DISCOVER WHY TOP ENGINEERS ACROSS THE GLOBE
CONSISTENTLY RELY ON PRC’S WIRE WOUNDS

RESISTORS
SENSORS
COMPENSATORS
SHUNTS

WIDEST RANGE OF SIZES, STYLES, OHMIC VALUES,
TOLERANCES & TEMPERATURE COEFFICIENTS
WITH UNPARALLELED PRECISION

10601 75th St. N. Largo, FL. 33777-1421 U.S.A
Tel. 727-541-5771  Fax. 727-546-9515
Url: www.precisionresistor.com
Email: sales@precisionresistor.com

MADE IN THE USA
PRC’s product catalog contains all detailed information including complete electrical & mechanical description of our special-purpose resistance devices and demonstrates how these unique concepts for precision wire winds will benefit you in today’s hi-tech world as a design engineer.

What Precision Means To You:

1. BETTER FLEXIBILITY FOR CUSTOM ENGINEERING
   PRC’s precision wire wounds are ideal for short run development projects as well as long production runs that are needed in a hurry. Set-ups and tooling are easier to assemble than other resistor types and specs can be quickly transferred from the model shop and laboratory to the production floor.

2. BUY ONLY WHAT YOU NEED
   Why buy 50 pieces or more, if all you need are a few resistors for tests or a dozen parts to complete your requirement? Small quantity lots or high volume production quantities are accurately checked 100% to assure specified limits and delivered on time to meet critical schedules.

3. LARGE SELECTION
   Widest range of values anywhere! You can specify any resistance value or decimal part of an ohm from 0.001Ω to 10MΩ with tolerances to ±0.005% and TCR’s to ±1 ppm/°C. Also, shown are temperature-sensitive resistors and compensators to +6000 ppm/°C. as well as a complete line of four-terminal thru-hole and SMD precision sub-miniature current shunts.

4. LOW VALUE/LOW TCR COMBINATIONS
   PRC’s extremely low values to 1 milliohm and TCR ±15 ppm/°C. provide better load-stability. This means the quality to resist permanent change is designed into the parts from the start for dependable and repeatable measurements piece-to-piece.

5. HIGH SURGE CURRENT HANDLING CAPABILITIES
   Many other resistor types on the market require at least 2 or more parts to equal the power and overload capabilities of 1 PRC resistor. That’s why the 3 and 5 watt precision shunt values are so popular.

6. COMMERCIAL PURE COPPER TERMINALS
   Why copper? Because of its excellent current carrying capacity. No material is better suited for precision parts than commercially pure copper. That is, oxygen-free, high conductivity, low resistivity, hot-tinned copper terminals. Hot-tinned rather than electro-tin plated terminals because they offer better wetting characteristics and longer shelf life. Beware of copper clad or other materials that have a strong magnetic attraction and exhibit a high EMF especially when specifying low value precision resistors. Another reason engineers want commercially pure copper is because of its low resistivity.

7. LOW THERMAL EMF VS. COPPER
   All PRC resistors (especially low values) have low EMF (<0.3 to 1.5 microvolts per deg. C.) with respect to the copper terminals. Many low value tin oxide and other general-purpose power resistors in the industry have thermocouple errors as large as 100 microvolts per deg. C., which degrade circuit performance. Try to avoid thermal gradients that could cause a large temperature difference across the resistor and specify resistors with low EMF construction.

8. TIME-PROVEN SERVICE
   PRC’s precision/power resistors are the choice of engineers and designers because of their reasonable costs and time-proven heavy-duty service. Reliability and dependable quality year-after-year are “the real value” of precision wire wound resistors.

If you are looking for stable quality components specifically designed for repetitive & predictable applications then review this easy-to-specify brochure and select exactly what you need. Let our 70+ years of invaluable experience in resistor design and manufacturing work for you.

We are very confident that you too can “profit from Precision.”
2. Engineers & Designers: What Precision means to you
3. Purchasing Information: Match resistors to your specs
4. PRC Facts: When you need the ultimate in Precision
5. Type HR/HVA/HVS: Ultra Precision thru-hole and SMD
6. Type LVS: PRC’s “crown jewel” for SMT current-sensing
7. Type PLV Shunts: Combine “power with precision”
8. More PRC Facts: Temperature-sensitive resistors
9. Type PT/ST Compensators: Offset for A/D conversions
10. PRC100 (Chart): “Tracks like platinum” but is more versatile
11. PRC100 Sensors: Request a few samples and compare
12. Type SX-Silicone Coated: Widest range of precision values anywhere
13. Type SM High-Value: Sub-miniature precision power resistors
14. Type SM-4: Unique low ohmic value 4-wire power designs
15. Type MS: DC MV Meter Shunt & MC-7: Digital Multimeter Calibrator
16. International Sales Representatives

PURCHASING INFORMATION

Please specify (where they apply) …

Quantity
Resistance value
Resistance tolerance
Current/Special lead size
TCR Char./Stability specs
PRC type or wattage rating
Temperature span of operation

Special Testing
Custom marking
Delivery requirements
Qualification standards
Overload requirements
Certification requirements
Bulk or tape and reel packaging
1. **TOLERANCE, TCR & AMBIENT TEMPERATURE as One Spec**
   The TCR and temperature are also vital factors when specifying very accurate resistors and must be part of the equation.

*Resistance Tolerance* is expressed as (+) or (-) plus or minus percent of the nominal value (ohms) required. (All PRC resistors are calibrated and tested within specified limits at 25°C unless otherwise noted.)

**TCR** - We know there is no TCR (Temperature Coefficient of Resistance) without a change in temperature. That is, no proportional change in resistance without a change in the ambient or some self-generated temperature shift resulting from an excitation of power. This variation in resistance with respect to the change in temperature is expressed in parts per million (ppm), Percent (%) or in ohms/ohm ... per °C.

For Example: The TCR for 0±5ppm, also expressed as ±0.000005Ω or ±0.0005% per degree C. as with all TCRs at PRC, is calculated between +25°C and +100°C using the industry standard formula on page 9 ... unless otherwise noted. Therefore, a 1000Ω 5ppm resistor is multiplied by 0.000005Ω or 0.005Ω change/°C.

**Temperature** is the measure of heat or cold of an object or substance and directly related to the TCR and tolerance. Since the TCR char. is the variation in resistance above or below room ambient (23°C or 25°C) or a span that includes both, it is essential with close resistance tolerances and low TCR requirements, to specify the temperature span of operation and treat all the surrounding conditions affecting the resistor as “one-spec.”

2. **WHY’S STABILITY SO IMPORTANT?**
   Stability is the quality to resist permanent change, and must be designed into the parts from the start. It is very difficult to stabilize or condition a general-purpose resistor and be confident that it will meet a critical application. All stability specs at PRC are designed for precise requirements even if you specify ±1% resistance tolerances.

3. **EXTRA POWER … When You Need It!**
   PRC’s precision power resistors are noted for the surge current handling and overload capabilities. However, all catalog ratings are based upon standard ±1% resistance tolerances at +25°C or +125°C depending upon the resistor type. Derating is required for higher temperatures and closer tolerances. Please refer to the derating curves for each type resistor. Usually a larger part or a lower TCR will help, but heat is heat and must be carried off in some manner.

4. **LVS SHUNT is PRC’s “crown jewel” for SURFACE MOUNT CURRENT SENSING**
   The LVS on page 6 as well as the PLV 4-lead version on page 7 are ideal in voltage drop applications and for accurate current-sensing requirements … because of their stability and flexibility. These unique requirements … because of their stability and flexibility. These unique parts not only offer lower values with closer tolerances, but also lower TCR’s (10ppm) … over a wider temperature span. The low TCR feature provides better thermal stability for more dependable measurements under load conditions. In addition, PRC’s shunt values provide low EMF with respect to the timed copper terminals. Thermal effects, EMF and dissimilar metals become part of the resistance readings of low values. Specify low EMF and try to avoid thermal gradients that could cause a large temperature difference across a critical part. Obviously, the more information we have, the better we are able to match parts to your specifications.

5. **PRC INTERESTING FACT**
   One of the shunt values we tested was a ten milliohm, 10-watt part (PLV10AL 0.01Ω ±1%) that developed over 30 amperes under full load. Because of its aluminum oxide rectangular case and special low TCR element, the resistance change (under load) was less than ±0.1% ... and there was virtually no measurable EMF. Now that is a breakthrough!

   We certainly were impressed with the results … and we are confident we can help you in a similar manner.

6. **PRC OFFERS THESE FEATURES:**
   1. Wide variety of shapes & sizes
   2. Measurable and predictable voltage/temperature relationship piece-to-piece
   3. Low value/close tolerance combinations
   4. Low TCRs
   5. High temperature insulation
   6. Single-joint 4-terminal construction to eliminate lead-out and contact resistance
   7. Assorted diameters of pure copper leads for high current-carrying capacities and lower resistance per circular mil foot

7. **YOU CAN CUSTOM DESIGN YOUR OWN LOW VALUE PRECISION SHUNT**
   That's right, you can design, test and fine-tune engineering samples so they perform like a precision instrument. Try a few of our shunts today, because many of the popular values are in-stock for immediate delivery. Better yet, if we don't have exactly what you need in stock, special engineering samples will be manufactured to your specs quickly … and at no cost!

(CONTINUED ON PAGES 5-7)
# HR/HVA/HVS- ULTRA PRECISION

## How Can the Ultra-Precision Series Help You?

Values ........................................ from 0.1Ω thru 10 Megohms
Tolerances .............................. ±0.01% (Std.) ... to ±0.005%
TCR Char ................................. ±5ppm (Std.) ... to ±1ppm°C
Greater Stability ........................... to ±0.001%/year
Temperature .............................. -65°C to +145°C

## ELECTRICAL & PHYSICAL SPECIFICATIONS

### PRC Type

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>Meets or Exceeds Environmental Conditions of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR103</td>
<td>MIL-R-39005 MIL-8-93</td>
</tr>
<tr>
<td>HR175N</td>
<td></td>
</tr>
<tr>
<td>HR186N</td>
<td></td>
</tr>
<tr>
<td>HR188N</td>
<td></td>
</tr>
<tr>
<td>HR258N</td>
<td></td>
</tr>
<tr>
<td>HR2512N</td>
<td></td>
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<tr>
<td>HR258N</td>
<td></td>
</tr>
<tr>
<td>HR3114N</td>
<td></td>
</tr>
<tr>
<td>HR378N</td>
<td></td>
</tr>
</tbody>
</table>

### AXIAL LEAD

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>(A) Length</th>
<th>(B) Diameter</th>
<th>Standard Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRB71</td>
<td>.2W</td>
<td>100V</td>
<td>7.92</td>
<td>(.312&quot;)</td>
<td>6.35 (.250&quot;)</td>
</tr>
<tr>
<td>HR33W</td>
<td>.2W</td>
<td>150V</td>
<td>12.7</td>
<td>(.500&quot;)</td>
<td>6.35 (.250&quot;)</td>
</tr>
<tr>
<td>HR55B</td>
<td>.2W</td>
<td>200V</td>
<td>12.7</td>
<td>(.500&quot;)</td>
<td>9.53 (.375&quot;)</td>
</tr>
<tr>
<td>HR53B</td>
<td>.2W</td>
<td>300V</td>
<td>12.7</td>
<td>(.500&quot;)</td>
<td>9.53 (.375&quot;)</td>
</tr>
</tbody>
</table>

### LEAD MOUNTED & SURFACE MOUNTED

<table>
<thead>
<tr>
<th>PRC TYPE</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>H</th>
<th>L</th>
<th>W</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>Lead Dia. 1&quot;</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVA1</td>
<td>0.2W</td>
<td>100V</td>
<td>3.30</td>
<td>9.14</td>
<td>1.5</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>0.15</td>
<td>75K</td>
</tr>
<tr>
<td>HVA2</td>
<td>0.25W</td>
<td>150V</td>
<td>8.35</td>
<td>19.78</td>
<td>2.5</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>0.15</td>
<td>100K</td>
</tr>
<tr>
<td>HVA3</td>
<td>0.5W</td>
<td>250V</td>
<td>6.35</td>
<td>12.7</td>
<td>5.72</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>0.15</td>
<td>150K</td>
</tr>
<tr>
<td>HVA5</td>
<td>1.0W</td>
<td>600V</td>
<td>7.87</td>
<td>15.88</td>
<td>100&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>.015&quot;</td>
<td>0.15</td>
<td>300K</td>
</tr>
</tbody>
</table>

## ENGINEERING DATA:

### RESISTANCE AND TOLERANCES

You can select any ohmic value or decimal part of an ohm with tolerances to ±0.005%. 10Ω min. required for ±0.01% tol.

### TCR CHARACTERISTIC

Standard: 0±5ppm/°C (100Ω and above); 0±15ppm/°C (values below 100Ω) - calculated between ±25°C and ±100°C. Special: to 0±1 ppm/°C. - matching to 0±0.5 ppm/°C.

### POWER VS. AMBIENT TEM.

All Ultra resistors are designed for full load based upon ±1% res. tol. - providing the ambient temp. - plus the temp. rise due to self-heating does not exceed 125°C. Derated to zero power at +145°C. see Fig. 1.

### STABILITY

To ±0.001% / yr. at 25°C. (no load).

## THERMAL EMF VS. COPPER TERMINALS

<±3 microvolts per degree C.

## INDUCTANCE

Non-inductive balanced reverse pi windings are standard on HR and RX. Special on HVS & HVA.

## PROTECTIVE SEAL

Stress free base coat and epoxy case. Solder heat and solvent resistant.

## MARKING (Identification)

PRC symbol, type, value and tolerance.

---

**PRECISION RESISTOR CO., INC.**

10601 75TH Street North, Largo, Florida 33777-1421 U.S.A.

Tel: 727-541-5771 Fax: 727-546-9515

Email: sales@precisionresistor.com

Web Site: http://www.precisionresistor.com
**LVS/PVS - CURRENT SENSING**

**How LVS/PVS Shunts Will Benefit You:**

SMD current-sensing

Ohmic/voltage drop tolerances

TCR Char. from 1 million to 100KΩ

Temperature Span from 1±10ppm/°C to ±15°C

For closer tolerances, see Fig. #3 De-rating Curve

---

**ELECTRICAL & PHYSICAL SPECIFICATIONS**

**PRC TYPE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. Watt.Amp</th>
<th>Pad Layout</th>
<th>Dimensions ± .787 MM (.031&quot;)</th>
<th>Max. Res. @ Max. Watts</th>
<th>Std. Min. Res. @ Derated Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVS1</td>
<td>1W 3A</td>
<td><img src="image" alt="PVS1" /></td>
<td>H: 3.30 L: 9.14</td>
<td>5K .11Ω @ 1W</td>
<td>.001Ω @ 100 W</td>
</tr>
<tr>
<td>LVS2</td>
<td>2W 8A</td>
<td><img src="image" alt="LVS2" /></td>
<td>H: 6.35 L: 9.78</td>
<td>100 .003Ω @ 7W</td>
<td>.001Ω @ .064W</td>
</tr>
<tr>
<td>PVS2</td>
<td>3W 15A</td>
<td><img src="image" alt="PVS2" /></td>
<td>H: 6.35 L: 12.7</td>
<td>15K .001Ω @ 0.225W</td>
<td></td>
</tr>
<tr>
<td>LVS3</td>
<td>5W 15A</td>
<td><img src="image" alt="LVS3" /></td>
<td>H: 7.87 L: 15.88</td>
<td>100 .002Ω @ 5W</td>
<td>.001Ω @ .064W</td>
</tr>
<tr>
<td>PVS5</td>
<td>8W 15A</td>
<td><img src="image" alt="PVS5" /></td>
<td>H: 2.54 L: 1.91</td>
<td>100 .001Ω @ .064W</td>
<td></td>
</tr>
</tbody>
</table>

---

**ENGINEERING DATA:**

5. **PROTECTIVE SEAL**

Rectangular solvent-resistant epoxy case offers excellent thermal transfer to base.

6. **TERMINALS**

Solderable ‘hot-tinned’ pure copper (ETP/OFHC) tab terminals and low EMF construction reduces thermal effects usually associated with low value resistors.

7. **SMT “Carrier Tape” PACKAGING**

per IEC 286-3 (EIA 481):

Please see Purchasing Information on pg 3.

---

**Precautionary Statement applies to all SMDs/SMTs**

*Not to be exposed to temps above 150°C for ±0.1% Tol. And 125°C for tolerances closer than ±0.1% without prior heat testing qualification approval procedure.

Re-flow solder methods not recommended closer than ±0.25%
How You Can Profit From PLV Shunts:

Variable lead sizes .......... for current-sensing to 45 Amps
Resistances values .................... to 0.001Ω
Voltage drop or ohmic tolerances .......... to ±0.005%
TCR characteristics ..............15ppm/°C (std.) to 10 ppm/°C
Temperature Span .......... -65 to +275°C @ 1% tolerance
For closer tolerance see Derating Curve Fig. 3

---

**ENGINEERING DATA:**

1. **RESISTANCE VS. TOLERANCE**
   - You can select any value from 1 milliohms to 100Ω. Please refer to Fig. #2 for Resistance vs. Tolerance ratios.

2. **TCR:** 0±15 ppm/°C (Std)
   - Specify - LTC for 0±10ppm to +150°C

3. **POWER & CURRENT RATINGS**
   - Full power ratings are based upon ±1% res. tols. at 25°C. Derating is required for closer tolerances, higher temperatures (Fig. #3) and lower values. Refer to Std. Min. Res. @ Max. watts in above column.

4. **STABILITY**
   - To ±0.001%/yr. at 25°C (no load).

---

**TERMINALS**

- All PLVs have solderable “hot-tinned” pure copper wire leads. Higher current-carrying capacity leads to #8 AWG are available for full power ratings on values below the Std. Min. Res. listed.

**PROTECTIVE ENCAPSULATION**

- PLVs are sealed in high temp/solvent resistant epoxy. Epoxy/aluminum cases are available on 7 watt & 10 watt sizes.

**MARKING**

- PRC symbol, type ohmic value and tolerance. Custom marking is available.
**MORE PRC FACTS**

**You can achieve dramatic results with PRC’s Compensators:**

1. **LINEAR COMPENSATION**
   PRC’s type PT/ST (+) TCR Char.
   3500ppm/°C. linear tracking
   temperature sensitive resistors help
   you develop the desired compensation
   for true RMS measurements... and can
   offset errors in dB output circuits.

2. **TOLERANCE ON +3500ppm/°C**
   ≥±100ppm/°C. from +25°C. to +100°C.
   For example: if you are
   looking for a systems offset of
   +3350 to +3450ppm/°C. ... try a
   few engineering samples of our (std.)
   off-the-shelf compensators. We are
   confident you can achieve dramatic
   results. The element wire used
   on our type PT/STs, as a rule, is very
   close to +3500ppm/°C. at 25°C. and
   lower that +3450ppm/°C at 100°C
   Please refer to the corresponding
   tracking chart - Fig #4 on pg. 9

3. **OFF-THE-SHELF / IMMEDIATE DELIVERY**
   Thru-hole and SMD designs are
   available for evaluation and tests.
   Ask about our PT styles (or the type
   AT35) for your wire lead terminals
   required. Also, if you have plans
   for SMT ... our type ST35 is a drop-
   in replacement for the thru-hole part
   with interchangeable specs.

4. **CUSTOM COMPENSATORS**
   Remember - we can customize any
   of our compensators to your specs
   in any ohmic value with pure metals,
   available alloys or composite
   windings. All of which are extremely
   linear, reasonably priced and
   delivered quickly.

5. **TRACKING CHART**
   Constant temperature oil bath
   computer tracking charts are
   available to match your temperature
   span and behavior specs exactly.
   (Continued on Pg. 9)

**Attributes of the extremely versatile PRC100 Series include:**

1. **THE PRC100 (Std. Reference):**
   A PLATINUM ALTERNATIVE
   Like a platinum RTD, the PRC100
   Std. is 100Ω at 0°C. ±0.12%
   with a TCR of +3850 ppm/°C.
   that meets the theoretical curve of
   platinum as defined by the IEC
   Standard, pub. 751 (per DIN Std.
   43760, Class B) alpha = 0.00385
   ohm/ohm/°C. Please refer to the
   chart and equations on Pg. 10.

2. **CRITICAL FACT TO REMEMBER:**
   Always use a consistent Base
   Temperature of Zero (0)°C in the
   platinum and PRC100 equations.
   For example: The nominal resistance
   of a platinum RTD and the PRC100
   Std. is 100Ω at Base 0°C. Then, if we
   use +100°C, as the other reference
   point, the TCR is calculated to be
   very close to +3850 ppm/°C
   The base temperature is important
   in this situation because the TCRs
   of all other resistance alloys are
   usually calculated between Base
   +25°C and +100°C. Any other
   reference points and resistance
   values in the TCR equations will
   give you a result other than the
   TCR expected.

   Platinum is generally offered in two
   grades: the Standard American
   Reference Grade of 0.003923
   ohm/ohm/°C and the DIN of
   0.003850 ohm/ohm/°C. We have
   selected the DIN Standard for
   our PRC100 (Std. Reference) to
   demonstrate our capability and
   the flexibility of this design for
   custom high quality special-
   purpose sensors.

3. **THE PRC100 STD. REFERENCE SERIES**
   IS IN STOCK & READILY AVAILABLE
   The Standard 100Ω reference is
   offered in an assortment of
   physical sizes for thru-hole, SMD,
   and probe applications. If you
   need a few pieces or several
   thousand of any of the PRC100
   configurations, we can usually ship
   them directly from our stock.

4. **DO YOU NEED HIGH QUALITY**
   “CUSTOM” SENSORS?
   If you do, the PRC100 Custom
   Series is actually more versatile
   than a platinum RTD, because
   you can select any ohmic value
   and tolerance that you need, and
   adjust the TCR characteristic ...
   if you want a slightly higher or
   lower ohms change per degree C.
   Let us know your exact particulars
   and we will custom manufacture the
   part to your specs and send you a
   sample together with a computer-
   tracking chart at no charge.
   (Continued on Pgs 10-11)
### Rectangular Axial & SMD 1K 3500 PPM Compensators

**AXIAL & PROBE SPECIAL-PURPOSE COMPENSATOR/SENSORS**

#### Axial Lead & Probe Design Temperature Sensing

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Rating</th>
<th>Length</th>
<th>Diameter</th>
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</thead>
<tbody>
<tr>
<td>Type SP</td>
<td>.02 W</td>
<td>6.86 (.270&quot;)</td>
<td>.75 (.070&quot;)</td>
</tr>
<tr>
<td>Type PT</td>
<td>.05 W</td>
<td>8.43 (.332&quot;)</td>
<td>2.54 (.100&quot;)</td>
</tr>
</tbody>
</table>

**Probes**

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Rating</th>
<th>Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type ST / PTS</td>
<td>.1 W</td>
<td>10.03 (.395&quot;)</td>
<td>3.18 (.125&quot;)</td>
</tr>
<tr>
<td>Type AT / ATS</td>
<td>.25 W</td>
<td>13.21 (.520&quot;)</td>
<td>4.75 (.187&quot;)</td>
</tr>
</tbody>
</table>

**How Can You Benefit From Our Custom Compensators?**

1000 Ω 3500 PPM Compensators are in stock.

Thru-hole or SMD is your choice!

Low RMS Noise for A/D conversions.

Linear Tracking from -65 to +150°C.

Custom Values & TCRs for high or lower ΩΔ°C.

---

### Engineering Data:

1. **All Standard 1000 Ω ± 1% Tolerance**
   - +3500 PPM compensators are in stock.
   - Special: Any value from 1Ω to 50kΩ.
   - Tolerances to ±0.05%.

2. **TCR Characteristics Available**
   - +40 ppm/°C: +3930 ppm/°C
   - +440 ppm/°C: +3930 ppm/°C
   - +490 ppm/°C: +3930 ppm/°C
   - +540 ppm/°C: +3930 ppm/°C
   - +600 ppm/°C: +3930 ppm/°C

3. **TCR Tolerance Window ±5%**
   - Calculated between +23°C. / -130°C.

4. **Stability Ensures Longer Shelf-Life**
   - Standard: ±0.05% per year at 25°C. w/o load.
   - Special: ±0.10% per year at 25°C. w/o load.

5. **Protective Seal**
   - Standard: Conformal silicone or epoxy case.
   - Special: Thermal conductive insulating coatings.
   - Un-coated components are also available upon request.

6. **MARKING**
   - PRC symbol, type, resistance value, tolerance and TCR characteristics, physical size permitting.

---

### Rectangular Axial & SMD 1K 3500 PPM Compensators

**PAD LAYOUT**

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>Max. Volts</th>
<th>H (mm. ins.)</th>
<th>L (mm. ins.)</th>
<th>W (mm. ins.)</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e (1&quot;L.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT35</td>
<td>100 V</td>
<td>.30</td>
<td>.30</td>
<td>.125&quot;</td>
<td>.914</td>
<td>.360</td>
<td>.318</td>
<td>.125&quot;</td>
<td>.075&quot;</td>
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<tr>
<td>ST35</td>
<td>.01 W</td>
<td>.30</td>
<td>.30</td>
<td>.125&quot;</td>
<td>.914</td>
<td>.360</td>
<td>.318</td>
<td>.125&quot;</td>
<td>.260&quot;</td>
</tr>
</tbody>
</table>

---

### RES/TEMP Curve & Equation

For nominal 1K ±1% +3500 PPM device.

**TCR (ppm/°C)**

For 1000Ω at 25°C. is 1257.25Ω at +100°C.

**TCR = R@25°C - R@100°C**

TCR = +1400 ppm/°C +2500 ppm/°C +3930 ppm/°C +4500 ppm/°C +6000 ppm/°C

---

**PRECISION RESISTOR CO., INC.**

10601 75TH Street North, Largo, Florida 33777-1421 U.S.A.

Tel: 727-541-5771 Fax: 727-546-9515

Email: sales@precisionresistor.com

Web Site: http://www.precisionresistor.com
### Resistance Temperature Characteristic (Rt)

Where the constants in these equations are:

\[ R_t = R_0 \left[ 1 + A t + B t + C (t - 100°C) \right] \]

### PRC100 Chart

<table>
<thead>
<tr>
<th>Temp. (Deg. C)</th>
<th>Value in Ohms</th>
<th>T.C. in PPM</th>
<th>Avg. Ohms Chg/Deg. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40 R = 9.416</td>
<td>1170</td>
<td>-0.3771</td>
<td></td>
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<tr>
<td></td>
<td>20</td>
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<td>89</td>
<td>134.315</td>
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</tbody>
</table>

**RESISTANCE TEMPERATURE CHARACTERISTIC (Rt)**

\( Rt \) is defined by IEC standard, pub. 751.

\( \alpha = 0.00305 \text{ ohm/ohm°C} \)

... For range -40°C to 0°C:

\( Rt = R_0 \left[ 1 + (3.79782 \times 10^{-10} \times t) + (6.502 x 10^{-12} \times t^2) \right] \)

... For range 0°C to 150°C:

\( Rt = R_0 \left[ 1 + (3.79782 \times 10^{-10} \times t) + (6.502 x 10^{-12} \times t^2) + (4.3735 \times 10^{-17} \times t^3) \right] \)

Where the constants in these equations are:

\( A = -3.79782 \times 10^{-10} \)

\( B = 6.502 \times 10^{-12} \)

\( C = 4.3735 \times 10^{-17} \)

**Email:** sales@precisionresistor.com

**Web Site:** http://www.precisionresistor.com
**PRC100 SENSORS**

What The PRC100 Means To You:

The PRC100 Custom Series is more than a platinum alternative because of its versatility.

The PRC100 (Std. Reference) ....... 100Ω at 0°C. ±0.12% with an average sensitivity of 0.00385 ohm/ohm/°C is in-stock for immediate delivery.

### RECTANGULAR AXIAL & SMD 100 SENSORS

#### BODY DIMENSIONS ± .787mm (.031")

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>Power Rating</th>
<th>Max. Volts</th>
<th>H (mm)</th>
<th>L (mm)</th>
<th>W (mm)</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>RESISTANCE &amp; TOL @ 0°C</th>
<th>RTC (0°C to +150°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRC100A</td>
<td>.1W</td>
<td>100V</td>
<td>.125</td>
<td>.125</td>
<td>.075**</td>
<td>.075**</td>
<td>.100**</td>
<td>.260**</td>
<td>100Ω ±0.12%</td>
<td>+3850 ppm/°C.</td>
<td></td>
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<td>PRC100T</td>
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<td>PRC100</td>
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#### PAD LAYOUT

<p>| |</p>
<table>
<thead>
<tr>
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<tbody>
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</tr>
</tbody>
</table>

### ENGINEERING DATA:

1. **RESISTANCE AND TOLERANCE**

   PRC100 (Std. Reference): 100Ω at 0°C ±0.12% (or ±0.3%) and 138.50Ω at +100°C ±0.22% (or ±0.8%) per DIN 43760, Class B.

   PRC100 (Custom Series): You can select any value from 50Ω to 5 Kilohms in tolerances from 1/4 DIN (±0.03%) to 2 x DIN (±0.24%).

2. **RESISTANCE TEMPERATURE CHARACTERISTIC (Rt)**

   Rt is defined by IEC Standard, pub. 751:
   
   \[
   \alpha = \frac{\Delta R_t}{R_t \Delta T} = \frac{R_0 (1 + \alpha T + \beta T^2 + \gamma T^3)}{R_0 (1 + \beta T + \gamma T^2)}
   \]

   Where the constants are:
   
   A = 3.79782 x 10⁻³
   
   B = 6.502 x 10⁻²
   
   C = 4.373 x 10⁻²

   Fixed points are in degrees Celsius, R₀ = 0°C. The other (Ref.) temperature is +100°C, but any temperature can be used in the equation with respect to Base 0°C. The PRC100 Std. Ref. follows a well-defined theoretical curve and linear slope from Base 0°C proving that most reference points are calculable within very close tolerances (Ratio = Rt/R₀).

3. **STABILITY OF CALIBRATION**

   All PRC100 sensors are closely matched and repeatable part-to-part. They are able to consistently reproduce output readings consecutively at the same temperature reference points ... under the same conditions and in the same direction.

4. **STABILITY (Rt) VS. TIME**

   The change in the original resistance (R₀) at 0°C after 10 cycles to +150°C is less than ±0.1°C or ±0.038% max. Shelf life stability is ±0.002%/yr. at 25°C (no load).

5. **POWER RATINGS VS. AMBIENT TEMPERATURE RANGE**

   The PRC100 is ideal as a compensator to offset drift or negative self-generating changes in resistance as a result of an excitation of power to 0.25 watt at +125°C to zero power at +150°C.

6. **THERMAL TIME CONSTANT**

   The time required for the PRC100 sensor to indicate 63.2% of a new impressed temperature from a step change of 0°C to +100°C can be customized to < 1 second

   * Theoretical curve and slope are based upon values of the International Practical Temperature Scale (IPTS-68 & 90).

7. **PRC100 (Std. Ref.) CONSTRUCTION**

   Wire: Ni, Co, Mn & Fe.
   
   Substrate: Epoxy or ceramic form.
   
   Terminals: Solderable hot-tinned copper.
   
   Protective Seal: Moisture and solvent resistant epoxy.

8. **MARKING (Std. Reference)**

   PRC100X  PRC100
   PRC100A  ±0.12%  ±0.12%
   PRC100T  ±3850 ppm/°C.  ±3850 ppm/°C.
   PRC100 12  PRC100-1  ±3850 ppm/°C.  ±3850 ppm/°C.
   PRC100  ±3850 ppm/°C.  ±3850 ppm/°C.

9. **CUSTOM APPLICATIONS**

   PRC100 (Custom) Series Sensors are available in any ohmic value with TCRs from +3000ppm to +4000ppm/°C in 50ppm steps with the same linear tracking characteristics as the Std. Ref.

   Custom Marking: e.g: 1K ohms = PRC1000, 10K ohms = PRC10000, etc.
**SX - HIGH PRECISION**

**The Widest Range of Custom Precision Wire Wounds You'll Find Anywhere!**

### Series Attributes Include:

- **Values** ................. from 0.01Ω to 6 MΩ
- **Tolerances** .................. ±0.05%
- **TCR Characteristic** .......... ±10 ppm/°C
- **Temperature** ........... -55°C to +145°C

**Engineering Data:**

1. **Resistance and Tolerance**
   Select any ohmic value or decimal part of an ohm desired with tolerances to ±0.05%.

2. **Temperature Coefficient of Resistance Also Known as T.C.R.**
   Standard: 0±10 ppm/°C (100Ω and above),
   0±15 ppm (values below 100Ω).
   For specific TCRs, see page 5.
   Refer to page 9 for TCRs to ±6000 ppm/°C.

3. **Stability vs. Time Characteristics**
   To ±0.005%/year at +25°C, with no load.

4. **Power Ratings vs. Ambient Temp. and Resistance Tolerance**
   Full power ratings are based upon standard ±1% resistance tolerances. Derating is required for higher resistances and lower resistance tolerances.
   Max Temperature for SX Coating: +145°C.

5. **Inductance**
   The standard type SX resistors are inductively wound. Non-inductive windings are available — add suffix letter “N” in the part number.

6. **Terminals**
   Standard: Solderable hot-tinned pure copper leads.

7. **Protective Coating**
   Solvent resistant silicone/epoxy high conductivity.

8. **Marking**
   PRC symbol, type, value, and tolerance.

---

### Electrical & Physical Specifications

**Inductive**

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<th>E = VR</th>
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<tbody>
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<td>Max. Volts</td>
</tr>
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<td>mm ± 787</td>
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<tr>
<td>(Ω)</td>
<td>(Ω)</td>
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<td>SX100</td>
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<td>0.003W</td>
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<td>mm ± 0.031</td>
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<tr>
<td>0.01W</td>
<td>65V</td>
</tr>
<tr>
<td>0.015W</td>
<td>85V</td>
</tr>
<tr>
<td>0.02W</td>
<td>100V</td>
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<tr>
<td>0.03W</td>
<td>125V</td>
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<tr>
<td>0.05W</td>
<td>165V</td>
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<tr>
<td>0.1W</td>
<td>200V</td>
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<tr>
<td>0.15W</td>
<td>250V</td>
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<td>0.2W</td>
<td>300V</td>
</tr>
<tr>
<td>0.3W</td>
<td>400V</td>
</tr>
<tr>
<td>0.5W</td>
<td>500V</td>
</tr>
<tr>
<td>0.75W</td>
<td>600V</td>
</tr>
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<td>1.0W</td>
<td>800V</td>
</tr>
<tr>
<td>1.5W</td>
<td>1000V</td>
</tr>
<tr>
<td>2.0W</td>
<td>1250V</td>
</tr>
<tr>
<td>2.5W</td>
<td>1500V</td>
</tr>
<tr>
<td>3.0W</td>
<td>1800V</td>
</tr>
<tr>
<td>4.0W</td>
<td>2200V</td>
</tr>
<tr>
<td>5.0W</td>
<td>3000V</td>
</tr>
<tr>
<td>6.0W</td>
<td>4000V</td>
</tr>
<tr>
<td>8.0W</td>
<td>6000V</td>
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<tr>
<td>10W</td>
<td>8000V</td>
</tr>
<tr>
<td>15W</td>
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<td>25W</td>
<td>20000V</td>
</tr>
<tr>
<td>50W</td>
<td>50000V</td>
</tr>
<tr>
<td>100W</td>
<td>100000V</td>
</tr>
<tr>
<td>250W</td>
<td>250000V</td>
</tr>
<tr>
<td>500W</td>
<td>500000V</td>
</tr>
</tbody>
</table>

**Applications:**

- **Resistor Applications**
- **Inductive Applications**
- **Device Applications**

**Specifications:**

- **Resistive Characteristic:**
- **TCR Characteristic:**
- **Max. Temperature:**
- **Power Dissipation:**
- **Terminal Designation:**
- **Physical Dimensions:**

**Technical Support:**

- **Customer Support:**
- **Technical Assistance:**
- **Application Engineering:**

**Contact Information:**

- **Precision Resistor Co., Inc.**
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  Email: sales@precisionresistor.com
  Web Site: http://www.precisionresistor.com
SM - PRECISION POWER

Profit from Precision Power SM Series

Sub-miniature high values .......... to 4 Megohms
Tolerance .................................. ±0.1%
TCR Characteristic 0±10ppm/°C
High voltage rating 1250 Volts
Low EMF construction Vs. copper leads

ELECTRICAL & PHYSICAL SPECIFICATIONS

Two (2) Terminal

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>RW Styles</th>
<th>Max Power Rating (Watts)</th>
<th>Min. Allowable Resist.* (Ohms)</th>
<th>Resist. (R= Ω)</th>
<th>Max. Voltage Rating (Volts)</th>
<th>Body Dimensions ±.787mm (0.31&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM041</td>
<td>10K</td>
<td>0.125W</td>
<td>1.0</td>
<td>5K</td>
<td>10K</td>
<td>25V 14.5 (250⁺⁻) 1.52 (.060⁺⁻) .20&quot;</td>
</tr>
<tr>
<td>SM062</td>
<td>17K</td>
<td>0.25W</td>
<td>1.0</td>
<td>17K</td>
<td>30K</td>
<td>65V 21.2 (250⁺⁻) 2.03 (.080⁺⁻) .20&quot;</td>
</tr>
<tr>
<td>SM063</td>
<td>24K</td>
<td>0.5W</td>
<td>0.1</td>
<td>24K</td>
<td>50K</td>
<td>110V 35.8 (250⁺⁻) 2.03 (.080⁺⁻) .20&quot;</td>
</tr>
<tr>
<td>SM094</td>
<td>40K</td>
<td>1W</td>
<td>0.1</td>
<td>40K</td>
<td>80K</td>
<td>200V 57.7 (250⁺⁻) 2.03 (.080⁺⁻) .20&quot;</td>
</tr>
<tr>
<td>SM076</td>
<td>53K</td>
<td>1.125W</td>
<td>0.1</td>
<td>53K</td>
<td>180K</td>
<td>245V 87.8 (250⁺⁻) 2.03 (.080⁺⁻) .20&quot;</td>
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<tr>
<td>SM156</td>
<td>90K</td>
<td>1.5W</td>
<td>0.1</td>
<td>90K</td>
<td>400K</td>
<td>375V 135.4 (250⁺⁻) 1.52 (.176⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM171</td>
<td>100K</td>
<td>2W</td>
<td>0.1</td>
<td>225K</td>
<td>900K</td>
<td>670V 206.8 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM186</td>
<td>120K</td>
<td>3W</td>
<td>0.025</td>
<td>80K</td>
<td>480K</td>
<td>500V 127.0 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM177</td>
<td>154K</td>
<td>3W</td>
<td>0.1</td>
<td>80K</td>
<td>540K</td>
<td>500V 147.5 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM228</td>
<td>156K</td>
<td>3W</td>
<td>0.02</td>
<td>120K</td>
<td>720K</td>
<td>600V 158.8 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM2812</td>
<td>186K</td>
<td>5W</td>
<td>0.02</td>
<td>200K</td>
<td>1MEG</td>
<td>1000V 222.3 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM3114</td>
<td>228K</td>
<td>6.5W</td>
<td>0.1</td>
<td>154K</td>
<td>1.5MEG</td>
<td>1000V 25.4 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
<tr>
<td>SM3726</td>
<td>4MEG</td>
<td>10W</td>
<td>0.07</td>
<td>156K</td>
<td>4MEG</td>
<td>1250V 45.21 (250⁺⁻) 2.03 (.190⁺⁻) .28&quot;</td>
</tr>
</tbody>
</table>


1. RESISTANCE RANGE
PRC's sub-miniature type SM “precision power” resistors offer the widest range of ohmic values anywhere.
You can select any value or decimal part of an ohm from 0.02Ω to 4 Megohms.

2. CUSTOM TOLERANCES
±1%(Std.), ±0.5%, ±0.25%, ±0.1%

3. TCR CHARACTERISTIC
Standard: 0±10ppm/°C for 100Ω and above 0±15ppm/°C below 100Ω.
For specific TCRs to ±1ppm/°C see page 5.
Refer to page 9 for TCRs to +600ppm/°C.

4. VOLTAGE RATING
DC Voltage or Peak Voltage:
The type SM’s high operating voltage winding patterns eliminate dangerous crossovers and potential problems usually associated with standard style bobbins and mandrel designs. To calculate the safe operating voltage for any resistance value below the maximum listed, apply the formula: E=PR

5. PRECISION POWER RATINGS
All standard ±1% tolerance type SM resistors are designed for continuous full load operation at +25°C. Derated to zero wattage at +275°C (see Fig. #5 above).

6. INDUCTANCE
Standard: Inductively wound Special: Non-inductive winding is available, simply add suffix letter "N" to the end of part number.

7. TERMINALS
Standard: Solderable hot-tinned pure copper leads.

8. PROTECTIVE SEAL
SM resistors are coated in a tough solvent resistant high-temperature silicone formulation … with indelible marking.

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REVISED 5-24-12. SUPERSEDES ANY AND ALL PREVIOUS PUBLISHED ARTICLES.
**SM-4 - 4 WIRE LOW VALUE**

**TYPE SM-4 FOUR TERMINAL SERIES AT A GLANCE:**

Shunt Values ........................... from 0.015Ω (at full power)
Lower Shunt Values .................... to 0.001Ω (derated watts)
Tolerances .................................... to ±0.005%
TCR Characteristic ...................... 0±15 ppm/°C
Stability .................................... to ±0.005%/year

*Both Max Power & Max Current Published Must Be De-Rated For Tolerances Closer Than ±1%*

---

**ENGINEERING DATA:**

1. **RESISTANCE AND TOLERANCE**
   - Standard: Any ohmic value or decimal part of an ohm desired from 0.015Ω to 100Ω with tolerances to ±0.005%.
   - Special: From 0.001Ω through 0.015Ω with tolerances to ±0.1%. Please see Fig. 6
   - Resistance Vs. Tolerance ratios above.

2. **TCR CHARACTERISTICS**
   - Standard: 0±15 ppm/°C. between 25 & 100°C.

3. **STABILITY VS. TIME CHARACTERISTICS**
   - To ±0.001% per year at +25°C. with no load.

4. **SOLVENT RESISTANCE COATING**
   - … with indelible marking.

5. **POWER & CURRENT RATING**
   - The Standard Minimum Resistance at full power (see above column) is based upon ±1% resistance tolerance at +25°C.
   - Derating is required for lower res. values, closer tolerances and higher temperatures. Please refer to Fig. # 7 at top of the page.

6. **TWO-TERMINAL VS. FOUR-TERMINAL (Kelvin)**
   - Two-terminal resistors are generally used for high ohmic values, where the effects of lead-out resistance and contact resistance are minimal. Allow approximately ±0.001 ohm per inch for the lead-out resistance on 2-Wire designs. However, on low values where lead resistance can be part of a very accurate measurement, the adder may be eliminated by using a 4-terminal device, because 4-Wire circuits will only indicate the voltage drop across the resistor.

7. **FOUR TERMINALS**
   - PRC's type SM-4 has four solderable hot-tinned copper wire leads. Lead identification is academic because of its single-joint construction. However for uniformity, while observing the PRC marking on the body of the resistor, select the 2 leads closest to the top for your sense leads and the other two as the current leads.

---

**ELECTRICAL & PHYSICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PRC Type</th>
<th>Max. Rating</th>
<th>Body Dimensions ± 0.787mm (301°)</th>
<th>Std. Lead Spac. ±0.05°</th>
<th>Standard Min. Resistance @ Max. Watts</th>
<th>Special Min. Resistance @ Derated Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRC</td>
<td>Amps</td>
<td>Min. Resistance</td>
<td>Derated Power</td>
<td>Ω</td>
<td>W</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>----------------------------------</td>
<td>------------------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>SM155-4</td>
<td>2.5 W</td>
<td>13.21 (.520&quot;)</td>
<td>.0285&quot;</td>
<td>.015 @ 1.25W</td>
<td>.001 @ .1W</td>
</tr>
<tr>
<td>SM186-4</td>
<td>2.5 W</td>
<td>16.5 (.650&quot;)</td>
<td>.0285&quot;</td>
<td>.025 @ 2.5W</td>
<td>.001 @ .1W</td>
</tr>
<tr>
<td>SM228-4</td>
<td>3.0 W</td>
<td>19.69 (.775&quot;)</td>
<td>.0285&quot;</td>
<td>.03 @ 3W</td>
<td>.001 @ .1W</td>
</tr>
<tr>
<td>SM2212-4</td>
<td>4.0 W</td>
<td>26.04 (1.025&quot;)</td>
<td>.0285&quot;</td>
<td>.028 @ 4W</td>
<td>.001 @ .14W</td>
</tr>
<tr>
<td>SM2812-4</td>
<td>5.0 W</td>
<td>26.04 (1.025&quot;)</td>
<td>.032&quot;</td>
<td>.02 @ 5W</td>
<td>.001 @ .22W</td>
</tr>
<tr>
<td>SM3724-4</td>
<td>7.5 W</td>
<td>45.72 (1.800&quot;)</td>
<td>.032&quot;</td>
<td>.03 @ 7.5W</td>
<td>.001 @ .22W</td>
</tr>
</tbody>
</table>

* Heavier current carrying capacity leads are available for low resistance - full power applications. Refer to Type PLV for custom millivolt drop requirements.

---

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ISSUE NO. 42

REVISED 11-10-11. SUPERSEDES ANY AND ALL PREVIOUS PUBLISHED ARTICLES.
DIGITAL MULTIMETER CALIBRATOR

The MC-7 Digital Multimeter Calibrator is a packaged group of seven (7) High-Precision resistors part # HR3716N, with ohmic values ranging from 1.0Ω to 1Megohm - used in the verification and adjustment of the resistance function of 3½ and 4½ digital multimeters. To your advantage, the MC-7 is always in-stock ... ready for delivery.

D.C. mV METER SHUNT

What Type MS means to you:

Resistance Value ........ from 0.001Ω to 100Ω
Tolerances .............. to ±0.005%
TCR Characteristics ...... to ±0.005%/°C
Temperature Span ........ -65 to +275°C
DC Current ................... to 50 Amps Max.
2 & 4 Terminals ......... for power or current-sensing

Type MS-40
(0.001Ω ±0.5% shunt) lets you quickly test current up to 40 Amps with a standard multimeter.

PHYSICAL SPECS:
Length ...................... 1.50"
Height ........................ 2.00"
Width ...................... 0.65"
Terminals .................. 0.75"
(Center-to-center)

Input/Output Conversion Chart

1 Amp = 1mV
2 Amps = 2mVs
5 Amps = 5mVs
7 Amps = 7mVs
10 Amps = 10mVs
20 Amps = 20mVs
30 Amps = 30mVs
40 Amps = 40mVs

VALUES & TOLERANCES

<table>
<thead>
<tr>
<th>Resistance (Ω)</th>
<th>Current (I)</th>
<th>Watts (P)</th>
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</thead>
<tbody>
<tr>
<td>0.001</td>
<td>50A</td>
<td>2.50W</td>
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<tr>
<td>0.002</td>
<td>25A</td>
<td>1.25W</td>
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<tr>
<td>0.003</td>
<td>16.7A</td>
<td>0.83W</td>
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<td>0.004</td>
<td>12.5A</td>
<td>0.62W</td>
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<tr>
<td>0.005</td>
<td>10A</td>
<td>0.5W</td>
</tr>
<tr>
<td>0.006</td>
<td>8.3A</td>
<td>0.42W</td>
</tr>
<tr>
<td>0.007</td>
<td>7.14A</td>
<td>0.36W</td>
</tr>
<tr>
<td>0.008</td>
<td>6.25A</td>
<td>0.31W</td>
</tr>
<tr>
<td>0.009</td>
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<td>0.28W</td>
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<tr>
<td>0.010</td>
<td>5A</td>
<td>0.25W</td>
</tr>
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<td>0.020</td>
<td>2.5A</td>
<td>0.125W</td>
</tr>
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<td>0.025</td>
<td>2A</td>
<td>0.1W</td>
</tr>
<tr>
<td>0.030</td>
<td>1.67A</td>
<td>0.08W</td>
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<td>0.040</td>
<td>1.25A</td>
<td>0.06W</td>
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<td>0.050</td>
<td>1A</td>
<td>0.05W</td>
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<tr>
<td>0.100</td>
<td>0.5A</td>
<td>0.025W</td>
</tr>
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<td>0.200</td>
<td>0.25A</td>
<td>0.0125W</td>
</tr>
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<td>0.250</td>
<td>0.2A</td>
<td>0.01W</td>
</tr>
<tr>
<td>0.500</td>
<td>0.1A</td>
<td>0.005W</td>
</tr>
<tr>
<td>1.000</td>
<td>0.05A</td>
<td>0.0025W</td>
</tr>
</tbody>
</table>

OHM’S LAW FORMULAS

I = (E/R), (P/E), (4PR)
R = (E/I), (E²/P), (P²/I)
P = (E²/R), (EI), (4PR)
E = (IR), (P/I), (4PR)

ENGINEERING DATA:

1. POWER RATINGS: 10 WATTS MAXIMUM
   All resistance values at full power are based upon ±1% resistance tolerance at 25°C. Derating is required or higher temperatures and/or closer tolerances.

2. RESISTANCE AND TOLERANCES:
   0.001Ω to 100Ω in any specified value or decimal part of an ohm - to ±0.005% - see Fig. 2 (Min. Resistance vs. Resistance Tolerance).

3. TCR CHARACTERISTICS:
   to ±0.005%/°C

4. TERMINALS:
   Heavy-duty commercially pure copper test leads match current rating of shunt selected. Also Four(4) low EMF copper terminals are available for very accurate current-sensing applications.

5. MARKING:
   PRC symbol, type, resistance, value, tolerance and terminal. Custom marking, if specified. e.g. MS-40A = 0.001Ω (to 40 amps).
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