

## Mechanical Encoder



### FEATURES

- Cost Effective - Eliminates A/D Converters
- High Resolution - Up to 36 Positions
- Stability - Operating Range of - 40°C to + 105°C
- Variability - Horizontal and Vertical Mounting

The Model 110E is a 7/8" square mechanical encoder which provides a 2 - bit grey code for relative reference and a 4 - bit grey code for absolute reference applications. Manually operated it has a rotational life of 100,000 shaft revolutions, a positive dentent feel and can be combined with a second

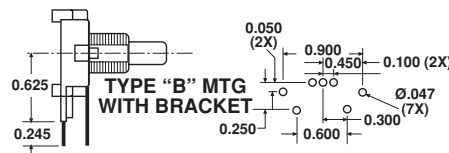
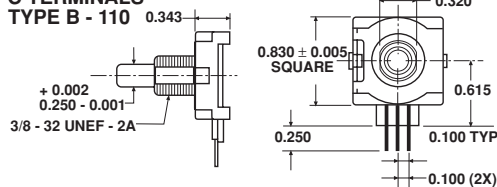
modular section in a concentric - shaft construction. Its small size makes it suitable for panel-mounted applications where the need for costly front - panel displays can be completely eliminated.

### DIMENSIONS in inches

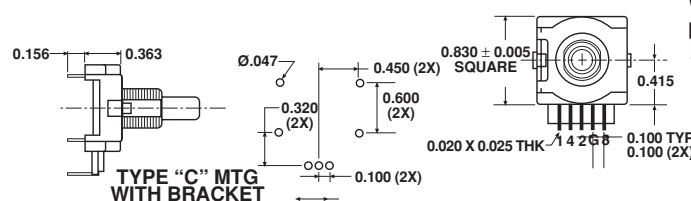
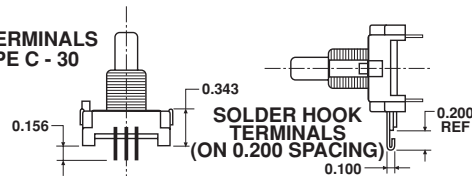
#### 2 - BIT, 36 - POSITION INCREMENTAL OUTPUT

| STEP | 1 | G | 2 |
|------|---|---|---|
| 1    |   |   |   |
| 2    |   |   |   |
| 3    |   |   |   |
| 4    |   |   |   |
| 5    |   |   |   |
| 6    |   |   |   |
| 7    |   |   |   |
| 8    |   |   |   |
| 9    |   |   |   |
| 10   |   |   |   |
| 11   |   |   |   |
| 12   |   |   |   |
| 13   |   |   |   |
| 14   |   |   |   |
| 15   |   |   |   |
| 16   |   |   |   |
| 17   |   |   |   |
| 18   |   |   |   |
| 19   |   |   |   |
| 20   |   |   |   |
| 21   |   |   |   |
| 22   |   |   |   |
| 23   |   |   |   |
| 24   |   |   |   |
| 25   |   |   |   |
| 26   |   |   |   |
| 27   |   |   |   |
| 28   |   |   |   |
| 29   |   |   |   |
| 30   |   |   |   |
| 31   |   |   |   |
| 32   |   |   |   |
| 33   |   |   |   |
| 34   |   |   |   |
| 35   |   |   |   |
| 36   |   |   |   |

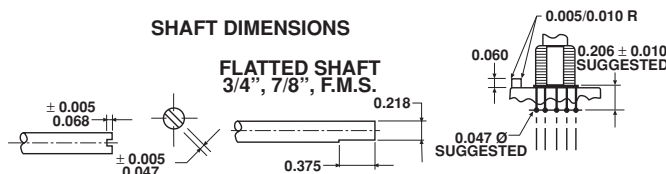
#### PC TERMINALS TYPE B - 110



#### PC TERMINALS TYPE C - 30



#### SHAFT DIMENSIONS



#### 4 - BITS, 6 - POSITION INCREMENTAL OUTPUT

| STEP | 1 | 4 | 2 | G | 8 |
|------|---|---|---|---|---|
| 1    |   |   |   |   |   |
| 2    |   |   |   |   |   |
| 3    |   |   |   |   |   |
| 4    |   |   |   |   |   |
| 5    |   |   |   |   |   |
| 6    |   |   |   |   |   |
| 7    |   |   |   |   |   |
| 8    |   |   |   |   |   |
| 9    |   |   |   |   |   |
| 10   |   |   |   |   |   |
| 11   |   |   |   |   |   |
| 12   |   |   |   |   |   |
| 13   |   |   |   |   |   |
| 14   |   |   |   |   |   |
| 15   |   |   |   |   |   |
| 16   |   |   |   |   |   |

#### Output Codes

At start position, step 1, is with shaft flat at 12 o' clock position when looking at shaft end with terminals down.

**ELECTRICAL SPECIFICATIONS**

|                                 |                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output                          | 2 - bit grey code, channel L leads channel R by 90 degrees electrically in the CW direction<br>4 bi - grey code, absolute electrical position output |
| Closed Circuit Resistance       | 5Ω maximum                                                                                                                                           |
| Open Circuit Resistance         | 100KΩ minimum                                                                                                                                        |
| Contact Rating                  | Resistance load 250mA at 28VDC                                                                                                                       |
| Switching Loads                 | 1.5mA at 115VDC<br>150mA at 14VDC                                                                                                                    |
| Bounce                          | 5ms/cycle at 15 RPM                                                                                                                                  |
| Dielectric Withstanding Voltage | 1000VAC at sea level                                                                                                                                 |
| Electrical Travel               | Continuous                                                                                                                                           |
| Operating Speed                 | 50 RPM maximum                                                                                                                                       |

**MECHANICAL SPECIFICATIONS**

|                       |                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Rotational Torque     | 3.5 oz - in (2.16 - 3.60 Ncm)                                                                                                               |
| Mechanical Travel     | Continuous                                                                                                                                  |
| Panel Mounting Torque | 7 lbs - in (1.13 Nm) maximum                                                                                                                |
| Shaft Load Force      | 10 lbs - in (1.13 Nm) maximum                                                                                                               |
| Shaft Pull Force      | 10 lbs - in maximum                                                                                                                         |
| Terminals             | Standard PC style, 3 terminals on 0.100" (2.54mm) grid - in - line perpendicular or parallel to shaft. Solder hook available on 0.200" grid |
| Molded Construction   | Molding compound used for housing/bushing and shaft has a UL94V - 2 rating                                                                  |
| Rotational Life       | 100,000 detented cycles at rated load typical (1 cycle = 720 degrees)                                                                       |

**ENVIRONMENTAL SPECIFICATIONS**

|                   |                                                                                                            |
|-------------------|------------------------------------------------------------------------------------------------------------|
| Temperature Range | - 40°C to + 105°C (Operating temperature)<br>- 55°C to + 120°C (Storage temperature)                       |
| Humidity          | Per MIL-STD 202, Method 106C Insulation resistance shall be 1 MΩ maximum of a relative humidity 90% @ 25°C |
| Shock             | Per MIL-STD 202, Method 213, Test Condition G consisting of 1 MIL-STD                                      |

**PACKAGING**

Box of 50 pieces

**ORDERING INFORMATION**

| 110E<br>MODEL | 1                            | A<br>BUSHING                                                                               | 48<br>SINGLE SHAFT FMS<br>CODED IN 64ths | F                              | 204P<br>2-4 - BIT GREY<br>CODE OPTIONS                                                                                                                                                 | P                                                                                                                                                                                                                                         |
|---------------|------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 110E          | 1 = at 9'o clock<br>0 = None | A = 3/8 (9.53mm)<br>dia x 1/4 (6.35mm) long<br>G = 3/8 (9.53mm)<br>dia x 3/8 (9.53mm) long | 48 = 0.750"<br>56 = 0.875"               | S:<br>Slotted<br>F:<br>Flatted | 204P = 4 cycles/rev<br>16 detents/rev<br>206P = 6 cycles/rev<br>24 detents/rev<br>209P = 9 cycles/rev<br>36 detents/rev<br><br>416P = 16 electrical<br>positions/rev<br>16 detents/rev | B: PC terminals straight<br>(horizontal mount)<br>C: PC terminals bent back<br>(vertical mount)<br>Type C - 30<br>P: Type B with<br>mounting bracket<br>D: Type C with<br>mounting bracket<br>S: Solder Hook<br><br>Hardware not included |

**SAP PART NUMBERING GUIDELINES**

|                                                     |   |   |   |         |   |     |   |       |   |       |              |   |   |           |   |   |         |
|-----------------------------------------------------|---|---|---|---------|---|-----|---|-------|---|-------|--------------|---|---|-----------|---|---|---------|
| 1                                                   | 1 | 0 | E | W       | 1 | G   | H | F     | P | 2     | 0            | 4 | P | B         | 2 | 5 |         |
| MODEL                                               |   |   |   | BUSHING |   | PEG |   | SHAFT |   | LEADS | CODE OPTIONS |   |   | PACKAGING |   |   | SPECIAL |
| See the end of this data book for conversion tables |   |   |   |         |   |     |   |       |   |       |              |   |   |           |   |   |         |



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