

PERFORMANCE SPECIFICATION

RESISTOR, VARIABLE, WIREWOUND, PRECISION,  
STYLE 2RR3100

This specification is approved for use by all Departments  
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall  
consist of this specification sheet and [MIL-PRF-12934](#).

1. SCOPE

1.1 Scope. This specification covers the requirements for style 2RR3100, precision, wirewound, variable resistors.

1.2 Part or Identifying number (PIN). Variable resistors covered by this specification must be identified by a PIN which must be in the following form.

<u>2RR3100</u>	<u>X</u>	<u>X</u>	<u>B</u>	<u>X</u>	<u>L</u>	<u>6650</u>
Style (1.2.1)	Function and shaft length (1.2.2)	Class and center tap (1.2.3)	Resistance temperature characteristic (1.2.4)	Rotational life characteristic (1.2.5)	Function conformity tolerance and resistance tolerance characteristic (1.2.6)	Resistance (1.2.7)

1.2.1 Style. Style 2RR3100 is a similar style to RR3100.

1.2.2 Function and shaft length. The function and shaft length applicable to this specification is identified by a single symbol X (see [figure 1](#)).

1.2.3 Class and center tap. The class and center tap applicable to this specification is symbol X.

1.2.4 Resistance temperature characteristic. The resistance temperature characteristic applicable to this specification is symbol B.

1.2.5 Rotational life characteristic. The rotational life characteristic applicable to this specification is symbol X.

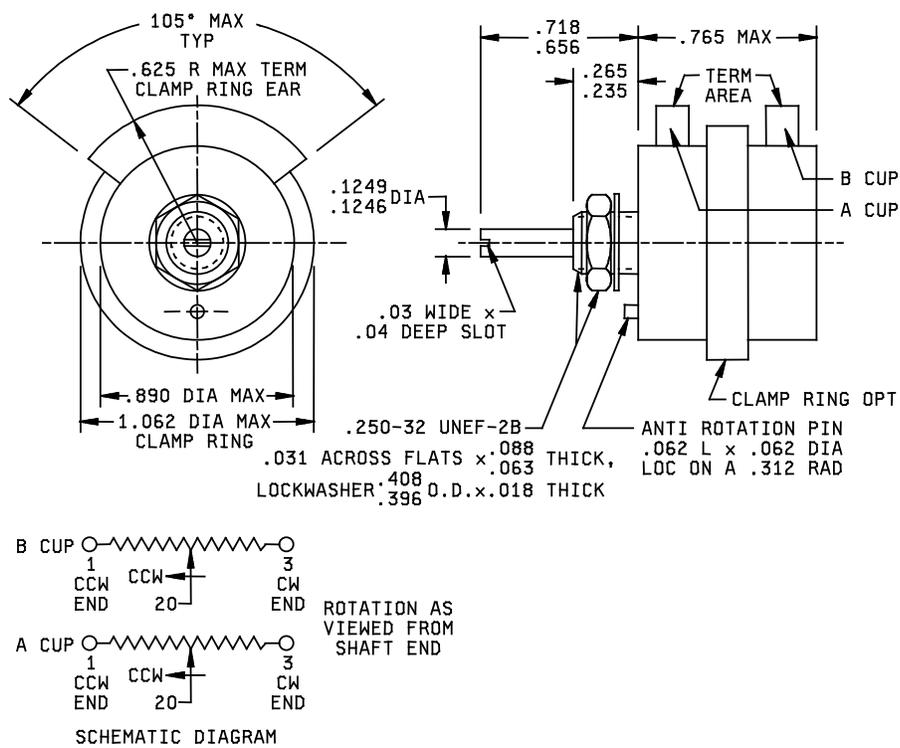
1.2.6 Function-conformity tolerance and resistance tolerance characteristics. The function-conformity tolerance and resistance tolerance characteristic applicable to this specification is symbol X.

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, Ohio 43218-3990 or by email [Resistor@dla.mil](mailto:Resistor@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil/>.

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1.2.7 Resistance. The nominal total resistance values and nominal resolution applicable to this specification is as follows:

First cup 665 ohms ( $\Omega$ ).  
Second cup 665 ohms ( $\Omega$ ).



Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
0.018	0.457	0.063	1.600	0.235	5.969	0.396	10.058	0.718	18.237
0.030	0.762	0.088	2.235	0.250	6.350	0.408	10.363	0.765	19.431
0.040	1.016	0.1246	3.165	0.265	6.731	0.625	15.875	0.890	22.606
0.062	1.575	0.1249	3.172	0.312	7.925	0.656	16.662	1.062	26.975

Style	Turns	Maximum continuous working voltage (volts)	Power rating (milliwatts)	Maximum starting torque		Stop torque (pound-inch)
				First cup	Second cup	
				Starting	Starting	
2RR3100	single	500	0.25	6.0	6.0	2.0

NOTES:

- Dimensions are in inches. Metric equivalents are given for general information only.

FIGURE 1. Style 2RR3100

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation (see 6.2).

#### DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-12934 - Resistor, Variable, Wirewound, Precision, General Specification for.

(Copies of these documents are available online at <http://quicksearch.dla.mil>).

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence unless otherwise noted. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 General. The requirements for acquiring the product described herein shall consist of this document and MIL-PRF-12934.

3.2 Interface and physical dimensions. The resistors shall meet the interface and physical dimensions specified in figure 1.

### 3.3 Electrical characteristics (for Cup A and Cup B).

3.3.1 Total resistance. The total resistance of 665 ohms  $\pm 5$  percent across terminals 1 and 3 throughout the temperature range from  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

3.3.1.1 Resistance value deviations. All maximum deviations as specified in this section are to be considered absolute limits with the exception of the contact resistance adjustments.

3.3.2 Output load and configuration. The output load and configuration is 20,000 ohms between terminals 2 and 3.

3.3.3 Actual electrical travel. The theoretical electrical travel shall be 334 degrees.

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3.3.4 Function and conformity. The type of function applicable to this specification shall be by the given equation:

$$E_{(OUT)} = E_{(IN)} * \text{SIN}(\theta - \frac{90}{34})$$

when loaded with the specified load per 3.5

where:

- $E_{(OUT)}$  = Voltage from the contact arm (terminal 2) to terminal 3
- $\theta$  = Shaft angle in degrees (measured from 0 degrees. (0 degrees is located at CW end of winding).
- ( $\theta$  = 50 degrees at index point).
- $E_{(IN)}$  = 10 V dc applied across terminals 1 and 3.

Note: Counterclockwise (CCW) rotation produces an increasing  $E_{(OUT)}$  as viewed from the shaft end.

3.3.5 Index point. The index point of the ganged assembly shall be located at  $\theta = 50$  degrees. The magnitude of the output voltage ration (to four digits) of Cup A shall be marked on the case. Cup B shall be phased with index point for simultaneous conformity.

3.3.6 Maximum contact arm current. The maximum contact arm current is 0.5 milliampere (ma).

3.3.7 Continuous working group voltage. The continuous working voltage is 10 Vdc.

3.4 Mechanical characteristics.

3.4.1 Mechanical travel. The mechanical travel shall exceed 334 degrees.

3.4.2 Torque.

3.4.2.1 Starting. The starting torque shall be a minimum of 2 inch-ounces (in-oz) and a maximum of 6 in-oz.

3.4.2.2 Stop. The mechanical stop shall withstand a stop torque of 2.0 inch-pounds (in-lb).

3.4.3 Shaft runout. The shaft runout shall be 0.0035 inch maximum.

3.4.4 Shaft radial play. The shaft radial play shall be 0.002 inch maximum.

3.4.5 Shaft end play. The shaft end play shall be 0.005 inch maximum.

3.4.6 Rotation Speed. The maximum shaft rotation in 5 rotations per minute (rpm).

3.4.7 Moment of Inertia. The maximum moment of inertia is 40 gm-cm<sup>2</sup> (ref).

3.4.8 Rotational load life. The resistor shall meet the requirements per MIL-PRF-12934 for 5,000 cycles. At the end and during cycling the resistor shall meet all the requirements of this specification.

3.5 Environmental characteristics.

3.5.1 High temperature exposure. In accordance with MIL-PRF-12934 class 2.

3.5.2 Temperature cycling. In accordance with MIL-PRF-12934, for class 2 except -55°C for low temperatures.

3.5.3 Shock. In accordance with MIL-PRF-12934, except resistors shall be checked for discontinuity during shock and performance after shock only.

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3.6 Pure tin. The use of pure tin, as an underplate or final finish is prohibited both internally and externally. Tin content of resistor components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.4).

#### 4. VERIFICATIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with [MIL-PRF-12934](#).

4.2 Extension of qualification. Manufacturers who have passed the qualification requirements, and have been approved and listed on or approved for listing on the qualified products list (QPL), for style RR3100, will be approved for style 2RR3100.

#### 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military services system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

#### 6. NOTES

(This section contains information of general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The intended use specified in [MIL-PRF-12934](#) will be applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification, and the complete PIN (see 1.2).
- b. If not otherwise specified (see 2.1), the versions of the individual documents referenced will be those in effect on the date of release of the solicitation.)
- c. Packaging instructions (see 5.1).

6.3 PIN. This specification requires a PIN that describes technology and appropriate references to associated documents (see 1.2 and 3.1).

6.4 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coatings of Tin).

6.5 Amendment notification. The margins of this specification are marked with vertical lines to indicate modification generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship.

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Custodians:  
Navy - EC  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5905-2013-075)

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