



REMOTE EVAPORATOR OPTION YCAL AIR-COOLED CHILLERS

INSTALLATION

New Release

Form 150.62-NM1.1 (200)

REMOTE EVAPORATOR OPTION YCAL0014 – YCAL0080



LISTED

200-3-60
230-3-60
380-3-60
460-3-60
575-3-60

MODELS ONLY

Standard, Brine and Metric Models Combined

REMOTE EVAPORATOR OPTION

GENERAL

The Remote Evaporator Option allows the evaporator to be located inside the conditioned space, which helps eliminate the possibility of water line freezing. This form is intended to be used as a supplement to Form 150.62-NM1 (60 Hz models) and Form 150.62-NM2 (50 Hz models) for all installation, start-up and operation instructions not outlined in this publication.

The unit and remote evaporator will be pressure-tested, evacuated and given a holding charge of Nitrogen - refer to tags on the unit and evaporator. An initial oil charge will also be included in the compressor.

After placing the system into operation, it is important to verify that the proper refrigerant charge has been installed by checking sub-cooling. Refer to Form 150.62-NM1 (60 Hz models) or Form 150.62-NM2 (50 Hz models).

Inventory the parts included with the Remote Cooler Option and compare them to the list in Table 1. Assure that all parts have been included.

REFRIGERANT PIPING

General

When the unit has been located in its final position, the unit piping may be connected. Normal installation precautions should be observed in order to ensure reliable operation and serviceability. System piping should conform to ASHRAE guidelines. After electrical and piping connections are completed, refer to Unit Installa-

tion, Operation and Maintenance Manual (Form 150.62-NM1 [60 Hz] and Form 150.62-NM2 [50 Hz]) for unit start-up instructions.

Threaded Connections

Threaded connections on the cooler refrigerant piping are **not** intended for field connection. The threaded pipe “plugs” must be removed in order to install refrigerant piping. Brazed connections must be made in the field. The holding charge of nitrogen should be relieved through the Schrader valve located on the liquid line connection before removing the sealed threaded pipe connections. If, when depressing the Schrader core, no nitrogen is relieved, the chiller barrel should be tested to ensure no leak in the refrigerant tubing exists before installing the chiller barrel.

Figure 1 shows the threaded steel “plugs” in the suction and liquid connections that must be removed with a pipe wrench to facilitate the connection of the copper refrigerant lines. Ensure that internal sealant is thoroughly cleaned from inside connections **before** connecting refrigerant piping.

Hand stop valves should be installed where needed to facilitate servicing of unit. Avoid eliminating service valves in favor of cost cutting.



Any section of a line that has a potential to be subject to hydrostatic expansion MUST have a pressure relief valve installed.

TABLE 1 – PARTS LIST

ITEM	*QTY.	DESCRIPTION
1	2	Temperature Sensor
2	2	Relief Valve
3	2	Liquid Line Solenoid Connector
4	2	** Thermal Expansion Valve
5	2	Liquid Line Sight Glass
6	2	Liquid Line Solenoid Valve
7	2	Liquid Line Filter Drier
8	See Fig. 3	Temperature Sensor Connector Hardware

* YCAL0014 – YCAL0034 have a quantity of 1, with the exception of Item 1.

** Contact YORK for alternate valve selection if chilled water temperatures below 30°F are desired.

Piping Connection Points

Each system liquid line and suction line will include field connections at the shutoff valves (see Fig. 2). The liquid line valve has a charging port to add refrigerant and measure liquid pressure. Field refrigerant piping can be connected to the condensing unit without loss of the holding charge in the unit.

Liquid Line Solenoid Valves and Expansion Valve Mounting

Liquid line solenoid valves and expansion valves must be mounted with the arrow on the devices pointing in the direction of refrigerant flow. The expansion valve

sensing bulbs should be mounted and clamped securely on the suction line in the 4 o'clock or 8 o'clock position. The bulb and pipe must then be properly insulated.

All expansion valves, filter driers, sight glasses and liquid line solenoid valves are YORK supplied and installed by others. Refrigerant field piping is supplied and installed by others (see Fig. 2).

For liquid lengths greater than 60 feet, a liquid line receiver may be required to accommodate the additional refrigerant charge quantity of the system, otherwise, the total condenser pumpdown capacity may be exceeded.

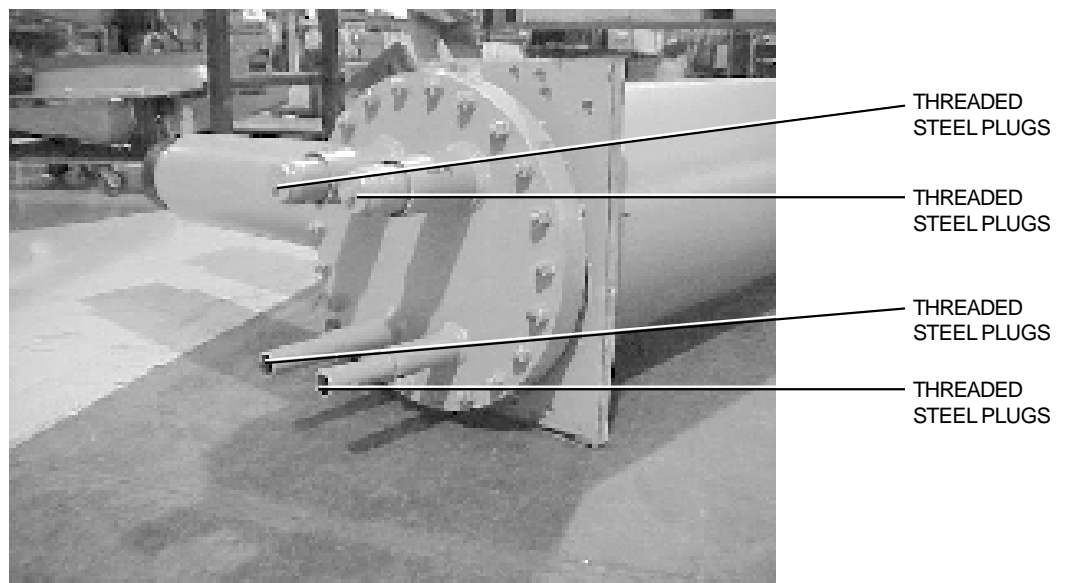
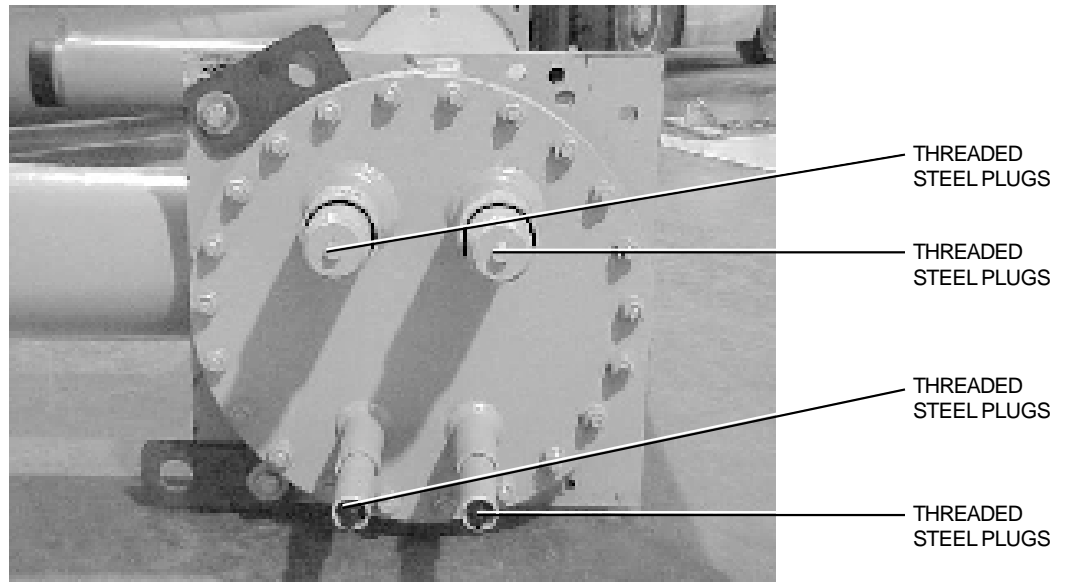


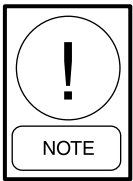
FIG. 1 – THREADED STEEL PLUGS

FOR REMOTE EVAPORATORS

REFRIGERANT PIPING

General

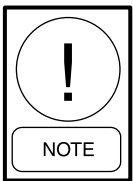
When the unit has been located in its final position, the unit piping may be connected. Normal installation precautions should be observed in order to receive maximum operating efficiencies. System piping should conform ASHRAE guidelines. All piping design and installation is the responsibility of the user.



YORK ASSUMES NO WARRANTY RESPONSIBILITY FOR SYSTEM OPERATION OR FAILURES DUE TO IMPROPER PIPING OR PIPING DESIGN.

Expansion valves, liquid line solenoid valves, filter driers and sight glasses are shipped loose for field installation on each refrigerant circuit.

Table 2 includes approximate equivalent lengths for copper fittings. Table 3 shows the refrigerant line connection sizes to the unit. Nominal pressure drop for solenoids, sight glass and driers are shown in Table 4.



Field piping must be sized according to application. Table 5 provides refrigerant line charges.

REFRIGERANT LINE SIZING

Refrigerant piping systems must be designed to provide practical line sizes without excessive pressure drops, prevent compressor oil from being “trapped” in the refrigerant piping, and ensure proper flow of liquid refrigerant to the thermal expansion valve. Considerations should be given to:

1. Suction line pressure drop due to refrigerant flow.
2. Suction line refrigerant velocity for oil return.
3. Liquid line pressure drop due to refrigerant flow.
4. Liquid line pressure drop (or gain) due to vertical rise of the liquid line.

A solid column of liquid refrigerant to the expansion valve must always be maintained. Refrigerant vapor in

the liquid line will measurably reduce valve capacity and poor system performance can be expected.

To allow adequate oil return to the compressor, suction risers should be sized for a minimum of 1000 FPM (5.08m/s) while the system is operating at minimum capacity to ensure oil return up to the suction riser.

Evaporator Below Unit

On a system where the evaporator is located below the unit, the suction line must be sized for both pressure drop and oil return. In some cases, a doubles suction riser must be installed to ensure reliable oil return at reduced loads.

Unit Below Evaporator

When the unit is located below the evaporator, the liquid line must be designed for both friction loss and static head loss, due to the vertical rise. The value of static head loss of .5 psi/ft. (3.4 kPa/30 cm) must be added to the friction loss pressure drop in addition to all pressure drops due to driers, valves, etc.

HOT GAS BYPASS

Hot Gas Bypass is a factory option available on System 1 only. With this option, field piping is still required from the shutoff valve at the unit to the evaporator.

OIL TRAPS

All horizontal suction lines should be pitched at least 1/4" per foot (2 cm/m) in the direction of the refrigerant flow, to aid in the return of oil to the compressor. All suction lines with a vertical rise exceeding 3 feet (0.91 meters) should have a “P” trap at the bottom and top of the riser. Suction lines with a vertical rise exceeding 25 feet (7.6 meters) should be trapped every 15 feet (4.6 meters).

RELIEF VALVES

A .375 inch diameter hole is required for a pipe coupling half to be brazed into the suction line(s). The relief valve can then be installed into the coupling.

REFRIGERANT CHARGE

The unit is charged with 6 lbs. (2.7 kg) of R-22 for a holding charge. The remaining operating charge for the chiller, evaporator coil and refrigerant piping must be weighed-in after all refrigerant piping is installed, leak-checked and evacuated. Refer to Physical Data in Installation, Operation and Maintenance Manual 150.62-NM1 (60 Hz) or 150.62-NM2 (50 Hz) for unit charge.

Final adjustment of refrigerant charge should be verified by subcooling values. Refer to Pre-Startup section in Form 150.62-NM1 (60 Hz) or Form 150.62-NM2 (50 Hz) for checking subcooling.

REFRIGERANT PIPING REFERENCE

For more details, refer to ASHRAE Refrigeration Handbook, Chapter 2.

COPPER FITTING EQUIVALENT LENGTHS		
LINE SIZE O.D.	SHORT RADIUS ELL	LONG RADIUS ELL
3/4" (19mm)	6.5 ft. (2m)	4.5 ft. (1.4m)
7/8" (22mm)	7.8 ft. (2.4m)	5.3 ft. (1.6m)
1-1/8" (29mm)	2.7 ft. (0.8m)	1.9 ft. (0.8m)
1-3/8" (35mm)	3.2 ft. (1m)	2.2 ft. (0.7m)
1-5/8" (41mm)	3.8 ft. (1.2m)	2.6 ft. (0.8m)
2-1/8" (54mm)	5.2 ft. (1.6m)	3.4 ft. (1m)
2-5/8" (67mm)	6.5 ft. (2.0m)	4.2 ft. (1.3m)

TABLE 2 – FITTING EQUIVALENT LENGTHS

REFRIGERANT LINE CONNECTION SIZES		
MODEL YCAL00	SUCTION	LIQUID
14	1-3/8"	7/8"
20	1-5/8"	7/8"
24	2-1/8"	7/8"
30	2-1/8"	7/8"
34	2-1/8"	7/8"
40	2-1/8"	7/8"
44	2-1/8"	7/8"
50	2-1/8"	7/8"
60	2-1/8"	7/8"
64	2-1/8"	1-1/8"
70	2-1/8"	1-1/8"
74	2-1/8"	1-1/8"
80	2-5/8"	1-1/8"

TABLE 3 – REFRIGERANT LINE CONNECTION SIZES

*MISCELLANEOUS LIQUID LINE PRESSURE DROPS	
SOLENOID VALVE	2 to 3 PSI (13.8 to 20.7 kPa)
FILTER/DRIER	2 to 3 PSI (13.8 to 20.7 kPa)
SIGHT GLASS	0.5 PSI (3.4 kPa)

* Pressure drops or equivalent length values are approximate. If a more precise value is desired, consult ASHRAE Refrigerant Handbook.

TABLE 4 – MISCELLANEOUS LIQUID LINE PRESSURE DROPS

REFRIGERANT LINE PIPING CHARGES			
SUCTION LINES		LIQUID LINES	
1-3/8" (35mm)	.2 oz./ft. (6 grams/30 cm)	3/4" (19mm)	2.7 oz./ft. (76 grams/30 cm)
1-5/8" (41mm)	.3 oz./ft. (8 grams/30 cm)	7/8" (22mm)	3.7 oz./ft. (105 grams/30 cm)
2-1/8" (54mm)	.6 oz./ft. (17 grams/30 cm)	1-1/8" (29mm)	6.2 oz./ft. (176 grams/30 cm)
2-5/8" (67mm)	.8 oz./ft. (23 grams/30 cm)	1-3/8" (35mm)	8.6 oz./ft. (244 grams/30 cm)

TABLE 5 – REFRIGERANT LINE PIPING CHARGES

ELECTRICAL WIRING

General

The chiller is shipped with all factory-mounted controls and power wiring for all components located in the chiller package. Field control wiring will be necessary for the flow switch, liquid line solenoid valves, water temp sensors and the cooler heater.

All wiring connections (incoming power, etc.) will be covered in the Installation, Operation and Maintenance Manual, Form 150.62-NM1 (60 Hz) or 150.62-NM2 (50 Hz).

Field Control Wiring

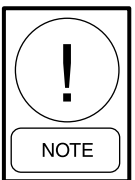
The field mounted and remote cooler components listed below will require connection to the control panel.

1. Flow Switch

A chilled water flow switch (either by YORK, or by others) **must** be installed in the leaving water piping of the cooler. There should be a straight horizontal run of at least 5 diameters on each side of the switch. Adjust the flow switch paddle to the size of the pipe in which it is installed. (See manufacturer's instructions furnished with the switch.)



The flow switch must not be used to stop and start the chiller. It is intended ONLY as a safety switch. Interlock the flow switch with the start/stop contacts. If the start/stop contacts are activated by an inductive load (water pump contactor, etc.), the relay/contactor coil must be suppressed. Use Suppressor 031-00808-000.



YORK ASSUMES NO WARRANTY RESPONSIBILITY FOR DAMAGE CAUSED BY EQUIPMENT CYCLED DIRECTLY FROM A FLOW SWITCH.

Flow switch controls should be connected to CTB1 terminal block of the control panel between terminals 13 and 14.

Flow switch wiring should be 2-CONDTR (20 AWG 300V) with foil shield and drain wire: ALPHA 5462, BELDEN 9320, or QUABBIN 0165 (supplied by others). The drain wire at the panel should be connected

to the panel chassis; the opposite end at the switch should be left unconnected and taped off.

2. Entering Water Temp Sensor

Fill the temperature well (Fig. 2) to a depth of 3 inches with heat-conductive compound. Insert the sensor in the well and ensure it is placed on the bottom of the well.

Assemble a proper length cable as shown in Fig. 2 between the sensor and plug J6 of the microprocessor board. Follow the instructions provided in Fig. 3 for assembly. Assure that the proper wire and tools noted are utilized.

Connect the cable to the sensor and plug J6 of the microprocessor board as shown in Fig. 5.

3. Leaving Water Temp Sensor

Fill the temperature well to a depth of 3 inches with heat-conductive compound. Insert the sensor in the well and ensure it is placed on the bottom of the well.

Assemble a proper length cable as shown in Fig. 2 between the sensor and plug J6 of the microprocessor board. Follow the instructions provided in Fig. 3 for assembly. Assure that the proper wire and tools noted are utilized.

Connect the cable to the sensor and plug J6 of the microprocessor board as shown in Fig. 5.

4. Liquid Line Solenoid Valves

Connect SYS 1 Liquid Line Solenoid Valve Wiring to wire number 120 and 2 in the junction box located under unit condenser coils (see Figs. 2, 4 and 6). The control panel will supply a 115VAC signal to energize the solenoid valve. An RC suppressor (P/N 031-00808-000) **must** be connected across wires 120 and 2.

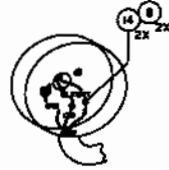
Connect SYS 2 Liquid Line Solenoid Valve Wiring to wire number 220 and 2 in the junction box located under the unit condenser coils (YCAL0040 - YCAL0080 only) (see Figs. 2, 4 and 6). The control panel will supply a 115VAC signal to energize the solenoid valve. An RC suppressor (P/N 031-00808-000) **must** be connected across terminals 220 and 2.

5. Cooler Heater

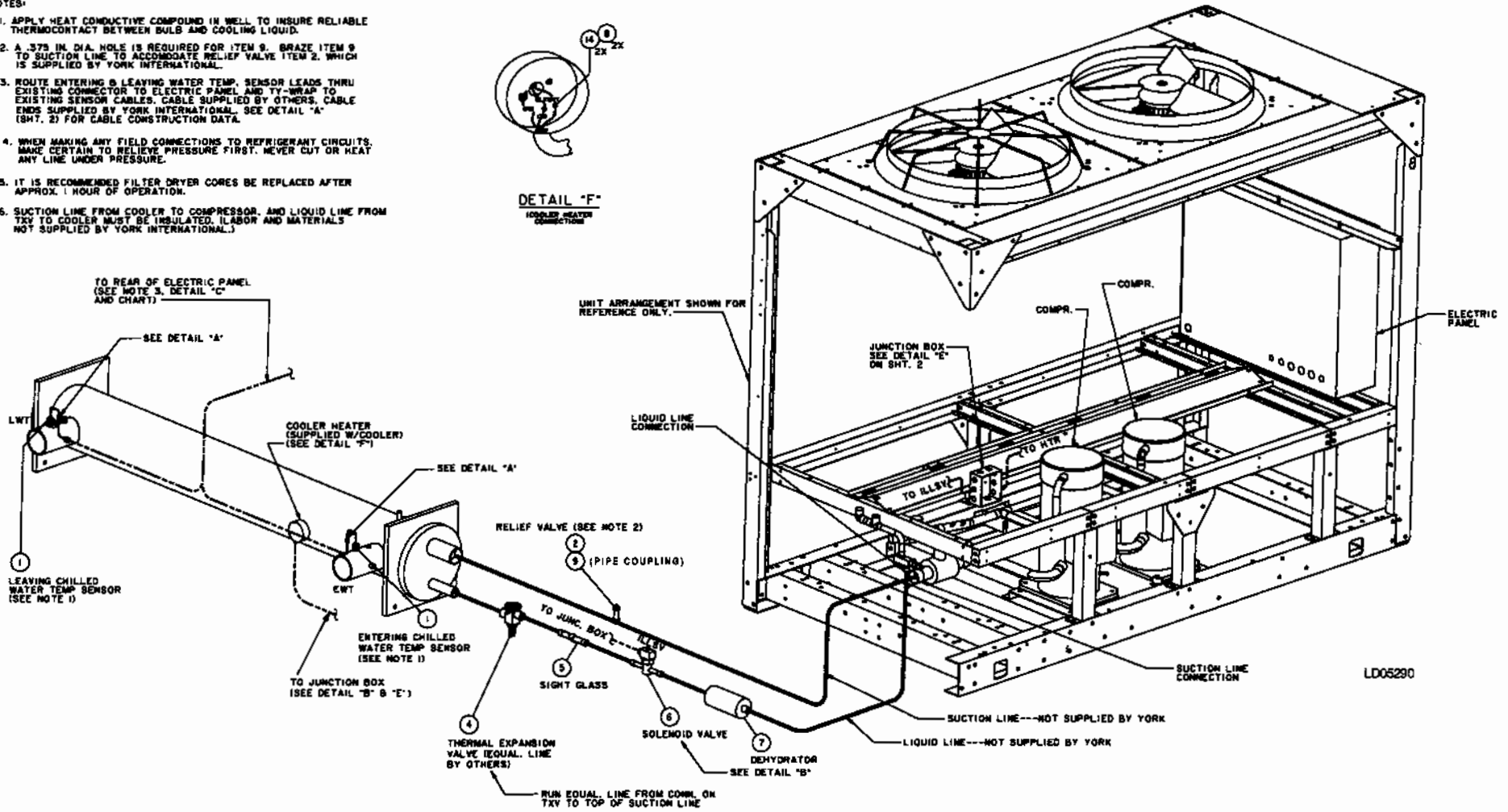
Connect the Cooler Heater wiring to wire number 139 and 2 in the junction box located under unit condenser coils (see Figs. 2, 4 and 6) An RC suppressor (P/N 031-00808-000) **must** be connected across 139 and 2.

NOTES:

1. APPLY HEAT CONDUCTIVE COMPOUND IN WELL TO INSURE RELIABLE THERMOCOACTY CONTACT BETWEEN BULB AND COOLING LIQUID.
2. A .375 IN. DIA. HOLE IS REQUIRED FOR ITEM 9. BRAZE ITEM 9 TO SUCTION LINE TO ACCOMMODATE RELIEF VALVE ITEM 2, WHICH IS SUPPLIED BY YORK INTERNATIONAL.
3. ROUTE ENTERING & LEAVING WATER TEMP. SENSOR LEADS THRU EXISTING CONNECTOR TO ELECTRIC PANEL AND TY-WRAP TO EXISTING SENSOR CABLES. CABLE SUPPLIED BY OTHERS. CABLE ENDS SUPPLIED BY YORK INTERNATIONAL. SEE DETAIL "A" (SHT. 2) FOR CABLE CONSTRUCTION DATA.
4. WHEN MAKING ANY FIELD CONNECTIONS TO REFRIGERANT CIRCUITS, MAKE CERTAIN TO RELIEVE PRESSURE FIRST. NEVER CUT OR HEAT ANY LINE UNDER PRESSURE.
5. IT IS RECOMMENDED FILTER DRYER CORES BE REPLACED AFTER APPROX. 1 HOUR OF OPERATION.
6. SUCTION LINE FROM COOLER TO COMPRESSOR, AND LIQUID LINE FROM TXV TO COOLER MUST BE INSULATED. (LABOR AND MATERIALS NOT SUPPLIED BY YORK INTERNATIONAL.)



DETAIL "F"
ISOLATED HEATER CONNECTION



LD05290

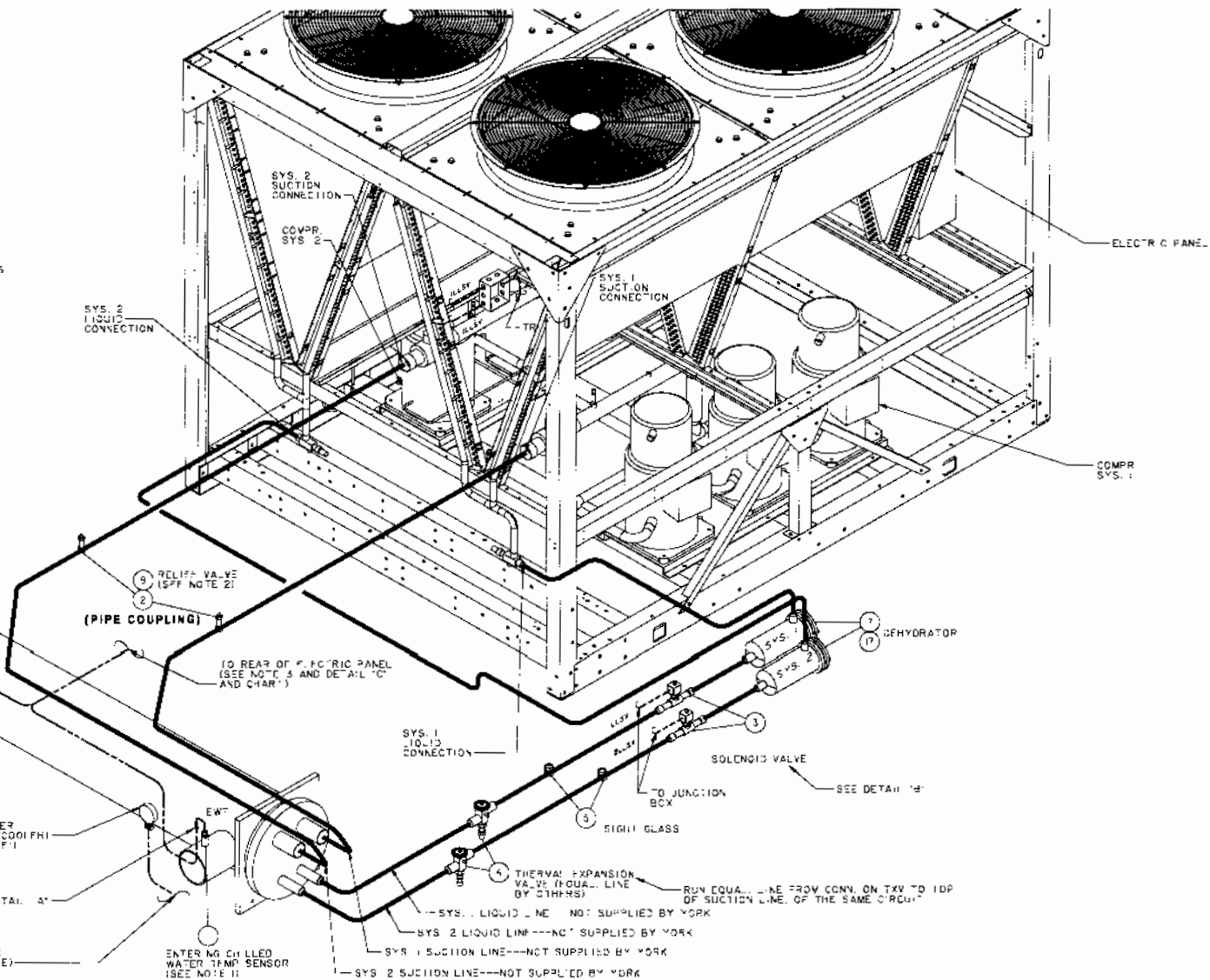
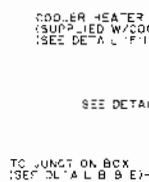
FIG. 2A - YCAL0014 - YCAL0034

NOTES:

1. APPLY HEAT CONDUCTIVE COMPOUND IN WFL. TO INSURE HELDABLE THERMOCONTACT BETWEEN BULB AND COOLING MEDIUM.
2. A 3/8" IN DIA. -0.015 IS REQUIRED FOR ITEM 9, BRAZT ITEM 9 TO SUCTION LINE TO ACCOMMODATE REFILL VALVE ITEM 2 WHICH IS SUPPLIED BY YORK INTERNATIONAL.
3. ROUTE ENTERING & LEAVING WATER TEMP SENSOR LEADS THRU EXISTING CONNECTOR TO ELECTRIC PANEL AND TY WRAP TO EXISTING SENSOR CABLES. CAB. F SUPPLIED BY OTHERS. CABLE ENDS SUPPLIED BY YORK INTERNATIONAL. SEE DETAIL A (SHEET 2) FOR CABLE CONSTRUCTION DATA.
4. WHEN MAKING ANY FIELD CONNECTIONS TO REFRIGERANT CIRCUITS, MAKE CERTAIN TO RELIEVE PRESSURE FIRST. NEVER CUT OR FIGHT ANY LINE UNDER PRESSURE.
5. IT IS RECOMMENDED FILTER DRYER CORES BE REPLACED AFTER APPROXIMATELY 1000 HOURS OF OPERATION.
6. SUCTION LINE FROM COOLER TO COMPRESSOR, AND LIQUID LINE FROM TXV TO COOLER, MUST BE INSULATED. (LARDER AND MATERIALS NOT SUPPLIED BY YORK INTERNATIONAL).



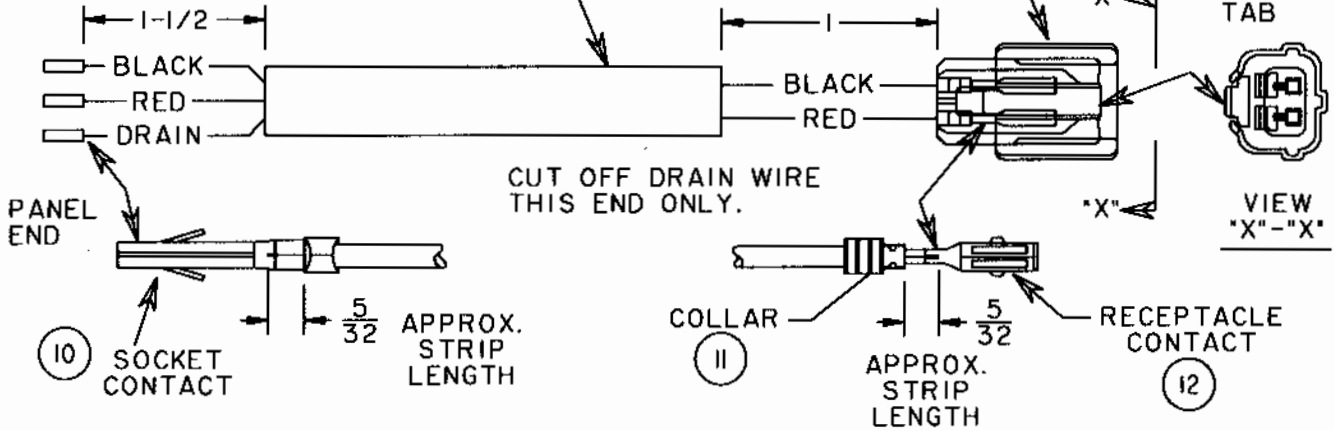
DETAIL "A"
COOLER HEATER CONNECTION



LD05292

6 FIG. 2C - YCAL0064 - YCAL0080

WIRE 2-CONDTR (20 AWG 300V, 60 DEG C)
 W/FOIL SHIELD AND DRAIN WIRE, CONDUCTOR
 POLYETHYLENE INSULATION UV RESISTANT,
 UL STYLE 2092, UL LISTED AND CSA APPROVED:
 QUABBIN 93042I-2 (BY OTHERS).



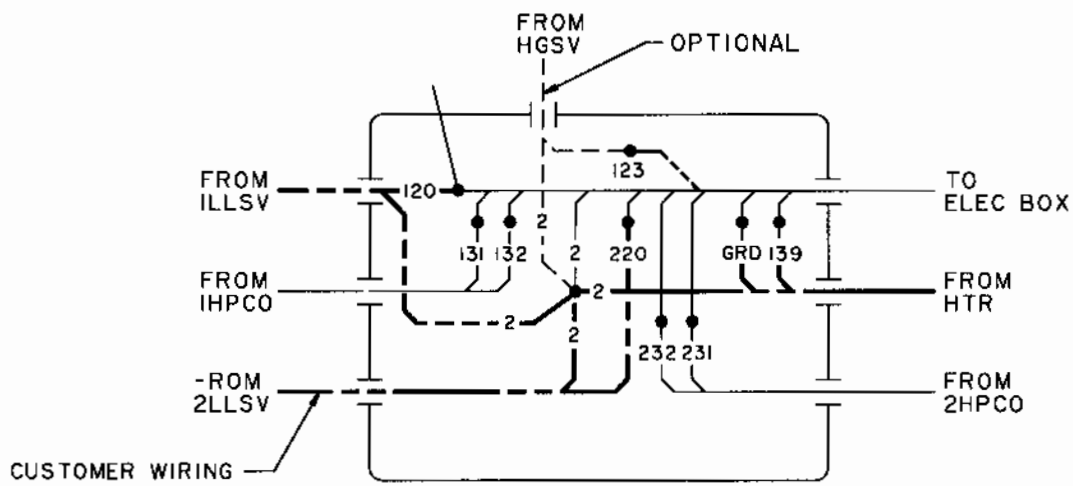
LD06293

NOTES:

1. All cable components supplied (except as noted)
2. Hand tools required to terminate contact terminals:
 AMP service Tool No. 1 #90287-1
 or
 AMP Super Champ Ft. #69758-2
 For Terminal (AMP #173707-1)

 AMP Service Tool #724651-1
 For Terminal (AMP #170362-1)
3. It is **absolutely necessary** to orient wires per data shown above and cable connection info chart in Fig. 1.

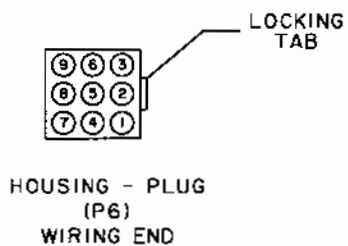
FIG. 3 – SENSOR END PLUG ASSEMBLY



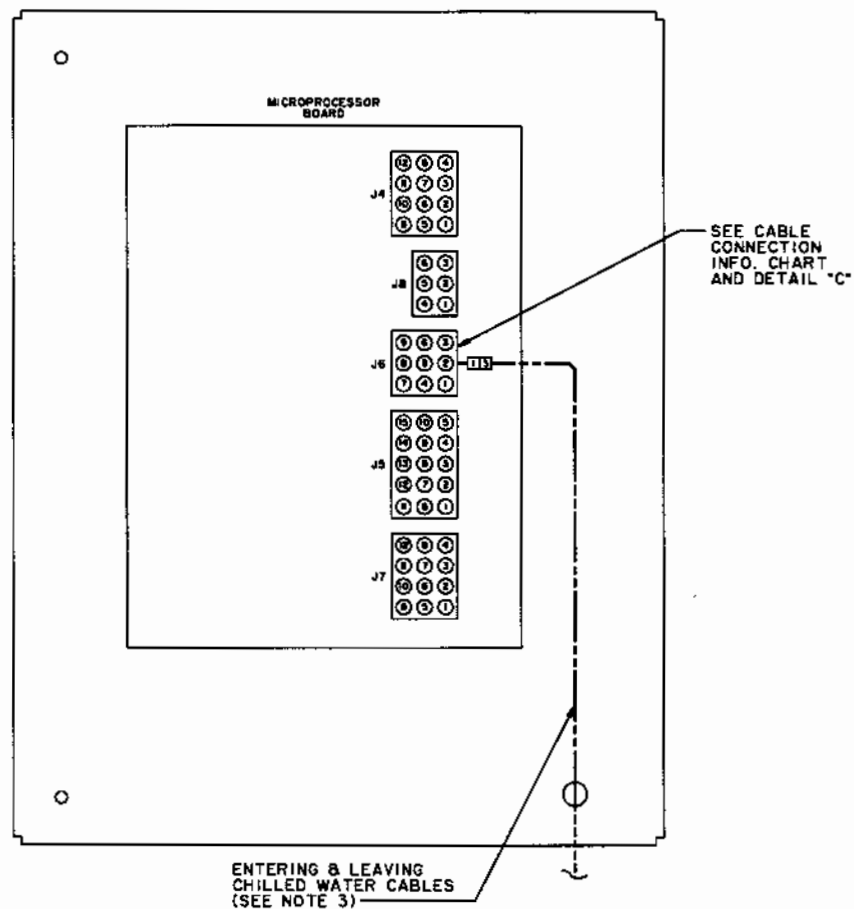
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FIG. 4 – CUSTOMER WIRING (UNIT JUNCTION BOX LOCATED UNDER COIL SECTION)

ELECTRIC PANEL
(INSIDE RIGHT DOOR)



CABLE TO PLUG (J6) CONNECTION INFORMATION CHART					
BOARD PLUG NO.	CABLE CODE	WIRE COLOR	PLUG PIN NO.	FUNCTION	LEGEND
MICRO P6	1	BLK	5	LEAVING WATER TEMP	LWT
		RED	8		
		DRAIN	2		
	3	BLK	6	ENTERING WATER TEMP	EWT
		RED	9		
		DRAIN	3		



LD06294

CONNECTION DIAGRAM
(ENTERING & LEAVING CHILLED
WATER TEMP SENSOR)

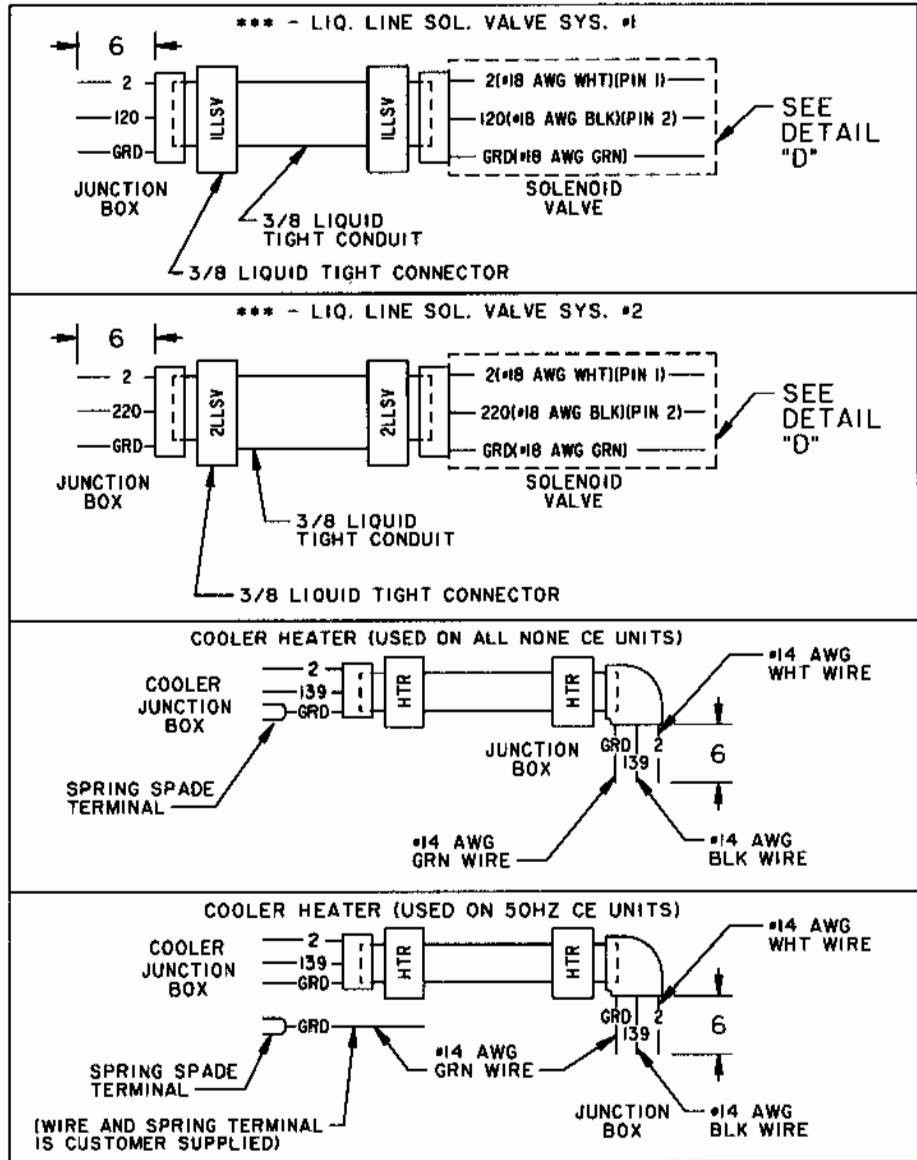
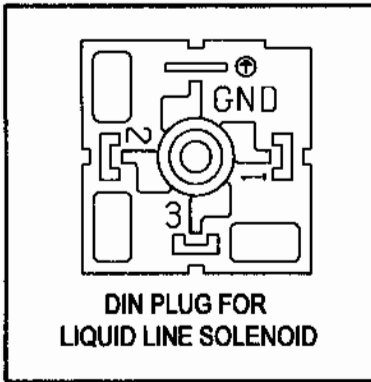


FIG. 6 – SOLENOID VALVE CONNECTION WIRING AND COOLER HEATER WIRING

