



**DEVILBISS® INTELLIPAP® 2 PAP DEVICE**  
**DEVILBISS BLUE® PAP DEVICE**  
**SERVICE MANUAL**

**MODEL DV63 STANDARD PLUS**  
**MODEL DV64 AUTOADJUST® / AUTOPLUS®**



**CAUTION**-Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.

Assembled in USA

SmartCode® Technology is protected under US patent 8649510

**IMPORTANT**- Do not provide this service manual to patients. Only qualified personnel should service this device.

# TABLE OF CONTENTS

GENERAL INFORMATION .....	3	GENERAL INFORMATION - DV6HH.....	23
A. Important Safeguards .....	3	A. Important Safeguards .....	23
B. Initial Inspection and Set Up.....	4	B. Travel .....	23
C. Travel .....	4	C. DC Power .....	23
D. Battery and DC Power .....	4	D. Important Parts.....	23
E. Supplemental Oxygen .....	5	E. Product Description .....	24
F. Setting Pressures and Features .....	5	DESCRIPTION OF NORMAL OPERATION - DV6HH.	25
G. Understanding the Display Screen.....	6	DV6HH Standard Humidifier .....	25
H. Important Parts.....	7	DV6HHPD PulseDose Humidifier.....	25
DESCRIPTION OF NORMAL OPERATION .....	8	MAINTENANCE AND TESTING - DV6HH.....	26
CLEANING .....	8	A. Cleaning .....	26
A. Routine Cleaning - Patient .....	8	B. Maintenance .....	26
B. Multi-Patient Use .....	8	C. Testing .....	26
MAINTENANCE .....	8	Heater Plate Temperature Test .....	26
A. Initial Inspection and Setup .....	8	Pulse Test .....	26
B. Routine Maintenance - Patient.....	8	NOTIFICATIONS, AUDIBLE ALERTS & SERVICE	
C. Routine Maintenance - Equipment Provider.....	8	CODES - DV6HH.....	27
TESTING .....	9	TROUBLESHOOTING - DV6HH .....	27
A. Pressure and Flow Accuracy Test .....	9	HEATER SERVICING AND PARTS	
B. Triggering & SmartFlex® Pressure Test.....	9	REPLACEMENT - DV6HH.....	28
C. Keypad, Rotary Knob & Display Test.....	9	Chamber Sealing Gasket.....	28
D. Auto-Start / Auto-Stop Test.....	10	Heater Plate .....	28
E. SD Card & Speaker .....	10	Top Cover.....	28
F. Serial Port .....	10	Heater Wire Harness .....	29
NOTIFICATIONS, AUDIBLE ALERTS & SERVICE		SPECIFICATIONS - DV6HH .....	30
CODES.....	11	ORDERING AND RETURNING PARTS .....	30
Notifications & Audible Alerts .....	11	Ordering Non-Warranty Replacement Parts .....	30
Service Codes - Visible to Patients .....	12	Ordering Warranty Replacement Parts .....	30
CALIBRATION .....	13	Returning Warranty Defective Parts.....	30
Auto-Calibration .....	13	Placing orders .....	30
Manual Calibration .....	13	FIGURES & PARTS LIST.....	31
TROUBLESHOOTING .....	14	PRODUCT DISPOSAL.....	35
CPAP SERVICING AND PARTS REPLACEMENT .....	16	DEVILBISS GUIDANCE AND MANUFACTURER'S	
Inspecting Internal Components.....	16	DECLARATION .....	36
Bottom Cover .....	17		
Top Cover .....	17		
PC Board / Keypad .....	18		
LCD Display / Encoder PC Board / Manifolds .....	19		
Blower.....	20		
Main Wire Harness.....	21		
UNIT SPECIFICATIONS .....	22		

## A. Important Safeguards

When servicing electrical products, basic safety precautions should always be followed.

### PLEASE READ ALL INSTRUCTIONS BEFORE USING THIS DEVICE.

#### WARNING

*A warning indicates the possibility of injury to the user or the operator.*

- **Electric Shock Hazard** – Do not use while bathing.
- **Electric Shock Hazard** – Do not immerse this device into water or any other liquid.
- **Electric Shock Hazard** – Do not attempt to open or remove the cabinet. There are no user-serviceable internal components. If service is required, contact your equipment provider for instructions on obtaining service. Opening or attempting to service your device will void the warranty.
- Refer to International Standard IEC 60601-1 Ed 3.0 Amendment 1 for safety requirements applicable to Medical Electrical Systems
- Oxygen supports combustion. To avoid possible physical injury, do not smoke while using this device with supplemental oxygen. Do not use this device near hot objects, volatile substances or sources of open flames.
- Always turn on the CPAP device before turning on the oxygen source. Turn off the oxygen source before turning off the device. Never allow the oxygen source to run continuously while connected to the device if the device is not in use. If the device is not being used, turn off the oxygen flow.
- CPAP pressure must be set higher than 8 cmH<sub>2</sub>O for supplemental oxygen use to prevent patient breathing pattern from forcing oxygen back into the CPAP.
- At a fixed flow rate of supplemental oxygen, the inhaled oxygen concentration will vary depending on the pressure setting, patient breathing pattern, mask selection and leak rate. This warning applies to most types of CPAP devices.
- The device should be used only with vented CPAP masks recommended by DeVilbiss, your physician or respiratory therapist. These include nasal, full face, nasal pillow and nasal cannula masks designed for CPAP use. Do Not use a non-vented mask with this CPAP device.
- To avoid rebreathing of exhaled air, do not use a CPAP mask unless the device is turned on and providing a supply of air. Venting in the mask should never be blocked. When the device is turned on and providing a fresh supply of air, exhaled air is flushed out of the mask vent. However, when the device is not operating, exhaled air may be rebreathed. Rebreathing of exhaled air for longer than several minutes can, in some circumstances, lead to suffocation. This warning applies to most CPAP devices.
- The device is not a life support device and may stop operating with certain device faults or with a power failure. It is intended to be used on spontaneously breathing individuals weighing 66 lbs/30 kg or greater.
- To avoid electric shock, always unplug power cord from wall outlet power source when cleaning or servicing.

- The following surface temperatures may exceed 41°C under certain conditions:
 

External surface of CPAP .....	43°C
Patient tubing connector.....	45°C
Encoder shaft (with control knob removed).....	42°C
Humidifier heater plate .....	65°C
External power supply .....	42°C
- Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the Electromagnetic Compatibility [EMC] information provided in the accompanying documents.
- Portable and Mobile RF Communications Equipment can affect Medical Electrical Equipment.
- The equipment or system should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.
- If you are using a full face mask (a mask covering both your mouth and your nose), the mask must be equipped with a safety (entrainment) valve.
- Do not connect the device to an unregulated or high pressure oxygen source.
- Do not use the device near a source of toxic or harmful vapors.
- Do not use this device if the room temperature is warmer than 40° C (104° F). If the device is used at room temperatures warmer than 40° C (104° F), the temperature of the airflow may exceed 43° C (109° F). This could cause irritation or injury to your airway.
- Do not operate the device in direct sunlight or near a heating appliance. These conditions can increase the temperature of the air coming out of the device.
- Contact your health care professional if symptoms of sleep apnea recur.
- If you notice any unexplained changes in the performance of this device, if it is making unusual or harsh sounds, if it has been dropped or mishandled, if water is spilled into the enclosure or if the enclosure is broken, disconnect the power cord and discontinue use. Contact your home care provider.
- Periodically inspect electrical cords and cables for damage or signs of wear. Discontinue use and replace if damaged.

#### CAUTION

*A Caution indicates the possibility of damage to the device.*

- For proper operation, place system on a flat, sturdy, level surface. Do not place the device where it can be knocked onto the floor or where the power cord may create a trip hazard.
- Never block air openings of the device. Do not insert objects into any openings or tubes.
- Use only accessories recommended by DeVilbiss.
- The USB port located on the back of the device is for provider use only. The port must only be used with accessories approved for use by DeVilbiss. Do not attempt to attach any other device to this port as it may damage the CPAP or the accessory device.
- Only the DeVilbiss DV6 series Heated Humidifier system is

recommended for use with this device. Other humidifier systems may prevent the device from detecting respiratory events and may cause inappropriate pressure levels in the mask.

- The height of the device must be lower than the mask when using a humidifier to prevent water from getting into the mask
- Never rinse or place the device in water. Never allow liquids to get into or around any of the ports, switches or air filter. Doing so will result in product damage. If this occurs, do not use the device. Disconnect the power cord and contact your equipment provider for service.
- Condensation may damage the device. If this device has been exposed to either very hot or very cold temperatures, allow it to adjust to room temperature (operating temperature) before starting therapy. Do not operate the device outside of the operating temperature range shown in the Specifications.
- Do not place the device directly onto carpet, fabric or other flammable materials.
- Tobacco smoke may cause tar build-up within the device, which may result in the device malfunctioning.
- Dirty inlet filters may cause high operating temperatures that may affect device performance. Regularly examine the inlet filters as needed for integrity and cleanliness.
- Never install a wet filter into the device. You must ensure sufficient drying time for the cleaned filter.
- Only use a DeVilbiss DC Power Cord and Battery Adapter Cable. Use of any other system may cause damage to the device.
- Oxygen is a prescribed gas and should only be administered under the supervision of a physician.
- The flow setting of the oxygen source must be specified by a physician.
  - Maximum oxygen pressure is 50 psi.
  - Maximum oxygen flow rate is 10 lpm.
- Always turn on CPAP before turning on oxygen flow.
- Always turn off oxygen flow before turning off CPAP.
- Proper filter function is important for the operation of the device and to protect the device from damage.

## B. INITIAL INSPECTION AND SET UP

DeVilbiss recommends equipment inspection upon delivery:

- Apply power to the IntelliPAP 2 / DeVilbiss BLUE DV6X CPAP device.
- Test pressure accuracy using an outlet cap (mask/leak simulator), a calibrated CPAP pressure gauge and the procedures listed under Pressure Accuracy Test in this manual.
- Set therapy pressures as prescribed and comfort features per patient preference using Setting Pressures and Features Section or the Provider Quick Setup Guide DV64D-125-XX.

## C. TRAVEL

### Air Travel

The IntelliPAP 2 and DeVilbiss BLUE DV6X CPAP devices are approved for use on commercial aircraft when using battery power as mentioned below.

**NOTE:** Use in Commercial Aircraft Approval requires that **Bluetooth® must be deactivated** in the aircraft. Refer to Instruction Guide for Bluetooth details. Also see DC Power below.

### International Travel

DV6x CPAP devices automatically accept AC voltages of 100-240V, 50 and 60 Hz. The device will need a power cord appropriate for the region/country. **NOTE:** Using a power cord or adapter (AC or DC) that is not intended for the DV6x CPAP may result in the CPAP showing error code E0D.

### Altitude

DV6x CPAP devices automatically compensate for altitudes between 700 hPa and 1060hPa (~ 1,400 ft below sea level to 9,800 ft). At higher altitudes, breathing patterns change which may cause the loss of some benefits of CPAP therapy.

## D. BATTERY AND DC POWER

DV6x CPAP devices automatically accept 12V DC power. Always use DeVilbiss power cords and adapters. **NOTE:** Using a power cord or adapter (AC or DC) that is not designed for the DV6 CPAP may result in the CPAP showing error code E0D.

### Custom Battery (Optional)

DV6x CPAP devices have an optional 98 wHr external battery (DV6EB) that is designed as a backup power source when AC power is not available, when traveling by air or any time portability is needed.

Pressure and DV6EB Battery Limitation Chart				
Pressure Setting	CPAP only Hours	CPAP & Heated Humidifier @ 1	CPAP & Heated Humidifier @ 3	CPAP & Heated Humidifier @ 5
5	23.33	7.46	7.01	4.54
10	14.41	6.13	5.76	3.92
15	10.32	5.30	4.26	3.27
20	7.21	4.56	3.51	2.95
One battery needed for 8 hour night		Two batteries needed for 8 hour night		Three batteries needed for 8 hour night

### 12 Volt DC Power

DV6x CPAP devices with heated humidification will operate using 12V DC power from a motor vehicle equipped with DC (cigarette lighter type) plug-in connector. The device must be connected to the plug-in using the optional DeVilbiss vehicle DC connector (DV6X-619). **NOTE:** If the vehicle's battery is used, for multiple nights, without powering the vehicle's motor during use, the vehicle should be powered during the day to replenish the battery.

DV6x CPAP devices with heated humidification will operate using a 12V deep-cycle marine battery using the optional DC battery clamp-on adapter (DV51D-696) with the optional DC power cord (DV6X-619). **NOTE:** See DC Power Chart below for the correct battery amperage needed.

# GENERAL INFORMATION

DV6x CPAP devices will operate on 12V DC power that has been inverted to 120V AC power. **NOTE:** See *DC Power Chart* below for the correct inverter specifications.

DC Power Chart for Vehicle & 12V Marine Battery			
Configuration of Use	Inverter Specification for use in vehicle	Battery Specification for stand-alone use	Battery Hours @ 20 cmH <sub>2</sub> O
If using a vehicle battery for multiple nights without powering the vehicle's motor during use, power the vehicle during the day to replenish the battery.			
CPAP device with heated humidification setting of 5	120V AC Modified or Quasi Sine Wave Inverter with 200w capacity	120 amp-hour, deep-cycle Marine Type	8 hours
	120V AC Modified or Quasi Sine Wave Inverter with 300w capacity		
	230V AC Modified or Quasi Sine Wave Inverter with 400w capacity	240 amp-hour, deep-cycle Marine Type	16 hours
CPAP device without heated humidification		80 amp-hour, deep-cycle Marine Type	8 hours

port. Then, insert the air supply tubing and the oxygen tubing to the adapter.

- Always START CPAP before starting oxygen flow.
- Always STOP oxygen flow before stopping CPAP.



## E. SUPPLEMENTAL OXYGEN

### WARNING-OXYGEN USE

- Oxygen supports combustion. To avoid possible physical injury, do not smoke while using this device with supplemental oxygen. Do not use this device near hot objects, volatile substances or sources of open flames.
- Always start the CPAP blower before starting the oxygen flow. Stop the oxygen flow before stopping the CPAP blower.
- Never allow the oxygen source to run continuously while connected to the DeVilbiss CPAP device if the device is not in use. If the DeVilbiss CPAP device is not being used, turn off the oxygen flow.
- CPAP pressure must be set higher than 8 cmH<sub>2</sub>O for supplemental oxygen use to prevent patient breathing pattern from forcing oxygen back into the CPAP.
- At a fixed flow rate of supplemental oxygen, the inhaled oxygen concentration will vary depending on the pressure setting, patient breathing pattern, mask selection and leak rate.

This warning applies to most types of CPAP devices.

### CAUTION

- Oxygen is a prescribed gas and should only be administered under the supervision of a physician.
- The flow setting of the oxygen source must be specified by a physician.
- Maximum oxygen pressure is 50 psi (345 kPa). Maximum oxygen flow rate is 10 LPM.

If a physician prescribed supplemental oxygen, it can be added one of two ways:

- Attach oxygen tubing directly to the oxygen port on the mask
- Insert the optional oxygen adapter into the device's air supply

## F. SETTING PRESSURES AND FEATURES

### Factory Default Settings

Factory default settings are installed on the IntelliPAP 2/DeVilbiss BLUE DV6x CPAP device prior to shipping.

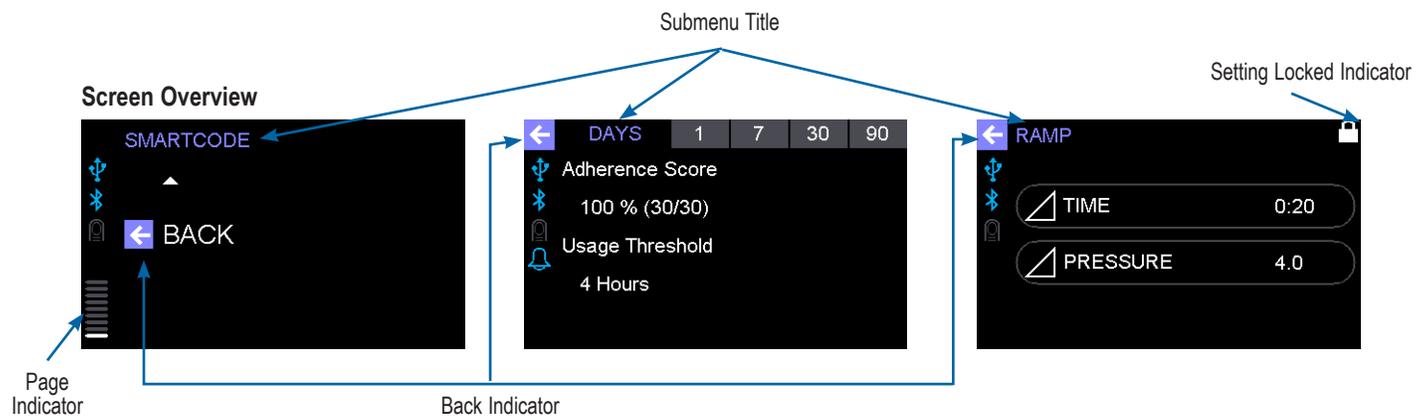
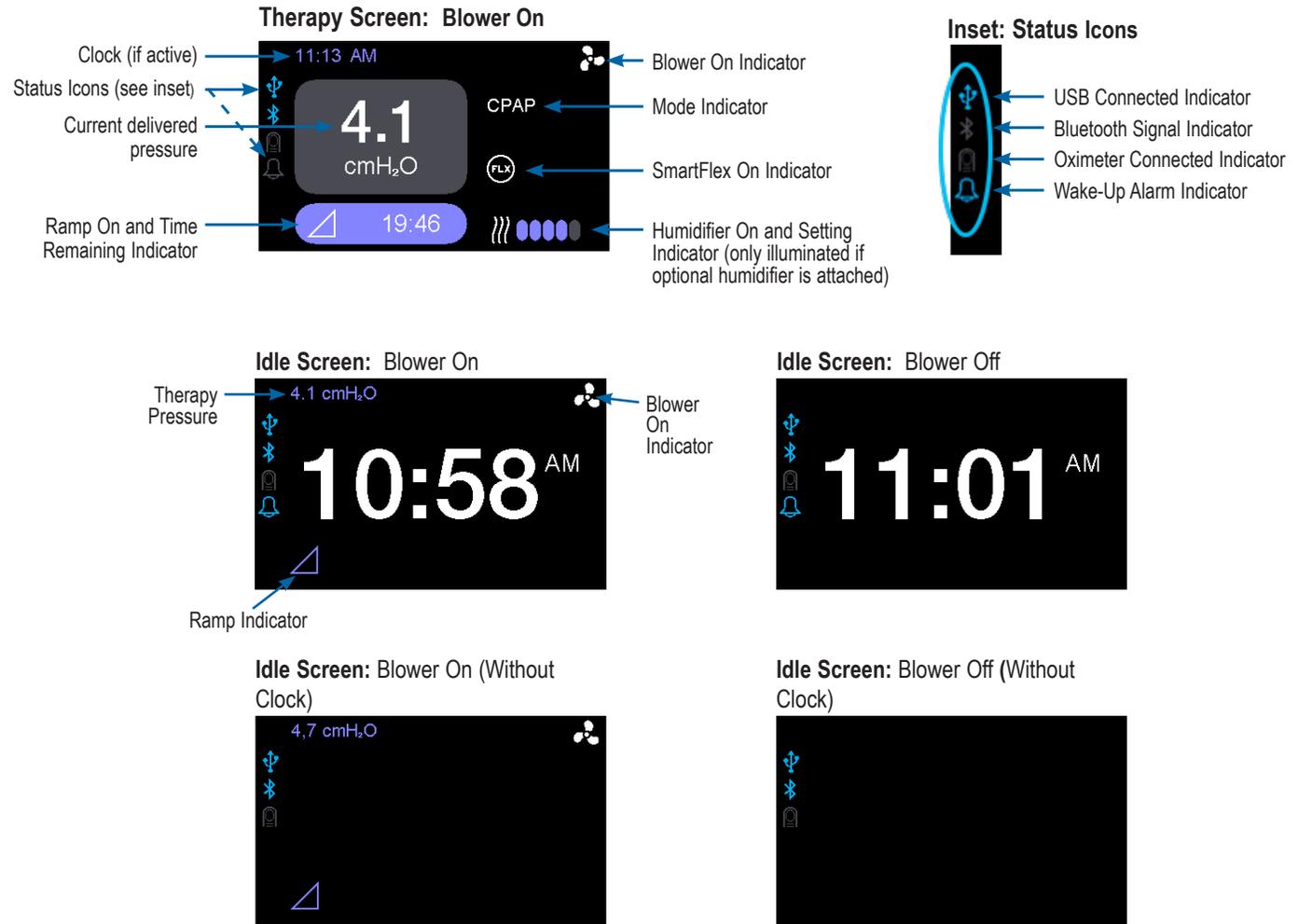
Setting	Default Value
Operating Mode	DV63 - CPAP DV64 - AutoAdjust
CPAP pressure	Default 10.0 (DV63 initial setting is 8.0, default is 10.0)
Upper Pressure Limit (UPL)	15.0 for DV64 AutoAdjust mode
Lower Pressure Limit (LPL)	7.0 for DV64 AutoAdjust mode
Apnea %	90
Apnea Duration	10 seconds
Hypopnea %	40
Hypopnea Duration	10 seconds
Ramp Pressure	4.0 cmH <sub>2</sub> O
Ramp Time	20 minutes
Split Night - Inhibit Time	240 minutes
Number of Sessions	0 (off)
Usage Threshold	4 hours
Wakeup Alert	0 (Off)

## Changing Settings

Use the following steps to enter Clinical menu and change therapy and comfort settings:

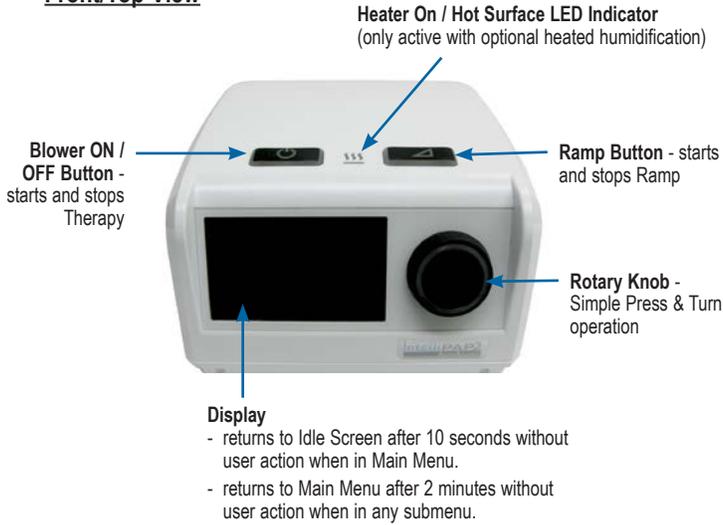
1. Apply power to the device.
2. Enter Clinical menu by simultaneously pressing the Blower START/STOP button, the Ramp button and the Rotary Knob.
3. Turn the rotary knob to desired setting item and press the rotary knob to select the setting item. *See Provider Quick Setup Guide, DV64D-125-XX for more details.*
4. Return to Patient mode by pressing the knob and buttons used in Step 2.

## G. UNDERSTANDING THE DISPLAY SCREEN



## H. Important Parts

### Front/Top View



### Side View (Right)



### Rear View



### Rear View with Filter Cover



### Bottom View



**DESCRIPTION OF NORMAL OPERATION**

An AC to DC power supply, plugged into an AC power source, converts AC voltage to DC voltage and powers the internal electronics of the DV6X CPAP device, such as microcontroller, motor control circuitry, blower, display, etc. Alternatively, the DV6X device is powered by DC voltage from a DC power source via an optional DC power adapter.

The CPAP device produces positive pressure by spinning a reverse-curved impeller with a brushless DC motor. Room air is drawn through a filter into the blower, pressurized in the blower, optionally passed through a heated humidifier chamber and then discharged through a 15 or 22mm-ID, smooth-bore tube. Pressure regulation is achieved using measured pressure as feedback.

The CPAP device senses patient breathing by monitoring the flow signal. A flow sensor triggers the Auto-START / Auto-STOP functionality and mask-OFF alerts.

**CLEANING**

**WARNING**

**To avoid electric shock, always unplug the power cord from the wall outlet power source before cleaning.**

**CAUTION:** *Never rinse or place the device in water. Never allow liquids to get into or around any of the ports, switches or air filter. Doing so will result in product damage. If this occurs, do not use the device. Disconnect the power cord and contact your equipment provider for service.*

**A. Routine Cleaning – Patient**

- Disconnect from power source and wipe the cabinet with a clean, damp cloth every 7 days. Allow the device to dry completely before returning to power source.
- Check the outer air-inlet filter every 10 days. Wash the dark foam filter in a solution of warm water and mild dishwashing detergent. Rinse with water. Allow the filter to dry completely before returning to the device. Replace every 6 months or sooner if necessary.
- Check the optional fine particle (inner) filter every 10 days and replace if dirty or damaged. Replace every 30 days.
- Clean the air supply tubing every day. Remove the tubing from the device and mask and wash the inside of the tubing in a solution of warm water and mild dishwashing detergent. Rinse with water and allow to air dry – to shorten drying time, connect tube to the device and allow air to flow through the tube – visually inspect tubing for water before use. Replace every 6 months.
- Clean the mask and headgear according to the manufacturer’s instructions or the device’s programmed notification.

**B. Multi-Patient Use**

The IntelliPAP 2 / DeVilbiss BLUE CPAP DV6x device is not approved for multi-patient use at this time.

**MAINTENANCE**

**WARNING**

**Electric shock hazard. Disconnect power supply before servicing.**

**A. INITIAL INSPECTION AND SET UP – Equipment Provider**

DeVilbiss recommends equipment inspection upon delivery:

- Apply AC power to the DV6X CPAP device.
- Test pressure accuracy using an outlet cap (DV51D-620), a calibrated pressure gauge and the procedures listed under Pressure Accuracy Test.
- Set prescribed therapy and patient features as described under Setting Pressures and Features Section or as described in the Provider Quick Setup Guide, DV6X-125-xx.

**B. ROUTINE MAINTENANCE – Patient**

Instruct patient on the following at-home maintenance tasks:

- Wipe case with damp cloth every week.
- Inspect air-inlet filter every 10 days and clean as needed. Replace every 6 months
- Inspect fine particle filter every 10 days and replace as needed. Do NOT clean. Replace every 30 days

**NOTE:** *Carefully demonstrate the proper alignment of the Fine Particle and Air-Inlet filters.*

- Wash air supply (patient) tubing daily.
- Clean mask and headgear per manufacturer’s instructions.

**C. ROUTINE MAINTENANCE – Equipment Provider**

The DV6X CPAP devices do not require routine maintenance.

**Pressure Accuracy**–No routine calibration or service is required provided the device is used in accordance with the manufacturer’s directions.

**NOTE:** *Some countries require periodic servicing and calibration of this type of medical device. Contact local authorities for further information.*

**Clearing Usage/Therapy Data**

- Apply AC power to the DV6X CPAP device.
- Enter the Clinical menu by pressing the Start and Ramp buttons while pressing the knob.
- Turn the knob to scroll to CPAP Settings and press the knob to select.
- Scroll to Admin (last option in list) and press the knob to select.
- Scroll to Clear Usage and press the knob to select.
- Scroll to Clear Usage and press the knob to clear all user data from the device and SD card, if inserted when usage is cleared. **NOTE:** *You will not be able to retrieve this data after it has been cleared.*
- Simultaneously press the Blower ON/OFF button, the Ramp button and the Rotary knob to return to Patient menu.

## TESTING

The following test procedures verify correct operation of the DV6x CPAP and should be performed on all devices prior to returning to patient.

### A. PRESSURE AND FLOW ACCURACY TEST

No routine calibration or service is required provided the device is used in accordance with the manufacturer's directions. **NOTE:** *Some countries require periodic servicing and calibration for this type of medical device. Contact your equipment provider for further information.*

Additional equipment required: outlet cap (DV51D-620), a calibrated pressure gauge (0-30 cmH<sub>2</sub>O, accuracy  $\pm 0.25$  cmH<sub>2</sub>O) with tubing, flow control valve and a mass flow meter.

1. Apply AC power to the unit with blower stopped.
2. Enter Clinical menu, select CPAP Settings and ensure the following settings are selected
  - a. Mode to CPAP
  - b. Pressure to 12 cmH<sub>2</sub>O
  - c. SmartFlex to OFF
3. Go to Mask Fit Check screen.
4. Attach calibrated pressure gauge to the device using the outlet cap.

**NOTE:** *Occlude (block) hole on side of outlet cap to ensure proper pressure reading. Any leak in test set-up will affect pressure accuracy.*

5. Start the blower and wait 30 seconds for pressure to stabilize.
6. Verify that the displayed pressure matches the pressure measured on the gauge ( $\pm 0.5$  cmH<sub>2</sub>O). Accuracy at other pressure settings can be checked if needed.
7. If the Pressure is out of calibration, remove tubing and stop the blower for approximately 1 minute to auto-calibrate. Allow no breathing on the unit while auto-calibration is taking place. Start the blower and allow 30 seconds for the pressure and flow to stabilize.

**NOTE:** *If the pressure is still out of calibration, perform a full calibration using the Manual Calibration Procedure. If manual calibration does not improve pressure or flow accuracy, there may be a problem with the flow path or control board. Refer to Troubleshooting.*

8. Connect the mass flow meter and flow control valve to the unit outlet port and close the valve.
9. In the Mask Fit Check screen, adjust the flow control valve to achieve 60 L/m on the flow meter. Wait at least 30 seconds for the flow to stabilize.
10. Verify that the leak flow on the Mask Fit Check screen matches the 60 L/m on the flow meter (set value  $\pm 10$  L/m). Accuracy at other flow settings can be checked if needed.
11. Correct all settings to the original, preferred or prescribed settings.
12. If the flow is out of calibration, remove tubing and stop the blower for approximately 1 minute to auto-calibrate. Allow no breathing on the unit while auto-calibration is taking place. Start the blower and allow 30 seconds for the pressure and flow to stabilize.

**NOTE:** *If the flow is still out of calibration, perform a full calibration using the Manual Calibration Procedure. If manual calibration does not improve pressure or flow accuracy, there may be a problem with the flow path or control board. Refer to Troubleshooting.*

### B. TRIGGERING and SMARTFLEX PRESSURE TEST

Additional equipment required: flow control valve, USB to Micro B USB CPAP to PC cable (DV63D-615) and a PC computer running DeVilbiss SmartLink<sup>®</sup> software v 3.0 or higher.

1. Connect the flow control valve to the unit outlet port and close the valve.
2. Apply AC power to the unit and connect the unit to the remote control application via the CPAP to PC cable.
3. Use the remote control application to ensure the following device settings are selected:
  - Operating mode is CPAP
  - CPAP Pressure is 12 cmH<sub>2</sub>O
  - SmartFlex is 3
  - SmartFlex Mode is Full-Time.

Start the blower and wait at least 30 seconds for the pressure to stabilize.

4. Display the Status screen on the remote control to observe the Triggering field.
5. Open the flow valve slightly to allow a small amount of air to escape. Allow the valve to remain open for several seconds and then quickly close the valve. Continue cycling the valve opening slightly then closing quickly and verify that the Status screen triggering value changes from 'inhale' to 'exhale'. It may take several cycles before the unit starts triggering.
6. If the unit did not trigger correctly during this test, stop the blower for approximately 1 minute to allow auto-calibration to occur. Start the blower and allow 30 seconds for the pressure to stabilize. Repeat above steps to check unit triggering.

**NOTE:** *If the unit still does not trigger correctly, perform a full calibration using the Manual Calibration Procedure. If manual calibration does not improve triggering, there may be a problem with the flow path, control board or blower. Refer to Troubleshooting.*

7. Observe the SmartFlex pressure increase and decrease during 'inhalation' and 'exhalation'. The pressure should change between 12 to 9 cmH<sub>2</sub>O.
8. Correct all settings to the original, preferred or prescribed settings.

**NOTE:** *If there is an issue with triggering 'inhalation' or 'exhalation' or with the SmartFlex pressure change, replace PC board.*

### C. KEYPAD, ROTARY KNOB and DISPLAY TEST

Requires DV6HH humidifier to be attached to DV6x CPAP. No additional equipment required.

1. Apply AC power to the unit and start the blower.
2. Enter Clinical menu. Rotate the knob to find the CPAP Settings menu; then press the knob to select.
3. Continue to the Ramp setting, press the knob and go to the Time setting. Set a 5 minute delay.
4. Go to the Pressure setting, select it and set the pressure to 3.0.
5. Rotate the knob to the left to highlight the arrow by the Ramp menu. Press to select.
6. Go to the Humidity setting, select it and rotate the knob to ensure that at least one heat icon is displayed.

7. Go to the Brightness menu and select Display in Active mode. Rotate the knob and observe the change in the brightness of the display. Protect the Display from room light if needed.
8. Return to the Brightness menu, select Controls in Active mode, protect the Keys and Rotary Knob from room light, rotate the knob and observe the change in the brightness of the keys and knob. Select a brightness level.
9. Allow the Display to return to the main screen, view the pressure, press the Ramp key and observe the Ramp pressure and the remaining Ramp time on the Display.
10. Ensure that the Heater On/Hot Surface Indicator light is illuminated.
11. Correct all settings to the original, preferred or prescribed settings.

**NOTE:** *If there is an issue with the functionality or brightness of the Key Pad, Rotary Knob or Display, refer to Troubleshooting.*

## D. AUTO-START/AUTO-STOP TEST

Additional equipment required: an adult test lung or 6 ft (1.8 m) x 22 mm smooth bore tubing. Use of tubing with dimensions other than 6 ft (1.8 m) x 22 mm will interfere with the Auto-START test. **NOTE:** *The change in tubing diameter allows testing without actual breathing. The 15 mm tubing has no issue activating Auto-START/Auto-STOP with patient breathing.*

### Auto-STOP Test

1. Apply AC power to the unit with blower stopped.
2. Enter Clinical menu.
3. Go to CPAP Settings and select the Enable menu.
4. Ensure that a ✓ appears beside both Auto-START & Auto-STOP features.
5. Return to Patient menu.
6. Start the blower and keep the airflow blocked for two minutes. Verify that the blower continues running and no mask alerts appear.
7. Unblock the smooth bore tubing to open the unit's airflow.
8. Verify that, after approximately 10 seconds, the Display shows 'Mask Off / Please check mask fit'.
9. After another 30-40 seconds, the blower should stop via the Auto-Stop feature. Wait approximately two minutes after the blower stops. Verify that the blower does not start without breathing present.

### Auto-START Test

If using an adult test lung:

- a. Attach lung to the tubing connector port on the unit.
- b. Manually simulate breathing by manipulating the sides of the lung – out for inhalation, then in for exhalation – and verify that the blower starts via the Auto-START feature.

### Auto-START Test

If using 6 ft (1.8 m) x 22 mm tubing:

- a. Go to CPAP Settings and select Tubing. Ensure that tubing Length is set to 6 ft (1.8 m) and diameter is set to 22 mm.
- b. Connect the 6 ft (1.8 m) x 22 mm smooth bore tubing to the CPAP.

- c. Tap the palm of your cupped hand on and off the end of the smooth bore tubing several times to verify that the blower starts via the Auto-START feature. (Hold your cupped hand 18 in. (45.7 cm) from the hose to force air into the tubing using a slow steady 'breath rate' to activate the flow sensor.)

10. Correct all settings to the original, preferred or prescribed settings, including the tubing diameter.

**NOTE:** *If any of the Auto-STOP or Auto-START features do not operate correctly, stop the blower for approximately 1 minute to allow auto-calibration to occur. Start the blower and allow 30 seconds for the pressure and flow to stabilize. If Auto-STOP or Auto-START features still do not operate correctly, perform a full calibration using the Manual Calibration Procedure. If manual calibration does not resolve issue, replace PC board.*

## E. SD CARD AND SPEAKER

Additional equipment needed: SD card.

**NOTE:** *The SD card must be a minimum of 128MB and a maximum of 2GB in size and formatted to FAT16.*

1. Apply AC power to the unit and start the blower.
2. Listen for speaker 'beep' as SD card is inserted in SD card slot.
3. Verify that the notification on the Display reads: Card Detected / Ready For Use

**NOTE:** *If there is an issue with the speaker or SD card, replace the speaker or SD card as needed.*

## F. SERIAL PORT

Additional equipment needed USB to Micro B USB CPAP to PC cable (DV63D-615) and a PC computer running DeVilbiss SmartLink software v 3.0 or higher.

1. Connect USB to Micro B USB cable to the unit and the computer.
2. Verify that the USB icon illuminates on the CPAP display (left side).
3. Open SmartLink software and click on the Download Data icon in the software's Home tab.
4. Select Direct Connect option and complete the data download
5. Find and open the data downloaded to the software
6. Verify that the data is complete and accurate.

**NOTE:** *If there is an issue with the data download, replace the USB cable. If that does not fix the problem, replace PC board.*

## Notifications and Audible Alerts

**NOTE:** To disable notifications from the patient's view, select CPAP Settings in the Clinical menu and remove the ✓ from Notifications in the Enable menu.

Some notifications are timed reminders to clean or replace components. Dismiss from the Display by button-press or knob-movement.

Displayed Message	Recurrence interval
Air Intake Filter Due for Cleaning	50 hours of while breathing use time
Mask, Tubing and Chamber Due for Cleaning	35 hours of while breathing use time

Some notifications have audible alerts. Audible alerts signify that attention should be given to the message on the Display. Dismiss from the Display by button press or knob movement.

Some notifications are in response to a condition or action. These may be informational or may require action. Dismiss from the Display by button press or knob movement.

Displayed Message	Condition for Occurrence
Mask Off Please Check Mask Fit	10 seconds after mask off condition detected.
Auto-STOP Detected	When an Auto-STOP condition occurs.
Auto-START Detected	When an Auto-START condition occurs.
Wake-Up Alert <current time> with audible alert	When wakeup alert setting is enabled, and wake alarm time is reached on device
Card Detected Please Wait ... with audible alert	When SD card is detected. (Removing SD card while this message is displayed may corrupt the download.)
Card Detected Ready for use with audible alert	When valid SD Card is inserted.
Card Removed Send to Provider with audible alert	When SD card is removed.
Card Error Contact Provider with audible alert	CPAP detects an error with the format or read/write of the SD card
Settings Not Updated Contact Provider with audible alert	When new settings did not transfer from SD card
Error with Code, Prescription Not Updated with audible alert	When SmartCode Rx is entered but code is incorrect.
Card Transfer Successful	When data transfer complete.
Firmware Update Please Wait ...	When SD Card containing firmware update is inserted.

Some notifications are displayed when Add-On items are in use. Dismiss from the Display by button press or knob movement.

Displayed Message with Audible Alert	Condition for Occurrence
Oximeter Logging Started SpO2 _____ Pulse Rate _____	When Oximeter is first detected and logging starts
Oximeter Logging Stopped	When Oximeter signal is lost and logging stops
Oximeter Finger Probe Off	When Oximeter finger probe off condition detected
Oximeter Finger Probe On SpO2 _____ Pulse Rate _____	When Oximeter finger probe off condition corrected
Wireless Modem Low Battery, Please Recharge	When DV6WM is paired and battery level is low (below 20%)

# NOTIFICATIONS, AUDIBLE ALERTS AND SERVICE CODES

## Service Codes (Visible to Patients) and Audible Alerts

Service codes are divided into Critical (E0x) or Non-Critical (E8x) categories. Critical service codes put the unit in a failsafe (blower STOP) state. All service codes have audible alerts. Audible alerts signify that attention should be given to the message on the Display. Critical Service Codes cannot be cleared from the Display. Non-Critical Service Codes can be cleared from the Display by button press or knob movement.

Service Code	CRITICAL SERVICE CODE Description
E00	No error present
E01	Read Setting Error. Prescription settings stored in non-volatile memory are corrupted.
E02	Motor Start Error. Error trying to start the motor.
E06	Motor Runaway Error. This error occurs if the motor speed is high and the pressure and total flow are low (close to zero) for a fixed period of time.
E07	Motor Over Current Error.
E08	Motor Bus Voltage Too High Error.
E09	Motor Bus Voltage Too Low Error.
E0B	Sensor Error. This error occurs if there is a problem communicating with the I2C pressure or flow sensor.
E0D	Unsupported Power Source Detected. The power source attached to the CPAP is unsupported.
Service Code	NON-CRITICAL SERVICE CODE Description
E80	Power Source Wattage Too Low. The attached power supply does not have enough power to run the unit and accessories. Unit may not meet performance requirements.
E81 HEATER	PulseDose Valve Error. This error indicates that the PulseDose valve is not working correctly. This error only occurs once per blower start-up and is reset after the blower stops.
E82 HEATER	Heater Plate Error. This error indicates that the humidifier heater plate is not working correctly. The heater LED is unlit (unless the heater plate temperature reading is greater than 48 °C) and the CPAP stops powering the humidifier heater plate. This error only occurs once per blower start-up and is reset after the blower stops.
E83	Clock Failure. This error occurs if the real-time clock is not advancing. Data logging will be stopped due to the failure. This error only occurs once per blower turn on and is reset once the blower is turned off.
E84	NAND Flash Failure. This error occurs if the NAND flash memory fails. Data logging will be stopped due to the failure. The message is shown once per blower on.

## CALIBRATION

### Auto-Calibration

The DV6x CPAP device automatically saves the offset and high calibration values every time the blower stops for 1 minute. During that time, the unit adjusts the pressure and flow sensor offsets so that the proper calibration span is maintained.

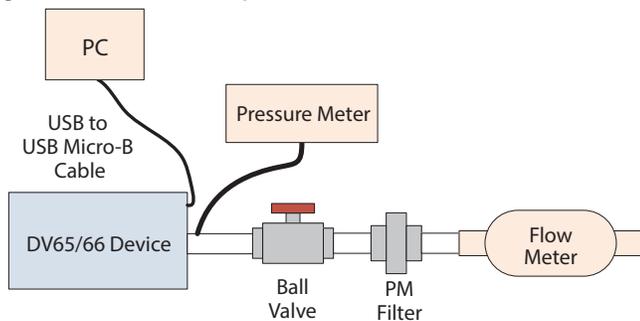
### Manual Calibration Procedure (Field Service)

The DV63/64 pressure and flow sensors can be calibrated manually using the following procedure. It is recommended that the PAP be recalibrated using this procedure whenever the PC board or blower is replaced or when testing or troubleshooting indicate calibration is required.

#### Required Equipment:

- PC with a free serial port
- USB to USB micro-B cable (DV63D-615)
- Terminal Program (Microsoft Windows HyperTerminal or equivalent)
- Calibrated pressure meter (0 to 30 cmH<sub>2</sub>O range)
- Calibrated mass airflow meter (0 to 150 Std. L/min range)
- Ball valve (or equivalent) to control the DV6x device flow
- Particulate Matter (PM) Filter (optional)

Figure 1 Calibration Setup



#### Procedure:

1. Setup the DV63/64 device as shown in Figure 1 and connect the DV6x device to the DC power supply. Do not attach the heated humidifier chamber to the DV6x device while performing calibration. Initially the ball valve should be closed so that no air can pass through.
2. Use a terminal program (such as Windows HyperTerminal) with COM settings 9600 baud, no parity, 8 data bits, 1 stop bit, Flow Control set to none. Open the terminal program and connect to the DV6x device. When sending terminal commands, the DV6x device will respond with "WF" if a command was not properly received, and the command should then be resent.
3. Send the terminal command 'Mo=3' to put the device into calibration mode.
4. Send the terminal command 'FE=00' to disable Auto-STOP.
5. In this step the low pressure value and low flow value will be calibrated. These calibration points are for when the pressure and flow values equal 0 cmH<sub>2</sub>O and 0 SLPM.
  - a. Send the terminal command 'Rs=0' to ensure the DV6x device blower is off.
  - b. Wait forty seconds for the DV6x device internal filtering to stabilize.
  - c. Send the terminal command 'Tc=cpl' to calibrate the DV6x device low pressure value.
  - d. Send the terminal command 'Tc=cfl' to calibrate the DV6x device low flow value.
6. In this step the high pressure value will be calibrated. This calibration point is for when the DV6x device blower is on and the pressure equals 20.0 cmH<sub>2</sub>O.
  - a. Send the terminal command 'Tw=18000' to set the motor speed to 18,000 RPM. This motor speed value should achieve a pressure that is close to 20 cmH<sub>2</sub>O.
  - b. Send the terminal command 'Rs=R' to turn the DV6x device blower on. Check the ball valve to ensure that it is closed, and that no air is flowing through.
  - c. The external pressure meter should be reading a value that is equal to 20.0 cmH<sub>2</sub>O. If the pressure does not equal 20.0 cmH<sub>2</sub>O, the terminal commands 'Tw+' and 'Tw-' can be used to increase or decrease the motor speed in small increments, thus increasing and decreasing the pressure. Once a pressure that is equal to 20.0 cmH<sub>2</sub>O has been achieved, wait forty seconds for the DV6x device internal filtering to stabilize.
  - d. Send the terminal command 'Tc=cph' to calibrate the high pressure value. **NOTE:** If the current pressure measurement is not equal to exactly 20.0 cmH<sub>2</sub>O, the terminal command 'Tc=cphNN.NN' can be used to interpolate the pressure calibration value. For example, the terminal command 'Tc=cph19.97' can be used to calibrate the high pressure value with the interpolated pressure of 19.97 cmH<sub>2</sub>O.
7. In this step the high flow value will be calibrated. This calibration point is for when the DV6x device blower is on and the flow equals 110 SLPM.
  - a. The DV6x device blower should still be turned on at the motor speed value used for the high pressure calibration in Step 6, and the ball valve closed.
  - b. Open the ball valve and adjust the ball valve until the flow meter measures 110 SLPM.
  - c. Wait forty seconds for the DV6x device internal filtering to stabilize.
  - d. Send the terminal command 'Tc=cfh' to calibrate the high flow value. **NOTE:** If the current flow measurement is not equal to exactly 110 SLPM, the terminal command 'Tc=cfhNNN.N' can be used to interpolate the flow calibration value. For example, the terminal command 'Tc=cfh109.5' can be used to calibrate the high flow value with the interpolated flow of 109.5 SLPM.
8. Testing will be performed to check the flow calibration settings. Adjust the ball valve to change the flow rate. Send the terminal command 'FI' and verify that the DV6x device returned flow value is within ± 4 SLPM of the flow measurement from the flow meter. Repeat this step at various flow rates.
9. In this step, testing will be performed to check the pressure calibration settings.

- a. Close the ball valve so no air flows through.
- b. Send the terminal command 'Pn=0' to ensure the DV6x device measured pressure is in cmH<sub>2</sub>O.
- c. Use the terminal command 'Tw=' to change the motor speed to an arbitrary value, thus changing the DV6x device pressure.
- d. Send the terminal command 'PR' and verify that the DV6x device returned pressure is equal to the pressure measurement from the external pressure meter. **NOTE:** *The DV6x device returned pressure is in multiples of 10.*
- e. Repeat the (Step 9) test for various motor speeds.

Once the DV6x device is calibrated, send the terminal command 'Mo=0' to put the device in CPAP mode or 'Mo=1' to put the device in AutoAdjust mode as required.

## TROUBLESHOOTING

Symptom	Action (for symptoms listed at left, follow the steps listed below)
Blower does not start when powered up (display may be blank). or Unit is dead.	1. Examine the CPAP LCD display for error codes. <ol style="list-style-type: none"> <li>a. If error code E01 (on second line)— <b>replace control PC board.</b></li> <li>b. If display is blank or shows error codes E02, E07, E08, E09, proceed to next step.</li> </ol> <b>NOTE:</b> <i>Wait at least 20 seconds after applying power for error codes to appear on display.</i>
	2. Open unit and verify that all wire harnesses are securely connected.
	3a. Measure resistance of PC board fuse F2. The ohmmeter should indicate a short or 0 ohms. If open, <b>replace the control board.</b> 3b. If reading is zero (0) ohms, check the voltage. It should be: 12 volts (+/- .5 volts) if out of spec or not present – <b>try another desk top power supply</b>
	4. Install a known good blower (remove AC power and reapply) – does the good blower run? <ol style="list-style-type: none"> <li>a. Yes – <b>replace the blower, burn in for 6 hours and test unit (subjective sound testing should be performed).</b></li> <li>b. No – <b>replace control board.</b></li> </ol>
Blower does not start when powered up and display shows E06 error code after a short time.	1. Open the unit and inspect the air intake filter, intake foam components and any internal connections. <b>Replace any foam pieces that appear damaged.</b>
	2. Check for signs of water damage in the unit (the blower assembly, pressure sensor or flow sensor can be damaged by water). <b>Replace any components that appear damaged.</b>
	3. Verify that the blower halves are properly snapped together. No visible gap should be present between the top and bottom sections.
	4. Recalibrate the pressure and flow sensors using Manual Calibration Procedure.
	5. If calibration does not resolve issue, install a known good blower (remove AC power and reapply) – does the good blower run? <ol style="list-style-type: none"> <li>a. Yes – <b>replace the blower, burn in for 6 hours and test unit (subjective sound testing should be performed).</b></li> <li>b. No – <b>replace control board.</b></li> </ol>
Blower runs loud.	1. Open the unit and verify that the blower assembly is properly snapped together. No visible gaps should be present.
	2. Check for correct assembly of the foam, blower and silicone isolator.
	3. If the unit assembly is correct, replace the blower, burn in for a minimum 6 hours and test unit (subjective sound testing should be performed).
Pressure or flow out of tolerance (Pressure ± 0.5 cmH <sub>2</sub> O of setting for Model (DV63, DV64) (Flow ± 10 L/Min).  OR  Unit not triggering properly.	1. Open the unit and inspect the air intake filter, intake foam components and any internal connections. Verify the PC Board is inserted into the manifold properly. <b>Replace any foam pieces and/or tubing that appear damaged.</b>
	2. Check for signs of water damage in the unit (the blower assembly, pressure sensor or flow sensor can be damaged by water). <b>Replace any components that appear damaged.</b>
	3. Verify that the blower halves are properly snapped together. No visible gap should be present between the top and bottom sections.
	4. Check the chassis manifold, verify that manifold is aligned on seal surfaces and that the motor wire harness is routed correctly through the manifold. <b>Replace the chassis manifold if it is damaged.</b>
	5. Check pressure and flow after replacing any of the above parts or snapping the blower together. If pressure and flow are still out of tolerance, go to next step.
	6. Calibrate the CPAP using the “Manual Calibration Procedure”.
	7. If the above steps do not improve pressure or flow accuracy, <b>replace the control board.</b>

# TROUBLESHOOTING

Symptom	Action (for symptoms listed at left, follow the steps listed below)
Manual calibration failed during testing.	<ol style="list-style-type: none"> <li>1. Open the unit and inspect the air intake filter and intake foam components. Check for disconnected, occluded (blocked) or kinked manifold for the flow transducer or manifold for the pressure sensor. <b>Replace any foam pieces that appear damaged and any manifolds that appear to be blocked.</b></li> <li>2. Check for signs of water damage in the unit (the blower assembly, pressure sensor or flow sensor can be damaged by water). <b>Replace any components that appear damaged.</b></li> <li>3. Verify that the blower halves are properly snapped together. No visible gap should be present between the top and bottom sections.</li> <li>4. If any changes were made above, calibrate the CPAP using the "Manual Calibration Procedure".</li> <li>5. If the above steps do not resolve the calibration problem, <b>replace the control board.</b></li> </ol>
LCD display does not light, backlight not lit up. (Plug-in start up test)  or  The blower runs, but nothing appears on the LCD.	<ol style="list-style-type: none"> <li>1. Open the unit and verify that the LCD connectors are secured (check connectors at the LCD display module and the control board). Examine the LCD tail for damage or creases from bending and also the tail going to the Encoder PC board for damage.</li> <li>2. If connectors are secure, the tail is undamaged and the display still does not function correctly, <b>replace the LCD display module.</b></li> <li>3. If LCD still does not show messages correctly, <b>replace control PC board</b> (re-install the original LCD)</li> </ol>
If any keypad button is non-responsive.	<ol style="list-style-type: none"> <li>1. Remove the keypad and check the carbon ink on the PC board for wear. Also check the Carbon Pills on the keypad for wear or if missing. <b>Replace either keypad or PC board.</b></li> </ol>
If user claims that keypad buttons did not work, but buttons work when tested.	<ol style="list-style-type: none"> <li>1. Check for sticking buttons and wear on either the PC board or the carbon pills on the keypad. Replace PC board or keypad if necessary.</li> </ol>
If Encoder (knob) is nonresponsive	<ol style="list-style-type: none"> <li>1. Check the tail from the LCD going to the Encoder board and the tail from the LCD going to the main PC board. If it looks OK, replace the Encoder board. If not, replace the LCD display assembly.</li> </ol>
User claims unit is warm.	<ol style="list-style-type: none"> <li>1. It is normal for the back of the unit to get a little warm when operating and when the blower is off (heat from power supply).</li> <li>2. Examine the power supply for any signs of overheating (discolored parts on supply). If needed, <b>replace power supply.</b></li> </ol>
User claims unit shuts off during night or User claims that pressure is high	<ol style="list-style-type: none"> <li>1. Check the "Last Error" recorded using Terminal Program. Send the terminal command "Er" to check "Last Error" recorded. An error code of E00 indicates that no errors were encountered in the field. <ol style="list-style-type: none"> <li>a. If no critical errors are present on the device, then the problem may be related to high leak flow operation.</li> <li>b. Unit calibration may be incorrect. Recalibrate using Manual Calibration Procedure.</li> </ol> </li> </ol>
Blower continues to run when unit is turned off.	<ol style="list-style-type: none"> <li>1. <b>Replace control board.</b></li> </ol>
No airflow from unit when blower is running or air is unusually warm.	<ol style="list-style-type: none"> <li>1. Air Filter may be occluded or dirty. Clean or replace filter.</li> <li>2. Check internal air path for components or foam out of place. Replace components as necessary and reassemble.</li> </ol>
Error Code E80. This message is shown once per blower on.	<ol style="list-style-type: none"> <li>1. Inadequate Power Supply. Replace Power Supply and start unit again.</li> </ol>
Error Code E81. This message is shown once per blower on.	<ol style="list-style-type: none"> <li>1. PulseDose failure. Replace PulseDose Valve.</li> </ol>
Error Code E82. This message is shown once per blower on.	<ol style="list-style-type: none"> <li>1. Heater plate failure. Check the wire harness inside the CPAP for any broken connections or pins in the connector pushed out.</li> <li>2. Replace the heater.</li> </ol>
Error Code E83. This message is shown once per blower on.	<ol style="list-style-type: none"> <li>1. Clock Failure. Real Time Clock is not advancing. Unplug the power and wait a few minutes then plug the power back in.</li> <li>2. If Error occurs again replace the PC Board.</li> </ol>
Error Code E84. This message is shown once per blower on.	<ol style="list-style-type: none"> <li>1. NAND Flash Failure. Unplug the power and wait a few minutes then plug the power back in.</li> <li>2. If Error occurs again replace the PC Board.</li> </ol>
Error Code E0B, error communicating with the sensors.	<ol style="list-style-type: none"> <li>1. Sensor failure, replace PC board.</li> </ol>
Error Code E0D, Unknown Power Supply.	<ol style="list-style-type: none"> <li>1. Replace Power Supply and try again.</li> <li>2. If Unit still Errors, replace the PC Board.</li> </ol>
SmartCode or Compliance meter not logging usage.	<ol style="list-style-type: none"> <li>1. Both of these features require that breathing detection (triggering) works correctly. Perform Triggering Test to confirm operation.</li> <li>2. Perform pressure and flow accuracy tests to confirm calibration.</li> </ol>

## CPAP SERVICING AND PARTS REPLACEMENT

Tools and Equipment Needed:

- T-10 Torx driver
- Needle nose pliers
- Digital Multimeter for measuring AC/DC voltages and resistance
- AC power source (100 to 240 VAC 50/60 Hz)

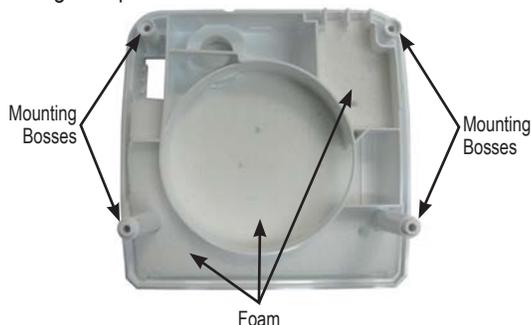
### Inspecting Internal Components

When servicing or troubleshooting the CPAP, it may be necessary to closely inspect all of the internal components in order to determine the cause of the problem or issue. The following steps are provided as a guide to assist you when performing a detailed inspection or evaluation of the CPAP.

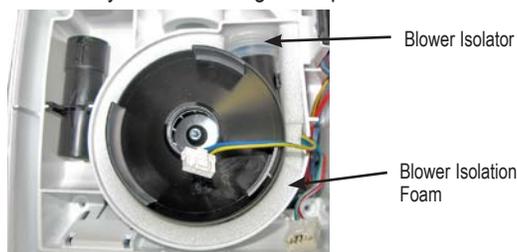
During service, do not touch the contacts at the end of the ribbon connector/cable. Grease or oil from your fingers will render the display inoperative.

### Inspecting components in and on the blower chassis:

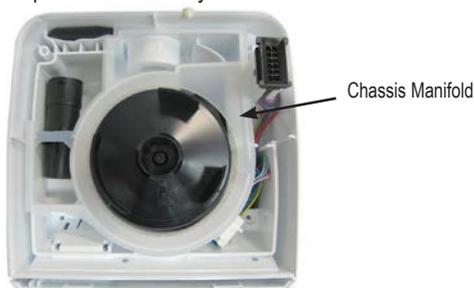
1. Remove bottom cover using instructions listed on pg. 17.
2. Inspect the bottom cover foam pieces and mounting bosses for damage. Replace as needed.



3. Remove blower. See 'to remove and replace blower' section.
4. Inspect the blower foam pieces and the blower discharge isolator. Ensure they are not damaged. Replace as needed.



5. Look for evidence of water residue inside the blower housing.
6. Verify that the blower halves are properly snapped together. No visible gap should be present between the top and bottom sections. Also inspect the chassis manifold for any damage. Replace if necessary.



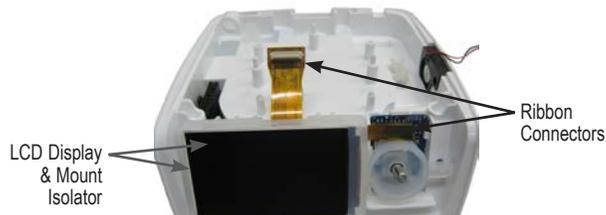
7. Make sure the flow element is positioned properly and not dirty or damaged.



8. Replace blower. See 'to remove and replace blower' section.

### Inspecting components in and on top of the main chassis:

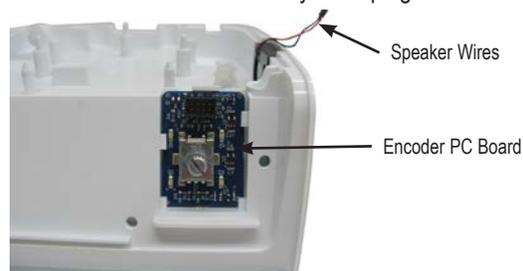
1. Remove top cover using instructions listed on pg. 17.
2. Remove PC board. See instructions 'to remove and replace PC board' section.
3. Inspect the LCD display mounting to the front of the chassis and ensure that it is positioned correctly.



4. Closely inspect both ribbon connectors. Make sure there are no breaks or nicks in the wire insulation. Also be sure the smaller ribbon connector is securely attached to the Encoder PC board.

**NOTE:** During service, do not touch the contacts at the end of the ribbon connector/cable. Grease or oil from your fingers will render the display inoperative.

5. Inspect the Encoder PC board for any broken connections around the stem that the rotary knob plugs onto.



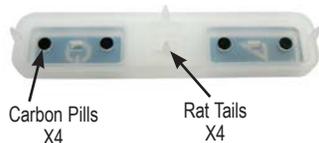
6. Inspect the speaker for any broken wires.
7. Remove the keypad from the PC board by gently pulling upward until the 'rat tails' are out of the holes.



- Inspect the keypad to be sure all the carbon pills are in place. Also inspect the carbon traces on the PC board for any breakage or dirt.



Carbon Traces  
X4



Carbon Pills  
X4

Rat Tails  
X4

- Replace the keypad by inserting the 'rat tails' in the mounting holes and then pulling them through the PC board with needle nose pliers.
- Replace PC board. See 'to remove and replace PC board' section.
- Replace top cover using instructions listed below.

## To Remove Bottom Cover – Access the Blower, Flow Element, Foam and Chassis Manifold

- Remove the four T-10 screws from the bottom cover.



Case Screws  
X4

- Lift bottom cover off CPAP device.

## To Replace Bottom Cover

- Ensure that the flow element is fully seated in the flow sensor manifold.



Flow Element

- Ensure that the foam under and around the blower is properly placed and free from tears.



Blower Foam

- Ensure that the blower is securely placed in the blower isolator.
- Ensure that the blue, green and yellow wire harness is properly positioned in the chassis manifold, and the manifold is secured to the main chassis frame.
- Fold the blue, green and yellow wire harness under its connector and insert harness wires under the connector when placing into the connector restraint molded into the main chassis.



Blower Wire Harness in  
Connector Restraint

- Ensure that the heater wire harness connector is in place and all wires are pushed deep into the cavity.
- Replace bottom cover and secure using four T-10 screws.

## To Remove Top Cover – Access PC Board, Keypad, Speaker, LCD Display, Encoder PC Board

- Remove the two front T-10 screws from the bottom cover, found under the Display and Rotary Knob.



Case Screws  
X2

- Pull/ Pry off the Rotary Knob.
- Use a flat-head driver to push up on the top cover latches on the back of the unit.



Latches

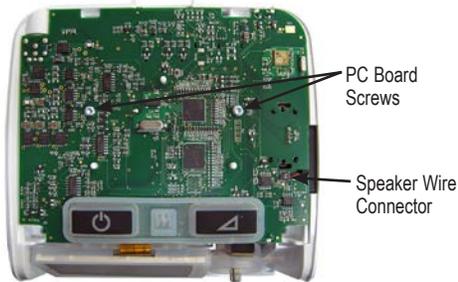
- Lift cover off the main chassis.

## To Replace Top Cover

- Place top cover onto chassis.
- Snap latches into place on back of unit.
- Ensure that the Display is positioned properly within the window while replacing two front T-10 screws into bottom cover.
- Push Rotary Knob onto stem.

## To Remove and Replace PC Board / Keypad

1. Remove top cover using instructions listed previously.
2. Remove two short T-10 screws from PC board.



3. Carefully remove speaker wire connector from top of PC board by lifting upwards.
4. Carefully lift front of PC Board to gain access to the LCD display's ribbon connector. Ensuring that the ribbon connector is not bent in the process, disconnect the display connector from the PC board.



5. Lift PC board out of the main chassis until the main wire harness connector is accessible.
6. Release main wire harness connector latch and carefully pull board from connector.



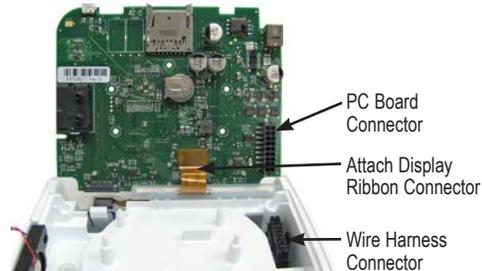
7. Remove board from top of chassis.
8. Remove keypad from PC board by carefully pulling upward until the "rat tails" are out of the holes.



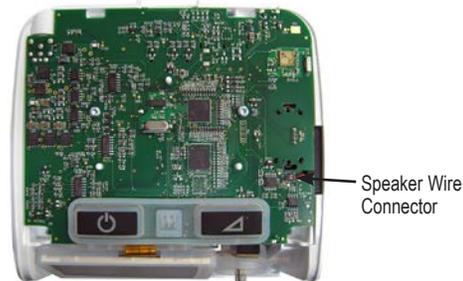
9. Position the keypad so that the Ramp key is on the front right of the new PC Board. Pull the "rat tails" through the corresponding holes in the new board using needle nose pliers. Ensure that the "rat tails" are pulled completely through the board with the keypad flush with the top of the board.



10. Align the LCD display ribbon connector with the PC board's connector and push into place without damaging the ribbon.



11. Hold main wire harness connector with both forefingers or needle nose pliers and align with PC board's connector. Then carefully push until it snaps into place.
12. Reconnect speaker wire connector to PC board by pushing straight down (red wire closest to delay button).



13. Ensure PC board is properly positioned on chassis and secure with two T-10 screws.
14. Replace top cover using instructions listed previously.

**NOTE:** If a NEW PC board was installed, proceed with the following steps including recalibration.

### The following steps including recalibration are required when installing a new PC board:

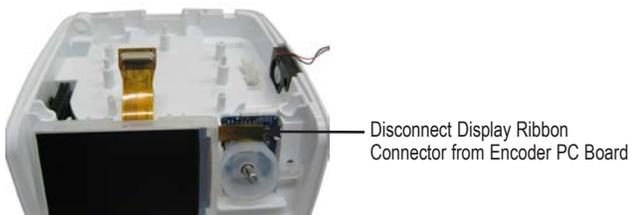
1. Connect the PAP to a PC Serial Port with cable DV63D-615 and turn the PAP on.
2. Use a terminal program (such as Windows Hyper Terminal or equivalent) with COM Settings 9600 baud, no parity, 1 stop bit, Flow Control set to none.
3. When the unit is connected, Type 'Mn<cr>'. The PAP will report the model number saved in memory. It should be "00000" if the PC Board is new.
4. Read the Model number from the PAP label in the back of the unit (EX; DV64D)
5. Type 'Mn=nnnnn' where nnnnn is the 5 digit model number read in the previous step. The PAP should return the 5 digit model Number.
6. Read the Serial Number from the label located on the back of the unit.

7. Type 'Sn=nnnnnnnnnn' where nnnnnnnnnn is the 10 digit serial number read in the previous step.
8. Read the hour meter("Uh<cr>")-a new PC Board should have 000000000.0 hours. It is recommended that the original hour meter value be restored if the original blower is used. Set the hour meter by typing 'Uh=nnnn<cr>' where nnnn is the hour meter reading X10 (Ex: 100.5 hours would be set by typing 'Uh=1005<cr>').
9. Read the Compliance Meter ("Up<cr>")-a new PC board should have 000000000.0. Clear the Compliance Meter if it is not by typing 'Up=c<cr>'. The CPAP will return 000000000.0.  
**NOTE:** *SmartCode data will also clear at this time.*
10. Check the hardware and firmware version information. Read and record the following:
  - a. BIOS rev "VB<cr>"
  - b. Firmware rev "VF<cr>"

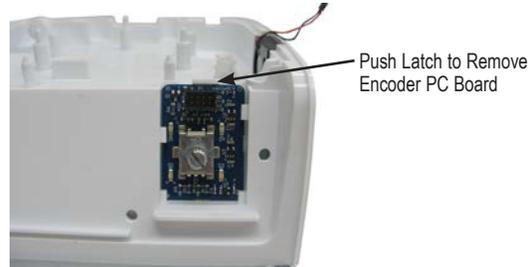
Check the present version of firmware to make sure the board is up to date. Install new firmware if the board has an old revision.
11. Clear the error code by typing 'Ec<cr>' the PAP will return "OK".
12. Clear the fault log by typing 'Uf=c<cr>'the PAP will return "OK".
13. Set all device settings to their default by typing 'TD<cr>'. The PAP should return "OK".
14. Recalibrate the unit using the Manual Calibration Procedure.
15. After the calibration is complete, close Hyper Terminal and set the clock. This requires the use of the DeVilbiss Remote Control Program which is included in SmartLink Desktop Software version 3.0 or higher. If necessary, install the software at this time.
16. Connect the PAP to a PC Serial Port with cable DV63D-615. In order to set the clock, open the DeVilbiss SmartLink Desktop Software and click on the Remote Control Program. When the program finds the PAP, click on the clock settings tab. Then click on the clock in the middle of the screen. When you click this, a message box will let you know that, by clicking this, all data will be permanently removed and will ask you if you want to proceed. By clicking "OK" the clock will be set to your computer time, and all data will be erased.
17. Close the software and disconnect the unit from the PC.

## To Remove and Replace LCD Display, Encoder PC Board, or Manifolds for Pressure and Flow Transducers

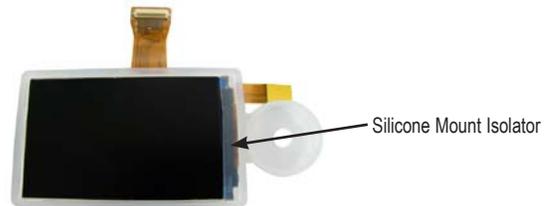
1. Remove PC Board using instructions listed previously and set aside PC Board with Keypad attached in a safe, clean location.
2. Use a fingernail to gently pry the LCD Display ribbon connector from Encoder PC board connection.



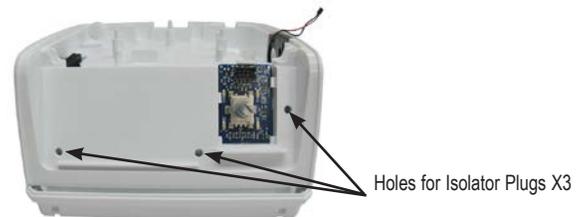
3. Remove the Display and its silicone display mount isolator.
4. If replacing Encoder PC board, release from the chassis by carefully pushing on the top latch while lifting the rotary knob stem up until the board is released. Install new Encoder board by positioning the board so that the Display's connector is on top, aligning the board in the chassis guides and pushing into position. The top latch will click into place.



5. If replacing the Display, remove old Display from the silicone mount isolator and carefully insert new Display ensuring that neither ribbon connector is bent or damaged in the process.

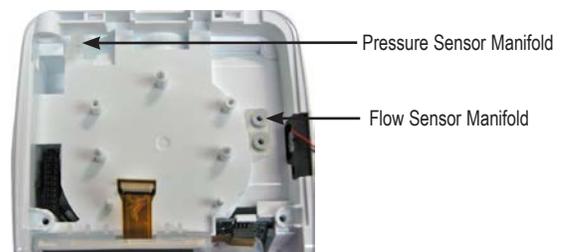


- a. Position the isolator so that the back two plugs align with the holes in the Display cavity, and the Rotary Knob isolator plug aligns with the hole to the right of the knob stem. Push the three plugs into their corresponding holes to attach the isolator to the main chassis.



- b. Attach ribbon connector to the Encoder PC board.

6. If replacing manifolds, pull appropriate silicone manifold from main chassis.



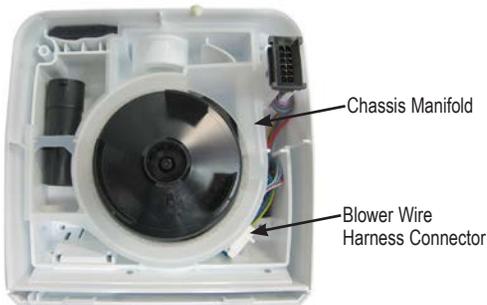
- a. If replacing the manifold for the pressure sensor, press tall connector over the larger port in the chassis.

- b. If replacing the manifold for the flow sensor, observe the flange on the short manifold connectors. These flanges must be pressed into the open space surrounding the flow sensor connection ports. Position manifold over both ports in the chassis and press into place at a slight angle using thumbs. Then, press a thumbnail into and around base of each manifold until each is fully seated in the chassis. When looking straight down on the manifold, the manifold openings should surround the ports at an equal distance.

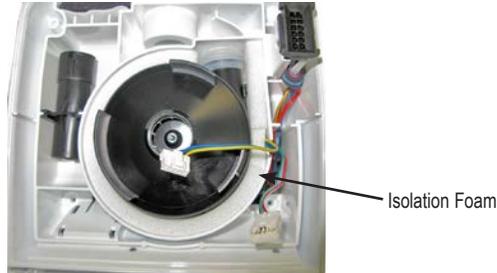
7. Replace PC Board using instructions listed previously.
8. Replace top cover using instructions listed previously.

## To Remove and Replace Blower

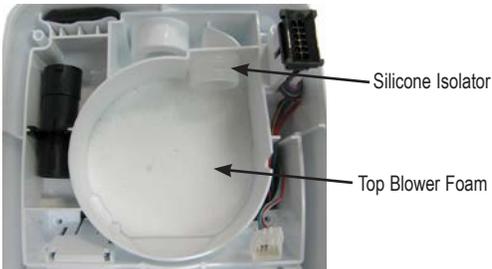
1. Remove bottom cover using instructions listed previously.
2. Disconnect blower wire harness connector.



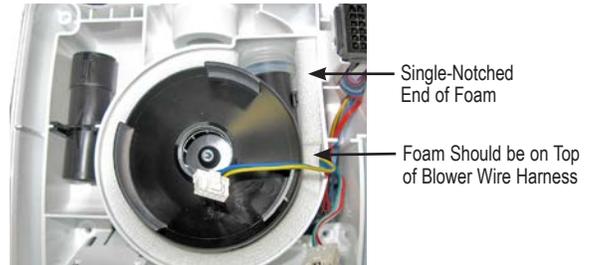
3. Remove chassis manifold.
4. Remove the isolation foam around the blower.



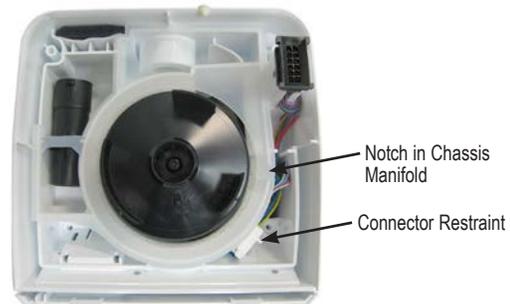
5. Push the silicone isolator off the blower outlet and remove blower.
6. Ensure that the top blower foam is positioned properly.



7. Insert silicone isolator onto new blower outlet port.
8. Place blower into chassis ensuring that outlet port with isolator is positioned properly in opening.
9. Insert the blower wrap isolation foam so that the single-notched end is beside the blower outlet port. Wrap the remaining foam strip clockwise around the blower so that the notched foam corresponds to the latches on the blower body and is ON TOP of the blower wire harness.



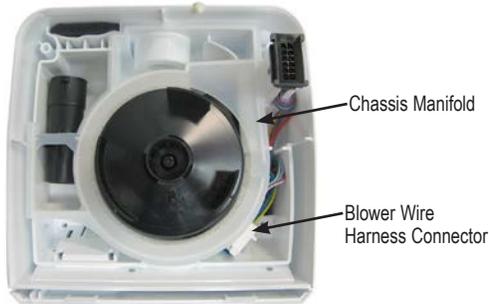
10. Install chassis manifold ensuring that it is seated properly on top of the chassis frame.
11. Insert the blower wire harness into the notch or cut out in the chassis manifold and connect it to the main wire harness.



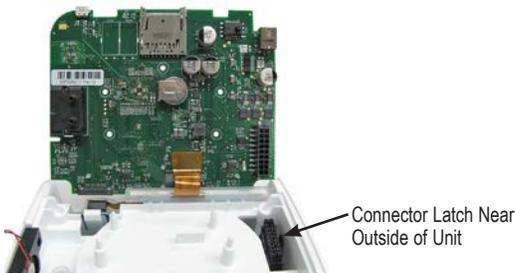
12. Fold the blue, green and yellow wire harness under its connector and insert the harness wires and connector into the connector restraint located to the left of the notch in the silicone manifold.
13. Replace bottom cover using instructions listed previously.
14. If a NEW blower was installed, the unit should be recalibrated using the Manual Calibration Procedure.

## To Remove and Replace Main Wire Harness

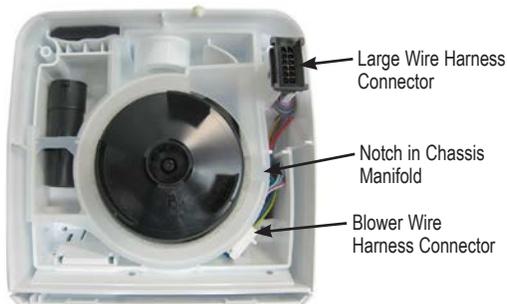
1. Remove bottom cover using instructions listed previously.
2. Disconnect blower wire harness connector.



3. Remove chassis manifold.
4. Remove PC Board using instructions listed previously and set aside PC Board with Keypad attached in a safe, clean location.
5. Pull main wire harness out from bottom of unit.
6. Insert top end of new wire harness through chassis. Ensure that latch on connector for PC board is facing toward the outside of the unit.



7. Replace PC Board using instructions listed previously.
8. Replace top cover using instructions listed previously.
9. Place CPAP on work surface with bottom of unit facing upward. Orient large wire harness connector so that the red wires are facing the back of unit and insert into connector restraint.
10. Install chassis manifold ensuring that it is seated properly on top of the chassis frame.
11. Insert the blower wire harness into the notch or cut out in the chassis manifold and then connect it to the main wire harness.
12. Fold the blue, green and yellow wire harness under its connector and insert the harness wires and connector into the connector restraint located to the left of the notch in the silicone manifold.



13. Replace bottom cover using instructions listed previously.

# SPECIFICATIONS

## UNIT SPECIFICATIONS

DV6x CPAP Device Specifications					
Size	3.7" (9.4 cm) H x 6.1" (15.5 cm) W x 5.9" (15 cm) D				
Weight	1.93 lbs (0.9 kg) CPAP only; 3.8 lbs. (1.74 kg) including DV6HH heated humidifier				
Electrical Requirements AC	100-240V~, 50/60 Hz				
Electrical Requirements DC	11-17 VDC, 5.2 Amps				
Maximum Power Consumption	65 watts max from AC power source (flow generator only)				
Pressure Range	3-20 cmH <sub>2</sub> O				
Operating Temperature Range	41°F to 104°F (5°C to 40°C)				
Operating Humidity Range	15% to 93% RH non-condensing				
Operating Atmospheric Conditions Range	1060 hPa - 700 hPa (~ 1,400 ft below sea level to 9,800 ft)				
Storage & Transportation Temperature Range	-13°F to 158°F (-25° C - +70° C)				
Storage & Transportation Humidity Range	15% to 93% RH non-condensing				
Maximum Limited Pressure	20 cmH <sub>2</sub> O under normal use, 30 cmH <sub>2</sub> O under single fault				
Sound Pressure Level (tested per ISO 17510-1:2007)	26.6 dBA				
Sound Power Level	34.6 dBA				
Filter Specifications					
Standard Filter	> 3.0 micron particles				
Optional Fine Particle Filter	> 0.3 micron particles				
Maximum Flowrate (per ISO 17510-1:2007)					
Test Pressures	3.0 cmH <sub>2</sub> O	7.0 cmH <sub>2</sub> O	12.0 cmH <sub>2</sub> O	16.0 cmH <sub>2</sub> O	20.0 cmH <sub>2</sub> O
Measured pressure at the patient connection port (cmH <sub>2</sub> O)	2.9	6.6	11.4	15.0	19.0
Average flow at the patient connection port (l/min)	78.2	123.5	166.8	157.7	138.0
Long Term Static Pressure Accuracy	± 0.5 cmH <sub>2</sub> O				
Dynamic Short-Term Pressure Accuracy with and without DV5HH Humidifier (per ISO 17510-1:2007)					
Waveform	Volume [mL]	Breath Rate [min <sup>-1</sup> ]	Set Pressure [cmH <sub>2</sub> O]	Pressure Accuracy CPAP only [Pk-Pk cmH <sub>2</sub> O]	Pressure Accuracy CPAP with Humidifier [Pk-Pk cmH <sub>2</sub> O]
Sinusoidal cycle with I:E = 1:1	500	10, 15, 20	3.0	0.5	0.5
			7.0	0.5	0.5
			12.0	1.0	1.0
			16.0	1.0	1.0
			20.0	1.0	1.0
Additional Specifications					
Equipment classification with respect to protection from electric shock	Class II				
Degree of protection from electric shock	Type BF Applied Part				
Degree of protection against ingress of liquids	IP21 Ingress Protection protected against finger access to hazardous parts and vertically falling water drops				
Mode of operation	Continuous				
Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide. See instructions for use with supplemental oxygen.					
US Patents					
SmartCode® Technology is protected under US Patent 8649510					
Approvals					
Meets RTCA/DO 160 – DO-160 section 21 Category M for battery operation only Airline use.					

## A. Important Safeguards

When servicing electrical products, basic safety precautions should always be followed.

### READ ALL INSTRUCTIONS BEFORE SERVICING THIS DEVICE

#### WARNING

A warning indicates the possibility of injury to the user or the operator.

- Electric Shock Hazard – Do not use while bathing.
- Electric Shock Hazard – Do not immerse this device into water or any other liquid.
- Electric Shock Hazard – Do not attempt to open or remove the enclosure. There are no user-serviceable internal components. If service is required, return the product to your home care provider. Opening or tampering with the product will void the warranty.
- Refer to International Standard IEC 60601-1 Ed 3.0 Amendment 1 for safety requirements applicable to Medical Electrical Systems.
- The height of the DV6 series device must be lower than the mask when using a humidifier to prevent water from getting into the mask.

- The humidifier water chamber is intended for single-patient use only.
- Empty and dry humidifier water chamber before transporting.
- Do not attempt to fill the water chamber while it is attached to the humidifier base (cradle). Damage to the humidifier cradle may occur. Always remove the water chamber from the humidifier cradle before filling.
- Never touch the heater plate on the humidifier base (cradle). Never touch the heat transfer plate on the bottom of the water chamber. These plates can reach temperatures as high as 158°F (70°C) during operation.
- Do not operate the heater if the water chamber is empty. The heater plate may be turned off using CPAP Settings when device is being used without water.

## B. TRAVEL

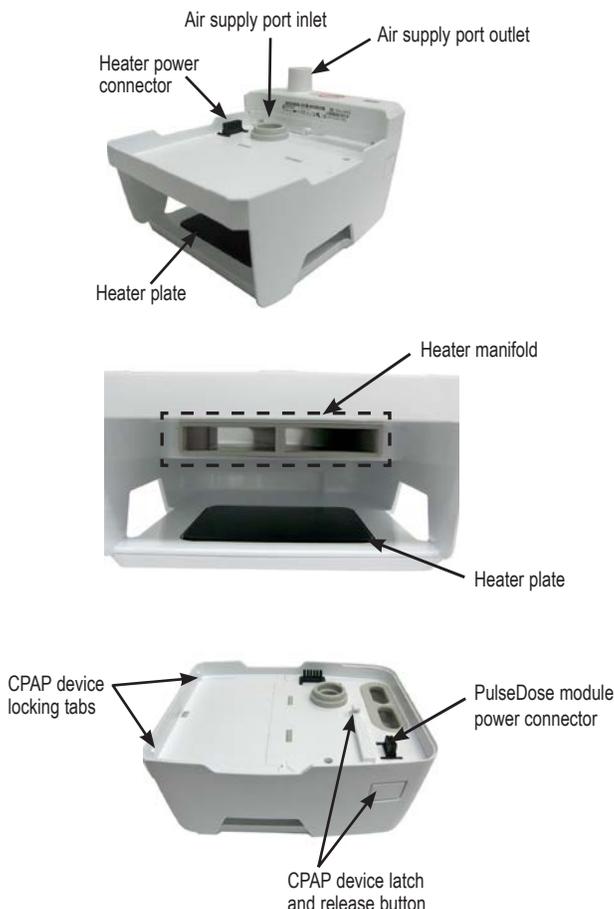
The DV6X Heated Humidifier operates with DC power provided by the DV6x CPAP. The CPAP device needs a power cord appropriate for the region/country.

## C. DC POWER

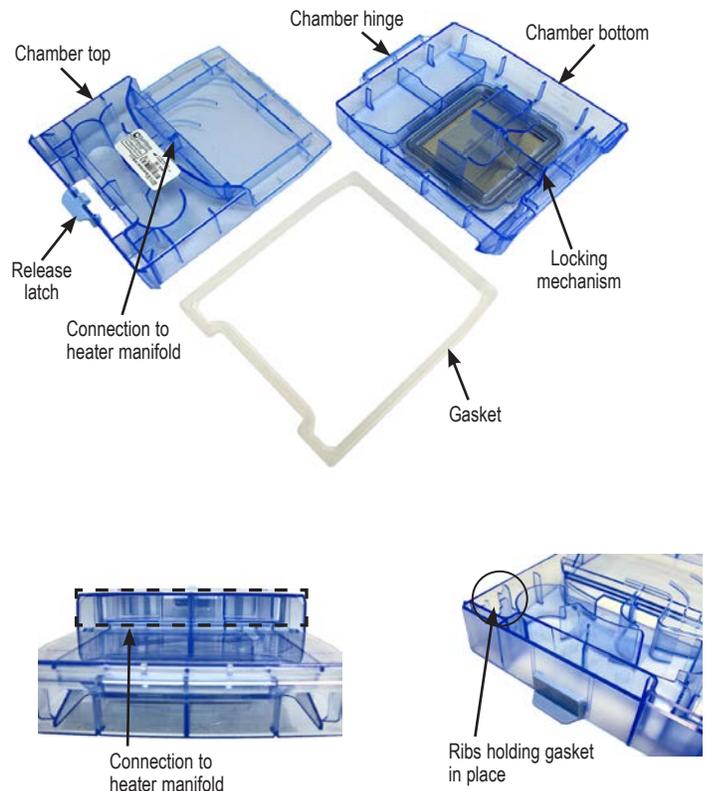
The DV6X Heated Humidifier is powered by the DV6x CPAP and operates with DC power of 11-17 VDC, 2 Amps DC typical (3.2 Amps DC peak at 12.5 VDC).

## D. IMPORTANT PARTS

### Humidifier Base (Cradle)/Heater



### Chamber



## E. PRODUCT DESCRIPTION

### **DV6HH Standard Humidifier**

The DV6HH Standard Heated Humidifier System is intended to warm and add moisture to the pressurized air supplied to the patient during the treatment of Obstructive Sleep Apnea (OSA). The addition of heated humidification to the air relieves dryness and irritation to the patient's airway during OSA therapy. The heated humidifier is used in conjunction with DV6X series CPAP devices and consists of a humidifier chamber and humidifier heater.

The humidifier chamber holds enough water for a minimum of 8 hours of operation with the heating unit at the maximum temperature setting with a system flow rate of 60 L/Min in ambient conditions of 23°C and 25% R.H. The chamber slides out of the unit for cleaning and filling without adjusting tubing connections. The chamber separates for easy cleaning but, when assembled, maintains a leak-free seal to a maximum operating pressure of 30 cmH<sub>2</sub>O.

Heat transferred from the heater to the chamber raises the efficiency of the DV6HH system. The patient controls the heater plate temperature using the rotary knob on the attached CPAP device in conjunction with the device's display to provide the appropriate level of humidification depending upon environmental conditions and individual preference.

### **DV6HHPD PulseDose® Humidifier**

The Humidifier PulseDose® Valve Module is an optional plug-in accessory for the DV6HH Heated Humidifier that offers two primary advantages: it saves power and water by eliminating wasted humidification during exhalation, and it is able to provide maximum humidification without inducing rainout in the patient tubing.

The PulseDose module relies on the heated humidifier to provide pressurized and humidified air, which the module releases to the patient upon inhalation. The valve module releases pressurized air without humidification to the patient during exhalation. This valve action saves water by only using humidity during half of the breathing cycle.

## DESCRIPTION OF NORMAL OPERATION

### DV6HH Standard Humidifier

The heated humidifier connects mechanically and electrically to a DV6x series CPAP device between the air-stream going from the device to the patient. The heated humidifier's output and START/STOP functions are controlled by the CPAP device's rotary knob and display. Prior to operation, the humidifier chamber must be filled with water to a predefined and visible water-fill level with the patient tubing and patient interface attached to the outlet port on the heated humidifier system.

During operation, the CPAP device's external power supply converts AC voltage to DC voltage, and the CPAP device routes DC power to the heater's low-voltage circuitry contained within the CPAP device. The humidifier's drive circuitry directs the DC power to the heating element on the heated humidifier's heater plate. A thermistor on the heater plate provides continuous feedback back to the control circuitry, so that the temperature of the heater plate is consistent with the setting selected on the CPAP device's display.

The heated humidifier's heater plate transmits heat to the water chamber via a heat transfer plate located on the bottom of the chamber. As the water in the chamber heats, its evaporation efficiency increases. Air from the CPAP device passes through the chamber, is humidified by the evaporated water and transmitted to the patient through the patient tubing and interface.

### DV6HHPD PulseDose® Humidifier

The optional PulseDose humidifier connects mechanically and electrically to the DV6X series CPAP device between the air-stream going from the device to the patient. The plug-in valve module contains an electro-mechanical PulseDose valve with a rotary valve body that delivers humidified air while the patient inhales and, conversely, delivers ambient room air while the patient exhales.

Patient flow, leak flow, inhalation and exhalation are continually monitored by the CPAP device's central processor. The timing of each breath is calculated to ensure that the valve delivers humidified air at the start and duration of each inhalation but delivers ambient air during exhalation.

The valve module's triggering algorithm works in tandem with the central processor's breath signal to position valve rotation so that maximum humidity is delivered without exceeding the dew point. Rainout, occurring when warm humidified air in the patient tube contacts cool ambient temperatures, will normally be eliminated when the dehumidified air clears out the humidity during exhalation.

## MAINTENANCE AND TESTING

### A. CLEANING

#### Humidifier Water Chamber

**NOTE:** *DeVilbiss recommends the use of distilled water in the DV6 water chamber.*

**NOTE:** *Use distilled water to avoid mineral deposit build up inside the chamber.*

**NOTE:** *DeVilbiss does not condone the use of essential oils or other additives in the distilled water.*

Humidifier water chamber should be cleaned daily.

1. Press down on the disassembly lever latch and pull the chamber from the base (cradle).
2. Press the release bar toward the release latch and lift the lid to separate chamber.

Optional: Remove sealing gasket from chamber lid only if desired. Gasket does not need to be removed for cleaning.

3. Hand wash in a solution of warm water and mild dishwashing detergent. Rinse thoroughly and allow the parts to air dry before reassembly.

**NOTE:** *The disassembled chamber may also be washed once per week in a dishwasher on the delicate or glassware cycle, top shelf only.*

**NOTE:** *If the sealing gasket was removed for cleaning, replace gasket into its groove around the top of the chamber ensuring that it is snapped under the 12 ribs.*

**CAUTION:** *Inspect the sealing gasket during each cleaning to ensure that it is not damaged and is properly seated under the ribs and in the groove around the entire chamber.*

4. Place the chamber lid's tabs into the hinge slots on the chamber base (cradle) and press the front of the lid until it clicks into place. Return the chamber to the base (cradle).

#### Humidifier Base (Cradle)

The humidifier base (cradle) should be cleaned weekly.

1. Stop the CPAP blower and remove the unit from its power source. Allow the system to cool for at least 10 minutes.
2. Disconnect tubing and remove the water chamber from the humidifier base (cradle) before detaching the base from the CPAP device.
3. Wipe the base (cradle) with clean damp cloth. Allow it to dry completely before reattaching to the CPAP device, refitting the tubing and chamber. Return to its power source for continued use.

### B. MAINTENANCE

**Humidifier Base (Cradle)** – Clean the base weekly.

**Humidifier Water Chamber** (single-patient use) – Clean the chamber daily. The chamber should be replaced as needed.

### C. TESTING

#### Heater Plate Temperature Test

Additional equipment needed: Thermometer

1. Using an empty water chamber, apply AC power to the unit and start the blower.
2. Enter Clinical mode.
3. Go to CPAP Settings, select the Humidity menu and ensure that a setting of 1 is enabled.
4. Allow the heat to stabilize for 3 minutes before removing the water chamber and laying thermometer on the heater plate.
5. After 1 minute verify that the temperature is 33° C (+/- 2°)
6. Return water chamber to heater base (cradle).
7. Go to CPAP Settings, select the Humidity menu and ensure that a setting of 5 is enabled.
8. Allow the heat to stabilize for 3 minutes before removing the water chamber and laying a thermometer on the heater plate.
9. After 1 minute verify that the temperature is 65° C (+/- 2°)
10. Correct all settings to the original preferred or prescribed settings.

#### WARNING

**To avoid burns, never touch the heater plate.**

**NOTE:** *If there is an issue with the temperature of the heater plate, proceed to the troubleshooting section.*

**Pulse Test** - for optional PulseDose<sup>®</sup> Valve Module on Heated Humidifier

Additional equipment required: USB to Micro B USB CPAP to PC cable (DV63D-615), outlet cap (DV51D-620) and a computer running a terminal program (Microsoft Windows HyperTerminal or equivalent).

1. Connect USB to Micro B cable from the computer to the CPAP device's USB port.
2. Connect an outlet cap to the heated humidifier's air supply port.
3. Apply power to the device.
4. Enter the following in the terminal program:
  - Mo=2 - Program returns 2
  - Hs=1 - Program returns 01
5. Observe that the Heater ON / Hot Surface Indicator light is now active.
6. Lift the outlet cap to a slight angle and observe that the pulse valve is rotating. If the cap is too open, the device will not trigger the pulse.

**NOTE:** *If there is an issue with operation of the PulseDose valve, replace PulseDose valve module.*

## NOTIFICATIONS, AUDIBLE ALERTS AND SERVICE CODES

### Service Codes - Visible to Patients – and Audible Alerts

- Service codes are divided into Critical (E0x) or Non-Critical (E8x) categories.
- Critical service codes put the unit in a failsafe (blower STOP) state.
- All service codes have audible alerts. Audible alerts signify that attention should be given to the message on the Display.
- Critical Service Codes cannot be cleared from the Display. Non-Critical Service Codes can be cleared from the Display by button press or knob movement.

Service Code	NON-CRITICAL SERVICE CODE Description
E81	PulseDose Valve Error. This error indicates that the PulseDose valve is not working correctly. This error only occurs once per blower start-up and is reset after the blower stops.
E82	Heater Plate Error. This error indicates that the humidifier heater plate is not working correctly. The heater LED is unlit (unless the heater plate temperature reading is greater than 48 °C), and the CPAP stops powering the humidifier heater plate. This error only occurs once per blower start-up and is reset after the blower stops.

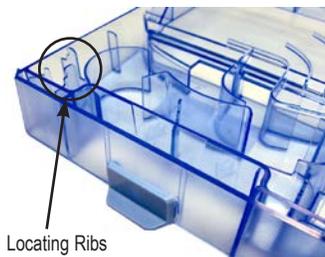
## TROUBLESHOOTING

GENERAL USE	
Symptom	Action
Water condensation in hose	Reduce humidifier heater setting and/or increase room temperature.
Heater setting is not displayed	Reseat the device to ensure proper contact with the heater base (cradle). Verify heater setting in CPAP device. If problem persists, replace heater plate.
KNOWN-GOOD CPAP DEVICE W/ HEATER ISSUE	
With a 'known-good' device's blower ON and the heat setting at 1 or above, neither the CPAP device nor the Display show Heat On lights.	Replace heater plate.
With a 'known good' device's blower ON and the heat setting at 1 or above, the heater plate does not get warm.	Replace heater plate.
KNOWN-GOOD HEATER W/ ISSUE	
With a 'known-good' DV6HH heater connected to the CPAP device with the blower ON and the heat setting at 1 or above, neither the device nor the Display show Heat On lights.	Check the wire harness on the PAP/heater connector and repair or replace if needed. If the wire harness and connections are good, replace the control PC board.
With a 'known-good' DV6HH heater connected to the CPAP device with the blower ON and the heat setting at 1 or above, the heater plate does not get warm.	Check the wire harness on the PAP/heater connector and repair or replace if needed. If the wire harness and connections are good, replace the control PC board.
MANIFOLD AND GASKET	
Excessive air leak	Remove the humidifier chamber and inspect the sealing gasket. Reposition gasket under ribs if needed. If the gasket is missing, worn or torn, replace the gasket. If the issue remains, replace the chamber and/or silicone manifold in the heater base (cradle).
Water leak from the humidifier chamber.	Remove the humidifier chamber. Inspect the chamber for cracks in the plastic or water leaking from the heat transfer plate. If cracks or transfer plate leaks are found, replace the water chamber. Also inspect the sealing gasket. Reposition gasket under ribs if needed. If gasket is missing, worn or torn, replace the gasket. If issue remains, replace the chamber.

## HEATER SERVICING AND PARTS REPLACEMENT

### To Remove and Replace Chamber Sealing Gasket

1. Remove the chamber from the heater base (cradle) and open it. See Cleaning the Humidifier Water Chamber under the Maintenance and Testing section of this manual.
2. Release the defective gasket from the ribs that hold it to the chamber top and discard.
3. Align the replacement gasket onto the chamber top and carefully ensure that the gasket is secured under each of the 12 ribs.

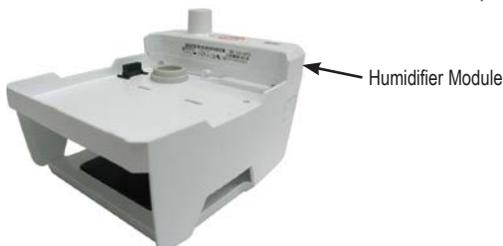


Locating Ribs

4. Close the chamber and return it to the base (cradle).

### To Remove and Replace Heater Plate

1. Remove the humidifier chamber from the DV6HH base (cradle).
2. Disconnect the humidifier module from the top of the heater.



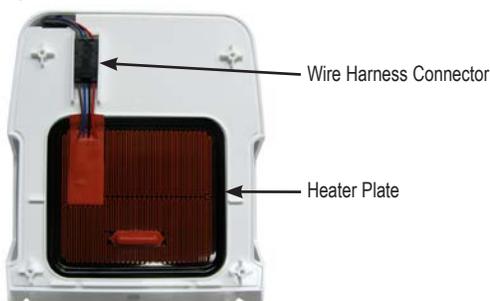
Humidifier Module

3. Turn the base (cradle) over so that the bottom of the unit faces up and remove four T-10 screws.



Humidifier Base Screws X4

4. Lift the bottom cover off the unit.
5. Disconnect heater plate wire harness connector and remove heater plate.



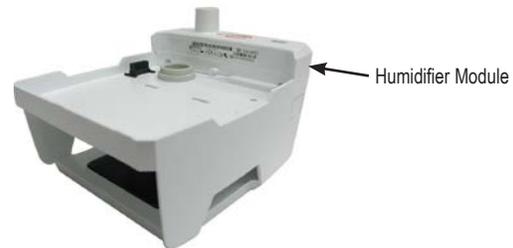
Wire Harness Connector

Heater Plate

6. Insert new heater plate and reconnect wire harness connector. Then, insert connector into connector restraint ensuring wires are not twisted.
7. Replace bottom cover and secure using four T-10 screws.
8. Reconnect the humidifier module to the top of the heater
9. Slide the humidifier chamber into the heater base (cradle) until it clicks into place.

### To Remove and Replace Top Cover (includes manifold and latch w/ spring)

1. Remove the humidifier chamber from the DV6HH base (cradle).
2. Disconnect the humidifier module from the top of the heater.



Humidifier Module

3. Remove two T-10 screws from the top cover of heater base (cradle).



Top Cover Screws

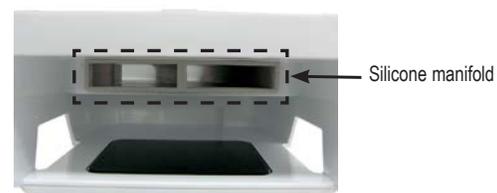
Latch Release Button

4. While holding latch release button in, carefully lift top cover off heater base (cradle).
5. Position new top cover on base (cradle). and push down until it snaps into place.



Top Cover

6. Ensure that the silicone manifold is oriented properly and not twisted.



Silicone manifold

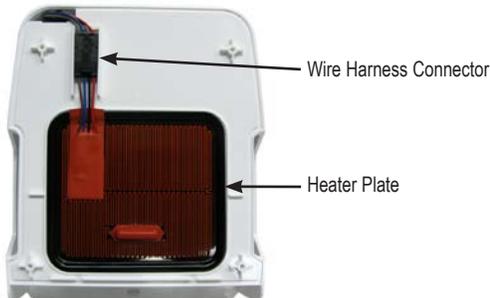
7. Replace two T-10 screws.
8. Reconnect the humidifier module to the top of the heater
9. Slide the humidifier chamber into the heater base (cradle) until it clicks into place.

## To Remove and Replace Heater Wire Harness

1. Remove the humidifier chamber from the DV6HH base (cradle).
2. Disconnect the humidifier module from the top of the heater.
3. Turn the base (cradle) over so that the bottom of the unit faces up and remove four T-10 screws.



4. Lift the bottom cover off the unit.
5. Disconnect heater plate wire harness connector and remove heater plate.



6. Turn the base (cradle) over so that the top of the unit faces up and remove two T-10 screws.



7. While holding latch release button in, carefully lift top cover off heater base (cradle).
8. Remove wire harness by pulling it out through top of unit.
9. Insert end of new wire harness down through base (cradle).
10. Insert heater plate and reconnect wire harness connector. Then, insert connector into connector restraint ensuring wires are not twisted.
11. Replace bottom cover and secure using four T-10 screws.
12. Turn the base (cradle) over so that the top of the unit faces upward.
13. Position upper portion of wire harness in top of base (cradle) using restraints to secure harness.



14. Position top cover on base (cradle) and push down until it snaps into place.
15. Ensure that the silicone manifold is oriented properly and not twisted.
16. Replace two T-10 screws.
17. Reconnect the humidifier module to the top of the heater
18. Slide the humidifier chamber into the heater base (cradle) until it clicks into place.

**SPECIFICATIONS**

<b>Chamber/Base (Cradle) Dimensions:</b>	
Size with CPAP Device	6.3" (16.1 cm) H x 6.1" (15.5 cm) W x 7.6" (19.3 cm) D
Weight with CPAP device	3.8 lbs (1.75 kg)
<b>Electrical Rating:</b>	
Maximum Power Consumption - Heater	40 Watts
DV6HH and DV6HHPD	11 to 17 VDC, 3.2 Amps peak at 12.5 VDC
<b>Heater Performance</b>	
Humidity Output (in the operating flow range)	≥10 mgH <sub>2</sub> O/l air
Heater Plate Thermal Cutout	239°F (115°C)
Power/Temperature Control	Humidity Setting of 1 (minimum) to 5 (maximum)
Heater Plate Temperature	91°F to 149°F (approx. 33°C to approx. 65°C)
<b>Operating, Transport &amp; Storage</b>	
Operating Temperature Range	41°F to 104°F (5°C to 40°C)
Operating Humidity Range	15% to 93% R.H. non-condensing
Operating Atmospheric Pressure Range	1060 hPa to 700 hPa (~ 1,400 ft below sea level to 9,800 ft)
Transport & Storage Temperature Range	-25°C to +70°C (-13°F to +158°F)
Transport & Storage Humidity Range	15% to 93% non-condensing
Class II Equipment: Type BF Applied Parts; Continuous Operation	
IP21, Drip-proof vertical	

**ORDERING & RETURNING PARTS - DV6X and DV6HH / DV6HHPD**

**Ordering Non-Warranty Replacement Parts**

Order non-warranty parts from your distributor or, if you have a DeVilbiss account, from DeVilbiss Customer Service. To expedite the process, be prepared to provide the following information:

- Account and ship-to numbers
- Ship-to address
- Part numbers and/or descriptions
- Quantity required
- Unit catalog number
- Unit serial number

**Returning Warranty Defective Units**

**Placing orders**

Orders may be placed by calling

- Customer Service 800-338-1988
- Warranty Parts- USA 800-338-1988
- International Department 814-443-4881
- Europe +49 (0) 621-178-98-0

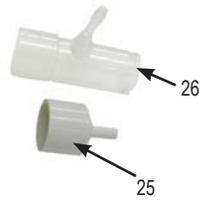
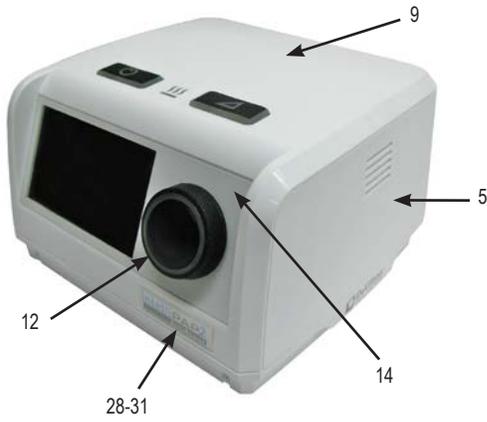
**IMPORTANT: Before returning units to the factory**, call the DeVilbiss Healthcare Customer Service Department at 800-338-1988 (USA office), 814-443-4881 (International office in USA) or +49 (0) 621-178-98-0 (European office) to obtain a return authorization number. The return authorization number should be written on the outside of the package. Inside the package, include a note indicating the return authorization number along with your company name, address, phone number and account number.

# FIGURES & PARTS LIST

## DV63 AND DV64 PAP

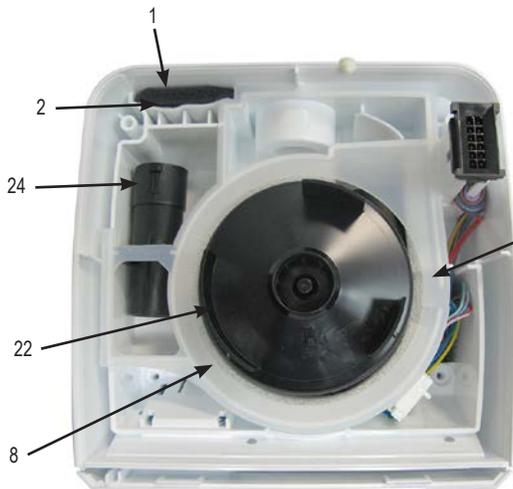
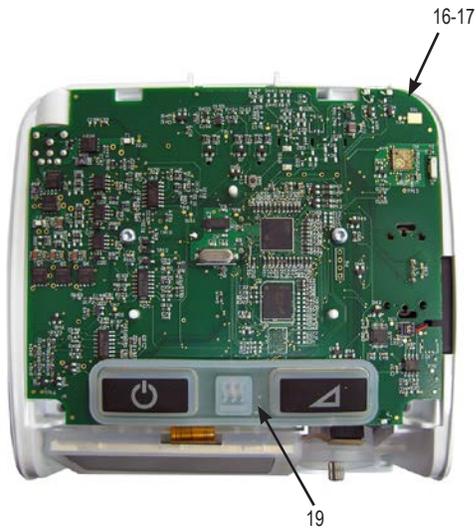
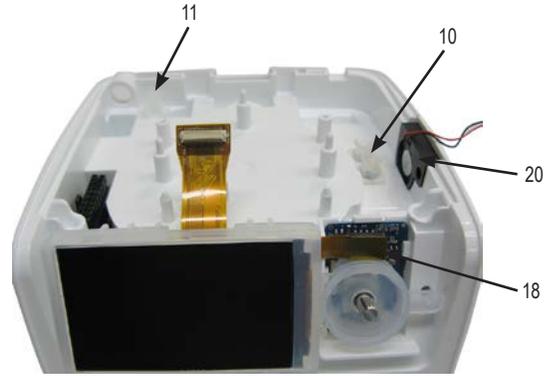
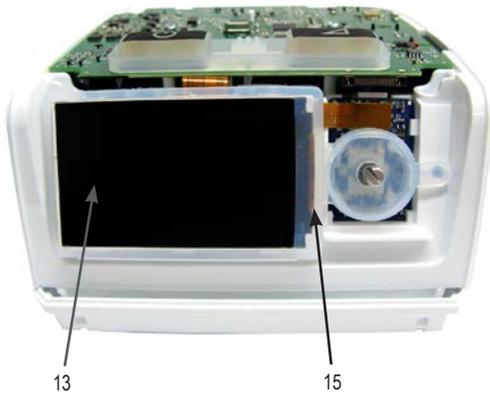


PAP w/Heated Humidifier  
AC Power Cord  
Power Supply

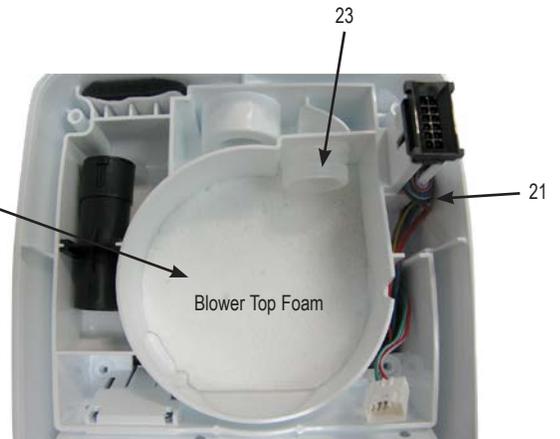


# FIGURES & PARTS LIST

## DV63 AND DV64 PAP

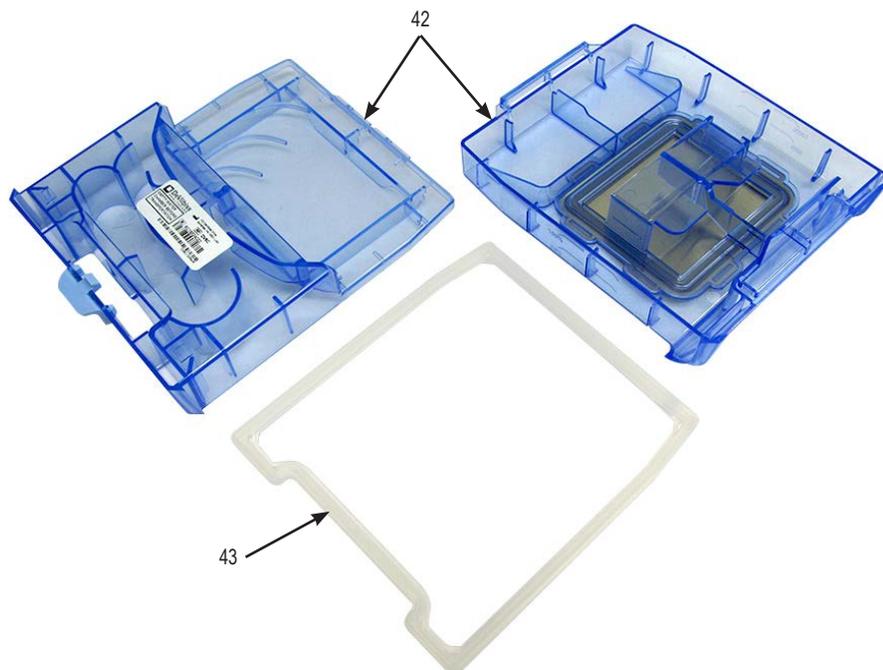
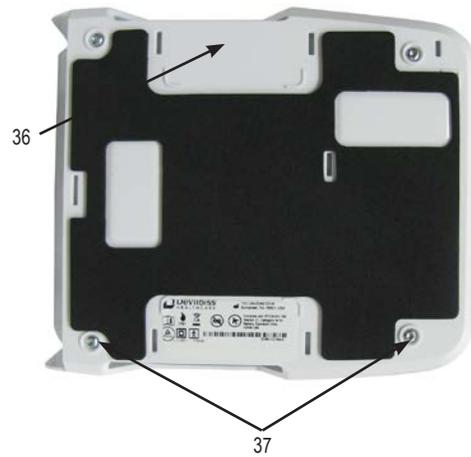
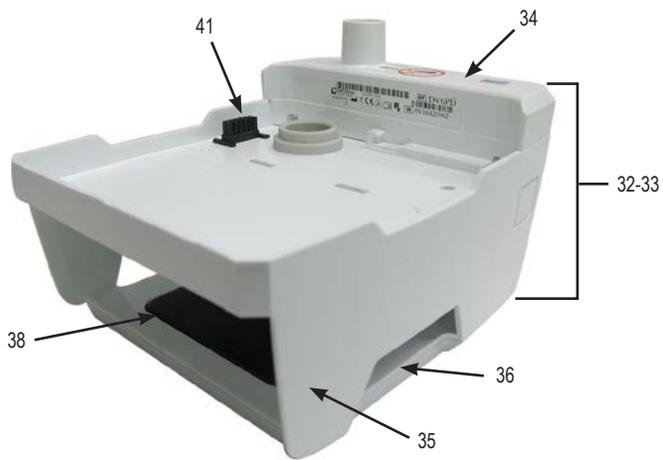


31A  
(Blower isolation  
foam located under  
chassis manifold)



# FIGURES & PARTS LIST

## DV6HH HEATED HUMIDIFIER



# FIGURES & PARTS LIST

DV63 and DV64 PAP		
	Part Description	Part #
1	Air-Inlet Filter (4/pk) Gray	DV51D-602
2	Fine Particle Filter (4/pk) White	DV51D-603
3	Filter Cover	DV63D-631
4	Air Supply Port Cover	DV61D-604
5	Main Chassis	DV63D-641
6	Chassis Bottom w/Foam	DV63D-642
7	Chassis Case Screws	DV63D-606
8	Chassis Manifold	DV63D-623
9	Chassis Top	DV63D-640
10	Flow Sensor Manifold	DV63D-621
11	Pressure Sensor Manifold	DV63D-622
12	Knob Assembly	DV63D-649
13	LCD Display	DV6X-601
14	Display Cover	DV63D-648
15	Display Mount Isolator	DV63D-608
16	DV63 Main PC Board	DV63D-630
17	DV64 Main PC Board	DV64D-630
18	DV6X Encoder PC Board	DV6X-632
19	Keypad	DV63D-643
20	Speaker W/Grommet Assembly	DV63D-695
21	DV6X Main Wire Harness	DV6X-690
22	Blower Assembly	DV63D-619
23	Blower Isolator	DV63D-627
24	Flow Element	DV63D-626
25	Outlet Cap (Mask/Leak Simulator)	DV51D-620
26	Oxygen Adapter	7353D-601
27	USB To Micro B USB Cable (6")	DV63D-615
28	IntelliPAP 2 Standard Plus Logo Label	LA-DV63D-LOGO
29	IntelliPAP 2 AutoAdjust Logo Label	LA-DV64D-LOGO
30	DeVilbiss BLUE Standard Plus Logo Label	LA-DV63E-LOGO
31	DeVilbiss BLUE AutoPlus Logo Label	LA-DV64E-LOGO
31A	Foam Kit	DV63D-644
	6' (1.8 m) X 15mm Tubing	CPAPTUB6TL
	6' (1.8 m) X 22mm Tubing	CPAPTUB6-90
	Heated Tube Kit	DV5HTK
	Carrying Case	DV63D-610
DV6HH		
32	Standard Heated Humidifier	DV6HH
33	PulseDose® Heated Humidifier	DV6HHPD
34	PulseDose® Module (humidifier only)	DV6PD
35	Humidifier Base (Cradle)	DV6H-625
36	Humidifier Bottom Cover w/Foam	DV6H-627
37	Humidifier Case Screws	DV6H-606
38	DV6HH Heater Plate Assembly	DV6H-628
39	Heater Plate Spring	DV6H-630
40	Humidifier Top Cover w/Manifold, Latch and Spring	DV6H-600
41	DV6HH Wire Harness	DV6X-691
42	Humidifier Water Chamber	DV6C
43	Chamber Sealing Gasket	DV6C-614

Power		
	Part Description	Part #
44	65 Watt Power Supply (for DV63 & DV64)	DV63D-613
45	AC Power Cord - USA	DV51D-606
46	AC Power Cord - EU	DV51D-607
47	AC Power Cord - UK	DV51D-608
48	AC Power Cord - Australia	DV51D-609
49	AC Power Cord - Brazil	DV51D-612
50	DC power cord (DV6X Series)	DV6X-619
	DV6 External Battery	DV6EB
	120 Watt Power Supply (for external battery)	DV68-620
	12V Adapter with Battery Clips (Requires DC cord DV6x-619)	DV51D-696
Add-Ons / Miscellaneous		
Description	Part #	
Wireless Modem - North America	DV6WM-NA	
Wireless Modem - Europe	DV6WM-EU	
Wireless Modem - UK	DV6WM-UK	
Wall Charger, Micro USB, UK plug	DV6WM-410-UK	
Wall Charger, Micro USB, EU plug	DV6WM-410-EU	
Wall Charger, Micro USB, NA plug	DV6WM-410-NA	
Micro SD Card	DV6WM-SD	
Micro USB to Serial Adapter (Remote Control; not downloads)	DV63D-617	
Nonin™ WristOx2™ Wireless Oximeter	3150	
Literature		
Description	Part #	
DV63 & DV64 Instruction Guide (IntelliPAP 2)	A-DV64	
DV63 & DV64 Instruction Guide (DeVilbiss BLUE)	SE-DV64-1 thru -6	
DV6x Provider Quick Setup Guide - IntelliPAP 2 (EN, ES, FR)	DV64D-125-XX	
DV6x Provider Quick Setup Guide - DeVilbiss BLUE (AR, DA, DE, EL, EN, ES, FI, FR, HI, IT, JA, NL, NO, PL, PT, RU, SV, TR, ZH, ZH-TW)	DV64E-125-XX	
DV63 & DV64 Service Manual	LT-2320	
Humidifier / Heater Instruction Guide (International)	A-DV6HH	
Humidifier / Heater Instruction Guide (EN, ES, FR)	D-DV6HH	
Wireless Modem Instruction Guide	SE-DV6WM-1 thru -4	

## PRODUCT DISPOSAL

The outer packaging is made of environmentally friendly materials that can be used as secondary raw materials. If you no longer need this packaging, take it to your local recycling and waste disposal facility according to the applicable regulations for your location.

The equipment, including accessories and internal components, does not belong in your regular household waste. Such equipment is manufactured from high-grade materials and can be recycled and reused. The internal motor, speaker, PC boards, display board and wiring should be removed from the unit and recycled as electronic waste. The remaining plastic components should be recycled as plastics.

The European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) requires that electrical and electronic equipment be collected and disposed of separately from other unsorted municipal waste with the aim of recycling it.

## GUIDANCE & MANUFACTURER'S DECLARATION

Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the Electromagnetic Compatibility [EMC] information provided in the accompanying documents.

Portable and Mobile RF Communications Equipment can affect Medical Electrical Equipment.

The equipment or system should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

**NOTE:** The EMC tables and other guidelines provide information to the customer or user that is essential in determining the suitability of the Equipment or System for the Electromagnetic Environment of use, and in managing the Electromagnetic Environment of use to permit the Equipment or System to perform its intended use without disturbing other Equipment and Systems or non-medical electrical equipment.

Guidance and Manufacturer's Declaration – Emissions All Equipment and Systems			
This device is intended for use in the electromagnetic environment specified below. The customer or user of this device should assure that it is used in such an environment.			
Emissions Test	Compliance	Electromagnetic Enforcement – Guidance	
RF Emissions CISPR 11	Group 2	The DeVilbiss DV63 and DV64 Series CPAP must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected.	
RF Emissions CISPR 11	Class B Radiated and Conducted Emissions	The DeVilbiss DV63 and DV64 Series CPAP is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.	
Harmonics IEC 61000-3-2	Class A		
Flicker IEC 61000-3-3	Complies		
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	±8kV contact ±15kV air	±8kV contact ±15kV air	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the relative humidity should be at least 30%.
Electrical Fast Transient/ burst IEC 61000-4-4	±2kV on AC Mains	±2kV on AC Mains	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV Differential ±2kV Common	±1kV Differential ±2kV Common	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of this device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or battery.
Power Frequency 50/60Hz Magnetic Field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be that of a typical location in a typical commercial or hospital environment.
Conducted RF IEC 61000-4-6	3 Vrms from 150 kHz to 80 MHz	V1 = 3 Vrms 6 Vrms on ISM & Amateur Bands	Portable and mobile RF communications equipment should be separated from the device by no less than the recommended separation distances calculated/listed below: $D=(0.4)\sqrt{P}$
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.5 GHz	E1 = 10 V/m	$D=(0.4)\sqrt{P}$ 80 to 800 MHz $D=(0.7)\sqrt{P}$ 800 MHz to 2.5 GHz Where P is the maximum power rating in watts, and D is the recommended separation distance in meters. Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels (V1 and E1). Interference may occur in the vicinity of equipment marked with the following symbol: 
For transmitters rated at a maximum output power not listed above, the recommended separation distance D in meters (m) can be estimated using the equation applicable to the frequency of the transmitter where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

# GUIDANCE & MANUFACTURER'S DECLARATION

## Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and this device. This device and system are NOT Life-Supporting

This device is intended for use in the electromagnetic environment in which radiated disturbances are controlled. The customer or user of this device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the device as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter M		
	150 kHz to 80 MHz outside ISM bands $D=(0.4)\sqrt{P}$	80 to 800MHz $D=(0.4)\sqrt{P}$	800 MHz to 2.5 GHz $D=(0.7)\sqrt{P}$
0.01	0.04	0.04	0.07
0.1	0.11	0.11	0.22
1	0.35	0.35	0.70
10	1.1	1.1	2.2
100	3.5	3.5	7.0

For transmitters rated at a maximum output power not listed above, the recommended separation distance D in meters (m) can be estimated using the equation applicable to the frequency of the transmitter where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.







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