



Installation Guide

Variable Frequency Drive

Conversion TR1 to TR170

for RTAC Condenser Fans

Models:

120 to 500 ton (RTAC)

Drives:

DRV03113

DRV03114

▲ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.



Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



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



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



Indicates a situation that could result in equipment or property-damage only accidents.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

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Revision History

- TR170 VFD Program Parameters section is moved to Set the VFD Programming Parameters chapter.
- Updated Modify Parameters section.
- Updated Reset Parameters Back to Factory Defaults section.



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General Information

About This Manual

The step-by-step instructions outlined in this manual describe the procedures required to successfully retrofit a Trane TR1 variable frequency drive (VFD) on RTAC™ air-cooled chillers to a Trane TR170 VFD. Drives are required for low and wide ambient operation. The Trane TR1 VFD was originally installed for RTAC design sequences W0 through 1C. An affected RTAC will have two, three, or four condenser fan drives. The number of drives will match the number of compressors. For example, a three-compressor RTAC will have three condenser fan drives.

The installation instructions in this manual are divided into three general topic areas:

- Removal of existing TR1 VFD.
- Installation of replacement TR170 VFD.
- TR170 programming of parameters.

Follow start-up and troubleshooting procedures outlined in the service manuals of the unit and/or the literature that is included with this TR170 control.

Tools Required

Very few tools are required to perform this installation. A service technician with a well-stocked tool chest should have the right tools to perform the job.

Materials Required

Two TR170 drives are available. Select the correct drive replacement kit based on the existing unit voltage as shown in the following table.

Table 1. Drive Selection

Unit Voltage	Drive Part Number	Drive Description
200/60/3 230/60/3	DRV03113	DRIVE; TR170 1.5HP 208VAC
380/60/3 400/50/3 460/60/3 575/60/3	DRV03114	DRIVE; TR170 1.5HP 460VAC

In addition to the drives, some field provided material will be required. A partial list of material is provided here to help you plan ahead and to avoid material shortages at the job site.

- Wire, #16 AWG—Control wire will be required to make the connections between components.
- Wire markers will be required to identify field wiring.
- Wire nuts and splicers may be required if splicing wires in the control panel.
- Cable ties help to “clean up” wiring runs.
- The blanket heater used with the Trane TR1 drive is sized incorrectly for use with a Trane TR170 drive. The part number for the TR170 blanket heater is HTR16716.
- Four-compressor units and circuit 1 of three-compressor units use a single LLID relay to enable both drives on a circuit. RTAC designs incorporating TR1 VFDs use a paralleled enable signals to start the drives. This configuration is not applicable to the TR170 drives. An additional relay with the following minimum specifications is required: 2 pole, normally open, 24-VDC contacts, and 120-VAC coil. Relay RLY00636 and socket BAS00154 are recommended.



Removing the Existing VFD and Components

This section describes the procedure used to remove a Trane TR1 VFD from its panel assembly in the RTAC fan control panels.

Programming parameters are supplied with the VFD that must be set based on unit specifications. See “TR170 VFD Program Parameters,” p. 10.

⚠ WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

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 a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06-EN.*

Note: For additional information regarding the safe discharge of capacitors, see PROD-SVB06x-EN or PROD-SVB06x-FR.

1. Turn off power to the machine, water pumps, and any field provided control power.
2. Secure all disconnect switches following lockout/tagout safety procedures.
3. Open the control panel doors and verify all power has been removed.
4. Record the following information from the condenser fan motor nameplate. This information will be needed during drive configuration.
 - Motor Power
 - Motor Voltage
 - Motor Frequency
 - Motor Current
 - Motor Nominal Speed

Note: Verify the condenser fan motor is inverter duty rated. Inverter duty motors provide a more robust system when combined with variable speed drives. In the event the condenser fan is not inverter duty rated, contact the local Trane Parts Center with the unit model number or serial number for replacement options.

5. Locate the existing TR1 VFD unit enclosure for RTAC units as shown in the following figures.

Removing the Existing VFD and Components

Figure 1. RTAC Panel Configuration

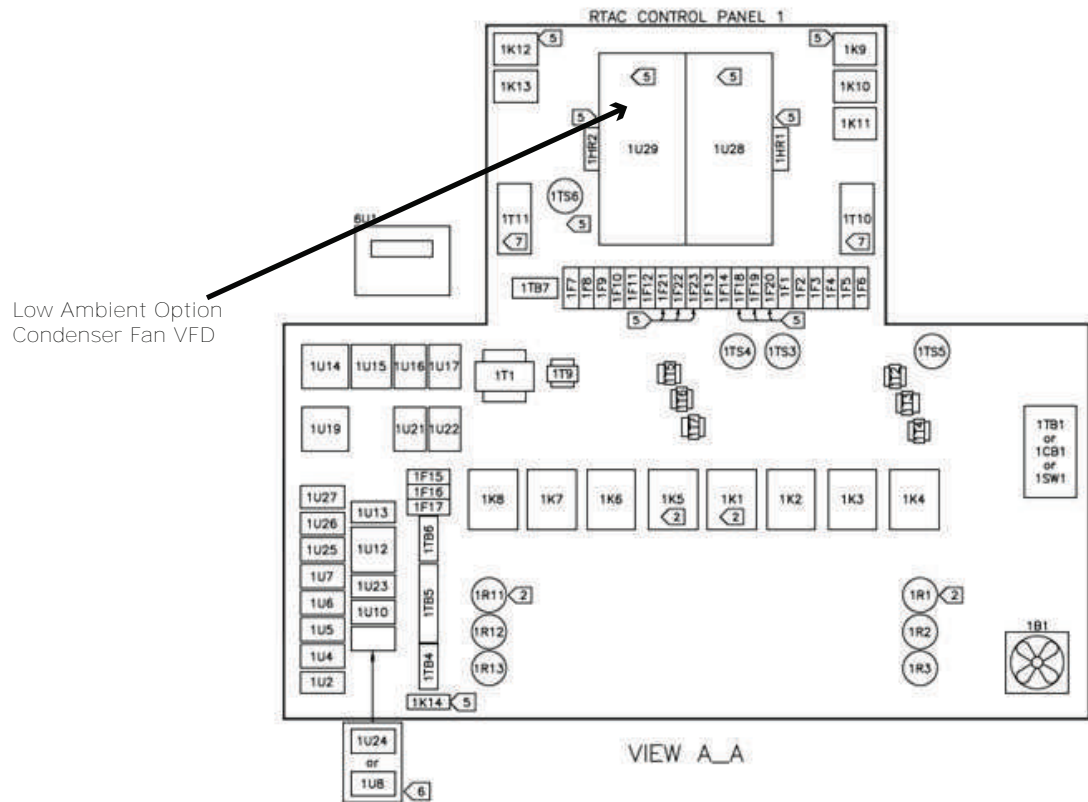


Figure 2. Typical RTAC 200 ton panel illustration and low ambient option VFD location



6. Disconnect power supply wires from VFD connection points 91, 92, 93, 95 (L1, L2, L3, GND respectively).
7. Disconnect output power wires from VFD connection points 96, 97, 98, 99 (T1, T2, T3, GND respectively).
8. Disconnect all control wires from the TR1 VFD itself and note the connection point numbers.



Removing the Existing VFD and Components

The TR1 and TR170 have the same connection point numbers. See the following table for common control wiring and their connection point numbers

Table 2. Typical Control Wires

Drive Connection	Description	Drive Designator			
		1U28	1U29	2U28	2U29
12	+24 VDC	151A	151B	651A	651B
18	Digital Input (RUN)	152A	152B	652A	652B
53	Analog Input 0-10 (Speed Command)	119A	122A	122A ^(a) or 619A ^(b)	622A
55	Common	128A	129A	129A ^(a) or 628A ^(b)	629A
1	Relay 1 [0] Common	121A	123A	123A ^(a) or 620A ^(b)	623A
3	Relay 1 [0] Normally Closed (Alarm)	120A	124A	124A ^(a) or 621A ^(b)	624A

^(a) Two-compressor applications

^(b) Three and four-compressor applications

9. The blanket heater used with the Trane TR1 drive is sized incorrectly for use with a Trane TR170 drive. Disconnect the heater wires at 1TB7-3,4 or 2TB7-3,4.
10. Locate and remove the four (4) fasteners securing the TR1 drive to its back panel after all cables and power supply wiring have been disconnected.
11. Remove existing drive and heater blanket.



Installing TR170 VFD and Components

Remove Trane TR170 drive from the box, verify the VFD model number, and complete the following procedures.

Install the TR170 Drive

1. Attach the new drive heater, HTR16716, to the side of the new drive. If another drive is present in the panel, the heater should be placed on the side of the drive that will not face the other drive. The heater has adhesive pre-applied to one side. Remove the protective film from the heater and press it against the side of the drive.
2. Hold the drive up to the back plate and mark the mounting hole locations on the backplate.
Note: *The Trane TR170 drive has a mounting hole pattern different than the original drive.*
3. Drill a 3/16" hole at each marked location. Be careful to protect other electrical components from metal shavings and clean all metal shavings from the enclosure when drilling is completed.
4. Line up the TR170 on the mounting hole-pattern and fasten the drive with the fasteners retained from the original drive to the back panel.

Wire the Power Supply and Controls to the TR170

The TR1 and TR170 have the same connection point numbers, however, a four-compressor unit or circuit 1 of a three-compressor unit requires an additional relay. These units will require the unit schematics to be marked up or replaced. Schematics document numbers may be found in "Wiring Diagram Matrix," p. 20. Print a copy from e-Library (if accessible) or contact the local Trane representative to obtain a copy.

1. Reconnect power supply wires to VFD connection points 91, 92, 93, 95 (L1, L2, L3, GND respectively) and output power wires to VFD connection points 96, 97, 98, 99 (T1, T2, T3, GND respectively).
2. Reconnect all control wires to the TR170 VFD according to the connection point numbers noted during TR1 removal. The TR1 and TR170 have the same connection point numbers. (See the "Typical Control Wires" table in "," for common control wires and their connection point numbers.)
3. Connect the new drive blanket heater wiring to 1TB7-3,4 or 2TB7-3,4.

Installing the Drive On a Four-Compressor Unit or Circuit 1 of a Three-Compressor Unit (RTAC)

If you are installing the drive on a four-compressor unit or circuit 1 of a three-compressor unit, an addition relay is required.

1. Mount this relay and base on the controls backplate.
2. Label the relay 1K9 if installed in control panel 1 or 2K9 if installed in control panel 2.
3. Make the wiring modifications presented in the following table:

Table 3. Intermediate relay wiring

Control Panel 1			
Wire Number	Description of New Function	Original Connections	New Connections
151A	+24 VDC	1U28-12 to 1TB6-6	1U28-12 to 1K9-1
152A	Digital Input (RUN)	1U28-18 to 1TB6-7	1U28-18 to 1K9-2
151B	+24 VDC	1U29-12 to 1TB6-6	1U29-12 to 1K9-3
152B	Digital Input (RUN)	1U29-18 to 1TB6-7	1U29-18 to 1K9-4
151C	Control Power Hot	1U15-J2-12 to 1TB6-6	1U15-J2-12 to 1TB5-3 (Node 62)

Table 3. Intermediate relay wiring (continued)

Control Panel 1			
Wire Number	Description of New Function	Original Connections	New Connections
152C	Fan Run Signal	1U15-J2-10 to 1TB6-7	1U15-J2-10 to 2K9-Coil
Field Provided	Control Power Neutral	–	1K9-Coil to 1TB5-12(Node 63)
Control Panel 2			
Wire Number	Description of New Function	Original Connections	New Connections
651A	+24 VDC	2U28-12 to 2TB6-6	2U28-12 to 2K9-1
652A	Digital Input (RUN)	2U28-18 to 2TB6-7	2U28-18 to 2K9-2
651B	+24 VDC	2U29-12 to 2TB6-6	2U29-12 to 2K9-3
652B	Digital Input (RUN)	2U29-18 to 2TB6-7	2U29-18 to 2K9-4
651C	Control Power Hot	2U15-J2-12 to 2TB6-6	2U15-J2-12 to 2TB5-3 (Node 562)
652C	Fan Run Signal	2U15-J2-10 to 2TB6-7	2U15-J2-10 to 2K9-Coil
Field Provided	Control Power Neutral	–	2K9-Coil to 2TB5-12(Node 563)

TR170 VFD Program Parameters

Drives are shipped with generic settings. These settings must be updated to reflect the drive application. The following table defines the parameters that must be modified for the Trane TR170 drives used in condenser fan applications on RTAC products.

Important: Pressing the "MENU" button once will enter the drive parameter wizard. **DO NOT** use the parameter wizard. The parameter wizard does not access all the required parameters and may cause drive errors. Pressing the "MENU" button twice will allow access to all parameters. **ALWAYS** use this method.

Table 4. TR170 VFD Drive Parameters

Parameter Number	Parameter Description	RTAC Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	(Motor Specific)	kW
1-22	Motor Voltage	(Motor Specific)	V
1-23	Motor Frequency	(Motor Specific)	Hz
1-24	Motor Current	(Motor Specific)	A
1-25	Motor Nominal Speed	(Motor Specific)	RPM
1-71	Start Delay	3	s
1-72	Start Function	DC Hold (0)	—
1-73	Flying Start	Enabled (1)	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—

Table 4. TR170 VFD Drive Parameters (continued)

Parameter Number	Parameter Description	RTAC Setting	Units
2-00	DC Hold/Motor Preheat Current	Default Value	%
2-02	DC Braking Time	Default Value	s
2-10	Brake Function	Off (0)	—
3-03	Maximum Reference	50/60*	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	5	s
3-42	Ramp 1 Ramp Down Time	20	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	3	Hz
4-14	Motor Speed High Limit [Hz]	50/60*	Hz
4-18	Current Limit	If p122 = 380V then 115 Else 125	%
5-12	Terminal 27 Digital Input	No operation (0)	—
5-40	Function Relay	Alarm (9)	—
6-10	Terminal 53 Low Voltage	0	V
6-14	Terminal 53 Low Ref./Feedb. Value	0	—
6-15	Terminal 53 High Ref./Feedb. Value	50/60*	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto Reset x10 (10)	—
14-21	Automatic Restart Time	30	s
14-50	RFI Filter	Off (0)	—

Note: *60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.

The following table defines the complete set of parameters for the TR170 VFD drives used in condenser fan applications on low ambient option IPAK II products.

Table 5. TR170 VFD Drive Parameters

Parameter Number	Parameter Description	Ipak II Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	1.1 (8) (Motor Specific)	kW
1-22	Motor Voltage	460 (Motor Specific)	V
1-23	Motor Frequency	60 (Motor Specific)	Hz
1-24	Motor Current	2.7 (Motor Specific)	A
1-25	Motor Nominal Speed	1140 (Motor Specific)	RPM
1-71	Start Delay	Default Value	s



Installing TR170 VFD and Components

Table 5. TR170 VFD Drive Parameters (continued)

Parameter Number	Parameter Description	Ipak II Setting	Units
1-72	Start Function	Default Value	—
1-73	Flying Start	Enabled (1)	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—
2-00	DC Hold/Motor Preheat Current	0	%
2-02	DC Braking Time	0	s
2-10	Brake Function	AC Brake is active (2)	—
3-03	Maximum Reference	60	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	10	s
3-42	Ramp 1 Ramp Down Time	10	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	22	Hz
4-14	Motor Speed High Limit [Hz]	60	Hz
4-18	Current Limit	137	%
5-12	Terminal 27 Digital Input	Coast and reset inverse (3)	—
5-40	Function Relay	Default Value	—
6-10	Terminal 53 Low Voltage	0	V
6-14	Terminal 53 Low Ref./Feedb. Value	22	—
6-15	Terminal 53 High Ref./Feedb. Value	60	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto reset x3 (3)	—
14-21	Automatic Restart Time	5	s
14-50	RFI Filter	Off (0)	—

Note: *60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.

The following table defines the complete set of parameters for the TR170 VFD drives used in condenser fan applications on CGAM products.

Table 6. TR170 VFD Drive Parameters

Parameter Number	Parameter Description	CGAM Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	(Motor Specific)	kW
1-22	Motor Voltage	(Motor Specific)	V

Table 6. TR170 VFD Drive Parameters (continued)

Parameter Number	Parameter Description	CGAM Setting	Units
1-23	Motor Frequency	(Motor Specific)	Hz
1-24	Motor Current	(Motor Specific)	A
1-25	Motor Nominal Speed	(Motor Specific)	RPM
1-71	Start Delay	3	s
1-72	Start Function	DC Hold (0)	—
1-73	Flying Start	Default Value	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—
2-00	DC Hold/Motor Preheat Current	Default Value	%
2-02	DC Braking Time	Default Value	s
2-10	Brake Function	Off (0)	—
3-03	Maximum Reference	50/60	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	5	s
3-42	Ramp 1 Ramp Down Time	20	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	5/6	Hz
4-14	Motor Speed High Limit [Hz]	50/60	Hz
4-18	Current Limit	If p122 = 460V then 115 Else 110	%
5-12	Terminal 27 Digital Input	No operation (0)	—
5-40	Function Relay	Alarm (9)	—
6-10	Terminal 53 Low Voltage	1	V
6-14	Terminal 53 Low Ref./Feedb. Value	5/6	—
6-15	Terminal 53 High Ref./Feedb. Value	50/60	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto Reset x10 (10)	—
14-21	Automatic Restart Time	30	s
14-50	RFI Filter	Off (0)	—

Note: *60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.

Please refer to BAS-SVP16*-EN (TR150 and TR170 Programming Guide), or the most recent version, for complete programming information.



Set the VFD Programming Parameters

Complete the following tasks to set and verify the TR170 parameters listed in the tables in "TR170 VFD Program Parameters," p. 15 section.

Power Up the VFD

1. When all components have been mounted and wired, close all electrical enclosures.
2. Restore machine power.
3. Place the unit in "STOP" to prevent unintended operation.
4. Open the cover or door over the drive and verify the drive has powered up.

Note: The drive cooling fan may be operating, even if the unit is in standby mode.

⚠ WARNING
PPE for Arc/Flash Required! Failure to wear appropriate PPE could result in death or serious injury. On this unit, if the handle shield is cracked the circuit breaker could arc/flash when reset. To avoid being injured, technicians MUST put on all necessary Personal Protective Equipment (PPE), in accordance with NFPA70E for arc/flash protection, PRIOR to entering the starter panel cabinet.

Reset Parameters Back to Factory Defaults

Note: In the event the drive parameters are inaccessible or the drive display fails, a "hard reset" may be accomplished by holding "OK" and "Menu" buttons while cycling the drive power.

To reset all programming parameters back to the factory defaults:

1. Go to parameter **14–22 Operation Mode**.
2. Press **OK**.
3. Select **2 "Initialization"**.
4. Press **OK**.
5. Cut off the main supply and wait until the display turns off.
6. Reconnect the main supply.
The frequency converter is now reset.
7. Ensure parameter 14–22 Operation Mode has reverted back to "Normal Operation".

Notes:

- Step 5 resets the drive to the default factory settings. The program parameters listed in Table 7, p. 16, Table 8, p. 17 and Table 9, p. 18 will need to be verified or changed as described in the previous Modify Parameters procedure.
- Some of the parameters listed in the Table are motor specific. Due to various motors and efficiencies available, use only the values stamped on the specific motor nameplate. Do not use the Unit nameplate values.
- A backup copy of the current setup may be saved to the LCP before changing parameters or resetting the drive. See LCP Copy in the VFD Operating Instructions for details.

Modify Parameters

Please refer to BAS-SVP16*-EN (TR150 and TR170 Programming Guide), or the most recent version, for complete programming information.

Notes:

- Pressing the "MENU" button once will enter the drive parameter wizard. The parameter wizard does not access all the required parameters.
- To access ALL parameters, press the "MENU" button twice.
- The parameters are set by different levels. Click OK to access Level 1 and Level 2.
- The default setting for Parameter 5-12 is Coast inverse which will cause a drive error on Products that do not need that function. Verify Parameter 5-12 is set per [Table 7, p. 16](#), [Table 8, p. 17](#) and [Table 9, p. 18](#) for the given Product you are installing the drive into (parameter 5-12 will be set to either Coast Inverse or No Function depending on your Product). Products that utilize the Coast inverse function will have a control wire going to terminal 27 on the drive.

Perform the following steps to modify each parameter:

1. On the first power up of the drive, a parameter wizard may appear. Press the **Back** button to leave the wizard screen.
2. Press the **Main Menu** button.
(Press the **Back** button if the main menu does not display.)
3. Use the **Up** and **Down** buttons to find the parameter menu group (first part of parameter number).
4. Press **OK**.
5. Use the **Up** and **Down** buttons to select the correct parameter sub-group, indicated by the first digit of the second part of the parameter number.
6. Press **OK**.
7. Use the **Up** and **Down** buttons to select the specific parameter.
8. Press **OK**.
9. Use the navigation buttons to move to a different digit within a parameter setting.
The highlighted area indicates the digit selected for modification.
10. Use the **Up** and **Down** buttons to adjust the digit.
11. Press **Cancel** to disregard the change, or press **OK** to accept the change and enter the new setting.
12. Repeat steps 1 through 11 for each menu selection setting in the parameters table.
13. After verifying that the VFD(s) are operating properly, press the STOP key at the Human Interface Module to stop the unit operation.
14. Follow the applicable steps in the "Final Unit Checkout" section in the unit Installation, Operation, Maintenance Manual (IOM) to return the unit to its normal operating mode.

Note: If a problem with a VFD occurs, ensure that the programmed parameters listed for condenser fan VFD (see the [Table 7, p. 16](#), [Table 8, p. 17](#) and [Table 9, p. 18](#)) have been set before replacing the drive.

TR170 VFD Program Parameters

Drives are shipped with generic settings. These settings must be updated to reflect the drive application. The following table defines the parameters that must be modified for the Trane TR170 drives used in condenser fan applications on RTAC products.

Important: Pressing the "MENU" button once will enter the drive parameter wizard. **DO NOT** use the parameter wizard. The parameter wizard does not access all the required parameters and may cause drive errors. Pressing the "MENU" button twice will allow access to all parameters. **ALWAYS** use this method.



Installing TR170 VFD and Components

Table 7. TR170 VFD drive parameter RTAC

Parameter Number	Parameter Description	RTAC Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	(Motor Specific)	kW
1-22	Motor Voltage	(Motor Specific)	V
1-23	Motor Frequency	(Motor Specific)	Hz
1-24	Motor Current	(Motor Specific)	A
1-25	Motor Nominal Speed	(Motor Specific)	RPM
1-71	Start Delay	3	s
1-72	Start Function	DC Hold (0)	—
1-73	Flying Start	Enabled (1)	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—
2-00	DC Hold/Motor Preheat Current	Default Value	%
2-02	DC Braking Time	Default Value	s
2-10	Brake Function	Off (0)	—
3-03	Maximum Reference	50/60 ^(a)	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	5	s
3-42	Ramp 1 Ramp Down Time	20	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	3	Hz
4-14	Motor Speed High Limit [Hz]	50/60 ^(a)	Hz
4-18	Current Limit	If p122 = 380V then 115 Else 125	%
5-12	Terminal 27 Digital Input	No operation (0)	—
5-40	Function Relay	Alarm (9)	—
6-10	Terminal 53 Low Voltage	0	V
6-14	Terminal 53 Low Ref./Feedb. Value	0	—
6-15	Terminal 53 High Ref./Feedb. Value	50/60 ^(a)	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto Reset x10 (10)	—
14-21	Automatic Restart Time	30	s
14-50	RFI Filter	Off (0)	—

^(a) 60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.

The following table defines the complete set of parameters for the TR170 VFD drives used in

condenser fan applications on low ambient option IPAK II products.

Table 8. TR170 VFD drive parameters Ipak II

Parameter Number	Parameter Description	Ipak II Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	1.1 (8) (Motor Specific)	kW
1-22	Motor Voltage	460 (Motor Specific)	V
1-23	Motor Frequency	60 (Motor Specific)	Hz
1-24	Motor Current	2.7 (Motor Specific)	A
1-25	Motor Nominal Speed	1140 (Motor Specific)	RPM
1-71	Start Delay	Default Value	s
1-72	Start Function	Default Value	—
1-73	Flying Start	Enabled (1)	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—
2-00	DC Hold/Motor Preheat Current	0	%
2-02	DC Braking Time	0	s
2-10	Brake Function	AC Brake is active (2)	—
3-03	Maximum Reference	60	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	10	s
3-42	Ramp 1 Ramp Down Time	10	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	22	Hz
4-14	Motor Speed High Limit [Hz]	60	Hz
4-18	Current Limit	137	%
5-12	Terminal 27 Digital Input	Coast and reset inverse (3)	—
5-40	Function Relay	Default Value	—
6-10	Terminal 53 Low Voltage	0	V
6-14	Terminal 53 Low Ref./Feedb. Value	22	—
6-15	Terminal 53 High Ref./Feedb. Value	60	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto reset x3 (3)	—
14-21	Automatic Restart Time	5	s
14-50	RFI Filter	Off (0)	—

Note: *60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.



Installing TR170 VFD and Components

The following table defines the complete set of parameters for the TR170 VFD drives used in condenser fan applications on CGAM products.

Table 9. TR170 VFD drive parameters CGAM

Parameter Number	Parameter Description	CGAM Setting	Units
0-03	Regional Settings	North America for 60 Hz, International for 50 Hz	—
0-06	Grid Type	Depends on Grid Type	—
0-40	[Hand on] Key on LCP	Disable (0)	—
1-20	Motor Power	(Motor Specific)	kW
1-22	Motor Voltage	(Motor Specific)	V
1-23	Motor Frequency	(Motor Specific)	Hz
1-24	Motor Current	(Motor Specific)	A
1-25	Motor Nominal Speed	(Motor Specific)	RPM
1-71	Start Delay	3	s
1-72	Start Function	DC Hold (0)	—
1-73	Flying Start	Default Value	—
1-82	Min Speed for Function at Stop [Hz]	0.1	Hz
1-90	Motor Thermal Protection	ETR Trip 1 (4)	—
2-00	DC Hold/Motor Preheat Current	Default Value	%
2-02	DC Braking Time	Default Value	s
2-10	Brake Function	Off (0)	—
3-03	Maximum Reference	50/60	—
3-16	Reference 2 Source	No function (0)	—
3-17	Reference 3 Source	No function (0)	—
3-41	Ramp 1 Ramp Up Time	5	s
3-42	Ramp 1 Ramp Down Time	20	s
4-10	Motor Speed Direction	Clockwise (0)	—
4-12	Motor Speed Low Limit [Hz]	5/6	Hz
4-14	Motor Speed High Limit [Hz]	50/60	Hz
4-18	Current Limit	If p122 = 460V then 115 Else 110	%
5-12	Terminal 27 Digital Input	No operation (0)	—
5-40	Function Relay	Alarm (9)	—
6-10	Terminal 53 Low Voltage	1	V
6-14	Terminal 53 Low Ref./Feedb. Value	5/6	—
6-15	Terminal 53 High Ref./Feedb. Value	50/60	—
14-01	Switching Frequency	5	kHz
14-12	Function at Mains Imbalance	De-rate (3)	—
14-20	Reset Mode	Auto Reset x10 (10)	—
14-21	Automatic Restart Time	30	s

Table 9. TR170 VFD drive parameters CGAM (continued)

Parameter Number	Parameter Description	CGAM Setting	Units
14-50	RFI Filter	Off (0)	—
<i>Note: *60 or 50Hz for Pueblo Production, 50Hz for Charmes production. Otherwise, set for maximum speed rating of motor/fan.</i>			

Copying Parameters to Multiple Drives

If you are installing multiple drives, the drive LCP (local control panel) can be used to copy parameters from one drive to another. This method can save time and reduce errors.

Uploading Data to the LCP

1. Go to 0-50 LCP copy.
2. Press **OK**.
3. Select **All from LCP**.
4. Press **OK**.

A progress bar shows the uploading process

5. Press **Hand on** to return to normal operation.

Remove the LCP from the configured drive and install it on the unconfigured drive.

Downloading Data from the LCP

1. Go to 0-50 LCP copy
2. Press **OK**
3. Select **All from LCP**
4. Press **OK**.

A progress bar shows the uploading process

5. Press **Hand on** to return to normal operation.



Wiring Diagram Matrix

Table 10. TR170 VFD IntelliPak II™ wiring schematics and connection diagrams

Wiring Diagram Number	Description
2313-0831	SCHEMATIC, POWER - 90-105 TON - STANDARD WITH LOW AMBIENT
2313-0832	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0833	SCHEMATIC, POWER - 90-105 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT
2313-0834	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/ LOW AMBIENT
2313-0835	SCHEMATIC, POWER - 90-105 TON - STANDARD WITH LOW AMBIENT
2313-0836	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0837	SCHEMATIC, POWER - 90-105 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT
2313-0838	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/ LOW AMBIENT
2313-0843	SCHEMATIC, POWER - 120-150 TON - STANDARD WITH LOW AMBIENT
2313-0844	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0845	SCHEMATIC, POWER - 120-150 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT
2313-0846	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/LOW AMBIENT
2313-0847	SCHEMATIC, POWER - 120-150 TON - STANDARD WITH LOW AMBIENT
2313-0848	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0849	SCHEMATIC, POWER - 120-150 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT
2313-0850	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/LOW AMBIENT
2313-0839	SCHEMATIC, POWER - 90-105 TON - STANDARD WITH LOW AMBIENT
2313-0840	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0841	90-105 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT SCHEMATIC, POWER
2313-0842	SCHEMATIC, POWER - 90-105 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/ LOW AMBIENT
2313-0851	SCHEMATIC, POWER - 120-150 TON - STANDARD WITH LOW AMBIENT
2313-0852	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY VFD AND WITH LOW AMBIENT
2313-0853	SCHEMATIC, POWER - 120-150 TON - WITH EXHAUST OR RETURN VFD AND WITH LOW AMBIENT
2313-0854	SCHEMATIC, POWER - 120-150 TON - WITH SUPPLY AND EXHAUST OR RETURN VFD & W/LOW AMBIENT
1213-1563	CONNECTION, CONTROL BOX - 90-105T, STANDARD W/ LOW AMBIENT
1213-1564	CONNECTION, CONTROL BOX - 90-105T, W/SUPPLY VFD W/ LOW AMBIENT
1213-1565	CONNECTION, CONTROL BOX - 90-105T, W/EXH/RTN VFD W/ LOW AMBIENT
1213-1566	CONNECTION, CONTROL BOX - 90-105T, W/SUP & EXH/RTN VFD W/ LOW AMBIENT
1213-1567	CONNECTION, CONTROL BOX - 90-105T, STANDARD W/ LOW AMBIENT
1213-1568	CONNECTION, CONTROL BOX - 90-105T, W/SUPPLY VFD W/ LOW AMBIENT
1213-1569	CONNECTION, CONTROL BOX - 90-105T, W/EXH/RTN VFD W/ LOW AMBIENT
1213-1570	CONNECTION, CONTROL BOX - 90-105T, W/SUP & EXH/RTN VFD W/ LOW AMBIENT
1213-1571	CONNECTION, CONTROL BOX - 120-150T, STANDARD W/ LOW AMBIENT
1213-1572	CONNECTION, CONTROL BOX - 120-150T, W/SUPPLY VFD W/ LOW AMBIENT

Table 10. TR170 VFD IntelliPak II™ wiring schematics and connection diagrams (continued)

Wiring Diagram Number	Description
1213-1573	CONNECTION, CONTROL BOX - 120-150T, W/EXH/RTN VFD W/ LOW AMBIENT
1213-1574	CONNECTION, CONTROL BOX - 120-150T, W/SUP & EXH/RTN VFD W/ LOW AMBIENT
1213-1575	CONNECTION, CONTROL BOX - 120-150T, STANDARD W/ LOW AMBIENT
1213-1576	CONNECTION, CONTROL BOX - 120-150T, W/SUPPLY VFD W/ LOW AMBIENT
1213-1577	CONNECTION, CONTROL BOX - 120-150T, W/EXH/RTN VFD W/ LOW AMBIENT
1213-1578	CONNECTION, CONTROL BOX - 120-150T, W/SUP & EXH/RTN VFD W/ LOW AMBIENT

Note: Wiring diagrams are available via e-Library (if accessible) or contact the local Trane representative to obtain a copy.

Table 11. TR170 VFD CGAM™ wiring schematics and connection diagrams

Wiring Diagram Number	Description
2309-2075	SCHEMATIC; CGAM, S, V, W

Note: Wiring diagrams are available via e-Library (if accessible) or contact the local Trane representative to obtain a copy.

Table 12. TR170 VFD RTAC™ wiring schematics and connection diagram

Wiring Diagram Number	Description
2309-2097	RTAC; 2 COMPRESSOR
2309-4621	RTAC; 3 COMPRESSOR, X-LINE STARTER
2309-4622	RTAC; 3 COMPRESSOR, WYE-DELTA STARTER
2309-4623	RTAC; 4 COMPRESSOR, X-LINE STARTER
2309-4624	RTAC; 4 COMPRESSOR, WYE-DELTA STARTER

Note: Wiring diagrams are available via e-Library (if accessible) or contact the local Trane representative to obtain a copy. See the Series R Air-Cooled Helical Rotary Liquid Chillers Wiring Manual (RTAC-SVE01-EN) (Refer to version E or subsequent versions).*



Notes

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