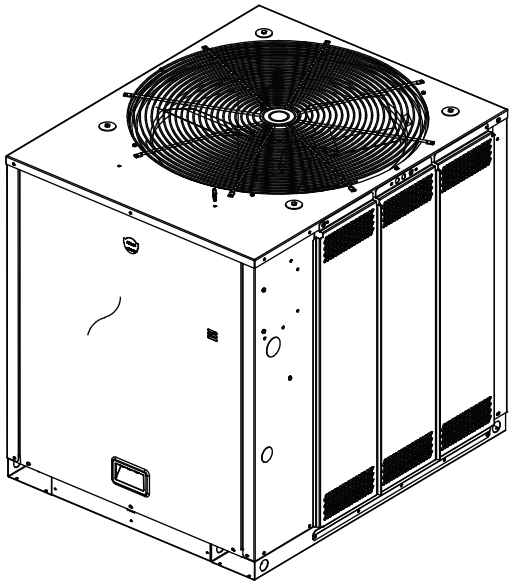
Service Facts

Split System Cooling Condensers

Single Compressor, R-410A



TTA120D300AA	TTA120DK00AA	TTA120D3H0AA	TTA120DKH0AA
TTA120D30RAA	TTA120DK0RAA	TTA120D3HRAA	TTA120DKHRAA
TTA120D30SAA	TTA120DK0SAA	TTA120D3HSAA	TTA120DKHSAA
TTA120D30TAA	TTA120DK0TAA	TTA120D3HTAA	TTA120DKHTAA
TTA120D30UAA	TTA120DK0UAA	TTA120D3HUAA	TTA120DKHUAA
TTA120D30WAA	TTA120DK0WAA	TTA120D3HWAA	TTA120DKHWAA
TTA120D400AA	TTA120DW00AA	TTA120D4H0AA	TTA120DWH0AA
TTA120D40RAA	TTA120DW0RAA	TTA120D4HRAA	TTA120DWHRAA
TTA120D40SAA	TTA120DW0SAA	TTA120D4HSAA	TTA120DWHSAA
TTA120D40TAA	TTA120DW0TAA	TTA120D4HTAA	TTA120DWHTAA
TTA120D40UAA	TTA120DW0UAA	TTA120D4HUAA	TTA120DWHUAA
TTA120D40WAA	TTA120DW0WAA	TTA120D4HWAA	TTA120DWHWAA

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Warnings, Cautions and Notices

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

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

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully.

⚠ **WARNING**: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

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

Important Environmental Concerns!

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

Responsible Refrigerant Practices!

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

⚠WARNING
Contains R-410A Refrigerant!

System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives. Use ONLY R-410A rated service equipment or components with this unit. For specific handling concerns with R-410A, please contact your local Trane representative. Failure to use R-410A rated service equipment or components and/or failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to appropriate MSDS and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA70E for arc/flash protection PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

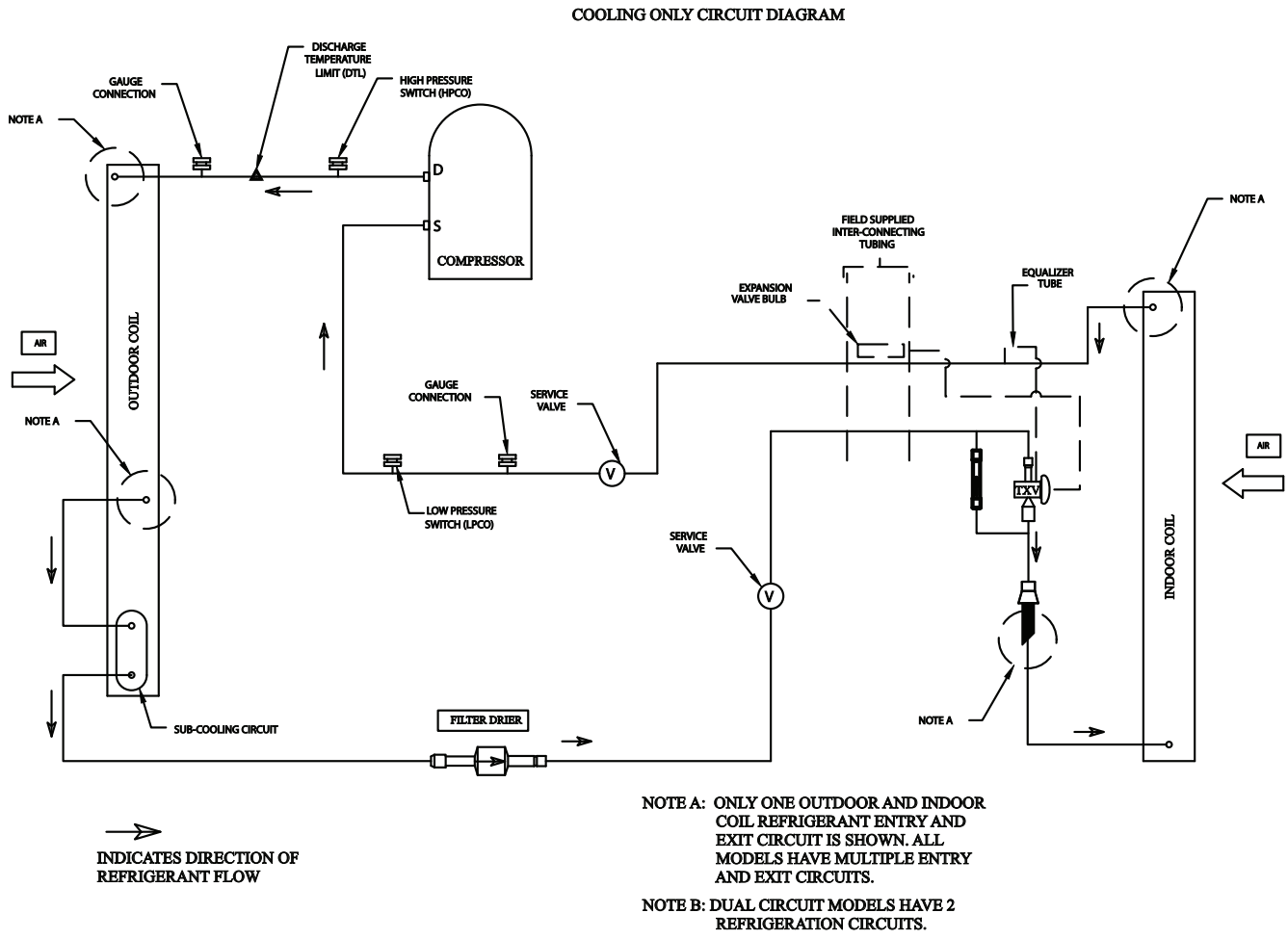
Accessories

Table 1. List of Available Accessories - TTA120D

MODEL	USED WITH	DESCRIPTION
Coil Guard		
BAYGARD059A	TTA120D	Hail Guard
HOT GAS BY-PASS		
BAYHGBP010A	TTA120D	Universal Hot Gas Bypass Kit
Trane Communication Interface		
BAYICSI003A	TTA120D	Comm 3/4 Communications Interface
Isolators		
BAYISLT005A	TTA120D	Rubber Isolator Kit
BAYISLT023A	TTA120D	Steel Spring Isolator Kit
Low Ambient		
BAYLOAMU02A	TTA120D	On/Off Fan Control Mounted in Unit Control Box (large cabinets)
BAYLOAM333A	TTA120D3	Modulating P-66 Head Pressure Control w/ 208-230V 1 HP Hi-Eff Motor (external mount)
BAYLOAM433A	TTA120D4	Modulating P-66 Head Pressure Control w/ 460V 1.0 HP Hi-Eff Motor (external mount)
LonTalk Communications Interface		
BAYLTCI002B	TTA120D	LonTalk Communications Interface
Time Delay Relay		
BAYRLAY002	TTA120D	Time Delay Relay

Refrigerant Circuit

Figure 1.



Product Specifications

Table 2. General Data — TTA120D

	10 Tons
	Single Compressor TTA120D3, D4, DW, DK
Cooling Performance	
Gross Cooling Capacity	
Matched Air Handler	124,000
Condensing Unit Only	112,000
ARI Net Cooling Capacity	120,000
Efficiency	
Matched Air Handler (EER)	11.2
Condensing Unit Only (EER)	12.2
System Integrated Part Load Value (IPLV)	N/A
System (IEER)	12.2
Condensing Unit Only (IPLV)	N/A
System kW/Condensing Unit kW	10.72/9.18
Compressor	
Type	Scroll
No./Tons	1/8.6
System Data	
No. Refrigerant Circuits	1
Suction Line (in.) OD	1 3/8
Liquid Line (in.) OD	1/2
Outdoor Coil - Type	Lanced
Tube Size (in.) OD	0.375
Face Area (sq ft)	24.0
Rows/FPI	2/18
Outdoor Fan - Type	Propeller
No. Used/Diameter (in.)	1/28
Drive Type/No. Speeds	Direct/1
CFM	9600
No. Motor/HP	1/1
Motor RPM	1100
Refrigerant Charge (Field Supplied)	
(lbs of R410A)	22.5

Table 3. Estimated charge levels at ARI rated line lengths (25 feet)

	Refrigerant Charge		**Per Circuit**	
Matched Set	**Circuit 1**	**Circuit 2**	**Liquid Line Diameter**	**Vapor Line Diameter**
TTA120D w/TWE120D	22.5	NA	0.5	1.375

NOTICE

Refrigerant in Crankcase!

Do not disconnect power except for safety or service. Follow these procedures prior to startup if unit has been charged or power has been disconnected for more than 12 hours. If system has just been charged through liquid line service valve port, an 8 hour compressor oil warming time is not required.
Set room thermostat to "OFF" position and ensure compressor is not running.
Apply power for at least 8 hours prior to startup by closing disconnect switch. This will energize compressor oil heater which will evaporate any liquid refrigerant in crankcase. After 8 hours the thermostat may be set to cooling.
Failure to follow the above could result in equipment damage.

Sequence of Operation

NOTICE

Equipment Damage!

Ensure the disconnect for the indoor air handler is closed before operating the system. Operating the outdoor unit without the indoor fan energized can cause unit trip-out on high pressure control and/or liquid flood back to the compressor.

Electromechanical Controls

General

Operation of the system cooling (and optional heating) cycles is controlled by the position of the system switch on the room thermostat. Once the system switch is placed in either the **HEAT** or **COOL** position, unit operation is automatic. The optional automatic changeover thermostat, when in the **AUTO** position, automatically changes to heat or cool with sufficient room temperature change.

Evaporator Fan (Indoor Supply Air)

The evaporator fan is controlled by an **ON/AUTO** switch on the room thermostat. With the switch positioned at **AUTO** and the system operating in the cooling mode, fan operation coincides with the cooling run cycles. If the system is equipped with heat and is operating in the heating mode while the fan switch is at **AUTO**, fan operation coincides with the heating run cycles. When the fan switch is positioned at **ON,** fan operation is continuous.

Cooling Mode

With the disconnect switch in the **ON** position, current is supplied to the compressor sump heater(s), phase monitor and control transformer. The sump heater(s) supplies heat to the compressor(s) during the **"Off"** cycle. The phase monitor looks at the incoming power to verify that there is no reversed phase, no phase imbalance, and no loss of phase. If the phase monitor detects any of these three conditions, it will shut off control voltage. The transformer steps down the line voltage to 24V for the low voltage control circuit. When the room thermostat system switch is positioned at **COOL** and the fan switch is at **AUTO**, the compressor contactor energizes on a call for cooling. When the contacts of the compressor contactor close, operation of the compressor and condenser fan begins. The evaporator fan contactor also energizes on a call for cooling and initiates evaporator fan operation.

On units with dual circuits, the second stage of cooling is initiated as a result of the 2-stage thermostat calling for additional cooling.

ReliaTel™ Controls

The ReliaTel™ Controls is a microelectronic control feature, which provides operating functions that are significantly different than conventional Electromechanical units. The ReliaTel™ Refrigeration Module **(RTRM)** uses Proportional/Integral control algorithms to perform specific unit functions that govern the unit operation in response to application conditions.

The RTRM provides compressor anti-short cycle timing functions through minimum **"Off"** and **"On"** timing to increase reliability, performance and to maximize unit efficiency. Upon power initialization, the RTRM performs self-diagnostic checks to ensure that all internal controls are functioning. It checks the configuration parameters against the components connected to the system. The system LED located on the RTRM module is turned **"On"** within one second after power-up if all internal operations are okay.

ReliaTel™ Control Cooling Mode

For Zone Sensor Control

When the system switch is set to the **COOL** position and the zone temperature rises above the cooling setpoint, the RTRM energizes the compressor contactor, provided the high and low pressure and the discharge temperature limit controls are closed. When the compressor contacts close, the compressor and the outdoor fan motor start to maintain the zone temperature to within ± 2°F of the sensor setpoint at the sensed location. On units with dual circuits, the second stage of cooling is initiated as a result of the Proportional/Integral control algorithms calling for additional cooling.

For Thermostat Control:

When the room thermostat system switch is positioned at **COOL** and the fan switch is at **AUTO**, the RTRM energizes the compressor contactor, provided the high and low pressure and the discharge temperature limit controls are closed. When the contacts of the compressor contactor close, operation of the compressor and condenser fan begins. The evaporator fan contactor also energizes on a call for cooling and initiates evaporator fan operation. On units with dual circuits, the second stage of cooling is initiated as a result of the 2-stage thermostat calling for additional cooling.

Note: *Irregular unit operation may occur when the unit is controlled with a triac-switching thermostat. Please review the approved thermostat vendor list for all recommended relay-switching thermostats.*

ReliaTel™ Control Evaporator Fan Operation

When the fan selection switch is set to the **AUTO** position, the RTRM energizes the evaporator fan relay coil approximately 1 second after energizing the compressor contactor coil in the cooling mode. In the heating mode, the RTRM energizes the evaporator fan relay coil approximately 1 second before energizing the electric heat contactors. The RTRM de-energizes the evaporator fan relay coil approximately 60 seconds on dual compressor units and 80 seconds on single compressor units after the cooling requirement has been satisfied to enhance unit efficiency. When the heating cycle is terminated, the evaporator fan relay coil is de-energized at the same time as the heater contactors. When the fan selection switch is set to the **ON** position, the RTRM keeps the evaporator fan relay coil energized for continuous fan motor operation.

ReliaTel™ Control Heating Operation

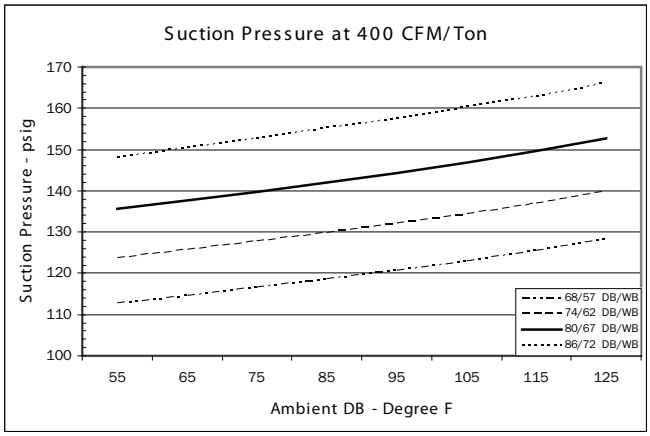
Electric heat is factory disabled on all split system units with ReliaTel control (jumper placed between J2-1 and J2-2 RTRM inputs). To configure the unit for electric heat, cut or remove the jumper wire between J2-1 and J2-2 on the RTRM. All split system units with ReliaTel control are also configured from the factory for only 1-stage of electric heat (jumper placed between J1-3 and J1-6 RTRM inputs). To configure the unit for 2-stages of electric heat, cut or remove the jumper placed between J1-3 and J1-6 RTRM inputs.

When the system switch is set to the **HEAT** position and heating is required, the RTRM energizes the Heat 1 relay coil on the RTRM. When the Heat 1 relay contacts close, the first stage electric heat contactor is energized. If the first stage of electric heat cannot satisfy the heating requirement, the RTRM energizes the Heat 2 relay coil on the RTRM. When the Heat 2 relay contacts close, the second stage electric heat contactor is energized. The first and second stages of heat are cycled **"On"** and **"Off"** as required to maintain the zone.

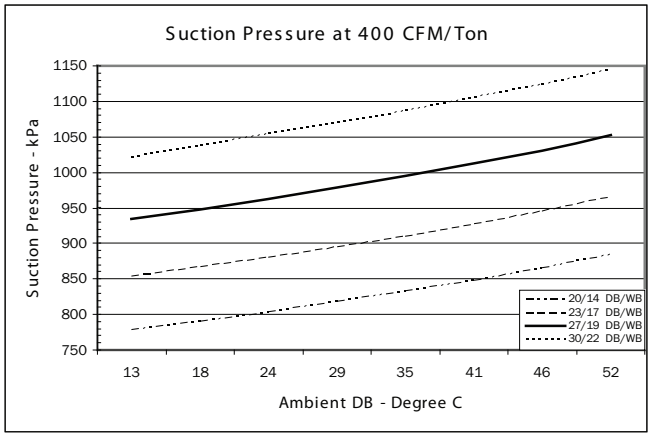
Cooling Pressure Curves

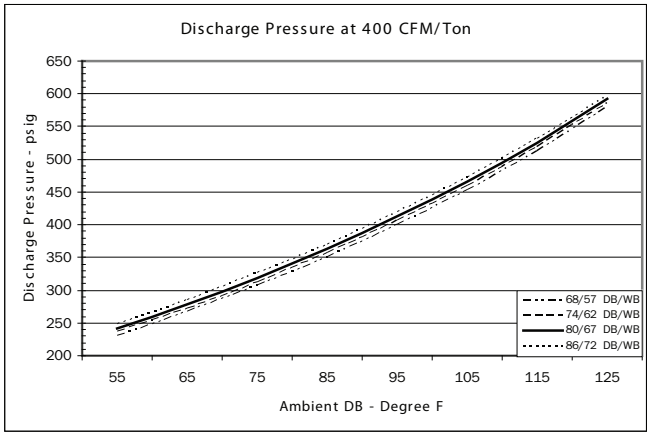
Figure 2. TWE120D

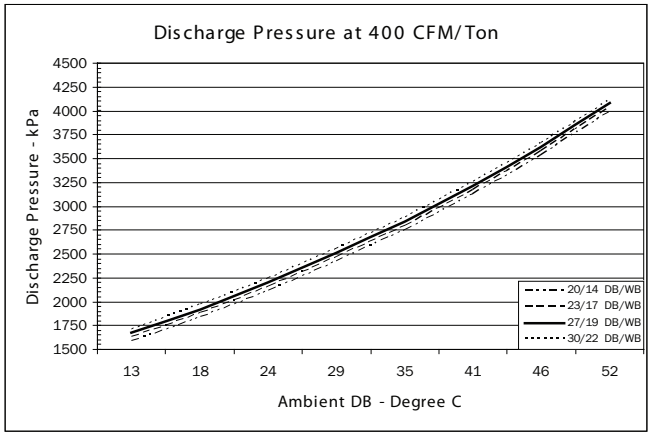
TTA120D with TWE120D (English)



TTA120D with TWE120D (Metric)

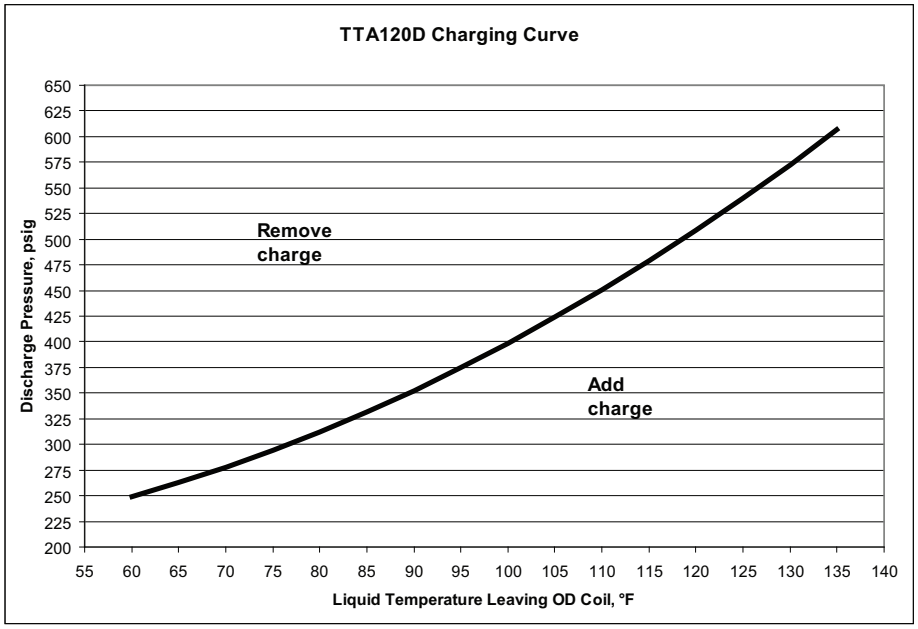






Charging Chart

Figure 3. TTA120D



Troubleshooting

SYSTEM FAULTS	POWER SUPPLY	HIGH VOLTAGE WIRING	COMPR. IOL	RUN CAPACITOR	CONTACTOR CONTACTS	LOW VOLTAGE WIRING	CONTROL TRANSFORMER	CONTACTOR COIL	INEFFICIENT COMPRESSOR	REFRIGERANT UNDERCHARGE	REFRIGERANT OVERCHARGE	EXCESSIVE EVAP. LOAD	NONCONDENSABLES	RESTRICTED O.D. AIRFLOW	O.D. AIR RECIRCULATION	TXV STUCK OPEN	SUPERHEAT	RESTRICTED I.D. AIRFLOW	REF. CIRCUIT RESTRICTIONS
REFRIGERANT CIRCUIT																			
Head Pressure Too High											P		S	P	S				S
Head Pressure Too Low									S	P						S	S		S
Suction Pressure Too High									S		P	P				S	P		
Suction Pressure Too Low										S							S	P	S
Liquid Refrig. Floodback (TXV System)																P	S		S
I.D. Coil Frosting										P									S
Compressor Runs Inadequate or No Cooling									S	P		P	S				S	P	S
ELECTRICAL																			
Compressor & O.D. Fan Do Not Start	P	P				S	P	P											
Compr. Will Not Start But O.D. Fan Runs		P	S		S														
O.D. Fan Won't Start		P		P	S														
Compressor Hums But Won't Start		P			S														
Compressor Cycles on IOL		P	S		S				S	P	P	S		S			S	P	S
I.D. Blower Won't Start	P	S				S	P												

P Primary Causes **S** Secondary Causes

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