YORK®
BY JOHNSON CONTROLS

Supersedes: 160.75-PW3 (311) Form 160.75-PW3 (513)

FIELD CONNECTIONS FOR YK CHILLER (STYLE G) OPTIVIEW CONTROL CENTER WITH REMOTE MEDIUM VOLTAGE VSD

WIRING DIAGRAM

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

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

JOB DATA:

CHILLER MODEL NO. YK_____NO. OF UNITS _____

COMPRESSOR MOTOR _____VOLTS, 3-PHASE _____ HZ

OIL PUMP MOTOR _____VOLTS, 3-PHASE _____ HZ

MEDIUM VOLTAGE VARIABLE SPEED DRIVE, MODEL NO. MVVSD_____R _____- _____

OPTIONAL FACTORY INSTALLED OIL PUMP POWER SUPPLY _____VOLTS, 3 PHASE __ HZ, __AMPS

Issue Date:
May 30, 2013

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 this individual posseses 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.

External wiring, unless specified as an optional connection in the manufacturer's product line, is not to be connected inside the OptiView 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.

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 Service office.

Operating/service personnel maintains the responsibility of the applicability of these documents to the competitive equipment the kit is installed on. If there is any question regarding the applicability of these documents, the technician should verify whether the equipment has been modified and if current literature is available with the owner of the equipment prior to performing any work on the chiller.

NOTES

1. All field wiring shall be in accordance with the current edition of the National Electrical Code (N.E.C.) as well as all other applicable codes and specifications.
2. Medium Voltage Variable Speed Drive and Compressor motor frame shall be grounded in accordance with the 2005 N.E.C. (Paragraph 250-118) for equipment grounding. When a separate grounding conductor is required, it must be a copper conductor only and sized per the 2005 N.E.C. (Table 250-122). Per 2005 N.E.C. [Paragraph 250-120 (f)(1)], where multiple (parallel) conduits are used each must contain a grounding conductor.
3. Wiring, electrical conduit, junction boxes, fused disconnect switches (FDS), or circuit breakers, starters (M), push-button stations (PB), manual-off-automatic switch (S), flow switch (FLS), and control relays furnished by others unless otherwise specified.
4. Items marked (*) furnished by Johnson Controls.
5. Items marked (**) available from Johnson Controls at additional cost.
6. Control Center power supply 115V-50/60 Hz, 2.0KVA capacity for control center only, is supplied by a control power transformer (1T) mounted within the Medium Voltage Variable Speed Drive as standard.
7. Motor power conduit connection location, motor full load amperes (FLA) and inrush amperes per Product Drawing Form 160.54-PA1. Multiple conduits shall contain an equal number of wires from each phase in each conduit to prevent overheating per 2005 N.E.C. (Paragraph 300-20 (a)). Use copper conductors only; DO NOT USE aluminum conductors. Flexible final connections should be used to provide vibration isolation.
8. A removable cover plate without knockouts is supplied for connection of power supply conduits. See *Table 1* for Frame information.
9. Condenser water pump motor starter (3M) holding coil to be furnished for 115V-50/60 Hz. The power requirements for the water pump starter (3M) must be a max. of 1 Amp holding and 10 Amps inrush. If power requirements exceed this value, furnish coil for line voltage, and control relay with 115V coil.
10. Wire #14 AWG copper for one way distance of less than 175 feet. Wire #12 AWG copper for one way distance of more than 175 feet, but less than 300 feet.
11. Wiring diagram for YORK OptiView Control Center Form 160.73-PW5. Field wiring modifications per Form 160.73-PW4. Wiring diagram for YORK Medium Voltage Variable Speed Drive Form 160.00-PW6.
12. The following interconnecting wires are field supplied when a YORK Medium Voltage Variable Speed Drive is used. (See Form 160.73-PW5.)
    A. 120 vac power – control panel Wire; single conductor, stranded, 10-12 awg, 600v, 75-90°C, THWN or UL style 1028/1015,UL listed and CSA approved, insulation shall be moisture resistant thermoplastic (pvc).

    Sys fault /run command - control panel Wire; single conductor, stranded, 14-18 awg, 600v, 75-90°C, THWN or UL style 1015,UL listed and CSA approved, insulation shall be moisture resistant thermoplastic (PVC)

    B. Drive to oil pump motor starter – wire; 3-conductor + ground cable, stranded 14 AWG, 600V 75-90°C, THHN/THWN in conduit UL Listed and CSA approved. Building wire per current N.E.C.

    C. Mod bus comms – Drive to control panel; 025 28701 003 Wire; 3 conductor w/foil shield and drain wire 20 AWG 300v, 80 °C, UL style 2464, UL listed and CSA approved; Alpha 5463, Belden 9364, Quabbin 022 or equivalent. Range 18-22 AWG.
13. Oil pump/drive power supply 460V-60Hz 400V-5Hz is supplied by a control power transformer mounted within the medium voltage variable speed drive as standard.

3 PHASE VOLTAGE	HZ	OIL PUMP DRIVE PANEL (AMPS) 2HP	CONTROL POWER (1T) TRANSFORMER (AMPS)	FDS1 OIL PUMP DRIVE PANEL FUSE
460	60	3.6	4.5	6
400	50/60	4.3	5.3	7

14. The YORK Medium Voltage Variable Speed Drives (2300 to 4160 volts) have high interrupting capacity current limiting fuses plus an integral non-load disconnect function and thus do not require the use of FDS2, provided the Medium Voltage Variable Speed Drive is placed in sight of the chiller. If the FDS2 is required minimum ampere

rating shall be 1.15X (compressor motor amps and control power amps and oil pump amps). See note 13 for additional information for oil pump and control transformer amps.

15. The York Medium Voltage Variable Speed Drive input power wiring ampacity shall be calculated as follows.

    Model YK minimum circuit ampacity:

    Ampacity = 1.25X (Compressor Motor FLA) + Oil Pump Drive Panel Amps + Control Power Transformer Amps, where 125% factor is per 2005 N.E.C. Para. 440-33); FLA is per Note 7; Oil Pump Panel and Control Transformer Amps per Note 13. Oil Pump Panel and Control Transformer Amps value used, to be adjusted by ratio of (120/(MVVSD nameplate voltage). Oil pump amps to be included if MV VSD optional oil pump power supply is included.

16. Medium voltage (2300 to 4160 volts) motors have three leads. Motor leads are furnished with a crimp type connector having a clearance hole for a 3/8" bolt. Motor terminal lugs are not supplied.

17. Starter to motor power wiring ampacity shall be calculated as follows:

- Minimum circuit ampacity per conductor (one of three): Ampacity = 1.25 x compressor motor amps. Where 125% factor is per 2005 NEC (para 440-33); Compressor motor amps (See Note 7) are FLA.

18. The Condenser Flow Switch is optional. If not present, a jumper must be installed between TB4-11 and TB4-1.

19. The interrupting capacity of the YORK Medium Voltage Variable Speed Drive is 50 KA RMS symmetrical amperes at the nameplate voltage. The YORK MVVSD is suitable for use on a circuit capable of delivering not more than 50KA RMS symmetrical amperes at the nameplate voltage.

20. Three phase oil pump motor must be properly phased. L1, L2 and L3 corresponding to phase sequence A, B and C.

21. Control circuit wiring for 3M condenser water pump motor starter is shown for cooling only application. For units with Flash Miniature Card Software Version C.MLM.01.00 through C.MLM.01.03, the condenser water pump should be wired to terminal 164 of TB2 instead of terminal 151, and the wire from terminal 22 of TB5 to terminal 150 of TB2 shall not be installed. For software version C.MLM.01.04 and higher, the condenser water pump connection should be as shown in the figure.

22. The main power transformer should be adequately sized such that the transformer voltage drop does not exceed 10% during unit start-up. The supply voltage, at starter input terminals, during start-up must be maintained above the minimum value specified in the table below. Note that while the YORK chiller will perform acceptably during startup with this amount of voltage drop, the performance of other equipment connected to the supply transformer could be adversely affected.

THREE PHASE VOLTAGE	HZ	MINIMUM VOLTAGE AT DRIVE INPUT TERMINALS DURING START-UP
4160	60	3536
2300	60	1955
3300	50	2805

23. Automatic control of the chilled water pump by the OptiView Control Center is shown. Chilled water pump motor starter (5M) holding coil to be furnished for 115V-50/60 Hz. The power requirements for the water pump starter (5M) must be a maximum of 1 Amp holding and 8 Amps inrush. If power requirements exceed this value, furnish coil for line voltage, and control relay with 115V coil.

    The pumps operate during oil pump prerun, during compressor operation and during cycling shutdown.

24. Each 115VAC field-connected inductive load, i.e. relay coil, motor starter coil, etc. shall have a transient suppressor wired (by others) in parallel with its coil, physically located at the coil. Spare transient suppressors are factory supplied in a bag attached to the keypad cable clamp in the Control Center.

30. The OptiView Control Center has a single output for condenser pump control. When using this control output for heat recovery an additional control means is needed to select operation of tower water condenser pump or heating water condenser pump. The diagram depicts use of a 3 position selector switch which may be added near the chiller for such purposes. Alternatively, a BAS control scheme may be used to control operation of the two condenser water pumps.

31. For heat recovery applications, the heating condenser is provided with a thermal type flow sensor. If an optional mechanical type flow switch is used instead, it is connected between terminal [1] on TB6 (lower right area of the panel) and terminal [1] of TB20 on the LTC I/O board in the upper right side of the control cabinet.

TABLE 1 - FRAME INFORMATION

FRAME 0

MVVSD Model Number	MVVSD Hp	Voltage	Hz	Applicable Motor Codes	Transformer Cubical Weight	Inverter Cubical Weight	Max Input Conduit	Max Motor Conduit
MVVSD0500RK-92	500	3300	50	5CW, 5CX			(1) 4”	(2) 3” or (1) 4”
MVVSD0600RK-92	600	3300	50	5DB, 5DC	8000	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0500RK-84	500	4160	60	CR, CS	6500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0600RK-84	600	4160	60	CT, CU	7700	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0700RK-84	700	4160	60	CV, CW, CX	8500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0800RK-84	800	4160	60	CY, CZ	9400	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0900RK-84	900	4160	60	CA, CB	10000	2500	(1) 4”	(2) 3” or (1) 4”

FRAME 1

MVVSD Model Number	MVVSD Hp	Voltage	Hz	Applicable Motor Codes	Transformer Cubical Weight	Inverter Cubical Weight	Max Input Conduit	Max Motor Conduit
MVVSD0500RK-80	500	2300	60	CR, CS	3700	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0600RK-80	600	2300	60	CT, CU	4000	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0700RK-80	700	2300	60	CV, CW, CX	4800	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0800RK-80	800	2300	60	CY, CZ	5300	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0900RK-80	900	2300	60	CA, CB	5800	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1000RK-80	1000	2300	60	DA	6200	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0800RK-92	800	3300	50	5CT, 5CU, 5CV	5500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD0900RK-92	900	3300	50	5CW, 5CX	6450	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1000RK-92	1000	3300	50	5DA	7200	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1250RK-92	1250	3300	50	5DB, 5DC	8000	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1500RK-92	1500	3300	50	5DD, 5DE, 5DF	8500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1000RK-84	1000	4160	60	DA	6500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1250RK-84	1250	4160	60	DB, DC	7700	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1500RK-84	1500	4160	60	DD, DE, DF	8500	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD1750RK-84	1750	4160	60	DH	9400	2500	(1) 4”	(2) 3” or (1) 4”
MVVSD2000RK-84	2000	4160	60	DJ	10000	2500	(1) 4”	(2) 3” or (1) 4”

FRAME 2

MVVSD Model Number	MVVSD Hp	Voltage	Hz	Applicable Motor Codes	Transformer Cubical Weight	Inverter Cubical Weight	Max Input Conduit	Max Motor Conduit
MVVSD1750RK-92	1750	3300	50	5DG, 5DH	11200	4500	(2) 4”	(2) 4”
MVVSD2000RK-92	2000	3300	50	5DJ	12000	4500	(2) 4”	(2) 4”
MVVSD2250RK-84	2250	4160	60	DK	11200	4500	(2) 4”	(2) 4”
MVVSD2500RK-84	2500	4160	60	DL	12000	4500	(2) 4”	(2) 4”

FRAME 3

MVVSD Model Number	MVVSD Hp	Voltage	Hz	Applicable Motor Codes	Transformer Cubical Weight	Inverter Cubical Weight	Max Input Conduit	Max Motor Conduit
MVVSD1250RK-80	1250	2300	60	DB, DC	8800	4500	(2) 4”	(3) 4”
MVVSD1500RK-80	1500	2300	60	DD, DE, DF	9500	4500	(2) 4”	(3) 4”
MVVSD1750RK-80	1750	2300	60	DH	10000	4500	(2) 4”	(3) 4”
MVVSD2250RK-92	2250	3300	50	5DK	12700	5500	(2) 4”	(3) 4”
MVVSD2500RK-92	2500	3300	50	5DL	13500	5500	(2) 4”	(3) 4”

FRAME 4

MVVSD Model Number	MVVSD Hp	Voltage	Hz	Applicable Motor Codes	Transformer Cubical Weight	Inverter Cubical Weight	Max Input Conduit	Max Motor Conduit
MVVSD2000RK-80	2000	2300	60	DJ	12500	6000	(2) 4”	(2) 4”
MVVSD2250RK-80	2250	2300	60	DK	12500	6000	(2) 4”	(2) 4”
MVVSD2500RK-80	2500	2300	60	DL	12500	6000	(2) 4”	(2) 4”

FIELD CONNECTIONS

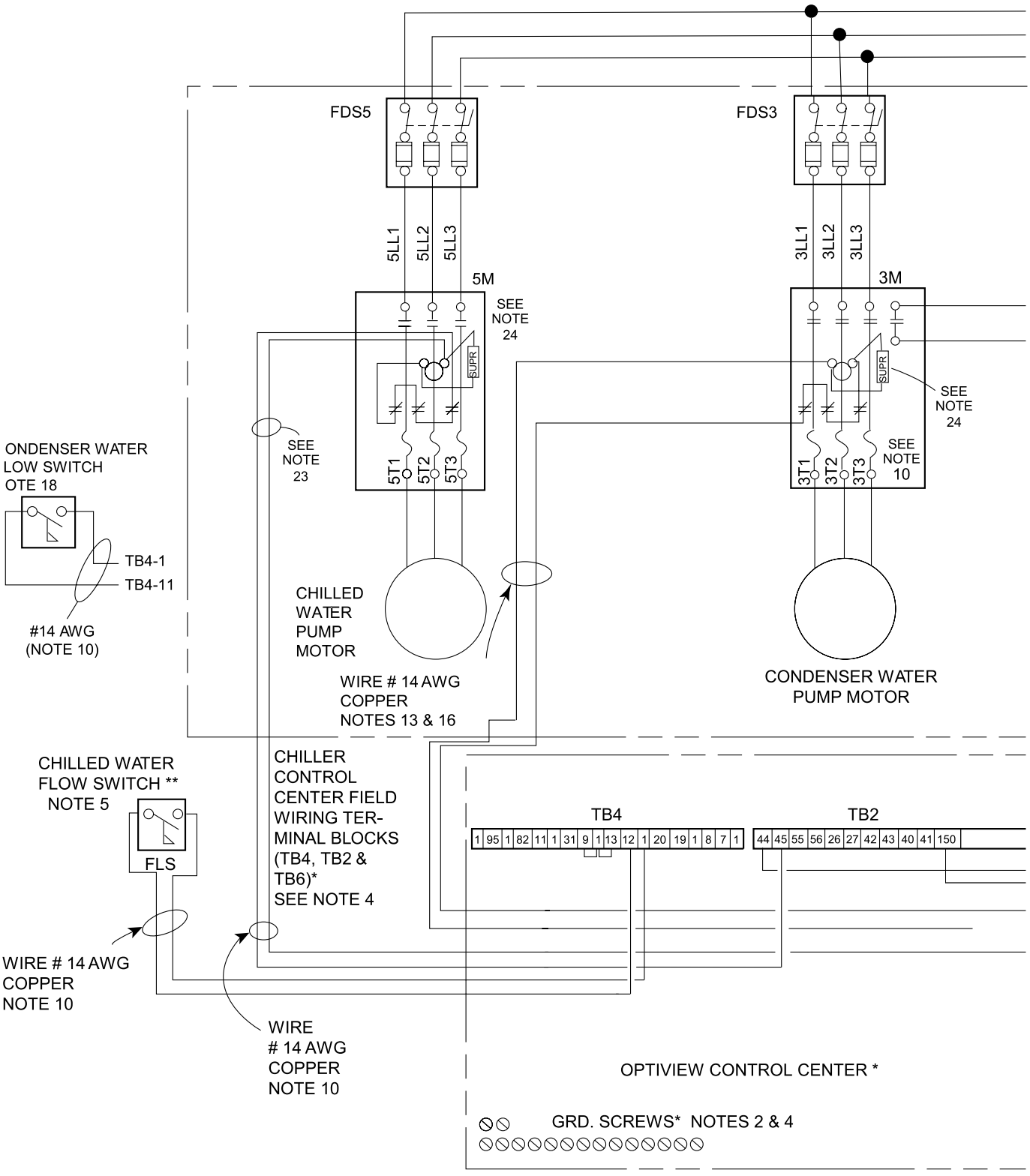

FIGURE 1 - FIELD CONNECTIONS

FIELD CONNECTIONS (CONT'D)

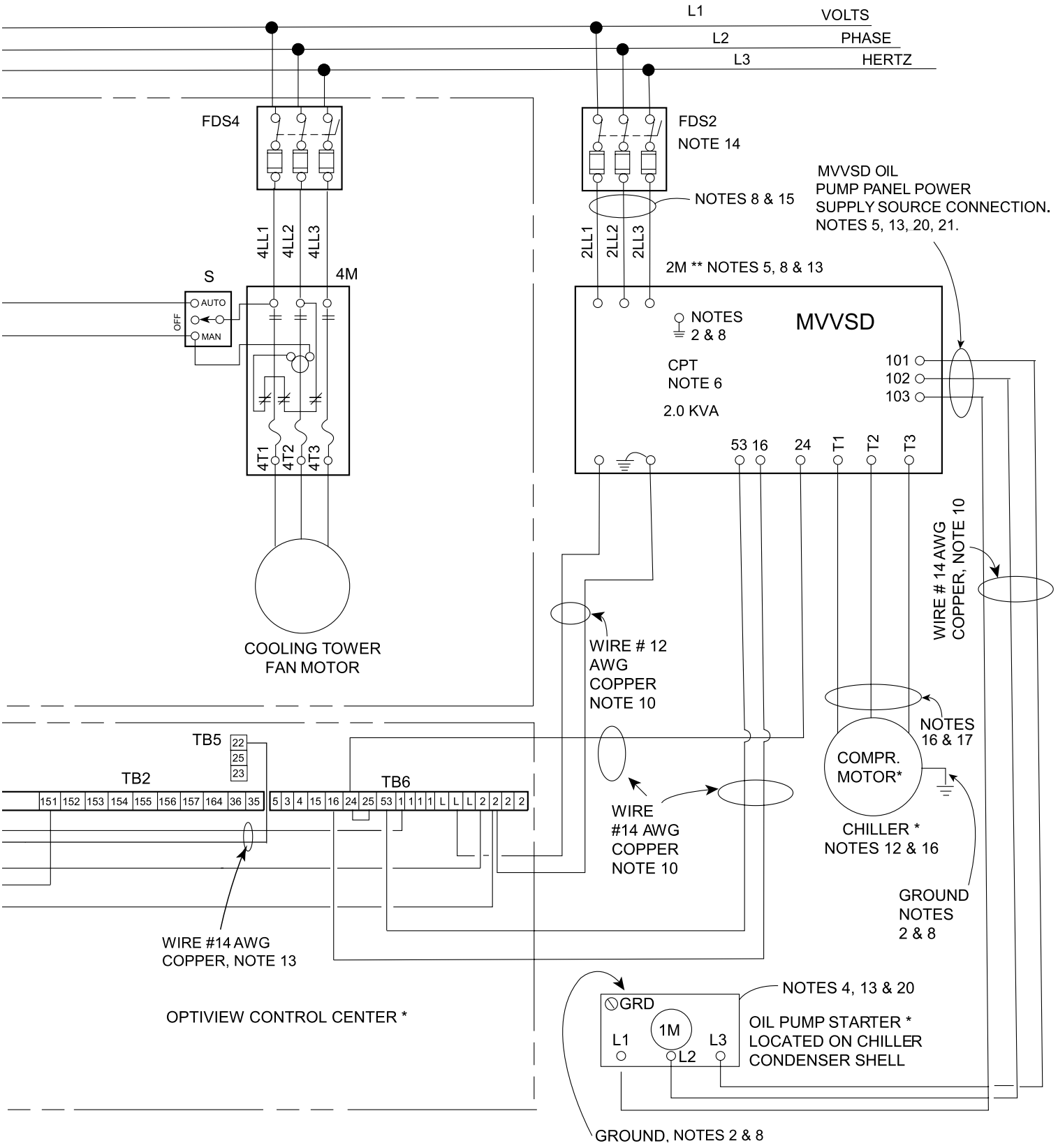

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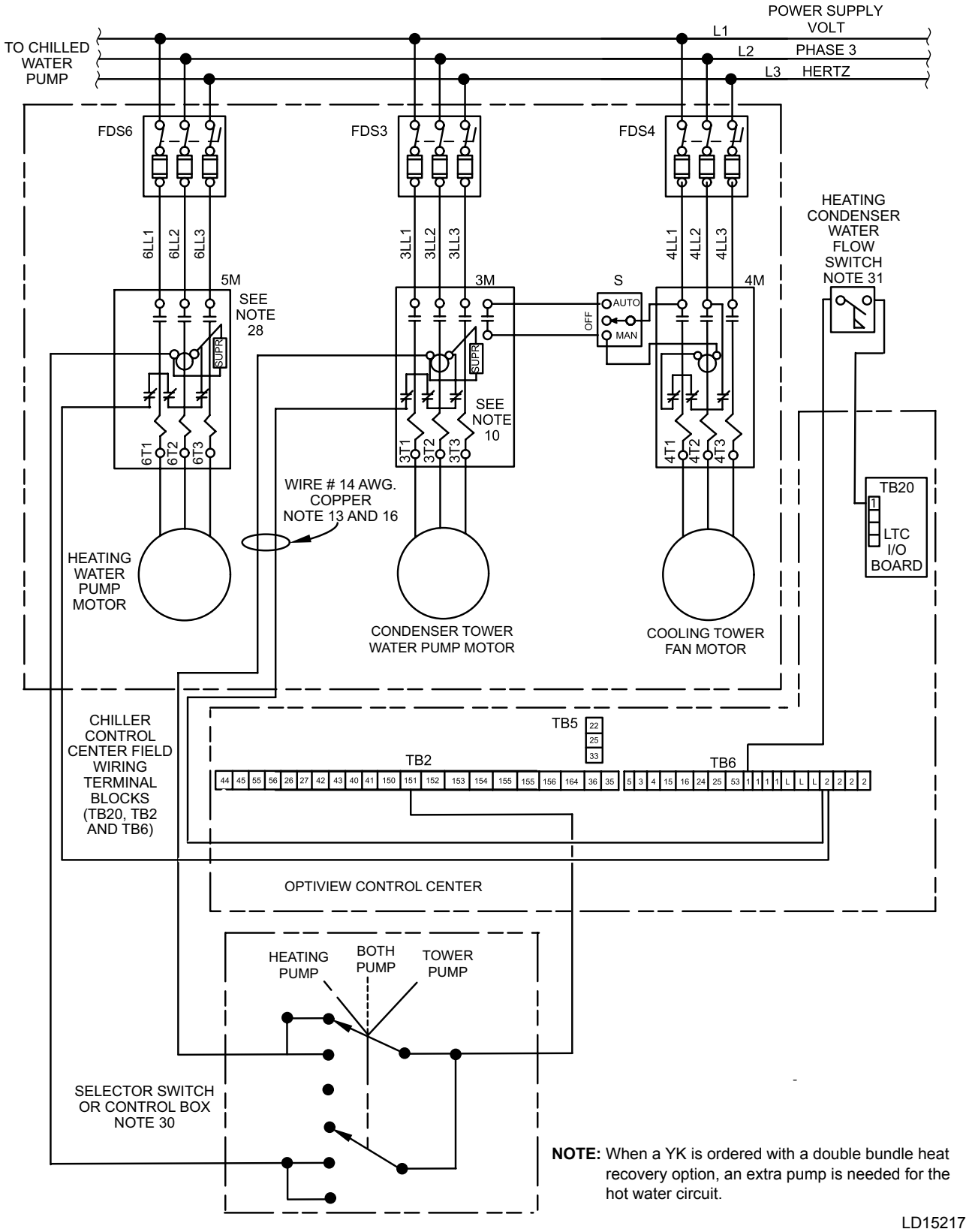
FIGURE 1 - FIELD CONNECTIONS (CONT'D)

FIELD CONNECTIONS
HEAT RECOVERY SUPPLEMENT



NOTE: When a YK is ordered with a double bundle heat recovery option, an extra pump is needed for the hot water circuit.

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FIGURE 2 - FIELD CONNECTIONS HEAT RECOVERY SUPPLEMENT

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