

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE
MANUAL INCLUDING PEPAIR PARTS LIST
FOR
DEGREASER, VAPOR SPRAY,
ELECTRICALLY HEATED
MODEL HD-525**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
DECEMBER 1979**

Technical Manual

No. 9-4340-408-14&P



HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 20315 December 1979

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

FOR

**DEGREASER, VAPOR SPRAY,
ELECTRICALLY HEATED, MODEL HD 525 (NSNA)**

REPORTING OF ERRORS

You can improve this manual. Mail your 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 direct to you.

NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom the degreaser is issued. Repair parts should be ordered by manufacturer's part number as shown on the parts list in the back of this manual. Model and serial numbers should be referenced when ordering replacement parts.

Manufactured by: Baron-Blakelock
9445 Ann Street
Santa Fe Springs, CA 91670

Procured under Contract No. DAAA09-75-M-1425

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.

Section I.

SAFETY*

1. If degreaser is in a pit, the pit should be ventilated and fan should be turned on before entering the pit.
2. Allow solvent to cool before draining. Make sure that all solvent and vapor have been removed before entering or welding in/on a degreaser. Aerate the tank using fan forced or compressed air from above with access and coil doors removed. Enter only with an attendant outside. A forced fresh-air mask is also recommended.
3. Do not smoke in the vicinity of a degreaser.
4. If solvent GETS INTO THE EYE--Hold eye open, flush with cold water for fifteen minutes.
5. If solvent should soak clothing, remove such clothing at once and aerate thoroughly. Use soap and water to wash parts of the body that have been wet with solvent, and then apply lanolin-type cream.
6. If solvent is swallowed, provoke vomiting immediately and secure medical attention promptly.
7. If a person is overcome by excessive exposure, give him fresh air and, if necessary, apply artificial respiration. Keep him warm, and secure medical attention immediately. Over-exposure can be fatal.
8. Stop distillation before heating element surfaces become exposed (liquid level never lower than the top of steam coils, gas immersion tubes, or electric heating elements).
9. Never add solvent to hot oil-solvent mixtures. Sudden expansion can splash solvent out of the degreaser and possibly harm operator.
- * See Manufacturing Chemists' Association Chemical Data Sheet SD-14

PERSONAL PROTECTION*

Specific requirements deemed necessary for personal protection are listed:

INSTRUCTION: "All employees working in and around open-surface tank operations must be instructed as to the hazards of their respective jobs, and in the personal protection and first aid procedures applicable to these hazards."

FILLING: Whenever there is a danger of splashing, for example, when additions are made manually to the tanks, or when acids and chemicals are removed from the tanks, the employees so engaged shall be required to wear either tight fitting chemical goggles or an effective face shield.

EMERGENCIES: "When, during emergencies, workers must be in areas where concentrations of air contaminants are greater than the threshold limit of solvent or oxygen concentrations are less than 19.5 percent, they shall be required to wear respirators adequate to reduce their exposure to a level below these limits, or to provide adequate oxygen. Such respirators shall also be provided in marked, quickly accessible storage compartments built for the purpose, when there exists the possibility of an accidental release of hazardous concentrations of air contaminants. Respirators shall be approved by the U.S. Bureau of Mines, U.S. Department of the Interior (see 30 CFR Part 11) and shall be selected by a competent industrial hygienist or other technically qualified source. Respirators shall be used in accordance with Section 1910.134 (a), (b), and (c), and persons who may require them shall be trained in their use."

SPLASHING: "Near each tank containing a liquid which may burn, irritate, or otherwise be harmful to the skin if splashed upon the worker's body, there shall be a supply of clean cold water. The water pipe (carrying a pressure not exceeding 25 pounds) shall be provided with a quick opening valve and at least 48 inches of hose not smaller than three-fourths inch, so that no time may be lost in washing off liquids from the skin or clothing. Alternatively, deluge showers and eye flushes shall be provided in cases where harmful chemicals may be splashed on parts of the body."

* From the Occupational Safety and Health Act

VAPOR SPRAY DEGREASER

HIGH VOLUME WORK LOADS

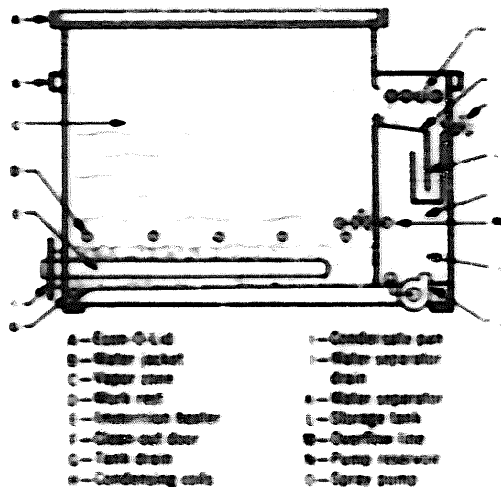
- Heavy gauge steel construction
- Stainless steel or vitrol steel inside
- Lock-grip pump with complete solvent spray assembly
- Econ-O-Lid container for re-chemicalized work area
- Econ-O-Lid roll top cover to reduce solvent costs at least 30%
- Immersion heaters for efficient heat transfer
- Self-draining for solvent recovery and reuse
- Panelboard available
- Lock handle available for complete delivery

Model HD vapor spray degreasers are specifically designed for heavy duty, high volume production requirements. Two types of heavy gauge construction are offered; either stainless steel or mild steel multi-coated with a corrosion resistant armor-clad lining. Both types are double-welded and reinforced for long life.

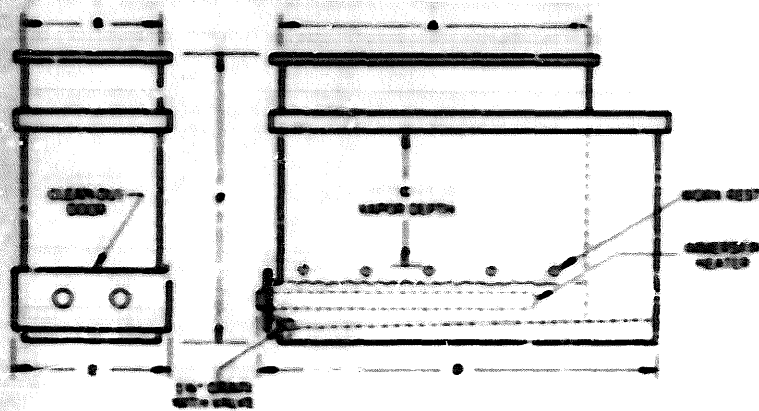
Immersion heaters, tubular or coil, are used on all electric, gas, and steam models to provide the most efficient means for vapor degreaser heating. Immersion heating puts the heat where you need it; provides faster start-up time and economies of operation.



STANDARD EQUIPMENT includes complete heating assemblies, water jacket, multi-pass fin tube coil condenser, water separator with drain-off valve, panelboard, special leak-proof pump and motor, motor starting switch, solvent resistant spray hose, aluminum spray lance with handle and vee-jet spray nozzle, tubular type work rest, tank drain and valve, high temperature control with manual reset feature (on gas and electric models), dial thermometer, and the exclusive Econ-O-Lid roll-type cover.



SPECIFICATIONS - Models ND



NOTES: Steam Pressure required—5-15 psig. Gas pressure required—7" W. C.

MODEL	BASE DIMENSIONS			OVERALL DIMENSIONS			WATER CONNECTIONS		SERVICE CONNECTIONS			EXHAUST STACK DIAMETER GAS MODELS	LIP EXHAUST SYSTEM			APPX. SHIP. PWS. WEIGHT
	A	B	C	D	E	F	G	H	GAS	STEAM	ELEC.		CFM*	WATER HP	BLOWER OUTLET	
ND-425	48	30	30	78	40	62					220V. 3ø				1200	
430	48	30	36	78	40	68	1"	1 1/2"	1/2"	1/2"	OR	6"	600	1/2	8 1/4" x 9 1/4"	1250
435	48	30	42	78	40	74					440V. 3ø				1300	
ND-525	60	36	30	90	46	67					220V. 3ø				1300	
530	60	36	36	90	46	73	1"	1 1/2"	1/2"	1/2"	OR	7"	900	1/2	11 1/4" x 8"	1365
535	60	36	42	90	46	79					440V. 3ø				1435	
540	60	36	48	90	46	85									1500	
ND-730	84	36	36	114	46	73					220V. 3ø				1600	
735	84	36	42	114	46	79	1"	1 1/2"	1/2"	1"	OR	1"	1200	1/2	11 1/4" x 8"	1700
740	84	36	48	114	46	85					440V. 3ø				1800	
ND-1030	120	48	36	150	58	79					220V. 3ø				2200	
1040	120	48	48	150	58	91	1"	1 1/2"	1/2"	1 1/2"	OR	10"	2400	1 1/2	13 1/4" x 9 1/4"	2400
1050	120	48	60	150	58	103					440V. 3ø				2500	
ND-1230	144	48	36	174	58	79					220V. 3ø				2600	
1240	144	48	48	174	58	91	1"	1 1/2"	1/2"	1 1/2"	OR	10"	2800	1 1/2	14 1/4" x 10 1/4"	2800
1250	144	48	60	174	58	103					440V. 3ø				3000	

*CFM rating not applicable in Illinois and New York. Request special blower volumes and prices from office for lip exhaust systems to be installed in Illinois or New York.

DESCRIPTION

Section II. A Vapor Degreaser (Equipment using Solvent for Cleaning)

(1) What is it?

A solvent vapor degreaser is a tank with some means of boiling the solvent and some means of controlling the vapors in the upper section.

(2) What does it do?

If the solvent is properly selected, contamination will be removed from the part being cleaned by solvent action.

(3) How does it work?

The selected solvent is heated within the tank, which will generate a vapor. The vaporized solvent is maintained in the tank by means of a cold area which condenses the vapor back to a liquid. The liquid solvent is collected in a trough and directed to a water separator (to remove free water) and returned to the tank.

(4) How does it clean?

The articles to be cleaned are suspended in the air-free zone of solvent vapors, which condense on the cool parts to dissolve the contaminate and give a continuous rinse in clean solvent. As the condensed solvent drains from the part, it carries off the contaminate and returns to the boiling liquid. The vapor treatment is often augmented by mechanical action such as liquid immersion or spraying the work with liquid (distillate) solvent in the vapor zone. The work is held in the vapor zone for final rinsing and drying until the parts reach vapor temperature, at which time condensation stops. The articles should then be slowly withdrawn from the machine. The process is a safe, rapid, economical procedure for preparing dry, clean articles for subsequent finishing or fabricating steps, usually without further treatment. Ultrasonics may be applied to further enhance the cleaning capability of the degreaser. By adding ultrasonics to a liquid immersion sump, holes & crevices on a part that cannot normally be cleaned by solvent action alone, should be penetrated to make the part thoroughly clean.

IMPORTANT RULES FOR VAPOR DEGREASING

- (1) No drafts at entrance and exit of equipment. (Drafts = solvent loss.)
- (2) The equipment should be up to temperature (condensation of heated solvent at coldspot) before processing any work.
- (3) Speed of travel for work entering, leaving, or while in vapor zone is 12 feet per minute maximum. The main reasons are fewer solvent losses and cleaner parts.
- (4) If spray is required, only spray in vapor zone.
- (5) Part or parts should be arranged so that solvent drains off readily. If this is not done, parts can trap solvent and bring solvent vapors out of degreaser creating a possible health hazard and undesired solvent losses.
- (6) Never lift part or parts above vapor zone when transferring from one sump to another sump.
- (7) Never let liquid level get below top of heat source. Keep adequate supply of solvent on hand. The equipment should always be filled to proper operating levels.
- (8) Size and type of load to be processed can be critical to the degreaser. If vapor line lowers rapidly and requires extra time to recover, load is too great for machine and should be reduced to machines design limits.
- (9) Machine maintenance - A cleancut schedule should be established for the removal of contamination (sludge) from the boil sump(s) at regular intervals to eliminate undesired and unsafe conditions, and to maintain efficient cleaning operation.
- (10) Never locate a degreaser near open flames, baking ovens, or any arc welding operations.
- (11) Never place hands below vapor line! Use hooks or long handle baskets to place parts in solvent. Do not use absorbent materials such as cloth, wood, or rope, etc. to handle work in degreaser.

OPERATION*

- Avoid excessive speed of work in and out of vapor
- Prevent liquid dragout by entrainment in parts
- Avoid contamination of solvent with water and other materials
- Keep proper heat balance

SPRAY CLEANING AND DEGREASING: In vapor degreasing, spraying takes place in an air-free atmosphere below the vapor blanket so that evaporative losses due to the mixing of solvent and air are negligible. However, care should be taken to always emerge parts dry.

COVERS: We recommend suitable covers for degreasers to reduce vapor emission when the degreasers are not operating and condenser coils are not functioning. For large machines, roll top covers or power operated covers are available to facilitate their use. In addition, freeboard chillers are very helpful in reducing solvent emissions. The principle used in this case is the creation of a heavy, cold air blanket over the solvent vapor by means of refrigeration devices.

WELDING IN VICINITY: "Degreasing or other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation. In addition, trichlorethylene and perchlorethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas shielded welding operations."

* From Occupational Safety and Health Act

INSTALLATION

Location

1. Install your degreaser in a location that is not subject to drafts from blowers, fans, open windows or doors.
2. Do not install your degreaser near an open flame, paint baking oven, or arc welding operation.
3. Be sure cleanout doors and clean solvent outlet are accessible. Provide clearance for removal of steam coil, gas burner, or electric heater assembly.
4. Machine should be mounted on a non-combustible floor. If this is not possible, provide suitable insulating protection.
5. Using the top of the machine as a reference, level the machine using shims as required.
6. Do not connect drains to sewer.

If degreaser is open top unit and is to be installed in a pit, the following points also apply:

7. Top of degreaser should be 42" to 44" above operating floor or be provided with a sturdy railing around the entire perimeter at this height.
8. Pit should be equipped with drain to sewer.
9. Pit 24" or more in depth is to be ventilated by powered exhaust at a rate not less than twice the pit volume per minute.
10. Install limit switch, trip or other device, to automatically actuate pit exhaust fan when pit access door is opened.

Water Connections

1. Place valve for controlling cooling water on the water inlet. Water should enter at about 75° F. and leave the machine at about 100° to 125° F.
2. Cooling water outlet should be above top of cooling coils to keep coils always full of water.

3. This outlet should discharge into an open sight drain, through funnel to sewer (See Figure 5) unless closed loop cooling system is used.

Electrical Connections

1. Check nameplate for voltage, phase and amp rating.
2. Provide a disconnect switch of proper size and in accordance with your local code.
3. Wire from the disconnect switch to the terminal block. Provide separate power supply if an electric fan is used.

If degreaser is equipped with pump, DO NOT CHECK OPERATION OF PUMP AFTER WIRING UNTIL IT IS FILLED WITH SOLVENT. Seal may be damaged if run dry.

Connections for Gas Heated Machines

1. Provide 7" w. c. natural gas (or LPG Gas in accordance with tag on machine). If the pressure runs much above this, it is necessary to install a gas pressure regulator. Provide pipe connection sized in accordance with your local utility company's recommendations. Gas volumes required are stated on the literature covering this model.
2. An exhaust stack must be provided for satisfactory operation. Connect at the exhaust outlet in accordance with Exhaust Stack Installation Sheet, No. 2391.1.
3. The burners must be adjusted to give the best possible flame, by opening air ports until the flame is clear and non-luminous.

Connections for Steam Heated Machines

1. The steam supply line to the degreaser must be of adequate capacity to supply the necessary volume of steam at the desired pressure. If the steam is to be taken from a high pressure line, it is necessary to install a reducing valve assembly a sufficient distance from degreaser to dissipate possible superheat. (Use distance recommended by reducer manufacturer).
2. Steam pressure must be sufficient to boil solvent, but must not exceed 15 lbs. for trichlorethylene, 50 lbs. for perchlorethylene.

3. On machines with two or more heated tanks, the steam inlet to each tank should be valved according to method of operation desired.
4. Inverted bucket type low pressure traps should be provided on steam outlets so the condensate flows into them by gravity (use eccentric coupling). Condensate line from the traps should run either to a drain or to the boiler condensate return line. Pipe for minimum back pressure.

Safety Controls

1. A high temperature control is provided as standard equipment on gas heated models; optional on electrically heated models; not required for steam heated models. A safety vapor control is optional on all models.
2. The safety vapor control (S.V.C.) turns heat OFF in the event of high vapor level and must be set below the boiling point of the solvent being used.
3. The high temperature control (H.T.C.) turns heat OFF in the event of low solvent level in boiling tank or too great a concentration of oil in boiling tank.

Both controls are manual reset type. Before start-up, check controls by pushing reset buttons until switches reset. During operation, if either control shuts heat OFF, fault must be corrected and control must be reset to turn heat ON again.

NOTE: For trichlorethylene operation, set safety vapor control at 160° F; high temperature control at 230° F.
For perchlorethylene operation, set safety vapor control at 200° F; high temperature control at 300° F.
For 1,1,1 trichloroethane operation, set safety vapor control at 160° F; high temperature control set at 190° F.

DEGREASERS

MODEL HD

GENERAL

1. Facing the machine the condenser and spray lance are at your right hand. The lid rolls open to the rear.
2. If baskets are to be used, fabricate them of round bar end wire mesh and hot dip galvanize. Any other construction may entrap solvent when the basket is withdrawn from the machine.
3. The work rest is provided to support the work in the vapors above the liquid solvent.
4. The adjusting knob and manual re-set button of the safety controls are mounted in the panelboard. A safety vapor control is an optional item. A high temperature control is provided as standard equipment on gas and electrically heated models but not on those for steam heated models since none is required.

NOTE: For trichloroethylene operation, set safety vapor control at 160°F
high temperature control at 230°F.
For perchloroethylene, set safety vapor control at 200°F
high temperature control at 300°F.

INSTALLATION

STEP I—LOCATION

1. Install your degreaser in a location that is not subject to drafts from blowers, fans, open windows or doors.
2. Do not install your degreaser near an open flame, paint baking oven, or arc welding operation.
3. Machine should be mounted on a non-combustible floor. If this is not possible, provide suitable insulating protection.
4. Using the top of the machine as a reference, level the machine using shims as required.

STEP II—SERVICE CONNECTIONS

WATER CONNECTIONS

1. Provide two valves in the water inlet line; one for daily on/off of water supply, the second for an initial adjustment to control the volume of water flow.
2. Do not install valves on the water outlet.

CONNECTIONS FOR ELECTRICALLY HEATED MACHINES

1. Check nameplate for voltage, phase and amp rating.
2. Provide a disconnect switch of proper size and in accordance with your local code.
3. Wire from the disconnect switch to the terminal block in the panel. No other connections are required. See wiring diagram 2336.1.

CONNECTIONS FOR GAS HEATED MACHINES

1. Provide 7" W. C. natural gas (or LPG Gas in accordance with tag on machine). Provide pipe connection sized in accordance with your local utility company's recommendations. Gas volumes required are stated on the literature covering this model.
2. An exhaust stack must be provided for satisfactory operation. Connect at the exhaust outlet of the burner tube in accordance with Exhaust Stack Installation Sheet No. 2391.1.
3. Electrical service is required for pump and safety control operation. Check nameplate for voltage and provide a disconnect switch of proper size and in accordance with your local code. Wire from the disconnect to the terminal block in the panelboard. Separate three phase service must be provided if a lip exhaust system or 220/440 volt spray pump motor was ordered. See Wiring Diagram No. 2336.2.

DEGREASERS

CONNECTIONS FOR STEAM HEATED MACHINES

1. If machine was ordered without the optional regulator and trap assembly, provide a gauge and steam pressure regulator, 0-15 psig range. Mount in steam supply line to fitting in the steam coil at right hand side of machine.
2. Connect other coil fitting to condensate return line with suitable trap mounted below coil and close to machine.
3. Electrical service is required for pump and safety control operation. Check nameplate for voltage and provide a disconnect switch of proper size and in accordance with your local code. Wire from the disconnect to a terminal block in the panelboard. Separate three phase service must be provided if a lip exhaust system. 220/440 volt spray pump motor was ordered. See Wiring Diagram No. 2336.3.

START-UP

1. Pour trichlorethylene, degreasing grade, directly into the main tank. Bring the liquid level to within 1" of the top of the work rest and maintain this level during operation by adding solvent, when required, to make up for losses.
2. Do not attempt to pour solvent into the storage tank for it will fill automatically. However the solvent collected there must be replaced in the main tank during initial start up.
3. Open both water valves and check for flow through the water jacket and the condensing coil.
4. Turn heat on.
5. When vapors have risen to the water jacket area inside the machine, slowly close one of the inlet water valves until the temperature of the outlet water is maintained at approximately 110°F. At this temperature the outlet water pipe will feel warm to touch. If the outlet water is hot, proper condensing will not be provided. If it's cold, water is being wasted. Once this adjustment has been made, henceforth use the second valve in the water inlet line for daily on-off operation.

OPERATION

1. The vapors generated from the boiling solvent rise to the water jacket area where their upward movement is limited by the condensing action of the relatively cool water passing through the water jacket and condensing coils. Some of the vapors also pass through the slot opening into the condensing tank. There the vapors are condensed and the resulting condensate passes through a water separator and drains to the bottom of the storage tank.
You will note the bottom of the storage tank is lower than the valved run-back line to the main tank. This will collect condensate for the spray pump. When the solvent level in the spray reservoir rises to the proper height, the liquid condensate will run back into the main tank through this line. Be sure valve in run-back line is open.
2. When vapors have risen to the working level (water jacket area), cleaning may commence. Immerse work into the vapor area and leave until the vapor line returns to the working level and condensate no longer drips off work. Spray lance or spray manifold may now be used to flush metal chips and/or heavy contaminants from the work. Never spray above the vapor line. Leave work in vapors for final vapor rinse until condensate no longer drips from work. Withdraw work slowly (11 FPM max.) tipping or shaking any parts that might trap liquid solvent.
3. Check the solvent level in the degreaser each morning. Provide sufficient solvent to maintain a level slightly below the work rest when the solvent is boiling.

DISTILLATION AND CLEANOUT

1. When the temperature of the boiling solvent reaches 195°F., oil contamination is too high for optimum degreasing. The solvent should be distilled and the machine cleaned out.
2. While the machine is operating, close the valve in the run-back line between the storage tank and the main tank of the degreaser. Continue boiling until either the vapor line drops below the slotted opening into the condensing chamber or until the heating assembly is about to be exposed.
Turn off heat, allow to cool and drain the remaining oil residue from the main tank. Clean solid deposits from the bottom and from around the heaters.
Open run-back valve allowing distilled solvent in the storage tank to run into the bottom chamber, and add new solvent as required.
Never allow the degreaser to operate unattended during the distilling cycle. Never allow the vapor line to be exposed or the chamber to boil dry. Never allow the pump to run for extended periods as wear may be damaged.

OPERATING SUGGESTIONS

1. Keep work loads light as vapor line does not drop with each load.
2. Rack the work for good drainage and accessibility to spray.
3. Do not spray longer than necessary.
4. Close lid when not in use.
5. Drain water separator daily or at shorter intervals depending on rate of water contamination.
6. Do not smoke near degreaser.
7. If solvent comes in contact with skin it will remove the natural oil. Apply lotion to restore these oils.

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 office:

- 1- **Manufacturer's Federal Supply Code Number-**
- 2- **Manufacturer's Part Number exactly as listed herein.**
- 3- **Nomenclature exactly as listed herein, including dimensions, if necessary.**
- 4- **Manufacturer's Model Number -**
- 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 1300 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 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:

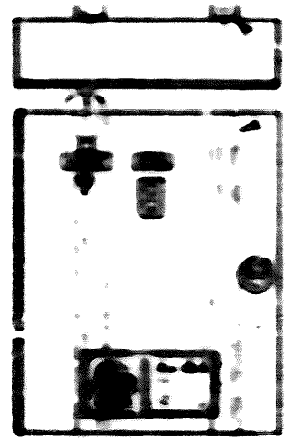
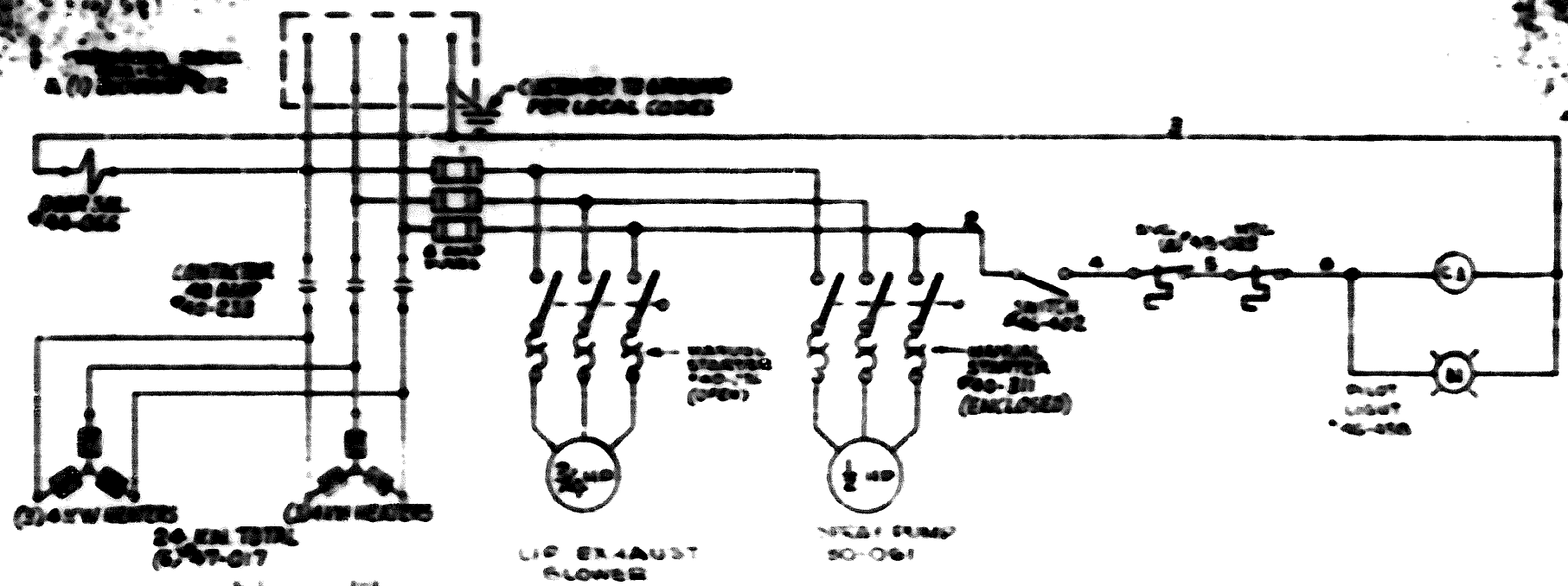
Manufacturer:

Model:

Serial:

Any other pertinent information such as frame number, type, dimensions, etc.

20 VOLT, 3 PHASE, 50 CYCLE SERVICE

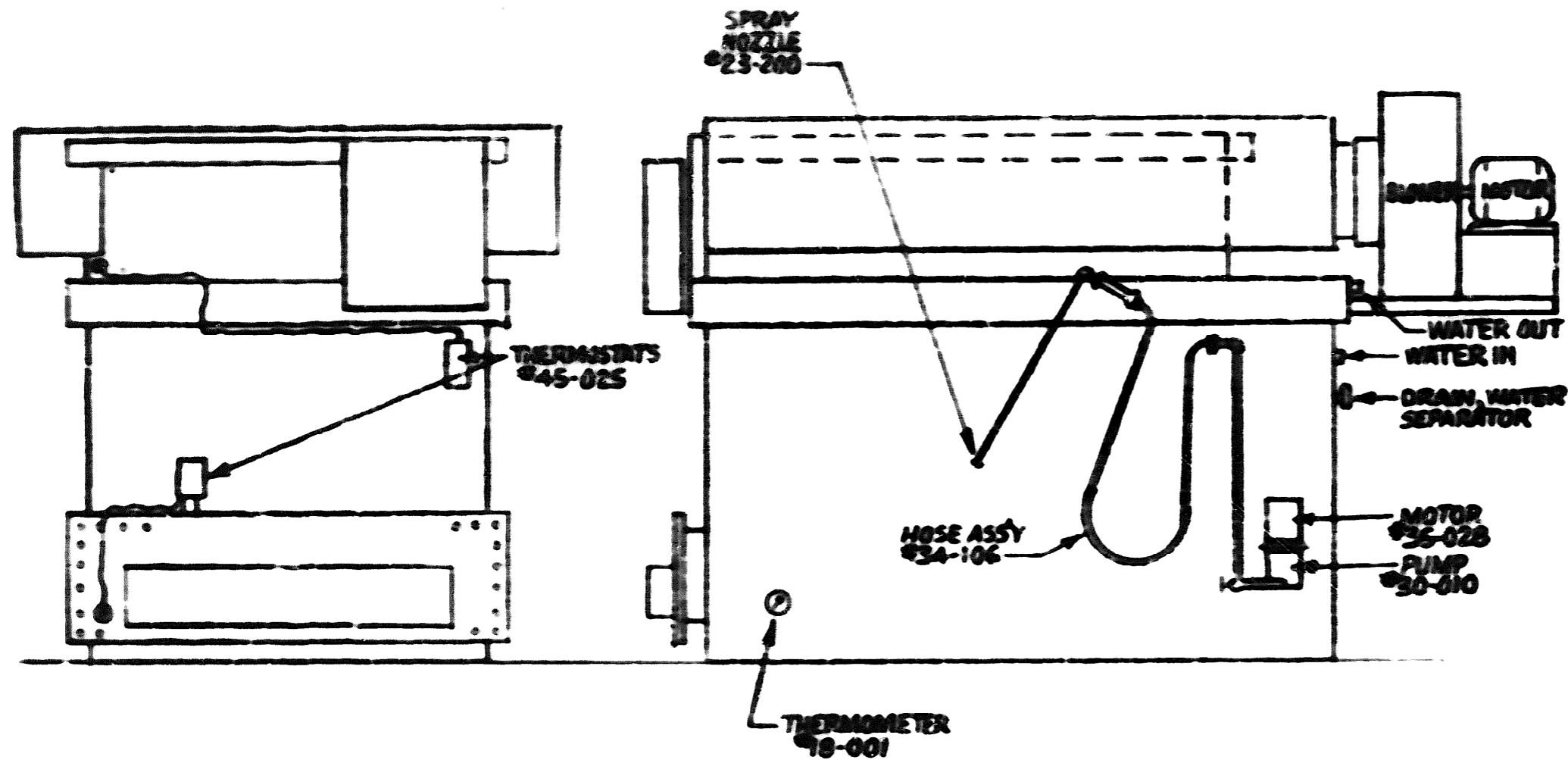


CONTROL PANEL
A 40 002 & 40 001

NOTE:
CUSTOMER TO SUPPLY & INSTALL A
CIRCUIT BREAKER OR FUSED DISCONNECT
SWITCH OR AS ABSENT TO EQUIPMENT
PER LOCAL CODES.

40 002	40 526 ELECTRIC DEBRASER	
	STANDARD WIRING	
		71-0

STYLES 4-0-0



MODEL HD-525
ELECTRICALLY HEATED
VAPOR SPRAY DEGREASER

FLUSH TYPE INSTALLATION INSTRUCTIONS FOR MACHINES WITH LIP EXHAUST SYSTEM

A. END BRACKETS:

- 1-- Set **END BRACKETS** in degreaser flush with top of machine, one at each end with **TENSION STRAPS** securing on **END BRACKETS** toward front of machine. Fig. I and Fig. VI.
- 2 - Space **END BRACKETS** so that **ROLLER** has clearance of $1/4$ to $3/8$ at each end. Shim if necessary. Fig. II.
- 3 - It is important to check **END BRACKETS** for squareness before securing to machine. Diagonal measurements from opposite ends of **END BRACKETS** should be identical. Fig. III.
- 4 - Drill side of degreaser through holes in **END BRACKETS** with a #7 drill and secure with stove head sheet metal screws provided.

B. ROLLER & COVER:

- 1 - Place **ROLLER** on **END BRACKETS** with **ROLLER** at front of machine and cover extended across to back side.
- 2 - Center **COVER** and **ROLLER** between **END BRACKETS** so that clearance is uniform along both sides. Fig. III.
- 3 - Set **COVER CLAMP BAR** in place over end of **COVER** and drill through each hole with #7 drill.
- 4 - Attach **COVER CLAMP BAR** with sheet metal screws provided. Fig. IV.

C. TENSION TAPES:

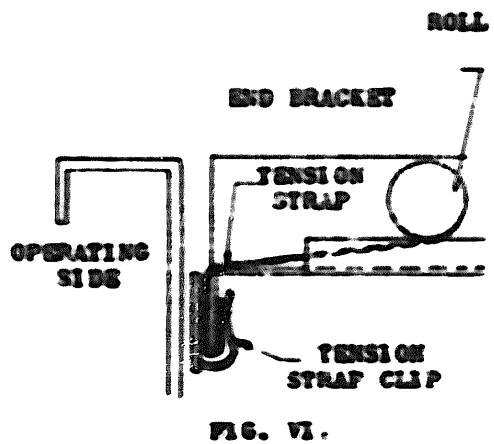
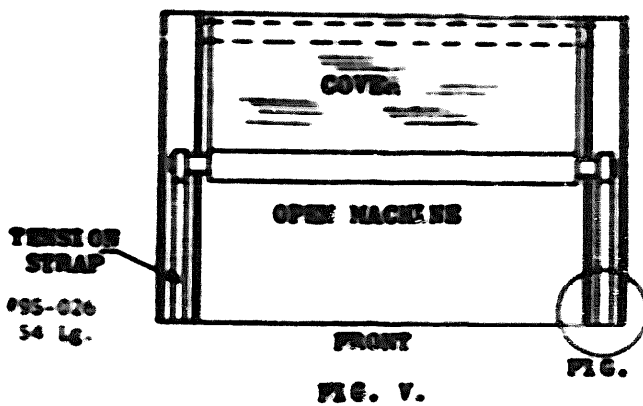
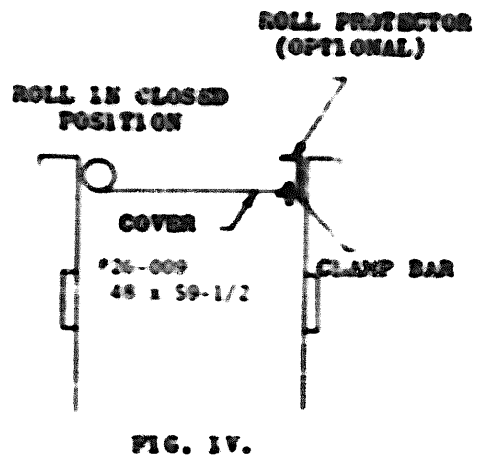
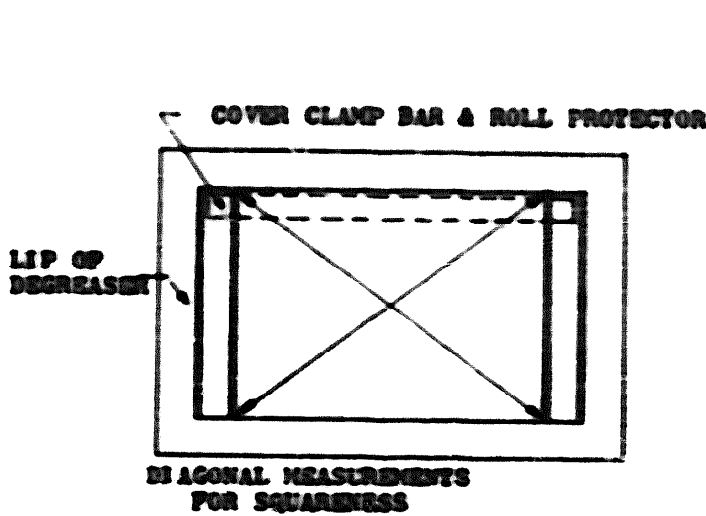
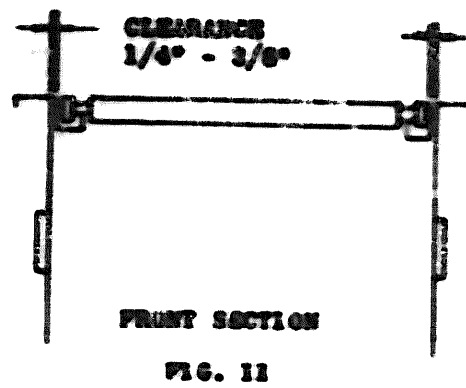
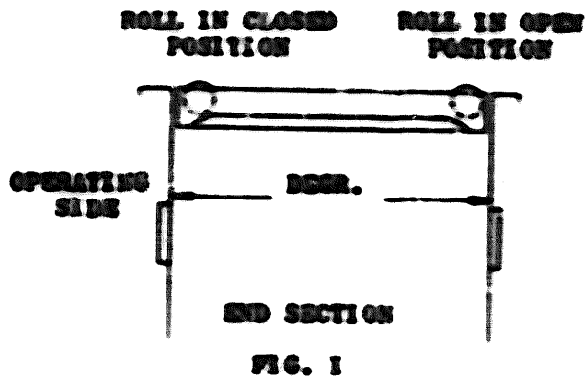
- 1 - With **COVER** rolled on tightly, place **ROLLER** on center line of degreaser. Fig. V.
- 2 - Wind **TENSION STRAPS** counter to **COVER** direction so that they have an equal number of turns to the cover. The thickness of **TENSION STRAP** should now equal to the **COVER** winding on the **ROLLER**.
- 3 - Place **TENSION STRAPS** under the front of **END BRACKETS** and while holding the **ROLLER** steady, tighten the **TAPES** and secure with the **TENSION STRAP CLIP**. Fig. VI.

D. OPERATION:

- 1 - Test the operation for proper clearances and tension setting.
- 2 - **ROLLER** should move freely without binding or excessive strain on the **TENSION STRAPS**.
- 3 - Readjustment may be necessary during the first few days to overcome the initial stretch on the **TENSION STRAPS**.

E. USE:

KEEP DEGREASER CLOSED BETWEEN LOADS AND WHENEVER SHUT DOWN - AN OPEN MACHINE IS WASTEFUL.

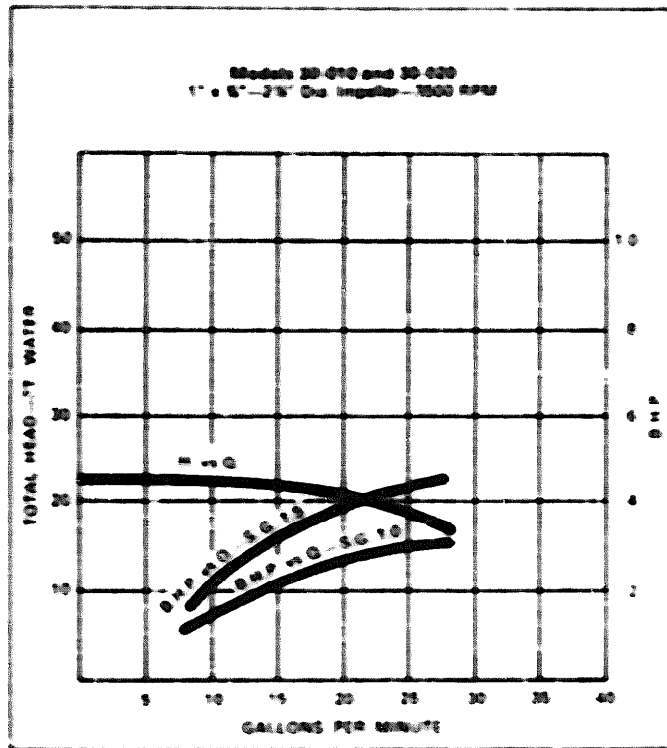


FLUSH TYPE SCROLL INSTALLATION	
	PL 1-4

SERVICE PARTS LIST CENTRIFUGAL PUMPAKS

Model Numbers				
Impeller Diameter	2-1/2"	2-7/8"	3-1/8"	3-1/4"
Cast Iron	30-010	30-011	30-012	30-013
Bronze	30-020	30-021	30-022	30-023
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY REQUIRED	
1	32-027	Gasket	1	
2	32-029	Impeller Drive Key	1	
3	32-025	Bronze Housing w/ 4 Studs (32-028)	1	
3	32-026	Cast Iron Housing w/ 4 Studs (32-028)	1	
4	32-028	Stud	4	
5	50-014	Hex Nut 5/16" - 24	4	
6		Pipe Plug - 1/8" N.P.T. 2 Drain, 1 Prime	3	
7	32-036	Seal Assembly (includes washer & seat)	1	
8	32-030	Impeller Sleeve Clamp Assembly 1 Split Clamp 2 Screws (50-005) 2 Hex Nuts (50-013) 2 Lockwashers (50-009)	1	
9	32-045	Impeller Lock Nut	1	
10	32-044	Cast Iron Impeller for Model 30-010	1	
11	32-035	Seal Spring Retainer	1	
12	50-010	Capscrew 3/8 - 16 x 7/8"	4	
13	50-008	Lockwasher 3/8	4	
14	32-032	Brass Adaptor	1	
14	32-033	Cast Iron Adaptor	1	
15	32-034	Impeller Drive Sleeve 5/8"	1	
16	50-005	Capscrew 5/16" - 18 - 1-3/4"	2	
17	50-013	Hex Nut 5/16" - 18	2	
18	50-009	Lockwasher 5/16"	6	

CENTRIFUGAL PUMPAK HEAD CAPACITY CURVE



GENERAL INSTRUCTIONS FOR PUMPAK 30-010

READ THIS BULLETIN CAREFULLY BEFORE INSTALLING OR OPERATING THE PUMPAK

CONSTRUCTION:

PUMPAK consists of housing, adaptor, stainless steel shaft sleeve, shaft seal, seal spring keeper, impeller, drive clamp, gaskets, Woodruff key, impeller locknut, and stainless steel fasteners.

The impeller is slipped onto shaft sleeve, driven by Woodruff key, and locked in place by self-locking nut. Shaft sleeve is machined to precisely fit shaft on your driver. No provision is made for internal drive key, and none is required. Drive clamp assembly takes place of internal drive key, securely locks shaft sleeve to driver shaft, and serves additionally as liquid slinger to protect your motor or engine.

The mechanical seal is a self-adjusting, greaseless type, lubricated by the liquid in the pump. It requires no maintenance and provides long and trouble-free operation. Because the seal is lubricated by the liquid in the pump, **THE PUMP SHOULD NEVER BE RUN DRY.**

ROTATION:

Check rotation of driver to be sure it coincides with the required rotation of PUMPAK assembly. PUMPAK is designed for Right Hand or Clockwise rotation (viewed from the drive end).

TO DISASSEMBLE THE PUMP:

Drain the system of liquid, break suction and discharge pipe unions, and if necessary, remove all piping from the suction and discharge openings. Remove the fasteners which hold the pump adaptor to the driver, loosen the drive clamp assembly, and remove the PUMPAK.

To disassemble, remove fasteners which hold pump hous-

ing to adaptor. Remove the housing, using caution not to tear housing gaskets.

Remove drive clamp assembly. The impeller, drive sleeve, seal bellows, and spring assembly will now slide forward, free of pump adaptor.

Seal seat and seat cup will remain in pump adaptor. If not damaged or worn, do not remove. If necessary, remove from adaptor counter bore with a piece of wood or screw-driver handle inserted through adaptor from drive end. A sharp tap or two is usually sufficient to knock out the seal seat. Use caution in removing the seal seat, so as not to crack a ceramic seat or distort a metal seat.

TO REMOVE THE IMPELLER:

Remove seal bellows, spring keeper, and spring assembly. The seal bellows will be bonded to shaft sleeve. Removal will require patience and caution to avoid damage to seal bellows and cage.

Remove impeller locknut from end of shaft sleeve. Slide impeller from shaft sleeve, and remove impeller Woodruff key.

INSPECTION:

Check all parts for wear. For ease of reassembly, shaft sleeve should have all nicks and burrs removed. Clean with light crocus cloth. Replace damaged parts with new parts.

Inspect seal seat and seat cup for grooves, scuff marks, or other deterioration. If a perfect lapped surface remains on seal seat, it may be re-used. If seat cup is in good condition, it may be re-used. If seal seat, cup, washer, or

bellows are damaged or worn, a new seal assembly should be installed.

REASSEMBLY:

Clean all castings with mild cleaning solvent, such as kerosene. All dirt and foreign matter should be removed. If seal is to be re-used, use soft, clean cloth to wipe seal faces.

Lubricate seal seat cut with liquid soap or clean grease, and press seal seat into adaptor counter bore, seating it firmly and squarely. Use caution, so as not to mar the lapped face of the seal seat.

Assemble shaft sleeve, impeller Woodruff key, impeller, and impeller locknut. Before installing seal bellows, seal spring keeper, and spring assembly, lubricate shaft sleeve and rubber bellows with liquid soap or clean grease. Press bellows, seal spring keeper, and spring assembly onto shaft sleeve. Be sure seal washer is properly positioned before and during assembly operation.

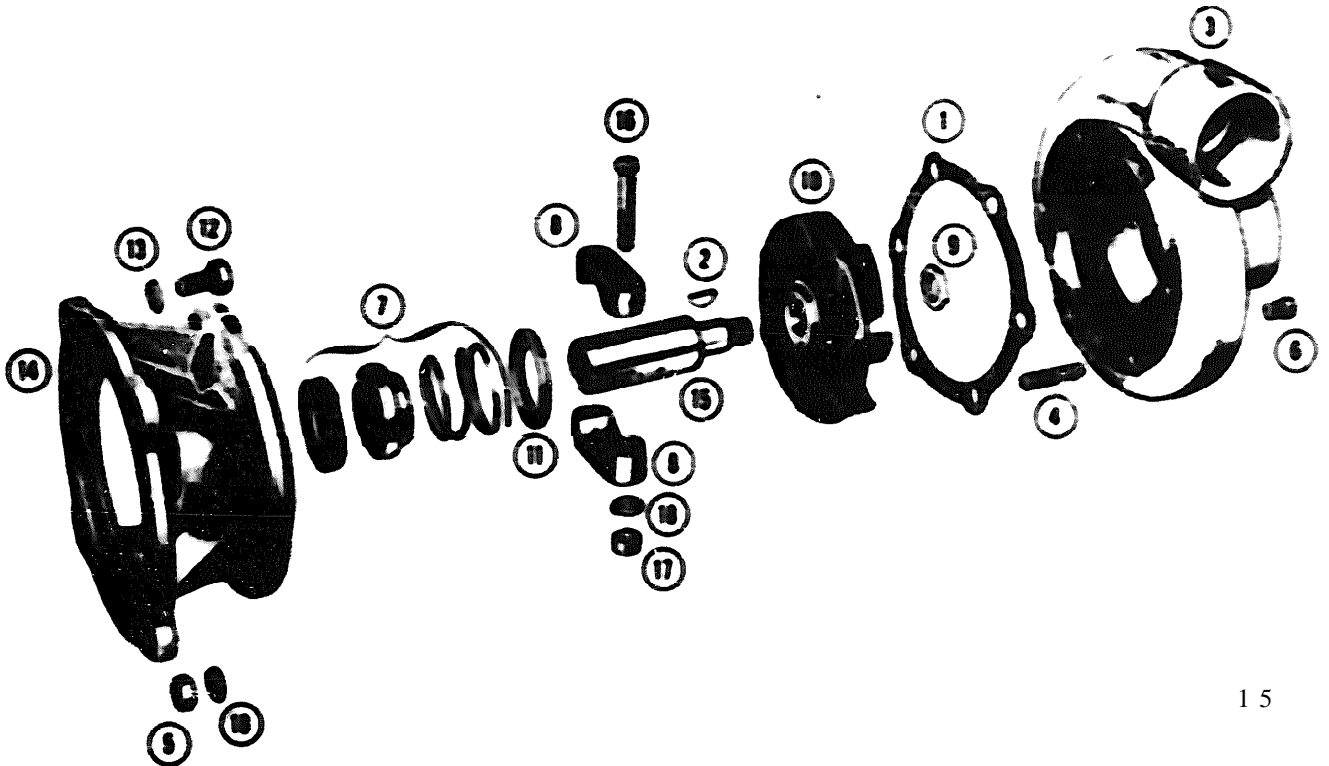
To be properly positioned, washer must be firmly against the rubber bellows member with driving lugs properly engaged. The raised shoulder on seal washer should contact lapped surface of seal seat in adaptor.

Slide impeller and seal assembly into adaptor. Install drive clamp assembly on shaft sleeve, but do not tighten.

If impeller is rubbing, shim needs readjustment.

1. Remove gaskets from housing.
2. Replace housing, pushing against impeller face. Secure housing with two fasteners 180° apart.
3. Securely tighten drive clamp.
4. Remove housing, and install one gasket.
5. Replace housing, securing with two fasteners 180° apart.
6. Rotate driver to determine if impeller rubs. If it does, add one more gasket. If not, replace all housing fasteners, and tighten.

SERVICE PARTS



RECOMMENDED SPARE PARTS

MODEL HD-525 ELECTRICALLY HEATED

DEGREASER

QUANTITY	DESCRIPTION	PART NO.	PAGE
1	Pump, Pumpak CI. 2-1/2 IMP.	30-010	13
1	Motor, 1/2 HP 3 Ø C Face 3450 RPM, 208/230/460 volt w/feet, horizontal mount, 56 C Flange, T.E. FC	36-028	15
1	Spray Hose	34-106	15
1	Spray Nozzle	23-200	15
1	Econ-O-Lid Fabric 48" x 59-1/2" Mylar	26-009	14
1	Fabric Tape	26-013	14
2	Tension Straps 54" lg.	95-026	14
1	Seal Kit for Pumpak Pump	32-036	13
1	Thermostat	45-025	15
1	Thermometer	18-001	15

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Rock Island, IL 61299

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The Adjutant General

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Chief of Staff

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PAGE NO.	PARA. GRAPH	FIGURE NO.	TABLE NO.
13			

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

Recommended Spare Parts List should also include the following:
 Part Number 45-025 - Thermostat
 Part Number 18-001 - Thermometer

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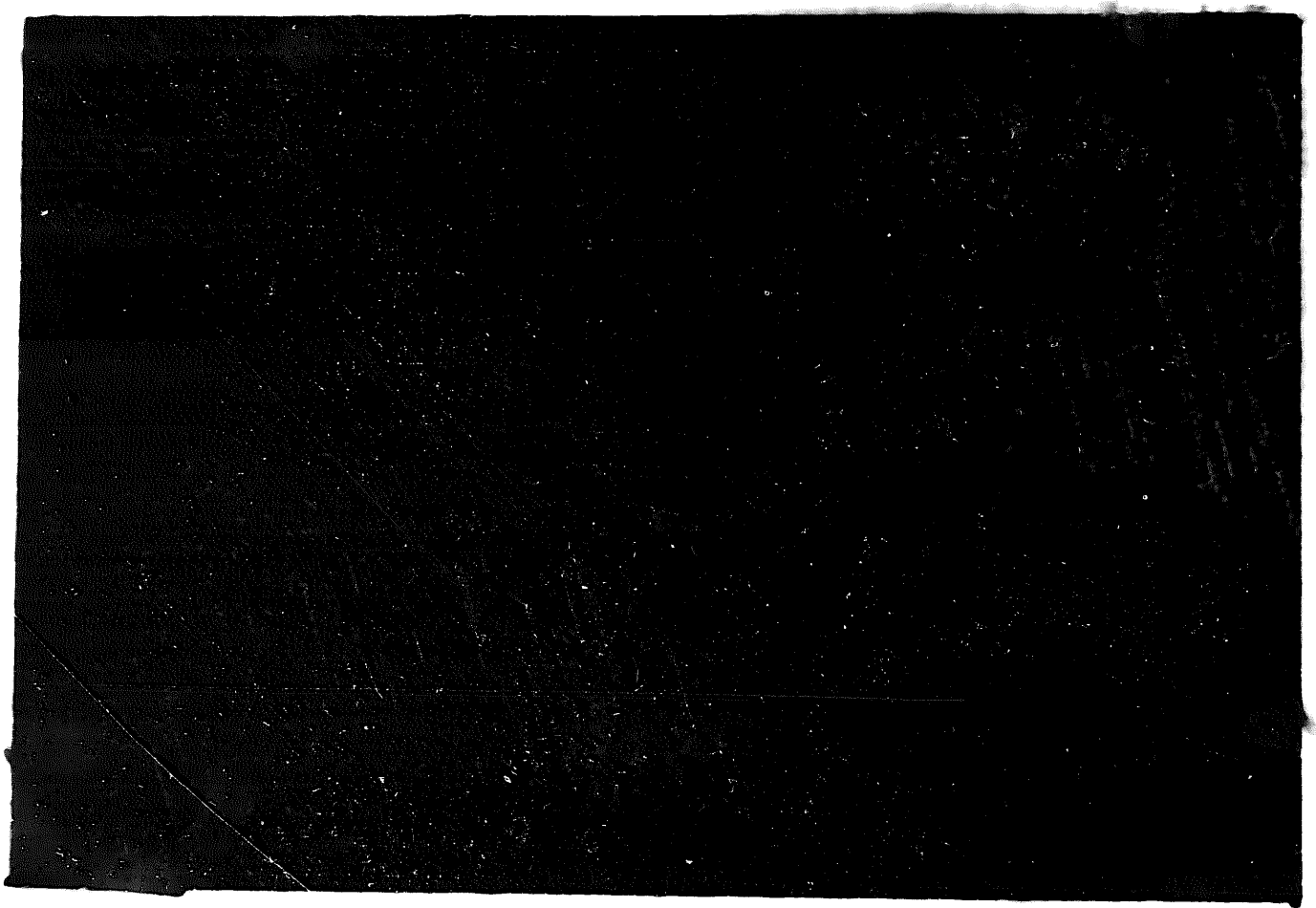
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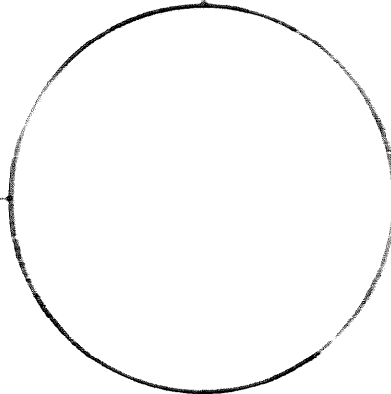
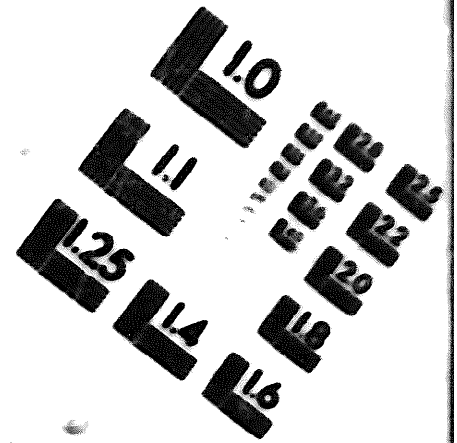
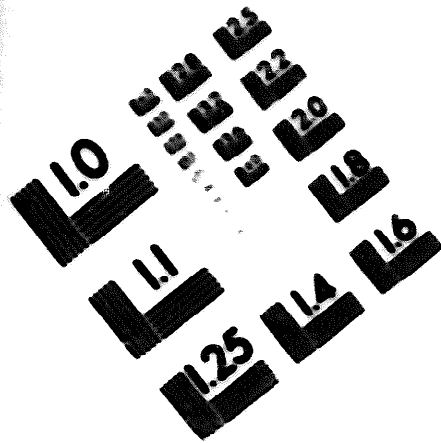
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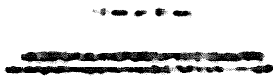




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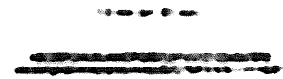
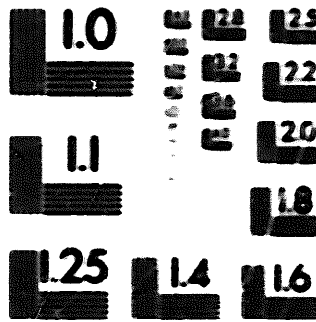
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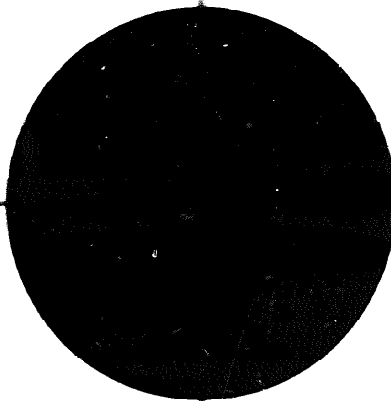
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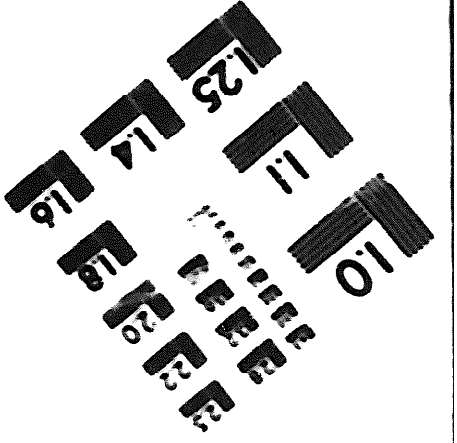
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