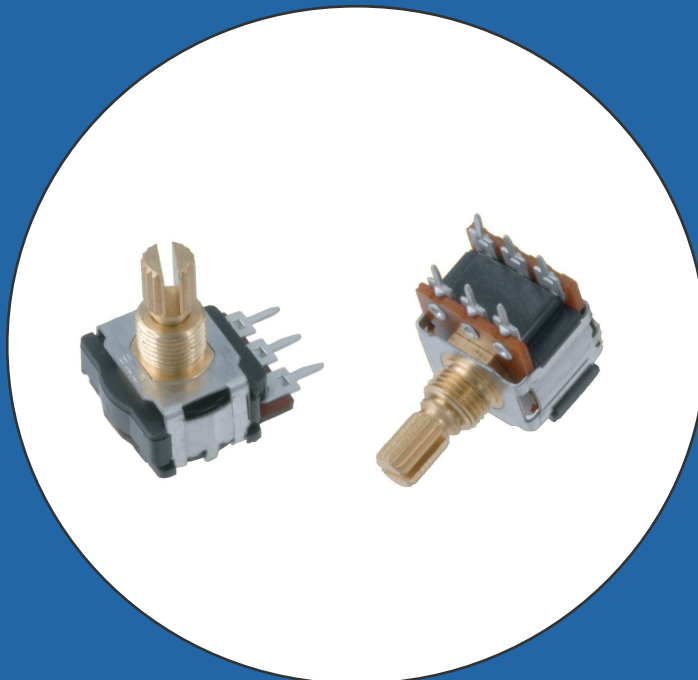


### Commercial Miniature 16mm Size Rotary Encoder

#### Features

- Robust Construction
- 2-bit Incremental or 4-bit Absolute Encoder
- Optional Momentary Switch
- Available with 16 Detents
- Continuous Rotation
- Bushing Mount
- Solder Lug or PCB Terminals
- RoHS Compliant



### Electrical and Mechanical Specifications

#### Encoder:

**Contact Resistance**

500Ω maximum

**Voltage Rating**

5 VDC @ 0.5mA maximum

**Detent Points**

16 detents available

**Rotational Life**

50,000 cycles

**Resolution**

2-bit: 4, 6, 8, 10 or 12 pulses in 360°

4-bit: 16 combinations in 360°

**Insulation Resistance**

10MΩ minimum at 50 VDC

**Temperature Range**

Operating: -25°C to +100°C

Storage: -30°C to +100°C

**Rotational Torque**

No Detent: 36 - 216 gf.cm

With Detent: 100 - 500 gf.cm

**Solder Heat Resistance**

260°C for 5 seconds

**Push-Pull Strength of Shaft**

8 kg minimum for 10 seconds

**Special**

Consult CTS for customized or features not listed, including other detent points, resolution, torque and mounting style.

# Electrical and Mechanical Specifications (continued)

## Optional Momentary Switch:

### Switch Contact Resistance

Initial: 100mΩ maximum  
After Life Cycles: 200mΩ maximum

### Switch Rating

16 VDC @ 20mA maximum

### Switch Bounce

5 milliseconds maximum

### Switch Operating Force

350 ± 150 g (12.3 ± 5.3 oz.)

### Switch Life

15,000 operations

### Switch Travel

0.5mm (.020")

## Truth Table

### 2 BIT BINARY CODE

| DENOTES CONTACT CLOSURE TO COMMON | 2 BIT BINARY CODE |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |
|-----------------------------------|-------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
|                                   | B                 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0  | 0  | 1  | 1  | 0  | 0  | 1  | 1  |    |
| A                                 | 0                 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1  | 1  | 0  | 0  | 1  | 1  | 0  |    |    |
| POS. NO.                          | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |
|                                   |                   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 0  | 1  | 1  |
|                                   |                   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 1  | 1  | 0  |
|                                   |                   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 46 | 47 | 48 |

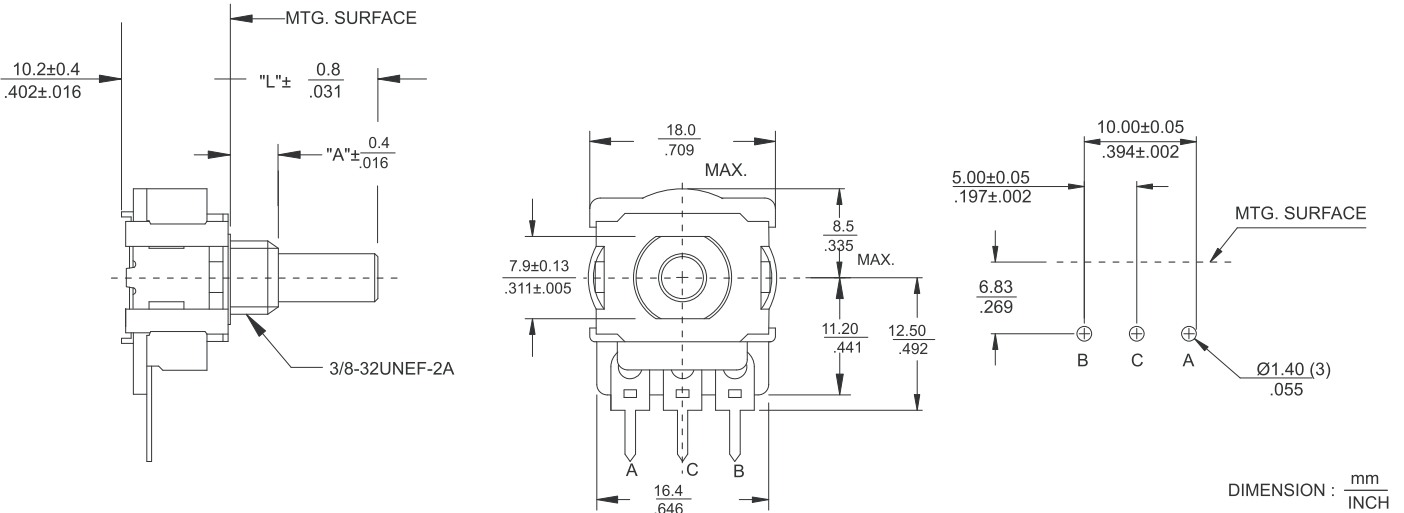
### 4 BIT GRAY CODE

| POS. NO. | DENOTES CONTACT CLOSURE TO COMMON |   |   |   |  |  |  |  |
|----------|-----------------------------------|---|---|---|--|--|--|--|
|          | A                                 | B | E | F |  |  |  |  |
| 1        | 0                                 | 0 | 0 | 0 |  |  |  |  |
| 2        | 0                                 | 0 | 0 | 1 |  |  |  |  |
| 3        | 0                                 | 0 | 1 | 1 |  |  |  |  |
| 4        | 0                                 | 0 | 1 | 0 |  |  |  |  |
| 5        | 1                                 | 0 | 1 | 0 |  |  |  |  |
| 6        | 1                                 | 0 | 1 | 1 |  |  |  |  |
| 7        | 1                                 | 1 | 1 | 1 |  |  |  |  |
| 8        | 1                                 | 1 | 1 | 0 |  |  |  |  |
| 9        | 0                                 | 1 | 1 | 0 |  |  |  |  |
| 10       | 0                                 | 1 | 1 | 1 |  |  |  |  |
| 11       | 0                                 | 1 | 0 | 1 |  |  |  |  |
| 12       | 0                                 | 1 | 0 | 0 |  |  |  |  |
| 13       | 1                                 | 1 | 0 | 0 |  |  |  |  |
| 14       | 1                                 | 1 | 0 | 1 |  |  |  |  |
| 15       | 1                                 | 0 | 0 | 1 |  |  |  |  |
| 16       | 1                                 | 0 | 0 | 0 |  |  |  |  |

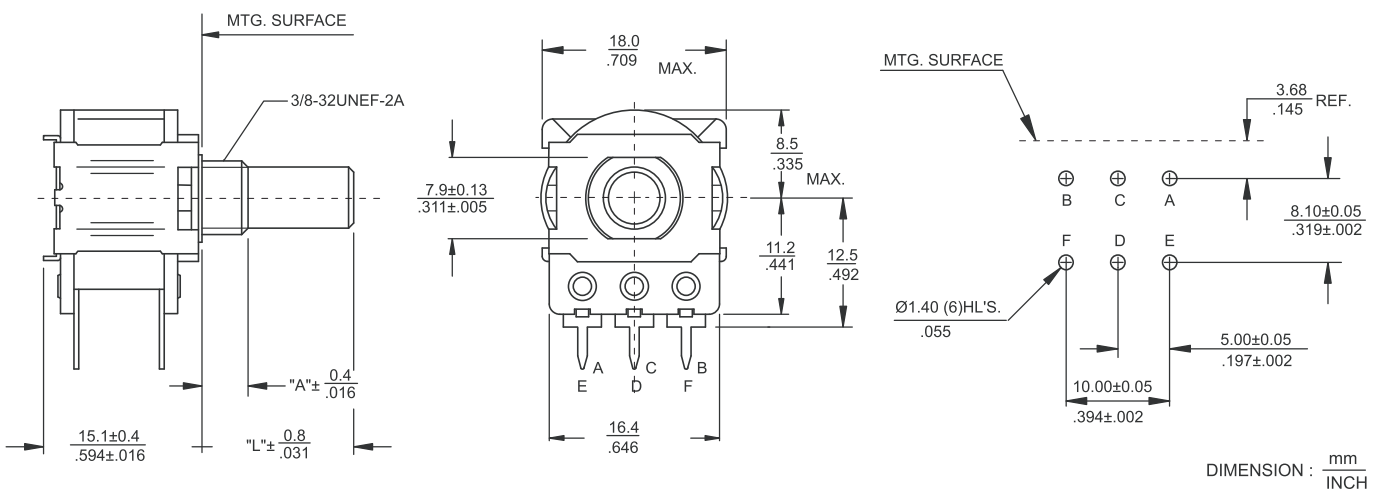
### 4 BIT HEXADECIMAL CODE

| POS. NO. | DENOTES CONTACT CLOSURE TO COMMON |   |   |   |  |  |  |  |
|----------|-----------------------------------|---|---|---|--|--|--|--|
|          | A                                 | B | E | F |  |  |  |  |
| 1        | 0                                 | 0 | 0 | 0 |  |  |  |  |
| 2        | 0                                 | 1 | 0 | 0 |  |  |  |  |
| 3        | 1                                 | 0 | 0 | 0 |  |  |  |  |
| 4        | 1                                 | 1 | 0 | 0 |  |  |  |  |
| 5        | 0                                 | 0 | 0 | 1 |  |  |  |  |
| 6        | 0                                 | 1 | 0 | 1 |  |  |  |  |
| 7        | 1                                 | 0 | 0 | 1 |  |  |  |  |
| 8        | 1                                 | 1 | 0 | 1 |  |  |  |  |
| 9        | 0                                 | 0 | 1 | 0 |  |  |  |  |
| 10       | 0                                 | 1 | 1 | 0 |  |  |  |  |
| 11       | 1                                 | 0 | 1 | 0 |  |  |  |  |
| 12       | 1                                 | 1 | 1 | 0 |  |  |  |  |
| 13       | 0                                 | 0 | 1 | 1 |  |  |  |  |
| 14       | 0                                 | 1 | 1 | 1 |  |  |  |  |
| 15       | 1                                 | 0 | 1 | 1 |  |  |  |  |
| 16       | 1                                 | 1 | 1 | 1 |  |  |  |  |

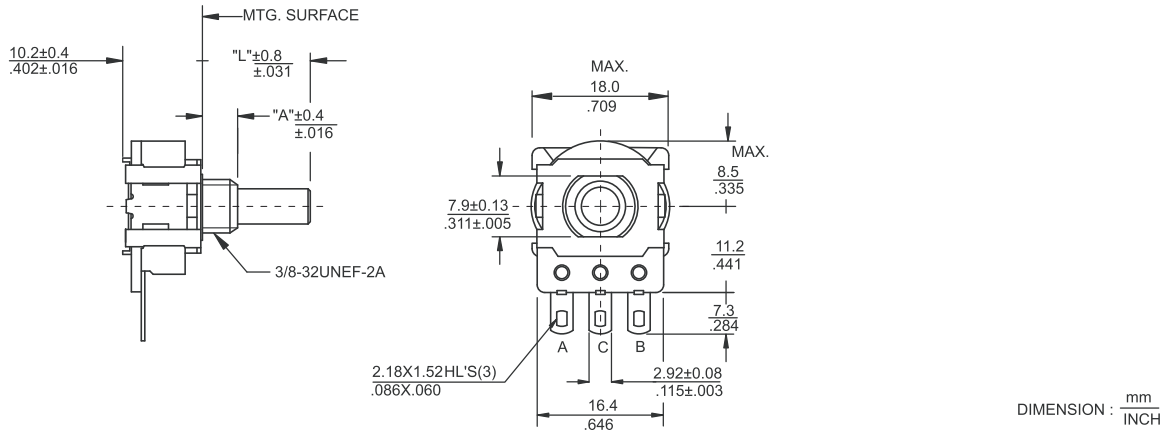
## 288X Typical 2-bit Encoder parallel to P.C. Board



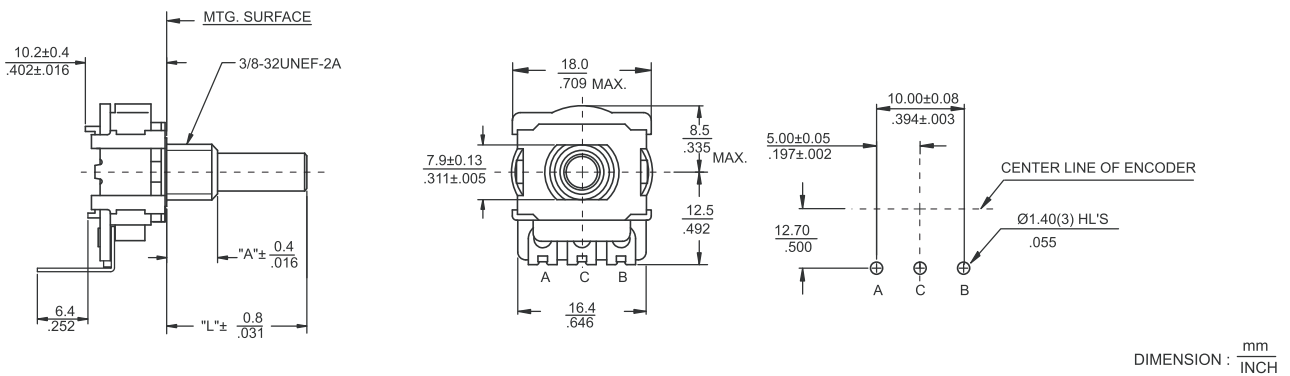
## 2-288X Typical 4-bit Encoder parallel to P.C. Board



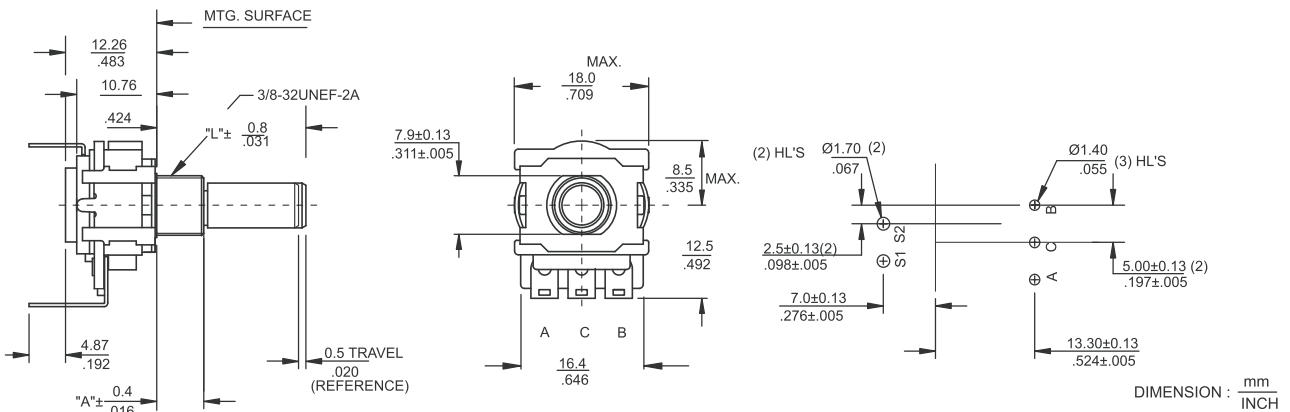
**288T** Typical 2-bit Encoder With Solder Lug Terminals



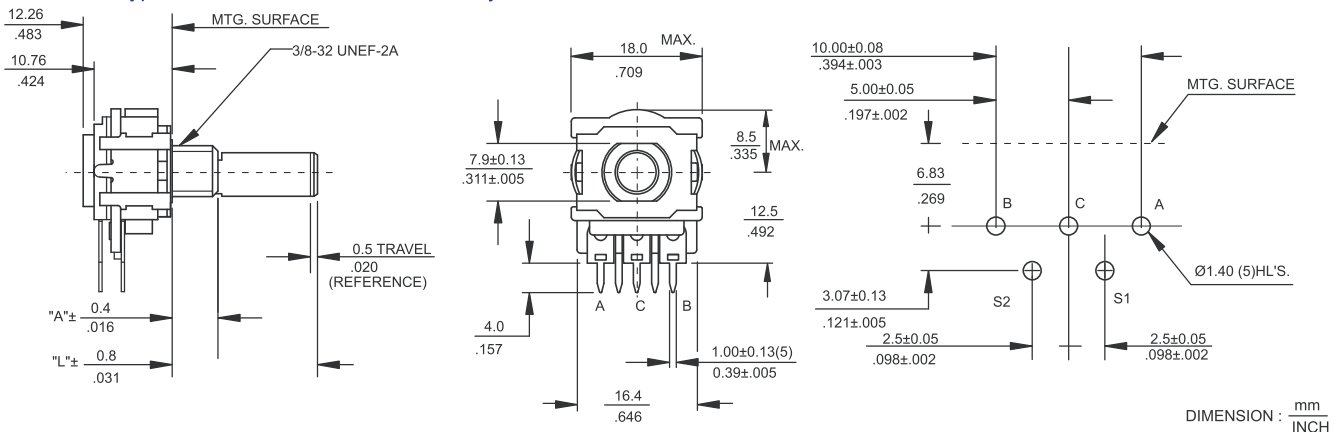
**288V** Typical 2-bit Perpendicular to P.C. Board



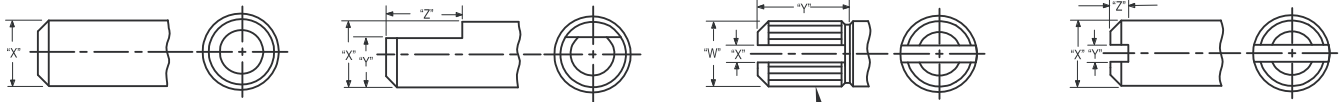
**MC-288V** Typical 2-bit Encoder With Momentary Switch Perpendicular to P.C. Board



**MC-288X** Typical 2-bit Encoder With Momentary Switch Parallel to P.C. Board



# Shaft Trim



**R - ROUND**

|                | X     |
|----------------|-------|
| Imperial Shaft | .250" |
| Metric Shaft   | 6.00  |

**F - FLATTED**

|                | X     | Y     | Z     |
|----------------|-------|-------|-------|
| Imperial Shaft | .250" | .156" | .375" |
| Metric Shaft   | 6.00  | 4.50  | 7.00  |

**K - KNURLED & SLOTTED**

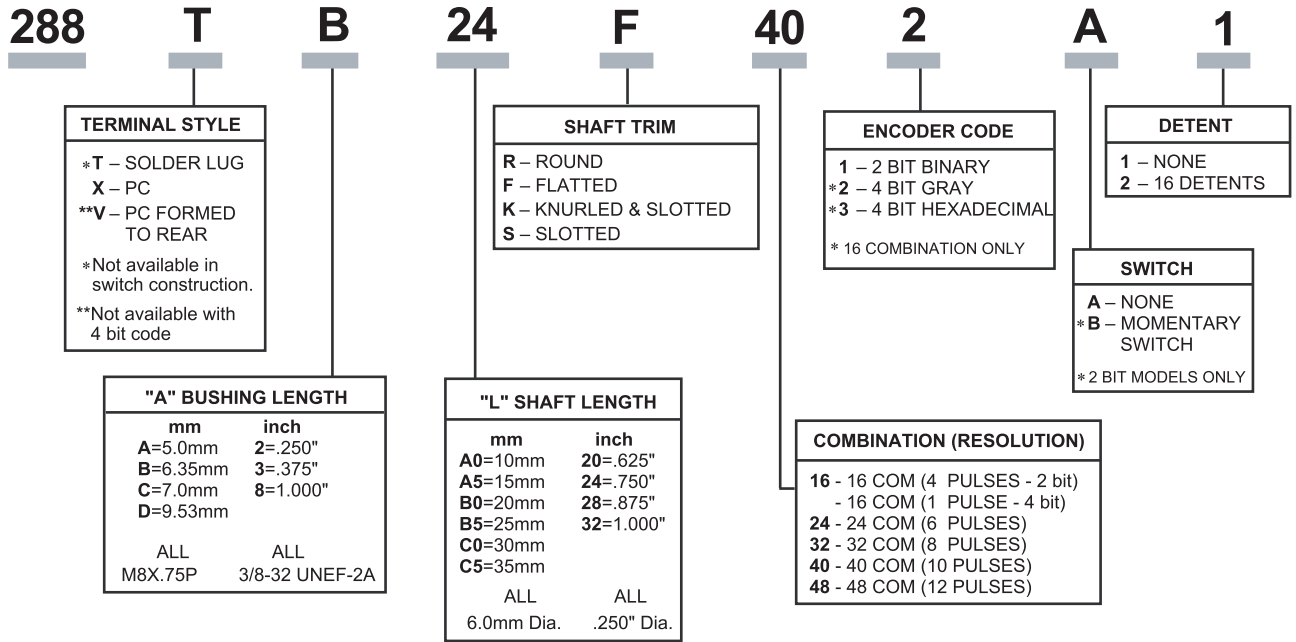
|                | W     | X     | Y     | Z        |
|----------------|-------|-------|-------|----------|
| Imperial Shaft | .236" | .062" | .344" | 24 TEETH |
| Metric Shaft   | 6.00  | 1.57  | 7.0   | 18 TEETH |

**S - SLOTTED**

|                | X     | Y     | Z     |
|----------------|-------|-------|-------|
| Imperial Shaft | .250" | .046" | .062" |
| Metric Shaft   | 6.00  | 1.17  | 1.57  |

DIMENSION:  $\frac{\text{inch}}{\text{mm}}$

## Ordering Information



Please consult CTS for customized or features not listed.

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[288VAB0F161B2](#)