START-UP

I. START-UP AND ADJUSTMENTS

⚠ **CAUTION:** Complete the required procedures given in the Pre-Start-Up section and unit start-up checklist at the end of this publication before starting the unit. Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 25 F (24 C) (unless accessory low ambient kit is installed).

A. Checking Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO. position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO. position. Set cooling control below room temperature. Observe that compressor and condenser- and evaporator-fan motors start. Observe that cooling cycle shuts down when control setting is satisfied.

B. Unit Controls

All units have the following internal-protection controls:

Compressor Overload

This overload interrupts power to the compressor when either the current or internal motor winding temperature become excessive, and automatically resets when the internal temperature drops to a safe level. This overload may require up to 60 minutes (or longer) to reset. If the internal overload is suspected of being open, disconnect the electrical power to the unit and check the circuit through the overload with an ohmmeter or continuity tester.

Time Guard® II Device

The unit is equipped with accessory Time Guard II recycle timer. The device will cause a 5-minute delay between compressor starts.

Cycle-LOC™ Device

When high-pressure or low-pressure fault occurs, the Cycle-LOC device will protect the system by not allowing the compressor to start.

Low-Pressure Switch (LPS)

When the suction line pressure drops below 7 psig (48 kPa), the LPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure reaches 22 psig (152 kPa), the switch resets and the compressor is allowed to restart.

High-Pressure Switch (HPS)

When the refrigerant high-side pressure reaches 426 psig (2937 kPa), the HPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure drops to 320 psig (2206 kPa), the switch resets and the compressor is allowed to restart.

C. Sequence of Operation

At start-up, the thermostat calls for cooling. When all safety devices are satisfied, the compressor contactor (fan contactor) will energize causing the compressor and outdoor (condenser) fan motor to operate. Terminal “G” at the thermostat is also energized, allowing the field-supplied and -installed (24v) indoor (evaporator) fan contactor to function. A field-supplied and -installed liquid line valve (connected between Terminals G and C at the outdoor unit), will also open. This allows the system to function in cooling; the LPS will not open if compressor is not running. As cooling demand is satisfied, the thermostat contacts break, deenergizing the contactor causing the system to shut off. The liquid line solenoid (LLS) valve closes, minimizing the potential for refrigerant migration at this time. The compressor does not restart until the thermostat again calls for cooling. If a demand for cooling occurs within 5 minutes after the thermostat is satisfied, the system will not restart due to the feature of Time Guard II device. After the 5-minute time period, the system will restart as normal upon thermostat demand.

The system is protected with a Cycle-LOC device so that the compressor will not start if a high-pressure or low-pressure fault occurs. To reset the Cycle-LOC device, set the thermostat to eliminate the cooling demand then return to the original set point. This should be done only once, and if system shuts down due to the same fault, determine the problem before attempting to reset the Cycle-LOC device.

The crankcase heaters must be energized for a minimum of 24 hours before starting a 569C and 576B unit.

D. Oil Charge

576B Units

Allow unit to run for about 20 minutes. Stop unit and check compressor oil level. Add oil only if necessary to bring oil into view in sight glass. *Use only approved compressor oil.*

Approved oils are:

Suniso 3GS
WF32-150

If oil is added, run unit for an additional 10 minutes. Stop unit and check oil level. If level is still low, add oil *only after* determining that piping system is designed for proper oil return and that system is not leaking oil.

569C Units

The 569C units do not have a sight glass and are factory charged with the correct amount of oil.

All Units

Do not reuse drained oil or use any oil that has been exposed to the atmosphere. Procedures for adding or removing oil are given in the Standard Service Techniques Manual, Chapter 1, Refrigerants.

CARE AND MAINTENANCE

To ensure continuing high performance and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This cooling unit should be inspected at least once each year by a qualified service person.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ **WARNING:** The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND POSSIBLE DAMAGE TO THIS EQUIPMENT.

SERVICE

⚠ WARNING: When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

I. CLEANING

Inspect unit interior at the beginning of each cooling season and as operating conditions require.

A. Condenser Coil

Inspect coil monthly. Clean condenser coil annually, or as required by location and outdoor-air conditions.

Clean coil as follows:

1. Turn off unit power and tag disconnect.
2. Remove and save top panel screws on condensing unit.
3. Remove condenser coil corner post. See Fig. 8. To hold top panel open, place coil corner post between top panel and side panel. See Fig. 9.
4. Remove bracket holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 10.
5. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
6. Reposition the outer coil section, attach the bracket removed in Step 4, and remove the coil corner post from between the top panel and side panel. Secure the sections together. Install the coil corner post and replace all screws (removed in Step 2).

II. LUBRICATION

A. Compressors

Each compressor is charged with the correct amount of oil at the factory. Refer to the Oil Charge section on page 9 for additional information.

B. Fan Motor Bearings

Fan motor bearings are of the permanently lubricated type. No further lubrication is required.

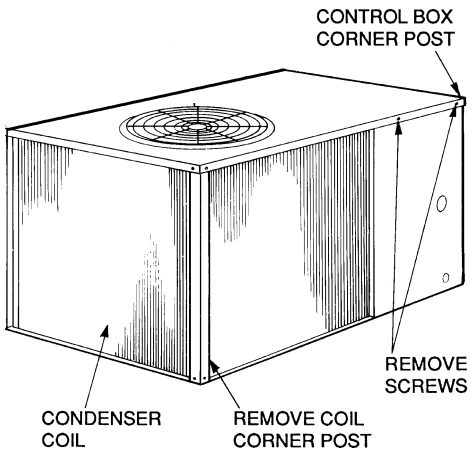


Fig. 8 — Cleaning Condenser Coil

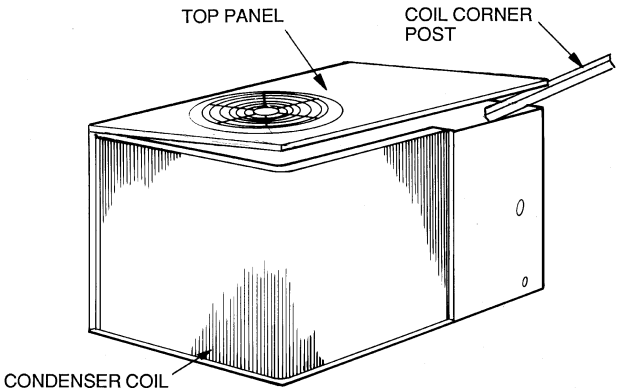


Fig. 9 — Propping Up Top Panel

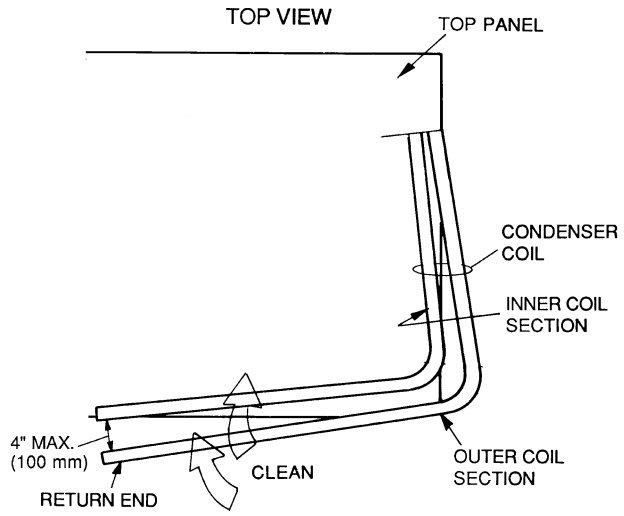
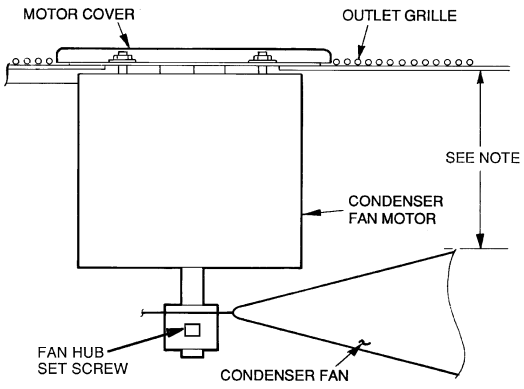


Fig. 10 — Separating Coil Sections

III. CONDENSER-FAN ADJUSTMENT (Fig. 11)

1. Shut off unit power supply, and tag disconnect.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in Fig. 11.
5. Tighten set screws.
6. Replace condenser-fan assembly.



NOTE: Fan height adjustments are as follows:

UNIT	in.	mm
569C072	4.50	114
All Units (except 569C072)	6.42	163

Fig. 11 — Outdoor (Condenser) Fan Adjustment

IV. CAPACITY CONTROL (576B120 Only)

A suction pressure-actuated unloader controls 2 cylinders and provides capacity control. Unloaders are factory set (see Table 1), but may be field adjusted:

A. Control Set Point

The control set point (cylinder load point) is adjustable from 0 to 85 psig. To adjust, turn control set point adjustment nut (Fig. 12) clockwise to its bottom stop. In this position, set point is 85 psig. Then, turn adjustment counterclockwise to desired control set point. Every full turn counterclockwise decreases set point by 7.5 psig.

B. Pressure Differential

The pressure differential (difference between cylinder load and unload points) is adjustable from 6 to 22 psig. To adjust, turn pressure differential adjustment screw (Fig. 12) counterclockwise to its back stop position. In this position, differential is 6 psig. Then, turn adjustment screw clockwise to desired pressure differential. Every full turn clockwise increases differential by 1.5 psig.

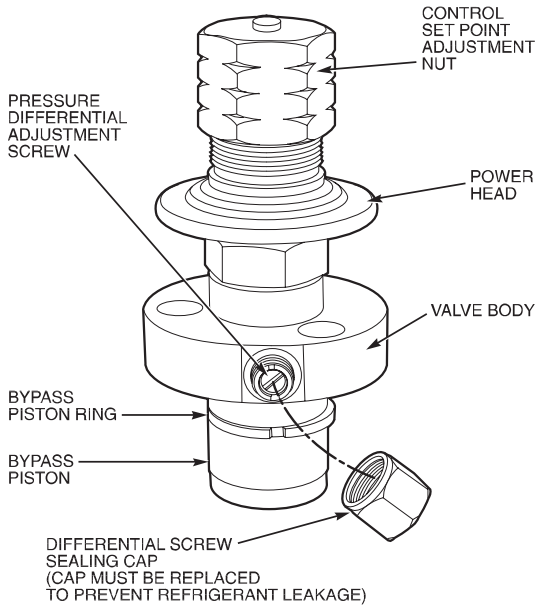


Fig. 12 — Compressor Capacity Control Unloader

V. COMPRESSOR REMOVAL

See Table 1 for compressor information.

Follow safety codes and wear safety glasses and work gloves.

1. Shut off power to unit and install lockout. Remove unit access panel (front of unit).
2. Remove refrigerant from system using refrigerant removal methods described in GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation.
3. Disconnect compressor wiring at compressor terminal box.
4. Remove bolts from suction flange and discharge service valve (576B units).

⚠ **CAUTION:** Excessive movement of copper lines at compressor may cause higher levels of vibration when unit is restored to service.

5. Remove crankcase heater from compressor base (576B units only).
6. Remove compressor holddown bolts.
7. Remove compressor from unit.
8. Clean system. Add new liquid line filter drier.
9. Install new compressor in unit.
10. Connect suction and discharge lines to compressor. Ensure that compressor holddown bolts are in place.
11. Install crankcase heater.
12. Connect wiring.
13. Evacuate and recharge unit, per Step VII.
14. Restore unit power.

VI. CRANKCASE HEATER

The crankcase heater prevents refrigerant migration and compressor oil dilution during shutdown when compressor is not operating.

Close both compressor service valves if applicable when crankcase heater is deenergized for more than 6 hours.

VII. REFRIGERANT CHARGE

Unit panels must be in place when unit is operating during charging procedure. Unit is shipped with a holding charge only. Weigh in 7 lbs of R-22 to start unit. Refer to GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation for additional information.

See Troubleshooting Guide on page 13 for additional information.

A. Low Charge Cooling

Using Cooling Charging Charts, Fig. 13 and 14, vary refrigerant until the conditions of the appropriate chart are met. Note the charging charts are different from type normally used. The charts are based on charging the units to the correct sub-cooling for the various operating conditions. Accurate pressure gage and temperature sensing device are required.

Connect the pressure gage to the service port on the liquid line service valve. Mount the temperature sensing device on the liquid line, close the liquid line service valve, and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

Operate unit a minimum of 15 minutes. Ensure that temperature and pressure have stabilized. Plot liquid pressure and temperature on chart and add or reduce charge as required. Do not vent refrigerant to the atmosphere. Recover any excess charge. Operate the unit until the system stabilizes. Adjust charge to conform with charging chart, using liquid pressure and temperature to read chart.

B. Refrigerant Leaks

Proceed as follows to repair a refrigerant leak and to charge the unit:

1. Locate the leak and ensure that refrigerant system pressure has been relieved.
2. Repair leak following accepted practices.

NOTE: Install a new filter drier in the liquid line whenever the system has been opened for repair.

3. Add a small charge of R-22 refrigerant vapor to system and leak-test unit.
4. Evacuate refrigerant system up to 500 micons. If additional leaks are not found.
5. Charge unit with R-22 refrigerant.

NOTE: Do not vent refrigerant to the atmosphere. Recover any excess charge.

VIII. REFRIGERANT SERVICE PORTS

Each unit has 3 service ports: one on the suction line, one on the liquid line, and one on the compressor discharge line. Be sure caps on the ports are tight.

IX. HIGH FLOW VALVES

Located on the compressor hot gas and suction tubes are High Flow Valves. Large black plastic caps distinguish these valves with O-rings located inside the caps. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

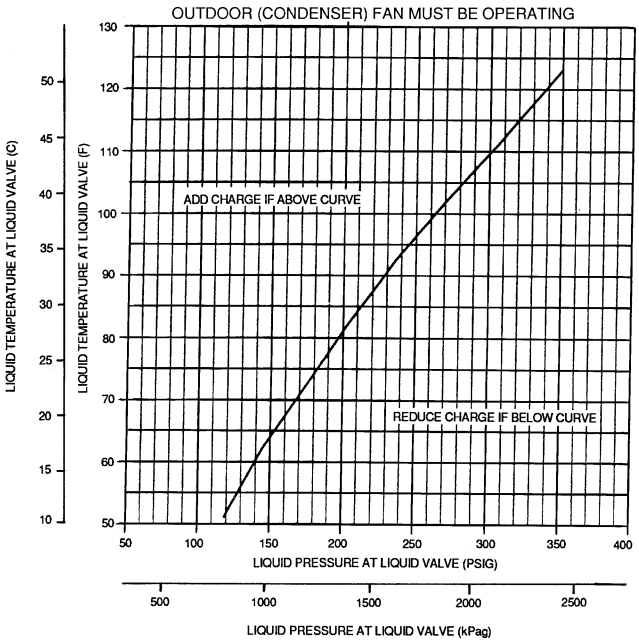


Fig. 13 — Cooling Charging Chart — 569C072

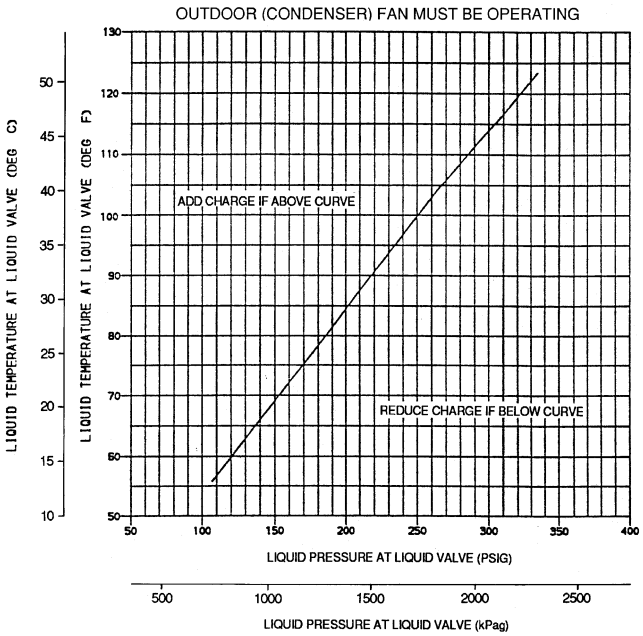


Fig. 14 — Cooling Charging Chart — 569C090, 120 and 576B090,102,120

TROUBLESHOOTING GUIDE

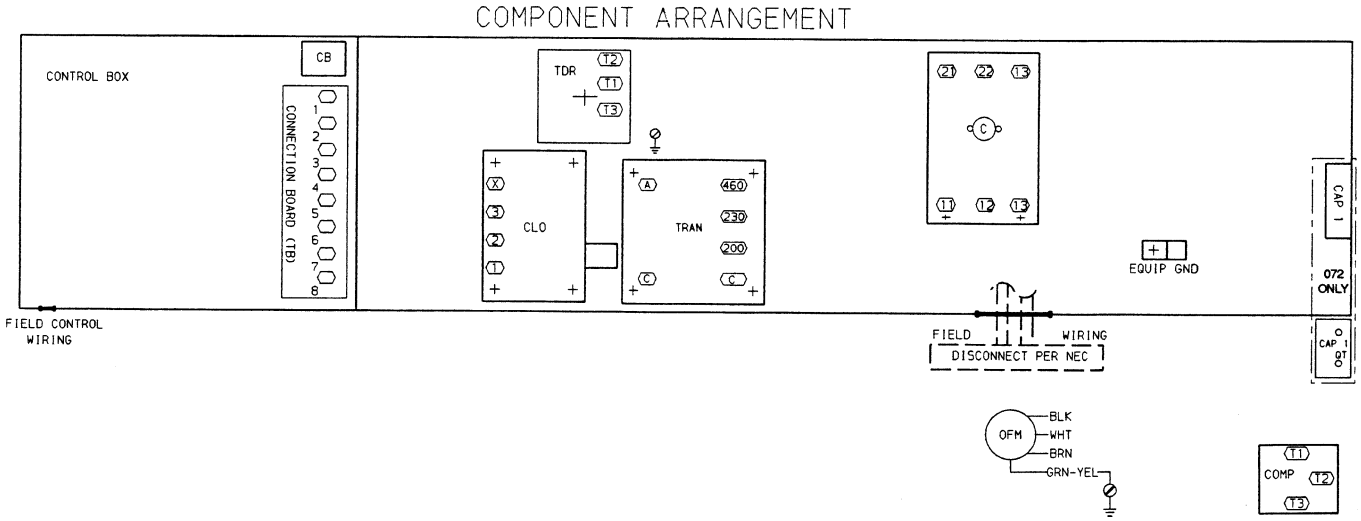
SYMPTOM	CAUSE	REMEDY
Compressor does not run — Contactor open	Power off.	Restore power.
	Fuses blown.	Replace with correct fuses after finding cause and correcting.
	Transformer open/shorted.	Replace transformer if primary windings are receiving power and no output.
	Thermostat circuit open.	Check thermostat setting.
	Low-pressure switch open.	Check for refrigerant undercharge or system leak.
	High-pressure switch open.	Check for refrigerant over charge or obstruction of outdoor airflow.
	Connections loose.	Tighten all connections.
	Compressor motor thermostat open.	Check for excessive motor temperature.
Compressor does not run — Contactor closed	Compressor leads loose, broken.	Check connections with power off.
	Single phasing.	Replace blown fuse.
	Compressor internal overload open.	Allow compressor motor windings to cool down to reset overload. Determine cause for overload opening.
Compressor cycles on high-pressure switch — Condenser fan on	High-pressure switch faulty.	Replace switch.
	Airflow restricted. Dirty coil.	Remove obstruction, clean condenser coil.
	Air recirculating.	Clear airflow area.
	Noncondensables in system.	Recover, evacuate and recharge as required. Refer to Carrier GTAC-II, Module 5, Charging, Recovery, Recycling, and Reclamation.
	Refrigerant overcharge.	Recover as required.
	Refrigerant system restrictions.	Check or replace filter drier, expansion valve, etc.
Compressor cycles on high-pressure switch — Condenser fan off	Fan slips on shaft.	Tighten fan hub screws.
	Motor not running.	Check power and capacitor $^{1}/_{3}$ and $^{3}/_{4}$ hp motor.
	Motor bearings seized.	Replace motor.
	Motor overload open.	Check overload rating. Check for fan blade obstruction.
	Motor burned out, windings open.	Replace motor.
Compressor cycles on low-pressure switch — Evaporator fan running	Filter drier plugged.	Replace filter drier.
	Expansion valve power head defective.	Replace power head.
	Low refrigerant charge.	Find leak, repair, evacuate system, and recharge.
	Expansion valve restricted/plugged.	Remove and replace expansion valve.
Airflow restricted — Low suction pressure	Evaporator coil iced up.	Check refrigerant charge.
	Evaporator coil dirty.	Clean coil fins.
	Indoor-air filter dirty.	Clean or replace filters.
	Indoor-air dampers closed.	Check damper operation and position.
Indoor (evaporator) fan stopped — Low suction pressure	Electrical connections loose.	Tighten all connections.
	Fan relay defective.	Replace relay.
	Motor overload open.	Check power supply.
	Motor defective.	Replace motor.
	Fan belt broken or slipping.	Replace or tighten belt.
Compressor runs but cooling insufficient — Suction pressure low	Refrigerant charge low.	Add charge.
	Head pressure low.	Check refrigerant charge.
	Indoor-air filters dirty.	Clean or replace filters.
	Expansion valve power head defective.	Replace power head.
	Expansion valve restricted/plugged.	Remove and replace expansion valve.
	Evaporator coil partially iced.	Check low-pressure setting.
	Evaporator airflow restricted.	Remove obstruction.
Compressor runs but cooling insufficient — Suction pressure high	Heat load excessive.	Check for open doors or windows.

NOTE: See Fig. 15 and 16 for component arrangements.

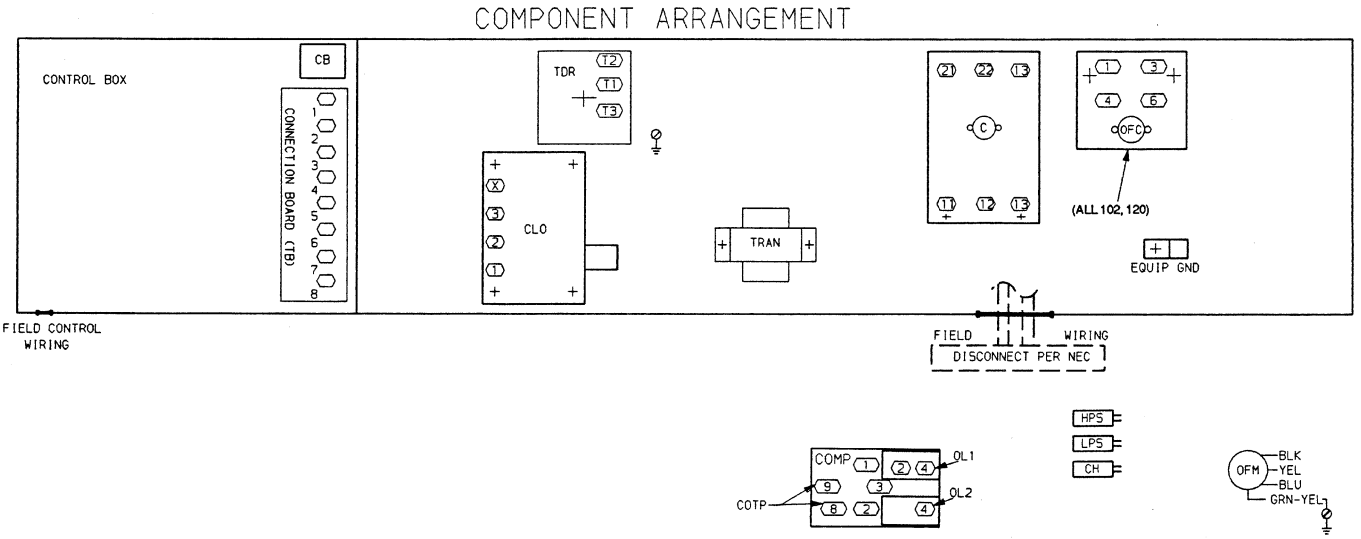
LEGEND FOR FIG. 15 AND 16

C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CH — Crankcase Heater
CLO — Compressor Lockout
COMP — Compressor Motor
COTP — Compressor Temperature Protection
EQUIP — Equipment
GND — Ground
HPS — High-Pressure Switch
LPS — Low-Pressure Switch
NEC — National Electrical Code
OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor
OL — Overload Relay
QT — Quadruple Terminal
TB — Terminal Block
TDR — Time-Delay Relay
TRAN — Transformer

Terminal (Marked)
Terminal (Unmarked)
Terminal Block
Factory Wiring
Field Power Wiring



→ **Fig. 15 — Typical 569C Component Arrangement**



→ **Fig. 16 — Typical 576B Component Arrangement**

START-UP CHECKLIST

I. PRELIMINARY INFORMATION

OUTDOOR: MODEL NO. _____ SERIAL NO._____

INDOOR: AIR HANDLER MANUFACTURER _____

MODEL NO. _____ SERIAL NO._____

ADDITIONAL ACCESSORIES _____

II. PRE-START-UP

OUTDOOR UNIT

IS THERE ANY SHIPPING DAMAGE? _____ (Y/N) _____

IF SO, WHERE: _____

_____

WILL THIS DAMAGE PREVENT UNIT START-UP? (Y/N) _____

CHECK POWER SUPPLY. DOES IT AGREE WITH UNIT? (Y/N) _____

HAS THE GROUND WIRE BEEN CONNECTED? (Y/N) _____

HAS THE CIRCUIT PROTECTION BEEN SIZED AND INSTALLED PROPERLY? (Y/N) _____

ARE THE POWER WIRES TO THE UNIT SIZED AND INSTALLED PROPERLY? (Y/N) _____

HAVE COMPRESSOR HOLDDOWN BOLTS BEEN LOOSENED, WHERE APPLICABLE (Snubber washers are snug, but not tight)? (Y/N) _____

CONTROLS

ARE THERMOSTAT AND INDOOR-FAN CONTROL WIRING

CONNECTIONS MADE AND CHECKED? (Y/N) _____

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (Y/N) _____

HAS CRANKCASE HEATER BEEN ENERGIZED FOR 24 HOURS? (Y/N) _____

INDOOR UNIT

HAS WATER BEEN PLACED IN DRAIN PAN TO CONFIRM PROPER DRAINAGE? (Y/N) _____

ARE PROPER AIR FILTERS IN PLACE? (Y/N) _____

HAVE FAN AND MOTOR PULLEYS BEEN CHECKED FOR PROPER ALIGNMENT? (Y/N) _____

DO THE FAN BELTS HAVE PROPER TENSION? (Y/N) _____

HAS CORRECT FAN ROTATION BEEN CONFIRMED? (Y/N) _____

PIPING

IS LIQUID LINE SOLENOID VALVE LOCATED AT THE EVAPORATOR COIL AS REQUIRED? (Y/N) _____

HAVE LEAK CHECKS BEEN MADE AT COMPRESSOR, CONDENSER, EVAPORATOR, TXVs (Thermostatic Expansion Valves), SOLENOID VALVES, FILTER DRIERS, AND FUSIBLE PLUGS WITH A LEAK DETECTOR? (Y/N) _____

LOCATE, REPAIR, AND REPORT ANY LEAKS. _____

ARE ALL 576B COMPRESSOR SERVICE VALVES FULLY OPENED (BACKSEATED)? (Y/N) _____

HAVE LIQUID LINE SERVICE VALVE AND SUCTION LINE SERVICE VALVE BEEN OPENED? (Y/N) _____

IS THE OIL LEVEL IN COMPRESSOR CRANKCASE ON 576B UNIT IN VIEW IN THE COMPRESSOR SIGHT GLASS? (Y/N) _____

CHECK VOLTAGE IMBALANCE

LINE-TO-LINE VOLTS: AB _____ V AC _____ V BC _____ V

(AB + AC + BC)/3 = AVERAGE VOLTAGE =V

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = _____ V

VOLTAGE IMBALANCE = 100 X (MAX DEVIATION)/(AVERAGE VOLTAGE) = _____ %

IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM!
CALL LOCAL POWER COMPANY FOR ASSISTANCE.

III. START-UP

CHECK EVAPORATOR-FAN SPEED AND RECORD. _____

CHECK CONDENSER-FAN SPEED AND RECORD. _____

AFTER AT LEAST 15 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

OIL PRESSURE (576B only)	_____
SUCTION PRESSURE	_____
SUCTION LINE TEMP	_____
DISCHARGE PRESSURE	_____
DISCHARGE LINE TEMP	_____
ENTERING CONDENSER-AIR TEMP	_____
LEAVING CONDENSER-AIR TEMP	_____
EVAP ENTERING-AIR DB (dry bulb) TEMP	_____
EVAP ENTERING-AIR WB (wet bulb) TEMP	_____
EVAP LEAVING-AIR DB TEMP	_____
EVAP LEAVING-AIR WB TEMP	_____
COMPRESSOR AMPS (L1/L2/L3)	_____ / _____ / _____

HAS REFRIGERANT CHARGE BEEN ADJUSTED PER UNIT CHARGING CHART? _____

NOTES:

_____

_____

_____

_____

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_____

_____

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_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE