



TRANE®

Confidential Service Bulletin

Rockwell LF 2.0 Drives AFDE Service Pak upgrade

Order Number: CTV-SVC30C-EN

DATE: September 2007

Introduction

The purpose of this bulletin is to explain and authorize Trane Field Service Offices to perform an upgrade on CVHE/F with the Refrigerant cooled Rockwell Drives AFDE. Trane personnel are expected to do this work if trained at one of the regional warranty conference (Feb. 2007) or by prior office training. Those who are not properly trained must call Rockwell to schedule site visits to install Firmware and upgrade the drive with Trane assistance, or for certain offices, to set up training visit. The Coordination of the site visits where Rockwell does the retrofits will be between the local Trane Office and Rockwell. We have identified which upgrades are to be installed on each drive.

NOTICE: Warnings and Cautions appear at appropriate sections throughout this literature. Read these carefully.

⚠ WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION: Indicates a situation that may result in equipment or property-damage only accidents.

Units Affected

AFDE LF 2.0 Drives Shipped on CVHE/F Prior to Oct. 2006

Chillers affected are identified on the list found on the La Crosse intranet. They are grouped by Sales office and service managers. Rockwell will have this same list.

Follow instructions for downloading information and files on:

http://tranenetlax1/lbu_technicalsupport/home/AFDEServicePak/AFDEPowerPak.htm

Discussion

Trane and Rockwell have been working together to identify product improvement areas. The main intent of this retrofit bulletin is to field implement line carrier frequency synchronization, and to identify other product upgrades on each LF 2.0 chiller and to provide instructions of how to complete the retrofit.

Previously the input of the drive, the Rectifier fired the IGBTs at 4 khz carrier frequency while the drive output, the inverter, fired the IGBTs at only 2 khz, This mismatch and random firing creates electrical disturbances which are detrimental to the CTV motor. Motor failures, on units with LF 2.0 Drives, have been attributed to “partial discharge (arcing)” in the stator slots, as found in analysis of field returned failed motors. The upgrade of the Line Carrier frequency synchronization will change the drive output, the inverter, to also fire at the 4 khz rate, and synchronize this firing to prevent the electrical disturbances identified.

This upgrade, if required, involves two board replacements, plus a wire harness addition, onto the right handle side of the Frame 3 (405 and 608amp) power module. Frame 4 has combined control board and the hardware already installed.

With the hardware installed Rockwell / Trane will enable this feature. With the VS utilities flashing of the RECOMM firmware upgrade the Trane TechView AFD Configuration must be set back to “YES Use Trane Defaults” by the technician on site via connected with TechView. Trane has been shipping this hardware since approx mid July 2005; Trane began manually enabling this feature in Mid March 2006 through May 2006, after which it became “defaulted on” with new RECOMM Firmware. If required, input Power Kit will also be installed to the drive. Additionally, the CH530 Main processor software will be upgraded to current revision (CTV 10.0) while on the site visit.

This Confidential Service Bulletin explains the work to be completed and why.

Details including the Sales order listing, hardware installation instructions, firmware flashing instructions and visual inspections in sections posted on the Trane intranet.

The following supporting sections are on the TRANE INTRANET;

http://tranenetlax1/lbu_technicalsupport/home/AFDEServicePak/AFDEPowerPak.htm

- Sales orders and items to be upgraded.
- Service bulletins
- How to presentations:
 - Hardware installation illustrations
 - DRIVE: Firmware Flashing instructions,
 - Visual Check
- CH530 DynaView main Processor software upgrade to SW CTV 10.0

WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer’s literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Note: For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN or PROD-SVB06A-FR

SECTION I

AFDE Tasks Summary

- 1 All Chillers with AFDE Drives: Upgrade the CH530 to 10.0 (or later). Reference CTV-SVB31_-EN.
- 2 All AFDE Rockwell drives (Frame 3 and 4): Upgrade Firmware in the CH530 LLID labeled RECOMM (Reliance Electric Communications) PCB to REV 1.007.027 (or greater)
- 3 Frame 3 drives on list (405 and 608 amp drives) only:
 - a If necessary, as determined from sales order list, Install KIT 14714 Input Power Kit and Label LBL00278.
 - a If necessary, as determined from sales order list, install KIT 14713 Line Synchron Retrofit KIT.
 - b UPGRADE all Frame 3 inverter and rectifier control pcbs firmware to: Inverter-LiquiFlo 1.009.040 (or greater), and activate rectifier to 1.012.025 (or greater)
- 4 Frame 4 drives on list (850 (900), and 1210 amp):
 - a If necessary, as indicated on sales order list as requiring FIRMWARE upgrade contact La Crosse for firmware.
- 5 All drives: While on site, do the visual inspection items.

Note: Several of these tasks are items to be performed at startup commissioning and on annual maintenances and are being brought to service technicians attention with this literature.

- 6 Save appropriate data files and information and E-mail to Rockwell and Trane.

Upgrade Items to be performed in this retrofit:

Depending on ship dates, some drives may require all items where others only two, or one.

Step 1. The Retrofit list, on the intranet, identifies the sales orders by office and serial number and identifies which items will be upgraded. Refer to this list to determine which, if any, parts need to be ordered. Only order KIT 14713 if there is a "NO" in that column, and only order KIT 14714 if there is a "NO" in either the fuse, cap or mov columns.

Step 2. Order required kits from Trane Parts

NOTE: PARTS MADE AVAILABLE IN JAN, 2007

Step 3. Trane is expected to do this work if trained at one of the regional warranty conferences (Feb. 2007) or by prior office training. Those who are not properly trained must call Rockwell to schedule site visits to install Firmware and upgrade the drive with Trane assistance.

To Schedule site visits contact Rockwell at the numbers:

1-888-374-8370 Rockwell (Select #5 when asked)

1-440-646-7246 Ken Daggs

1-440-646-7244 Brian Murphy

Note: Please try all three numbers then leave a voice mail, if necessary.

For Trane CTV Technical Support assistance contact; 1-877-78-TRANE (1-877-788-7263)

For Rockwell Technical Support Contact (864) 458-2033 - office or (864) 918-8485 - cell

Local Trane will set up a site visit based on the upgrades required, and coordinate with Rockwell if necessary.

Note:

- Frame 3 drives are 405 and 608 amp.
- Frame 4 drives are 850 and 1210 amps.

Item 1. Frame 3 Drives: Install the Line Carrier frequency synchronization hardware KIT14713, and enable the synchronization feature.

- See “How to Power Points” on Intranet for illustrations on installation of these components.

The Frame 3 Line Synch Retrofit Kit is TRANE KIT14713 .

Each kit consists of:

KIT 14713

- 1 pc 180063-A01 Rectifier Control Board
- 1 pc 180064-A01 Inverter Control Board
- 1 pc 180945-C01 Harness Cable



Note: If the two PCBs become mixed up, look at the white sticker on the large 1C chip as it will be on the appropriate box as well.

- 1.1) On **Frame 3** drives, which already have the new control assembly PCBs, only Firmware will be upgraded if necessary.

Item 2. Frame 3 Input Power Kit KIT14714.

Each kit consisting of:

- KIT 14714
- 1 pc 24797-033-03 MOV Assembly
- 1 pc 149862 5 amp Control Fuse
- 1 pc 181116-C04 1mfd Capacitor

Note: With each KIT14714 also order one wiring diagram label LBL00278



2.1) Install MOV and 1 uF cap to the 2A6 filter assembly. The purpose of a Metal Oxide Varistor and 1 micro farad capacitor are to dissipate electrical disturbances that could be harmful to the drive electronic components (such as IGBT).

2.2) additionally, only on Frame 3 (405 and 608amp) drives, we will upgrade to a 5 amp 2F3 fuse. The Fuse 2F3 was 4 amps and periodically this has been found to blow. This has been changed to 5 amps on Frame 3 Drives.

Item 3. Firmware Flashing. (Via Rockwell VS utilities tool KIT12151)

- See Firmware Flashing presentation.

Note: You must have the three BIN files (Intranet) and associated "NVS" files, saved onto the computer (PC) and be able to find them from the browser when prompted.

Firmware

All Drives on list: RECOMM Firmware 1.007.027 (began shipping in May 2006).

TRANE RECOMM (LLID) firmware upgrade; the RECOMM printed circuit board is the communication device coordinating communications between the Drive and Trane CH530. This board also contains Default Drive setup parameters written to the drive upon power.

The following features are upgraded with Drive RECOMM Firmware;

3.1) This will enable the 4 kHz Rectifier carrier frequency as default, and will implement up AND when the Trane AFD Configuration is set to YES.

3.2) The Power loss reset time of 60 will also provide an anti cycle time equal to same setting. Default is 60 seconds. Short cycling has shown to cause over current conditions if the drive is only off line for 15 seconds or so as can happen with variable water flow applications and some water flow loss and power loss



scenarios. The TechView adjustable setting will remain at 60 seconds but not provide the timing for two functions; power loss reset time, and the minimum time from drive stop to restart. The Chiller restart inhibit still can override this timer, if the free starts are consumed.

3.3) AFD Output Phase Loss: Changes the % current imbalance allowed to 20% from 15%, and time from 5 seconds to 9 seconds.

Frame 3 drives (405 and 608 amps) with factory installed line sync control PCBs shipped prior to June 2006: these PCB's need to have to firmware revision checked. Use the OIM to check the revision. (Note: Upgrade firmware on the Line Synchronization pcbs if necessary.)

3.4) LiquiFlo 2.0 Inverter Control PCB 1.009.040

3.5) Active Rectifier Control PCB 1.012.025

Note: After down load of Firmware(s), check that CH530 AF configuration states "Use Trane Defaults = Yes. If not, then change to Yes and load. With Yes loaded, then cycle power to drive so the ReComm powers up with Yes present which will load the new "hidden" parameters into the drive. Check that PI5I in the inverter now is set to 4K.

Frame 4 Drives.

If your unit states "needs Firmware" in sales order list, contact Tech Service for Firmware.

Step 4. All Units on list - Trane service

CH530 Dynaview main processor application download.

4.1) Download version CTV 10.0 or later, Main processor software into the Dynaview. (Do not continue operation with version 8 if installed. Ref CTV-SVA31B-EN) Ref CTV-SVA31B-EN, and CTV-SVA19A-EN Units where Drive will not increase speed.

*Note: 1) While the compressor is STOPPED, enter COMPRESSOR starts and hours from the Set point view/Compressor Tab. TechView writes these set point values into a temporary (Volatile) memory location.
2) Turn chiller power OFF to cycle DynaView power off. This step is required to write the starts and hours to the non0volatiel stored memory. Purge counts and timers are reset with the new download and are not set points. (Future software download great than CTV 10, CTVD 5, and CVR 4 should not affect these set points.)*

If uploading from MP5.0 you will also need to set the PTON and NTON values after the 10.0 installation.

Step 5. All Drives on List - Visual inspections and checks (Trane)

- See Intranet for illustrations and power points.

5.1) Filter capacitor fuses; check for proper size. Check continuity with ohm meter

5.2) Check Precharge Contactor power wiring routing for sharp edges and any conductor insulation damage. Inspect Precharge Contactor and auxiliaries.

5.3) Check the CH530 Diagnostics history using TechView for Drive instantaneous over current. Check Drive Faults for any DSAT faults. See Service Alert CTV-SVA28A-EN

Past related service information to be aware of:

5.4) Verify has external balance resistors if required. Reference CTV -SVC12A-EN (If power module shipped after March 2004, then OK)

5.5) Verify inductor clearances per CTV-SVA04A-EN.



5.6) Has chiller had the mandatory bearing retrofit. Reference CTV-SVC27A-EN and CTV-SVC24A-EN

Step 6. Document and report your completed work (Trane)

6.1) Mark Chiller drive as having completed the AFDE Service PAK upgrade, and write the DRIVE SERIAL NUMBER on the Service ticket.

Properly Identify by marking near the drive nameplate on door of drive that:

This AFDE Drive has been upgraded per service bulletin CTV-SVC30A-EN SERVICE PAK upgrade. Date: _____

5.2) E-mail the following information to:

LBU Tech Service: techservice@trane.com

Include the claim number and complete data

Be sure to note the drive serial number (MEA____) in the claim.

and

wekowaleski@ra.rockwell.com & jjjenks@ra.rockwell.com

- The Chiller Serial Number _____
- The DRIVE POWER MODULE serial Number_____
- Drive Parameter files from inverter & rectifier.

Parts

Note: PARTS BECAME AVAILABLE JAN, 2007

DO NOT ORDER PARTS PRIOR TO THEIR AVAILABILITY

Jobs that do not require parts can be upgraded prior to then; (ie Where Firmware and CH530 software upgrade, & visual checks only)

Order your required parts, (as identified in the sales order list) from La Crosse Parts. Parts for the retrofit to be charged against account number CTV-SVC30_-EN.

All required parts are being furnished via Rockwell to Trane Parts (M.O.V.,1uf, fuse, pcbs, jumper) at no charge.

- KIT14713 Line Synch Retrofit Kit (Frame 3)
- KIT14714 Input Power Kit (Frame 3) and LBL00278 wiring diagram adhesive backed for inside door)

1 Microfarad CAPACITOR

The capacitor is not required to proceed with the synchronization purpose of the retrofit. It has come to our attention that several sites do not have the 1 microfarad capacitor even though the information provided indicates they shipped with the capacitor.

If you find units in your area which do not have the capacitor [Rockwell Part number Capacitor 181116-C04]. They will be available from Rockwell for no charge, however the installation of them is recommended but not mandatory. The decision to install them will be a local decision, and not claimable on the retrofit as a second trip was not authorized.

Contact Rockwell via E-mail at: basands@ra.rockwell.com with the following information:

Qty	Part No.	Description	Chiller Serial No(s)
No. of caps needed	181116-C04	1mfd. Liquiflo capacitor	List serial numbers of Trane chiller(s) being retrofitted with caps from this order

The Trane Service office will need to provide Rockwell the address to ship the caps. Caps will not be shipped to job sites. Please provide us with the following information:

Ship to:

Office Name _____
 Address _____
 City _____
 State _____
 Zip _____
 Attn: _____
 Phone No: _____

Tools

- Trane TechView and cables.
- Rockwell VS utilities cable (TRANE KIT: KIT12151) KIT12151 = RECOMM-VSU232

Contains the CD, RS-232 device, and necessary cables, to download Firmware. This Rockwell tool can then be used on any future service of Trane drives.



Labor

Two hours labor per chiller for repairs, plus three hours travel per site are authorized. Submit the hours on Falcon Retrofit Claim.

Expiration Date

September 30, 2007

Reference

CTV-SVA26A-EN . AFDE STARTUP

CTV-SVB26B-EN. Revised instructions for AFDE-MANUALLY Enabling Line Synchronization

CTV-SVA04A-EN. CVHE-F with Rockwell LF 2.0 Drive

CTV-SVA28A-EN. Instantaneous Current Overload with DSAT Rockwell Fault Codes

CTV-SVA31B-EN. CH530 DynaView Memory Loss Issue

CTV-SVA19A-EN. AFD Drive will not increase speed yet indicates it's running at maximum capacity

CTV-CVC12B-EN. CVHE-F with Rockwell LF 2.0, 1.5 and 1.0 Drives Resistor Retrofit, Potential Drive Power Module Failures

Questions

For general questions contact the CTV Technical Service department in La Crosse at 1-877-78-TRANE or e-mail at TechService@trane.com.



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A business of American Standard Companies
www.trane.com

For more information contact your local district office or e-mail us at comfort@trane.com

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Trane has a policy of continuous product data and product improvement and reserves the right to change design and specifications without notice. Only qualified technicians should perform the installation and servicing of equipment referred to in this bulletin.