Series 388/389 Custom Potentiometer Designer Guide
Now almost any special combination potentiometer you specify can be manufactured and shipped soon after your order is received.

Since Clarosystem and Mod Pot potentiometers are modular in construction, we can produce prototype quantities of 1/2 or 5/8 inch square, conductive plastic, cermet, or hot molded carbon pots for you in just a few hours . . . and even production quantities in a matter of days with our VIP (Very Important Potentiometer) service!

Over one billion combinations of single, dual, triple, quad arrangements, push-pull or rotary switches and hundreds of shaft terminal variations can be produced.

If you need a potentiometer and you need it fast, call our product manager or fax us your requirements using the Custom Potentiometer Order Form included in this catalog.

WHY WAIT?
**Series 388 Potentiometer**  
Conductive Plastic - 1/2 inch square; .5 Watt

**Series 389 Potentiometer**  
Cermet - 1/2 inch square; 1 Watt

**Description**  
The 388 and 389 series are 1/2 in. square, modular, stackable potentiometers. The basic construction suits the series for countless design options. The 388 and 389 series can be found in a wide range of sophisticated systems in a broad scope of industries.

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<th>Operational Specifications</th>
<th>Operational Specifications</th>
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</thead>
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<tr>
<td><strong>Series 388</strong></td>
<td><strong>Series 389</strong></td>
</tr>
<tr>
<td><strong>Resistance Range</strong></td>
<td><strong>Resistance Range</strong></td>
</tr>
<tr>
<td>Linear: 100 ohm to 5 Megohm</td>
<td>Linear: 50 ohm to 5 Megohm</td>
</tr>
<tr>
<td>Tapered: 500 ohm to 1 Megohm</td>
<td>Tapered: 100 ohm to 1 Megohm</td>
</tr>
<tr>
<td>See chart, page 7</td>
<td>See chart, page 7</td>
</tr>
<tr>
<td><strong>Resistance Tolerance</strong></td>
<td><strong>Resistance Tolerance</strong></td>
</tr>
<tr>
<td>Linear: thru 500K ohm, ±10%;</td>
<td>Linear: ±10%; ±20% special</td>
</tr>
<tr>
<td>above 500K ohm, ±20%</td>
<td>Tapered: ±10%</td>
</tr>
<tr>
<td>Tapered: thru 100K ohm, ±10%;</td>
<td>Under 20 ohm ±20%</td>
</tr>
<tr>
<td>above 100K ohm, ±20%</td>
<td></td>
</tr>
<tr>
<td><strong>Taper</strong></td>
<td><strong>Taper</strong></td>
</tr>
<tr>
<td>See Taper Curve charts on page 6 for standard and special tapers available</td>
<td>See Taper Curve charts on page 6 for standard and special tapers available</td>
</tr>
<tr>
<td><strong>Taper Tolerance</strong></td>
<td><strong>Taper Tolerance</strong></td>
</tr>
<tr>
<td>±20% of nominal resistance at 50%</td>
<td>±20% of nominal resistance at 50%</td>
</tr>
<tr>
<td>±3% mechanical rotation</td>
<td>mechanical rotation</td>
</tr>
<tr>
<td><strong>Independent Linearity</strong></td>
<td><strong>Independent Linearity</strong></td>
</tr>
<tr>
<td>±5% standard with specials available</td>
<td>±5% standard with specials available</td>
</tr>
<tr>
<td><strong>End Resistance</strong></td>
<td><strong>End Resistance</strong></td>
</tr>
<tr>
<td>4 ohms max. each end linear and low side of taper. 1% of total R high side of taper.</td>
<td>2 ohms max. each end (5 ohms - 2.5K ohms)</td>
</tr>
<tr>
<td></td>
<td>4 ohms max. each end (above 2.5K)</td>
</tr>
<tr>
<td><strong>Dynamic Noise (C.R.V.)</strong></td>
<td><strong>Dynamic Noise (C.R.V.)</strong></td>
</tr>
<tr>
<td>1.5% of total R, standard linear; 1.0% of total R, special linear; 2.2% of total R, tapered.</td>
<td>3.0% of total R, standard linear; 1.5% of total R, special linear (500 ohms and above); 6.0% of total R, tapered.</td>
</tr>
<tr>
<td><strong>Static Noise</strong></td>
<td><strong>Static Noise</strong></td>
</tr>
<tr>
<td>Up to 30K ohms - 20db; 100K ohms - 12 db; 1 Megohms +3db</td>
<td>Up to 100 ohms - 25db; 10K ohms - 15 db; 100K ohms - 10db.</td>
</tr>
</tbody>
</table>

**Features**
- **Small size** - 1/2 in. square
- **Stackable** - up to 8 modules
- **Switches** - rotary, push-pull, push-momentary, and shadow.
- **Versatility** - various shaft, bushings, terminal styles, resistance values, tapers and tolerances. Available in Conductive Plastic or Thick Film Cermet
- **RoHS Compliant**

**Special Features**
- **Detents** - Center detent and 11 position detents available
- **Seals** - mounting and shaft seals
- **Medium torque** - 1 to 6 oz. in.

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### Operational Specifications Series 388

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Rating</strong></td>
<td>0.5 Watt @ 70°C bushing mounting, 0.25 Watt @ 70°C PC mounting. Derate to 0 watts at 120°C, derate 50% for non-linear tapers and derate multiple sections 1/2 wattage of panel unit.</td>
</tr>
<tr>
<td><strong>Working Voltage</strong></td>
<td>350 Vdc across end terminals, but power not to exceed rating.</td>
</tr>
<tr>
<td><strong>Dielectric Withstanding Voltage</strong></td>
<td>750 VAC @ ATM pressure -760mm Mercury, equivalent to sea level. 350 VAC @ 3.4 in. - 86.36mm Mercury, equivalent to 50,000 feet.</td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td>1000 Megohms minimum for dry, clean conditions @ 25°C</td>
</tr>
<tr>
<td><strong>Temperature Coefficient</strong></td>
<td>See Temperature Resistance Change table on page 7</td>
</tr>
<tr>
<td><strong>Tracking</strong></td>
<td>10% voltage ratio tracking between sections standard. Specials available.</td>
</tr>
<tr>
<td><strong>Electrical Rotation</strong></td>
<td>295° ±5°</td>
</tr>
<tr>
<td><strong>Effective Rotation</strong></td>
<td>265° ±5° without switch; 240° ±5° with switch.</td>
</tr>
<tr>
<td><strong>Load Life</strong></td>
<td>10% maximum change in resistance and within end resistance limits with rated power across element, at 70°C ambient temperature. Power applied 1.5 hours “on” 0.5 hours “off” for 1000 hours.</td>
</tr>
<tr>
<td><strong>Rotational Life</strong></td>
<td>Potentiometer: 10% maximum resistance change up to 25,000 cycles under load. Rotary Switch: 15,000 cycles of operation. Trimmer: 5,000 cycles</td>
</tr>
<tr>
<td><strong>Low Temperature Operation</strong></td>
<td>Less than 3% change in total R. Operating torque at -40°C is 30 oz. in.</td>
</tr>
</tbody>
</table>

### Operational Specifications Series 389

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Rating</strong></td>
<td>1.0 Watt @ 85°C bushing mounting, 0.5 Watt @ 85°C PC mounting. Derate to 0 watts at 150°C, derate 50% for non-linear tapers and derate multiple sections 1/2 wattage of panel unit.</td>
</tr>
<tr>
<td><strong>Working Voltage</strong></td>
<td>350 Vdc across end terminals, but power not to exceed rating.</td>
</tr>
<tr>
<td><strong>Dielectric Withstanding Voltage</strong></td>
<td>750 VAC @ ATM pressure - 760mm Mercury, equivalent to sea level 350 VAC @ 3.4 in. 86.36mm Mercury, equivalent to 50,000 feet. 900 VAC single standard module</td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td>1000 Megohms minimum for dry, clean conditions @ 25°C</td>
</tr>
<tr>
<td><strong>Temperature Coefficient</strong></td>
<td>15 ohms to 100 ohms 250 ppm/°C. 100 ohms to 5 Megohms 150 ppm/°C Temperature range -55°C to 150°C.</td>
</tr>
<tr>
<td><strong>Tracking</strong></td>
<td>10% voltage ratio tracking between sections standard. Specials available.</td>
</tr>
<tr>
<td><strong>Electrical Rotation</strong></td>
<td>295° ±5°</td>
</tr>
<tr>
<td><strong>Effective Rotation</strong></td>
<td>250° +10° -5° without switch; 225° +10° -5° with switch.</td>
</tr>
<tr>
<td><strong>Load Life</strong></td>
<td>5% maximum change in resistance and within end resistance limits with rated power across element, at 85°C ambient temperature. Power applied 1.5 hours “on” 0.5 hours “off” for 1000 hours.</td>
</tr>
<tr>
<td><strong>Rotational Life</strong></td>
<td>Potentiometer: 10% maximum resistance change up to 25,000 cycles under load. Rotary Switch: 15,000 cycles of operation. Trimmer: 5,000 cycles</td>
</tr>
<tr>
<td><strong>Low Temperature Operation</strong></td>
<td>Less than 2% change in total R. Operating torque at -40°C is 30 oz. in.</td>
</tr>
</tbody>
</table>
Environmental and Mechanical Specifications

### Mechanical Specifications - Series 388 & Series 389

#### Body Size
- Single module: .5 in. square ±.047 in. (except at standoffs)

#### Terminals
- Printed circuit style on 0.100 in. grid in line, 0.250 in. long.
- Maximum PC terminal length: .875 in.
- Terminal spacing in multiple section controls: 0.300 in.
- Solder lugs formed from PC pins to accept 3 - #22 AWG wires.

#### Housing
- Molded thermoplastic

#### Anti-turn Device
- Location 1 supplied unless otherwise specified.
- See Chart D.
- Anti-turn Device radius: 6.35mm.

#### Shafts
- Single shaft: 1/8 in. or 1/4 in. dia. Nickel-plated brass.
- Outer Concentric Shaft: 1/8 in. dia. Stainless Steel.
- Inner Concentric Shaft: 0.078 in. dia. Nickel-plated brass.

#### Seals
- Mounting seal and shaft seal for single shafts only.
  Caution: These seals are not designed to meet board washing requirements.

#### Bushing Diameter
- 1/4 in. x 32NEF-2A standard
- 3/8 in. x 32NEF-2A optional
  - When using 3/8 in. diameter bushing, distance from mounting surface to PC terminals is .170 in. See page 8.

#### Bushing Length
- Plain: 1/4 in., 3/8 in. or 1/2 in
- Split-locking style: 3/8 in.

#### Rotational Torque
- Single and dual concentric controls: 0.2 to 3.0 oz. in.
- Two Modules: 0.3 to 3.5 oz. in.
- Three Modules: 0.5 to 4.5 oz. in.
- Four Modules: 0.5 to 5.5 oz. in.
- Medium Torque Option for single shaft only: 1 to 6 oz. in.
- Torque Variation within a rotation: 1 oz. in. max.

#### Stop Torque
- Single shaft: 3 lb. in. (standard)
- High Stop Torque: 5 lb. in. 1/8” shaft with O-ring
- 8 lb. in. ¼” or 1/8” shaft without O-Ring

#### Actuating Forces
- Pot/BJ Switch: 10-22 oz.; Dual Pot/BJ Switch: 10-25 oz.;
- Pot/BJM Switch: 25-40 oz.; Pot/Pot/BJM Switch: 25-43 oz.

Environmental and Specifications continued on next page
Mechanical Rotation
With or without switch: 295°±5°.

Maximum Shaft Pull Force
.125 in. diameter shaft: 18 lbs (20 lbs Option)
.250in. diameter shaft: 10 lbs (20 lbs Option)
Concentric Front & Rear Shaft: 7.5 lbs.
AJ rotary and BJ Push-Pull Switches: 10 lbs (20 lbs Option)
BJ Push-Pull or BJM Momentary Switches: 20 lbs.

Shaft Radial Play (single shaft potentiometer)
.028 in. maximum 1 in. from mounting surface with
.250 in diameter bushing

Shaft End Play
.020 in. maximum

Mounting Torque
Torque applied to the mounting nuts should not exceed
15 to 18 inch-pounds (1.7 to 2.0 N-m) for the .375 inch
(9,52 mm) diameter bushing.

**Standard Taper Curves**

- Reverse Z = Reverse Audio / Reverse Log
- S = Linear
- Z = Audio/Log

**Special Taper Curves**

- T
- REVERSE T
- V
- W
- M

**Tap Terminal Strength**
18 lbs. maximum pull

**Hardware**
Mounting Hardware available as the following:
A. Hex mounting nut 1/4 in. x 32 thread, 5/16 in. across
flats, 1/16 in. thick.
B. Internal tooth lockwasher 13/32 in. OD x .025 in. thick.
C. Jam hex nut 5/16 in. across flats, 5/32 in. thick -
supplied with locking type bushings.

**Marking**
Consisting of State Electronics part number.
Customer part number optional.

“S” Taper is linear, the change in resistance value being
directly proportional to the degree of rotation. It can be
used either as right-hand or left-hand taper.

“Z” Taper is measured between the wiper and the
counter-clockwise terminals (pin 1 and 2) attains 10%
resistance value at 50% of clockwise rotation (left hand).

“Reverse Z” Taper is measured between the wiper
and the clockwise terminals (pin 2 and 3) attains 10%
resistance value at 50% of counter-clockwise rotation
(right hand).

For conformity and special output curves, consult State
Electronics.
### Standard Resistance Values

<table>
<thead>
<tr>
<th></th>
<th>388 Linear</th>
<th>388 Audio</th>
<th>388 Reverse</th>
<th>389 Linear</th>
<th>389 Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td></td>
<td></td>
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<tr>
<td>100</td>
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<td>10K</td>
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<td>22K</td>
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<td>500K</td>
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<td>1M</td>
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</tr>
<tr>
<td>2.5M</td>
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<td></td>
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<tr>
<td>5M</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Temperature Resistance Change

<table>
<thead>
<tr>
<th>Nominal Resistance</th>
<th>-55°C</th>
<th>-40°C</th>
<th>0°C</th>
<th>+25°C</th>
<th>+85°C</th>
<th>+105°C</th>
<th>+120°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Ohms</td>
<td>±5.0</td>
<td>±4.0</td>
<td>±1.5</td>
<td>0</td>
<td>±1.5</td>
<td>±2.0</td>
<td>±3.5</td>
</tr>
<tr>
<td>10K Ohms</td>
<td>+7.0</td>
<td>+5.5</td>
<td>+2.0</td>
<td>0</td>
<td>±1.5</td>
<td>±2.5</td>
<td>±5.5</td>
</tr>
<tr>
<td>100K Ohms</td>
<td>+8.0</td>
<td>+6.0</td>
<td>+2.5</td>
<td>0</td>
<td>±2.0</td>
<td>±3.5</td>
<td>±6.0</td>
</tr>
<tr>
<td>1 Megohm</td>
<td>+10.0</td>
<td>+8.0</td>
<td>+3.0</td>
<td>0</td>
<td>±2.5</td>
<td>±4.0</td>
<td>±7.5</td>
</tr>
</tbody>
</table>

Note: For non-linear tapers, multiply chart values by 1.25

### Locating Tab Options

**P.C. Board & Panel Mounting Dimensions**
- Using Slots for Locating Tab(s)
- Using Holes for Locating Tab(s)

**Locating Lug Style:**
- Tab width: .091"
- Tab Height:.041±.005" FMS
- Spacing:.250"

**Option Number**
- 1 = one tab - at 9 o'clock (standard)
- 2 = one tab - at 3 o'clock
- 3 = one tab - at 12 o'clock
- 4 = one tab - at 6 o'clock
- 5 = two tabs - at 3 and 9 o'clock
- 6 = two tabs - at 6 and 12 o'clock
- 7 = No Locating Lug

**Ref Bushing**
- A 1/4 – 32-NEF Max Dia. (0.249 [6.32mm])
- B 3/8 – 32-NEF Max Dia. (0.375 [9.53mm])

**Mounting Panel Hole**
- 0.265"[6.76mm]
- 0.390"[9.91mm]

**NOTE:** Slots are recommended for the locating tab(s) when using 3/8" diameter bushings because of clearance issues.
### Potentiometer Schematic

**Figure 3**

Front View

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**Figure 4**

Series AJ Switch: Rotary Style

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**Series 388/389 Bushings**

**Figure 6**

.250 (6.35mm) Diameter Bushing, Plain Shaft

“A” Bushing Lengths for .250” Dia. Bushing:
- .250 [6.35mm] STD
- .375 [9.53mm]
- .500 [12.70mm]

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**Figure 7**

.375 (9.53mm) Diameter Bushing, Plain Shaft

“A” Bushing Lengths for .375” Dia. Bushing:
- .250 [6.35mm] STD
- .375 [9.53mm]
- .500 [12.70mm]

---

**Figure 8**

.250 (6.35mm) Diameter, Locking Bushing

---

**Figure 9**

.375 (9.53mm) Diameter, Locking Bushing
Series 388/389 Shafts

Figure 10
.125 (3.18mm) Diameter - Slotted Shaft

Flat can extend to within .031 (0.79) of mounting bushing where shaft length will not permit standard flat.

Figure 12
.250 (6.35mm) Diameter, Flatted Shaft

Flat is Opposite Movable Contact

Figure 14
.125 (3.18mm) Diameter, Flatted Shaft

Flat will extend to within .031 (0.79) of mounting bushing where shaft length will not permit standard flat.

Figure 11
.250 (6.35mm) Diameter - Slotted Shaft

Figure 13
.125 (3.18mm) Diameter - Concentric Shafts

Note: Only Plain Ends are Available for Concentric Shafts

Figure 15
Trimmer

Dimension A: .025 (0.64) Standard
Other lengths available to .50 (12.70) Maximum
Series 388 & 389 controls are assembled from 1/2” square, stackable potentiometer and switch modules. Combine up to 8 modules, with single or concentric metal shafts. Series 388 potentiometer modules have conductive plastic resistive elements, and Series 389 potentiometer modules have cermet resistive elements.

The most common configurations are listed below. Contact your State Electronics sales representative for your custom requirements.

### Series 388/389 - Horizontal Mounting Styles

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-22: 1, 2, 3, or 4 Potentiometer or Rotary Switch Modules, PC Pin Terminals</td>
<td>11</td>
</tr>
<tr>
<td>B-22: 2 or 3 Potentiometer or Rotary Switch Modules, PC Pin Terminals, Concentric Shafts</td>
<td>11C</td>
</tr>
<tr>
<td>B-24: 1, 2, 3, or 4 Potentiometer or Rotary Switch Modules, PC Pin Terminals, Support Plates</td>
<td>12</td>
</tr>
<tr>
<td>B-22: 2 or 3 Potentiometer or Rotary Switch Modules, PC Pin Terminals, Concentric Shafts, Support Plates</td>
<td>12C</td>
</tr>
<tr>
<td>B-22: 1, 2, 3, or 4 Potentiometer or Rotary Switch Modules, Solder Hook Terminals</td>
<td>13</td>
</tr>
<tr>
<td>B-22: 2 or 3 Potentiometer or Rotary Switch Modules, Solder Hook Terminals, Concentric Shafts</td>
<td>13C</td>
</tr>
<tr>
<td>B-22: Single Potentiometer or Rotary Switch, plus Push-Pull/Momentary Switch, PC Pin Terminals</td>
<td>14</td>
</tr>
<tr>
<td>B-22: Single, Dual Pot or Rotary Switch, plus Push-Pull/Momentary Switch, Solder Hook Terminals</td>
<td>14C</td>
</tr>
<tr>
<td>B-28: Dual Potentiometer/Rotary switch with (BJ) Push-Pull/(BJM) Momentary Switch; PC Pin Terminals</td>
<td>15</td>
</tr>
</tbody>
</table>

**Detent**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-22: Single, Dual Potentiometer with Detent, Valley Style, PC Pin Terminals, Solder Hook Terminals</td>
<td>16</td>
</tr>
<tr>
<td>B-24: Single, Dual Potentiometer with Detent, Valley Style, PC Pin Terminals, Support Plates</td>
<td>17</td>
</tr>
</tbody>
</table>

**Schadow Switch**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single, Dual Potentiometer with DPDT Schadow Switch, PC Pin Terminals</td>
<td>18</td>
</tr>
</tbody>
</table>

### Series 388/389 - Vertical Mounting Styles

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-8: Single Potentiometer or Rotary Switch, PC Pin Terminals</td>
<td>19</td>
</tr>
<tr>
<td>A-18: Single Potentiometer or Rotary Switch, PC Pin Terminals</td>
<td>19</td>
</tr>
<tr>
<td>C-15: BBJ Single Push-Pull / BBJM Momentary Switch, PC Pin Terminals</td>
<td>20</td>
</tr>
<tr>
<td>A-19, A-20: Dual Potentiometer or Rotary Switch, PC Pin Terminals</td>
<td>20</td>
</tr>
<tr>
<td>C-14, A-21, C-9, C-10: Dual Potentiometer or Rotary Switch, PC Pin Terminals</td>
<td>21</td>
</tr>
<tr>
<td>A-22, C-15: BBJ Momentary/ BBJM Push-Pull Switch, PC Pin Terminals</td>
<td>21</td>
</tr>
<tr>
<td>C-11: Single Potentiometer and BBJ/BBJM Switch, PC Pin Terminals</td>
<td>22</td>
</tr>
</tbody>
</table>

**Concentric Shafts**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-9, C-10: Dual Potentiometer, Concentric Shaft, PC Pin Terminals</td>
<td>22</td>
</tr>
</tbody>
</table>

**Detent**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-8, A-18, C10, A20: Single, Dual Potentiometer with Detent, Valley Style, PC Pin Terminals</td>
<td>23</td>
</tr>
</tbody>
</table>
Series 388/389 - Horizontal Mounting Styles

Dwg 11-1: B-22 Single Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 11-2: B-22 Dual Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 11-3: B-22 Triple Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 11-4: B-22 Quad Potentiometer or Rotary Switch, PC Pin Terminals

Notes:
1. Basic dimensions are in inches.
   Dimensions in brackets are in millimeters.
   Dimensional Tolerance ±.016 [0.41], except as specified.
2. B-22 PC pin length standard is 0.250". Maximum 0.875".
3. Drawings are not to scale.
Series 388/389 - Horizontal Mounting Styles (continued)

**Drawing 11C-1:** B-22 Dual Potentiometer or Rotary Switch, Concentric Shaft, PC Pin Terminals

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A ± 0.031</td>
<td>(0.80)</td>
<td></td>
</tr>
<tr>
<td>B ± 0.031</td>
<td>(1.80 ± 0.025)</td>
<td></td>
</tr>
<tr>
<td>C ± 0.031</td>
<td>(0.76 ± 0.025)</td>
<td></td>
</tr>
<tr>
<td>Tab Length: Maximum</td>
<td>0.168 (4.27)</td>
<td>for 3/8&quot; Dia. Bushings</td>
</tr>
<tr>
<td>Pin Length: 0.152 (3.86)</td>
<td>for 1/4&quot; Dia. Bushing</td>
<td></td>
</tr>
<tr>
<td>Pin Length: 0.152 (3.86)</td>
<td>for 3/8&quot; Dia. Bushings</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Basic dimensions are in inches.
2. Dimensional Tolerance ± 0.016 (0.40), except as specified.
3. Dimensions in brackets are in millimeters.
4. 8-22 PC pins length standard is 0.250". Maximum 0.875"
5. Drawings are not to scale.

---

**Drawing 11C-2:** B-22 Triple Potentiometer or Rotary Switch, Concentric Shaft, PC Pin Terminals

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A ± 0.031</td>
<td>(0.80)</td>
<td></td>
</tr>
<tr>
<td>B ± 0.031</td>
<td>(1.80 ± 0.025)</td>
<td></td>
</tr>
<tr>
<td>C ± 0.031</td>
<td>(0.76 ± 0.025)</td>
<td></td>
</tr>
<tr>
<td>Tab Length: Maximum</td>
<td>0.168 (4.27)</td>
<td>for 3/8&quot; Dia. Bushings</td>
</tr>
<tr>
<td>Pin Length: 0.152 (3.86)</td>
<td>for 1/4&quot; Dia. Bushing</td>
<td></td>
</tr>
<tr>
<td>Pin Length: 0.152 (3.86)</td>
<td>for 3/8&quot; Dia. Bushings</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Basic dimensions are in inches.
2. Dimensional Tolerance ± 0.016 (0.40), except as specified.
3. Dimensions in brackets are in millimeters.
4. 8-22 PC pins length standard is 0.250". Maximum 0.875"
5. Drawings are not to scale.
**Dwg 12-1: B-24 Single Potentiometer or Rotary Switch, Support Plates**

**Dwg 12-2: B-24 Dual Potentiometer or Rotary Switch, Support Plates**

**Dwg 12-3: B-24 Triple Potentiometer or Rotary Switch, Support Plates**

**Dwg 12-4: B-24 Quad Potentiometer or Rotary Switch, Support Plates**

**Notes:**
1. Basic dimensions are in inches.
   Dimensions in brackets are in millimeters.
   Dimensional Tolerance ± .016 [0.40], except as specified.
2. B-24 PC pins length standard is 0.250". Maximum 0.875".
3. Drawings are not to scale.

---

**Support Plate Dimensions:**

<table>
<thead>
<tr>
<th>Type</th>
<th>&quot;A&quot; Support Plate</th>
<th>&quot;C&quot; Terminal Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-24-3</td>
<td>.625 [15.88]</td>
<td>.500 [12.70]</td>
</tr>
<tr>
<td>B-24-4</td>
<td>.750 [19.05]</td>
<td>.625 [15.88]</td>
</tr>
<tr>
<td>B-24-5</td>
<td>.275 [6.98]</td>
<td>.125 [3.18]</td>
</tr>
</tbody>
</table>

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**Series 388/389 - Horizontal Mounting Styles (continued)**

**Dwg 12C-1:** B-24 Dual Potentiometer or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates

![Dwg 12C-1 Diagram](image)

**Dwg 12C-2:** B-24 Triple Potentiometer or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates

![Dwg 12C-2 Diagram](image)

**Support Plate Dimensions:**

<table>
<thead>
<tr>
<th>Type</th>
<th>&quot;A&quot; Support Plate</th>
<th>&quot;C&quot; Terminal Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-24-3</td>
<td>.625 [15.88]</td>
<td>.500 [12.70]</td>
</tr>
<tr>
<td>B-24-4</td>
<td>.750 [19.05]</td>
<td>.625 [15.88]</td>
</tr>
<tr>
<td>B-24-5</td>
<td>.275 [6.98]</td>
<td>.125 [3.18]</td>
</tr>
</tbody>
</table>

**Notes:**

1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 [0.40], except as specified.
2. B-22 PC pins length standard is 0.250". Maximum 0.875"
3. Drawings are not to scale.
Series 388/389 - Horizontal Mounting Styles (continued)

**Dwg 13-1: B-22 Single Potentiometer or Rotary Switch, Solder Hook Terminals**

![Diagram of B-22 Single Potentiometer or Rotary Switch]

**Dwg 13-2: B-22 Dual Potentiometer or Rotary Switch, Solder Hook Terminals**

![Diagram of B-22 Dual Potentiometer or Rotary Switch]

**Dwg 13-3: B-22 Triple Potentiometer or Rotary Switch, Solder Hook Terminals**

![Diagram of B-22 Triple Potentiometer or Rotary Switch]

**Dwg 13-4: B-22 Quad Potentiometer or Rotary Switch, Solder Hook Terminals**

![Diagram of B-22 Quad Potentiometer or Rotary Switch]

**NOTE:** Solder Hook Terminal receives (3) NO. 22 AWG .025 (0.64mm) solid wires
**Series 388/389 - Horizontal Mounting Styles (continued)**

**Dwg 13C-1**: B-22 Dual Potentiometer or Rotary Switch, Concentric Shaft, Solder Hook Terminals

![Dwg 13C-1 Diagram](image1)

**Dwg 13C-2**: B-22 Triple Potentiometer or Rotary Switch, Concentric Shaft, Solder Hook Terminals

![Dwg 13C-2 Diagram](image2)

**Notes:**
1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 (0.40), except as specified.
2. B-22 PC pins length standard is 0.250". Maximum 0.875"
3. Drawings are not to scale.
Series 388/389 - Horizontal Mounting Styles (continued)

Dwg 14-1A: B-22 Single Module, plus Push-Pull/Momentary Switch, PC Pin Terminals

Dwg 14-1B: B-22 Single Module, plus Push-Pull/Momentary Switch, PC Pin Terminals, Support Plate

Dwg 14-1C: B-22 Single Pot or Rotary Switch, plus Push-Pull/Momentary Switch, Solder Hook Terminals

Notes:
1. Basic dimensions are in inches. Dimensions in brackets are in millimeters.
   Dimensional Tolerance ±0.016 [0.40], except as specified.
2. B-22 PC pins length standard is 0.250". Maximum 0.875".
3. Drawings are not to scale.
**SERIES 388, 389**

**Series 388/389 - Horizontal Mounting Styles (continued)**

**Dwg 14-2A:** B-22 Dual Potentiometer or Rotary Switch, plus Push-Pull/Momentary Switch, PC Pin Terminals

![Diagram of B-22 Dual Potentiometer or Rotary Switch, plus Push-Pull/Momentary Switch, PC Pin Terminals]

**Notes:**
1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 (0.40), except as specified.
2. B-22 PC pins length standard is 0.250”. Maximum 0.875”
3. Drawings are not to scale.

---

**Dwg 14-2B:** B-22 Dual Potentiometer or Rotary Switch, plus Push-Pull/Momentary Switch, PC Pin Terminals with Support Plates

![Diagram of B-22 Dual Potentiometer or Rotary Switch, plus Push-Pull/Momentary Switch, PC Pin Terminals with Support Plates]

**Notes:**
1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 (0.40), except as specified.
2. B-22 PC pins length standard is 0.250”. Maximum 0.875”
3. Drawings are not to scale.

---

**Dwg 14-2C:** B-22 Dual Pot or Rotary Switch, plus Push-Pull/Momentary Switch, Solder Hook Terminals

![Diagram of B-22 Dual Pot or Rotary Switch, plus Push-Pull/Momentary Switch, Solder Hook Terminals]

**Notes:**
1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 (0.40), except as specified.
2. B-22 PC pins length standard is 0.250”. Maximum 0.875”
3. Drawings are not to scale.
**Series 388/389 - Horizontal Mounting Styles (continued)**

**Dwg 14-3: B-24 Dual Pot or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates**

![Diagram of B-24 Dual Pot or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates](image1)

**Dwg 14-3A: B-24 Triple Pot or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates**

![Diagram of B-24 Triple Pot or Rotary Switch, Concentric Shaft, PC Pin Terminals, Support Plates](image2)

**Support Plate Dimensions:**

<table>
<thead>
<tr>
<th>Type</th>
<th>&quot;A&quot; Support Plate</th>
<th>&quot;C&quot; Terminal Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-24-3</td>
<td>.625 [15.88]</td>
<td>.500 [12.70]</td>
</tr>
<tr>
<td>B-24-4</td>
<td>.750 [19.05]</td>
<td>.625 [15.88]</td>
</tr>
<tr>
<td>B-24-5</td>
<td>.275 [6.98]</td>
<td>.125 [3.18]</td>
</tr>
</tbody>
</table>
**SERIES 388, 389 - Horizontal Mounting Styles (continued)**

**Dwg 15-1:** Dual Potentiometer/Rotary switch with (BJ) Push-Pull/(BJM) Momentary Switch; PC Pin Terminals (Support Plates optional)

Locating Lug (no Support Brackets)

Support Brackets (no Locating Lug)

**Dwg 15-2:** Dual Potentiometer/Rotary switch with (BJ) Push-Pull/(BJM) Momentary Switch; Solder Hook Terminals.

1. Basic dimensions are in inches. Dimensions in brackets are in millimeters.
   Dimensional Tolerance ±.016 (.40), except as specified.
2. .22 PC pins length standard is .050”. Maximum .0875”
3. Drawings are not to scale.

---

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**SERIES 388, 389 - Horizontal Mounting Styles (continued)**

**Dwg 15-3:** Triple Potentiometer/Rotary switch with (BJ) Push-Pull/(BJM) Momentary Switch; PC Pin Terminals (Support Plates optional)

Locating Lug and no Support Brackets

Support Brackets and no Locating Lug

**Dwg 15-4:** Triple Potentiometer/Rotary switch with (BJ) Push-Pull/(BJM) Momentary Switch; Solder Hook Terminals.

---

1. Basic dimensions are in inches. Dimensions in brackets are in millimeters.
2. B-22 PC pins length standard is 0.250”. Maximum 0.875”
3. Drawings are not to scale.
Series 388/389 - Horizontal Mounting Styles (continued)

Dwg 16-1: B-22 Single Potentiometer with detent, Valley Style, PC Pin Terminals

Dwg 16-2: B-22 Dual Potentiometer with detent, Valley Style, PC Pin Terminals

Dwg 16-3: B-22 Single Potentiometer with detent, Valley Style, Solder Hook Terminals

Dwg 16-4: B-22 Dual Potentiometer with detent, Valley Style, Solder Hook Terminals
**Dwg 17-1: B-24 Single Potentiometer with detent, Valley Style, PC Pin Terminals, Support Plates**

**Dwg 17-2: B-24 Dual Potentiometer with detent, Valley Style, PC Pin Terminals, Support Plates**
Series 388/389 - Horizontal Mounting Styles (continued)

**Dwg 18-1:** Single Potentiometer with DPDT Schadow Switch: Momentary Push or Push On / Push Off.

**Dwg 18-2:** Dual Potentiometer with DPDT Schadow Switch: Momentary Push or Push On / Push Off.

Schadow Switch Schematic DPDT Push-Pull / Momentary
(Shown with shaft extended)
**Series 388/389 - Vertical Mounting Styles**

**Dwg 19-1: C-8 Single Potentiometer or Rotary Switch, PC Pin Terminals**

- PC Board Layout (top view) Type C-8
  - Tab Length: 1/4" Dia. Bushing: 0.039±0.005 (0.099)
    3/8" Dia. Bushing: 0.07±0.005 (0.178)

**Dwg 19-2: A-18 Single Potentiometer or Rotary Switch, PC Pin Terminals**

- PC Board Layout (top view) Type A-18
  - Tab Length: 1/4" Dia. Bushing: 0.039±0.005 (0.099)
    3/8" Dia. Bushing: 0.07±0.005 (0.178)

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**Series 388/389 - Vertical Mounting Styles (continued)**

**Dwg 20-1: C-15 Single BBJ Push-Pull / BBJM Momentary Switch, PC Pin Terminals**

[Diagram of C-15 Single BBJ Push-Pull / BBJM Momentary Switch, PC Pin Terminals]

**Dwg 20-2: A-19 Dual Potentiometer or Rotary Switch, PC Pin Terminals**

[Diagram of A-19 Dual Potentiometer or Rotary Switch, PC Pin Terminals]

**Dwg 20-3: A-20 Dual Potentiometer or Rotary Switch, PC Pin Terminals**

[Diagram of A-20 Dual Potentiometer or Rotary Switch, PC Pin Terminals]

**Notes:**

1. Basic dimensions are in inches. Dimensions in brackets are in millimeters. Dimensional Tolerance ±0.016 (0.40), except as specified.
2. Drawings are not to scale.

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Dwg 21-1: A-21 Dual Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 21-2: A-20 Dual Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 21-3: C-9 Dual Potentiometer or Rotary Switch, PC Pin Terminals

Dwg 21-4: C-10 Dual Potentiometer or Rotary Switch, PC Pin Terminals
Dwg 22-1: C-9 Dual Potentiometer, Concentric Shaft, PC Pin Terminals

Dwg 22-2: C-10 Dual Potentiometer, Concentric Shaft, PC Pin Terminals

Dwg 22-3: C-11 Single Potentiometer and BBJ Momentary/BBJM Push-Pull Switch, PC Pin Terminals

DIMENSION NOTES
A = Shaft Length (Out Position)
B = Bushing Length
.250 [6.35mm] STD
.375 [9.53mm]
.500 [12.70mm]

Tab-Length:
1/4" Dia. Bushing: 0.019 x 0.005 [0.099]
3/8" Dia. Bushing: 0.070 x 0.005 [0.178]

Shaft shown in the extended position
Note: Connecting terminals 2 and 4 together will create a SPDT switch
**Series 388/389 - Vertical Mounting Styles (continued)**

### Dwg 23-1: C-8 Single Potentiometer with Detent, PC Pin Terminals

![PC Board Layout (top view)](Image)

**Front View**

**DIMENSION NOTES**
- **B** = Bushing Length
- 0.884 ±.0156 (22.45 ±0.40)
- PC Board Surface

**Typical**
- 300 (7.62)

**Mounting Surface**
- 109 (2.78) DIAMETER

**Tab Length:**
- 1/4" Diameter Bushing: 0.039 ±.005 (0.099)
- 3/8" Diameter Bushing: 0.07 ±.005 (0.178)

**PC Board Layout (top view) Type C-8**

### Dwg 23-2: A-18 Single Potentiometer with Detent, PC Pin Terminals

![PC Board Layout (top view)](Image)

**Front View**

**DIMENSION NOTES**
- **B** = Bushing Length
- 0.584 ±.0156 (14.83 ±0.40)
- PC Board Surface

**Typical**
- 300 (7.62)

**Mounting Surface**
- 109 (2.78) DIAMETER

**Tab Length:**
- 1/4" Diameter Bushing: 0.039 ±.005 (0.099)
- 3/8" Diameter Bushing: 0.07 ±.005 (0.178)

**PC Board Layout (top view) Type A-18**

### Dwg 23-3: C-10 Dual Potentiometer with Detent, PC Pin Terminals

![PC Board Layout (top view)](Image)

**Front View**

**DIMENSION NOTES**
- **B** = Bushing Length
- 0.884 ±.0156 (22.45 ±0.40)
- PC Board Surface

**Typical**
- 300 (7.62)

**Mounting Surface**
- 109 (2.78) DIAMETER

**Tab Length:**
- 1/4" Diameter Bushing: 0.039 ±.005 (0.099)
- 3/8" Diameter Bushing: 0.07 ±.005 (0.178)

**PC Board Layout (top view) Type C-10**

### Dwg 23-4: A-20 Dual Potentiometer with Detent, PC Pin Terminals

![PC Board Layout (top view)](Image)

**Front View**

**DIMENSION NOTES**
- **B** = Bushing Length
- 0.884 ±.0156 (22.45 ±0.40)
- PC Board Surface

**Typical**
- 300 (7.62)

**Mounting Surface**
- 109 (2.78) DIAMETER

**Tab Length:**
- 1/4" Diameter Bushing: 0.039 ±.005 (0.099)
- 3/8" Diameter Bushing: 0.07 ±.005 (0.178)

**PC Board Layout (top view) Type A-20**

---

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## Request Quotation Online at Potentiometer.com

Customer Name ___________________________ Address ___________________________

City, State, Zip, Country ___________________________ Customer Part Number/When Specified ___________________________

SEE DATA SHEETS FOR ASSEMBLED DIMENSIONS & DETAILED DESCRIPTION OF THE FOLLOWING OPTIONS:

### FOLLOW STEPS TO DESCRIBE CONTROL

**STEP 1**
- RESISTANCE ELEMENT (Select One)
  - Conductive Plastic - Series 388
  - Cermet - Series 389

**STEP 2**
- TERMINALS (Select One)
  - 822 FC Pin Style Terminals (See Other Options At Right)
  - 350’ length
  - 875” length

**STEP 3**
- TAPER (Insert Taper Designation Letter for Each Resistance Module)
  - Cermet: S, Z
  - Conductive Plastic: S, Z, RZ (See Graph Below)

**STEP 4**
- RESISTANCE VALUE (Insert for Each Resistance Module)
  - Nominal Resistance Values in Ohms:
    - 100
    - 1K
    - 10K
    - 100K
    - 1.0 Meg
    - 250
    - 2.5K
    - 25K
    - 250K
    - 2.5 Meg
    - 500
    - 5K
    - 50K
    - 500K
    - 5 Meg
    - Other Values Available on Special Order
    - Standard Tolerance: AJ

**STEP 5**
- SWITCH MODULES (Insert for Each Switch Module)
  - AJ Rotary SPDT CW or CCW detent
  - BJ Push-Pull SPDT (last section only)
  - BJM Momentary SPDT (last section only)
  - Schadow DPDT Momentary (last section only)
  - Schadow DPDT Push-Push (last section only)

**STEP 6**
- BUSHING (Select Length and Diameter)
  - Length (Dim “A”)
    - 1/4”
    - 3/8”
    - Locking 3/8”
  - Bushing Diameter
    - 1/4”
    - 3/8”

**STEP 7**
- SHAFT (Select Diameter and Length)
  - Length (Dim “B” Inches):
    - From Mounting Surface (FMS)
  - 1/8” Diameter
    - 1/8”
    - 1/4”
    - 3/8”
    - 1/2”
    - 5/8”
    - 3/4”
    - 7/8”
    - 1”
    - Other
  - 1/4” Diameter
    - 1/4”
    - 1/2”
    - 3/4”
    - 7/8”
    - 1”
    - Other

**STEP 8**
- LOCATING LUG OPTIONS (Select One)
  - 1 = tab at 9 o’clock (std)
  - 2 = tab at 3 o’clock
  - 3 = tab at 12 o’clock
  - 4 = tab at 6 o’clock
  - 5 = tabs at 3 and 9 o’clock
  - 6 = tabs at 6 and 12 o’clock
  - 7 = No Locating Lug

**STEP 9**
- MOUNTING HARDWARE (Select One)
  - STANDARD
  - OTHER

**STEP 10**
- MARKING (Select One)
  - STANDARD
  - NONE

**STEP 11**
- KNOB
  - Indicate Manufacturer and Part Number

### DISCLAIMERS:
- Due to the unlimited design combinations, certain designs may not perform in accordance with all of the specifications
- Fax completed form to: STATE ELECTRONICS, 36 Route 10, East Hanover, NJ 07936 • FAX 973-887-1940
- For Assistance Contact Clarosystem Product Manager: Toll Free – 800-631-8083
**SERIES 388, 389**

**CLAROSYSTEM**

Series 388/389

Request For Quotation

Page 1 of 3

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**Series 388/389 Custom Ordering Information – Follow Steps to Describe Control**

1. Resistance Element (choose one)
   - [ ] Series 388 Conductive Plastic
   - [ ] Series 389 Cermet

2. Terminals OR Support Plates (choose one)
   - [ ] Terminals (choose style)
     - [ ] Solder Hook
     - [ ] PC Pin Style B22 (specify length)
       - [ ] .250 in. (6.35mm)
       - [ ] .350 in. (8.89mm)
       - [ ] .750 in. (19.05mm)
       - [ ] .500 in. (12.7mm)
       - [ ] .625 in. (15.875mm)
       - [ ] .875 in. (22.225mm) Standard
     - [ ] PC Pin Style special configuration (specify)

3. Optional Support Plates (choose one type)

<table>
<thead>
<tr>
<th>Type</th>
<th>&quot;A&quot; Support Plate in. (mm)</th>
<th>&quot;C&quot; Terminal in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-24-1</td>
<td>.375 (9.53)</td>
<td>.250 (6.35)</td>
</tr>
<tr>
<td>B-24-2</td>
<td>.500 (12.53)</td>
<td>.375 (9.53)</td>
</tr>
<tr>
<td>B-24-3</td>
<td>.625 (15.88)</td>
<td>.500 (12.70)</td>
</tr>
<tr>
<td>B-24-4</td>
<td>.750 (19.05)</td>
<td>.625 (15.88)</td>
</tr>
<tr>
<td>B-24-5</td>
<td>.275 (6.98)</td>
<td>.125 (3.18)</td>
</tr>
<tr>
<td>B-24-6</td>
<td>.2969 (7.54)</td>
<td>.175 (4.45)</td>
</tr>
<tr>
<td>B-24-7</td>
<td>.4375 (11.11)</td>
<td>.315 (8.00)</td>
</tr>
<tr>
<td>B-24-8</td>
<td>.5625 (14.28)</td>
<td>.425 (10.8)</td>
</tr>
</tbody>
</table>

* (Discontinued - For Reference Only)
3. Taper (Insert taper designation letter below module or modules)

<table>
<thead>
<tr>
<th>Cermet or Conductive Plastic</th>
<th>Taper Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>S</td>
</tr>
<tr>
<td>Clockwise Modified Log</td>
<td>Z</td>
</tr>
<tr>
<td>Counter Clockwise Modified Log</td>
<td>R</td>
</tr>
<tr>
<td>Modified Linear</td>
<td>M*</td>
</tr>
<tr>
<td>Counter Clockwise Modified Log</td>
<td>V*</td>
</tr>
<tr>
<td>Modified Log</td>
<td>W*</td>
</tr>
<tr>
<td>Counter Clockwise Modified Log</td>
<td>T*</td>
</tr>
<tr>
<td>Modified Log</td>
<td>RT*</td>
</tr>
</tbody>
</table>

*(special order)*

4. Tolerance (Insert tolerance for each resistance module)

- Cermet: 10% standard; 5% special
- Conductive Plastic: 10% standard; 5% special

5. Resistance Value (Insert for each resistance module)

<table>
<thead>
<tr>
<th>Nominal Resistance Values in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>250</td>
</tr>
<tr>
<td>500</td>
</tr>
</tbody>
</table>

Other Values Available on Special Order

6. Switch Modules (Insert designation in proper module box)

- AJ SPDT Rotary – CCW detent
- AJ SPDT Rotary – CW detent
- BJ SPDT Push-Pull (last section only)
- BJM SPDT Push Momentary (last section only)
- Schadow DPDT Push-Push (single shaft, last section only)
- Schadow DPDT Momentary (single shaft, last section only)
### Special Options (Specify if required)
- 8 lb. Stop Torque

### Bushing (Choose length and diameter)

<table>
<thead>
<tr>
<th>Length (Dim &quot;A&quot;)</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain .250 in. (6.35mm)</td>
<td>Plain .250 in. (6.35mm)</td>
</tr>
<tr>
<td>Plain .375 in. (9.53mm)</td>
<td>Plain .375 in. (9.53mm)</td>
</tr>
<tr>
<td>Plain .500 in (12.70mm)</td>
<td>Plain .500 in (12.70mm)</td>
</tr>
<tr>
<td>Locking .375 in (9.53mm)</td>
<td>Locking .375 in (9.53mm)</td>
</tr>
</tbody>
</table>

### Shaft
- Diameter (Choose one)
  - .125 in. (3.18mm) (with .250 in. (6.35mm) Dia. bushing)
  - .250 in. (6.35mm) (with .375 in. (9.53mm) Dia. bushing)

<table>
<thead>
<tr>
<th>Length (Dim &quot;B&quot;) from mounting surface (FMS) (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

- Concentric Shafts (available for up to 3 modules. Module closest to Panel is controlled by outer shaft.)
  - .125 in. (3.18mm) Outer Diameter; .078 in. (1.98mm) Inner Diameter

<table>
<thead>
<tr>
<th>Length FMS (specify)</th>
<th>Outer</th>
<th>Inner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Shaft Ending (Select one)
- Plain
- Flattened (specify length & thickness)
- Slotted
- Special (specify)

### Locating Lug Options (Select one)
- 1 = one tab - at 9 o'clock (standard)
- 2 = one tab - at 3 o'clock
- 3 = one tab - at 12 o'clock
- 4 = one tab - at 6 o'clock
- 5 = two tabs - at 3 and 9 o'clock
- 6 = two tabs - at 6 and 12 o'clock
- 7 = No Locating Lug

### Mounting Hardware (Specify)
- Standard
- IP66 Hardware
- None

### Marking (Specify)
- Standard
- Other

**DISCLAIMER:** Due to the unlimited design combinations, certain designs may not perform in accordance with all of the specifications.
<table>
<thead>
<tr>
<th>Mod-Pot™ SERIES OPTIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; Square / Modular Design</td>
<td>1/2&quot; Square / Modular Design</td>
</tr>
<tr>
<td>S159</td>
<td>388389S127</td>
</tr>
<tr>
<td>Non-Magnetic Construction</td>
<td>Technology</td>
</tr>
<tr>
<td>Conductive Plastic</td>
<td>Cermet</td>
</tr>
<tr>
<td>Operating Temperature (°C)</td>
<td>-55 ° to 120 °</td>
</tr>
<tr>
<td>Temperature Coefficient (TC)</td>
<td>+/-5% (Typical)</td>
</tr>
<tr>
<td>Rotational Life</td>
<td>100,000</td>
</tr>
<tr>
<td>Sections</td>
<td>64</td>
</tr>
<tr>
<td>Center Detent</td>
<td>Center or 11 - Detents</td>
</tr>
<tr>
<td>21 - Detents</td>
<td>Not Available</td>
</tr>
<tr>
<td>Rotary Switch - Counter Clockwise Detent</td>
<td>Maximum of 1-Switch per Shaft</td>
</tr>
<tr>
<td>Maximum SPST, N.O. + SPST N.C. OR</td>
<td>1</td>
</tr>
<tr>
<td>Rotary Switch - Clockwise Detent</td>
<td>Maximum of 1-Switch per Shaft</td>
</tr>
<tr>
<td>Push-Pull Switch (1/8&quot; or 1/4&quot; Dia. Shaft)</td>
<td>Optional</td>
</tr>
<tr>
<td>Push-Momentary - 1/8&quot; Dia. Shaft</td>
<td>Not Available</td>
</tr>
<tr>
<td>Push-Momentary - 1/4&quot; Dia. Shaft</td>
<td>2 SPST N.O. + 2 SPST N.C.</td>
</tr>
<tr>
<td>Push-On  / Push-Off - 1/8&quot; Dia. Shaft</td>
<td>Not Available</td>
</tr>
<tr>
<td>Max Shaft Single Length - 1/8 Dia.</td>
<td>Metal Shaft 2.5&quot;</td>
</tr>
<tr>
<td>Max Shaft Single Length - 1/4 Dia.</td>
<td>Metal Shaft 2.5&quot;</td>
</tr>
<tr>
<td>Concentric Shafts .078 / .125</td>
<td>Any Metal Shaft Combination for Inner &amp; Outer Shaft</td>
</tr>
<tr>
<td>Vernier Drive</td>
<td>Optional</td>
</tr>
<tr>
<td>Internal Shaft Seal</td>
<td>Optional</td>
</tr>
<tr>
<td>IP Rated</td>
<td>No</td>
</tr>
<tr>
<td>Stop Torque</td>
<td>4 lb.-in.</td>
</tr>
<tr>
<td>High Stop Torque</td>
<td>Not Available</td>
</tr>
<tr>
<td>Rotational Torque Standard (Min / Max)</td>
<td>Single section</td>
</tr>
<tr>
<td>Rotational Torque, Medium Torque Option (Min / Max)</td>
<td>Available - Varies with each configuration</td>
</tr>
<tr>
<td>Non-Magnetic</td>
<td>N/A</td>
</tr>
<tr>
<td>Lug Terminals</td>
<td>Not Available</td>
</tr>
<tr>
<td>Rotary Switch Actuating Torque</td>
<td>20 oz.-in.</td>
</tr>
<tr>
<td>Note: Most parameters (wattage rating, rotational torque, etc.) are affected by the total number of sections. Download full specifications for further details.</td>
<td></td>
</tr>
</tbody>
</table>
GLOSSARY OF TERMS

Input and Output Terms

Output Voltage
(e) The voltage between the wiper terminal and the designated reference point. Unless otherwise specified, the designated reference point is the CCW terminal (See 3.1).

Output Voltage

Electrical Overtravel - Nonwirewound
The shaft travel over which there is continuity between the wiper terminal and the resistance element beyond each end of the Theoretical Electrical Travel.

Electrical Continuity Travel
The total travel of the shaft over which electrical continuity is maintained between the wiper and the resistance element.

Tap Location
The position of a tap relative to some reference. This is commonly expressed in terms of an Output Ratio and/or a shaft position. When a shaft position is specified, the Tap Location is the center of the Effective Tap Width.

Resistance

End Resistance
The resistance measured between the wiper terminal and an end terminal with the shaft positioned at the corresponding End Point.

Temperature Coefficient Of Resistance
The unit change in resistance per degree celsius change from a reference temperature, expressed in parts per million per degree celsius as follows:

\[ T.C. = \frac{R_2 - R_1}{R_1(T_2 - T_1)} \times 10^6 \]

Where:
- \( R_1 \) = Resistance at reference temperature in ohms.
- \( R_2 \) = Resistance at test temperature in ohms
- \( T_1 \) = Reference temperature in degrees celsius.
- \( T_2 \) = Test temperature in degrees celsius.

Conformity and Linearity

Linearity
A specific type of conformity where the theoretical function characteristic is a straight line.

Mathematically:

\[ \frac{\delta}{E} = f(W) \pm C = A(W) + B \pm C \]

Where:
- \( A \) is the given slope; \( B \) is given intercept at \( W = 0 \).
- \( W \) = Angle or slope

Absolute Linearity
The maximum deviation of the actual function characteristic from a fully defined straight reference line. It is expressed as a percentage of the Total Applied Voltage and measured over the Theoretical Electrical Travel. An Index Point on the actual output is required.
The straight reference line may be fully defined by specifying the low and high theoretical end Output Ratios separated by the Theoretical Electrical Travel. Unless otherwise specified, these end Output Ratios are 0.0 and 1.0 respectively.

Mathematically:

\[
\frac{e}{E} = \frac{A(W/W_T) + B \pm C}{E}
\]

Where:
A is the given slope; B is given intercept at W=0.
Unless otherwise specified: A=1; B=0

Figure 2

**Independent Linearity**

The maximum deviation, expressed as a percent of the Total Applied Voltage, of the actual function characteristic from a straight reference line with its slope and position chosen to minimize deviations over the Actual Electrical Travel, or any specified portion thereof.

Note: End Voltage requirements, when specified, will limit the slope and position of the reference line.

Mathematically:

\[
\frac{e}{E} = \frac{P(W/W_A) + Q \pm C}{E}
\]

Where:
P is unspecified slope; Q is unspecified intercept at W=0. And both are chosen to minimize C but are limited by the End Voltage requirements.

Figure 3
## Electrical Characteristics

### Noise
Any spurious variation in the electrical output not present in the input, defined quantitatively in terms of an equivalent parasitic, transient resistance in ohms, appearing between the contact and the resistance element when the shaft is rotated or translated. The Equivalent Noise Resistance is defined independently of the resolution, the functional characteristics, and the total travel. The magnitude of the Equivalent Noise Resistance is the maximum departure from a specified reference line. The wiper of the potentiometer is required to be excited by a specified current and moved at a specified speed.

### Output Smoothness (Non-wirewound Potentiometers Only)
Output Smoothness is a measurement of any spurious variation in the electrical output not present in the input. It is expressed as a percentage of the Total Applied Voltage and measured for specified travel increments over the Theoretical Electrical Travel. Output Smoothness includes effects of contact resistance variations, resolution, and other micrononlinearities in the output.

### Resolution
A measure of the sensitivity to which the Output Ratio of the potentiometer may be set.

### Dielectric Strength
Ability to withstand under prescribed conditions, a specified potential of a given characteristic between the terminals of each cup and the exposed conducting surfaces of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the gang without exceeding a specified leakage current value.

### Insulation Resistance
The resistance to a specified impressed DC voltage between the terminals of each cup and the exposed conducting surfaces of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the gang, under prescribed conditions.

### Power Rating
The maximum power that a potentiometer can dissipate under specified conditions while meeting specified performance requirements.

### Power Derating
The modification of the nominal power rating for various considerations such as Load Resistance, Output Slopes, Ganging, nonstandard environmental conditions and other factors.

### Life
The number of shaft revolutions or translations obtainable under specific operating conditions and within specified allowable degradations of specific characteristics.

## Mechanical Characteristics

### Shaft Runout
The eccentricity of the shaft diameter with respect to the rotational axis of the shaft, measured at a specified distance from the end of the shaft. The body of the potentiometer is held fixed and the shaft is rotated with a specified load applied radially to the shaft. The eccentricity is expressed in inches, TIR.

### Lateral Runout
The perpendicularity of the mounting surface with respect to the rotational axis of the shaft, measured on the mounting surface at a specified distance from the outside edge of the mounting surface. The shaft is held fixed and the body of the potentiometer is rotated with specified loads applied radially and axially to the body of the pot. The Lateral Runout is expressed in inches.

### Shaft Radial Play (single shaft potentiometer)
The total radial excursion of the shaft, measured at a specified distance from the front surface of the unit. A specified radial load is applied alternately in opposite directions at a specified point. Shaft Radial Play is expressed in inches.

### Shaft End Play
The total axial excursion of the shaft, measured at the end of the shaft with a specified axial load supplied alternately in opposite directions. Shaft End Play is expressed in inches.

### Starting Torque
The maximum moment in the clockwise and counterclockwise directions required to initiate shaft rotation anywhere in the Total Mechanical Travel.

### Running Torque
The maximum moment in the clockwise and counterclockwise directions required to sustain uniform shaft rotation at a specified speed throughout the Total Mechanical Travel.

### Moment of Inertia
The mass moment of inertia of the rotating elements of the potentiometer about their rotational axis.

### Stop Strength

#### Static Stop Strength
The maximum static load that can be applied to the shaft at each mechanical stop for a specified period of time without permanent change of the stop positions greater than specified.

#### Dynamic Stop Strength
The inertia load, at a specified shaft velocity and a specified number of impacts, that can be applied to the shaft at each stop without a permanent change of the stop position greater than specified.
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Claims for defective material must be made within 30-days of the customer’s receipt of shipment. No products may be returned without a return authorization (RMA).

Country of Origin

The 388 / 389 and 70 series Mod-Pot products are assembled in the United States at our facility located in East Hanover, New Jersey, USA, using components parts manufactured by the Sensing and Control Division of Honeywell International headquartered in Morris Township, New Jersey, USA.

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EXPORT CONTROL CLASSIFICATION # (ECCN #) - EAR99
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