

# Type 1787 Current Sense Resistor Networks

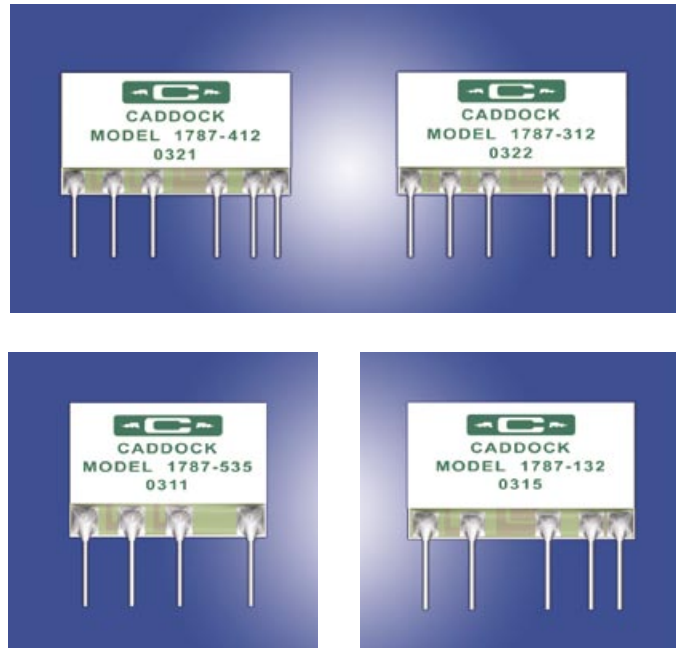
## Accurate Current Sensing in Multi-Range Instrumentation

Type 1787 Current Sense Resistor Networks utilize Caddock's Micronox® resistance films and advanced high thru-put laser manufacturing capabilities to achieve many vital advantages in precision current measurement circuits, including laboratory and bench-type digital instrumentation:

- The thin-profile single-package configuration replaces as many as four discrete current sense resistors.
- The monolithic construction and standardized lead spacing simplify installation.
- Caddock Micronox® resistance films provide exceptional stability for improved long-term measurement accuracy.

Twelve standard models in five network arrangements provide the specific accuracy and resistance values required for a wide range of current measuring instruments and circuits.

Prototype quantities of most models of the Type 1787 Current Sense Resistor Networks are available either from stock or within 6 weeks after receipt of order.



| Model No. | Resistance Values |                |                |                | Power Rating Watts |                |                |                | Max. Power Rating Watts Total Pkg. | Fig. | Absolute Tolerance %<br>① | Maximum Absolute TC ppm/°C<br>② | Absolute Stability Max. % Change in Resistance Value |                 |
|-----------|-------------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|------------------------------------|------|---------------------------|---------------------------------|--|-----------------|
|           | R <sub>A</sub>    | R <sub>B</sub> | R <sub>C</sub> | R <sub>D</sub> | R <sub>A</sub>     | R <sub>B</sub> | R <sub>C</sub> | R <sub>D</sub> |                                    |      |                           |                                 | Load Life<br>③                                       | Shelf Life<br>④ |
| 1787-31   | 999.9 Ω           | 99.9 Ω         | 9.9 Ω          | 0.9 Ω          | 0.25               | 0.25           | 0.50           | 1.0            | 1.0                                | 1    | 0.25                      | 80                              | 0.05   | 0.03            |
| 1787-312  | 999.9 Ω           | 99.9 Ω         | 9.9 Ω          | 0.9 Ω          | 0.25               | 0.25           | 0.50           | 1.0            | 1.0                                | 1    | 0.10                      | 80                              | 0.03   | 0.02            |
| 1787-41   | 1,000 Ω           | 100 Ω          | 10 Ω           | 1 Ω            | 0.25               | 0.25           | 0.50           | 1.0            | 1.0                                | 2    | 0.25                      | 80                              | 0.05   | 0.03            |
| 1787-412  | 1,000 Ω           | 100 Ω          | 10 Ω           | 1 Ω            | 0.25               | 0.25           | 0.50           | 1.0            | 1.0                                | 2    | 0.10                      | 80                              | 0.03   | 0.02            |
| 1787-5    | 999 Ω             | 99 Ω           | 9 Ω            | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 3    | 0.25                      | 50                              | 0.04   | 0.02            |
| 1787-53   | 999 Ω             | 99 Ω           | 9 Ω            | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 3    | 0.10                      | 50                              | 0.02   | 0.01            |
| 1787-535  | 999 Ω             | 99 Ω           | 9 Ω            | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 3    | 0.05                      | 50                              | 0.02   | 0.01            |
| 1787-6    | 1,000 Ω           | 100 Ω          | 10 Ω           | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 4    | 0.25                      | 50                              | 0.04   | 0.02            |
| 1787-64   | 1,000 Ω           | 100 Ω          | 10 Ω           | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 4    | 0.10                      | 50                              | 0.02   | 0.01            |
| 1787-645  | 1,000 Ω           | 100 Ω          | 10 Ω           | N/A            | 0.25               | 0.25           | 0.75           | N/A            | 0.75                               | 4    | 0.05                      | 50                              | 0.02   | 0.01            |
| 1787-13   | 99.9 Ω            | 9.9 Ω          | 0.9 Ω          | N/A            | 0.25               | 0.50           | 1.0            | N/A            | 1.0                                | 5    | 0.25                      | 100                             | 0.05   | 0.03            |
| 1787-132  | 99.9 Ω            | 9.9 Ω          | 0.9 Ω          | N/A            | 0.25               | 0.50           | 1.0            | N/A            | 1.0                                | 5    | 0.10                      | 100                             | 0.03   | 0.02            |

① **Absolute Tolerance:**

Tolerance of R<sub>A</sub>, R<sub>B</sub>, R<sub>C</sub>, or R<sub>D</sub> when measured in accordance with proper Figure No.

② **Absolute Temperature Coefficient:**

Temperature coefficient of R<sub>A</sub>, R<sub>B</sub>, R<sub>C</sub>, or R<sub>D</sub> from 0°C to +70°C, referenced to +25°C.

③ **Load Life:** Stability of R<sub>A</sub>, R<sub>B</sub>, R<sub>C</sub>, or R<sub>D</sub> with full power applied individually for 2,000 hours at +70°C.

④ **Shelf Life:** Stability of R<sub>A</sub>, R<sub>B</sub>, R<sub>C</sub>, or R<sub>D</sub> for six months at shelf conditions.

**Storage Temperature:** -55°C to +85°C.

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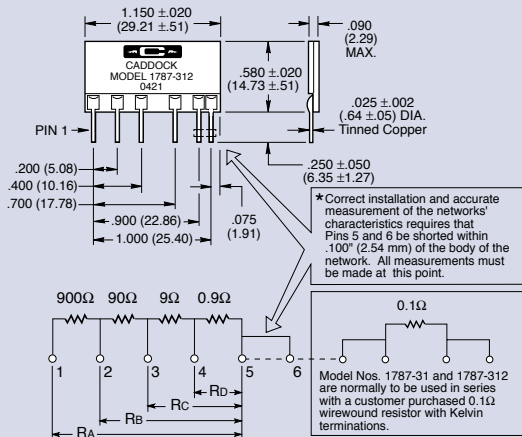
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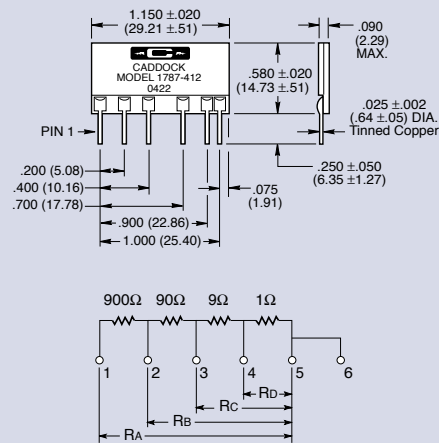
Figure 1 - Model Nos. 1787-31 and 1787-312



Model Nos. 1787-31 and 1787-312 Measurement Connections

| Resistances    |             | Kelvin Connections        |                             |                             |                           |
|----------------|-------------|---------------------------|-----------------------------|-----------------------------|---------------------------|
| "R"            | Total Value | Sense Lead P <sub>1</sub> | Current Lead C <sub>1</sub> | Current Lead C <sub>2</sub> | Sense Lead P <sub>2</sub> |
| R <sub>A</sub> | 999.9 Ω     | Pin 1                     | Pin 1                       | Pin 5 *                     | Pin 6 *                   |
| R <sub>B</sub> | 99.9 Ω      | Pin 1                     | Pin 2                       | Pin 5 *                     | Pin 6 *                   |
| R <sub>C</sub> | 9.9 Ω       | Pin 1                     | Pin 3                       | Pin 5 *                     | Pin 6 *                   |
| R <sub>D</sub> | 0.9 Ω       | Pin 1                     | Pin 4                       | Pin 5 *                     | Pin 6 *                   |

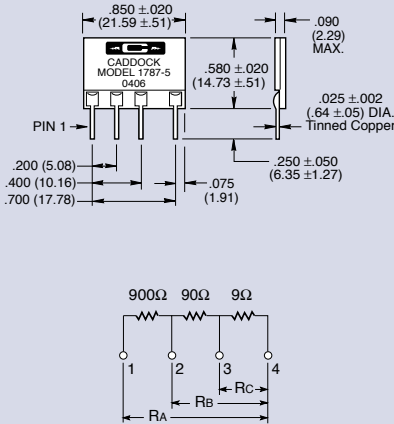
Figure 2 - Model Nos. 1787-41 and 1787-412



Model Nos. 1787-41 and 1787-412 Measurement Connections

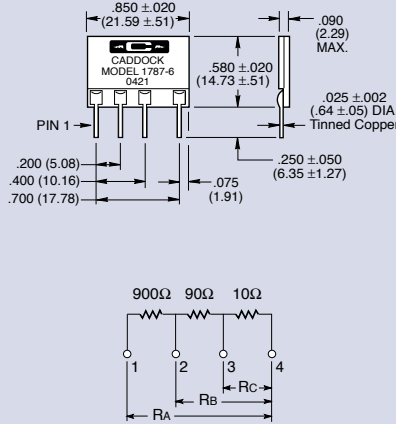
| Resistances    |             | Kelvin Connections        |                             |                             |                           |
|----------------|-------------|---------------------------|-----------------------------|-----------------------------|---------------------------|
| "R"            | Total Value | Sense Lead P <sub>1</sub> | Current Lead C <sub>1</sub> | Current Lead C <sub>2</sub> | Sense Lead P <sub>2</sub> |
| R <sub>A</sub> | 1,000 Ω     | Pin 1                     | Pin 1                       | Pin 5                       | Pin 6                     |
| R <sub>B</sub> | 100 Ω       | Pin 1                     | Pin 2                       | Pin 5                       | Pin 6                     |
| R <sub>C</sub> | 10 Ω        | Pin 1                     | Pin 3                       | Pin 5                       | Pin 6                     |
| R <sub>D</sub> | 1 Ω         | Pin 1                     | Pin 4                       | Pin 5                       | Pin 6                     |

Figure 3 - Model Nos. 1787-5, 1787-53, and 1787-535



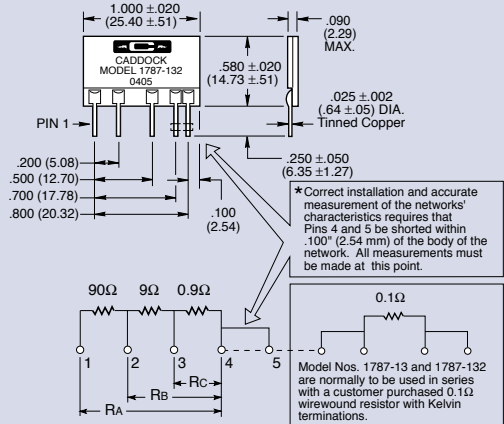
| Resistances    |             |
|----------------|-------------|
| "R"            | Total Value |
| R <sub>A</sub> | 999 Ω       |
| R <sub>B</sub> | 99 Ω        |
| R <sub>C</sub> | 9 Ω         |

Figure 4 - Model Nos. 1787-6, 1787-64, and 1787-645



| Resistances    |             |
|----------------|-------------|
| "R"            | Total Value |
| R <sub>A</sub> | 1,000 Ω     |
| R <sub>B</sub> | 100 Ω       |
| R <sub>C</sub> | 10 Ω        |

Figure 5 - Model Nos. 1787-13 and 1787-132



Model Nos. 1787-13 and 1787-132 Measurement Connections

| Resistances    |             | Kelvin Connections        |                             |                             |                           |
|----------------|-------------|---------------------------|-----------------------------|-----------------------------|---------------------------|
| "R"            | Total Value | Sense Lead P <sub>1</sub> | Current Lead C <sub>1</sub> | Current Lead C <sub>2</sub> | Sense Lead P <sub>2</sub> |
| R <sub>A</sub> | 99.9 Ω      | Pin 1                     | Pin 1                       | Pin 4 *                     | Pin 5 *                   |
| R <sub>B</sub> | 9.9 Ω       | Pin 1                     | Pin 2                       | Pin 4 *                     | Pin 5 *                   |
| R <sub>C</sub> | 0.9 Ω       | Pin 1                     | Pin 3                       | Pin 4 *                     | Pin 5 *                   |

DIMENSIONS IN INCHES AND (MILLIMETERS)