary encoder (incremental type) 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 following:

1.2.1. **Ambient Temperature:** 15 to 35C.

1.2.2. **Relative Humidity:** 25 to 85%.

1.2.3. **Air Pressure:** 86 to 106kPa.

1.2.4. If there is any doubt about the results, measurement shall be made within the following limits:

1.2.4.1. **Ambient Temperature:** 15+/-1C.

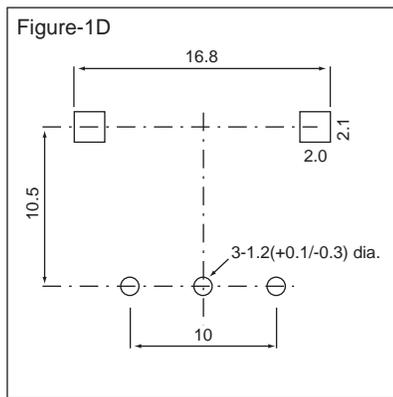
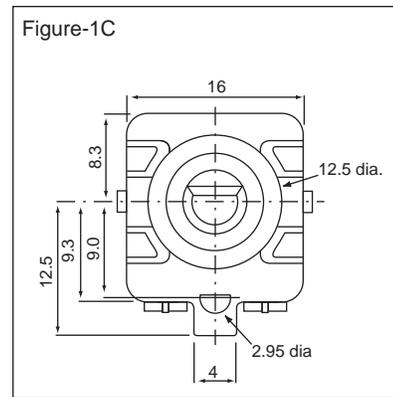
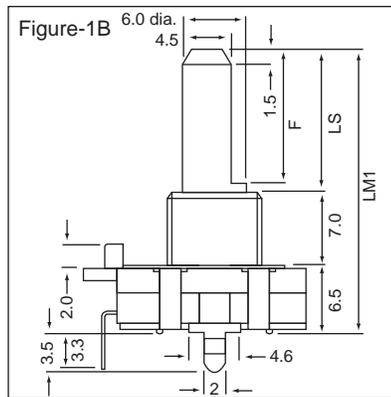
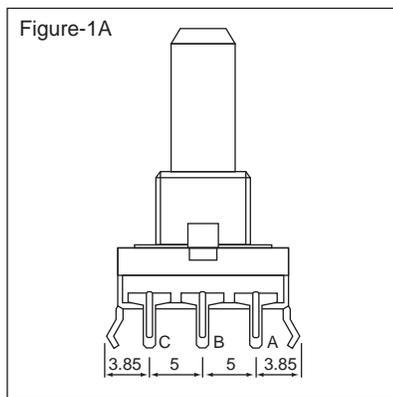
1.2.4.2. **Relative Humidity:** 63 to 67%.

1.2.4.3. **Air Pressure:** 86 to 106kPa.

1.3. **Operating Temperature:** -10 to 70C.

1.4. **Storage Temperature:** -30 to 80C.

**2. DIMENSIONS (mm)**



**3. RATING**

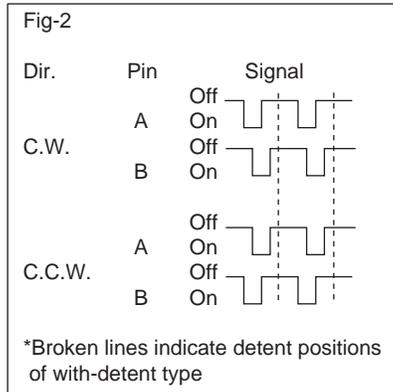
3.1. **Rated Voltage:** 5VDC.

3.2. **Maximum Operating Current (Resistive Load):** 0.5mA.

3.3. **Common Load:** 1mA.

## 4. ELECTRICAL CHARACTERISTICS

### 4.1. Output Signal Format:

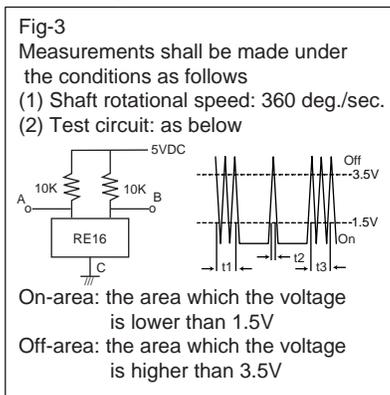


4.2. **Resolution:** 24 pulses/revolution.

4.3. **Dielectric Strength:** 50VAC for 1 minute (between terminal and busing).

4.4. **Insulation Resistance:** 10 megaohms min. 50VDC (between terminal and busing).

### 4.5. Switching Characteristics:

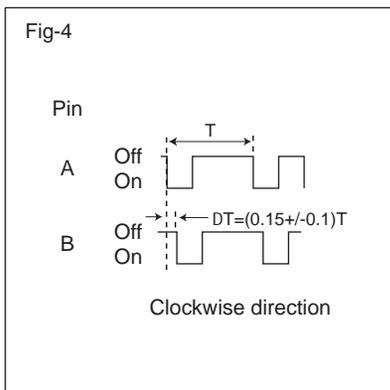


4.5.1. **Chattering:**  $t1 \cdot t2 < 3\text{ms}$  (specified by the signal's passage time from 3.5V to 1.5V or from 1.5V to 3.5V of each switching position, OFF to ON or ON to OFF).

4.5.2. **Sliding Nose (bounce):**  $t2 < 2\text{ms}$  (specified by the time of the voltage change exceed 1.5V in code ON area. When the bounce has code ON time less than 1ms 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 1ms they are regarded as one linked bounce).

4.5.3. **Sliding Noise:** 3.5V min. (the voltage change in code ON area).

4.6. **Phase Difference:**  $DT = 0.15 \pm 0.10T$  (measurement shall be made under the condition which the shaft is rotated in constant speed.) See figure-4.



**5. MECHANICAL PERFORMANCE**

- 5.1. **Total Rotation Angle:** 360 degrees (endless).
- 5.2. **Detent Torque:** 3 to 20mN\*M (30.5 to 204gf\*cm).
- 5.3. **Number and Position of Detent:** 24 detents (step angle: 15+/-3 degrees).
- 5.4. **Push Pull Strength of Shaft:** a push and pull static load of 80N shall be applied to the shaft in axial direction for 10s.
- 5.5. **Terminal Strength:** a static load of 3N shall be applied to the tip of the terminals in any direction for 10s.
- 5.6. **Shaft Wobble:** 0.7L/30mm P-P max. (L is shaft length in mm. A momentary load of 50mN\*m shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axial of shaft).
- 5.7. **Shaft Play In Axial Direction:** 0.4mm P-P max. (a push-and-pull static load of 5N shall be applied to the shaft in the axial direction).
- 5.8. **Side Thrust Strength Of Shaft:** a load of 30N shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular the axial of the shaft.
- 5.9. **Bushing Nut Tightening Strength:** 1N\*m (10.2kgf\*cm) max.

**6. ENDURANCE CHARACTERISTICS**

- 6.1. **Rotational Life:** 50,000 cycles.
- 6.2. **Damp Heat:** 40+/-2 celsius RH of 90% for 240+/-10h.
- 6.3. **Dry Heat:** 80+/-2 celsius for 240+/-10h.
- 6.4. **Cold:** -40+/-3 celsius for 240+/-10h.

**7. SOLDERING CONDITIONS**

**7.1. Manual Soldering**

- 7.1.1. **Bit Temperature of Soldering Iron:** 300C or less.
- 7.1.2. **Application Time of Soldering:** with 3s.

**7.2. Dip Soldering**

- 7.2.1. **Printed Wiring Board:** single-side copper clad laminated board with thickness of 1.6mm.
- 7.2.2. **Flux Specific Gravity:** 0.82 or more.
- 7.2.3. Flux shall be applied to the board using a bubble foaming type fluxer. The board shall be soaked in the flux bubble only to the middle of its thickness. Flux shall not come into contact with the component side surface.
- 7.2.4. Preheating
  - 7.2.4.1. **Surface Temperature Of Board:** 100C or less.
  - 7.2.4.2. **Preheating Time:** within 2 minutes.
- 7.2.5. **Soldering**
  - 7.2.5.1. **Soldering Temperature:** 260C or less.
  - 7.2.5.2. **Immersion Time:** within 3s.
  - 7.2.5.3. Apply the above soldering process for 1 to 2 times.

**ORDERING INFORMATION**

RE16-V24

Height, LM1		Detent		Rotation Torque	
A	LM1=26.5, LS=13.0, F=12.0	C	24 detents	1	50g
B	LM1=31.5, LS=18.0, F=12.0	N	without detent	2	90g
C	LM1=21.5, LS=8.0, F=7.0				

