Water-Source Heat Pump
Axiom™ GEHC

Installation
Operation
Maintenance

⚠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.

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GEHC-SVX01A-EN

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Trane has a policy of continuous product data improvement and reserves the right to change design and specifications without notice.

GEHC-SVX01A-EN Jul.2013

We are committed to using environmentally conscious print practices that reduce waste.

Contents

Caution This manual is dedicated to the unit and is client's property. The contractor should put it back to technical material envelop when installation completed.

Warning Unit power source should be cut off and locked in that state before any installation or service work is performed in case of body injury or death of personnel as a result of electric shock or contact to running parts.

The air conditioner must be installed in compliance with national, regional and local codes.

The manual should be read carefully before installation. Unit installation and service should be in accordance with procedures noted in this manual to achieve normal and liable unit operation by experienced technicians authorized by Trane.

It's not the aim of this manual to cover all unit differences or occurrence of problems during installation. If further information about this unit or any other units is needed or problems encountered beyond the coverage of this manual, please contact Trane local sales office.

Note **Warning** or **Caution** will appear in proper section throughout this manual, which should be firmly conformed to assure body safety and better operation performance. Trane claims no liability for unqualified installation or service.

Unit Dimensions

G	E	H	C	0	1	2	6	1	M	O	1	1	L	R	E
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Digits 1-2 Product Type
GE = Packaged Unit

Digit 3 H = Horizontal Conguration

Digits 4 Development Sequence
C

Digits 5-7 Unit Size
012 024 030 036 048 060

Digit 8 Voltage/Hertz/Phase
6=220–240V/50Hz/1Ph (012-030)
9=380V-415V/50Hz/3Ph (036-060)

Digit 9 Thermostat
1 = With LCD Thermostat (Applicable Single or Modular Conguration)
2 = Without LCD Thermostat (For Modular Conguration Only)

Digit 10 Controller
M = Microprocessor Control

Digit 11 Refrigeration Cycle
C = Cooling
O = Heat Pump

Digit 12 System Application
1 = Water Loop (Cooling Tower System)
2 = Ground Water (Opened System)
3 = Ground Loop (Closed System)

Digit 13 Blower Conguration
0 = Zero Static Pressure
1 = Standard Static Pressure
2 = High Static Pressure

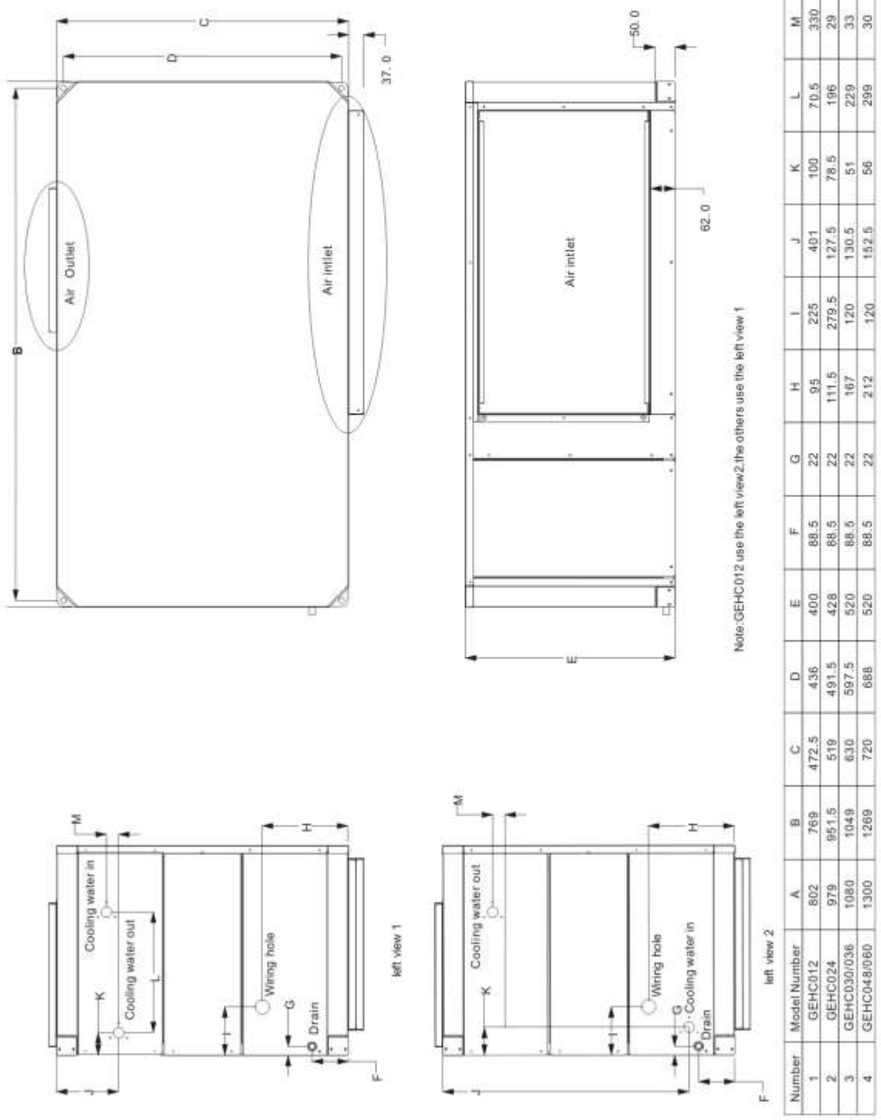
Digit 14 Supply-Air Arrangement
L = Left Side
T = Front

Digit 15 Return-Air Arrangement
N = Right Side w/o Filter
R = Right Side w/6 mm Nylon Iter
T = Right Side w/12 mm Aluminum Iter

Digit 16 Region
E = Export

Unit Dimensions

Figure 1 Unit Dimensions



Number	Model Number	A	B	C	D	E	F	G	I	J	K	L	M
1	GEHC012	802	769	472.5	436	400	88.5	22	225	401	100	70.5	330
2	GEHC024	979	951.5	519	491.5	428	88.5	22	279.5	127.5	78.5	196	29
3	GEHC030/036	1080	1049	630	597.5	520	88.5	22	120	130.5	51	229	33
4	GEHC048/060	1300	1269	720	688	520	88.5	22	120	152.5	56	299	30

Receiving and storage

Field receiving

Inspect the unit carefully for possible freight damage.Should any damage revealed，a report should be submitted to the carrier for compensation.Check the unit nameplate data with order request form data and data on the freight bill to assure the unit is "as ordered". To minimize loss of transmit damage,please follow the inspection steps hereafter one by one before signing on the freight bill.

1 .Inspect each component carefully. Check the unit and cartons for any visible scratch or damage.

2 .Inspect the unit for any concealed damage on arrival as soon as possible.A report should be submitted within fifteen days. Should any concealed damage exist, stop unpacking the unit and keep everything as they are at the job site.Photos should be taken,if possible,and evidence should be provide by the clients on a damaged unit before arrival.

3.Inform the final carrier of damage situation by phone or mail.At the presence of both the carrier and sales personnel,check procedures should be performed on to what extent the unit is damaged.

4.Contact sales representative and ask for repair. Service the unit only after signature of the carrier on the damage situation report.

Note:

The unit is charged with adequate refrigerant before ex-factory. Pressure check should be done on unit arrival with pressure gauge to assure leak free during transmit.A service valve hose is shipped in the unit shell for this purpose. If no leakage found,a indication of normal unit, remove the hose and cap the service valve for seal purpose, if else, a service should be on the way.

Field storage

This unit is designed for indoor use.Erosion due to bad weather will damage the unit and provide the opportunity for pollutant's emergence,which the indoor air quality will suffer from when unit placed outdoor. When outdoor installment is the only option, protections hereafter should be provided.

1.Install the unit on or above a dry field where air flows without obstruction.

2.Waterproof oilcloth should be used to protection the unit from wind blowing and rain falling on.

3.Methods should be taken to assure continuous ventilation around the unit in case of humidity attachment on the unit surface.Wet insulation layer is a perfect place for bacteria,mould specially to grow, which is acknowledged as a reason responsible for odor diffusion and air quality loss.

4 .Unit should be placed in a upright position so as to remain oil in the compressor.

5.Less than three horizontal units can be tiled horizontally, which is not an option for vertical units.

Warning Wet insulation layer inside the unit is a perfect place for microbial(mould)growth which is proven as responsible for indoor odor diffusion and air quality loss resulting directly health problem. If any mould appears in the insulation layer, remove and change that layer prior to unit start or severe health problems will be suffered from.

Preinstallation

Hanging unit

Balance the unit weight center for safety before unit hanging.Refer to Table 1 and Figure 2 for unit gross weight and mass distribution.

Warning Field hanging device must have a safety factor to bear unit weight.Under capability hanging device used will cause body hurt or death of personnel and damage to the unit.

Table 1 Unit Net Weight

Unit Model	Unit Net Weight
012	68kg
024	72kg
030	83kg
036	130kg
048	142kg
060	148kg

Note data Tolerance±15%.

Horizontal unit installation clearance

Adequate clearance should be spared for service access.Required service access for horizontal unit is shown in Figure 3.A 457mm pass-way space should be reserved around the unit for service.For units with supply and return at the same side,as shown in Figure 3, a 76mm pass-way at one side of the unit, other methods should be taken for throttle valve maintenance.This configurationis typical for units installed in a constrainedplace, corridor specially.

Vertical unit installation clearance

Adequate clearance around the unit must be reserved for convenient service and fluent ventilation. Minimum clearance required for vertical unit service and ventilation is shown in Figure 4.

Figure 2 Unit Mass Distribution

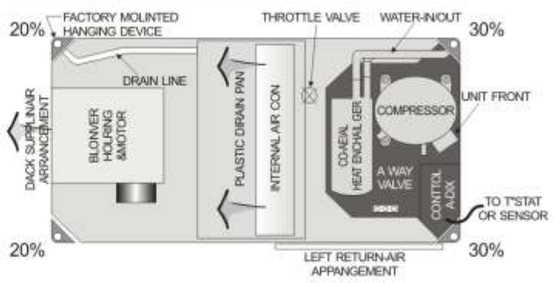


Figure 3 Horizontal Unit Service Clearance

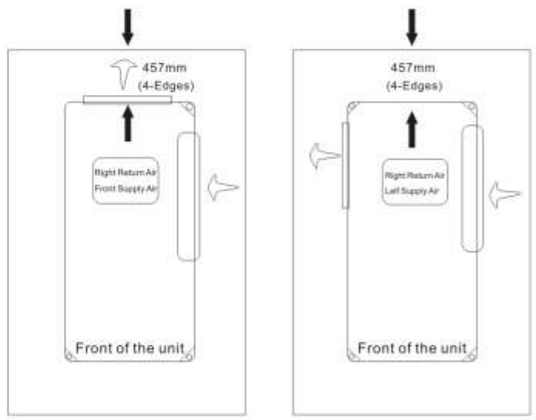
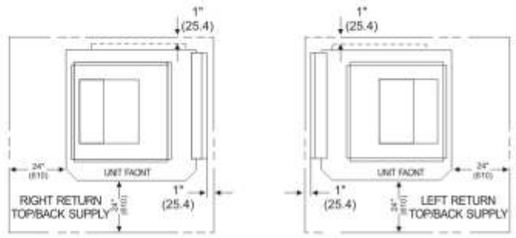


Figure 4 Vertical Unit Service Clearance



Installation and checklist

Installation checklist

Installation completed,check with the checklist to assure all its items are followed. DO NOT SKIP THE CONTENT OF MANUAL AND READ THIS CHECK LIST AS THE ONLY GUIDE.THE INSTRUCTIONS IN THIS MANUAL MUST BE FIRMLY CONFORMED.

1.Inspect the received unit carefully to assure damage free and parts as ordered before signing on the shipping papers.

2.Inspect the unit and its accessories to assure voltage accordance with unit nameplate.

3.Unload all accessories from unit cartons for field installation,typically including filter frame,duct opening,filter and etc..

4.Check the installation site and make sure required service and ventilation space around the unit.

5.Open the service panel and inspect the unit.Refrigerant tubes should be away from neighborly parts for some distanee.Wiring on the control box should be firmly fixed.

6 .Field made duct installation.Duct should be firmly placed and with untrapped discharge

7.Condensate hose and trap installation should be firmly Placed for fluent drainage.

Warning Cut off the power source and remote disconnect switch and lock them in that condition before any installation or service performed in case of sudden power-on. Or body hurt and death of personnel will be resulted.

8.Make sure power supply in accordance with nameplate data.

9.Inspect the field wiring to assure clean and firm connection.

10.Disconnect switch is field supplied and connected to the main power supply with cord of adequate diameter and protection level.

11.Check unit grounding state. Current and local codes must be firmly abided by for unit grounding.

Installation

Supply hose connection

A closed flexible adaptor is field-supplied for duct connection in case of sound diffusion,detailed in Figure 5.A elbow with viable blade or recommended to attenuate noise and decrease static pressure loss due to torrent current.

Figure 5 Supply hose connection diagram

Return hose connection

A closed flexible adaptor is field-supplied for duct connection in case of sound diffusion, as shown in Figure 6.A elbow with viable blade or baffles is recmmended to attenuate noise and decrease static pressure loss due to torrent current.

Caution NO unit operation allowed prior to filter installation.

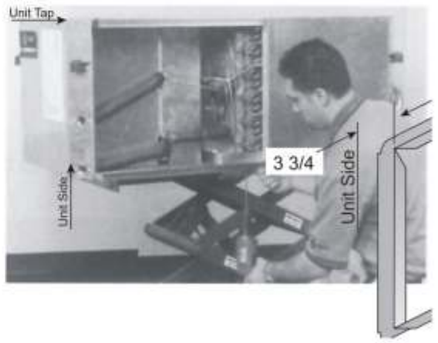
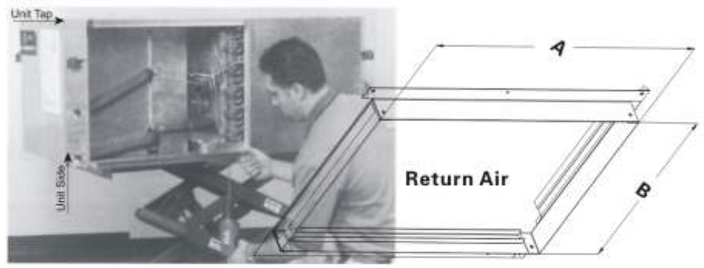


Figure 6 Return hose connection diagram

Return duct opening panel

A return duct opening frame is added to the return opening for horizontal unit to alternate between direct air return and air return from the return duct. In lieu of filter rack, duct opening panel can be equally sealed. Duct flange is used for field piping ease, as shown in Figure 8.

Figure 7 Duct Opening Frame Diagram



Duct opening sizes

Model	Return air duct opening	Supply air duct opening
	A*B(mm)	A*B(mm)
GEHC 012	352*306	297.5*258
GEHC 024	512*334	300*300
GEHC 030	532*426	356*357
GEHC 036		
GEHC 048	752*426	356*357
GEHC 060		

Alternate supply installation

Follow procedures hereafter to easily alternate air supply, back supply to left supply as shown.

Step1Cut off power source

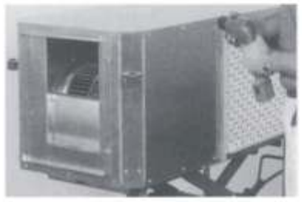
Warning

Disconnect power source before service,or severe body hurt or death of personnel will occur.

Step 2 Remove the fan motor wiring plug

Step3 Loosen the screw fixing fan assemblies to the unit

Step 4 Remove the side panel on the left



Step 5 Remove fan assemblies

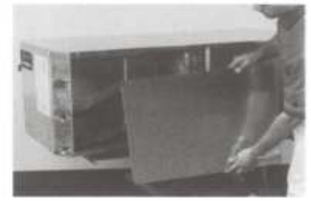
Step 6 Revolve the fan assemblies by 180 degree and slip it carefully into the supply plenum. No revolution is needed for right return.

Note: Service opening must be set aside for the reconfigured unit.

Step 7 Fix the fan assemblies

Step 8 Connect the fan motor plug

Step 9 Bolt the left panel removed before to the back of unit



Four-speed motgor wiring color

Motor speed	High	Mid High	Mid Low	Low
Wire color	Red	Blue	Black	Brown

Pull out the void cord on the motor relay and cut from the end then insulated in case of short circuit.

Attenuation pad

For units operating in a noise sensitive environment, an attenuation pad is field supplied and installed under the unit, twice of the size of footprint for horizontal unit and same size for vertical unit with a thickness of 1/2"

Installation and checklist

Concealed installation for horizonta unit

Following procedures hereafter for horizontal unit installation.Figure 9 shows unit rigging.

1.Furnish attenuation pad around the four rigging bracket at unit return section.

2.Safely suspend the unit with bolt 3/8″in size from building supporting framework like joist cement backbone and any other capable constructs. Each rigging bracket must be fixed with field supplied bolt and lock gasket.

3.It's the contractor responsibility to determine on unit pitch in accordance with local codes.A pitch toward the drain discharge must be 2%in slope from at least two dimensions.

Warning A capable suport must be used for unit to suspend from，or serious body hurt/death of personnel or damage to unit will occur.

Condensate drain

Hose with female thread size of 1/2" is used for drain discharge. Install water trap at proper location of unit pipeline.What is important and must be taken into account for trap design of water source heat pump system is the influence of minus pressure.For unit in normal operation with a well-designed trap,water column in the trap will rise until a stable discharge is formed.There must always be water in the trap especially in seasons when hot supply is required.Regular clean the trapped pipeline to ensure fluent discharge.Negative pressure system with water trap is typically shown in Figure 10.

Caution Caution Drain hose must have a pitch of three to five degrees towards the discharge direction for the convenience of water drainage.

Supply/return hose connection

Supply/return flexible hose is connected to the water in/out of the unit.In lieu of rigid connection,steel braided flexible hose is recommended for use in the main water circuit to isolate vibration. A water circuit is connected with self balance flexible hose in Figure11.For a typical open circuit,water filter is used to shut the access of foreign materials to coaxial heat exchanger.

Clean and flush of water circuit

A thorough clean and flush schedule must be performed to the water circuit before connecting to the unit.

Or pollutants will enter the system resulting in prompt block, ice formation and unit malfunction.The same clean process must be done to field connecting tubes as well.

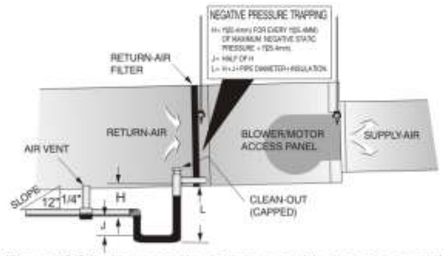


Figure10 Design sample of system with trap for negative pressure

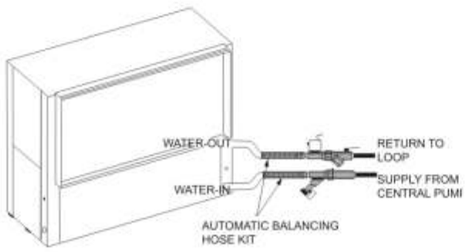


Figure 11 Supply/Return hose connection diagram

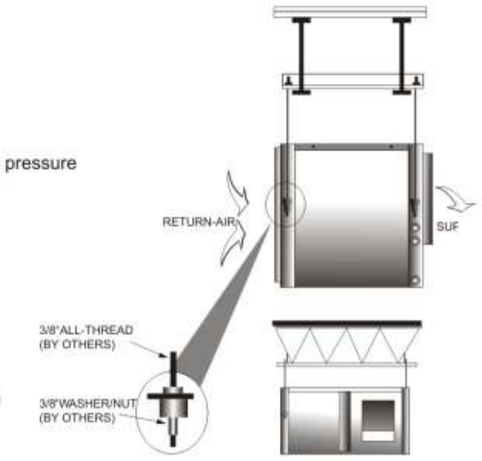


Figure 9 Ceiling mounting diagram for horizontal unit

TRANE

Installation and checklist

Water supply/return system design

Unit main water system design is optional from central and distributed model.

CENTRAL WATER SUPPLY SYSTEM is charaeterized as a system with a single pump typically furnished in the cell or machine room which is responsible for the supply/return water for the whole building and may be superseded by a backup pump in time of malfunction.

A typical central water supply system is shown is Figure 12 and charaeterized as hereafter.

1.Connect supply/return joint components to according unit hoses.Trane has a variety of composition of joint components for the best regulation of water system balance. Flexible connection is always used to alleviate and isolate vibfation rom the rigid main pipeline.

2.High voltage wiring is at the left corner of unit,where a wiring hole is reserved.

3.Connect to line voltage disconnect switch,which id field supplied.

4.Supply/return pipeline of a central water supply system must be sized capable of providing adequate flow rate when system operates at pressure loss minimum.

Caution Supply/return water pipeline will sweat with water flow in low temperature.When designed to operate in temperature lower than 16°C,pipe sweat must be avoided with a insulation coat.

5.For installation in noise-sensitive places,a horizontal layer of noise-proof glass fibre 6" in thickness and two size of unit base must be padded beneath the unit to attenuate operation noise.

DISTRIBUTED WATER SUPPLY SYSTEM is characterized as a system with either a single pump or a couple of pumps,which connect directly to supply/return hose. Each pump in such a system must be special in size for use in one location of water source heat pump system.Figure13 shows a typical distributed water supply system,which is characterized as the following.

1.Pipe connections are used to connect between unit water in/out and system supply/return pipe.Trane has a variety of pipe connections for better regulation of water system balance. Flexible joint pipe is always used to alleviate and isolate vibration from the main water pipeline.

2.High voltage wiring is at the left corner of unit, where a wiring hole is reserved.

3 .Connect to line voltage disconnect switch，which is field supplied.

4.A independent pump supply system is constructed with pump and relative flexible pipes. Each pump device is a whole assembly ready to connect to water and electricity system，which is designed with flow rate maximum of 1.3L/s according to some practical requirements.

5 . Supply/return pipeline of a central water supply system must be sized capable of providing adequate flow rate when system operates at pressure loss minimum.

Caution Supply/return water pipeline will sweat with water flow in low temperature. When designed to operate in temperature lower than 16°C, pipe sweat must be avoided with a insulation coat.

6 .For installation in noise-sensitive places，a horizontal layer of noise-proof glass fibre 6" in thickness and two size of unit base must be padded beneath the unit to attenuate operation noise.

Figure 12 Design sample of central water supply system

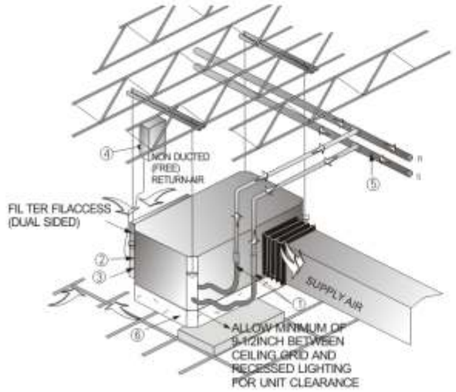
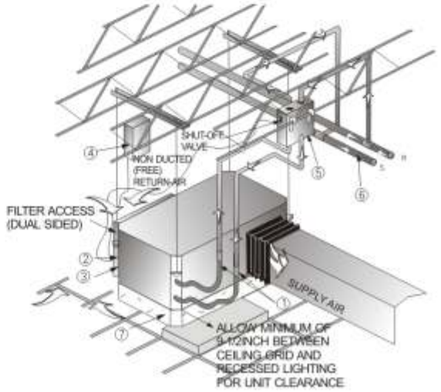


Figure 13 Connection sample of distributed water supply/return system



Field wiring

All wiring and grounding must be in accordance with national and **local codes**. **Trane shoulder no** liability for installation performed by **unqualified personnel**.

Warning In the process of installation, debugging,servicing and repairing, when power-on operation is required, it must be performed by qualified and special trained personnel.Or severe body hurt and even death of operator will result from electric shock.

Wiring safety precautions

1.Check the accordance of electric parameters on the nameplate and unit power specification.

2.A disconnect switch must be provided at the job site and installed above or adjacent to the unit.

3.Cooper wire only.Other kind of wire will damage the unit.

4.Safety grounding is required for all the units.

5.High voltage wire is connected firmly and reliably to the control box thru reserved hole on the shell.

Temperature controller installation

Temperature controller must be furnished at well-ventilated better average temperature indicated locations, excluding back door or corner, cool/heat duct adjacency, radiator neighbor like direct sunshine places, concealed duct or chimney adjacency, outdoor wall or un-conditioned area,other unit neighbor or conditioned area supply outlet.See Figure 14 for the detail.

Wire controller

a. Wire controller can be set on the 86 type of base box, which is installed align to the wall.

b.Thread the communication shield wire thru the reserved hole on the base of the wire controller,which is then fixed on the selected place.

c.Connect the communication shield wire on the according terminals,as shown in Figure 17.

d.Close the controller cover.

Connection to the main unit

a.Open the control box.

b.Connect power line and control line firmly according to unit wiring diagram.

c.Connect shield wire of wire controller to according terminals on the main unit control terminal, as shown in Figure 16.

d .Close the control box.

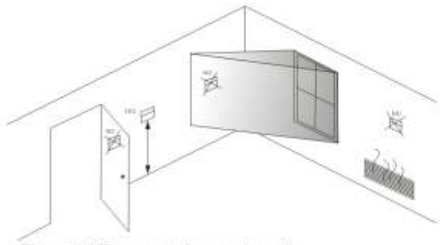


Figure 14 Thermostat/sensor Location

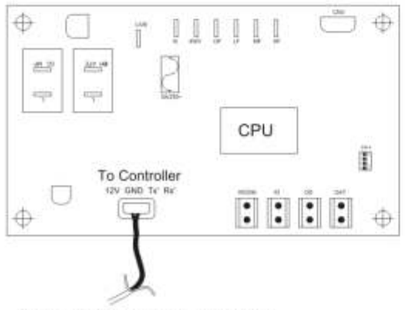


Figure 16 Main unit control board

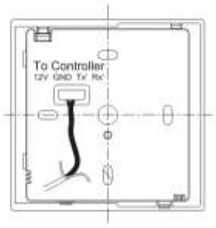


Figure 17

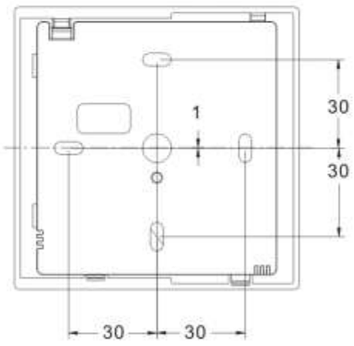
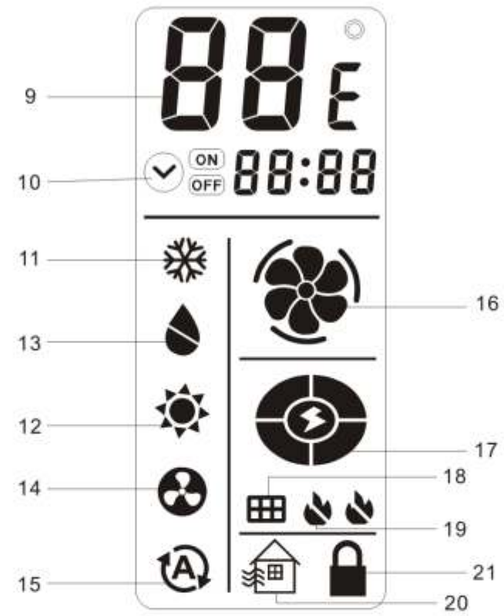


Figure 15 Wire controller base framework

Control panel operation guide

Figure 18 Control panel



Note

1.For description only. Difference may occur from actual controller.

2.Unit will do null when no option is provided for a function.

Control panel operation guide

Fuctions		LCD display	
1	Power Button	9	Temperature Display
	Power on/off shift.		Display temperature set value
2	Temperature Set/Change Button	10	Time&Timer Display
	This button set is for temperature/time setting.Temperature range 15-30°C.		Display current time. Display a cycle of power-on time, power-off time and current time when press query button.
3	Speed set/Fresh air Button	11	Cool mode
	Press this button to shift among fan speed of H/M/L/Auto. If fresh air valve is provided，press this button for 5s will start fresh air function，press another 5s will stop it.	12	Heat mode
4	Set/Reset Button	13	Dehumidify mode
	Unit parameter setting,password required.Press this button to reset when error occurs,but if error still exists,system will alarm.When filter need changing,press to reset.	14	Vent mode
5	Timer Button	15	Auto mode
		16	Fan speed
	Press this button to shift/set among Time on/off.Time on only,Time off only，Caneel Timer.	17	Compressor state
			Blank when compressor closed and nothing when power-off.
6	Time set/view Button	18	Filter clean state Display
	Press this button to view/set current time,timer on a 24 hour basis．In each condition,press Up/Down button to change temperature/time within 5s.	19	Auxiliary electric heater Display
7	Mode selection Button	20	Fresh air fuction Display
	Press this button to shift among Cool/Heat/Vent/Dehumidify/Auto modes.	21	Controller lock Display
8	Parameters view	9	Error code Display
	Press this button to view the following parameters,water in/out temperature,indoor temperature,coil temperature，max/min water in temperature for cool/heat mode，min water supply for heat mode,min coil temperature for cool mode，max coil temperature for heat mode.		When system error，service required or protections work the screen will display in the Time area the error code with a flashbackground light error number in the Hour/Minute area and with three minute beeping. When unit power off or error corrected,it will return to normal.

LCD symbols detail

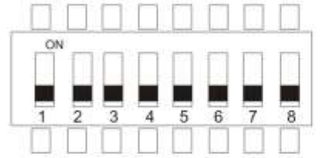
	Icon Description					Note
COMP state	Stop	Running				
Mode	Cool	Heat	Dry	Vent	Auto	
Timer	Time	Timer start	Timer stop			
Fan speed	Low	Middle	High	Auto		Animation
Fresh air						
Miscellaneous	Filter dirty notice	AEH				
Unit lock						

Control panel operation guide

UCM controller DIP Switch function setting

DIP Switch SW1 contains eight switches for addressing the UCM. These switches allow a user to set a unique communication address for each UCM. Each UCM on a given communication link must have a unique address in order for Trane variable water flow system central controller.

DIP Switch SW2 contains eight switches for definition the functions of the UCM. It is mean to 1 when the switch is at ON position, and it is mean to 0 when the switchis at OFF position.



Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit8
Mode		C/H	Ambient	Type		Alarm	ON/OFF

Bit 1&2 is setting the Mode:

00 Working mode (default)

01 Working mode with data view function

10 System service mode

11 API mode

Bit 3 is setting the C/H:

0 Thermostat valid

1 Thermostat invalid

Bit 4 is setting the Ambient:

0 Use the return air temperature sensor for room temperature

1 Use the thermostat for room temperature

Bit 5&6 is setting the Type:

00 Heat pump with electric heater option

01 Heat pump option

10 Cooling only with electric heater option

11 Cooling only option

Bit 7 is setting the Alarm :

0 Failure output invalid (default),

1 Failure output valid except for unit with electric heater option

Bit 8 is setting the On/off:

0 Remote controller invalid (default)

1 Remote controller valid

Control panel operation guide

Thermostat DIP Switch define

Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1
Void	Flow	Void	Spare	Spare	Spare	Spare	Auto

DIP Switch in the thermostat contains eight switches for definition the functions of the thermostat. It is mean to 1 when the switch is at ON position, and it is mean to 0 when the switch is at OFF position. There are only Bit1 and Bit 7 with functions.

Bit 1 is setting Auto:

0 Manual start up when power restores（Default）

1 Auto start up when power restores（Unit at working state when power cut）

Bit 7 is setting Flow:

0 Flow switch protect" invalid（Default）

1 Flow switch protect" valid （When water pump stop after 30S，if the flow switch close still, warning occur）

Use the parameter view button in thermostat to read the parameter below :

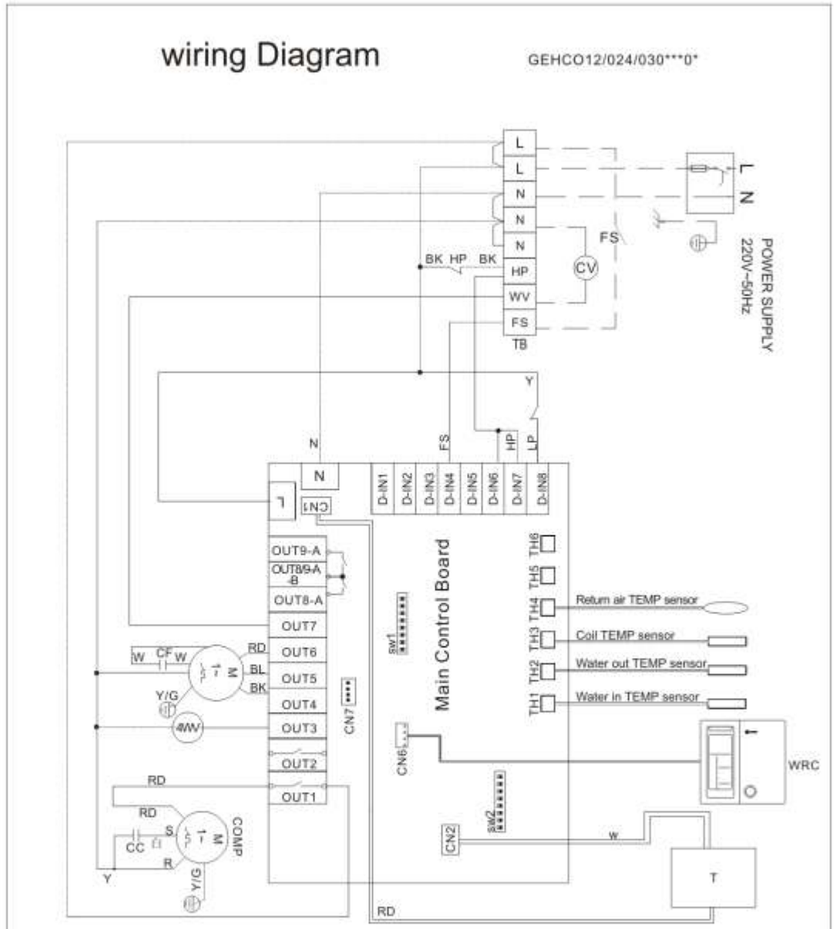
ID Display	Parameter description
082	Water inlet TEMP
083	Water outlet TEMP
084	Environmental TEMP
085	Coil TEMP
129	Software version
128	Network node number

Thermostat failure code display :

Thermostat failure code	Failure description
EE	Thermostat and controller communication failure
ED	Centralize controller and controller communication failure
7E	Return air temperature sensor failure
80	Coil temperature sensor failure
84	Water inlet temperature sensor failure
85	Water outlet temperature sensor failure
6D	Condenser lack of water flow failure
6E	Water overflow protect
97	Enter water temperature over high protection
96	Enter water temperature over low protection
92	Outlet water temperature over low protection
AP	Coil temperature over low protection
98	Coil temperature over high protection
AA	Cooling function failure
AB	Heating function failure
64	High pressure protection
66	Low pressure protection
8F	Freeze-proofing alarm
AP	Enter freeze-proofing alarm

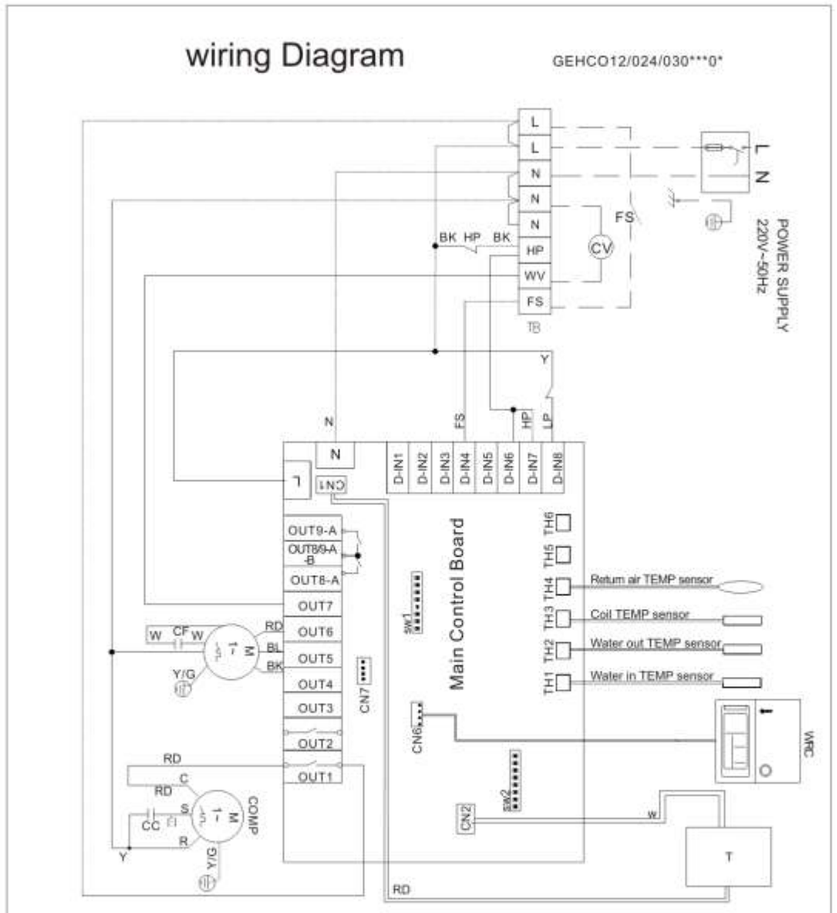
NOTE : **Panel display Eg after UNIT stop when remote control mode valid**

Wiring diagram



COMP	Compressor	T	Transformer	HP	High pressure switch	C	Commom
LF	Low speed	L	Live line	LP	High pressure switch	R	Run winnding
MF	High speed	N	Neutral line	CV	Water valve	S	Start winnding
HF	High speed	FS	Flow switch	TB	Terminal board	4WV	Reversing valve
CC	COMP cspacitor	WRC	Thermostat	W	White wire	⏚	Ground
FC	Fan capacitor	M	Fan motor	BK	Black wire	———	Factory wiring
PD	Rwd wire	Y	Yellow wire	Y/G	Ground line	— —	Field wiring
WV	WV Terminal	BL	Blue wire	A-V	Spare Teiminal		

Wiring diagram



COMP	Compressor	T	Transformer	HP	High pressure switch	C	Commom
LF	Low speed	L	Live line	LP	Low pressure switch	R	Run winnding
MF	Middle speed	N	Neutral line	CV	Water valve	S	Start winnding
HF	High speed	FS	Flow switch	TB	Terminal board	4WV	Reversing valve
CC	COMP cspacitor	WRC	Thermostat	W	White wire	⏚	Ground
FC	Fan capacitor	M	Fan motor	BK	Black wire	———	Factory wiring
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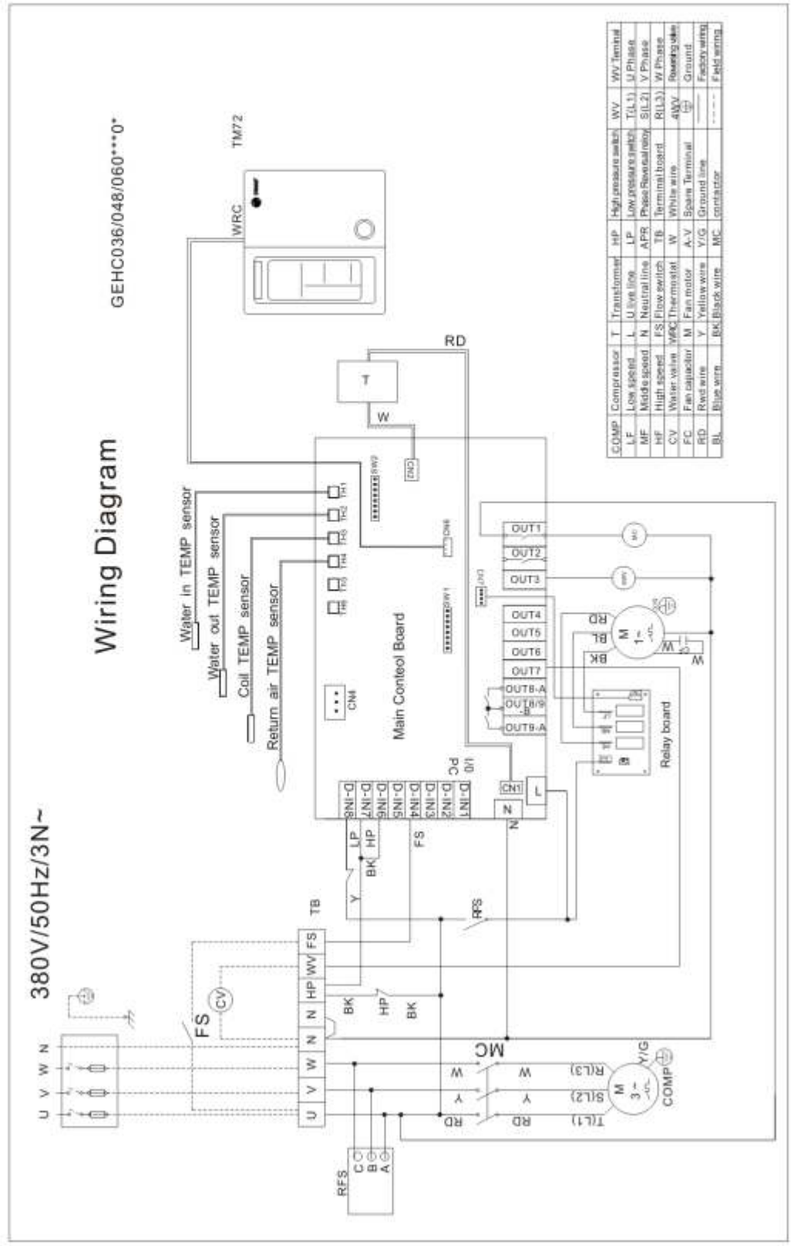
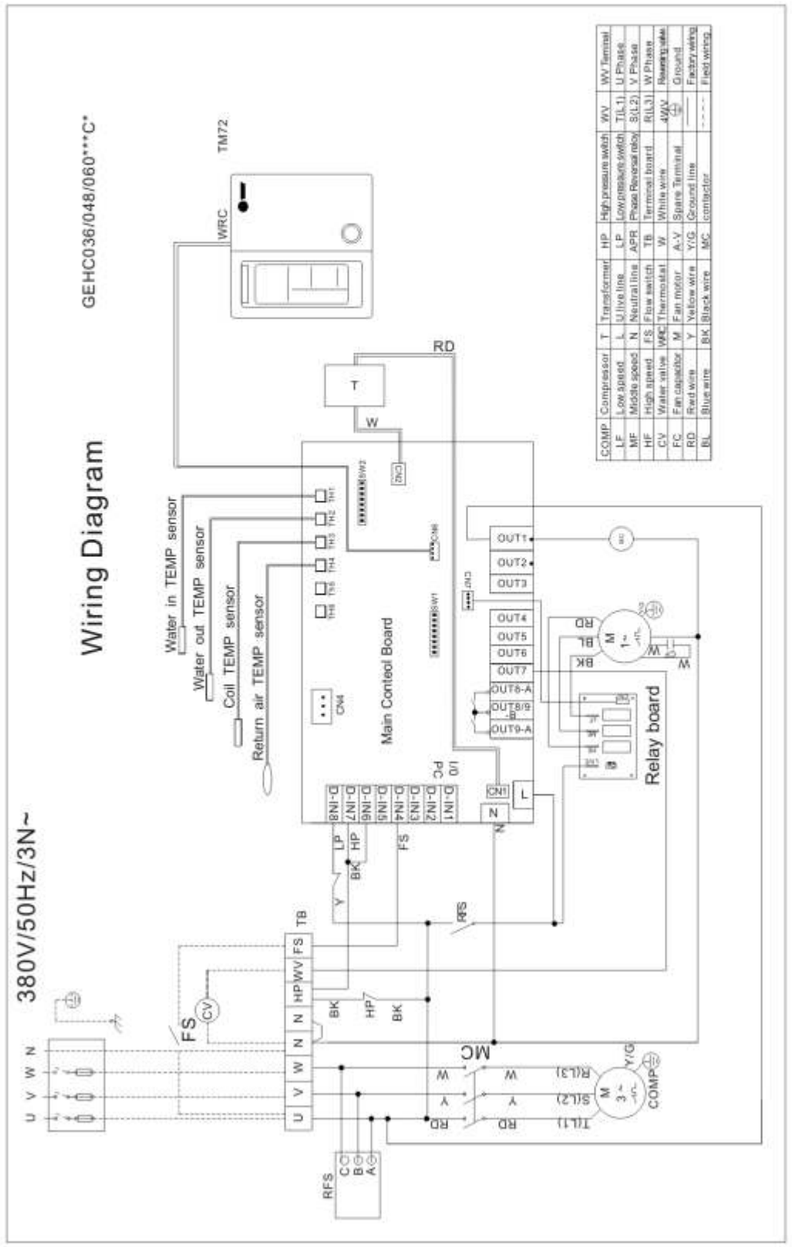


Wiring diagram



Start-up and operation

Preliminary checks before start-up

Before proceeding with a start-up of individual units, the following steps should be verified:

- High voltage power is correct and in accordance to nameplate.
- Correct unit phase and compressor revolving direction(scroll compressor only).
- Wire size adequate for protection.
- Wiring correct in accordance with wiring diagram provided.
- Check water circuit cleanness, rightness and completeness. Clean and flush the unit according to suggestions listed in installation manual for water source heat pump.
- Vibration isolator, to name a few, attenuation pad, flexible connections and etc..
- Adequacy of service and supply/ return clearance.
- Rightness of temperature valve cap in high/low pressure pipeline.
- Temperature controller in OFF position.
- Water can flow fluently in the water circuit.
- Reliability of condensate drainage.
- Rightness of temperature controller wiring and installation site.
- Normal revolution and no friction for fan.
- Accordance of installation and grounding with national and local codes. Existence of anti-freeze additive to close system in case of heat exchanger frozen.

Unit start-up procedures

1. Maximize controller temperature set value.
2. Set system as COOL, fan as AUTO on temperature controller. Compressor don't run.
3. After compressor, reversing valve, solenoid valve and circulating pump energized, decrease temperature set value. Then regulate flow rate by revolving the pressure/temperature bolt as recommended in the water pressure loss table. As unit running, water out temperature surpluses water in temperature by five to seven degrees, fan operates stably, current of compressor and fan varies within nameplate current range, and no frost forms at the cool suction of refrigerant circuit.
4. Set temperature controller power switch to OFF. Then unit stops running and reversing valve de-energized.
5. Operate the unit for five minutes until system balance acquired.
6. Minimize controller temperature set value.
7. Set system as HEAT on temperature controller.
8. Increase temperature set value till unit starts running. Then hot gas will supply, water out temperature of heat exchanger will decrease three to five degrees, fan and compressor operates stably and no frost forms around the refrigerant circuit.
9. Change temperature set value as required.
10. Instruct customer on operation procedures.

Maintenance

Preventive Maintenance

Maintenance on the unit is simplified with the following preventive suggestions:

1.Clean the filter regularly for good performance. Check the filter every three months and replace it promptly when dirt.

Filter size

Unit Model	Filter size(mm)
012	348×302
024	508×330
030-036	528×422
048-060	748×422

2.Evacuate the coaxial heat exchanger for long term stop like winter in case of frozen.

Inspect the contactor switch and relay in the control box annually to assure firm connection of control circuit.

In open system water filter of sixty holes or more per spuare centimeter must be installed in case of foreign materials entrance to heat exchanger. If well water is used, measures must be taken to keep it clear and clean. On deposit formation resulting from polluted or bad quality water, only experienced and qualified personnel can perform chemical clean-up.

Inspect at constant intervals water quality shown in the following table.

Water quality table

Deposit	
Calcium and magnesium(total solidity)	Less than 350ppm
Rust	
PH	7-9.5
H2S	Less than 1ppm
Sulphate	Less than 25ppm
Haloid	Less than 152ppm
Carbon dioxide	Less than 75ppm
Total dissolved solid	Less than 1000ppm
Bacteria	
Steel germ	Low
Corrosion	Low
Suspended solid	Low

Troubleshooting

Problem	Heating	Cooling	Cause	Correction
No response to any thermostat setting	X	X	Main power off	Check fuses
	X	X	Defective control transformer	Replace
	X	X	Broken or loose connection	Repair
	X	X	Defective thermostat	Replace
Unit short cycles	X	X	Thermostat improperly located	Relocate
	X	X	Defective compressor overload	Replace
	X	X	Heat anticipator setting	Adjust
Blower runs but compressor does not	X	X	Defective compressor overload	Replace(if external)
	X	X	Defective compressor contactor	Replace
	X	X	Defective lockout relay	Replace
	X	X	Supply voltage too low	Correct
	X	X	Defective compressor capacitor	Replace
	X	X	Defective windings	Replace
	X	X	Limit switches open	Check cause/Replace
	X	X	Seized compressor	"Bump off" with start capacitor/replace
Insufficient capacity	X	X	Dirty filter	Replace/clean
	X	X	Blower RPM too low	Correct
	X	X	(1-phase)blower running backward	Checking wiring at capacitor
	X	X	Loss of conditioned air due to leaks in ductwork	Repair leaks
		X	Introduction of excessively hot return air	Correct
	X	X	Introduction of excessively low return air	Correct
	X	X	Low on refrigerant charge	Locate leak, repair and recharge
	X	X	Cap/tube strainer or expansion valve is restricted	Replace
	X	X	Defective reversing valve	See Touch Test Chart
	X	X	Thermostat improperly located	Relocate
	X	X	Unit undersized	Recalculate heat gains/losses
	X	X	Inadequate water flow	Increase GPM
	X	X	Scaling in chiller	Clean or replace
		X	Water too hot	Decrease temperature
	X		Water too cold	Increase temperature
High pressure switch open		X	Inadequate GPM	Increase
		X	Water too hot	Decrease temperature
	X		Inadequate air flow	Check, clean blower and coil
	X		Dirty filter	Clean/replace
	X	X	Overcharged with refrigerant	Decrease charge
	X	X	Defective pressure switch	Check replace
High head pressure		X	Trash in chiller	Backflush
		X	Low water flow	Increase GPM
	X	X	Overcharged with refrigerant	Decrease charge
	X	X	Non-condensibles in system	Evacuate and recharge
	X	X	Water too hot	Decrease temperature
	X		Dirty filter	Clean/replace
	X		Inadequate air flow	Check, clean blower and coil
Low suction pressure	X	X	Undercharged	Locate leak, repair and recharge
	X	X	Restricted metering device	Repair/replace
		X	Inadequate air flow	Check, clean blower and coil
		X	Dirty filter	Clean/replace