

INCH-POUND

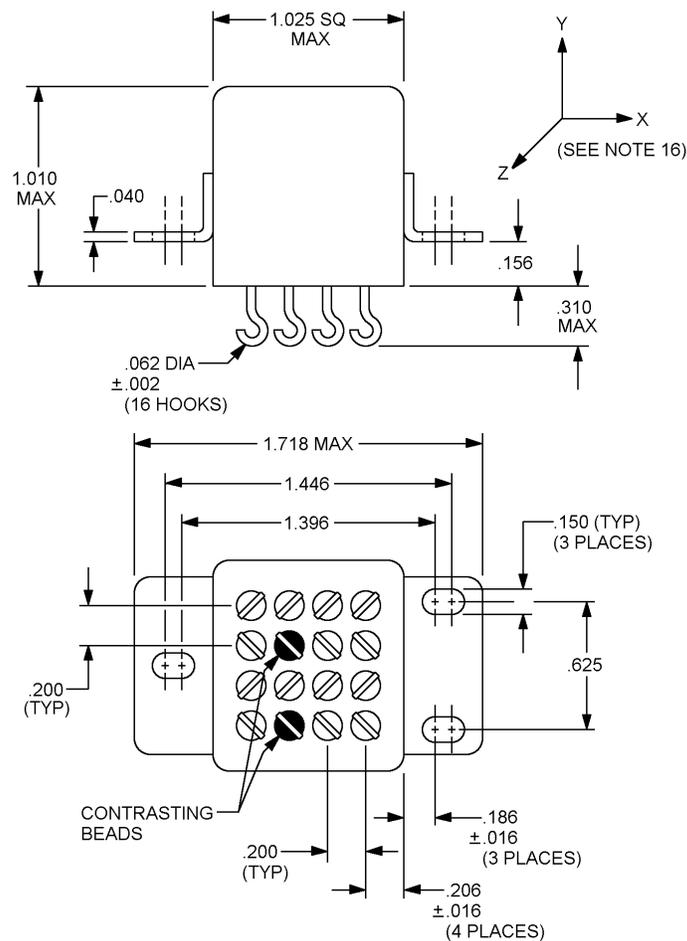
MIL-PRF-83536/18B
5 January 2010
SUPERSEDING
MIL-PRF-83536/18A
12 July 2004

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, 4PDT,
LOW LEVEL TO 10 AMPERES, MAGNETIC LATCH, HERMETICALLY SEALED,
ALL WELDED, DC COILS

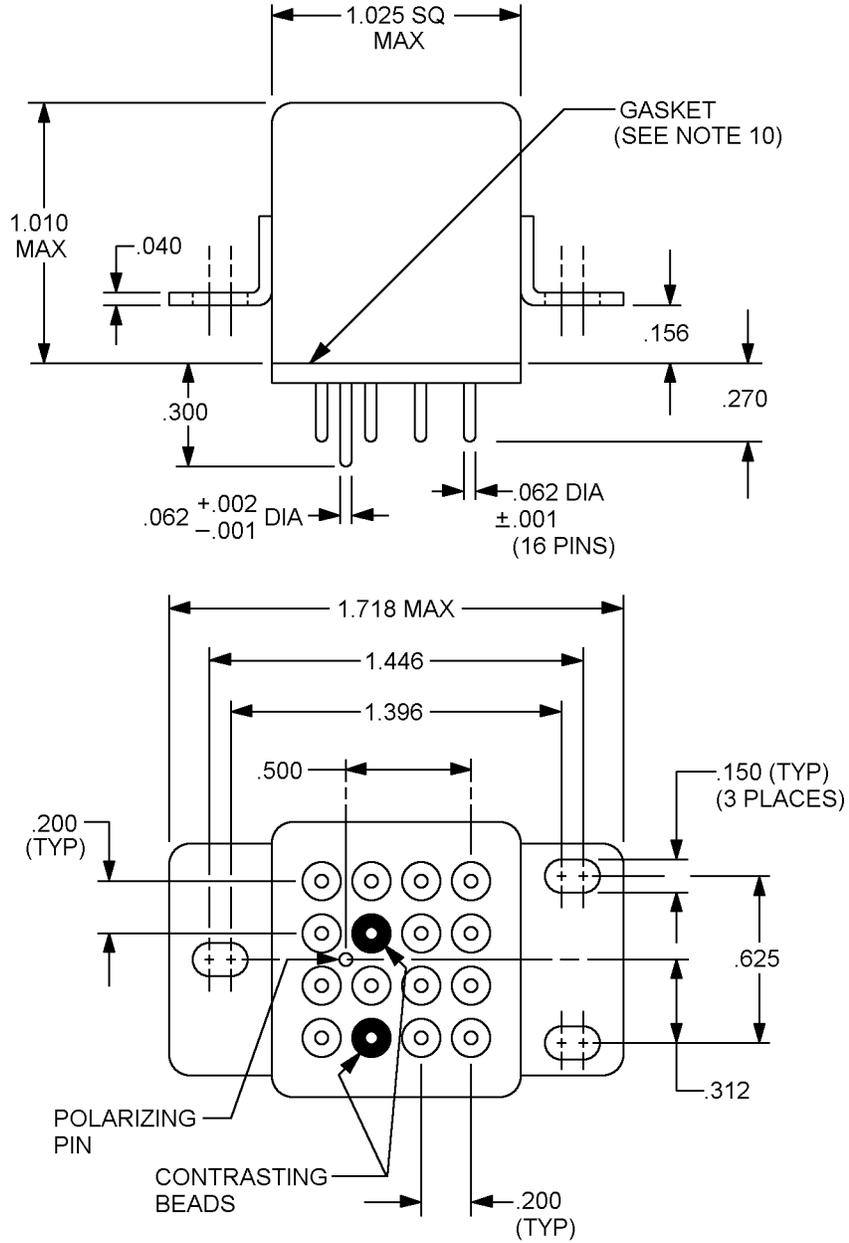
This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist
of this specification sheet and the latest issue of [MIL-PRF-83536](#).



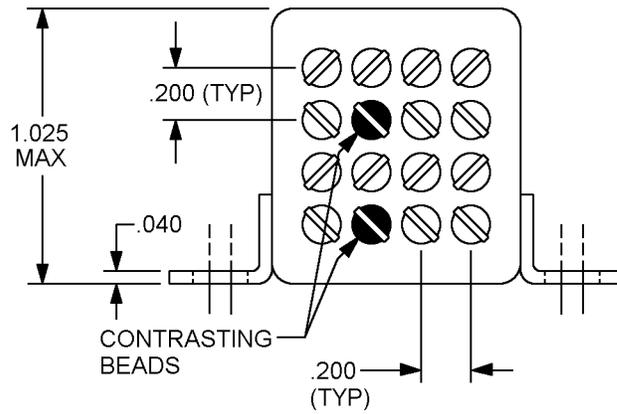
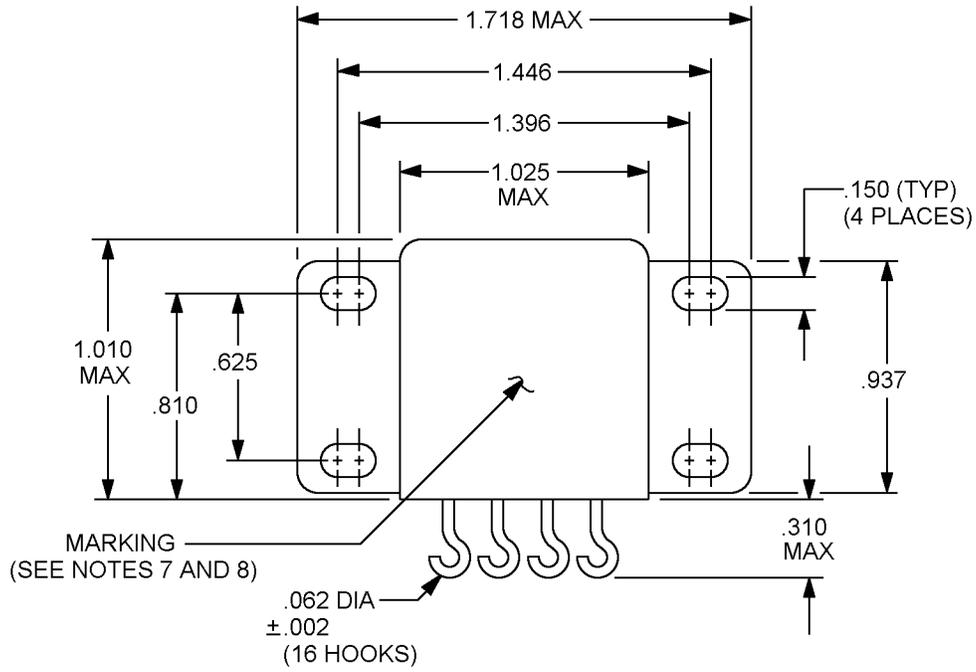
RAISED VERTICAL FLANGE MOUNT (RVFM) WITH SOLDER HOOKS

FIGURE 1. Dimensions and configurations.



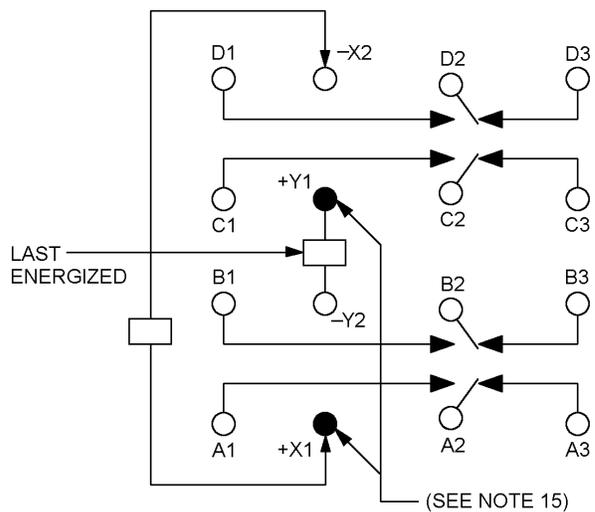
RAISED VERTICAL FLANGE MOUNT (RVFM) WITH SOCKET PINS

FIGURE 1. Dimensions and configurations - Continued.

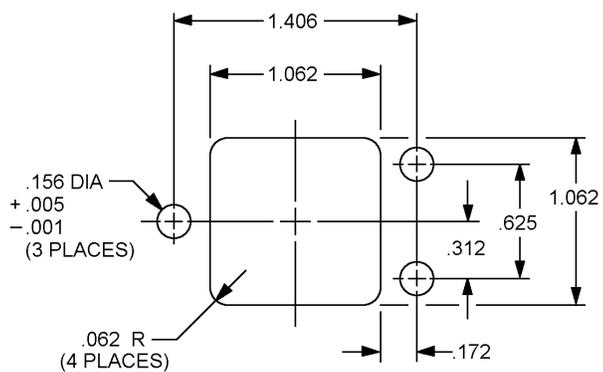


HORIZONTAL FLANGE MOUNT (HFM) WITH SOLDER HOOKS

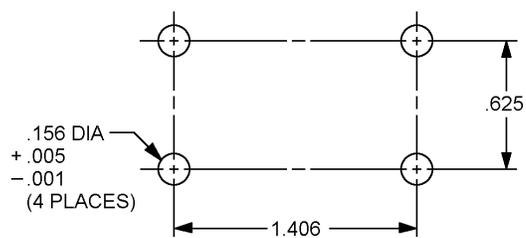
FIGURE 1. Dimensions and configurations - Continued.



CIRCUIT DIAGRAM TERMINAL VIEW



MOUNTING HOLE LAYOUT (RVFM)



MOUNTING HOLE LAYOUT (HFM)

FIGURE 1. Dimensions and configurations - Continued.

Inches	mm	Inches	mm	Inches	mm
.001	0.03	.200	5.08	1.010	25.65
.002	0.05	.270	6.86	1.025	26.04
.005	0.13	.300	7.62	1.062	26.98
.040	1.02	.310	7.87	1.396	35.46
.050	1.27	.312	7.92	1.406	35.71
.062	1.58	.500	12.70	1.446	36.73
.150	3.81	.625	15.88	1.718	43.64
.156	3.96	.810	20.57		
.172	4.37	.937	23.80		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is $\pm .010$ (0.25 mm).
4. There shall be affixed to the relay a suitable legible circuit diagram that identifies each terminal location specified.
5. These relays are polarized monostable.
6. This relay shall not operate or be damaged by reverse polarity.
7. Applicable to horizontal flange mount only. The circuit diagram, manufacturer's PIN, and the military PIN shall be marked on the near side. The remaining portion of the nameplate data shall be marked on the far side.
8. Applicable to horizontal flange mount only. Relays shall be marked with the manufacturer's name or CAGE code and date code. Marking shall be with the bottom of the print adjacent to the near side.
9. Socket pin terminals shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold-plated contacts. Terminals, except the polarizing pin, shall be gold plated. One system for gold plating that may be used is [ASTM B488](#), type 3, class 1.25 with a nickel underplate of 50 to 150 microinches thick. The gold plating system shall enable the product to meet the performance requirements of this specification and shall be approved by the qualifying activity.
10. Gasket shall provide a reliable seal between the relay and mating socket that will meet the environmental, operational, and interface requirements of the relay with the mating socket. The gasket shall have shore hardness 15 to 35, thickness $.050 \pm .005$. Gasket material according to [SAE-AMS 3332](#) has been considered acceptable.
11. Relay is magnetically latched in both positions.
12. All hooks shall be tin finished.
13. Relays shall have a (+) sign placed on the circuit diagram as shown.
14. Coil symbol optional in accordance with [MIL-STD-1285](#).
15. Indicated terminals shall be identified by a contrasting bead.
16. Plane of critical motion for vibration and shock is Y-axis.

FIGURE 1. Dimensions and configurations - Continued.

REQUIREMENTS:

Contact data:

Load ratings: See [table I](#).

Low level: 10 μ A to 50 μ A at 10 mV dc to 50 mV dc or peak ac.

Intermediate current: Applicable.

Mixed loads: Applicable.

TABLE I. Rated contact load and cycles (amperes per pole).

Type of load (high level)	Cycles x 10 ³	28 V dc	115 V ac 1 phase 400 Hz	115 V ac 1 phase 50/60 Hz 1/	115/200 V ac 3 phase 400 Hz	115/200 V ac 3 phase 50/60 Hz 1/
Resistive	100	10	10	2.5	10	2.5
Inductive	20	8	8	N/A	8	N/A
Inductive	10	N/A	N/A	2.5	N/A	2.5
Motor	100	4	4	2	4	2
Lamp	100	2	2	1	N/A	N/A

[1/](#) For 50/60 Hz rating, rupture and overload are not applicable and life for each load shall be 10,000 cycles.

Life: Unless otherwise specified (see [table I](#)), 100,000 cycles.

Contact voltage drop or resistance:

Initial contact voltage drop: 0.100 volt maximum. Rated resistive current at 6 V dc or peak ac. Relays shall not make or break this load.

Initial contact resistance: 0.010 ohm maximum. 50 mA max at 6 V dc or peak ac.

High level life (contact voltage drop):

During life: 10 percent open circuit voltage maximum.

After life: 0.125 volt maximum.

Intermediate current (contact resistance):

During intermediate current: 3 ohms maximum.

After intermediate current: 0.150 ohm maximum.

Low level (contact resistance):

During low level: 100 ohms maximum.

After low level: 0.150 ohm maximum at 100 mA and 28 V dc.

Contact bounce: 1.0 millisecond maximum.

Contact stabilization time: 2.5 milliseconds maximum.

Overload current: 40 amperes dc (60 amperes ac).

Rupture current: 50 amperes dc, (80 amperes ac).

Time current relay characteristics: See [table II](#).

TABLE II. Time current relay characteristics. [1/](#)

Successive application	Amperes	Time
1	15	1 hour
2	50	5.0 seconds
3	100	1.2 seconds
4	250	0.2 second
5	350	0.1 second

[1/](#) All relays shall withstand overload and fault currents. Relays must be able to sustain five applications (make and carry only) of power concurrently on adjacent poles at each of five different current levels in the sequence listed in [table II](#). Separate relays shall be tested at 28 V dc and 115/200 V ac, 400 Hz 3-phase. Cooling time between successive applications shall be 30 minutes. Tests shall be performed on both normally open and normally closed contacts. There shall be no failures or evidence of welding or sticking and relays shall pass contact voltage drop at the conclusion.

Coil data [1/](#): See [table III](#).

Operate time: 15 milliseconds maximum (each coil) with rated coil voltage over the temperature range.

Duty rating: Continuous.

Coil transient suppression: Not applicable.

Neutral screen: Applicable.

Electrical data:

Insulation resistance:

Initial: 100 megohms minimum at 500 V dc.

After life or environmental tests: 50 megohms minimum at 500 V dc.

[1/](#) CAUTION: Due to possible interaction of relay magnetic fields, the following spacing requirements, as a minimum, shall be considered in dense packaging situations:

- a. Row to row assisting fields: .125 (3.18 mm).
- b. Row to row opposing fields: .1875 (4.763 mm).
- c. Side to side alternating fields: .0625 (1.588 mm).
- d. Side to side like fields: .125 (3.18 mm).

TABLE III. Dash numbers and characteristics. 1/

Dash number <u>2/</u>		Mount	Coil data						
			At 25°C				Over temperature range	Maximum pickup voltage	
Solder hook	Socket pin		Coil voltage (V dc) <u>3/</u>	Coil resistance (ohms) minimum		Specified latch/reset voltage (V dc) <u>4/</u>	Specified latch/reset voltage (V dc) <u>4/</u>	High temperature test	Continuous current test
		Rated	Max						
001	002	RVFM	6	7.3	25	3.5	4.5	5.0	5.7
003	---	HFM	6	7.3	25	3.5	4.5	5.0	5.7
004	005	RVFM	12	14.5	100	6.5	9.0	9.9	11.25
006	---	HFM	12	14.5	100	6.5	9.0	9.9	11.25
007	008	RVFM	28	29 <u>5/</u>	405	14.5	18.0	19.8	22.5
009	---	HFM	28	29 <u>5/</u>	405	14.5	18.0	19.8	22.5
011	012	RVFM	48	50	1,350	24.0	36.0	38.0	42.0
013	---	HFM	48	50	1,350	24.0	36.0	38.0	42.0
014	---	RVFM	28	29 <u>5/</u>	405	14.5	18.0	19.8	22.5
015	---	HFM	28	29 <u>5/</u>	405	14.5	18.0	19.8	22.5

1/ Each relay possesses high level and low level capabilities. However, relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuits are not recommended for subsequent use in low level applications.

2/ The suffix letter L, M, P, or R to designate the applicable failure rate level shall be L, 3.0; M, 1.0; P, 0.1; R, 0.01. Example: 001L, 002R.

3/ CAUTION: The use of any coil voltages less than the rated coil voltage will compromise the operation of the relay.

4/ Latch/reset voltages as shown are for test purposes only and is not to be used for design criteria.

5/ When maximum ambient temperature does not exceed +85°C, the maximum coil voltage shall be 32 V dc.

Dielectric withstanding voltage 2/:

	All others	
	Coil to coil Coil to case	All other points
Sea level:		
Initial:	1,000	1,250
After life:	1,000	1,000
Altitude:		
At 80,000 feet:	250	350
At 300,000 feet:	500	500

Maximum leakage current: 100 microamperes rms in accordance with [MIL-PRF-83536](#).

Environmental characteristics:

Temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet.

Shock (specified pulse): Applicable, [MIL-STD-202](#), method 213, test condition C except peak value shall be 200 g's for 6 ±1 ms. Horizontal flange mount peak value shall be 100 g's for 6±1 ms. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (sinusoidal): Applicable, [MIL-STD-202](#), method 204, test condition G, except frequency range shall be 30 g's 10 to 3,000 Hz. Horizontal flange mount shall be 20 g's, 57 to 3,000 Hz. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (random): Applicable to qualification and group C inspection. Test in accordance with [MIL-STD-202](#), method 214, test condition IG (0.4 g²/Hz, 50 to 2,000 Hz). Horizontal flange mount shall be at (0.2 g²/Hz, 50 to 2,000 Hz). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Acceleration: Applicable, except 15 g's.

Physical data:

Dimensions and configurations: See [figure 1](#).

Weight: 0.17 pound (77.2 grams).

Terminal strength:

Solder hook terminals:

Pull force: 10 pounds ±1.0 pound.

Bend: Applicable.

Twist: Not applicable.

2/ Dielectric may be improved by suitable insulation of terminals and wiring after installation.

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Socket pin terminals:

Pull force: 10 pounds ±1.0 pound.

Bend: Applicable.

Twist: Not applicable.

Terminal solderability: Applicable to solder hook terminals only.

Seal: Hermetic.

Marking: Applicable.

Part or Identifying Number (PIN): M83536/18 (dash number from [table III](#) and suffix letter designating failure rate level).

Qualification inspection:

Qualification inspection and sample size: See [table IV](#).

TABLE IV. [Qualification inspection and sample size.](#) [1/](#)

Single submission	Group submission	
18 units plus 1 open unit for level L at C = 0 2/ 33 units plus 1 open unit for level M at C = 0 2/ Qualification inspection as applicable	M83536/18-008	18 units plus 1 open unit for level L at C = 0 2/
	M83536/18-008	33 units plus 1 open unit for level M at C = 0 2/
	M83536/18-008	Qualification inspection as applicable
	M83536/18-007	2 units, qualification inspection
	M83536/18-009	table, Q2, shock, vibration, acceleration, terminal strength, and seal
	M83536/18-002	2 units, qualification inspection
	M83536/18-006	table, Q1
M83536/18-012	2 units, qualification inspection	
M83536/18-014	table, Q1	
M83536/18-015	2 units, qualification inspection	
	table, Q1	

[1/](#) For retention of qualification or extension of qualification to lower failure rate levels, all life test data accumulated on [MIL-PRF-83536/19](#) may be used in addition to MIL-PRF-83536/18 data. Prior to performance of retention of qualification testing, the relay manufacturer shall preselect the sampling plan.

[2/](#) The number of units required for qualification testing shall be increased as required in Q5, table II of [MIL-PRF-83536](#), if the contractor elects to test the number of units permitting one or more failures. Prior to performance of qualification testing, the relay manufacturer shall preselect the sampling plan.

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Qualification inspection (reduced testing) (sample size - 2 units each coil voltage and 1 unsealed unit). See [table V](#).

If the relays produced for MIL-PRF-83536/18 are similar in construction and design except for the suppression network to the relays produced for [MIL-PRF-83536/19](#), then reduced testing for qualification of MIL-PRF-83536/18 relays may be performed concurrent with or subsequent to successful qualification of [MIL-PRF-83536/19](#) relays. For reduced testing, see [table V](#).

TABLE V. Qualification inspection (reduced testing).

Inspection
2 units each coil voltage Q1 of qualification inspection table 1 unsealed sample unit for internal inspection

Supersession data: See [table VI](#).

TABLE VI. Supersession data.

Superseded PIN M6106/51-	Replacement PIN M83536/18-
001	007
002	008
003	009

Referenced documents. In addition to [MIL-PRF-83536](#), this document references the following:

[MIL-PRF-83536/19](#)
[MIL-STD-202](#)

[MIL-STD-1285](#)
[ASTM B488](#)

[SAE-AMS3332](#)

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.

Custodian:
Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC
(Project 5945-2010-011)

Review activity:
Air Force - 99

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