YORK BY JOHNSON CONTROLS	Supersedes: 160.67-PW1 (904) Form: 160.67-PW1 (914)
WIRING DIAGRAMS	**MODEL YST STEAM TURBINE DRIVE CENTRIFUGAL LIQUID CHILLERS OPTIVIEW CONTROL CENTER DESIGN LEVEL F**

CONTRACTOR _____	PURCHASER _____
ORDER NO. _____	JOB NAME _____
JCI CONTRACT NO. _____	LOCATION _____
JCI ORDER NO. _____	ENGINEER _____

☐ REFERENCE DATE _____	☐ APPROVAL DATE _____	☐ CONSTRUCTION DATE _____

JOB DATA:

CHILLER MODEL NO. YST _____

NO. OF UNITS _____

STEAM TURBINE MODEL _____

OIL PUMP MOTOR _____ VOLTS, 3-PHASE, _____ HZ, _____ FLA

Issue Date:
September 23, 2014

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, 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 these individuals possess 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 shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

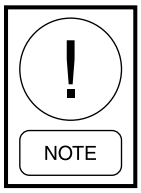
SAFETY SYMBOLS

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

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

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

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



Highlights additional information useful to the technician in completing the work being performed properly.

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 Johnson Controls' published specifications and must be performed only by a qualified electrician. Johnson Controls will NOT be responsible for damage/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this warning will void the manufacturer's warranty and cause serious damage to property or personal injury.

NOTES

1. This wiring diagram describes the standard electronic control scheme for use with a steam turbine drive. For details of standard modifications refer to product form 160.67-PW2.
2. Field wiring to be in accordance with the national electrical code as well as all other applicable codes and specifications. See drawings 077-13916-000 (Top Mount Steam Condenser) and 077-13258-000 (Floor Mount Steam Condenser) for field wiring connections.
3. Numbers along the left side of diagram are line identification numbers. The number along the right side indicate the line number location of relay contacts. An underlined contact location signifies a normally closed contact.
4. Main control panel class 1 field wiring terminal connection points are indicated by numbers a rectangle. I.E. [15]. Main control panel factory wiring terminal connection points are indicated by numbers within a triangle. I.E. <5>. Component terminal connection points are indicated by numbers within a circle, I.E. (C1). Numbers adjacent to circuit lines are the circuit identifications numbers. Power panel wiring terminal connection points are indicated by numbers within a hexagon, I.E. <L1> steam condenser junction box wiring terminal connection points are indicated by numbers within a diamond, I.E. <80>.
5. To cycle unit off automatically and provide a controlled shutdown. Install a cycling device between terminals [1] & [13] (line 33A) (see note 9). If a cycling device is installed, jumper must be removed between terminals [1] & [13] .
6. Fuse sizes and motor overload setpoints depend on voltage of single point power supply. See chart on field connection diagram on the door of the panel.
7. To stop unit and not permit it to be restarted again after a controlled shutdown, Install a stop device between terminals [1] & [8] (line 32A)(see note 9). A remote permissive start switch may be connected to terminals [1] & [7] (line 32A)(see note 9). Remote switches are operative only in the "Remote" operating mode.
8. Contact rating is 5 amps resistive at 120 volts A.C. or 240 volts A.C.
9. Device contact rating to be 5 milliamperes at 115 volts A.C.
10. Three phase power must be properly phased. L1, L2, & L3 corresponding to phase sequence A, B, & C.
11. Contact rating is 5 amps resistive @ 250 volts A.C. & 30 Volts D.C. 2 amp inductive (.4 PF) @ 250 Volts A.C. & 30 Volts D.C.
12. Each 115 vac field-connected inductive load, i.e. Relay Coil. Motor Starter Coil, etc. shall have a transient suppressor wired in parallel with its coil, physically located at the coil. Spare transient suppressor and control circuit fuses are supplied in a bag attached to green ground screw in lower left corner of control panel.
13. Turbine Auxiliary Oil Pump, Oil Cooler, Oil Sensors & Turbine Oil Safety Logic are supplied only on Turbines with pressurized lubrication.
14. If optional chilled and condenser liquid low pressure differential switches are installed, panel must be configured for "Digital" Flow Sensor. See for 160.67-O1.
15. The Timing Diagram is abbreviated and does not include all events and messages. See Operators Manual.
16. Do not apply voltage on field wiring terminal blocks TB4 ot TB6. All 115 volt A.C. power is fed from terminals 1 and 2.
17. Do not apply voltage on field instrument wiring terminal block TB7. All instrument loop power is supplied from terminals 325, 327, & 329.
18. For one piece probe wiring (supplied on J compressors prior to 2006). See 160.67-M1, Section 13. Figure 44 and 45.
19. Wiring for stall transducer 025-40088-000 is shown. Early vintage YST chillers were supplied with stall transducer 025-39464-000. See form 160.67-M1, Section 17 for wiring.

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LEGEND

CHDT	Compressor High Discharge Temperature (Provided by TE-112)
CHOP	Compressor High Oil Pressure (Provided by PE-140 & PE-141)
CHOT	Compressor High Oil Temperature (Provided by TI-140)
CLOP	Compressor Low Oil Pressure (Provided by PE-140 & PE-141)
CLOT	Compressor Low Oil Temperature (Provided by TE-140)
CLOTD	Compressor Low Oil Temperature Diff. (Provided by TE-140 & TE-112)
FCV	Solenoid Valve
FDTS	Faulty Discharge Temperature Sensor
FLA	Full Load Amps
FSL	Low Flow Switch
FU	Fuse
HGBP	Hot Gas Bypass Valve (TCV-100A)
HP	High Cond. Pressure (Provided by PE-112)
HPCO	Compressor Discharge High Pressure Cut-out, Hardwired (PSHH-112A)
HTR	3 Phase Thermostatically Controlled 3000 Watt Oil Heater At Line Voltage
HW	Hotwell
K7, K8, K13, K14, K17, K18	Relays mounted on YORK I/O Board
LCV	Level Control Valve Actuator (LCV-113)
LE	Level Transducer (0-5 VDC Output)
LEP	Low Evaporator Pressure (Provided by PE-111)
LSH	High Level Switch
LT	Level Transmitter (4-20 MA DC Output)
LCLT	Low Chilled Liquid Temperature (Provided by TE-100)
M	Contactor/Motor Starter
MOV	Metal Oxide Varistor
MPU	Magnetic Pickup
OL	Motor Starter Overloads
PE	Pressure Transducer (0.5 - 4.5 VDC Output)
PGD	Proximity Gap Distance (ZE-142)
PT	Pressure Transmitter (4-20 MA DC Output)
PRV	Pre-Rotation Vanes (TCV-100)
PWM	Pulse Width Modulated
R	Control Relay
RES	Resistor
SSI	DPDT 3 Position Rocker Switch
ST	Speed Transmitter (4-20 MA DC Output)
T	Class 2 Power Supply Transformer
TAOP	Turbine Aux. Oil Pump Control (Provided by PT-160)
TB1, TB3, TB5	Terminal Block, Factory Wiring – 
TB2, TB4	Terminal Block, Field Wiring – 
TB6	Terminal Block, Field (Bottom), Factory (Top)
TB7	Terminal Block, Field (Left), Factory (Right)
TB8	Terminal Block In Power Panel , Factory – 
TB9	Terminal Block In Steam Condenser Junction Box – 
TE	Resistance Temperature Sensing Element
TEHP	Turbine Exhaust High Pressure (Provide By PT-173)
TGEBHT	Turbine Gov. End Bearing High Temp. (Provided by TE-162)
THOT	Turbine High Oil Temperature (Provided by TE-160)
TLOP	Turbine Low Oil Pressure Provided by PT-160)
TSEBHT	Turbine Shaft End Bearing High Temp. (Provided by TE-161)
VGD	Variable Geometry Diffuser
VMS	Vane Motor Closed Limit Switch
ZS	Limit Switch
----------	Field Wiring
————	Factory Wiring
.....	Circuit Board Or Enclosure Boundary
	Jack (J1, J2,...)
	Plug (P1, P2,...)
	Wire Entrance Hold In Control Panel
—— – ——	Option (When Supplied by YORK)
—— - - ——	Mechanical Linkage
	Shielded Cable
	Metal Oxide Varistor
SUPR	Transient Suppressor

ELEMENTARY DIAGRAM

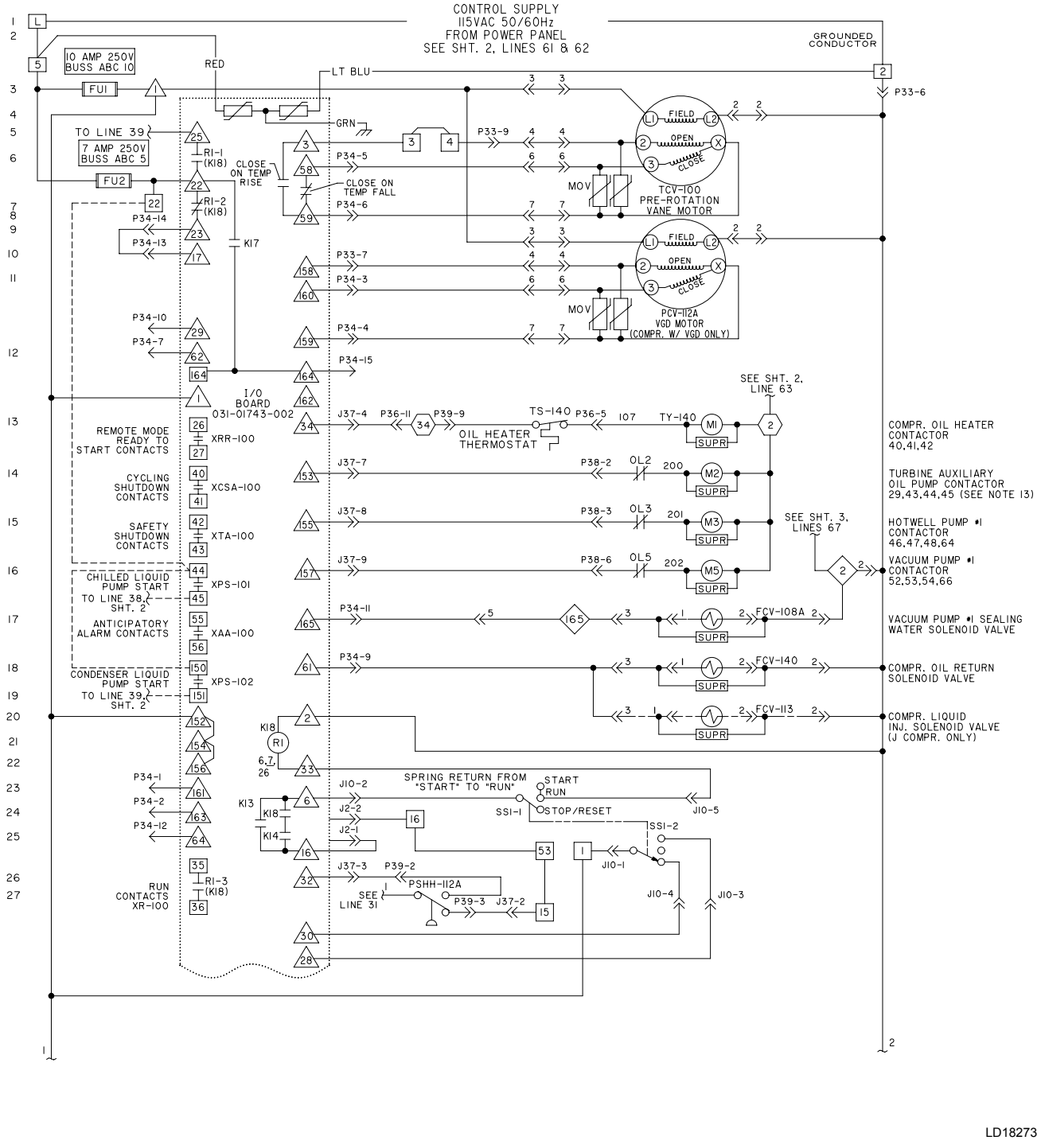

FIGURE 1 - ELEMENTARY DIAGRAM

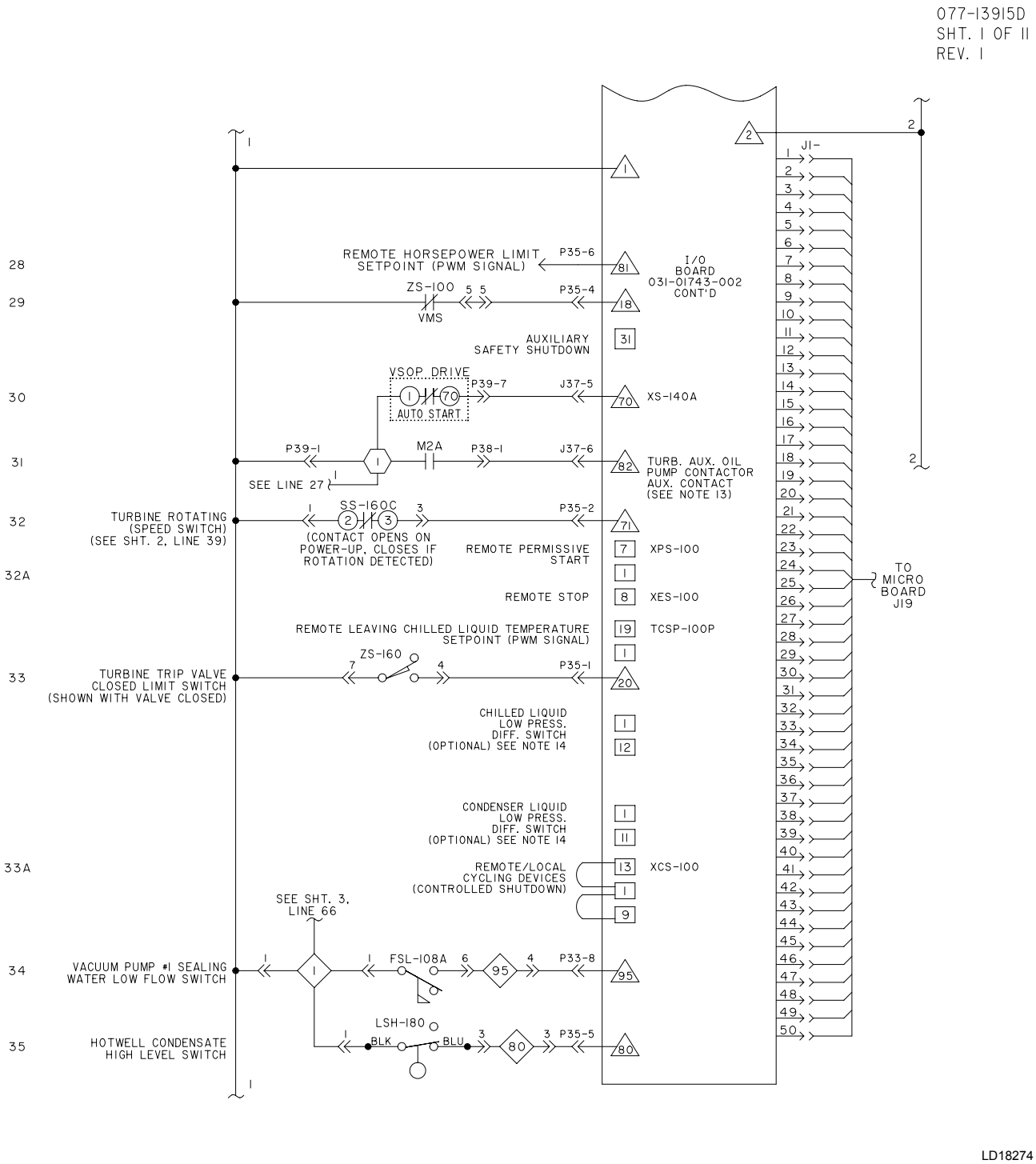

FIGURE 1 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM (CONT'D)

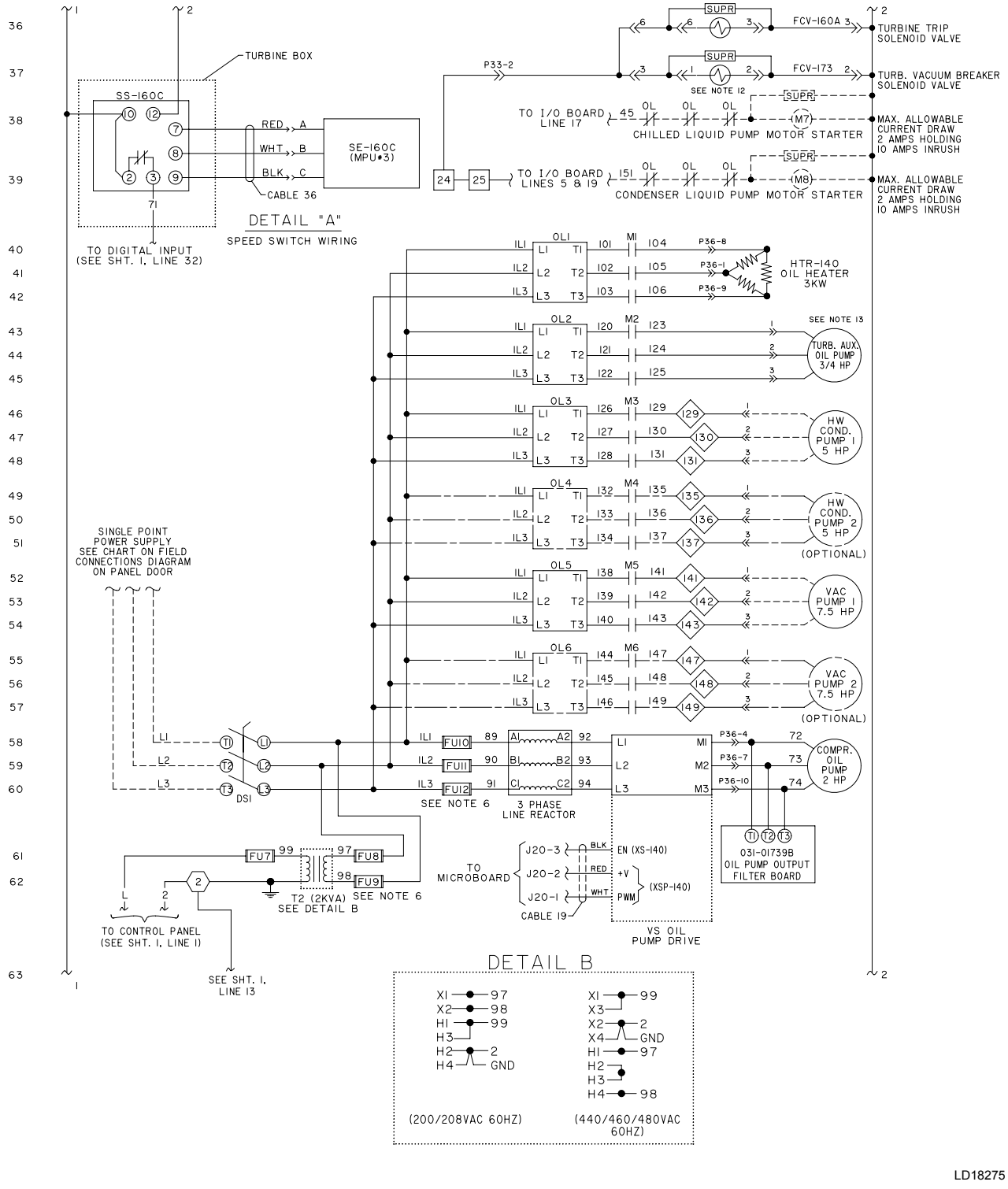

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FIGURE 2 -

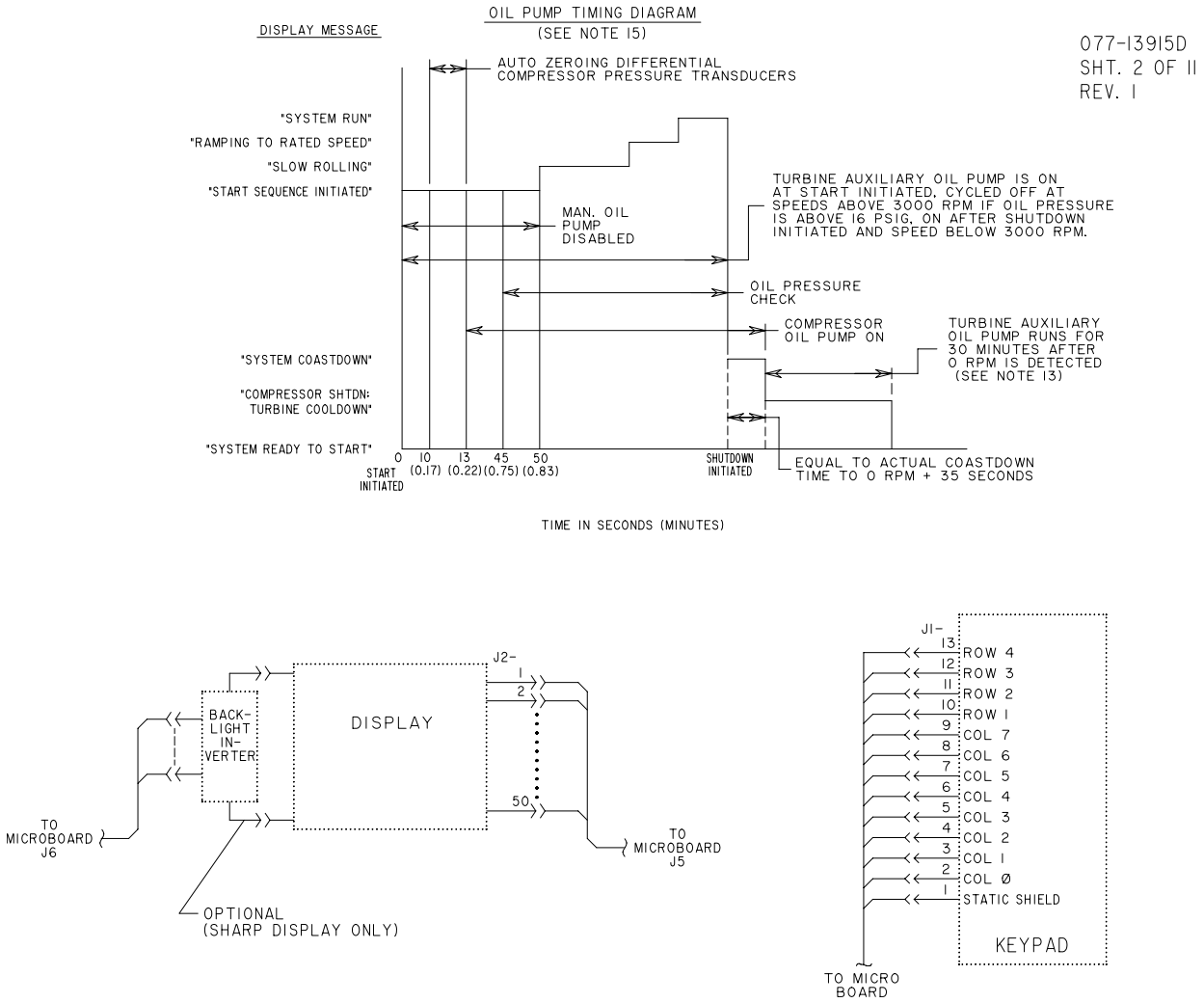

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FIGURE 2 - (CONT'D)

ELEMENTARY DIAGRAM (CONT'D)

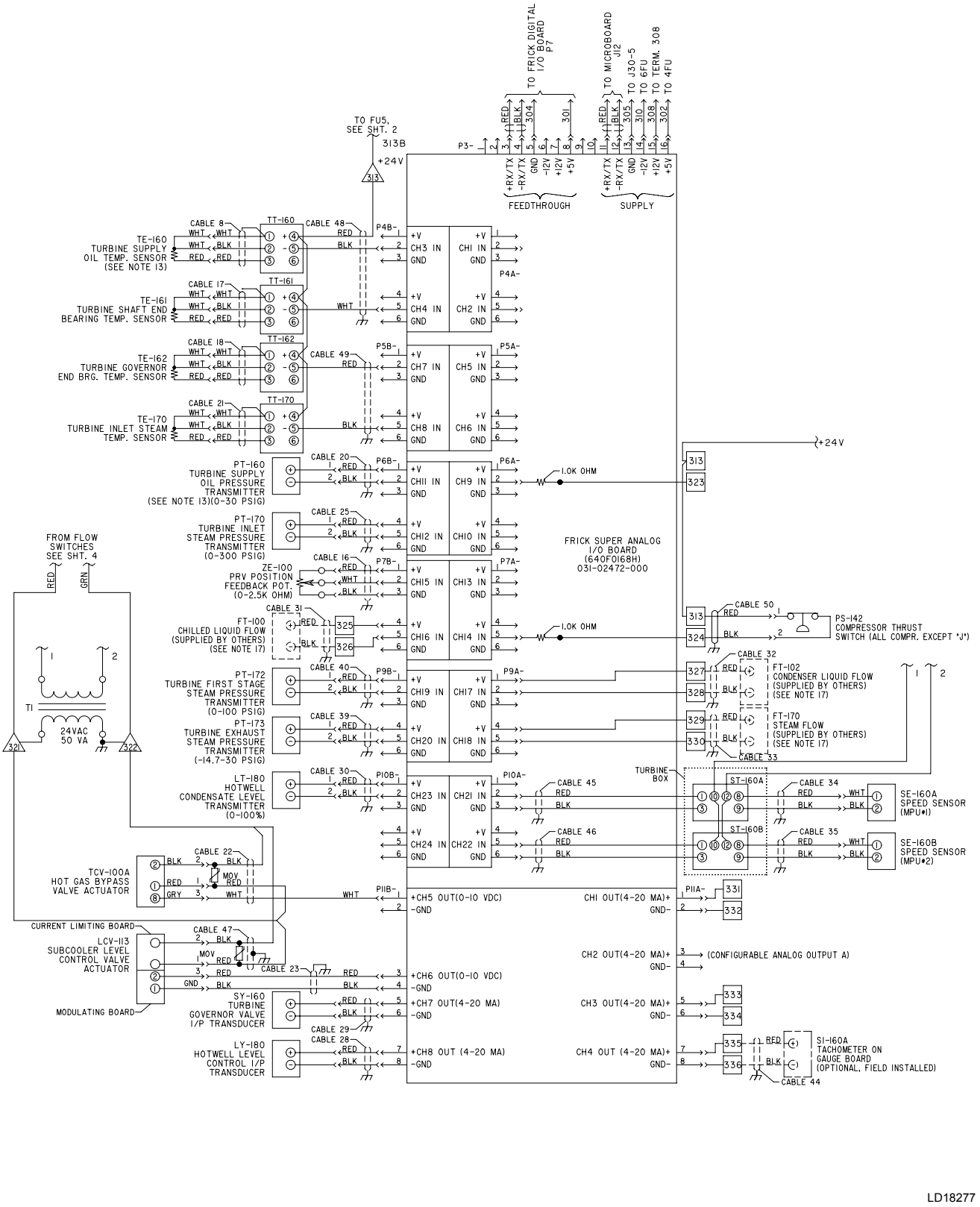

FIGURE 3 -

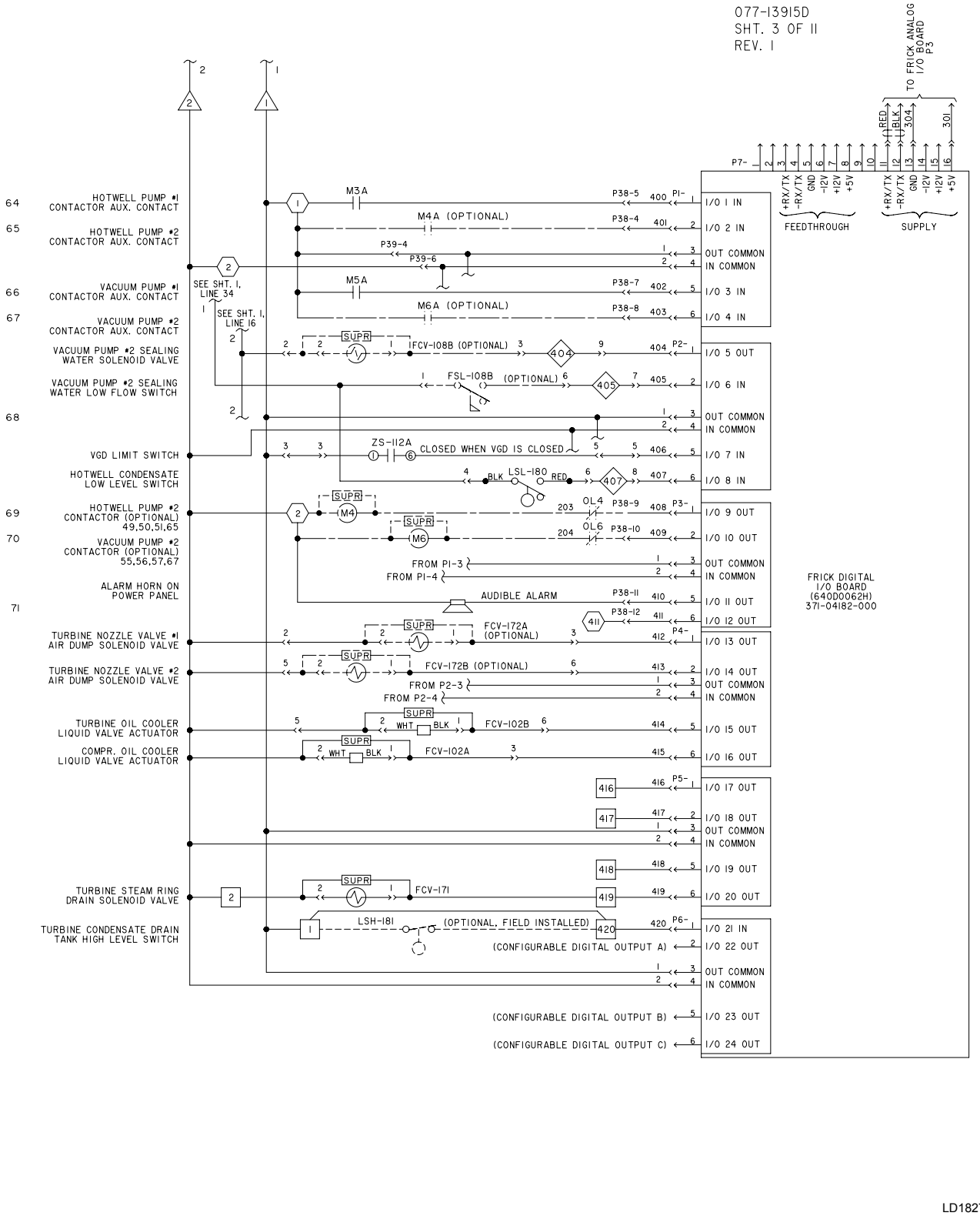

FIGURE 3 - (CONT'D)

ELEMENTARY DIAGRAM (CONT'D)

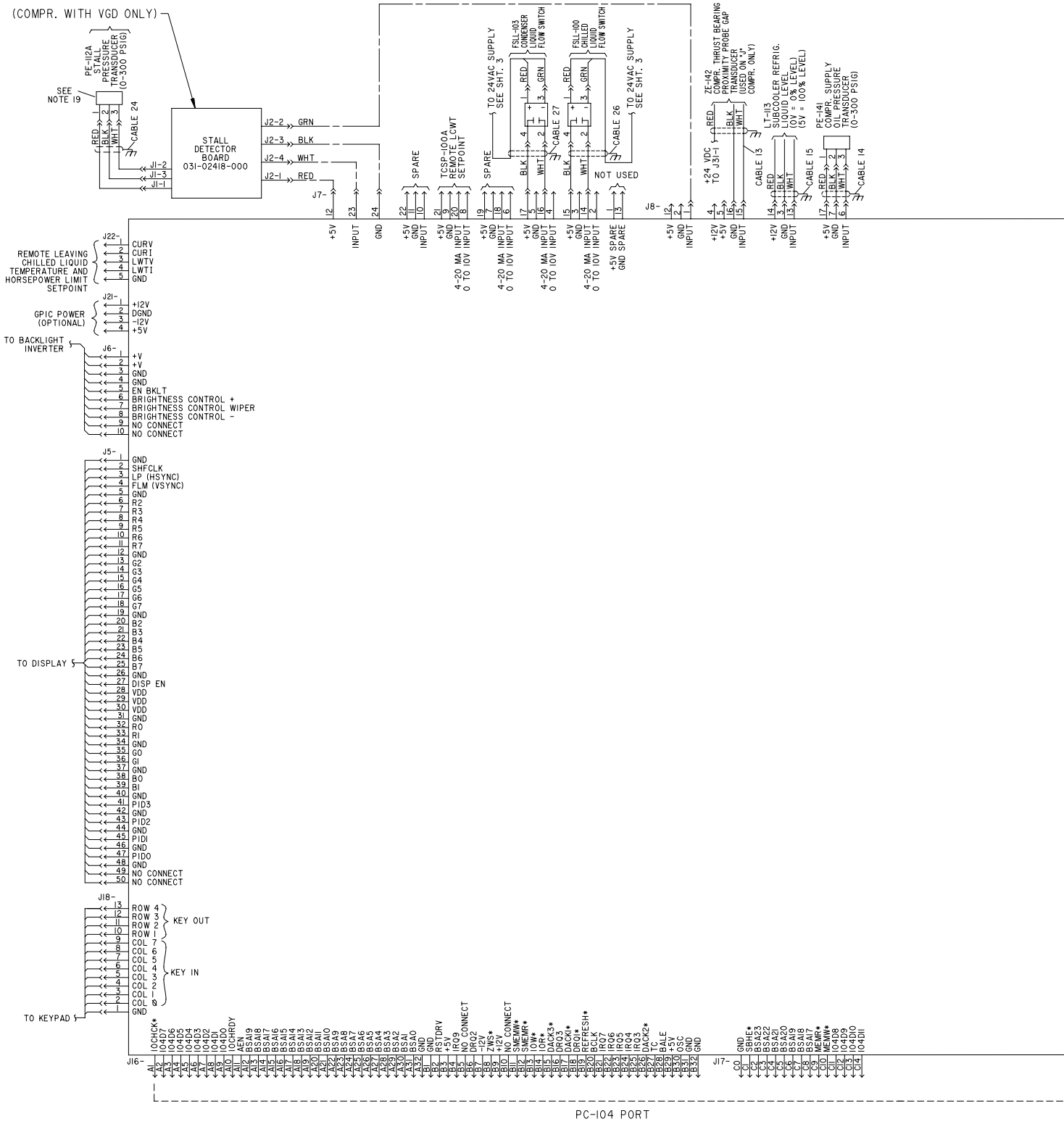

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FIGURE 4 - MICROBOARD 031-02430

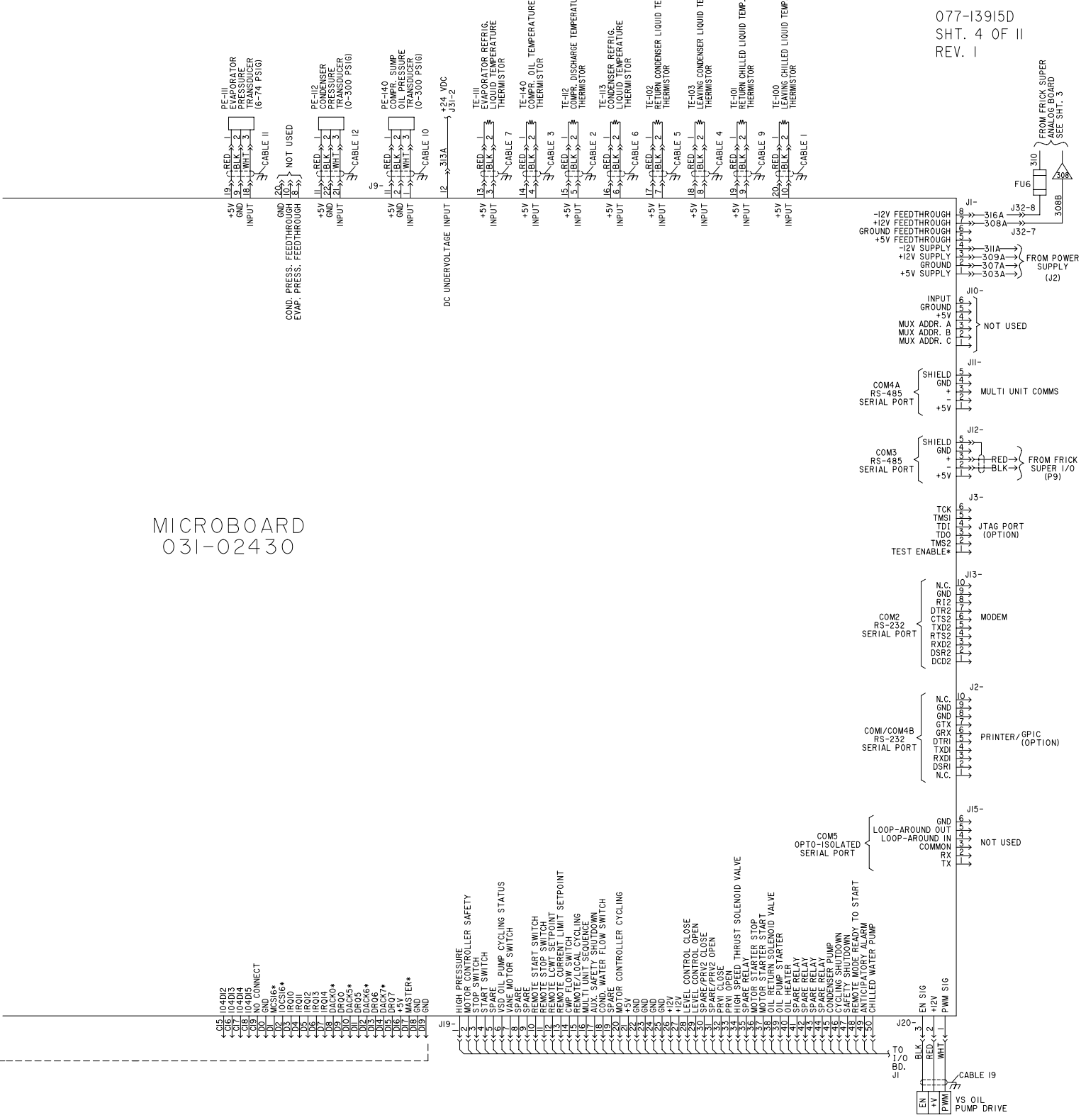

FIGURE 4 - MICROBOARD 031-02430 (CONT'D)

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DISPLAY INTERFACE BOARD

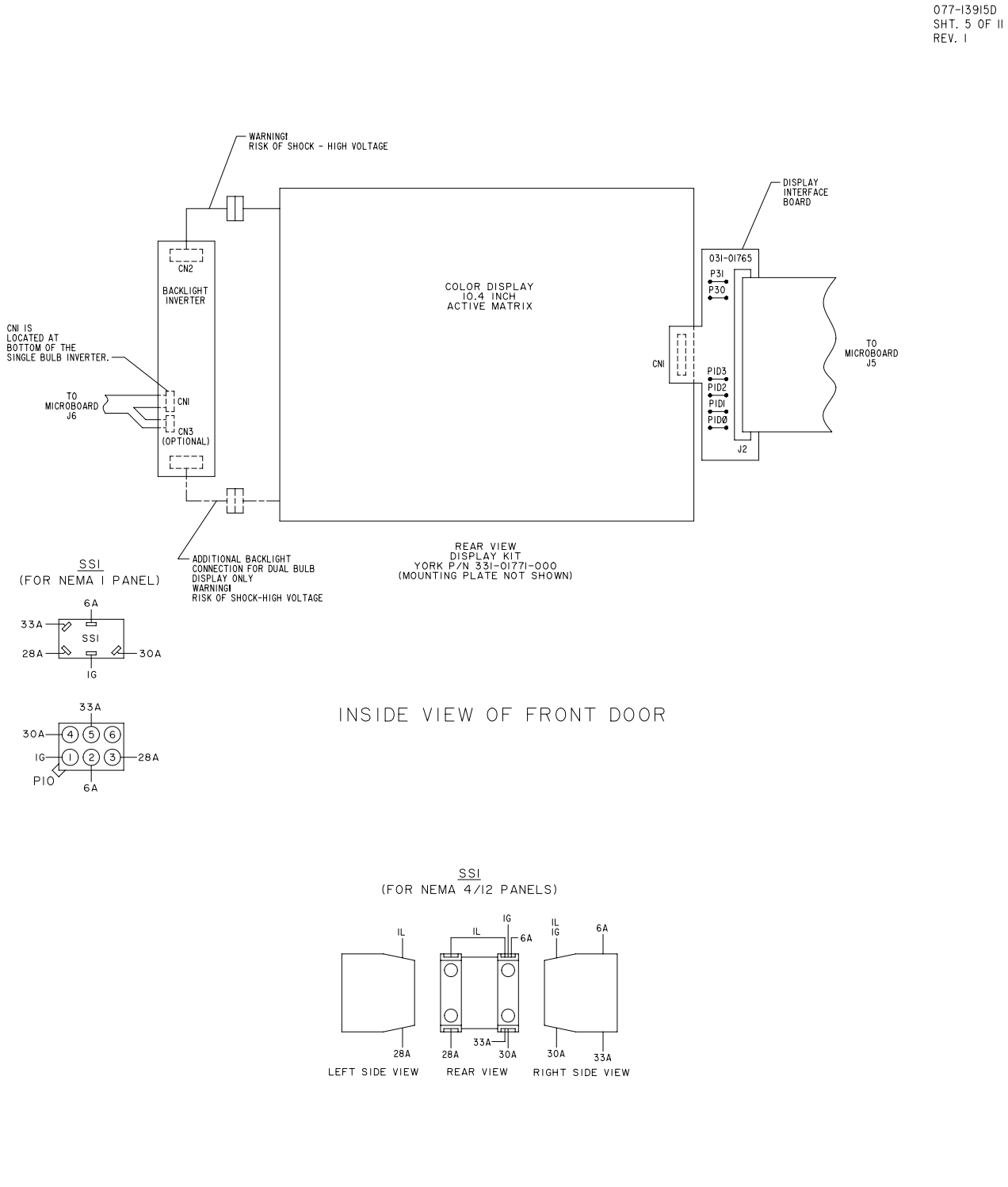
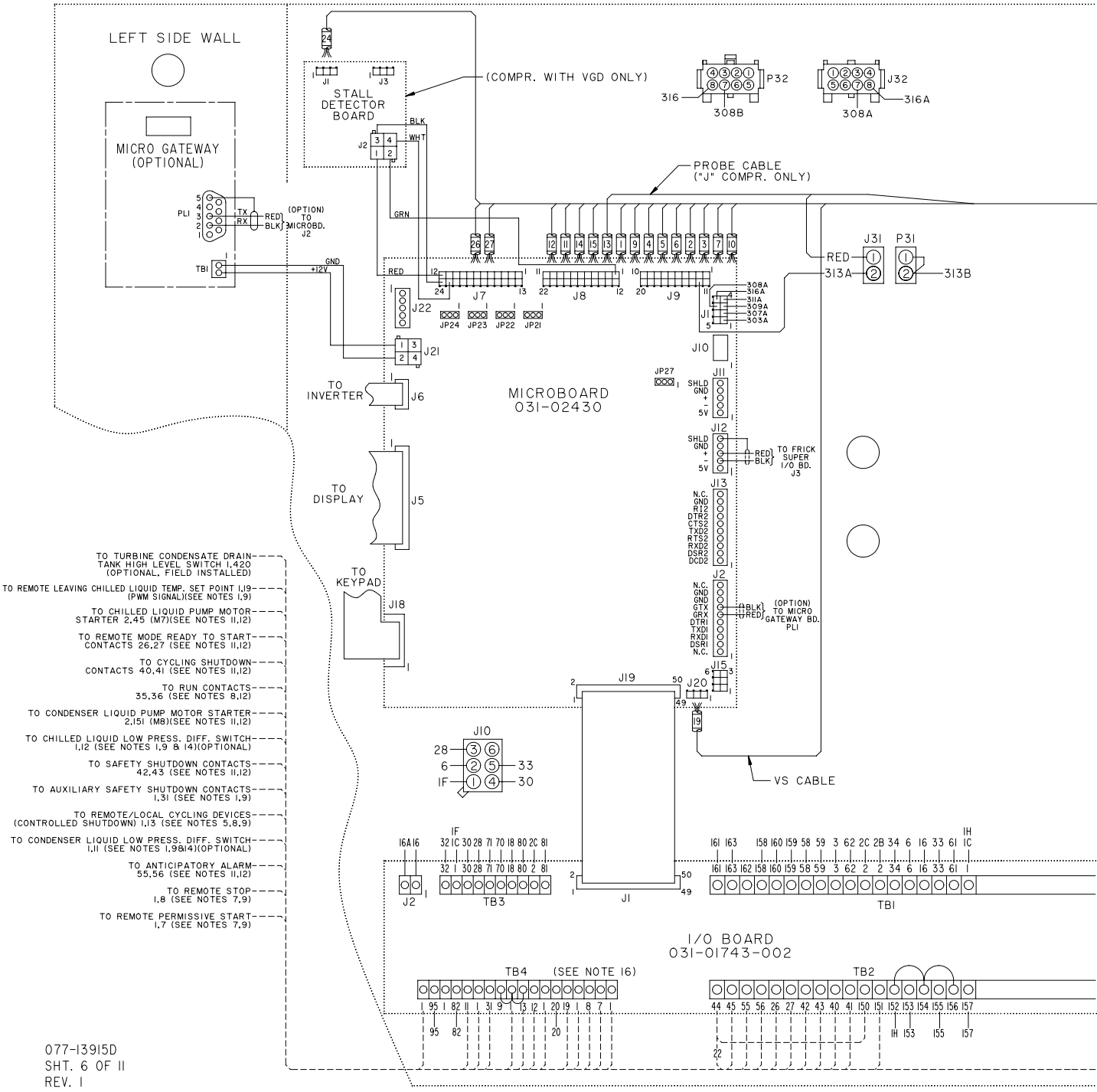


FIGURE 5 - DISPLAY INTERFACE BOARD

CONNECTION DIAGRAM



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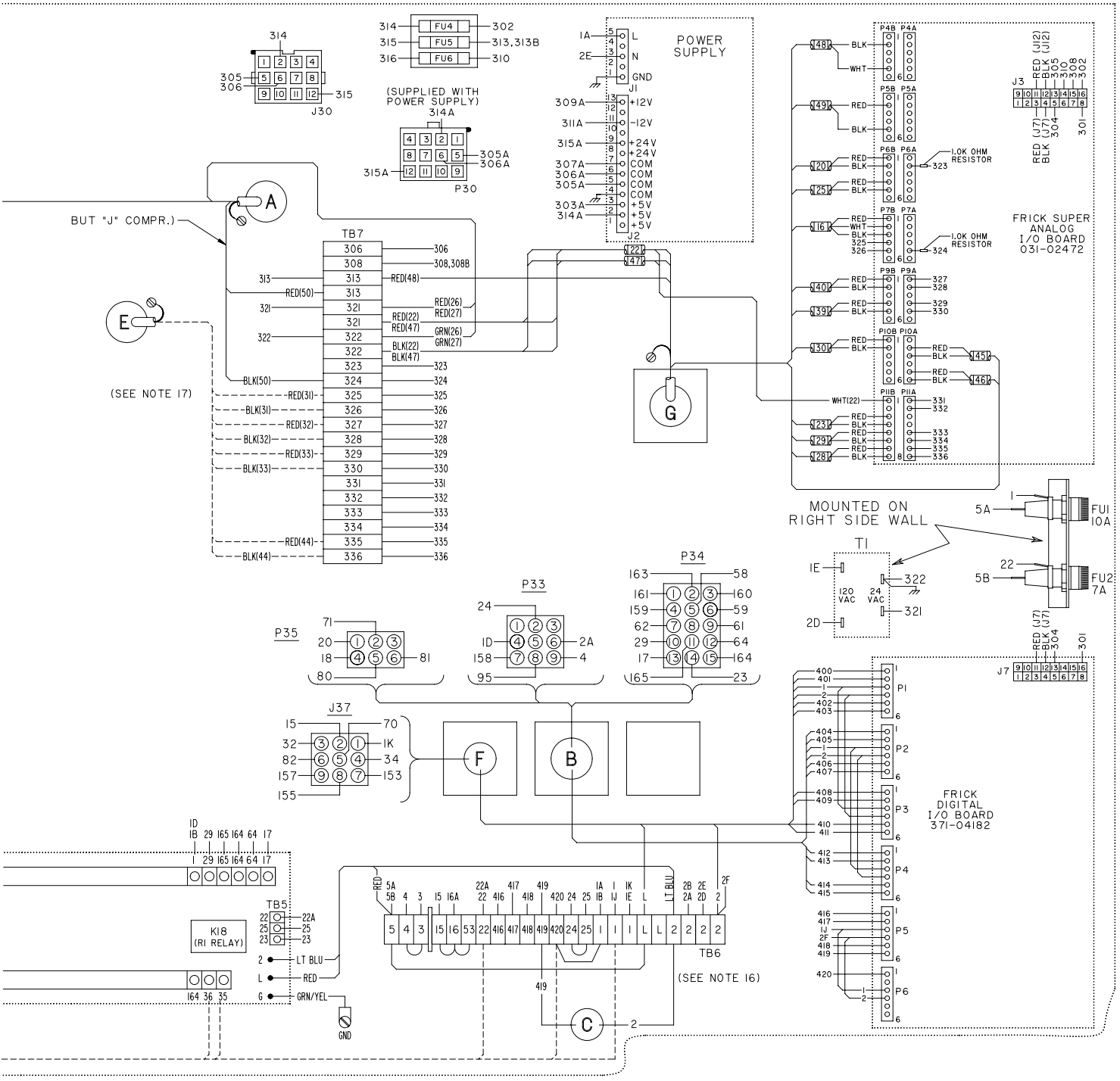
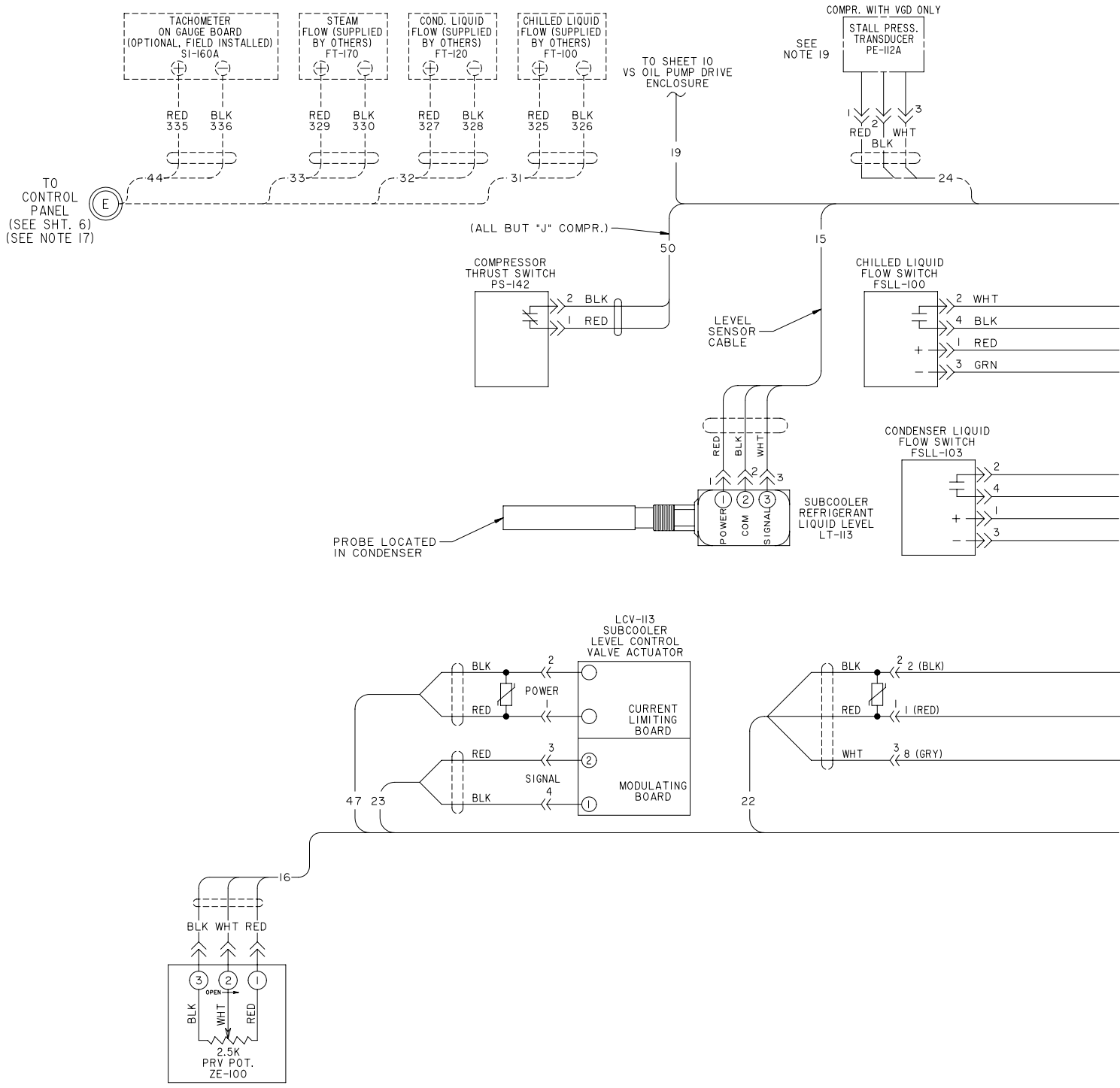

POWER SUPPLY
FRICK SUPER ANALOG I/O BOARD 031-02472
FRICK DIGITAL I/O BOARD 371-04182
MOUNTED ON RIGHT SIDE WALL
(SUPPLIED WITH POWER SUPPLY)
(SEE NOTE 17)
(SEE NOTE 16)
BUT "J" COMPR.)
TB7
TB5
TB6
J30
P30
J2
J1
J3
J7
P1
P2
P3
P4
P5
P6
P33
P34
P35
J37
TI
FU1 10A
FU2 7A
KI8 (RI RELAY)
GND
1.0K OHM RESISTOR

LD18283

CONNECTION DIAGRAM (CONT'D)



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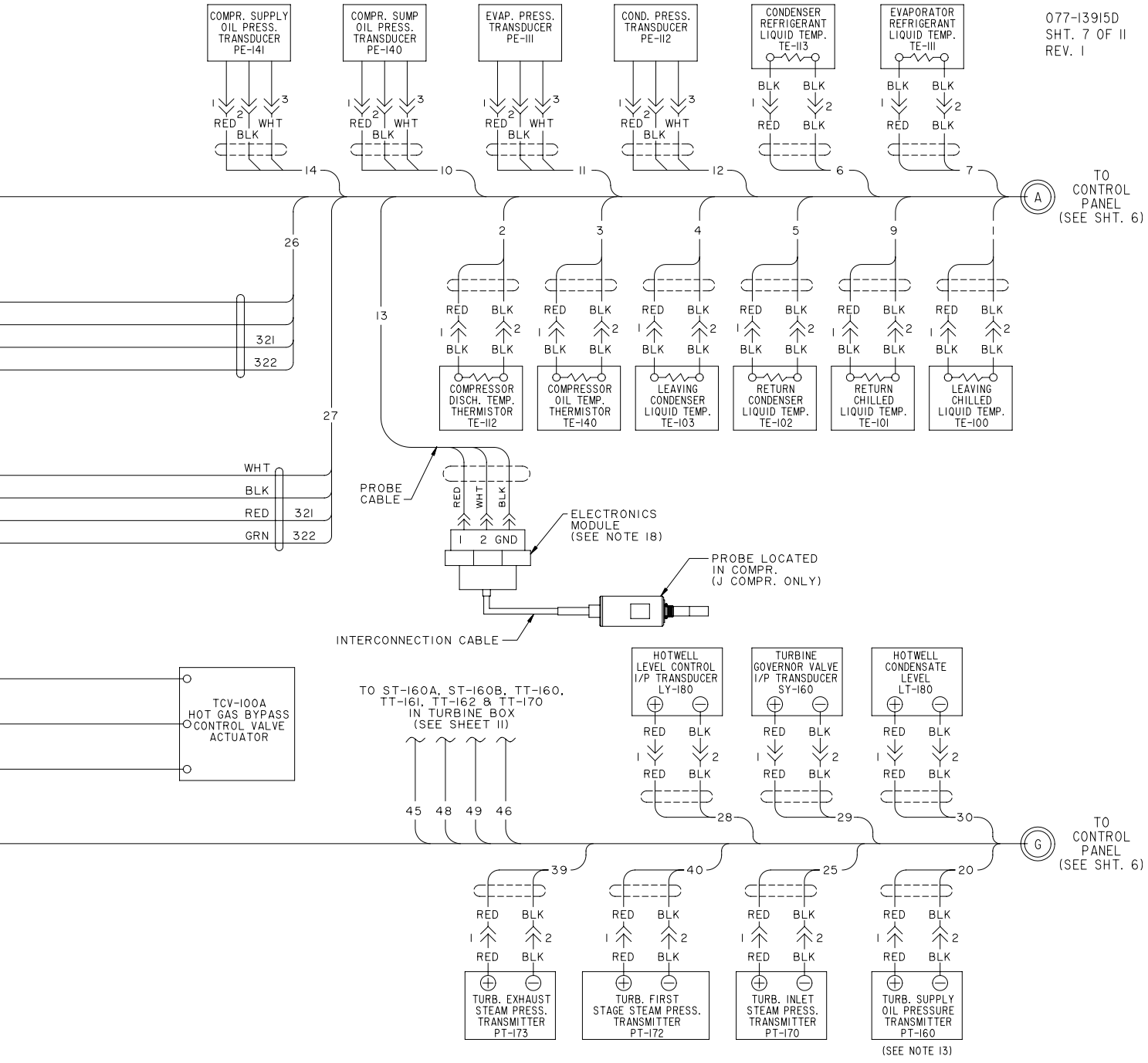
077-13915D
SHT. 7 OF 11
REV. 1
COMPR. SUPPLY OIL PRESS. TRANSDUCER PE-141
COMPR. SUMP OIL PRESS. TRANSDUCER PE-140
EVAP. PRESS. TRANSDUCER PE-111
COND. PRESS. TRANSDUCER PE-112
CONDENSER REFRIGERANT LIQUID TEMP. TE-113
EVAPORATOR REFRIGERANT LIQUID TEMP. TE-111
RED
WHT
BLK
14
10
11
12
6
7
A
TO CONTROL PANEL (SEE SHT. 6)
26
27
13
321
322
WHT
BLK
RED
GRN
2
3
4
5
9
1
COMPRESSOR DISCH. TEMP. THERMISTOR TE-112
COMPRESSOR OIL TEMP. THERMISTOR TE-140
LEAVING CONDENSER LIQUID TEMP. TE-103
RETURN CONDENSER LIQUID TEMP. TE-102
RETURN CHILLED LIQUID TEMP. TE-101
LEAVING CHILLED LIQUID TEMP. TE-100
PROBE CABLE
ELECTRONICS MODULE (SEE NOTE 18)
1 2 GND
PROBE LOCATED IN COMPR. (J COMPR. ONLY)
INTERCONNECTION CABLE
TCV-100A HOT GAS BYPASS CONTROL VALVE ACTUATOR
TO ST-160A, ST-160B, TT-160, TT-161, TT-162 & TT-170 IN TURBINE BOX (SEE SHEET 11)
45
48
49
46
HOTWELL LEVEL CONTROL I/P TRANSDUCER LY-180
TURBINE GOVERNOR VALVE I/P TRANSDUCER SY-160
HOTWELL CONDENSATE LEVEL LT-180
28
29
30
G
TO CONTROL PANEL (SEE SHT. 6)
39
40
25
20
TURB. EXHAUST STEAM PRESS. TRANSMITTER PT-173
TURB. FIRST STAGE STEAM PRESS. TRANSMITTER PT-172
TURB. INLET STEAM PRESS. TRANSMITTER PT-170
TURB. SUPPLY OIL PRESSURE TRANSMITTER PT-160
(SEE NOTE 13)

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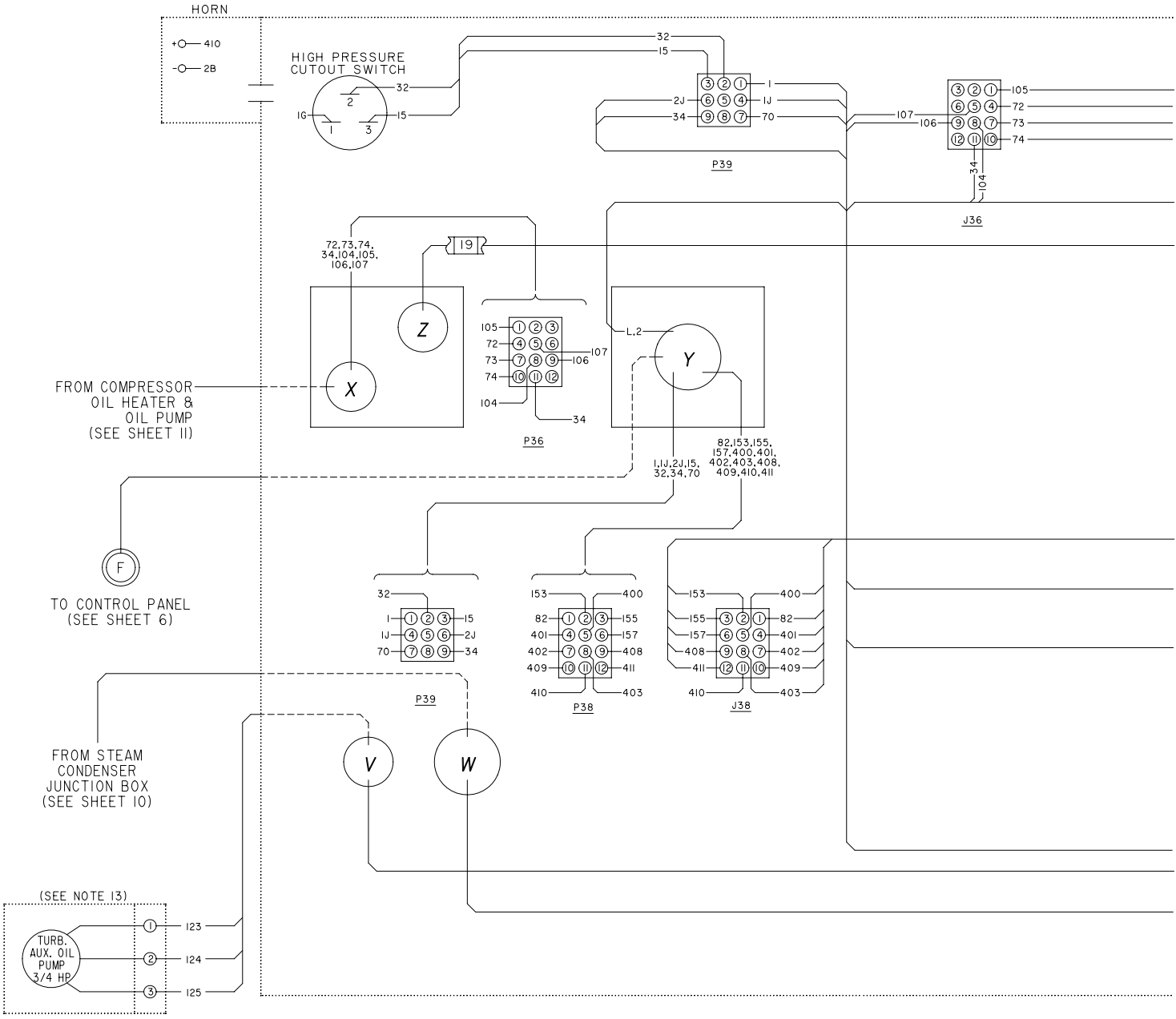
CONNECTION DIAGRAM (CONT'D)



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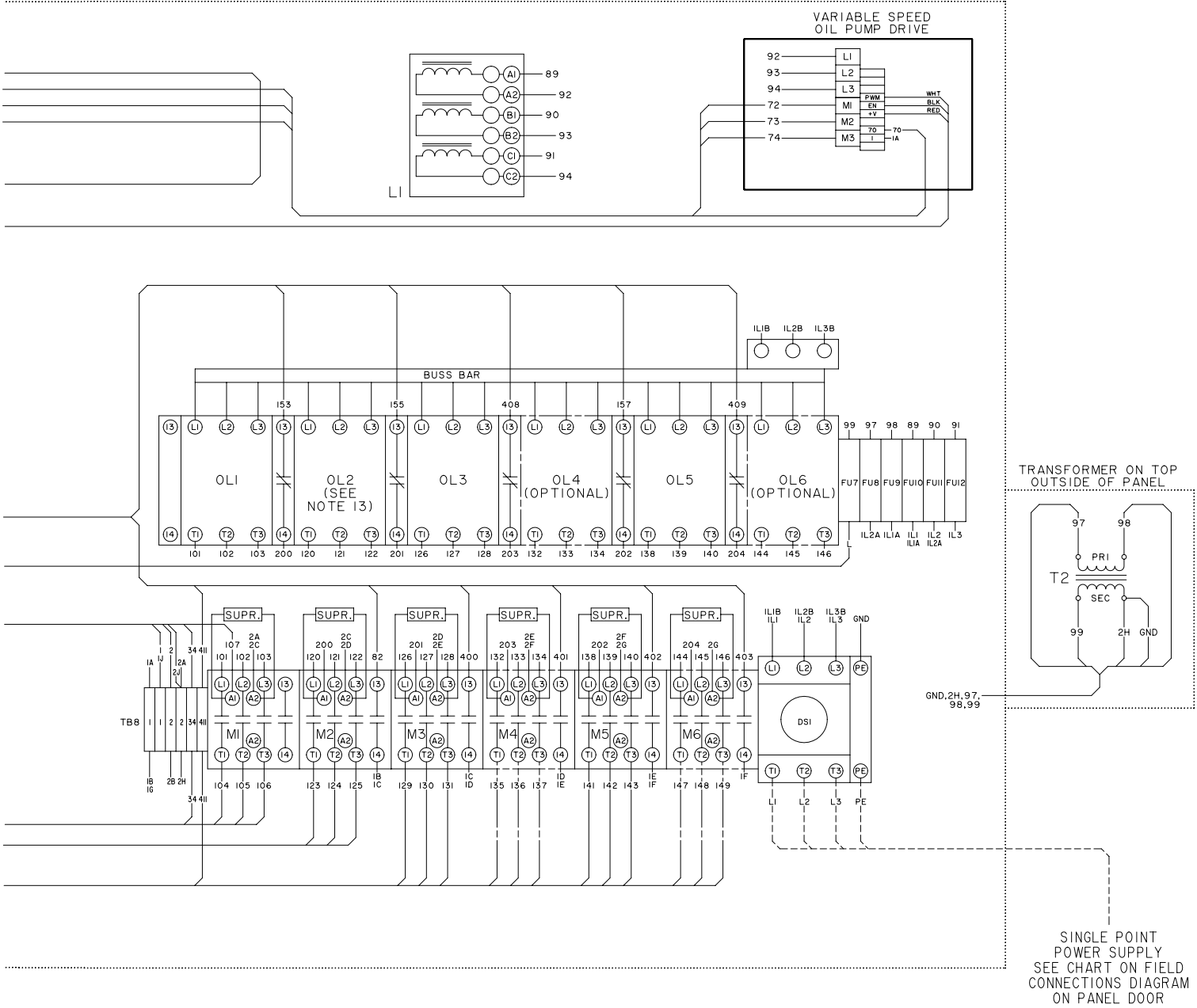
077-13915D
SHT. 8 OF 11
REV. I



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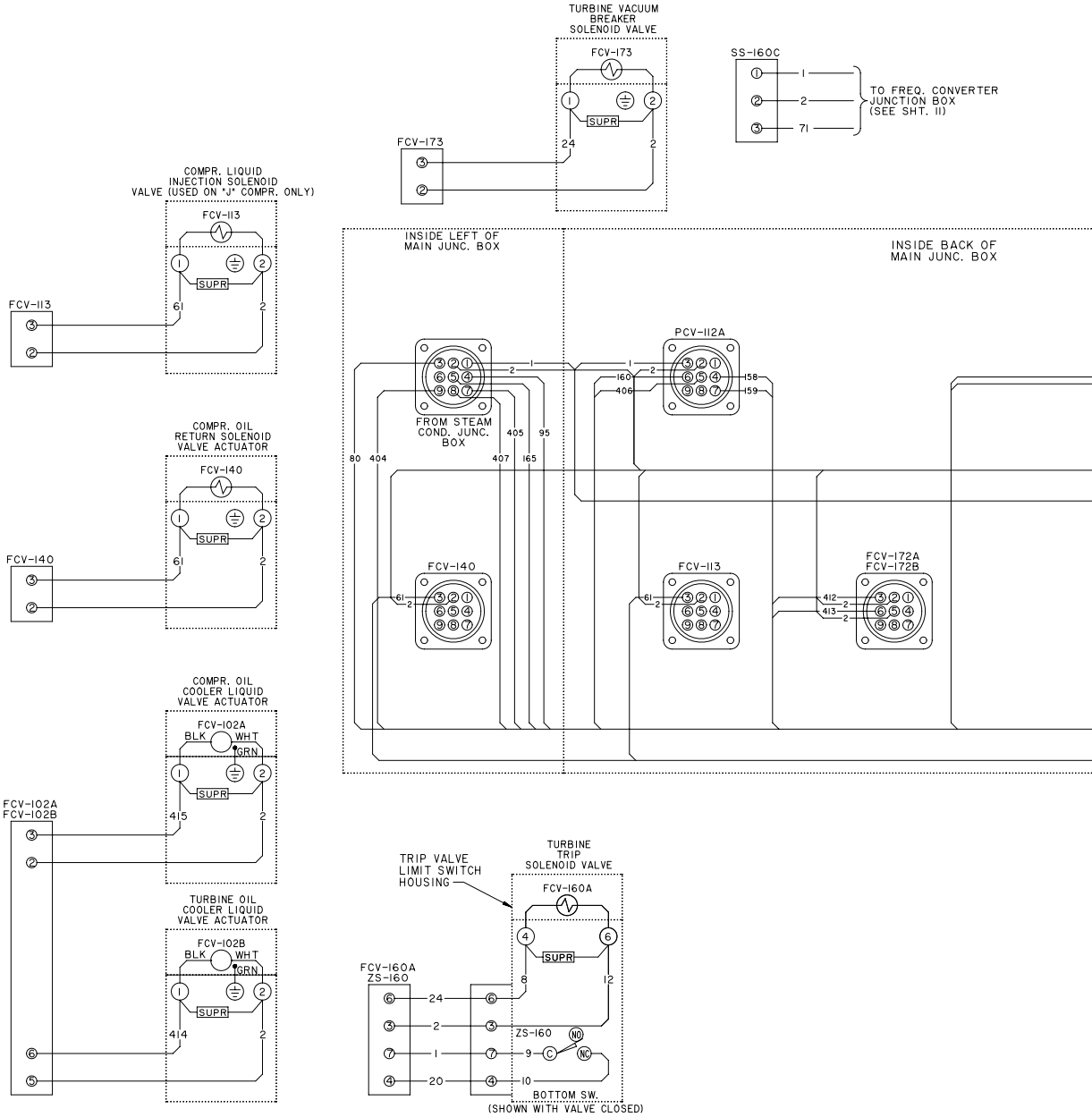

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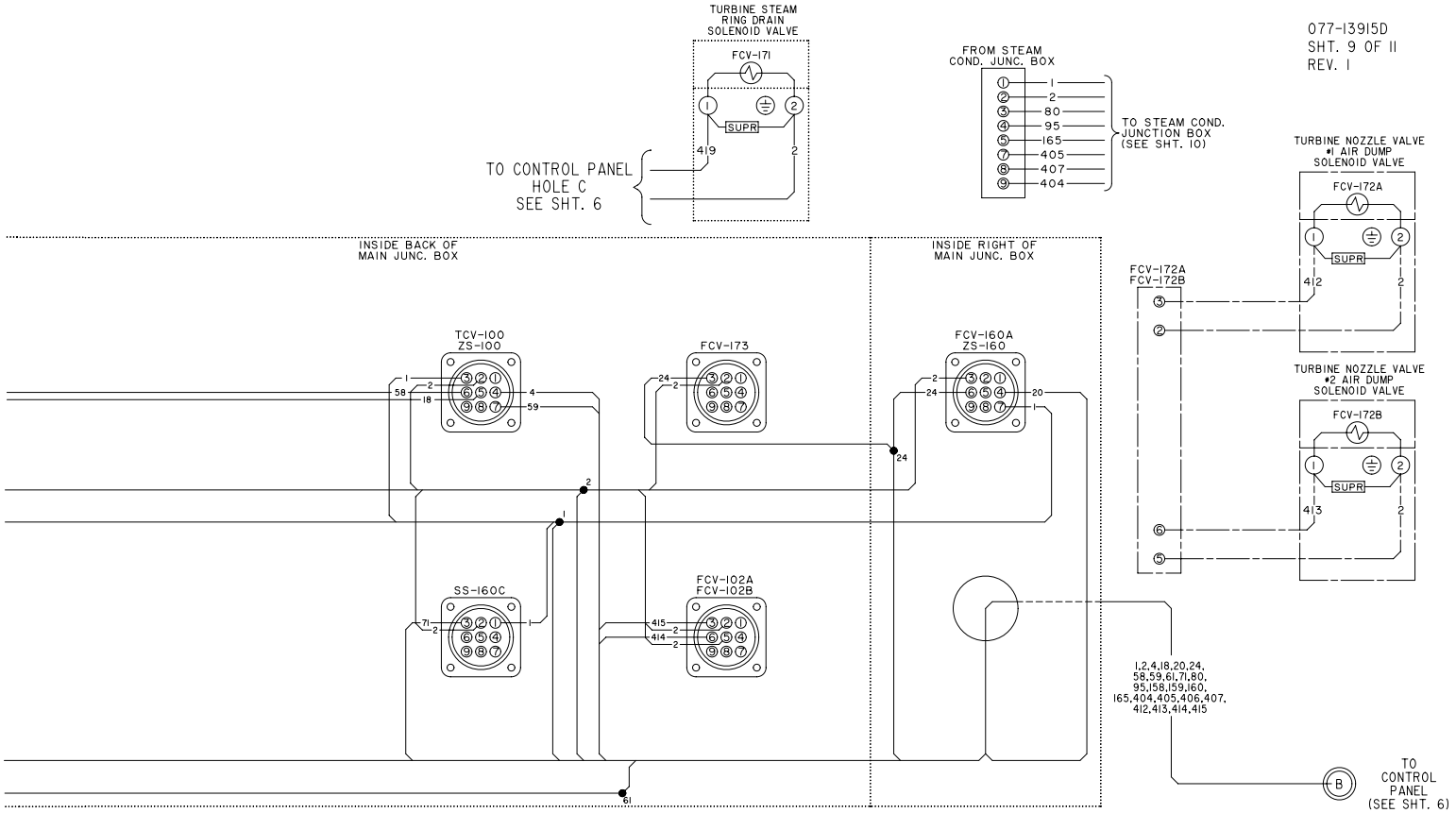
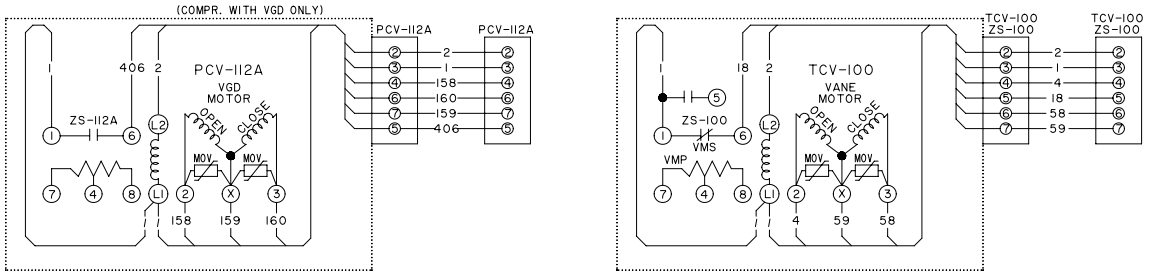
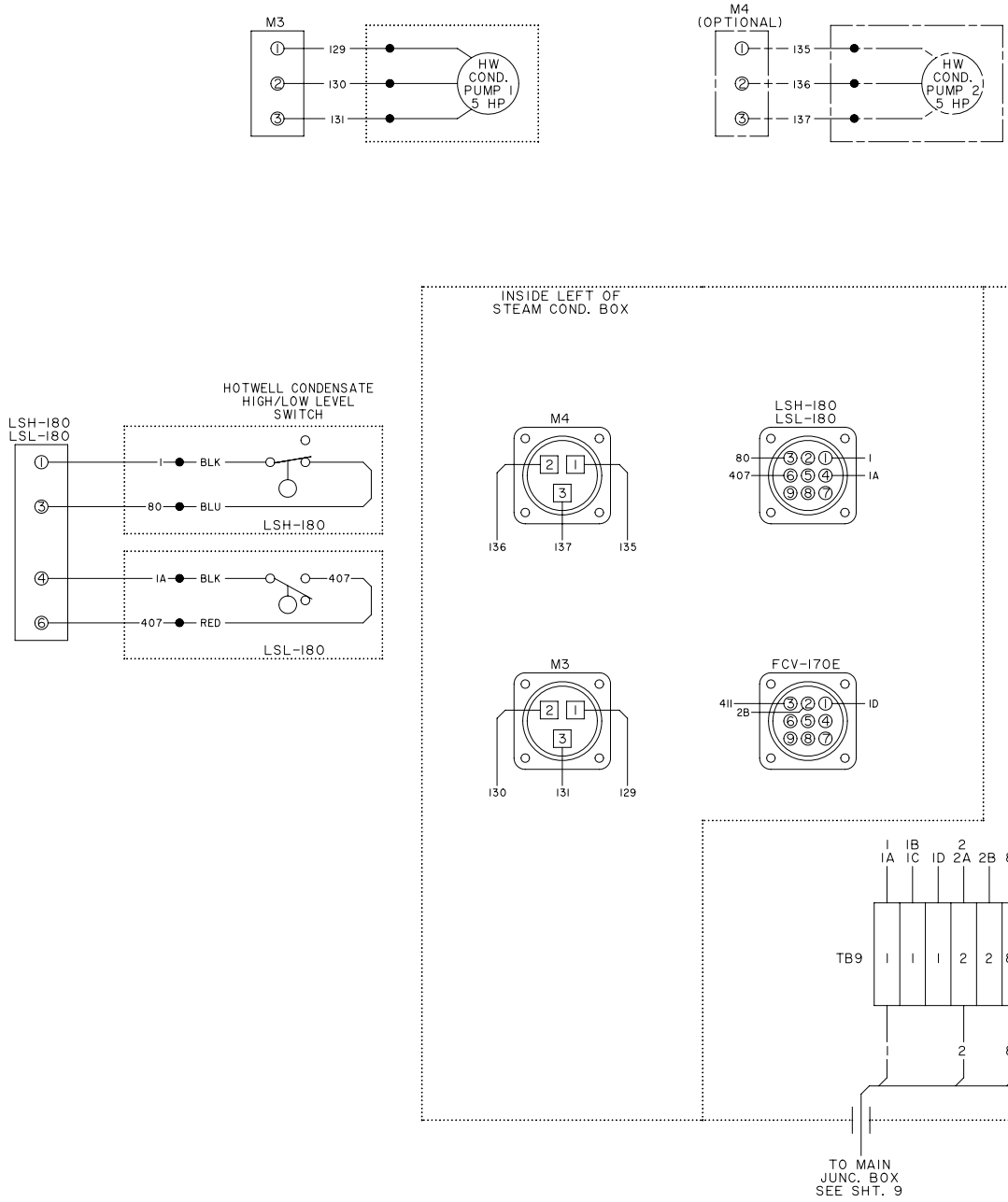

TURBINE STEAM
RING DRAIN
SOLENOID VALVE
FCV-171
SUPR
419
2
TO CONTROL PANEL
HOLE C
SEE SHT. 6
FROM STEAM
COND. JUNC. BOX
1
2
80
95
165
405
407
404
TO STEAM COND.
JUNCTION BOX
(SEE SHT. 10)
077-13915D
SHT. 9 OF 11
REV. 1
TURBINE NOZZLE VALVE
#1 AIR DUMP
SOLENOID VALVE
FCV-172A
SUPR
412
2
FCV-172A
FCV-172B
TURBINE NOZZLE VALVE
#2 AIR DUMP
SOLENOID VALVE
FCV-172B
SUPR
413
2
INSIDE BACK OF
MAIN JUNC. BOX
INSIDE RIGHT OF
MAIN JUNC. BOX
TCV-100
ZS-100
FCV-173
FCV-160A
ZS-160
SS-160C
FCV-102A
FCV-102B
1,2,4,18,20,24,
58,59,61,71,80,
95,158,159,160,
165,404,405,406,407,
412,413,414,415
TO
CONTROL
PANEL
(SEE SHT. 6)


(COMPR. WITH VGD ONLY)
PCV-112A
VGD
MOTOR
ZS-112A
OPEN
CLOSE
MOV
158
159
160
TCV-100
VANE
MOTOR
ZS-100
VMS
VMP
4
59
58
TCV-100
ZS-100

LD18289

CONNECTION DIAGRAM (CONT'D)



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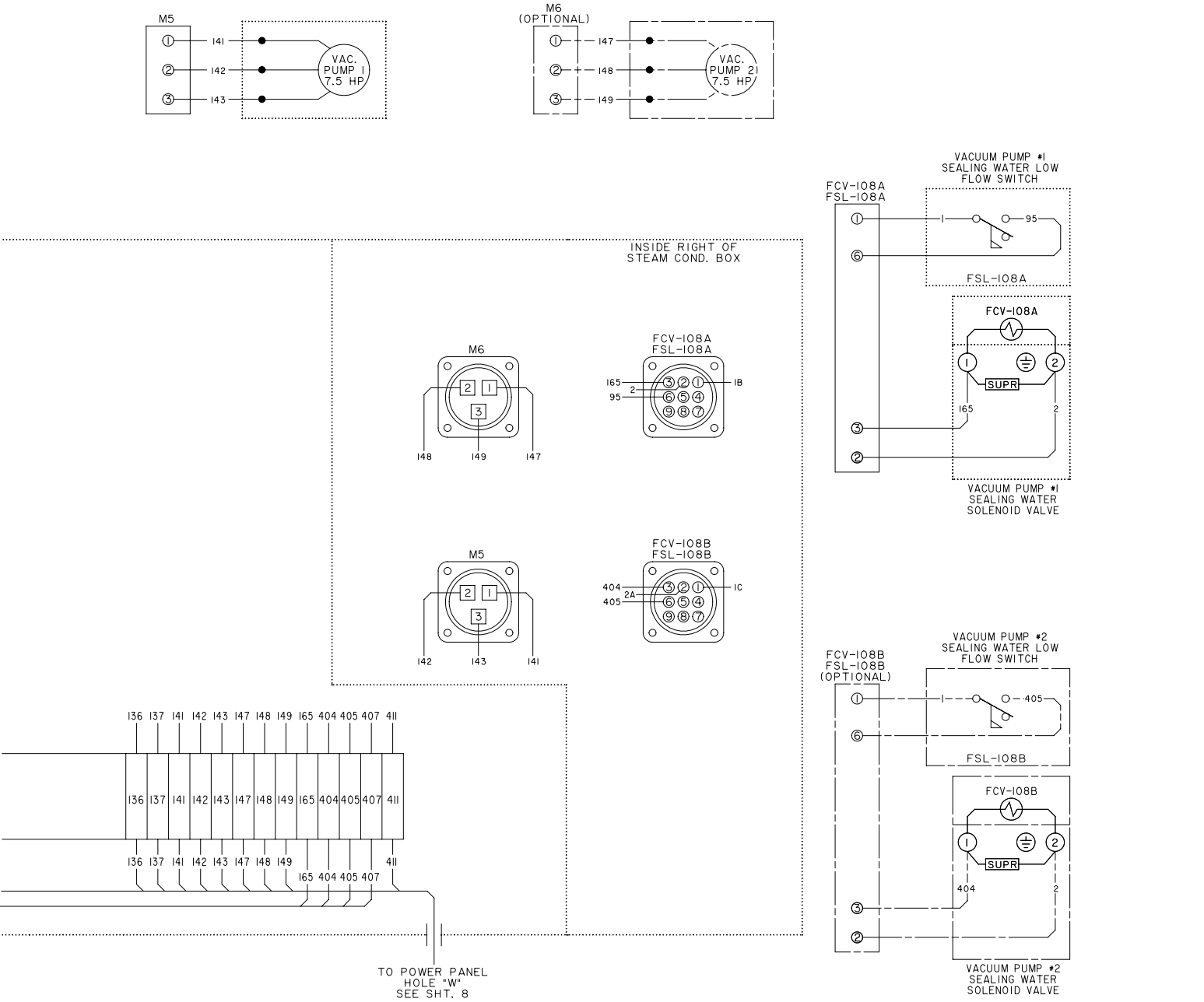
077-13915D
SHT. 10 OF 11
REV. 1



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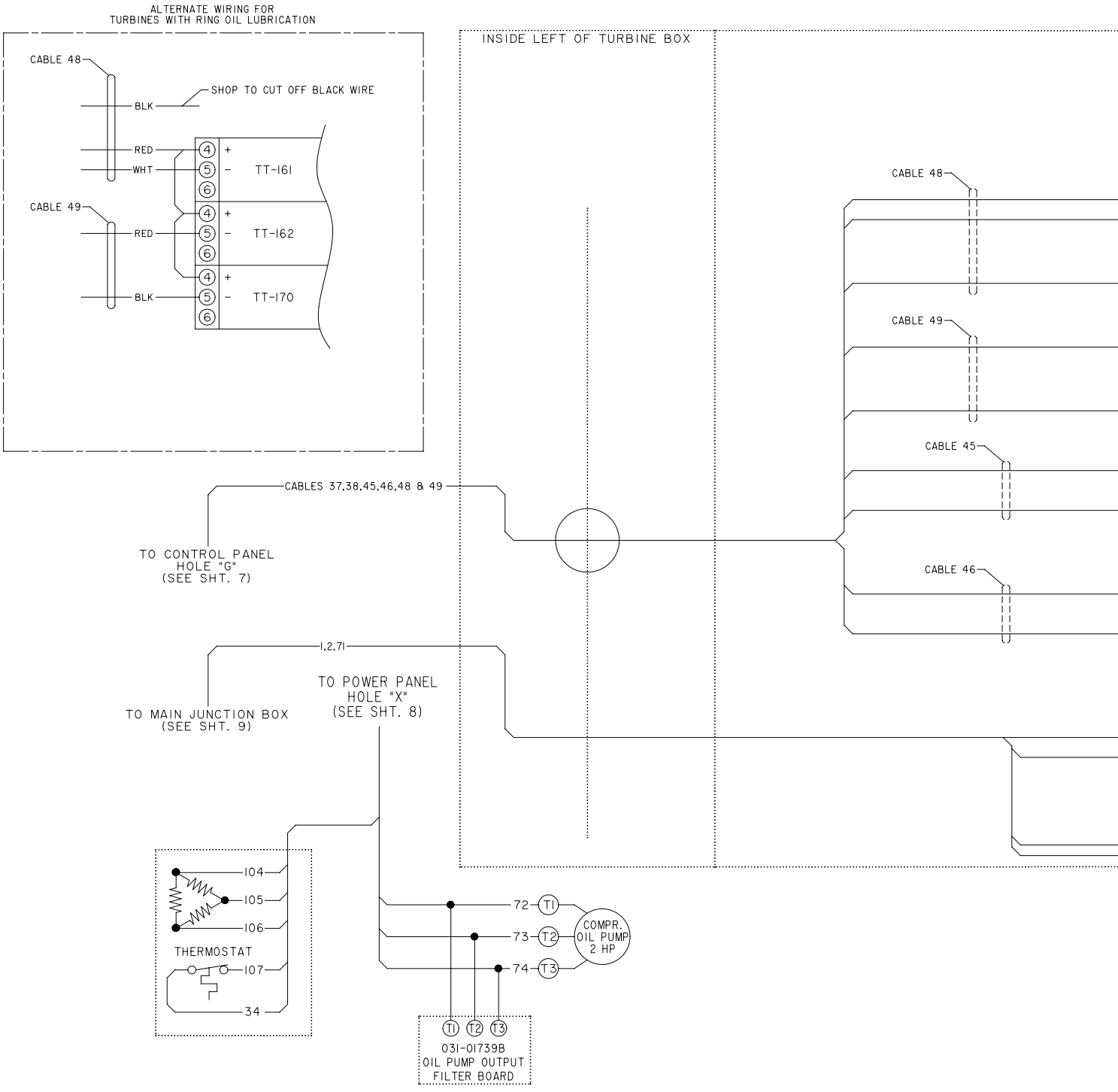
CONNECTION DIAGRAM (CONT'D)



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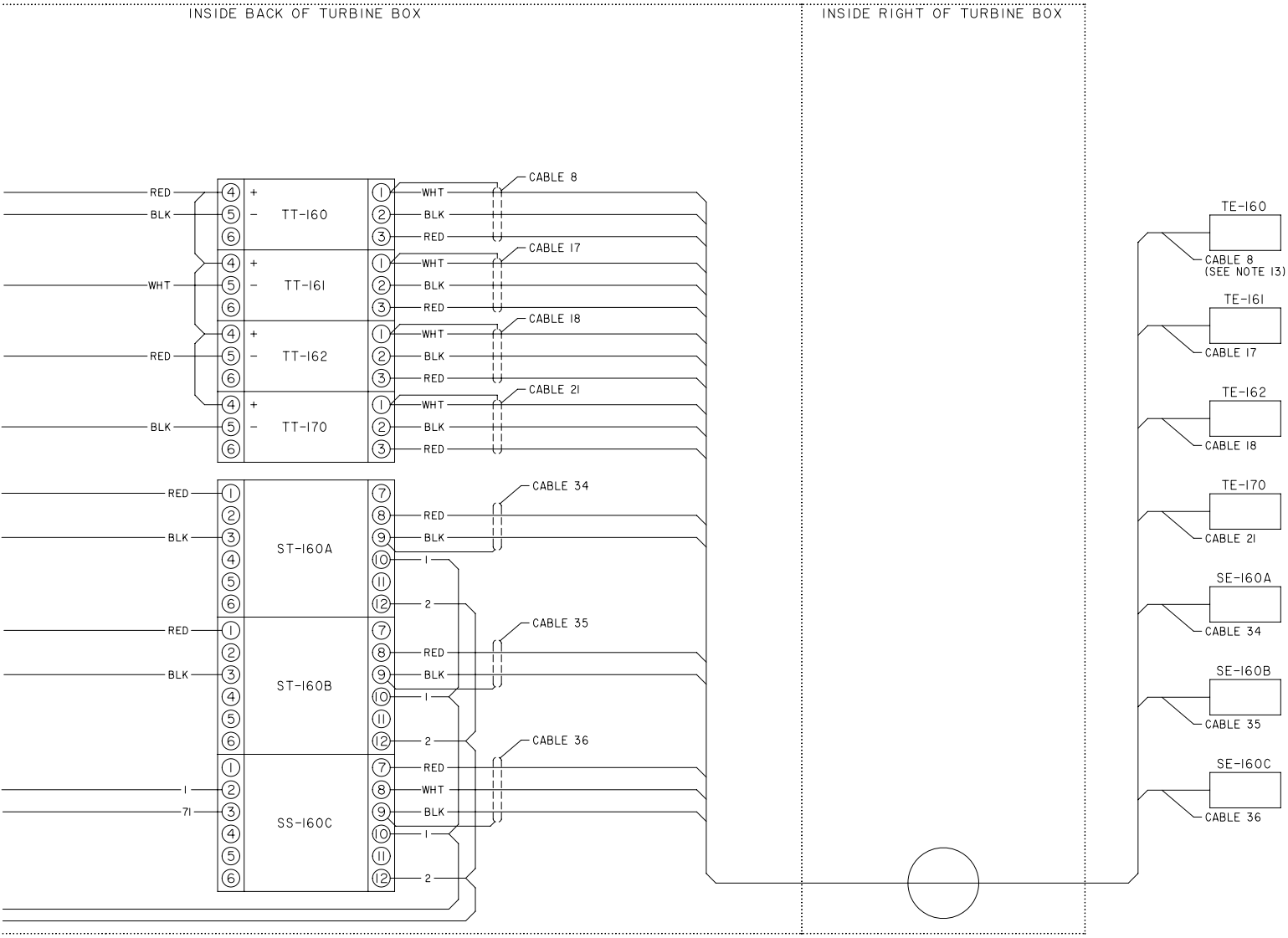
077-13915D
SHT. 11 OF 11
REV. 1



LD18293

TABLE 1 - PRESSURE TEMPERATURE CHART

INSTRUMENT TAG NUMBER	SOFTWARE SAFETY DESIGNATION	UNITS	OPERATING POINT	
			ON RISE	ON FALL
TE-112	CHDT	DEG. F / DEG. C	220/104.4	219/103.9
TE-140	CHOT	DEG. F / DEG. C	180/82.2	179/81.7
PE-140/PE-141	CLOP	PSID/kPa	25/172	15/104
			For Further Information. See Operation Manual	
PE-112	HP	PSIG/kPa	Cut-Out 180/1241	Cut-In 120/827
PE-111	LEP	PSIG/kPa	Cut -In 25.1/173	Cut-Out 25.0/175 ***
PE-140/PE-141	CHOP	PSIG/kPa	90/620.6	<90/620.6
TE-112	FDTS	DEG. F / DEG. C	30.0/-1.10	29.9/-1.20
TE-100	LCLT	DEG. F / DEG. C	Programmable Per Operation Manual Form 160.67-O1	
TE-140	CLOT	DEG. F / DEG. C	71.0/21.7	55.0/12.8
TE-140/PE-112	CLOTD †	DEG. F / DEG. C	30/16.7	29.9/16.6
TE-140/PE-112	CLOTD † †	DEG. F / DEG. C	40/22.2	39.9/22.1
TE-161	TSEBHT	DEG. F / DEG. C	220/104.4 **	218/103.3
TE-162	TGEBHT	DEG. F / DEG. C	220/104.4 **	218/103.3
PT-160	TAOP (See Note 13)	PSIG/kPa	16/110 **	8/55 **
PT-160	TLOP (See Note 13)	PSIG/kPa	7/48	6/41 **
TE-160	THOT (See Note 13)	DEG. F / DEG. C	135/57 **	134/57
PT-173	TEHP	PSIG/kPa	3.5/24 **	3.0/21

** - Programmable setpoint (default value shown) - See operation manual Form 160.67-O1.

*** - The chilled liquid flow switch safety is bypassed to allow slow roll without chilled liquid flow. During the slow roll, the LEP cutout is set at 30 PSIG. For further information see operation manual For 160.67-O1.

† - Application if unit was shutdown for 30 mins. or less

† † - Application if unit was shutdown for greater than 30 mins.

NOTES

P.O. Box 1592, York, Pennsylvania USA 17405-1592
800-861-1001
Subject to change without notice. Printed in USA

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