YORK® BY JOHNSON CONTROLS	AIR-COOLED LIQUID CHILLERS HERMETIC SCROLL	
INSTALLATION, OPERATION, MAINTENANCE	Supersedes 150.62-NM8 (1108)	Form 150.62-NM8 (410)

035-22320-000

YCAL0014E_ - YCAL0134E_
AIR COOLED SCROLL CHILLERS
STYLE C
WITH IPU II AND I/O BOARDS
60 Hz

29224(R)A

R-22 & HFC-407C

Metric Conversions

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

Standard, Glycol & Metric Models, Combined

IMPORTANT!
READ BEFORE PROCEEDING!
GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual will have read and understood this document and any referenced materials. This individual will also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

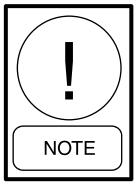
SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to areas of potential hazard:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTE is used to highlight additional information which may be helpful to you.

External wiring, unless specified as an optional connection in the manufacturer's product line, is NOT to be connected inside the micro panel cabinet. Devices such as relays, switches, transducers and controls may NOT be installed inside the micro panel. NO external wiring is allowed to be run through the micro panel. All wiring must be in accordance with Johnson Controls published specifications and must be performed ONLY by qualified Johnson Controls personnel. Johnson Controls will not be responsible for damages/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this will void the manufacturer's warranty and cause serious damage to property or injury to persons.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls policy for continuous product improvement, the information contained in this document is subject to change without notice. While Johnson Controls makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest Johnson Controls Engineered Systems Service office.

It is the responsibility of operating/service personnel to verify the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.

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LIST OF FIGURES (CONT'D)

PRODUCT IDENTIFICATION NUMBER (PIN)

BASIC MODEL NUMBER

YCAL0080EC46**XCA**

1 2 3 4 BASE PRODUCT TYPE
- Y : YORK
- C : Chiller
- A : Air-Cooled
- U : Condensing Unit
- L : Scroll

5 6 7 8 NOMINAL CAPACITY
- 0 # # #
- 1 # # #

Even Number:
60 HZ Nominal Tons
Odd Number:
50 HZ Nominal kW

9 UNIT DESIGNATOR
- E : High Efficiency

10 REFRIGERANT
- C : R-22
- B : R-407C

11 12 13 VOLTAGE/STARTER

11	12	13
1	7	: 200 / 3/ 60
2	8	: 230 / 3 / 60
4	0	: 380 / 3 / 60
4	6	: 460 / 3 / 60
5	0	: 380-415 / 3 / 50
5	8	: 575 / 3 / 60
		X : Across the Line

14 15 DESIGN/DEVELOPMENT LEVEL
- 14: C
- 15: A : Design Series, Engineering Change or PIN Level

PRODUCT IDENTIFICATION NUMBER (PIN)

EXAMPLES:

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
X	X	X	X	X	X	X	X	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	X	X	X	X	X	X	X	X	X	X	X	X	X
S	D	T	C	A	T	S	R	L	X	P	R	S	2	5	C	X	1	X	X	X	X	3	D	W	S	A	R	X	B	X	X	4	B	X	X	L	X	S	D

OPTIONS MODEL NUMBER

16 17 18 19 POWER FIELD

- X X : SP Supply TB
- X X : MP Supply TB
- S X : SP Supply TB
- S D : SP NF Disconnect Switch
- B X : SP Circuit Breaker w/ Lockable Handle
- T : Control Transformer (factory)
- C : Power Factor Capacitor

MP = Multiple Point
SP = Single-Point
NF = Non-Fused
TB = Terminal Block
Ser. = Service
Ind. Sys. Brkr. & L. Ext. Handles = Individual System Breaker & Lockable External Handle

20 21 22 23 24 25 26 27 28 CONTROLS FIELD

- L : Low Ambient Kit (factory)
- H : High Ambient Kit (factory)
- A : Both Low / High Ambient (factory)
- T : BAS/EMS Temp. Reset / Offset
- S : Spanish LCD & Keypad Display
- F : French LCD & Keypad Display
- G : German LCD & Keypad Display
- I : Discharge Pressure Transducers/ Readout Kit
- R : Suction Pressure Transducers / Readout Kit
- S : Both Discharge & Suction Pressure Transducers / Readout
- B : N. American Safety Code
- L : (cU.L./cE.T.L.)
- N : No Listing (typically 50 HZ non-CE, non-U.L.
- C : Remote Control Panel
- R : Sequence Control & Automatic Lead Transfer
- S : Leaving Supply Temp.

29 30 31 32 33 34 35 36 37 COMPRESSOR / PIPING FIELD

- # # : Chicago Code Kit Req'd.
- C : Service Isolation Valves
- S : Both Chicago & Svc. Iso.
- B : Elec. Expansion Valve
- E : Hot Gas By-Pass req'd. (1 circuit)
- I : X
- X : X
- X : Crankcase Heater Std.

38 39 40 41 42 43 44 EVAP. FIELD

- 3 : 300 PSIG DWP Waterside
- D : Double Thick Insulation
- W : Weld Flange Kit
- V : Victaulic Flange Kit
- S : Flow Switch
- A : ASME Pressure Vessel & Associated Codes
- R : Remote DX Cooler

45 46 47 CONDENSER FIELD

- X : Aluminum
- C : Copper
- B : Black Fin
- P : Phenolic
- X : TEAO Fan Motors

48 49 50 51 52 53 54 CABINET FIELD

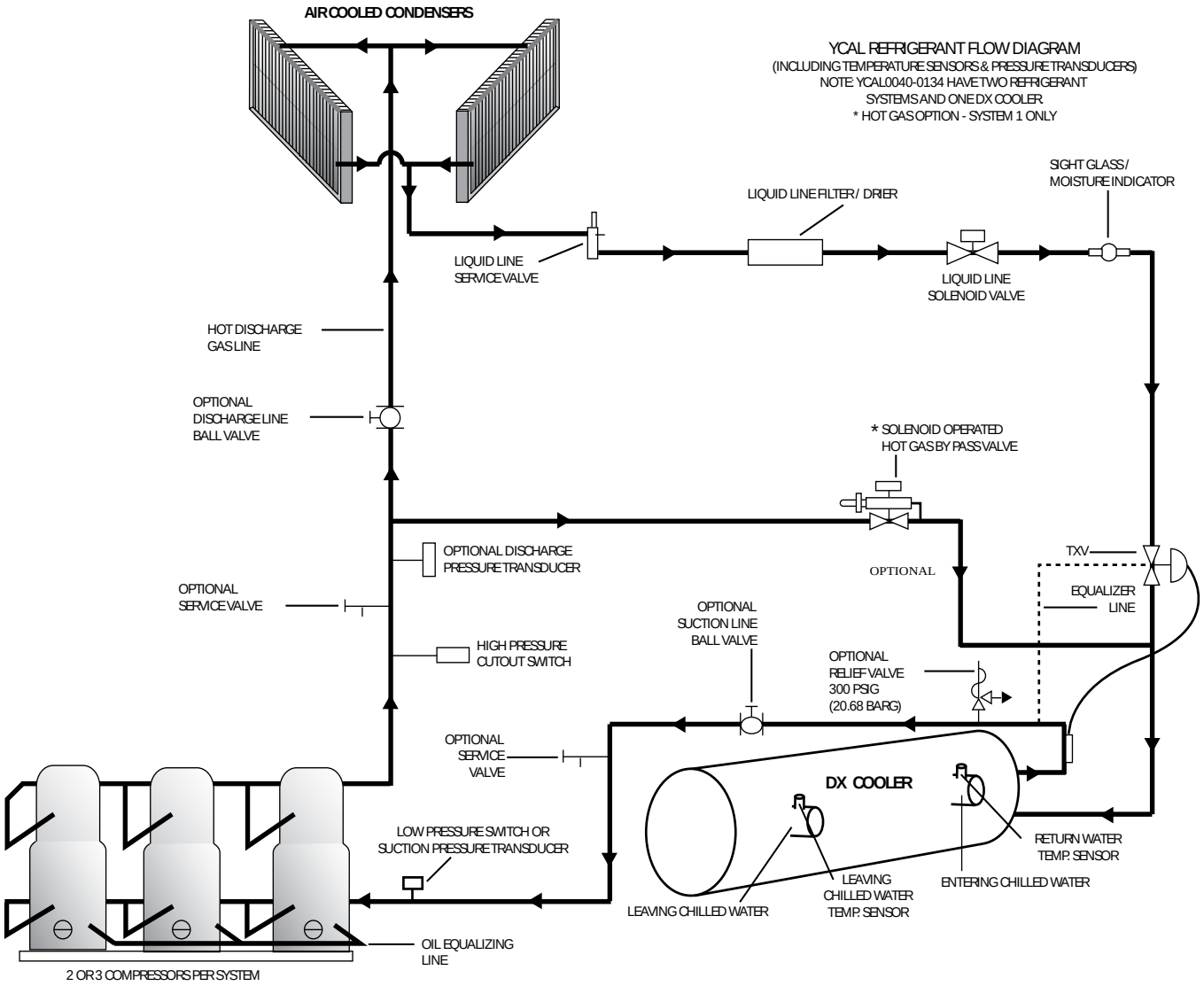
- X : Wire Condenser Headers Only (factory)
- 1 : Wire (Full Unit) Enc. Panels (factory)
- 2 : Wire (Full Unit) Enc. Panels (field)
- 3 : Wire/Louvered Enc. Panels (factory)
- 4 : Wire/Louvered Enc. Panels (field)
- 5 : Louvered (Cond. Only) Enc. Panels (factory)
- 6 : Louvered (Cond. Only) Enc. Panels (field)
- 7 : Louvered (Full Unit) Enc. Panels (factory)
- 8 : Louvered (Full Unit) Enc. Panels (field)
- B : Acoustic Sound Blanket
- L : Low Sound Fans
- 1 : 1" Deflection
- S : Seismic
- N : Neoprene Pads

55 EXTENDED FIELD

- X : 1st Year Parts Only
- B : 1st Year Parts & Labor
- C : 2nd Year Parts Only
- D : 2nd Year Parts & Labor
- E : 5 Year Compressor Parts Only
- F : 5 Year Compressor Parts & Labor Only
- G : 5 Year Units Parts Only
- H : 5 Year Unit Parts & Labor

NOTES:
1. Q :DENOTES SPECIAL / S.Q.
2. # :DENOTES STANDARD
3. X :w/in OPTIONS FIELD, DENOTES NO OPTION SELECTED
4. Agency Files (i.e. U.L. / E.T.L.; CE; ARI; ETC.) will contain info. based on the first 14 characters only.

REFRIGERANT FLOW DIAGRAM



LD07613A

FIG. 1 – REFRIGERANT FLOW DIAGRAM

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SECTION 1 - INSTALLATION

WARNING

To ensure warranty coverage, this equipment must be commissioned and serviced by an authorized Johnson Controls service mechanic or a qualified service person experienced in chiller installation. Installation must comply with all applicable codes, particularly in regard to electrical wiring and other safety elements such as relief valves, HP cutout settings, design working pressures, and ventilation requirements consistent with the amount and type of refrigerant charge.

Lethal voltages exist within the control panels. Before servicing, open and tag all disconnect switches.

INSTALLATION CHECK LIST

The following items,must be checked before placing the units in operation.

1. Inspect the unit for shipping damage.
2. Rig unit using spreader bars.
3. Open the unit only to install water piping system. Do not remove protective covers from water connections until piping is ready for attachment. Check water piping to ensure cleanliness.
4. Pipe unit using good piping practice *(see ASHRAE handbook section 215 and 195).*
5. Check to see that the unit is installed and operated within limitations *(Refer to Operational and Voltage Limitations located in Section 1 of this IOM).*

The following pages outline detailed procedures to be followed to install and startup the chiller.

HANDLING

These units are shipped as completely assembled units containing full operating charge, and care should be taken to avoid damage due to rough handling.

WARNING

The unit should be lifted by inserting hooks through the holes provided in unit base rails. Spreader bars should be used to avoid crushing the unit frame rails with the lifting chains.

EXAMPLE OF PROPER LIFITING

29224(RIG)A

INSPECTION

Immediately upon receiving the unit, it should be inspected for possible damage which may have occurred during transit. If damage is evident, it should be noted in the carrier's freight bill. A written request for inspection by the carrier's agent should be made at once. *See Instruction manual, Form 50.15-NM for more information and details.*

LOCATION AND CLEARANCES

These units are designed for outdoor installations on ground level, rooftop, or beside a building. Location should be selected for minimum sun exposure and to insure adequate supply of fresh air for the condenser. The units must be installed with sufficient clearances for air entrance to the condenser coil, for air discharge away from the condenser, and for servicing access.

In installations where winter operation is intended and snow accumulations are expected, additional height must be provided to ensure normal condenser air flow.

Clearances are listed under Dimensions in Section 1 of this IOM.

Foundation

The unit should be mounted on a flat and level foundation, floor, or rooftop capable of supporting the entire operating weight of the equipment. *See Physical Data in Section 1 of this IOM for operating weight.* If the unit is elevated beyond the normal reach of service personnel, a suitable catwalk must be capable of supporting service personnel, their equipment, and the compressors.

Ground Level Locations

It is important that the units be installed on a substantial base that will not settle. A one piece concrete slab with footers extended below the frost line is highly recommended. Additionally, the slab should not be tied to the main building foundations as noise and vibration may be transmitted. Mounting holes are provided in the steel channel for bolting the unit to its foundation. (*See Dimensions in Section 1 of this IOM*.)

For ground level installations, precautions should be taken to protect the unit from tampering by or injury to unauthorized persons. Screws and/or latches on access panels will prevent casual tampering. However, further safety precautions such as a fenced-in enclosure or locking devices on the panels may be advisable.

Rooftop Locations

Choose a spot with adequate structural strength to safely support the entire weight of the unit and service personnel. Care must be taken not to damage the roof.

Consult the building contractor or architect if the roof is bonded. Roof installations should have wooden beams (treated to reduce deterioration), cork, rubber, or vibration isolators under the base to minimize vibration.

Noise Sensitive Locations

Efforts should be made to assure that the chiller is not located next to occupied spaces or noise sensitive areas where chiller noise level would be a problem. Chiller noise is a result of compressor and fan operation. Considerations should be made utilizing noise levels published in the YORK Engineering Guide for the specific chiller model. Sound blankets for the compressors and low sound fans are available.

SPRING ISOLATORS (OPTIONAL)

When ordered, four (4) isolators will be furnished.

Identify the isolator, locate at the proper mounting point, and adjust per instructions. *See Isolator Data In Section 7 of this IOM.*

COMPRESSOR MOUNTING

The compressors are mounted on four (4) rubber isolators. The mounting bolts should not be loosened or adjusted at installation of the chiller.

REMOTE COOLER OPTION

For units using remote cooler option, refer to instructions included with miscellaneous cooler parts kit.

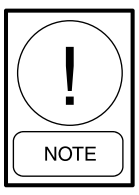
The unit and remote cooler are shipped with a 6 lb. (2.7 kg) nitrogen holding charge. The nitrogen charge must be removed, and system evacuated, and the refrigerant charge must be weighed-in according to the operating charge listed in Table 15 “Physical Data”. Additional charge must also be added for the refrigerant lines.

CHILLED WATER PIPING

General

When the unit has been located in its final position, the unit water piping may be connected. Normal installation precautions should be observed in order to receive maximum operating efficiencies. Piping should be kept free of all foreign matter. All chilled water evaporator piping must comply in all respects with local plumbing codes and ordinances.

Since elbows, tees and valves decrease pump capacity, all piping should be kept as straight and as simple as possible.



All piping must be supported independent of the chiller.

Consideration should be given to compressor access when laying out water piping. Routing the water piping too close to the unit could make compressor servicing/replacement difficult.

Hand stop valves should be installed in all lines to facilitate servicing.

Piping to the inlet and outlet connections of the chiller should include high-pressure rubber hose or piping loops to ensure against transmission of water pump vibration. The necessary components must be obtained in the field.

Drain connections should be provided at all low points to permit complete drainage of the cooler and system water piping.

A small valve or valves should be installed at the highest point or points in the chilled water piping to allow any trapped air to be purged. Vent and drain connections should be extended beyond the insulation to make them accessible.

The piping to and from the cooler must be designed to suit the individual installation. It is important that the following considerations be observed:

1. The chilled liquid piping system should be laid out so that the circulating pump discharges directly into the cooler. The suction for this pump should be taken from the piping system return line and not the cooler. This piping scheme is recommended, but is not mandatory.

2. The inlet and outlet cooler connection sizes are 3" (YCAL0014 through 0024), 4" (YCAL0030 through 0034), 6" (YCAL0040 through 0080), or 8" (YCAL0090 through 0134).

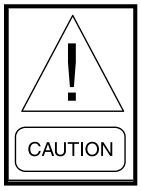
3. A strainer, preferably 40 mesh, must be installed in the cooler inlet line just ahead of the cooler. This is important to protect the cooler from entrance of large particles which could cause damage to the evaporator.

4. All chilled liquid piping should be thoroughly flushed to free it from foreign material before the system is placed into operation. Use care not to flush any foreign material into or through the cooler.

5. As an aid to servicing, thermometers and pressure gauges should be installed in the inlet and outlet water lines.

6. The chilled water lines that are exposed to outdoor ambients should be wrapped with supplemental heater cable and insulated to protect against freeze-up during low ambient periods, and to prevent formation of condensation on lines in warm humid locations.

7. A chilled water flow switch, (either by YORK or 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 to be installed. *(See manufacturer's instructions furnished with the switch.)* The switch is to be wired to terminals 13 and 14 of CTB1 located in the control panel, as shown on the unit wiring diagram.



The flow switch MUST NOT be used to start and stop the chiller (i.e. starting and stopping the chilled water pump). It is intended only as a safety switch.

WIRING

Liquid Chillers are shipped with all factory-mounted controls wired for operation.

Field Wiring

Power wiring must be provided through a fused disconnect switch to the unit terminals (or optional molded disconnect switch) in accordance with N.E.C. or local code requirements. *Minimum circuit ampacity and maximum dual element fuse size are given in the Tables 2 – 6.*

A 120-1-60, 15 amp source must be supplied for the control panel through a fused disconnect when a control panel transformer (optional) is not provided. *Refer to Table 1 and Fig. 2 through Fig. 6.*

See Fig. 2 through Fig. 6 and unit wiring diagrams for field and power wiring connections, chilled water pump starter contacts, alarm contacts, compressor run status contacts, PWM input, and load limit input. *Refer to Unit Operation in Section 2 of this IOM for a detailed description of operation concerning aforementioned contacts and inputs.*

Evaporator Pump Start Contacts

Terminal block CTB2 – terminals 23 to 24, are normally-open contacts that can be used to switch field supplied power to provide a start signal to the evaporator pump contactor. The contacts will be closed when any of the following conditions occur:

1. Low Leaving Chilled Liquid fault
2. Any compressor is running
3. Daily schedule is not programmed OFF and the Unit Switch is ON

The pump will not run if the micro panel has been powered up for less than 30 seconds, or if the pump has run in the last 30 seconds, to prevent pump motor overheating. *Refer to Fig. 6 and unit wiring diagram.*

System Run Contacts

Contacts are available to monitor system status. Normally-open auxiliary contacts from each compressor contactor are wired in parallel with TB1 – terminals 25 to 26 for system 1, and TB1 – terminals 27 to 28 for system 2 (YCAL0040 - YCAL0134). *Refer to Fig. 6 and unit wiring diagram.*

Alarm Status Contacts

Normally-open contacts are available for each refrigerant system. These normally-open contacts close when the system is functioning normally. The respective contacts will open when the unit is shut down on a unit fault, or locked out on a system fault. Field connections are at TB1 terminals 29 to 30 (system 1), and terminals 31 to 32 (system 2 YCAL0040 - YCAL0134).

Remote Start/Stop Contacts

To remotely start and stop the chiller, dry contacts can be wired in series with the flow switch and CTB1 - terminals 13 to 14. *Refer to Fig. 6 and unit wiring diagram.*

Remote Emergency Cutoff

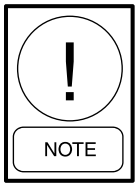
Immediate shutdown of the chiller can be accomplished by opening a field-installed dry contact to break the electrical circuit between terminals 5 to L on terminal block TB1. The unit is shipped with a factory jumper installed between terminals 5 to L, which must be removed if emergency shutdown contacts are installed. *Refer to Fig. 6 and unit wiring diagram.*

PWM Input

The PWM input allows reset of the chilled liquid setpoint by supplying a “timed” contact closure. Field wiring should be connected to TB1 – terminals 13 to 20. A detailed explanation is provided in Section 2, “Unit Controls”. *Refer to Fig. 6 and unit wiring diagram.*

Load Limit Input

Load limiting is a feature that prevents the unit from loading beyond a desired value. The unit can be “load limited” either 33%, 40%, 50%, 66% or 80%, depending on the number of compressors on unit. The field connections are wired to TB1 – terminals 13 to 21, and work in conjunction with the PWM inputs. A detailed explanation is provided in Section 2, “Unit Controls”. *Refer to Fig. 6 and unit wiring diagram.*



When using the Load Limit feature, the PWM feature will not function. Simultaneous operation of load limiting and temperature reset (PWM input) cannot be done.

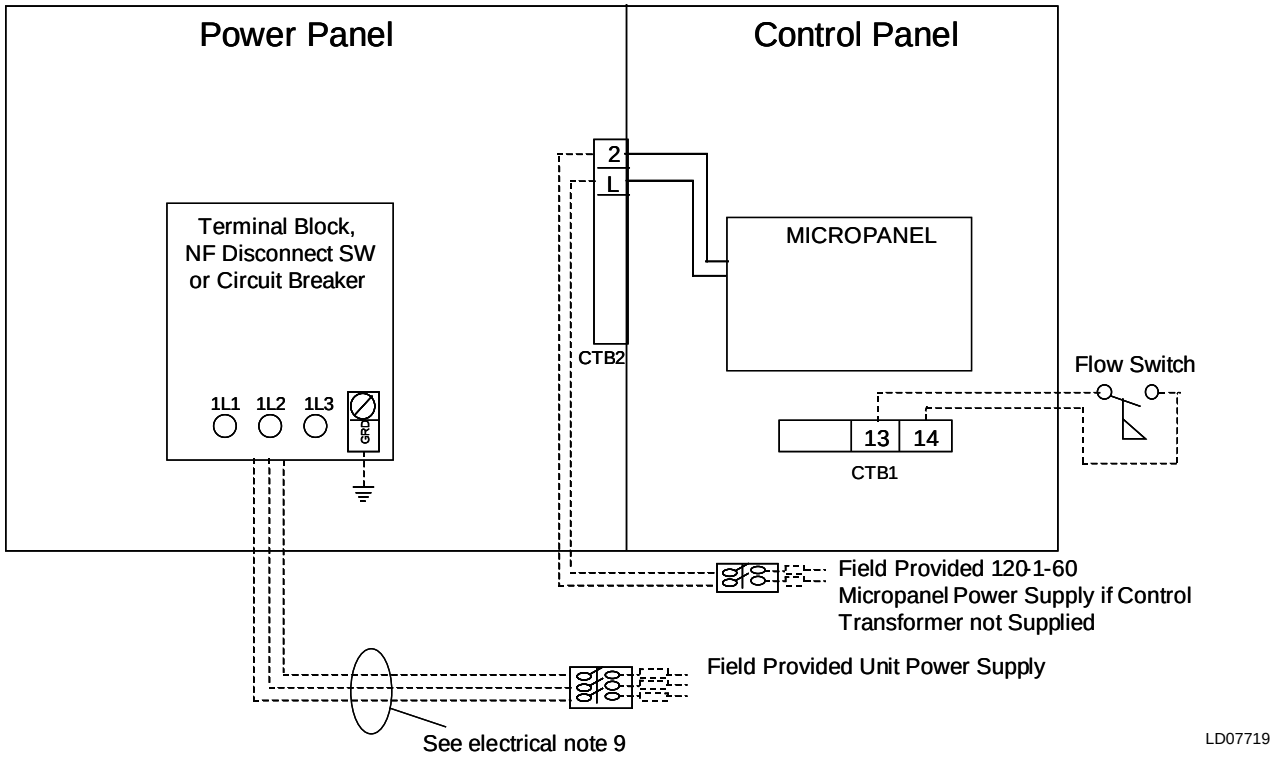
Flow Switch Input

The flow switch is field wired to CTB1 terminals 13 and 14. *See Fig. 6 and unit wiring diagram.*

Compressor Heaters

Compressor heaters are standard. If power is OFF more than two hours, the crankcase heaters must be energized for 18 - 24 hours prior to restarting a compressor. This will assure that liquid slugging and oil dilution does not damage the compressors on start.

SINGLE-POINT SUPPLY CONNECTION – TERMINAL BLOCK, NON-FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER (0014 - 0080)



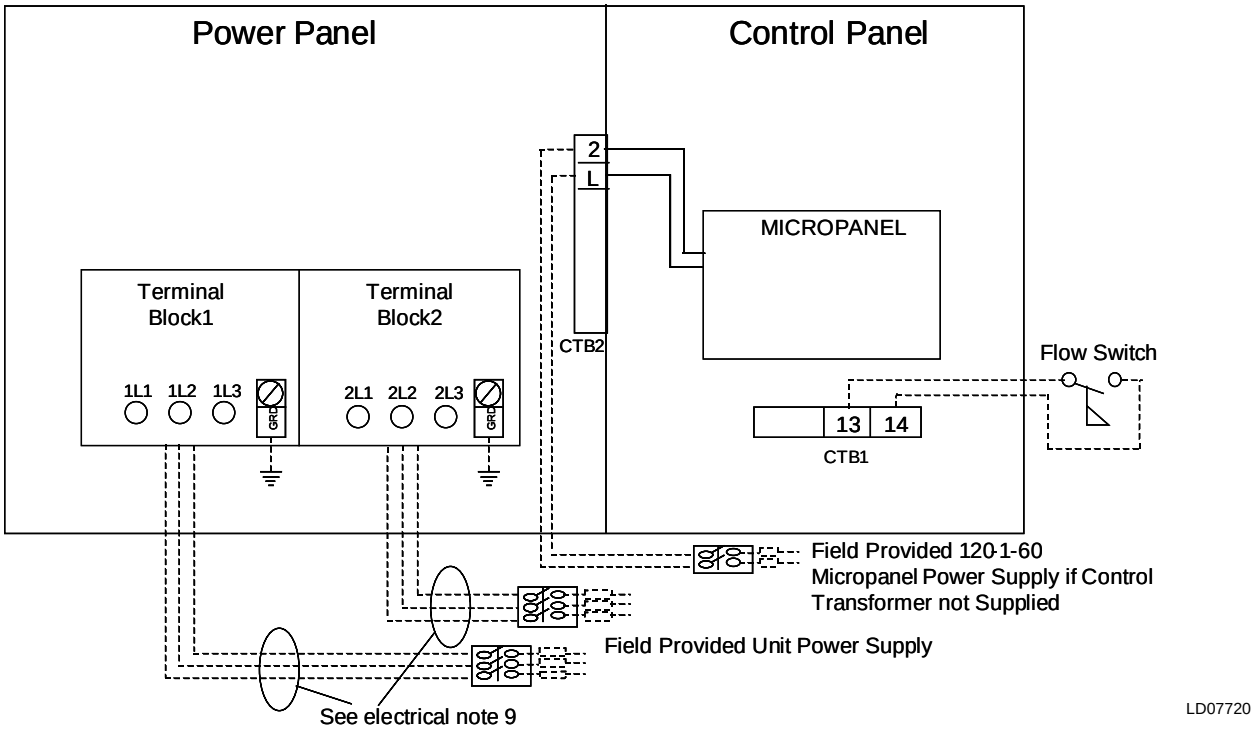
See Electrical Notes and Legend located on page 28.

FIG. 2 – SINGLE-POINT SUPPLY CONNECTION – TERMINAL BLOCK, NON-FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER (0014 - 0080)

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

MULTIPLE POINT POWER SUPPLY CONNECTION – TERMINAL BLOCK (0040 - 0080)



* Models YCAL0040 through 0080 only (Models YCAL0014 through 0034 are Single Point)

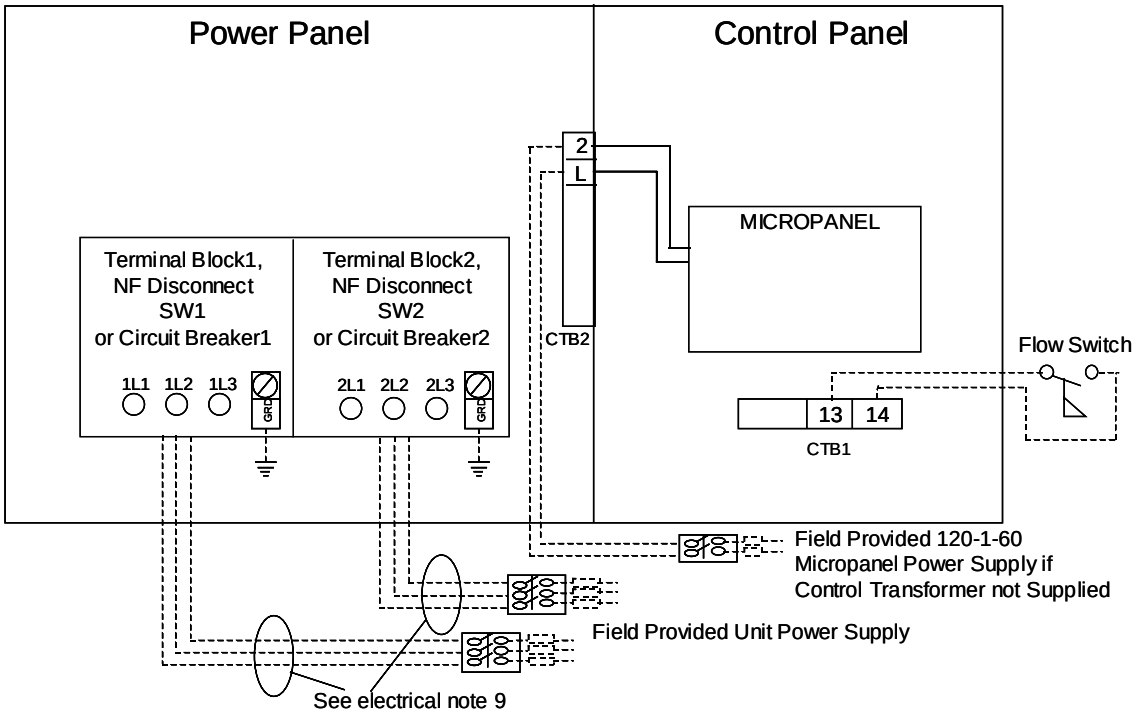
See Electrical Notes and Legend located on page 28.

FIG. 3 – MULTIPLE POINT POWER SUPPLY CONNECTION – TERMINAL BLOCK (0040 - 0080)

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

MULTIPLE POINT POWER SUPPLY CONNECTION – TERMINAL BLOCK, NON-FUSED DISCONNECT SWITCHES OR CIRCUIT BREAKERS (0090 - 0134)



See Electrical Notes and Legend located on page 28.

FIG. 4 – MULTIPLE POINT POWER SUPPLY CONNECTION – TERMINAL BLOCK, NON-FUSED DISCONNECT SWITCHES OR CIRCUIT BREAKERS (0090 - 0134)

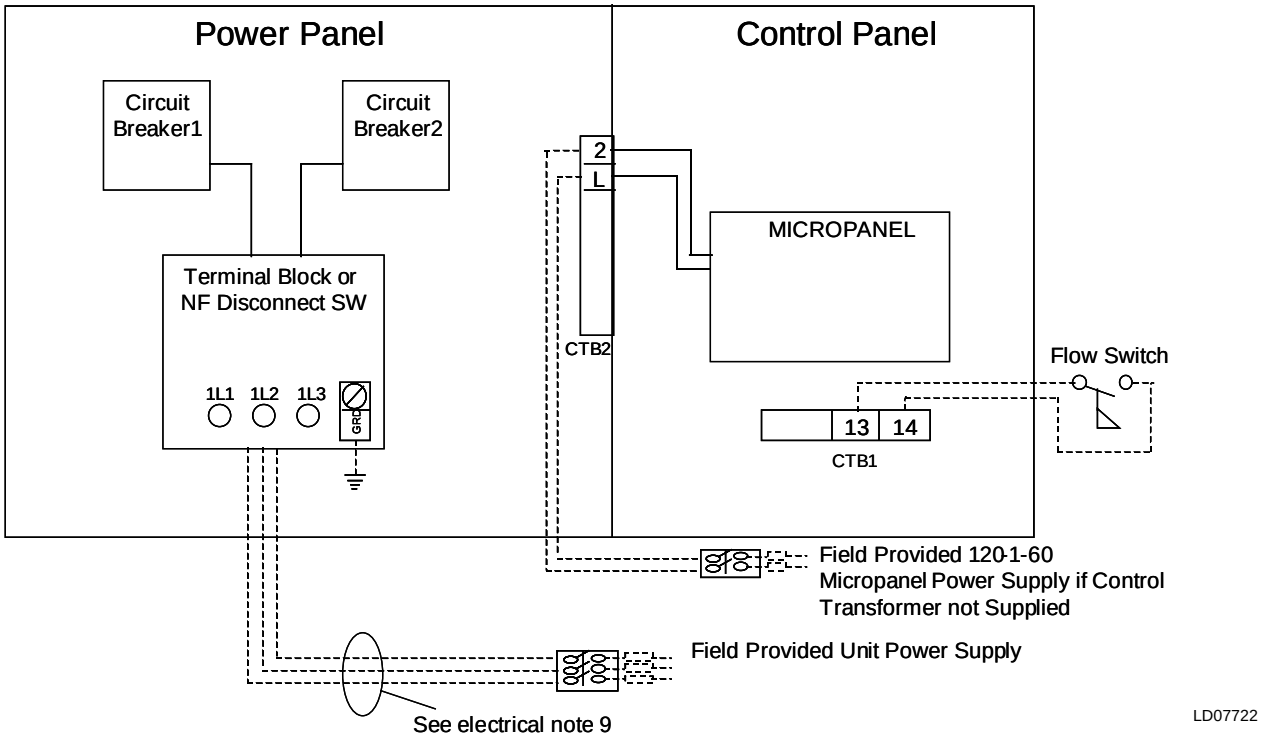
WARNING

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

CAUTION

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

SINGLE-POINT SUPPLY CONNECTION – TERMINAL BLOCK OR NON-FUSED DISCONNECT SWITCH TO INDIVIDUAL SYSTEM CIRCUIT BREAKERS (0090 - 0134)



See Electrical Notes and Legend located on page 28.

FIG. 5 – OPTIONAL SINGLE-POINT POWER WIRING

WARNING

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

CAUTION

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

CONTROL WIRING

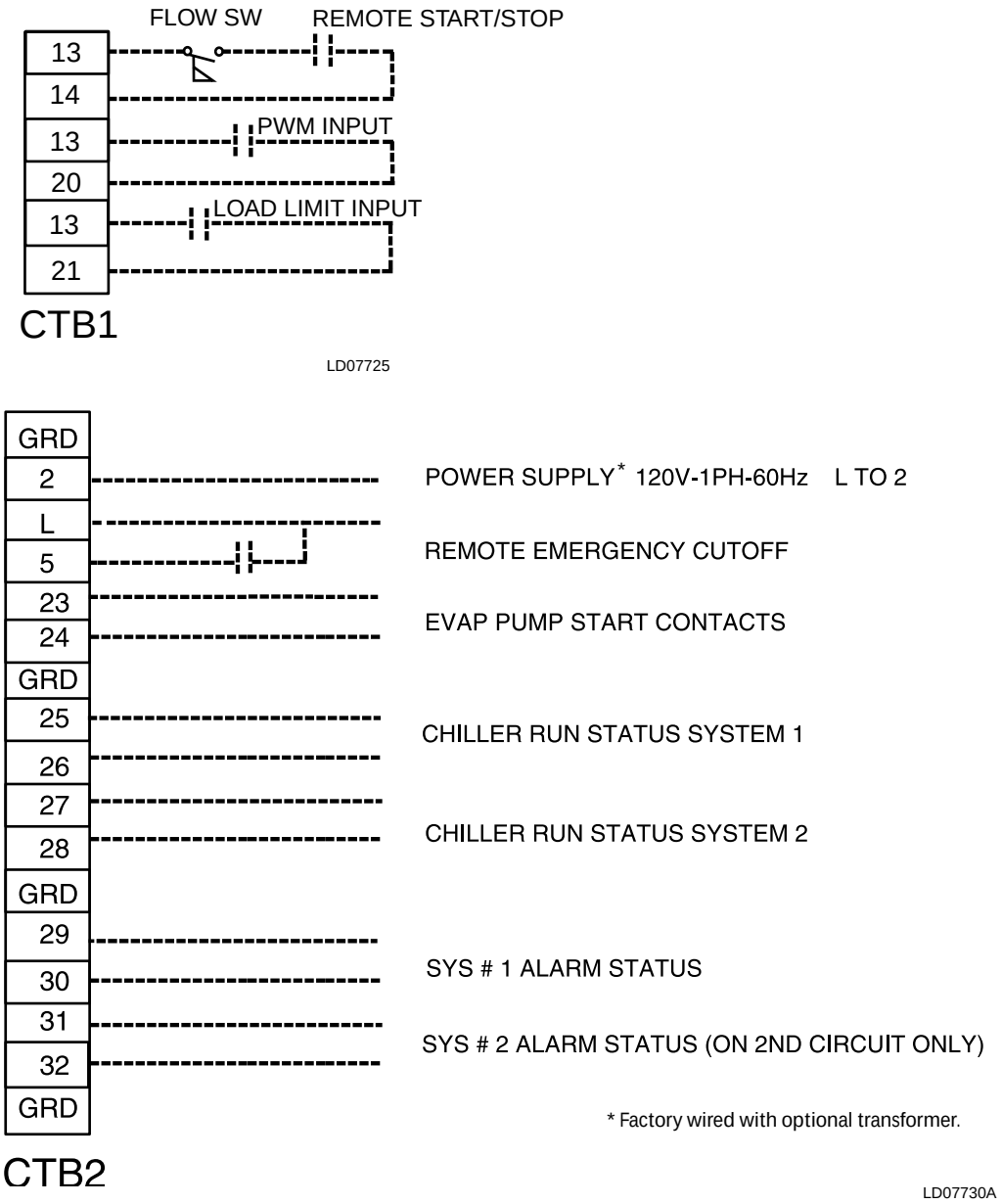


FIG. 6 – CONTROL WIRING

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

ELECTRICAL NOTES AND LEGEND

1. Minimum Circuit Ampacity (MCA) is based on 125% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit, per N.E.C. Article 430.33. If the Factory-mounted Control Transformer is provided, add the following to the system MCA values in the electrical tables for the system supplying power to the optional transformer. -17, add 2.5 amps; -28, add 2.3 amps; -40, add 1.5 amps, -46, add 1.3 amps; -58, add 1 amp.
2. The minimum recommended disconnect switch is based on 115% of the rated load amps for all loads included in the circuit, per N.E.C. Article 440.12 (A) 1.
3. Minimum fuse size is based upon 150% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit to avoid nuisance trips at startup due to lock rotor amps. It is not recommended in applications where brown outs, frequent starting and stopping of the unit, and/or operation at ambient temperatures in excess of 95°F is anticipated.
4. Maximum fuse size is based upon 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit, per N.E.C. Article 440.22.
5. Circuit breakers must be U.L. listed and CSA certified and maximum size is based on 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit. Exception: YCAL0014 and YCAL0020 must have the optional factory overloads installed to use a standard circuit breaker. Otherwise, HACR-type circuit breakers must be used. Maximum HACR circuit breaker rating is based on 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit.
6. The “Incoming Wire Range” is the minimum and maximum wire size that can be accommodated by the unit wiring lugs. The (2) preceding the wire range indicates the number of termination points available per phase of the wire range specified. Actual wire size and number of wires per phase must be determined based on the National Electrical Code, using copper connectors only. Field wiring must also comply with local codes.
7. A ground lug is provided for each compressor system to accommodate a field grounding conductor per N.E.C. Table 250.122. A control circuit grounding lug is also supplied.
8. The supplied disconnect is a “Disconnecting Means” as defined in the N.E.C. 100.I, and is intended for isolating the unit for the available power supply to perform maintenance and troubleshooting. This disconnect is not intended to be a Load Break Device.
9. Field wiring by others which complies to the National Electrical Code and local codes.

LEGEND	
ACR-LINE	ACROSS -THE-LINE START
C.B.	CIRCUIT BREAKER
D.E.	DUAL ELEMENT FUSE
DISC SW	DISCONNECT SWITCH
FACT MOUNT CB	FACTORY-MOUNTED CIRCUIT BREAKER
FLA	FULL LOAD AMPS
HZ	HERTZ
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MIN	MINIMUM
MIN NF	MINIMUM NON FUSED
RLA	RATED LOAD AMPS
S.P. WIRE	SINGLE-POINT WIRING
UNIT MTD SERV SW	UNIT MOUNTED SERVICE (NON-FUSED DISCONNECT SWITCH)
LRA	LOCKED ROTOR AMPS

VOLTAGE CODE
-17 = 200-3-60
-28 = 230-3-60
-40 = 380-3-60
-46 = 460-3-60
-58 = 575-3-60

LEGEND:

Field Wiring — — — —

Factory Wiring ————

ELECTRICAL DATA

TABLE 1 – MICRO PANEL POWER SUPPLY

UNIT VOLTAGE	UNIT VOLTAGE	CONTROL POWER	MCA	OVER CURRENT PROTECTION, *SEE NOTE B*		NF DISC SW
			NOTE A	MIN	MAX	
MODELS w/o CONTROL TRANS		115-1-60/50	15A	10A	15A	30 A / 240V
MODELS w/ CONTROL TRANS	-17	200-1-60	15A	10A	15A	30 A / 240V
	-28	230-1-60	15A	10A	15A	30 A / 240V
	-40	380-1-60	15A	10A	15A	30 A / 480V
	-46	460-1-60	15A	10A	15A	30 A / 480V
	-58	575-1-60	15A	10A	15A	30 A / 600V

A. Minimum #14 AWG, 75°C, Copper Recommended

B. Minimum and Maximum Over Current Protection, Dual Element Fuse or Circuit Breaker

It is possible that multiple sources of power can be supplying the unit power panel. To prevent serious injury or death, the technician should verify that NO LETHAL VOLTAGES are present inside the panel AFTER disconnecting power, PRIOR to working on equipment.

The unit evaporator heater uses 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

SINGLE-POINT POWER SUPPLY CONNECTIONS – YCAL0014E_ - YCAL0034E_

One Field Provided Power Supply to the chiller. Field connections to Factory Provided Power Terminal Block (standard), Non-Fused Disconnect Switch (optional) or Circuit Breaker (optional).

TABLE 2 – SINGLE-POINT POWER SUPPLY

MODEL YCAL	VOLT	HZ	SINGLE POINT FIELD SUPPLIED WIRING									SYSTEM #1 COMPRESSOR & FAN							
			MCA1	MIN N/F DISC SW2	D.E. FUSE		CKT. BKR.5		INCOMING (LUGS) WIRE RANGE6			COMPR. #1		COMPR. #2		COMPR. #3		FANS	
					MIN3	MAX4	MIN	MAX	TER-MINAL BLOCK (STD)	NF DISC. SWITCH (OPT)	CIRCUIT BREAK-ER (OPT)	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA (EA)
0014	200	60	81	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	28.3	189	28.3	189	—	—	2	7.6
	230	60	75	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.2	189	26.2	189	—	—	2	7.4
	380	60	44	60	50	50	50	50	# 10 - # 1	# 14 - 1/0	# 14 - 2	15.1	112	15.1	112	—	—	2	4.5
	460	60	37	60	40	45	40	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	12.5	99	12.5	99	—	—	2	4.0
	575	60	29	60	35	35	35	35	# 10 - # 1	# 14 - 1/0	# 14 - 2	10.0	74	10.0	74	—	—	2	2.9
0020	200	60	101	150	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	37.4	278	37.4	278	—	—	2	7.6
	230	60	94	100	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	34.6	278	34.6	278	—	—	2	7.4
	380	60	54	60	60	70	60	70	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.9	151	19.9	151	—	—	2	4.5
	460	60	46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	16.5	127	16.5	127	—	—	2	4.0
	575	60	36	60	40	45	40	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	13.2	100	13.2	100	—	—	2	2.9
0024	200	60	128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	49.4	350	49.4	350	—	—	2	7.6
	230	60	119	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	45.8	350	45.8	350	—	—	2	7.4
	380	60	69	100	80	90	80	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	—	—	2	4.5
	460	60	58	60	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	—	—	2	4.0
	575	60	46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	17.4	125	17.4	125	—	—	2	2.9
0030	200	60	138	150	175	175	175	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	53.8	425	53.8	425	—	—	2	7.6
	230	60	128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	49.8	425	49.8	425	—	—	2	7.4
	380	60	74	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	28.7	239	28.7	239	—	—-	2	4.5
	460	60	62	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	—	—	2	4.0
	575	60	49	60	60	60	60	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.0	148	19.0	148	—	—	2	2.9
0034	200	60	178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.4	350	49.4	350	49.4	350	2	7.6
	230	60	165	200	200	200	200	200	# 10 - 300	# 3 - 300	# 3 - 300	45.8	350	45.8	350	45.8	350	2	7.4
	380	60	96	150	110	110	110	110	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	26.4	195	26.4	195	26.4	195	2	4.5
	460	60	79	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	21.8	158	2	4.0
	575	60	63	100	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	17.4	125	17.4	125	17.4	125	2	2.9

See Notes and Legend on page 28

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ELECTRICAL DATA – DUAL POINT POWER SUPPLY CONNECTIONS – YCAL0040E_ - YCAL0080E_

Two Field Provided Power Supply Circuits to the chiller. Field connections to Factory Provided Terminal Blocks per system.

TABLE 3 – DUAL POINT POWER SUPPLY CONNECTIONS

MODEL YCAL	VOLT	HZ	SYSTEM #1 FIELD SUPPLIED WIRING									SYSTEM #1 COMPRESSOR & FAN							
			MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]			COMPR. #1		COMPR. #2		COMPR. #3		FANS	
									TERMINAL BLOCK (std)	NF DISC. SWITCH (opt)	CIR BREAKER (opt)								
					MIN[3]	MAX[4]	MIN	MAX				RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
0040	200	60	101	150	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	37.4	278	37.4	278	—	—	2	7.8
	230	60	94	100	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	34.6	278	34.6	278	—	—	2	7.8
	380	60	55	60	60	70	60	70	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.9	151	19.9	151	—	—	2	4.7
	460	60	46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	16.5	127	16.5	127	—	—	2	4.0
	575	60	36	60	40	45	40	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	13.2	100	13.2	100	—	—	2	3.1
0042	200	60	128	150	150	175	150	125	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	49.4	350	49.4	350	—	—	2	7.8
	230	60	119	150	150	150	150	125	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	45.8	350	45.8	350	—	—	2	7.8
	380	60	69	100	80	90	80	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	—	—	2	4.7
	460	60	58	60	70	70	70	60	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	—	—	2	4.0
	575	60	46	60	50	60	50	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	17.4	125	17.4	125	—	—	2	3.1
0044	200	60	128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	49.4	350	49.4	350	—	—	2	7.8
	230	60	119	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	45.8	350	45.8	350	—	—	2	7.8
	380	60	69	100	80	90	80	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	—	—	2	4.7
	460	60	58	60	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	—	—	2	4.0
	575	60	46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	17.4	125	17.4	125	—	—	2	3.1
0050	200	60	138	150	175	175	175	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	53.8	425	53.8	425	—	—	2	7.8
	230	60	128	150	150	175	150	150	# 10 - 3/0	# 2 - 4/0	# 3 - 300	49.8	425	49.8	425	—	—	2	7.8
	380	60	75	100	90	100	90	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	28.7	239	28.7	239	—	—	2	4.7
	460	60	62	100	70	80	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	—	—	2	4.0
	575	60	49	60	60	60	60	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.0	148	19.0	148	—	—	2	3.1
0060	200	60	138	150	175	175	175	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	53.8	425	53.8	425	—	—	2	7.8
	230	60	128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	49.8	425	49.8	425	—	—	2	7.8
	380	60	75	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	28.7	239	28.7	239	—	—	2	4.7
	460	60	62	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	—	—	2	4.0
	575	60	49	60	60	60	60	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.0	148	19.0	148	—-	—	2	3.1
0064	200	60	178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.4	350	49.4	350	49.4	350	2	7.8
	230	60	165	200	200	200	200	200	# 10 - 300	# 3 - 300	# 3 - 300	45.8	350	45.8	350	45.8	350	2	7.8
	380	60	96	150	110	110	110	110	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	26.4	195	2	4.7
	460	60	79	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	21.8	158	2	4.0
	575	60	63	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	17.4	125	17.4	125	17.4	125	2	3.1
0070	200	60	178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.4	350	49.4	350	49.4	350	2	7.8
	230	60	165	200	200	200	200	200	# 10 - 300	# 3 - 300	# 3 - 300	45.8	350	45.8	350	45.8	350	2	7.8
	380	60	96	150	110	110	110	110	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	26.4	195	2	4.7
	460	60	79	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	21.8	158	2	4.0
	575	60	63	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	17.4	125	17.4	125	17.4	125	2	3.1
0074	200	60	192	250	225	225	225	225	# 10 - 300	# 3 - 300	# 3 - 300	53.8	425	53.8	425	53.8	425	2	7.8
	230	60	178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.8	425	49.8	425	49.8	425	2	7.8
	380	60	103	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0	28.7	239	28.7	239	28.7	239	2	4.7
	460	60	86	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	23.7	187	2	4.0
	575	60	68	100	80	80	80	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	19.0	148	19.0	148	19.0	148	2	3.1
0080	200	60	192	250	225	225	225	225	# 10 - 300	# 3 - 300	# 3 - 300	53.8	425	53.8	425	53.8	425	2	7.8
	230	60	178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.8	425	49.8	425	49.8	425	2	7.8
	380	60	103	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0	28.7	239	28.7	239	28.7	239	2	4.7
	460	60	86	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	23.7	187	2	4.0
	575	60	68	100	80	80	80	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	19.0	148	19.0	148	19.0	148	2	3.1

See Notes and Legend on page 28.

ELECTRICAL DATA – DUAL POINT POWER SUPPLY CONNECTIONS – YCAL0040E_ - YCAL0080E_

SYSTEM #2 FIELD SUPPLIED WIRING									SYSTEM #2 COMPRESSOR & FAN							
MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]			COMPR. #1		COMPR. #2		COMPR. #3		FANS	
		MIN[3]	MAX[4]	MIN	MAX	TERMINAL BLOCK (std)	NF DISC. SWITCH (opt)	CIR BREAKER (opt)	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
101	150	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	37.4	278	37.4	278	—	—	2	7.8
94	100	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	34.6	278	34.6	278	—	—	2	7.8
55	60	60	70	60	70	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.9	151	19.9	151	—	—	2	4.7
46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	16.5	127	16.5	127	—	—	2	4.0
36	60	40	45	40	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	13.2	100	13.2	100	—	—	2	3.1
101	150	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	37.4	278	37.4	278	—	—	2	7.8
94	100	110	125	110	125	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	34.6	278	34.6	278	—	—	2	7.8
55	60	60	70	60	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	19.9	151	19.9	151	—	—	2	4.7
46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	16.5	127	16.5	127	—	—	2	4.0
36	60	40	45	40	45	# 10 - # 1	# 14 - 1/0	# 14 - 2	13.2	100	13.2	100	—	—	2	3.1
128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	49.4	350	49.4	350	—	—	2	7.8
119	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	45.8	350	45.8	350	—	—	2	7.8
69	100	80	90	80	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	—	—	2	4.7
58	60	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	—	—	2	4.0
46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	17.4	125	17.4	125	—	—	2	3.1
128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	49.4	350	49.4	350	—	—	2	7.8
119	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	45.8	350	45.8	350	—	—	2	7.8
69	100	80	90	80	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	—	—	2	4.7
58	60	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	—	—	2	4.0
46	60	50	60	50	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	17.4	125	17.4	125	—	—	2	3.1
138	150	175	175	175	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	53.8	425	53.8	425	—	—	2	7.8
128	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 3 - 300	49.8	425	49.8	425	—	—	2	7.8
75	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	28.7	239	28.7	239	—	—	2	4.7
62	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	—	—	2	4.0
49	60	60	60	60	60	# 10 - # 1	# 14 - 1/0	# 14 - 2	19.0	148	19.0	148	—	—	2	3.1
138	150	150	175	150	175	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	37.4	278	37.4	278	37.4	278	2	7.8
129	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0	34.6	278	34.6	278	34.6	278	2	7.8
75	100	80	90	80	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	19.9	151	19.9	151	19.9	151	2	4.7
62	100	70	70	70	70	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	16.5	127	16.5	127	16.5	127	2	4.0
50	60	60	60	60	60	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	13.2	100	13.2	100	13.2	100	2	3.1
178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.4	350	49.4	350	49.4	350	2	7.8
165	200	200	200	200	200	# 10 - 300	# 3 - 300	# 3 - 300	45.8	350	45.8	350	45.8	350	2	7.8
96	150	110	110	110	110	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	26.4	195	26.4	195	26.4	195	2	4.7
79	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	21.8	158	2	4.0
63	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	17.4	125	17.4	125	17.4	125	2	3.1
178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.4	350	49.4	350	49.4	350	2	7.8
165	200	200	200	200	200	# 10 - 300	# 3 - 300	# 3 - 300	45.8	350	45.8	350	45.8	350	2	7.8
96	150	110	110	110	110	# 10 - # 1	# 14 - 1/0	# 2 - 4/0	26.4	195	26.4	195	26.4	195	2	4.7
79	100	90	100	90	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	21.8	158	21.8	158	21.8	158	2	4.0
63	100	70	80	70	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	17.4	125	17.4	125	17.4	125	2	3.1
192	250	225	225	225	225	# 10 - 300	# 3 - 300	# 3 - 300	53.8	425	53.8	425	53.8	425	2	7.8
178	200	200	225	200	225	# 10 - 300	# 3 - 300	# 3 - 300	49.8	425	49.8	425	49.8	425	2	7.8
103	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0	28.7	239	28.7	239	28.7	239	2	4.7
86	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	23.7	187	23.7	187	23.7	187	2	4.0
68	100	80	80	80	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0	19.0	148	19.0	148	19.0	148	2	3.1

ELECTRICAL DATA – SINGLE POINT POWER SUPPLY CONNECTIONS – YCAL0040E_ - YCAL0080E_

(One Field Provided Power Supply Circuit to the chiller. Field connections to Factory Provided Terminal Block (optional), Non-Fused Disconnect Switch (optional) or Circuit Breaker (optional).)

TABLE 4 – SINGLE POINT POWER SUPPLY CONNECTIONS

MODEL YCAL	VOLT	HZ	SINGLE POINT FIELD SUPPLIED WIRING								
			MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]		
					MIN[3]	MAX[4]	MIN	MAX	TERMINAL BLOCK (opt)	NF DISC. SWITCH (opt)	CIRCUIT BREAKER (opt)
0040	200	60	192	250	225	225	225	225	# 10 - 300	# 6 - 350	# 3 - 300
	230	60	179	200	200	200	200	200	# 10 - 300	# 6 - 350	# 3 - 300
	380	60	104	150	110	110	110	110	# 10 - # 1	# 2 - 4/0	# 2 - 4/0
	460	60	87	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0
	575	60	69	100	80	80	80	80	# 10 - # 1	# 14 - 1/0	# 14 - 1/0
0042	200	60	219	250	250	250	250	250	# 10 - 300	# 6 - 350	# 3 - 300
	230	60	204	250	225	225	225	225	# 10 - 300	# 6 - 350	# 3 - 300
	380	60	119	150	125	125	125	125	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
	460	60	98	150	110	110	110	110	# 10 - # 1	# 2 - 4/0	# 14 - 1/0
	575	60	78	100	90	90	90	90	# 10 - # 1	# 14 - 1/0	# 14 - 1/0
0044	200	60	243	400	300	300	300	300	# 10 - 300	250-500	# 6 - 350
	230	60	226	250	250	250	250	250	# 10 - 300	# 6 - 350	# 6 - 350
	380	60	132	150	150	250	150	250	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
	460	60	109	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0
	575	60	87	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0
0050	200	60	253	400	300	300	300	300	# 10 - 300	250-500	250-500
	230	60	235	400	250	250	250	250	# 10 - 300	250-500	# 6 - 350
	380	60	137	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
	460	60	113	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0
	575	60	90	100	100	100	100	100	# 10 - # 1	# 14 - 1/0	# 14 - 1/0
0060	200	60	262	400	300	300	300	300	# 4 - 500	250-500	250-500
	230	60	243	400	300	300	300	300	# 4 - 500	250-500	250-500
	380	60	142	200	150	150	150	150	# 10 - 3/0	# 6 - 350	# 2 - 4/0
	460	60	117	150	125	125	125	125	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
	575	60	94	150	100	110	100	110	# 10 - # 1	# 2 - 4/0	# 14 - 1/0
0064	200	60	306	400	350	350	350	350	# 4 - 500	250-500	250-500
	230	60	284	400	300	300	300	300	# 4 - 500	250-500	250-500
	380	60	165	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 2 - 4/0
	460	60	137	200	150	150	150	150	# 10 - 3/0	# 6 - 350	# 2 - 4/0
	575	60	109	150	125	125	125	125	# 10 - # 1	# 2 - 4/0	# 2 - 4/0
0070	200	60	342	400	400	400	400	400	(2) # 10 - 3/0	250-500	250-500
	230	60	318	400	350	350	350	350	# 4 - 500	250-500	250-500
	380	60	185	250	200	200	200	200	# 10 - 300	# 6 - 350	# 4 - 300
	460	60	153	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 4 - 300
	575	60	122	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
0074	200	60	356	400	400	400	400	400	(2) # 10 - 300	250-500	250-500
	230	60	331	400	350	350	350	350	# 4 - 500	250-500	250-500
	380	60	192	250	200	200	200	200	# 10 - 300	# 6 - 350	# 4 - 300
	460	60	159	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 4 - 300
	575	60	127	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0
0080	200	60	369	600	400	400	400	400	(2) # 10 - 300	(3) 2/0 - 400	250-500
	230	60	343	400	400	400	400	400	(2) # 10 - 300	250-500	250-500
	380	60	199	250	225	225	225	225	# 10 - 300	# 6 - 350	# 4 - 300
	460	60	165	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 4 - 300
	575	60	131	150	150	150	150	150	# 10 - 3/0	# 2 - 4/0	# 2 - 4/0

ELECTRICAL DATA – SINGLE POINT POWER SUPPLY CONNECTIONS – YCAL0040E_ - YCAL0080E_

SYSTEM #1 COMPRESSOR & FAN								SYSTEM #2 FIELD SUPPLIED WIRING							
COMPR. #1		COMPR. #2		COMPR. #3		FANS		COMPR. #1		COMPR. #2		COMPR. #3		FANS	
RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
37.4	278	37.4	278	—	—	2	7.8	37.4	278	37.4	278	—	—	2	7.8
34.6	278	34.6	278	—	—	2	7.8	34.6	278	34.6	278	—	—	2	7.8
19.9	151	19.9	151	—	—	2	4.7	19.9	151	19.9	151	—	—	2	4.7
16.5	127	16.5	127	—	—	2	4.0	16.5	127	16.5	127	—	—	2	4.0
13.2	100	13.2	100	—	—	2	3.1	13.2	100	13.2	100	—	—	2	3.1
49.4	350	49.4	350	—	—	2	7.8	37.4	278	37.4	278	—	—	2	7.8
45.8	350	45.8	350	—	—	2	7.8	34.6	278	34.6	278	—	—	2	7.8
26.4	195	26.4	195	—	—	2	4.7	19.9	151	19.9	151	—	—	2	4.7
21.8	158	21.8	158	—	—	2	4.0	16.5	127	16.5	127	—	—	2	4.0
17.4	125	17.4	125	—	—	2	3.1	13.2	100	13.2	100	—	—	2	3.1
49.4	350	49.4	350	—	—	2	7.8	49.4	350	49.4	350	—	—	2	7.8
45.8	350	45.8	350	—	—	2	7.8	45.8	350	45.8	350	—	—	2	7.8
26.4	195	26.4	195	—	—	2	4.7	26.4	195	26.4	195	—	—	2	4.7
21.8	158	21.8	158	—	—	2	4.0	21.8	158	21.8	158	—	—	2	4.0
17.4	125	17.4	125	—	—	2	3.1	17.4	125	17.4	125	—	—	2	3.1
53.8	425	53.8	425	—	—	2	7.8	49.4	350	49.4	350	—	—	2	7.8
49.8	425	49.8	425	—	—	2	7.8	45.8	350	45.8	350	—	—	2	7.8
28.7	239	28.7	239	—	—	2	4.7	26.4	195	26.4	195	—	—	2	4.7
23.7	187	23.7	187	—	—	2	4.0	21.8	158	21.8	158	—	—	2	4.0
19.0	148	19.0	148	—	—	2	3.1	17.4	125	17.4	125	—	—	2	3.1
53.8	425	53.8	425	—	—	2	7.8	53.8	425	53.8	425	—	—	2	7.8
49.8	425	49.8	425	—	—	2	7.8	49.8	425	49.8	425	—	—	2	7.8
28.7	239	28.7	239	—	—	2	4.7	28.7	239	28.7	239	—	—	2	4.7
23.7	187	23.7	187	—	—	2	4.0	23.7	187	23.7	187	—	—	2	4.0
19.0	148	19.0	148	—	—	2	3.1	19.0	148	19.0	148	—	—	2	3.1
49.4	350	49.4	350	49.4	350	2	7.8	37.4	278	37.4	278	37.4	278	2	7.8
45.8	350	45.8	350	45.8	350	2	7.8	34.6	278	34.6	278	34.6	278	2	7.8
26.4	195	26.4	195	26.4	195	2	4.7	19.9	151	19.9	151	19.9	151	2	4.7
21.8	158	21.8	158	21.8	158	2	4.0	16.5	127	16.5	127	16.5	127	2	4.0
17.4	125	17.4	125	17.4	125	2	3.1	13.2	100	13.2	100	13.2	100	2	3.1
49.4	350	49.4	350	49.4	350	2	7.8	49.4	350	49.4	350	49.4	350	2	7.8
45.8	350	45.8	350	45.8	350	2	7.8	45.8	350	45.8	350	45.8	350	2	7.8
26.4	195	26.4	195	26.4	195	2	4.7	26.4	195	26.4	195	26.4	195	2	4.7
21.8	158	21.8	158	21.8	158	2	4.0	21.8	158	21.8	158	21.8	158	2	4.0
17.4	125	17.4	125	17.4	125	2	3.1	17.4	125	17.4	125	17.4	125	2	3.1
53.8	425	53.8	425	53.8	425	2	7.8	49.4	350	49.4	350	49.4	350	2	7.8
49.8	425	49.8	425	49.8	425	2	7.8	45.8	350	45.8	350	45.8	350	2	7.8
28.7	239	28.7	239	28.7	239	2	4.7	26.4	195	26.4	195	26.4	195	2	4.7
23.7	187	23.7	187	23.7	187	2	4.0	21.8	158	21.8	158	21.8	158	2	4.0
19.0	148	19.0	148	19.0	148	2	3.1	17.4	125	17.4	125	17.4	125	2	3.1
53.8	425	53.8	425	53.8	425	2	7.8	53.8	425	53.8	425	53.8	425	2	7.8
49.8	425	49.8	425	49.8	425	2	7.8	49.8	425	49.8	425	49.8	425	2	7.8
28.7	239	28.7	239	28.7	239	2	4.7	28.7	239	28.7	239	28.7	239	2	4.7
23.7	187	23.7	187	23.7	187	2	4.0	23.7	187	23.7	187	23.7	187	2	4.0
19.0	148	19.0	148	19.0	148	2	3.1	19.0	148	19.0	148	19.0	148	2	3.1

ELECTRICAL DATA – MULTIPLE POINT POWER SUPPLY CONNECTIONS – YCAL0090E_ - YCAL0134E_

Two Field Provided Power Supply Circuits to the chiller. Field connections to Factory Provided Terminal Blocks (standard), Non-Fused Disconnect Switches (optional), or Individual System Circuit Breakers (optional) per electrical system

TABLE 5 – MULTIPLE POINT POWER SUPPLY CONNECTIONS

MODEL YCAL	VOLT	HZ	SYSTEM #1 FIELD SUPPLIED WIRING								
			MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]		
					MIN[3]	MAX[4]	MIN	MAX	TERMINAL BLOCK (std)	NF DISC. SWITCHES (opt)	CIR BREAKERS (opt)
0090	200	60	221	250	250	300	250	300	# 10 - 300	(1) # 6 - 350	(1) # 6 - 350
	230	60	204	250	250	250	250	250	# 10 - 300	(1) # 4 - 300	(1) # 6 - 350
	380	60	119	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	99	150	110	125	110	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	575	60	78	100	90	100	90	100	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0094	200	60	221	250	250	300	250	300	# 10 - 300	(1) # 6 - 350	(1) # 6 - 350
	230	60	206	250	250	250	250	250	# 10 - 300	(1) # 4 - 300	(1) # 6 - 350
	380	60	120	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	99	150	110	125	110	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	575	60	79	100	90	100	90	100	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0104	200	60	251	400	300	300	300	300	# 4 - 500	250 - 500	250 - 500
	230	60	233	250	250	250	250	250	# 4 - 500	250 - 500	250 - 500
	380	60	135	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	112	150	125	125	125	125	# 10 - 3/0	(1) # 6 - 350	# 3 - 3/0
	575	60	89	100	100	110	100	110	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0114	200	60	251	400	300	300	300	300	# 4 - 500	250 - 500	250 - 500
	230	60	233	250	250	250	250	250	# 4 - 500	250 - 500	250 - 500
	380	60	135	150	150	150	150	150	# 14 - 2/0	(1) # 6 - 350	# 6 - 350
	460	60	112	150	125	125	125	125	# 14 - 2/0	(1) # 6 - 350	# 3 - 3/0
	575	60	89	100	100	110	100	110	# 14 - 2/0	(1) # 6 - 350	# 3 - 3/0
w	200	60	317	400	350	400	350	400	# 4 - 500	250 - 500	250 - 500
	230	60	294	400	350	350	350	350	# 4 - 500	250 - 500	250 - 500
	380	60	171	200	200	200	200	200	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	141	200	175	175	175	175	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	575	60	113	150	125	125	125	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0134	200	60	317	400	350	400	350	400	# 4 - 500	250 - 500	250 - 500
	230	60	294	400	350	350	350	350	# 4 - 500	250 - 500	250 - 500
	380	60	171	200	200	200	200	200	# 10 - 3/0	# 6 - 350	# 6 - 350
	460	60	141	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 6 - 350
	575	60	113	150	125	125	125	125	# 12 - # 1	# 6 - 350	#3 - 3/0

MODEL YCAL	VOLT	HZ	SYSTEM #2 FIELD SUPPLIED WIRING								
			MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]		
					MIN[3]	MAX[4]	MIN	MAX	TERMINAL BLOCK (std)	NF DISC. SWITCHES (opt)	CIR BREAKERS (opt)
0090	200	60	181	200	225	250	225	250	# 10 - 300	(1) # 4 - 300	(1) # 4 - 300
	230	60	168	200	200	225	200	225	# 10 - 300	(1) # 4 - 300	(1) # 4 - 300
	380	60	98	150	125	125	125	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	460	60	81	100	90	110	100	110	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	575	60	65	100	80	90	80	90	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0094	200	60	221	250	250	300	250	300	# 10 - 300	(1) # 6 - 350	# 6 - 350
	230	60	206	250	250	250	250	250	# 10 - 300	(1) # 4 - 300	# 6 - 350
	380	60	120	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	99	150	110	125	110	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	575	60	79	100	90	100	90	100	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0104	200	60	221	250	250	300	250	300	# 10 - 300	(1) # 6 - 350	# 6 - 350
	230	60	206	250	250	250	250	250	# 10 - 300	(1) # 4 - 300	# 6 - 350
	380	60	120	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	99	150	110	125	110	125	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
	575	60	79	100	90	100	90	100	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0114	200	60	251	400	300	300	300	300	# 4 - 500	250 - 500	250 - 500
	230	60	233	250	250	250	250	250	# 4 - 500	250 - 500	250 - 500
	380	60	135	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	112	150	125	125	125	125	# 10 - 3/0	(1) # 6 - 350	# 3 - 3/0
	575	60	89	100	100	110	100	110	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0124	200	60	259	400	300	300	300	300	# 4 - 500	250 - 500	250 - 500
	230	60	241	400	300	300	300	300	# 4 - 500	250 - 500	250 - 500
	380	60	140	150	150	175	150	175	# 10 - 3/0	(1) # 6 - 350	# 6 - 350
	460	60	116	150	125	125	125	125	# 10 - 3/0	(1) # 6 - 350	# 3 - 3/0
	575	60	92	100	100	110	100	110	# 12 - # 1	(1) # 6 - 350	# 3 - 3/0
0134	200	60	314	400	350	400	350	400	# 4 - 500	250 - 500	250 - 500
	230	60	294	400	350	350	350	350	# 4 - 500	250 - 500	250 - 500
	380	60	171	200	200	200	200	200	# 10 - 3/0	# 6 - 350	# 6 - 350
	460	60	141	200	175	175	175	175	# 10 - 3/0	# 6 - 350	# 6 - 350
	575	60	113	150	125	125	125	125	# 12 - # 1	# 6 - 350	#3 - 3/0

ELECTRICAL DATA – MULTIPLE POINT POWER SUPPLY CONNECTIONS – YCAL0090E_ - YCAL0134E_

SYSTEM #1 COMPRESSOR & FAN

COMPR. #1		COMPR. #2		COMPR. #3		FANS	
RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
87.2	500	87.2	500	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1
87.2	500	87.2	500	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1
69.4	505	69.4	505	69.4	505	3	7.8
64.3	505	64.3	505	64.3	505	3	7.8
37.0	280	37.0	280	37.0	280	3	4.7
30.6	225	30.6	225	30.6	225	3	4.0
24.5	180	24.5	180	24.5	180	3	3.1
69.4	505	69.4	505	69.4	505	4	7.8
64.3	505	64.3	505	64.3	505	4	7.8
37.0	280	37.0	280	37.0	280	4	4.7
30.6	225	30.6	225	30.6	225	4	4.0
24.5	180	24.5	180	24.5	180	4	3.1
87.2	500	87.2	500	87.2	500	4	7.8
80.8	500	80.8	500	80.8	500	4	7.8
46.6	305	46.6	305	46.6	305	4	4.7
38.5	250	38.5	250	38.5	250	4	4.0
30.8	198	30.8	198	30.8	198	4	3.1
87.2	500	87.2	500	87.2	500	4	7.8
80.8	500	80.8	500	80.8	500	4	7.8
46.6	305	46.6	305	46.6	305	4	4.7
38.5	250	38.5	250	38.5	250	4	4.0
30.8	198	30.8	198	30.8	198	4	3.1

SYSTEM #2 COMPRESSOR & FAN

COMPR. #1		COMPR. #2		COMPR. #3		FANS	
RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
69.4	505	69.4	505	—	—	3	7.8
64.3	505	64.3	505	—	—	3	7.8
37.0	280	37.0	280	—	—	3	4.7
30.6	225	30.6	225	—	—	3	4.0
24.5	180	24.5	180	—	—	3	3.1
87.2	500	87.2	500	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1
87.2	500	87.2	500	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1
69.4	505	69.4	505	69.4	505	4	7.8
64.3	505	64.3	505	64.3	505	4	7.8
37.0	280	37.0	280	37.0	280	4	4.7
30.6	225	30.6	225	30.6	225	4	4.0
24.5	180	24.5	180	24.5	180	4	3.1
69.4	505	69.4	505	69.4	505	4	7.8
64.3	505	64.3	505	64.3	505	4	7.8
37.0	280	37.0	280	37.0	280	4	4.7
30.6	225	30.6	225	30.6	225	4	4.0
24.5	180	24.5	180	24.5	180	4	3.1
87.2	500	87.2	500	87.2	500	4	7.8
80.8	500	80.8	500	80.8	500	4	7.8
46.6	305	46.6	305	46.6	305	4	4.7
38.5	250	38.5	250	38.5	250	4	4.0
30.8	198	30.8	198	30.8	198	4	3.1

ELECTRICAL DATA – SINGLE POINT POWER SUPPLY CONNECTIONS WITH INDIVIDUAL SYSTEM CIRCUIT BREAKERS – YCAL0090E_ - YCAL0134E_

One Field Provided Power Supply Circuit to the chiller. Field connections to Factory Provided Terminal Block (optional) or Non-Fused Disconnect Switch (optional). Includes Individual Branch Circuit Protection (Breakers) per electrical system.

TABLE 6 – SINGLE POINT POWER SUPPLY CONNECTIONS WITH INDIVIDUAL SYSTEM CIRCUIT BREAKERS

MODEL YCAL	VOLT	HZ	SINGLE POINT FIELD SUPPLIED WIRING							
			MCA[1]	MIN N/F DISC SW[2]	D.E. FUSE		CKT. BKR.[5]		INCOMING (LUGS) WIRE RANGE[6]	
					MIN[3]	MAX[4]	MIN	MAX	TERMINAL BLOCK (opt)	NF DISC. SWITCH (opt)
0090	200	60	385	600	450	450	450	450	(2) # 6 - 500	(3) 2/0 - 400
	230	60	358	400	400	400	400	400	(2) # 6 - 500	(3) 2/0 - 400
	380	60	208	250	225	250	225	250	# 10 - 300	(1) # 6 - 350
	460	60	172	200	200	200	200	200	# 10 - 3/0	(1) # 6 - 350
	575	60	137	150	150	150	150	150	# 10 - 3/0	(1) # 6 - 350
0094	200	60	420	600	450	500	450	500	(2) # 6 - 500	(2) 250 - 500
	230	60	391	600	450	450	450	450	(2) # 6 - 500	(2) 250 - 500
	380	60	227	250	250	250	250	250	# 10 - 300	(1 or 2) 3/0 - 500
	460	60	188	250	200	225	200	225	# 10 - 300	(1) # 6 - 350
	575	60	150	200	175	175	175	175	# 10 - 3/0	(1) # 6 - 350
0104	200	60	454	600	500	500	500	500	(2) # 6 - 500	(2) 250 - 500
	230	60	422	600	450	450	450	450	(2) # 6 - 500	(2) 250 - 500
	380	60	245	400	300	300	300	300	# 4 - 500	(1 or 2) 3/0 - 500
	460	60	203	250	225	225	225	225	# 10 - 300	(1) # 6 - 350
	575	60	162	200	175	175	175	175	# 10 - 3/0	(1) # 6 - 350
0114	200	60	483	600	600	600	600	600	(2) # 6 - 500	(2) 250 - 500
	230	60	449	600	500	500	500	500	(2) # 6 - 500	(2) 250 - 500
	380	60	261	400	300	300	300	300	# 4 - 500	(1 or 2) 3/0 - 500
	460	60	223	250	250	250	250	250	# 10 - 300	(1 or 2) 3/0 - 500
	575	60	172	200	200	200	200	200	# 10 - 300	(1) # 6 - 350
0124	200	60	553	800	600	600	600	600	(2) # 6 - 500	(2) 250 - 500
	230	60	514	600	600	600	600	600	(2) # 6 - 500	(2) 250 - 500
	380	60	299	400	350	350	350	350	# 4 - 500	(1 or 2) 3/0 - 500
	460	60	247	400	300	300	300	300	# 10 - 300	(1 or 2) 3/0 - 500
	575	60	197	250	225	225	225	225	# 10 - 300	(1) # 6 - 350
0134	200	60	611	800	700	700	700	700	(2) # 6 - 500	(2) 250 - 500
	230	60	568	800	600	600	600	600	(2) # 6 - 500	(2) 250 - 500
	380	60	330	400	350	350	350	350	# 4 - 500	(1 or 2) 3/0 - 500
	460	60	271	400	300	300	300	300	# 4 - 500	(1 or 2) 3/0 - 500
	575	60	218	250	225	225	225	225	# 10 - 300	(1) 6AWG - 350

See Notes and Legend on page 28.

ELECTRICAL DATA – SINGLE POINT POWER SUPPLY CONNECTIONS WITH INDIVIDUAL SYSTEM CIRCUIT BREAKERS – YCAL0090E_ - YCAL0134E_

SYSTEM #1 COMPRESSOR & FAN								SYSTEM #2 FIELD SUPPLIED WIRING							
COMPR. #1		COMPR. #2		COMPR. #3		FANS		COMPR. #1		COMPR. #2		COMPR. #3		FANS	
RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA(EA)
87.2	500	87.2	500	—	—	3	7.8	69.4	505	69.4	505	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8	64.3	505	64.3	505	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7	37.0	280	37.0	280	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0	30.6	225	30.6	225	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1	24.5	180	24.5	180	—	—	3	3.1
87.2	500	87.2	500	—	—	3	7.8	87.2	500	87.2	500	—	—	3	7.8
80.8	500	80.8	500	—	—	3	7.8	80.8	500	80.8	500	—	—	3	7.8
46.6	305	46.6	305	—	—	3	4.7	46.6	305	46.6	305	—	—	3	4.7
38.5	250	38.5	250	—	—	3	4.0	38.5	250	38.5	250	—	—	3	4.0
30.8	198	30.8	198	—	—	3	3.1	30.8	198	30.8	198	—	—	3	3.1
69.4	505	69.4	505	69.4	505	3	7.8	87.2	500	87.2	500	—	—	3	7.8
64.3	505	64.3	505	64.3	505	3	7.8	80.8	500	80.8	500	—	—	3	7.8
37.0	280	37.0	280	37.0	280	3	4.7	46.6	305	46.6	305	—	—	3	4.7
30.6	225	30.6	225	30.6	225	3	4.0	38.5	250	38.5	250	—	—	3	4.0
24.5	180	24.5	180	24.5	180	3	3.1	30.8	198	30.8	198	—	—	3	3.1
69.4	505	69.4	505	69.4	505	4	7.8	69.4	505	69.4	505	69.4	505	4	7.8
64.3	505	64.3	505	64.3	505	4	7.8	64.3	505	64.3	505	64.3	505	4	7.8
37.0	280	37.0	280	37.0	280	4	4.7	37.0	280	37.0	280	37.0	280	4	4.7
30.6	225	30.6	225	30.6	225	4	4.0	30.6	225	30.6	225	30.6	225	4	4.0
24.5	180	24.5	180	24.5	180	4	3.1	24.5	180	24.5	180	24.5	180	4	3.1
87.2	500	87.2	500	87.2	500	4	7.8	69.4	505	69.4	505	69.4	505	4	7.8
80.8	500	80.8	500	80.8	500	4	7.8	64.3	505	64.3	505	64.3	505	4	7.8
46.6	305	46.6	305	46.6	305	4	4.7	37.0	280	37.0	280	37.0	280	4	4.7
38.5	250	38.5	250	38.5	250	4	4.0	30.6	225	30.6	225	30.6	225	4	4.0
30.8	198	30.8	198	30.8	198	4	3.1	24.5	180	24.5	180	24.5	180	4	3.1
87.2	500	87.2	500	87.2	500	4	7.8	87.2	500	87.2	500	87.2	500	4	7.8
80.8	500	80.8	500	80.8	500	4	7.8	80.8	500	80.8	500	80.8	500	4	7.8
46.6	305	46.6	305	46.6	305	4	4.7	46.6	305	46.6	305	46.6	305	4	4.7
38.5	250	38.5	250	38.5	250	4	4.0	38.5	250	38.5	250	38.5	250	4	4.0
30.8	198	30.8	198	30.8	198	4	3.1	30.8	198	30.8	198	30.8	198	4	3.1

OPERATIONAL LIMITATIONS (ENGLISH)

TABLE 7 – TEMPERATURES AND FLOWS

YCAL	LEAVING WATER					
	TEMPERATURE (°F)		COOLER FLOW (GPM[3])		AIR ON CONDENSER (°F)	
	MIN[1]	MAX[2]	MIN	MAX	MIN[4]	MAX[5]
0014*	40	55	25	60	0	125
0020*	40	55	25	60	0	125
0024*	40	55	30	70	0	125
0030*	40	55	35	170	0	125
0034*	40	55	35	170	0	125
0040*	40	55	60	325	0	125
0042*	40	55	60	325	0	125
0044*	40	55	60	325	0	125
0050*	40	55	60	325	0	125
0060*	40	55	60	325	0	125
0064*	40	55	100	350	0	125
0070*	40	55	100	350	0	125
0074	40	55	100	350	0	125
0080	40	55	100	400	0	125
0090	40	55	138	525	0	125
0094	40	55	138	525	0	125
0104	40	55	156	625	0	125
0114	40	55	156	625	0	125
0124	40	55	156	625	0	125
0134	40	55	156	625	0	125

Voltage Limitations

The following voltage limitations are absolute and operation beyond these limitations may cause serious damage to the compressor.

Excessive flow will cause damage to the cooler. Do not exceed max. cooler flow. Special care should be taken when multiple chillers are fed by a single pump.

TABLE 8 – VOLTAGE LIMITATIONS

UNIT POWER	MIN.	MAX.
200-3-60	180	220
230-3-60	207	253
380-3-60	355	415
460-3-60	414	506
575-3-60	517	633

NOTES:

1. For leaving brine temperature below 40°F (4.4°C), contact your nearest Johnson Controls Office for application requirements.
2. For leaving water temperature higher than 55°F (12.8°C), contact the nearest Johnson Controls Office for application guidelines.
3. The evaporator is protected against freezing to -20°F (-28.8°C) with an electric heater as standard.
4. For operation at temperatures below 25°F (-3.9°C), the optional low ambient kit will need to be installed on the system (for YCAL0014-0080 models only).
5. For operation at temperatures above 115°F (46.1°C), the optional high ambient kit will need to be installed on the system.

OPERATIONAL LIMITATIONS (ENGLISH)

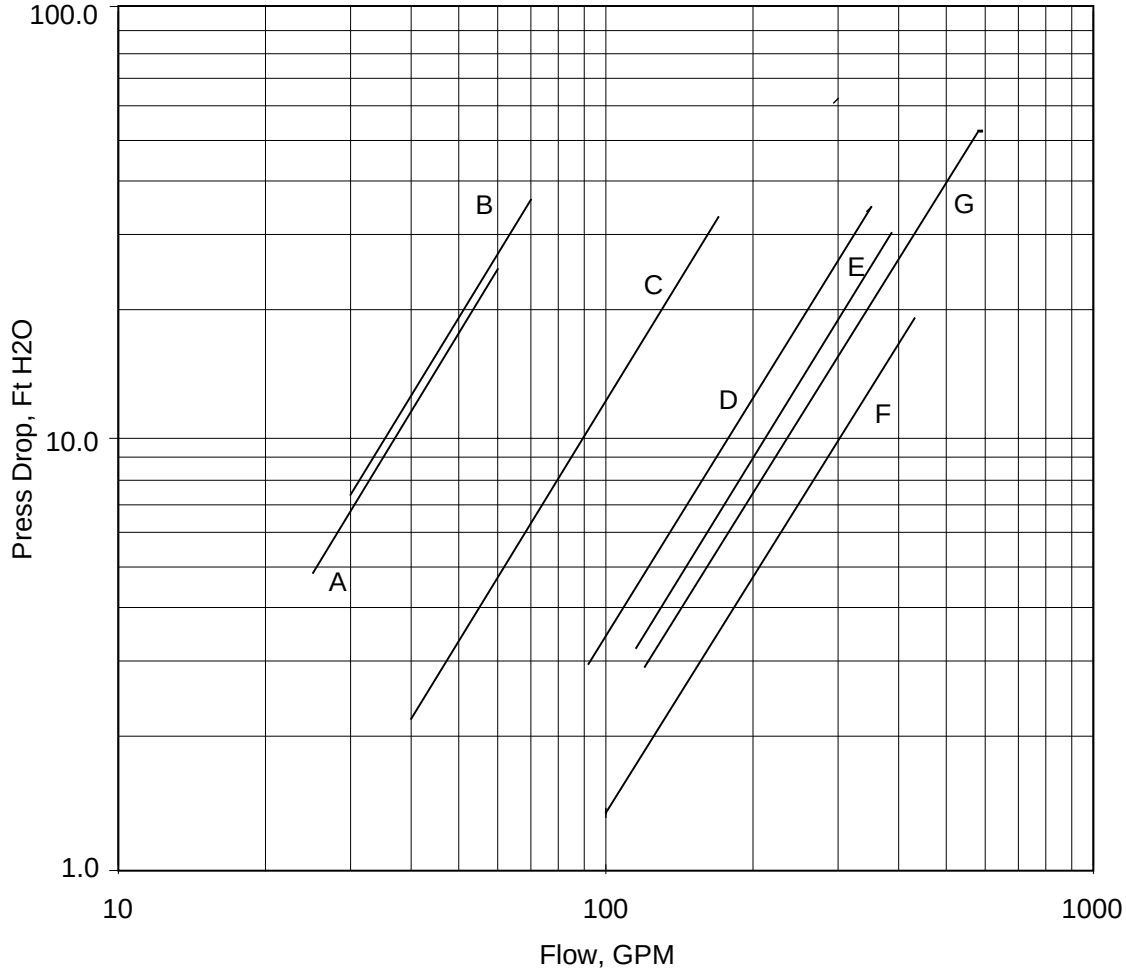


TABLE 9 – COOLER PRESSURE DROP CURVES

MODEL YCAL	COOLER CURVE
0014, 0020	A
0024	B
0030, 0034	C
0040, 0042 0044, 0050, 0060	D
0064, 0070, 0074	E
0080	F
0090, 0094	G
0104, 0114, 0124, 0134	H

TABLE 10 – ETHYLENE / PROPYLENE GLYCOL CORRECTION FACTORS

ETHYLENE GLYCOL					
% WEIGHT	TONS kW	COMPR	GPM°F/ TON	PRESS DROP	FREEZE PT
10	0.985	0.997	24.1	1.034	26
20	0.981	0.996	24.9	1.062	16
30	0.974	0.995	26.1	1.096	5
40	0.966	0.991	27.5	1.134	-10
50	0.957	0.989	29.1	1.172	-32

PROPYLENE GLYCOL					
% WEIGHT	TONS kW	COMPR	GPM°F/ TON	PRESS DROP	FREEZE PT
10	0.983	0.996	24.2	1.048	27
20	0.974	0.995	24.4	1.086	19
30	0.961	0.990	25.1	1.134	8
40	0.946	0.98	26.0	1.186	-5
50	0.928	0.984	27.2	1.247	-25

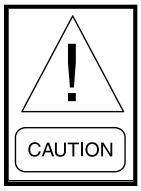
OPERATIONAL LIMITATIONS (METRIC)

TABLE 11 – TEMPERATURES AND FLOWS

YCAL	LEAVING WATER					
	TEMPERATURE (°F)		COOLER FLOW (GPM[3])		AIR ON CONDENSER (°F)	
	MIN[1]	MAX[2]	MIN	MAX	MIN[4]	MAX[5]
0014*	4.4	12.8	1.6	3.8	-17.7	51.7
0020*	4.4	12.8	1.6	3.8	-17.7	51.7
0024*	4.4	12.8	1.9	4.4	-17.7	51.7
0030*	4.4	12.8	2.2	10.7	-17.7	51.7
0034*	4.4	12.8	2.2	10.7	-17.7	51.7
0040*	4.4	12.8	3.8	20.5	-17.7	51.7
0042*	4.4	12.8	3.8	20.5	-17.7	51.7
0044*	4.4	12.8	3.8	20.5	-17.7	51.7
0050*	4.4	12.8	3.8	20.5	-17.7	51.7
0060*	4.4	12.8	3.8	20.5	-17.7	51.7
0064*	4.4	12.8	6.3	22.1	-17.7	51.7
0070*	4.4	12.8	6.3	22.1	-17.7	51.7
0074	4.4	12.8	6.3	22.1	-17.7	51.7
0080	4.4	12.8	6.3	25.2	-17.7	51.7
0090	4.4	12.8	8.7	33.1	-17.7	51.7
0094	4.4	12.8	8.7	33.1	-17.7	51.7
0104	4.4	12.8	9.8	39.4	-17.7	51.7
0114	4.4	12.8	9.8	39.4	-17.7	51.7
0124	4.4	12.8	9.8	39.4	-17.7	51.7
0134	4.4	12.8	9.8	39.4	-17.7	51.7

Voltage Limitations

The following voltage limitations are absolute and operation beyond these limitations may cause serious damage to the compressor.



Excessive flow will cause damage to the cooler. Do not exceed max. cooler flow. Special care should be taken when multiple chillers are fed by a single pump.

TABLE 12 – VOLTAGE LIMITATIONS

UNIT POWER	MIN.	MAX.
200-3-60	180	220
230-3-60	207	253
380-3-60	355	415
460-3-60	414	506
575-3-60	517	633

NOTES:

1. For leaving brine temperature below 40°F (4.4°C), contact your nearest Johnson Controls Office for application requirements.
2. For leaving water temperature higher than 55°F (12.8°C), contact the nearest Johnson Controls Office for application guidelines.
3. The evaporator is protected against freezing to -20°F (-28.8°C) with an electric heater as standard.
4. For operation at temperatures below 25°F (-3.9°C), the optional low ambient kit will need to be installed on the system (for YCAL0014-0080 models only).
5. For operation at temperatures above 115°F (46.1°C), the optional high ambient kit will need to be installed on the system.

OPERATIONAL LIMITATIONS (METRIC)

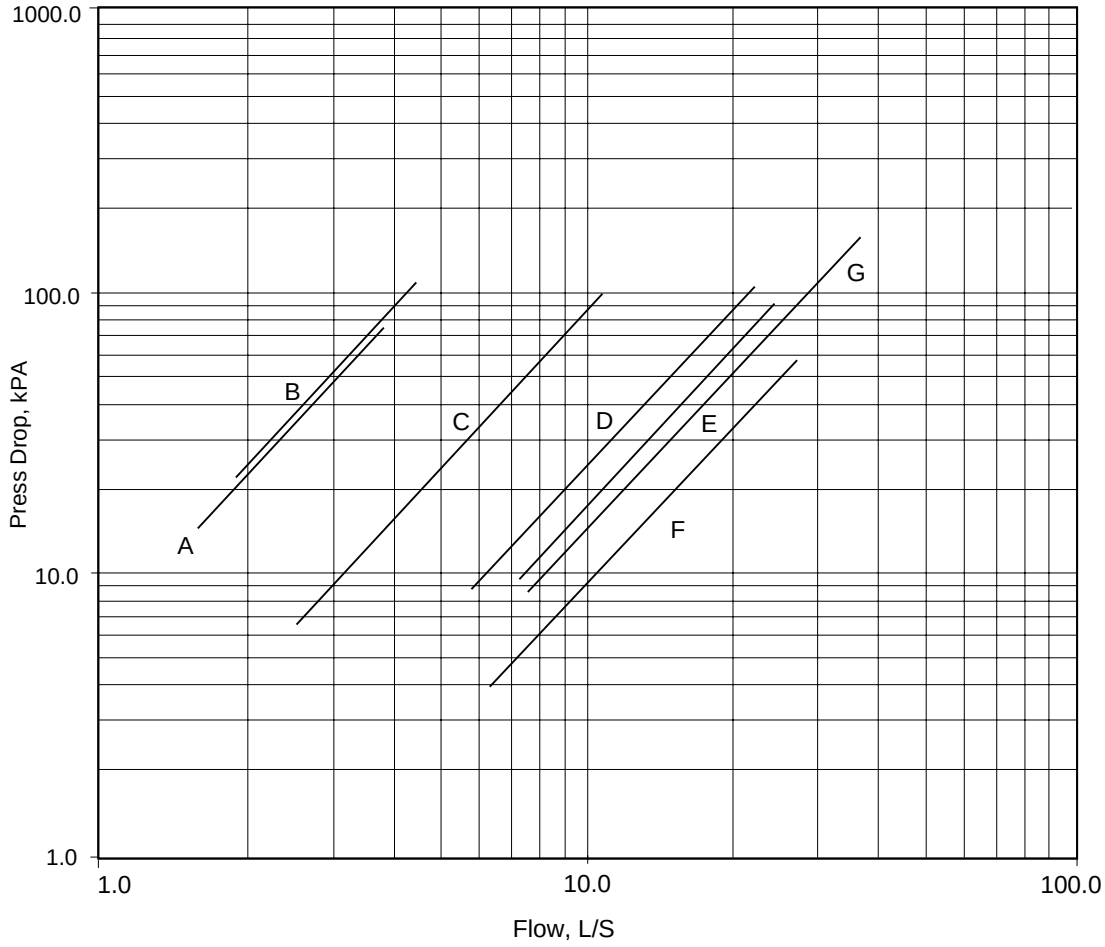


TABLE 13 – COOLER PRESSURE DROP CURVES

MODEL YCAL	COOLER CURVE
0014, 0020	A
0024	B
0030, 0034	C
0040, 0042 0044, 0050, 0060	D
0064, 0070, 0074	E
0080	F
0090, 0094	G
0104, 0114, 0124, 0134	H

TABLE 14 – ETHYLENE / PROPYLENE GLYCOLCORRECTION FACTORS

ETHYLENE GLYCOL					
% WEIGHT	TONS kW	COMPR	GPM°F/ TON	PRESS DROP	FREEZE PT
10	0.985	0.997	24.1	1.034	26
20	0.981	0.996	24.9	1.062	16
30	0.974	0.995	26.1	1.096	5
40	0.966	0.991	27.5	1.134	-10
50	0.957	0.989	29.1	1.172	-32

PROPYLENE GLYCOL					
% WEIGHT	TONS kW	COMPR	GPM°F/ TON	PRESS DROP	FREEZE PT
10	0.983	0.996	24.2	1.048	27
20	0.974	0.995	24.4	1.086	19
30	0.961	0.990	25.1	1.134	8
40	0.946	0.98	26.0	1.186	-5
50	0.928	0.984	27.2	1.247	-25

PHYSICAL DATA (ENGLISH)
YCAL0014E_ - YCAL0134E_

TABLE 15 – PHYSICAL DATA (ENGLISH)

	Model Number YCAL							
	0014*	0020*	0024*	0030*	0034*	0040*	0042*	0044*
General Unit Data								
Nominal Tons, R-22	13.2	18.0	22.4	28.3	34.0	38.7	42.9	47.1
Nominal Tons, R-407C	12.7	17.4	21.7	26.7	31.7	36.3	40.2	44.1
Number of Refrigerant Circuits	1	1	1	1	1	2	2	2
Refrigerant Charge								
R-22, ckt1 / ckt2, lbs	44	44	58	72	72	48/48	48/48	46/48
R-407C, ckt1 / ckt2, lbs	42	42	55	69	69	46/46	46/46	46/46
Oil Charge, ckt1 / ckt2, gallons	2.2	2.2	2.2	2.2	3.3	2.2/2.2	2.2/2.2	2.2/2.2
Shipping Weight								
Aluminum Fin Coils, lbs	2472	2488	2857	2933	3279	4689	4752	4822
Copper Fin Coils, lbs	2622	2638	3007	3083	3429	4989	5052	5122
Operating Weight								
Aluminum Fin Coils, lbs	2548	2564	2940	3036	3381	4931	4994	5064
Copper Fin Coils, lbs	2762	2778	3275	3371	3717	5300	5363	5433
Compressors, scroll type								
Compressors per circuit	2	2	2	2	3	2	2	2
Compressors per unit	2	2	2	2	3	4	4	4
Nominal Tons per compressor	7.5	10	13	15	13	10/10	13/10	13/13
Condenser								
Total Face Area ft2	47.2	47.2	66.1	66.1	66.1	128.0	128.0	128.0
Number of Rows	2	2	2	3	3	2	2	2
Fins per Inch	13	13	13	13	13	13	13	13
Condenser Fans								
Number of Fans total	2	2	2	2	2	4	4	4
Fan hp/kw	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4
Fan RPM	1140	1140	1140	1140	1140	1140	1140	1140
Number of Blades	3	3	3	3	3	3	3	3
Total Chiller CFM	16257	16257	23500	23500	23500	47360	47360	47360
Evaporator, Direct Expansion								
Diameter x Length	8”x6’	8”x6’	8”x6.5’	8”x7’	8”x7’	10”x8’	10”x8’	10”x8’
Water Volume, gallons	9.2	9.2	10.0	12.3	12.3	29.1	29.1	29.1
Maximum Water Side Pressure, psig	150	150	150	150	150	150	150	150
Maximum Refrigerant Side Pressure, psig	350	350	350	350	350	350	350	350
Minimum Chiller Water Flow Rate, gpm	25	25	30	35	60	60	60	60
Maximum Chiller Water Flow Rate, gpm	60	60	70	170	170	300	300	300
Water Connections, inches	3	3	3	4	4	6	6	6

* HFC-407c units only

Model Number YCAL											
0050*	0060*	0064*	0070*	0074	0080	0090	0094	0104	0114	0124	0134
51.1	56.2	63.1	70.2	76.0	82.2	83.2	89.9	99.6	111.1	121.0	130.3
48.1	53.3	58.9	65.7	71.6	78.0	79.6	85.8	94.9	106.5	115.1	124.3
2	2	2	2	2	2	2	2	2	2	2	2
48/48	66/66	70/68	76/76	78/76	80/80	94/90	94/94	103/103	112/112	112/112	112/112
46/46	63/63	67/65	72/72	74/72	76/76	90/86	90/90	98/98	108/108	108/108	108/108
2.2/2.2	2.2/2.2	3.3/3.3	3.3/3.3	3.3/3.3	3.3/3.3	4.2/4.2	4.2/4.2	6.3/4.2	6.3/6.3	6.3/6.3	6.3/6.3
4906	4994	5866	6045	6217	6448	6541	6619	7434	9001	9289	9677
5206	5294	6166	6425	6597	6828	7369	7448	8378	10261	10549	10937
5148	5236	6208	6386	6558	6779	6981	7059	7923	9491	9779	10167
5517	5605	6651	6829	7001	7222	7809	7888	8867	10751	11039	11427
2	2	3	3	3	3	2	2	3/2	3	3	3
4	4	6	6	6	6	4	4	5	6	6	6
15/13	15/15	13/10	13/13	15/13	15/15	25/20	25/25	20/25	20/20	25/20	25/25
128.0	128.0	149.3	149.3	149.3	149.3	168.0	168.0	192.0	222.0	222.0	222.0
2	3	2	3	3	3	3	3	3	3	3	3
13	13	13	13	13	13	13	13	13	13	13	13
4	4	4	4	4	4	6	6	6	8	8	8
2 / 1.4	2 / 1.4	2 / 1.7	2 / 1.7	2 / 1.7	2 / 1.7	2/1.8	2/1.8	2/1.8	2/1.8	2/1.8	2/1.8
1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
3	3	3	3	3	3	3	3	3	3	3	3
47360	46080	55253	55253	54550	53760	79800	79800	85800	106400	106400	106400
10”x8’	10”x8’	12”x8’	12”x8’	12”x8’	12”x8’	14”x8’	14”x8’	15”x8’	15”x8’	15”x8’	15”x8’
29.1	29.1	41.2	41.2	41.2	39.9	53.0	53.0	58.9	58.9	58.9	58.9
150	150	150	150	150	150	150	150	150	150	150	150
350	350	350	350	350	350	350	350	350	350	350	350
60	60	100	100	100	100	125	138	150	165	180	180
300	300	350	350	350	385	525	525	625	625	625	625
6	6	6	6	6	6	8	8	8	8	8	8

* HFC-407c units only

PHYSICAL DATA (METRIC)
YCAL0014E_ - YCAL0134E_

TABLE 16 – PHYSICAL DATA (METRIC)

	Model Number YCAL							
	0014*	0020*	0024*	0030*	0034*	0040*	0042*	0044*
General Unit Data								
Nominal kW, R-22	46.4	63.3	78.8	99.5	119.6	136.1	150.9	165.7
Nominal kW, R-407C	44.7	61.2	76.3	93.9	111.5	127.7	141.4	155.1
Number of Refrigerant Circuits	1	1	1	1	1	2	2	2
Refrigerant Charge								
R-22, ckt1 / ckt2, kg	14.5	17.3	24.4	29.5	31.4	20.5/20.5	24.5/20.5	24.5/24.5
R-407C, ckt1 / ckt2, kg	14.5	17.3	24.4	29.5	31.4	20.5/20.5	24.5/20.5	23.5/23.5
Oil Charge, ckt1 / ckt2, liters	8.3	8.3	8.3	8.3	12.5	8.3/8.3	8.3/8.3	8.3/8.3
Shipping Weight								
Aluminum Fin Coils, kg	1121	1129	1296	1330	1487	2127	2155	2187
Copper Fin Coils, kg	1189	1197	1364	1398	1555	2263	2292	2323
Operating Weight								
Aluminum Fin Coils, kg	1156	1163	1334	1377	1534	2237	2265	2297
Copper Fin Coils, kg	1224	1231	1402	1445	1602	2373	2401	2433
Compressors, scroll type								
Compressors per circuit	2	2	2	2	3	2	2	2
Compressors per unit	2	2	2	2	3	4	4	4
Nominal kW per compressor	26	35	46	53	46	35/35	46/35	46/46
Condenser								
Total Face Area meters^2	4	4	6	6	6	12	12	12
Number of Rows	2	2	2	3	3	2	2	2
Fins per m	512	512	512	512	512	512	512	512
Condenser Fans								
Number of Fans total	2	2	2	2	2	4	4	4
Fan hp/kw	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4	2 / 1.4
Fan RPM	1140	1140	1140	1140	1140	1140	1140	1140
Number of Blades	3	3	3	3	3	3	3	3
Total Chiller Airflow l/s	7672	7672	11091	11091	11091	22351	22351	22351
Evaporator, Direct Expansion								
Diameter x Length	203x1829	203x1830	203x1981	210x2134	210x2134	248x2438	248x2438	248x2438
Water Volume, liters	34.9	34.9	37.7	46.7	46.7	110.3	110.3	110.3
Maximum Water Side Pressure, bar	10	10	10	10	10	10	10	10
Maximum Refrigerant Side Pressure, bar	24	24	24	24	24	24	24	24
Minimum Chiller Water Flow Rate, l/s	1.6	1.6	1.9	2.2	3.8	3.8	3.8	3.8
Maximum Chiller Water Flow Rate, l/s	3.8	3.8	4.4	10.7	10.7	18.9	18.9	18.9
Water Connections, inches	3	3	3	4	4	6	6	6

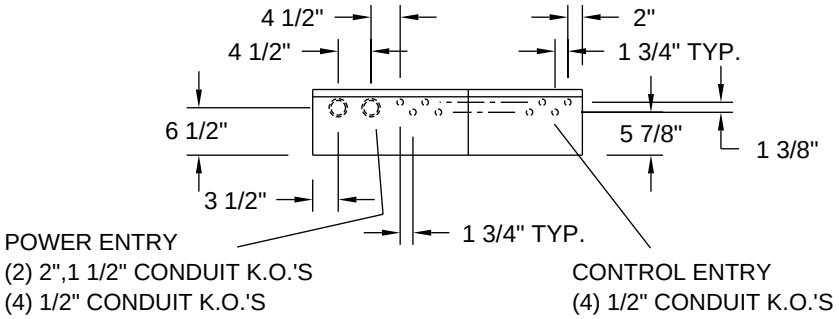
* HFC-407c units only

Model Number YCAL											
0050*	0060*	0064*	0070*	0074	0080	0090	0094	0104	0114	0124	0134
179.7	197.7	221.9	246.9	267.3	289.1	292.6	316.2	350.3	390.7	425.6	457.9
169.2	187.5	207.2	231.1	251.8	274.3	280.0	301.8	333.8	374.6	404.8	436.9
2	2	2	2	2	2	2	2	2	2	2	2
27.3/24.5	32.7/32.7	34.1/28.2	34.1/34.1	41.8/37.7	45.5/45.5	43/35	43/43	51/43	51/51	51/51	51/51
27.3/24.5	26/26	30/26	30/30	40/30	40/40	41/34	41/41	49/41	49/49	49/49	49/49
8.3/8.3	8.3/8.3	12.5/12.5	12.5/12.5	12.5/12.5	12.5/12.5	16/16	16/16	24/16	24/24	24/24	24/24
2225	2265	2661	2742	2820	2925	2967	3002	3372	4086	4217	4393
2361	2401	2797	2914	2992	3097	3343	3378	3800	4658	4789	4965
2335	2375	2816	2897	2975	3075	3167	3202	3594	4308	4439	4615
2471	2511	2952	3069	3147	3247	3542	3578	4022	4881	5011	5187
2	2	3	3	3	3	2	2	3/2	3	3	3
4	4	6	6	6	6	4	4	5	6	6	6
53/46	53/53	46/35	46/46	53/46	53/53	88/70	88/88	70/88	70/70	88/70	88/88
12	12	14	14	14	14	16.0	16.0	18.0	21.0	21.0	21.0
2	3	2	2	3	3	3	3	3	3	3	3
512	512	512	512	512	512	512	512	512	512	512	512
4	4	4	4	4	4	6	6	6	8	8	8
2 / 1.4	2 / 1.4	2 / 1.7	2 / 1.7	2 / 1.7	2 / 1.7	2 / 1.8	2 / 1.8	2 / 1.8	2 / 1.8	2 / 1.8	2 / 1.8
1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
3	3	3	3	3	3	3	3	3	3	3	3
22351	21747	26076	26076	25744	25371	37660	37660	39784	50214	50214	50214
248x2438	248x2438	309x2438	309x2438	309x2438	315x2438	356x2438	356x2438	381x2438	381x2438	381x2438	381x2438
110.3	110.3	156.1	156.1	156.1	151.1	200.6	200.6	222.9	222.9	222.9	222.9
10	10	10	10	10	10	10	10	10	10	10	10
24	24	24	24	24	24	24	24	24	24	24	24
3.8	3.8	6.3	6.3	6.3	6.3	7.9	8.7	9.5	10.4	11.4	11.4
18.9	18.9	22.1	22.1	22.1	24.3	33.1	33.1	39.4	39.4	39.4	39.4
6	6	6	6	6	6	8	8	8	8	8	8

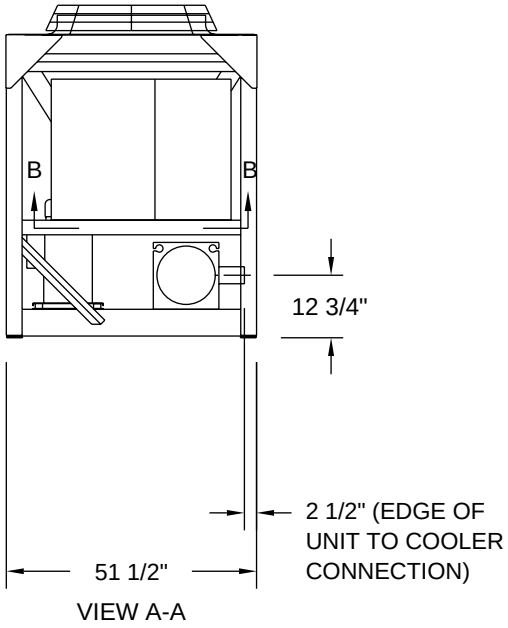
* HFC-407c units only

DIMENSIONS AND CLEARANCES

DIMENSIONS - YCAL0014-YCAL0020 (ENGLISH)



VIEW B-B

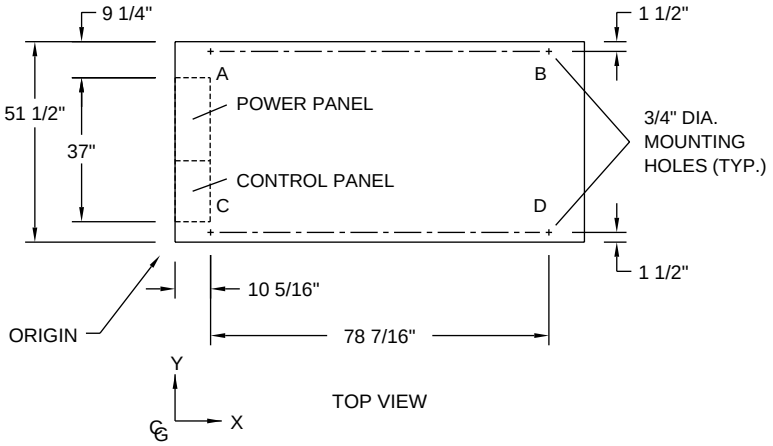


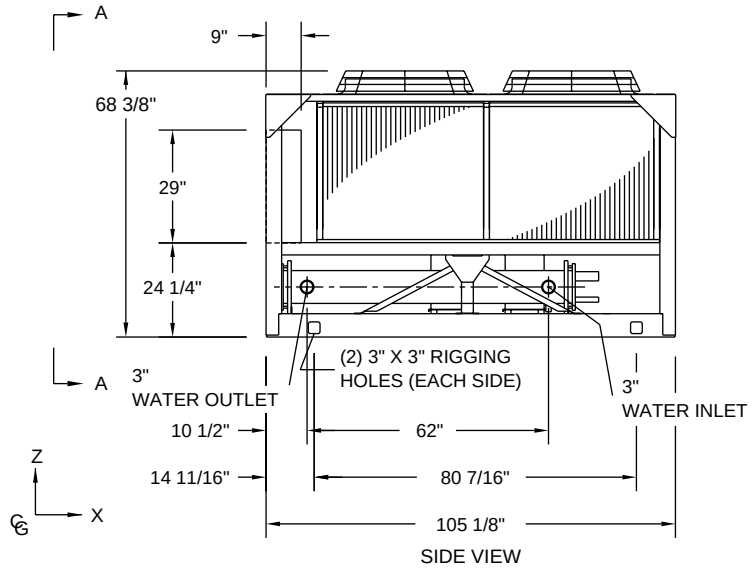
VIEW A-A

LD07735

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD07736

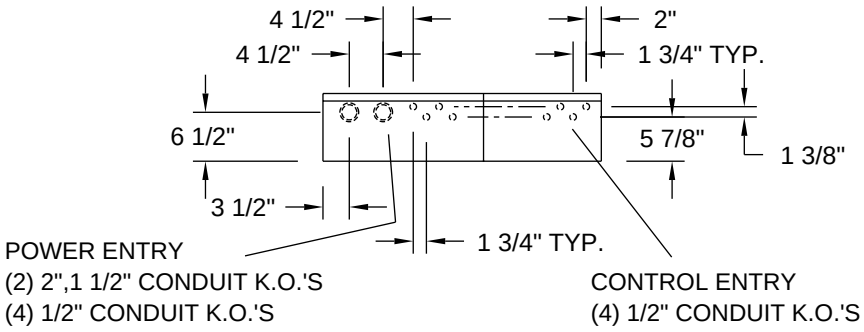
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0014	44.8	24.1	28.3
0020	44.8	24.1	28.3

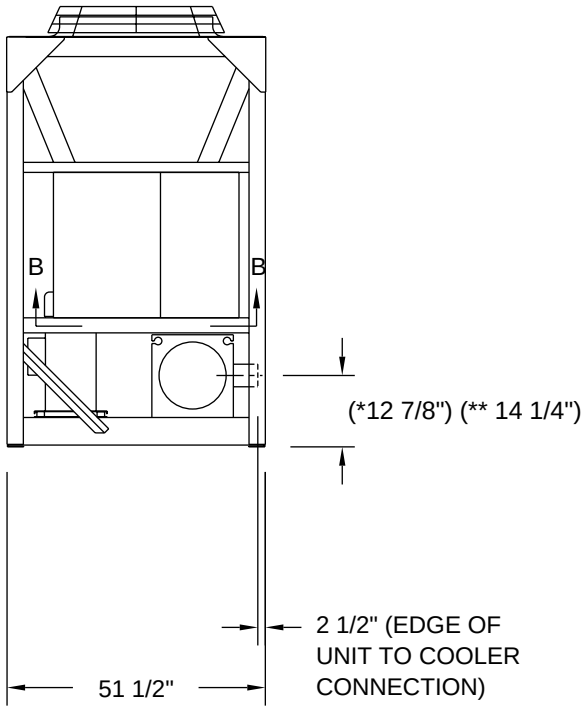
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0014	45.4	24.2	28.8
0020	45.4	24.2	28.8

DIMENSIONS - YCAL0024-YCAL0034 (ENGLISH)



VIEW B-B



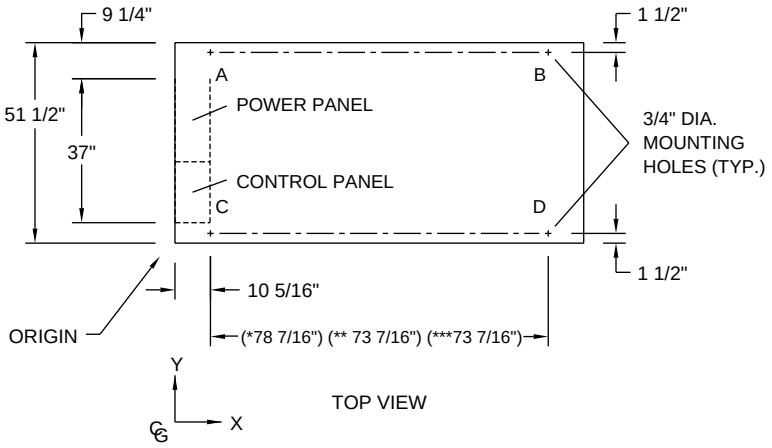
VIEW A-A

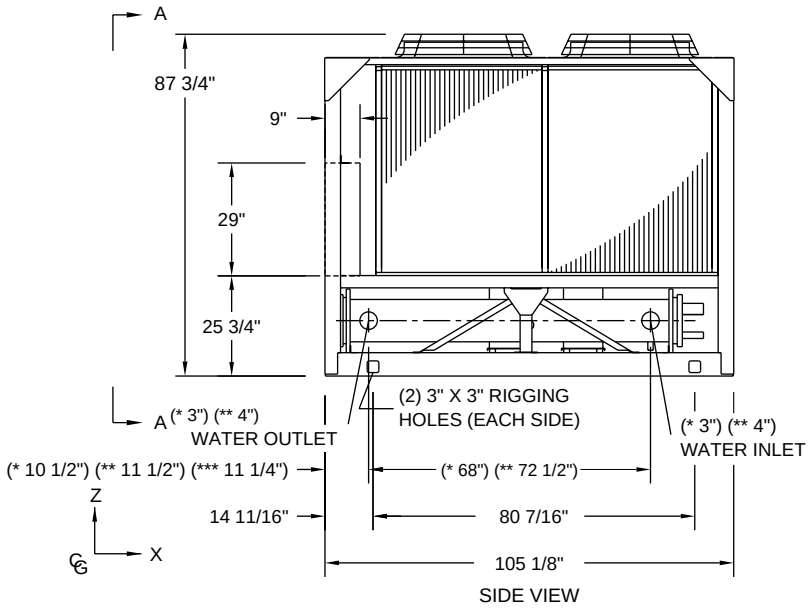
LD07731

* Refers to Model YCAL0024
** Refers to Model YCAL0030 and YCAL0034

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD07732

* Refers to Model YCAL0024
** Refers to Model YCAL0030 and YCAL0034

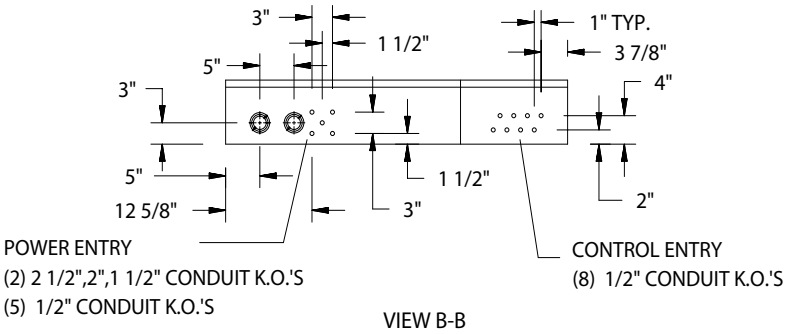
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0024	45.0	24.4	35.3
0030	45.0	24.4	34.9
0034	45.0	25.5	33.8

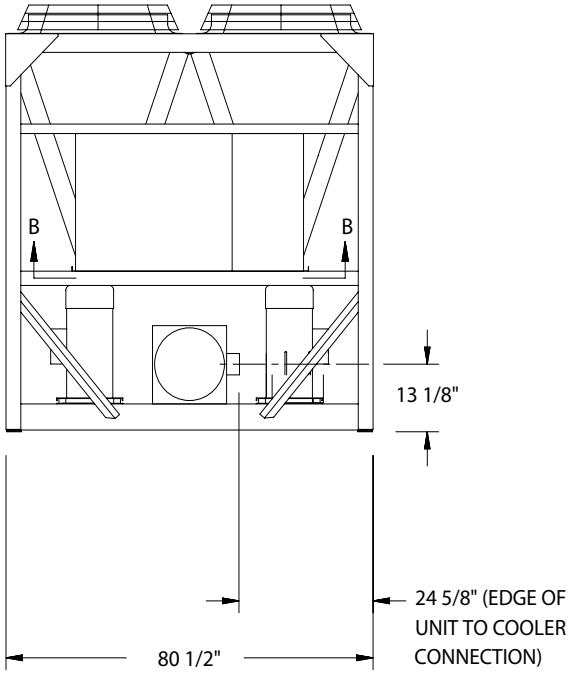
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0024	45.8	24.5	36.2
0030	45.8	24.5	35.8
0034	45.7	25.5	34.7

DIMENSIONS - YCAL0040-YCAL0060 (ENGLISH)



VIEW B-B

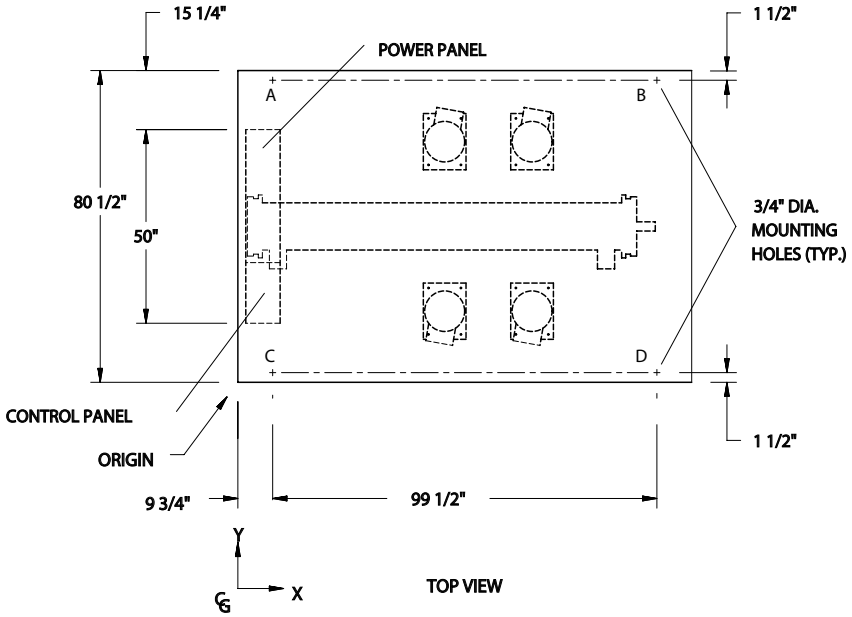


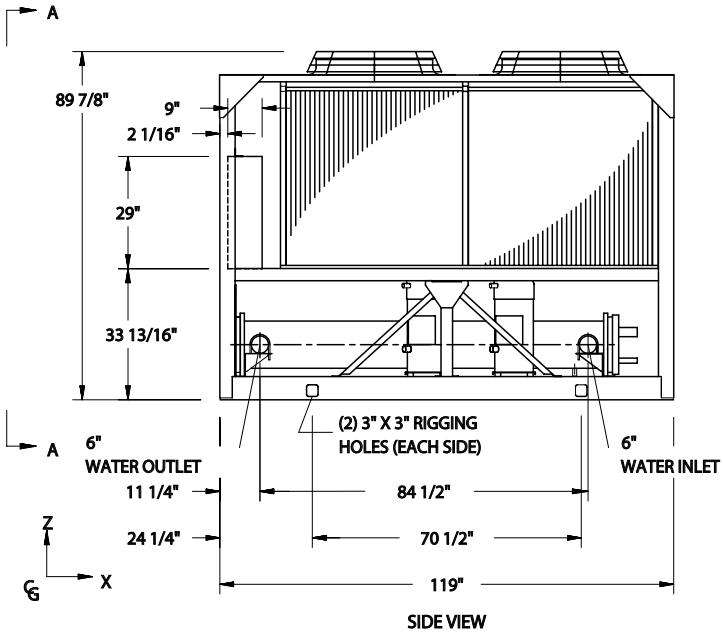
VIEW A-A

LD08700

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD04873A

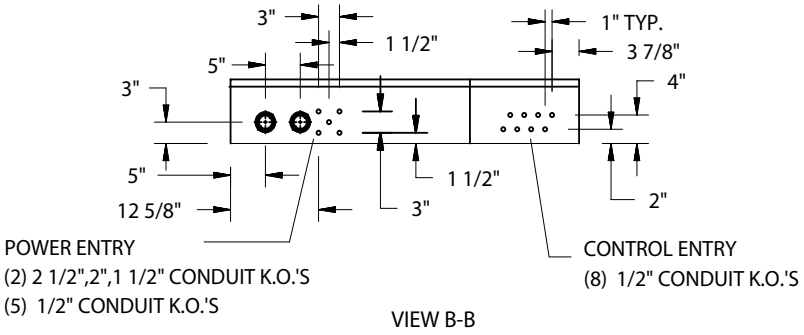
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0040	58.7	40.2	41.2
0042	58.3	40.4	39.7
0044	58.4	40.2	39.5
0050	58.4	40.4	39.5
0060	58.5	40.2	39.4

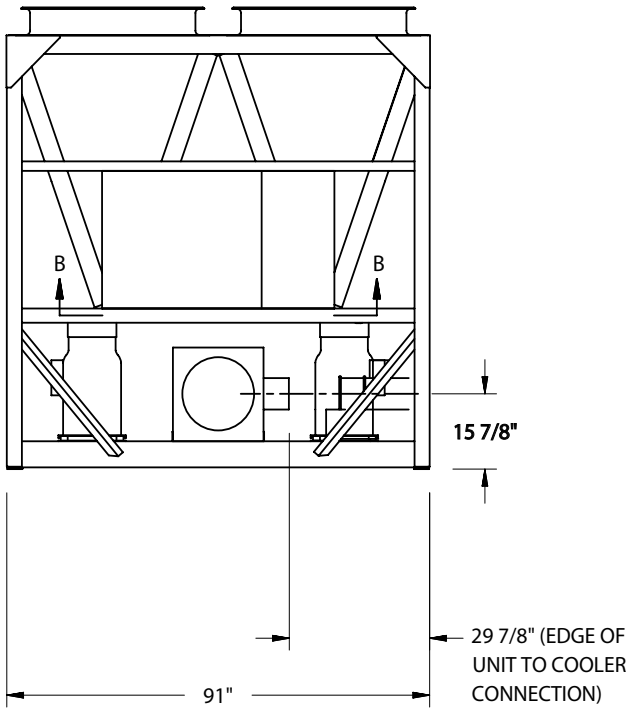
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0040	58.3	40.2	40.3
0042	58.4	40.4	40.1
0044	58.5	40.2	39.9
0050	58.5	40.4	39.9
0060	58.6	40.2	39.8

DIMENSIONS - YCAL0064-YCAL0080 (ENGLISH)



VIEW B-B

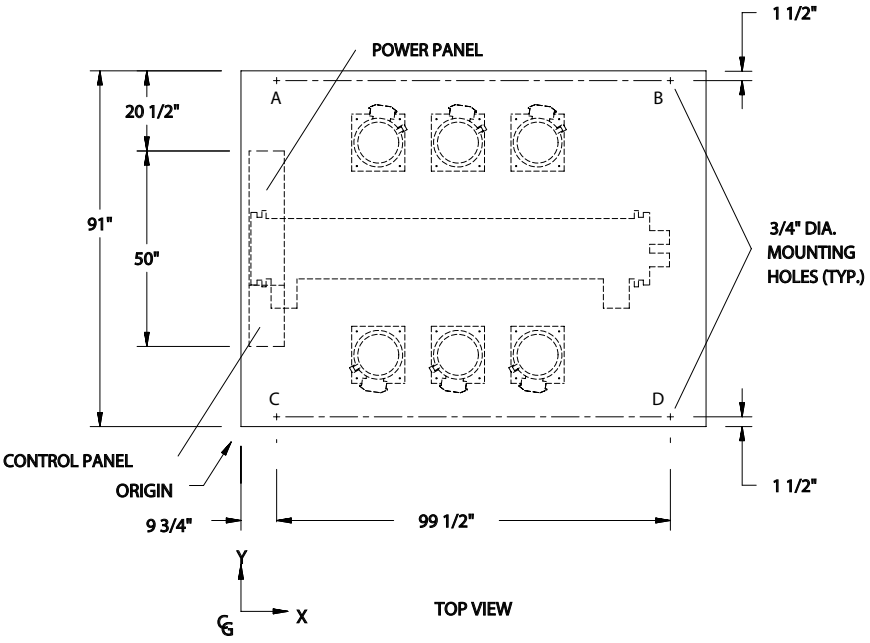


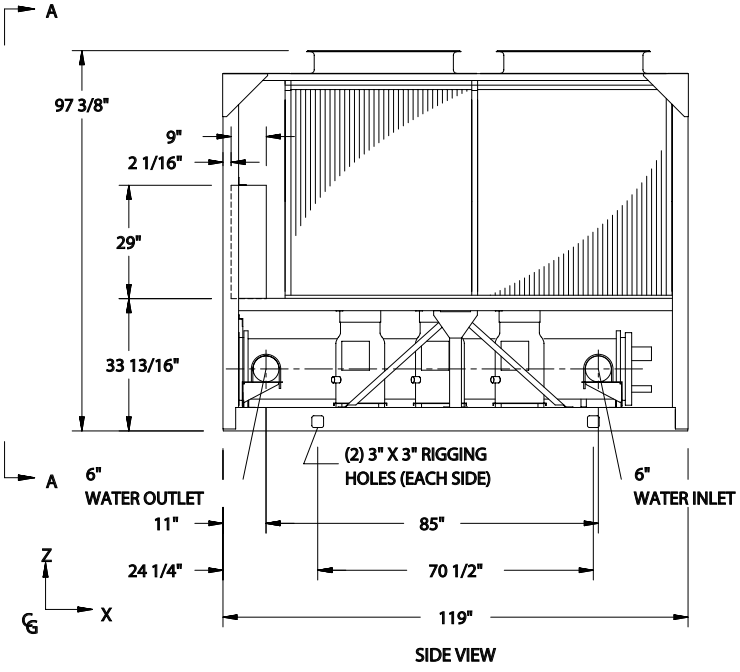
VIEW A-A

LD08701

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD04877A

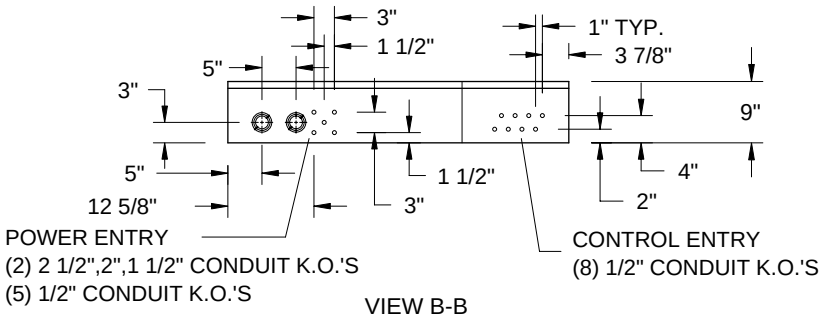
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0064	56.5	45.8	39.4
0070	56.6	45.4	39.4
0074	56.6	45.7	39.5
0080	56.6	45.4	39.0

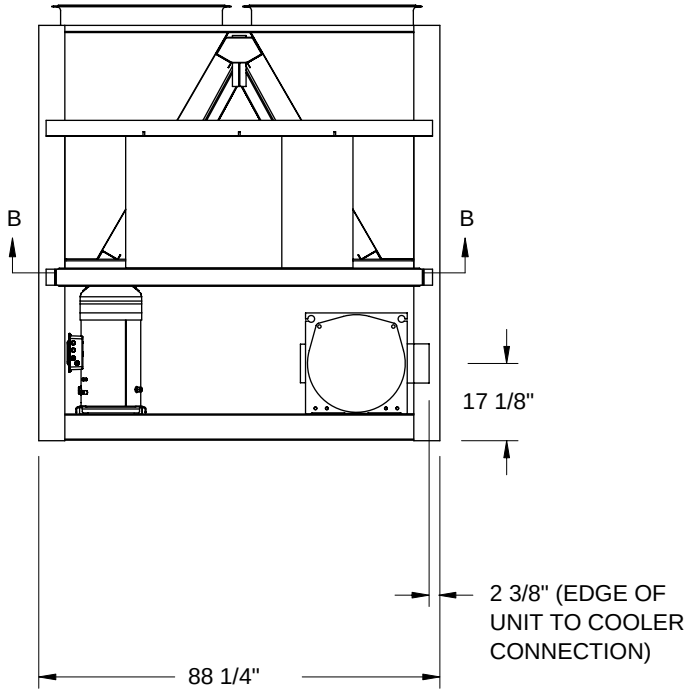
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0064	56.7	45.7	40.0
0070	56.8	45.5	40.0
0074	56.8	45.7	40.1
0080	56.8	45.5	39.6

DIMENSIONS - YCAL0090-YCAL0094 (ENGLISH)



VIEW B-B



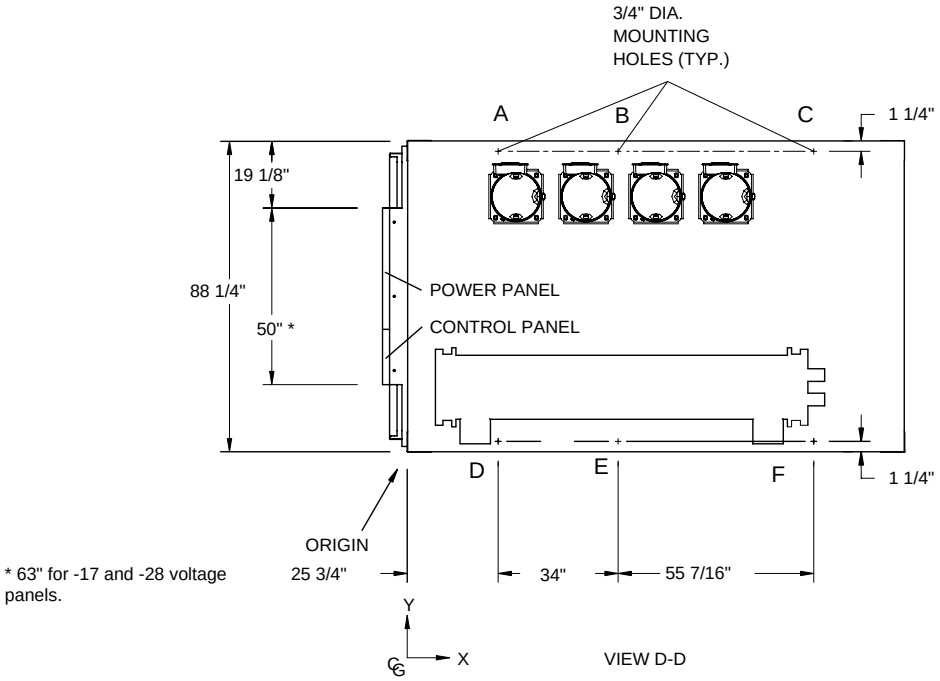
VIEW A-A

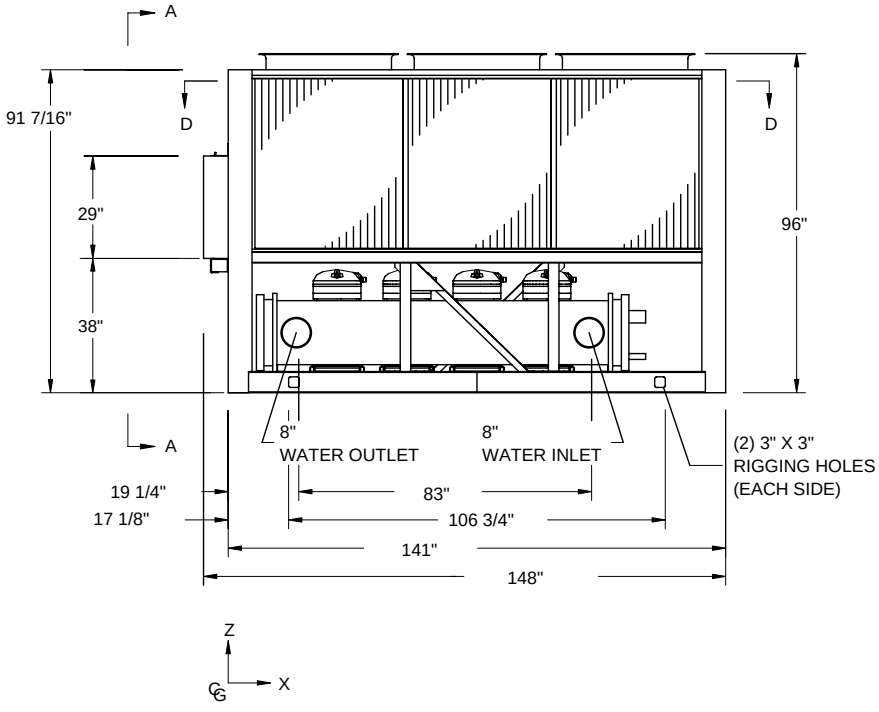
POWER: MULTIPLE POINT WITH TERMINAL BLOCKS

LD07707

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





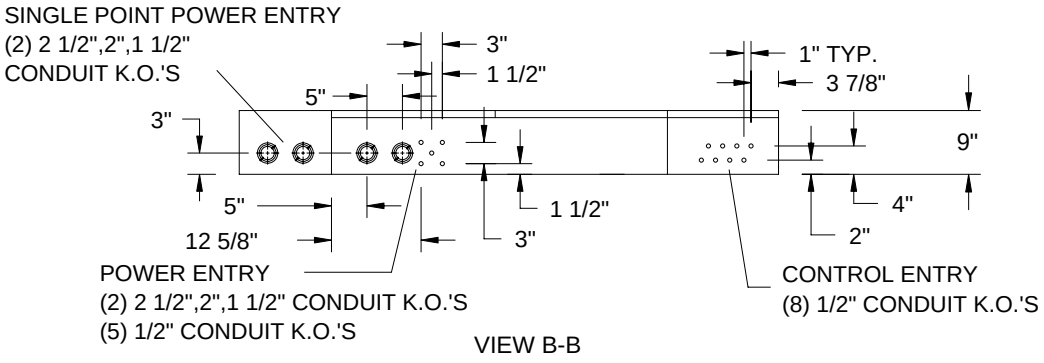
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0090	63.4	44.3	42.1
0094	64.3	44.4	41.9

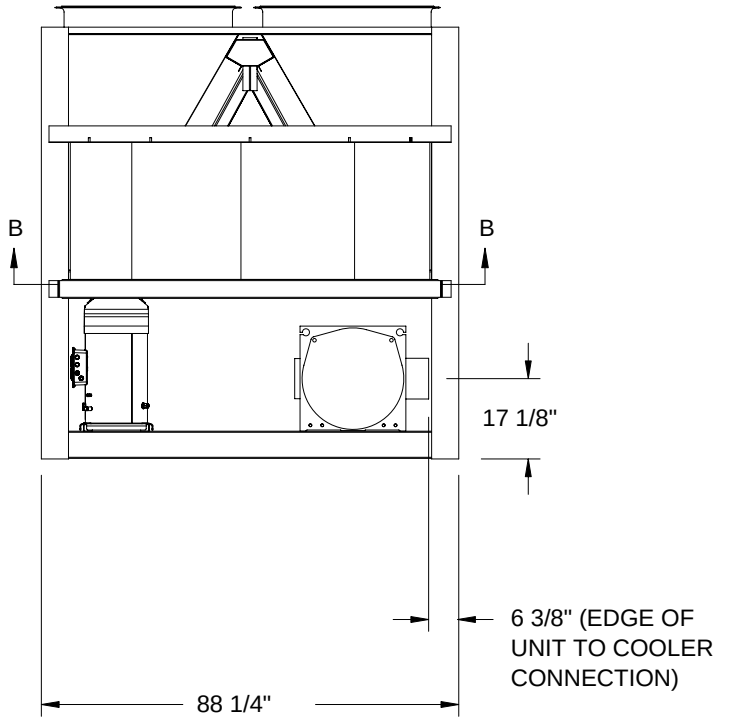
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0090	64.1	44.3	44.5
0094	64.8	44.4	44.2

DIMENSIONS - YCAL0104 (ENGLISH)



VIEW B-B

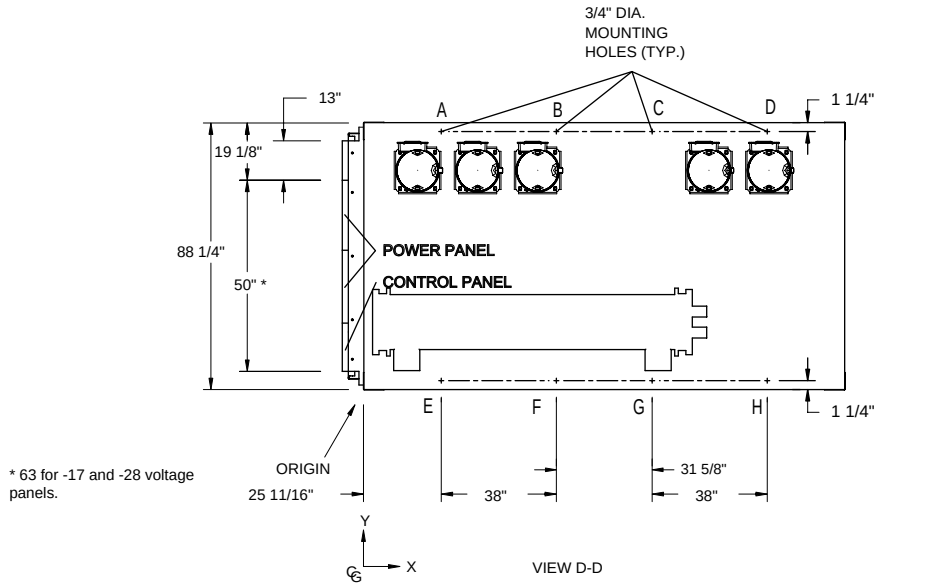


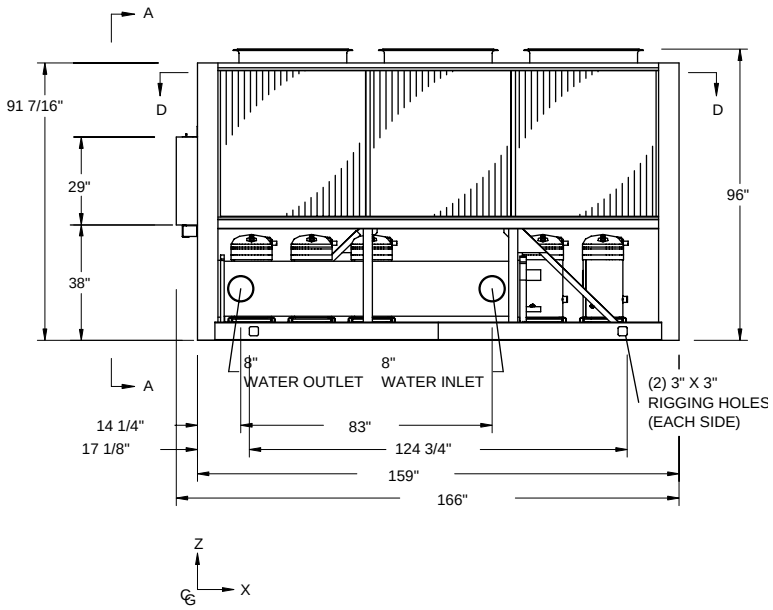
VIEW A-A

LD07709

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD08703

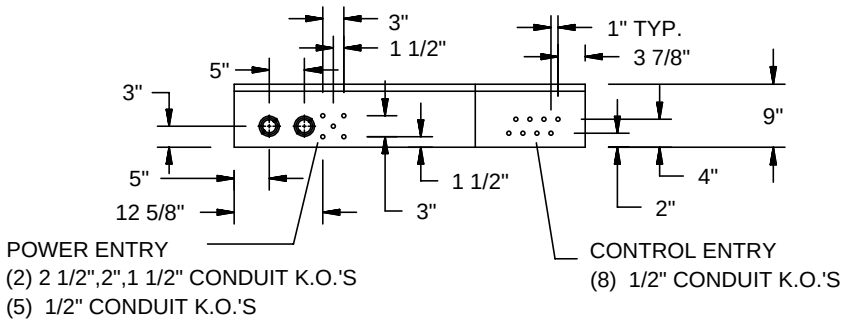
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0104	70.3	45.7	40.8

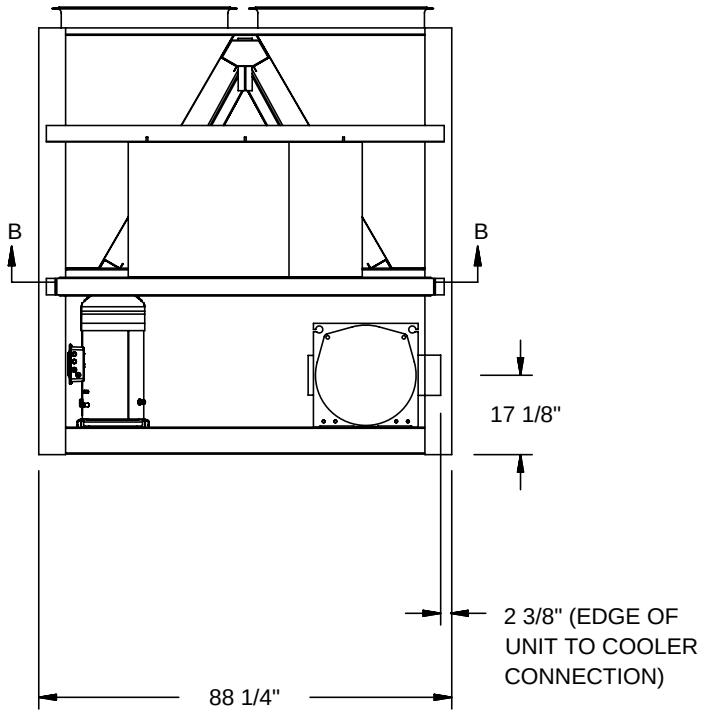
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0104	71.3	45.5	42.7

DIMENSIONS - YCAL0114 - YCAL0134 (ENGLISH)



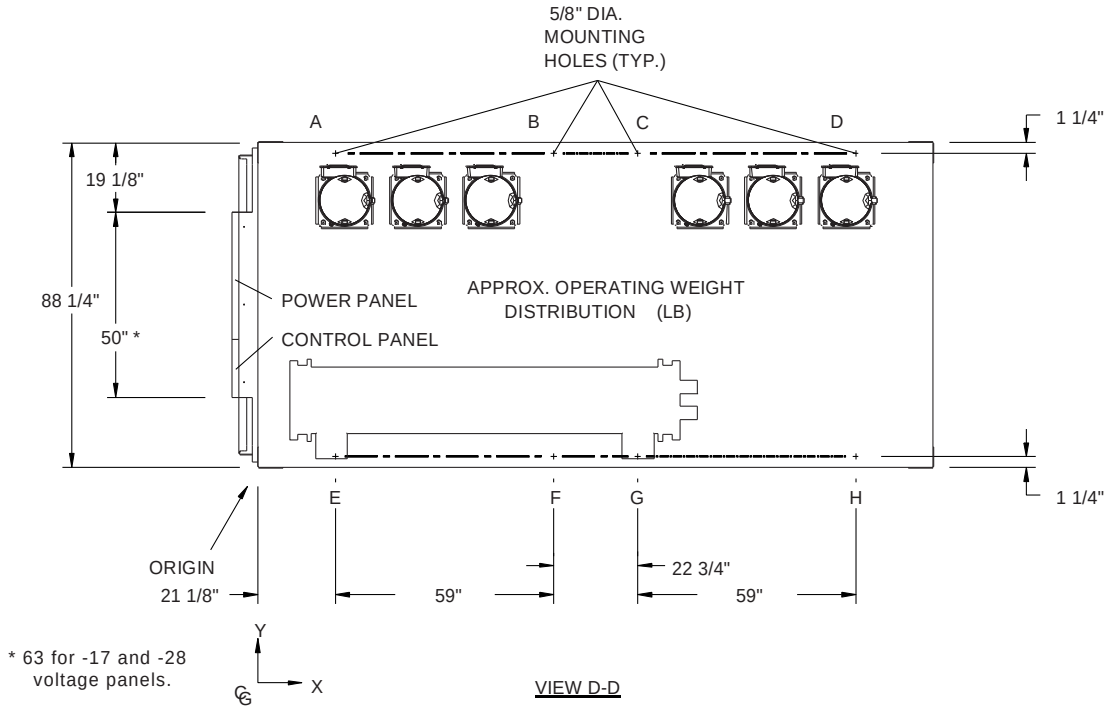
VIEW B-B

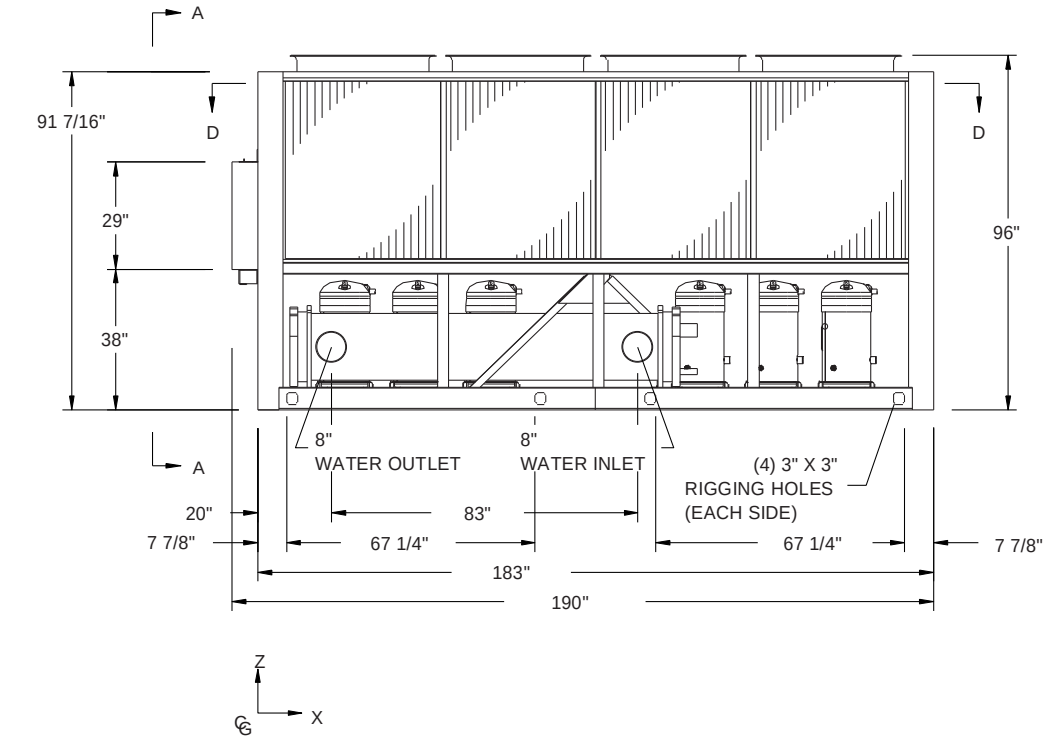


VIEW A-A

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





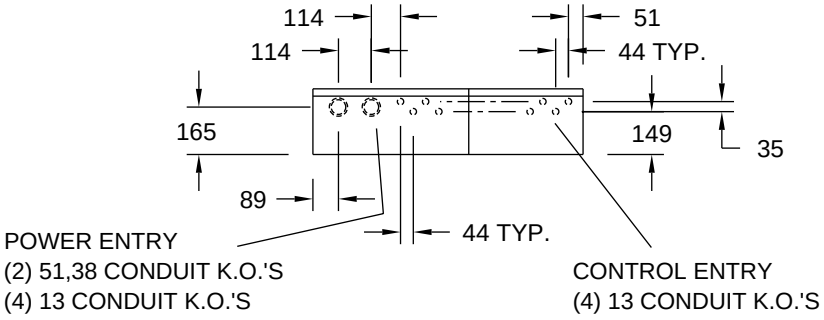
ALUMINUM

YCAL	Center of Gravity (in.)		
	X	Y	Z
0114	82.2	45.5	43.7
0124	81.1	46.2	43.1
0134	81.9	46.8	42.5

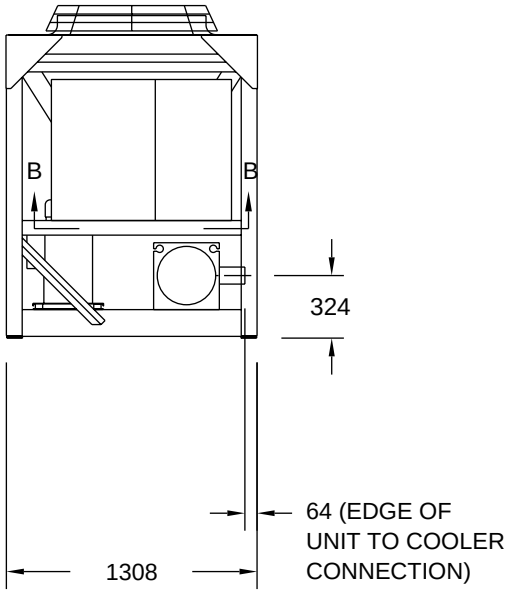
COPPER

YCAL	Center of Gravity (in.)		
	X	Y	Z
0114	83.3	45.2	45.3
0124	82.3	45.9	44.7
0134	82.9	46.5	44.2

DIMENSIONS - YCAL0014-YCAL0020 (SI)



VIEW B-B



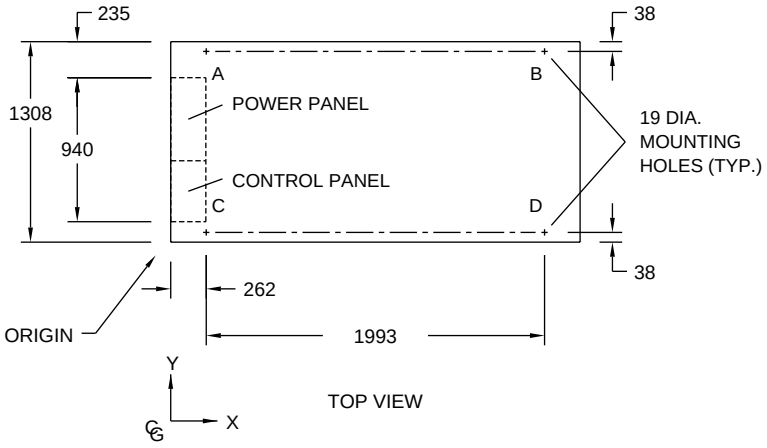
VIEW A-A

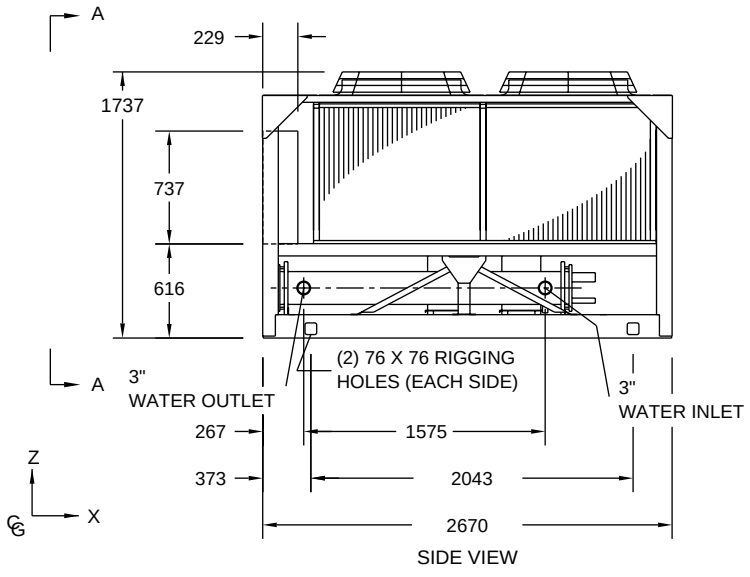
NOTE: *All dimensions are in mm unless specified otherwise.*

LD07737

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD07738

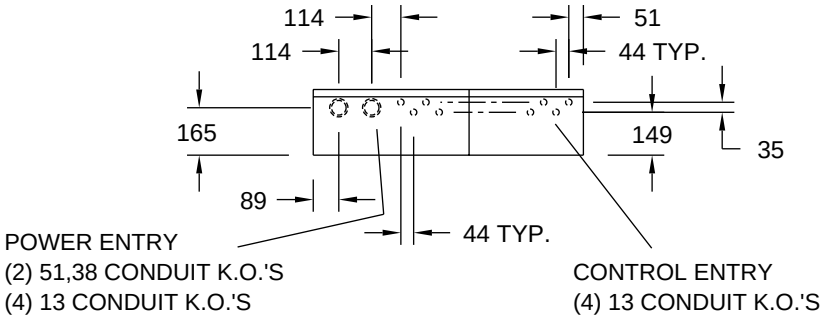
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0014	1138	612	719
0020	1138	611	719

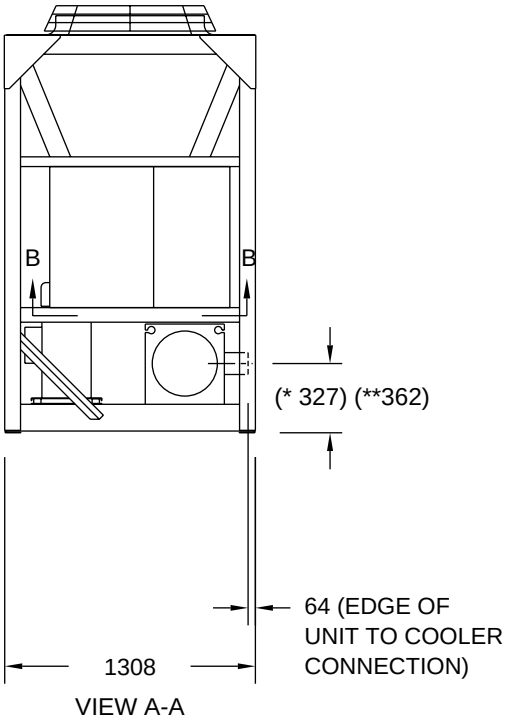
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0014	1153	615	731
0020	1153	615	731

DIMENSIONS - YCAL0024-YCAL0034 (SI)



VIEW B-B



VIEW A-A

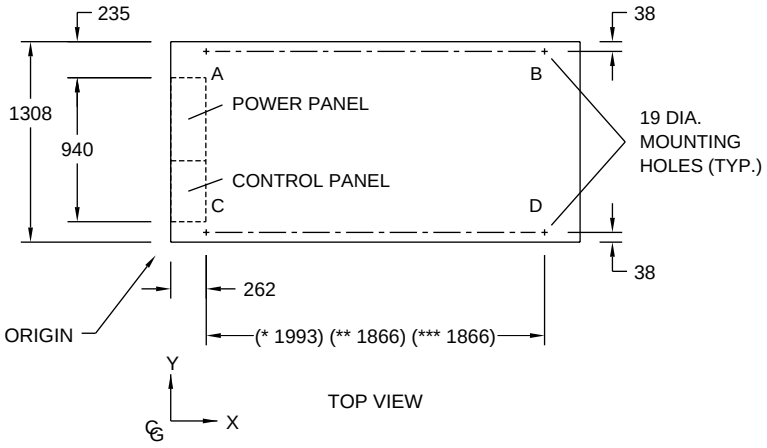
LD07733

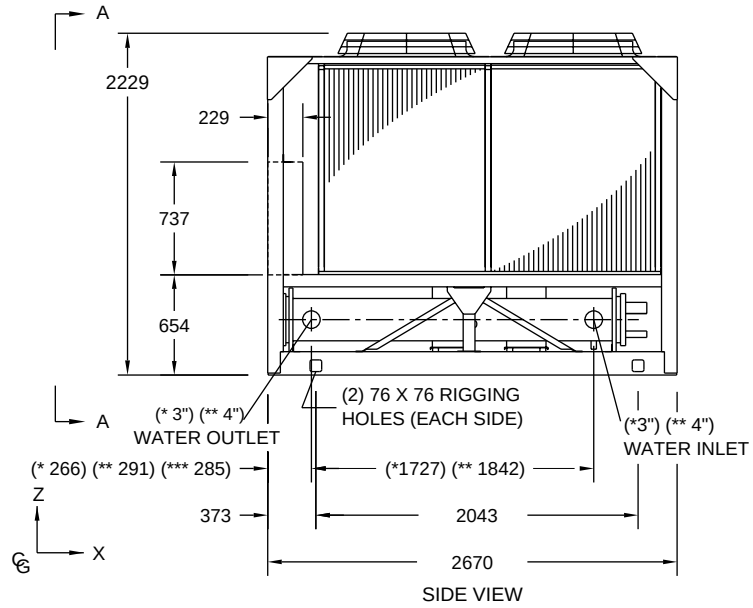
* Refers to Model YCAL0024
** Refers to Model YCAL0030 and YCAL0034

NOTE: *All dimensions are in mm unless specified otherwise.*

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD07734

* Refers to Model YCAL0024
** Refers to Model YCAL0030 and YCAL0034

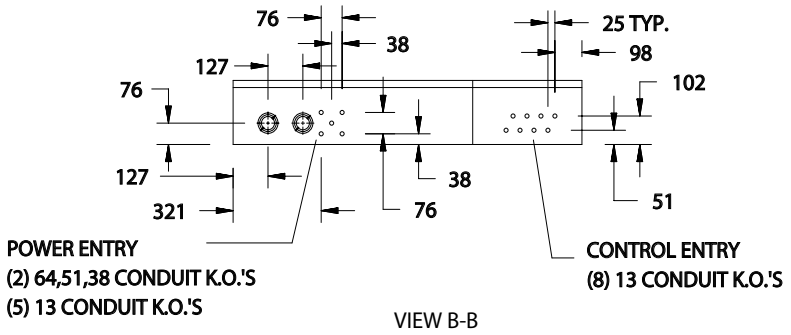
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0024	1142	619	897
0030	1144	620	887
0034	1142	646	860

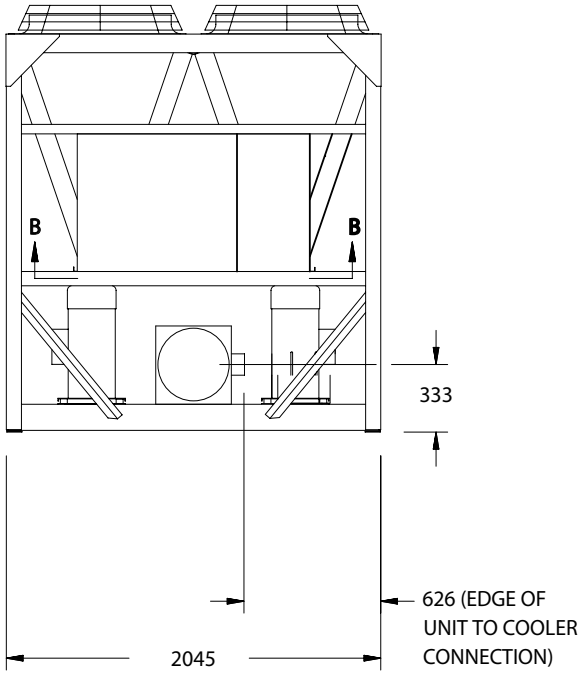
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0024	1162	623	919
0030	1163	623	909
0034	1160	647	882

DIMENSIONS - YCAL0040-YCAL0060 (SI)



VIEW B-B



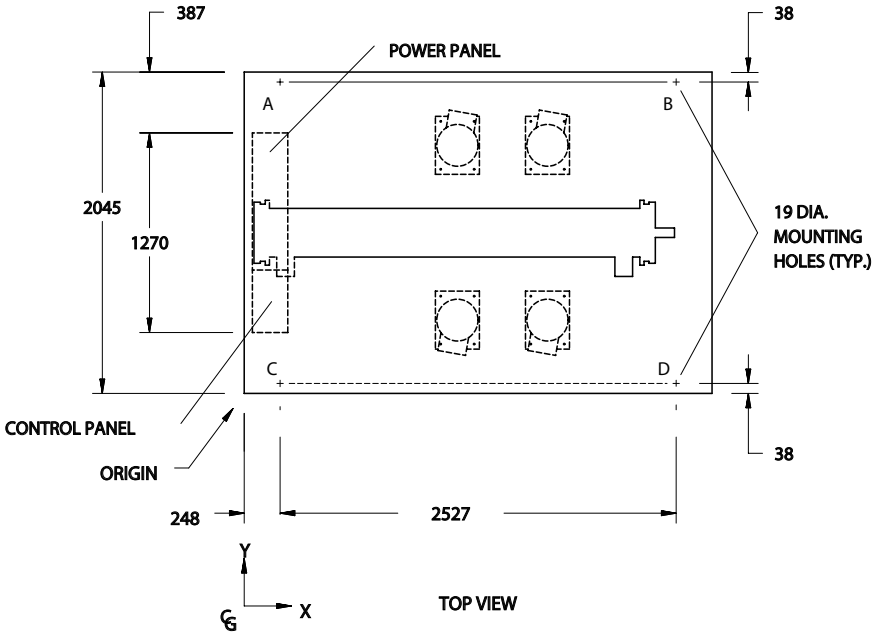
VIEW A-A

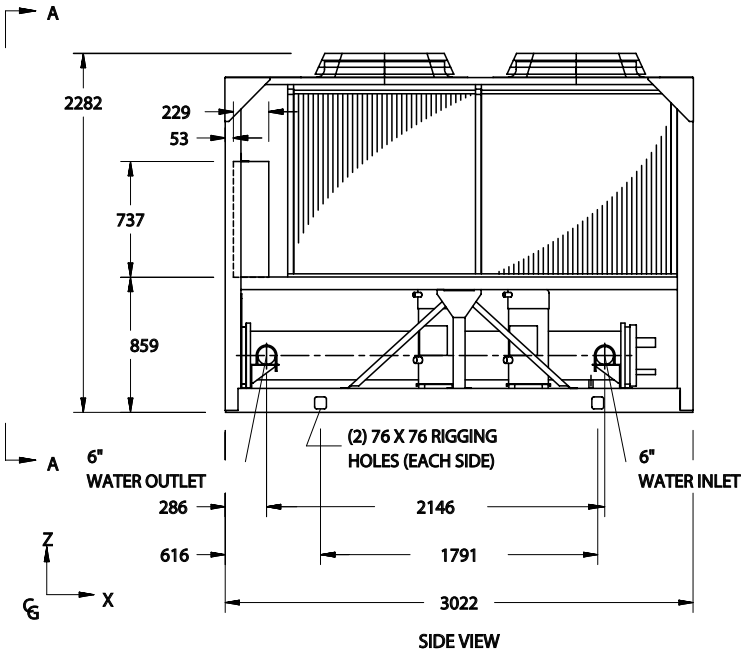
LD08706

NOTE: *All dimensions are in mm unless specified otherwise.*

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD04875A

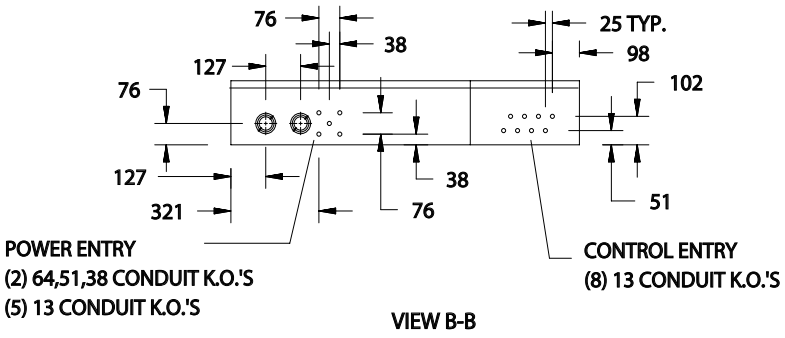
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0040	1490	1021	1047
0042	1481	1026	1009
0044	1483	1021	1004
0050	1484	1025	1003
0060	1485	1021	1001

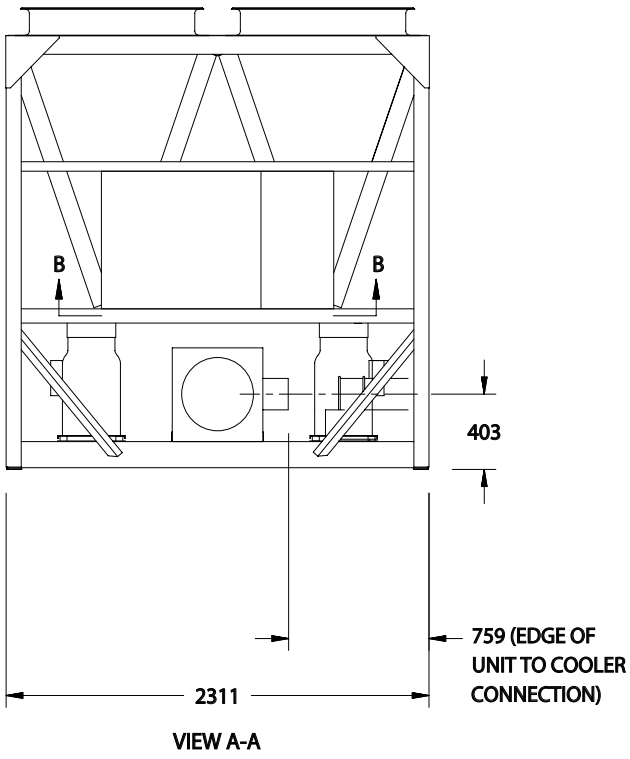
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0040	1482	1021	1023
0042	1483	1026	1018
0044	1485	1021	1013
0050	1486	1025	1012
0060	1487	1021	1010

DIMENSIONS -YCAL0064-YCAL0080 (SI)



VIEW B-B



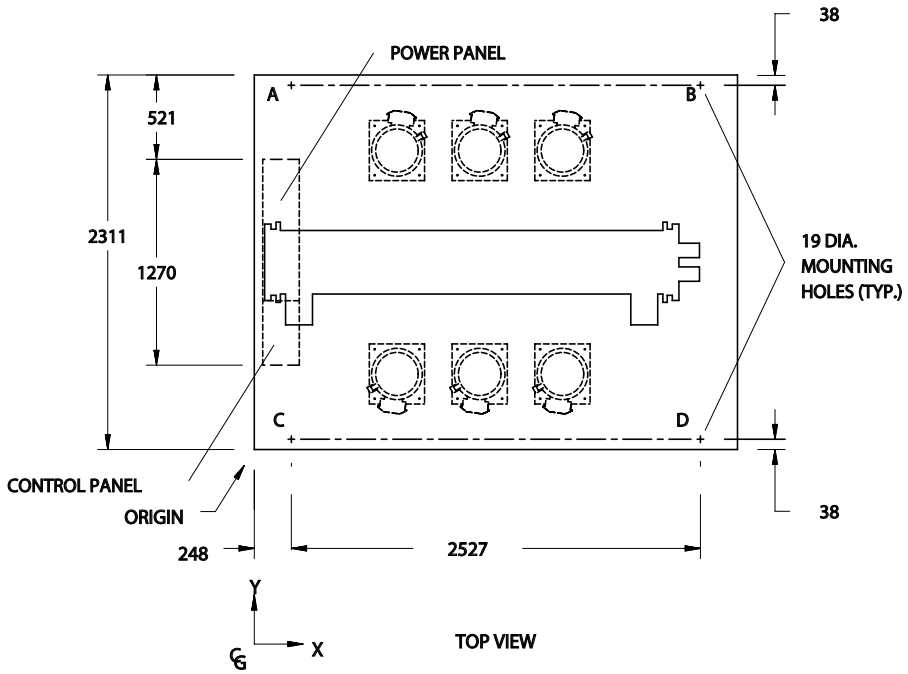
VIEW A-A

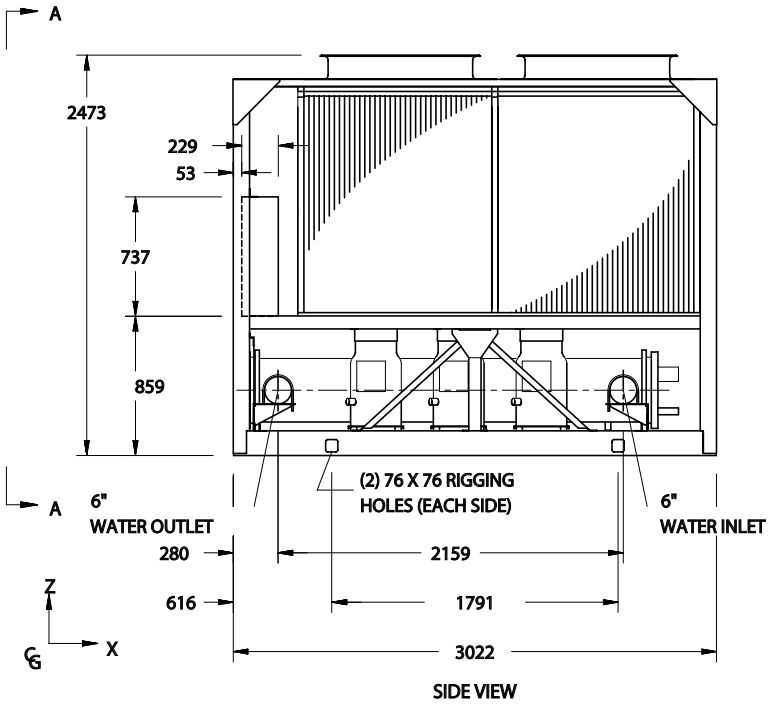
NOTE: *All dimensions are in mm unless specified otherwise.*

LD08707

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD04879A

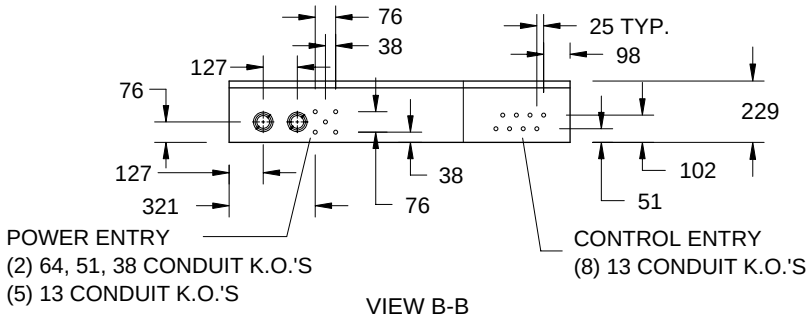
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0064	1435	1162	1001
0070	1437	1154	1002
0074	1438	1161	1003
0080	1437	1154	991

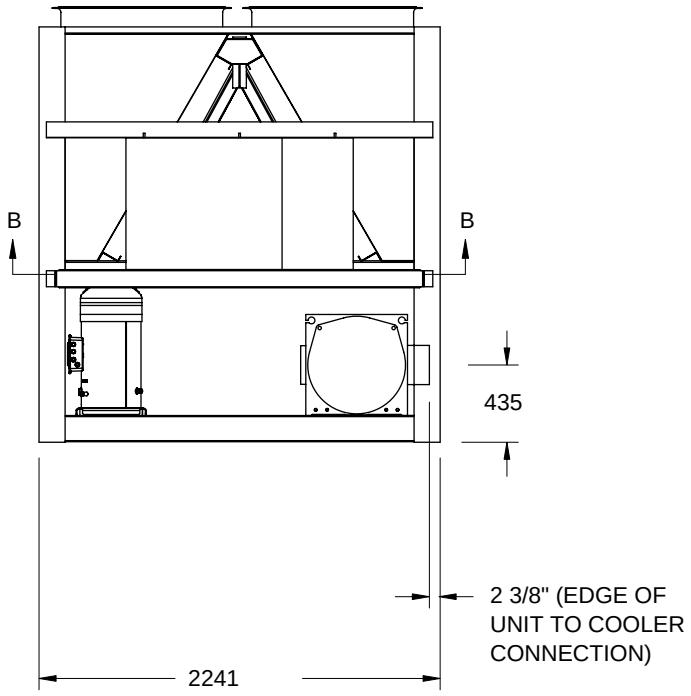
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0064	1440	1162	1016
0070	1442	1154	1017
0074	1443	1160	1018
0080	1442	1154	1006

DIMENSIONS - YCAL0090-YCAL0094 (SI)



VIEW B-B



VIEW A-A

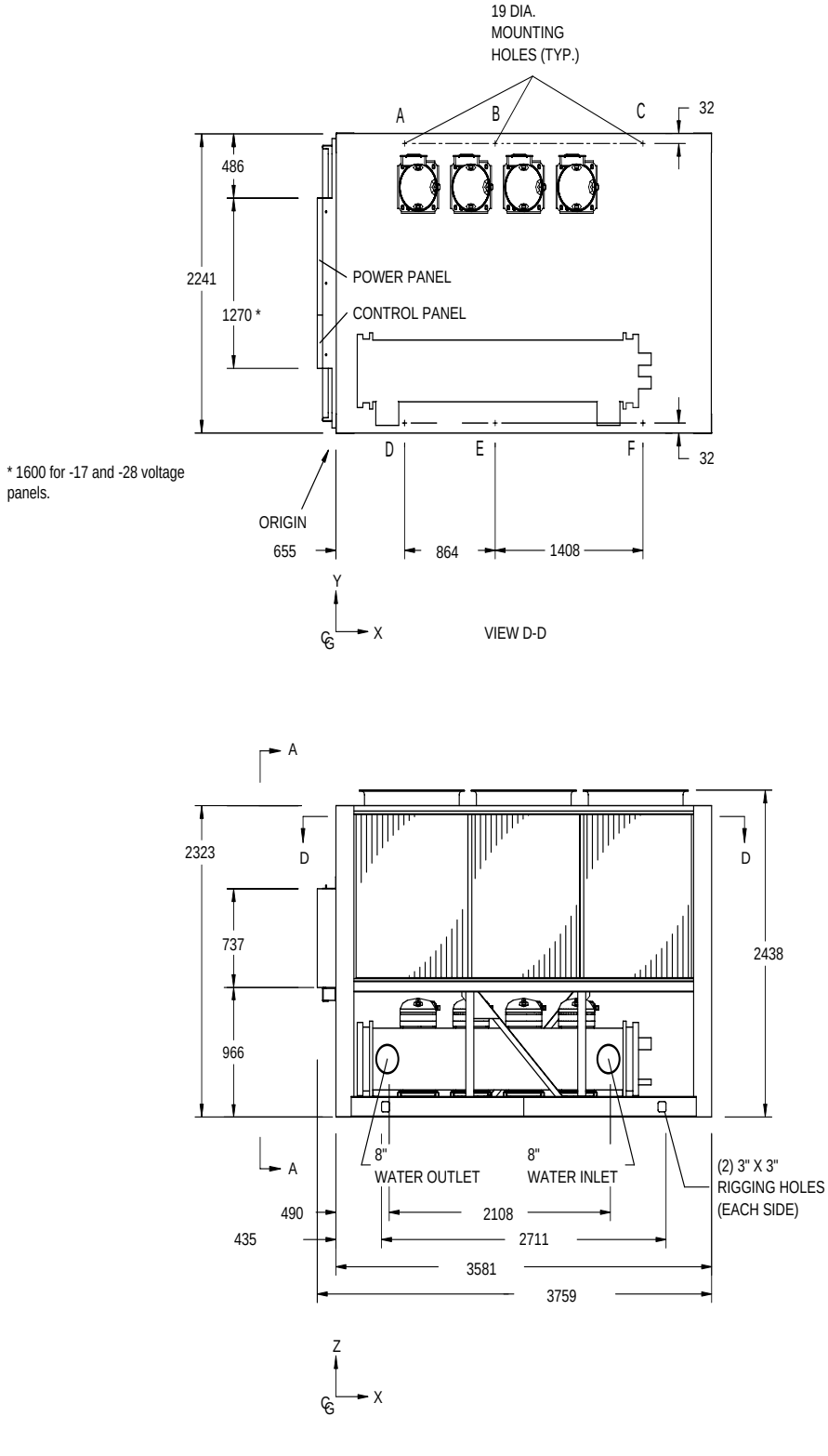
POWER: MULTIPLE POINT WITH TERMINAL BLOCKS

NOTE: *All dimensions are in mm unless specified otherwise.*

LD07713

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.



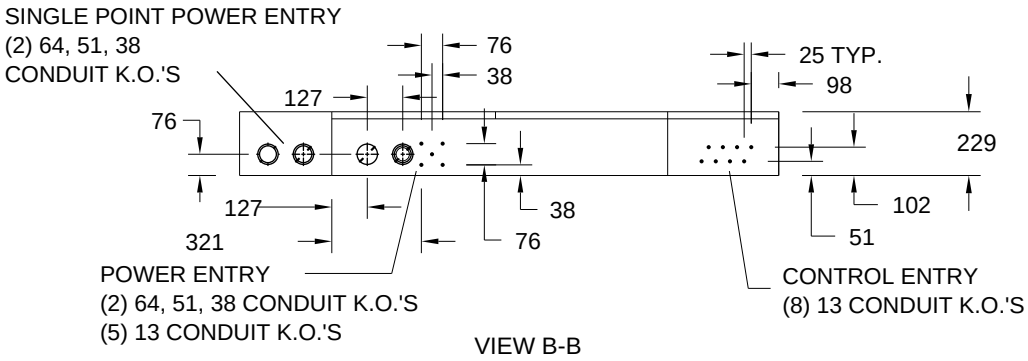
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0090	1610	1125	1069
0094	1633	1128	1064

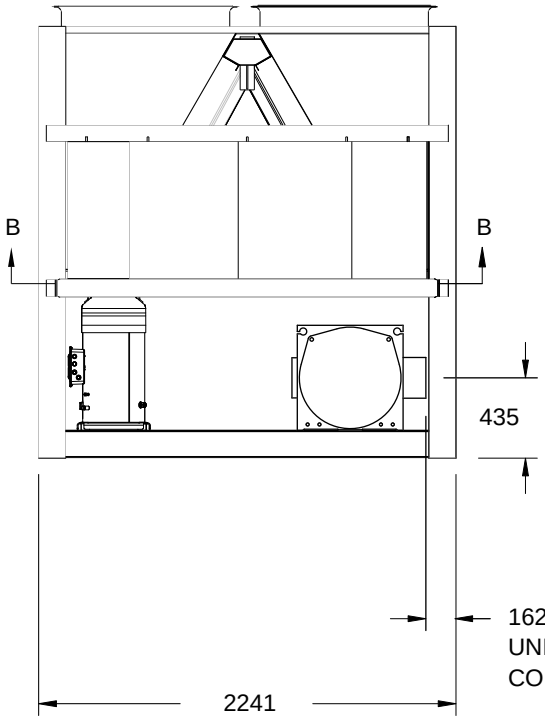
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0090	1628	1125	1130
0094	1646	1127	1124

DIMENSIONS - YCAL0104 (SI)



VIEW B-B



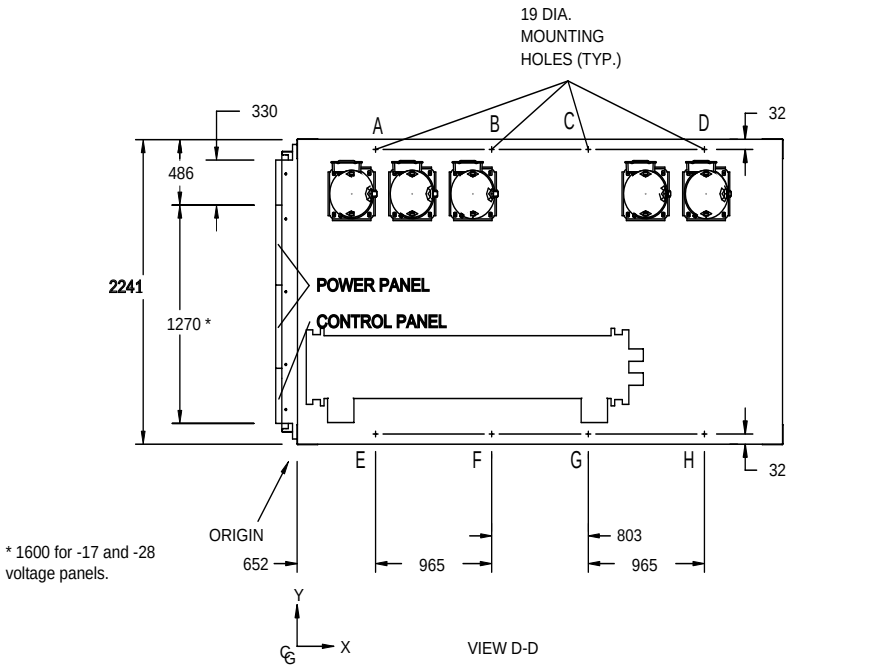
VIEW A-A

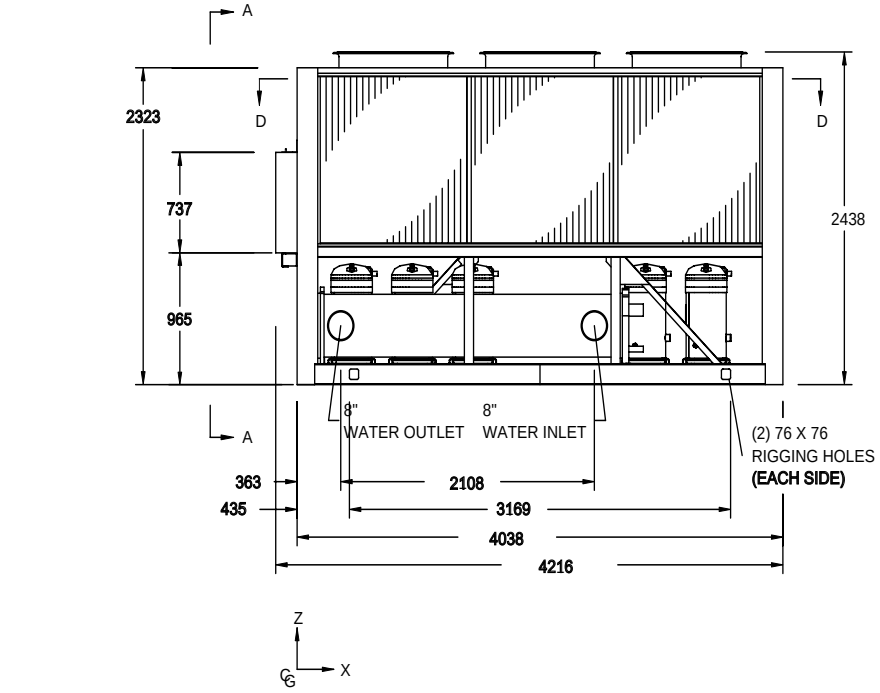
NOTE: *All dimensions are in mm unless specified otherwise.*

LD07715

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





LD08709

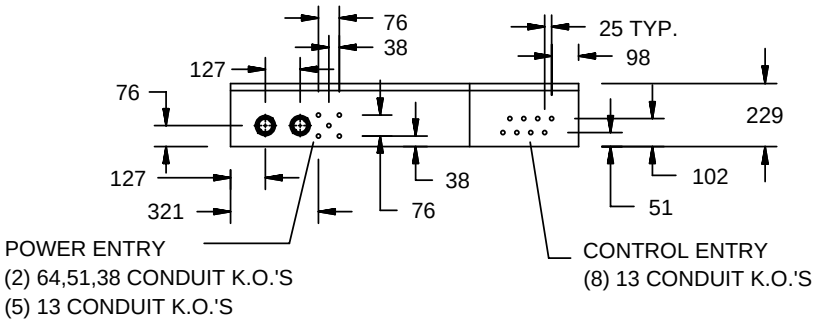
ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0104	1786	1160	1035

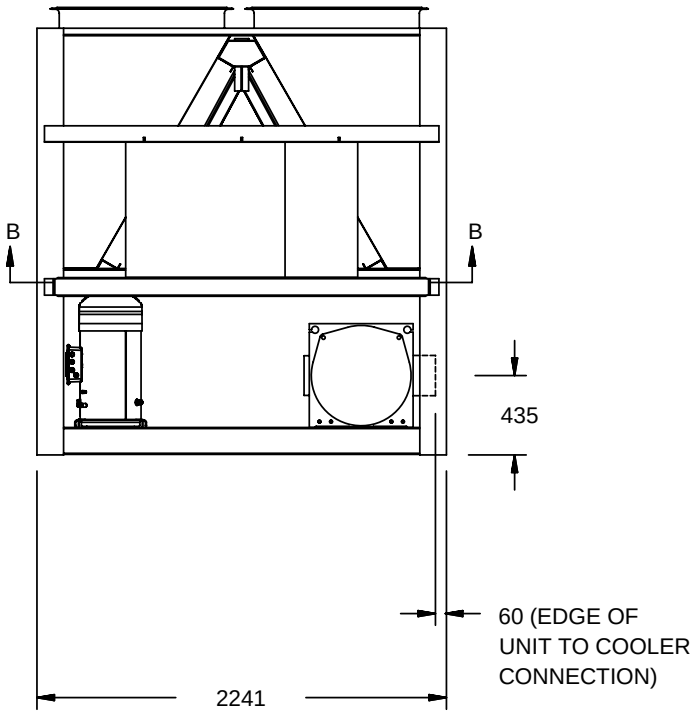
COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0104	1811	1155	1084

DIMENSIONS - YCAL0114 - YCAL0134 (SI)



VIEW B-B

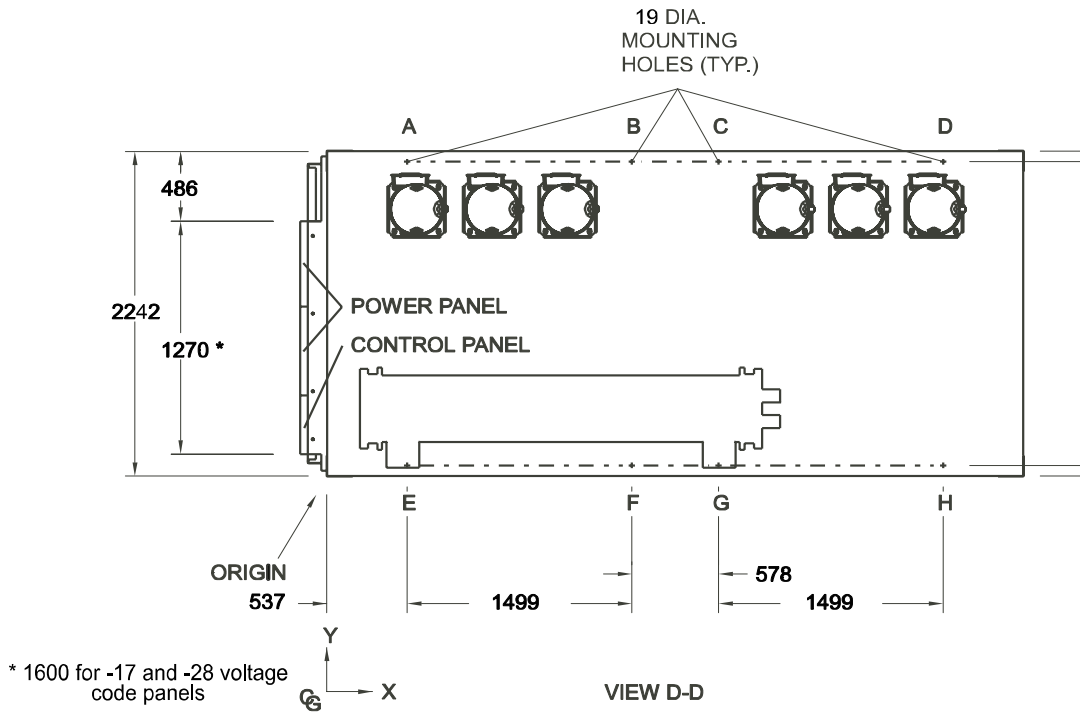


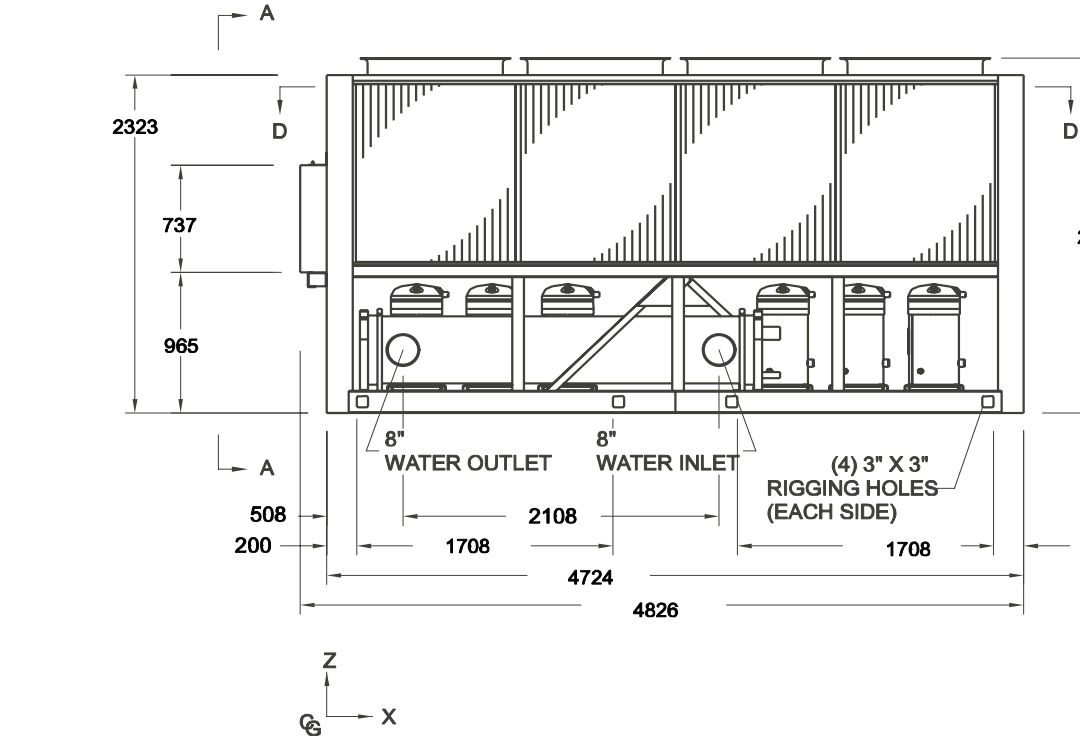
VIEW A-A

NOTE: *All dimensions are in mm unless specified otherwise.*

NOTE:

Placement on a level surface of free of obstructions (including snow, for winter operation) or air circulation ensures rated performance, reliable operation, and ease of maintenance. Site restrictions may compromise minimum clearances indicated below, resulting in unpredictable airflow patterns and possible diminished performance. YORK's unit controls will optimize operation without nuisance high-pressure safety cutouts; however, the system designer must consider potential performance degradation. Access to the unit control center assumes the unit is no higher than on spring isolators. Recommended minimum clearances: Side to wall – 6'; rear to wall – 6'; control panel to end wall – 4'0"; top – no obstructions allowed; distance between adjacent units – 10'. No more than one adjacent wall may be higher than the unit.





ALUMINUM

YCAL	Center of Gravity (mm)		
	X	Y	Z
0114	2087	1156	1110
0124	2059	1172	1094
0134	2079	1189	1080

COPPER

YCAL	Center of Gravity (mm)		
	X	Y	Z
0114	2115	1148	1151
0124	2089	1166	1135
0134	2106	1181	1121

EQUIPMENT PRE-STARTUP AND STARTUP CHECKLIST

JOB NAME: _____
SALES ORDER #: _____
LOCATION: _____
SOLD BY: _____
INSTALLING CONTRACTOR: _____
START-UP TECHNICIAN/ COMPANY: _____
START-UP DATE : _____

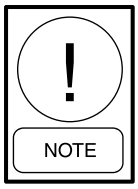
CHILLER MODEL #: _____
SERIAL #: _____

Pre-Startup

Checking The System Prior To Initial Start (No Power)

Unit Checks

- ❑ 1. Inspect the unit for shipping or installation damage.
- ❑ 2. Assure that all piping has been completed.
- ❑ 3. Visually check for refrigerant piping leaks.
- ❑ 4. Open suction line ball valve, discharge line ball valve, and liquid line valve for each system.
- ❑ 5. The compressor oil level should be maintained so that an oil level is visible in the sight glass. The oil level can only be tested when the compressor is running in stabilized conditions, guaranteeing that there is no liquid refrigerant in the lower shell of the compressor. In this case, the oil should be between 1/4 and 3/4 in the sight glass. At shutdown, the oil level can fall to the bottom limit of the oil sight glass.
- ❑ 6. Assure water pumps are on. Check and adjust water pump flow rate and pressure drop across the cooler *(see Operational Limitations listed earlier in this section of the IOM).* Verify flow switch operation.



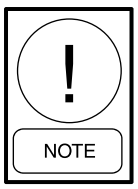
Excessive flow may cause catastrophic damage to the evaporator.

- ❑ 7. Check the control panel to ensure it is free of foreign material (wires, metal chips, etc.).
- ❑ 8. Visually inspect wiring (power and control). Wiring must meet N.E.C. and local codes. *See Fig. 2 through Fig. 5, pages 23 - 26.*
- ❑ 9. Check tightness of power wiring inside the power panel on both sides of the motor contactors and overloads.
- ❑ 10. Check for proper size fuses in main and control circuits, and verify overload setting corresponds with RLA and FLA values in electrical tables.
- ❑ 11. Assure 120VAC Control Power to CTB2 has 15 amp minimum capacity. *See Table 1, page 29.*
- ❑ 12. Be certain all water temp sensors are inserted completely in their respective wells and are coated with heat conductive compound.
- ❑ 13. Assure that evaporator TXV bulbs are strapped onto the suction lines at 4 or 8 o'clock positions or suction temp. sensors if EEVs are installed.
- ❑ 14. Assure oil level in the compressor or oil line sight glasses is between 1/4 and 3/4.
- ❑ 15. Check the tightness of the heaters on each compressor. Tighten the heater if the heater fingers do not touch the compressor housing. Inspect the heater around the entire perimeter of each compressor. The heater should be torqued to 26 in./lbs., plus or minus 4 in./lbs.

Compressor Heaters (Power On – 24 Hours Prior To Start)

- ❑ 1. Apply 120VAC and verify its value between terminals 5 and 2 of CTB2. The voltage should be 120VAC plus or minus 10%.

  Each heater should draw approximately 0.5 to 1amp.



Power must be applied 24 hours prior to startup.

TABLE 17 - SETPOINTS ENTRY LIST

OPTIONS	
Display Language	
Sys 1 Switch	
Sys 2 Switch	
Chilled Liquid	
* Ambient Control	
Local/Remote Mode	
Control Mode	
Display Units	
* Lead/Lag Control	
* Fan Control	
Manual Override	
Current Feedback	
** Soft Start	
** Unit Type	
** Refrigerant Type	
** Expansion Valve Type	
COOLING SETPOINTS	
Cooling Setpoint	
Range	
EMS-PWM Max. Setpoint	
PROGRAM	
Discharge Pressure Cutout	
Suct. Pressure Cutout	
Low Amb. Temp. Cutout	
Leaving Liquid Temp. Cutout	
Anti-Recycle Time	
Fan Control ON Pressure	
Fan Differential OFF Pressure	
Total # of Compressors	
* Number of Fans/System	
* Unit/Sys Voltage	
Unit ID	
* Sys 1 Superheat Setpoint	
* Sys 2 Superheat Setpoint	

* Not on all models
** Viewable only

Startup

Panel Checks (Power On – Both Unit Switch Off)

❑ 1. Apply 3-phase power and verify its value. Voltage imbalance should be no more than 2% of the average voltage.

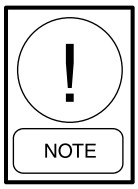
❑ 2. Apply 120VAC and verify its value on the terminal block in the Power Panel. Make the measurement between terminals 5 and 2 of CTB2. The voltage should be 120VAC plus or minus 10%.

❑ 3. Program/verify the Cooling Setpoints, Program Setpoints, and unit Options. Record the values in Table 17 *(see information on Setpoints and Unit keys in Section 2 of this IOM for programming instruction).*

❑ 4. Put the unit into Service Mode *(as described under Section 4 Service and Troubleshooting)* and cycle each condenser fan to ensure proper rotation.

❑ 5. Prior to this step, turn system 2 off *(if applicable –refer to Option 2 under Unit Key in Section 2 of this IOM for more information on system switches.)* Connect a manifold gauge to system 1 suction and discharge service valves.

Place the Unit Switch in the control panel to the ON position.



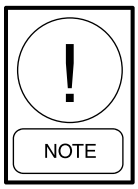
As each compressor cycles ON, ensure that the discharge pressure rises and the suction pressure decreases.

If this does not occur, the compressor being tested is operating in the reverse direction and must be corrected. After verifying proper compressor rotation, turn the Unit Switch to OFF.

This unit uses scroll compressors which can only operate in one direction. Failure to observe this will lead to compressor failure.

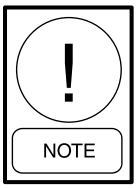
❑ 6. YCAL0040 through YCAL0134 units only – Turn system 1 off and system 2 ON *(refer to Option 2 under Unit Key in Section 2 of this IOM for more information on system switches.)*

Place the Unit Switch in the control panel to the ON position.



As each compressor cycles ON, ensure that the discharge pressure rises and the suction pressure decreases.

If this does not occur, the compressor being tested is operating in the reverse direction and must be corrected. After verifying proper compressor rotation, turn the Unit Switch to "OFF."



The chilled liquid setpoint may need to be temporarily lowered to ensure all compressors cycle ON.

❑ 7. After verifying compressor rotation, return the Unit Switch to the OFF position and ensure that both systems are programmed for ON *(refer to Option 2 under Unit Key in Section 2 of this IOM for more information on system switches).*

Initial Startup

After the preceding checks have been completed and the control panel has been programmed as required in the Equipment Pre-startup and, the chiller may be placed into operation.

❑ 1. Place the Unit Switch in the control panel to the ON position.

❑ 2. The first compressor will start and a flow of refrigerant will be noted in the sight glass. After several minutes of operation, the vapor in the sight glass will clear and there should be a solid column of liquid when the TXV stabilizes.

❑ 3. Allow the compressor to run a short time, being ready to stop it immediately if any unusual noise or adverse conditions develop.

❑ 4. Check the system operating parameters. Do this by selecting various displays such as pressures and temperatures and comparing these readings to pressures and temperatures taken with manifold gauges and temperature sensors.

❑ 5. With an ammeter, verify that each phase of the condenser fans and compressors are within the RLA as listed under Electrical Data.

Checking Superheat and Subcooling

The subcooling and superheat should always be checked when charging the system with refrigerant.

When the refrigerant charge is correct, there will be no vapor in the liquid sight glass with the system operating under full load conditions, and there will be 15°F (8.34°C) subcooled liquid leaving the condenser.

An overcharged system should be guarded against. The temperature of the liquid refrigerant out of the condenser should be no more than 18°F (10°C) subcooled at design conditions.

The subcooling temperature of each system can be calculated by recording the temperature of the liquid line at the outlet of the condenser and subtracting it from the liquid line saturation temperature at the liquid stop valve (liquid line saturation temperature is converted from a temperature/pressure chart).

Example:

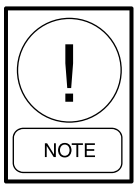
Liquid line pressure =	102°F
202 psig converted to	- 87°F
minus liquid line temp.	
Subcooling =	15°F

The subcooling should be adjusted to 15°F (-9.4°C) at design conditions.

❑ 1. Record the liquid line pressure and its corresponding temperature, liquid line temperature and subcooling below:

	SYS 1	SYS 2	
Liq Line Press =	_____	_____	psig
Saturated Temp =	_____	_____	°F
Liq Line Temp =	_____	_____	°F
Subcooling =	_____	_____	°F

After the subcooling is verified, the suction superheat should be checked. The superheat should be checked only after steady state operation of the chiller has been established, the leaving water temperature has been pulled down to the required leaving water temperature, and the unit is running in a fully loaded condition. Correct superheat setting for a system is 10°F minus 15°F (5.56°C minus 8.33°C) 18" (46 cm) from the cooler.



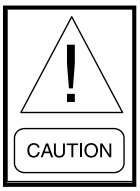
Superheat should typically be set for no less than 10°F (-12.2°C) with only a single compressor running on a circuit.

The superheat is calculated as the difference between the actual temperature of the returned refrigerant gas in the suction line entering the compressor and the temperature corresponding to the suction pressure as shown in a standard pressure/temperature chart.

Example:

Suction Temp =	46°F
minus Suction Press	
60 psig converted to Temp	- 34°F
Superheat =	12°F

When adjusting the expansion valve (TXV only), the adjusting screw should be turned not more than one turn at a time, allowing sufficient time (approximately 15 minutes) between adjustments for the system and the thermal expansion valve to respond and stabilize.



The EEV is non-adjustable. Superheat setpoint is programmable from the keypad.

Assure that superheat is set at a minimum of 10°F (5.56°C) with a single compressor running on each circuit.

❑ 2. Record the suction temperature, suction pressure, suction saturation temperature, and superheat of each system below:

	SYS 1	SYS 2	
Suction temp =	_____	_____	°F
Suction Pressure =	_____	_____	psig
Saturation Temp =	_____	_____	°F
Superheat =	_____	_____	°F

Leak Checking

❑ 1. Leak check compressors, fittings, and piping to ensure no leaks.

If the unit is functioning satisfactorily during the initial operating period, no safeties trip and the compressors cycle to control water temperature to setpoint, the chiller is ready to be placed into operation.

UNIT OPERATING SEQUENCE

The operating sequence described below relates to operation on a hot water start after power has been applied, such as startup commissioning. When a compressor starts, internal timers limit the minimum time before another compressor can start to 1 minute.

1. For the chiller system to run, the flow switch must be closed, any remote cycling contacts must be closed, the daily schedule must not be scheduling the chiller off, and temperature demand must be present.

2. When power is applied to the system, the microprocessor will start a 2 minute timer. This is the same timer that prevents an instantaneous start after a power failure.

3. At the end of the 2 minute timer, the microprocessor will check for cooling demand. If all conditions allow for start, a compressor on the lead system will start and the liquid line solenoid will open or the EEV will begin to operate (EEV equipped chillers only). Coincident with the start, the anti-coincident timer will be set and begin counting downward from "60" seconds to "0" seconds.

   If the unit is programmed for auto lead/lag, the system with the shortest average run-time of the compressors will be assigned as the "lead" system. A new lead/lag assignment is made whenever all systems shut down.

4. Several seconds after the compressor starts, that systems first condenser fan will be cycled ON (outdoor air temperature more than 25°F (-4°C) or discharge pressure). *See the section on Condenser Fan Control located in Section 2 of this IOM for details concerning condenser fan cycling*. YCAL0090 through YCAL0134 cycle fans on discharge pressure only.

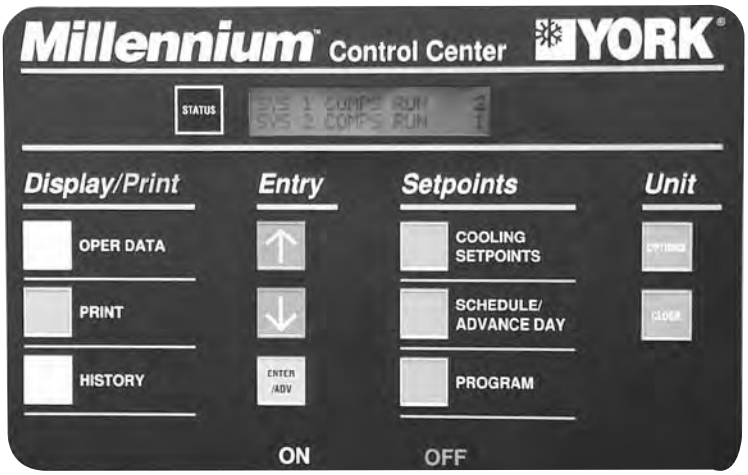
5. After 1 minute of compressor run time, the next compressor in sequence will start when a system has to load. Additional compressors will be started at 60 second intervals as needed to satisfy temperature setpoint.

6. If demand requires, the lag system will cycle ON with the same timing sequences as the lead system after the lead system has run for five minutes. *Refer to Capacity Control under Unit Operation in Section 2 of this IOM for a detailed explanation of system and compressor staging.*

7. As the load decreases below setpoint, the compressors will be shut down in sequence. This will occur at intervals of either 60, 30, or 20 seconds based on water temperature as compared to setpoint, and control mode. *See Capacity Control under Unit Operation in Section 2 of this IOM for a detailed explanation.*

8. When the last compressor in a "system" (two or three compressors per system), is to be cycled OFF, the system will initiate a pump-down. Each "system" has a pump-down feature upon shut-off. On a non-safety, non-unit switch shutdown, the LLSV will be turned off or the EEV will close (EEV equipped chillers only), and the last compressor will be allowed to run until the suction pressure falls below the Suction Pressure Cutout or for 180 seconds, whichever comes first.

SECTION 2 - UNIT CONTROLS



00065VIP

INTRODUCTION

The YORK Millennium MicroComputer Control Center is a microprocessor based control system designed to provide the entire control for the liquid chiller. The control logic embedded in the microprocessor based control system will provide control for the chilled liquid temperatures, as well as sequencing, system safeties, displaying status, and daily schedules. The MicroComputer Control Center consists of four basic components:

1. IPU II & I/O Boards
2. Transformer
3. Display
4. Keypad.

The keypad allows programming and accessing setpoints, pressures, temperatures, cutouts, daily schedule, options, and fault information.

Remote cycling, demand limiting and chilled liquid temperature reset can be accomplished by field supplied contacts.

Compressor starting/stopping and loading/unloading decisions are performed by the microprocessor to maintain leaving or return chilled liquid temperature. These decisions are a function of temperature deviation from setpoint.

A Master ON/OFF switch is available to activate or deactivate the unit.

IPU II AND I/O BOARDS

The IPU and I/O Boards are assembled to function as a single microprocessor controller requiring no additional hardware. The IPU II board contains a coldfire microprocessor and is the controller and decision maker in the control panel. The I/O Board handles all of the chiller I/O (Inputs and Outputs). System inputs from pressure transducers and temperature sensors are connected to the I/O Board. The I/O Board contains a processor capable of reading the inputs and controlling the outputs. It communicates through the transition header with the IPU II microprocessor.

The I/O Board circuitry multiplexes the analog inputs, digitizes them, and constantly scans them to keep watch on the chiller operating conditions. The input values are transmitted serially to the IPU II microprocessor board. From this information, the IPU II then issues commands to the I/O Board relay outputs to control contactors, solenoids, etc. for Chilled Liquid Temperature Control and to react to safety conditions. The I/O Board converts logic signals to operate relay outputs to 115VAC levels used by motor contactors, fan contactors, solenoid valves, etc. to control system operation. The low voltage side of all relay coils on the I/O Board are powered by +12V.

Keypad commands are actuated upon by the microprocessor to change setpoints, cutouts, scheduling, operating requirements, and to provide displays. The keypad and display are connected to the I/O Board.

The on-board power supply converts 24VAC from 75VA, 120/24VAC 50/60Hz UL listed class 2 power transformer to +12V, +5V and +3.3V using switching and linear voltage regulators located on the I/O and IPU II boards. These voltages are used to operate integrated circuitry on the board. The 40 character display and unit sensors (transducers and temp sensors) are supplied power for the micro board +5V supply. 24VAC is rectified, but not regulated, to provide unregulated +30VDC to supply all of the digital inputs.

The IPU II board contains one green "Power" LED to indicate that the board is powered up and one red "Status" LED to indicate by blinking that the processor is operating.

The I/O Board contains one green "Power" LED to indicate that the board is powered up and one red "Status" LED to indicate by blinking that the processor is operating. The I/O Board also contains two sets of Receiver/Transmit LED's, one for each available serial communication port. The Receive LED's are green, and the Transmit LED's are red.

A jumper on the I/O Board selects 4-20mA or 0-10VDC as the input type on the remote temperature reset analog input.

UNIT SWITCH

A unit ON/OFF switch is just underneath the keypad. This switch allows the operator to turn the entire unit OFF if desired. The switch must be placed in the ON position for the chiller to operate.

DISPLAY

The 40 Character Display (2 lines of 20 characters) is a liquid crystal display used for displaying system parameters and operator messages.

The display in conjunction with the keypad, allows the operator to display system operating parameters as well as access programmed information already in memory. The display has a lighted background for night viewing and for viewing in direct sunlight.

When a key is pressed, such as the OPER DATA key, system parameters will be displayed and will remain on the display until another key is pressed. The system parameters can be scrolled with the use of the ↑ (UP) AND ↓ (DOWN) arrow keys. The display will update all information at a rate of about one a second.

Display messages may show characters indicating "greater than" (>) or "less than" (<). These characters indicate the actual values are greater than or less than the limit values which are being displayed.

KEYPAD

The 12 button non-tactile keypad allows the user to retrieve vitals system parameters such as system pressures, temperatures, compressor running times and starts, option information on the chiller, and system setpoints. This data is useful for monitoring chiller operation, diagnosing potential problems, troubleshooting, and commissioning the chiller.

It is essential the user become familiar with the use of the keypad and display. This will allow the user to make full use of the capabilities and diagnostic features available.

BATTERY BACK-UP

The IPU II contains a Real Time Clock integrated circuit chip with an internal battery backup. The purpose of this battery backup is to assure any programmed values (setpoints, clock, cutouts, etc.) are not lost during a power failure regardless of the time involved in a power cut or shutdown period.

TRANSFORMER

A 75VA, 120/24VAC 50/60Hz transformer is provided to supply power to the microprocessor board, which in turn rectifies, filters, and regulates as necessary to supply power to the display, sensors, and transducers.

SINGLE SYSTEM SELECT AND PROGRAMMING # OF COMPRESSORS

The control software is common between single (1) and dual (2) system units. A jumper is installed between terminals 13 and 17 on the user terminal block to configure a unit for a single system. Dual (2) system chillers do not have a jumper installed. The jumper is only checked by the microprocessor on power-up.

The total number of compressors is programmable under the PROGRAM key:

- Single (1) system chillers can have two or three compressors.
- Dual (2) system chillers can have four, five, or six compressors.

STATUS KEY

00066VIP

The following messages are displayed when the STATUS key is pressed. Following each displayed message is an explanation pertaining to that particular display.

General Status Messages

In the case of messages which apply to individual systems, SYS 1 and SYS 2 messages will both be displayed and may be different. In the case of single system units, all SYS 2 messages will be blank.

```
UNIT SWITCH OFF
SHUTDOWN
```

This message informs the operator that the Unit Switch on the control panel is in the OFF position which will not allow the unit to run.

```
REMOTE CONTROLLED
SHUTDOWN
```

The REMOTE CONTROLLED SHUTDOWN message indicates that either an ISN system or RCC has turned the unit OFF, not allowing it to run.

```
DAILY SCHEDULE
SHUTDOWN
```

The DAILY SCHEDULE SHUTDOWN message indicates that the daily/holiday schedule programmed is keeping the unit from running.

```
FLOW SWITCH/REM STOP
NO RUN PERM
```

NO RUN PERM shows that either the flow switch is open or a remote start/stop contact is open in series with the flow switch between terminals 13 and 14 of terminal block CTB1. A 3-second delay is built into the software to prevent nuisance shutdowns due to erroneous signals on the run permissive input.

```
SYS 1 SYS SWITCH OFF
SYS 2 SYS SWITCH OFF
```

SYS SWITCH OFF tells that the system switch under options is turned off. The system will not be allowed to run until the switch is turned back ON.

```
SYS 1 NO COOL LOAD
SYS 2 NO COOL LOAD
```

This message informs the operator that the chilled liquid temperature is below the point (determined by the setpoint and control range) that the microprocessor will bring on a system or that the microprocessor has not loaded the lead system far enough into the loading sequence to be ready to bring the lag system ON. The lag system will display this message until the loading sequence is ready for the lag system to start.

```
SYS 1 COMPS RUN X
SYS 2 COMPS RUN X
```

The COMPS RUNNING message indicates that the respective system is running due to demand. The "X" will be replaced with the number of compressors in that system that are running.

```
SYS 1 AR TIMER XX S
SYS 2 AR TIMER XX S
```

The anti-recycle timer message shows the amount of time left on the respective systems anti-recycle timer. This message is displayed when the system is unable to start due the anti-recycle timer being active.

```
SYS 1 AC TIMER XX S
SYS 2 AC TIMER XX S
```

The anti-coincidence timer is a software feature that guards against 2 systems starting simultaneously. This assures instantaneous starting current does not become excessively high due to simultaneous starts. The microprocessor limits the time between compressor starts to 1 minute regardless of demand or the anti-recycle timer being timed out. The anti-coincidence timer is only present on two system units.

```
SYS 1 DSCH LIMITING
SYS 2 DSCH LIMITING
```

When this message appears, discharge pressure limiting is in effect. The discharge pressure limiting feature is integral to the standard software control; however the discharge transducer is optional on some models. Therefore, it is important to keep in mind that this control will not function unless the discharge transducer is installed in the system.

The limiting pressure is a factory set limit to keep the system from faulting on the high Discharge Pressure Cutout due to high load or pull down conditions. When the unload point is reached, the microprocessor will automatically unload the affected system by de-energizing one compressor. The discharge pressure unload will occur when the discharge pressure gets within 15 psig of the programmed Discharge Pressure Cutout. This will only happen if the system is fully loaded and will shut only one compressor off. If the system is not fully loaded, discharge limiting will not go into effect. Reloading the affected system will occur when the discharge pressure drops to 85% of the unload pressure and 10 minutes have elapsed.

```
SYS 1 SUCT LIMITING
SYS 2 SUCT LIMITING
```

When this message appears, suction pressure limiting is in effect. Suction pressure limiting is only available on units that have the suction pressure transducer installed. If a low pressure switch is installed instead, suction pressure limiting will not function.

The suction pressure limit is a control point that limits the loading of a system when the suction pressure drops to within 15% above the Suction Pressure Cutout. On a standard system programmed for 44 psig/3.0 bar Suction Pressure Cutout, the microprocessor would inhibit loading of the affected system with the suction pressure less than or equal to 1.15 x 44 psig/3.0 bar equals 50 psig/3.5 bar. The system will be allowed to load after 60 seconds and after the suction pressure rises above the suction pressure limit point.

```
SYS 1 LOAD LIMIT XX%
SYS 2 LOAD LIMIT XX%
```

This message indicates that load limiting is in effect and the percentage of the limiting in effect. This limiting could be due to the load limit/PWM input, ISN or RCC controller could be sending a load limit command.

```
MANUAL
OVERRIDE
```

If Manual Override mode is selected, the STATUS display will display this message. This will indicate that the daily schedule is being ignored and the chiller will startup when chilled liquid temperature allows, Remote Contacts, Unit Switch and system switches permitting. This is a priority message and cannot be overridden by anti-recycle messages, fault messages, etc. when in the STATUS display mode. Therefore, do not expect to see any other STATUS messages when in the Manual Override mode. Manual Override is to only be used in emergencies or for servicing. Manual Override mode automatically disables itself after 30 minutes.

```
SYS 1 PUMPING DOWN
SYS 2 PUMPING DOWN
```

The PUMPING DOWN message indicates that a compressor in the respective system is presently in the process of pumping the system down. When pumpdown is initiated on shutdown, the liquid line solenoid or EEV will close and a compressor will continue to run. When the suction pressure decreases to the Suction Pressure Cutout setpoint or runs for 180 seconds, whichever comes first, the compressor will cycle off.

Fault Status Messages

Safeties are divided into two categories, System Safeties and Unit Safeties. System Safeties are faults that cause the individual system to be shut down. Unit safeties are faults that cause all running compressors to be shut down. Following are display messages and explanations.

System Safeties

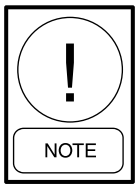
System Safeties are faults that cause individual systems to be shut down if a safety threshold is exceeded for 3 seconds. They are auto reset faults in that the system will be allowed to restart automatically after the fault condition is no longer present. However, if 3 faults on the same system occur within 90 minutes, that system will be locked out on the last fault. This condition is then a manual reset. The system switch (under OPTIONS key) must be turned off and then back on to clear the lockout fault.

```
SYS 1 HIGH DSCH PRES
SYS 2 HIGH DSCH PRES
```

The Discharge Pressure Cutout is a software cutout in the microprocessor and is backed-up by a mechanical high pressure cutout switch located in the refrigerant circuit. It assures that the system pressure does not exceed safe working limits. The system will shutdown when the programmable cutout is exceeded and will be allowed to restart when the discharge pressure falls 40 psig below the cutout. Discharge transducers must be installed for this function to operate.

```
SYS 1 LOW SUCT PRESS
SYS 2 LOW SUCT PRESS
```

The Suction Pressure Cutout is a software cutout that helps protect the chiller from an evaporator freeze-up should the system attempt to run with a low refrigerant charge or a restriction in the refrigerant circuit.



Repeated starts after resetting a low suction pressure fault will cause evaporator freeze-up. Whenever a system locks out on this safety, immediate steps should be taken to identify the cause.

At system start, the cutout is set to 10% of programmed value. During the next three minutes the cutout point is ramped up to the programmed cutout point. If at any time during this three minutes the suction pressure falls below the ramped cutout point, the system will stop.

This cutout is ignored for the first 30 seconds of system run time to avoid nuisance shutdowns, especially on units that utilize a low pressure switch in place of the suction pressure transducer.

After the first 3 minutes, if the suction pressure falls below the programmed cutout setting, a “transient protection routine” is activated. This sets the cutout at 10% of the programmed value and ramps up the cutout over the next 30 seconds. If at any time during this 30 seconds the suction pressure falls below the ramped cutout, the system will stop. This transient protection scheme only works if the suction pressure transducer is installed. When using the mechanical low pressure switch, the operating points of the low pressure switch are: opens at 23 psig plus or minus 5 psig (1.59 barg plus or minus .34 barg), and closes at 35 psig plus or minus 5 psig (2.62 barg plus or minus .34 barg).

```
SYS 1 MP/HPCO INHIB
SYS 2 MP/HPCO INHIB
```

The Motor Protector/Mechanical High Pressure Cutout protects the compressor motor from overheating or the system from experiencing dangerously high discharge pressure.

This fault condition is present when CR1 (SYS 1) or CR2 (SYS 2) relays de-energize due to the HP switch or motor protector opening. This causes the respective CR contacts to open resulting in 0VDC to be applied on the input to the I/O Board. The fault condition is cleared when a 30VDC signal is restored to the input.

The internal motor protector opens at 185°F to 248°F (85°C to 120°C) and auto resets. The mechanical HP switch opens at 405 psig plus or minus 10 psig (27.92 barg plus or minus .69 barg) and closes at 330 psig plus or minus 25 psig (22.75 barg plus or minus 1.72 barg).

The compressor is also equipped with a discharge temperature sensor for the purpose of sensing internal scroll temperature. This sensor protects the scrolls from overheating due to inadequate cooling that may occur when refrigerant charge is low, or superheat is too high.

When the sensor senses a high temperature, it opens the motor protector circuit in the compressor causing the compressor to shut down.

During the first two faults an MP/HP INHIBIT message will be displayed and the system will not be locked out. Only after the third fault will the MP/HP Fault message shown below be displayed on the STATUS display. Additionally, the system will be locked out.

```
SYS 1 MP/HPCO FAULT
SYS 2 MP/HPCO FAULT
```

Whenever the motor protector or discharge sensor shuts down a compressor and the system, the internal compressor contacts will open for a period of 30 minutes to assure that the motor or scroll temperatures have time to dissipate the heat and cool down.

After 30 minutes, the contacts will close and the system will be permitted to restart. The microprocessor will not try to restart the compressors in a system that shuts down on this safety for a period of 30 minutes to allow the internal compressor timer to time out.

```
SYS 1 HIGH MTR CURR
SYS 2 HIGH MTR CURR
```

When System Current Feedback option is selected (Option 11 under OPTIONS key Current Feedback), this safety will operate as follows. If the actual voltage of the system exceeds the programmed trip voltage for 5 seconds, the system will shutdown. This fault will not be cleared until the condition is no longer present.

```
SYS 1 LOW EVAP TEMP
SYS 2 LOW EVAP TEMP
```

The Low Evaporator Temperature Cutout is to protect the evaporator from freeze-up with R-407C. This safety uses the Cooler Inlet Refrigerant Temp Sensors to monitor evaporator inlet refrigerant temperature on each system. These sensors are only installed on R-407C units. This safety is ignored for the first 270 seconds of runtime.

In water cooling mode, if the refrigerant temperature falls below 21°F (-6.1°C), the system will be shut down.

In glycol cooling mode, if the refrigerant temp. is below 21°F (-6.1°C) and falls 19°F (-7.2°C) below the leaving chilled liquid temp., the system will shut down.

In either cooling mode, if the cooler inlet refrigerant temp. sensor reads out of range low, the system will also shut down.

```
SYS 1 LOW SUPERHEAT
SYS 2 LOW SUPERHEAT
```

The Low Superheat Cutout is to protect the compressor(s) from liquid floodback due to low suction superheat. This safety is only active when EEV is selected as the expansion valve in Service Mode. This safety is ignored for the first 15 seconds of system runtime.

This safety can be triggered by two events. The first is when suction superheat is less than 2.0°F for three seconds. The second is when the EEV pilot solenoid is closed 10 times in two minutes due to low superheat.

```
SYS 1 SENSOR FAILURE
SYS 2 SENSOR FAILURE
```

The Sensor Failure Safety prevents the system from running when the sensors measuring superheat are not functioning properly. This safety is only active when EEV is selected as the expansion valve type in Service Mode. This safety is ignored for the first 15 seconds of system runtime.

This safety will shut down a system if either suction temperature or suction pressure sensors read out of range high or low. This condition must be present for three seconds to cause a system shutdown. The safety locks out a system after the first fault and will not allow automatic restarting.

Unit Safeties

Unit safeties are faults that cause all running compressors to be shut down. Unit faults are auto reset faults in that the unit will be allowed to restart automatically after the fault condition is no longer present.

```
UNIT FAULT:
LOW AMBIENT TEMP
```

The Low Ambient Temp Cutout is a safety shutdown designed to protect the chiller from operating in a low ambient condition. If the outdoor ambient temperature falls below the programmable cutout, the chiller will shut down. Restart can occur when temperature rises 2°F above the cutoff.

```
UNIT FAULT:
LOW LIQUID TEMP
```

The Low Leaving Chilled Liquid Temp Cutout protects the chiller form an evaporator freeze-up should the chilled liquid temperature drop below the freeze point. This situation could occur under low flow conditions or if the micro panel setpoint values are improperly programmed. Anytime the leaving chilled liquid temperature (water or glycol) drops below the cutout point, the chiller will shutdown. Restart can occur when chilled liquid temperature rises 2°F above the cutout.

```
UNIT FAULT:
115VAC UNDER VOLTAGE
```

The Under Voltage Safety assures that the system is not operated at voltages where malfunction of the microprocessor could result in system damage. When the 115VAC to the micro panel drops below a certain level, a unit fault is initiated to safely shut down the unit. Restart is allowed after the unit is fully powered again and the anti-recycle timers have finished counting down.

```
UNIT FAULT:
HIGH MTR CURR
```

When the CURRENT FEEDBACK ONE PER UNIT option is selected under the OPTIONS key, the unit will shut down when the voltage exceeds the programmed trip voltage for five seconds.

The trip voltage is programmed at the factory according to compressor or unit RLA.

Restart will occur after the anti-recycle timer times out.

Unit Warning

The following messages are not unit safeties and will not be logged to the history buffer. They are and will not auto-restart. Operator intervention is required to allow a restart of the chiller.

```
!! LOW BATTERY !!
CHECK PROG/SETP/OPTN
```

The Low Battery Warning can only occur at unit power-up. On micro panel power-up, the RTC battery is checked. If a low battery is found, all programmed setpoints, program values, options, time, schedule, and history buffers will be lost. These values will all be reset to their default values which may not be the desired operating values. Once a faulty battery is detected, the unit will be prevented from running until the PROGRAM key is pressed. Once PROGRAM is pressed the anti-recycle timers will be set to the programmed anti-recycle time to allow the operator time to check setpoints, and if necessary, reprogram programmable values and options.

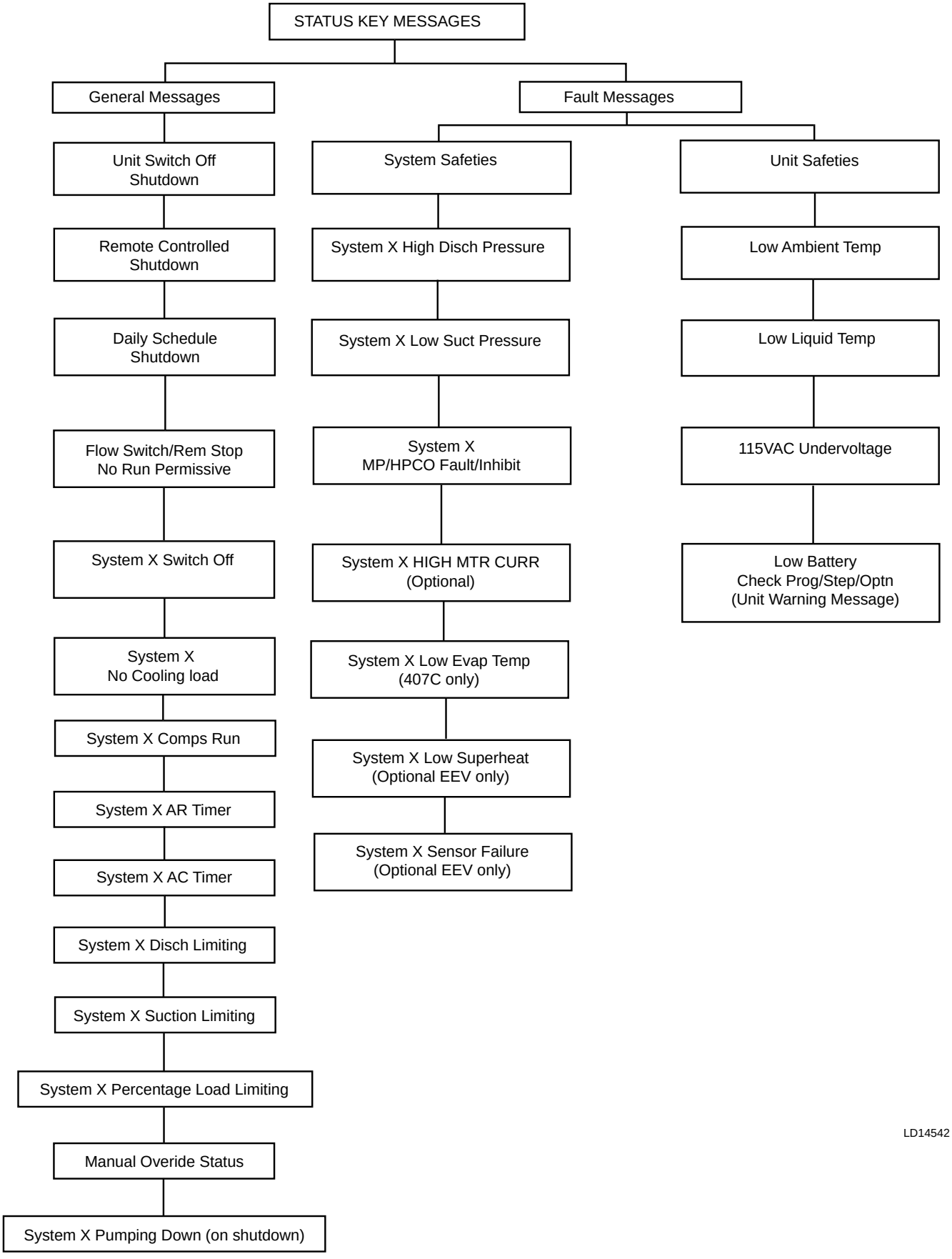
If a low battery is detected, it should be replaced as soon as possible. The programmed values will all be lost and the unit will be prevented from running on the next power interruption. The RTC/battery is located at U5 on the IPU board.

```
INCORRECT
UNIT TYPE
```

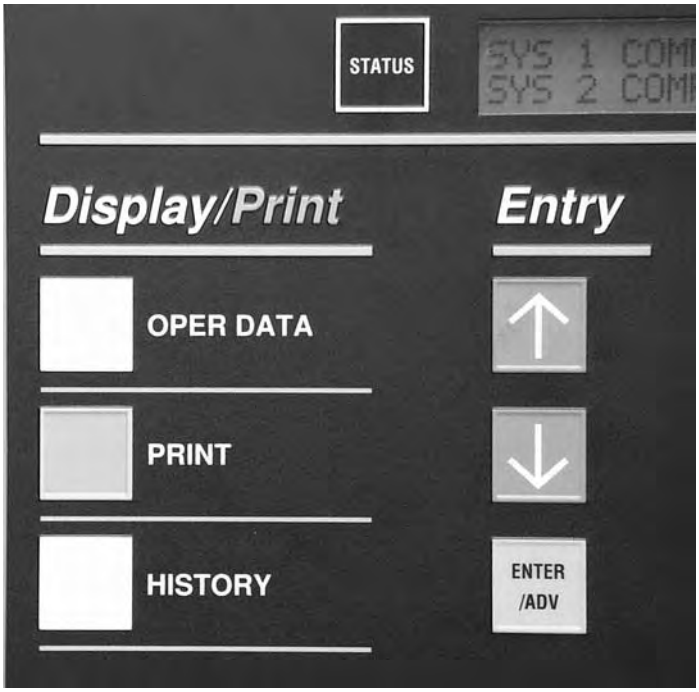
This indicates the condensing unit jumper is installed on J11-12. This jumper must be removed to operate the chiller

STATUS KEY MESSAGES

TABLE 18 – STATUS KEY MESSAGES



DISPLAY/PRINT KEYS



00067VIP

The Display/Print keys allow the user to retrieve system and unit information that is useful for monitoring chiller operation, diagnosing potential problems, troubleshooting, and commissioning the chiller.

System and unit information, unit options, setpoints, and scheduling can also be printed out with the use of a printer. Both real-time and history information are available.

Oper Data Key

The OPER DATA key gives the user access to unit and system operating parameters. When the OPER DATA key is pressed, system parameters will be displayed and remain on the display until another key is pressed. After pressing the OPER DATA key, the various operating data screens can be scrolled through by using the ↑ (UP) and ↓ (DOWN) arrow keys located under the "Entry" section.

NOTE

System 2 information will only be displayed for 2 system units.

With the "UNIT TYPE" set as a liquid chiller (via no jumper between J1-7 and J11-12 on the I/O Board), the following list of operating data screens are viewable under the OPER DATA key in the order that they are displayed. The DOWN arrow key scrolls through the displays in the order they appear below:

NOTE

The chiller MUST be set to be a liquid chiller via no jumper between J11-7 and J11-12 on the I/O Board. DO NOT operate the chiller if not properly set up.

```
LCHLT = 46.2°F
RCHLT = 57.4°F
```

This display shows chilled leaving and return liquid temperatures. The minimum limit on the display for these parameters are 9.2°F (-12.7°C). The maximum limit on the display is 140°F (60°C).

```
AMBIENT AIR TEMP
= 87.5°F
```

This display shows the ambient air temperature. The minimum limit on the display is 0.4°F (-17.6°C). The maximum limit on the display is 131.2°F (55.1°C).

```
SYS X SP = 72.1 PSIG
      DP =227.0 PSIG
```

These displays show suction and discharge pressures for each system. The discharge pressure transducer is optional on some models.

If the optional discharge transducer is not installed, the discharge pressure would display 0 psig (0 barg).

Some models come factory wired with a low pressure switch in place of the suction transducer. In this case, the suction pressure would only be displayed as the maximum suction pressure reading of more than 200 psig (13.79 barg) when closed, or less than 0 psig (0 barg) when open.

The minimum limits for the display are:
Suction Pressure: 0 psig (0 barg)
Discharge Pressure: 0 psig (0 barg)

The maximum limits for the display are:
Suction Pressure: 200 psig (13.79 barg)
Discharge Pressure: 400 psig (27.58 barg)

```
SYS X SUCT = XXX.X°F
   SAT SUCT = XXX.X°F
```

```
SYS X EEV = XXX.X %
SUCT SHEAT = XXX.X°F
```

These messages will be displayed for each system, if an EEV is installed in the system. The EEV % is the EEV controller output.

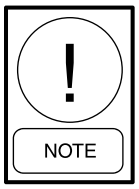
```
SYS X COOLER INLET
REFRIG TEMP=XXX.X°F
```

Cooler inlet temperatures, as measured by the refrigerant temperature sensor in the cooler, will be displayed on R-407C units for both systems.

```
SYS X HOURS 1=XXXXX
     2=XXXXX, 3=XXXXX
```

```
SYS X STARTS 1=XXXXX
     2=XXXXX, 3=XXXXX
```

The above two messages will appear sequentially for each system. The first display shows accumulated running hours of each compressor for the specific system. The second message shows the number of starts for each compressor on each system.



Run times and starts will only be displayed for the actual number of systems and compressors on the unit.

```
  LOAD TIMER  58 SEC
UNLOAD TIMER   0 SEC
```

This display of the load and unload timers indicate the time in seconds until the unit can load or unload. Whether the systems loads or unloads is determined by how far the actual liquid temperature is from setpoint. A detailed description of unit loading and unloading is covered under the topic of "Capacity Control" *See Unit Operation in Section 2 of this IOM*.

```
COOLING DEMAND
2 OF 8 STEPS
```

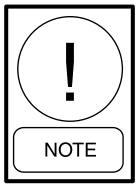
The display of COOLING DEMAND indicates the current "step" in the capacity control scheme when in Return Water Control mode. The number of available steps are determined by how many compressors are in the unit. In the above display, the "2" does not mean that two compressor are running but only indicates that the capacity control scheme is on step 2 of 8. "Capacity Control" is covered in more detail in this publication which provides specific information on compressor staging (for Return Water Control only). *See Unit Operation in Section 2 of this IOM*

```
TEMP ERROR XXX.X°F
TEMP RATE  XXX.X°F/M
```

The COOLING DEMAND message will be replaced with this message when Leaving Chilled Liquid Control is selected. This message indicates the temperature error and the rate of change of the chilled liquid

```
LEAD SYSTEM IS
SYSTEM NUMBER 2
```

This display indicates the current lead system. In this example system 2 is the lead system, making system 1 the lag system. The lead system can be manually selected or automatic. *Refer to the programming under the OPTIONS key.* The LEAD SYSTEM display will only appear on a two system unit.



A unit utilizing Hot Gas Bypass should be programmed for MANUAL with system 1 as the lead system. Failure to do so will prevent hot gas operation if system 2 switches to the lead system when programmed for Automatic Lead/Lag.

```
EVAP PUMP IS ON
EVAP HEATER IS OFF
```

This display indicates the status of the evaporator pump contacts and the evaporator heater.

The evaporator pump dry contacts are energized when any compressor is running, or the unit is not OFF on the daily schedule and the Unit Switch is ON, or the unit has shutdown on a Low Leaving Chilled Liquid fault. However, even if one of above is true, the pump will not run if the micro panel has been powered up for less than 30 seconds or if the pump has run in the last 30 seconds to prevent pump motor overheating.

The evaporator heater is controlled by ambient air temperature. When the ambient temperature drops below 40°F (4.4°C) the heater is turned ON. When the temperature rises above 45°F (7.2°C) the heater is turned off. An under voltage condition will keep the heater off until full voltage is restored to the system.

```
ACTIVE REMOTE CTRL
NONE
```

There are several types of remote systems that can be used to control or monitor the unit. The following messages indicate the type of remote control mode active:

NONE – no remote control active. Remote monitoring may be via ISN.

ISN – YorkTalk via ISN allows remote load limiting and temperature reset through an ISN system.

*LOAD LIM – load limiting enabled. Can be either stage 1 or stage 2 of limiting *(see Section 2, Load Limiting located on Page 123 of this IOM).*

*PWM TEMP – EMS-PWM temperature reset *(see Section 2, EMS-PWM Remote Temperature Reset located on page 124of this IOM).*

If the microprocessor is programmed for CURRENT FEEDBACK ONE PER UNIT under the OPTIONS key, the display will show up as the first display prior to the SYS 1 displays. Total chiller current is displayed as shown below:

```
UNIT AMPS = 54.0
     VOLTS = 1.2
```

If the microprocessor is programmed for CURRENT FEEDBACK NONE, no current display will appear.

```
SYS X COMP STATUS
1=XXX 2=XXX 3=XXX
```

```
SYS X RUN TIME
XX-XX-XX-XX D-H-M-S
```

```
SYS X LLSV IS ON
HOT GAS SOL IS OFF
```

```
SYS X FAN STAGE 3
```

```
SYS X AMPS = 36.0
     VOLTS = 0.8
```

The preceding five messages will appear sequentially, first for system 1, then for system 2.

The first message indicates the system and the associated compressors which are running.

The second message indicates the system run time in days – hours – minutes – seconds. Please note that this is not accumulated run time but pertains only to the current system cycle.

The third message indicates the system, and whether the liquid line solenoid or EEV pilot solenoid and hot gas solenoid are being turned ON by the I/O Board. Please note that hot gas in not available for system 2, so there is no message pertaining to the hot gas solenoid when system 2 message is displayed.

The fourth message indicates what stage of condenser fan operation is active. For YCAL0014 to YCAL0080 unless a low ambient kit is added, only stages 1 and 3 will be used to cycle the condenser fans. However, stage 2 may be shown in this display without a low ambient kit added, but it has no effect. YCAL0090 through YCAL0134 have 3 or 4 fan stages as standard.

See Condenser Fan Control in Section 2 of this IOM for more information.

The fifth message displays current as sensed by the optional current feedback circuitry. The display reads out in amps along with the DC feedback voltage from the module. Current is calculated by:

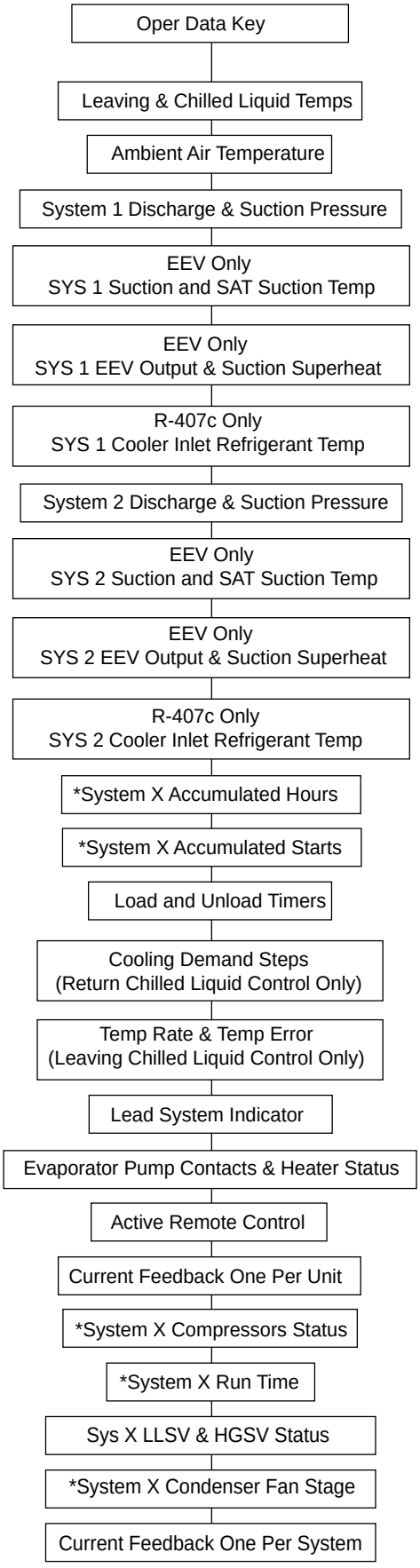
$$\frac{225A \bullet \text{Actual Volts}}{5 \text{ Volts}}$$

Individual displays will be present for each system, if CURRENT FEEDBACK ONE PER SYSTEM is programmed under the OPTIONS key. Combined compressor current for each system is displayed.

Oper Data Quick Reference List

The following table is a quick reference list for information available under the OPER DATA key.

TABLE 19 – OPERATION DATA



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* Block of information repeats for each system

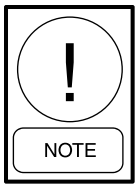
Print Key

The PRINT key allows the operator to obtain a printout of real-time system operating data or a history printout of system data at the "instant of the fault" on the last six faults which occurred on the unit. An optional printer is required for the printout.

Operating Data Printout

Pressing the PRINT key and then OPER DATA key allows the operator to obtain a printout of current system operating parameters. When the OPER DATA key is pressed, a snapshot will be taken of system operating conditions and panel programming selections. This data will be temporarily stored in memory and transmission of this data will begin to the printer. A sample Operating Data printout is shown below. (Note: Not all values are printed for all models.)

```
    YORK INTERNATIONAL CORPORATION
      MILLENNIUM LIQUID CHILLER

             UNIT STATUS
           2:04PM 01 JAN 10

SYS 1                NO COOLING LOAD
SYS 2          COMPRESSORS RUNNING 2

               OPTIONS
CHILLED LIQUID                  WATER
AMBIENT CONTROL              STANDARD
LOCAL/REMOTE MODE              REMOTE
CONTROL MODE           LEAVING LIQUID
LEAD/LAG CONTROL             AUTOMATIC
FAN CONTROL          AMB & DSCH PRESS
CURRENT FEEDBACK                NONE
SOFT START                   ENABLED
EXPANSION VALVE          THERMOSTATIC


            PROGRAM VALUES
DSCH PRESS CUTOUT           395 PSIG
SUCT PRESS CUTOUT            44 PSIG
LOW AMBIENT CUTOUT         25.0 DEGF
LEAVING LIQUID CUTOUT      36.0 DEGF
ANTI RECYCLE TIME           600 SECS
FAN CONTROL ON PRESS        240 PSIG
FAN DIFF OFF PRESS           80 PSIG
NUMBER OF COMPRESSORS             6
NUMBER OF FANS PER SYSTEM         4
UNIT TRIP VOLTS                 3.0
REFRIGERANT TYPE                R-22
REMOTE UNIT ID PROGRAMMED          2

               UNIT DATA
RETURN LIQUID TEMP         58.2 DEGF
LEAVING LIQUID TEMP        53.0 DEGF
COOLING RANGE      42.0 +/- 2.0 DEGF
AMBIENT AIR TEMP           74.8 DEGF
LEAD SYSTEM                  SYS 2
EVAPORATOR PUMP                ON
EVAPORATOR HEATER             OFF
ACTIVE REMOTE CONTROL        NONE
UNIT  XXX.X AMPS          X.X VOLTS
SOFTWARE VERSION        C.MMC.03.03

            SYSTEM 1 DATA
COMP STATUS  1=OFF 2=OFF 3=OFF
RUN TIME    0- 0- 0- 0 D-H-M-S
SUCTION PRESSURE           66 PSIG
DISCHARGE PRESSURE        219 PSIG
SUCTION TEMPERATURE      52.8 DEGF
SAT SUCTION TEMP         40.0 DEGF
SUCTION SUPERHEAT        12.8 DEGF
COOLER INLET REFRIG      31.6 DEGF
LIQUID LINE SOLENOID          OFF
HOT GAS BYPASS VALVE          OFF
CONDENSER FAN STAGES          OFF
EEV OUTPUT                  0.0 %
SYSTEM    XXX.X AMPS  X.X VOLTS

            SYSTEM 2 DATA
COMP STATUS1=OFF, 2=OFF, 3=OFF
SUCTION PRESSURE           51 PSIG
DISCHARGE PRESSURE        157 PSIG
SUCTION TEMPERATURE      44.3 DEGF
SAT SUCTION TEMP         32.1 DEGF
SUCTION SUPERHEAT        12.2 DEGF
COOLER INLET REFRIG      31.6 DEGF
LIQUID LINE SOLENOID           ON
CONDENSER FAN STAGE             3
EEV OUTPUT                  0.0%
SYSTEM   XXX.X AMPS    X.X VOLTS

           DAILY SCHEDULE
S M T W T F S           *=HOLIDAY
MON START=00:00AM STOP=00:00AM
TUE START=00:00AM STOP=00:00AM
WED START=00:00AM STOP=00:00AM
THU START=00:00AM STOP=00:00AM
FRI START=00:00AM STOP=00:00AM
SAT START=00:00AM STOP=00:00AM
HOL START=00:00AM STOP=00:00AM
```



See Service and Troubleshooting section for Printer Installation information.

History Printout

Pressing the PRINT key and then the HISTORY key allows the operator to obtain a printout of information relating to the last six Safety Shutdowns which occurred. The information is stored at the instant of the fault, regardless of whether the fault caused a lockout to occur. The information is also not affected by power failures (long-term internal memory battery backup is built into the circuit board) or manual resetting of a fault lock-out.

When the HISTORY key is pressed, a printout is transmitted of all system operating conditions which were stored at the "instant the fault occurred" for each of the six Safety Shutdown buffers. The printout will begin with the most recent fault which occurred. The most recent fault will always be stored as Safety Shutdown No. 1. Identically formatted fault information will then be printed for the remaining Safety Shutdowns.

Information contained in the Safety Shutdown buffers is very important when attempting to troubleshoot a system problem. This data reflects the system conditions at the instant the fault occurred and often reveals other system conditions which actually caused the safety threshold to be exceeded.

The history printout is similar to the operational data printout shown in the previous section. The differences are in the header and the schedule information. The daily schedule is not printed in a history print.

One example history buffer printout is shown following. The data part of the printout will be exactly the same as the operational data print so it is not repeated here. The difference is that the daily schedule is not printed in the history print and the header will be as follows.

```
YORK INTERNATIONAL CORPORATION
MILLENNIUM LIQUID CHILLER

SAFETY SHUTDOWN NUMBER 1
SHUTDOWN @ 3:56PM  29 JAN 10

SYS 1   HIGH DSCH PRESS SHUTDOWN
SYS 2                 NO FAULTS
```

History Displays

The HISTORY key gives the user access to many unit and system operating parameters at the time of a unit or system safety shutdown. When the HISTORY key is pressed the following message is displayed.

```
DISPLAY SAFETY SHUT-
DOWN NO. 1 (1TO6)
```

While this message is displayed, the UP arrow key can be used to select any of the six history buffers. Buffer number 1 is the most recent, and buffer number 6 is the oldest safety shutdown that was saved.

After selecting the shutdown number, pressing the ENTER key displays the following message which shows when the shutdown occurred.

```
SHUTDOWN OCCURRED
03:56 PM 29 JAN 02
```

The ↑ (UP) and ↓ (DOWN) arrows are used to scroll forward and backward through the history buffer to display the shutdown conditions stored at the instant the fault occurred. The DOWN arrow key scrolls through the displays in the order they appear below:

```
UNIT FAULT:
LOW LIQUID TEMP
```

Displays the type of fault that occurred.

```
UNIT TYPE
LIQUID CHILLER
```

Displays the type of chiller; Liquid, Condensing Unit or Heat Pump.

```
CHILLED LIQUID
XXXXX
```

Displays the chilled liquid type; Water or Glycol.

```
AMBIENT CONTROL
XXXXXXXXXX
```

Displays the type of ambient control; Standard or Low Ambient. This message will not be displayed on YCAL0090 through YCAL0134.

```
LOCAL/REMOTE MODE
XXXXXXXXX
```

Displays Local or Remote control selection.

```
CONTROL MODE
LEAVING LIQUID
```

Displays the type of chilled liquid control; Leaving or Return.

```
LEAD/LAG CONTROL
XXXXXXXX
```

Displays the type of lead/lag control; Manual System 1, Manual System 2 or Automatic. This is only selectable on 2-system chillers.

```
FAN CONTROL
DISCHARGE PRESSURE
```

Displays the type of Fan Control; Discharge Pressure or Ambient and Discharge Pressure. This message will not be displayed on YCAL0090 through YCAL0134.

```
MANUAL OVERRIDE MODE
XXXXXXXXX
```

Displays whether manual override was Enabled or Disabled.

```
CURRENT FEEDBACK
XXXXXXXXXXXXXXXX
```

Displays type of Current Feedback utilized.

```
SOFT START
XXXXXXX
```

Displays whether the optional European Soft Start was installed and selected.

```
DISCHARGE PRESSURE
CUTOUT = XXXX PSIG
```

Displays the programmed Discharge Pressure Cutout.

```
SUCTION PRESSURE
CUTOUT = XXXX PSIG
```

Displays the programmed Suction Pressure Cutout.

```
LOW AMBIENT TEMP
CUTOUT = XXX.X °F
```

Displays the programmed Low Ambient Cutout.

```
LEAVING LIQUID TEMP
CUTOUT = XXX.X °F
```

Displays the Leaving Liquid Temp. Cutout programmed.

```
FAN CONTROL ON
PRESSURE=XXX PSIG
```

Displays the programmed Fan ON Pressure.

```
FAN DIFFERENTIAL OFF
PRESSURE=PSIG
```

Displays the programmed Fan OFF Differential.

```
SYS 1 TRIP VOLTS
      = X.X VOLTS
```

Displays the programmed High Current Trip Voltage.

```
SYS 2 TRIP VOLTS
      = X.X VOLTS
```

Displays the programmed High Current Trip Voltage.

```
LCHLT = XXX.X °F
RCHLT = XXX.X °F
```

Displays the “Leaving” and “Return” chilled liquid temperature at the time of the fault.

```
SETPOINT = XXX.X °F
   RANGE = +/- °F
```

Displays the programmed Setpoint and Range, if the chiller is programmed for Leaving Chilled Liquid Control.

```
SETPOINT = XXX.X °F
   RANGE = +XX.X °F
```

Displays the programmed Setpoint and Range, if the chiller is programmed for return chilled liquid control.

```
AMBIENT AIR TEMP
      = XXX.X °F
```

Displays the Ambient Temp. at the time of the fault.

```
LEAD SYSTEM IS
SYSTEM NUMBER X
```

Displays which system is in the lead at the time of the fault.

```
EVAP PUMP IS XXX
EVAP HEATER IS XXX
```

Displays status of the evaporator pump and heater at the time of the fault.

```
ACTIVE REMOTE CTRL
        XXXX
```

Displays whether Remote Chiller Control was active when the fault occurred.

```
UNIT ACTUAL AMPS
      =XXX.X AMPS
```

This is only displayed when the Current Feedback option is one per unit.

```
SYS X COMP STATUS
1=XXX 2=XXX 3=XXX
```

Displays which compressors were running in the system when the fault occurred.

```
   SYS X RUN TIME
XX-XX-XX-XX D-H-M-S
```

Displays the system run time when the fault occurred.

```
SYS X SP = XXXX PSIG
     DP = XXXX PSIG
```

Displays the system Suction and Discharge Pressure of the time of the fault.

```
SYS X SUCT = XXX.X°F
  SAT SUCT = XXX.X°F
```

Displays the System Suction Temp and Saturated Suction Temp when an EEV is installed.

```
SYS X EEV  = XXX.X %
SUCT SHEAT = XXX.X°F
```

Displays the EEV signal % and Suction Superheat when an EEV is installed.

```
SYS X COOLER INLET
REFRIG TEMP=XXX.X°F
```

System Inlet Cooler Temperature will be displayed only on R-407C units.

```
SYS X LLSV IS XXX
HOT GAS SOL IS XXX
```

Displays whether the System Liquid Line Solenoid or Hot Gas Solenoid was energized at the time of the fault.

```
SYS X FAN STAGE XXX
```

Displays the number of fan stages in the system active at the time of the fault.

```
SYS X AMPS = 40.3
     VOLTS =  2.2
```

Displays the system amperage (calculated approximately) and, DC feedback voltage from the 2ACE module, at the time of the fault.

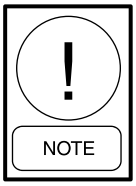
For this message to appear, CURRENT FEEDBACK ONE PER SYSTEM must be programmed under the OPTIONS key. If the microprocessor is programmed as one CURRENT FEEDBACK ONE PER UNIT under the PROGRAM key, the display will be the first display prior to the SYS 1 info. If the microprocessor is programmed for CURRENT FEEDBACK NONE, no current display will appear.

Displays for system 1 starting with SYS X NUMBER OF COMPS RUNNING X through SYS X AMPS = XXX.X VOLTS = X.X will be displayed first, followed by displays for System 2.

Further explanation of the above displays is covered under the STATUS, OPER DATA, COOLING SETPOINTS, PROGRAM, and OPTIONS keys.

Software Version

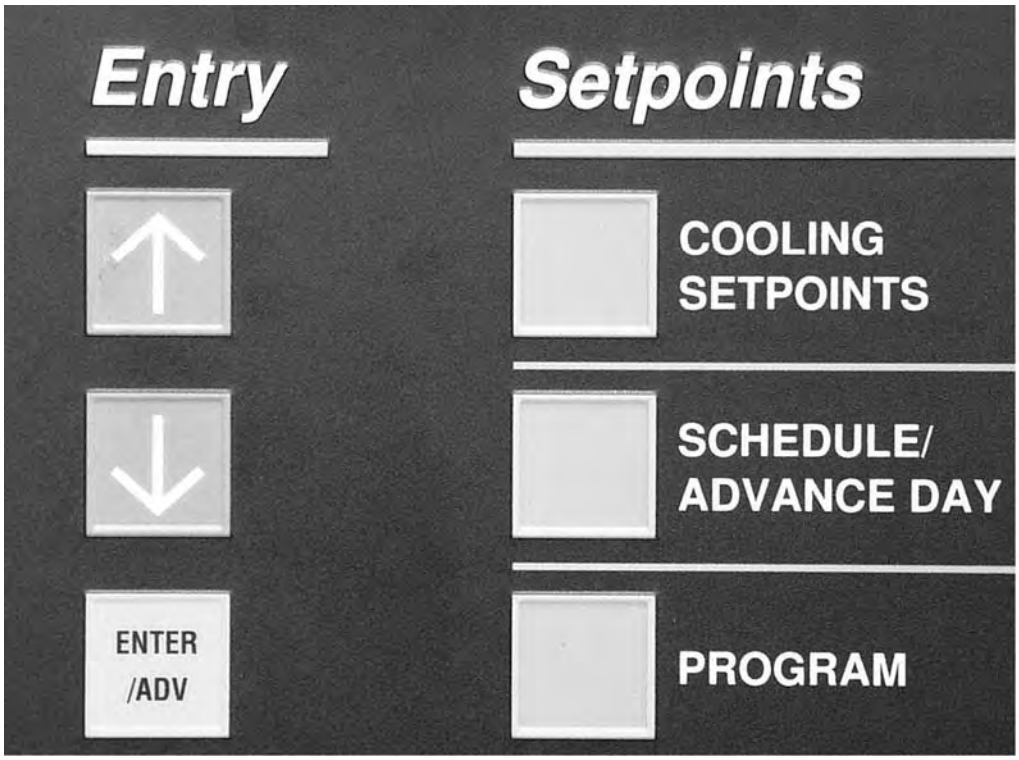
The software version can be viewed by pressing the HISTORY key and pressing the DOWN arrow key repeatedly from the DISPLAY SAFETY SHUTDOWN NO. X.



The version shown below is only an example. The software for the YCAL0014 through 0080 and YCAL0090 through 0134 each have their own part and version number.

```
SOFTWARE VERSION
C.MMC.04.01
```

ENTRY KEYS



00068VIP

The ENTRY key allows the user to view, change programmed values. The ENTRY keys consist of an UP arrow key, DOWN arrow key, and an ENTER/ADV key.

Up and Down Arrow Keys

Used in conjunction with the OPER DATA, HISTORY, COOLING SETPOINTS, SCHEDULE/ADVANCE DAY, OPTIONS and CLOCK keys, the ↑ (UP) and ↓ (DOWN) arrow keys allow the user to scroll through the various data screens. *Refer to the section on DISPLAY/ PRINT keys for specific information on the displayed information and specific use of the ↑ (UP) and ↓ (DOWN) arrow keys.*

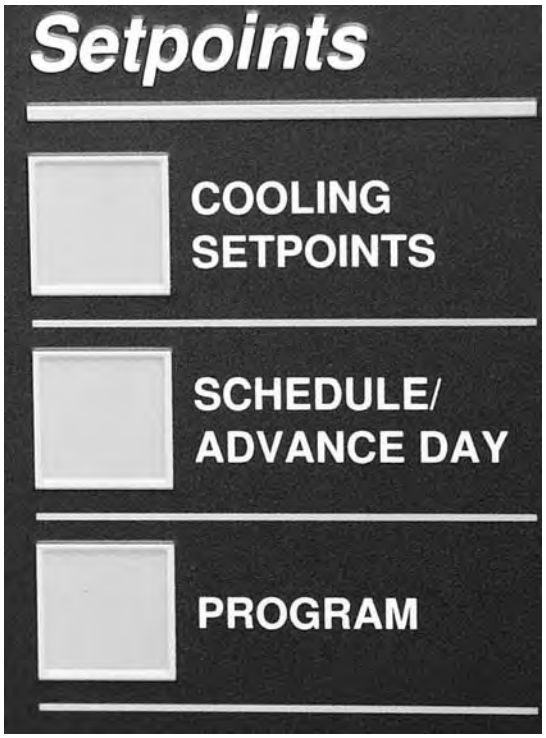
The ↑ (UP) and ↓ (DOWN) arrow keys are also used for programming the control panel such as changing numerical or text values when programming Cooling Setpoints, setting the Daily Schedule, changing Safety Setpoints, Chiller Options, and setting the Clock.

Enter/Adv Key

The ENTER key must be pushed after any change is made to the Cooling Setpoints, Daily Schedule, Safety Setpoints, Chiller Options, and the Clock. Pressing this key “enters” the new values into memory. If the ENTER key is not pressed after a value is changed, the changes will not be “entered” and the original values will be used to control the chiller.

Programming and a description on the use of the ↑ (UP) and ↓ (DOWN) arrow and ENTER/ADV keys are covered in detail under the SETPOINTS, and UNIT keys.

SETPOINTS KEYS



00069VIP

Programming of the Cooling Setpoints, Daily Schedule, and Safeties is accomplished by using the keys located under the Setpoints section.

The three keys involved are labeled COOLING SETPOINTS, SCHEDULE/ADVANCE DAY, and PROGRAM.

Following are instructions for programming the respective setpoints. The same instruction should be used to view the setpoints with the exception that the setpoint will not be changed.

Cooling Setpoints

The Cooling Setpoint and range can be programmed by pressing the COOLING SETPOINTS key.

Leaving Chilled Liquid Control

```
SETPOINT = 45.0°F
RANGE = +/- 2.0°F
```

The above message shows the current chilled water temperature SETPOINT at 45.0°F (notice the cursor positioned under the number 0). Pressing either the ↑ (UP) and ↓ (DOWN) arrow will change the setpoint in 0.5°F increments. After using the ↑ (UP) and ↓ (DOWN) arrows to adjust to the desired setpoint, the ENTER/ ADV key must be pressed to enter this number into memory and advance to the RANGE setpoint.

This will be indicated by the cursor moving under the current RANGE setpoint. The ↑ (UP) and ↓ (DOWN) arrow keys are used to set the range, in .5°F increments, to the desired RANGE setpoint. After adjusting the setpoint, the ENTER/ADV key must be pressed to enter the data into memory.

Notice that the RANGE was programmed for plus or minus X.X°F. This indicates the setpoint to be in the center of the control range. If the control mode has been programmed for Return Liquid Control, the message below would be displayed in place of the previous message.

When in leaving chilled liquid temperature control, the microprocessor will attempt to control the leaving water temperature within the temperature range of the setpoint plus or minus the range. In the above example, control will be in the range of 43 to 47°F.

Return Chilled Liquid Control

```
SETPOINT  =  45.0  °F
   RANGE  =  +2.0 °F
```

Notice that the range no longer has a plus or minus X.X°F, but only a + X.X°F RANGE setpoint. This indicates that the setpoint is not centered within the range but could be described as the bottom of the control range. A listing of the limits and the programmable values for the COOLING SETPOINTS are shown in Table 20.

The SETPOINT and RANGE displays just described were based on local control. If the unit was programmed for remote control (under the OPTIONS key), the above programmed setpoints would have no effect.

When in return chilled liquid temperature control, the microprocessor will turn all compressors OFF at setpoint and will turn compressors ON as return chilled liquid temperature rises. All compressors will be on at setpoint plus the range. If the range equals the temperature drop across the evaporator when fully loaded, the leaving chilled liquid temperature will remain near the setpoint plus or minus a few degrees as the chiller loads and unloads according to return chilled liquid temperature.

Both Leaving and Return control are described in detail under the section on "Capacity Control". *See Unit Operation in Section 2 of this IOM*

Pressing the COOLING SETPOINTS key a second time will display the remote setpoint and cooling range. This display automatically updates about every 2 seconds. Notice that these setpoints are not "locally" programmable, but are controlled by a remote device such as an ISN control. These setpoints would only be valid if the unit was operating in the Remote mode.

The messages below illustrate both Leaving Chilled Liquid Control and Return Chilled Liquid Control respectively.

```
REM  SETP  =  44.0°F
 RANGE  =  +/-2.0°F
```

(leaving chilled liquid control)

```
REM  SETP  =  44.0°F
     RANGE  =  +10.0°F
```

(return chilled liquid control)

The low limit, high limit, and default values for the keys under "SETPOINTS" are listed in Table 20.

Pressing the COOLING SETPOINTS a third time will bring up the display that allows the Maximum EMS-PWM Temperature Reset to be programmed. This message is shown below.

```
MAX EMS-PWM REMOTE
TEMP RESET  =  +20°F
```

The Temp Reset value is the maximum allowable reset of the temperature setpoint. The setpoint can be *reset* upwards by the use of a contact closure on the PWM Temp Reset input (CTB1 terminals 13 and 20). *See the section on Operating Controls for a detailed explanation of this feature.*

As with the other setpoints, the UP arrow and DOWN arrow keys are used to change the Temp Reset value. After using the ↑ (UP) and ↓ (DOWN) arrows to adjust to the desired setpoint, the ENTER/ADV key must be pressed to enter this number into memory.

Schedule/Advance Day Key

The schedule is a seven day daily schedule that allows one start/stop time per day. The schedule can be programmed Monday through Sunday with an alternate holiday schedule available. If no start/stop times are programmed, the unit will run on demand, providing the chiller is not shut OFF on a unit or system shutdown. The daily schedule is considered "not programmed" when the times in the schedule are all zeros (00:00 AM).

To set the schedule, press the SCHEDULE/ADVANCE DAY key. The display will immediately show the following display.

```
MON  START  =  00:00  AM
      STOP  =  00:00  AM
```

TABLE 20 – COOLING SETPOINTS, PROGRAMMABLE LIMITS AND DEFAULTS

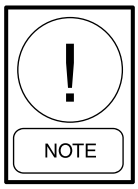
SETPOINT KEY	MODE	LOW LIMIT	HIGH LIMIT	DEFAULT
LEAVING CHILLED LIQUID SETPOINT	WATER COOLING	40.0°F 4.4°C	**70.0°F 21.1°C	44.0°F 6.7°C
	GLYCOL COOLING	*10.0°F -12.2°C	**70.0°F 21.1°C	44.0°F 6.7°C
LEAVING CHILLED LIQUID CONTROL RANGE	—	1.5°F 0.8°C	2.5°F 1.4°C	2.0°F 1.1°C
RETURNED CHILLED LIQUID SETPOINT	WATER COOLING	40.0°F 4.4°C	70.0°F 21.1°C	44.0°F 6.7°C
	GLYCOL COOLING	10.0°F -12.2°C	70.0°F 21.1°C	44.0°F 6.7°C
RETURN CHILLED LIQUID CONTROL RANGE	—	4.0°F 2.2°C	20.0°F 11.1°C	10.0°F 5.6°C
MAX EMS-PWM REMOTE TEMPERATURE RESET	—	2°F 1.1°C	40°F 22.2°C	20°F 11.0°C

* *Refer to Engineering Guide for operation below 30°F (-1.1°C)*. Alternate thermal expansion valves must be used below 30°F (-1.1°C).

* When using glycol, Leaving Chilled Liquid Setpoint should not be set below 20°F (-6.7°C).

** Do not exceed 55°F (12.8°C) setpoint before contacting the nearest Johnson Controls Office for application guidelines.

The line under the 0 is the cursor. If the value is wrong, it may be changed by using the ↑ (UP) and ↓ (DOWN) arrow keys until correct. Pressing the ENTER/ADV key will enter the times and then move the cursor to the minute box. The operation is then repeated if necessary. This process may be followed until the hour, minutes, and meridian (AM or PM) of both the START and STOP points are set. After changing the meridian of the stop time, pressing the ENTER/ADV key will advance the schedule to the next day.



Whenever the daily schedule is changed for Monday, all the other days will change to the new Monday schedule. This means if the Monday times are not applicable for the whole week then the exceptional days would need to be re-programmed to the desired schedule.

To page to a specific day press the SCHEDULE/ ADVANCE DAY key. The start and stop time of each day may be programmed differently using the ↑ (UP) and ↓ (DOWN) arrow, and ENTER/ADV keys.

After SUN (Sunday) schedule appears on the display a subsequent press of the SCHEDULE/ADVANCE DAY key will display the holiday schedule. This is a two part display. The first reads:

```
HOL START = 00:00 AM
      STOP = 00:00 AM
```

The times may be set using the same procedure as described above for the days of the week. After changing the meridian of the stop time, pressing the ENTER/ADV key will advance the schedule to the following display:

```
S_ M T W T F S
HOLIDAY NOTED BY *
```

The line below the empty space next to the S is the cursor and will move to the next empty space when the ENTER/ADV key is pressed. To set the Holiday, the cursor is moved to the space following the day of the week of the holiday and the is pressed. An * will appear in the space signifying that day as a holiday. The * can be removed by pressing the DOWN arrow key.

The holiday schedule must be programmed weekly –once the holiday schedule runs, it will revert to the normal daily schedule.

Program Key

There are several operating parameters under the PROGRAM key that are programmable. These setpoints can be changed by pressing the PROGRAM key, and then the ENTER/ADV key to enter Program Mode. Continuing to press the ENTER/ADV key will display each operating parameter. While a particular parameter is being displayed, the ↑ (UP) and ↓ (DOWN) arrow keys can be used to change the value. After the value is changed, the ENTER/ADV key must be pressed to enter the data into memory. Table 21 shows the programmable limits and default values for each operating parameter.

Following are the displays for the programmable values in the order they appear:

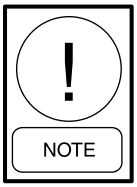
```
DISCHARGE PRESSURE
CUTOUT = 395 PSIG
```

Discharge Pressure Cutout is the discharge pressure at which the system will shutdown as monitored by the *optional* discharge transducer. This is a software shutdown that acts as a backup for the mechanical high pressure switch located in the refrigerant circuit. The system can restart when the discharge pressure drops 40 psig (2.76 barg) below the cutout point.

If the optional discharge pressure transducer is not installed, this programmable safety would not apply. It should be noted that every system has a mechanical high pressure cutout that protects against excessive high discharge pressure regardless of whether or not the optional discharge pressure is installed.

```
SUCTION PRESSURE
CUTOUT = 44.0 PSIG
```

The SUCTION PRESSURE CUTOUT protects the chiller from an evaporator freeze-up. If the suction pressure drops below the cutout point, the system will shut down.



There are some exceptions when the suction pressure is permitted to temporarily drop below the cutout point. Details are explained under the topic of System Safeties *located in Section 2 of this IOM.*

```
LOW AMBIENT TEMP
CUTOUT = 25.0°F
```

The Low Ambient Temp Cutout allows the user to select the chiller outside ambient temperature cutout point. If the ambient falls below this point, the chiller will shut down. Restart can occur when temperature rises 2°F (1.11°C) above the cutout setpoint.

```
LEAVING LIQUID TEMP
CUTOUT = 36.0°F
```

The Leaving Liquid Temp Cutout protects the chiller from an evaporator freeze-up. Anytime the leaving chilled liquid temperature drops to the cutout point, the chiller shuts down. Restart will be permitted when the leaving chilled liquid temperature rises 2°F (1.11°C) above the cutout setpoint.

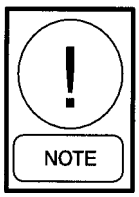
When water cooling mode is programmed (OPTIONS key), the value is fixed at 36.0°F (2.22°C) and cannot be changed. Glycol cooling mode can be programmed to values listed in Table 20.

```
ANTI RECYCLE TIMER
= 600 SEC
```

The programmable anti-recycle timer assures that systems do not cycle. This timer is programmable under the PROGRAM key between 300 and 600 seconds. Whenever possible, to reduce cycling and motor heating, the anti-recycle timer should be adjusted as high as possible. The programmable anti-recycle timer starts the timer when the first compressor in a system starts. The timer begins to count down. If all the compressors in the circuit cycle off, a compressor within the circuit will not be permitted to start until the anti-recycle timer has timed out. If the lead system has run for less than five minutes, 3 times in a row, the anti-recycle timer will be extended to 10 minutes maximum.

```
FAN CONTROL ON
PRESSURE = XXX PSIG
```

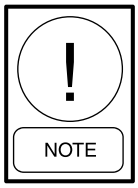
The Fan Control ON Pressure is the programmed pressure value that is used to stage the condenser fans ON, in relation to discharge pressure. *Refer to Condenser Fan Control in Section 2 Unit Operation and Tables 27 - 31.*



The microprocessor will not allow programming the "Fan Control ON Pressure" minus the Fan Control Differential OFF Pressure below 160 psig. This assures discharge pressure does not drop too low.

```
FAN DIFFERENTIAL OFF
PRESSURE = XXX PSIG
```

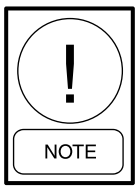
The Fan Differential OFF Pressure is the programmed differential pressure value that is used to stage the condenser fans off, in relation to discharge pressure. *Refer to Condenser Fan Control in Section 2 Unit Operation and Tables 27 - 31.*



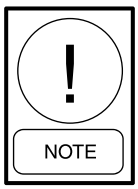
The microprocessor will not allow programming the Fan Control ON Pressure minus the "an Control Differential OFF Pressure below 160 psig. This assures discharge pressure does not drop too low.

```
TOTAL NUMBER OF
COMPRESSORS = 6
```

The Total Number Of Compressors is the total quantity of compressors in the chiller, and determines the stages of cooling available. Note in Table 21, the chiller may have single or dual systems.



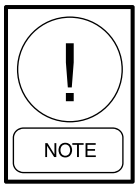
This MUST be programmed correctly to assure proper chiller operation.



A single system chiller MUST have a jumper between terminals 13 and 17 on terminal block CTB1. If the jumper is not installed, the unit will act as a 2-system chiller. The jumper is only checked by the microprocessor at unit power-up. If the jumper is removed, power must be removed and re-applied to register the change in memory.

```
NUMBER OF FANS
PER SYSTEM = X
```

The number of fans per system is programmed for the total number of fans on each system, or the total number on the chiller divided by 2. This is only programmable on YCAL0090 through YCAL0134 chillers.



This MUST be programmed correctly to assure proper chiller operation.

```
SYS X TRIP VOLTS
=X.X VOLTS
```

```
UNIT TRIP VOLTS
=X.X VOLTS
```

Depending on the option, the trip voltage for a specific system or unit high current trip *(see page 96)* can be programmed. It also calibrates the current readout under the OPER DATA key. The approximate programmed value is calculated using the following formulas:

460VAC System Trip Volts

For individual system high current trip programming on 460VAC chillers:

- Add the sum of the compressor and fan RLA's in the system
- Multiply the sum by 1.25
- Divide by 225A
- The resulting voltage is the value that should be programmed

For example, if fan and compressor RLA's total 100A:

$$\frac{5V \times 100A}{225A} \times 1.25 = \frac{625VA}{225A} = 2.8V$$

The programmed value will be 2.8V. A similar calculation and programming will be necessary for the other system in a 2-system chiller.

460VAC Unit Trip Volts

For total chiller high current trip programming on 460VAC chillers:

- Add the sum of all the compressor and fan RLA's in the chiller
- Multiply the sum by 1.25
- Divide by 225A
- The resulting voltage is the value that should be programmed

For example, if fan and compressor RLA's total 180A:

$$\frac{5V \times 180A}{225A} \times 1.25 = \frac{1125VA}{225A} = 5.0V$$

The programmed value will be 5.0V.

208/230VAC Chillers

On 208/230VAC chillers, the process is similar, but instead of performing the calculation using 225A, a number of 450A must be substituted.

```
   REMOTE UNIT ID
PROGRAMMED = X
```

When communications is required with a BAS or OptiView Panel, individual unit IDs are necessary for communications with specific chillers on a single RS-485 line. ID 0-7 is selectable.

```
   SYS 1 SUCT SUPERHEAT
SETPOINT = XX.X°F
```

```
   SYS 2 SUCT SUPERHEAT
SETPOINT = XX.X°F
```

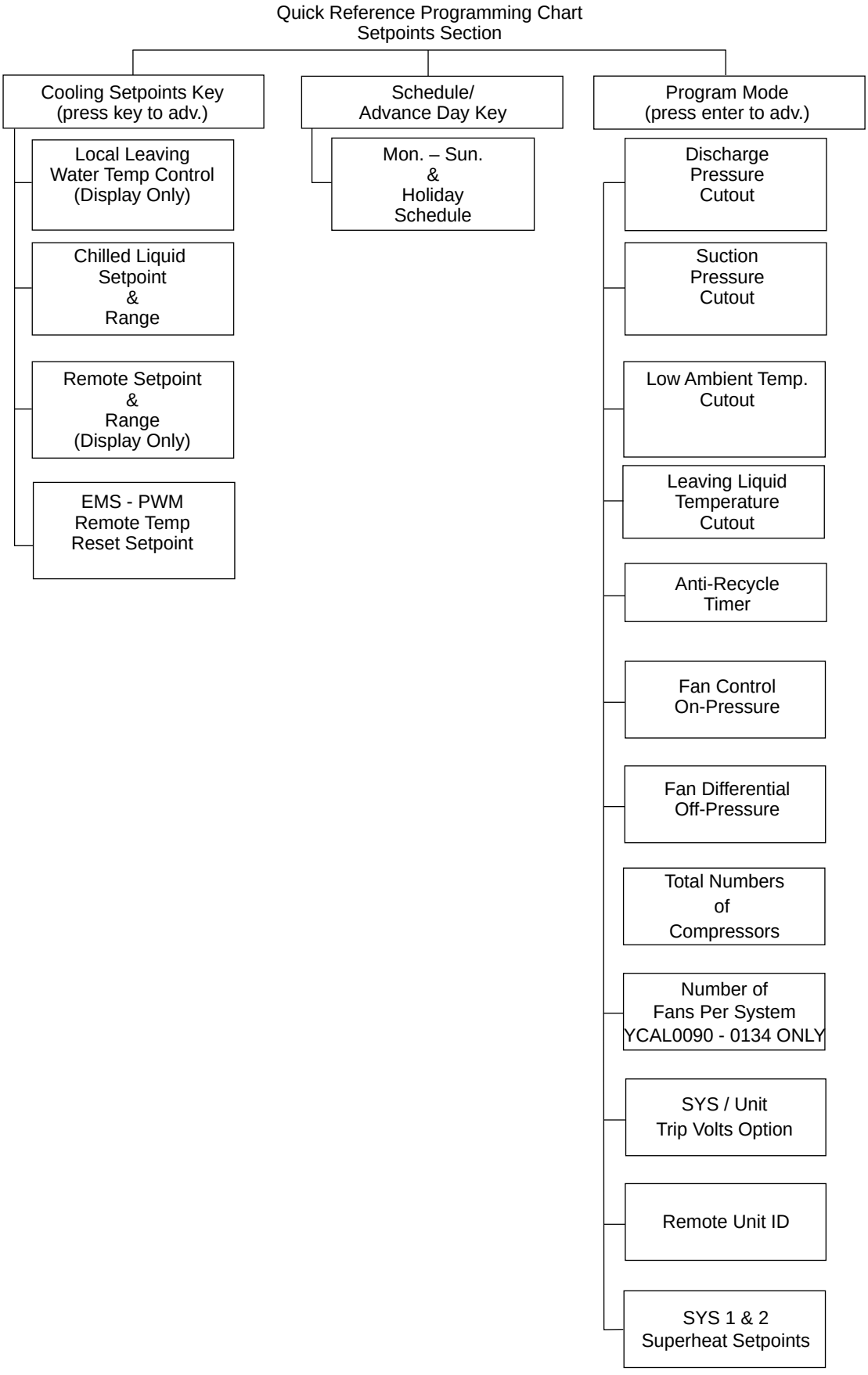
These messages only appear and are programmable when EEV is selected as the expansion valve type in the Service Mode. EEV must only be selected when an EEV is installed. Superheat is programmable between 10°F - 15°F. A setpoint of 12°F - 15°F is recommended.

TABLE 21 – PROGRAM KEY LIMITS AND DEFAULTS

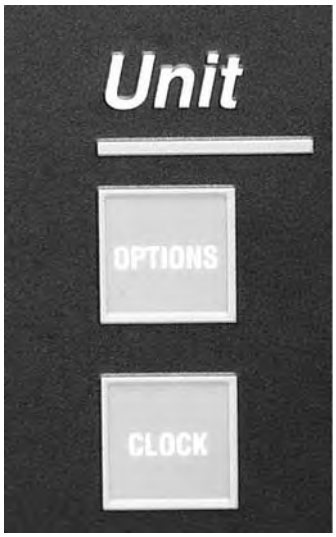
PROGRAM VALUE	MODE	LOW LIMIT	HIGH LIMIT	DEFAULT
DISCHARGE PRESSURE CUTOUT	—	200 psig	399 psig	395 psig
		13.8 barg	27.5 barg	27.2 barg
SUCTION PRESSURE CUTOUT	WATER COOLING	44.0 psig	70.0 psig	44.0 psig
		3.03 barg	4.83 barg	3.03 barg
	GLYCOL COOLING	20.0 psig	70.0 psig	44.0 psig
		1.38 barg	4.83 barg	3.03 barg
LOW AMBIENT TEMP, CUTOUT	STANDARD AMBIENT	25.0°F	60.0°F	25.0°F
		-3.9°C	15.6°C	-3.9°C
	LOW AMBIENT	0°F	60.0°F	25.0°F
		-17.8°C	15.6°C	-3.9°C
LEAVING CHILLED LIQUID TEMP CUTOUT	WATER COOLING	—	—	36.0°F
				2.2°C
	GLYCOL COOLING	8.0°F	36.0°F	36.0°F
		-13.3°C	2.2°C	2.2°C
ANTI-RECYCLE TIMER	—	300 sec.	600 sec.	600 sec.
FAN CONTROL ON PRESSURE	—	225 psig	260 psig	240 psig
		15.5 barg	17.9 barg	16.5 barg
FAN DIFFERENTIAL OFF PRESSURE	—	50 psig	100 PSID*	80 PSID
		3.45 barg	6.89 barg*	5.52 barg
TOTAL NUMBER OF COMPRESSOR	SINGLE SYSTEM	2	3	3
	TWO SYSTEM	4	6	6
NUMBER OF FANS PER SYSTEM	YCAL 0090 -YCAL0134 ONLY	3	4	3
UNIT/SYSTEM TRIP VOLTS	CURRENT FEEDBACK OPTION ENABLED. ONE PER UNIT	0.5	4.5	2
REMOTE UNIT ID	—	0	7	0
SYSTEM 1 SUPERHEAT SETPOINT	EEV	10.0°F	15.0°F	12.0°F
		5.5°C	8.3°C	6.6°C
SYSTEM 2 SUPERHEAT SETPOINT	EEV	10.0°F	15.0°F	12.0°F
		5.5°C	8.3°C	6.6°C

* The minimum discharge pressure allowed is 160 psig. The Fan Differential OFF Pressure will be lowered to prevent going below 160 psig based on where the Fan Control ON Pressure is programmed.

TABLE 22 – SETPOINTS QUICK REFERENCE LIST



UNIT KEYS



00070VIP

Options Key

There are many programmable options under the OPTIONS key. The OPTIONS key is used to scroll through the list of options by repeatedly pressing the OPTIONS key . After the selected option has been displayed, the ↑ (UP) and ↓ (DOWN) arrow keys are then used to change that particular option. After the option is changed, the ENTER/ADV key must be pressed to enter the data into memory. Table 23 shows the programmable options. Following are the displays in the order they appear:

Option 1 – Language

```
DISPLAY LANGUAGE
ENGLISH
```

English, Spanish, French, German, and Italian can be programmed.

Option 2 – System Switches

(two system units only, Single System Display is similar)

```
SYS 1 SWITCH ON
SYS 2 SWITCH ON
```

This allows both systems to run

or

```
SYS 1 SWITCH ON
SYS 2 SWITCH OFF
```

This turns system 2 off

or

```
SYS 1 SWITCH OFF
SYS 2 SWITCH ON
```

This turns system 1 off

or

```
SYS 1 SWITCH OFF
SYS 2 SWITCH OFF
```

This turns systems 1 & 2 off

Note: Turning a system off with its system switch allows a pumpdown to be performed prior to shutdown.

Option 3 – Chilled Liquid Cooling Type

```
CHILLED LIQUID
WATER
```

The chilled liquid is water. The Cooling Setpoint can be programmed from 40°F to 70°F (4.4°C to 21.1°C)

or

```
CHILLED LIQUID
GLYCOL
```

The chilled liquid is glycol. The Cooling Setpoint can be programmed from 10°F to 70°F (-12.2°C to 21.1°C).

Option 4 – Ambient Control Type
(YCAL00014-00080 Only)

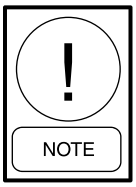
```
AMBIENT CONTROL
STANDARD
```

The Low Ambient Cutout is adjustable from 25°F to 60°F (-3.9°C to 15.6°C).

or

```
AMBIENT CONTROL
LOW AMBIENT
```

The Low Ambient Cutout is programmable down to 0°F (-17.8°C).



A low ambient kit MUST be installed for this option to be chosen. If the kit is NOT installed, and low ambient is selected, low pressure faults and compressor damage may occur. YCAL0090 through 0134 are fixed in the Low Ambient Mode as standard and cannot be reprogrammed.

Option 5 – Local/Remote Control Type

```
LOCAL / REMOTE MODEL
LOCAL
```

When programmed for "Local", an ISN or RCC control can be used to monitor only. The micro panel will operate on locally programmed values and ignore all commands from the remote devices. The chiller will communicate and send data to the remote monitoring devices.

or

```
LOCAL/REMOTE MODE
REMOTE
```

This mode should be selected when an ISN or RCC control is to be used to control the chiller. This mode will allow the ISN to control the following items:

- Remote Start/Stop
- Cooling Setpoint
- Load Limit
- History Buffer Request.

If the unit receives no valid ISN transmission for five minutes, it will revert back to the locally programmed values.

Option 6 – Unit Control Mode

```
CONTROL MODE
RETURN LIQUID
```

Unit control is based on return chilled liquid temp. Return Chilled Liquid Control can only be selected on units that have four to six compressors (dual system units).

or

```
CONTROL MODE
LEAVING LIQUID
```

Unit control is based on leaving chilled liquid temp. *Refer to section on Capacity Control for details on loading and unloading sequences. See Unit Operation in Section 2 of this IOM*

Option 7 – Display Units

```
DISPLAY UNITS
IMPERIAL
```

This mode displays system operating values in Imperial units of °F or psig.

or

```
DISPLAY UNITS
SI
```

This mode displays system operating values in Scientific International Units of °C or barg.

Option 8 – Lead/Lag Type
(two system units only)

```
LEAD/LAG CONTROL
MANUAL SYS 1 LEAD
```

SYS 1 selected as lead compressor. SYS 1 lead option MUST be chosen if Hot Gas Bypass is installed.

or

```
LEAD/LAG CONTROL
MANUAL SYS 2 LEAD
```

SYS 2 selected as lead compressor.

or

```
LEAD/LAG CONTROL
AUTOMATIC
```

Lead/lag between systems may be selected to help equalize average run hours between systems on chillers with 2 refrigerant systems. Auto lead/lag allows automatic lead/lag of the two systems based on an average run hours of the compressors in each system. A new lead/lag assignment is made whenever all compressors shut down. The microprocessor will then assign the "lead" to the system with the shortest average run time.

Option 9 – Condenser Fan Control Mode **(YCAL0014-0080 Only)**

```
FAN CONTROL
DISCHARGE PRESSURE
```

Condenser fans are controlled by discharge pressure only. This mode may only be chosen when discharge pressure transducers are installed. YCAL0090 through 0134 are fixed in the fan control by discharge pressure mode and cannot be reprogrammed.

or

```
FAN CONTROL
AMBIENT & DSCH PRESS
```

Condenser fans are controlled by ambient temperature and discharge pressure. This mode must be chosen if the discharge pressure transducers are NOT installed.

Option 10 – Manual Override Mode

```
MANUAL OVERRIDE MODE
DISABLED
```

This option allows overriding of the daily schedule that is programmed. Manual Override Mode – Disabled indicates that override mode has no effect.

or

```
MANUAL OVERRIDE MODE
ENABLED
```

Manual Override Mode is enabled. This is a service function and when enabled, will allow the unit to start when shut down on the daily schedule. It will automatically be disabled after 30 minutes.

Option 11 – Current Feedback Options Installed

```
CURRENT FEEDBACK
NONE
```

This mode should be selected when the panel is not equipped with current sensing capability.

or

```
CURRENT FEEDBACK
ONE PER UNIT
```

This mode should be selected when an optional 2ACE module is installed to allow combined current monitoring of all systems by sensing current on the incoming line. Current input is to J7-12 & J7-4 of the I/O Board.

or

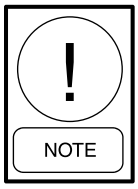
```
CURRENT FEEDBACK
ONE PER SYSTEM
```

This mode should be selected when an optional 2ACE module is installed to allow individual current monitoring of each system. SYS 1 input is to J7-12 & J7-4 of the I/O Board. SYS 2 input is to J9-12 & J9-4 of the I/O Board.

Option 12 – Soft Start Enable/Disable

```
SOFT START
ENABLED
```

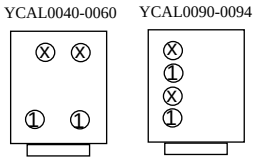
This should only be enabled on European units with soft start on two compressors. This feature modifies the compressor lead/lag to start the compressor(s) furthest from the control panel last to minimize current inrush. These compressors will be equipped with a soft starter.



Soft start is only viewable under OPTIONS key and must be programmed from the Service Mode.

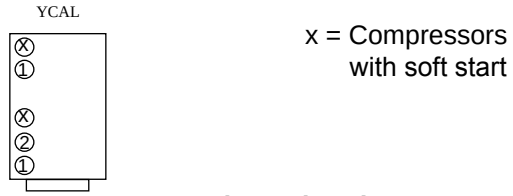
On two compressor chillers, soft start will always be applied to the compressor farthest from the control panel. This compressor will always start last to minimize current inrush with the other compressor running.

On four compressor chillers, soft start will always be applied to the compressor furthest from the control panel on each system. These compressors will always start last to minimize current inrush with the other compressors running.



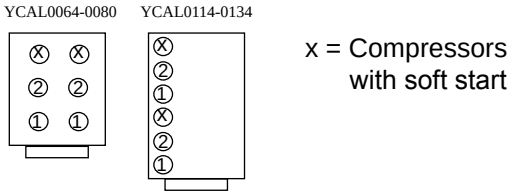
Control Panel End

On five compressor chillers, soft start will always be applied to the compressor furthest from the control panel on each system. Compressors 1 and 2 will continue to lead/lag per the selected option. The soft start compressors will always start last, to minimize current inrush with the other compressors running.



Control Panel End

On six compressor chillers, soft start will always be applied to the compressors farthest from the control panel on each system. Compressors 1 and 2 of each system will continue to lead/lag per the selected option. The soft start compressors will always start last to minimize current inrush with the other compressors running.



Control Panel End

```
SOFT START
DISABLED
```

This MUST be selected on all chillers without the soft start option.

Option 13 – Unit Type

```
UNIT TYPE
LIQUID CHILLER
```

The UNIT TYPE message cannot be modified under the unit keys.

LIQUID CHILLER must be displayed, or damage to compressors or other components will occur if operated in the Heat Pump or Condensing Unit modes.

If Unit Type needs to be changed to make the unit a liquid chiller, remove the jumper between J11-7 and J11-12 on the I/O Board and reapply power to the micropanel.

Option 14 – Refrigerant Type

```
REFRIGERANT TYPE
R-22
```

Refrigerant type R-22 or R-407C may be selected under Service Mode. Refrigerant type is displayed under the Options key, but is only programmable in Service Mode.

Incorrect programming may cause damage to compressors.

Option 15 – Expansion Valve Type

```
EXPANSION VALVE TYPE
THERMOSTATIC
```

Expansion valve type, thermostatic or electronic may be selected under Service Mode. Expansion valve type is displayed under the OPTIONS key, but is only programmable in Service Mode.

Option 16 – Flash Card Update

```
F L A S H   C A R D   U P D A T E
        D I S A B L E D
```

A Flash Card is used to input the operating program into the chiller IPU. A Flash Card is used instead of an EPROM. Normally, a Flash Card update is not required and the message above will be displayed.

If the operating software is to be updated, insert the Flash Card into the Flash Card input port. Turn off the Unit Switch and set the Flash Card Update to "Enabled" using the ↑ (UP) and ↓ (DOWN) arrow keys.

```
F L A S H   C A R D   U P D A T E
        E N A B L E D
```

Press the ENTER key and the following message will be displayed until the update has been completed. The keypad and display will not respond during the update. DO NOT reset or power down the chiller until the update is completed.

```
F L A S H   C A R D   U P D A T I N G
P L E A S E   W A I T . . .
```

After the update is completed, an automatic reboot will occur. If an error occurred, the following message will appear with the error code and no reboot will occur:

```
F L A S H   C A R D   U P D A T E
E R R O R                    XXXXX
```

If the update resulted in an error, the original program will still be active. When an error occurs, assure the correct Flash Card was utilized. Incorrect chiller software will cause an error. If this is not the case, the Flash Card is most likely defective or the IPU and I/O combo board is bad.

Incorrect programming may cause damage to compressors.

Also *see the Unit Keys Programming Quick Reference List in Table 23, Page 112.*

CLOCK

The Clock Display shows the current day, time, and date. Pressing the CLOCK key will show the current day, time, and date.

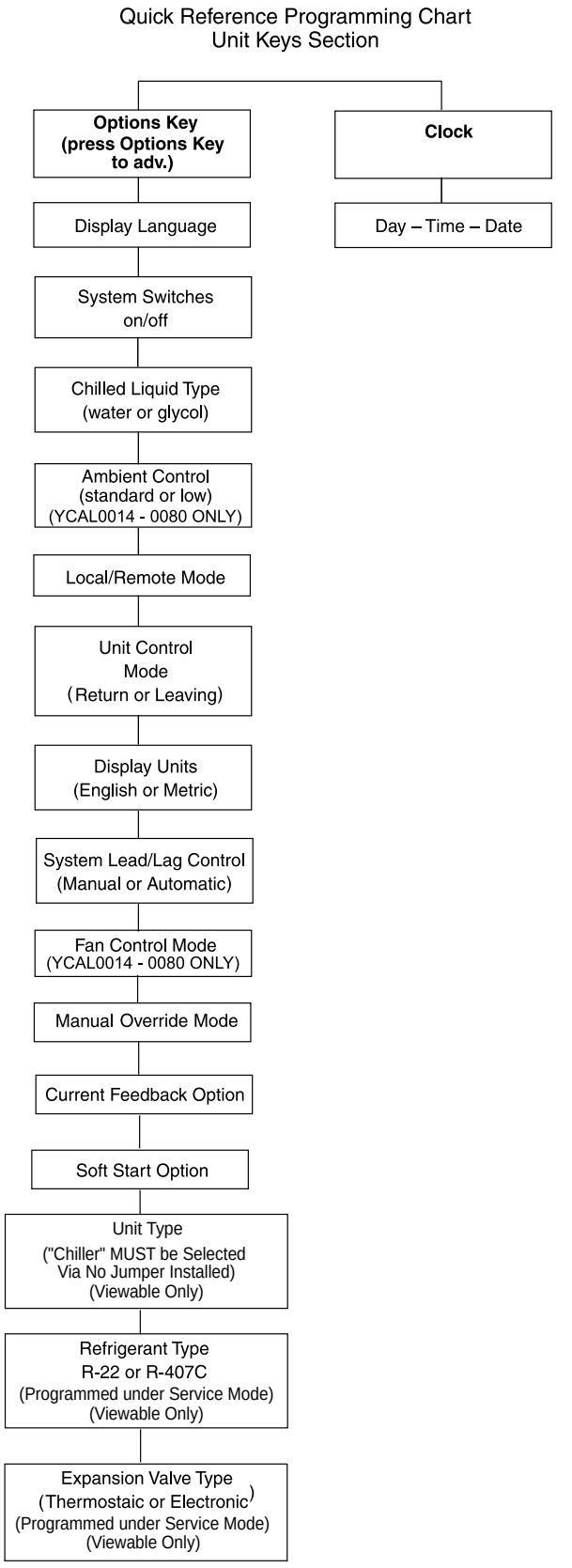
It is important that the date and time be correct, otherwise the daily schedule will not function as desired if programmed. In addition, for ease of troubleshooting via the history printouts, the day, time, and date should be correct.

To change the day, time, and date press the CLOCK key. The display will show something similar to the following:

```
T O D A Y   I S   F R I   0 8 : 5 1 A M
        2 5   J A N   0 2
```

The line under the F is the cursor. If the day is correct, press the ENTER/ADV key. The cursor will move under the 0 in 08 hours. If the day is incorrect, press the UP or DOWN arrow keys until the desired day is displayed and then press the ENTER/ADV key at which time the day will be accepted and the cursor will move under the first digit of the "2 digit hour". In a similar manner, the hour, minute, meridian, month, day, and year may be programmed, whenever the cursor is under the first letter/numeral of the item. Press the UP or DOWN arrow keys until the desired hour, minute, meridian, day, month, and year are displayed. Pressing the ENTER/ ADV key will save the valve and move the cursor on to the next programmable variable.

TABLE 23 – UNIT KEYS PROGRAMMING QUICK REFERENCE LIST



SECTION 3 - UNIT OPERATION

CAPACITY CONTROL

To initiate the start sequence of the chiller, all run permissive inputs must be satisfied (flow/remote start/stop switch), and no chiller or system faults exist.

The first phase of the start sequence is initiated by the daily schedule start or a remote cycling device. If the unit is shut down on the daily schedule, the chilled water pump I/O Board contacts (TB5 3-4) will close when the daily schedule start time has been reached. Once flow has been established and the flow switch closes, capacity control functions are initiated.

If unit cycling is accomplished with a remote cycling device wired in series with the flow switch, the chilled water pump contacts will always be energized as long as the Unit Switch is turned ON. When the flow switch and remote cycling contacts are closed, the capacity control functions will be initiated.

It should be noted that the chilled water pump contacts (TB5 3-4) are not required to be used to cycle the chilled water pump. However, in all cases the flow switch must be closed to allow unit operation.

The control system will evaluate the need for cooling by comparing the actual leaving or return chilled liquid temperature to the desired setpoint, and regulate the leaving or return chilled liquid temperature to meet that desired setpoint.

SUCTION PRESSURE LIMIT CONTROLS

The anticipatory controls are intended to prevent the unit from ever actually reaching a low-pressure cutout. Loading is prevented, if the suction pressure drops below 1.15 x Suction Pressure Cutout. Load may reoccur after suction pressure rises above the unload point and a period of one minute elapses. This control is only operable if the optional suction pressure transducers are installed.

DISCHARGE PRESSURE LIMIT CONTROLS

The discharge pressure limit controls unload a system before it reaches a safety limit due to high load or dirty condenser coils. The microprocessor monitors discharge pressure and unloads a system, if fully loaded, by one compressor when discharge pressure exceeds the programmed cutout minus 15 psig. Reloading will occur when the discharge pressure on the affected system drops to 85% of the unload pressure and 10 minutes have elapsed.

This control is only applicable if optional discharge pressure transducers are installed.

LEAVING CHILLED LIQUID CONTROL

The setpoint, when programmed for Leaving Chilled Liquid Control, is the temperature the unit will control to within plus or minus the cooling range. The Setpoint High Limit is the setpoint plus the cooling range. The Setpoint Low Limit is the setpoint minus the cooling range *(see Fig. 8)*. Figure 8 should be utilized to aid in understanding the remainder of the description of Leaving Chilled Liquid Control.

If the leaving chilled liquid temperature is above the Setpoint High Limit, the lead compressor on the lead system will be energized along with the liquid line solenoid. Upon energizing any compressor, the 60 second Anti-Coincidence timer will be initiated.

If after 60 seconds of run-time the leaving chilled liquid temperature is still above the Setpoint High Limit, the next compressor in sequence will be energized. Additional compressors will be energized at a rate of once every 60 seconds if the chilled liquid temperature remains above the Setpoint High Limit and the chilled liquid temperature is dropping less than 3°F/min. The lag system will not be allowed to start a compressor until the lead system has run for five minutes.

If the chilled liquid temperature falls below the Setpoint High Limit but is greater than the Setpoint Low Limit, loading and unloading do not occur. This area of control is called the control range.

If the chilled liquid temperature drops to between Setpoint Low Limit and 0.5°F (.28°C) below the Setpoint Low Limit, unloading occurs at a rate of 60 seconds. If the chilled liquid temperature falls to a value greater than 0.5°F (.28°C) below the Setpoint Low Limit but not greater than 1.5°F (.83°C) below the Setpoint Low Limit, unloading occurs at a rate of 20 seconds. If the chilled liquid temperature falls to a value greater than 1.5°F (.83°C) below the Setpoint Low Limit, unloading occurs at a rate of 30 seconds. If the chilled liquid temperature falls below 1°F above the low chilled liquid temperature cutout, unloading occurs at a rate of 10 seconds.

Hot gas, if present, will be the final step of capacity. If temperature remains below the Setpoint Low Limit on the lowest step of capacity, the microprocessor will close the liquid line solenoid or EEV, after turning off hot gas, and pump the system down before turning off the last compressor in a system.

The Leaving Chilled Liquid Setpoint is programmable from 40°F to 70°F (4.4°C to 21.1°C) in water chilling mode and from 10°F to 70°F (-12.2°C to 21.1°C) in glycol chilling mode. In both modes, the cooling range can be from plus or minus1.5°F to plus or minus2.5°F (plus or minus.83°C to 1.39°C).

Leaving Chilled Liquid Control Override to Reduce Cycling

To avoid compressor cycling the I/O Board will adjust the setpoint upward temporarily. The last run time of the system will be saved. If the last run time was greater than five minutes, no action is to be taken. If the last run time for the lead system was less than five minutes, increase the Setpoint High Limit according to the chart at right, with a maximum value allowed of 50°F.

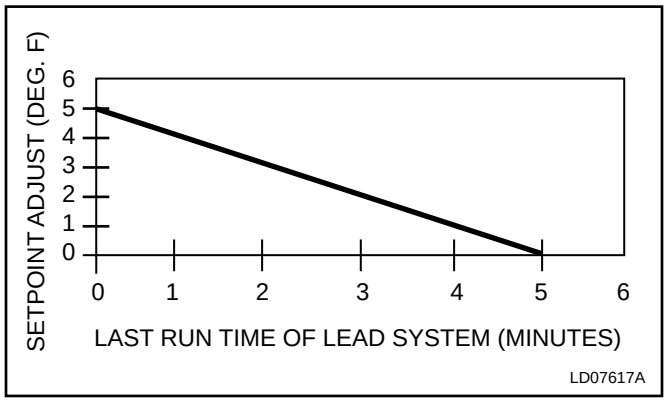


FIG. 7 – SETPOINT ADJUST

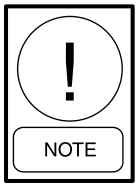
If adding the setpoint adjust value to the Setpoint High Limit causes the Setpoint High Limit to be greater than 50°F, the Setpoint High Limit will be set to 50°F, and the difference will be added to the Setpoint Low Limit.

Once a system runs for greater than five minutes, the setpoint adjust will be set back to 0. This will occur while the system is still running.

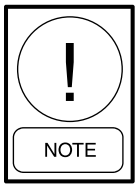
RETURN CHILLED LIQUID CONTROL

(Can be used on Dual System 4, 5 & 6 Comp Units Only)

Return Chilled Liquid Control is based on staging the compressors to match the cooling load. The chiller will be fully loaded when the return water temperature is equal to the Cooling Setpoint plus the range. The chiller will be totally unloaded (all compressors off) when the return water temperature is equal to the Cooling Setpoint *(see sample in Table 24).* At return water temperatures between the Cooling, and Cooling Setpoint plus range, compressor loading and unloading will be determined by the formulas in Table 25 or Table 26.



Return Chilled Liquid Control MUST only be used when constant chilled liquid flow is ensured.



The RANGE MUST always be programmed to equal the temperature drop across the evaporator when the chiller is fully loaded. Otherwise, chilled liquid temperature will over or under shoot.

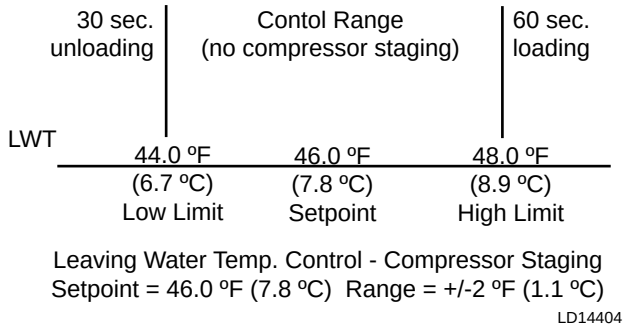


FIG. 8 – LEAVING WATER TEMPERATURE CONTROL EXAMPLE

TABLE 24 – COMPRESSOR STAGING FOR RETURN WATER CONTROL

COMPRESSOR STAGING FOR RETURN WATER CONTROL								
6 COMPRESSORS COOLING SETPOINT = 45°F (7.2°C) RANGE = 10°F (5.6°C)								
# OF COMP ON	**0**	***1+HG**	**1**	**2**	**3**	**4**	**5**	**6**
RWT	45°F (7.2°C)	46.25°F (7.9°C)	46.7°F (8.2°C)	48.3°F (9.1°C)	50.0°F (10.0°C)	51.7°F (11.0°C)	53.4°F (11.9°C)	55.0°F (12.8°C)

* Unloading Only

Normal loading will occur at intervals of 60 seconds according to the temperatures determined by the formulas. Unloading will occur at a rate of 30 seconds according to the temperatures determined in the formulas.

The return chilled liquid setpoint is programmable from 40°F to 70°F (4.4°C to 21.1°C) in water chilling mode and from 10°F to 70°F (-12.2°C to 21.1°C) in glycol chilling mode. In both modes, the cooling range can be from 4°F to 20°F (2.2° to 11.1°C).

As an example of compressor staging *(refer to Table 24)*, a chiller with six compressors using a Cooling Setpoint programmed for 45°F (7.20°C) and a Range Setpoint of 10°F (5.56°C). Using the formulas in Table 25, the control range will be split up into six (seven including hot gas) segments, with the Control Range determining the separation between segments. Note also that the Cooling Setpoint is the point at which all compressors are OFF, and Cooling Setpoint plus range is the point all compressors are ON. Specifically, if the return water temperature is 55°F (12.8°C), then all compressors will be ON, providing full capacity. At nominal gpm, this would provide approximately 45°F (7.2°C) leaving water temperature out of the evaporator.

If the return water temperature drops to 53.4°F (11.9°C), one compressor would cycle off leaving five compressors running. The compressors would continue to cycle off approximately every 1.7°F (.94°C), with the exception of hot gas bypass. Notice that the Hot Gas Bypass would be available when the return water temperature dropped to 46.25°F (7.9°C). At this point one compressor would be running.

Should the return water temperature rise from this point to 46.7°F (8.2°C), the Hot Gas Bypass would shut off, still leaving one compressor running. As the load increased, the compressors would stage ON every 1.7°F (.94°C).

Also notice that Tables 24, 25 and 26 not only provide the formulas for the loading (ON POINT) and unloading (OFF POINT) of the system, the "STEP" is also shown in the tables. The "STEP" is that sequence in the capacity control scheme that can be viewed under the OPER DATA key. *Refer to the section on the DISPLAY/PRINT keys for specific information on the OPER DATA key.*

TABLE 25 – RETURN CHILLED LIQUID CONTROL FOR 5 & 6 COMPRESSORS (7 & 8 STEPS)

*STEP	COMPRESSOR	COMPRESSOR ON POINT	COMPRESSOR OFF POINT
0	0	SETPOINT	SETPOINT
1	1 W/HGB	SP + CR/8 (Note 1)	SETPOINT
2	1 NO HGB	SP + CR/6	SETPOINT
3	2	SP + 2*CR/6 (Note 2)	SP + CR/6
4	2	SP + 2*CR/6	SP + CR/6 (Note 3)
5	3	SP + 3*CR/6	SP + 2*CR/6
6	4	SP + 4*CR/6	SP + 3*CR/6
7**	5	SP + 5*CR/6	SP + 4*CR/6
8	6	SP + CR	SP + 5*CR/6

* STEP can be viewed using the OPER DATA key and scrolling to COOLING DEMAND.

** 5-Compressor Chillers stop at 7 steps

Notes:

1. Step 1 is Hot Gas Bypass and is skipped when loading occurs. Hot Gas Bypass operation is inhibited during pumpdown.
2. Step 3 is skipped when loading occurs.
3. Step 4 is skipped when unloading occurs.

TABLE 26 – RETURN CHILLED LIQUID CONTROL FOR 4 COMPRESSORS (6 STEPS)

*STEP	COMPRESSOR	COMPRESSOR ON POINT	COMPRESSOR OFF POINT
0	**0**	**SETPOINT**	**SETPOINT**
1	1 W/HGB	SP + CR/8 (Note 1)	SETPOINT
2	1 NO HGB	SP + CR/4	SP + CR/8
3	2	SP + 2*CR/4 (Note 2)	SP + CR/4
4	2	SP + 2*CR/4	SP + CR/4 (Note 3)
5	3	SP + 3*CR/4	SP + 2*CR/4
6	4	SP + CR	SP + 3*CR/4

Notes:

1. Step 1 is Hot Gas Bypass and is skipped when loading occurs. Hot Gas Bypass operation is inhibited during pumpdown.
2. Step 3 is skipped when loading occurs.
3. Step 4 is skipped when unloading occurs.

* STEP can be viewed using the OPER DATA key and scrolling to COOLING DEMAND.

SYSTEM LEAD/LAG

Lead/lag between systems may be selected to help equalize average run hours between systems on chillers with 2 refrigerant systems. This may be programmed under the OPTIONS key. Auto lead/lag allows automatic lead/lag of the two systems based on average run hours of the compressors in each system. Manual lead/lag selects specifically the sequence in which the microprocessor starts systems.

COMPRESSOR LEAD/LAG

The compressors within a system rotate starts in sequence 1, 2 or 1, 2, 3 with wraparound. The longest-off compressor in a system will start first, and the longest-running compressor in a system will turn off first. When unloading, the system with the most compressors ON, unloads first. The lag system will shut down a compressor first when equal numbers of compressors are operating in each system. The microprocessor will not attempt to equalize run time of compressors in a system.

Once the second system has started a compressor, the microprocessor will attempt to equally load each system. Once this occurs, loading will alternate between systems.

If soft start is enabled on European models with this option, compressor lead/lag will function as outlined in Option 12 under the OPTIONS key.

ANTI-RECYCLE TIMER

The programmable anti-recycle timer assures that systems do not cycle. This timer is programmable under the PROGRAM key between 300 and 600 seconds. Whenever possible, to reduce cycling and motor heating, the anti-recycle timer should be adjusted to 600 seconds. The programmable anti-recycle timer starts the timer when the first compressor in a system starts. The timer begins to count down. If all of the compressors in a circuit cycle off, a compressor within the circuit will not be permitted to start until the anti-recycle timer has timed out. If the lead system has run for less than five minutes, 3 times in a row, the anti-recycle timer will be extended to 10 minutes.

ANTI-COINCIDENCE TIMER

This timer is not present on single-system units. Two timing controls are present in software to assure compressors within a circuit or between systems, do not start simultaneously. The anti-coincidence timer assures there is at least a one minute delay between system starts on 2-circuit systems. This timer is NOT programmable. The load timers further assure that there is a minimum time between compressor starts within a system.

EVAPORATOR PUMP CONTROL

The evaporator pump dry contacts (CTB2 – terminals 23 and 24) are energized when any of the following conditions are true:

1. Low Leaving Chilled Liquid fault
2. Any compressor is running
3. Daily schedule is not programmed OFF and Unit Switch is ON

The pump will not run if the micro panel has been powered up for less than 30 seconds or if the pump has run in the last 30 seconds to prevent pump motor overheating.

EVAPORATOR HEATER CONTROL

The evaporator heater is controlled by ambient air temperature. When the ambient temperature drops below 40°F (4.4°C) the heater is turned ON. When the temperature rises above 45°F (7.2°C) the heater is turned off. An under voltage condition will keep the heater off until full voltage is restored to the system.

PUMPDOWN CONTROL

Each system has a pump-down feature upon shut-off. Manual pumpdown from the keypad is possible by turning off the respective system's switch under the OPTIONS key. On a non-safety, non-unit switch shutdown, all compressors but one in the system will be shut off. The LLSV or EEV will also be turned off. The final compressor will be allowed to run until the suction pressure falls below the cutout, or for 180 seconds, whichever comes first.

The EEV pilot solenoid is also used as a low superheat safety device when the EEV is selected as the expansion valve type. While the system is running and not in a pumpdown mode, the EEV pilot solenoid will close if the suction superheat falls below 4°F. The EEV pilot solenoid will open again when the superheat rises above 7.0°F. This safety device is ignored for the first 30 seconds of system run time. If the EEV pilot solenoid is closed 10 times in two minutes on the safety device, the low superheat safety will be triggered.

ELECTRONIC EXPANSION VALVE (EEV)

General

The EEV is optional on the YCAL0014 through YCAL0080 and standard on the YCAL0090 through YCAL0114. When the EEV is installed, it is programmed under Service Mode, which instructs the microprocessor to control the associated outputs.

The EEV controller in the microprocessor is a PI controller. The integration time is fixed while gain scheduling varies the proportional gain based on the superheat error. As the superheat gets smaller, the proportional gain gets smaller.

The output of the PI controller may be viewed on the display and printouts as the EEV output percentage. This output % is converted to a PWM signal that is used to control the EEV. It can over and under drive the heat motor for faster valve response. This PWM output is the percentage of a one second period that the 24VAC heat motor power signal is energized.

MOP Feature

The controller has an MOP feature that overrides the superheat control when the MOP setpoint is exceeded. This is generally only active during hot water starts. The MOP setpoint is 60°F saturated suction temp.

The MOP feature is also used to prevent undershoot when the suction temperature of a system being started is much higher than the return water temperature. This provides better startup superheat control for high ambient, low water temp startups when the superheat measurement is high due to a warm suction line.

Valve Preheat

The heat motor is pre-heated for moderate and low ambient standby conditions. When the ambient is below 25°F, the heat motor is preheated to 25%. Between 25 and 50°F, the preheat is ramped from 25% to 0% linearly, preheat at 50°F and above is 0%.

Inputs

Two external inputs to the microprocessor are used to control the superheat. These inputs are the suction temperature sensor input and the suction pressure transducer input.

Outputs

Two output signals are fed to the EEV. The first controls the EEV pilot solenoid portion of the valve and is 115VAC.

The second output is the EEV PWM signal which feeds the heat motor. The signal will be a 24VAC pulsed signal that is fed to the valve heat motor within a one second period. This 24VAC signal can be fed to the motor 0% to 100% of the one second period. The signal is measured in terms of watts with 100% equating to 30W, 50% to 15W, etc.

The EEV PWM signal is used to overdrive the valve for faster response. It also allows the valve to stabilize and control superheat more accurately. This feature is especially valuable at start and during transients when valve overfeed could cause liquid to be fed to the compressor.

Program

The superheat setpoint is programmable under the PROGRAM key. Superheat may be programmed for 10°F to 15°F, with 12°F as the default. It is recommended that a 12°F to 15°F setpoint be used for most applications.

Safeties

Two safeties are associated with the EEV, the low superheat safety and the sensor failure safety. Details are outlined in "System Safeties" located in Section 2 "Fault Status Messages".

CONDENSER FAN CONTROL (YCAL0014 THROUGH YCAL0080 CHILLERS)

Condenser fan operation must be programmed with the OPTIONS key under "Fan Control." Condenser Fan Control can be selected for Ambient Temp. and Disch. Pressure, or Discharge Pressure Only.

The Condenser Fan Control by "Ambient Temperature and Discharge Pressure" is a feature that is integral to the standard software control. If the optional discharge transducer is not installed, the condenser fans will operate based on outdoor ambient temperature only *(see Table 27).*

The Condenser Fan Control by "Discharge Pressure" is a feature that can be selected if the discharge pressure transducer is installed and fan recycling is not a concern. Fan control by discharge pressure will work according to Table 28. The Fan Control ON Pressure and Fan Differential OFF Pressure are programmable under the PROGRAM key.

CONDENSER FAN CONTROL (YCAL0090 THROUGH YCAL0134)

YCAL0090 through YCAL0134 fan control will be by discharge pressure only *(see Tables 30 and 31).*

LOW AMBIENT CONDENSER FAN CONTROL (YCAL0014 THROUGH YCAL0080)

(YCAL0090 through YCAL0134 always operate in Low Ambient Mode)

For unit operation below 25°F (-3.9°C) a low ambient kit is required. The kit consists of a discharge pressure transducer(s) and reversing contactors.

With the low ambient kit installed and the unit programmed for low ambient operation, the condenser fans will operate as shown in Table 29 (YCAL0014 through YCAL0080) YCAL0090 through YCAL0134 is shown in Tables 30 and 31.

Condenser fan operation will controlled by discharge pressure control only.

The Fan Control ON Pressure and the Fan Differential OFF Pressure are programmable under the PROGRAM key.

A low ambient kit MUST be installed when AMBIENT CONTROL LOW AMBIENT is selected under the OPTIONS key on YCAL0014 through YCAL0080.

Compressor damage could occur if programming does not match installed hardware.

CONDENSER FAN CONTROL
YCAL0014 - YCAL0080

TABLE 27 – YCAL0014 THROUGH YCAL0080 CONDENSER FAN CONTROL USING OUTDOOR AMBIENT TEMPERATURE AND DISCHARGE PRESSURE.

FAN STAGE	ON	OFF	CONTACTOR		I/O BOARD OUTPUT		FAN #	
			SYS 1	SYS 2	SYS 1	SYS 2	SYS 1	SYS 2
1 1 FAN FWD	OAT >25°F (-3.9°C) OR DP > Fan Ctrl On Press	OAT < 20°F (-6.7°C) AND DP < Fan Ctrl On Press – (Diff. Press.)	8M	11M	TB7-9	TB10-9	3	4
***3 2 FANS FWD**	OAT >65°F (18.3°C) OR DP > Fan Ctrl On Press + 40 psig (2.76 bars)	OAT < 60°F (15.6°C) AND DP < Fan Ctrl On Press.- [Diff. Press + 40 psig (2.76 bars)]	7M & 8M	10M & 11M	TB7-8 & TB7-9	TB10-8 & TB10-9	1 & 3	2 & 4

* (Discharge Pressure Controls will not function unless the optional Discharge Pressure Transducer is installed)

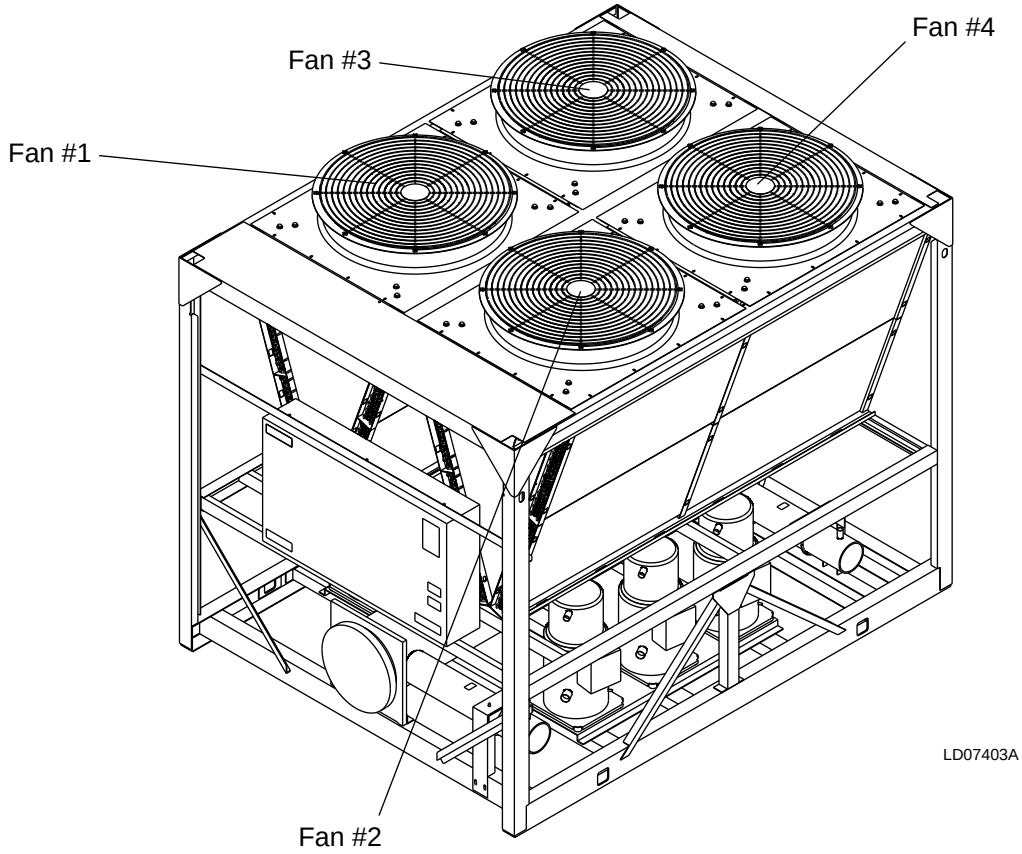


FIG. 9 – YCAL0014 THROUGH YCAL0080 FAN LOCATION (TYPICAL)

3

CONDENSER FAN CONTROL - YCAL0014 THROUGH YCAL0080 (CONT'D)

TABLE 28 – YCAL0014 THROUGH YCAL0080 CONDENSER FAN CONTROL USING DISCHARGE PRESSURE ONLY

FAN STAGE	ON	OFF	CONTACTOR		I/O BOARD OUTPUT		FAN #	
			SYS 1	SYS 2	SYS 1	SYS 2	SYS 1	SYS 2
1 1 FAN FWD	DP > Fan Ctrl On Press	DP < Fan Ctrl On Press – (Diff. Press.)	8M	11M	TB7-9	TB10-9	3	4
***3 2 FANS FWD**	DP > Fan Ctrl On Press + 40 psig (2.76 bars)	DP < Fan Ctrl On Press.) – [(Diff Press.) + 40 psig (2.76 bars)]	7M & 8M	10M & 11M	TB7-8 & TB7-9	TB10-8 & TB10-9	1 & 3	2 & 4

*** NOTE:** STEP 2 is not active in the “Standard Ambient” mode. When changing to “Low Ambient” control, fan power wiring also changes.

TABLE 29 – YCAL0014 - YCAL0080 LOW AMBIENT CONDENSER FAN CONTROL – DISCHARGE PRESSURE CONTROL

FAN STAGE	ON	OFF	CONTACTOR		I/O BOARD OUTPUT		FAN #	
			SYS 1	SYS 2	SYS 1	SYS 2	SYS 1	SYS 2
1 1 FAN REV	DP > Fan Ctrl On Press	DP < Fan Ctrl On Press – Diff. Press.	7M	10M	TB7-8	TB10-8	1 REV	2 REV
2 1 FAN FWD	DP > Fan Ctrl On Press + 20 psig (1.38 bars)	DP < Fan Ctrl On Press.) – [Diff Press. + 20 psig (1.38 bars)]	8M	11M	TB7-9	TB10-9	3 FWD	4 FWD
3 2 FANS FWD	DP > Fan Ctrl On Press + 40 psig (2.76 bars)	DP < Fan Ctrl On Press.) – [Diff Press. + 40 psig (2.76 bars)]	8M & 9M	11M & 12M	TB7-9 & TB7-10	TB10-9 & TB10-10	1 & 3 FWD	2 & 4 FWD

NOTE: When “Low Ambient” control of the fans is selected, fan control will be by discharge pressure only.

CONDENSER FAN CONTROL (CONT'D)

YCAL0090 – YCAL0104

Condenser Fan Control on models YCAL0090 through YCAL0104 will always be by discharge pressure. The ON pressure and the differential OFF pressure are programmable under the PROGRAM key.

The following figures and tables outline fan sequencing for the various models. These models are equipped to operate to 0°F ambient as a standard.

TABLE 30 – YCAL0090 - YCAL0104 CONDENSER FAN CONTROL

FAN STAGE	ON	OFF	CONTACTOR		I/O BOARD OUTPUT		FAN #	
			SYS 1	SYS 2	SYS 1	SYS 2	SYS 1	SYS 2
1 1 FAN FWD	DP > Fan Ctrl On Press	DP < Fan Ctrl On Press – (Diff. Press.)	10M	14M	TB7-8	TB10-8	7	8
2 2 FANS FWD	DP > Fan Ctrl On Press + 20 psig (1.38 bars)	DP < Fan Ctrl On Press.) – [(Diff Press.) + 20 psig (1.38 bars)]	9M & 10M	13M & 14M	TB7-8 & TB7-9	TB10-8 & TB10-9	5 & 7	6 & 8
3 3 FANS FWD	DP > Fan Ctrl On Press + 40 psig (2.76 bars)	DP < Fan Ctrl On Press.) – [(Diff Press.) + 40 psig (2.76 bars)]	8M, 9M & 10M	12M, 13M & 14M	TB7-8, TB7-9 & TB7-10	TB10-8, TB10-9 & TB10-10	3, 5 & 7	4, 6 & 8

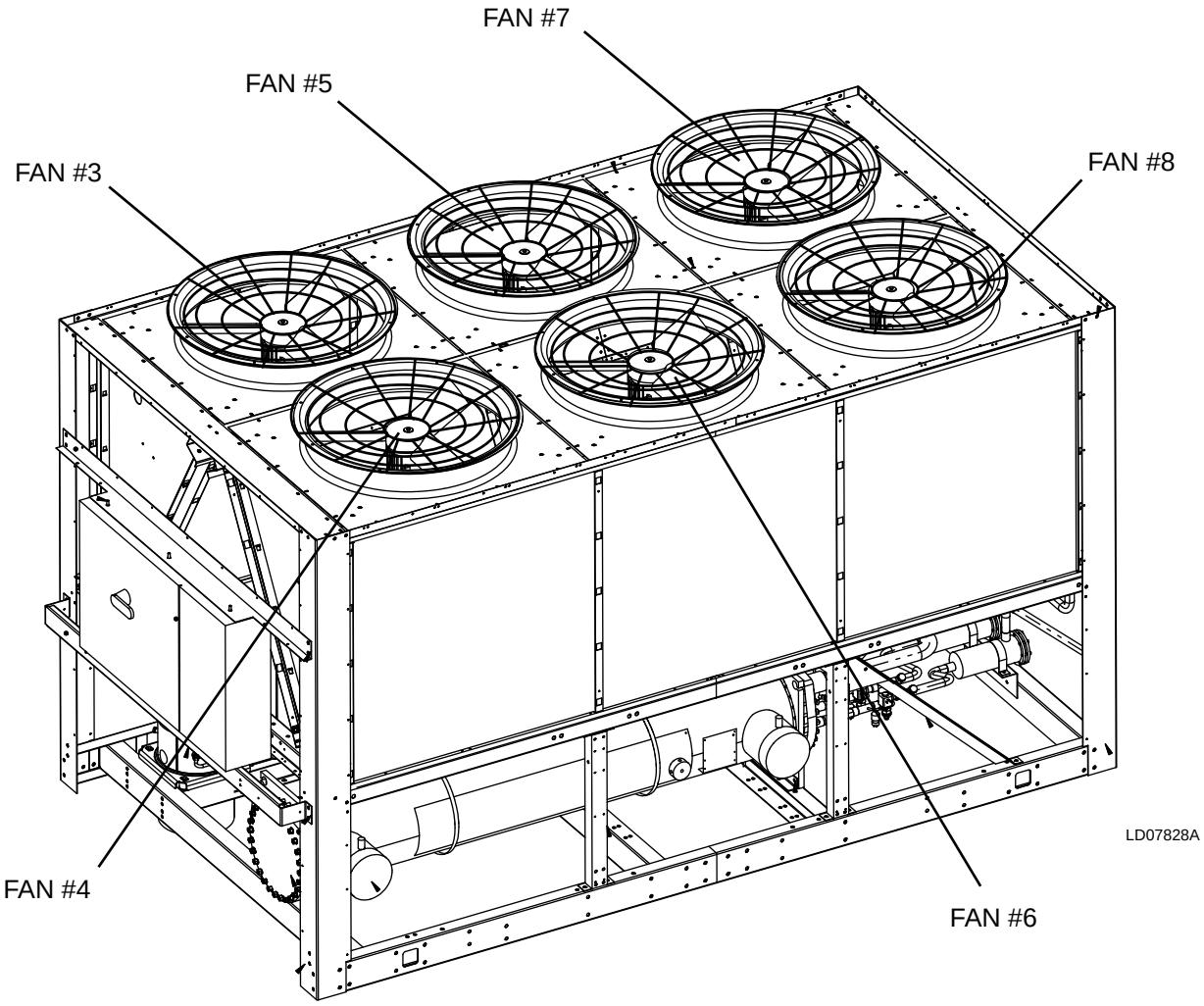


FIG. 10 – YCAL0090 THROUGH YCAL0104 FAN LOCATION

CONDENSER FAN CONTROL (CONT'D)

YCAL0114 – YCAL0134

TABLE 31 – YCAL0114 - YCAL0134 CONDENSER FAN CONTROL

FAN STAGE	ON	OFF	CONTACTOR		I/O BOARD OUTPUT		FAN #	
			SYS 1	SYS 2	SYS 1	SYS 2	SYS 1	SYS 2
1 1 FAN FWD	DP more than Fan Ctrl On Press	DP < Fan Ctrl On Press – (Diff. Press.)	10M	14M	TB7-8	TB10-8	7	8
2 2 FANS FWD	DP more than Fan Ctrl On Press + 20 psig (1.38 bars)	DP < Fan Ctrl On Press.) – [(Diff Press.) + 20 psig (1.38 bars)]	9M & 10M	13M & 14M	TB7-8 & TB7-9	TB10-8 & TB10-9	5 & 7	6 & 8
4 4 FANS FWD	DP more than Fan Ctrl On Press + 40 psig (2.76 bars)	DP < Fan Ctrl On Press.) – [(Diff Press.) + 60 psig (4.14 bars)]	7M, 8M, 9M & 10M	11M, 12M, 13M & 14M	TB7-8, TB7-9 & TB7-10	TB10-8, TB10-9 & TB10-10	1, 3, 5 & 7	2, 4, 6 & 8

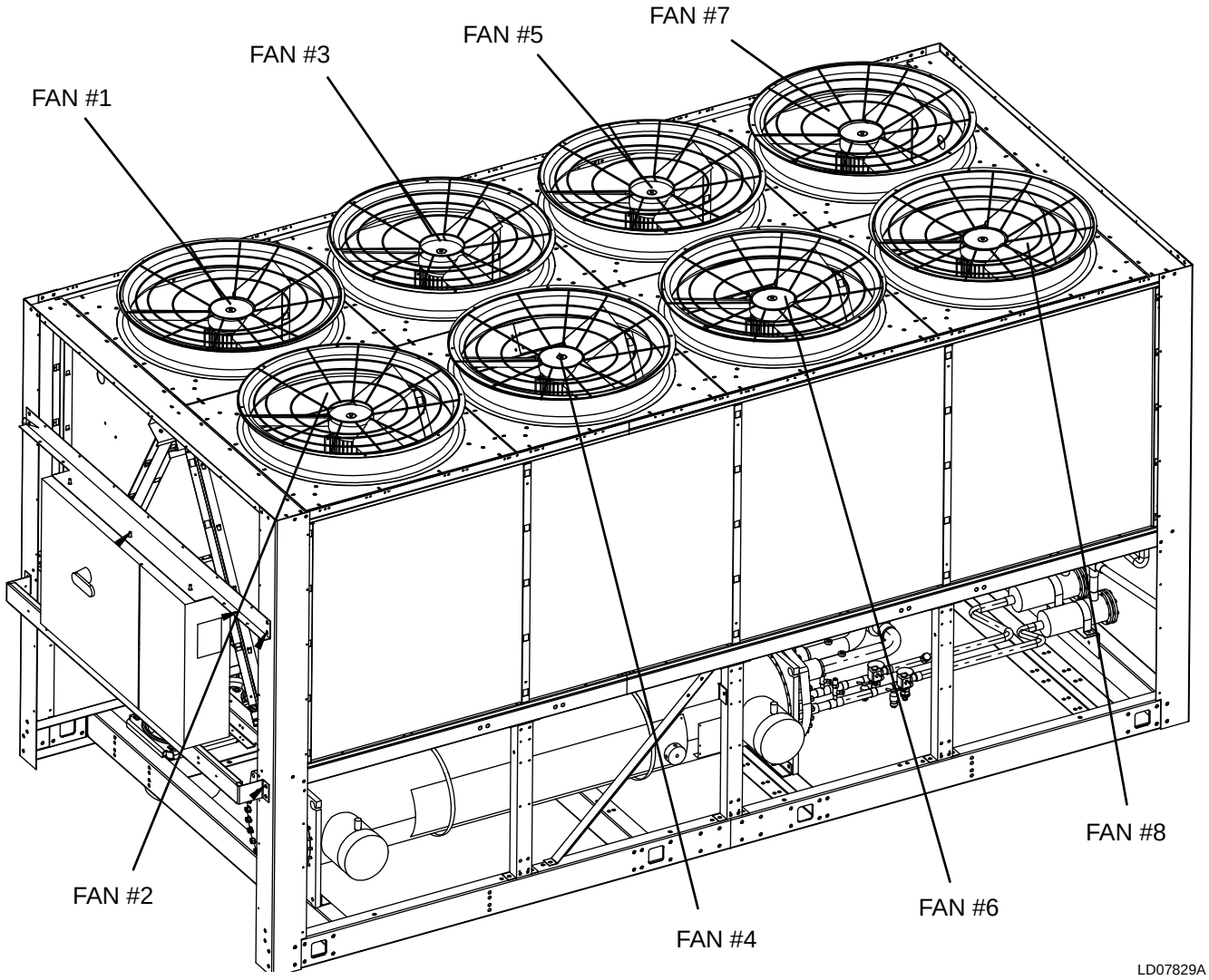


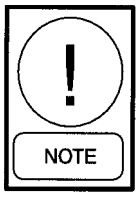
FIG. 11 – YCAL0114 – YCAL0134 FAN LOCATION

LOAD LIMITING

Load limiting is a feature that prevents the unit from loading beyond the desired value. Two and four compressor units can be load limited to 50%. This would allow only 1 compressor per system to run. Three and six compressor units can be load limited to 33% or 66%. The 66% limit would allow up to two compressors per system to run, and the 33% limit would allow only 1 compressor per system to run. Five-compressor units may be load limited to 40% (1 compressor per system runs) or 80% (up to two compressors per system) are permitted to run. No other values of limiting are available.

There are two ways to load limit the unit. The first is through remote communication via an ISN.

A second way to load limit the unit is through closing contacts connected to the Load Limit (CTB1 – terminals 13 and 21) and PWM inputs (CTB1 – terminals 13 and 20). Stage 1 of load limiting involves closing the Load Limit input. Stage 2 of load limiting involves closing both the Load Limit and PWM inputs. The first stage of limiting is either 80%, 66% or 50%, depending on the number of compressors on the unit. The second stage of limiting is either 40% or 33% and is only available on three, five & six compressor units. Table 32 shows the load limiting permitted for the various number of compressors.



Simultaneous operation of load limiting and EMS-PWM Temperature Reset (described on following pages) cannot occur.

COMPRESSOR RUN STATUS

Compressor run status is indicated by closure of contacts at CTB2 – terminals 25 to 26 for system 1 and CTB2 – terminals 27 to 28 for system 2.

ALARM STATUS

System or unit shutdown is indicated by normally-open alarm contacts opening whenever the unit shuts down on a unit fault, or locks out on a system fault. System 1 alarm contacts are located at CTB2 – terminals 29 to 30. System 2 alarm contacts are located at CTB2 – terminals 31 to 32. The alarm contacts will close when conditions allow the unit to operate.

TABLE 32 – COMPRESSOR OPERATION – LOAD LIMITING

COMPRESSORS IN UNIT	STAGE 1	STAGE 2
2	50%	–
3	66%	33%
4	50%	–
5	80%	40%
6	66%	33%

EMS-PWM REMOTE TEMPERATURE RESET

EMS-PWM Remote Temperature Reset is a value that resets the chilled liquid setpoint based on a PWM input (timed contact closure) to the I/O Board. This PWM input would typically be supplied by an Energy Management System.

A contact closure on the PWM Temp Reset input at CTB1 terminals 13 and 20, will reset the chilled liquid setpoint based on the length of time the contacts remain closed. The maximum temperature reset is achieved at a contact closure of 11 seconds. This is the longest contact closure time allowed. One second is the shortest time allowed and causes the chilled liquid setpoint to revert back to the local programmed value. The reset value is always added to the chilled liquid setpoint, meaning that this function never lowers the chilled liquid setpoint below the locally programmed value, it can only reset to a higher value. The I/O Board must be refreshed between 30 seconds and 30 minutes. Any contact closure occurring sooner than 30 seconds will be ignored. If more than 30 minutes elapse before the next contact closure, the setpoint will revert back to the locally programmed value. The new chilled liquid setpoint is calculated by the following equations:

setpoint = local chilled liquid setpoint + °reset

$$\text{°reset} = (\text{Contact Closure} - 1) \times \frac{(\text{*Max. Reset Value})}{10}$$

Example:
Local chilled liquid setpoint = 45°F (7.22°C).
*Max Reset Value = 10°F (5.56°C)
Contact Closure Time = 6 Seconds.

(English)
(6 sec. - 1) (10°F/10) = 5°F Reset

So, the new chilled liquid setpoint = 45°F + 5°F= 50°F. This can be viewed by pressing the COOLING SETPOINTS key twice. The new value will be displayed as "REM SETP = 50.0°F."

(Metric)
(6 sec - 1) * (5.56°C/10) = 2.78°C
Reset Cooling Setpoint = 7.22°C + 2.78°C = 10.0°C

So, the new reset Cooling Setpoint = 7.22 °C + 2.78°C = 10°C. This can be viewed by pressing the COOLING SETPOINTS key twice. The new value will be displayed as "REM SETP = 10.0°C."

BAS/EMS TEMPERATURE RESET OPTION

The Remote Reset option allows the control center of the unit to reset the chilled liquid setpoint using a 0 to10VDC input, a 4 to 20mA input, or a contact closure input. The Remote Reset circuit board converts the signals mentioned above into pulse width modulated (PWM) signals which the microprocessor can understand. Whenever a reset is called for, the change may be noted by pressing the COOLING SETPOINTS key twice. The new value will be displayed as "REM SETP = XXX°F."

The optional Remote Reset option would be used when reset of the chilled liquid setpoint is required and a PWM signal (timed contact closure) cannot be supplied by an Energy Management System. The Remote Temp. Reset Board will convert a voltage, current, or contact signal that is available from an EMS to a PWM signal, and every 80 seconds provide a PWM input to the I/O Board. Figure 12 shows a diagram of the field and factory electrical connections.

If a 0 - 10VDC signal is available, it is applied to terminals A+ and A-, and jumpers are applied to JU4 and JU2 on the reset board. This DC signal is conditioned to a 1 to 11 second PWM output and supplied to the PWM input on the I/O Board at CTB1 terminals 13 and 20. To calculate the reset chilled liquid setpoint for values between 0VDC and 10VDC use the following formula:

setpoint = local chilled liquid setpoint + °reset

$$\text{°reset} = \frac{(\text{DC voltage signal}) \times (\text{*Max Reset Value})}{10}$$

Example:
Local chilled liquid setpoint = 45°F (7.22°C)
*Max Reset Value = 20°F (11.11°C)
Input Signal = 6VDC

(English)

$$\text{°reset} = \frac{6\text{VDC} \times 20\text{°F}}{10} = 12\text{°F reset}$$

setpoint = 45°F + 12°F = 57°F

(Metric)

$$\text{°reset} = \frac{6\text{VDC} \times 11.11\text{°C}}{10} = 6.67\text{°C reset}$$

setpoint = 7.22°C + 6.67°C = 13.89°C

* Max Reset Value is the "Max EMS-PWM Remote Temp. Reset" setpoint value described in the "Setpoints Keys" segment of Section 2 in this IOM. Programmable values are from 2°F to 40°F (1.11°C to 22.2°C).

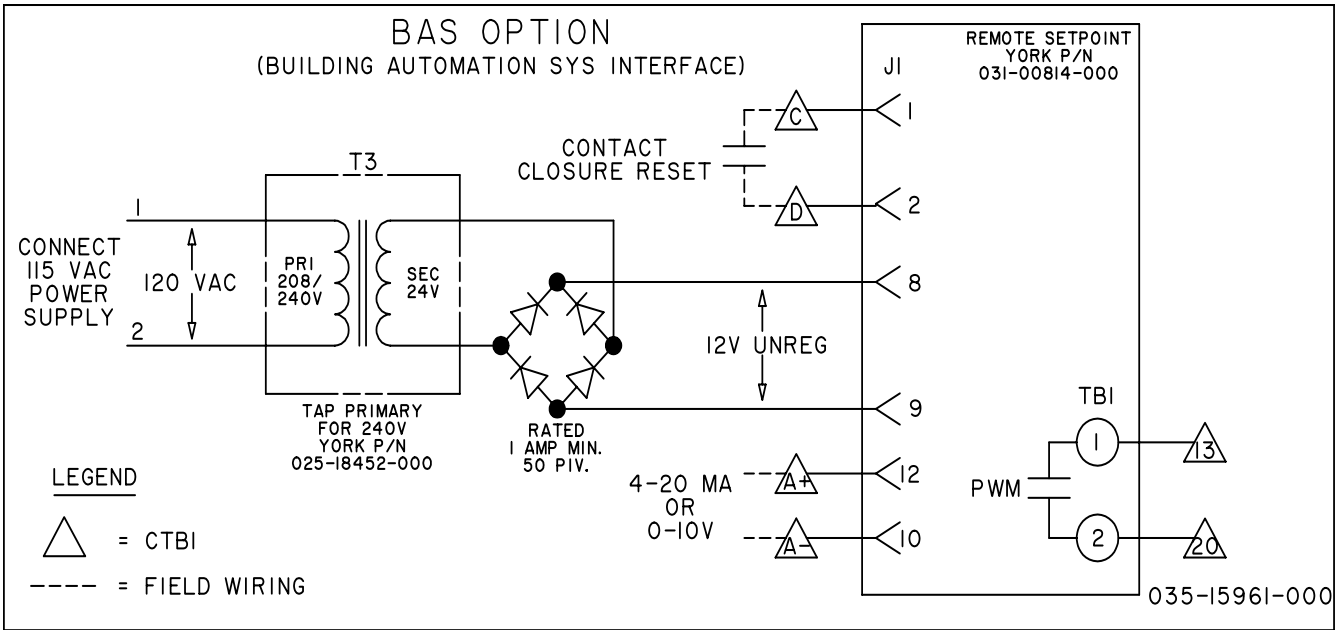


FIG. 12 – FIELD AND FACTORY ELECTRICAL CONNECTIONS OPTIONAL REMOTE TEMPERATURE RESET BOARD

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If a 4-20mA signal is available, it is applied to terminals A+ and A- and jumpers are applied to JU5 and JU3 on the reset board. The mA signal is conditioned to a 1 to 11 second PWM output. The PWM output is then supplied to the PWM input on the I/O Board at CTB1 terminals 13 and 20. To calculate the chilled liquid setpoint for values between 4mA and 20 mA use the following formula:

setpoint = local chilled liquid setpoint + °reset

$$\text{°reset} = \frac{(\text{mA signal} - 4) \times (\text{*Max Reset Value})}{16}$$

Example:
Local chilled liquid setpoint = 45° (7.22°C)
*Max Reset Value = 10°F (5.56°C)
Input Signal = 12 mA

(English)

$$\text{°reset} = \frac{8\text{mA} \times 10\text{°F}}{16} = 5\text{°F reset}$$

setpoint = 45°F + 5°F = 50°F

(Metric)

$$\text{°reset} = \frac{8\text{mA} \times 5.56\text{°C}}{16} = 2.78\text{°C reset}$$

setpoint = 7.22°C + 2.78°C = 10.0°C

NOTE

A 240-24 Volt Ratio Transformer (T3) is used to derive nominal 12 volt output from the 120 volt supply.

If the contact closure input is used. The connections are made to terminals C and D and only **jumper JUI must be in place** on the reset board. This input is used when a single reset value is needed. When the contacts are closed, the remote temperature reset board will convert this contact closure to a PWM signal that is applied to CTB1 terminals 13 and 20.

To set the PWM output, the contacts must be closed on inputs C and D, and potentiometer R11 (located on the front edge of the PC board) is adjusted to 10VDC as measured at TP3 to terminal 10 on the circuit board. The reset value will be the "Max EMS-PWM Remote Temp. Reset" setpoint value programmed in the Setpoints section under the COOLING SETPOINTS key.

NOTE

The coil of any added relay used for reset must be suppressed to prevent possible component damage. Use YORK PN031-00808-000 suppressor.

* Max Reset Value is the "Max EMS-PWM Remote Temp. Reset" setpoint value described in the "Setpoints Keys" segment of Section 2 in this IOM. Programmable values are from 2°F to 40°F (1.11°C to 22.2°C).

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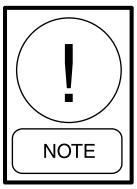
SECTION 4 - SERVICE AND TROUBLESHOOTING

CLEARING HISTORY BUFFERS

The history buffers may be cleared by pressing the HISTORY key and then repeatedly pressing the UP arrow key until you scroll past the last history buffer choice. The following message will be displayed:

```
INITIALIZE HISTORY
ENTER = YES
```

Pressing the ENTER/ADV key at this display will cause the history buffers to be cleared. Pressing any other key will cancel the operation.



DO NOT CLEAR BUFFERS. Important information may be lost. Contact factory service.

SOFTWARE VERSION

The software version may be viewed by pressing the HISTORY key and then repeatedly pressing the DOWN arrow key until you scroll past the first history buffer choice. The following message is an example of what will be displayed:

```
SOFTWARE VERSION
C.MMC.01.01
```

SERVICE MODE

Service Mode is a mode that allows the user to enable or disable all of the outputs (except compressors) on the unit, change chiller configuration setup parameters and view all the inputs to the I/O Board.

To enter Service Mode, turn the Unit Switch off and press the following keys in the sequence shown; PROGRAM, UP ARROW, UP ARROW, DOWN ARROW, DOWN ARROW, ENTER. Service Mode will time out after 30 minutes and return to normal control mode, if the panel is accidentally left in this mode. Otherwise, turning the Unit Switch ON will take the panel out of Service Mode.

Service Mode – Outputs

After pressing the key sequence as described, the control will enter Service Mode permitting the outputs (except compressors), operating hours, refrigerant type, expansion valve type, and start/hour counters to be viewed/modified. The ENTER/ADV key is used to advance through the outputs. Using the UP/DOWN arrow keys will turn the respective digital output ON/OFF or modify the value.

Following is the order of outputs that will appear as the ENTER/ADV key is pressed:

SYS 1 COMP 1 STATUS TB7-2 IS:
SYS 1 LLSV STATUS TB7-3 IS:
SYS 1 COMP 2 STATUS TB7-4 IS:
SYS 1 COMP 3 STATUS TB7-5 IS:
SYS 1 HGBP STATUS TB7-7 IS:
SYS 2 COMP 4 STATUS TB10-2 IS:
SYS 2 LLSV STATUS TB10-3 IS:
SYS 2 COMP 5 STATUS TB10-4 IS:
SYS 2 COMP 6 STATUS TB10-5 IS:
SYS 1 FAN OUTPUT 1 TB7-8 IS:
SYS 1 FAN OUTPUT 2 TB7-9 IS:
SYS 1 FAN OUTPUT 3 TB7-10 IS:
SYS 2 FAN OUTPUT 1 TB10-8 IS:
SYS 2 FAN OUTPUT 2 TB10-9 IS:
SYS 2 FAN OUTPUT 3 TB10-10 IS:
EVAP HEATER STATUS TB8-2 IS:
SYS 1 ALARM STATUS TB8-3 IS:
SYS 2 ALARM STATUS TB9-2 IS:
EVAP PUMP STATUS TB8-6 & TB8-7 IS:
SYS 1 EEV OUTPUT TB5-1 & 2 = :
SYS 2 EEV OUTPUT TB6-1 & 2 = :

Each display will also show the output connection on the I/O Board for the respective output status shown. For example:

```
SYS 1 LLSV STATUS
TB10-3 IS OFF
```

This display indicates that the system 1 liquid line solenoid valve is OFF, and the output connection from the I/O Board is coming from terminal block 10 - pin 3.

Pressing the UP arrow key will energize the liquid line solenoid valve and OFF will change to ON in the display as the LLSV is energized.

Service Mode – Chiller Configuration

After the outputs are displayed, the next group of displays relate to chiller configuration and start/hour counters. Data logging, soft start, refrigerant type, and expansion valve type all must be programmed to match actual chiller configuration.

Soft start, Refrigerant Type, and Expansion Valve Type MUST be properly programmed or damage to compressors and other system components may result.

Following is a list, in order of appearance:

DATA LOGGING MODE = : DO NOT MODIFY
DATA LOGGING TIMER = : DO NOT MODIFY
SOFT START
REFRIGERANT TYPE
EXPANSION VALVE TYPE
SYS 1 HOURS
SYS 2 HOURS
SYS 1 STARTS
SYS 2 STARTS

The last displays shown on the above list is for the accumulated run and start timers for each system. All values can also be changed using the ↑ (UP) and ↓ (DOWN) arrow keys, but under normal circumstances would not be advised. After the last start display, the microprocessor will display the first programmable value under the PROGRAM key.

Service Mode – Inputs

After entering Service Mode (program UP arrow, UP arrow ↑↑ then DOWN arrow, DOWN arrow ↓↓), all digital and analog inputs to the I/O Board can be viewed by pressing the OPER DATA key. After pressing the OPER DATA key, the UP arrow and DOWN arrow keys are used to scroll through the analog and digital inputs.

Following is the order of analog and digital inputs that will appear when sequenced with the DOWN arrow key:

ANALOG INPUTS

- SYS 1 *SUCT PRESSURE
- UNIT TYPE
- SYS 1 **DISCH PRESSURE
- SYS 1*** COOLER INLET REFRIG. TEMP.
- SYS 2*** COOLER INLET REFRIG. TEMP.
- SYS 1**** SUCTION TEMP.
- SYS 2**** SUCTION TEMP.
- AMBIENT AIR TEMP.
- LEAVING LIQUID TEMP.
- RETURN LIQUID TEMP.
- SYS 2 *SUCTION PRESSURE
- SYS 2 SPARE
- SYS 2 **DISCH PRESSURE
- SYS 1 MTR VOLTS
- SYS 2 MTR VOLTS

DIGITAL INPUTS

- PWM TEMP RESET INPUT
- LOAD LIMIT INPUT
- FLOW SW / REM START
- SPARE
- SINGLE SYSTEM SELECT
- SYS 1 MP / HPCO INPUT
- SYS 2 MP / HPCO INPUT

* The suction pressure transducer is optional on YCAL0014 through YCAL0060. A low pressure switch is standard on these models in place of the suction transducer.

** The discharge pressure transducer is optional on some models.

*** The cooler inlet refrigerant temp. sensor is on R-407C units only.

****The suction temp. sensor is on EEV units only.

The analog inputs will display the input connection, the temperature or pressure, and corresponding input voltage such as:

```
SYS 1 SUCT PR J7-10
 2.1 VDC = 81 PSIG
```

This example indicates that the system 1 suction pressure input is connected to plug 7 - pin 10 (J7-10) on the I/O Board. It indicates that the voltage is 2.1VDC which corresponds to 81 psig (5.6 bars) suction pressure.

The digital inputs will display the input connection and ON/OFF status such as:

```
FLOW SW/REM START
   J13-5 IS ON
```

This indicates that the flow switch/remote start input is connected to plug 13 - pin 5 (J13-5) on the I/O Board, and is ON (ON = +30VDC unregulated input, OFF = 0VDC input on digital inputs).

CONTROL INPUTS/OUTPUTS

Tables 33 through 36 are a quick reference list providing the connection points and a description of the inputs and outputs respectively. All input and output connections pertain to the connections at the I/O Board.

Figure 13 illustrates the physical connections on the I/O Board.

TABLE 33 – I/O BOARD DIGITAL INPUTS

J13-1	30VDC UNREGULATED SUPPLY
J13-2	UNIT ON/OFF SWITCH
J13-3	PWM TEMP RESET OR LOAD LIMIT STAGE 2 ON 3, 5 & 6 COMP UNITS
J13-4	LOAD LIMIT STAGE 1
J13-5	FLOW SWITCH AND REMOTE START / STOP
J13-6	SPARE
J13-7	SINGLE SYSTEM SELECT (JUMPER = SINGLE SYS, NO JUMPER=TWO SYS)
J13-8	CR1 (SYS 1 MOTOR PROTECTOR / HIGH PRESS CUTOUT)
J13-9	CR2 (SYS 2 MOTOR PROTECTOR / HIGH PRESS CUTOUT)

TABLE 34 – I/O BOARD ANALOG INPUTS

J7-10	SYS 1 SUCTION PRESS TRANSDUCER **OR** SYS 1 LOW PRESS SWITCH
J11-7 to J11-12	UNIT TYPE:CHILLER = NO JUMPER J4-6 TO J4-11 YCAL CONDENSING UNIT = JUMPER J4-6 TO J4-11
J7-11	SYS 1 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
J11-11	SPARE
J8-8	SYS 1 COOLER INLET REFRIGERANT TEMP SENSOR (R-407C)
J10-8	SYS 2 COOLER INLET REFRIGERANT TEMP. SENSOR (R-407C)
J8-8	SYS 1 SUCTION TEMP SENSOR (EEV OPTION)
J10-8	SYS 2 SUCTION TEMP SENSOR (EEV OPTION)
J6-9	AMBIENT AIR TEMPERATURE SENSOR
J6-7	LEAVING CHILLED LIQUID TEMPERATURE SENSOR
J6-8	RETURN CHILLED LIQUID TEMPERATURE SENSOR
J9-10	SYS 2 SUCTION PRESSURE TRANSDUCER **OR** SYS 2 LOW PRESSURE SWITCH
J9-11	SYS 2 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
J7-12	SYS 1 MOTOR VOLTS
J9-12	SYS 2 MOTOR VOLTS

TABLE 35 – I/O BOARD DIGITAL OUTPUTS

TB7-2	SYS 1 COMPRESSOR 1
TB7-3	SYS 1 LIQUID LINE SOLENOID VALVE OR EEV PILOT SOLENOID
TB7-4	SYS 1 COMPRESSOR 2
TB7-5	SYS 1 COMPRESSOR 3
TB7-7	SYS 1 HOT GAS BYPASS VALVE
TB10-2	SYS 2 COMPRESSOR 1
TB10-3	SYS 2 LIQUID LINE SOLENOID VALVE OR EEV PILOT SOLENOID
TB10-4	SYS 2 COMPRESSOR 2
TB10-5	SYS 2 COMPRESSOR 3
TB7-8	SYS 1 CONDENSER FAN OUTPUT 1
TB7-9	SYS 1 CONDENSER FAN OUTPUT 2
TB7-10	SYS 1 CONDENSER FAN OUTPUT 3
TB10-8	SYS 2 CONDENSER FAN OUTPUT 1
TB10-9	SYS 2 CONDENSER FAN OUTPUT 2
TB10-10	SYS 2 CONDENSER FAN OUTPUT 3
TB8-2	EVAPORATOR HEATER
TB8-3	SYS 1 ALARM
TB9-2	SYS 2 ALARM
TB8-6 & TB8-7	EVAPORATOR PUMP STARTER
TB10-7	SYS 2 HOT GAS BYPASS VALVE

TABLE 36 – I/O BOARD ANALOG OUTPUTS

TB5-1 & 2	SYS 1 EEV OUTPUT
TB6-1&2	SYS 2 EEV OUTPUT
J15-3 & 7	SPARE
J15-4 & 8	SPARE

* The 30VDC unregulated supply is <u>not</u> an input. This voltage originates on the I/O Board and is used to supply the contacts for the digital inputs.

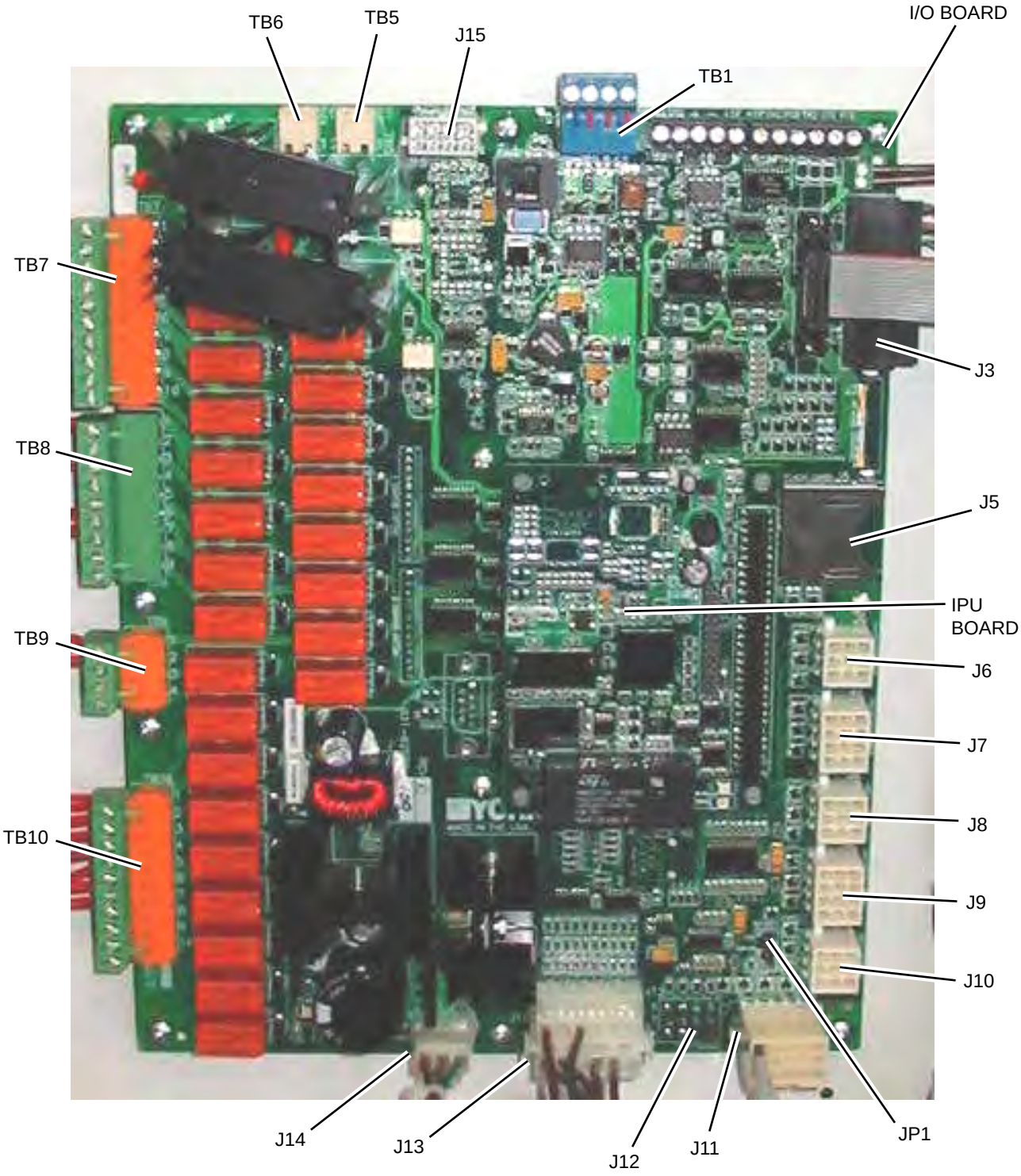


FIG. 13 – I/O BOARD LAYOUT

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Checking Inputs and Outputs

Digital Inputs

Refer to the unit wiring diagram. All digital inputs are connected to J13 of the I/O Board. The term "digital" refers to two states – either ON or OFF. As an example, when the flow switch is closed, 30 volts ***DC*** will be applied to J13, pin 5 (J13) of the I/O Board. If the flow switch is open, 0VDC will then be present at J13-5.

Pin 1 of J13 is an unregulated 30VDC that is the DC voltage source used to supply the DC voltage to the various contacts, unit switch, flow switch, etc. This DC source is factory wired to CTB1, terminal 13. Any switch or contact used as a digital input would be connected to this terminal, with the other end connecting to its respective digital input on the I/O Board. Any time a switch or contact is closed, 30VDC would be applied to that particular digital input. Any time a switch or contact is open, 0VDC would be applied to that particular digital input.

Typically, as high as 34VDC could be measured for the DC voltage on the digital inputs. This voltage is in reference to ground. The unit case should be sufficient as a reference point when measuring digital input voltages.

Analog Inputs – Temperature

Refer to the unit wiring diagram. Temperature inputs are connected to the I/O Board on plug J6. These analog inputs represent varying DC signals corresponding to varying temperatures. All voltages are in reference to the unit case (ground). Following are the connections for the temperature sensing inputs:

Outside Air Sensor

J6-6 = +5VDC regulated supply to sensor.

J6-6 = VDC input signal to the I/O Board. *(See Table 37 for voltage readings that correspond to specific outdoor temperatures.)*

J6-3 = drain (shield connection = 0VDC).

TABLE 37 – OUTDOOR AIR SENSOR TEMPERATURE/VOLTAGE/ RESISTANCE CORRELATION

TEMP °F	VOLTAGE	RESISTANCE	TEMP C°
0	0.7	85398	-18
5	0.8	72950	-15
10	0.9	62495	-12
15	1.0	53685	-9
20	1.1	46240	-7
25	1.2	39929	-4
30	1.4	34565	-1
35	1.5	29998	2
40	1.7	26099	4
45	1.8	22673	7
50	2.0	19900	10
55	2.2	17453	13
60	2.3	15309	16
65	2.5	13472	18
70	2.6	11881	21
75	2.8	10501	24
80	2.9	9298	27
85	3.1	8250	29
90	3.2	7332	32
95	3.4	6530	35
100	3.5	5827	38
105	3.6	5209	41
110	3.7	4665	43
115	3.8	4184	46
120	3.9	3759	49
125	4.0	3382	52
130	4.1	3048	54

TABLE 38 – ENTERING/LEAVING CHILLED LIQUID TEMP. SENSOR, COOLER INLET TEMPERATURE SENSOR, AND SUCTION TEMPERATURE SENSOR: TEMPERATURE/VOLTAGE/ RESISTANCE CORRELATION

TEMP °F	VOLTAGE	RESIS-TANCE	TEMP °C
0	1.71	25619	-18
2	1.78	24046	-17
4	1.85	22580	-16
6	1.93	21214	-14
8	2.00	19939	-13
10	2.07	18749	-12
12	2.15	17637	-11
14	2.22	16599	-10
16	2.30	15629	-9
18	2.37	14721	-8
20	2.45	13872	-7
22	2.52	13077	-6
24	2.59	12333	-4
26	2.67	11636	-3
28	2.74	10982	-2
30	2.81	10370	-1
32	2.88	9795	0
34	2.95	9256	1
36	3.02	8750	2
38	3.08	8276	3
40	3.15	7830	4
42	3.21	7411	6
44	3.27	7017	7
46	3.33	6647	8
48	3.39	6298	9
50	3.45	5970	10
52	3.51	5661	11
54	3.56	5370	12
56	3.61	5096	13
58	3.67	4837	14
60	3.72	4593	16
62	3.76	4363	17
64	3.81	4145	18
66	3.86	3941	19
68	3.90	3747	20
70	3.94	3564	21
72	3.98	3392	22
74	4.02	3228	23
76	4.06	3074	24
78	4.10	2928	26
80	4.13	2790	27

Entering Chilled Liquid Sensor

J6-5 = +5VDC regulated supply to sensor.

J6-8 = VDC input signal to the I/O Board. (*See Table 38 for voltage readings that correspond to specific liquid temperatures.)*

J6-2 = drain (shield connection = 0VDC)

Leaving Chilled Liquid Temp. Sensor

J6-4 = +5VDC regulated supply to sensor.

J6-7 = VDC input signal to the I/O Board. *(See Table 38 for voltage readings that correspond to specific liquid temperatures.)*

J6-1 = drain (shield connection = 0VDC)

Suction Temp Sensor

J8-5 = +5VDC regulated to sensor

J8-8 = VDC input signal to I/O Board from Sys 1 Suction Temp Sensor (EEV only)

J8-1 = Drain (shield connection = 0VDC)

J10-5 = +5VDC regulated to sensor

J10-8 = Suction Temp Sensor (EEV only)

J10-2 = Drain (shield connection = 0VDC)

Analog Inputs – Pressure

Refer to the unit wiring diagram. Pressure inputs are connected to the I/O Board on plugs J7 and J9. These analog inputs represent varying dc signals corresponding to varying pressures. All voltages are in reference to the unit case (ground).

System 1 discharge and suction pressures will be connected to J7 of the I/O Board. System 2 discharge and suction pressure transducers will be connected to J9 of the I/O Board.

The discharge transducers are optional on all units except the YCAL0090 through YCAL0134. If the discharge transducers are not installed, no connections are made to the I/O Board and the discharge pressure readout on the display would be zero.

The suction pressure transducers are optional on YCAL0014 through YCAL0060. If the suction transducers are not installed, a mechanical low pressure switch will be installed in its place, and the suction pressure readout on the display will be 0 psig when the low pressure switch is open, and 200 psig (13.79 barg) when the low pressure switch is closed.

The discharge transducers have a range from 0 to 400 psig. The output will be linear from .5VDC to 4.5VDC over the 400 psig (27.5 barg) range. Following is the formula that can be used to verify the voltage output of the transducer. All voltage reading are in reference to ground (unit case).

V = (Pressure in psig x .01) + .5
or
V = (Pressure in barg x .145) + .5

where V = dc voltage output
Pressure = pressure sensed by transducer

The I/O Board connections for the Discharge Transducers:

System 1 Discharge Transducer

J7-6 = +5VDC regulated supply to transducer.

J7-11 = VDC input signal to the I/O Board. *See the formula above for voltage readings that correspond to specific discharge pressures.*

J7-7 = +5VDC return

J7-2 = drain (shield connection = 0VDC)

System 2 Discharge Transducer

J9-6 = +5VDC regulated supply to transducer.

J9-11 = VDC input signal to the I/O Board. *See the formula above for voltage readings that correspond to specific discharge pressures.*

J9-7 = +5VDC return

J9-2 = drain (shield connection = 0VDC)

The suction transducers have a range from 0 to 200 psig (13.79 barg). The output will be linear from .5VDC to 4.5VDC over the 200 psig (13.79 barg) range. Following is a formula that can be used to verify the voltage output of the transducer. All voltage reading are in reference to ground (unit case).

V = (Pressure in psig x .02) + .5
or
V = (Pressure in barg x .29) + .5

Where V = dc voltage input to microprocessor
Pressure = pressure sensed by transducer

Following are the I/O Board connections for the Suction Transducer:

System 1 Suction Transducer

J7-5 = +5VDC regulated supply to transducer.

J7-10 = VDC input signal to the I/O Board. (*See the formula above for voltage readings that correspond to specific suction pressures.)*

J7-9 = +5VDC return

J7-1 = drain (shield connection = 0VDC)

System 2 Suction Transducer

J9-5 = +5VDC regulated supply to transducer.

J9-10 = VDC input signal to the I/O Board. *(See the formula above for voltage readings that correspond to specific suction pressures.)*

J9-9 = +5VDC return

J9-1 = drain (shield connection = 0VDC)

If the optional Suction Transducer is not used on the YCAL0014 through YCAL0060, a Low Pressure switch will be used. Following are the I/O Board connections for the Low Pressure switch.

System 1 Low Pressure Switch

J7-5 = +5VDC regulated supply to low pressure switch.

J7-10 = input signal to the I/O Board. 0VDC = open switch / +5VDC = closed switch.

J7-1 = drain (shield connection = 0VDC)

System 2 Low Pressure Switch

J9-5 = +5VDC regulated supply to low pressure switch.

J9-10 = input signal to the I/O Board. 0VDC = open switch / +5VDC = closed switch.

J9-1 = drain (shield connection = 0VDC)

Digital Outputs

Refer to the unit wiring diagram and Fig. 14. The digital outputs are located on TB7, TB8, TB9 and TB10 of the I/O Board. All outputs are 120VAC with the exception of TB8-6 to TB8-7 which are the contacts that can be used for a remote evaporator pump start signal. The voltage applied to either of these terminals would be determined by field wiring.

Each output is controlled by the microprocessor by switching 120VAC to the respective output connection energizing contactors, evaporator heater, and solenoids according to the operating sequence.

120VAC is supplied to the I/O Board via connections at TB7-1, TB7-6, TB10-1, TB10-6, TB8-1 and TB9-1. Figure 14 illustrates the relay contact architecture on the I/O Board.

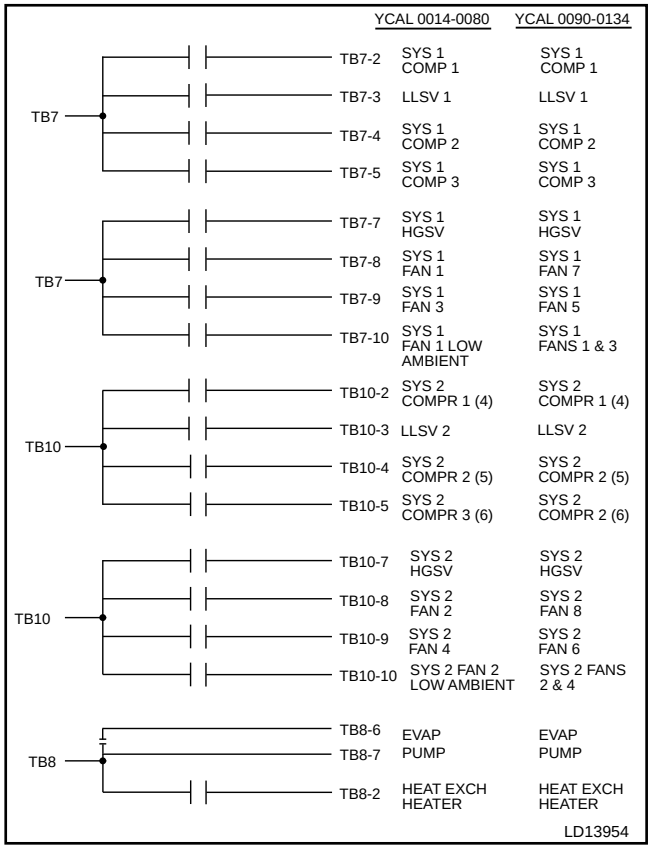


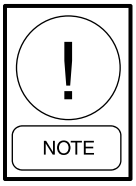
FIG. 14 – I/O BOARD RELAY CONTACT ARCHITECTURE

KEYPAD

The operator keypad is connected to the I/O Board by a ribbon cable, which is connected to J2 on the I/O Board.

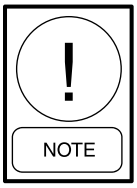
The integrity of a specific "button" on the keypad can be verified by doing a continuity check across two specific points (or pins), that represent one of twelve "buttons" on the keypad.

Table 39 lists the key/pin assignments for the keypad.



Power to the I/O Board must be turned off, and the ribbon cable disconnected from the I/O Board prior to conducting the tests, or component damage may result.

After the ribbon cable is disconnected from I/O Board, ohmmeter leads are connected to the pins representing the specific "button" to be tested. After connecting the meter leads, the "button" being checked is pressed and a reading of zero ohms should be observed. After releasing the "button," the resistance value should be infinite (open circuit).



Pin 1 is usually identified by a stripe on the ribbon cable.

TABLE 39 – KEYPAD PIN ASSIGNMENT MATRIX

KEYPAD	PIN CONNECTIONS
STATUS	1 TO 5
OPER DATA	1 TO 7
PRINT	1 TO 6
HISTORY	1 TO 8
UP ARROW	2 TO 5
DOWN ARROW	2 TO 7
ENTER/ADV	2 TO 6
COOLING SETPOINTS	2 TO 8
SCHEDULE/ADVANCE DAY	3 TO 5
PROGRAM	3 TO 7
OPTIONS	3 TO 6
CLOCK	3 TO 8

The micro panel is capable of supplying a printout of chiller conditions or fault shutdown information at any given time. This allows operator and service personnel to obtain data and system status with the touch of the keypad. In addition to manual print selection, the micro panel will provide an automatic printout whenever a fault occurs. Detailed explanation of the print function is given under PRINT key located in the "Display/Print keys" segment of Section 2 in this IOM.

Johnson Controls recommends the field tested WEIGH-TRONIX model 1220 printer (or former IMP 24). This is a compact low cost printer that is ideal for service work and data logging.

The WEIGH-TRONIX printer can be obtained by contacting WEIGH-TRONIX for purchase information at:

WEIGH-TRONIX
2320 Airport Blvd.
Santa Rosa, CA 95402
Phone: 1-800-982-6622 or 1-707-527-5555
(International Orders Only)

The part number for the printer that is packaged specifically for Johnson Controls is P/N 950915576. The cable to connect the printer can either be locally assembled from the parts listed, or ordered directly from WEIGH-TRONIX under part number 287-040018.

Parts

The following parts are required:

1. WEIGH-TRONIX model 1220 printer.
2. 2.25" (5.7cm) wide desk top calculator paper.
3. 25 ft. (7.62m) maximum length of Twisted Pair Shielded Cable (minimum 3 conductor), #18 AWG stranded, 300V minimum insulation.
4. One 25 pin Cannon connector and shell.
   Connector: Cannon P/N DB-25P or equivalent.

   Shell: Cannon P/N DB-C2-J9.

Assembly and Wiring

All components should be assembled and wired as shown in Figure 15. Strip the outside insulation back several inches and individual wires about 3/8" (9.5 mm) to connect the cable at the I/O Board. Do not connect the shield at the printer-end of the cable.

Obtaining a Printout

A printout is obtained by pressing the PRINT key on the keypad and then pressing either the OPER DATA key or HISTORY key.

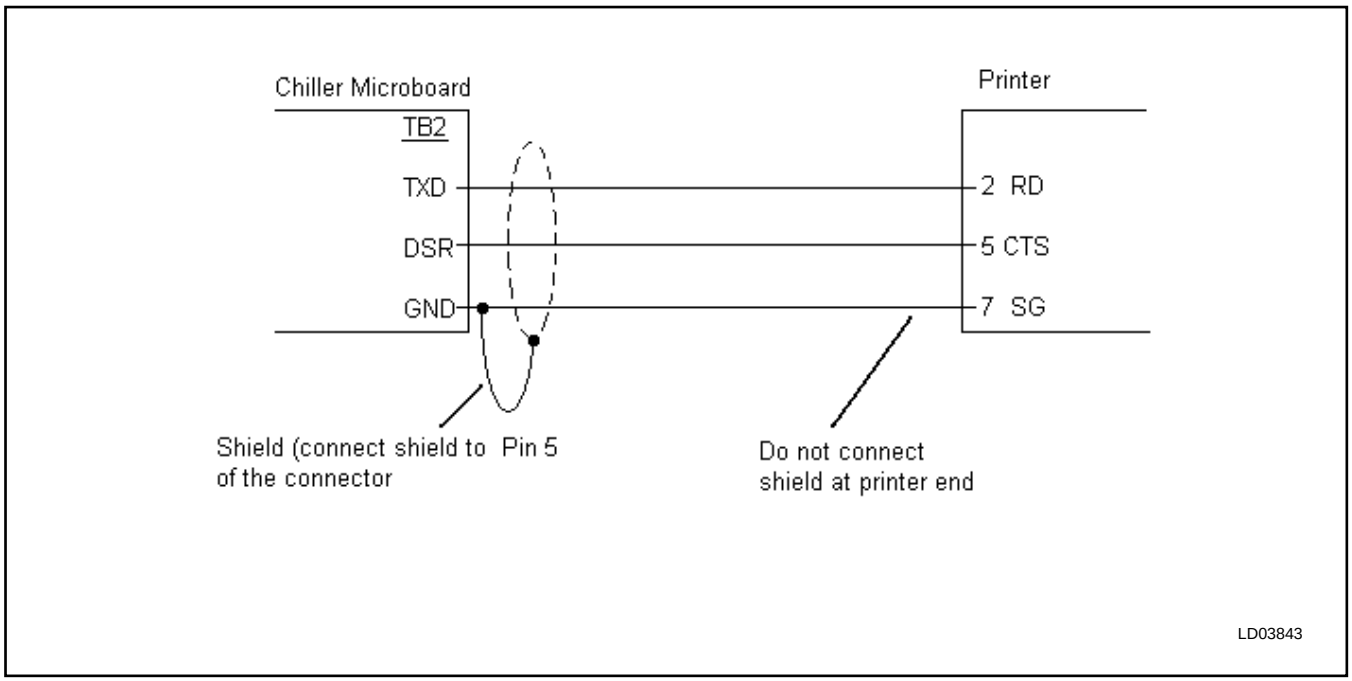


FIG. 15 – PRINTER TO I/O BOARD ELECTRICAL CONNECTIONS

TROUBLESHOOTING CHARTS

TABLE 40 – TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
NO DISPLAY ON PANEL UNIT WILL NOT OPERATE	1. No 115VAC to 1T.	1a. Check wiring and fuse 3FU 1b. Check wiring emergency stop contacts 5 to L of CTB2 terminal block. 1c. Replace 1T.
	2. No 24VAC to I/O Board.	2. Check wiring 1T to I/O Board.
	3. 1T defective, no 24VAC output.	3. Replace 1T.
	4. Short in wire to temp. sensors or pressure transducers.	4. Unplug connections at I/O Board to isolate.
	5. Defective I/O & IPU2 board or Display board	5. Replace I/O Board & IPU2 board. NOTE: Contact Johnson Controls Service before replacing circuit boards.
FLOW SWITCH/REM STOP NO RUN PERMISSIVE	1. No chilled liquid flow.	1. Check chilled liquid flow.
	2. Flow switch improperly installed.	2. Check that the flow switch is installed according to manufacturer's instructions.
	3. Defective flow switch.	3. Replace flow switch.
	4. Remote cycling device open.	4. Check cycling devices connected to terminals 13 and 14 of the CTB1 terminal block.
LOW SUCTION PRESSURE FAULT	1. Improper Suction Pressure Cutouts adjustments.	1. Adjust per recommended settings.
	2. Low refrigerant charge.	2. Repair leak if necessary and add refrigerant.
	3. Fouled filter dryer.	3. Change dryer/core.
	4. TXV / EEV defective.	4. Replace TXV/EEV.
	5. Reduced flow of chilled liquid through the cooler.	5. Check GPM *(See Operational Limitations in Installation section).* Check operation of pump, clean pump strainer, purge chilled liquid system of air.
	6. Defective suction pressure transducer/ low pressure switch or wiring.	6. Replace transducer/low pressure switch or faulty wiring. *Refer to Service section for pressure/ voltage formula.*
	7. LLSV defective	7. Replace LLSV
	8. EEV Unit Setup in TXV mode.	8. Place in Service Mode & program for EEV.

TROUBLESHOOTING (CONT'D)

PROBLEM	CAUSE	SOLUTION
HIGH DISCHARGE PRESSURE FAULT	1. Condenser fans not operating or operating backwards.	1. Check fan motor, fuses and contactors. Assure fan blows air upward.
	2. Too much refrigerant.	2. Remove refrigerant.
	3. Air in refrigerant system.	3. Evacuate and recharge system.
	4. Defective discharge pressure transducer.	4. Replace discharge pressure transducer. *Refer to Service section for pressure/voltage formula.*
LOW LIQUID TEMP FAULT	1. Improperly adjusted leaving chilled liquid temp. cutout (glycol only).	1. Re-program the leaving chilled liquid temp. cutout.
	2. Micro panel setpoint/range values improperly programmed.	2. Re-adjust setpoint/range.
	3. Chilled liquid flow too low.	3. Increase chilled liquid flow – *refer to Operational Limitations in Installation section.*
	4. Defective LWT or RWT sensor. (assure the sensor is properly installed in the bottom of the well with a generous amount of heat conductive compound).	4. Compare sensor against a known good temperature sensing device. *Refer to Service section for temp./ voltage table.*
MP / HPCO FAULT	1. Compressor internal motor protector (MP) open.	1. Verify refrigerant charge is not low. Verify superheat setting of 10° - 15°F (5.6° - 8.3°C). Verify correct compressor rotation. Verify compressor is not over loaded.
	2. External overload tripped.	2. Determine cause and reset.
	3. HPCO switch open.	3. *See High Press. Disch. fault.*
	4. Defective HPCO switch.	4. Replace HPCO switch.
	5. Defective CR relay	5. Replace relay.
COMPRESSOR(S) WON'T START	1. Demand not great enough.	1. No problem. Consult INstallation Manual to aid in understanding compressor operation and capacity control.
	2. Defective water temperature sensor.	2. Compare the display with a thermometer. Should be within +/- 2 degrees. *Refer to Service section for RWT/LWT temp./ voltage table.*
	3. Contactor/Overload failure.	3. Replace defective part.
	4. Compressor failure.	4. Diagnose cause of failure and replace.

TROUBLESHOOTING (CONT'D)

PROBLEM	CAUSE	SOLUTION
LACK OF COOLING EFFECT	1. Fouled evaporator surface Low suction pressure will be observed.	1. Contact the local Johnson Controls Service representative.
	2. Improper flow through the evaporator.	2. Reduce flow to within chiller design specs. *See Operational Limitations in Installation section.*
	3. Low refrigerant charge. Low suction pressure will be observed.	3. Check subcooling and add charge as needed.

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SECTION 5 - MAINTENANCE

It is the responsibility of the equipment owner to provide maintenance on the system.

IMPORTANT

If system failure occurs due to improper maintenance during the warranty period, Johnson Controls will not be liable for costs incurred to return the system to satisfactory operation. The following is intended only as a guide and covers only the chiller unit components. It does not cover other related system components which may or may not be furnished by Johnson Controls. System components should be maintained according to the individual manufacture's recommendations as their operation will affect the operation of the chiller.

COMPRESSORS

Oil Level check

The oil level can only be tested when the compressor is running in stabilized conditions, to ensure that there is no liquid refrigerant in the lower shell of the compressor. When the compressor is running at stabilized conditions, the oil level must be between 1/4 and 3/4 in the oil sight glass. Note: at shutdown, the oil level can fall to the bottom limit of the oil sight glass. Use YORK "F" oil when adding oil.

Oil Analysis

The oil used in these compressors is pale yellow in color (mineral oil). If the oil color darkens or exhibits a change in color, this may be an indication of contaminants in the refrigerant system. If this occurs, an oil sample should be taken and analyzed. If contaminants are present, the system must be cleaned to prevent compressor failure.

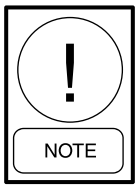
Never use the scroll compressor to pump the refrigerant system down into a vacuum. Doing so will cause internal arcing of the compressor motor which will result in failure of compressor.

CONDENSER FAN MOTORS

Condenser fan motors are permanently lubricated and require no maintenance.

CONDENSER COILS

Dirt should not be allowed to accumulate on the condenser coil surfaces. Cleaning should be as often as necessary to keep coil clean.



Exercise care when cleaning the coil so that the coil fins are not damaged.

OPERATING PARAMETERS

Regular checks of the system should be preformed to ensure that operating temperatures and pressures are within limitations, and that the operating controls are set within proper limits. *Refer to the Operation, Startup, and Installation sections of this manual.*

ON-BOARD BATTERY BACK-UP

U5 (031-02565-000) on the IPU2 Board is the Real Time Clock chip that maintains the date/time and stores customer programmed setpoints.

The unit evaporator heater is 120VAC. Disconnecting 120VAC power from the unit, at or below freezing temperatures, can result in damage to the evaporator and unit as a result of the chilled liquid freezing.

OVERALL UNIT INSPECTION

In addition to the checks listed on this page, periodic overall inspections of the unit should be accomplished to ensure proper equipment operation. Items such as loose hardware, component operation, refrigerant leaks, unusual noises, etc. should be investigated and corrected immediately.

BACNET, MODBUS AND YORKTALK 2 COMMUNICATIONS

Data can be read and in some cases modified using a serial communication BACnet, Modbus or YorkTalk 2 network connection. This information allows communications of chiller operating parameters and external control changes to setpoint, load limiting, and start/stop commands.

BACnet and YorkTalk 2 RS485 networks are wired to the + and - terminals of TB1 for port 1 communications. Modbus network connection has the option of RS232 or RS485 connection for port 2 communications. Modbus network is wired to either TB2 or TB3 as follows:

- RS-485: connect to TB2 - Network (-1) to TB2 (-1); Network (+1) to TB2 (+1)
- RS-232: connect to TB3 - Network (RX) to TB3 (TXD); Network (TX) to TB3 (RXD); Network (GND) to TB3 (GND)

Refer to Micro Panel Connections on page 143 for TB1, TB2 and TB3 locations.

In most cases, communication parameters will need to be modified. Table 42 "Values Required for BAS Communication" lists setup parameters for the available protocols. Modification is accomplished by pressing the PROGRAM, DOWN ARROW, DOWN ARROW, DOWN ARROW, DOWN ARROW, and ENTER keys in sequence. The list below shows the displays for the values that may be modified:

DE MODIFIER ADDRESS XXXXX	P2 PROTOCOL XXXXXXXXXX
DE MODIFIER OFFSET XX	P2 MANUAL MAC ADDRESS XXX
P1 PROTOCOL XXXXXX	P2 BAUD RATE XXXXX
P1 MANUAL MAC ADDRESS XXX	P2 PARITY XXXXX
P1 BAUD RATE XXXXX	P2 STOP BITS X
P1 PARITY XXXXX	P2 HW SELECT BIT XXXXX
P1 STOP BITS X	REAL TIME ERROR ## RESET 1 = YES, 0 = NO 0

Note: See Table 43 for error descriptions

MICRO PANEL CONNECTIONS

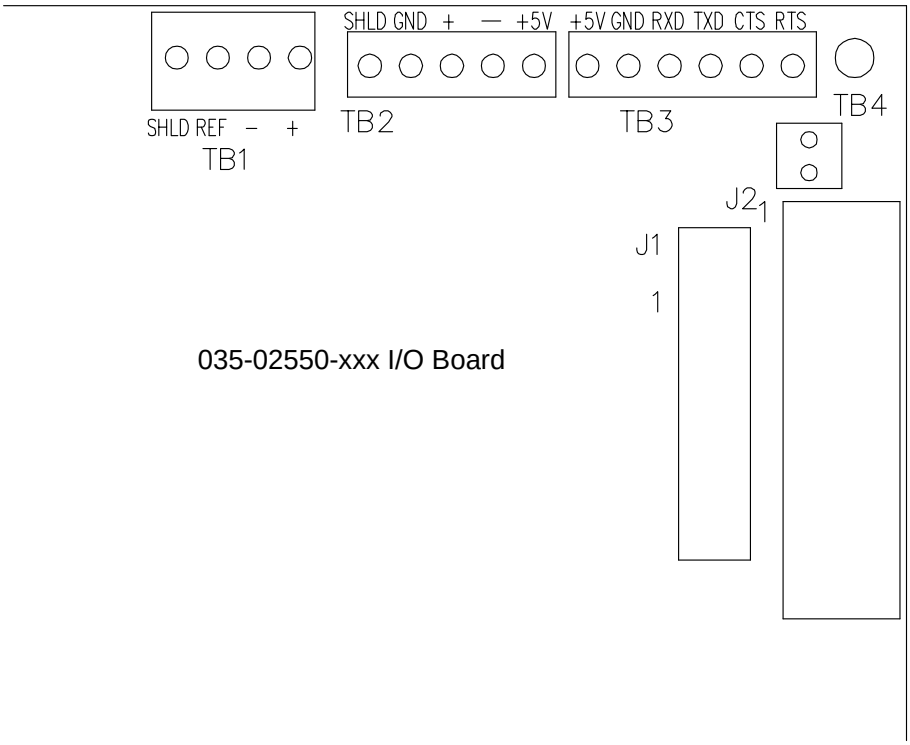


TABLE 41 – MINIMUM, MAXIMUM AND DEFAULT VALUES

DESCRIPTION	MINIMUM	MAXIMUM	DEFAULT
DE MODIFIER ADDRESS	-1	41943	-1
DE MODIFIER OFFSET	-1	99	-1
P1 BAUD RATE	1200	76800	4800
	1200, 4800, 9600, 19200, 38400, 76800, AUTO SELECTABLE		
P2 BAUD RATE	1200	57600	1200
	1200, 4800, 9600, 19200, 38400, 57600 SELECTABLE		
P1, P2 MANUAL Mac ADDRESS	-1	127	-1
P1, P2 PARITY	NONE	IGNORE	NONE
	NONE, EVEN, ODD, IGNORE SELECTABLE		
P1 PROTOCOL	BACNET	API	BACNET
	BACNET, API SELECTABLE		
P2 PROTOCOL	TERMINAL	MODBUS CLIENT	API
	TERMINAL, MODBUS IO, MODBUS SERVER, API, MODBUS CLIENT selectable		
P1, P2 STOP BITS	1	2	1
RESET REAL TIME ERROR	NO	YES	NO

5

TABLE 42 – VALUES REQUIRED FOR BAS COMMUNICATION

SETTING DESCRIPTION	Protocol		
	BACnet MS/TP	Modbus RTU[5]	YorkTalk 2
DE MODIFIER ADDRESS	0 to 41943(3)	1	-1
DE MODIFIER OFFSET	0 to 99(4)	0	N/A
P1 PROTOCOL	BACNET	N/A	N/A
P1 MANUAL MAC ADDRESS	0-127(1)	N/A	N/A
P1 BAUD RATE	9600 to 76800 or Auto Selectable(1)	N/A	N/A
P1 PARITY	NONE	N/A	N/A
P1 STOP BITS	1	N/A	N/A
P2 PROTOCOL	N/A	MODBUS SVR	N/A
P2 MANUAL MAC ADDRESS	N/A	0-127(1)	N/A
P2 BAUD RATE	N/A	19,200(2)	N/A
P2 PARITY	N/A	NONE(2)	N/A
P2 STOP BITS	N/A	1	N/A
P2 HW SELECT BIT	N/A	RS-485 or RS-232(1)	N/A
RESET REAL TIME ERROR	N/A	N/A	N/A
P1 HW SELECT BIT	N/A	N/A	N/A
CHILLER ID	N/A	N/A	0

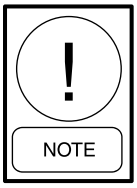
[1]as required by network

[2]or other as required by network

[3]number is multiplied by 100, set as required by network

[4]number is added to DE MODIFIER ADDRESS, set as required by network

[5]unit operating software version C.MMC.13.03 or later required for Modbus protocol



Reboot required (cycle power) after settings are changed.

The table below shows the real time error numbers that may be encountered during communication setup and a description of each.

TABLE 43 – REAL TIME ERROR NUMBERS

ERROR NUMBER (##)	DESCRIPTION
0	ALL OK
1	DATUM TYPE OK TEST FAILED
2	ENGLISH TEXT TOO LONG
3	FLOATING POINT EXCEPTION
4	GET PACKET FAILED
5	GET TYPE FAILED
6	INVALID UNIT CONVERSION
7	INVALID HARDWARE SELECTION
8	REAL TIME FAULT
9	SPANISH TEXT TOO LONG
10	THREAD EXITED
11	THREAD FAILED
12	THREAD STALLED
13	IO BOARD RESET
14	BRAM INVALID
15	BACNET SETUP FAILED

BACnet and Modbus Communications

Chiller data that can be read and modified using specific BACnet or Modbus Register Addresses; and the data associated with the addresses, is outlined in the following description:

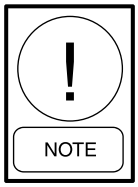
ANALOG WRITE POINTS
This data can be read and modified using a BACnet or Modbus network connection. The Modbus Register Address for these points is 1025 + AV #.

BINARY WRITE POINTS
This data can be read and modified using a BACnet or Modbus network connection. The Modbus Register Address for these points is 1537 + BV #.

ANALOG READ ONLY POINTS
This data can be read using a BACnet or Modbus network connection and can NOT be modified using this connection. The Modbus Register Address for these points is 513 + AI #.

BINARY MONITOR ONLY POINTS
This data can be read using a BACnet or Modbus network connection and can NOT be modified using this connection. The Modbus Register Address for these points is 1281 + BI #.

Refer to Table 44 for complete list of BACnet and Modbus registers.



The latest data map information is listed on the Johnson Controls Equipment Integration website.

Communications Data Map Notes

(See Table 44)

1. IPU II based units are configured for Native BACnet MS/TP and Modbus RTU communications. MicroGateway or E-Link not required for these two communication protocols.

2. BACnet Object Types: 0= Analog In, 1 = Analog Out, 2= Analog Value, 3= Binary In, 4 = Binary Output, 5= Binary Value, 8= Device, 15 = Alarm Notification (0 through 127 are reserved ASHRAE Objects).

3. WC= Inches of water column; CFM = Cubic Feet per Minute; FPM = Feet per Minute: PSI = Lbs per square inch; Pa = Pascals; kPa = Kilopascals; PPM = Part per Million; kJ/kg = Kilojoules per Kilogram.

4. Water Cooled Scroll units use the same firmware as Air Cooled Scroll units, ignoring fan control.

YCAL/YCUL/YCWL/YLAA IPU II **Native** **Modbus and BACnet MS/TP Data Maps** **Board: 031-02630-xxx w/ 031-02550**

ITEM	Version	Date	York PN	Check Sum	Comments
1	C.MMC.13.00	29-Nov-06	031-02755-001		Standard with Board: 031-02630-xxx w/ 031-02550
2	C.MMC.15.00	29-Nov-06	031-02755-002		Basildon with Board: 031-02630-xxx w/ 031-02550
3	C.MMC.14.00	29-Nov-06	031-02755-003		MMHP with Board: 031-02630-xxx w/ 031-02550
4	C.MMC.16.00	29-Nov-06	031-02755-004		Basildon MMHP with Board: 031-02630-xxx w/ 031-02550
5	C.MMC.13.02	17-Oct-08	031-02755-001		Standard Micro Board 031-02550-xxx . Fix native Modbus communications. Fix Café Metric functionality (SCR-766)
6	C.MMC.14.02	17-Oct-08	031-02755-003		MMHP with Board: 031-02630-xxx w/ 031-02550Fix native Modbus communications. Fix Café Metric functionality (SCR-766)
7	C.MMC.16.02	17-Oct-08	031-02755-004		Basildon MMHP with Board: 031-02630-xxx w/ 031-02550 Fix native Modbus communications. Fix Café Metric functionality (SCR-766)
8					
9					
10					

ITEM REF NUM	BACnet NAME	BACnet Object/Instance	MODBUS ADDRESS	MODBUS Data Type Supported	ENG UNITS	READ WRITE	POINT DESCRIPTION	Point List Code S=Standard; O = Optional; N = Not Available									
								1	2	3	4	5	6	7	8	9	10
1					SEE NOTE 5		**SEE NOTE 1**										
3	**ANALOG WRITE POINTS**																
4	REM_SETP	AV_1	1026	03,06,16	F°	R/W	Setpoint Cooling Setpoint(HP Only), 99 = Auto; (40°F - 70°F)										
5	SP_REM_SP_S1	AV_2	1027	03,06,16	PSIG	R/W	Sys 1 Setpoint (Suction Pressure Control units only)										
6	LOAD_LIMIT	AV_3	1028	03,06,16	index	R/W	Load Limit Stage (0, 1, 2)										
7	REM_CR	AV_4	1029	03,06,16	F°	R/W	Cooling Range (DAT Mode Only)										
8	SP_REM_SP_S2	AV_5	1030	03,06,16	PSIG	R/W	Sys 2 Setpoint (Suction Pressure Control)										
9	REM_SP_HEAT	AV_6	1031	03,06,16	F°	R/W	Heating Setpoint (HP Only), 999 = Auto (95°F - 122°F)										
10	HP_MODE	AV_7	1032	03,06,16	index	R/W	Mode (HP Only) (0=Panel, 1=Cooling, 2=Heating)										
11																	
12	**BINARY WRITE POINTS**																
13	START_STOP	BV_1	1538	01,03,05,15,06,	0, 1	R/W	Stop Start Command										
14	SS_SYS1	BV_2	1539	01,03,05,15,06,	0, 1	R/W	Sys 1 Start/Stop (Suction Pressure (SP) Control Only)										
15	SS_SYS2	BV_3	1540	01,03,05,15,06,	0, 1	R/W	Sys 2 Start/Stop (Suction Pressure (SP) Control Only)										
16	**ANALOG READ ONLY POINTS**																
17	LCHLT	AI_1	514	03,04	F°	R	Leaving Chilled Liquid Temp										
18	RCHLT	AI_2	515	03,04	F°	R	Return Chilled Liquid Temp										
19	DAT	AI_3	516	03,04	F°	R	Condensing Unit Models Only										
20	S1_SUCT_TEMP	AI_4	517	03,04	F°	R	Electronic Expansion Valve Models Only										
21	OAT	AI_5	518	03,04	F°	R	Ambient Air Temperature										
22	S1_SUCT_SHEAT	AI_6	519	03,04	F°	R	Sys 1 Suction Superheat (EEV Models Only)										
23	S1_RUN_TIME	AI_7	520	03,04	seconds	R	Sys 1 Run Time (seconds)										
24	S1_SUCT_PR	AI_8	521	03,04	PSIG	R	Sys 1 Suction Pressure										
25	S1_DSCH_PR	AI_9	522	03,04	PSIG	R	Sys 1 Discharge Pressure										
27	S1_CIR_TEMP	AI_10	523	03,04	F°	R	Sys 1 Cooler Inlet Refrigerant Temp (R-407c Models Only)										
28	S1_DEF_TEMP	AI_11	524	03,04	F°	R	Sys 1 Defrost Temperature (HP Only)										
29	S1_EEV_OUT	AI_12	525	03,04	F°	R	System 1 EEV Output % (EEV Models Only)										
30	S1_AR_TIMER	AI_13	526	03,04	seconds	R	Sys 1 Anti-Recycle Timer										
31	AC_TIMER	AI_14	527	03,04	seconds	R	Anti-Coincident Timer										
32	S2_SUCT_TEMP	AI_15	528	03,04	°F	R	System 2 Suction Temp (EEVModels Only)										
33	S2_RUN_TIME	AI_16	529	03,04	seconds	R	Sys 2 Run Time (seconds)										
34	S2_SUCT_PR	AI_17	530	03,04	PSIG	R	Sys 2 Suction Pressure										
35	S2_DSCH_PR	AI_18	531	03,04	PSIG	R	Sys 2 Discharge Pressure										
36	S2_CIR_TEMP	AI_19	532	03,04	F°	R	Sys 2 Cooler Inlet Refrigerant Temperature(R-407c Only)										
37	S2_DEF_TEMP	AI_20	533	03,04	F°	R	Sys 2 Defrost Temperature (HP Only)										
38	S2_SUCT_SH	AI_21	534	03,04	F°	R	Sys 2 Suction SuperHeat (EEV Models Only)										
39	S2_AR_TIMER	AI_22	535	03,04	F°	R	Sys 2 Anti-Recycle Timer										
40	S2_EEV_OUT	AI_23	536	03,04	seconds	R	Sys 2 Suction Superheat (EEV Models Only)										

TABLE 44 (cont'd) - BACNET AND MODBUS COMMUNICATIONS DATA MAP

ITEM REF NUM	BACnet NAME	BACnet Object/Instance	MODBUS ADDRESS	MODBUS Data Type Supported	ENG UNITS	READ WRITE	POINT DESCRIPTION	Point List Code S=Standard; O = Optional; N = Not Available									
								1	2	3	4	5	6	7	8	9	10
41	NUM_COMPS	AI_24	537	03,04	count	R	Number of Compressors										
42	S1_OP_CODE	AI_25	538	03,04	index	R	Sys 1 Operational Code *(See Table A & B)*										
43	S1_FLT_CODE	AI_26	539	03,04	index	R	Sys 1 Fault Code *(See Table A & B)*										
44	S2_OP_CODE	AI_27	540	03,04	index	R	Sys 2 Operational Code *(See Table A & B)*										
45	S2_FLT_CODE	AI_28	541	03,04	index	R	Sys 2 Fault Code *(See Table A & B)*										
46	S1_DBG_CODE	AI_29	542	03,04	index	R	Sys 1 Debug Code										
47	S1_FAN_STAGE	AI_30	543	03,04	count	R	Sys 1 Condenser Fan Stage										
48	S2_DBG_CODE	AI_31	544	03,04	index	R	Sys 2 Debug Code										
49	S2_FAN_STAGE	AI_32	545	03,04	count	R	Sys 2 Condenser Fan Stage										
50	CONTROL_MODE	AI_33	546	03,04	count	R	Unit Control Mode (0=Leaving Water, 1=Return Water, 2=Discharge Air, 3=Suction Press, 4=Cooling, 5=Heating)										
51	AR_TIME	AI_34	547	03,04	seconds	R	Anti-Recycle Time (Programmed)										
52	LCHLT_CUT	AI_35	548	03,04	F°	R	Leaving Chilled Liquid Temp Cutout										
53	LOW_AMB_CUT	AI_36	549	03,04	F°	R	Low Ambient Temperature Cutout										
54	SUCT_P_CO_HT	AI_37	550	03,04	PSIG	R	Low Suction Pressure Cutout Heating (HP Only)										
55	L_SUCT_P_CO	AI_38	551	03,04	PSIG	R	Low Suction Pressure Cutout (Cooling on HP units)										
56	H_DSCH_P_CO	AI_39	552	03,04	PSIG	R	High Discharge Pressure Cutout										
57	COOL_SETP	AI_40	553	03,04	F°	R	Setpoint										
58	SP_SETP_S1	AI_41	554	03,04	F°	R	Setpoint 1 (SP Control)										
59	CONTROL_RG	AI_42	555	03,04	F°	R	Cooling Range										
60	SP_CTL_RG_S1	AI_43	556	03,04	F°	R	Cooling Range 1 (SP Control)										
61	SP_SETP_S2	AI_44	557	03,04	F°	R	Setpoint 2 (SP Control)										
62	HEAT_SETP	AI_45	558	03,04	F°	R	Heating Setpoint (HP Only)										
63	SP_CTL_RG_S2	AI_46	559	03,04	F°	R	Cooling Range 2 (SP Control)										
64	HEAT_RANGE	AI_47	560	03,04	F°	R	Heating Range (HP Only)										
65	S1_DSCH_TEMP	AI_48	561	03,04	F°	R	Sys 1 Discharge Temperature (EEV Only)										
66	S1_DSCH_SHEAT	AI_49	562	03,04	F°	R	Sys 1 Discharge Superheat (EEV Only)										
67	S2_DSCH_TEMP	AI_50	563	03,04	F°	R	Sys 2 Discharge Temperature (EEV Only)										
68	S2_DSCH_SH	AI_51	564	03,04	F°	R	Sys 2 Discharge Superheat (EEV Only)										
69	LEAVING_HOT	AI_52	565	03,04	F°	R	Leaving Liquid Hot Temp (R-410a)										
70	RETURN_HOT	AI_53	566	03,04	F°	R	Return Liquid Hot Temp (R-410a)										
71																	
72																	
74	**BINARY MONITOR ONLY POINTS**																
75	S1_ALARM	BI_1	1282	01,02,03	0, 1	R	Sys 1 Alarm										
76	S2_ALARM	BI_2	1283	01,02,03	0, 1	R	Sys 2 Alarm										
77	EVAP_HTR	BI_3	1284	01,02,03	0, 1	R	Evaporator Heater Status										
78	EVAP_PUMP	BI_4	1285	01,02,03	0, 1	R	Evaporator Pump Status										
79	S1_C1_RUN	BI_5	1286	01,02,03	0, 1	R	Sys 1 Comp 1 Run										
80	S2_C1_RUN	BI_6	1287	01,02,03	0, 1	R	Sys 2 Comp 1 Run										
81	S1_LLSV	BI_7	1288	01,02,03	0, 1	R	Sys 1 Liquid Line Solenoid Valve										
82	S1_MODE_SV	BI_8	1289	01,02,03	0, 1	R	Sys 1 Mode Solenoid Valve (HP Only)										
83	S1_HGBV	BI_9	1290	01,02,03	0, 1	R	Sys 1 Hot Gas Bypass Valve										
84	S1_BHS	BI_10	1291	01,02,03	0, 1	R	Bivalent Heat Source (HP Only)										
85	S1_C2_RUN	BI_11	1292	01,02,03	0, 1	R	Sys 1 Comp 2 Run										
86	S2_C2_RUN	BI_12	1293	01,02,03	0, 1	R	Sys 2 Comp 2 Run										
87	S2_LLSV	BI_13	1294	01,02,03	0, 1	R	Sys 2 Liquid Line Solenoid Valve										
88	S2_MODE_SV	BI_14	1295	01,02,03	0, 1	R	Sys 2 Mode Solenoid Valve (HP Only)										
89	LEAD_SYS	BI_15	1296	01,02,03	0, 1	R	Lead System (0 = Sys 1, 1 = Sys 2)										
90	S1_C3_RUN	BI_16	1297	01,02,03	0, 1	R	Sys 1 Comp 3 Run										
91	S2_C3_RUN	BI_17	1298	01,02,03	0, 1	R	Sys 2 Comp 3 Run										
92	CH_LIQ_TYPE	BI_18	1299	01,02,03	0, 1	R	Chilled Liquid Type (0=Water, 1=Glycol)										
93	AMB_MODE	BI_19	1300	01,02,03	0, 1	R	Ambient Control Mode (0=Std Amb, 1=Low Amb)										

TABLE 44 (cont'd) - BACNET AND MODBUS COMMUNICATIONS DATA MAP

ITEM REF NUM	BACnet NAME	BACnet Object/Instance	MODBUS ADDRESS	MODBUS Data Type Supported	ENG UNITS	READ WRITE	POINT DESCRIPTION	Point List Code S=Standard; O = Optional; N = Not Available									
								1	2	3	4	5	6	7	8	9	10
94	CNTL_MODE	BI_20	1301	01,02,03	0, 1	R	Local/Remote Control Mode (0=Local, 1=Remote)										
95	DATA_UNIT	BI_21	1302	01,02,03	0, 1	R	Units (0=Imperial, 1=SI)										
96	AUTO_LL	BI_22	1303	01,02,03	0, 1	R	Lead/Lag Control Mode (0=Manual, 1=Auto)										

TABLE A

Code	Operational Codes
0	No Abnormal Condition
1	Unit Switch Off
2	System Switch Off
3	Lock-Out
4	Unit Fault
5	System Fault
6	Remote Shutdown
7	Daily Schedule Shutdown
8	No Run Permissive
9	No Cool Load
10	Anti-Coincidence Timer Active
11	Anti-Recycle Timer Active
12	Manual Override
13	Suction Limiting
14	Discharge Limiting
15	
16	Load Limiting
17	Compressor(s) Running
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

TABLE B

Code	Fault Codes
0	No Fault
1	VAC Under Voltage
2	Low Ambient Temperature
3	High Ambient Temperature
4	Low Leaving Chilled Liquid Temp
5	High Discharge Pressure
6	High Differential Oil Pressure
7	Low Suction Pressure
8	High Motor Current
9	LLSV Not On
10	Low Battery Warning
11	High Oil Temperature
12	High Discharge Temperature
13	Improper Phase Rotation
14	Low Motor Current / MP / HPCO
15	Motor Current Unbalanced
16	Low Differential Oil Pressure
17	Ground Fault
18	MP/HPCO Fault
19	Low Evaporator Temperature
20	Incorrect Refrigerant Programmed
21	Power Failure, Manual Reset Required
22	Unit Motor Current
23	Low Superheat
24	Sensor Fault
25	
26	MP/HPCO Inhibit
27	
28	
29	
30	

NOTES

1	The IPU II based YCAL /YCUL Units are configured for Native BACnet MS/TP and Modbus RTU communications. The Microgateway product is not required for these 2 interfaces
2	
3	BACnet Object Types: 0= Analog In, 1 = Analog Out, 2= Analog Value, 3= Binary In, 4 = Binary Output, 5= Binary Value, 8= Device, 15 = Alarm Notification (0 -127 are reserved ASHRAE Objects)
4	WC= Inches of water column; CFM = Cubic Feer per Minute; FPM = Feet per Minute: PSI = Lbs per square inch; Pa = Pascals; kPa = Kilopascals; PPM = Part Per Million; kJ/kg = Kilojoules per Kilogram
5	See the applicable Middle Market Chiller Operations Manual for more details
6	The YCWL uses the same firmware as a YCAL , it just ignores Fan Control
7	
8	
9	
10	

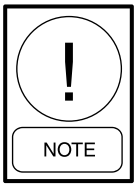
Yorktalk 2 Communications

Received Data (Control Data)

The unit receives eight data values from the MicroGateway or E-Link. The first four are analog values and the last four are digital values. These eight data values are used as control parameters when in Remote mode. When the unit is in LOCAL mode, these eight values are ignored. If the unit receives no valid YorkTalk 2 transmission for five minutes it will revert back to all local control values. Table 45 “Yorktalk 2 Communications Data Map” lists the control parameters. These values are found under feature 54 in the MicroGateway or E-Link.

Transmitted Data

After receiving a valid transmission from the MicroGateway or E-Link, the unit will transmit either operational data or history buffer data depending on the “History Buffer Request” on ENG PAGE 10. Data must be transmitted for every page under feature 54. If there is no value to be sent to a particular page, a zero will be sent. Table 45 “Yorktalk 2 Communications Data Map” shows the data values and page listings for this unit.



The latest point map information is listed on the Johnson Controls Equipment Integration website.

YCAL/YCWL/YLAA Middle Market w/ 2050, 2550 **York Talk 2** **MicroGateway / ELINK** **Micro Board: 031-02050/02550**

Item	Ref.	Version	Date	YORK P N	Checksum	Baud	COMMENTS
1		C.MMC.03.02		031-02049-001	944D	4800	YCAL Micro Board 031-02050-xxx
2		C.MMC.03.01		031-02049-001	964B	4800	YCAL Micro Board 031-02050-xxx
3		C.MMC.03.00		031-02049-001	2226	4800	YCAL Micro Board 031-02050-xxx
4		C.MMC.13.xx		flash	xxxx	4800	YCAL Micro Board 031-02550-xxx, IPU 2 board.
5		C.MMC.13.xx		flash	xxxx	4800	YCWL (water cooled version) Micro Board 031-02550-xxx, IPU 2 board.
6		C.MMC.13.02		flash	xxxx	4800	Micro Board 031-02550-xxx . Fix native Modbus communications (SCR . Fix Café Metric functionality (SCR-766)
7							
8							
9							
10							
	▽	Use ASCII page column for interfaces utilizing an ASCII XL Translator or MicroGateway to communicate to a chiller LINC					

ENG PAGE REF	ASCII PAGE REF	GPIC Object Type	York Talk Point Type	ISN LINC Descriptive Text	York Talk Character Position	N2 Address	POINT LIST CODE: S = STANDARD O = OPTIONAL N = NOT AVAILABLE POINT LIST DESCRIPTION	1	2	3	4	5	6	7	8	9	10	ENG PAGE REF
P03	P01		A. Control			ADF 1	Setpoint	S	S	S	S	S						P03
P04	P02		A. Control			ADF 2	Load Limit Stage (0, 1, 2)	S	S	S	S	S						P04
P05	P03		A. Control			ADF 3	Heating Setpoint (HP and YCWL HP)	O	O	O	O	O						P05
P06	P04		A. Control			ADF 4	Mode (HP and YCWL HP only) (0=Panel, 1= Cooling, 2 = Heating)	O	O	O	O	O						P06
P07	P05		D. Control			BD 1	Start/Stop Command	S	S	S	S	S						P07
P08	P06		D. Control			BD 2												P08
P09	P07		D. Control			BD 3												P09
P10	P08		D. Control			BD 4	History Buffer Request	S	S	S	S	S						P10
P11	P09		A. Monitor		8 - 11	ADF 5	Leaving Chilled Liquid Temp	S	S	S	S	S						P11
P12	P10		A. Monitor		12 - 15	ADF 6	Return Chilled Liquid Temp	S	S	S	S	S						P12
P13	P11		A. Monitor		16 - 19	ADF 7	Leaving Hot Liquid Temp (R-410a) Heat Mode Only	O	O	O	O	O						P13
P14	P12		A. Monitor		20 - 23	ADF 8	Discharge Air Temp (Cond Unit) Return Hot Liquid Temp (410a- Heat Mod	S	S	S	S	S						P14
P15	P13		A. Monitor		24 - 27	ADF 9	Leaving Liquid Temp Hot (R-410a)	O	O	O	O	O						P15
P16	P14		A. Monitor		28 - 31	ADF 10	Ambient Air Temperature	S	S	S	S	S						P16
P17	P15		A. Monitor		32 - 35	ADF 11	Sys 1 Suction Superheat (EEV only)	O	O	O	O	O						P17
P18	P16		A. Monitor		36 - 39	ADF 12	Sys 1 Run Time (seconds)	S	S	S	S	S						P18
P19	P17		A. Monitor		40 - 43	ADF 13	Sys 1 Suction Pressure	S	S	S	S	S						P19
P20	P18		A. Monitor		44 - 47	ADF 14	Sys 1 Discharge Pressure	S	S	S	S	S						P20
P21	P19		A. Monitor		48 - 51	ADF 15	Sys 1 Cooler Inlet Refrigerant Temperature(R-407c Only)	S	S	S	S	S						P21
P22	P20		A. Monitor		52 - 55	ADF 16												P22
P23	P21		A. Monitor		56 - 59	ADF 17	Sys 1 EEV Output % (EEV only)	O	O	O	O	O						P23
P24	P22		A. Monitor		60 - 63	ADF 18	Sys 1 Anti- Recycle Timer	S	S	S	S	S						P24
P25	P23		A. Monitor		64 - 67	ADF 19	Anti-Coincident Timer	S	S	S	S	S						P25
P26	P24		A. Monitor		68 - 71	ADF 20	Sys Suction Temp (EEV only)	O	O	O	O	O						P26
P27	P25		A. Monitor		72 - 75	ADF 21	Sys 2 Run Time (seconds)	S	S	S	S	S						P27
P28	P26		A. Monitor		76 - 79	ADF 22	Sys 2 Suction Pressure	S	S	S	S	S						P28
P29	P27		A. Monitor		80 - 83	ADF 23	Sys 2 Discharge Pressure	S	S	S	S	S						P29
P30	P28		A. Monitor		84 - 87	ADF 24	Sys 2 Cooler Inlet Refrigerant Temperature (R-407c systems Only)	S	S	S	S	S						P30
P31	P29		A. Monitor		88 - 91	ADF 25	Sys 2 Defrost Temperature (HP only)	O	O	O	O	O						P31
P32	P30		A. Monitor		92 - 95	ADF 26	Sys 2 Suction Superheat (EEV only)	O	O	O	O	O						P32
P33	P31		A. Monitor		96 - 99	ADF 27	Sys 2 Anti-Recycle Timer	S	S	S	S	S						P33
P34	P32		A. Monitor		100 - 103	ADF 28	Sys 2 EEV Output % (EEV only)	O	O	O	O	O						P34
P35	P33		A. Monitor		104 - 107	ADF 29	Number of Compressors	S	S	S	S	S						P35
P36	P34		D. Monitor		108	BD 5	Sys 1 Alarm	S	S	S	S	S						P36
P37	P35		D. Monitor		109	BD 6	Sys 2 Alarm	S	S	S	S	S						P37
P38	P36		D. Monitor		110	BD 7	Evaporator Heater Status	S	S	S	S	S						P38
P39	P37		D. Monitor		111	BD 8	Evaporator Pump Status	S	S	S	S	S						P39
P40	P38		D. Monitor		112	BD 9	Sys 1 Compressor 1 Run	S	S	S	S	S						P40
P41	P39		D. Monitor		113	BD 10	Sys 2 Compressor 1 Run	S	S	S	S	S						P41
P42	P40		D. Monitor		114	BD 11	Sys 1 Liquid Line Solenoid Valve	S	S	S	S	S						P42

TABLE 45 (cont'd) - YORKTALK 2 COMMUNICATIONS DATA MAP

ENG PAGE REF	ASCII PAGE REF	GPIC Object Type	York Talk Point Type	ISN LINC Descriptive Text	York Talk Character Position	N2 Address	POINT LIST CODE: S = STANDARD O = OPTIONAL N = NOT AVAILABLE POINT LIST DESCRIPTION	1	2	3	4	5	6	7	8	9	10	ENG PAGE REF
P43	P41		D. Monitor		115	BD 12	Sys 1 Hot Gas Bypass Valve	S	S	S	S	S						P43
P44	P42		D. Monitor		116	BD 13	Sys 1 Compressor 2 Run	S	S	S	S	S						P44
P45	P43		D. Monitor		117	BD 14	Sys 2 Compressor 2 Run	S	S	S	S	S						P45
P46	P44		D. Monitor		118	BD 15	Sys 2 Liquid Line Solenoid Valve	S	S	S	S	S						P46
P47	P45		D. Monitor		119	BD 16	Lead System (0 = Sys 1, 1 = Sys 2)	S	S	S	S	S						P47
P48	P46		D. Monitor		120	BD 17	Sys 1 Compressor 3 Run	S	S	S	S	S						P48
P49	P47		D. Monitor		121	BD 18	Sys 2 Compressor 3 Run	S	S	S	S	S						P49
P50	P48		D. Monitor		122	BD 19	Chilled Liquid Type (0=Water, 1=Glycol)	S	S	S	S	S						P50
P51	P49		D. Monitor		123	BD 20	Ambient Control Mode (0=Std Amb, 1=Low Amb)	S	S	S	S	N						P51
P52	P50		D. Monitor		124	BD 21	Local/Remote Control Mode (0=Local, 1=Remote)	S	S	S	S	S						P52
P53	P51		D. Monitor		125	BD 22	Units (0=Imperial, 1=SI)	S	S	S	S	S						P53
P54	P52		D. Monitor		126	BD 23	Lead/Lag Control Mode (0=Manual, 1=Auto)	S	S	S	S	S						P54
P55	P53		D. Monitor		127	BD 24	Sys 2 Hot Gas Bypass Valve	S	S	S	S	S						P55
P56	P54		Code Monitor		128	ADI 1	*Sys 1 Operational Code	S	S	S	S	S						P56
P57	P55		Code Monitor		129	ADI 2	*Sys 1 Fault Code	S	S	S	S	S						P57
P58	P56		Code Monitor		130	ADI 3	*Sys 2 Operational Code	S	S	S	S	S						P58
P59	P57		Code Monitor		131	ADI 4	*Sys 2 Fault Code	S	S	S	S	S						P59
P60	P58		Code Monitor		132	ADI 5		S	S	S	S	S						P60
P61	P59		Code Monitor		133	ADI 6	Sys 1 Condenser Fan Stage	S	S	S	S	S						P61
P62	P60		Code Monitor		134	ADI 7		S	S	S	S	S						P62
P63	P61		Code Monitor		135	ADI 8	Sys 2 Condenser Fan Stage	S	S	S	S	S						P63
P64	P62		Code Monitor		136	ADI 9												P64
P65	P63		Code Monitor		137	ADI 10	Unit Control Mode (0=Lv Wtr, 1=Ret Wtr, 2=Dis Air, 3=SP, 4=Cool, 5=Heat	S	S	S	S	S						P65
P66	P64		A. Monitor		138 - 141	ADF 30	Anti-Recycle Time (Programmed)	S	S	S	S	S						P66
P67	P65		A. Monitor		142 - 145	ADF 31	Leaving Chilled Liquid Temp Cutout	S	S	S	S	S						P67
P68	P66		A. Monitor		146 - 149	ADF 32	Low Ambient Temperature Cutout	S	S	S	S	S						P68
P69	P67		A. Monitor		150 - 153	ADF 33	Low Suction Pressure Cutout (Heating HP Only)	S	S	S	S	S						P69
P70	P68		A. Monitor		154 - 157	ADF 34	Low Suction Pressure Cutout (Cooling HP only)	S	S	S	S	S						P70
P71	P69		A. Monitor		158 - 161	ADF 35	High Discharge Pressure Cutout	S	S	S	S	S						P71
P72	P70		A. Monitor		162 - 165	ADF 36	Setpoint (local)	S	S	S	S	S						P72
P73	P71		A. Monitor		166 - 169	ADF 37	Cooling Range	S	S	S	S	S						P73
P74	P72		A. Monitor		170 - 173	ADF 38	Setpoint 2 (SP Control), Heating Setpoint (HP and YCWL HP only)	O	O	O	O	O						P74
P75	P73		A. Monitor		174 - 177	ADF 39	Cool Range Setpoint 2 (SP Control), Heat Range (HP and YCWL HP only)	O	O	O	O	O						P75
P76	P74		A. Monitor		178 - 181	ADF 40	Sys 1 Discharge Temp (EEV only)	O	O	O	O	O						P76
P77	P75		A. Monitor		182 - 185	ADF 41	Sys 1 Discharge Superheat (EEV only)	O	O	O	O	O						P77
P78	P76		A. Monitor		186 - 189	ADF 42	Sys 2 Discharge Temp (EEV only)	O	O	O	O	O						P78
P79	P77		A. Monitor		190 - 193	ADF 43	Sys 2 Discharge Superheat (EEV only)	O	O	O	O	O						P79
P80	P78		D. Monitor		194	BD 25												P80
P81	P79		D. Monitor		195	BD 26												P81
P82	P80		D. Monitor		196	BD 27												P82
P83	P81		D. Monitor		197	BD 28												P83
P84	P82		D. Monitor		198	BD 29												P84

NOTE: The Appropriate Product Code Listing Summary Should Accompany Document

TABLE 45 (cont'd) - YORKTALK 2 COMMUNICATIONS DATA MAP

ENG PAGE	ASCII PAGE	Operational Code	ENG PAGE	ASCII PAGE	Fault Code			
P56	P54	C_OPER.CODE	P57	P55	C_FAULT.CODE			
0	0	No Abnormal Condition	0	0	No Fault Code			
1	1	Unit Switch Off	1	1	n/a			
2	2	System Switch Off	2	2	Low Ambient Temperature			
3	3	Lock-Out	3	3	n/a			
4	4	Unit Fault	4	4	Low Leaving Chilled Liquid Temperature			
5	5	System Fault	5	5	High Discharge Pressure			
6	6	Remote Shutdown	6	6	n/a			
7	7	Daily Schedule Shutdown	7	7	Low Suction Pressure			
8	8	No Run Permissive	8	8	n/a			
9	9	No Cool Load	9	9	n/a			
10	10	Anti-Coincidence Timer Active	10	10	n/a			
11	11	Anti-Recycle Timer Active	11	11	n/a			
12	12	Manual Override	12	12	n/a			
13	13	Suction Limiting	13	13	n/a			
14	14	Discharge Limiting	14	14	n/a			
15	15	n/a	15	15	n/a			
16	16	Load Limiting	16	16	n/a			
17	17	Compressor(s) Running	17	17	n/a			
18	18	Heat Pump Load Limiting (HP Only)	18	18	MP / HPCO Fault			
			19	19	Low Evaporator Temperature			
			20	20	n/a			
			21	21	n/a			
			22	22	Unit Motor Current			
			23	23	Low Superheat			
			24	24	Sensor Fault			
			25	25	Discharge Inhibit			
			26	26	MP/HPCO Inhibit			
			27	27	Pump Trip			
			28	28	Pump Fail Make Flow			

SECTION 6 - WIRING DIAGRAMS

ELEMENTARY DIAGRAM
YCAL0014E_ – YCAL0030E_

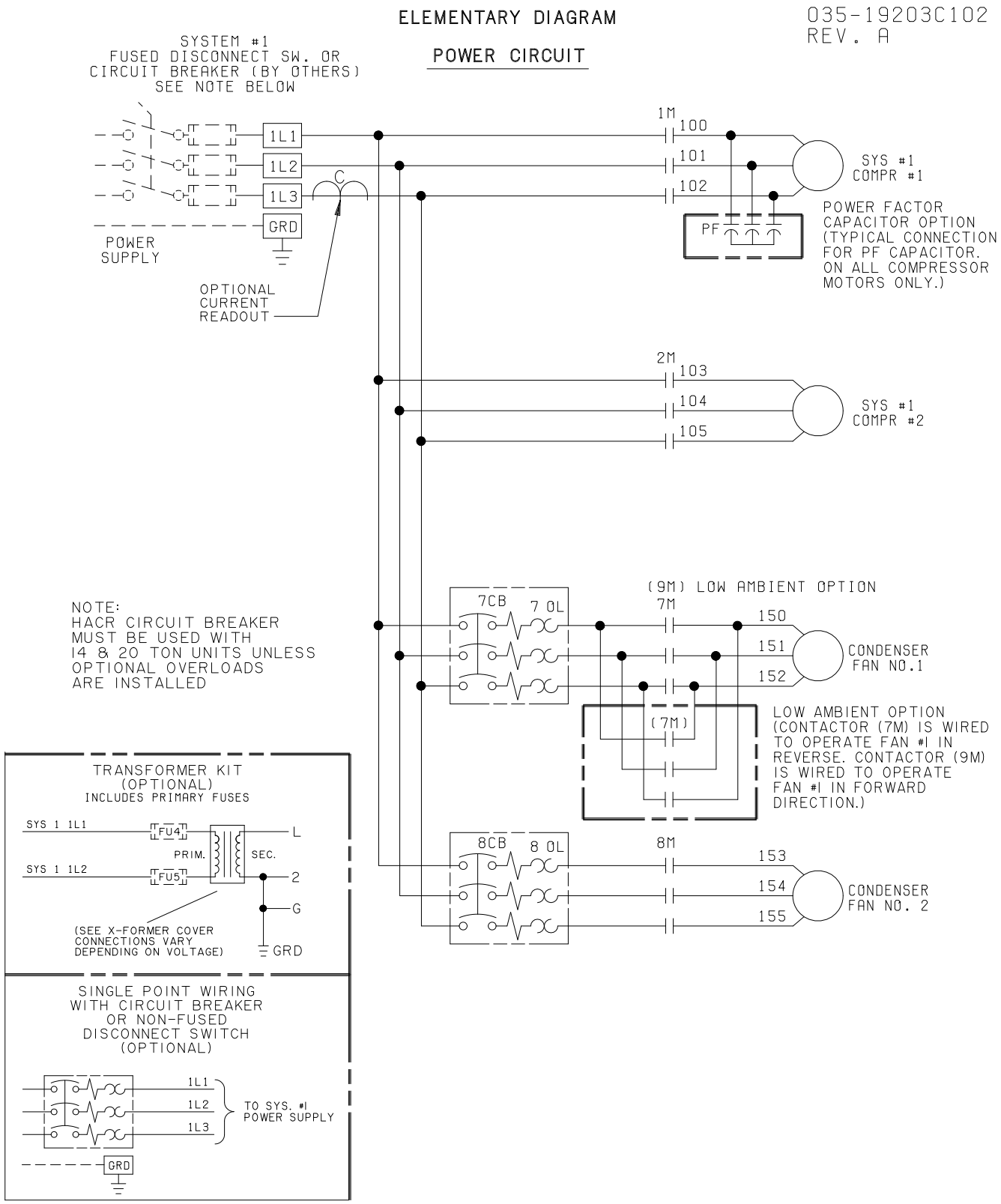


FIG. 16 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0014E_ - YCAL0030E_

6

ELEMENTARY DIAGRAMS
YCAL0014E_ – YCAL0030E_

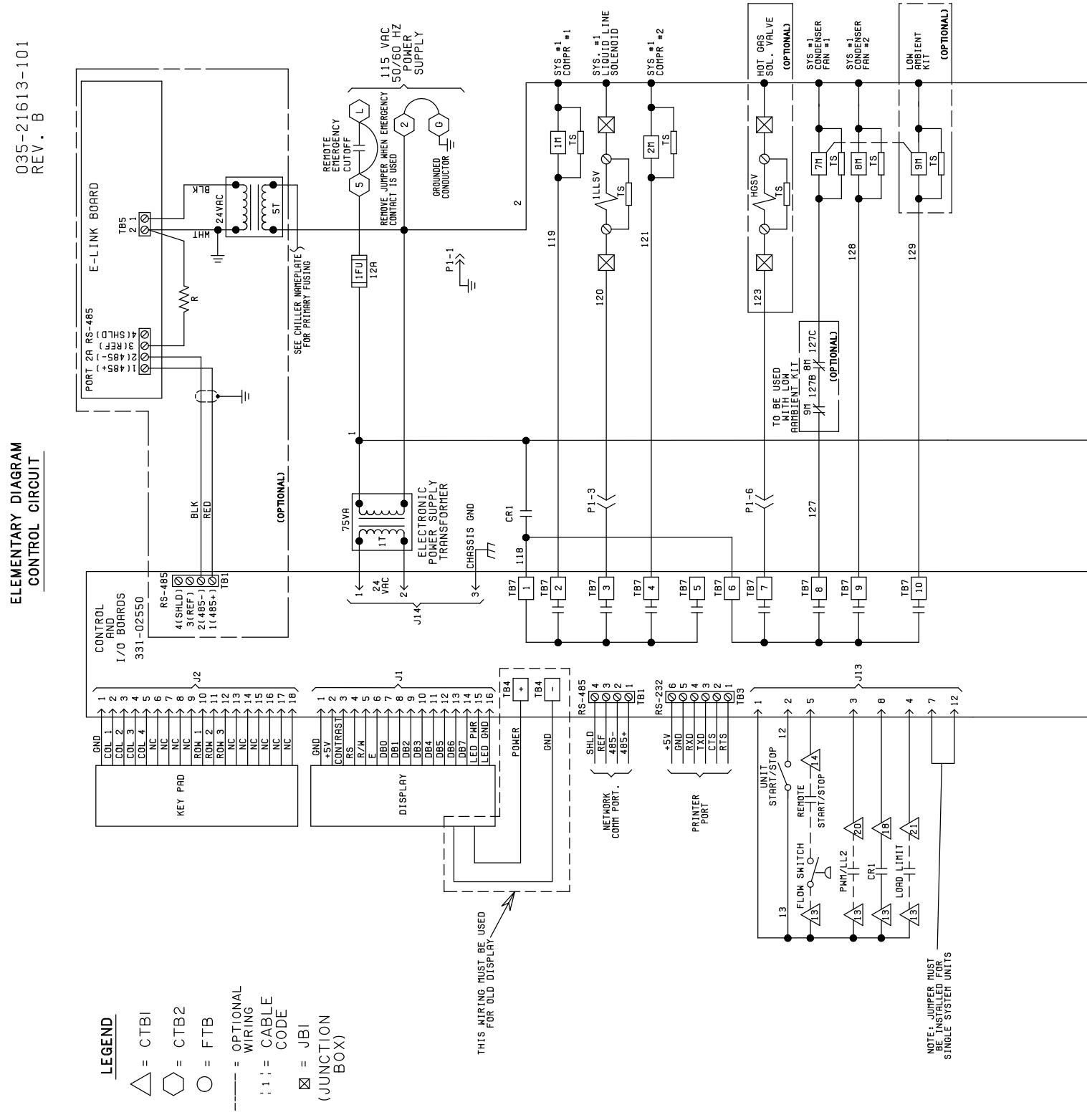
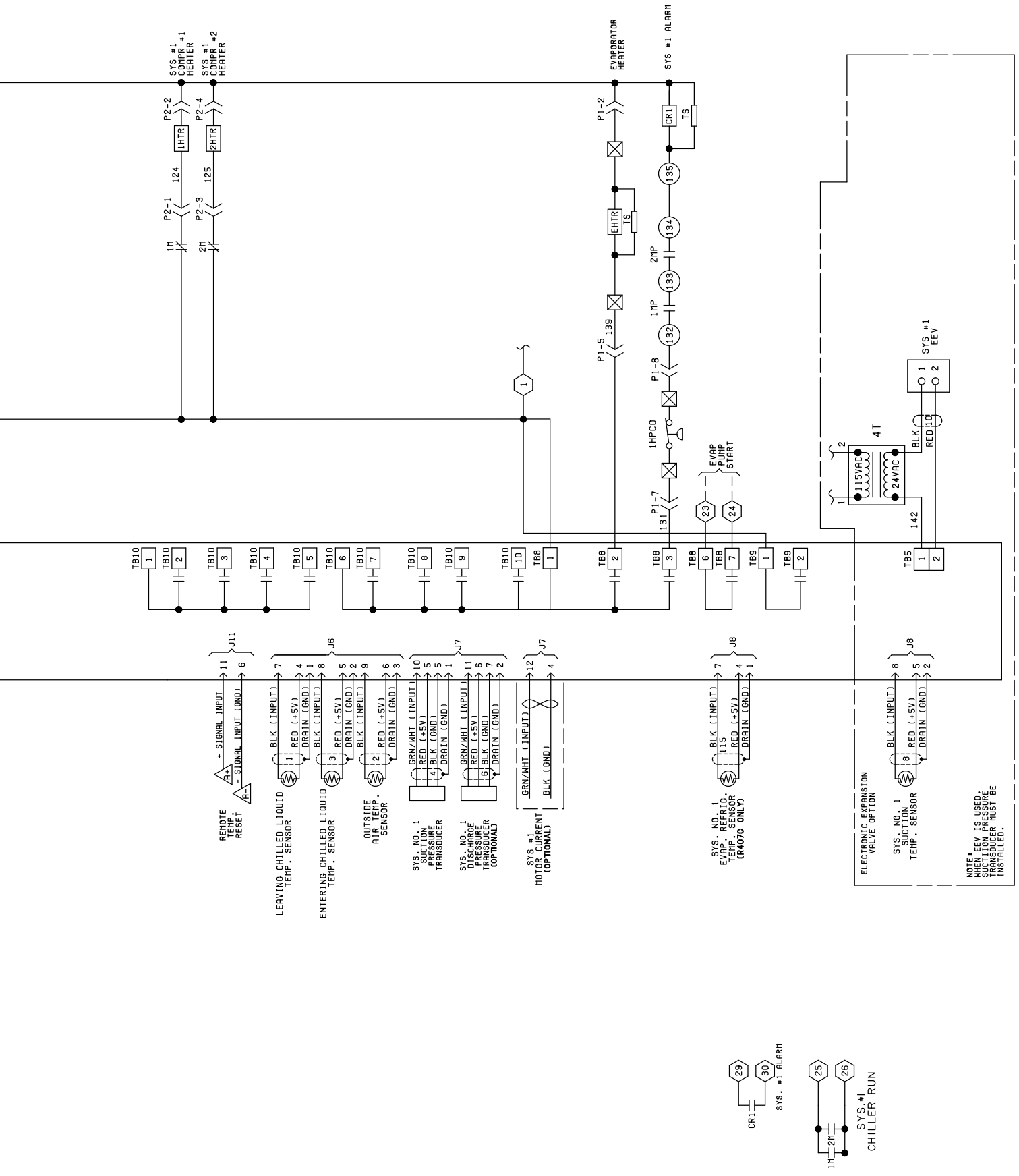


FIG. 17 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0014E_ - YCAL0030E_


SYS #1 COMPR #1 HEATER
SYS #1 COMPR #2 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
P2-2
P2-4
P2-1
P2-3
1HTR
2HTR
124
125
1M
2M
P1-2
P1-5
P1-8
P1-7
EHTR
TS
CR1
135
134
133
132
131
139
2MP
1MP
1HPCO
EVAP PUMP START
23
24
SYS #1 EEV
4T
115VAC
24VAC
BLK
RED
142
TB10
TB8
TB9
TB5
J11
J6
J7
J8
+ SIGNAL INPUT
- SIGNAL INPUT (GND)
REMOTE TEMP. RESET
BLK (INPUT)
RED (+5V)
DRAIN (GND)
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
GRN/WHT (INPUT)
BLK (GND)
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS #1 MOTOR CURRENT (OPTIONAL)
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
ELECTRONIC EXPANSION VALVE OPTION
SYS. NO. 1 SUCTION TEMP. SENSOR
NOTE; WHEN EEV IS USED, SUCTION PRESSURE TRANSDUCER MUST BE INSTALLED.
29
30
CR1
SYS. #1 ALARM
25
26
1M
2M
SYS.#1 CHILLER RUN

CONNECTION DIAGRAM
YCAL0014E_ AND YCAL0030E_

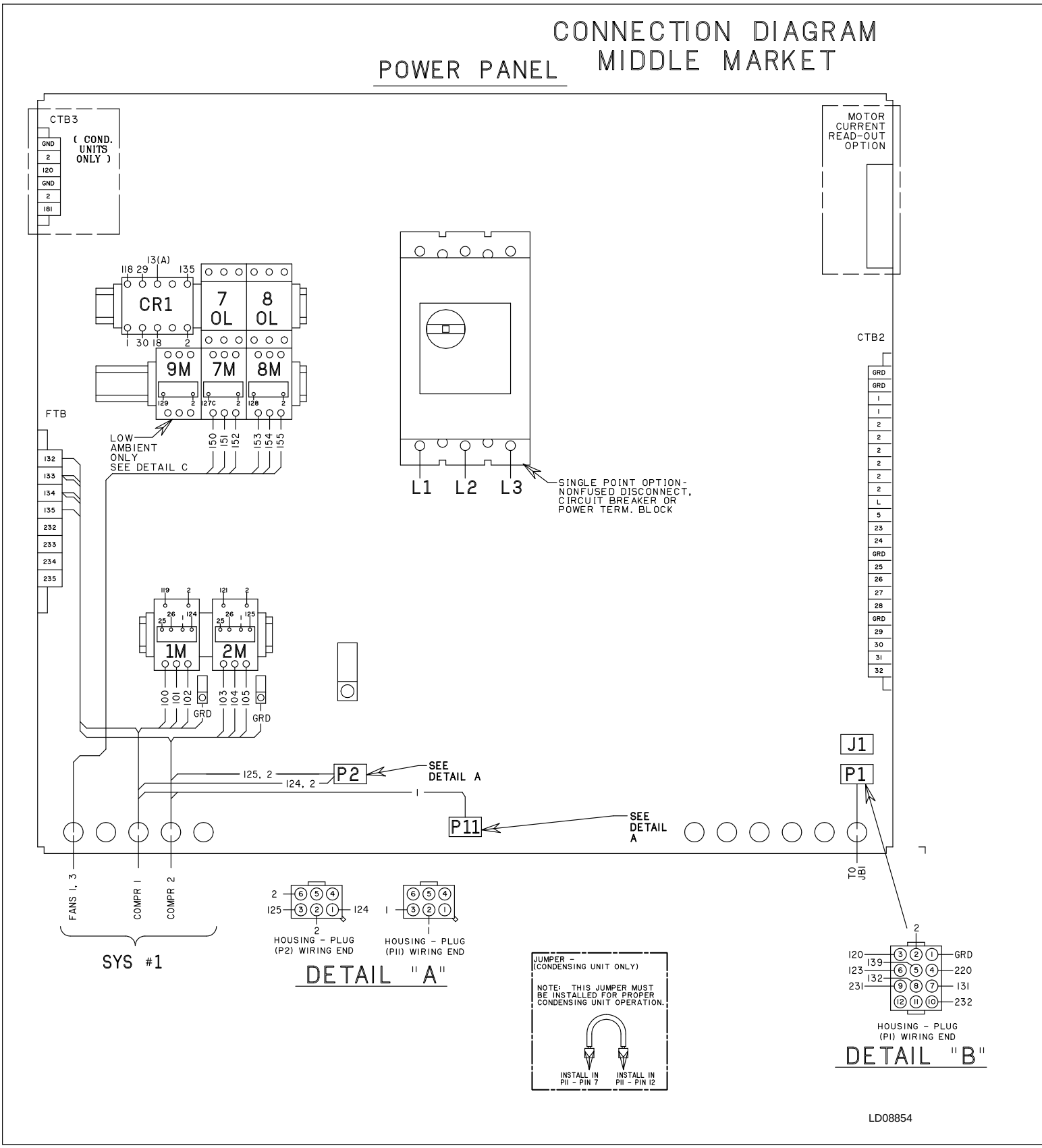
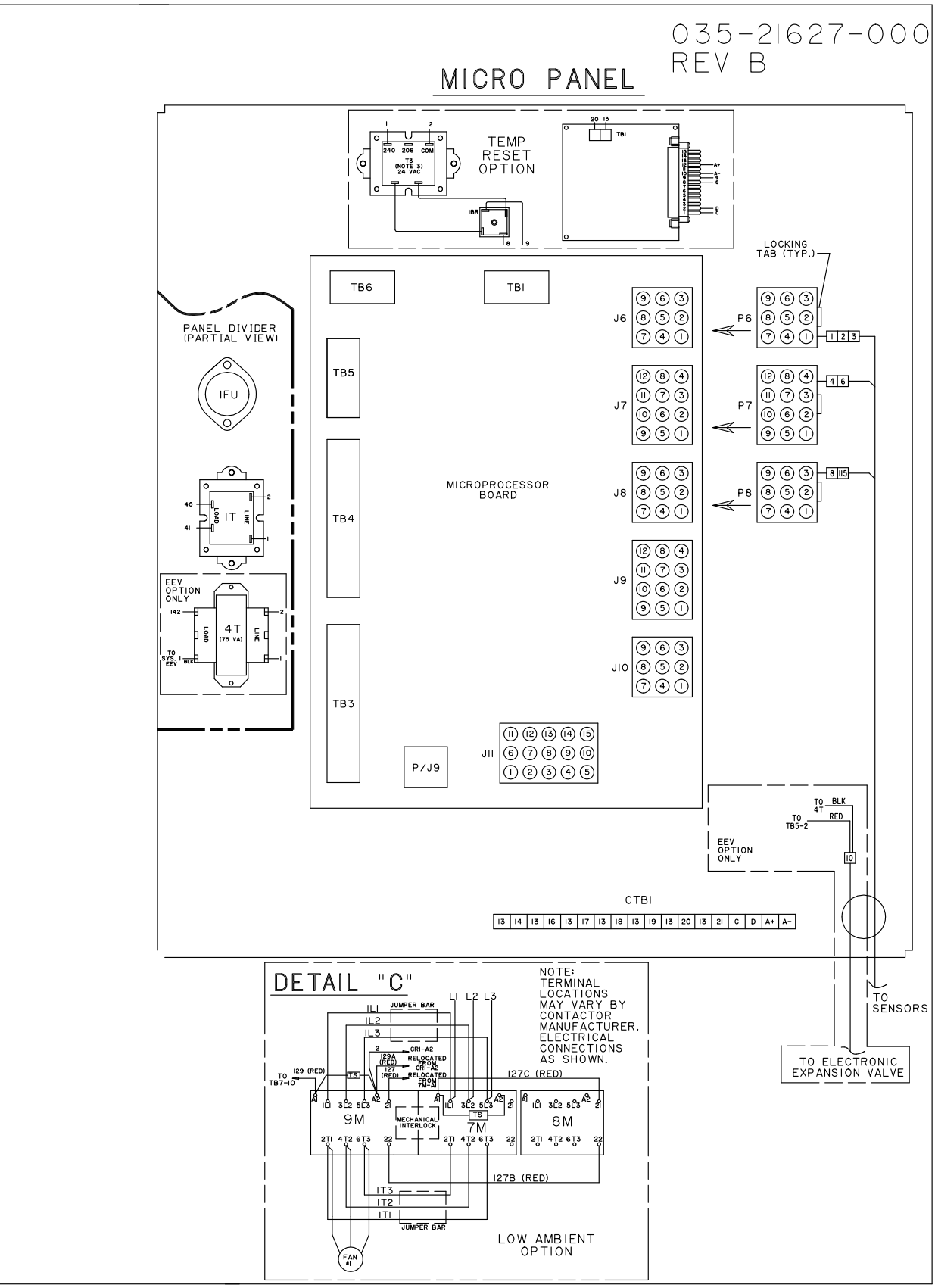


FIG. 18 – CONNECTION DIAGRAM, MIDDLE MARKET – YCAL0014E_ - YCAL0030E_

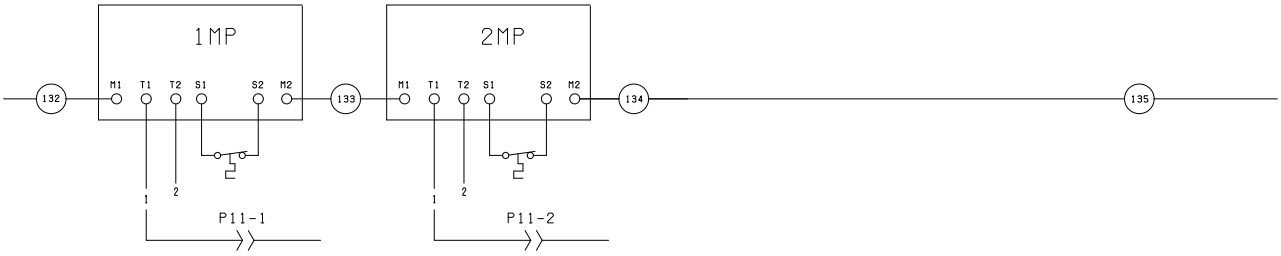

035-21627-000
REV B
MICRO PANEL
TEMP
RESET
OPTION
T3
(NOTE 3)
24 VAC
240
208
COM
TBI
IBR
LOCKING
TAB (TYP.)
TB6
TBI
TB5
TB4
TB3
P/J9
J6
J7
J8
J9
J10
J11
P6
P7
P8
MICROPROCESSOR
BOARD
PANEL DIVIDER
(PARTIAL VIEW)
IFU
IT
LOAD
LINE
EEV
OPTION
ONLY
4T
(75 VA)
TO
SYS.
EEV
BLK
TO BLK
4T
RED
TO
TB5-2
EEV
OPTION
ONLY
CTBI
13 14 15 16 17 18 19 20 21 C D A+ A-
TO
SENSORS
TO ELECTRONIC
EXPANSION VALVE
DETAIL "C"
NOTE:
TERMINAL
LOCATIONS
MAY VARY BY
CONTACTOR
MANUFACTURER.
ELECTRICAL
CONNECTIONS
AS SHOWN.
L1 L2 L3
JUMPER BAR
CR1-A2
RELOCATED
FROM
7M-A1
I29 (RED)
TO
TB7-10
TS
I27 (RED)
I27C (RED)
9M
MECHANICAL
INTERLOCK
7M
8M
I27B (RED)
IT3
IT2
IT1
JUMPER BAR
FAN
#1
LOW AMBIENT
OPTION

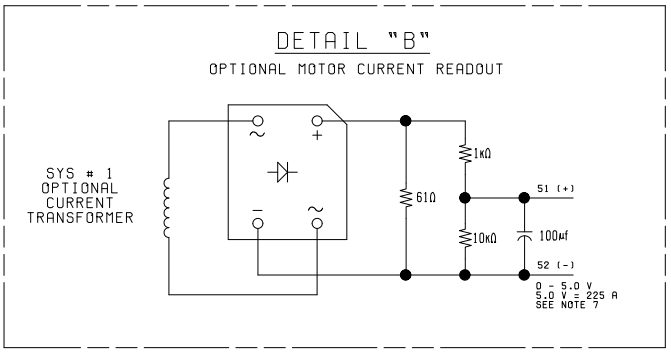
LD08855

6

ELEMENTARY DIAGRAM
YCAL0014E_ AND YCAL0030E_

DETAIL "A"





Notes:

1. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.
2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.
3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.
4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.
5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.
6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.
7. Optional current readout. 5V = 225A.
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— – – ——	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 19 – ELEMENTARY DIAGRAM, MIDDLE MARKET – YCAL0014E_ - YCAL0030E_

ELEMENTARY DIAGRAM
YCAL0034E_

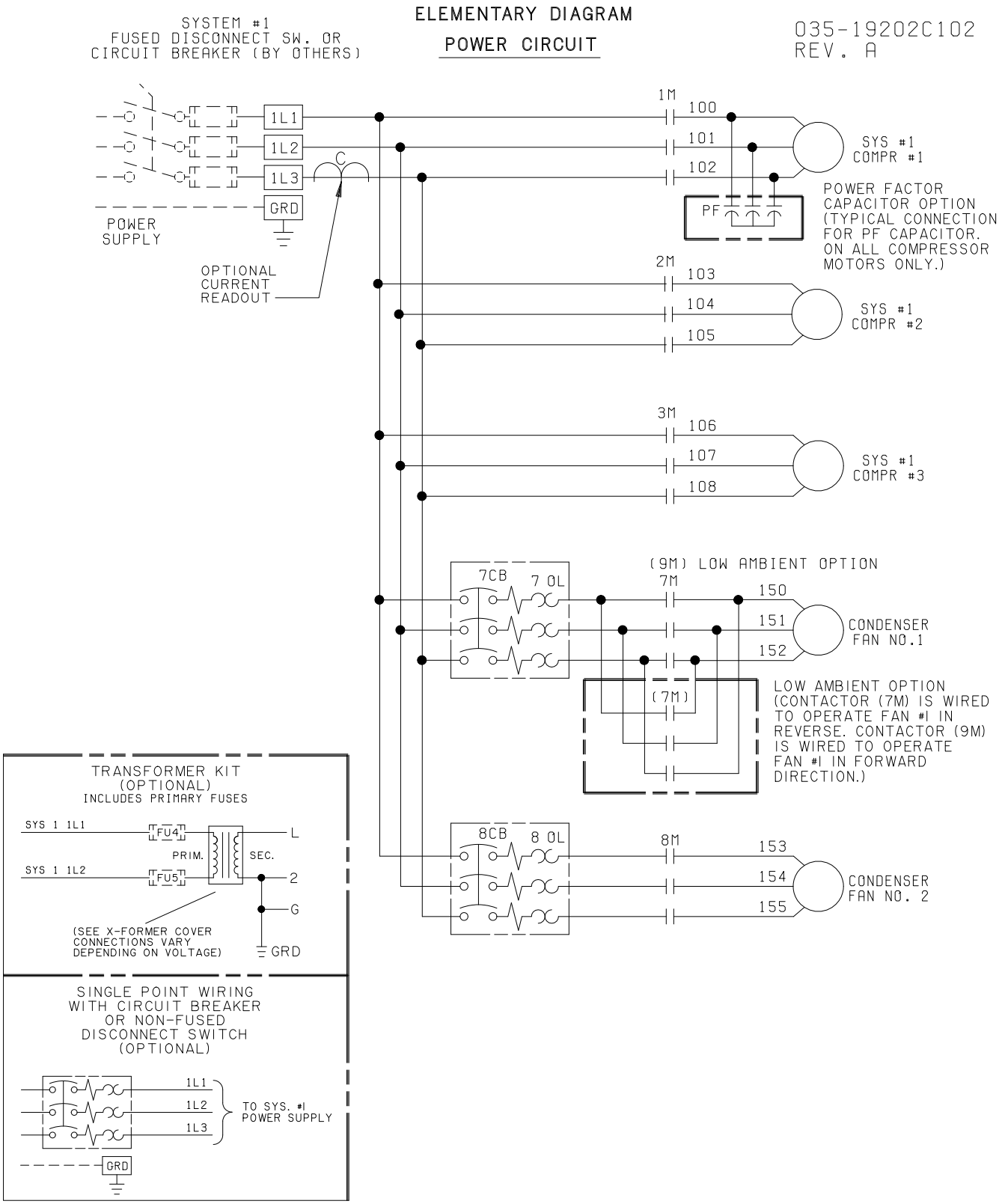


FIG. 20 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0034E_

6

ELEMENTARY DIAGRAM
YCAL0034E_

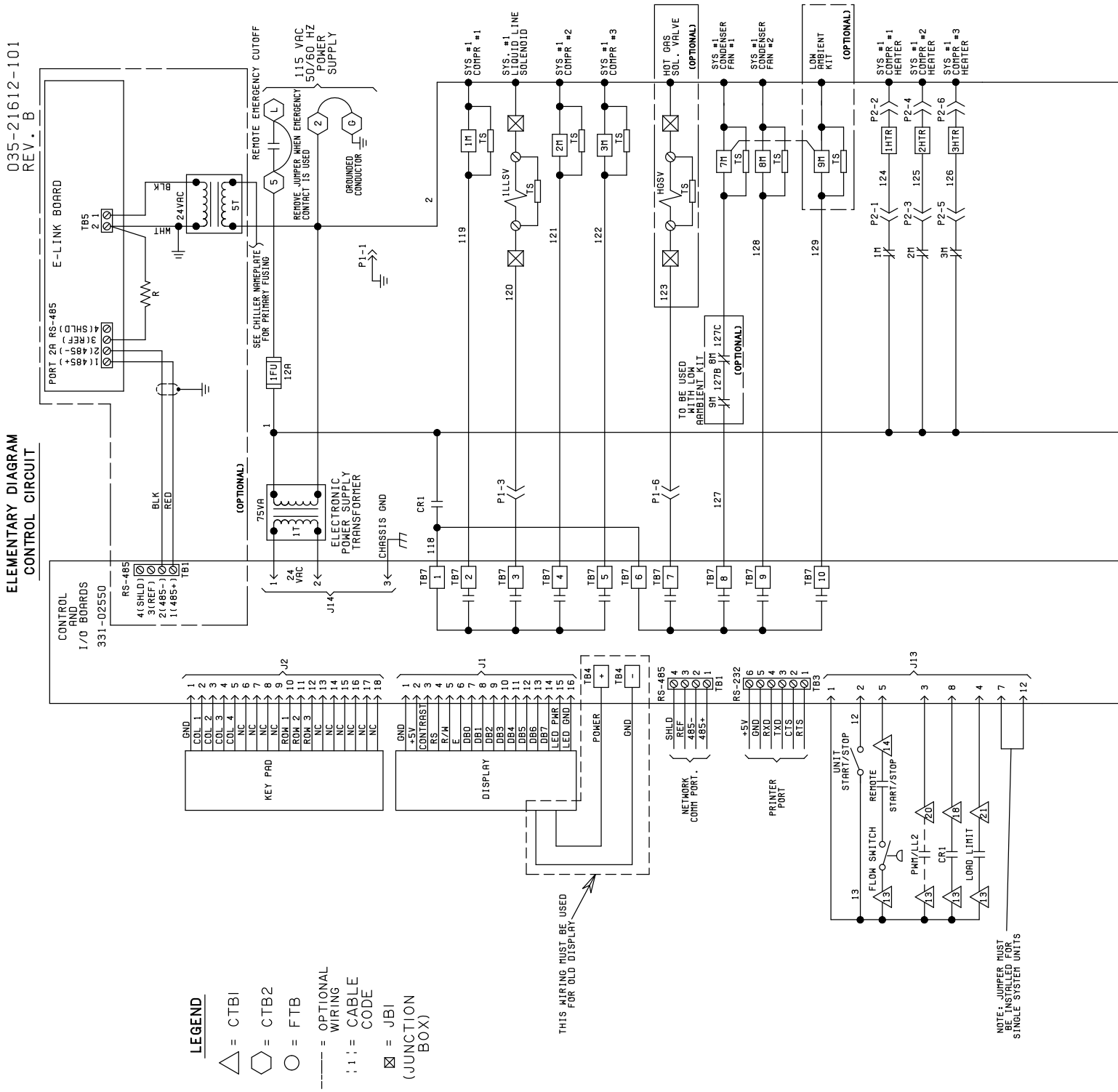
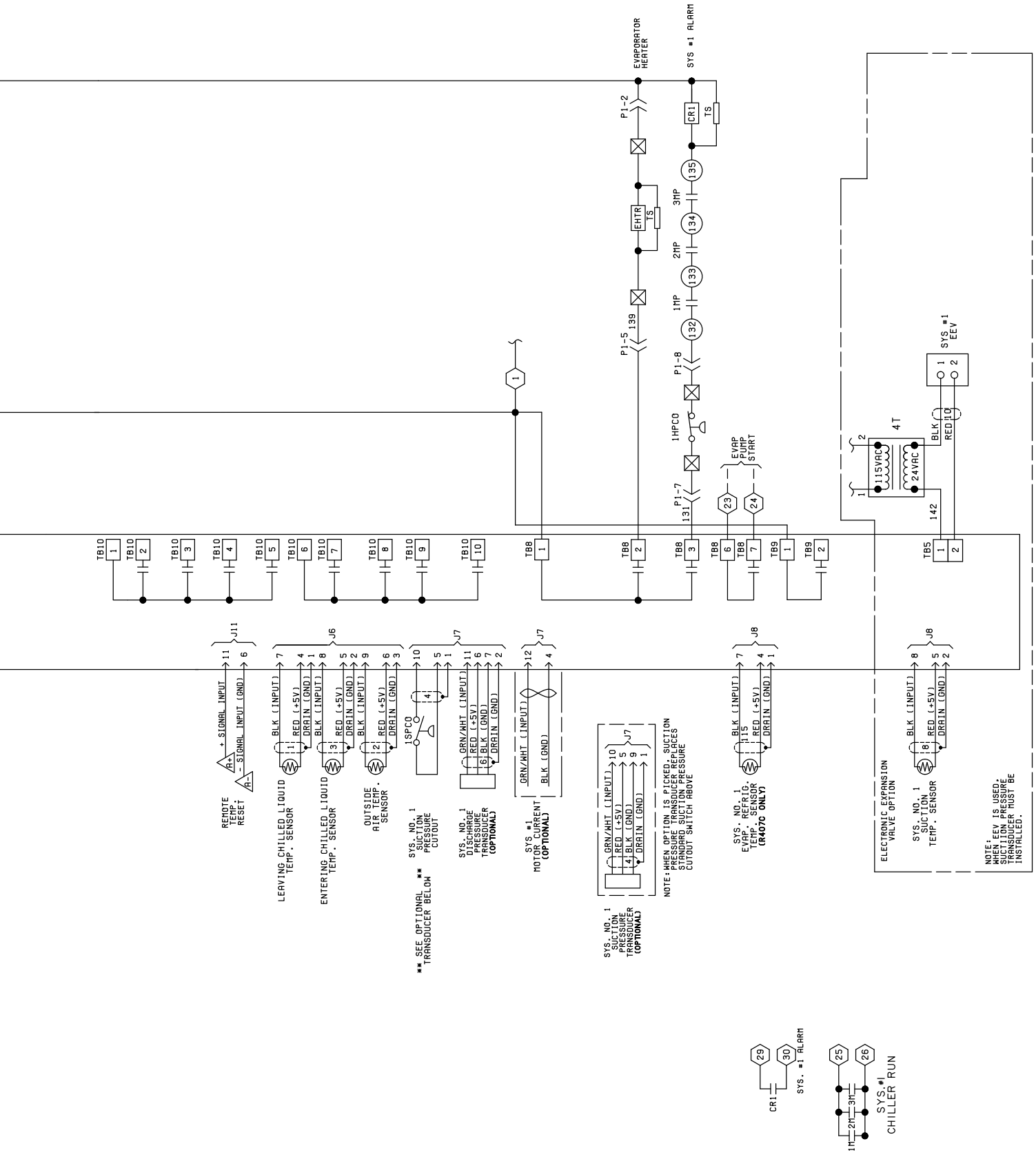


FIG. 21 – ELEMENTARY DIAGRAM, MIDDLE MARKET – YCAL0034E_


EVAPORATOR HEATER
SYS #1 ALARM
P1-2
CR1
TS
EHTR
TS
3MP
2MP
1MP
P1-5
139
P1-8
1HPCO
P1-7
131
EVAP PUMP START
23
24
1
115VAC
24VAC
4T
2
BLK
RED
10
SYS #1 EEV
142
TB10 1
TB10 2
TB10 3
TB10 4
TB10 5
TB10 6
TB10 7
TB10 8
TB10 9
TB10 10
TB8 1
TB8 2
TB8 3
TB8 6
TB8 7
TB9 1
TB9 2
TB5 1
TB5 2
J11
J6
J7
J8
+ SIGNAL INPUT
- SIGNAL INPUT (GND)
REMOTE TEMP. RESET
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
** SEE OPTIONAL ** TRANSDUCER BELOW
SYS. NO. 1 SUCTION PRESSURE CUTOUT
1SPCO
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS. #1 MOTOR CURRENT (OPTIONAL)
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER (OPTIONAL)
NOTE: WHEN OPTION IS PICKED, SUCTION PRESSURE TRANSDUCER REPLACES STANDARD SUCTION PRESSURE CUTOUT SWITCH ABOVE
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
ELECTRONIC EXPANSION VALVE OPTION
SYS. NO. 1 SUCTION TEMP. SENSOR
NOTE: WHEN EEV IS USED, SUCTION PRESSURE TRANSDUCER MUST BE INSTALLED.
CR1
SYS. #1 ALARM
29
30
1M
2M
3M
25
26
SYS.#1 CHILLER RUN

CONNECTION DIAGRAM
YCAL0034E_

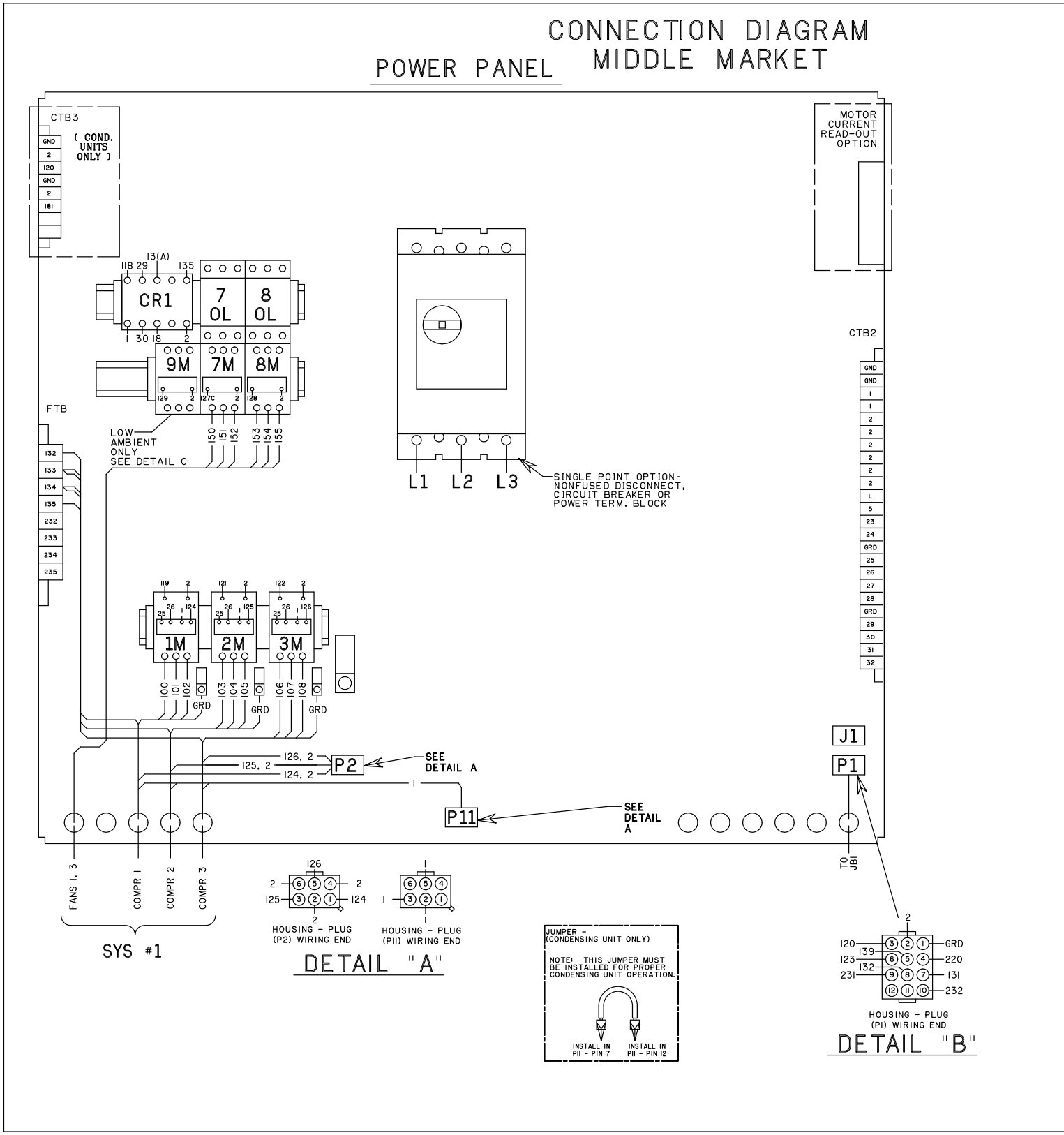
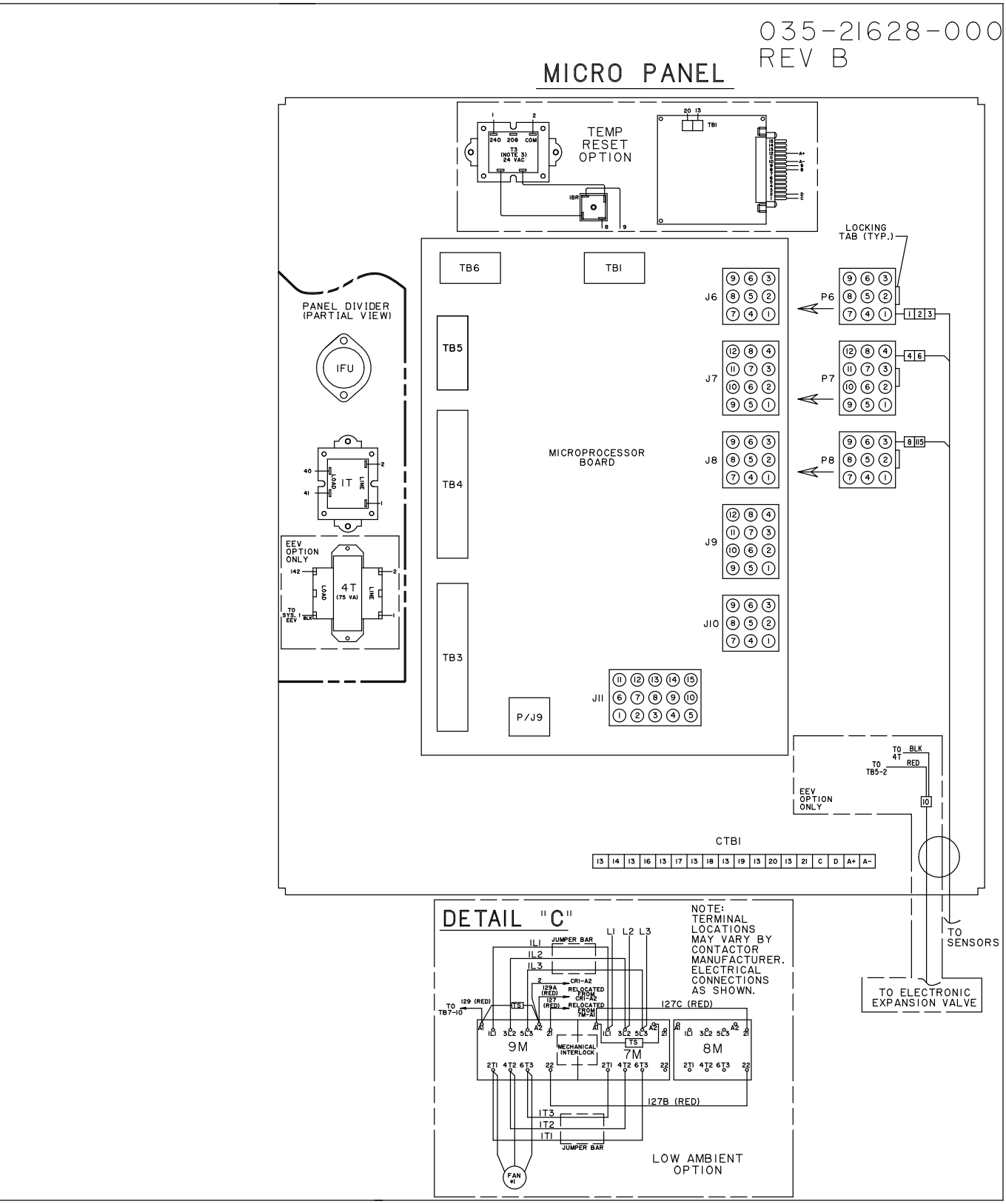
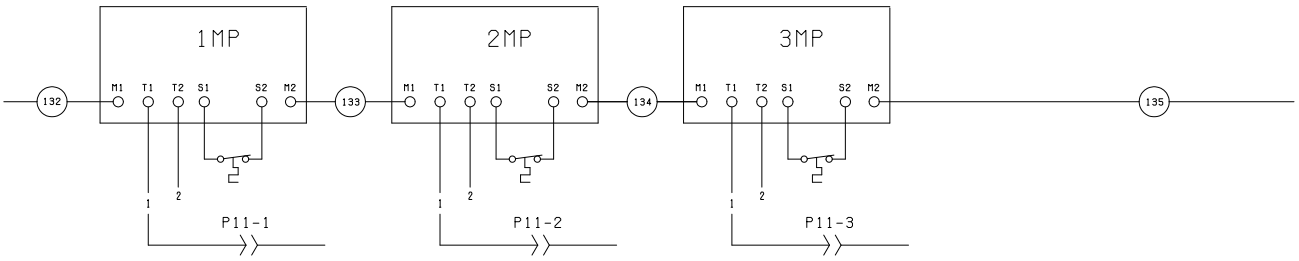


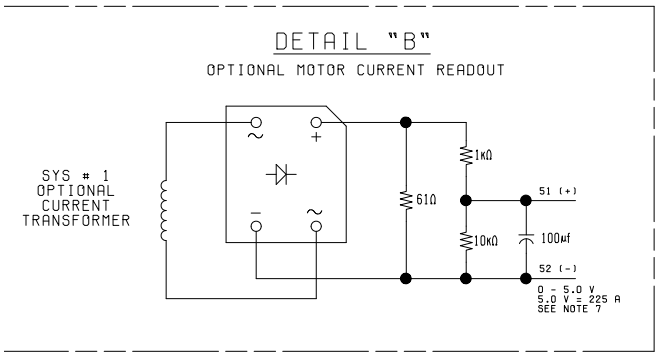
FIG. 22 – CONNECTION DIAGRAM, MIDDLE MARKET – YCAL0034E_


035-21628-000
REV B
MICRO PANEL
TEMP
RESET
OPTION
TBI
LOCKING
TAB (TYP.)
TB6
TB5
TB4
TB3
P/J9
PANEL DIVIDER
(PARTIAL VIEW)
IFU
1T
4T
(75 VA)
EEV
OPTION
ONLY
MICROPROCESSOR
BOARD
J6
J7
J8
J9
J10
J11
P6
P7
P8
CTBI
TO BLK
4T
TO
TB5-2
TO
SENSORS
TO ELECTRONIC
EXPANSION VALVE
DETAIL "C"
NOTE:
TERMINAL
LOCATIONS
MAY VARY BY
CONTACTOR
MANUFACTURER.
ELECTRICAL
CONNECTIONS
AS SHOWN.
JUMPER BAR
9M
7M
8M
MECHANICAL
INTERLOCK
TS
127B (RED)
127C (RED)
LOW AMBIENT
OPTION
FAN
#1

ELEMENTARY DIAGRAM
YCAL0034E_

DETAIL "A"





Notes:

I. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.

2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.

3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.

4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.

5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.

6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.

7. Optional current readout. 5V = 225A.

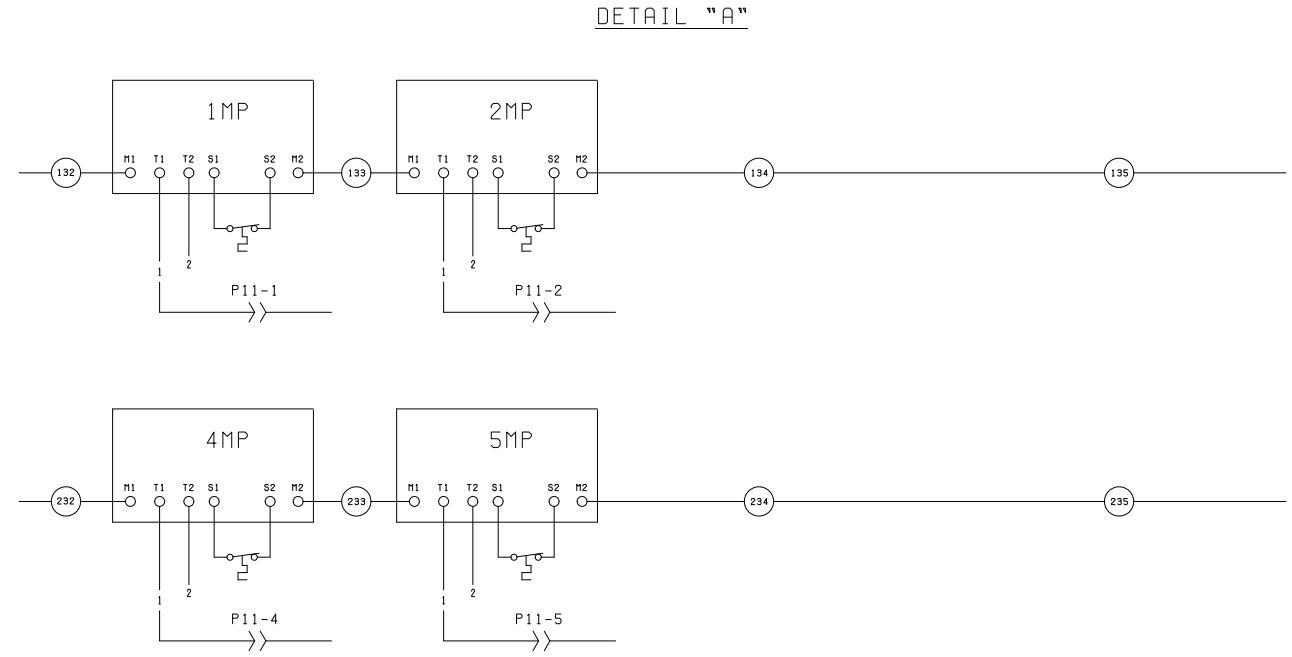
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

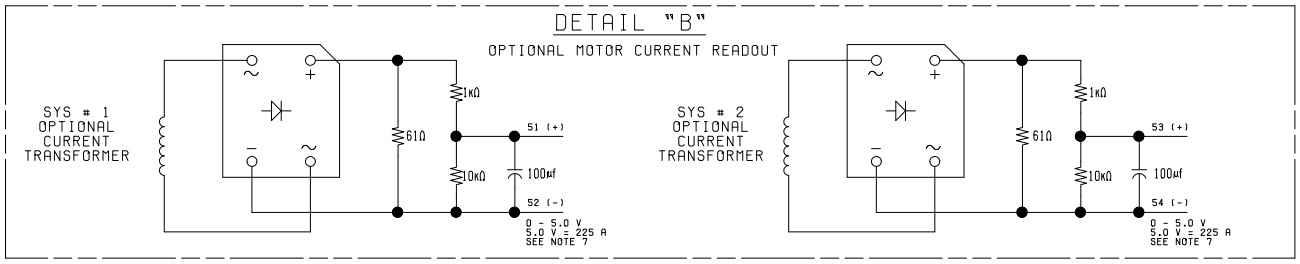
LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— - - ——	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 23 – ELEMENTARY DIAGRAM, MIDLLE MARKET – YCAL0034E_

ELEMENTARY DIAGRAM
YCAL0040E_ – YCAL0060E_





Notes:

I. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.

2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.

3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.

4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.

5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.

6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.

7. Optional current readout. 5V = 225A.

8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— - ——	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 24 – ELEMENTARY DIAGRAM, MIDLLE MARKET – YCAL0040E_ - YCAL0060E_

ELEMENTARY DIAGRAM
YCAL0040E_ – YCAL0060E_

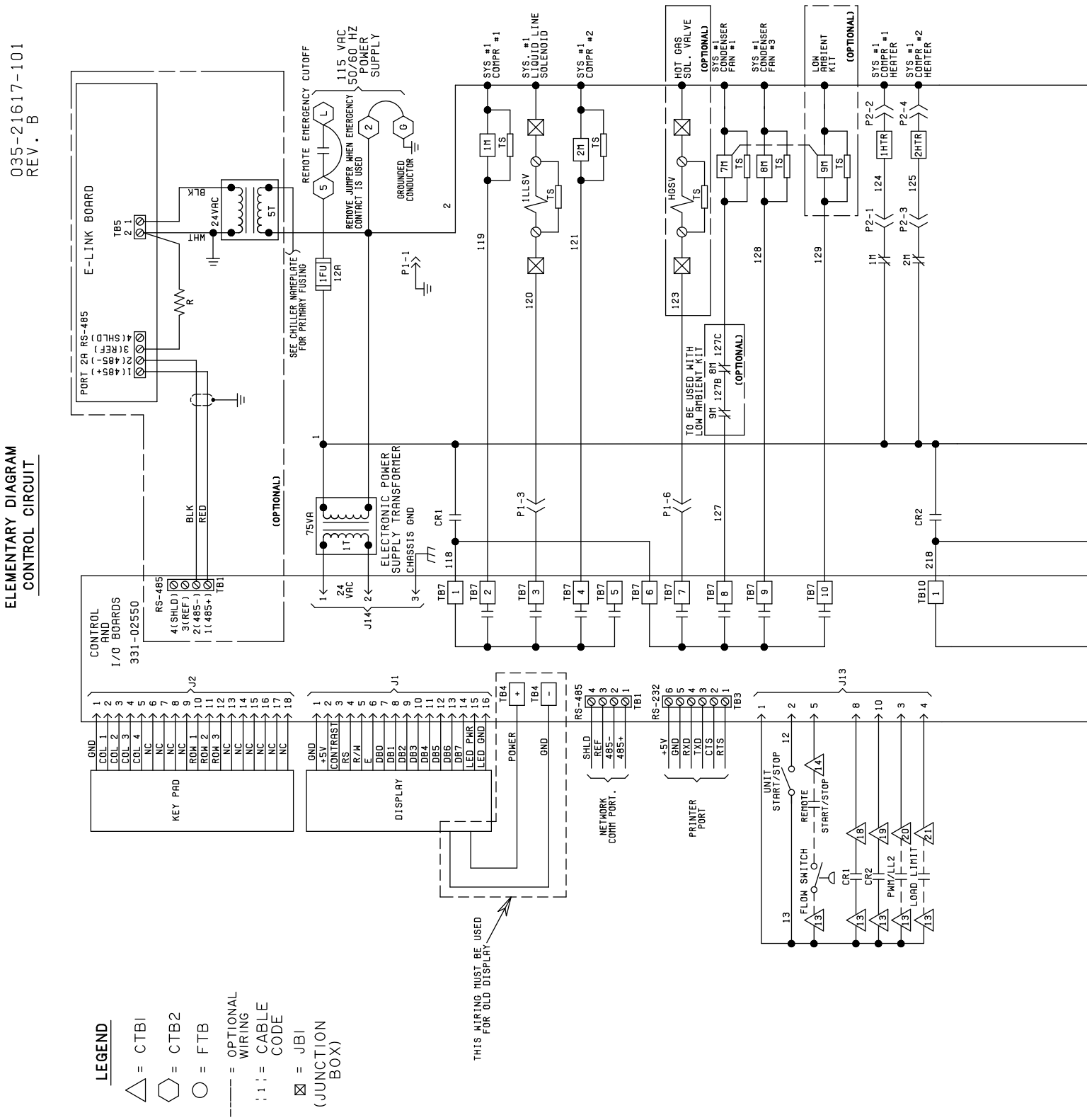
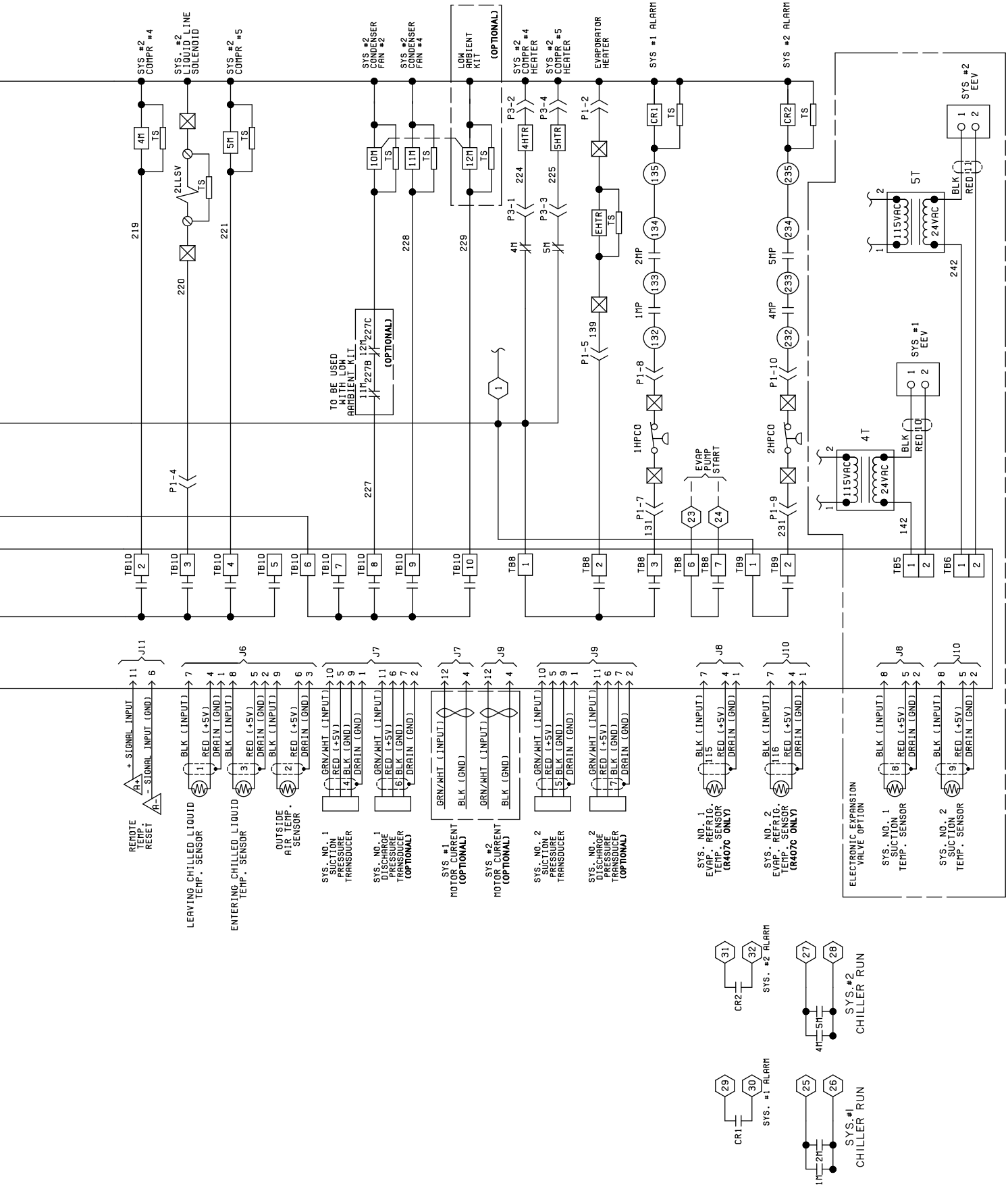


FIG. 25 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0040E_ - YCAL0060E_


SYS #2 COMPR #4
SYS. #2 LIQUID LINE SOLENOID
SYS #2 COMPR #5
SYS #2 CONDENSER FAN #2
SYS #2 CONDENSER FAN #4
LOW AMBIENT KIT (OPTIONAL)
SYS #2 COMPR #4 HEATER
SYS #2 COMPR #5 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
SYS #2 ALARM
TO BE USED WITH LOW AMBIENT KIT (OPTIONAL)
SYS #2 EEV
SYS #1 EEV
REMOTE TEMP RESET
+ SIGNAL INPUT
- SIGNAL INPUT (GND)
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS #1 MOTOR CURRENT (OPTIONAL)
SYS #2 MOTOR CURRENT (OPTIONAL)
SYS. NO. 2 SUCTION PRESSURE TRANSDUCER
SYS. NO. 2 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 2 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 1 SUCTION TEMP. SENSOR
SYS. NO. 2 SUCTION TEMP. SENSOR
ELECTRONIC EXPANSION VALVE OPTION
EVAP PUMP START
SYS.#2 CHILLER RUN
SYS.#1 CHILLER RUN

ELEMENTARY DIAGRAM
YCAL0040E_ – YCAL0060E_

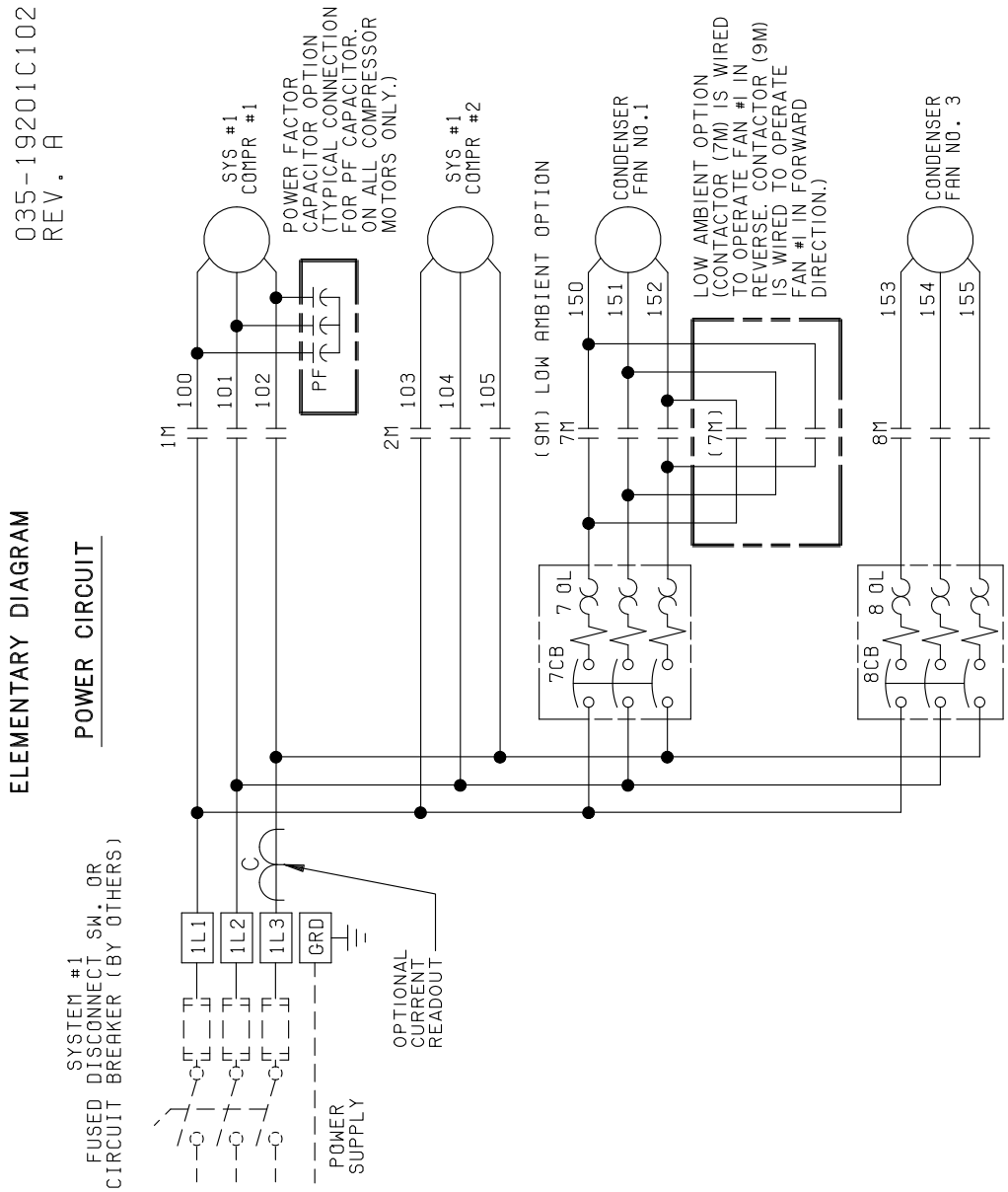
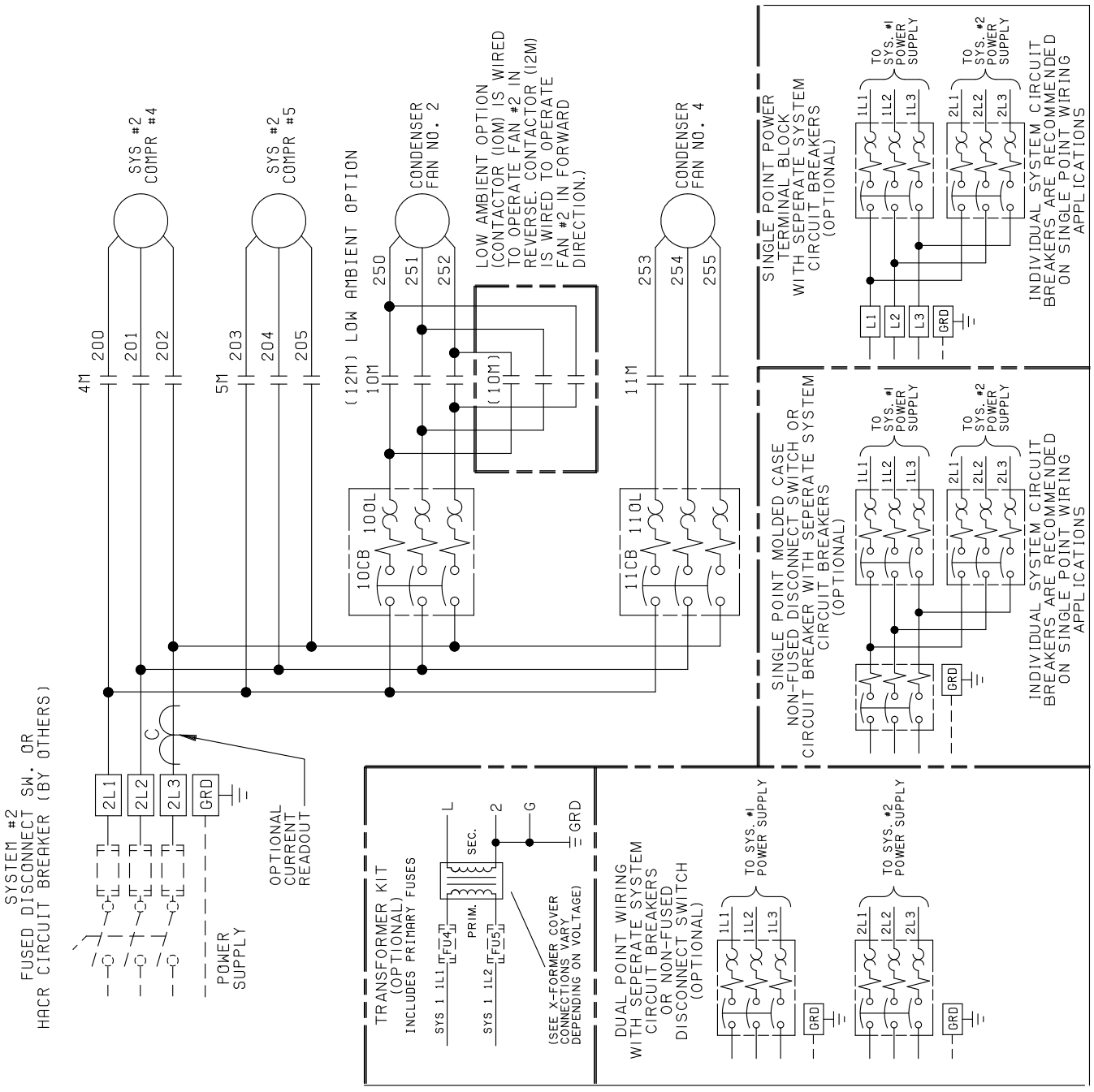


FIG. 26 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0040E_ - YCAL0060E_


SYSTEM #2
FUSED DISCONNECT SW. OR
HACR CIRCUIT BREAKER (BY OTHERS)
2L1
2L2
2L3
GRD
POWER SUPPLY
OPTIONAL CURRENT READOUT
C
4M
200
201
202
SYS #2 COMPR #4
5M
203
204
205
SYS #2 COMPR #5
(12M) LOW AMBIENT OPTION
10M
250
251
252
CONDENSER FAN NO. 2
(10M)
LOW AMBIENT OPTION (CONTACTOR (10M) IS WIRED TO OPERATE FAN #2 IN REVERSE. CONTACTOR (12M) IS WIRED TO OPERATE FAN #2 IN FORWARD DIRECTION.)
11M
253
254
255
CONDENSER FAN NO. 4
10CB 100L
11CB 110L
TRANSFORMER KIT (OPTIONAL)
INCLUDES PRIMARY FUSES
SYS 1 1L1
SYS 1 1L2
FU4
FU5
PRIM.
SEC.
L
2
G
GRD
(SEE X-FORMER COVER CONNECTIONS VARY DEPENDING ON VOLTAGE)
DUAL POINT WIRING WITH SEPERATE SYSTEM CIRCUIT BREAKERS OR NON-FUSED DISCONNECT SWITCH (OPTIONAL)
1L1
1L2
1L3
TO SYS. #1 POWER SUPPLY
2L1
2L2
2L3
TO SYS. #2 POWER SUPPLY
SINGLE POINT MOLDED CASE NON-FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER WITH SEPERATE SYSTEM CIRCUIT BREAKERS (OPTIONAL)
INDIVIDUAL SYSTEM CIRCUIT BREAKERS ARE RECOMMENDED ON SINGLE POINT WIRING APPLICATIONS
SINGLE POINT POWER TERMINAL BLOCK WITH SEPERATE SYSTEM CIRCUIT BREAKERS (OPTIONAL)
L1
L2
L3

CONNECTION DIAGRAM
YCAL0040E_ – YCAL0060E_

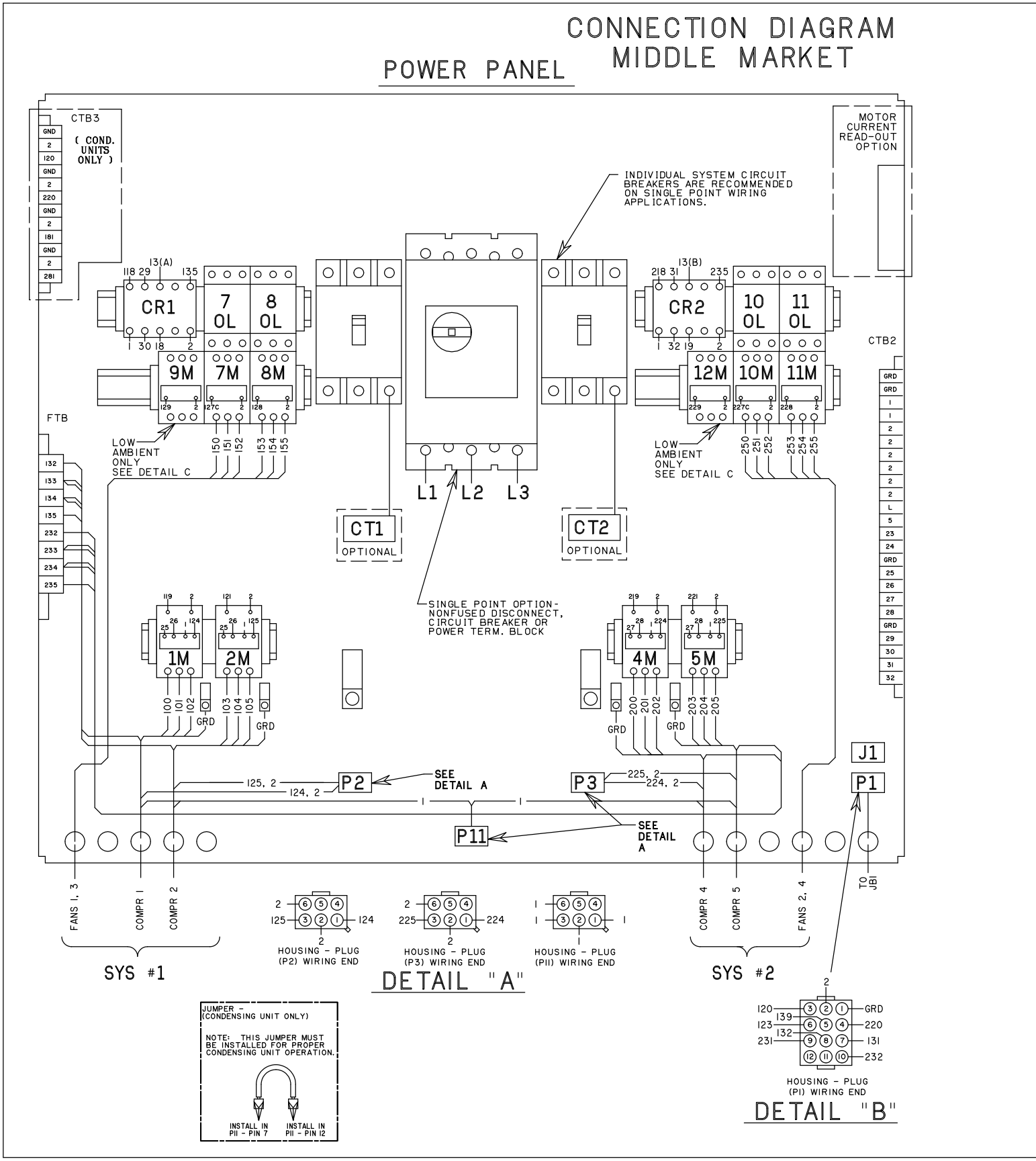
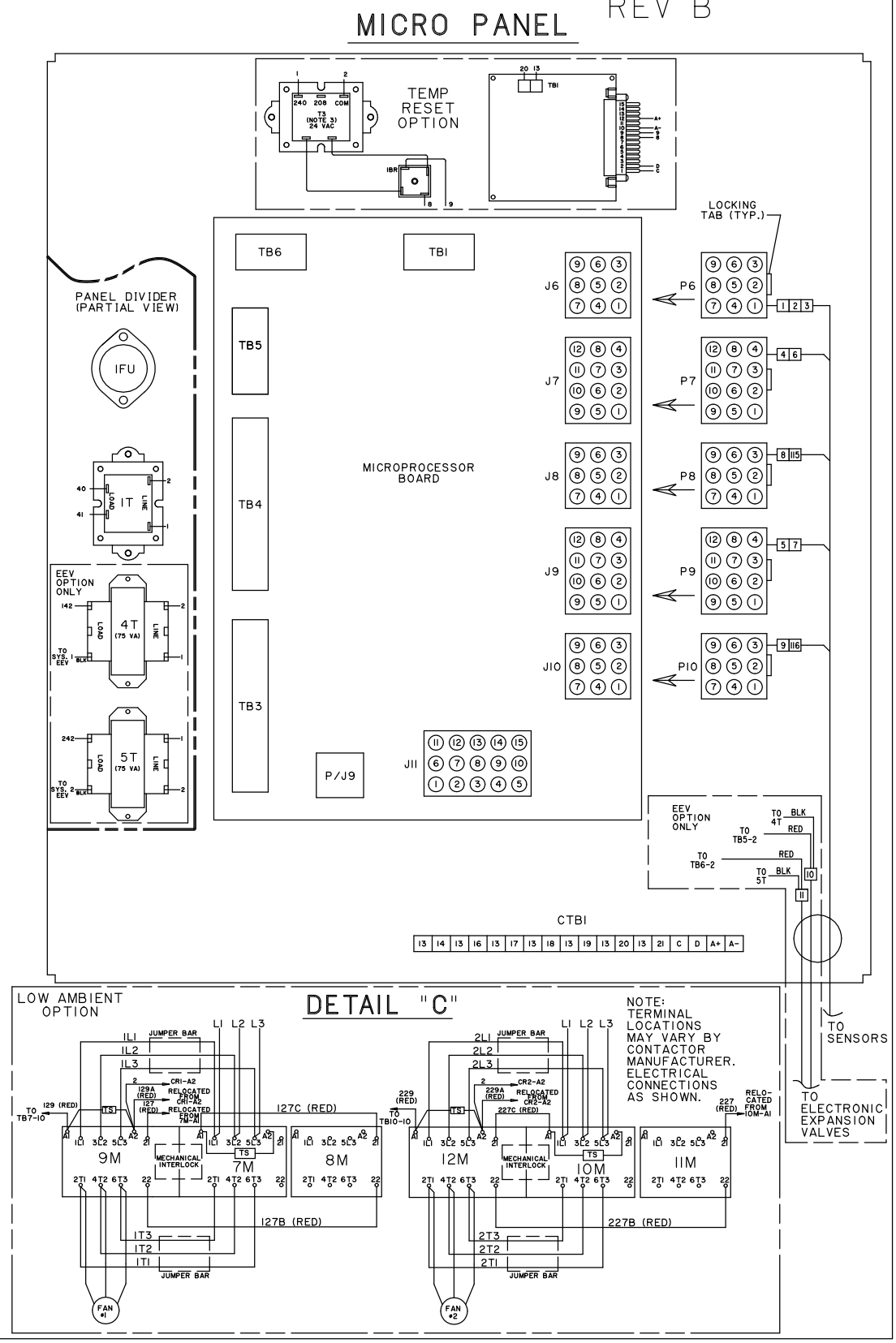


FIG. 27 – CONNECTION DIAGRAM, MIDDLE MARKET – YCAL0040E_ - YCAL0060E_

035-21625-000
REV B



6

ELEMENTARY DIAGRAM
YCAL0064E_ – YCAL0080E_

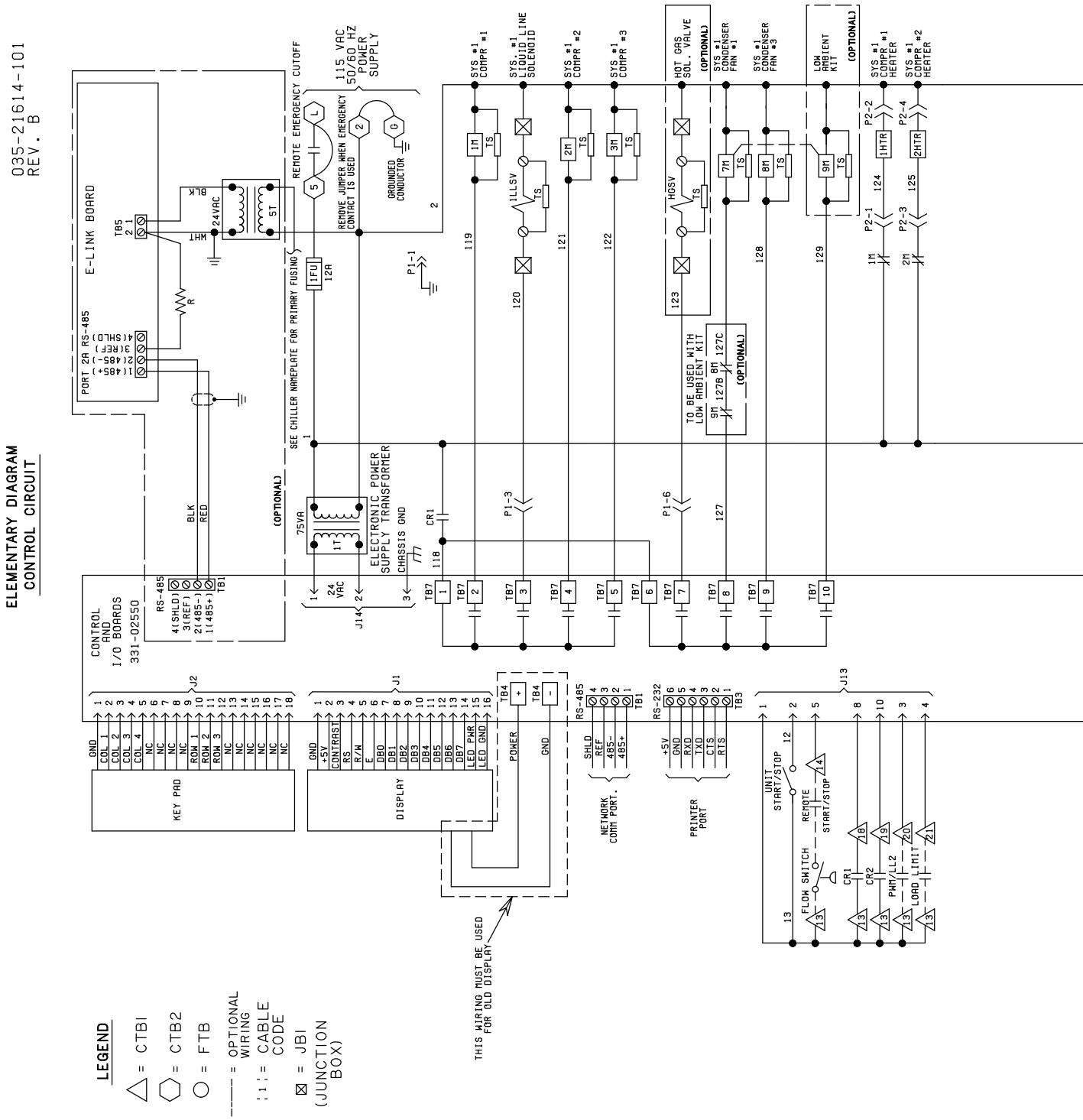
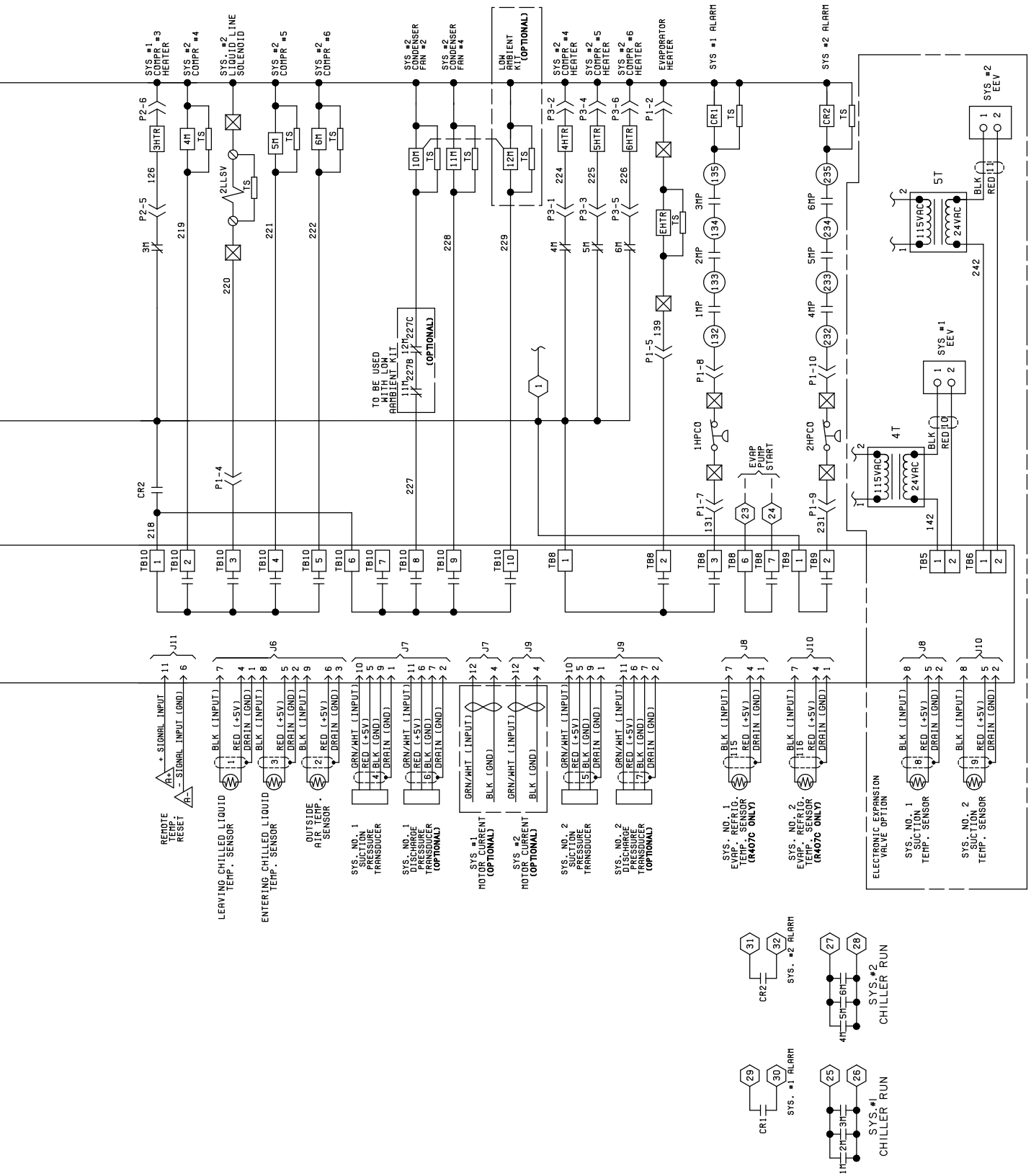


FIG. 28 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0064E_ - YCAL0080E_


SYS #1 COMPR #3 HEATER
SYS #2 COMPR #4
SYS #2 LIQUID LINE SOLENOID
SYS #2 COMPR #5
SYS #2 COMPR #6
SYS #2 CONDENSER FAN #2
SYS #2 CONDENSER FAN #4
LOW AMBIENT KIT (OPTIONAL)
SYS #2 COMPR #4 HEATER
SYS #2 COMPR #5 HEATER
SYS #2 COMPR #6 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
SYS #2 ALARM
SYS #2 EEV
TO BE USED WITH LOW AMBIENT KIT (OPTIONAL)
SYS #1 EEV
EVAP PUMP START
ELECTRONIC EXPANSION VALVE OPTION
REMOTE RESET
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS #1 MOTOR CURRENT (OPTIONAL)
SYS #2 MOTOR CURRENT (OPTIONAL)
SYS. NO. 2 SUCTION PRESSURE TRANSDUCER
SYS. NO. 2 DISCHARGE PRESSURE TRANSDUCER (OPTIONAL)
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 2 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 1 SUCTION TEMP. SENSOR
SYS. NO. 2 SUCTION TEMP. SENSOR
SYS. #1 ALARM
SYS. #2 ALARM
SYS.#1 CHILLER RUN
SYS.#2 CHILLER RUN

6

ELEMENTARY DIAGRAM
YCAL0064E_ – YCAL0080E_

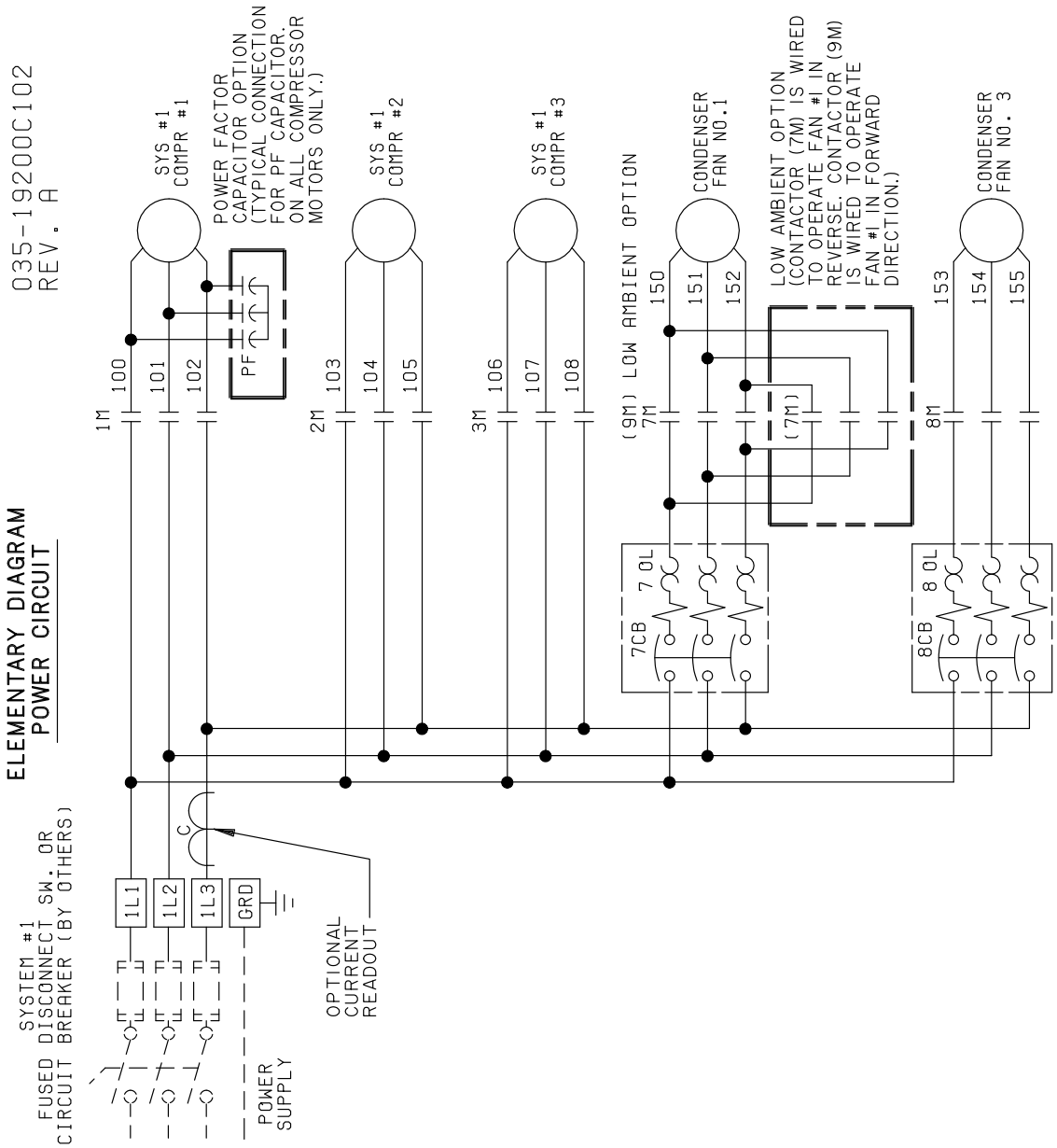
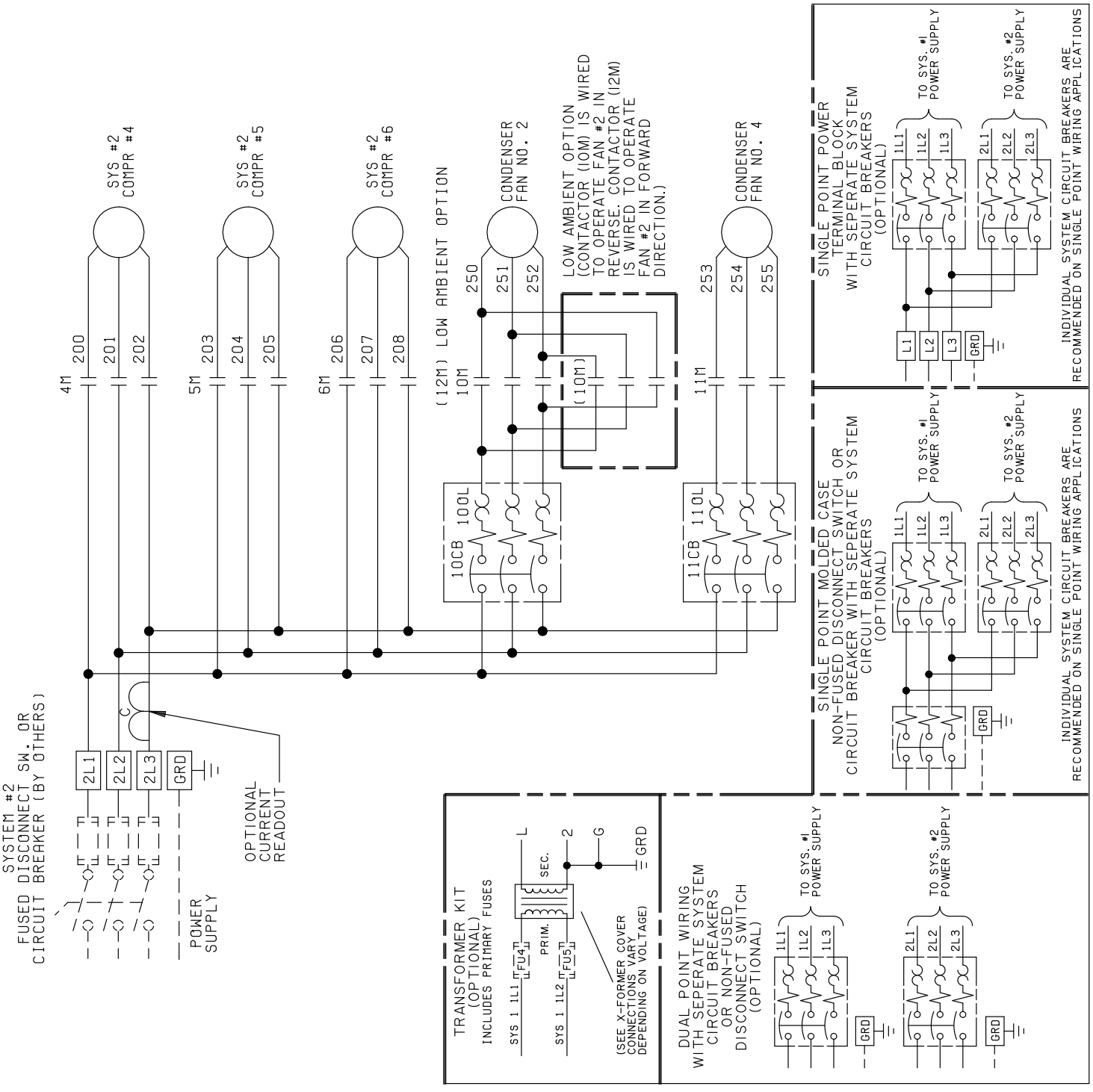


FIG. 29 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0064E_ - YCAL0080E_


SYSTEM #2
FUSED DISCONNECT SW. OR
CIRCUIT BREAKER (BY OTHERS)
2L1
2L2
2L3
GRD
POWER
SUPPLY
OPTIONAL
CURRENT
READOUT
4M
200
201
202
SYS #2
COMPR #4
5M
203
204
205
SYS #2
COMPR #5
6M
206
207
208
SYS #2
COMPR #6
(12M) LOW AMBIENT OPTION
10M
250
251
252
CONDENSER
FAN NO. 2
LOW AMBIENT OPTION
(CONTACTOR (10M) IS WIRED
TO OPERATE FAN #2 IN
REVERSE. CONTACTOR (12M)
IS WIRED TO OPERATE
FAN #2 IN FORWARD
DIRECTION.)
(10M)
10CB
100L
11M
253
254
255
CONDENSER
FAN NO. 4
11CB
110L
TRANSFORMER KIT
(OPTIONAL)
INCLUDES PRIMARY FUSES
SYS 1 1L1
FU4
SYS 1 1L2
FU5
PRIM.
SEC.
L
2
G
GRD
(SEE X-FORMER COVER
CONNECTIONS VARY
DEPENDING ON VOLTAGE)
DUAL POINT WIRING
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
OR NON-FUSED
DISCONNECT SWITCH
(OPTIONAL)
1L1
1L2
1L3
TO SYS. #1
POWER SUPPLY
GRD
2L1
2L2
2L3
TO SYS. #2
POWER SUPPLY
GRD
SINGLE POINT MOLDED CASE
NON-FUSED DISCONNECT SWITCH OR
CIRCUIT BREAKER WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
1L1
1L2
1L3
TO SYS. #1
POWER SUPPLY
2L1
2L2
2L3
TO SYS. #2
POWER SUPPLY
GRD
INDIVIDUAL SYSTEM CIRCUIT BREAKERS ARE
RECOMMENDED ON SINGLE POINT WIRING APPLICATIONS
SINGLE POINT POWER
TERMINAL BLOCK
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
L1
L2
L3
GRD
1L1
1L2
1L3
TO SYS. #1
POWER SUPPLY
2L1
2L2
2L3
TO SYS. #2
POWER SUPPLY
INDIVIDUAL SYSTEM CIRCUIT BREAKERS ARE
RECOMMENDED ON SINGLE POINT WIRING APPLICATIONS

CONNECTION DIAGRAM
YCAL0064E_ – YCAL0080E_

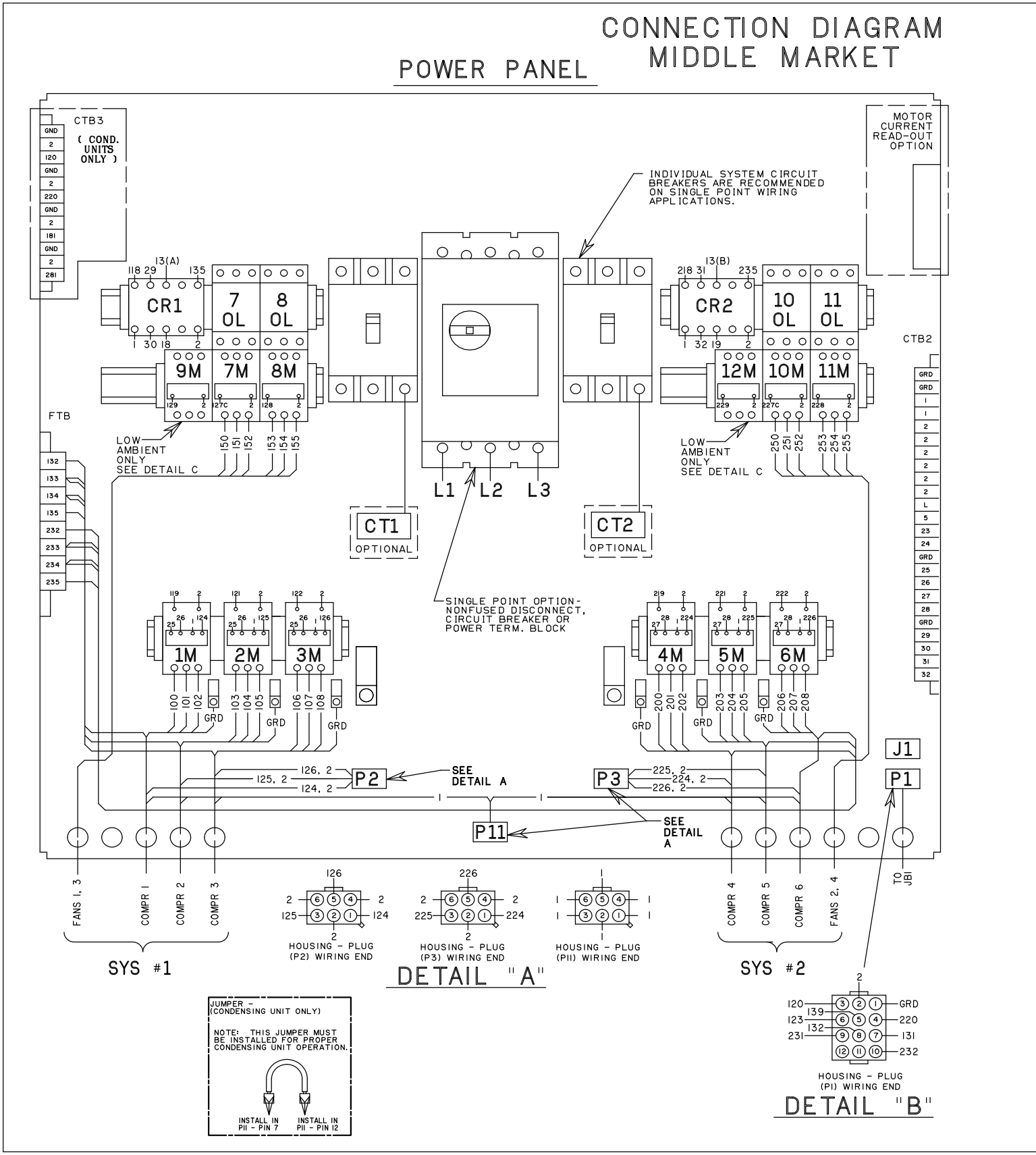
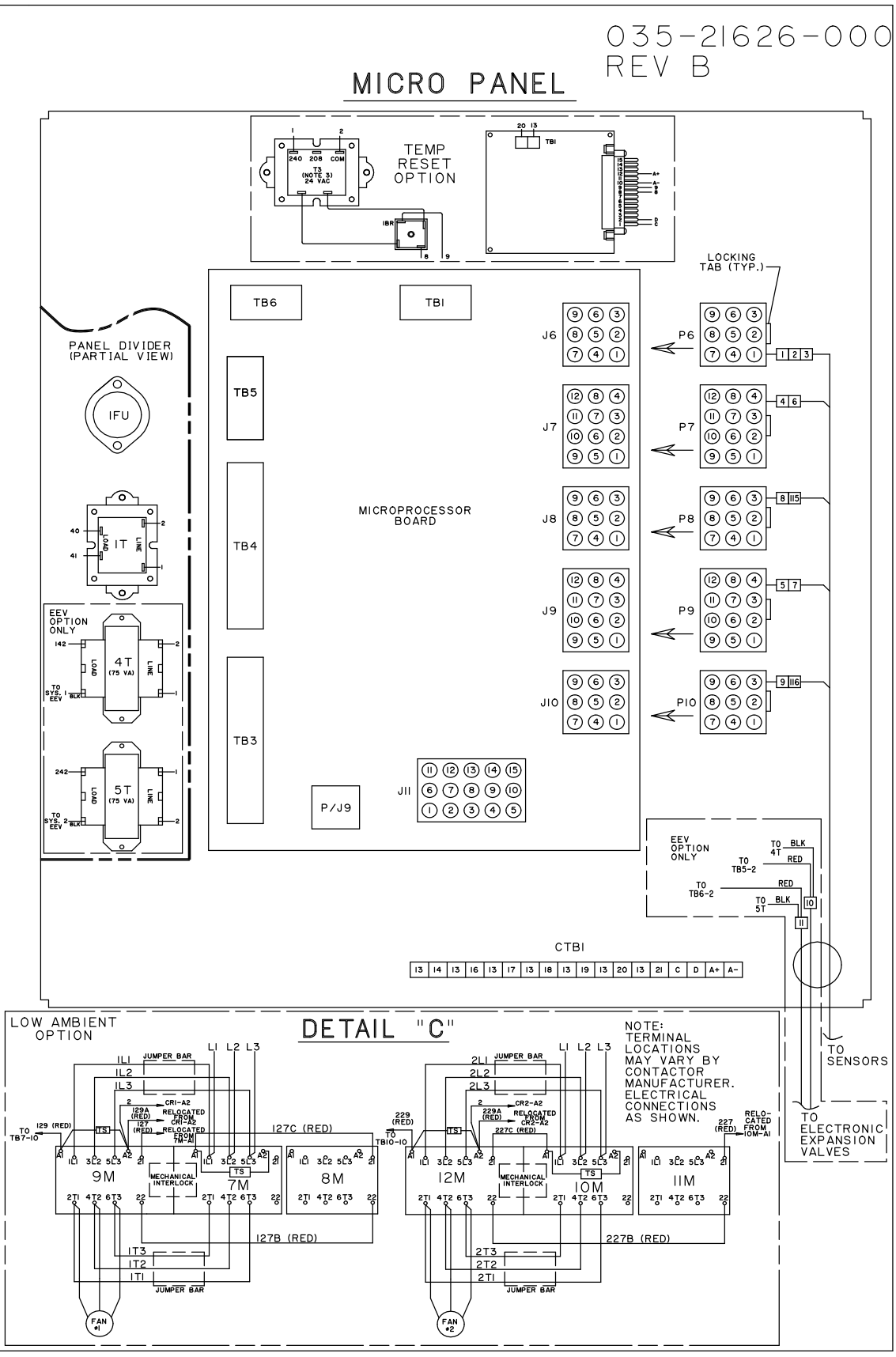


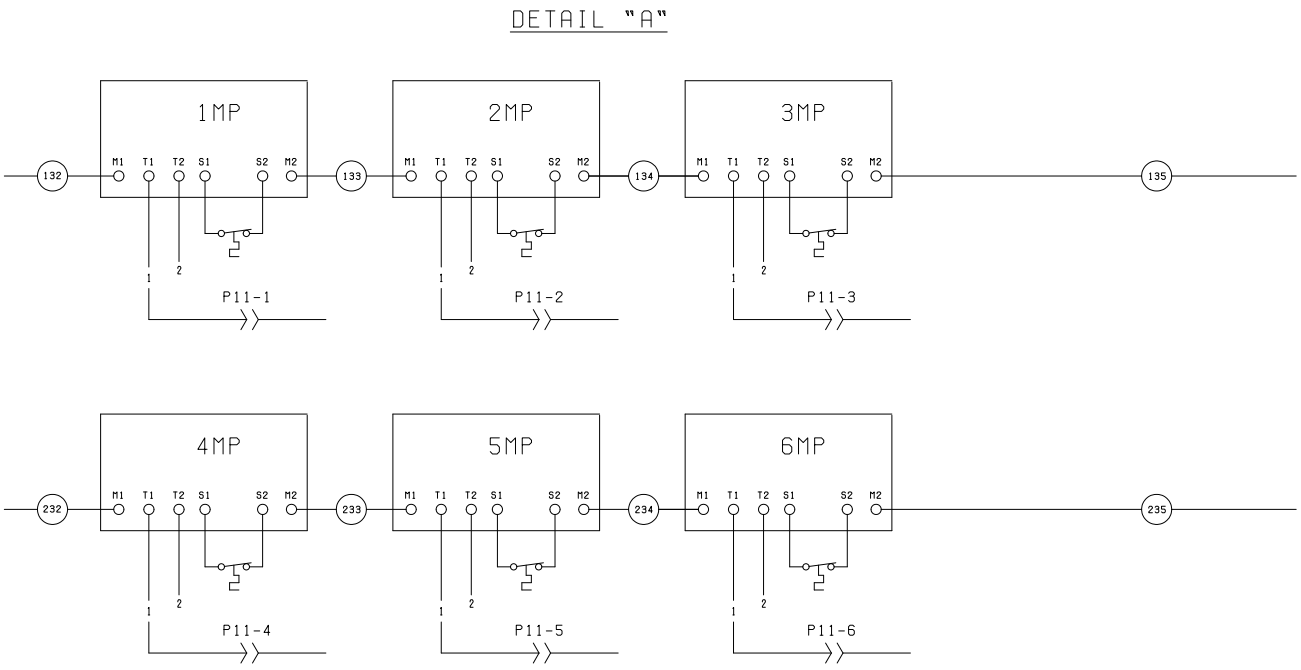
FIG. 30 – CONNECTION DIAGRAM, MIDDLE MARKET – YCAL0064E_ - YCAL0080E_

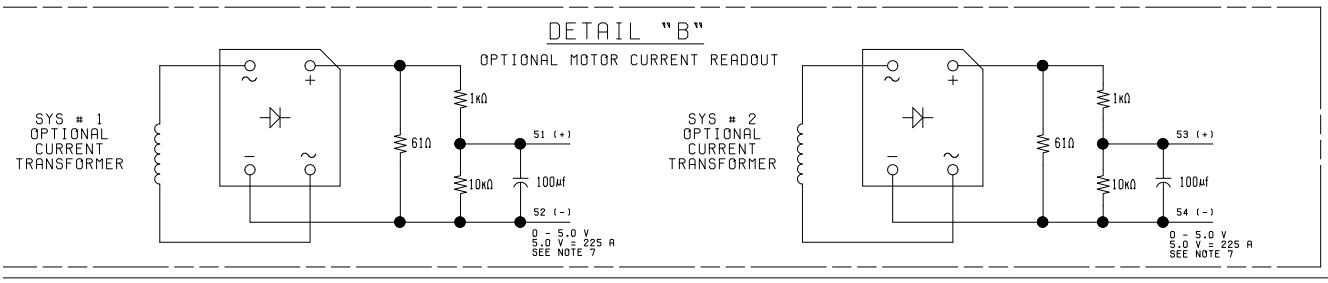
035-21626-000
REV B



6

ELEMENTARY DIAGRAM
YCAL0064E_ – YCAL0080E_





Notes:

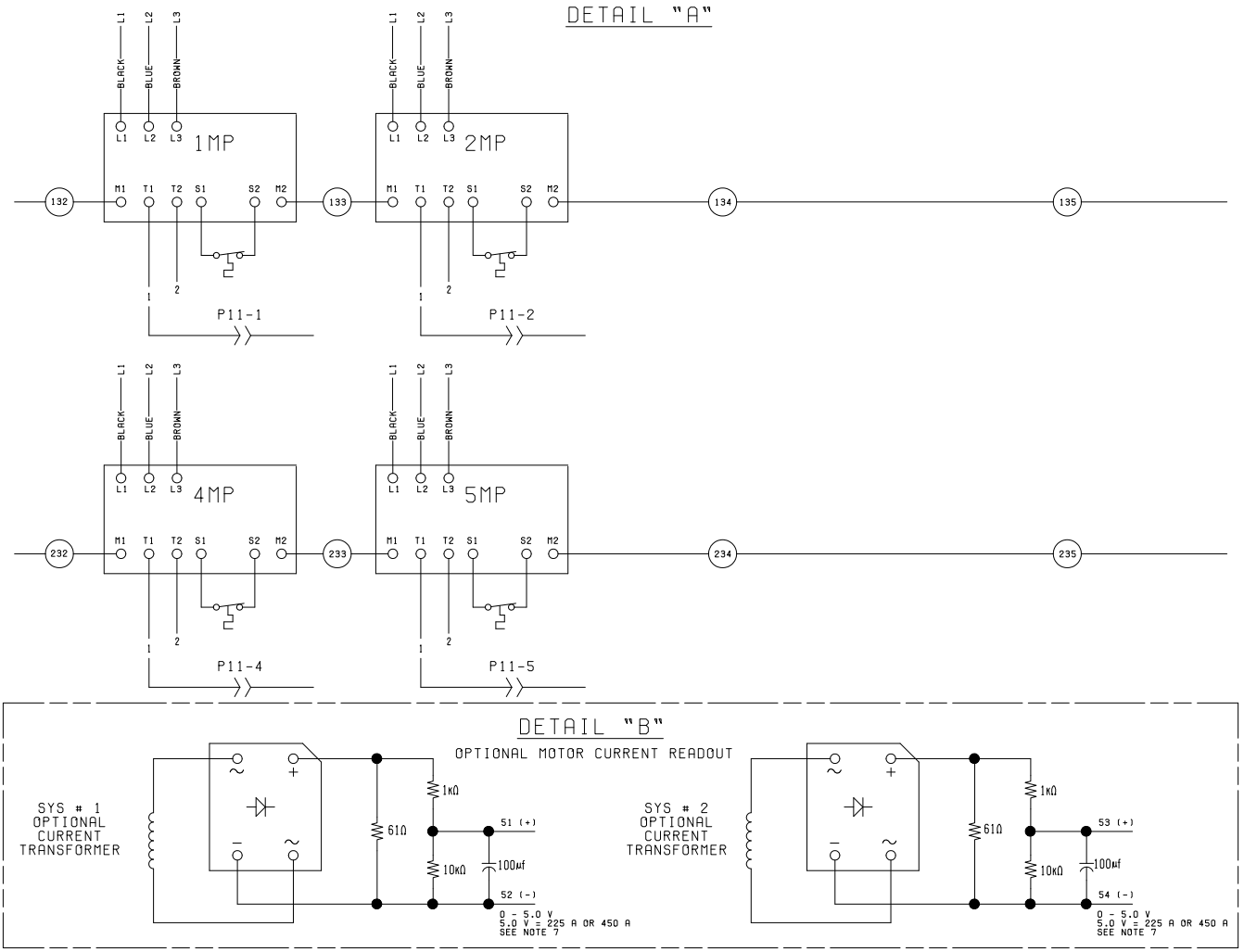
1. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.
2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.
3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.
4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.
5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.
6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.
7. Optional current readout. 5V = 225A.
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— – – ——	Optional equipment.
__ __ __	Wiring and/or components by others.

FIG. 31 – ELEMENTARY DIAGRAM, MIDDLE MARKET – YCAL0064E_ - YCAL0080E_

ELEMENTARY DIAGRAM
YCAL0090E_ – YCAL0094E_



Notes:

1. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.
2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.
3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.
4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.
5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.
6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.
7. Optional current readout. 5V = 225A for 380, 400, 460 & 575V.
   5V = 450A for 200 & 230V chillers..
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— - ——	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 32 – ELEMENTARY DIAGRAM, MIDDLE MARKET – YCAL0090E_ - YCAL0094E_

ELEMENTARY DIAGRAM
YCAL0090E_ – YCAL0094E_

035-21610-101
REV. A

ELEMENTARY DIAGRAM
CONTROL CIRCUIT

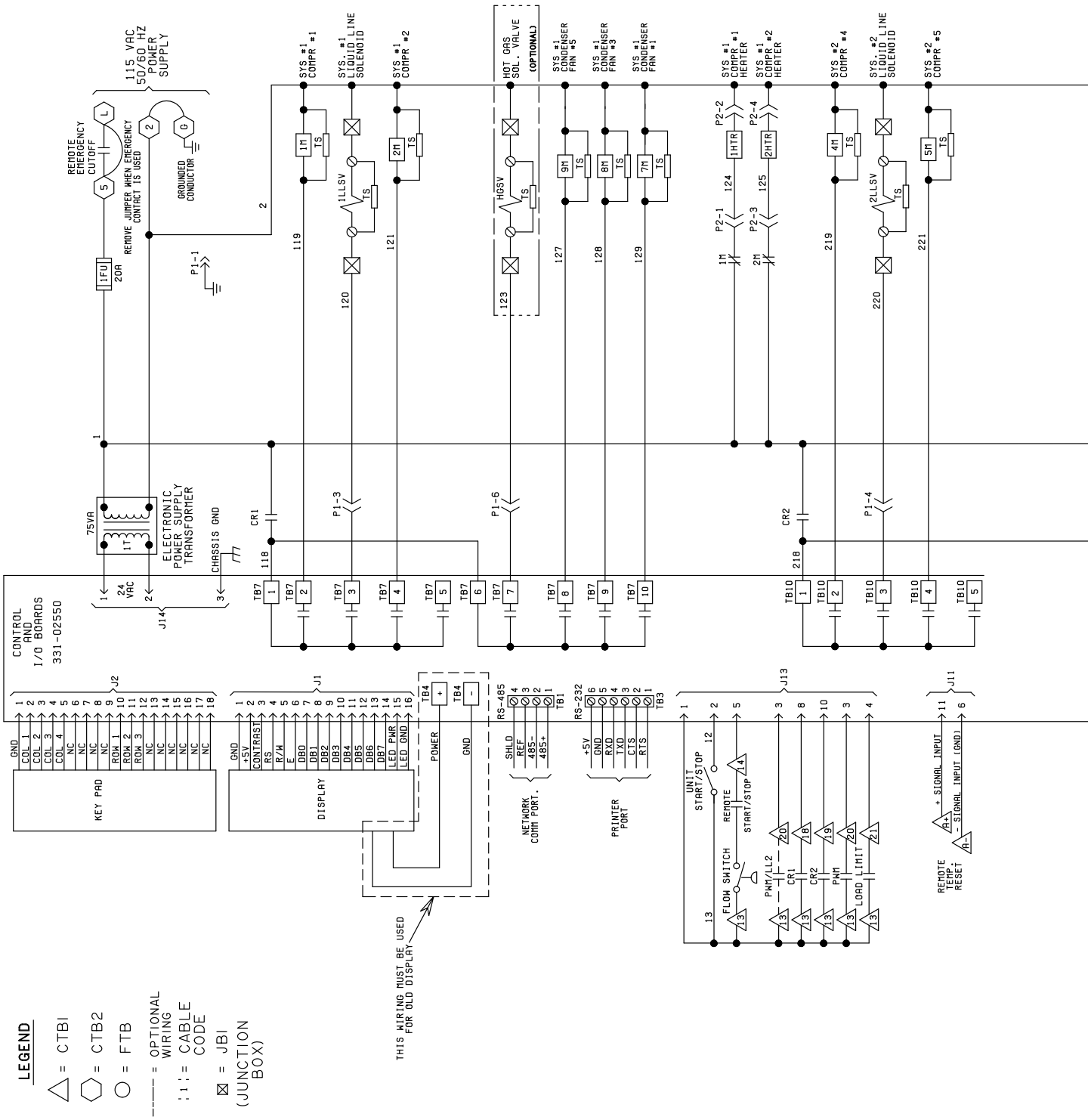
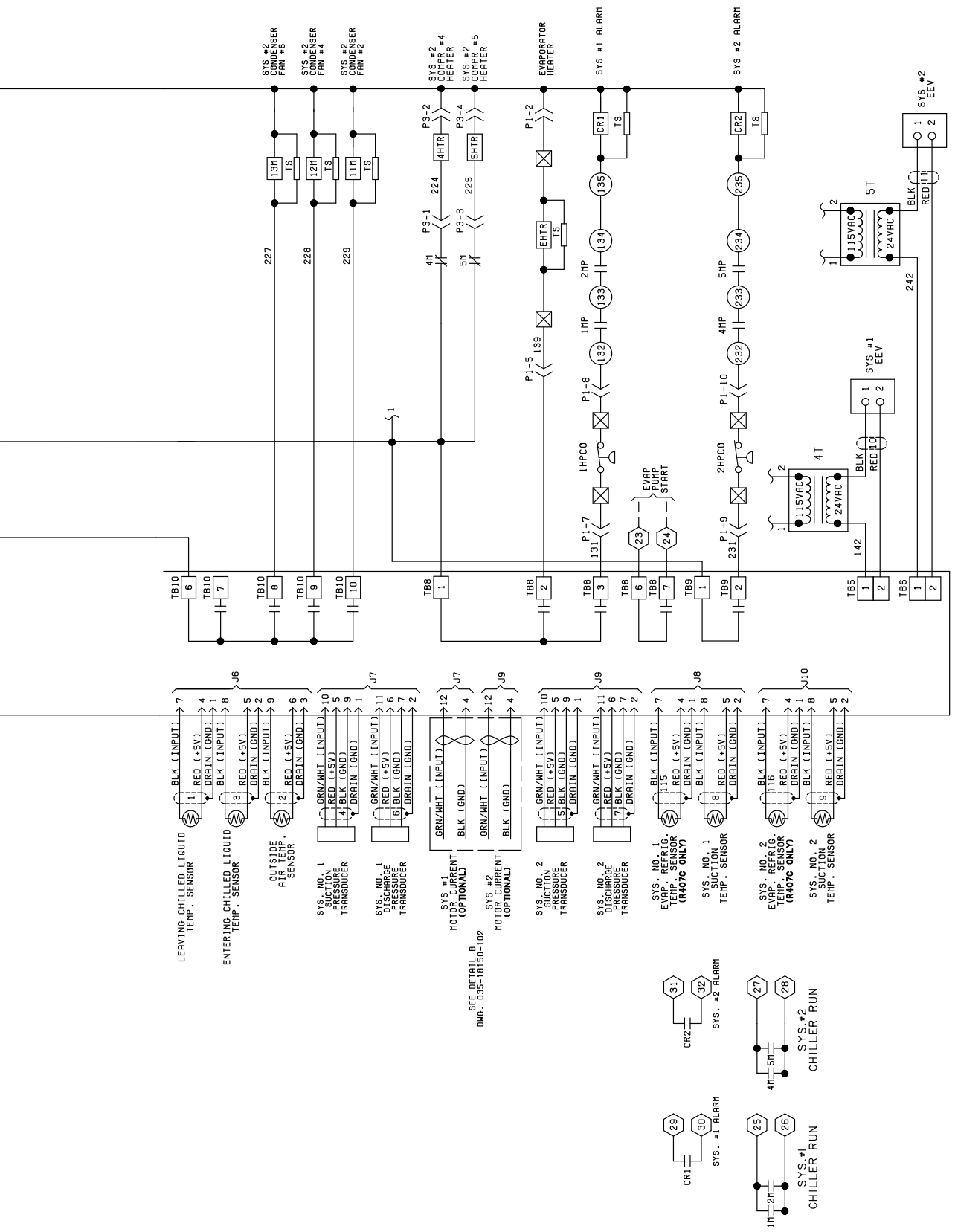
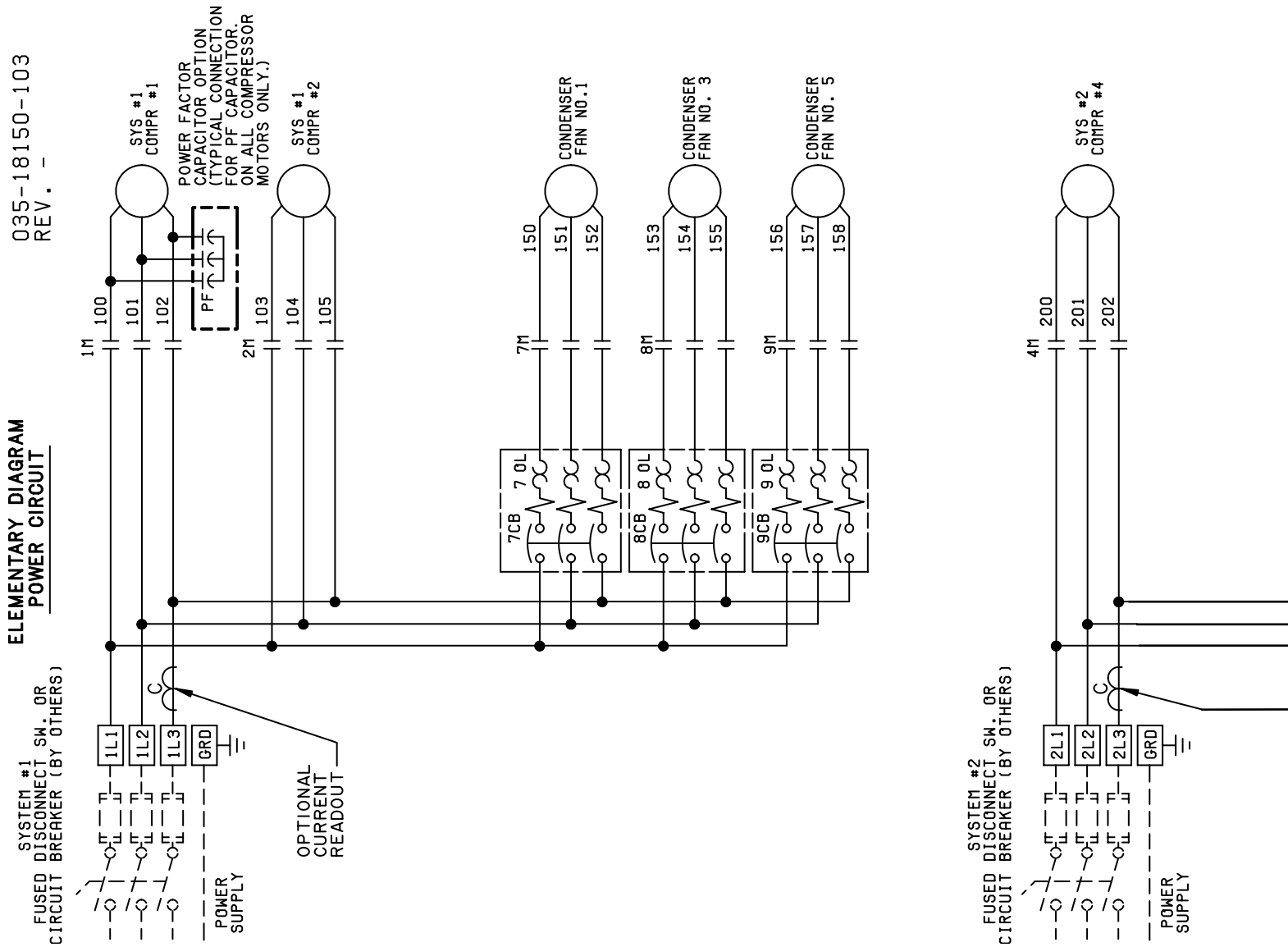


FIG. 33 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0090E_ - YCAL0094E_


SYS #2 CONDENSER FAN #6
SYS #2 CONDENSER FAN #4
SYS #2 CONDENSER FAN #2
SYS #2 COMPR #4 HEATER
SYS #2 COMPR #5 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
SYS #2 ALARM
SYS #2 EEV
SYS #1 EEV
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER
SYS #1 MOTOR CURRENT (OPTIONAL)
SYS #2 MOTOR CURRENT (OPTIONAL)
SEE DETAIL B DWG. 035-18150-102
SYS. NO. 2 SUCTION PRESSURE TRANSDUCER
SYS. NO. 2 DISCHARGE PRESSURE TRANSDUCER
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 1 SUCTION TEMP. SENSOR
SYS. NO. 2 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 2 SUCTION TEMP. SENSOR
SYS. #2 ALARM
SYS. #1 ALARM
SYS.#2 CHILLER RUN
SYS.#1 CHILLER RUN
EVAP PUMP START
115VAC
24VAC
BLK (INPUT)
RED (+5V)
BLK (GND)
DRAIN (GND)
ORN/WHT (INPUT)

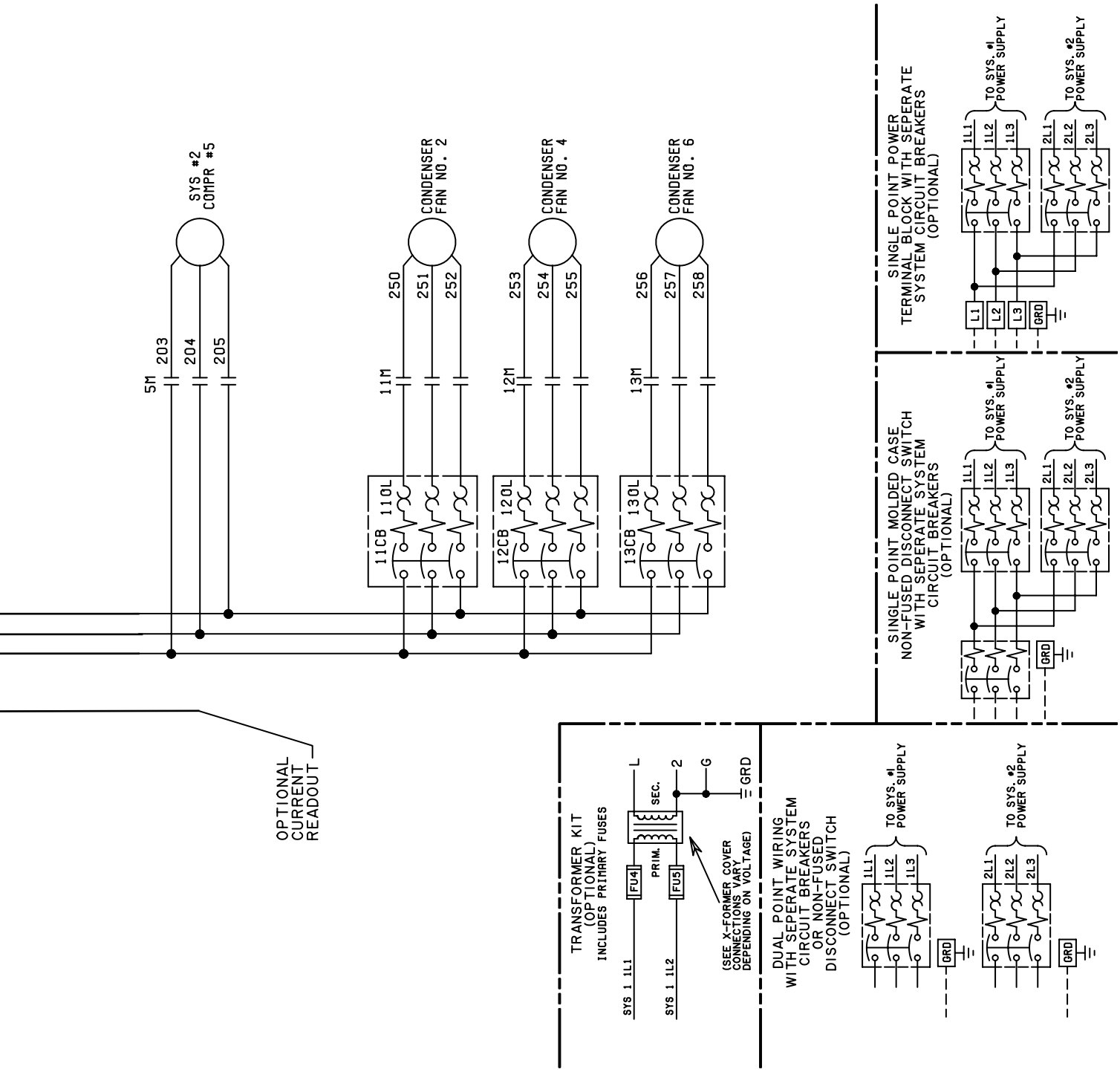
6

ELEMENTARY DIAGRAM
YCAL0090E_ – YCAL0094E_



LD08832

FIG. 34 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0090E_ - YCAL0094E_


OPTIONAL CURRENT READOUT
5M
203
204
205
SYS #2 COMPR #5
11M
250
251
252
CONDENSER FAN NO. 2
12M
253
254
255
CONDENSER FAN NO. 4
13M
256
257
258
CONDENSER FAN NO. 6
11CB
110L
12CB
120L
13CB
130L
SINGLE POINT POWER TERMINAL BLOCK WITH SEPERATE SYSTEM CIRCUIT BREAKERS (OPTIONAL)
L1
L2
L3
GRD
1L1
1L2
1L3
2L1
2L2
2L3
TO SYS. #1 POWER SUPPLY
TO SYS. #2 POWER SUPPLY
SINGLE POINT MOLDED CASE NON-FUSED DISCONNECT SWITCH WITH SEPERATE SYSTEM CIRCUIT BREAKERS (OPTIONAL)
TRANSFORMER KIT (OPTIONAL) INCLUDES PRIMARY FUSES
SYS 1 1L1
SYS 1 1L2
FU4
FU5
PRIM.
SEC.
L
2
G
GRD
(SEE X-FORMER COVER CONNECTIONS VARY DEPENDING ON VOLTAGE)
DUAL POINT WIRING WITH SEPERATE SYSTEM CIRCUIT BREAKERS OR NON-FUSED DISCONNECT SWITCH (OPTIONAL)

LD08833

CONNECTION DIAGRAM
YCAL0090E_ – YCAL0094E_

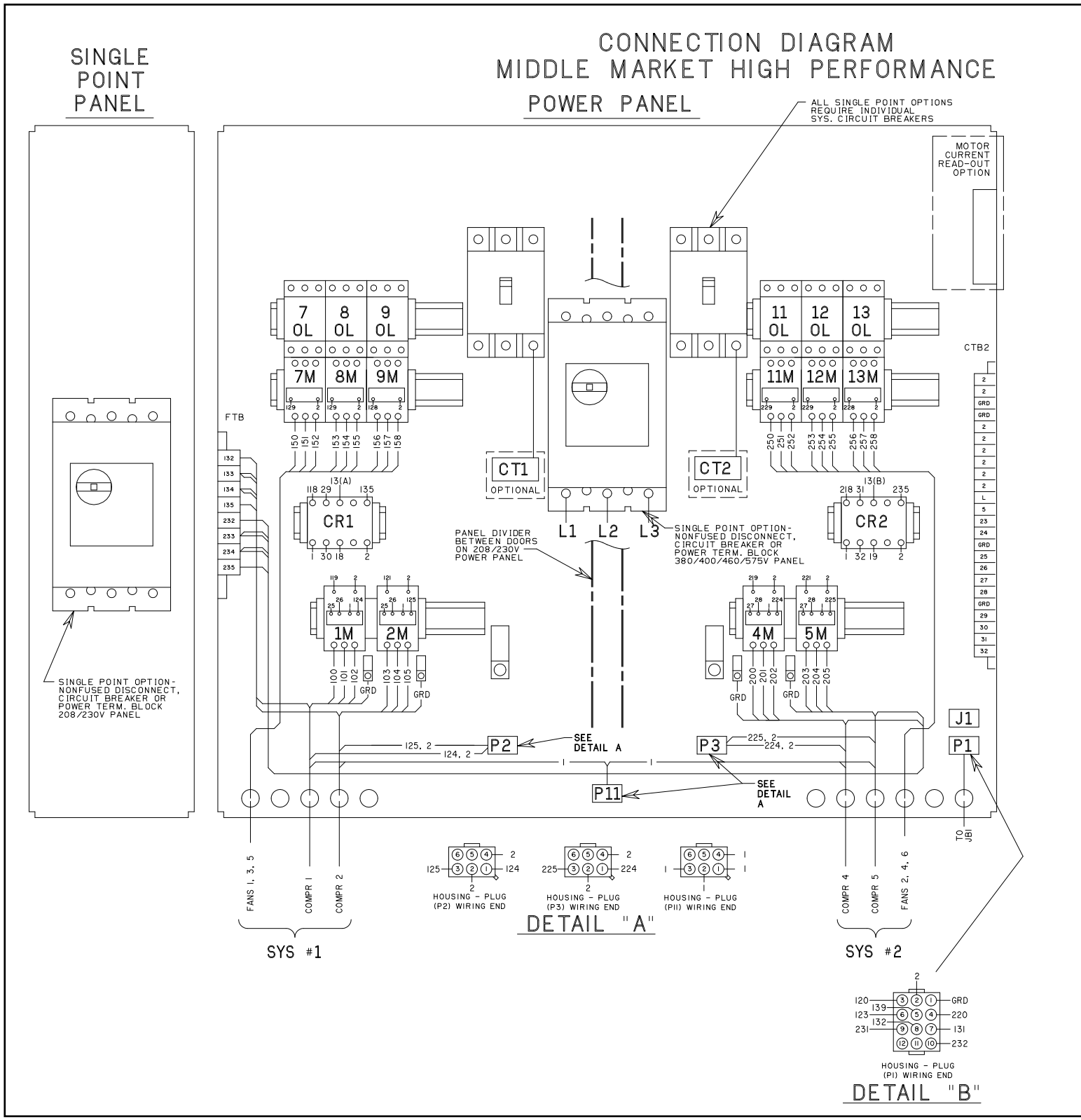
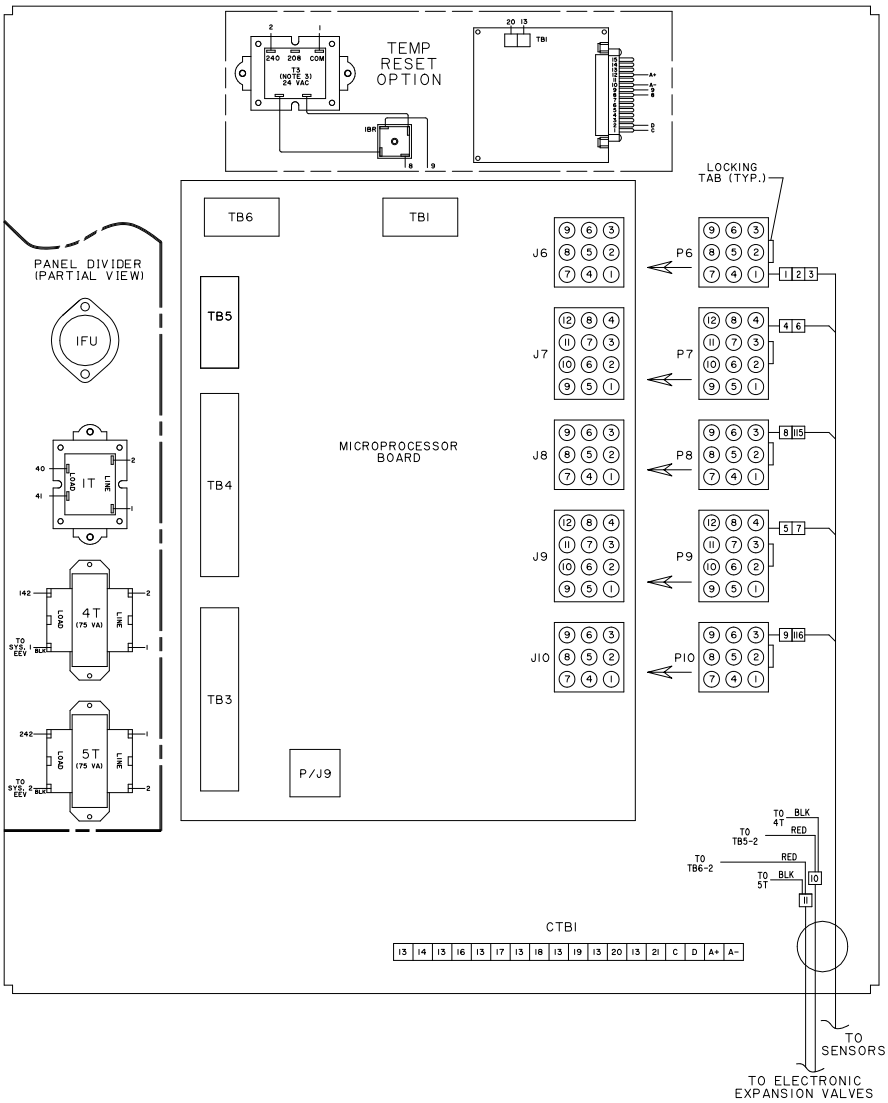


FIG. 35 – CONNECTION DIAGRAM, MIDDLE MARKET HIGH PERFORMANCE – YCAL0090E_ - YCAL0094E_

035-21610-104
REV -

MICRO PANEL



ELEMENTARY DIAGRAM
YCAL0104E_

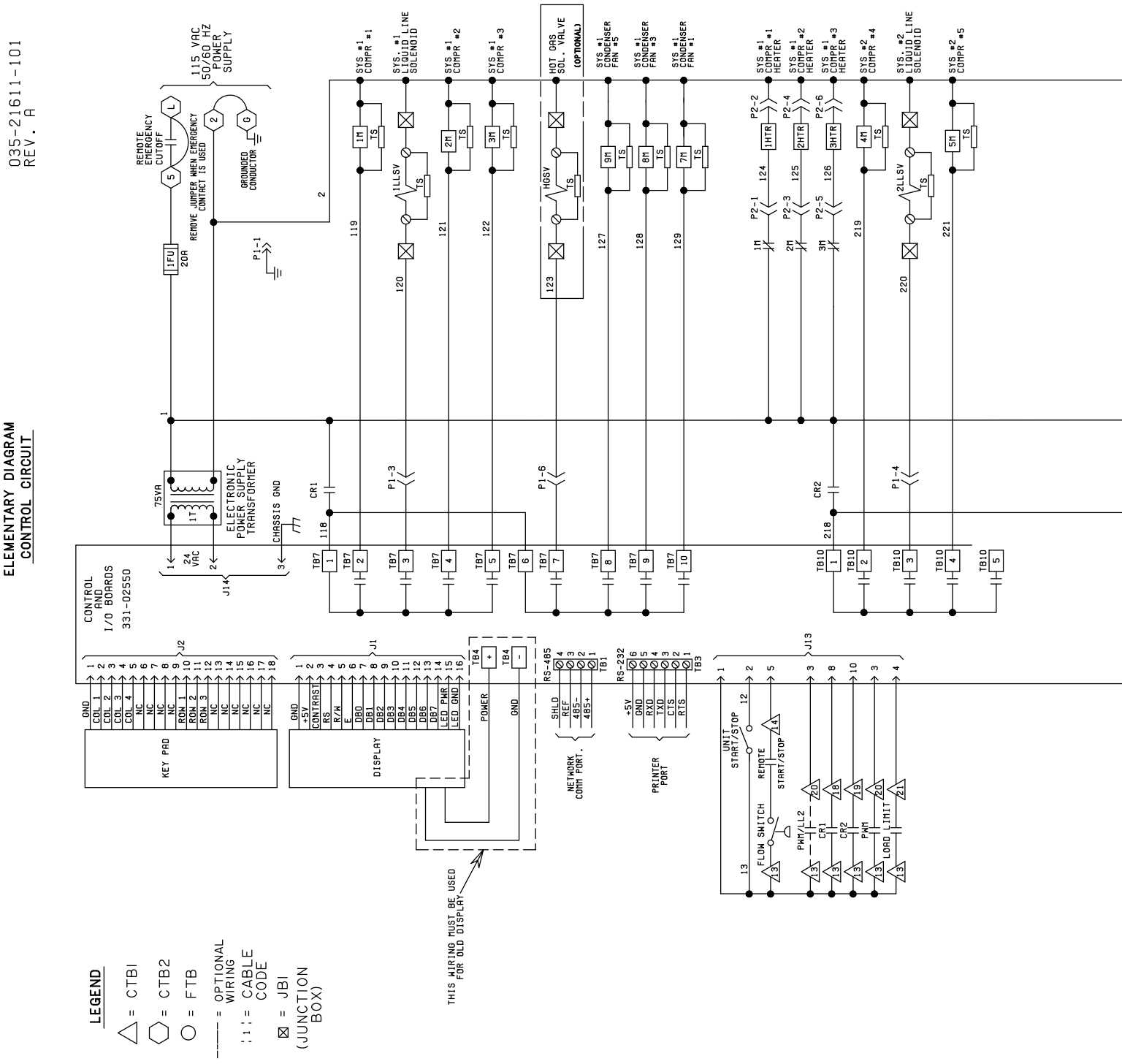
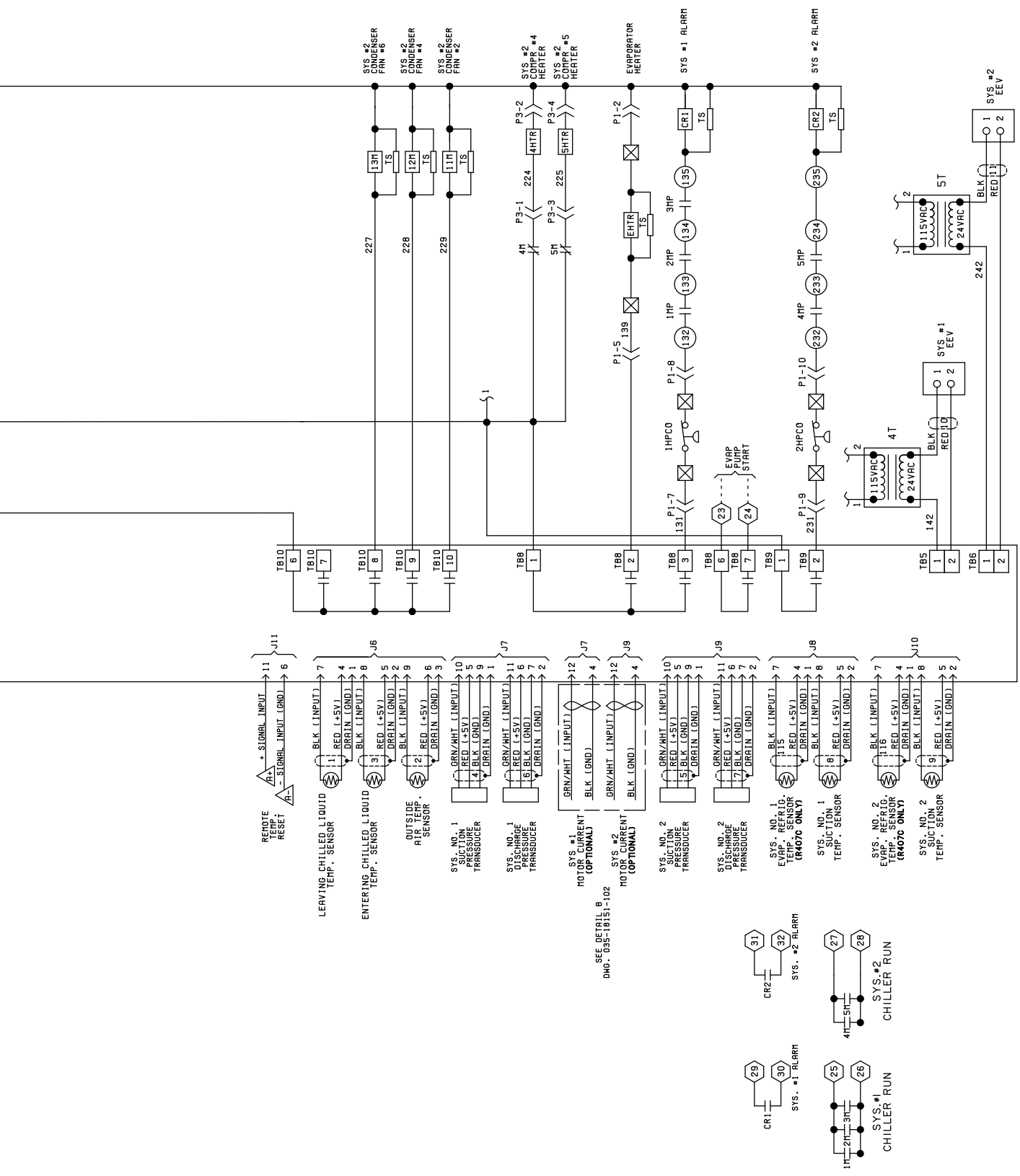


FIG. 36 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0104E_


SYS #2 CONDENSER FAN #6
SYS #2 CONDENSER FAN #4
SYS #2 CONDENSER FAN #2
SYS #2 COMPR #4 HEATER
SYS #2 COMPR #5 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
SYS #2 ALARM
SYS #2 EEV
SYS #1 EEV
REMOTE TEMP. RESET
+ SIGNAL INPUT
- SIGNAL INPUT (GND)
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER
SYS #1 MOTOR CURRENT (OPTIONAL)
SYS #2 MOTOR CURRENT (OPTIONAL)
SEE DETAIL B DWG. 035-18151-102
SYS. NO. 2 SUCTION PRESSURE TRANSDUCER
SYS. NO. 2 DISCHARGE PRESSURE TRANSDUCER
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 1 SUCTION TEMP. SENSOR
SYS. NO. 2 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 2 SUCTION TEMP. SENSOR
SYS. #2 ALARM
SYS. #1 ALARM
SYS.#2 CHILLER RUN
SYS.#1 CHILLER RUN
1HPCO
2HPCO
EVAP PUMP START
115VAC
24VAC

ELEMENTARY DIAGRAM
YCAL0104E_

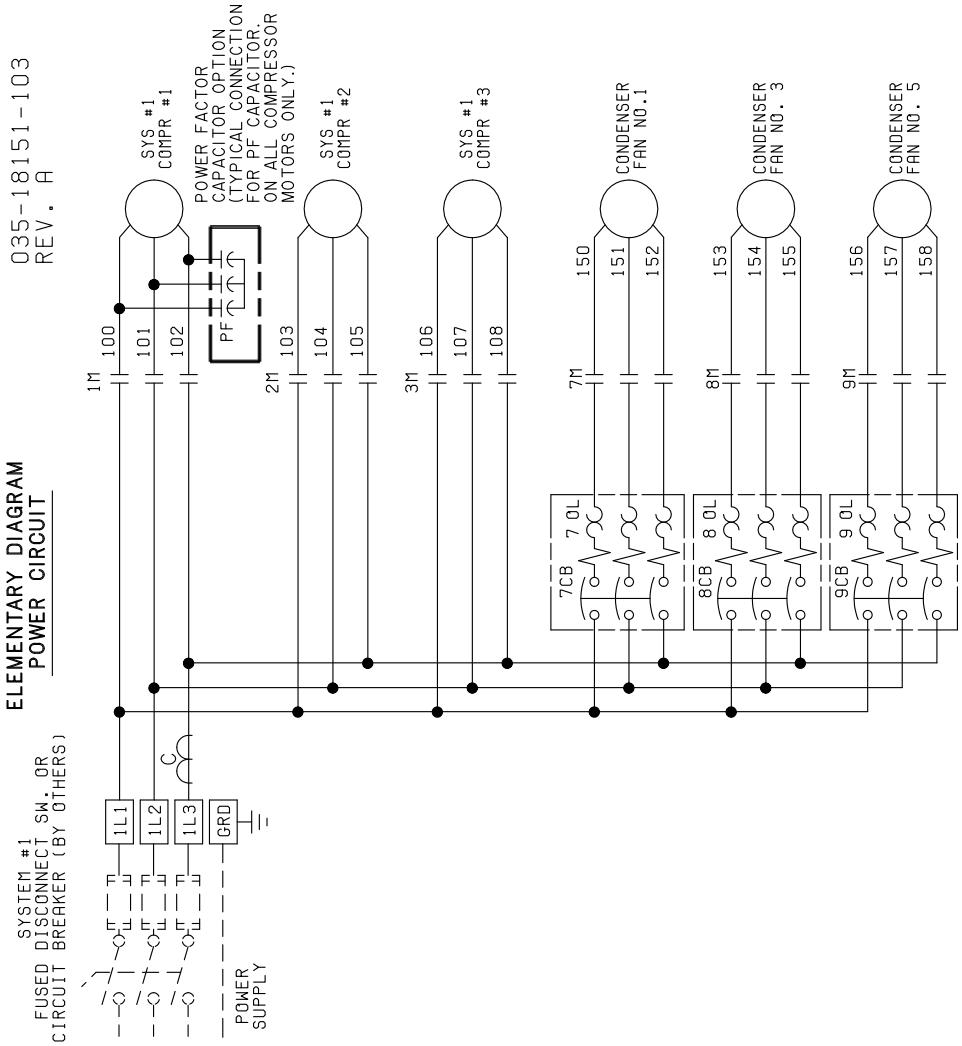
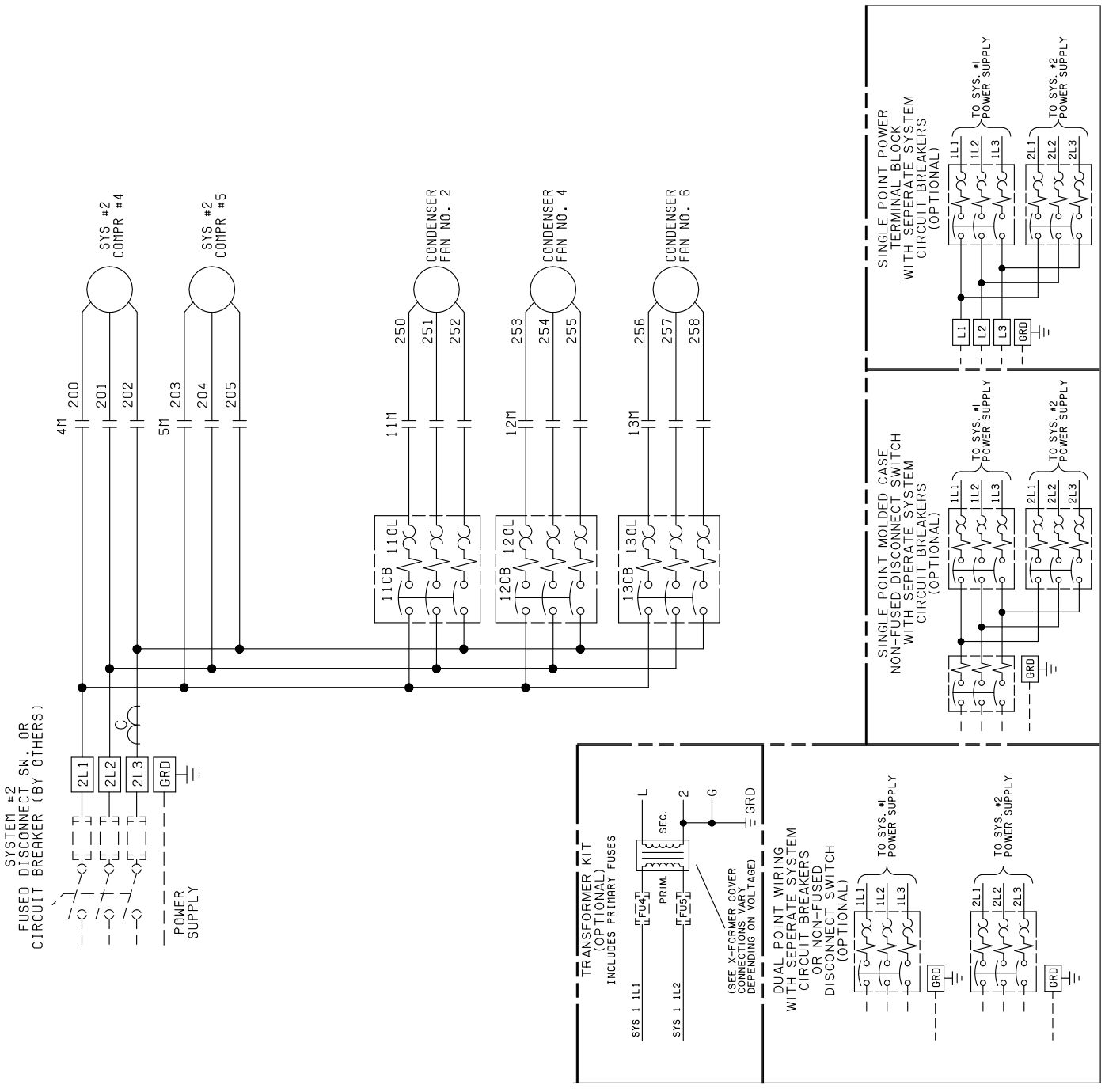


FIG. 37 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0104E_


SYSTEM #2
FUSED DISCONNECT SW. OR
CIRCUIT BREAKER (BY OTHERS)
2L1
2L2
2L3
GRD
POWER
SUPPLY
4M
200
201
202
SYS #2
COMPR #4
5M
203
204
205
SYS #2
COMPR #5
11M
250
251
252
11CB
110L
CONDENSER
FAN NO. 2
12M
253
254
255
12CB
120L
CONDENSER
FAN NO. 4
13M
256
257
258
13CB
130L
CONDENSER
FAN NO. 6
TRANSFORMER KIT
(OPTIONAL)
INCLUDES PRIMARY FUSES
SYS 1 1L1
SYS 1 1L2
PRIM.
SEC.
L
2
G
GRD
(SEE X-FORMER COVER
CONNECTIONS VARY
DEPENDING ON VOLTAGE)
DUAL POINT WIRING
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
OR NON-FUSED
DISCONNECT SWITCH
(OPTIONAL)
1L1
1L2
1L3
TO SYS. #1
POWER SUPPLY
2L1
2L2
2L3
TO SYS. #2
POWER SUPPLY
GRD
SINGLE POINT MOLDED CASE
NON-FUSED DISCONNECT SWITCH
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
SINGLE POINT POWER
TERMINAL BLOCK
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
L1
L2
L3
GRD

6

CONNECTION DIAGRAM
YCAL0104E_

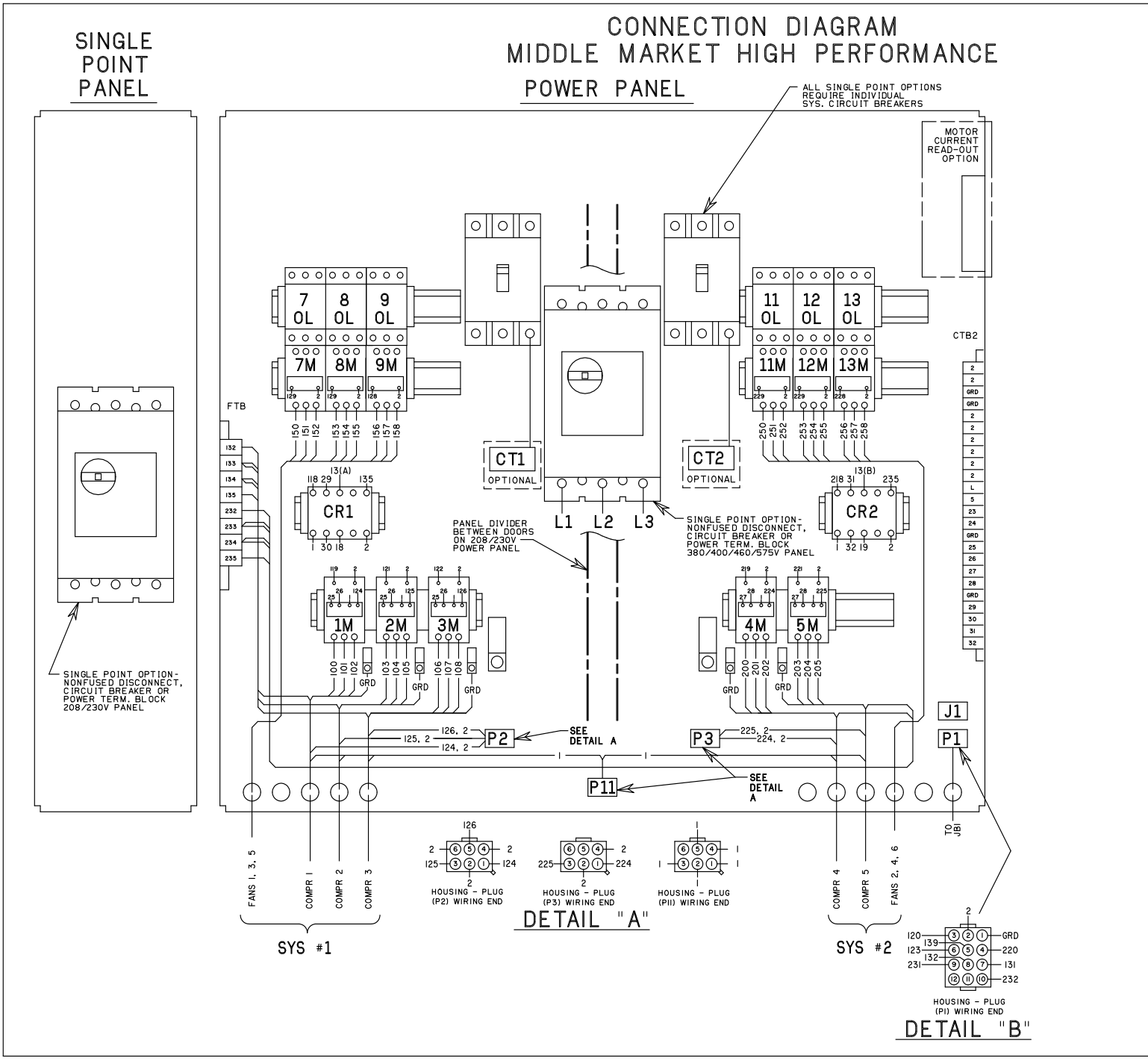
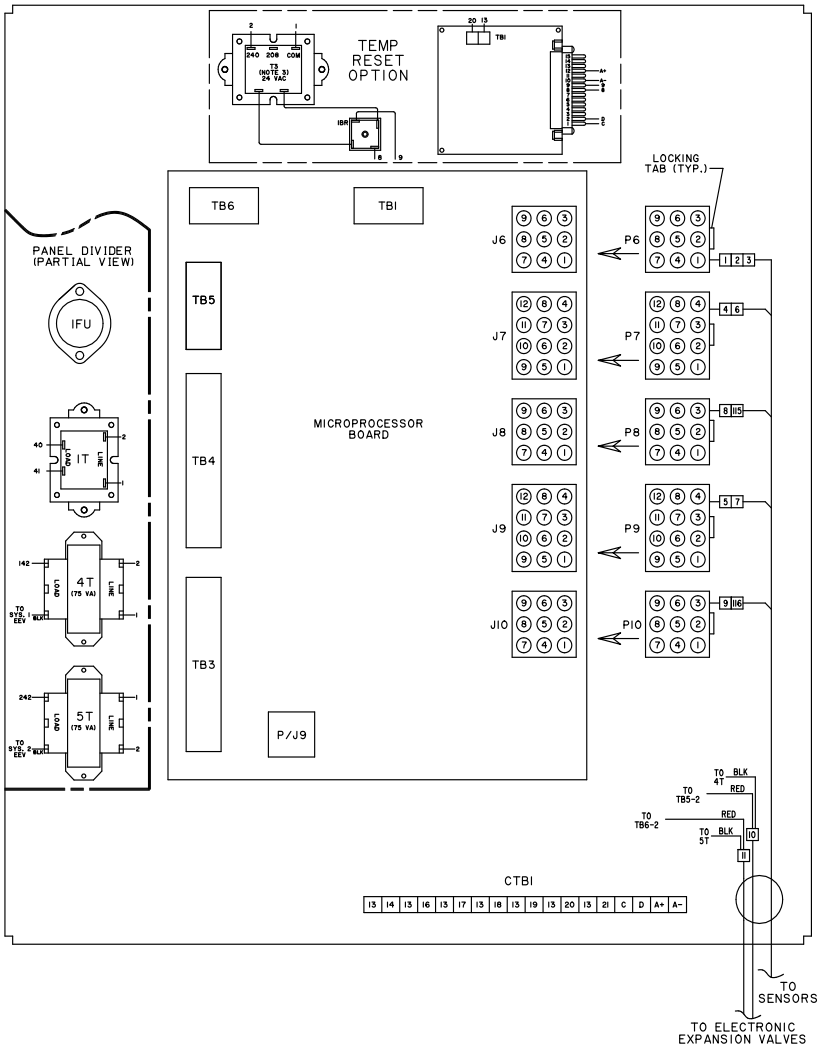


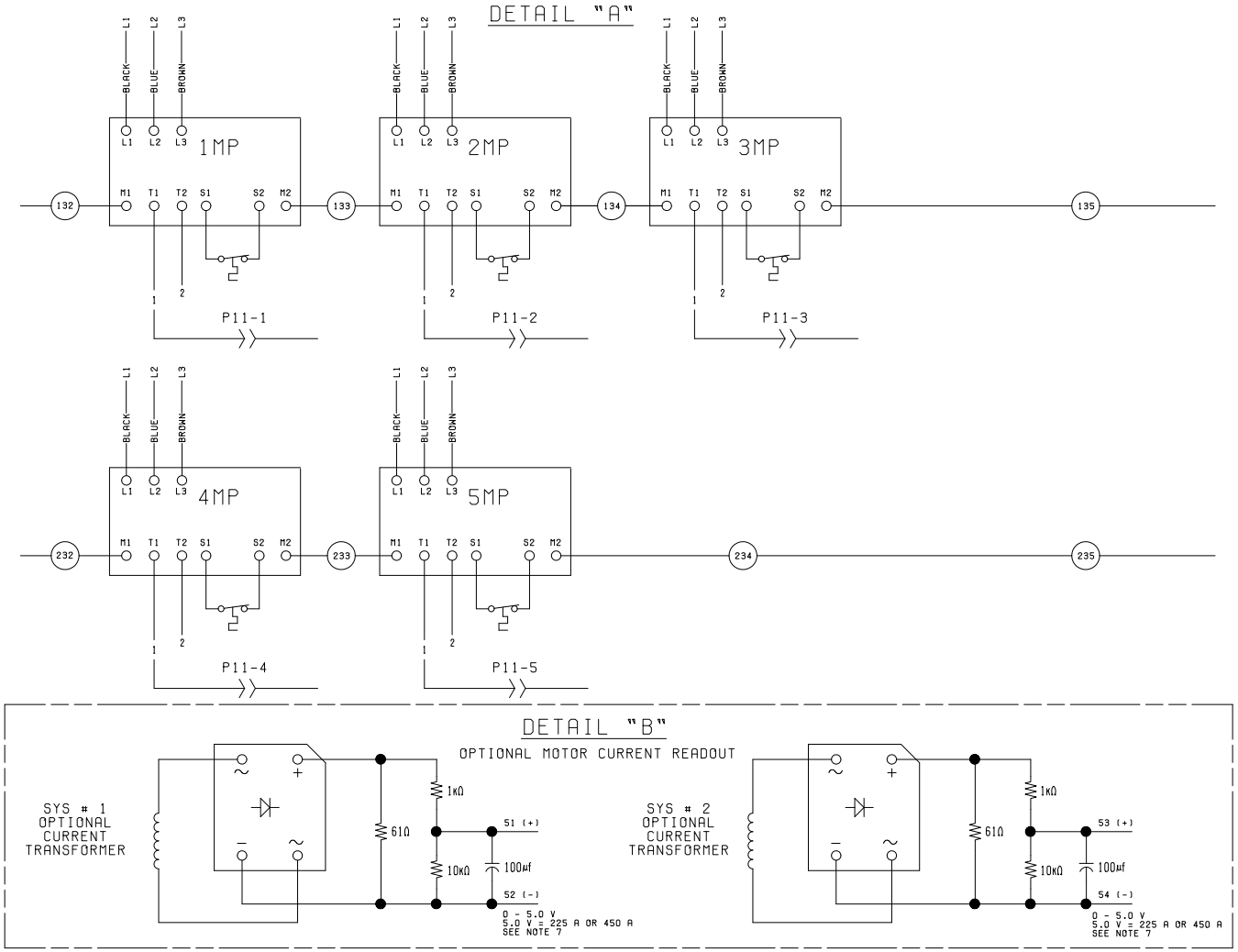
FIG. 38 – CONNECTION DIAGRAM, MIDDLE MARKET HIGH PERFORMANCE – YCAL0104E_

035-21611-104
REV -

MICRO PANEL



ELEMENTARY DIAGRAM
YCAL0104E_



Notes:

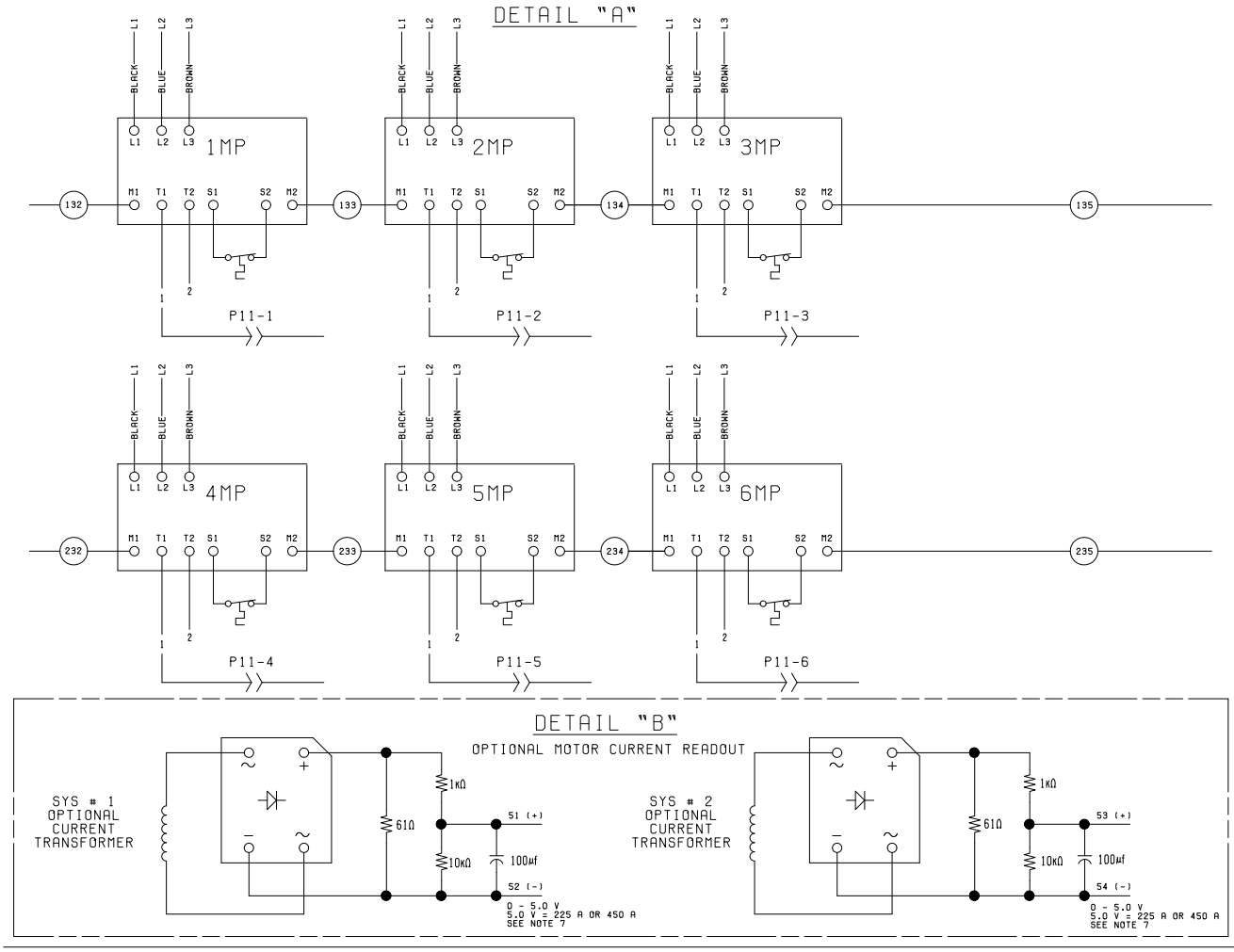
1. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.
2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.
3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.
4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.
5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.
6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.
7. Optional current readout. 5V = 225A for 380, 400, 460 & 575V.
   5V = 450A for 200 & 230V chillers..
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
—— - ——	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 39 – ELEMENTARY DIAGRAM, MIDDLE MARKET HIGH PERFORMANCE– YCAL0104E_

ELEMENTARY DIAGRAM
YCAL0114E_ – YCAL0134E_



Notes:

1. Field wiring to be in accordance with the current edition of the National Electrical Code as well as all other applicable codes and specifications.
2. Contacts must be suitable for switching 24VDC (gold contacts recommended). Wiring shall not be run in the same conduit with any line voltage (class 1) wiring.
3. To cycle unit ON and OFF automatically with contact shown, install a cycling device in series with the flow switch. See Note 2 for contact rating and wiring specifications.
4. To stop unit (emergency stop) with contacts other than those shown, install the stop contact between terminals 5 and 1. If a stop device is not installed, a jumper must be connected between terminals 5 and 1. Device must have a minimum contact rating of 6A at 115VAC.
5. Contacts are rated at 115V, 100VA, resistive load only, and must be suppressed at load by user.
6. See Installation Operation and Maintenance manual when feeding analog signal for Remote Temp. Reset.
7. Optional current readout. 5V = 225A for 380, 400, 460 & 575V.
   5V = 450A for 200 & 230V chillers..
8. 1MP thru 6MP are contained in their respective compressor junction boxes.

LEGEND

TS	Transient Voltage Suppression.
⬡	Terminal Block for customer connections.
△	Terminal Block for customer low voltage (class 2) connections. *See Note 2.*
○	Terminal block for YORK connections only.
———	Wiring and components by YORK.
— — —	Optional equipment.
— — —	Wiring and/or components by others.

FIG. 40 – ELEMENTARY DIAGRAM, MIDDLE MARKET HIGH PERFORMANCE – YCAL0114E_ - YCAL0134E_

ELEMENTARY DIAGRAM
YCAL0114E_ – YCAL0134E_

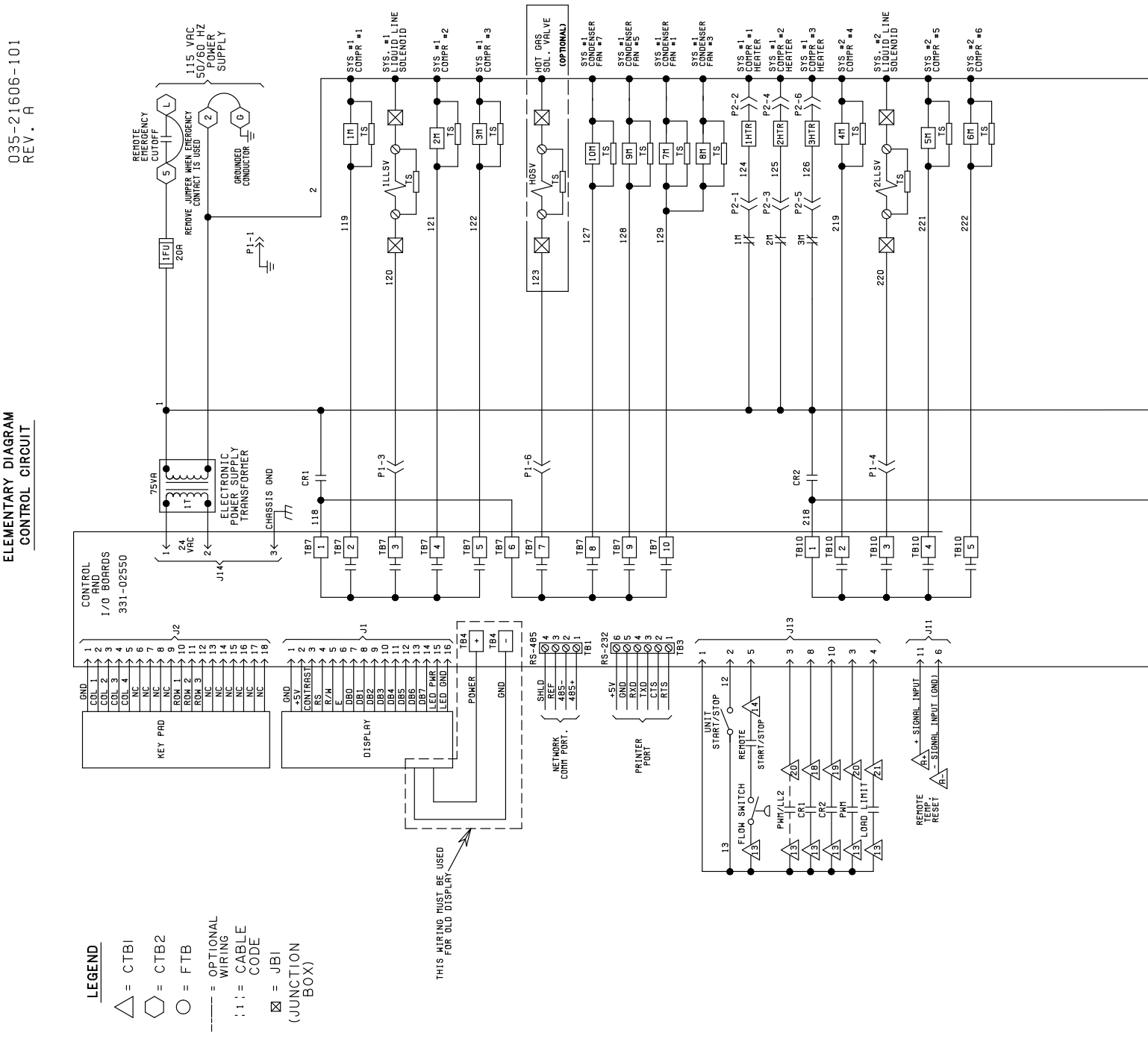
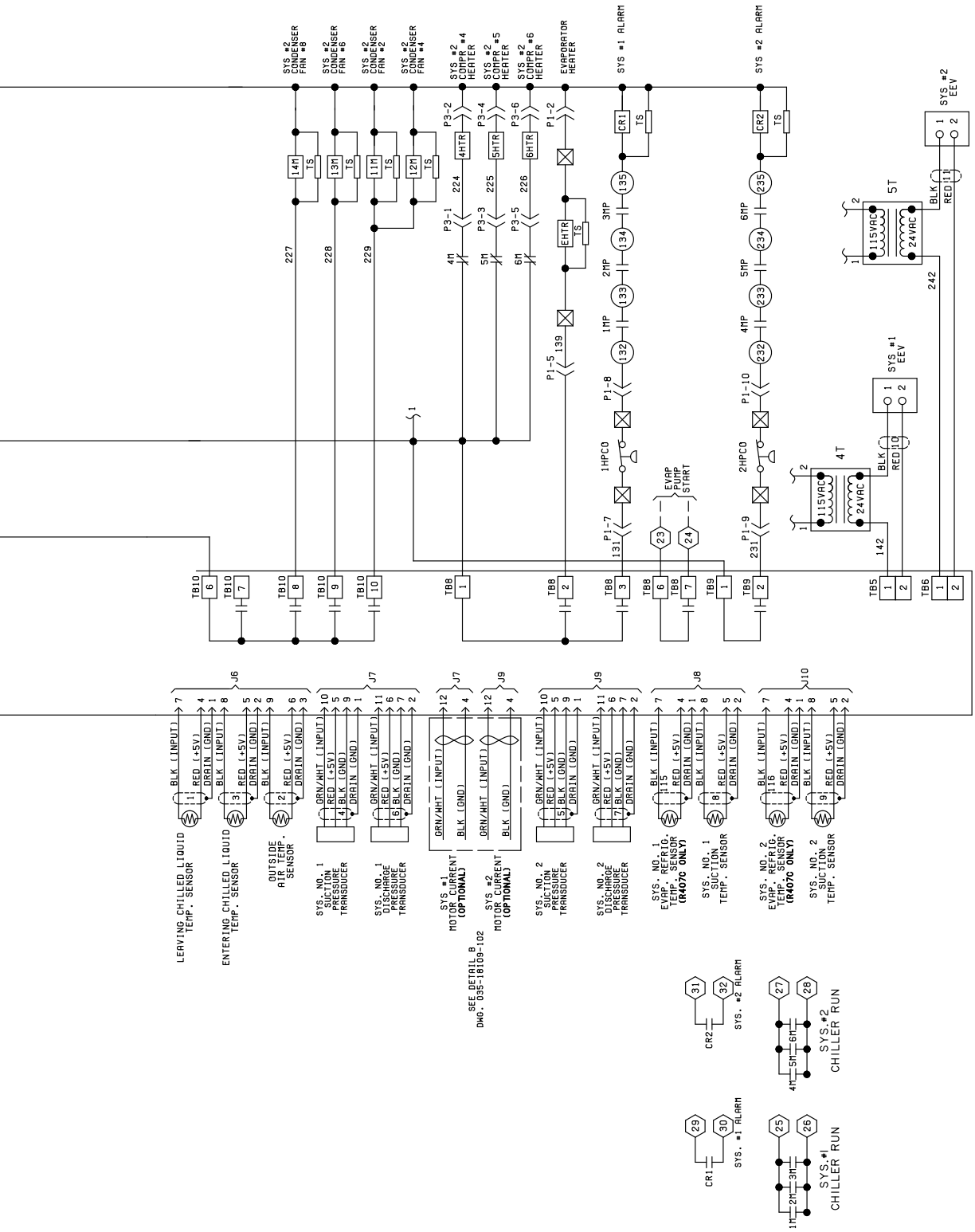


FIG. 41 – ELEMENTARY DIAGRAM, CONTROL CIRCUIT – YCAL0114E_ - YCAL0134E_


SYS #2 CONDENSER FAN #8
SYS #2 CONDENSER FAN #6
SYS #2 CONDENSER FAN #2
SYS #2 CONDENSER FAN #4
SYS #2 COMPR #4 HEATER
SYS #2 COMPR #5 HEATER
SYS #2 COMPR #6 HEATER
EVAPORATOR HEATER
SYS #1 ALARM
SYS #2 ALARM
SYS #2 EEV
SYS #1 EEV
LEAVING CHILLED LIQUID TEMP. SENSOR
ENTERING CHILLED LIQUID TEMP. SENSOR
OUTSIDE AIR TEMP. SENSOR
SYS. NO. 1 SUCTION PRESSURE TRANSDUCER
SYS. NO. 1 DISCHARGE PRESSURE TRANSDUCER
SYS. #1 MOTOR CURRENT (OPTIONAL)
SYS. #2 MOTOR CURRENT (OPTIONAL)
SEE DETAIL B DWG. 035-18109-102
SYS. NO. 2 SUCTION PRESSURE TRANSDUCER
SYS. NO. 2 DISCHARGE PRESSURE TRANSDUCER
SYS. NO. 1 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 1 SUCTION TEMP. SENSOR
SYS. NO. 2 EVAP. REFRIG. TEMP. SENSOR (R407C ONLY)
SYS. NO. 2 SUCTION TEMP. SENSOR
1HPCO
2HPCO
EVAP PUMP START
SYS. #2 ALARM
SYS. #1 ALARM
SYS.#2 CHILLER RUN
SYS.#1 CHILLER RUN

6

ELEMENTARY DIAGRAM
YCAL0114E_ – YCAL0134E_

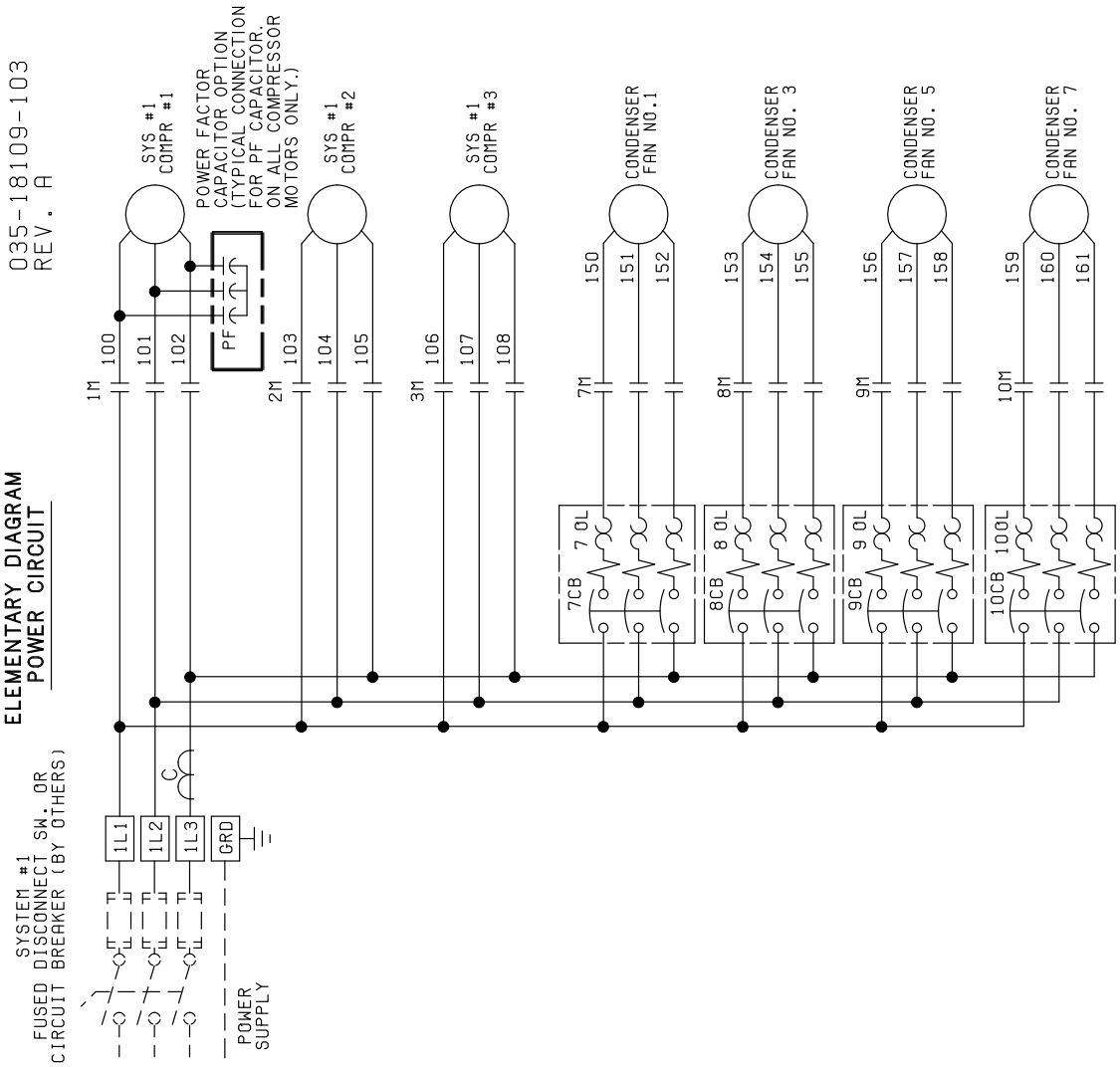
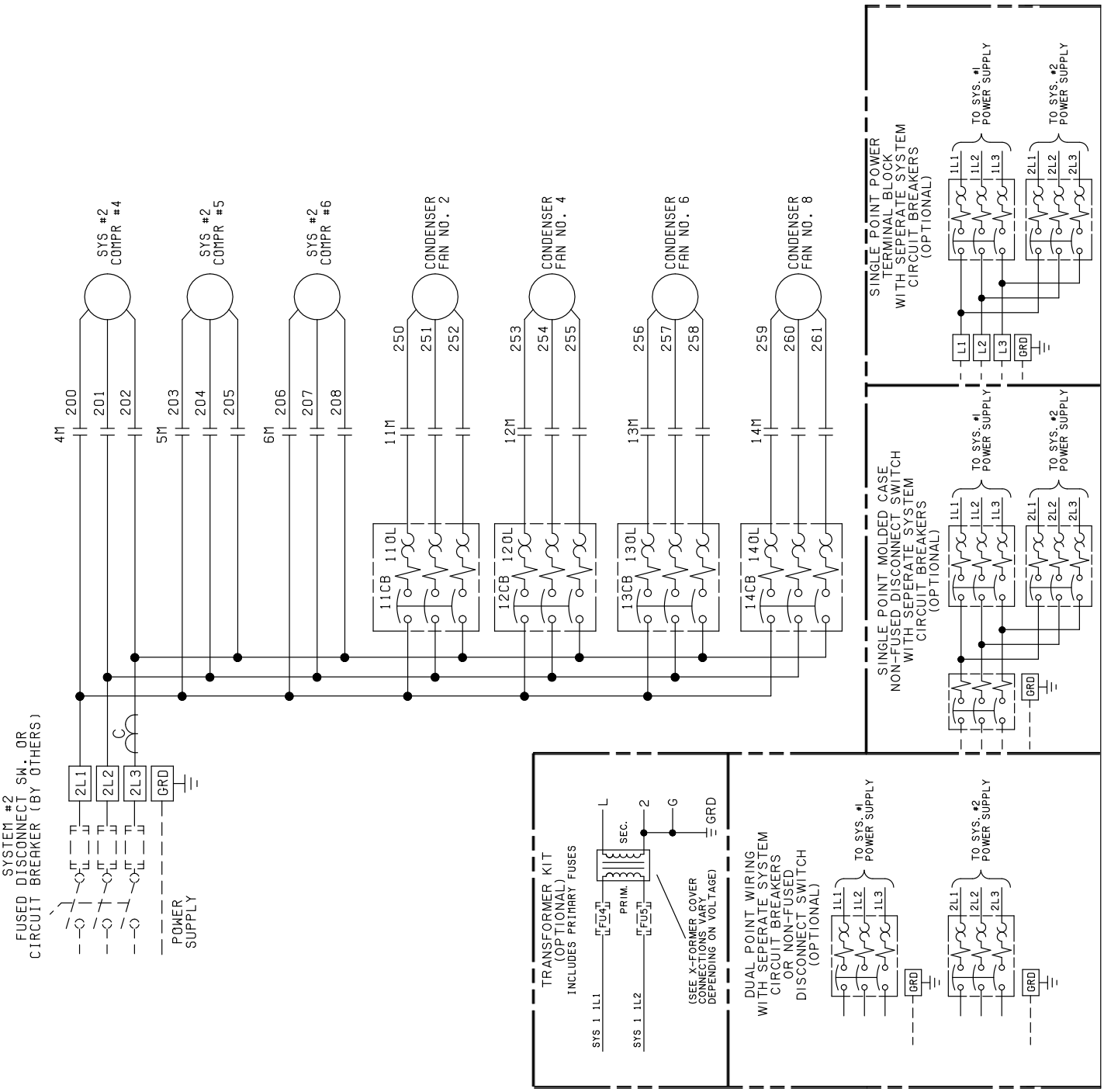


FIG. 42 – ELEMENTARY DIAGRAM, POWER CIRCUIT – YCAL0114E_ - YCAL0134E_


SYSTEM #2
FUSED DISCONNECT SW. OR
CIRCUIT BREAKER (BY OTHERS)
POWER
SUPPLY
2L1
2L2
2L3
GRD
C
4M
5M
6M
11M
12M
13M
14M
200
201
202
203
204
205
206
207
208
250
251
252
253
254
255
256
257
258
259
260
261
SYS #2
COMPR #4
SYS #2
COMPR #5
SYS #2
COMPR #6
CONDENSER
FAN NO. 2
CONDENSER
FAN NO. 4
CONDENSER
FAN NO. 6
CONDENSER
FAN NO. 8
11CB
110L
12CB
120L
13CB
130L
14CB
140L
SINGLE POINT POWER
TERMINAL BLOCK
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
SINGLE POINT MOLDED CASE
NON-FUSED DISCONNECT SWITCH
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
(OPTIONAL)
TRANSFORMER KIT
(OPTIONAL)
INCLUDES PRIMARY FUSES
SYS 1 1L1
SYS 1 1L2
FU4
FU5
PRIM.
SEC.
L
2
G
GRD
(SEE X-FORMER COVER
CONNECTIONS VARY
DEPENDING ON VOLTAGE)
DUAL POINT WIRING
WITH SEPERATE SYSTEM
CIRCUIT BREAKERS
OR NON-FUSED
DISCONNECT SWITCH
(OPTIONAL)
TO SYS. #1
POWER SUPPLY
TO SYS. #2
POWER SUPPLY
1L1
1L2
1L3
2L1
2L2
2L3
L1
L2
L3
GRD

6

CONNECTION DIAGRAM
YCAL0114E_ – YCAL0134E_

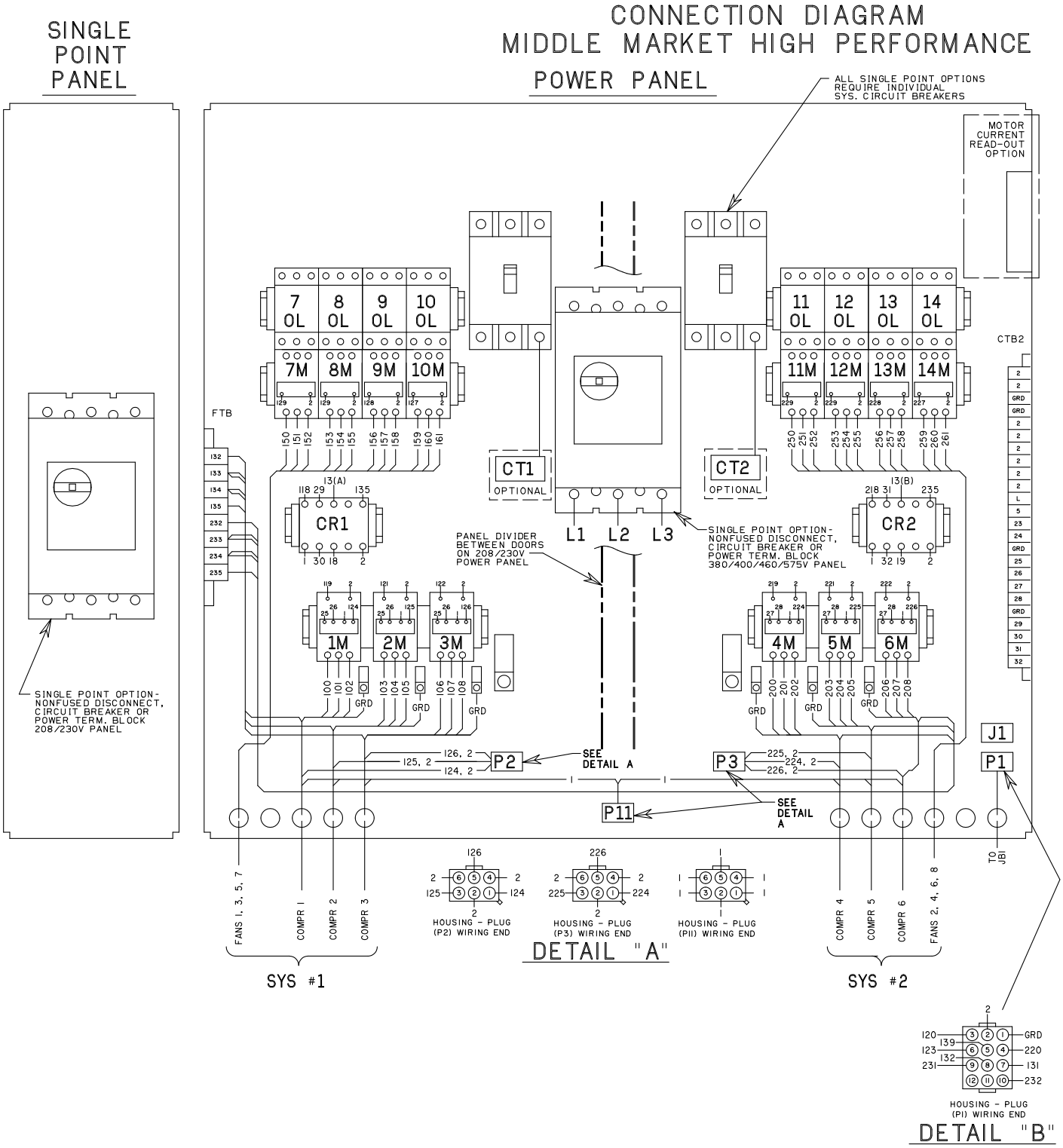
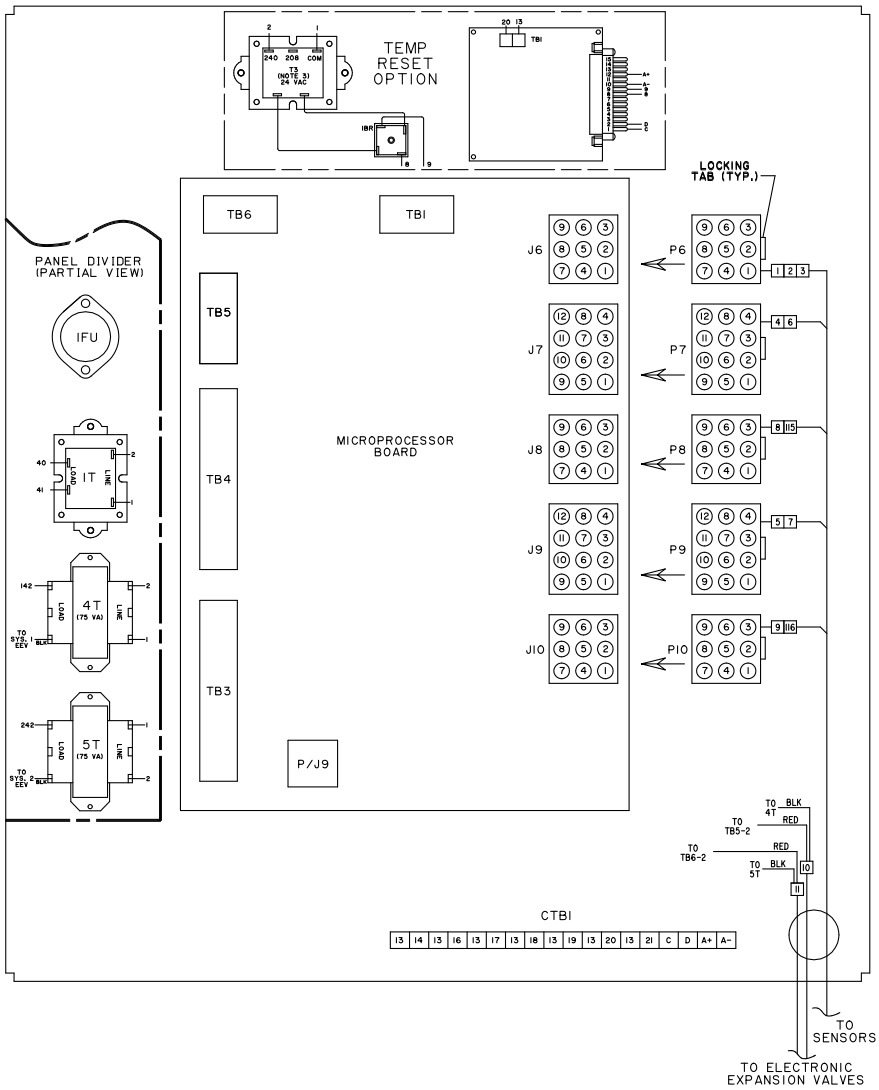


FIG. 43 – CONNECTION DIAGRAM, MIDDLE MARKET HIGH PERFORMANCE – YCAL0114E_ - YCAL0134E_

035-21606-104
REV -

MICRO PANEL



6

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SECTION 7 - ISOLATOR DATA

WEIGHT DISTRIBUTION

ALUMINUM FIN COILS

English Units

ALUMINUM FIN COIL WEIGHT DISTRIBUTION (LBS)									
YCAL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
0014	668	524	760	596	---	---	---	---	2,548
0020	672	527	765	600	---	---	---	---	2,564
0024	776	615	864	685	---	---	---	---	2,940
0030	758	680	842	755	---	---	---	---	3,036
0034	882	789	903	807	---	---	---	---	3,381
0040	1,261	1,200	1,266	1,204	---	---	---	---	4,931
0042	1,283	1,223	1,274	1,214	---	---	---	---	4,994
0044	1,292	1,235	1,297	1,239	---	---	---	---	5,064
0050	1,318	1,263	1,311	1,256	---	---	---	---	5,148
0060	1,333	1,280	1,338	1,284	---	---	---	---	5,236
0064	1,655	1,466	1,637	1,450	---	---	---	---	6,208
0070	1,688	1,501	1,692	1,505	---	---	---	---	6,386
0074	1,742	1,552	1,727	1,538	---	---	---	---	6,558
0080	1,792	1,593	1,797	1,597	---	---	---	---	6,779
0090	1,307	1,172	1,037	1,249	1,155	1,061	---	---	6,981
0094	1,292	1,188	1,082	1,269	1,166	1,062	---	---	7,059
0104	1,344	1,133	923	712	1,246	1,050	855	660	7,923
0114	1,531	1,326	1,121	916	1,439	1,246	1,053	860	9,491
0124	1,644	1,403	1,162	921	1,490	1,271	1,053	835	9,779
0134	1,704	1,469	1,235	1,000	1,499	1,293	1,086	880	10,167

SI Units

ALUMINUM FIN COIL WEIGHT DISTRIBUTION (KG)									
YCAL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
0014	303	238	345	270	---	---	---	---	1,156
0020	305	239	347	272	---	---	---	---	1,163
0024	352	279	392	311	---	---	---	---	1,333
0030	344	309	382	343	---	---	---	---	1,377
0034	400	358	410	366	---	---	---	---	1,534
0040	572	544	574	546	---	---	---	---	2,236
0042	582	555	578	551	---	---	---	---	2,265
0044	586	560	588	562	---	---	---	---	2,297
0050	598	573	595	570	---	---	---	---	2,335
0060	605	581	607	583	---	---	---	---	2,375
0064	751	665	742	658	---	---	---	---	2,816
0070	766	681	768	683	---	---	---	---	2,897
0074	790	704	783	698	---	---	---	---	2,975
0080	813	723	815	724	---	---	---	---	3,075
0090	593	532	470	567	524	481	---	---	3,167
0094	586	539	491	576	529	482	---	---	3,202
0104	610	514	419	323	565	476	388	299	3,594
0114	694	601	508	415	653	565	478	390	4,305
0124	746	636	527	418	676	577	478	379	4,436
0134	773	667	560	454	680	586	493	399	4,612

WEIGHT DISTRIBUTION (CONT'D)

COPPER FIN COILS

English Units

COPPER FIN COIL WEIGHT DISTRIBUTION (LBS)									
YCAL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
0014	718	581	809	654	---	---	---	---	2,762
0020	722	584	814	658	---	---	---	---	2,778
0024	854	704	941	776	---	---	---	---	3,275
0030	830	776	912	853	---	---	---	---	3,371
0034	954	885	974	904	---	---	---	---	3,717
0040	1,354	1,292	1,358	1,296	---	---	---	---	5,300
0042	1,375	1,315	1,366	1,307	---	---	---	---	5,363
0044	1,384	1,327	1,389	1,332	---	---	---	---	5,433
0050	1,410	1,355	1,403	1,348	---	---	---	---	5,517
0060	1,426	1,372	1,430	1,377	---	---	---	---	5,605
0064	1,766	1,577	1,747	1,561	---	---	---	---	6,651
0070	1,799	1,612	1,803	1,616	---	---	---	---	6,829
0074	1,852	1,662	1,838	1,649	---	---	---	---	7,001
0080	1,903	1,704	1,907	1,708	---	---	---	---	7,222
0090	1,427	1,310	1,193	1,409	1,293	1,177	---	---	7,809
0094	1,414	1,326	1,237	1,391	1,304	1,216	---	---	7,888
0104	1,460	1,251	1,041	832	1,364	1,169	973	777	8,867
0114	1,688	1,483	1,279	1,074	1,597	1,404	1,210	1,017	10,751
0124	1,799	1,560	1,320	1,081	1,649	1,430	1,210	990	11,039
0134	1,859	1,626	1,393	1,160	1,659	1,451	1,243	1,035	11,427

SI Units

COPPER FIN COIL WEIGHT DISTRIBUTION (KG)									
YCAL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
0014	326	263	367	297	---	---	---	---	1,253
0020	327	265	369	299	---	---	---	---	1,260
0024	387	319	427	352	---	---	---	---	1,486
0030	377	352	414	387	---	---	---	---	1,529
0034	433	402	442	410	---	---	---	---	1,686
0040	614	586	616	588	---	---	---	---	2,404
0042	624	597	620	593	---	---	---	---	2,432
0044	628	602	630	604	---	---	---	---	2,464
0050	640	615	637	612	---	---	---	---	2,502
0060	647	622	649	624	---	---	---	---	2,542
0064	801	715	793	708	---	---	---	---	3,017
0070	816	731	818	733	---	---	---	---	3,098
0074	840	754	833	748	---	---	---	---	3,176
0080	863	773	865	775	---	---	---	---	3,276
0090	647	594	541	639	586	534	---	---	3,542
0094	641	601	561	631	591	552	---	---	3,578
0104	662	567	472	377	619	530	441	352	4,022
0114	765	673	580	487	724	637	549	461	4,877
0124	816	707	599	490	748	648	549	449	5,007
0134	843	738	632	526	752	658	564	470	5,183

ISOLATOR SELECTIONS

ALUMINUM FIN COILS

1" DEFLECTION ISOLATOR SELECTION - VMC TYPE								
YCAL	VMC TYPE CP-X-XX							
	A	B	C	D	E	F	G	H
0014	CP-1-27	CP-1-26	CP-1-28	CP-1-27	---	---	---	---
0020	CP-1-27	CP-1-26	CP-1-28	CP-1-27	---	---	---	---
0024	CP-1-28	CP-1-27	CP-1-28	CP-1-28	---	---	---	---
0030	CP-1-28	CP-1-27	CP-1-28	CP-1-28	---	---	---	---
0034	CP-1-28	CP-1-28	CP-1-31	CP-1-28	---	---	---	---
0040	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0042	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0044	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0050	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0060	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0064	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0070	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0074	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0080	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0090	CP-2-27	CP-2-27	CP-2-26	CP-2-27	CP-2-27	CP-2-26	---	---
0094	CP-2-27	CP-2-27	CP-2-26	CP-2-27	CP-2-27	CP-2-26	---	---
0104	CP-2-27	CP-2-27	CP-2-26	CP-2-25	CP-2-27	CP-2-26	CP-2-26	CP-2-25
0114	CP-2-28	CP-2-27	CP-2-27	CP-2-26	CP-2-27	CP-2-27	CP-2-26	CP-2-25
0124	CP-2-28	CP-2-27	CP-2-27	CP-2-26	CP-2-27	CP-2-27	CP-2-26	CP-2-25
0134	CP-2-28	CP-2-27	CP-2-27	CP-2-26	CP-2-27	CP-2-27	CP-2-26	CP-2-25

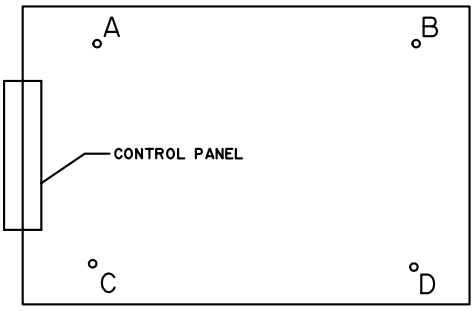
SEISMIC ISOLATOR SELECTION - VMC TYPE								
YCAL	SEISMIC ISOLATOR SELECTION - VMC TYPE							
	A	B	C	D	E	F	G	H
0014	AEQM-97	AEQM-96	AEQM-98	AEQM-97	---	---	---	---
0020	AEQM-97	AEQM-96	AEQM-98	AEQM-97	---	---	---	---
0024	AEQM-98	AEQM-97	AEQM-98	AEQM-98	---	---	---	---
0030	AEQM-98	AEQM-97	AEQM-98	AEQM-98	---	---	---	---
0034	AEQM-98	AEQM-98	AEQM-99	AEQM-98	---	---	---	---
0040	AEQM-1300	AEQM-1300	AEQM-1300	AEQM-1300	---	---	---	---
0042	AEQM-1300	AEQM-1300	AEQM-1300	AEQM-1300	---	---	---	---
0044	AEQM-1300	AEQM-1300	AEQM-1300	AEQM-1300	---	---	---	---
0050	AEQM-1600	AEQM-1300	AEQM-1600	AEQM-1300	---	---	---	---
0060	AEQM-1600	AEQM-1300	AEQM-1600	AEQM-1300	---	---	---	---
0064	AEQM-1625	AEQM-1600	AEQM-1625	AEQM-1600	---	---	---	---
0070	AEQM-1625	AEQM-1600	AEQM-1625	AEQM-1600	---	---	---	---
0074	AEQM-1625	AEQM-1600	AEQM-1625	AEQM-1600	---	---	---	---
0080	AEQM-1625	AEQM-1600	AEQM-1625	AEQM-1600	---	---	---	---
0090	AEQM-1600	AEQM-1600	AEQM-1300	AEQM-1600	AEQM-1300	AEQM-1300	---	---
0094	AEQM-1600	AEQM-1600	AEQM-1300	AEQM-1600	AEQM-1300	AEQM-1300	---	---
0104	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1000	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1000
0114	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1000
0124	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1000
0134	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1000

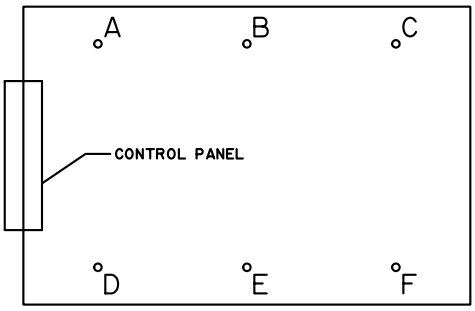
ISOLATOR SELECTIONS (CONT'D)

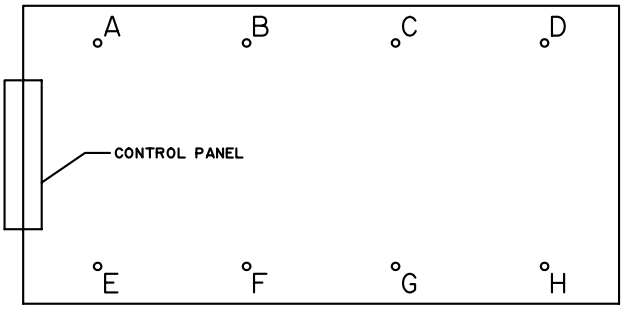
ALUMINUM FIN COILS

NEOPRENE ISOLATOR SELECTION - VMC TYPE RD

YCAL	A	B	C	D	E	F	G	H
0014	-3 Grn	-2 Gray	-3 Gray	-3 Grn	---	---	---	---
0020	-3 Grn	-2 Gray	-3 Gray	-3 Grn	---	---	---	---
0024	-3 Gray	-3 Grn	-3 Gray	-3 Grn	---	---	---	---
0030	-3 Gray	-3 Grn	-3 Gray	-3 Grn	---	---	---	---
0034	-3 Gray	-3 Grn	-3 Gray	-3 Grn	---	---	---	---
0040	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0042	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0044	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0050	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0060	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0064	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0070	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0074	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0080	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0090	-4 Blk	-4 Blk	-3 Gray	-4 Blk	-4 Blk	-3 Gray	---	---
0094	-4 Blk	-4 Blk	-3 Gray	-4 Blk	-4 Blk	-3 Gray	---	---
0104	-4 Blk	-4 Blk	-3 Gray	-3 Grn	-4 Blk	-3 Gray	-3 Gray	-3 Grn
0114	-4 Red	-4 Blk	-4 Blk	-3 Gray	-4 Blk	-4 Blk	-3 Gray	-3 Gray
0124	-4 Red	-4 Blk	-4 Blk	-3 Gray	-4 Blk	-4 Blk	-3 Gray	-3 Gray
0134	-4 Red	-4 Blk	-4 Blk	-3 Gray	-4 Blk	-4 Blk	-3 Gray	-3 Gray







ISOLATOR SELECTIONS (CONT'D)

COPPER FIN COILS

YCAL	A	B	C	D	E	F	G	H
0014	CP-1-27	CP-1-26	CP-1-28	CP-1-27	---	---	---	---
0020	CP-1-27	CP-1-26	CP-1-28	CP-1-27	---	---	---	---
0024	CP-1-28	CP-1-27	CP-1-31	CP-1-28	---	---	---	---
0030	CP-1-28	CP-1-27	CP-1-31	CP-1-28	---	---	---	---
0034	CP-1-31	CP-1-28	CP-1-31	CP-1-28	---	---	---	---
0040	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0042	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0044	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0050	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0060	CP-2-27	CP-2-27	CP-2-27	CP-2-27	---	---	---	---
0064	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0070	CP-2-28	CP-2-28	CP-2-28	CP-2-28	---	---	---	---
0074	CP-2-31	CP-2-28	CP-2-31	CP-2-28	---	---	---	---
0080	CP-2-31	CP-2-28	CP-2-31	CP-2-28	---	---	---	---
0090	CP-2-28	CP-2-27	CP-2-27	CP-2-28	CP-2-27	CP-2-27	---	---
0094	CP-2-28	CP-2-27	CP-2-27	CP-2-28	CP-2-27	CP-2-27	---	---
0104	CP-2-28	CP-2-27	CP-2-26	CP-2-26	CP-2-28	CP-2-27	CP-2-26	CP-2-25
0114	CP-2-32	CP-2-31	CP-2-28	CP-2-27	CP-2-31	CP-2-28	CP-2-28	CP-2-26
0124	CP-2-32	CP-2-31	CP-2-28	CP-2-27	CP-2-31	CP-2-28	CP-2-28	CP-2-26
0134	CP-2-32	CP-2-31	CP-2-28	CP-2-27	CP-2-31	CP-2-28	CP-2-28	CP-2-26

SEISMIC ISOLATOR SELECTION - VMC TYPE

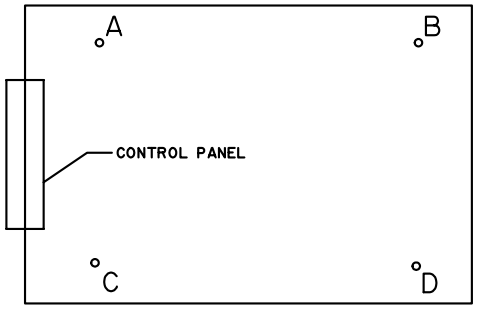
YCAL	A	B	C	D	E	F	G	H
0014	AEQM-97	AEQM-96	AEQM-98	AEQM-97	---	---	---	---
0020	AEQM-97	AEQM-96	AEQM-98	AEQM-97	---	---	---	---
0024	AEQM-98	AEQM-97	AEQM-99	AEQM-98	---	---	---	---
0030	AEQM-98	AEQM-97	AEQM-99	AEQM-98	---	---	---	---
0034	AEQM-99	AEQM-98	AEQM-99	AEQM-98	---	---	---	---
0040	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1300	---	---	---	---
0042	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1300	---	---	---	---
0044	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	---	---	---	---
0050	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	---	---	---	---
0060	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	---	---	---	---
0064	AEQM-1625	AEQM-1600	AEQM-1625	AEQM-1600	---	---	---	---
0070	AEQM-1625	AEQM-1625	AEQM-1625	AEQM-1625	---	---	---	---
0074	AEQM-1625	AEQM-1625	AEQM-1625	AEQM-1625	---	---	---	---
0080	AEQM-1625	AEQM-1625	AEQM-1625	AEQM-1625	---	---	---	---
0090	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	---	---
0094	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	AEQM-1600	---	---
0104	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000	AEQM-1600	AEQM-1300	AEQM-1300	AEQM-1000
0114	AEQM-1625	AEQM-1625	AEQM-1600	AEQM-1000	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000
0124	AEQM-1625	AEQM-1625	AEQM-1600	AEQM-1000	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000
0134	AEQM-1625	AEQM-1625	AEQM-1600	AEQM-1000	AEQM-1625	AEQM-1600	AEQM-1300	AEQM-1000

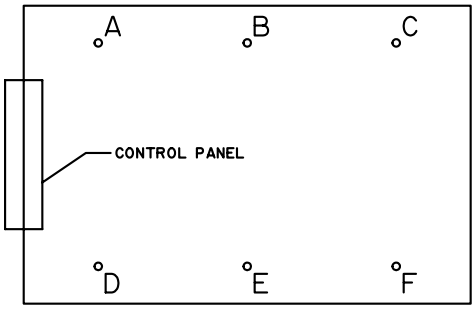
ISOLATOR SELECTIONS (CONT'D)

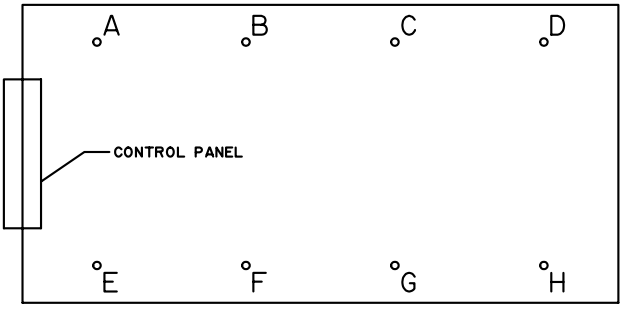
COPPER FIN COILS

NEOPRENE ISOLATOR SELECTION - VMC TYPE

COPPER FIN, NEOPRENE MOUNT SELECTIONS								
VMC TYPE RD								
YCAL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
0014	-3 Grn	-3 Grn	-3 Gray	-3 Grn	---	---	---	---
0020	-3 Grn	-3 Grn	-3 Gray	-3 Grn	---	---	---	---
0024	-3 Gray	-3 Gray	-3 Gray	-3 Gray	---	---	---	---
0030	-3 Gray	-3 Gray	-3 Gray	-3 Gray	---	---	---	---
0034	-3 Gray	-3 Gray	-3 Gray	-3 Gray	---	---	---	---
0040	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0042	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0044	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0050	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0060	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---	---	---
0064	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0070	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0074	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0080	-4 Red	-4 Red	-4 Red	-4 Red	---	---	---	---
0090	-4 Blk	-4 Blk	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---
0094	-4 Blk	-4 Blk	-4 Blk	-4 Blk	-4 Blk	-4 Blk	---	---
0104	-4 Blk	-4 Blk	-3 Gray	-3 Gray	-4 Blk	-4 Blk	-3 Gray	-3 Gray
0114	-4 Red	-4 Red	-4 Blk	-4 Blk	-4 Red	-4 Blk	-4 Blk	-3 Gray
0124	-4 Red	-4 Red	-4 Blk	-4 Blk	-4 Red	-4 Blk	-4 Blk	-3 Gray
0134	-4 Red	-4 Red	-4 Blk	-4 Blk	-4 Red	-4 Blk	-4 Blk	-3 Gray







ISOLATOR DIMENSIONS AND SPRINGS CP-1 AND CP-2

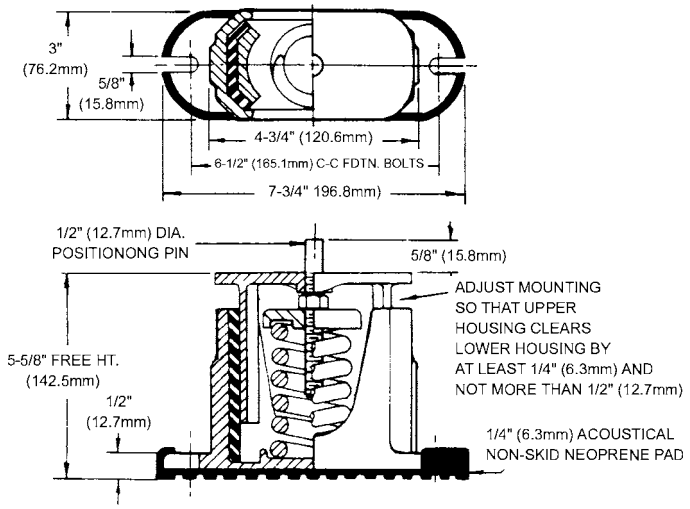


FIG. 44 – TYPE CP 1

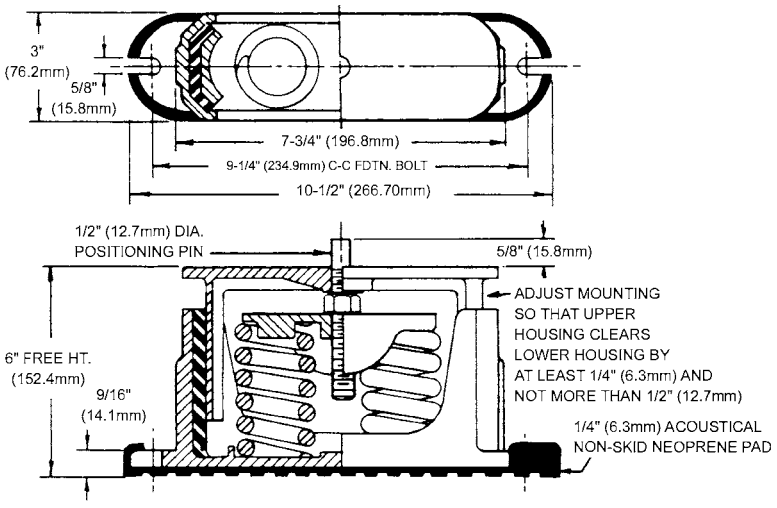


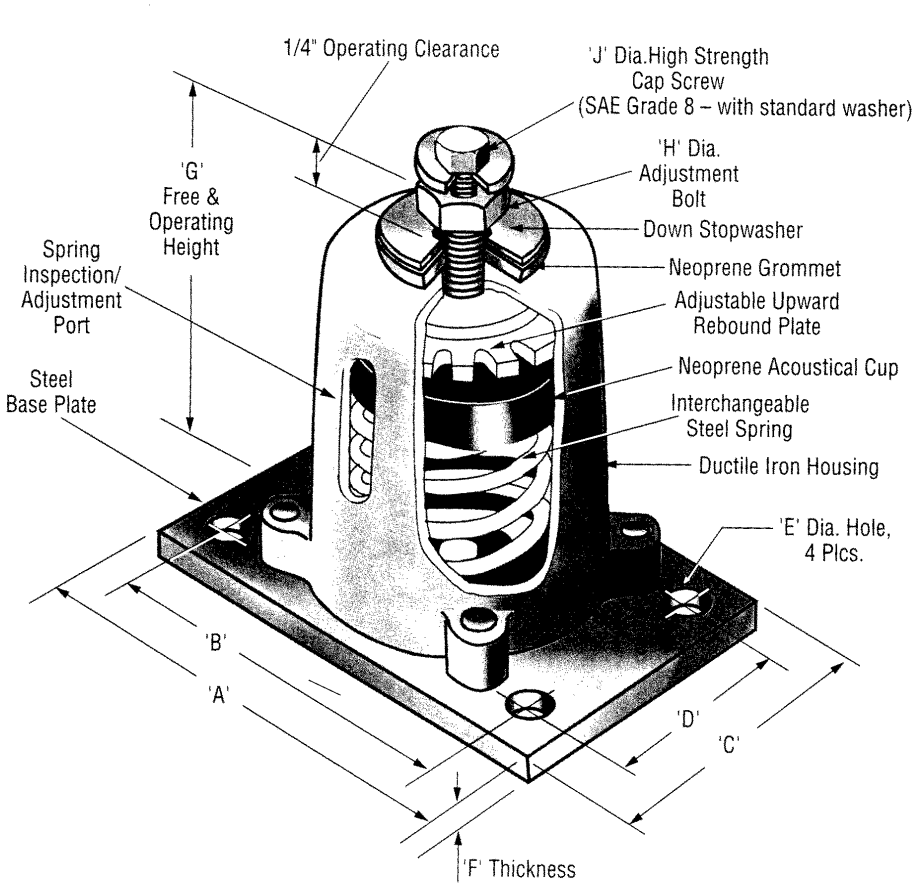
FIG. 45 – TYPE CP 2

ISOLATOR SPRING IDENTIFICATION TABLE

1" DEFLECTION			SEISMIC		
MODEL	**PART- #**	**COLOR**	**MODEL**	**PART #**	**COLOR**
CP-1-26	308439-26	PURPLE	**AEQM-96**	301055-96	BLACK
CP-1-27	308439-27	ORANGE	**AEQM-97**	301055-97	WHITE
CP-1-28	308439-28	GREEN	**AEQM-98**	301055-98	GRAY
CP-1-31	308439-31	GRAY	**AEQM-99**	301055-99	BLUE
CP-2-25	308439-25	RED	**AEQM-1000**	30106-1000	GREEN
CP-2-26	308692-26	PURPLE	**AEQM-1300**	30106-1300	YELLOW
CP-2-27	308962-27	ORANGE	**AEQM-1600**	301060-1600	GRAY
CP-2-28	308692-28	GREEN	**AEQM-1625**	301060-1625	RED
CP-2-31	308692-31	GRAY	**AEQM-1628**	301060-1628	GRAY/GREEN

SEISMIC ISOLATOR DIMENSIONS

MODEL #	A	B	C	D	E	F	G	H	J
AEQM-97	7	5-1/2	4-1/2	2-1/2	5/8	1/4	7-1/4	5/8	3/8
AEQM-98	7	5-1/2	4-1/2	2-1/2	5/8	1/4	7-1/4	5/8	3/8
AEQM-99	7	5-1/2	4-1/2	2-1/2	5/8	1/4	7-1/4	5/8	3/8
AEQM-1000	8-1/2	6-1/2	6	4-1/2	3/4	3/8	8-3/8	7/8	1/2
AEQM-1300	8-1/2	6-1/2	6	4-1/2	3/4	3/8	8-3/8	7/8	1/2
AEQM-1600	8-1/2	6-1/2	6	4-1/2	3/4	3/8	8-3/8	7/8	1/2
AEQM-1625	8-1/2	6-1/2	6	4-1/2	3/4	3/8	8-3/8	7/8	1/2
AEQM-1628	8-1/2	6-1/2	6	4-1/2	3/4	3/8	8-3/8	7/8	1/2



LD04045

FIG. 46 – R SPRING SEISMIC ISOLATOR

INSTALLATION AND ADJUSTING INSTRUCTIONS
TYPE CP MOUNTING

Mountings are shipped completely assembled, ready to install.

1. Locate mountings under equipment at positions shown on tags or on VM layout drawings, or as indicated on packing slip or correspondence.
2. Set mountings on subbase, shimming or grouting where required to provide flat and level surface at the same elevation for all mountings (1/4" maximum difference in elevation can be tolerated). Support the full underside of the base plate – do not straddle gaps or small shims.
3. Unless specified, mountings need not be fastened to floor in any way. If required, bolt mountings to floor through slots.
4. Set the machine or base on the mountings. The weight of the machine will cause the upper housing of the mount to go down, possibly resting on the lower housing.
5. If clearance "X" is less than 1/4" on any mounting, with wrench turn up one complete turn on the adjusting bolt of each mounting. Repeat this procedure until 1/4", clearance at "X" is obtained on one or more mountings.
6. Take additional turns on all mountings having less than 1/4" clearance, until all mountings have at least this clearance.
7. Level the machine by taking additional turns on all mounts at the low side. Clearance should not exceed 1/2" - greater clearance indicates that mountings were not all installed at the same elevation, and shims are required. This completes adjustment.

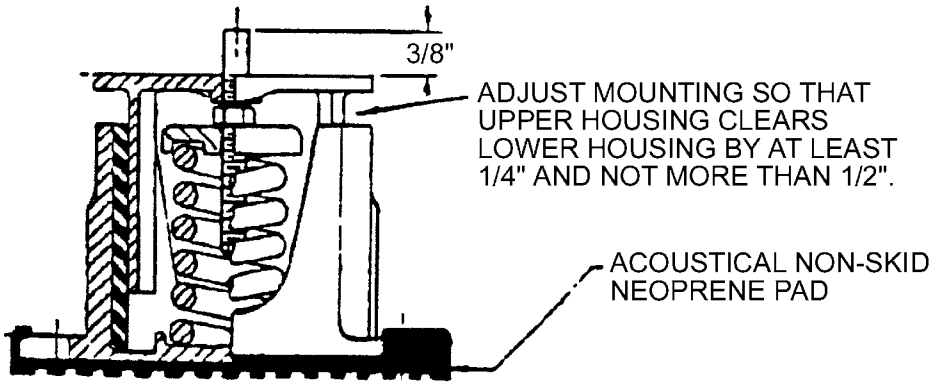


FIG. 47 – TYPE CP MOUNTING

AEQM SPRING-FLEX MOUNTING
INSTALLATION AND ADJUSTMENT INSTRUCTIONS

1. Isolators are shipped fully assembled and are to be spaced and located in accordance with installation drawings or as otherwise recommended.

   1a. Locate spring port facing outward from equipment or base so that spring is visible.

2. To facilitate installation, prior to installing, VMC recommends turning adjusting bolt “B” so that the “Operating Clearance” marked “*” is approximately 1" to 1-1/2" for 1" deflection units, 1-1/2" to 2" for 1-1/2" deflection units, and 2" to 2-1/2" for 2" deflection units.

3. Locate isolators on floor or subbase as required, ensuring that the isolator centerline matches the equipment or equipment base mounting holes. Shim and/or grout as required to level all isolator base plates “A”. A 1/4" maximum difference in elevation can be tolerated.

4. Anchor all isolators to floor or subbase as required. For installing on concrete VMC recommends HILTI type HSL heavy duty anchors or equal.

5. Remove cap screw “C” and save. Gently place machine or machine base on top of bolt “B”. Install cap screw “C” but **DO NOT** tighten.

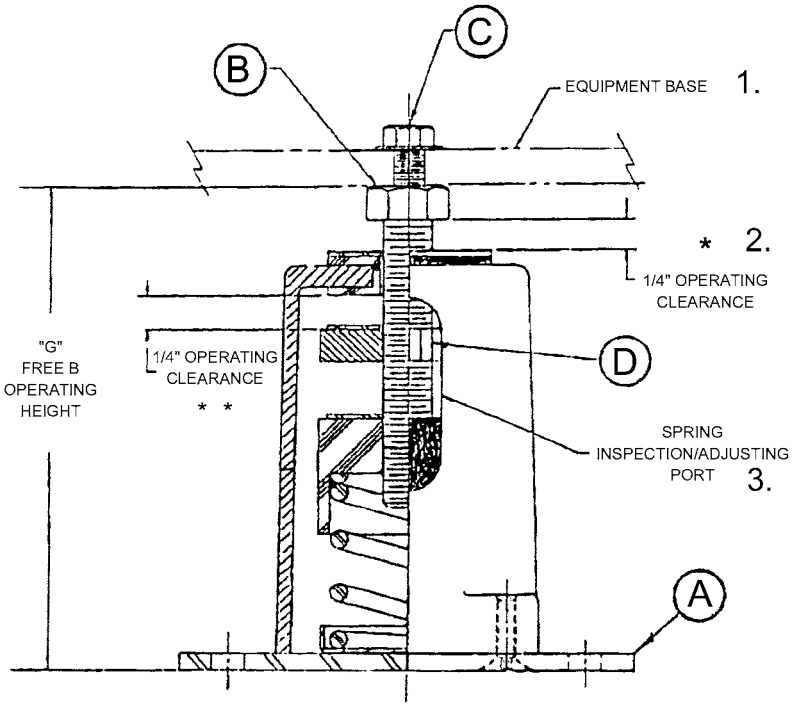
6. The weight of the machine will cause the spring and thus bolt “B” to descend.

7. Adjust all isolators by turning bolt “B” so that the operating clearance “*” is approximately 1/4". NOTE: It may be necessary to adjust rebound plate “D” for clearance.

6. Check equipment level and fine adjust isolators to level equipment.

9. Adjust rebound plate “D” so that the operating clearance “**” is no more than 1/4".

10. Tighten cap screw “C”. Adjustment is complete.



LD03838

FIG. 48 – AEQM SPRING-FLEX MOUNTING

Johnson Controls

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