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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 the non-observance of the safety warnings.

1.1.3 Service and Product Support

Should you experience any difficulties in system operation, 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 (i.e. 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 function:

ATC Board

Takes the signals from the temperature probe and flow meter, compensates for temperature deviation from 15 ^{o}C (59 ^{o}F), then sends the compensated signal back to the main processor board.

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 voltage signal that is sent to the ATC board, via the I.S. Barrier.

Thermal Test Well

Provides a mechanical-thermal connection to accommodate a remote temperature probe, for calibration purposes, to give a true reading of product temperature.

Probe Connector Assembly

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

2.1 Pre-Installation

2.1.1 Site Preparation

CAUTION

The following is a list of precautions that should be followed before installation of this product. Failure to do so could result in serious personal injury!

- 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

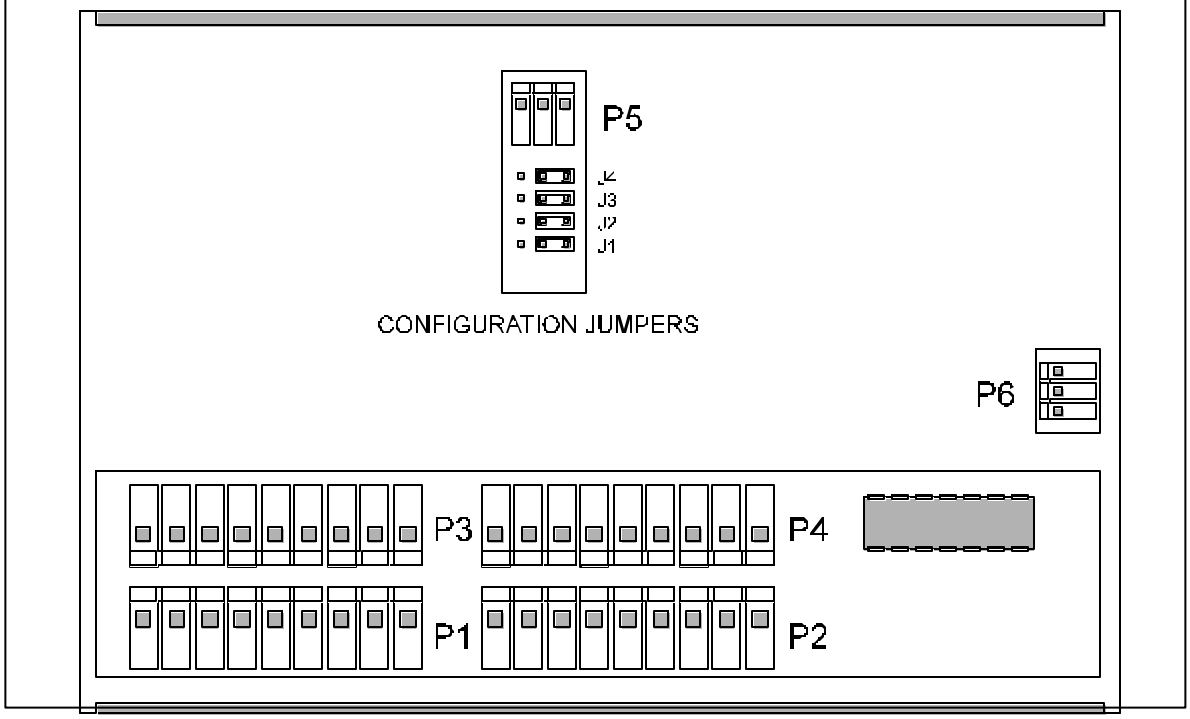
ATTENTION

The following points should be taken into consideration before installing this product:

- Any electrical installation should be carried out by a registered electrician.
- Any fuel 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.

Before the BTC100 unit can be installed, it must first be configured for the type of application it is to control. This is accomplished by positioning the jumper plugs on the circuit board as seen in Figure 1 below:

Figure 1 BTC100 Board Layout



Options for configuration can be set in accordance with Table 1 as follows: (The factory setting is for use with gasoline on both sides)

Table 1 ATC Board Jumper Settings BTC100

JUMPER#	OPTION	SWITCH POSITION
1	Selects whether product 1 is gasoline or diesel	RIGHT = GAS
2	Selects whether product 2 is gasoline or diesel	RIGHT = GAS
3	Selects whether temperature compensation is enabled or disabled	LEFT = ENABLED
4	1 or 2 Temperature probes	LEFT = 2 PROBES

2.2 Component Installation

2.2.1 Test Well and Temperature Probes

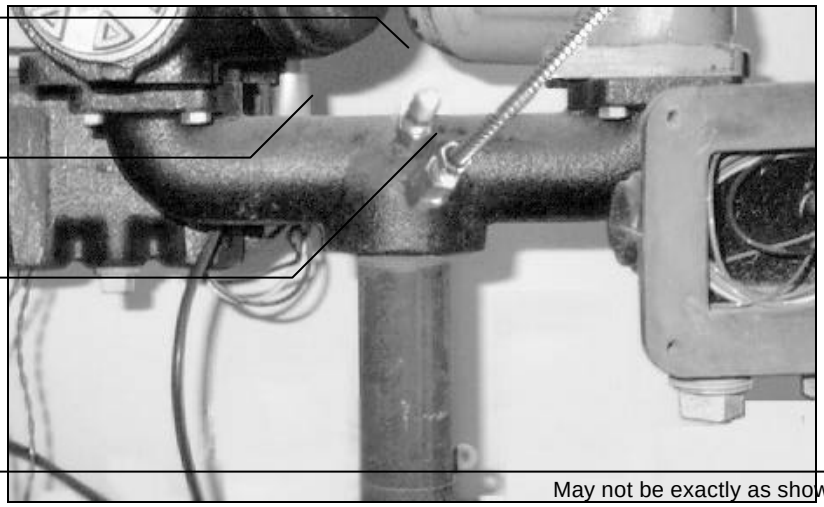
2.2.1.1 In a Single Product Dispenser

CAUTION

Before components can be installed, power MUST be shut off to the dispenser.

1. Remove the lower panels.
2. Locate the single product supply manifold. (See Figure 2).
3. Remove manifold from pump assembly.

Figure 2 Single Product Supply Manifold



May not be exactly as shown

CAUTION

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

2.2 Component Installation

2.2.1 Test Well and Temperature Probes

2.2.1.1 In a Single Product Dispenser (Cont'd)

4. With the manifold mounted securely, drill two holes of size Q (0.332") and tap for 1/8" NPT, male thread. Holes should be located near the center of the manifold, common to both meters.

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

- The hole should be drilled so that the well will be at an angle within 45^{o} of vertical when installed and manifold is reconnected. This is so that it will hold thermally conductive fluid for measuring purposes.

- The fittings 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.

ATTENTION

If a probe is for two hoses, the probe and test well must be in a portion of the flow which is common to both hoses.

5. Install temperature probe and extension fitting.

ATTENTION

Any connections must be made using thread sealing compound suitable for use with gasoline. Any connections having less than five (5) threads should be soldered.

6. Install test well into the manifold and, after tightening, cover with a plug (provided).

7. Re-connect manifold to pump assembly.

ATTENTION

Before reconnecting manifold, it must be cleaned thoroughly to prevent drill cuttings from entering the dispensing system.

2.2 Component Installation

2.2.1 Test Well and Temperature Probes

2.2.1.2 In a Dual Product Dispenser

CAUTION

Before components can be installed, power MUST be shut off to the dispenser.

1. Remove lower panels.

2. Locate the product supply lines. The supply lines should be similar to that of the single product dispenser (See previous section).

3. Remove the section of pipe, from each product supply line, that is most suitable for installation of the temperature probes and thermal test wells.

CAUTION

Due to the presence of combustible gasses, DO NOT drill holes or solder fittings to parts directly connected to any piping.

4. With the pipe section mounted securely, drill two holes of size Q (0.332") and tap for 1/8" NPT. The following guidelines should also be followed for installing the test well and probe fittings:

- The hole should be drilled so that the well will be at an angle within 45^{o} of vertical when installed. This is so that it will hold thermally conductive fluid for measuring purposes.

- The fittings should provide easy access for insertion of a thermometer.

- The fitting should be placed so as not to hinder reinstallation of the assembly.

2.2 Component Installation

2.2.1 Test Well and Temperature Probes

2.2.1.2 In a Dual Product Dispenser (Cont'd)

ATTENTION

Any connections must be made using thread sealing compound suitable for use with gasoline. Any connections having less than five (5) threads should be soldered.

5. Install the temperature probe and extension fitting.
6. Install the test well into the extension fitting and, after tightening, cover with the supplied plug.
7. Reconnect pipe section to pump assembly.

ATTENTION

Before reconnecting, make sure pipe section is thoroughly cleaned to prevent drill cuttings from entering the dispensing system.

2.2 Component Installation

2.2.2 I.S. Barrier Installation

1. Remove the front cover to expose the inside of the pump electronics enclosure.

2. Remove the hose retractor section in order to mount the I.S. Barrier.

3. Drill a 3/8” hole through the support tubing and insert the threaded extension of the I.S. Barrier (See Figure 3) *Note: The I.S. Barrier must be mounted inside the vapor barrier*.

4. Tighten the I.S. Barrier into place using the supplied hex nut and aluminum washer.

5. Connect the three short wires extending from the epoxy side of the I.S. barrier to the three wires of the W78 harness by matching the like coloured wires, using crimp on wire connectors.

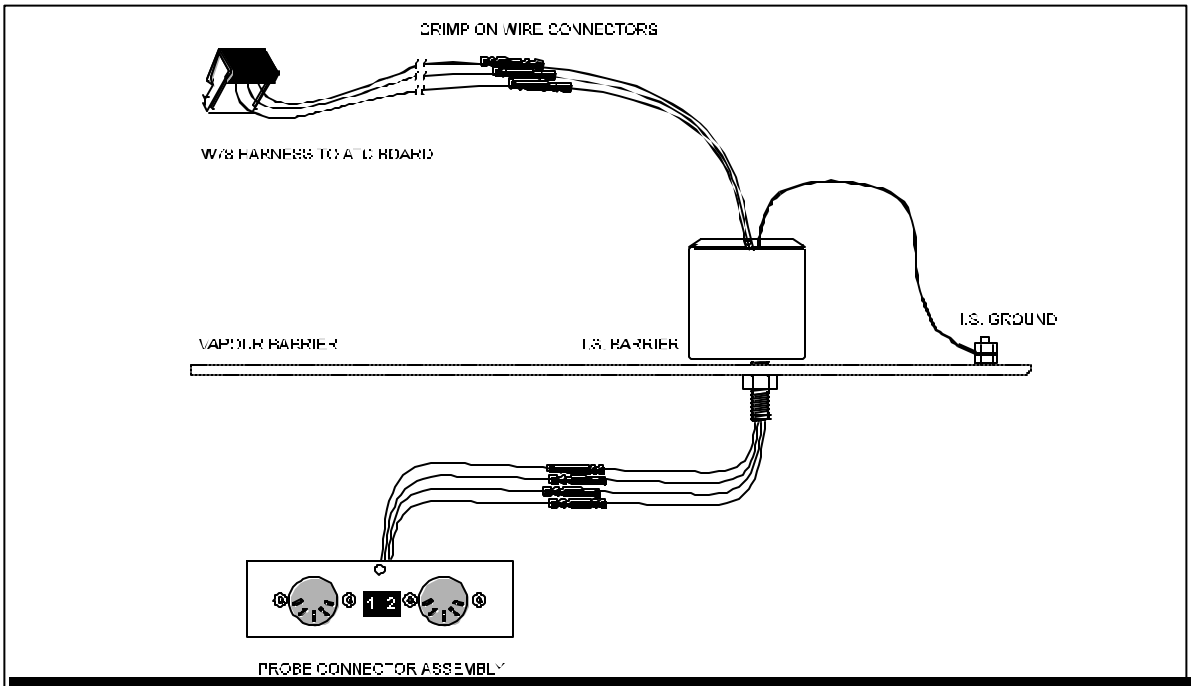


Figure 3 I.S. Barrier Installation

ATTENTION

Connections made using crimp on wire connectors is a Weights and Measures requirement to make the connection tamper resistant.

5. Connect the intrinsic safety barrier ground (20 AWG green wire) to the grounding stud.

2.2 Component Installation

2.2.3 Probe Connector Assembly Installation

1. Remove the covers from the lower enclosure.

2. Find a suitable mounting location to attach the probe connector assembly bracket (mounting bracket can accommodate bolt up to 5/16”).

3. Connect the wires from the probe connector to the like coloured wires from the I.S. barrier using the supplied crimp on wire connectors. (See Figure 3)

ATTENTION

Connections made using crimp on wire connectors is a Weights and Measures requirement to make the connection tamper resistant.

4. Plug the temperature probe plugs into the appropriate jacks on the probe connector assembly.

5. Coil and suitably fasten the armoured cable to take up the excess, as well as to prevent the weight of the cables from pulling on the plugs.

2.2 Component Installation

2.2.4 Installation of the BTC100 ATC Board

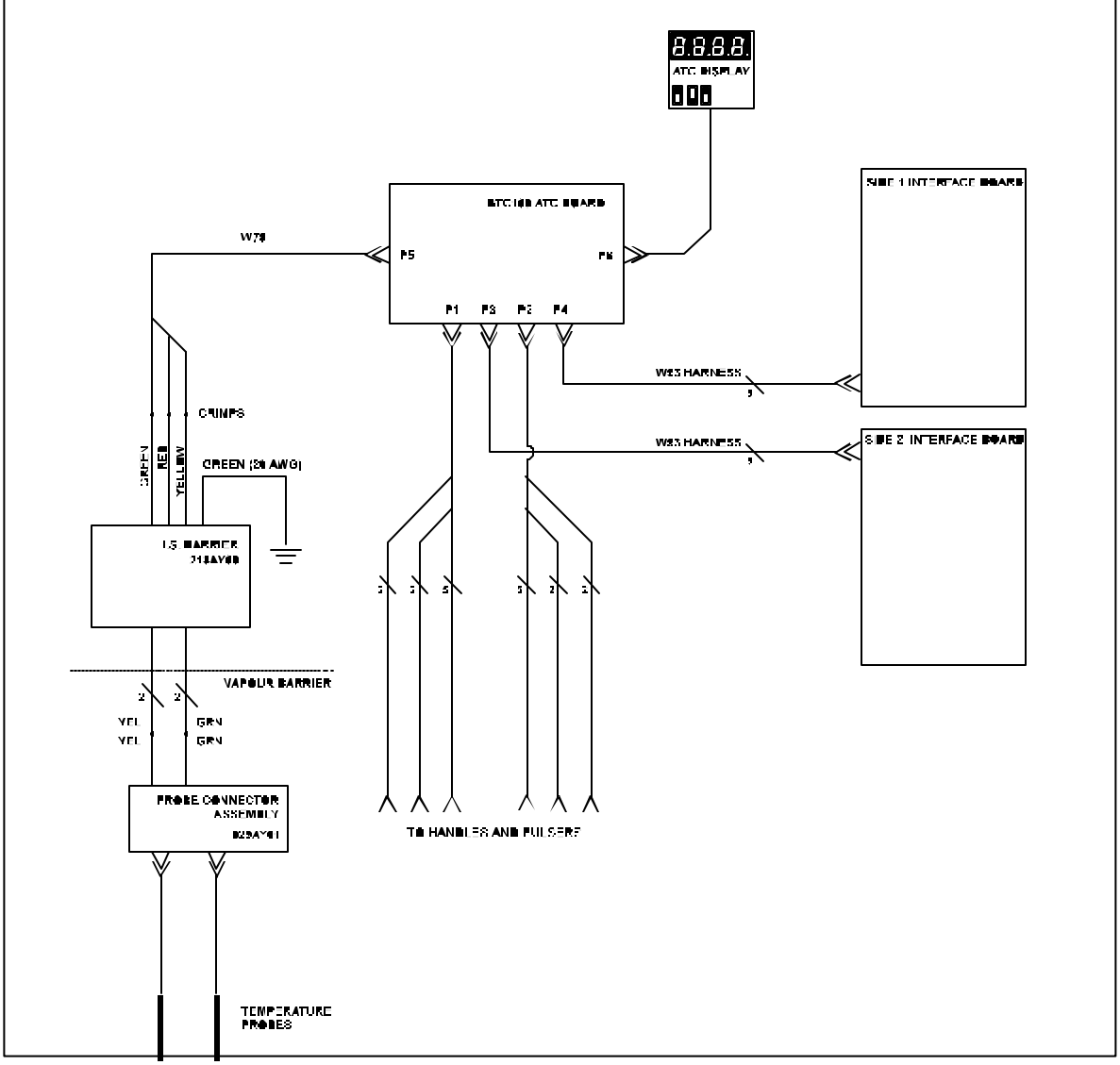
ATTENTION

Make sure the unit is configured for the type of application it is to control. Refer 2.1.3

1. Remove the 9 pin plug from the side 1 interface board and connect to P1 of the ATC board. (See Figure 4)

2. Connect one of the W93 wiring harnesses between P3 of the BTC100 board and the Side 1 interface board.

Figure 4 ATC Board Connections



2.2 Component Installation

2.2.4 Installation of the BTC100 ATC Board (Cont'd)

3. Remove the 9 pin plug from the side 2 interface board and connect it to P2 of the BTC100 board.

4. Connect the other W93 wiring harness between P4 of the BTC100 board and the side 2 interface board.

5. Connect the plug end of the W78 harness from the I.S. Barrier to P5 of the BTC100 board.

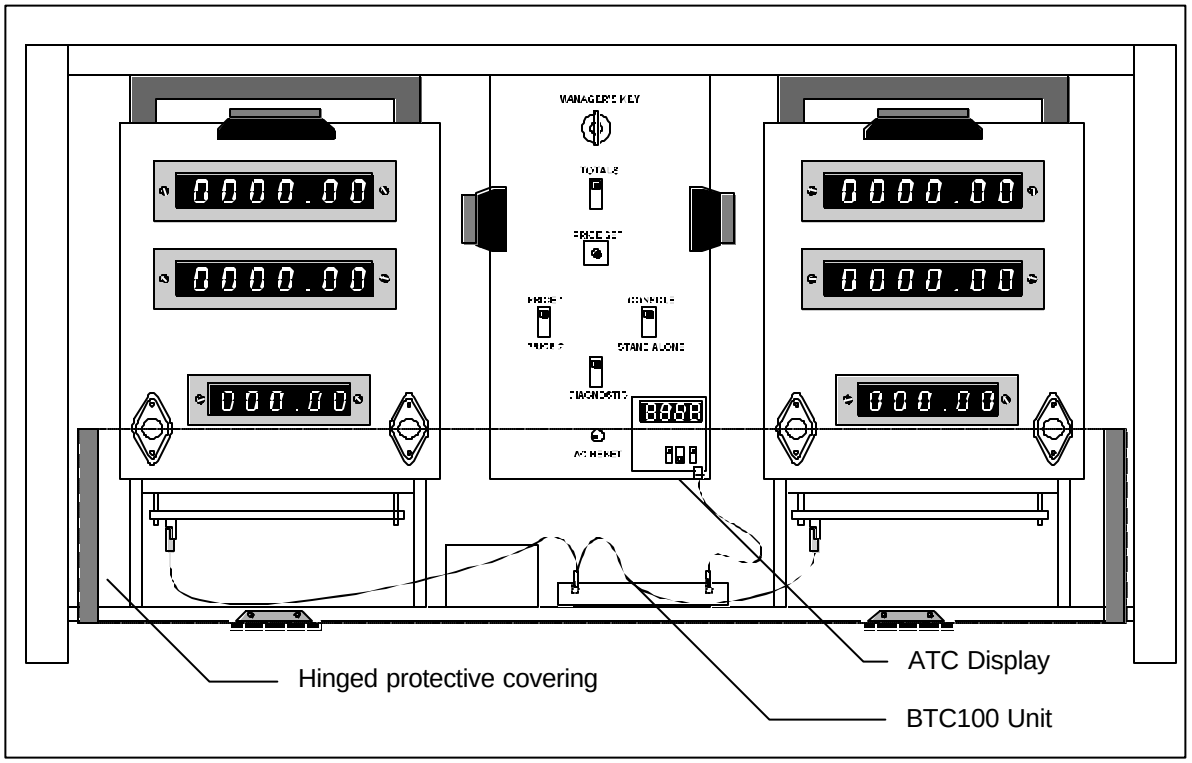
6. Connect one end of the 3 pin ATC display wiring harness (W151) to P6 of the BTC100 board.

7. Remove the paper backing from the ATC display board and adhere to the lower right hand corner of the pump configuration board (See Figure 5). (*Position the display board where it can be read when the covering is in the closed position*)

8. Connect the other end of the ATC display wiring harness (W151) to the 3 pin connector on the display board.

9. Remove the paper backing from the BTC100 board assembly and adhere the unit into place in the area between the two interface boards (See Figure 5).

Figure 5 Placement **BTC100 and ATC Display Board**



2.2 Component Installation

2.2.5 ATC Display Board Functions

The three switches on the board (See Figures 6 & 7) determine what information is displayed.

SWITCH 1	A/B	Selects the temperature and uncompensated volume reading for either **Side 1 or Side 2**.
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 labelled BLEND.

Figure 6 ATC Display Board

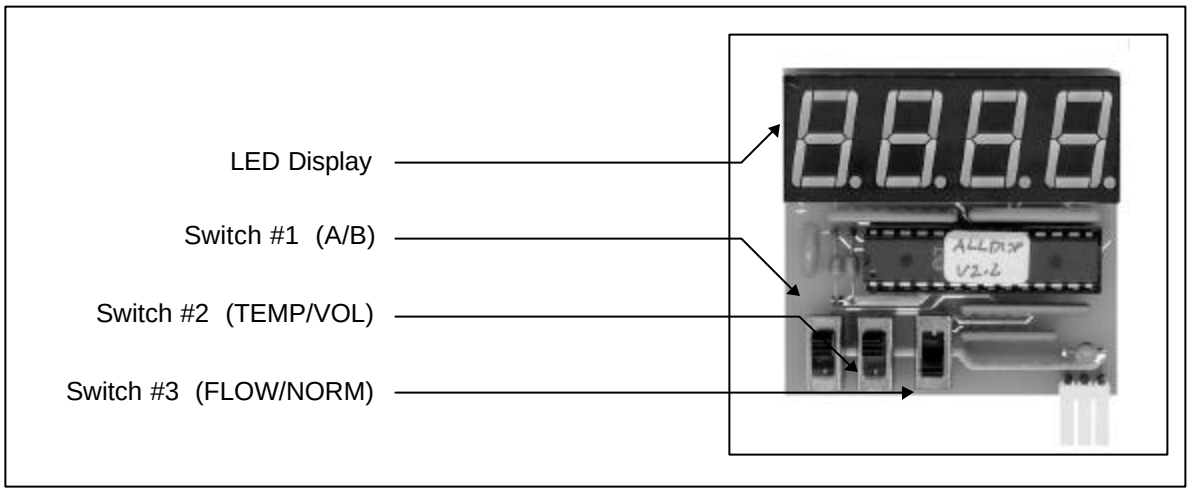
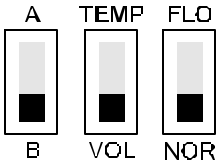
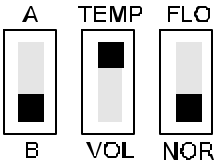


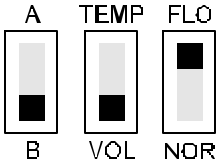
Figure 7 ATC Display Switch Settings



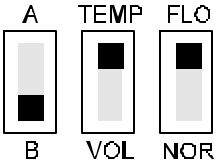
VOLUME



TEMPERATURE



FLOW



BLEND

2.2.5 ATC Display Board Functions (Cont'd)

Error Messages

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

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

2.3.1 Post Installation Check

Once the ATC system has been installed as per the previous instructions, and the pump has been re-assembled, power can be restored.

The following operations should now be verified:

- Sales displays are operational. (The pulser error code may be flashing on the price display)
- 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 Main Processing board to the ATC Board.

ATTENTION

If error messages are flashing on the price displays, reset them with the handle switches.

2.3 Installation Check

2.3.2 Probe Connection Verification

With the dispenser ready to be tested:

1. Ensure sure power is applied to the unit.
2. Ensure ATC is ON (Jumper #3 is set left)
3. Initialize the system as per the Bennett pump requirements.
4. Set the ATC display to show volume for the side being tested.
5. 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.

6. Now 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.

7. Repeat the test procedure for each hose.

2.3 Post Installation

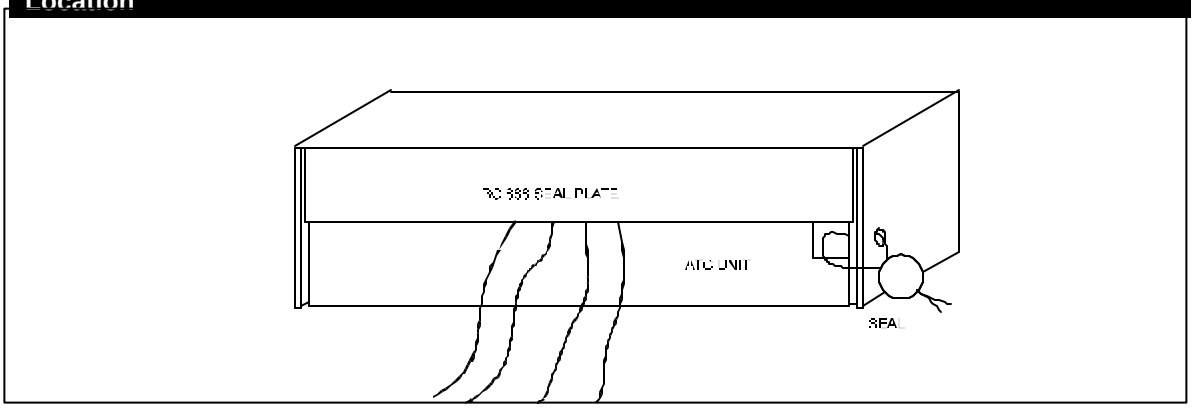
2.3.3 Enabling ATC Function

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

The ATC function must be disabled with the appropriate jumper plug until the pump is inspected.

Once the pump has been approved by the inspector, JP1 should be positioned to enable the ATC function. The BC686 seal plate should also be installed over the BTC100 so that the inspector can seal the unit as shown in Figure 8.

Figure 8 Plate Mounting Location



The BC256B "VOLUME CORRECTED TO 15° C" labels must then be applied to the faceplates adjacent to the volume displays, and the plate with the S.WA number must be applied to the side of the dispenser.

2.3.4 Meter Calibration

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

3.1 Components

3.1.1 List of Components

The following is a list of components supplied for installation of ATC in a Bennett 6000:

Table 2 List of Components

Bennett 6000 ATC

QTY	PART #	DESCRIPTION
1	BTC 100	ATC BOARD AND CASE ASSEMBLY
1	BC686	SEAL COVER
1	218AY00	DUAL INSTRINSIC SAFETY BARRIER
1		5/16" HEX NUT
1		5/16" FLAT WASHER
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY (FOR SINGLE UNITS)
1	W 78	3 PIN WIRE HARNESS FOR I.S. BARRIER
2*	W 199	TEMPERATURE PROBES
2*	SBC 407	THERMAL WELL KITS
4*	120B 02 X 02	EXTENSION FITTINGS
2	W93	9 WIRE HARNESS
1	SKIL-446	ATC DISPLAY BOARD
4	BC256B	BLACK "VOLUME CORRECTED TO 15^{O}C" LABEL
1	BC1328	AV2314 SERIALIZED W&M NAMEPLATE
10		18-22 AWG CRIMP SPLICES
1	W151	3 WIRE ATC DISPLAY HARNESS
2*	BC546	120B 1/8" NPT ADAPTERS DRILLED OUT TO 17/64" I.D.
1	228AY00.INS	BTC100 BENNETT 6000 DISPENSER INST. MANUAL

***** Quantity different for single product dispensers.