

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Added dimensional tolerances.	3-8-88	David W. Withrow
B	Editorial changes throughout.	22 Aug 2000	K. A. Cottongim
C	Editorial changes throughout. Added pure tin prohibition.	25 Apr 2006	M. Radecki
D	Editorial changes throughout, update vendor's address and add QR code.	9 Aug 2016	

INACTIVE FOR NEW DESIGN AFTER 22 August 2000.
FOR REPLACEMENT PURPOSES ONLY.

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43216-5000



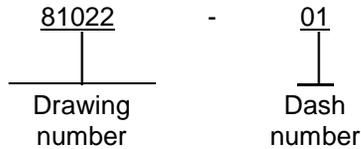
Prepared in accordance with [ASME Y14.100](#)

REV STATUS OF PAGES	REV	D	D	D	D	D	D	D	D										
	PAGES	1	2	3	4	5	6	7	8										
PMIC N/A	PREPARED BY David E. Moore 3-30-81		DESIGN ACTIVITY DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OH																
Original date of drawing 30 March 1981	CHECKED BY Richard C. Brophy 3-30-81		TITLE FILTER, LINE 400 Hertz																
	APPROVED BY Ivan R. Jones 3-30-81																		
	SIZE A	CODE IDENT. NO. 14933		DWG NO. 81022															
	REV D		PAGE 1 OF 8																

1. SCOPE

1.1 Scope. This drawing describes the requirements for a 400 Hz, 115 V rms line filter designed to transmit 400 Hz with a 0.26 dB insertion loss, when the resistive load current equals 335 mA. The filter will attenuate frequencies above 420 Hz and below 380 Hz.

1.2 Part or Identifying Number (PIN). The complete PIN is as follows:



2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this drawing. This section does not include documents cited in other sections of this drawing 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 of documents in sections 3 and 4 of this drawing, whether or not they are listed here.

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 or contract (see 6.2).

DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-E-5400 - Electronic Equipment, Aerospace, General Specification for.
- MIL-F-18327 - Filters, High Pass, Low Pass, Band Pass, Band Suppression and Dual Functioning, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-1285 - Marking of Electrical and Electronic Parts.
- MS3113 - Connector, Receptacle, Electric, Series 1, Solder Type, Solder Mounting, Bayonet Coupling.

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

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-F-18327 for type FR4QY22YY1 filter and as specified herein.

3.1.1 Finishes. Finishes shall be in accordance with MIL-E-5400.

3.1.2 Pure tin prohibition. The use of pure tin is prohibited as an undercoat and final finish both internally and externally to the filter body and on all associated mounting hardware. The tin content of filter components, hardware, and solder shall not exceed 97 percent. Tin shall be alloyed with a minimum of 3 percent lead (see 6.3).

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 81022
		REV D	PAGE 2

3.1.2 Locking devices and lockwashers. Locking devices and lockwashers shall be in accordance with MIL-E-5400.

3.1.3 Potting. Filter shall be potted with silicon sand. Prior to potting, the sand shall be preheated for a minimum of 12 hours at 135°C to remove moisture.

3.1.4 Inductors. Inductors shall be in accordance with MIL-E-5400.

3.1.5 Washers. Washers for ceramic and vitreous surfaces shall be in accordance with MIL-E-5400.

3.1.6 Welding. Welding shall be in accordance with MIL-E-5400.

3.1.7 Terminal type. Hermetic sealed connector, MS3113H14-5P, or equivalent.

3.1.8 Paint. Filters are to be painted with epoxy, catalyzed paint, color gray. No paint shall be on the connector or mounting surface.

3.1.9 Case dimensions. In accordance with figure 1.

3.2 Operating temperature range: -55°C to +72°C.

3.3 Non-operating temperature range: -62°C to +85°C.

3.4 Altitude: 70,000 feet, maximum in accordance with MIL-E-5400 for class 2 equipment.

3.5 Maximum temperature rise: +56°C.

3.6 Electrical characteristics.

3.6.1 Electrical schematic. In accordance with figure 2.

3.6.2 Insertion loss. Shall not exceed .26 dB maximum when tested in accordance with figure 3.

3.6.3 Frequency response. Shall meet the following requirements when tested in accordance with figure 4.

<u>Frequency (Hz)</u>	<u>Attenuation (dB)</u>
20	38.0 minimum
380	0.44 maximum
400	0 (reference)
420	0.44 maximum
1200	9.10 minimum

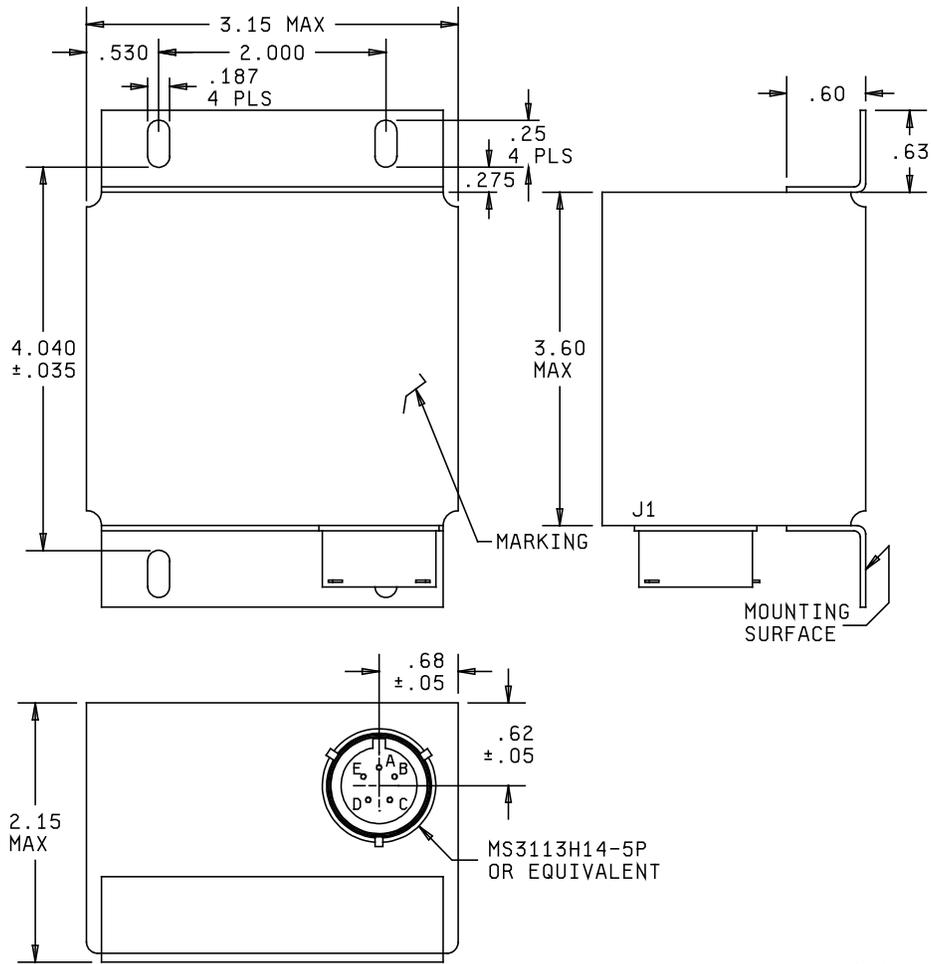
3.6.4 Dielectric withstanding voltage. Insulation between each terminal and the metal case shall be capable of withstanding 500 volts dc for 15 seconds.

3.7 Environmental requirements.

3.7.1 Shock. Filters shall be capable of withstanding 3 impact shocks of 15 G and a time duration of 11 ±1 milliseconds in both directions along each of three principal axes.

3.7.2 Vibration. Filters shall be capable of withstanding the following vibration in each principal plane. The frequency shall vary between 5 and 500 Hz at an amplitude of .10 inch (double amplitude) or an acceleration of 10 G, whichever is the limiting value. The rate of frequency change shall be approximately uniform, and shall be such that a complete cycle (5 Hz to 500 Hz to 5 Hz) will take approximately 15 minutes.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 81022
		REV D	PAGE 3



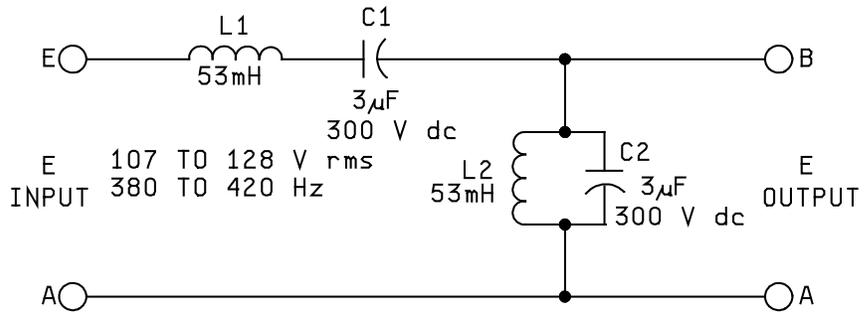
Inches	mm
.010	.25
.02	.51
.035	.89
.05	1.3
.187	4.75
.25	6.3
.275	6.98
.530	13.46
.60	15.2
.62	15.7
.63	16.0
.68	17.3
2.000	50.80
2.15	54.6
3.15	80.0
3.60	91.4
4.040	102.62

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Tolerances unless otherwise specified - .xx ±.02, .xxx ±.010.

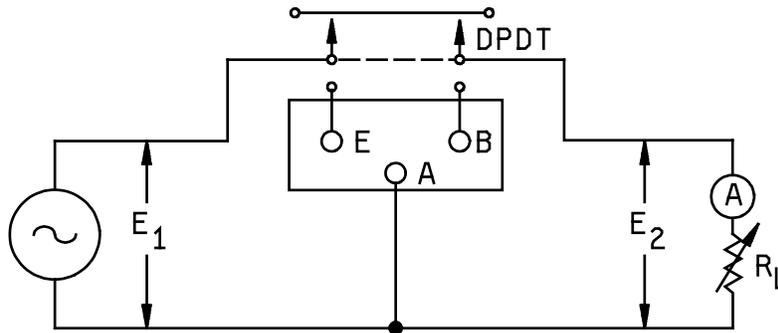
FIGURE 1. Case outline and dimensions.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE	CODE IDENT NO.	DWG NO.
	A	14933	81022
		REV D	PAGE 4



C₁, C₂: Dearborn Electronic
part number
LP66A1D305J or
equivalent.

FIGURE 2. Electrical schematic.



E₁ = 115 V rms, 400 Hz with 335 mA flowing through R_L
Measure E₂ with the filter out of the circuit. Switch the filter
into the circuit and measure E₂. Insertion loss shall be calculated
as follows:

$$\text{Attenuation (dB)} = 20 \log \left[\frac{E_2 \text{ (with the filter in the circuit)}}{E_2 \text{ (with the filter out of the circuit)}} \right]$$

FIGURE 3. Test circuit for insertion loss.

DEFENSE ELECTRONICS SUPPLY CENTER,
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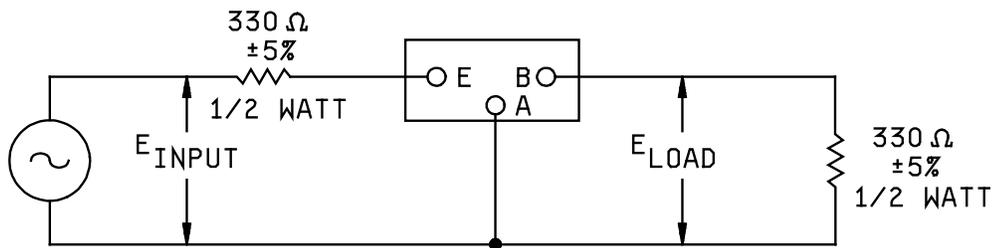
SIZE
A

CODE IDENT NO.
14933

DWG NO.
81022

REV D

PAGE 5



Adjust E input to hold E Load at 9.0 V rms at 400 Hz.
 Hold E input constant and measure E Load at the
 frequencies specified. Calculate attenuation as follows:

$$\text{Attenuation (dB)} = 20 \log \left[\frac{E \text{ Load (at desired frequency)}}{9.0} \right]$$

FIGURE 4. Test circuit for frequency response.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 81022
		REV D	PAGE 6

3.7.3 Hermetic seal. Filters shall be immersed for three minutes in a water bath maintained at a temperature of 85°C +5°C, -0°C. The temperature of the filter shall not exceed 40°C at the time of immersion. Filter shall be considered to have failed if a continuous stream of bubbles comes from any portion of the unit. Following the test measure insulation resistance of units between terminals (A, B, E) tied together and the metal case. Test potential shall be 500 V dc applied for not more than one minute. The minimum insulation resistance shall be 1,000 megohms.

3.8 Marking. The PIN as specified in 1.2, the manufacturer's name, applicable manufacturer's code and contract number shall be marked in accordance with MIL-STD-1285 in the location shown (see figure 1).

3.9 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.10 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a approved source of supply.

3.11 Workmanship. Filters shall be processed in such a manner as to be uniform in quality and shall be free from cold soldering, corrosion, pits, dents, cracks, rough or sharp edges, misalignments, and other defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not applicable to this drawing.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections of MIL-F-18327.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the military services' systems 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 a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. Filters conforming to this drawing are intended for use for Government logistics purposes.

6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2)
- b. Requirements for delivery, and one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for notification of change of product to acquiring activity, if applicable.
- d. Requirements for packaging and packing.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 81022
		REV D	PAGE 7

6.3 Tin plated finish. Pure tin plating is prohibited (see 3.1.2) since it may result in tin whisker growth. The use of alloys with tin content greater than 97 percent 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 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 have shown to inhibit the growth of tin whiskers. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coating of Tin).

6.4 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at capacitorfilter@dla.mil or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0551 or DSN 850-0551.

6.5 Changes from previous issue. The margins of this specification are marked with vertical lines 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.

6.6 Approved sources of supply. Approved source(s) of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at capacitorfilter@dla.mil , or by contacting DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0551 or DSN 850-0551.

DLA Land and Maritime drawing PIN	Vendor CAGE number	Vendor similar part number ^{1/}	Vendor name & address
81022-01	56662	A-1329	Frequency Selective Networks Inc. 5572 61st St Maspeth, NY 11378-2411 United States

^{1/} Parts must be purchased to the DLA Land and Maritime drawing PIN to assure that all performance requirements and tests are met.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 81022
		REV D	PAGE 8