Trouble Shooting a Jouan C/CR4.22 Centrifuge

No Spin Condition
Erratic Speed Control
No Cooling
General Parts List
Wiring Diagram
No Spin Condition (Removing the Front Panel)

- Using a 3mm Allen Wrench, remove screws at the base of the Front Panel

- Using a Flat blade screwdriver, insert the tip of the screwdriver between the top deck of the machine, and the front panel

- Using the screwdriver, pry the front panel pins out of the top deck to completely detach the front panel from the centrifuge.

- Carefully allow the panel to fold down, allowing the string to tighten and hold the panel in place.
No Spin Condition (Removing the Left Side Panel)

- Using a 3mm Allen Wrench, remove screws at the base of the Left Side Panel

- Using a Flat blade screwdriver, insert the tip of the screwdriver between the top deck of the machine, and the left side panel

- Using the screwdriver, pry the panel pins out of the top deck to completely detach the front panel from the centrifuge.
No Spin Condition – Error Codes

- The C/CR4.22 centrifuge will alarm if an alarm condition is met.

- The alarms that the unit will give are:
  - Chamber Overtemperature
  - Motor Overtemperature
  - Imbalance
  - Lid Open

- If the unit does not give any errors and does not spin:
  - Click Here
No Spin Condition – Chamber Overtemperature

- If a Chamber Overtemperature alarm occurs:
  - Verify the actual temperature in the chamber (at the sensor)
  - Verify the temperature reading on the display
    - To see the temperature read by the centrifuge, when in standby press the “F” key. The chamber temperature will flash on the display

- If the Displayed temp. value matches the Actual:
  - Fault in the Compressor Circuit

- If the Displayed temp and Actual temperature do not match:
  - Faulty Temperature Sensor
  - Faulty CPU assembly
No Spin Condition – Motor Overtemperature

- If a Motor Overtemperature error occurs:
  - Locate connector J5 on the Main PCB
  - With connector still connected place a jumper across Pins 4 & 6 (Brown or Blue wires)

- If unit spins:
  - Check that the Overtemperature wires are not cut or disconnected from the connector on the PCB.
  - If the Overtemperature wires are OK, then replace the motor

- If unit fails to spin:
  - Replace CPU

- Click Here for a General Parts List
No Spin Condition – Imbalance

- The first thing to check on an imbalance alarm:
  - Unit is positioned on a sturdy countertop
  - Buckets are properly Loaded.
  - These units are capable of running with up to 20 grams of imbalance.
  - Check that the unit’s trunnions are properly lubricated.

- If the above checks are OK, proceed to next slide
If an Imbalance Condition occurs:

If an Imbalance occurs right after start is pressed:
   • Imbalance sensor is somehow shorted
     • Imbalance sensor is shorted during shipping to prevent damage to the Pendulum.
   • Check that sensor is not physically shorted
   • Unplug the imbalance sensor from Main CPU
     ▪ Connector J5 Pins 7 & 8
   • If Imbalance still occurs right after start is pressed with sensor unplugged:
     • Replace CPU PCB

Click Here for a General Parts List
No Spin Condition – Lid Open

- If a Lid Open error Occurs:
  - Faulty Lid Switches
    - When the Lid is closed you should see a short across the micro-Switches
    - To test the switches unplug connector J4 from the Main CPU.
      - The Lid switches connect to J4 Pins 5 & 6 (Gray Wires)
      - With the lid closed check that the switches are shorted.
        - Replace switches if they are open
  - Faulty Main CPU
    - If the above check is OK Replace Main CPU.

- Click Here for a General Parts List
No Spin Condition – Checking Motor Voltage

- Locate the Power PCB on the Left Side of the unit.
- You will notice a four pin connector right above the Motor Relay.
- Check the DC Voltage when Start is pressed on the Red & Black wire.
- Voltage applied should be approximately 30vdc at start, and ramp up to as high as 110vdc at maximum speed.
No Spin Condition – Checking Motor Voltage (continued)

- If voltage is present:
  - Brushes may be hung up
  - Brushes may be too short
    - Must be at least 0.50” Long
  - Faulty Motor

- If no Voltage is applied to the motor proceed to next slide

- Click Here for a General Parts List
The two possible causes left on a No Spin Condition are:

- Main CPU
- Power PCB

The best way to determine Which PCB is faulty is to run the integrated tests.

- Specifically Test # 7.

Continue to the next slide for instructions on how to run the test.
Running the Integrated Tests (View of Front Panel)
Running the Integrated Tests – Test # 7

- *Note: It is necessary to have a program with a DELTA TEMP = 0, before access to test procedure.
- To call the test Procedure push the following keys in sequence:
  - “ENTER”, “STOP”, “7”
  - Press “ENTER”, then “ENTER” again.

- The following Message appears
  - FULL=0, ONE=1
    - Keying “0” will cause all the tests to run. Keying “1” requires the operator to select which test to run, by keying the test number.
    - In this case, press “1” then “ENTER”

- The following Message appears
  - Test NO.? ___
    - Press “7”, then “ENTER”
Running the Integrated Tests – Test # 7 (Continued)

- The message on the display is now:
  - Test No. 7: Motor Test
  - Press “Enter”

- The displayed message now is:
  - Close the Lid
    - Even if the lid is closed, this message will appear
  - Close the lid and press “ENTER”

- The display now says:
  - Press Start
  - Press “START” to run the test
Running the Integrated Tests – Test # 7 (Continued)

- The display will show alternately:
  
  • 220v = 5.5A
  
  • 110v = 11A
  
  • If the unit spins, the RPM value will also be displayed

- If the unit spins, the display will show:
  
  • TEST NO 7 OK

- If the unit does not spin, the display will show:
  
  • TEST NO 7 BAD
Test # 7 Results

- If the unit fails Test # 7:
  - Failure of the SCR Bridge, or Relay on Power PCB is likely.
    - Replacement of the Power Control PCB is needed.

- If unit passes Test # 7:
  - Replacement of the Main CPU is needed.
    - It is possible to reset the processor on the MAIN CPU, and sometimes, temporarily fix the no spin condition.
      - Proceed to the next slide for details.

- Click here for a General Parts List
Resetting the Processor

- To reset the Processor:
  - Short pins 35 & 36 together on the chip (see next slide) for 3 seconds.
  - Unit will “beep”
  - The display will come up in French
  - It will be necessary to reprogram unit
  - Unit may spin now, which can help your customer to continue their work, but PCB still needs to be replaced.
  - See next slide for a view of CPU PCB and pins 35 & 36 of EPROM
View of CPU PCB.
Erratic Speed Control (Removing the Front Panel)

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Erratic Speed Control (Removing the Left Side Panel)

- Using a 3mm Allen Wrench, remove screws at the base of the Left Side Panel

- Using a Flat blade screwdriver, insert the tip of the screwdriver between the top deck of the machine, and the left side panel

- Using the screwdriver, pry the panel pins out of the top deck to completely detach the front panel from the centrifuge.
Erratic Speed Control – Verifying Values

- Create a program with an Acceleration Rate of “9”, and a Set Speed of 4000 RPM.

- Allow centrifuge to either stabilize at set speed, or stabilize at the maximum speed it will make. Remove the Black viewport cap.

- Using a Photo-Tachometer, measure the actual speed of the unit through the view port in the center of the centrifuge lid.

- If the speed is accurate compared to the set point, try again at 2000RPM’s.
Erratic Speed Control – Possible Failures

- If the speed display and the actual speed match:
  - Check Brushes

- If the speed display is different from the actual speed, check:
  - Tachometer Sensor
  - Motor Magnets
  - Main CPU
Erratic Speed Control – Checking Brushes

- You can check the brushes two different ways:

- Remove the back panel (refrigerated units only) and remove the brushes

- Turn the unit on its back or side (if refrigerated, refrigeration side must go down) and the bottom of the motor is exposed.

- Click Here for a General Parts List
Erratic Speed Control – Tachometer Sensor Check

- Locate Connector J5 on Main CPU
- Verify that there is a 12vdc supply on J5 Pins 1 & 3 (Pink wire & White/Black wire)
  - If no 12vdc supply is present:
    - Replace Main CPU
- Check for 4 pulses per 1 revolution of the rotor on J5 Pins 2 & 3 (Orange Wire & White/Black wire).
  - If one or more pulses are missing:
    - Check the Motor Magnets
- Check the frequency at Pins 2 & 3 while the motor is spinning. Multiply your reading by 15 to obtain the correct tach reading
- Click Here for a General Parts List
Erratic Speed Control Checking the Magnets in the Motor

- Remove rotor from the centrifuge.
- Disconnect Motor wires, Tachometer wires, and Imbalance wires.
- Turn centrifuge on its side (refrigeration side down)
- Remove the three 10mm bolts from the motor mounts located under the chamber.
- Rotate the motor so that it can be pulled straight out.
- Once motor is pulled, remove tach sensor from motor by unscrewing the two Phillips head screws or 7mm bolts from Tach tray.
- Look inside the motor towards the top. You should see four circular magnets.
- If you are missing one or more of these, replace the motor.

[Click Here for a General Parts List]
Erratic Speed Control – Checking the CPU

- Check the following:
  - Brushes
  - Tachometer Sensor
  - Motor Magnets

- If the above checks are OK:
  - Then the problem is with the CPU

- Click Here for a General Parts List
In a “NO-COOL” situation there are several possibilities:

- Temperature Sensor
- CPU
- Triac
- Compressor
No Cooling – Checking Temperature Sensor

- Measure Temperature Sensor resistance:
  - $30\,\text{k}\Omega \ @ \ 25^\circ\text{C}$ across Brown & Green Wires
  - $6\,\text{k}\Omega \ @ \ 25^\circ\text{C}$ across Brown & Yellow Wires

- If sensor does not read correctly replace sensor

- Click Here for General Parts List
No Cooling – Checking CPU

- Checking the Gate Signal
  - Locate connector J3
  - Connect meter leads to pins 9 & 11
  - When CPU commands the Compressor to be “OFF”, voltage should read line voltage.
  - When CPU commands the compressor to be “ON”, voltage should drop to approximately 1-2VAC.
  - If signal is not applied correctly, replace the CPU
If sensor and PCB are correct:

- Verify proper operation of cooling Triac
- Verify proper operation of Compressor and starting components.
  - Check that start cap is not corroded
- If CPU, Temperature Sensor, Triac and starting components are OK, then replace the compressor

Click Here for General Parts List
General Parts List

- **Bushes (sold individually)** –
  - ALC Motor – 89000214
  - Non ALC Motor – 89000056
- **Condensing Unit (Embraco)** – 51245458
- **Keypad** – 25176008
- **Lid Switches**
  - Old style (lever actuator) – 25445041
  - New Style (push button) – 86001406
- **Locking Assy.** – 89003307
- **Motor** – 25509559
- **PCB’s** –
  - Main CPU-
    - C4.22 – 89000191
    - CR4.22 – 81000312
    - CT4.22 – 81000314
- **PCB’s** –
  - Power – 25153152
  - Low Voltage Supply – 26005001
- **Sensors** –
  - Tachometer – 25153151
  - Imbalance – 85240244
  - Temperature - 86001274
- **Starting Components (Embraco)** –
  - Capacitor – 81001062
  - Relay – 81001063
- **Triac (cooling)** – 26897009
Wiring Diagram (2 of 3)

4.22 CPU PCB Layout with Inputs & Outputs
Wiring Diagram (3 of 3)

4.22 Power Control PCB Layout with Inputs & Outputs