Wiring Diagrams for Model YK Style H and Style J with OptiView Control Center and SSS with Modbus, VSD with Modbus

Form Number: 160.76-PW6 (224)
Supersedes: 160.76-PW6 (1021)
Issue Date: 2024-02-09

Wiring diagram

Contractor:			
Order number:			
Johnson Controls contract number:			
Johnson Controls order number:			
Purchaser:			
Job name:			
Location:			
Engineer:			
☐	**Reference**	**Date:**	
☐	**Approval**	**Date:**	
☐	**Construction**	**Date:**	

Job data

Chiller model number YK _____

Number of units _____

Compressor motor _____ V, three-phase, _____ Hz

Oil pump motor _____ V, three-phase, _____ Hz, _____ FLA

General safety guidelines

Important: Read before proceeding.

This equipment is a relatively complicated apparatus. During rigging, installation, operation, maintenance, or service, individuals might be exposed to certain components or conditions including, but not limited to: heavy objects, refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled incorrectly, to cause bodily injury or death. It is the obligation and responsibility of rigging, installation, and operating and 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 rigging, installation, operating, and service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks correctly and safely. It is essential that, before performing any task on this equipment, this individual must read and understand the on-product labels, this document and any referenced materials. This individual must also be familiar with and comply with all applicable industry and governmental standards and regulations relating to the task in question.

Safety symbols

The following symbols are used in this document to alert the reader to specific situations:

DANGER

Indicates a possible hazardous situation which will result in death or serious injury if correct care is not taken.

WARNING

Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if correct care is not taken.

CAUTION

Identifies a hazard which could lead to damage to the machine, damage to other equipment and environmental pollution if correct care is not taken or instructions are not followed.

Note: Highlights additional information useful to the technician in completing the work being performed correctly.

Wiring warning

WARNING

External wiring, unless specified as an optional connection in the manufacturer's product line, is not to be connected inside the control cabinet. Devices such as relays, switches, transducers and controls and any external wiring must not be installed inside the micro panel. All wiring must be in accordance with the published specifications of Johnson Controls and must be performed only by a qualified electrician. Johnson Controls will not be responsible for damage or problems resulting from incorrect connections to the controls or application of incorrect control signals. Failure to follow this warning will void the manufacturer's warranty and cause serious damage to property or personal injury.

Changeability of this document

In complying with the Johnson Controls® policy for continuous product improvement, the information contained in this document is subject to change without notice. Johnson Controls makes no commitment to update or provide current information automatically to the manual or product owner. Updated manuals, if applicable, can be obtained by contacting the nearest Johnson Controls Service office or accessing the Johnson Controls Knowledge Exchange website at https://docs.johnsoncontrols.com/chillers/.

It is the responsibility of rigging, lifting, operating, and service personnel to verify the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, rigging, lifting, and operating and service personnel should verify whether the equipment has been modified and if current literature is available from the owner of the equipment before performing any work on the chiller.

Revision notes

Revisions made to this document are indicated in the following table. These revisions are to technical information, and any other changes in spelling, grammar, or formatting are not included.

Table 1: Revision notes

Affected pages	Description
1	Updating document title to include Style J
3	Updating Table 2 to include Style J in document titles

Associated literature

Table 2: Associated literature

Manual description	Form number
Wiring Diagrams – Field Connections for YK Chiller Style H and Style J with OptiView Control Center and LV EMS or LVSSS	160.76-PW1
Wiring Diagrams – Field Control Wiring for YK Chiller Style H and Style J	160.76-PW4
Wiring Diagrams – Model YK Style H and Style J with OptiView Control Center and SSS with Modbus, VSD with Modbus	160.76-PW6
Wiring Diagrams – Model YK with LVVSD	160.76-PW7

Notes

1. This wiring diagram describes the standard electronic control scheme for use with YORK Solid State Starter or Variable Speed Drive. For details of standard field control wiring, refer to *Form 160.76-PW4*.
2. Field wiring must be in accordance with the National Electrical Code (NEC), as well as all other applicable codes and specifications. Refer to *Form 160.76-PW1* or *160.76-PW7* for field wiring connections.

> **⚠ CAUTION**
>
> Field wiring contacts may have voltage present when power is removed. Field wiring contacts could be connected to external power sources.

3. The numbers along the left side of the diagram are line identification numbers. The numbers along the right side indicate the line number location of the relay contacts. An underlined contact location signifies a normally closed contact.
4. The main control panel Class 1 field wiring terminal connection points are indicated by numbers within a rectangle. The main control panel factory wiring terminal connection points are indicated by numbers within a triangle. Component markings are indicated by numbers within a circle. Numbers adjacent to circuit lines are the circuit identification numbers.
5. To cycle the unit on and off automatically with contacts other than those shown, install a cycling device between Terminals 1 and 13 (line 38). See Note 7. If a cycling device is installed, the jumper must be removed between Terminals 1 and 13.
6. A remote run-stop switch may be connected to Terminals 1 and 7 (line 32). See Note 7. The remote run-stop (line 32) is operative only in the remote operating mode.
7. The device contact rating must be 5 mA at 115 VAC.
8. The contact rating is 5 A resistive at 120 VAC or 240 VAC.
9. For the wiring diagram of LCSSS or LVVSD, refer to product *Form 160.76-PW6*.
10. A jumper is installed between Terminals 21 and 24 for normal operation. To check motor rotation on initial start-up, complete the following steps:
    a. Remove the jumper and install a momentary switch between Terminals 21 and 24.
    b. Press the Start key on the display screen on the control panel.
    c. After completion of the prelube sequence, jog the motor with the momentary switch.
    d. When proper rotation is obtained, replace the momentary switch with a jumper. The momentary switch must have a minimum contact rating of 1 FLA, 10 LRA at 115 VAC.

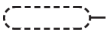
> **⚠ CAUTION**
>
> A temporary momentary switch or jumper is the only connection permitted between Terminals 21 and 24. Connections of any other devices to either Terminals 21 and 24 may cause inadvertent compressor start-up.

11. Solid state motor overload contact (CM) LCSSS is set up to trip at 105% FLA.
12. Contact rating is 5 A resistive at 250 VAC and 30 VDC, and 2 A inductive (0.4 PF) at 250 VAC and 30 VDC.

13. Field connected control power supply is not required, as control transformer is supplied on the solid state starter and the medium voltage variable speed drive.
14. The maximum allowable current draw for the sum of all loads is 2 A holding, 10 A inrush.
15. Each 115 VAC field-connected inductive load, that is relay coil, motor starter coil, and others, must have a transient suppressor wired in parallel with its coil, physically located at the coil. Spare transient suppressors and control circuit fuses are supplied in a bag attached to the green ground screw located in the lower left corner of the control panel.

Legend

Item	Description
1HTR	1 phase 1000 W oil heater
1LEP	Low evaporator pressure (provided by evaporator pressure transducer)
1OL	2T protector (346 V AD 600 V units only)
1T	Class 2 power supply transformer
3M	Condenser pump motor starter
1R	Compressor motor/1HTR heater control relay (K18 - located on I/O board)
3R	VS oil pump drive run relay
1SOL	Oil return solenoid valve
1SW	Safety stop switch
CM	Solid state overload/power fault contacts
FDTS	Faulty discharge temperature sensor
FLA	Full load amps (compressor motor)
FU	Fuse
PGD	Proximity gap distance (probe located in compressor)
HDT	Refrid. high discharge temperature (provided by RT2)
HOP	High oil pressure (provided by two transducers)
HOT	High oil temperature (provided by RT3)
HPCO	High pressure cutout
K13, K14, K17	Relays mounted on I/O board refer to the operation manual
LCWT	Leaving chilled water temp (PWM). Refer to *160.73-PW4*.
LEP	Low evaporator pressure (provided by evaporator press transducer)
LLS	Liquid level sensor (probe)
LOT	Low oil temperature (provided by RT3 and condenser press transducer)
LOTD	Low oil temperature differential (provided by RT3 and condenser press transducer)
HGBP	Hot gas bypass
L1	Inductor 4 A, 9 mH (460 VAC) or 8 A, 3 mH (230 VAC)
LWT	Low water temperature (provided by RT3)
MOV	Metal oxide varistor
OL	Motor starter overloads
OP	Low oil pressure (provided by two transducers)
OVA	Condenser level control actuator
PRV	Pre-rotation vane motor
	Remote current limit setpoint (PWM). Refer to *160.73-PW4*.
RES	Resistor
RT1-RT9	Resistance temperature sensing element
SUPR	Transient suppressor
TB1, TB3, TB5	Terminal block, factory wiring - △
TB2, TB4	Terminal block, field connection - □
TB6	Terminal block, field (bottom), factory (top)
VGD	Variable geometry diffuser
VMP	Vane motor potentiometer
VMS	Vane motor switch
VS	Variable speed oil pump drive
– – – – –	Field wiring
———	Factory wiring
.....	Circuit board or enclosure boundary
——→	Jack (J1, J2, ...)
>———	Plug (P1, P2, ...)
◎	Wire entrance hole in control panel
——–——	Option, when supplied, by YORK

Item	Description
	Mechanical linkage
	Shield cable
	Metal oxide varistor
	Terminal located in starter (TB1 or 1TB)

Wiring diagrams

Elementary diagram

Figure 1: Elementary diagram

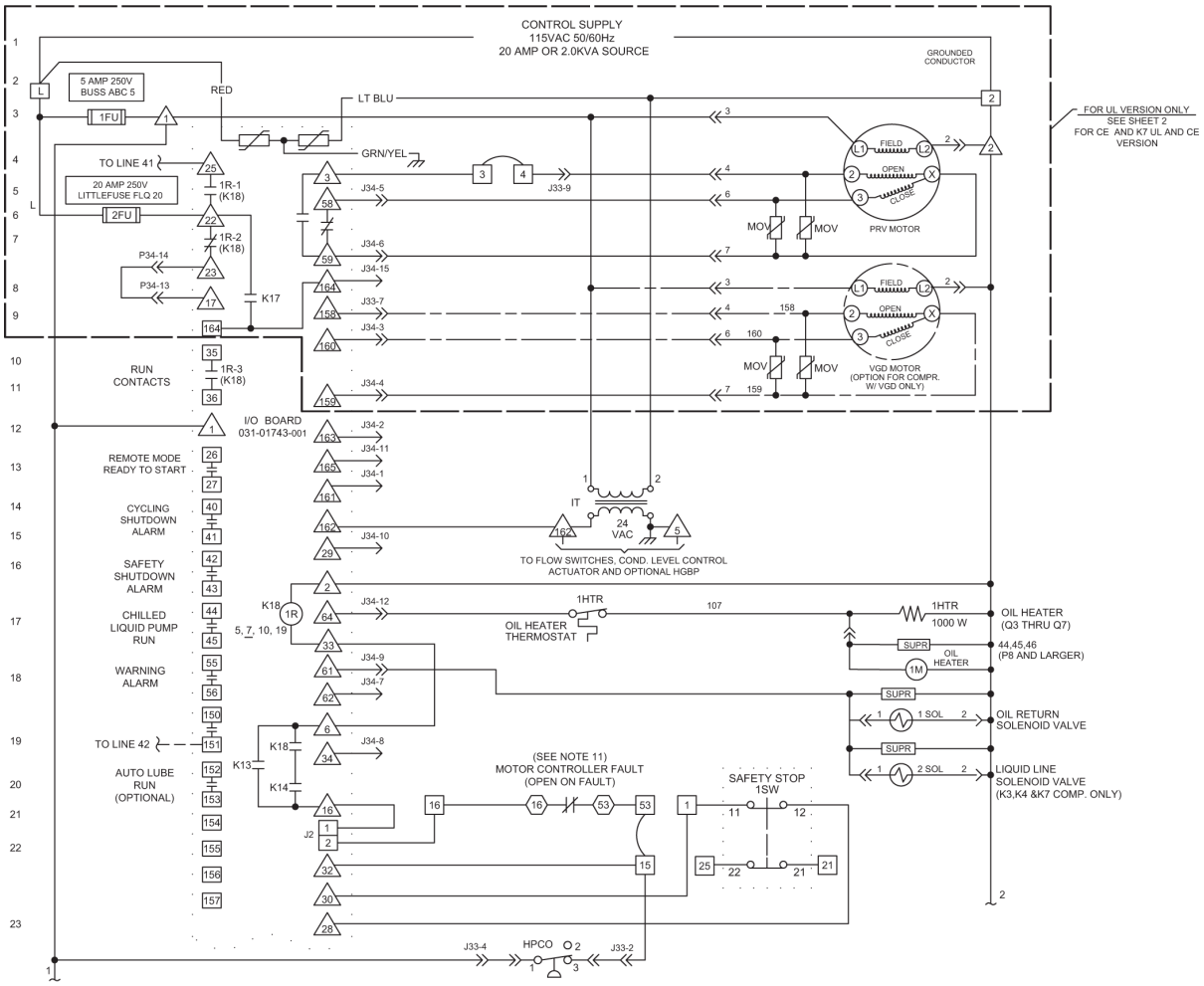


Figure 1: Elementary diagram

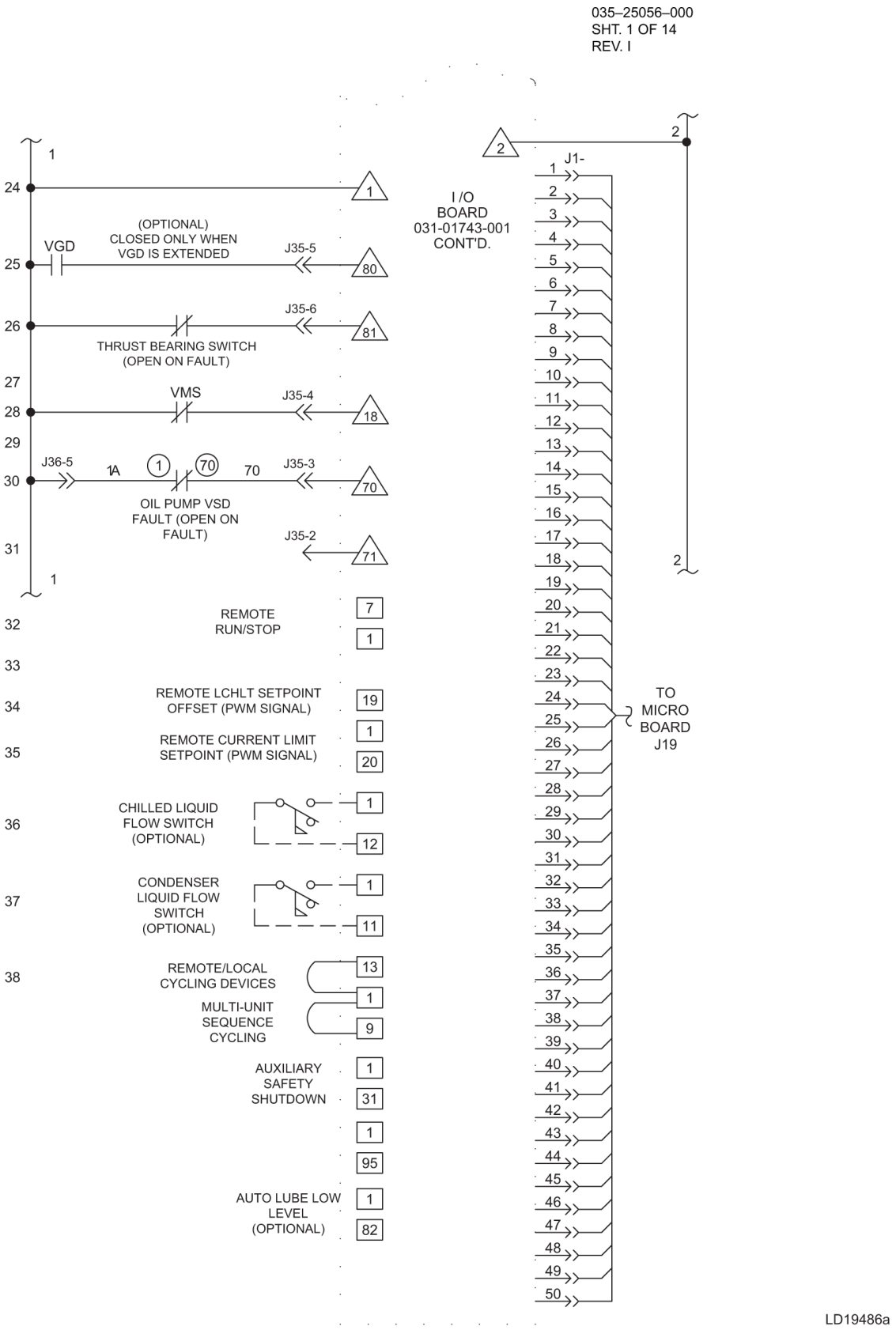


Figure 2: Elementary diagram

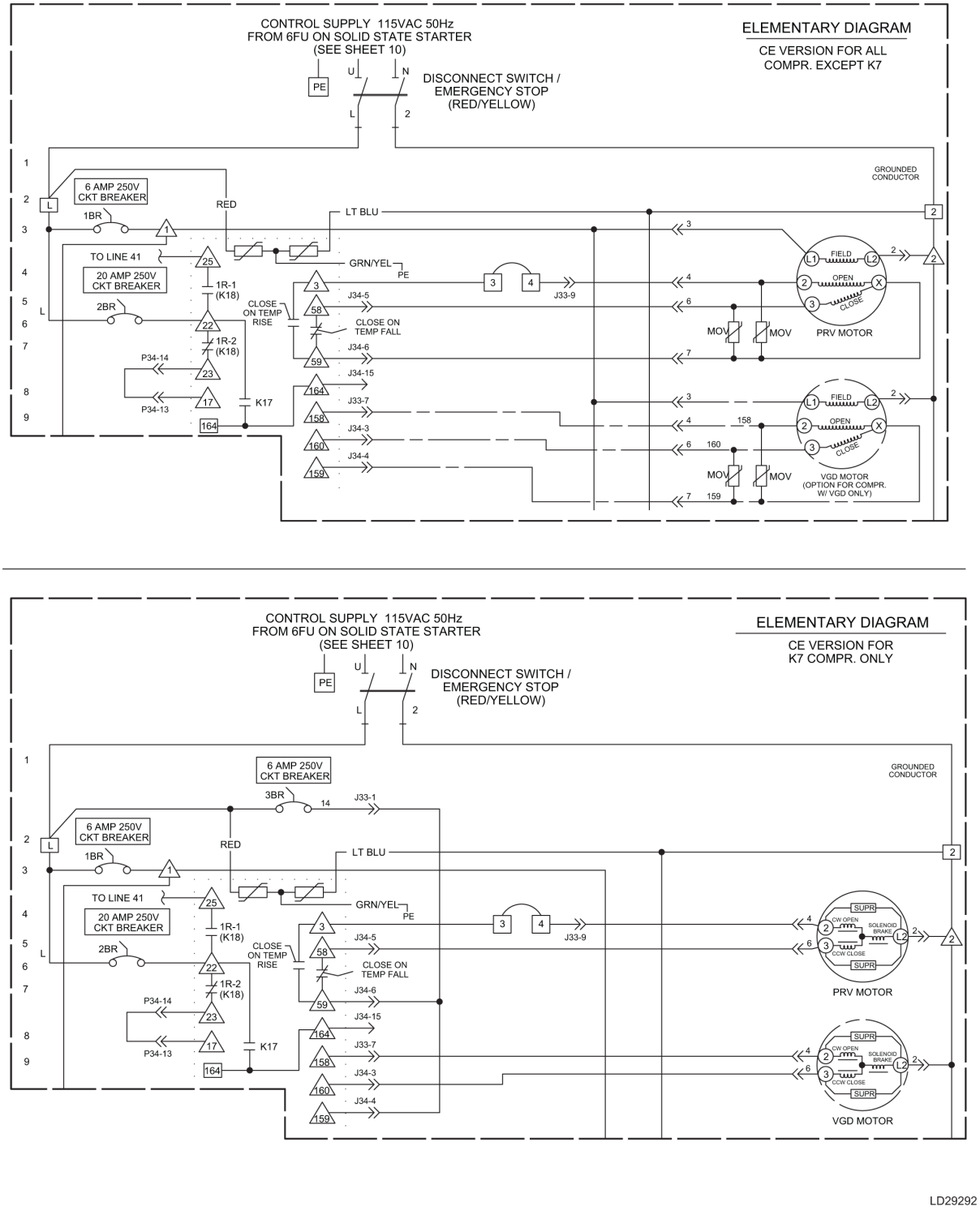


Figure 2: Elementary diagram

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SHT. 2 OF 14
REV. I

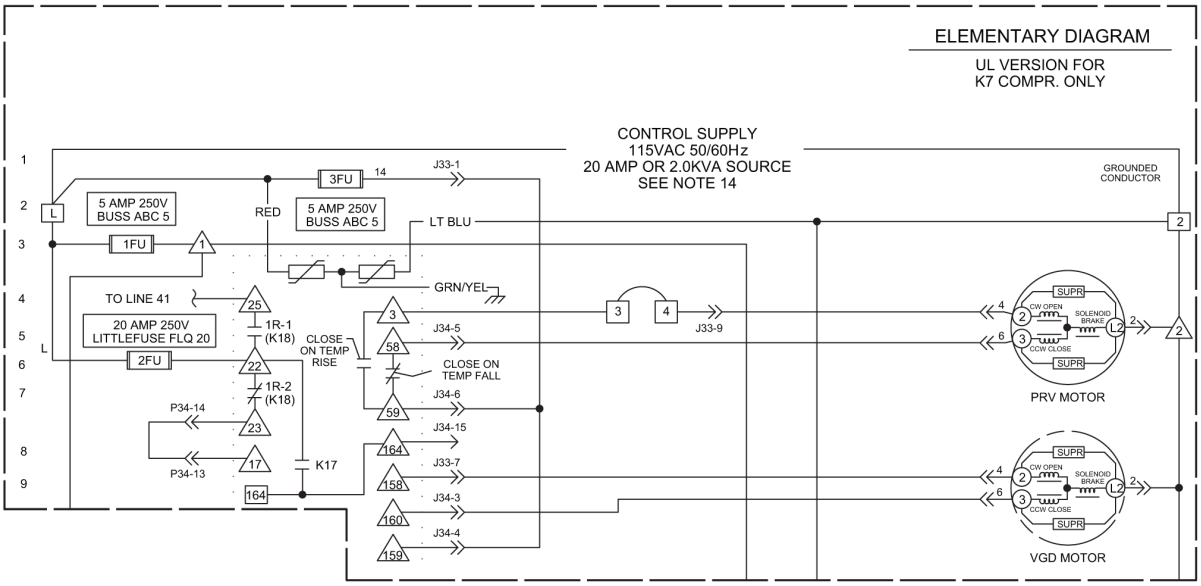

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Figure 3: Elementary diagram

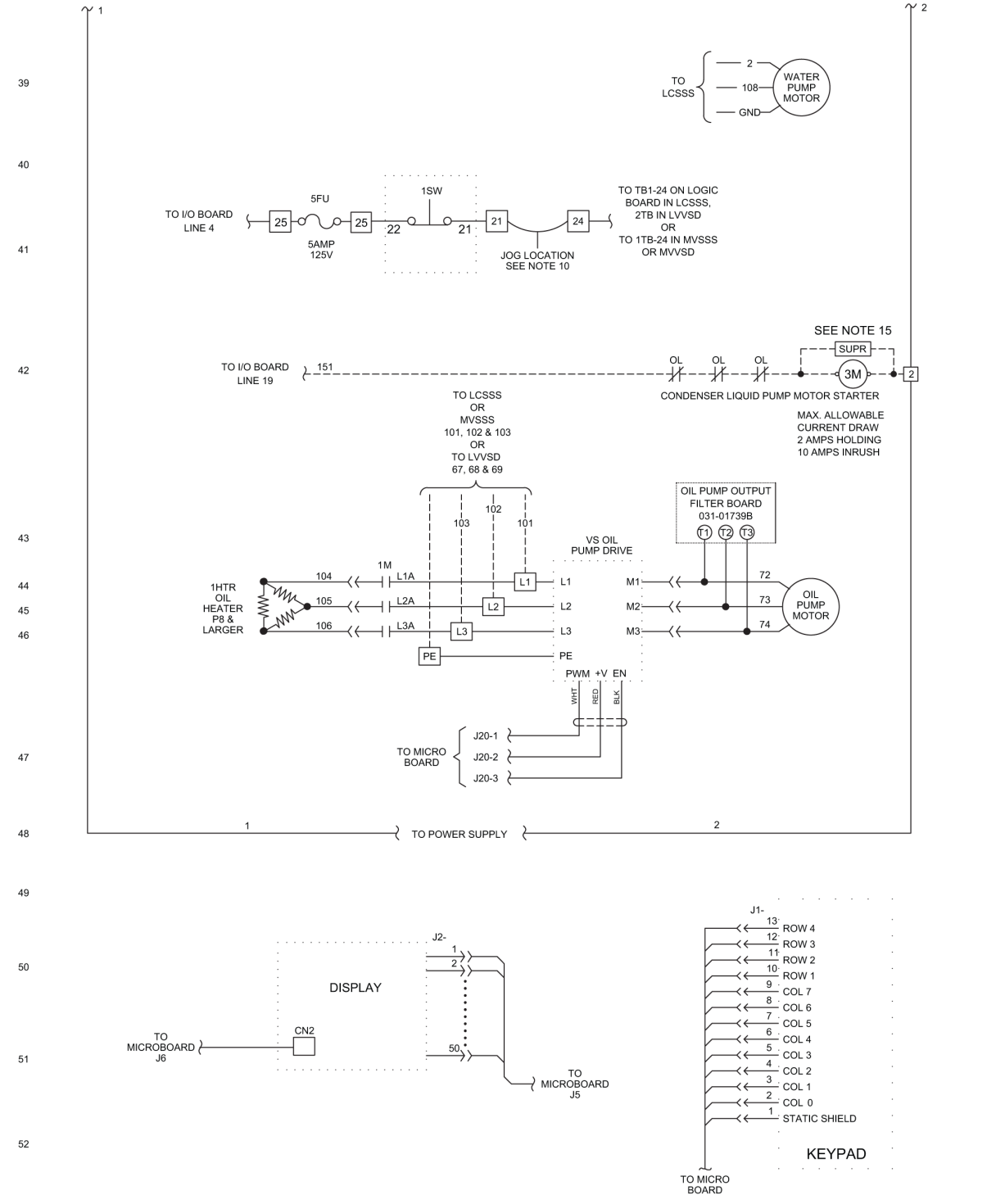

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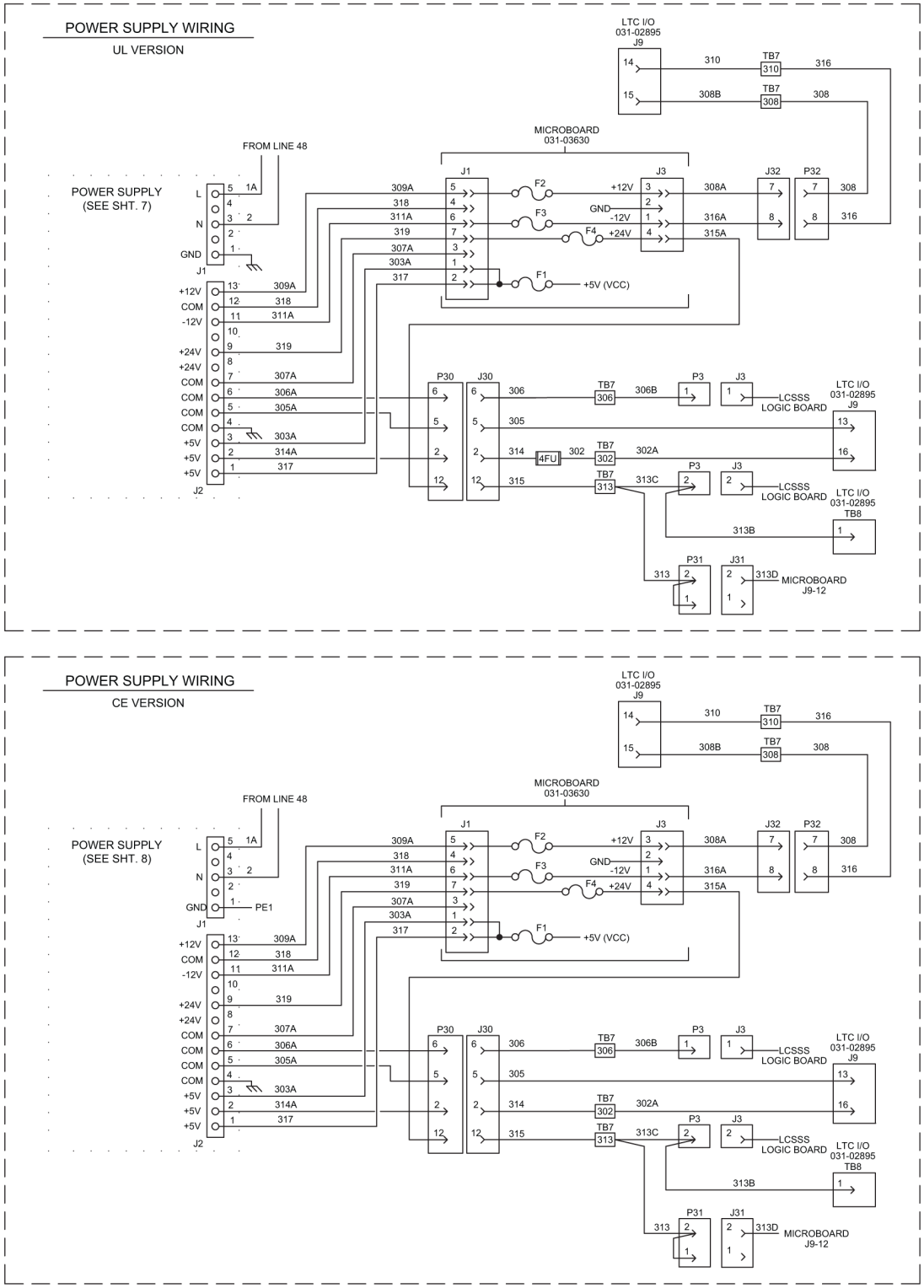
Figure 3: Elementary diagram

035–25056–000
SHT. 3 OF 14
REV. I



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Microboard diagram (031-03630)

Figure 4: Microboard diagram

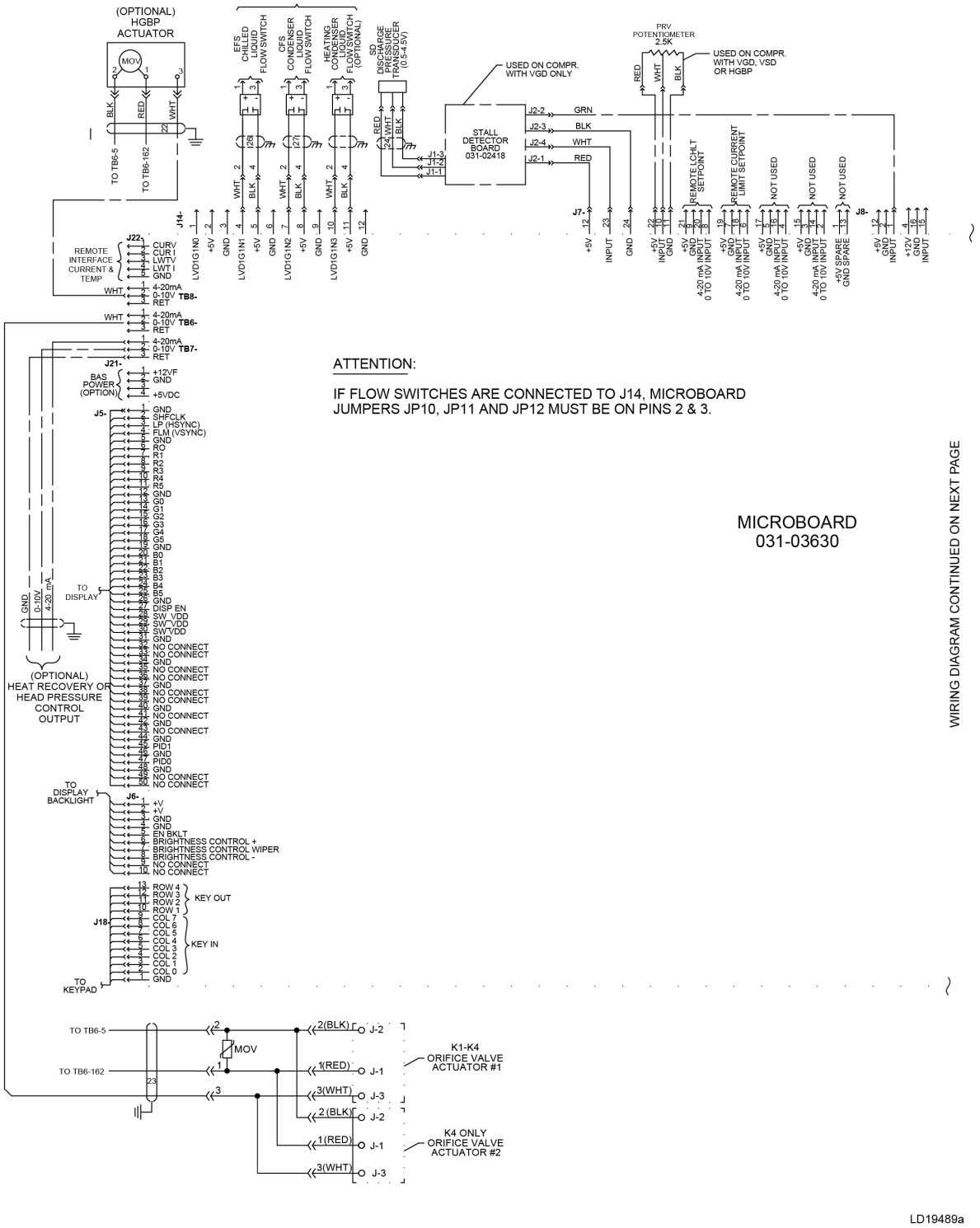
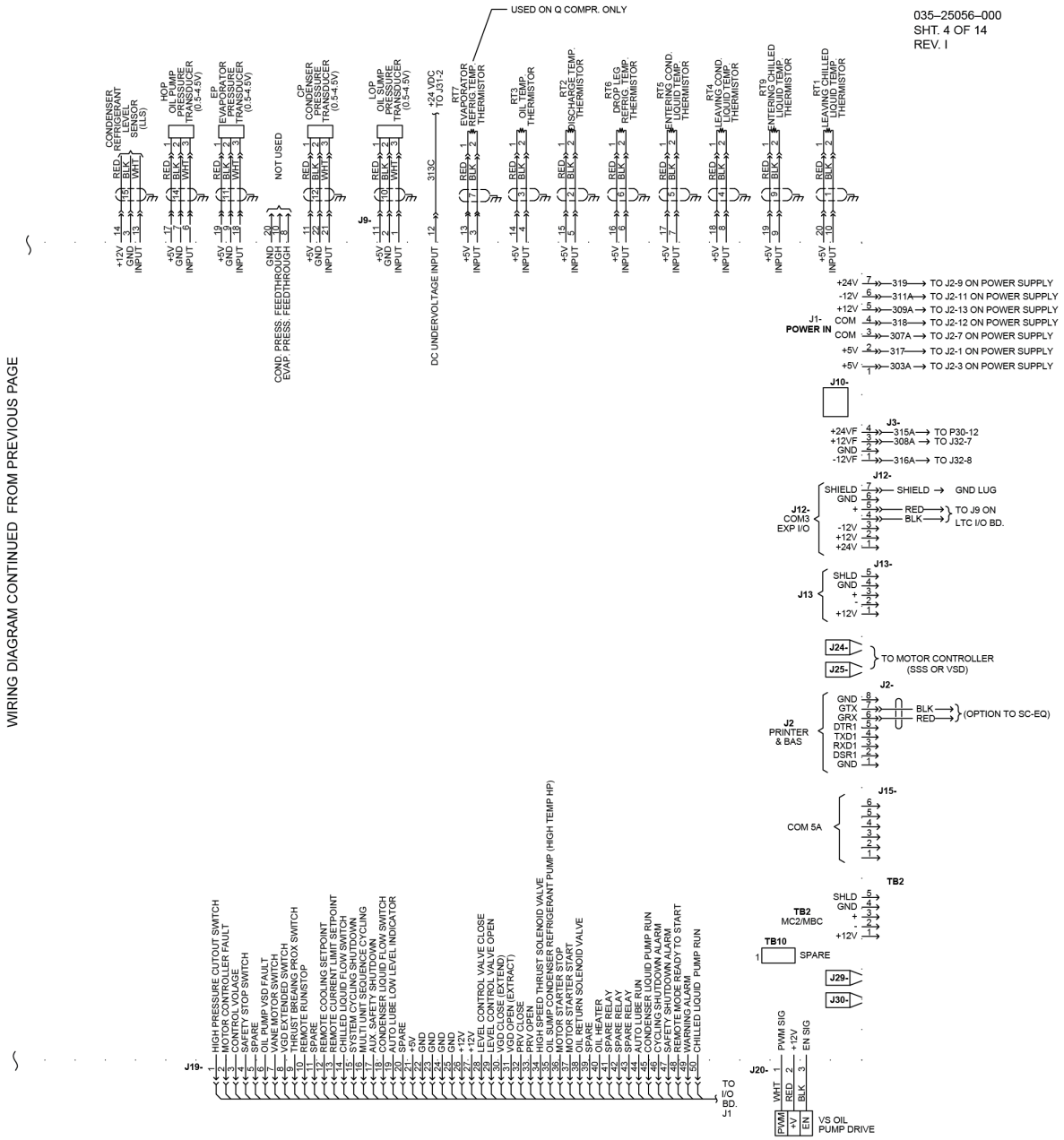
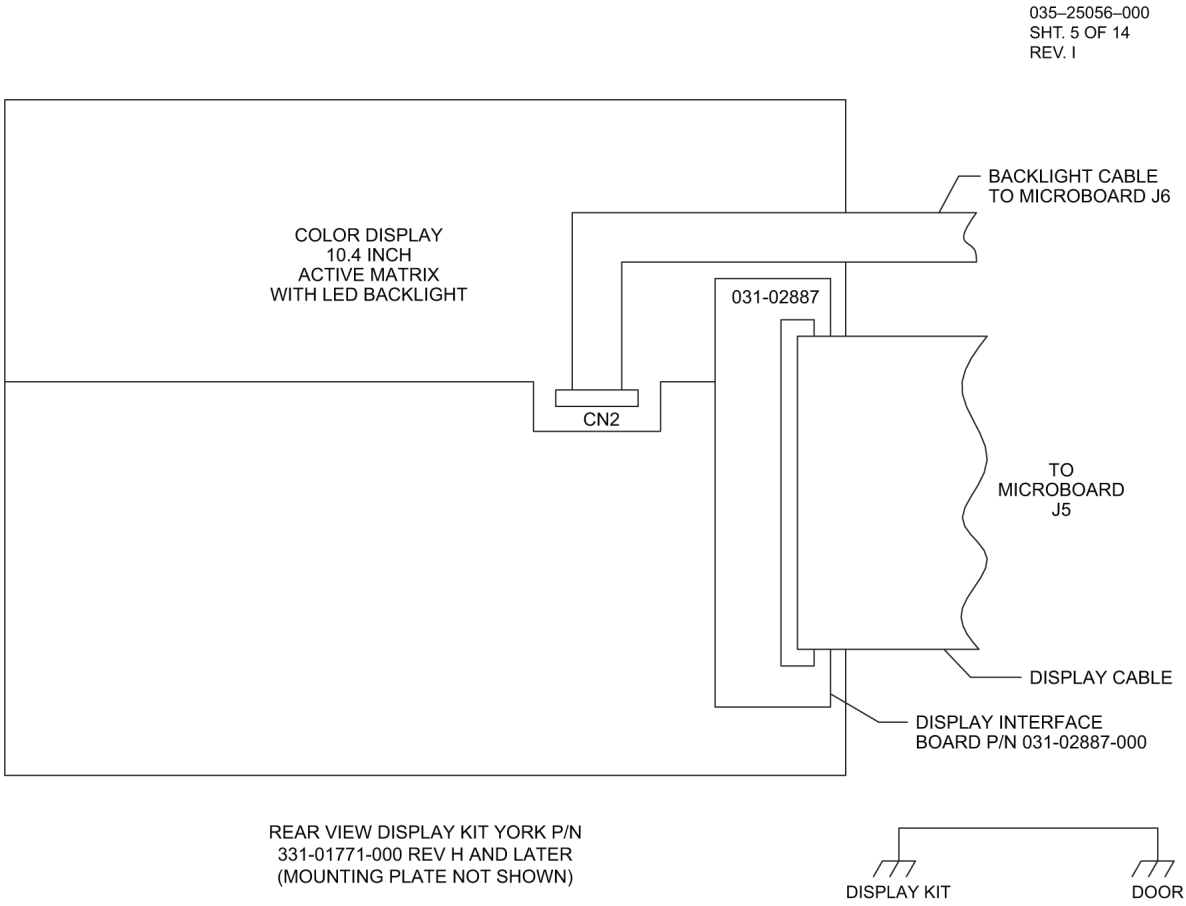


Figure 4: Microboard diagram

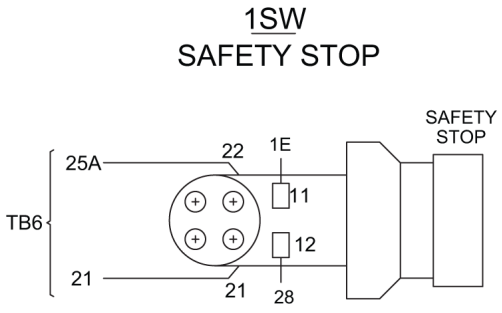


Display interface board

Figure 5: Display interface board



INSIDE VIEW OF FRONT DOOR



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Pressure temperature chart

Table 3: Pressure temperature chart

Refrigerant type	Condenser mode	Evaporator application		Device	Units	Operating point	
		Water	Brine			(Control action) On rise	(Control action) On fall
All	All	X	X	High discharge temp (HDT)	°F/°C	(Trip) ≥ 220/104.4	(Reset) < 219/103.8
All	All	X	X	High oil temp (HOT)	°F/°C	(Trip) > 135/57.2	(Reset) < 130/54.4
All	All	X	X	Low oil pressure (LOP)	psid/kPa	(Reset) Chiller stopped	(Trip) Running ≤ 15/103.4 at 0.5 s (Trip) Prelube ≤ 25/172.3 at 5 s
High pressure (HP)							
All	Extended condenser temperature range disabled	X	X	HP	psig/kPa	(Trip) ≥ 180/1241.1	(Reset) < 120/827.4
All	Extended condenser temperature range enabled	X	X	HP	psig/kPa	(Trip) ≥ 200/1378.9	(Reset) < 140/965.3
All	Heat pump	X	X	HP	psig/kPa	(Trip) ≥ 364/2509.7	(Reset) < 340/2344.2
Low evaporator pressure (LEP) water duty only smart freeze disabled adjustable 25 psig to 30 psig							
All	All	X		LEP	psig/kPa	(Reset) Evap pressure > Low evaporator cutout	(Trip) Evap pressure ≤ Low evaporator cutout 0.5 s
Low evaporator pressure (LEP) water duty only smart freeze enabled adjustable							
All	All	X		LEP	psig/kPa	(Reset) > Evap press override threshold	(Trip) ≤ Evap press override threshold 120 s
Low evaporator pressure (LEP) brine duty only adjustable trip value based on brine percentage							
R-134a	All		X	1LEP	psig/kPa	(Reset) > 6–30/41.3–206.8	(Trip) ≤ 6–30/41.3–206.8
R-513A	All		X	1LEP	psig/kPa	(Reset) > 8.8–34.4/60.7–237.2	(Trip) ≤ 8.8–34.4/60.7–237.2
R-1234ze	All		X	1LEP	psig/kPa	(Reset) > 0.4–18.4/2.8–126.9	(Trip) ≤ 0.4–18.4/2.8–126.9

Table 4: Low/high voltage trip/reset values

SSS type	Compressor motor supply voltage range in V	Low line voltage operating point		High line voltage operating point	
		Cutout in V, on fall	Cutin in V, on rise	Cutout in V, on rise	Cutin in V, on fall
LCSSS	200 to 208	160	174	227	226
LCSSS	220 to 240	185	200	262	261
LCSSS	380	305	331	415	414
LCSSS	400	320	349	436	435
LCSSS	415	335	362	454	453
LCSSS	440 to 480	370	400	524	523
LCSSS	550 to 600	460	502	65	654
LCSSS	Supply voltage range disabled	None	0	None	0

LTC I/O board (031-02895)

Figure 6: LTC I/O board (031-02895)

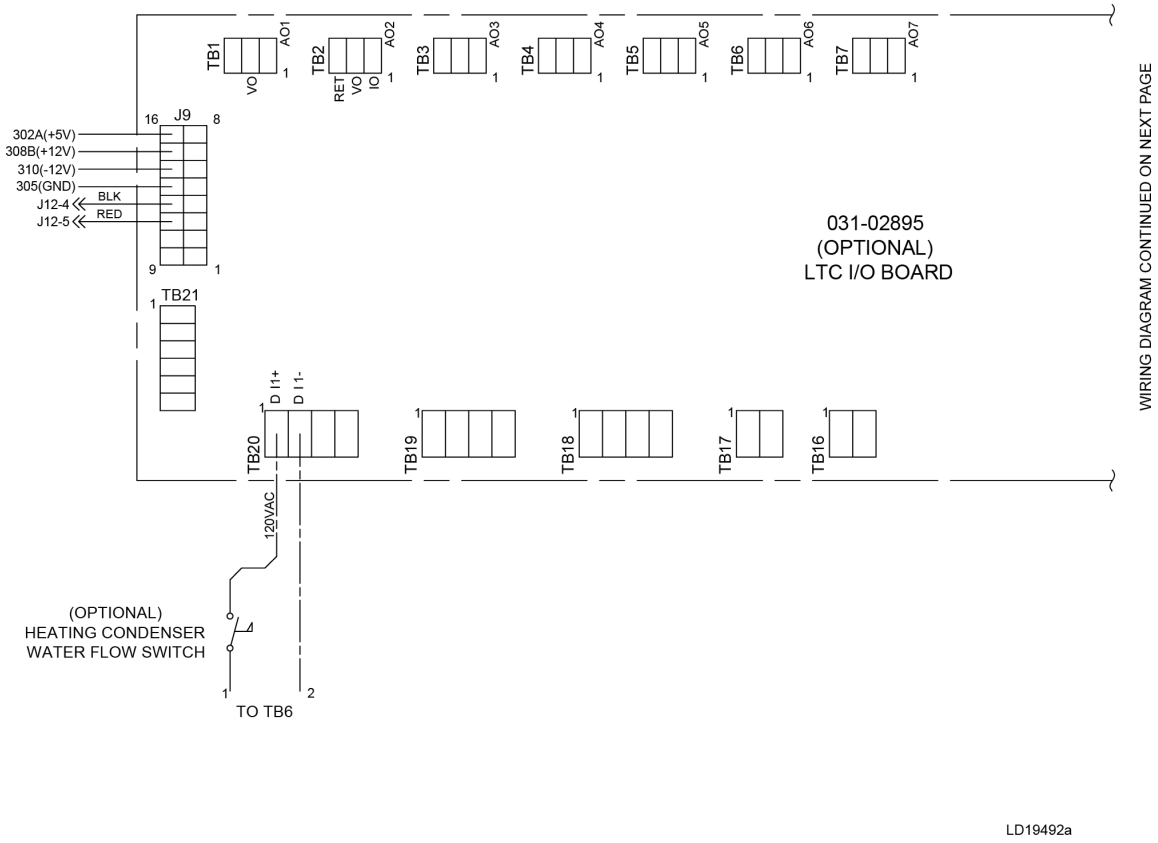
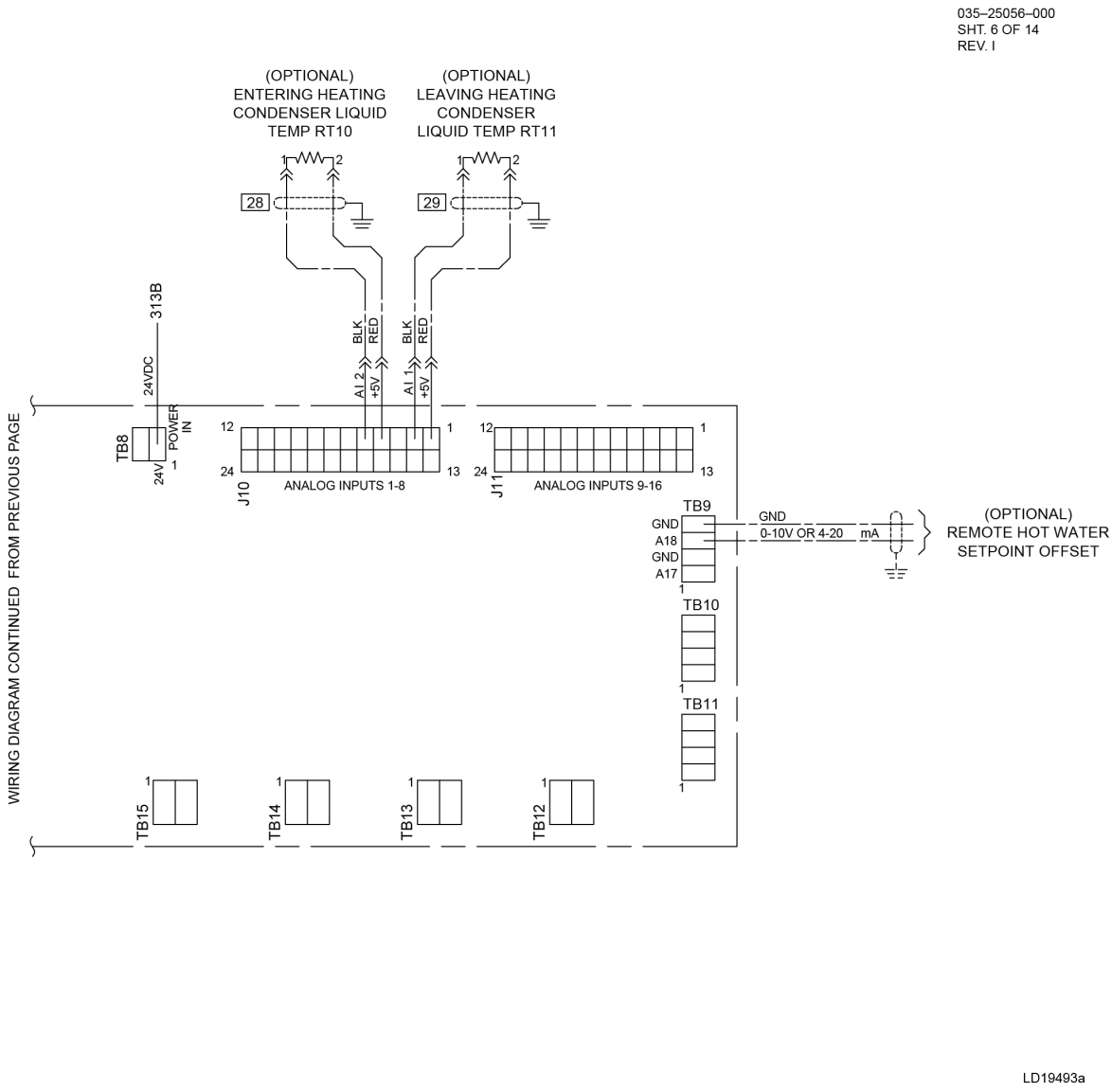


Figure 6: LTC I/O board (031-02895)



Connection diagram

Figure 7: Connection diagram (UL applications only)

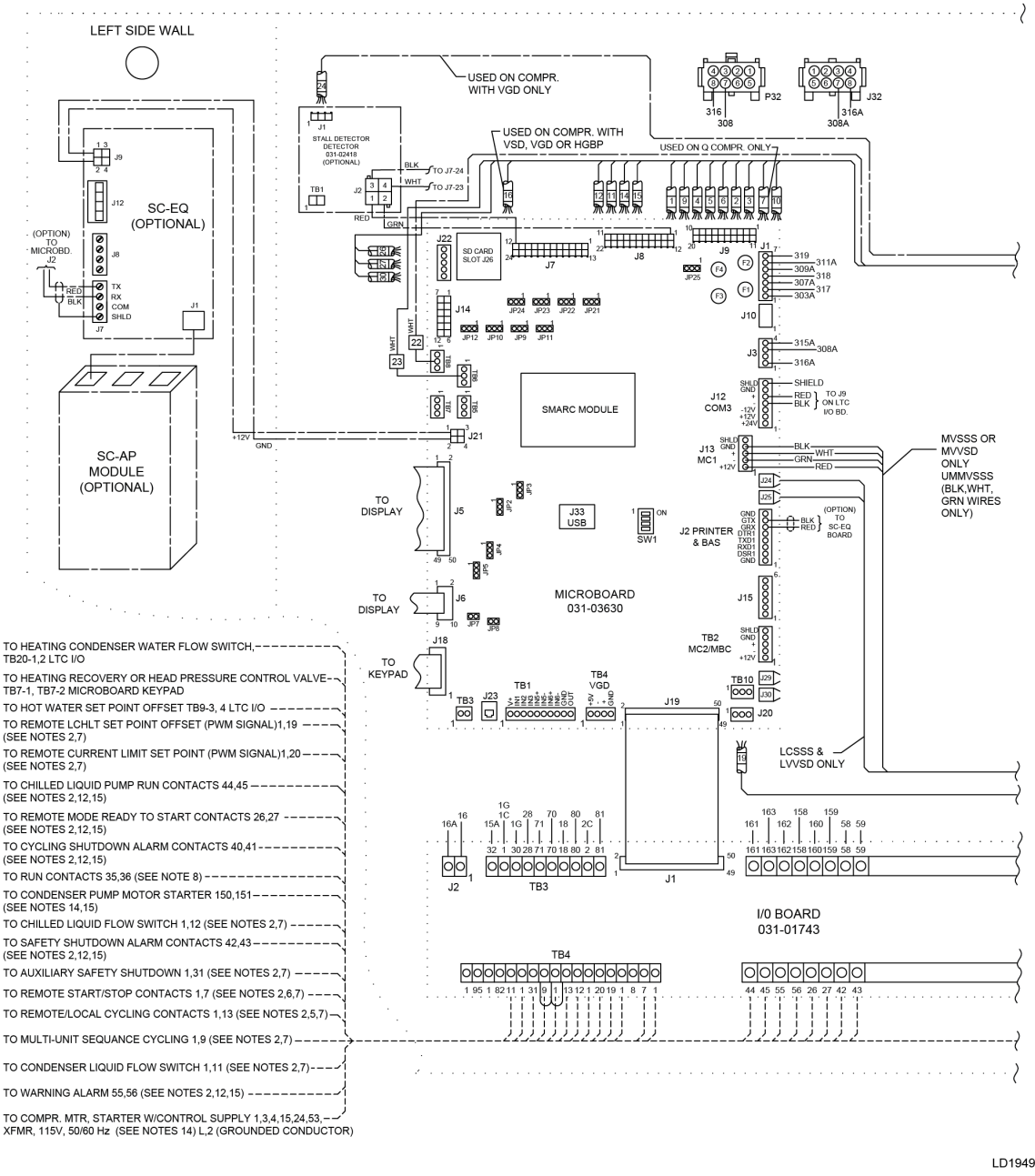


Figure 7: Connection diagram (UL applications only)

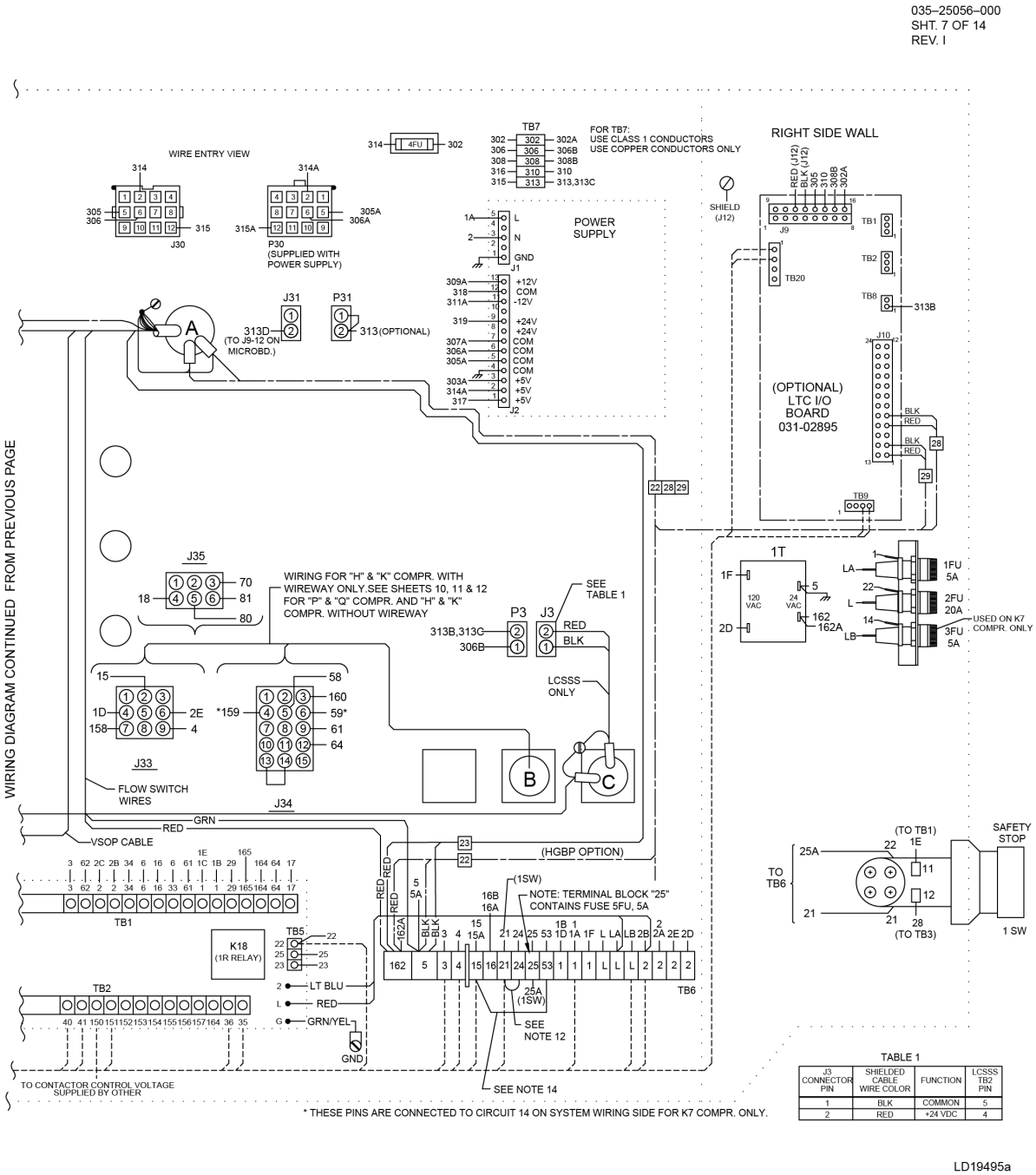


Figure 8: Connection diagram (CE applications only)

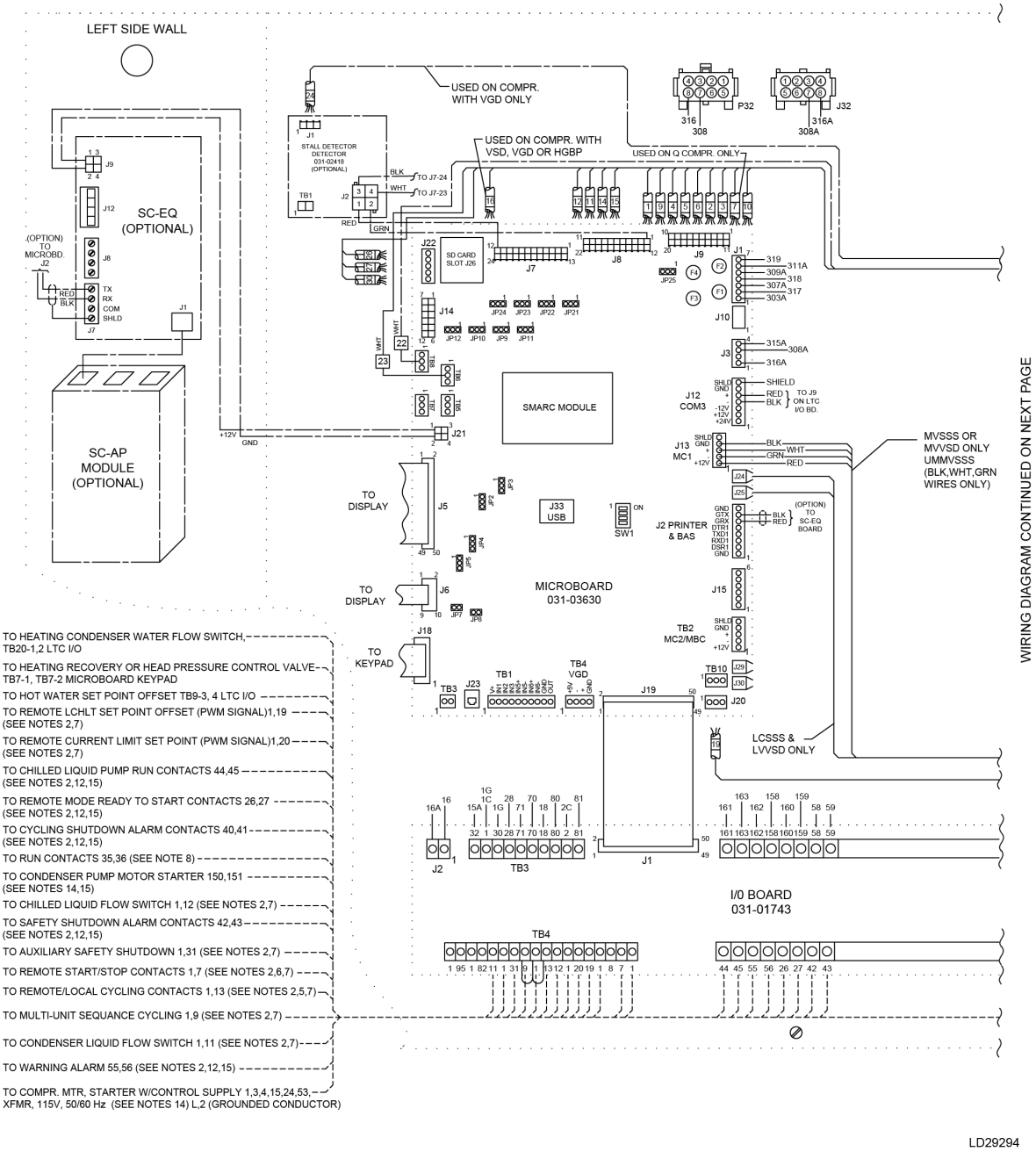


Figure 8: Connection diagram (CE applications only)

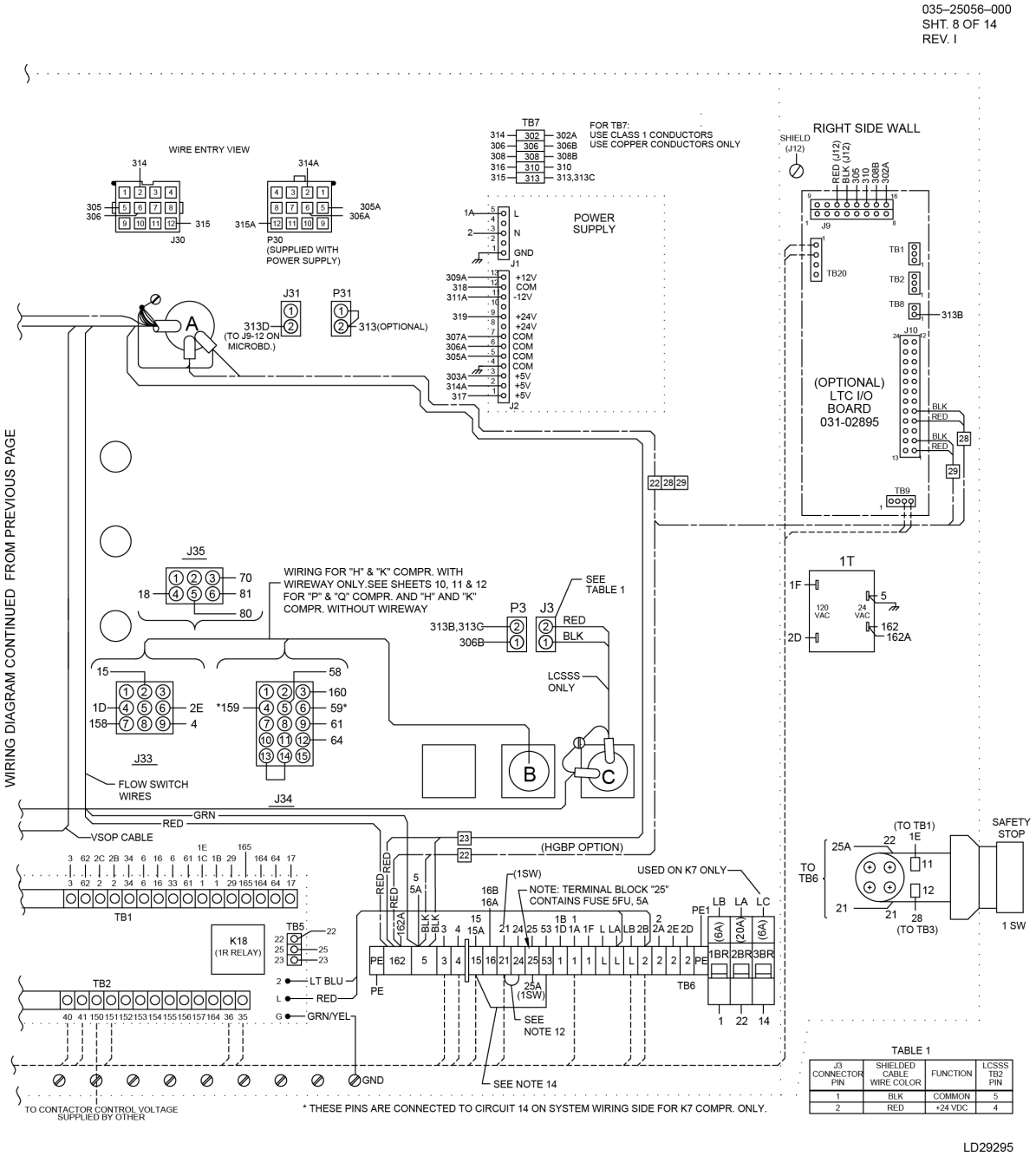


Figure 9: Connection diagram

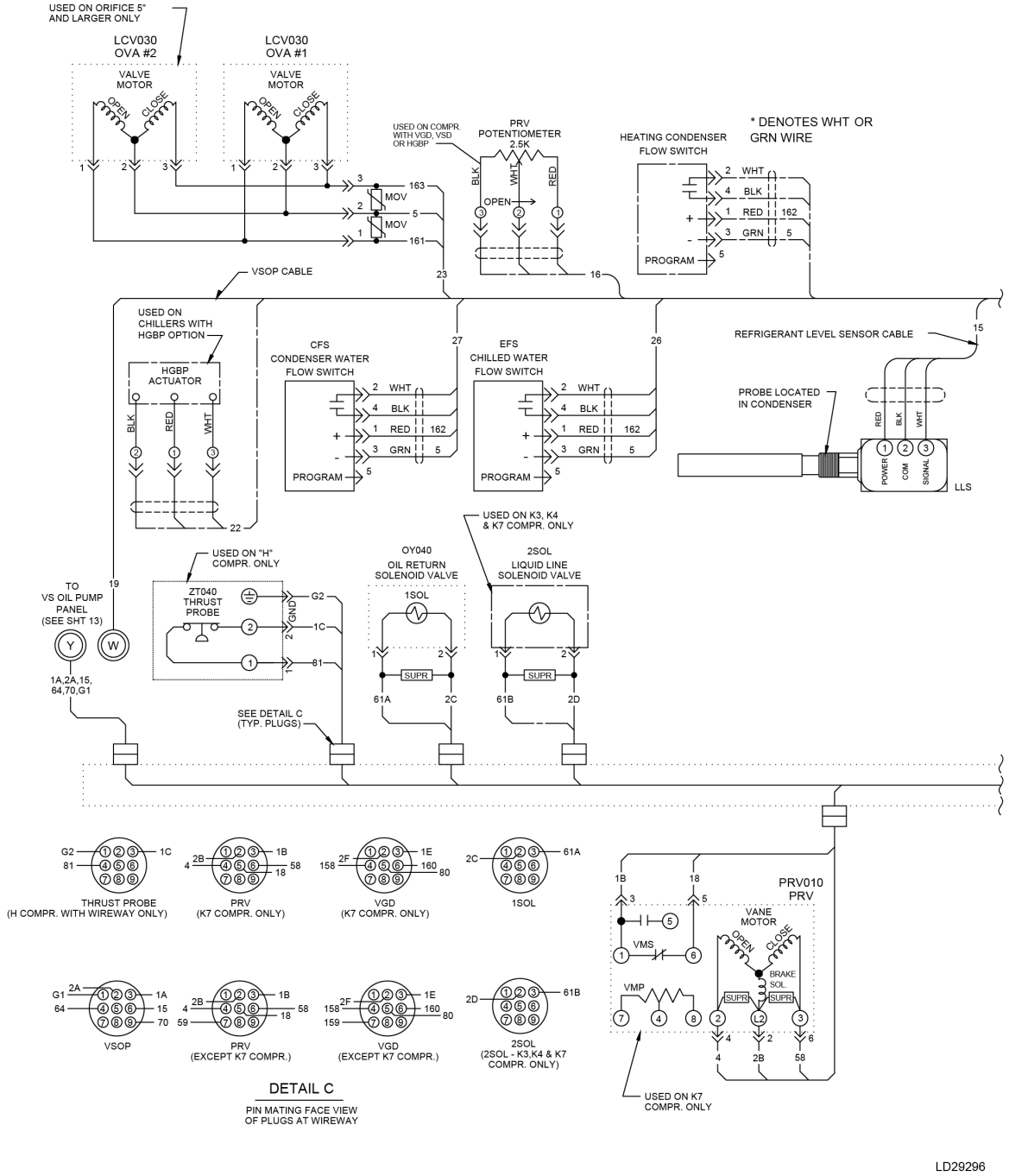


Figure 9: Connection diagram

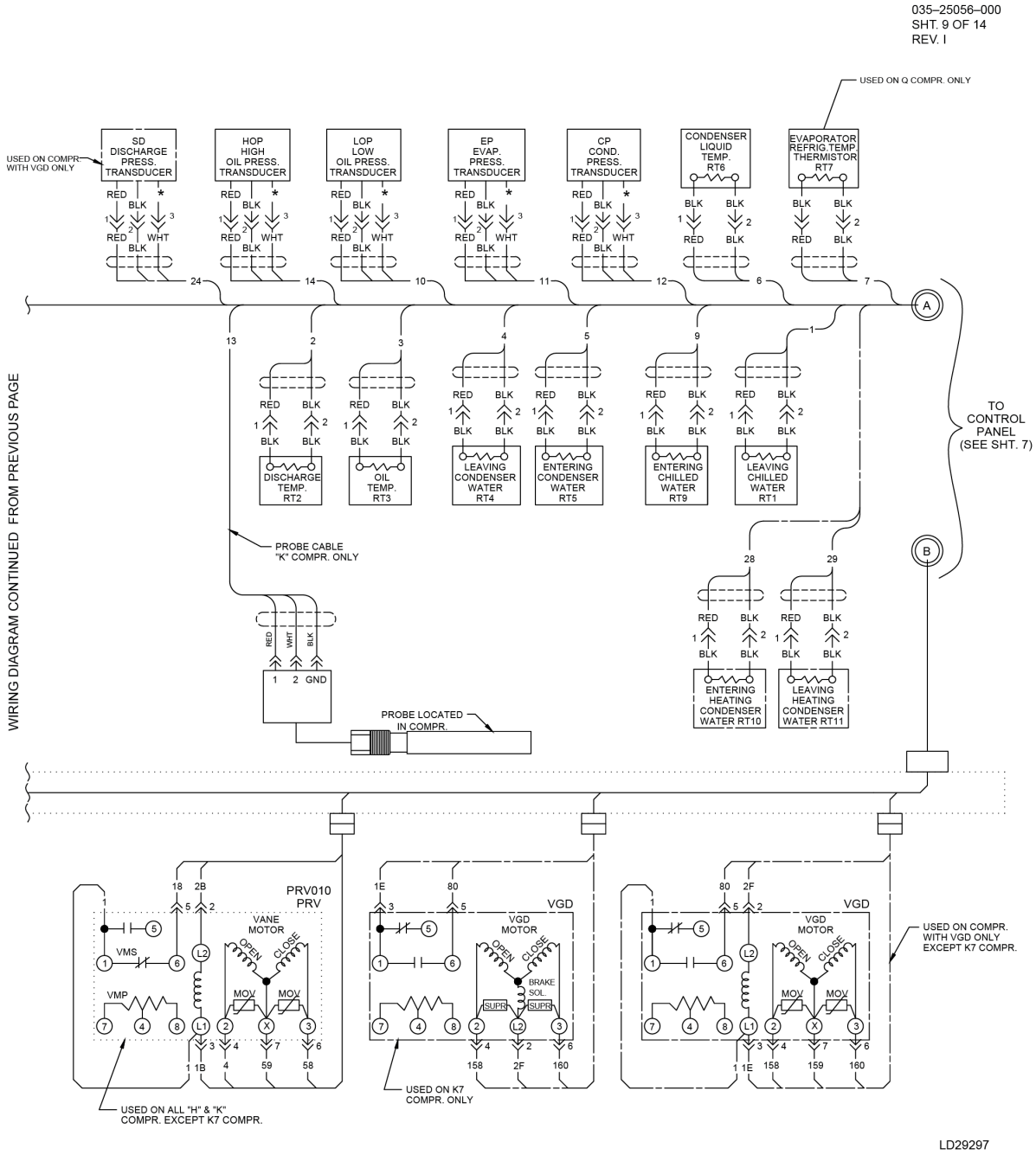


Figure 10: Connection diagram

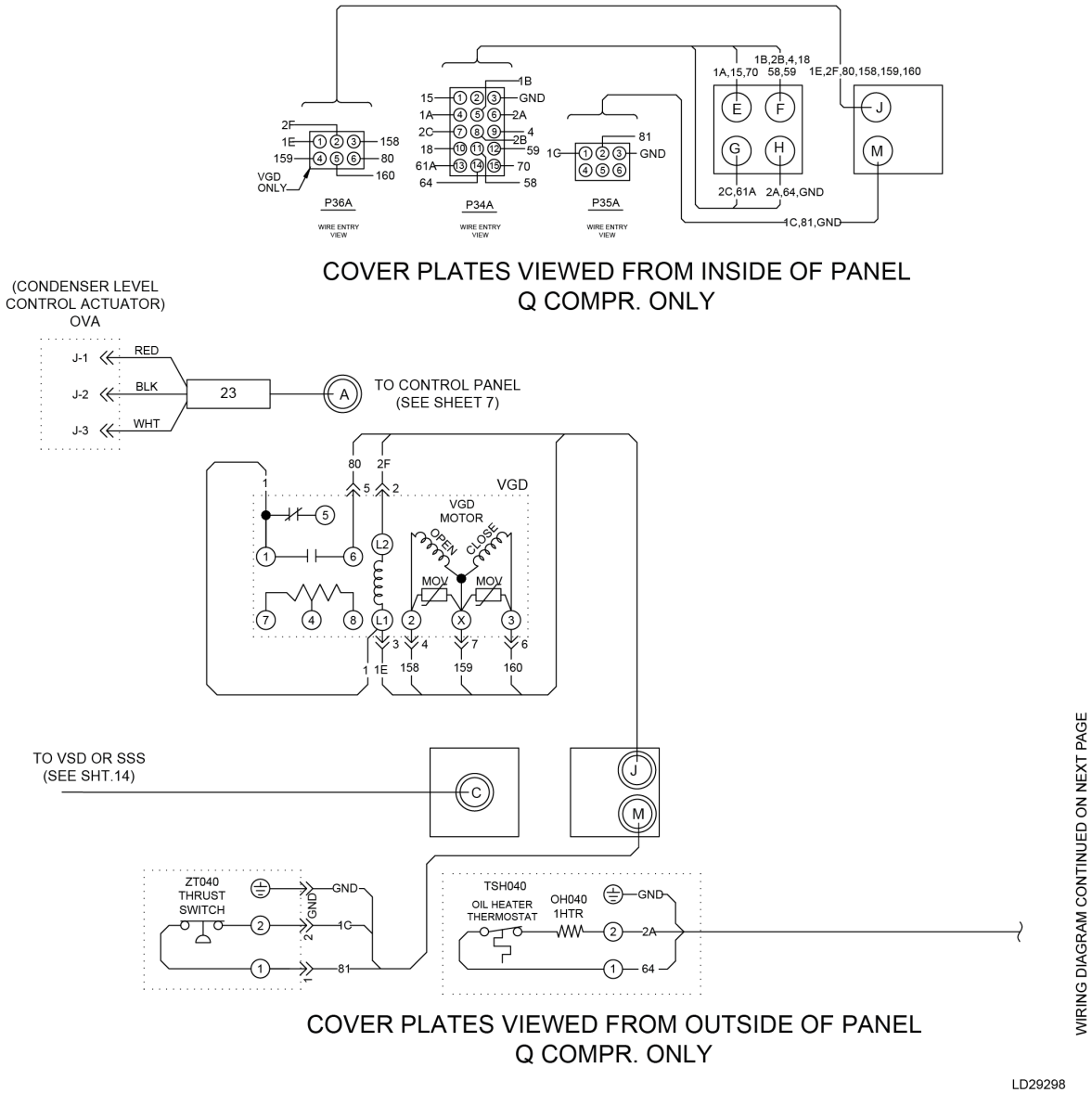


Figure 10: Connection diagram

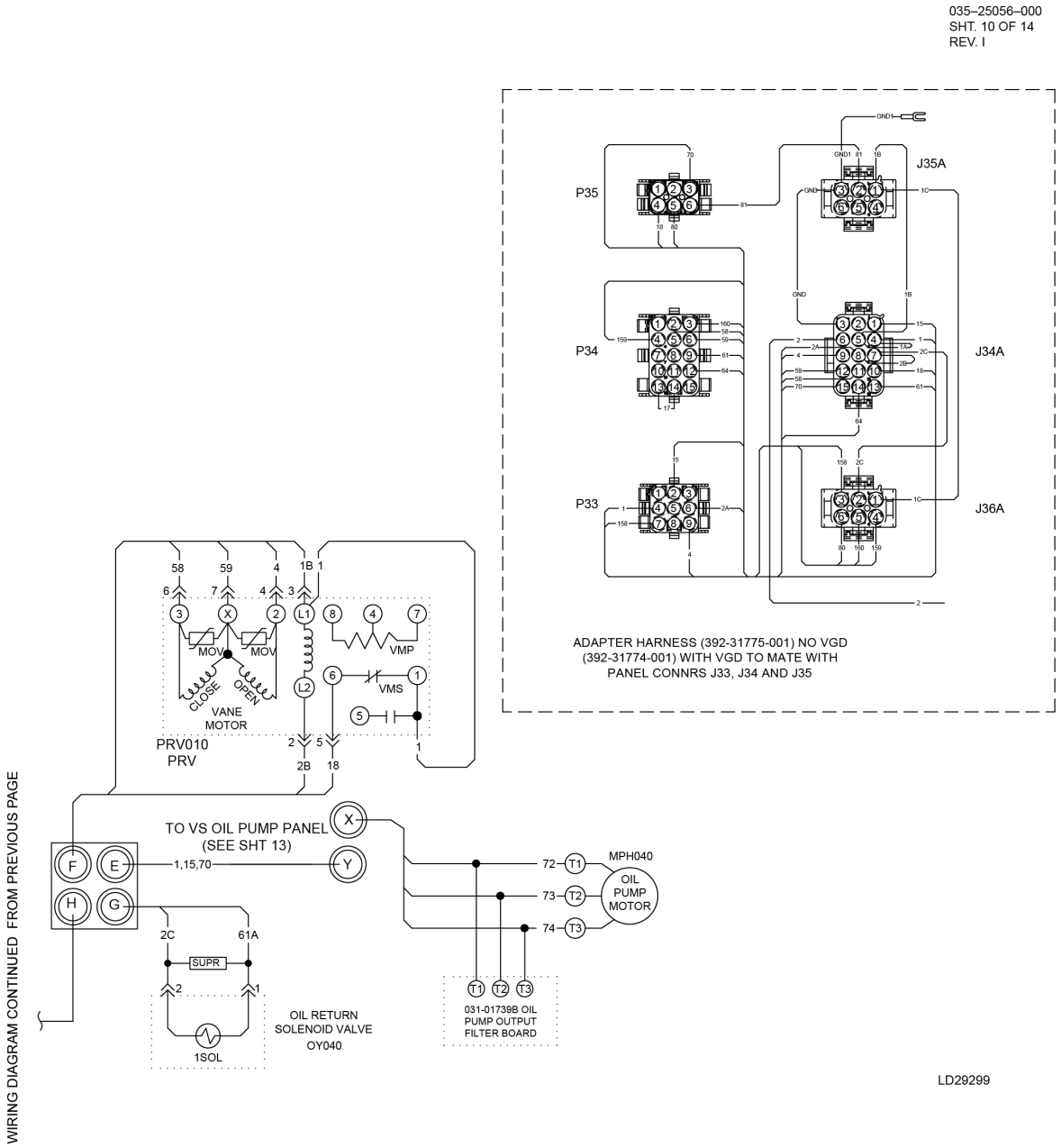


Figure 11: Connection diagram

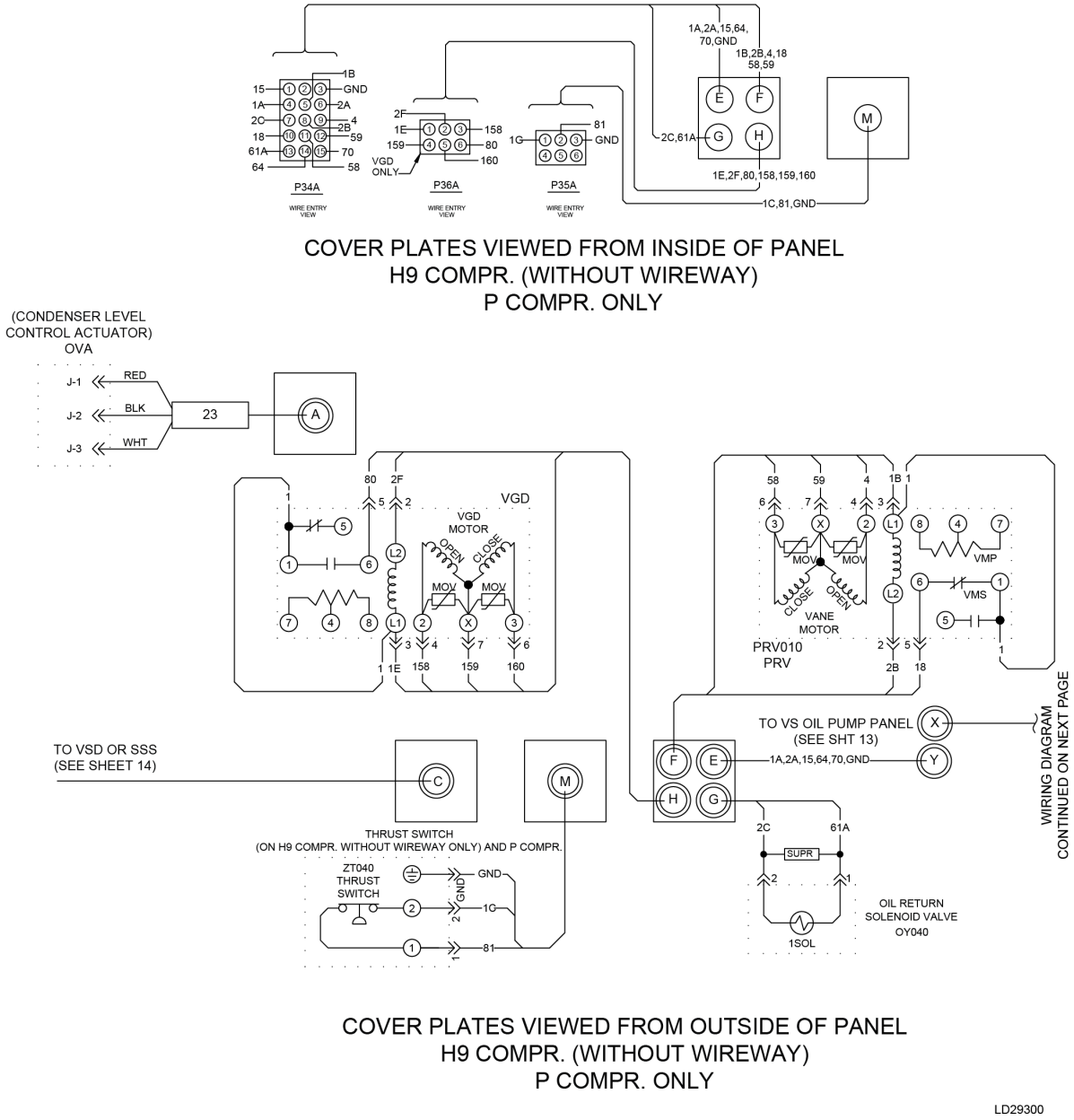


Figure 11: Connection diagram

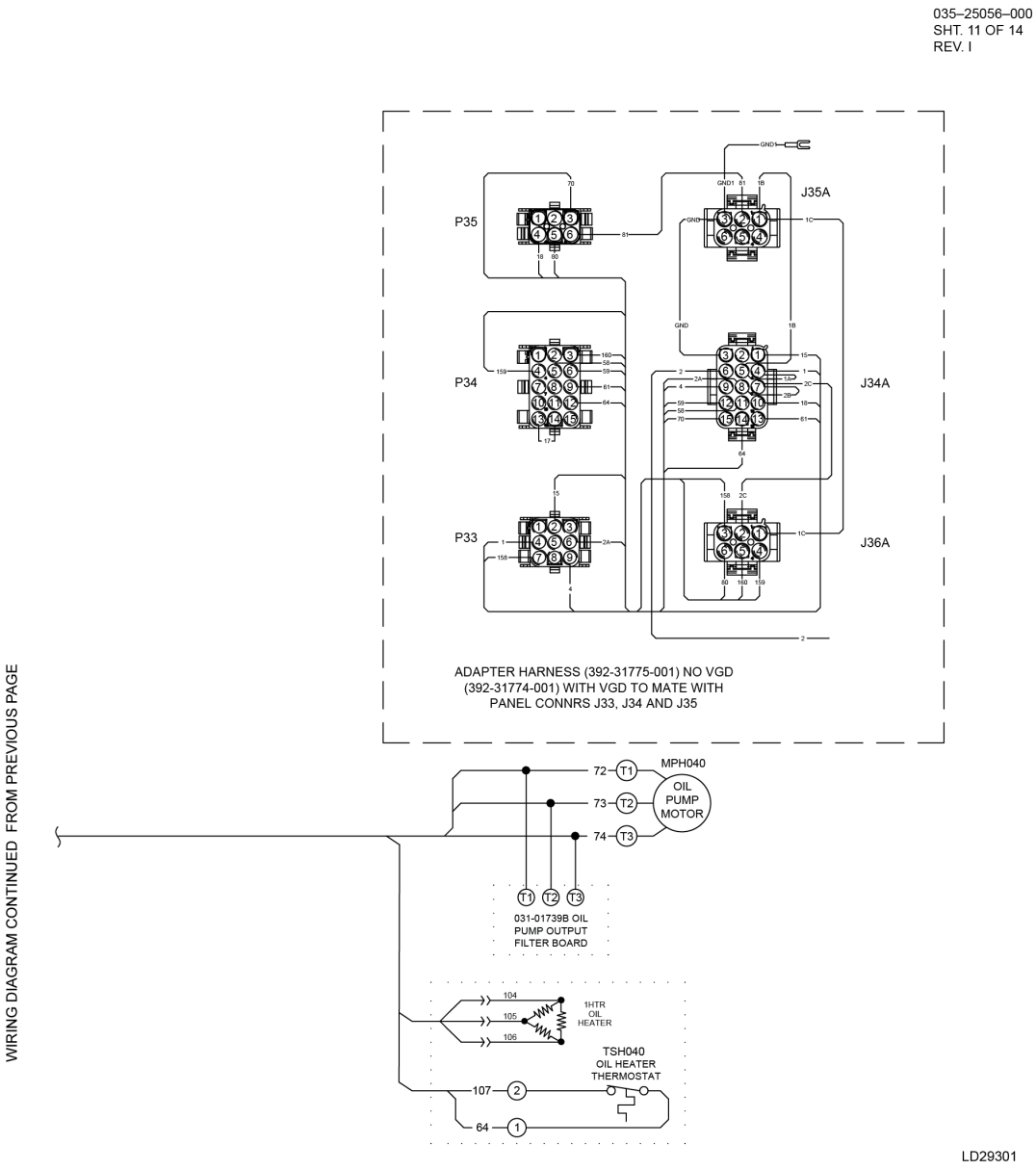


Figure 12: Connection diagram

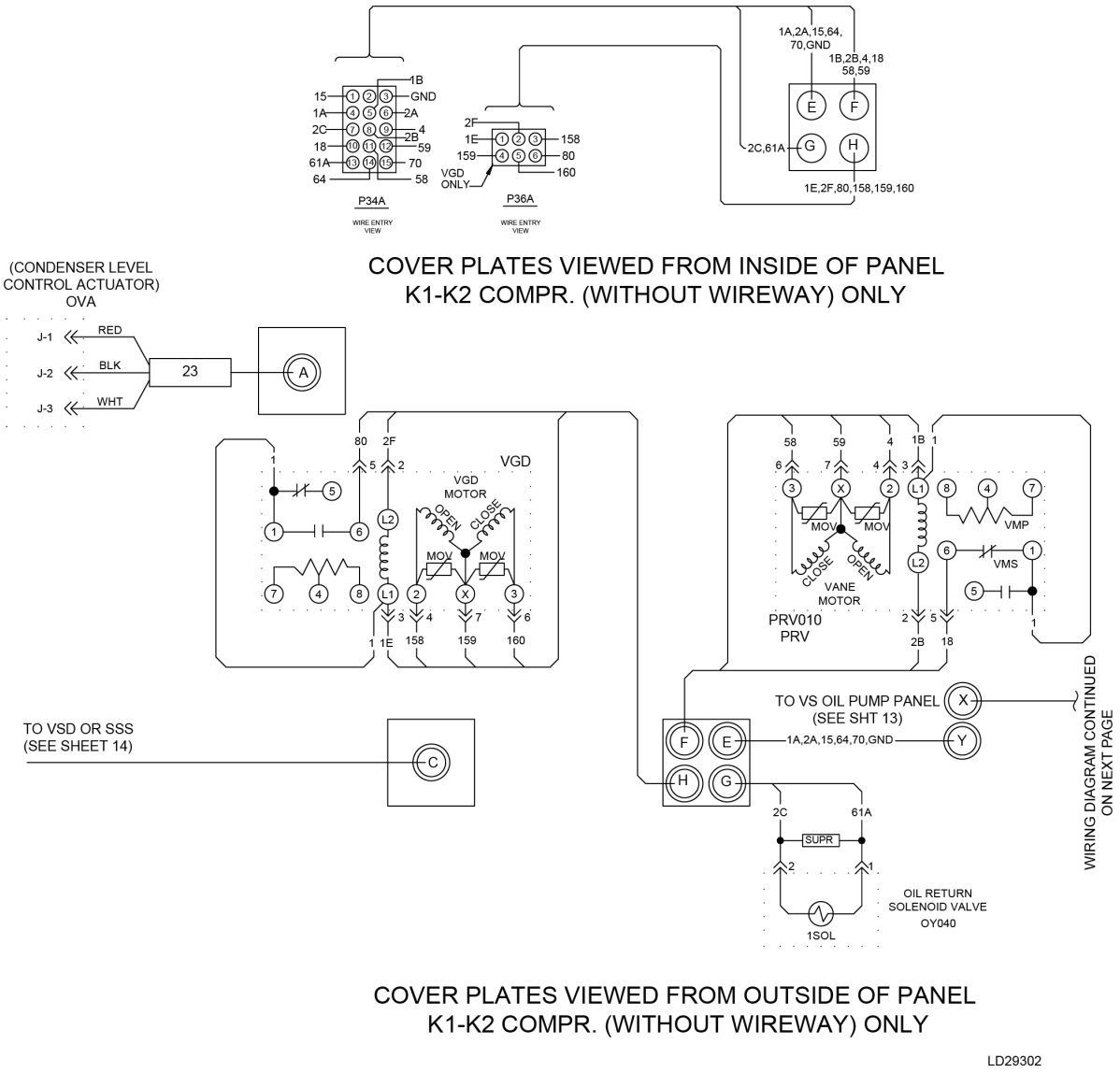
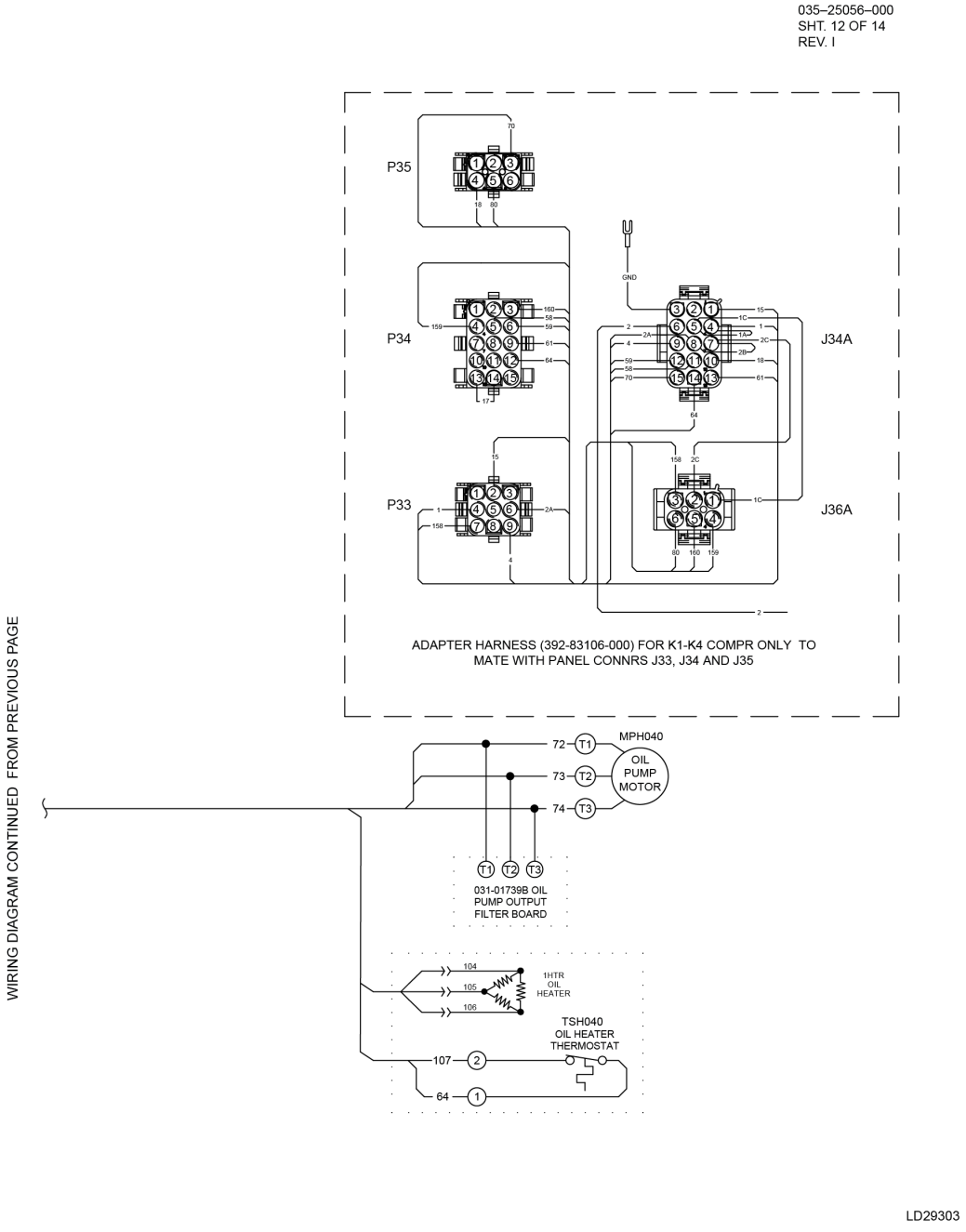


Figure 12: Connection diagram



Variable speed oil pump drive panel

Figure 13: Variable speed oil pump drive panel

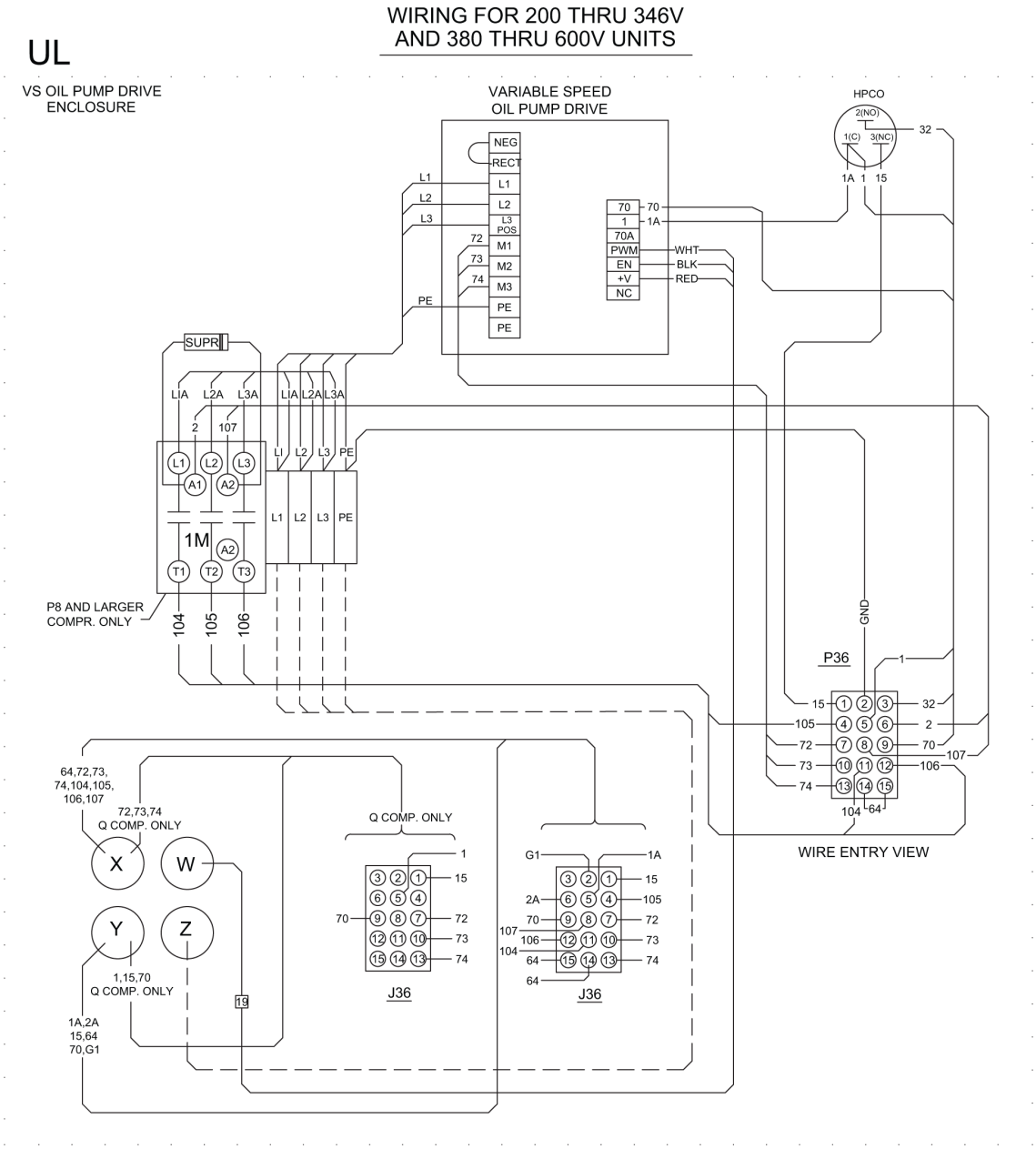


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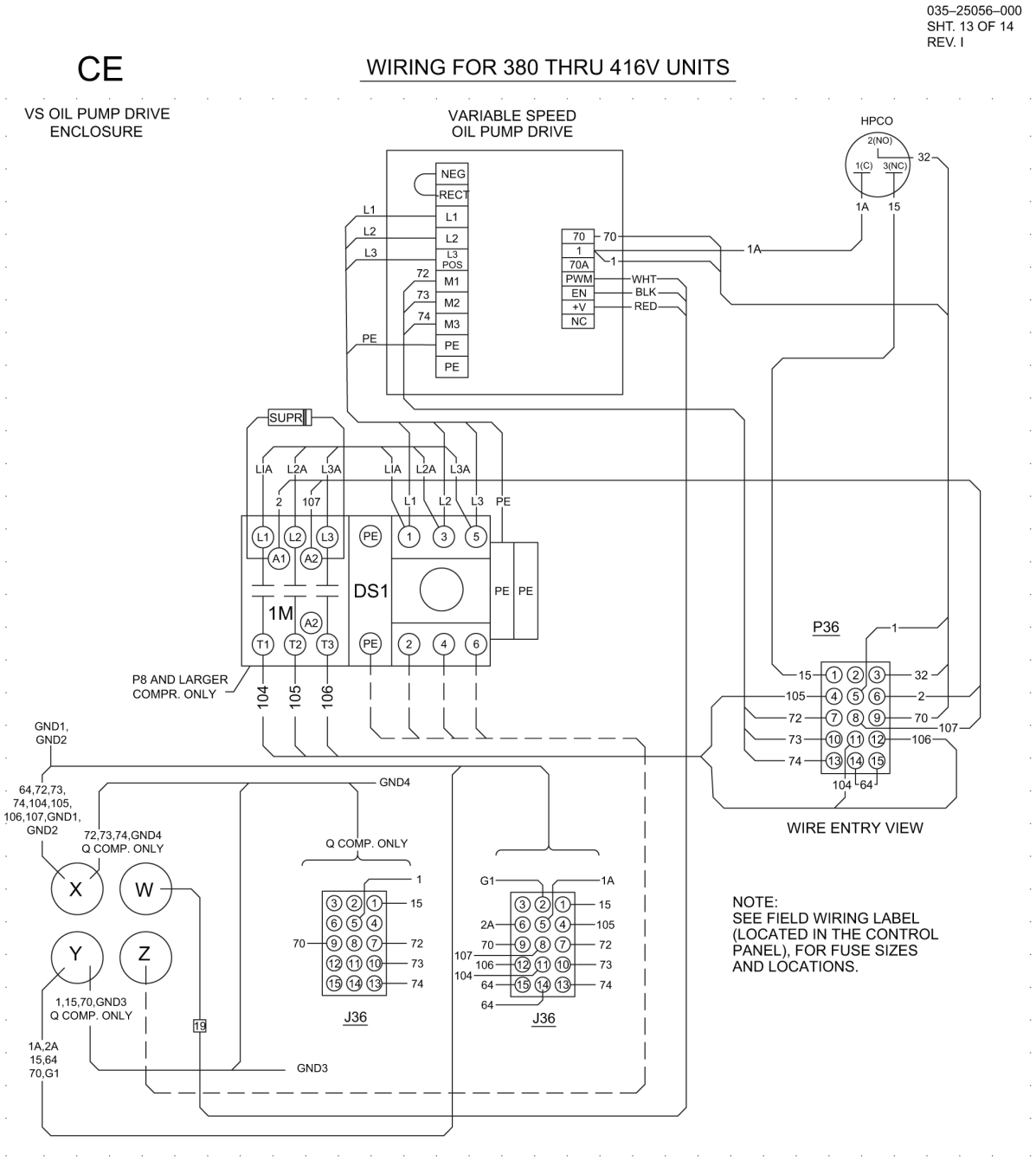
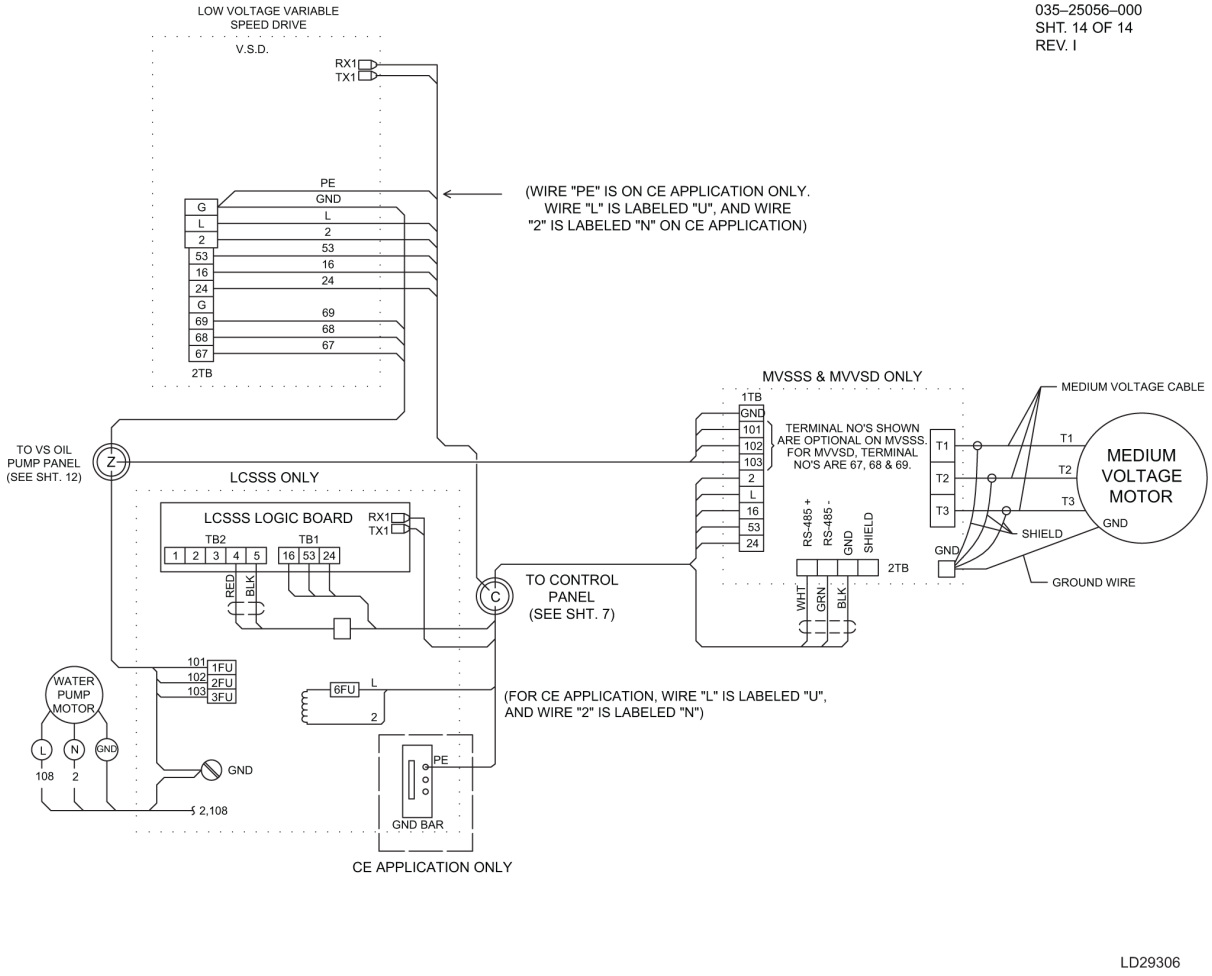
Figure 13: Variable speed oil pump drive panel



Starter wiring for all compressors

Figure 14: Starter wiring for all compressors



Unit conversion

The following factors can be used to convert from imperial to the most common SI Metric values.

Table 5: SI metric conversion

Measurement	Multiply imperial unit	By factor	To obtain metric unit
Capacity	Tons refrigerant effect (ton)	3.516	Kilowatts (kW)
Power	Horsepower (hp)	0.7457	Kilowatts (kW)
Flow rate	Gallons / minute (gpm)	0.0631	Liters / second (L/s)
Length	Feet (ft)	0.3048	Meters (m)
	Inches (in.)	25.4	Millimeters (mm)
Weight	Pounds (lb)	0.4536	Kilograms (kg)
Velocity	Feet / second (fps)	0.3048	Meters / second (m/s)
Pressure drop	Feet of water (ft)	2.989	Kilopascals (kPa)
	Pounds / square inch (psi)	6.895	Kilopascals (kPa)

Temperature

To convert degrees Fahrenheit (°F) to degrees Celsius (°C), subtract 32° and multiply by 5/9 or 0.5556.

Example: (45.0°F - 32°) x 0.5556 = 7.22°C

To convert a temperature range (that is, a range of 10°F) from Fahrenheit to Celsius, multiply by 5/9 or 0.5556.

Example: 10.0°F range x 0.5556 = 5.6 °C range