UNITED TECHNOLOGIES CARRIER

Commercial Division
Carrier Corporation

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PAGE: 1 OF: 17

SERVICE BULLETIN

SUPERSEDE BULLETIN:
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SUBJECT: PUMPOUT UNITS

PURPOSE

To transmit the attached Installation, Operation and Replacement Parts Instructions pertaining to the standard pumpout unit.

MACHINES AFFECTED

17CA, 17DA, 17M,P,S and 19C machines provided with pumpout units.

PROCEDURE

The attached instructions are issued to cover procedures pertaining to the standard pumpout unit.

INSTALLATION, OPERATION AND SERVICE PARTS INSTRUCTIONS
PUMPOUT UNIT
17CA, 17DA, 17M,P,S, & 19C CENTRIFUGAL MACHINES

4.0 PUMPOUT UNIT

The standard pumpout unit consists of a reciprocating compressor, oil separator, water-cooled condenser, pressure reducing device (float valve), and storage tank.

This unit provides two important functions:

(a) Capability of transferring the refrigerant into a storage tank which enables the machine to be opened without losing any refrigerant.

(b) Capability of distilling the refrigerant charge, thereby removing all impurities from the refrigerant.

4.1 Transferring the Refrigerant

Figure 1 shows a typical pumpout system with the cooler and storage tank on the same level. To transfer liquid from the cooler to the storage tank, the hand valves are set to permit the pumpout compressor to discharge into the cooler while taking its suction from the storage tank. The pressure differential thus created forces the liquid from the cooler into the storage tank. This method of transfer also applies when the storage tank is located above the cooler.

It is desirable to locate the storage tank so that its top is below the bottom of the cooler. Then, by opening the proper valves, it is possible to vent the storage tank to the cooler, and the liquid will drain by gravity.

To transfer refrigerant from the machine to the storage tank, open valves 5, 7, 6, 2, and 12 (Fig. 1), close the remaining valves, and operate the pumpout compressor. This takes a suction on the storage tank and pressurizes the machine. When the pressure in the storage tank is reduced to less than that of the machine, open valve 11. This permits flow of the refrigerant from the machine to the storage tank.

After all the liquid is transferred, the remaining refrigerant vapor can be drawn off by taking a suction on the machine and discharging through the pumpout unit condenser into the storage tank. This is done by opening valves 12, 3, 7, 6, 8, and 9, while closing the remaining valves. During this operation, assure that there is water flow through the pumpout condenser. This will condense the refrigerant prior to its entering the storage tank.

The high pressure cut-out is set to prevent excessive pressure which could cause the rupture disc to blow and, consequently, lose the refrigerant charge. The normal pumpout condensing temperature is 110°F at maximum load.

During evacuation of the cooler, any liquid remaining in the cooler shell will flash off. This may lower the temperature in the cooler enough to freeze the "brine."* For this reason, it is essential that all liquid

*Brine is the fluid passing through the cooler tubes, and may be water or another chilled liquid.

refrigerant be removed from the cooler before evacuation is started. When complete drainage is not assured, the brine pump must be operated during evacuation of the cooler.

To transfer the liquid from the storage tank to the cooler, operate the pumpout compressor with the appropriate valves set to pressurize the storage tank and take its suction from the cooler. The pressure in the cooler is lowered to a corresponding saturated refrigerant liquid temperature equal to 2° above the brine freezing temperature. The proper valves are then set so that the pressure difference between the two vessels forces the liquid from the storage tank to the cooler.

To charge the machine from the storage tank, take a suction on the cooler and discharge into the storage tank by opening valves 12, 3, 7, 6, and 4 (Fig. 1), and closing the remaining valves. When there is a pressure differential, open Valve 11 and refrigerant will flow into the cooler. Again, care must be taken to assure that cooler water is being circulated to prevent freeze-up.

4.2 Use of the Centrifugal Compressor

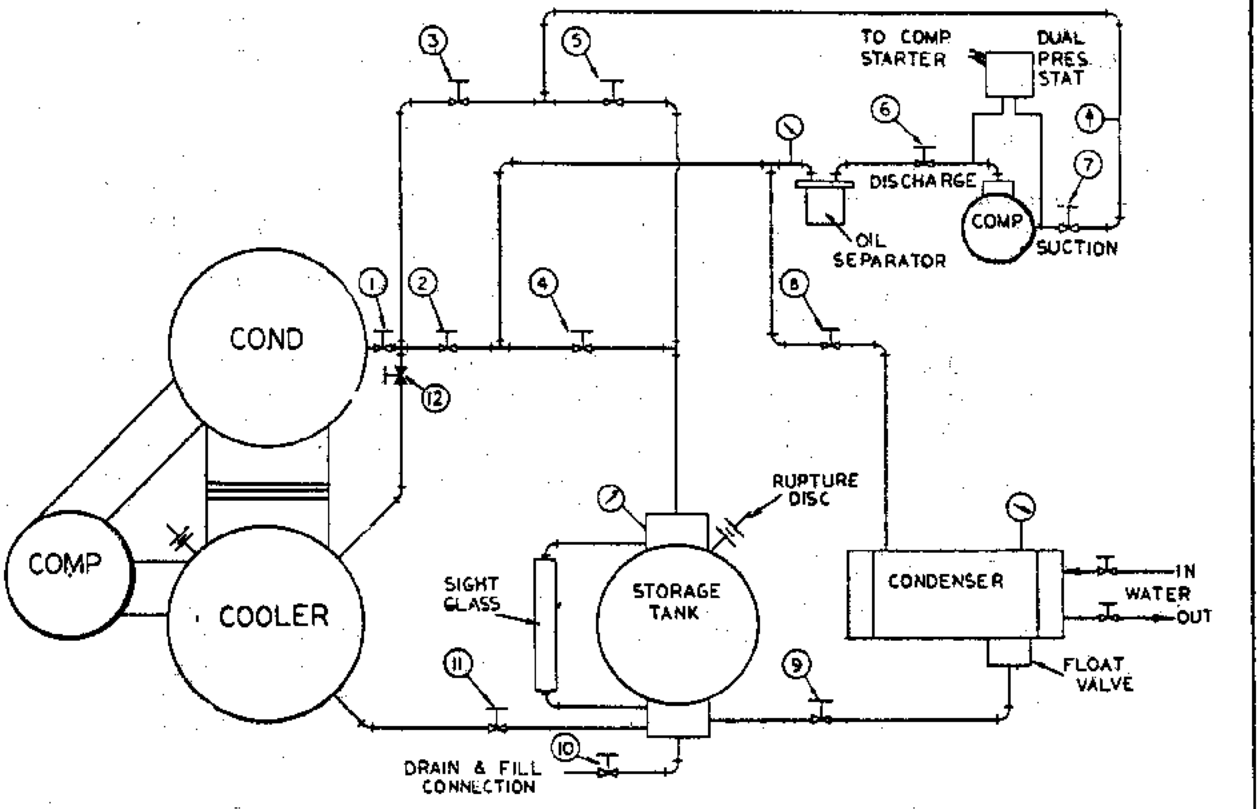
Under certain circumstances, it may be found that the 5F20 compressor must be operated for a very long time to build up enough pressure in the storage tank to return refrigerant to the cooler. This can occur, for example, when a large storage tank has a large charge of very cold refrigerant. In this case, the hot gas from the compressor will be condensed by the cold refrigerant with a very slow build-up in temperature and pressure.

The rate of transfer of refrigerant to the cooler may be increased by running the centrifugal compressor to lower the cooler pressure and, if necessary, the storage tank can be pressurized by bleeding pressure from the machine condenser to the storage tank. *Care must be taken, however, to prevent blowing the rupture disc of the storage tank.*

Other precautions that must be taken when using the centrifugal compressor in this manner are: Assure a flow of brine through the cooler to minimize the possibility of a freeze-up. The suction damper must be maintained in a minimum position, a careful watch of the suction pressure gage must be kept, and the cooler pressure must be maintained above the freezing point of the brine. Also, maintain a safe temperature on all the compressor bearings during this operation.

4.3 Distilling the Charge

To distill the charge, take a suction from the storage tank (which contains the refrigerant), and discharge into the machine condenser as follows: Open valves 5, 7, 6, 2, and 1 (Fig. 1), while closing the remaining valves. During this operation, circulate condensing water to condense the refrigerant as it enters the machine. The impurities in the refrigerant will be left in the storage tank and must be drained off through Valve 10.



TYPICAL PUMP-OUT UNIT
FIGURE 1

4.4 System Limitations

To transfer liquid from one vessel to another requires either a difference in elevation to permit gravity flow, or a difference in pressure between the two vessels to force the flow of liquid. The latter method requires lowering the pressure in one vessel which, if there is liquid in the vessel, means reducing its temperature and, simultaneously, increasing the pressure in the other vessel.

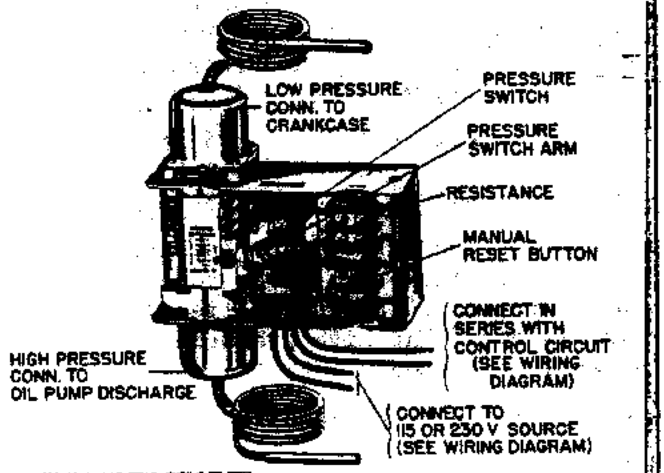
On most applications, this is not a problem. However, applications such as low temperature jobs, outdoor installations, or installations with high temperature differentials between the storage tank and the cooler require a careful study of the problems that can develop in transferring the refrigerant.

In some cases, it may be necessary to add auxiliary heat to one of the vessels or to insulate the storage tank where high ambient temperatures or sun load make it difficult to reduce the temperature and pressure in the vessel. All storage tanks located outdoors must have a cover or roof over the tank to be sure that the pressure in the tank does not exceed the relief pressure setting.

Sound engineering judgment must be used on all pumpout systems to determine their limitations on a particular application.

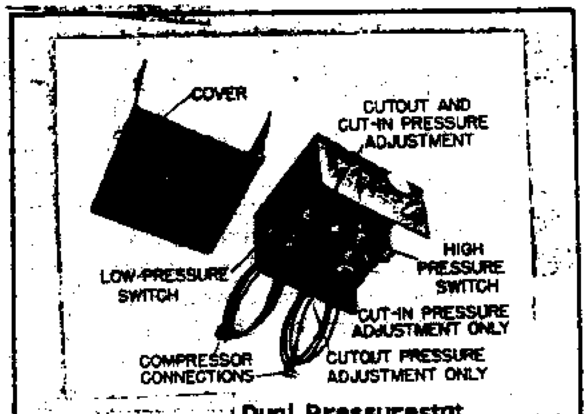
4.5 Pumpout System Adjustments

Each pumpout unit is supplied with an oil safety switch (Fig. 2), and a dual pressurestat (Fig. 3). A description of these switches follows.



Oil Safety Switch

FIGURE 2



Dual Pressurestat

FIGURE 3

4.5.1 Oil Safety Switch

The oil safety switch is provided to sense the oil pressure differential between the oil reservoir and pump discharge. The switch contains two switches and a heater element. If the oil temperature falls below the cutout pressure (see Table 1), the oil pressure differential switch closes, which energizes the heater element which, in turn, opens the oil pump failure switch (a thermostatic type switch) that shuts the compressor off. If the oil pressure increases to above the cut-in pressure, the oil pressure differential switch opens, de-energizes the heater element and, in turn, the oil pump failure switch closes. This operation is covered in more detail under 4.8, Controls.

4.5.2 Dual Pressurestat

The dual pressurestat consists of a high and low pressure safety switch.

4.5.2.1 High Pressure Switch. This switch measures pumpout unit compressor discharge pressure and will open when the pressure corresponds to a temperature of approximately 125°, thus shutting the compressor off. These pressure settings vary, depending upon the type of refrigerant used (see Table 1). The switch will close again at a pressure corresponding to approximately 100°.

4.5.2.2 Low Pressure Switch. This switch measures compressor suction pressure and will open when the pressure corresponds to a temperature of approximately 38°, thus shutting the

compressor off. Again, these values vary, depending upon the type of refrigerant (Table 1). This switch will close again at a pressure corresponding to approximately 50°.

Table 1. Suggested Pressure Settings

Refrigerant	Dual Pressurestat (psig)*				Oil Safety Switch		Normal Oil Pressure (psid)
	High Pressure		Low Pressure		Cut-out (psid)**	Cut-in (psid)	
	Cut-out	Cut-in	Cut-out	Cut-in			
114	50	30	1	10	11-14	16-19	45-55
12	165	115	36	67	11-14	16-19	45-55
500	190	140	44	60	11-14	16-19	45-55

*Settings given are for water chilling application. For other applications, set the low pressure cut-out to atmospheric pressure or to a pressure corresponding to a temperature equal to 5° above the freezing temperature of the brine, whichever is highest. The high pressure switch and oil safety switch settings remain as shown.

**Differential pressure (between oil reservoir and pump discharge).

4.7 Storage Tank Safeties

Table 2 summarizes the rupture disc and/or safety relief valve settings on the pumpout storage tank. Field adjustment is not required on these devices. Check device nameplate against Table 2.

Table 2. Pumpout Storage Tank Safety Device

System Refrigerant	Rupture Disc/Relief Valve (psig)
114	60
12	185
500	225

4.8 Controls

The schematic wiring diagrams for a pumpout unit are shown in Figs. 4 and 5. They differ only in respect to the power source to the compressor motor. Figure 4 shows a high voltage motor.

The following is a step-by-step explanation of the operation of the control circuit, using Fig. 4 as a guide. The control circuit uses 110 volt power. A CR relay, located across one of the power legs from the starter to the compressor motor, is also part of this circuit. To simplify, the circuit will be divided into three sub-circuits; namely, the crankcase heater (Branch A), the safety (Branch B), and the oil pressure circuit (Branch C). Also, the various connections will be alpha-numerically numbered.

When the start switch is depressed, power is available to the compressor starter (c) relay, bypassing from B1 through the normally closed stop switch to B2, through the now closed start button to B3, through the normally closed oil pump failure safety switch to B4, through the normally closed low pressure switch to B5, through the normally closed high pressure switch and a set of overloads to the relay, and on to ground at B6.

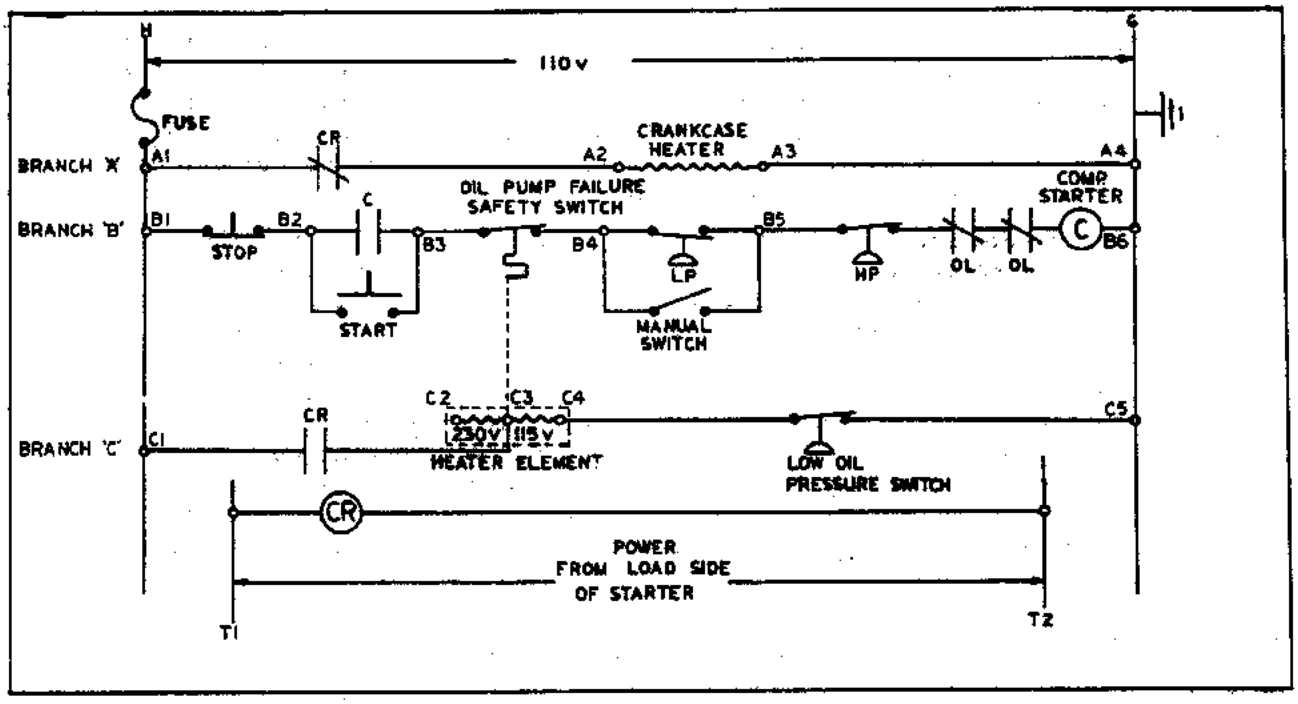


Fig. 4. Pumpout System Schematic Wiring Diagram for Compressor Motor Voltage Other than 230

When the relay (C) is energized, the starter contacts close and power is supplied to the compressor motor, the C contact in parallel with the start button closes, making the circuit from B2 to B3, which allows the start button to be released, and the safety circuit (Branch B) is energized and self-sustaining.

When power is applied to the compressor motor, the CR relay located across one of the legs of T1 and T2 is energized. As a result of CR relay being energized, the set of normally closed CR contacts in the crankcase heater circuit (Branch A) opens and the set of normally open CR contacts in the oil pressure circuit (Branch C) closes. With the CR contacts in Branch A open, the power is interrupted between A1 and A2 thus de-energizing the crankcase heater. With the CR contacts in Branch C closed, power is available from C1 to C3; thus the heater element would energize. However, the low oil pressure switch opened when the compressor started and oil pressure built up so power is interrupted from C4 to C5, thus de-energizing the heater element. At this stage, the compressor is operating normally and all switches are in their operating position.

To stop the compressor, one of the safeties must be actuated, or the stop button must be pushed.

If the stop button is pushed, the opposite of the starting sequence occurs. The C relay is de-energized, the compressor starter contacts open, de-energizing the compressor motor, and the C contacts in Branch B open, interrupting power between B2 and B3, thus opening the safety subcircuit (Branch B) which requires depressing the start button to restart. With the compressor motor de-energized, the CR relay is de-energized. As a result, the CR contacts in Branch A close, allowing power to A2, energizing the crankcase heater to A3, and on to ground at A4. Also, the CR contacts in Branch C open, interrupting power between C1 and C3, thus preventing any power from passing through the heater element by opening Branch C.

If the high or low pressure switch should open (by the pressure settings as listed in Table1 being exceeded), the sequence of events will be the same as just described. By manually closing the jumper switch from B4 to B5, the low pressure switch is bypassed. This enables the machine to pump down to any pressure, usually atmospheric, without the pumpout compressor cycling off due to low pressure.

If oil pressure should fail while the compressor is operating, the low oil pressure switch will close. In review, when the compressor is operating, the CR contacts in Branch C are closed. Thus, with the closing of the low oil pressure switch, power is available across the heater element to ground at C5, which results in the element heating up. This, in turn, causes the oil pump failure safety switch (a thermostatic switch) to open, interrupting power from B3 to B4, thus opening Branch B and, again, causing the same sequence of events as described in pushing the stop button. A momentary loss in oil pressure will not necessarily cause the compressor to shut off, since there is a time lag in the oil safety switch; namely, the time it takes for the element to heat up sufficiently to open the oil pump failure safety switch.

Figure 5 is similar to Fig. 4, except that a 230 V compressor is used. In this application, the low oil pressure switch and heater element of the oil safety switch can be wired across the 230 V source, eliminating one set of CR contacts. Both methods of wiring are equally acceptable.

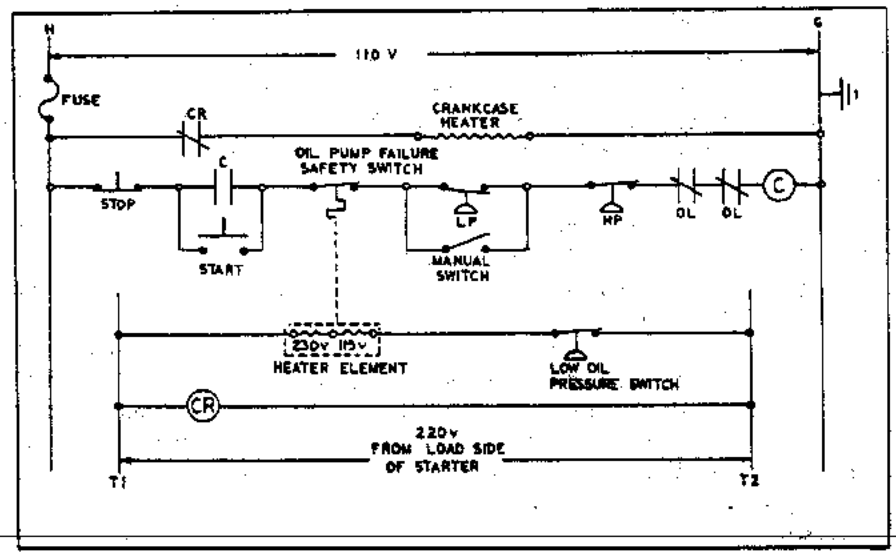


Fig. 5. Pumpout System Schematic Wiring Diagram (Compressor Motor Voltage of 230/3/60)

NOTE: The oil pressure switch is shown schematically as three separate devices. Actually, they are all contained within one switch box as shown in Fig. 2. The control consists of a low oil pressure switch which opens with an increase in pressure and closes with a decrease in pressure. Next, a heater element which can be wired across 230 or 110 V, depending upon the availability of 230 V, which heats up whenever the low oil pressure switch is closed and power is available to it. Last, an oil pump failure safety switch (normally closed thermostatic switch) which will open whenever the heater element is energized long enough to raise its temperature above a predetermined setting.

4.9 Assembly and Parts

Figure 6 shows a direct drive pump-out unit with explosion proof controls, showing the compactness of the unit.

The standard storage tanks for R-114 and R-12 are shown in Figs. 7 and 7A, respectively. The two types of condensing units, direct drive and belt driven, are shown on Figs. 8 and 9, respectively, with the parts called out for each unit.

NOTE: On installations requiring explosion-proof controls, the direct drive unit is supplied.

The installation details for the standard pumpout unit used with R-114 machines are shown in Fig. 10. The details for units using R-12 are similar, and each job will be provided with a layout drawing.

Pumpout units for R-500, R-22, or other special applications, such as large volume requirements, are obtainable through special orders.

4.9.1 Items Supplied by Carrier, Syracuse, and Factory Assembled

5F20 (5F40, special order only) belt driven compressor. (Direct drive on explosion proof units.)

5F20 condenser (5F40; special order only).

Oil separator.

Dual high and low pressure cut-out switch, 110/220 volt.

Oil safety switch, 110/220 volt.

Crankcase oil heater, 100 watts, 110 volts.

Float valve(s).

Suction and discharge gages.

Special control enclosure (weatherproof, explosion-proof, if required).

4.9.2 Items Not Furnished by Carrier, Syracuse

Motor starter. Must be ordered for 110 volt holding coil.

Special control relays required (see 4.8, Controls).

Interconnecting refrigerant valves and piping.

Control relays.

Momentary contact switch.

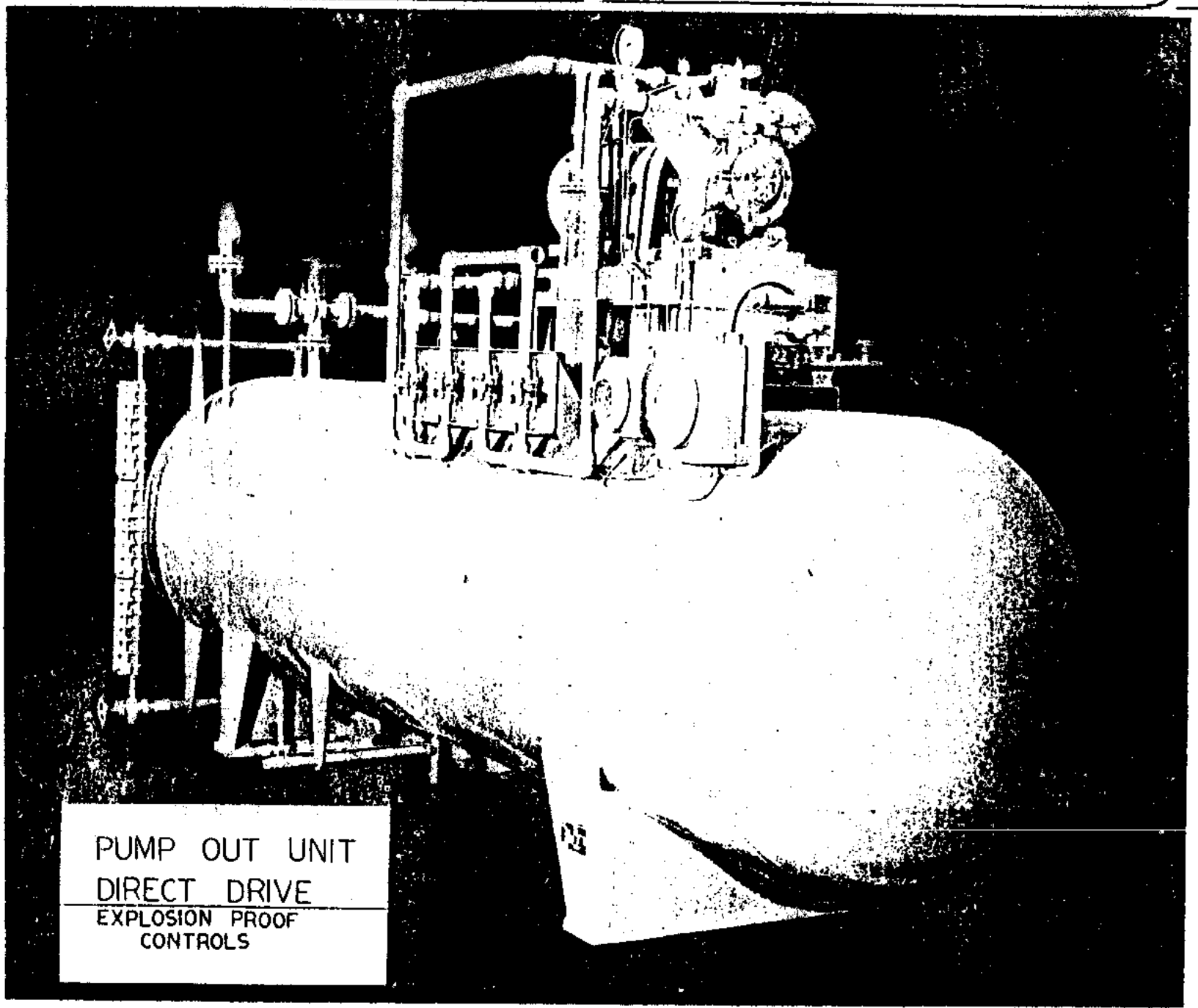
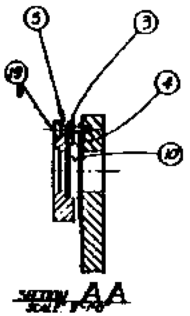
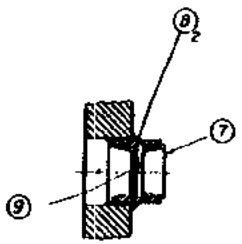


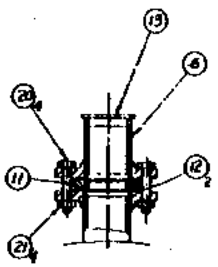
FIGURE 6



SECTION A-A



SECTION B-B



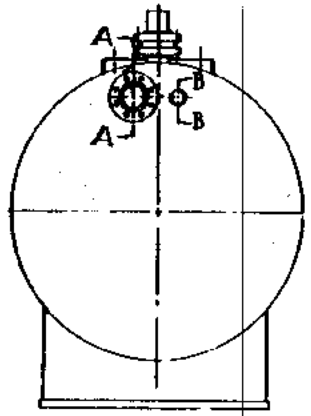
SECTION C-C

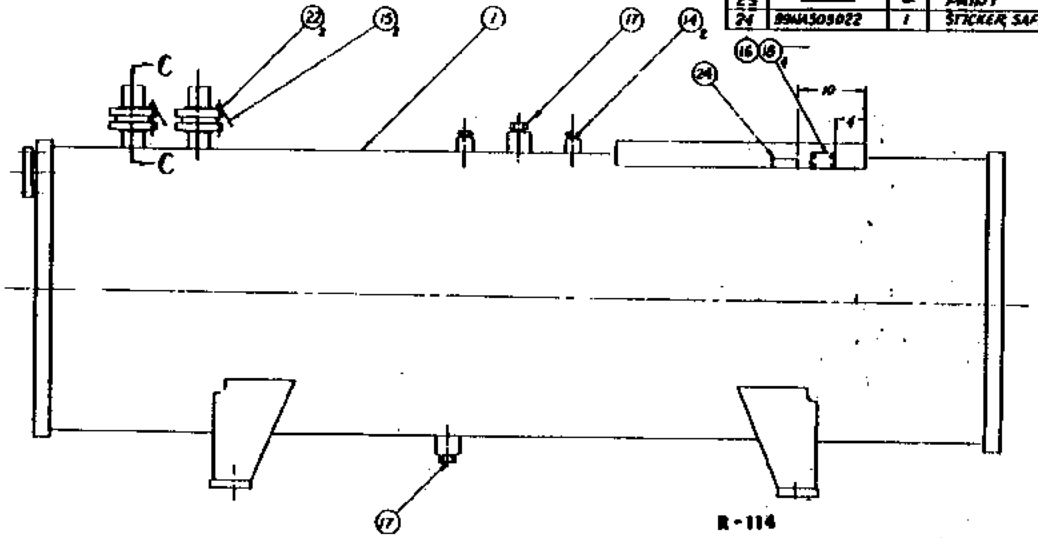
NOTES:

1. MAXIMUM DESIGN PRESSURE 50 PSI
2. HYDROSTATIC LEAK TEST AT 75 PSI NAMEPLATE TO BE STAMPED FOR 50 PSI MAXIMUM ALLOWABLE WORKING PRESSURE
3. RUPTURE DISC IS TO BE INSTALLED AS SHOWN, AFTER TESTING HAS BEEN COMPLETED
4. ITEMS "20 & "21, ⅝-11 NUTS & BOLTS, TO BE LUBRICATED WITH A MIXTURE OF GRAPHITE & OIL AND TIGHTENED TO A TORQUE OF 80 FT LBS MAX. APPLY EQUAL LOADS TO EACH BOLT.
5. WIDE LY SHELL TO BE FREE OF DIRT, SCALE, WELD SPATTER, ETC.

ITEM "2 - SHIPPING SKID	
TYPE	PART NO
DOMESTIC	1901-784
WEST COAST	1901-774 (OLD STYLE 1901-784 OLD PART NO. 784)
EXPORT	1901-784

ITEM	PART NO	REQD	DESCRIPTION
1	1901-744	1	STORAGE TANK WELD ASS'Y
2	PER JOB REQR	1	SHIPPING SKID - NOT SHOWN
3	1901-3281	1	GASKET, 3" SIGHT GLASS
4	1901-3301	1	GASKET, 3" SIGHT GLASS COVER
5	17DAB7-5802	1	COVER, SIGHT GLASS
6	1901-702	2	3" STUB-OUT ASS'Y
7	RS-1001	1	GLAND, BULL'S EYE SIGHT GLASS
8	RS-1004	2	GASKET, BULL'S EYE SIGHT GLASS
9	KM36AW109	1	GLASS, SIGHT - 1"
10	KM36AW113	1	GLASS, 3" SIGHT
11	EB58LY059	2	DISC, 3"-30" RUPTURE
12	CB30SA501	4	GASKET, RING
13	LF99A2014	2	PLUG, WEDGE
14	CA65AA231	2	PLUG-1" PIPE
15	1901-4272	2	TAG WARNING
16	SF20-4102	1	NAMEPLATE, A.S.M.E.
17	CA65AA101	2	PLUG, 8" PIPE
18	AL61A0089	4	SCREW, DRIVE
19	AA44A1325	8	SCREW, SOCKET HD CAP ⅝-11 × 2"LG.
20	AH06BB332	6	SCREW, HEX HD CAP ⅝-11-8½"LG.
21	AT11AA334	8	NUT, ⅝-11 HEX.
22	AW02AA332	2	WASHER, ⅝
23		1	PAINT
24	99MA505022	1	STICKER, SAFETY CODE





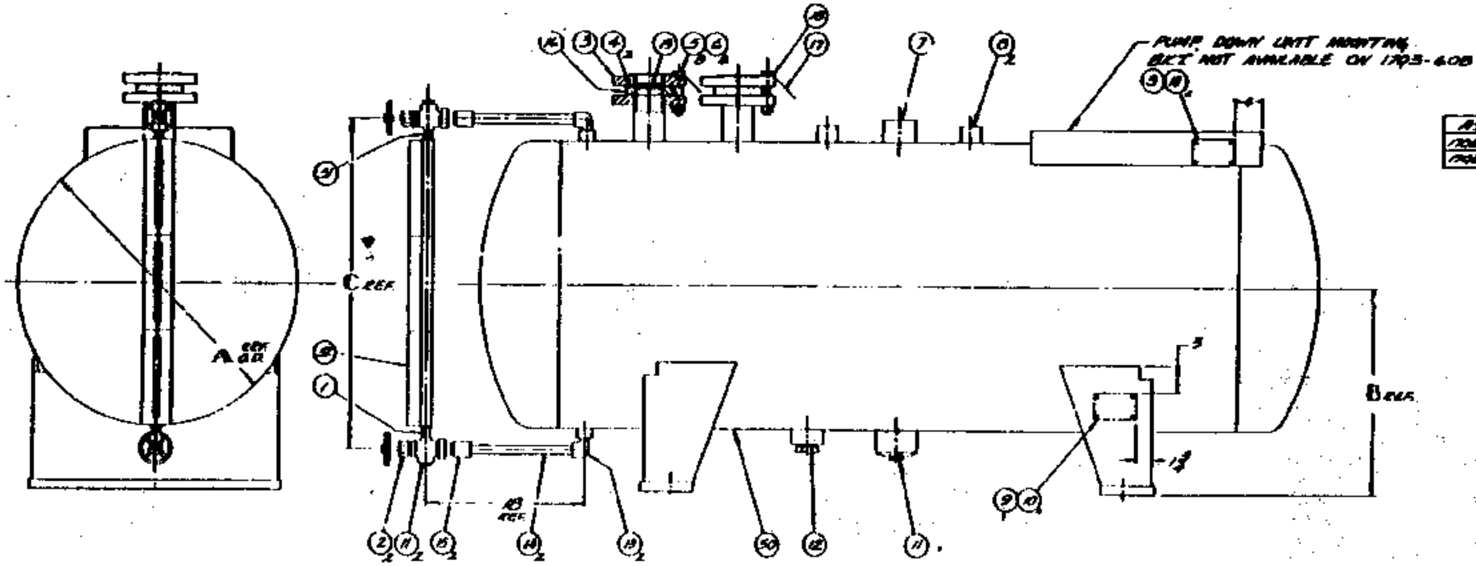
R-114

STORAGE TANK ASSEMBLY
FIGURE 7

NOTES:

1. DESIGN PRESSURE 185 P.S.I. MAX.
2. HYDROSTATIC LEAK TEST AT 278 P.S.I. NAMEPLATE TO BE STAMPED FOR 185 P.S.I. MAX ALLOWABLE WORKING PRESSURE.
3. RUPTURE DISC IS TO BE INSTALLED AS SHOWN, AFTER TESTING HAS BEEN COMPLETED.
4. ITEMS #5 & #6, 3/4-10 NUTS & BOLTS, TO BE LUBRICATED WITH MIXTURE OF GRAPHITE AND OIL AND TIGHTENED TO A TORQUE 8 1/2 FT. LBS. MAX. APPLY EQUAL LOADS TO EACH BOLT
6. INSIDE OF SHELL TO BE CLEAN OF DIRT, SCALE, WELD SPATTER, ETC.
7. ALL PRE-ASSEMBLED PIPE THREADS TO BE SEALED WITH LOCTITE PIPE SEALANT (PF20-23), ITEM # 20
8. HYDROSTATIC TEST TO BE MADE WITH SIGHT GLASS VALVES CLOSED SO THAT WATER DOES NOT ENTER GLASS ASSY.

NO.	PART NO.	REQ.	DESCRIPTION
1	[illegible]	1	[illegible]
2	[illegible]	2	VALVE - SIGHT GLASS
3	[illegible]	2	FLANGE - THREADED [illegible]
4	[illegible]	4	GASKET
5	[illegible]	16	[illegible]
6	[illegible]	16	HEX NUT - 3/4-10
7	[illegible]	1	CAPLUG - 2"
8	[illegible]	2	CAPLUG - 1"
9	SF88 - 4102	1	NAMEPLATE - ASME
10	[illegible]	4	DRIVE SCREW
11	[illegible]	3	PIPE PLUG - 3/4
12	[illegible]	1	PIPE PLUG - 2"
13	[illegible]	2	STREET ELBOW - 3/4
14	[illegible]	2	[illegible]
15	[illegible]	2	FULL COUPLING - 3/4
16	[illegible]	2	RUPTURE DISC - 1"
17	[illegible]	2	[illegible]
18	[illegible]	2	[illegible]
19	[illegible]	2	CAPLUG - 1"
20	PF20-23		LOCTITE, PIPE SEALANT



ASSY NO.	A	B	C
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

R-12
STORAGE TANK ASSEMBLY
FIGURE 7A

ITEM	PART NO.	REQ'D.	DESCRIPTION
1	5F20-C509	1	Compressor Assembly
2	17R3-817-7	1	Base Weld Assembly
3	5F20-344	1	Condenser Assembly
4	5F20-2042	2	Support Strap
5	5F20-1112	2	Strap Liner (On 5F20-1682)
6	KH31LZ011	1	Oil Separator
7	DE54CA701	2	1-1/8 Solder Ground Union
8	DE35BA903	2	1-3/8 X 1-1/8 Solder Red Bushing
9	DD12CA051	1	1/4 M. FL X 1/4 F. FL Elbow
10	DE53DA701	1	1-1/8 Streamline Plug
11	DE40BA701	1	1-1/8 O.D.S. Tee
12	EP44BC331	1	1-1/8 ODT Globe Valve
13	1795-4061-25	2	5/8 O.D.S. X 3/4 M.P.T. Coupling
14	AB06HR168	2	1/4 - 28 X 3/4 Lg Hex Hd. Capscrew
15	DD07DA051	1	1/4 MFL X 1/4 MPT Union Cplg
16	Per Job Req	1	Cond Relief Valve
17	AA06BR232	4	3/8 - 16 X 1-1/4 Lg Hex Hd Screw
18	AT44AH241	4	3/8 - 16 Square Nut
19	AU11AR241	4	3/8 Lockwasher
20	CA53AA255	1	1" MPT X 1/4 FPT Red Bushing
21	CA20JA251	1	1" X 1" X 1" FPT Tee
22	DE04DA904	1	1-3/8 OD X 1" MPT Coupling
23	17R3-556-3	1	Tube Assembly
24	1794-4071-85	1	30" - 0 - 200# Gage
25	1794-4071-86	1	0 - 250# Gage (dwg. 1794-4071-85)
26	DD19DA301	1	5/8 Flare Cap
27	DD14CA302	1	Flare Reducing Tee
28	CA29RA152	1	1/2 X 3/8 F.P.T. Reducer
29	CA52JA101	1	3/8 X 3/8 MPT Hex Nipple
30	DD07DA305	1	5/8 M. FL X 1/4 MPT Half Union Cplg
31	AU11AR171	2	1/4 Lockwasher
32	EC01HE017	1	Float Valve Assembly
33	17R3-3502-4	1	Oil Separator Strap
34	AA06BR229	2	3/8 - 16 X 7/8 Lg Hex Hd Screw
35	EP71GQ241	1	3/4 F.P.T. Ball Valve
36	17R3-3502-18	1	Valve to Tee Tube
37	17R3-556-5	1	Tube Assembly
38		1	1-1/8 O.D. X.065 W Cu. Tube (HA03-10) X 3" Lg
39		1	1-3/8 O.D. X.065 W Cu. Tube (HA03-10) X 8 Lg
40	17R3-1122-30	1	Coupling Guard
41	17R3-1122-19	1	Compressor to Union Tube
42	17R3-1122-29	1	Cond. to Tee Tube
43	DE20BA903	1	Adapter 1-3/8 O.D. X 1-1/8 O.D.
44	Per Job Req.	1	Base Direct Drive
45	17R3-556-8	1	Tube Assy (on 17R3-556-
*46	DE04DA302	1	1/2 MPT X 5/8 O.D.S. Cplg
47	DE40BA302	1	5/8 X 5/8 X 1/2 Tee
48		2	5/8 OD X.035 W. Cu Tube X 2 Lg
49		1	1/2 OD X.035 W. Cu Tube X 15 Lg
50	901-1052	1	Nameplate

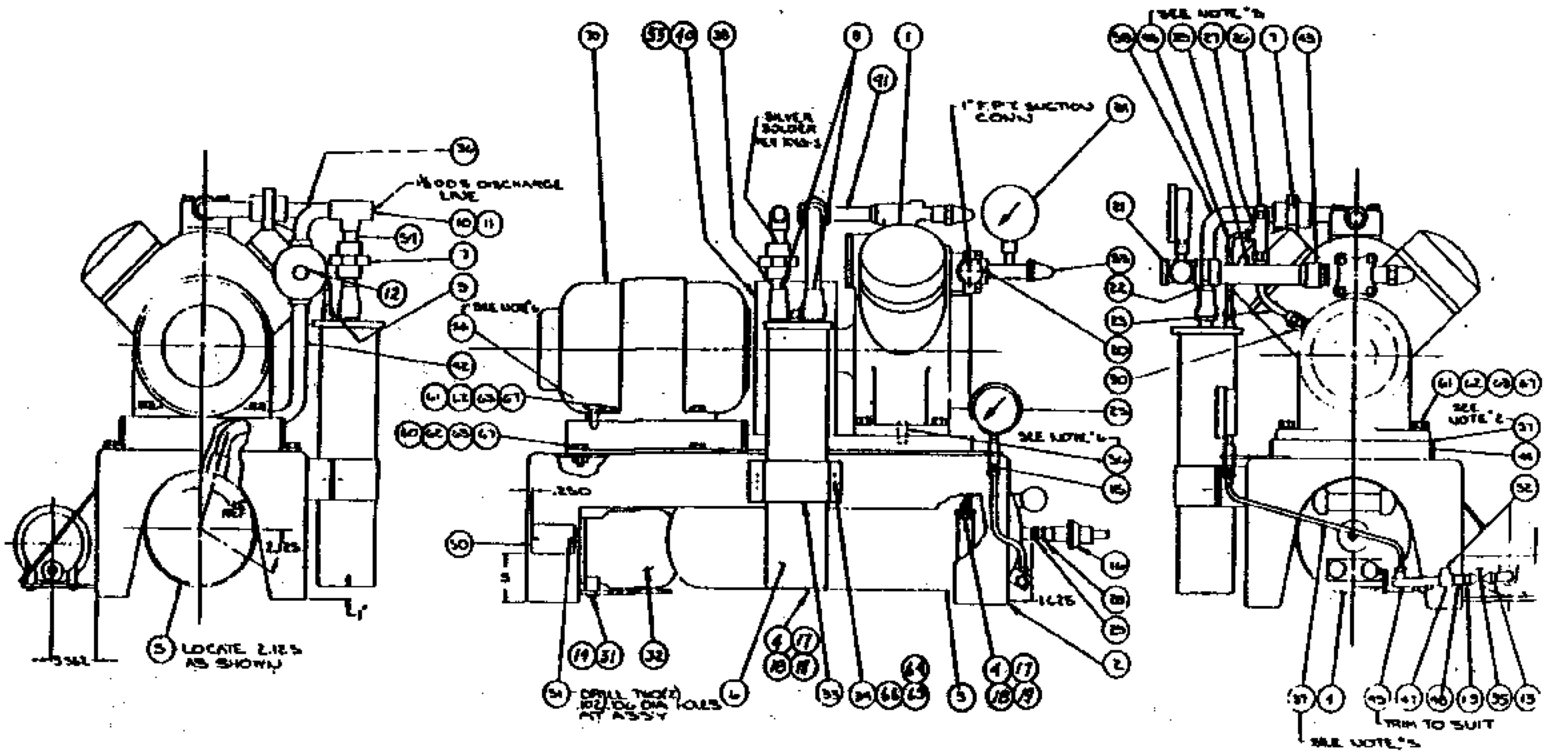
ITEM	PART NO.	REQ'D.	DESCRIPTION
51	AL81AF084	2	#4 X 5/16 Lg Drivescrew
52	DE53DA301	1	5/8 Streamline Plug
53	EP23MC090	1	Packed Angle Valve
54		1	1-1/8 O.D. X .065 W. Cu. Tube X 3-5/8 Lg
55	5F20-263-1	1	Flexible Coupling
56	AX15AA205	4	#5 X 2" Lg Taper Dowel Pin
57		2 each	1/32 - 1/64 Shim
58	17R3-123-20		Union to Separator Line
59			
60	AA06BR292	8	1/2 - 13 X 1/4 Lg Hex Hd Capscrew
61	AA06BR295	8	1/2 - 13 X 2 Lg Hex Hd Capscrew
62	AT11AA301	16	1/2 - 13 Hex Nut
63	AU11UA301	16	1/2 Lockwasher
64	AB06BR129	4	#10 - 32 X 3/4 Lg Hex Hd Screw
65	AT39AA132	4	#10 - 32 Hex Nut
66	AU27AS131	4	#10 Lockwasher
67	AU02AA301	16	1/2 Flatewasher
68			
*69	5F20-381	1	Crankcase Htr. Pkg.
70	See B/M	1	Motor
71	Per Job Req.	1	Relief Pressure Relief

Refrig.	Item # 16	Item # 71 (Explosionproof)
114	17D5-1101-13	1796-4072-5
12	17D5-1101-14	1796-4072-6
500	17D5-1101-15	1796-4072-8

5F-20 PUMP OUT UNIT

DIRECT DRIVE

SPECIFIED PARTS



NOTES:

1. ALIGN COMPRESSOR AND MOTOR IN ACCORDANCE WITH STANDARD PRACTICE.
2. SHIM AS REQUIRED (ITEM #57) TO OBTAIN PROPER ALIGNMENT.
3. ALL SOLDER JOINTS TO BE SILVER SOLDERED.
4. SOLDER SPEC APPLIES TO ALL SIMILAR JOINTS.
5. ITEMS #37 AND 45 TO BE FORMED AS REQUIRED AT ASSEMBLY.
6. LOCATE DRILL AND REAM FOR #5 TAPER PIN AS REQUIRED.
7. * INDICATES ITEMS NOT SHOWN ON THIS DWG.

SF-20 PUMP OUT UNIT
DIRECT DRIVE
ASSEMBLY

FIGURE 8

ITEM	PART Nº	REQ'D.	DESCRIPTION
31	CA53AA255	1	1"MPT. × ¼ FPT REDUCING BUSHING
32	CA29RA152	1	½ × ⅜ F.P.T. REDUCER
33	DE35BA903	2	1⅜ × 1⅛ BUSHING.
34	DE54EA701	1	1⅛ SOLDER GROUND JOINT UNION
35	DE04DA201	1	½ O.D.T. × ½ M.P.T COUPLING
36	DE12BA701	1	1⅜ × 1⅛ × 90° ELBOW
37	DD12CA051	1	¼ M.F. × ¼ F.P. ELBOW
38	DE53DA701	1	1⅛ PLUG
39	DE40BA701	1	1⅛ × 1⅛ × 1⅛ O.D.S TEE
40	CA20JA251	1	1" × 1" × 1" F.P.T. TEE
41	DD14CA302	1	⅜ × ⅜ × ¼ M.FLARE TEE
42	DD19DA301	1	⅜ FLARE CAP
43	AA06BR234	4	⅜-16 HEX HD. CAP SCREW × 1¾ LG.
44	AA06BR232	4	⅜-16 HEX HD CAP SCREW × 1¼ LG.
45	AB06BR168	2	¼-28 HEX HD. CAP SCREW × ¾ LG.
46	AA06BR229	2	⅜-16 HEX HD. CAP SCREW × ⅞ LG.
47	AU11AR241	8	⅜ LOCKWASHER
48	AU11AR171	2	¼ LOCKWASHER
49	AT44AH241	8	⅜-16 SQUARE NUT
50	*5F20-381	1	CRANKCASE HEATER PACKAGE
51	*17R3-224	1	CRATE
52	LF39RR2017	1	CA-PLUG-1"
53	(See Chart)	1	DUAL PRESSURESTAT

* Denotes not shown on drawing.

ITEM	PART Nº	REQ'D.	DESCRIPTION
1	17R3-214	1	5F 20 PUMPDOWN WELD ASSEMBLY
2	5F20-344	1	CONDENSER ASSEMBLY
3	5F20-2042	2	CONDENSER SUPPORT STRAP
4	5F20-1112	2	CONDENSER STRAP LINER (5H ONLY 5F20-1048)
5	5F20-1053	1	COMPRESSOR FLYWHEEL
6	17R3-122	1	TUBE ASSEMBLY
7	17R3-132	2	↓
8	17R3-6055	1	TUBE (OIL SEPARATOR TO TEE)
9	17R3-2776	1	OIL SEPARATOR SUPPORT STRAP
10	17R3-2067	1	TUBE (VALVE TO CONDENSER LINE)
11	17R3-2786	1	TUBE (CONDENSER TO FLOAT VALVE)
12	17R3-6005	1	1⅛ O.D. × .065 W. × 4¾ LG. CUT TUBE (KA03-2)
13	17R3-6015	1	↓ < 2½ LG.
14	17R3-6025	1	↓ < 3½ LG.
15	17R3-6035	1	↓ < 9¾ LG.
16	17R3-6045	1	1⅛ O.D. × .065 W. × BLG.
17	*5F20-212	1	OIL SAFETY SWITCH PACKAGE
18	EC01BE017	1	FLOAT VALVE ASSEMBLY
19	(See Chart)	1	CONDENSER RELIEF VALVE
20	EP44BC331	1	1⅛ O.D.T GLOBE VALVE
21	KH31LZ011	1	OIL SEPARATOR
22	KR12BG414	1	PULLEY
23	KM03AQ368	1	30"-0-150" GAGE, 3½ DIA, ¼ MPT.
24	KM01AF370	1	0-200" GAGE, 3½ D., ¼ M.P.T.
25	HD59AZ051	1	MOTOR (5 H.P. AC-220/440V-3PH-60CY., 1750 RPM, FRAME 215)
26	KR20BA063	2	V" BELT
27	CA52JA101	1	⅜ MPT. HEX NIPPLE
28	DD07DA305	1	⅜ M.F. × ¼ MPT HALF UNION CPLG.
29	DD07DA051	1	¼ M.F. × ¼ M.P.T. HALF UNION CPLG.
30	DE04DA904	1	1⅜ ODT × 1" MPT COUPLING

NOTES:
1. ALL SOLDER TYPE TUBE CONN'S. TO BE BRAZED
2. ITEM Nº 7 IS TO BE BENT TO SHAPE AT ASSEMBLY.
3. OUTSIDE SURFACES OF ASS'Y. TO BE PAINTED IN ACCORDANCE WITH ENG. REQ.
4. ALL PIPE THREADS TO BE WRAPPED WITH TEFLON TAPE PF20-G.

Refrig.	Item # 19	53 (Standard)	53 (Explosionproof)
114	17D5-1101-13	17Q6-4072-3	17Q6-4072-5
12	17D5-1101-14	17Q6-4072-4	17Q6-4072-6
500	17D5-1101-15	17Q6-4072-7	17Q6-4072-8

5F-20 PUMP OUT UNIT

BELT DRIVE

SPECIFIED PARTS

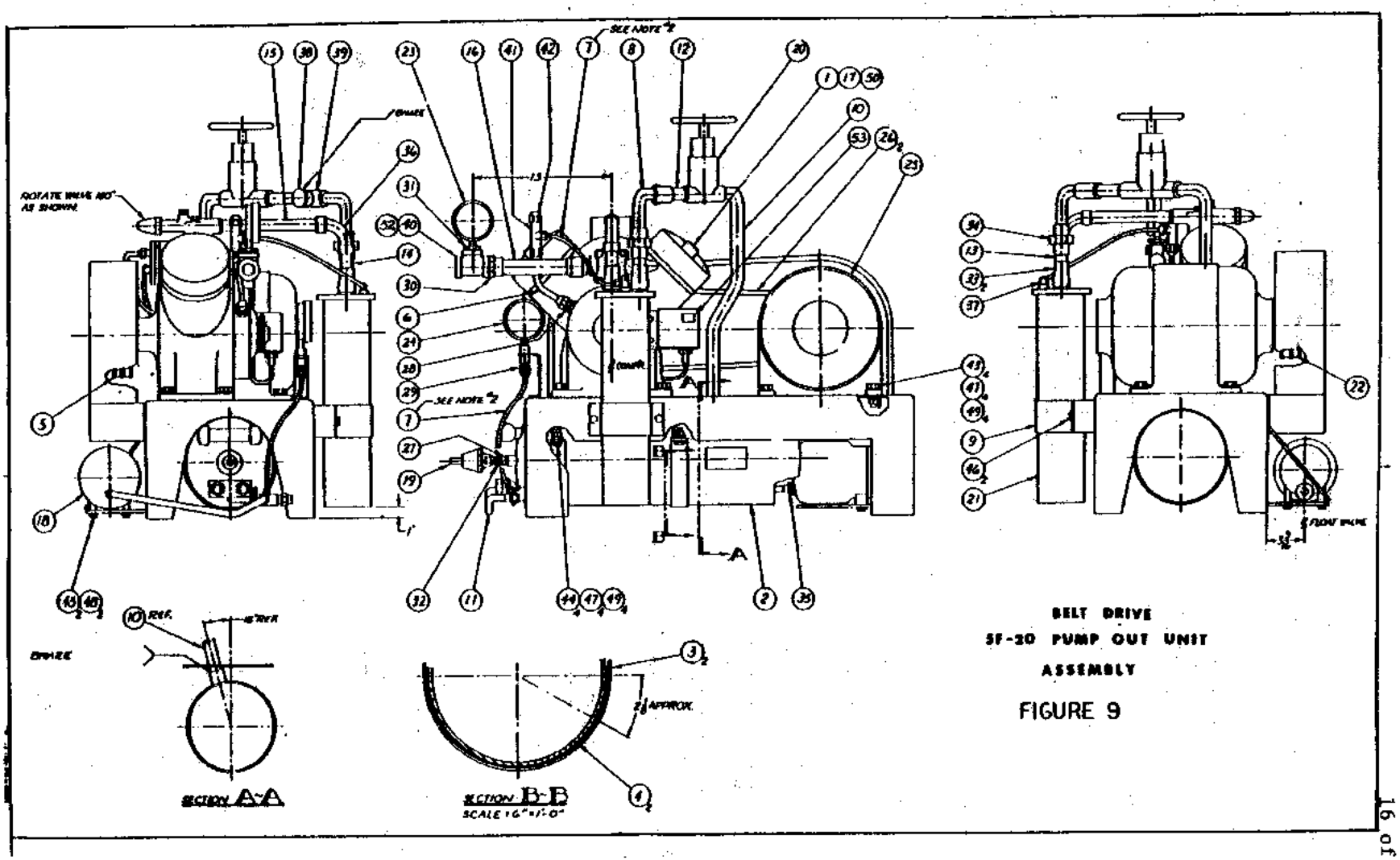
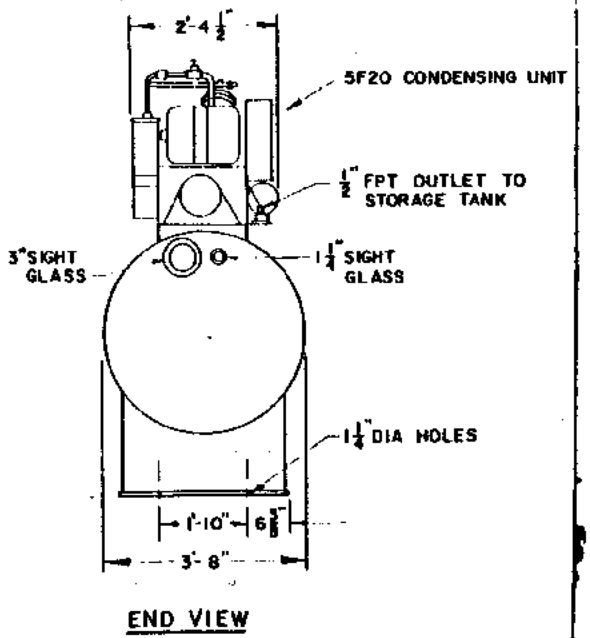

SEE NOTE 2
ROTATE VALVE 180° AS SHOWN
SEE NOTE 2
SECTION A-A
SECTION B-B
SCALE 1½"=1'-0"
BELT DRIVE
SF-20 PUMP OUT UNIT
ASSEMBLY

FIGURE 9



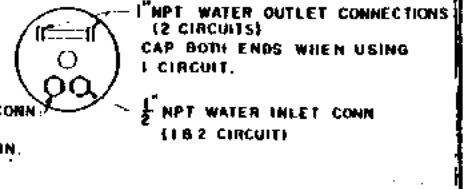
END VIEW

NOTES.

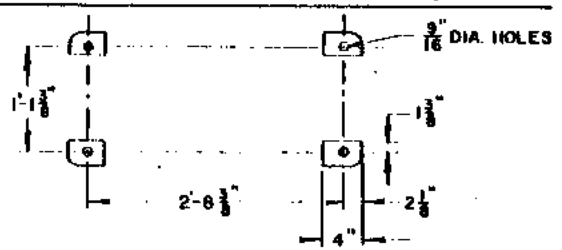
1. 5F20 CONDENSING UNIT MAY BE FLOOR MOUNTED IF CONDITIONS DICTATE
2. STORAGE TANK SHOULD BE LOCATED BELOW COOLER LEVEL IF POSSIBLE THIS WILL ALLOW LIQUID TO DRAIN FROM THE COOLER TO THE STORAGE TANK
3. RUPTURE DISCS CANNOT TAKE ANY PIPING STRAIN. USE FLEXIBLE CONNECTIONS AT OUTLET OF DISC.
4. STORAGE TANK DESIGN PRESSURE = 50 PSIG. RUPTURE DISC BURSTING PRESSURE Shown in Table 2

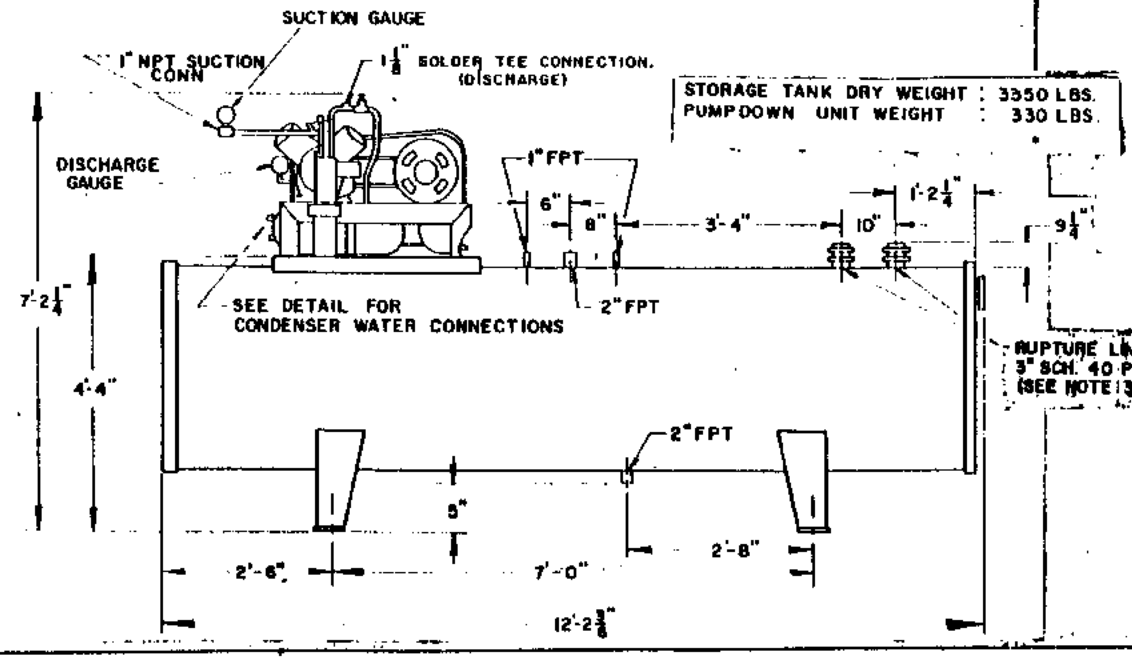
WATER CONNECTIONS TO 5F20 PUMPDOWN UNIT CONDENSER

NOTE APPROXIMATE CONDENSER WATER QUANTITY = 15 GPM SINGLE CIRCUIT CONNECTIONS RECOMMENDED FOR PIPING SIMPLICITY



COMPRESSOR – CONDENSER FLOOR MOUNTING DIMENSIONS (SEE NOTE 1)





STORAGE TANK DRY WEIGHT	3350 LBS.
PUMPDOWN UNIT WEIGHT	330 LBS.

INSTALLATION DETAILS

FIGURE 10