



## 1- Opening and Closing Procedures

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# 1- Opening and Closing Procedures



## **WARNING**

Before starting any procedure, review the safety information provided in the Gendex expert<sup>®</sup> DC User Manual.

# Master Control

## Opening the Master Control

|                 |                            |
|-----------------|----------------------------|
| Tools Required: | No. 2 Phillips Screwdriver |
|-----------------|----------------------------|

There are 2 configurations for the Master Control:

- Local - Master Control Touch Panel is mounted directly to the Master Control
  - Remote - Master Control Touch Panel is mounted on a wall plate
1. Turn OFF the power switch.
  2. Disconnect the external power source:
    - FOR A SYSTEM WITH A LINE CORD (120 V ac only), unplug the line cord.
    - FOR A HARD-WIRED SYSTEM, disconnect the mains supply (external power source) and use a meter to verify the mains supply is disconnected.
  3. For **Local configurations**, continue with **Local Configuration Instructions**.

For **Remote configurations**, continue with **Remote Configuration Instructions** on page 1-6.

## Local Configuration Instructions

To open the Master Control when the Master Control Touch Panel is mounted directly, (Local configuration):

1. Remove the Master Control Touch Panel:

*(Continued)*

*(Continued)*

- a. Pull out at the top of the Master Control Touch Panel.



Figure 1-1 Removing the Master Control Touch Panel

- b. Disconnect the control cable and the exposure switch coil-cord or wall switch cord.



Figure 1-2 Disconnecting the Cable and Cord

- c. Lay the Master Control Touch Panel aside. This will be re-installed later.
2. Position the horizontal arm so that it is parallel to the wall.

*(Continued)*

*(Continued)*

3. Remove the small top cover by pulling up at the corner.



Figure 1-3 Removing the Top Cover

4. Grip the outer cover at the top and at the bottom rear hand-grip cutout and carefully pull it off.



Figure 1-4 Removing the Outer Cover

5. Pull the control cable and the coil-cord back through the cutout for the cables while removing the outer cover.
6. Lay the covers aside for later re-installation.

*(Continued)*

*(Continued)*

7. Unscrew the Strain Relief to remove the control cable and coil-cord from the door.



Figure 1-5 Removing the Control Cable and Coil-Cord

8. Remove the two Phillips head screws and open the door carefully.

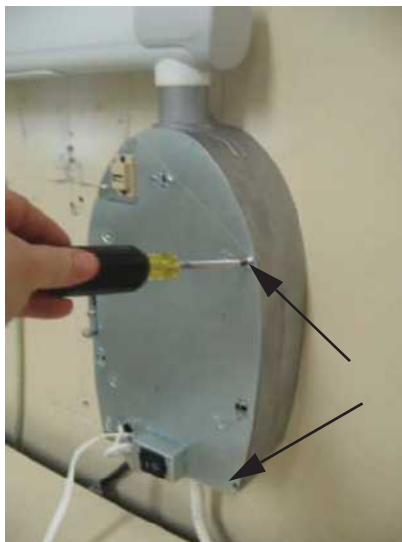


Figure 1-6 Opening the Door

## Opening the Master Control

### Remote Configuration Instructions

To open the Master Control in systems with the Master Control Touch Panel mounted on a wall plate (Remote configuration):

1. Pull out at the top of the blank panel.



Figure 1-7 Removing the Blank Touch Panel

2. Lay the blank panel aside. This will be reinstalled later.
3. Position the Horizontal Arm so that it is parallel to the wall.
4. Remove the small top cover by pulling up at the corner, and lay the cover aside; this will be reinstalled later.



Figure 1-8 Removing the Top Cover

*(Continued)*



*(Continued)*

5. Grip the outer cover at the top and at the bottom rear hand-grip cutout and carefully pull it off.



Figure 1-9 Removing the Outer Cover

6. Lay the covers aside to be re-installed later.
7. Remove the two Phillips head screws and open the door carefully.

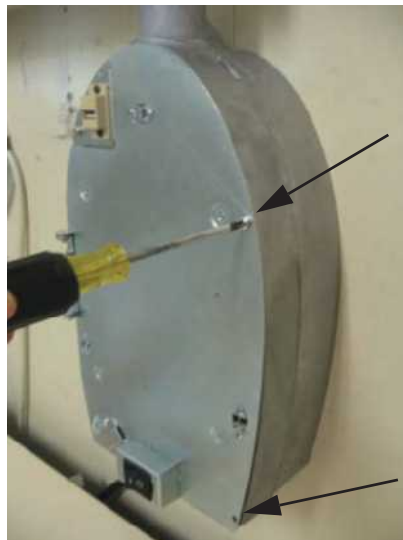


Figure 1-10 Opening the Door



## Closing the Master Control

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### Closing the Master Control

|                 |                            |
|-----------------|----------------------------|
| Tools Required: | No. 2 Phillips Screwdriver |
|-----------------|----------------------------|

1. Close the door and reinstall the two Phillips screws.
2. Reinstall the outer cover and the top cover.
3. For **Local configurations**, continue to step 4.

For **Remote configurations**, skip to step 5.

4. For the Master Control Touch Panel that is mounted directly to the Master Control:
  - a. Put the cables back in the Strain Relief.
  - b. Pull the control cable and the coil-cord back through the cutout for the cables when reinstalling the outer cover.
  - c. Connect the control cable and the exposure switch coil-cord to the Master Control Touch Panel before attaching the panel to the outer cover.
  - d. Skip to step 6.
5. Install the Blank Plate in the outer cover.
6. Make sure all parts and screws are back on.
7. Restore power to the equipment:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), plug in the line cord.
  - FOR A HARD-WIRED SYSTEM, reconnect the mains supply (external power source) and use a meter to verify the mains supply is connected properly.
8. Turn ON the power switch.

## Articulated Arm

### Opening an End of the Articulated Arm

1. Turn OFF the power switch.
2. Disconnect the external power source:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), unplug the line cord.
  - FOR A HARD-WIRED SYSTEM, disconnect the mains supply (external power source) and use a meter to verify the mains supply is disconnected.



#### **CAUTION**

There are three pins inserted into posts that hold the two sections of the Trim Cover together. Do not use excessive force when separating the two sections as the pins can be broken. If it is necessary to use a small screwdriver to separate the two sections, position the screwdriver at the location of the pins as shown in Figure 1-11.

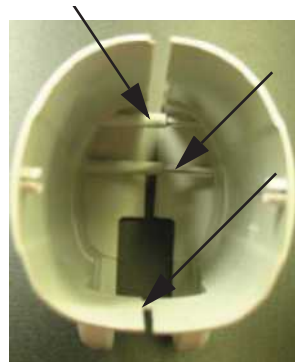


Figure 1-11 Locating the Three Pins Inside the Articulated Arm Trim Covers

*(Continued)*

## **Closing an End of the Articulated Arm**

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*(Continued)*

3. Separate and remove the plastic Trim Covers from the end of the section of the Articulated Arm. Set the Trim covers aside.

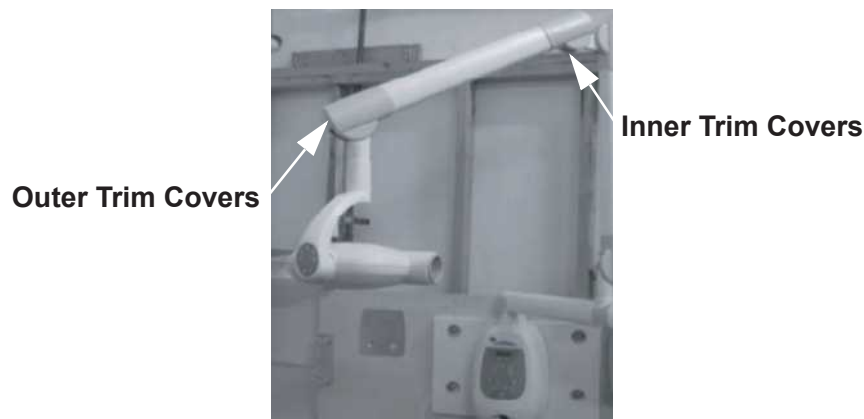


Figure 1-12 Articulated Arm Trim Covers

## **Closing an End of the Articulated Arm**

1. Place the two sections at the end of the Articulated Arm, one on each side. Press the two sections together ensuring that the pins of the one section are aligned correctly inside the posts of the other section.
2. Restore power to the equipment:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), plug in the line cord.
  - FOR A HARD-WIRED SYSTEM, reconnect the mains supply (external power source) and use a meter to verify the mains supply is connected properly.
3. Turn ON the power switch

## 2- Checks

To prevent unnecessary problems in the future, perform the following set of checks as part of the recommended maintenance as indicated in the User Manual.



### **WARNING**

**Failure to perform these checks may result in a system that fails to comply with U.S. Radiation Performance Standards 21 CFR Subchapter J.**



### **CAUTION**

**To avoid any potential hazard to operators or patients, any unusual operation, problems with mechanical functions, or presence of debris, should be reported to Gendex immediately.  
If problems persist, advise the owner NOT TO USE THE SYSTEM.**

## System Functions



### WARNING

Before starting any procedure, review the safety information provided in the Gendex expert<sup>®</sup> DC User Manual.

If problems are found, refer to the appropriate section in this Service Manual for:

- Adjustment procedures for the Horizontal Arm, Articulated Arm, and Tubehead (page 3-1)
- Maintenance procedure for the Articulated Arm (page 3-11)
- Troubleshooting information (page 5-1)
- Electrical block diagrams (page 5-20).

**IMPORTANT!** Contact GENDEX Technical Support if additional information is required.

- \_\_\_ 1. **Tubehead** - Check for oil leaks or other evidence that could indicate internal damage. Replace the Tubehead if necessary.
- \_\_\_ 2. **Tubehead Rotation** - Ensure that the Tubehead maintains its position around the horizontal axis while remaining easy to rotate and position. For horizontal dropping, refer to page 3-2 for the procedure.

Also check for unwanted pivoting of the Tubehead around the vertical axis. Problems with vertical pivot are typically caused when the Horizontal Arm is not properly leveled although the problem can simply be caused when the cabling inside the Tubehead Yoke is too tight.

- \_\_\_ 3. **Mounting** - Be sure that the wall support is adequate and that the system is properly mounted to the wall.
- \_\_\_ 4. **Power Switch** - Verify that the switch is working properly and that the Ready Indicator Lamp is illuminated when the power switch is in the ON position.

*(Continued)*

*(Continued)*

- \_\_\_\_\_ 5. **Master Controls** - With the power switch in the ON position, verify that a Time Selection value indicates on the Master Control Touch Panel display.

Also check the function of the selector switches for the Anatomical Time Selection, Imaging Type Selection and Patient Selection. Pressing the selection buttons should cause indicator lamps to indicate the selected item.

- \_\_\_\_\_ 6. **Quickset Tubehead Control** - Verify that the indicator lamps are consistent with the Master Control selections. Verify that the selector button works properly.
- \_\_\_\_\_ 7. **Push-button exposure switch** - Verify that the push-button switch in the face of the operator controls is functioning properly.
- \_\_\_\_\_ 8. **Coil-cord exposure switch** - If the coil-cord switch is used, inspect the switch housing and coiled cord for damage or wear. Replace if there is evidence of damage present.
- \_\_\_\_\_ 9. **Exposure Indicators** - Make several exposures and verify that the Radiation Indicator Lamp illuminates and the audible signal is heard.
- \_\_\_\_\_ 10. **Premature Termination** - Select an exposure of 2 seconds using the manual adjustment buttons. Initiate an exposure, but release the exposure switch after a brief period of time before the timer terminates the exposure. Verify that exposure terminates immediately upon release of the exposure switch.
- \_\_\_\_\_ 11. **X-ray Beam Size** - Position the cone of the Tubehead directly onto a panoramic film or several occlusal films taped together to form a large rectangle. Process the film and verify that the resulting image is containable in a 6 cm circle.
- \_\_\_\_\_ 12. Check that the arms are evenly balanced and that all movements are smooth and quiet. Verify that the Horizontal and Articulated Arms do not drift.

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## 3- Adjustments and Maintenance

Procedures include adjustments for the:

- Tubehead (page 3-2)
- Horizontal Arm (page 3-2)
- Articulated Arm (page 3-5)

Procedures include maintenance for the Articulated Arm (page 3-11).

### Preliminary Information

The balance of the Articulated Arm is initially set at the factory. Other friction and drift adjustments are set during the installation process.

Adjustments provided in this document are to accommodate customer preferences or changes in the leveling of the system due to age.

**Note!** The mechanical adjustments should not be used to compensate for a system that is not properly leveled on the wall.

Before making any adjustments, first verify that the unit is properly leveled on the wall; then make adjustments as necessary.



#### **WARNING**

**Before starting any procedure, review the safety information provided in the Gendex expert® DC User Manual.**

# Adjustments

## Tubehead - Horizontal Drifting

The Tubehead will drift from the correct horizontal position if the four hex locking nuts are not adjusted properly. This can happen when the supplied 8" (20 cm) cone is replaced with the longer, heavier 12" (30 cm) cone.

**Note!** The adjustment of the four hex locking nuts does not lock the Tubehead in place but provides proper friction to allow the Tubehead to be rotated and then to remain in the position to which it has been rotated.

|                 |  |
|-----------------|--|
| Tools Required: | 2.5 mm Allen Wrench<br>4.5 mm Hex Wrench |
|-----------------|--|

1. Turn OFF the power switch.
2. Disconnect the external power source:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), unplug the line cord.
  - FOR A HARD-WIRED SYSTEM, disconnect the mains supply (external power source) and use a meter to verify the mains supply is disconnected.
3. Unscrew the two screws on the Tubehead Yoke Cover Plate, using a 2.5 mm Allen wrench and remove the cover plate from the underside of the Tubehead yoke. (It may be necessary to position a thin screwdriver at the base and gently pry off the cover.)



Figure 3-1 Removing the Tubehead Yoke Cover Plate

*(Continued)*

(Continued)

4. Tighten the locking nuts:
  - a. Rotate the Tubehead to its maximum position (until it stops).
  - b. Locate the first hex locking nut, and tighten it with the 4.5 mm hex wrench.

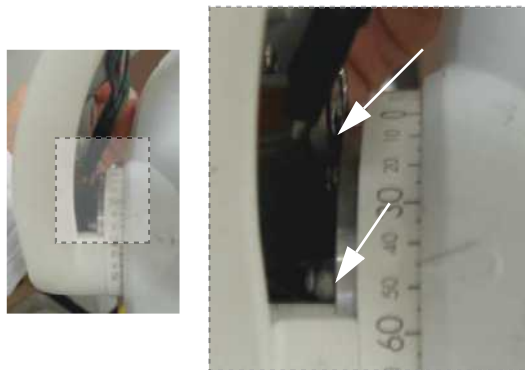


Figure 3-2 Two of the Four Hex Locking Nuts

- c. Rotate the Tubehead until you see the next hex locking nut. Tighten the nut.
  - d. Repeat step c. for the remaining two hex nuts.

**Note!** Tighten all four hex nuts equally, to apply adequate friction to prevent drifting.

5. Reposition the cover plate and snap it into place. Screw in the two screws that secure the cover plate.
6. Restore power to the equipment:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), plug in the line cord.
  - FOR A HARD-WIRED SYSTEM, reconnect the mains supply (external power source) and use a meter to verify the mains supply is connected properly.
7. Turn ON the power switch.

## Horizontal Arm - Horizontal Drifting

### Horizontal Arm - Horizontal Drifting

|                 |                   |
|-----------------|-------------------|
| Tools Required: | 4 mm Allen Wrench |
|-----------------|-------------------|



#### WARNING

Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.

1. Follow the steps outlined in *Opening the Master Control*, page 1-2 to page 1-7, to open the Master Control.
2. Locate the Horizontal Pivot Brake (the bar clamped around the Horizontal Arm pivot post). There are two screws on either side of the brake.
3. Using a 4 mm Allen wrench, tighten the two screws equally to apply adequate braking to the pivot post to prevent drifting.

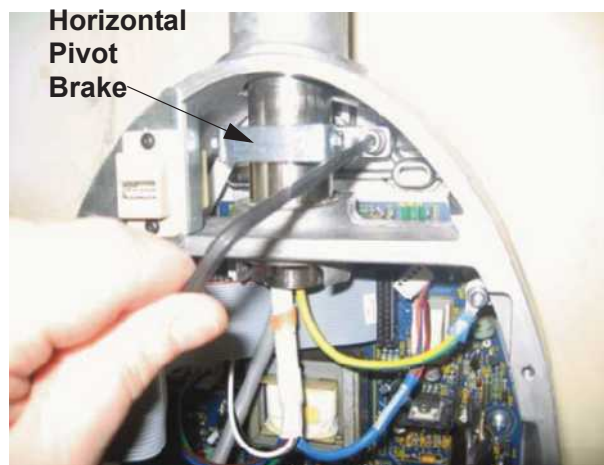


Figure 3-3 Tightening the Pivot Brake Screws

4. Follow the steps outlined in *Closing the Master Control* on page 1-8 to close the Master Control.

## Articulated Arm - Horizontal Drifting

|                 |                   |
|-----------------|-------------------|
| Tools Required: | 4 mm Allen Wrench |
|-----------------|-------------------|

1. Turn OFF the power switch.
2. Disconnect the external power source:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), unplug the line cord.
  - FOR A HARD-WIRED SYSTEM, disconnect the mains supply (external power source), and use a meter to verify the mains supply is disconnected.
3. Slide off the end cap cover from the end of the Horizontal Arm.



Figure 3-4 Removing the End Cap Cover

*(Continued)*

## Articulated Arm - Horizontal Drifting

*(Continued)*

4. Locate the Friction screw. Using a 4 mm Allen wrench, tighten or loosen as necessary to get the proper amount of friction or drag to prevent horizontal drifting.

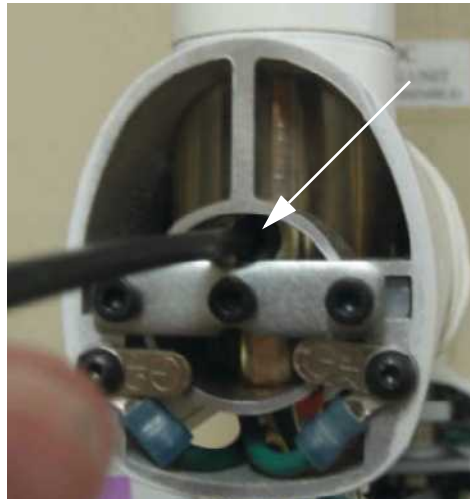


Figure 3-5 Adjusting the Friction Screw

5. Install the end cap cover.
6. Restore power to the equipment:
  - FOR A SYSTEM WITH A LINE CORD (120 V ac only), plug in the line cord.
  - FOR A HARD-WIRED SYSTEM, reconnect the mains supply (external power source), and use a meter to verify the mains supply is connected properly.
7. Turn ON the power switch.

## Articulated Arm - Vertical Drifting

### Outer Section

Figure 3-6 shows the location referred to as the outer section of the Articulated Arm (the section nearest the Tubehead).



Figure 3-6 Locating the Outer Section of the Articulated Arm

|                 |  |
|-----------------|--|
| Tools Required: | 7 1/2" (190 mm) long 5/16" (8 mm) Allen Wrench<br>- or -<br>8" (203 mm) long 8 mm T-handle Allen Wrench<br>Small Flat Head Screwdriver |
|-----------------|--|



#### WARNING

Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.

*(Continued)*

(Continued)

1. Follow the steps outlined in *Opening an End of the Articulated Arm* on page 1-9 to remove the trim cover from the end of the outer section of the Articulated arm.
2. Drop the outside section of the arm to a position to easily access the adjustment nut (approximately 30° off of horizontal).

**Note!** For the following step, a minimum 7 ½" (190 mm) long Allen wrench is required. A T-handled Allen wrench is recommended. If a standard Allen wrench is used, additional leverage may be needed to turn the nut.

3. Insert an 8 mm Allen wrench about 8 inches long through the hole at the end of the arm and into the adjustment nut.



Figure 3-7 Adjusting the Vertical Drifting

4. If the arm section is drifting either up or down, rotate the adjustment nut in the needed direction until the drifting stops:
  - Rotate clockwise to increase the upward force on the arm.
  - Rotate counterclockwise to decrease the upward force on the arm.

**Note!** If you need to turn the screw more than three times, contact Gendex Technical Support.

**Note!** You can not unscrew the adjustment nut completely.

5. Continue turning the nut in the same direction counting the turns until the arm starts to move in the opposite direction. Then turn the adjustment nut the opposite direction ½ the number of turns counted.
6. Follow the steps outlined in *Closing an End of the Articulated Arm* on page 1-10 to install the trim cover and restore power.



### Inner Section

The inner section of the Articular Arm is the section nearest the fork of the Tubehead.



Figure 3-8 Locating the Inner Section of the Articulated Arm

|                |  |
|----------------|--|
| Tools Required | 7 1/2" (190 mm) long 5/16" (8 mm) Allen Wrench<br>- or -<br>8" (203 mm) long 8 mm T-handle Allen Wrench<br>Small Flat Head Screwdriver |
|----------------|--|



#### WARNING

**Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.**

1. Follow the steps outlined in *Opening an End of the Articulated Arm* on page 1-9 to remove the trim cover from the end of the inner section of the Articulated arm.
2. Position the inside section of the Articulated Arm at approximately a 45° angle to the Horizontal Arm.  
The angle of the arm allows access to the adjusting nut (see Figure 3-9).

*(Continued)*

## Articulated Arm - Vertical Drifting

(Continued)

**Note!** For the following step, a minimum 7 ½" (190 mm) long wrench is required. A T-handled wrench is recommended. If a standard Allen wrench is used, additional leverage may be needed to turn the nut.

3. Insert an 5/16" (8 mm) Allen wrench through the hole at the end of the arm and insert into the adjustment nut.

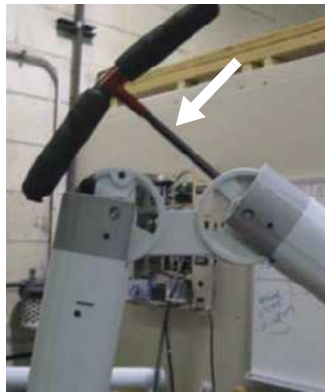


Figure 3-9 Inserting the Wrench

4. If the arm section is drifting either up or down, rotate the adjustment nut in the needed direction until the drifting stops:
  - Rotate clockwise to increase the upward force on the arm.
  - Rotate counterclockwise to decrease the upward force on the arm.
5. Continue turning the nut in the same direction, counting the turns, until the arm starts to move in the opposite direction. Then turn the adjustment nut the opposite direction ½ the number of turns counted.
6. Follow the steps outlined in *Closing an End of the Articulated Arm* on page 1-10 to install the trim cover and restore power.

# Maintenance

## Articulated Arm - Inspection

To ensure smooth functioning of the Gendex expert® DC Articulated Arm, the following procedure must be performed periodically.

|                   |  |
|-------------------|--|
| Tools Required    | Small flat-head screwdriver                        |
| Supplies Required | "Tri-Gel" lubricant (Gendex part number 1603-0001) |

**Note!** To avoid any potential hazard to operators or patients, any unusual operation, problems with mechanical functions, or presence of debris should be reported to Gendex immediately.



### WARNING

**Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.**

1. Follow the steps outlined in *Opening an End of the Articulated Arm* on page 1-9 to remove all four trim covers from the ends of the Articulated Arm.
2. Inspect the insides of each cover for debris. Remove and clean as necessary.
3. At each pantograph link (all four), inspect the pins retaining the pantograph link as indicated in Figure 3-10.



**(The illustration does not show the matching pin on the opposite side of the**

Figure 3-10 Locating the Pins for Inspection

*(Continued)*

## Articulated Arm - Inspection

---

(Continued)



### CAUTION

The pins referred to in the following step should never be adjusted in the field. This information is given to determine if you need to contact Gendex Technical Support.

4. Ensure that the pins are fully inserted into the casting, and the pantograph links are seated on the shoulder of the pin. If the pins have moved outward more than 0.015" (0.38 mm or the thickness of a business card), contact Gendex Technical Support.

**Note!** The pins are held in with sealed set screws-NEVER REMOVE THE SEALANT-this may void the warranty.

5. If the arm is squeaking, lubricate the shoulder of the pins where they meet the pantograph link with "Tri-Gel" lubricant (Gendex part number 1603-0001).
6. Exercise the arm for several cycles.
7. Check the arm for balance and smooth operation. If drifting is observed, follow the adjustment procedure that corresponds to the type of drifting.
8. Follow the steps outlined in *Closing an End of the Articulated Arm* on page 1-10 to install the trim covers and then restore power.

## 4- Configuration Settings

This chapter describes the procedures to properly set the SW2 switch and the AC Input Select Jumper.



### **WARNING**

**Before starting any procedure, review the safety information provided in the Gendex expert<sup>®</sup> DC User Manual.**

## SW2 - Setting for X-Ray Output

# Switch Settings

## SW2 - Setting for X-Ray Output

Normally the dip switch setting for x-ray output, SW2 position 4, should not be changed. If for some reason the setting has been changed, the x-ray output will be disabled. All other functions will appear normal.

**Note!** It is recommended that this procedure be performed only by a qualified Gendex service agent.



### WARNING

**Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.**

1. Follow the steps outlined in *Opening the Master Control*, beginning on page 1-2, to open the Master Control.
2. Locate the series of dip switches labeled SW2 located at the bottom left of the Logic Board.
3. Set the position 4 switch to the OFF position. All other switches should remain in the OFF position.

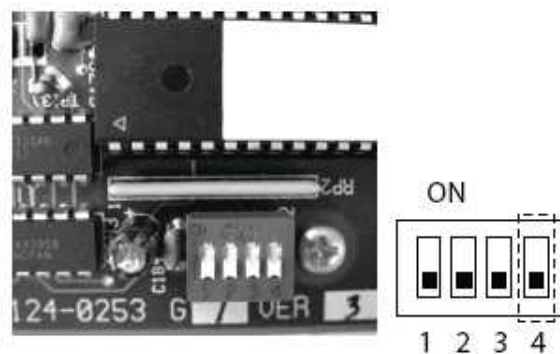


Figure 4-1 Setting the SW2 Dip Switch

4. Follow the steps outlined in *Closing the Master Control* on page 1-8 to close the Master Control.

### SW2 - Setting for Optional 12" (30 cm) Cone

The default settings for anatomical exposure times are set at the factory for an 8" (20 cm) focal length cone. The 12" (30 cm) cone is recommended when using the paralleling film positioning technique. Using the longer cone requires the use of longer exposure times. These exposure times can be programmed into the system by changing the setting on Switch SW2.

**Note!** It is recommended that this procedure be performed only by a qualified Gendex service agent.

1. Turn the system on and note the initial displayed exposure time.



#### WARNING

**Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.**

2. Follow the steps outlined in *Opening the Master Control*, starting on page 1-2, to open the Master Control.
3. Locate the series of dip switches labeled SW2 located at the bottom left of the Logic Board.
4. Set the position 3 switch to ON position.

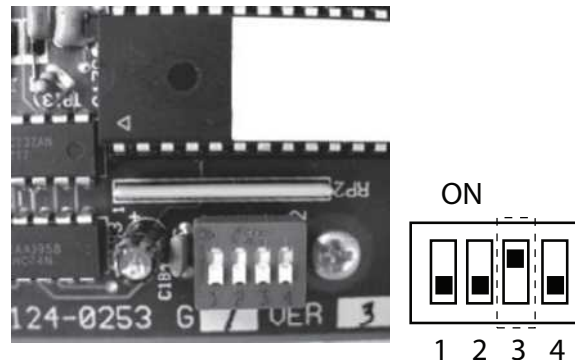


Figure 4-2 Setting the SW2 with Optional Cone Dip Switch

5. Follow the steps outlined in *Closing the Master Control* on page 1-8 to close the Master Control.
6. The initially displayed exposure time should now be two times the time displayed in step 1.

# Jumper Settings

## JP1 - Setting for 120 V ac

**Note!** The unit is shipped with the jumper configured for 220 V ac. Systems using 120 V ac with the line cord option requires moving the “AC Input Select” jumper from the 220 V setting to the 120 V setting, and cutting the JP1 jumper to enable the neutral line fuse.



### WARNING

**Ensure that you follow the procedure referenced in the following step. This equipment must always be electrically disconnected from the mains electrical supply (external power source) before beginning any procedure.**

1. Follow the steps outlined in *Opening the Master Control*, starting on page 1-2 to open the Master Control.
2. Locate the AC Input Select jumper.
3. Unplug the jumper from the 230 V ac and plug it into the 120 V ac setting

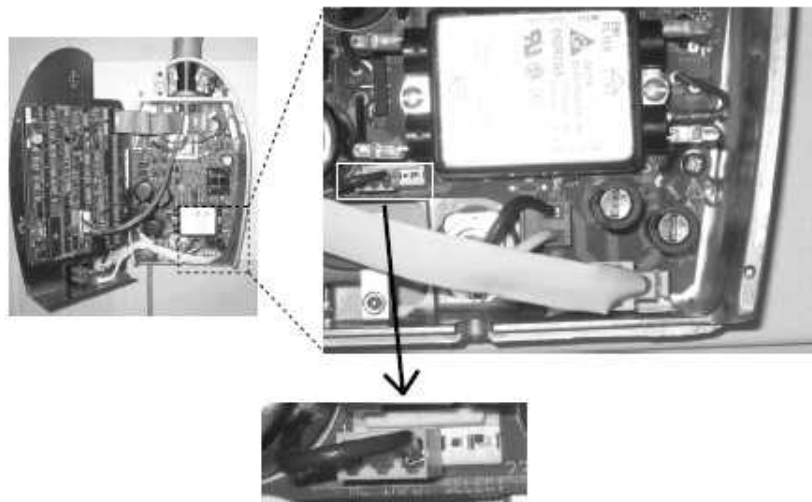


Figure 4-3 Locating the AC Input Select Jumper

(Continued)



(Continued)

4. To enable the neutral line fuse, cut jumper JP1 on the Converter Board (124-0292G1), as shown in Figure 4-4.
5. Follow the steps outlined in *Closing the Master Control* on page 1-8 to close the Master Control

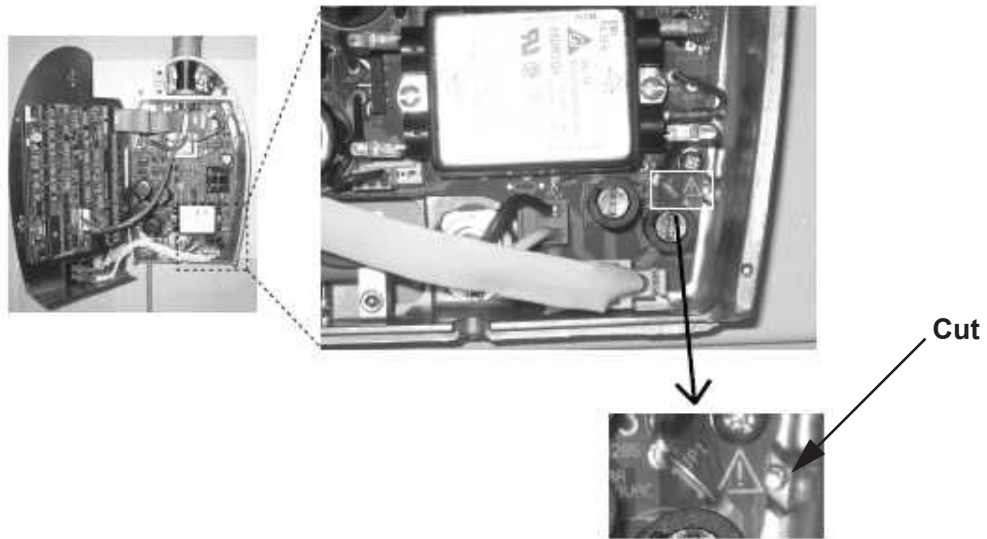


Figure 4-4 Cutting Jumper JP1



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## 5- Problem Resolution



### WARNING

Before starting any procedure, review the safety information provided in the Gendex expert® DC User Manual.

Follow these steps before contacting Gendex for additional support.

1. Verify all electrical connections, including the plug connections between the Articulated Arm and the Horizontal Arm, are good.

**Note!** Poor connections can occur when dressing the cables up into the Horizontal Arm.

2. Verify the assembly of the equipment is correct.
3. Review the information in this chapter:
  - Common symptoms and possible remedies. See page 5-1.
  - For the Converter Board:
    - Location and description for LEDs. See page 5-8.
    - Location and description for test points. See page 5-10.
    - Descriptions of connectors and jumpers. See page 5-12.
  - For the Logic Board:
    - Location and description for LEDs. See page 5-14.
    - Location and description for test points. See page 5-16.
    - Descriptions of connectors and jumpers. See page 5-18.
  - Electrical block diagram. See page 5-20.

*(Continued)*

(Continued)

Table 5-1 Common Symptoms and Possible Remedies

| Symptom   | Additional Symptoms   | Possible Cause  | Remedy  |
|---|---|---|---|
| No x-ray output                                   | All other functions appear normal.  | SW2 -4 set incorrectly  | Set SW2-4 from the ON position to the OFF position  |
| No time display                                   |   | Mains voltage missing; power switch OFF or pluggable terminal strip not connected | If wiring difficulty is not easily discerned, have a qualified electrician check the power line   |
|   |   | F5-F6 fuse blown  | Contact GENDEX Technical Support for further assistance   |
|   |   | F1 fuse blown   | Contact GENDEX Technical Support for further assistance   |
| Display flashes "Err0" and the Ready light is OFF |   | Premature release of the exposure switch  | Pressing any key but the exposure switch on the Master Control Touch Panel will clear the display. Be sure to press and hold the exposure button until the exposure is finished |
|   | Operation may be normal most of the time, with fault appearing intermittently | Faulty exposure switch or wiring  | Verify and correct wiring as necessary, or replace the exposure switch  |

(Table continued on the next page)

Table 5-1 Common Symptoms and Possible Remedies (Continued)

| Symptom   | Additional Symptoms  | Possible Cause   | Remedy   |
|---|--|--|--|
| Display flashes "Err1" and the Ready light is OFF | Ready light is OFF, other display functions appear normal  | Mains voltage configuration jumper improperly positioned   | Re-configure the jumper per the instructions on page 4-5   |
|   |  | Mains voltage out of range 108 V - 132 V or 198 V - 253 V  | Wait until the line voltage returns to normal (indicated by the lamp being steady) or have a qualified electrician check the power line  |
| Display flashes "Err2" and the Ready light is OFF | Ready light is OFF; exposure terminates normally, but the output may be below normal   | Mains voltage drops below minimum required during exposure, or source resistance may be too high | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the display. If the problem persists, have a qualified electrician check the power line |
| No exposure with the remote exposure switch       |  | Wrong remote cable selected from the D800 HK kit   | Verify and correct the wiring as necessary.  |
|   |  | Faulty handswitch or wiring  |  |
|   |  | Mis-wired 110-0160G1 remote cable adapter kit --customer-supplied wiring problems                |  |
| Cooling light is ON                               | Normal operation by design -- protects and extends the life of the tubehead if too many exposures are made in too short a period of time | X-ray unit is in the cooling mode  | Wait until the lamp goes out, indicating that the tube has properly cooled down.   |

(Table continued on the next page)

Table 5-1 Common Symptoms and Possible Remedies (Continued)

| Symptom   | Additional Symptoms  | Possible Cause                             | Remedy  |
|---|--|--|---|
| Display flashes "Err3" and the Ready light is OFF | Operation may appear normal for several minutes, or until an exposure is attempted | P6 feedback plug open circuit              | Verify and correct the wire termination to the plug as necessary.   |
|   |  | Horizontal Arm J20 misconnected            | Ensure that the arm connections are securely made, and that the connectors are neatly dressed into the Horizontal Arm, with no undue stress being exerted on the wiring.  |
| Display flashes "Err4" and the Ready light is OFF |  | P5 filament drive plug offset by 1 pin     | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. Verify and correct plug connections as necessary.  |
|   |  | P6 filament feedback plug offset by 1 pin. |   |
|   |  | Horizontal Arm J16 misconnected            | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. Ensure that the arm connections are securely made, and that connectors are neatly dressed into the Horizontal Arm, with no undue stress being exerted on the wiring. |

*(Table continued on the next page)*

Table 5-1 Common Symptoms and Possible Remedies (Continued)

| Symptom   | Additional Symptoms         | Possible Cause                               | Remedy  |
|---|-----------------------------|--|---|
| Display flashes "Err4" and the Ready light is OFF (Continued) |                             | Floating main earth ground                   | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. If the wiring difficulty is not easily discerned, have a qualified electrician check the power line.                                     |
|   | Intermittent operation      | Intermittent interconnecting wire in the arm | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. Bad connector terminal crimp, loose connector terminal, or a broken cable wire; contact GENDEX Technical Support for further assistance. |
|   | Symptom may be intermittent | Preheat pot misadjusted                      | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. Follow the filament preheat reset procedure provided with the replacement tubhead.   |

*(Table continued on the next page)*

Table 5-1 Common Symptoms and Possible Remedies (Continued)

| Symptom   | Additional Symptoms   | Possible Cause  | Remedy  |
|---|---|---|---|
| Display flashes "Err4" and the Ready light is OFF (Continued) | Symptom may appear only on the first few exposures of the day | The Tubehead is arcing internally                           | Pressing any key except the exposure switch on the Master Control Touch Panel will clear the flashing. Contact GENDEX Technical Support for further assistance. |
| Display on the Quickset Tubehead Control is not lit           |   | Time selected does not conform to a default patient setting | Normal operation -- display will come back on when the time up or down arrows are pushed to select a time that corresponds to a default patient setting.        |
|   |   | P9 Quickset Tubehead Control plug is offset                 | Verify and correct the plug connections as necessary.   |
| Display on the Quickset Tubehead Control is not correct       | Time display reads "0001" -- no decimal point                 | P9 Quickset Tubehead Control plug is reversed               | Verify and correct the plug connections as necessary.   |

*(Table continued on the next page)*



Table 5-1 Common Symptoms and Possible Remedies (Continued)

| Symptom   | Additional Symptoms                                  | Possible Cause                     | Remedy   |
|---|--|------------------------------------|--|
| Display on the Quickset Tubehead Control is not lit correctly | Individual lights may or may not be working properly | Horizontal Arm J17 is misconnected | Ensure that the arm connections are securely made, and that the connectors are neatly dressed into the Horizontal Arm, with no undue stress being exerted on the wiring. |
|   |  | Horizontal Arm J21 is misconnected | Ensure that the arm connections are securely made, and that the connectors are neatly dressed into the Horizontal Arm, with no undue stress being exerted on the wiring. |

# Converter Board (part no. 124-0292)

## Converter Board - LEDs

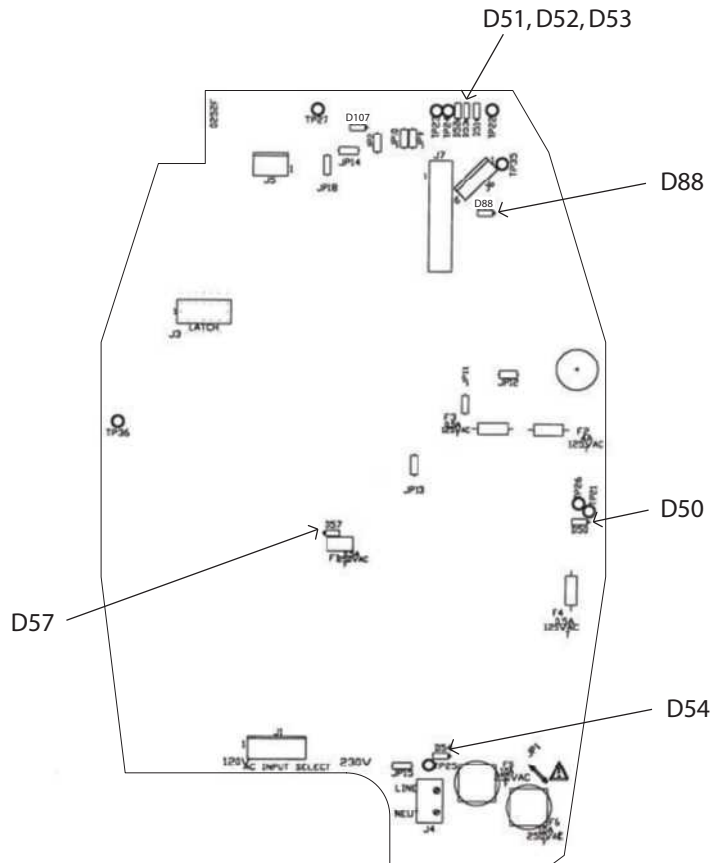


Figure 5-1 Location of the Converter Board LEDs

(Continued)

(Continued)

Table 5-2 Converter Board LEDs Description

| LED Number | Color | Normal State | Explanation  |
|------------|-------|--------------|--|
| D50        | Green | On           | P15 V isolated Output voltage is present   |
| D51        | Green | On           | -15 V output voltage is present  |
| D52        | Green | On           | 15 V output voltage is present   |
| D53        | Green | On           | 5 V output voltage is present  |
| D54        | Green | On           | P15 output voltage is present  |
| D57        | Green | On           | 325 V dc bus voltage is present  |
| D88        | Green | On           | Filament output voltage is present<br><br><b>Note!:</b> This LED is only fully illuminated during exposure |

# Converter Board - Test Points

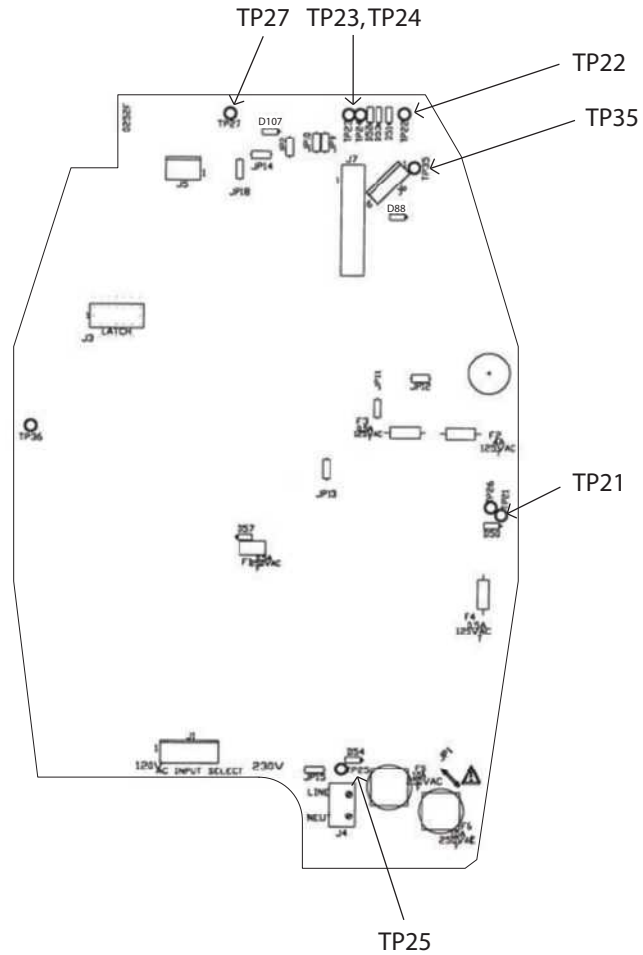


Figure 5-2 Location of Converter Board Test Points  
(Continued)

*(Continued)*

Table 5-3 Convert Board Test Points Description

| Test Point | Return | Description     | Type   | Nom. Value     | Notes          |
|------------|--------|-----------------|--------|----------------|----------------|
| TP21       | TP26   | P15VISO Output  | Analog | 14 to 16 V     |                |
| TP22       | TP35   | -15 V Output    | Analog | -14 to -16 V   |                |
| TP23       | TP35   | 15 V Output     | Analog | 14.5 to 15.5 V |                |
| TP24       | TP35   | 5 V Output      | Analog | 4.75 to 5.25 V |                |
| TP25       | TP36   | P15 V Output    | Analog | 14 to 16 V     |                |
| TP26       | N/A    | P0VISO Return   | Analog |                |                |
| TP27       | TP35   | Filament Output | Analog | 0.75 to 1.25 V | During standby |
| TP35       | N/A    | Analog Ground   | Analog |                |                |
| TP36       | N/A    | P0V Return      | Analog |                |                |

# Converter Board - Connectors and Jumpers

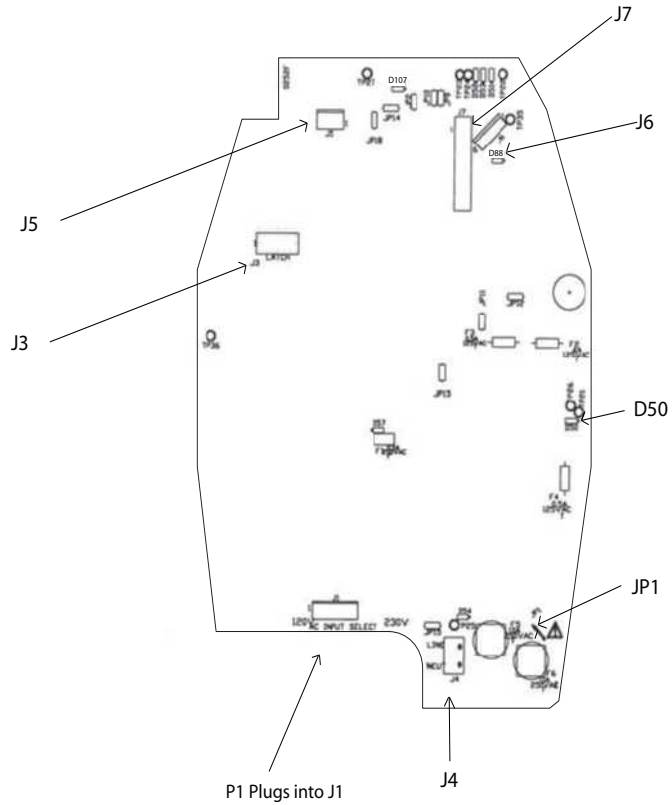


Figure 5-3 Location of Converter Board Connectors and Jumpers

(Continued)



## Converter Board - Connectors and Jumpers

(Continued)

Table 5-4 Converter Board (part no. 124-0292) Connectors

| Connector | Description   |
|-----------|---|
| J1        | Line Voltage Configuration (P1 plugs into J1 for 120 or 230 V ac) |
| J3        | HVDC Transformer Drive Output                                     |
| J4        | AC Input 120/230 V ac   |
| J5        | Filament Drive Output   |
| J6        | HV Feedback Input   |
| J7        | Control Board Interconnect  |
| J8        | Power Switch (not shown on page 5-12)                             |

Table 5-5 Converter Board (part no. 124-0292) Jumpers

| Jumper | Description   |
|--------|---|
| JP1    | Neutral Fuse Jumper (must be present for hard-wired installations of 220 V) |
| P1     | Line Voltage Configuration Jumper (Plugs into J1 for 120 or 230 V ac)       |

## Logic Board - LEDs

# Logic Board (part no. 124-0293)

## Logic Board - LEDs

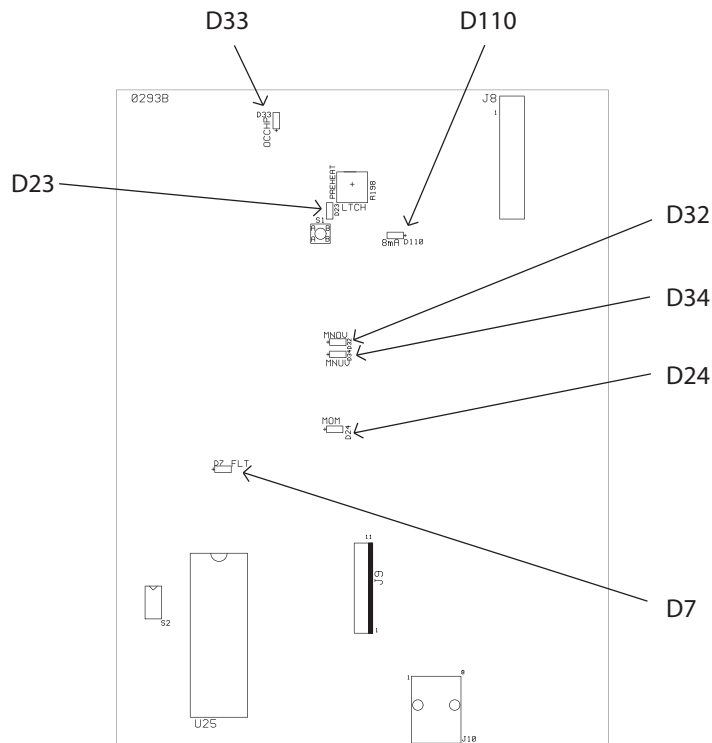


Figure 5-4 Location of Logic Board LEDs

*(Continued)*



(Continued)

Table 5-6 Logic Board LEDs Description

| Lamp Number | Color | Normal State | Error State | Explanation  |
|-------------|-------|--------------|-------------|--|
| D7          | Red   | Off          | On          | A fault has occurred   |
| D23         | Red   | Off          | On          | A latched fault has occurred   |
| D24         | Red   | Off          | On          | A momentary fault exists   |
| D32         | Red   | Off          | On          | Mains overvoltage fault  |
| D33         | Red   | Off          | On          | Overcurrent fault  |
| D34         | Red   | Off          | On          | Mains undervoltage fault   |
| D110        | Green | Off          | On          | On mA feedback is over 8V<br><br><b>Note:</b> This is for factory use only |

## Logic Board - Test Points

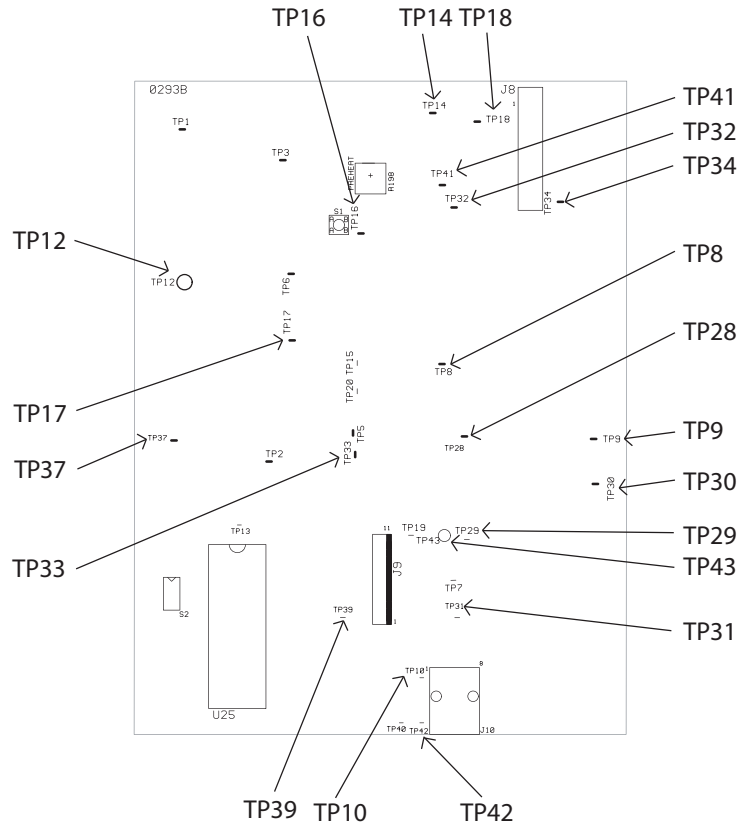


Figure 5-5 Location of Logic Board Test Points

*(Continued)*

(Continued)

Table 5-7 Logic Board Test Points Description

| Test Point | Return         | Description       | Type    | Nom. Range Values | Notes   |
|------------|----------------|-------------------|---------|-------------------|---|
| TP8        | TP37, 41 or 42 | 5V Reference      | Analog  | 4.75 to 5.25 V    |   |
| TP9        | TP37, 41 or 42 | 2.5V Reference    | Analog  | 2.4 to 2.6 V      |   |
| TP10       | TP37, 41 or 42 | Exposure Switch   | Digital | 0 or 5 V          | 0 V during exposure switch closure  |
| TP12       | TP37, 41 or 42 | X-ray On          | Digital | 0 or 5 V          | 5 V during exposure   |
| TP14       | TP37, 41 or 42 | 10V Reference     | Analog  | 9.5 to 10.5 V     |   |
| TP16       | TP37, 41 or 42 | 15V Output        | Analog  | 14.5 to 15.5 V    | Power supply  |
| TP17       | TP37, 41 or 42 | 5V Output         | Analog  | 4.75 to 5.25 V    | Power supply  |
| TP18       | TP37, 41 or 42 | -15V Output       | Analog  | -14 to -16 V      |   |
| TP28       | TP37, 41 or 42 | Filament I sense  | Analog  | 1.9 to 2.3 V      | During standby;<br>2 V/ 1A  |
| TP29       | TP37, 41 or 42 | Preheat I Command | Analog  | -1.9 to -2.3 V    | During standby  |
| TP30       | TP37, 41 or 42 | mA Setpoint       | Analog  | 6.7 to 7.3 V      |   |
| TP31       | TP37, 41 or 42 | mA Feedback       | Analog  | 0 V               | During exposure;<br>1 V/1 mA<br><b>Note:</b> There is no voltage at this test point unless an exposure is being made  |
| TP32       | TP37, 41 or 42 | HV I Sense        | Analog  | 0V                | During standby;<br>1 V/2 A  |
| TP33       | TP37, 41 or 42 | kV Feedback       | Analog  | 0V                | During exposure;<br>1 V/20 kV<br><b>Note:</b> There is no voltage at this test point unless an exposure is being made |
| TP34       | TP37, 41 or 42 | kV Setpoint       | Analog  | 3.1 to 3.4 V      |   |
| TP37       | NA             | Analog Ground     | Analog  | NA                |   |
| TP39       | TP40           | 5V Digital        | Analog  | 4.75 to 5.25 V    | Power Supply  |
| TP41       | NA             | Analog Ground     | Analog  | NA                |   |
| TP42       | NA             | Analog Ground     | Analog  | NA                |   |
| TP43       | TP37, 41 or 42 | X-ray Indicate    | Digital | 0 or 5 V          | 5 V during exposure   |

# Logic Board - Connectors and Jumpers

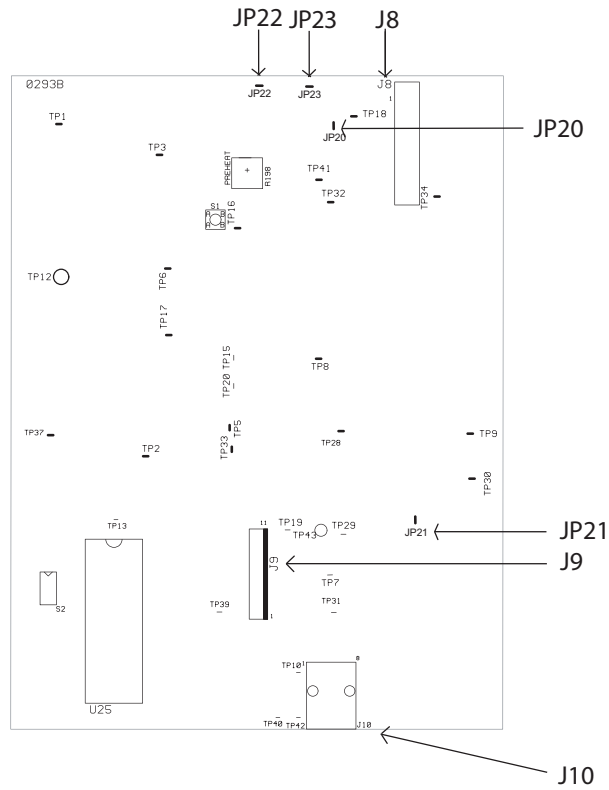


Figure 5-6 Location of Logic Board Connectors and Jumpers

(Continued)

*(Continued)*

Table 5-8 Logic Board (part no. 124-0293) Connectors

| <b>Designator</b> | <b>Description</b>   |
|-------------------|--|
| J8                | Converter Board Interconnect                               |
| J9                | Tubehead Interface PCB                                     |
| J10               | Interface Assembly (Master Control Touch Panel serial bus) |

Table 5-9 Logic Board (part no. 124-0293) Jumpers

| <b>Designator</b> | <b>Description</b>  |
|-------------------|---|
| JP20              | Negative Preheat Offset (must be open for normal operation) |
| JP21              | mA Feedback Loop (must be present for normal operation)     |
| JP22              | Positive Preheat Offset (must be open for normal operation) |
| JP23              | Jumper Holder   |

# Electrical Block Diagram

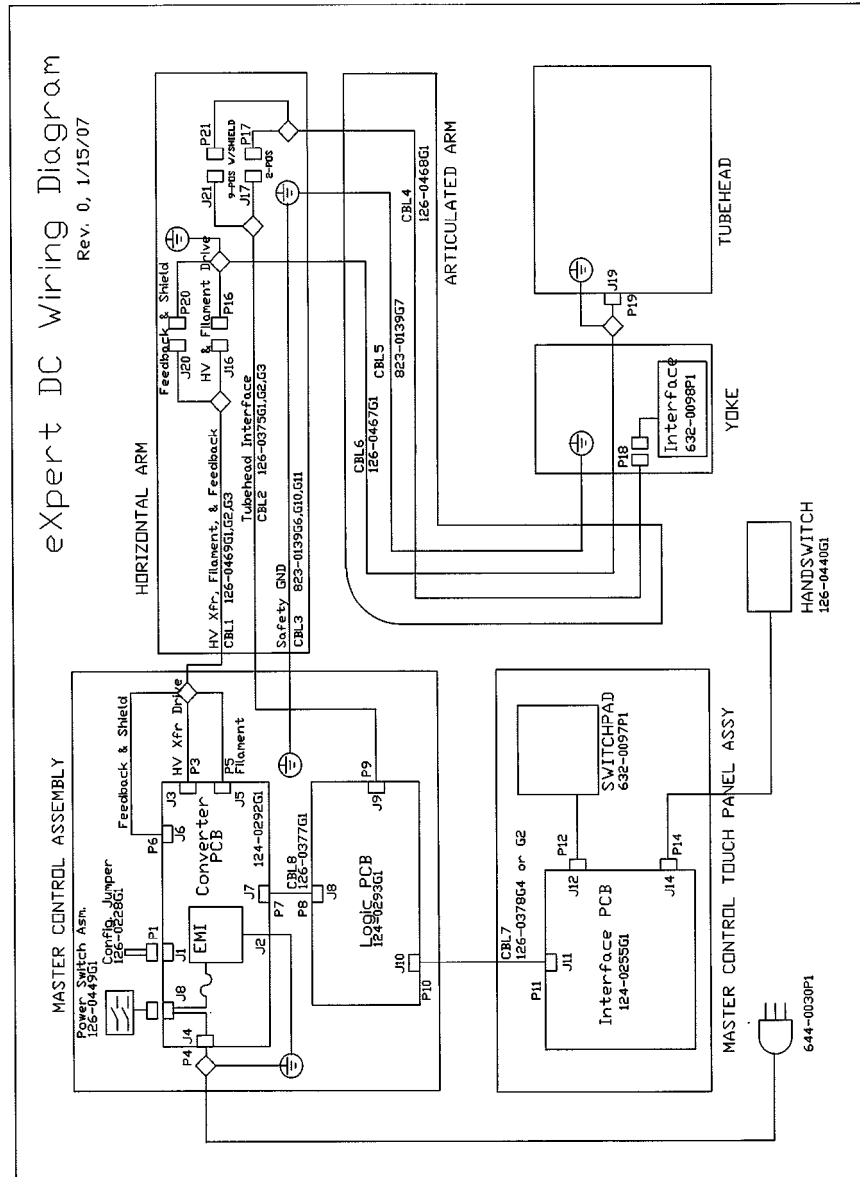


Figure 5-7 Electrical Block Diagram

## 6- Replacement Parts



### WARNING

Before starting any procedure, review the safety information provided in the Gendex expert® DC User Manual.



Figure 6-1 Gendex expert® DC Assemblies

# Articulated Arm and Tubehead

## Assemblies

### Articulated Arm and Tubehead

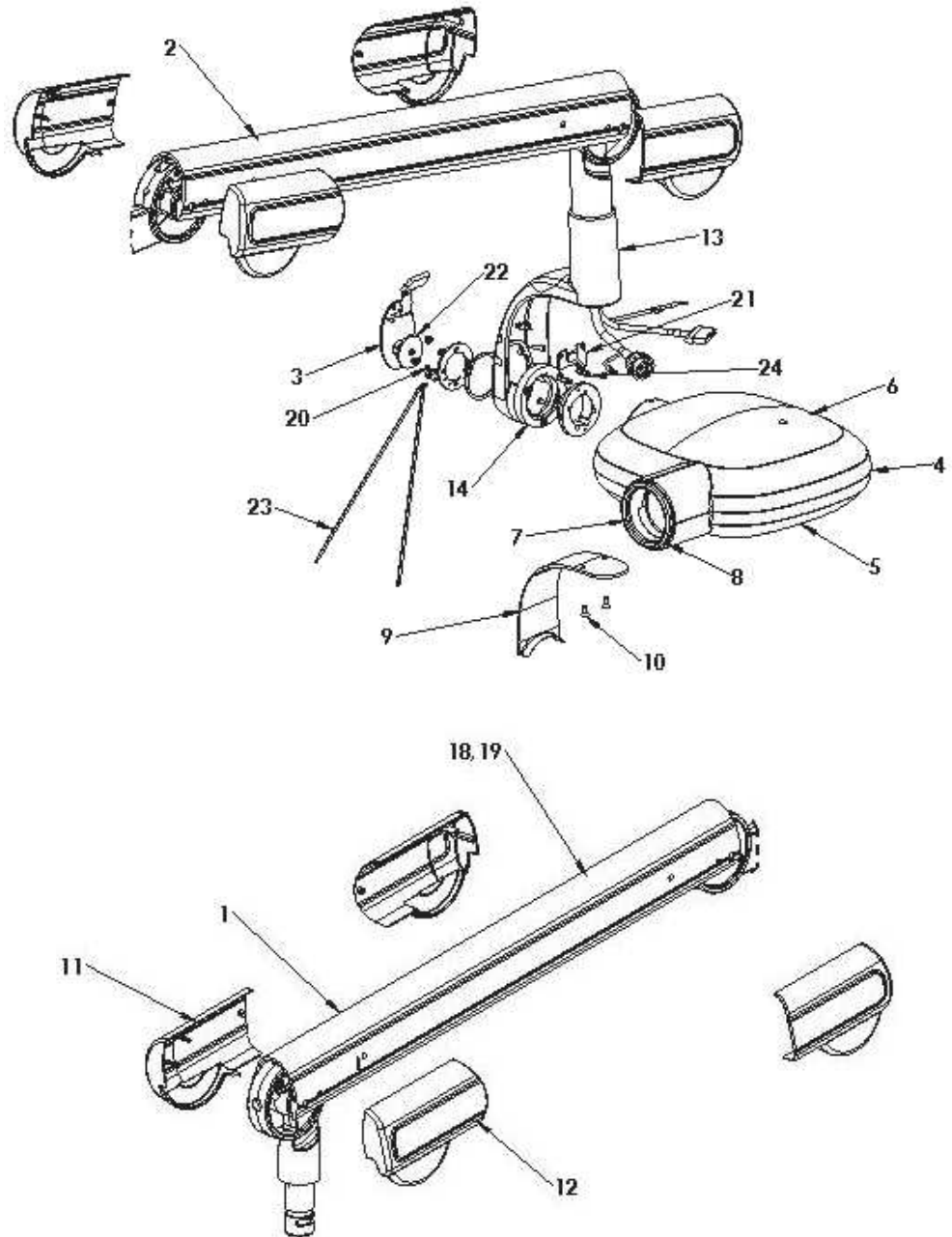


Figure 6-2 Articulated Arm and Tubehead Diagram





## Articulated Arm and Tubehead

Table 6-1 Articulated Arm and Tubehead Part Description

| Item           | Part No.        | Description  |
|----------------|-----------------|--|
| 1              | 112-1194G1      | Assy, Articulated Arm Converter Side                           |
| 2              | 112-1197G1      | Assy, Articulated Arm, Tube Side                               |
| 3              | 112-1198G1      | Assy, Keypad Yoke, Expert                                      |
| 4              | 110-0209G1      | Assy, Tube Head, Final, Expert (includes top and bottom cover) |
| 5              | 303-0135P1      | Cover, Tube Head, Bottom, Expert                               |
| 6              | 303-0134P1      | Cover, Tube Head, Top, Expert                                  |
| 7              | D720C           | Cone Assy, 8" (20 cm) Focal Length                             |
| 8              | 404-0006P11     | Cone O-Ring  |
| 9              | 300-0030P4      | Cover, Yoke, Silk Screened                                     |
| 10             | 05-00-040010-01 | Screw, M4x.7x10 mmLG.  |
| 11             | 303-0127P1      | Cap, End, Arm, Male x 4  |
| 12             | 303-0128P1      | Cap, End, Arm, Female x 4                                      |
| 13             | 112-0941G1      | Yoke Assy  |
| 14             | 241-0025P1      | Plate, Yoke  |
| NS             | D730C           | Cone Assy, 12" (30 cm) Focal Length                            |
| NS             | D720RC          | Rectangular Cone, 8" (20 cm) Focal Length                      |
| NS             | D730RC          | Rectangular Cone, 12" (30 cm) Focal Length                     |
| 18             | 110-0204G1      | Assy, Scissors Arm and Tubehead                                |
| 19             | 112-1194G1      | Assy, Scissors Arm without Tubehead                            |
| 20             | 203-0393        | Bracket, lower   |
| 21             | 210-0321        | Bracket, upper   |
| 22             | 214-0160        | Friction plate   |
| 23             | 46208758P9      | Cable ties   |
| 24             | 642-0152        | Nut, Yoke Keyboard Base  |
| NS = Not Shown |                 |  |

## Horizontal Arm

### Horizontal Arm

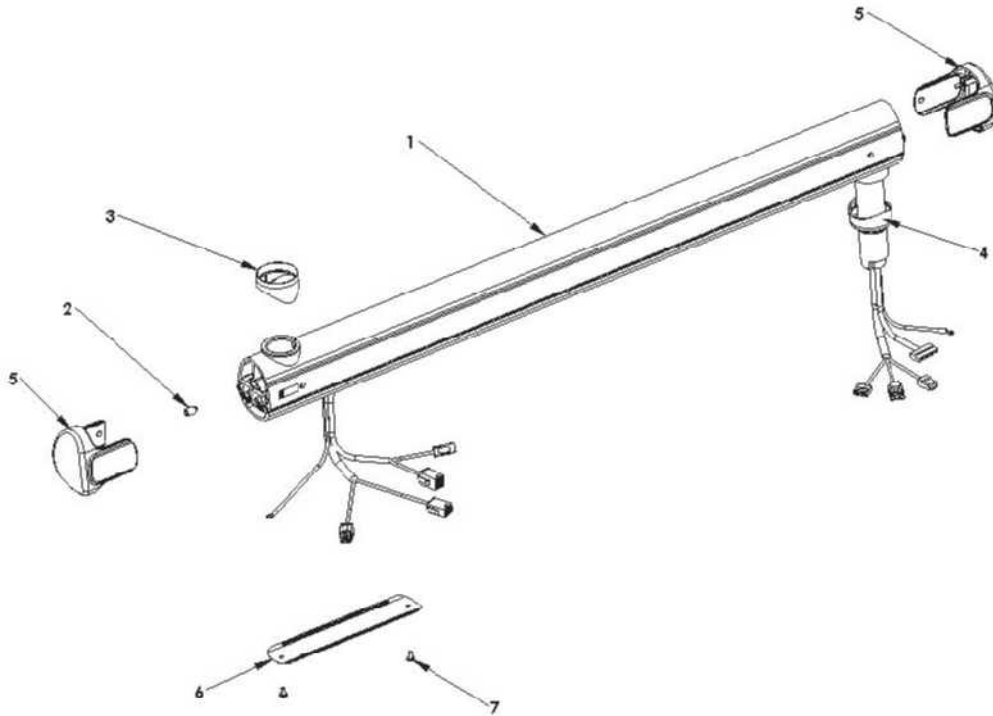


Figure 6-3 Horizontal Arm Diagram

Table 6-2 Horizontal Arm Description

| Item | Part No.        | Description                                     |
|------|-----------------|---|
| 1    | 112-1193G1      | Assy, Horizontal Arm, Expert, 75" (191cm) reach |
|      | 112-1193G2      | Assy, Horizontal Arm, Expert, 65" (165cm) reach |
|      | 112-1193G3      | Assy, Horizontal Arm, Expert, 55" (140cm) reach |
| 2    | 09-06-080012-05 | Nylon Tipped Set Screw                          |
| 3    | 303-0125P1      | Joint Arm Cover, Articulated Arm Side           |
| 4    | 303-0124P1      | Joint Arm Cover, Converter Side                 |
| 5    | 303-0126P1      | Cap, End, Horizontal Arm                        |
| 6    | 303-0106P2      | Cover Wire Access                               |
| 7    | 08-10-040008-01 | Screw, M4 x 8, PPHDMS                           |

Master Control

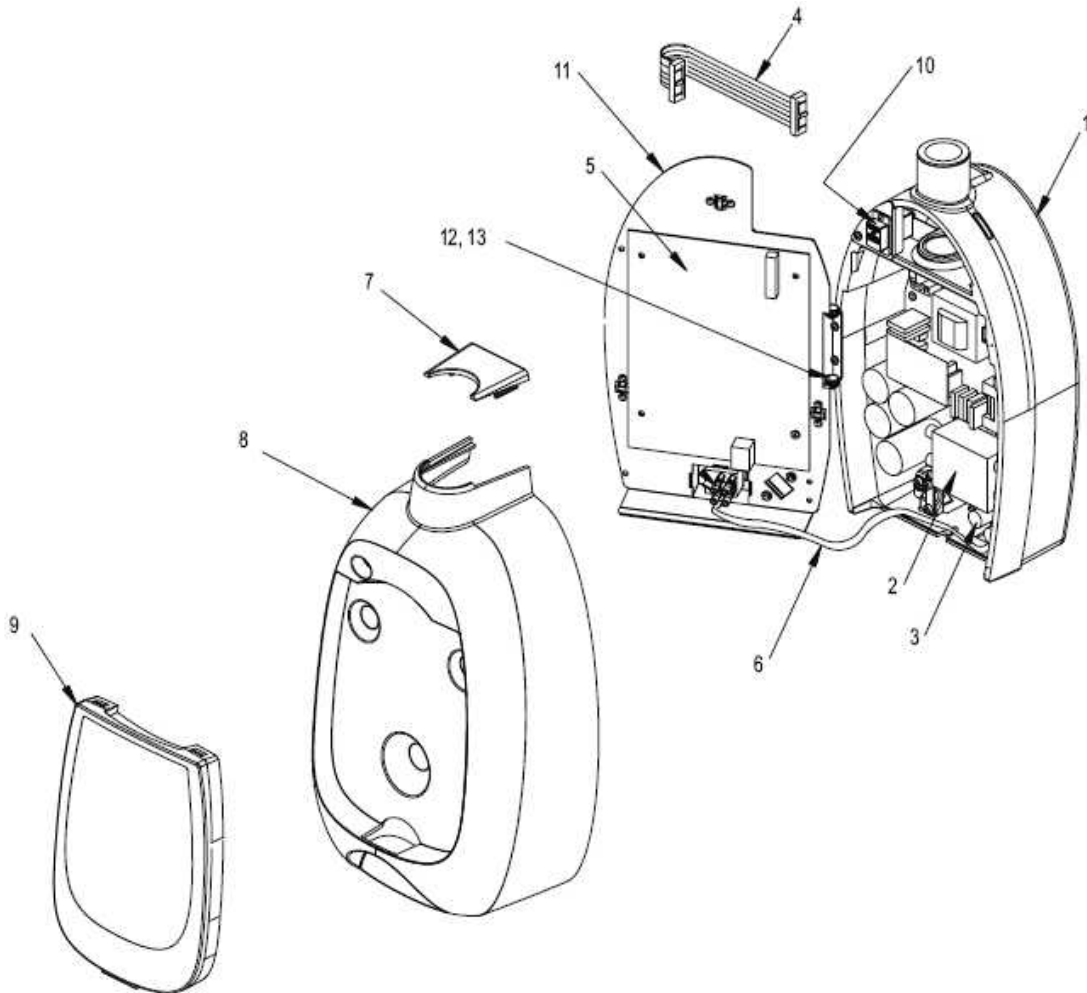


Figure 6-4 Master Control Diagram

Table 6-3 Master Control Parts Description

| Item | Part No.     | Description                   |
|------|--------------|-------------------------------|
| 1    | 112-0991G1   | Assy, Converter with Bearings |
| 2    | 124-0292G1   | Assy, PCB, Converter          |
| 3    | 46-170021P53 | Fuse, 10A                     |
| 4    | 126-0377G1   | Assy, Cable, CPU to Power     |
| 5    | 124-0293G1   | Assy, PCB, Control & CPU      |

(Table continued on the next page)



## Master Control

---

Table 6-3 Master Control Parts Description (Continued)

| Item | Part No.   | Description                             |
|------|------------|---|
| 6    | 126-0449G1 | Assy, Power Switch & Cable, 20A, 250VAC |
| 7    | 303-0132P1 | Cover, Top, Main, Expert                |
| 8    | 112-1206G1 | Assy, Cover, Outer, Main, Expert        |
| 9    | 303-0133P2 | Cover, Remote Filler, Expert            |
| 10   | 112-1191G1 | Assy, USB Connector, Wall Mount         |
| 11   | 112-1205G1 | Assy, Door, Wall Mount                  |
| 12   | 427-0027P4 | Push Retainer                           |
| 13   | 230-0225P2 | Hinge Pin, Door, Wall Mount             |

## Master Control Touch Panel

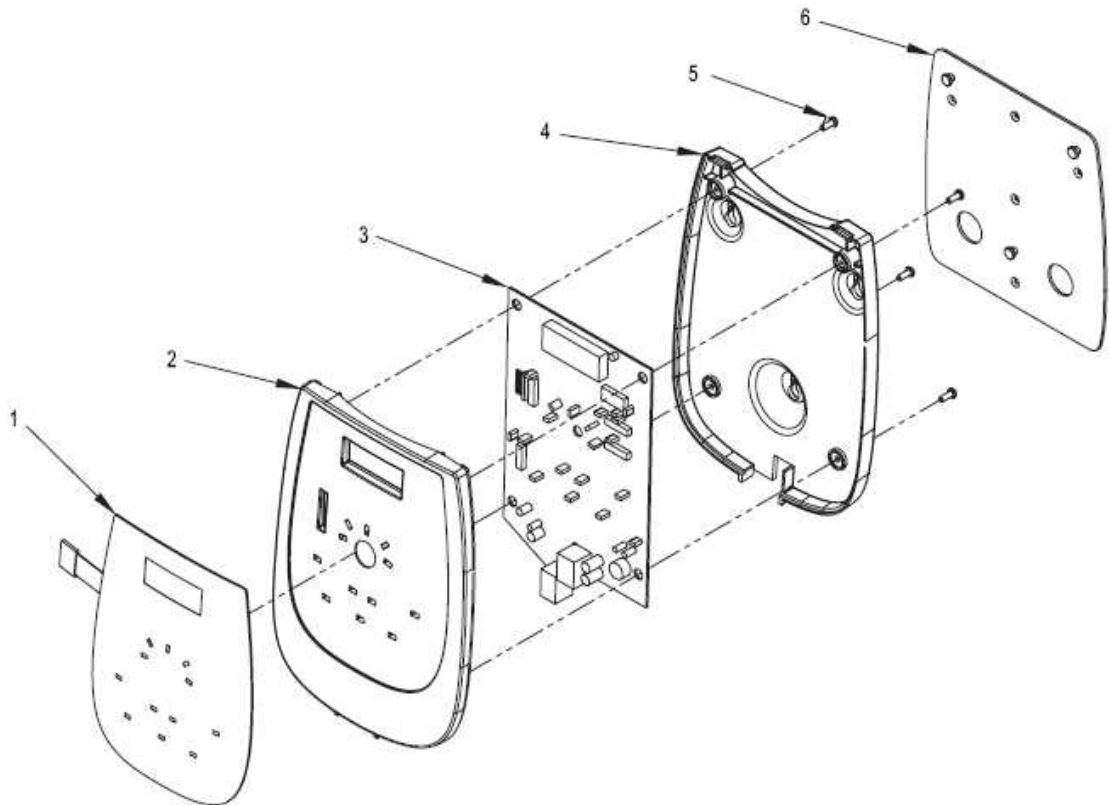


Figure 6-5 Master Control Touch Panel Diagram

Table 6-4 Master Control Touch Panel

| Item | Part No.   | Description                          |
|------|------------|--------------------------------------|
| 1    | 632-0097P1 | Keypad, Remote, Expert               |
| 2    | 303-0129P2 | Cover, Remote, Front, Expert         |
| 3    | 124-0255G1 | Assy, Interface P.C.B.               |
| 4    | 303-0130P1 | Cover, Remote, Rear, Expert          |
| 5    | 422-0098P2 | Screw, Phil Pan HD, HI-LO, #6x3/8 x4 |
| 6    | 114-0458G1 | Weldment, Plate, Remote Mounting     |
| NS   | 427-0196P4 | Screw, 8x2-1/2, Drywall x 3 or x 6   |
| NS   | 112-1167G2 | Assy, Remote Switch Mounting Screws  |



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