

TM 9-4910-609-14&P

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT
SUPPORT, AND GENERAL SUPPORT MAINTENANCE
MANUAL INCLUDING REPAIR PARTS LIST
FOR
MAINTENANCE FIXTURE,
MODEL RM-77**

NSN 4910-00-357-1874

(HYDRAULICS INTERNATIONAL, INC.)

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1981

WARNING

Safety device must be tightened after radiator has been raised to desired height and position.

Technical Manual }
No. 9-4910-609-14&P }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 24 July 1981

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST

**MAINTENANCE FIXTURE
MODEL RM-77
(NSN 4910-00-357-874)**

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

Manufactured by: Hydraulics International, Inc.
9035 Independence Ave
Canoga Park, CA 91304

Procured under Contract No. DAAA09-77-C-6925

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

- 1 - Manufacturer's Federal Supply Code Number - 56529
- 2 - Manufacturer's Part Number exactly as listed herein.
- 3 - Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 - Manufacturer's Model Number - Model RM-77
- 5 - Manufacturer's Serial Number (End Item)
- 6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4,5,6, list manufacturer's Federal Supply Code Number - 56529 followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:
Noun: (nomenclature of repair part)
For: NSN: 4910-00-357-1874
Manufacturer: HYDRAULICS, INTERNATIONAL, INC.

Model: RM-77
Serial: (of end item)

Any other pertinent information such as Frame Number,
Type, Dimensions, Ietc.

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I. INTRODUCTION

- 1.1 This manual provides information for the maintenance and operation of the Model RM-77, "Radiator Maintenance Fixture".

1.2 Purpose and Function

The Model RM-77 is an air hydraulically-operated maintenance fixture, designed for use in cleaning, testing and repairing all types of automotive radiators.

The Model RM-77 is used to raise radiators over the edge of the maintenance tank and submerge them for cleaning, repairing and testing.

1.3 Capabilities

Model RM-77 is capable of lifting radiators with dimensions of up to 45 inches wide x 45 inches high and 6 inches thick, with a weight of Up to 350 lbs.

1.4 Performance Characteristics

The vertical movement is manually controlled by using a 3-way lever operated air valve (Item 2-6 Fig. 1).

The amount of depression on the lever will control the speed of the vertical movement. Due to the compressibility of air, a small vertical movement is induced after the 3-way valve is brought to a neutral position. Should the operator desire to prevent this movement, jog the 3-way valve in the opposite direction.

1.5 Dimensions, Weight, Volume, Center of Gravity

1.5.1 Dimensions

Minimum required mounting dimensions for base, is 12" x 14"

(See Fig. 2).

Height:	Retracted	50 inches
	Fully Extended	98 inches
	Clearance Radius	80 inches.

1.5.2 Shipping Weight

210 lbs. crated.

1.5.3 Volume

Reservoir, 2 gals. for SAE 30.

1.5.4 Center of Gravity

Due to the rotational capability of the maintenance fixture, the center of gravity is not stationary. The size of the fastening bolts and base thickness are designed to compensate for this variation.

1.6 Power and Utility Requirements

Shop Air, 10 to 15 cfm, 100 - 150 psi.

1.7 Environmental Requirements

A maintenance fixture, Model RM-77 is designed for use inside an automotive maintenance building. No other special precaution is required.

1.8 List of Items Furnished

The RM-77 consists of five (5) major assemblies. (See Fig. 1 and Parts List #77003).

1.9 List of Items Required for Installation

To install the Maintenance Fixture, the following parts are required:

A. There are two ways of mounting. Either use:

4 ea 1/2" dia. bolts of sufficient length, with associated washers;

OR

4 ea 1/2" N.C. studs embedded in 4" concrete. Locate studs per Fig. 2, when pouring new base.

B. A 1/4" NPTN with flexible or rigid lines, for connection to the inlet port.

1.10 Storage Data

No special instructions are required for storage, other than the usual precautions against deterioration when the unit remains idle for lengthy periods of time.

1.11 Tools and Test Equipment

No special tools or test equipment are required.

II. PREPARATION FOR USE AND INSTALLATION

2.1 Preparation for Use

Uncrating: When shipped, the MR-77 is suitably covered with moisture resistant paper, and is enclosed in a wooden crate.

Upon receipt, the crate and paper should be carefully inspected for signs of mishandling or breakage which might have resulted in damage to the fixture.

After uncrating, examine the unit thoroughly for any damage or deformation.

2.2 Installation

- A. See Figs. 1 and 2.
- B. Read reassembly procedure, Para 5.4.
- C. Install maintenance fixture upright.
- D. Fill reservoir with approximately two (2) gals. of SAE 30, or equal.

III. OPERATING INSTRUCTIONS

3.1 Use and Function of Each Control or Instrument

(All Item Numbers refer to Figure 1)

- A. 3-way air operated valve (Item 2-6), controls the "UP", "STOP", and DOWN movement.
- B. Hand-knob (Item 3-4), locks the radiator holding assembly in various vertical positions.
- c. Locknut (Item 5-4), locks radiator holding assembly in various horizontal positions.
- D. Safety Device (Item 1-1-1.) prevents the overhanging lifting arm and holding assembly from dropping suddenly because of failure of the pneumatic or hydraulic supply, or connections.

3.2 Initial Adjustments and Control Settings

No initial adjustment or control setting is required or applicable to RM-77. However, air pressure supply should be limited to 150 psi maximum. If shop air pressure exceeds 150 psi, a pressure regulator and relief valve will be needed for a branch line to be piped to the Radiator Maintenance Fixture.

3.3 Start-up

3.3.1 Depress handle of Item 2-6 into UP position, and hold until the desired height is reached. Release handle. It will automatically return to neutral (center) position. (See Para 1.4 for Dead Stop).

3.3.2 Swing overhanging arm and radiator holding assembly to desired position.

3.3.3 Lock the safety device (Item 1-1-1)

3.3.4 Loosen locknut (Item 5-4). Rotate holding assembly on horizontal plane to desired position.

3.3.5 Tighten locknut (Item 5-4).

3.3.6 Loosen hand-knob (Item 3-4). Rotate radiator holding assembly to desired position.

3.3.7 Tighten hand-knob (Item 3-4).

3.3.8 Prior to lowering the fixture, repeat steps 3.3.2 thru 3.3.7, in reverse order.

3.3.9 Depress handle (Item 2-6) in DOWN position, until desired height is reached.

3.4 Normal Operation

3.4.1 Position radiator on lower pads (Item 5-6, two ea with lower pads at approximately equal distances from the center of the holding fixture).

3.4.2 Place upper pads (Item 5-7) directly above lower pads.

3.4 Normal Operation Continued

3.4.3 Secure clamps with hold-down hand-knob (Item 5-7-5)

3.4.4 Proceed with step 3.3.1 thru 3.3.9 as needed.

IV. TROUBLESHOOTING

4.1 Shop air applies pressure through the 3-way selector valve, pushes the hydraulic oil in reservoir into cylinder, which forces the cylinder to move up. When the 3-way selector valve is in the DOWN position, the weight of the assemblies will produce a downward movement.

This is the basic principle for operation. All other tasks are manual. Due to this simplicity, a number of malfunctions are reduced to only the following:

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
Cylinder not moving up	Insufficient pressure	Check air pressure
	3-way valve orifice clogged	Remove valve, clean or replace.
	Seal in cylinder head damaged	Replace seals
Cylinder not moving down	3-way valve orifice clogged	Clean valve or replace
Will not rotate vertically	Rotating shaft (Item 4-1), binding	Disassemble, clean, deburr
Will not rotate horizontally	Interface of holding assembly & overhand arm binding	Disassemble, clean, deburr

V. DISASSEMBLY, REPAIR, REPLACEMENT, REASSEMBLY

5.1	<u>Disassemble</u>	<u>Action</u>
	Partholding Assembly, item 5	<ol style="list-style-type: none"> 1. Unscrew Item 5.4. 2. Lift assembly and remove.
	Overhanging arm, Item 4	<ol style="list-style-type: none"> 1. Remove retaining ring, Item 3-2, push out assembly. 2. Remove assembly.
	Drive Guide, Item 3	<ol style="list-style-type: none"> 1. Unscrew Item 1-10 (2 places) 2. Unscrew Item 1-8 (2 places) 3. Remove Item 1-6. 4. Lift assembly and remove.
	Reservoir, Item 2	<ol style="list-style-type: none"> 1. Remove tubing, Item 2-8, by loosening both nuts at each end. 2. Unscrew 4 bolts ea (Item 2-3). 3. Lift assembly and remove.
5.2	<u>Repair</u>	
	No special technique is required to repair this fixture. Standard shop practices are applicable.	
5.3	<u>Replacement</u>	
	See Parts List.	
5.4	<u>Reassemble</u>	<u>Action</u>
	Holding Assembly, Item 5	<ol style="list-style-type: none"> 1. Locate holding assembly, Item 5, on top of lifting arm fixture, Item 4, so that stud goes through guide hole, (placing bearing retainers, Item 5-5, on top and bottom of hole).

5.4 <u>Reassemble (Continued)</u>	<u>Action</u>
Overhanging Arm, Item 4	<ol style="list-style-type: none"> 2. Tighten Item 5-4. 1. Insert rotating shaft, Item 4-1., through guiding hole of Item 3, insert retaining ring, Item 3-2.
Drive Guide, Item 3	<ol style="list-style-type: none"> 1. Locate drive-guide on top of actuator. 2. Insert Item 1-6 into actuator. 3. Tighten Item 1-8 (2 places) 4. Tighten Item 1-10 (2 places)
Reservoir, Item 2	<ol style="list-style-type: none"> 1. Place and secure reservoir to the base, Item 1, using (4) ea bolts and washers, Items 2-4 and 2-3. 2. Connect tubing, Item 2-8. Tighten nuts at each end.
Clamping Fixture Item 5	<ol style="list-style-type: none"> 1. Place clamp assemblies, Item 5-6, (2) on the clamping fixture, Item 5, with pads, Item 5-7-3, facing each other. 2. Insert clamp traveler bar, Item 5-2, through the end hole of Item 5 and through the holes on the clamp assemblies, Item 5-6, and through the other hole in Item 5. 3. Secure Item 5-2 with the set screw, Item 5-3 (2).

VI. PARTS LIST #77003

<u>ITEM NO.</u>	<u>QTY/UNIT</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
1	1	Cylinder and Base Assembly	77003-1
1-1	1	Rod	010800053
1-1-1	1	Safety Device	77003-1-1-1
1-2	1	Piston Assembly	77003-1-2
1-2-1	1	O-Ring	240000022
1-2-2	2	Back-up Rings	240005334
1-2-3	1	O-Ring	240000336
1-2-4	1	Piston	071500021
1-2-5	1	Ring - Cast iron	240004006
1-3	1	Gland Assembly	77003-1-3
1-3-1	1	Rod Scraper	250001222
1-3-2	1	Back-up Ring	240005222
1-3-3	1	O-Ring	240000222
1-3-4	1	Snap Ring	230001300
1-3-5	1	Gland	081500032
1-3-6	1	Back-up Ring	240005334
1-3-7	1	O-Ring	240000336

VI. PARTS LIST #77003

Fig 1

<u>ITEM NO.</u>	<u>QTY/UNIT</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
1-4	1	Nut-Lock	220000210
1-5	2	Snap Ring	5160-98
1-6	1	Support Rod	77003-1-6
1-7	2	Arm	77003-1-7
1-8	2	Bolt 1/2-13 x 3/4" lg. H. H.	
1-9	2	Washer, 1/2" flat	
1-10	2	Bolt, 1/4-20 x 3/4" lg. H. H.	
1-11	2	Washer, 1/4" size x 1" O.D.	
2	1	Reservoir Assembly	77003-2
2-1	1	Reservoir	77003-2-1
2-2	1	Fill Plug 1/2" NPT	3152 x 8
2-3	4	Bolt, 1/4-20 x 3/4" Lg. H.H.	
2-4	4	Lockwasher, 1/4" size	
2-5	1	Nipple-pipe	3328 x 4
2-6	1	Valve-hoist 1/4" NPT	301AC
2-7	1	Elbow, 90°, 1/2" NPT x - 8 tube	49 x 8 x 8

VI. PARTS LIST #77003

Fig 1

<u>ITEM NO.</u>	<u>QTY/UNIT</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
2-8	1	Tube Assembly	77003-2-8
2-9	1	Adapter - Str. 1/2" NPT x -8 Tube	48 x 8 x 8
3	1	Lifting Arm Support Assembly	77003-3
3-1	1	Lifting Arm	77003-3-1
3-2	1	Snap Ring	5160-200
3-3	1	Lube fitting	1641-B
3-4	1	Knob Screw	77003-3-4
3-5	2	Roller Bar	77003-3-5
3-6	2	Roller - Nylon	77003-3-6
3-7	2	Set Screw	
4	1	Pivot Arm Assembly	77003-4
4-1	1	Pivot Arm	77003-4-1
4-2	1	Lube Fitting	1641-B

VI. PARTS LIST #77003

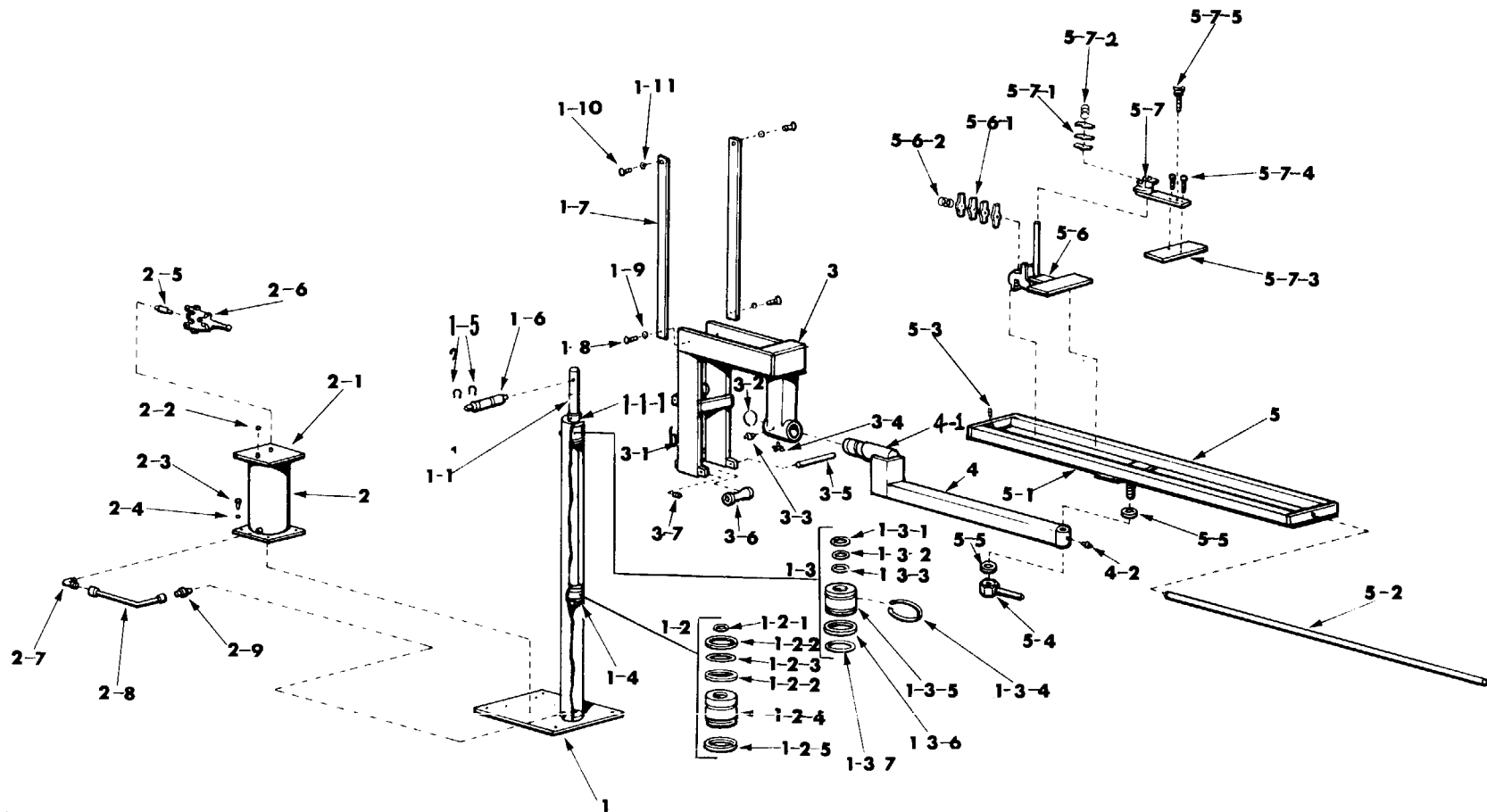
Fig 1 ITEM NO.	QTY/UNIT	DESCRIPTION	PART NUMBER
5	1	Clamping Fixture Assembly	77003-5
5-1	1	Clamping Fixture Frame	77003-5-1
5-2	1	Clamp Traveler Rod	77003-5-2
5-3	2	Set Screw	
5-4	1	Locking Nut	77003-5-4
5-5	2	Washer	
5-6	2	Clamp Assembly 3/4"	77003-5-6
5-6-1	8	Clamp Disc	
5-6-2	2	Spring	
5-7	2	Clamp Assembly 1/2"	77003-5-7
5-7-1	6	Clamp Disc	
5-7-2	2	Spring	
5-7-3	2	Pad	77003-5-7-3
5-7-4	4	Screw	
5-7-5	2	Knob Screw	77003-5-7-5

VII. Safety Precautions

OPERATOR SHOULD MAKE SURE THAT ALL HAND KNOBS AND CLAMPS
ARE SECURED.

VIII. Warning

SAFETY DEVICE, ITEM 1-1-1, MUST, BE TIGHTENED AFTER RADIATOR
HAS BEEN RAISED TO DESIRED HEIGHT AND POSITION.



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
AND TOLERANCES ARE

.XXX	.XX	ANGLES
± .010	± .030	± 0°30'

MACH. FINISH 125/ OR BETTER

BREAK SHARP EDGES 0.10
REMOVE ALL BURRS
DIMS. APPLY AFTER FINISH

FIG 1

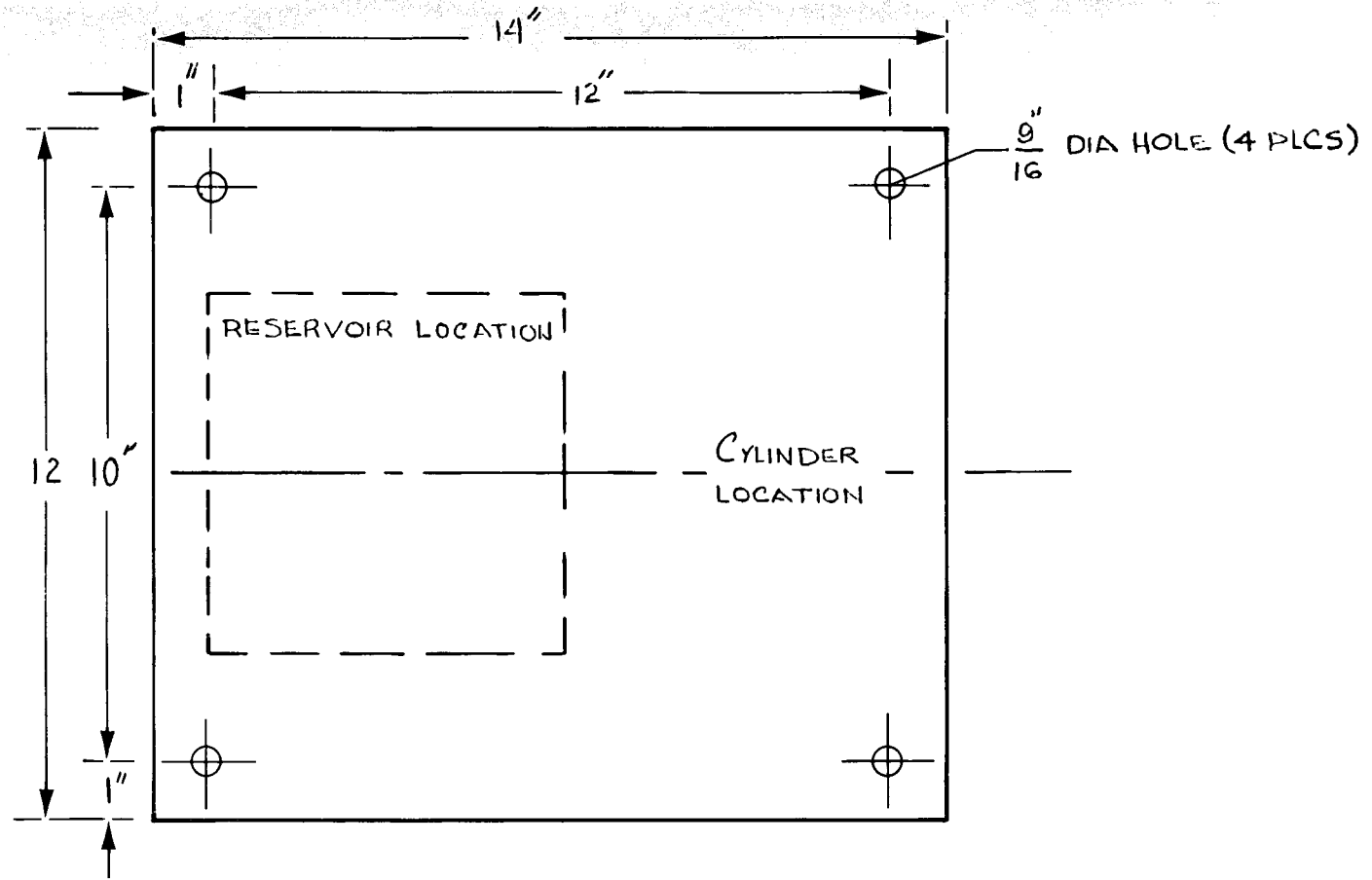


FIG 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
AND TOLERANCES ARE

.XXX	.XX	ANGLES
± .010	± .030	± 0°30'

MACH. FINISH 125 OR BETTER

BREAK SHARP EDGES 0.10
REMOVE ALL BURRS
DIMS. APPLY AFTER FINISH

CHIEF
CHK
VE
ANGLE
1 0'30'
TYPE II
010
100

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512		191	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.

Figure 191, item 3 has the wrong NSN. Supply rejects orders for this item. The NSN shown here is not listed in the AMDF or the MCRL.

Please give us the correct NSN and P/N.

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John Smith

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