

Installer's Guide

Integrated Variable or Multi-Speed Control Drive Replacement

Important: These instructions do not cover all system variations or possible installation issues. For additional information or specific problems, please contact your installing dealer or local distributor.

Important: Confirm the correct replacement drive is used by verifying the drive label color and unit tonnage.

2-Ton Variable Speed: Replace with green labeled drive only

3-Ton Variable Speed: Replace with green or pink labeled drive

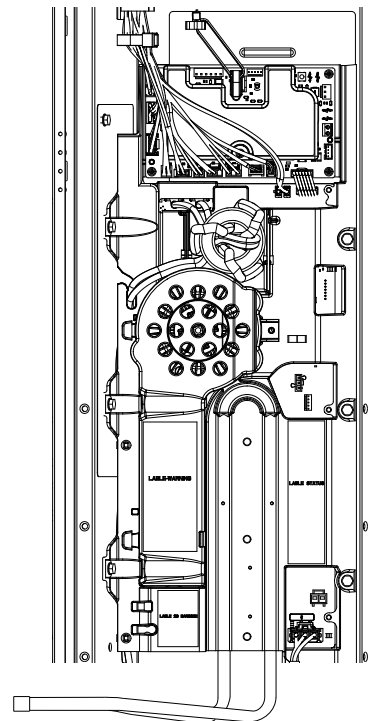
4- and 5-Ton Variable Speed: Replace with pink labeled drive only

2-Ton Multi-Speed: Replace with purple labeled drive only

3-Ton Multi-Speed: Replace with purple or orange labeled drive

4- and 5-Ton Multi-Speed: Replace with orange labeled drive only

Important: Do not replace only the AOC on Variable Speed models. The replacement drive includes both the AOC and MOC, which must be installed together to ensure firmware compatibility.



⚠ 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.

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.

Important 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 according to local rules. For the USA, 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

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.

⚠ WARNING

Cancer and Reproductive Harm!

This product can expose you to chemicals, including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage. This unit is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

Do not allow children to play or climb on the unit or to clean or maintain the unit without supervision.

⚠ WARNING

High Leakage Current!

Failure to follow instructions below could result in death or serious injury.
Properly connect the system's oversized protective earthing (grounding) terminal(s).

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

⚠ WARNING

Grounding Required!

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

- Reconnect all grounding devices.
- All parts of this product that are capable of conducting electrical current are grounded.
- If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

⚠ CAUTION

Hot Surface!

Failure to follow instructions below could result in minor to severe burns.
Do not touch top of compressor. It may be hot.

⚠ WARNING

Electrical Hazard!

Failure to follow instructions below could result in death or personal injury.
WAIT TWO (2) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 400 VDC. Then verify DC Voltage is less than 42 VDC at inverter test points labeled +DC and -DC before servicing board.



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Required Tools and Parts

Tools

- DC volt meter
- 5/16-inch nut driver
- 7/16-inch socket wrench
- Torque wrench with 7/16-inch socket

Parts

- Thermal grease
- Aluminum nuts (3)
The aluminum nuts secure the cold plate to the drive assembly. These are spare parts, if the existing nuts are damaged.
- Multi-speed LPCO jumper
- Multi-speed wiring diagram

Terminology

The following terms and abbreviations are used:

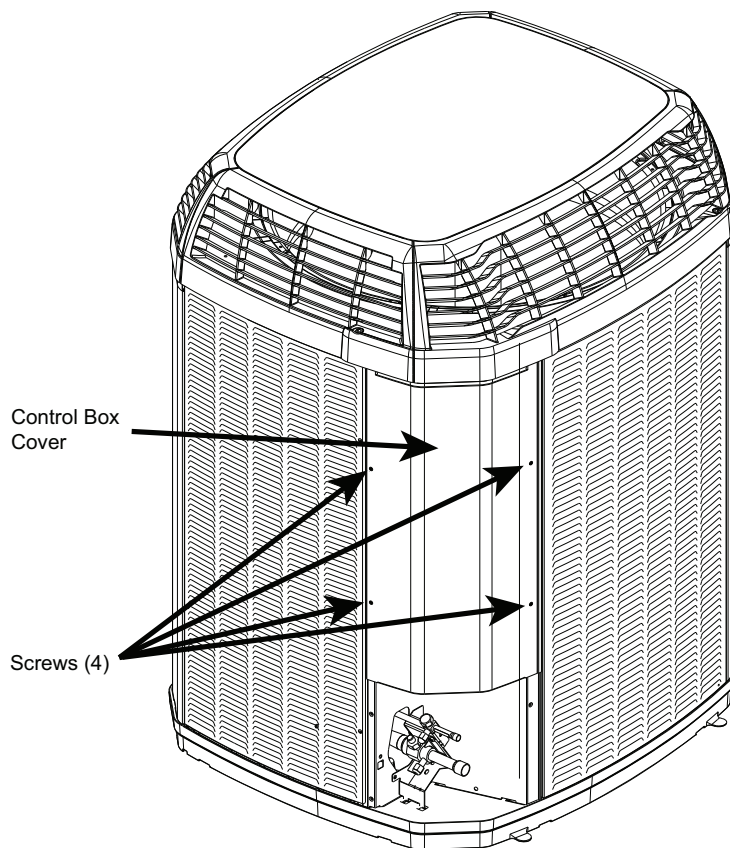
Term	Abbreviation
Drive	Same as MOC
Drive Assembly	Same as AOC and MOC
EEV	Electronic Expansion Valve
HPCO	High-Pressure Cutoff
IVSC	Integrated Variable Speed Control
PM	Personality Module
IMSC	Integrated Multi-Speed Control

Removing the Existing Drive

Shut Down the Unit and Remove the Cover

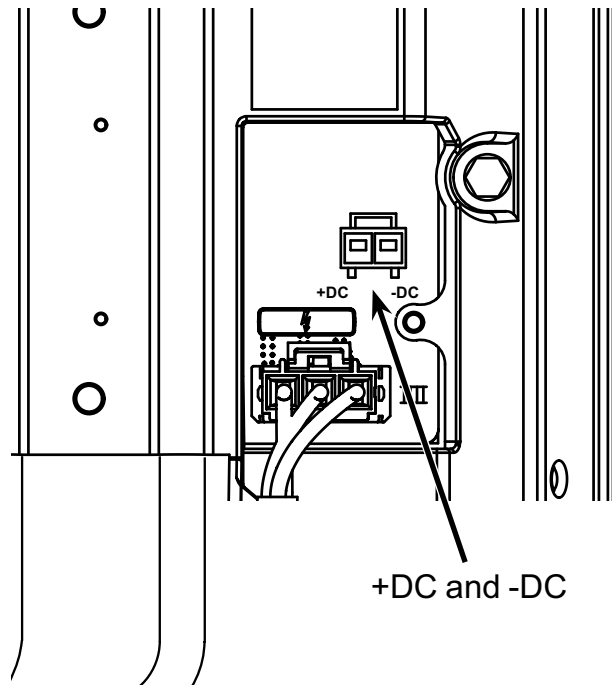
1. Shut down the unit and wait for at least two minutes before proceeding.
2. Remove the four screws securing the control box cover.
Retain the screws and cover.

Figure 1. Control box cover and screws



3. Test the voltage across the inverter test points (see [Figure 2, p. 8](#)).
Important: Do not proceed until the DC voltage measures **less than 42 VDC**.

Figure 2. Drive test points



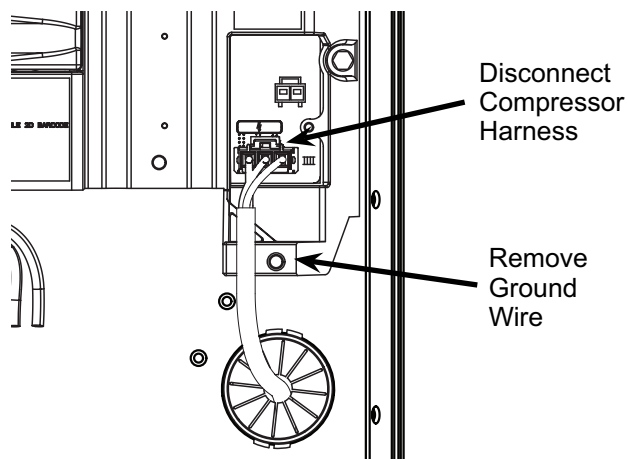
Removing the Connections

1. Remove the ground wire located at the bottom of the drive.
2. Disconnect the harness.

The original drive in the unit may have ferrite harnesses attached to HPCO leads, fan motor, or compressor harness. Reuse these, as the replacement drive in this kit does not come with additional ferrites.

3. Unplug all the AOC connectors located at the top of the drive and move the leads to the side.

Figure 3. Compressor connections

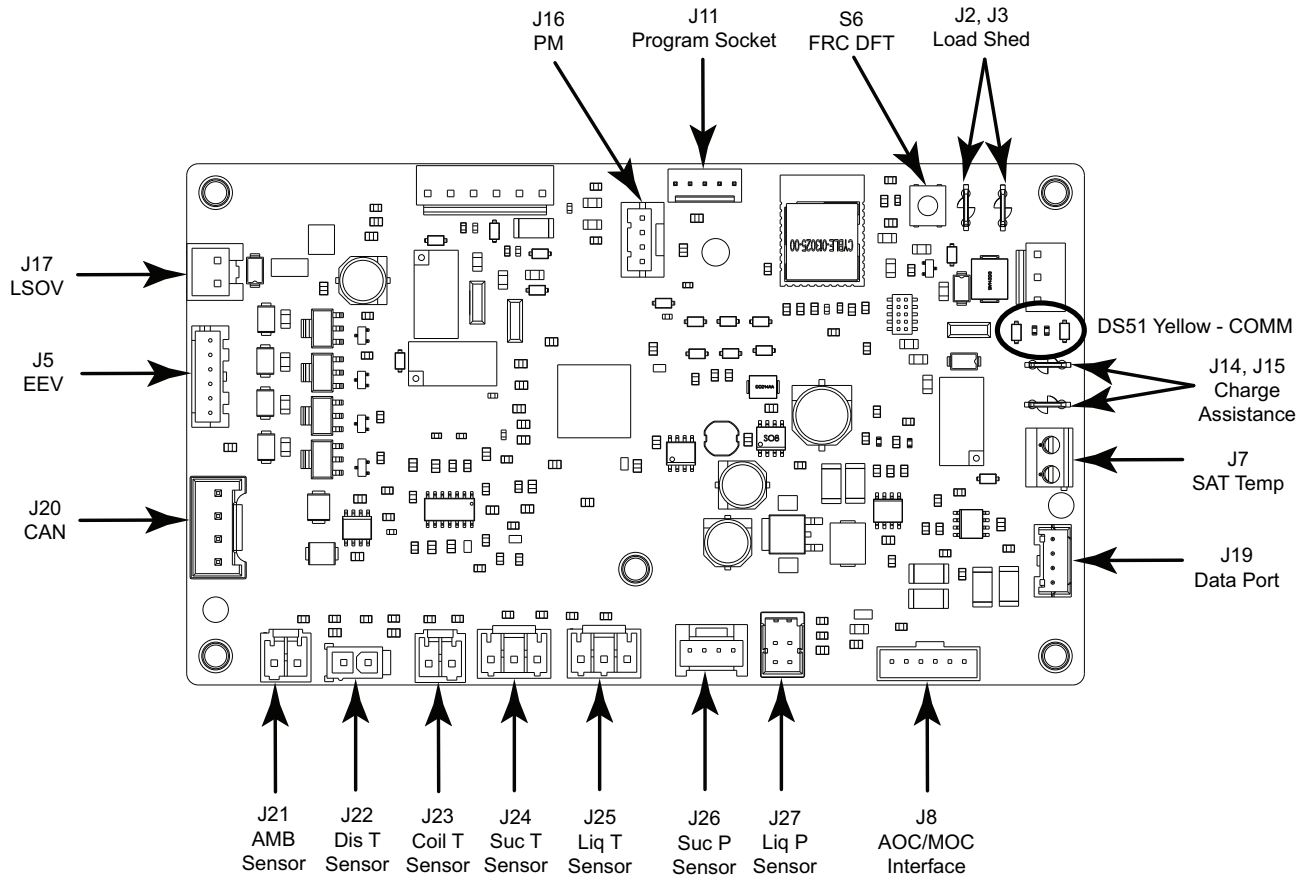


Disconnecting Variable Speed Drives

Unplug the following connectors from the AOC:

- Latching Switchover Valve J17
- EEV J5
- CAN J20
- Ambient Temperature J21
- Discharge Temperature J22
- Coil Temperature J23
- Suction Temperature J24
- Liquid Temperature J25
- Suction Pressure J26
- Liquid Pressure J27
- Personality module J16

Figure 4. IVSC connections

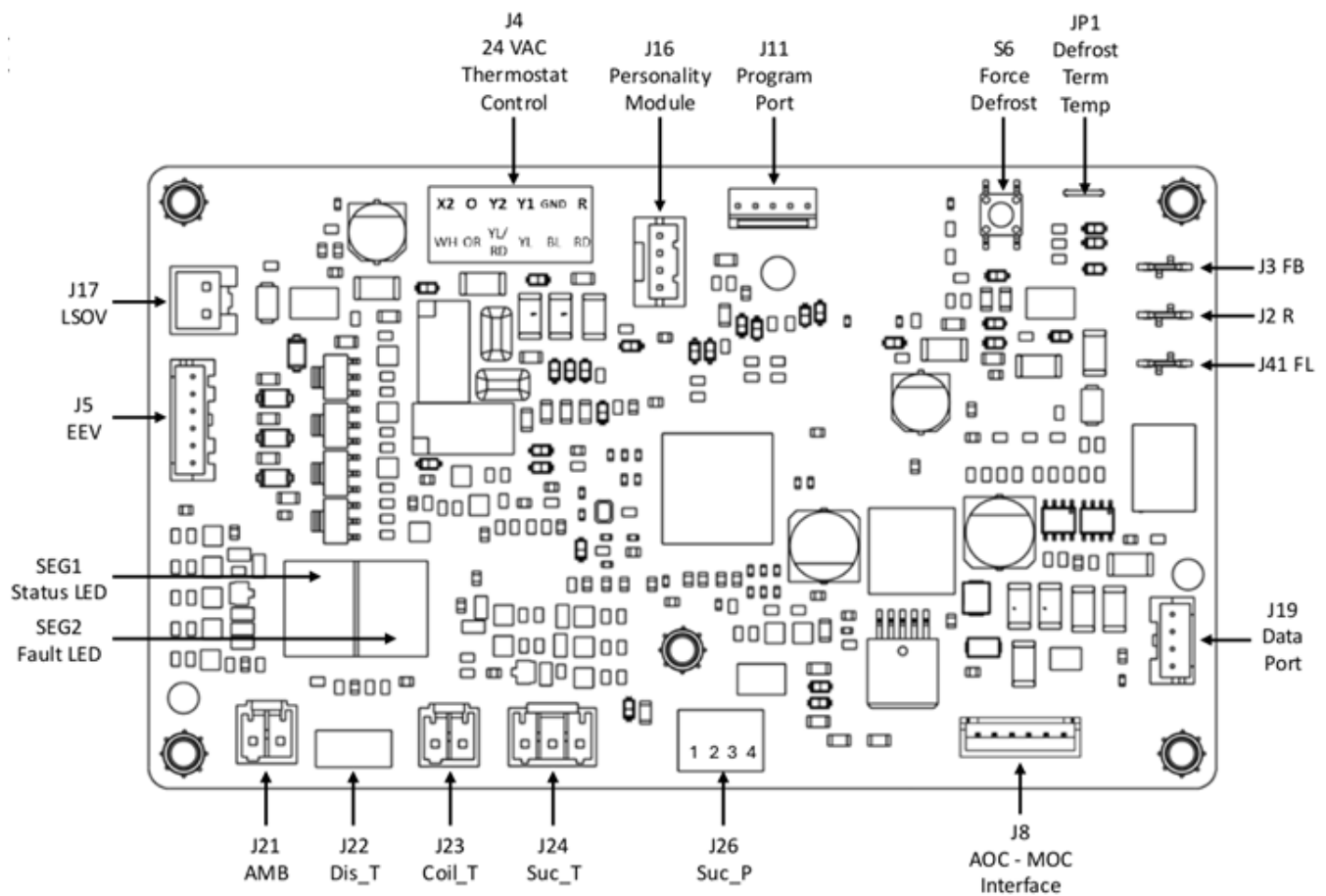


Disconnecting Multiple Speed Drives

Unplug the following connectors from the AOC:

- Latching Switchover Valve (LSOV) J17
- Electronic Expansion Valve (EEV) J5
- Ambient Temperature (AMB) J21
- Discharge Temperature (Dis_T) J22
- Coil temperature (Coil_T) J23
- 24 VAC Thermostat Control J4
- Personality Module J16
- LPCO (Suc_P) J26 – G02 and later drives

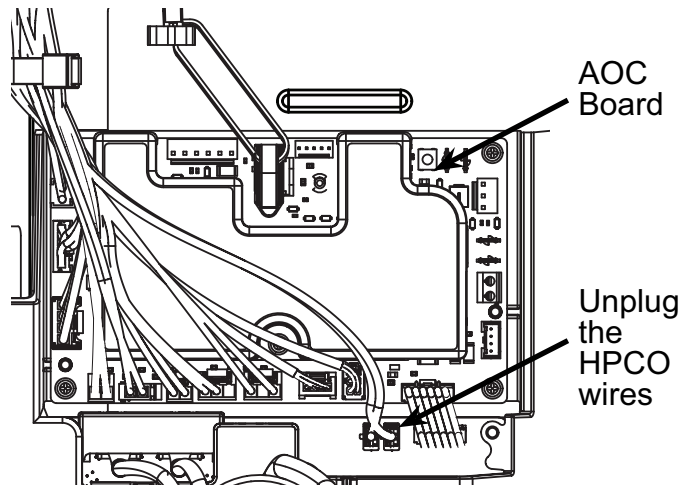
Figure 5. IMSC connections



Unplug the HPCO wires, fan harness, and compressor harness from the MOC.

Disconnect the high-voltage field connections. Use care when removing the connectors. Some connectors have latching tabs that must be depressed while removing. **Do not pull on the wires.** Grasp by connector only when removing the plug from the board.

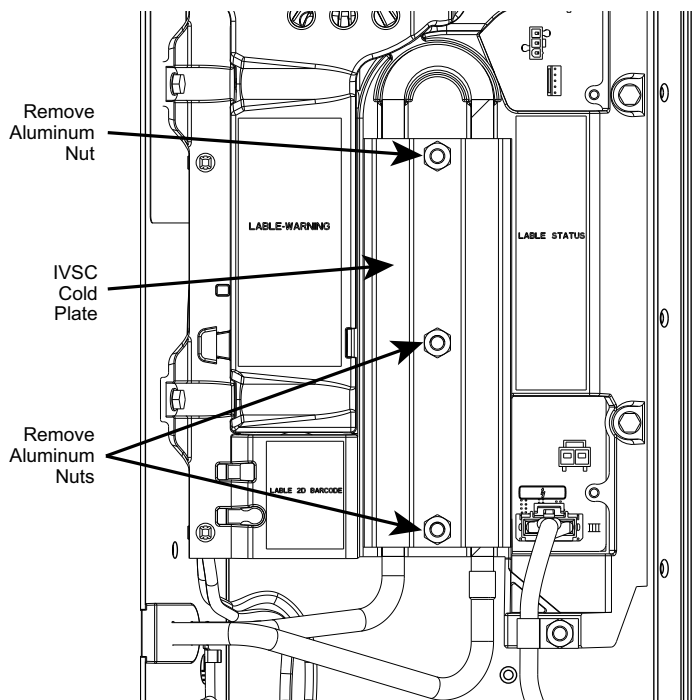
Figure 6. MOC drive connections



Removing the Cold Plate

1. Remove the three aluminum nuts securing the cold plate to the drive assembly and set aside the nuts.
You will use a torque wrench when reattaching cold plate to the drive.
2. Remove the cold plate and set aside.
Avoid direct contact with the thermal grease that is exposed when the plate is removed.
3. Separate the liquid line from the drive assembly by one to two inches. Be careful to not bend or strain the copper tubing.
4. Using a clean, dry cloth, carefully wipe away any existing thermal grease from the copper tubes.
Support the tubing at all times and take care to not bend or twist the tubing.

Figure 7. Drive cold plate



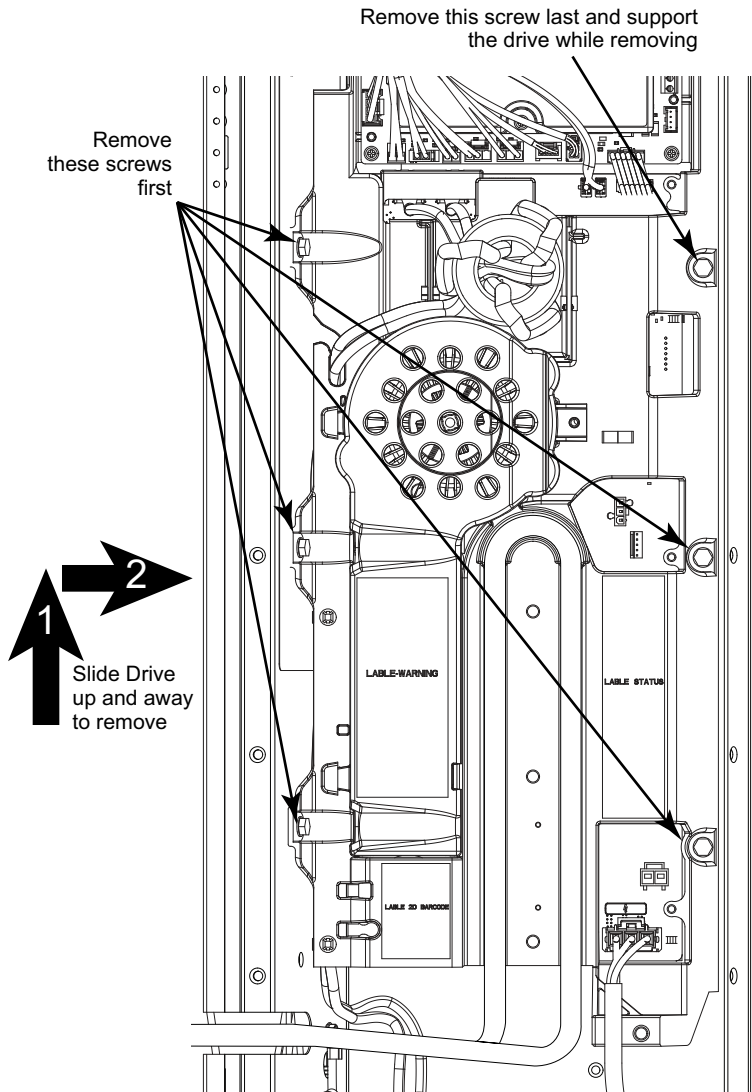
Removing the Drive

1. Remove the screws securing the drive. When removing the final screw, support the drive with one hand.

Important: Use care and not allow the drive to slip, which would damage the liquid line.

2. Remove the drive by sliding it up and away from the cabinet housing.

Figure 8. Drive screw locations



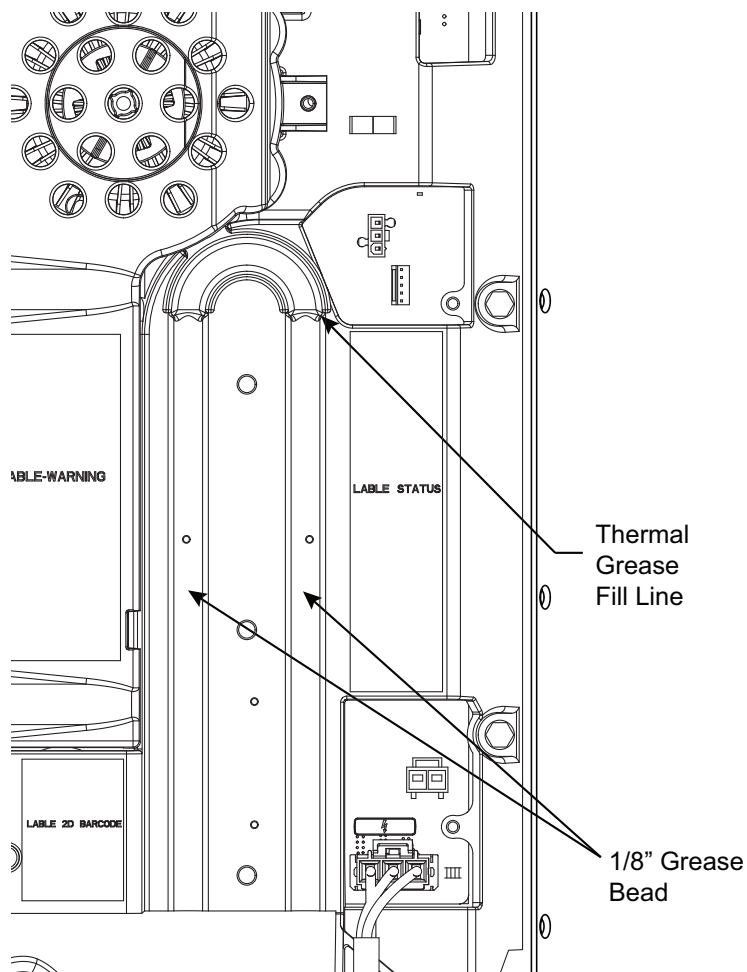
Applying Thermal Grease

To apply the thermal grease, the drive should be positioned so that the plastic cover is facing down and the cutout for the liquid line is facing up.

It is critical that the copper liquid line has good thermal contact with the aluminum plate. Proper application of thermal grease will ensure this contact.

Apply a small, 1/8-inch bead of thermal grease in the center of the cutout around the entire length. It takes very little grease to create adequate thermal transfer. The included 0.5 oz tube contains enough grease for two to three applications.

Figure 9. Heat sink detail



Installing the Drive

Returning the Drive to the Cabinet Housing

1. Place the drive back in its original position by sliding it between the liquid line and the cabinet housing.
2. While holding the drive firmly against the cabinet with one hand, replace the top, right screw first. Hand-tighten the screw enough to secure the drive to the cabinet but still allow the drive to move.
3. Verify that all wire harnesses and wires are out of the way and that none of them are pinched between the drive and cabinet housing.
4. Align the screw holes and replace the remaining five screws and tighten with a 5/16-inch nut driver.

Reconnecting the Wiring

Refer to [Figure 4, p. 9](#), [Figure 5, p. 10](#), and [Figure 6, p. 11](#) for locations of sensors and harnesses and reattach the connectors to the AOC and MOC. While the order in which you reattach the wiring is not significant, you may find it easiest to start in the upper left hand of the AOC and move down and then right.

If the drive being replaced is a Multi-Speed D162554G01 or D162556G01 drive, the LPCO and HPCO will be in series. The new drive has a dedicated LPCO connection on the AOC. Use the provided jumper to connect the unit's LPCO wires to the AOC (see [Figure 5, p. 10](#)). Attach both HPCO wires to the MOC terminals.

Positioning the Liquid Line

1. Align the liquid line with the cutout on the drive.
2. Locate the rubber grommet that protects the liquid line from the sharp edges of the cabinet housing.
3. Push the rubber grommet into the notch in the housing so that it is flush with the edge of the cabinet and the grommet is seated securely around the liquid line.
4. Position the cold plate over the liquid line and slide it over the bolts.
5. Place the three aluminum nuts on the bolts and hand-tighten two to three turns.
6. Press the liquid line into the cutout so that it is properly aligned and seated into the cutout.
7. Apply pressure to the cold plate and finger-tighten the aluminum nuts.

Repeat this process three to four times to verify that the liquid line is firmly seated in the cutout. You should see the thermal grease begin to flow around the copper tubing.

Important: Use only the aluminum nuts that were on the unit originally or those shipped with the replacement kit.

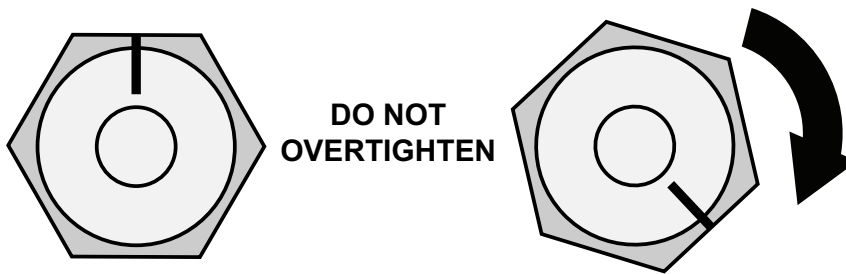
Tightening the Aluminum Nuts

Using a torque wrench, tighten the aluminum nuts to 40 to 50 in-lb.

Important: The aluminum nuts are designed to strip out at 80 in-lb. **Do not overtighten.**

If you do not have a torque wrench, finger-tighten the nuts. With a felt tip marker, mark a position on the nut at the 12 o'clock position and turn the nut to the 5 o'clock position.

Figure 10. Tightening the aluminum nuts



Reattaching the Compressor Wiring

1. Plug in the compressor plug to the connector at the bottom of the drive.
2. Reattach the shielded harness ground wire to the drive assembly.

Adhering the Wiring Diagram

If the drive being replaced is a Multi-Speed D162554G01 or D162556G01 drive, adhere the provided wiring diagram to the inside of the control cover.

Place the new diagram over the existing one. The new diagram shows updated wiring and fault code list.

Final Inspection

1. Verify all the wires and plugs are reconnected and that no wires are pinched between the drive and cabinet housing.
2. Start up the unit and verify operation.
3. Reattach the shielded harness ground wire to the drive assembly.
4. Verify that the line set cover is in place.

Returning the Drive Board

Package the faulty control and return to your local parts center.

Note: To receive factory credit for the failed drive boards covered by the limited warranty, a valid pre-authorization number is required. Mark the box and the service invoice with the pre-authorization number before returning to your local parts center.

About Trane and American Standard Heating and Air Conditioning

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