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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 (60 °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.

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

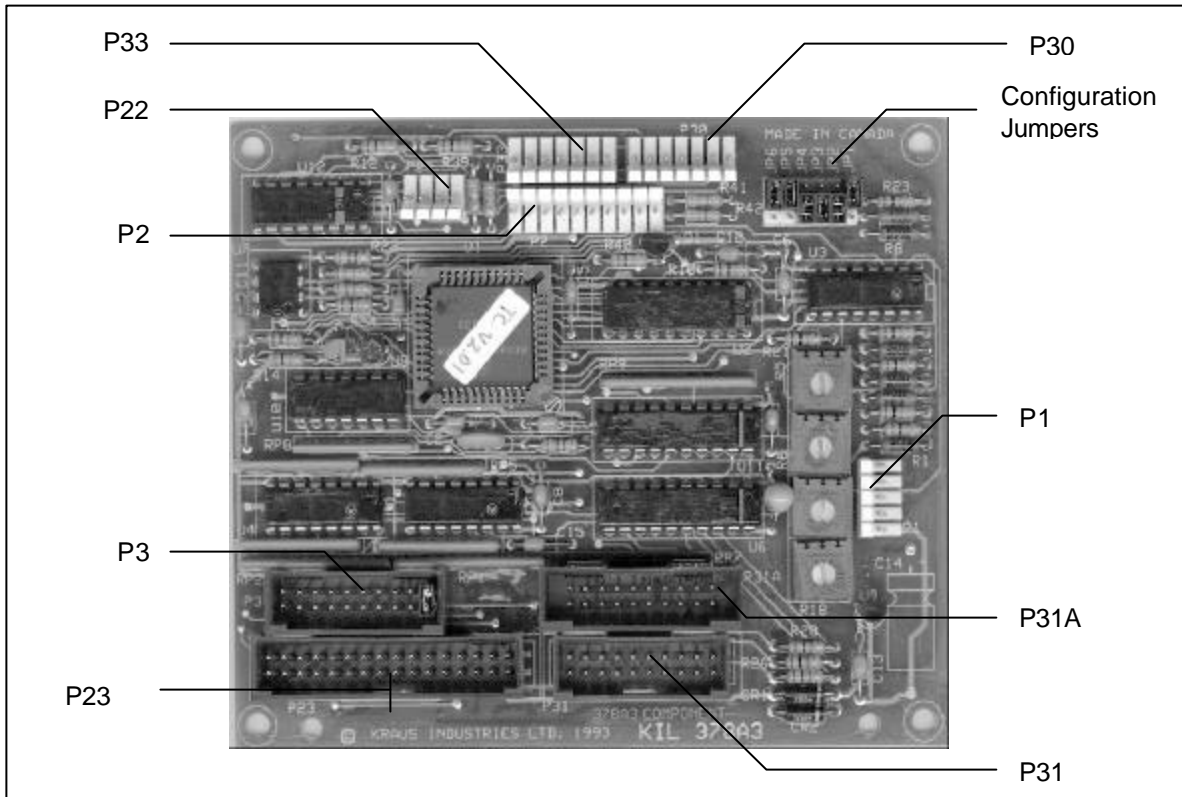
Before the ATC board can be installed, it must be configured for the particular application. This is accomplished by positioning the jumper plugs, located on the upper right hand corner of the circuit board.

Options for configuration can be set in accordance with the table below (UP is closest to the edge of the board. See Figure 1 for jumper location).

ATC Board Jumper Settings		TCS 200
JUMPER#	OPTION	JUMPER POSITION
JP1	Selects whether ATC is enabled or disabled	UP = ENABLED
JP2	Selects whether product 4 is gasoline or diesel	UP = DIESEL
JP3	Selects whether product 3 is gasoline or diesel	UP = DIESEL
JP4	Selects whether product 2 or side B is gasoline or diesel	UP = DIESEL
JP5	Selects whether product 1 or side A is gasoline or diesel	UP = DIESEL
JP6	Selects whether or not the pump is a 2 probe 262A	DOWN = 2 PROBE 262A

Figure 1

ATC Board Layout



2.2 Component Installation

2.2.1 Test Well and Temperature Probes

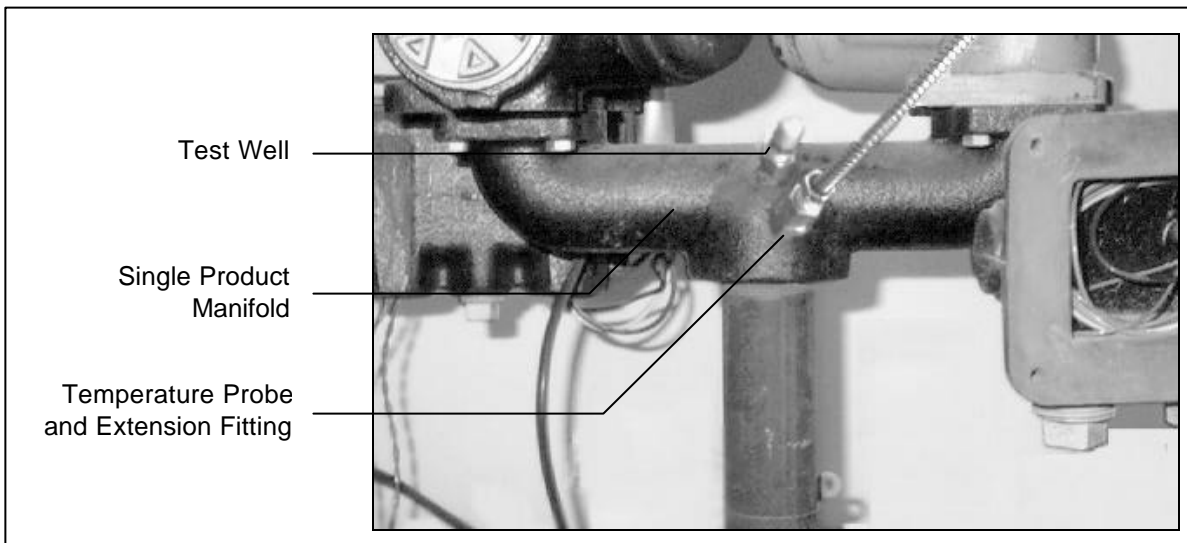
2.2.1.1 In a Single Product 262A Dispenser



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.



CAUTION

Due to the presence of combustible gasses, DO NOT drill 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 262A 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.

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 manifold 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.



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.



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 temperature probe and extension fitting.

6. Install test well into the manifold and, after tightening, cover with the thermal well plug.
7. Re-connect manifold to pump assembly.



ATTENTION

Make sure manifold is cleaned thoroughly before connecting manifold to pump assembly. This is to prevent drill cuttings from entering the dispensing system.

2.2 Component

2.2.1 Test Well and Temperature Probes

Installation

2.2.1.2 In a Dual Product 262A 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 262A 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° 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 262A 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 pipe section 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

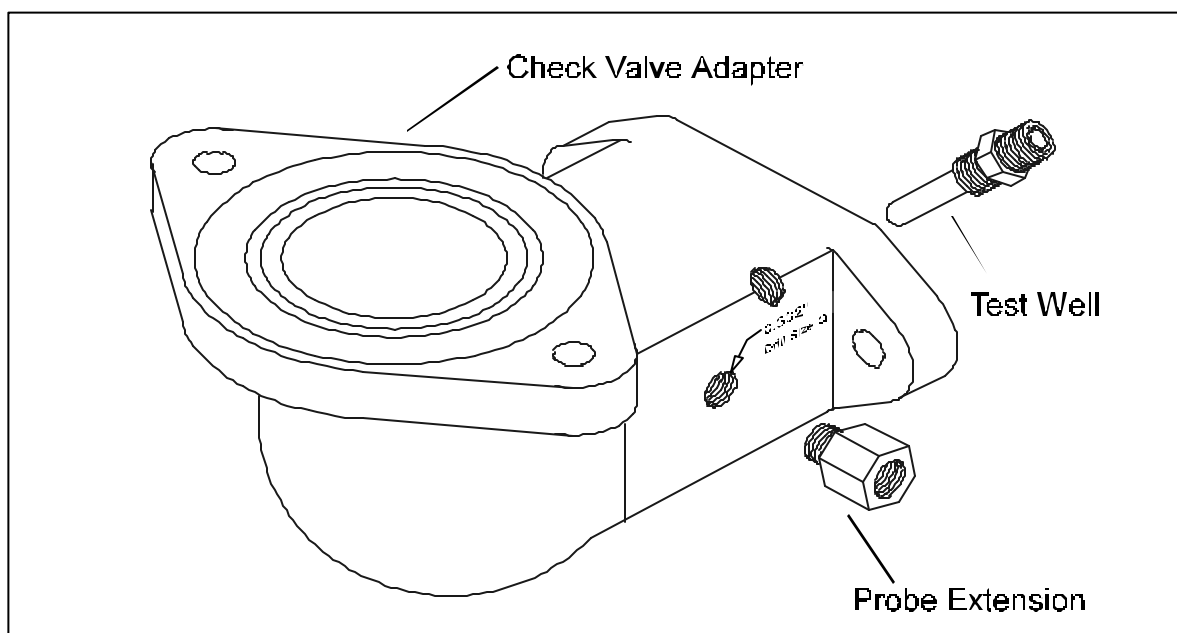
2.2.1 Test Well and Temperature Probes

2.2.1.3 In a TCS Dispenser

1. Remove the lower panels.
2. Locate and remove the check valve adapter casting for each product. (See Figure 3)
3. Drill and tap (0.332", tap NPT) the casting to receive the test well and probe extension fitting as shown in Figure 3. (Drill the test well hole at a 45 degree angle as shown).
4. Install the probe extension fitting, and tighten.
5. Install the temperature probe.

Figure 3

Probe and Test Well Installation



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.

5. Install the test well and tighten. Cover test well with the thermal well plug.
6. Re-connect check valve adapter assembly to pump.

2.2 Component Installation

2.2.1 Test Well and Temperature Probes

2.2.1.4 In a TCS Suction Unit

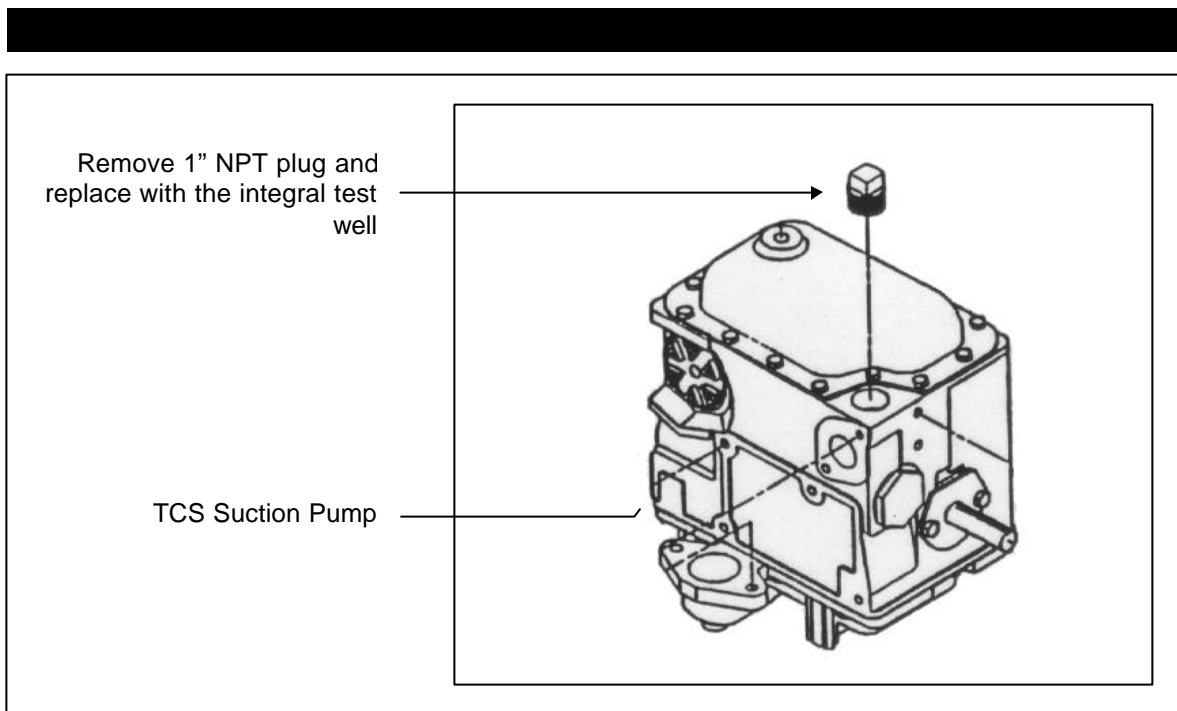
1. Remove the lower panels.
2. Remove the 1" NPT plug from the pumping unit, next to the discharge outlet. (See Figure 4)



ATTENTION

Any connections must be made using thread sealing compound suitable for use with gasoline.

3. Replace the 1" NPT plug attached to the suction unit with the integral test well and 1/8" NPT threaded hole.
4. Install the probe into the plug, and tighten.

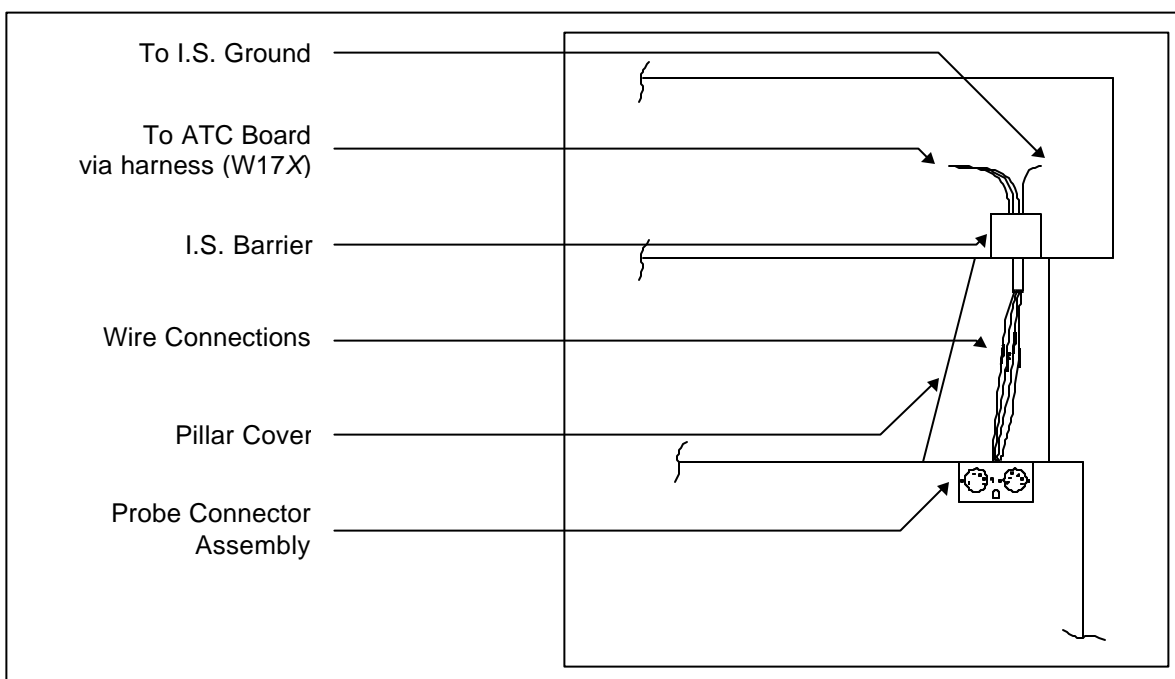


2.2 Component Installation

2.2.2 I.S. Barrier Installation

2.2.2.1 In a 262A Dispenser

1. Remove the cover from the pillars on the front side of the dispenser.
2. Open the front display panel.
3. Install the I.S. Barrier by removing the mounting bolt and attach as shown in Figure 5 below.



4. Connect the intrinsic safety barrier ground (20 AWG green wire), coming out of the top of the barrier (epoxy side), to the grounding stud beside the card cage.
5. Connect the other wires to the like coloured ones on the W17X harness, **using crimp on wire nuts or butt connectors only.**



ATTENTION

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

2.2 Component Installation

2.2.2 I.S. Barrier Installation

2.2.2.1 In a 262A Dispenser (Cont'd)

6. Remove the covers from the lower enclosure.
7. Mount the probe connector assembly bracket on the pump, below the pillar, inside the vapour barrier. (See Figure 6)
8. Connect the wires from the probe connector assembly to the like coloured wires of the I.S. barrier using crimp on wire nuts or butt connectors only.
9. Plug the temperature probes into the connector assembly.

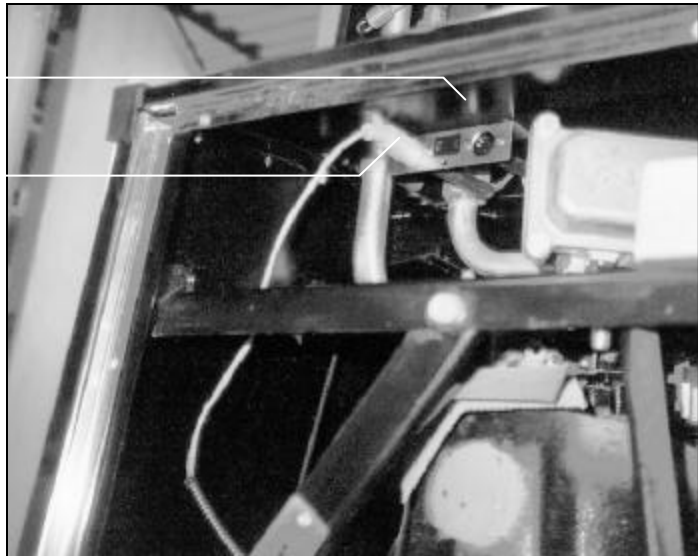


ATTENTION

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

Probe Connector
Assembly

Probe Connection

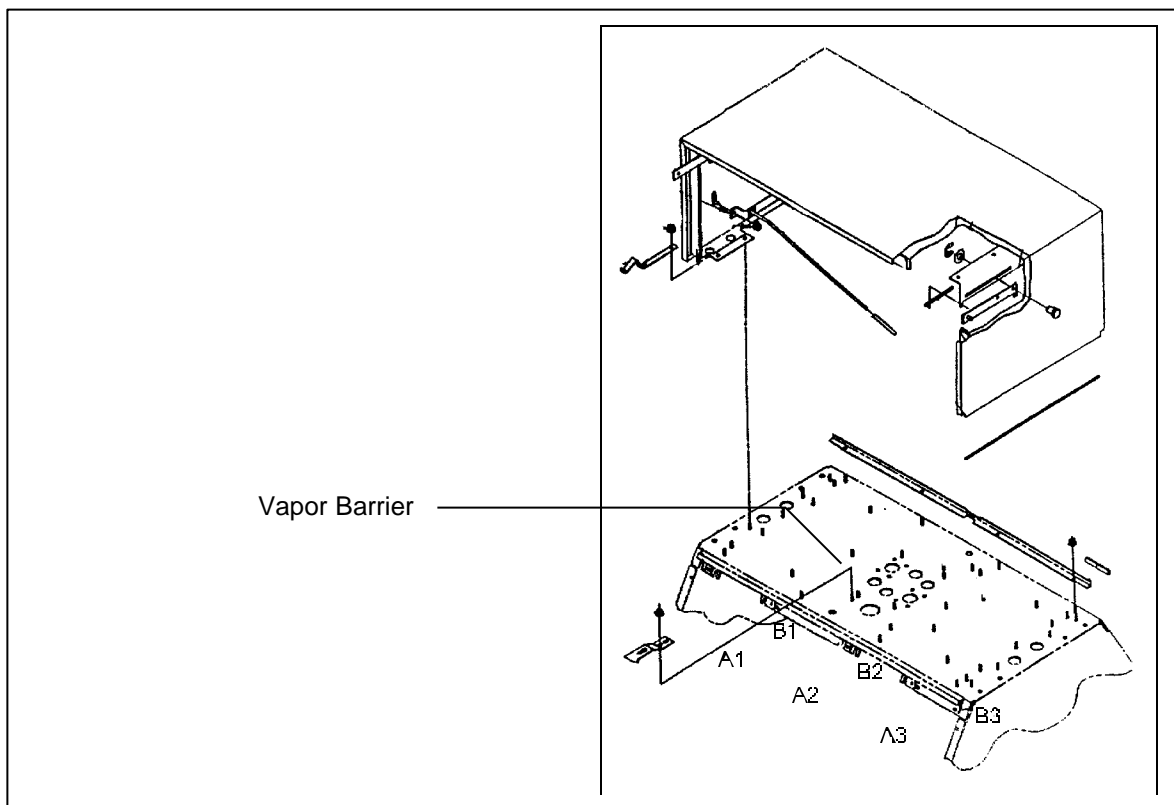


2.2 Component Installation

2.2.2 I.S. Barrier Installation

2.2.2.2 In a TCS Dispenser

1. Open the front display panel.
2. In a three or four product unit, drill two 5/16" holes through the vapor barrier over pulser assemblies A1 and B3 as shown in Figure 7.



3. In a one or two product unit, only the hole over pulser assembly A1 is needed.



ATTENTION

It is recommended that an angle air drill be used if there is concern that hazardous atmospheres may be present. Use grease on the tip of the bit to prevent sparking and increase bit life.

2.2 Component Installation

2.2.2 I.S. Barrier Installation

2.2.2.2 In a TCS Dispenser (Cont'd)

4. Install the barriers in the holes, and tighten with the washers and hex nuts provided.
5. Connect the green 20 AWG wires coming out of the tops of the barriers (epoxy side), to the grounding stud beside the card cage.
6. Connect the yellow and green wires from the dual barrier, for products one and two, to the wires from the W17X harness with the colours 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.

7. In a three product kit, connect the yellow wire from the second barrier to the blue wire of the harness (W17X). Note: the green wire is unused.
8. 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 harness.
9. The temperature probes can now be plugged into the connectors under the I.S. barrier.

2.2 Component Installation

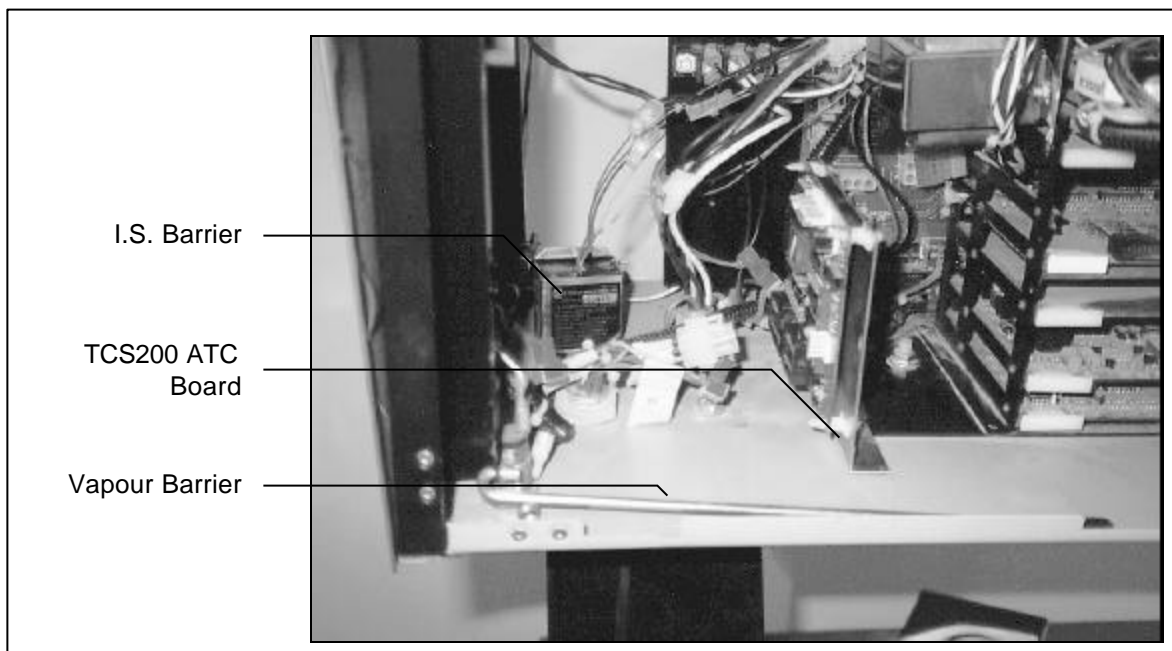
2.2.3 ATC Board Installation

2.2.3.1 For 262A Models (Refer to Figures 8 & 9)

1. Remove the plugs from J23, 30, 31, and 33 on the mother board and plug them into P23 through P33 respectively on the ATC board.
2. Connect the W106, 8 wire harness from P2 on the ATC board to J30 and 33 on the motherboard. The 7 pin plug with one wire goes to J30.
3. Connect the W105, 18 wire harness from P3 on the ATC board to J23 on the motherboard.
4. Connect the W88, 20 wire ribbon cable between P31A on the ATC board and J31 on the motherboard.
5. Plug the 5 pin plug from the I.S. barriers onto P1.
6. Replace the keyswitch with the one provided.
7. Plug the 4 pin plug with 1 wire from the keyswitch onto P22 of the ATC board. Connect the remaining plugs to the mother board, as per the original keyswitch.
8. The ATC board unit may now be fastened under the bolt head or nut as shown in Figure 8.

Figure 8

ATC Board Assembly



2.2 Component Installation

2.2.3 ATC Board Installation

2.2.3.2 For TCS Models (Refer to Figure 10)

1. Remove the plugs from J23 and 31 on the mother board. Plug them into P23 and 31 respectively on the ATC board.
2. Connect the W107, 8 wire harness from P2 on the ATC board to J9 on each of the dial interconnect boards on the dial panels. The 7 pin plug with one wire goes to the "B" side.
3. Replace, on each side, the wire harness which was connected between the money-volume display and J9 on the dial interconnect board with the longer W108 harnesses supplied.
 - Connect one between J9 on the "A" side dial interconnect board and P33 on the ATC board.
 - Connect the other from P30 on the ATC to the "B" side (J9)
4. Connect the W105, 18 wire harness from P3 on the ATC board to J23 on the motherboard.
5. Connect the W88, 20 wire ribbon cable between P31A on the ATC board and J31 on the motherboard.
6. Plug the 5 pin plug from the I.S. barriers onto P1 on the ATC board.
7. Replace the keyswitch with the one provided.
8. Plug the 4 pin plug with 1 wire from the keyswitch onto P22 of the ATC board. Connect the remaining plugs to the mother board, as per the original keyswitch.
9. The ATC board unit may now be fastened under the bolt head or nut as shown in Figure 8.

2.2 Component Installation

2.2.3 ATC Board Installation

2.2.3.3 ATC Board Connection Diagrams

The following diagrams (Figures 9 & 10) show the wiring connections for the TCS 200 ATC board for 262A and TCS units:

Figure 9 ATC Board Connections for 262A Units

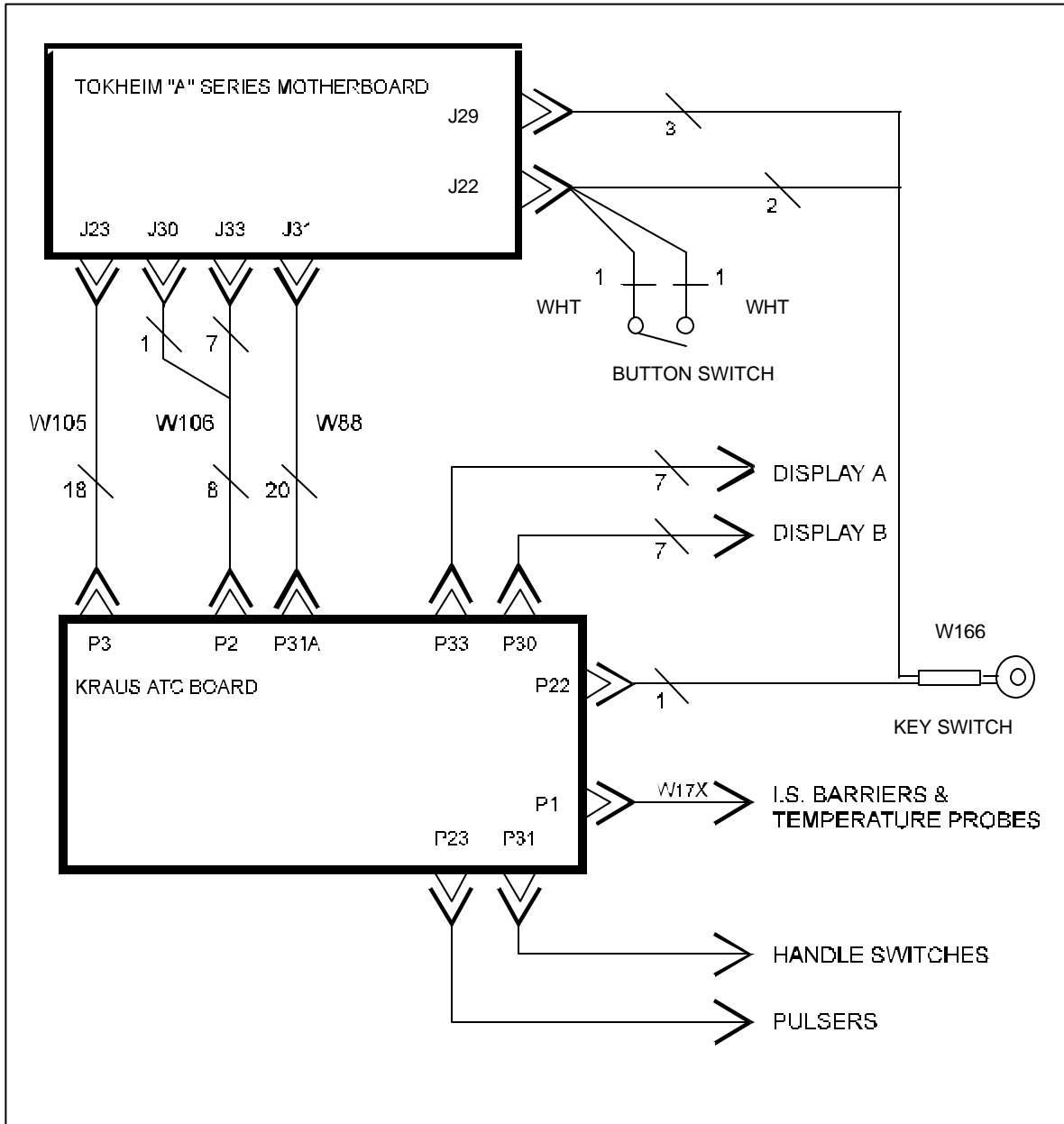
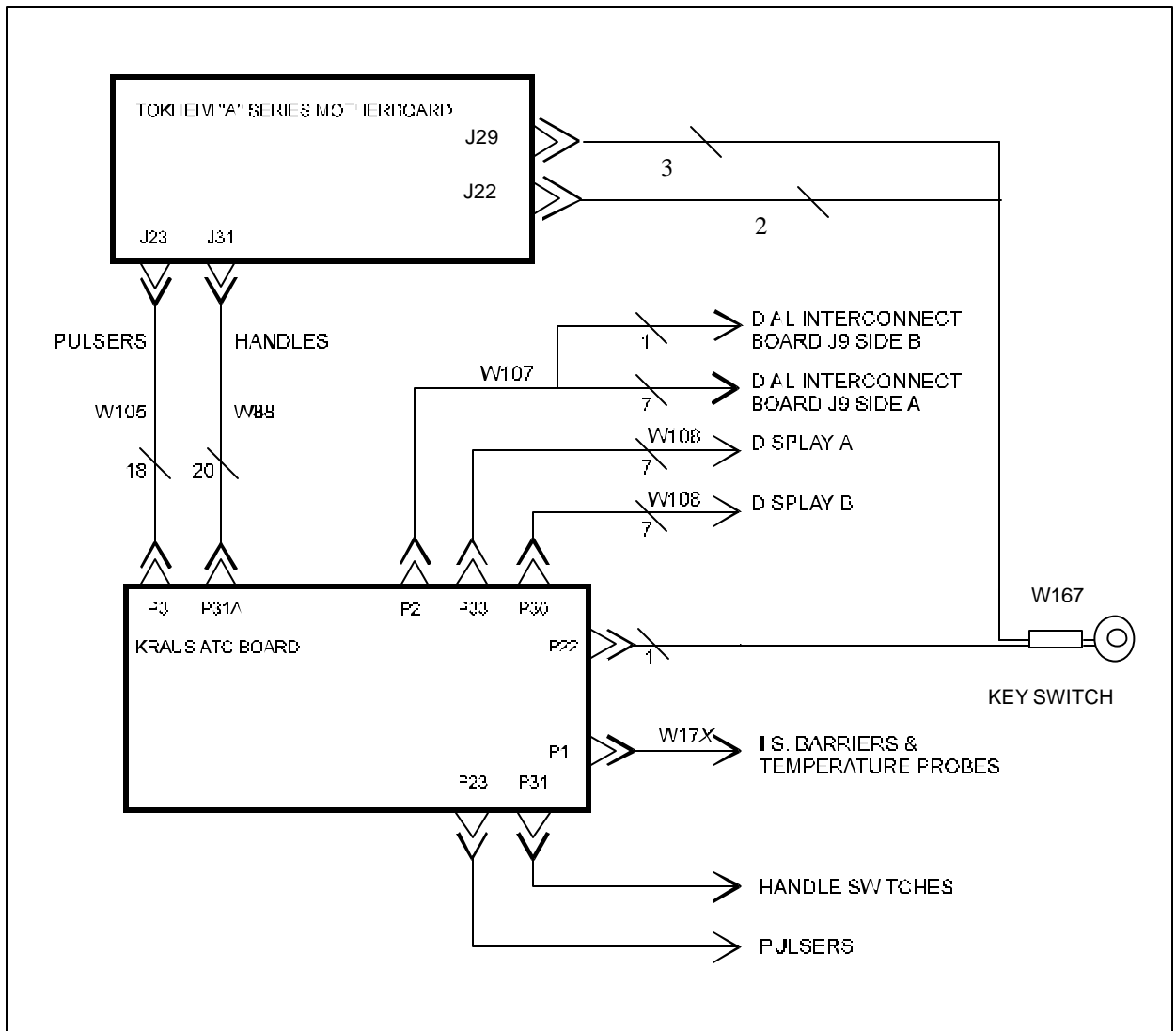


Figure 10

ATC Board Connections for TCS Units



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 Tokheim instructions.
2. To display the temperature, uncorrected volume, flowrate, and compensation type (gas or diesel), turn the keyswitch to the ATC display position (i.e. to the left).
3. 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.

4. 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.

5. 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 Enabling ATC Function

The ATC function must be disabled with the appropriate jumper plug (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 plate may be installed over the ATC board so that the inspector can seal the unit.

The BC256B "VOLUME CORRECTED TO 15° C" labels must also be applied to the faceplates adjacent to the volume displays.

2.3.3 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 can not be used for this purpose.

3.1 Components

3.1.1 List of Components

TOKHEIM "A" Series ATC		TCS 200-1A SINGLE PRODUCT 262A -
QTY	PART #	DESCRIPTION
1	028AY00	ATC BOARD AND BRACKET ASSEMBLY
1	218AY00	DUAL INTRINSIC SAFETY BARRIER
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY
1	W171	5 PIN, 2 WIRE HARNESS FOR I.S. BARRIER
1	W199	TEMPERATURE PROBE
1	BC407	THERMOWELL
1	BC546	120-B, 1/8" NPT ADAPTER DRILLED TO 17/64" I.D.
1	235-C	THERMOWELL PLUG
1	122-B	1/8" NPT x 1" HEX NIPPLE
1	103-B	1/8" NPT COUPLING
4	BC256A	WHITE "VOLUME CORRECTED TO 15 C" LABELS
6		18-22 AWG CRIMP SPLICE
1	W88	20 PIN RIBBON CABLE
1	W105	18 WIRE HARNESS
1	W106	8 WIRE HARNESS
1	BC819	SERIALIZED AV-2238 NAMEPLATE
1	W166	KEYSWITCH ASSEMBLY
1		5/6" HEX NUT
1		5/16" FLAT WASHER
1	028AY00.INS R01	TCS/262-A ATC INSTALLATION MANUAL

TOKHEIM "A" Series ATC		TCS 200-2A TWO PRODUCT 262A -
QTY	PART #	DESCRIPTION
1	028AY00	ATC BOARD AND BRACKET ASSEMBLY
1	218AY00	DUAL INTRINSIC SAFETY BARRIER
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	W172	5 PIN, 3 WIRE HARNESS FOR I.S. BARRIER
2	W199	TEMPERATURE PROBES
2	BC407	THERMOWELLS
2	BC546	120-B, 1/8" NPT ADAPTER DRILLED TO 17/64" I.D.
2	235-C	THERMOWELL PLUG
2	122-B	1/8" NPT x 1" HEX NIPPLES
2	103-B	1/8" NPT COUPLINGS
4	BC256A	WHITE "VOLUME CORRECTED TO 15 C" LABELS
10		18-22 AWG CRIMP SPLICES
1	W88	20 PIN RIBBON CABLE
1	W105	18 WIRE HARNESS
1	W106	8 WIRE HARNESS
1	BC819	SERIALIZED AV-2238 NAMEPLATE
1	W166	KEYSWITCH ASSEMBLY
1		5/6" HEX NUT
1		5/16" FLAT WASHER
1	028AY00.INS R01	TCS/262-A ATC INSTALLATION MANUAL

3.1 Components

3.1.1 List of Components

TOKHEIM "A" Series ATC		TCS 200-2T TWO PRODUCT TCS -
QTY	PART #	DESCRIPTION
1	028AY00	ATC BOARD AND BRACKET ASSEMBLY
1	218AY00	DUAL INTRINSIC SAFETY BARRIER
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	W172	5 PIN, 3 WIRE HARNESS FOR I.S. BARRIER
2	W199	TEMPERATURE PROBES
2	BC407	THERMOWELLS
2	120-B	1/8" NPT ADAPTER
2	235-C	THERMOWELL PLUG
2	BC256B	BLACK "VOLUME CORRECTED TO 15 C" LABELS
5		18-22 AWG CRIMP SPLICES
1	W88	20 PIN RIBBON CABLE
1	W105	18 WIRE HARNESS
1	W107	8 WIRE HARNESS
2	W108	7 WIRE DISPLAY HARNESS
1	BC819	SERIALIZED AV-2238 NAMEPLATE
1	W167	KEYSWITCH ASSEMBLY
1		5/6" HEX NUT
1		5/16" FLAT WASHER
1	028AY00.INS R01	TCS/262-A ATC INSTALLATION MANUAL

TOKHEIM "A" Series ATC		TCS 200-3T THREE PRODUCT TCS -
QTY	PART #	DESCRIPTION
1	028AY00	ATC BOARD AND BRACKET ASSEMBLY
2	218AY00	DUAL INTRINSIC SAFETY BARRIER
1	212AY04	SINGLE PROBE CONNECTOR ASSEMBLY
1	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	W173	5 PIN, 4 WIRE HARNESS FOR I.S. BARRIER
3	W199	TEMPERATURE PROBES
3	BC407	THERMOWELLS
3	120-B	1/8" NPT ADAPTER
3	235-C	THERMOWELL PLUG
2	BC256B	BLACK "VOLUME CORRECTED TO 15 C" LABELS
7		18-22 AWG CRIMP SPLICES
1	W88	20 PIN RIBBON CABLE
1	W105	18 WIRE HARNESS
1	W107	8 WIRE HARNESS
2	W108	7 WIRE DISPLAY HARNESS
1	BC819	SERIALIZED AV-2238 NAMEPLATE
1	W167	KEYSWITCH ASSEMBLY
2		5/6" HEX NUT
2		5/16" FLAT WASHER
1	028AY00.INS	TCS/262-A ATC INSTALLATION MANUAL

3.1 Components

3.1.1 List of Components

TOKHEIM "A" Series		TCS 200-4T FOUR PRODUCT TCS -
ATC		
QTY	PART #	DESCRIPTION
1	028AY00	ATC BOARD AND BRACKET ASSEMBLY
2	218AY00	DUAL INTRINSIC SAFETY BARRIER
2	212AY05	DUAL PROBE CONNECTOR ASSEMBLY
1	W174	5 PIN, 5 WIRE HARNESS FOR I.S. BARRIER
4	W199	TEMPERATURE PROBES
4	BC407	THERMOWELLS
4	120-B	1/8" NPT ADAPTER
4	235-C	THERMOWELL PLUG
2	BC256B	BLACK "VOLUME CORRECTED TO 15 C" LABELS
8		18-22 AWG CRIMP SPLICES
1	W88	20 PIN RIBBON CABLE
1	W105	18 WIRE HARNESS
1	W107	8 WIRE HARNESS
2	W108	7 WIRE DISPLAY HARNESS
1	BC819	SERIALIZED AV-2238 NAMEPLATE
1	W167	KEYSWITCH ASSEMBLY
2		5/6" HEX NUT
2		5/16" FLAT WASHER
1	028AY00.INS	TCS/262-A ATC INSTALLATION MANUAL