

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE RECEIVED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL:

- A. UNITS SHALL BE CAPABLE OF MEETING THE APPLICABLE REQUIREMENTS OF MIL-R-93 CHARACTERISTIC C; EXCEPT AS AND IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
- B. PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND1002215 CLASS 1, CODE 2.
- C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND 1015404 CLASS 2.
- D. INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

2. INSPECTION AND ACCEPTANCE:

- A. RESISTANCE VALUES: SEE TABLE.
- B. RESISTANCE TOLERANCE: SEE TABLE.
- C. TEMPERATURE COEFFICIENT: ABOVE 10Ω 15 PPM/°C, (EXCEPT AS SPECIFIED IN NOTE 2) 10 Ω TO 1 Ω 30 PPM/°C, 1 Ω AND BELOW 40 PPM/°C.
- D. LEAD DATA: WELDABLE GRADE A GOLD PLATED NICKEL PER ND PS 1015400. A CERTIFICATE OF COMPLIANCE TO I THIS REQUIREMENT SHALL ACCOMPANY EACH LOT SHIPPED.
- E. MARKING: MARK UNITS PER ND 1002019 WITH THE NASA PART NUMBER AND REVISION LETTER AND THE MANUFACTURER'S NAME AND/OR SYMBOL. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE. MARKING OF UNIT PACKAGES AND EXTERIOR SHIPPING CONTAINERS SHALL INCLUDE NASA PART NUMBER AND REVISION LETTER PER MIL-STD-129

3. DESIGN REQUIREMENTS:

- A. POWER RATING: 1/10 WATT AT +125°C DERATED TO ZERO AT 145°C
- B. MAXIMUM VOLTAGE RATING: 150 VOLTS.
- C. STABILITY: 100 PPM/YEAR AT +25°C AT 1/2 RATED POWER. (SEE NOTE 2)
- D. TEMPERATURE RANGE: MINUS 65°C TO PLUS 125°C.
- E. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING TWO (2) BENDS UNDER A TWO (2) POUND VERTICAL PULL (LEADS VERTICAL WITH RESPECT TO UNIT BODY). TWO (2) BENDS SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT, WHILE IN THE PLANE, THROUGH 90° IN ONE DIRECTION, THEN BACK 180° TO THE OPPOSITE DIRECTION AND BACK 90° TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
- F. EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF FOUR (4) POUNDS MINIMUM.

4. SPECIAL CONDITIONING BY SUPPLIER:

- A. BURN IN: 100 HOURS @ 125°C @ 1/10 WATT (AC OR DC). REJECT ANY PART WHICH CHANGES MORE THAN 0.1% OR CANNOT MEET PURCHASE TOLERANCE.

NOTES:

- 1. RESISTANCE VALUES ABOVE 35K ARE NOT AVAILABLE, PER THE REQUIREMENTS OF THIS DRAWING AND MIL-R-93, USING .001 MIN. DIA. WIRE.

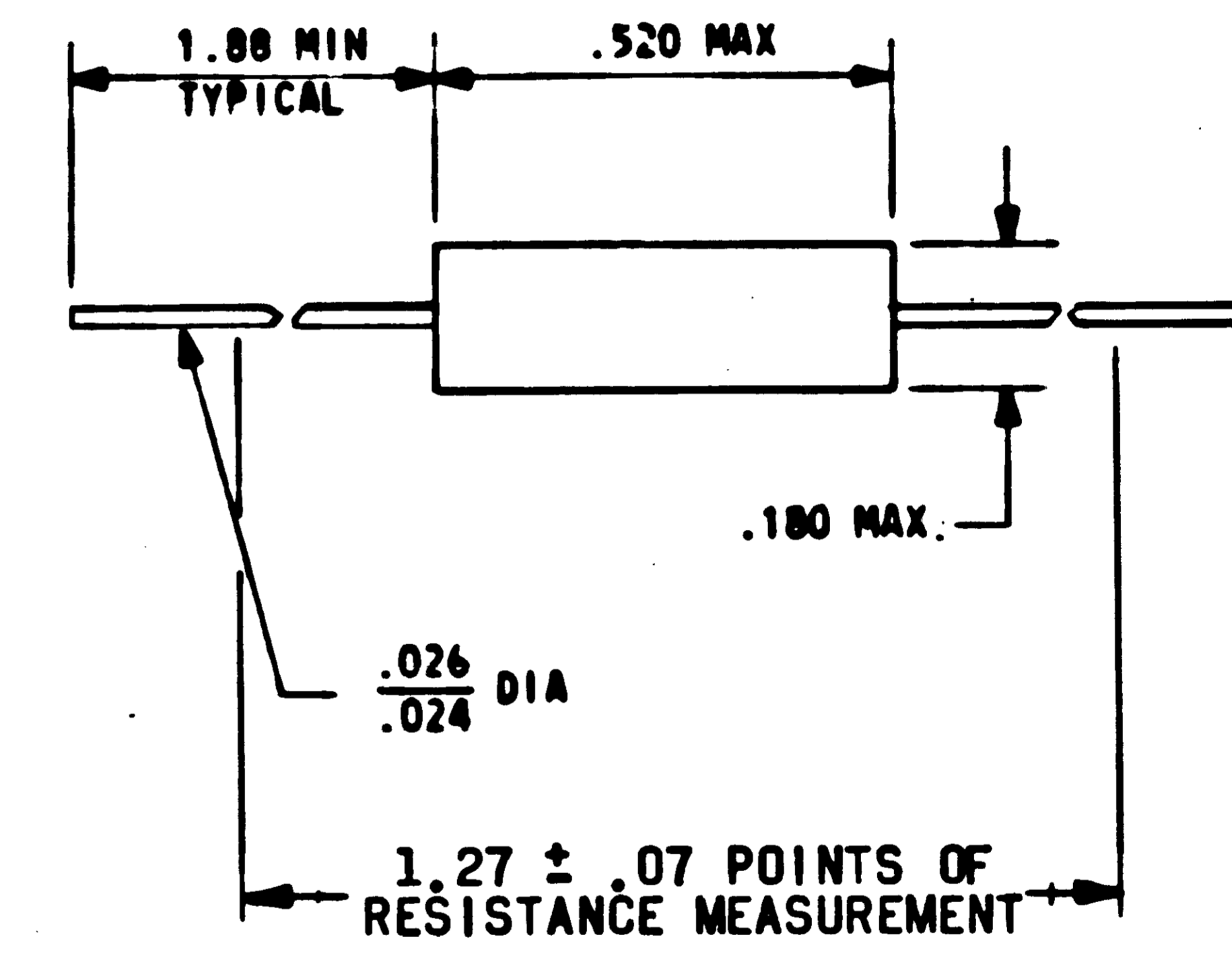
PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

SEE NOTE 1.

DASH NO.	NOMINAL RES OHMS	RES TOL	DASH NO.	NOMINAL RES OHMS	RES TOL
1	4,000	±0.1%	53	25,000	±0.1%
2	87,500		54	12,500	
3	88,750		55	8,330	
4	90,000		56	6,250	
5	91,250		57	1	±0.5%
6	92,500		58	2	
7	93,750		59	3	
8	95,000		60	4	
9	96,250		61	5	
10	97,500		62	6	
11	98,750		63	7	
12	100,000		64	8	
13	101,250		65	9	
14	102,500		66	10	
15	103,750		67	11	
16	105,000		68	12	
17	106,250		69	13	
18	107,500		70	14	
19	108,750		71	15	
20	110,000		72	16	
21	111,250		73	17	
22	112,500	±0.1%	74	18	
23	50	±1%	75	19	
24	374		76	82,500	
25	400		77	83,750	
26	600		78	85,000	
27	650		79	86,250	
28	700		80	87,500	
29	750		81	88,750	
30	775		82	90,000	
31	850		83	91,250	
32	925		84	92,500	
33	1,000		85	93,750	
34	1,100		86	95,000	
35	1,200		87	96,250	
36	3,300		88	97,500	±1.0%
37	10,000		89	98,750	
38	22,500		90	100,000	
39	35,000		91	101,250	
40	45,000		92	102,500	
41	67,500		93	103,750	
42	90,000		94	105,000	
43	112,000		95	106,250	
44	134,500		96	107,500	
45	157,000		97	108,750	
46	179,500		98	110,000	
47	202,500		99	111,250	
48	225,000		100	112,500	
49	39,000		101	113,750	
50	20,000		102	115,000	
51	5,000		103	116,250	
52	25,000		104	117,500	

Z LLE0101

SYM	DESCRIPTION	DATE	APPROVAL
K	REPLACES REV J WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02103	7/17/62	JW
L	REVISED PER TDRR 02478	8-2-62	WIL
M	REVISED PER TDRR 03382	7/24/62	JW
N	REVISED PER TDRR 03968	10/2/62	WIL
P	REVISED PER TDRR 07311	7/31/62	WIL
R	REVISED PER TDRR 08175	4/28/62	WIL
S	REVISED PER TDRR 08941	6/26/62	WIL
T	REVISED PER TDRR 10045	6/26/62	WIL
U	REVISED PER TDRR 11508	8/12/62	WIL
V	REVISED PER TDRR 12608	6/26/62	WIL
W	REVISED PER TDRR 13388	6/26/62	WIL
Y	REVISED PER TDRR 16598	4/24/65	WIL
Z	REVISED PER TDRR 18746	8/18/66	WIL



K REPLACES REV J WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE MASS DWC NO. _____ CONTRACT 497		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>Chapel</i> DATE JUN 62		RESISTORS, FIXED, WW, PRECISION	
CHECKED <i>W. Brown</i> DATE JUN 63			
APPROVAL <i>W. Brown</i> DATE 15 JUL 62		SPECIFICATION CONTROL DRAWING	
APPROVAL _____			
HEAT TREATMENT NONE		CODE IDENT NO.	NASA DRAWING NO.
FINAL FINISH NONE		C	1010377
MIT APPROVAL <i>W. Brown</i> 7/17/62		SCALE _____	WT _____ SHEET 1 OF 2

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Z LLE0101

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
K	REPLACES REV J WITH CHANGES AND UPGRADED TO CLASS A RELEASE. PER TDRR 02103	7/7/63	WJL
L	REVISED PER TDRR 02478	8-7-63	WJL
M	REVISED PER TDRR 03382	7/2/64	WJL
N	REVISED PER TDRR 03968	1/20/64	WJL
P	REVISED PER TDRR 07311	3/31/64	WJL
R	REVISED PER TDRR 08175	4/28/64	WJL
S	REVISED PER TDRR 08941	6/2/64	WJL
T	REVISED PER TDRR 10045	6/9/64	WJL
U	REVISED PER TDRR 11508	8/14/64	WJL
V	REVISED PER TDRR 12608	9/2/64	WJL
W	REVISED PER TDRR 13388	10/20/64	WJL
Y	REVISED PER TDRR 16598	2/24/65	WJL
Z	REVISED PER TDRR 18746	5/18/65	WJL

NOTE 2: DASH 301 TO 313 AND DASH 315, 316, 345 SHALL HAVE TEMP COEFFICIENT OF 3 PPM/°C BETWEEN THE TEMPERATURES OF 0°C TO +65°C. AND SHALL HAVE SPECIAL STABILITY FEATURE OF 50 PPM/YR @ 25°C AT 1/2 RATED POWER

DASH NO.	NOMINAL RES OHMS	RES TOL
325	740	±1%
326	810	↓
327	890	↓
328	960	↓
329	1050	↓
330	1150	↓
331	42	±1%
332	125.842K	±0.01%
333	25.708K	±0.01%
334	25.009K	±0.01%
335	1740	±1%
336	82.250K	±0.1%
337	82.500K	↓
338	83.750K	↓
339	85.000K	↓
340	113.750K	↓
341	115.000K	↓
342	116.250K	↓
343	117.500K	↓
344	86.250K	↓
345	125.796K	±0.01%

D
C
B
A

DASH NO.	NOMINAL RES OHMS	RES TOL	DASH NO.	NOMINAL RES OHMS	RES TOL
105	16,000	±1.0%	165	119	±0.1%
106	6,200	↓	166	121	↓
107	100	↓	167	123	↓
108	150	↓	168	125	↓
109	7,500	↓	169	127	↓
110	4,700	↓	170	129	↓
111	91,000	↓	171	131	↓
112	1	↓	172	133	↓
113	15	±0.1%	173	135	↓
114	17	↓	174	137	↓
115	19	↓	175	139	↓
116	21	↓	176	141	↓
117	23	↓	177	143	↓
118	25	↓	178	145	↓
119	27	↓	179	147	↓
120	29	↓	180	149	↓
121	31	↓	181	151	↓
122	33	↓	182	153	↓
123	35	↓	183	155	↓
124	37	↓	184	157	↓
125	39	↓	185	159	↓
126	41	↓	186	161	↓
127	43	↓	187	163	↓
128	45	↓	188	165	↓
129	47	↓	189	167	↓
130	49	↓	190	169	↓
131	51	↓	191	171	↓
132	53	↓	192	173	↓
133	55	↓	193	175	↓
134	57	↓	194	177	↓
135	59	↓	195	179	↓
136	61	↓	196	181	↓
137	63	↓	197	183	↓
138	65	↓	198	185	↓
139	67	↓	199	187	↓
140	69	↓	200	189	↓
141	71	↓	201	191	↓
142	73	↓	202	193	↓
143	75	↓	203	195	↓
144	77	↓	204	197	↓
145	79	↓	205	199	↓
146	81	↓	206	201	↓
147	83	↓	207	700	↓
148	85	↓	208	710	↓
149	87	↓	209	720	↓
150	89	↓	210	730	↓
151	91	↓	211	740	↓
152	93	↓	212	750	↓
153	95	↓	213	760	↓
154	97	↓	214	770	↓
155	99	↓	215	780	↓
156	101	↓	216	790	↓
157	103	↓	217	800	↓
158	105	↓	218	810	↓
159	107	↓	219	820	↓
160	109	↓	220	830	↓
161	111	↓	221	840	↓
162	113	↓	222	850	↓
163	115	↓	223	860	↓
164	117	↓	224	870	↓

DASH NO.	NOMINAL RES OHMS	RES TOL
225	880	±0.1%
226	890	↓
227	900	↓
228	910	↓
229	920	↓
230	930	↓
231	940	↓
232	950	↓
233	960	↓
234	970	↓
235	980	↓
236	990	↓
237	1000	↓
238	1010	↓
239	1020	↓
240	1030	↓
241	1040	↓
242	1050	↓
243	1060	↓
244	1070	↓
245	1080	↓
246	1090	↓
247	1100	↓
248	1110	↓
249	1120	↓
250	1130	↓
251	1140	↓
252	1150	↓
253	1160	↓
254	1170	↓
255	1180	↓
256	1190	↓
257	1200	↓
258	1210	↓
259	1220	↓
260	1230	↓
261	1240	↓
262	1250	↓
263	1260	↓
264	1270	↓
265	1280	↓
266	1290	↓
267	1300	↓
268	1310	↓
269	1320	↓
270	1330	↓
271	1340	↓
272	1350	↓
273	1360	↓
274	1370	↓

DASH NO.	NOMINAL RES OHMS	RES TOL
275	1380	±0.1%
276	1390	↓
277	1400	↓
278	500	±1%
279	2100	↓
280	1620	↓
281	53K	±1%
282	64K	↓
283	73K	↓
284	127K	↓
285	136K	↓
286	145K	↓
287	154K	↓
288	163K	↓
289	172K	↓
290	181K	↓
291	190K	↓
292	199K	↓
293	208K	↓
294	217K	↓
295	226K	↓
296	235K	↓
297	244K	↓
298	253K	↓
299	262K	↓
300	271K	↓
301	866.98Ω	±0.01%
302	1.9638K	↓
303	2.6027K	↓
304	4.000K	↓
305	8.000K	↓
306	12.500K	↓
307	25.000K	↓
308	25.490K	↓
309	30.000K	↓
310	30.067K	↓
311	44.999K	↓
312	100.000K	↓
313	128.146K	↓
314	80K	±1%
315	25.760K	±0.01%
316	125.574K	±0.01%
317	16.5Ω	±1%
318	21.4Ω	↓
319	27.0Ω	↓
320	33.7Ω	↓
321	43.0Ω	↓
322	20.7Ω	↓
323	18.8Ω	↓
324	44.0Ω	±1%

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
 TOLERANCES ON
 FRACTIONS DECIMALS ANGLES
 ± — ± — ± —
 DO NOT SCALE THIS DRAWING
 MATERIAL —
 HEAT TREATMENT —
 FINAL FINISH —

K REPLACES J WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE MASS CONTRACT 497		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>Capel</i> DATE <i>10 JUN 63</i>		RESISTORS, FIXED, WW, PRECISION	
CHECKED <i>Wilson</i> DATE <i>11 JUN 63</i>			
APPROVAL <i>W.A. Test</i> DATE <i>15 JUL 63</i>		SPECIFICATION CONTROL DRAWING	
NASA APPROVAL <i>W.A. Test</i> DATE <i>7/17/63</i>		CODE IDENT NO.	NASA DRAWING NO.
MIT APPROVAL <i>W.A. Test</i> DATE <i>7/17/63</i>		C 1010377	
SCALE	WT	SHEET 2 OF 2	