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1.1 Introduction

1.1.1 About This Manual

This manual introduces the functions and operations, as well as installation and maintenance procedures for the KRAUS Automatic Temperature Compensation system.

In an effort to help our customers take full advantage of our state-of-the-art products, we have provided this handbook to aid in initial set up and later to be used as a reference guide should the need arise.

The three divided sections are:

1. INFORMATION

Gives general information on system functions as well as cautionary advice.

2. INSTALLATION

Gives all information needed to successfully install and operate the system, as well as technical illustrations to aid in understanding text.

3. TECHNICAL DATA

Gives information on products that make up the system, in the form of drawings, manufacturer's literature, and references to related systems and products.

These three sections are set up in such a way that information is easily understood and instantly available to those who need it, whether they are an engineer, technician or supply manager.

Due to different environmental conditions this manual may be subject to, it has been designed to fit neatly in a protective three holed binder. This also serves the function of containing information from other related products in one convenient package.

1.1 Introduction

1.1.2 Helpful Hints and Warnings

Throughout this manual, in the left hand margin, there will be indicators, with text, to give various hints and warnings. The following are examples of what you will see, and their meanings:



SUGGESTION

Gives a hint on how to best use the equipment or advice on proper procedures.



ATTENTION

Gives notice to an important aspect of system operation.



CAUTION

Gives a warning to prevent damage to equipment or cause human injury.



Kraus Industries Ltd. assumes no responsibility for personal injury or equipment damage caused by non observance of the safety warnings.

1.1 Introduction

1.1.3 Service and Product Support

Should you experience any difficulties in system operation, and you have referred to the troubleshooting tables in this manual without success, customer assistance is available.

The procedure to receive such assistance is as follows:

1. Document the following information:

- System Disfunctions
- Corrective Measures Taken
- System Model Number
- System Serial Number
- Purchase Order Information
- Date of Installation
- Equipment Location (ie. City, Address, etc...)

2. Call or Fax our Product Service line at:

Company Service number	1 204 988 1234
Company Fax number	1 204 654 2881

One of our qualified personnel will provide assistance in getting your system operational.

1.2 Product Information

1.2.1 System Components

The following is a list of operating components used in this installation, along with a brief explanation of their operation:

ATC Board

Takes the signals from the temperature probe and flow meter, compensates for temperature deviation from 15°C, then sends the compensated signal back to the main processor board.

Adapter Board

Diverts the signal from the pulser to the ATC board, then returns the compensated signal from the ATC board to the main processor board. Also supplies a +5VDC and handle switch signals to the ATC Board and display.

Intrinsic Safety (I.S.) Barrier

Energy limits the temperature probe signal, then sends the same signal on to the ATC board.

Temperature Probes

Converts temperature of the product to a corresponding signal that is sent to the ATC board, via the I.S. Barrier.

ATC Display Board

Gives a visual display of product temperature, flow rate and uncompensated volume. Also indicates error conditions.

Probe Connector Assembly

Provides secure electrical connection between the temperature probe(s) and I.S. Barrier.

2.1 Pre-Installation

2.1.1 Site Preparation



CAUTION

The following list of precautions should be followed before installation:

- Extreme caution should be used to ensure that no ignition sources exist.
- The dispensing area should be roped off or isolated from public use.
- Dispenser station operator should be made aware of the work that needs to be completed to prevent accidental “turn on” of the pump.
- Any main electrical disconnection should be labeled or locked to prevent accidental power up.

2.1.2 Installation Requirements



ATTENTION

To complete the installation, the following points should be taken into consideration:

- Any electrical installation should be carried out by a registered electrician.
- Any gas dispensing connections should be made by qualified and experienced personnel.
- Installation must be performed in accordance with the relevant standards, laws and by-laws governing the type of application.

2.1 Pre-Installation

2.1.3 Unit Configuration

The GTC 200-3M must be configured for installation. This is accomplished by setting the DIP switches on the ATC circuit board.

These options can be changed by setting the eight switches in accordance with the table below:

SWITCH #	OPTION	SWITCH STATUS
1	Selects whether product 1 is gasoline or diesel	OFF = GASOLINE
2	Selects whether product 2 is gasoline or diesel	OFF = GASOLINE
3	Selects whether product 3 is gasoline or diesel	OFF = GASOLINE
4	Selects whether product 4 is gasoline or diesel	OFF (N/A)
5	Selects whether Blender is used	OFF (N/A)
6	Selects whether or not dispenser is 2 Product Highline	OFF = NOT
7	Selects whether or not the unit is installed in a modular or MPD pump	OFF = MPD or MODULAR
8	Selects whether ATC is ON or OFF	ON = ATC ON

2.2 Component Installation

2.2.1 Temperature Probe Installation

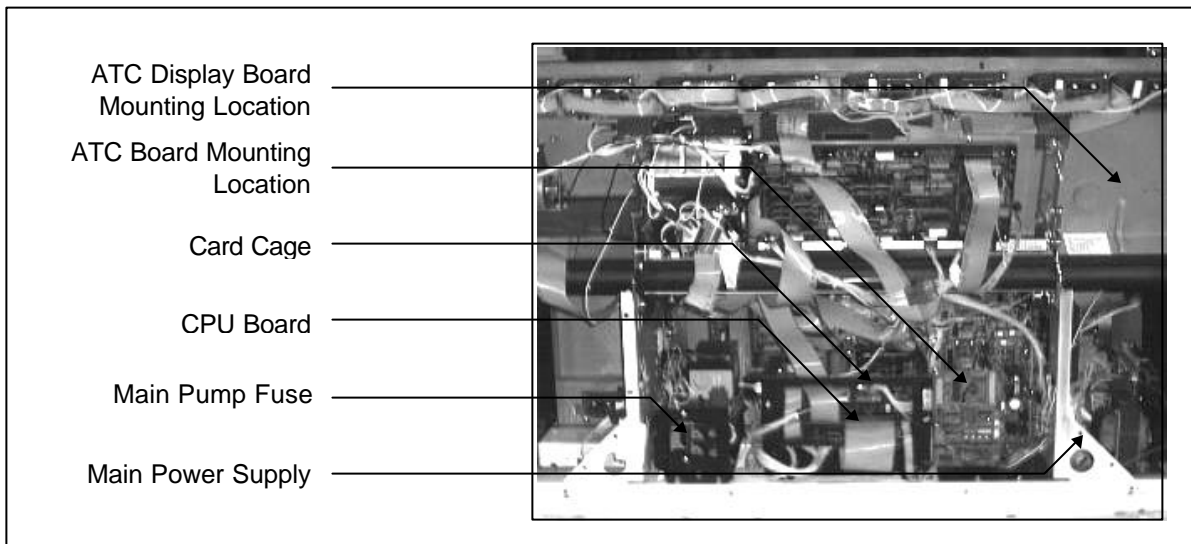


SUGGESTION

Complete component installation diagrams are located in Technical Data Section 3.1.2

Before components can be installed, power must be turned off to the pump as follows:

1. Open front panel of display, on top of pump, to expose main control boards. (See Figure 1)



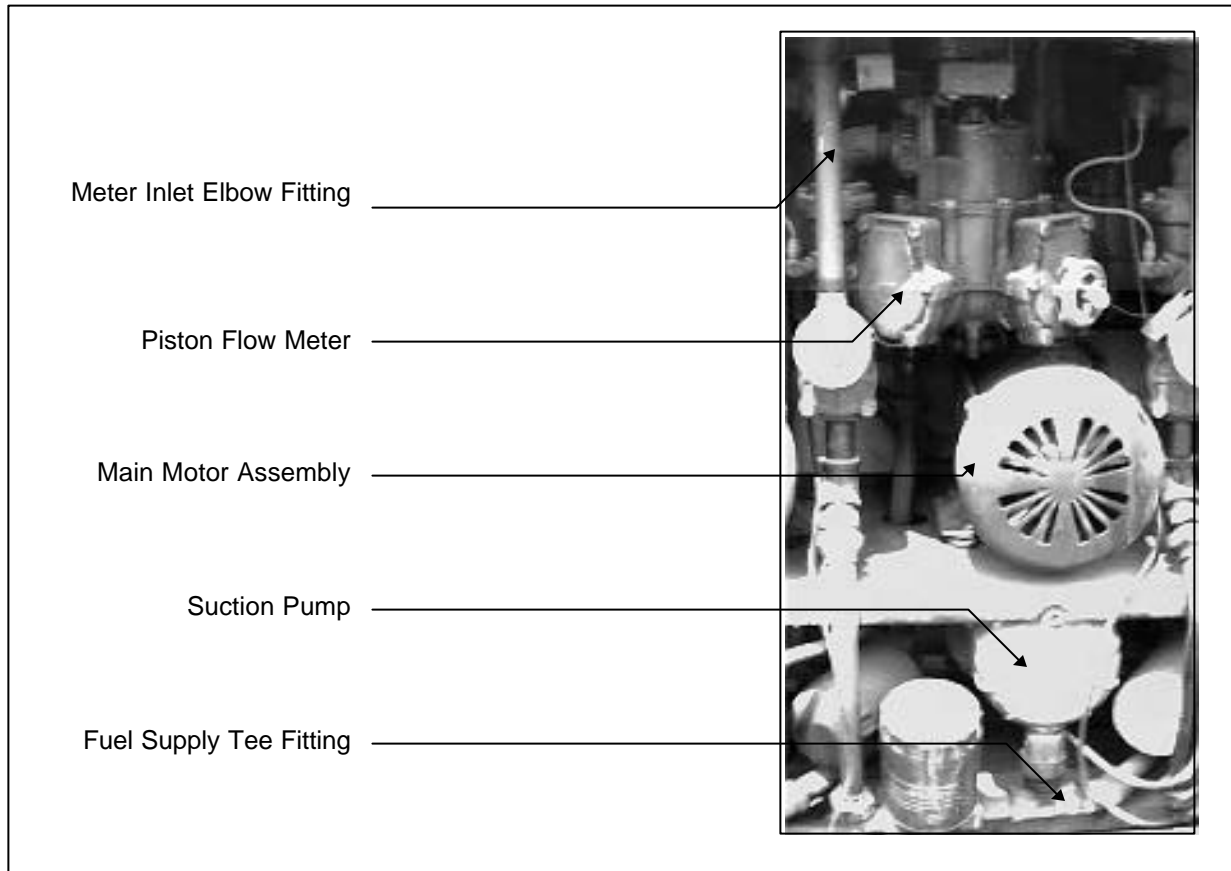
2. If possible, disconnect electrical power supply at main breaker or remove fuse located inside the display unit.

2.2 Component Installation

2.2.1 Temperature Probe Installation

2.2.1.1 Installation in a Suction Unit

1. Remove the two lower panels to expose the main pump assembly.



2. Locate fuel supply tee fittings at the bottom of each line.
3. Remove the tee fittings.
4. With the tee fitting mounted securely, drill 1 hole of size Q or 21/64", in the center, and tap for 1/8" NPT. (See Figure 2 for location)

2.2 Component Installation

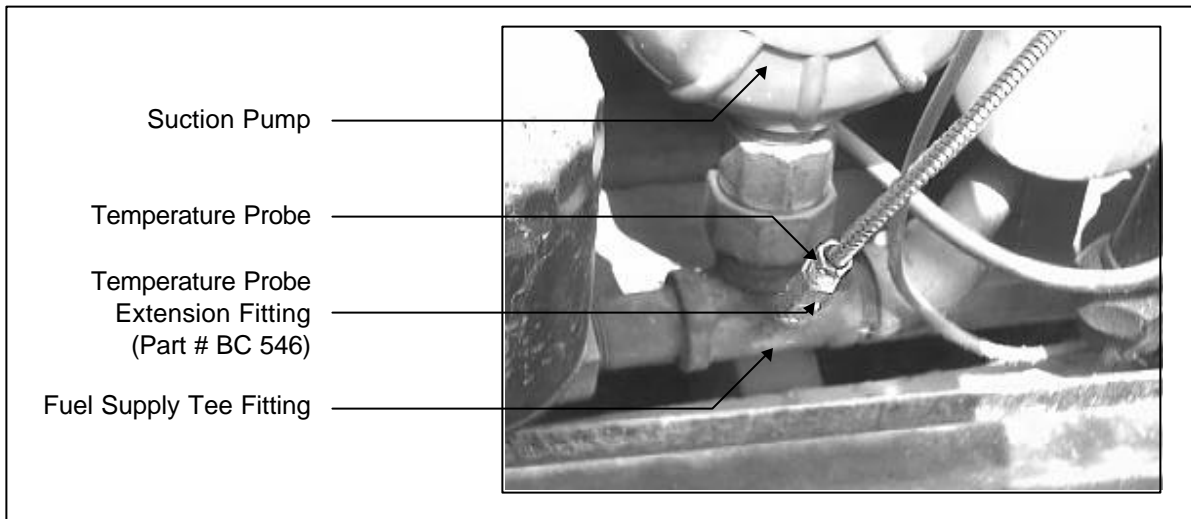


SUGGESTION

2.2.1 Temperature Probe Installation

2.2.1.1 Installation in a Suction Unit

The hole should be placed so that with the probe installed, the manifold can be re-connected without the probe interfering with the front panel of the enclosure.



5. Install extension fitting (Part # BC 546) into hole, using sealing compound suitable for use with gasoline.
6. Install the temperature probe into the extension fitting.



SUGGESTION

The temperature probe end should ideally be placed in the center of fuel flow inside the piping, two extension fittings are supplied in order to adjust the position of the probe.

7. Re-install the tee fitting into the pump assembly.

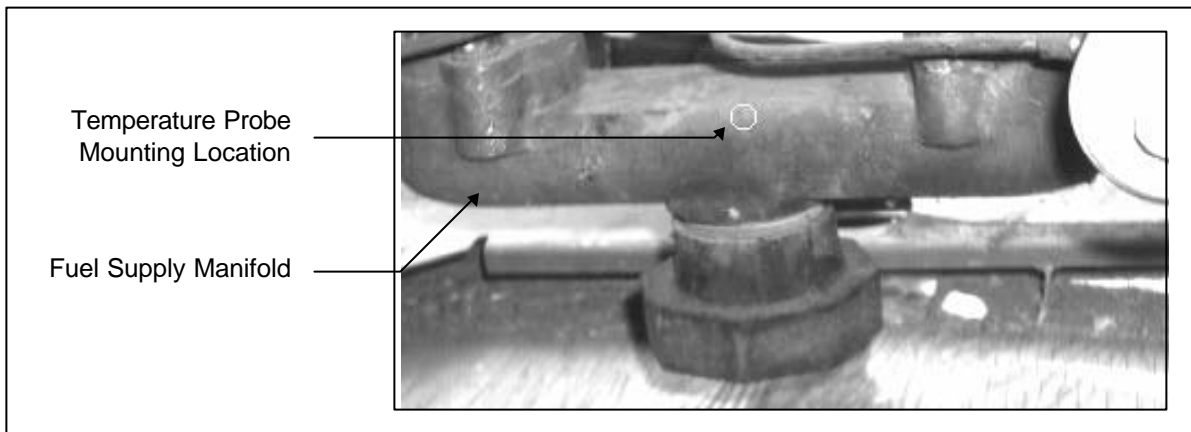
Repeat procedure for each temperature probe

2.2 Component Installation

2.2.1 Temperature Probe Installation

2.2.1.2 Installation in a Dispensing Unit

1. Remove the two lower panels to expose the main pump assemblies.
2. Locate fuel supply manifold at the bottom of each pump.
3. Remove the manifolds.
4. With the manifold mounted securely, drill 1 hole of size Q or 21/64", in the center, and tap for 1/8" NPT. (See Figure 4 for location)



5. Install extension fitting (Part # BC 546) into hole, using sealing compound suitable for use with gasoline.
6. Install the temperature probe into the extension fitting.



SUGGESTION

The temperature probe end should ideally be placed in the center of fuel flow inside the piping, two extension fittings are supplied in order to adjust the position of the probe.

7. Re-install the tee fitting into the pump assembly.

Repeat procedure for each temperature probe

2.2 Component Installation

2.2.2 Test Well Installation

Locations for installation of the thermal test wells may change with different piping. The following instructions give installation procedures for these changes.

2.2.2.1 Installation in the case of having removable ELBOW FITTINGS before the meters:

1. Remove the two lower panels to expose the main pump assembly. (See Figure 5)
2. Locate the meter inlet elbow fittings before each meter. (See Figure 5)
3. Remove the elbows from each section.



CAUTION

Due to the presence of combustible gasses, DO NOT drill probe holes or solder fittings while the pipe is connected to the pump assembly.

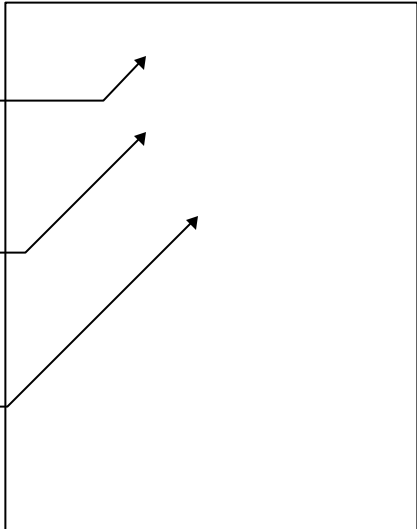
4. With the elbow mounted securely, drill 1 hole of size Q or 21/64", in the outside top of the angle, and tap for 1/8" NPT. (See Figure 5)



Thermal Test Well and
Extension
(Parts # BC 546 & BC 407)

Meter Inlet Elbow

Flange Mounting Bolts



2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.1 *Installation in the case of having removable ELBOW FITTINGS before the meters:*

The following guidelines should also be followed for installing the test well:

- The hole should be drilled so that the extension will be at an angle within 45° of vertical when the extension is installed and assembly is reconnected. This is so that it will hold thermally conductive fluid for measuring purposes.
 - The fitting should provide easy access for insertion of a thermometer.
 - The fitting should be placed in an appropriate position so as not to hinder reinstallation of the assembly.
5. Install the 1/8" NPT test well extension fitting (Part # BC 546) into the newly drilled hole. The inside will be drilled out larger to accommodate the test well (Part # BC 407). (See Figure 5)



ATTENTION

If connection is less than 5 threads, then soldering is required. Any other connections must be made using thread sealing compound suitable for use with gasoline.

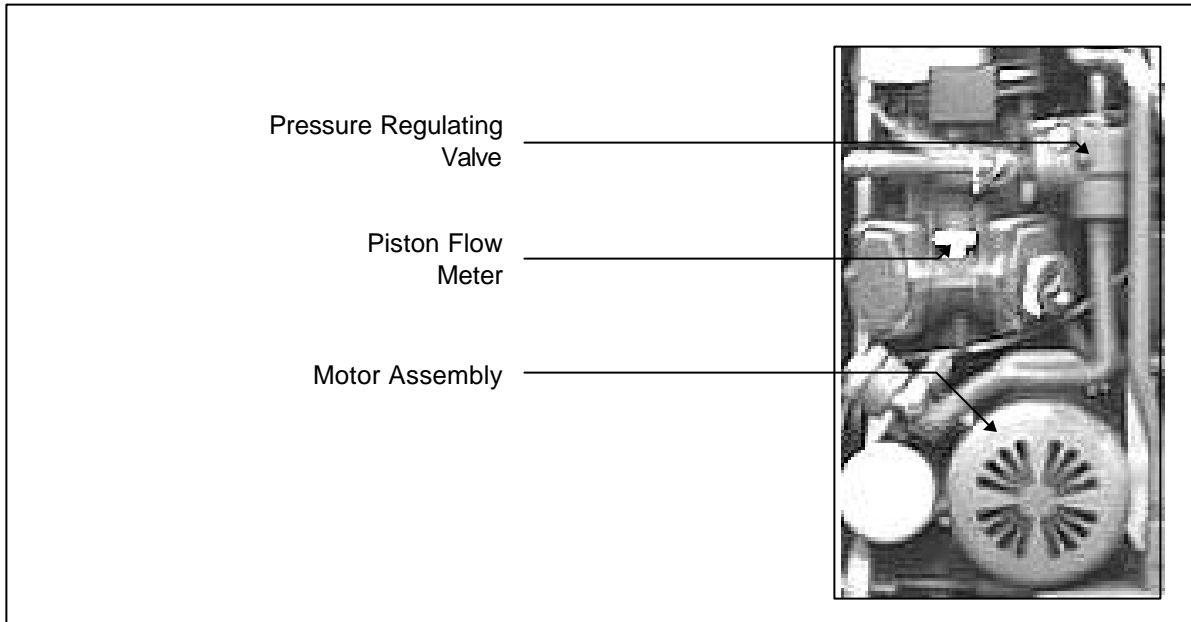
6. Install the test well (Part # BC 407) into the extension fitting (Part # BC 546) and, after tightening, cover with a thermal well plug. (Part # 235-C-2) (See Figure 5)
7. Re-connect the elbow to the meter inlet.
8. Repeat procedure for each test well to be installed.

2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.2 Installation in the case of **PRESSURE REGULATING VALVES** before the meters:

1. Remove the two lower panels to expose the main pump and Pressure Regulating Valve assembly. (See Figure 6)



2. Locate the pressure regulating valve before each meter. (See Figure 6)
3. Remove the valves from each section.



CAUTION

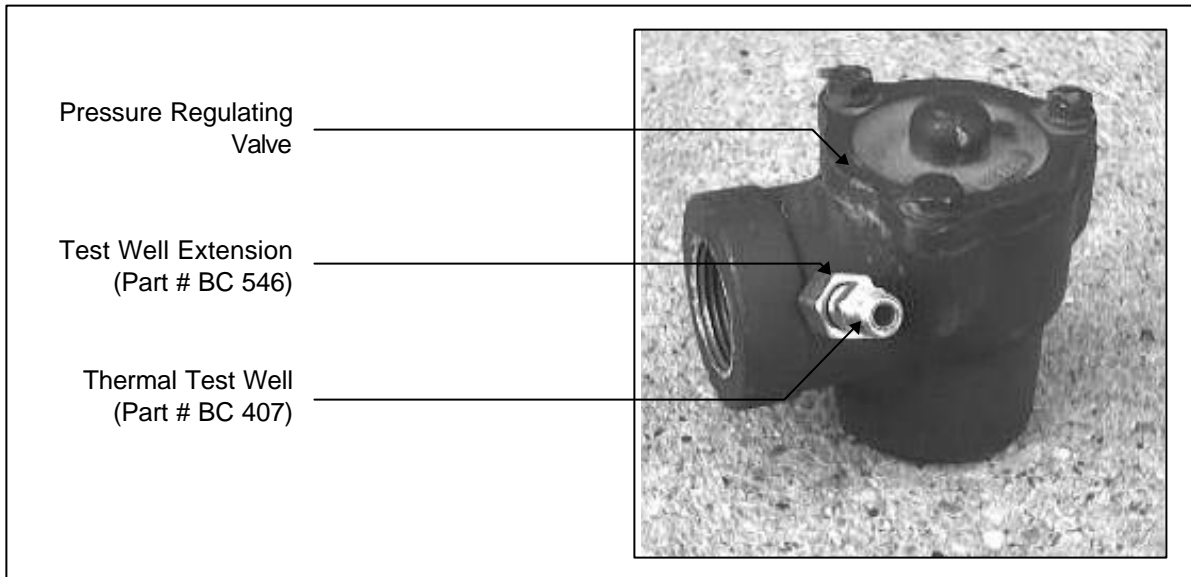
Due to the presence of combustible gasses, DO NOT drill probe holes or solder fittings while the pipe is connected to the pump assembly.

2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.2 Installation in the case of **PRESSURE REGULATING VALVES** before the meters:

4. With the valve mounted securely, drill 1 hole of size Q or 21/64", in the leg that leads to the meter, and tap for 1/8" NPT. (See Figure 7)



The following guidelines should also be followed for installing the test well:

- The hole should be drilled so that the extension will be at an angle within 45° of vertical when the extension is installed and assembly is reconnected. This is so that it will hold thermally conductive fluid for measuring purposes.
 - The fitting should provide easy access for insertion of a thermometer.
 - The fitting should be placed in an appropriate position so as not to hinder reinstallation of the assembly.
5. Install the 1/8" NPT test well extension fitting (Part # BC 546) into the newly drilled hole. The inside will be drilled out larger to accommodate the test well (Part # BC 407). (See Figure 7)

2.2 Component Installation



ATTENTION

2.2.2 Test Well Installation

2.2.2.2 *Installation in the case of PRESSURE REGULATING VALVES before the meters:*

If connection is less than 5 threads, then soldering is required. Any other connections must be made using thread sealing compound suitable for use with gasoline.

6. Install the test well (Part # BC 407) into the extension fitting (Part # BC 546) and, after tightening, cover with a thermal well plug. (Part # 235-C-2) (See Figure 7)
7. Re-connect the completed assembly.
8. Repeat procedure for each test well to be installed.



ATTENTION

Pressure regulating valve assembly operates as a check valve in forward flow cases, and therefore does not alter the temperature of product being measured.

2.2 Component Installation

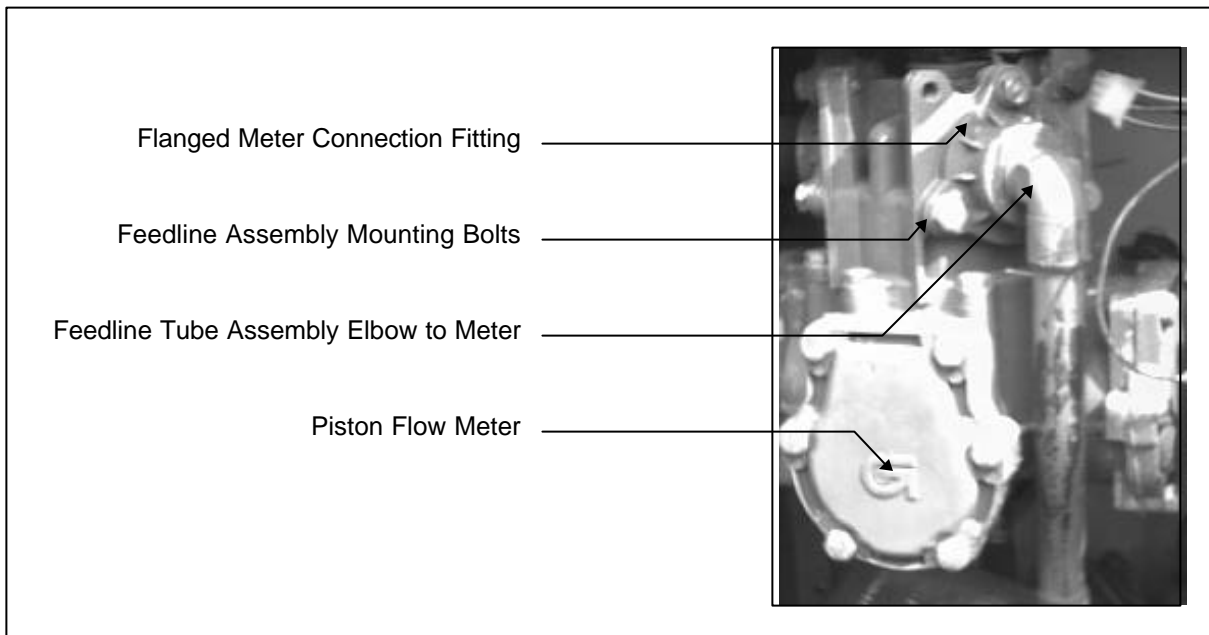
2.2.2 Test Well Installation

2.2.2.3 Installation in the case of FEEDLINE TUBE ASSEMBLIES before the meters:

1. Remove the two lower panels to expose the main pump assembly.
2. Locate the feedline tube assemblies connected to each meter. (See Figures 8)

In order to connect test wells, each complete assembly must be removed as follows:

3. Disconnect the bolts that mount the flanged fitting end of the assembly to the meter, being careful not to damage the O-ring seal between the flange and meter inlet. (See Figure 8)



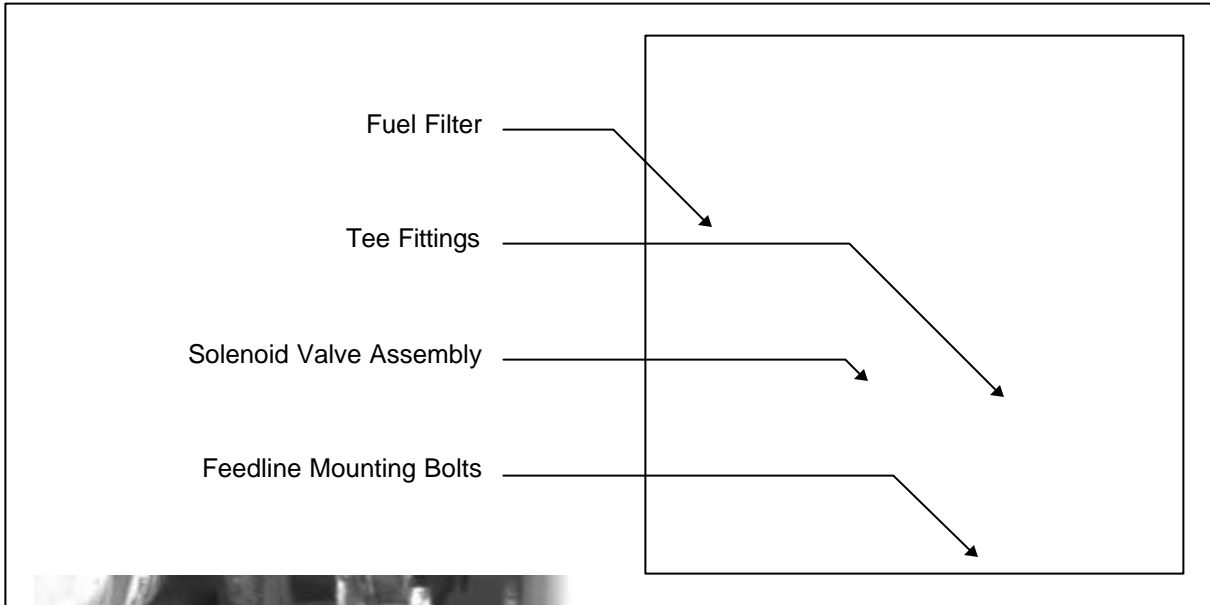
4. Disconnect the tubing from the tee fittings on the solenoid valve assembly. (See Figure 9)
5. Disconnect the bolts mounting the solenoid valve assembly to the pressure regulator. (See Figure 9)

2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.3 Installation in the case of FEEDLINE TUBE ASSEMBLIES before the meters:

6. Remove feedline tube assembly and repeat procedure for each one in the enclosure.





CAUTION

**Due to the presence of combustible gasses,
DO NOT drill probe holes or solder fittings to
parts directly connected to the pump.**

With the feedline assemblies removed:

7. Remove the flanged fitting from the assembly in order that the sealant is not destroyed due to soldering.

2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.3 Installation in the case of FEEDLINE TUBE ASSEMBLIES before the meters:

8. With the pipe section mounted securely, drill 1 hole of size Q or 21/64", in the middle of the elbow that is located just before the meter, and tap for 1/8" NPT. (See Figure 10) The following guidelines should also be followed for installing the test well:
 - The hole should be drilled so that the extension will be at an angle within 45° of vertical when the extension is installed and assembly is reconnected. This is so that it will hold thermally conductive fluid for measuring purposes.
 - The fitting should provide easy access for insertion of a thermometer.
 - The fitting should be placed in an appropriate position so as not to hinder reinstallation of the assembly.
9. Install and silver solder the 1/8" NPT test well extension fitting (Part # BC 546) into the newly drilled hole. The inside will be drilled out larger to accommodate the test well (Part # BC 407). (See Figure 10)



ATTENTION

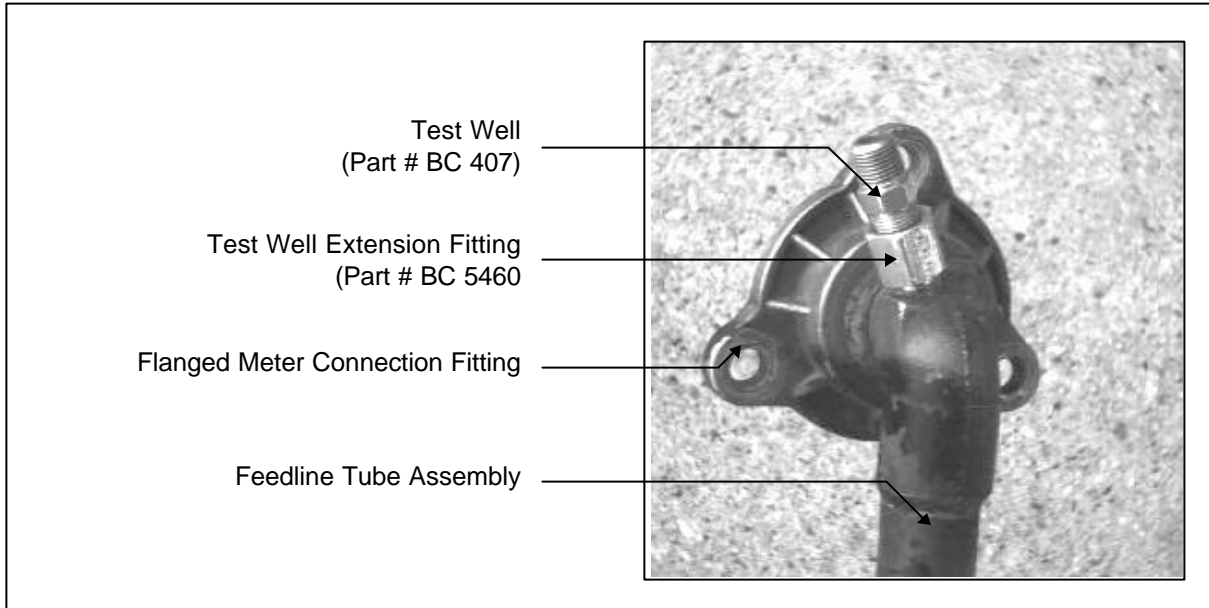
If connection is less than 5 threads, then soldering is required. Any other connections must be made using thread sealing compound suitable for use with gasoline.

10. Install the test well (Part # BC 407) into the extension fitting (Part # BC 546) and, after tightening, cover with a thermal well plug. (Part # 235-C-2) (See Figure 10)

2.2 Component Installation

2.2.2 Test Well Installation

2.2.2.3 Installation in the case of FEEDLINE TUBE ASSEMBLIES before the meters:



11. Re-connect the feedline tube assemblies, by following steps 3 to 7 in reverse order. (Apply new thread sealing when reattaching the flanged fitting and elbow)

2.2 Component Installation

2.2.3 I.S. Barrier and Connector Assembly

1. Remove the lower panels to expose pump assembly.
2. Drill two 5/16" holes through the bottom of the electronics compartment to the left of the lamp ballast and between the fluorescent light enclosures as viewed from the front. (The front, or "A" side, is the side from which the card cage is accessed)
3. Mount I.S. Barriers to the bottom of the pump display head by putting the threaded extension through the newly drilled holes. (I.S.Barrier must be located ABOVE the vapor barrier)
4. Place nut on the threaded extension and tighten.
5. Install the dual probe connector assembly by using one of the bolts holding the product 1 meter to the cross plate.
6. Install the single probe connector assembly by using one of the bolts holding the product 2 meter to the cross plate.
7. Inside the pump enclosure, connect and crimp the wires between the I.S. Barriers and connector assemblies.

Connect the like coloured wires from the dual barrier to the wires from the dual probe connector assembly, and the same for the single barrier and connector assembly. (See Diagram 2, Section 3.1.2)

8. Connect the probes from products 1 & 2 to the dual probe connector assembly.
9. Connect the probe from product 3 to the single probe connector assembly.
10. Connect and crimp the remaining wires leading from the I.S. Barriers to the loose wired end of the ATC Board wiring harness. (Part # W173) Wiring detail is shown in Connection Diagram 2.
11. Run wiring harness through partition and into the ATC Control Board mounting area. (See Figure 1)



ATTENTION

Ground wire connection is critical for safe operation of the equipment.

12. Connect the ground wire (Green #20 AWG) from the ATC I.S. Barriers to the same ground connection for the pulsers, I.S. Barriers and handle switches for the pump.

2.2 Component Installation

2.2.4 Adapter Board Connection

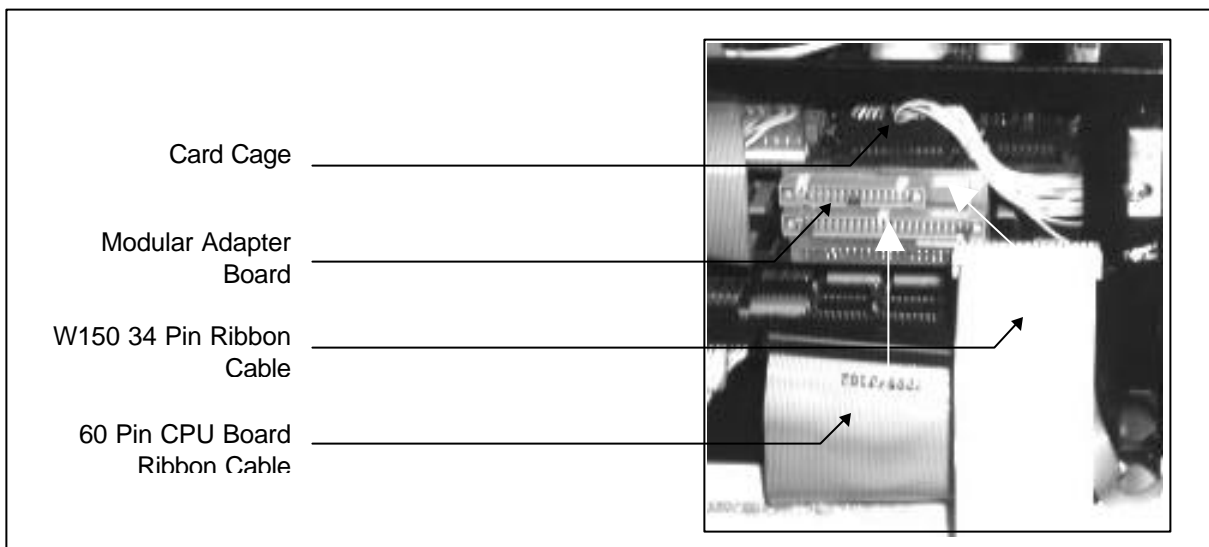
1. Open MPD front panel and lock in the upright position. (See Figure 1)
2. Detach the 60 Pin Ribbon Cable from CPU Board (middle board) in the card cage. (See Figure 11)
3. Attach the Modular Adapter Board (Part #SKIL-428) to the CPU Board on the connector to which the cable was attached.



ATTENTION

Be sure connecting pins are centered and not offset.

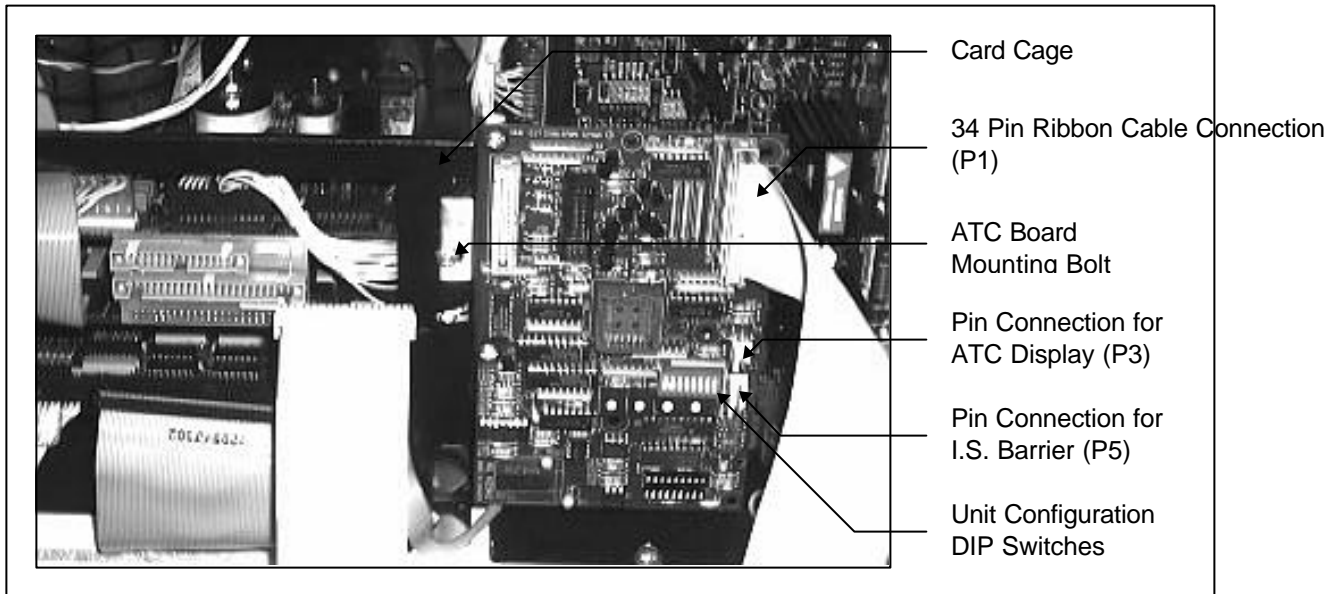
4. Re-attach Ribbon Cable in 60 pin receptacle on Modular Adapter board.
5. Attach Ribbon Cable W150 to the remaining 34 Pin, upper receptacle on the Adapter Board, then run to area where ATC board will be mounted. (See Figure 11)



2.2 Component Installation

2.2.5 ATC Board Installation

1. Open front panel of MPD (If not already done). (See Figure 1)
2. Locate and loosen the mounting bolt on the right hand side of the Card Cage. (See Figure 12)
3. Insert bracket end of ATC board between the bolt and the card retainer, then tighten.
4. Connect the wire harness from the I.S. Barrier (Part # W173) to the connector P5 on the ATC board.



5. Connect the 34 Pin Ribbon Cable (Part # W150), already attached to the modular adapter board, to connector P1 on the upper right hand side of the ATC board.

2.2 Component Installation

2.2.6 ATC Display Board Installation

1. Remove backing paper to expose adhesive strips.
2. Position the display board inside the front cover of the Main Unit and adhere firmly, making sure the display is visible when enclosure is opened. (See Figure 1 for placement)



SUGGESTION

Place the ATC board as close as possible to the operator keypad.

3. Attach the wire harness (Part # W151) from ATC Display to connector P3 on middle right hand side of the ATC Board.

2.3 Post Installation

2.3.1 Post Installation Check

If components have been installed as per the previous instructions and pump has been re-assembled, power can be restored.

The following operations should now be verified:

- Sales displays are operational.
- ATC display is operational. (Display may be blank until handle switches are thrown) If display is not operating, check to see if power is being sent from the CPU board to the ATC Board by measuring for +5 VDC on the ribbon connector P3. Signal can be measured across pins 1 & 3.

or,

Move the slide switches on the display board.



ATTENTION

If error messages are flashing on the price displays, reset them by removing AC power and re-applying fuse at bottom left.

2.3 Post Installation

2.3.2 ATC Display Board Functions

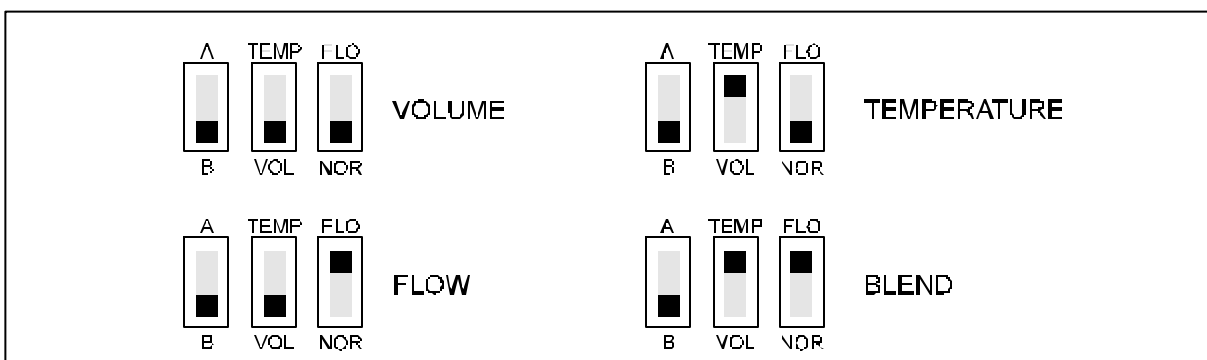
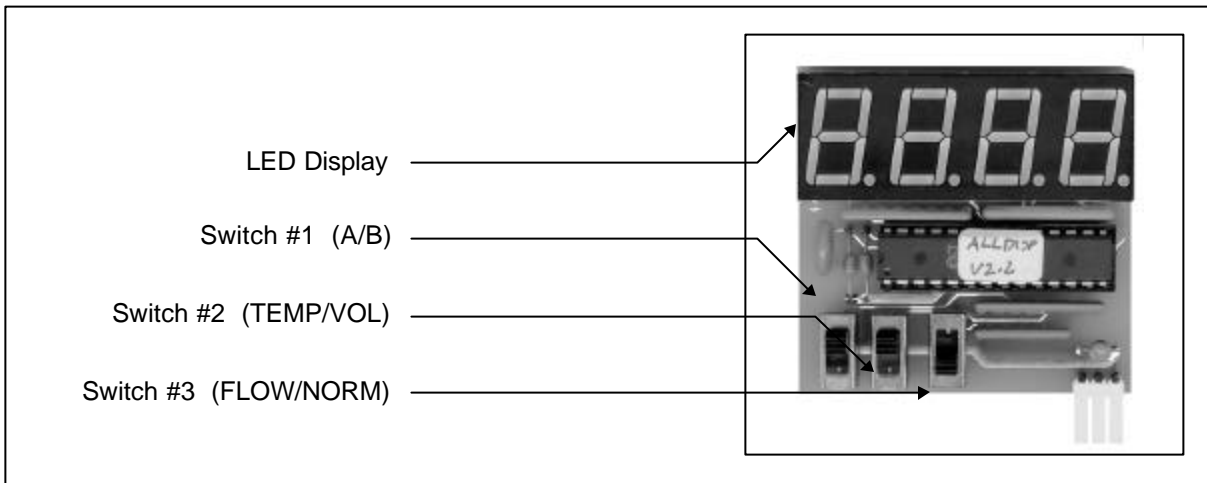
The three switches on the board (See Figures 13 & 14) determine what information is displayed.

SWITCH 1 A/B Selects the temperature and uncompensated volume reading for either **A side** or **B side**.

SWITCH 2 TEMP/VOL Selects between the product **temperature** and uncorrected **volume** of product. (In normal mode)

SWITCH 3 FLOW/NORM Selects between having the **flowrate** or the **temperature and volume** (as above) of a product displayed.

Note: The NORM position may be labeled BLEND.



Error Messages

Error message will alternate at 1 second intervals with the information selected by the switches.

A-d	A/D Converter Error
Prob	Probe Error
PULS	Pulser Error

The priority of errors is as shown above. That is, if there is both a probe and pulser error, only a probe error is reported.

Status Messages

Will show for 1 second when handle switch is turned on. Must be in normal mode.

With **TEMP** switch selected:

re1.5 Software Revision Number for the ATC Main Board Controller.

With **VOL** switch selected:

gas	Shows product type is gasoline
desl	Shows product type is diesel
OFF	ATC Compensation is disabled

2.3 Post Installation

2.3.4 Probe Connection Verification

With the dispenser ready to be tested:

1. Make sure power is applied to the unit.
2. Ensure that ATC is ON (DIP switch #8 is ON).
3. Initialize the system as per the Gilbarco pump requirements.
4. Run a delivery into a test can.

The ratio of the net volume on the dispenser and the gross volume on the ATC display should be the correct VCF (Volume Correction Factor) for the temperature displayed and the product selected.

5. Unplug the temperature probe for the product being delivered.

The pump should stop, and the status on the ATC display should indicate a temperature probe failure.

6. Repeat the test procedure for each hose.

2.3 Post Installation

2.3.5 Enabling ATC Function

When the meters are calibrated in a pump with ATC enabled, it will be necessary to use the gross volume reading from the mechanical counter or ATC display. The temperature compensated volume on the pump display cannot be used for this purpose.



ATTENTION

Before the dispenser can be used in trade, in the ATC mode, it must be inspected and approved by Weights and Measures Canada.

The ATC function must be disabled with DIP switch #8 set to OFF until the pump is inspected.

Once the inspector approves the pump, the B256B "VOLUME CORRECTED TO 15°C" labels should then be applied to the faceplates adjacent to the volume displays, and the plate with the AV number must be applied to the side of the dispenser.

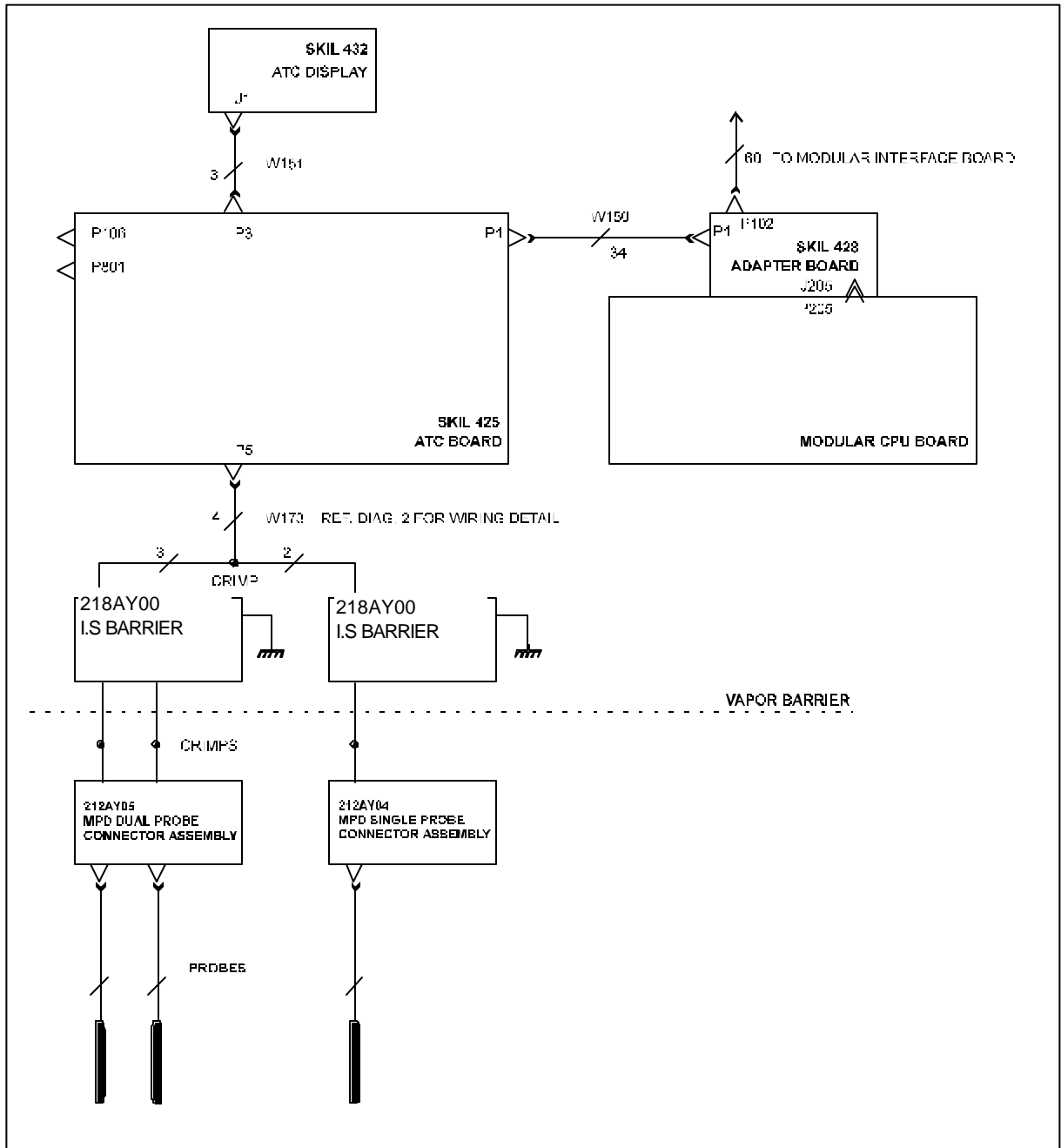
Failure to do so could result in the station being closed down by Weights and Measures inspectors.

3.1 Components

3.1.1 Connection Diagrams

3.1.1.1 General Connection Detail

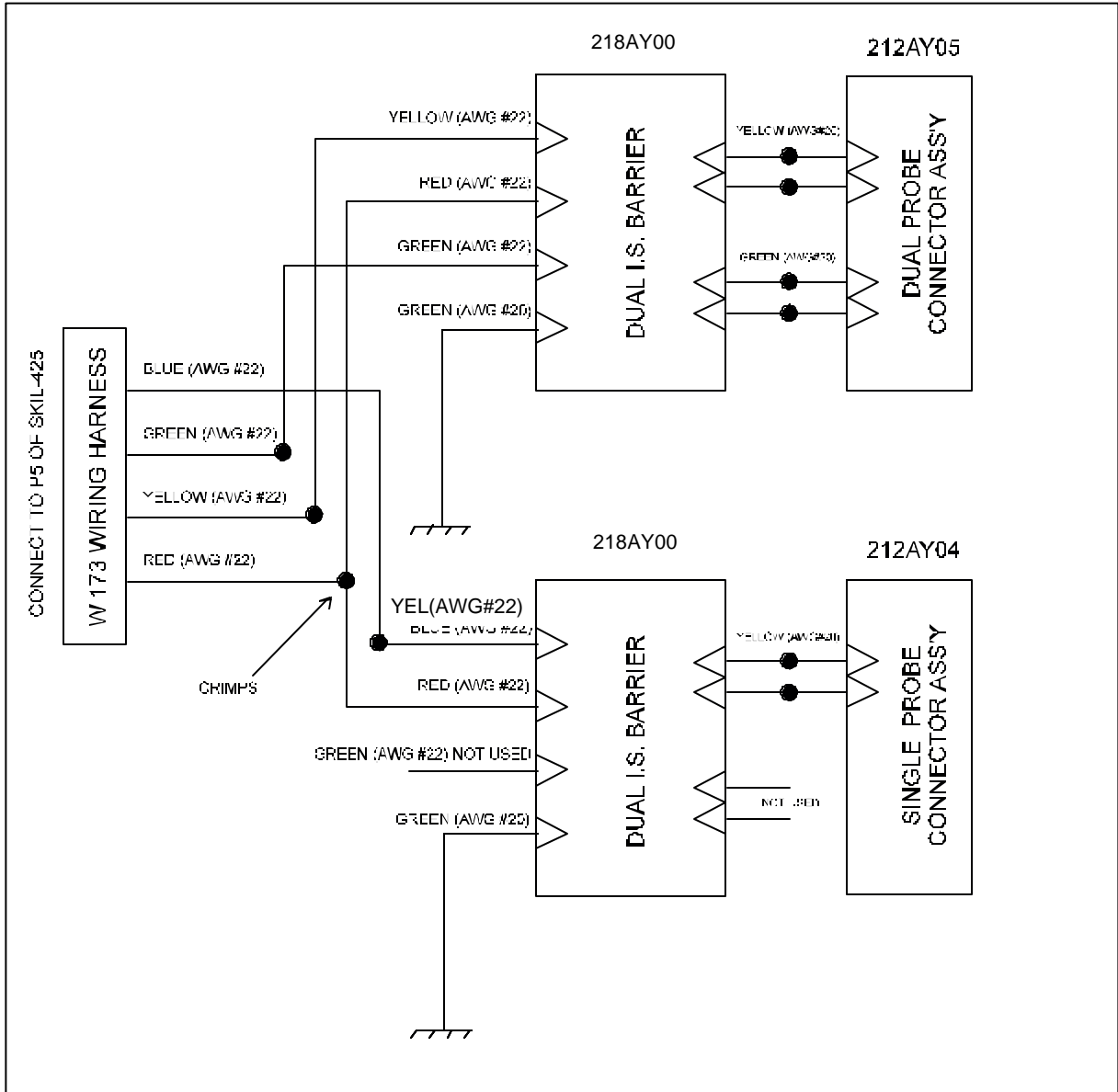
The following diagram shows overall connections for the GTC 200-3M.



3.1 Components

3.1.1 Connection Diagrams

3.1.1.1 W173 Harness Wiring Detail



3.1 Components

3.1.2 List of Components

3.1.2.1 GTC 200-3M

The following is an itemized account of parts supplied to complete an ATC installation for the GTC 200-3M:

Table 2	Parts List
GILBARCO MPD Dispenser ATC Kit	GTC 200-3M

QTY	PART #	DESCRIPTION
1	SKIL-425	ATC BOARD
1	BC 1060	SEAL COVER
4	LCBS-4N	PC BOARD MOUNTS FOR Z80 MPD
2	218AY00	DUAL INTRINSIC SAFETY BARRIER
1	212AY04	MPD SINGLE PROBE CONNECTOR ASSEMBLY
1	212AY05	MPD DUAL PROBE CONNECTOR ASSEMBLY
1	W173	5 PIN 4 WIRE HARNESS FOR I.S. BARRIER
3	W199	TEMPERATURE PROBES
6	BC407	THERMAL WELLS
6	120B 02X02	EXTENSION FITTINGS
6	235-C	THERMAL WELL PLUGS
1	SKIL-446	ATC DISPLAY BOARD
2	BC256B	BLACK "VOLUME CORRECTED TO 15 C" LABELS
1	BC1058	DWG #4559 SERIALIZED NAMEPLATE
15		18-22 AWG CRIMP SPLICES
1	W189	3 WIRE ATC DISPLAY HARNESS
6	BC 546	120-B 1/8" NPT ADAPTER DRILLED OUT TO 17/64" I.D.
1	212KT06.INS	GTC 200-3M INSTALLATION MANUAL