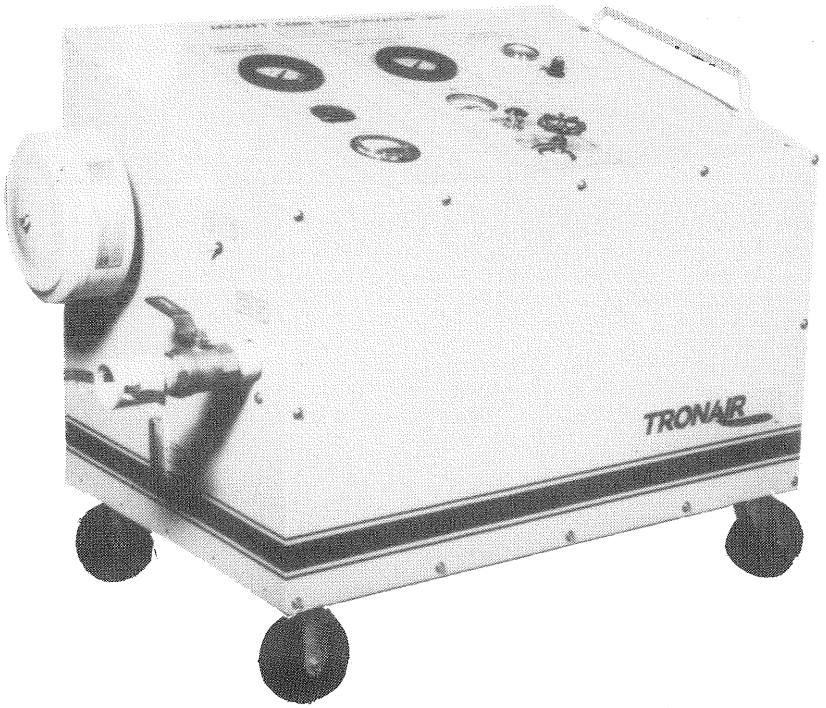
TRONAIR

OPERATION & SERVICE MANUAL

MODEL:

15-7600-1000

AIRCRAFT CABIN PRESSURIZATION UNIT



AIRCRAFT GROUND SUPPORT EQUIPMENT

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9/87

G-110 3-87

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II. INTERNAL COMPONENTS

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1.0 GENERAL DESCRIPTION

The Tronair Model 15-7600-1000 Aircraft Cabin Pressurization Unit (CPU) provides a source of clean, low pressure air for performing required aircraft maintenance.

Some important features are:

- o High quality rotary blower
- o Blower oil level indicator
- o Low noise level; 85 dba at 3 feet under load
- o Heavy duty 3 phase, 10 HP, electric motor with 5 year warranty

1.1 AIRCRAFT ADAPTOR KITS

Aircraft adaptor kits for specific aircraft are offered, please contact Tronair for the appropriate kit number.

2.0 TECHNICAL SPECIFICATIONS

2.1 Pneumatic (Reference Pneumatic Schematic, Figure 1)

A) Cabin Supply

- Rotary blower, belt driven
- Pressure range: 1 to 12 PSIG
- Air Flow : 0 t 200 ACFM
- Air inlet filter; dry element
- Pressure relief valve set at 13 PSIG
- 10 foot cabin air supply hose; 2 inch diameter
- Quick disconnect couplings on air supply hose

2.0 TECHNICAL SPECIFICATIONS (Cont'd)

2.1 B) Cabin Pressurization Unit Control

- o Pressure gauge 0-15 PSIG (½% Accuracy)
- o Temperature indicator 0-240°F
- o Air control valve
- o Ball Shut-Off Valve, aircraft cabin air supply

C) Regulated Shop Air Supply

- o Pressure gauge, 0-30 PSIG
- o Pressure regulator

2.2 Electrical (Reference Electrical Schematic , Figure 2)

- 10 HP air cooled induction motor
- Power Requirements; 3 phase voltage, 50 Hz or 60 Hz.
- Full Load AMPS @ Voltage, Hertz

AMPERAGE	VOLTAGE	HERTZ
30	200	60
26	230	60
13	460	60
27.2	220	50
15.6	380	50

- Master power switch w/light
- Magnetic starter with over load protection
- 50 foot electrical power input cable less plug

2.0 TECHNICAL SPECIFICATIONS (Cont'd)

2.3 Instrumentation/Controls (Reference Figures 5-7 for the location of the following)

1. Aircraft Cabin Feed Back Data

   - o Pressure gauge, 0-15 PSIG (½% Accuracy)
   - o Rate of climb, 0-4000 Ft./Min.
   - o Air leakage gauge, 0-8 inches water
   - o 15 foot cabin pressure sensor hose

2.4 Mechanical

- Dimensions: 57 "L x 39 "W x 43 "H
- Weight: 660 lbs.
- Casters: 6 inch, 2 swivel and 2 rigid
- Foot operated floor brake

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4.0 DETAILED DESCRIPTION

The aircraft cabin pressurization unit (CPU) uses a rotary blower driven by a 10 HP, 3Ø electric motor to provide a source of clean, low pressure air. As shown in the pneumatic system schematic, Figure 1, air enters the unit through a dry element filter located outside of the cabinet. After the air has passed through the blower, it is either directed to the aircraft or returned to atmosphere via the air flow control valve. A pressure relief valve has been provided to protect the blower from dead head start-up and is adjusted to open at 13 PSIG.

The exterior panels and components of the CPU are shown in Figures 3 - 5.

The CPU control panel is broken down into three distinct sections for ease of operation and data gathering:

- o Group 1. - Aircraft Cabin Feedback Data
- o Group 2. - Cabin Pressurization Unit Control
- o Group 3. - Regulated Shop Air Supply

4.1 Group 1.; Aircraft Cabin Feedback Data

The aircraft cabin feedback data section is located on the far left side of the CPU control panel as shown in Figure 5. It is this group of instruments that tell what is happening inside the aircraft. The instruments in this group include the following as shown in Figure 6.

1. 0-15 PSIG pressure gauge
2. 0-4000 Ft./Min. rate of climb gauge
3. 0-8 inch WG air leakage gauge

4.1.1 Pressure Gauge

The pressure gauge is connected directly to the aircraft via the sensor hose, and senses the ACTUAL pressure within the aircraft, see Figure 1. A gauge with an accuracy of ½% has been selected for this purpose to assure accurate representation of cabin pressure.

4.0 DETAILED DESCRIPTION (Cont'd)

4.1.2 Rate of Climb Gauge

The rate of climb gauge is also connected directly to the aircraft via the sensor hose and senses the cabin pressure rate of change, see Figure 1. Most aircraft manufacturers require the cabin be pressurized or de-pressurized in terms of "rate of climb" or thousands of feet per minute. By controlling the rate of aircraft cabin pressurization, the affect on sensitive pneumatically operated flight gauges is minimized.

The operator must be aware that the rate of climb reads:

A) INCREASING PRESSURE; NEEDLE MOVES IN THE "DOWN" DIRECTION, COUNTER-CLOCKWISE ROTATION (CCW)

B) DECREASING PRESSURE; NEEDLE MOVES IN THE "UP" DIRECTION, CLOCKWISE ROTATION (CW)

A label on the control panel illustrates rate of climb indications.

4.1.3 Air Leakage Gauge

The air leakage gauge is the only gauge in Group 1 that is not connected to the aircraft sensor hose. As shown in Figure 1, the air leakage gauge senses differential pressure in the aircraft air supply line. This differential pressure is translated into an air leakage flow reading via Curve 2 in Appendix I .

When the aircraft cabin pressure is held in a state of equilibrium, as indicated by a ZERO reading on the rate of climb gauge, the air going to the aircraft cabin is equal to the air leaking from the aircraft cabin.

4.2 Group 2.; Cabin Pressurization Unit Control

The cabin pressurization unit control section is located in the middle of the control panel as shown in Figure 5. It is the group of instruments and controls that govern CPU operation. This group includes the following as shown in Figure 7.

1. 0-15 PSIG pressure gauge
2. 0-240°F temperature indicator
3. Power switch
4. Air control
5. Cabin air supply valve, see Figure 3

4.2.1 Pressure Gauge

The pressure gauge in this group indicates the pressure level of the CPU.

This pressure gauge will read higher than the aircraft cabin pressure gauge in Group 1. The difference in readings is the pressure drop of the system. In those aircraft where the supply air flows directly into the aircraft cabin the difference will be minimal. However, on those aircraft where the supply air must flow through a mass flow control valve, heat exchanges, check valve, etc. the difference may be significant. For example, in the Lear aircraft the Group 2 pressure gauge will read 5 to 6 PSIG before the mass flow control valve opens and allows air to enter the aircraft cabin. At the leakage pressure level, the difference between the aircraft cabin pressure and the CPU pressure is about 3 PSIG on the Lear.

In some instances it may be necessary, depending on the aircraft system, to attach the aircraft air supply hose down stream of those back pressure devices in order to achieve the required pressure level for testing; check with the aircraft manufacturer FIRST.

4.2 Group 2.; Cabin Pressurization Unit Control (Cont'd)

> **CAUTION**
>
> TO PREVENT BODILY INJURY OR DAMAGE TO AIRCRAFT.
>
> ALWAYS FOLLOW THE AIRCRAFT MANUFACTURERS INSTRUCTIONS WHEN PRESSURIZING AIRCRAFT

It is the CPU pressure indication that is used in the air leakage determination - NOT the cabin pressure from Group 1.

4.2.2 Temperature Indicator

The temperature indicator in this group senses the temperature of the air passing by the flow measuring station. This temperature reading has a two fold purpose. First, for correcting the actual air flow data (ACFM) to standard cubic foot per minute (SCFM) values, and second, to indicate the temperature of the make-up air going to the aircraft.

Appendix I gives the method for correcting ACFM data to SCFM.

As air is compressed, the temperature of the air is increased at the approximate rate of 13°F per 1 PSIG pressure over the ambient air temperature. It is expected to see higher air temperatures as the ambient temperature rises and as higher pressure levels are obtained. Temperatures of 220°F are possible under certain conditions. However, due to the volume of air in the aircraft cabin, the amount of air being supplied and the heat loss between CPU and aircraft, little effect on cabin interior temperature will be seen for short runs of twenty minutes or less.

4.2 Group 2.; Cabin Pressurization Unit Control (Cont'd)

4.2.2.1 Calculation of anticipated CPU air out temperature:

To = Ta + (13 x Pcpu)

Where: To = CPU air out temperature
Ta = ambient temperature
13 = °F use per CPU control group pressure
Pcpu = CPU control group pressure level

For example, on a 90°F day where the CPU must generate 10 PSIG air in order to get the aircraft cabin to 8 PSIG.

To = 90°F + (13 x 10 PSIG)
To = 90°F + (130)
To = 220°F

4.2.3 Power Switch

The power switch in Group 2, see Figure 7, is the main electrical power switch for the CPU. It is a push/pull switch with ON being in the pulled direction and OFF being in the pushed direction.

4.2.4 Air Control

The air control in Group 2 is a valve that controls the amount of air directed to the aircraft, reference Figure 1. As shown in the pneumatic schematic, air from the blower is either directed to the aircraft or dumped to atmosphere. By opening this valve (full CCW position) the greatest amount of air is dumped to atmosphere, and as it is closed (CW rotation) air flow is increased to the aircraft along with a corresponding increase in pressure.

WARNING

ALWAYS START & STOP THE CPU WITH AIR CONTROL IN FULL OPEN (COUNTER CLOCKWISE) POSITION - FAILURE TO DO THIS MAY CAUSE DAMAGE TO AIRCRAFT INSTRUMENTS.

4.3 Group 3.; Regulated Shop Air Supply

The regulated shop air supply section is located on the far right side of the control panel as shown in Figure 5. There is no interconnection of this group with either Groups 1 or 2 as shown in Figure 1. The purpose of this group is to provide a supply of regulated shop air up to 30 PSIG for pressurizing aircraft cabin door seals. This group includes the following as shown in Figure 8.;

1. 0 - 30 PSIG pressure gauge
2. Air regulator

The inlet and outlet connections for this group are on the upper left corner of the cabinet rear panel, see Figure 4.

5.0 PREPARATION FOR USE

The Aircraft Cabin Pressurization Unit (CPU) is shipped fully assembled and only the following steps are required to make the unit operational.

5.1 GENERAL INSPECTION

Visually check unit for loose nuts, bolts, etc. that may have resulted from shipment. Remove both front and rear panels to accomplish this check.

5.2 BLOWER

Check the blower oil level. A sight gauge is provided, shown in Figure 3, on the left side panel.

NOTE
If oil is required, see paragraph 7.1.b for oil type and filling procedure.

5.3 CONNECTING ELECTRICAL LEADS

Install plug (not supplied) onto the electrical cord. Check for proper motor rotation as follows:

a) Turn "air control valve" fully CCW to full "OPEN" position.

b) Fully "OPEN" the aircraft cabin air supply shut-off valve.

c) Power switch in "OFF" position.

d) Connect to electrical power supply.

e) Check motor rotation by "bumping" the master switch on-off. Rotation should be in the direction of the arrows afixed to the blower.

f) To correct motor rotation, change any two of the three input power leads at the plug.

g) Re-install both front and rear panels.

5.4 PRESSURE RELIEF VALVE (INTERNAL)

The pressure relief valve is factory set at 13.0 PSIG and should NOT be re-set by the customer to open at any pressures above 13.0 PSIG.

6.0 OPERATION

Due to the complexities, differences, and changes in aircraft pneumatic systems, no attempt has been made to relate to any specific aircraft. The customer must ALWAYS follow the aircraft manufacturer's instructions regarding aircraft cabin pressurization procedures and pressure levels. It is mandatory for safety reasons that the operator read and understand this manual and the aircraft maintenance manual prior to using this equipment. Refer to the pages illustrating the control panel, Figure 5, left side and front, Figure 3, right side and rear, Figure 4, pneumatic system schematic Figure 1, and internal component pages in the customer parts list for clarification while reading this manual.

CAUTION

TO PREVENT PERSONNEL INJURY AND/ OR DAMAGE TO AIRCRAFT:

1. ALWAYS FOLLOW AIRCRAFT MANUAL PROCEDURES FOR AIRCRAFT PRESSURIZATION.
2. NEVER EXCEED SPECIFIED AIRCRAFT PRESSURE LEVELS.
3. NEVER OPERATE THIS CPU PRIOR TO READING THIS MANUAL.
4. NEVER OPEN ANY AIRCRAFT CABIN DOOR OR ACCESS PANEL IF THERE IS ANY PRESSURE IN THE CABIN.
5. ALWAYS USE APPLICABLE SAFETY EQUIPMENT REQUIRED FOR AIRCRAFT PRESSURIZATION TESTS.

6.1 GENERAL

This aircraft cabin pressurization unit (CPU) is a pneumatic device and as such is influenced by the laws of compressible fluids. The operator should be aware of the following information.

6.1 GENERAL (Cont'd)

6.1.2 COMPRESSED AIR

As air is compressed, a tremendous amount of energy is stored. This is similar to the energy stored in a car coil spring when compressed. Under NO circumstances are aircraft doors or access panels to be opened if there is any pressure at all in the aircraft above atmospheric pressure.

As an example, the force produced on a door `2` feet wide by `5` feet high with only `1` PSIG is equal to 1440 lbs.

6.1.3 ACFM vs. SCFM

Since air is a compressible fluid and is affected by pressure and temperature, the data taken represents "actual" cubic foot per minute (ACFM) air flows. By correcting for pressure and temperature, ACFM air flows are corrected to "standard" cubic foot per minute (SCFM) air flows. This is necessary so that leakage rates can be compared to aircraft specification values regardless of ambient conditions. Reference Appendix I.

6.2 OPERATING PROCEDURE

6.2.1 GENERAL PLAN

In general, aircraft cabin leakage testing should be done as follows:

a) Using the CPU, establish actual aircraft leakage rate.

b) Compare the leakage rate (SCFM) to the aircraft manufacturer's specification.

c) Repair cabin leaks, starting with major leaks first. Use low pressure air, 1-2 PSI.

d) After repair, using the CPU again, determine the new leakage rate (SCFM) and compare to aircraft specification.

6.2 OPERATION PROCEDURE (Cont'd)

6.2.1 GENERAL PLAN

e) Repeat c) and d) above until the cabin leakage rate meets or is less than that required by the aircraft manufacturer's specifications.

6.2.2 TEST METHODS

Two different test methods are used to determine aircraft cabin leakage rates. One of these is generally specified by the aircraft manufacturer.

a) Flow measurement method

b) Pressure decay method

The following paragraphs explain each of the above methods.

> **CAUTION**
>
> TO PREVENT PERSONAL INJURY AND/OR DAMAGE TO THE AIRCRAFT, ALWAYS FOLLOW THE AIRCRAFT MANUFACTURER's INSTRUCTIONS FOR PRESSURIZING AIRCRAFT.

A) FLOW MEASUREMENT METHOD

The flow measurement method measures the flow of air leakage from the aircraft cabin.

The step by step test procedure for this test method is given in Appendix II.

B) PRESSURE DECAY METHOD

The pressure decay method determins cabin air leakage by timing the rate of climb depressurization from a set pressure. The time is normally measured in seconds. A stopwatch readable in 10th's of a second may be used for this test.

The step by step test procedure for this test method is given in Appendix II.

6.2 OPERATION PROCEDURE (Cont'd)

6.2.3 AIRCRAFT LEAKAGE

Aircraft cabins generally leak in the following areas:

- o Door seals
- o Outflow valves and valve gaskets
- o Safety valves and valve gaskets
- o Pneumatic air line connections
- o Control cable seals in pressure bulkheads
- o Electrical wiring bundles through pressure bulkheads
- o Window seals
- o Fuselage rivets and overlapping fuselage panels

6.2.4 LOCATING AIRCRAFT CABIN LEAKS

a) It DOES NOT require high pressure air to find leakage points in the aircraft cabins. Whenever possible all leakage investigations should be performed at aircraft cabin pressures of between 1 and 2 PSIG. In this way:

   1. Less heat build-up will occur during extended running. Reference paragraph 4.2.2.

   2. Lower CPU noise is generated, allowing audible leaks to be found.

   3. Lower power consumption by the CPU.

b) Non-audible leaks can be found by spraying the aircraft exterior with a soap and water solution. Leaks are revealed by the bubbles generated and can be marked with a colored grease pencil for later correction.

7.0 MAINTENANCE AND TROUBLE SHOOTING

7.1 MAINTENANCE

a) PRESSURE GAUGES

It is MANDATORY for safe unit operation that the pressure gauges reading aircraft cabin pressure and CPU pressure be calibrated and certified by an authorized repair station annually or sooner if they are suspected to be reading incorrectly.

- These gauges must read within ½% accuracy.

> CAUTION
>
> SERIOUS BODILY INJURY CAUSED BY CABIN OVER PRESSURIZATION MAY RESULT BY FAILURE TO COMPLY WITH PRESSURE GAUGE CALIBRATION AND CERTIFICATION

b) INSTRUMENTATION

All other instrumentation gauges should be calibrated annually in order to maintain unit over-all accuracy.

c) BLOWER OIL LEVEL

Prior to each use the blower oil level should be checked and replenished as required.

- An oil level gauge is located on the left side panel.
- To replenish, remove CPU front panel, remove blower vent cap and add oil as required.
- DO NOT OVER FILL
- Use a high grade of SAE 40 NON-DETERGENT oil
- See Appendix IV for maintenance data

d) BELTS

The drive belts must remain tight or slippage will occur at higher operating pressures.

- Belts can be inspected by removing the rear panel.
- Adjustment is made by loosening the motor adjustment plate bolts and tightening the bolt located on the left end of the adjustment plate. After adjustment, re-tighten all motor bolts.

7.1 MAINTENANCE (Cont'd)

e) CASTER LUBRICATION

Once a year lubricate all casters with general purpose grease.

f) BLOWER ROUTINE MAINTENANCE AND REPAIR

o See Appendix IV for maintenance data.

g) ELECTRIC MOTOR

The electric motor selected for this CPU is of high quality and should provide years of trouble free service. See Appendix V.

h) INLET AIR FILTER

Depending on conditions, clean periodically and replace annually.

o See the illustrated customer parts list for the Part Number of the replacement filter element.

7.2 TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
Cannot build required cabin air pressure - Flow HIGH - CPU Pressure lower	Excessive cabin leakage	Assure all aircraft inspection panels in place.
		Assure door seal inflated
		Assure aircraft cabin air controls are properly set. Check outflow and safety valves.
		Seal aircraft leakage areas.

7.2 TROUBLE SHOOTING (Cont'd)

PROBLEM	PROBABLE CAUSE	REMEDY
Cannot build required cabin air pressure. - Flow LOWER - CPU Pressure high	Back pressure loss in air-craft system.	ASSURE aircraft cabin air controls are set properly.
		Common on aircraft where CPU air enters upstream of aircraft mass air flow valve. Re-plumb down stream of aircraft mass air flow valve.
CPU output presure and/or flow low.	Loose belts	Tighten belts
		Replace worn belts
	Dirty inlet filter	Replace filter
	Low power	Check for facility blown fuse, loose wire or CPU motor starter heater.
No CPU output	Drive belts failed	Inspect and tighten or replace
	Blocked inlet	Inspect inlet silencer/ filter for blockage and correct
	Failed Motor	Replace motor
	Failed Blower	Refer to Appendix IV Blower Maintenance.
	No inlet power	Check facility

TRONAIR

MODEL 15-7600-1000

FIGURE 1: PNEUMATIC SCHEMATIC

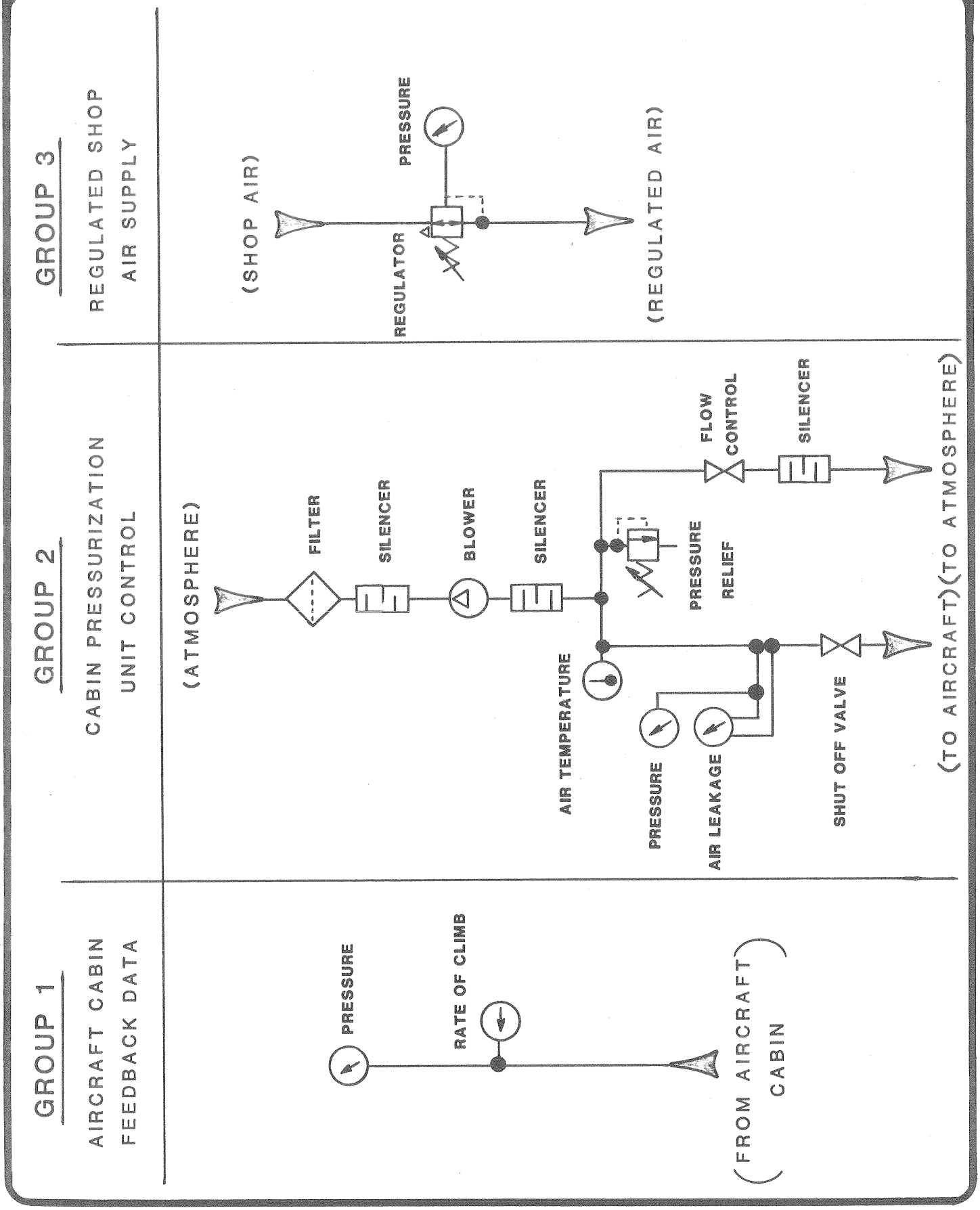
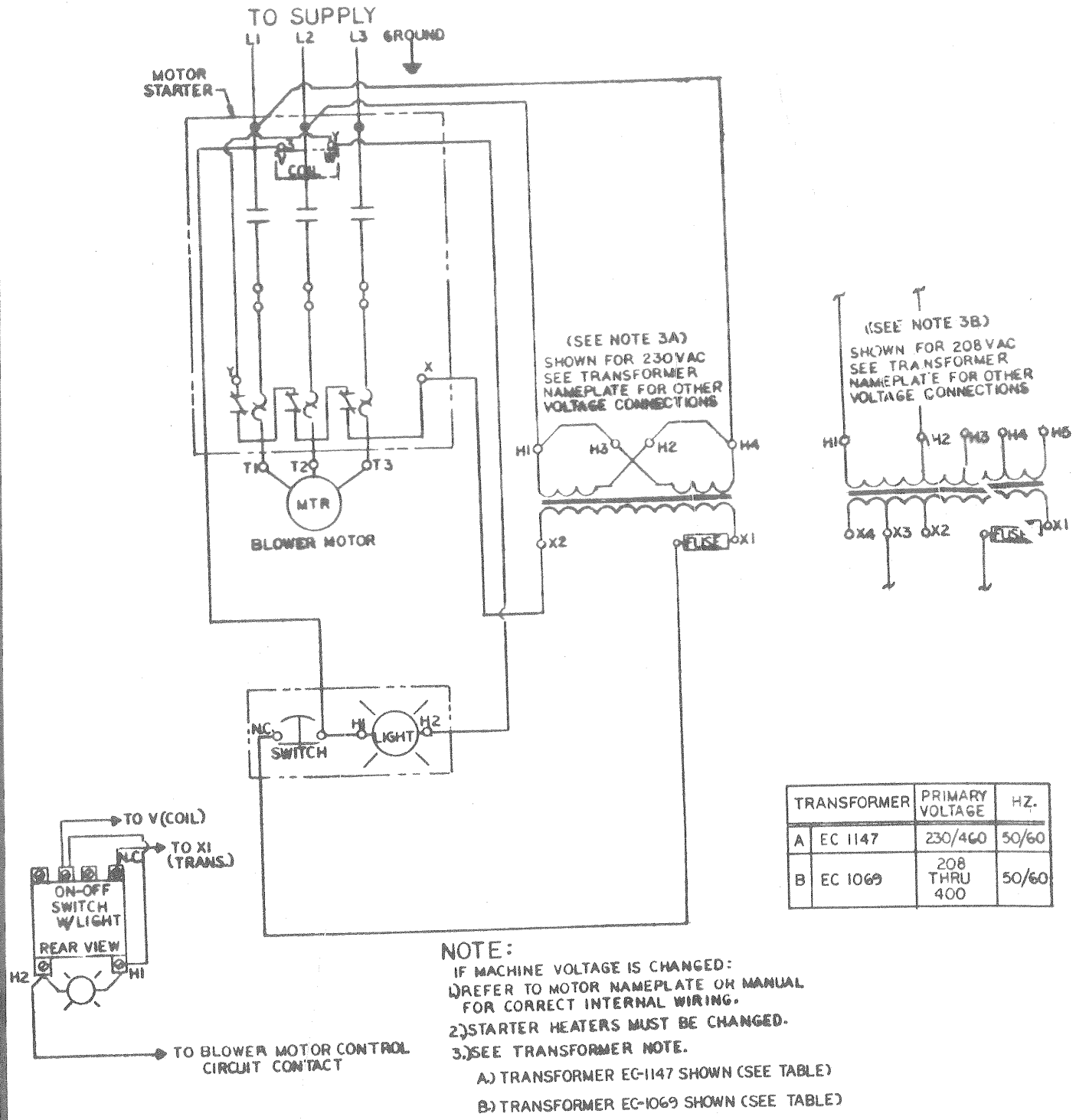


FIGURE 2: ELECTRICAL SCHEMATIC



TRANSFORMER		PRIMARY VOLTAGE	HZ.
A	EC 1147	230/460	50/60
B	EC 1069	208 THRU 400	50/60

NOTE:

IF MACHINE VOLTAGE IS CHANGED:

1.) REFER TO MOTOR NAMEPLATE OR MANUAL FOR CORRECT INTERNAL WIRING.

2.) STARTER HEATERS MUST BE CHANGED.

3.) SEE TRANSFORMER NOTE.

A.) TRANSFORMER EC-1147 SHOWN (SEE TABLE)

B.) TRANSFORMER EC-1069 SHOWN (SEE TABLE)

FIGURE 3: CPU FRONT AND LEFT SIDE

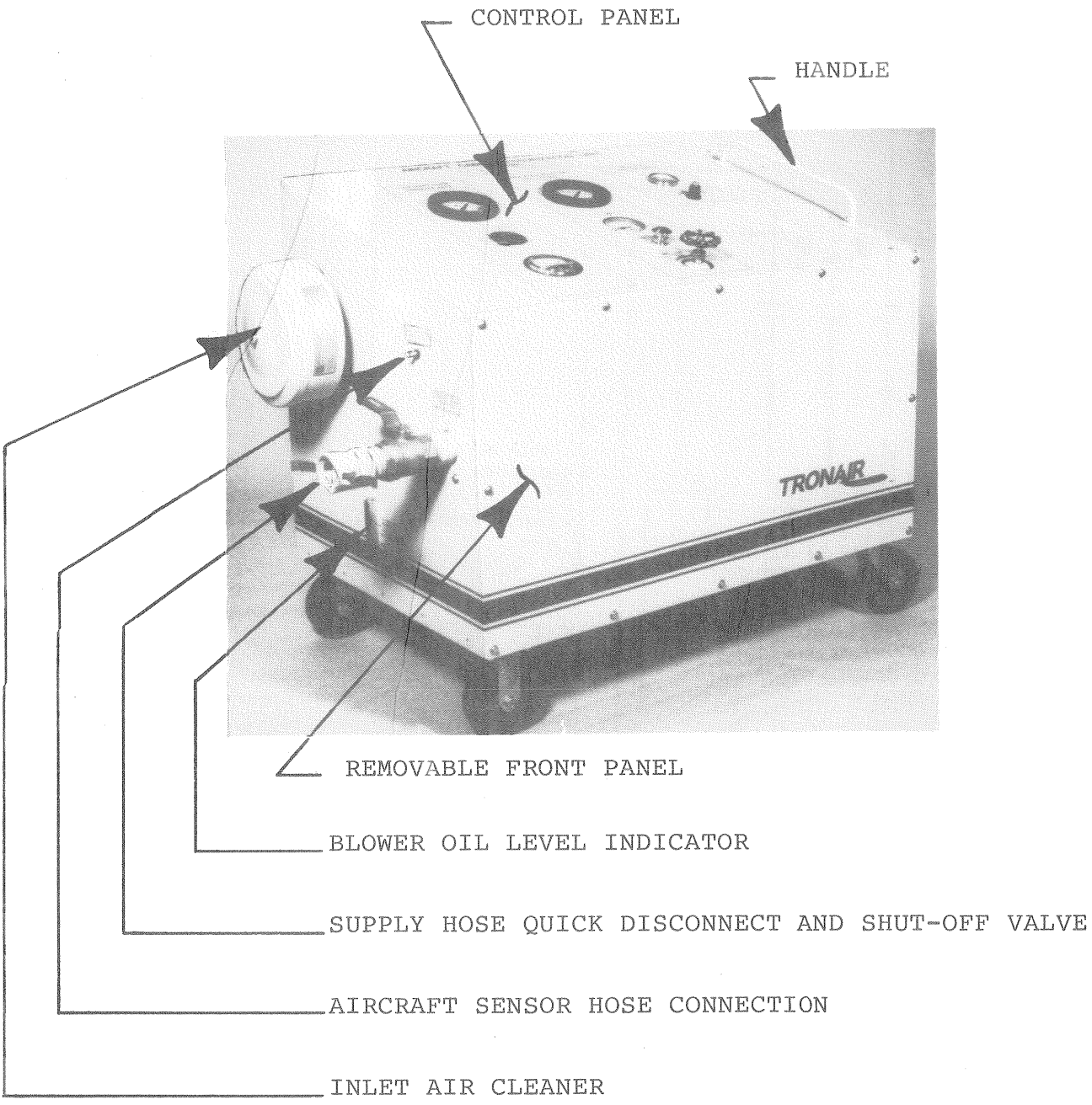


FIGURE 4: CPU REAR AND RIGHT SIDE

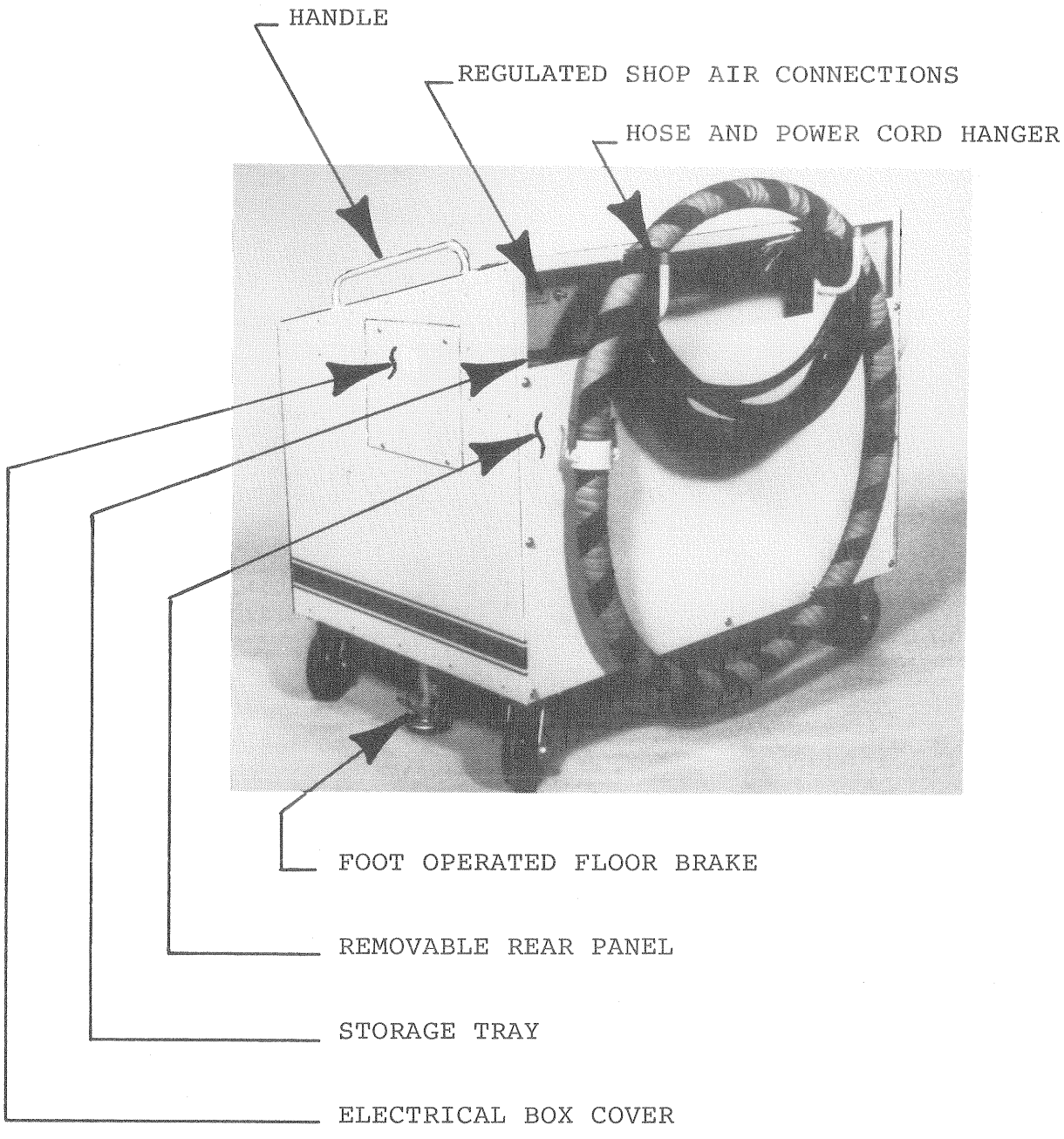
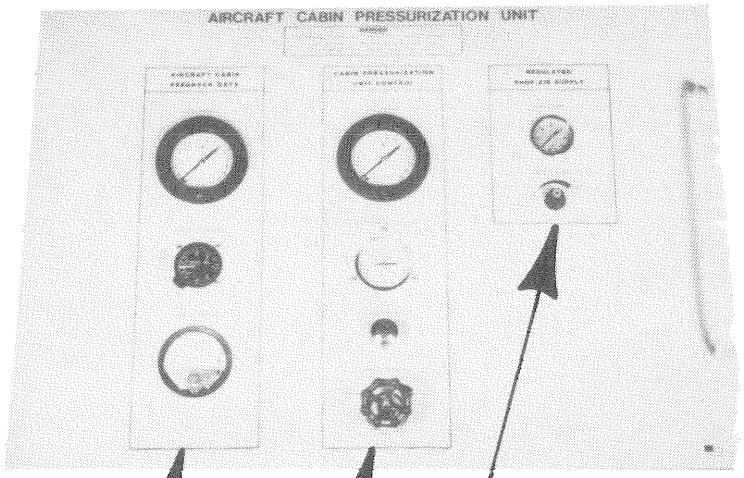


FIGURE 5: CPU CONTROL PANEL LAYOUT



GROUP 3 - Regulated Shop Air Supply

GROUP 2 - Cabin Pressurization Unit Control

GROUP 1 - Aircraft Cabin Feed Back Data

FIGURE 6: AIRCRAFT CABIN FEED BACK DATA

GROUP I

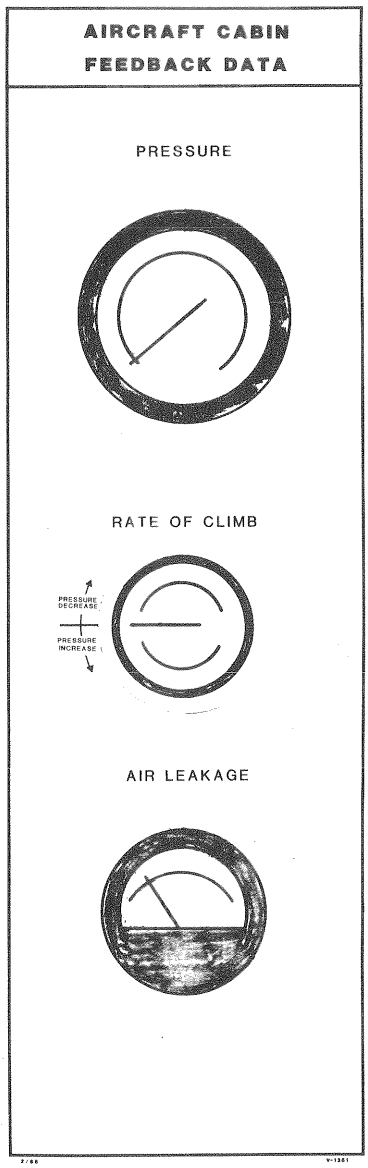
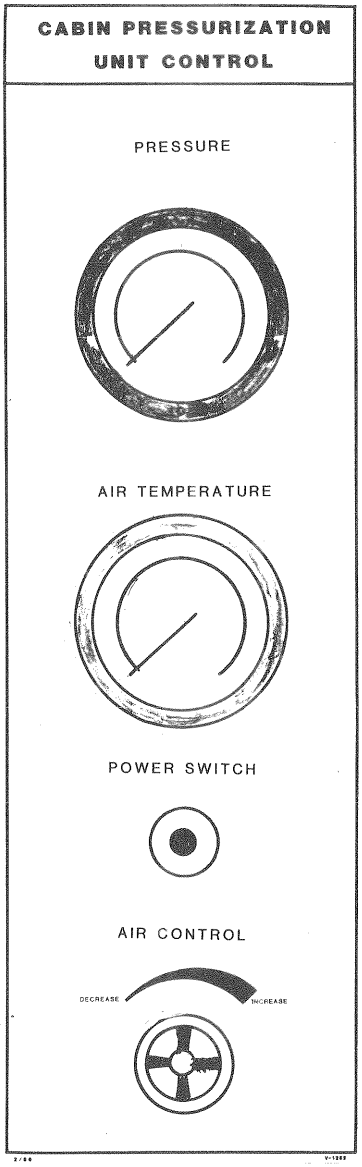
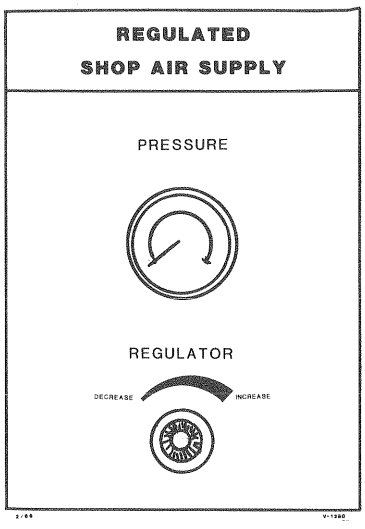


FIGURE 7: CABIN PRESSURIZATION UNIT CONTROL

GROUP II



GROUP III


REGULATED
SHOP AIR SUPPLY
PRESSURE
REGULATOR
DECREASE
INCREASE

APPENDIX

I. LEAKAGE AIR FLOW DETERMINATION AND SCFM PROCEDURE

II. FLOW MEASUREMENT TEST PROCEDURE

III. PRESSURE DECAY TEST PROCEDRUE

IV. BLOWER MAINTENANCE DATA

V. MOTOR MAINTENANCE DATA

VI. AIR FLOW GAUGE (MAGNEHELIC) CALIBRATION AND MAINTENANCE DATA

VII. PRESSURE GAUGE CALIBRATION DATA

APPENDIX I

LEAKAGE AIR FLOW DETERMINATION AND SCFM CORRECTION PROCEDURE

PROCEDURE

1. Convert the reading (inches of WG.) obtained from the air leakage gauge (Group 1) to air flow by using Curve 1.

   A) Find inches of WG. value on the vertical scale.

   B) Move horizontally across graph to the CPU pressure curve.

      (1) CPU pressure is used to calculate leakage flow and not aircraft cabin pressure.

      (2) Interpolate if the CPU pressure falls between the pressure lines provided.

   C) At the intersection of inches of WG. and the CPU pressure curve, move downward on the graph and read air flow (CFM) the horizontal scale.

      Note: This value is the air flow as measured on a 70°F day.

2. Correct the air flow value (CFM) obtained in step (1) by multiplying this value by the temperature correction factor obtained from Curve 2. The result is air flow or leakage corrected to standard day conditions; SCFM.

   A) Find the air flow temperature value read from the temperature gauge (Group 2) on the vertical scale of Curve 2.

   B) Move horizontally across the graph to the curve.

   C) At the intersection of temperature and the curve, move downward on the graph and read the Temperature Multiplication Factor.

   D) Multiply the air flow value obtained in step (1) by this temperature factor. Leakage air flow is now in SCFM terms.

      CFM x Temp Factor = SCFM

APPENDIX II

- FLOW MEASUREMENT TEST PROCEDURE

THIS TEST PROCEDURE SHOULD BE USED WHEN THE AIRCRAFT MANUFACTURER REQUIRES CABIN AIR LEAKAGE BE MEASURED IN TERMS OF AIR FLOW; SCFM.

DANGER

TO PREVENT PERSONAL INJURY AND/OR DAMAGE TO THE AIRCRAFT....

1. ALWAYS FOLLOW THE AIRCRAFT MANUFACTURER'S INSTRUCTIONS FOR PRESSURIZING AIRCRAFT.

2. NEVER OPERATE THIS CPU PRIOR TO READING THE CPU OPERATION AND SERVICE MANUAL.

FLOW MEASUREMENT TEST PROCEDURE

1. Determine the aircraft pressurization limits and leakage rates from the aircraft manufacturer's manual. A handy form for recording this data is provided at the end of this procedure.

2. Connect the air supply hose to the aircraft with the appropriate adaptor.

3. Connect the sensor hose to the aircraft.

CAUTION

TO OBTAIN TRUE AIRCRAFT CABIN FEED BACK DATA AND PREVENT OVER PRESSURIZING THE AIRCRAFT CABIN.

- ALL CONNECTIONS MUST BE TIGHT AND FREE OF LEAKS

- AIRCRAFT CONNECTION PORT MUST BE UNOBSTRUCTED AND CONNECTED DIRECTLY TO THE CABIN AND/OR COCKPIT AREA.

4. If required, connect the regulated shop air hose to the aircraft in order to pressurize door seals, etc.

NOTE

It is suggested that prior to each use, the regulator be adjusted to its minimum setting and re-set as required.

5. Set aircraft cabin pressurization controls in the cockpit in accordance with the aircraft manufacturer's instructions for ground pressurization testing using an external air source.

6. Secure all aircraft windows, access panels and doors as if preparing the aircraft for take off.

CAUTION

TO PREVENT PERSONAL INJURY, ATTACH, WARNING TAGS TO ALL DOOR HANDLES: "DO NOT OPEN".

7. "CLOSE" the CPU aircraft cabin air supply valve.

8. "FULLY OPEN" the CPU air control valve (full CCW position).

9. Turn power "ON" to CPU.

10. Slowly "OPEN" the aircraft cabin air supply valve.

    a) The CPU rate of climb gauge will start reading (on most aircraft) showing air is going into the aircraft.

    b) The rate of climb gauge indicates an INCREASE in pressure when the needle moves in the DOWN direction; (counter-clockwise - CCW).

    c) Check and correct any leaks in the air supply hose connections between CPU and aircraft as these will contribute to the aircraft leakage rate and give erroneous readings.

11. INCREASE aircraft cabin pressure, read off the CPU panel (Group 1),by turning the CPU air control valve clockwise. The cabin rate of climb gauge will respond directly with the turning of this valve.

WARNING

DAMAGE TO THE AIRCRAFT INSTRUMENTATION IS POSSIBLE.

DO NOT EXCEED AIRCRAFT MANUFACTURER'S RATE OF CLIMB SPECIFICATION.

12. As the aircraft cabin pressure approaches the required level, gradually back-off the CPU cabin air control valve so that at the required pressure level, the rate of climb reads zero (0).

NOTE

If the leakage rate is too high, the required pressure may not be attainable. At this point record the data stated in (13) below.

13. Maintaining the CPU rate of climb at zero, record the following data:

    a) Aircraft cabin pressure, PSIG

    b) Air leakage rate, inch WG

    c) CPU pressure, PSIG

    d) CPU air temperature, °F

14. After the data has been recorded, reduce the aircraft cabin pressure to zero (0) using the CPU aircraft cabin air control valve. Turn the valve counter-clockwise (CCW) while maintaining an acceptable rate of descent on the rate of climb gauge.

NOTE

The rate of climb gauge shows a DECREASE in cabin pressure when the needle moves in the UP direction; clockwise (CW).

WARNING

DAMAGE TO THE AIRCRAFT INSTRUMENTATION IS POSSIBLE.

DO NOT EXCEED AIRCRAFT MANUFACTURER'S RATE OF CLIMB SPECIFICATION.

15. If there is still pressure in the aircraft after the aircraft cabin air control valve is in the full CCW position, CLOSE the aircraft cabin air supply valve and shut off the CPU.

    The remaining aircraft cabin pressure will bleed off naturally. Opening the supply valve slightly will increase bleed off rate, however, do not exceed rate of descent limits.

16. Assure ALL cabin pressure is bled off.

DANGER

UNDER POSSIBILITY OF BODILY INJURY

- DO NOT OPEN CABIN DOOR UNTIL....

  1. "TAPPED" CABIN FEED BACK PRESSURE GAUGE READS ZERO (0)

  2. DISCONNECTED AIR SUPPLY HOSE FROM CABIN PRESSURIZATION UNIT IS CHECKED TO ASSURE NO AIR IS COMING FROM AIRCRAFT.

- SLOWLY UNLATCH CABIN DOOR

17. See Appendix I for leakage data correction to SCFM.

AIRCRAFT: _____

AIRCRAFT REGISTRATION NO. _____

PRESSURES:

- Not to exceed _____PSIG
- Safety Valve Operation _____PSIG
- Leakage Test _____PSIG

RATE OF CLIMB (not to exceed):

- Ascent _____FT/MIN
- Descent _____FT/MIN

CABIN LEAKAGE LIMIT: _____SCFM

* record and calculate*

- Test Data
  - Unit Air Supply Temp._____°F
  - Flow Rate _____"WG
  - CPU Pressure* _____PSIG
- From Curve 1
  "WG = _____ACFM
- From Curve 2
  ____Temp.Factor X (____ACFM)=____SCFM

TESTED BY:_____ DATE:_____

REPAIR STATION CERT. NO._____

*CPU PRESSURE,NOT AIRCRAFT CABIN PRESSURE

NOTES

TRONAIR

MODEL 15-7600-1000 CPU

DATA SHEET: FLOW TEST METHOD

APPENDIX III

- PRESSURE DECAY TEST PROCEDURE

THIS TEST PROCEDURE SHOULD BE USED WHEN THE AIRCRAFT MANUFACTURER REQUIRES CABIN AIR LEAKAGE BE MEASURED IN TERMS OF PRESSURE DECAY DURING A PERIOD OF TIME; SECONDS.

DANGER

TO PREVENT PERSONAL INJURY AND/OR DAMAGE TO THE AIR-CRAFT....

1. ALWAYS FOLLOW THE AIR CRAFT MANUFACTURER'S INSTRUCTIONS FOR PRES-SURIZING AIRCRAFT.

2. NEVER OPERATE THIS CPU PRIOR TO READING THE CPU OPERATION AND SER-VICE MANUAL.

PRESSURE DECAY TEST PROCEDURE

The pressure decay method determines cabin air leakage by timing the rate of cabin de-pressurization from a set pressure. The time is normally measured in seconds. A stopwatch readable in 10th's of a second may be used for this test.

1. Determine the aircraft pressurization limits and leakage rates from the aircraft manufacturer's manual. A handy form for recording this data is provided at the end of this procedure.

2. Connect the air supply hose to the aircraft with the appropriate adaptor.

3. Connect the sensor hose to the aircaft.

CAUTION

TO OBTAIN TRUE AIRCRAFT CA-BIN FEED BACK DATA AND PRE-VENT OVER PRESSURIZING THE AIRCRAFT CABIN.

- ALL CONNECTIONS MUST BE TIGHT AND FREE OF LEAKS
- AIRCRAFT CONNECTION PORT MUST BE UNOBSTRUCTED AND CONNECTED DIRECTLY TO THE CABIN AND/OR COCKPIT AREA.

4. If required, connect the regulated shop air hose to the aircraft in order to pressurize door seals, etc.

NOTE

It is suggested that prior to each use, the regulator be adjusted to its minimum setting and re-set as required.

5. Set aircraft cabin pressurization controls in the cockpit in accordance with the aircraft manufacturer's instructions for ground pressurization testing using an external air source.

6. Secure all aircraft windows, access panels and doors as if preparing the aircraft for take off.

CAUTION

TO PREVENT PERSONAL INJURY, ATTACH, WARNING TAGS TO ALL DOOR HANDLES: "DO NOT OPEN".

7. "CLOSE" the CPU aircraft cabin air supply valve.

8. "FULLY OPEN" the CPU air control valve (full CCW position).

9. Turn power "ON" to CPU.

10. Slowly "OPEN" the aircraft cabin air supply valve.

    a) The CPU rate of climb gauge will start reading (on most aircraft) showing air is going into the aircraft.

    b) The rate of climb gauge indicates an INCREASE in pressure when the needle moves in the DOWN direction; (counter-clockwise - CCW).

    c) Check and correct any leaks in the air supply hose connections between the CPU and aircraft as these will contribure to the aircraft leakage rate and give erroneous readings.

11. INCREASE aircraft cabin presssure, read off the CPU panel (Group 1), by turning the CPU air control valve clockwise. The cabin rate of climb gauge will respond directly with the turning of this valve.

> **WARNING**
>
> DAMAGE TO THE AIRCRAFT INSTRUMENTATION IS POSSIBLE.
>
> DO NOT EXCEED AIRCRAFT MANUFACTURER'S RATE OF CLIMB SPECIFICATION.

12. As the aircraft cabin pressure approaches the required level, gradually back-off the CPU cabin air control valve so that at the required pressure level, the rate of climb reads zero (0).

13. With the CPU rate of climb gauge stabilized at zero, the following tasks must be performed in rapid succession:

    a) "CLOSE" the aircraft cabin air supply valve.

    b) "START" stop watch.

    c) "SHUT OFF" CPU master switch.

    d) "RECORD" the elapsed time rate between the two specified pressure levels.

14. After the data has been obtained, bleed off the aircraft cabin pressure to zero (0).

NOTE

1. If the bleed off rate is low, open the supply valve slightly to increase bleed off rate, however, do not exceed rate of descent limits.

2. The rate of climb gauge shows DECREASE in cabin pressure when the needle moves in the UP direction, clockwise, (CW).

15. Assure ALL cabin pressure is bled off.

DANGER

UNDER POSSIBILITY OF BODILY INJURY

- DO NOT OPEN CABIN DOOR UNTIL....
  1. "TAPPED" CABIN FEED BACK PRESSURE GAUGE READS ZERO (0).
  2. DISCONNECTED AIR SUPPLY HOSE FROM CABIN PRESSURIZATION UNIT IS CHECKED TO ASSURE NO AIR IS COMING FROM AIRCRAFT.
- SLOWLY UNLATCH CABIN DOOR

AIRCRAFT: _____

AIRCRAFT REGISTRATION NO. _____

PRESSURES:

- o Not to exceed _____PSIG
- o Safety Valve Operation _____PSIG
- o Leakage Test
  - Initial Pressure _____PSIG
  - End Pressure _____PSIG

RATE OF CLIMB (not to exceed):

- o Ascent _____FT/MIN
- o Descent _____FT/MIN

CABIN PRESSURE DECAY

- o Specification Time Limit _____SEC
- o Actual Time _____SEC

TESTED BY: _____ DATE: _____

REPAIR STATION CERT. NO. _____

*CPU PRESSURE NOT AIRCRAFT CABIN PRESSURE

NOTES

TRONAIR

MODEL 15-7600-1000 CPU

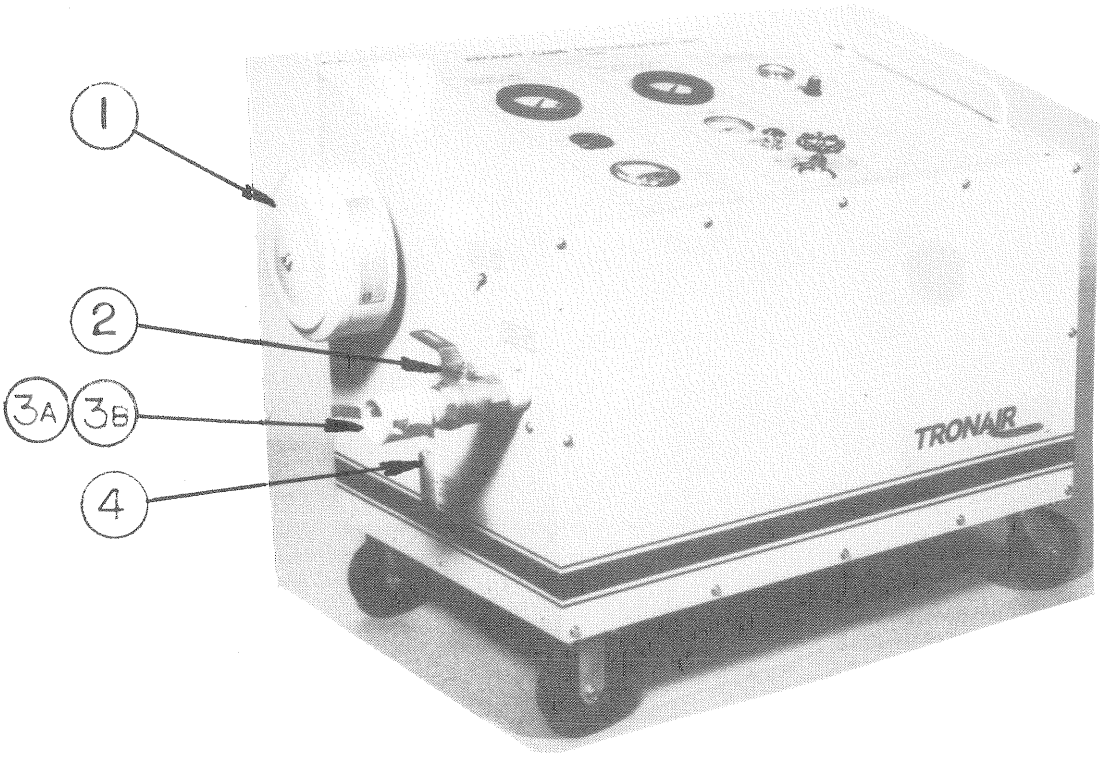
DATA SHEET: PRESSURE DECAY METHOD

ILLUSTRATED PARTS LIST

I. EXTERNAL COMPONENTS

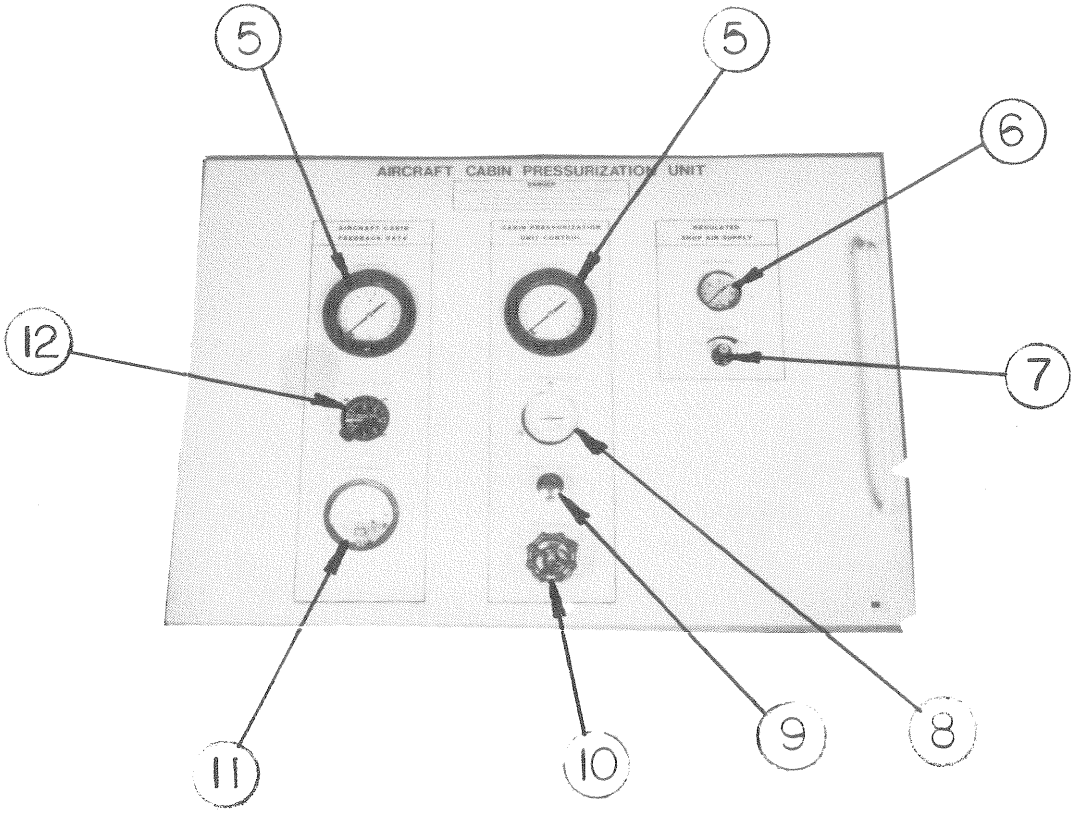
II. INTERNAL COMPONENTS

III. ELECTRICAL COMPONENTS



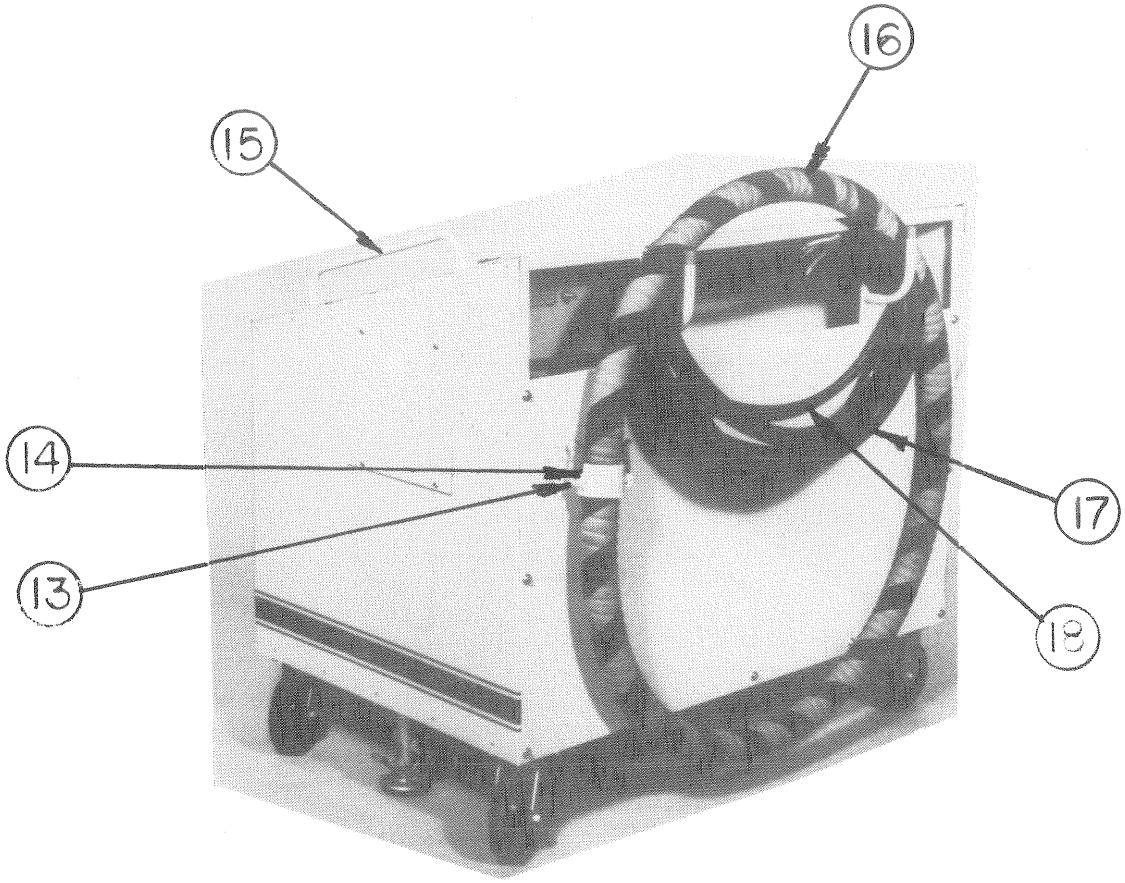
ITEM	PART NUMBER	QTY	DESCRIPTION
1	H-1402	1	Filter
	H-1439	1	Element Replacement
2	HC-1179	1	Ball Valve
3A	N-1521	1	Hose Coupling (M.P.T. Socket)
3B(LOOSE)	N-1522	1	Hose Coupling (F.P.T. Plug)
4	HC-1220	1	Flush Channel Gauge

EXTERNAL COMPONENTS



ITEM	PART NUMBER	QTY	DESCRIPTION
5	H-1394	2	Press. Gauge (0-15 PSI)
6	H-1395	1	Press. Gauge (0-30 PSI)
7	H-1397	1	Regulator - ¼"
8	HC-1134-1	1	Pyrometer
9	EC-1058	1	Switch w/Red Pilot Light
	EC-1073	1	Replacement Light Bulb
10	H-1407	1	Gate Valve
11	H-1409	1	Gage 0-8" WG
12	H-1396	1	Vert. Speed Indicator

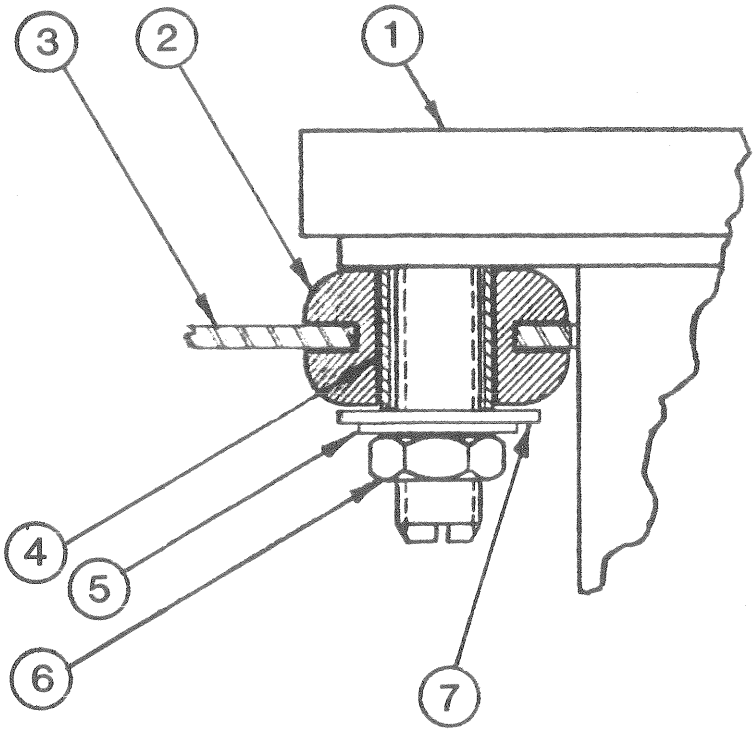
NOTE: FOR INSTALLATION OF ITEMS 5 AND 12 SEE PRESSURE GAUGE AND VERT. SPEED INDICATOR MOUNTING PAGES IN ILLUSTRATED PARTS LIST I.



ITEM	PART NUMBER	QTY	DESCRIPTION
13	H-1432	1	Hose Coupling (Hose Plug)
14	H-1435	1	Hose Coupling (Hose Socket)
15	Z-1656	1	Handle
16	H-1410	1	Hose
17	Z-1698	1	Hose Ass'y - Gray - Cabin Sensor Line
18	---	1	Power Cord

TRONAIR

PRESSURE GAUGE MOUNTING



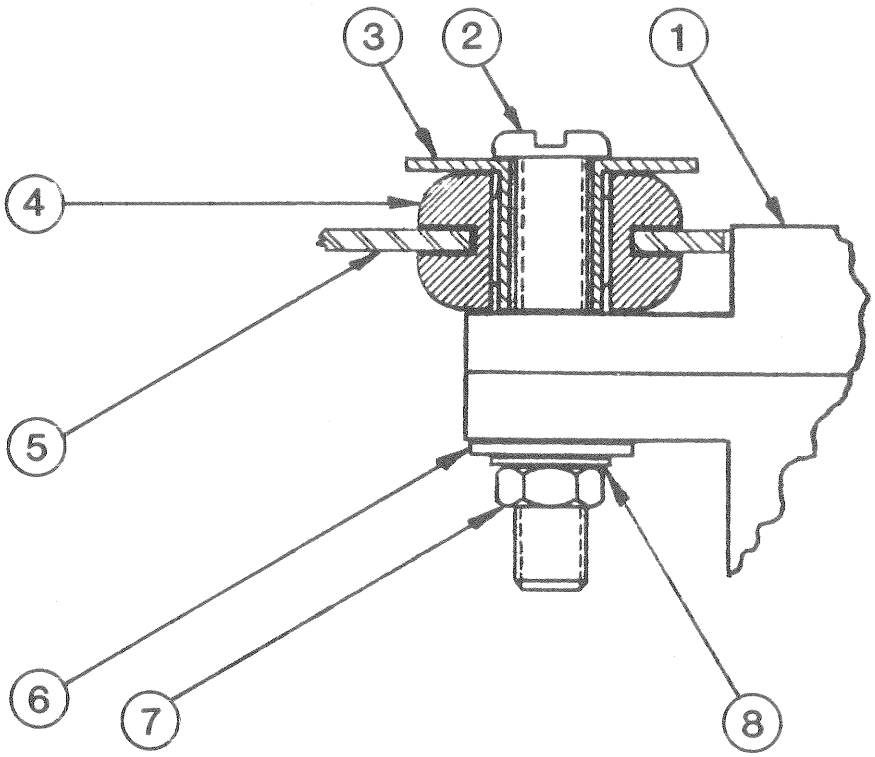
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	H-1394	2	PRESS. GAUGE (0-15 PSI)
*2	H-1484-3	6	VIBRATION GROMMET
3	----	REF.	CONTROL PANEL
*4	TR-1196	6	GROMMET SPACER
*5	G-1251-1030R	6	#10 LOCKWASHER
*6	G-1200-1030	6	10-24 HEX. NUT
*7	G-1250-1030N	6	#10 FLATWASHER

NOTE:

ITEMS INDICATED WITH * CAN BE PURCHASED AS K-1354/GAUGE VIBRATION KIT.

TRONAIR

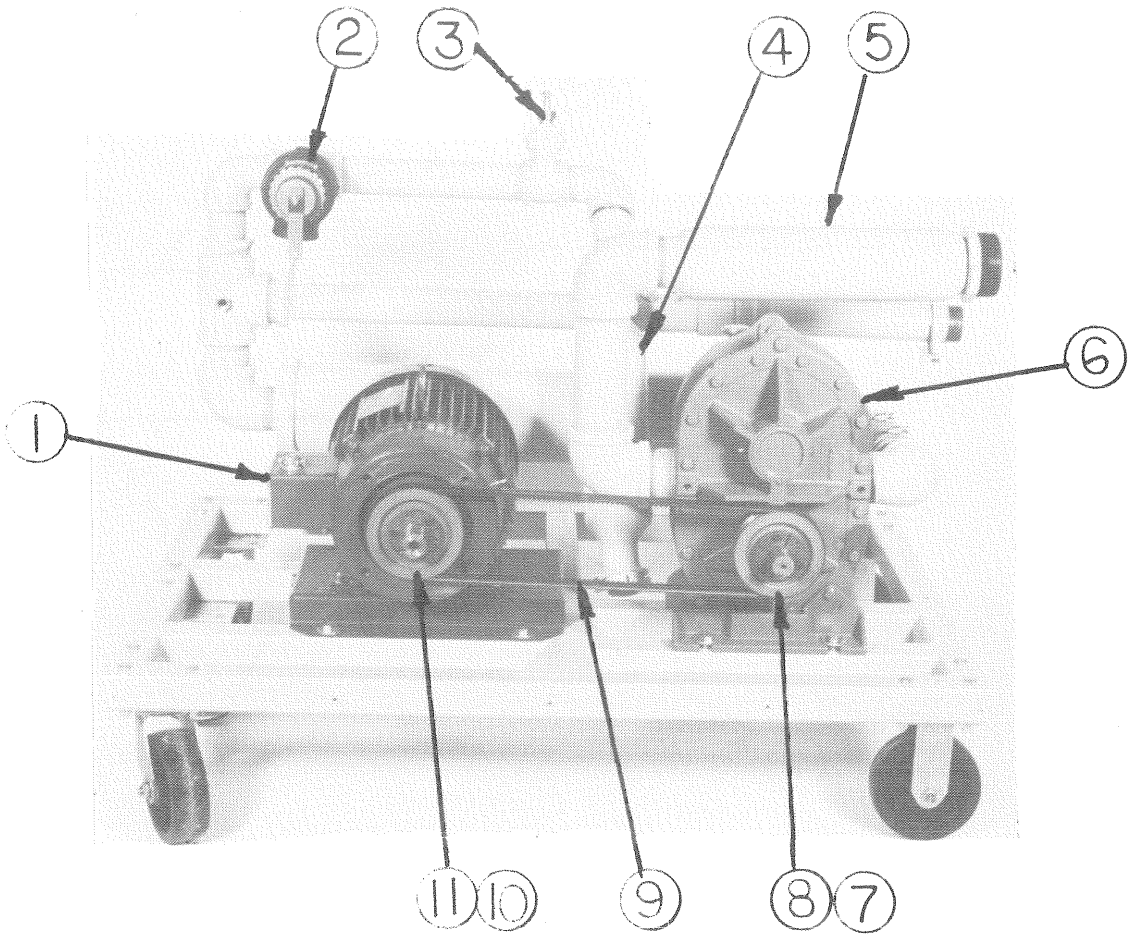
VERT. SPEED INDICATOR MOUNTING



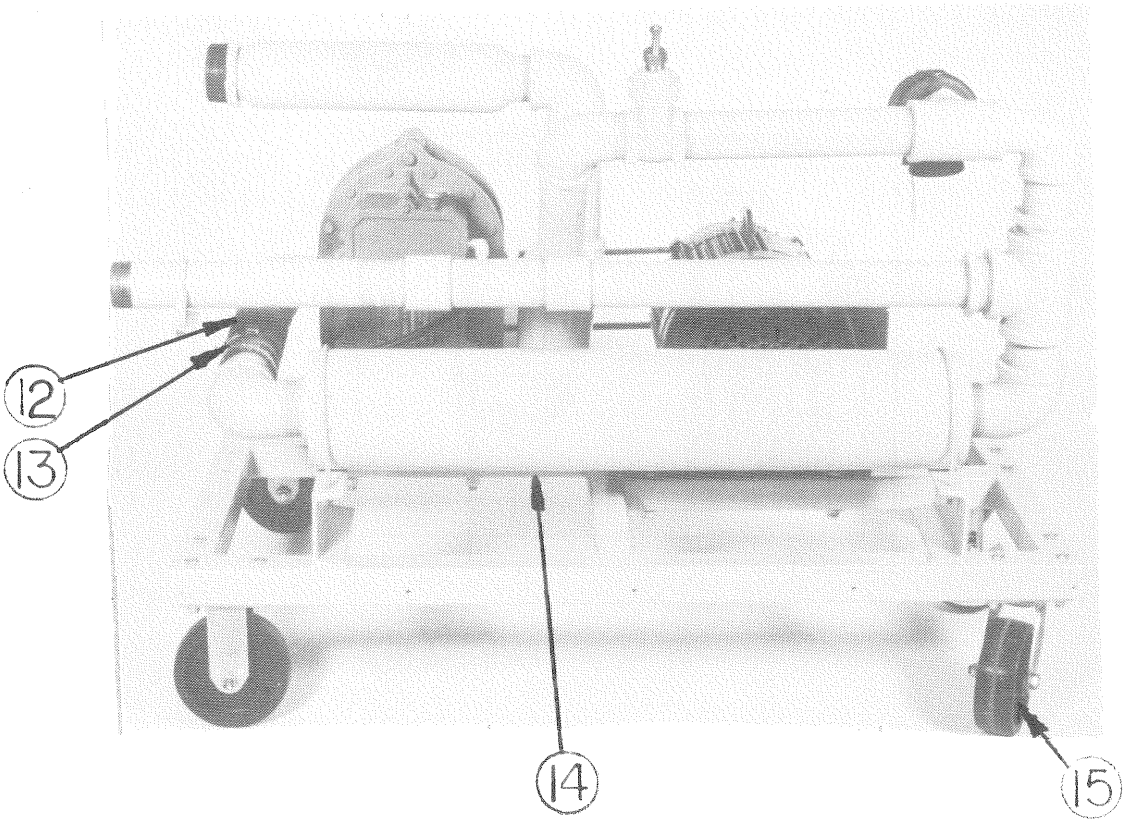
ITEM	PART NUMBER	QTY	DESCRIPTION
*1	H-1396	1	VERT. SPEED INDICATOR
2	G-1161-101012	3	6-32 x 1 1/4 LG. PAN HD. MACH. SCR.
*3	H-1487	3	GROMMET SPACER
*4	H-1484-1	3	VIBRATION GROMMET
5	------	REF.	CONTROL PANEL
*6	G-1250-1010N	3	#6 FLATWASHER
*7	G-1200-1010	3	6-32 HEX NUT
*8	G-1251-1010R	3	#6 LOCKWASHER

NOTE:

ITEMS INDICATED WITH * CAN BE PURCHASED AS K-1354/GAUGE VIBRATION KIT



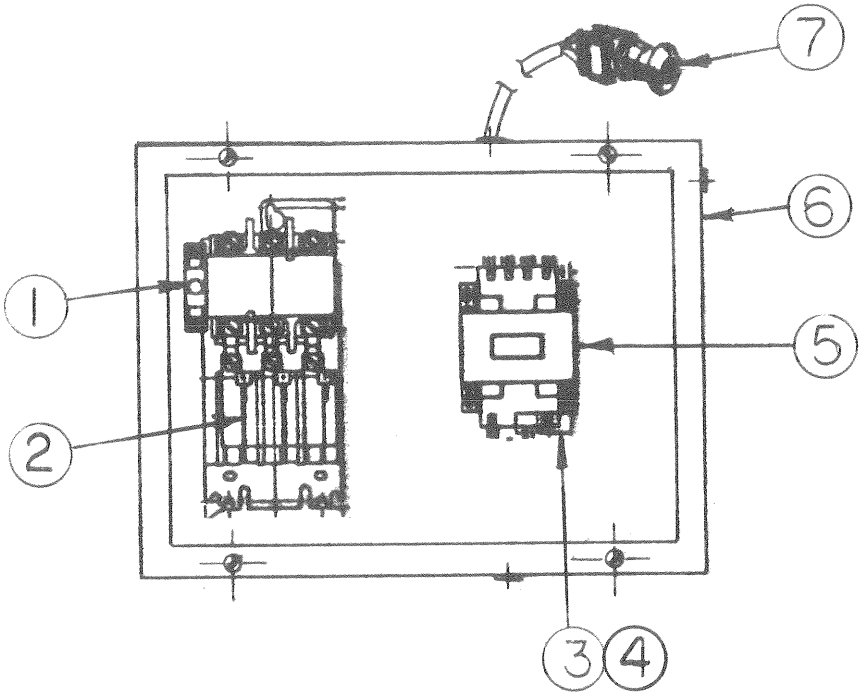
ITEM	PART NUMBER	QTY	DESCRIPTION
1	EC-1143-1	1	MOTOR 200/400V-60HZ (10 HP)
	EC-1143-2	1	MOTOR 230/460V-60HZ (10 HP)
	EC-1201	1	MOTOR 230/460V-50HZ (15 HP)
2	H-1406	1	RELIEF VALVE
3	H-1407	1	GATE VALVE
4	Z-1662	1	PIPING ASSEMBLY
5	Z-1657	1	MUFFLER WELDMENT
6	H-1400-8	1	BLOWER
7	H-1398	1	SHEAVE
8	H-1399	1	BUSHING
9	H-1401-14	2	V-BELT-60HZ; 10 HP MOTOR
	H-1401-15	2	V-BELT-50HZ; 15 HP MOTOR
10	H-1357	1	SHEAVE-60HZ; 10 HP MOTOR
	H-1545	1	SHEAVE-50HZ; 15 HP MOTOR
11	H-1060	1	BUSHING-60HZ; 10 HP MOTOR
	H-1546	1	BUSHING-50HZ; 15 HP MOTOR



ITEM	PART NUMBER	QTY	DESCRIPTION
12	H-1411	1	HOSE
13	H-1426-12	4	HOSE CLAMP
14	H-1403	1	SILENCER
15	H-1437	-	REPLACEMENT KIT CASTER WHEEL

TRONAIR

ELECTRICAL COMPONENTS



ITEM	PART NUMBER	QTY	DESCRIPTION
1	SEE TABLE A	1	STARTER
2	EC-1053*	3	HEATER
3	EC-1071	1	FUSE HOLDER
4	EC-1094	1	FUSE
5	SEE TABLE B	1	TRANSFORMER
6	EC-1067	1	ELECTRICAL BOX
7	EC-1058	1	SWITCH

TABLE A

STARTER NUMBER	USED WITH
EC-1144	208V/60HZ
EC-1126	ALL VOLTAGES EXCEPT 208V/60HZ

TABLE B

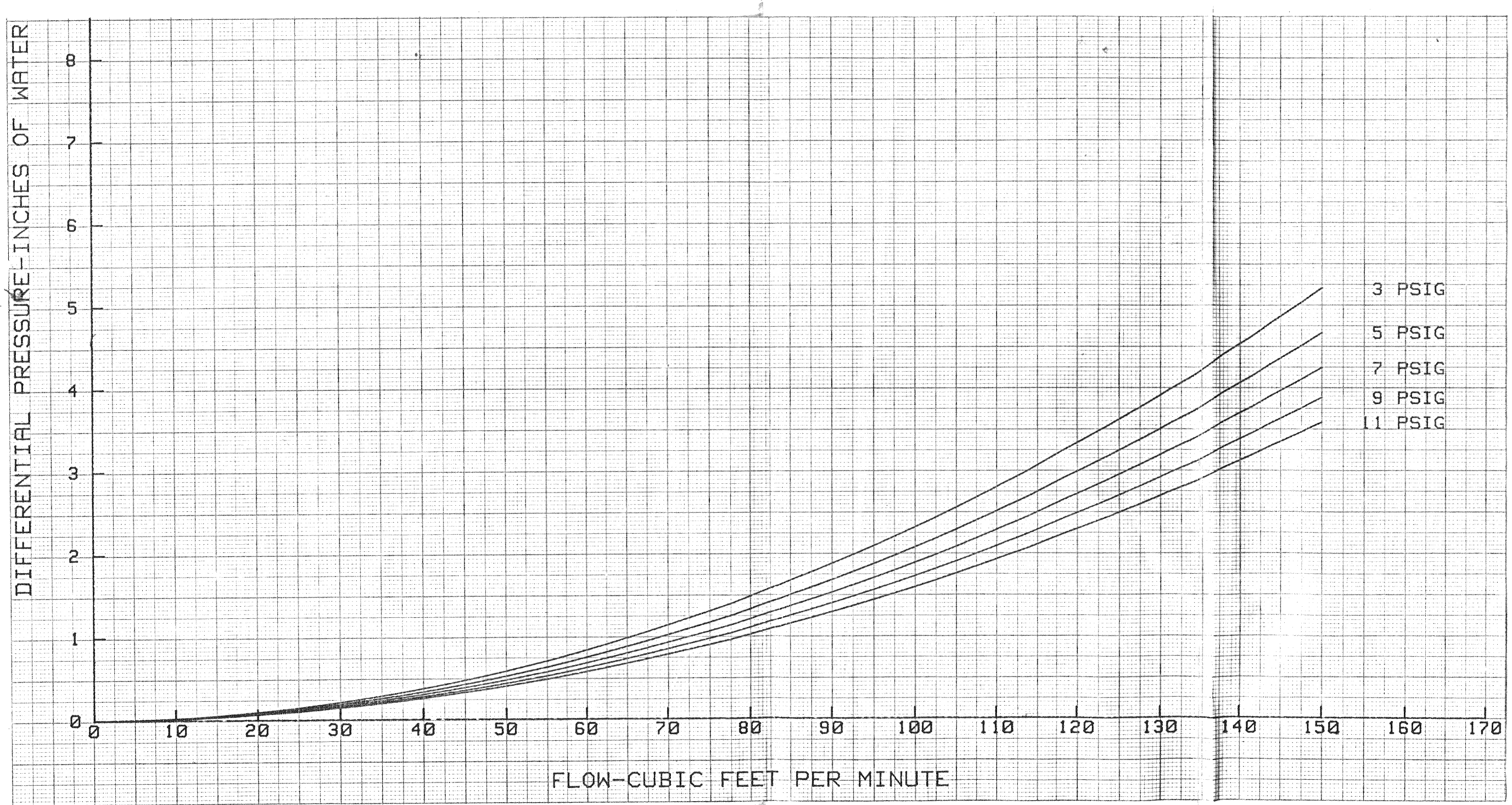
TRANSFORMER NUMBER	USED WITH
EC-1069	208V/60HZ, 240V/50HZ 380V/50HZ 415V/50HZ
EC-1147	220V/50HZ, 220V/60HZ, 230V/60HZ, 440V/50HZ, 460V/60HZ

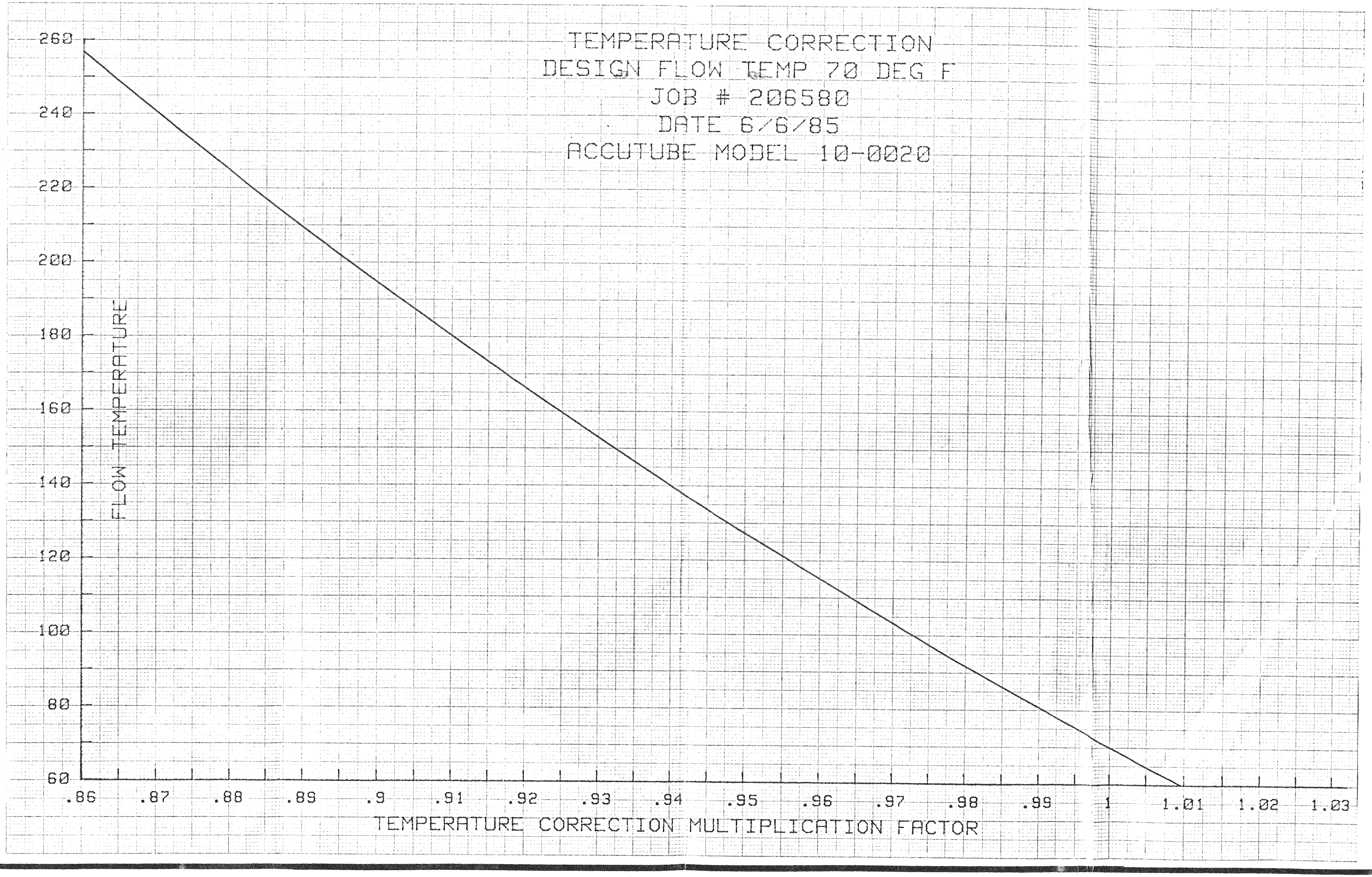
*SPECIFY PROPER VOLTAGE AND HZ WHEN ORDERING

TRONAIR

CURVE 1

INCHES WG to ACFM




TEMPERATURE CORRECTION
DESIGN FLOW TEMP 70 DEG F
JOB # 206580
DATE 6/6/85
ACCUTUBE MODEL 10-0020
260
240
220
200
180
160
140
120
100
80
60
FLOW TEMPERATURE
.86
.87
.88
.89
.9
.91
.92
.93
.94
.95
.96
.97
.98
.99
1
1.01
1.02
1.03
TEMPERATURE CORRECTION MULTIPLICATION FACTOR