

[INCH-POUND]

MS24143W  
24 Nov 1993  
SUPERSEDING  
MS24143V  
31 March 1992

## MILITARY SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, 25 AMPERES, 3 PST (N.O.),  
TYPE I, HERMETICALLY SEALED

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

The requirements for acquiring the product described herein shall consist of  
this specification sheet and the issue of the following specification listed  
in that issue of the Department of Defense Index of Specifications and  
Standards (DODISS) specified in the solicitation: MIL-R-6106.

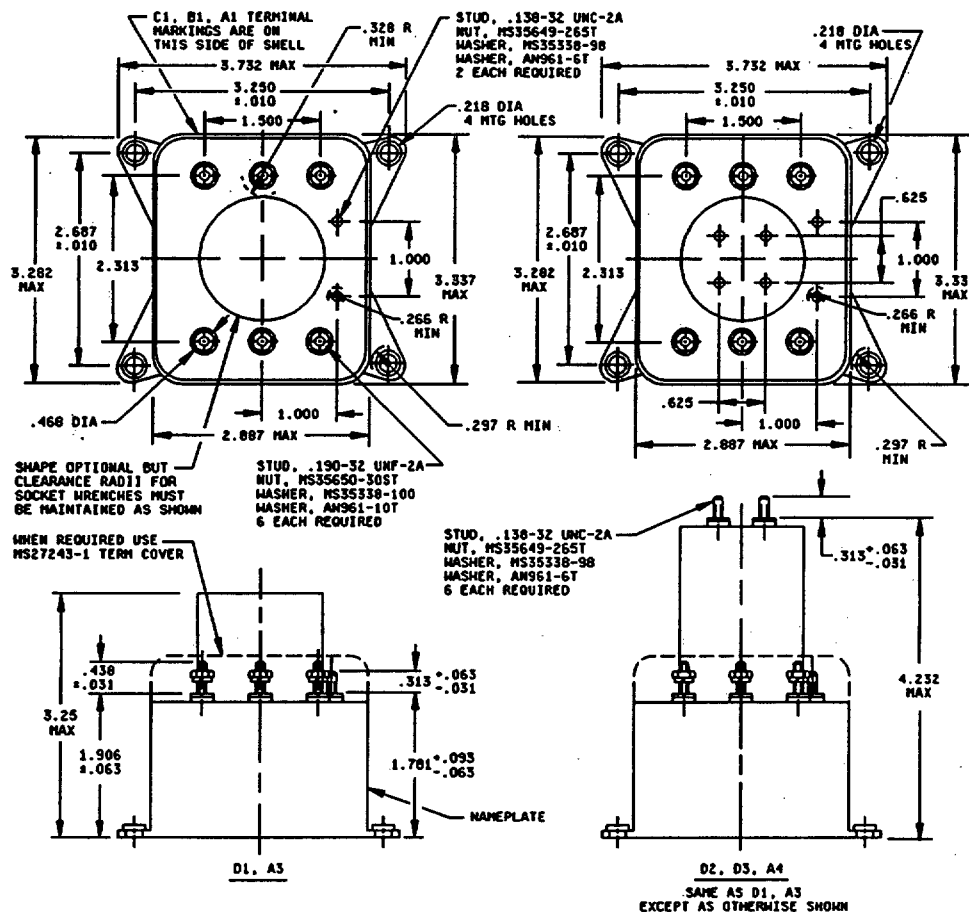
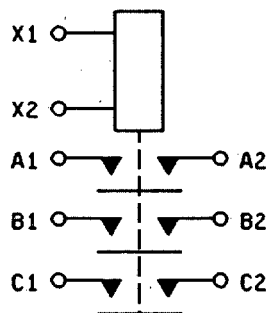


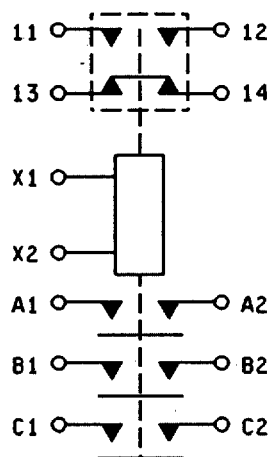
FIGURE 1. Dimensions and configurations.

denotes changes  
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**CIRCUIT DIAGRAM A**  
**APPLICABLE TO RELAYS**  
**WITHOUT AUXILIARY CONTACTS**



**CIRCUIT DIAGRAM B**  
**APPLICABLE TO RELAYS**  
**WITH AUXILIARY CONTACTS**

Inches	mm	Inches	mm	Inches	mm
.010	0.25	.313	7.95	2.313	58.75
.031	0.79	.328	8.33	2.687	68.25
.063	1.60	.438	11.13	2.887	73.33
.093	2.36	.468	11.89	3.250	82.55
.138	3.51	.625	15.88	3.282	83.36
.190	4.83	1.000	25.40	3.337	84.76
.218	5.54	1.500	38.10	3.732	94.79
.266	6.76	1.781	45.24	4.232	107.49
.297	7.54	1.906	48.41		

**NOTES:**

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.031$  (0.79 mm).
4. Coil and auxiliary terminals may use additional washer for terminal seat.
5. This specification sheet takes precedence over procurement documents referenced herein.
6. Referenced documents shall be of the issue in effect on date of invitation for bid.

**FIGURE 1. Dimensions and configurations - Continued.**

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## REQUIREMENTS:

Dimensions and configurations: See figure 1.

## ENVIRONMENTAL CHARACTERISTICS:

Temperature range 1/: -70°C to +125°C.

Maximum altitude rating: 80,000 ft.

Shock G-level: 25 g's.

Duration: 6-9 ms.

Max duration contact opening: 2 ms.

Vibration - Sinusoidal: See table I.

Vibration - Random: Not applicable.

High shock: Not applicable.

Acceleration: 15 g's.

## ELECTRICAL CHARACTERISTICS (see tables II, III, and IV):

Insulation resistance, initial: 100 MΩ.

After life or environmental tests: 50 MΩ.

Dielectric strength (sea level): 2-5 s.

	<u>Initial <u>2/</u></u>		<u>After life tests <u>2/</u></u>	
	<u>28 V dc</u>	<u>115 V ac</u>	<u>28 V dc</u>	<u>115 V ac</u>
Coil to case	1,250 V rms	1,500	1,000 V rms	1,125
Aux contacts	1,250 V rms	1,500	1,000 V rms	1,125
All other points	1,250 V rms	1,800	1,000 V rms	1,350

Dielectric strength (altitude): 1 minute.

	<u>28 V dc <u>2/</u></u>	<u>115 V ac <u>2/</u></u>
Coil to case	500 V rms	500
Aux contacts	500 V rms	500
All other points	700 V rms	700

Max contact drop initial: .150 V.

After life test: .175 V.

Overload current (NO): 200 A. 3/

Rupture current (NO): 250 A. 3/

Duty rating: Continuous.

RFI specification: MIL-STD-461.

(Applicable to coil circuits of ac operated relays.)

1/ Coils operated at either 50, 60, or 400 Hz require ambient temperature not to exceed +71°C maximum.

2/ For A3 and A4, coil terminals X1 and X2 must be shorted together for all dielectric testing between coil to case, coil to main or auxiliary contacts, and coil to all other points.

3/ For A3 and A4, rupture and overload current (NO) is 75 A.

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TABLE I. Vibration levels.

Dash number	5-10 Hz	10-55 Hz	55-250 Hz	250-500 Hz	500-1,500 Hz
D1				6 g's	6 g's
D2	.06 DA	.06 DA	10 g's	5 g's	4 g's
D3				5 g's	4 g's
A3, A4				5 g's	4 g's

TABLE II. Operating characteristics.

Dash number MS24143-	Coil data										Time - milliseconds max.			
	Rated		Max		Max pick-up voltage			Hold voltage		Drop out voltage 2/ 3/	Operate 4/	Release 5/	Contact bounce 4/	
	Coil	Volts 1/	Frequency Hz	Res +15% -10	Volts	Ampere	Normal 2/	High temp test	Cont current test				Main	Aux
D1	X1,X2	28	dc	52	29	0.6	18	21	22.5	7	25	10	NO NC	NO NC
D2, D3	X1,X2	28	dc	52	29	0.6	18	21	22.5	7	25	10	2 ---	4 4
A3	X1,X2	115	50/60/400 6/	---	124	.225	90	100	104	40	30	65	5 ---	---
A4	X1,X2	115	50/60/400 6/	---	124	.225	90	100	104	40	30	65	5 ---	6 6

1/ Caution: Use of any coil voltage less than rated coil voltage will compromise the operation of the relay.

2/ Over the temperature range.

3/ At 50/60 Hz, chattering may occur at or near dropout voltage when voltage is slowly decreased.

4/ With rated coil voltage.

5/ From rated coil voltage.

6/ Coils will operate on either 50, 60, or 400 Hz except ambient temperature must be derated to +71°C maximum.

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(W) TABLE III. Rated contact load (amperes per pole) case grounded (applicable to -D1, -D2, -A3, and -A4).

Type of load	Life operating cycles x 10 <sup>3</sup>	28 V dc				115 V ac, 1-phase						115/200 V ac, 3-phase 1/					
		Main		Aux		Main		Aux		2/		Main		Aux		Aux	
		NO	NC	NO	NC	400 Hz	50/60 Hz	400 Hz	50/60 Hz	400 Hz	50/60 Hz	400 Hz	50/60 Hz	400 Hz	50/60 Hz	400 Hz	50/60 Hz
Resistive	50	25	---	5	5	25	25	5	---	---	---	25	15	---	---	---	---
Inductive	50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Inductive	10 3/	25	---	5	5	25	---	5	---	---	---	25	12.5	---	---	---	---
Motor	50	25	---	---	---	25	15	---	---	---	---	25	12.5	---	---	---	---
Lamp	50	---	---	.75	.75	---	---	.75	---	---	---	---	---	---	---	---	---
Transfer load																	
Mechanical life reduced current	100	6.25	---	1.25	1.25	6.25	6.25	1.25	---	---	---	6.25	3.75	---	---	---	---
Intermediate current	50	5	---	Per spec	Per spec	---	---	---	---	---	---	---	---	---	---	---	---

1/ Absence of value indicates relay is not rated for 3-phase application.

2/ Derated contact loads at 50/60 Hz are applicable to A3 and A4 only.

3/ Derate cycles by 50 percent for A3 and A4 only.

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(U) TABLE IV. Rated contact load (amperes per pole) case grounded (applicable to -D3 only).

Type of load	Life operating cycles x 10 <sup>3</sup>	28 V dc						115 V ac, 1-phase						115/200 V ac, 3-phase 1/						See appropriate notes
		Main			Aux			Main			Aux			Main			Aux			
		NO	NC		NO	NC		400 Hz	60 Hz		400 Hz	60 Hz		400 Hz	60 Hz		400 Hz	60 Hz		
		12	---	1.25	1.25	1.25	12	---	1.25	---	---	12	---	---	---	---	12	---	---	
Resistive	100	12	---	1.25	1.25	12	---	1.25	---	---	12	---	---	---	---	12	---	---	---	
Inductive	100	12	---	.75	.75	12	---	.75	---	---	12	---	---	---	---	12	---	---	---	
Inductive																				
Motor	100	6	---	---	---	6	---	---	---	---	6	---	---	---	---	6	---	---	---	
Lamp																				
Transfer load																			2/	
Mechanical life reduced current	100	3	---	.25	.25	3	---	.25	---	---	3	---	.25	---	---	3	---	---	---	
Intermediate current	100	1.2	---	Per spec	Per spec	1.2	---	---	---	---	1.2	---	---	---	---	1.2	---	---	---	

1/ Absence of value indicates relay is not rated for 3-phase application.

2/ Transfer load indicates relay is suitable for transfer between unsynchronized ac power supplies at rating indicated.

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Part or Identifying Number (PIN): MS24143- (plus dash number from table V).

General characteristics: See table V.

Qualification by similarity: See table VI.

TABLE V. Dash numbers and general characteristics. 1/

Dash number MS24143-	Type	Coil type	Terminal type	Mounting or mating socket	Auxiliary contacts	Maximum weight in pounds 2/
D1	I	dc	Stud	Flange	None	1.5
D2		dc			Yes	1.7
D3 3/		dc			Yes	1.7
A3		ac			None	1.7
A4		ac			Yes	1.9

1/ A1 and A2 have been superseded by A3 and A4.

2/ Weights include covers and barriers.

3/ For Government logistics support, MS24143-D3 shall be used in lieu of MS21330-D2.

TABLE VI. Qualification by similarity.

Dash number MS24143-	Loads						Dynamics 1/			Environmental 2/		
	Type 1			Type 1 ER								
	A	B	C	D	E	F	A	X	Y	A	B	C
D1	4						2			4		
D2	4						2			4 2/		
D3 3/	4						2			4 2/		
A3			1						1			1
A4	2/		1 2/						1			1 2/

1/ All relays must be tested. Reference MIL-R-6106, appendix I.

2/ Testing of relays with auxiliary contacts: Reference MIL-R-6106, appendix I.

3/ MS24143-D3 shall receive complete group C testing for retention of qualification.

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CONCLUDING MATERIAL

Custodians:

Air Force - 85  
Navy - AS

Review activities:

Air Force - 99  
Navy - EC

Preparing activity:

Air Force - 85

Agent:

DLA - ES

(Project 5945-0921)