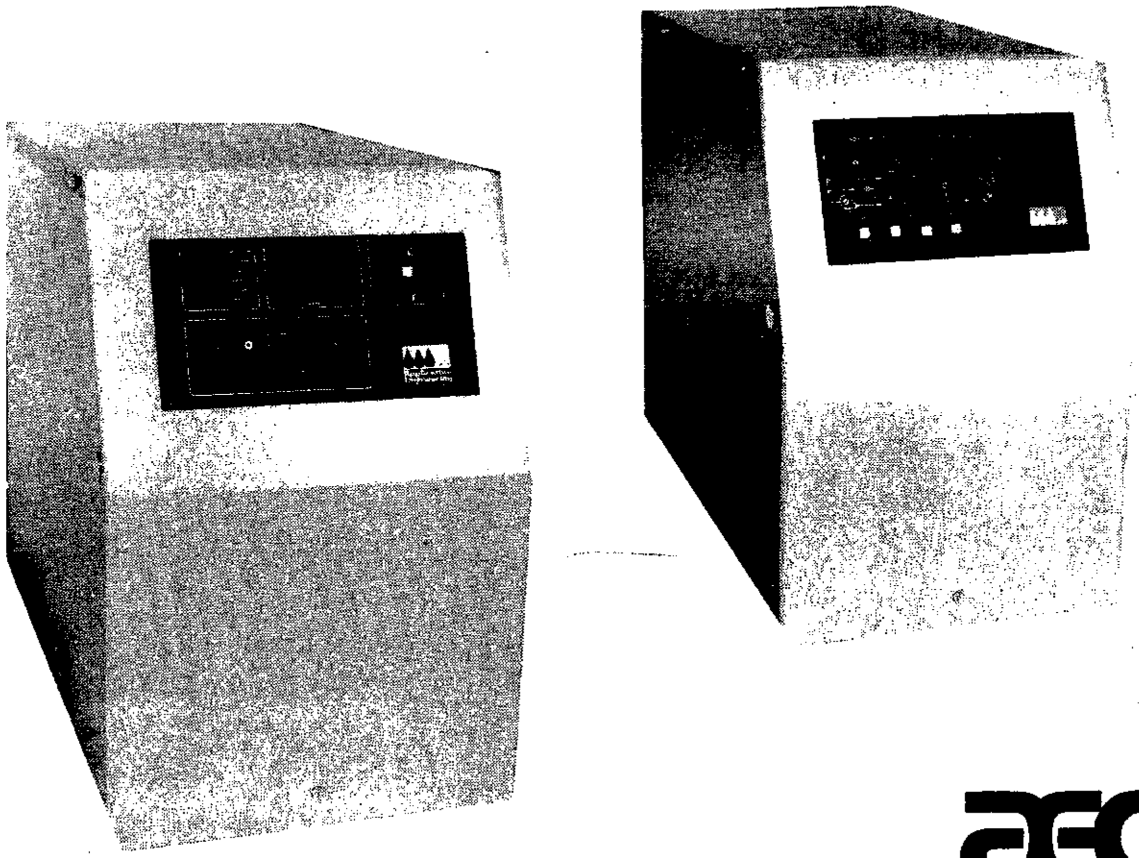
AEC DIRECTOR SERIES WATER TEMPERATURE CONTROL UNITS

OPERATING AND INSTALLATION INSTRUCTIONS

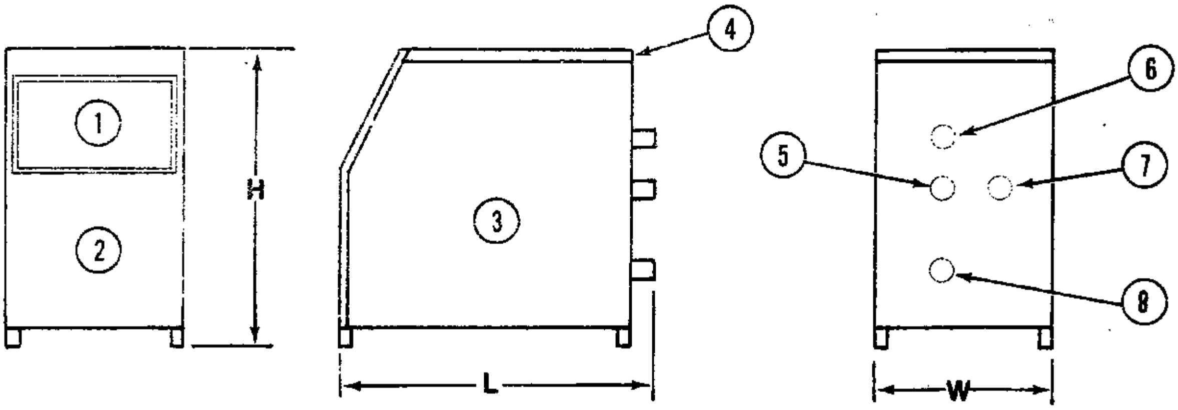


aec®

TABLE OF CONTENTS: TDW-1C, TDW-1D, TDC-1C, TFW-1D & TDV-1

NOTE: The information contained within this manual covers the following units: TDW, TDC, plus the following controls: Electromechanical, and Digital Solid State.

OUTLINE DRAWINGS & DIMENSIONS



1. Graphic Display
2. Electrical Enclosure
3. Pump/Heater Access Panel
4. Top Panel (Htr Removal)
5. Cooling Water-Out
6. Cooling Water-In
7. To Process
8. From Process

UNIT SPECIFICATIONS

MODEL NUMBER	FLOW (GPM)	PUMP (Hp)	AMPS @ 480-3-60 4.5 kW	9.0kW	12.0kW	DIMENSIONS LxWxH (IN)	SHIPPING WEIGHT (LBS)
TDW-1C/1D	30	¾	8	13	NA	31x16x26	175
	35	1	8	14	NA		175
	50	1½	9	14	18		175
	60	2	9	15	18		175
	70	3	10	16	19		180
	90	5	13	18	21		190
	100	7½	15	21	24		210
TDC-1C/1D	30	¾	8	13	NA		205
	35	1	8	14	NA		205
	50	1½	9	14	18		205
	60	2	9	15	18		205
	70	3	10	16	19		215
	90	5	13	18	21		225
	100	7½	15	21	24		245

MODEL NUMBER	FLOW M³/MIN	PUMP (kW)	AMPS @ 380-3-50 3.1 kW	6.2kW	8.2kW	DIMENSIONS LxWxH (MM)	SHIPPING WEIGHT
TDW-1C/1D	.113	.56	6.1	10.8	NA	787x406x635	79
	.133	.746	6.3	11	NA		79
	.189	1.119	7.1	11.8	13.9		79
	.227	1.492	7.4	12.1	15.2		79
	.265	2.238	8.7	13.4	16.5		82
	.341	3.73	10.4	15.1	18.1		86
	.379	5.595	15	19.7	22.8		95
TDC-1C/1D	.113	.56	6.1	10.8	NA		93
	.133	.746	6.3	11	NA		93
	.189	1.119	7.1	11.8	13.9		93
	.227	1.492	7.4	12.1	15.2		93
	.265	2.238	8.7	13.4	16.5		98
	.341	3.73	10.4	15.1	18.1		102
	.379	5.595	15	19.7	22.8		111

TFW & TDV is dimensionally equivalent to the TDW & TDC. See unit nameplate for electrical characteristics.

II. INTRODUCTION

The AEC models TDW, TDC, TFW & TDV are supplied with solid state temperature control packages and are designed specifically for the requirement of water temperature control. Performance, reliability, accuracy, and serviceability are the key concepts in their design. They are manufactured with high quality components, assembled by skilled craftsmen, and tested by experienced technicians in order to assure you of the highest quality package available on the market today.

As is true with any machinery, their full potential can only be realized through their proper installation and operation. With this in mind, we urge you to read and understand this manual, as you are the final determinant for successful operation over a long period of time.

Before accepting delivery, visually inspect the unit for any shipping damage. Any indication of mishandling warrants further inspection. Severely damaged packaging should be opened in front of the delivery driver. All visual damage should be noted on the delivery receipt, prior to acceptance. AEC's warranty specifically excludes any damage caused in transit. AEC should be advised of the situation and will provide any assistance required. Be aware, however, that AEC cannot file the actual claim. Once the unit is accepted by you, any liabilities resulting from improper filing of a damaged shipment claim become your responsibility.

III. PREPARING UNIT FOR OPERATION

3. SERVICE CONNECTIONS

3.1 Electrical Connections

3.1.1 Check nameplate voltage and amperage. Bring properly sized power leads and ground from fused disconnect (by customer) to unit. Use dual element time delay in the disconnect switch, and size them according to National Electrical Code recommendations. Be certain that unit is grounded and proper voltage within 10% of nameplate voltage is applied to unit.

3.2 Water Connections

3.2.1 Connect unit to process lines using full size hoses and fittings wherever possible. Even processes with small passages should have full size hose or pipe connected as close as possible to the unit, so that pump motor power is not wasted getting water to and from process.

3.2.2 Connect COOLING WATER IN and OUT lines to their appropriate supply and return lines, (either to a tower water SUPPLY and RETURN, chiller SUPPLY and RETURN or to a city water supply and drain). It is important that a net SUPPLY pressure of at least 25psi be available at unit, to keep water from flashing to steam at pump inlet, and to guarantee proper cooling. It is also important that a maximum SUPPLY pressure of 75psi not be exceeded. If more than 75psi is available at unit, coupled with pump pressure and pressure surges from rapidly closing solenoid valves, premature opening of the pressure relief valve will occur

IV. SEQUENCE OF OPERATION

4. TDW, TDC, TFW & TDV START-UP PROCEDURE

4.1 Check that all hoses are in correct location. Connect to AC power source per nameplate requirements.

4.1.1 Press START switch. Unit should go into a one minute venting sequence. When venting is complete, the pump will start. Check pump rotation. It should be clockwise as viewed from motor enc. If rotation is wrong, disconnect power, and switch any two of the incoming power leads at terminal blocks on sub-panel. Reconnect power and press START switch again, to start control sequences.

4.1.2 The TDC-1D utilizes an operator activated vent switch. The switch is located on the side of the cabinet. Before pressing the start switch, allow the unit to vent for 30 seconds. Press the start switch and vent for an additional 30 seconds with pump on. Check motor rotation.

4.1.3 Enter setpoint (see section VII) and the unit will immediately begin to heat or cool as required.

4.2 TDW (Direct Injection) Operation

4.2.1 The TDW is capable of operating up to a temperature of 250°F. A pressure switch in the cooling line will shut the unit off if pressure is not sufficient to keep water in circuit from boiling at elevated temperatures.

4.2.2 Heating is accomplished with a two circuit calrod type electric immersion heater. At start-up both circuits are energized to produce full heater output. As process temperature approaches set point, controller will cycle off one circuit to avoid overshooting the set point. This feature not only extends heater life, but allows user to continue to operate if one heater circuit fails. (TDW-1C and TDC-1C).

4.2.3 Cooling is accomplished by allowing a small amount of hot process water out of the system through a solenoid valve. This loss of water is automatically made up through the COOLING WATER in line. The greater the temperature difference between the set point and the cooling water, the greater the cooling effect will be.

4.3 TDC (Indirect Cooling) Operation

4.3.1 The unit is capable of operating up to a temperature of 250°F. A pressure switch in the fill line will shut the unit off if pressure is not sufficient to keep the water in the circuit from boiling at elevated temperatures. The unit is equipped with a heat exchanger to allow cooling without mixing cooling water with process water (as in the case of the TDW). This is desirable when cooling water is unusually dirty or corrosive and cannot be tolerated in the process circuit. Two water sources are required for TDC operation. A city water, chiller, or clean water source is required to fill, vent and pressurize the system and a tower water source should be used for cooling.

4.3.2 Heating is accomplished in the same manner as in the TDW.

4.3.3 Cooling is done by allowing cold cooling water through the tube side of a heat exchanger, thus extracting heat from the process water which runs through the shell side of the heat exchanger.

4.4 TDC (Indirect Cooling) "Totally Closed" Operation

4.4.1 The unit is capable of operating up to a temperature of approximately 180°F. If you require operating temperatures above 180°F, consult the factory. This unit is also equipped with a heat exchanger, but the process circuit is open to the atmosphere, thus lowering it's maximum operating temperature to a point where the water in the process circuit will not boil. This unit must be manually filled, and water level monitored to assure proper operation. The process water and cooling water are totally isolated from each other, allowing this unit to be filled with treated water and run continually without fear of contaminant migration from the cooling water circuit. This unit is preferable in some cases to the standard TDC only when operating temperatures do not exceed 180°F, and process circuit water quality must be maintained at a certain level.

4.5 TFW Operation

4.5.1 The TFW is capable of operating up to a temperature of 250°F. A pressure switch in the pump suction will shut the unit off if pressure is not sufficient to keep the water in circuit from boiling at elevated temperatures. The unit is identical in operation and control to the TDW, with the exception that this unit does not have a heater. It is used mostly in processes with a cooling load only.

4.5.2 Heating cannot be accomplished with this unit.

4.5.3 Cooling is accomplished in the same manner as the TDW.

4.6 TDV (Negative Pressure Direct Injection) Operation

4.6.1 The TDV is capable of operating up to a temperature of 180°F, while continuously pulling a vacuum through a given mold. A pressure switch in the cooling water line will shut the unit off if incoming pressure is not sufficient to guarantee proper cooling and unit operation.

4.6.2 Heating is accomplished in the same manner as the TDW.

4.6.3 Cooling is accomplished by allowing a small amount of hot process water out of the system through a solenoid valve. A float switch in the expansion tank senses this loss of fluid in the system and opens another solenoid valve. This valve allows cold water into the process circuit, thus accomplishing direct injection with an open process circuit.

4.6.4 A negative pressure is induced in the mold through the use of a venturi. Pump pressure through the venturi is the force used to create the vacuum. Once a negative pressure exists in the mold, water can no longer leak from the system due to the higher pressure (atmospheric) that exists in the mold cavity. Instead, air now is forced into the system through the leak in the mold. Air and water now return back to the expansion tank where the air is separated and vented from the process circuit. If enough water cannot be pulled through the mold by negative pressure to do the required cooling, some water may be diverted from the pump circuit to the mold. This is accomplished by opening the pressure adjusting valve at rear of the unit until mold starts to leak. Now, close the adjusting valve until the leak stops. This will guarantee the maximum amount of water is flowing through the mold while maintaining a slightly negative pressure at the leak point in the mold.

4.6.5 To use the TDV to purge the mold of water, it is necessary to put the unit into a cooling mode and stop the supply of water into the mold and to introduce a supply of air. The less than atmospheric pressure (vacuum) produced by the venturi will draw the water from the mold if the vacuum is broken and air is allowed to replace the water. This may be conveniently accomplished by shutting off the water supply valve to the mold manifold and opening an unused manifold distribution valve or disconnect a supply hose to admit the air. Atmospheric pressure will enter the mold through the valve or disconnected hose and push water back to the TDV, where it will be pumped back to its source (chiller/tower). Do not use compressed air.

V. COMPONENT SPECIFICATIONS

5. MECHANICAL COMPONENTS

5.1 Pump

Pumps range from ¾ hp to 7½ hp (see pump curves, page 29 for operating characteristics) and are equipped with 3 phase O.D.P. motors with stainless steel shafts. Pumps are fitted with EDPM or Viton seals, closed impellers, and are non-overloading over their entire operating range.

5.1.1 Heaters

Heaters are electric flanged immersion type of 4.5, 9 or 12 kW capacity. Heater sheaths are of incoloy for longer life and are of low watt density design. 9 and 12 kW units are built in two circuits to allow user to select which circuits to use if only minimal heat input is required. (TDW-1C and TDC-1C).

5.1.2 Solenoids

All solenoids are of rugged industrial design with replaceable 110V coils and Nema 1 enclosures.

5.1.3 Pressure Switch

Adjustable pressure switch is of commercial design with a Nema 1 enclosure. Stainless steel bellows are included along with a capillary spring guard for longer life.

5.1.4 Relief Valve

Relief valve is of ASME construction with a non-adjustable stainless steel spring set at 150 psi.

5.1.5 Heat Exchangers (TDC Models Only)

Heat exchangers are of straight shell and tube design with brass shell and copper/nickel tubes.

5.1.6 Thermostat (Optional)

High temperature safety is of rugged industrial design with Nema 1 enclosure and operates on the capillary tube principal.

5.1.7 Cabinet

The TDW and TDC are enclosed in a rugged sheet metal cabinet with a baked enamel finish. The heavy duty design allows the units to be stacked on top of each other (up to three units high) to conserve floor space. The limited amount of fasteners assures quick and easy component inspection and maintenance.

5.1.8 Water Hammer Arrestor (Shok Stop)
A P.D.I listed welded metal bellows type shock absorber, with a precharged and sealed nitrogen blanket, is installed as standard on all units with a ¾" or larger solenoid. The Shok Stop is installed as close to the solenoid valve as possible, to immediately accommodate the shock wave that occurs when the solenoid valve closes.

5.1.9 Venturi (TDV Models only)
A properly sized, precision machined, cast iron venturi is installed on every TDV unit. The venturi is of rugged industrial design and has been a proven and dependable component in many pumping applications.

5.1.10 Float Switch (TDV Models only)
Float switch is of heavy duty stainless steel design. Switch is hermetically sealed and operates on reed switch principal.

5.2 Electrical Components

5.2.1 Transformer
Custom designed transformer allows for all domestic and foreign incoming voltages and provides 120 volts to control circuit and also 24 or 28 volts to solid state controller.

5.2.2 Pump Starter
Starter is a quality NEMA rated industrial motor control, with 3 heater overloads and manual reset.

5.2.3 Heater Contactors
Contactors are of mercury displacement design with life expectancy in excess of 10 million cycles. Electrical contact is made in a totally encapsulated environment, surrounded by an arc quenching gas (Argon).

VI. SOLID STATE CONTROLLER TDW-1D and TDC-1D

3.1 Electrical Connections

6.1.1 Move SELECTOR switch to any position except off (pump will start in approximately 30 seconds), once pump has started, check pump rotation. It should be clockwise as viewed from motor end. If rotation is wrong, disconnect power, and switch any two of the incoming power leads at terminal blocks on sub-panel.

6.1.2 Reconnect power, unit is ready to begin control sequence.

6.1.3 Start control sequence.

6.1.3.1 With SELECTOR switch in at any position except off, vent sequence will start. Sequence will continue for 30 seconds with pump off and 30 seconds with pump on.

6.1.3.2 The DISPLAY SELECTOR switch has 6 functions. The display selector can be switched to indicate SET TEMP, PROCESS TEMP, SUPPLY TEMP, RETURN TEMP, OFF and ΔT (temperature difference between supply and return).

6.1.3.3 Depress °F or °C switch for required temperature scale.

6.1.3.4 With SELECTOR switch turned to SET TEMP, Dial in required set temperature on SET TEMP dial. Unit will start to heat or cool immediately after the vent sequence is completed.

VII. SOLID STATE CONTROLLER — TDW-1C, TDC-1C, TFW-1C, TDV-1

3.1 Electrical Connections

7.1.1 Press POWER ON switch, once pump has started, check pump rotation. It should be clockwise as viewed from motor end. If rotation is wrong, disconnect power, and switch any two of the incoming power leads at terminal blocks on sub-panel.

7.1.2 Reconnect power, unit is ready to begin control sequence.

7.1.3 Start Control Sequence.

7.1.3.1 Switch POWER ON to energize controller. Vent sequence will start.

7.1.3.2 Turn DISPLAY SELECTOR switch to SET TEMP.

7.1.3.3 Switch DISPLAY MAINTAINED to up position. Set temperature will appear on graphic display.

7.1.3.4 Dial in required set temperature on SET TEMP dial. Unit will start to heat or cool once the vent sequence is complete.

7.1.3.5 The HIGH-LOW heater switch enables the controller to supply 100% (9kW) of rated heater output or 50% (4.5kW) of rated heater output dependant upon process requirements. If only minimal heat input is required, only 1 circuit is energized, thus reducing running time on other circuit.

7.1.3.6 The PRIMARY heater switch enables the user to stagger the running time on each heater circuit.

7.1.3.7 The DISPLAY MAINTAINED switch enables the user to monitor set temperature with the switch up and process temperature with the switch in the center position.

7.1.3.8 The DISPLAY SELECTOR switch has 7 functions. With the DISPLAY MAINTAINED switch up, the display selector can be switched to indicate SET TEMP, SUPPLY TEMP, RETURN TEMP and ΔT (temperature difference between supply and return). The other three selectors are for electronic calibrations and test bench diagnostics.

VII. TROUBLE SHOOTING

8. MECHANICAL COMPONENTS

8.1 Pump (if pump is not running or does not seem to be pumping).

8.1.1 Make sure proper voltage per nameplate is brought to unit.

8.1.2 If pump light on graphic display is on, pump contactor should be energized, if not, re-set motor starter overloads.

8.1.3 Check motor starter coil neutral wire. It should be grounded. If not, correct.

8.1.4 If motor continually overloads, check amp draw of each leg of incoming power and compare with motor nameplate. If current on any of three phases is higher than nameplate rating, disconnect power and check each motor winding's resistance. High current may indicate that one or more windings have gone to ground. If any winding has "0" ohm resistance when referenced to ground, change motor.

8.1.5 Check motor rotation. It should be clockwise as viewed from motor end. See section IV.4.1.1 for motor rotation correction.

8.2 Heater

8.2.1 Make sure proper voltage is brought to unit.

8.2.2 If heater lights on graphic display are on, contactors should be energized.

8.2.3 Check amp draw of each heater leg. The current through each leg should be approximately equal, if not, isolate leg where current is different, disconnect power and check phase to phase resistance and phase to ground resistance of suspected heater leg. If resistance is 0 ohms, or is infinitely high, replace heater. This suggests the heater element is either broken, or has gone to ground inside the sheath.

8.2.4 If all tests indicate that heater is *not* malfunctioning but unit will not heat to desired set point, the problem is probably with the solenoid valve. If a small piece of foreign matter stuck in the valve when the solenoid closes, cold water will still be allowed into the circuit, thus cooling process circuit while unit is calling for heat. To check this, close a valve on the cooling water *out* line; this will keep all water in circuit regardless of solenoid condition. If temperature immediately starts to rise, the problem has been isolated. To clear the solenoid of any foreign material, adjust the set point up and down forcing the solenoid to cycle. This action usually clears all debris from valve seat. If this does not work, the solenoid must be cleaned manually. (See page 28 for solenoid disassembly).

8.2.5 Check heater contactor coil neutral wire. It should be grounded. If not, correct.

8.3 Solenoids

8.3.1 If cooling light on graphic display is on, solenoid should be energized. If not, disconnect power and check coil resistance. If resistance is infinitely high, replace coil.

8.3.2 Check solenoid coil neutral wire. It should be grounded. If not, correct.

8.4 Pressure Switch

8.4.1 Check to make sure at least 25 psi is available at unit. Check setting on switch to make sure that it is set at 25 psi.

8.4.2 Check to see if 115 volts is at switch. If not, jump power across switch and see if unit starts. If 25 psi is available at unit and switch will not operate, replace switch.

8.5 Relief Valve

8.5.1 If relief valve is constantly leaking, manually open the valve to try to clear seat of foreign material. If this does not work, replace valve.

8.6 Heat Exchangers (TCD only)

8.6.1 If, over a period of time, the heat exchanger does not appear to be able to handle the cooling requirements, the cooling side (tube side) of the heat exchanger has probably been fouled with dirty water. Stop unit and remove head of heat exchanger and clean with chemicals or mechanical scrubbers.

8.7 Thermostat (Hi Temp Safety)

8.7.1 Check to see if voltage is available through the switch when process temperature is above thermostat setting. If voltage is not *through* switch, replace thermostat.

8.8 Water Hammer Arrestor (Shok Stop)

8.8.1 If over a period of time, water hammer occurs where it once had not existed, the Shok Stop may have lost its charge. Stop unit and relieve pressure from system. Remove Shok Stop and pressurize with air pressure. Immerse Shok Stop in water to see if Shok Stop has developed a leak in the arresting chamber, if so, replace.

8.9 Float Switch (TDV only)

8.9.1 Disconnect power and check switch continuity. Manually make and break switch by raising float ball on the stem. If switch does not show continuity, replace.

8.10 Electrical Components

8.10.1 Solid state control.

8.10.2 Check voltage output at transformer.

8.10.3 Check all fuses at solid state control printed circuit board. See wiring diagrams for fuse location.

IX. ROUTINE MAINTENANCE

9. MECHANICAL COMPONENTS

9.1 Pump

9.1.1 Pump motor bearings are permanently sealed and lubricated and require no further lubrication on a regular basis.

9.1.2 Pump is equipped with an EDPM mechanical seal and should last for many years. If seal does require changing, see exploded view drawing (page 26) for proper installation.

9.2 Heaters

9.2.1 Dependent upon water quality, heaters may have to be cleaned chemically or mechanically to eliminate potential hot spots and to maintain effective heat transfer.

9.3 Solenoids

9.3.1 No routine maintenance required.

9.4 Pressure Switch

9.4.1 No routine maintenance required.

9.5 Relief Valve

9.5.1 If valve develops a leak clear valve seat by manually opening valve. Allow to clean for 5-10 seconds. This will clean the seat of deposits which cause it to stick open and leak.

9.6 Heat Exchangers (TDC only)

9.6.1 Cleaning of heat exchangers should take place at least every year (dependent upon water conditions) to assure proper heat transfer and efficient operation.

9.7 Thermostat

9.7.1 No routine maintenance required.

9.8 Water Hammer Arrestor (Shok Stop)

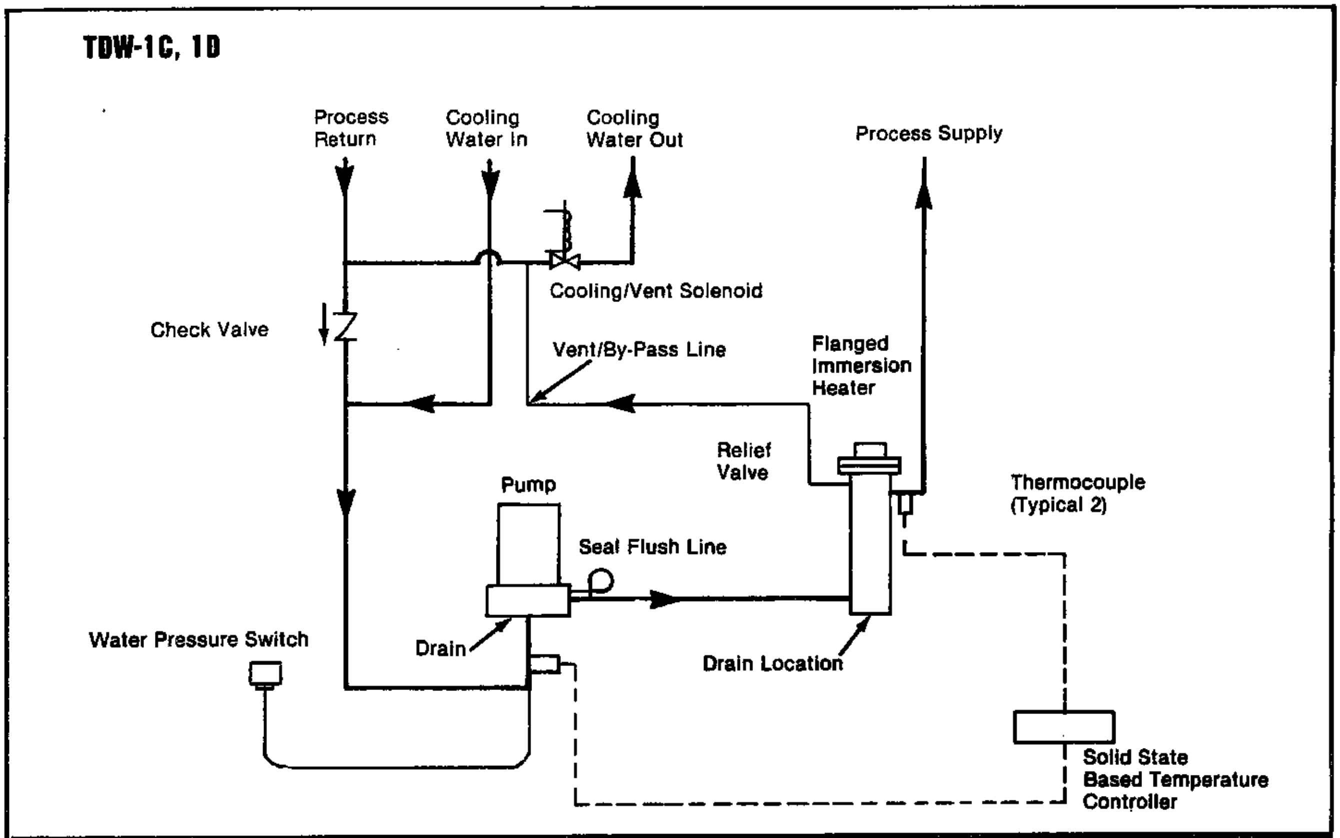
9.8.1 No routine maintenance required.

9.9 Float Switch

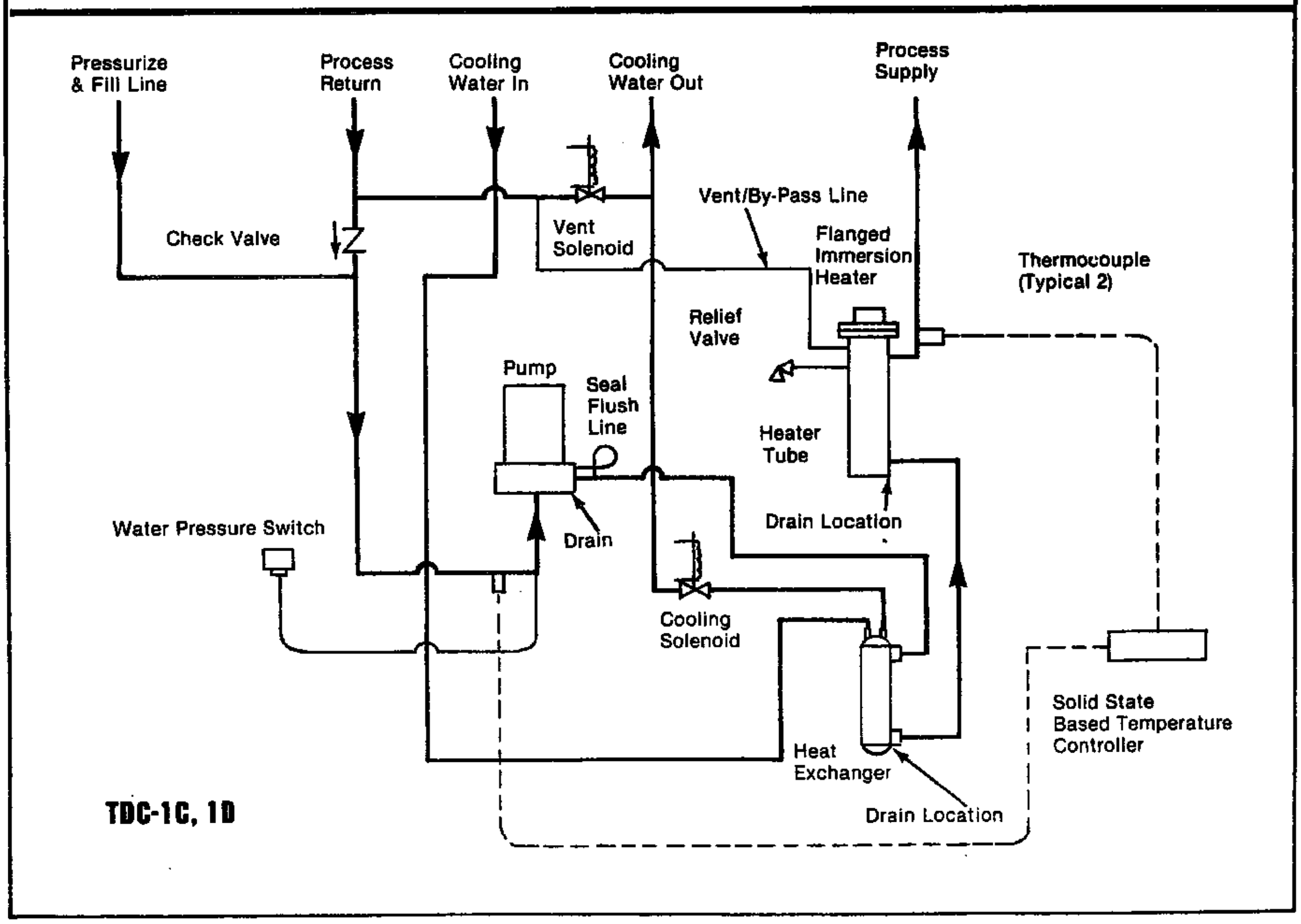
9.9.1 No routine maintenance required.

9.10 Electrical Components

9.10.1 No routine maintenance required.

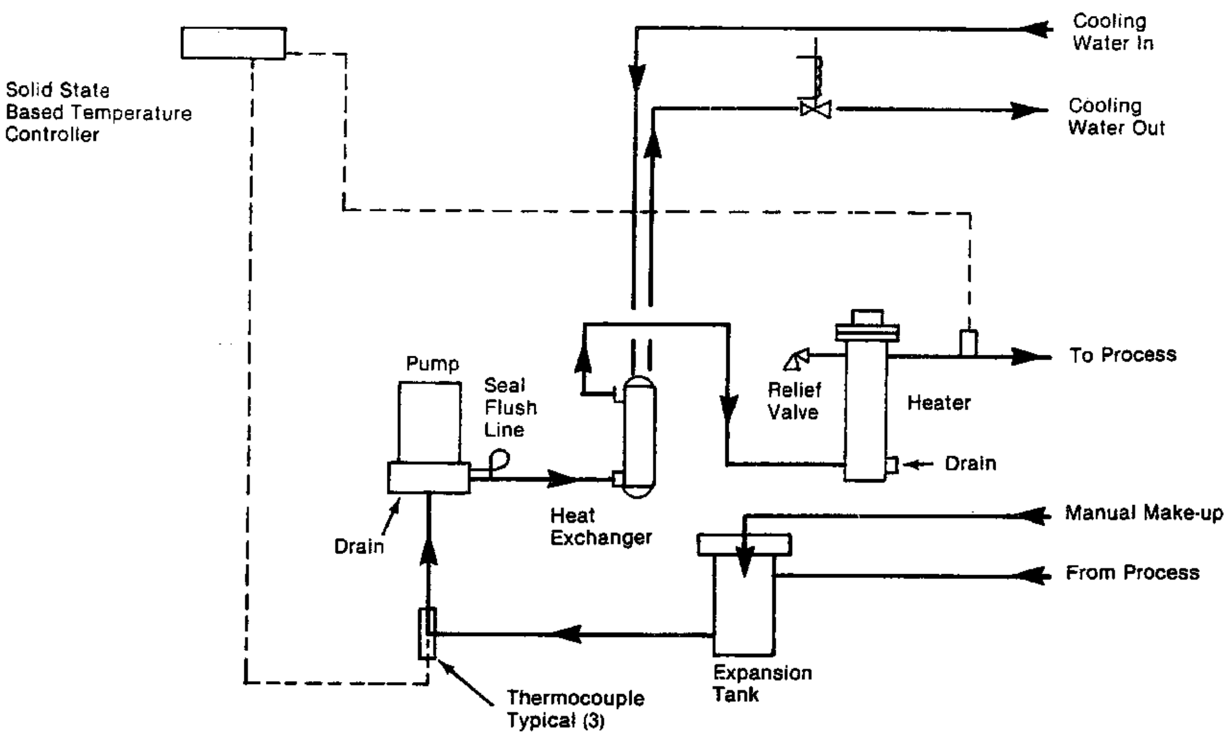


TDW-1C, 1D
Process Return
Cooling Water In
Cooling Water Out
Process Supply
Cooling/Vent Solenoid
Check Valve
Vent/By-Pass Line
Flanged Immersion Heater
Relief Valve
Pump
Thermocouple (Typical 2)
Seal Flush Line
Water Pressure Switch
Drain
Drain Location
Solid State Based Temperature Controller

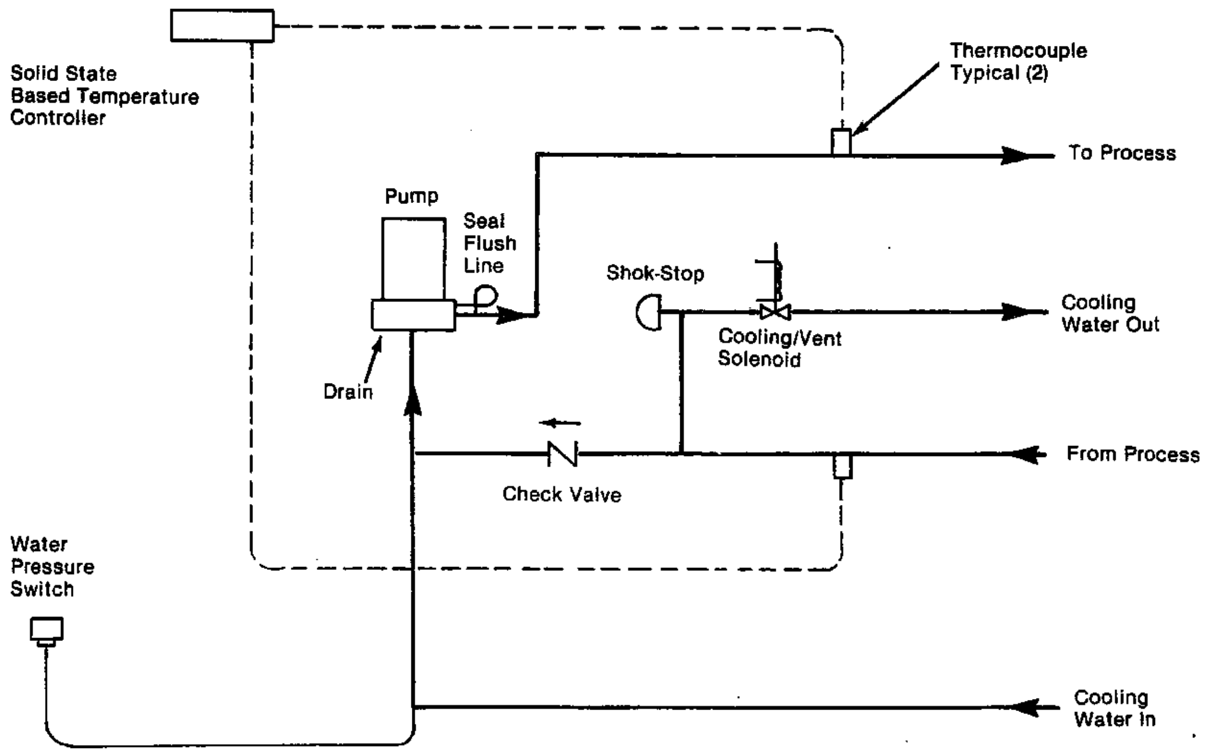


Pressurize & Fill Line
Process Return
Cooling Water In
Cooling Water Out
Process Supply
Vent/By-Pass Line
Check Valve
Vent Solenoid
Flanged Immersion Heater
Thermocouple (Typical 2)
Relief Valve
Pump
Seal Flush Line
Heater Tube
Drain Location
Water Pressure Switch
Drain
Cooling Solenoid
Solid State Based Temperature Controller
Heat Exchanger
Drain Location
TDC-1C, 1D

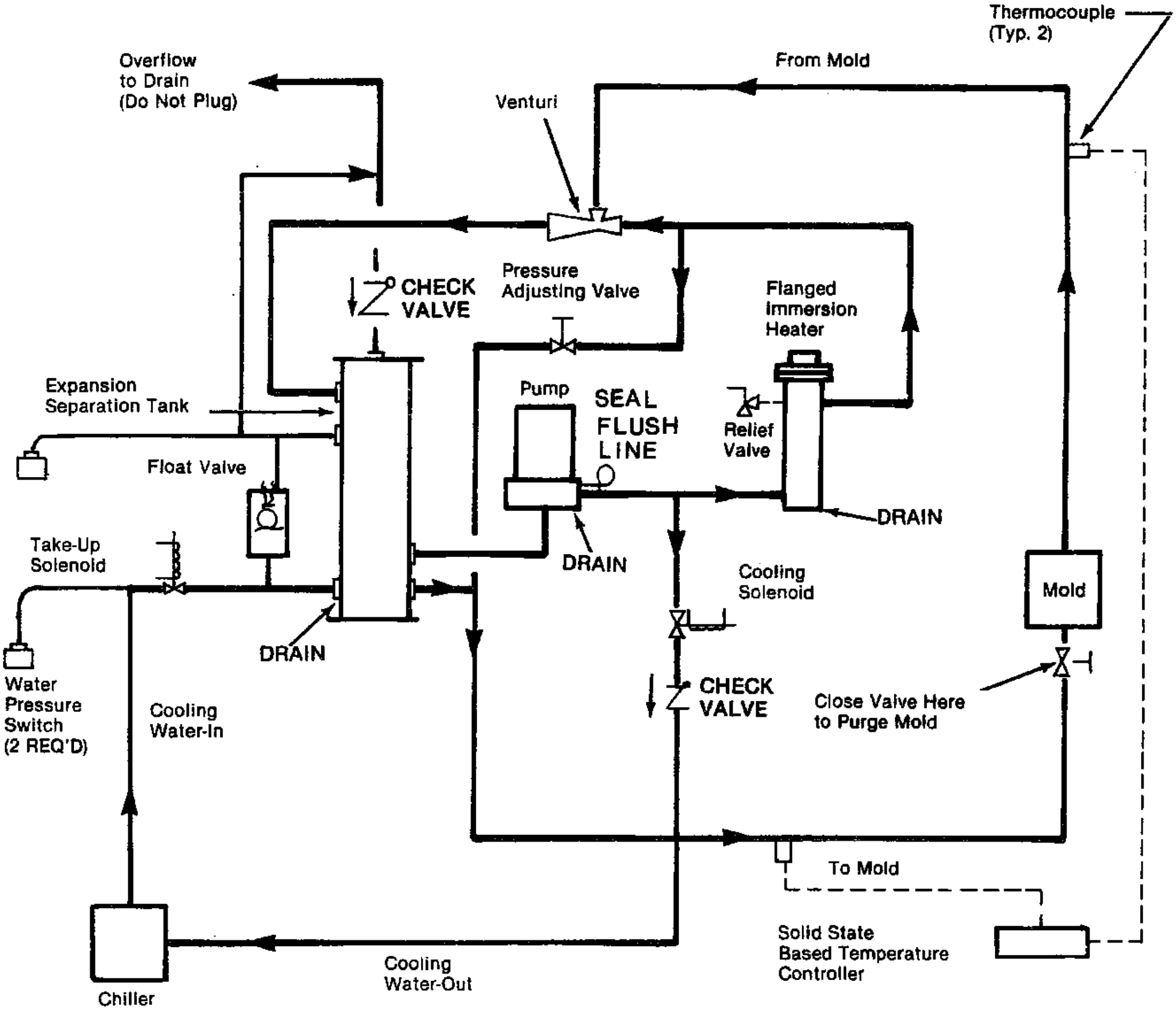
TDC,1C, 1D (TOTALLY CLOSED)



TFW-1C, 1D

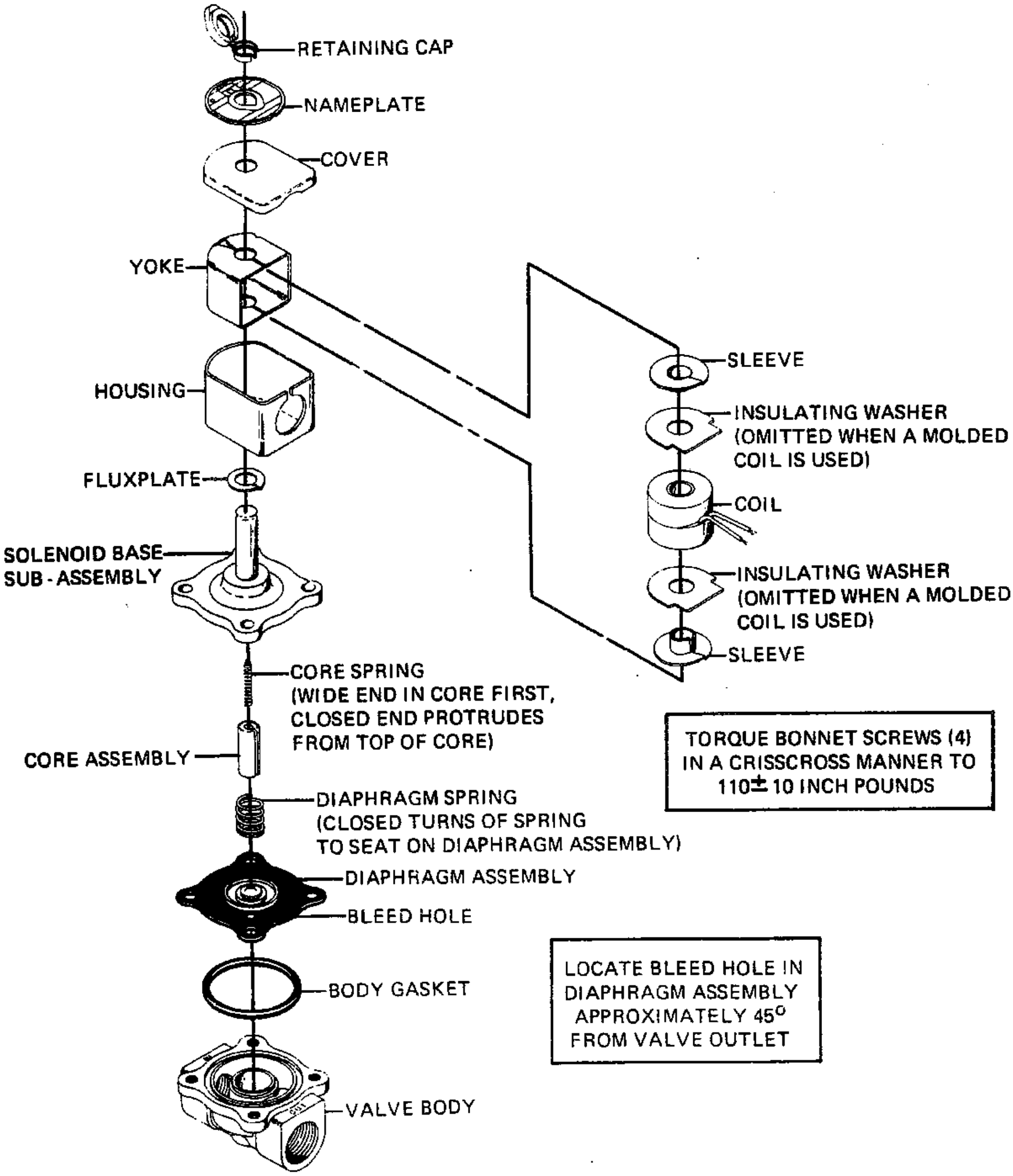


SCHEMATIC PIPING DIAGRAM



X. COOLING/VENT SOLENOID

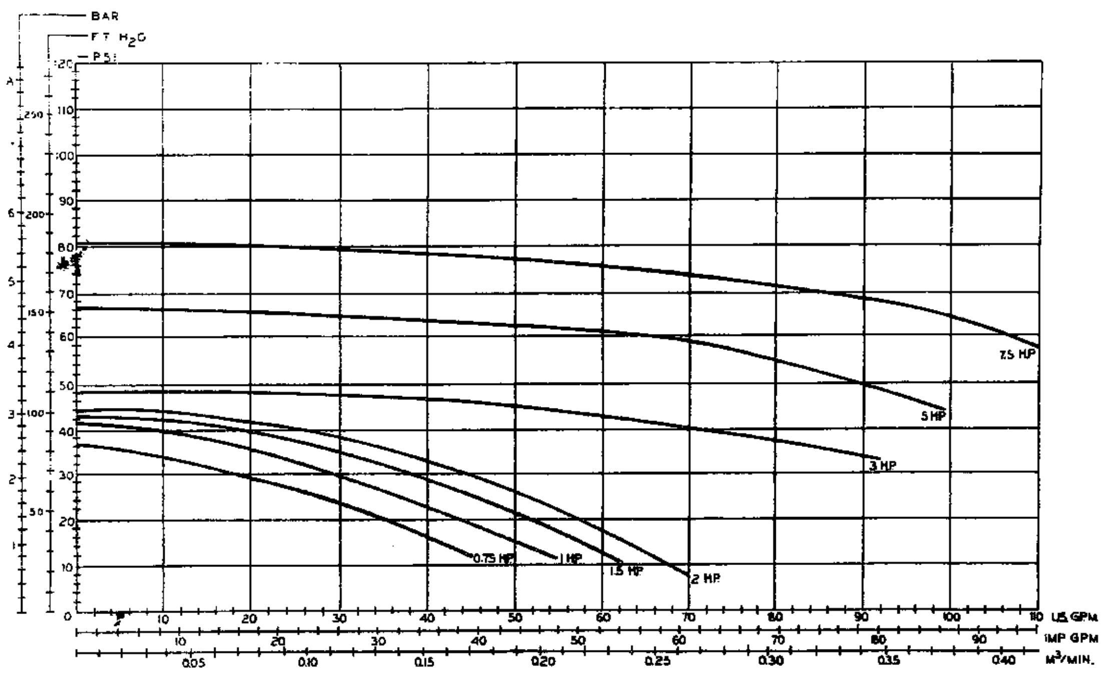
TYPICAL SOLENOID VALVE DISASSEMBLY



TORQUE BONNET SCREWS (4) IN A CRISSCROSS MANNER TO 110± 10 INCH POUNDS

LOCATE BLEED HOLE IN DIAPHRAGM ASSEMBLY APPROXIMATELY 45° FROM VALVE OUTLET

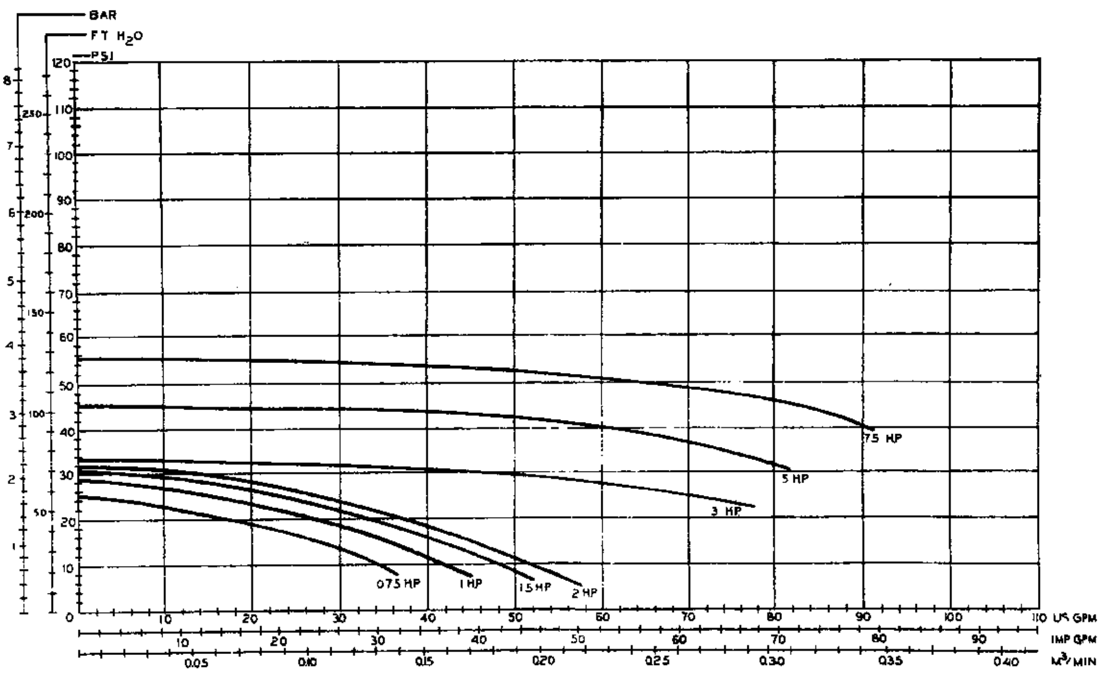
60 CYCLE PUMP CURVES

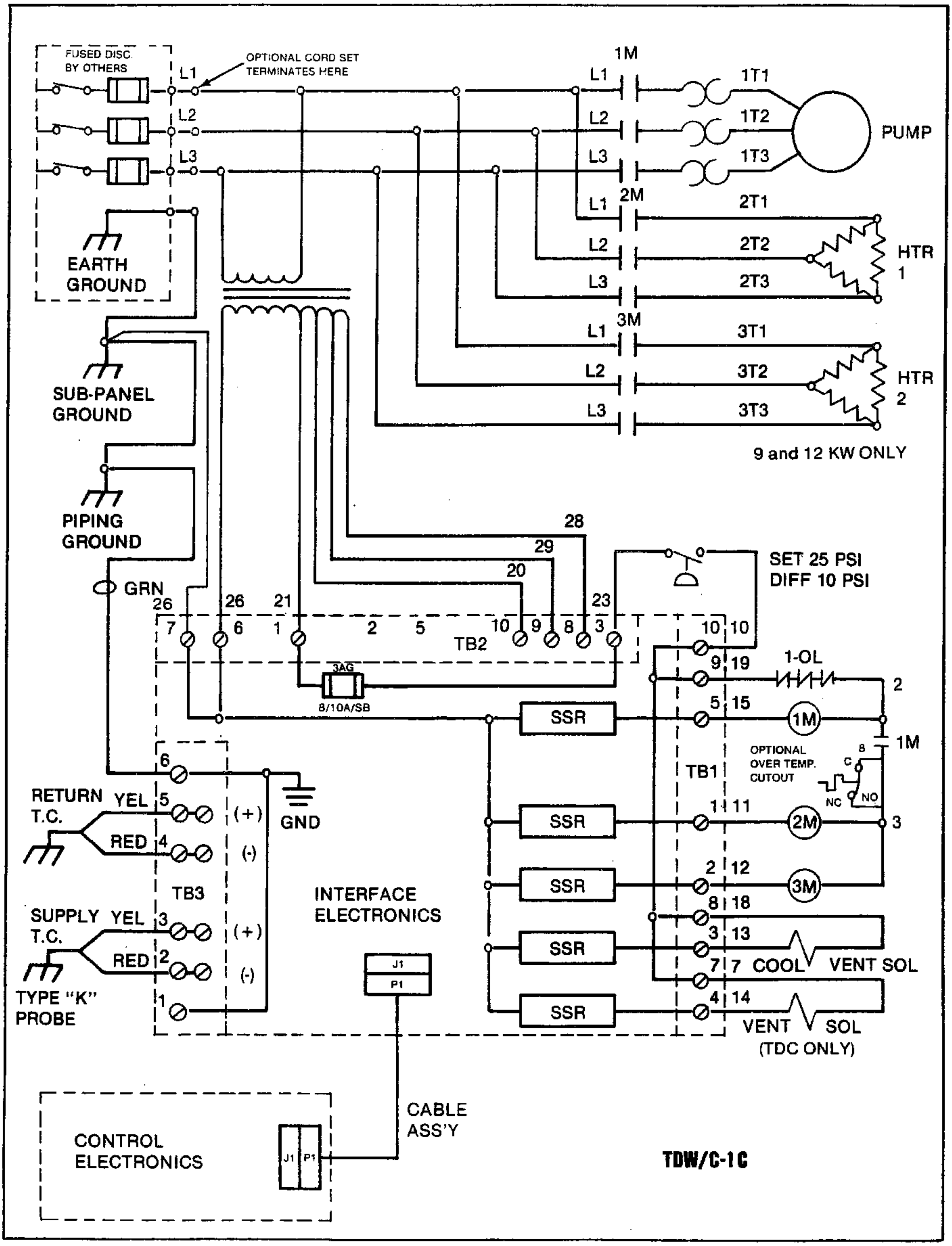


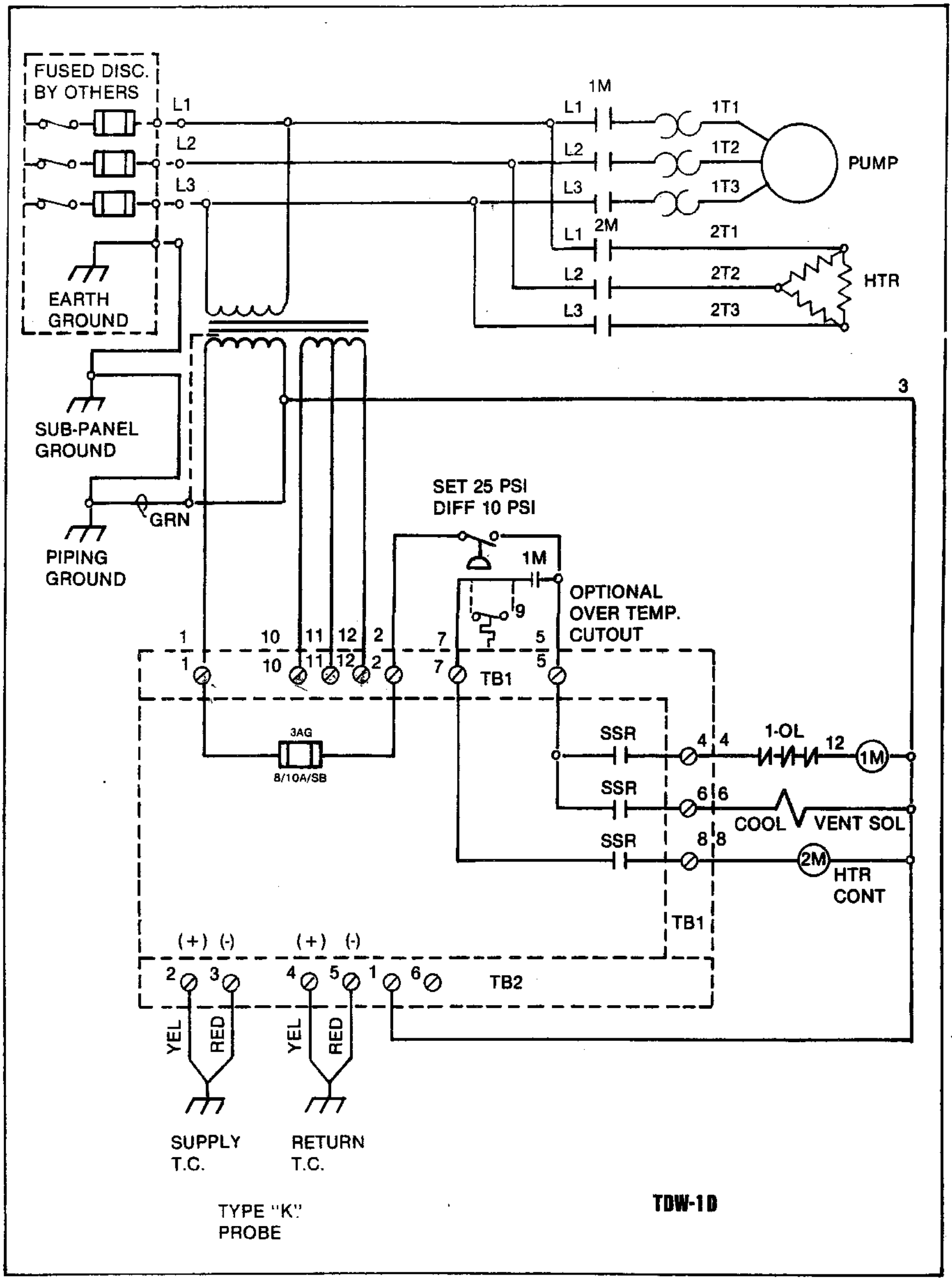
CURVES REPRESENT PUMP DISCHARGE

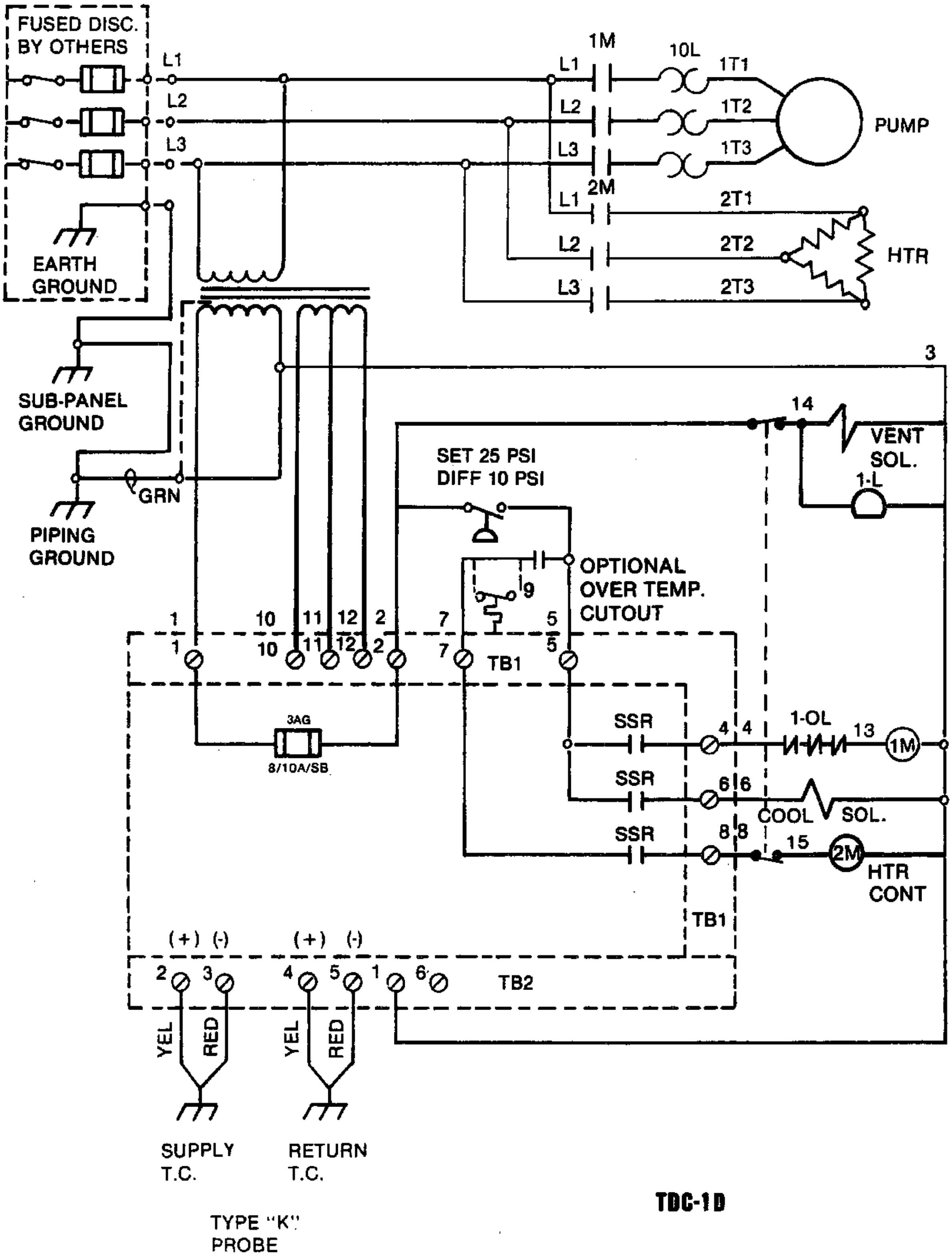
50 CYCLE PUMP CURVES

(Note: H.P. Shown is Nominal 60 Cycle Motor H.P.)

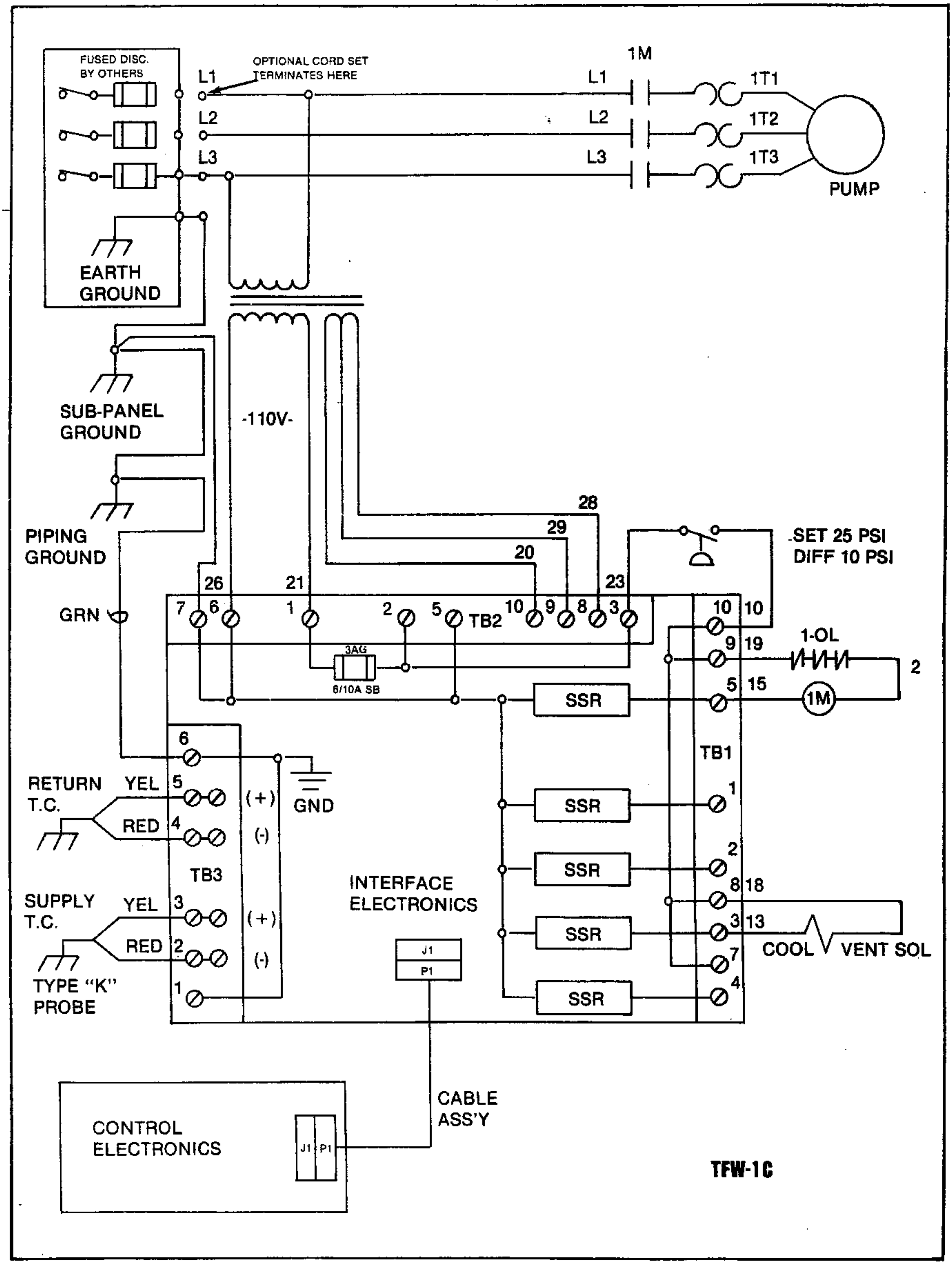


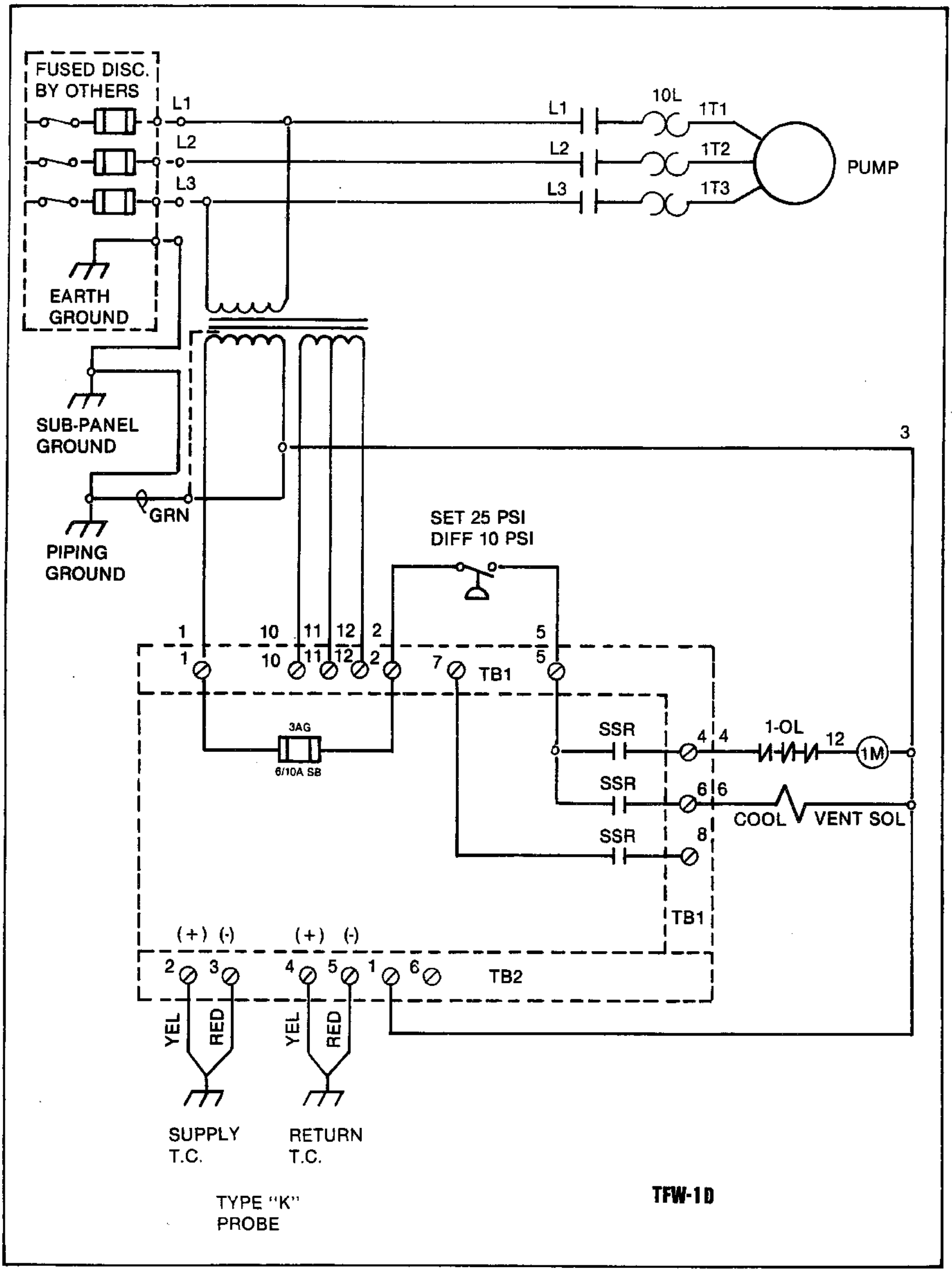

FUSED DISC. BY OTHERS
OPTIONAL CORD SET TERMINATES HERE
L1
L2
L3
EARTH GROUND
SUB-PANEL GROUND
PIPING GROUND
GRN
1M
1T1
1T2
1T3
PUMP
2M
2T1
2T2
2T3
HTR 1
3M
3T1
3T2
3T3
HTR 2
9 and 12 KW ONLY
28
29
20
26
21
23
SET 25 PSI
DIFF 10 PSI
TB2
3AG
8/10A/SB
SSR
1-OL
OPTIONAL OVER TEMP. CUTOUT
C
NC
NO
TB1
1M
2M
3M
COOL
VENT SOL
VENT SOL
(TDC ONLY)
RETURN T.C.
YEL
RED
(+)
(-)
GND
TB3
SUPPLY T.C.
TYPE "K" PROBE
INTERFACE ELECTRONICS
J1
P1
CABLE ASS'Y
CONTROL ELECTRONICS
TDW/C-1C

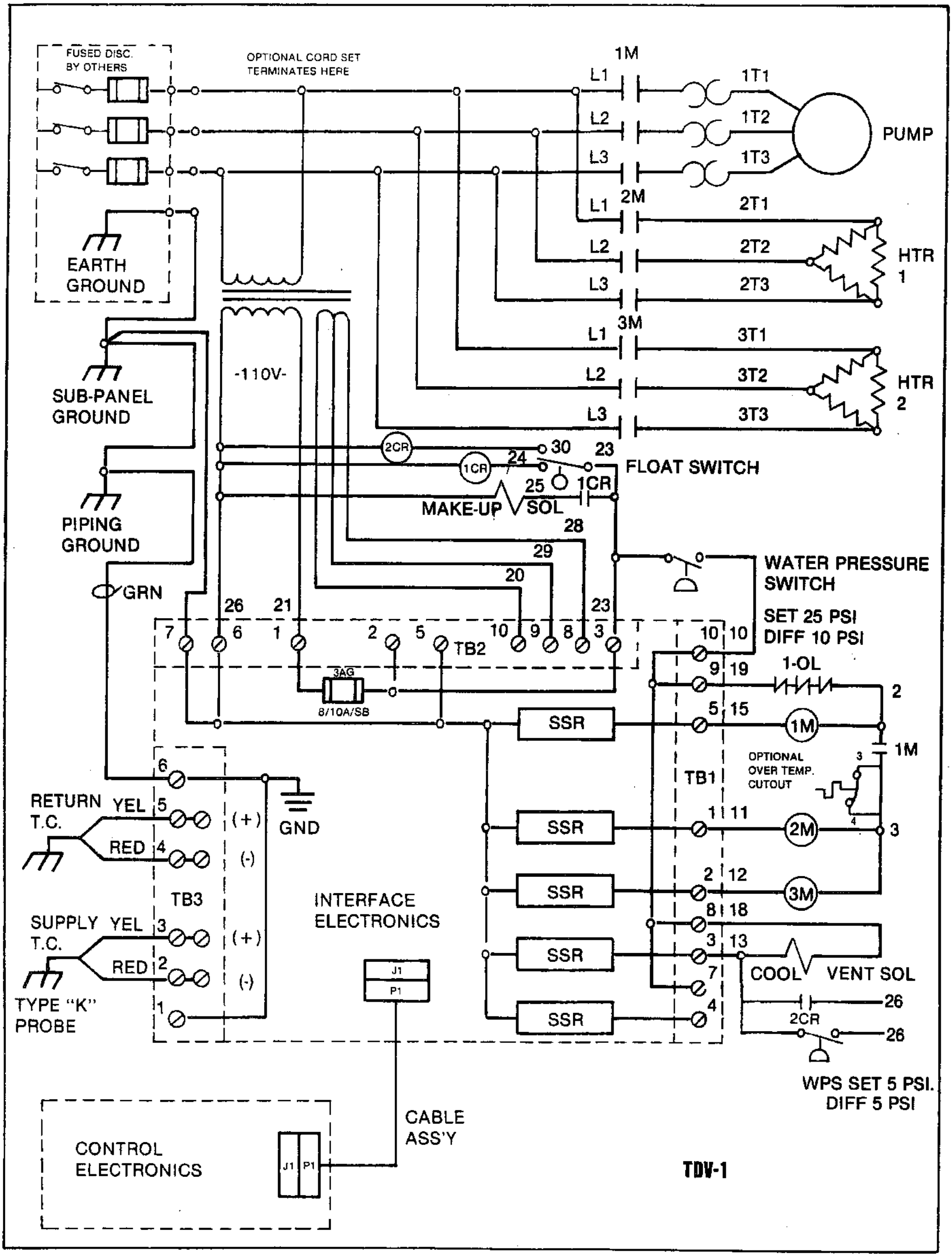

FUSED DISC.
BY OTHERS
L1
L2
L3
EARTH
GROUND
1M
L1
L2
L3
1T1
1T2
1T3
PUMP
2M
L1
L2
L3
2T1
2T2
2T3
HTR
3
SUB-PANEL
GROUND
GRN
PIPING
GROUND
SET 25 PSI
DIFF 10 PSI
1M
9
OPTIONAL
OVER TEMP.
CUTOUT
1
10
11
12
2
7
5
TB1
3AG
8/10A/SB
SSR
SSR
SSR
4
4
1-OL
12
1M
6
6
COOL
VENT SOL
8
8
2M
HTR
CONT
TB1
(+) (-)
(+) (-)
2
3
4
5
1
6
TB2
YEL
RED
YEL
RED
SUPPLY
T.C.
RETURN
T.C.
TYPE "K"
PROBE
TDW-1D


FUSED DISC.
BY OTHERS
L1
L2
L3
EARTH
GROUND
SUB-PANEL
GROUND
GRN
PIPING
GROUND
1M
10L
1T1
1T2
1T3
PUMP
2M
2T1
2T2
2T3
HTR
3
14
VENT
SOL.
1-L
SET 25 PSI
DIFF 10 PSI
OPTIONAL
OVER TEMP.
CUTOUT
9
TB1
3AG
8/10A/SB
SSR
1-OL
13
1M
COOL
SOL.
15
2M
HTR
CONT
TB2
(+) (-)
YEL
RED
SUPPLY
T.C.
RETURN
T.C.
TYPE "K"
PROBE

TDC-1D

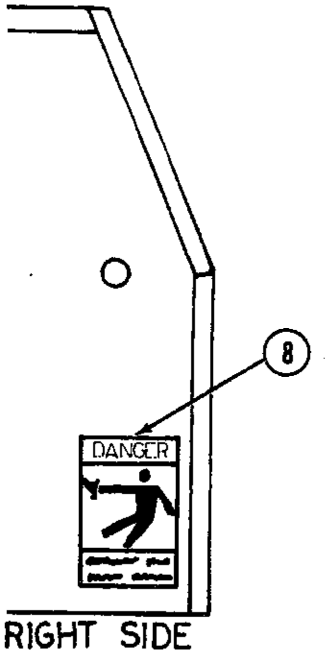

FUSED DISC. BY OTHERS
OPTIONAL CORD SET TERMINATES HERE
L1
L2
L3
1M
1T1
1T2
1T3
PUMP
EARTH GROUND
SUB-PANEL GROUND
PIPING GROUND
-110V-
28
29
20
26
21
23
SET 25 PSI
DIFF 10 PSI
GRN
TB2
3AG
6/10A SB
1-OL
1M
SSR
TB1
TB3
GND
RETURN T.C.
YEL
RED
SUPPLY T.C.
TYPE "K" PROBE
(+)
(-)
INTERFACE ELECTRONICS
J1
P1
COOL
VENT SOL
CABLE ASS'Y
CONTROL ELECTRONICS
TFW-1C

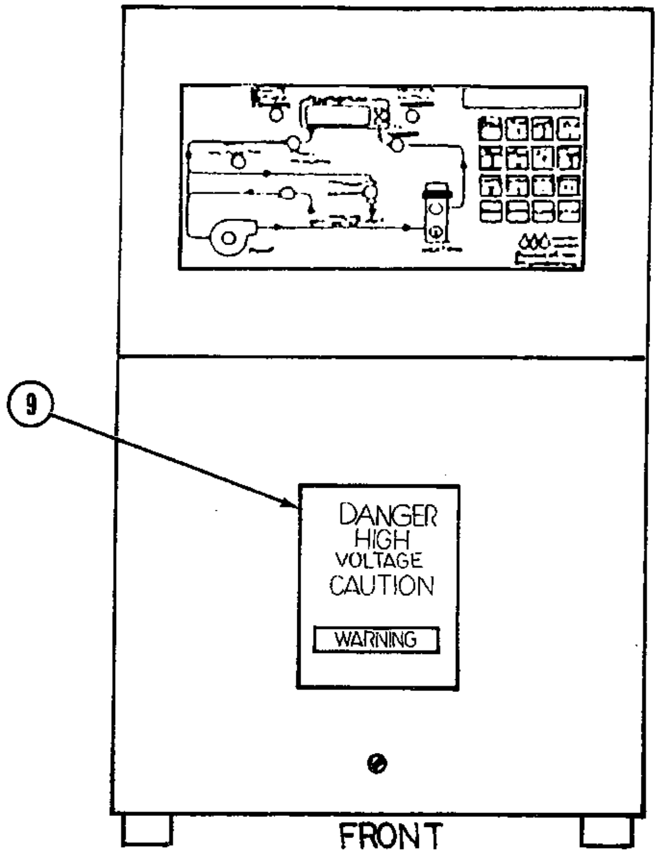

FUSED DISC.
BY OTHERS
L1
L2
L3
EARTH
GROUND
10L
1T1
1T2
1T3
PUMP
SUB-PANEL
GROUND
3
GRN
PIPING
GROUND
SET 25 PSI
DIFF 10 PSI
1
10
11
12
2
5
7
TB1
3AG
6/10A SB
SSR
4
1-OL
12
1M
6
COOL
VENT SOL
8
TB1
(+) (-)
(+) (-)
TB2
YEL
RED
SUPPLY
T.C.
RETURN
T.C.
TYPE "K"
PROBE
TFW-1D

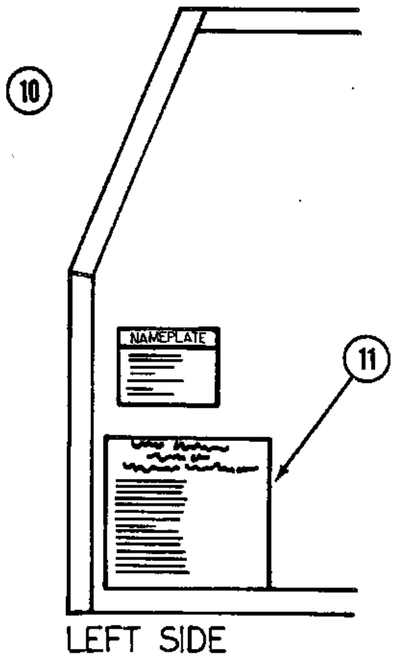

FUSED DISC. BY OTHERS
OPTIONAL CORD SET TERMINATES HERE
1M
L1
L2
L3
1T1
1T2
1T3
PUMP
2M
2T1
2T2
2T3
HTR 1
3M
3T1
3T2
3T3
HTR 2
EARTH GROUND
SUB-PANEL GROUND
PIPING GROUND
GRN
-110V-
2CR
1CR
30
23
24
25
FLOAT SWITCH
1CR
MAKE-UP SOL
28
29
20
WATER PRESSURE SWITCH
SET 25 PSI
DIFF 10 PSI
26
21
23
TB2
3AG
8/10A/SB
1-OL
SSR
1M
OPTIONAL OVER TEMP. CUTOUT
TB1
2M
3M
COOL
VENT SOL
2CR
WPS SET 5 PSI.
DIFF 5 PSI
RETURN T.C.
YEL
RED
(+)
(-)
GND
TB3
SUPPLY T.C.
TYPE "K" PROBE
INTERFACE ELECTRONICS
J1
P1
CABLE ASS'Y
CONTROL ELECTRONICS

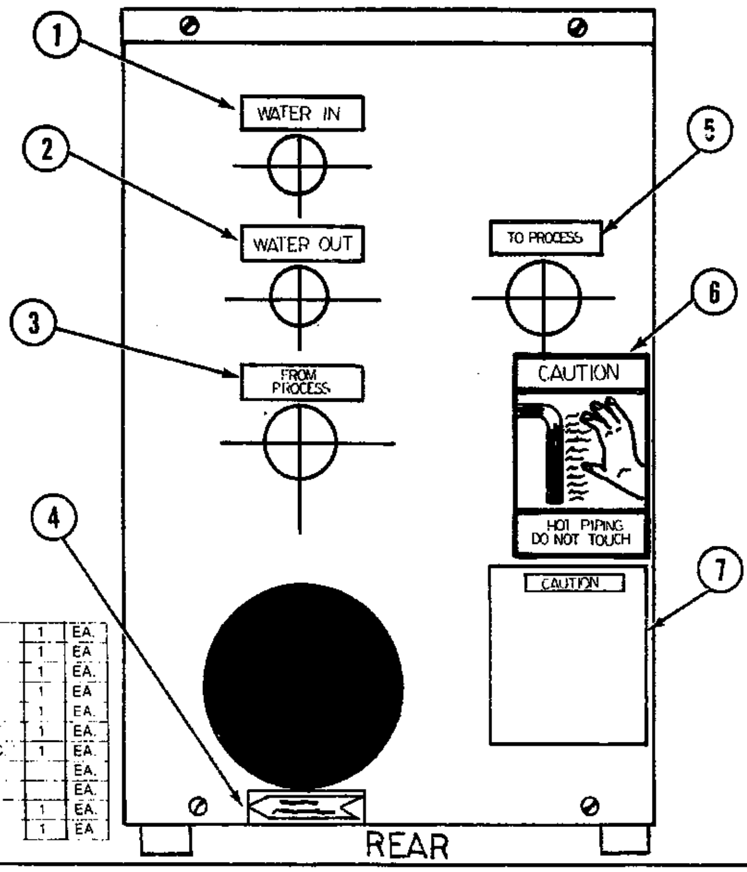
TDV-1

LABEL LOCATIONS









1	A0069512	STICKER "WATER IN"	1	EA.
2	A0069513	STICKER "WATER OUT"	1	EA
3	A0069497	STICKER "FROM PROCESS"	1	EA.
4	A0103779	STICKER "PUMP ROTATION"	1	EA
5	A0069496	STICKER "TO PROCESS"	1	EA.
6	A0503882	STICKER "CAUTION, HOT PIPING, DO NOT TOUCH"	1	EA.
7	A0103780	STICKER "THIS EQUIPMENT CONTAINS FLUID, ETC."	1	EA.
8	A0503880	STICKER "DANGER-		EA.
9	A0103840	STICKER "DANGER-HIGH VOLTAGE-CAUTION"		EA.
10	A0103257	NAMEPLATE	1	EA.
11	A0103081	STICKER "TDW/C AND TCW/C OPERATING INSTR."	1	EA

PUMP SEAL CHANGING INSTRUCTION

A. Disassembly (Removal of Old Seal Assembly)

1. Remove volute (A) from adaptor (I) and impeller assembly by removing four pump screws (J).
2. Remove impeller lock nut (B), and on ½ to 2 HP pumps remove d-washer (C).

NOTE: Opposite end of motor shaft is fitted with screw driver slot to hold shaft securely while impeller screw is being removed.

3. Remove pump impeller (D) (NOTE: Impeller on ½ HP to 2 HP pumps unscrews counterclockwise. Impeller on 3 HP and 5 HP pumps are held in place by a key (C) and impeller slides off shaft. Remove spring (E), Rotary Seal Head (F) and Stationary Seat (G).
4. Adapter (I) may have to be removed by removing four motor screws (K) to aid in the replacement of the seal assembly.

Caution: NEVER RUN THE LAPPED RUNNING FACES DRY. THE LIQUID BEING HANDLED INSURES PROPER LUBRICATION. IN SOME CASES A SHORT PERIOD OF OPERATION IS REQUIRED TO CLEAN UP SLIGHT LEAKAGE.

C. Installation — Stationary Seat (G)

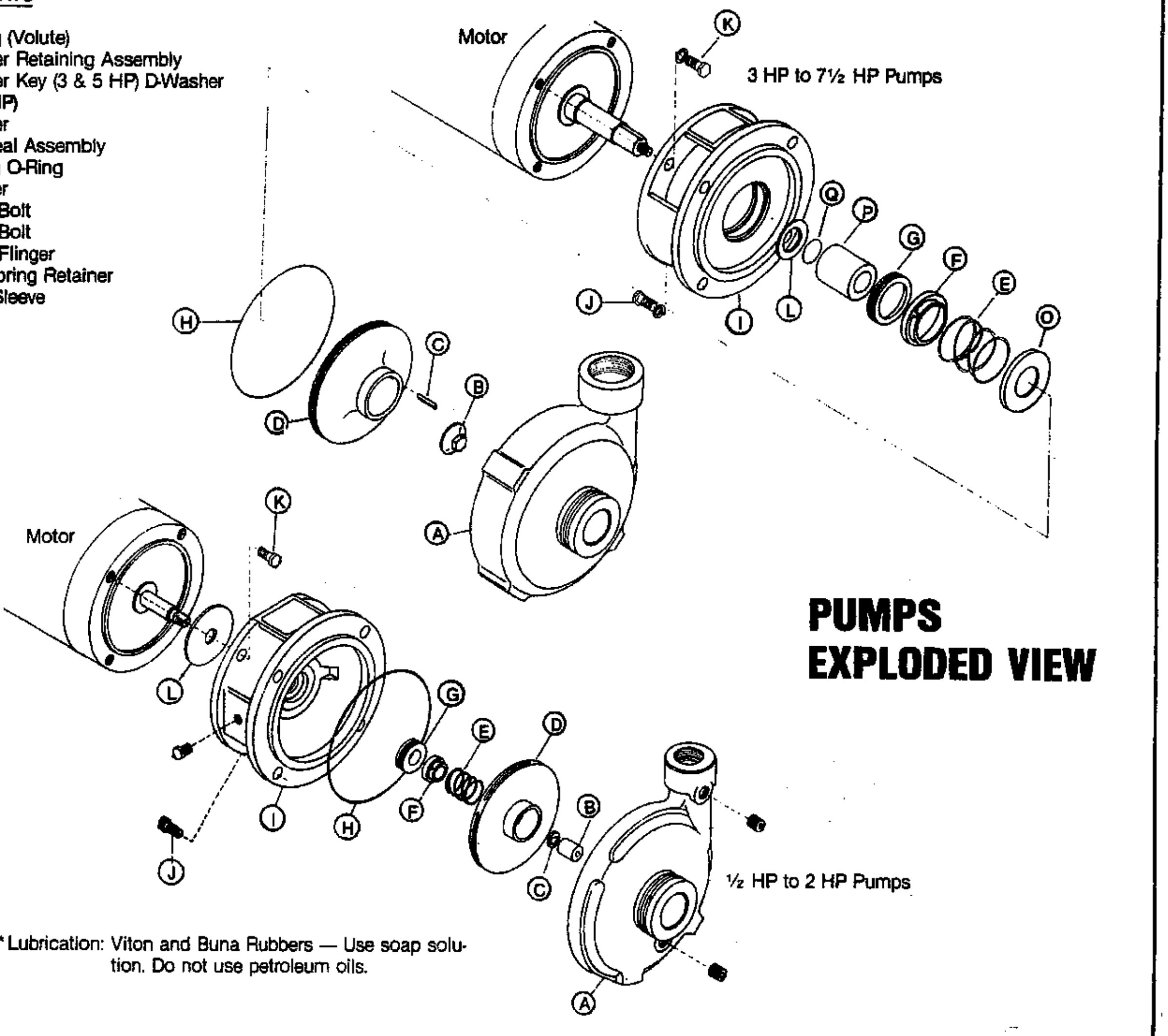
1. Clean seal cavity in adaptor (I).
2. Lubricate* "O" ring (Q) or cup and press seat firmly and squarely into seal with lapped face out.
3. Be careful not to scratch lapped face.

D. Installation — Rotary Seal Head (F)

1. Clean, polish and lubricate* shaft sleeve.
2. Check lapped faces on stationary seat (G) and rotary seal head (F). Be certain no dirt is on either face. Lubricate* lightly.
3. Slide rotary seal head (F) on shaft pressing on drive band.
4. Install spring (and spring retainer washer (O) if used).
5. Install impeller which will compress the spring to proper length assuring correct pressure on the lapped running faces.

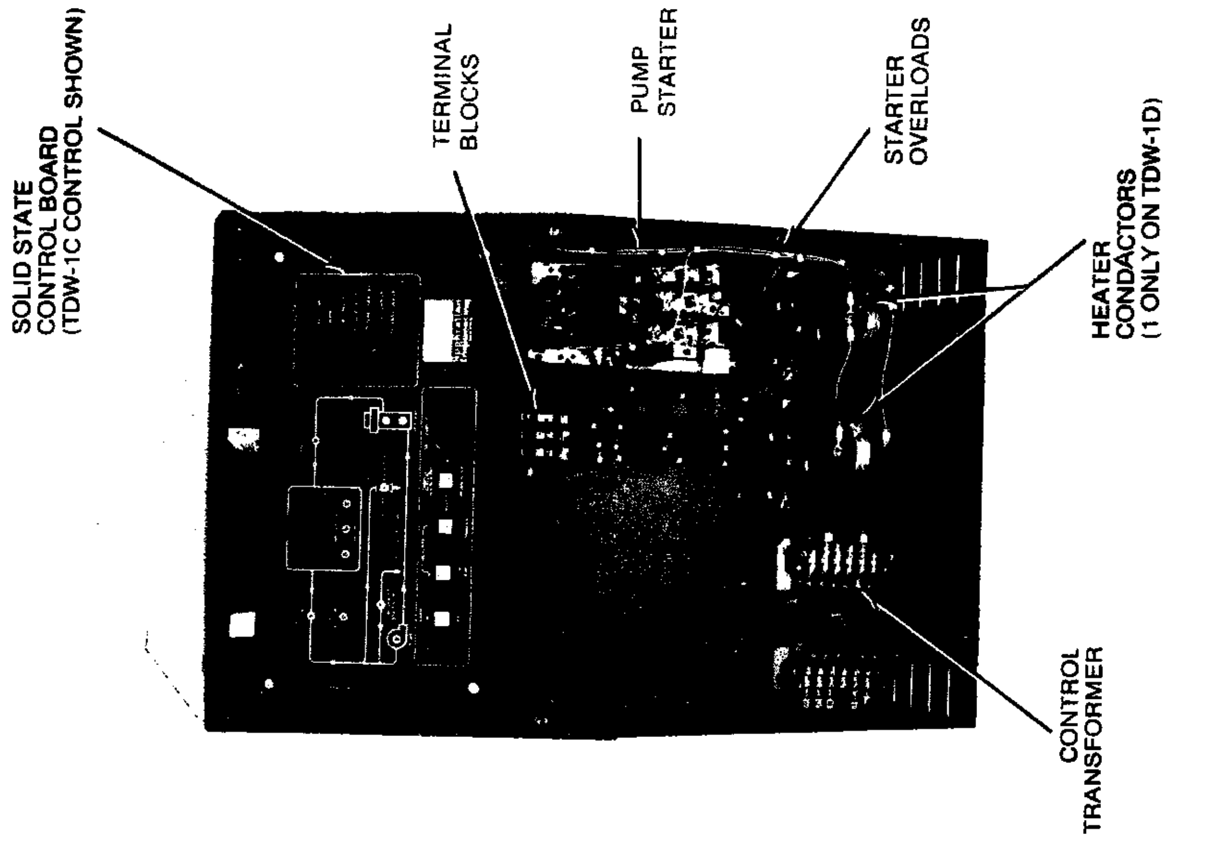
PUMP PARTS

A. Casing (Volute)
B. Impeller Retaining Assembly
C. Impeller Key (3 & 5 HP) D-Washer (½-2 HP)
D. Impeller
E. F.G. Seal Assembly
H. Casing O-Ring
I. Adapter
J. Pump Bolt
K. Motor Bolt
L. Water Flinger
O. Seal Spring Retainer
P. Shaft Sleeve

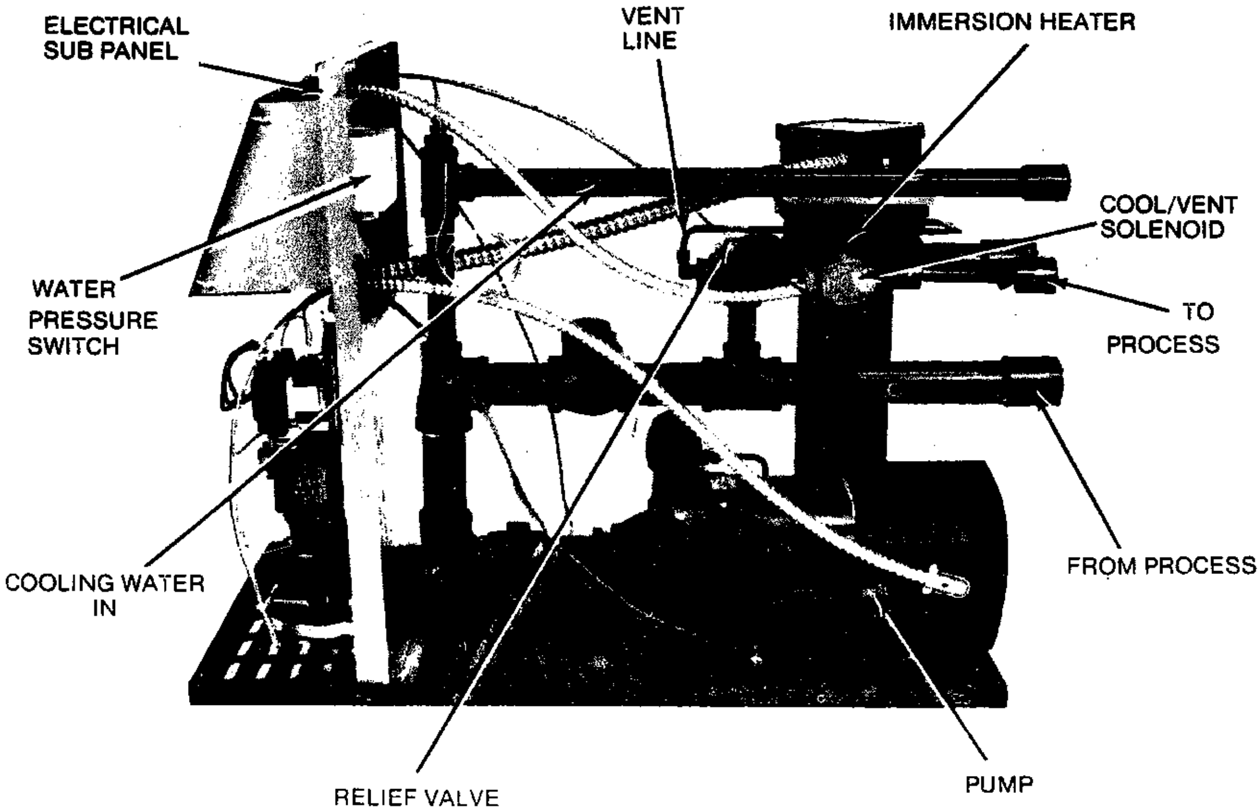


PUMPS EXPLODED VIEW

*Lubrication: Viton and Buna Rubbers — Use soap solution. Do not use petroleum oils.



TDW-1C & 1D SUBPANEL



TDW-1C, 1D

AEC, INC.
801 AEC DRIVE / WOOD DALE, ILLINOIS 60191-1198 U.S.A.
(312) 595-1060 / TELEX II 9102220219 / FAX (312) 595-5841

Printed in U.S.A.

Form No. 13-607.5
Dated: December, 1985
Supersedes: 13-607.4
Dated: January, 1982