

**TJERNLUND PRODUCTS, INC.**

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INTRODUCTION: Completion of all the steps contained in this guide will verify that the all Tjernlund Specified System products are operating properly. Follow the directions carefully; step by step completion ensures thoroughness and allows Tjernlund to provide better support if difficulties occur. This guide is normally completed in 15 minutes.

Upon completing the guide, please complete the attached warranty form and fax or mail a completed copy of the entire guide to Tjernlund Products.

**IMPORTANT:** IN ORDER TO ACTIVATE THE WARRANTY FOR ANY TJERNLUND SPECIFIED SYSTEM PRODUCT THIS GUIDE MUST BE COMPLETED AND RETURNED TO TJERNLUND PRODUCTS ALONG WITH THE INCLUDED WARRANTY ACTIVATION FORM.

## TJERNLUND SPECIFIED SYSTEMS START-UP GUIDE AND WARRANTY ACTIVATION FORM

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THIS GUIDE THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, CARBON MONOXIDE POISONING, EXPLOSION, OR PERSONAL INJURY OR PROPERTY DAMAGE.

**DO NOT DESTROY. PLEASE READ CAREFULLY AND  
KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.**

# Specified Systems Start-Up Guide

## A. System Restart

To ensure success in this process, please use the disconnect switch to **power off every appliance** served by the Auto-Draft system. Verify that all "Call" LEDs on the CPC are unlit.

Next, **power OFF the Tjernlund CPC-3 and VFD**. Verify that all LEDs are unlit for both units.

Wait one minute for the VFD to completely shutdown.

Then, **power ON the VFD and CPC-3 controller**. Some LEDs on the VFD and the CPC-3 should become lit.

Wait one minute for CPC-3 to reinitialize.

## B. CPC-3 Status Verification

Indicate the status of the following LEDs located on the CPC-3 by **checking the corresponding box** within the appropriate table.

### NOTES

If you are using the CPC-3 for a **Draft** application, verify that the some of the **LEDs under the "Draft" heading** (on your LEFT hand side) are lit and record their status in the Draft table.

If you are using the CPC-3 for a **Combustion Air** application, verify that some of the **LEDs under the "Combustion Air" heading** (on your RIGHT hand side) are lit and record their status in the Combustion Air table.

If you are using the CPC-3 for **both Draft and Combustion Air** applications, **fill out the appropriate table for each application**.

### Draft

IMPORTANT CPC-3 INDICATORS			LIT	UNLIT
Limit Status OK LED				
VFD Status OK LED				
Analog LED				
Digital LED				
Any Call LED (Under Burner Heading)				

### Combustion Air

IMPORTANT CPC-3 INDICATORS			LIT	UNLIT
Limit Status OK LED				
VFD Status OK LED				
Analog LED				
Digital LED				
Any Call LED (Under Burner Heading)				

### IMPORTANT

If **ANY of your indications fall within a shaded box**, continue on to Section X-1 on page 10 and locate the corresponding solution.

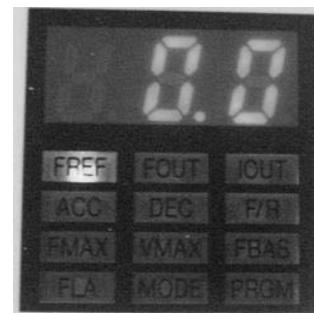
If **NONE of your indications fall within a shaded box**, continue on to Section C on page 2.



## E. VFD Status Verification

Determine which of the LEDs on the Status Panel, located below the red Display LED on the VFD, is lit.

If **FREF is lit**, **continue** on to record the status of Run and Alarm LEDs.



If an LED other than the FREF LED is lit, **press the DSPL button until the FREF LED becomes lit.**



Indicate the status of the following LEDs located on the VFD by checking the appropriate box within the following table.

VFD

IMPORTANT CPC-3 INDICATORS	LIT	UNLIT	BLINKING
Run LED			
Alarm LED			

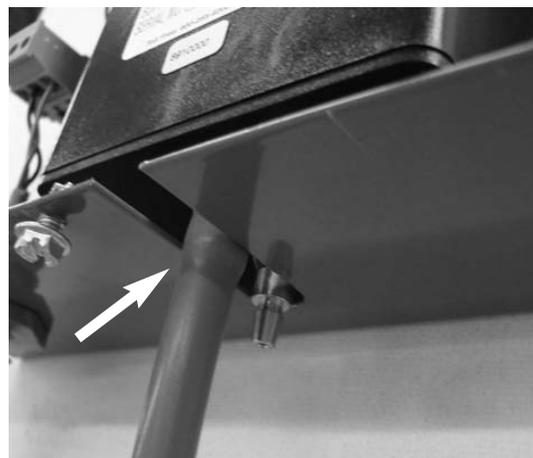
### IMPORTANT

If **ANY of your indications fall within a shaded box**, continue on to Section X-3 on page 11 and locate the corresponding solution.

If **NONE of your indications fall within a shaded box**, continue.

## F. Transducer Set-Up Verification

Verify that the **sensing tube** is connected to the Transducer **Port closest to you** and furthest from the surface upon which the transducer is mounted.





## (7) LED Verification

Indicate the status of the following LEDs located on the CPC-3 by checking the appropriate box within the following table.

### CPC-3 and VFD

IMPORTANT CPC-3 INDICATORS	LIT	UNLIT	BLINKING
VFD Activated LED (on CPC-3)			
Run LED (on VFD)			
Alarm LED (on VFD)			

#### IMPORTANT

If **ANY of your indications fall within a shaded box**, consult a Tjernlund Products technician at 800-255-4208 or FanMail@TjFans.com.

If **NONE of your indications fall within a shaded box**, continue on to Section H on page 5.

## H. Fan Rotation Testing Determination

#### IMPORTANT

If **operating a SINGLE FAN system**, continue on to Section I-1 on page 6.

If **operating a MULTIPLE FAN system**, continue on to Section I-2 on page 8.

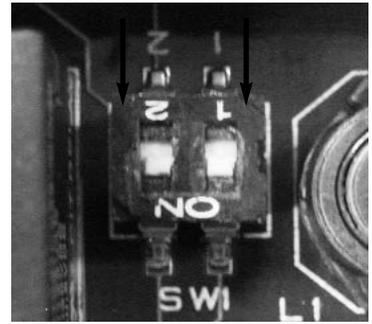


**(2) Identify the input voltage of the system by looking at the white label on the VFD.**

**For 115V**

Leave the **left Dip Switch (#2)** of the appropriate Dip Switch set, as determined in the previous step, **down** toward the floor.

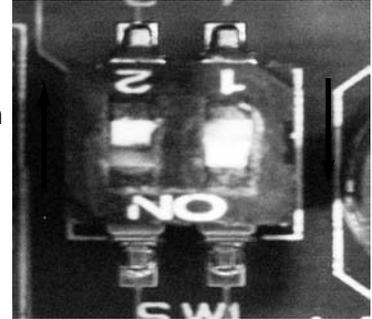
Move the **right Dip Switch (#1)** of the appropriate Dip Switch set, as determined in the previous step, **down** toward the floor.



**For 230V or 460V**

Move the **left Dip Switch (#2)** of the appropriate Dip Switch set, as determined in the previous step, **up** toward the ceiling.

Move the **right Dip Switch (#1)** of the appropriate Dip Switch set, as determined in the previous step, **down** toward the floor.



**(3) Wait up to 90 seconds for Actual Pressure to stabilize**

**(4) Record the Actual Pressure**

Top Line Reads:

Operation Mode	Set Point	Actual Pressure	% Speed
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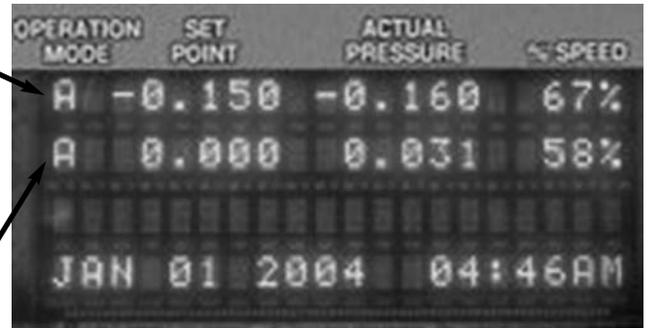
(Disregard if system is for Combustion Air only)

Second from Top Line Reads:

Operation Mode	Set Point	Actual Pressure	% Speed
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(Disregard if system is for Draft only)



Note: The above numbers have no meaning in regards to these steps-- they are merely placeholders. Your numbers do not need to match these.

**K-1. Fan Rotation Setting**

Compare the last two readings of Actual Pressure recorded on pages 6 and 7.

For a **Draft** system, identify the more negative Actual Pressure reading and **configure the Dip Switches in the manner that resulted in that more negative Actual Pressure** reading.

If more negative reading is the reading recorded on page 6 configure as shown on page 2.

If more negative reading is the reading recorded on page 7 configure as shown on page 7.

For a **Combustion Air** system, identify the more positive Actual Pressure reading and **configure the Dip Switches in the manner that resulted in that more positive Actual Pressure** reading.

If more positive reading is the reading recorded on page 6 configure as shown on page 2.

If more positive reading is the reading recorded on page 7 configure as shown on page 7.





# ERRORS SECTION

**IMPORTANT: IF ANY OF THE FOLLOWING ACTIONS CORRECT THE ERROR YOU ARE EXPERIENCING GO BACK TO THE BEGINNING OF THE SECTION WHICH LEAD YOU TO THIS SECTION AND REPEAT THOSE STEPS BEFORE CONTINUING ON WITH THE GUIDE.**

## X-1. CPC-3 Primary LED Errors

NOTE: If none of the following listed correction measures result in a change to the proper reading, consult a Tjernlund Products technician at 800-255-4208 or FanMail@TJFans.com.

### X-1A. VFD Status OK LED Unlit

Check to see if a fault code appears in the red LED display on the VFD. If something other than 0.0 appears, a fault code is being displayed



#### Fault Code Appears

Refer to the Fault Code Table and identify cause for that code appearing.

#### No Fault Code Appears

Verify that the following wiring scenarios are true and correct them if necessary:

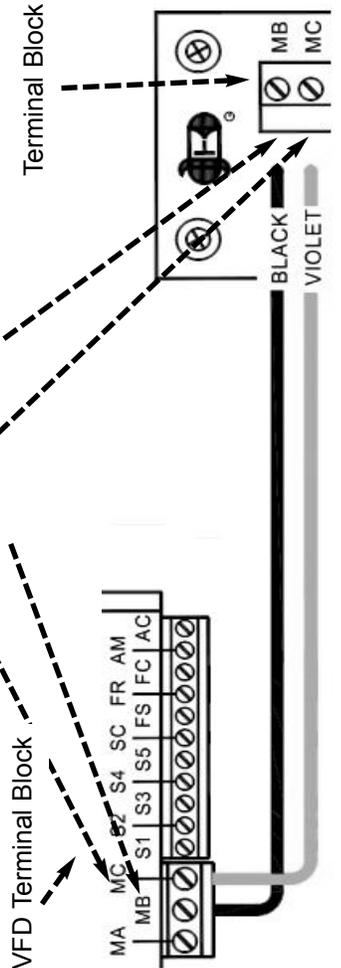
The ten position terminal block is plugged into the appropriate harness on the VFD. Press firmly to verify

The wire from the CPC-3 terminal block at the MB position is connected to the VFD terminal block at the MB position.

The wire from the CPC-3 terminal block at the MC position is connected to the VFD terminal block at the MC position.

The wire from the VFD terminal block at the MB position is connected to the VFD at the MB position.

The wire from the VFD terminal block at the MC position is connected to the VFD at the MC position



### X-1B. Limit Status OK LED Unlit

Verify that leads are connected to positions S1 and S2 on the VFD terminal block.

**If leads are NOT connected to S1 and S2**, consult the Tjernlund wiring diagram and wire accordingly. Check the Limit Status OK LED after properly wiring the CPC-3.

**If leads are connected to S1 and S2**, disconnect leads and install a jumper-wire between S1 and S2.

**If the Limit Status OK LED is NOW LIT**, verify the continuity of the safety circuit. Refer to the Tjernlund wiring diagram.

**If the Limit Status OK LED is STILL UNLIT**, jumper-wire within the CPC-3 positions M1 and M2.

**If Limit Status OK LED is NOW LIT**, verify the wiring between the CPC-3 and the VFD. Refer to the provided wiring diagrams.

### X-1C. Analog LED and/or Digital LED

Disconnect all wires, except the power supply, from the CPC-3.

If "Analog" and/or "Digital" LED is NOW LIT, verify the wiring. Refer to the provided wiring diagrams.

## X-1D. Any Call LED (Under Burner Section)

Verify that all heater disconnects are in the off position.

Check interlock terminal blocks corresponding to the Call LEDs which are lit and confirm that the AB positions are not jumper-wired.

**If AB positions are jumper-wired**, remove jumper wire.

**If AB positions are NOT jumper-wired**, verify that the 1 and 2 positions have no power supplied.

**If 1 and 2 have power supplied**, remove the power source.

## X-2. CPC-3 Display Errors

### NOTE

If the following listed correction measure does not result in a change to the proper reading, consult a Tjernlund Products technician at 800-255-4208 or FanMail@TjFans.com

Verify that the wiring from the Transducer to the CPC-3 is correct. Refer to the provided wiring diagrams.

## X-3. VFD LED Errors

### NOTE

If none of the following listed correction measures result in a change to the proper reading, consult a Tjernlund Products technician at 800-255-4208 or FanMail@TjFans.com

#### “Run” LED

Consult a Tjernlund Products technician at 800-255-4208 or FanMail@TjFans.com.

#### “Alarm” LED

Refer to the Fault Code Table to determine the solution to the fault displayed on the red VFD display.

## X-4. Errors Regarding Actual Pressure

Disconnect the sensing tube from its location within the ducts.

Create an artificial change in pressure by forcing air in or out of the sensing tube.

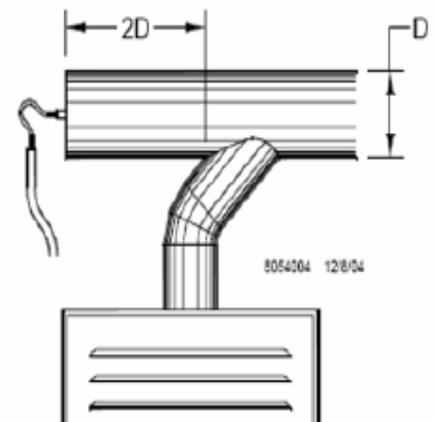
**If changes in the Actual Pressure DO occur**, slightly adjust the sensing tube depth within its current location and look for a change or adjust the sensing tubes position within the ducts to an alternate location that meets the following specifications:

The sensing tube should be 2 times the diameter of the vent pipe behind the heater farthest from the vent termination.

**If this is impossible**, the tube must be installed with sensing tube flush with the interior wall of manifold vent pipe.



**DO NOT** install sensing tube in an elbow.



**If changes in the Actual Pressure DO NOT occur or if the problem persists**, consult a Tjernlund Products technician at 800-255-4208 or FanMail@TjFans.com.

# Warranty Activation Form

Please complete this form and return it to Tjernlund Products. Completing and returning this form is necessary in order to activate the warranty for any Specified System component. Please note that the warranty period begins at the date the first component of the system was shipped and not the date this form is returned.

## Customer Information

Specified System Owner: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Phone Number: \_\_\_\_\_

System Location (If Different from Owner Location):

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Qualified System Installer: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Phone Number: \_\_\_\_\_

## Components Under Warranty:

Number of VFDs \_\_\_\_\_  
Number of CPC-3s \_\_\_\_\_  
Number of VSADs \_\_\_\_\_  
Number of VSUBs \_\_\_\_\_  
Number of VSRI's \_\_\_\_\_  
Number of VSSI's \_\_\_\_\_

## Guide Completion Verification

I, hereby, attest that the Tjernlund Specified Systems Start-Up Guide has been completed by a qualified professional installer and that, to the best of my knowledge, all Tjernlund components are functional at this time.

Signature: \_\_\_\_\_

Name (Print): \_\_\_\_\_

Position: \_\_\_\_\_

Date: \_\_\_\_\_

# Appendix A: Transducer Sensing Tube Location Guide

**IMPORTANT: TJERNLUND HIGHLY RECOMMENDS THAT TRANSDUCER SENSING TUBES BE LOCATED WITHIN THE CAP OF A TEE OR THE REAR OF A COMMON MANIFOLD.**

The tee is necessary so that only static pressure is measured. If the transducer sensing tube is installed in the side of a vent pipe it could also measure velocity pressure, giving an incorrect signal back to the CPC-3. Typically, draft applications should sample at the point in back of the vent connection that is furthest from the inducer/blower.

## TD-2 (For Draft and Sealed Combustion Air)

The possible locations for the sensing tube, in order of reliability and accuracy for:

### Category 1 or 2 Heaters

**Location 1** In a tee behind the heater furthest from the inducer/blower.

**Location 2** In the riser of the heater furthest from the inducer/blower.

**Location 3** In any other tee, no closer than 5 times the vent diameter from an elbow.

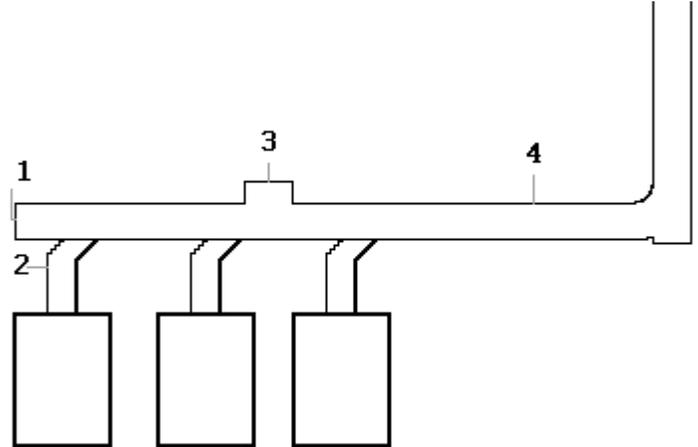
**Location 4** Any other area of straight pipe.

### Category 3 or 4 Heaters

**Location 1** In a tee behind the heater furthest from the inducer/blower.

**Location 3** In any other tee, no closer than 5 times the vent pipe diameter from an elbow.

**Location 4** Any other area of straight pipe.



- Velocity in the manifold should not exceed 1800 ft/min.
- Area of the manifold should be at least 75% of all the appliance outlet areas added together.

## TD-3 (For Open Combustion Air)

In open mode the mechanical room air is sampled and an adjacent space is referenced. Referencing an adjacent space within the building typically provides a more stable reference pressure than referencing outdoor air—the goal is to reference static pressure. Do not sample pressures at locations that can be affected by frequently opened doors, elevator shafts, ventilation fans, or diffusers. Use the model IPS-1 for indoor pressure sensing and model WW1 if sampling must be referenced outdoors.

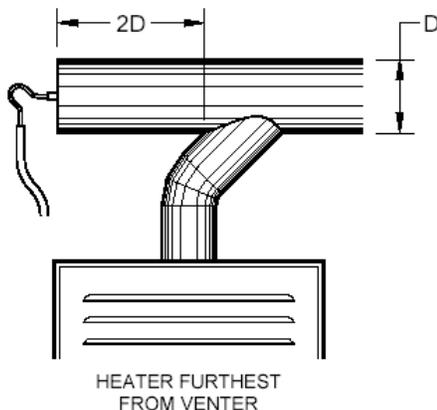
### Other Location Directions:

- Do not place sensing tube in an elbow.
- Do not place sensing tube from the underneath area of the vent pipe; condensate and/or debris could plug sensing tube.

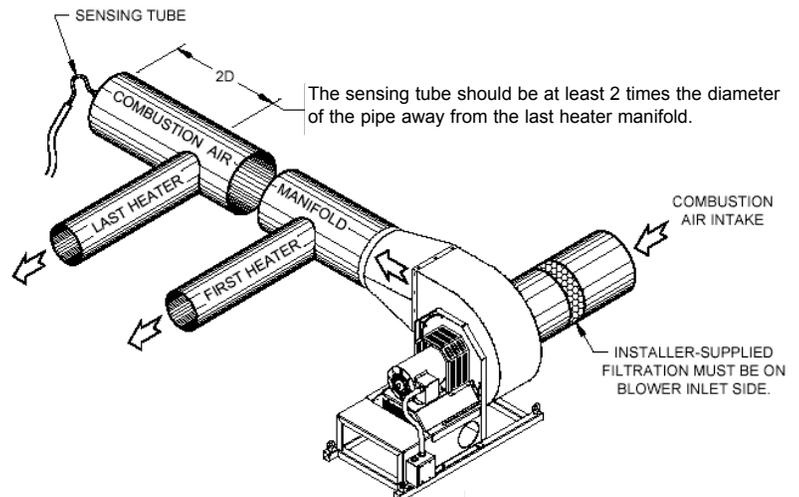
See below for diagrams of proper transducer sensing tube locations.

### Mechanical Draft Applications

The sensing tube should be at least 2 times the diameter of the pipe back from the manifold.



### Sealed Combustion Air Applications



# Appendix B: CPC-3 and VFD Abridged Fault Code Guide

Use the information below to overcome CPC-3 and/or VFD faults. For a complete VFD fault guide, consult the Yaskawa fault code guide. Contact Tjernlund Products at 800-255-4208 if neither fault code guide provides a solution.

## CPC-3 Faults

### INDUC MECH FAULT

**Cause:** The safety circuit between S1 and S2 is open on the VFD.

VSAD: The Motor High Limit or Fan High Limit or Tilt Switch is open.

VSUB: The Motor High Limit is open.

**Solution:** Varies; see below.

VSAD: Check the continuity of the Motor High Limit, Fan High Limit, and Tilt Switch to determine which is open. If there is no continuity for either of the limits or the switch, contact Tjernlund Products for a replacement. If all have continuity, verify that the wiring between the VFD and the fan provides continuity. If continuity does not exist between the VFD and fan, replace the existing wiring.

VSUB: Check the continuity of the Motor High Limit to determine if it is open. If there is no continuity, contact Tjernlund Products for a replacement. If there is continuity, verify that the wiring between the VFD and the fan provides continuity. If continuity does not exist between the VFD and fan, replace the existing wiring.

### C AIR MECH FAULT

**Cause:** The safety circuit between S1 and S2 is open.

Fire Freeze Protection (FFP) Limit is open.

**Solution:** Check the continuity of FFP Limit to determine if it is open. If there is no continuity, contact Tjernlund Products for a replacement. If there is continuity, verify that the wiring between the VFD and the fan provides continuity. If continuity does not exist between the VFD and fan, replace the existing wiring.

### INDUC PROV FAULT or C AIR PROV FAULT

**Cause:** The fan prover is not making.

**Solution:** Inspect the prover, sensing tube, and tubing for problems. One or all may need to be set and/or relocated.

### AUX SENSOR FAULT

**Cause:** The safety is not making on the auxiliary device.

**Solution:** Inspect the auxillary device. The auxiliary sensor requires contact closure to work correctly.

### INDUC VFD FAULT or C AIR VFD FAULT

**Cause:** Fault related to VFD.

**Solution:** Inspect VFD and reference below and/or the Yaskawa fault code guide.

### UNDR DRAFT FAULT or C AIR PRES FAULT

**Cause:** The fan is unable to bring the actual pressure to the CPC-3 set point.

**Solution:** Check to see if the VFD displays a fault message. If so, see below. If not, verify the transducer is properly functioning. See the Tjernlund Specified Systems Transducer Sensing Tube Location Guide and/or Section X-4 in the Start-Up and Warranty Activation Guide.

## VFD Faults

For a complete guide to the VFD faults, reference the Yaskawa fault code guide.

**ou, blinking:** Check the power supply voltage. Confirm that the power supply matches the supply for which the VFD is rated.

**EF, blinking:** Verify the fan rotation dip switches within CPC-3 are correctly oriented. Refer to Section E and then proceed to Section J-1 through L-1 in the Start-Up and Warranty Activation Guide.

**FAn, solid:** Verify that the VFD cooling fan is plugged in and supplied power.

**oL I, solid:** The motor is over-amping. Remove power to the VFD, wait 2 minutes and then reinitiate power to the VFD. While VFD is reinitializing, press the DSPL button on the VFD until the IOUT LED on the VFD is lit. As the fan begins to operate, compare the amp draw displayed on the red LED screen of the VFD with that displayed on the fan's nameplate.

If the value displayed VFD exceeds the number displayed on the fan's nameplate, confirm that the fan impeller is operating in the correct direction (counter-clockwise). Refer to Section E and then proceed to Section J-1 through L-1 in the Start-Up and Warranty Activation Guide to alter the direction of the impeller's rotation, if necessary. Also, verify that all 3 windings of the motor do not return an open Ohm reading.

## **Appendix B: CPC-3 and VFD Abridged Fault Code Guide (Continued)**

### **Resetting the VFD and/or CPC-3**

#### **Resetting Faulted Drives from the CPC-3:**

1. Press and Hold the "Save Setting" Button for 5 seconds until the display reads "Keypad Open".
2. Press the Options button. The Options Menu will appear on the display.
3. Press the "Up" arrow button until "Reset Drives" appears on the Display.
4. Press the "Save Setting" button and wait about 5 seconds for the CPC-3 to reset the drive(s). "Drives Reset" should appear on the display.
5. To return the keypad to its normal Locked Mode state, press the "Options Button". The display should read "Key Pad Open".
6. Press the "Enter" button. The display should read "Lock Out Key Pad"
7. Press the "Save Setting" button. The display should read "Keypad Locked".

#### **Resetting CPC-3 Faults from the CPC-3:**

1. Press and Hold the "Save Setting" Button for 5 seconds until the display reads "Keypad Open".
2. Press the Options button. The Options Menu will appear on the display.
3. Press the "Up" arrow button until "Fault History" appears on the Display.
4. Press the "Enter" button. The last fault to occur within the control will appear on the display. Record the fault message.
5. Press the "Up" arrow button and record the next fault message. Continue to use the "Up" arrow button while recording all posted faults.
6. After recording all fault messages, Press the "Up" arrow button until "Clear All Faults" appears on the display.
7. Press the "Save Setting" button.
8. To return the keypad to its normal Locked Mode state, press the "Options Button". The display should read "Key Pad Open".
9. Press the "Enter" button. The display should read "Lock Out Key Pad".
10. Press the "Save Setting" button. The display should read "Keypad Locked".