Service Instructions

Centurion Qex
CeramPress Qex
Neytech Qex

DENTSPLY Ceramco
Yucaipa, CA

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1.1 Safety Information

Repair work must only be performed by service technicians authorized by DENTSPLY Ceramco!

The unit must only be operated with original spare parts and accessories. Only in this way the performance data provided in the instructions for use can be achieved and the required operational safety is ensured.

⚠ **!! During service work the unit must be unplugged from electrical source!!**

Exception:
During setting and adjustment work the unit must be switched on.
These types of work must be carried out extremely carefully since live components may be touched!

Prior to touching any electric components a metal part should be touched with the hand to avoid electrostatic charging of the human body. We recommend to wear an earthing strap while working on the electronic equipment of the unit.

The PC boards must only be stored and shipped in antistatic material (e.g. aluminum foil).
If possible, use original packing.

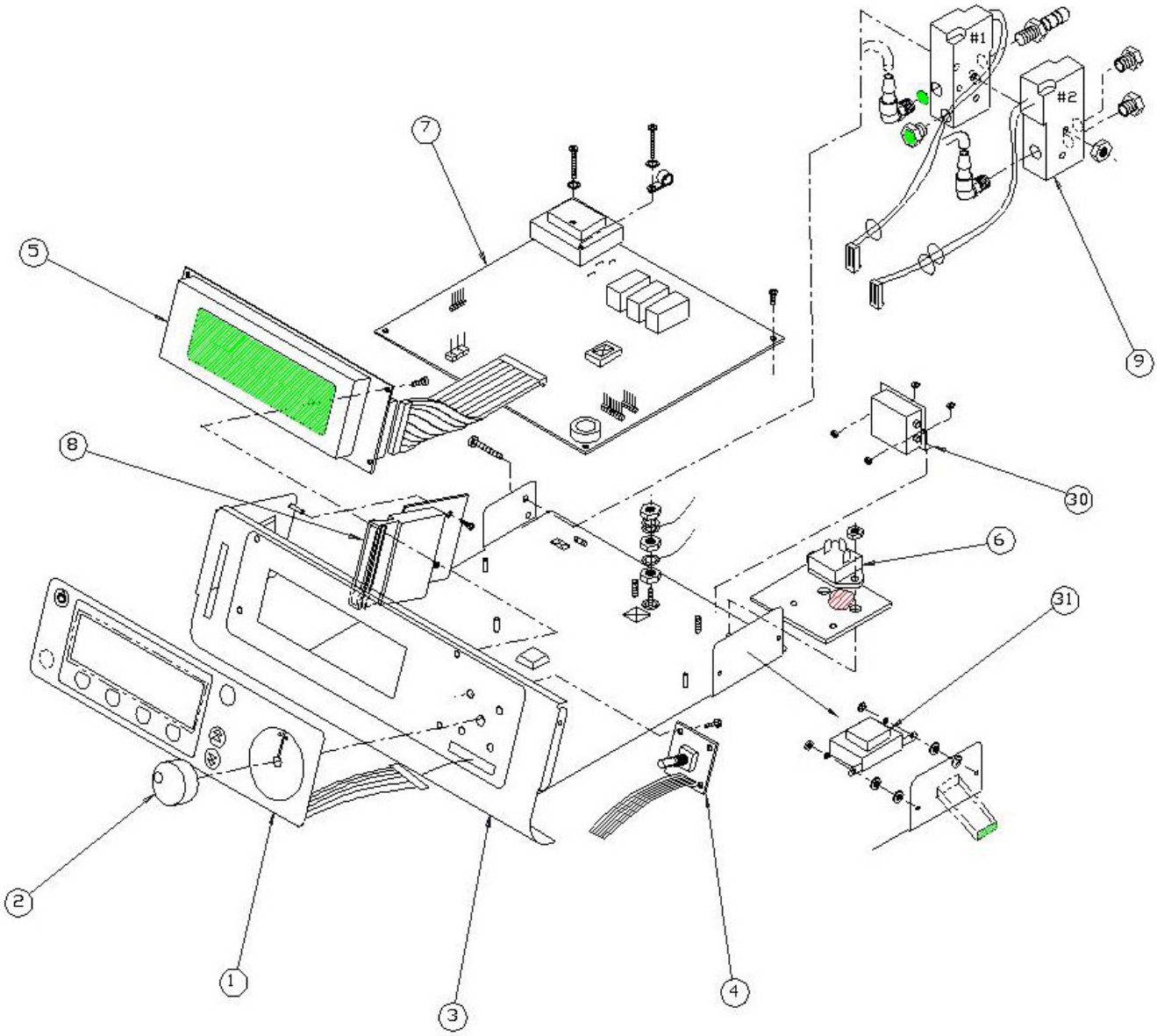
1.2 Repair Devices and Tools

Device/Tool	Where Used	Source
Card Holder with Service Card, Special Card & Calibration Card	To activate service functions	DENTSPLY Ceramco
Digital Vacuum Meter (absolute)	Vacuum Adjustment and Control	GDH 12AN Greisinger Electronic
Temperature Meter (Type-R)	To measure muffle temperature	Extech 421508
Calibration Platform	To calibrate furnace temperature	DENTSPLY Ceramco
Potentiometer Adjustment Tool	To change potentiometer settings for temperature or vacuum	Electronic Store
Temperature/Calibrator (Type-R)	To inject a temperature for calibration purposes	Omega Engineering CL25

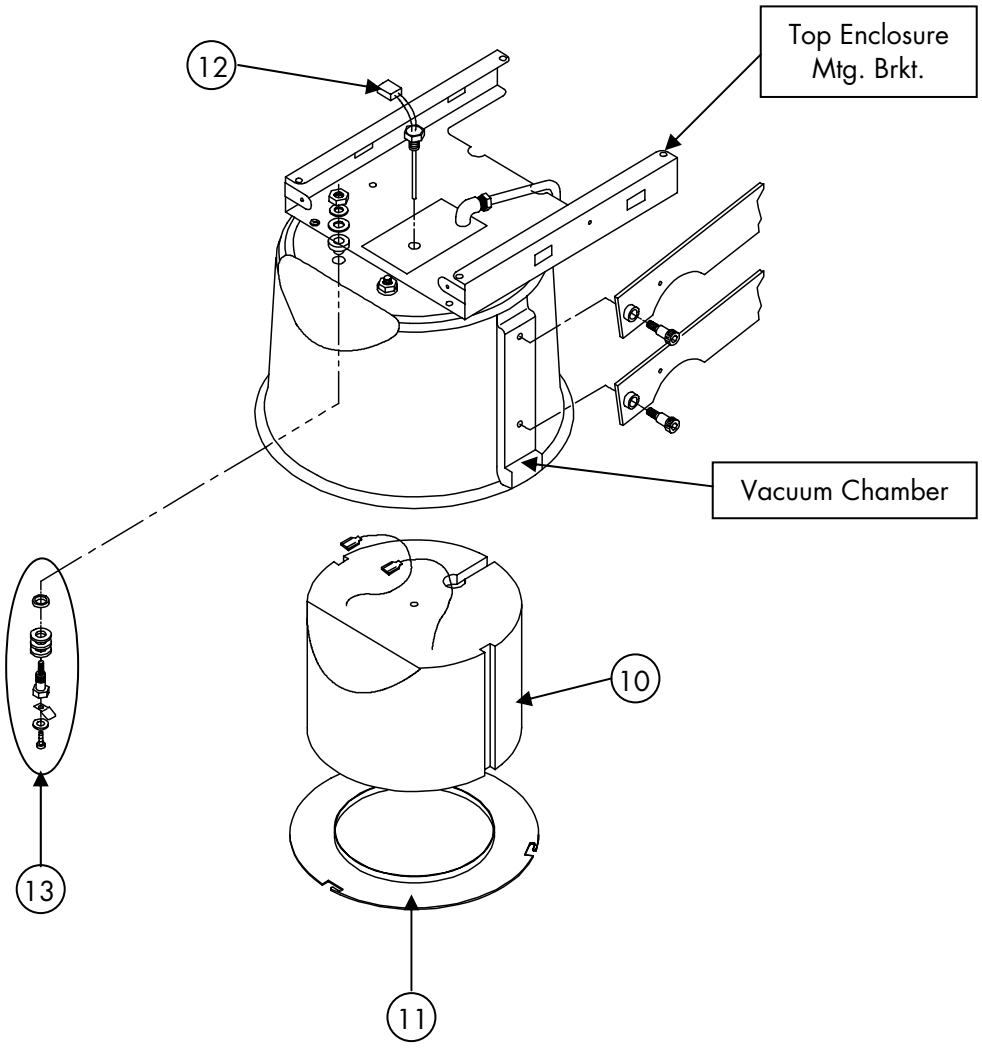
2.1 Repair Parts

		Centurion Qex		Cerampress Qex		Neytech Qex	
		120V	230V	120V	230V	120V	230V
Item No.	Description	9494305	9494306	9494310	9494311	9494400	9494401
1	Membrane Switch; Cent. Qex	9354418	→	→	→	→	→
2	Knob; Encoder Qex	9355028	→	→	→	→	→
3a	Control Drawer; Qex	9494215	→	→	→	→	→
3b	Control Drawer; Qex *Effective date code 0650*	R9495154	–	R9495154	–	R9495154	–
3c	Control Drawer; Qex *Effective date code 0638*	–	R9495154	–	R9495154	–	R9495154
4	Serv; PCB Assy, Encoder	R9494314	→	→	→	→	→
5a	Serv; Display Assy, Qex	R9494376	→	→	→	→	→
5b	Serv; PCB Assy. Display *Effective date code 0703*	R9495146	–	R9495146	–	R9495146	–
5c	Serv; PCB Assy. Display *Effective date code 0637*	–	R9495146	–	R9495146	–	R9495146
6	Triac; 25A, 400V	9303015	→	→	→	→	→
7a	Serv; PCB Assy, Control	R9494307	R9494308	R9494312	R9494313	R9494389	R9494390
7b	Serv; PCB Assy. Control *Effective date code 0703*	R9495138	–	R9495138	–	R9495138	–
7c	Serv; PCB Assy. Control *Effective date code 0637*	–	R9495145	–	R9495145	–	R9495145
8	Serv; PCB Assy, Card, Qex	R9494322	→	→	→	→	→
9	Serv; Valve Kit, Qex	9494303	→	→	→	→	→
10	Serv; Muffle Assy	9494317	9494318	9494090	9494091	9494317	9494318
11	Muffle Retaining Ring	9492902	→	→	→	→	→
12	Serv; Thermocouple	9494302	→	→	→	→	→
13	Muffle Termination Kit	9493062	9493062	9493680	9493680	9493062	9493062
14	Air Cylinder	9352087	→	→	→	→	→
15	Upper Pivot Arm	9492893	→	→	→	→	→
16	Lower Pivot Arm	9492959	→	→	→	→	→
17	Fan Axial	–	–	9493662	9493662	–	–
18	Rod; Plunger	–	–	9353066	9353066	–	–
19	Serv; Motor Assy, Qex	9494304	→	→	→	→	→
20	Rod; Seal	–	–	9357106	9357106	–	–
21	Door; Oring	9357071	→	→	→	→	→
22	Door Machined	9361065	→	→	→	→	→
23	Door Insulation	9494293	9494293	9494028	9494028	9494293	9494293
24	Cap Door Insulation	–	–	9494027	9494027	–	–
25	Slide Shelf	9361081	→	→	→	→	→
26	Column Cover	9494263	→	→	→	→	→
27	Top Enclosure	9494251	9494251	9494246	9494246	9494251	9494251
28	Bottom Wraparound	9494214	→	→	→	→	→
29a	Counter Balance	9352040	→	→	→	→	→
29b	Counter Balance, Adjustable *Effective date code 0150*	9352102	→	→	→	→	→
30	Filter, EMI	–	9320120	–	9320120	–	9320120
31	Inductor DC Choke	–	9310045	–	9310045	–	9310045

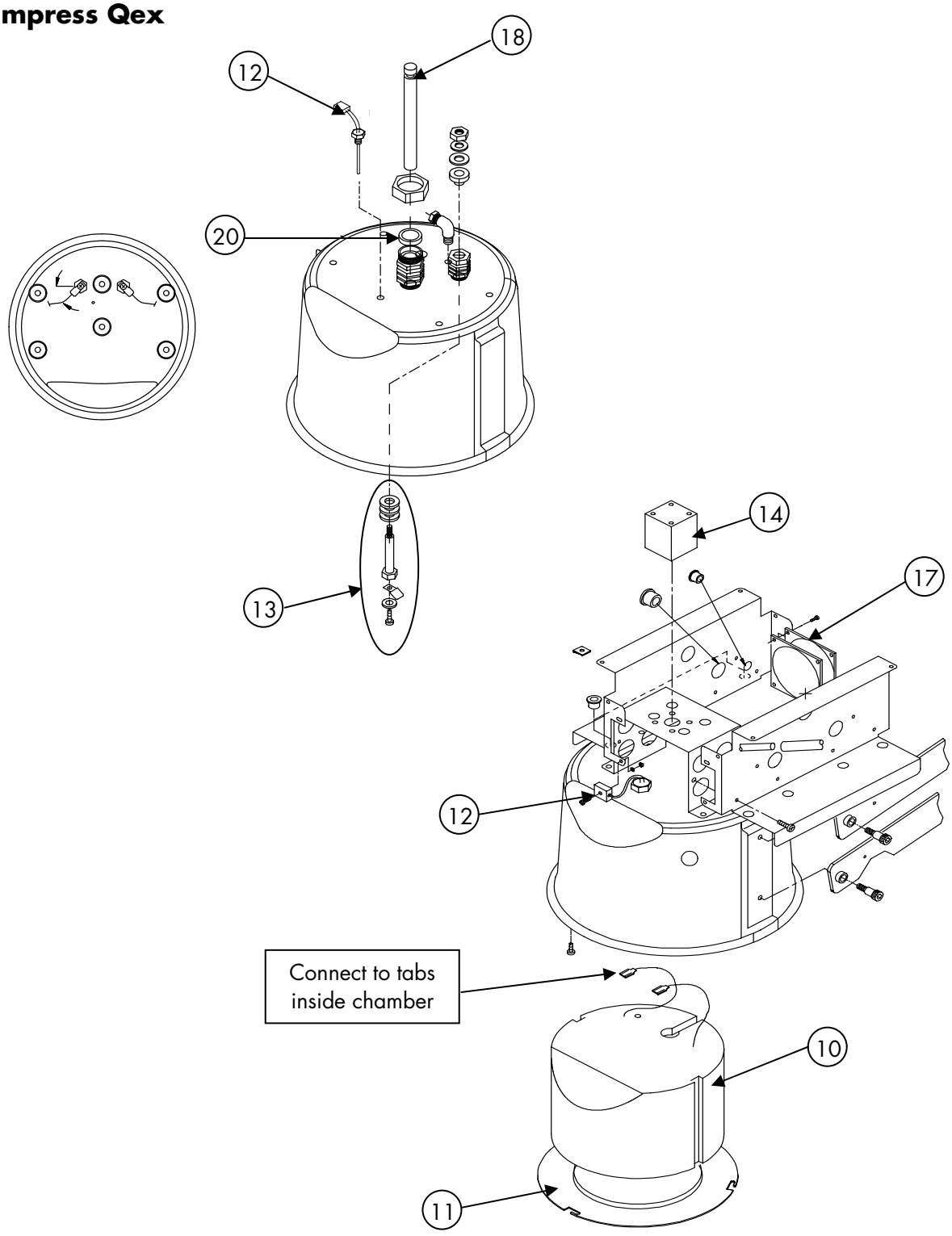
2.1 Repair Parts Cont.



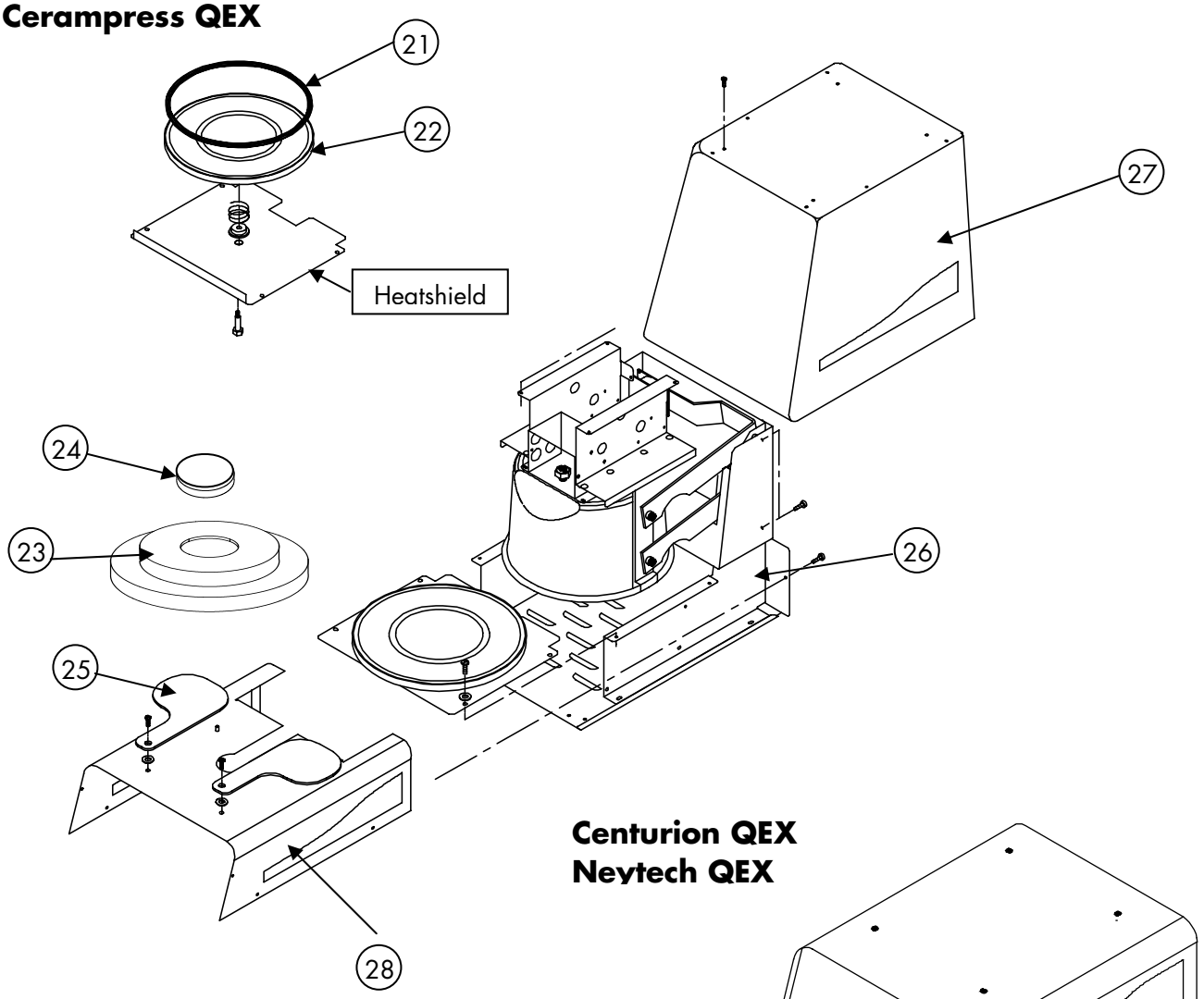
Centurion Qex
Neytech Qex



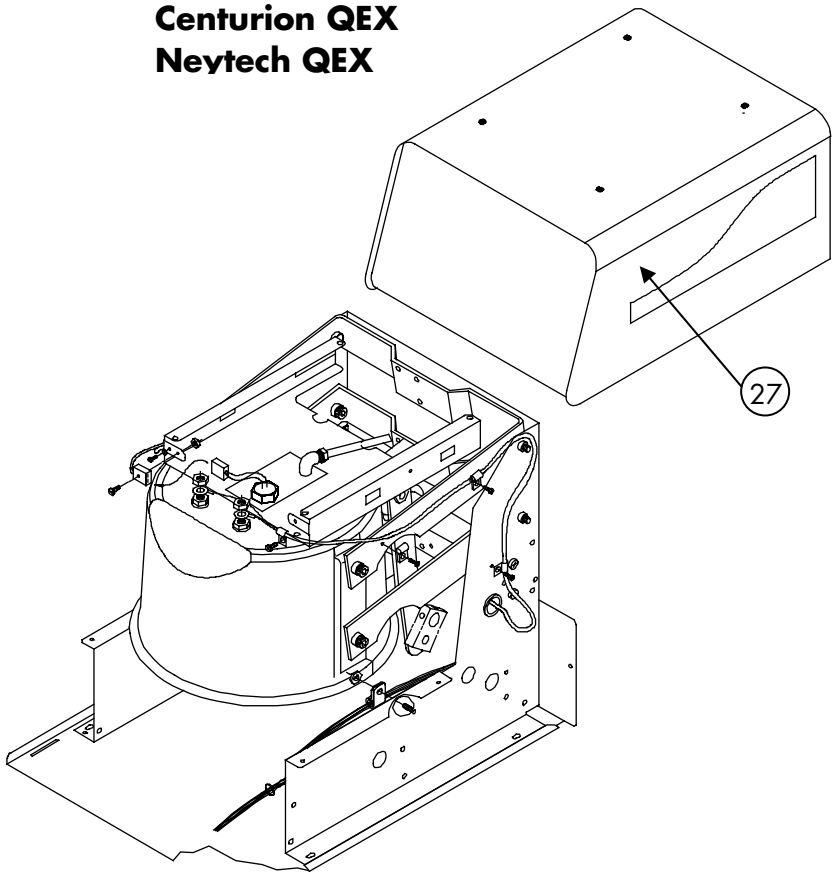
Cerampress Qex



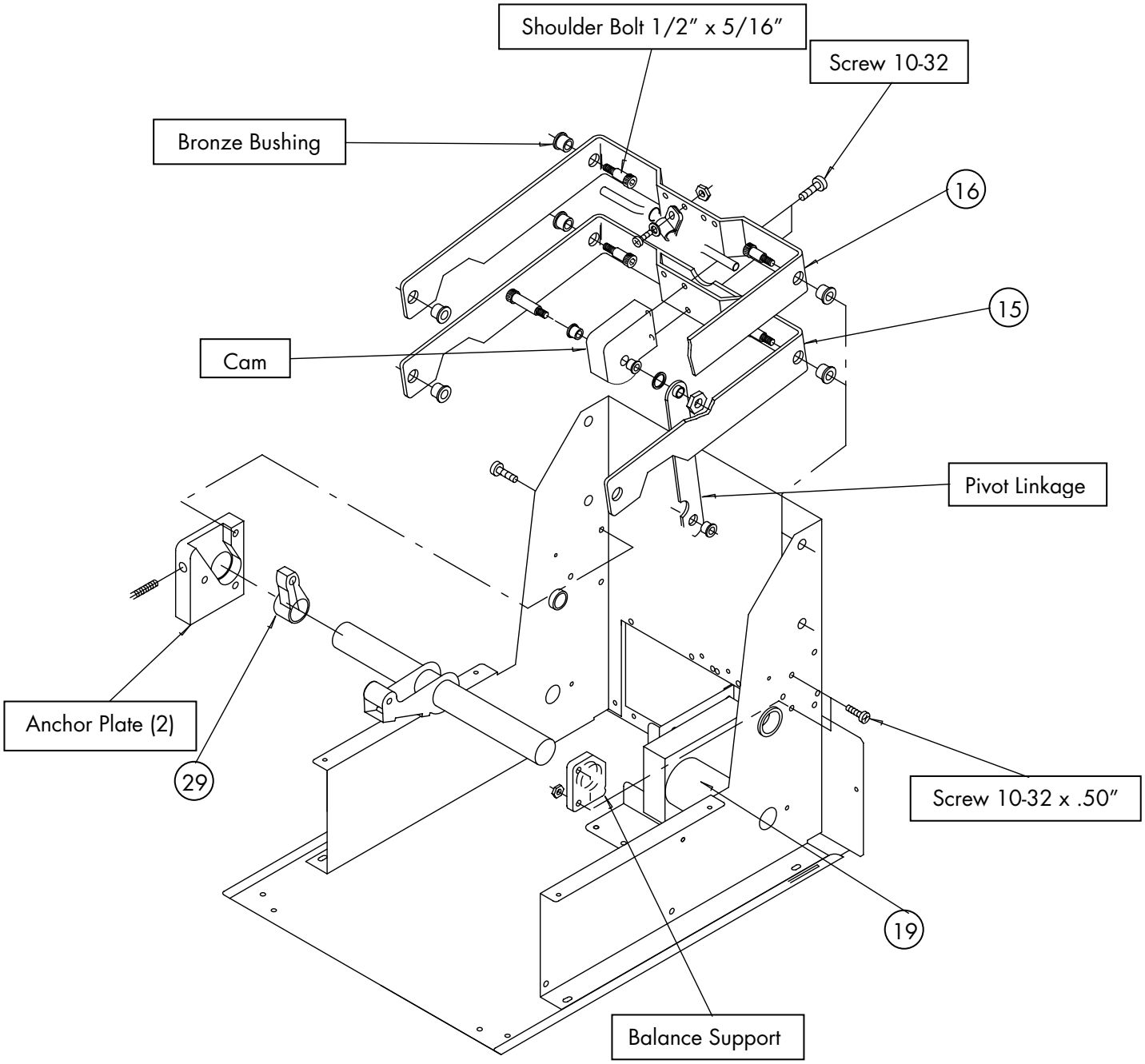
Cerampress QEX



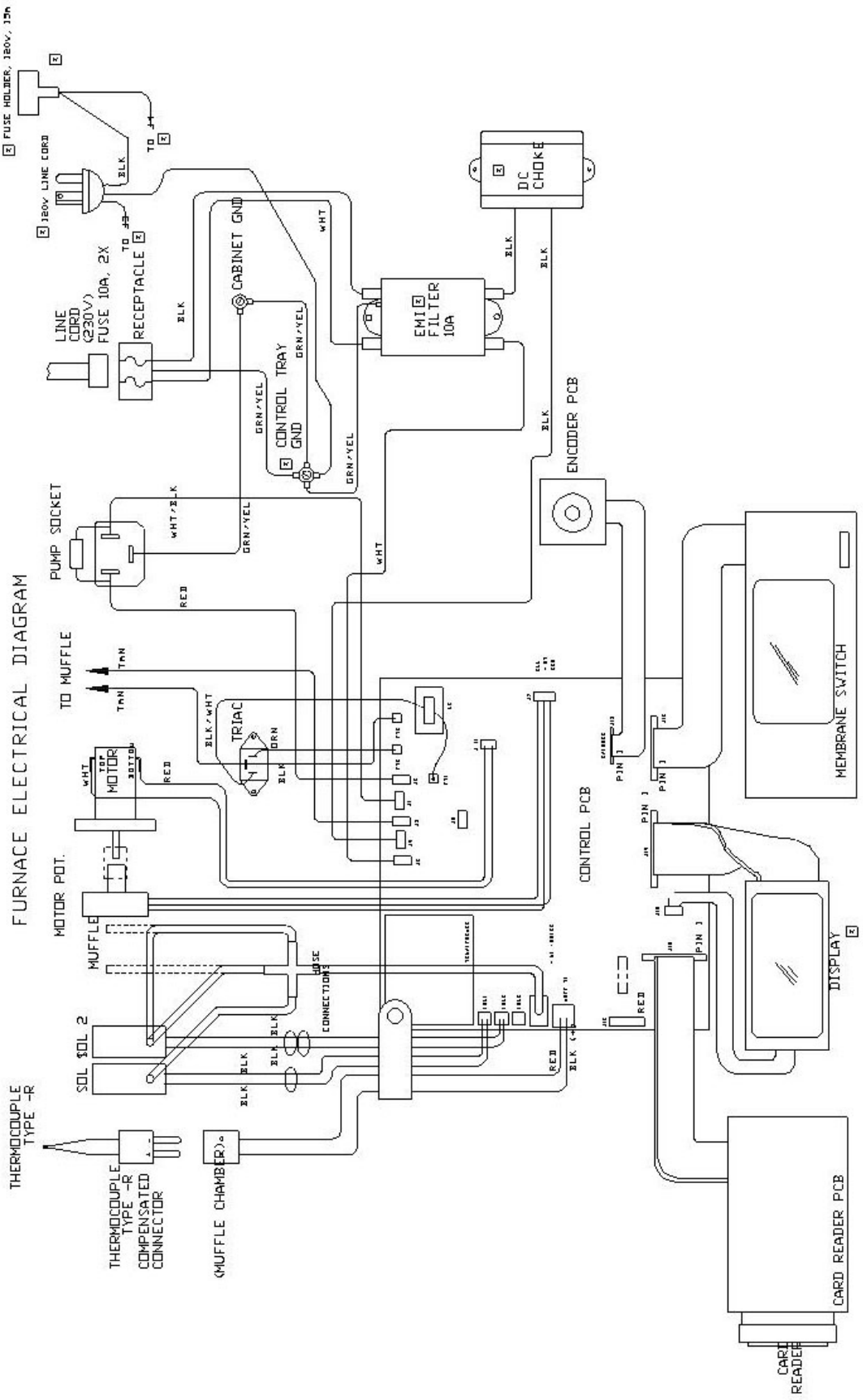
Centurion QEX
Neytech QEX



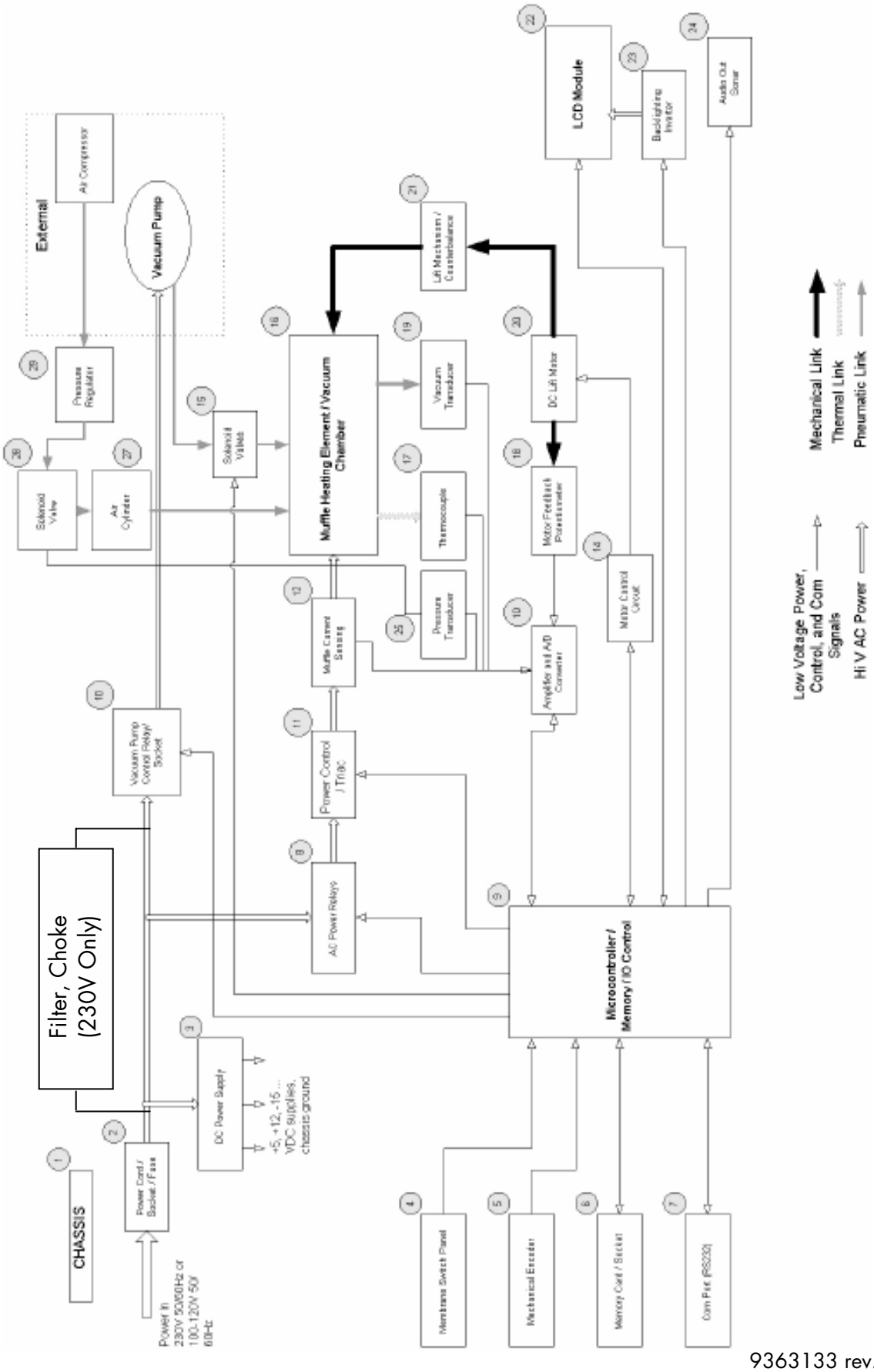
2.1 Repair Parts Cont.



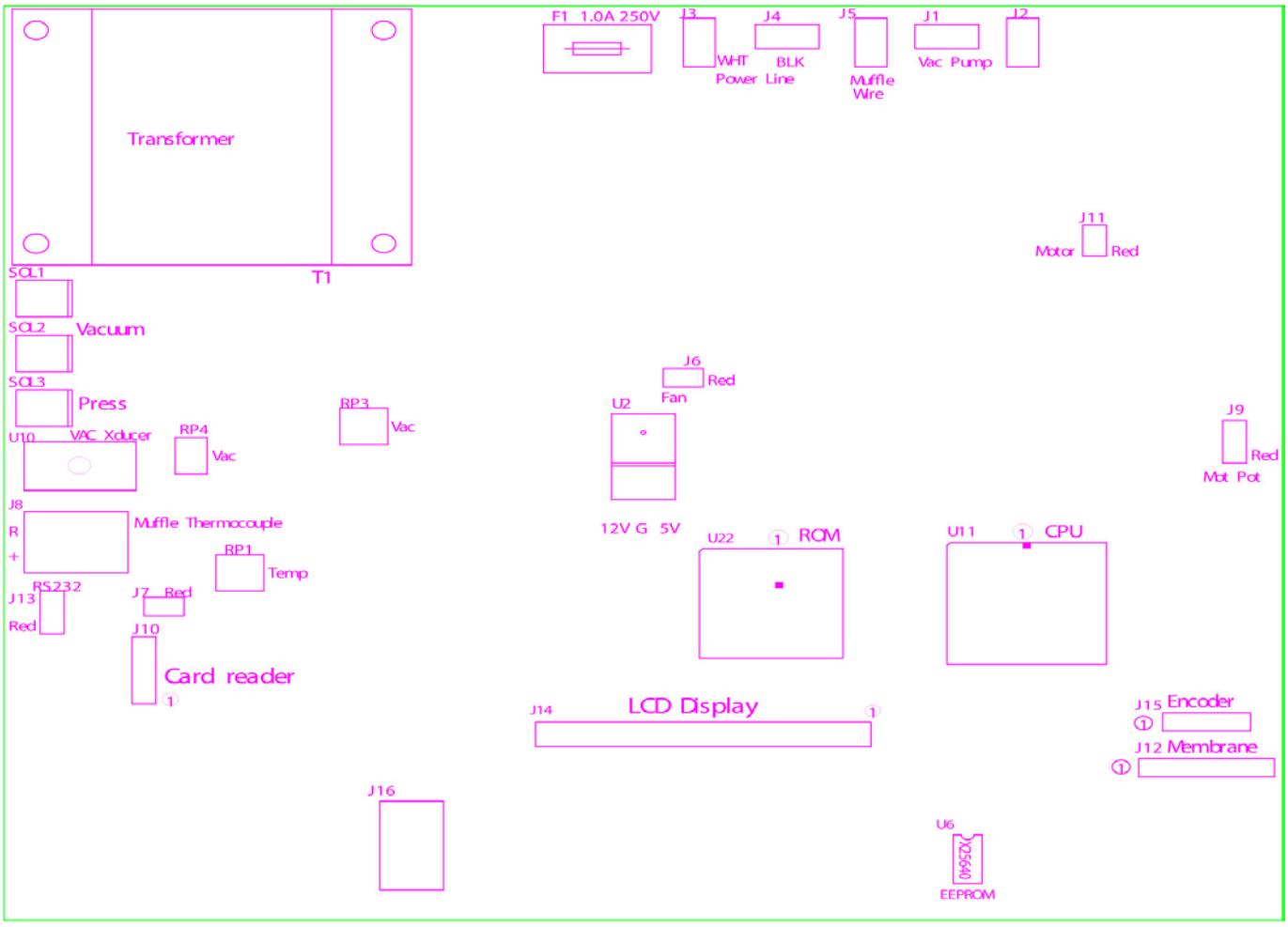
3.1 Wiring Diagram



3.2 Block Circuit Diagram

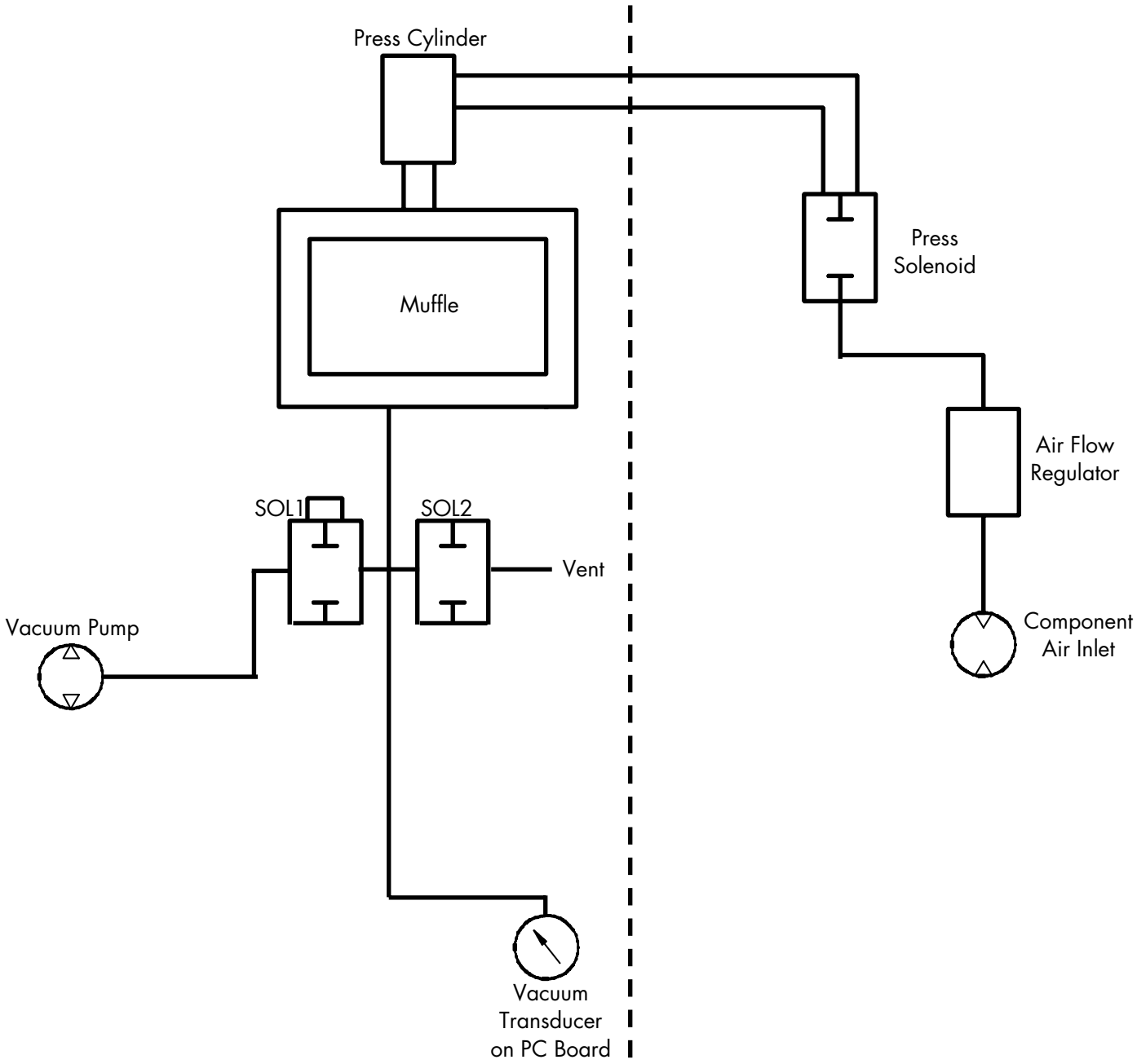


3.3 Component Mounting Diagram of Control PCB



J6 Fan connection CeramPress
J7, J8 Thermocouple connection
J9 Motor connection
J11 Motor connection (feedback)
J13 RS-232 connection
J16 LCD backlight connection
RP1 Muffle temperature potentiometer
RP3 Adjustment pressure potentiometer
RP4 vacuum level potentiometer

3.4 Pneumatic Diagram



4.1 Troubleshooting

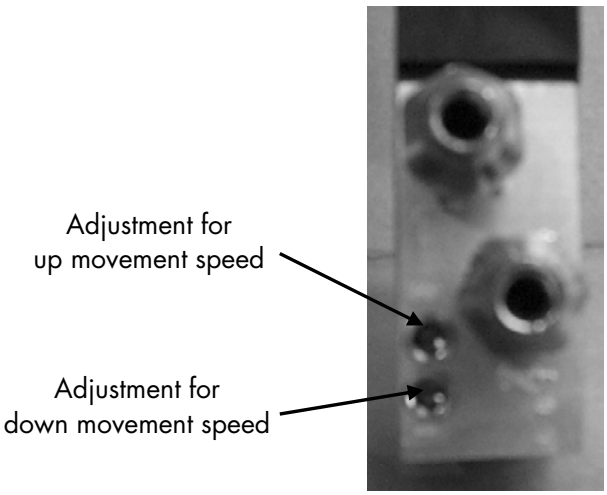
Furnace does not turn on
- Disconnect power cord from furnace, check fuses at inlet socket on back panel (230V). Check F1 on PCB
- Check J-16 on the control PCB
- Exchange control PCB (chapter 7.1.1)

LCD display has no content
- Check contrast adjustment - turn adjustment wheel after furnace is turned on (first display screen that appears).
- Check the -15V on the control PCB (U24 : 1)
- Exchange display PCB (chapter 7.1.3)
- Exchange control PCB (chapter 7.1.1)

Membrane keys without function
- Exchange membrane (chapter 7.1.2)
- Exchange control PCB (chapter 7.1.1)

Adjustment wheel without function
- Exchange encoder PCB (chapter 7.1.4)
- Exchange control PCB (chapter 7.1.1)

Piston moves too slow or too fast (Cerampress) (units built prior to date code 0232)
- Check air pressure (4.5 bar)
- Check air flow restriction adjustment (See Fig. 1)
- Disconnect then reconnect power cord from furnace
- Observe piston down/up movement
- If down speed is too fast, turn bottom screw, located on the pressing valve (Sol 3), slightly clockwise
- If up speed too fast, turn top screw, located on the pressing valve (Sol 3), slightly clockwise



Pressing Valve (Sol 3)
Fig. 1

4.2 Error Messages

"Err 1" appears on the display

No temperature signal

- Short J7 thermocouple input the display should read room temperature
- Exchange the thermocouple (chapter 7.2.1)
- Exchange the control PCB (chapter 7.1.1)

"Err 2" appears on the display

Temperature exceeded 1220°C

- Remove wires from J8, connect calibrator/thermometer CL25 to J8 (chapter 5.1)
- Check thermocouple wiring harness from control PCB to muffle
- Exchange thermocouple (chapter 7.2.1)
- Exchange the control PCB (chapter 7.1.1)

"Err 3" appears on the display

No temperature increase

- Check proper connections on J8
  Red wire to 'R', black wire to '+'
- Check resistance on triac (MT1-Gate)
  25-50 Ohms
- Exchange thermocouple (chapter 7.2.1)
- Exchange the control PCB (chapter 7.1.1)

"Err 4" appears on the display

Triac shorted

- Exchange thermocouple (chapter 7.2.1)
- The temperature increased above the programmed value
  Unplug the line cord and try again
- Exchange the triac
  Use heatsink compound between triac and heatsink

"Err 5" appears on the display

Muffle does not heat

- Check muffle resistance (9-11 Ohms for 120V, 35-40 Ohms for 230V)
- Check triac MT1-Gate (25-50 Ohms)
- Exchange the control PCB (chapter 7.1.1)

"Err 6" appears on the display

No vacuum

- Connect the vacuum pump to a separate outlet and check operation
- Check the seal on door to muffle chamber
  (Press on top cabinet while pulling vacuum)
- Check for complete muffle closure
- Check vacuum hose connection for kinks
- Exchange the solenoid assembly (chapter 7.2.2)

"Err 7" appears on the display

Vacuum level low

- Check the seal on door to muffle chamber (Press on top cabinet while pulling vacuum)
- Check for complete muffle closure
- Check vacuum hose connection for kinks
- Check the performance of the vacuum pump
- Check vacuum calibration (chapter 6.2)
- Remove thermocouple and wrap thread with teflon tape and reinstall (chapter 7.2.1)
- Exchange seal on plunger (Press units only)
- Exchange solenoid assembly (chapter 7.2.2)

"Err 8" appears on the display

Muffle movement mechanism not functioning (slow or no movement)

- Check for friction on metal parts
- Check voltage on J11 (11-12V)
- Disconnect wires from J11 and connect a 9V battery to the wires
- Run motor with external supply
- Exchange the motor assembly (chapter 7.2.4)
- Exchange the control PCB (chapter 7.1.1)

"Err 9" appears on the display

Motor feedback to control PCB not functioning

- Check connection to J9
- Check motor feedback potentiometer (chapter 5.4)
- Exchange the motor assembly (chapter 7.2.4)

"Err 40" appears on the display

No line frequency detected

- Exchange the control PCB (chapter 7.1.1)

5.1 Check of Temperature (PCB)

Aids:
- Calibrator/thermometer (CL25)

Purpose:
- To check and adjust the temperature on the PCB at 980°C

Procedure:
Also see chapter 4.3, thermocouple connection and potentiometer location
- Remove all power from the furnace
- Open lower cabinet according to chapter 7.1
- Disconnect wires from J8
- Connect the calibrator/thermometer to J8 and set to 980°C

Important: Pay attention to the polarity, set the calibrator to type R
- Apply power to the furnace
- Adjust RP1 to obtain a display temperature reading of 980°C
- Remove all power from the furnace
- Reconnect the wires to J8
- Apply power to the furnace

5.2 Check of Temperature (Muffle)

Aids:

- Temperature Meter
- Calibration Platform
- Calibration Card (Centurion and Cerampress)
- Calibration Card (Neytech)

Procedure:

- Check in the setup screen for a calibration temperature of 0°C
- Insert the calibration card
- Run the warm-up program

Important: Before adjusting the temperature at least one cycle should be fired to ensure a good working temperature of the furnace.

- Place the calibration platform on the door and close the muffle, connect the temperature meter to the thermocouple connector.
- Wait until the temperature on the meter reads 400°C
- Start the calibration program (see "Test Programs" chapter 8.4)
- The temperature ramps to 780°C
- After 5 minutes the temperature should read between 780°C - 787°C for Centurion, 776°C - 783°C for Cerampress.
  - The temperature ramps to 980°C
- After 5 minutes the temperature should read between 978 - 983°C (for Cerampress & Centurion).

5.3 Check of Vacuum Loss

Aids:

- Stop watch

Procedure:

- Connect a vacuum pump to the Qex. Let the unit cool to 100°C or less. Create the following vacuum program:
  LoTemp = 100°C
  Rate = 1°C/min
  HiTemp= 400°C
  Vacuum = ON, vacuum on @ 100°C. Start the vacuum program
- After the pump has reached its maximum level the pump turns off automatically
- After a few seconds a reduction in vacuum results is seen on the display as increasing numbers
- Start the stop watch once the display value increases
- The vacuum loss should not be greater than 7mm during a 3 minute period

If the value is outside the above listed specifications, repeat the above vacuum cycle and follow the steps below to determine the source of the vacuum leak.

A Remove the top enclosure and pinch the tube to the chamber with cushioned pliers. If the leak rate is less than 3 hPa (mm) in 5 sec., then the problem is in the chamber. If greater than 3hPa (mm) in 5 sec., then there is a problem below the chamber. (Valves, connections, tubing and transducer). Go to step D. Note: there may be a leak in the chamber as well. Testing is being done to verify these cut off levels.

B If pinch test determines leak is in chamber, verify by teeing in test chamber to the unit and check for leaks by running leak test cycle. If leak stops, then this confirms the leak is in chamber.

C Leaks in the chamber can be due to the following:

- Poor door o-ring to chamber seal
- Leak through thermocouple either through epoxy or at the o-ring seat between chamber and thermocouple.
- Porosity in the chamber (maybe due to chamber heating)
- Leak at muffle termination bolts (Tighten if needed)
- Copper tube connection. (Tighten if needed)
- Through plunger seal (Replace if needed)

D Non chamber leaks

- Pinch tube between valves and transducer, if leak rate is more than 2 hPa (mm) per second then leak is through transducer. If less, then problem is with valves, tubing or fittings. (Go to next step)
- If fails, check fittings and connections. If continues to fail, then replace valve.
- If leak continues when valve reinstalled, then problem may be due to leak through tubing or cross tee. Replace and repeat test.
- If leak persists, there may also be a leak in the chamber. Check with known non-leaking test chamber as described in step B. If leak stops, then there is a leak in the chamber as well. Replace chamber.

5.4 Check of Motor Position

Aids:
- Service card
- Multimeter

Purpose:
To verify the correct potentiometer adjustment on the motor assembly
- Open the control drawer as described in chapter 7.1

Procedure: (Centurion Qex, Cerampress Qex)
- Insert the service card with muffle in closed position
- The value after "Pot Pos" which is shown inside the window should show 70-90
- Bring the muffle to its open position
- Remove the service card
- Insert the service card
- The value after "Pot Pos" which is shown inside the window should show 160-190

Procedure: (Neytech)
- Bring the muffle to its closed position
- Select the Setup screen
- Press the "Hidden" Key (chapter 8.2)
- The value after "Pot Pos" should be 70-90
- Press Esc
- Bring the muffle to its up position
- Press the "Hidden" Key
- The value after "Pot Pos" should be 160-190

If the values are not within the specified range:
- Open the furnace as described in chapter 7.1
- The adjustment of the pot is done by rotating the short silicon hose which connects the motor shaft to the potentiometer
- As an aid the multimeter may be used
- Connect the ohmmeter between the center terminal of J9 and ground (Tab of U2 is ideal).
- Adjust to the following values:
  Muffle Close 3-4 KOhm
  Muffle Open 6-7 KOhm
- Recheck the positions again with the service card

6.1 Calibration of the Muffle Temperature

Aids:

- Temperature Meter (Type-R)
- Cal-platform
- Calibration Card (Centurion and Cerampress)
- Calibration Card (Neytech)

Procedure:

(Also see chapter 3.3 for the location of the adjustment potentiometer)

- Open the control drawer as described in chapter 7.1
- Check in "Setup" that the Cal Temp is 0°C
- Check if the muffle is properly seated
- The thermocouple wires should be separated slightly
- Start the furnace with vacuum and let the program finish
- After the program is finished replace the door insulation with the cal-platform
- Let the furnace cool to 400°C
- Start the calibration program
  (See Test Program chapter 8.4)
- After a hold time of 5 min. at 980°C adjust potentiometer RP1 so the temperature meter reads 980°C
- After 5 min. check the meter reading for 978°C - 983°C, re-run cycle and re-calibrate, if necessary

6.2 Calibration of Vacuum

Aids:
- Digital vacuum meter

Purpose:
- Vacuum adjustment after control PCB exchange

Procedure:
(Also see chapter 3.3 for the location of the adjustment potentiometers)
- Open control drawer as described in chapter 7.1
- Connect the vacuum meter with a T-adaptor to the vacuum hose and transducer

Adjustment of the atmospheric pressure
- Read the atmospheric pressure from the Barometer
- Apply power to the furnace
- Adjust potentiometer RP3 if the barometric pressure is off by more than 3mm.

Adjustment of the low end vacuum
- Apply power to the furnace
- Run a vacuum cycle with VAC CONT or Vac = 101%.
- Compare the meter reading with the furnace display reading and adjust potentiometer RP4 if the reading is off by more than 3mm
- Stop the firing cycle and check the barometric pressure reading again. Re-adjust if necessary.

7.1 General Repair Information

Note:
⚠ !! During servicing, the unit must be unplugged from the electrical power source!!

Please remember the order of disassembly in order to ensure a proper reassembly.

Control Drawer:
In order to service the described repairs the control drawer should be opened as follows:

Remove 2 screws from the bottom

Remove screw from each side

Carefully pull the control drawer toward you

When closing the furnace please observe that the vacuum and pressure hoses as well as the electric wires do not interfere with moving parts of the lift assembly.

Note:
⚠ **!! During servicing, the unit must be unplugged from the electrical power source!!**

Top Enclosure:
Centurion Qex / Neytech Qex


Remove 4 screws from the top


Lift enclosure as shown

CeramPress Qex


Remove 4 screws from the top


Lift enclosure as shown

Caution:
- When operating the furnace without the top enclosure, injury from burn may occur if the muffle chamber is touched
- The assembly is done in reverse order
- Never operate the furnace without door insulation
- The removal of the top will affect balancing. Motor may not be able to close muffle without weight provided from the top enclosure.

7.1.1 Exchange of Computer Board

Aids:
IC removal tool for PLCC chips

Procedure:
Caution:
Firing programs as well as furnace data, will be lost when exchanging the PC board.

- Before exchanging the PC board save programs on a Backup card
- Observe recommendations per chapter 1
- Open control drawer as described in chapter 7.1
- Remove the memory chip IC 6 which contains above mentioned data and install it into the new PC board
- Disconnect all hoses and wires from the PC board

Caution:
Remove all ribbon connections very carefully and avoid kinking.

- Install the new PC board
- Carefully reconnect the ribbon cables, hoses and wire
- Calibrate furnace as described in chapter 6.1 and 6.2
- Close the control drawer and reinstall 4 screws

7.1.2 Exchange of Keypad

Procedure:

- Observe instructions according to chapter 1
- Open control drawer as described in chapter 7.1
- Disconnect the keypad ribbon cable from the PC board (J12)
- Remove the adjustment wheel
- Lift a corner of the keypad with a sharp object and remove the membrane switch
- Remove any epoxy leftover from the metal
- Guide the ribbon connector through the bezel opening and install the keypad

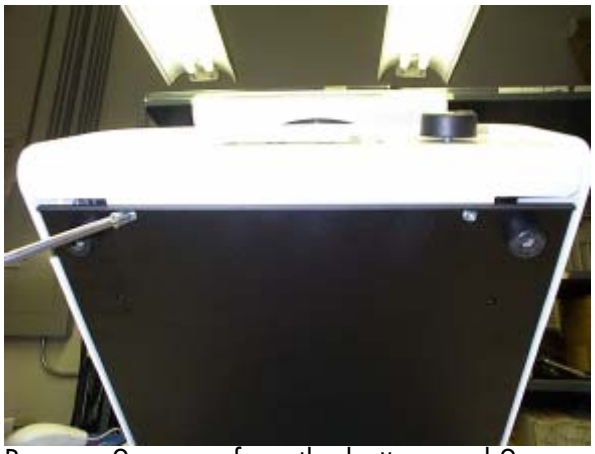
Caution: Do not kink the ribbon connector

- Install the adjustment wheel
- Connect the keypad ribbon connector to the PC board (J12)
- Reassemble the control drawer as described in chapter 7.1

7.1.3 Exchange of Display

Procedure:

- Observe instructions according to chapter 1
- Open control drawer as described in 7.1

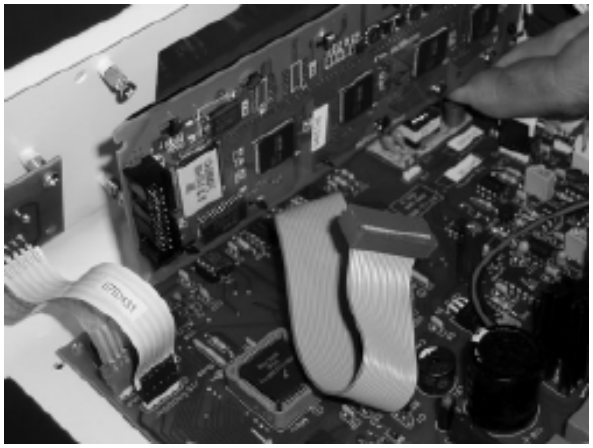


Remove 2 screws from the bottom and 2 screws from the sides

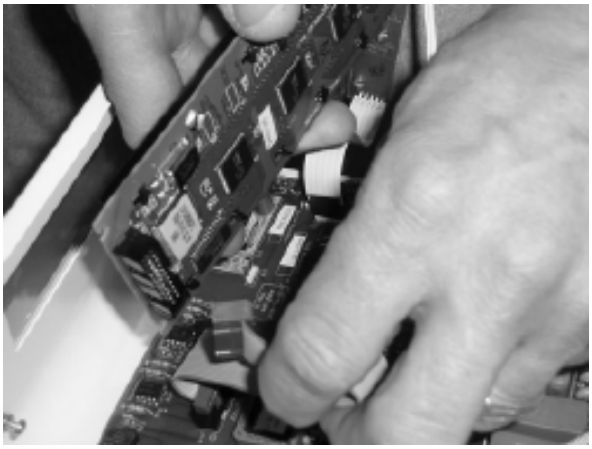
Remove all ribbon connectors which lead to the display (J14, J16)

Remove 4 screws from the display module
<u>New display, effective date 0637</u>

Exchange the display module (Ensure correct placement of card reader bracket)



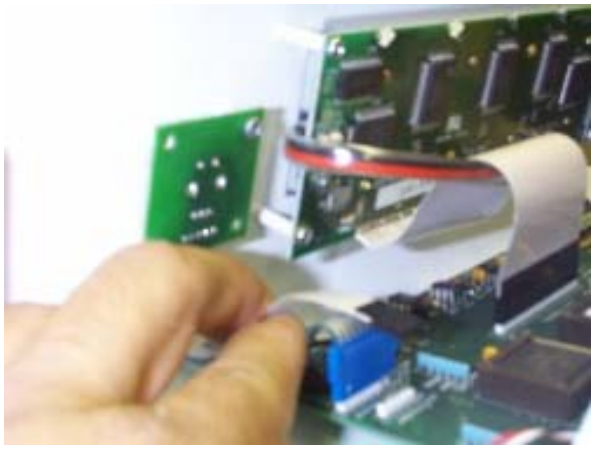
Red line on cable needs to be on top
Reassemble in reverse order.
Caution: Do not kink the ribbon connectors



7.1.4 Exchange of Encoder

Procedure:

- Observe instructions according to chapter 1
- Open control drawer as described in chapter 7.1



Remove the encoder ribbon cable from the control PCB (J15)

Remove adjusting wheel

Remove 2 screws from the encoder PC board

Exchange the encoder PC board

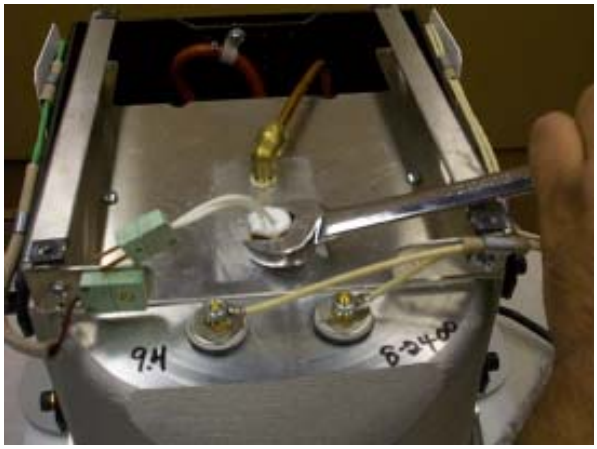
Caution: Do not kink the ribbon connector

- Install the new encoder in reverse order

7.2.1 Exchange of Thermocouple

Procedure:

- Observe instructions according to chapter 1
- Remove top enclosure as described in chapter 7.1



Disconnect the thermocouple, unscrew and remove

- Install the new thermocouple
- Check for vacuum leak according to chapter 5.3
- Calibrate the temperature according to chapter 6.1 and 5.2

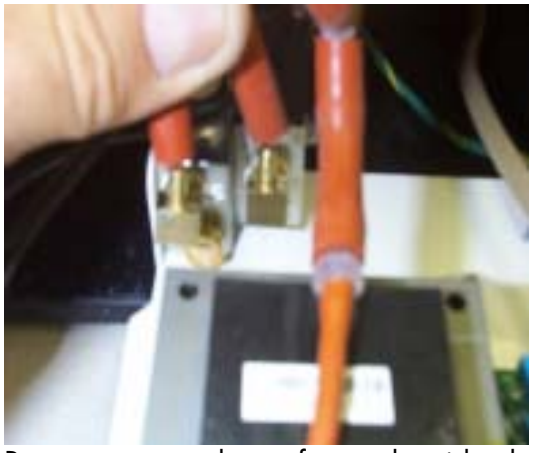
7.2.2 Exchange of Solenoid Valves

Procedure:

- Observe instructions according to chapter 1
- Open control drawer as described in chapter 7.1

Remove electrical connections (SOL1, SOL2)

Remove screw from transformer clamp.
Remove solenoid valve terminals from clamp.



Remove vacuum hoses from solenoid valves

Remove screw and nut from valve body

Slide spiral wrap away from hose barb
Cut the spiral hose at end of inlet

- Reassemble in reverse order.
- Check for vacuum leak according to chapter 5.3

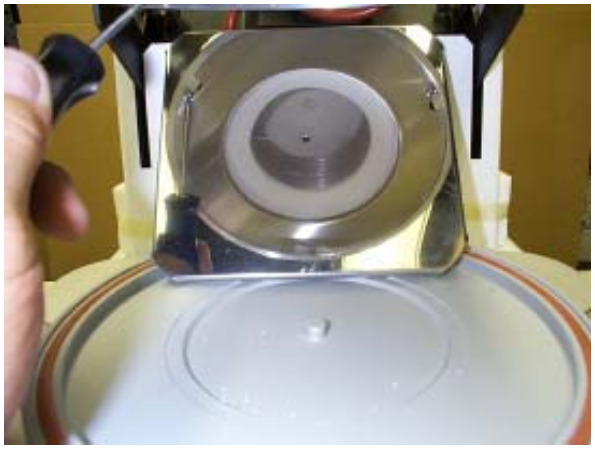
7.2.3 Exchange of Muffle

Procedure:

Chamber must be in up position for muffle exchange

Caution: Wear a face mask during this service

- Observe instructions according to chapter 1
- Remove top enclosure as described in chapter 7.1
- Disconnect the thermocouple as described in chapter 7.2.1



Loosen 3 retainer screws

Turn the retainer ring counter clockwise and remove

Caution: Hold muffle in place

Lower muffle to rest on covered door

Move muffle to side to remove muffle wires

7.2.3 Exchange of Muffle Cont.

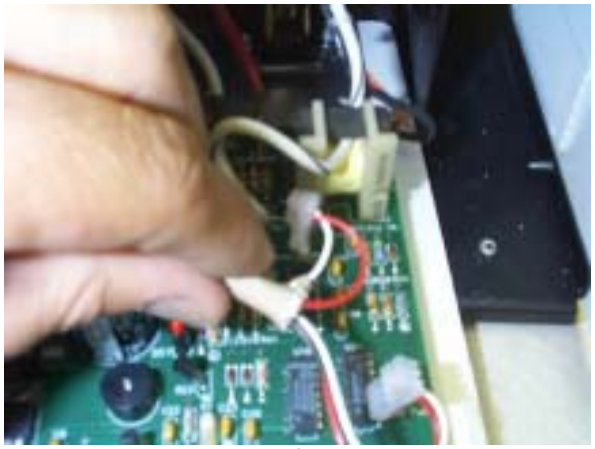
Disconnect both quick connectors

- Reassemble in reverse order.
- Add teflon tape to the threads of the thermocouple and install
- Check for vacuum leaks according to chapter 5.3
- Check temperature according to chapter 5.2 and calibrate according to chapter 6.1, if necessary

7.2.4 Exchange of Motor

Procedure:

- Ensure chamber is in up position before starting
- Observe instructions according to chapter 1
- Open control drawer as described in chapter 7.1



Disconnect motor wire harnesses (J9, J11)

Remove 8 screws from rear access panels

Carefully move right side access panel to right.
Use allen wrench to remove motor linkage bolt.

Remove motor mounting screw (from rear of furnace)

Remove motor assembly. Ensure motor wires are free and clear before removal.

- Reassemble in reverse order.
- Check the motor feedback hose connections as outlined in chapter 5.4. Adjust as needed.

8.1 Reset of Firing Cycles

Purpose:

- To reset the firing cycles

Procedure:

- Select the Setup function
- Press the "Hidden" Key

Hidden Key

- Select the "Clear Firing Cycles" line
- Push the adjustment wheel
- The number of previous firing cycles is now 0
- Push ESC

8.2 Reset of Memory

Purpose:

- To erase programs and firing cycles

Procedure A:

- Select the Setup function
- Press the "Hidden" Key

Hidden Key

- Select the "Clear EEPROM" line
- Push the adjustment wheel
- The furnace displays a box "Please Wait"
- After 15 seconds the furnace executes a test, the muffle stays open
- The display is dark
- See chapter 8.4 for Mode Selection

Procedure B:

- Unplug the furnace
- Hold down the F2 key and apply power
- Release the key
- See chapter 8.4 for Mode Selection

8.3 Centurion/Cerampress Selection

Purpose:

- **To define model after reset of memory or exchange of computer PCB.**

Procedure:

- Select the Setup function
- Press the “Hidden” Key

Hidden Key

- Select the furnace model
- Push the adjustment wheel
- Push ESC

8.4 Test Programs

Purpose:

- To aid in temperature check

Procedure:

- Insert calibration card
- Press the card function key

To run the warm-up program select card Program 1.

To run the temperature calibration program select card Program 2.

9.1 Product Service

WARNING:

This equipment is designed with safety features to protect the operator and must not be modified in any form. Only qualified individuals should repair this piece of equipment. Failure to observe these precautions may result in burns or electrical shock.

Three methods of product service are available:

- Telephone assistance available at the number listed below,
- Return the unit for servicing using the instructions below,
- Call DENTSPLY at the phone number below and obtain a service manual for a nominal fee

BEFORE RETURNING THE UNIT:

- Call DENTSPLY for an RMA (Return Material Authorization) number. This is used to track and identify your unit. Equipment received without this number may not be identifiable.
- Equipment damaged in shipment as a result of improper packing may not be paid by the carrier.

DENTSPLY will not be responsible for damages resulting from improper packing.

Ship prepaid to:
DENTSPLY Ceramco
DENTSPLY International
RMA Number _____
13553 Calimesa Blvd.
Yucaipa, CA 92399-1203 USA
Phone:909.795.2461
Fax: 909.795.5268
equipmentrepair.ca@dentsply.com

Disposing of the device:

The device is an electronic device according to the "Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Devices" (ElektroG).

It was identified in accordance with the existing law and provided with this symbol.

The device is not intended for private use. It is manufactured and delivered for commercial use and is to be disposed by the end user according to the specifications of the Electrical and Electronic Equipment Act – ElektroG.