



Installation

Tracer AdaptiView™ Chiller Controller Retrofit Replacement Panel

Single Door Pneumatic



Model: CVRE

Note: Distribution/use of this document is limited to the Trane sales and service organization in support of the Tracer AdaptiView™ control panel upgrade and is not intended for independent third party use or for use apart from the Tracer AdaptiView™ control panel.





Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provide to alert installing contractors to potential hazards that could result in personal injury or death. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that may result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

ATTENTION: Warnings, Cautions and Notices 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, could result in minor or moderate injury.

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

Important Environmental Concerns!

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants—including industry replacements for CFCs such as HCFCs and HFCs.

Responsible Refrigerant Practices!

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified. The Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

WARNING

Refrigerant under Positive Pressure!

System contains oil and refrigerant and may be under positive pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

Failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

WARNING

Personal Protective Equipment (PPE) Required!

Always refer to appropriate MSDS and OSHA guidelines when handling fluorocarbon refrigerants. Use proper breathing, eye, and body protection during the handling of fluorocarbon refrigerants. Failure to follow proper handling guidelines could result in death or serious injury.



Introduction

Literature change history. CVRE-SVN01A-EN (February 2009) manual first release. It describes the installation procedures required to retrofit single door pneumatic controls on PCV, CV, and CTV water-cooled Tracer AdaptiView™ controls onto a water-cooled chiller. This retrofit uses a new control panel with some components pre-installed to replace the existing single door control panel enclosure.

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General Information

About This Manual

This manual is provided to support the factory-assembled CVRE complete control panel for former single door pneumatic control panels. This work replaces the older pneumatic control panel with the current Tracer AdaptiView Chiller Control system. The factory assembled portion is the control panel only. Some of the control items will be field installed.

The step-by-step instructions outlined in this manual describe the procedures required to successfully install Tracer AdaptiView controls on PCVs, CVs, and CTVs with a single door pneumatic-based control system.

Notice that the installation instructions in this manual are divided into the following general topic areas:

1. Control panel installation includes removal of existing control panel. It is followed by installation of new panel and mounting brackets, and wiring in the new control panel.
2. Sensor installation includes the mounting of temperature and pressure sensors and wiring instructions.
3. Starter Panel Conversion includes a step-by-step procedure for wye-delta starter applications, as well as additional information for converting non-wye-delta starters.
4. Actuator mounting includes removal of the old pneumatic actuator and installation instructions for the stepper IGV actuator.
5. Accessories and options installation includes information on how to install and wire any optional LLIDs or components. LLIDs are individual control components that communicate with the main processor.

Note: *New Tracer AdaptiView and older Trane wiring diagrams are often referenced throughout this manual. Locate any drawings reflecting changes, upgrades, or BAS tie-ins that have been performed on the unit since original installation. A complete set of Tracer AdaptiView wiring diagrams are referenced in “Wiring Diagram Matrix,” p. 40 in this manual. Also referenced in this manual are wiring diagrams that are representative of the machine you will be retrofitting. You may find it helpful to obtain a copy of the machine or job specific drawings before you attempt to perform the control system conversion.*

Unit Model Number

For a detailed breakdown of the CVRE model number, refer to the start-up and programming manual, CVRE-SVP01A-EN, or the latest version.

Application Guidelines

This Tracer AdaptiView control package is specifically designed to upgrade the controls of older Trane (PCV, CV, and CTV) water cooled chillers having pneumatic controls that are housed in a single door, horizontal style enclosure.

Table 1. Retrofit panel types

Description	Application ^(a)
Single door pneumatic	1966 to 1976 Trane CenTraVac chillers with pneumatic controls and a single horizontal door control panel
Double door pneumatic	1976 to 1980 Trane CenTraVac chillers with pneumatic controls and a double horizontal door control panel
Classic	1980 to 1985 CVHE/CVHB CenTraVac chillers with Trane electronic “Classic” type controls
UCP1 ^(b)	1985 to 1993 CVHE/CVHB/CVHF CenTraVac chillers having factory installed Trane UCP1 digital controls
UCP2 ^(b)	1993 to 2001 CVHE/CVHF/CVHG CenTraVac chillers having factory installed Trane UCP2 digital controls

(a) These are general guidelines. The dates are not exact. It is necessary to confirm exactly which control system your chiller has.

(b) The UCP1 and UCP2 application is specific to those units originally shipped with those controls. It does NOT include retrofit UCP1, UCP2, and FastPak™ controllers.

General Information

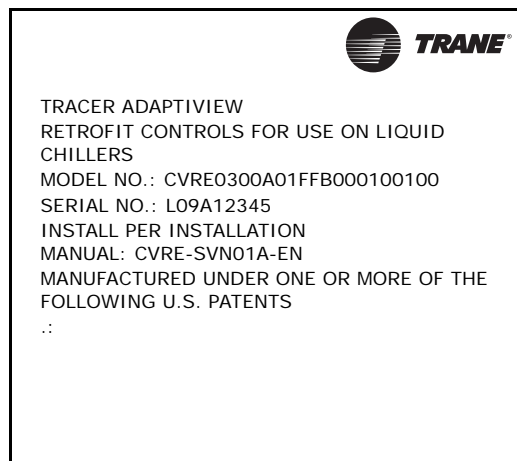
Getting Started

To properly install a Tracer AdaptiView retrofit, the technician must have a good knowledge of Tracer AdaptiView control systems. Training in Tracer AdaptiView controls is highly recommended before beginning this retrofit.

Nameplates

A Tracer AdaptiView nameplate is provided with the kit; the nameplate should be placed onto the panel after installation. Always provide the model number and serial number information from the nameplate when making inquiries, or ordering parts or literature for the Tracer AdaptiView retrofit system.

Figure 1. Tracer AdaptiView nameplate example



Remove the existing chiller metal nameplate on the unit and relocate to the outside of the new control panel. Important information is contained on this existing nameplate that must be retained for future unit servicing.

Tracer AdaptiView Panel Conversion Kit Contents

Each Tracer AdaptiView panel conversion “kit” includes a pre-assembled control panel with a number of standard features and options installed, wired, bound, and tested, along with some device LLIDs shipped loose that require field installation and binding.

Before commencing the Tracer AdaptiView control retrofit, be sure to compare the data on the panel nameplate and ordering and shipping information to the data in the following tables to verify that the proper Tracer AdaptiView components were shipped. The tables are split into those components that are factory installed and those that are shipped loose and need to be field installed. For more detail on the options listed, see Engineering Bulletin ECTV-PRB010-EN.

If an inspection of the conversion package reveals damage or material shortages, be sure to file these claims with the carrier immediately. Specify the extent of the damage or material shortages and be sure to notify the appropriate Trane representative. Do not install a damaged component or panel.

Table 2. LLID legend and identification^(a)

LLID Name	Description	Number on Part	Part Number
Tracer AdaptiView color display		X13760326-	MOD01629
COMM4	Tracer Summit communication	X13650844-	MOD01405
COMM5	LCI-C Communications interface for chillers	X13650845-	MOD01683
DAIO	Dual analog input and output	X13650731-	BRD02945
DBI	Dual low voltage binary input	X13650728-	BRD02942
DHVBI	Dual high voltage binary input	X13650729-	BRD02946
DRO	Dual relay output	X13650733-	BRD02944
HPRO	High power relay output	X13650902-	MOD01401
IGV	Inlet guide vane stepper actuator	X13611024-	ACT00415
Power supply	27 Vac to 24 Vdc for bus power supply	X13650737-	BRD02102
Pressure sensor	Low pressure range, 0 to 50 psia	X13790362-	TDR00355
Pressure sensor	High pressure range, 0 to 475 psia	X13790348-	TDR00354
QRO	Quad relay output	X13650806-	BRD02948
Starter module		X13650741-	BRD03542
Temp sensor	Low range temperature sensor	X13650726-	SEN01314
Triac	Dual triac output	X13650734-	BRD02947
TWTI	Triple winding temperature input	X13650921-	MOD01402
Tracer UC800 controller		X13651144-	MOD01628

(a) All part number information in this table is subject to change at any time. Contact the Trane Parts Center for assistance with identification of all parts involved with the Tracer AdaptiView system. Xcode numbers are purposely abbreviated and do not include the last three digits.

Table 3. Factory installed LLIDs

	DBI	DHVBI	HPRO	QRO	TWTI	Power Supply	UC800	Color Display
Panel type—single door pneumatic	1	2	1	3	1	2	1	



General Information

Table 4. Field installed LLIDs for various options

	DBI	DHVBI	DRO	HPRO	QRO	DAIO	COMM4	LCI-C	IGV	Temp Sensor	Press Sensor	Starter Module	Color Display
Panel type—single door pneumatic										7			1
Starter module—3-phase												1	
Actuator-stepper									1				
Actuator-pulse ^(a)	1												
Oil protection—full, low pressure, or high pressure											2		
Oil protection—oil pressure switch ^(a)	1 ^(b)										2		
Heat recovery / aux condenser										2			
Hot gas bypass			1							1			
Cold water reset										1			
Enhanced protection										3	1		
Chilled/tower water flow display						1							
Extended operation	2		1			1							
Free cooling	1				1								
Communications module—COMM4							1						
LCI-C								1					
Generic BAS						2							

(a) Option not applicable for single door applications.

(b) DVHBI shared with IGV pulse end switch LLID.

Notes for Remote Starter Installations

For applications where you have a remote starter that is at a distance that makes it difficult to use extension cables you can use CAB01163 to connect the starter module to the control panel. This cable is not included in the standard package and can be ordered through Trane Parts Centers. This can be used for distances up to 150 feet. It is a four conductor cable that can be used for power and communication. If the starter is more than 150 feet from the unit, a separate power supply and possibly two transformers are required. This extra power supply is a special application and would not ship with the standard package. Contact product support team for more information.

When an extra power supply is used, connect communications via a twisted pair wire such as Trane ICS wire to one of the internal power supplies. Do not connect the two 24 Vdc power wires from the two power supplies to each other. Attach the LLIDs in the starter via bus cable to the power supply in the starter. Attach the LLIDs in the control panel to the power supply in the panel via bus cable. The twisted pair is the communications wire between them.

Tools Required

Normal tools are required to perform the work. A service technician with a well stocked tool chest should have the right tools to perform the job. The following special tools are also required to perform the controls retrofit:

Note: Some field provided material will be required to perform the replacement. This is a partial list in addition to normal service tools and hardware.

- Type A to Type B USB cable.
- Computer having Tracer™ TU version 2.0 or newer.

- Digital multi-meter, with phase detection capability.
- 13 mm and 14 mm wrenches.
- 6 mm Allen wrench.

Field Provided Material

Some field provided material will be required to perform the Tracer AdaptiView controls retrofit. A list of material is provided here to help the technician plan ahead and to avoid material shortages at the job site.

- Wire, Red #16 AWG - Control wire will be required to make the connections between LLIDs and existing components.
- Wire connectors (fork, ring, 1/4- and 3/16-inch female quick connect), and crimping tool for these connectors. 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.
- A heat conductive adhesive will be required when mounting the bearing temperature sensors to the bearing oil return lines. Use “Output High Strength Adhesive” by Loctite®, or equal.
- An epoxy will be required when mounting plastic sensor sleeves on the machine for externally mounted sensors. Trane recommends “Master Mend Epoxy” by Duro®.
- Optional, temperature sensor cable mounting hardware. Use bracket BRK03270 (one per package) and strain relief CON00849 (package of 10). These are used with sensor wells like WEL00083 and WEL00084.
- A can of Executive Beige spray paint (Trane part # PAI00061) or standard gray (PAI00011) may be required for touch-up work.
- Field provided fuses will be required when installing the optional potential transformers. Refer to [Table 5](#) for proper fuse sizing.
- Field provided relays may be required in the starter (refer to “[Wiring Diagram Matrix](#),” p. 40).
- A control power transformer may be required if the existing transformer in the starter panel does not have a minimum capacity of 3 KVA.
- Loctite® 565.
- Loctite® 277.

Table 5. Fusing for 2F1, 2F2 and 2F3, customer supplied

Voltage (Vac)	Fuse (A)	Voltage (Vac)	Fuse (A)
200	25	600	8
230	17.5	2400	3
380	15	4200	3
460	10	3300	5
575	8	6600	1

Replacing an existing single door pneumatic control system with one based on the Tracer AdaptiView control scheme requires a number of wiring and hardware changes. To ensure that the chiller control system retrofit procedure is performed properly, carefully review the instructions in this section, and, if necessary, contact a qualified service organization before beginning the work.

Important: Record a detailed description of all electrical changes made during the Tracer AdaptiView retrofit process. Be sure to add a copy of this report to the chiller record file for future reference.

Installation

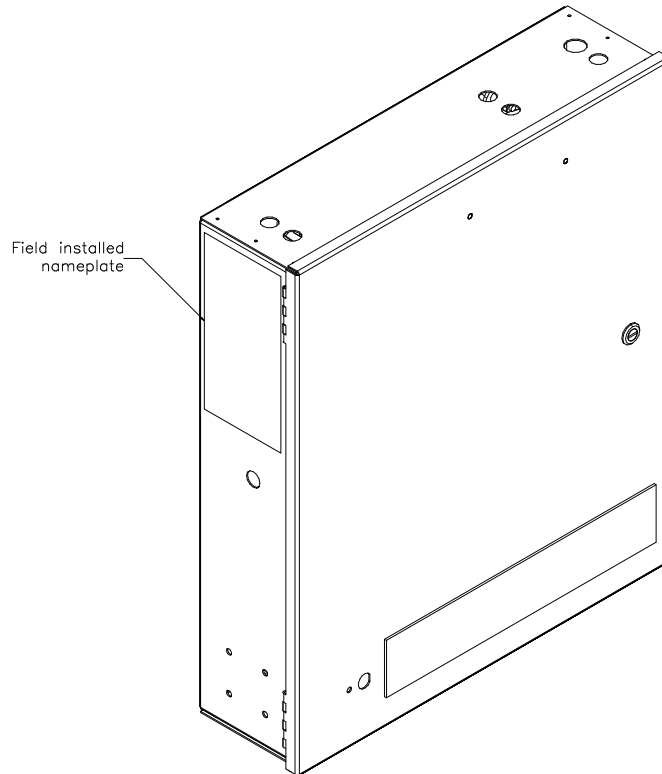
Control Panel Conversion

The control panel conversion will consist of removing, marking, and retaining selected wires in the existing control panel. The existing control panel will be removed. The new control panel will be installed. The existing wires will be terminated on the terminal block or LLIDs in the control panel along with any new wires required.

Make a note of run hours and starts on the hour meter and start counter. Tracer AdaptiView will allow you to enter this information into its program.

Remove the nameplate from the existing panel by cutting the rivets holding it on. If the chiller original nameplate is a stick-on label, it may be necessary to cut out the metal section. This nameplate needs to be moved and attached to the new control panel near the new control panel nameplate. The old nameplate contains original unit information that will be useful in service and parts issues in the future.

Figure 2. Recommended nameplate location on new panel



Before You Begin

1. Identify all field modifications made to the existing chiller control scheme; then label all field-installed wiring entering the control panel accordingly, if required. This will probably include things like the power supply for the purge and any BAS interface wiring.
2. Determine how each of the field-adapted control functions just identified in [Step 1](#) will be assumed by the new Tracer AdaptiView chiller control panel.
3. Open all starter and control panel disconnect switches and secure them in that position.

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.

WARNING

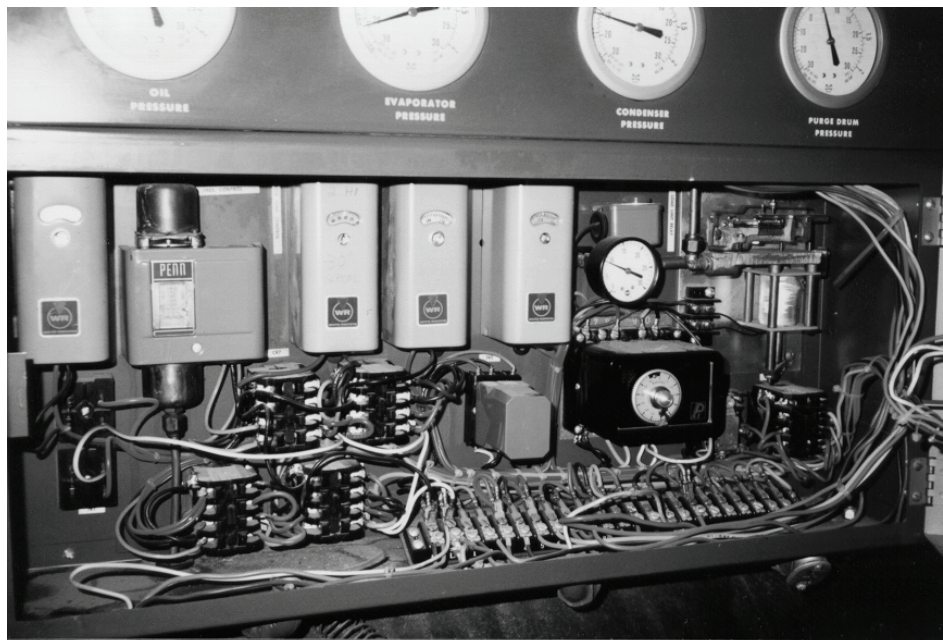
PPE for Electric Contact and Arc/Flash Required!

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

4. Disconnect the leads at the control panel terminal block from the oil heater (wire numbers 10 and LL2), oil pump (wire numbers 12 and LL2) and purge (wire numbers 3, 4, and LL2). Insure that these wires are properly identified and marked before disconnecting them. To assist in the identification of wires, refer to the job specific wiring diagrams (see "[Wiring Diagram Matrix](#)," p. 40 for a list of "typical" original wiring diagrams). Note that these are only a typical wiring diagram and is not meant to be an accurate representation of the machine being retrofit.

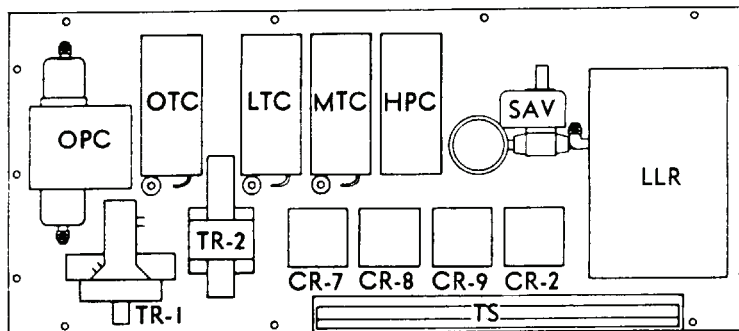
Note: To eliminate migration of refrigerant into the oil sump, temporarily connect a field supplied thermostat and an auxiliary 115 volt power source to the oil heater.

Figure 3. Typical single door pneumatic panel before retrofit



5. Disconnect all field-installed wiring entering the control panel (i.e., identified in [Step 1](#)) from the control panel terminal strips. Also identify chilled and condenser water flow circuits.
6. Remove from the control panel terminal block all wiring that has been routed through conduit from the starter panel to the control panel (wire numbers LL1, LL2, 2, and 7). This should include wires from the variable ratio current transformer (wire numbers 8A, 8B, 8C, 8D, and 9). Insure that these wires are properly identified before disconnecting them. Many of these wires will be re-terminated to the terminal block in the new panel.

Figure 4. Typical existing control panel assembly



OPC—OIL PRESSURE CONTROL
 OTC—OIL TEMP. CONTROL
 LTC—LOW TEMP. CONTROL
 MTC—MOTOR TEMP. CONTROL
 HPC—HIGH PRESSURE CONTROL
 SAV—SOLENOID AIR VALVE
 LLR—LOAD LIMIT RELAY
 TR-1, 2—TIME DELAY RELAY
 CR-2, 7, 8, 9—CONTROL RELAY

7. Remove the sensor bulbs of the following and place them inside the control panel enclosure.
 - a. Motor temperature cutout switch (MTC),
 - b. High oil temperature switch (OTC), and
 - c. Low refrigerant temperature switch (LTC).
8. Valve off, disconnect, and remove any pneumatic lines at the control panel.
9. Oil differential pressure switch (OPC):

The OPC will be replaced by individual oil pressure transducers outside the new control panel. Before the existing control panel can be removed, the OPC must be removed and the new oil pressure transducers installed. Care must be taken to prevent infiltration of air into the machine during the installation.

Removal of Existing Panel

Remove the existing single door panel. The existing brackets on the chiller will be reused to mount the new control panel. New isolators are provided with the new panel so discard the old isolators.

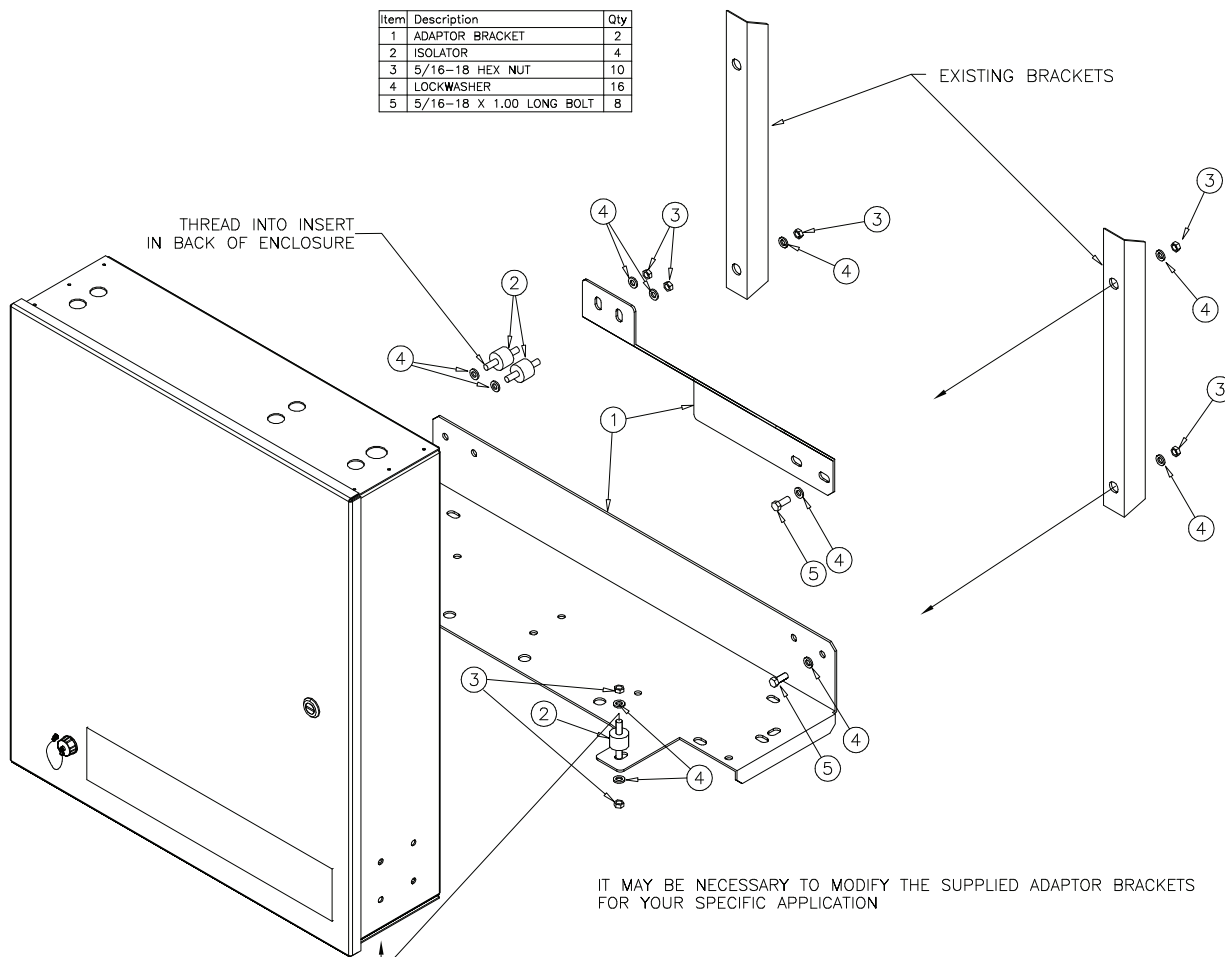
Installation of New Control Panel

Install the new control panel. The two isometric views at the top of the figure show the space required for the control panel based on the mounting holes used. The bottom bracket has two sets of holes so the control panel can be positioned to avoid interference with the condenser shell.

Adapter brackets and hardware are provided. New holes may need to be drilled in existing brackets. Mark and drill holes as required.

It may be necessary to modify the supplied adapter brackets for your specific application.

Figure 5. Mounting brackets, AdaptiView panel upgrade, ref. 50710526 rev. A



Wiring Installation

WARNING

Electrocution and Fire Hazards with Improperly Installed and Grounded Field Wiring!

Improperly installed and grounded field wiring poses **FIRE & ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. All field wiring **MUST** be performed by qualified personnel. Failure to follow these requirements could result in death or serious injury.

Installation

Unless otherwise indicated, all 115 volt control circuits use, as a minimum, #16 AWG, 600 volt wire. Be sure to use existing conduit wherever possible and separate all 115 volt wiring from any low voltage circuits.

Most wiring will use the existing wires removed and marked from the original panel and moved to the terminal block in the new panel. Some wires may need to be connected directly on a LLID terminal. The following chart details the “before and after” of wires from the original panel to the new panel. Also refer to the connection and schematic diagrams listed in “[Wiring Diagram Matrix](#),” p. 40 for additional detail.

Note: For 50 Hz applications, the control power transformer (1T1) is supplied as a 60 Hz application. To convert from 60 Hz to 50 Hz, the following step must be performed: move wire 2H from H3 on 1T1 to H2.

Note: If you have wired a temporary thermostat and 115 volt power source to the oil heater leads, wait to connect these wires until the Tracer AdaptiView retrofit is complete to avoid too much cooling of the oil.

The information in [Table 6, p. 14](#) describes where the wiring that exited the old control panel is to be rewired in the new factory panel. Also refer to the connection and schematic diagrams listed in “[Wiring Diagram Matrix](#),” p. 40.

Table 6. Field wiring cross reference, old to new panel

Existing Wire #	From (in Existing Panel)	To (in New Panel)	Legend ID on New Schematic	Description or Comments
FS1		1X1-4	5S10	Evaporator flow switch
FS1		1X1-17	5S10	Evaporator flow switch
FS2		1X1-4	5S20	Condenser flow switch
FS2		1X1-18	5S20	Condenser flow switch
MS3		N/A	5K1	Chilled water pump relay ^(a)
MS3		N/A	5K1	Chilled water pump relay ^(a)
MS4		1A5 J2-1	5K2	Condenser water pump relay
MS4-LL2		Neutral	5K2	Condenser water pump relay
MS1-12		1X1-14		Oil pump
MS1-LL2		1X1-6		Oil pump
Starter-12		1X1-13		Oil pump interlock
OPC		N/A		Oil pressure control ^(b)
OPC		N/A		Oil pressure control ^(b)
HR1-10		1X1-20		Oil heater
HR1-LL2		1X1-7		Oil heater
LTC		N/A		Low temperature cutout ^(c)
LTC		N/A		Low temperature cutout ^(c)
HPC		1S1-2	1S1	High pressure cutout ^(d)
LL1		1X1-1		Control power. 115 Vac from starter (2TB1-1 typical)
LL2		1X1-5		Control power neutral. 115 Vac from starter (2TB1-2 typical)
Ground		1X1-G-21		Control power ground
4L1		1X1-19		Vent line solenoid valve (4L1), if present, Tracer AdaptiView requires the addition of a separate timer (1K20) to perform this function. Wire solenoid to this timer relay.
4L1		1X1-6		Vent line solenoid valve (4L1)—if present.

(a) The Chilled water pump on Single Door units was typically a 480V (line voltage) device. Thus, a pilot relay (5K10) would be needed to operate using Tracer AdaptiView. See schematic for new wiring details.

(b) The differential oil pressure switch will be replaced with individual oil pressure transducer LLIDs in Tracer AdaptiView.

(c) The LTC will be replaced with a Tracer AdaptiView temperature sensor LLID measuring saturated evaporator refrigerant temperature.

(d) A new HPC (1S1) is provided in the new control panel. The wire from the existing HPC to the starter module must be moved to the 1S1-2 (wire 4A). In addition, the pressure line from the condenser must be moved from the old HPC to the 1S1.

Mount Display Arm and Display

1. Secure the arm to the control panel using the 5/16 - 18 x 1-inch hex bolts, 5/16 - inch lock washers, and 5/16 - 18 hex nuts provided. There are pre-drilled holes on the left and right sides of the control panel; select the side that's most suitable for your specific application.

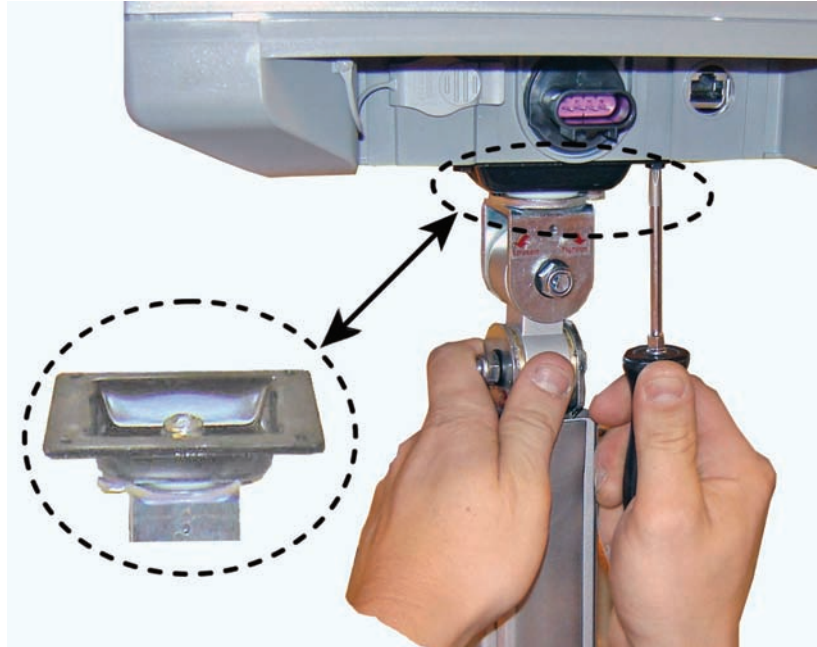
Note: The holes on the unused side should be plugged.

Figure 6. Bolting display arm to the panel



2. Securely fasten the Tracer AdaptiView display to the mounting plate on the end of the display arm with the hardware provided.

Figure 7. Attaching the Tracer AdaptiView display to arm



3. After the display is attached, recheck the arm tension. The arm tension should be set so that the display does not spring up or sag down out of the position it is moved to by the operator.

⚠ CAUTION
Display Arm Under Tension!

The display arm is spring-loaded! Do not unfasten the Tracer AdaptiView display from the display arm for any reason without first decreasing the arm tension to its lowest setting! Failure to relieve the tension from the spring-loaded arm before unfastening the display could result in the arm forcefully snapping upwards unexpectedly, the moment the weight of the display is removed from it! Failure to follow these instructions could result in minor to moderate personal injury.

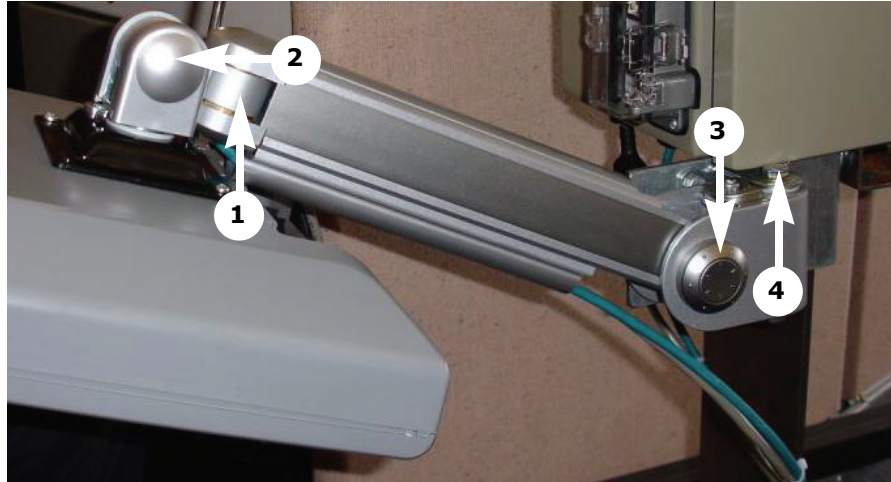
Adjusting the Tracer AdaptiView Display Arm

The Tracer AdaptiView display arm may be too loose or too tight and in need of adjustment. To adjust the tension on the display arm:

1. There are three joints on the display arm that allow the Tracer AdaptiView display to be positioned at a variety of heights and angles (refer to items labeled 1, 2, and 3 in [Figure 8, p. 17](#)). At each joint in the display arm there is either a hex bolt (1 and 2) or hex screw (3). Turn the hex bolt or screw in the proper direction to increase or decrease tension.

Note: Each hex bolt or screw is labeled with 'loosen'/'tighten', or '+/'-' indicators.

Figure 8. Joint locations on the display arm



2. Joint 3 has a 6 mm hex screw controlling the tension on a gas spring, which allows the Tracer AdaptiView display to tilt up and down.
3. Joints 1 and 2 are covered by a plastic cap. Remove the plastic cap to access the hex bolt. Adjust using a 13 mm wrench as necessary.
4. To adjust the swivel of the Tracer AdaptiView display (the spin right and left similar to the steering wheel on a car), you need to adjust the hex bolt located inside the display arm back plate. This adjustment needs to be done BEFORE attaching the display. Use a 9/16" or 14 mm wrench.
5. Use a 13 mm wrench to adjust the bolt (item labeled 4 in [Figure 8](#)) that allows the entire display arm to swivel to the left and right.

Oil Pressure Transducer Installation

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.

WARNING **PPE for Electric Contact and Arc/Flash Required!**

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

The oil differential pressure switch (1S2) will be replaced with two Tracer AdaptiView pressure transducers.

1. The copper lines leading to the existing DP switch will be modified for reuse with the new sensors. The Tracer AdaptiView pressure sensors are 1/4" MPT. Fittings are supplied to convert from the existing flair connection to 1/4" female pipe thread. Use Loctite® 277 on threads of conversion piece to prevent leaks. Use Loctite® 565 on pressure transducer so connection can be broken without heat if future replacement of pressure transducer is required. Note which line is oil pump discharge pressure and which is sump pressure. Quickly attach sensors to lines to avoid large quantities of air entering machine.

The transducers can be mounted in any direction. Lines should be routed and transducers mounted to minimize any potential stacking of liquid on top of the transducers.

If desired, Tracer AdaptiView pressure transducers can be mounted externally from the control cabinet (see [Figure 9](#)). This can be done to avoid spraying control panel components with oil if the fittings should leak. Use caution with copper lines to avoid crimping if moving outside control cabinet.

Figure 9. Pressure transducers mounted outside of control cabinet



2. Remove oil differential pressure switch and wires from enclosure. Tracer AdaptiView does not require the switch function so the switch and associated wiring can be discarded.
3. Once the new panel is installed attach pressure transducers to the cabinet using adhesive pads and wire ties or similar method.
4. Label pressure transducers using labels provided.

Sensor Installation and Wiring

Existing single door sensors cannot be used with a Tracer AdaptiView retrofit. It is recommended that existing bulb wells be used. Installing new wells would necessitate opening the chiller to atmosphere.

WARNING

Refrigerant under Positive Pressure!

System contains oil and refrigerant and may be under positive pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

Failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

If installing new bulb wells (optional), use safe refrigerant practices to evacuate the chiller.

Install and wire each of the temperature sensors listed below.

When the sensor is installed in a bulb well, be sure to:

- add thermastic paste to each bulb well before inserting the sensor, and
- ensure that the sensor “bottoms out” at the base of the bulb well.

It is recommended that sensors “1” through “3” be mounted in wells. The rest may be installed externally. Connect all Tracer AdaptiView temperature sensors to the main IPC bus using the provided pluggable cables.

NOTICE:

Sensor Malfunction!

Never route low-voltage leads with other conductors carrying 30 or more volts! Failure to follow these safety precautions could result in equipment damage due to electrical noise.

The Tracer AdaptiView component identification is in parenthesis following each sensor name:

1. Oil tank temperature sensor (4R5)
2. Evaporator leaving water temperature sensor (4R7)
3. Evaporator saturated refrigerant temperature sensor (4R10)
4. Condenser entering and leaving water temperature sensors (4R8 and 4R9)
5. Evaporator entering water temperature sensor (4R6)
6. Condenser saturated refrigerant temperature sensor (4R11)

Locate sensor at the bottom of the condenser or on the condenser liquid line upstream of any orifices or float valves.

Note: *If unit has an EarthWise™ purge, PRGD (CH530 controls), the sensor bound as Condenser Saturated Refrigerant Temperature Sensor (used as Purge Liquid Temperature) cannot be used and will need to be unbound. Install the temperature sensor sent with the Tracer AdaptiView components as described above.*

7. Condenser discharge refrigerant temperature sensor 4R16 (optional). This sensor is only shipped if Hot gas bypass or Enhanced Protection packages were ordered and are to be installed.
8. Bearing temperature sensors: inboard-4R1, outboard-4R2 (optional). These sensors are only shipped if Enhanced Protection package was ordered and is to be installed.

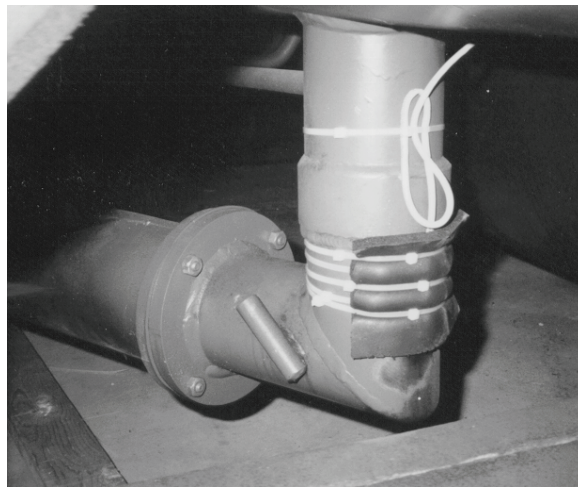
Mounting Sensors Externally

1. Remove the paint and rust from the pipe or chiller surface; then use a wire wheel to expose bare metal.
2. Epoxy the supplied plastic sleeve to the pipe surface. Use “Master Mend Epoxy” by Duro®, or equivalent, [Figure 10, p. 20](#).
3. Install the sensor probe, with thermastic paste, into the sleeve. Wire tie the sensor leads to the plastic sleeve tab.
4. Wrap the sensor with Armaflex® insulation, [Figure 11, p. 20](#).

Figure 10. Epoxy application



Figure 11. Sensor mounting with Armaflex insulation

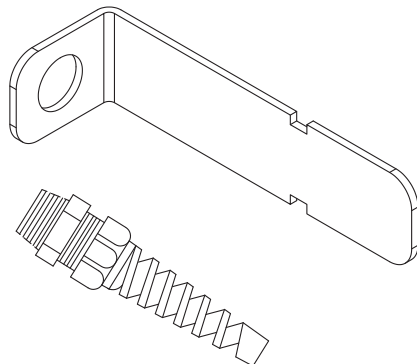


Temperature Sensor Cable Mounting for Wells

For a convenient way to mount Tracer AdaptiView temperature sensors into existing wells, order bracket BRK03270 and strain relief CON00849 (10 per package).

To install insert the threaded end of the strain relief through the hole in the bracket and screw this into the temperature well, [Figure 12, p. 21](#). The Tracer AdaptiView temperature sensor cable can then be secured to the bracket using tie-wraps. The temperature probe can be inserted through the hole in the strain relief.

Figure 12. Field supplied bracket and strain relief



Option I/O Installation

Wire additional LLIDs as shown on schematics. Pay careful attention to which LLIDs require low voltage inputs and which are 115 Vac inputs.

Inlet Guide Vane Actuator Installation

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.

WARNING

PPE for Electric Contact and Arc/Flash Required!

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

Inlet guide vane (IGV) stepper actuator mounting and wiring follows.

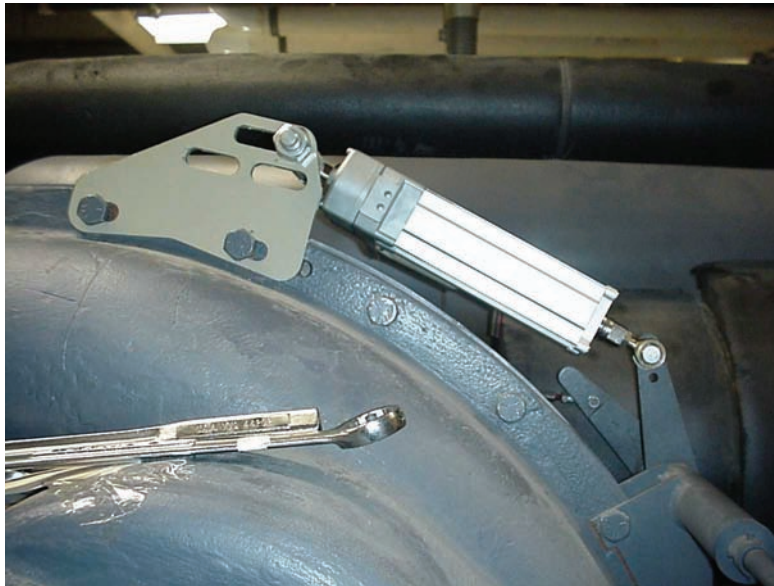
1. Installing Tracer AdaptiView stepper actuator.
 - a. Determine the inlet guide vane stroke by manually closing and opening the vanes and accurately measuring the length of travel.
 - b. Record this value as it will be used when performing the post conversion checkout.
2. Remove the existing pulse IGV actuator and existing conduit and wire.
3. Install the new IGV actuator on the chiller.
 - a. Use the connecting hardware retained when the old pulse actuator was removed.
 - b. Use the existing actuator mounting plate, piston yoke and mounting hardware to install the new electric actuator.

The motor can be rotated 180 degrees to accommodate existing hardware. The actuator rod may be connected to the mounting plate at the compressor housing or to the vane linkage.

NOTICE:
Equipment Damage!

When mounting the actuator, make sure that the 0 degree vane position corresponds with the actuator fully closed. Failure to do so could result in severe damage to the machine.

Figure 13. Installed stepper IGV actuator



4. The IGV ships in a mid-position. The first time the IGV is powered up, it will drive closed. This may mean travel as much as 1". Disconnect the IGV actuator from the IGV linkage until fully retracted.

Note: For PCV-2C through PCV-3J units, the stroke of the actuator is towards the compressor.

Running the IPC Bus

There are several ways to string the IPC communication bus on the chiller. The Tracer AdaptiView retrofit kit includes a general wire kit that has several different types of wires. An example of a wiring layout can be seen in [Figure 14, p. 23](#). Each application will vary depending on the options. You may have extra cables, or may be short needed cables. Extra cables can be ordered through your local Trane Parts Center. Use the latest version of PART-SVB16A-EN for identification of individual cables.

 **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.

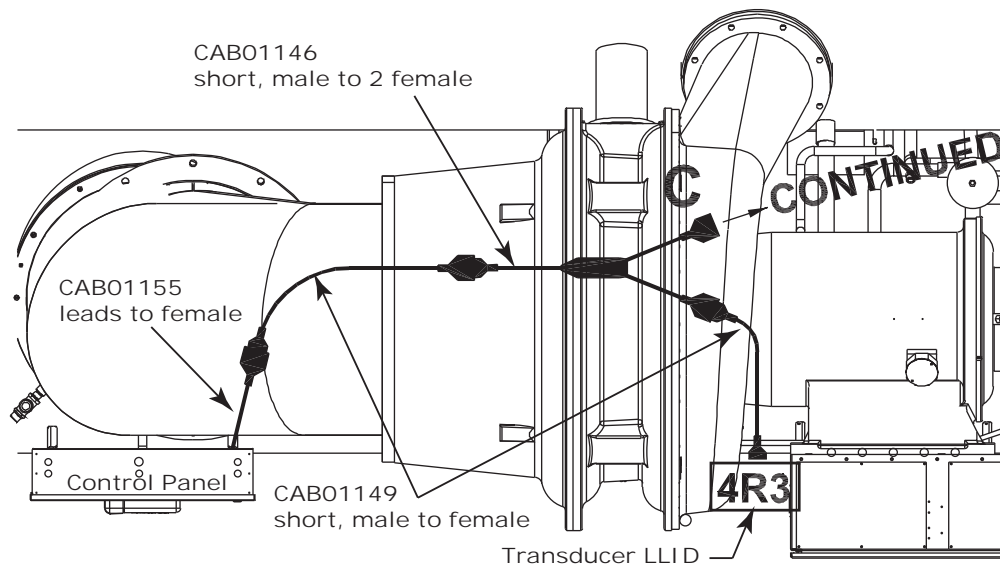
Note: For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN or PROD-SVB06A-FR.

⚠ WARNING

PPE for Electric Contact and Arc/Flash Required!

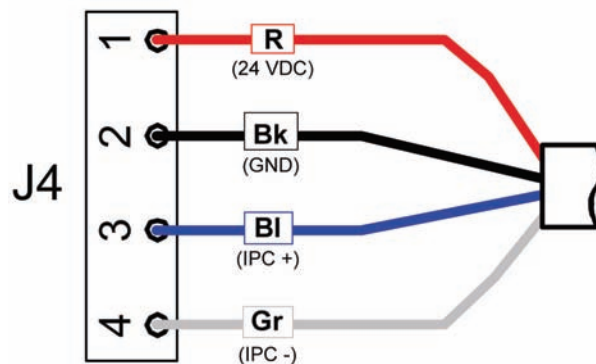
Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

Figure 14. Sample of IPC cable routing



To connect the IPC bus to the control panel LLIDs, thread the bus into the control panel via a knockout or other entry. The CAB01155 connector has a female plug on one end and four stripped leads on the other end. Attach the four stripped leads to the power supply in the control panel.

Figure 15. Connecting the stripped leads to the power supply



Notes:

Installation

- *R. Red wire for 24 Volts direct current*
- *Bk. Black wire for ground*
- *Bl. Blue wire for IPC+ connection*
- *Gr. Gray wire for IPC- connection*

Make sure all devices and LLIDs are connected together in some way. Use the correct cables so that you don't have any open plugs when finished. Avoid placing wire ties directly over plug connectors. This may press on the locking mechanism and over time the plugs may release.

Table 7. Cables shipped for various options

	CAB01146 branch M^(a) to 2 F 500 mm	CAB01147 branch M to 2F 1000 mm	CAB01148 branch M to 3F 500 mm	CAB01149 extension M to F 1000 mm	CAB01150 extension M to F 2000 mm	CAB01152 extension M to leads 1000 mm	CAB01154 extension M to receptacle 1 M	CAB01155 extension F to leads 1000 mm
Standard panel cables	5	5	5	10	9	1	2	2
Actuator-stepper		1						
Oil protection—full, low pressure or high pressure		1		1				
Heat recovery / aux condenser		1	1		1			
Hot gas bypass—electric actuator		1		1				
Hot gas bypass—pulse actuator		1	1					
Cold water reset		1			8			
Enhanced protection	1	2	1	3				

(a) The letters M and F represent male and female connectors.

Purge Control Installation

Important: *Be sure to retain all existing purge safety controls!*

The purge power line connections for the power to the unit should be wired per the purge wiring diagram. In general the 115 Vac power for the purge originates from the unit control panel. In the new control panel a circuit breaker 1Q2 is provided to power the purge. A neutral connection can be found on the 1X1 terminal strip.

PRGA and PRGB Purifier Purge

Older model Purifier purges can be connected to the Tracer AdaptiView control panel. A compressor run contact will be used to give the purge an auto start contact when the chiller is running. Use similar wiring options as discussed for PRGC models. The exception is that a pilot relay needs to be driven from the Quad relay output. The contacts of the quad relay are only rated for 2.8 A pilot duty, 7.2 A resistive at 120 Vac and 1/3 HP, 7.2 FLA at 240 Vac, 5 A general purpose. Refer to the existing purge wiring diagram to determine the connection points for this auto start contact.

PRGC Purifier Purge

The PRGC Purifier[®] purge uses UCP2-based communications and does not communicate with Tracer AdaptiView controls. A PRGC requires a compressor running signal connected to J26, 1 and 2 on 3U1 in the purge to operate in the auto or adaptive modes. Use the Compressor Running contact closure from the quad relay LLID - 1A8, connected to 115 Vac purge power source.

PRGD EarthWise Purge

If a stand-alone EarthWise[™] purge (CH530 control) exists on the chiller, it will need some hardware changes to work with the Tracer AdaptiView retrofit controls. If the purge is a new installation with the Tracer AdaptiView, then skip to [Step 6](#).

⚠ 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.

⚠ WARNING**PPE for Electric Contact and Arc/Flash Required!**

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

1. The Compressor running LLID (3A6) will not be needed, disconnect and remove.
2. The Condenser Saturated Refrigerant Temperature LLID (purge liquid temperature) will not be needed, disconnect and remove.
3. The existing 120-27 Vac transformer in the purge is undersized and should be removed. The transformer shipped with the Tracer AdaptiView will be used.
4. Remove and save purge power supply LLID.
Remove IPC bus cable from power supply LLID. (Ensure remaining LLIDs are still connected to IPC bus).
It is optional to remove and discard the wires (303A, 304A, and 318A) from control power transformer to this power supply LLID (3A5).
5. The DynaView and optional tilt bracket can be removed.
Disconnect the cable from the DynaView to the power supply LLID.
Remove the tilt bracket from the purge base. DynaView can remain attached to the tilt bracket panel.
6. Connect the IPC bus from the control panel to the IPC bus for the purge using an IPC bus cable.

Starter Work

Starter Panel Conversion Installation

1. Installing the Starter Panel sub-box and/or back panel:
2. The starter module LLID, and CTs and any turn-down transformers can be mounted on a back panel that can be installed in the optional sub-box or directly into the starter cabinet if there is sufficient room.
3. Mounting of the optional starter sub-box:
 - a. Remove door from box. Door can be hinged on either side of cabinet.
 - b. Mount starter sub-box on starter panel as shown in [Figure 16](#) using hardware provided. When drilling holes in starter cabinet, take care to avoid getting metal shavings into starter cabinet.
 - c. Drill 3/4" or 1" hole through panel and starter cabinet, near top of cabinet, to accommodate wires from sub-box to starter. Add grommet to hole.

Figure 16. Mounting starter sub-box



4. Mounting and pre-wiring of components on back panel.
 - a. Mount starter module LLID on the back panel.
 - b. Label components using labels provided.
 - c. Attach starter module LLID to IPC bus.

Starter Planning

The starter work required varies significantly from one application to the next. These instructions are somewhat generic. Detailed plans have to be worked out using these instructions as a guide along with your specific starter wiring and hardware information. Use the existing starter wiring and the Tracer AdaptiView ship with starter wiring diagrams for determining your exact wiring.

The 3-phase starter module can control the starter using one of two methods. They are either direct control of each starter contactor or pilot relay interface to the existing contactors. Both methods result in similar operation of the starter. When the module is wired for direct control all functions of the dry run test can be performed. The pilot relay method must be used when the contactor coils are voltages other than 115 Vac. If both direct control or pilot relay control can be used on your application, select the method that best suits your needs.

The wiring diagrams for direct control are referenced in “[Wiring Diagram Matrix](#),” p. 40. Also use “[Wiring Diagram Matrix](#),” p. 40 for pilot relay diagrams, sometimes referred to as customer supplied starter wiring. Pilot relays are field provided.

Retain any special options and determine how they might fit into the new method of control. Keep a detailed record of your revisions to help with further troubleshooting.

Starter panel conversion varies with existing starter type and starter control voltage. For reference, “[Wiring Diagram Matrix](#),” p. 40 lists the electrical schematics for typical Tracer AdaptiView wiring for wye-delta, across-the-line, primary reactor, auto transformer, and solid-state starters.

Important: *To ensure that the starter panel retrofit procedure is performed properly, carefully review the instructions in this section. Record a detailed description of all electrical changes made during the starter retrofit process. Be sure to add a copy of this report to the chiller record file for future reference.*

The instructions that follow detail the rework of a typical wye-delta starter for direct control by Tracer AdaptiView and the starter module LLID. It will require a field provided relay, 2K11, as the Interlock relay.

While this conversion procedure specifically applies to wye-delta starters, it can be adapted to successfully modify other types of starters for operation with a Tracer AdaptiView starter module.

Notes:

- A typical, single door wye-delta unit-mounted starter schematic and connection diagram appears in [Figure 17](#), p. 28. Be sure to refer to this diagram and the wiring diagrams listed in “[Wiring Diagram Matrix](#),” p. 40 as you review the following instructions. The wire numbers and component designations indicated in these steps appear in these figures.
- To simplify future chiller trouble analysis, Trane recommends removing all existing, non-essential components from the starter panel enclosure.

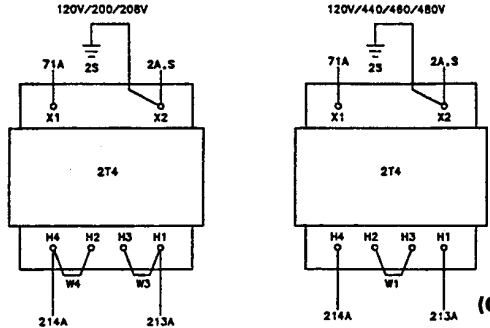
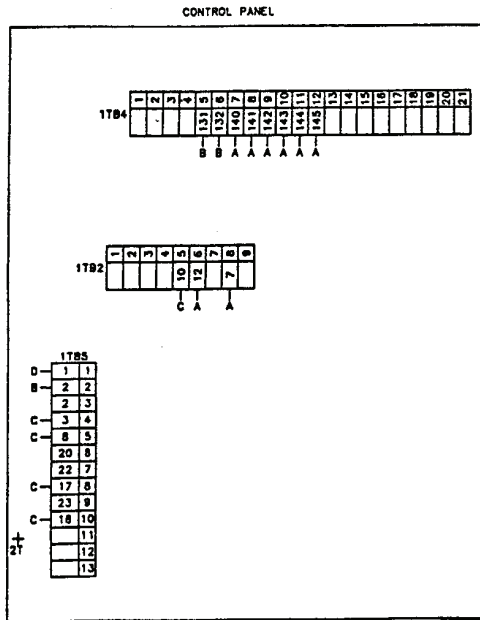
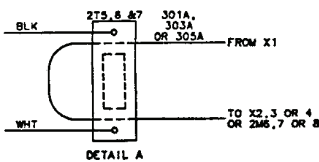
Starter Work

Figure 17. Typical old wye-delta starter connection diagram

CHART A	
CURRENT RATIO	TERMINALS
150:5	X1 TO X2
175:5	X1 TO X3
200:5	X1 TO X4
250:5	X1 TO X2
300:5	X1 TO X3
350:5	X1 TO X4
400:5	X1 TO X2
500:5	X1 TO X3
600:5	X1 TO X4
700:5	X1 TO X2
800:5	X1 TO X3
1000:5	X1 TO X4
1200:5	X1 TO X2
1500:5	X1 TO X3

NOTES

- 1 SEE DETAIL "A".
- 2 WIRES WHT AND BLK ARE UNSHIELDED CABLE.



(Continued on next page)

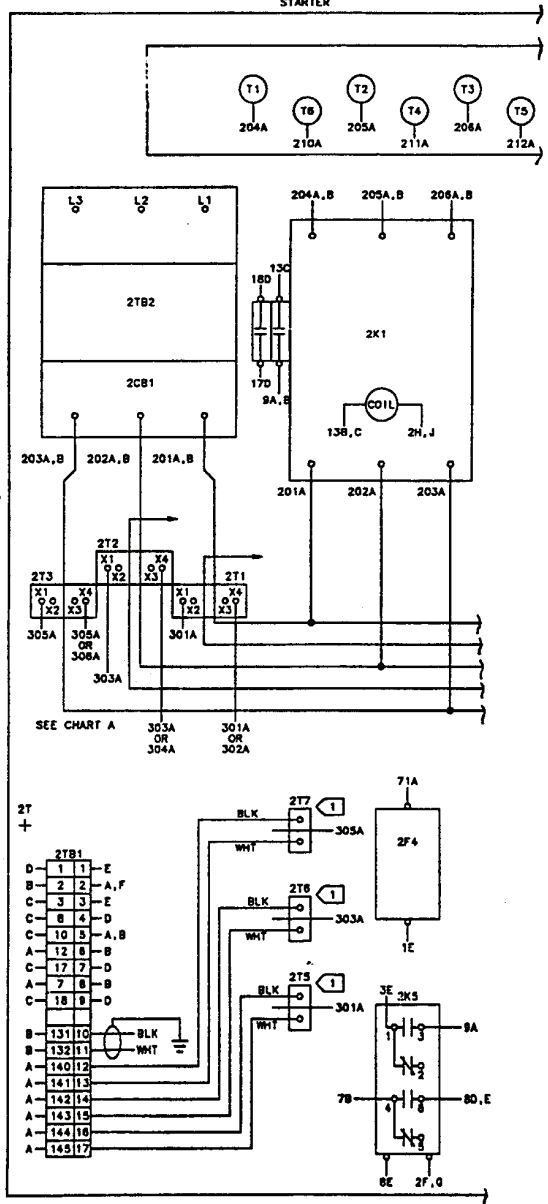
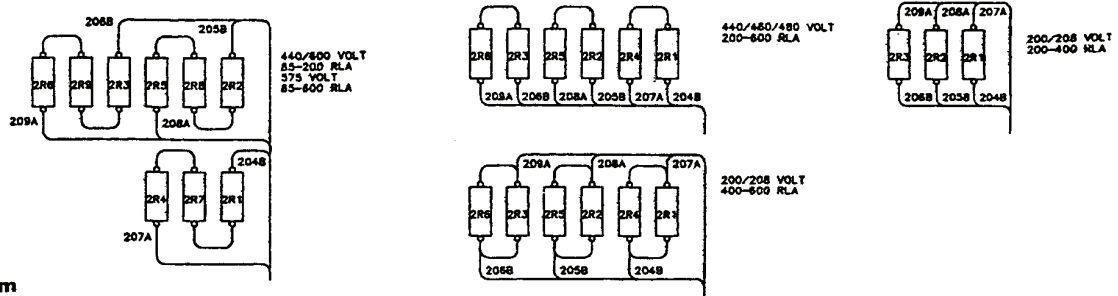
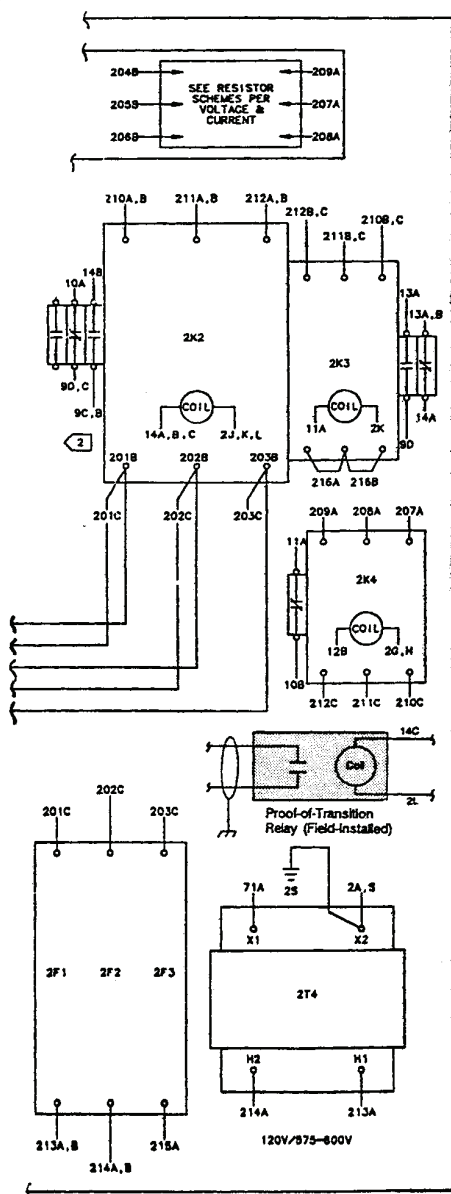


Figure 17. (continued from previous page) Typical wye-delta starter connection diagram

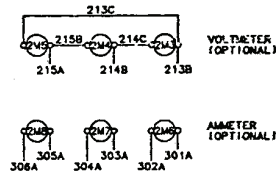


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WARNING
Disconnect electrical power supply to prevent injury or death due to electrical shock.

Caution
Use copper conductors only to prevent equipment damage (unless otherwise specified).



Legend

- 2CB1 Starter Circuit Breaker
- 2F1 Phase 1 Primary Starter Fuse
- 2F2 Phase 2 Primary Starter Fuse
- 2F3 Phase 3 Primary Starter Fuse
- 2F4 Secondary Starter Fuse
- 2K1 Start Contactor
- 2K2 Run Contactor
- 2K3 Shorting Contactor
- 2K4 Transition Contactor
- 2K5 Pilot Relay
- 2R1-9 Transition Resistors
- 2T1 Phase 1 Line CT
- 2T2 Phase 2 Line CT
- 2T3 Phase 3 Line CT
- 2T4 Control Power Transformer
- 2T5 Phase 1 Auxiliary CT
- 2T6 Phase 2 Auxiliary CT
- 2T7 Phase 3 Auxiliary CT

- 2TB1 Control Terminal Block
- 2TB2 Line Terminal Block

Drwg. X39470405C

Control Power Transformer

If the existing starter does not have 115 Vac 3 KVA of additional control power, install a transformer (field-supplied) that will provide 115 Vac to the Tracer AdaptiView control panel. (As just described, transformer requirements are: line voltage primary/115 Vac secondary, minimum capacity 3 KVA.)

Current Transformers, CTs

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.

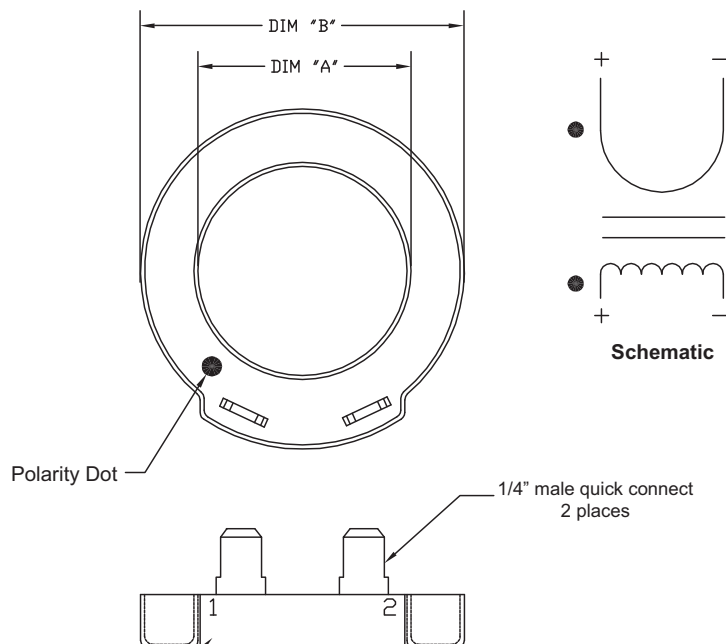
Note: For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN or PROD-SVB06A-FR.

WARNING

PPE for Electric Contact and Arc/Flash Required!

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

Three new current transformers CTs ("donut" shape) are required to re-work the starter. For data that describes these CTs, see [Figure 18, p. 31](#) and [Table 8, p. 32](#). Install these three new CTs as shown on wiring diagram. Pay careful attention to the polarity dot and its orientation. The polarity dot should face incoming power, in other words, towards the disconnect.

Figure 18. Current transformer, single turn-down


Wire the leads from the male quick connects to the starter module as shown on the wiring diagram. Use female insulated quick connect terminals.

The application of Tracer AdaptiView chiller controls to a medium voltage chiller (greater than 600 Vac) recommends specific use of the dual current transformer (CT) application, rather than a single CT which is a common option on low voltage applications (600 Vac or less). See CVRD-SVN11A-EN, or current version, for wiring of medium voltage CT applications.

The dual CT installation uses a primary CT that reduces the amperage to less than 5 amps. A second CT is then used to reduce the current input to the starter module to a nominal 100 mA value. Use dual CT data from [Table 9, p. 33](#) for the primary/secondary application.

It is recommended that you confirm the correct CT has been provided before starting installation. Before wiring the starter module and CT be sure to confirm incoming power phasing. If Phase A, B, and C are wired in the wrong order the controls will not allow the motor to start. Use the phase meter on the low voltage side of the potential transformer. Do NOT use the meter on the primary side where there is medium voltage because it probably exceeds the safe operating voltage range of most service meters.

Starter Work

Table 8. CT specifications for single transformer per phase

Actual Motor RLA (A)	CT Extension X13580253 or X13580269	CT Ratio (A:A)	CT Rating (A)	Diameter ^(a) (inches)		Primary Turns	CT Meter Scale
				Inside A	Outside B		
5.6–8.3	09	50:0.1	50	2.0	3.35	6	8.3
6.7–10.0	09	50:0.1	50	2.0	3.35	5	10.0
8.4–12.5	09	50:0.1	50	2.0	3.35	4	12.5
11.2–16.6	09	50:0.1	50	2.0	3.35	3	16.6
16.7–25.0	09	50:0.1	50	2.0	3.35	2	25
25.0–37.5	10	75:0.1	75	2.0	3.35	2	37.5
33.4–50	09	50:0.1	50	2.0	3.35	1	50
50–75	10	75:0.1	75	2.0	3.35	1	75
67–100	01	100:0.1	100	2.0	3.35	1	100
100–150	02	150:0.1	150	2.0	3.35	1	150
134–200	03	200:0.1	200	2.0	3.35	1	200
184–275	04	275:0.1	275	2.0	3.35	1	275
267–400	05	400:0.1	400	2.5	3.95	1	400
334–500	06	500:0.1	500	2.5	3.95	1	500
467–700	07	700:0.1	700	2.5	3.95	1	700
667–1000	08	1000:0.1	1000	2.5	3.95	1	1000
934–1400	11	1400:0.1	1400	3.5	5.25	1	1400
1200–1800	12	1800:0.1	1800	4.0	6.50	1	1800

(a) Refer to [Figure 18, p. 31](#) for location of diameter A and B.

When using existing CTs having a nominal chiller current to 5 amp ratio (i.e., 200:5), it is necessary to install secondary CTs. In this case, two CTs are used per phase to either achieve the necessary turn-down or for metering convenience. The first stage consists of either the X13580271, X13580272, X13580047 or X13580048 CT (each of these CTs have a 5 amp secondary). Second stage CTs consists of small transformers that reduce the nominal 3.6 amp signal to the 100 mA value used by the starter module. The existing 5 amp CTs cannot be used if they do not match the required ratio in [Table 9, p. 33](#).

The part number on the secondary CT is X13580266-01, Trane part number TRR00975, three required per starter.

Table 9. CT specifications for two transformers per phase

Actual Motor RLA (A)	CT Xcode	CT Ext.	CT Ratio (A:A)	CT Rating (A)	Inside dia. (inches)	Primary turns	CT meter scale
8.0–12.0	X13580272	01	50:5	50	1.25	3	12
12.0–18.0	X13580272	01	50:5	50	1.25	2	18
18.0–27.0	X13580272	02	75:5	75	1.25	2	27
24.0–36.0	X13580272	01	50:5	50	1.25	1	36
36.0–54.0	X13580272	02	75:5	75	1.25	1	54
48.0–72.0	X13580271	01	100:5	100	1.75	1	72
24.0–36.0	X13580048	01	150:5	150	2.5	3	36
28.8–43.2	X13580048	01	180:5	180	2.5	3	43.2
36.0–54.0	X13580048	01	150:5	150	2.5	2	54
43.2–64.8	X13580048	01	180:5	180	2.5	2	64.8
48.0–72.0	X13580048	01	200:5	200	2.5	2	72
60.0–90.0	X13580048	02	250:5	250	2.5	2	90
72.0–108.0	X13580048	01	150:5	150	2.5	1	108
86.4–129.6	X13580048	01	180:5	180	2.5	1	129.6
96.0–144.0	X13580048	01	200:5	200	2.5	1	144
120–180	X13580048	02	250:5	250	2.5	1	180
144–216	X13580048	02	300:5	300	2.5	1	216
168–252	X13580048	02	350:5	350	2.5	1	252
192–288	X13580048	03	400:5	400	2.5	1	288
240–360	X13580048	03	500:5	500	2.5	1	360
288–432	X13580048	03	600:5	600	2.5	1	432
336–504	X13580048	04	700:5	700	2.5	1	504
384–576	X13580048	04	800:5	800	2.5	1	576
480–720	X13580048	04	1000:5	1000	2.5	1	720
480–720	X13580047	02	1000:5	1000	4.0	1	720
576–864	X13580048	05	1200:5	1200	2.5	1	864
576–864	X13580047	02	1200:5	1200	4.0	1	864
720–1080	X13580048	05	1500:5	1500	2.5	1	1080
720–1080	X13580047	02	1500:5	1500	4.0	1	1080
864–1296	X13580047	01	1800:5, X1-X2	1800	4.0	1	1296
1008–1512	X13580047	01	2100:5, X1-X3	2100	4.0	1	1512
1200–1800	X13580047	01	2500:5, X1-X4	2500	4.0	1	1800

The secondary CT used in the two transformer per phase is shown in [Figure 19, p. 34](#). For a typical wiring diagram used for wiring low voltage applications using dual CTs, two transformers per phase, see [Figure 20, p. 35](#).

Figure 19. Secondary CT used with 5 amp primary CT, X13580266-01, TRR00975

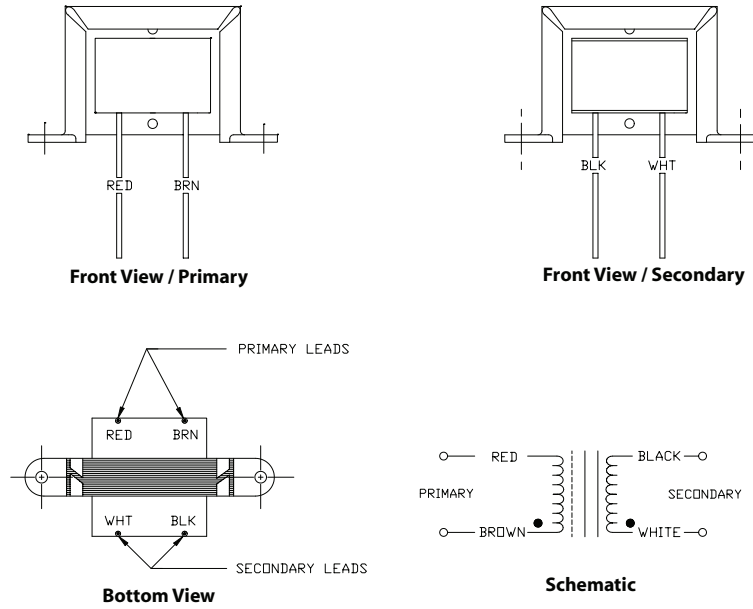
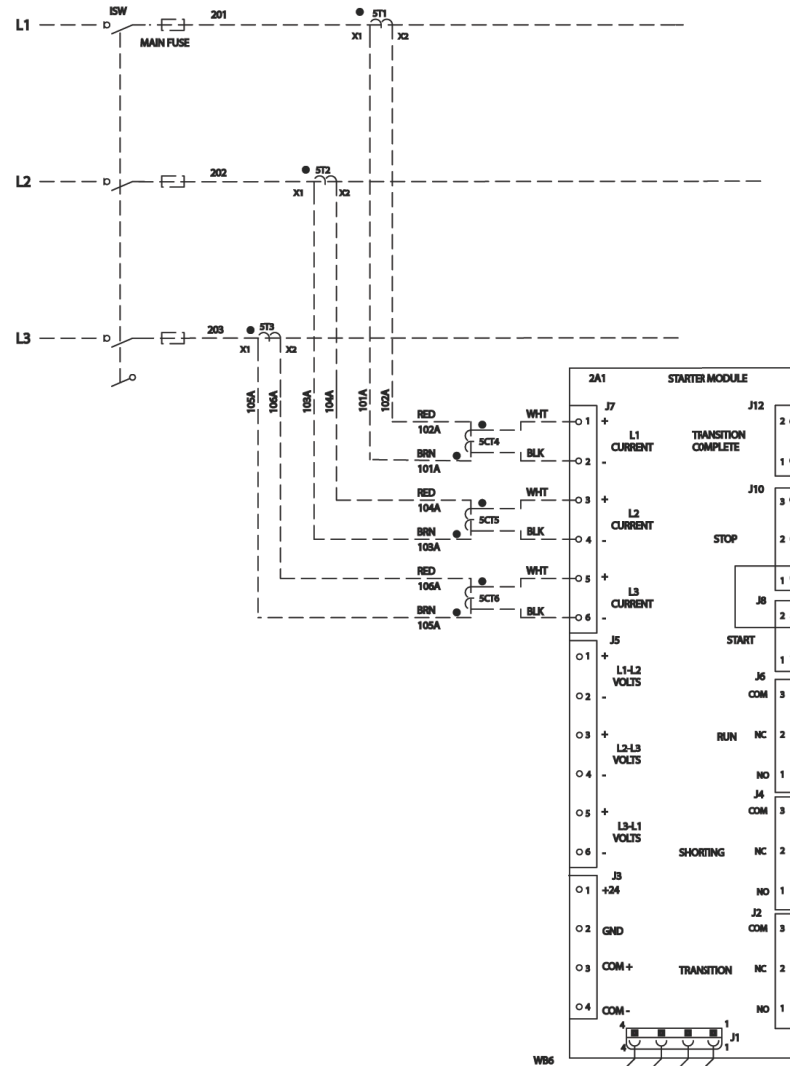


Figure 20. Dual CT wiring example



Potential Transformers, Optional PTs

⚠ 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.

⚠ WARNING

PPE for Electric Contact and Arc/Flash Required!

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

Install the optional potential transformers (PTs). The potential transformers are used to measure line voltage. The wiring must have the correct polarity for them to work correctly.

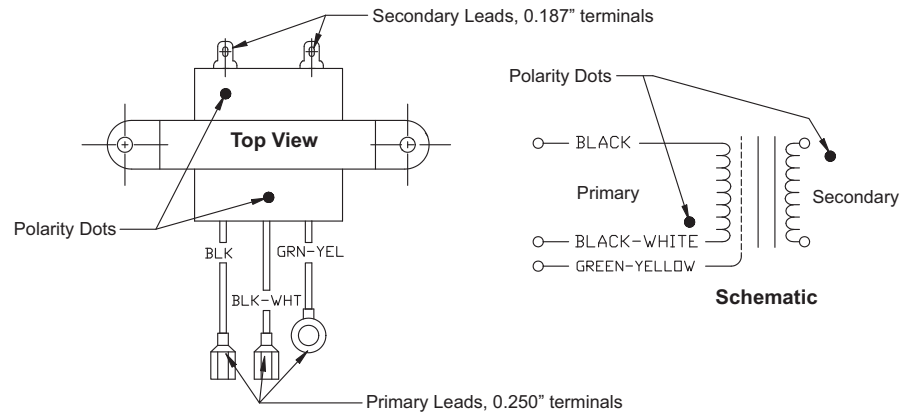
For applications greater than 600 Vac, a large medium voltage PT is used to step from line voltage to 115 Vac and a second PT steps the voltage to less than 30 Vac. The large PT is a three phase type except for the 6600 Vac where three single phase PTs are used. See CVRD-SVN11A-EN, or the current version, for detailed wiring instructions.

For applications less than 600 Vac a single PT per phase like that shown in [Figure 21, p. 36](#) is used to step the signal down to a voltage less than 30 Vac for input into the starter module. The black leads are connected to the line from phases A-B, B-C and C-A. The green ground wire is connected to chassis ground. Field provided wires connect the Starter module to the terminals on the PTs.

The part number on the less than 600 volt PT is X13590079-01, Trane part number TRR00713, three required per starter. Or, order quantity one of KIT04099, which is a package of three with mounting screws.

Note: Fuses (2F1, 2F2 and 2F3) must be installed with the optional potential transformers (see ["Wiring Diagram Matrix," p. 40](#) for a list of the appropriate wiring diagram examples). Use [Table 5, p. 9](#) to size the fuses.

Figure 21. Potential transformer, X13590079-01, TRR00713



Starter Wiring

WARNING

Electrocution and Fire Hazards with Improperly Installed and Grounded Field Wiring!

Improperly installed and grounded field wiring poses **FIRE & ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. All field wiring **MUST** be performed by qualified personnel. Failure to follow these requirements could result in death or serious injury.

Refer to the appropriate wiring diagram (see [“Wiring Diagram Matrix,”](#) p. 40) to determine how to wire the contactors.

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.

WARNING

PPE for Electric Contact and Arc/Flash Required!

Technicians must wear all necessary PPE equipment in accordance with NFPA 70E for electric contact and arc/flash protection prior to disconnecting electric power including remote disconnects. Failure to follow this requirement could result in an electrical shock and/or being struck by an arc/flash, which could result in death or serious injury.

The starter should be rewired and connected to the starter module as shown on the ship with wiring diagrams. Wire and terminal block numbers shown are new. Re-label existing wires as shown on wiring diagram. A field provided terminal block may be helpful or the existing terminal block/strip may be relabeled.

A field provided interlock relay (2K11) is required. A relay that is no longer required from the existing starter may be reused or a new relay field provided. The following information is for the typical Wye-delta starter using direct control of the contactors.

Starter Work

Table 10. Starter wiring

From Terminal	To Terminal
Mount new interlock relay 2K11	
Wire 507, 2K11 hot side coil terminal	Run contactor 2K1, neutral side contact terminal
Wire 508, 2K11 neutral side coil terminal	2TB1-N
Wire 506, 2K1 hot side contact terminal of start contactor	Start contactor 2K1, hot side coil terminal
Wire 510, 2K1 hot side coil terminal	2A1 J8-1
Wire 505, 2K1 same hot side contact terminal as wire 505	Interlock relay 2K11, neutral side contact terminal
Wire 510, 2K11 hot side contact terminal	2A1 J8-1
Wire 511, 2K1, neutral side coil terminal	2TB1-N
Wire 512, 2A1 J6-3	1Q1-1
Wire 514, 2A1 J6-1	2K11, unoccupied hot side contact terminal
Wire 515, 2K11, unoccupied hot side contact terminal opposite Wire 508	Shorting contactor 2K3, NC hot side contact terminal
Wire 516, 2K3, NC neutral side contact terminal opposite Wire 509	Run contactor 2K2, hot side coil terminal
Wire 517, 2K2 neutral side coil contact	2TB1-N
Wire 518, 2A1 J4-3	1Q1-1
Wire 519, 2A1 J4-1	Transition contactor 2K4, NC hot side contact terminal
Wire 521, 2K4, NC neutral side contact terminal	2K3 hot side coil terminal
Wire 522, 2K3, neutral side coil terminal	2TB1-N
Wire 523, 2A1 J2-3	1Q1-1
Wire 524, 2A1 J2-1	2K4, hot side coil terminal
Wire 526, 2K4 neutral side coil terminal	2TB1-N
Wire 4B permanently attached to condenser high pressure switch	2A1 J10-3
Wire 504, 2A1 J12-1	2TB1-N
Wire 503, 2A1 J12-2	2K2 auxiliary neutral side contact terminal
Wire 502, 1Q1-1	2K2 auxiliary hot side contact terminal
Wire 3A permanently attached to condenser high pressure switch	1Q1-1
Wire 7A permanently attached to condenser high pressure switch	1A4 J2-2

Table 11. Existing single door wiring legend

Device	Description
CPT	Control power transformer
CR2	Control relay (for SAV)
CR7	Low refrigerant temperature relay
CR8	High pressure cutout relay
CR9	Motor temperature relay
FS1	Evaporator flow switch
FS2	Condenser flow switch
HPC	High pressure cutout switch
LLR	Load limiting relay coil
LTC	Low refrigerant temperature switch
MS1	Oil pump starter
MS3	Chilled water pump starter
MS4	Condenser water pump starter
MTC	Motor temperature switch
OPC	Oil pressure switch
OTC	Oil temperature thermostat
PB1	Start button for chilled water pump
PC	Purge over pressure switch
PE1	Pneumatic electric switch
PL2	Purge heater operating pilot light
PL3	Purge power pilot light
PSV	Purge isolation valve
R	Run contactor auxiliary contacts
S1	Oil pump switch
S10	Condenser pump switch (continuous/intermittent)
S11	Cooling tower fan switch (manual/auto)
S2	Purge heater switch
S3	Purge compressor switch
S4	Demand limiter switch
S5	Reset button for safety string inputs, LTC, MTC, HPC
SAV	Solenoid air valve
TC2	Cooling tower fan thermostat
TR1	Time delay relay, 15 seconds
TR10	Time delay relay, prevents evaporator flow switch "chatter"
TR11	Time delay relay, prevents condenser flow switch "chatter"
TR2	Time delay relay, post lube, 7 minutes
TR3	Anti-recycle timer, 30 minutes
TR4	Time delay relay, pre lube, 30 seconds



Wiring Diagram Matrix

Table 1. Wiring diagrams

Type	Number
Unit Controls	5071-0449
Unit & Opt	5071-0450
Optional	5071-0461
Optional	5071-0462
Legend	5071-0539
Field Connection Diag	5071-0542
Starters	
Wye-Delta TS	5071-0496
X-line TS	5071-0497
Primary Reactor TS	5071-0498
Auto X-former TS	5071-0499
Solid State TS	5071-0528
Wye-Delta CS	5071-0523
X-line CS	5071-0524
Primary Reactor CS	5071-0525
Auto X-former CS	5071-0527
<i>Plt 7 Conn Diag</i>	<i>5071-0467</i>

Note: Wiring diagrams are available via e-Library.



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

Literature Order Number	CVRE-SVN01A-EN
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Date	February 2009
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Supersedes	New
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