

INCH-POUND

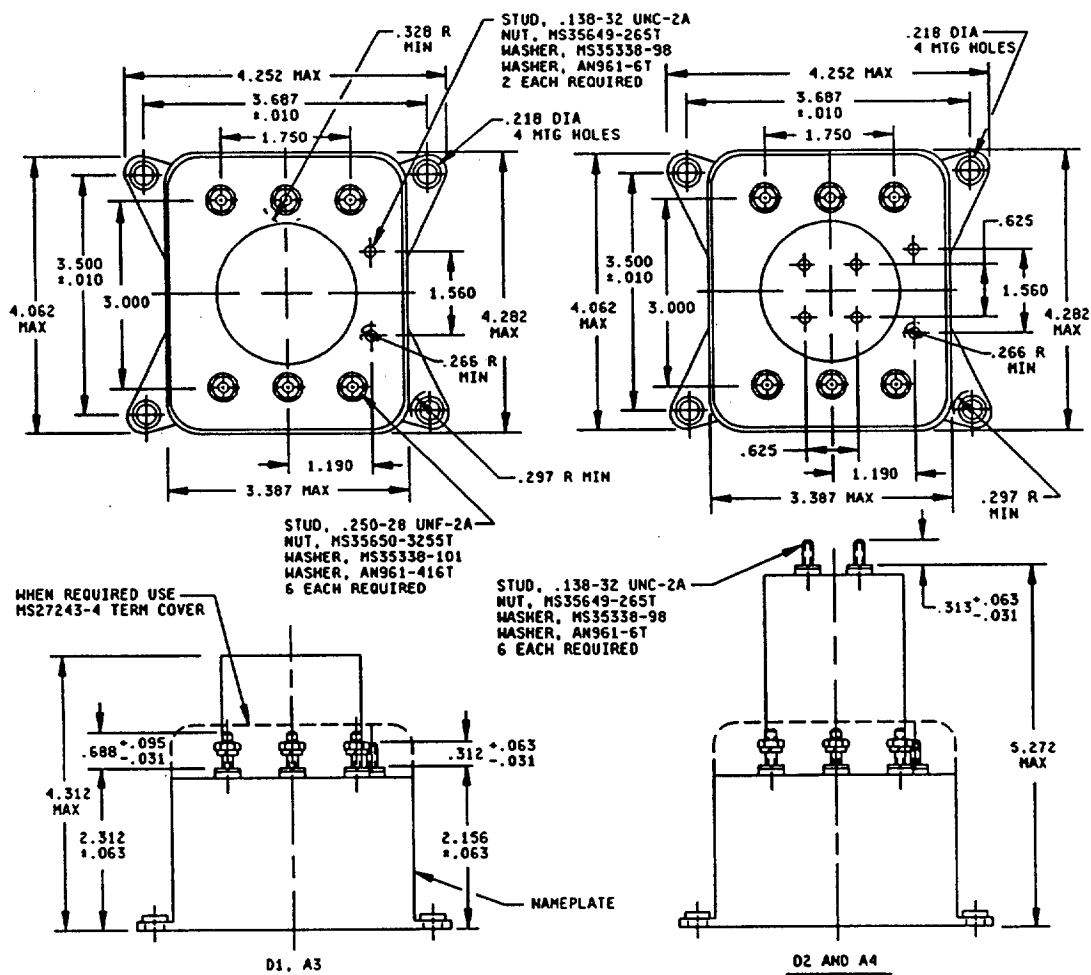
MS24168R  
13 May 1994  
SUPERSEDING  
MS24168P  
25 April 1990

## MILITARY SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, 100 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.

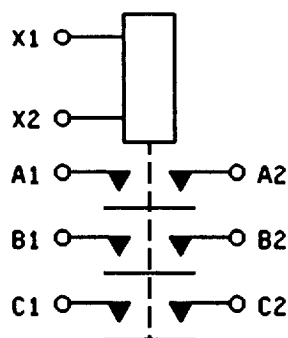
The requirements for acquiring the product described herein shall consist  
of this specification sheet and the issue of the following specification  
listed in that issue of the Department of Defense Index of Specifications  
and Standards (DODISS) specified in the solicitation: MIL-R-6106.



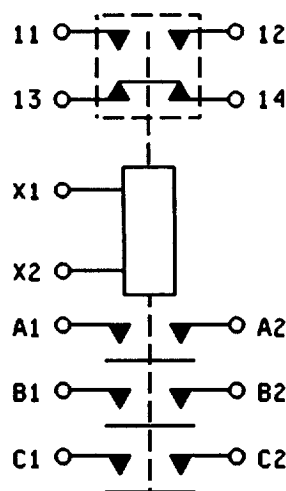
(R) FIGURE 1. Dimensions and configurations.

(R) denotes changes

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**CIRCUIT DIAGRAM A**  
**D1 AND A3**



**CIRCUIT DIAGRAM B**  
**D2 AND A4**

Inches	mm	Inches	mm	Inches	mm
.010	0.25	.328	8.33	3.387	86.03
.031	0.79	.625	15.88	3.500	88.90
.063	1.60	.688	17.48	3.687	93.65
.095	2.41	1.190	30.23	4.062	103.48
.138	3.51	1.560	39.62	4.282	108.76
.218	5.54	1.718	43.64	4.312	109.52
.250	6.35	1.750	44.45	5.272	133.91
.266	6.76	2.156	54.76		
.297	7.54	2.312	58.72		
.312	7.92	3.000	76.20		

## 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 an additional flat washer for terminal seat.
5. Break all sharp edges and remove all burrs.
6. This specification sheet takes precedence over documents referenced herein.
7. Referenced documents shall be of the issue in effect on date of invitations for bid.
8. There shall be affixed to the relay a legible circuit diagram that permanently and positively identifies each terminal location specified.

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

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## REQUIREMENTS:

Dimensions and configurations: See figure 1.

- (R) Part or Identifying Numbers (PIN's) and general characteristics: See table I.

## Contact data:

Load ratings: See table II.

Maximum contact drop, initial: 0.150 V.

After life test: 0.175 V.

Overload current (NO): 800 amperes. 1/

Rupture current (NO): 1,000 amperes. 1/

## Coil data: See table III.

Duty rating: Continuous.

RFI specification: MIL-STD-461 (applicable to coil circuits of ac operated relays).

## Electrical data:

Minimum insulation resistance:

Initial: 100 megohms.

After life or environmental test: 50 megohms.

## Dielectric strength: 2/

Sea level, 2-5 seconds:

	Initial		After life tests	
	28 V dc	115 V ac	28 V dc	115 V ac
Coil to case:	1,250 V rms	1,500 V rms	1,000 V rms	1,125 V rms
Aux. contacts:	1,250 V rms	1,500 V rms	1,000 V rms	1,125 V rms
All other points:	1,250 V rms	1,800 V rms	1,000 V rms	1,350 V rms

- (R) Altitude, 1 minute: 3/

	28 V dc	115 V ac
Coil to case:	500 V rms	500 V rms
Aux. contacts:	500 V rms	500 V rms
All other points:	700 V rms	700 V rms

## Environmental characteristics:

Temperature range: -70°C to +125°C. 4/

- (R) 1/ For 50/60 Hz, overload and rupture currents (NO) are 200 amperes.  
 2/ For A3 and A4, coil terminals X1 and X2 shall be shorted together for all dielectric testing.  
 3/ Use terminal cover MS27243-4 during dielectric testing at altitude.  
 4/ Coils operated at either 50, 60, or 400 Hz require ambient temperature not to exceed +71°C.

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Maximum altitude rating: 80,000 feet.

Shock, g-level: 25 g's.

Duration: 6-9 ms.

Maximum duration contact opening: 2 ms.

Vibration, sinusoidal: See table IV.

Vibration, random: Not applicable.

High shock: Not applicable.

Acceleration: 15 g's.

PIN: MS24168- (plus applicable dash number from table I).

Qualification by similarity: See table V.

(R) TABLE I. PIN's and general characteristics.

PIN MS24168-	Type	Coil type	Auxiliary contacts	Maximum weight (pounds) <sup>1/</sup>
D1	I	dc	No	3.4
D2	I	dc	Yes	3.6
A3	I	ac	No	3.8
A4	I	ac	Yes	3.8

<sup>1/</sup> Weight includes covers and barriers.

(R) TABLE II. Rated contact load (amperes per pole) case grounded. <sup>1/</sup>

Type of load	Life oper- ating cycles  x 10 <sup>3</sup>	28 V dc				115 V ac, 1 phase				115/200 V ac, 3 phase <sup>2/</sup>			
		Main		Aux		Main		Aux		Main		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
Resistive	50	100		5	5	100	50	5	2	100	50		
Inductive	10	100		5	5						50		
Motor	50	100				100	20			100	40		
Lamp	50			.75	.75			.75	.75				
Transfer <sup>3/</sup> load													
Mechanical life reduced current	100	25		1.25	1.25	25	12.5	1.25	1.25	25	12.5		
Intermediate current	50	10		<sup>4/</sup>	<sup>4/</sup>	10	10			10	10		

<sup>1/</sup> Absence of value indicates that parameter is not applicable to this specification sheet.

<sup>2/</sup> Absence of value indicates that relay is not rated for three phase applications.

<sup>3/</sup> Transfer load indicates relay is suitable for transfer between unsynchronized ac power supplies at the rating indicated.

<sup>4/</sup> In accordance with MIL-R-6106.

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(R) TABLE III. Operating characteristics.

PIN MS24168-	Coil data											Time (milliseconds maximum)					
	Coil	Rated		Res +15% -10% (Ω)	Max		Max pick-up		Hold voltage 2/ 3/ 4/	Drop- out voltage 2/ 3/ 4/	Oper- ate	Re- lease	Contact bounce				
		Volts 1/	Freq. Hz		Volts	Coil cur- rent	Nor- mal 2/	High temp test					Cont cur- rent test	Main			
														NO	NC	AUX	
D1	X1,X2	28	dc	55	29	0.6	18	21	22.5	1.5	7	60	25	2.5	n/a	n/a	n/a
D2	X1,X2	28	dc	55	29	0.6	18	21	22.5	1.5	7	60	25	2.5	n/a	4.5	4.5
A3	X1,X2	115	400/50/60 6/		120	0.25	90	100	104	10	40	65	80	5	n/a	n/a	n/a
A4	X1,X2	115	400/50/60 6/		120	0.25	90	100	104	10	40	65	115	5	n/a	7	7

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 and 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 at either 50, 60, or 400 Hz; however, ambient temperature must not exceed +71°C.

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(R) TABLE IV. Vibration levels.

PIN MS24168-	Frequency				
	5-10 Hz	10-55 Hz	55-250 Hz	250-500 Hz	500-1,500 Hz
D1	.08 DA	.06 DA	8 g's	5 g's	3 g's
D2				3 g's	3 g's
A3				5 g's	3 g's
A4				3 g's	3 g's

TABLE V. Qualification by similarity.

PIN MS24168-	Loads						Dynamics 1/			Environmental		
	Type I			Type I ER								
	A	B	C	D	E	F	A	X	Y	A	B	C
D1	4						2			4		
D2	4 2/						2			4 2/		
A3			1						1			1
A4			1 2/						1			1 2/

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

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

## CONCLUDING MATERIAL

Custodians:  
Navy - AS  
Air Force - 85

Preparing activity:  
Air Force - 85

Agent:  
DLA - ES

(Project 5945-0929)