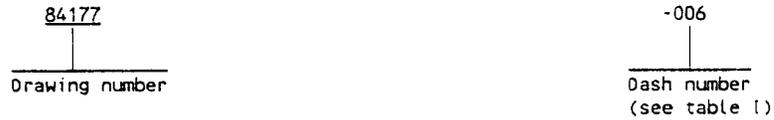




1. SCOPE

1.1 Scope. This drawing describes the complete requirements for nonhermetically sealed solid state relays supplied to Y level screening requirements of MIL-R-28750.

1.2 Part or Identifying Number (PIN). The complete PIN will be as shown in the following example:



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification and standard. The following specification and standard form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

MILITARY

MIL-R-28750 - Relays, Solid State, General Specification for.

STANDARD

MILITARY

MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.

(Unless otherwise indicated, copies of federal and military specifications, and standards are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA, 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-R-28750, and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-R-28750, and herein (see figure 1).

3.3 Input characteristics. See table I and figure 2.

- a. Rated input for 84177-006 is 28 V dc.
- b. Rated input for 84177-008 and -009 is 115 V ac.

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TABLE I. Dash numbers and characteristics.

Dash numbers		Input data				Output data
Output Current		Voltage range	Current mA 1/	Must 1/ turn-on voltage	Must 1/ turn-off voltage	Output voltage
25 A	40 A					
----	-006	12-32 V dc	23 at 32 V dc	12 V dc	1.0 V dc	480 V ac max.
-008	-009	90-250 V ac	20 at 250 V ac	90 V ac	3.5 V ac	480 V ac max.

1/ Over the temperature range.

3.4 Output characteristics. See table I.

3.4.1 Output current ratings.

3.4.1.1 Minimum output current rating. Not applicable.

3.4.1.2 Maximum output current rating. See table I.

3.4.2 Overload current. Two times rated current, 1 second period, 10 percent duty cycle, 10 events maximum.

3.4.3 Output voltage drop. The output voltage drop shall be 2.0 V ac maximum at +25°C and +80°C, and 2.5 V ac maximum at -40°C.

3.4.4 Offstate leakage current. The maximum offstate leakage current shall be 10 mA at 440 V ac over the temperature range.

3.4.5 Zero voltage turn on point. The zero voltage turn on point shall be ±50 V peak maximum.

3.4.6 Exponential rate of voltage rise (dv/dt). The exponential rate of voltage rise (dv/dt) at +25°C only shall be 200 volts per microsecond (based on a 50-ohm source impedance).

3.4.7 Electrical characteristics.

3.4.7.1 Capacitance. Capacitance shall be 15 pF maximum (input to output).

3.4.7.2 Dielectric withstanding voltage. The dielectric withstanding voltage shall be 3750 V ac (rms) 60 Hz minimum (input to output and all pins to case).

3.4.7.3 Reverse voltage protection. The reverse voltage protection shall be 32 V dc maximum.

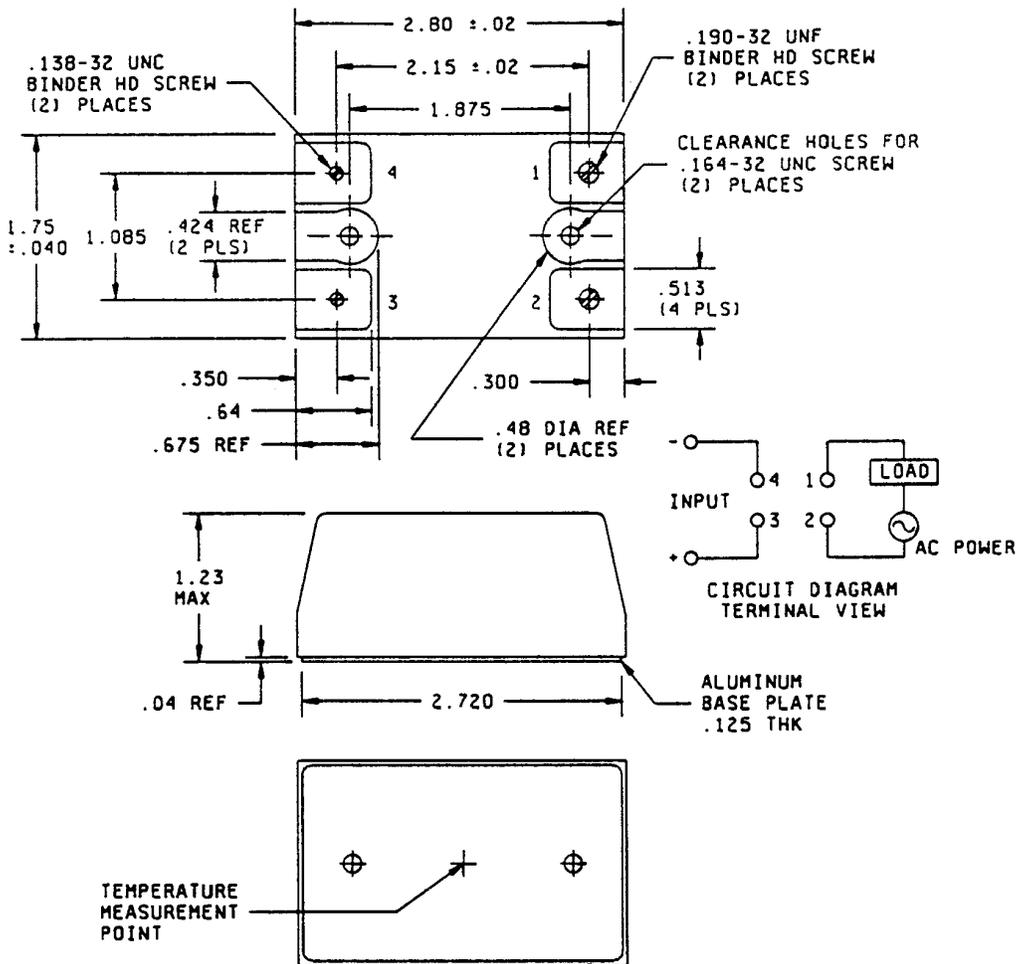
3.4.7.4 Insulation resistance. Insulation resistance shall be 1000 megohms minimum at +25°C and 50 megohms minimum at +80°C (input to output and all pins to case).

3.4.7.5 Output current ratings. See table I and figures 3 and 4.

3.4.7.6 Load voltage range. The load voltage range shall be 25 V ac minimum, 480 V ac maximum.

3.4.7.7 Load voltage rating. The load voltage rating shall be 440 V ac.

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Inches	mm	Inches	mm
.02	0.51	.64	16.26
.04	1.02	.675	17.14
.125	3.18	1.085	27.56
.300	7.62	1.23	31.24
.350	8.89	1.75	44.45
.424	10.77	1.875	47.62
.48	12.19	2.15	54.61
.513	13.03	2.720	69.09
		2.800	71.12

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are  $\pm 0.009$  (0.23 mm) for three place decimals and  $\pm 0.01$  (0.25 mm) for two place decimals.
4. Circuit diagram shown on part is terminal view.

FIGURE 1. Outline drawing and dimensions.

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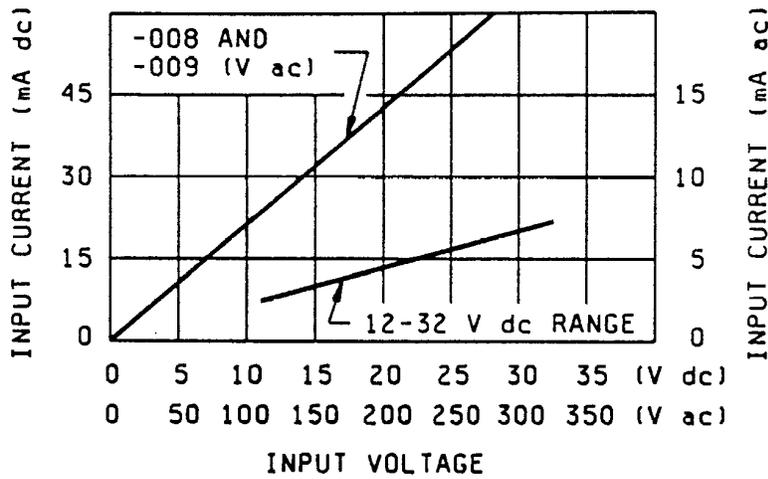
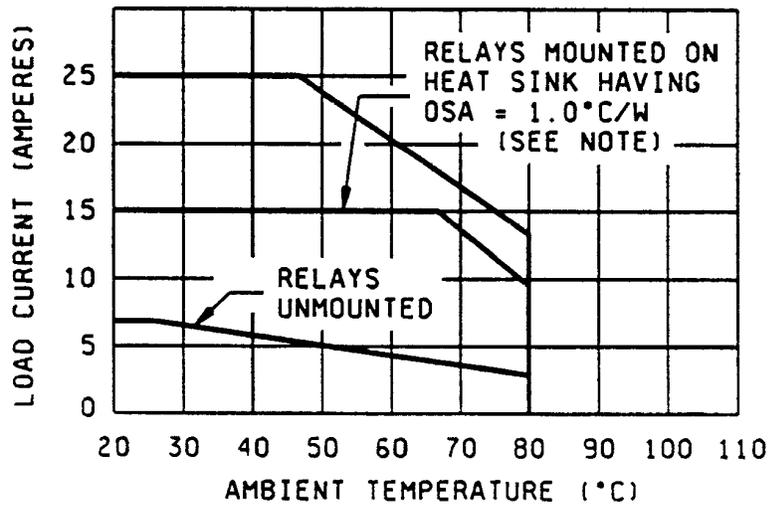


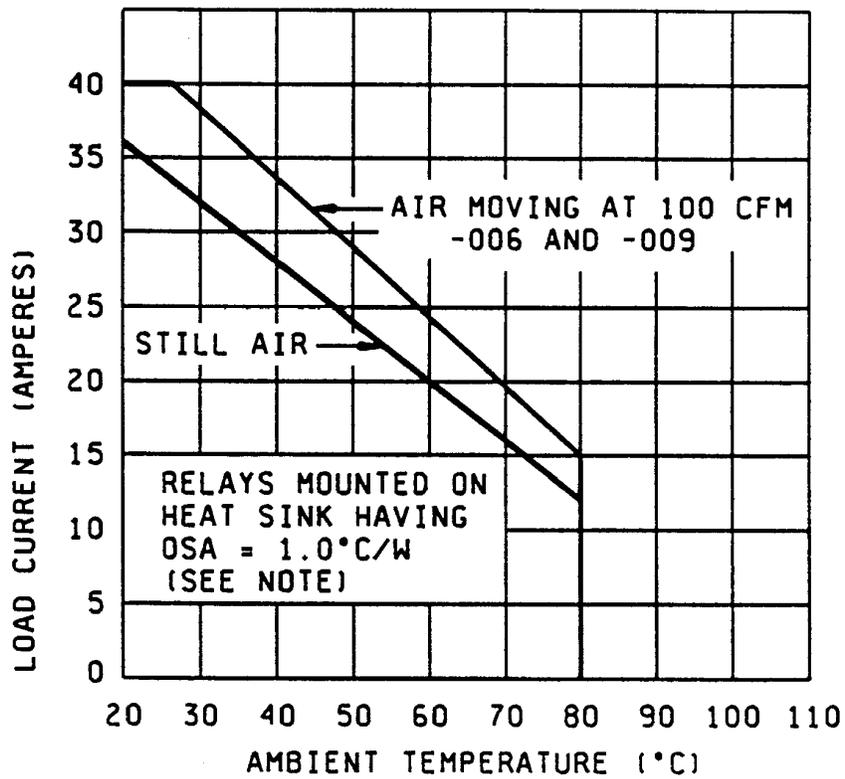
FIGURE 2. Typical input current versus input voltage.



NOTE: A typical 1.0°C/W heatsink is Astrodyne PIN 2518-0500-A00B.

FIGURE 3. Maximum allowable current versus ambient temperature.

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NOTE: A typical 1.0°C/W heat sink is Astrodyne PIN 2518-0500-A008.

FIGURE 4. Maximum allowable current versus ambient temperature.

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- 3.4.7.8 Transient overvoltage rating (T <20 ms). The transient overvoltage rating shall be 800 V peak.
- 3.4.7.9 Load frequency range. The load frequency range shall be 47 Hz minimum, 70 Hz maximum (60 Hz rated test frequency).
- 3.4.7.10 Turn on time. The turn on time shall be 1/2 cycle of 60 Hz line maximum at rated input, rated output, and rated load current.
- 3.4.7.11 Turn off time. The turn off time is measured at rated input, rated output, and rated load current.
- 3.4.7.11.1 Turn off time (84177-006). Turn off time for 84177-006 shall be 1 cycle of 60 Hz line.
- 3.4.7.11.2 Turn off time (84177-008 and -009). Turn off time for 84177-008 and -009 shall be 40 ms maximum.
- 3.4.7.12 Triac power dissipation.
- 3.4.7.12.1 Triac power dissipation (84177-008). The triac power dissipation for 84177-008 shall be 1.21 W/ampere.
- 3.4.7.12.2 Triac power dissipation (84177-006, and -009). The triac power dissipation for 84177-006 and -009 shall be 1.25 W/ampere.
- 3.4.7.13 Thermal resistance, junction to heatsink. The thermal resistance, junction to heat sink shall be 1.1°C/W.
- 3.4.7.14 Triac junction temperature(T<sub>j</sub>). The triac junction temperature shall be +125°C maximum.
- 3.4.7.15 Fusing I<sup>2</sup>t (1 ms).
- 3.4.7.15.1 Fusing I<sup>2</sup>t (1 ms) (84177-008). The fusing for 84177-008 shall be 250 A<sup>2</sup>s.
- 3.4.7.15.2 Fusing I<sup>2</sup>t (1 ms) (84177-006 and -009). The fusing for 84177-006 and -009 shall be 300 A<sup>2</sup>s.
- 3.4.7.16 Electromagnetic interference. Not applicable.
- 3.4.7.17 DC offset voltage. Not applicable.
- 3.4.7.18 Waveform distortion. Not applicable.
- 3.5 Environmental data.
- 3.5.1 Operating temperature range. The operating temperature range shall be -40°C to +80°C.
- 3.5.2 Storage temperature range. The storage temperature range shall be -40°C to +100°C.
- 3.5.3 Shock. Shock shall be in accordance with MIL-STD-202, method 213, test condition G (50 g's).
- 3.5.4 Vibration. Vibration shall be 20 g's, 10 to 2000 Hz and as specified in MIL-STD-202, method 204, test condition D.
- 3.5.5 Salt spray. Not applicable.
- 3.6 Physical. Physical requirements shall be as specified herein.
- 3.6.1 Dimensions and configuration. See figure 1.
- 3.6.2 Weight. The weight shall be 227 grams (8 ounces) maximum.
- 3.7 Marking. Marking shall be in accordance with MIL-R-28750, except the PIN shall be in accordance with 1.2 herein. The "M28750/X-XXXY" PIN shall not be used.

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3.8 Certification as an approved source of supply. In order to be listed as an approved source of supply for relays manufactured to this drawing, a manufacturer shall:

- a. Agree to make available to DESC, upon request, all pertinent test data on its production of the subject part, including, but not limited to, test data in accordance with the qualification inspection table of MIL-R-28750, Y screening level; and
- b. Provide to DESC-ELDM or its designated agent, upon request, free of charge and without obligation, a current production sample from its production of the subject part; and
- c. Meet one of the following criteria:
  - (1) Currently possess listing on qualified products list QPL-28750 for at least one part; or
  - (2) Be in current production of the subject part.

3.9 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply (see 6.5 and 6.6).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Product assurance program. The product assurance program specified in MIL-R-28750 is not applicable to this document.

4.2 Statistical process control. The statistical process control program specified in MIL-R-28750 is not applicable to this document.

#### 4.3 Quality conformance inspection.

4.3.1 Inspection of product for delivery. Inspection of product for delivery shall consist of the group A inspections of MIL-R-28750 for the Y screening level. Group A testing shall be performed on each inspection lot and manufacturers shall keep lot records for 3 years (minimum), monitor for compliance to the prescribed procedures, and records on lots are maintained for these relays. Components used internally to the relay shall not require hermetic packaging. Temperature range for screening tests shall be as specified in 3.5.1 herein.

4.3.2 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-R-28750.

4.4 Methods of inspection. Methods of inspection shall be in accordance with MIL-R-28750.

#### 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-R-28750.

#### 6. NOTES

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

6.1 Intended use. Relays conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-28750, this drawing will become inactive for new design. The QPL-28750 product shall be the preferred item for all applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. Complete PIN (see 1.2).
- b. One copy of the quality conformance inspection data as required in 4.2 to be shipped with each lot.
- e. Requirements for packaging and packing.

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6.3 Replaceability. Relays covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.4 Comments. Comments on this drawing should be directed to DESC-ELDM, Dayton, Ohio 45444, or telephone 513-296-6189.

6.5 Submission of certificate of compliance. The certificate of compliance submitted to DESC-ELDM, prior to listing as an approved source, shall state that the manufacturer's product meets the requirements herein.

6.6 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.9) has been submitted to DESC-ELDM.

DESC drawing PIN 84177- 1/	Vendor CAGE number	Vendor similar PIN
006	16170	M21-6Y
008	16170	M21-13Y
009	16170	M21-15Y

1/ PIN 84177-001 through -005 and 84177-007 are obsolete.

Vendor CAGE  
number

16170

Vendor name  
and address

Teledyne Electronic Technologies  
12964 Panama Street  
Los Angeles, CA 90066-6534  
Phone: (310) 822-8229

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