

PERFORMANCE SPECIFICATION
RESISTOR, VARIABLE, WIREWOUND
(LOW OPERATING TEMPERATURE), STYLE RA20

This specification is approved for use by all Department of 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-19

1. SCOPE

1.1 Scope. This specification covers the requirements for style RA20, low operating temperature, wirewound, variable resistors.

1.2 Part or Identifying Number (PIN). Variable resistors covered by this specification are identified by a PIN, which is in the following form:

<u>RA20</u>	<u>N</u>	<u>A</u>	<u>SK</u>	<u>103</u>	<u>A</u>
Style	Bushing (1.2.1)	Switch (1.2.2)	Operating shaft and length (1.2.3)	Resistance (1.2.4)	Resistance characteristic (1.2.5)

1.2.1 Bushing. The type of bushing applicable to this specification is identified by a single symbol in accordance with table I.

TABLE I. Bushing.

Symbol	Bushing
N	Standard
L	Locking
S	Shaft and panel-seal (standard)
T	Shaft and panel seal (locking)

1.2.2 Switch. The type of switch or lock of switch applicable to this specification is identified by a single symbol in accordance with [table II](#).

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. 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/>



MIL-PRF-19/2D
w/ Amendment 2

*

TABLE II. Switch.

Symbol	Switch
A	No switch
B	Single pole, single throw switch which is actuated to the "on" position at the start of the clockwise rotation.

1.2.3 Operating shaft and length. The operating shaft and length applicable to this specification are identified by a two letter symbol. The first letter indicates the shaft style as specified in table III and the second letter indicates the shaft length as specified in table IV.

TABLE III. Shaft style.

Symbol	Shaft
S	Slotted

TABLE IV. Shaft length

Symbol	Length of shaft from mounting surface, nominal	
	Bushings N and S in inches (± 0.03125)	Bushings L and T in inches (± 0.03125)
A	0.500	---
B	---	0.625
D	0.875	0.875
G	1.250	1.250
K	2.500	---

1.2.4 Resistance. The nominal total resistance and available tapers applicable to this specification are in accordance with table V.

*

TABLE V. Resistance values and available tapers.

Nominal total resistance (in ohms)	Available taper(s)	Nominal total resistance (in ohms)	Available taper(s)
3	A, C, F	250	A, C, F
6		350	
8		500	
10		750	
15		1,000	
20		1,500	
25		2,000	
35		2,500	
50		3,500	
75		5,000	
100		7,500	
150		10,000	
200		15,000	

MIL-PRF-19/2D
w/ Amendment 2

1.2.5 Resistance characteristic. The resistance characteristic applicable to this specification is in accordance with table VI.

*

TABLE VI. Resistance characteristic.

Symbol	Resistance taper	Resistance tolerance
A	A	± 10 percent
C <u>1/</u>	C	
E <u>2/</u>	F	

1/ Resistance taper type C is a CW taper with 10% resistance at 50% rotation.

2/ Resistance taper type E is a F taper, a CCW taper with 10% resistance at 50% rotation.

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 STANDARDS

MIL-PRF-19 - Resistor, Variable, Wire-wound (Low Operating Temperature), General Specification for.

*

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

*

2.4 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. 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 herein shall consist of this document and [MIL-PRF-19](#).

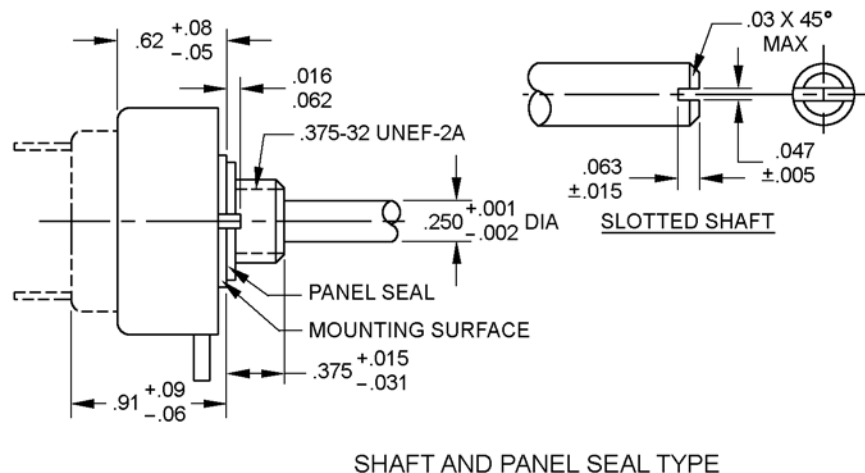
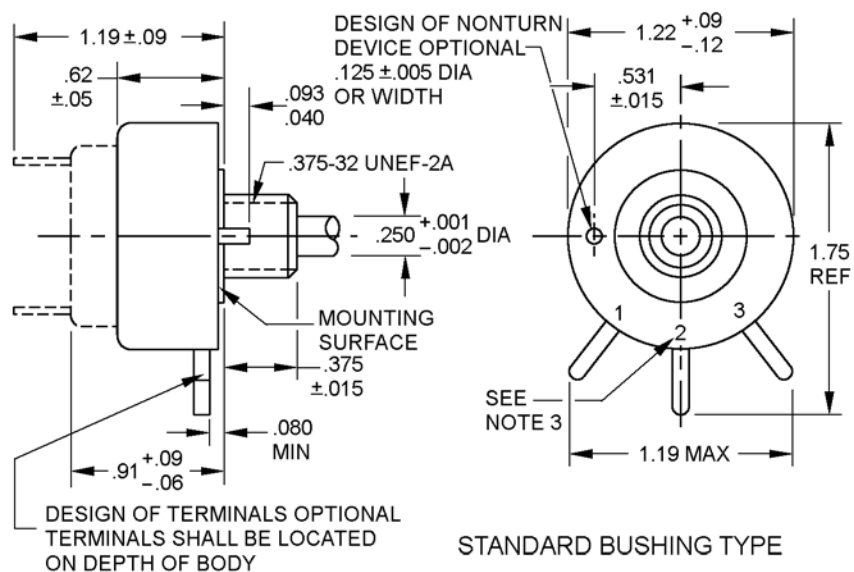
3.2. Interface and physical dimensions. The resistors shall meet the interface and physical dimensions specified in [figure 1](#).

3.3 Power rating. The power rating shall be in accordance with table VII at an ambient temperature of 40°C.

Table VII. Power rating.

Taper	Power rating (in watts)
A	2.0
C	1.1
F	

*



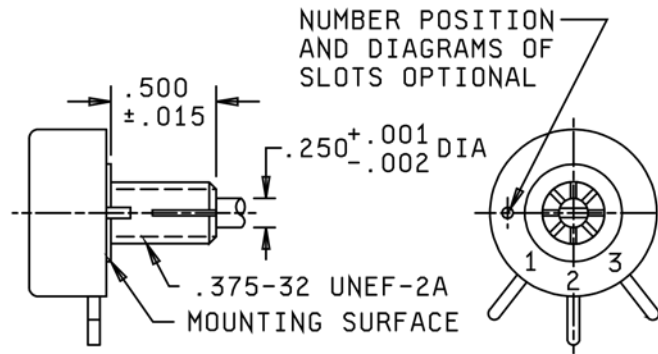
<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>	<u>Inch</u>	<u>mm</u>
.001	0.03	.016	0.41	.047	1.19	.063	1.60	.120	3.05	.531	13.49	1.220	30.99
.002	0.05	.030	0.76	.050	1.27	.080	2.03	.125	3.18	.620	15.75	1.750	44.45
.005	0.13	.031	0.79	.060	1.52	.090	2.29	.250	6.35	.910	23.11		
.015	0.38	.040	1.02	.062	1.57	.093	2.36	.375	9.53	1.190	30.23		

NOTES:

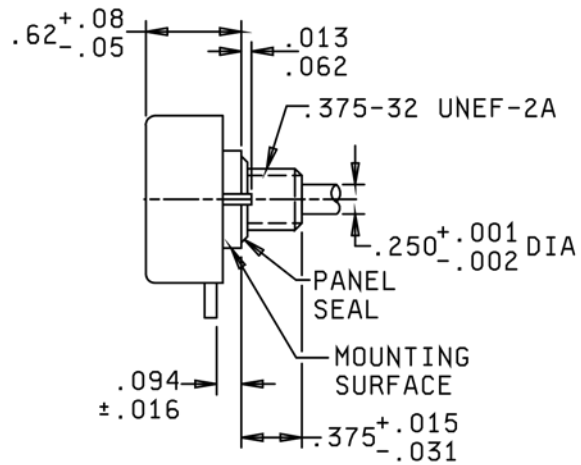
1. Dimensions are in inches. Metric equivalent are given for general information only
2. Terminal identification for reference only.

FIGURE 1. Style RA20 Resistors.

MIL-PRF-19/2D
w/ Amendment 2



LOCKING BUSHING TYPE



SHAFT AND PANEL SEALED LOCKING BUSHING TYPE

Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
.001	0.03	.015	0.38	.050	1.27	.094	2.39	.500	12.70
.002	0.05	.016	0.41	.062	1.57	.250	6.35	.620	15.75
.013	0.33	.031	0.79	.080	2.03	.375	9.53		

NOTES:

1. Dimensions are in inches. Metric equivalent are given for general information only.

FIGURE 1. Style RA20 Resistors. (continued)

MIL-PRF-19/2D
w/ Amendment 2

3.4 Torque. The torque required to effect rotation shall be not less than 1.2 ounce-inch nor more than 6 ounce-inches. The torque applied through the operating shaft to the stops shall be 8 pound-inches. For locking-bushing type, the control arm shall not move when a torque of 30 ounce-inches is applied to the shaft after the locking nut is tightened with a torque of 10 pound-inches.

3.5 Mechanical rotation. The mechanical rotation with or without a switch shall be 290° minimum and 305° maximum.

3.6 Actual electrical rotation. The electrical rotation with switch shall be 220° minimum and 285° maximum; without a switch 290° minimum and 305° maximum.

3.7 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).

3.8 Hardware. The mounting nut shall be 0.094 inch thick and shall measure 0.500 inch across the hexagonal flats, unless otherwise specified (see 6.2). The locking nut shall be 0.151 to 0.234 inch thick and shall measure 0.500 inch across the hexagonal flats. Threads size shall be 0.375-32UNEF-2B. Internal-tooth lockwasher of suitable size shall be supplied.

3.9 Retainer rings. If retainer rings are used, they shall be not thicker than 0.047 inch.

4. VERIFICATIONS.

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-19.

5. PACKAGING

5.1 Packaging. For acquisition purpose, 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 activities 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 Notes. The notes specified in MIL-PRF-19 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. Title, number, and date of the applicable detail specification, and complete PIN (see 1.2 and 3.1).
- c. Unless 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.
- d. Packaging requirements (see 5.1)
- e. Mounting nut dimensions across the hexagonal flats, if other than 0.500 inch.

MIL-PRF-19/2D
w/ Amendment 2

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 asterisks to indicate where changes from the previous issue were made. 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 to the last previous issue.

Custodians:

Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5905-2017-002)

Review activities

Army - AR, AT, CR4, MI
Navy - AS, CG, MC, OS
Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of the this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the Assist Online database at <https://assist.dla.mil>.