Installation Manual

Mini-Split System
Condensing Units TTK
Horizontal Air Discharge
9,000 to 36,000 BTU/h
50/60 Hz

Models:

TTK 509 E
TTK 512 E
TTK 518 E
TTK 524 E
TTK 530 E
TTK 536 E

September 2003 **SS-SVN03B-EN**

General Information

General Information

Congratulations on your choice of a Trane mini-split system. These systems have been carefully designed and manufactured under strict **Trane Worldwide Quality Standards** to provide you with years of comfortable, convenient cooling or heating/cooling with a minimum of service.

This Installation Manual is given as a guide to good practice in the installation by the installer of TTK condensing unit for mini-split system. Installation procedures should be performed in the sequence that they appear in this manual.

For installing the unit to operate properly and reliably, it must be installed in accordance with these instructions. Also, the services of a qualified service technician should be employed, through the maintenance contract with a reputable service company.

Read these Installation Instructions completely before installing the air conditioning system.

About this Manual

Cautions appear at appropriate places in this Instruction Manual. Your personal safety and proper operation of this machine require that you follow them carefully. The Trane Company assumes no liability for unstalltions or servicing performed by unqualified personnel.
All phases of the installation of this air conditioning system must comfort to all national, provincial, state and local codes.

About this Unit

These TTK condensing units are assembled, pressure tested, dehydrated, charged and run tested before shipment. The information contained in this manual applies to TTK condensing units are designed to operate in cooling mode only.

Trane TTK series of condensing units for mini-split systems offer five models of capacity.

Reception

On arrival, inspect the unit before signing the delivery note. Specify any damage of the unit on the delivery note, and send a registered letter of protest to the last carrier of the goods within 72 hours of delivery. Notify the dealer at the same time.

The unit should be totally inspected within 7 days of delivery. If any concealed damage is discovered, send a registered letter of protest to the carrier within 7 days of delivery and notify the dealer.

Warranty

Warranty is based on the general terms and conditions by country. The warranty is void if the equipment is modified or repaired without the written approval of The Trane Company, if the operating limits are exceeded or if the control system or the electrical wiring is modified.

Damage due to inappropriate installation, lack of knowlegde or failure to comply with the manufacturer's instructions, is not covered by the warranty obligation. If the installtion does not conform to the rules described in Installtion Manual, it may entail cacellation of warranty and liabilities by The Trane Company.

Important

This document is customer property and is to remain with unit. Please place in service information pack upon completion of work.
These instructions do not cover all variations in systems, nor do they provide for every possible contingency to be met in connection with installation.
Should further information be desired or should particular problems arise which are not covered sufficiently in this manual, the matter should be referred to your authorized Trane dealer.

⚠ WARNING!

Warnings are provided at appropriate places in this manual to indicate to installers, operators and service personnel of potentiallly hazardous situations which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION:

Cautions are provided at appropriate places in this manual to indicate to installers, operators and service personnel of potentially hazardous situtions which, if not avoided, MAY result in minor or moderate injury or malfunction of the unit.

Contents

Model Number

1	2	3	4	5	6	7	8	9	10	11
T	**T**	**K**	**5**	**0**	**9**	**E**	**5**	**U**	**A**	**0**

Digit 1 - Brand Name
T Trane Mini-split

Digit 2 - Functional Type
T Cooling Only
W Heat Pump

Digit 3 - Quantity of Refrigerating Circuits
K 1 Refrigerating Circuit

Digit 4 - Refrigerant and Connection Types
5 Refrigerant R-22 / Service Valve

Digits 5,6 - Nominal Capacity Class (BTU/H)
09 9,000 BTU/h
12 12,000 BTU/h
18 18,000 BTU/h
24 24,000 BTU/h
30 30,000 BTU/h
36 36,000 BTU/h

Digit 7 - Development Sequence
E Sequence (Brazil)

Digit 8 - Electric Power Supply Characteristics
5 1 Phase - 60 Hz - 208/230 VAC
B 1 Phase - 50 Hz - 208/230 VAC

Digit 9 - Agency Listing
U UL, ETL and ARI Standards
L IRAM Standard

Digit 10 - Optional
A with Multi-Function Service Valve and Orifice Kit

Digit 11 - Product Service Change
0 First Version

General Data

General

This “Installation Manual” describes information for condensing units TTK 509 to TTK 536, with horizontal air discharge, cooling-only, from 9,000 to 36,000 Btu/h.

WARNING!

After unpacking the unit, inspect the unit for any damage incurred in transit. Immediately notify the carrier.

Compare the power supply characteristics with the unit nameplate data. The power supply must comply with the unit nameplate data.

All stages of this installation should comply with local, state and national codes.

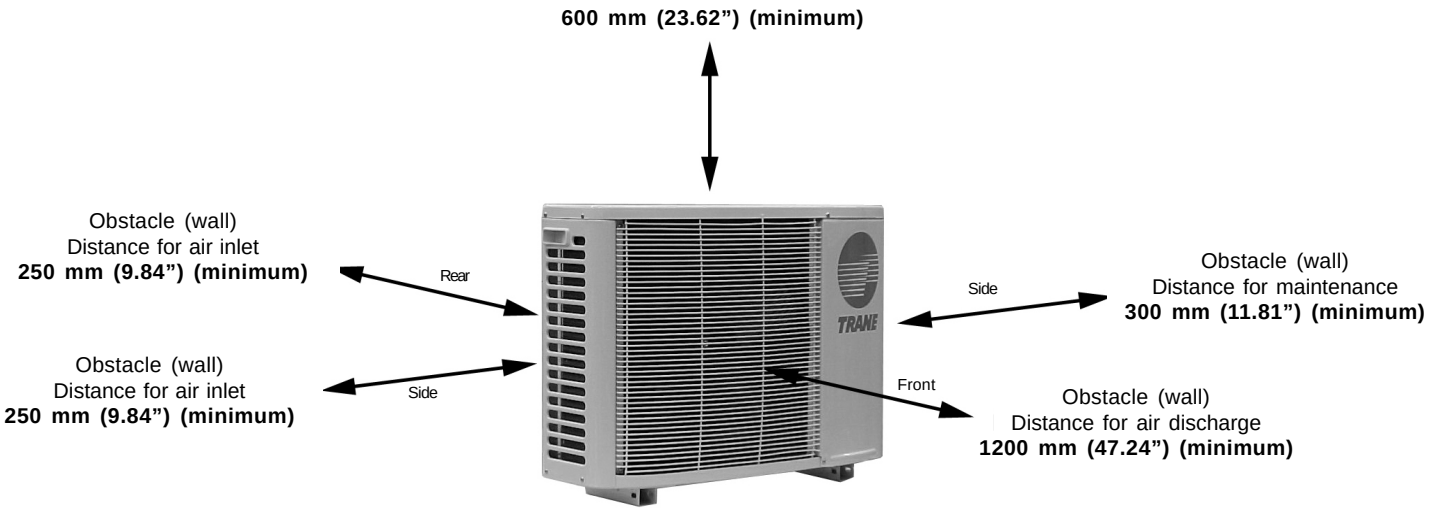
These installation instructions should be carefully read prior to the air conditioning system installation.

These instructions are not intended for all system variations, nor advise against all situations that may occur during an installation. If more information is required, or problems that avoid client satisfaction arise, contact your nearest Trane sales office or Trane.

Unit Location and Preparation

1. The unit should be installed on a leveled and reinforced concrete foundation. The minimum height of the concrete foundation should be 50 mm (1.97”). Unit shall be fixed to the foundation with bolts (not supplied).
2. The concrete foundation must be positioned at least 250 mm (9.84”) away from any existing wall or shrubbery.
3. The minimum clearance on the air inlet sides of the unit should be 250 mm (9.84”), and on the air discharge side, 1200 mm (47.24”).
4. When the unit is mounted on a roof, be sure the roof will support the unit weight. Proper vibration isolation is recommended in order to prevent transmissions to the building structure.
5. Minimum clearances between the unit and other objects should be observed in order to assure proper ventilation.

Recommended installation and maintenance clearances



Note: All dimensions are in mm(inches)

Figure 01 - Recommended installation clearances

Line Connections

Refrigerant Line Connections

Flange thread-type connection:

1. Thread-type connections for series TTK-5

WARNING!

Do not open liquid or gas line valves until tube installation and system evacuation are finished.

Table 01 - Torque

Piping Diam.		Torque	
mm	in.	kgf x cm	lbs x in.
6,35	1/4"	150-200	130-170
9,52	3/8"	350-400	300-340
12,7	1/2"	500-550	430-470
15,88	5/8"	600-650	520-570
19,05	3/4"	700-750	610-650

Connection of refrigerant lines to unit using flange thread-type service valves

1. Using a tube cutter, cut the refrigerant tube and remove burrs, inside and outside (be very carefull to avoid that burrs fall into the tube).
2. Insulate both refrigerant lines.
3. Remove the service valve falnged nut and place it in the tube.
4. Make the flange of the tube as perfect as possible.
5. Apply refrigerant oil on coupling surfaces of the union of the valve with the flanged tube end before coupling them.
6. Align the union center formed by the tube and the valve, lightly screwing the nut with the hand, by 3 to 5 turns.
7. Tighten the nut according to the torque table in the next page .
8. Repeat the previous procedure for other connections.

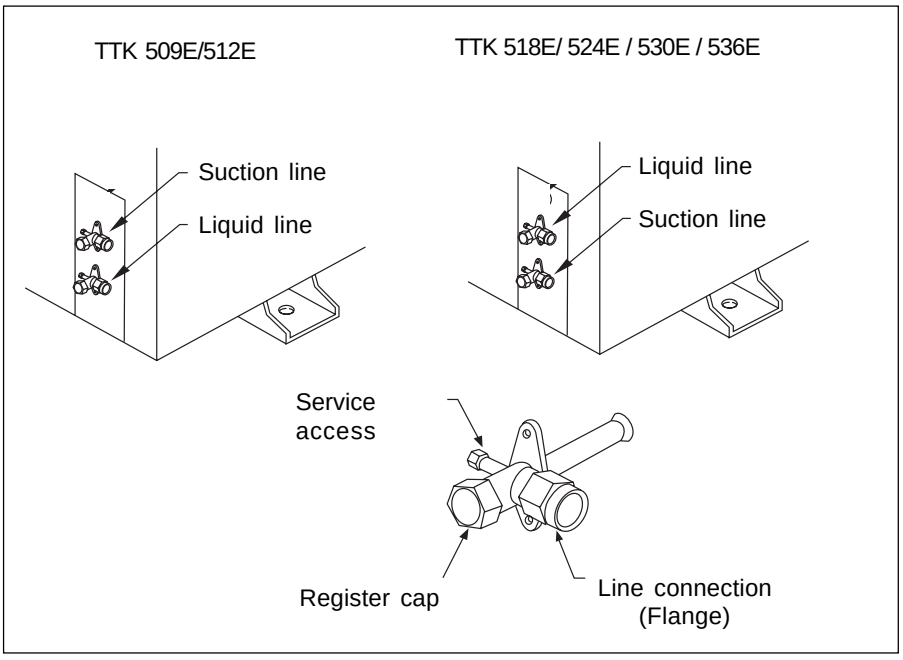


Figure 02 - System detail

System Evacuation

System Evacuation and Purge

1. The outdoor unit is supplied with refrigerant pre-loaded in factory . The load indicated on the nameplate is the total amount required by a system with a refrigerant line lenght of up to 7.5 meters (295.3"). Considering that the outdoor unit does not require evacuation, except in cases of refrigerant leakage, the suction and liquid valves should remain closed.
2. After installation is finished, apply vacuum in refrigerant lines and indoor unit.
3. The system should be evacuated until the vacuum gauge shows a reading of 350 microns (5.9 x 10^{-2} inHg).
4. Close the vacuum pump valve, and observe the vacuum gauge. If the reading is more than 500 microns (8.3 x 10^{-2} inHg) in an interval of one minute, the evacuation is not complete, or there is a system leakage.
5. If the vaccum gauge does not pass 500 microns (8.3 x 10^{-2} inHg) within the interval of one minute, the vaccum is finished.
6. With the vacuum pump off and the manifold closed, open the service valves in the liquid and suction lines.
7. Replace the register and valve caps to prevent leakages.

Table 02 - Additional refrigerant load

Tubing Sizes Liquid - Suction	Additional Load
1/4" - 1/2"	26 g/m 17.5x10^{-3} lbs/ft
1/4" - 5/8"	30 g/m 20.2x10^{-3} lbs/ft
3/8" - 5/8"	59 g/m 39.6x10^{-3} lbs/ft
3/8" - 3/4"	60 g/m 40.3x10^{-3} lbs/ft
3/8" - 7/8"	62 g/m 41.7x10^{-3} lbs/ft
3/8" - 1 1/8"	68 g/m 45.7x10^{-3} lbs/ft

The refrigerant load will have to be completed when the distance between internal and external units is more than 7.5 meters (295.3"). Use table 2 for recommended additional loads.

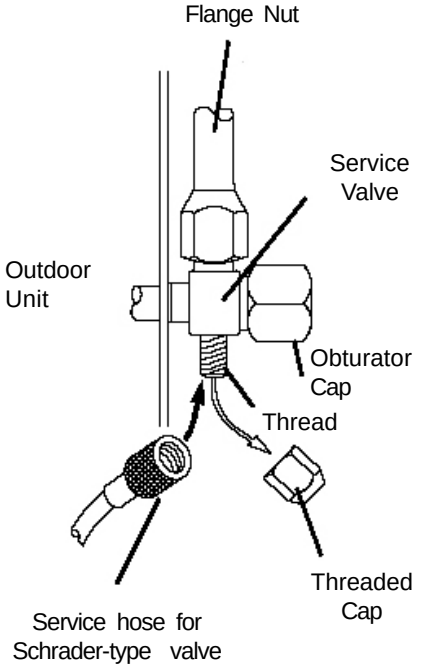
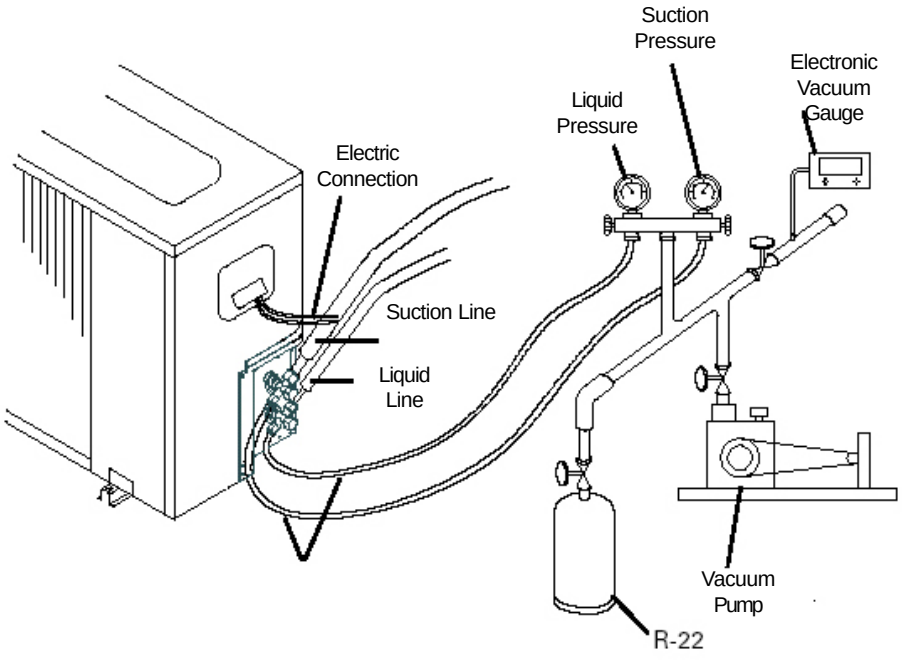


Figure 03 - Service Valve



Obs: Notice that the position of suction and liquid lines is different for some models, refer to page 06 - fig. 02

Figure 04 - Evacuation System

Service Valve
Multi-Function (Liquid Line)

Field Installation of the Restrictor for Multi-Function Service Valve (Liquid Line)

Condensing units TTK, are supplied with a multi-function service valve for liquid line and a restrictor kit. The use of the restrictor allows the refrigerant expansion in installations where the indoor unit does not have its own expansion device. The machine is supplied with a passage orifice installed at the muti-function valve, making it adequate for use in conjunction with indoor units that already have their own expansion device. **For use with indoor units that does not have an expansion device, it is necessary to replace this passage orifice with one of the restrictor supplied with the machine.**

Step 1. Check in the table below the restrictor orifice code to be used, according to the indoor unit model. The code is marked on the restrictor body.

MODEL	ORIFICE MCW	ORIFICE MCX & MCD
TTK509E	034	034
TTK512E	040	040
TTK518E	047	047
TTK524E	055	055
TTK530E	063	063
TTK536E	067	067

Step 2. Isolate the refrigerant circuit, closing the multi-function service valve (if the valve is open). Remove the obturator cover with a 23 mm (0.91”) wrench or other appropriate wrench. Insert a 5 mm (0.20”) Allen wrench in the obturator and turn it clockwise until some resistance is felt. Remove the flanged nut and the copper cover.

Step 3. Carefully remove passage orifice installed in factory, being careful not to damage the flare nut thread and sealing surface between the orifice and the flare nut.

Step 4. The new restrictor should be appropriately lubricated and have an o-ring on the perimeter. The orifice and the o-ring should be encapsulated in the valve body seat, and, for that, a small "crack" should be heard in order to assure that the orifice was properly installed. The assembly of these parts is shown in the figure below:

Step 5. The liquid line tube should be flanged and burr-free. Clean the tube to avoid the introduction of dirt or other strange materials in the refrigerating circuit and possible damages in the tube flange while the flanged nut is tightened.

Step 6. Manually install the flare nut on the liquid line tube and be sure to apply the correct torque. Continue the manual assembly on the valve body until a screwing resistance is felt (metal with metal). Then, tighten the nut using a 7/8" wrench or other adapted wrench, according to the flare nut dimensions.

Step 7. Open the valve, turning it counterclockwise (04 turns, or a resistance is felt), using a 5 mm (0.20”) Allen wrench.

Step 8. Replace the obturator cover, manually turning it clockwise by approx. half-turn.

ATTENTION!

There are indoor units that have device valves, have been not necessary to use the restrictors.

Multi-Function Service Valve for Liquid Line

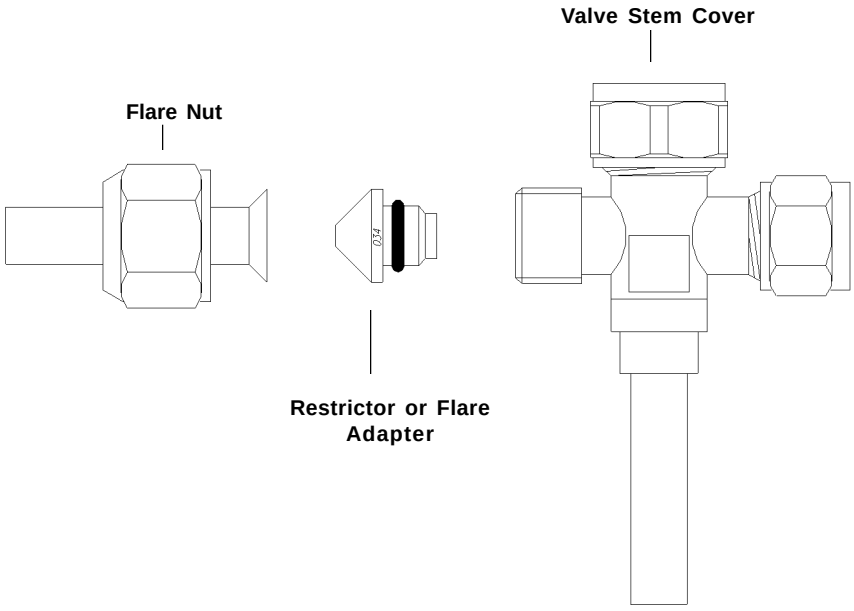


Figure 05 - Multi-Function Service Valve

Electric Connections

Electric Connections

1. **Important:** do not allow electric wires from the compressor casing to touch refrigerant tubes or the compressor.
2. Equipment electric installation and grounding should be made according to IEC 335-2-40: 2002 and local codes and/or NEC.
3. The power supply should comply with the specification in the equipment nameplate.
4. Install an exclusive overcurrent protection circuit-breaker for the outdoor unit. It can also be used for system protection.
5. Use flexible electric conduits in cases where vibrations can introduce noises inside the structure.
6. Appropriate color electric wires should be used, for command, to allow easier connections between indoor and outdoor units.

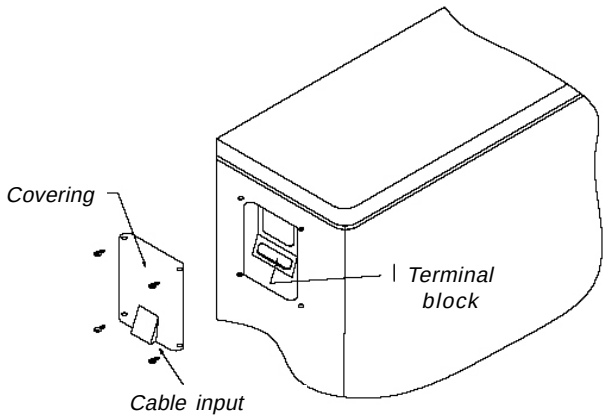


Figure 06 - Electric connection detail

System Start-Up

System checking before start-up

1. Make sure that field connections comply with electric and refrigerant diagrams for the equipment. **Always refer to Installation and User Manuals and Engineering or Service Bulletins provided with the indoor units.**
2. Check that units are correctly installed and there is no tool or debris under or on the units.
3. Check piping and connections for refrigerant leaks.
4. Check that the unit has a proper grounding. If there is no grounding at the site, it is essential to follow completely this procedure in order to assure a perfect equipment operation.
5. Check that voltage is within specified ratings, and check for proper circuit-breaker/fuse sizes.
6. Check that electrical wiring is as specified and connections are tight.

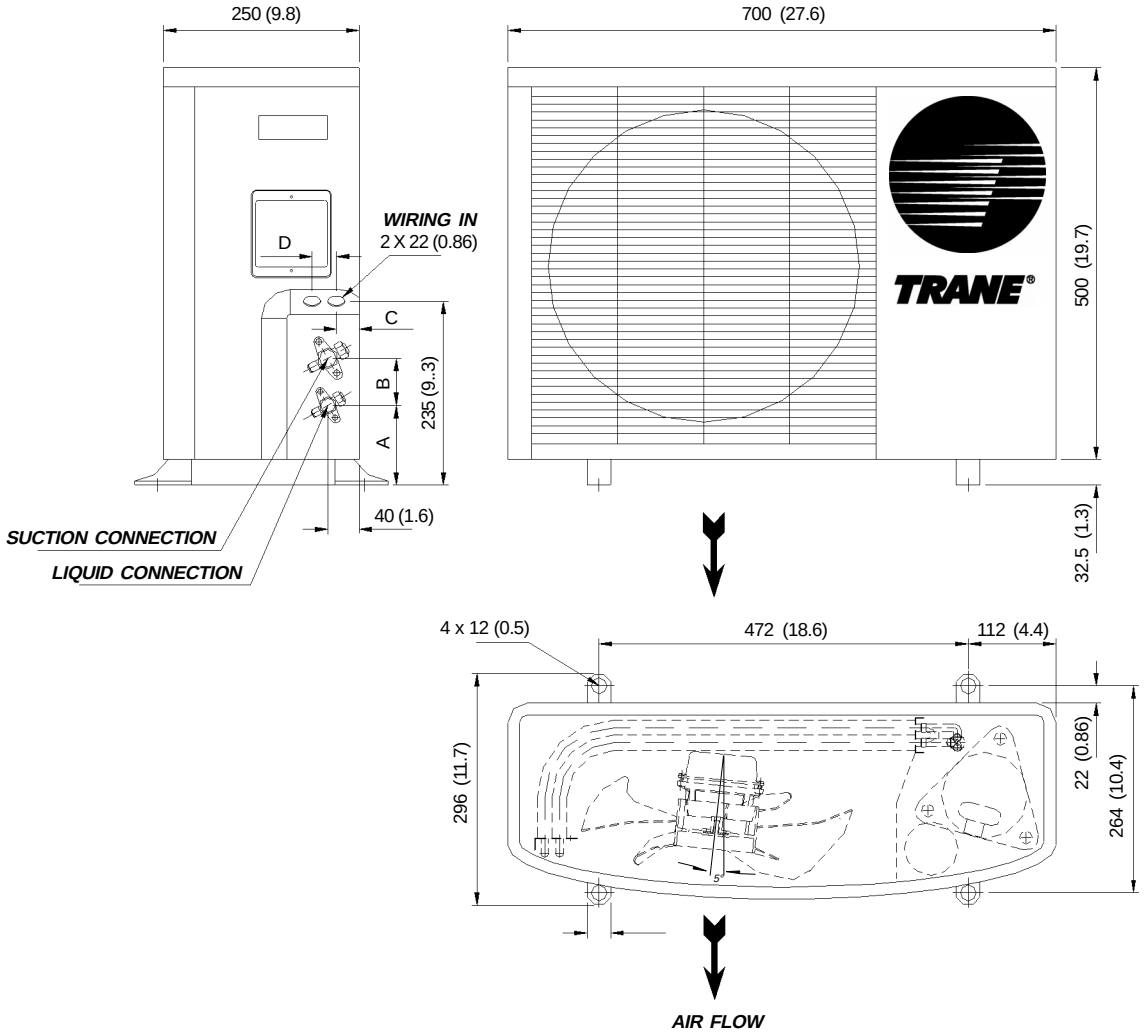
Start the system and carefully observe the operation. Follow all recommendations in Installation and User Manuals.

Checking List for Mini-Split Unit Start-Up

- Verify correct refrigerant and electric connections
- Check for strange materials or tools under or on the equipment
- Check for possible leaks at connections
- Check that lines are well isolated
- Check that passages through piping structure are well insulated
- Check that water drains are free
- Insufflation and return grids are free and unobstructed
- Air filters are installed and clean
- Use an inpected thermometer to check if the thermostat is accurate
- Check grounding
- Check for power voltage, fuse/circuit-breaker ratings in amperes
- Check that wire sizes are adequate for the power load
- Check all field wiring for tight connection
- Check that electric wires do not touch refrigerant pipes
- Check if remote control batteries are charged

Dimensional Data

Figure 7. Outline Dimensions - TTK 509 E - TTK 512 E



Note: All dimensions are in mm (inches)

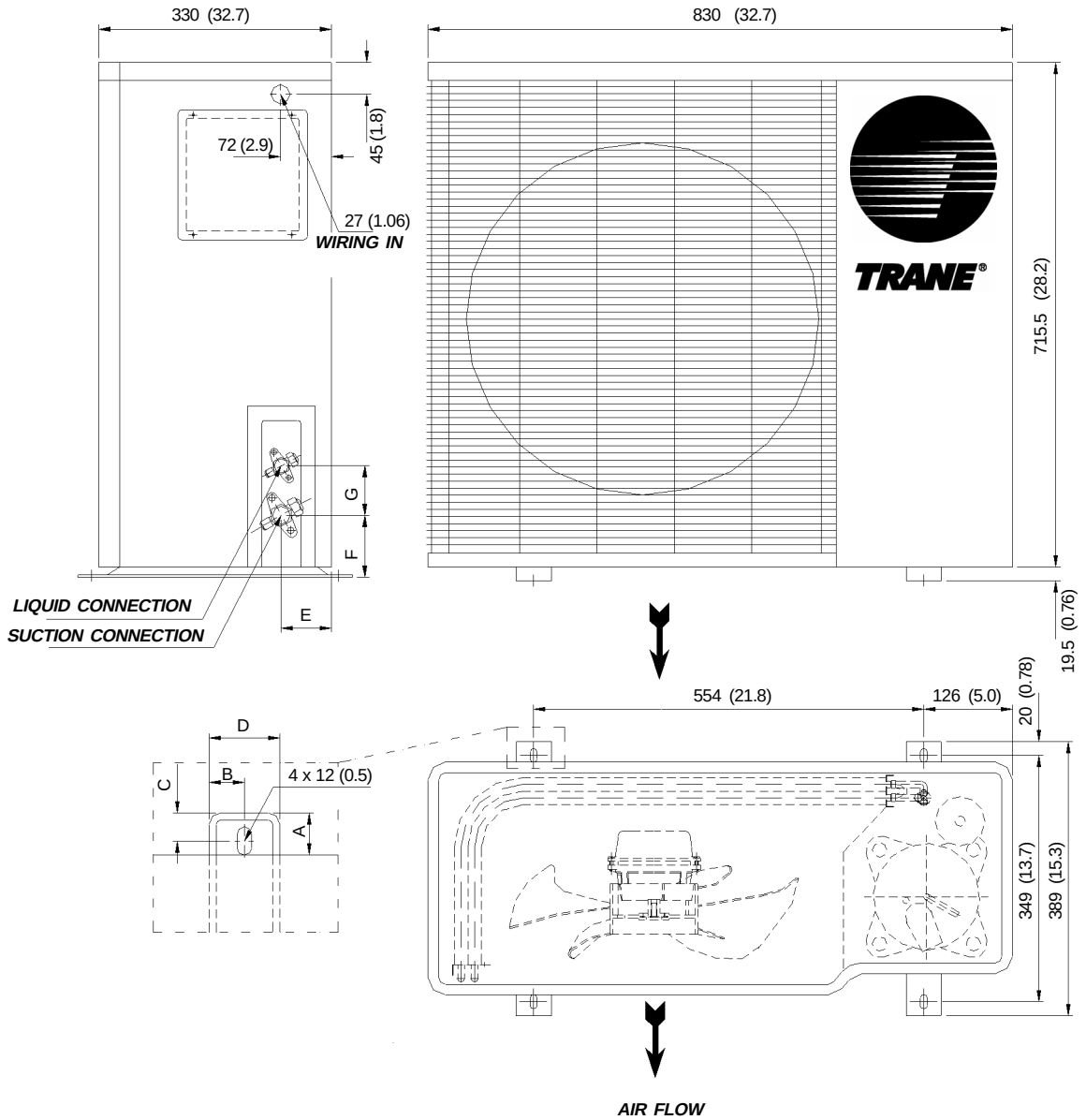
Table 3 - Dimensional Data

	Connection Sizes		Weight	Dimensional Data			
Model	**Liquid**	**Suction**	**Kg (Lbs)**	**A**	**B**	**C**	**D**
TTK 509E	1/4 (6.35)	3/8 (9.5)	27 (60)	102 (4.1)	60 (2.4)	29 (1.2)	31 (1.22)
TTK 512E	1/4 (6.35)	1/2 (13)	32 (70.5)	102 (4.1)	60 (2.4)	29 (1.2)	31 (1.22)

Note: Diameter of Liquid and Suction Lines are in inches (mm)

Dimensional Data

Figure 8. Outline Dimensions - TTK 518E - TTK524E - TTK530E - TTK536E



Note: All dimensions are in mm (inches)

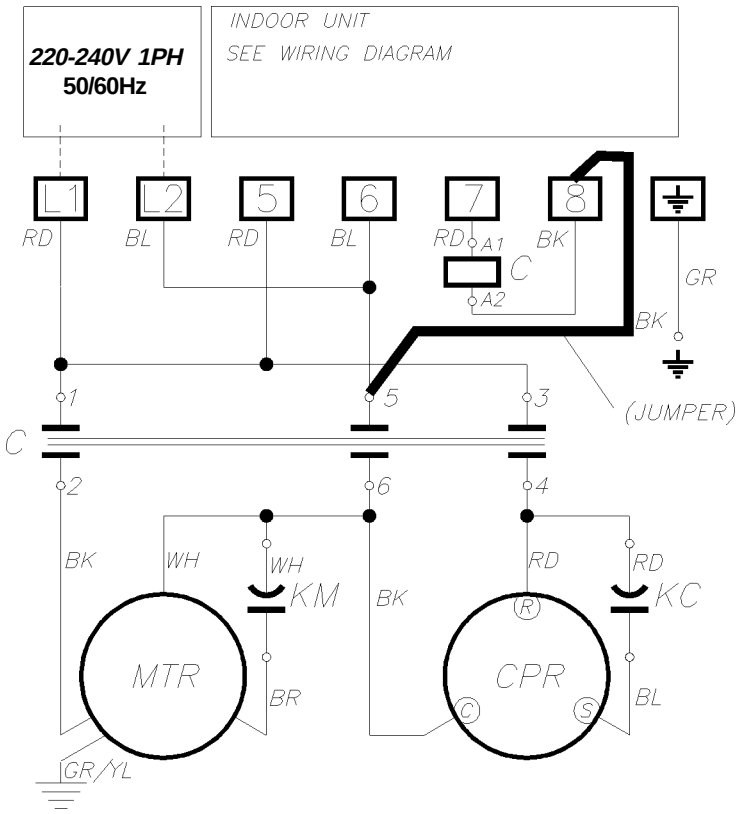
Table 4 - Dimensional Data

	Connection Sizes		Weight	Dimensional Data						
Model	**Liquid**	**Suction**	**Kg (Lbs)**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
TTK 518E	1/4 (6.35)	1/2 (12.7)	48 (106)	30 (1.2)	25 (0.98)	20 (0.78)	50 (1.96)	71 (2.8)	87.5 (3.5)	70 (2.8)
TTK 524E	3/8 (9.5)	5/8 (15.8)	57 (126)	30 (1.2)	25 (0.98)	20 (0.78)	50 (1.96)	71 (2.8)	87.5 (3.5)	70 (2.8)
TTK 530E	3/8 (9.5)	5/8 (15.8)	67 (148)	30 (1.2)	25 (0.98)	20 (0.78)	50 (1.96)	71 (2.8)	87.5 (3.5)	70 (2.8)
TTK 536E	3/8 (9.5)	3/4 (19.05)	69 (153)	30 (1.2)	25 (0.98)	20 (0.78)	50 (1.96)	71 (2.8)	87.5 (3.5)	70 (2.8)

Note: Diameter of Liquid and Suction Lines are in inches (mm)

Typical Wiring Diagram

Figure 9. Wiring Diagram - TTK 509E / 512E / 518E / 524E / 530E / 536E



NOTES :

1) Wiring must comply with local codes

2) Use copper supply wires

CPR Compressor
MTR Fan Motor
Capacitor CPR/MTR
Contact NO/Coil
Terminal Board
Factory Wiring
Field Wiring
Grounding
Junction

COLOR	RD	BL	BK	WH	BR	YL	GR
	Red	Blue	Black	White	Brown	Yellow	Green

Wiring Interconnection

Figure 10. Wiring Interconnection: MCW, "K" and "L" model, with condensing units TTK

NOTES:
1) Single power supply point for **both** units.
(indoor unit and outdoor unit)

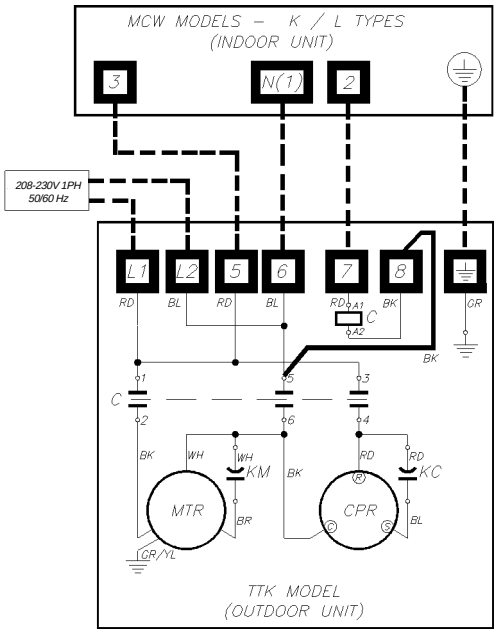
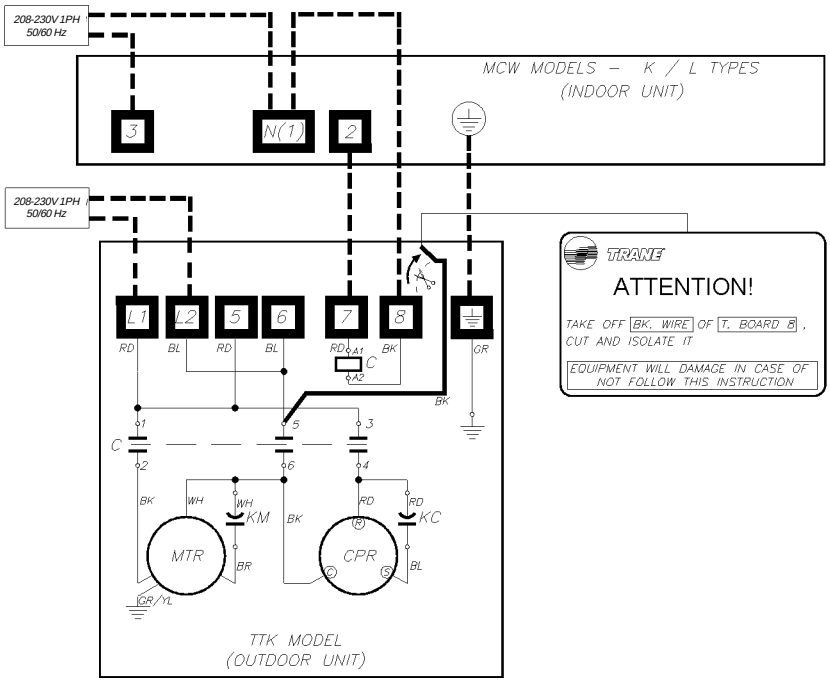


Figure 11. Wiring Interconnection: MCW, "K" and "L" models, with condensing units TTK

NOTES:
1) Single power supply point for **each** unit.
(indoor unit and outdoor unit)



Wiring Interconnection

Figure 12. Wiring Interconnection: MCW, "A" model, with condensing units TTK

NOTES:
1) Single power supply point for **both** units.
(indoor unit and outdoor unit)

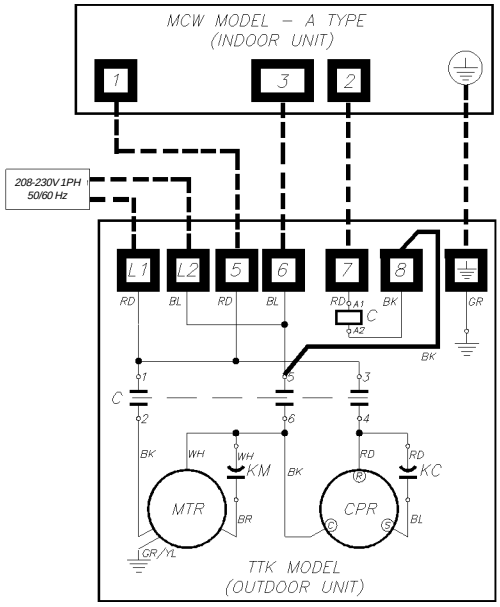
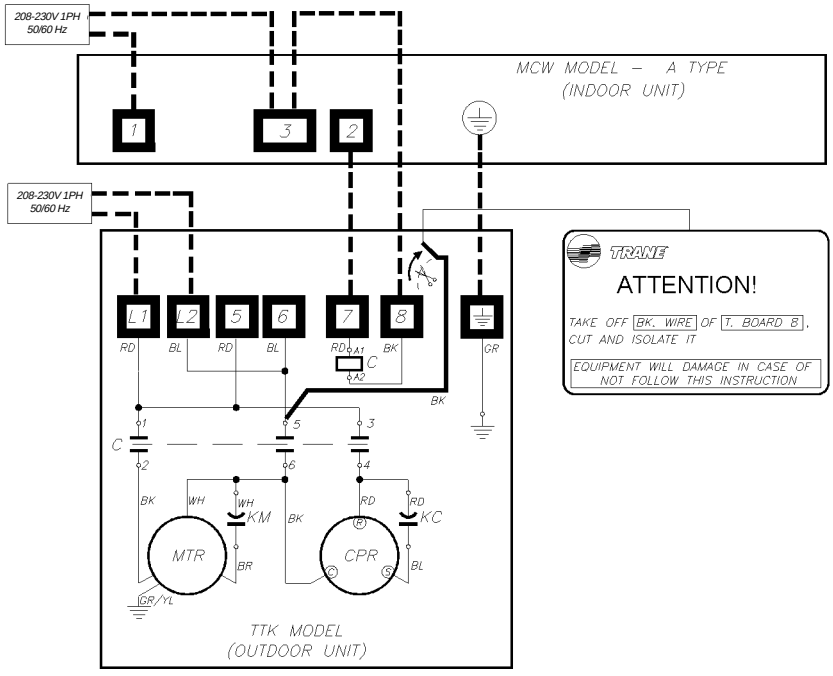


Figure 13. Wiring Interconnection: MCW, "A" model, with condensing units TTK

NOTES:
1) Single power supply point for **each** unit.
(indoor unit and outdoor unit)



Wiring Interconnection

Figure 14 . Wiring Interconnection: MCX with condensing units TTK

NOTES:
1) Single power supply point for **both** units.
(indoor unit and outdoor unit)

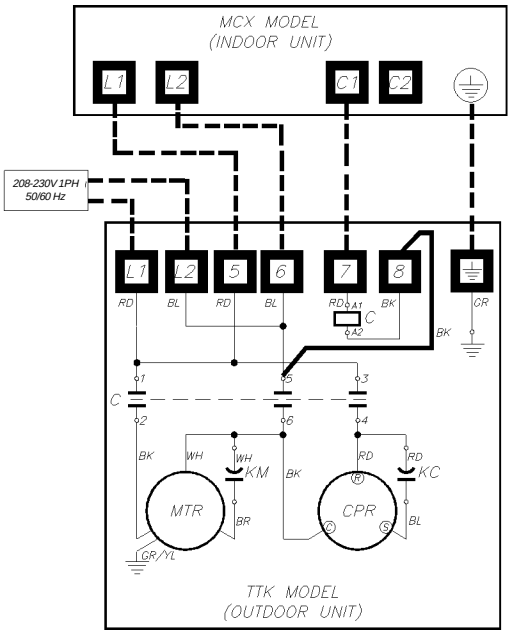
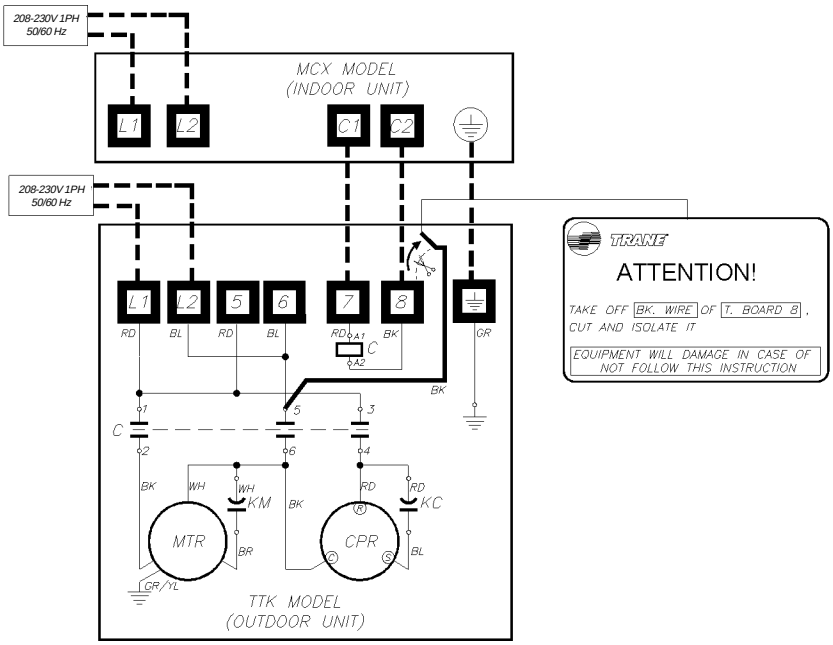


Figure 15. Wiring Interconnection: MCX with condensing units TTK

NOTES:
1) Single power supply point for **each** unit.
(indoor unit and outdoor unit)



Wiring Interconnection

Figure 16. Wiring Interconnection: MCD with condensing units TTK

NOTES:
1) Single power supply point for **both** units.
(indoor unit and outdoor unit)

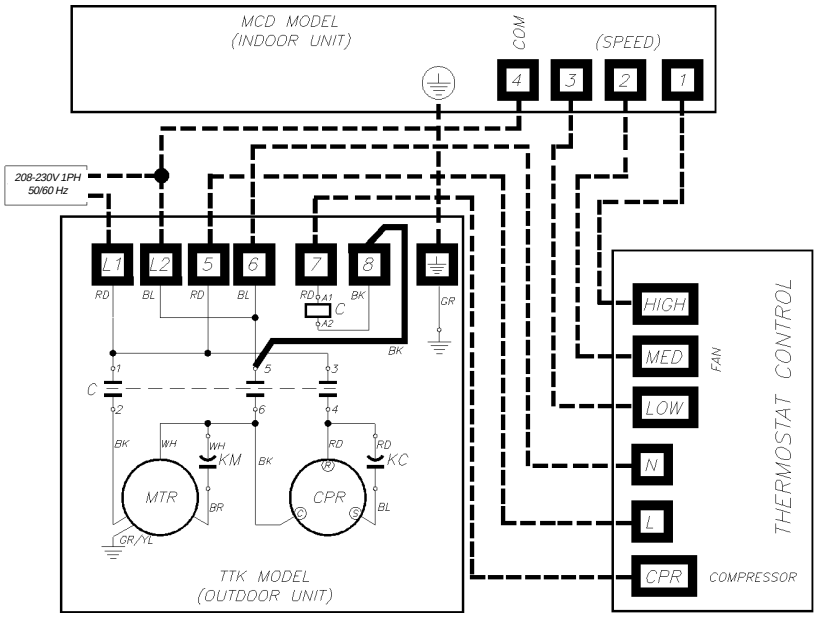
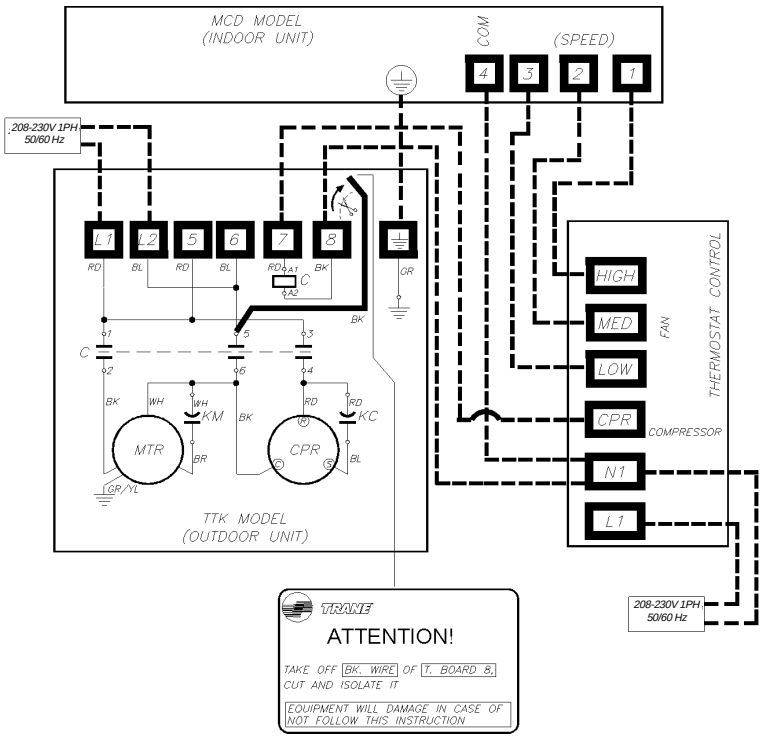


Figure 17. Wiring Interconnection: MCD with condensing units TTK

NOTES:
1) Single power supply point for **each** unit.
(indoor unit and outdoor unit)



Code: X39150103-01

Trane
A business of American Standard Companies
www.trane.com

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

Literature Order Number:	SS-SVN03B-EN
File Number:	SL-UN-000-SS-SVN03B-EN 0903
Supersedes:	SS-SVN03A-EN 0703
Stocking Location:	Houston, TX