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**MODEL 6600-M4 Rev. B7**

**USER'S MANUAL**

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## WARNING

THE 6600-M4 USES LINE VOLTAGES FOR ITS OPERATION WHICH ARE POTENTIALLY DANGEROUS. IMPROPER OPERATION OF THIS EQUIPMENT MAY RESULT IN PERSONAL INJURY OR LOSS OF LIFE. HENCE THE EQUIPMENT DESCRIBED IN THIS MANUAL SHOULD BE OPERATED ONLY BY PERSONNEL TRAINED IN PROCEDURES THAT WILL ASSURE SAFETY TO THEMSELVES, TO OTHERS AND TO THE EQUIPMENT.

BEFORE PERFORMING ANY MAINTENANCE, TURN THE POWER OFF AND DISCONNECT THE POWER CORD FROM THE POWER SOURCE.

ALWAYS USE A 3-PIN GROUNDED OUTLET AS YOUR AC POWER SOURCE

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## SECTION 1

### INTRODUCTION

Note: Pt = Pitot , Ps1 = Primary Static, Ps2 = Secondary Static

The model 6600-M4 is a high accuracy automated pressure controller, specifically designed for controlling air data parameters such as altitude, airspeed, Mach and climb. It provides three independent outputs - Ps1, Ps2 and Pt, which allows the unit to be used on aircraft which use "smart" probes capable of reading Angle of Attack based on Static differential pressures. This instrument can also be used to control pressures in units of inHg and mbar. The 6600-M4 is equipped with internal pressure and vacuum pumps. The Remote unit is used to interface with the Main unit. The small size of the Remote unit allows it to be used in the cockpit of an aircraft.

The 6600-M4 has three high accuracy transducers that measure pressure in the range of 0 to 38 inHg absolute on the Ps1 (primary static) output, 0 to 38 inHg absolute on the Ps2 (secondary static) output and 0 to 100 inHg absolute on the Pt (pitot) output. These transducers are designed to accurately measure the pressure of dry air over an ambient temperature range of -10°C to 50°C. The 6600-M4 can be used by connecting only two outputs (Pt and Ps1) or all three outputs (Pt, Ps1, Ps2) to an aircraft. The 6600-M4 is RVSM compliant.

The 6600-M4 allows the user to control altitude in feet, meters, inHg or mbar; Rate of change in feet/minute, meters/minute, inHg/min or mbar/min; airspeed in knots, mach, mph and kmph. The Ps2 port can be controlled in absolute units of feet, meters, inHg or mbar as well as differential (Ps2-Ps1) units of differential inHg (Dfin), differential mbar (Dfmb), knots or kmph. The 6600-M4 also allows the user to control EPR on the Pt output.

The model 6600-M4 features programmable limits on altitude, airspeed, mach number, climb rate, and static differential (Ps2-Ps1). These limits are checked during data entry and thereby prohibit entry of erroneous target values. These limits are also checked continuously during operation, and if any of these is exceeded, the unit automatically takes abortive action.

The user has the ability to program into the 6600-M4 a profile of set-points to be controlled in a sequence. Once such a profile has been setup, the user can command the unit to move from one set-point to the next simply by pushing the 'GO' button. Up to 50 points can be stored in one profile. The 6600-M4 can store up to 12 such profiles in non-volatile memory at any one time.

Calibration of the unit is required only once a year. This process is the only scheduled maintenance function required on the 6600-M4.

The model 6600-M4 comes with an RS232 interface. This interface can be used to download profiles from a computer or to completely automate the operation of the unit.



## SECTION 2

### CONTROLS AND CONNECTIONS

**Note:** Pt = Pitot , Ps1 = Primary Static and Ps2 = Secondary Static

#### 2.1 MAIN UNIT TOP PANEL

The model 6600-M4 top panel provides easy access to all the connections. Please refer to Figure 2.1.

##### [1] AC INPUT connector :

This is a 3-pin male circular connector. A power cord is provided with the 6600-M4. The circular connector end of the power cord needs to be connected here. The power requirement of the 6600-M4 is 90-260 VAC, 47-440 Hz with a maximum power consumption of 200 VA.

**Caution: Connecting incorrect power to the 6600-M4 will cause considerable damage**

The power cord is normally left connected to the 6600-M4 at the AC INPUT connector and is wrapped around two cord posts. The cord retainers on top of these posts swivel in either direction and latch at 180 degree positions, allowing easy wrapping and unwrapping of the power cord. A cord clamp allows the cord to be held in place after it is wrapped.

##### [2] Fuse :

A 5x20 mm fuse is located inside the fuse holder. The fuse is a time-delay fuse with a rating of 3.0 amps, 250 Volts.

##### [3] AC On/Off switch :

This toggle switch connects (or disconnects) AC power between the AC INPUT connector and the 6600-M4. Even when this switch is ON, the 6600-M4 becomes operational only after the On/Off switch located on the right side of the Remote Unit is turned ON. (Push in to turn ON)

##### [4] Remote Unit connection:

The 6600-M4 is provided with a 50 foot remote cable to connect to the Remote unit. The male end of the remote cable is connected here on the top panel. The female end of the remote cable is connected to the Remote unit. This cable should be connected prior to applying power to the 6600-M4. This cable should not be disconnected while power is applied to the 6600-M4.

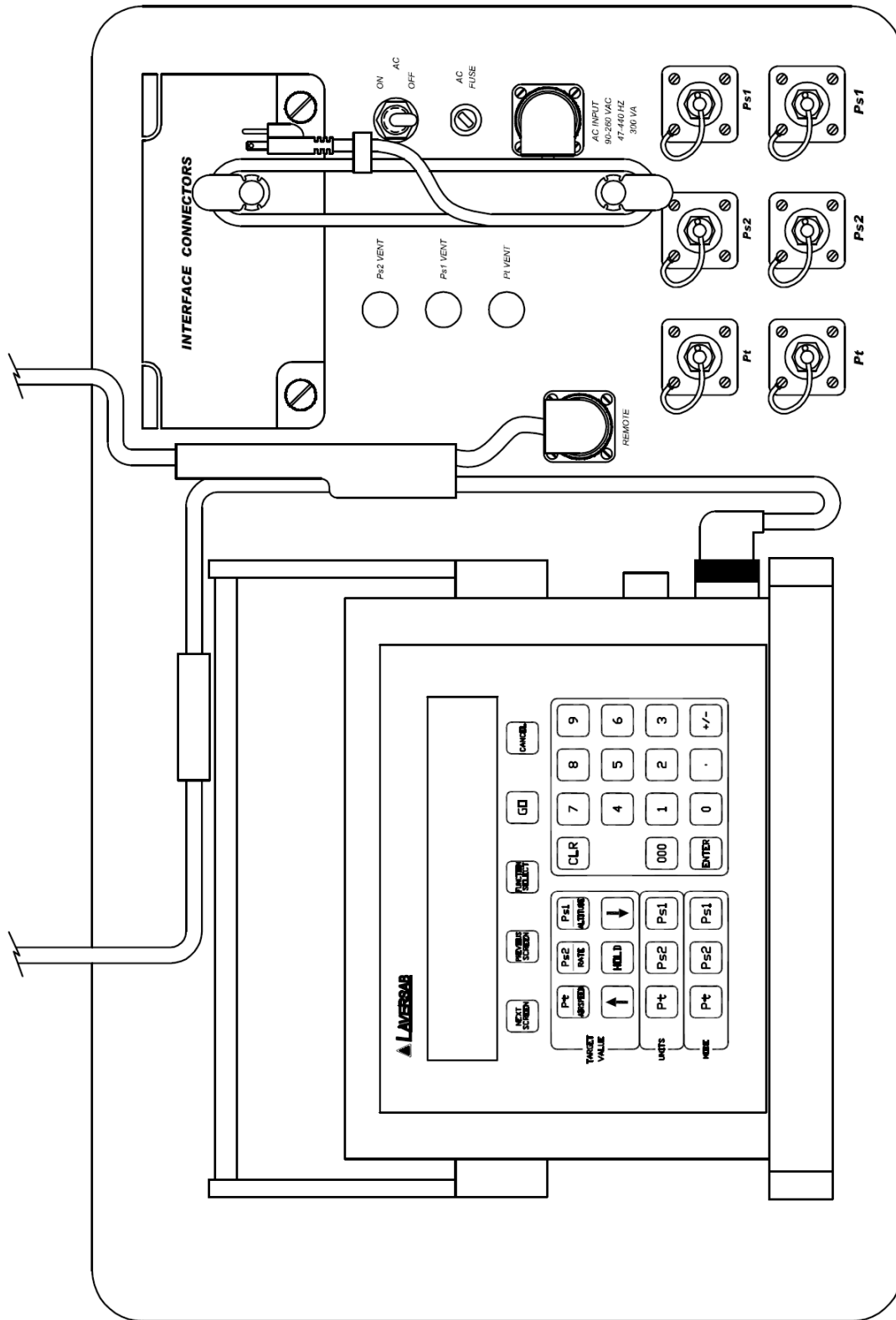


Figure 2.1 (A)

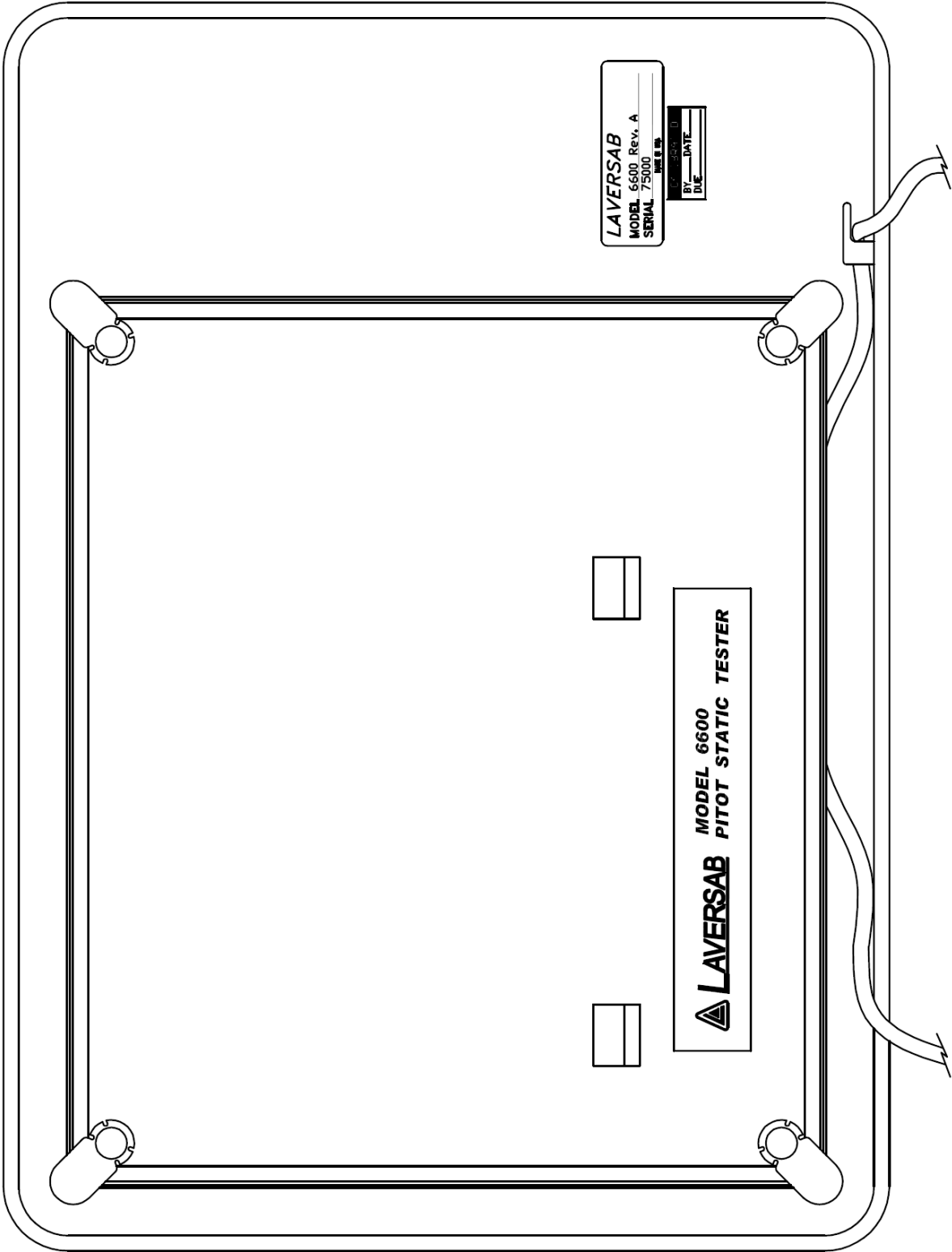


Figure 2.1 (b)

The remote cable is normally left connected to the 6600-M4 at the “Remote” connector on the top panel and is wrapped around four cord posts on the lid of the 6600-M4 case. The cord retainers on top of these posts swivel in either direction and latch at 180 degree positions, allowing easy wrapping and unwrapping of the remote cable. A cord clamp allows the cable to be held in place after it is wrapped. It is easier to wrap the remote cable around the posts after disconnecting the cable from the Remote unit.

If the remote cable needs to be disconnected and removed from the 6600-M4 completely for storage elsewhere then opening the Interface Connectors cover allows the cable to be dislodged from the cable guide.

#### **[5] Primary Static ports (Ps1) :**

The Primary Static output is provided on two ports that are internally connected. Both ports have #4 AN fittings. At least one of these ports must be connected through a hose to the Static port (Ps1 and P $\alpha$ 1 on smart-probe) on the aircraft. The hose must be connected **after** performing the Self Test on the 6600-M4. The hose, once connected, must not be disconnected while the aircraft Static system is not at “Ground” level. An unused port must remain closed.

**Caution: Do not connect this output to the aircraft before performing the Self Test.**

**Caution: Do not disconnect this output from the aircraft unless the aircraft’s Pitot Static system is at “Ground” level and the tester is OFF.**

#### **[6] Secondary Static ports (Ps2) :**

The Secondary Static output is provided on two ports that are internally connected. Both ports have #4 AN fittings. These ports are typically used when the aircraft has “smart-probes” requiring a differential static input. These ports may also be used either as a secondary static output or a secondary airspeed output. When using the tester with aircraft with “smart-probes”, at least one of these ports must be connected through a hose to the P $\alpha$ 2 port of the smart-probe on the aircraft. The hose must be connected **after** performing the Self Test on the 6600-M4. The hose, once connected, must not be disconnected while the aircraft Static system is not at “Ground” level. An unused port must remain closed.

**WARNING: If the Ps2 output is not being used then it must be capped-off (closed).**

**Caution: Do not connect this output to the aircraft before performing the Self Test.**

**Caution: Do not disconnect this output from the aircraft unless the aircraft’s Pitot Static system is at “Ground” level and the tester is OFF.**

**[7] Pitot ports (Pt) :**

The Pt output is provided on two ports that are internally connected. Both ports have #4 AN fittings. At least one of these ports must be connected through a hose to the Pitot port on the aircraft. The hose must be connected **after** performing the Self Test on the 6600-M4. The hose, once connected, must not be disconnected while the aircraft Pitot system is not at "Ground" level. An unused port must remain closed.

**Caution: Do not connect this output to the aircraft before performing the Self Test.**

**Caution: Do not disconnect this output from the aircraft unless the aircraft's Pitot Static system is at "Ground" level and the tester is OFF.**

**[8] RS232 interface connector:**

This connector is accessed by opening the "Interface Connectors" access panel. The connector is a standard DB-9 female connector used for a serial RS232 interface. It can be connected directly to the "COM" port of a standard PC to allow communication. This port is normally used for downloading "profiles" from a computer. Other remote communication with the 6600-M4 is also possible through this interface. Figure 2.2 shows the RS232 connector with the panel removed. For more details on downloading profiles, please refer to Section 4. For more details on communication with the 6600-M4, please refer to Section 8.

**[9] IEEE-488 interface connector:**

This feature is currently not available on the 6600-M4.

**[10] Encoder interface connector:**

This feature is currently not available on the 6600-M4.

**[11] Primary Static Vent (Ps1 Vent) :**

In the event that the 6600-M4 is in-operable due to a malfunction or due to loss of power, it is possible to vent the Static system manually. This is done using the metering valve labeled "Ps1 Vent". This valve is a positive shut-off valve. Opening this valve slowly will vent the Static output of the 6600-M4 to ambient pressure. While venting, care must be taken to ensure that the maximum climb rate of the aircraft connected to the tester is not exceeded.

The Secondary Static (Ps2) and Pitot (Pt) ports are referenced to the Primary Static (Ps1) port. The "Ps2 Vent" and "Pt Vent" valves are used to cross-bleed to the Primary Static (Ps1) ports. Therefore the manual vent valves must be opened in sequence. First open the "Ps2 Vent" valve, then the "Pt Vent" valve and last, the "Ps1 Vent" valve.

**Caution:** Before opening the “Ps1 Vent” valve, both the “Ps2 Vent” and “Pt Vent” valves must be completely open.

**Caution:** Do not over-tighten the valve as this may damage the seat of the valve.

#### [12] Secondary Static Vent (Ps2 Vent) :

In the event that the 6600-M4 is in-operable due to a malfunction or due to loss of power, it is possible to vent the Ps2 system manually. This is done using the metering valve labeled “Ps2 Vent”. This valve is a positive shut-off valve. Opening this valve slowly will cross-bleed the Ps2 output to the Ps1 output of the 6600-M4. While venting, care must be taken to ensure that the maximum climb rate of the aircraft connected to the tester is not exceeded. Also, the “Pt Vent” may need to be used to maintain the airspeed within limits of the indicator on the aircraft.

The Secondary Static (Ps2) and Pitot (Pt) ports are referenced to the Primary Static (Ps1) port. The “Ps2 Vent” and “Pt Vent” valves are used to cross-bleed to the Primary Static (Ps1) ports. Therefore the manual vent valves must be opened in sequence. First open the “Ps2 Vent” valve, then the “Pt Vent” valve and last, the “Ps1 Vent” valve.

**Caution:** Before opening the “Ps1 Vent” valve, both the “Ps2 Vent” and “Pt Vent” valves must be completely open.

**Caution:** Do not over-tighten the valve as this may damage the seat of the valve.

#### [13] Pitot Vent (Pt Vent) :

In the event that the 6600-M4 is in-operable due to a malfunction or due to loss of power, it is possible to vent the Pitot system manually. This is done using the metering valve labeled “Pt Vent”. This valve is a positive shut-off valve. Opening this valve slowly will cross-bleed the Pt output to the Ps1 output of the 6600-M4. While venting, care must be taken to maintain the airspeed within limits of the indicator on the aircraft.

The Secondary Static (Ps2) and Pitot (Pt) ports are referenced to the Primary Static (Ps1) port. The “Ps2 Vent” and “Pt Vent” valves are used to cross-bleed to the Primary Static (Ps1) ports. Therefore the manual vent valves must be opened in sequence. First open the “Ps2 Vent” valve, then the “Pt Vent” valve and last, the “Ps1 Vent” valve.

**Caution:** Before opening the “Ps1 Vent” valve, both the “Ps2 Vent” and “Pt Vent” valves must be completely open.

**Caution:** Do not over-tighten the valve as this may damage the seat of the valve.

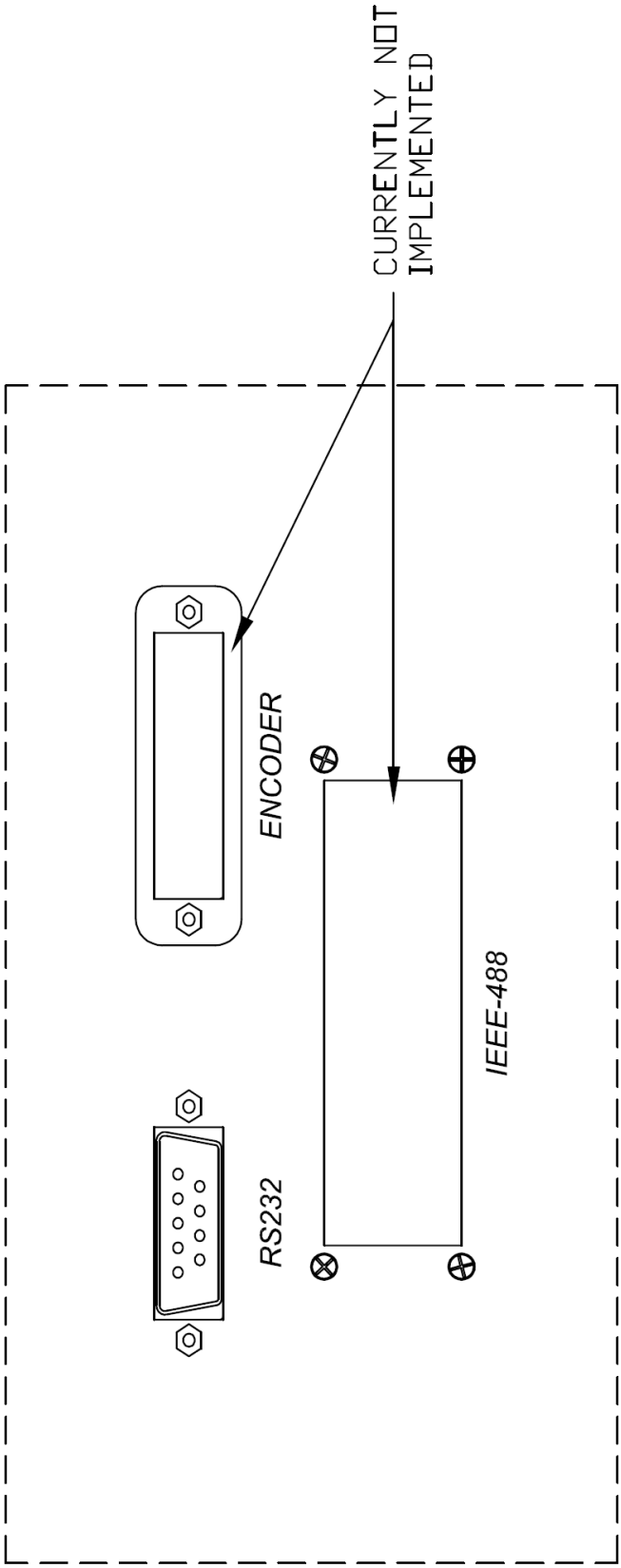


Figure 2.2

# 6600 INTERFACE CONNECTORS

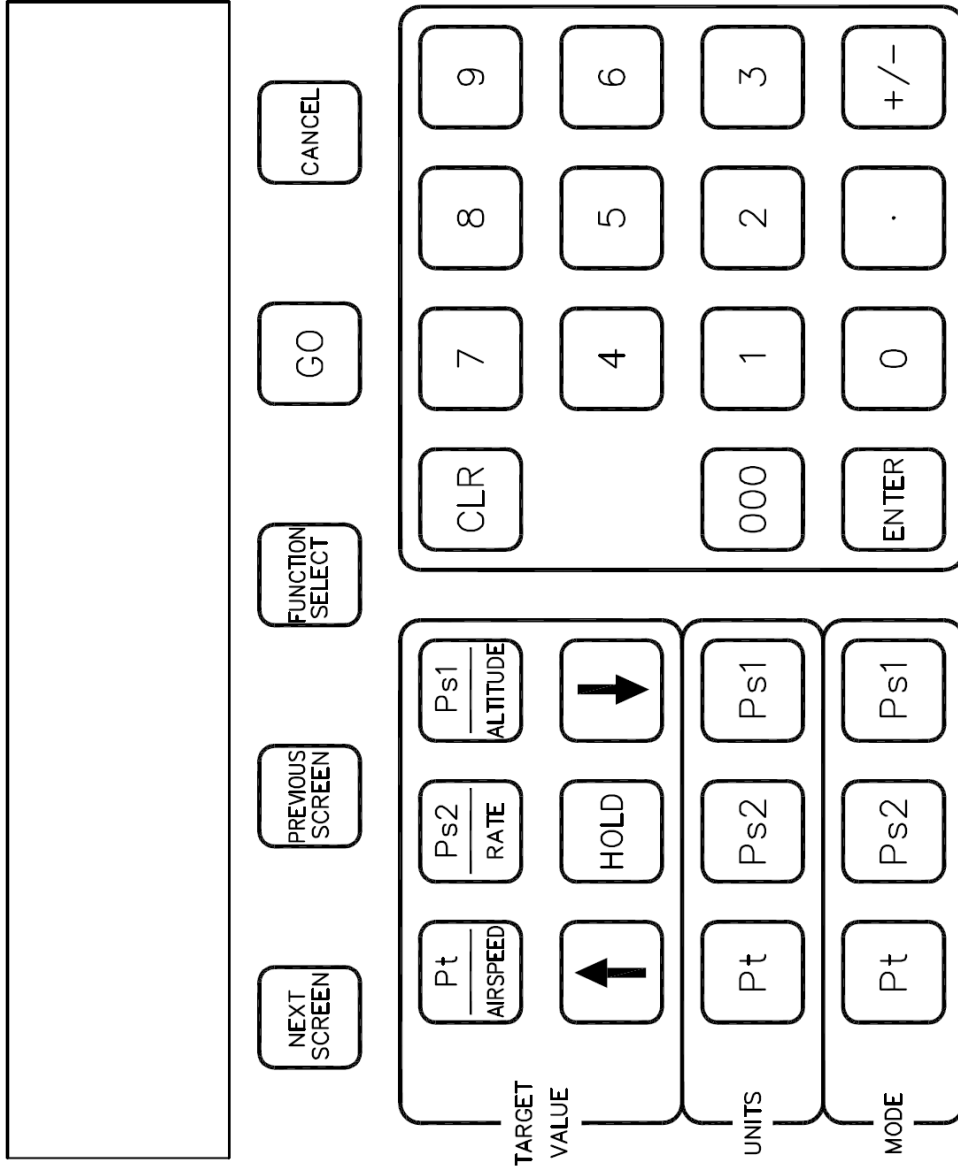


Figure 2.3



## 2.2 REMOTE UNIT TOP PANEL

Please refer to Figure 2.3 which shows the front panel of the Remote unit. The LCD display has 4 lines of 40 characters each. There are five function keys just below the display. **NEXT SCREEN** and **PREVIOUS SCREEN** are used to move between the different operating screens of the 6600-M4. At present there are only three upper level operating screens : Main, Calibrate and Self test.

The **PREVIOUS SCREEN** key is also used to toggle the Main Screen between the 2-output format and the 3-output format. Please refer to Section 3.2 for more details.

The **FUNCTION SELECT** key is used to go into a screen which allows the user to choose any one of eight functions. The functions are:

1. View Limits
2. Set Limits
3. Set Knots rate
4. Execute profile
5. Setup profile
6. Height Correction
7. Set "Ground"
8. Go to "Ground"

These functions are described in detail in Section 3.

The **GO** key is used to execute all changes made through the Remote unit. After the changes have been 'ENTER' ed, they will flash on the screen until executed by the GO key. This allows for simultaneous execution of several changes in target values, modes, units etc.

The **CANCEL** key has multiple purposes. It is used to abort all changes that are flashing on the screen. It is also used to exit out of target value entry, unit selection and mode selection. It is used to exit out of other screens like Leak test and Function select. The CANCEL key is also used to acknowledge error messages or exit an executing profile.

### NUMERIC KEYS :

These keys are used for numeric entry of target values and other numeric data. The '+/-' key operates just like on a calculator and is used to enter negative values. This key must be used after entering the positive value, to make it negative.

The **CLR** key is used to clear the data entry field.

The **ENTER** key is used to accept numeric entries and also select units and modes.

The '000' key is used to when numbers are needed to entered in thousands. For example, to enter the number 5000, press '5' and then press '000'.

### **TARGET VALUE KEYS :**

There are typically 4 parameters that the 6600-M4 controls - Airspeed (or Pt pressure), Altitude (or Ps1 pressure), Climb (or Pt, Ps1, Ps2 rate) and Secondary Altitude (or Ps2 pressure). Each parameter can be changed using a specific target-value key.

The **Pt/AIRSPEED** key is used to select Pt or Airspeed target value.

The **Ps2/RATE** key is used to select Ps2 target value if the Main screen being displayed is in the 3-output format (section 3.2). If the Main screen being displayed is in the 2-output format then this key is used to select the target value for Rate of change of Ps1, in Ps1 units per minute (i.e. feet/min, meters/min, inHg/min or mbar/min).

The rate of change of Ps1 is also used as the rate of change of Ps2, and in units of inHg and mbar, is also used as the rate of change of Pt. For more details please see "Effects of Rate target value" in section 3.2.2.

The **Ps1/ALTITUDE** key is used to select Ps1 or Altitude target value.

After selecting the target value key, the new value can be entered using the numeric keypad.

The **UP ARROW** and **DOWN ARROW** keys are used to "Jog" a target value. For more information, please refer to Section 3.2.2. The arrow keys are also used to move between various choices during Unit selection and Mode selection.

The **HOLD** key is used to hold the current pressure on all three outputs. Pressing the HOLD key again will allow pressure to continue to ramp towards the desired target.

### **UNITS SELECT KEYS :**

Units can be selected independently for the Pt, Ps1 and Ps2 outputs.

The **Pt UNITS** key will bring up the choices in Pt units onto the 4th line of the display. To exit from this selection mode, press CANCEL. To move between the choices use the arrow keys. There are nine Pt units in all. The cursor location is indicated by the blinking unit mnemonic. Once the cursor is on the desired units, press 'ENTER' to select that unit.

The **Ps1 UNITS** key brings up the choices for Ps1 units onto the 4th line of the display. Use CANCEL to exit this unit selection mode. Use the arrow keys to move between the choices. Use the ENTER key to select a choice. There are four Ps1 units to choose from.

The **Ps2 UNITS** key brings up the choices for Ps2 units onto the 4th line of the display. Use **CANCEL** to exit this unit selection mode. Use the arrow keys to move between the choices. Use the **ENTER** key to select a choice. There are eight Ps2 units to choose from.

For more information on Units Selection please refer to Section 3.2.3.

#### **MODE SELECT KEYS :**

These keys are used to select between one of three operating modes (Measure, Leak, Control). Modes can be selected independently for the Ps1, Ps2 and Pt outputs. Pressing the **Pt Mode**, **Ps1 Mode** or **Ps2 Mode** keys brings up the selection of modes for the corresponding output onto the 4th line of the display. The desired selection can be chosen by moving the cursor using the arrow keys and then pressing **ENTER**. The **GO** key will execute the entered selection.

For more information on Mode Selection please refer to Section 3.2.4.

## SECTION 3

### UNDERSTANDING THE 6600-M4

**Note:** Pt = Pitot , Ps1 = Primary Static and Ps2 = Secondary Static

The 6600-M4 is typically used to calibrate and check air data instruments like altimeters, climb indicators, and airspeed/ Mach indicators on an aircraft. It is also used to leak-check the Pitot/ Static system of an aircraft. This section will explain how to use the 6600-M4 to perform these functions.

#### 3.1 START UP

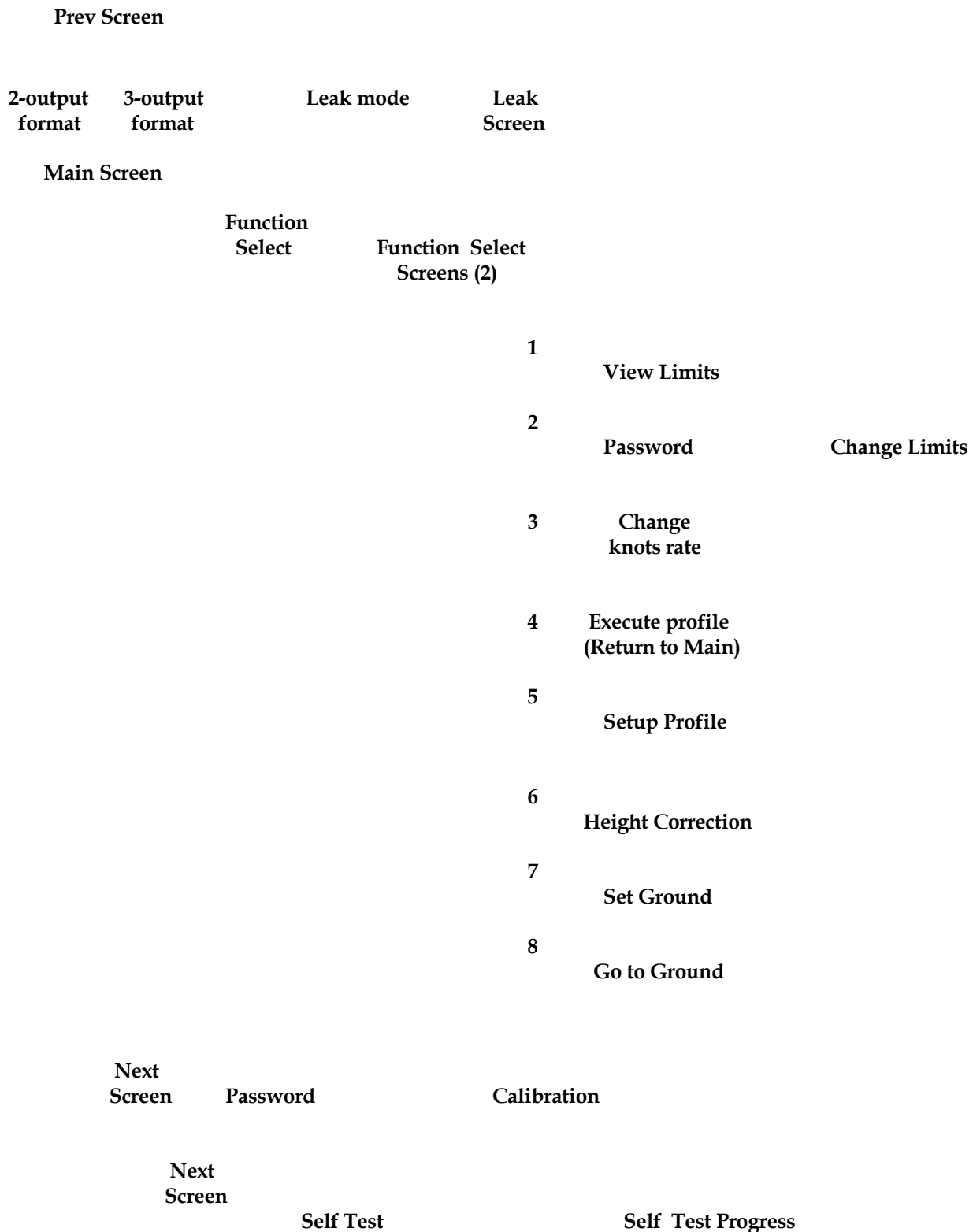
- Step 1: Check the ON/OFF switch on the Remote unit and make sure it is OFF.
- Step 2: Remove the protective caps from **one each** of the Pt, Ps1 and Ps2 outputs on the main unit. DO NOT connect any hoses to the aircraft yet. Make certain that the outputs are open to ambient. Close the Pt, Ps1 and Ps2 Vent valves.
- Step 3: Connect the power cable from the "AC INPUT" connector on the main unit to a suitable AC supply.
- Step 4: On the Main unit, turn the AC On/Off switch ON. On the Remote unit, turn the ON/OFF switch ON.

The 6600-M4 will turn ON and the Remote unit will turn ON. The display will briefly show the sign-on screen and then go into the Main screen. The Main screen should appear as follows:

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

The Actual values shown on line 2 will be different from the ones shown. The 4th line should be blank.

Before actually using the 6600-M4 to perform certain tasks, it is important to understand how to use the Remote unit to make the 6600-M4 do what you want. This section explains everything about the information that you see on the Remote unit and what it means, and



**Figure 3.1**

how to change all the parameters that are shown on the display. As we proceed through the explanations, it will become clearer as to how the 6600-M4 actually operates.

Interaction with the 6600-M4 is done through several different screens that are displayed on the Remote unit. All the screens are shown in Figure 3.1. Of the screens shown in Figure 3.1, the Self Test screen is used only at startup, all the Function Select screens are used only a few times during normal operation and also when first setting up the 6600-M4. The Calibrate screen is used only once a year by the calibration facility. During normal operation, the two screens that are used the most are the Main Operating screen (Main Screen), in either 2-output format or 3-output format, and the Leak Screen. All the different screens, except the calibration screen, are explained in this section. The Calibration screen is explained in section 6.

### 3.2 MAIN OPERATING SCREEN

Most of the operation of the 6600-M4 is done in the Main Screen. All the pertinent parameters are displayed on this screen. The screen is also used to change Target values, Units, and Modes.

The Main Screen can be toggled between the 2-output format and 3-output format using the PREV SCREEN key.

#### Main Screen: 2-output format

In the 2-output format, information pertaining only to Pt and Ps1 is displayed. Although all three outputs of the 6600-M4 are always active, if only the Pt and Ps1 outputs are connected to the aircraft then the Main Screen should be in the 2-output format. The 2-output format appears as shown below.

*Main Screen: 2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>5.2</b>	<b>0</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

Pt

Ps1 Rate of change

Ps1

As shown above in the sample 2-output format, information is divided into three vertical sections. The left section shows information for the Pt output, the right section shows information for the Ps1 output and the middle section shows information for the rate of



2-output format

	1		4		2																						
13						14																					
<table border="0" style="width: 100%;"> <tr> <td><b>Units:</b></td> <td></td> <td align="center"><b>knots</b></td> <td></td> <td align="center"><b>Feet/min</b></td> <td></td> <td align="center"><b>Feet</b></td> </tr> <tr> <td><b>Actual:</b></td> <td align="center"><b>M</b></td> <td align="center"><b>5.2</b></td> <td></td> <td align="center"><b>0</b></td> <td></td> <td align="center"><b>1005 M</b></td> </tr> <tr> <td><b>Target:</b></td> <td></td> <td align="center"><b>20.0</b></td> <td></td> <td align="center"><b>3000</b></td> <td></td> <td align="center"><b>0</b></td> </tr> </table>							<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>	<b>Actual:</b>	<b>M</b>	<b>5.2</b>		<b>0</b>		<b>1005 M</b>	<b>Target:</b>		<b>20.0</b>		<b>3000</b>		<b>0</b>
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<b>Actual:</b>	<b>M</b>	<b>5.2</b>		<b>0</b>		<b>1005 M</b>																					
<b>Target:</b>		<b>20.0</b>		<b>3000</b>		<b>0</b>																					
5	9		8	12	6	10																					

3-output format

			3			15																					
<table border="0" style="width: 100%;"> <tr> <td><b>Units:</b></td> <td></td> <td align="center"><b>knots</b></td> <td></td> <td align="center"><b>Feet</b></td> <td></td> <td align="center"><b>Feet</b></td> </tr> <tr> <td><b>Actual:</b></td> <td align="center"><b>M</b></td> <td align="center"><b>5.2</b></td> <td></td> <td align="center"><b>1006 M</b></td> <td></td> <td align="center"><b>1005 M</b></td> </tr> <tr> <td><b>Target:</b></td> <td></td> <td align="center"><b>20.0</b></td> <td></td> <td align="center"><b>0</b></td> <td></td> <td align="center"><b>0</b></td> </tr> </table>							<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>	<b>Actual:</b>	<b>M</b>	<b>5.2</b>		<b>1006 M</b>		<b>1005 M</b>	<b>Target:</b>		<b>20.0</b>		<b>0</b>		<b>0</b>
<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>																					
<b>Actual:</b>	<b>M</b>	<b>5.2</b>		<b>1006 M</b>		<b>1005 M</b>																					
<b>Target:</b>		<b>20.0</b>		<b>0</b>		<b>0</b>																					
			7			11																					

- |   |  |
|---|--|
| 1. Pt units                                     | 9. Pt Target value                           |
| 2. Ps1 units                                    | 10. Ps1 Target value                         |
| 3. Ps2 units (3-output format only)             | 11. Ps2 Target value (3-output format only)  |
| 4. Ps1 Rate units (2-output format only)        | 12. Rate Target value (2-output format only) |
| 5. Pt Actual value                              | 13. Pt mode                                  |
| 6. Ps1 Actual value                             | 14. Ps1 mode                                 |
| 7. Ps2 Actual value (3-output format only)      | 15. Ps2 mode (3-output format only)          |
| 8. Ps1 Rate Actual value (2-output format only) |  |

**Figure 3.2**



### 3.2.1 DISPLAYED PARAMETERS

There are 15 basic parameters of importance while using the 6600-M4. Each of these parameters is displayed on the Main Screen either on the 2-output format or on the 3-output format. The 15 parameters are indicated in the 2-output and 3-output formats shown in Figure 3.2 above.

Each parameter is explained in detail below and highlighted in a sample screen.

**Parameter 1. Pt Units:** Unit of measurement for displaying the Pt output. This parameter is accessible in both 2-output and 3-output formats. Normally, the Pt unit used is 'Knots' for displaying airspeed. Other possible units for displaying the Pt output are shown in section 3.2.3, which also explains how to select a particular unit. The currently selected Pt unit is shown on the first line of the display (as shown below). The two values (101.2 and 20.0) that appear below it are in these units.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 2. Ps1 Units:** Unit of measurement for displaying the Ps1 output. This parameter is accessible in both 2-output and 3-output formats. Normally, the Ps1 unit used is 'Feet' for displaying altitude. Other possible units for displaying the Ps1 output are shown in section 3.2.3, which also explains how to select a particular unit. The currently selected Ps1 unit is shown on the first line of the display (as shown below). The two values (1005 and 0) that appear below it are in these units.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 3. Ps2 Units:** Unit of measurement for displaying the Ps2 output. This parameter is accessible only on the 3-output format. There are eight possible selections for Ps2 units. These are shown in section 3.2.3, which also explains how to select a particular unit. The currently selected Ps2 unit is shown on the first line of the display (as shown below). The two values (1006 and 0) that appear below it are in these units.

*3-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>1006</b>	<b>M</b>	<b>1005</b>
<b>Target:</b>		<b>20.0</b>	<b>0</b>		<b>0</b>

**Parameter 4. Ps1 Rate Units:** Unit of measurement for displaying the rate of change of the Ps1 output. This parameter is accessible only on the 2-output format. Normally, the Ps1 Rate unit used is 'Feet/min' for displaying rate of change of altitude. These units cannot be independently chosen. Whatever the unit selected for the Ps1 output, the Ps1 Rate unit is the per-minute rate of that selected Ps1 unit. If the Ps1 unit selected is 'inHg' then the Ps1 Rate unit will be 'inHg/min'. The currently selected Ps1 Rate unit is shown on the first line of the display (as shown below). The two values (3500 and 3000) that appear below it are in these units.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>		<b>1005</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>		<b>0</b>

**Parameter 5. Pt "Actual" value:** This is the current pressure measured at the Pt output, displayed in the current units. This parameter is accessible in both 2-output and 3-output formats. In the sample screen shown below, the current pressure at the Pt output is 101.2 knots. This value is updated every 0.25 seconds.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>		<b>1005</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>		<b>0</b>

**Parameter 6. Ps1 "Actual" value:** This is the current pressure measured at the Ps1 output, displayed in the current units. This parameter is accessible in both 2-output and 3-output formats. In the sample screen shown below, the current pressure at the Ps1 output is 1005 Feet. This value is updated every 0.25 seconds.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 7. Ps2 “Actual” value:** This is the current pressure measured at the Ps2 output, displayed in the current units. This parameter is accessible only in the 3-output format. In the sample screen shown below, the current pressure at the Ps2 output is 1006 Feet. This value is updated every 0.25 seconds.

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>1006</b>	<b>M</b>	<b>1005 M</b>
<b>Target:</b>		<b>20.0</b>		<b>0</b>		<b>0</b>

**Parameter 8. Ps1 Rate “Actual” value:** This is the current rate of change of pressure measured at the Ps1 output, displayed in the current units. This parameter is accessible only on the 2-output format. In the sample screen shown below, the current rate of change of pressure at the Static output is 3500 feet/min.. This value is updated every 0.25 seconds.

*2-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>3500</b>		<b>1005 M</b>
<b>Target:</b>		<b>20.0</b>		<b>3000</b>		<b>0</b>

**Note:** The “Actual” values for Ps2 rate and Pt rate are not displayed anywhere in the 6600-M4 since they are not used as a reference for checking any specific instrument or function on the aircraft. The Ps1 rate, however, is used as a reference for checking the VSI on the aircraft, and is therefore displayed.

**Parameter 9. Pt “Target” value:** This is the value that you command the 6600-M4 to achieve on the Pt output. This parameter is accessible in both 2-output and 3-output formats. In the sample screen below, the 6600-M4 has been commanded to achieve a pressure of 20.0 knots on the Pt output. The Pt “Target” value is meaningful only when the Pt output is in the “Control” mode. This is explained later in this section. How to change the Pt “Target” value is explained in section 3.2.2.

*2-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>3500</b>		<b>1005 M</b>
<b>Target:</b>		<b>20.0</b>		<b>3000</b>		<b>0</b>

**Parameter 10. Ps1 “Target” value:** This is the value that you command the 6600-M4 to achieve on the Ps1 output. This parameter is accessible in both 2-output and 3-output formats. In the sample screen below, the 6600-M4 has been commanded to achieve a pressure of 0 Feet on the Ps1 output. The Ps1 “Target” value is meaningful only when the Ps1 output is in the “Control” mode. This is explained later in this section. How to change the Ps1 “Target” value is explained in section 3.2.2.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 11. Ps2 “Target” value:** This is the value that you command the 6600-M4 to achieve on the Ps2 output. This parameter is accessible only in the 3-output format. In the sample screen below, the 6600-M4 has been commanded to achieve a pressure of 10 Feet on the Ps2 output. The Ps2 “Target” value is meaningful only when the Ps2 output is in the “Control” mode. This is explained later in this section. How to change the Ps2 “Target” value is explained in section 3.2.2.

*3-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>1006</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>10</b>	<b>0</b>	

**Parameter 12. Rate “Target” value:** This is the value that you command the 6600-M4 to achieve as the rate of change of pressure on the Ps1 output. This parameter is accessible only in the 2-output format.

**Caution:** This target value is also used for controlling the rate of change of pressure on the Ps2 output and under certain conditions, also the rate of change of pressure on the Pt output. For details please refer to “Effects of Rate Target Value” in section 3.2.2.

In the sample screen below, the 6600-M4 has been commanded to achieve a rate of change of 3000 Feet/min. on the Ps1 and Ps2 outputs. The Ps1 Rate “Target” value is meaningful only when the Ps1 (and/or Ps2, Pt) output is in the “Control” mode. This is explained later in this section. How to change the Ps1 Rate “Target” value is explained in section 3.2.2.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 13. Pt Mode:** This parameter is accessible in both 2-output and 3-output formats. The Pt output can be in one of three modes –

Measure (“M”), Leak (“L”), or Control (“C”).

In the Measure mode, the pressure at the Pt output is simply being measured and displayed as the “Actual” value in the current Pt units. The pressure is not being changed by the 6600-M4. In this mode, the Pt control-valve inside the 6600-M4 that is used to change the pressure at the Pt output is pneumatically isolated from the Pt output. In the Measure mode, the Pt “Target” value is meaningless, since the 6600-M4 is not trying to achieve any specific target value.

The Leak mode is pneumatically identical to the Measure mode. When either Pt, Ps1 or Ps2 outputs is in Leak mode, the screen changes from the Main Operating screen to the Leak screen. The Leak screen is detailed in section 3.3.

When the Pt output is in the Control mode the 6600-M4 is actually attempting to achieve the Pt “Target” value. The Pt control-valve inside the 6600-M4 is now connected to the Pt output and is actually increasing or decreasing the pressure to achieve and maintain the “Target” value.

The sample screen below shows the Pt mode as Measure (“M”). For an explanation of how to change the Pt mode between Measure, Leak and Control, please refer to section 3.2.4.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 14. Ps1 Mode:** This parameter is accessible in both 2-output and 3-output formats. The Ps1 output can be in one of three modes –

Measure (“M”), Leak (“L”), or Control (“C”).

In the Measure mode, the pressure at the Ps1 output is simply being measured and displayed as the “Actual” value in the current Ps1 units. The pressure is not being changed by the 6600-M4. In this mode, the Ps1 control-valve inside the 6600-M4 that is used to change the pressure at the Ps1 output is pneumatically isolated from the Ps1 output. In the Measure mode, the Ps1 “Target” value is meaningless, since the 6600-M4 is not trying to achieve any specific target value.

The Leak mode is pneumatically identical to the Measure mode. When either Pt, Ps1 or Ps2 outputs is in Leak mode, the screen changes from the Main Operating screen to the Leak screen. The Leak screen is detailed in section 3.3.

When the Ps1 output is in the Control mode the 6600-M4 is actually attempting to achieve the Ps1 “Target” value. The Ps1 control-valve inside the 6600-M4 is now connected to the Ps1 output and is actually increasing or decreasing the pressure to achieve and maintain the “Target” value.

The sample screen below shows the Ps1 mode as Measure (“M”). For an explanation of how to change the Static mode between Measure, Leak and Control, please refer to section 3.2.4.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Parameter 15. Ps2 Mode:** This parameter is accessible only in the 3-output format. The Ps2 output can be in one of three modes –

Measure (“M”), Leak (“L”), or Control (“C”).

In the Measure mode, the pressure at the Ps2 output is simply being measured and displayed as the “Actual” value in the current Ps2 units. The pressure is not being changed by the 6600-M4. In this mode, the Ps2 control-valve inside the 6600-M4 that is used to change the pressure at the Ps2 output is pneumatically isolated from the Ps2 output. In the Measure mode, the Ps2 “Target” value is meaningless, since the 6600-M4 is not trying to achieve any specific target value.

The Leak mode is pneumatically identical to the Measure mode. When either Pt,Ps2 or Ps2 outputs is in Leak mode, the screen changes from the Main Operating screen to the Leak screen. The Leak screen is detailed in section 3.3.

When the Ps2 output is in the Control mode the 6600-M4 is actually attempting to achieve the Ps2 “Target” value. The Ps2 control-valve inside the 6600-M4 is now connected to the Ps2

output and is actually increasing or decreasing the pressure to achieve and maintain the “Target” value.

The sample screen below shows the Ps2 mode as Measure (“M”). For an explanation of how to change the Static mode between Measure, Leak and Control, please refer to section 3.2.4.

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>1006</b>	<b>M</b>	<b>1005</b>
<b>Target:</b>		<b>20.0</b>		<b>10</b>		<b>0</b>

**Error Messages :** The Main screen is also used to display error conditions as they occur. The errors are displayed on the last (4<sup>th</sup>) line of the display, as shown below. Errors are shown on the 4<sup>th</sup> line on both 2-output and 3-output formats.

*2-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>3500</b>		<b>1005</b>
<b>Target:</b>		<b>20.0</b>		<b>3000</b>		<b>0</b>
<b>Error 5:</b>	<b>Pt target exceeds knots limits</b>					

**Profile Execution :** When a “profile” is being executed, the 4<sup>th</sup> line of the display will indicate the profile number and the point in the profile. This is done identically on both 2-output and 3-output formats. A sample screen is shown below, where point number 12 of profile number 3 is being executed. Notice that this sample screen shows some of the values to be different from our previous sample screens. The essence of using profiles is that all the 7 parameters can be changed simply by moving to the next point in the profile, eliminating the need to perform a lot of data entry.

*2-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>
<b>Actual:</b>	<b>C</b>	<b>101.2</b>		<b>3500</b>		<b>1005</b>
<b>Target:</b>		<b>200.0</b>		<b>6000</b>		<b>5000</b>
<b>Executing Profile</b>	<b>3.12 Lear-55 ADC</b>					

For more information on profiles, please refer to Section 4.

The Main operating screen will be used almost all the time during normal operation for commanding target values, viewing actual values, setting units and modes.

### 3.2.2 TARGET VALUE ENTRY

**Pt target value :** A Pt or airspeed target value can be entered using the Pt/AIRSPEED key. On pressing this key the target value field for Pt gets put into reverse video. The 6600-M4 is now awaiting numeric entry from the operator. While this new value is being entered, the old target value is still effective and does not in any way affect the Pt output. After the Pt/AIRSPEED key is pressed, the 2-output format will appear as shown below.

The Pt target value can also be entered in the 3-output format.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>          </b>	<b>3000</b>	<b>0</b>	

**Note:** The last effective Pt target value is retained through a power On/Off cycle.

#### **Numeric value entry:**

Use the numeric keys to enter the value. Use the +/- key, after entering the value, to change the sign of the value. The 6600-M4 will beep on every key entry, and it will beep for a longer time period if extra invalid digits are entered. It is not necessary to enter the decimal point and the digit after the decimal point if that digit is "0". That is, if you want to enter the number "200.0" you may enter just "200" and leave out the "." And the "0". After entering "200" the display will appear as shown below.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>200</b>	<b>3000</b>	<b>0</b>	

If a mistake is made during entry, it can only be corrected by using the CLR key to clear the entry and re-entering the value. When the desired value is input into the value entry field, press ENTER and the value will blink. The trailing decimal and '0' will automatically get added. In the sample screen below the "200.0" is shown shadowed to indicate "blinking".

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>200.0</b>	<b>3000</b>	<b>0</b>	

The value will continue to blink until the GO key is pressed. Only after the GO key is pressed,



will the value become effective.

If you change your mind and want to abort the new value entry, press CANCEL to exit the value entry mode. You can press CANCEL even when the value is blinking. In the above example, if you were to press CANCEL the old Pt target value of 20.0 will remain effective.


If there is an error in the value being entered then that error will be displayed on line 4 of the display. To clear the error, enter CANCEL or CLR. This will also erase the erroneous value and the previous value will stay in effect. Most errors are caused because a value entered is outside the limits.

If the new value does not blink after pressing ENTER and no error message appears, then there is a communication problem between the Remote unit and the main unit. Please abort and contact the factory.

If new target values need to be entered for Ps1 and Ps2 then these should be entered and left in the blinking state before pressing GO. This will enable the 6600-M4 to start moving to the new targets on all outputs simultaneously, when the GO key is pressed.

**Ps1 target value:** The Ps1 target value can be entered both in the 2-output and 3-output formats. For entering Ps1 target values, press the Ps1 / ALTITUDE key. After the key is pressed, the 2-output format will appear as shown below.

*2-output format*

<b>Units:</b>	<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual: M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>	<b>20.0</b>	<b>3000</b>		

Now follow the same process for entering the value as described above in Numeric Value Entry.

**Note:** The last effective Ps1 target value is retained through a power On/Off cycle.

**Ps2 target value:** The Ps2 target value can be entered only in the 3-output format. Change the Main Screen to the 3-output format using the PREV SCREEN key. In the 3-output format the middle vertical section will show the units for Ps2 and will NOT indicate “/min”. After the screen shows the 3-output format, press the Ps2 / RATE key to enter the Ps2 target value. After the key is pressed, the 3-output format will appear as shown below.

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>1006</b>	<b>M</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>				<b>0</b>	

Now follow the same process for entering the value as described above in Numeric Value Entry.

**Note:** The last effective Ps2 target value is retained through a power On/Off cycle.

**Important Note:** If the Ps2 output is not being used then it is mandatory that the Ps2 output be in units of Differential inHg (Dfin) and the Ps2 target value be set to 0.000 Dfin. This is NOT done automatically on power-On. It is the operator's responsibility to perform this function. Failure to do so will result in improper operation of the unit.

**Important Note:** If the Ps2 output is not being used then it must be capped-off (closed).

**Rate target value :** The Rate target value can only be entered in the 2-output format. Change the Main Screen to the 2-output format using the PREV SCREEN key. In the 2-output format the middle vertical section will show the Rate units for Ps1 and will indicate "/min". After the screen shows the 2-output format, press the Ps2 / RATE key to enter the Rate target value. After the key is pressed, the 2-output format will appear as shown below.

*2-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet/min</b>		<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>3500</b>		<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>				<b>0</b>	

Now follow the same process for entering the value as described above in Numeric Value Entry.

**Note that while entering Rate values, it is NOT necessary to include the sign of the rate of change. The 6600-M4 will automatically determine the direction of the rate of change. The displayed actual value will, however, indicate with a minus sign when the rate of change is negative.**

**Note:** The last effective Rate target value is retained through a power On/Off cycle.

### Effect of Rate target value :

The Rate target value affects the rate of change of Ps1, Ps2 and also sometimes, Pt. The Rate target value can be entered in four different units, depending on the selected units for Ps1. The four Ps1 units are : feet, meters, inHg and mbar. Feet and meters are considered as “altitude” units. InHg and mbar are considered as “engineering” units. The 6600-M4 maintains two distinct Rate target values for “altitude” units and “engineering” units.

When a Rate target value is entered as 6000 feet/min it is automatically converted to 1828.8 meters/min. But it is not converted to inHg/min or mbar/min. Conversely, when a Rate target value is entered as 4.000 inHg/min it is automatically converted to 135.46 mbar/min. But it is not converted to feet/min or meters/min. The 6600-M4 distinctly maintains two Rate target values of 6000 feet/min for “altitude” units and 4.000 inHg/min for “engineering” units.

If Ps1 is in Control mode and the units for Ps1 are “altitude” units then the 6600-M4 will ramp towards the Ps1 target using the Rate target value in “altitude” units, i.e. 6000 feet/min. If Ps1 is in “engineering” units then the 6600-M4 will ramp towards the Ps1 target using the Rate target value in “engineering” units, i.e. 4.000 inHg/min.

The Pt output has four “airspeed” units - knots, Mach, mph, kmph. When the Pt output is in one of these four “airspeed” units, the Rate of change of the Pt output is controlled by the “Knots Rate” which is setup using Function 3. (section 3.5.3). While in “airspeed” units, the Pt output is not affected either by the “altitude” rate or by the “engineering” rate.

The Pt output also has five “engineering” units - Pt inHg, Qc inHg (differential), Pt mb, Qc mb (differential), and EPR (Pt divided by Ps1). While the Pt output is in any one of these “engineering” units, its Rate of change is the “engineering” rate entered in the Rate target value. If the “engineering” rate was entered as 4.000 inHg/min then the Pt output will ramp towards its target value at 4.000 inHg/min.

The Ps2 output has four “engineering” units - inHg, mbar, Differential inHg (Dfin), and Differential mbar (Dfmb). The Ps2 output has two “altitude” units - feet and meters. The Ps2 output also has two “airspeed” units - knots and kmph. When the Ps output is in “engineering” units it will use the “engineering” rate (i.e. 4.000 inHg/min) to ramp towards the target. When the Ps2 output is in “altitude” units it will use the “altitude” rate (i.e. 6000 ft/min). When the Ps2 output is in “airspeed” units it will use the “Knots Rate” (section 3.5.3) to ramp towards the target.

Because of the distinct use of the “engineering” rate and the “altitude” rate, it is recommended that the Rate target values be set in both “engineering” and “altitude” units.

The default values set at the factory are 4.000 inHg/min for the “engineering” rate and 3000 feet/min for the “altitude” rate. The default value for the “Knots Rate” is 500 knots/min.

To summarize the effects of the Rate target value on Ps1, Ps2 and Pt, let us assume that the factory defaults, shown above, are in effect. Then the following table shows which Rate value will be effective depending on the units selected for each output.

Pt output		Ps2 output		Ps1 output	
Units	Rate	Units	Rate	Units	Rate
knots	500 knots/min	Feet	3000 feet/min	Feet	3000 feet/min
Mach	500 knots/min	meters	3000 feet/min	meters	3000 feet/min
mph	500 knots/min	inHg	4.000 inHg/min	inHg	4.000 inHg/min
kmph	500 knots/min	mbar	4.000 inHg/min	mbar	4.000 inHg/min
Pt inHg	4.000 inHg/min	Diff. inHg	4.000 inHg/min		
Qc inHg	4.000 inHg/min	Diff. mbar	4.000 inHg/min		
Pt mbar	4.000 inHg/min	knots	500 knots/min		
Qc mbar	4.000 inHg/min	kmph	500 knots/min		
EPR	4.000 inHg/min				

### **Limitations of “engineering” rate:**

The target “engineering” rate in inHg/min can be set to any value between 0 and 30.000 inHg/min. However, this rate is limited by the Limit for Maximum Altitude Rate (Max. Ft/min) (section 3.5.2). While the Ps1 or Ps2 outputs are being ramped towards the target, if the “engineering” rate translates to an “altitude” rate which exceeds the Limit of Max. Ft/min, then the effective target Rate will be the Max. Ft/min Limit value.

For example, assume that the “engineering” rate is set to 4.000 inHg/min and the Max. Ft/min limit is set to 10,000 ft/min. Assume that the Ps1 output is being ramped from 30.000 inHg to a target of 5.000 inHg. At approximately 9.0 inHg the rate of 4.000 inHg/min translates to 10,000 ft/min. Above 9.0 inHg the rate of 4.000 inHg/min translates to less than 10,000 ft/min, whereas below 9.0 inHg the rate of 4.000 inHg/min translates to more than 10,000 ft/min.

Therefore, while the Ps1 output is above 9.0 inHg the Rate target will be 4.000 inHg, but once the Ps1 output goes below 9.0 inHg, the Rate target will be set to 10,000 ft/min. The 10,000 ft/min value will translate to a reducing value in inHg/min as the pressure reduces. At 5.000 inHg, the 10,000 ft/min will translate to only about 2.400 inHg/min.

On the 2-output format, you will notice that although the target Rate is set to 4.000 inHg, once the Ps1 output goes below 9.0 inHg, the Actual Ps1 Rate will slowly reduce from 4.000 inHg/min to 2.400 inHg/min as the Ps1 output approaches its target of 5.000 inHg.

**Note:** This limitation of the “engineering” rate is imposed only on the Ps1 and Ps2 outputs. This limitation does not directly affect the “engineering” rate for the Pt output. However, the “engineering” rate for the Pt output may be indirectly affected by the rate change of the Ps1 output due to other possible constraints of maintaining specific differentials between the Pt and Ps1 outputs.

## Target Value Jog

Each of the three target values can be jogged up or down in small increments by using the arrow keys. This is done to help the operator achieve a perfect reading on the instrument in the aircraft, by bumping the set-point in small increments. Another application of the “jog” feature is while testing the Mach/Over-speed warning on the aircraft, where the airspeed is incremented in small steps until the warning alarm sounds.

To jog a target value, select the value by pressing the appropriate target value key and then use the arrow keys. The selected target value can be “jogged” with the arrow keys until any key other than the arrow keys is pressed. Each time the arrow key is pressed, the selected target value will be incremented (UP arrow) or decremented (DOWN arrow) by a specific amount, depending on the units of the target value.

The increment amount for each “jog” is shown below for the different units of each target value.

Pt target value		Ps2 target value		Ps1 target value		Rate target value	
Units	Increment	Units	Increment	Units	Increment	Units	Increment
knots	1	Feet	1	Feet	1	Feet/min	10
Mach	0.001	meters	1	meters	1	meters/min	10
mph	1	inHg	0.001	inHg	0.001	inHg/min	0.01
kmph	1	mbar	0.01	mbar	0.01	mbar/min	0.1
Pt inHg	0.001	Diff. inHg	0.001				
Qc inHg	0.001	Diff. mbar	0.01				
Pt mbar	0.01	knots	1				
Qc mbar	0.01	kmph	1				
EPR	0.001						

### 3.2.3 UNITS SELECTION

**Pt Units :** Pt units may be selected in both 2-output and 3-output formats. There are nine units to select from on the Pt output. The units are: knots (Kts), Mach, Pt inHg (Ptin), Qc inHg (Qcin), Pt mbar (Ptmb), Qc mbar (Qcmb), miles per hour (mph), kilometers per hour (kmph), and Engine pressure ratio (EPR). EPR is defined as the ratio of Pt pressure to Ps pressure and is unit-less. Any of these units can be selected by pressing the Pt key in the “Units” section of the keypad. The choices will appear on line 4 of the display, four at a time. The cursor is placed under the first choice. The cursor position is indicated by the blinking unit name. The arrow keys can be used to move the cursor. The UP ARROW key moves the cursor right, the DOWN ARROW key moves the cursor left. AS the cursor moves past the last selection, the next selection will be displayed. The sample screen below shows the different Pt units, with the cursor at “knots”, indicated by blinking “knots”.

2-output format

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	101.2	3500	1005	<b>M</b>
<b>Target:</b>		20.0	3000	0	
<b>Pt units :</b>		<b>kts</b>	Mach, EPR , Pfin, ....		

When the cursor is moved past "Ptin" , line 4 of the display will look like this:

<b>Pt units :</b>	....	<b>Mach</b>	<b>EPR</b>	<b>Pfin</b>	<b>Qcin</b>	....
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Each time the cursor is moved right, the displayed units will scroll left. When the cursor is moved to the last selection, line 4 will look like this:

<b>Pt units :</b>	....	<b>Ptmb</b>	<b>Qcmb</b>	<b>mph</b>	<b>kmph</b>	.
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Select the desired units by moving the cursor to the unit of choice and then press ENTER. The new units will be displayed on the screen and will blink. Also, the actual and target values will get converted into the new units and the target value will blink. This is shown in the sample screen below where the units of Mach have been selected.

2-output format

<b>Units:</b>		<b>Mach</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	0.136	3500	1005	<b>M</b>
<b>Target:</b>		0.064	3000	0	

The unit selection will not become effective until the GO key is pressed. The 6600-M4 will return to the old units if the CANCEL key is pressed.

**Note:** It is important to note that the differential units of knots, Mach, mph, kmph, Qc inHg and Qc mbar always use Ps1 as the reference to determine the differential. Ps2 is never used as a reference.

**Note:** The last effective Pt units are retained through a power On/Off cycle.

**Ps1 Units :** Ps1 units may be selected in both 2-output and 3-output formats. There are four Ps units to choose from: Feet, Ps inHg (Psin), meters (mtrs), and mbar (Psemb). When a particular unit is selected, the units for Rate automatically changes to selected units/minute. Any of these units can be selected by pressing the Ps1 key in the "Units" section of the

keypad. Line 4 of the display will show all four units, with the cursor at "Feet", indicated by "Feet" blinking. The arrow keys can be used to move the cursor. The UP ARROW key moves the cursor right, the DOWN ARROW key moves the cursor left. The sample screen below shows the different Ps units, with the cursor at "Feet".

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	
<b>Ps units :</b>		<b>Feet</b>	<b>Psin, mtrs, Psmb</b>		

Select the desired units by moving the cursor to the unit of choice and then press ENTER. The new units will be displayed on the screen and will blink. Also, the actual and target values, both for Static and Climb will get converted into the new units and the target values will blink. This is shown in the sample screen below where the units of inHg (Psin) have been selected.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>inHg/min</b>	<b>inHg</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>8.345</b>	<b>28.986</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>10.000</b>	<b>29.054</b>	

The unit selection will not become effective until the GO key is pressed. The 6600-M4 will return to the old units if the CANCEL key is pressed. .

**Note:** The units change does not perform a conversion between the units of feet/minute or meters/minute to Ps1 inHg/min or Ps1 mbar/min. The target values for inHg/min and mbar/min are distinct from feet/min and meters/min. The values do get converted between feet/min and meters/min. They also do get converted between inHg/min and mbar/min. Please see "Effect of Rate target value" in section 3.2.2 above for more details

**Note:** The last effective Ps1 units are retained through a power On/Off cycle.

**Ps2 units :** Ps2 units can be selected only in the 3-output format. Use the PREV SCREEN key to move to the 3-output format. Then press the Ps2 key in the "Units" section of the keypad. The Ps2 units selection will be displayed on the 4<sup>th</sup> line of the display as shown below. There are eight Ps2 units - Differential inHg (Dfin), inHg, Differential mbar (Dfmb), mbar, feet, meters (mtrs), knots (kts), kmph.

The units of Differential inHg (Dfin) and Differential mbar (Dfmb) display the value of Ps2 pressure minus Ps1 pressure in either inHg or mbar. In other words, Ps2 pressure is displayed as a differential using Ps1 as the reference. This differential pressure can also be displayed in units of knots or kmph. This is useful when testing Angle of Side Slip (AOSS), where two different airspeeds have to be simulated on two separate probes on the aircraft.

In the 3-output format, when the Ps2 key in the “Units” section of the keypad is pressed, the choice of Ps2 units will appear on line 4 of the display, four at a time. The cursor is placed under the first choice. The cursor position is indicated by the blinking unit name. The arrow keys can be used to move the cursor. The UP ARROW key moves the cursor right, the DOWN ARROW key moves the cursor left. As the cursor moves past the last selection, the next selection will be displayed. The sample screen below shows the different Ps2 units, with the cursor at “Dfin”, indicated by blinking “Dfin”.

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>1006 M</b>		<b>1005 M</b>
<b>Target:</b>		<b>20.0</b>		<b>0</b>		<b>0</b>
<b>Ps2 units :</b>		<b>Dfin</b>	, inHg, Dfmb , mbar , ....			

When the cursor is moved past “mbar” , line 4 of the display will look like this:

<b>Ps2 units :</b>	.... inHg, Dfmb , mbar, <b>feet</b> , ....
--------------------	--

Each time the cursor is moved right, the displayed units will scroll left. When the cursor is moved to the last selection, line 4 will look like this:

<b>Ps2 units :</b>	.... <b>feet, mtrs, kts</b> , <b>kmph</b> .
--------------------	---

Select the desired units by moving the cursor to the unit of choice and then press ENTER. The new units will be displayed on the screen and will blink. Also, the actual and target values will get converted into the new units and the target value will blink. This is shown in the sample screen below where the units of “inHg” have been selected.

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>inHg</b>		<b>Feet</b>
<b>Actual:</b>	<b>M</b>	<b>101.2</b>		<b>28.849 M</b>		<b>1005 M</b>
<b>Target:</b>		<b>20.0</b>		<b>29.921</b>		<b>0</b>

The unit selection will not become effective until the GO key is pressed. The 6600-M4 will



return to the old units if the CANCEL key is pressed.

**Note:** The last effective Ps2 units are retained through a power On/Off cycle.

**Important Note:** If the Ps2 output is not being used then it is mandatory that the Ps2 output be in units of Differential inHg (Dfin) and the Ps2 target value be set to 0.000 Dfin. This is NOT done automatically on power-On. It is the operator's responsibility to perform this function. Failure to do so will result in improper operation of the unit.

**Important Note:** If the Ps2 output is not being used then it must be capped-off (closed).

### 3.2.4 MODE SELECTION

**Pt Mode :** The Pt mode can be selected both in 2-output and 3-output formats. The Pt output has three modes of operation. The three mode are Measure (M), Leak (L) and Control (C). The power-up mode defaults to Measure (M). To change the mode press the Pt key in the "Mode" section of the keypad. The three modes will be displayed on line 4 of the display, with the cursor at Measure (MEAS), indicated by "MEAS" blinking. The UP ARROW key can be used for moving the cursor right and the DOWN ARROW key can be used to move the cursor left. The cursor wraps around the selections, that is, moving the cursor left past "MEAS" wraps it around to "CTRL". The sample screen below shows the three mode choices displayed on line 4 of the display, with the cursor at "MEAS".

*2-output format*

<b>Units:</b>	<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual: M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>	<b>20.0</b>	<b>3000</b>	<b>0</b>	
<b>Pt mode :</b>	<b>MEAS</b>	<b>LEAK</b>	<b>CTRL</b>	

Move the cursor to the desired mode and then press ENTER. The selected mode is displayed on the screen and blinks until the GO key is pressed. The new mode will not become effective until the GO key is pressed. The sample screen below shows the selected Pt mode as "LEAK". Notice that the "L" on the left in line 2 is blinking.

*2-output format*

<b>Units:</b>	<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual: L</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>	<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Important Note:** When either the Pt, Ps1 or Ps2 Mode is changed to Control (C), ALL three outputs (Pt, Ps1 and Ps2) are automatically changed to Control. During normal

operation, all three outputs must be connected to the aircraft and all three outputs must be set to achieve specific target values. If the aircraft requires only the Pt and Ps1 outputs then the Ps2 output must be capped-off (closed) on the 6600-M4.

**Note:** When the 6600-M4 is powered-ON, the Pt mode will always be in MEASURE.

**Ps1 Mode :** The Ps1 mode can be selected both in 2-output and 3-output formats. The Ps1 output has three modes of operation. The three mode are Measure (M), Leak (L) and Control (C). The power-up mode defaults to Measure (M). To change the mode press the Ps1 key in the “Mode” section of the keypad. The three modes will be displayed on line 4 of the display, with the cursor at Measure (MEAS), indicated by “MEAS” blinking. The UP ARROW key can be used for moving the cursor right and the DOWN ARROW key can be used to move the cursor left. The cursor wraps around the selections, that is, moving the cursor left past “MEAS” wraps it around to “CTRL”. The sample screen below shows the three mode choices displayed on line 4 of the display, with the cursor at “MEAS”.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	
<b>Ps1 mode :</b>		<b>MEAS</b>	<b>LEAK</b>	<b>CTRL</b>	

Move the cursor to the desired mode and then press ENTER. The selected mode is displayed on the screen and blinks until the GO key is pressed. The new mode will not become effective until the GO key is pressed. The sample screen below shows the selected Ps1 mode as “LEAK”. Notice that the “L” on the right in line 2 is blinking.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>L</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

**Important Note:** When either the Pt, Ps1 or Ps2 Mode is changed to Control (C), ALL three outputs (Pt, Ps1 and Ps2) are automatically changed to Control. During normal operation, all three outputs must be connected to the aircraft and all three outputs must be set to achieve specific target values. If the aircraft requires only the Pt and Ps1 outputs then the Ps2 output must be capped-off (closed) on the 6600-M4.

**Note:** When the 6600-M4 is powered-ON, the Ps1 mode will always be in MEASURE.

**Ps2 Mode :** The Ps2 mode can be selected only in the 3-output format. The Ps2 output has three modes of operation. The three mode are Measure (M), Leak (L) and Control (C). The power-up mode defaults to Measure (M). Move to the 3-output format using the PREV SCREEN key. To change the mode press the Ps2 key in the “Mode” section of the keypad. The three modes will be displayed on line 4 of the display, with the cursor at Measure (MEAS), indicated by “MEAS” blinking. The UP ARROW key can be used for moving the cursor right and the DOWN ARROW key can be used to move the cursor left. The cursor wraps around the selections, that is, moving the cursor left past “MEAS” wraps it around to “CTRL”. The sample screen below shows the three mode choices displayed on line 4 of the display, with the cursor at “MEAS”.

*3-output format*

<b>Units:</b>	<b>knots</b>	<b>Feet</b>	<b>Feet</b>
<b>Actual: M</b>	<b>101.2</b>	<b>1006 M</b>	<b>1005 M</b>
<b>Target:</b>	<b>20.0</b>	<b>0</b>	<b>0</b>
<b>Ps2 mode :</b>	<b>MEAS</b> , LEAK, CTRL		

Move the cursor to the desired mode and then press ENTER. The selected mode is displayed on the screen and blinks until the GO key is pressed. The new mode will not become effective until the GO key is pressed. The sample screen below shows the selected Ps2 mode as “LEAK”. Notice that the “L” in the middle vertical section is blinking.

*3-output format*

<b>Units:</b>	<b>knots</b>	<b>Feet</b>	<b>Feet</b>
<b>Actual: M</b>	<b>101.2</b>	<b>1006 L</b>	<b>1005 M</b>
<b>Target:</b>	<b>20.0</b>	<b>0</b>	<b>0</b>

**Important Note:** When either the Pt, Ps1 or Ps2 Mode is changed to Control (C), ALL three outputs (Pt, Ps1 and Ps2) are automatically changed to Control. During normal operation, all three outputs must be connected to the aircraft and all three outputs must be set to achieve specific target values. If the aircraft requires only the Pt and Ps1 outputs then the Ps2 output must be capped-off (closed) on the 6600-M4.

**Important Note:** If the Ps2 output is not being used then it must be left in Control Mode while either Ps1 or Pt are in Control Mode. The Ps2 units must be “Dfin” and the Ps2 target value must be 0.000 Dfin.

**Note:** When the 6600-M4 is powered-ON, the Ps2 mode will always be in MEASURE.

## The 'MEASURE' to 'CONTROL' transition

When either of the Pt, Ps1 or Ps2 outputs are changed from Measure or Leak to Control mode, a sequence of events takes place that needs explaining. Since the controlling portion of the 6600-M4 is isolated from the output during Measure or Leak modes, it will usually be at a pressure quite different from that at the output. Simply introducing the controlling section into the pneumatic system connected to the output will cause a surge in pressure (or vacuum) at the output. To prevent such a surge, the 6600-M4 measures the pressure at the output, shuts-off the output from the internal 6600-M4 pneumatics, and then controls the pressure within the internal control mechanism to match the pressure at the output. Once this is done, the 6600-M4 controlling section is connected to the output. This process is termed as Equalization.

While the 6600-M4 is undergoing this process, the term 'EQZN' is displayed on the main screen in place of the "Actual" value. The whole process usually takes about 15 seconds or less to complete. During the 'EQZN' process, the Main Operating screen will appear as shown below.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>C</b>	<b>EQZN</b>	<b>EQZN</b>	<b>EQZN</b>	<b>C</b>
<b>Target:</b>		<b>20.0</b>	<b>3000</b>	<b>0</b>	

*3-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet</b>	<b>Feet</b>	
<b>Actual:</b>	<b>C</b>	<b>EQZN</b>	<b>EQZN C</b>	<b>EQZN</b>	<b>C</b>
<b>Target:</b>		<b>20.0</b>	<b>0</b>	<b>0</b>	

Once the Equalization process is complete, the Actual values appear on the Main Screen. Following the Equalization process, *only* when the actual value on the Ps1 and Ps2 outputs are less than 2000 feet from Ground and the Pt output is less than 100 knots, the 6600-M4 will automatically inject a small vacuum on the Ps1 and Ps2 outputs and a small pressure on the Pt output. This is done to determine the volume of the Pitot and Static system on the aircraft, so that the 6600-M4 can automatically adjust the gain of its control mechanism. Due to this, the actual value will always increase in both altitude and in knots for about 5 seconds, regardless of the target value. Once this process is complete, the actual values will move towards the target values.

This process is part of the "Measure" (or "Leak") to "Control" transition, and will take place only when the transition to "Control" takes place within 2000 feet of Ground and 100 knots.

### 3.3 LEAK SCREEN

Although most of the operation of the 6600-M4 will be performed while in the Main Operating Screen described above, at times, the Leak Screen is also accessed. When any of the outputs is put into the "Leak" mode (after pressing GO), the display changes to the Leak Screen. A sample Ps1 Leak Screen is shown below.

<b>Start: 5000 feet</b>	<b>Instant Leak rate</b>
<b>Curr: 4990 feet</b>	<b>30 Feet/m</b>
<b>Timer: 00:20</b>	<b>Per min. Leak rate</b>
<b>Pt = 200 kts Ps2= 4950 feet</b>	<b>WAIT Feet/m</b>

A sample Ps2 Leak Screen is shown below.

<b>Start: 6000 feet</b>	<b>Instant Leak rate</b>
<b>Curr: 5990 feet</b>	<b>25 Feet/m</b>
<b>Timer: 00:24</b>	<b>Per min. Leak rate</b>
<b>Pt = 200 kts Ps1= 5000 feet</b>	<b>WAIT Feet/m</b>

A sample Pt Leak Screen is shown below.

<b>Start: 200.0 kts</b>	<b>Instant Leak rate</b>
<b>Curr: 199.5 kts</b>	<b>1.5 knots/m</b>
<b>Timer: 00:20</b>	<b>Per min. Leak rate</b>
<b>Pt = 0 feet Ps2= 0 feet</b>	<b>WAIT knots/m</b>

The parameters shown in the Leak Screen are:

- Start: This is the reading at which the leak test was started.
- Curr: This is the current reading of the output being leak checked
- Timer: Shows the elapsed time of the leak test in minutes and seconds
- Line 4 left-half: Shows the actual value of the outputs that are **not** in leak mode.
- Instant Leak rate: Shows the instantaneous rate at which the output is leaking. For the Ps1 and Ps2 leak checks this number is updated every 0.25 seconds and shows "0" for leaks less than 20 ft/min. For the Pt leak check this number is updated every 3 seconds.
- Per min. leak rate: This is the amount the output has leaked in the past full minute. It is updated at the end of every minute on the timer. Until the first minute has elapsed it shows "WAIT".

While in the Ps1 or Ps2 Screens, if the leak ever exceeds 2000 ft/min, the 6600-M4 will automatically trip out of the Leak mode and revert back to Control mode. It will then display

a message as follows (shown for Ps1 leak):

**Ps1 leak exceeds 2000 ft/min.  
Returning Ps1 to Control Mode.  
Please press "GO"**

While in the Pt Leak Screen, if the leak ever exceeds 50 knots/min, the 6600-M4 will automatically trip out of the Leak mode and revert back to Control mode. It will then display a message as follows:

**Pt leak exceeds 50 knots/min.  
Returning Pt to Control Mode.  
Please press "GO"**

When either of these warning messages is displayed, press GO. This will bring up the Main Operating Screen. At this point it is recommended to go back to GROUND and to Measure mode on both outputs and fix the leak before proceeding further.

**Note:** It is important that each output be put into the Leak mode independently. That is, when the Pitot system of the aircraft needs to be checked for leaks, only the Pt output should be in Leak mode, keeping the Ps1 and Ps2 outputs in Control mode. When the Static system of the aircraft needs to be checked for leaks, only the Ps1 output should be in Leak mode, keeping the Pt and Ps2 outputs in Control mode. When the Differential Static system (only on aircraft with smart-probes) of the aircraft needs to be checked for leaks, only the Ps2 output should be in Leak mode, keeping the Pt and Ps1 outputs in Control mode.

Pressing the CANCEL key allows you to exit from the Leak Screen, back to the Main Operating Screen. If the mode prior to entering the Leak mode was Control then the 6600-M4 will revert back to Control mode on exiting the Leak Screen.

**Note:** If the Leak screen is entered from the 2-output format of the Main screen then pressing CANCEL in the Leak screen will bring up the 2-output format. If the Leak screen is entered from the 3-output format of the Main screen then pressing CANCEL in the Leak screen will bring up the 3-output format.

### 3.4 SELF TEST SCREEN

As part of the start up procedure, it is recommended that a Self Test be performed on the 6600-M4. Before performing the Self Test you must follow the start up procedure explained in section 3.1. The Main Operating Screen must be displayed on the Remote unit. There should be no errors displayed on line 4 of the display. If there are errors on line 4 of the display, press CANCEL to clear each error as it appears, until line 4 is clear.

Now press the NEXT SCREEN key two times. The display will show the screen shown below.

**SELF TESTS**  
**Please vent Pt, Ps1 and Ps2 ports**  
**to ambient, then press "GO"**

There are seven tests performed on the system. These tests check every subsystem for acceptable operation. If a malfunction is detected in any part of a subsystem, that subsystem is flagged as defective. Once a defective subsystem is detected, the self test function is aborted. Therefore, if more than one subsystem is defective, the first defective subsystem will cause the tests to abort, thereby preventing the user from detecting the flaws in the other malfunctioning subsystems.

The tests are performed on the following subsystems:

1. System ROM.
2. System RAM.
3. Ps1 and Ps2 pressure measurement systems
4. Pt pressure measurement system
5. Pressure and Vacuum pump assembly
6. Ps1 and Ps2 pressure control system
7. Pt pressure control system.

To start the Self Test, please make sure that at least one port of each of the Pt, Ps1 and Ps2 outputs are open to ambient, and then press GO. The status of each test will be displayed on the screen as shown below.

**ROM OK**                      **RAM OK**  
**Ps1, Ps2 measurement system OK**  
**Pt measurement system OK**

After the pump section test has passed successfully, the screen is cleared and the status of the remaining tests is displayed as shown below.





Once in the correct screen, select a number to go to the desired function. An explanation of each of the functions is given below.

### 3.5.1 FUNCTION 1: VIEW LIMITS

The 6600-M4 checks both the Target values and the Actual values to determine if they are within specific limits. These limits can be set by the user. To view these limits, you can press the Function Select key and then choose Function 1 (View Limits) by pressing "1". The VIEW LIMITS screen appears as shown below.

VIEW LIMITS	
1. max. knots = 500.0	4. max. feet = 50000
2. max. Dfin = 3.0	5. min. feet = -2000
3. max. mach = 1.000	6. max. ft/min.= 6000

To exit from this screen, press CANCEL.

For an explanation of the limits please refer to the "Set Limits" function.

### 3.5.2 FUNCTION 2: SET LIMITS

To set the limits, press 2 on the Function Select screen. Access to the "Set Limits" screen is protected by means of a password. Enter the password followed by the ENTER key on the screen shown below.

SET LIMITS	
Please enter password :	<input type="password"/>

The correct password will take you into the "Set Limits" screen shown below.

SET LIMITS	
1. max. knots = 500.0	4. max. feet = 50000
2. max. Dfin = 3.0	5. min. feet = -2000
3. max. mach = 1.000	6. max. ft/min.= 6000

There are six limit values that can be set. These limits are checked when a Target value is entered. If the target value exceeds any of the limits, an error is generated. The Actual values are also checked when the 6600-M4 is in the "Control" mode. If any of these limits is exceeded by a pre-defined amount, an error will be generated and the 6600-M4 will revert to "Measure" mode on all three outputs.

**Note:** When an Actual value exceeds the limit the 6600-M4 will put all outputs into Measure mode. To get back into Control mode, it is first necessary to temporarily increase the limit so that the Actual values are within the new limit. If the limit is not increased, the Actual value will continue to exceed the limit and will constantly generate an error, preventing the outputs from going into Control mode.

An explanation of each limit follows:

**1. Max. knots :** This defines the maximum airspeed that can entered as a Target value or generated as an Actual value. Typically this is set to the maximum airspeed that the instruments on the aircraft can tolerate. The maximum value for this limit is 1100 and the minimum is 0. A typical setting for this limit is 500.0. The factory default is 400.0.

**2. Max. Dfin :** This limit defines the maximum allowed differential between the Ps1 and Ps2 outputs in inHg. If the limit is set to 3.0 then the maximum difference allowed between Ps1 and Ps2 pressures is +/- 3.0 inHg. The maximum value allowed for this limit is 30.0 inHg and the minimum is 1.0 inHg. The factory default is 3.0 inHg.

**3. Max. Mach :** This limit is usually set to the maximum allowable Mach number that the aircraft can tolerate. The maximum value for this limit is 5.0 and the minimum is 0.1 A typical setting for this limit is 1.0. The factory default is 1.0.

**4. Max. Feet :** This limit is usually set to the maximum altitude that the aircraft instruments can tolerate. The maximum value is 80,000 and the minimum is 0. A typical setting for this limit is 50,000. The factory default is 55,000.

**5. Min. Feet :** This limit is usually set to the minimum altitude that the aircraft instruments can tolerate. It is usually a negative number. The maximum value for this limit is 80,000 and the minimum is -16,000. A typical setting for this limit is -2000. The factory default is -2000.

**6. Max. Ft./min :** This limit is usually set to the maximum rate of climb that the aircraft instruments can tolerate. It is usually limited to the maximum indication on the Vertical Speed Indicator (VSI) on the aircraft. The maximum value for this limit is 50,000 and the minimum is 100. A typical setting for this limit is 6000. The factory default is 6000.

**Important Note:** There is an additional limit for minimum knots. This limit is set to -200 knots and limits the negative differential between Pt and Ps1. This limit is not adjustable by the user.

To modify a limit, select the limit by entering its serial number (1 to 6). The entry field will be blanked and a new value can be entered into it, followed by the "ENTER" key. The value becomes effective as soon as it is entered. In the screen shown below, "1" was selected to modify the max. knots limit.

**Note:** To set a negative value, enter the positive value and then press the "+/-" key.

SET LIMITS			
1. max. knots =	<input type="text"/>	4. max. feet =	50000
2. max. Dfin =	3.0	5. min. feet =	-2000
3. max. mach =	1.000	6. max. ft/min.=	6000

The CLR key is used to clear the value entered. The CANCEL key is used to exit the SET LIMITS screen.

### 3.5.3 FUNCTION 3: SET KNOTS RATE

Pressing "3" on the Function Select screen brings you into the "Set Knots Rate" screen. This screen is shown below.

<b>CURRENT RATE = 250.0</b>	<b>knots /min.</b>
<b>NEW RATE =</b> <input type="text"/>	<b>knots /min.</b>
<b>min : 0 ,</b>	<b>max : 500</b>

The knots rate is the rate at which the Actual airspeed value is ramped towards the Target airspeed value. A typical knots rate value of 500.0 is ideal for most operations. Enter the desired value followed by the ENTER key. This will take you into the following screen which shows that a new value of 300.0 was entered. Press GO to return to the Main screen.

<b>Thank you. Press "GO" to continue.</b>	
<b>NEW RATE = 300.0</b>	<b>knots /min.</b>

**Note:** The Knots Rate is used to ramp the Pt output when the Pt units are "airspeed" units of knots, Mach, mph, kmph. It is also used to ramp the Ps2 output when the Ps2 units are knots or kmph. Please refer to "Effects of Rate target value" in section 3.2.2 for more details.

### 3.5.4 FUNCTION 4: VIEW & EXECUTE PROFILES

To execute a profile, press Function Select and then press “4”. This will bring you back into the Main Screen as shown below. You will need to enter the profile number that you want to execute. A full explanation of profiles is given in Section 4.

<b>Units:</b>	<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>M 101.2</b>	<b>3500</b>	<b>1005</b>	<b>M</b>
<b>Target:</b>	<b>20.0</b>	<b>3000</b>	<b>0</b>	
<b>ENTER PROFILE NUMBER :</b> <span style="background-color: black; color: black;">          </span> .				

Profiles may be executed from both 2-output and 3-output formats. During the execution of a profile, it is possible to toggle between the two formats using the PREV SCREEN key.

Assuming you enter a profile number of “2.1”, followed by the ENTER key, the first point of profile # 2 will be displayed on the screen. Also, the name of the profile is shown here. This is shown in the screen below. The name of profile 2 is CJ1-RVSM. In this profile note that both Modes changed to “C”, and all three target values changed. These parameters were programmed as the first point of profile # 2. You will also notice that the number “2.1” is flashing. This indicates that the current profile point is ready for execution and awaiting the “GO” key to be pressed. When the “GO” key is pressed, the 6600-M4 will execute the profile point, i.e. it will change to Control mode and move towards the desired targets.

<b>Units:</b>	<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>C 101.2</b>	<b>3500</b>	<b>1005</b>	<b>C</b>
<b>Target:</b>	<b>100.0</b>	<b>5000</b>	<b>1000</b>	
<b>ENTER PROFILE NUMBER :</b> <span style="border: 1px solid black; padding: 2px;">2.1</span> CJ1-RVSM				

Once the targets have been achieved, you can move to the next profile point by pressing ENTER. Then, the parameter values in point 2 of profile # 2 will be displayed, the profile number will change to “2.2” and will again flash, awaiting the “GO” key.

If you want only to view the profile without executing it, then DO NOT press the “GO” key. Simply press the “ENTER” key to go to the next point in the profile. Each time you press the “ENTER” key, the next profile point will be displayed. When you press the “ENTER” key after the last point in the profile, the Main screen will revert back to its original setting prior to invoking Function 4.

At any time, to exit out of the profile viewing or execution function, press CANCEL and the screen will revert back to the last executed point and line 4 will be cleared.

### 3.5.5 FUNCTION 5: SETUP PROFILES

This function is used to load profiles into the 6600-M4 from a PC. A full explanation of how to load profiles into the 6600-M4 is provided in Section 4.. The following screen will come up when Function 5 is selected.

**PROFILE SETUP**  
**Please stay in this screen and download**  
**One or more profiles through the RS232**  
**interface. On completion press "GO".**

Once the profiles have been loaded, press GO to exit this function.

### 3.5.6 FUNCTION 6: HEIGHT CORRECTION

This function allows the user to enter the difference in height between the 6600-M4 and Ground level. This value should normally be 0 unless the 6600-M4 is elevated to a height of more than 3 feet above ground level. A value of between 0 and 50 feet can be entered. The screen appears as shown below.

**Current Height Correction = 0 feet**  
**New Height Correction =  feet**  
**Enter new height (0-50) or press CANCEL**

### 3.5.7 FUNCTION 7: SET GROUND

The "Set Ground" function is used to indicate to the 6600-M4 the ambient "Ground" pressure. Before connecting the 6600-M4 to the aircraft, just after the Self Test has been performed, it is mandatory that this function be invoked. All three ports (Pt, Ps1 and Ps2) must still be open to ambient when using this function. When the "GO" key is pressed in the screen shown below, the 6600-M4 will "memorize" the ambient pressure it measures, as the "Ground" pressure. This will be used later when the "Go To Ground" function is invoked.

**Press "GO" to Set Ground ;**  
**or press "CANCEL" to exit.**

When the GO key is pressed, the 6600-M4 responds with "Thank You" as an indication that Ground has been set. It will then return to the Main screen. If the CANCEL key is pressed the display will simply revert back to the Main screen.

### 3.5.8 FUNCTION 8: GO TO GROUND

The “Go To Ground” function is used to bring the aircraft back down to “Ground”. The target value for Ps1 and Ps2 is set to the value “memorized” in the “Set Ground” function and the target value for Pt is set to the equivalent of 20 knots. The 6600-M4 then ramps towards these targets. Once these targets have been achieved, you must put the 6600-M4 into Measure mode on all three outputs, or turn the unit Off, before disconnecting the 6600-M4 from the aircraft. The “Go to Ground” screen is shown below.

**Press “GO” to Go To Ground ;  
or press “CANCEL” to exit.**

When “GO” is pressed, the 6600-M4 shows the Main screen. This screen is shown below in the 2-output format, with the new targets of 20 knots and 275 feet. This assumes that the “Ground” pressure was 275 feet when the “Set Ground” function was invoked.

*2-output format*

<b>Units:</b>		<b>knots</b>	<b>Feet/min</b>	<b>Feet</b>	
<b>Actual:</b>	<b>C</b>	<b>101.2</b>	<b>3500</b>	<b>1005</b>	<b>C</b>
<b>Target:</b>		<b>20.0</b>	<b>5000</b>	<b>275</b>	

The 3-output format would appear as follows:

*3-output format*

<b>Units:</b>		<b>knots</b>		<b>Feet</b>		<b>Feet</b>
<b>Actual:</b>	<b>C</b>	<b>101.2</b>		<b>1006</b>	<b>C</b>	<b>1005</b>
<b>Target:</b>		<b>20.0</b>		<b>275</b>		<b>275</b>

**Note:** During the Go To Ground process, the selected units remain unchanged. Any output that is not in Control mode will be forced into Control mode. The Rate target value remains unchanged. Only the Pt, Ps1 and Ps2 targets are modified to the “Ground” values.

## SECTION 4

### PROFILES

Profiles are created in Microsoft Excel and downloaded into the 6600-M4 through the COM1 port on your PC using the Hyperterminal program that is normally available on all PC's.

#### 4.1 WHAT IS A PROFILE.

A profile is a set of up to 50 points that tell the 6600-M4 what you would want it to do at each point. Each point consists of 10 parameters: 1) Pt units, 2) Pt mode, 3) Pt target value, 4) Ps1 units, 5) Ps1 mode, 6) Ps1 target value, 7) Rate target value, 8) Ps2 units, 9) Ps2 mode and 10) Ps2 target value. These 10 parameters are defined by you in the Excel program.

A total of 15 such profiles can reside in the 6600-M4 at any time. Each profile is identified by a number between 1 to 15 and also a name which can have up to 12 characters. The profile number and the name are also part of the profile that is created in Excel.

A typical profile named "Sample" is shown below as it would appear in Excel.

	A	B	C	D	E	F	G	H	I	J
1	<b>Profile</b>									
2	<b>Sample</b>		<b>3</b>		<b>0</b>					
3	knots	Control	100.0	Feet	Control	0	6000	Dfin	Control	0.100
4	knots	Control	200.0	Feet	Control	0	6000	Dfin	Control	0.100
5	knots	Leak	200.0	Feet	Control	0	6000	Dfin	Control	0.100
6	knots	Control	100.0	Feet	Control	1000	6000	Dfin	Control	0.200
7	knots	Control	200.0	Feet	Control	5000	6000	Dfin	Control	0.200
8	knots	Control	300.0	Feet	Control	10000	6000	Dfin	Control	0.200
9	knots	Control	100.0	Feet	Control	18000	6000	Dfin	Control	0.200
10	knots	Control	100.0	Feet	Leak	18000	6000	Dfin	Control	0.200
11	knots	Control	100.0	Feet	Control	30000	6000	Dfin	Control	0.300
12	knots	Control	100.0	Feet	Control	50000	6000	Dfin	Control	0.300
13	<b>knots</b>	<b>Control</b>	<b>20.0</b>	<b>Feet</b>	<b>Control</b>	<b>Ground</b>	<b>6000</b>	Dfin	<b>Control</b>	<b>Ground</b>
14	<b>knots</b>	<b>Measure</b>	<b>20.0</b>	<b>Feet</b>	<b>Measure</b>	<b>Ground</b>	<b>6000</b>	Dfin	<b>Measure</b>	<b>Ground</b>
15	<b>END</b>									

Row 1 always says "Profile". This indicates to the 6600-M4 that a profile is to follow.

Row 2 left cell shows the name of the profile. This profile is named "Sample". The name can have up to 12 alphanumeric characters. This name will show up on the 4<sup>th</sup> line of the

6600-M4 display when this profile is executed.

Row 2 middle cell shows the number of the profile. This profile has a number 3. This tells the 6600-M4 that this profile is to be loaded in as profile number 3. When profile 3 is executed on the 6600-M4, this "Sample" profile will be executed. This number can be any number between 1 and 15. When this profile is downloaded into the 6600-M4 it will overwrite the previous profile that was resident in the 6600-M4 as number 3.

Row 2 right cell shows the height correction. This should normally be zero.

Rows 3 through 14 are the points of the profile. This profile has only 12 points. For each of these points the columns contain the following information:

<u>Column</u>	<u>Information</u>
A	Pt units
B	Pt mode
C	Pt target value
D	Ps1 units
E	Ps1 mode
F	Ps1 target value
G	Rate target value
H	Ps2 units
I	Ps2 mode
J	Ps2 target value

In the sample profile, Row 3, which is the first point in the profile, tells the 6600-M4 to go in Control mode to 100 knots on the Pt output, in Control mode to 0 feet at 6000 ft/min on the Ps1 output, and in Control mode to a value of 0.100 inHg differential (Ps2-Ps1) (Dfin) on the Ps2 output.

Row 4 (point 2) makes the 6600-M4 go to 200 knots and 0 feet at 6000 ft/min and 0.100 inHg differential on Ps2.

Row 5 (point 3) puts Pt into Leak mode while still keeping Ps1 and Ps2 in Control at 0 feet and 0.100 inHg diff.

Row 6 (point 4) puts the Pt back into Control and takes it down to 100 knots. Ps1 is simultaneously moved up to 1000 feet at 6000 ft/min and Ps2 is changed to 0.200 Dfin.

Row 7 (point 5) takes Pt up to 200 knots, Ps1 up to 5000 feet and Ps2 to 0.200 Dfin.

Row 8 (point 6) takes Pt up to 300 knots, Ps1 up to 10,000 feet and Ps2 to 0.2000 Dfin.

Row 9 (point 7) takes Pt down to 100 knots, Ps1 up to 18,000 feet and Ps2 to 0.200 Dfin.

Row 10 (point 8) keeps Pt at 100 knots and puts Ps1 into Leak mode while at 18,000 feet. Ps2 is held at 0.200 Dfin.



Row 11 (point 9) keeps Pt at 100 knots and ramps Ps1 in Control mode to 30,000 feet at 6000 ft/min. Ps2 is also changed to 0.300 Dfin.

Row 12 (point 10) keeps Pt at 100 knots and ramps Ps to 50,000 feet at 6000 ft/min while Ps2 is maintained at 0.300 Dfin.

Row 13 (point 11) takes Pt down to 20 knots and ramps Ps1 and Ps2 back to “Ground” at 6000 ft/min. Since Ps2 is in Dfin, the actual Dfin target value is 0.000 since both Ps1 and Ps2 are achieving the same pressure (Ground).

Row 14 (point 12) puts Pt, Ps1 and Ps2 into Measure mode.

## 4.2 CREATING A PROFILE

1. Start with opening the “Profile Template.xls” file.
2. Do not change anything on Row 1.
3. On Row 2, left-most cell, replace “Template” with the name of your profile. Limit is 12 characters.
4. On Row 2, middle cell, replace “11” with a profile number between 1 and 15 that you would like this profile to be saved as, in the 6600-M4.
5. Do not change row 2 , 3<sup>rd</sup> cell or 4<sup>th</sup> cell.
6. In rows 3 through 50, change the cells as per the points you want to generate in your test. For entering Units and Modes use the drop down menu selections for those cells. If you do not use all the rows for your profile, select the cells in the unused rows up to row 50 and delete them, shifting the cells up. DO NOT delete rows 51, 52 and 53.
7. Format the cells with values so that they show the correct number of digits after the decimal point. For instance, knots values have 1 digit after the decimal, Mach values have 3 digits after the decimal. Format the cell just like a regular Excel cell with a number. The following table lists the digits after the decimal for the various units. The Rate target value has the same number of digits after decimal as the Ps1 value in the same units.

Pt units	Digits after decimal	Ps1 units	Digits after decimal	Ps2 units	Digits after decimal
Knots	1	Feet	0	Feet	0
Mach	3	Ps inHg	3	Ps inHg	3
EPR	3	Meters	1	Meters	1
Pt inHg	3	Ps mb	2	Ps mb	2
Qc inHg	3			Dfin	3
Pt mb	2			Dfmb	2
Qc mb	2			knots	1
Mph	1			mph	1
Kmph	1				

8. Check the values, units and modes in your profile to ensure they are all valid and

correct. If you going into the Leak mode at any point, then make sure that you achieve that point in Control mode before you actually change to Leak mode. For example, if you want to perform a Leak at 18,000 feet, then you must have one point in Control mode which takes the Ps1 port to 18,000 feet, followed by another point where the Ps1 port is put into Leak mode at 18,000 feet.

9. Now that the profile is complete, save the profile as an Excel file ( .xls file) using the name of the profile as the filename. Then save it again using the "Save As" command but this time change the file type (using the "Save as type:" drop-down selection ) to "Text - Tab delimited". Use the profile name as the filename again. You will get many warnings from Excel about the incompatibility of this text file, but simply say "Yes" to all the warnings. Once you have saved the file as a text file, you will need to close the file. When you do this, many more warnings will pop up. Please say "yes" to all these too.
10. At the end, you should have two files for your new profile. One .xls file and one .txt file, both with the same filename. Your profile has been created.

### 4.3 SETTING UP HYPERTERMINAL

You download a profile into the 6600-M4 using the Hyperterminal program. At first you need to setup Hyperterminal. You only need to do this once.

1. Hyperterminal comes loaded in your PC as part of the accessories. Go into "All Programs", then select "Accessories", then select "Communication", then select Hyperterminal. It will ask you to setup a new connection. Create a new connection with the name "6600-M4". A dialog box named "Connect To" will appear. The bottom selection in this box is "Connect using". From the drop down menu in "Connect using", select "COM1". Select "OK". A new dialog box will open named "Com1 Properties". Setup the Port Settings as follows:

Bits per second:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow control:	None

Select "Apply". Then select "OK". This will take you into the "6600-M4 Hyperterminal" window.

2. Select "File". Select "Properties". A new dialog box "6600-M4 Properties" appears. Select the "Settings" tab. In the "Emulation" menu select "ANSI". Select "OK". Now you are back in the "6600-M4 Hyperterminal" window. Select "File", select "Save". Close this window. A warning appears, select "Yes". Hyperterminal is now setup.

3. To verify that the 6600-M4 file is setup in Hyperterminal, select "All Programs" from the desktop, select "Accessories", select "Communications", select "Hyperterminal". The "6600-M4" icon should appear. If it does not appear then you will need to repeat steps 1 and 2 above.

#### 4.4 DOWNLOADING PROFILES

1. Connect the one-to-one RS232 cable to the RS232 port on the 6600-M4. You will need to remove the access panel for this. Connect the other end of this cable to the COM1 port on your PC.
2. Turn on the 6600-M4 and select Function 5, Set Profiles. The following screen appears.

**PROFILE SETUP**  
**Please stay in this screen and download**  
**One or more profiles through the RS232**  
**interface. On completion press "GO".**

- Stay in this screen until all profiles you would like to download have been downloaded.
3. Start the 6600-M4 file in Hyperterminal. On the task bar select "Transfer". Then select "Send Text file". The dialog box will open that allows you to select the .txt file you want to transfer. Open this file. You will see the profile being downloaded as it is echoed back from the 6600-M4.
  4. After the profile has completed downloading, the last section should say "PASS". If it does not then the profile did not download correctly. If no characters are echoed when you open the .txt file to download then you probably have a communication problem.
  5. If you see "garbage" on the first line of the profile as it downloads then you should redo the download. This could happen on some systems on the very first profile you download during a session in Hyperterminal.
  6. To download more profiles in the same session simply repeat step 3 from the point you select "Transfer". After all profiles you wish to download have been transferred, press GO on the 6600-M4. Check that the profile loaded properly by selecting Function 4 on the 6600-M4 and entering the profile number starting at step 1 (i.e. "18.1" to check profile 18). Step through the profile using only ENTER and check if the points match what you have setup on the PC as your profile.

## 4.5 EXECUTING A PROFILE

On the 6600-M4, select Function 4: Execute profile. On line 4 on the Main screen, a profile number is required to identify the profile. This number is x.y where x is the profile number and y is the point number within that profile. Since a particular point can be specified, the user can start a profile at any point, not necessarily at point 1. 'x' can have a value between 1 and 15 and 'y' can have a value between 1 and 50.

When a profile number is entered using the ENTER key, the name of the profile will appear to the right of the profile number and the parameters of the particular point in that profile will be displayed on the screen in their respective locations. It will appear as if the user had entered all those parameters from the front panel. The value x.y will flash on line 4 of the display, indicating that the point is ready to be executed. To execute the point press 'GO'. To view the next point in the profile press 'ENTER'. As long as the profile point number is flashing, it will not be executed.

Some of the rules to follow and points to observe while executing profiles are:

1. Press CANCEL to abort a profile. If CANCEL is pressed while the system is moving towards a target value, it will continue to do so. Aborting a profile simply allows the user the freedom to perform all functions possible from the front panel with no restrictions. Operating within a profile restricts the user to follow the profile
2. Press GO to execute the flashing profile point. Once the 6600-M4 achieves the state it has been commanded to go to, it will stay there until the next profile point is invoked (using ENTER) and executed (using GO).
3. Press ENTER to invoke the next profile point. All parameters of the point will be shown on the screen and the point number will flash on line 4. ENTER allows the user to view an entire profile without executing any point. It also allows the user to skip certain points if so desired.
4. The ARROW keys may be used during profile execution to allow the user to jog the profile's target values. A new target value cannot be entered while a profile is executing. The existing target value may be jogged up or down in fixed increments as described in section 3.2.2. The PREV SCREEN key may be used to toggle the Main screen between the 2-output and 3-output formats.
5. No other keys are effective. Changing units or modes or target values will require aborting the profile.
6. When a profile goes into leak mode, the Leak Screen will be displayed. The profile will stay in this screen until the user enters CANCEL to exit the leak screen. The 6600-M4 returns to the main screen where the user must press ENTER to invoke the next profile point.

7. When the last point in the profile is executed, pressing ENTER will cause line 4 of the display to be cleared. This will be the only indication that the profile has been completed.
8. Each profile can have up to 50 points. There can be 12 profiles resident in the 6600-M4 at any one time.
9. New profiles can be loaded any number of times. They have to be numbered 1 to 12 and will overwrite existing resident profiles with the same profile number.
10. Errors during profile execution will cause the profile to abort. It can be restarted by the user at the point where the error occurred, after the error is rectified.
11. If a particular test procedure requires more than 50 points, then these points can be split between 2 or more profiles. For instance, if a transponder test requires 80 points, then the first 50 points can be loaded as profile 1 and the remaining 30 points can be loaded as profile 2. When profile 1 has been completed at point 1.50, the 6600-M4 will stay at that point until the next command. The user can start profile 2.1 and execute the 51st point and continue through the remaining 30 points using profile 2.

## SECTION 5

### TYPICAL USE

This section assumes that the user has read Section 3 and understood the functioning of the 6600-M4. Please do not follow the sequence shown below without first reading Section 3.

The following steps show a typical use of the 6600-M4 for checking aircraft instruments.

1. Turn on the 6600-M4 and perform the Self Test (NEXT SCREEN two times). Hoses should be disconnected and at least one Pt, one Ps1 and one Ps2 port must be open to ambient. Pt, Ps1 and Ps2 Vent valves must be closed.
2. With ports still open to ambient, Set Ground (Function 7)
3. Connect hoses between the 6600-M4 outputs and the aircraft. Plug all unused Pt, Ps1 and Ps2 ports on the 6600-M4. Plug all unused Pitot or Static ports on the aircraft.
4. Select Function 8: Go To Ground. This will put Pt, Ps1 and Ps2 into Control mode with targets of 20 knots for Pt and 185 feet (assuming your "Ground" was 185 ft.) for Ps1 and Ps2. Wait for the targets to be achieved.
5. Set the Pt target to 200 knots and GO.
6. When Pt achieves 200 knots, put ONLY Pt into Leak mode, leave Ps1 and Ps2 in Control mode.
7. If Pt has a significant leak (more than 5 knots/min.) then first try and find the leak while the 6600-M4 is in the Leak screen. If you lose all airspeed while searching for the leak, cancel out of the Leak screen and go back to Step 6 and continue to search for the leak. If you need to disconnect ANY hoses on the aircraft or between the 6600-M4 and the aircraft, then
  - a. Go To Ground
  - b. Put Pt, Ps1 and Ps2 in Measure mode.
  - c. Then disconnect hoses.
8. Only after the Pt system is reasonably leak-tight, should you proceed to the next step.
9. Leave the Pt target at 200 knots and set the Ps1 and Ps2 targets to 3000 feet above Ground. Pt, Ps1 and Ps2 outputs should all be in CONTROL mode. Press GO.
10. When Pt, Ps1 and Ps2 targets have been achieved, put ONLY Ps1 into LEAK mode, leaving Pt in CONTROL mode.
11. If the Ps1 port has a significant leak (more than 100 feet/min.) then first try and find the leak while the 6600-M4 is in the Leak screen. If you lose significant altitude while searching for the leak, cancel out of the Leak screen and go back to Step 10 and continue to search for the leak. If you need to disconnect ANY hoses on the aircraft or between the 6600-M4 and the aircraft, then
  - a. Go To Ground
  - b. Put Pt, Ps1 and Ps2 in Measure mode.
  - c. Then disconnect hoses.
12. Only after the Ps1 system is reasonably leak-tight , should you proceed to the next step.

13. Repeat steps 9 through 12 for performing a leak check on the Ps2 output. This needs to be done only if the Ps2 output is connected to the aircraft.
14. Now that all three systems are reasonably leak-tight, start your checkout procedure for checking the instruments inside the aircraft. At this point you may want to execute the appropriate Profile for your test.

**Caution: During your tests, do not put Pt, Ps1 or Ps2 outputs in MEASURE mode unless the aircraft is at "Ground". Use only the Control and Leak modes. If the Ps2 output is not connected to the aircraft then the Ps2 output must be in units of Dfin, the Ps2 target value must be 0.000 and Ps2 must always be in Control mode.**

15. After you finish the last point of your test procedure, select Function 8: "Go to Ground". If you are executing a profile, this should already be part of your profile. The targets will get set to 20 knots for Pt and 185 feet (Your Ground) for Ps1 and Ps2.
16. After the targets have been achieved, set Pt, Ps1 and Ps2 outputs to **MEASURE** mode. This should be part of your profile. Alternately, you can simply turn OFF the 6600-M4.
17. Turn OFF the 6600-M4.
18. Disconnect the hoses from the aircraft and from the 6600-M4.

During your test procedure, if you lose power, the 6600-M4 will maintain the pressure. When power comes back on, the 6600-M4 and the aircraft will be at the same pressure as before except for pressure lost due to leaks in the system.

If the 6600-M4 behaves erratically for whatever reason, turn OFF the 6600-M4 using the ON/OFF switch on the Remote unit. Turn the unit back ON after 30 seconds and attempt to use the 6600-M4 again.

The 6600-M4 is capable of overcoming substantial leaks in the system. It is not capable of overcoming extremely large leaks. Therefore it is essential that the system be reasonably leak-tight before taking the aircraft to higher altitude or airspeed. During a leak check, a leak of more than 2000 feet/min. either on the Ps1 or Ps2 outputs, or a leak of more than 50 knots/min on the Pt output, will immediately cause the 6600-M4 to exit the Leak screen and go back into Control mode automatically. A message will indicate that a large leak exists. Go back to Ground and go through the leak test process shown above, to find and fix the leak before proceeding further.

It may be helpful to keep a copy of the procedure, shown in Figure 5.1, with the 6600-M4 to assist the operator while using the 6600-M4.

## 6600-M4 : TYPICAL USE

### STEP 0: PREP AIRCRAFT

- 0.1 Connect adapters and hoses to the aircraft, tape-up all unused ports on the aircraft.
- 0.2 Leave hose ends near the 6600-M4 but DO NOT connect to 6600-M4 yet.

### STEP 1: SELF TEST

- 1.1 Open at least one each of Pt, Ps1 and Ps2 ports on 6600-M4 to ambient. Close all Vent valves.
- 1.2 Turn ON 6600-M4 and run SELF TEST (NEXT SCREEN twice; GO).

### STEP 2: SET GROUND

- 2.1 With ports still open SET GROUND (F-7 ; GO)

### STEP 3: LOW LEVEL LEAK CHECK

- 3.1 Connect hoses from aircraft to 6600-M4. Close all unused ports on the 6600-M4.
- 3.2 GO TO GROUND (F-8 ; GO)
- 3.3 **Pitot Leak check:**
  - a. Airspeed Target = 200 knots; GO
  - b. Setup Pt Mode = Leak ("L" flashing) wait for Pt to stabilize at 200 knots; GO
  - c. If Pt cannot achieve 200 knots or if Pt Leak exceeds 50 kts/min. (warning message ) then GO TO GROUND, Go to MEASURE on Pt, Ps1 and Ps2, then find the leak. Go back to Step 3.2
  - d. If Pt leaks down to below 100 knots and leak has not yet been found then CANCEL out of Leak Screen, allow Pt to "recharge" to 200 knots, then change Pt back into Leak Mode and continue searching for the leak.
  - e. When Pitot is Leak tight, CANCEL out of Leak Screen and proceed to step 3.4
- 3.4 **Ps1 Leak check:**
  - a. Pt=200 knots; Ps1=Ps2 = 3000 feet above Ground; GO
  - b. Setup Ps1 Mode = Leak ("L" flashing) wait for Ps1 to stabilize at target; GO.
  - c. If Ps1 cannot achieve target or if Ps1 Leak exceeds 2000 ft/min. ( warning message) then GO TO GROUND, Go to MEASURE on Pt, Ps1 and Ps2, then find the leak. GO TO GROUND, then go back to Step 3.4
  - d. If Ps1 leaks down more than 1000 feet and leak has not yet been found then CANCEL out of Leak Screen, allow Ps1 to "recharge" to target, then change Ps1 back into Leak Mode and continue searching for the leak.
  - e. When Ps1 is Leak tight, CANCEL out of Leak Screen and proceed to step 3.5.
- 3.5 **Ps2 Leak check :**
  - a. Only if the Ps2 output is connected to the aircraft, repeat 3.4 for the Ps2 output leak check. Once Ps2 is leak tight, proceed to step 4.

### STEP 4: CHECKOUT AIRCRAFT INSTRUMENTS

- 4.1 Run Profile (F -4) or execute your Test Procedure to checkout cockpit instruments.
- 4.2 GO TO GROUND at the end of Profile or Test Procedure.
- 4.3 Turn off 6600-M4, then disconnect hoses.

Figure 5.1



## SECTION 6

### CALIBRATION

#### 6.1 EQUIPMENT:

This calibration procedure requires the following equipment:

1. Vacuum pump.
2. Pressure supply of clean, dry air ("Zero" Air preferred) at 55 psia
3. Pressure standard having accuracy of at least 0.002 inHg up to 38 inHg and an accuracy of at least 0.003 inHg from 38 inHg to 100 inHg.

#### 6.2 GENERAL NOTES:

The transducers inside the 6600-M4 are sensitive to the change in density of the medium being used. The unit must be calibrated with Dry Air only. Calibrating with Nitrogen or any medium other than Dry Air will give erroneous results.

Because the transducers are medium-sensitive, care must be taken to ensure that the hoses used in the calibration system do not out-gas. Normally, PVC hoses, or refrigeration type hoses have a tendency to out-gas. The ideal hoses to use are Teflon or Teflon-coated hoses because they have a very low absorption and out-gas coefficient. Stainless steel hoses may also be used.

If the wrong type of hoses are used, then the typical results obtained will show that the error increases as the pressure increases. Also, it is very unlikely that the repeatability of the indicated pressure will be less than 0.002 inHg at 100 inHg. If the system cannot achieve repeatability of 0.002 inHg or less, then the most likely cause is the out-gassing of hoses.

In the following sections, the instructions call for generating a pressure of 1.000 inHg abs. using the Pressure Standard. If your Standard cannot generate such a low pressure, then please generate as low a pressure as possible provided it is less than 4.0 inHg abs.

The 6600-M4 has a drift of typically 0.005 %FS per year. Therefore it needs to be calibrated once a year to perform adequately as a calibration standard for air data equipment.

### 6.3 Ps1 and Ps2 CALIBRATION:

**Step 1.** Connect the output of the Pressure Standard to the Ps1 and Ps2 ports on the 6600-M4. The pressure and vacuum sources are to be connected to the control mechanism of the Pressure Standard.

**Step 2.** Turn on the 6600-M4 and allow it to warm up for about 30 minutes. Change the main screen to the 3-output format. Change the Pt unit to "PtinHg" (Ptin) and Ps1 and Ps2 units to "inHg". Refer to section 3.2.3 on how to change units. During the warm-up period, purge the system with Dry Air by cycling the pressure at the Ps1 and Ps2 ports between 38 inHg absolute and 1 inHg absolute (or lower), at least three times.

During the warm-up period, ensure that the leaks in the system are within acceptable limits. At 1 inHg absolute, the leak rate must not exceed 0.030 inHg/min. At 38 inHg absolute, the leak rate must not exceed 0.010 inHg/min. To determine the leak rate, control the Pressure Standard to the desired pressure, hold the pressure for 5 minutes to allow any temperature effects to subside, then isolate the control mechanism from the Pressure Standard and measure the leak rate. If the Pressure Standard is a Dead Weight Tester, the leak rate should be low enough to ensure that the maximum allowable sink rate of the Dead Weight Tester is not exceeded.

Towards the end of the warm-up period, perform a repeatability check at 38 inHg. Take the pressure down to about 5 inHg and then back up to 38.000 inHg. Wait for 2 minutes, then note the Actual value on Ps1 as "R1". Again, take the pressure down to about 5 inHg and then back up to 38.000 inHg. Wait for 2 minutes, then note the Actual value on Ps1 as "R2". The difference between "R1" and "R2" must not exceed +/- 0.002 inHg.

**Step 3.** After the warm-up period is over, using the Pressure Standard, generate a pressure of 1.000 inHg absolute. Allow the pressure to be stable at 1.000 inHg for 2 minutes and note the actual values for Ps1 and Ps2 on the 6600-M4. These are the "As Found" readings for the Vacuum Test Point (please see Fig. 6.1 below). They will indicate the zero drift since the previous calibration.

**Step 4.** Generate a pressure of 38.000 inHg absolute, allow the pressure to stabilize for 2 minutes and note the actual values for Ps1 and Ps2 on the 6600-M4. These are the "As Found" readings for the Full Scale Test Point (please see Fig. 6.1 below). They will indicate the zero plus slope drift since the previous calibration. Leave the pressure at 38.000 inHg while you perform the next step.

If you do not wish to make a calibration adjustment, but just want to verify the accuracy of the 6600-M4, please skip to Step 10.

**Step 5.** To make a calibration adjustment for the Ps1 and Ps2 outputs, on the 6600-M4, move to the the CALIBRATION screen using the NEXT SCREEN key and enter the password. The calibration screen appears as follows:

## CALIBRATION

	Pt inHg	Ps inHg
Vacuum:	1. _____	3. _____
F.S. :	2. _____	4. _____

**Step 6.** Ensure that the pressure generated by the Standard on the Static port is still 38.000 inHg. Select item '4' using the keypad on the remote unit and then enter the value 38.000 in item 4. This indicates the full scale point for the calibration. It is the "As Left" Full Scale Test Point for Ps1 and Ps2 in Fig. 6.1.

If you make an error while entering data, press "CLR". **Do not** press "CANCEL". You may re-enter the value any number of times.

**Step 7.** Now generate a pressure of 1.000 inHg with the Standard. Allow the pressure to stabilize for 2 minutes, select item '3' using the keypad on the remote unit and then enter the value 1.000 in item 3. This indicates the vacuum point for the calibration. It is the "As Left" Vacuum Test Point for Ps1 and Ps2 in Fig. 6.1.

If you make an error while entering data, press "CLR". **Do not** press "CANCEL". You may re-enter the value any number of times.

**Step 8.** On the keypad of the remote unit, press "PREV SCREEN". The display will return to the Main Screen.

**WARNING:** If you press "CANCEL" the calibration adjustment will become void.

**Step 9.** The calibration adjustment is now complete for the Ps1 and Ps2 outputs. Proceed to the next step to verify the calibration.

**Step 10.** Verify the calibration by generating pressures in approximately 10% increments and noting the actual values for Ps1 and Ps2 at each pressure point. Your calibration sheet will appear as shown in Figure 6.1.

### 6.4 Pt CALIBRATION:

**Step 1.** Connect the output of the Pressure Standard to the Pitot port on the 6600-M4. The pressure and vacuum sources are to be connected to the control mechanism of the Pressure Standard.

**Step 2.** Turn on the 6600-M4 and allow it to warm up for about 30 minutes. The main screen may be either in the 2-output or 3-output format. Change the Pt unit to "PtinHg" (Ptin).

Refer to section 3.2.3 on how to change units. During the warm-up period, purge the system with Dry Air by cycling the pressure at the Pt port between 60 inHg absolute and 1 inHg absolute (or lower), at least three times.

During the warm-up period, ensure that the leaks in the system are within acceptable limits. At 1 inHg absolute, the leak rate must not exceed 0.030 inHg/min. At 100 inHg absolute, the leak rate must not exceed 0.050 inHg/min. To determine the leak rate, control the Pressure Standard to the desired pressure, hold the pressure for 5 minutes to allow any temperature effects to subside, then isolate the control mechanism from the Pressure Standard and measure the leak rate. If the Pressure Standard is a Dead Weight Tester, the leak rate should be low enough to ensure that the maximum allowable sink rate of the Dead Weight Tester is not exceeded.

Towards the end of the warm-up period, perform a repeatability check at 100 inHg. Take the pressure down to about 5 inHg and then back up to 100.000 inHg. Wait for 2 minutes, then note the Actual value on Pt as "R1". Again, take the pressure down to about 5 inHg and then back up to 100.000 inHg. Wait for 2 minutes, then note the Actual value on Pt as "R2". The difference between "R1" and "R2" must not exceed +/- 0.002 inHg.

**Step 3.** After the warm-up period is over, using the Pressure Standard, generate a pressure of 1.000 inHg absolute. Allow the pressure to be stable at 1.000 inHg for 2 minutes and note the actual values for Pt on the 6600-M4. This is the "As Found" reading for the Pt Vacuum Test Point (please see Fig. 6.1 below). It will indicate the zero drift since the previous calibration.

**Step 4.** Generate a pressure of 100.000 inHg absolute, allow the pressure to stabilize for 2 minutes and note the actual value for Pt on the 6600-M4. This is the "As Found" reading for the Pt Full Scale Test Point (please see Fig. 6.1 below). It will indicate the zero plus slope drift since the previous calibration. Leave the pressure at 100.000 inHg while you perform the next step.

If you do not wish to make a calibration adjustment, but just want to verify the accuracy of the 6600-M4, please skip to Step 10.

**Step 5.** To make a calibration adjustment for the Pt output, on the 6600-M4, move to the the CALIBRATION screen using the NEXT SCREEN key and enter the password. The calibration screen appears as follows:

CALIBRATION			
	Pt inHg		Ps inHg
Vacuum:	1. _____		3. _____
F.S. :	2. _____		4. _____

**Step 6.** Ensure that the pressure generated by the Standard on the Pitot port is still 100.000 inHg. Select item '2' using the keypad on the remote unit and then enter the value 100.000 in item 2. This indicates the Pt full scale point for the calibration. It is the "As Left" Full Scale Test Point for Pt in Fig. 6.1.

If you make an error while entering data, press "CLR". **Do not** press "CANCEL". You may re-enter the value any number of times.

**Step 7.** Now generate a pressure of 1.000 inHg with the Standard. Allow the pressure to stabilize for 2 minutes, select item '1' using the keypad on the remote unit and then enter the value 1.000 in item 1. This indicates the vacuum point for the calibration. It is the "As Left" Vacuum Test Point for Pt in Fig. 6.1.

If you make an error while entering data, press "CLR". **Do not** press "CANCEL". You may re-enter the value any number of times.

**Step 8.** On the keypad of the remote unit, press "PREV SCREEN". The display will return to the Main Screen.

**WARNING:** If you press "CANCEL" the calibration adjustment will become void.

**Step 9.** The calibration adjustment is now complete for the Pt output. Proceed to the next step to verify the calibration.

**Step 10.** Verify the calibration by generating pressures in approximately 10% increments and noting the actual values for Pt at each pressure point. Your calibration sheet will appear as shown in Figure 6.1.

Model: 6600-M4

Serial#: 77123

Full scale: Ps: 38 inHg  
Pt: 100 inHg

Last Calibrated date: June 25, 2008 Next Calibration due: June 25, 2010

**CALIBRATION RESULTS**

**Ps1 Output**

<u>TEST POINT</u>	<u>AS FOUND</u>	<u>AS LEFT</u>	<u>DEVIATION</u>
	inHg	inHg	inHg
1. Vacuum	1.001	1.000	0.001
2. Fullscale	38.002	38.000	0.002

**Ps2 Output**

<u>TEST POINT</u>	<u>AS FOUND</u>	<u>AS LEFT</u>	<u>DEVIATION</u>
	inHg	inHg	inHg
1. Vacuum	1.000	1.000	0.000
2. Fullscale	38.001	38.000	0.001

**Pt Output**

<u>TEST POINT</u>	<u>AS FOUND</u>	<u>AS LEFT</u>	<u>DEVIATION</u>
	inHg	inHg	inHg
1. Vacuum	1.001	1.000	0.001
2. Fullscale	100.002	100.000	0.002

**VERIFICATION RESULTS**

**Ps1 Output**

**Ps2 Output**

**Pt Output**

<u>APPLIED</u>	<u>DISPLAYED</u>	<u>APPLIED</u>	<u>DISPLAYED</u>	<u>APPLIED</u>	<u>DISPLAYED</u>
inHg	inHg	inHg	inHg	inHg	inHg
1.000	1.000	1.000	1.000	1.000	1.000
4.000	4.000	4.000	4.000	10.000	9.999
8.000	8.000	8.000	7.999	20.000	19.999
12.000	12.000	12.000	11.999	30.000	30.000
15.000	15.000	15.000	15.000	40.000	40.000
19.000	19.001	19.000	19.000	50.000	50.000
23.000	23.001	23.000	23.000	60.000	60.000
27.000	27.000	27.000	27.001	70.000	70.001
30.000	30.000	30.000	30.000	80.000	80.002
34.000	34.000	34.000	34.000	90.000	90.001
38.000	38.000	38.000	38.000	100.000	100.000

Calibrated by:

Date: June 25, 2009

Figure 6.1 Sample calibration sheet

**SECTION 7**  
**MAINTENANCE**

Scheduled maintenance of the 6600-M4 includes calibration once a year. The calibration procedure is described in Section 6.

Apart from this there are no other scheduled maintenance requirements.

## SECTION 8

### COMMUNICATION INTERFACE

The model 6600-M4 is capable of communicating with a remotely located computer via the RS232 serial interface. Using this interface it is possible to perform all functions that are available on the front panel.

#### 8.1 RS232 SERIAL INTERFACE

The serial interface is a three wire interface using the signals RX, TX and GND. Each byte of data is sent in ASCII format using 8 bits per byte, with 1 stop bit, no parity at 9600 baud.

The pin-out of the interface is as follows:

- Pin 2 - Transmit (TX)
- Pin 3 - Receive (RX)
- Pin 5 - Signal ground (GND)

The baud rate, parity, bits per byte, and number of stop bits cannot be altered and is set to 9600, No parity, 8 bits and 1 stop bit respectively.

#### 8.2 COMMUNICATION SYNTAX

All commands to the 6600-M4 are two letter commands. Some commands are used both to read and write data. Others are used only to read data back from the 6600-M4. If a command is used to write data then it is followed by the equal sign followed by the data to be written. Each command must be terminated by a carriage return <CR>. Each value returned by the 6600-M4 is terminated by a <CR>. No hardware or software handshaking is provided.

Commands are serviced by the 6600-M4 every 250 msec. A string of several commands may be sent to the 6600-M4 at any time. The maximum string length must not exceed 32 characters. For proper operation, it is recommended that not more than 3 commands be sent every 250 msec.

A list of all commands is shown below.



<u>Command</u>	<u>Type</u>	<u>Description</u>																				
PA	R	Actual Pt value in current units																				
RA	R	Actual Rate value in current units																				
SA	R	Actual Ps1 value in current units																				
DA	R	Actual Ps2 value in current units																				
PT	R	Read current Pt target value																				
PT=n	W	Set Pt target value to n																				
RT	R	Read current Rate target value																				
RT=n	W	Set Rate target value to n																				
ST	R	Read current Ps1 target value																				
ST=n	W	Set Ps1 target value to n																				
DT	R	Read current Ps2 target value																				
DT=n	W	Set Ps2 target value to n																				
PJ=n	W	Jog up (n=0) or down (n=1) Pt target																				
RJ=n	W	Jog up (n=0) or down (n=1) Rate target																				
SJ=n	W	Jog up (n=0) or down (n=1) Ps1 target																				
DJ=n	W	Jog up (n=0) or down (n=1) Ps2 target																				
PU	R	Read current Pt units (value returned: 1 to 9)																				
PU=n	W	Set Pt units as per following: <table border="0" style="margin-left: 40px;"> <tr> <td><u>n</u></td> <td><u>units</u></td> </tr> <tr> <td>1</td> <td>knots</td> </tr> <tr> <td>2</td> <td>mach</td> </tr> <tr> <td>3</td> <td>Pt inHg</td> </tr> <tr> <td>4</td> <td>Qc inHg</td> </tr> <tr> <td>5</td> <td>Pt mb</td> </tr> <tr> <td>6</td> <td>Qc mb</td> </tr> <tr> <td>7</td> <td>mph</td> </tr> <tr> <td>8</td> <td>kmph</td> </tr> <tr> <td>9</td> <td>EPR</td> </tr> </table>	<u>n</u>	<u>units</u>	1	knots	2	mach	3	Pt inHg	4	Qc inHg	5	Pt mb	6	Qc mb	7	mph	8	kmph	9	EPR
<u>n</u>	<u>units</u>																					
1	knots																					
2	mach																					
3	Pt inHg																					
4	Qc inHg																					
5	Pt mb																					
6	Qc mb																					
7	mph																					
8	kmph																					
9	EPR																					
SU	R	Read current Ps1 units (value returned: 1 to 4)																				
SU=n	W	Set Ps1 units as follows: <table border="0" style="margin-left: 40px;"> <tr> <td><u>n</u></td> <td><u>units</u></td> </tr> <tr> <td>1</td> <td>Feet</td> </tr> <tr> <td>2</td> <td>inHg</td> </tr> <tr> <td>3</td> <td>meters</td> </tr> <tr> <td>4</td> <td>mbar</td> </tr> </table>	<u>n</u>	<u>units</u>	1	Feet	2	inHg	3	meters	4	mbar										
<u>n</u>	<u>units</u>																					
1	Feet																					
2	inHg																					
3	meters																					
4	mbar																					
DU	R	Read current Ps2 units (value returned: 1 to 8)																				

<u>Command</u>	<u>Type</u>	<u>Description</u>																		
DU=n	W	Set Ps2 units as follows: <table border="1"> <thead> <tr> <th><u>n</u></th> <th><u>units</u></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Diff. inHg</td> </tr> <tr> <td>2</td> <td>inHg</td> </tr> <tr> <td>3</td> <td>Diff. mbar</td> </tr> <tr> <td>4</td> <td>mbar</td> </tr> <tr> <td>5</td> <td>Feet</td> </tr> <tr> <td>6</td> <td>meters</td> </tr> <tr> <td>7</td> <td>knots</td> </tr> <tr> <td>8</td> <td>kmph</td> </tr> </tbody> </table>	<u>n</u>	<u>units</u>	1	Diff. inHg	2	inHg	3	Diff. mbar	4	mbar	5	Feet	6	meters	7	knots	8	kmph
<u>n</u>	<u>units</u>																			
1	Diff. inHg																			
2	inHg																			
3	Diff. mbar																			
4	mbar																			
5	Feet																			
6	meters																			
7	knots																			
8	kmph																			
PM	R	Read current Pt mode																		
PM=n	W	Set Pt mode to Measure (1), Leak (2), Control (3)																		
SM	R	Read current Ps1 mode																		
SM=n	W	Set Ps1 mode to Measure (1), Leak (2), Control (3)																		
DM	R	Read current Ps2 mode																		
DM=n	W	Set Ps2 mode to Measure (1), Leak (2), Control (3)																		
ER	R	Read current error ; 0 if no error																		
L1	R	Read max. knots limit																		
L1=n	W	Set max. knots limit																		
L2	R	Read max. differential limit in inHg																		
L2=n	W	Set max. differential limit in inHg																		
L3	R	Read max. Mach limit																		
L3=n	W	Set max Mach limit																		
L4	R	Read max. altitude limit																		
L4=n	W	Set max. altitude limit																		
L5	R	Read min. altitude limit																		
L5=n	W	Set min. altitude limit																		
L6	R	Read max. altitude rate limit																		
L6=n	W	Set max. altitude rate limit																		
KR	R	Read current Knots rate																		
KR=n	W	Set Knots rate to n																		
PF	R	Read current profile point																		
PF=n	W	Set current profile point to n (xx.xx)																		

<u>Command</u>	<u>Type</u>	<u>Description</u>
GO	W	Command to execute current settings.
CN	W	Command to cancel current settings
HC	R	Read current Height Correction
HC=n	W	Set Height Correction to n
C1	R	Read Pt vacuum calibration point
C1=n	W	Set Pt vacuum calibration point
C2	R	Read Pt full-scale calibration point
C2=n	W	Set Pt full-scale calibration point
C3	R	Read Ps1 and Ps2 vacuum calibration point
C3=n	W	Set Ps1 and Ps2 vacuum calibration point
C4	R	Read Ps1 and Ps2 full-scale calibration point
C4=n	W	Set Ps1 and Ps2 full-scale calibration point
CC	W	Activate new calibration points after new values have been entered.
SF=0	R	Read the status of the Self Test last performed.
SF=1	W	Start the Self Test.
SG	W	Set 'Ground'
GG	W	Go To 'Ground'

**APPENDIX A**  
**ERROR CODES**

All errors are displayed on line 4 of the display when the 6600-M4 is in the Main screen. An error must be acknowledged before any other key entries are accepted. The error may be acknowledged either by pressing the CANCEL or the CLR key.

<u>ERROR CODES</u>	<u>DESCRIPTION</u>
1	Ps2 target exceeds limit
2	Ps2 actual value exceeds limit
3	Pt target exceeds knots limits
4	Pt target exceeds mach limit
5	Rate target exceeds limit
6	Ps1 target exceeds altitude limits
7	Pt actual value exceeds knots limits
8	Pt actual value exceeds Mach limit
9	Ps actual value exceeds altitude limits.
10	Ps2 EQZN transducer error
11	Profile error
12	Ps1 EQZN transducer error
13	Pt EQZN transducer error
14-18	Internal use only
19	Ps2 Target exceeds Diff limits
20	Ps2 Actual exceeds limit
21	Ps2 Target exceeds Qc limit
22	Ps2 Target exceeds Mach limit
23	Ps2 Target exceeds Alt limit
24	Ps2 Actual exceeds Qc limit
25	Ps2 Actual exceeds Mach limit
26	Ps2 Actual exceeds Alt limit

**APPENDIX B**  
**SPECIFICATIONS**

**Ps1 Output**

**Pressure function**

range: 0.1 to 42 inHg  
resolution: 0.001 inHg  
accuracy: 0.002 inHg

**Altitude function**

range: -4000 ft. to 80,000 ft.  
resolution: 1 foot  
accuracy: 2 ft. @ 0 ft.  
6 ft. @ 35,000 ft.  
12 ft. @ 50,000 ft.

**Climb function**

range: 0 ft/min to 25,000 ft/min  
resolution: 1 ft/min  
accuracy: 1% of rate of climb

**Pt Output**

**Pressure function**

range: 0.1 to 100 inHg  
resolution: 0.001 inHg  
accuracy: 0.003 inHg

**Airspeed function**

range: 0 to 1000 knots  
resolution: 0.1 knots  
accuracy: 0.5 knots @ 50 knots  
0.25 knots @ 100 knots  
0.05 knots @ 650 knots

**Mach function**

range: 0.0 to 5.0 Mach  
resolution: 0.001 Mach  
accuracy: 0.001 above 0.2 Mach

**Ps2 Output**

range: 0.1 to 42 inHg (Diff. to Ps1: +/-30.0 inHg)  
resolution: 0.001 inHg  
accuracy: 0.002 inHg

**Power requirement**

90-260 VAC, 47-440 Hz., 250 VA

**Interfaces**

RS232

**Dimensions & weights**

Main unit: 22" x 14" x 9" / 45 lbs  
Remote unit: 7" x 8" x 2" / 1 lb.

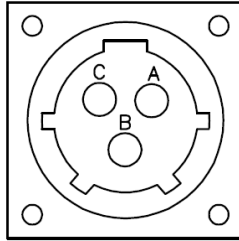
**Environmental specs:**

Operating temp. 0° to 50°C  
Storage temp. -25° to 75°C  
Humidity: 5 to 95% non-condensing

## APPENDIX C

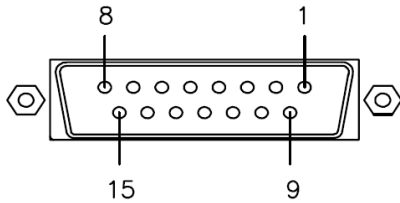
### CONNECTOR PIN-OUTS

#### AC INPUT



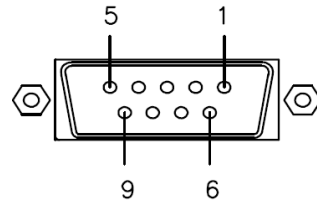
- A.- AC LINE.
- B.- AC NEUTRAL
- C.- EARTH GND.

#### ENCODER



- 1.- A1
- 2.- A2
- 3.- A4
- 4.- B1
- 5.- B2
- 6.- B4
- 7.- C1
- 8.- C2
- 9.- C4
- 10.- D4
- 11.- N.C.
- 12.- N.C.
- 13.- +12V
- 14.- GND
- 15.- GND

#### RS-232



- 1.- INTERNAL CONNECTION
- 2.- TX
- 3.- RX
- 4.- INTERNAL CONNECTION
- 5.- GND
- 6.- INTERNAL CONNECTION
- 7.- INTERNAL CONNECTION
- 8.- INTERNAL CONNECTION
- 9.- INTERNAL CONNECTION

## APPENDIX D

### REPAIR AND RETURN POLICIES

If it is determined that the product is defective, please call Laversab customer service department: (281) 325-8300 or fax (281) 325-8399 or e-mail [aservice@laversab.com](mailto:aservice@laversab.com) for further assistance.

Before shipping any equipment to Laversab for repair, please call the customer service department at (281) 325-8300 or fax (281) 325-8399 or e-mail to [aservice@laversab.com](mailto:aservice@laversab.com) . Please include a description of the problem that has been identified when returning defective equipment.

**Note: Please pack the 6600-M4 in a carton prior to shipping. Do not ship without proper packing. Laversab, Inc. will not be liable for damage to the 6600-M4 if it is shipped without proper packing.**