YORK BY JOHNSON CONTROLS	Supersedes: 160.67-PW6 (107) Form: 160.67-PW6 (114)
WIRING DIAGRAMS	**MODEL YST STEAM TURBINE DRIVE CENTRIFUGAL CHILLER WITH OPTIVIEW™ CONTROL CENTER**

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

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

JOB DATA:

YST CHILLER MODEL NO. _____

NO. OF UNITS _____

STEAM TURBINE MODEL_____

OIL PUMP MOTOR _____ VOLTS, 3-PHASE, _____ Hz, _____FLA

REMARKS:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Issue Date:
January 20, 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.

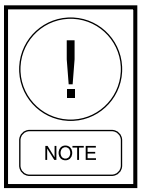
SAFETY SYMBOLS

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.

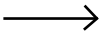
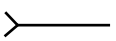
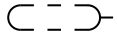
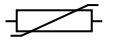
Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if proper care is not taken.



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.

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 TE-140)
CLOP	Compressor Low Oil Pressure (provided by PE-140 & PE-141)
CLOT	Compressor Low Oil Tempreature (provided by TE-140)
CLOTD	Compressor Low Oil Temperature Diff. (provided by TE-140 & TE-112)
FCV	Solenoid Or Electrically Actuated Ball Valve
FDTS	Faulty Dischagrge Temperature Sensor
FLA	Full Load Amps
FSL	Low Flow Switch
FU	Fuse
HGBP	Hot Gas Bypass Valve (TCV-100A)
HP	High Condition Pressure (provided by PE-112)
HPCO	Compressor Discharge High Pressure Cutout - 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 Tranducer (0.5-4.5 VDC output)
PGD	Proximity Gap Distance (ZE-142)
PT	Pressure Transmitter (4-20 MA DC circuit)
PRV	Pre-Rotational Vane (TCV-100)
PWM	Pulse Width Modulated
R	Control Relay
RES	Resistor
SS1	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 Connection - 
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 (provided by PT-173)
TGEBHT	Turbine Gov. End Bearing High Temp. (provided by TE-162)
THOT	Turbine High Oil Temp. (provided by TE-160)
TLOP	Turbine Low Oil Pressure (provided by PT-160)
TSEBHT	Turbine Shaft End Bearing High Temp. (provided by TE-161)
VE	Vibration Proximity Probe
VGD	Variable Geometry Diffuser
VMS	Vane Motor Closed Limit Switch
VT	Vibration Transmitter
ZS	Limit Switch
– – – – – –	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)
——— – – ———	Mechanical Linkage
	Shielded Cable
	Metal Oxide Varisor
SUPR	Transient Suppressor

NOTES

1. This wiring diagram describes the standard electronic control scheme for use with a steam turbine drive. For details of field control modifications refer to product form 160.67-PW2.
2. Field wiring to be in accordance with the National Electrical Code as well as all applicable codes and specifications. See Form 160.67-PW5 (Top Mount Steam Condenser) and Form 160.67-PW4 (Floor Mount Steam Condenser)) for field wiring connections.
3. Numbers along the left side of the 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 as indicated by numbers within 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 identification 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 the unit ON and 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, a jumper must be removed between terminals [1] & [13].
6. Fuse sizes and motor overload setpoints depend on a voltage of single point power supply. See chart on field connection diagram on door of panel.
7. To stop unit and not permit it to start again. After a controlled shutdown install a stop device between terminals [1] & [8] (line 32A)(see note 9). A remote start-stop switch may be connected to terminals [1], [7], & [8]. (line 32A)(see note 9). Remote switches are operative only in the "Remote" operating mode.
8. Contact rating is 5 amps resistive at 120 VAC or 240 VAC.
9. Device contact rating to be 5 milliamperes at 115 VAC.
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 VAC & 30 VDC 2 Amp inductive (.4 PF) @ 250 VAC & 30 VDC.
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 it's coil. Physically located at the coil. Spare transient suppressor and control circuit fuses are supplied in a bag attached to the green ground screw in the lower left corner of the panel.
13. Turbine auxiliary oil pump, oil cooler, oil sensor & 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 form 160.67-O1.
15. The timing diagram is abbreviated and does not include all events and messages. See operation manual.
16. Do NOT apply voltage on field wiring terminal blocks TB4 or TB6. All 115 VAC power is fed from terminals 1 & 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 June 2006). See Form 160.67-M1, Section 13, FIG. 44 & 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 22, FIG. 61 for wiring.
20. Liquid injection solenoid is supplied on J3, J4, & J5 compressors only.
21. Turbine vibration probes and automated nozzle valves are standard on chillers supplied with automatic start and optional for manual start.
22. The panel may be supplied with any of several displays. Refer to Form 160.67-M3, Section 7 for additional details.

NOTES (CONT'D)

23. For inlet steam pressures up to 200 PSIG, PT-170 Range is 0-300 PSIG and PT-172 Range is -14.7-100 PSIG. For inlet steam pressures above 200 PSIG, PT-170 Range is 0-500 PSIG and PT-172 Range is 0-100 PSIG.

ELEMENTARY DIAGRAM

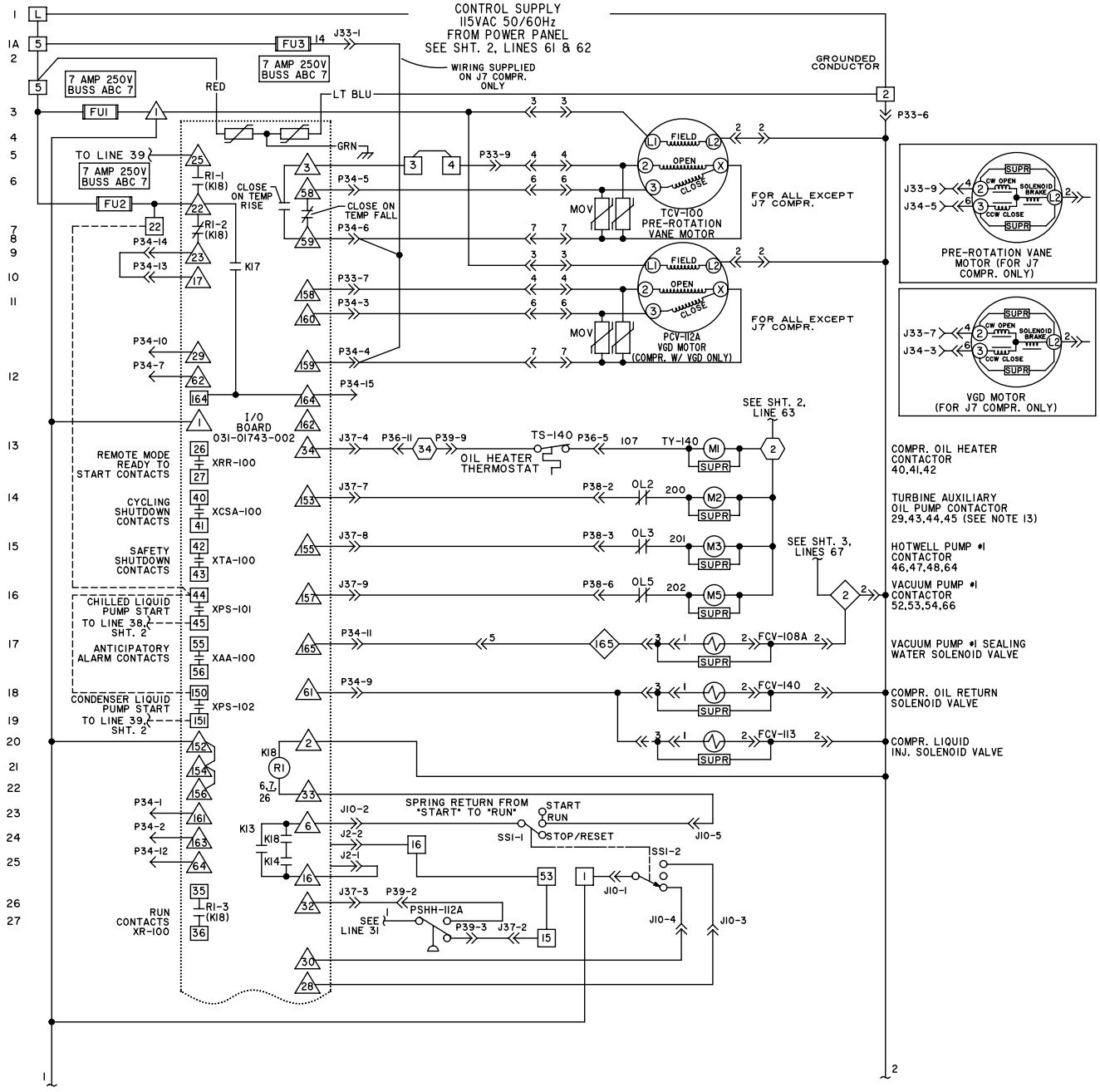
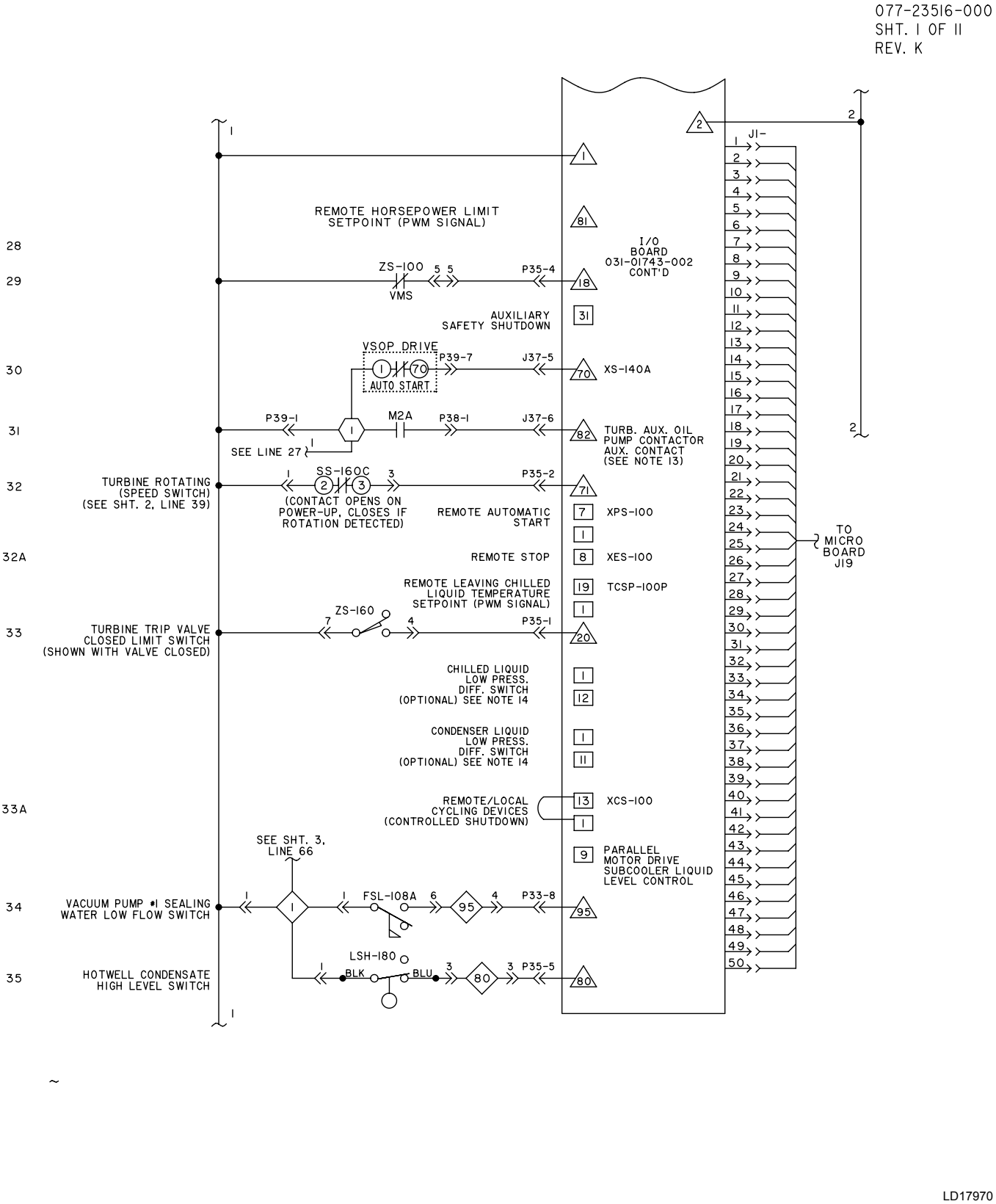


FIGURE 1 - ELEMENTARY DIAGRAM

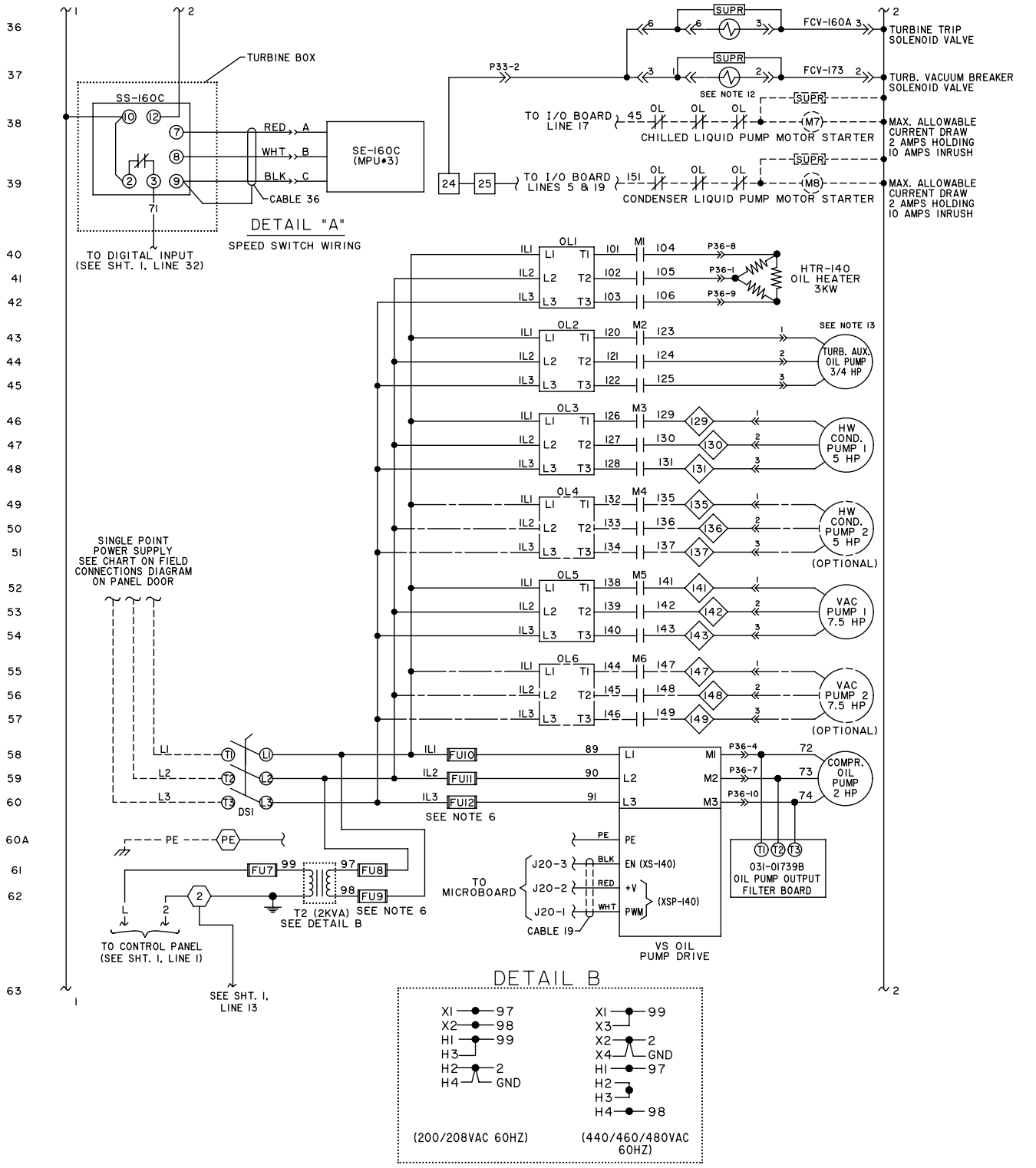
ELEMENTARY DIAGRAM (CONT'D)



LD17970

FIGURE 1 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM

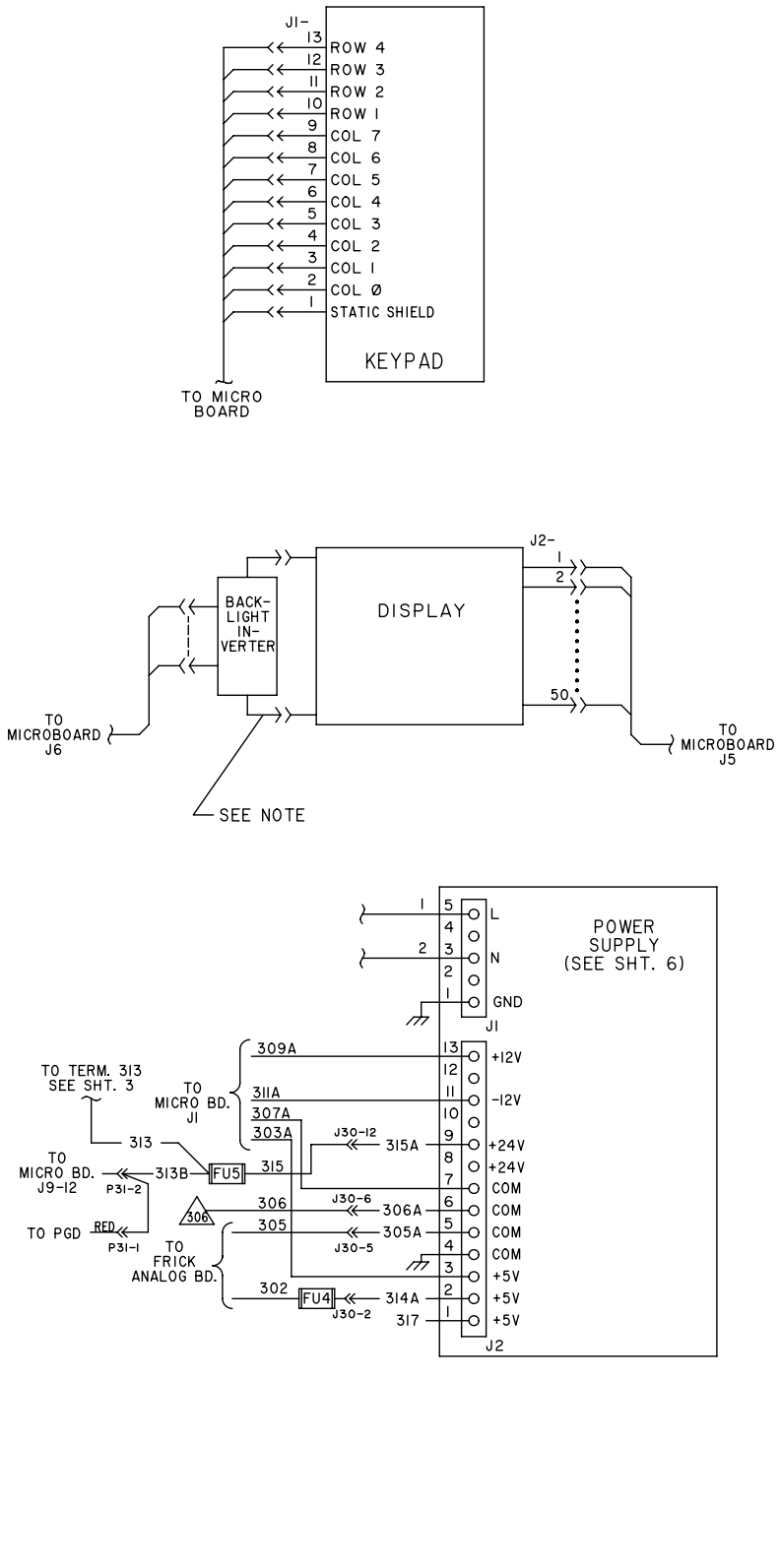


LD17971

FIGURE 2 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM (CONT'D)

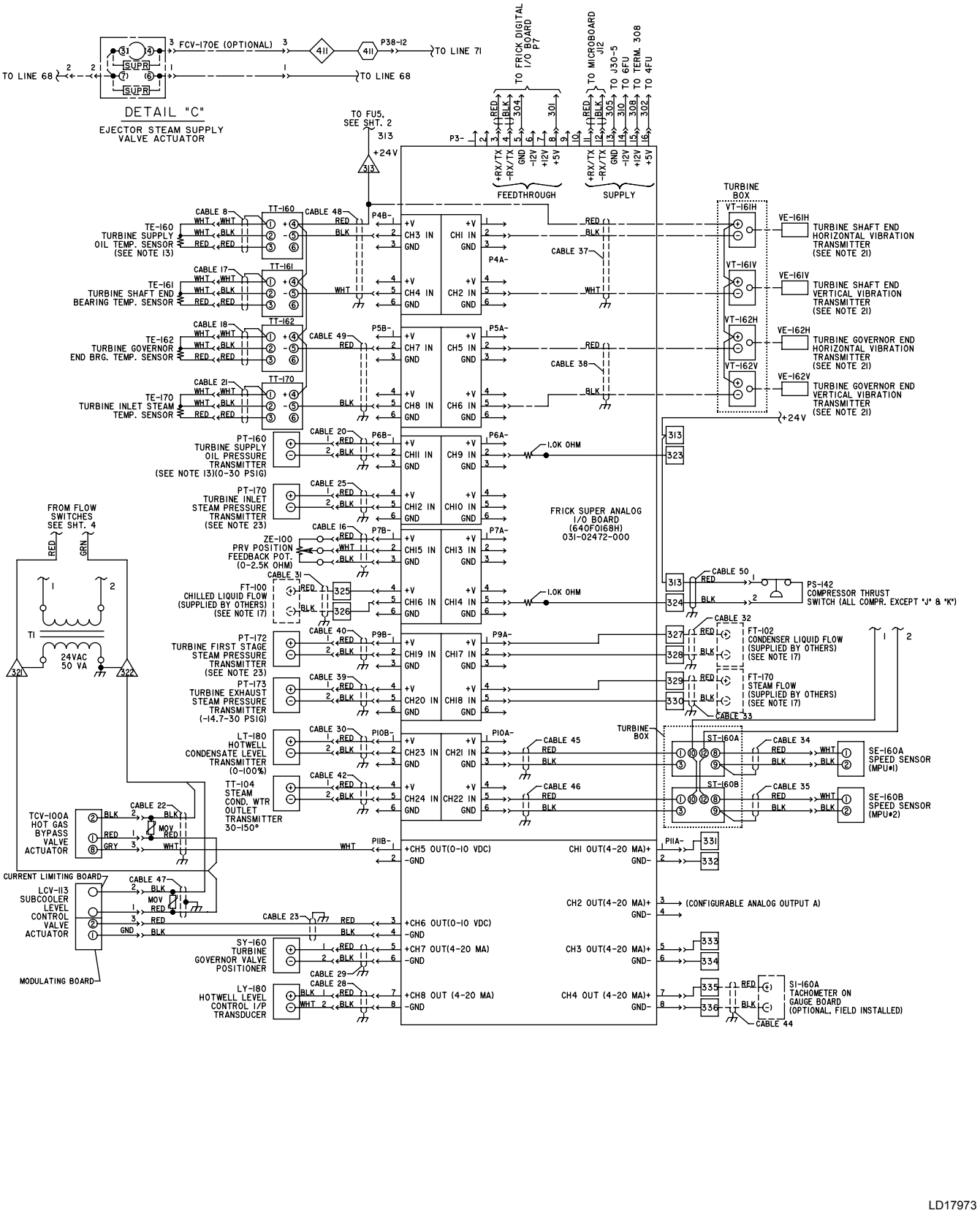
077-23516-000
SHT. 2 OF 11
REV. K



LD17972

FIGURE 2 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM



LD17973

FIGURE 3 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM (CONT'D)

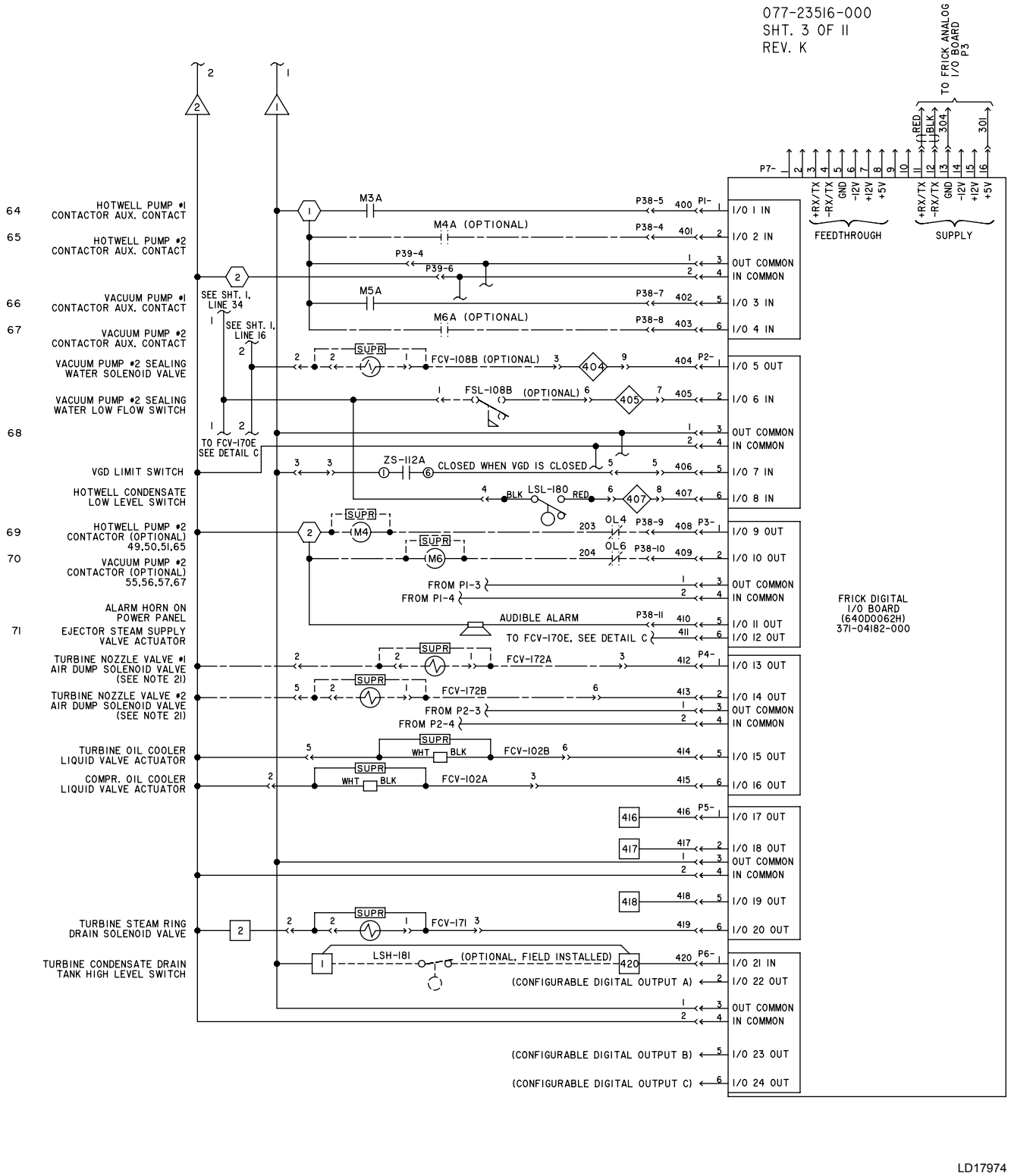


FIGURE 3 - ELEMENTARY DIAGRAM (CONT'D)

MICROBOARD DIAGRAM

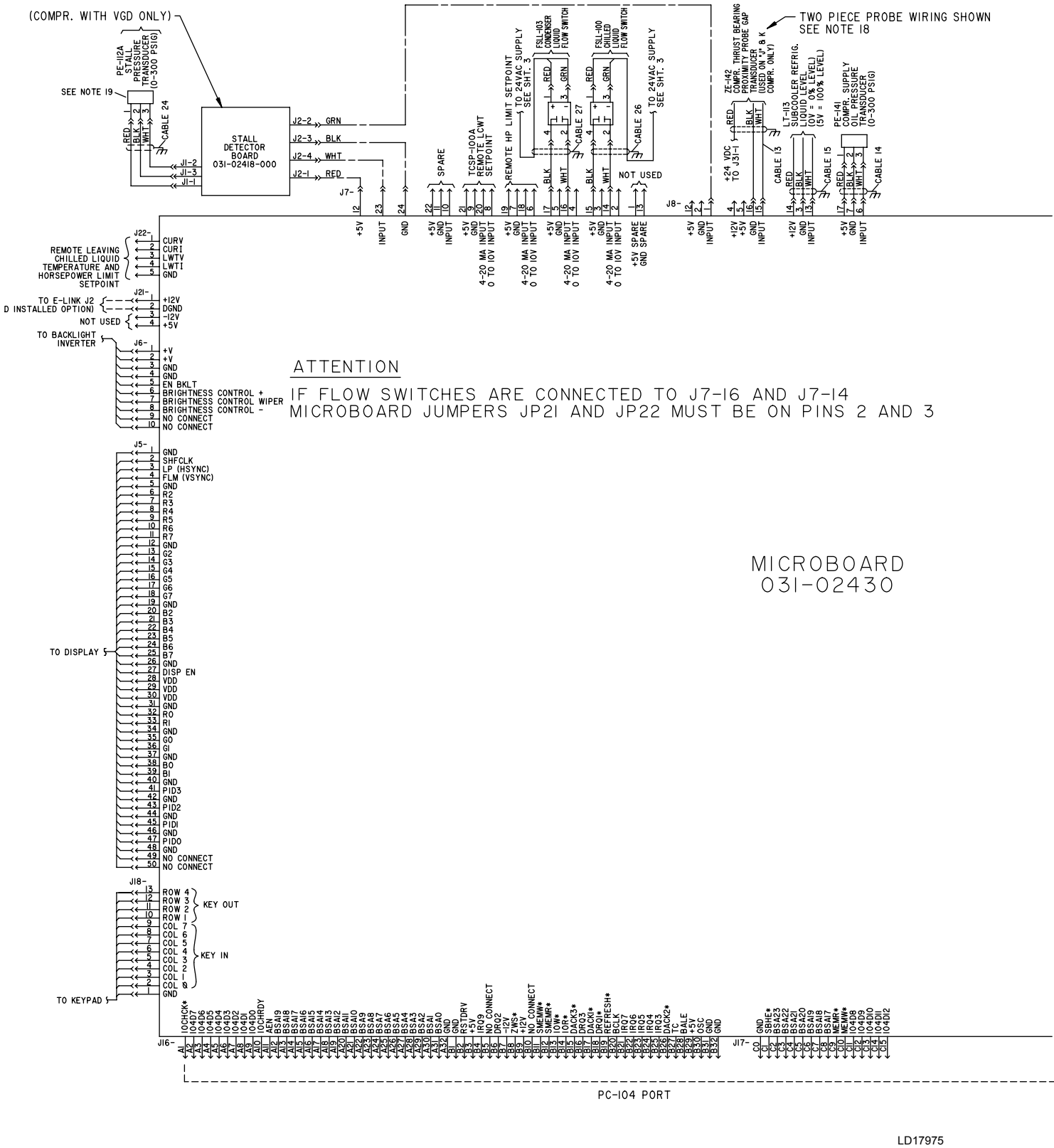


FIGURE 4 - MICROBOARD DIAGRAM

MICROBOARD DIAGRAM (CONT'D)

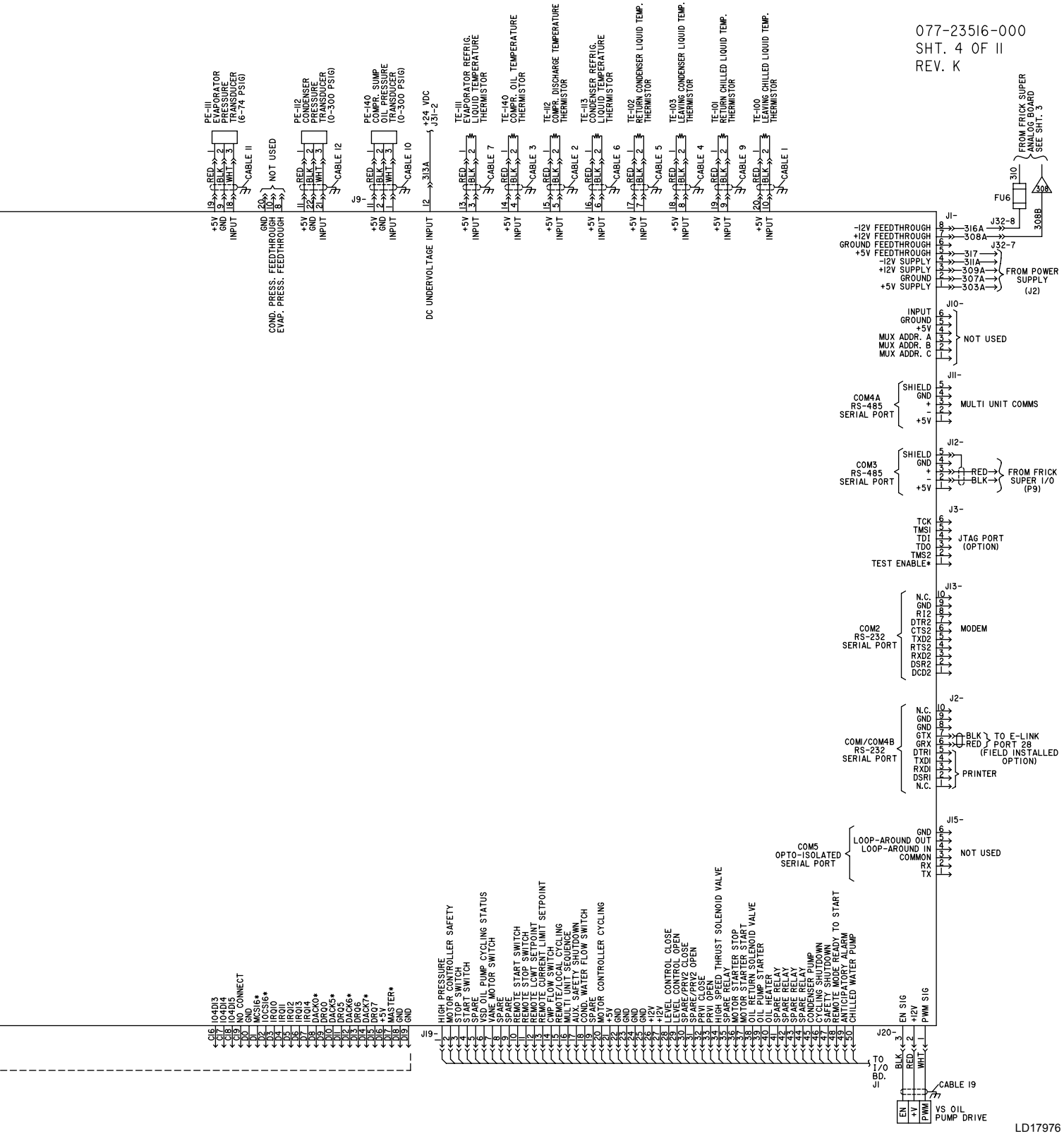


FIGURE 4 - MICROBAORD DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM

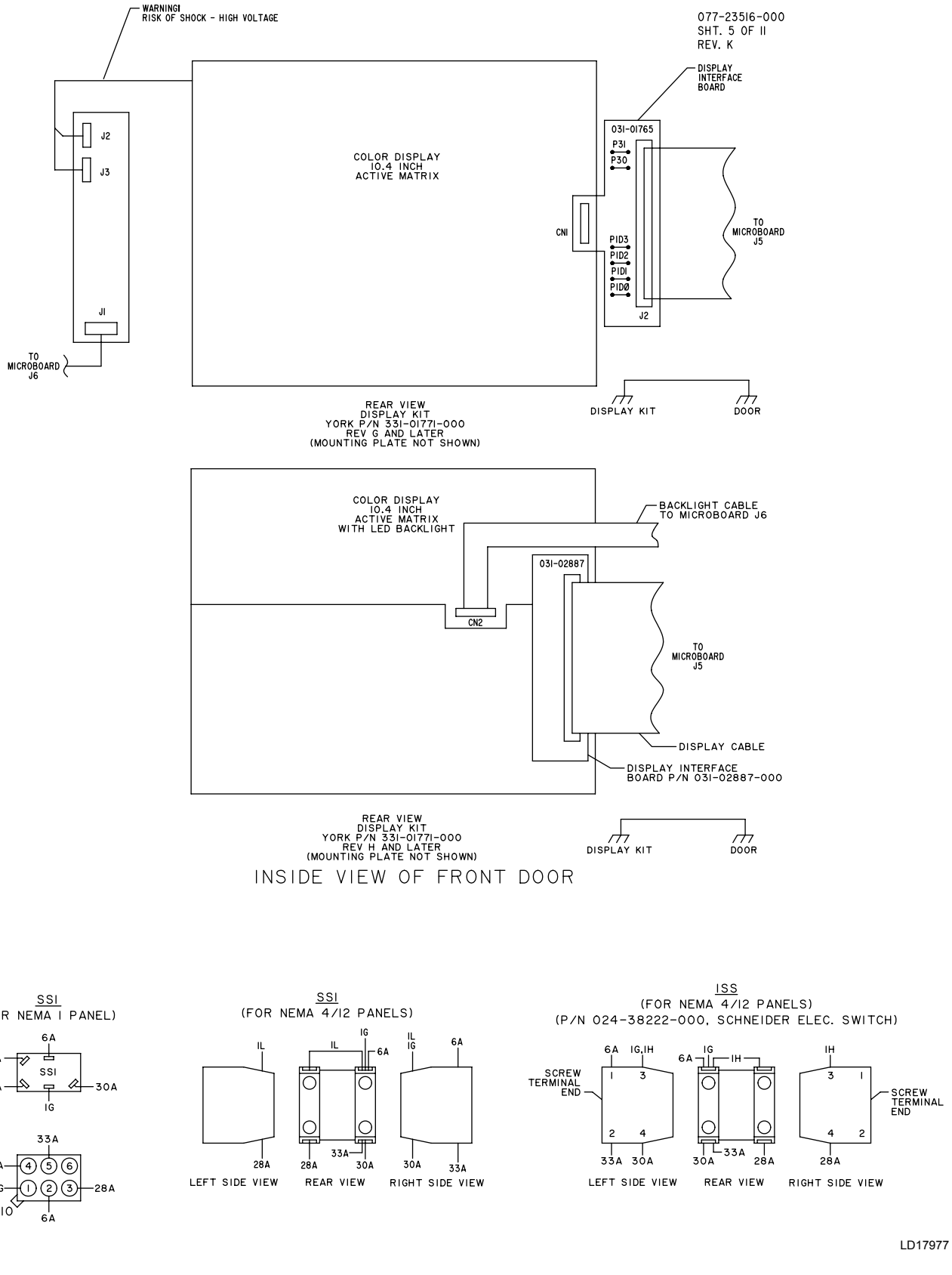
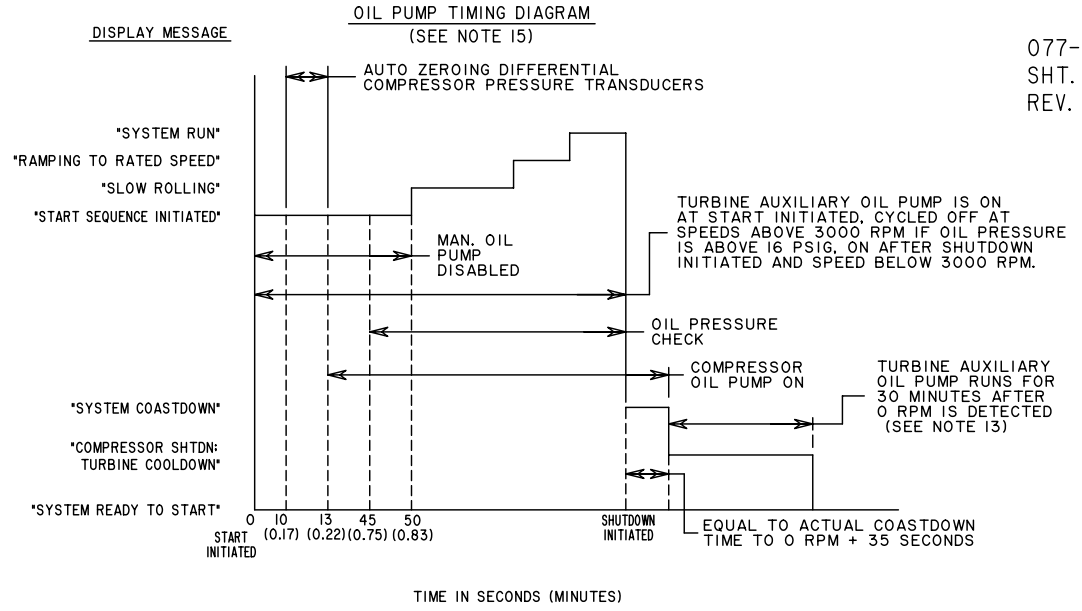


FIGURE 5 - ELEMENTARY DIAGRAM

TIMING DIAGRAM



LD17979

FIGURE 6 - TIMING DIAGRAM

PRESSURE - TEMPERATURE CHART				
INSTRUMENT TAG NUMBER	**SOFTWARE SAFETY DESIGNATION**	**UNITS**	**OPERATING POINT**	
			ON RISE	**ON FALL**
TE-112	CHOT	Deg. F. / Deg. C	200/104.4	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 25.0/172***
PE-140 / PE-141	CHOP	PSID/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 For 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	TSEBHT	Deg. F / Deg. C	220/104.4**	218/103.3
PT-160	TAOP (See Note 13)	PSID/kPa	16/110**	8/55**
PT-160	TLOP (See Note 13)	PSID/kPa	7/48	6/41
TE-160	THOT (See Note 13)	Deg. F / Deg. C	135/57**	134/57**
PT-173	TEHP	PSIA/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 Form: 160.67-O1

† - Applicable If Unit Was Shutdown For 30 Mins. Or Less
†† - Applicable If Unit Was Shutdown For Greater Than 30 Mins.

FIGURE 7 - PRESSURE TEMPERATURE CHART

ELEMENTARY DIAGRAM

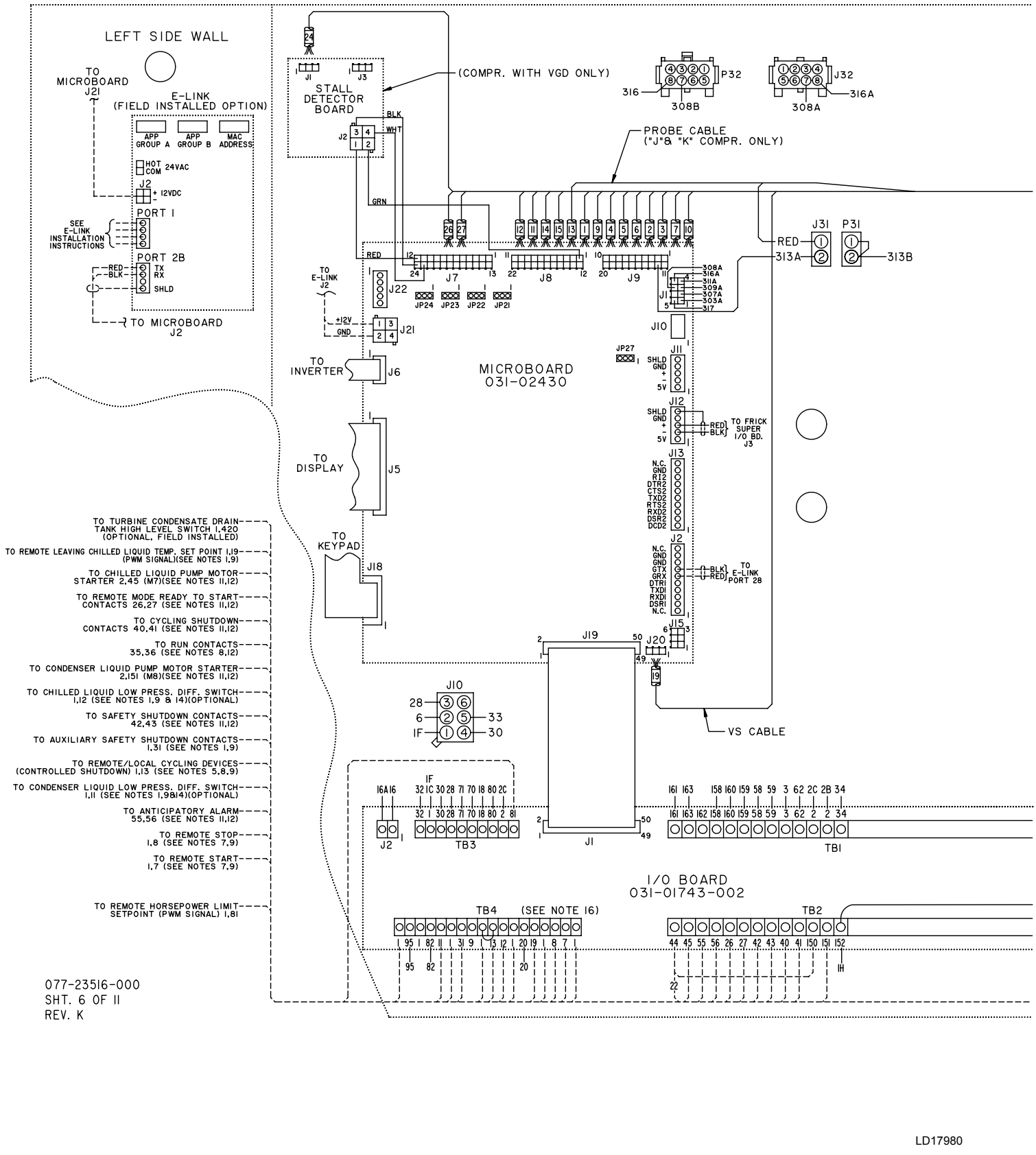
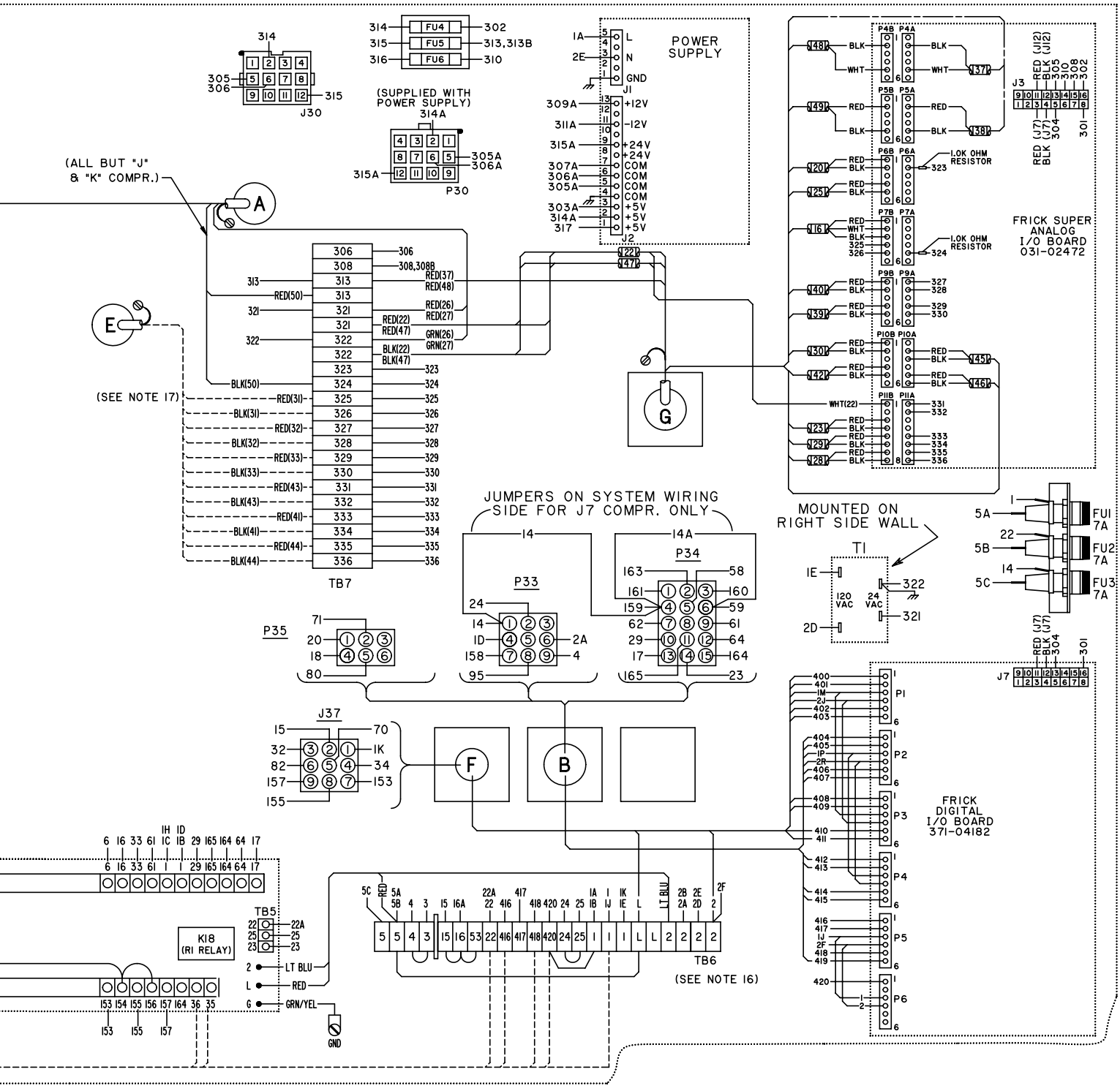


FIGURE 8 - ELEMENTARY DIAGRAM

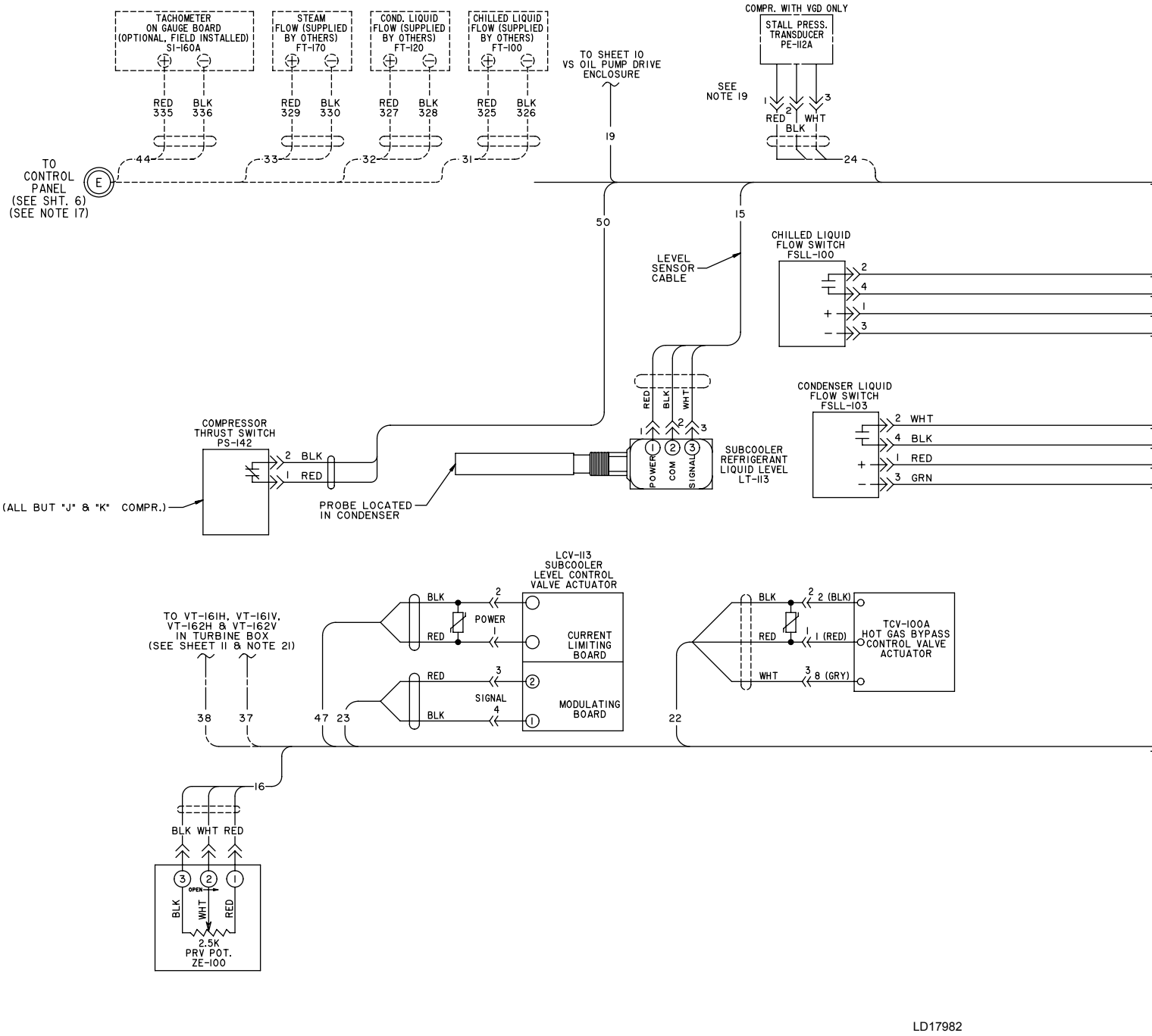
ELEMENTARY DIAGRAM



LD1798

FIGURE 8 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM



LD17982

FIGURE 9 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM

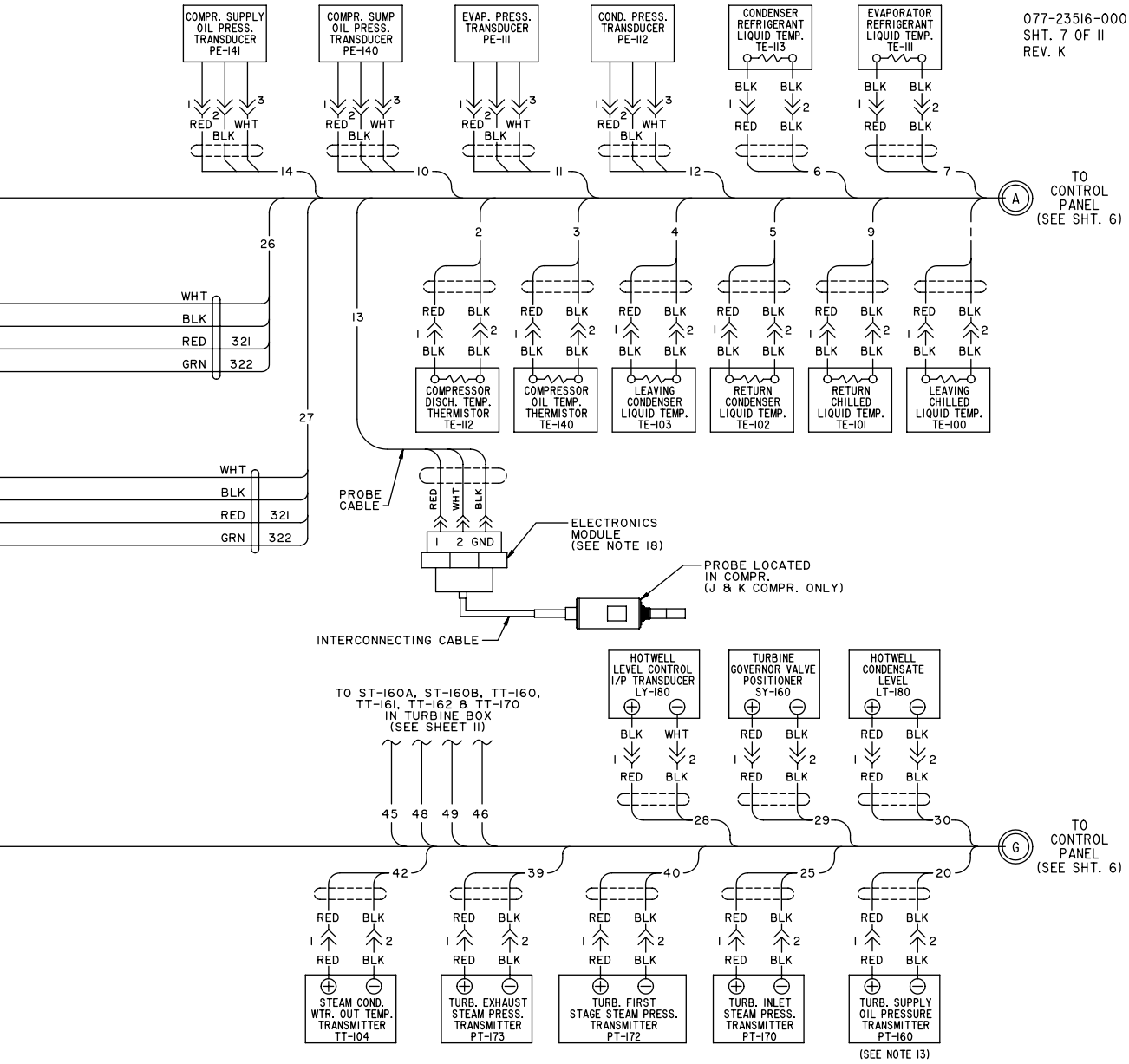


FIGURE 9 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM

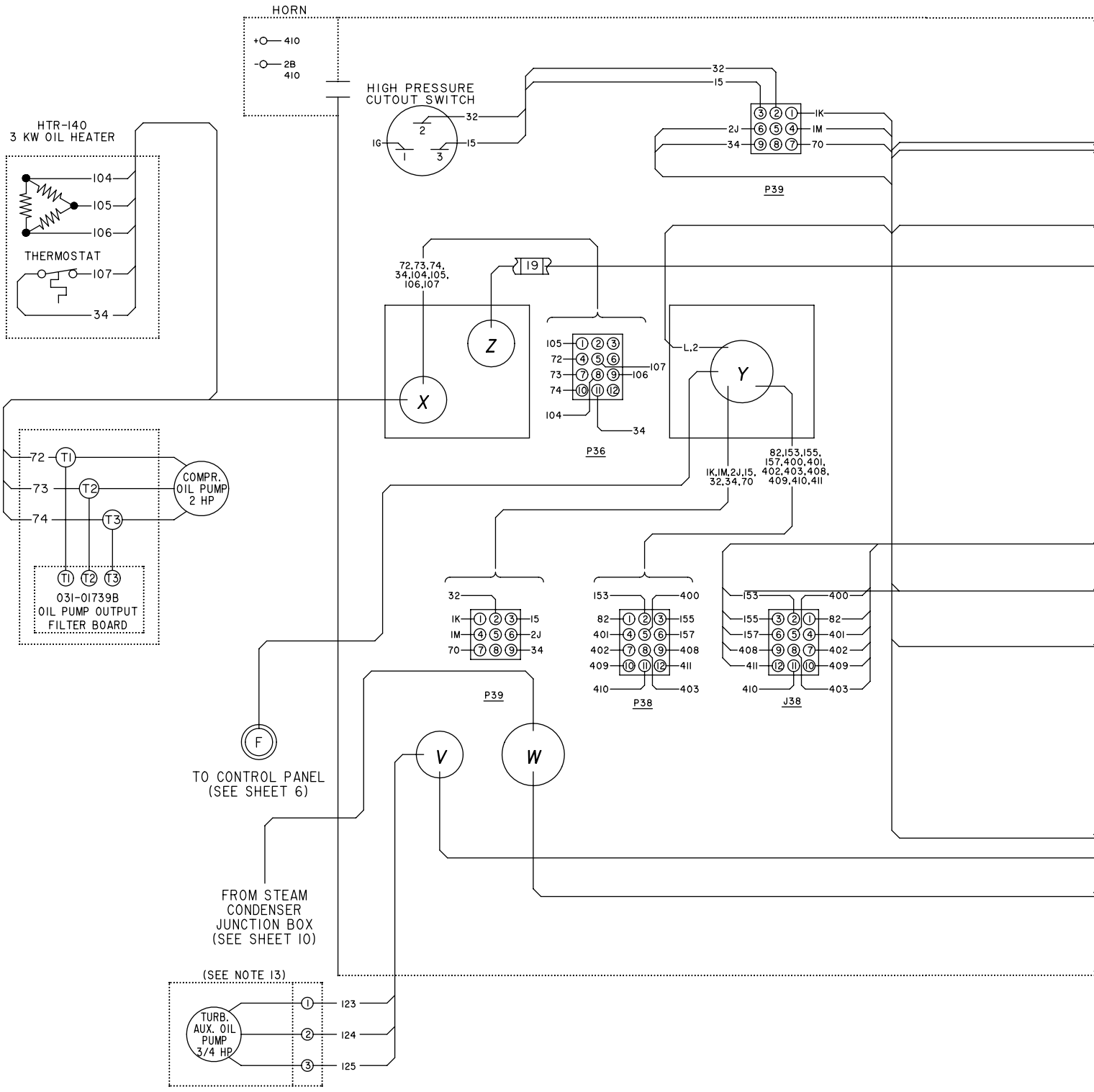


FIGURE 10 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM

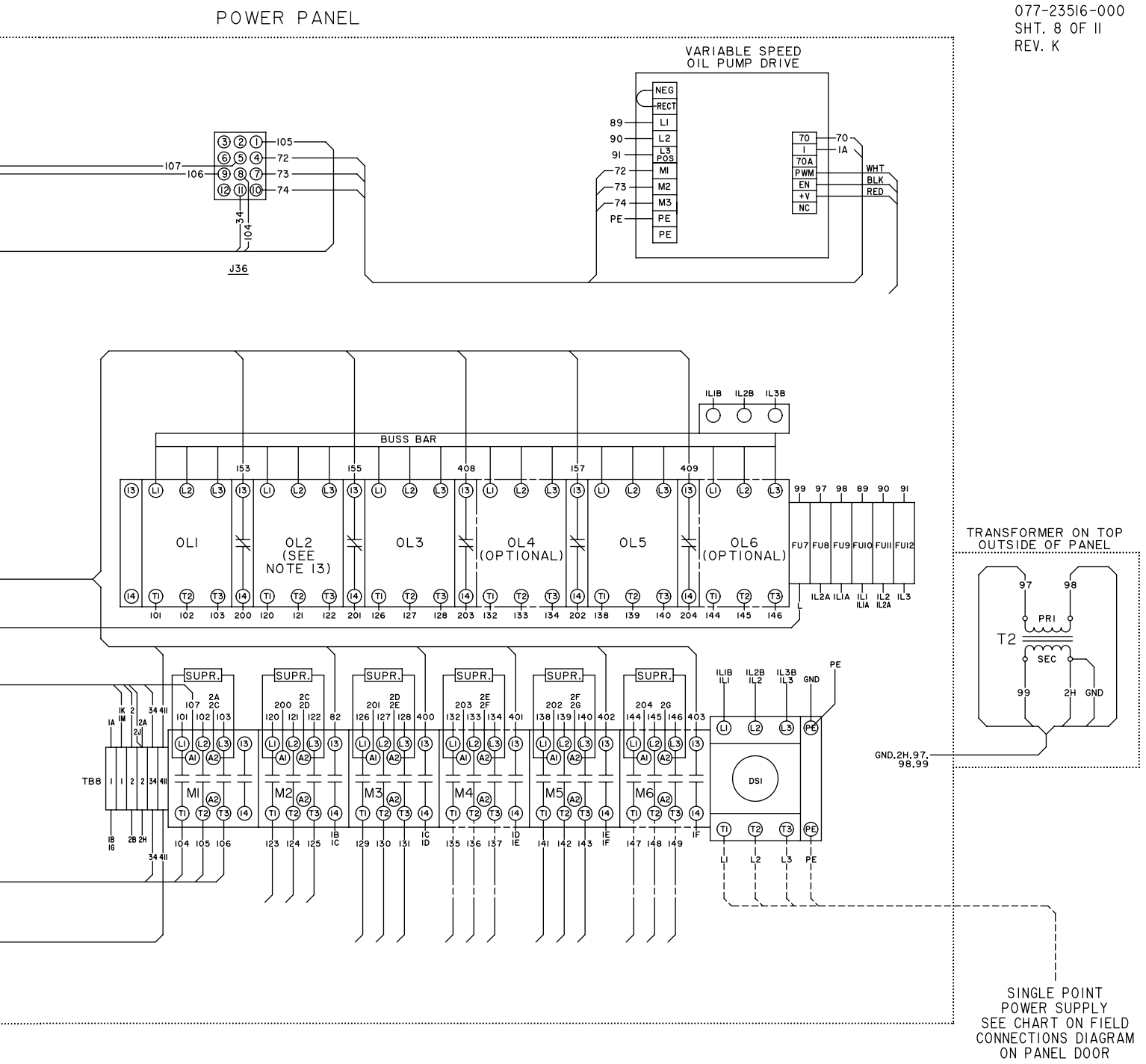


FIGURE 10 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM

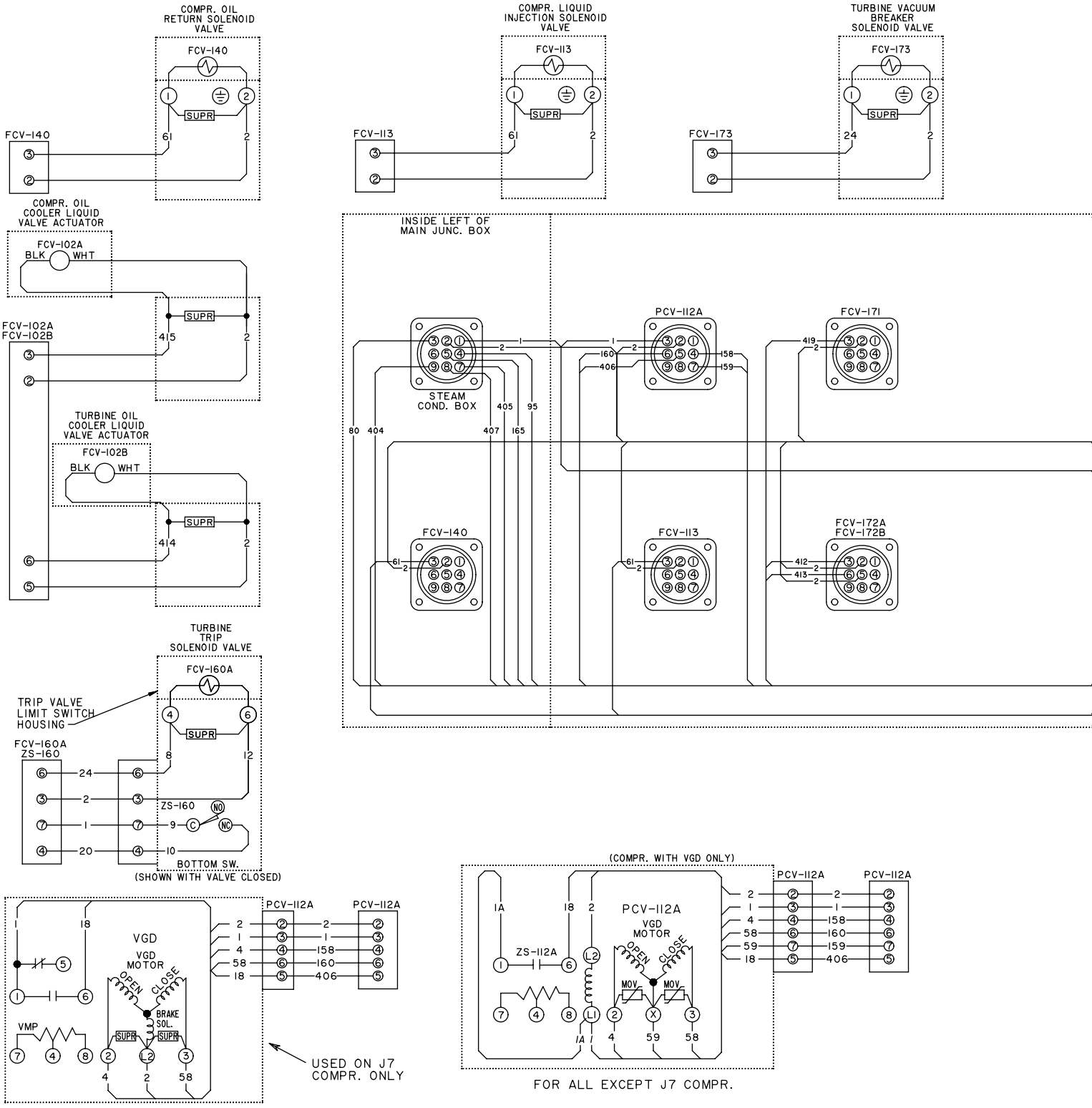
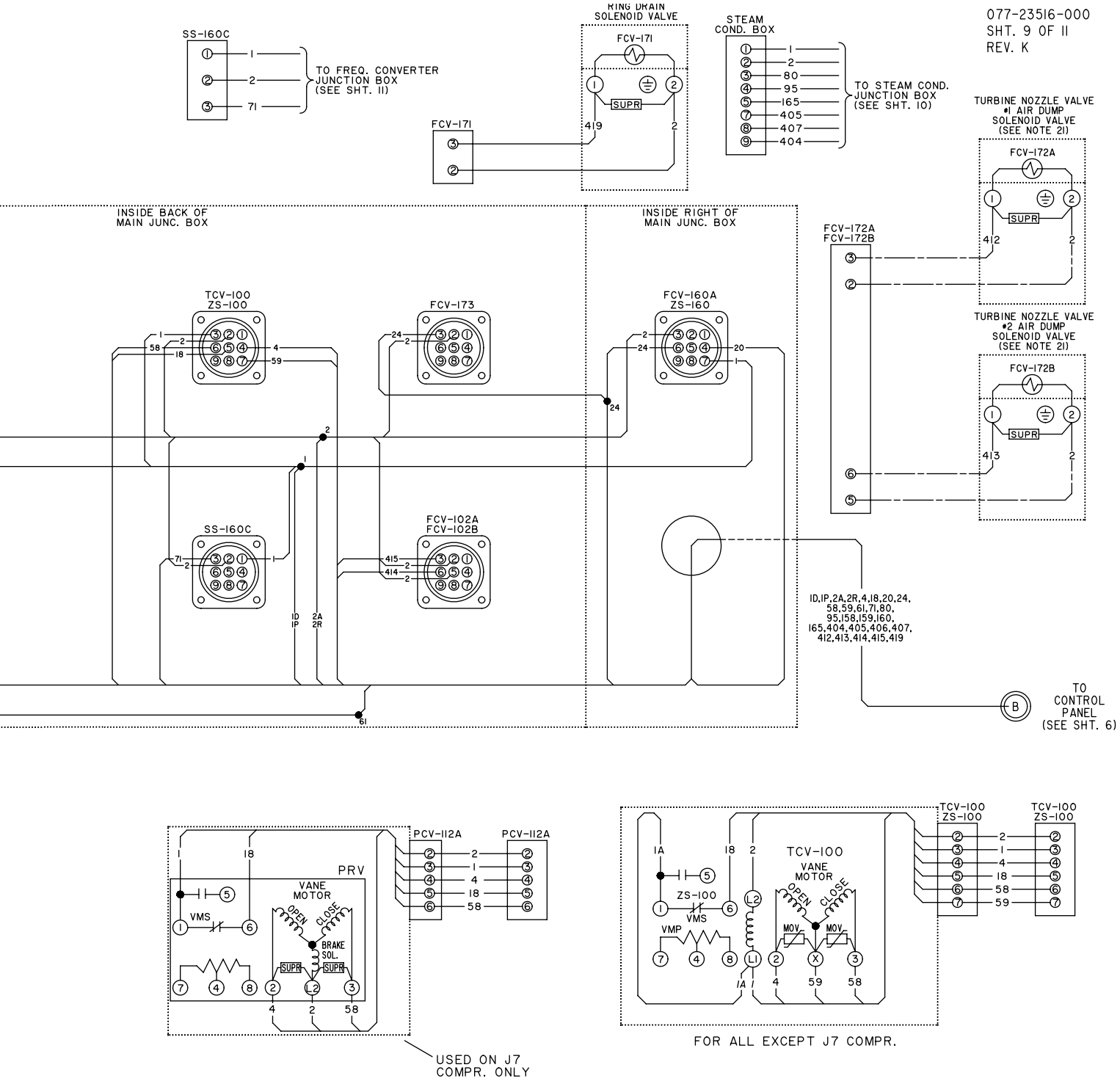


FIGURE 11 - ELEMENTARY DIAGRAM

LD17986

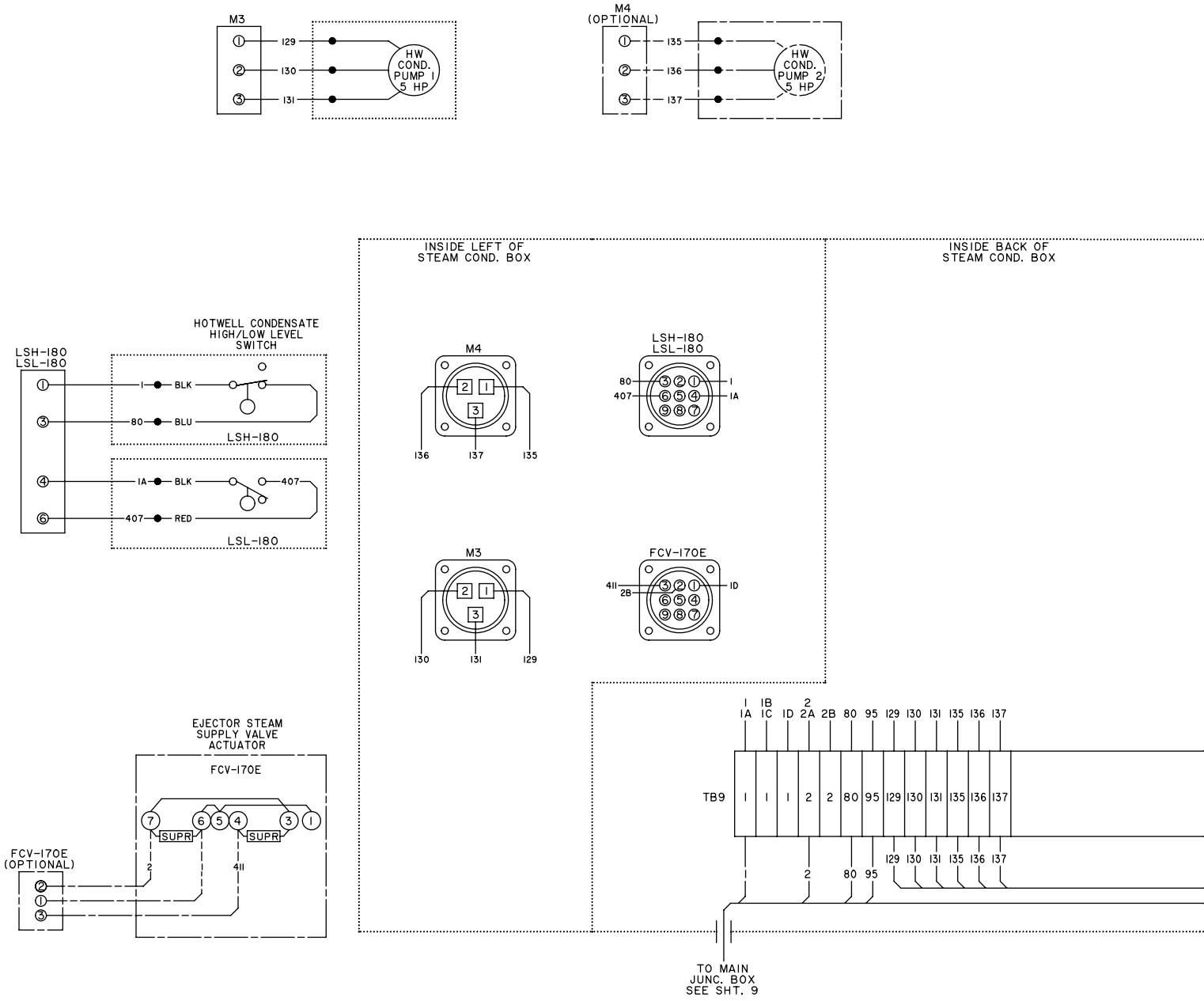
ELEMENTARY DIAGRAM



LD17987

FIGURE 11 - ELEMENTARY DIAGRAM (CONT'D)

ELEMENTARY DIAGRAM

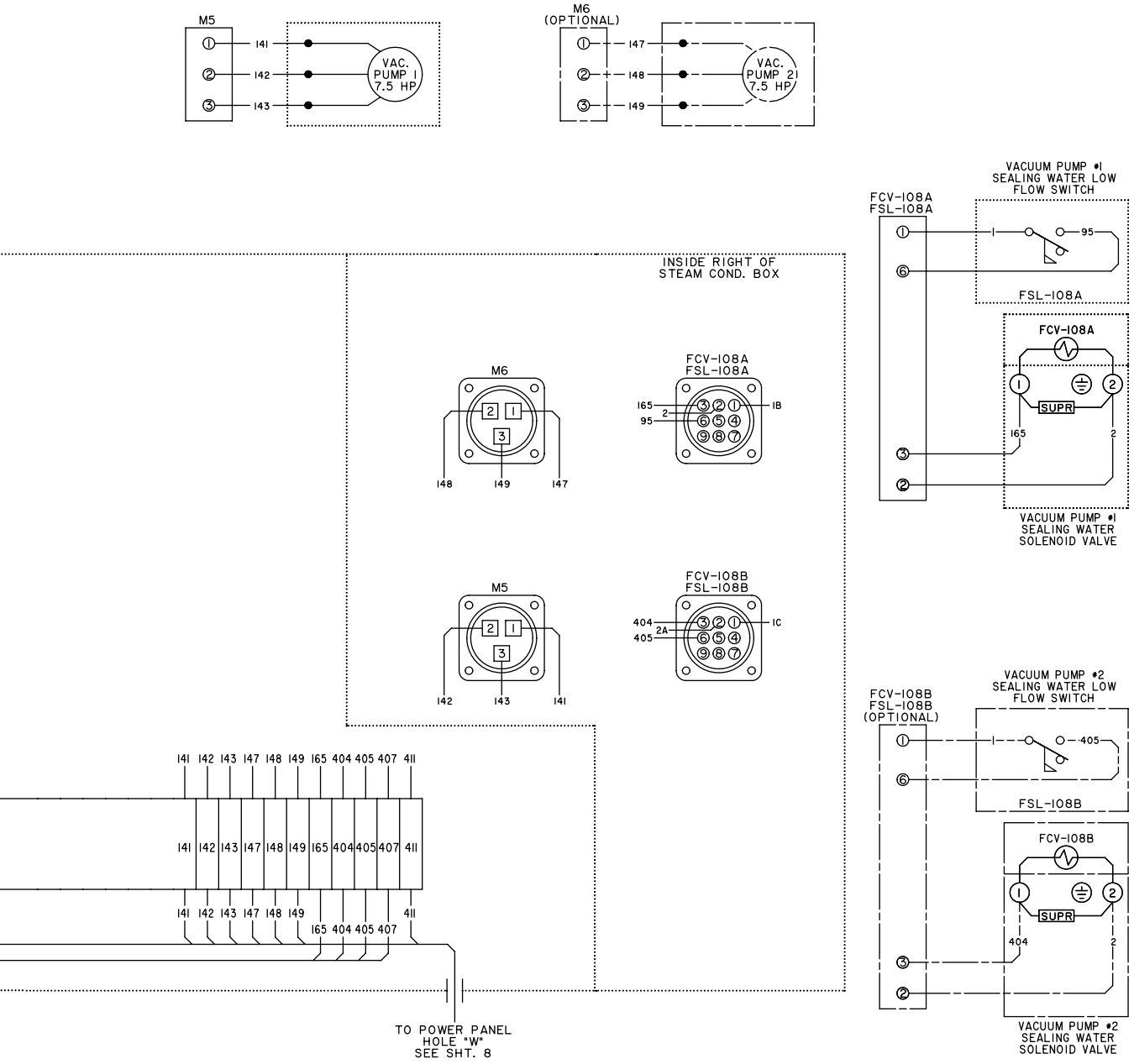


LD17988

FIGURE 12 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM

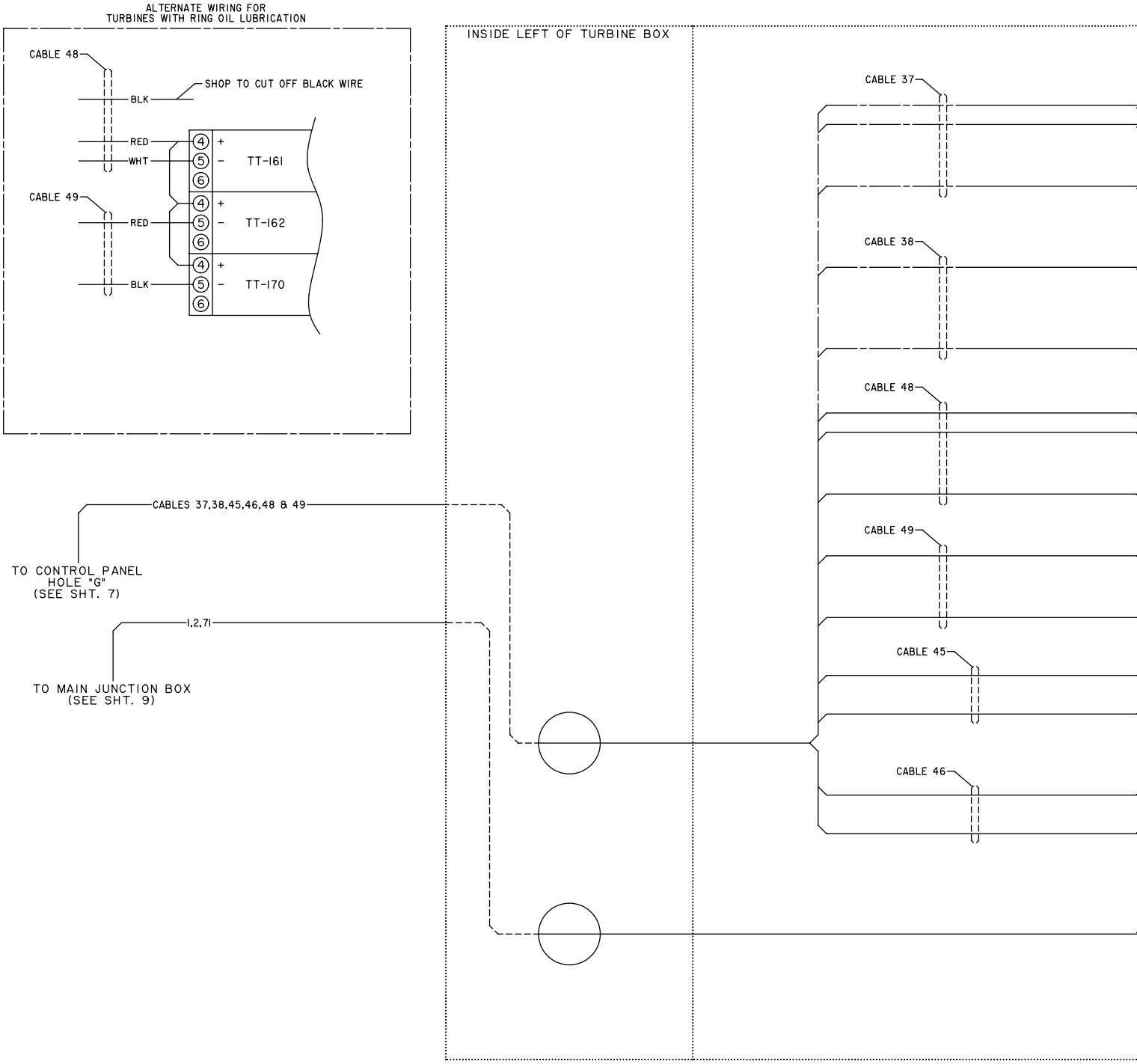
077-23516-000
SHT. 10 OF 11
REV. K



LD17989

FIGURE 12 - ELEMENTARY DIAGRAM (CONT'D)

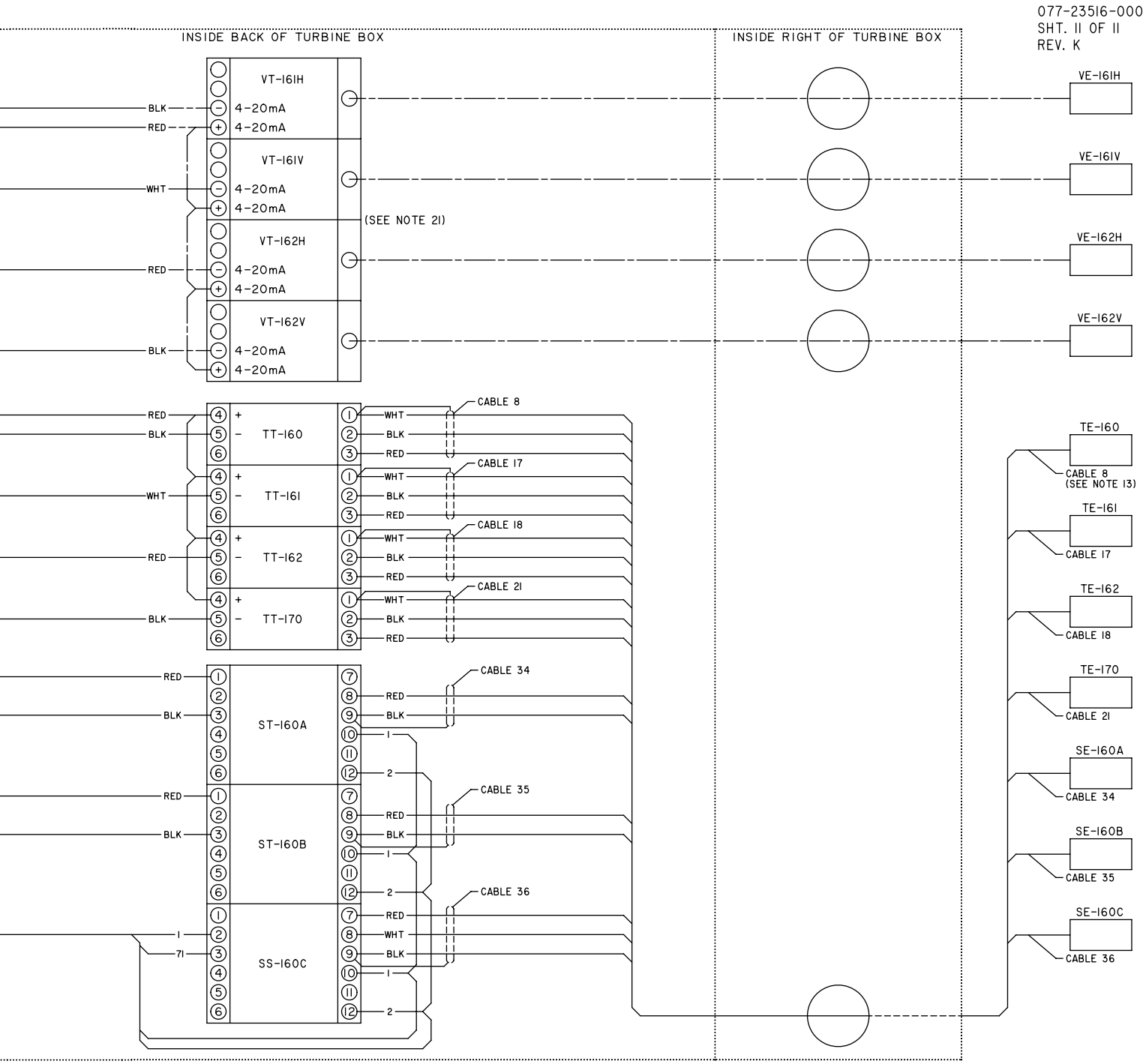
ELEMENTARY DIAGRAM



LD17990

FIGURE 13 - ELEMENTARY DIAGRAM

ELEMENTARY DIAGRAM



LD17991

FIGURE 13 - ELEMENTARY DIAGRAM (CONT'D)

P.O. Box 1592, York, Pennsylvania USA 17405-1592
800-861-1001
www.johnsoncontrols.com

Form 160.67-PW6(114)
Issue Date: January 20, 2014
Supersedes: 160.67-PW6 (107)