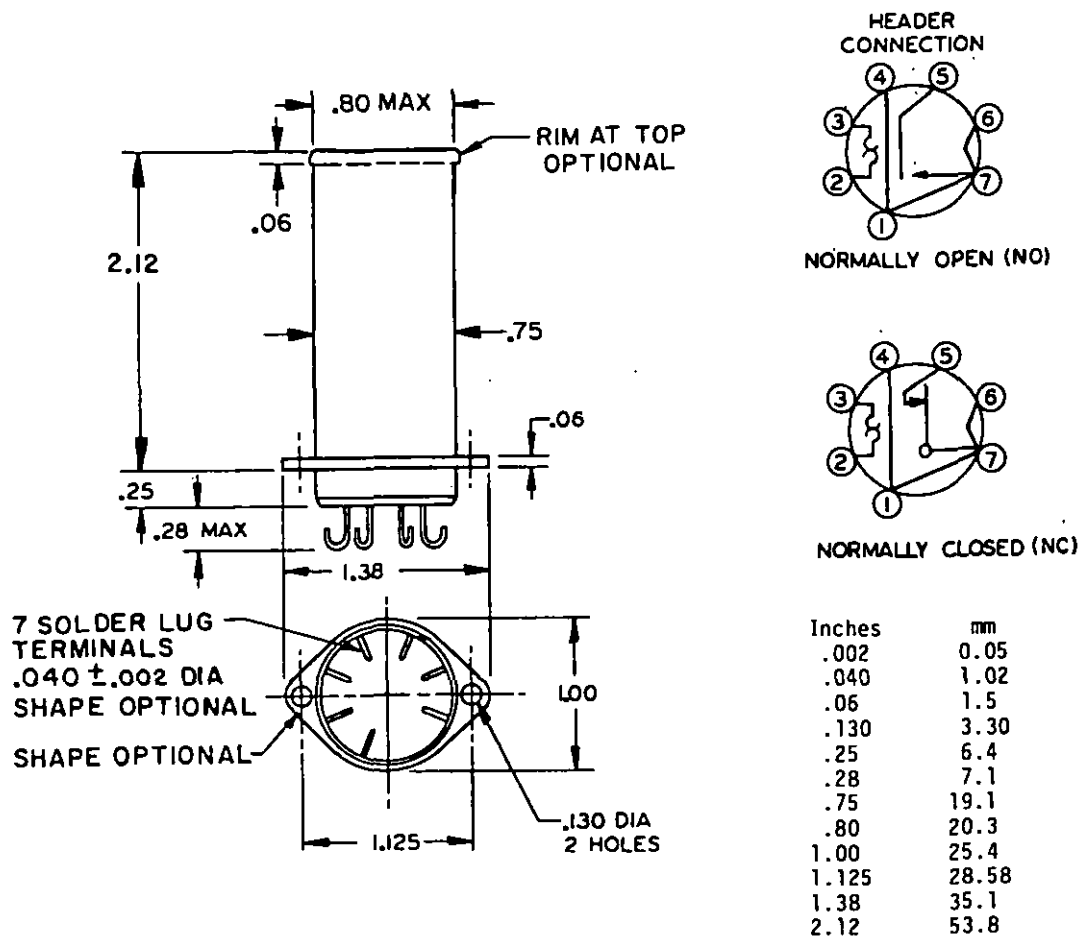


## MILITARY SPECIFICATION SHEET

RELAYS, TIME DELAY, THERMAL, HERMETICALLY SEALED,  
ADJUSTABLE, 3 to 180 SECONDS, FLANGE MOUNT,  
SPST CONTACTS, 2 AMPERES

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

The complete requirements for acquiring the relays described herein shall consist of this specification and the latest issue of MIL-R-19648.



## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances shall be  $\pm .02$  (0.5 mm) for two place decimals and  $\pm .005$  (0.13 mm) for three place decimals.
4. Pins 1, 4, and 6 are electrically connected to pin 7 by internal construction. Do not use as tie points.

FIGURE 1. Dimensions and configurations.

(E) denotes changes

## MIL-R-19648/1E

## REQUIREMENTS:

Dimensions and configuration: See figure 1.

## Heater data:

Duty rating: Continuous.

Rated heater voltage: See table I.

Oversvoltage: 100 percent rated heater voltage.

Minimum operate voltage: 83 percent of rated heater voltage over rated temperature range.

Minimum hold-in voltage: 83 percent of rated heater voltage over rated temperature range.

Power dissipation: 4.5 watts maximum.

## Contact data:

## Contact ratings:

Resistive: 2 amperes to 250 V ac; 1 ampere to 32 V dc.

Inductive: 25 volt-amperes at 250 V ac; 0.125 ampere at 32 V dc.

Contact resistance:

.050 ohm before life test.

.100 ohm after life test.

Contact arrangement:

Form A SPST NO.

Form B SPST NC.

## Electrical data:

## Dielectric withstanding voltage:

## Sea level:

Contacts to heater

Contacts to case

Heater to case

1000  $\pm$ 50 V rms 60 Hz for

115 V, 60 Hz applications;

1250  $\pm$ 50 V rms 60 Hz for

115 V, 400 Hz applications.

Between open contacts

500  $\pm$ 10 V rms 60 Hz.

Altitude (70,000 feet):

Contacts to heater

Contacts to case

Heater to case

500  $\pm$ 10 V rms 60 Hz.

Insulation resistance: 100 megohms minimum at 100  $\pm$ 10 V dc between insulated terminals and any insulated terminal and case or frame.

## Environmental data:

Shock: 50 G, 11 ms operating or nonoperating (level 1).

Vibration: 10-500 Hz operating or nonoperating (level 2)

Temperature range: Class B, -65°C to 125°C continuous duty

Hermetic seal: Seal test I.

Acceleration: Not applicable.

Salt spray: Applicable.

Moisture resistance: Not applicable.

Thermal shock: -65°C to +125°C operate time tolerance during exposure to temperature extremes shall not exceed  $\pm$ 15 percent of normal operate time.

Temperature extremes: -65°C to 125°C (class B).

Normal operate time tolerance: See table I.

## Physical data:

Terminal strength: 5  $\pm$ .5 pounds.

Terminal configuration: Hooked solder terminals.

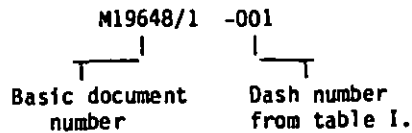
Adjustment: Covered.

Weight: 2 oz maximum.

## MIL-R-19648/1E

Part number: Consists of the basic number of this specification sheet and a dash number taken from table I.

Example:



Supersession information: See table II.  
First article inspection and sample size: See table III.

TABLE I. Relay dash numbers and applicable characteristics.

| M19648/1- | Heater voltage <u>1/</u> | Contact arrangement | Normal operate time (N.O.T.)seconds | Operate time range seconds <u>2/</u> | Operate time tolerance <u>3/</u> |
|-----------|--------------------------|---------------------|-------------------------------------|--------------------------------------|----------------------------------|
| 101       | 6.3                      | NO                  | 6                                   | 3 - 8                                | *10% 4/<br>of N.O.T.             |
| 102       | "                        | "                   | 10                                  | 8 - 12                               |                                  |
| 103       | "                        | "                   | 20                                  | 12 - 22                              |                                  |
| 104       | "                        | "                   | 30                                  | 22 - 33                              |                                  |
| 105       | "                        | "                   | 40                                  | 33 - 45                              |                                  |
| 106       | "                        | "                   | 60                                  | 45 - 65                              |                                  |
| 107       | "                        | "                   | 80                                  | 65 - 90                              |                                  |
| 108       | "                        | "                   | 120                                 | 90 - 125                             |                                  |
| 109       | "                        | "                   | 160                                 | 125 - 180                            |                                  |
| 110       | "                        | NC                  | 6                                   | 3 - 8                                |                                  |
| 111       | "                        | "                   | 10                                  | 8 - 12                               |                                  |
| 112       | "                        | "                   | 20                                  | 12 - 22                              |                                  |
| 113       | "                        | "                   | 30                                  | 22 - 33                              |                                  |
| 114       | "                        | "                   | 40                                  | 33 - 45                              |                                  |
| 115       | "                        | "                   | 60                                  | 45 - 65                              |                                  |
| 116       | "                        | "                   | 80                                  | 65 - 90                              |                                  |
| 117       | "                        | "                   | 120                                 | 90 - 125                             |                                  |
| 118       | "                        | "                   | 160                                 | 125 - 180                            |                                  |
| 119       | 28                       | NO                  | 6                                   | 3 - 8                                |                                  |
| 120       | "                        | "                   | 10                                  | 8 - 12                               |                                  |
| 121       | "                        | "                   | 20                                  | 12 - 22                              |                                  |
| 122       | "                        | "                   | 30                                  | 22 - 33                              |                                  |
| 123       | "                        | "                   | 40                                  | 33 - 45                              |                                  |
| 124       | "                        | "                   | 60                                  | 45 - 65                              |                                  |
| 125       | "                        | "                   | 80                                  | 65 - 90                              |                                  |
| 126       | "                        | "                   | 120                                 | 90 - 125                             |                                  |
| 127       | "                        | "                   | 160                                 | 125 - 180                            |                                  |
| 128       | "                        | NC                  | 6                                   | 3 - 8                                |                                  |
| 129       | "                        | "                   | 10                                  | 8 - 12                               |                                  |
| 130       | "                        | "                   | 20                                  | 12 - 22                              |                                  |
| 131       | "                        | "                   | 30                                  | 22 - 33                              |                                  |
| 132       | "                        | "                   | 40                                  | 33 - 45                              |                                  |
| 133       | "                        | "                   | 60                                  | 45 - 65                              |                                  |
| 134       | "                        | "                   | 80                                  | 65 - 90                              |                                  |
| 135       | "                        | "                   | 120                                 | 90 - 125                             |                                  |
| 136       | "                        | "                   | 160                                 | 125 - 180                            |                                  |

## MIL-R-19648/1E

TABLE I. Relay dash numbers and applicable characteristics - Continued.

| M19648/1- | Heater voltage 1/ | Contact arrangement | Normal operate time (N.O.T.)seconds | Operate time range seconds 2/ | Operate time tolerance 3/ |
|-----------|-------------------|---------------------|-------------------------------------|-------------------------------|---------------------------|
| 137       | 115               | NO                  | 6                                   | 3 - 8                         | ±10% 4/<br>of N.O.T.      |
| 138       | "                 | "                   | 10                                  | 8 - 12                        |                           |
| 139       | "                 | "                   | 20                                  | 12 - 22                       |                           |
| 140       | "                 | "                   | 30                                  | 22 - 33                       |                           |
| 141       | "                 | "                   | 40                                  | 33 - 45                       |                           |
| 142       | "                 | "                   | 60                                  | 45 - 65                       |                           |
| 143       | "                 | "                   | 80                                  | 65 - 90                       |                           |
| 144       | "                 | "                   | 120                                 | 90 - 125                      |                           |
| 145       | "                 | "                   | 160                                 | 125 - 180                     |                           |
| 146       | "                 | NC                  | 6                                   | 3 - 8                         |                           |
| 147       | "                 | "                   | 10                                  | 8 - 12                        |                           |
| 148       | "                 | "                   | 20                                  | 12 - 22                       |                           |
| 149       | "                 | "                   | 30                                  | 22 - 33                       |                           |
| 150       | "                 | "                   | 40                                  | 33 - 45                       |                           |
| 151       | "                 | "                   | 60                                  | 45 - 65                       |                           |
| 152       | "                 | "                   | 80                                  | 65 - 90                       |                           |
| 153       | "                 | "                   | 120                                 | 90 - 125                      |                           |
| 154       | "                 | "                   | 160                                 | 125 - 180                     |                           |
| 155       | 6.3               | NO                  | 180                                 | 125 - 180                     |                           |
| 156       | 6.3               | NC                  | 180                                 | 125 - 180                     |                           |
| 157       | 28                | NO                  | 180                                 | 125 - 180                     |                           |
| 158       | 28                | NC                  | 180                                 | 125 - 180                     |                           |
| 159       | 115               | NO                  | 180                                 | 125 - 180                     |                           |
| 160       | 115               | NC                  | 180                                 | 125 - 180                     |                           |
| 161       | 230               | NO                  | 6                                   | 3 - 8                         |                           |
| 162       | "                 | "                   | 10                                  | 8 - 12                        |                           |
| 163       | "                 | "                   | 20                                  | 12 - 22                       |                           |
| 164       | "                 | "                   | 30                                  | 22 - 33                       |                           |
| 165       | "                 | "                   | 40                                  | 33 - 45                       |                           |
| 166       | "                 | "                   | 60                                  | 45 - 65                       |                           |
| 167       | "                 | "                   | 80                                  | 65 - 90                       |                           |
| 168       | "                 | "                   | 120                                 | 90 - 125                      |                           |
| 169       | "                 | "                   | 160                                 | 125 - 180                     |                           |
| 170       | "                 | "                   | 180                                 | 125 - 180                     |                           |
| 171       | "                 | NC                  | 6                                   | 3 - 8                         |                           |
| 172       | "                 | "                   | 10                                  | 8 - 12                        |                           |
| 173       | "                 | "                   | 20                                  | 12 - 22                       |                           |
| 174       | "                 | "                   | 30                                  | 22 - 33                       |                           |
| 175       | "                 | "                   | 40                                  | 33 - 45                       |                           |
| 176       | "                 | "                   | 60                                  | 45 - 65                       |                           |
| 177       | "                 | "                   | 80                                  | 65 - 90                       |                           |
| 178       | "                 | "                   | 120                                 | 90 - 125                      |                           |
| 179       | "                 | "                   | 160                                 | 125 - 180                     |                           |
| 180       | "                 | "                   | 180                                 | 125 - 180                     |                           |

1/ Operation shall be satisfactory over the frequency range of 0 to 400 Hz true rms.

2/ Basic time for which unit is designed. The timing range is the range of timing adjustment wherein the change in other operating characteristic is at a minimum considered acceptable for normal usage.

3/ Tolerance at rated heater voltage and room temperature. Voltage variation or temperature extremes will result in additional timing tolerance.

4/ Tolerance ±10% but not less than .4 seconds in N.O.T. time range of 3 to 10 seconds. Not less than 2 seconds in N.O.T. time range above 12 to 180 seconds.

## MIL-R-19648/1E

TABLE II. Supersession information.

| Superseded<br>Part numbers and<br>type designations |           | New<br>part numbers | Superseded<br>Part numbers and<br>type designations |           | New<br>part numbers |
|---|-----------|---------------------|---|-----------|---------------------|
| M19648/1-001  | RY1B1A101 | M19684/1-101        | M19648/1-043  | RY1B1B101 | M19648/1-110        |
| M19684/1-002  | RY1B1A102 | M19648/1-137        | M19648/1-044  | RY1B1B102 | M19648/1-146        |
| M19648/1-003  | RY1B1A103 | M19648/1-119        | M19648/1-045  | RY1B1B103 | M19648/1-128        |
| M19648/1-004  | RY1B1A104 | M19648/1-103        | M19648/1-046  | RY1B1B104 | M19648/1-112        |
| M19648/1-005  | RY1B1A105 | M19648/1-139        | M19648/1-047  | RY1B1B105 | M19648/1-148        |
| M19648/1-006  | RY1B1A106 | M19648/1-121        | M19648/1-048  | RY1B1B106 | M19648/1-130        |
| M19648/1-007  | RY1B1A107 | M19648/1-104        | M19648/1-049  | RY1B1B107 | M19648/1-113        |
| M19648/1-008  | RY1B1A108 | M19648/1-140        | M19648/1-050  | RY1B1B108 | M19648/1-149        |
| M19648/1-009  | RY1B1A109 | M19648/1-122        | M19648/1-051  | RY1B1B109 | M19648/1-131        |
| M19648/1-010  | RY1B1A110 | M19648/1-106        | M19648/1-052  | RY1B1B110 | M19648/1-115        |
| M19648/1-011  | RY1B1A111 | M19648/1-142        | M19648/1-053  | RY1B1B111 | M19648/1-151        |
| M19648/1-012  | RY1B1A112 | M19648/1-124        | M19648/1-054  | RY1B1B112 | M19648/1-133        |
| M19648/1-013  | RY1B1A113 | M19648/1-107        | M19648/1-055  | RY1B1B113 | M19648/1-116        |
| M19648/1-014  | RY1B1A114 | M19648/1-143        | M19648/1-056  | RY1B1B114 | M19648/1-152        |
| M19648/1-015  | RY1B1A115 | M19648/1-125        | M19648/1-057  | RY1B1B115 | M19648/1-132        |
| M19648/1-016  | RY1B1A116 | M19648/1-108        | M19648/1-058  | RY1B1B116 | M19648/1-117        |
| M19648/1-017  | RY1B1A117 | M19648/1-144        | M19648/1-059  | RY1B1B117 | M19648/1-153        |
| M19648/1-018  | RY1B1A118 | M19648/1-126        | M19648/1-060  | RY1B1B118 | M19648/1-135        |
| M19648/1-019  | RY1B1A119 | M19648/1-109        | M19648/1-061  | RY1B1B119 | M19648/1-118        |
| M19648/1-020  | RY1B1A120 | M19648/1-145        | M19648/1-062  | RY1B1B120 | M19648/1-154        |
| M19648/1-021  | RY1B1A121 | M19648/1-127        | M19648/1-063  | RY1B1B121 | M19648/1-136        |
| M19648/1-022  | RY1B2A101 | M19648/1-101        | M19648/1-064  | RY1B2B101 | M19648/1-110        |
| M19648/1-023  | RY1B2A102 | M19648/1-137        | M19648/1-065  | RY1B2B102 | M19648/1-146        |
| M19648/1-024  | RY1B2A103 | M19648/1-119        | M19648/1-066  | RY1B2B103 | M19648/1-128        |
| M19648/1-025  | RY1B2A104 | M19648/1-103        | M19648/1-067  | RY1B2B104 | M19648/1-112        |
| M19648/1-026  | RY1B2A105 | M19648/1-139        | M19648/1-068  | RY1B2B105 | M19648/1-148        |
| M19648/1-027  | RY1B2A106 | M19648/1-121        | M19648/1-069  | RY1B2B106 | M19648/1-130        |
| M19648/1-028  | RY1B2A107 | M19648/1-104        | M19648/1-070  | RY1B2B107 | M19648/1-113        |
| M19648/1-029  | RY1B2A108 | M19648/1-140        | M19648/1-071  | RY1B2B108 | M19648/1-149        |
| M19648/1-030  | RY1B2A109 | M19648/1-122        | M19648/1-072  | RY1B2B109 | M19648/1-131        |
| M19648/1-031  | RY1B2A110 | M19648/1-106        | M19648/1-073  | RY1B2B110 | M19684/1-115        |
| M19648/1-032  | RY1B2A111 | M19648/1-142        | M19648/1-074  | RY1B2B111 | M19648/1-151        |
| M19648/1-033  | RY1B2A112 | M19648/1-124        | M19648/1-075  | RY1B2B112 | M19648/1-133        |
| M19648/1-034  | RY1B2A113 | M19648/1-107        | M19648/1-076  | RY1B2B113 | M19648/1-116        |
| M19648/1-035  | RY1B2A114 | M19648/1-143        | M19648/1-077  | RY1B2B114 | M19648/1-152        |
| M19648/1-036  | RY1B2A115 | M19648/1-125        | M19648/1-078  | RY1B2B115 | M19648/1-134        |
| M19648/1-037  | RY1B2A116 | M19648/1-108        | M19648/1-079  | RY1B2B116 | M19648/1-117        |
| M19648/1-038  | RY1B2A117 | M19648/1-144        | M19648/1-080  | RY1B2B117 | M19648/1-153        |
| M19648/1-039  | RY1B2A118 | M19648/1-126        | M19648/1-081  | RY1B2B118 | M19648/1-135        |
| M19648/1-040  | RY1B2A119 | M19648/1-109        | M19648/1-082  | RY1B2B119 | M19648/1-118        |
| M19648/1-041  | RY1B2A120 | M19648/1-145        | M19648/1-083  | RY1B2B120 | M19648/1-154        |
| M19648/1-042  | RY1B2A121 | M19684/1-127        | M19648/1-084  | RY1B2B121 | M19648/1-136        |

## MIL-R-19648/1E

③ TABLE III. First article inspection and sample size.

| Part number  | Group submission  |
|--------------|---|
| M19648/1-159 | 10 units plus 1 open unit<br>First article testing<br>as applicable |
| M19648/1-124 | 2 units   |
| M19648/1-133 | 2 units<br>First article inspection<br>Group 1.                     |

## Custodians:

Army - ER  
Navy - EC  
Air Force - 85

## Review activities:

Army - AR, AT, AV, ME  
Navy - AS  
Air Force - 11, 17, 80

## User activities:

Army - MI  
Navy - MC, OS, SH  
Air Force - 19

## Preparing activity:

Navy - EC

## Agent:

DLA - ES

(Project 5945-0724-01)