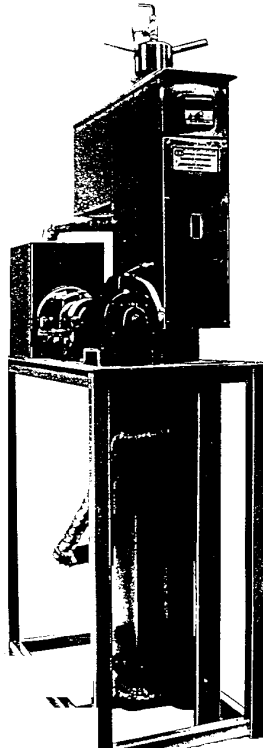


Oil Calibration Bath



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IMPORTANT!

INCORRECT MOTOR ROTATION WILL DAMAGE THE PUMP. BEFORE INITIAL START UP, IT IS IMPORTANT TO CHECK THE ROTATION OF THE MOTOR.

- 1. REMOVE SHAFT GUARD.**
- 2. CHECK ROTATION OF MOTOR. DIRECTIONAL ARROWS ARE LOCATED ON THE PUMP.**
- 3. ENGAGE COUPLING, LEAVING A 1/16" GAP.**
- 4. TIGHTEN THE SET SCREW.**
- 5. REPLACE THE SHAFT GUARD. YOU NOW ARE READY TO START UP.**

Section I.

INTRODUCTION

The Kuster Calibration Oil Baths are designed to calibrate and test the KPG, K2, K3, K4 and AK-1 subsurface pressure and temperature instruments. The oil bath must be used in conjunction with a dead weight tester or similar system to achieve accurate calibrations

The bath consists of an upright vessel, a pump and motor, a heater(s) and an indicator-controller. All controls are mounted on one panel. The heater(s), pump and motor are serviced from the floor level

A centrifugal pump circulates a heat transfer fluid through the electrical, heater chamber. The heater is regulated by a thermocouple-indicator-controller. The circulating pump and heater are electrically connected so that the bath cannot be operated without oil circulation.

The baths are designed in two basic configurations:

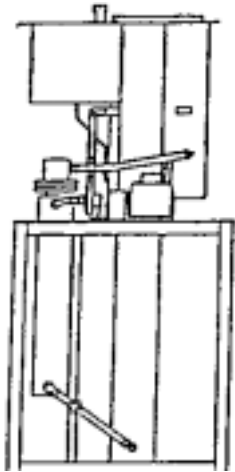
1. Type designated "open"; wherein the cylindrical vessel is exposed to the atmosphere and with appropriate adapters can be pressure controlled.
2. Type designated "closed"; wherein a pressure tank is installed in the cylindrical vessel

The following oil baths are available:

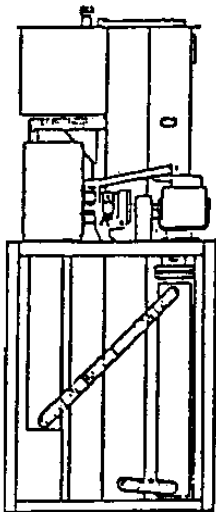
Oil Bath Model	Type Designation	Temperature Limits	Pressure Limits (psi)	Pressure Tank Req'd
11800	Open	175°C (347°F)	Ambient	-
11810	Closed	175°C (347°F)	12K	11812-101
11820	Closed	175°C (347°F)	25K	11814-101
11801	Open	260°C (500°F)	Ambient	-
11811	Closed	260°C (500°F)	12K	11812-101
11821	Closed	260°C (500°F)	25K	11814-101

BASIC OIL BATHS

BASIC ACCESSORIES



Oil Bath
 Low Temperature (175 C)
 11800 – Ambient Pressure
 11810 – High Pressure (12K)
 11820 – High Pressure (25K)



Oil Bath
 High Temperature (175 C)
 11801 – Ambient Pressure
 11811 – High Pressure (12K)
 11821 – High Pressure (25K)



11802-101
 Chain Hoist



11601-101
 Single Calibration
 Adapter Unit



11601-103
 Triple Manifold
 Calibration Unit



11610-101
 High Pressure KPG
 Dual Calibration Unit



11813-101
 High Pressure
 Gauge Extension



11812-101
 High Pressure
 Tank (12K)



11814-101
 High Pressure
 Tank (25K)

Section II

SPECIFICATIONS

Dimensions: **Basic for all models:** 39 ½” x 22” (100cm x 56cm) area x 84 ½” (215cm) height
(See page 3.2 for installation minimum)

Weights:

MODEL #	UNIT WEIGHT	SHIPPING WEIGHT
		Domestic pallet w/ Gauge Hoist Assembly
11800	535 lbs (241 kg)	625 lbs (281 kg)
11810	710 lbs (320 kg)	757 lbs (341 kg)
11820	774 lbs (348 kg)	821 lbs (369 kg)
11801	705 lbs (317 kg)	752 lbs (338 kg)
11811	880 lbs (396 kg)	927 lbs (417 kg)
11821	944 lbs (447 kg)	991 lbs (446 kg)

Electrical:

Model & Assy. Designator	Power			Pump HP	Motor RPM	Total Wattage Requirement
	VAC	PH	HZ			
11800-101	220	Sgl.	50	1/2	1425	7 KW
11810-101						
11820-101						
11800-102	220	Sgl.	60	1/2	1725	7 KW
11810-102						
11820-102						
11800-103	460	3	60	1/2	1725	7 KW
11810-103						
11820-103						
11801-101	220	Sgl.	50	3/4	1425	14 KW
11811-101						
11821-101						
11801-102	220	Sgl.	60	3/4	1725	14 KW
11811-102						
11821-102						
11801-103	460	3	60	3/4	1725	14 KW
11811-103						
11821-103						

Thermocouple: Fenwall, Model 53-121202-001. Accuracy: 0° - 277°C = +/- 2.2°C
278° - 760°C = +/- .75

SPECIFICATIONS (CONT.)

Controller:	Love, Model 149	Digital indicator, 0° to 800°F.
Input:		Type J (Fe/CuNi) thermocouple.
Input Impedance:		Greater than 500,000 Ohms.
Common Mode Rejection:		Greater than 120 DB @ 240 VAC (60 Hz).
Accuracy:		+ 0.25% of span or +/-1° whichever is greater (+/- least significant digit).
Repeatability:		+/- 0.1% of span.
Resolution:		1° or 0.1° dependent upon range.
Proportional Band:		Adjustable, 0.5 to 30% of span.
Automatic Reset (Integral):		Adjustable, off to 15 minutes. (off to 0.06 repeats per minute).
Automatic Rate (Derivative):		Adjustable, off to 3 minutes
Cycle Rate:		Adjustable, 5 to 50 seconds incenter of band.
Setability		+/- 1 least significant digit.
Max Thermocouple Resistance:		300 Ohms with rated accuracy.
Supply Voltage:		120/208/240 VAC, 50/60 Hz by terminal selection.
Line Voltage Stability:		+ 0.2° of span maximum, within 85 to 110% of rated line .
Control relay:		Plug in, 5A (240 VAC), non inductive. Single pole, double throw contacts.
Transformer:		Plug in, thermostatically protected.
Fuses:		Common contacts of relay are internally fused for 10A. (3) AB250 V. fuses.
Ambient Temperature Range:		2° to 60° C (35° to 140°F) maximum.
Temperature Stability:		7uV./ C (4uV./ F) maximum.
Humidity Conditions:		0 to 70% R.H. normal operation. 0 to 90% R.H. extreme operating conditions.
Thermocouple Break Protection:		Selectable up/down-scale standard.
Dimensions and Weight:		4" high, 4 1/4 wide, 9" long; four (4) lbs.

SPECIFICATIONS (CONT.)

Gauge/Bath Specifics:	Gauge Model	Dimensions	Adapter Required		Subadapter Required
			Part #	Unit Loading	
KPG		1-1/4" x 73" (32mm x 186m)	11601-103	1	
			11601-103	3	
K2		1" x 39" (25mm x 99mm)	11601-103		288-001
			11601-103		
K3		1-1/4" x 41-1/2" (32mm x 105mm)	11601-103		
			11601-103		
K4		3/4" x 42" (19mm 107mm)	11601-103		488-001
			11601-103		
AK-1		2-1/4" x 39" (57mm x 99mm)	11606-101	1	9507-101
			11606-101		

Bath Loading Capabilities:	
11800 will accommodate: 11801	Three (3) KPG or Three (3) K2 or Three (3) K3 or Three (3) K4 or One (1) AK-1
11810 will accommodate: 11811	Same as above
11820 will accommodate: 11821	One (1) KPG or One (1) K2 or One (1) K3 or Three (3) K4

Pump(s):

For models **11800**, **11810** and **11820**, one each:

Oberdorfer Centridugal Pump, Model 60-P
 3/4" NPT suction; 1/2" NPT discharge
 GPM @ Discharge: @ 1425 RPM, five (5)
 @ 1725 RPM, six (6)

For models **11801**, **11811** and **11821**, one (1) each:

Dean Bros Centrifugal Pump, Model PH-210(crane seal# 15wt)
 1 1/2" NPT suction, 1" NPT discharge
 GPM @ discharge; @ 1425 RPM, thirty two (32).
 @ 1725 RPM, thirty nine (39).

SPECIFICATIONS (CONT.)

Heater(s):	Chromalox:	Model NWHO 36015
	Kilowatts:	6
	Volts:	240
	Dimensions:	6.2" (15.7cm) Dia. x 43.3" (109.9cm) O.A.L.
	Number required:	One (1) each: 11800; 11810; 11820. Two (2) each: 11801; 11811; 11821.

Transfer Fluid: Recommended; Dow Corning Silicon #200, maximum temperature 315°C (600°F), 500 cs @ 25°C.

a) For heat transfer use, approximate amount required:

- Model 11800 5 gallons (18.9 liters) per unit
- 11801 6 gallons (22.7 liters) per unit
- 11810 3 gallons (11.4 liters) per unit
- 11811 4 gallons (15.1 liters) per unit
- 11820 3 gallons (11.4 liters) per unit
- 11821 4 gallons (15.1 liters) per unit

b) For pressure transfer use, (excluding dead weight tester use):

- Model: 11810 2 gallons (7.6 liters) per unit
- 11811 2 gallons (7.6 liters) per unit
- 11820 1 gallon (3.8 liters) per unit
- 11821 1 gallon (3.8 liters) per unit

Fluid flow systems: Circulations routes, (See Figure 3)

- | | |
|----------------------------------|--------------------------------|
| a) *High temperature bath system | b) Low temperature bath system |
| 1. pump discharge to heater #1 | 1. Pump suction from heater |
| 2. Heater #1 to heater #2 | 2. Pump discharge to well |
| 3. Heater #2 to well | 3. Well to heater |
| 4. Well to pump suction | |

*Note: This system is 100% insulated except for the well opening.

c) Systems drainage,

1. Drain plug at the bottom of the well, (Fig 3 K).
2. Drain plug beneath the pump casting suction port, (For temperature bath pumps only).
3. Drain plug under the heater(s) cylinder.
4. Drain plug under the oiler pedestal, (For high temperature bath pumps only).

Section III

INSTALLATION

Packing List:

- | | |
|----------------------|----------------------|
| 1. Oil Bath | 5. Controller Manual |
| 2. Hoist Assembly | 6. Pump Manual |
| 3. Controller Module | 7. Oil Bath Manual |
| 4. Pump Oiler | |

Unpacking:

Remove the shipping case/pallet with care. If any damage has occurred immediately file a claim with the transportation company. Photographs taken of the shipping container and contents are very desirable.

Location:

Pit installation is suggested for operational convenience. Minimum ceiling height must be 170" (4.3m). (See Figure 1) Floor mounting; Four (4) bolt holes are provided in base for anchoring. Minimum ceiling height must be 216" (5.5m). (See Figure 1)

Environment:

The bath should not be exposed to adverse weather conditions. Adequate ventilation is recommended as heat and fumes may be present during operations.

Controller:

Insert the temperature controller module, (packed separately), into the aluminum housing, (factory installed), which is located at the top of the electrical panel. Tighten into position with the screw located behind the hinge-down door on the front of the module. (Figure 2 E).

Electrical:

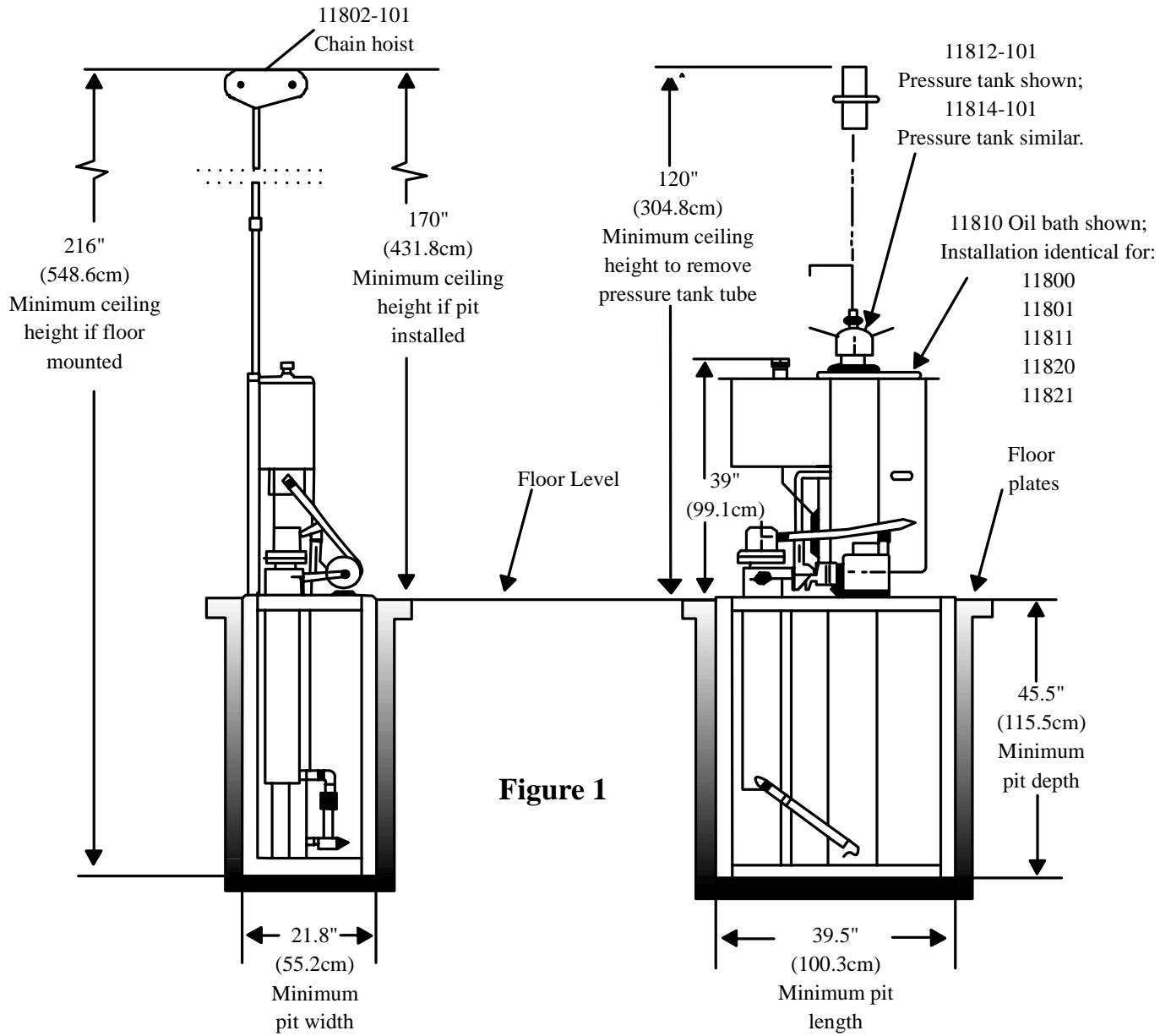
A qualified electrician must wire the bath to the power source. The bath is delivered with dummy "shipping wires" installed. (Figure 2 P). Remove the electrical panel lower face plate, (eight (8) attach screws).(Figure 2 L), Replace the dummy wires with power source wires as follows:

- Basic #s –101 (1) 10 gauge copper stranded green insulated
- And –102 (1) 10 gauge copper stranded black insulated
- (1) 10 gauge copper stranded white insulated
- Basic #s –103 (1) 10 gauge copper stranded green insulated
- (3) 10 gauge copper stranded orange insulated

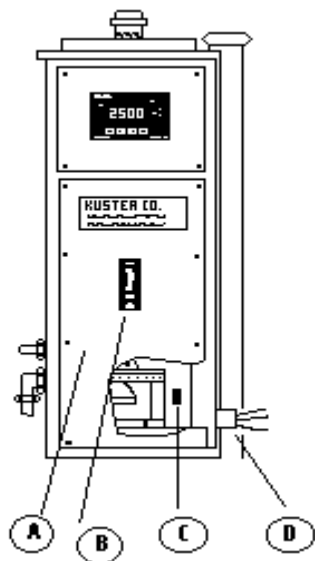
The green insulated ground wire leads to the ground terminal located adjacent to the magnetic contactor, (Figure 2 N).

A wiring diagram is located on the back of the electrical panel lower face plate, (Figure 2 L).

INSTALLATION (CONT.)

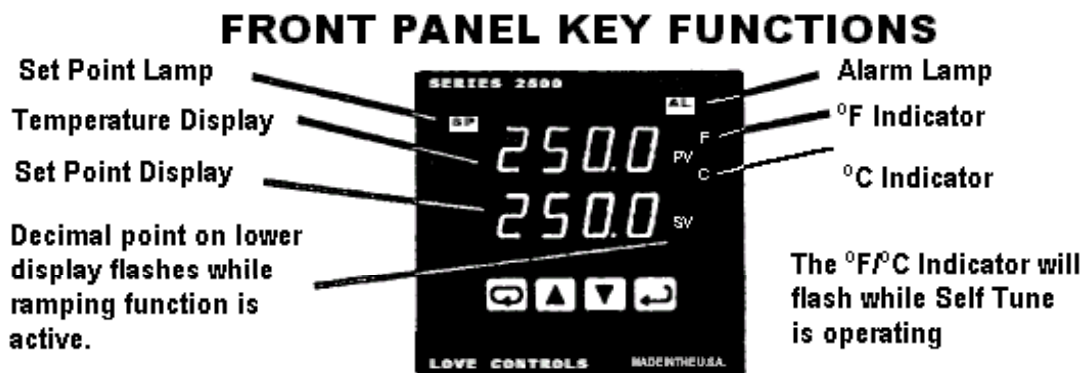


INSTALLATION



- A. LOWER FACE PLATE PANEL
- B. "ON-OFF" SWITCH
- C. GROUND TERMINAL
- D. POWER SOURCE LEAD IN
("SHIPPING WIRES" SHOWN)

Figure 2



INSTALLATION

- (A) Filler tube cap
- (B) Well Opening
- (C) Reservoir tank
- (D) Filler tube
- (E) Pressure tank cap assembly
- (F) Pressure tank tube
- (G) Pressure tank opening
- (H) Overflow standpipe
- (J) Drain bleed tube
- (K) Drain plug
- (L) Pressure vent needle valve
- (M) Pressure vent
- (N) Chain hoist stop

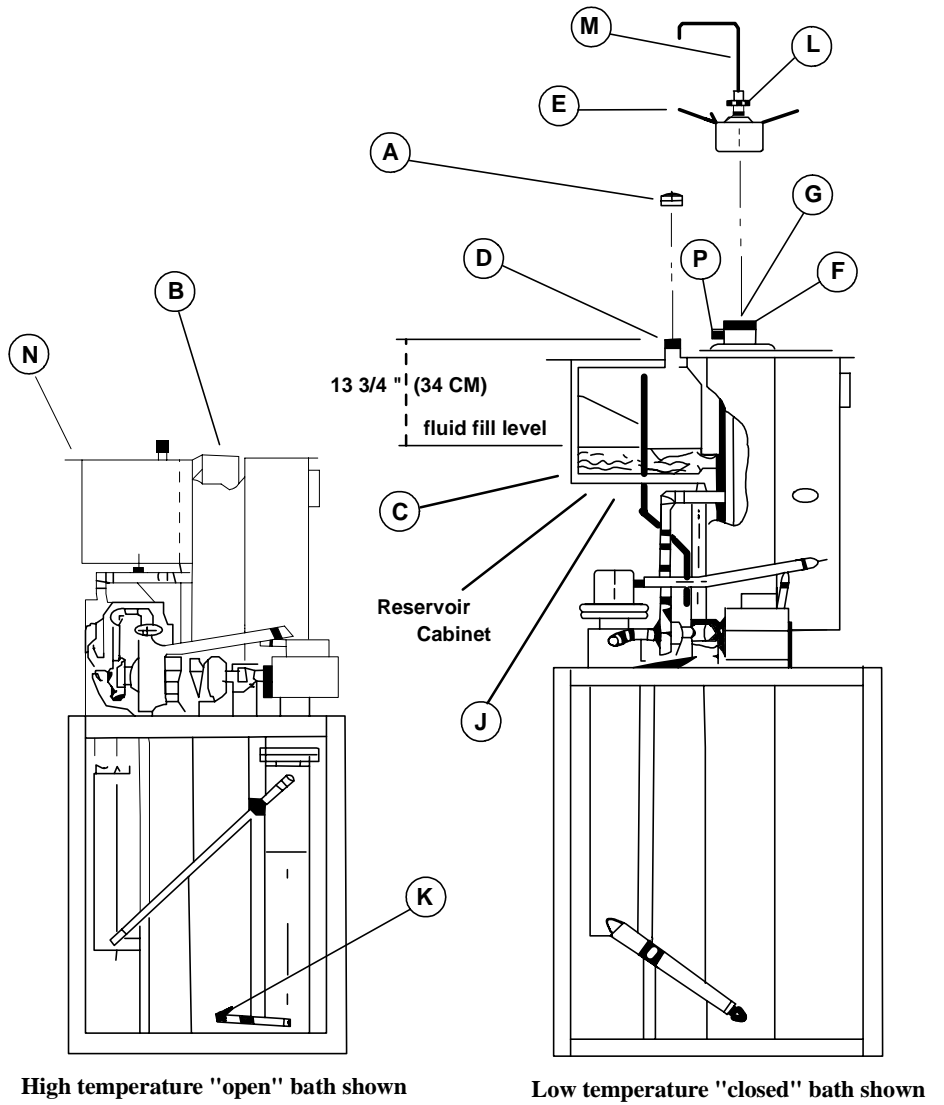


Figure 3

INSTALLATION (CONT.)

Initial Testing: A suggested pre-operational test should be run prior to calibration operations.

1. System heat transfer fluidization,
 - a) Remove the filler cap,-(Fig. 3 A).
 - b) Add the heat transfer fluid, (See page 2.4) through 'the top of the well, (Fig. 3 B), until the level in the reservoir, tank, (Fig. 3 C), is 13.75" (34cm) below the top-of the filler tube, (Fig. 3 D).
 - c) The level of the fluid in the reservoir will rise due to insertion of gauges and adapters in the well and to the heat expansion of the fluid.
 - d) An overflow standpipe, (Fig. 3 H),in the reservoir is connected to a drain bleed tube, (Fig. 3 J), which will conduct any overflow to an appropriate drain container.
 - e) Excess fluid which has spilled during filling of the system should be carefully cleaned up before turning the power on, Accumulation of overflow in the drain container should be disposed of frequently because of proximity to the motor and heater.
2. Actuating the system:
 - a) Push the main breaker switch to the "on" position. (Fig. 2 M), activating the circulation pump and temperature controller functions. The existing temperature in the well should display on the controller digital read-out, (Fig. 2 K).
 - b) Selected test temperature is set by:

Step 1. Selection of hi-to range, located inside of the hinge down panel, (Fig. 2 B).

Step 2. Actuate the set point switch, (Fig. 2 A), by holding in the "up" position during step 3.

Step 3. Depress the set point knob, (Fig. 2 J), and rotate clockwise to raise the temperature or counterclockwise
To the lower unit until

Step 4. Releasing both switches will then indicate the existing fluid temperature reading.

3. Controller temperature read-out verification,

Note: The controller adjustments have been factory pre-set. However this initial, as well as periodic checks are recommended.

- a) Immerse a mercury thermometer. in the well, (open models), or in the pressure tank tube,(closed models)
- b) The optimum depth for the thermometer suspension would be 15.7" (39.9cm) below the well tube opening, (Fig. 3 B), the point in closest proximity to the thermocouple location.