

AQUA CAT MANUAL
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ONAN ENGINE PARTS & SERVICE CATALOG

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MANUFACTURER'S LIMITED WARRANTY

Hydra-Master Corporation extends to the original purchaser of goods for use, the following Warranty covering goods manufactured or supplied by Hydra-Master, subject to the qualifications indicated.

**THERE IS NO OTHER EXPRESSED WARRANTY
IN NO EVENT IS HYDRA-MASTER LIABLE
FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

- Hydra-Master Corporation warrants to original purchaser for the periods set forth herein that goods manufactured or supplied by it will be free from defects in workmanship and material, provided such goods are installed, operated and maintained in accordance with Hydra-Master's written instructions and that such installations are performed or inspected by Hydra-Master's Authorized Representatives.

PRODUCT OR SYSTEM

CLEANING UNIT

Engine
Vacuum/Blower
High Pressure Pump
Heater System
Frame
Instruments & Instrument Panel
Hoses (Internal)
Cleaning Tools
Hose Reel(s)
Tanks
Fuel
Vacuum

Internal Controls & Valves
All Fittings (Internal)
Main Power Coupler (Eng. to Vacuum)

One Year or/1000
hours from date
of purchase.

Warranty expires
upon attaining
either of the above

HOSES AND FITTINGS (EXTERNAL)

High Pressure Hose
Vacuum Hose
Quick Connectors or
Solution Couplers
Pulley Belts
Garden Hose

Three Months (90 Days)
from date of purchase.

NOTE: The Ninety day limitation on Warranty regarding hoses and quick connect fittings equals or exceeds warranties extended by respective manufacturers/suppliers.

- Hydra-Master's sole liability and purchaser's sole remedy for a failure of goods under this Warranty and for any and all other claims arising out of the purchase and use of the goods, including negligence on the part of the manufacturer, shall be limited to the repair of the product by the repair or replacement, at Hydra-Master's option, of parts that do not conform to this Warranty. Product or part(s) must be returned to Hydra-Master Corporation, 20309 - 64th Ave. W., Lynnwood, Washington 98036, transportation charges prepaid.
- WARRANTY DOES NOT INCLUDE:** reimbursement for labor, travel time, mileage or work loss incurred in the removal, reinstallation or replacement of parts and/or equipment approved under the provisions of this Warranty.
- THIS WARRANTY SHALL NOT APPLY TO:**
 - Cost of maintenance, adjustments, installation and start-up.
 - Failures due to normal wear, accident, misuse, abuse, negligence or improper installation.
 - Products which are altered or modified in manner not authorized by Hydra-Master Corporation in writing.
 - Failure of goods caused by defects in the system or application in which the product is installed, i.e. truck, van, building, etc.
 - Telephone, telegraph, teletype or other communications expense.
 - Living and travel expenses of persons performing service excepting those authorized by Hydra-Master under prior contract.
 - Rental equipment used while Warranty repairs are being performed.
 - Overtime labor requested by purchaser.
 - Parts, sub-assemblies, assemblies or major components affected directly or indirectly by freezing.

IMPORTANT: Freeze Guard Systems incorporated within units either as standard equipment or as options are convenience items only. Hydra-Master assumes no responsibility for their failure, power failures affecting their performance or any resulting damage.

Items susceptible to damage by freezing are as follows:

- | | |
|---|---|
| <ol style="list-style-type: none"> Pressure & Solution Gauges Flow Meters High Pressure Pumps Heater or heat exchanger components Hoses Fittings (steel, brass and plastic) | <ol style="list-style-type: none"> Solution quick connect fittings (couplers) Relief valves or high pressure by-pass valves Cleaning tools and their respective controls/valves Regulators and solenoids Solution & pressure switches Pump clutches damaged by frozen pumps |
|---|---|
- No person is authorized to extend any other warranties or to assume any other liability on Hydra-Master's behalf unless made or assumed in writing by an officer of Hydra-Master Corporation and no person is authorized to give any warranties or assume any other liabilities on behalf of seller unless made or assumed in writing by seller.



Claim No. _____

WARRANTY CLAIM

DATE CLAIM FILED _____

Customer Name _____

Address _____ City _____ State _____ Zip _____

Equipment Model _____ Serial No. _____

Purchased From _____ Date Purchased _____

No. of Hours Used _____ Defective Part _____

Briefly Describe Defect _____

Signature _____

Factory Use Only

Date Part Received _____ Inspected By _____

Describe Findings: _____

Action Taken: _____

Amount of Claim \$ _____



PARTS ORDERS

Dear Customer,

To expedite your parts needs, please call your Regional Sales Representative. In most instances, he either stocks or has access to parts through a Regional Service Center.

In the event parts are unavailable locally, your Sales/Service Representative will contact Hydra-Master and coordinate your needs. If this becomes necessary, always indicate the method of shipment you desire, i.e. UPS, UPS Blue Label, Air Freight, Air Express, Etc..

Thank you for your compliance with the above request and we shall do our best to fulfill your needs.

WARRANTY NEEDS

Hydra-Master Warranty is second to none and provides you the assurance of continued reliability. We realize the importance of minimum down time which can only be achieved through manufacturers support. The following procedure defines the steps necessary to provide you this service. Compliance with it is essential if parts are required.

1. Call Hydra-Master Corporation (206) 775-7275) and provide the following:
 - A. Name of Company and address
 - B. Model of equipment
 - C. Date of purchase
 - D. Hours on the unit
 - E. Serial number of unit
 - F. Name of person authorized to order parts
 - G. Salesman unit purchased from
 - H. Description of the problem
 - I. Pressure readings on high pressure gauge with wand turned on and turned off
2. Method of shipment - UPS, Air Freight, Air Mail, Air Express, Auto Freight, Etc..

3. DO NOT give malfunctioning part(s) to a sales/service representative. All parts must be returned, freight prepaid, to Hydra-Master Corporation for evaluation.

Hydra-Master's warranty policy provides parts without charge for thirty days to customer maintaining good credit rating. Malfunctioning parts must be returned directly to Hydra-Master Corporation for final disposition. Un-approved warranty evaluations and/or failure to return part(s) for warranty consideration will result in appropriate charges. Detailed instructions always accompany each shipment to outline both your obligations and options to the warranty procedure.

Any questions you have regarding the warranty program should be directed to service personnel at Hydra-Master Corporation. We shall endeavor to be fair in our evaluation of your warranty claim and always provide you a complete analysis of our findings.

AQUA CAT SPECIFICATIONS

GENERAL

Warranty	* One Year or 1000 Hours
Dimensions	* 48" L X 32" W X 34" H
Weight	* 550 Lbs.

COMPONENTS

A. Engine	* 20 Horsepower Onan Industrial Water- Cooled
RPM	* 2600 Factory Recom- mended
Fuel	* Unleaded
Oil Capacity	* 3½ Quarts W/Filter
B. Vacuum/Blower	* Positive Displacement (Lobe Type)
RPM	* 2600 Factory Recom- mended
Water Lift & Air Flow	* 195-210 inches Pre-set 275 CFM
Oil	* 40 S.A.E.
Grease	* High Temperature Bearing
C. Water Pump	* Positive Displacement Piston W/Stainless Cylinders
Oil	* Special Cat Oil Lubricant
Pressure	* 300 PSI Factory Pre-Set Adjustment
Pulley Belt	* 5L380
R.P.M.	* 900
D. Heat Exchanger	* Tube Type Stainless
Heat Setting	* 190 - 200 Max
Tank - Exchanger Storage	* Anodized Aluminum (Non-Corrosive)

E. Frame Construction	* Steel
Legs	* Retractable W/Castered Wheels
Recovery Tank	* Anodized Aluminum
F. Hoses	
Internal	* Teflon W/Steel Rein- forced Sheath
External Solution	* High Pressure - Non Marking 2500 P.S.I. Rated
External Vacuum	* Heavy Duty Flexible and Non-Marking
G. Tools	
Hydra-Hoe Carpet Wand	* Stainless Steel W/Adjustable Handle and High Pressure Valve Jet Size 8006E
Stair Sprayer	* Replaceable Lips
Stair Vacuum	* Hand Held W/Single Jet 8006E
H. Battery	* Cast Aluminum
I. Safety Features	* 12 VDC - VW Type
	* Enclosed Frame
	* Automatic Vacuum Tank Limit Switch
	* Over Temp Limit Switch W/Auto Pump Out
	* Over Temp Engine Shut Down
	* Incoming Water Pressure Switch W/Auto Shut Down Capability
J. Instrumentation	
Pressure Gauge	* 0-1000 PSI Glycerine Filled
Temperature Gauge	* 100-200 Degrees
Vacuum Gauge	* 0-30 HG
Hour Meter	* Total Lapse Time in Hours and Tenths
Chemical Flow Meter	* 0-10 Gallons/Hour
Choke	* Mechanical
Service Computer	* Electronic

- | | |
|---|---|
| Over Temperature Indicator | * Auto Bulb |
| Eng. Temp. & Water Temp Switch | * Electrical Switch |
| Master Fuse | * 20 AMP |
| Charging Fuse | * 15 AMP |
|
K. Options and Auxillary
Systems |
* Pump-in System W/Aux.
Pump & Holding Tank
For Transporting Water
Supply. |

SPECIFICATIONS AQUA CAT

DASH PANEL

STAINLESS STEEL

HIGH PRESSURE GAUGE	0-1000 PSI GLYCERINE FILLED
TEMPERATURE GAUGE	100-200 DEGREES
VACUUM GAUGE	0-30 HG
HOUR METER	HOURS & TENTHS OF HOURS
CHEMICAL FLOW METER	0-10 GPH
MASTER POWER FUSE	30 AMP
CHARGING FUSE	15 AMP
FREEZE GUARD FUSE	15 AMP
VISUAL ON INDICATOR	AUTO TYPE BULB
HI-TEMP INDICATOR	AUTO TYPE BULB
AUX. PUMP INDICATOR	AUTO TYPE BULB
SERVICE REQUIRED LIGHT	AUTO TYPE BULB
CHOKE	PULL TYPE
ENGINE TEMP & WATER TEMP	ELECTRICAL SWITCH
AUX. PUMP	ELECTRICAL SWITCH

GENERAL INFORMATION

This manual contains installation and operation instructions as well as information required for proper maintenance, adjustment and repair of this unit. Since the first and most important part of repair work is the correct diagnosis of the trouble, a general troubleshooting section and component manual troubleshooting charts have been included for your convenience.

Unlike the garden tractor, lawnmower and cement mixer all having one and maybe two functions to perform, the Hydra-Master truck mounted carpet cleaning plant has many functions to perform simultaneously.

1. Engine has to run constant RPM.
2. Vacuum has to pull air and dirty water back from cleaning site.
3. Water pump provides stable pressure at proper water flow for cleaning.
4. Chemical has to be injected into the water stream at the right consistency.
5. Heater must fire on demand and maintain proper heat. (Except for Aqua Cat).
6. Vacuum tank must store dirty water until drained.

As you can see it is not just a turn key operation with only one thing to worry about, DOES IT START?!

As there is no guesswork in the manufacture of these highly advanced cleaning plants, there must be none in preparing it to get the job done in the field. It is the purpose of this manual to help you properly understand, maintain and service your Hydra-Master cleaning plant. Follow the directions carefully and you will be rewarded with years of profitable trouble-free operation.

It is imperative that no section be overlooked when preparing for operation of this equipment.

WARNING

Hydra-Master uses this symbol throughout the manual to warn of possible injury or death.

CAUTION

This symbol is used to warn of possible equipment damage.

MAINTAIN GOOD PROFIT - WITH GOOD MAINTENANCE

In the past 3 years, we at Hydra-Master have become alarmed at the increasing number of calls pertaining to service problems.

Our findings are that 85% of all down time is a direct result of poor maintenance habits. If maintenance is a difficult function to schedule into your busy operation, here is one important parallel that may influence your thinking toward maintenance procedure:

Each hour of machine operation is equal to 75 miles of driving.

A 5½ hour average day equals 310 miles.

An average 5 day week or 27½ hours = 2062.5 miles.

Each month an average of 8660 miles is put on the machine.

One year of average machine operation is equal to 103,920 miles.

Compare this to your car and the maintenance you would give it for this many miles of trouble-free driving!

Enclosed is a maintenance log sheet that should be attached to the machine and kept in force by a responsible operator.

GOOD PROFITS AND GOOD MAINTENANCE GO HAND IN HAND

HYDRA-MASTER WANTS YOU TO BE A TROUBLE-FREE DRIVER!

HYDRA-MASTER CORPORATION

MAINTENANCE LOG		DATE	DATE	DATE	DATE	DATE	DATE	DATE
SERVICE ITEMS	MAX HRS.	HOURS	HOURS	HOURS	HOURS	HOURS	HOURS	HOURS
Inspect Machine Generally	8							
Check Engine Oil	8							
Check Pump Oil	8							
Clean Vac holding tank, Nylon filter bag & S/S filter W/brush	8							
* Change Eng. oil (Summer SAE 30 Winter SAE 20) 3 Qts. W/O oil filter 3½ Qts. W/Oil filter	30							
* Disassemble H/P bypass valve & lube stem assy. (ref. drawing)	100							
* Remove Machine from Truck for Complete inspection of:								
Battery Electrolytes	100							
Belts and Pulleys	100							
Fuel Lines	100							
Nuts and Bolts	100							
Heater cover (Except Aqua Cat)	100							
Heater Burner Assy. (Ex. Aqua Cat)	100							
Service Air Cleaner	100							
Clean Vacuum Tank (free float hinge of lint & lube)	100							
Spray Quick Connectors (all with WD 40)	100							
Lightly Oil Direct Drive Shafts	100							
Check for Chafing Wires	100							
Tighten Exhaust Manifold Clamps	100							
Tighten Dodge Coupler (direct drive) (DO NOT OVERTORQUE)	100							
Replace Engine Oil Filter	200							
Replace Spark Plugs (LP gas gap .018/gas gap .025)	200							
* Change Blower Oil (40 wt. non-detergent)	200							
Replace Points & Condenser (gap .020)	300							
* Grease Blower Fittings	300							
* Change Pump Oil (Cat Oil)	300							
Lube Throttle Lever	300							
Heater Slide & Button Assembly	300							
Check Engine Valve Clearance & Decarbon Heads	500							
Replace Pump Short Cup Kit	1000							
Inspect Valves (grind if nec.)	1000							

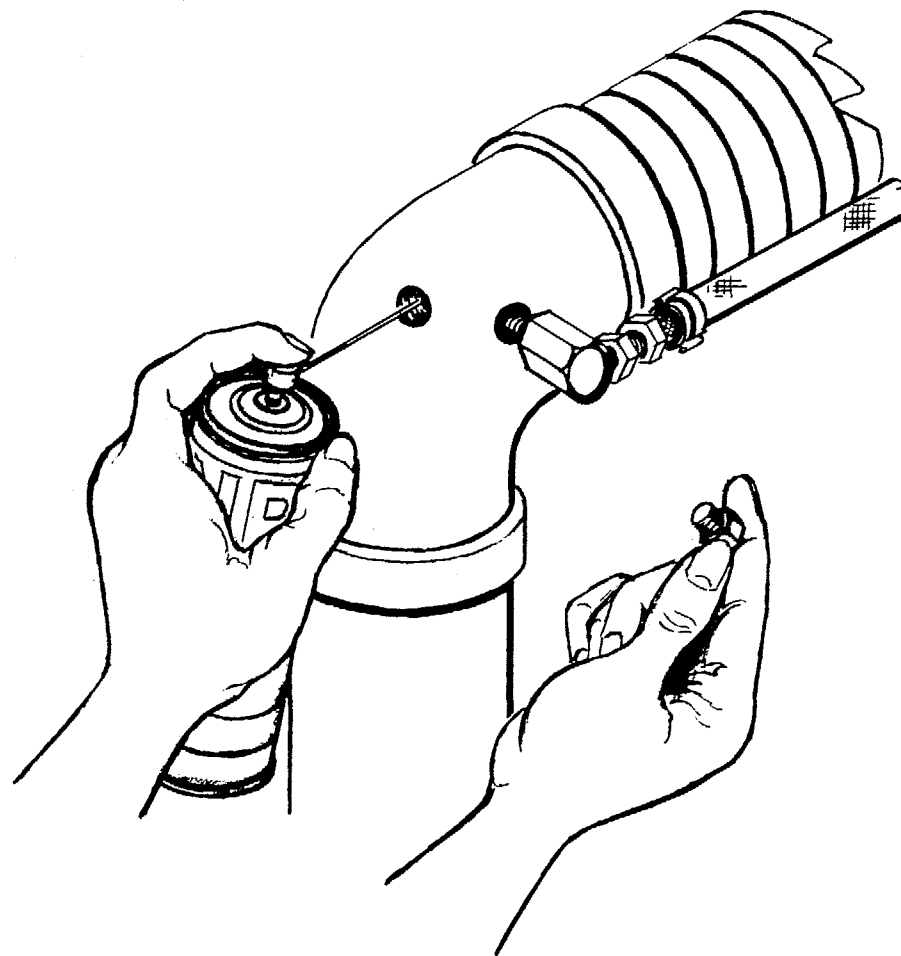
Charge Battery W/Lead Wires
 Disconnected

- * Engine Oil Summer 30 SAE
- * Blower Oil 40 SAE Non-Detergent
- * Pump Oil Special Cat Oil

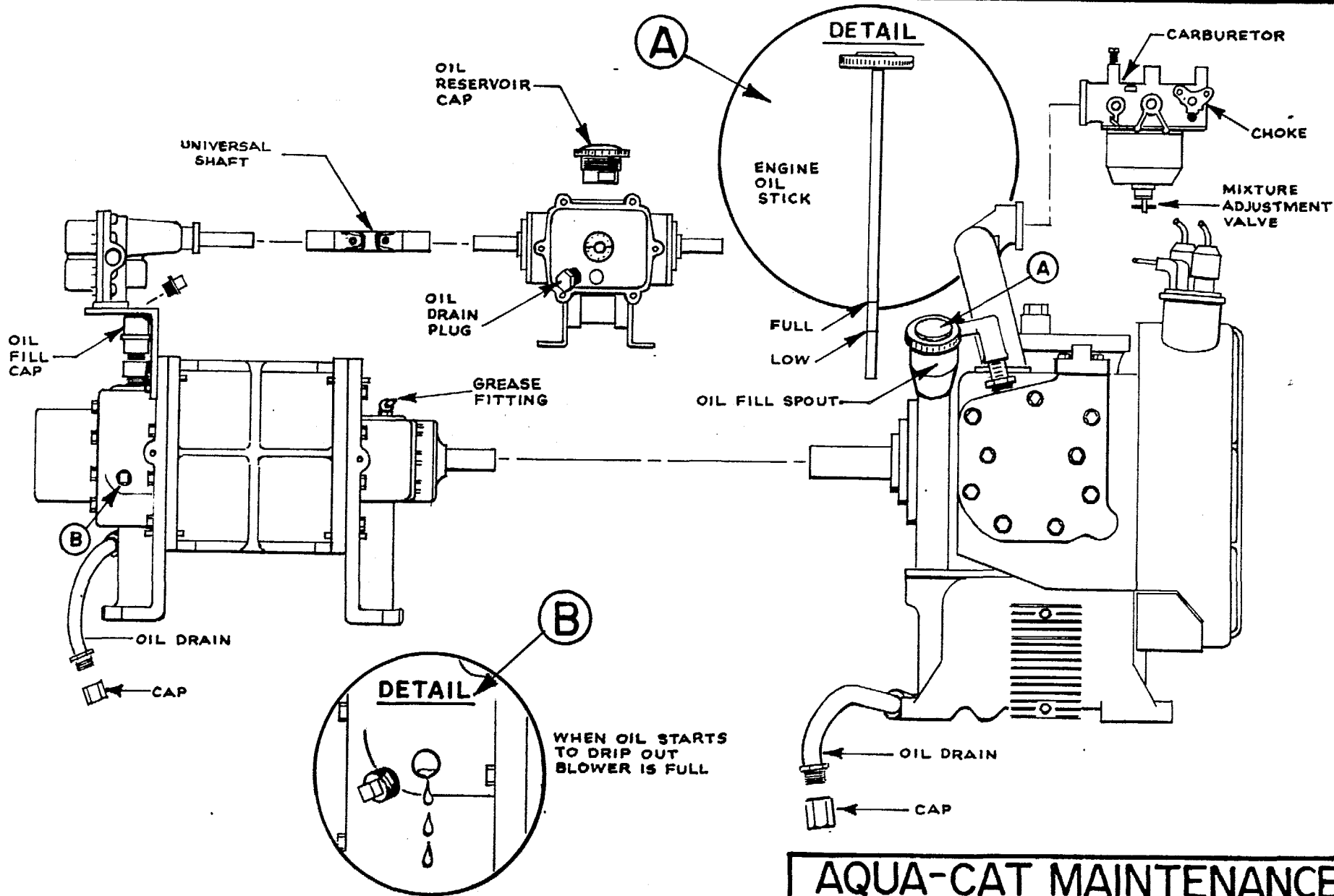
Recommended Fuel - Unleaded Gasoline

SERVICE REMINDER - The Service Reminder operates on 50 hr. cycle. When Service Reminder light is on it is time for 50 hr. check. On completion of 50 hr. check, set switch located on the computer (on back of dash panel). After re-setting switch to the opposite position the computer is ready for another 50 hr. cycle. Be sure to follow the maintenance log suggestions supplied with the manual.

To assure correct maintenance of the blower, a lubrication, used periodically, is required. Suggested is LUBRICANT LPS/25 or equivalent.



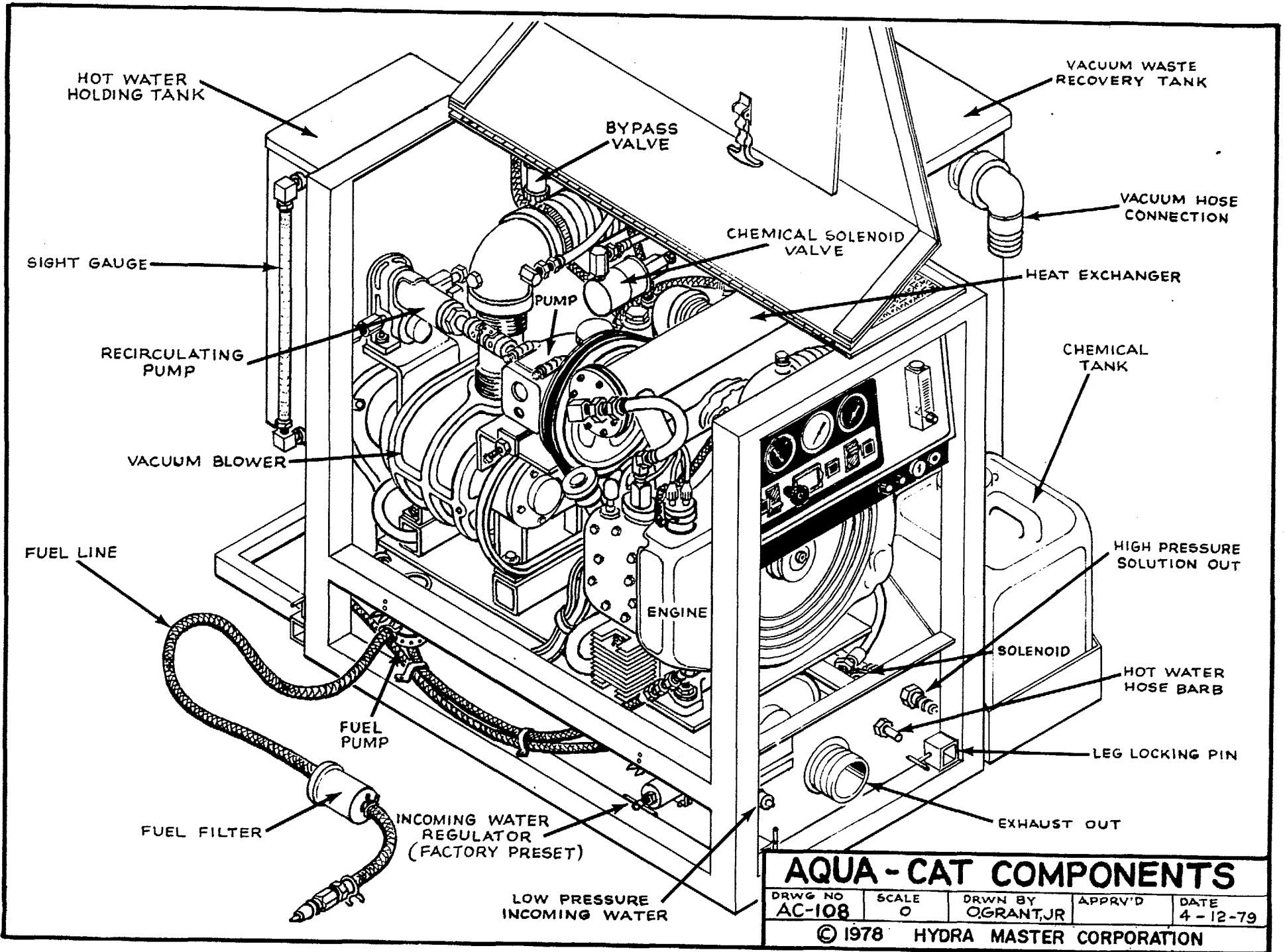
BLOWER LUBRICANT DETAIL				
DRWG NO	SCALE	DRWN BY	APPRVD	DATE
HM-100	0	O. GRANT, JR.		4-3-79
© 1978 HYDRA MASTER CORPORATION				



AQUA-CAT MAINTENANCE

DRWG NO AC-102	SCALE 0	DRWN BY O. GRANT, JR.	APPRVD	DATE 4-4-79
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AQUA - CAT COMPONENTS

DRWG NO AC-108	SCALE 0	DRWN BY OGRANT, JR	APPRV'D	DATE 4-12-79
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TRUCK PREPARATION

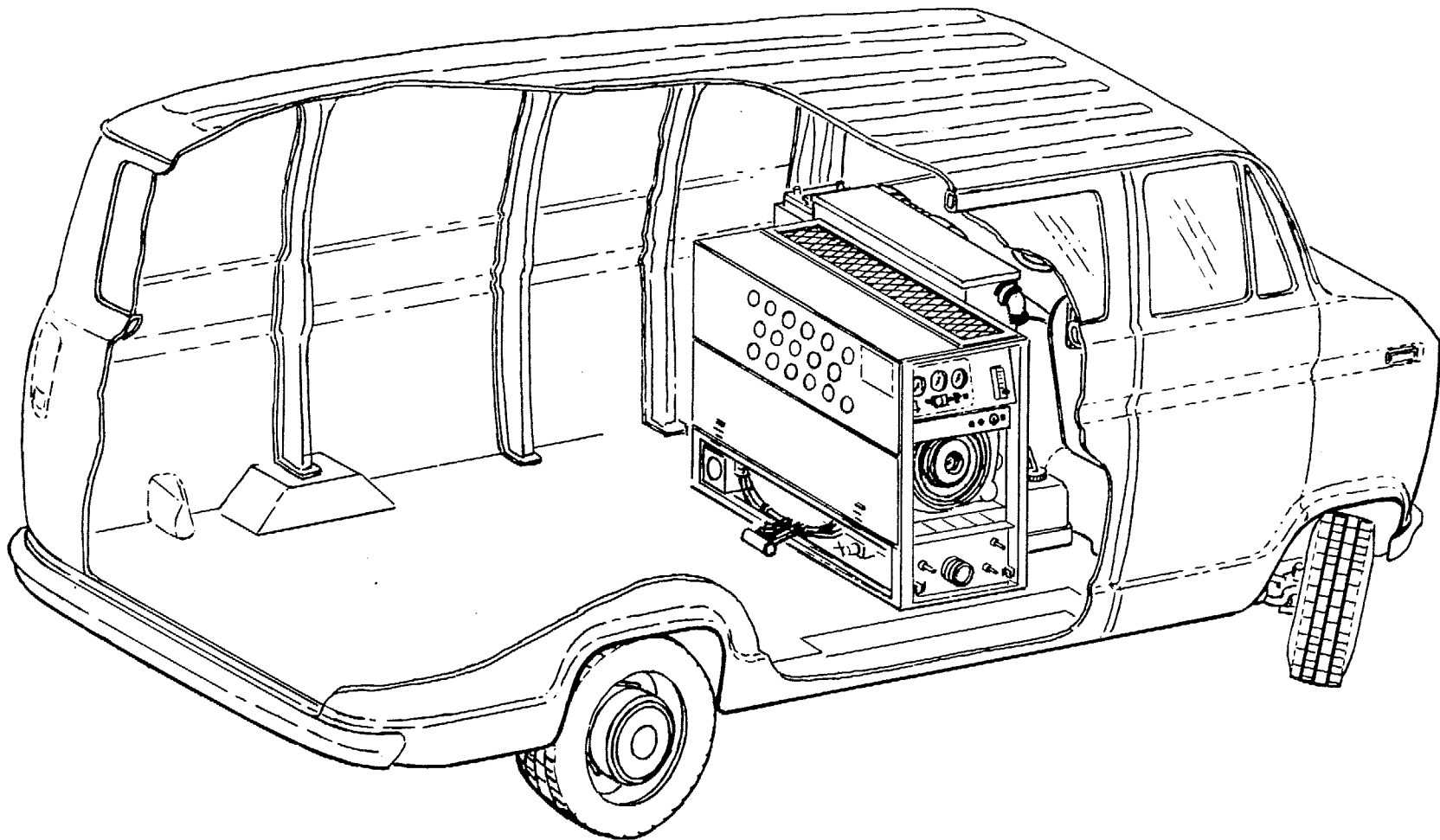
- Truck Prep.: Materials needed:
1. 6' x 12' Ozite indoor/outdoor carpet
 2. 4x8x5/8" Plywood (1 side good)
 3. 6 - 1½" sheet metal screws
 4. 1 - 1"x1"x18" angle iron
 5. 3 - 2"x5/16" bolts
 6. 3 - 5/16" flat washers
 7. 3 - 5/16" lock washers
 8. 3 - 5/16" nuts
 9. 1 can marine adhesive
 10. 1 staple hammer or glue gun
 11. 1 gas hook-up (thru floor mount)

Decide location of machine in Van.

- A. Side door: Most installations are side door. This provides rear access for accessories and hoses as well as unobstructed access to component/working side of machine, thus making it a bit easier to perform maintenance and/or repair without removing unit from the truck.
- B. Rear door: Although this location partly limits working access, it does direct the noise away from the cleaning site. Some cleaners in the colder areas prefer this location because it puts the weight mass over the rear wheels for better traction in ice and snow. Rear mounting requires the unit to be slid to the right side as far as possible. This not only provides adequate working space on the component side of the unit but also makes better weight distribution inside the Van (engine and component wt. line up over drive shaft). Also, it is physically easier to load unit into rear door due to height of Van bed. When carrying water, tank will then be located over center of Van.

WARNING

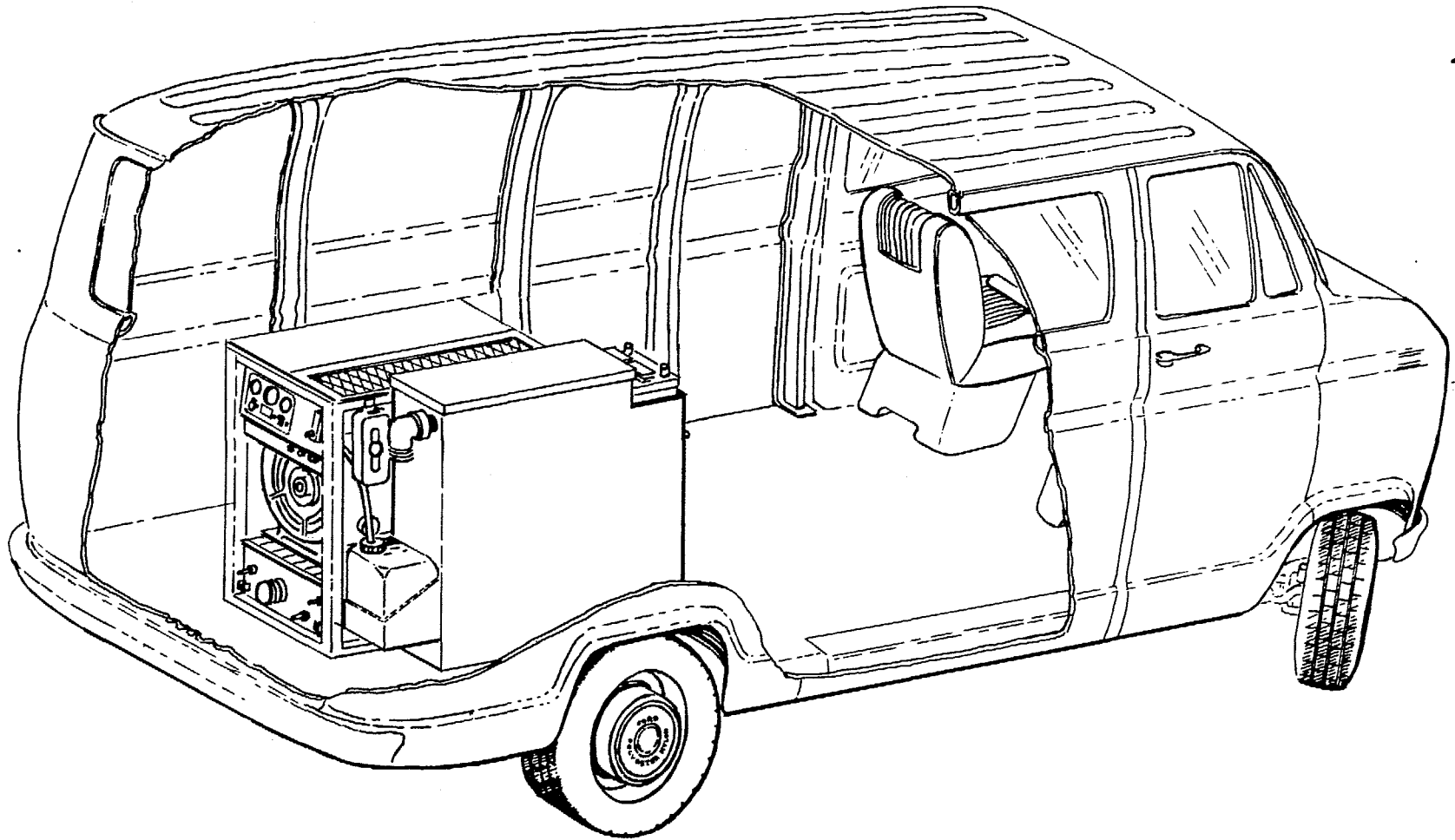
Ensure that machine is well secured to the floor of Van w/hardware supplied. Sudden or crash stop will cause machine to rocket forward, all 550 lbs. worth! Protect your driver and machine. SECURE IT!



UNIT LOCATION I

DRWG NO	SCALE	DRWN BY	APPRVD	DATE
HM-124	0	O.GRANT, JR.		4-4-79

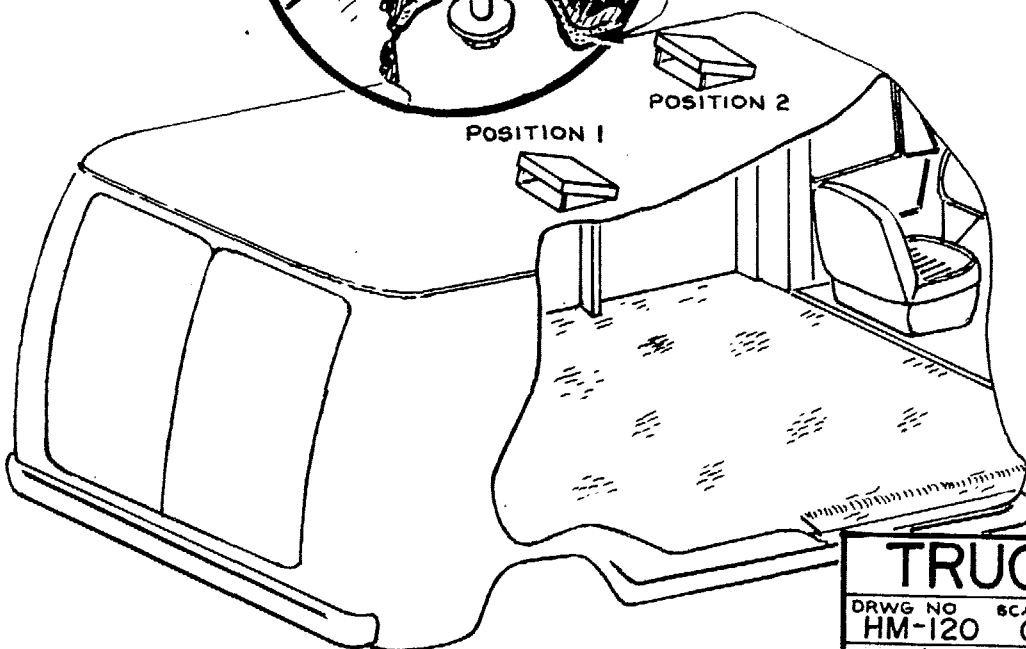
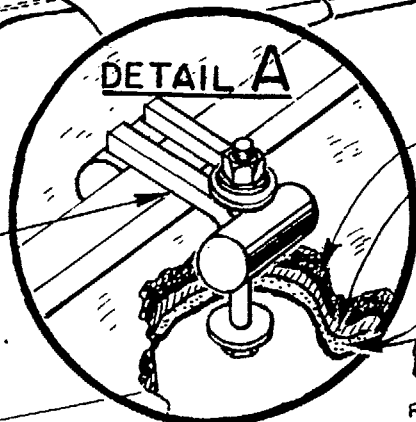
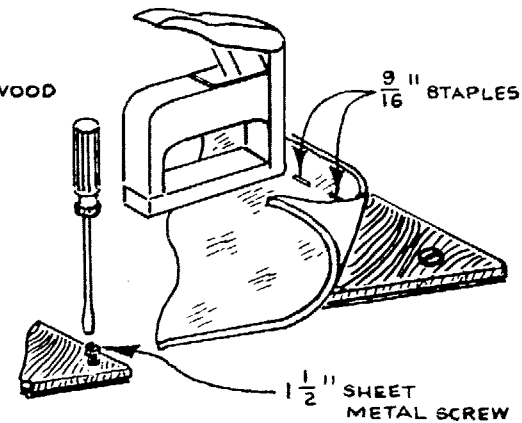
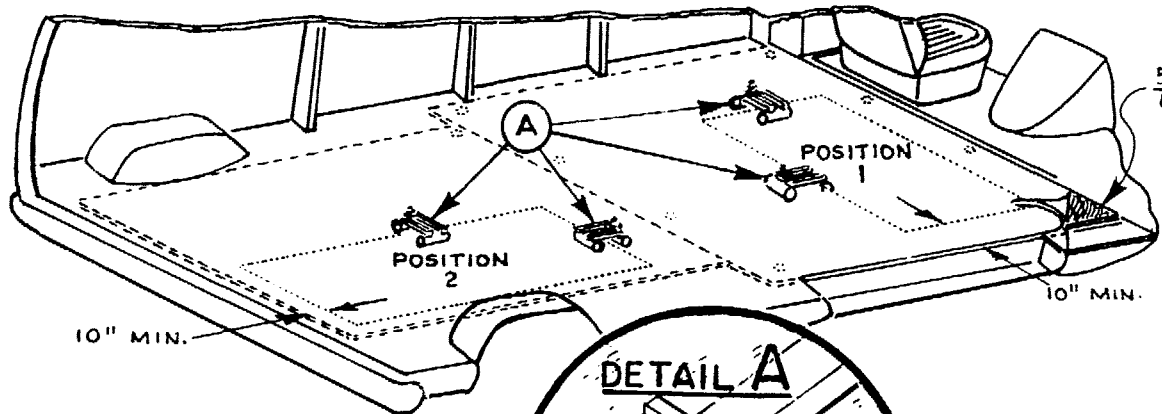
© 1978 HYDRA MASTER CORPORATION



UNIT LOCATION II

DRWG NO	SCALE	DRWN BY	APPRVD	DATE
HM-125	0	O.GRANT,JR.		4-3-79

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Note:

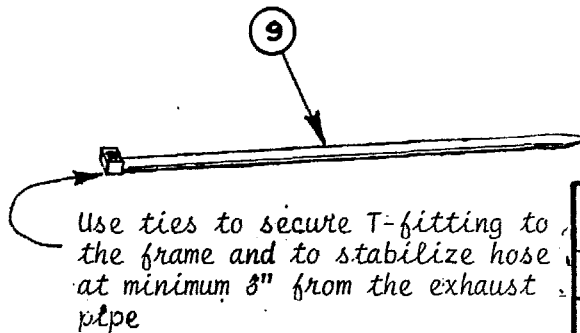
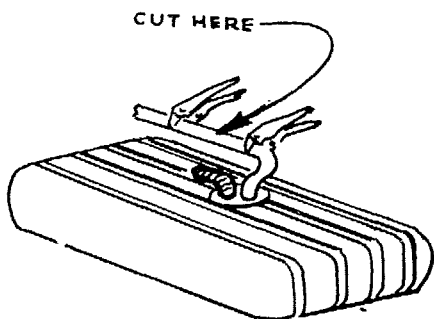
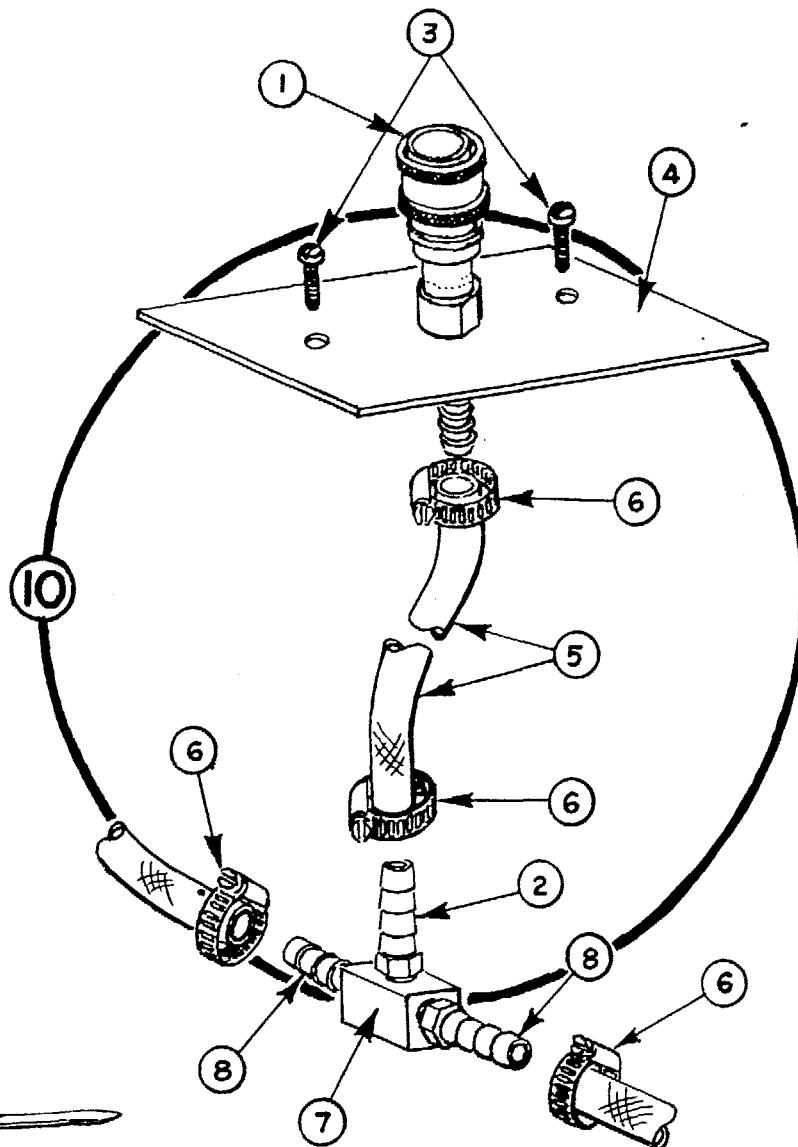
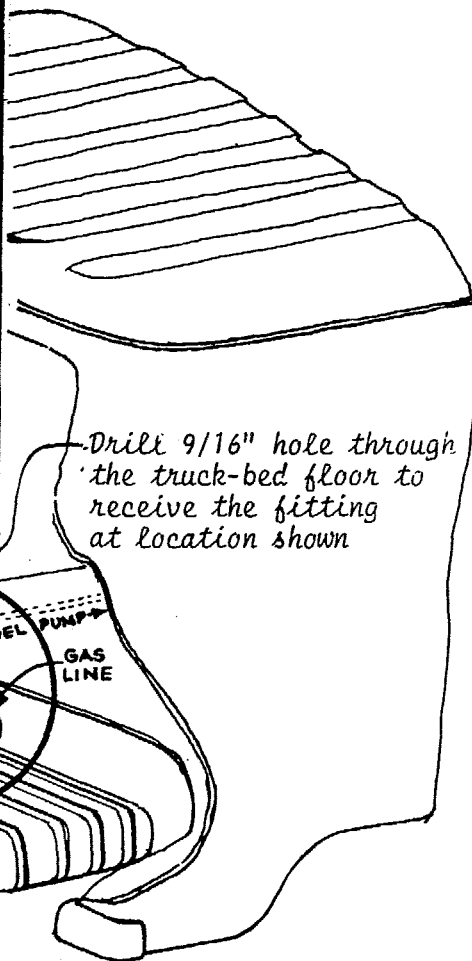
1. A non-rubber backed indoor-outdoor type carpet is stapled in place after the plywood has been attached to the bed of the van.
2. To prevent the machine from sliding Tie Down Cleats must be positioned over the frame. (Shown in DETAIL A)
3. A vent placed in the van roof directly over the heater is recommended.

TRUCK PREPARATION

DRWG NO	SCALE	DRWN BY	APPRVD	DATE
HM-120	0	O.GRANT, JR		4-4-79

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REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	611002	QUICK CONN. SOCKET	1
2.	613024	HOSE BARB	2
3.	619130	SCREW	2
4.	625701	PLATE	1
5.	637104	HOSE	1
6.	620104	HOSE CLAMP	4
7.	612090	FITTING	1
8.	613025	HOSE BARB	2
9.	620305	TIE WRAP	6
10.	625700	THRU FLOOR GAS HOOK UP (Kit)	1



FLOOR GAS DIAGRAM

DRWG NO	SCALE	DRWN BY	APPRVD	DATE
HM-121	0	O. GRANT, JR.		4-4-79

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AQUA CAT

OPERATION PRECAUTIONS

MACHINE ADJUSTMENTS: ALTHOUGH THIS UNIT HAS BEEN FACTORY ADJUSTED IT MAY REQUIRE ADDITIONAL ADJUSTMENTS TO ACHIEVE OPTIMUM PERFORMANCE; I.E. ALTITUDE MAY REQUIRE CARB ADJUSTMENT AND AMBIENT TEMPERATURES MAY REQUIRE HEAT CONTROL ADJUSTMENT. WHEN REQUIRED, RE-ADJUSTMENT MUST BE ACCOMPLISHED BY AN AUTHORIZED HYDRA-MASTER REPRESENTATIVE OR WARRANTY MAY BE INVALIDATED.

ENGINE COOLING: UNITS EMPLOYING AIR COOLED ENGINES MUST NOT BE INCAPACITATED WITHIN A VAN WITH DOORS AND WINDOWS CLOSED. EXCESSIVE TEMPERATURES WITHIN THE ENGINE WILL RESULT IN PREMATURE ENGINE FAILURE AND A COMPROMISE OF APPLICABLE WARRANTY



A. WHEN RUNNING THE AQUA CAT THE COLD WATER SOURCE MUST BE CONNECTED TO KEEP ENGINE PROPERLY COOLED.

LEVEL: DURING OPERATION, VAN OR TRAILER MUST BE PARKED ON LEVEL GROUND NOT TO EXCEED + OR - 10 DEG.. FAILURE TO INSURE PROPER LEVELING MAY PREVENT PROPER INTERNAL LUBRICATION OF ENGINE, VACUUM AND/OR HIGH PRESSURE PUMP COMPONENTS.



FREEZE PROTECTION: ALL UNITS ARE EQUIPPED WITH FREEZE PROTECTION DEVICES AND/OR INSTRUCTIONS PROVIDED ON OPERATING LABELS FOR THE PREVENTION OF FREEZE DAMAGE.



FAILURE TO PERFORM RECOMMENDED STEPS OR USE SYSTEMS DESIGNED FOR THIS PURPOSE CAN RESULT IN EXPENSIVE COST, DOWNTIME AND COMPROMISE TO APPLICABLE WARRANTY.

FREEZE PROTECTION PROCEDURE

Protecting the Aqua Cat from accidental freezing is a relatively easy task if the following procedure is complied with. Failure to adopt it in sub-freezing climates may result in costly repair or replacement of components.

1. Drain the water from the hot water recirculating tank with the drain hose provided.
2. Pour 5 gallons of 50/50 antifreeze and water into the recirculating hot water holding tank. Lid on tank must be removed to perform this step and then replaced.

NOTE: Antifreeze solution must be checked with each use to ensure safe levels are maintained since dilution will occur. It is recommended that levels are monitored frequently and antifreeze added as necessary to provide an added ten degree margin of safety.

3. To effectively pump antifreeze solutions throughout fittings, hoses, engine, pumps, etc., start unit without incoming water attached and with safety pressure switch locked out using the switch provided for this purpose located on the dash panel.
4. With solution hoses and cleaning tool attached, draw antifreeze solution or alcohol through the chemical flow meter and hoses for 20 - 30 seconds. Unit is effectively freeze guarded when antifreeze solution starts to discharge from cleaning tool.
5. Prior to turning unit off, move rocker lock-out switch to its opposite setting to open the over-temperature solenoid on the hot water discharge line. This ensures total elimination of water from all remaining water lines.
6. Prior to starting future cleaning operations the following must be performed.
 - A. Drain antifreeze solutions into a 5 gallon sealed container and save for future use.

- B. Attach incoming water supply hose just prior to starting unit and flush antifreeze from unit by turning cleaning tool on. Cleaning operation can resume once antifreeze no longer is emitted from the cleaning tool.

NOTE: All hoses containing antifreeze must be cleared in this manner to prevent possible discoloration to carpet fibers.

7. Repeat operations 1 through 5 when retiring the unit for the day or when placing unit into storage.

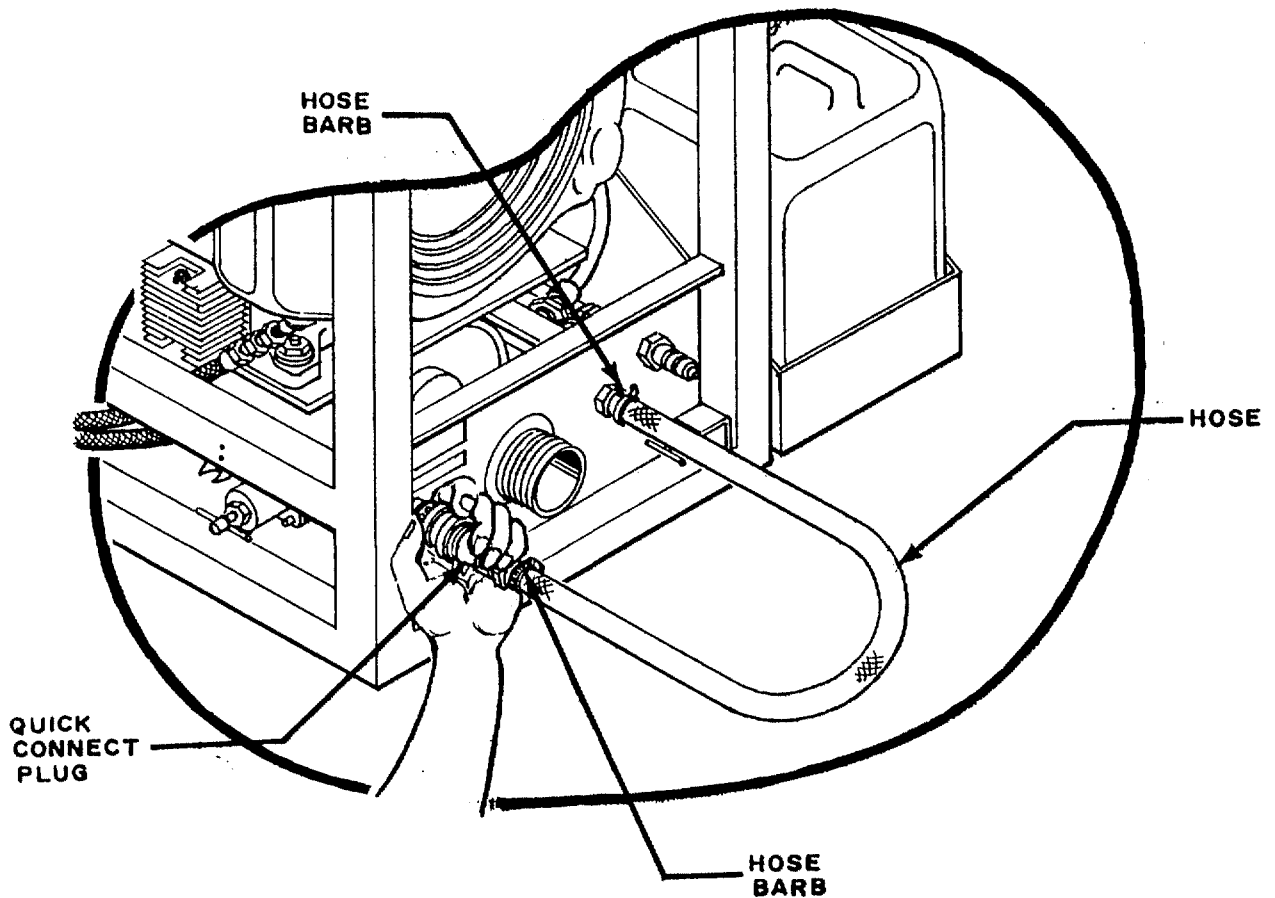


FIGURE A

TROUBLESHOOTING

I. ENGINE ONAN INDUSTRIAL (Ref. Onan Operation Manual - Sect. 12)

PROBLEMSCAUSE AND/OR SOLUTION

- | | | |
|--|------------------|---|
| FAILS TO START
ENGINE STOPS WHILE
CLEANING
ROUGH RUNNING
BACK FIRING | -
-
-
- | 1. Loss of fuel : Plugged fuel line.
Defective fuel pump.
Empty gas tank.
Kinked fuel line.

2. Blown fuse: Electrical short/coil open.
Coil wires not fully inserted
in coil.

3. Maladjusted Points.

4. Oil on points: Drill 1/8" hole in point
box cover approx. 3/8"
from bottom. Clean points.

5. Check plugs: Remove and/or replace/clean.
Check for spark.

6. Check compression: Possible hung valve.

7. Float valves in recovery tank: Stuck in
upright position or defective. NOTE: Disconnect
float wire.

8. Bad starter: Check for loose wire or
connection.

9. Plugged Carburetor jet.

10. Lack of engine oil: Engine seized.

11. Choke jammed (on gas models) push to rear
of carburetor.

12. Too lean a gas mixture: Adjust at T-Handle
on bottom of carburetor.

13. Dead Battery: No water.

14. Loose battery cable at battery.

15. Engine high temp. switch on block defective
or stuck open. (Will short to ground).

16. Incoming pressure switch not closed due to
lack of incoming water or switch is defective. |
|--|------------------|---|

AQUA CAT

TROUBLESHOOTING (CONT.)

II. VACUUM BLOWER - SUTORBILT - POSITIVE DISPLACEMENT
Ref. Blower Operation/Maintenance Manual Section II

- NOISE IN BLOWER:
1. Loose direct drive coupler. (Do not use).
 2. Skip timing.
 3. Worn Gears.
 4. No oil or grease.
 5. Foreign material (internal).
 6. Bad bearings.

- LOSS OF VACUUM:
1. Obstructed or pinched hoses in vacuum plumbing.
 2. Pop-off/Relief valve malfunction - Repair/lube.
 - * 3. Stainless Steel filter is plugged.
 - * 4. Open dump valve.
 5. Lint build-up between Blower and waste tank (not using recovery tank filter bags).
 - * 6. Tank lid not sealed due to worn coping material.
- * Most frequent.

TROUBLESHOOTING (CONT.)

III. PUMP: HIGH PRESSURE PUMP

(See Cat Pump Manual for Charts, Terminology & Number Code Section 10)

- FAILS TO OPERATE:
1. Chemical build-up due to non-compliance with standard operating procedures. (Start-up & Shut-down).
 2. Damaged or worn cup piston
 3. Damaged cylinder "O" rings
 4. Damaged piston "O" rings
 5. Debris lodged in discharge valve spring assembly
- WATER IN OIL:
6. Damaged piston rod seal, washer or "O" ring (piston sleeve). Replace or rebuild
- WATER LEAK:
7. Cracked (hairline) inlet or discharge manifolds
 8. Loose or damaged fittings or elbow

IV. DIRECT DRIVE COUPLER

- VIBRATION:
- Tighten bolts and Allen screws. (Also Allen screws that secure Coupler to shafts of engine and Blower).
- MISALIGNMENT:
- Due to loose bolts on engine or Blower mounts.

AQUA CAT

TROUBLESHOOTING (CONT.)

V. LOSS OF HIGH PRESSURE:

1. Air leaks in low pressure side of system or chemical flow lines.
2. Relief valve malfunction - disassemble and clean. apply a light coat of grease (Lubriplate) to spring and 'o' ring assembly when re-assembling.
3. Damaged high pressure gauge - reads incorrectly.
- 4 High pressure pump malfunction.
5. Crumpled, collapsed or twisted garden hose.
6. Check the garden hose screen behind the incoming water quick connector for blockage by foreign material.
7. Slipping pulley on pump, key in key-way gone, Allen screws gone, worn belt.

NOTE: By isolating or checking one function at a time the problem shows up much quicker and negates any possible damage to the machine.

TROUBLESHOOTING (CONT.)

VI . LOSS OF CHEMICAL FLOW:

1. Plugged filter screen in chemical jug. (5 gal.)
2. Crimped hoses.
3. Jammed flow meter float ball at bottom of meter, usually due to chemical build-up.
4. Improper mixing of chemicals.
5. Low or improper flow of water through system/measure water flow at cleaning tool. This flow should measure 1.5 gallons per minute with machine running at 300 PSI.
6. Broken wire to chemical solenoid on top of Cat pump.
7. Clogged solenoid valve.
8. Flow switch malfunction.

NOTE: Again we remind you that chemical flow depends on consistent high pressure flow to the cleaning tool.

AQUA CAT

TROUBLESHOOTING (CONT.)

VII. FREEZING: WATER FLOW

If unit has been exposed to freezing conditions, the entire water flow may be affected. Prior to trying to start, attach water supply and thoroughly check for leaks or malfunctions.

Freezing - Loss of or reduced solution flow. (The following are possible and/or probable problems which occur during freezing).

DAMAGED: Quick connect couplers - replace
Incoming water regulator and incoming
pressure switch - replace
Heater water flow regulator - rebuild
(Except Aqua Cat).
Expanded, warped or cracked inlet or
discharge manifolds on Cat pump. (Hi
pressure/Lo pressure) Ref. #31,54 Cat
Pump Manual.
Broken and/or damaged seals or retainers
on pump piston rod assemblies, Ref.
Inlet Manifold.
Hi-pressure relief valve warped.
Cracked chemical check valve - (Except
Aqua Cat).
Cracked chemical flow meter.
Expanded valve damage to trigger assem-
blies on all cleaning tools. (Plunger).

NOTE: On Aqua Cat, check heat exchanger for any
cracks or leaks. Also check solenoids
and hoses where applicable.

Inspect all fittings and hoses for leaks
or damage.

H-M 1-79

VIII OVER - WETTING

Over-wetting is annoying to all concerned and sometimes leaves a bad impression of the cleaning process used.

There are several areas that will cause over-wetting:

1. Too few vacuum strokes or improper vacuum strokes.
2. Obstructed, kinked or cut hoses.
3. Vacuum tank drain valve left partially open.
4. Clogged vacuum blower filter.
5. Cleaning a heavily foam-saturated carpet without defoamer. (We recommend crystal type).
6. Vacuum relief valve not operating properly, due to wear and misalignment, or adjustment may be required to increase vacuum to original factory setting. (14-15 HG).

NOTE: 1979 model has vacuum relief valve built in to tank lid and has been preset at the factory.



No. PSB-HM-100

Date: 8-11-77

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): HYDRA-CAT, BOB-CAT
& AQUA CAT

Section Insert#:

Subject: CARBON REMOVAL - ENGINE

Units operating on regular gasoline require carbon removal from combustion chambers approximately every 500 hours as defined by the Onan Service Manual. Failure to comply will void the engine manufacturers warranty and could result in unnecessary expense and costly down time. The cost to perform carbon removal is relatively inexpensive but does vary throughout the country. Normally this service must be scheduled with the Onan Service Center in the same manner as tune-ups, etc..



No. PSB-HM-101

Date: January 1977

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): ALL

Section Insert#:

Subject: ONAN ENGINE VALVE ADJUSTMENTS

To ensure continued reliability from the ONAN engines incorporated in our units, it is NECESSARY to adjust both intake and exhaust valves after 300 hours of use. Failure to comply with this suggestion may necessitate a valve repair after 500 hours of use and can compromise engine warranty during the warranty period.

The condition which will often occur if valves are not adjusted is power loss and damage to valves and valve seats.

Instructions for preventive maintenance procedures, i.e. tune-up, oil changes, carburetor breather filter, fuel adjustment, valve adjustments, etc. are outlined in the ONAN Service Manual contained in the Hydra-Master Manual. Your local small engine service shops as well as ONAN Service Centers are qualified to perform necessary adjustments.



No. PSB-HM-102

Date: JANUARY 1979

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): ALL

Section Insert#:

Subject: CLEANING STROKE PROCEDURE

PURPOSE:

To eliminate excess moisture remaining in the carpet fiber and the sawtooth appearance which results from diagonal movement of the cleaning tool.

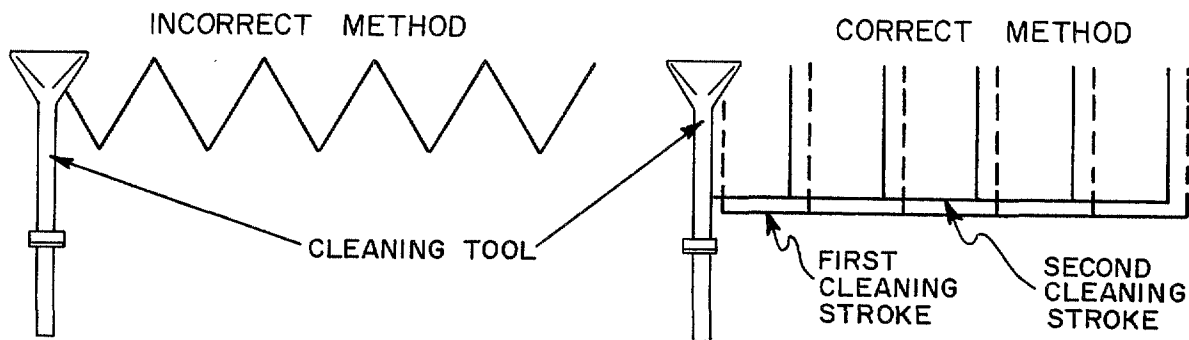
SCOPE:

All types of carpet.

PROCEDURE:

Always move the cleaning tool in smooth forward and backward strokes. Apply slight pressure on the forward stroke while the solution is injected into the carpet. When extracting (drying), apply firm pressure on the forward stroke to ensure a positive "lock" for the vacuum and minimize the "hopping" effect resulting on unsmooth carpet. During the forward and reverse strokes, movement to the right or left should only be accomplished at the extreme rear of the stroke. A drawing is provided below to illustrate this technique. Overlapping is also important to ensure even application of solution to prevent saturation.

Failure to adopt the above procedure can result in increased fiber shrinkage, brown out, and longer drying periods.



FORM # _____



No. PSB-HM-103

Date: JANUARY 1979

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): ALL

Section Insert #:

Subject: WATER SOFTENER

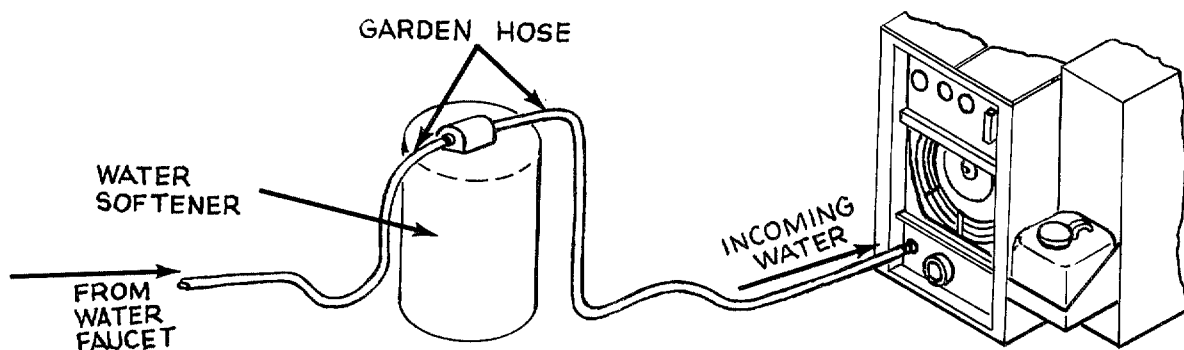
Many areas of the country have an excess of minerals in the water which results in what is commonly called "hard water". These minerals tend to adhere to the insides of heater coils and other parts of the machines causing damage and a loss of cleaning effectiveness.

Reports from several of our machine users commending the results of the use of water softeners in conjunction with their machines prompts us to recommend the procedure to everyone in a "hard water" area.

The relatively low cost of a water softener service is more than made up for in the increased life of machine parts and continued cleaning efficiency.

Contact a water softener distributor in your area for information on the rental of a simple water treatment unit to carry in your truck.

See installation diagram below.



FORM # _____



No. PSB-HM-104

Date: JANUARY 1979

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): ALL

Section Insert#:

Subject: CHEMICAL BUILD-UP

TO SAVE TIME AND MONEY, REMEMBER PROTECTIVE MAINTENANCE IS THE KEY TO MANY SUCCESSFUL OPERATIONS. SOME OF OUR CUSTOMERS ARE NEGLECTING TO FLUSH THEIR MACHINES AFTER 40 HOURS OF USE. REMEMBER, BECAUSE OF THE DIFFERENT TYPES OF CHEMICALS, WATER CONDITIONS, AND HEAT, CHEMICAL BUILD-UP MAY OCCUR. TO FIGHT THIS PROBLEM, FLUSH THE MACHINE ONCE A WEEK OR EVERY 35 - 40 HOURS WITH VINEGAR. FOLLOW THESE INSTRUCTIONS: WHILE MACHINE IS RUNNING, PLACE CHEMICAL FEED HOSE IN A BOTTLE OF WHITE VINEGAR AND TURN ON TOOL SO THE VINEGAR WILL BE PULLED THROUGH THE SYSTEM. DO NOT LEAVE IN SYSTEM ANY LONGER THAN 45 MINUTES OR DAMAGE MAY OCCUR TO INTERNAL COMPONENTS. FLUSH WITH CLEAR WARM WATER IN THE SAME MANNER AS THE VINEGAR WAS INJECTED. THIS WILL BREAKDOWN BUILD-UP AND PREVENT COSTLY DOWN TIME, AND LONGER LIFE FOR YOUR MACHINE.

WHITE VINEGAR IS A MILD ACID AND WILL CONTRIBUTE TO THE REMOVAL/BREAKDOWN OF EXCESSIVE CHEMICAL BUILD-UP IN COMPONENTS SUCH AS HOSES, FITTINGS AND HEATERS.



No. PSB-HM-105

Date: JANUARY 1979

PRODUCT SUPPORT BULLETIN

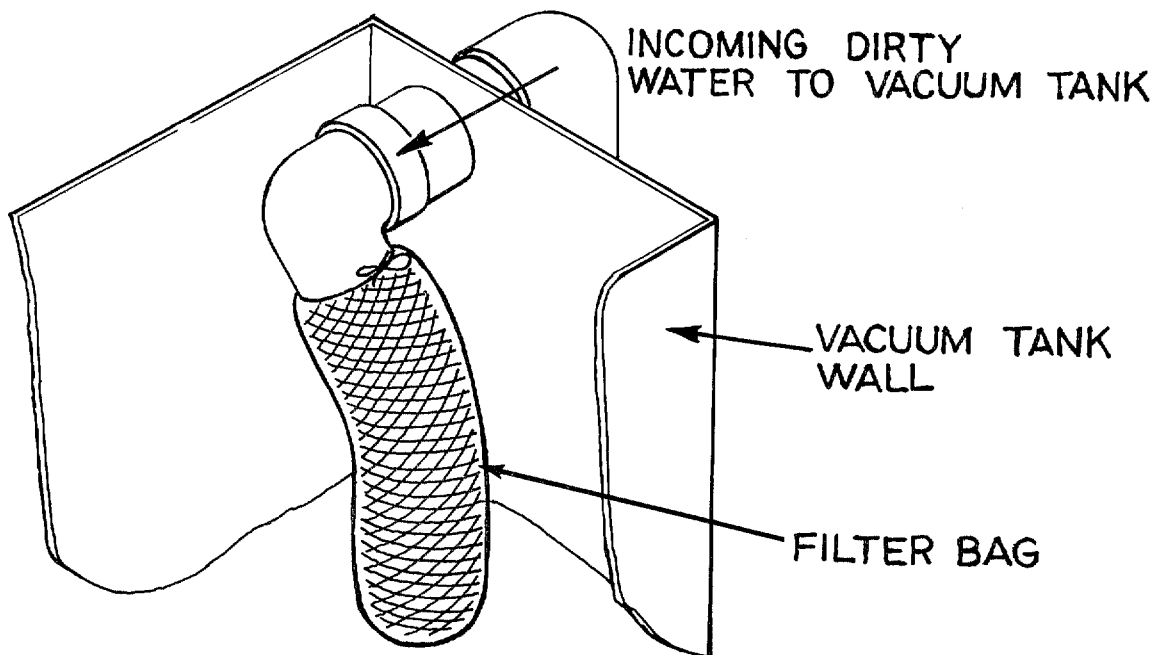
Service/Parts/Publications

Model(s): ALL

Section Insert#:

Subject: VACUUM TANK FILTER BAGS

We have available, for your purchase, filter bags that are designed to trap all of the lint, sand and dirt that would normally collect at the bottom of your vacuum tank. The use of these bags, if emptied at the end of each job or at the end of the day, will eliminate the buildup of much of the debris in the tank. The drawstring top of these bags is designed to be tied to the incoming water inlet in the vacuum tank.



FORM # _____



No. PSB-HM-106

Date: April, 1979

PRODUCT SUPPORT BULLETIN

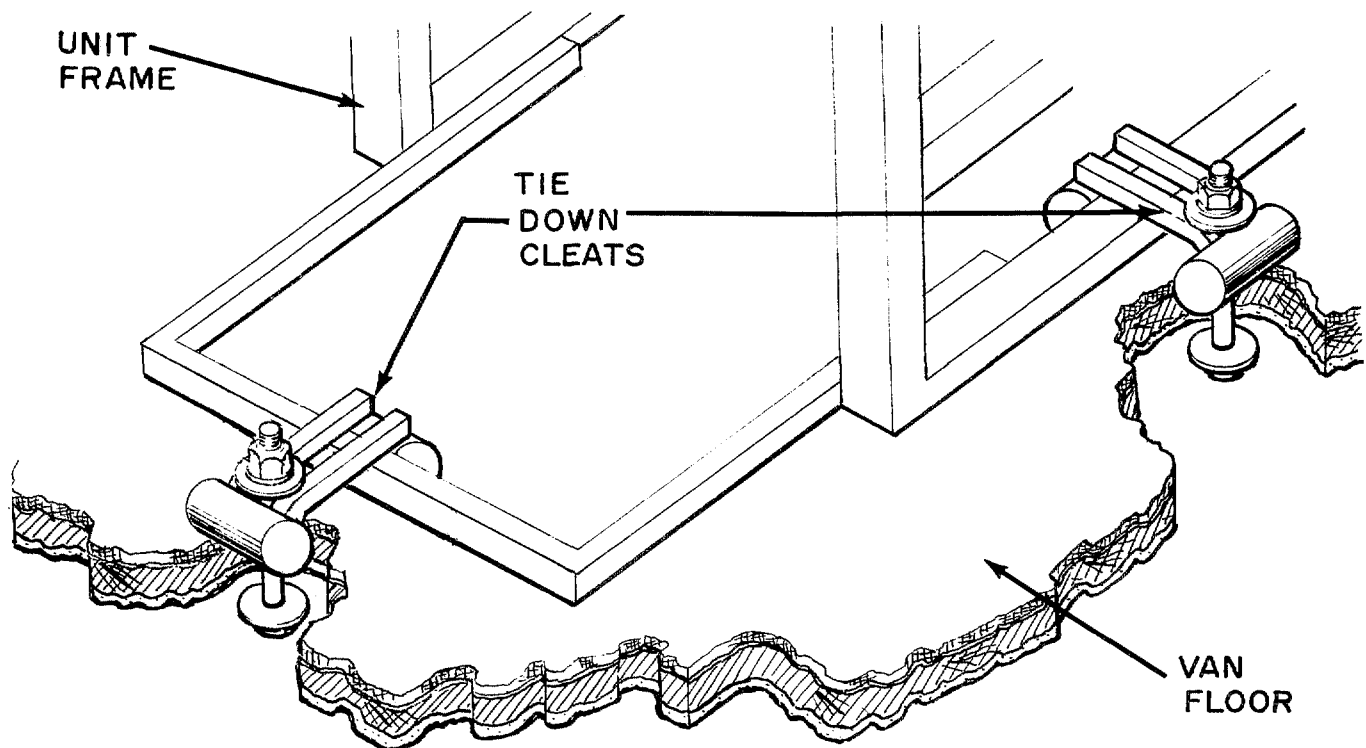
Service/Parts/Publications

Model(s):

Section Insert#:

Subject: Cleats for securing Hydra-Master units
to Van floors

Cleats for securing equipment are now available for units manufactured prior to February 28, 1979. Units manufactured after that date have been equipped with cleats as standard equipment. The benefits are obvious and increase operator safety in the event the vehicle is involved in an accident. The drawing below defines installation requirements which enables the unit to be removed from the vehicle without excessive difficulty.





No. PSB-HM-107

Date: April, 1979

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

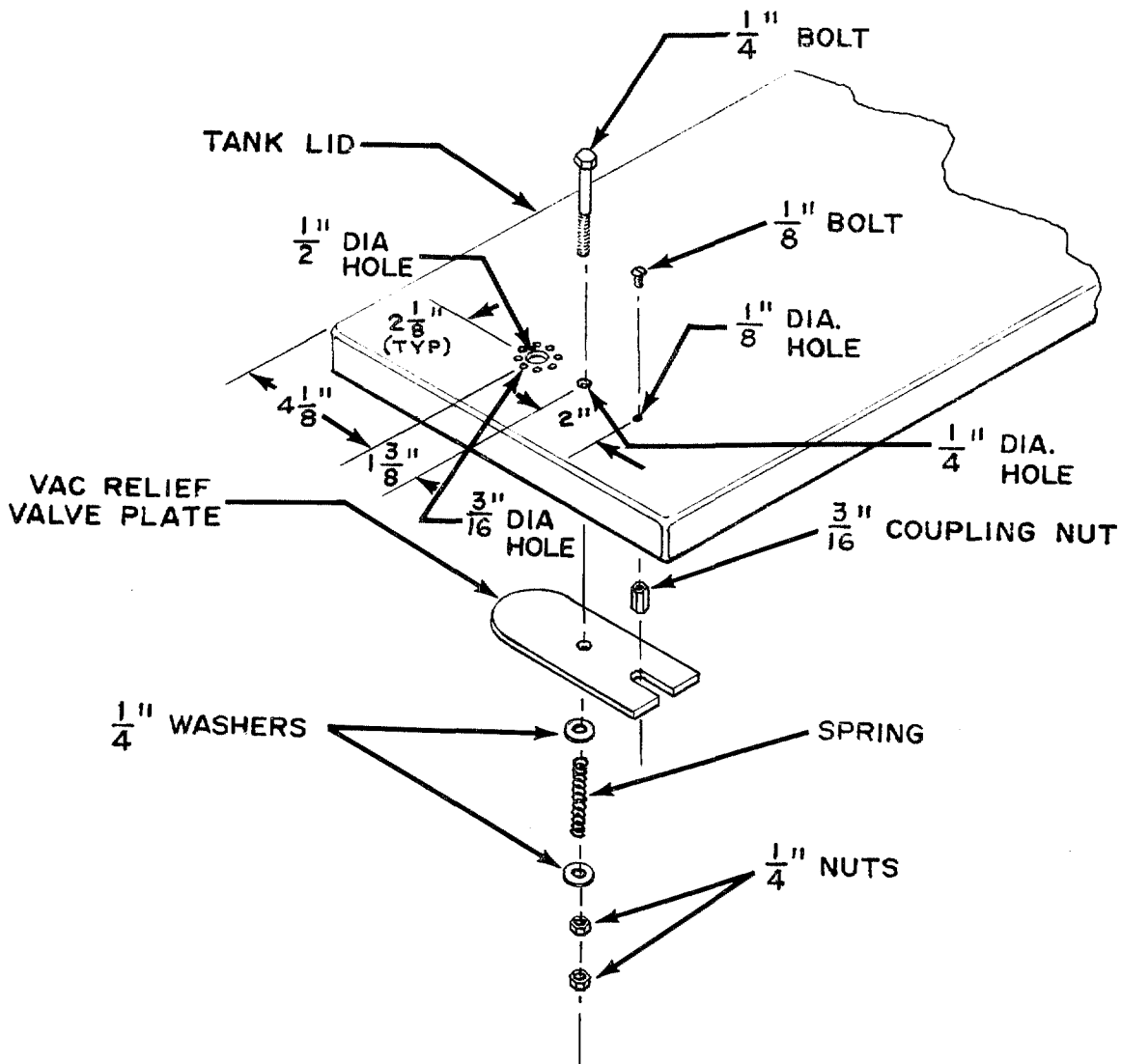
Model(s):

Section Insert#:

Subject: VACUUM RELIEF VALVE MODIFICATION

Units manufactured prior to March 1, 1979 incorporated a brass plunger type Vacuum Relief Valve which required daily lubrication. Excessive plunger shaft wear would result through either lack of lubrication or excessive vibration and compromised vacuum strength at the cleaning tool.

Units manufactured after March 1, 1979 now incorporate the Vacuum Relief valve depicted below which requires no daily lubrication. A modification kit is available which can be adapted to existing equipment in the field at a moderate price. This revision will minimize the over-wetting condition of carpets which can result through the excessive shaft wear described above.





No. 119

Date: May 1980

PRODUCT SUPPORT BULLETIN

Service/Parts/Publications

Model(s): Aqua-Cat

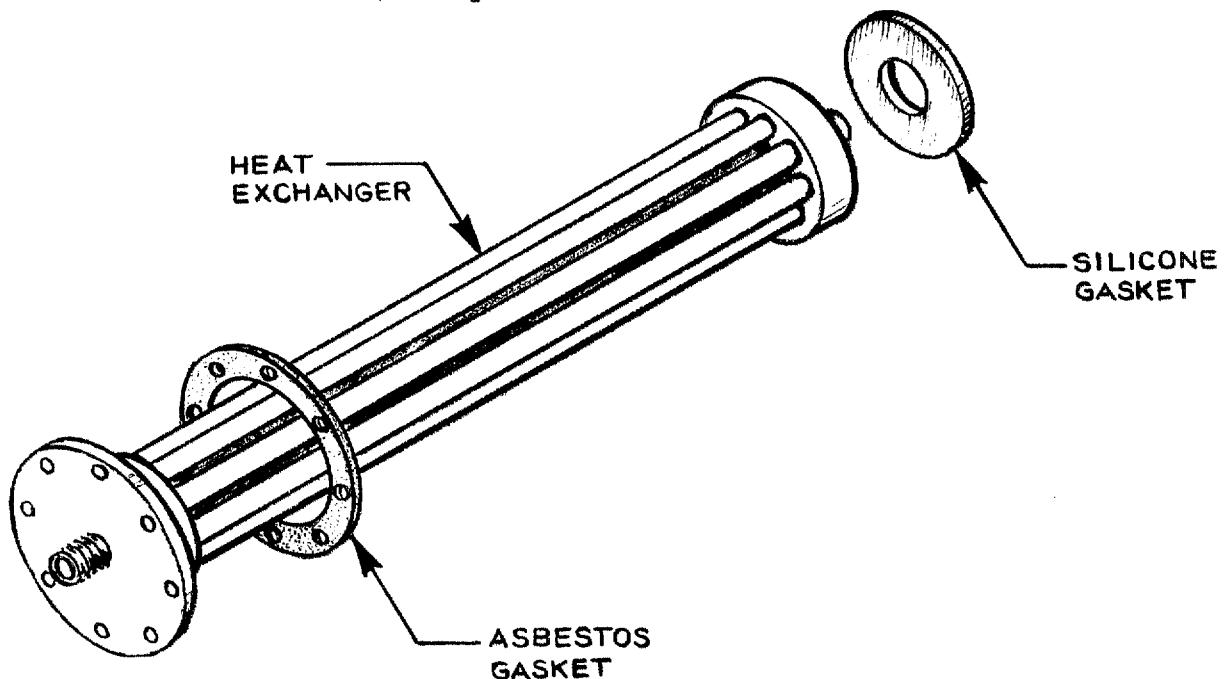
Section Insert#:

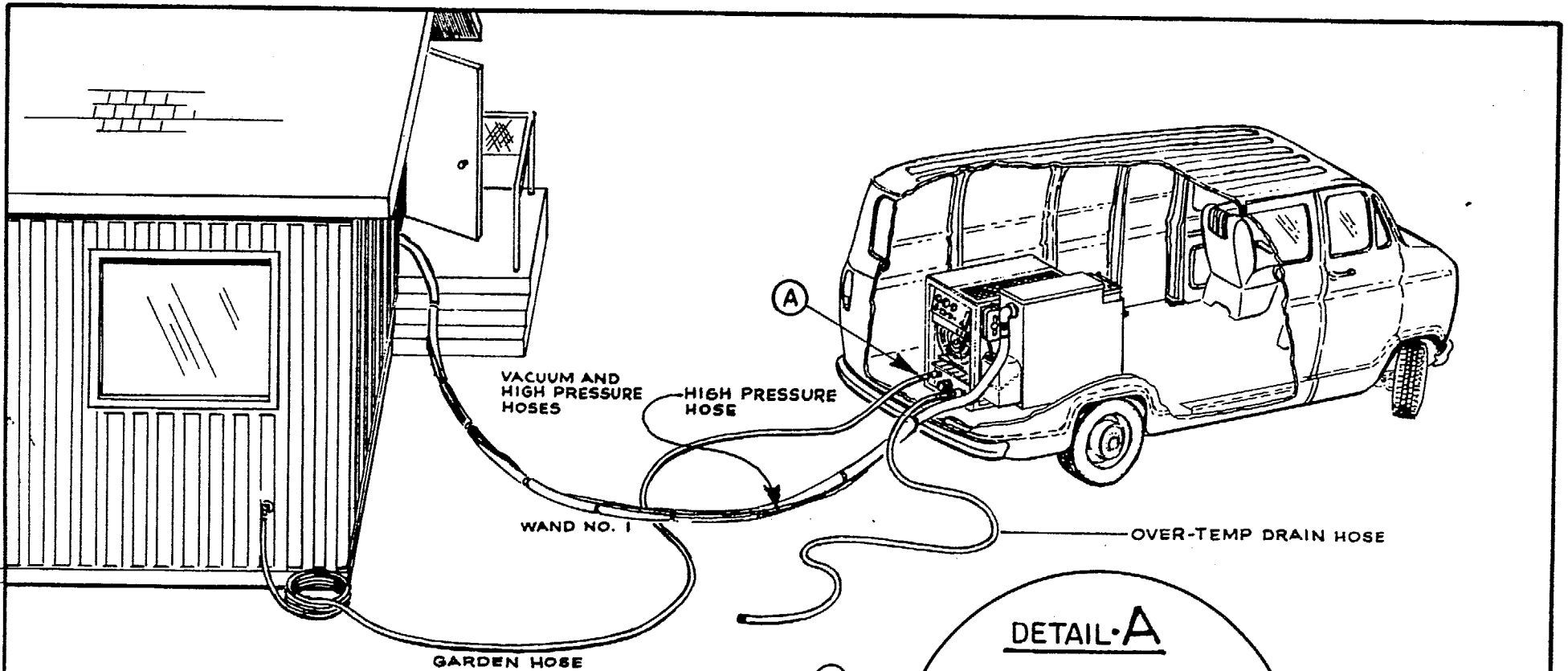
Subject: Service Memo

It has come to Hydra-Master's attention that the asbestos gaskets in the heat exchanger shell are breaking up due to constant high temperature and exhaust pressure. These gaskets are now being replaced with a silicone gasket which will eliminate chance of an exhaust leak.

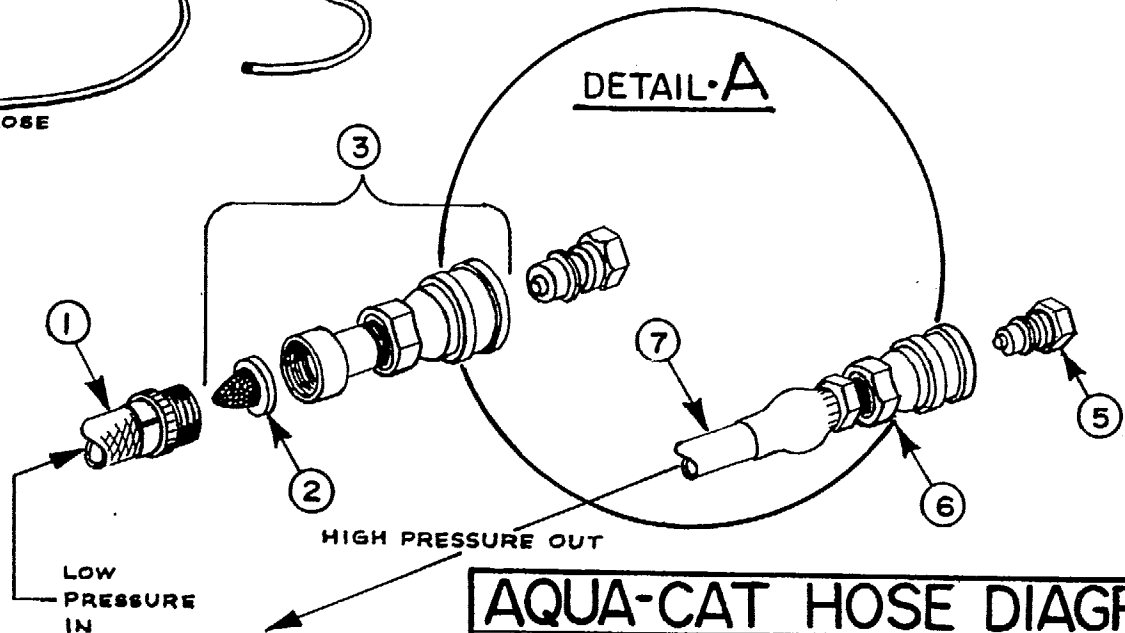
If you find that your gasket is not adequate, please phone Hydra-Master's parts department, (206) 775-7276 or your Hydra-Master Representative.

This part number is 225801, Compression Gasket.

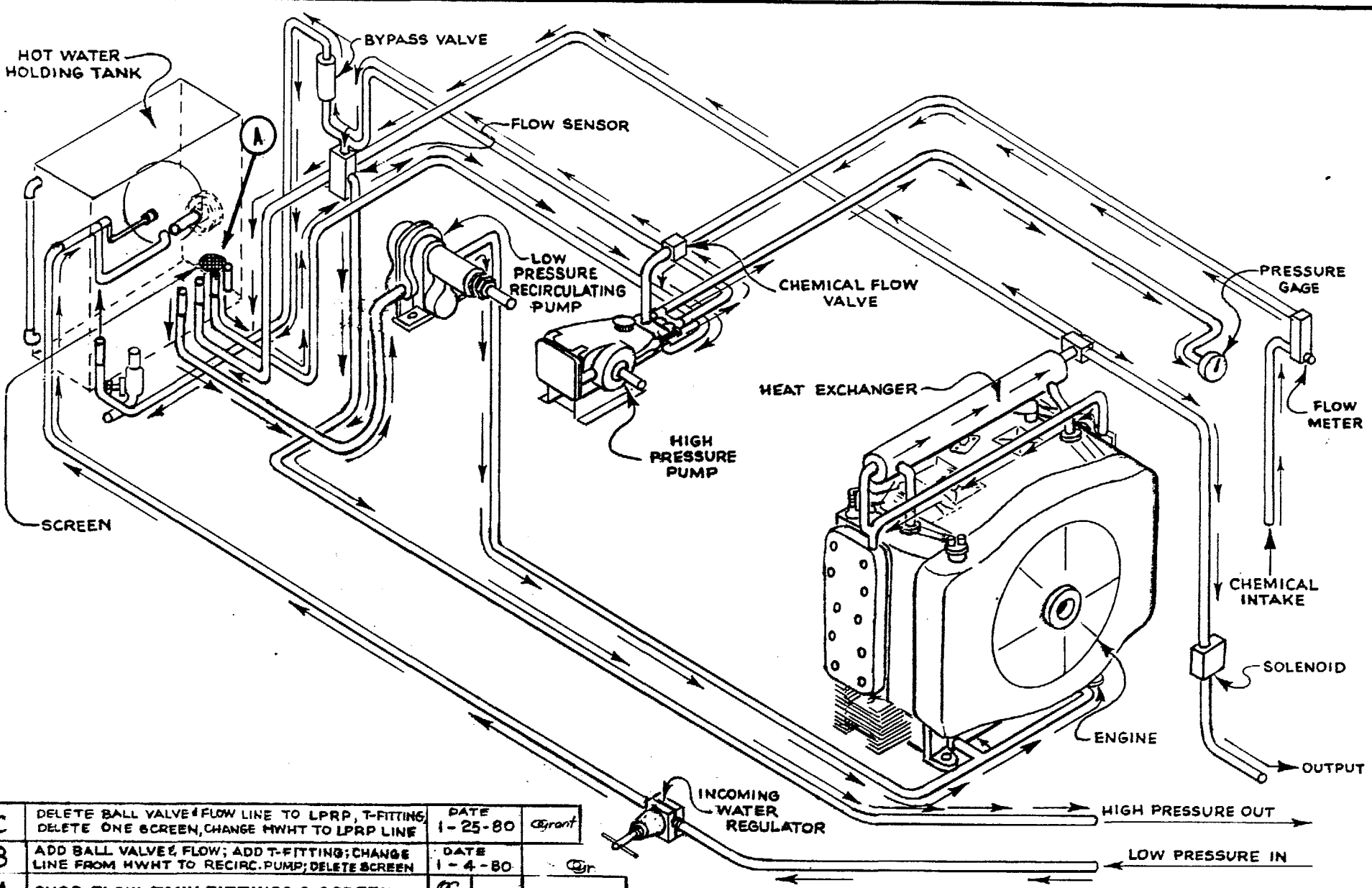




REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	636020	GARDEN HOSE	1
2.	636024	SCREEN REPLACEMENT	1
3.	636022	INLET GDN. HOSE CONN. (Inc. Screen)	1
4.	611201	QUICK CONN. PLUG	1
5.	611101	QUICK CONN. PLUG	1
6.	611102	QUICK CONN. SOCKET	1
7.	636001	HIGH PRESSURE HOSE M-F	1



AQUA-CAT HOSE DIAGRAM
 DRWG NO AC-101 SCALE 0 DRWN BY O.GRANT, JR. APPRVD DATE 4-3-79
 © 1978 HYDRA MASTER CORPORATION

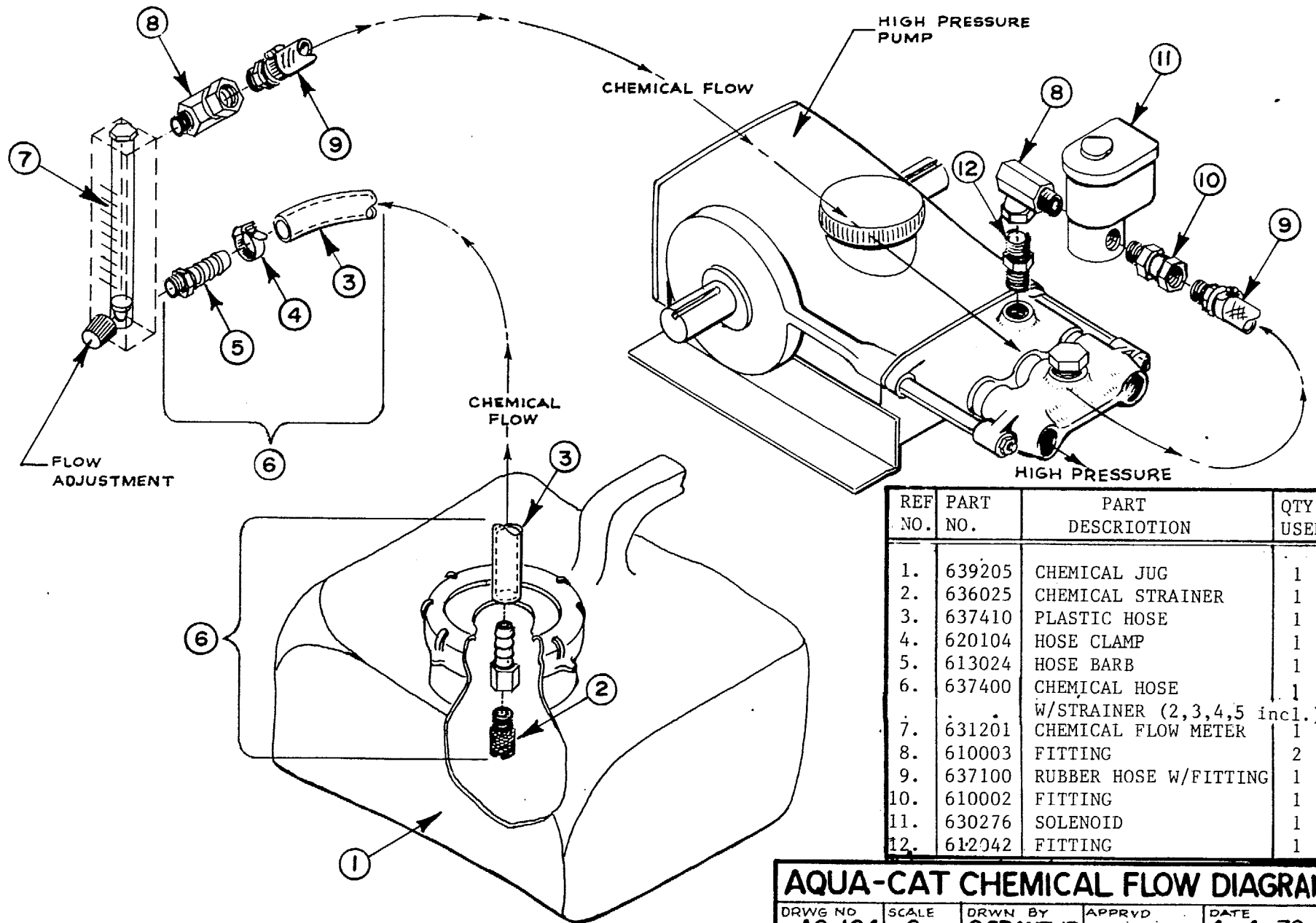


C	DELETE BALL VALVE & FLOW LINE TO LPRP, T-FITTING; DELETE ONE SCREEN, CHANGE HWHT TO LPRP LINE	DATE 1-25-80	Grant
B	ADD BALL VALVE & FLOW; ADD T-FITTING; CHANGE LINE FROM HWHT TO RECIRC. PUMP; DELETE SCREEN	DATE 1-4-80	Gr.
A	CHGD FLOW TANK FITTINGS & SCREEN	Gr.	7-11-79
ET	REVISION	BY CKR	DATE



AQUA CAT FLOW DIAGRAM

DRAWING NO AC-103
 DRAWN BY O GRANT JR
 DATE 4-5-79

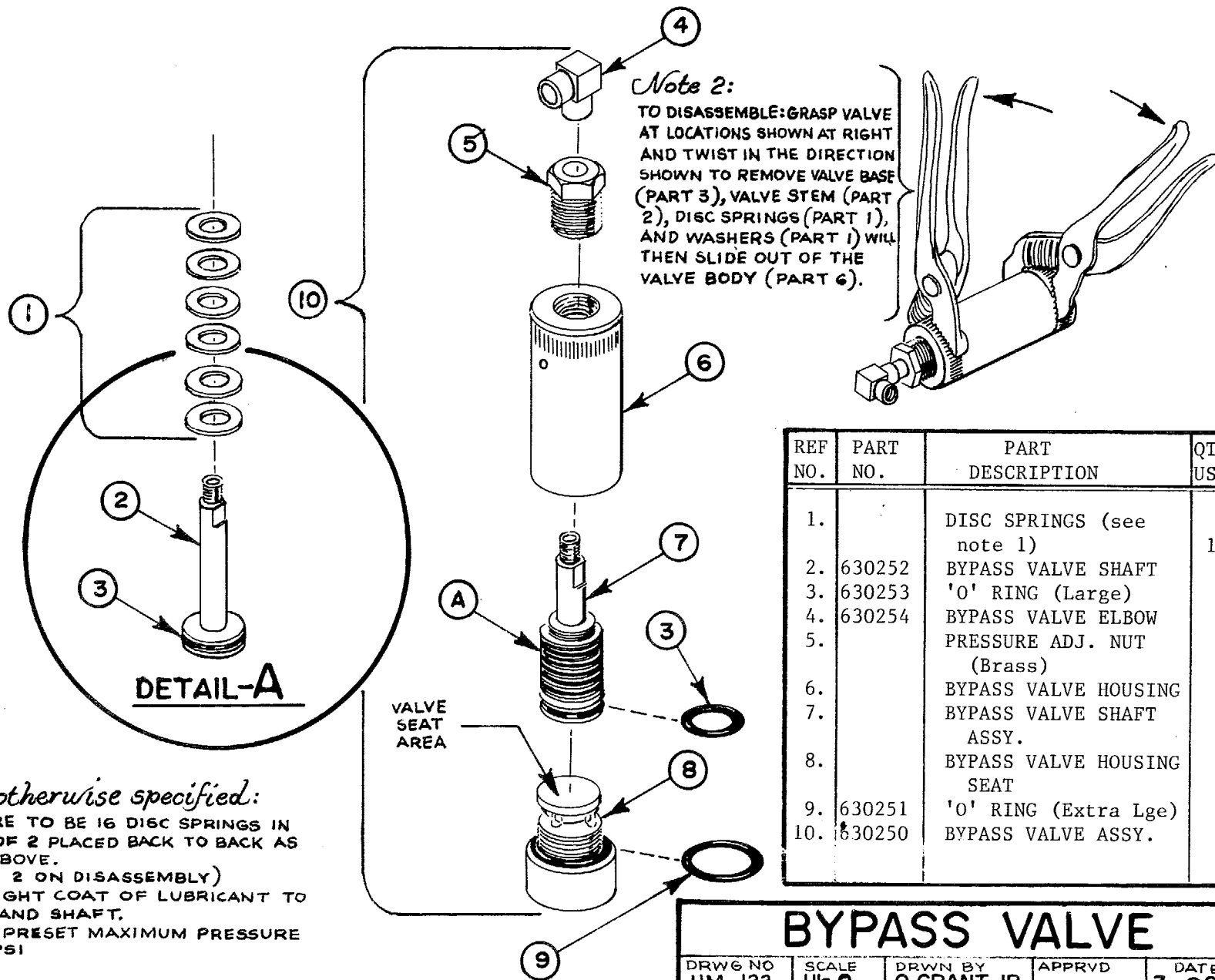


REF NO.	PART NO.	PART DESCRIPTION	QTY USED
1.	639205	CHEMICAL JUG	1
2.	636025	CHEMICAL STRAINER	1
3.	637410	PLASTIC HOSE	1
4.	620104	HOSE CLAMP	1
5.	613024	HOSE BARB	1
6.	637400	CHEMICAL HOSE W/STRAINER (2,3,4,5 incl.)	1
7.	631201	CHEMICAL FLOW METER	1
8.	610003	FITTING	2
9.	637100	RUBBER HOSE W/FITTING	1
10.	610002	FITTING	1
11.	630276	SOLENOID	1
12.	612042	FITTING	1

AQUA-CAT CHEMICAL FLOW DIAGRAM

DRWG NO AC-104 SCALE 0 DRWN BY O.GRANT, JR. APPRVD DATE 4-4-79

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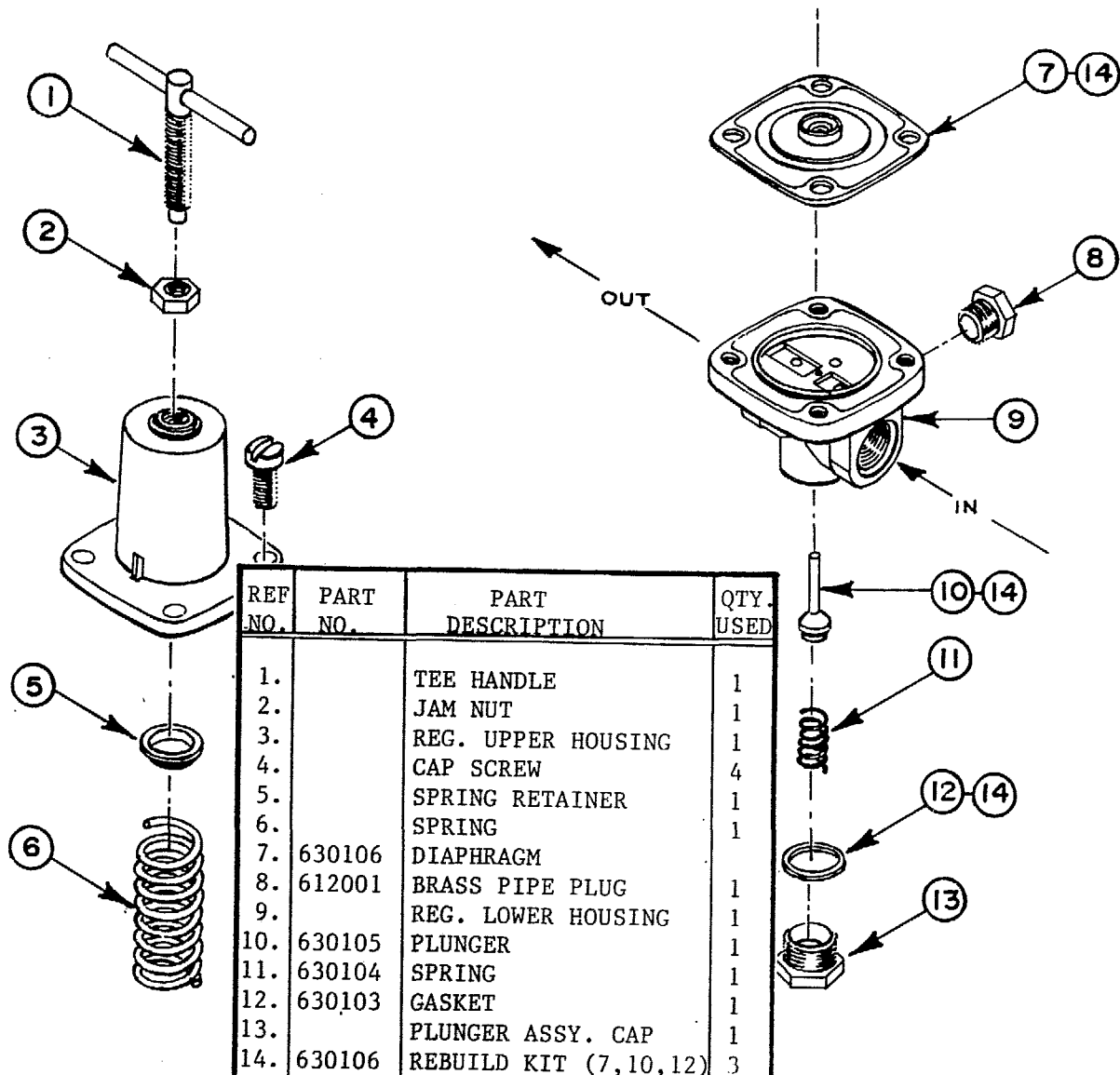
Note unless otherwise specified:

1. THERE ARE TO BE 16 DISC SPRINGS IN 8 SETS OF 2 PLACED BACK TO BACK AS SHOWN ABOVE.
2. (SEE NOTE 2 ON DISASSEMBLY)
3. APPLY LIGHT COAT OF LUBRICANT TO SPRINGS AND SHAFT.
4. FACTORY PRESET MAXIMUM PRESSURE AT 450 PSI

BYPASS VALVE

DRWG NO HM-122	SCALE 1"=0	DRWN BY O. GRANT, JR.	APPRVD	DATE 3-29-79
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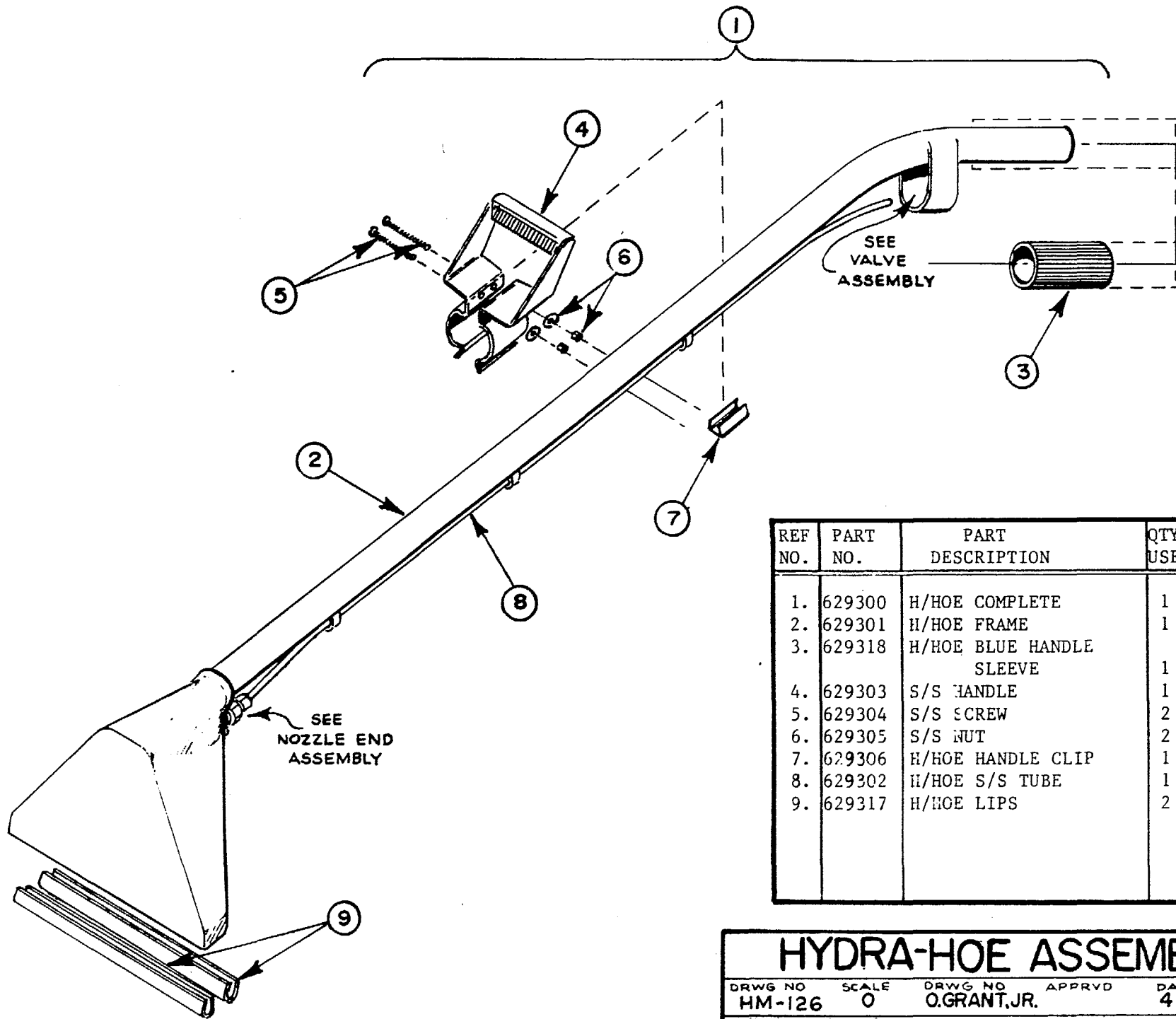


REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.		TEE HANDLE	1
2.		JAM NUT	1
3.		REG. UPPER HOUSING	1
4.		CAP SCREW	4
5.		SPRING RETAINER	1
6.		SPRING	1
7.	630106	DIAPHRAGM	1
8.	612001	BRASS PIPE PLUG	1
9.		REG. LOWER HOUSING	1
10.	630105	PLUNGER	1
11.	630104	SPRING	1
12.	630103	GASKET	1
13.		PLUNGER ASSY. CAP	1
14.	630106	REBUILD KIT (7,10,12)	3
	630105		
	630103		

INCOMING WATER REGULATOR

DRWG NO HM-123	SCALE 0	DRWN BY O.GRANT,JR.	APPRVD	DATE 4-3-79
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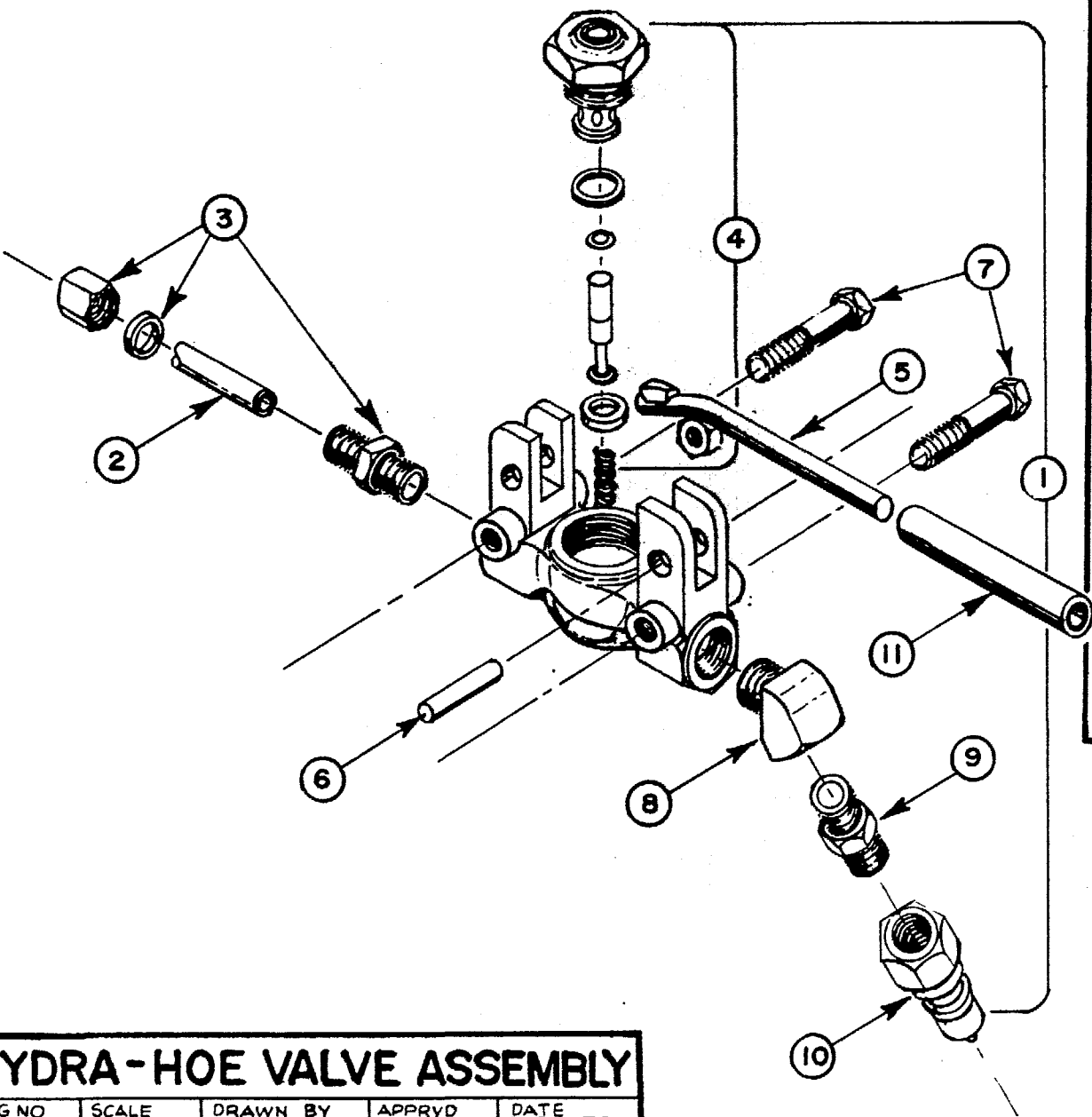


REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	629300	H/HOE COMPLETE	1
2.	629301	H/HOE FRAME	1
3.	629318	H/HOE BLUE HANDLE SLEEVE	1
4.	629303	S/S HANDLE	1
5.	629304	S/S SCREW	2
6.	629305	S/S NUT	2
7.	629306	H/HOE HANDLE CLIP	1
8.	629302	H/HOE S/S TUBE	1
9.	629317	H/HOE LIPS	2

HYDRA-HOE ASSEMBLY

DRWG NO. HM-126 SCALE 0 DRWG NO. O.GRANT, JR. APPRVD DATE 4-3-79

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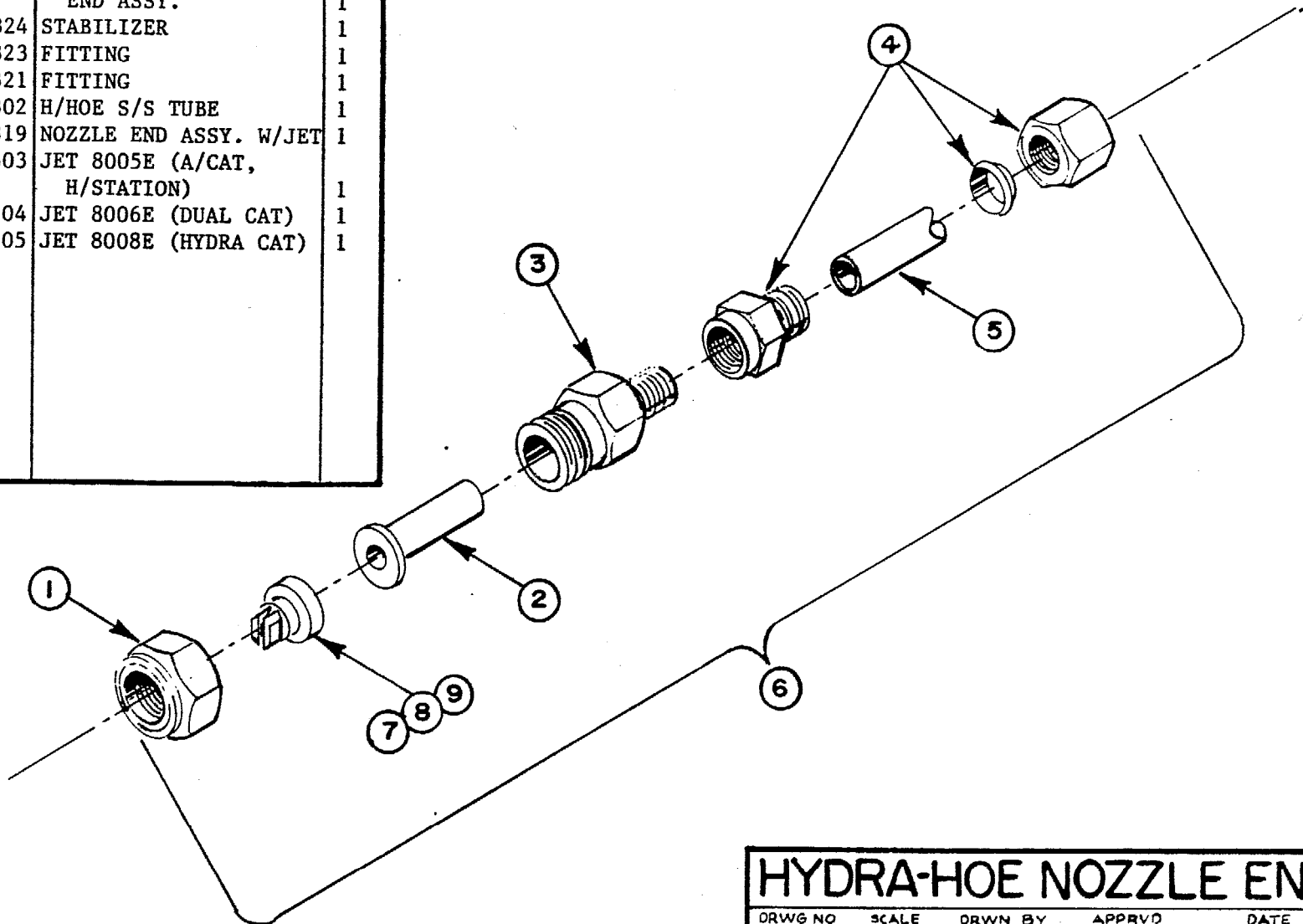
REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	629309	H/HOE VALVE COMPLETE	1
2.	629302	H/HOE S/S TUBE	1
3.	629322	FITTING	1
4.	629313	H/HOE PLUNGER KIT	1
5.	629310	H/HOE TRIGGER	1
6.	629312	H/HOE TRIGGER PIN	1
7.	618502	BOLT	2
8.	612080	FITTING	1
9.	612042	FITTING	1
10.	611101	QUICK CONNECT PLUG	1
11.	629311	H/HOE TRIGGER SLEEVE	1

HYDRA-HOE VALVE ASSEMBLY

DRWG NO HM-127	SCALE 1" = 0	DRAWN BY O. GRANT, JR.	APPRVD	DATE 3-30-79
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REF NO.	PART NO.	PART DESCRIPTION	QTY USED
1.	629320	BRASS CAP FOR NOZZLE END ASSY.	1
2.	629324	STABILIZER	1
3.	629323	FITTING	1
4.	629321	FITTING	1
5.	629302	H/HOE S/S TUBE	1
6.	629319	NOZZLE END ASSY. W/JET	1
7.	629603	JET 8005E (A/CAT, H/STATION)	1
8.	629604	JET 8006E (DUAL CAT)	1
9.	629605	JET 8008E (HYDRA CAT)	1

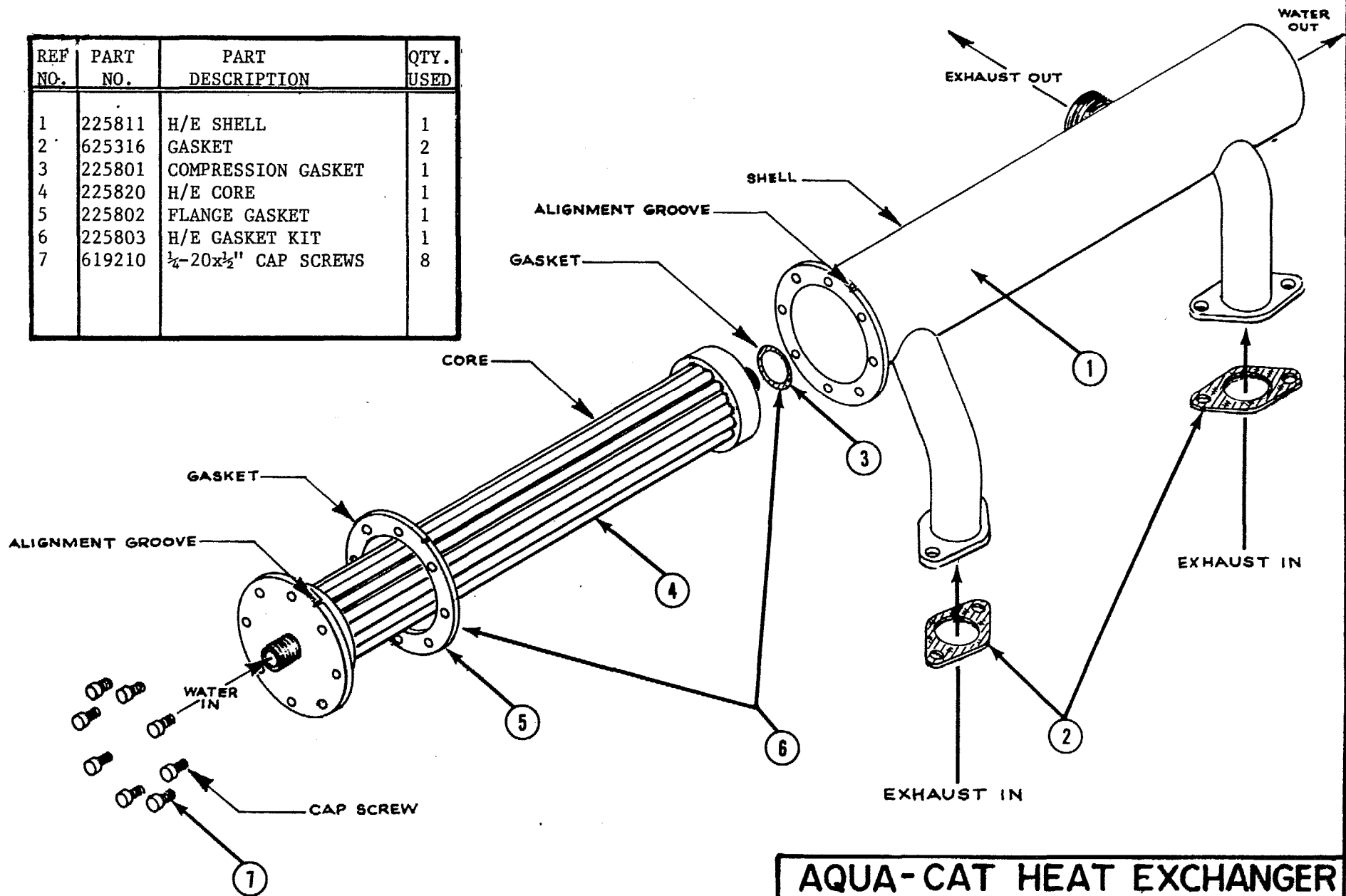


HYDRA-HOE NOZZLE END ASS'Y

DRWG NO. SCALE DRWN BY APPRVD DATE
 HM-128 0 O.GRANT, JR. 4-3-79

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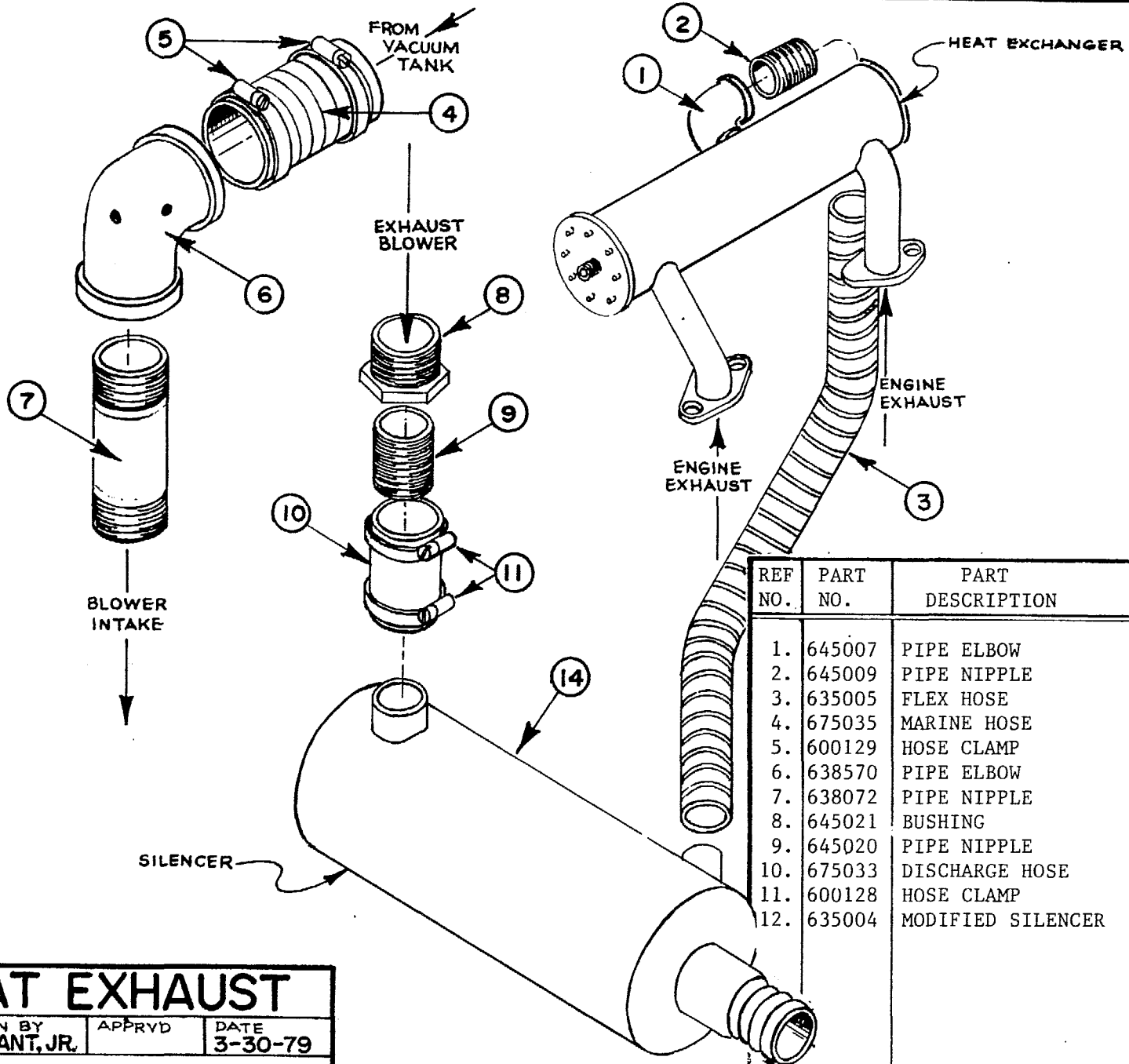
REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1	225811	H/E SHELL	1
2	625316	GASKET	2
3	225801	COMPRESSION GASKET	1
4	225820	H/E CORE	1
5	225802	FLANGE GASKET	1
6	225803	H/E GASKET KIT	1
7	619210	$\frac{1}{4}$ -20x $\frac{1}{2}$ " CAP SCREWS	8



AQUA-CAT HEAT EXCHANGER

DRWG NO AC-106	SCALE 0	DRWN BY O.GRANT, JR.	APPRVD	DATE 4-4-79
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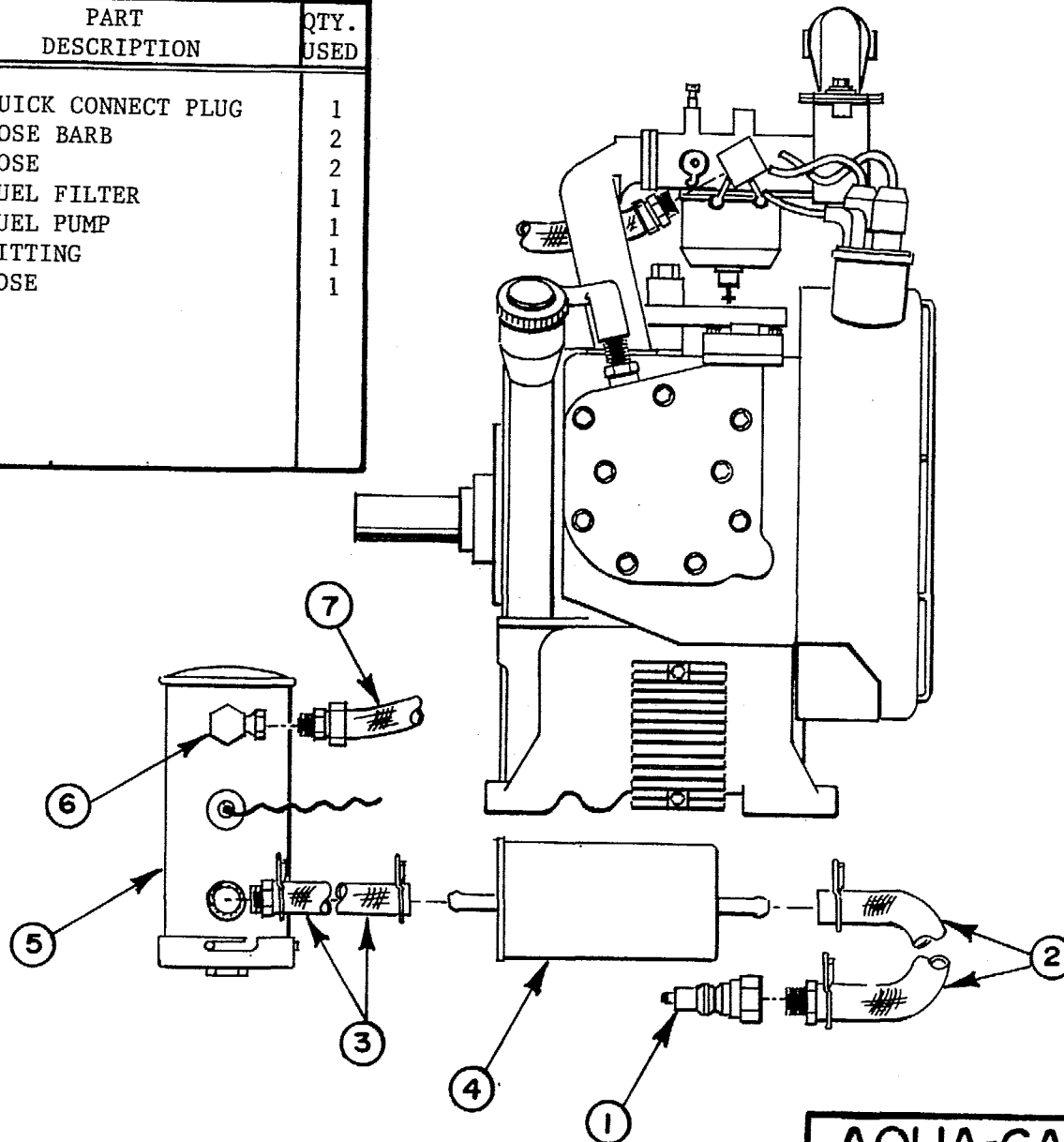
REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	645007	PIPE ELBOW	1
2.	645009	PIPE NIPPLE	1
3.	635005	FLEX HOSE	1
4.	675035	MARINE HOSE	1
5.	600129	HOSE CLAMP	2
6.	638570	PIPE ELBOW	1
7.	638072	PIPE NIPPLE	1
8.	645021	BUSHING	1
9.	645020	PIPE NIPPLE	1
10.	675033	DISCHARGE HOSE	1
11.	600128	HOSE CLAMP	2
12.	635004	MODIFIED SILENCER	1

AQUA-CAT EXHAUST

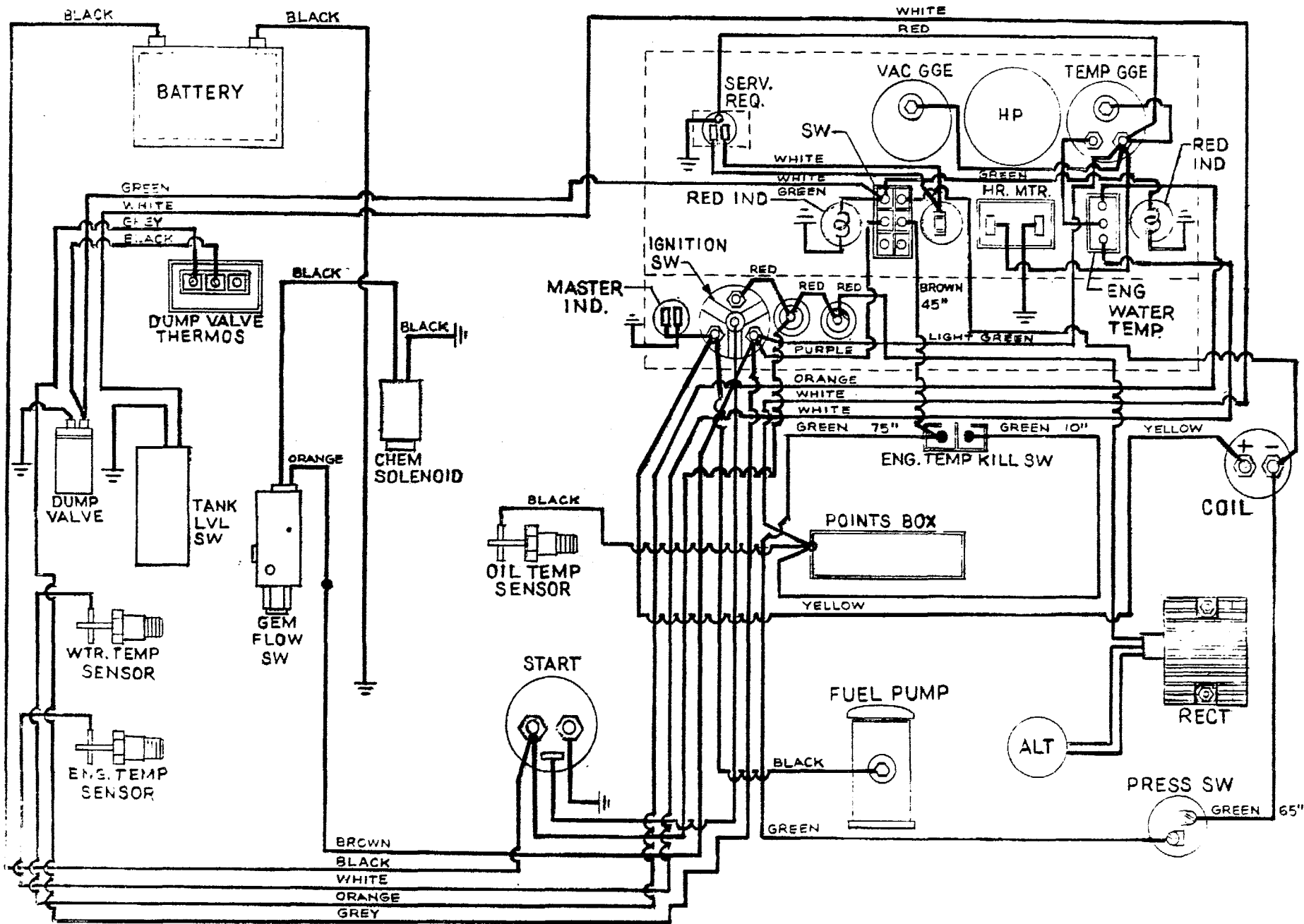
DRWG NO AC-105	SCALE 1" = 0	DRWN BY O.GRANT, JR.	APPRVD	DATE 3-30-79
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REF NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	611001	QUICK CONNECT PLUG	1
2.	613025	HOSE BARB	2
3.	637110	HOSE	2
4.	625300	FUEL FILTER	1
5.	625313	FUEL PUMP	1
6.	610001	FITTING	1
7.	637101	HOSE	1

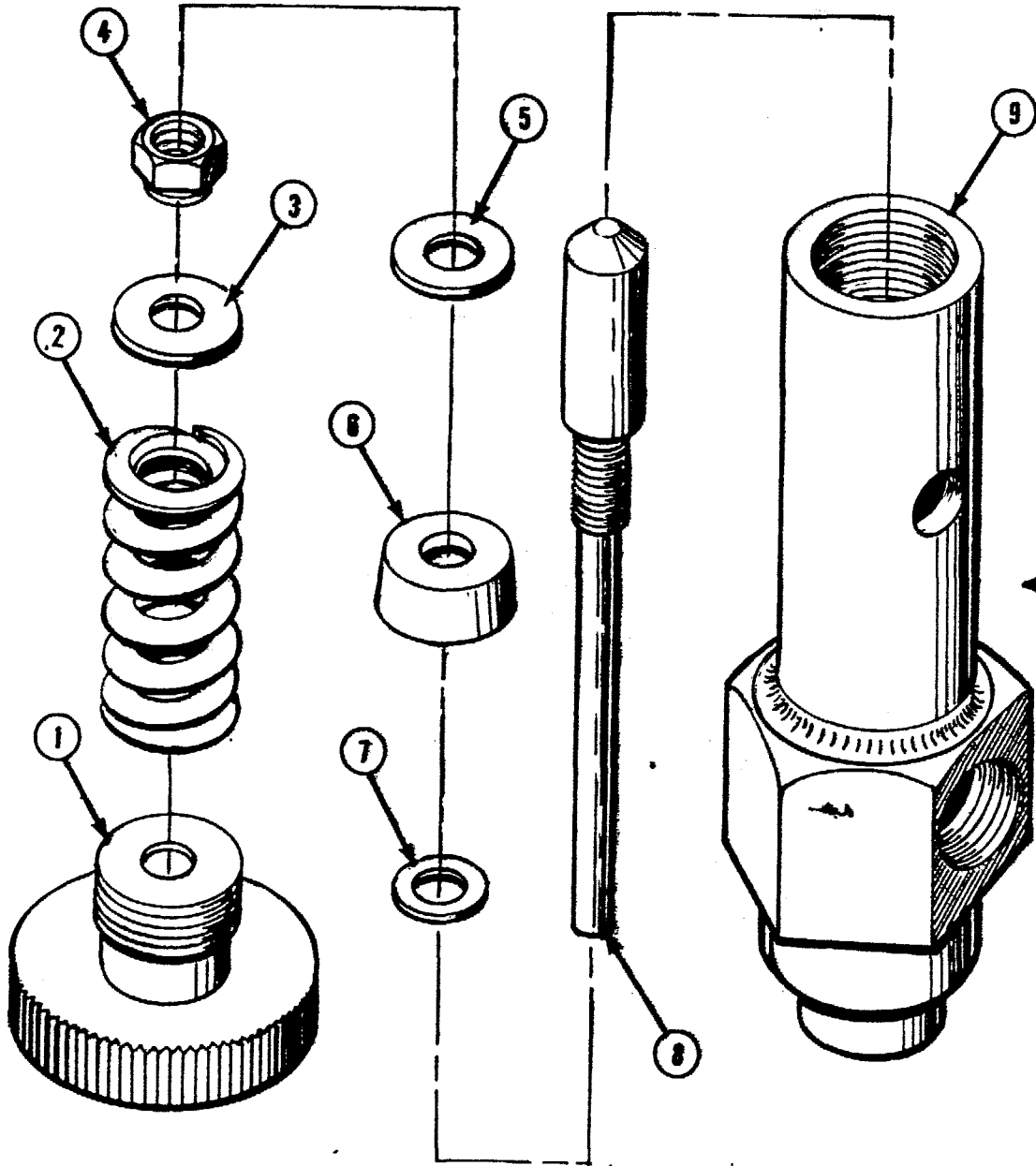


AQUA-CAT FUEL SYSTEM			
DRWG NO AC-109	SCALE 0	DRWN BY OGRANT, JR.	APPRVD
			DATE 4-4-79
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AQUA CAT ELECTRICS

DRAWING NO		PAGE
DRAWN BY	<i>Carto</i>	28
DATE	12-7-79	



REF. NO.	PART NO.	PART DESCRIPTION	QTY. USED
1.	-----	BYPASS VALVE KNOB	1
2.	000-155-109	SPRING, STOCK	1
	000-155-108	" , HEAVY DUTY	1
3.	-----	WASHER	1
4.	-----	NUT	1
5.	-----	WASHER	1
6.	000-044-002	CUP, LEATHER	1
	000-044-003	" , BLACK RUBBER	1
7.	-----	WASHER	1
8.	000-150-005	REPLACEMENT SHAFT	1
9.	-----	BYPASS BODY	1



BYPASS VALVE

DRAWING NO HM-122
 DRAWN BY Grant
 APPD AQUA-CAT
 ASSY
 DATE: 5-5-80
 SCALE: FULL