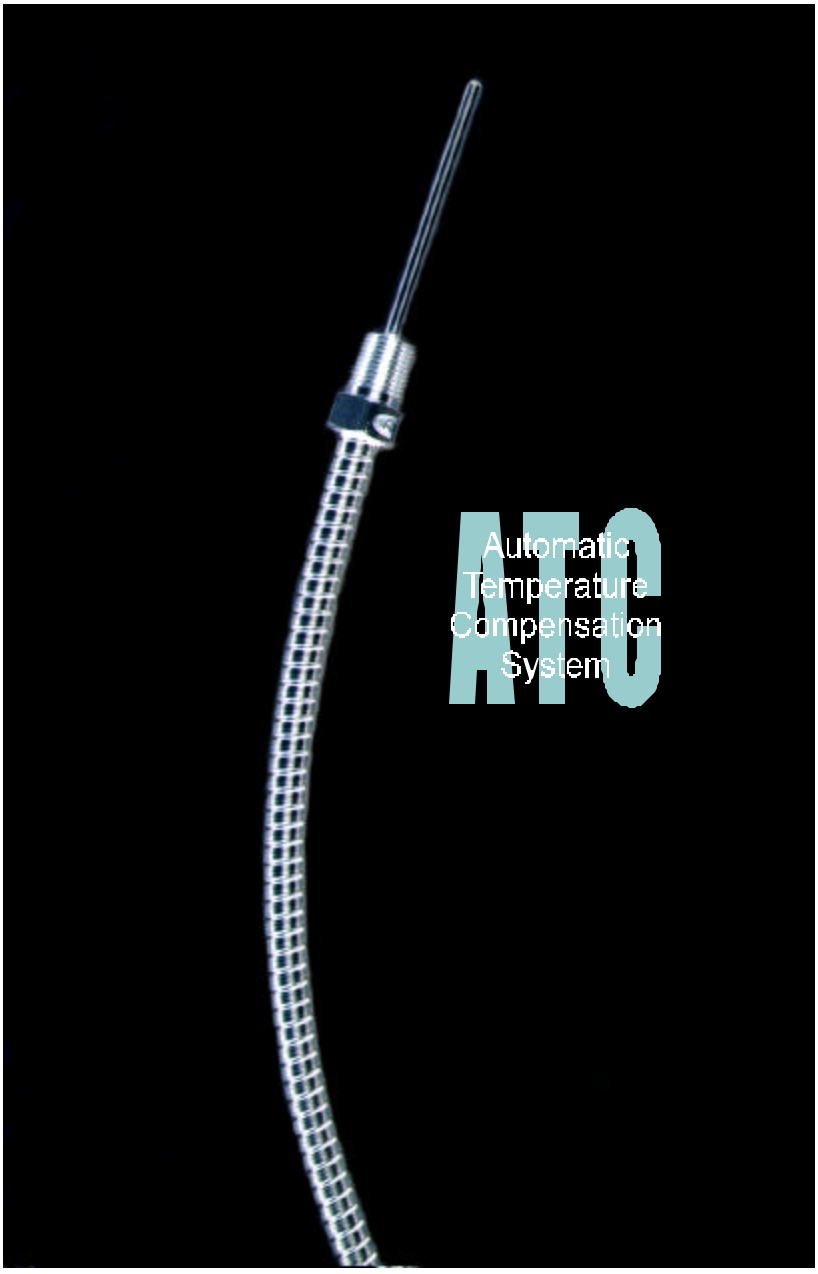
IN CONSTANT PURSUIT OF EXCELLENCE

Kraus Group Inc.

An RNG Company



223KT00.INS R04

Installation Manual

BENNETT 7/8/9000 SERIES – B9K 100

Table of Contents

1.1 Introduction

1.1.1 About This Manual

This manual introduces the installation and operation 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, 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°C (59°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 secure electrical connection between the temperature probe(s) and I.S. Barrier.

Inspector's Switch for 92D electronics

Enables inspector to view ATC functions through the dispenser's display system.

ATC Display Board for 82D Electronics and 8000

Enables inspector to view ATC functions through the supplied display.

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.

2.1 Pre-Installation

2.1.3 Unit Configuration

Before the ATC board can be installed, it must be configured for the particular application it is to control. This is accomplished by positioning the DIP switches, located on the circuit board.

Options for configuration can be set in accordance with the table below:

B9K 100 UNIT CONFIGURATION (DIP SWITCH SETTINGS)

SWITCH	OPTION	POSITION
1-4	Selects whether product is diesel or gasoline	ON = Diesel OFF = Gas (prod A-D)
5	Selects whether or not blender option is enabled	ON = Blender OFF = Non Blender
6	Selects 1000 or 1024 Pulse Edges per Unit	ON = Incount = 1024 (Horizon Pulser) OFF = Incount = 1000 (Standard)
7	Selects electronics type	ON = 92D OFF = 82D or 8000
8	Selects whether or not ATC is enabled	ON = ATC enabled OFF = ATC disabled

Figure 1 **ATC Board Layout**

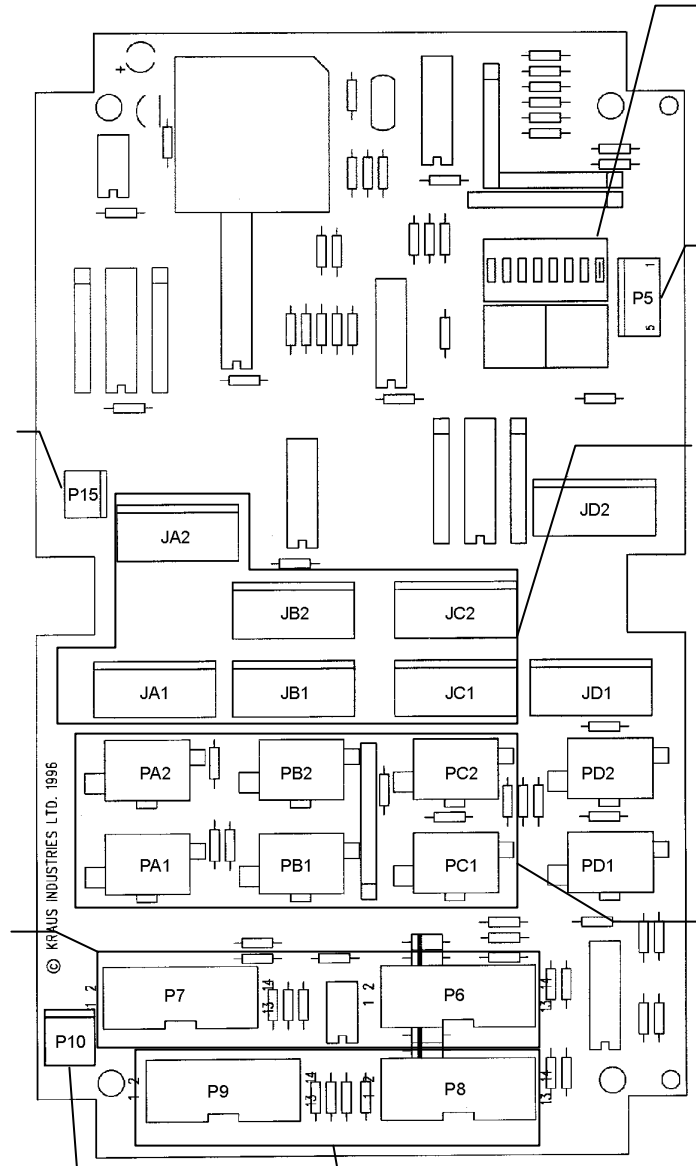


Figure 2 **ATC Wiring Diagram: BENNETT 8000*****

***Installation and configuration of the BENNETT 8000 is similar to the 7000 and 9000 series.

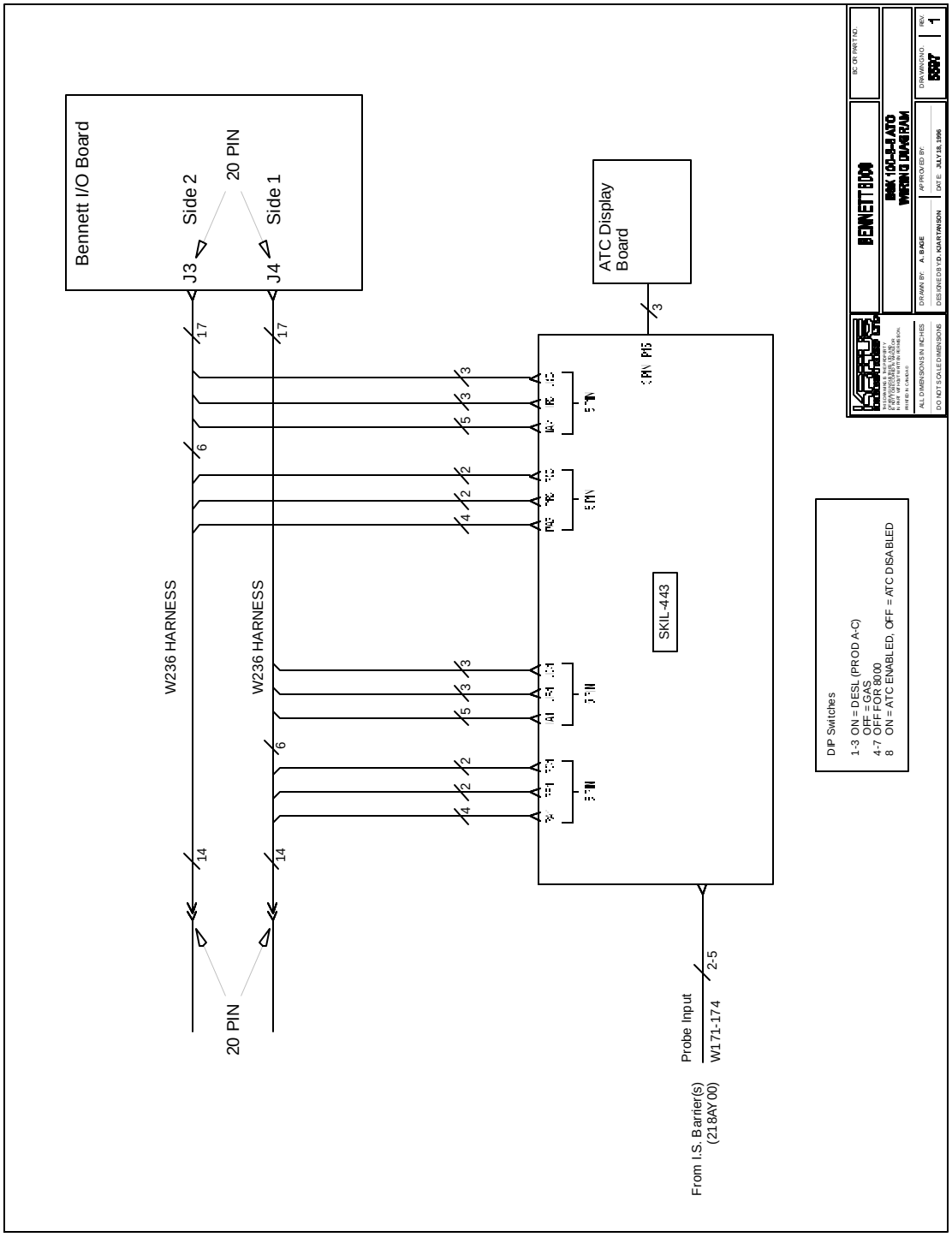
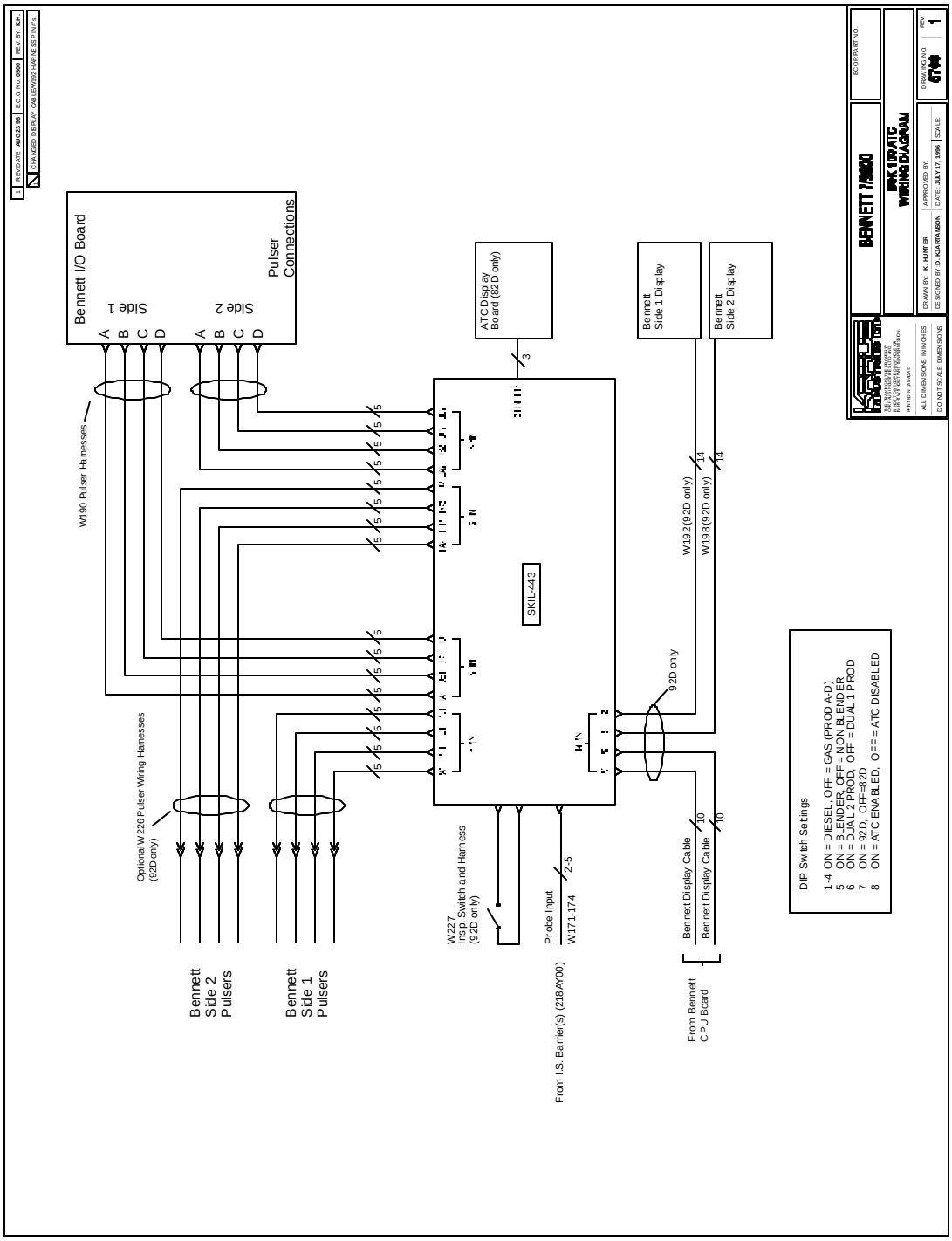


Figure 3 **ATC Wiring Diagram: BENNETT 7000 and 9000**



2.2 Component Installation

2.2.1 Test Well and Temperature Probes (See Figure 4)

2.2.1.1 In a Dispenser

1. Remove the lower panels.
2. Locate and remove the casting for each product. (See Figure 5.)
3. Drill (Q) and tap (1/8" NPT) the casting to receive the Thermal test well and Temperature probe as shown in Figure 5. Clean entire casting using Varsol or equivalent to remove all drill cuttings and debris.
4. Install the Temperature probe into the casting body.
5. Install the Thermal test well into the casting body. Cover the Thermal test well with the Thermal well plug.
6. Clean and lightly lubricate all O-rings and O-ring surfaces.
7. Re-connect the casting assembly to the dispenser.
8. Power up dispenser and open shear valve to allow operating pressure into the system. Check for leaks. If leak occurs, power down system and close shear valve. Correct as required.

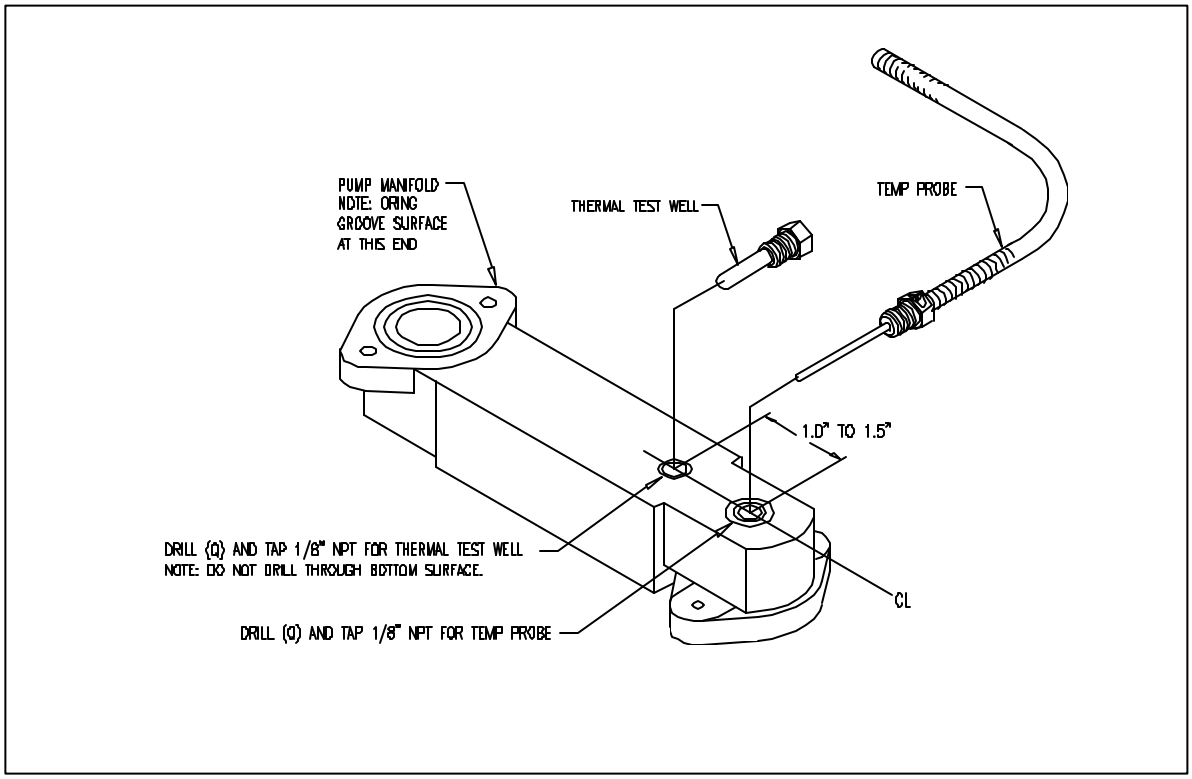
ATTENTION

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

ATTENTION

Thoroughly clean all parts that have been removed from the dispenser before installation.

Figure 4 **Probe and Test Well Installation**



2.2 Component Installation

2.2.1 Test Well and Temperature Probes

2.2.1.2 In a Suction Unit

1. Remove the lower panels.
2. Locate and remove the section of pipe, between the suction pump and branch point for the two meters, suitable to mount the temperature probe extension fitting and thermal well.
3. Drill (Q) and tap (1/8" NPT) two holes in the pipe section to receive the test well and thermal well.

The following guidelines should also be used when drilling the holes:

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

- The fittings should provide easy access for insertion of a thermometer.
- Probe and test well must be no closer than 5 pipe diameters from the pump discharge.
- The temperature probe extension fitting should be placed so as not to hinder reinstallation of the assembly.

ATTENTION

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

4. Install the thermal test well into the pipe section.
5. If required, install the probe extension fitting into the pipe section.
6. Install the temperature probe into the probe extension fitting.
7. Re-install completed pipe assembly to the dispenser Secure all cables and wire harnesses as required.

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 (See Figure 4)

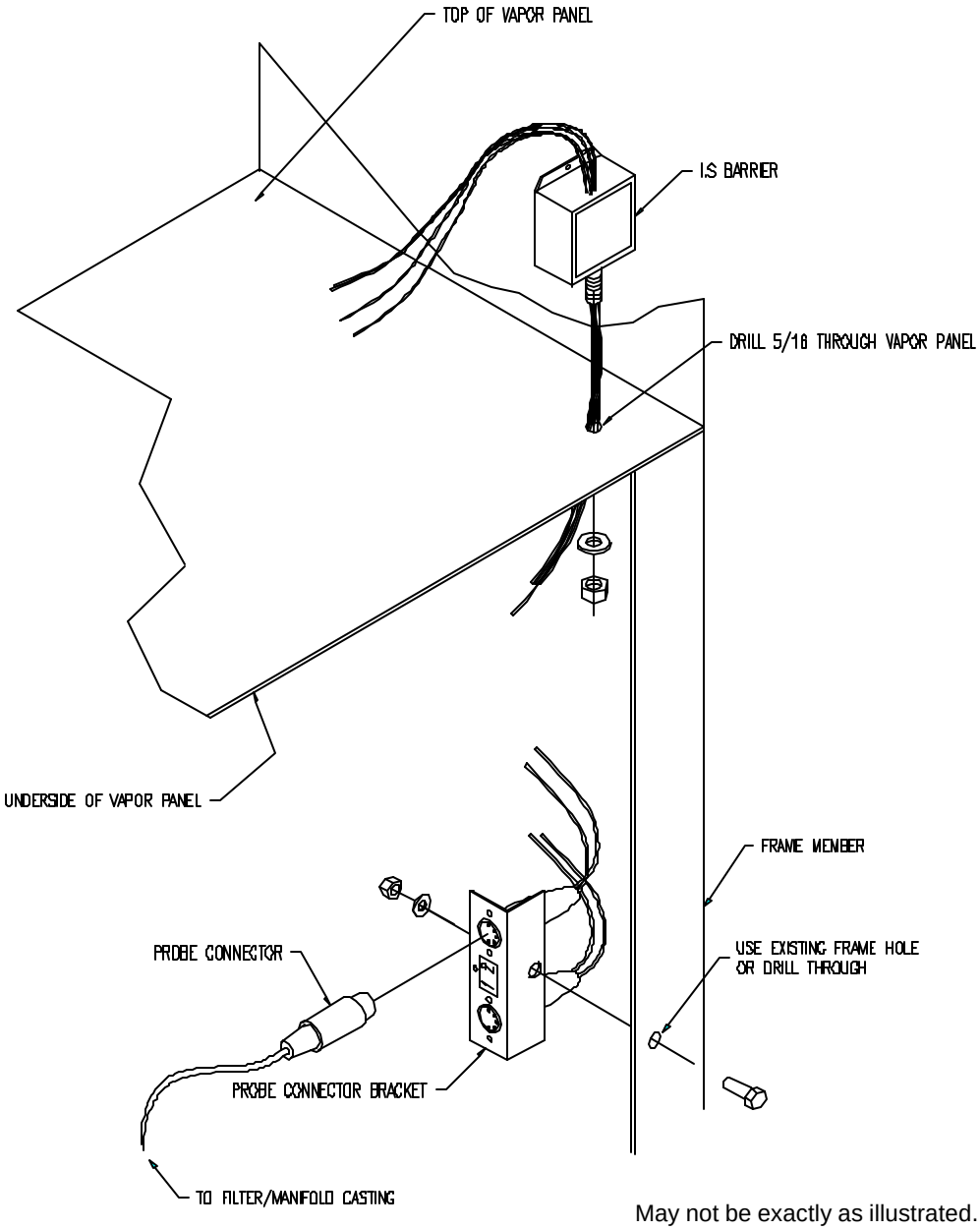
1. Open front display panel.
2. Drill one hole (5/16”) through the vapor panel per I.S. barrier.
3. Insert threaded end of I.S. barrier through the panel hole and tighten with the washer and hex nut.
4. Connect the green 20 AWG wires coming out of the tops of the barriers (black epoxy side), to the I.S. ground.
5. Connect the yellow and green wires from the dual barrier, for products one and two, to the wires from the W17*X* harness with the colors matched, **using crimp on wire nuts or butt connectors only.** Red wires from the I.S. barrier are *common*, and should be connected to the red wire on the harness.

ATTENTION

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

6. In a three product kit, connect the yellow wire from the second barrier to the blue wire of the harness (*W173*). Note: the green wire is unused.
7. In a four product kit, connect the yellow wire from the second barrier to the blue wire, and the green wire to the purple wire of the W174 harness.
8. Remove the lower front panels from the dispenser.
9. Mount the probe connector bracket to the pump frame, below the vapor panel. The connector bracket should be located for easy connection of the temperature probes. The connector bracket is designed to be mounted using an existing frame bolt (5/16 or smaller) if convenient. Otherwise drilling of the frame is required.
10. Connect the wires from the probe connector assembly to the like colored wires of the I.S. barrier using crimp on wire nuts or butt connectors only.
11. Plug the temperature probes into the connector bracket. Secure all cable and wire harnesses as required.

Figure 5 **I.S Barrier/Probe Connector Bracket Installation**



May not be exactly as illustrated. For reference purpose only.

2.2 Component Installation

2.2.3 ATC Board Installation (See Figure 1,2, 3, 5, 7)

1. For 92D, locate Side 2 of the dispenser. You will be facing Side 2 when the battery, which is located in the upper portion of the dispenser behind the display panel, is visible. The pulser interface boards will also be visible from this side. For 82D, locate Side 1 of the dispenser. (Refer to figure 8)

2. The ATC board is shipped pre-mounted in a black ABS case for ease of installation. For 92D electronics, install the case to the back of the display panel using the supplied self-adhesive sponges. Check that the case does not interfere with the operation of the display panel.

For 8000, connect as shown in wiring diagram (figure 2).

3. Disconnect pulser plugs C1, C2, B1, B2, A1, A2 from the three separate interface boards located on Side 2 of the dispenser. Connect them to PC1, PC2, PB1, PB2, PA1, PA2 respectively, on the ATC board. These connections may be extended with the supplied W226 harness.

4. Connect W190 harnesses between JC1, JC2, JB1, JB2, JC1, JC2 on the ATC board and respectively, pulsers C1, C2, B1, B2, A1, A2 on the interface boards.

5. For 92D electronics, disconnect the display cables from the displays and connect them to P7 & P6. (Side 2 display to P9, Side 1 display to P8) on the ATC board.

6. For 92D electronics, connect Ribbon cables W192/W198 between P9 & P8 on the ATC board and JP6 & JP5 and the displays. (Refer to 2.2.5 for 82D electronics)

7. Connect the W17*X* harness from the I.S. barrier to P5 on the ATC board.

8. The ATC board must be configured for use with the type of application it is to control. (See Table 1 in Section 2.1.3 at the beginning of this manual)

9. Secure all wire harnesses as required.

2.2 Component Installation

2.2.4 Inspectors Switch Installation (See Figure 7) for 92D Electronics

1. Installation of the inspectors switch is to be used for the 92D electronics only. For 82D electronics, the switch is not supplied.(Refer to 2.2.5)

2.2 Component Installation

2.2.4 Inspectors Switch Installation (Cont.) for 92D Electronics

2. Install the switch on Side 2 on the inside display panel cover. Locate an existing hole on the panel below the display. If one does not exist then drill a 0.25 hole. Check that the switch does not interfere with the operation of the display panel.

3. Connect the switch harness W227 to P10 on the ATC board.

4. Secure wire harness as required.

2.2 Component Installation

2.2.5 Display Board Installation (See Figure 8) for 82D Electronics and 8000

1. Installation of the ATC display board is to be used for the 82D electronics only. For 92D electronics, the dispensers display and supplied Inspector's switch serves this purpose. (Refer to 2.2.4)

2. Secure the Display board to the front of the inside display panel on Side 1 of the dispenser.

3. Connect the supplied three pin harness from the display to P15 on the ATC board.

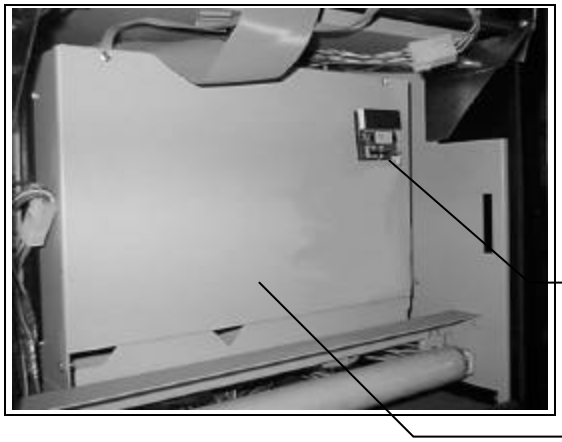
4. Secure all wire harnesses as required.

5. Display must be accessible without the use of tools.

Figure 6 ATC Board Location (82D)

Figure 7 **Inspectors Switch Location (92D)**

Figure 8 **ATC Display Board Location (82D)**



2.3 Post Installation

2.3.1 Probe Connection Verification

With the dispenser ready to be tested:

1. Apply power to the unit, and initialize the system as per the Bennett instructions.

2. Set Dip switch 8 to the on position. Wait for 5 seconds, then return Dip switch 8 to the off position. This programs the number of pulsers into novram. Not necessary for Blenders, i.e., dip switch 5 ON.

3. To display the temperature for 92D electronics, uncorrected volume, flowrate, and compensation type (gas or diesel), move the inspection switch to the ATC display position (i.e. to the UP position). 82D electronics use the ATC display board.

4. Run a delivery into a test can.

   The ratio of the net volume on the normal dispenser display to the gross volume on the ATC display should be the correct VCF for the temperature displayed and the product selected.

5. Unplug the probe for the product being tested.

   *The pump should stop, and the ATC display should read "*ProbE*" in the ppu readout to indicate temperature probe failure.*

6. Repeat the test procedure for each hose. Always ensure that the correct probe is being used to compensate each product.

   *If you are testing with product one and unplug probe one, the pump should stop and the ATC display will indicate "*ProbE*". If the pump, for example, does not stop when probe one is unplugged but does when probe two is unplugged, then the probes are mixed up.*

2.3 Post Installation 2.3.2 ATC Display Board Functions (82D electronics)

The three switches on the board (See Figures 9&10) determine what information is displayed.

SWITCH 1	A/B	Selects the temperature and uncompensated volume reading for either **side 1 or side 2**. On Blender, Temp A/B selects probe A/B for both sides.
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.

Figure 9 **ATC Display Board**

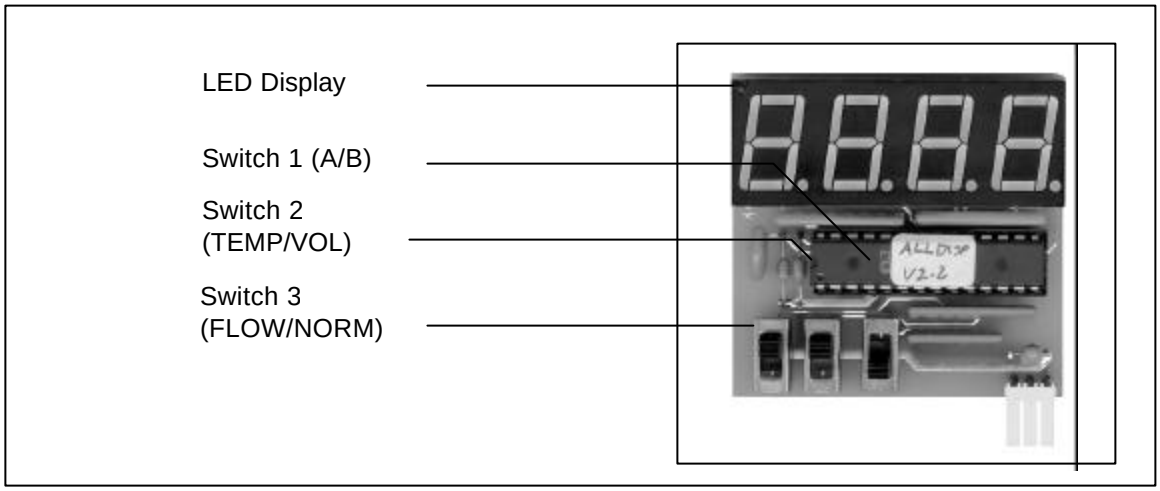
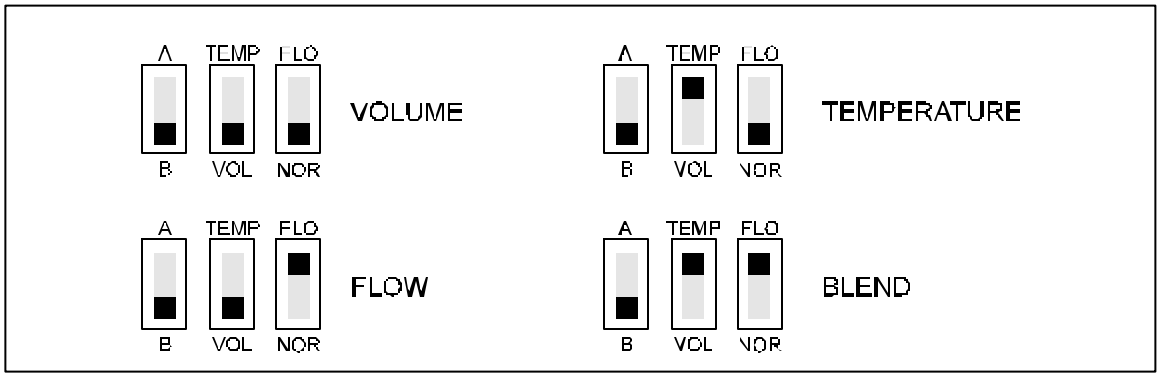


Figure 10 **ATC Display Switch Settings**



2.3 Post Installation 2.3.3 ATC Display Board Messages

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 Enabling ATC Function

The ATC function must be disabled with Dip switch 8 (See table: Section 2.1.3) until the pump is inspected and the nameplate with the AV number must be applied to the side of the dispenser.

ATTENTION

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

Once the inspector approves the pump, the seal cover may be installed over the ATC board so that the inspector can seal the unit.

The BC256A "VOLUME CORRECTED TO 15°C" labels must also be applied to the faceplates adjacent to the volume displays.

2.3.5 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

BENNETT SERIES 7/9000 (92D)		B9K 100 THREE PRODUCT ATC
QTY	PART #	DESCRIPTION
1	223AY00	B9K 100 ATC BOARD AND BOX ASSEMBLY
2	218AY00	DUAL INTRINSIC SAFETY BARRIER
2	BC256A	WHITE “VOLUME CORRECTED TO 15^{0}C” LABEL
3	BC407	THERMOWELL
3	BC546	120-B, 1/8” NPT ADAPTER DRILLED TO 17/64” I.D.
2	W226	PULSER EXTENSION HARNESS
6	W190	PULSER HARNESS
1	W192	SIDE 2 DISPLAY RIBBON CABLE-SHORT
1	W198	SIDE 1 DISPLAY RIBBON CABLE-LONG
1	BC1464	SERIALIZED W&M AV-?? NAMEPLATE
1	W173	5-PIN 4-WIRE HARNESS FOR I.S. BARRIERS
17		18-22 AWG CRIMP SPLICES
1	W227	INSPECTORS SWITCH AND HARNESS ASSEMBLY
3	W199	PROBE ASSEMBLIES
3	235-C	THEMOWELL PLUGS
3	122-B	1/8” NPT x 1” HEX NIPPLES
3	103-B	1/8” NPT COUPLINGS
2		5/16” HEX NUT
2		5/16” FLAT WASHER
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY
2	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	223KT00.INS	INSTALLATION MANUAL

BENNETT SERIES 7/9000 (82D)		B9K 100 THREE PRODUCT ATC
QTY	PART #	DESCRIPTION
1	223AY00	B9K 100 ATC BOARD AND BOX ASSEMBLY
2	218AY00	DUAL INTRINSIC SAFETY BARRIER
2	BC256A	WHITE “VOLUME CORRECTED TO 15^{0}C” LABEL
3	BC407	THERMOWELL
3	BC546	120-B, 1/8” NPT ADAPTER DRILLED TO 17/64” I.D.
2	W226	PULSER EXTENSION HARNESS
6	W190	PULSER HARNESS
1	W189	ATC DISPLAY HARNESS
1	SKIL-446	ATC DISPLAY BOARD
1	BC1464	SERIALIZED W&M AV-2328 NAMEPLATE
1	W173	5-PIN 4-WIRE HARNESS FOR I.S. BARRIERS
17		18-22 AWG CRIMP SPLICES
3	W199	PROBE ASSEMBLIES
3	235-C	THEMOWELL PLUGS
3	122-B	1/8” NPT x 1” HEX NIPPLES
3	103-B	1/8” NPT COUPLINGS
2		5/16” HEX NUT
2		5/16” FLAT WASHER
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	223KT00.INS	INSTALLATION MANUAL

3.1 Components 3.1.1 List of Components (Cont.)

BENNETT SERIES 7/9000 (82D)		B9K 100 THREE PRODUCT ATC
QTY	PART #	DESCRIPTION
1	223AY00	B9K 100 ATC BOARD AND BOX ASSEMBLY
2	218AY00	DUAL INTRINSIC SAFETY BARRIERS
2	BC256B	BLACK “VOLUME CORRECTED TO 15°C” LABELS
3	BC407	THERMOWELLS
3	BC546	120-B, 1/8” NPT ADAPTERS DRILLED TO 17/64” I.D.
2	W236	8000 ADAPTER HARNESS
1	W189	ATC DISPLAY HARNESS
1	SKIL-446	ATC DISPLAY BOARD
1	BC1464	SERIALIZED W&M AV-2328 NAMEPLATE
1	W173	5-PIN 4-WIRE HARNESS FOR I.S. BARRIERS
17		18-22 AWG CRIMP SPLICES
1		24” PC 22 AWG STRANDED RED
3	W199	PROBE ASSEMBLIES
3	235-C	THEMOWELL PLUGS
3	122-B	1/8” NPT x 1” HEX NIPPLES
3	103-B	1/8” NPT COUPLINGS
2		5/16” HEX NUTS
2		5/16” FLAT WASHERS
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
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