

Installation Manual

Truck Edition V-520 RT Series Model 10, 20, 30 and 50 Single Temperature Systems

TK 54987-1-IM (Rev. 2, 03/12)



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Release History

Released	(09/11)
Rev. 1	(12/11) Added information on Model 20 and 50 units.
Rev. 2	(03/12) Pages 20, 46 and 47; updated the total amount of oil required by model.

Introduction

This manual was written to assist with the installation of a **Thermo King V-520 RT** Models 10, 20, 30 and 50 units with a **ES500** remote evaporator onto trucks designed and built for refrigerated applications. Due to its complexity, you should not attempt this installation unless you:

- Are an experienced mechanic.
- Can safely lift 34 kilos (75 lbs.)
- Are certified or trained in the repair and maintenance of transport refrigeration systems.
- Have a basic understanding of electricity and electrical wiring.
- Have the necessary tools and equipment to complete the installation
- Have a truck body designed and built to meet the requirements of this installation.

This manual is published for informational purposes only. Thermo King makes no representations warranties express or implied, with respect to the information recommendations and descriptions contained herein. Information provided should not be regarded as all-inclusive or covering all contingencies. If further information is required, Thermo King Corporation Service Department should be consulted.

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Manufacturer shall have no liability to any person or entity for any personal injury, property damage or any other direct, indirect, special, or consequential damages whatsoever, arising out of the use of this manual or any information, recommendations or descriptions contained herein.

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Recover Refrigerant

At Thermo King, we recognize the need to preserve the environment and limit the potential harm to the ozone layer that can result from allowing refrigerant to escape into the atmosphere.

We strictly adhere to a policy that promotes the recovery and limits the loss of refrigerant into the atmosphere.

In addition, service personnel must be aware of Federal regulations concerning the use of refrigerants and the certification of technicians. For additional information on regulations and technician certification programs, contact your local THERMO KING dealer.

R-404A / R-134a

WARNING: Use ONLY Polyol Ester based refrigeration compressor oil (TK P/N 203-513) in R-404A and R-134a units.

DO NOT use Polvol Ester based oil in standard Thermo King units.

DO NOT mix Polyol Ester and standard synthetic compressor oils.

Keep Polyol Ester compressor oil in tightly sealed containers. If Polyol Ester oil becomes contaminated with moisture or standard oils, dispose of properly—DO NOT USE!

WARNING: When servicing Thermo King R-404A and R-134a units, use only those service tools certified for and dedicated to R-404A or R-134a refrigerant and Polyol Ester compressor oils. Residual non-HFC refrigerants or oils will contaminate R-404A and R-134a systems.

CAUTION

Thermo King condenser units and remote evaporators are shipped with a 35 kPa (5 psi) holding charge of Nitrogen. This holding charge may be safely vented into the atmosphere.

CAUTION: SEVERE COMPRESSOR DAMAGE will result from operating the unit before completing the installation which includes: installing the components, releasing the holding charge, connecting refrigeration lines, leak testing, evacuation, clean-up and charging of the system with the proper amount and type of refrigerant.

Safety Precautions

The **A** symbol appears next to a point that is particularly important:



DANGER: Addresses a circumstance that, if encountered, will lead to death or serious injury.



WARNING: Addresses a circumstance that, if encountered, might lead to death or serious injury.



CAUTION: Addresses a circumstance that, if encountered, may cause damage to equipment or minor injury.

DANGER: Never operate the unit with the discharge valve closed as it could cause the compressor to explode, causing death or serious injury.



DANGER: Never apply heat to a sealed refrigeration system or container because it could explode, causing death or serious injury.



DANGER: Fluorocarbon refrigerants, in the presence of an open flame or electrical short, produce toxic gases that are severe respiratory irritants capable of causing death.



DANGER: Be careful when working with a refrigerant or refrigeration system in any enclosed or confined area with a limited air supply (i.e., a trailer, container or the hold of a ship). Refrigerant tends to displace air and can cause oxygen depletion which may result in death by suffocation. WARNING: Always wear eye protection such as goggles or safety glasses. Refrigerant liquid, refrigeration oil, and battery acid can permanently damage the eyes (see First Aid under Refrigeration Oil).



WARNING: Keep your hands away from fans when the unit is running. This should also be considered when opening and closing the compressor service valves.



WARNING: Make sure gauge manifold hoses are in good condition. Never let them come in contact with a belt, fan motor pulley, or any hot surface.



WARNING: Make sure all mounting bolts are tight and are of correct length for their particular application.

Battery Installation and Cable Routing



WARNING: Improperly installed battery cables could result in fire or explosion! Battery cables must be installed, routed and secured properly to prevent them from rubbing, chaffing or making contact with hot, sharp or rotating components.

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- WARNING: Do not attach fuel lines or any additional wiring harnesses to the battery cables as this could cause an electrical fire!
- CAUTION: Do not connect other manufacturer's equipment or accessories to the Thermo King unit. This could result in severe damage to equipment and void the warranty!
- CAUTION: Set all unit electrical controls to the OFF position before connecting battery cables to the battery to prevent unit from starting unexpectedly and causing personal injury.
- CAUTION: Always wear protective clothing, gloves and eye wear when handling and installing batteries. Battery acid can cause serious burns when exposed to eyes or skin. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.
- CAUTION: Always cover battery terminals to prevent them from making contact with metal components during battery installation. Battery terminals grounding against metal could cause the battery to explode.

Refrigerant

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WARNING: Although fluorocarbon refrigerants are classified as safe refrigerants, certain precautions must be observed when handling them or servicing a unit in which they are used. When released to the atmosphere in the liquid state, fluorocarbon refrigerants evaporate rapidly, freezing anything they contact.

First Aid

FROST BITE: In the event of frost bite, the objectives of First Aid are to protect the frozen area from further injury, to warm the affected area rapidly and to maintain respiration.

EYES: For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.

SKIN: Flush area with large amounts of lukewarm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection/injury. Get medical attention. Wash contaminated clothing before reuse.

INHALATION: Move victim to fresh air and use CPR or mouth-to-mouth ventilation, if necessary. Stay with victim until arrival of emergency medical personnel.

Refrigeration Oil

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WARNING: Avoid refrigeration oil contact with the eyes. Avoid prolonged or repeated contact of refrigeration oil with skin or clothing. Wash thoroughly after handling refrigeration oil to prevent irritation.

First Aid

NOTE: In case of eye contact, immediately flush with plenty of water for at least 15 minutes. CALL A PHYSICIAN. Wash skin with soap and water.

IMPORTANT INSTALLATION INFORMATION

- Read this Installation Manual to understand how all components are to be located and properly installed.
- The vehicle's cargo area must be designed and built for refrigeration applications with insulated walls, ceilings and floors. All cargo doors must close and seal tightly.
- The vehicle's exterior roof must be able to adequately support the combined weight of the rooftop mounted components. Additional supports (installer supplied) may be required. See "Dimensions and Weights Models 10 and 30" on page 12 and "Dimensions and Weights Models 20 and 50" on page 13.

Model 10 - Refrigeration and Condenser Modules Approximate weight 50 kg(110 lbs.)

Model 20 - Refrigeration, Power Pack and Condenser Modules Approximate weight 100 kg (220 lbs.)

Model 30 - Refrigeration and Condenser Modules Approximate weight 52 kg (115 lbs.)

Model 50 - Refrigeration, Power Pack and Condenser Modules Approximate weight 102 kg (225 lbs.)

• The vehicle's interior ceiling must be able to adequately support the weight of the ES500 evaporator. Additional internal structural supports (installer supplied) may be required.

Model 10 ES500 Evaporator - approximate weight 23 kg (51 lbs.)

Model 30 ES500 Evaporator - approximate weight 33 kg (72 lbs.)

• Thermo King recommends securely installing steel support plates with mounting studs or threaded inserts (installer supplied) to the truck's interior roof structure to mount the V-520 RT refrigeration module, condenser module and the ES500 evaporator prior to insulating and finishing the cargo area.

- The V-520 RT must be installed with the refrigeration module facing towards the front of the vehicle.
- Verify tools and special equipment required for the installation are available and in good operating condition before beginning the installation.
- Verify all measurements before drilling holes in vehicle.
- Verify there is no interference with OEM electrical wiring, internal supports, etc. before drilling holes in vehicle.
- Provide protection to vehicle's finish to prevent damage during the installation process.
- Install all components using the correct hardware for your particular application and tighten securely.
- All access holes through the cargo area must be sealed with silicone caulking to prevent moisture from entering and air from escaping.
- Always use protective grommets when routing electrical harnesses or refrigeration hoses through sheet metal floors or walls.
- Always keep electrical harness and refrigeration hoses from rubbing or chafing against sharp metal objects or rotating components.
- The fabrication and installation (by the installer) of protective covers for any exposed refrigerant hoses, drain hoses and electrical wiring inside or outside the cargo area is recommended.
- Verify the air outlet of the ES500 evaporator is facing the correct direction for proper airflow before installing.
- Allow a minimum distance of 6.00 in. (152 mm) from the cargo area wall to the rear of the ES500 evaporator for refrigerant hose and drain hose connections.
- ES500 evaporator drain hoses should be installed and routed correctly with no kinks or sharp bends to provide for proper drainage.

Tips for a Successful Installation (continued)

REFRIGERATION HOSES

- Always keep refrigeration system fittings capped and sealed until the installation of the refrigeration hoses.
- Only cut refrigerant hoses with the correct hose cutting tool (204-677). NEVER USE A SAW!
- Always use the correct hose fitting tool (204-1045 or 204-1128) when assembling refrigerations hoses.
- Tips for a Successful Installation (continued)
- Always lubricate hose fittings with refrigerant oil when assembling to refrigeration hoses.
- Always install and lubricate o-rings with refrigerant oil when connecting refrigeration hose fittings to component connections.
- All refrigeration connections should be tightened securely using two wrenches.
- Refrigeration hoses should be installed onto components in such a way as to allow for vibration and movement. THEY SHOULD NEVER BE STRETCHED TIGHT!
- Refrigeration hoses should be carefully routed from the vehicle's engine compartment, up the interior wall of the cargo area.

ELECTRICAL

- Superlube or equivalent should always be applied to all electrical connections.
- All electrical harnesses should be neatly routed and secured with band wraps or clamps.
- Evaporator heater resistance wires must be installed as far as possible into the drain hoses. NEVER CUT HEATER RESISTANCE WIRES!
- Electrical power to the In-Cab controller must be connected to a fused circuit of the vehicle to provide power only when the ignition switch is in the ON position.
- If the vehicle is equipped with a battery disconnect switch, always wire the unit <u>after</u> the switch. This allows power to the unit to be turned off by the battery disconnect switch.

- The unit's power wires (2) and (BAT) must be spliced together into the supplied 40 amp fuse and connected securely to the vehicle's positive (+) battery connection.
- The unit's ground harness must be connected securely to the vehicle's negative (-) battery connection.
- The In-Cab controller must only be mounted inside the vehicle. It should be accessible and visible from the drivers position while not interfering with the driver's mobility, visibility or access to the vehicle controls and instruments.

ELECTRIC STANDBY MODELS

NOTE: Thermo King recommends a 20 amp fused power source for electric standby operation.

- Verify the receptacle box is wired for the correct voltage for your application.
- The standby receptacle box should be installed securely to the exterior of the vehicle. It should be easily accessible while not interfering with the driver's visibility or operation of the vehicle.

SYSTEM EVACAUTION AND CHARGING

- Flush compressor with oil (203-515).
- The Liquid Injection Solenoid Valve and the Defrost Solenoid Valve must both be in the OPEN position during evacuation procedures. The valves are normally in the closed position and must be held open manually using special magnets (204-1074) designed for this purpose. DO NOT put a magnet onto the Condenser Blocking Solenoid Valve as this is a normally open valve and a magnet will close it.
- Thermo King Evacuation Station P/N 204-725 and Evacuation Station Operation and Field Application Instructions (TK-40612) is required.
- The oil in the evacuation station vacuum pump should be changed after each use.
- Verify the refrigeration system is charged with the correct type and amount of refrigerant for your application.
- Verify the refrigeration system has been checked for leaks by using an electronic leak detector.

Required Tools

1.	Protective Eye Wear	12. Voltmeter		
2.	Drill	13. Silicone Caulk		
3.	Drill Bits	14. Manifold Gauge Set		
4.	Tape Measure	15. Evacuation Station		
5.	Hand Saw	16. Reclaiming Station		
6.	File	17. Electronic Leak Detector		
7.	Mechanics Tools	18. Refrigerant and Scale		
8.	Torque Wrench	19. Overhead Crane or Hoist with locking lifting hooks		
9.	Wire Crimper	20. Work Platform (Recommended)		
10	Hose Cutting Tool (204-677)	21. Solenoid Valve Magnet (204-1074)		
11.	11. Hose Fitting Tools (204-1045 and 204-1128)			

IMPORTANT: Equipment such as scales, gauges, and torque wrenches should be in good working condition and routinely calibrated to assure accurate readings.

Required Tools



ABA461

Dimensions and Weights - Models 10 and 30



Approximate Weights:

Model 10 and MAX 10 Refrigeration and Condenser Modules = 46 kg (100 lbs.) Model 30 and MAX 30 Refrigeration and Condenser Modules = 52 kg (115 lbs.)

Dimensions		
Α.	1137 mm (44.75in.)	
В.	1800 mm (70.85 in.)	
C.	172 mm (6.76 in.)	

Dimensions and Weights - Models 20 and 50



Approximate Weights:

Model 20 and MAX 20 Refrigeration, Power Pack and Condenser Modules = 100 kg (220 lbs.) Model 50 and MAX 50 Refrigeration, Power Pack and Condenser Modules = 102 kg (225 lbs.)

Dimensions		
Α.	1137 mm (44.75in.)	
В.	2159 mm (85.00 in)	
C.	229 mm (9.00 in.)	

Dimensions and Weights - ES500 Evaporators





Dimensions - ES500 Evaporator Mounting Holes



Dimensions - Refrigeration Module Mounting Holes



Dimensions - Power Pack Module Mounting Holes



Dimensions - Condenser Module Mounting Holes



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Installation - Vehicle Powered Compressor

Installation

NOTE: Always confirm compressor installation kit is correct for your vehicle <u>before</u> preceding with the installation.

Add only 4 oz. of oil (supplied) to the compressor and rotate clutch end to circulate the oil throughout the compressor.

- Do not add more than 4 oz. of oil to the compressor at this time.
- Additional oil will need to be added later to the system. See "TOTAL AMOUNT OF OIL REQUIRED BY MODEL" on page 47.

Install compressor on the vehicle by following the instructions included in the compressor kit.

Installation - Vehicle Powered Compressor



Important Installation Recommendations

IMPORTANT: The interior ceiling of the cargo area must be able to adequately support the weight of the ES500 evaporator. See "Dimensions and Weights - ES500 Evaporators" on page 14. Additional supports (installer supplied) may be required.

Support Plates

Thermo King recommends securely installing a steel support plate with mounting studs (installer supplied) directly to the truck's interior roof structure to safely support the weight of the ES500 evaporator prior to insulating and finishing the cargo area. The support plate should be correctly located to position the evaporator a minimum of 152 mm (6.00 in.) from the compartment front bulkhead wall. This distance is required to allow access for refrigerant hose and drain hose connections.

Preferred Installation Method

(with pre-installed support plates)

- 1. Remove the plastic cover from the evaporator.
- 2. **HEAT OPTION ONLY** Position the accumulator assembly at the rear of the evaporator:
 - Connect the 7/8" tube to the mating tube inside the evaporator.
 - Secure the accumulator to the rear of the evaporator with supplied hardware and tighten securely.
- 3. Position the evaporator onto (installer supplied) mounting studs.
- 4. Install washers and locking nuts and tighten hardware securely.

NOTE: The evaporator cover will be installed later.

Alternative Installation Method (without pre-installed support plates)

- 1. Remove the plastic cover from the evaporator.
- 2. **HEAT OPTION ONLY** Position the accumulator assembly at the rear of the evaporator:
 - Connect the 7/8" tube to the mating tube inside the evaporator.
 - Secure the accumulator to the rear of the evaporator with supplied hardware.
- 3. Locate and mark the center line (C/L) of the interior compartment ceiling.
- 4. Mark a line a minimum of 152 mm (6.00 in.) from the interior bulkhead.

NOTE: This distance is required to allow access for refrigerant hose and drain hose connections.

5. Position the evaporator up to the ceiling and mark the location of the four mounting holes or use "Dimensions - ES500 Evaporator Mounting Holes" on page 15).

NOTE: Be sure the evaporator's air outlet is facing the correct direction for proper airflow.

- 6. Drill four 5 mm (0.472 in.) mounting holes into the ceiling and loosely install the supplied 1/4" lag bolts and washers.
- 7. Apply RTV silicone adhesive sealant (installer supplied) per the RTV manufacturer's instructions to the top surface area of the evaporator.
- 8. Position the evaporator onto the mounting hardware in the ceiling and hand tighten bolts securely.

NOTE: The evaporator cover will be installed later.

Installation - ES500 Evaporator



Important Installation Recommendations

IMPORTANT: The roof of the vehicle must be able to adequately support the combined weight of the Refrigeration and Condenser Modules for Model 10 and 30 units or the Refrigeration, Power Pack and Condenser Modules for Model 20 and 50 units. See "Dimensions and Weights -Models 10 and 30" on page 12 and "Dimensions and Weights - Models 20 and 50" on page 13. Additional supports (installer supplied) may be required.

Support Plates

Thermo King recommends securely installing steel support plates (installer supplied) to the vehicle's inner roof support structure prior to insulating and finishing the interior ceiling. These support plates should have correct size mounting studs or thread inserts installed to safely secure the V-520 Refrigeration, Condenser and Power Pack Modules to the vehicle's roof. The support plates should be located to correctly position the refrigeration module and condenser modules in relationship to the interior bulkhead and evaporator.

Preferred Installation Method

(with pre-installed support plates and pre-cut access hole)

- 1. Remove the plastic cover from the refrigeration module and trim the foam gasket away from the two drain holes located in the corners.
- 2. Install rubber gasket (supplied) around access hole opening.
- 3. Apply caulking around all mounting bolts or inserts.
- 4. Use an appropriate 2-point lifting device with locking hooks attached to the modules's two lifting brackets and raise into position on vehicle's roof.
- 5. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely. *NOTE: Multiple mounting holes are provided every two inches along the sides of the refrigeration module for mounting options. Choose four mounting holes, ideally one in each corner to secure the refrigeration module.*

Alternative Installation Method

(without pre-installed support plates and pre-cut access hole)

- 1. Remove plastic cover from refrigeration module and trim foam gasket away from the two drain holes located in the corners.
- 2. Locate and mark the center line (C/L) of vehicle's roof.
- 3. Determine location of interior bulkhead in relationship to vehicle's roof. Mark location of bulkhead on vehicle's roof.
- 4. Use "Dimensions Refrigeration Module Mounting Holes" on page 16) to mark location on roof of refrigeration module's 133.35 mm (5.25 in.) access hole and mounting holes. *NOTE: Multiple mounting holes are provided every two inches along the sides of the refrigeration module for mounting options. Choose four mounting holes, ideally one in each corner to secure the refrigeration module.*
 - Confirm large access hole is positioned behind bulkhead and <u>inside</u> of cargo compartment. *NOTE: This is necessary so the refrigeration hoses and electrical harness will be located on the inside of cargo compartment, not in the passenger compartment.*
 - Choose mounting holes spaced farthest apart whenever possible.
 - Confirm there is no internal structural roof supports where access holes will be drilled.
- 5. Mark and drill four 5 mm (0.472 in.) mounting holes only into the internal ceiling supports in the roof.
- 6. Mark and cutout 133.35 mm (5.25 in. dia.) access opening for refrigeration tubing/electrical harnesses. *NOTE: This hole will be drilled completely through the roof and into interior compartment.*
- 7. Install rubber gasket (supplied) around access hole opening.
- 8. Apply caulking around all mounting bolts or inserts.
- 9. Use an appropriate 2-point lifting device with locking hooks attached to the modules's two lifting brackets and raise into position on vehicle's roof.
- 10. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely.



Alternative Installation Method



Important Installation Recommendations

IMPORTANT: The roof of the vehicle must be able to adequately support the combined weight of the Refrigeration, Power Pack and Condenser Modules for Model 20 and 50 units. See "Dimensions and Weights - Models 20 and 50" on page 13. Additional supports (installer supplied) may be required.

Support Plates

Thermo King recommends securely installing steel support plates (installer supplied) to the vehicle's inner roof support structure prior to insulating and finishing the interior ceiling. These support plates should have correct size mounting studs or thread inserts installed to safely secure the V-520 Refrigeration, Condenser and Power Pack Modules to the vehicle's roof. The support plates should be located to correctly position the refrigeration module and condenser modules in relationship to the interior bulkhead and evaporator.

Preferred Installation Method

(with pre-installed support plates and pre-cut access hole)

NOTE: It is recommended the copper tubing be installed onto the standby compressor prior to installing the Power Pack Module onto the roof. See "Installation - Refrigeration Hoses" page 40.

- 1. Remove the plastic cover from the power pack module.
- 2. Apply caulking around all mounting bolts or inserts.
- 3. Use an appropriate 4-point lifting device with locking hooks attached to the modules's four lifting holes and raise into position on vehicle's roof.
- 4. Align the power pack's three front mounting studs with the three matching mounting holes on the refrigeration module's frame.
 - Install flat washers and locking nuts and tighten securely.
- 5. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely. *NOTE: Multiple mounting holes are provided every two inches along the sides of the module for mounting options. Choose four mounting holes, ideally one in each corner to secure the module.*

Alternative Installation Method

(without pre-installed support plates and pre-cut access hole)

NOTE: It is recommended the copper tubing be installed onto the standby compressor prior to installing the Power Pack Module onto the roof. See "Installation - Refrigeration Hoses" page 40.

- 1. Remove plastic cover from power pack module.
- 2. Locate and mark the center line (C/L) of vehicle's roof.
- 3. Choose mounting holes spaced farthest apart whenever possible. NOTE: Multiple mounting holes are provided every two inches along the sides of the module for mounting options. Choose four mounting holes, ideally one in each corner to secure the module
 - Confirm there is no internal structural roof supports where access holes will be drilled.
 - Mark and drill four 5 mm (0.472 in.) mounting holes only into the internal ceiling supports in the roof.
- 4. Apply caulking around all mounting bolts or inserts.
- 5. Use an appropriate 4-point lifting device with locking hooks attached to the modules's four lifting holes and raise into position on vehicle's roof.
- 6. Align the power pack's three front mounting studs with the three matching mounting holes on the refrigeration module's frame.
 - Install flat washers and locking nuts and tighten securely.
- 7. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely.

Installation - Power Pack Module



IMPORTANT: The roof of the vehicle must be able to adequately support the combined weight of the Refrigeration and Condenser Modules for Model 10 and 30 units or the Refrigeration, Power Pack and Condenser Modules for Model 20 and 50 units. See "Dimensions and Weights -Models 10 and 30" on page 12 and "Dimensions and Weights - Models 20 and 50" on page 13. Additional supports (installer supplied) may be required.

Support Plates

Thermo King recommends securely installing steel support plates (installer supplied) to the vehicle's inner roof support structure prior to insulating and finishing the interior ceiling. These support plates should have correct size mounting studs or thread inserts installed to safely secure the V-520 Refrigeration, Condenser and Power Pack Modules to the vehicle's roof. The support plates should be located to correctly position the refrigeration module and condenser modules in relationship to the interior bulkhead and evaporator.

Preferred Installation Method

(with pre-installed support plates)

- 1. Trim the foam gasket away from the two drain holes located in the corners of the condenser module prior to installing on roof.
- 2. Apply caulking around each mounting location on the vehicle's roof.
- 3. Install four 1/4-20 lifting eyebolts (installer supplied) into the four threaded inserts located on the top of the condenser module.
 - Use an appropriate 4-point lifting device with locking lifting hooks attached to the lifting eyebolts to raise the condenser module into position on the vehicle's roof.
- 4. Align the four top front mounting holes of the condenser module's cover with the matching four rear mounting brackets with speed nuts on the refrigeration module (or power pack's) frame.
 - Install four 6 mm screws, lock washers and flat washers and tighten securely.
- 5. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely.

Alternative Installation Method

(without pre-installed support plates)

- 1. Trim the foam gasket away from the two drain holes located in the corners of the condenser module prior to installing on roof.
- 2. Install four 1/4-20 lifting eyebolts (installer supplied) into the four threaded inserts located on the top of the condenser module.
 - Use an appropriate 4-point lifting device with locking lifting hooks attached to the four lifting eyebolts to raise the condenser module into position on the vehicle's roof.
- 3. Align the four top front mounting holes of the condenser module's cover with the matching four rear mounting brackets with speed nuts on the refrigeration module (or power pack's) frame.
 - Install four 6 mm screws, lock washers and flat washers and tighten securely.
- 4. Use the condenser modules's six mounting holes as a template and drill 5mm (0.472 in.) mounting holes into the internal supports of the roof.
- 5. Apply caulking around each mounting location on the vehicle's roof.
- 6. Secure refrigeration module to the roof using the supplied 1/4" lag bolts and washers and hand tighten securely.

Installation - Condenser Module



TK 2000 Assembly System

The TK 2000 System is designed for assembly with Multi-Refrigeration hose only.

The benefits are virtually endless:

- No Guess work
- No Leaking Crimps
- No Power Supply Needed
- As easy to use as a pair of Pliers
- Easy to use in confined areas

Assembly Materials Checklist

- Hose Fitting Tools (204-1045 and 204-1128)
- Hose Cutting Tools (204-677)
- TK 2000 Multi-Refrigerant Hose
- Nipple Assembly
- Appropriately Sized Clips and Cage
- •

NOTE: The two black O-rings on the nipple assembly are of a specific rubber compound and size. They should not be removed or replaced.



Cut the Hose

1. Cut the hose to proper length with an appropriate cutting tool. Hand-held hose cutter (204-677) has been specially designed for cutting all non-wire reinforced hose, such as TK 2000 Multi-refrigerant hose. Be sure the cut is made square to the hose length.



Slip on Two Clamps

2. Install two proper- size clips onto the cut end of the hose. Orientation of the clips does not affect the performance of the connection. However for ease of assembly, both clips should have the same orientation.





CAUTION: Failure to slide the clips over the hose at this time will require the clips to be stretched over the hose or fitting later. This may permanently damage the clip

Fabricating Refrigeration Hoses

Oil the Nipple

- 3. Lubricate the nipple with a generous amount of the refrigeration or A/C system's compressor lubricating oil. This MUST be done to lower the force of nipple insertion.
- 4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion.

NOTE: Be sure to wipe excess oil from the nipple and hose.





Snap on the Cage

- 5. Snap the cage into the groove on the nipple. The arms should extend over the hose length. When the cage has been carefully installed in the cage grove, the cage will be able to rotate in the grove. This step must be performed to ensure:
 - The clips will be located over the O-ring on the nipple.
 - The connection will be compatible with the connection's pressure rating.



Slide the Clips

6. Slide the clips over the cage arms and into the channels on each arm.



Close the Clips

7. Use the fitting tool (204-1045 or 204-1128) to close the clips. The pliers should be positioned squarely on the clip connection points and should remain square during the closing of the clip.



NOTE: For easiest assembly, the clasp should be closed between the cage arms.

Fabricating Refrigeration Hoses



Nose of the pliers should be firmly seated under the assembly bump and lock latch.

If the pliers are not kept square during closing the clip, the clasp may have an offset. Use the piers to correct the clasp alignment.



Correct



Fabricating Refrigeration Hoses



CAUTION: TK 2000 Speedy Clip System components should not be reused. Failure to follow these instructions and/or the use of TK 2000 Speedy Clip System hose with fittings supplied by other manufactures could result in sudden or unintended escape of refrigerant gases. Personal injury and/or violations of EPA regulations may occur as a consequence.

NOTE: Thermo King recommends adherence to all guidelines, including EPA guidelines concerning the service of refrigerant systems.



Improperly Installed Clip

Model 10 and MAX 10 - Single Temperature Systems

Condenser Module Connections

- 1. Liquid Line
 - Fabricate #6 hose from drier in refrigeration module to liquid line fitting on condenser module.
 - Install #6 female 90°, #6 male 90° ORS fittings and O-rings and attach ORS fittings onto drier and liquid line fittings and tighten securely.
- 2. Discharge Line
 - Fabricate #8 hose from oil separator tee fitting in refrigeration module to discharge fitting on condenser module
 - Install #8 female 90°, #8 male 90° ORS fittings and O-rings and attach ORS fitting onto oil separator tee fitting and condenser discharge fitting and tighten securely.

ES500 Evaporator Connections

3. Liquid Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach onto liquid injection fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto liquid line fitting and tighten securely.

4. Defrost Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach #6 ORS fitting onto oil separator tee fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install a #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto defrost line fitting and tighten securely.

- 5. Suction Line
 - Install #16 female 90° ORS fitting onto a #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting \underline{A} and tighten securely.

IMPORTANT: The suction line for the evaporator must be attached only to manifold fitting \underline{A} or severe damage to the compressor will result!

- Route hose down through the access hole to evaporator.
- Cut hose to length and install #16 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto suction fitting and tighten securely.

Vehicle's Compressor Connections

6.Discharge Line

- Install #8 female 90° ORS fitting onto #8 hose.
- Install O-ring and attach ORS fitting onto oil separator fitting.
- Route hose down to vehicle's compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.
- 7. Suction Line
 - Install #16 female 90° ORS fitting onto #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>C</u> and tighten securely.

IMPORTANT: The suction line for the compressor must be attached only to manifold fitting \underline{C} or severe damage to the compressor will result!

- Route hose down through the access hole to compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.

NOTE: Center manifold fitting \underline{B} is not used on this application and must remain capped.

Model 10 and MAX 10 - Single Temperature Systems



Model 30 and MAX 30 - Single Temperature Systems

Condenser Module Connections

- 1. Liquid Line
 - Fabricate #6 hose from drier in refrigeration module to liquid line fitting on condenser module.
 - Install #6 female 90°, #6 male 90° ORS fittings and O-rings and attach ORS fittings onto drier and liquid line fittings and tighten securely.

2. Discharge Line

- Fabricate #8 hose from oil separator tee fitting in refrigeration module to discharge fitting on condenser module
- Install #8 female 90°, #8 male 90° ORS fittings and O-rings and attach ORS fitting onto oil separator tee fitting and condenser discharge fitting and tighten securely.

ES500 Evaporator Connections

3. Liquid Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach onto liquid injection fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto liquid line fitting and tighten securely.

4. Defrost Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach #6 ORS fitting onto oil separator tee fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install a #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto defrost line fitting and tighten securely.

- 5. Suction Line
 - Install #16 female 90° ORS fitting onto a #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>A</u> and tighten securely.

IMPORTANT: The suction line for the evaporator must be attached only to <u>manifold fitting A</u> or severe damage to the compressor will result!

- Route hose down through the access hole to evaporator.
- Cut hose to length and install #16 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto suction fitting and tighten securely.

Vehicle's Compressor Connections

6.Discharge Line

- Install #8 female 90° ORS fitting onto #8 hose.
- Install O-ring and attach ORS fitting onto oil separator fitting.
- Route hose down to vehicle's compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.
- 7. Suction Line
 - Install #16 female 90° ORS fitting onto #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>C</u> and tighten securely.

IMPORTANT: The suction line for the compressor must be attached only to manifold fitting \underline{C} or severe damage to the compressor will result!

- Route hose down through the access hole to compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.

NOTE: Center manifold fitting \underline{B} is not used on this application and must remain capped.

Model 30 and MAX 30 - Single Temperature Systems



Model 20, 20 MAX, 50 and 50 MAX - Single Temperature Systems

Standby Module Compressor Connections

NOTE: The compressor contains oil. Tip the compressor forward to prevent oil from spilling and place rags under the fittings before removing the protective caps to catch any oil. Replace any oil that is spilled.

- 1. Locate the supplied suction and discharge copper tubes:
 - Remove the protective caps from the rear of the standby compressor and from the ORS fittings on the refrigeration module
 - Install O-rings onto the ORS fittings on the refrigeration module and attach the copper tubes onto the fittings and tighten securely.
 - Install O-rings onto the suction and discharge copper tube fittings and attach the tubes to the rear of the compressor. Secure the tubes with the supplied manifold hold down bracket and retaining screw and tighten securely.
 - Secure the tubes to the standby module with the supplied clamps, screws and flat washers.

Model 20, 20 MAX, 50 and 50 MAX - Single Temperature Systems



Model 20 and 20 MAX - Single Temperature Systems

Condenser Module Connections

- 1. Liquid Line
 - Fabricate #6 hose from drier in refrigeration module to liquid line fitting on condenser module.
 - Install #6 female 90°, #6 male 90° ORS fittings and O-rings and attach ORS fittings onto drier and liquid line fittings and tighten securely.
- 2. Discharge Line
 - Fabricate #8 hose from oil separator tee fitting in refrigeration module to discharge fitting on condenser module
 - Install #8 female 90°, #8 male 90° ORS fittings and O-rings and attach ORS fitting onto oil separator tee fitting and condenser discharge fitting and tighten securely.

ES500 Evaporator Connections

- 3. Liquid Line
 - Install #6 female 90° ORS fitting onto #6 hose.
 - Install O-ring and attach onto liquid injection fitting and tighten securely.
 - Route hose down through the access hole to evaporator.
 - Cut hose to length and install #6 female 90° ORS fitting.
 - Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto liquid line fitting and tighten securely.

4. Defrost Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach #6 ORS fitting onto oil separator tee fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install a #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto defrost line fitting and tighten securely.

- 5. Suction Line
 - Install #16 female 90° ORS fitting onto a #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>A</u> and tighten securely.

IMPORTANT: The suction line for the evaporator must be attached only to manifold fitting \underline{A} or severe damage to the compressor will result!

- Route hose down through the access hole to evaporator.
- Cut hose to length and install #16 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto suction fitting and tighten securely.

Vehicle's Compressor Connections

6. Discharge Line

- Install #8 female 90° ORS fitting onto #8 hose.
- Install O-ring and attach ORS fitting onto oil separator fitting.
- Route hose down to vehicle's compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.
- 7. Suction Line
 - Install #16 female 90° ORS fitting onto #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>C</u> and tighten securely.

IMPORTANT: The suction line for the compressor must be attached only to manifold fitting \underline{C} or severe damage to the compressor will result!

- Route hose down through the access hole to compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46

Model 20 and 20 MAX - Single Temperature Systems



Model 50 and 50 MAX - Single Temperature Systems

Condenser Module Connections

- 1. Liquid Line
 - Fabricate #6 hose from drier in refrigeration module to liquid line fitting on condenser module.
 - Install #6 female 90°, #6 male 90° ORS fittings and O-rings and attach ORS fittings onto drier and liquid line fittings and tighten securely.

2. Discharge Line

- Fabricate #8 hose from oil separator tee fitting in refrigeration module to discharge fitting on condenser module
- Install #8 female 90°, #8 male 90° ORS fittings and O-rings and attach ORS fitting onto oil separator tee fitting and condenser discharge fitting and tighten securely.

ES500 Evaporator Connections

3. Liquid Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach onto liquid injection fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto liquid line fitting and tighten securely.

4. Defrost Line

- Install #6 female 90° ORS fitting onto #6 hose.
- Install O-ring and attach #6 ORS fitting onto oil separator tee fitting and tighten securely.
- Route hose down through the access hole to evaporator.
- Cut hose to length and install a #6 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto defrost line fitting and tighten securely.

- 5. Suction Line
 - Install #16 female 90° ORS fitting onto a #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>A</u> and tighten securely.

IMPORTANT: The suction line for the evaporator must be attached only to manifold fitting \underline{A} or severe damage to the compressor will result!

- Route hose down through the access hole to evaporator.
- Cut hose to length and install #16 female 90° ORS fitting.
- Route hose through rear access hole of evaporator, install O-ring and attach ORS fitting onto suction fitting and tighten securely.

Vehicle's Compressor Connections

6. Discharge Line

- Install #8 female 90° ORS fitting onto #8 hose.
- Install O-ring and attach ORS fitting onto oil separator fitting.
- Route hose down to vehicle's compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.
- 7. Suction Line
 - Install #16 female 90° ORS fitting onto #16 hose.
 - Install O-ring and attach ORS fitting onto manifold fitting <u>C</u> and tighten securely.

IMPORTANT: The suction line for the compressor must be attached only to manifold fitting \underline{C} or severe damage to the compressor will result!

- Route hose down through the access hole to compressor.
- See "Vehicle Powered Compressor Hose Installation" on page 46.

Model 50 and 50 MAX - Single Temperature Systems



Vehicle Powered Compressor Hose Installation

The refrigeration hoses should be neatly routed from the cargo area along the vehicle's chassis to the engine compartment and compressor. The hoses a should be secured adequately to prevent rubbing or chafing against hot or moving components.

- 1. Install a #16 90° female ORS fitting onto the #16 suction hose and #8 90° female ORS fitting onto the discharge hose.
 - Place an O-ring on each fitting.
 - Lubricate the compressor refrigeration fittings and O-rings with refrigerant oil.
- 2. Locate your model unit on the chart and add the proper amount of compressor oil directly into the suction hose.
- 3. Provide an oil trap and connect the **SUCTION** hose fitting onto the compressor fitting marked **S**.
- 4. Connect the **DISCHARGE** hose fitting onto the compressor fitting marked **D**.
- 5. Use two wrenches and tighten refrigeration hose fittings.
- 6. Mount the liquid injection switch onto the compressor discharge fitting.



TOTAL AMOUNT OF OIL REQUIRED BY MODEL

MODEL 10 = 12 ounces total

Add 4 oz. to the compressor, see pages 20-21.

Add 8 oz. into the suction hose, see pages 46-47.

MODEL 20 = 16 ounces total

Add 4 oz. to the compressor, see pages 20-21. Add 8 oz. into the suction hose, see pages 46-47. *NOTE: 4 oz. already factory installed in system.*

MODEL 30 = 16 ounces total

Add 4 oz. to the compressor, see pages 20-21. Add 12 oz. into the suction hose, see pages 46-47.

MODEL 50 = 24 ounces total

Add 4 oz. to the compressor, see pages 20-21.

Add 16 oz. into the suction hose, see pages 46-47.

NOTE: 4 oz. already factory installed in system.

Procedures

IMPORTANT: Thermo King Evacuation Station P/N 204-725 and Evacuation Station Operation and Field Application Instructions (TK-40612) is required.

NOTE: The oil in the evacuation station vacuum pump should be changed after each use.

Solenoid Valve Positions - Model 30

IMPORTANT: The Liquid Injection Solenoid Valve and the Defrost Solenoid Valve must both be in the OPEN position during evacuation procedures. The valves are normally in the closed position and must be held open manually using special magnets (204-1074) designed for this purpose. DO NOT put a magnet onto the Condenser Blocking Solenoid Valve as this is a normally open valve and a magnet will close it.

- a. Unscrew the solenoid coil retaining nut and remove the coil assembly.
- b. Place a magnet tool on the solenoid valve stem.
- c. Carry out the required leak check and evacuation procedures.
- d. After completing the leak check and evacuation procedures, remove the magnet tools and replace the solenoid coil assembly on the solenoid valve and hand tighten the coil retaining nut.

Leak Check and Evacuation

- 1. Connect the gauge manifold to the suction and discharge intakes of the vehicle compressor.
- 2. Connect the central line of the gauge manifold to the vacuum pump. Always use recommended vacuum equipment. Before each use, check that there are no leaks in the vacuum equipment either in the pump itself or in the hoses.
- 3. Open the gauge manifold and vacuum pump valves. Open all the solenoid valves in the circuit.
- 4. Start the vacuum pump and maintain suction until it reaches 500 microns.
- 5. Once it reaches 500 microns, leave suction running for **one hour**.
- 6. Close the vacuum pump valve, switch off the pump, checking that the gauge reading for the vacuum pump does not exceed **2000 microns** in the following five minutes. If vacuum level exceeds 2000 microns after five minutes, a leak is present or additional evacuation time is required.
- 7. Start the vacuum pump again and open the vacuum valve. Leave the pump running until it reaches **500 microns** of pressure again.
- 8. Once it reaches 500 microns, close the vacuum pump valve and switch off the pump.

The unit is ready to be filled with refrigerant.

System Leak Check and Evacuation



Condenser Fan Connections

Models 10 and 30

1. From the **Refrigeration Module** to the **Condenser Module** - connect the Condenser Fan Motor connectors (**CF1-01, CFI**) and (**CF2, CFK**) to the mating connectors.

Models 20 and 50 (not shown)

- 1. From the **Refrigeration Module** to the **Power Pack Module** connect the Condenser Fan Motor connectors (**CF1-01, CFI**) and (**CF2, CFK**) to the mating connectors.
 - Then from the **Power Pack Module** to the **Condenser Module** connect the Condenser Fan Motor connectors (**CF1-01, CFI**) and (**CF2, CFK**) to the mating connectors.

Installation - Electrical Connections to Condenser

Condenser Fan Connections AND UN ABA390

Installation - Electrical Connections to Power Pack

Model 20, 20 MAX, 50 and 50 MAX - Single Temperature Systems

Procedures

- 1. Route the harness from the Refrigeration Module to Power Pack:
 - Connect the 12-pin connector into the mating connector on the Power Pack Module.
 - Insert the two electrical barrel connectors (2R-01) and (CH10) into the mating terminal connector block on the Power Pack and tighten securely.

Installation - Electrical Connections to Power Pack



Evaporator Connections

Procedures

Route the remainder of the condenser harness from the refrigeration module down through the access hole and into the cargo area. Make the following connections to the mating connectors at the evaporator:

- 1. Evaporator Fan Motor 1 (EFI, CHC).
- 2. Evaporator Fan Motor 2 (EF2, CHD).
- 3. Evaporator Fan Motor 3 (EF3, CHE).
- 4. Defrost Termination Switch (12, CHB).
- 5. Hot Gas Defrost Solenoid (26,CHM).
- 6. Temperature Sensor 1 (PNK, BLK).

MAX UNITS ONLY

 See "Installation - Evaporator Drain Hoses" on page 58 regarding the drain hoses and the correct placement of the drain heater wires (27,CHF), (27A, CHG) and installing the evaporator cover.

30 and 50 MODELS ONLY

- 8. Route the hot gas solenoid jumper harness from the refrigeration module down through the access hole and into the cargo area and make the following connections at the evaporator:
 - Disconnect the existing 2-pin harness connector (CHM, 26) from hot gas solenoid and connect it to the 2-pin connector on the jumper harness.
 - Connect the other 2-pin connector from the jumper harness to the mating connector on the hot gas defrost solenoid.

DOOR SWITCH OPTION

9. Remove and discard blank plug (**DSW1, CHH**) and connect mating door switch harness connector.

NOTE: Make sure all harness are neatly routed and secured to prevent rubbing or chafing against sharp edges inside the evaporator assembly.

Installation - Electrical Connections to Evaporator





Installation - Standby Power Receptacle

Procedures

NOTE: Thermo King recommends a 20 amp fused power source for electric standby operation.

- Verify the receptacle box is wired for the correct voltage for your application.
- The standby receptacle box should be installed securely to the exterior of the vehicle. It should be easily accessible while not interfering with the driver's visibility or operation of the vehicle.

Installation - Standby Power Receptacle



Standard Systems

- 1. Cut the drain hose into two sections of suitable length and attach each drain hose onto the evaporator drain tubes.
- 2. Allow the drain hoses a sufficient slope to ensure that the water drains away from the evaporator.
- 3. Secure the connections with tie bands.
- 4. Route both hoses directly out through the compartment wall and join to a third single drain hose using the **Y** connector.
- 5. Route the single drain down the outside of the cargo area and secure with clamps.
- 6. Seal drain hose holes in the cargo area with caulking.

Max Systems

- 1. Cut the drain hose into two sections of suitable length and attach onto the drain tubes.
- 2. Allow approximately 7.00 in. (180 mm) of defrost wire to extend from each defrost tube into the pan.
- 3. Insert the defrost heater wires through each drain hose and along its entire length.
 - *Do not* use band wraps (wire ties) to hold the defrost heater wires.
 - *Do not* cover or wrap the defrost heater wires.
 - *Do not* cut the defrost heater wires.
 - Do not install more than 4 defrost heater wires into the drain tube.
- 4. Connect Drain Heater 1 (27,CHF) and Drain Heater 2 (27A, CHG) to mating connectors.
- 5. Install the cover onto the evaporator.
- 6. Secure the hose connections with tie bands.
- 7. Route both hoses directly out through the compartment wall and join to a third single drain hose using the **Y** connector.
- 8. Route the single drain down the outside of the cargo area and secure with clamps.
- 9. Seal the drain hose holes in the cargo area with caulking.

Installation - Drain Hoses





ARD584

Installation - In-Cab Controller

Procedures

- 1. From the cargo area route the **Controller Harness** with connectors (CHO, TXD, RXD, 9V, SHIELD) and the Vehicle Ignition Switch Harness with connector (ACC) to the interior of the cab.
 - Attach the 5-pin connector (CHO, TXD, RXD, 9V, SHIELD) firmly to the rear of the controller.
 - Install the controller to the bracket.

NOTE: Install the in-cab controller in a location that is accessible and visible from the driver's position and that does not hinder the driver's mobility, visibility or access to the vehicle instruments and levers.

- 2. Connect the **Vehicle Ignition Switch Harness (ACC)** to the ON side of the vehicle ignition switch.
- 3. Neatly route and secure all harnesses.

Installation - In-Cab Controller



Installation - Electrical Connections to Compressor and Battery

Procedures

IMPORTANT: See "Battery Installation and Cable Routing" on page 7.

NOTE: If the vehicle is equipped with a battery disconnect switch, always wire the unit <u>after</u> the switch. This allows power to the unit to be turned off by the battery disconnect switch.

- 1. Route the compressor harness with connectors (LIS, CLU) and (CLU1) to the engine compartment.
- 2. Connect Liquid Injection (LIS, CLU) connector to the mating connector on the liquid injection switch.
- 3. Connect the Clutch Harness (CLU1) to the mating connector on the clutch.
- 4. Remove the terminal ring from the (BAT) wire:
 - Combine the **BAT** and **2 wire** together and install the provided 40 amp in-line fuse using crimp connector in the kit.
 - Attach the in-line fuse (with BAT and 2 wire) onto the *positive* (+) post of the battery. See note above.
- 5. Connect the Negative (CH) wire to the *negative* (-) post of the battery.

Installation - Electrical Connections to Compressor and Battery



Procedures

- 1. Connect a gauge manifold set to the suction and discharge service ports on the engine driven compressor.
- 2. Connect the refrigerant bottle to the gauge manifold and place it on a scale.
- 3. Connect the refrigerant bottle valve and drain the gauge fitting line.
- 4. Keep the low pressure side valve of the gauge manifold closed. Open the high pressure side valve.
- 5. Locate your model unit on the chart below. Add the proper amount of refrigerant for your model.

AMOUNT OF REFRIGERANT PER MODEL			
Model 10	4.00 lbs.		
Model 20	4.75 lbs.		
Model 30	4.25 lbs.		
Model 50	5.00 lbs.		

NOTE: The refrigerant charge must be made in liquid phase for R-404A.

- 6. Close the refrigerant bottle valve and the high side valve of the gauge manifold.
- 7. Start the vehicle's engine, run at approximately 1000 rpm and turn the unit ON.
- 8. Set the unit thermostat at 0C/32F (see operating manual).

- Run the unit until it reaches a temperature close to that indicated, and a high circuit pressure of 12.5 bar (180 psig for R-134a) or 19 bar (275 psig for R-404A). Partially block off the air intake to the condenser if necessary.
- 10. Open the low side valve of the gauge manifold and the refrigerant bottle valve, and add refrigerant slowly until no bubbles can be seen through the liquid sight glass.
- 11. Close the refrigerant bottle and gauge manifold valves.
- 12. Leave the unit running for 15 minutes.
- 13. Check that there are no bubbles in the sight glass. If bubbles are seen, repeat steps 10 and 11.
- 14. Turn the unit OFF, stop the vehicle's engine and remove the gauge manifold.

NOTE: The above conditions MUST be established each time the refrigerant level is checked or if refrigerant needs to be added for any reason.

System Charging



Installation Check List

Components are installed with recommended hardware and		Compressor was filled with the proper amount and type of oil.
ignieneu Securely.		All electrical connectors are properly locked in place.
All mounting holes and access holes are sealed with silicone caulk.		Standby Power Receptacle mounted securely to vehicle.
All covers, guards or screens are installed securely on unit.		All electrical harnesses and wiring is routed and secured adaquately.
Evaporator drain hoses are angled downward for proper drainage.		Correct size and amperages fuse was installed in the main power harness to the battery.
Drain hose heaters (if applicable) are installed correctly.		All battery connections are clean and tight.
The orifice screen is installed in the expansion valve at the evaporator.		Vehicle compressor drive kit test was carried out.
In-cab controller installed and is accessible and visible from the driver's position.		Complete refrigeration system was checked for leaks.
		Unit is charged with correct type and amount of refrigerant.
Refrigerant hoses are not taut - they are able to absorb vibrations.		Unit operates correctly.
Refrigerant hoses are not rubbing against moving components, sharp objects, or items that can reach high		

temperatures.



Providing equipment and services to manage controlled-temperature environments for food and other temperature-sensitive products, our Climate Control Technologies sector encompasses both transport and stationary refrigeration solutions. Our product brands include Thermo King[®], a world leader in transport temperature control systems, and Hussmann[®], a manufacturer of refrigeration and food merchandising equipment.

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