DEPOT MAINTENANCE WORK REQUIREMENT FOR

ELECTRIC MOTOR-OPERATED SHUTOFF VALVES INLCUDING REPAIR PARTS AND SPECIAL TOOLS LIST

PART NUMBER	NATIONAL STOCK NUMBER
AV16B1700B	2915-00-936-8549
AV16B1667D	2915-00-991-3255
AV16B1296D	2915-00-778-2298
AV16B1294D	4810-00-778-2299

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THIS PUBLICATION IS A REPRINT OF DMWR 55-2915-300, DATED 30 DECEMBER 1974, INCLUDING CHANGES 1 THROUGH 4.

U.S. ARMY AVIATION AND TROOP COMMAND
1 DECEMBER 1974

WARNING

Cleaning solvent is toxic and flammable. Use cleaning solvent in a well-ventilated area, and avoid breathing fumes or contact with skin, to minimize danger to health. Keep away from flames to avoid fire hazard. Solvent flash point must not be less than 100°F.

WARNING

AIR UNDER PRESSURE
88 PSI AIR PRESSURE
is used in the operation of this valve.
DEATH
or severe injury may result if personnel fail to observe safety precautions.

WARNING

AIR AND FLUID UNDER PRESSURE
185 PSI AIR AND FLUID PRESSURE
is used in testing this valve.
DEATH
or severe injury may result if personnel fail to observe safety precautions.

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with regulations.

NOTE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original - 1 December 1974
Change 1 - 22 February 1979
Change 2 - 31 March 1987
Change 3 - 15 August 1988
Change 4 - 30 July 1993

Page No.	*Change No.
Title	4
Blank	0
a	3
b blank	0
A	4
B blank	0
i through iii	4
iv blank	4
1-1 and 1-2	4
1-2.1 through 1-2.3	3
Blank	3
1-3	0
1-4	4
1-5	0
1-6 and 1-7	4
1-8 blank	4
2-1	4
2-2	0
2-3	4
2-4 through 2-6	0
3-1 through 3-9	0
3-10	1
3-11 through 3-23	0
3-24 and 3-25	2
3-26 through 3-28	0
3-29	1
3-30 through 3-32	0
4-1	4
4-2 blank	4
5-1 through 5-4	4
A-1	3
A-2 blank	3
B-1 through B-13	3
B-14 blank	3

*Zero in this column indicates an original page.

DEPOT MAINTENANCE
WORK REQUIREMENT
NO. 55-2915-300

U.S. ARMY AVIATION AND
TROOP COMMAND
ST. LOUIS, MO 63120-1798
1 December 1974

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

SECTION 1. GENERAL

1-1. PURPOSE

1-2. This Depot Maintenance Work Requirement (DMWR) is intended to provide overhaul instructions for Electric Motor Operated Gates Shutoff Valves, Part No. AV16B1294D, AV16B1296D, AV16B1667D, and AV16B1700B (see Figure 1-1), Manufactured by ITT General Controls, Aerospace Products, Burbank, California 91502.

1-3. SCOPE

1-4. This DMWR contains all information necessary to impact and test the valves and their components to determine their serviceability, and to disassemble, inspect components, repair and/or replace defective components, reassemble and return the valves to service after such overhaul. Instructions for preparation for shipment and storage are also provided. Where the requirements of this DMWR conflict with any referenced documnerts, the requirements of this DMWR shall apply.

1-5. MAINTENANCE FORMS AND RECORDS

1-6. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751 and in the contract.

1-7. REPORTING OF ERRORS

1-8. DEVIATIONS AND EXCEPTIONS

When any work segment as set forth in this DMWR cannot be accomplished, or can be accomplished only in a manner other than specified, the contractor shall submit a Request for Action form, AMSAV-M Form 1379, figure 1-1.1 through the contracting officer to AMSAT-I-MP with a copy to AMSAT-I-MDO. If the problem is publications related or requires a change to a publicaiton, a DA Form 2028, figure 1-1.2, shall also accompany the Request for Action. The request for action shall state the problems, the reason for urgency, and the following specifics:

a. Serial number (if applicable), part number, and NSN of affected equipment.

b. Work elements which will not be completed or which will not be accomplished as specified herein.

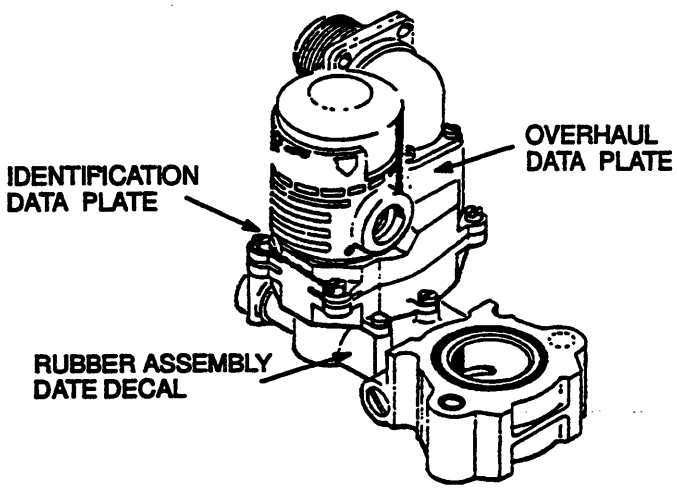
c. Reason for nonaccomplishment or deviation.

d. Action taken to correct condition causing nonaccomplishment or deviation.

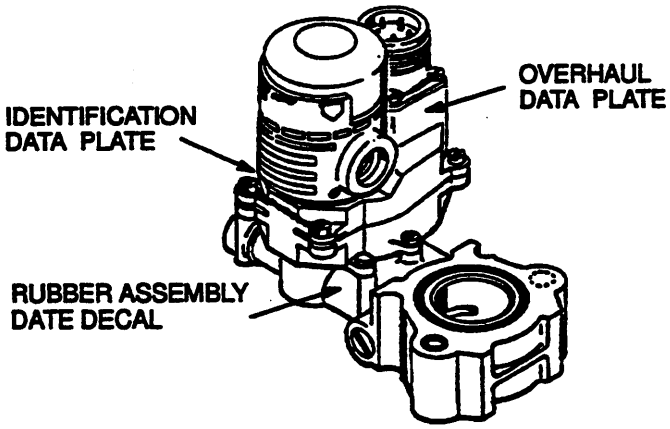
e. Data relative to availability of parts required, if applicable

f. Estimate man-hours

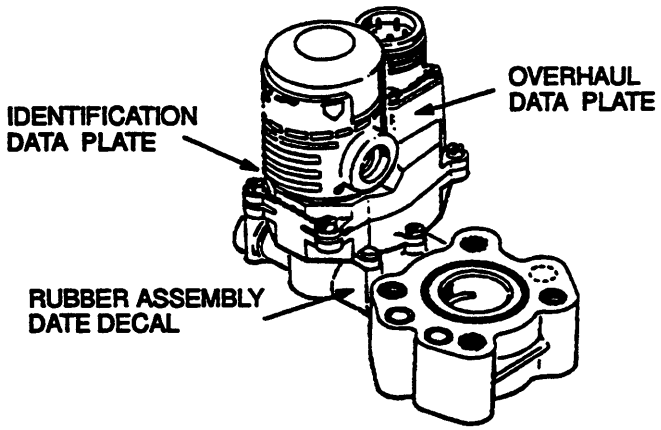
g. Instructions and inspection required to maintain the integrity of the end items because of such omission or deviation.



PART NUMBER AV16B1294D



PART NUMBER AV16B1296D



PART NUMBER AV16B1700B

Figure 1-1. Electric Motor Operated Gate Shutoff Valves, Part No. AV16B1294D, AV16B1296D, AV16B1667D, and AV16B1700B.

Section II. DESCRIPTION AND DATA

1-9. DESCRIPTION

1-10. The valve consists of a gate valve, operated by an actuator assembly. The actuator assembly includes a motor assembly. The gate valve is a two-position valve, with two ports in the valve body. When the valve gate (or slide) is extended, the valve ports are closed. When the slide is retracted, the valve ports are open. The slide of the valve is operated by the output shaft of the actuator assembly on the valve. The actuator output shaft rotates to place the slide in the open or closed position.

1-11. The actuator includes a two-page gear train. The gear train reduces the rotational speed of the output shaft of the motor to a usable power level. The output shaft of the motor is serrated, engages an idler gear in the actuator housing assembly. The idler gear rides on an oilite bushing on an idler shaft that is swaged into the actuator housing. The pinion gear of the idler gear engages the output shaft of the of the idler gear engages the output shaft of the motor. The spur gear of the idler gear drives the pinion gear of an input gear. The input gear rides on a center pin (shaft) that is installed through the center of the two planetary gear assemblies in the gear train. The spur gear of the input gear drives three planet gears. The three planet gears drive against a ring gear in the gear housing assembly of the actuator. This set of planet gears, when rotating, turn the input planetary assembly in the gear housing ring gear. The spur gear on the bottom of input planetary drives three more planet gears on the on the output planetary gear assembly. The last three planet gears also rotate in the ring gear of the gear housing assembly, causing the output planetary to rotate. The effective output rotational speed of the motor is reduced to approximately 60 rpm at the output planetary of of the actuator. The output shaft of the actuator is operated by the output planetary through a clutch ring. The clutch ring will slip when shaft forces of over 70 pound-inches are encountered; otherwise, the clutch ring and output planetary operates as a one-piece unit.

1-12. The output shaft of the actuator engages with a slot in an arm in the gate valve body. A roller on the opposite end of the arm engages in a slot in the valve slide. Rotation of the actuator output shaft rotates the arm, extending or withdrawing the and slide in the valve body.

1-13. The slide rides in a groove in the valve body. Two seal rings, one on either side of the slide, provide sealing. The seal rings are carried in individual seal ring shells, and contained in two port retainers. Port springs behind the seal rings provide seal ring pressure against the slide. Packings on each port retainer on each port retainer provide flange or mounting leakage protection.

REQUEST FOR ACTION	CONTRACT NO	PRIORITY OF REQUEST ☐ URGENT ☐ ROUTINE	DATE OF REQUEST
TO THRU COPIES	FROM POINT OF CONTACT		
	PUBLICATION NO AND TITLE		

STATEMENT OF THE PROBLEM ☐ PUBLICATIONS PROCEDURES ☐ OTHER

(USE CONTINUATION SHEET IF NECESSARY)

REASONS FOR URGENCY

RECOMMENDED SOLUTIONS OR DISPOSITION

☐ DA FORM 12-32 ATTACHED

(USE CONTINUATION SHEET IF NECESSARY)

	SIGNATURE	DATE

AMSAV-M Form 1379

FIGURE 1-1. AMSAV-M Form 1379

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 310-1; the proponent agency is the US Army Adjutant General Center.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE
TO: (Forward to proponent of publication or form; include ZIP Code)	FROM: (Activity and location; include ZIP Code)	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE

ITEM NO	PAGE NO	PARAGRAPH	LINE NO*	FIGURE NO	TABLE NO	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)

*Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028

REPLACES DA FORM 2028, DEC 68, WHICH WILL BE USED

FIGURE 1-1.2 DA Form 2028

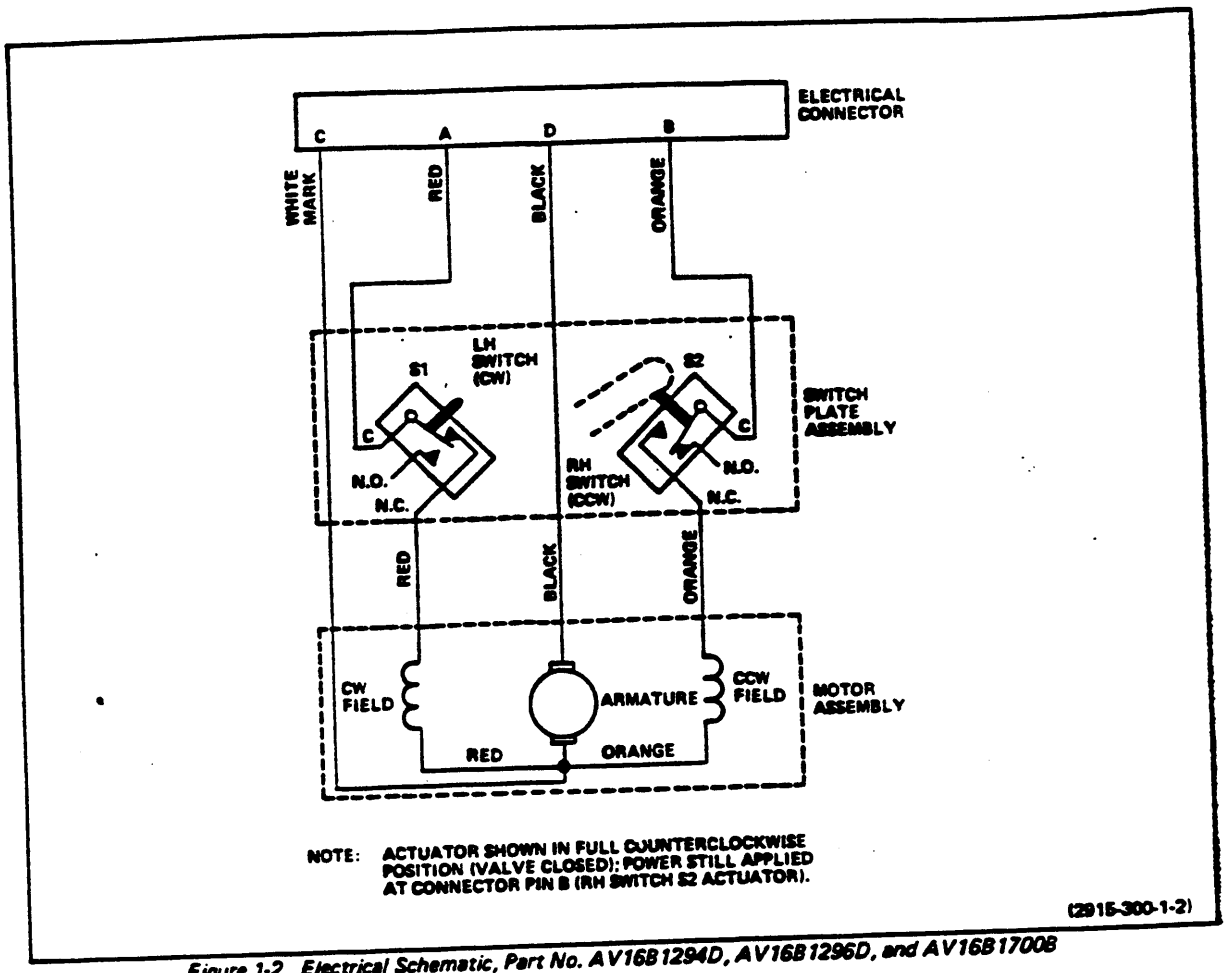


Figure 1-2. Electrical Schematic, Part No. AV16B1294D, AV16B1296D, and AV16B1700B

1-14. DIFFERENCES BETWEEN MODELS

1-15. Valves, Part No. AV16B1294D, AV16B1296D, and AV16B1700B, are operated electrically as follows (see figure 1-2):

a. With operating voltage applied to pins A (positive) and D (negative), the valve operates to the open position. When the valve reaches full open, the motor will be automatically deenergized, and pin A will be disconnected from the actuator motor.

b. With operating voltage connected to pins B (positive) and D (negative), the valve operates to the closed position. When the valve reaches full closed, the motor will be automatically deenergized, and pin D will be disconnected from the actuator motor.

c. Whenever the actuator motor is energized, a signal voltage will appear at pin C of the electrical connector. When the valve reaches the extreme closed or open position selected, the internal limit switch will actuate, and the signal voltage (in-transit signal) will be automatically removed from pin C of the electrical connector.

1-16. Valve, Part No. AV16B1667D, is operated electrically as follows (see figure 1-3):

a. With operating voltage applied to pins A (positive) and E (negative), the valve operates to the open position. When the valve reaches full open, the motor will be automatically deenergized, and pin A will be connected to pin C.

b. With operating voltage connected to pins B (positive) and E (negative), the valve operates to the closed position. When the valve reaches full closed, the motor will be automatically deenergized, and pin B will be connected to pin D.

c. The connection of pin A to pin C in step a provides a valve-open indication. The connection of pin B to pin D in step b provides a valve-closed indication. When operating voltage is removed from pin A or B, as applicable, the voltages at pin C or D will also be removed, removing the valve position indicating voltage.

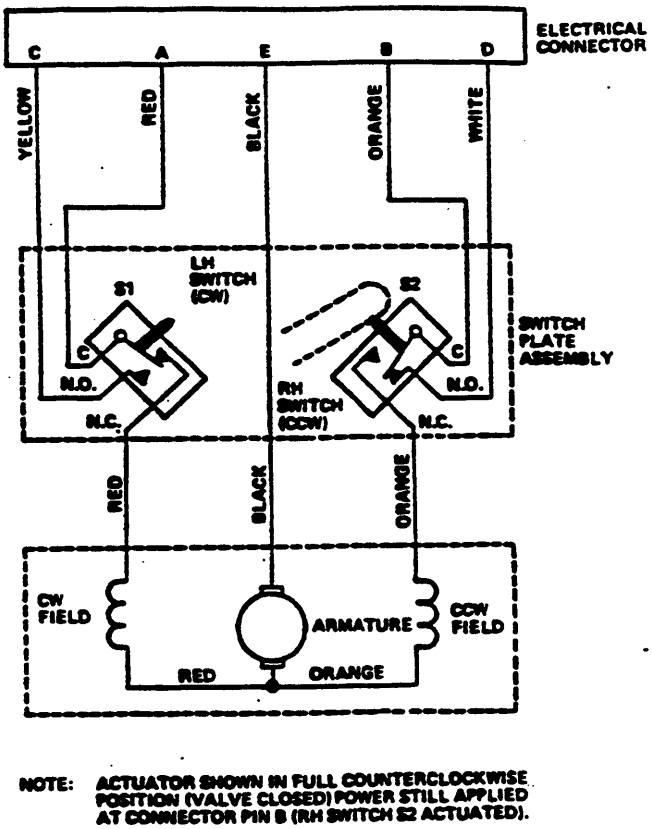


Figure 1-3. Electrical Schematic, Part No. AV16B1667D

1-17. An indicator arm or override arm on the valve acturator indicates valve position. The override arm (on Part No. AV16B1294D, AV16B1667D) may be used to manually operate the valve.

1-18. TABULATED DATA

1-19. REFER TO TABLE 1-1.

1-20. DATA PLATES

Equipment data plates used on this valve are the identification plate and the overhaul plate. Figure 1-1 shows the location of these data plates.

a. IDENTIFICATION DATA PLATES (FIGURE 1-4). The identification data plate must contain, as a minimum, the manufacture's name and part number, the contact number, serial number, modification data (as applicable), and the specification number (or customer part number). It shall also contain the fluid type, maximum pressure, voltage requirement, power usage and size.

b. OVERHAUL DATA PLATES (FIGURE 1-6.). The overhaul data contains the date and the place of overhaul. It is installed at the first overhaul, and replaced at each overhaul thereafter and must contain the overhaul's agency's name or code symbol, a quality control stamp from the agency or an inspector's initials, the word "overhauled," and the date the valve was overhauled. Overhaul data plates shall be fabricated from adhesive-backed, photo sensitive aluminum sticker (item 22, table 2-2 consumable materials) or scotchcal vinyl (item 23), 0.005 inch thick or equivalent. In accordance with figure 1-6.

c. RUBBER ASSEMBLY DATE DECAL (FIGURE 1-6). The rubber assembly data decal contains the date on which all rubber parts in the motor operated gate valve have been replaced and the words " rubber assy date." Rubber assembly date decal shall be fabricated for adhesive backed scotchcal vinyl (item 24) or equivalent, in accordance with figure 1-6. Stenciling shall employ silk screen process or indelible ink stamping.

Table 1-1. Table of Leading Particulars

Type Fluid ..... Fuel per Military Specification MIL-F-5572, MIL-F-5616, MIL-J-5624, and MIL-H-3136

Temperatures:
Fluid ..... −65°F to +135°F (−53.9°C to +57.2°C)
Ambient ..... −65°F to +160°F (−53.9°C to +71.1°C)

Operating Pressure ..... 0 to 60 psig

Proof Pressure ..... 188 psig

Thermal Relief Valve Data:

Part No.	Line (psig)			Body (psig)		
	Cracking		Reseat	Cracking		Reseat
	Max	Min	Max	Min	Max	Min
AV16B1294D	135	105	105	135	105	105
AV16B1296D	135	105	105	135	105	105
AV16B1667D	120	90	80	150	–	125
AV16B1700B	95	–	65	135	105	105

Operating Time ..... 1/2 second minimum to 1 second maximum at 28 ±1 volts dc at +70°F (+21.1°C) at operating pressure

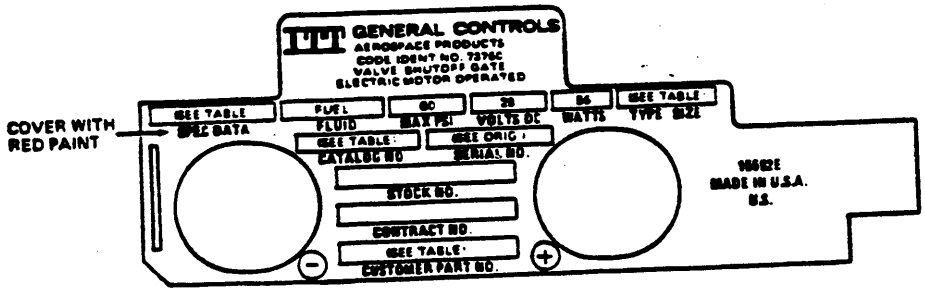
Port Connections:
Part No. AV16B1294D ..... Per MS33786-12-16
Part No. AV16B1296D ..... Per MS33786-20
Part No. AV16B1667D ..... Per MS33786-16
Part No. AV16B1700B ..... Per MS33786-16

Electrical Connector:
Part No. AV16B1294D ..... Per MS33678C14S2P
Part No. AV16B1296D .... Per AND100066C14S2P
Part No. AV16B1667D ..... Per MS3102R14S5P
Part No. AV16B1700B ..... Per MS33678R14S2P

Voltage ..... 18 to 30 volts dc (28 volts dc nominal)

Current Drain ..... 2 amperes, running

Weight:
Part No. AV16B1294D and AV16B1667D ..... 1.56 pounds (estimated)
Part No. AV16B1296D .... 1.68 pounds (estimated)
Part No. AV16B1700B .... 1.60 pounds (estimated)



CATALOG NO.	CUSTOMER PART NO.	TYPE SIZE	SPEC DATA
AV16B1294D		1-3/4"	
AV16B1296D		1-1/4"	
AV16B1667D	205-080-612-3	1"	105-080-612-3
AV16B1700B		1"	

(2915-300-1-4)

Figure 1-4. Identification Plate, Part No. 15562E

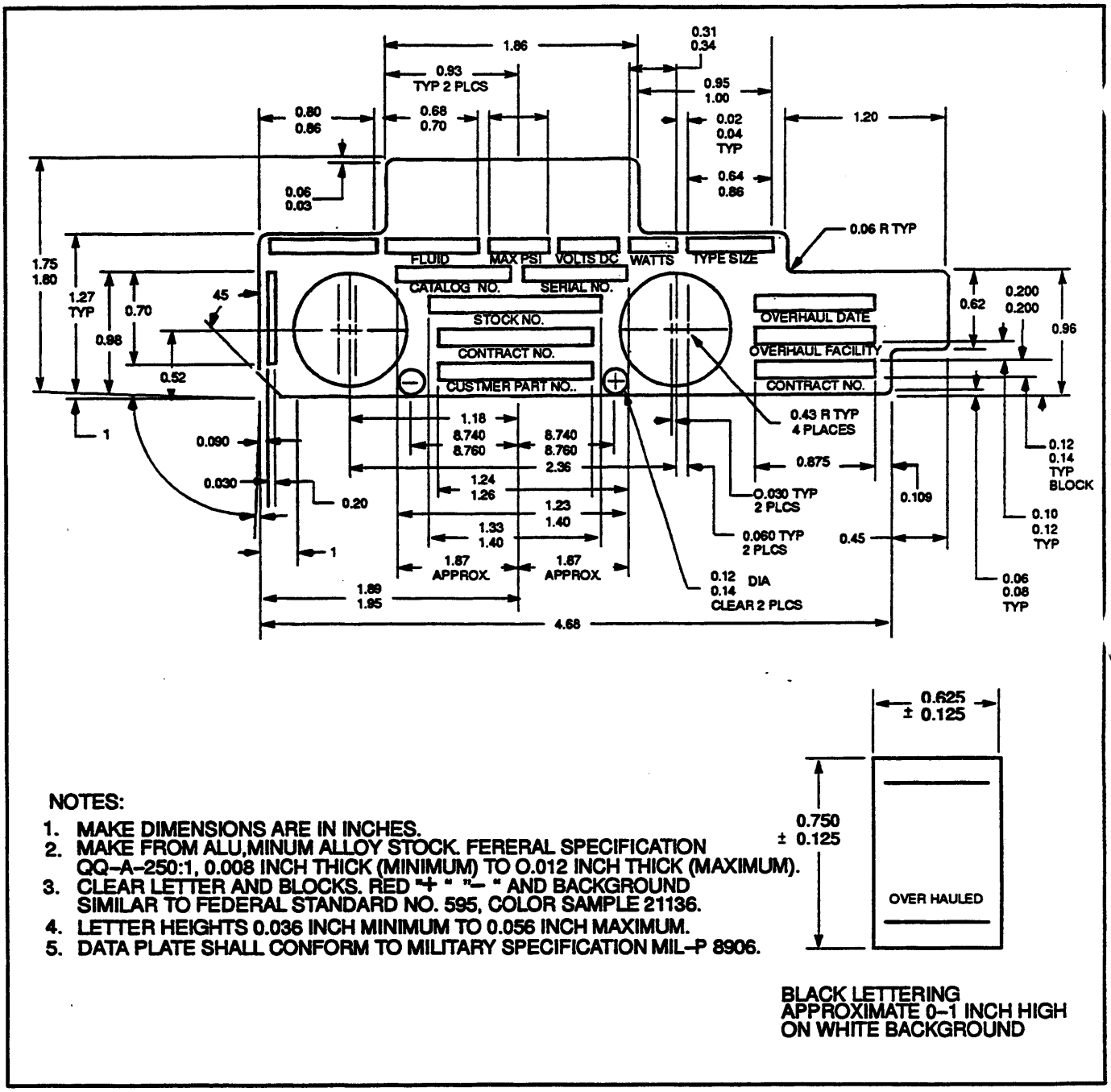
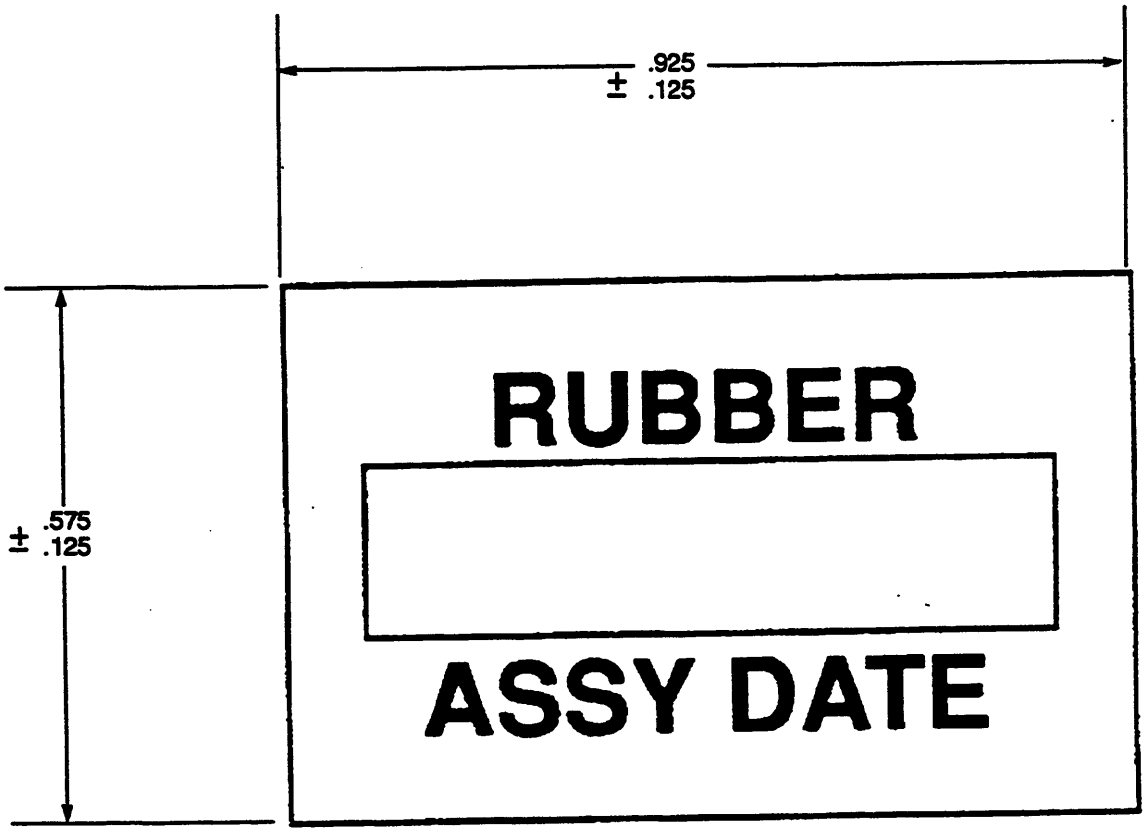


Figure 1-5. Overall Data Plate.



WHITE LETTERING
APPROX 0.1 INCH HIGH
ON RED BACKGROUND

Figure 106. Rubber Assembly Date Decal.

CHAPTER 2

TECHNICAL REQUIREMENTS

SECTION I. FACILITIES, TOOLS, AND EQUIPMENT

2-1. FACILITIES

2-2. Facilities required to perform the tests described in this manual include the following:

a. A test stand capable of supplying test fluid, Federal Specification P-D-680, or equivalent, at pressures from 0 to 188 psig. The test stand shall include pressure gages to read pressures within the stated pressure range with an accuracy of ±0.5%.

b. An air pressure source capable of supplying air at pressures to 188 psig. The supply source shall include a pressure gage to read supply pressure with an accuracy of ± 5%.

c. A water tank of approximately 5 gallons capacity, of overall dimensions suitable for water submersion tests of the valve.

2-3. TOOLS AND EQUIPMENT

2-4. Special tools, inspection, test equipment and consummable materials required for the procedures described in this manual are listed in tables 2-1 and 2-2.

2-5. FABRICATED TOOLS AND EQUIPMENT

2-6. Instructions and illustrations of tools and equipment that are considered necessary to the performance of the operation described in this DMWR and that must be locally fabricated are shown in table 2-3.

Section II. STANDARDS

2-7. QUALITY OF MATERIAL

2-8. Parts and materials used for replacement, repair, or modification will comply with applicable drawings and specifications unless otherwise specified.

2-9. TIME SCHEDULE GUIDE

2-10. (NOT APPLICABLE.)

2-11. WEAR LIMITS, FITS, AND TOLERANCES

2-12. Wear limits, fits, and tolerances specified throughout this manual will be complied with unless otherwise stated in the contract/work directive.

2-13. REPAIR PARTS

2-14. Repair parts required for overhaul, repair, or modification of the equipment are listed in Appendix B.

2-15. MODIFICATIONS

2-16. All MWO and Engineering Orders (EO) required for application to the item as specified by the contract/work directive will be applied.

2-17. FLIGHT SAFETY PARTS PROGRAM

2-18. This DMWR is not impacted by the Flight Safety Parts Program.

Table 2-1. Special Tools, Inspection and Test Equipment

NOMENCLATURE	FSN OR PART NO.	REFERENCE PARAGRAPH OF USE
Cylinder, Graduated Laboratory	6640-419-7000	Para 3-61, step g
Drilling Machine, Upright	3413-529-0809	Para 3-30, 3-31
End Play, Rotor, Multi-Purpose	4920-601-1144	Para 3-40, step h & i
Fluorescent Inspection Kit; or Fluorescent Penetrant Inspection Unit	6635-566-5198 6635-641-2661	Table 3-1; Para 3-31, step h
Kit, Magnetic Inspection; or Magnetic Inspection Unit Stationary	6635-566-5197 4940-869-0444 6635-530-1130	Table 3-1
Multimeter	6625-553-0142 6625-933-2406 6130-504-0327	Table 3-1, Fig. 3-5, 3-6
Power Supply	6130-504-0347 6625-841-8917	Para 3-40, step l, Para 3-45, step a & b, Para 3-46, Para 3-58
Press, Arbor, Hand Operated	3444-243-2654	Para 3-19, step j, Para 3-40, step b
Driver, Vessel Impact (Goodkin Hardware Corporation, 3669 7th Avenue, Los Angeles, California 90007)	Part or Type No. 250CN	Para 3-21, step b
Stopwatch, 1-second markings	6645-250-4680	Table 3-1; Para 3-46, Para 3-64, step e & g
Test Stand, Fuel Components	4920-874-0876	Para 3-56
Test Set, Insulation Breakdown	6625-765-9079 6625-648-9931 6625-366-1494 6625-540-8761	Table 3-1; Para 3-46, step h, Para 3-62 and 3-63
Tester, Spring: or Gage, Spring Testing	4920-567-3050 4933-122-1101 4933-122-1100	Table 3-1; Para 3-40, step g4
Gage, Depth, Dial Indicating	5210-921-5036	
Gage, Depth, Dial Indicator (Surface Finish)	5210-116-3485	Table 3-1
Multimeter, Simpson 270R5; or Multimeter, AN/PSM-6B; or Multimeter, AN/PSM-4A & 4B	6625-897-4051 6625-957-4374 6625-643-1668	
Ohmmeter, Portable	6625-648-8685	
Ohmmeter, Insulation Resistance; or Tester, Insulation	6625-246-5880 6625-342-4268 6625-366-1447	
Megohmmeter	6625-473-6365	

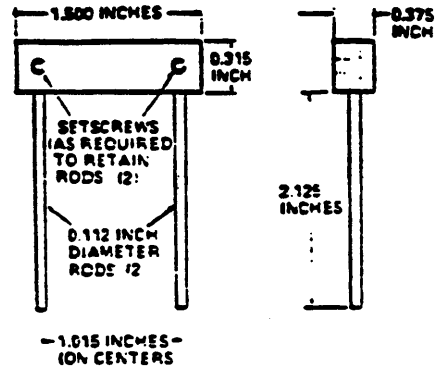
Table 2-2. Consummable Materials

ITEM NO.	NOMENCLATURE	SPECIFICATION OR SOURCE
1	Thinner, Lacquer	MIL-L-19357
2	Fluid, Preservative	MIL-H-6083
3	Bags, Plastic	PPP-B-26
4	Solvent, Cleaning	P-D-680
5	Solder	QQ-S-571, Composition Sn63
6	Varnish, Insulating	MIL-V-1137, Type M, Grade CB
7	Solder	QQ-S-571, Composition Sn10
8	Grease	MIL-L-15719
9	Grease	MIL-G-23827B
10	Grease, No. 630AA	
11	Lockwire	MS20995NC20
12	Tape, Insulating	MIL-I-15126A
13	Lockwire	MS20995NC32
14	Protective Covers	1/4 x 1/4 x 4 inch cardboard
15	Tape, Masking	UU-T-416
16	Ink, Black, permanent	TT-I-558
17	Lacquer, Clear	TT-L-58
18	Desiccant	MIL-D-3464, Class 1
19	Polyurethane Foam	MIL-P-26514, Type 1
20	Box, Fiberboard	PPP-B-636, Type SF, Grade V2
21	Aluminum, 1100 to 1/2 hard, 0.008 to 0.012 thick	QQ-A-250/1
22	Aluminum, Sticker photo	6750-00-485-9914
23	Vinyl, Scotchcal, P/N 8015 (34360)	6750-00-297-3944
24	Plastic, Vinyl material Scotchcal	9330-00-264-7629

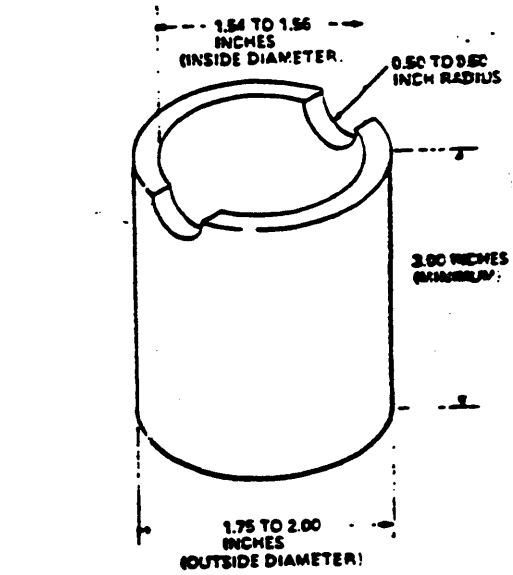
Table 2-3. Fabricated Tools and Test Equipment

NOMENCLATURE	REFERENCE OR PART NO.	MATERIAL REQUIRED
Motor Assembly Tool	Sketch A below	Tool Steel
Motor Housing Support	Sketch B below	Refer to Sketch B.
Port Adapter – AV16B1294D, AV16B1296D, and AV16B1667D	Sketch C	Aluminum Plate.
Port Adapter – AV16B1700B	Sketch D	Aluminum Plate.

Fabrication Instructions: Fabricate per sketches below. All dimensions given are in inches unless otherwise noted.



SKETCH A – MOTOR ASSEMBLY TOOL

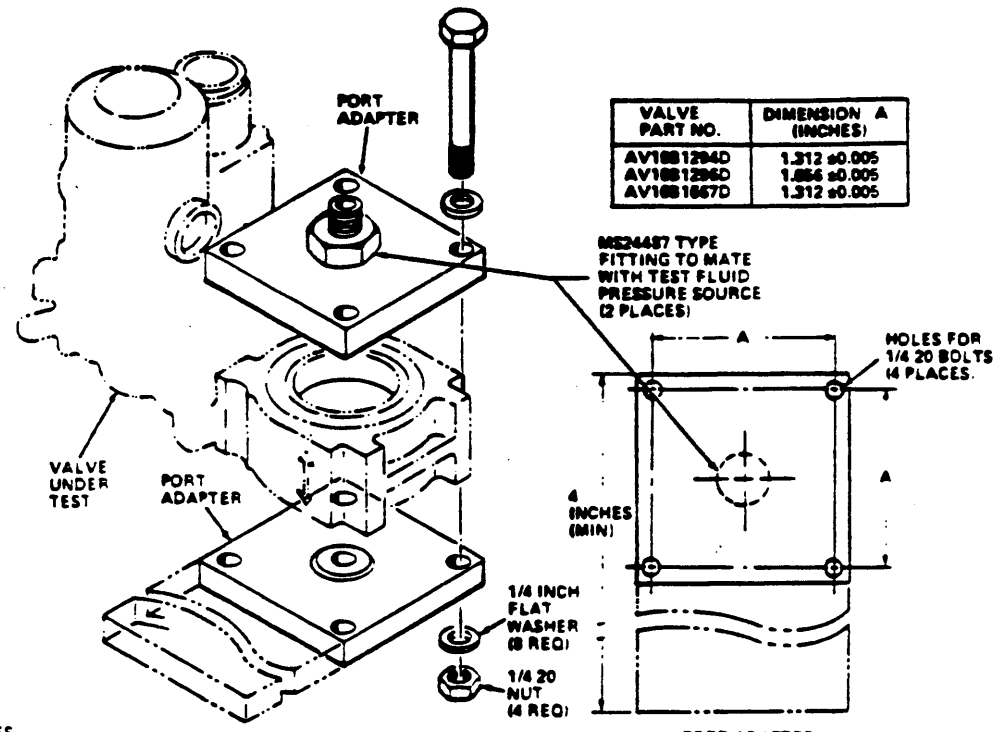


MAKE FROM: ALUMINUM, STEEL, BAKELITE, HARDWOOD, OR OTHER EQUIVALENT MATERIAL.

SKETCH B – MOTOR HOUSING SUPPORT

(2915-300-T2-3-1)

Table 2-3. Fabricated Tools and Test Equipment – Continued



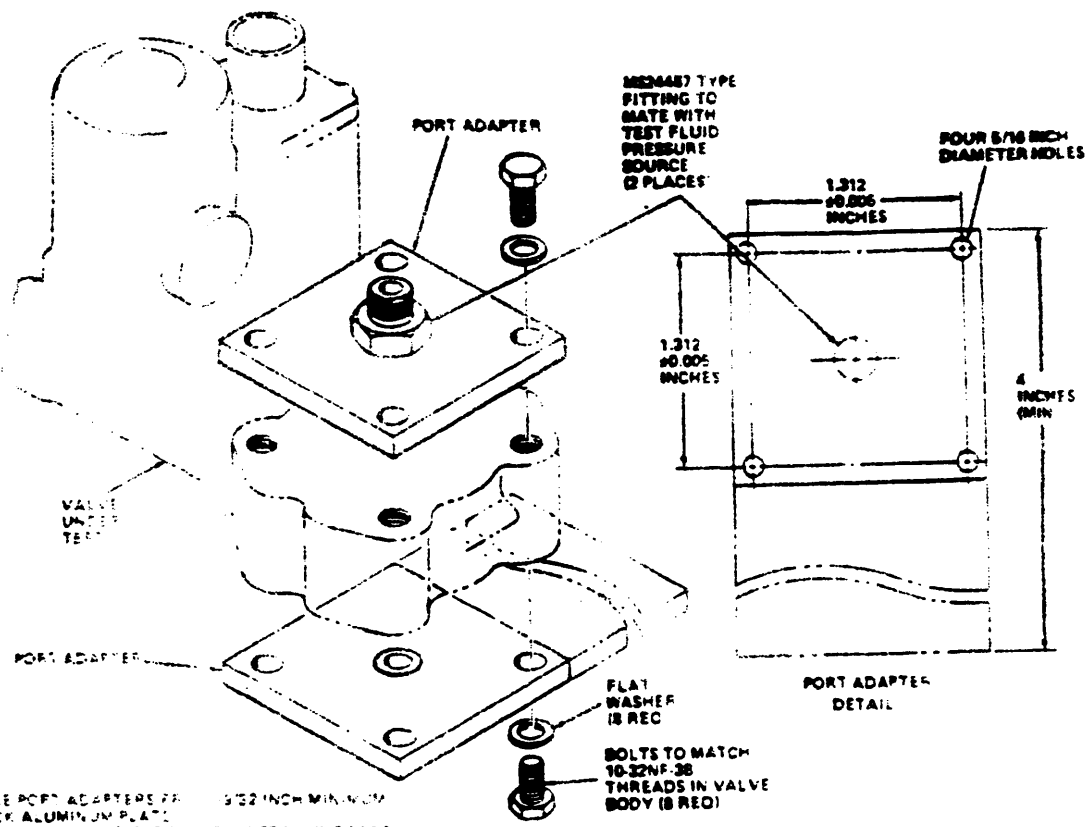
VALVE PART NO.	DIMENSION A (INCHES)
AV16B1294D	1.312 ±0.005
AV16B1296D	1.856 ±0.005
AV16B1667D	1.312 ±0.005

NOTES
1. MAKE PORT ADAPTERS FROM 19/32 INCH MINIMUM THICK ALUMINUM PLATE
2. USE PACKINGS (2 FIG 3-1 OR 3-2) WHEN INSTALLING PORT ADAPTERS ON BOTH PORTS OF VALVE
3. MS24487 TYPE FITTING SHALL BE FLUSH OR BELOW SURFACE OF PORT ADAPTER TO PREVENT FITTING FROM PROTRUDING INTO VALVE PORT
4. SUPPORT EXTENSION REQUIRED ON ONE PORT ADAPTER

SKETCH C – PORT ADAPTER, PART NO. AV16B1294D, AV16B1296D, AND AV16B1667D

(2915-300-T2-3-2)

Table 2-3. Fabricated Tools and Test Equipment – Continued



NOTES
1. MAKE PORT ADAPTERS FROM 3/32 INCH MINIMUM THICK ALUMINUM PLATE.
2. USE PACKINGS [illegible] WHEN INSTALLING PORT ADAPTERS ON BOTH PORTS OF VALVE.
3. MS2446[illegible] TYPE FITTING SHALL BE FLUSH OR BELOW SURFACE OF PORT ADAPTER TO PREVENT FITTING FROM RESTRICTING INTO VALVE PORT.
4. SUPPORT EXTENSION PER [illegible] TO ONE PORT ADAPTER.

SKETCH D – PORT ADAPTER, PART NO. AV16B1700B

(2915-300-T2-3-3)