SHEET INDEX

SHEET #	SHEET DESCRIPTION
1	COVER SHEET
2	GRINDER AND CONNECTIONS PROPOSED LAYOUT
3	DUPLEX PUMP STATION PROPOSED LAYOUT
4	DUPLEX W/ GRINDER PUMP STATION PROPOSED LAYOUT
5	PUMP STATION DETAILS
6	PUMP STATION PROPOSED STRUCTURAL LAYOUT

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

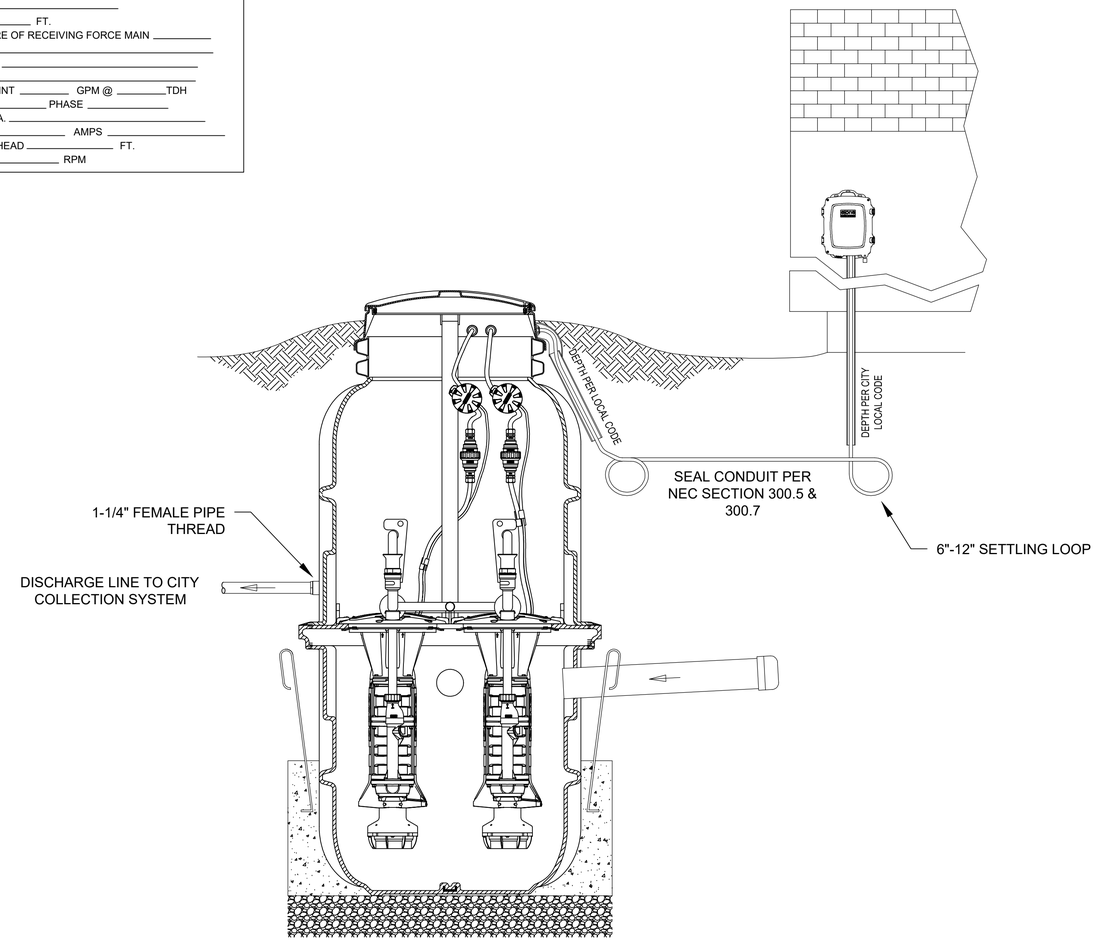
INDEX 801:
PUMP STATION STANDARD MECHANICAL AND STRUCTURAL DETAILS

SEE PUMP STATION STANDARD ELECTRICAL DETAILS FOR APPROPRIATE STANDARDS

INDEX 802: 240V 1-PH, SINGLE PUMP 1.5 TO 10 HP
INDEX 803: 240V 1-PH, DUPLEX 1 TO 7.5 HP
INDEX 804: 240V 3-PH, DUPLEX 9.4 TO 12 HP
INDEX 805: 480V 3-PH, DUPLEX 15 TO 20 HP
INDEX 806: 480V 3-PH, DUPLEX 25 TO 30 HP
INDEX 802: 480V 3-PH, DUPLEX 47 TO 88 HP

PUMP STATION DATA:

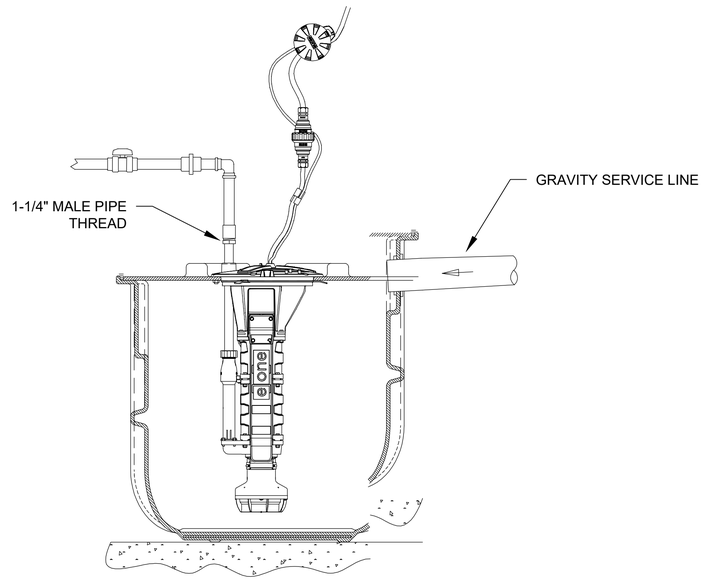
1. OWNER _____
2. OWNER PHONE NO. _____
3. ADDRESS _____
4. POWER CO. METER NO. _____
5. POWER CO. POLE/PAD NO. _____
6. SERVICE AREA _____
7. DESIGN CAPACITY (PEAK) _____ GPM
8. WET WELL VOLUME _____ GALLONS _____ FT. DIA.
9. CONTROL ELEVATIONS:
   - TOP EL. _____
   - INVERT EL. _____
   - ALARM EL. _____
   - AUTO DIALER EL. _____
   - LAG 2 ON EL. _____
   - LAG 1 ON EL. _____
   - DROP INVERT EL. _____ (IF REQUIRED)
   - LEAD ON EL. _____
   - OVERRIDE OFF EL. _____
   - PUMPS OFF EL. _____
   - BOTTOM EL. _____
10. STATIC HEAD _____ FT.
    DESIGN PRESSURE OF RECEIVING FORCE MAIN _____
11. PUMP MODEL _____
12. PUMP SERIAL NO. _____
    PUMP SERIAL NO. _____
13. PUMP DESIGN POINT _____ GPM @ _____TDH
14. PUMP H.P. _____ PHASE _____
15. PUMP IMP. NO./DIA. _____
16. PUMP VOLTS _____ AMPS _____
17. PUMP SHUT-OFF HEAD _____ FT.
18. PUMP SPEED _____ RPM



OUTSIDE

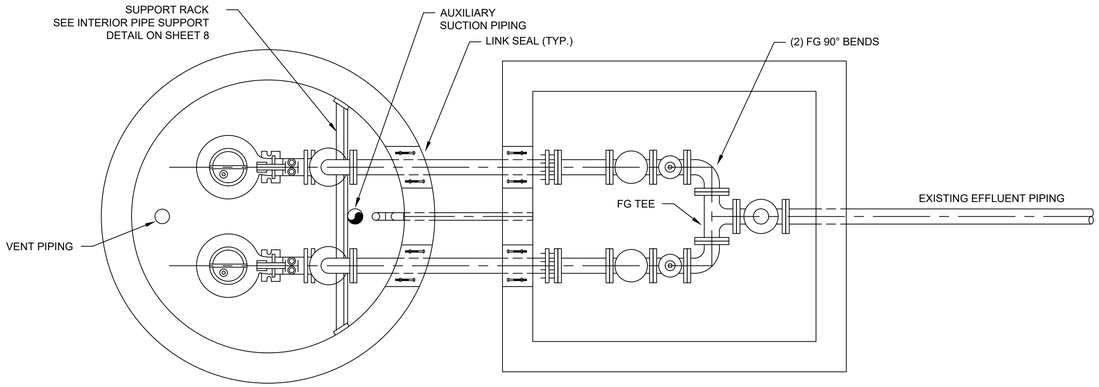
NOTES:

1. ONE PUMP STATION MAY PROVIDE SERVICE TO A SINGLE FAMILY RESIDENCE, DUPLEX RESIDENCE OR TRIPLEX RESIDENCE.
2. SINGLE FAMILY RESIDENTIAL UNITS MAY USE A SINGLE PUMP STATION.
3. PUMP STATIONS SERVICING DUPLEX OR TRIPLEX RESIDENTIAL UNITS AND COMMERCIAL PROPERTIES SHALL BE DUPLEX PUMP STATIONS.
4. PLEASE REFER TO CITY OF CLEARWATER SANITARY DETAILS INDEX 305, PAGES 1, 2 AND 3 CONCERNING SANITARY LATERAL CONNECTIONS.

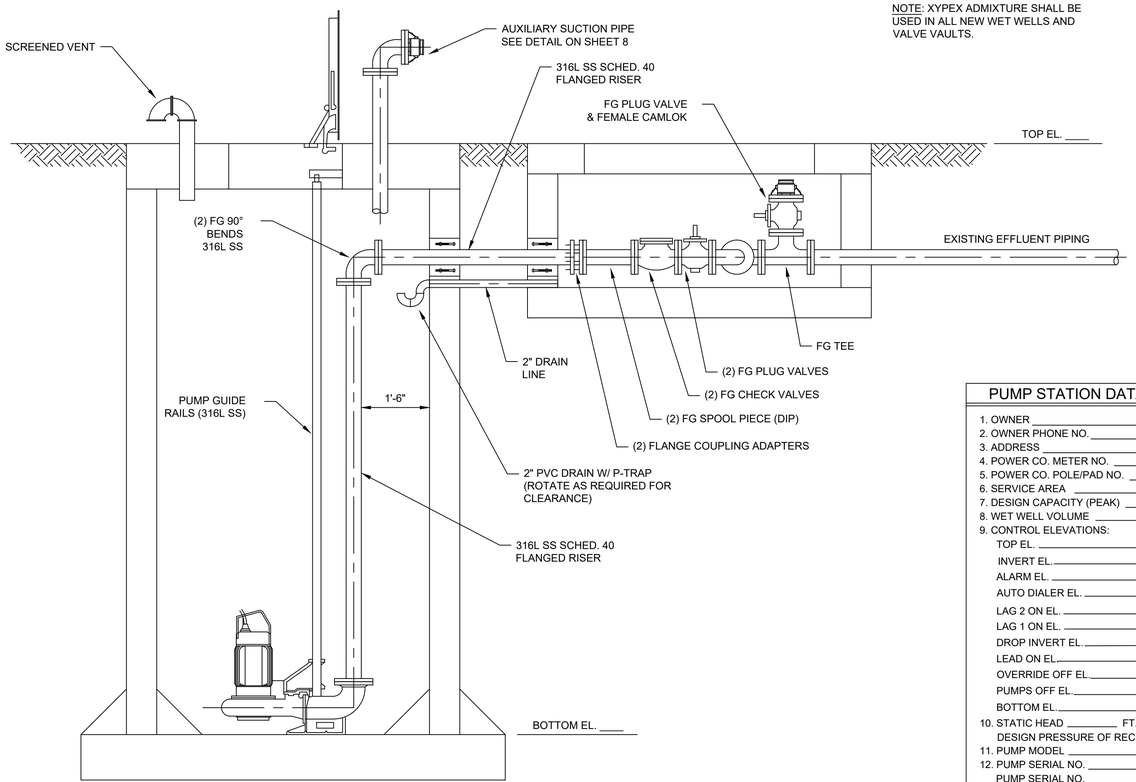


[VIEW ROTATED FOR CLARITY]

INSIDE
(ON SLAB)



PLAN BELOW GRADE



ELEVATION VIEW

NOTE: XYPEX ADMIXTURE SHALL BE USED IN ALL NEW WET WELLS AND VALVE VAULTS.

PUMP STATION DATA:

1. OWNER _____
2. OWNER PHONE NO. _____
3. ADDRESS _____
4. POWER CO. METER NO. _____
5. POWER CO. POLE/PAD NO. _____
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7. DESIGN CAPACITY (PEAK) _____ GPM
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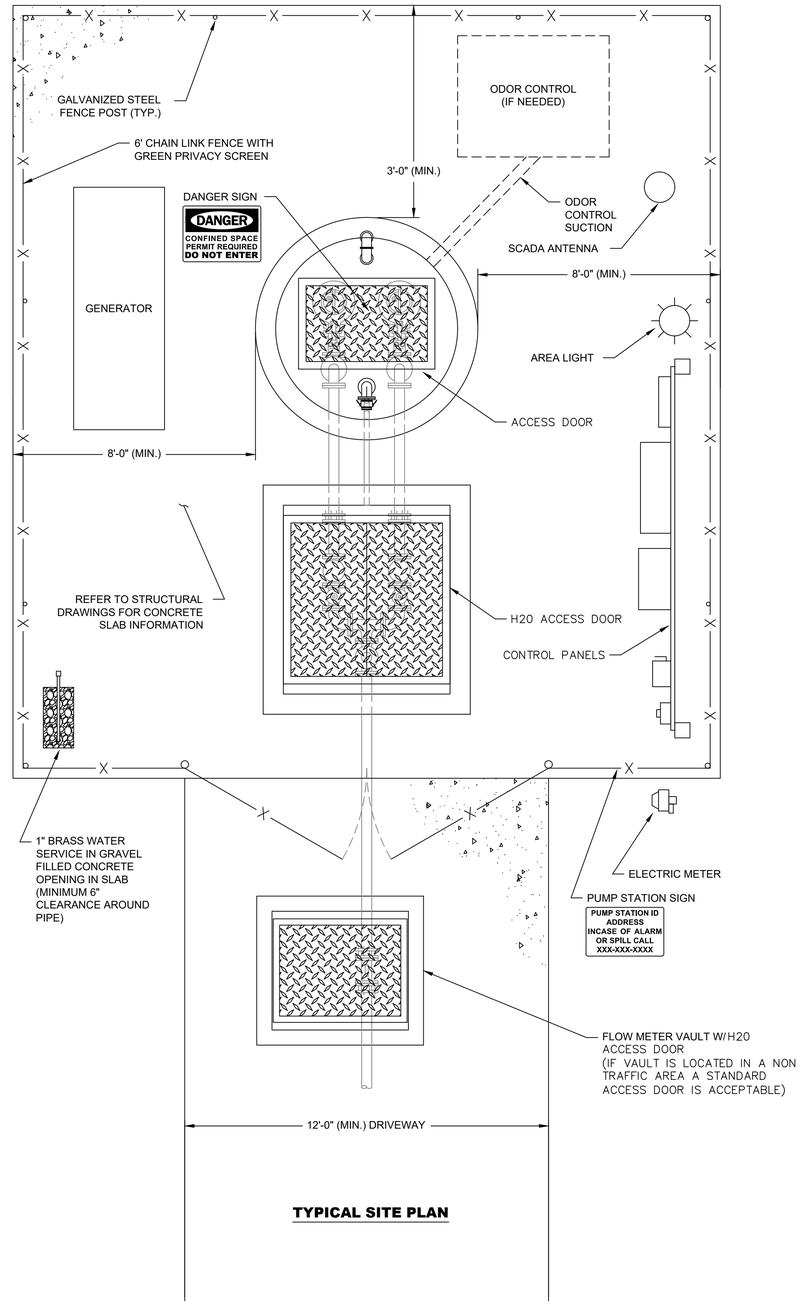
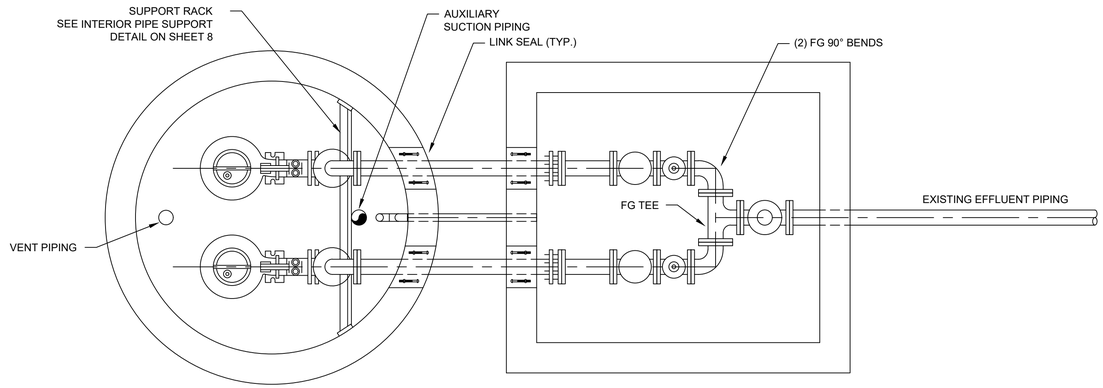
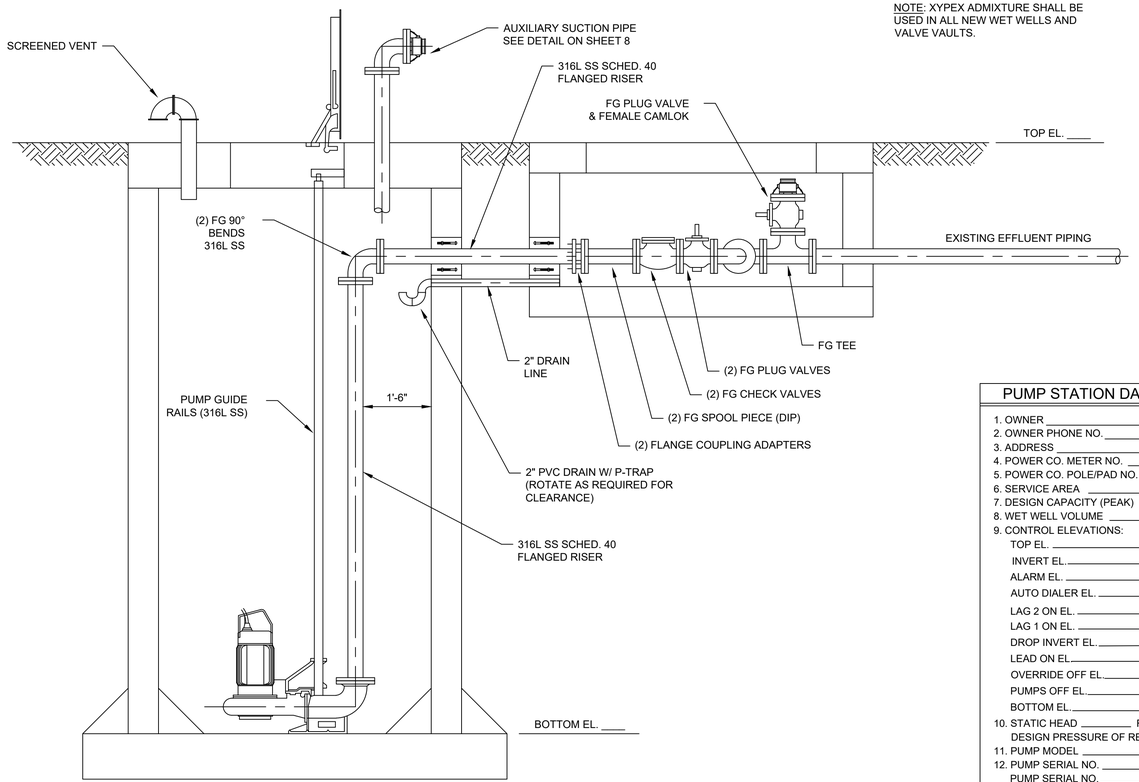
   - ALARM EL. _____
   - AUTO DIALER EL. _____
   - LAG 2 ON EL. _____
   - LAG 1 ON EL. _____
   - DROP INVERT EL. _____ (IF REQUIRED)
   - LEAD ON EL. _____
   - OVERRIDE OFF EL. _____
   - PUMPS OFF EL. _____
   - BOTTOM EL. _____
10. STATIC HEAD _____ FT.
    DESIGN PRESSURE OF RECEIVING FORCE MAIN _____
11. PUMP MODEL _____
12. PUMP SERIAL NO. _____
    PUMP SERIAL NO. _____
13. PUMP DESIGN POINT _____ GPM @ _____TDH
14. PUMP H.P. _____ PHASE _____
15. PUMP IMP. NO./DIA. _____
16. PUMP VOLTS _____ AMPS _____
17. PUMP SHUT-OFF HEAD _____ FT.
18. PUMP SPEED _____ RPM



TYPICAL SITE PLAN



PLAN BELOW GRADE



ELEVATION VIEW

NOTE: XYPEX ADMIXTURE SHALL BE USED IN ALL NEW WET WELLS AND VALVE VAULTS.

PUMP STATION DATA:

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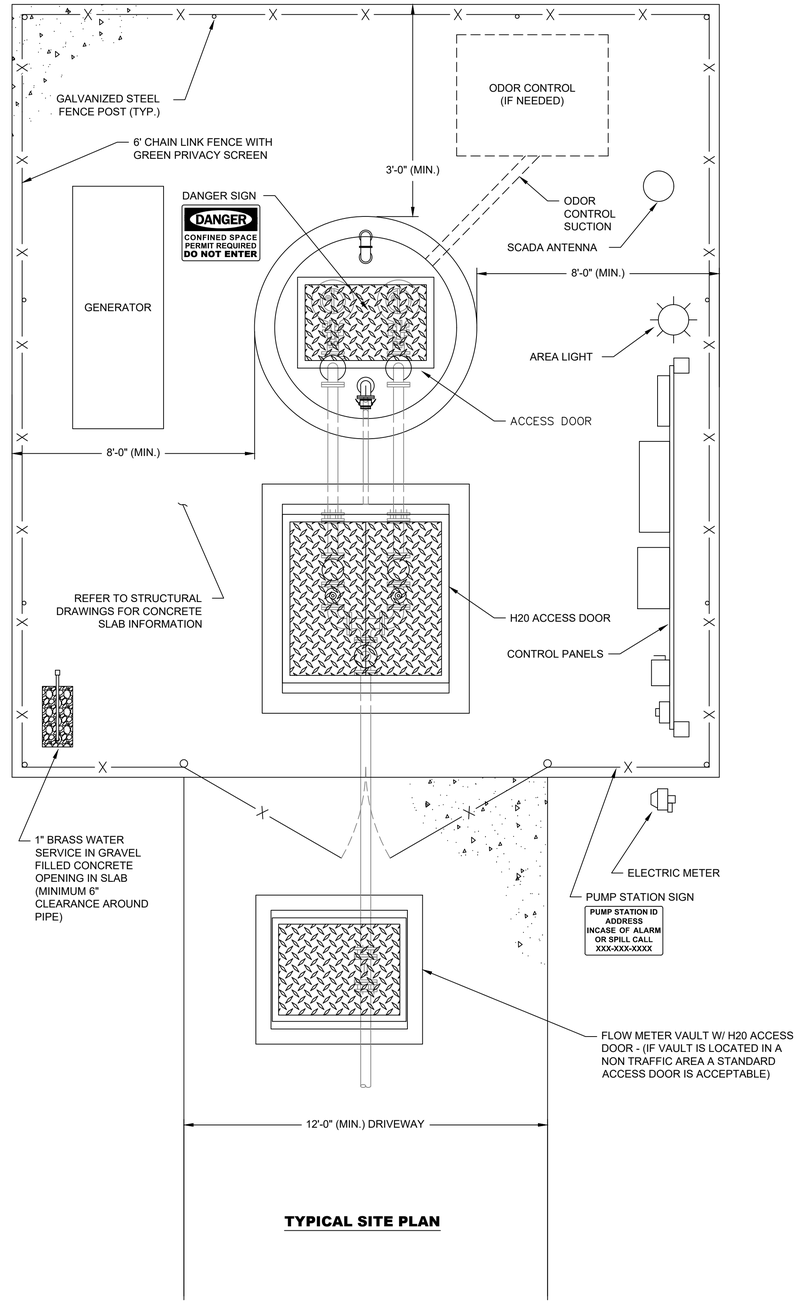
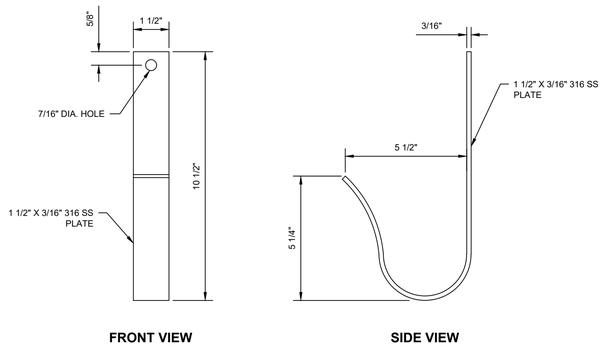
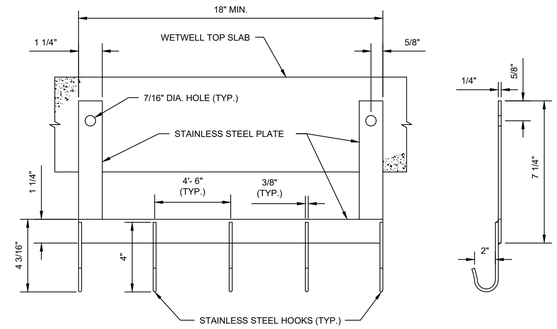
15. PUMP IMP. NO./DIA. _____
16. PUMP VOLTS _____ AMPS _____
17. PUMP SHUT-OFF HEAD _____ FT.
18. PUMP SPEED _____ RPM



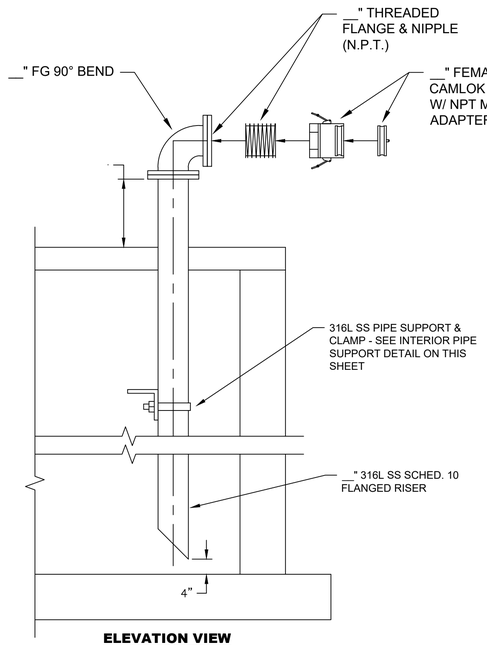
TYPICAL SITE PLAN



ELECTRICAL CABLE HANGER DETAIL

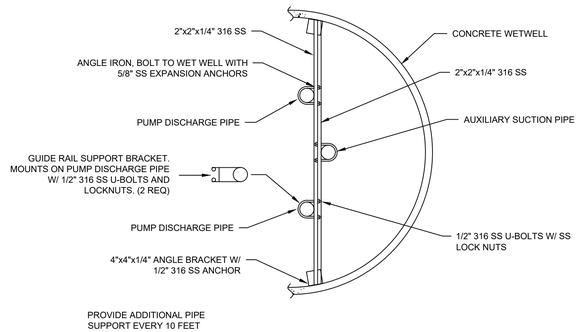


FLOAT CABLE HANGER DETAIL

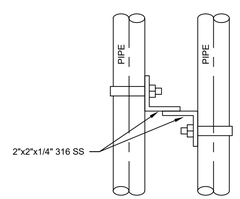


ELEVATION VIEW

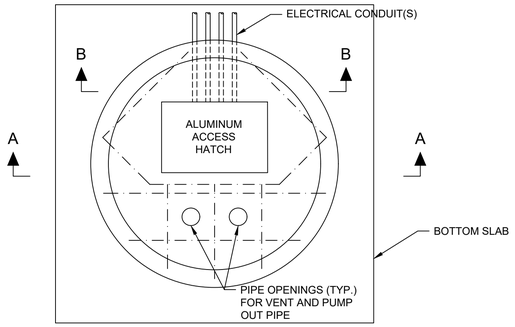
TRANSDUCER STILLING WELL & AUXILIARY SUCTION PIPE DETAIL



INTERIOR PIPE SUPPORT DETAIL - TOP VIEW



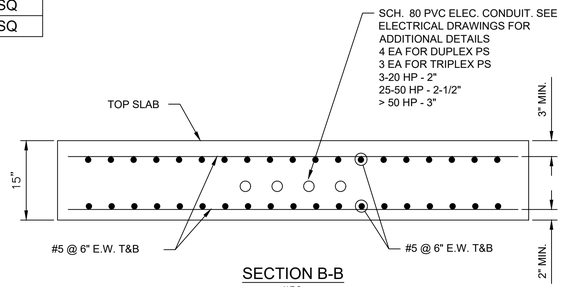
INTERIOR PIPE SUPPORT DETAIL ELEVATION VIEW



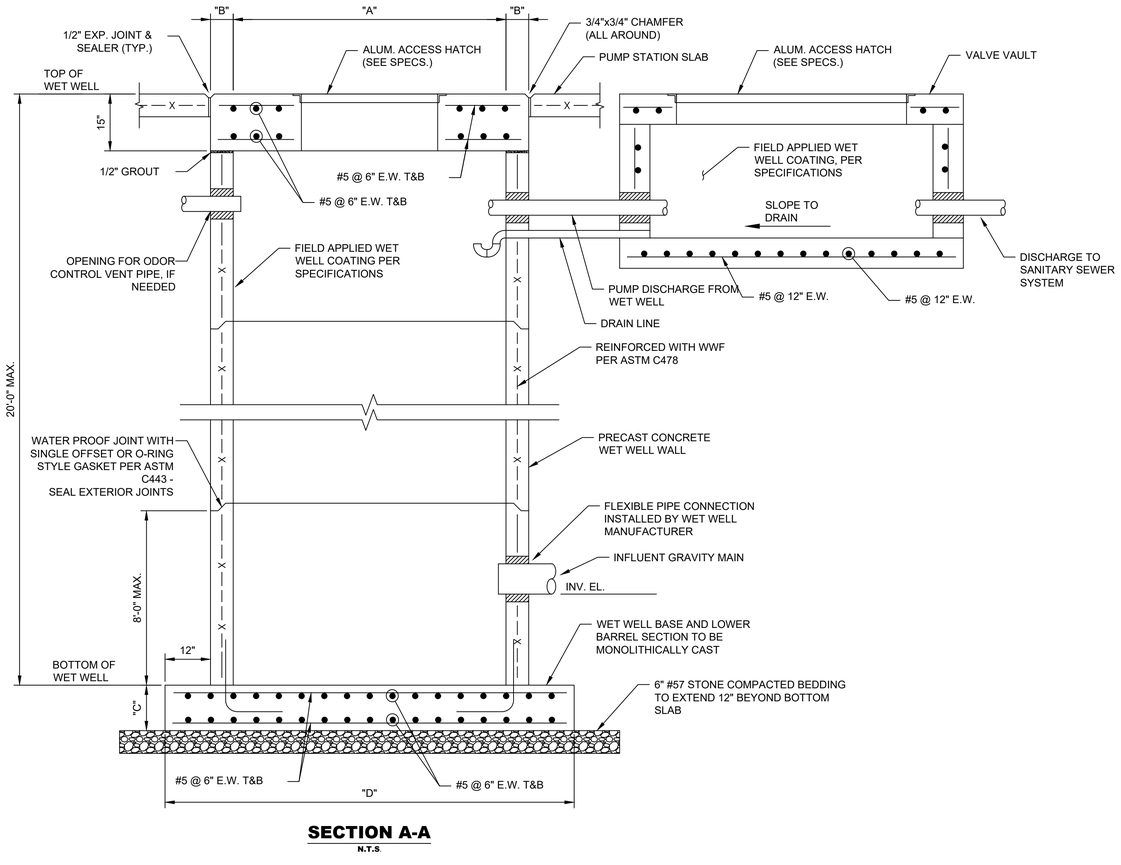
TYPICAL TOP SLAB REINFORCING PLAN
N.T.S.

WET WELL DIMENSIONS			
A	B	C	D*
6'-0"	0'-8"	1'-0"	9'-4" SQ
8'-0"	0'-9"	1'-6"	11'-6" SQ
10'-0"	0'-10"	1'-6"	13'-8" SQ

*BOTTOM SLAB DIMENSIONS ARE MINIMUMS. ADJUST AS REQUIRED PER BUOYANCY CALCULATIONS.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

STRUCTURAL NOTES

1. GENERAL

THE WET WELL DESIGN WALL THICKNESS, BOTTOM SLAB THICKNESS AND DIMENSIONS, BOTTOM SLAB EXTENSION, TOP SLAB THICKNESS AND DIMENSIONS, AND FOUNDATION BASE COURSE ARE MINIMUM DIMENSIONS. THE STRUCTURAL DESIGN IS BASED ON THE LOADS AND CONDITIONS LISTED HERE. THE PROJECT ENGINEER SHALL VERIFY THAT THE SITE CONDITIONS MEET THE DESIGN CONDITIONS, INCLUDING THE GEOTECHNICAL CONDITIONS AND FLOTATION CALCULATIONS. IF THE SITE CONDITIONS VARY FROM THE DESIGN CONDITIONS, THE ENGINEER SHALL MODIFY THE DESIGN AS NEEDED.

CONTRACTOR SHALL COORDINATE ALL PIPE AND CONDUIT LOCATIONS WITH MECHANICAL AND ELECTRICAL DRAWINGS PRIOR TO PLACING CONCRETE. STRUCTURAL DRAWINGS SHALL BE COORDINATED WITH MECHANICAL AND ELECTRICAL DRAWINGS TO PROPERLY LOCATE WILL PIPES, PIPE SLEEVES, ANCHOR BOLTS, BLOCKOUTS, ETC. DISCREPANCIES SHALL BE BROUGHT THE ATTENTION OF THE ENGINEERING DEPARTMENT BEFORE PROCEEDING WITH THE WORK.

REFER TO THE SPECIFICATIONS FOR ITEMS NOT INCLUDED ON THE DRAWING.

SHOP DRAWINGS AND CALCULATIONS SHALL BE PROVIDED PER CITY OF CLEARWATER AND PROJECT SPECIFICATION REQUIREMENTS.

2. DESIGN CRITERIA AND LOADS

ACI 350 CONCRETE SANITARY ENGINEERING STRUCTURES
ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE
ASTM C478 STANDARD SPECIFICATION FOR CIRCULAR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS
ASTM C433 STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE PIE AND MANHOLES USING RUBBER GASKETS

WET WELL TOP SLAB LIVE LOAD AASHTO HS20-44
ALLOWABLE SOIL BEARING CAPACITY 1,500 PSF (MINIMUM)

3. CAST-IN-PLACE CONCRETE

CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4,000 PSI. CONCRETE AT WET WELLS AND VALVE VAULTS SHALL CONTAIN XYPEX B10-SAN C500 ADMIXTURE.

4. PRECAST CONCRETE

PRECAST WET WELL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4,000 PSI.

5. REINFORCING STEEL

REINFORCING STEEL FOR ALL BARS SHALL CONFORM TO ASTM A615, GRADE 60.

WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

SHEET INDEX

SHEET #	SHEET DESCRIPTION
1	COVER SHEET
2	240V SINGLE PHASE, SINGLE PUMP LIFT STATION 0.5 TO 10 HP ELECTRICAL STANDARDS
3	240V SINGLE PHASE, SINGLE PUMP LIFT STATION EQUIPMENT RACK ELEVATION
4	TYPICAL PUMP CONTROL CABINET, DFS CABINET & JUNCTION BOX DETAILS
5	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM
6	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS
7	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
8	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
9	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
10	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
11	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
12	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
13	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
14	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
15	TYPICAL LIFT STATION ONE LINE DIAGRAMS
16	ELECTRICAL SCHEDULES AND LOAD CALCULATIONS
17	TYPICAL LIFT STATION ELECTRICAL DETAILS
18	CONDUIT AND CABLE SCHEDULE AND PANEL SCHEDULE
19	INSTRUMENTATION LEGEND ABBREVIATIONS AND SYMBOLS
20	TYPICAL LIFT STATION P&IDs

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

INDEX 802:
PUMP STATION STANDARD ELECTRICAL DETAILS
240V 1-PH, SINGLE PUMP 1.5 TO 10 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

$ SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:

NEUTRAL WIRE

ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

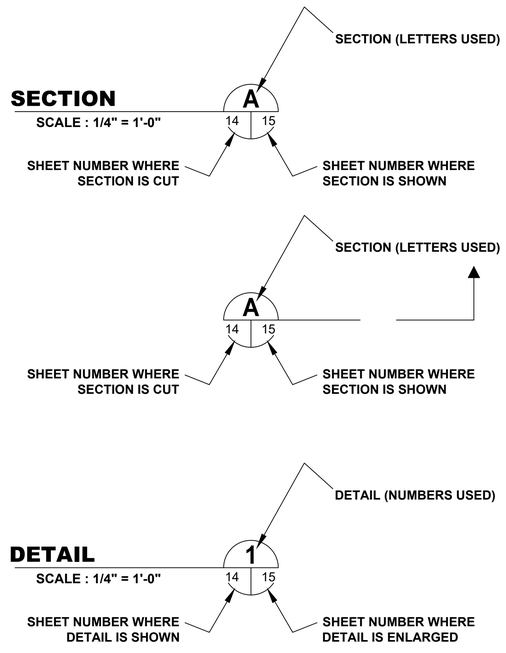
PUMP THERMAL SENSOR

FAN THERMOSTAT

ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL



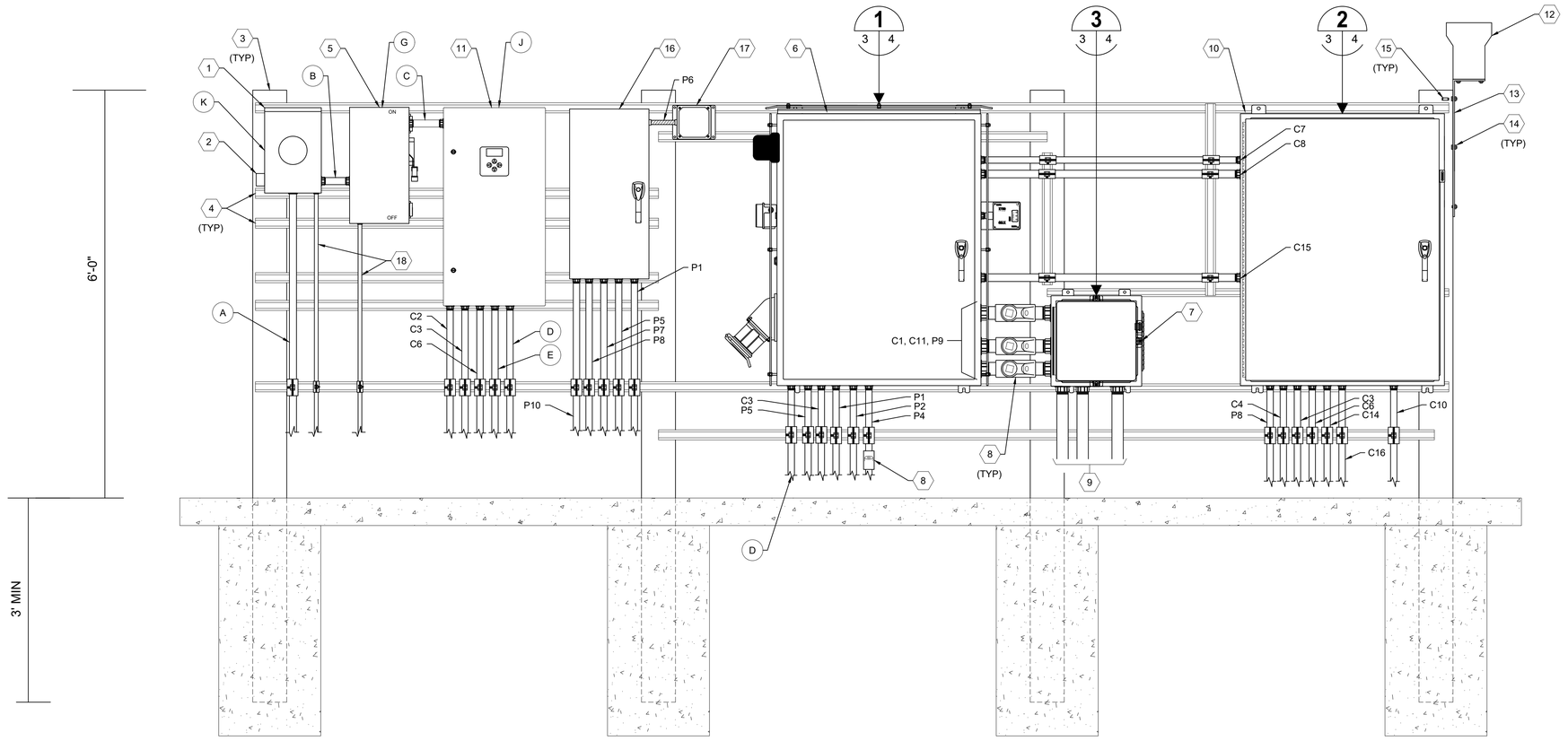
CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, SINGLE PUMP 1.5 TO 10 HP

240V SINGLE PHASE, SINGLE PUMP STATION EQUIPMENT RACK ELEVATION

INDEX NO.	PAGE NO.
802	2 OF 20
LATEST REVISION	11/2022



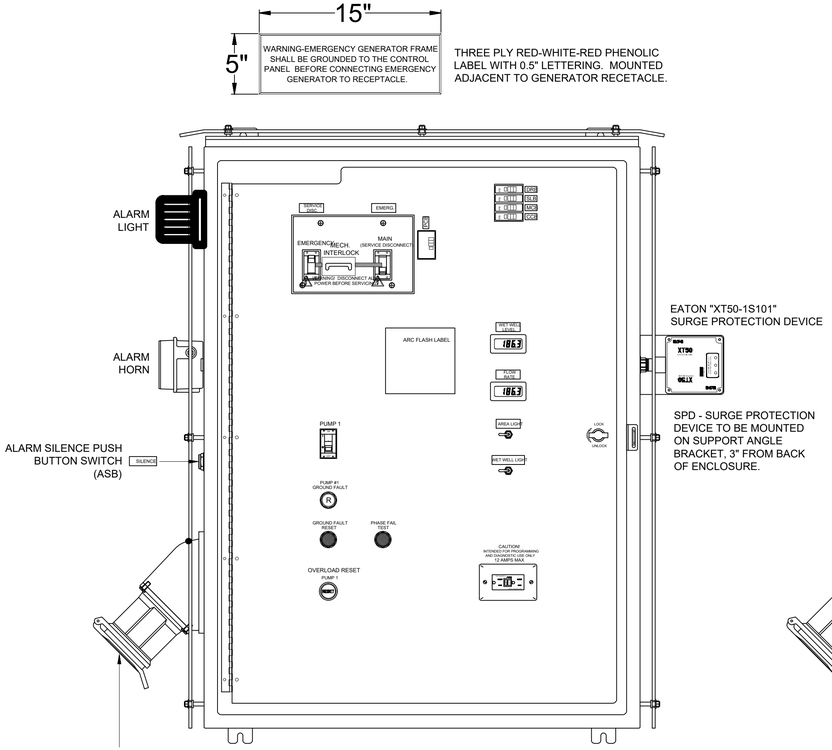
240V 3-PHASE SINGLE PUMP STATION
EQUIPMENT RACK FRONT SIDE ELEVATION
SCALE : NONE

KEYED NOTES:

1. PROVIDE AND INSTALL METER SOCKET. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. COORDINATE REQUIREMENTS WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
3. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
4. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
5. PROVIDE AND INSTALL 2-POLE, 240V, FUSED DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. DISCONNECT SHALL BE PAD-LOCKABLE.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAIL ON SHEET 4.
7. PROVIDE AND INSTALL NEW 16" x 16" x 6" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 4.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12, C13 AND P11. CABLES FOR PUMP MOTORS, LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.
10. DATA FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 4.
11. PROVIDE AND INSTALL NEW 240V, 2-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH (ATS). REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
12. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
13. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
14. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
15. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).
16. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
17. PROVIDE AND INSTALL SURGE PROTECTION DEVICE (SPD) UNIT, 120/240V, 3Ø, TYPE 1, ASCO SERIES 400, IN NEMA 4X ENCLOSURE.
18. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN 1" CONDUIT.

GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. PROVIDE CONDUIT AND CONDUCTOR BETWEEN PUMP CONTROL PANEL AND NEW DFS RTU ENCLOSURE AS REQUIRED (NOT SHOWN FOR CLARITY).



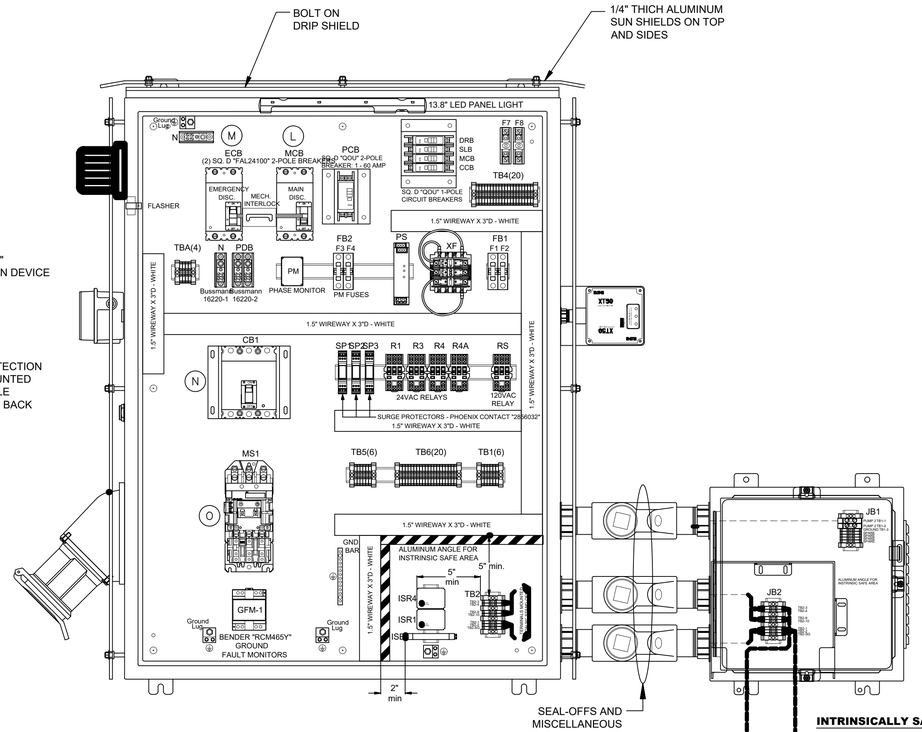
PUMP CONTROL PANEL DETAIL (1)

SCALE : N.T.S.

INNER DOOR VIEW
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:
HAMMOND HW483612S16HK (48"H x 36"W x 12"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD, PAD-LOCKING HASP AND 0.25" THICK ALUMINUM SUN SHIELDS ON TOP AND SIDES. OUTER DOOR SHALL HAVE ROLLER CAM TYPE 3-POINT, PAD-LOCKABLE HANDLE, WELDED ON STUDS FOR PRINT POCKET AND 90° STOP.

INNER DOOR:
HID-4836, 0.125 BLACK ENGRAVED ALUMINUM WITH CONTINUOUS HINGE, TWIST LATCHES, AND 90° STOP.



PUMP CONTROL PANEL BACK PANEL

SCALE : N.T.S.

BACK PANEL:
HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

INTRINSICALLY SAFE NOTES:

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.

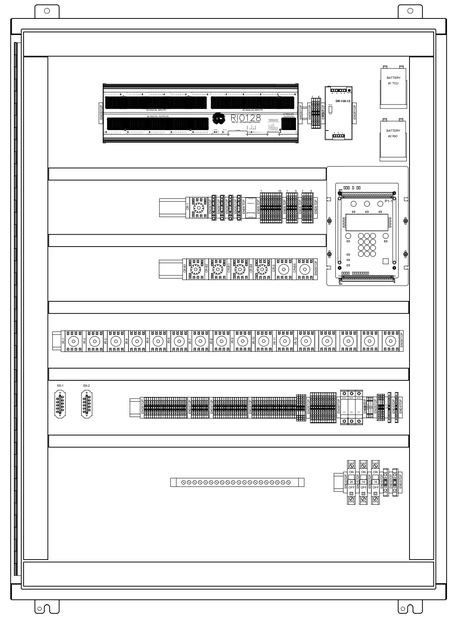
JUNCTION BOX ENCLOSURE DETAIL (3)

SCALE : N.T.S.

JUNCTION BOX:
HAMMOND 1418N4S16G6 (16"H x 16"W x 6"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD AND INTEGRAL 12 GA. INNER PANEL. OUTER DOOR SHALL HAVE STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:
HAMMOND EP1616 (14.2"H x 14.2"W) FABRICATED FROM 12 GA. WHITE ENAMELED STEEL.

LOUVER:
WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



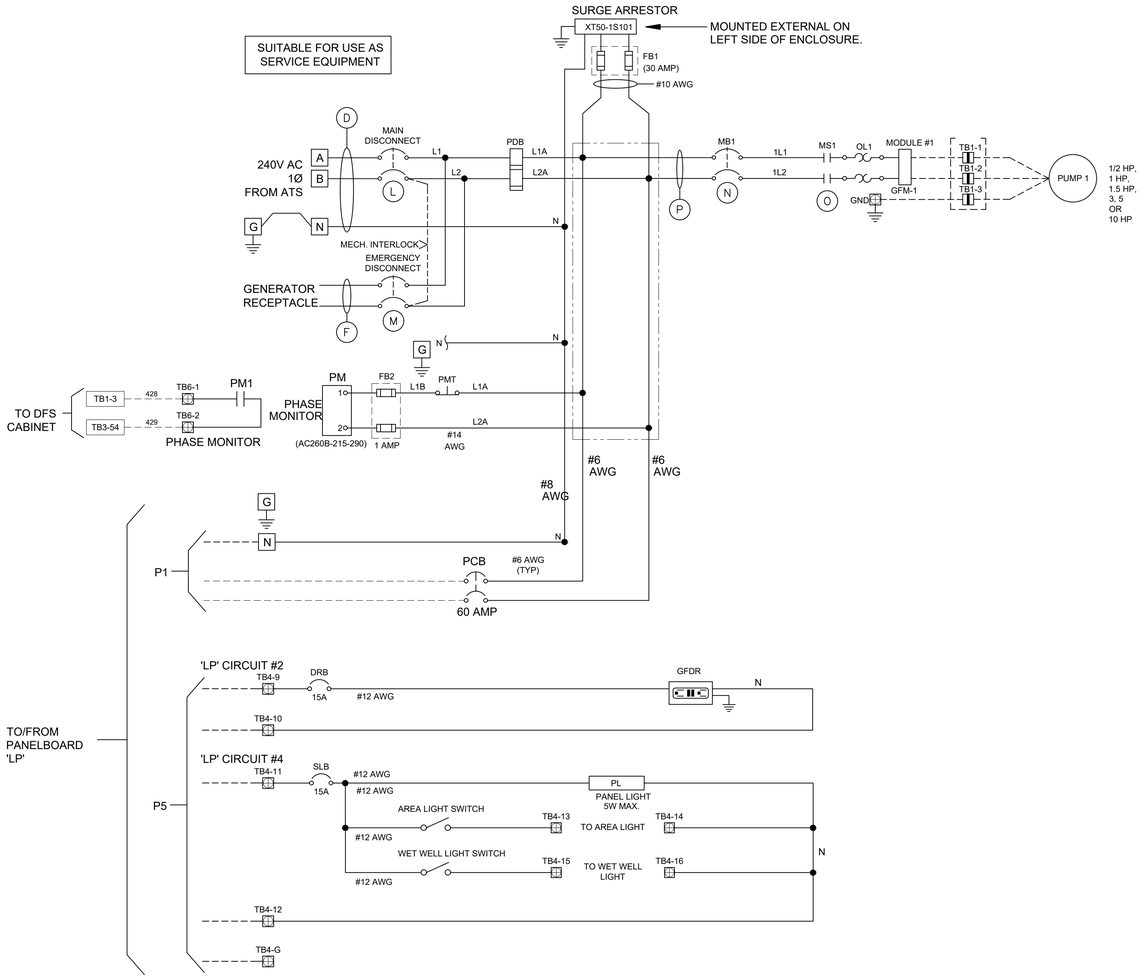
DFS CABINET DETAIL (2)

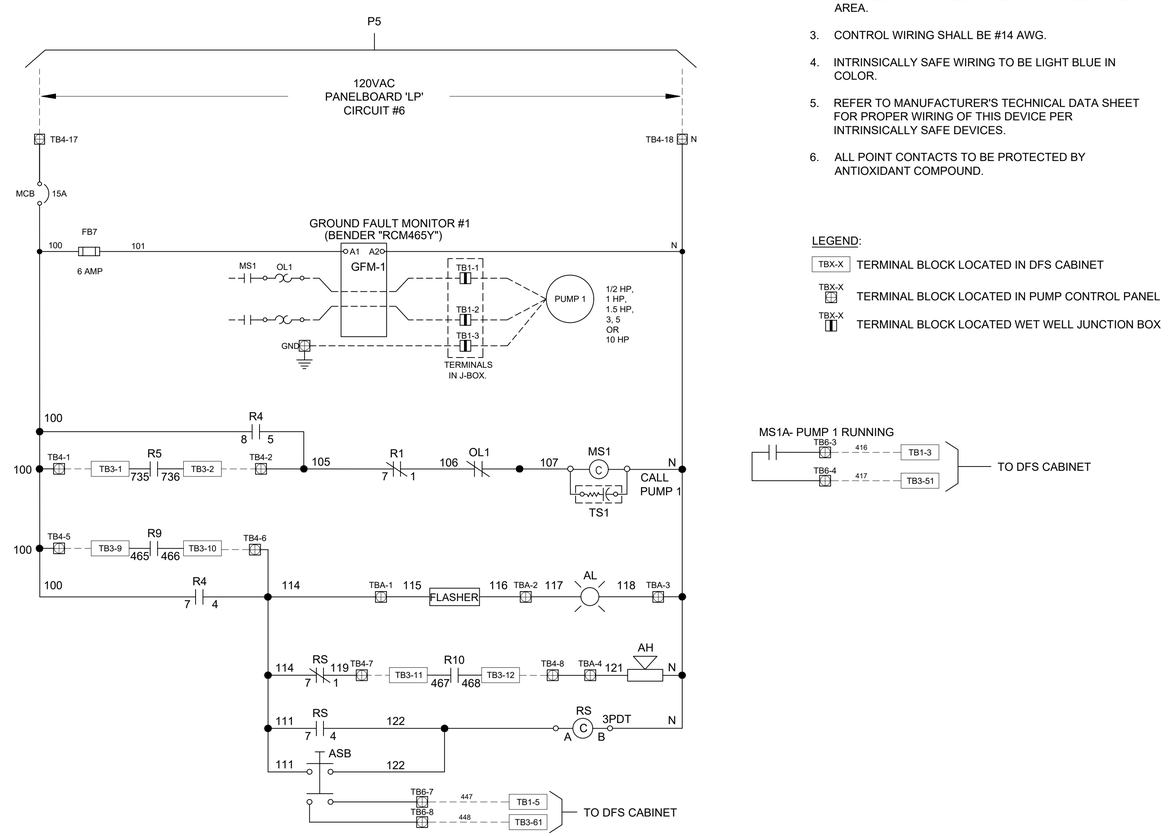
SCALE : N.T.S.

TCU ENCLOSURE:
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:
HAMMOND HW483612GYHK (48"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

BACK PANEL:
HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.



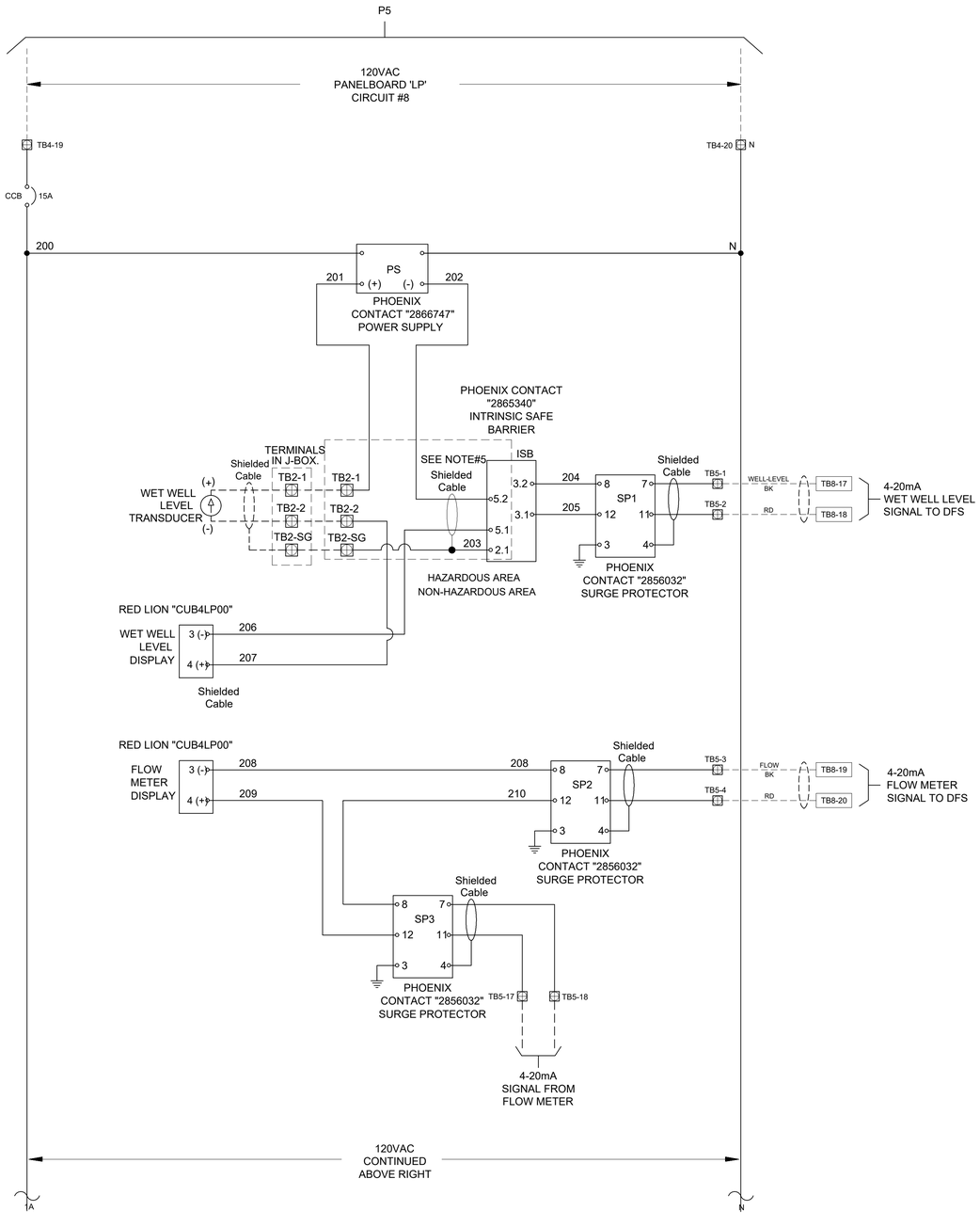


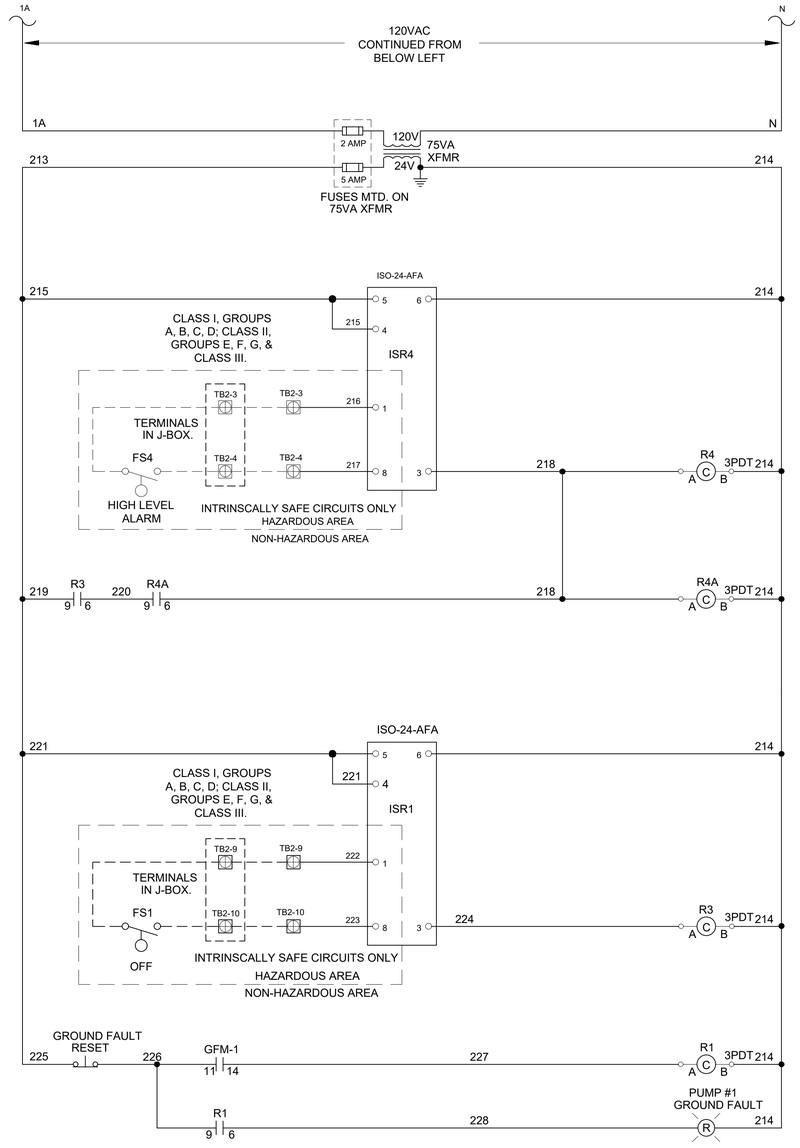
NOTES:

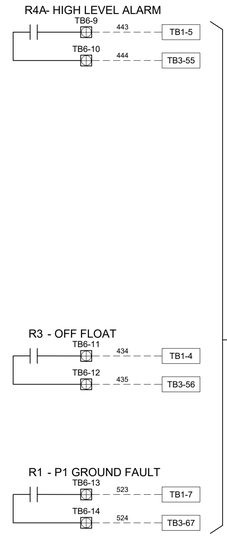
1. PANEL SHALL BE U.L. 698A LABELED FOR HAZARDOUS LOCATIONS AND SERVICE ENTRANCE RATED.
2. ANTENNA CABLE SURGE SUPPRESSOR SHALL NOT BE LOCATED OR MOUNTED IN THE INTRINSICALLY SAFE AREA.
3. CONTROL WIRING SHALL BE #14 AWG.
4. INTRINSICALLY SAFE WIRING TO BE LIGHT BLUE IN COLOR.
5. REFER TO MANUFACTURER'S TECHNICAL DATA SHEET FOR PROPER WIRING OF THIS DEVICE PER INTRINSICALLY SAFE DEVICES.
6. ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX







LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

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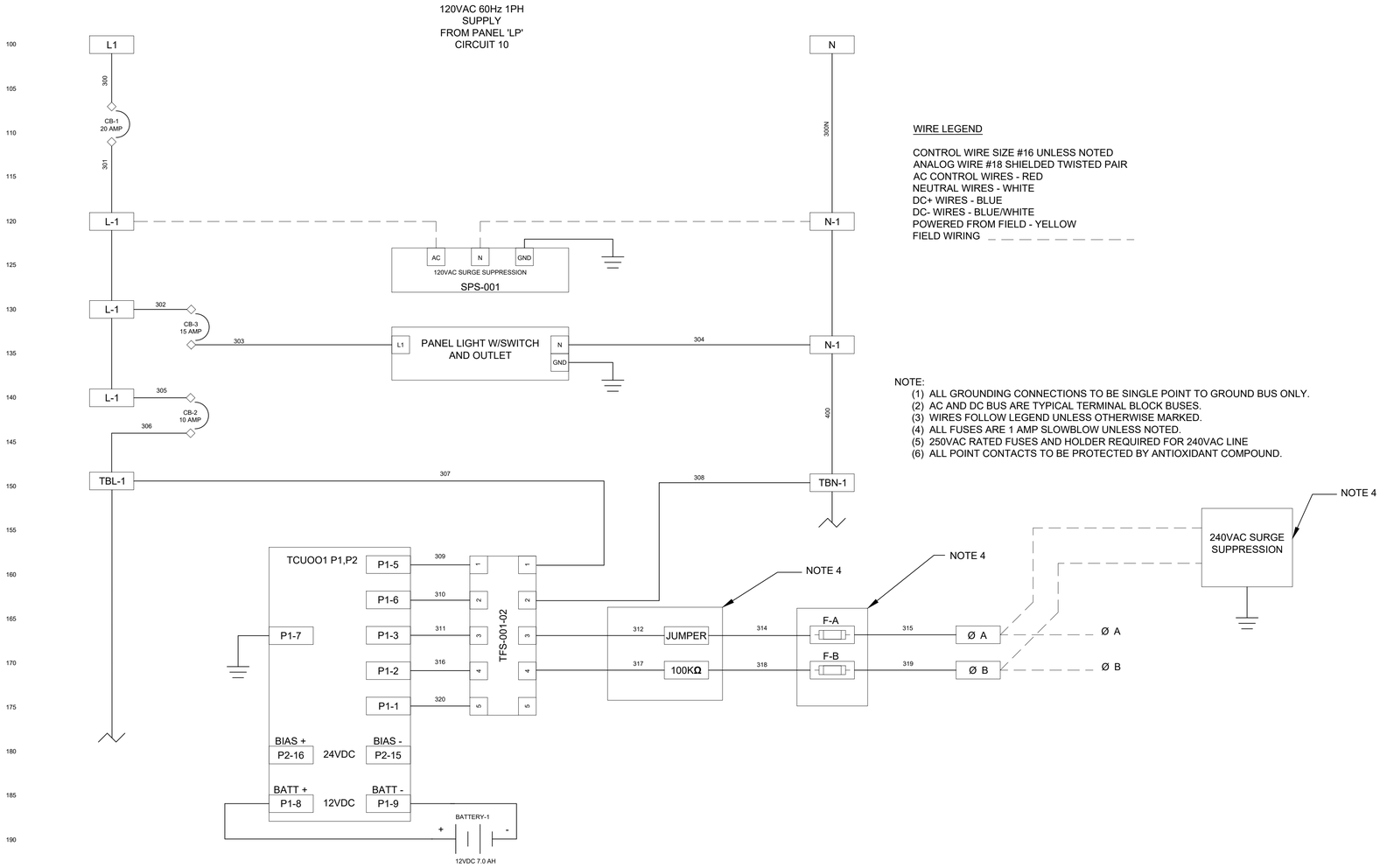
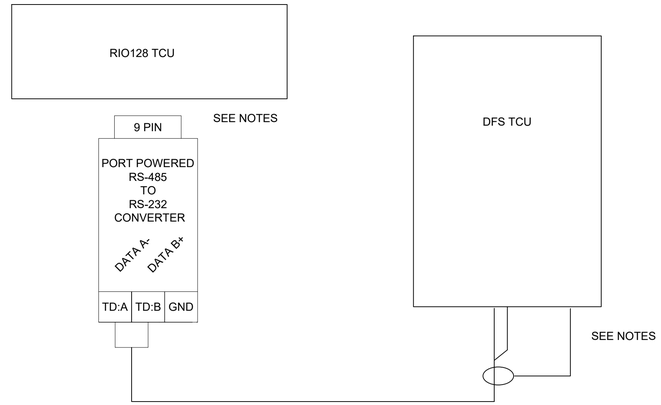


WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5

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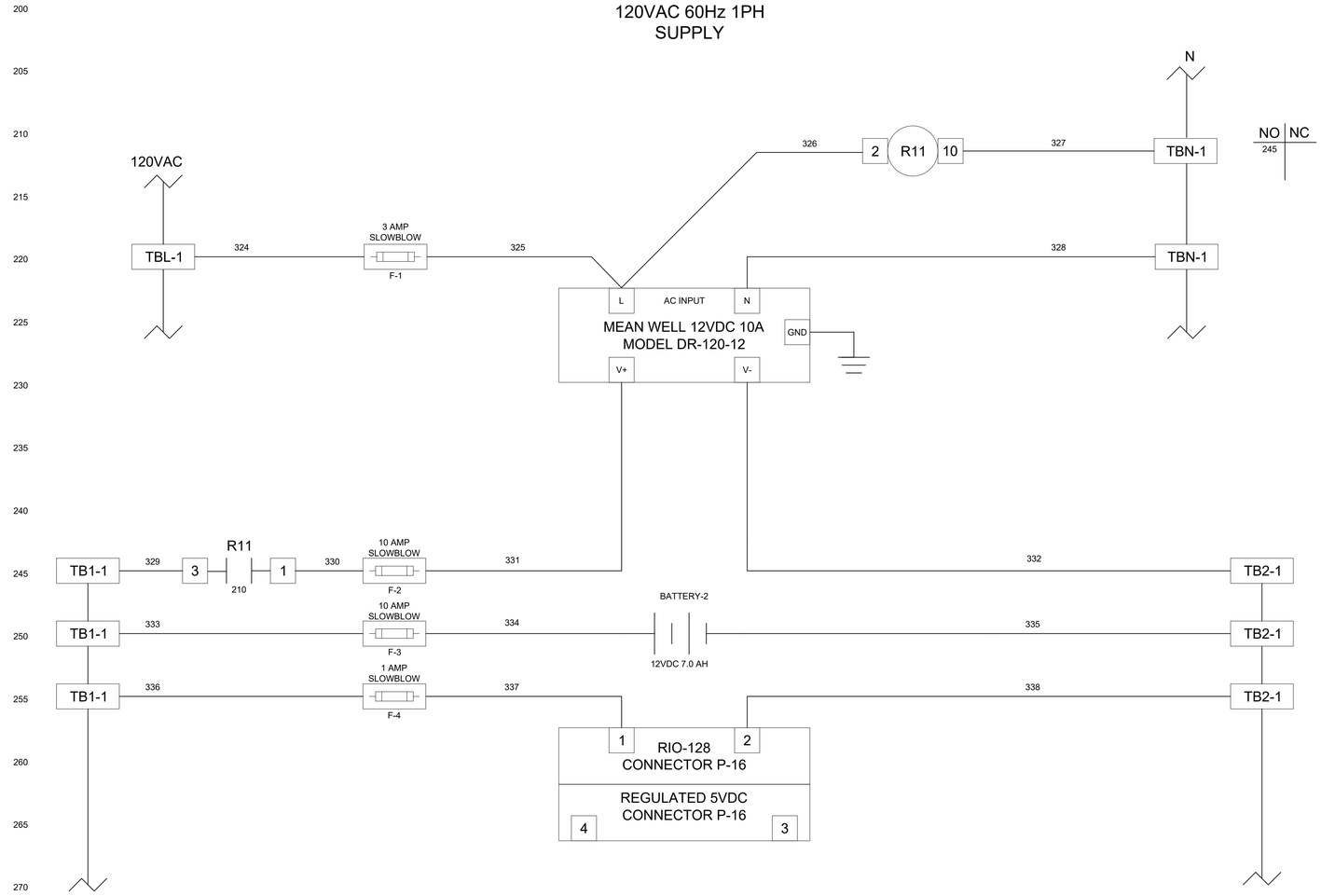
2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, SINGLE PUMP 1.5 TO 10 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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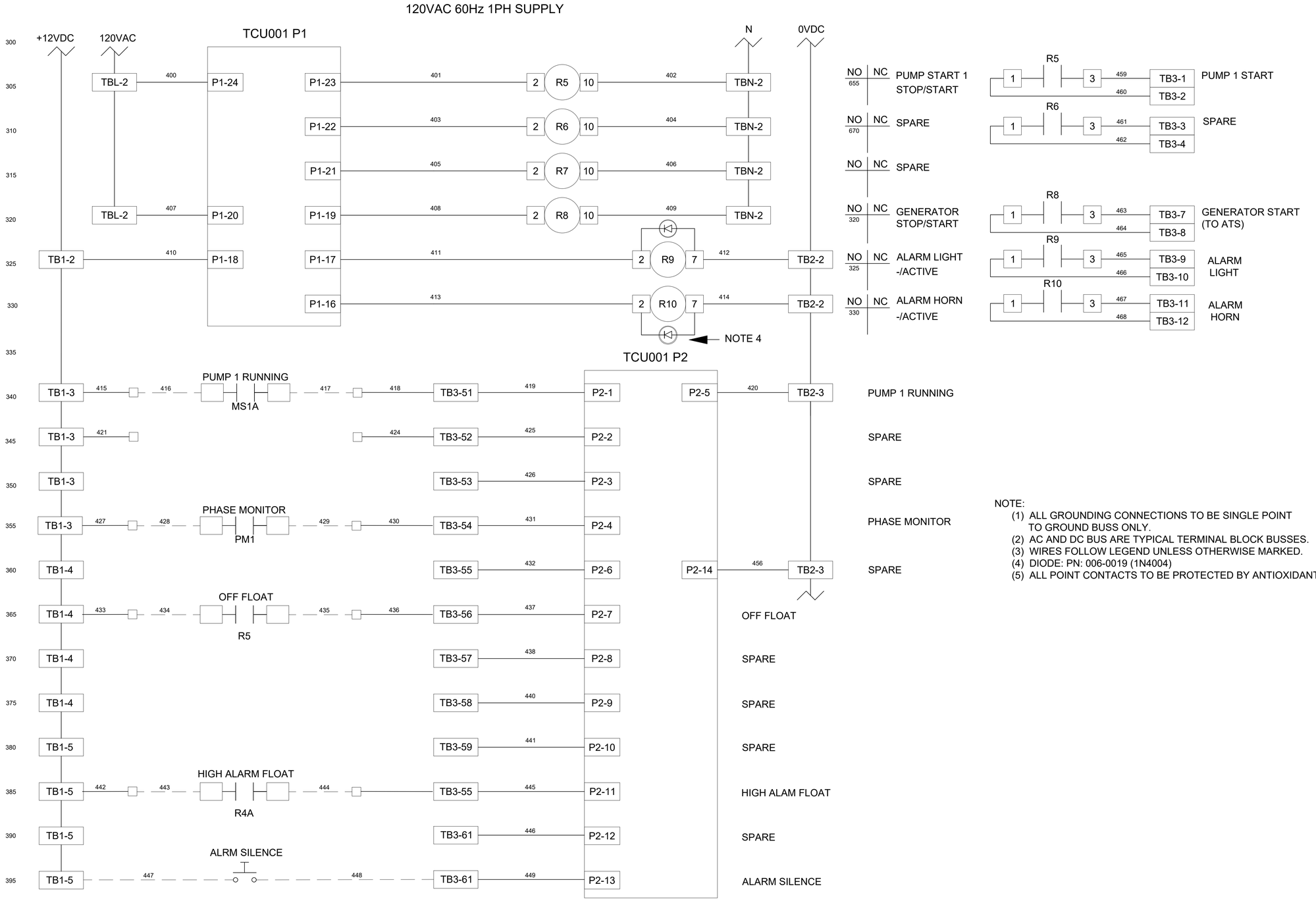

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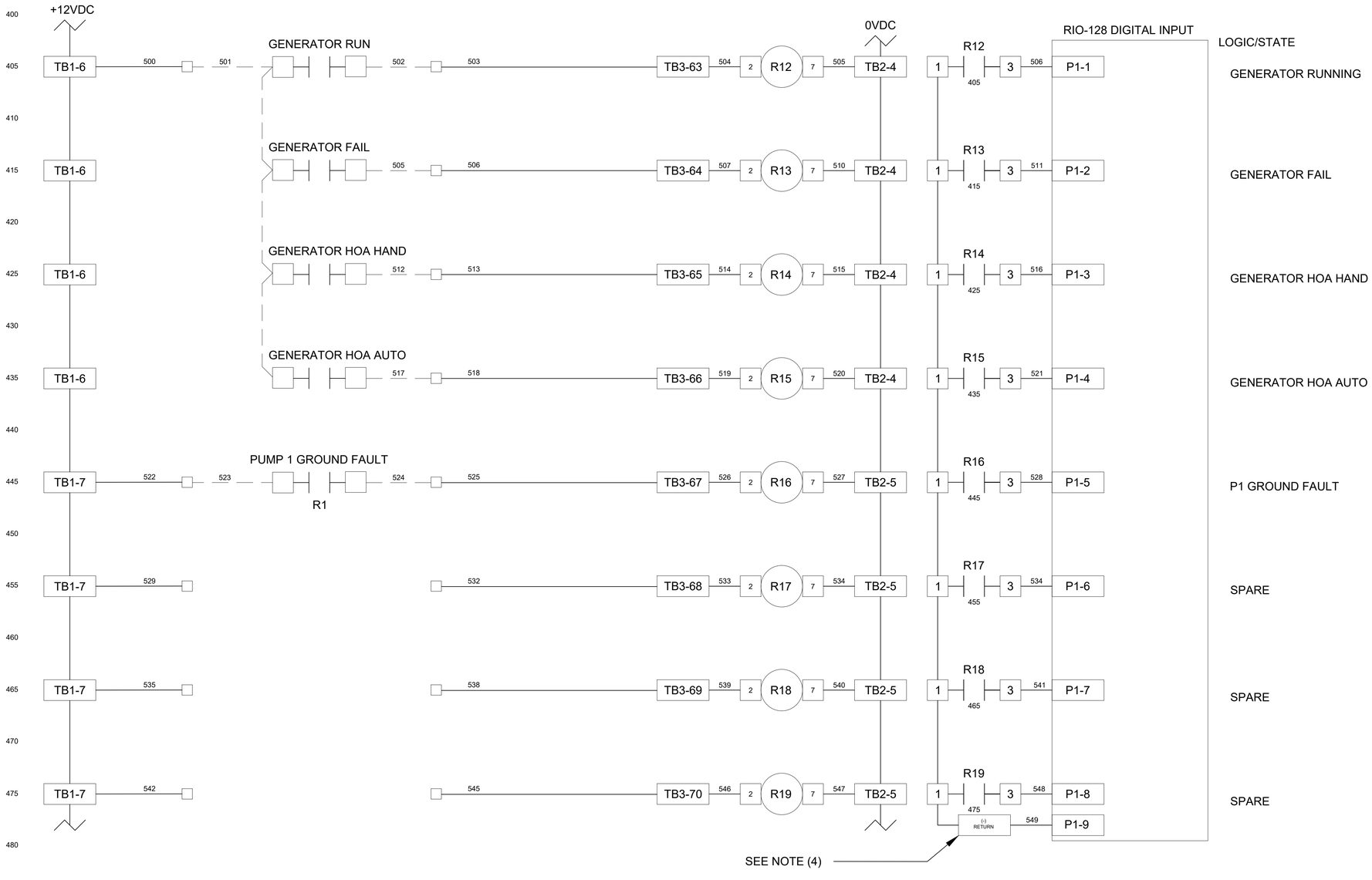
LATEST REVISION	11/2022



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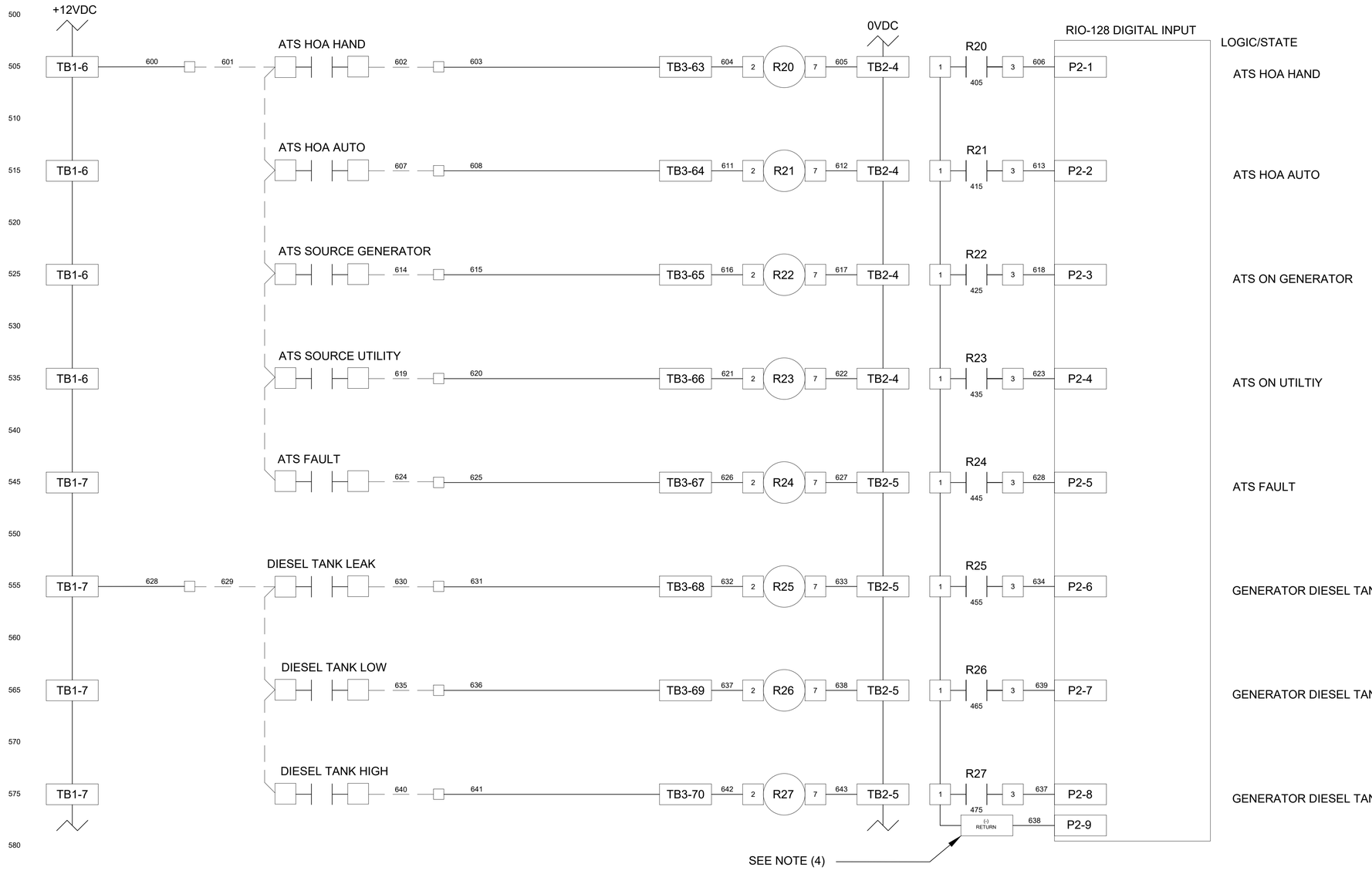

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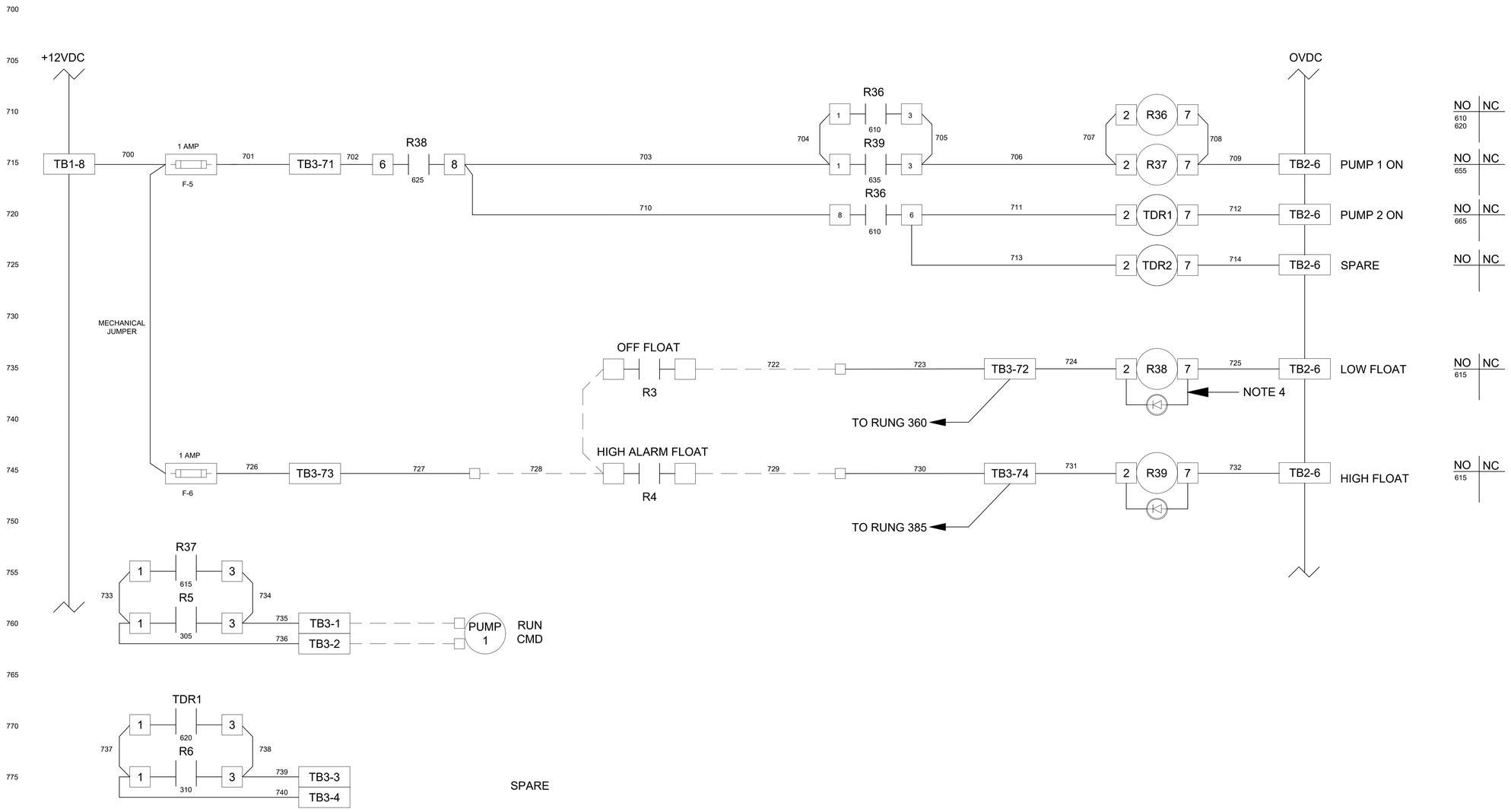

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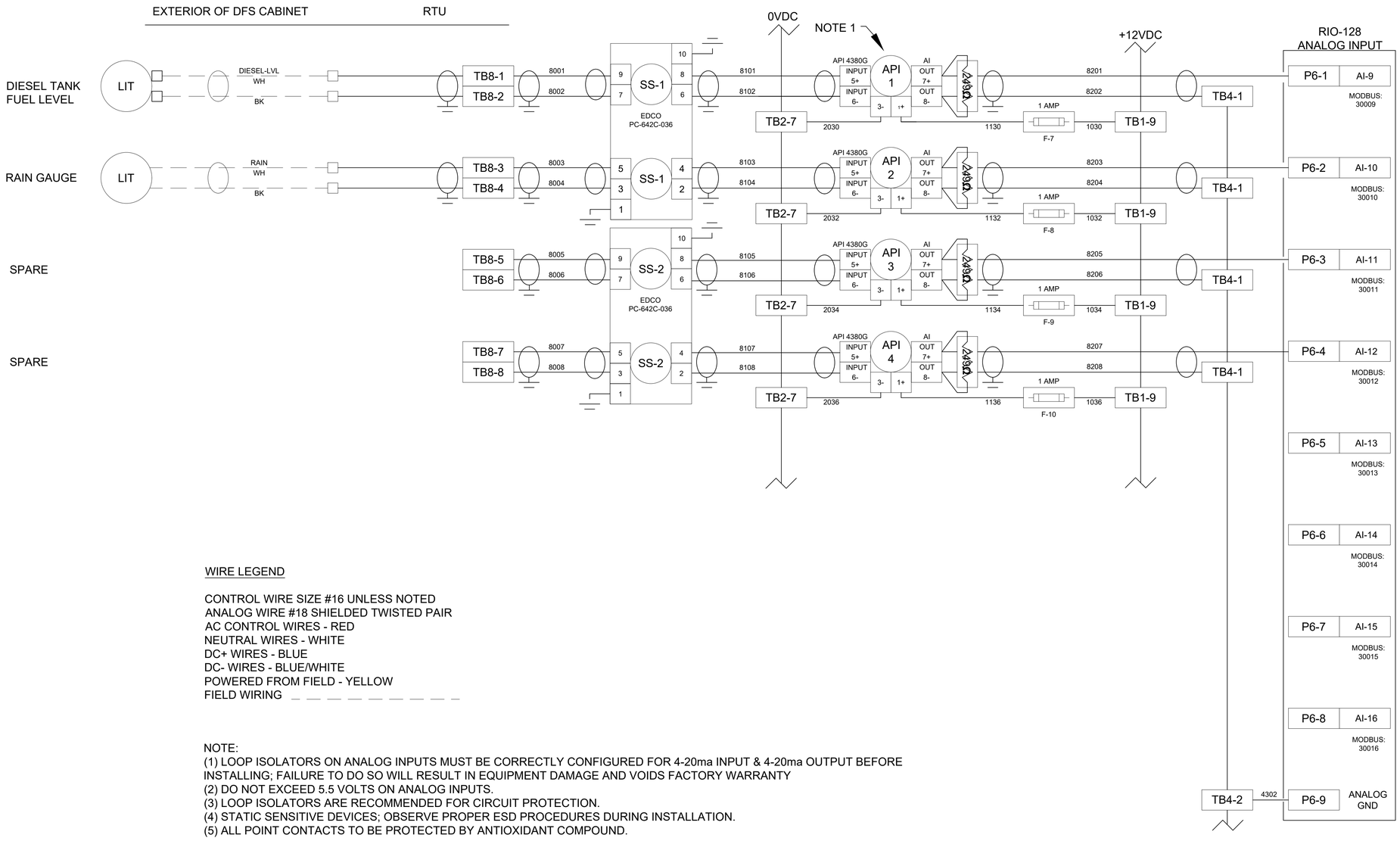

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(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
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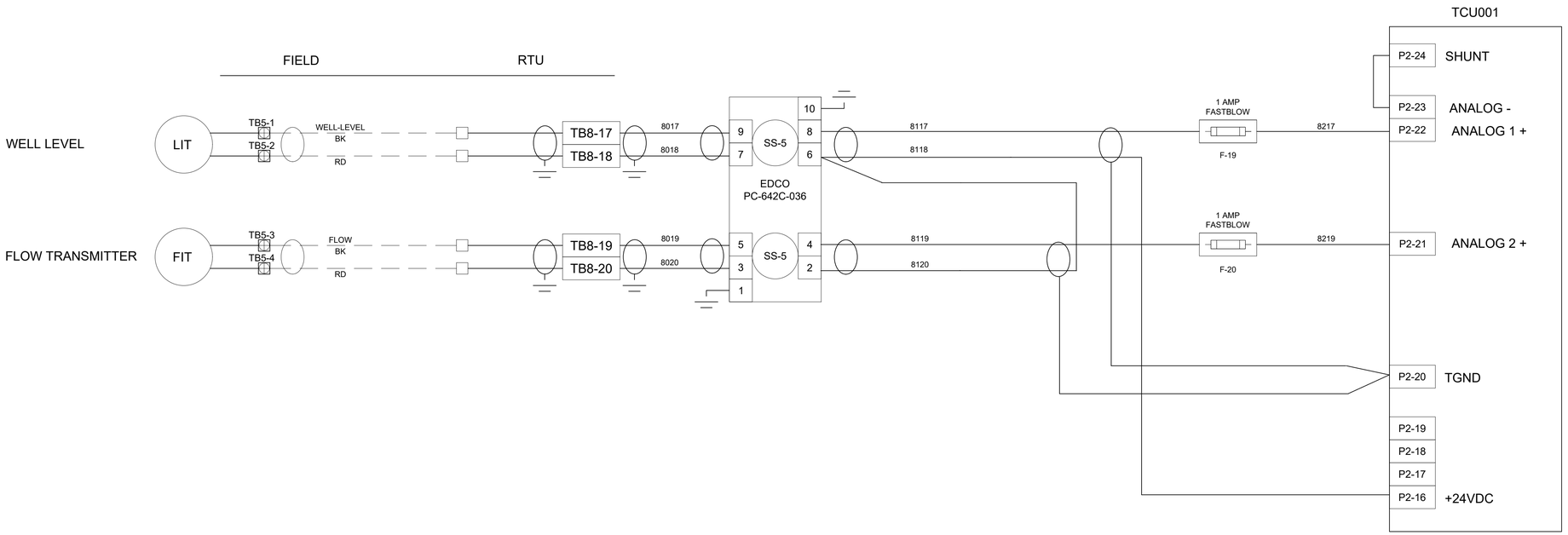

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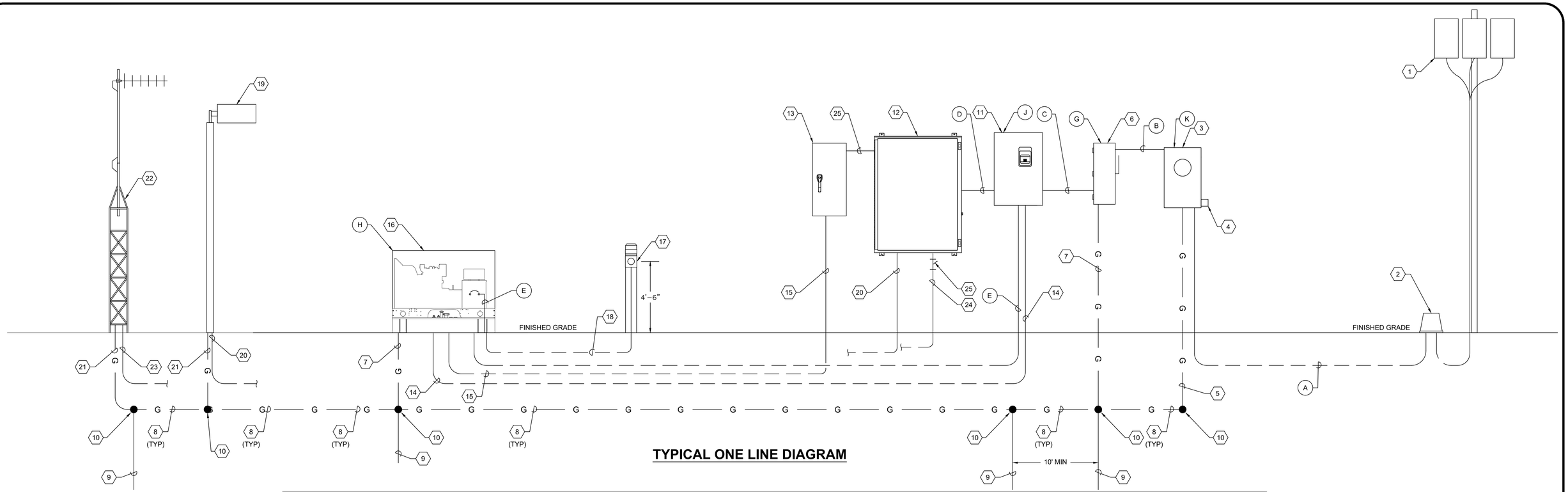


TYPICAL ONE LINE DIAGRAM

ONE LINE DIAGRAM NOTES:

1. UTILITY TRANSFORMERS. COORDINATE ALL WORK WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED PEDESTAL.
3. PROVIDE AND INSTALL NEW 240V, SINGLE PHASE, METER SOCKET. GROUND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE NEW ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH UTILITY. REFER TO SCHEDULE FOR SIZE REQUIRED PER SITE.
4. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
5. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR. COORDINATE REQUIREMENTS WITH UTILITY.
6. PROVIDE AND INSTALL NEW 240, 3-POLE DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. PROVIDE SOLID NEUTRAL AND GROUND LUG KITS TO MAKE DISCONNECT SERVICE ENTRANCE RATED. REFER TO SCHEDULE FOR AMPERE AND FUSING REQUIREMENTS.
7. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR.
8. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
9. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
10. EXOTHERMIC WELD.
11. PROVIDE AND INSTALL 2-POLE, S/N, 240V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SCHEDULE FOR SIZE.
12. PROVIDE AND INSTALL PUMP CONTROL PANEL.
13. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
14. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
15. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
16. PROVIDE AND INSTALL NEW 240V, 1Ø, 3-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
17. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
18. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
19. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
20. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
21. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
22. NEW DFS ANTENNA.
23. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
24. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
25. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT.

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	1/2 HP STATIONS		1 HP STATIONS		1.5 HP STATIONS		3 HP LIFT STATIONS		5 HP LIFT STATIONS		10 HP LIFT STATIONS			
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	FROM:	TO:
(A)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL	1-1/2" C.	UTILITY	METER
(B)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	METER	MAIN DISCONNECT
(C)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	MAIN DISCONNECT	ATS
(D)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	ATS	PUMP CONTROL PANEL
(E)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	ATS	GENERATOR SET
(F)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND		PUMP CONTROL PANEL	GENERATOR RECEPTACLE
(P2)	2-#12 THWN CU + 1-#12 THWN CU GND		2-#12 THWN CU + 1-#12 THWN CU GND		2-#12 THWN CU + 1-#12 THWN CU GND		2-#10 THWN CU + 1-#10 THWN CU GND		2-#8 THWN CU + 1-#10 THWN CU GND		2-#6 THWN CU + 1-#8 THWN CU GND		PUMP CONTROL PANEL	WET WELL JUNCTION BOX

EQUIPMENT						NOTES:
(G)	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	ALL DISCONNECTS SHALL BE PADLOCKABLE
(H)	240V, 1Ø, 30 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 1Ø, 30 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 1Ø, 30 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 1Ø, 30 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 1Ø, 30 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 1Ø, 30 KW GENERATOR WITH 125 AMPERE MAIN CIRCUIT BREAKER	
(J)	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 125 AMPERE TRANSFER SWITCH	
(K)	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	125 AMPERE, 240V, SINGLE PHASE METER	
PUMP CONTROL PANEL							NOTES:
(L)	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	125 AMPERE MAIN CIRCUIT BREAKER	
(M)	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	125 AMPERE EMERGENCY CIRCUIT BREAKER	
(N)	15 AMP MOTOR CIRCUIT BREAKER	15 AMP MOTOR CIRCUIT BREAKER	20 AMP MOTOR CIRCUIT BREAKER	35 AMP MOTOR CIRCUIT BREAKER	60 AMP MOTOR CIRCUIT BREAKER	90 AMP MOTOR CIRCUIT BREAKER	
(O)	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	
(P)	#12 AWG CU MOTOR CONDUCTORS	#12 AWG CU MOTOR CONDUCTORS	#12 AWG CU MOTOR CONDUCTORS	#10 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	#6 AWG CU MOTOR CONDUCTORS	

LOAD CALCULATION: 1/2 HP

MOTORS:
PUMP NO. 1: 1/2 HP, 240 VAC, 1 Ø, 5.0 A
+ 25% OF LARGEST MOTOR 1.2 A
SUB-TOTAL 6.2 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 26.2 A

SERVICE SIZE:
100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 1 HP

MOTORS:
PUMP NO. 1: 1 HP, 240 VAC, 1 Ø, 8.0 A
+ 25% OF LARGEST MOTOR 2.0 A
SUB-TOTAL 10.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 30.0 A

SERVICE SIZE:
100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 1.5 HP

MOTORS:
PUMP NO. 1: 1.5 HP, 240 VAC, 1 Ø, 10.0 A
+ 25% OF LARGEST MOTOR 2.5 A
SUB-TOTAL 12.5 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 32.5 A

SERVICE SIZE:
100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 3 HP

MOTORS:
PUMP NO. 1: 3 HP, 240 VAC, 1 Ø, 17.0 A
+ 25% OF LARGEST MOTOR 4.3 A
SUB-TOTAL 21.3 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 41.3 A

SERVICE SIZE:
100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 5 HP

MOTORS:
PUMP NO. 1: 5 HP, 240 VAC, 1 Ø, 28.0 A
+ 25% OF LARGEST MOTOR 7.0 A
SUB-TOTAL 35.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 55.0 A

SERVICE SIZE:
100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

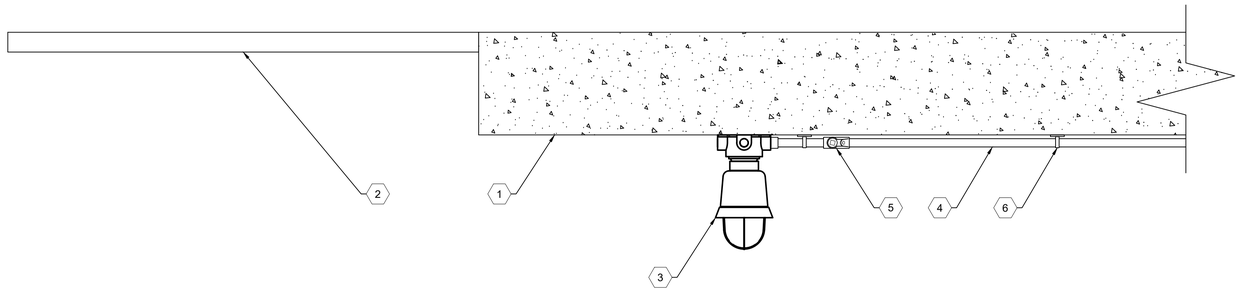
LOAD CALCULATION: 10 HP

MOTORS:
PUMP NO. 1: 1 HP, 240 VAC, 1 Ø, 50.0 A
+ 25% OF LARGEST MOTOR 12.5 A
SUB-TOTAL 72.5 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 92.5 A

SERVICE SIZE:
125 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

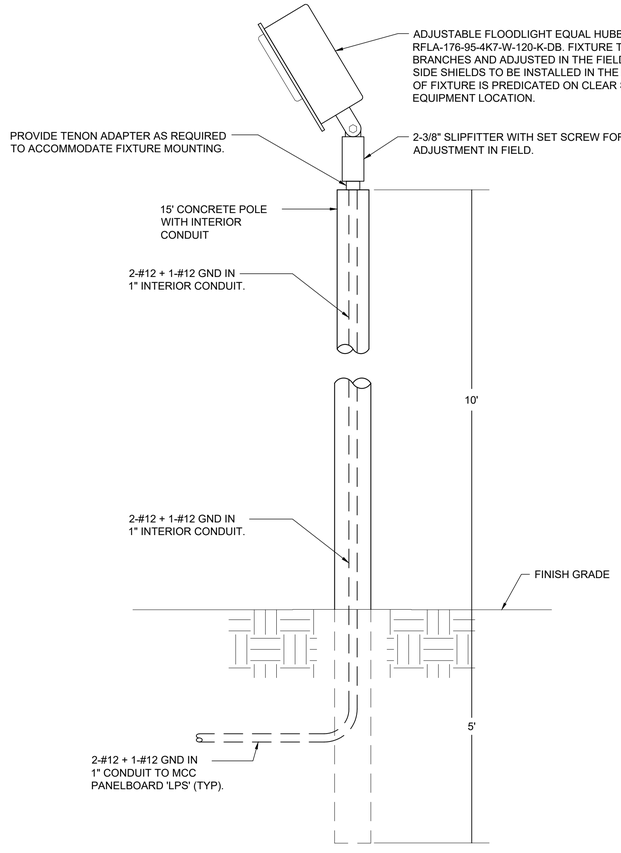


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL. CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	1-1/4"	2-#6 + 1-#6 NEU + 1-#8 GND	PUMP CONTROL PANEL	PANELBOARD 'LP'	
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	QUANTITY OF AREA LIGHTS DIFFERS BETWEEN LS 54 AND LS 65.
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	3/4"	2-#10 + 1-#10 NEU + 1-#10 GND	PANELBOARD 'LP'	PANELBOARD 'LP' SURGE PROT	CONNECT SURGE PROTECTION DEVICE VIA NON-METALLIC FLEXIBLE CONDUIT.
P7	1"	6-#12 + 2-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P8	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P9	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #1 POWER.
P10	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P11	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #1 POWER.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1"	TWO (2) 2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	DFS CABINET	4-20mA FLOW METER SIGNAL AND LEVEL TRANSMITTER SIGNAL. BOTH CABLES SHALL BE BELDEN 8719.
C8	1-1/4"	12-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/4"	14-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C16	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. QO ; 120/240 VOLTS, 1Ø, 3W ; 60 AMP MAIN CIRCUIT BREAKER ; 35K AIC RATING ; SURFACE ENCLOSURE TOP AT 5'-6" AFF

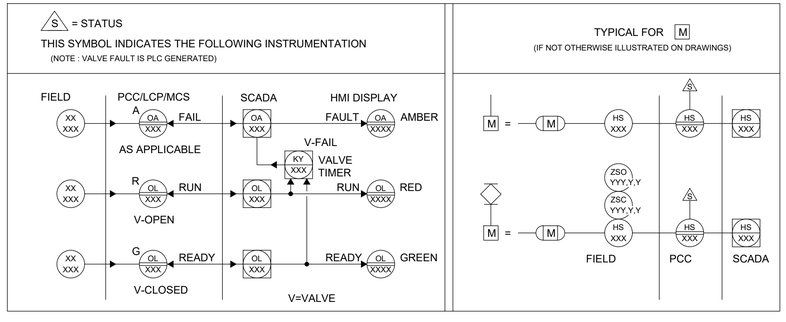
EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE		CIRC.	CIRC.	KVA/PHASE		CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	NO.	NO.	A	B	POLE	AMPS	FRAME	
SURGE PROTECTION DEVICE	2	30	QOB	.		1	2	0.8		1	20	QOB	PUMP CONTROL PANEL RECEPTACLE
" "	-	-	-		.	3	4		1.0	1	20	QOB	PUMP CONTROL PANEL LIGHTS
GENERATOR BLOCK HEATER	2	20	QOB	1.2		5	6	0.4		1	20	QOB	PUMP CONTROL PANEL CONTROLS
" "	-	-	-		1.2	7	8		0.4	1	20	QOB	PUMP CONTROL PANEL CONTROLS
GENERATOR ALTERNATOR HEATER	1	20	QOB	0.8		9	10	0.6		1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB		1.0	11	12		.				SPACE
FLOW METER TRANSMITTER	1	20	QOB	0.2		13	14	.		--	--	--	SPACE
SPARE	1	20	QOB		.	15	16		.	--	--	--	SPACE
SUB-TOTAL KVA				2.2	2.2			1.8	1.4				

TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS					
	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK — D —— D —

RADIO LINK — R —— R —

FIBER OPTIC DATA — F —— F —

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT
SP = SET POINT INPUT
C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DISCRETE INPUT
DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO
S/S = START/STOP
SEL = SELECTOR
O/C = OPEN/CLOSE
O/O = ON/OFF
LOS = LOCKOUT-START
LOR = LOCAL-OFF-REMOTE
OAC = OPEN-AUTO CLOSE
CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN
O/R = OVERRIDE
MCS = MASTER CONTROL STATION
VFD = VARIABLE FREQUENCY DRIVE
PCC = PROCESS CONTROL CABINET
LCP = LOCAL CONTROL PANEL
ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN
E = ENGINE
G = GENERATOR
F = FILTER
GS = GRINDER/SCREEN
K = COMPRESSOR
H = HOIST
ME = MECHANICAL EQUIPMENT
MX = MIXER
P = PUMP
T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

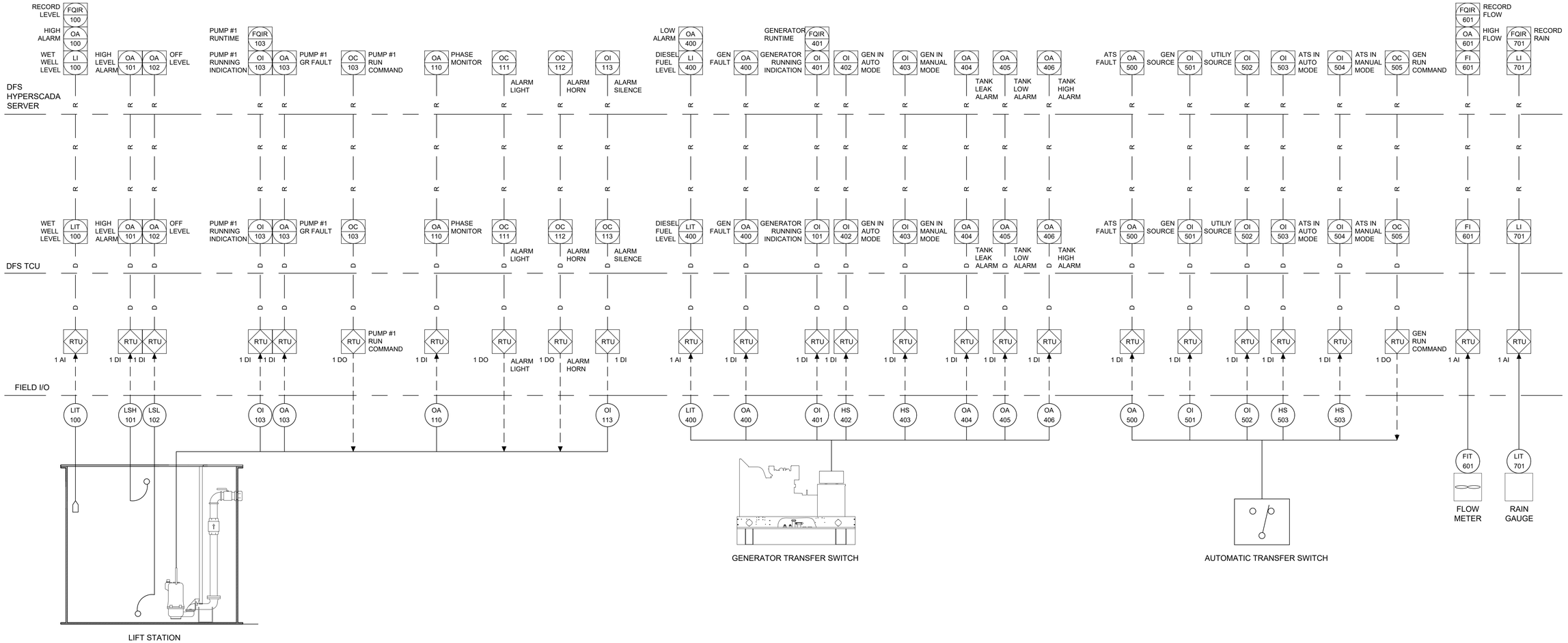
SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.
PLC - PROGRAMMABLE LOGIC CONTROL
SA - SURGE SUPPRESSOR DEVICE

I — INTERLOCK

I-3 — CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊡	OR	⊡⊡	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊡	OR	⊡⊡	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, SINGLE PUMP 1.5 TO 10 HP

TYPICAL LIFT STATION P&ID'S

INDEX NO.	PAGE NO.
802	20 OF 20
LATEST REVISION	11/2022

SHEET INDEX

SHEET #	SHEET DESCRIPTION
1	COVER SHEET
2	240V SINGLE PHASE, DUPLEX PUMP LIFT STATION 1 TO 7.5 HP ELECTRICAL STANDARDS
3	240V SINGLE PHASE, DUPLEX PUMP STATION EQUIPMENT RACK ELEVATION
4	TYPICAL PUMP CONTROL PANEL, DFS CABINET AND JUNCTION BOX DETAILS
5	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM
6	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS
7	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
8	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
9	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
10	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
11	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
12	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
13	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
14	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
15	TYPICAL LIFT STATION ONE LINE DIAGRAMS
16	ELECTRICAL SCHEDULES AND LOAD CALCULATIONS
17	TYPICAL LIFT STATION ELECTRICAL DETAILS
18	CONDUIT AND CABLE SCHEDULE AND PANEL SCHEDULE
19	INSTRUMENT LEGEND ABBREVIATIONS AND SYMBOLS
20	TYPICAL LIFT STATION P&IDs
21	TYPICAL LIFT STATION P&IDs

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

INDEX 803:
PUMP STATION STANDARD ELECTRICAL DETAILS
240V 1-PH, DUPLEX 1 TO 7.5 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

$ SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:

NEUTRAL WIRE

ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

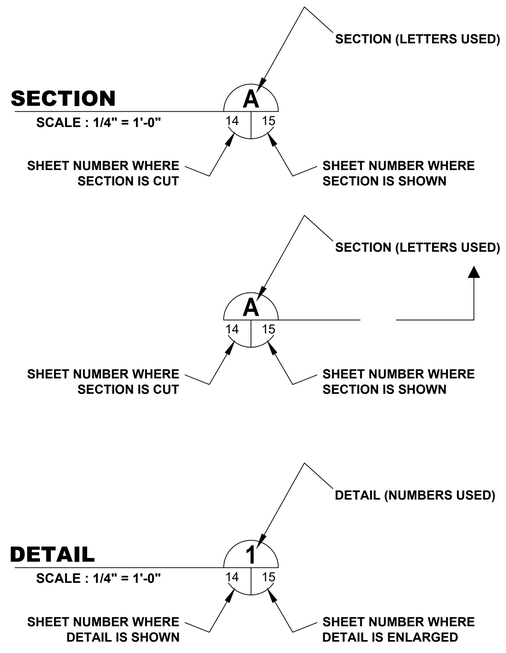
PUMP THERMAL SENSOR

FAN THERMOSTAT

ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL



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CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

240V SINGLE PHASE, DUPLEX PUMP LIFT STATION 1 TO 7.5 HP ELECTRICAL STANDARDS

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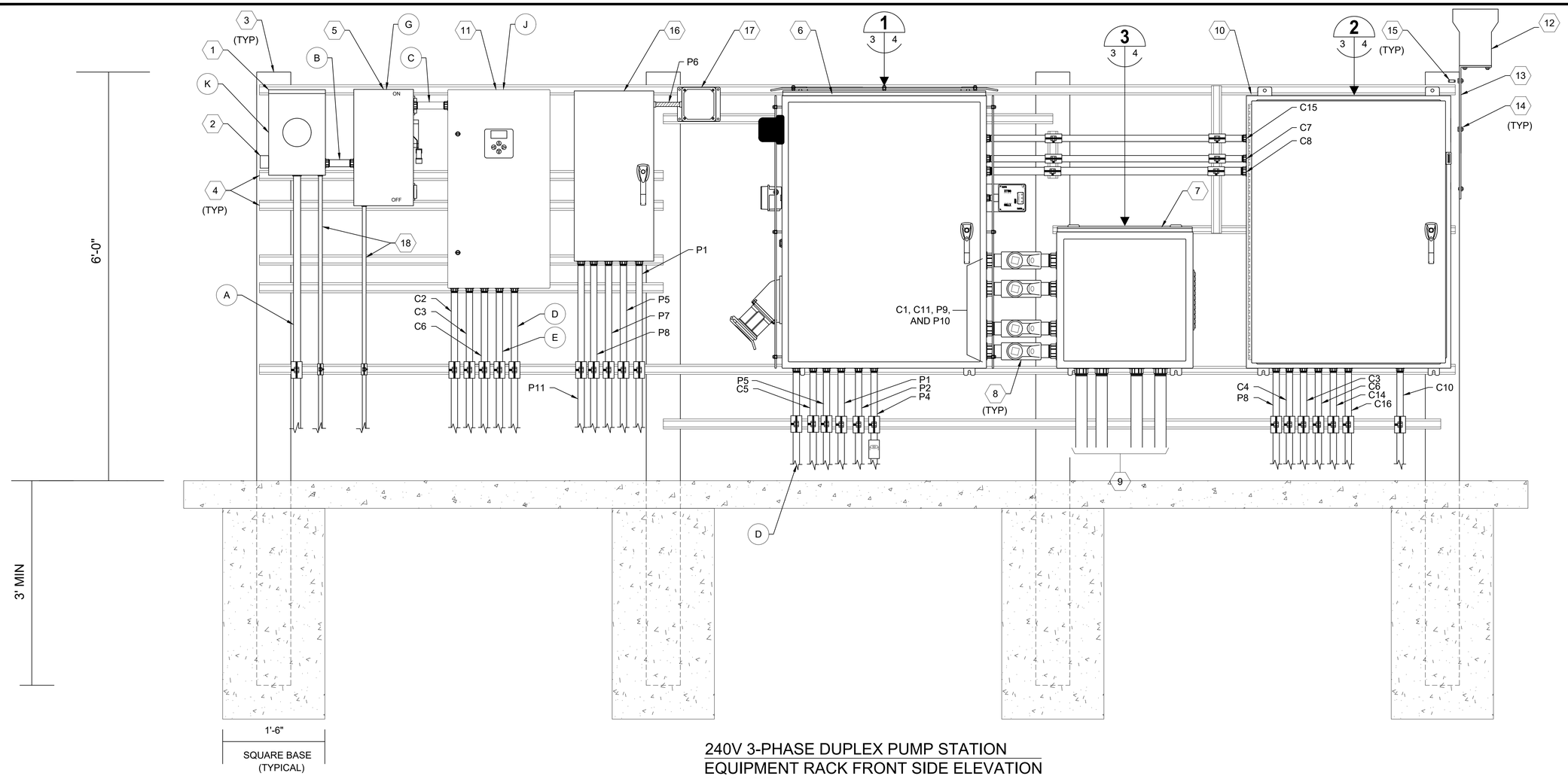


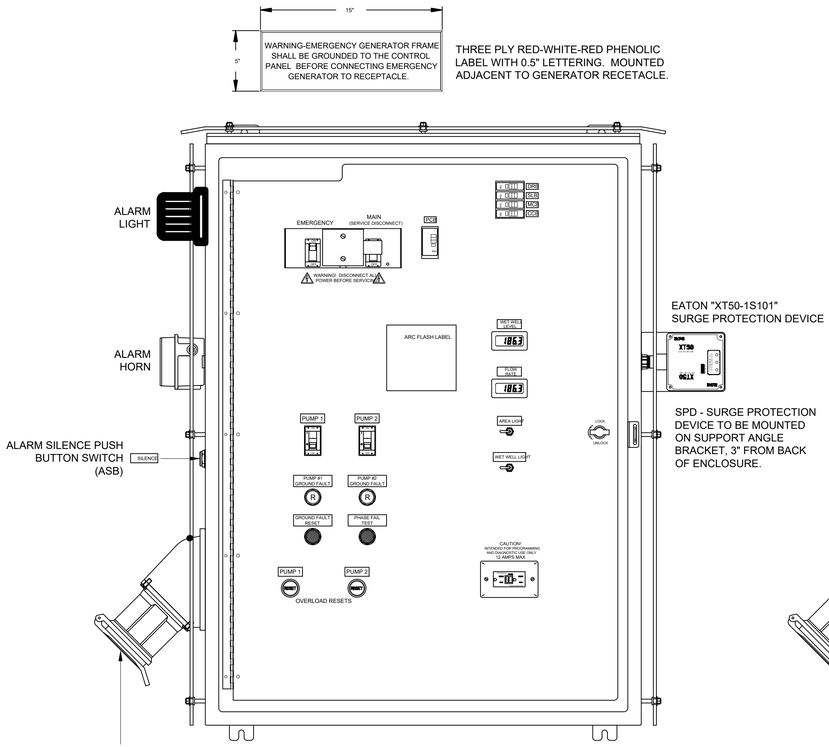
240V 3-PHASE DUPLEX PUMP STATION
EQUIPMENT RACK FRONT SIDE ELEVATION
SCALE : NONE

KEYED NOTES:

1. PROVIDE AND INSTALL METER SOCKET. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. COORDINATE REQUIREMENTS WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
3. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
4. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
5. PROVIDE AND INSTALL 2-POLE, 240V, FUSED DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. DISCONNECT SHALL BE PAD-LOCKABLE.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAIL ON SHEET 4.
7. PROVIDE AND INSTALL NEW 24" x 24" x 8" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 4.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12, C13, P12 AND P13. CABLES FOR PUMP MOTORS, LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.
10. DATA FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 4.
11. PROVIDE AND INSTALL NEW 240V, 2-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH (ATS). REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
12. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
13. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
14. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
15. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).
16. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
17. PROVIDE AND INSTALL SURGE PROTECTION DEVICE (SPD) UNIT, 120/240V, 3Ø, TYPE 1, ASCO SERIES 400, IN NEMA 4X ENCLOSURE.
18. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN 1" CONDUIT.

GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. PROVIDE CONDUIT AND CONDUCTOR BETWEEN PUMP CONTROL PANEL AND NEW DFS RTU ENCLOSURE AS REQUIRED (NOT SHOWN FOR CLARITY).



PUMP CONTROL PANEL DETAIL 1

SCALE : N.T.S.

INNER DOOR VIEW

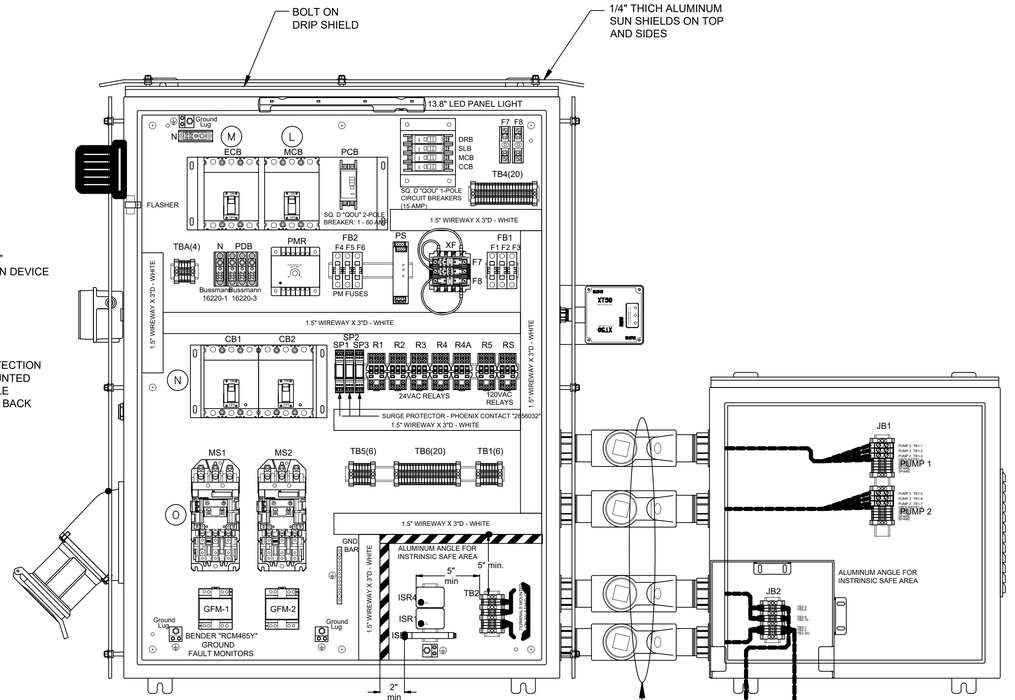
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:

HAMMOND HW483612S16HK (48"H x 36"W x 12"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD, PAD-LOCKING HASP AND 0.25" THICK ALUMINUM SUN SHIELDS ON TOP AND SIDES. OUTER DOOR SHALL HAVE ROLLER CAM TYPE 3-POINT, PAD-LOCKABLE HANDLE, WELDED ON STUDS FOR PRINT POCKET AND 90° STOP.

INNER DOOR:

HID-4836, 0.125 BLACK ENGRAVED ALUMINUM WITH CONTINUOUS HINGE, TWIST LATCHES, AND 90° STOP.

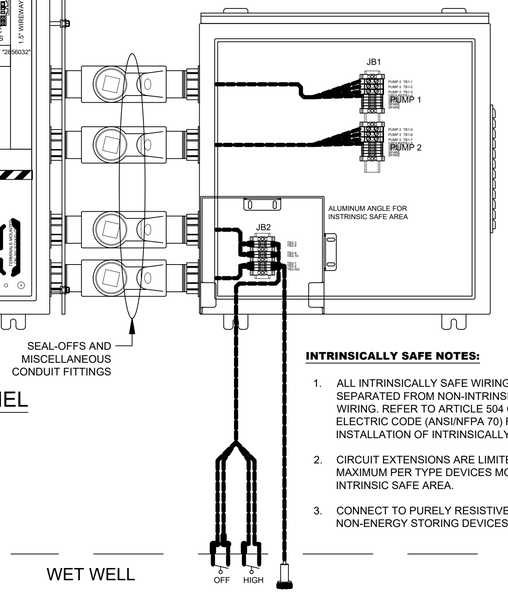


PUMP CONTROL PANEL BACK PANEL

SCALE : N.T.S.

BACK PANEL:

HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.



INTRINSICALLY SAFE NOTES:

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.

JUNCTION BOX ENCLOSURE DETAIL 3

SCALE : N.T.S.

JUNCTION BOX:

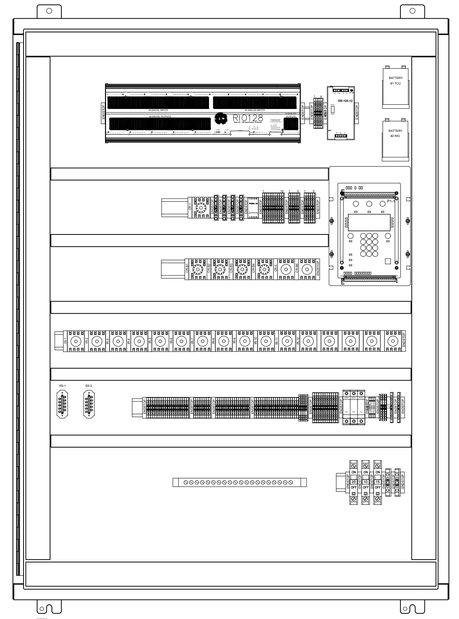
SPN4SS6-24248 (24"H x 24"W x 8"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD. OUTER DOOR HAS STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:

SPP-2424 (21"H x 21"W) FABRICATED FROM 12GA. WHITE ENAMELED STEEL.

LOUVER:

WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



DFS CABINET DETAIL 2

SCALE : N.T.S.

TCU ENCLOSURE:

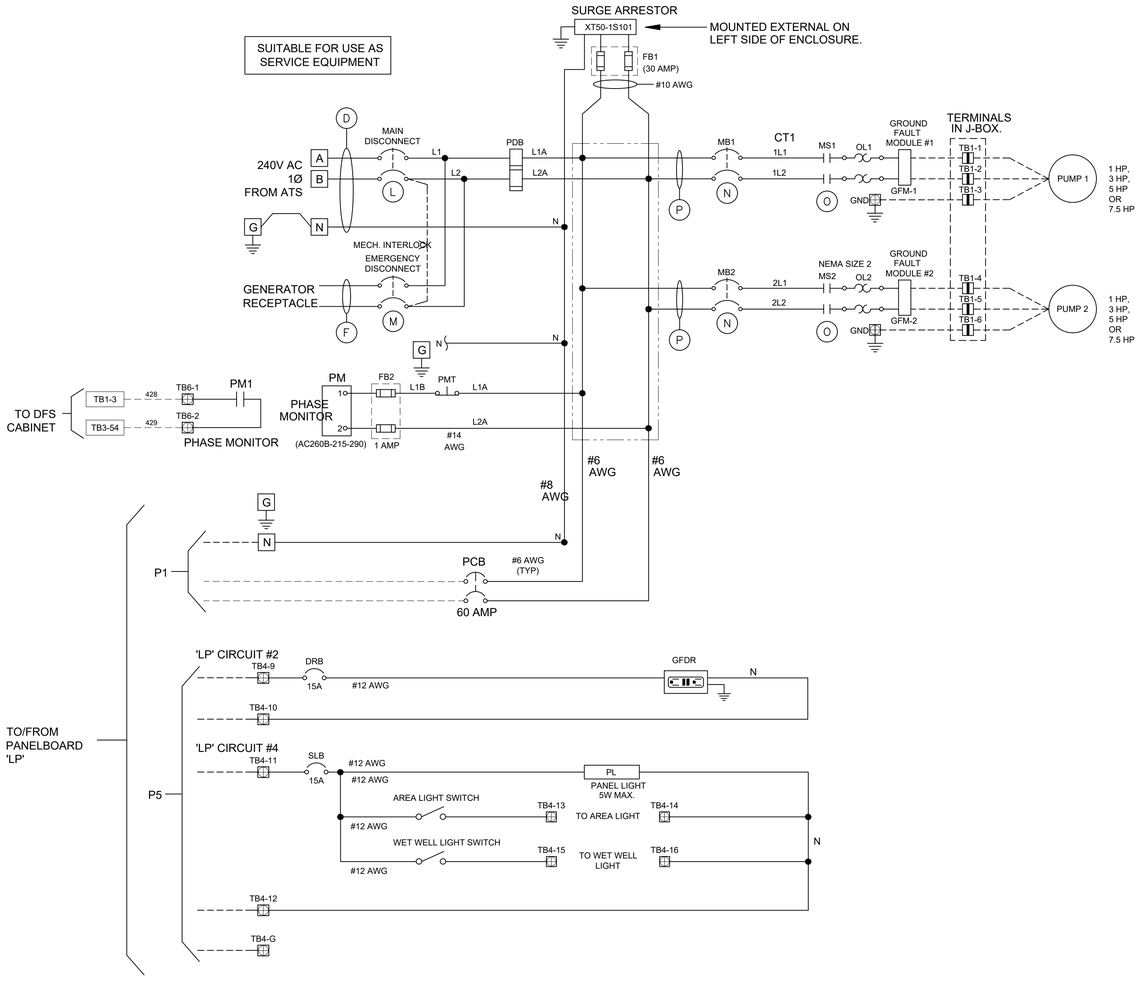
(OUTER DOOR REMOVED FOR CLARITY)

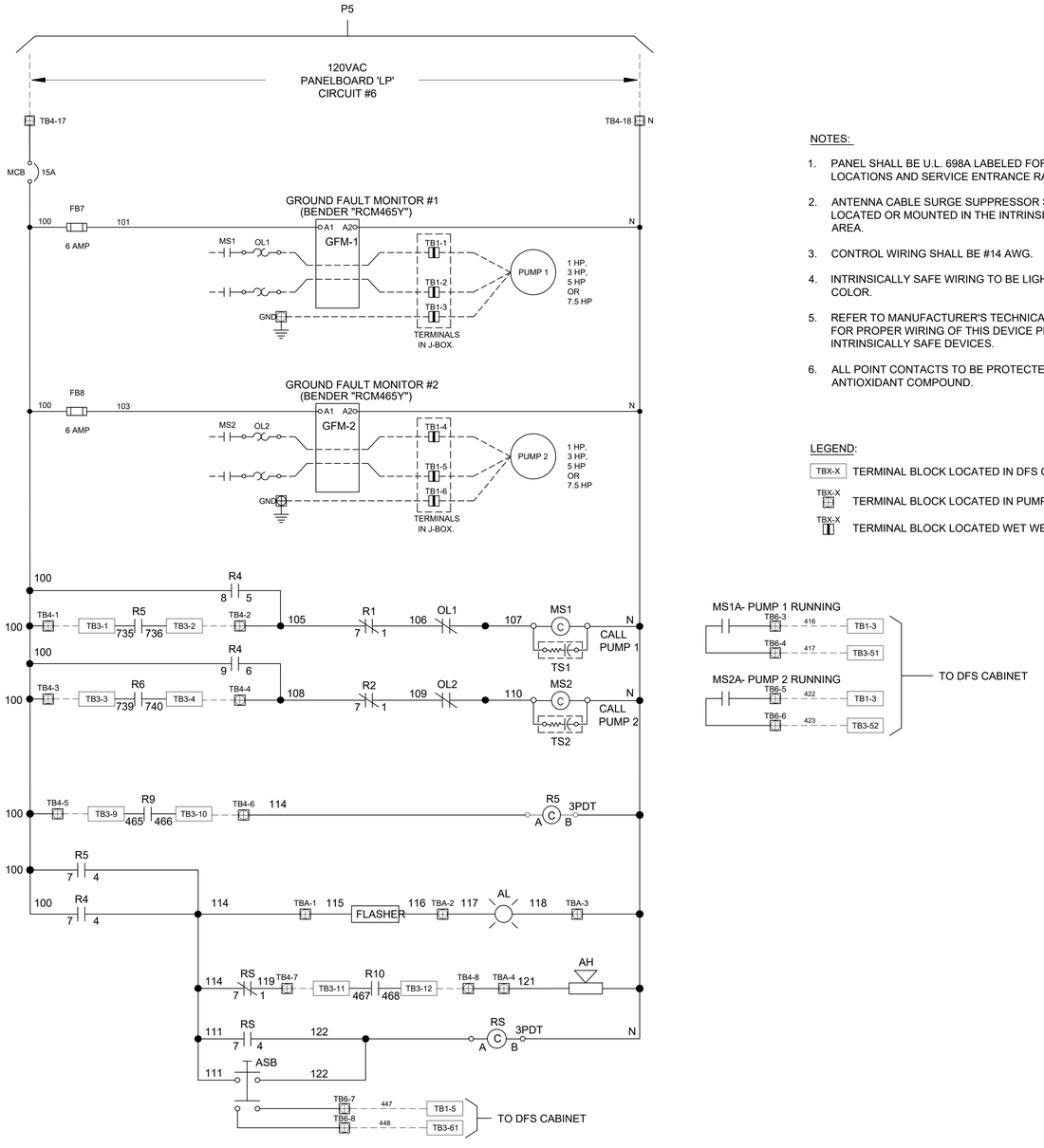
ENCLOSURE:

HAMMOND HW483612GYHK (48"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

BACK PANEL:

HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.





NOTES:

1. PANEL SHALL BE U.L. 698A LABELED FOR HAZARDOUS LOCATIONS AND SERVICE ENTRANCE RATED.
2. ANTENNA CABLE SURGE SUPPRESSOR SHALL NOT BE LOCATED OR MOUNTED IN THE INTRINSICALLY SAFE AREA.
3. CONTROL WIRING SHALL BE #14 AWG.
4. INTRINSICALLY SAFE WIRING TO BE LIGHT BLUE IN COLOR.
5. REFER TO MANUFACTURER'S TECHNICAL DATA SHEET FOR PROPER WIRING OF THIS DEVICE PER INTRINSICALLY SAFE DEVICES.
6. ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM

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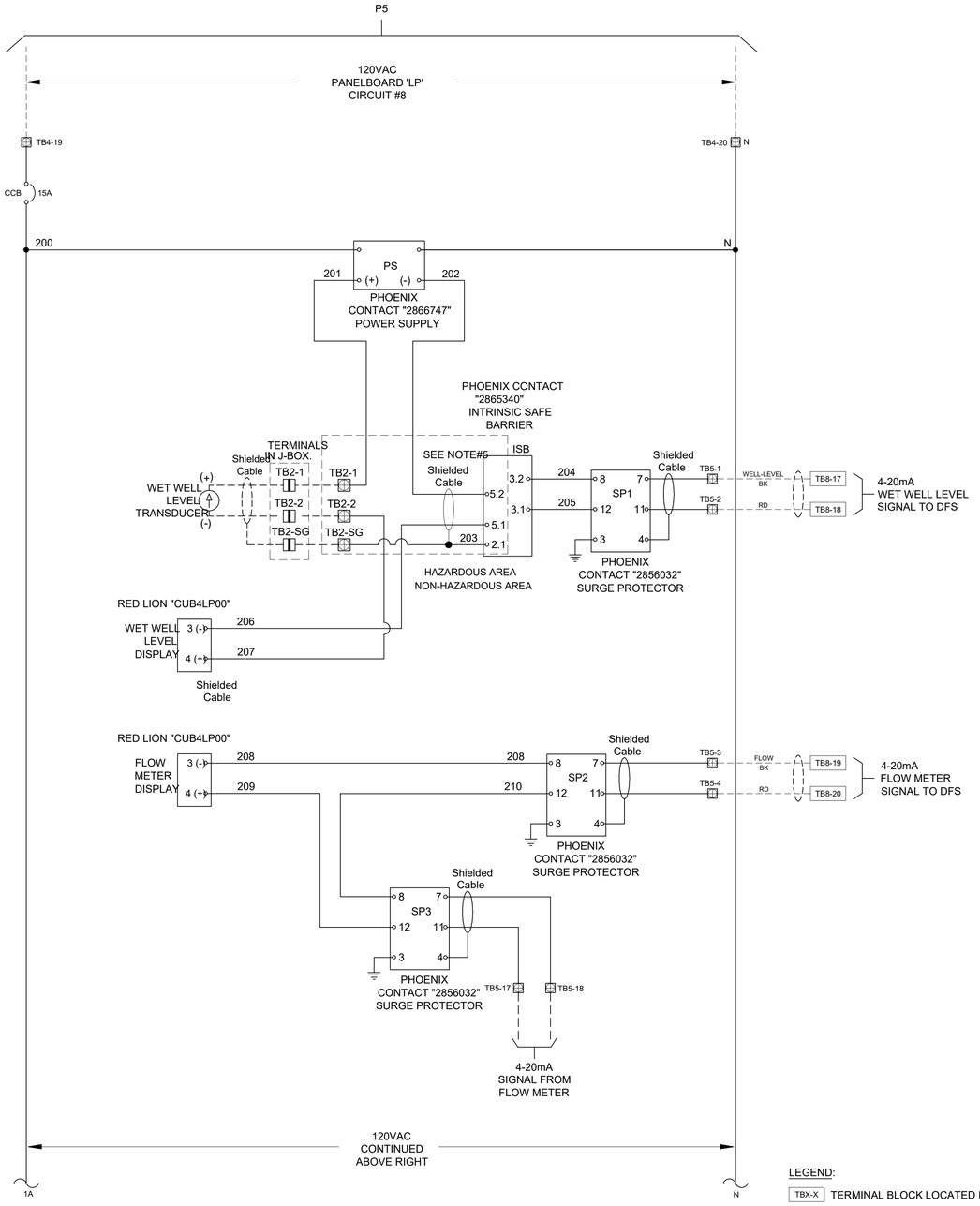

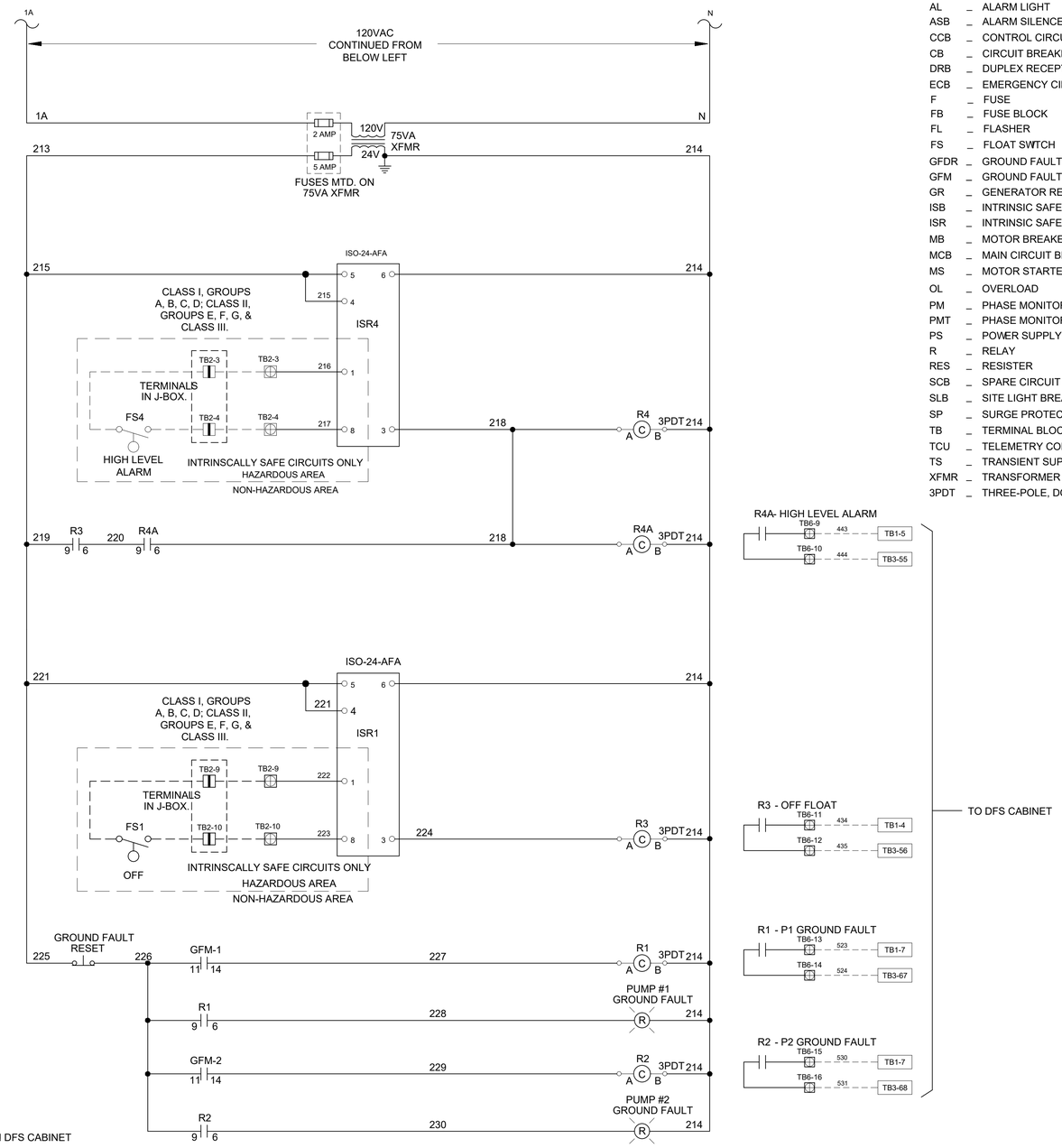

LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

LEGEND:

TBX-X TERMINAL BLOCK LOCATED IN DFS CABINET

TBX-X TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL

TBX-X TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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240V 1-PH, DUPLEX 1 TO 7.5 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS

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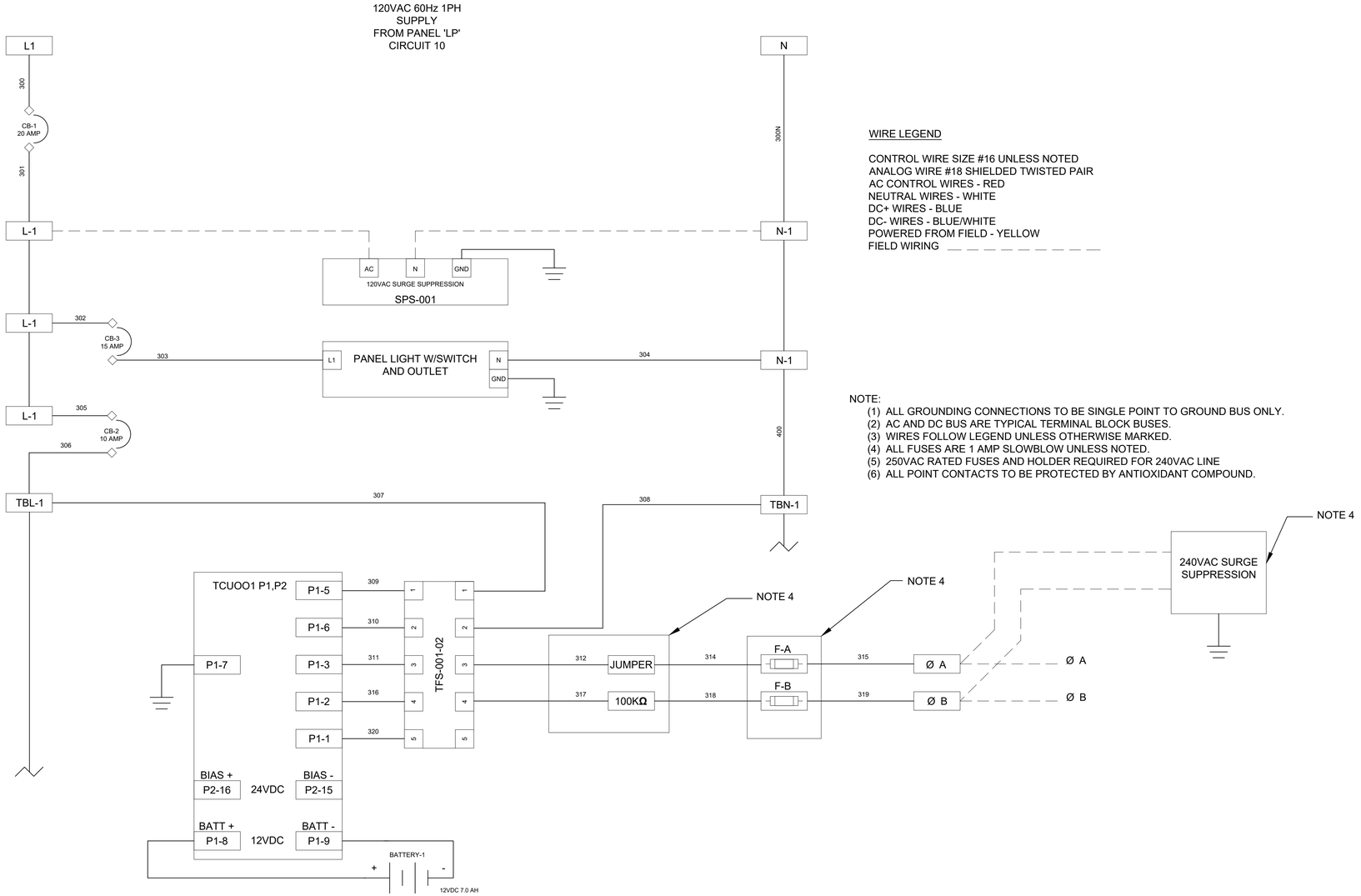
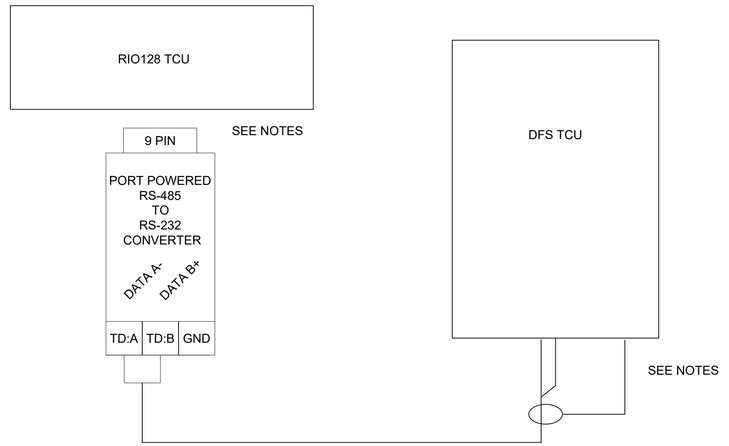


WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _ _ _

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5

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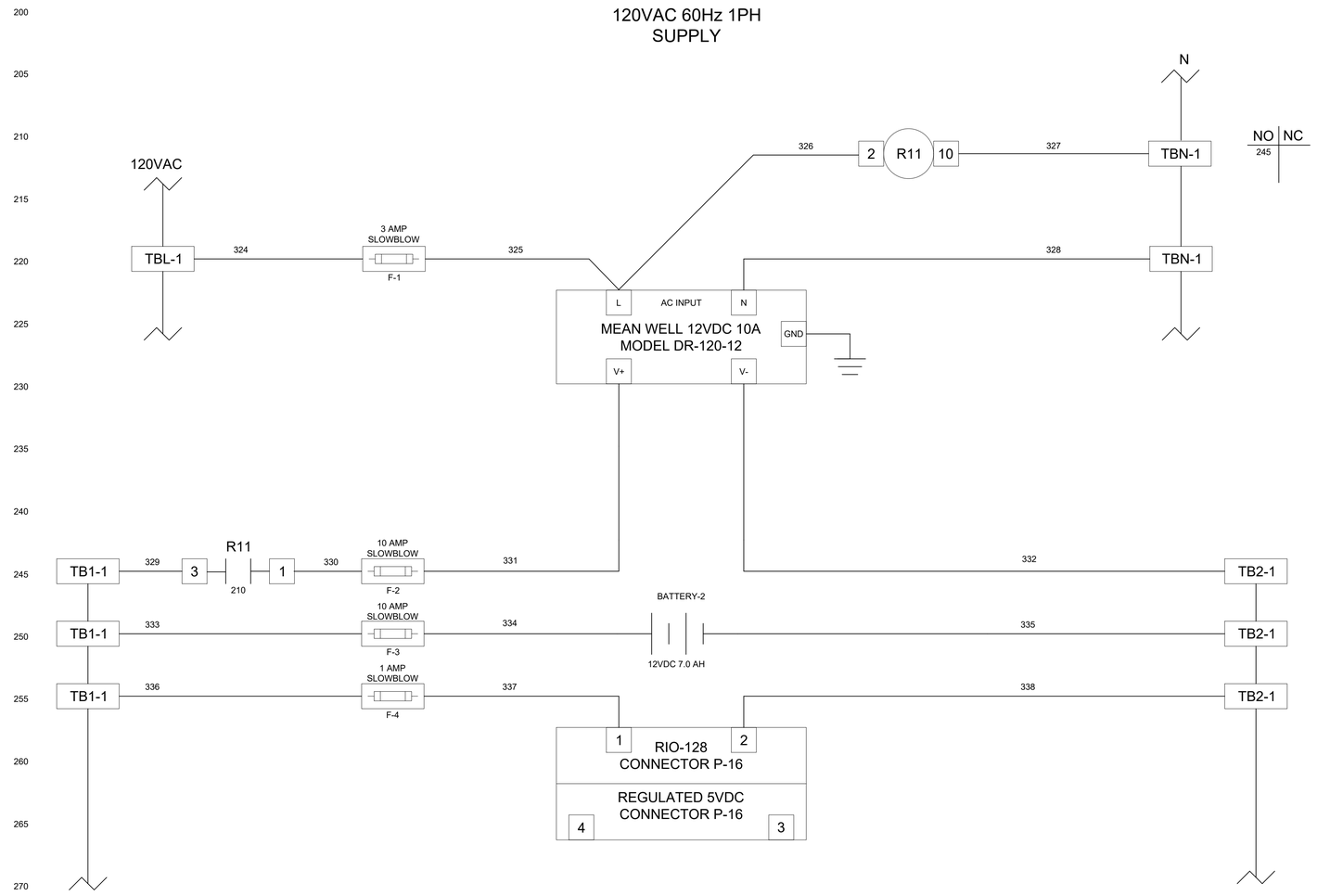
TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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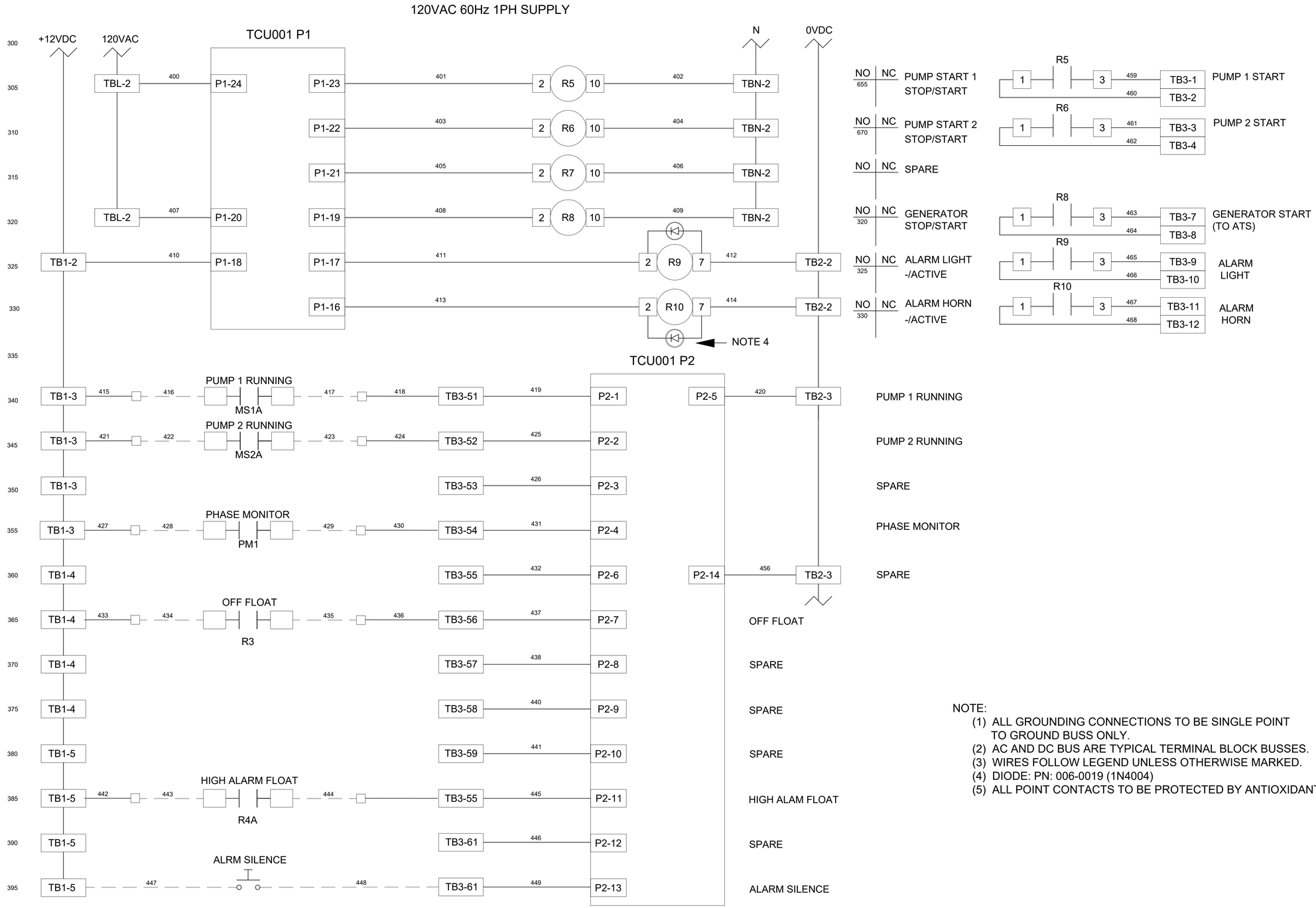

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(4) DIODE: PN: 006-0019 (1N4004)
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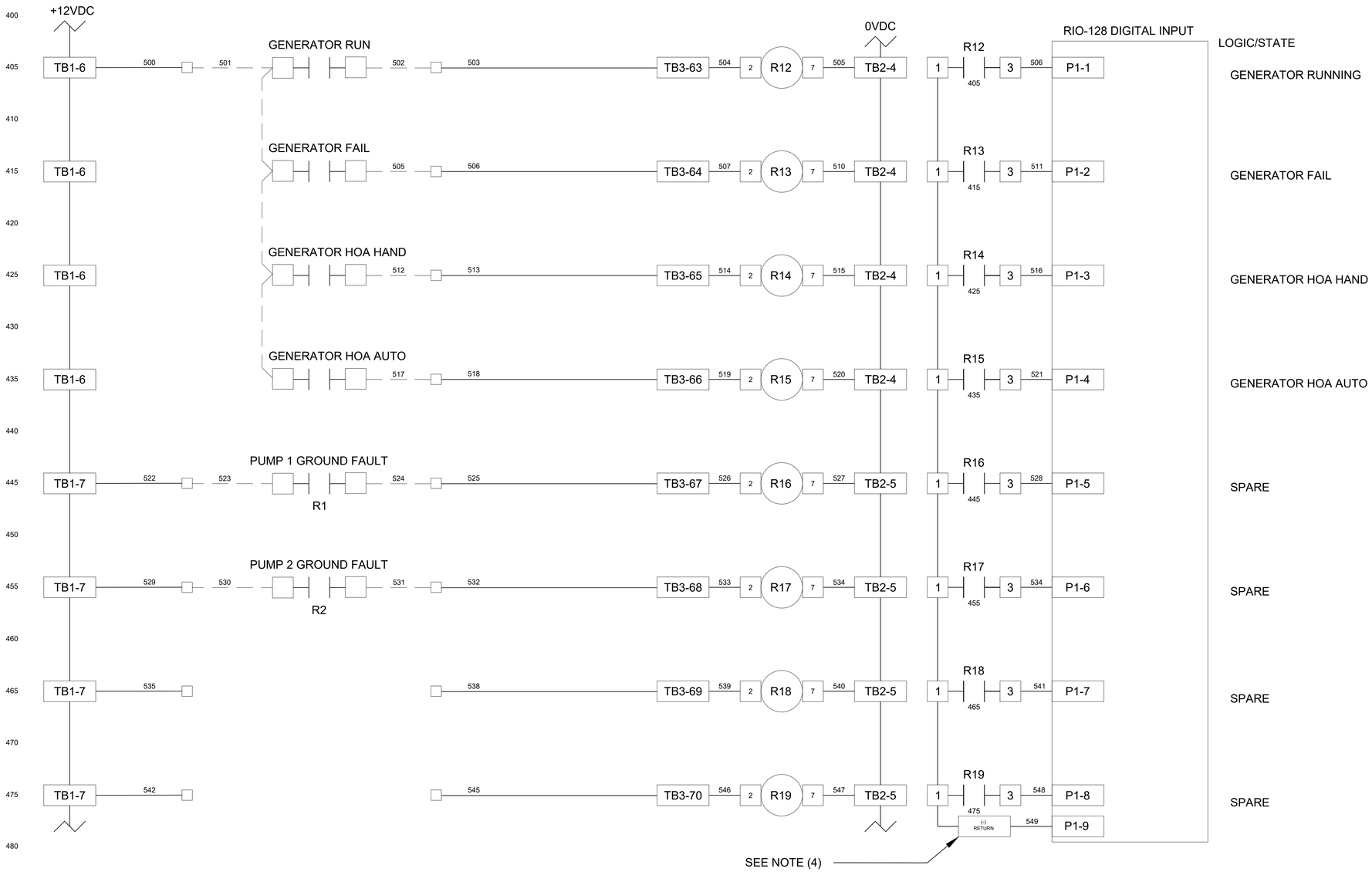

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(4) TERMINAL BLOCKS ARE FOR THE DC RETURN (-) BUS FOR THE RIO-128 DIGITAL INPUTS.
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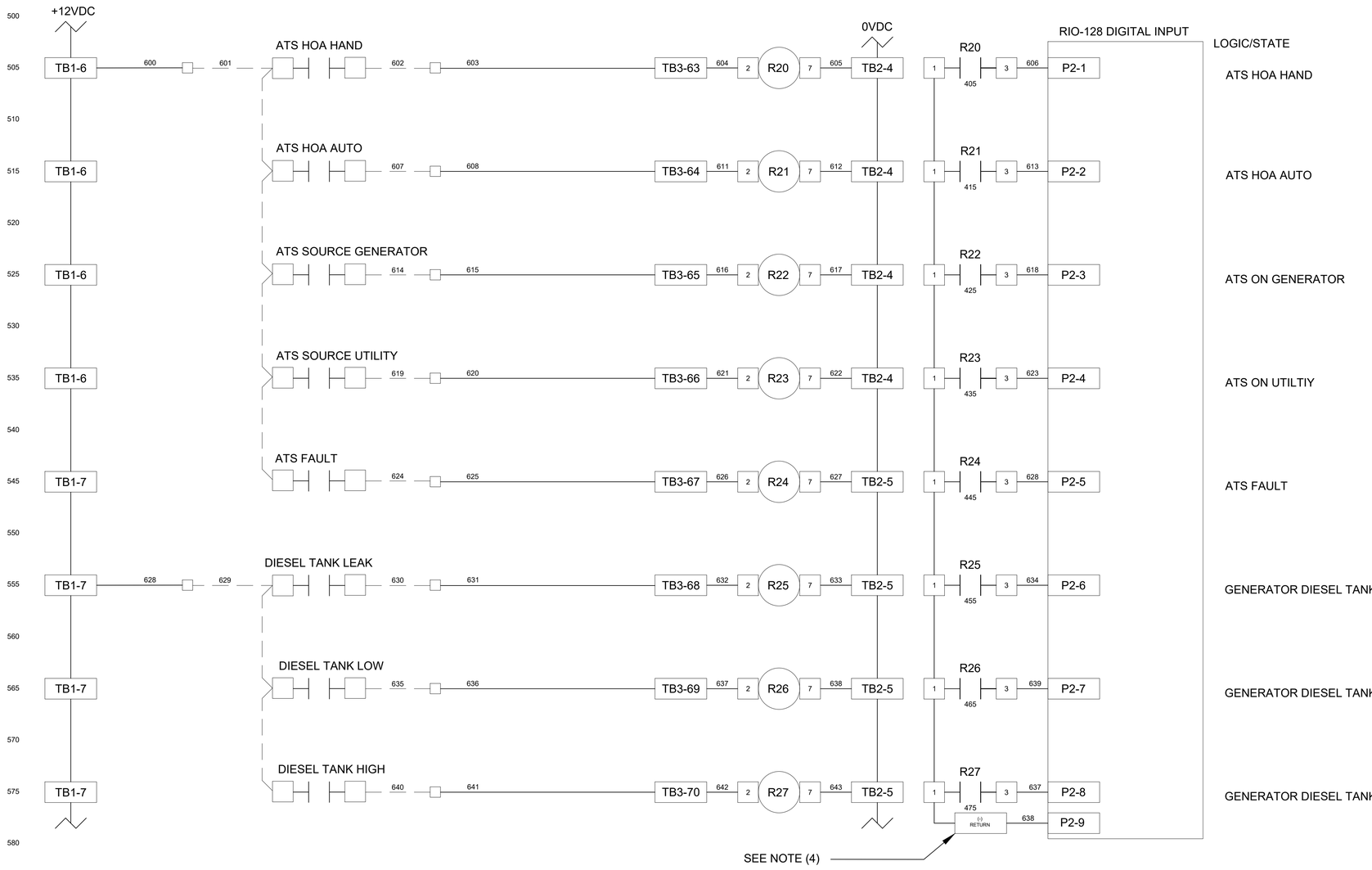
2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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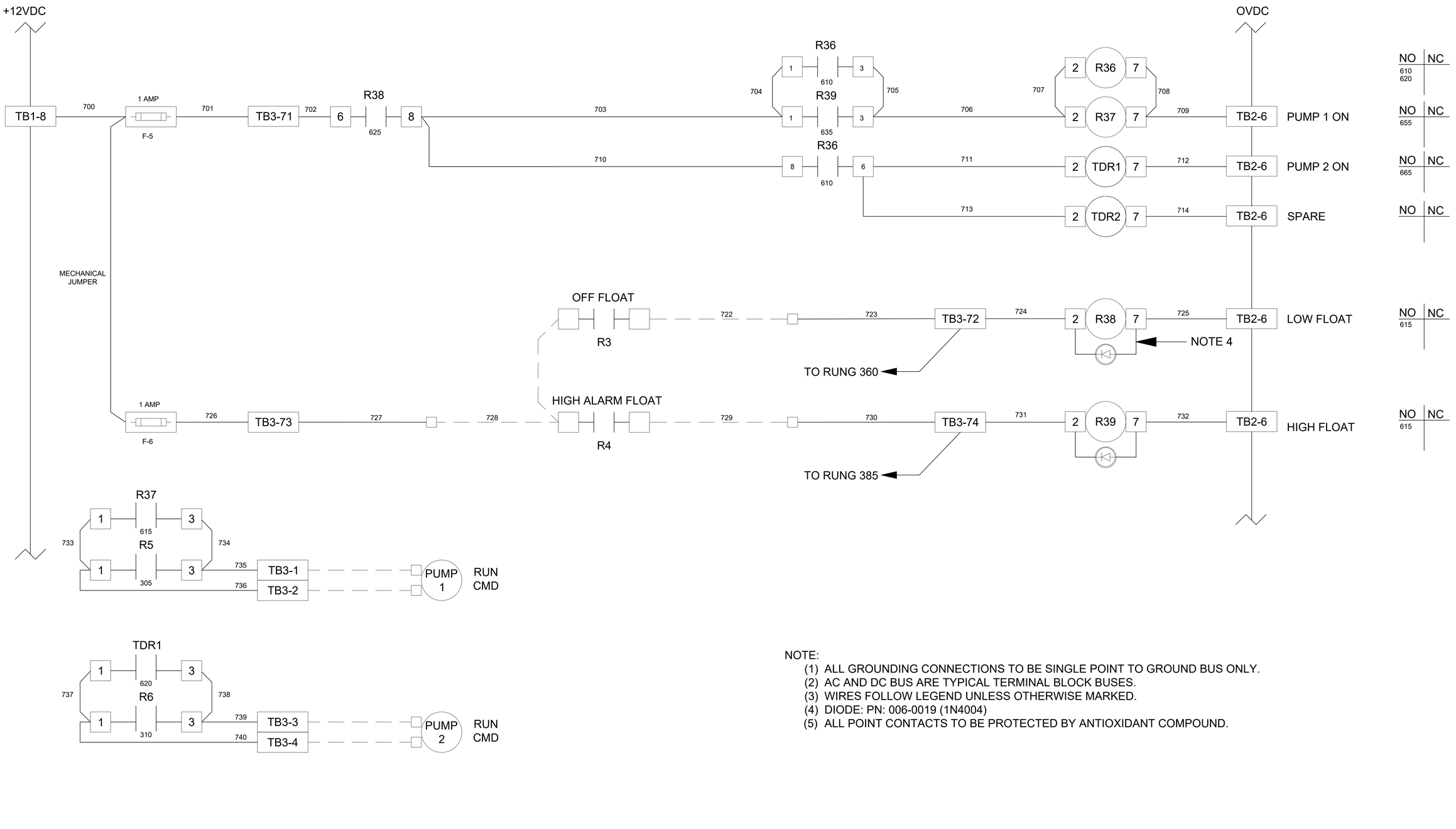

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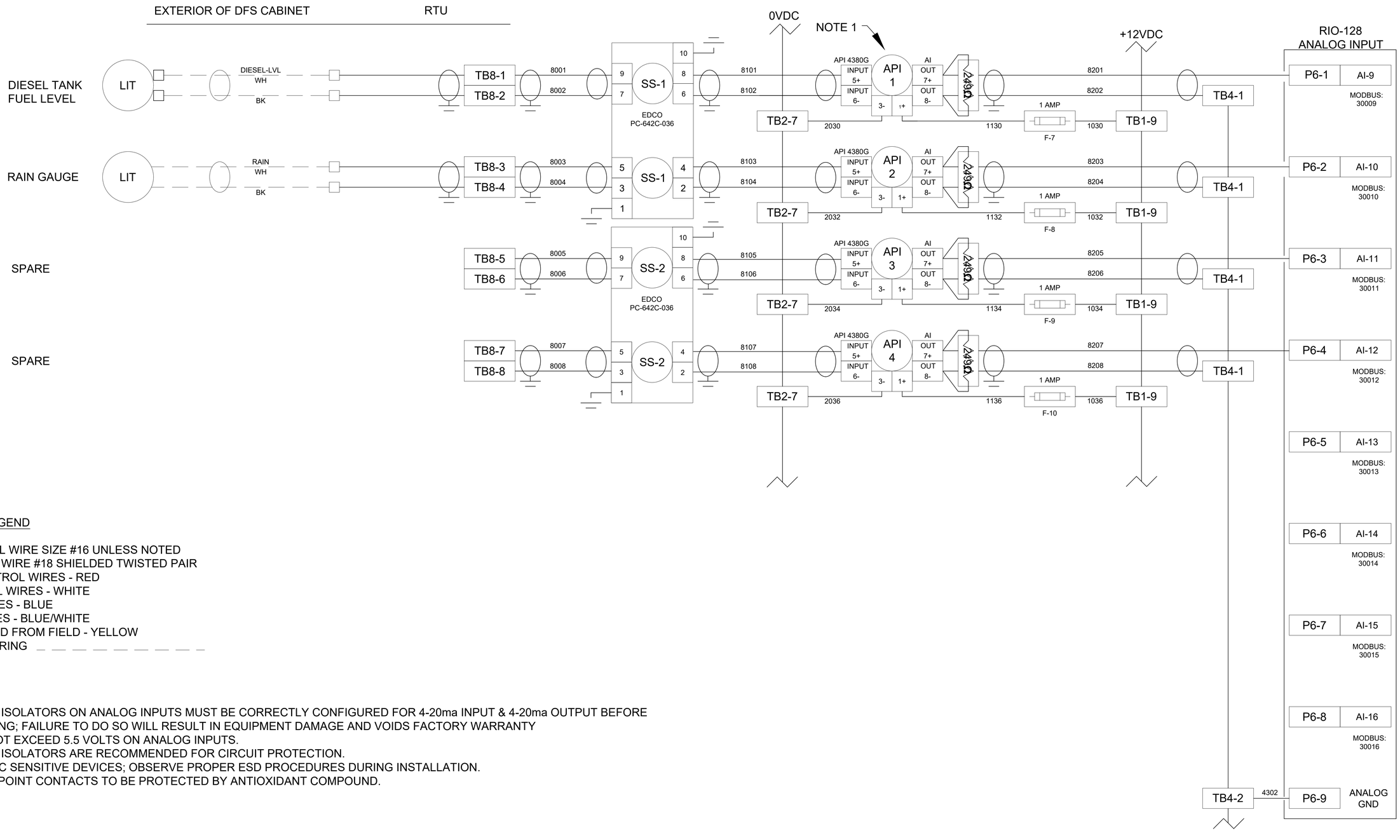

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DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _ _ _

NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

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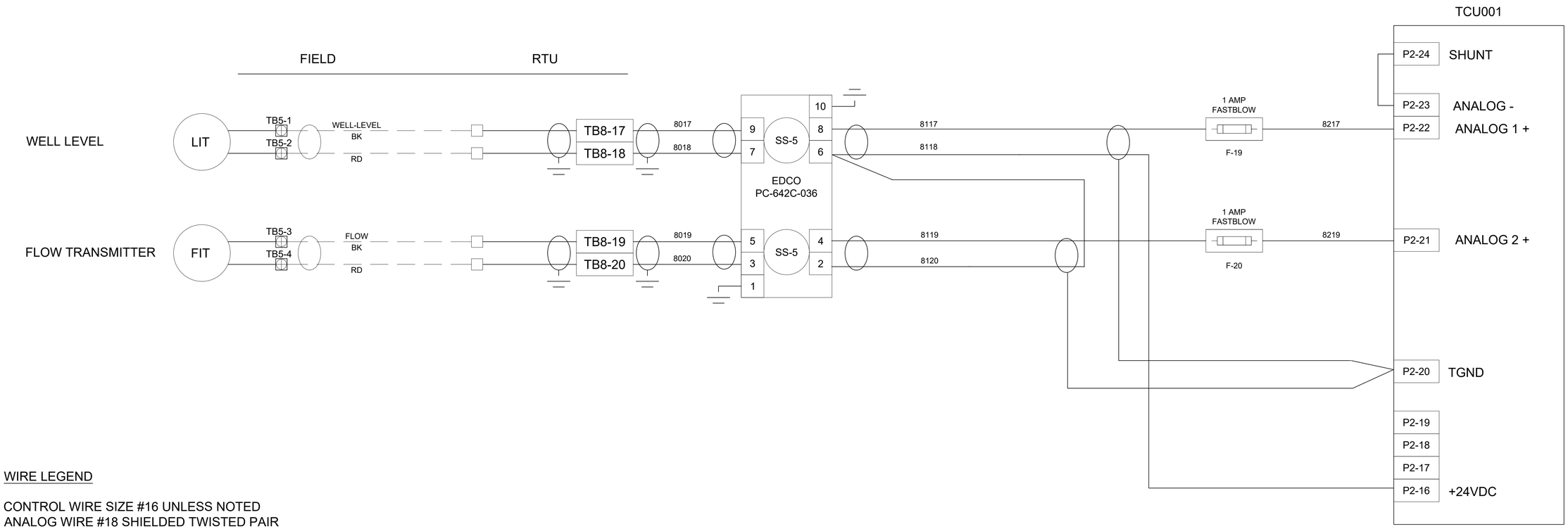
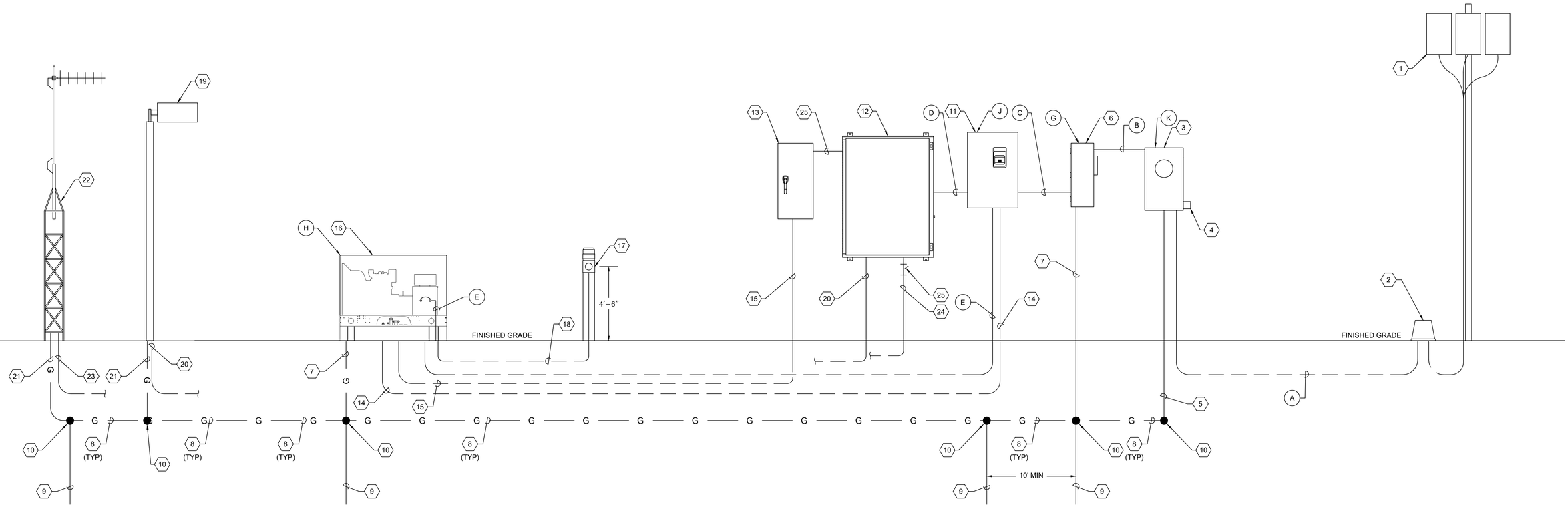


WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ __ __ __ __ __ __ __ _

NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



ONE LINE DIAGRAM NOTES:

1. UTILITY TRANSFORMERS. COORDINATE ALL WORK WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED PEDESTAL.
3. PROVIDE AND INSTALL NEW 240V, SINGLE PHASE, METER SOCKET. GROUND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE NEW ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH UTILITY. REFER TO SCHEDULE FOR SIZE REQUIRED PER SITE.
4. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
5. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR. COORDINATE REQUIREMENTS WITH UTILITY.
6. PROVIDE AND INSTALL NEW 240, 2-POLE DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. PROVIDE SOLID NEUTRAL AND GROUND LUG KITS TO MAKE DISCONNECT SERVICE ENTRANCE RATED. REFER TO SCHEDULE FOR AMPERE AND FUSING REQUIREMENTS.
7. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR.
8. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
9. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
10. EXOTHERMIC WELD.
11. PROVIDE AND INSTALL 3-POLE, S/N, 240V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SCHEDULE FOR SIZE.
12. PROVIDE AND INSTALL PUMP CONTROL PANEL.
13. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
14. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
15. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
16. PROVIDE AND INSTALL NEW 240V, 3Ø, 4-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
17. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
18. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
19. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
20. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
21. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
22. NEW DFS ANTENNA.
23. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
24. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
25. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT.

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

TYPICAL LIFT STATION ONE LINE DIAGRAMS

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	1 HP STATIONS		3 HP STATIONS		5 HP STATIONS		7.5 HP LIFT STATIONS				
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	FROM:	TO:	NOTES:
(A)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL	1-1/2" C.	UTILITY	METER	
(B)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	METER	MAIN DISCONNECT	
(C)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	MAIN DISCONNECT	AUTOMATIC TRANSFER SWITCH	
(D)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	PUMP CONTROL PANEL	
(E)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	GENERATOR SET	
(F)	2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		2-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND		PUMP CONTROL PANEL	GENERATOR RECEPTACLE	
(P2)	2-#12 THWN CU + 1-#12 THWN CU GND		2-#10 THWN CU + 1-#10 THWN CU GND		2-#8 THWN CU + 1-#10 THWN CU GND		2-#8 THWN CU + 1-#10 THWN CU GND		PUMP CONTROL PANEL	WET WELL JUNCTION BOX	

EQUIPMENT					NOTES:
(G)	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	ALL DISCONNECTS SHALL BE PADLOCKABLE
(H)	240V, 3Ø, 20 KW GENERATOR WITH 60 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 30 KW GENERATOR WITH 90 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 40 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 50 KW GENERATOR WITH 125 AMPERE MAIN CIRCUIT BREAKER	
(J)	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 100 AMPERE TRANSFER SWITCH	240V, 125 AMPERE TRANSFER SWITCH	
(K)	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	100 AMPERE, 240V, SINGLE PHASE METER	125 AMPERE, 240V, SINGLE PHASE METER	
PUMP CONTROL PANEL					NOTES:
(L)	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	125 AMPERE MAIN CIRCUIT BREAKER	
(M)	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	125 AMPERE EMERGENCY CIRCUIT BREAKER	
(N)	15 AMP MOTOR CIRCUIT BREAKERS	35 AMP MOTOR CIRCUIT BREAKERS	60 AMP MOTOR CIRCUIT BREAKERS	80 AMP MOTOR CIRCUIT BREAKERS	
(O)	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 1 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	
(P)	#12 AWG CU MOTOR CONDUCTORS	#10 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	

LOAD CALCULATION: 1 HP

MOTORS:

PUMP NO. 1: 1 HP, 240 VAC, 1 Ø, 8.0 A

PUMP NO. 2: 1 HP, 240 VAC, 1 Ø, 8.0 A

MOTOR SUB-TOTAL 16.0 A

+ 25% OF LARGEST MOTOR 2.0 A

SUB-TOTAL 18.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 38.0 A

SERVICE SIZE:

100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 3 HP

MOTORS:

PUMP NO. 1: 3 HP, 240 VAC, 1 Ø, 17.0 A

PUMP NO. 2: 3 HP, 240 VAC, 1 Ø, 17.0 A

MOTOR SUB-TOTAL 34.0 A

+ 25% OF LARGEST MOTOR 4.3 A

SUB-TOTAL 38.3 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 58.3 A

SERVICE SIZE:

100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 5 HP

MOTORS:

PUMP NO. 1: 5 HP, 240 VAC, 1 Ø, 28.0 A

PUMP NO. 2: 5 HP, 240 VAC, 1 Ø, 28.0 A

MOTOR SUB-TOTAL 56.0 A

+ 25% OF LARGEST MOTOR 7.0 A

SUB-TOTAL 63.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 83.0 A

SERVICE SIZE:

100 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

LOAD CALCULATION: 7.5 HP

MOTORS:

PUMP NO. 1: 7.5 HP, 240 VAC, 1 Ø, 40.0 A

PUMP NO. 2: 7.5 HP, 240 VAC, 1 Ø, 40.0 A

MOTOR SUB-TOTAL 80.0 A

+ 25% OF LARGEST MOTOR 10.0 A

SUB-TOTAL 90.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 110.0 A

SERVICE SIZE:

125 A, 240 VAC, 1 Ø, 3 - WIRE MINIMUM.

CITY OF CLEARWATER
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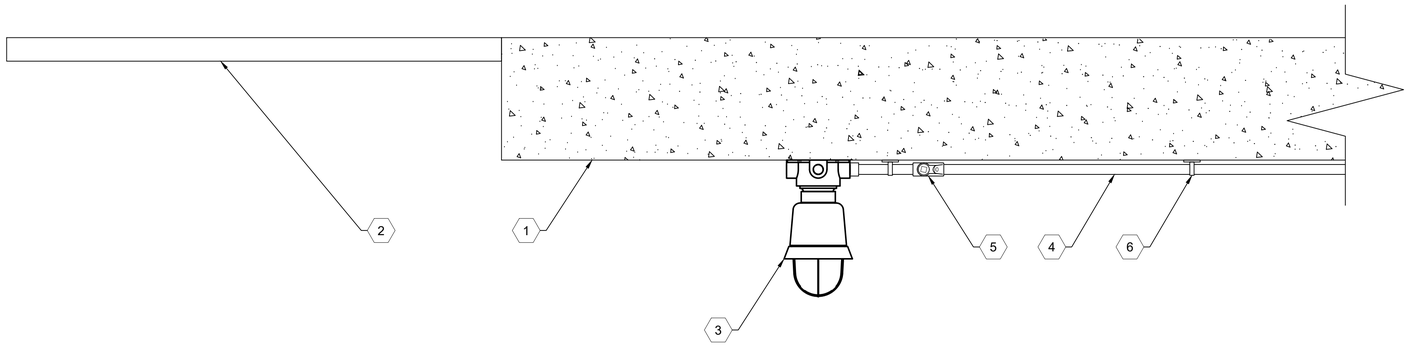
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

ELECTRICAL SCHEDULES AND LOAD CALCULATIONS

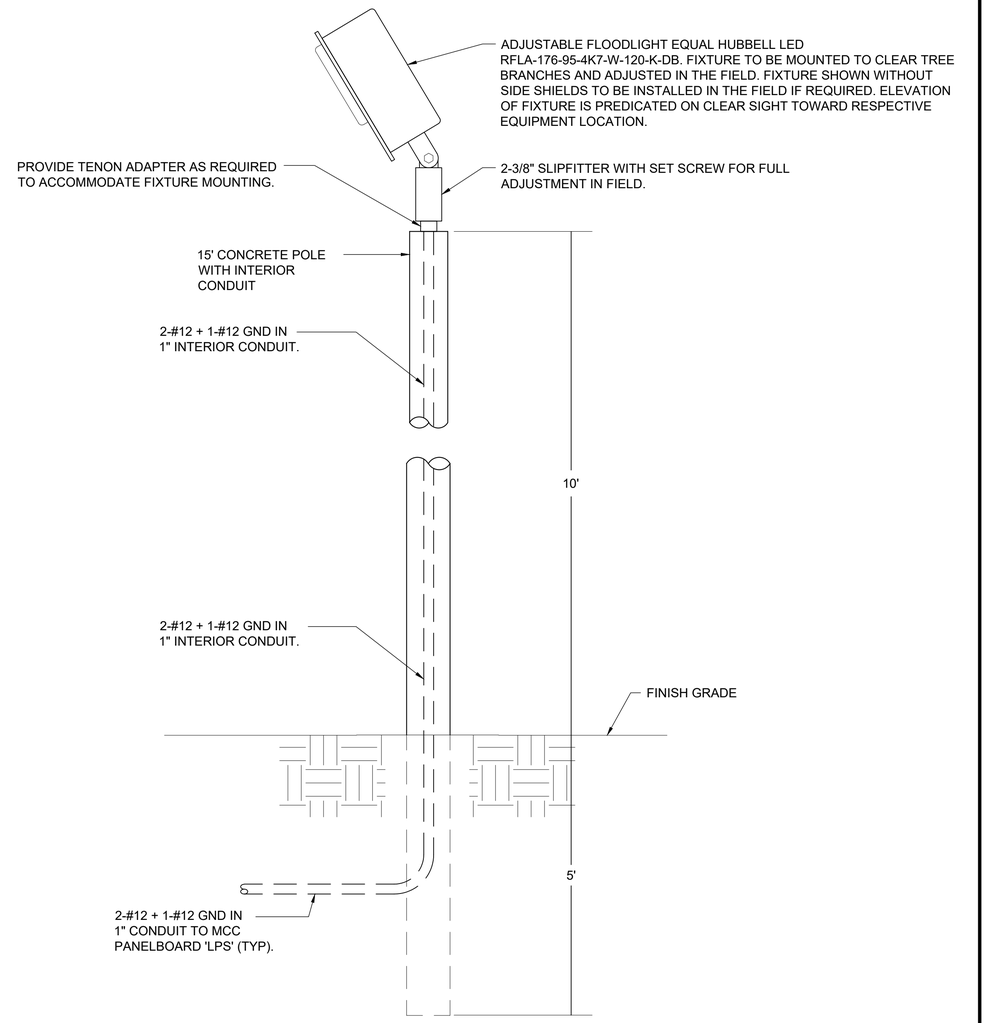


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL. CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	1-1/4"	2-#6 + 1-#6 NEU + 1-#8 GND	PUMP CONTROL PANEL	PANELBOARD 'LP'	
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	QUANTITY OF AREA LIGHTS DIFFERS BETWEEN LS 54 AND LS 65.
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	3/4"	2-#10 + 1-#10 NEU + 1-#10 GND	PANELBOARD 'LP'	PANELBOARD 'LP' SURGE PROT	CONNECT SURGE PROTECTION DEVICE VIA NON-METALLIC FLEXIBLE CONDUIT.
P7	1"	6-#12 + 2-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P8	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P9	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #1 POWER.
P10	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #2 POWER.
P11	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P12	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #1 POWER.
P13	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #2 POWER.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1"	TWO (2) 2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	DFS CABINET	4-20mA FLOW METER SIGNAL AND LEVEL TRANSMITTER SIGNAL. BOTH CABLES SHALL BE BELDEN 8719.
C8	1-1/4"	20-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/4"	14-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C16	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. QO ; 120/240 VOLTS, 1Ø, 3W ; 60 AMP MAIN CIRCUIT BREAKER ; 35K AIC RATING ; SURFACE ENCLOSURE TOP AT 5'-6" AFF

EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE		CIRC.	CIRC.	KVA/PHASE		CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	NO.	NO.	A	B	POLE	AMPS	FRAME	
SURGE PROTECTION DEVICE	2	30	QOB	.		1	2	0.8		1	20	QOB	PUMP CONTROL PANEL RECEPTACLE
" "	-	-	-		.	3	4		1.0	1	20	QOB	PUMP CONTROL PANEL LIGHTS
GENERATOR BLOCK HEATER	2	20	QOB	1.2		5	6	0.4		1	20	QOB	PUMP CONTROL PANEL CONTROLS
" "	-	-	-		1.2	7	8		0.4	1	20	QOB	PUMP CONTROL PANEL CONTROLS
GENERATOR ALTERNATOR HEATER	1	20	QOB	0.8		9	10	0.6		1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB		1.0	11	12		.				SPACE
FLOW METER TRANSMITTER	1	20	QOB	0.2		13	14	.		--	--	--	SPACE
SPARE	1	20	QOB		.	15	16		.	--	--	--	SPACE
SUB-TOTAL KVA				2.2	2.2			1.8	1.4				

TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

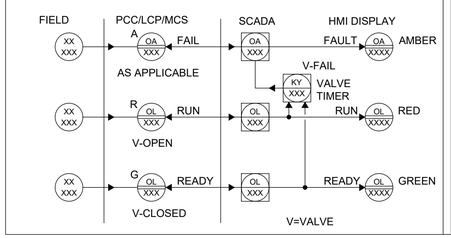
FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS					
	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED

S = STATUS

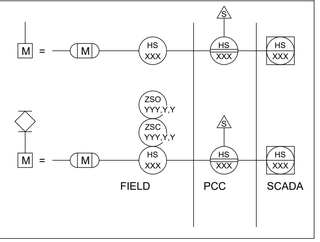
THIS SYMBOL INDICATES THE FOLLOWING INSTRUMENTATION

(NOTE : VALVE FAULT IS PLC GENERATED)



TYPICAL FOR M

(IF NOT OTHERWISE ILLUSTRATED ON DRAWINGS)



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK —— D —— D ——

RADIO LINK —— R —— R ——

FIBER OPTIC DATA —— F —— F ——

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT
SP = SET POINT INPUT
C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DISCRETE INPUT
DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO
S/S = START/STOP
SEL = SELECTOR
O/C = OPEN/CLOSE
O/O = ON/OFF
LOS = LOCKOUT-START
LOR = LOCAL-OFF-REMOTE
OAC = OPEN-AUTO CLOSE
CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN
O/R = OVERRIDE
MCS = MASTER CONTROL STATION
VFD = VARIABLE FREQUENCY DRIVE
PCC = PROCESS CONTROL CABINET
LCP = LOCAL CONTROL PANEL
ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN
E = ENGINE
G = GENERATOR
F = FILTER
GS = GRINDER/SCREEN
K = COMPRESSOR
H = HOIST
ME = MECHANICAL EQUIPMENT
MX = MIXER
P = PUMP
T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

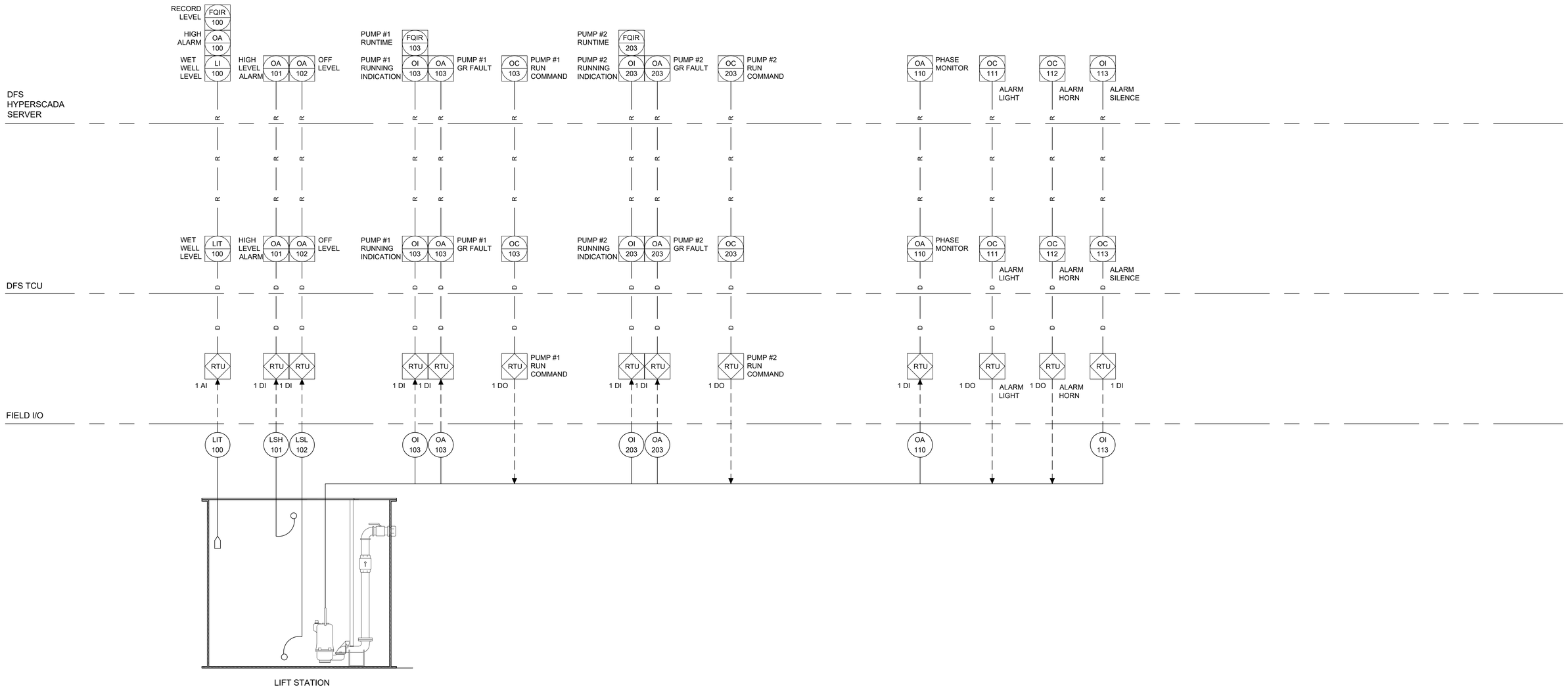
SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.
PLC - PROGRAMMABLE LOGIC CONTROL
SA - SURGE SUPPRESSOR DEVICE

I INTERLOCK

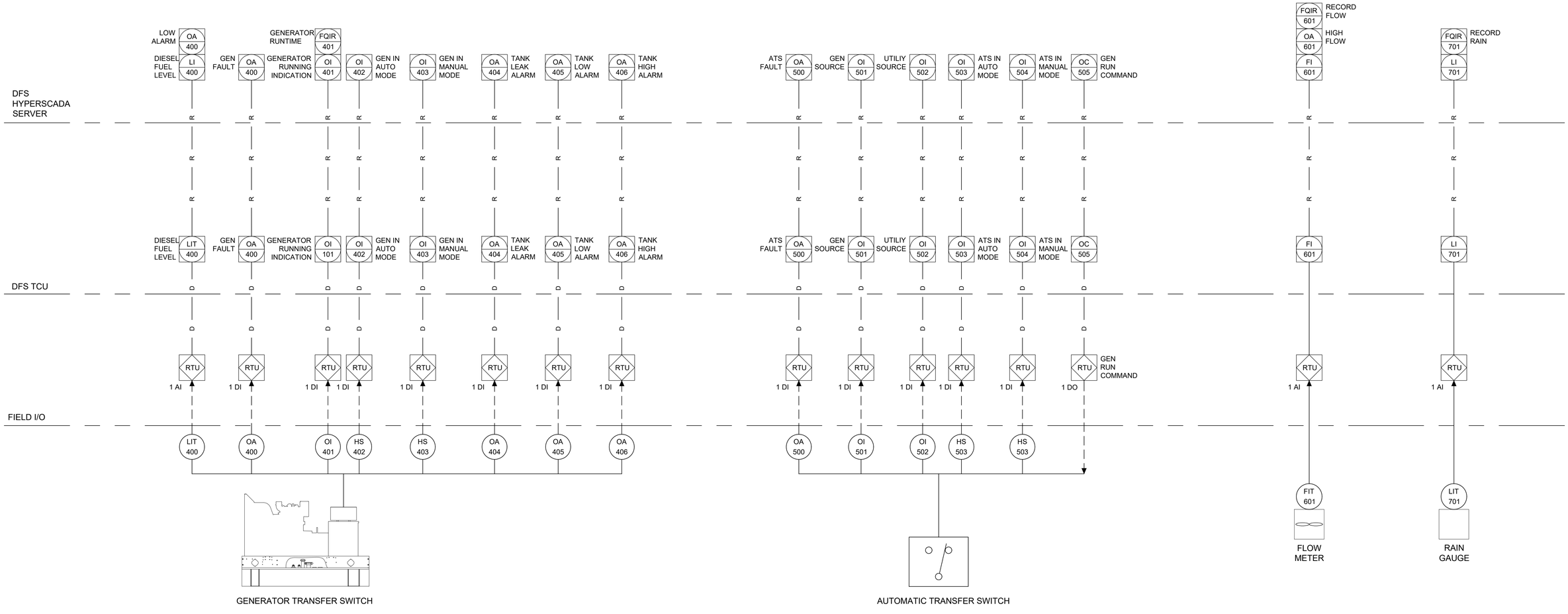
I-3 CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊟	OR	⊟⊟	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊟	OR	⊟⊟	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**240V 1-PH, DUPLEX 1 TO 7.5 HP**	**TYPICAL LIFT STATION P&ID'S**	INDEX NO. 803 / PAGE NO. 20 OF 21 LATEST REVISION 11/2022



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DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 1-PH, DUPLEX 1 TO 7.5 HP

TYPICAL LIFT STATION P&ID'S

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SHEET #	SHEET DESCRIPTION
1	COVER SHEET
2	240V 3-PHASE, DUPLEX PUMP LIFT STATION 9.4 TO 12 HP ELECTRICAL STANDARDS
3	240V 3-PHASE, DUPLEX PUMP STATION EQUIPMENT RACK ELEVATION
4	TYPICAL PUMP CONTROL PANEL, DFS CABINET & JUNCTION BOX DETAILS
5	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM
6	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS
7	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
8	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
9	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
10	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
11	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
12	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
13	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
14	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
15	TYPICAL LIFT STATION ONE LINE DIAGRAM
16	ELECTRICAL SCHEDULES AND LOAD CALCULATIONS
17	TYPICAL LIFT STATION ELECTRICAL DETAILS
18	CONDUIT AND CABLE SCHEDULE AND PANEL SCHEDULE
19	INSTRUMENTATION LEGEND ABBREVIATIONS AND SYMBOLS
20	TYPICAL LIFT STATION P&IDs
21	TYPICAL LIFT STATION P&IDs

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

INDEX 804:
PUMP STATION STANDARD ELECTRICAL DETAILS
240V 3-PH, DUPLEX 9.4 TO 12 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

$ SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:
NEUTRAL WIRE
ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

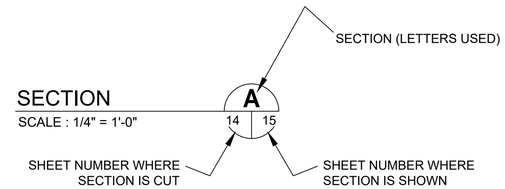
PUMP THERMAL SENSOR

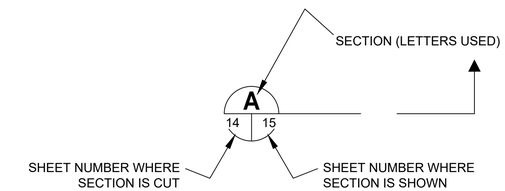
FAN THERMOSTAT

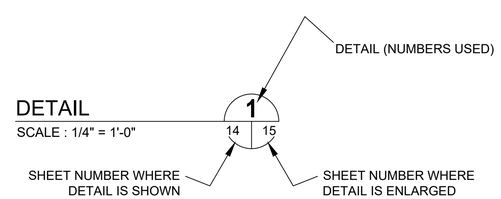
ABBREVIATIONS:

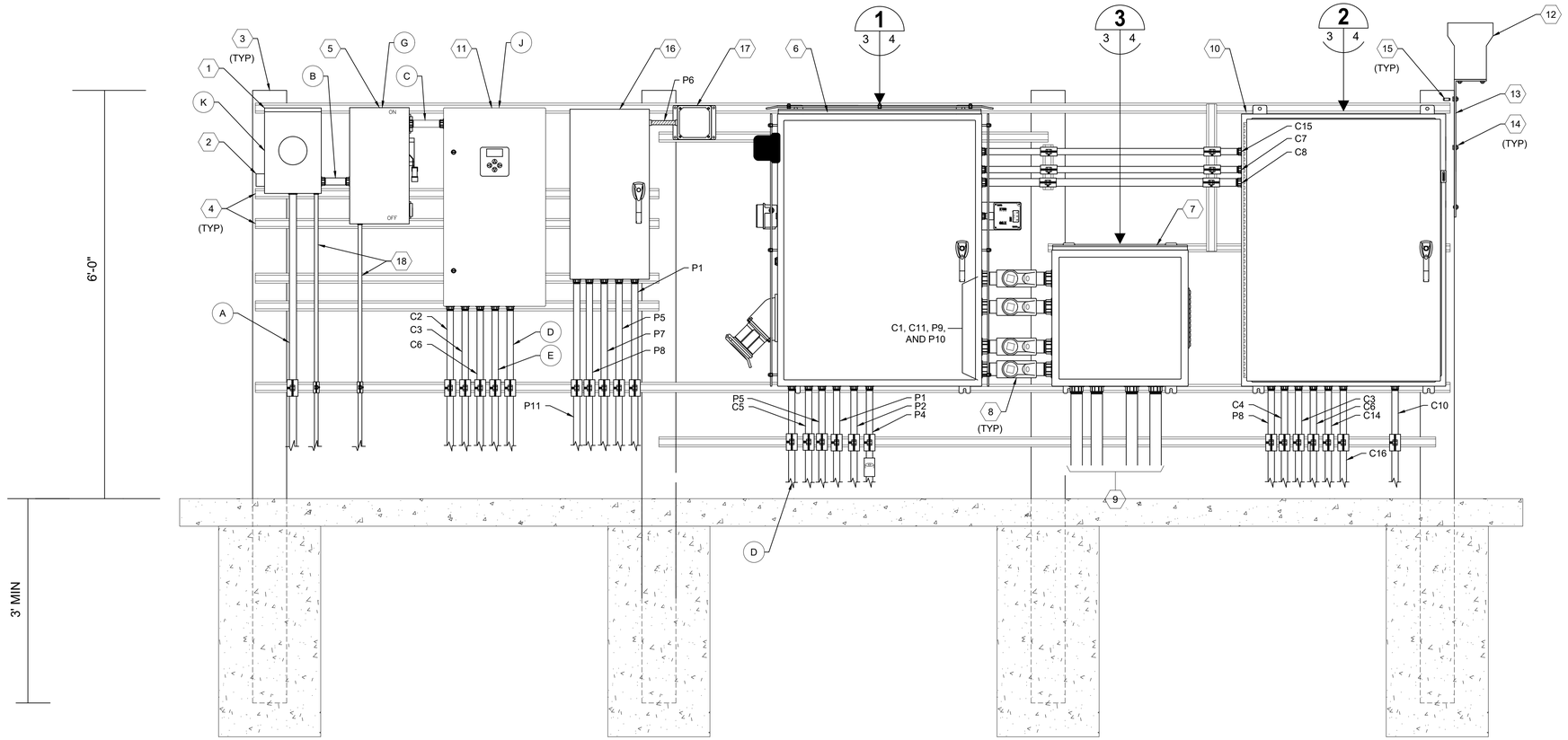
A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL









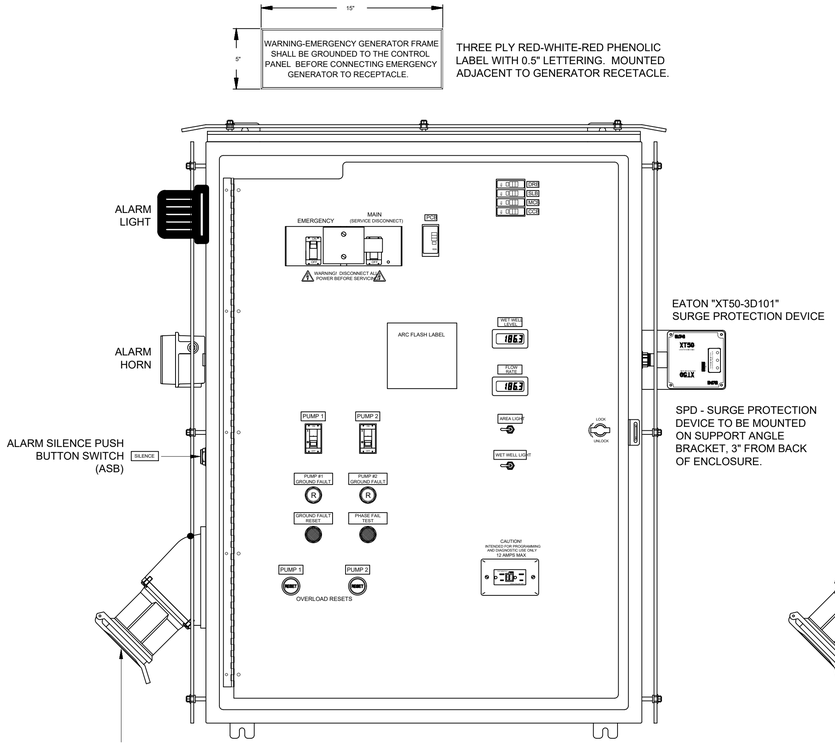
240V 3-PHASE DUPLEX PUMP STATION
EQUIPMENT RACK FRONT SIDE ELEVATION
SCALE : NONE

KEYED NOTES:

1. PROVIDE AND INSTALL METER SOCKET. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. COORDINATE REQUIREMENTS WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
3. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
4. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
5. PROVIDE AND INSTALL 3-POLE, 240V, FUSED DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. DISCONNECT SHALL BE PAD-LOCKABLE.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAIL ON SHEET 4.
7. PROVIDE AND INSTALL NEW 24" x 24" x 8" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 4.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12, C13, P12 AND P13. CABLES FOR PUMP MOTORS, LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.
10. DATA FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 4.
11. PROVIDE AND INSTALL NEW 240V, 3-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH (ATS). REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
12. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
13. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
14. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
15. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).
16. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
17. PROVIDE AND INSTALL SURGE PROTECTION DEVICE (SPD) UNIT, 120/240V, 3Ø, TYPE 1, ASCO SERIES 400, IN NEMA 4X ENCLOSURE.
18. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN 1" CONDUIT.

GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. PROVIDE CONDUIT AND CONDUCTOR BETWEEN PUMP CONTROL PANEL AND NEW DFS RTU ENCLOSURE AS REQUIRED (NOT SHOWN FOR CLARITY).



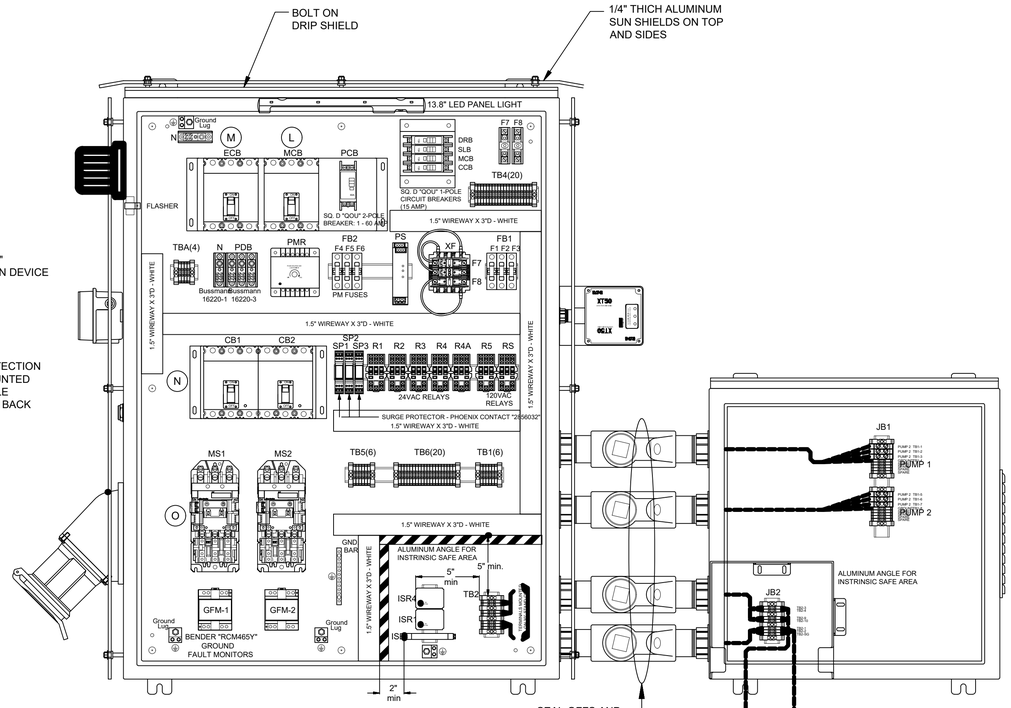
PUMP CONTROL PANEL DETAIL 1

SCALE : N.T.S.

INNER DOOR VIEW
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:
HAMMOND HW483612S16HK (48"H x 36"W x 12"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD, PAD-LOCKING HASP AND 0.25" THICK ALUMINUM SUN SHIELDS ON TOP AND SIDES. OUTER DOOR SHALL HAVE ROLLER CAM TYPE 3-POINT, PAD-LOCKABLE HANDLE, WELDED ON STUDS FOR PRINT POCKET AND 90° STOP.

INNER DOOR:
HID-4836, 0.125 BLACK ENGRAVED ALUMINUM WITH CONTINUOUS HINGE, TWIST LATCHES, AND 90° STOP.



PUMP CONTROL PANEL BACK PANEL

SCALE : N.T.S.

BACK PANEL:
HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

INTRINSICALLY SAFE NOTES:

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.

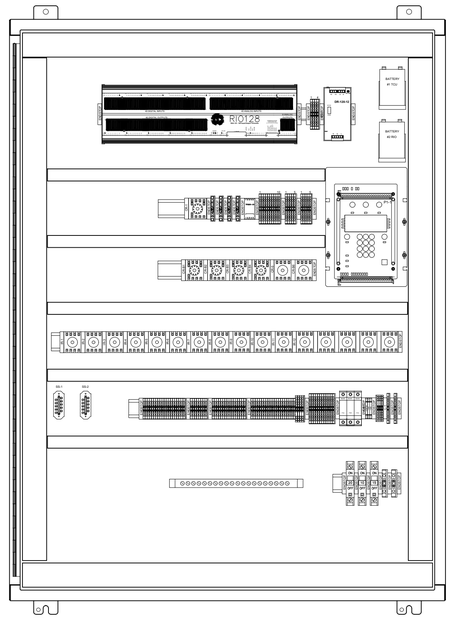
JUNCTION BOX ENCLOSURE DETAIL 3

SCALE : N.T.S.

JUNCTION BOX:
SPN4SS6-24248 (24"H x 24"W x 8"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD. OUTER DOOR HAS STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:
SPP-2424 (21"H x 21"W) FABRICATED FROM 12GA. WHITE ENAMELED STEEL.

LOUVER:
WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



DFS CABINET DETAIL 2

SCALE : N.T.S.

TCU ENCLOSURE:
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:
HAMMOND HW483612GYHK (48"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

BACK PANEL:
HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

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2022 STANDARD ELECTRICAL DETAILS

240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL PUMP CONTROL PANEL, DFS CABINET AND JUNCTION BOX DETAILS

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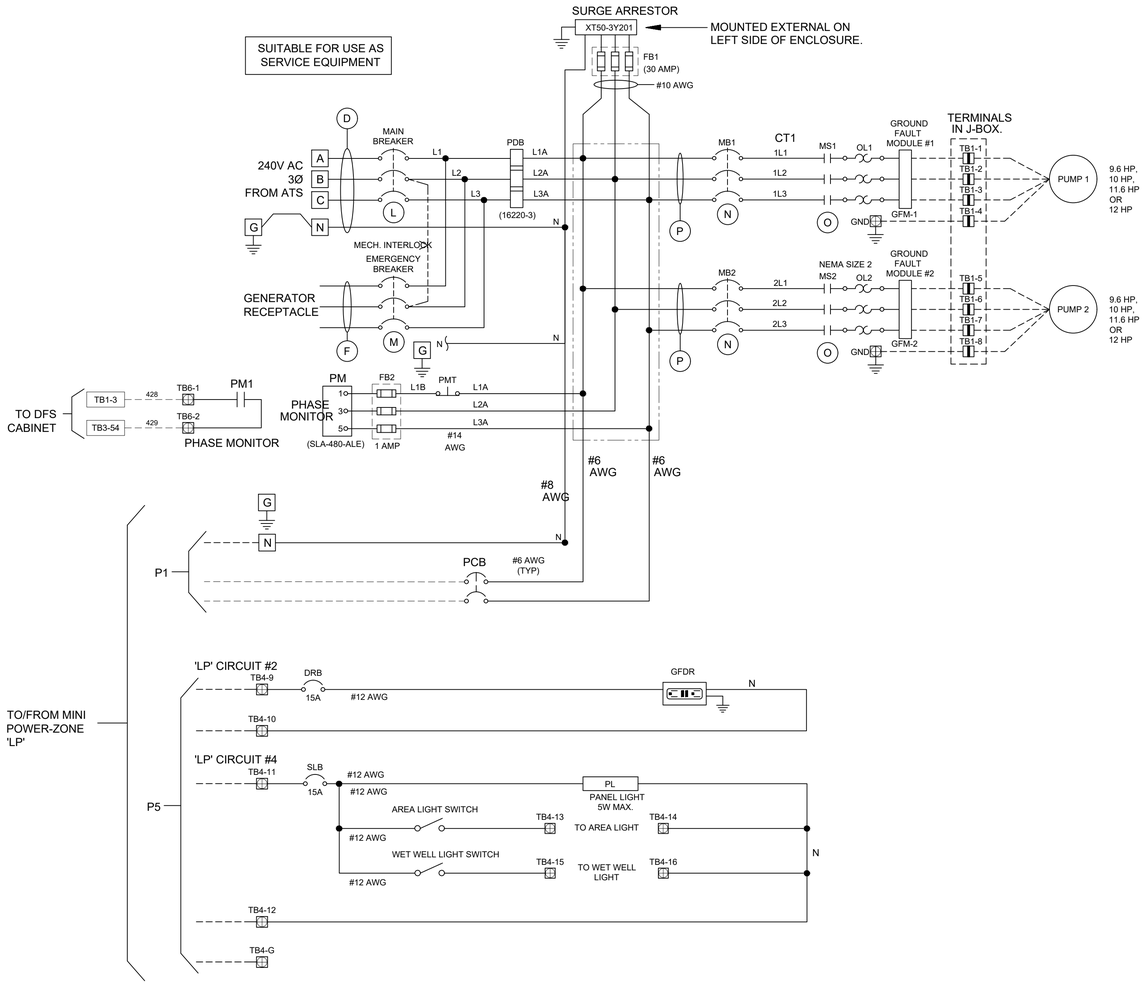

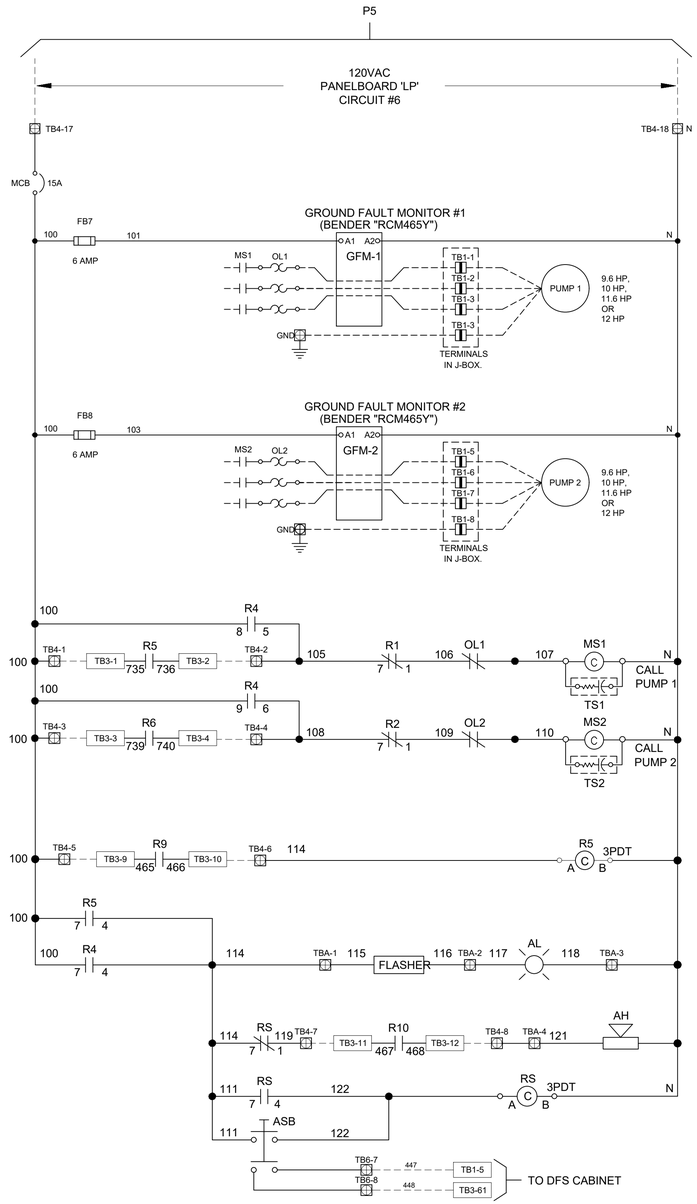

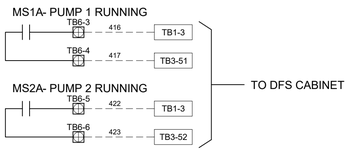

NOTES:

1. PANEL SHALL BE U.L. 698A LABELED FOR HAZARDOUS LOCATIONS AND SERVICE ENTRANCE RATED.
2. ANTENNA CABLE SURGE SUPPRESSOR SHALL NOT BE LOCATED OR MOUNTED IN THE INTRINSICALLY SAFE AREA.
3. CONTROL WIRING SHALL BE #14 AWG.
4. INTRINSICALLY SAFE WIRING TO BE LIGHT BLUE IN COLOR.
5. REFER TO MANUFACTURER'S TECHNICAL DATA SHEET FOR PROPER WIRING OF THIS DEVICE PER INTRINSICALLY SAFE DEVICES.
6. ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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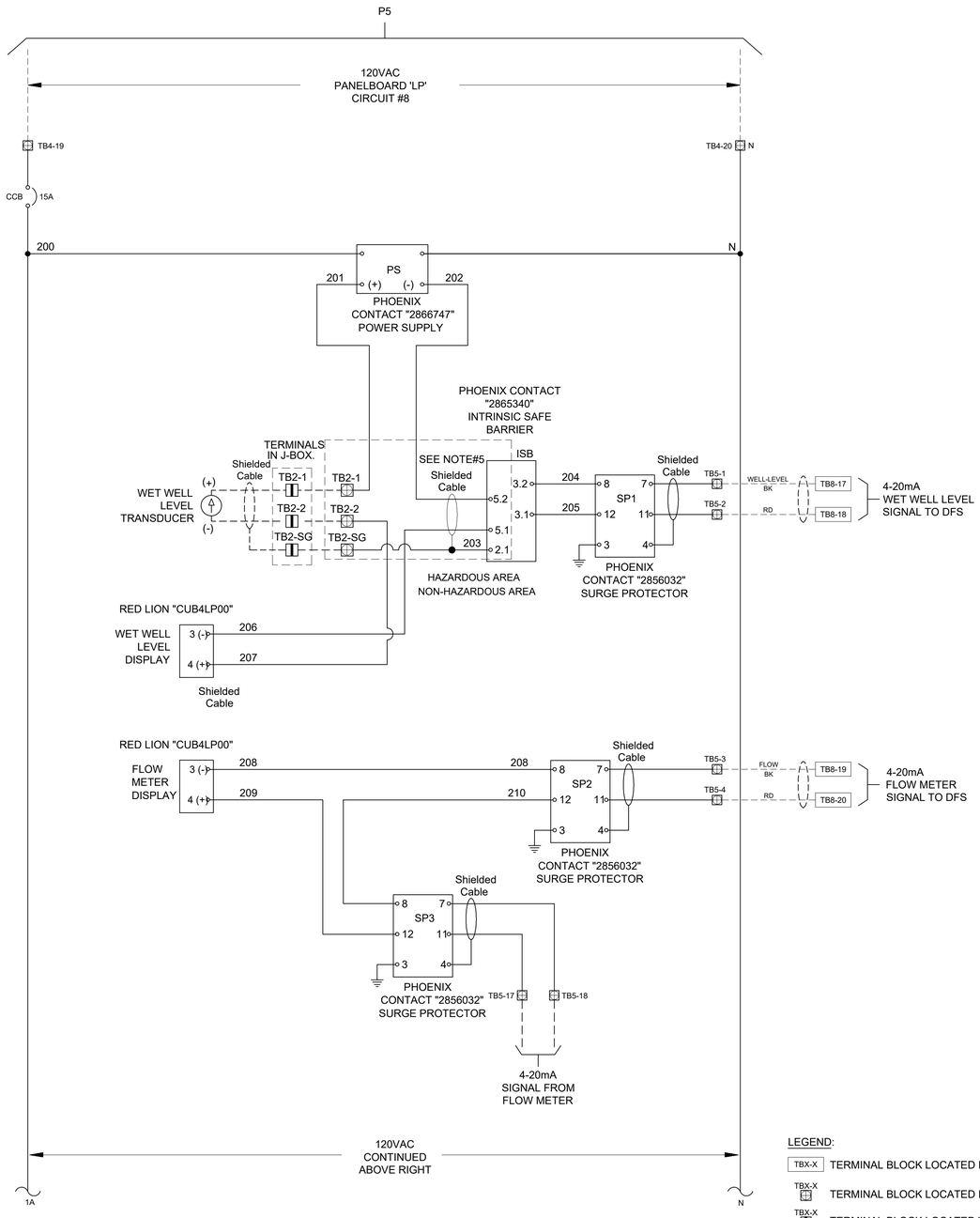
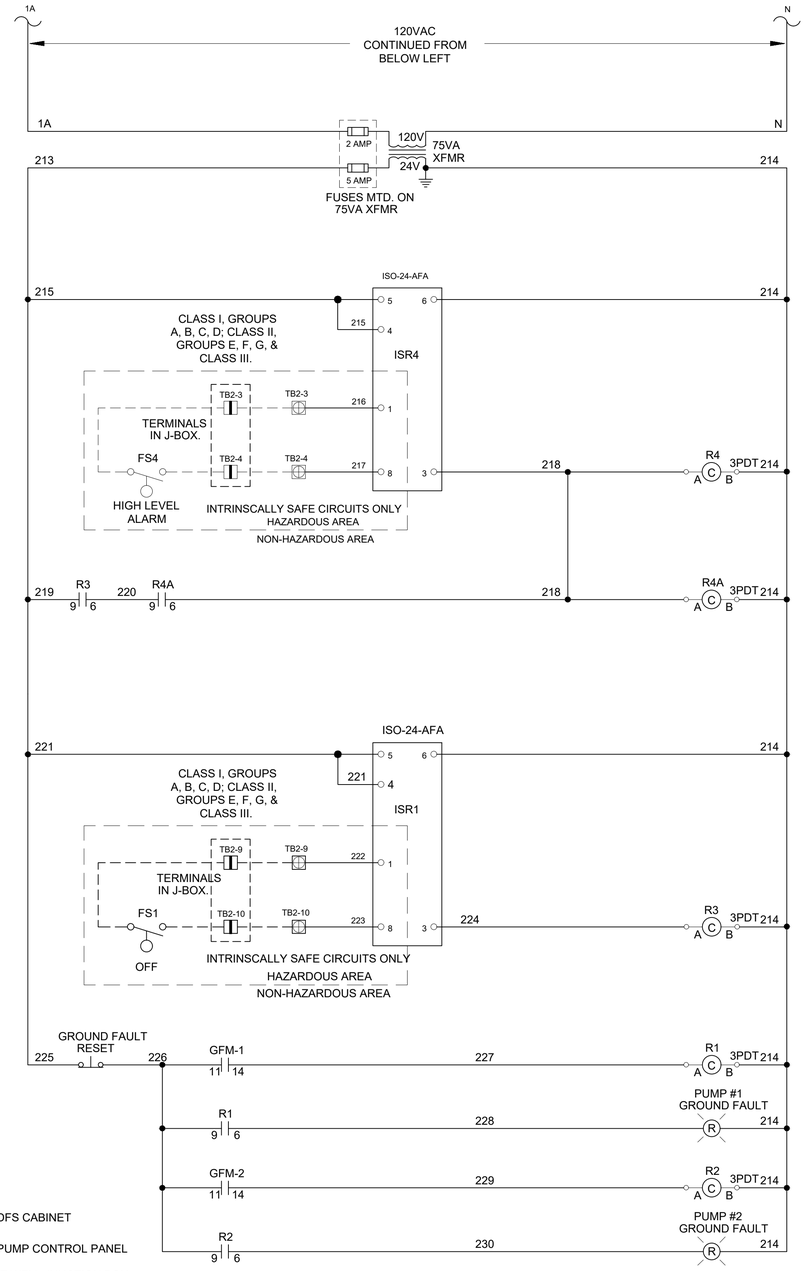
2022 STANDARD ELECTRICAL DETAILS

240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM





LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS

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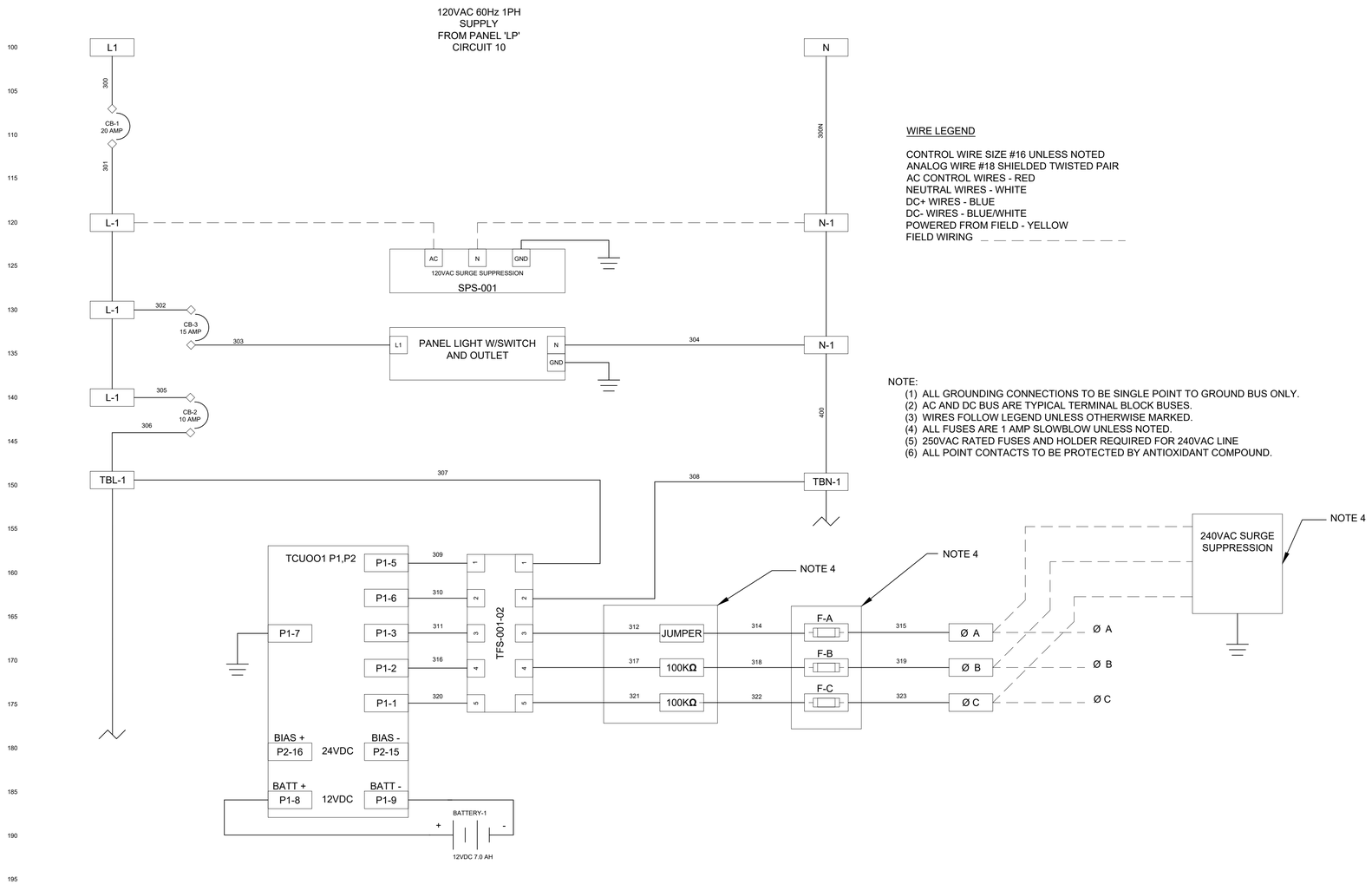
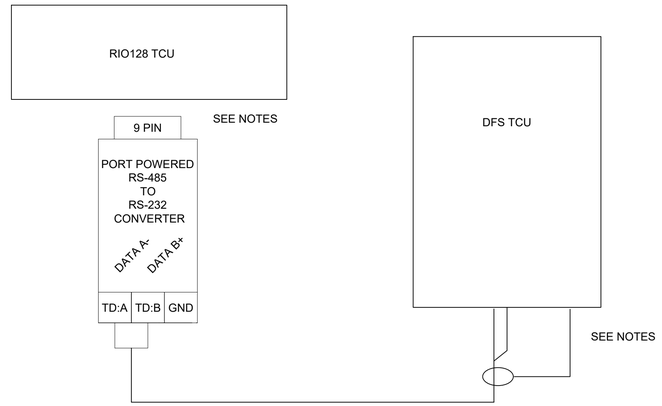


WIRE LEGEND

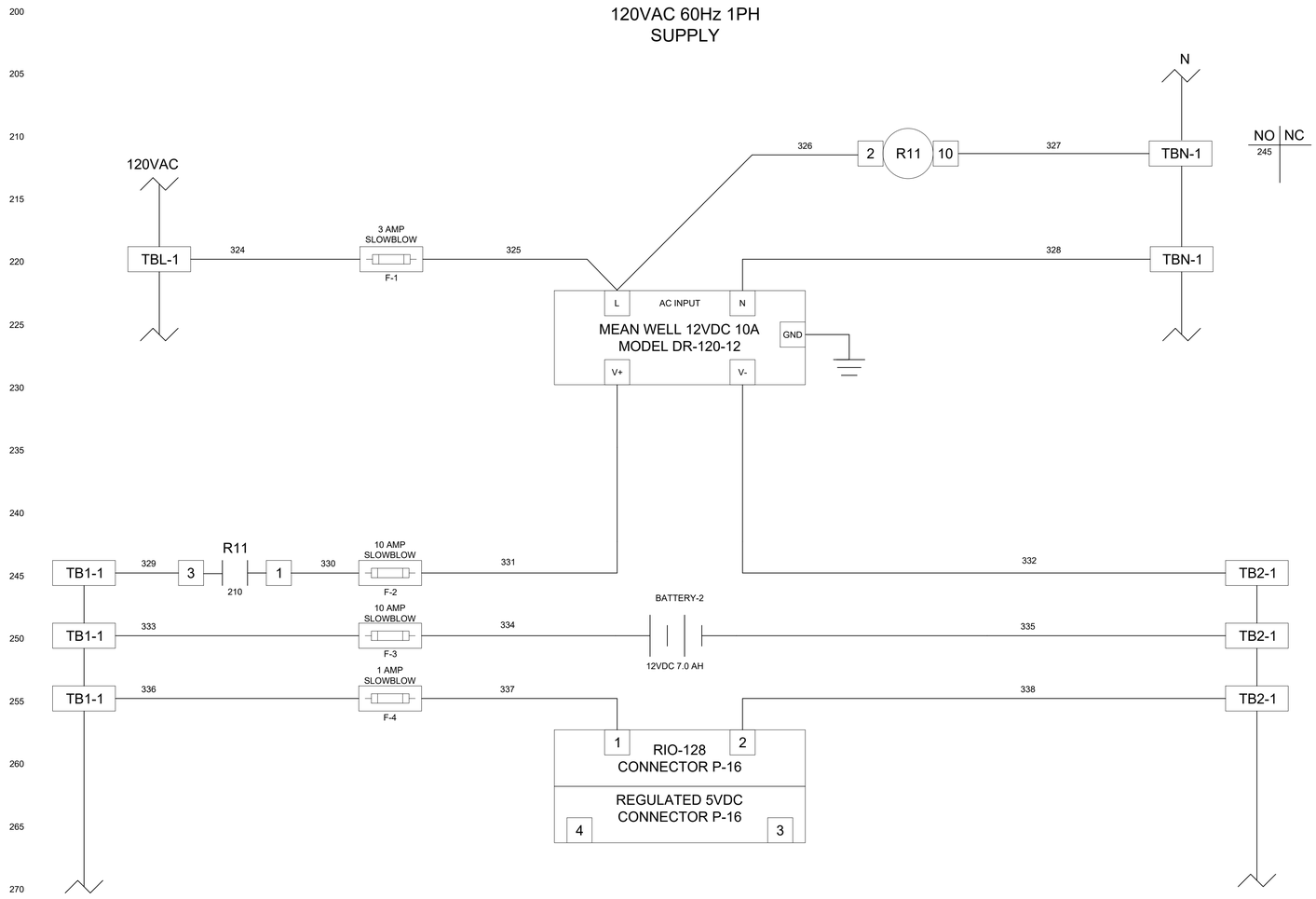
CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _ _ _

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5



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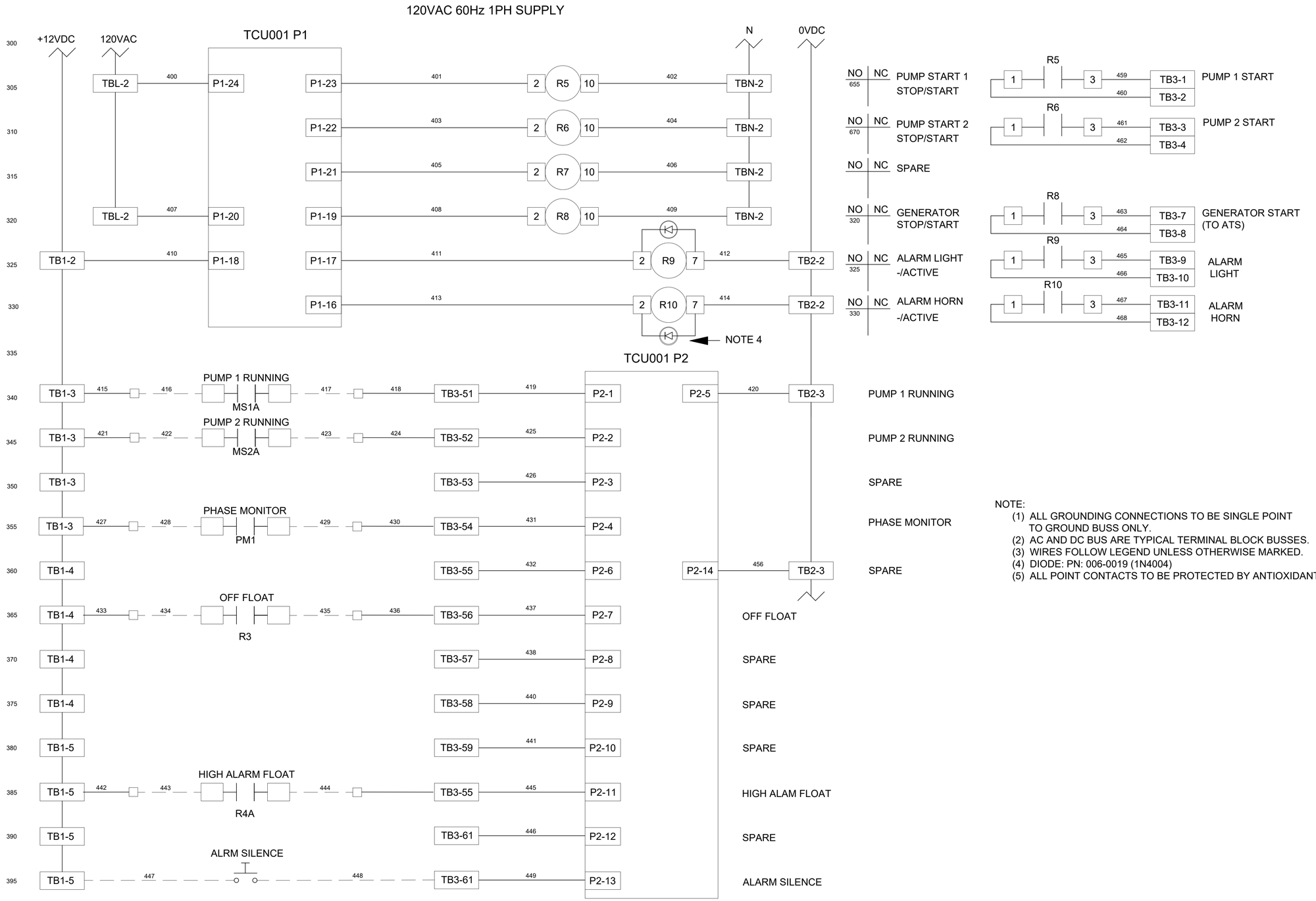
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



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(4) DIODE: PN: 006-0019 (1N4004)
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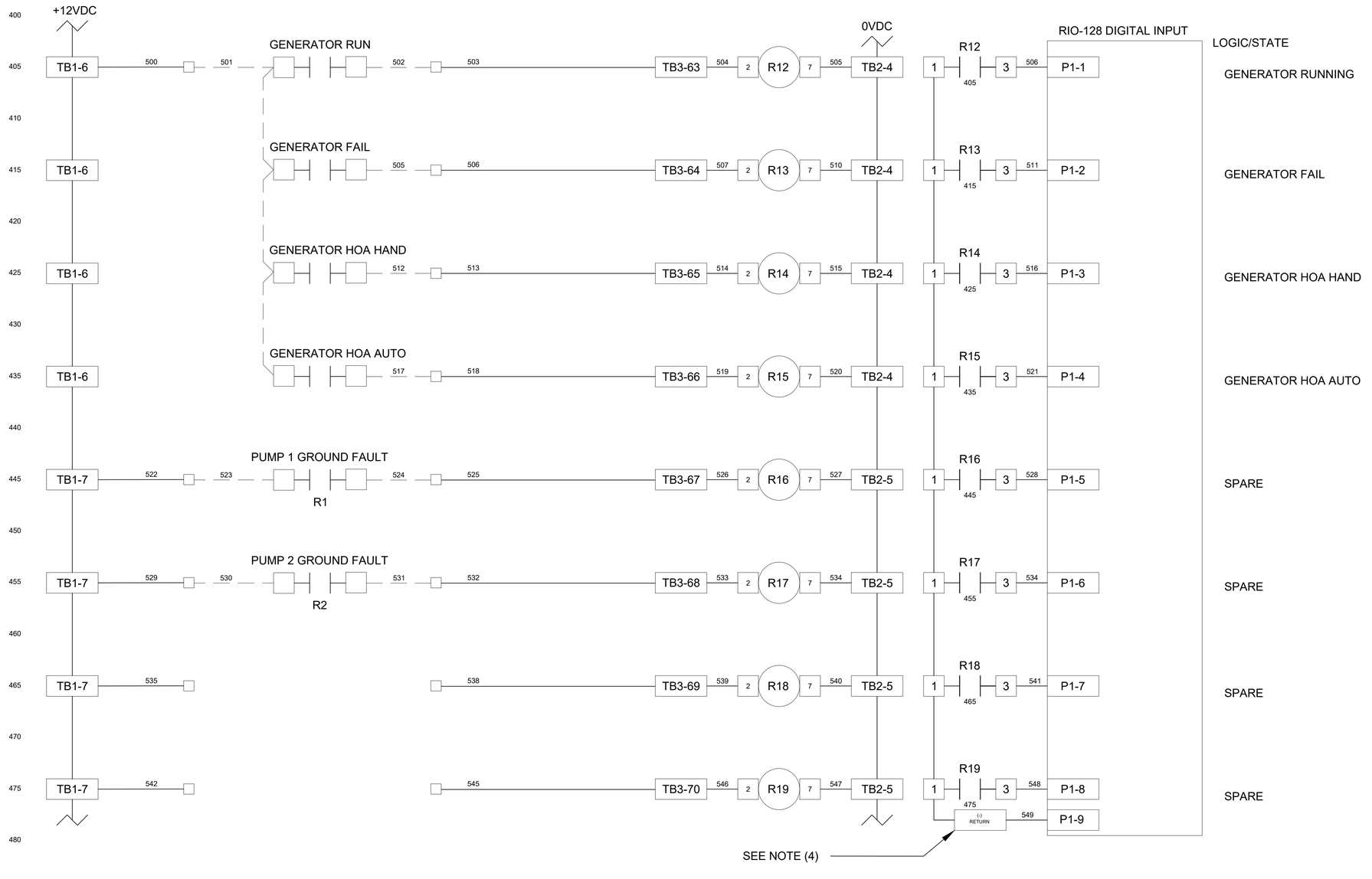

WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING

NOTE:
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(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) TERMINAL BLOCKS ARE FOR THE DC RETURN (-) BUS FOR THE RIO-128 DIGITAL INPUTS.
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CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM

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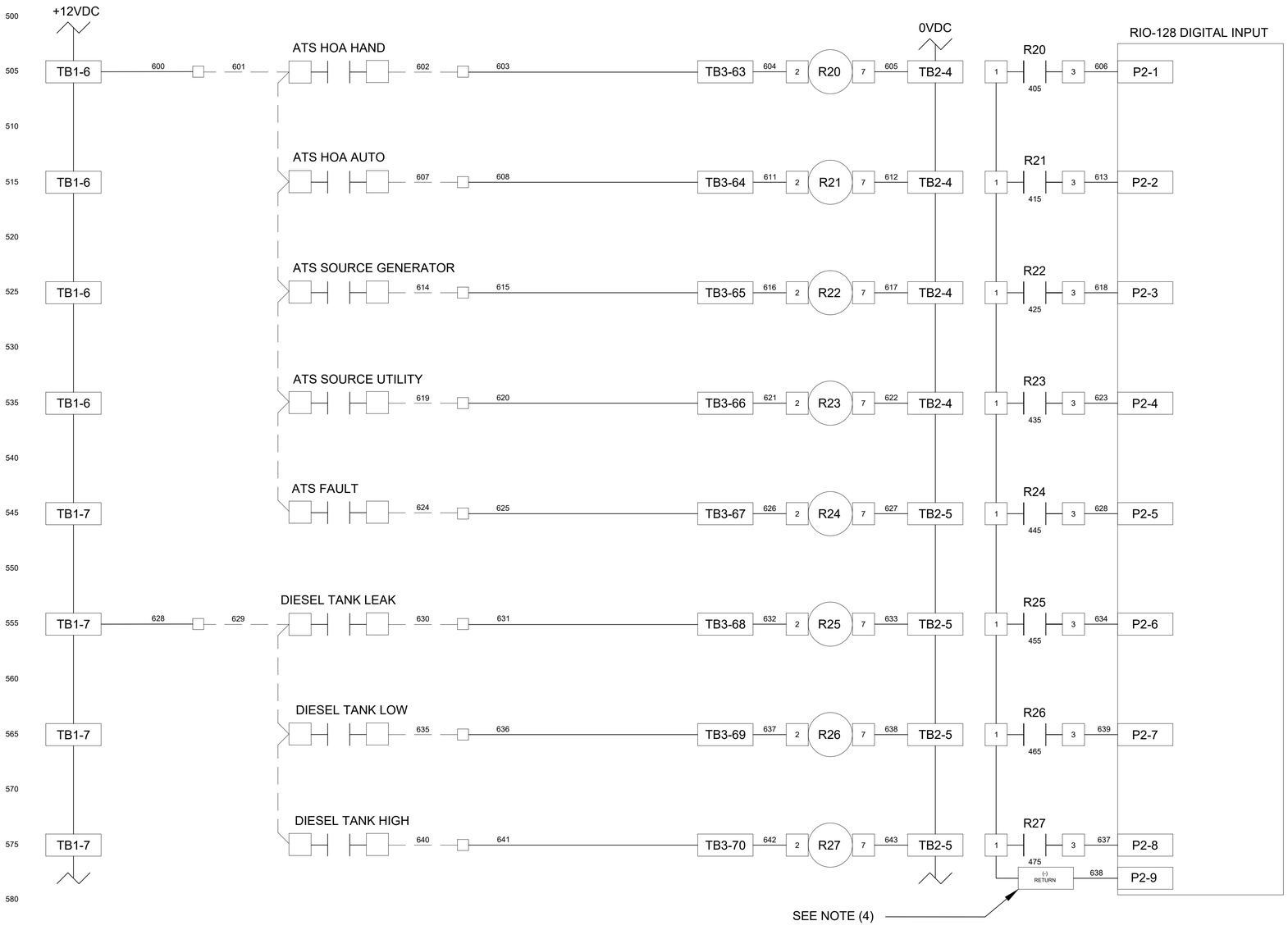

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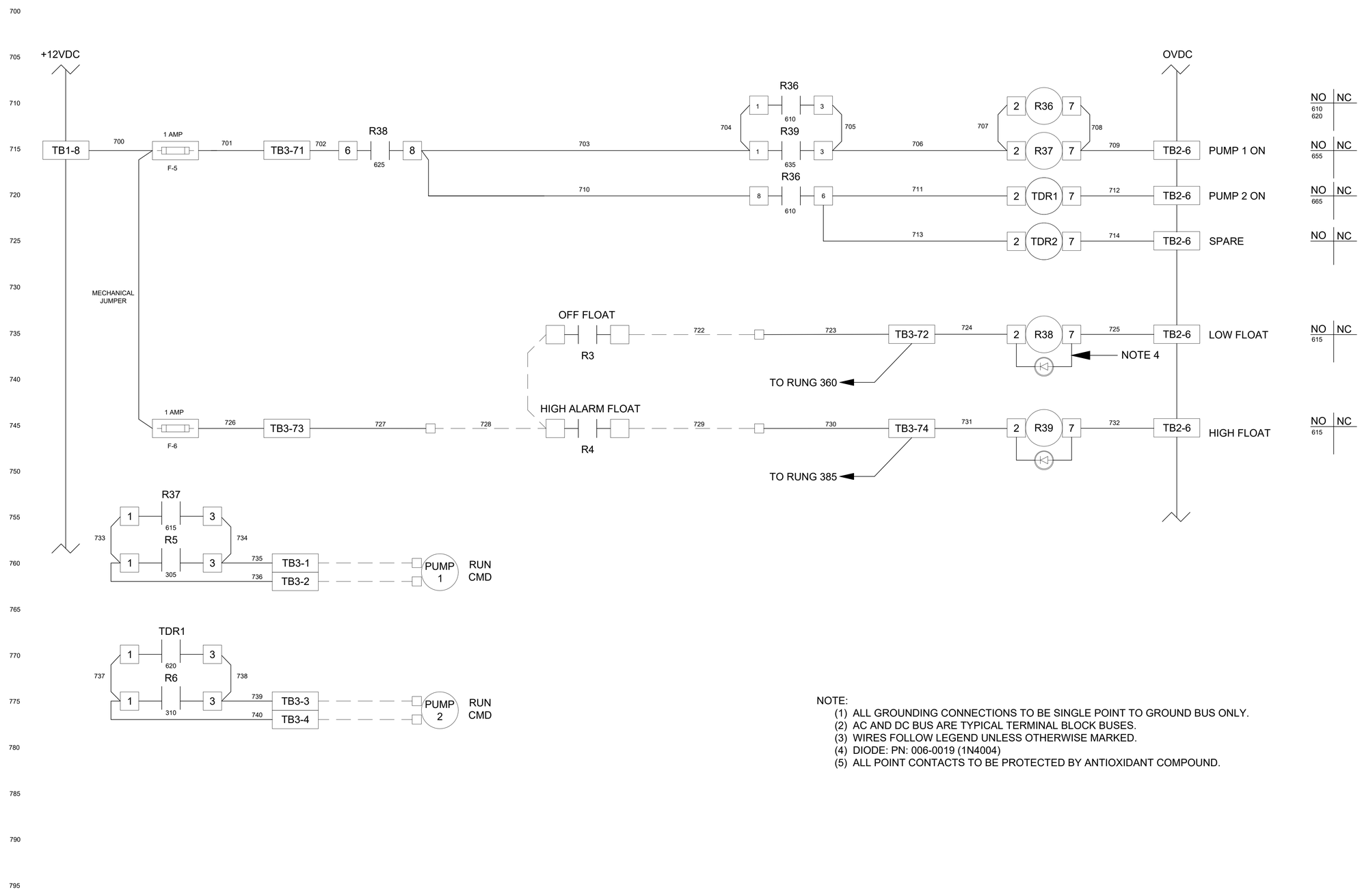
240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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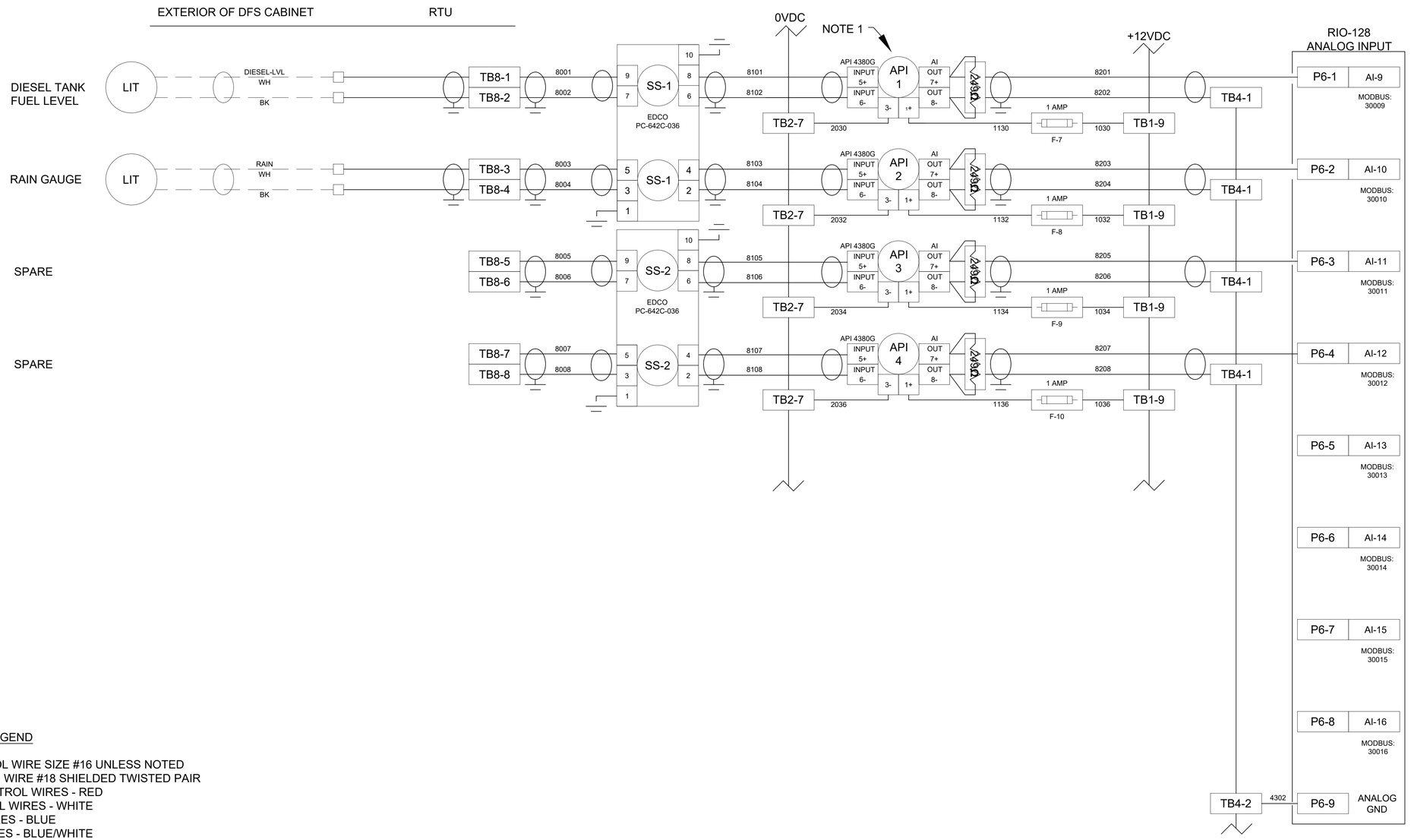

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FIELD WIRING _ __ __ __ __ __ __ __ _

NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
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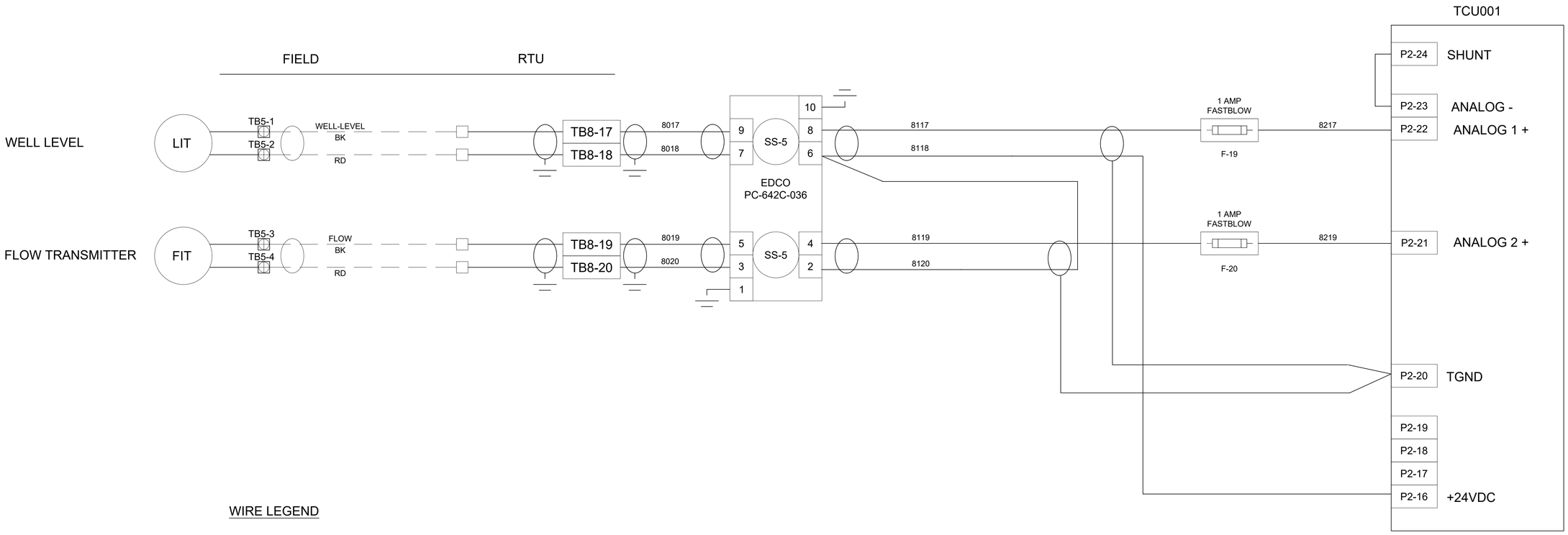

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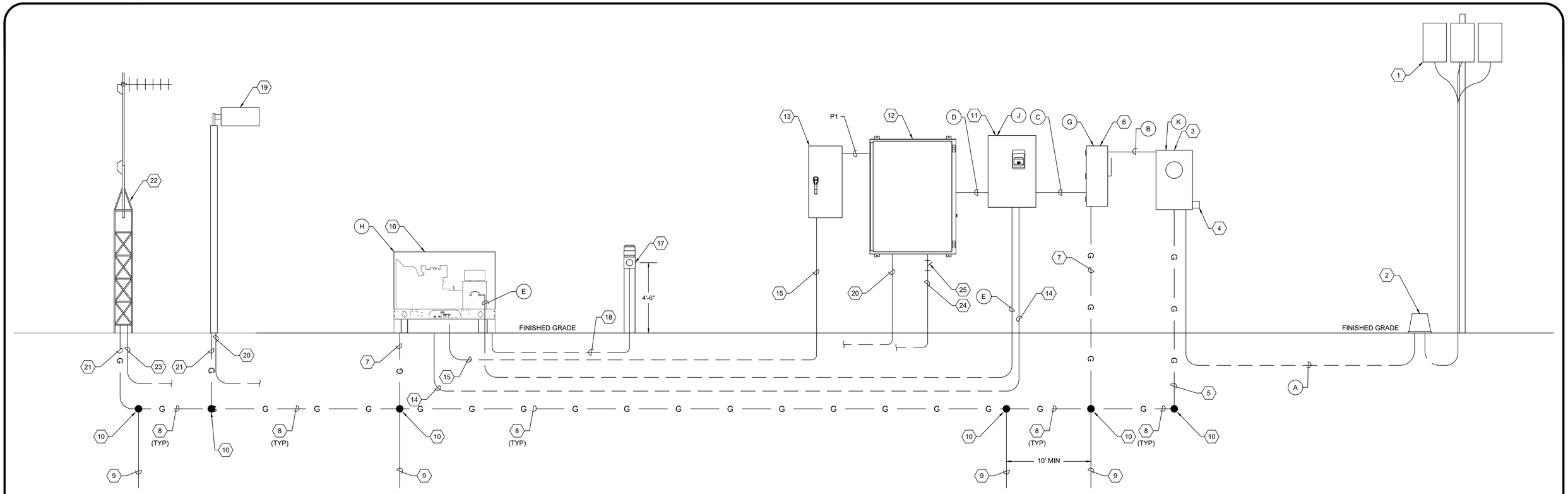


ONE LINE DIAGRAM NOTES:

1. UTILITY TRANSFORMERS. COORDINATE ALL WORK WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED PEDESTAL.
3. PROVIDE AND INSTALL NEW 480V, 3Ø, METER SOCKET. GROUND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE NEW ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH UTILITY. REFER TO SCHEDULE FOR SIZE REQUIRED PER SITE.
4. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
5. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR. COORDINATE REQUIREMENTS WITH UTILITY.
6. PROVIDE AND INSTALL NEW 240, 3-POLE DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. PROVIDE SOLID NEUTRAL AND GROUND LUG KITS TO MAKE DISCONNECT SERVICE ENTRANCE RATED. REFER TO SCHEDULE FOR AMPERE AND FUSING REQUIREMENTS.
7. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR.
8. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
9. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
10. EXOTHERMIC WELD.
11. PROVIDE AND INSTALL 3-POLE, S/N, 240V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SCHEDULE FOR SIZE.
12. PROVIDE AND INSTALL PUMP CONTROL PANEL.
13. PROVIDE AND INSTALL 240V, 60A, SINGLE-PHASE LOADCENTER IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SHEET 18 FOR PANEL SCHEDULE.
14. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
15. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
16. PROVIDE AND INSTALL NEW 240V, 3Ø, 4-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
17. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
18. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
19. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
20. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
21. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
22. NEW DFS ANTENNA.
23. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
24. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
25. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT.

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	9.4 HP STATIONS		10 HP STATIONS		11.6 HP STATIONS		12 HP LIFT STATIONS				
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	FROM:	TO:	NOTES:
(A)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL	1-1/2" C.	UTILITY	METER	
(B)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	METER	MAIN DISCONNECT	
(C)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	MAIN DISCONNECT	AUTOMATIC TRANSFER SWITCH	
(D)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	PUMP CONTROL PANEL	
(E)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	GENERATOR SET	
(F)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND		3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#6 THWN CU GND		PUMP CONTROL PANEL	GENERATOR RECEPTACLE	
(P2)	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	

EQUIPMENT				NOTES:
(G)	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	ALL DISCONNECTS SHALL BE PADLOCKABLE
(H)	240V, 3Ø, 40 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 50 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 50 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	240V, 3Ø, 50 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	
(J)	240V, 100 AMPERE TRANSFER SWITCH	240V, 125 AMPERE TRANSFER SWITCH	240V, 125 AMPERE TRANSFER SWITCH	240V, 125 AMPERE TRANSFER SWITCH	
(K)	100 AMPERE, 240V, 3-PHASE METER	125 AMPERE, 240V, 3-PHASE METER	125 AMPERE, 240V, 3-PHASE METER	125 AMPERE, 240V, 3-PHASE METER	
PUMP CONTROL PANEL					NOTES:
(L)	100 AMPERE MAIN CIRCUIT BREAKER	125 AMPERE MAIN CIRCUIT BREAKER	125 AMPERE MAIN CIRCUIT BREAKER	125 AMPERE MAIN CIRCUIT BREAKER	
(M)	100 AMPERE EMERGENCY CIRCUIT BREAKER	125 AMPERE EMERGENCY CIRCUIT BREAKER	125 AMPERE EMERGENCY CIRCUIT BREAKER	125 AMPERE EMERGENCY CIRCUIT BREAKER	
(N)	50 AMP MOTOR CIRCUIT BREAKERS	60 AMP MOTOR CIRCUIT BREAKERS	70 AMP MOTOR CIRCUIT BREAKERS	70 AMP MOTOR CIRCUIT BREAKERS	
(O)	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	
(P)	#8 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	

LOAD CALCULATION: 9.4 HP

MOTORS:

PUMP NO. 1: 9.4 HP, 240 VAC, 3 Ø, 26.0 A

PUMP NO. 2: 9.4 HP, 240 VAC, 3 Ø, 26.0 A

MOTOR SUB-TOTAL 52.0 A

+ 25% OF LARGEST MOTOR 6.5 A

SUB-TOTAL 58.5 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 78.5 A

SERVICE SIZE:

100 A, 240 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 10 HP

MOTORS:

PUMP NO. 1: 10 HP, 240 VAC, 3 Ø, 28.0 A

PUMP NO. 2: 10 HP, 240 VAC, 3 Ø, 28.0 A

MOTOR SUB-TOTAL 56.0 A

+ 25% OF LARGEST MOTOR 7.0 A

SUB-TOTAL 63.0 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 83.0 A

SERVICE SIZE:

125 A, 240 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 11.6 HP

MOTORS:

PUMP NO. 1: 11.6 HP, 240 VAC, 3 Ø, 32.5 A

PUMP NO. 2: 11.6 HP, 240 VAC, 3 Ø, 32.5 A

MOTOR SUB-TOTAL 65.0 A

+ 25% OF LARGEST MOTOR 8.1 A

SUB-TOTAL 73.1 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 93.1 A

SERVICE SIZE:

125 A, 240 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 12 HP

MOTORS:

PUMP NO. 1: 12 HP, 240 VAC, 3 Ø, 34.0 A

PUMP NO. 2: 12 HP, 240 VAC, 3 Ø, 34.0 A

MOTOR SUB-TOTAL 68.0 A

+ 25% OF LARGEST MOTOR 8.5 A

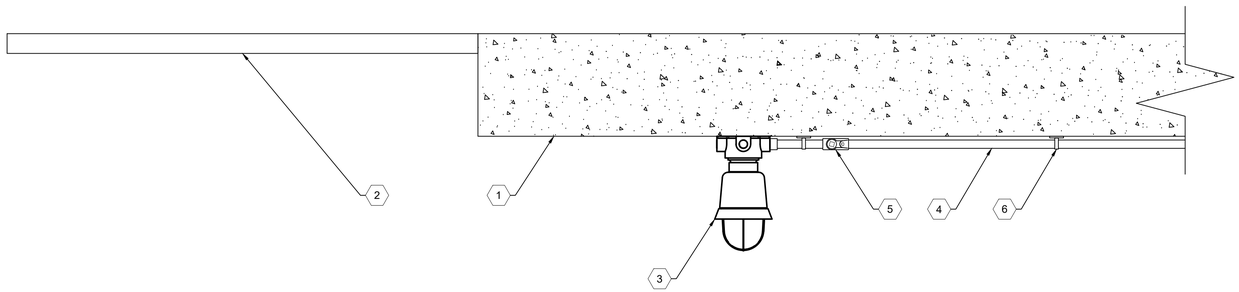
SUB-TOTAL 76.5 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 96.5 A

SERVICE SIZE:

125 A, 240 VAC, 3 Ø, 4 - WIRE MINIMUM.

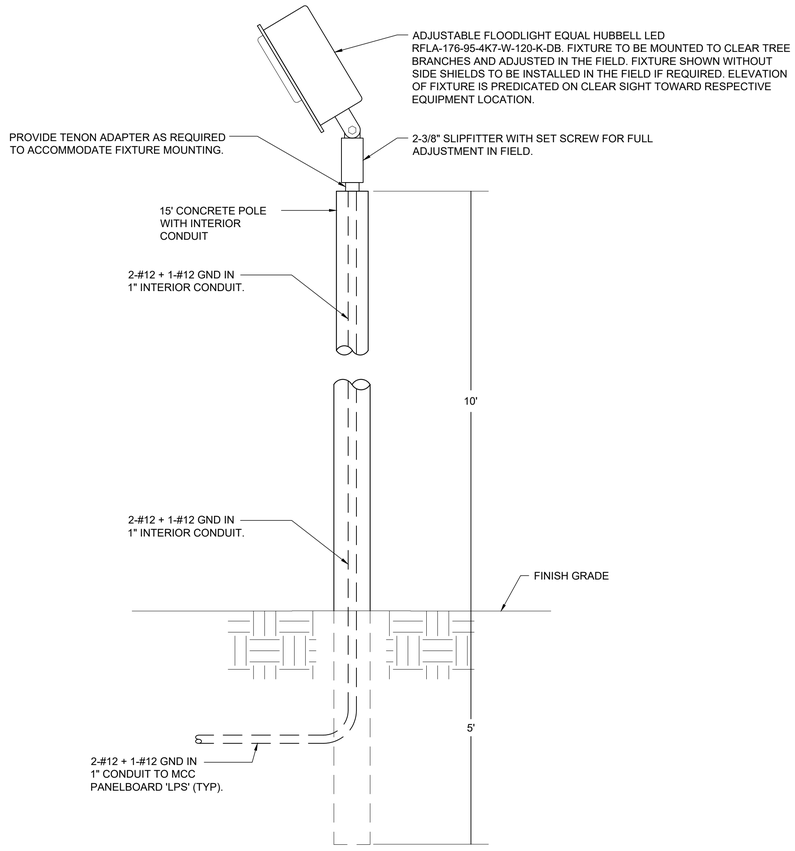


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL. CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	1-1/4"	2-#6 + 1-#6 NEU + 1-#8 GND	PUMP CONTROL PANEL	PANELBOARD 'LP'	PANELBOARD 'LP' 240V FEEDER FROM THE PUMP CONTROL PANEL.
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	QUANTITY OF AREA LIGHTS DIFFERS BETWEEN LS 54 AND LS 65.
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	3/4"	2-#10 + 1-#10 NEU + 1-#10 GND	PANELBOARD 'LP'	PANELBOARD 'LP' SURGE PROT	CONNECT SURGE PROTECTION DEVICE VIA NON-METALLIC FLEXIBLE CONDUIT.
P7	1"	6-#12 + 2-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P8	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P9	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #1 POWER.
P10	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #2 POWER.
P11	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P12	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #1 POWER.
P13	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #2 POWER.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1"	TWO (2) 2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	DFS CABINET	4-20mA FLOW METER SIGNAL AND LEVEL TRANSMITTER SIGNAL. BOTH CABLES SHALL BE BELDEN 8719.
C8	1-1/4"	20-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/4"	14-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C16	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. QO ; 120/240 VOLTS, 1Ø, 3W ; 60 AMP MAIN CIRCUIT BREAKER ; 35K AIC RATING ; SURFACE ENCLOSURE TOP AT 5'-6" AFF

EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE		CIRC.	CIRC.	KVA/PHASE		CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	NO.	NO.	A	B	POLE	AMPS	FRAME	
SURGE PROTECTION DEVICE	2	30	QOB	.		1	2	0.8		1	20	QOB	PUMP CONTROL PANEL RECEPTACLE
" "	-	-	-		.	3	4		1.0	1	20	QOB	PUMP CONTROL PANEL LIGHTS
GENERATOR BLOCK HEATER	2	20	QOB	1.2		5	6	0.4		1	20	QOB	PUMP CONTROL PANEL CONTROLS
" "	-	-	-		1.2	7	8		0.4	1	20	QOB	PUMP CONTROL PANEL CONTROLS
GENERATOR ALTERNATOR HEATER	1	20	QOB	0.8		9	10	0.6		1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB		1.0	11	12		.				SPACE
FLOW METER TRANSMITTER	1	20	QOB	0.2		13	14	.		--	--	--	SPACE
SPARE	1	20	QOB		.	15	16		.	--	--	--	SPACE
SUB-TOTAL KVA				2.2	2.2			1.8	1.4				

TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

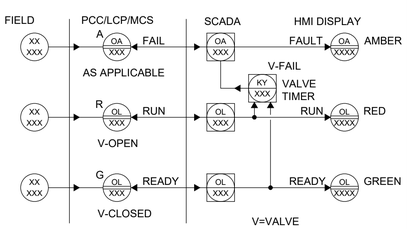
FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS					
	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED

S = STATUS

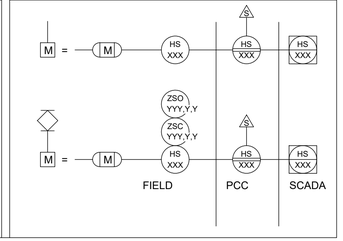
THIS SYMBOL INDICATES THE FOLLOWING INSTRUMENTATION

(NOTE : VALVE FAULT IS PLC GENERATED)



TYPICAL FOR M

(IF NOT OTHERWISE ILLUSTRATED ON DRAWINGS)



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK —D——D—

RADIO LINK —R——R—

FIBER OPTIC DATA —F——F—

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT

SP = SET POINT INPUT

C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT

AO = ANALOG OUTPUT

DI = DISCRETE INPUT

DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO

S/S = START/STOP

SEL = SELECTOR

O/C = OPEN/CLOSE

O/O = ON/OFF

LOS = LOCKOUT-START

LOR = LOCAL-OFF-REMOTE

OAC = OPEN-AUTO CLOSE

CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN

O/R = OVERRIDE

MCS = MASTER CONTROL STATION

VFD = VARIABLE FREQUENCY DRIVE

PCC = PROCESS CONTROL CABINET

LCP = LOCAL CONTROL PANEL

ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN

E = ENGINE

G = GENERATOR

F = FILTER

GS = GRINDER/SCREEN

K = COMPRESSOR

H = HOIST

ME = MECHANICAL EQUIPMENT

MX = MIXER

P = PUMP

T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.

PLC - PROGRAMMABLE LOGIC CONTROL

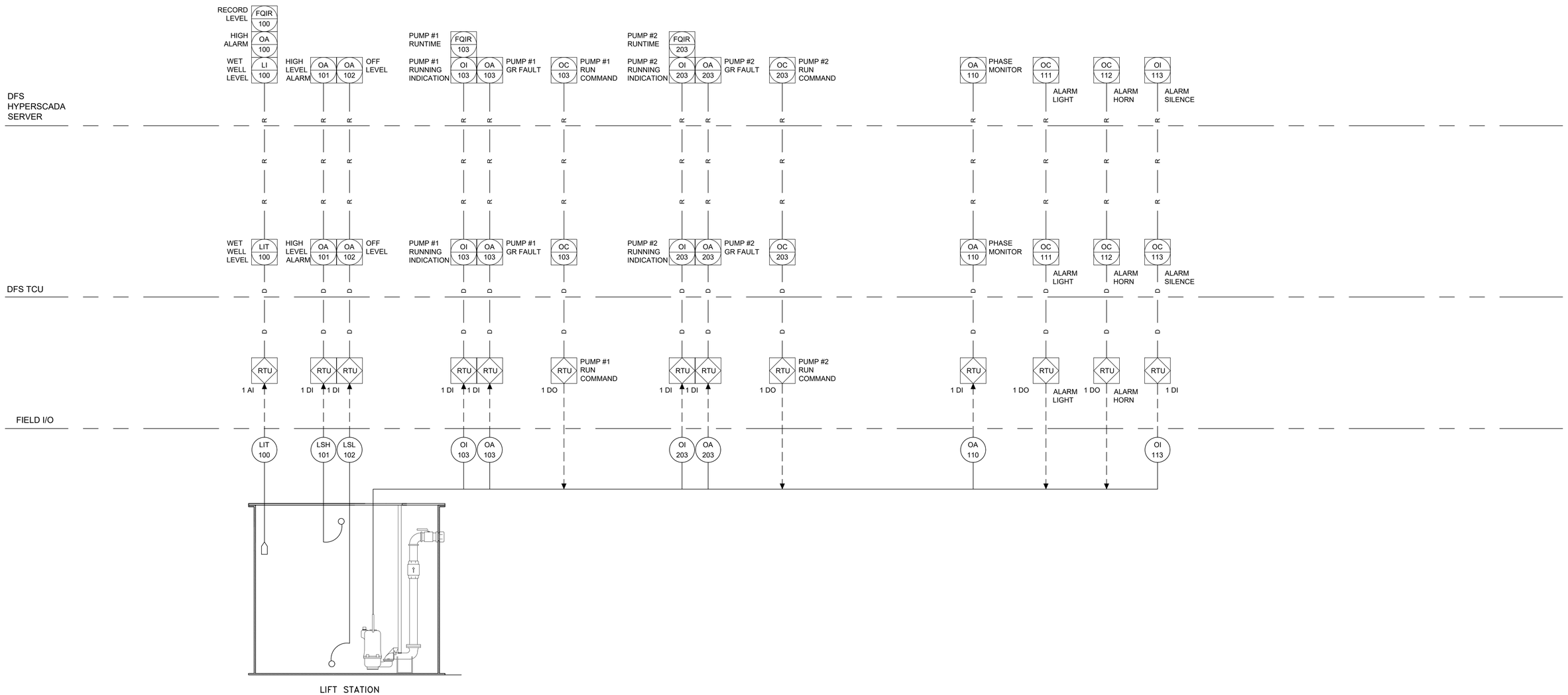
SA - SURGE SUPPRESSOR DEVICE

I INTERLOCK

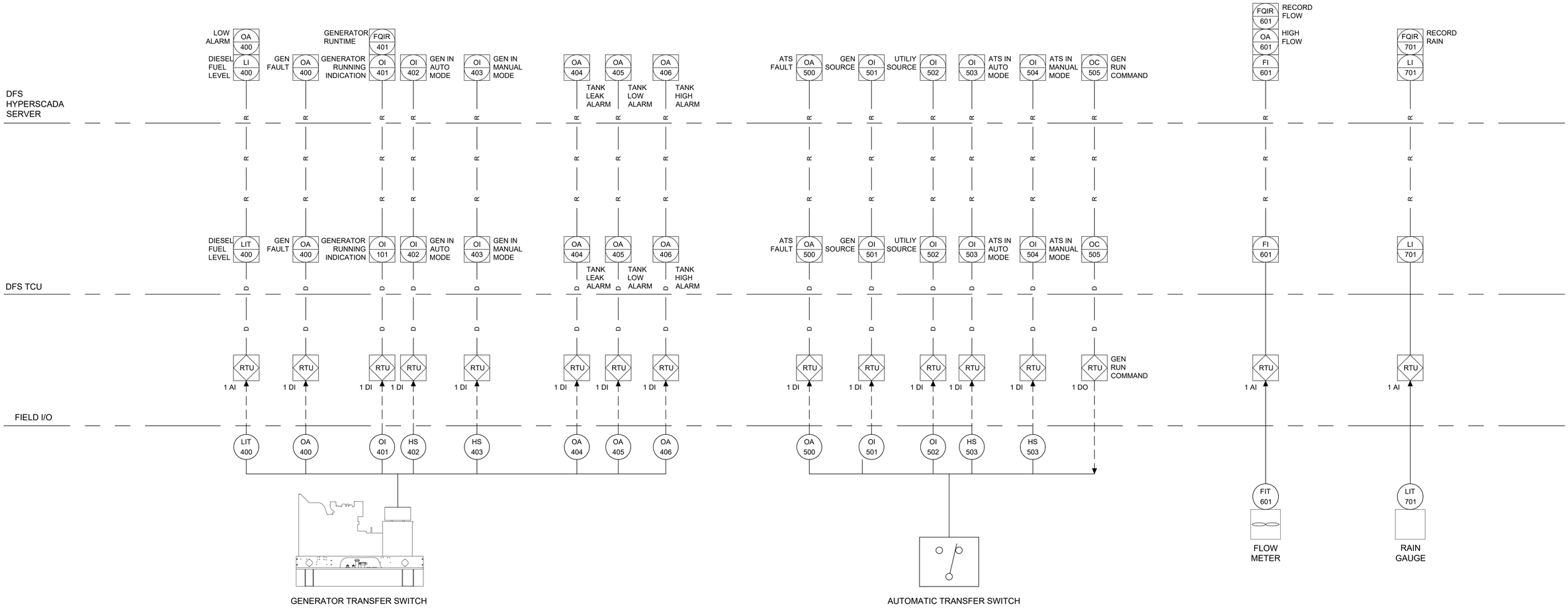
I-3 CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊟	OR	⊟⊟	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊟	OR	⊟⊟	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**240V 3-PH, DUPLEX 9.4 TO 12 HP**	**TYPICAL LIFT STATION P&ID'S**	INDEX NO. 804	PAGE NO. 20 OF 21
				LATEST REVISION	11/2022



CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

240V 3-PH, DUPLEX 9.4 TO 12 HP

TYPICAL LIFT STATION P&ID'S

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SHEET INDEX

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1	COVER SHEET
2	480V 3-PHASE, DUPLEX PUMP LIFT STATION 15 TO 20 HP ELECTRICAL STANDARDS
3	480V 3-PHASE, DUPLEX PUMP STATION EQUIPMENT RACK ELEVATION
4	TYPICAL PUMP CONTROL PANEL, DFS CABINET & JUNCTION BOX DETAILS
5	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM
6	TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS
7	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
8	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
9	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
10	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
11	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
12	TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM
13	PUMP STATION PROPOSED STRUCTURAL LAYOUT
14	PUMP STATION PROPOSED STRUCTURAL LAYOUT
15	TYPICAL LIFT STATION ONE LINE DIAGRAM
16	ELECTRICAL SCHEDULES AND LOAD CALCULATIONS
17	TYPICAL LIFT STATION ELECTRICAL DETAILS
18	CONDUIT AND CABLE SCHEDULE AND PANEL SCHEDULE
19	INSTRUMENTATION LEGEND ABBREVIATIONS AND SYMBOLS
20	TYPICAL LIFT STATION P&IDs
21	TYPICAL LIFT STATION P&IDs

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

INDEX 805:
PUMP STATION STANDARD ELECTRICAL DETAILS
480V 3-PH PUMP 15 TO 20 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

$ SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:

NEUTRAL WIRE

ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

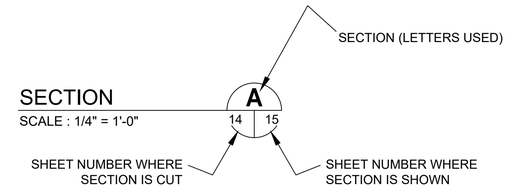
PUMP THERMAL SENSOR

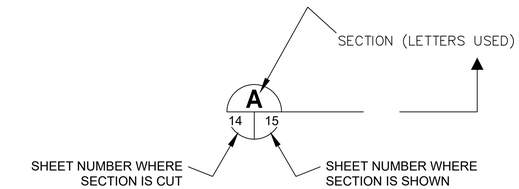
FAN THERMOSTAT

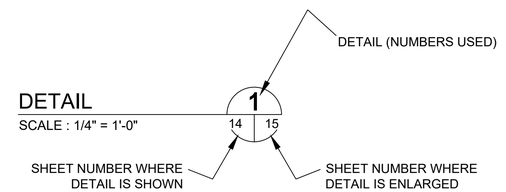
ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL







CITY OF CLEARWATER
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CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 15 TO 20 HP

480V 3-PHASE, DUPLEX PUMP LIFT STATION 15 TO 20 HP ELECTRICAL STANDARDS

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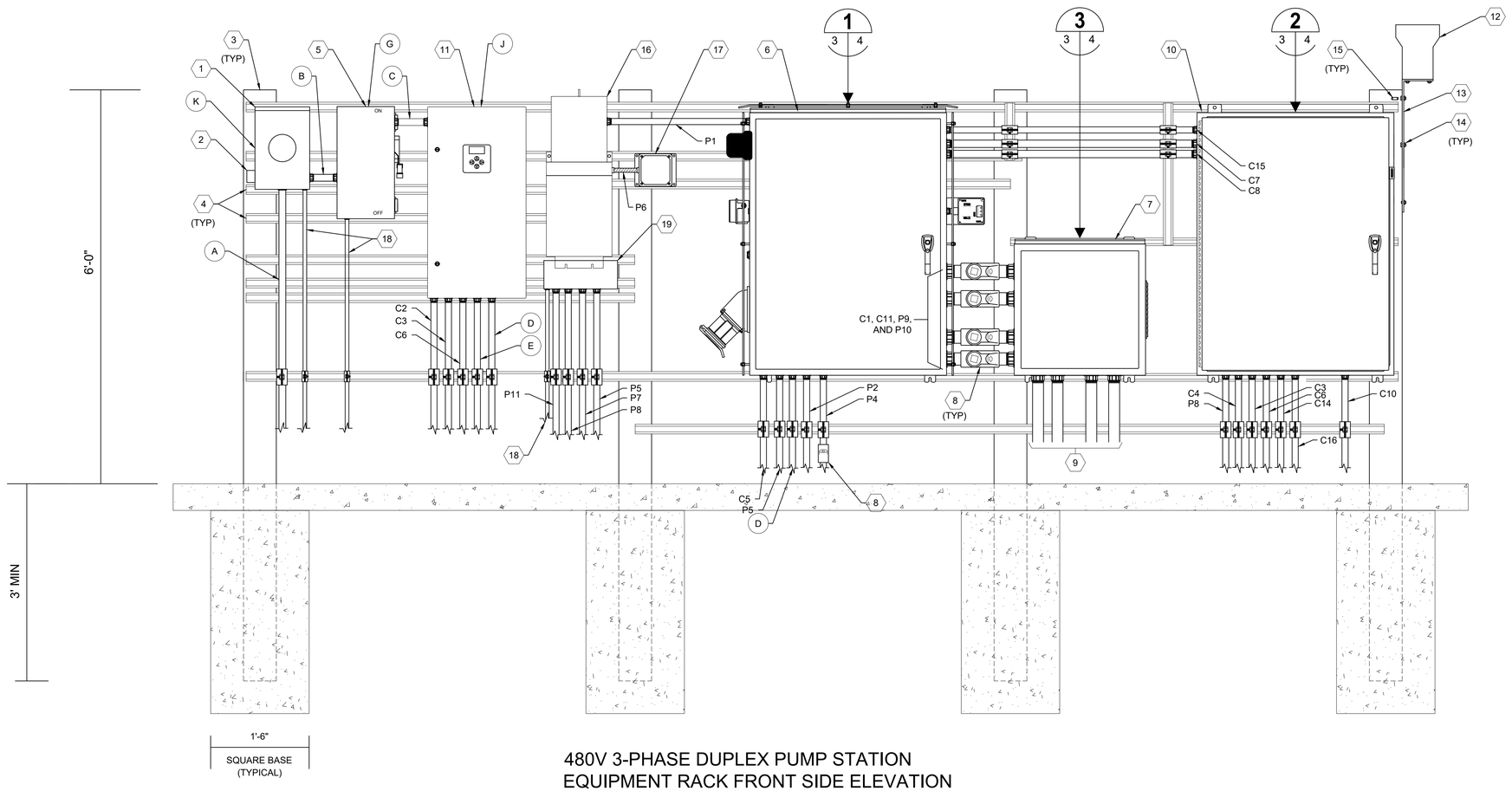


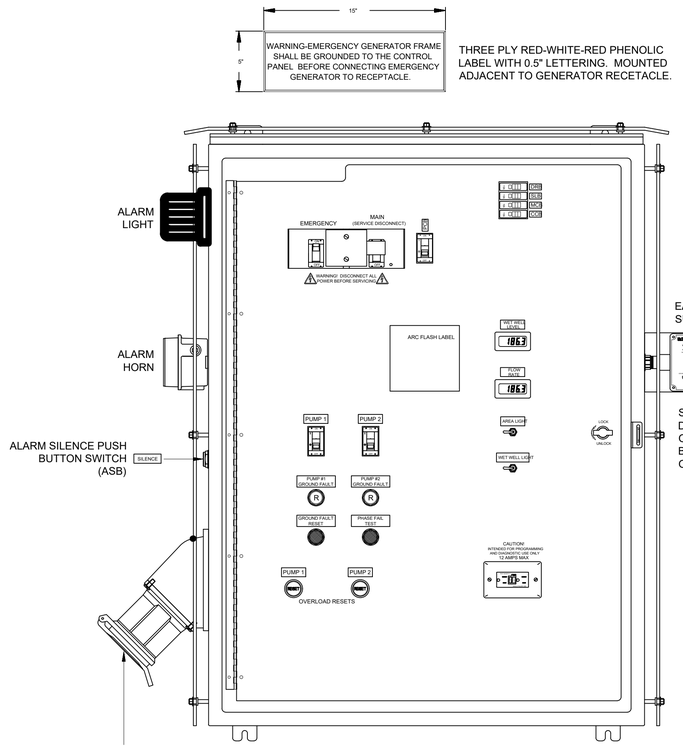
480V 3-PHASE DUPLEX PUMP STATION
EQUIPMENT RACK FRONT SIDE ELEVATION
SCALE : NONE

KEYED NOTES:

1. PROVIDE AND INSTALL METER SOCKET. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. COORDINATE REQUIREMENTS WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
3. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
4. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
5. PROVIDE AND INSTALL 3-POLE, 480V, FUSED DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. DISCONNECT SHALL BE PAD-LOCKABLE.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAIL ON SHEET 4.
7. PROVIDE AND INSTALL NEW 24" x 24" x 8" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 4.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12, C13, P12 AND P13. CABLES FOR PUMP MOTORS, LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.
10. DATA FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 4.
11. PROVIDE AND INSTALL NEW 480V, 3-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH (ATS). REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
12. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
13. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
14. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
15. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).
16. PROVIDE AND INSTALL 10 KVA, 480V-120/240V, SINGLE-PHASE MINI-POWER ZONE IN NEMA 3R STAINLESS STEEL ENCLOSURE. SQUARE D MPZB10S40FSS. REFER TO SHEET 18 FOR PANEL SCHEDULE.
17. PROVIDE AND INSTALL SURGE PROTECTION DEVICE (SPD) UNIT, 120/240V, 1Ø, TYPE 1, ASCO SERIES 400, IN NEMA 4X ENCLOSURE.
18. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT.
19. PROVIDE AND INSTALL NEMA 3R STAINLESS STEEL WIREWAY TO ACCOMMODATE REQUIRED CONDUITS (IF NECESSARY). SIZE WIREWAY IN ACCORDANCE WITH NEC REQUIREMENTS.

GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. PROVIDE CONDUIT AND CONDUCTOR BETWEEN PUMP CONTROL PANEL AND NEW DFS RTU ENCLOSURE AS REQUIRED (NOT SHOWN FOR CLARITY).



PUMP CONTROL PANEL DETAIL 1

SCALE : N.T.S.

3 | 4

INNER DOOR VIEW

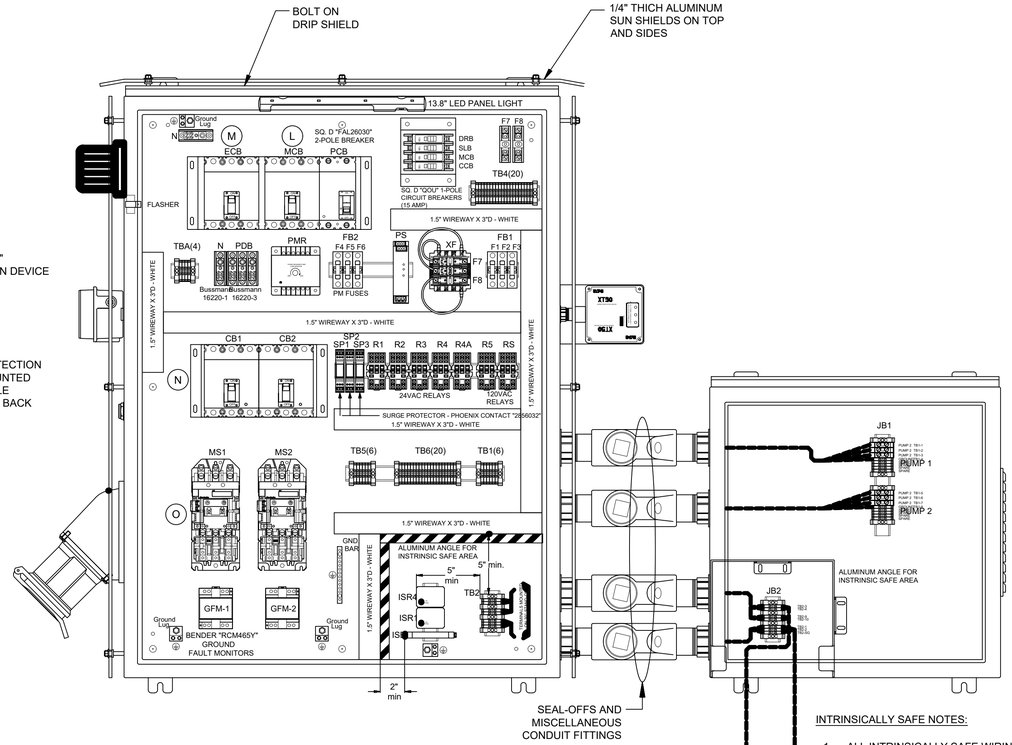
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:

HAMMOND HW483612S16HK (48"H x 36"W x 12"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD, PAD-LOCKING HASP AND 0.25" THICK ALUMINUM SUN SHIELDS ON TOP AND SIDES. OUTER DOOR SHALL HAVE ROLLER CAM TYPE 3-POINT, PAD-LOCKABLE HANDLE, WELDED ON STUDS FOR PRINT POCKET AND 90° STOP.

INNER DOOR:

HID-4836, 0.125 BLACK ENGRAVED ALUMINUM WITH CONTINUOUS HINGE, TWIST LATCHES, AND 90° STOP.



PUMP CONTROL PANEL BACK PANEL

SCALE : N.T.S.

BACK PANEL:

HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

INTRINSICALLY SAFE NOTES:

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.

JUNCTION BOX ENCLOSURE DETAIL 3

SCALE : N.T.S.

3 | 4

JUNCTION BOX:

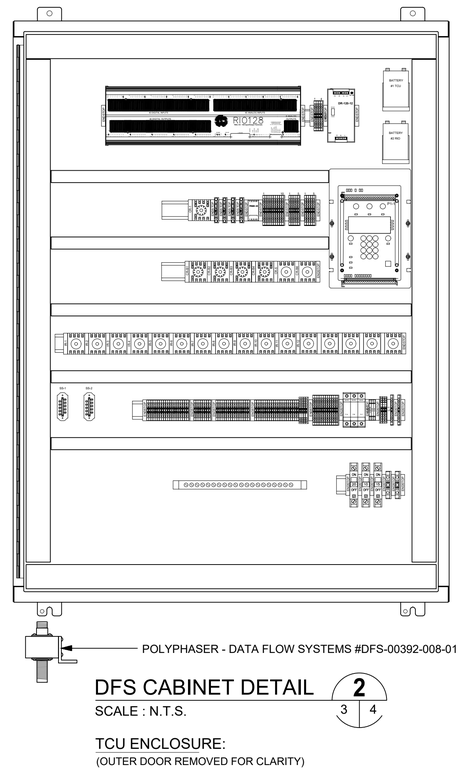
SPN4SS6-24248 (24"H x 24"W x 8"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD. OUTER DOOR HAS STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:

SPP-2424 (21"H x 21"W) FABRICATED FROM 12GA. WHITE ENAMELED STEEL.

LOUVER:

WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



DFS CABINET DETAIL 2

SCALE : N.T.S.

3 | 4

TCU ENCLOSURE:

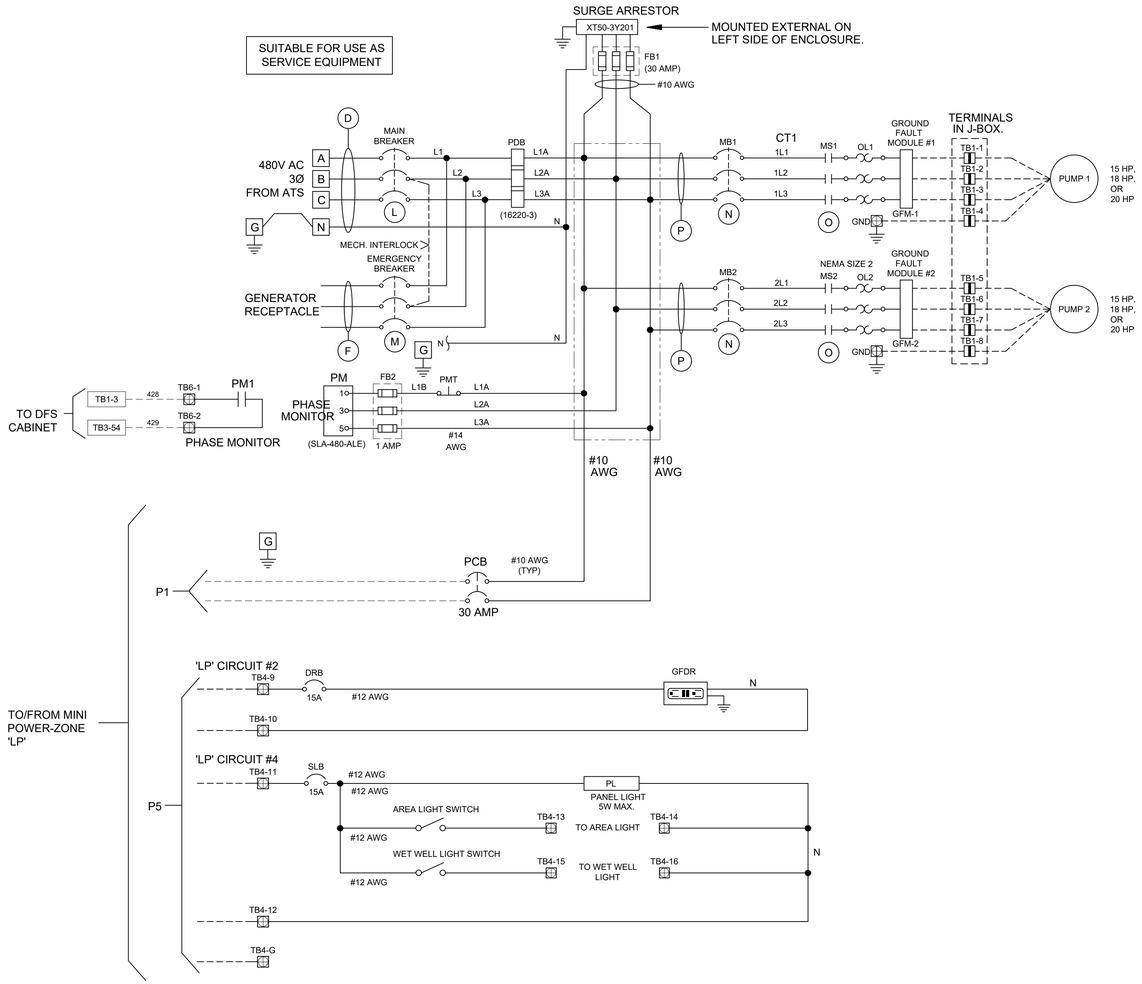
(OUTER DOOR REMOVED FOR CLARITY)

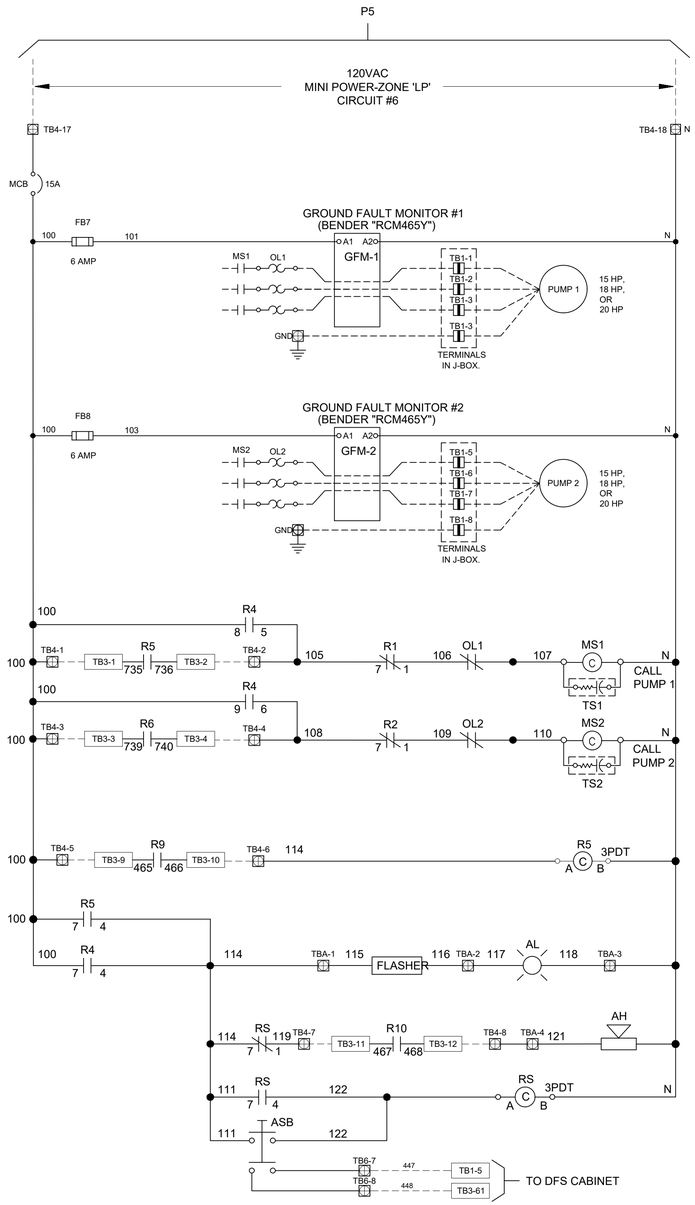
ENCLOSURE:

HAMMOND HW483612GYHK (48"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

BACK PANEL:

HAMMOND 18P4533 (45"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.





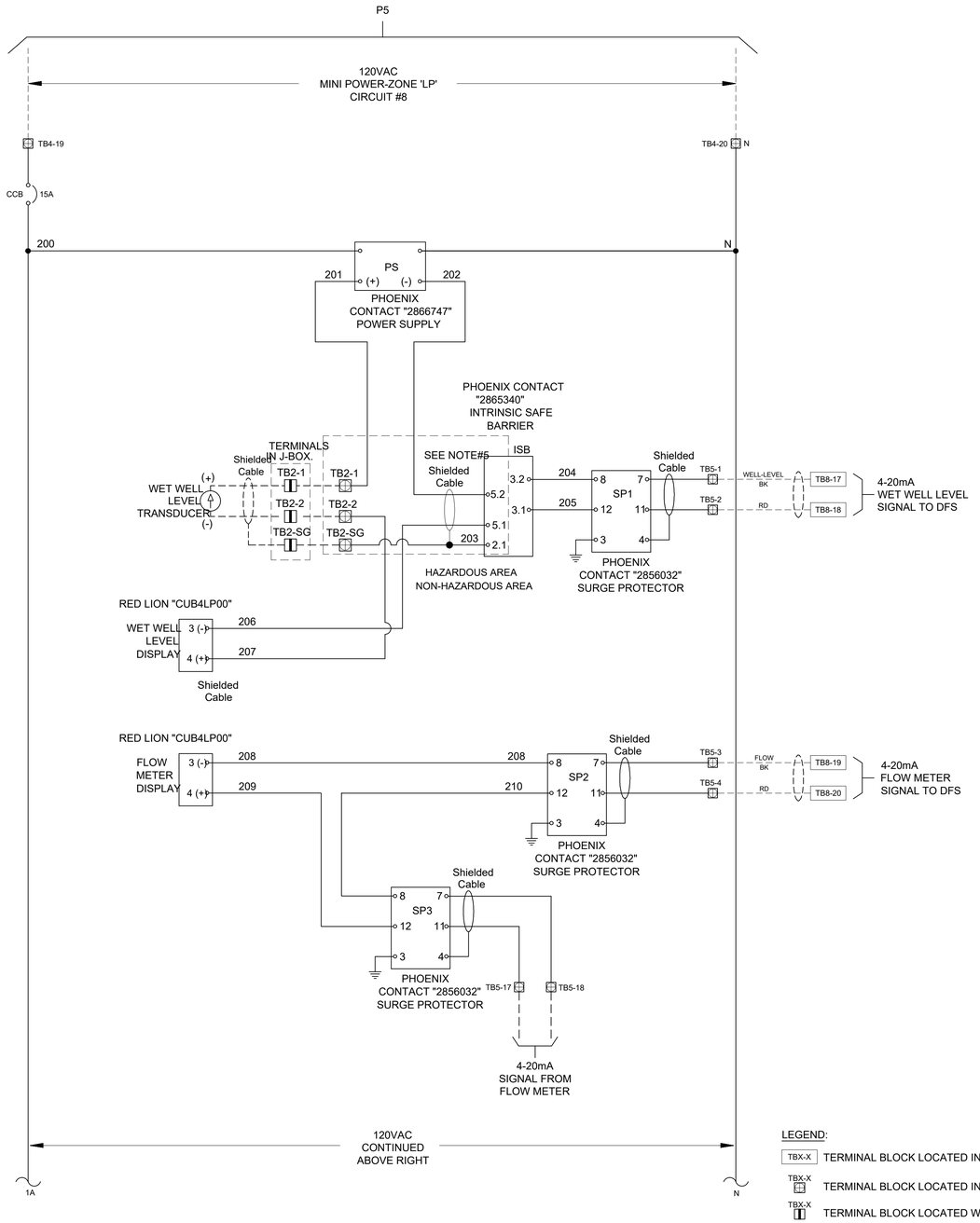
NOTES:

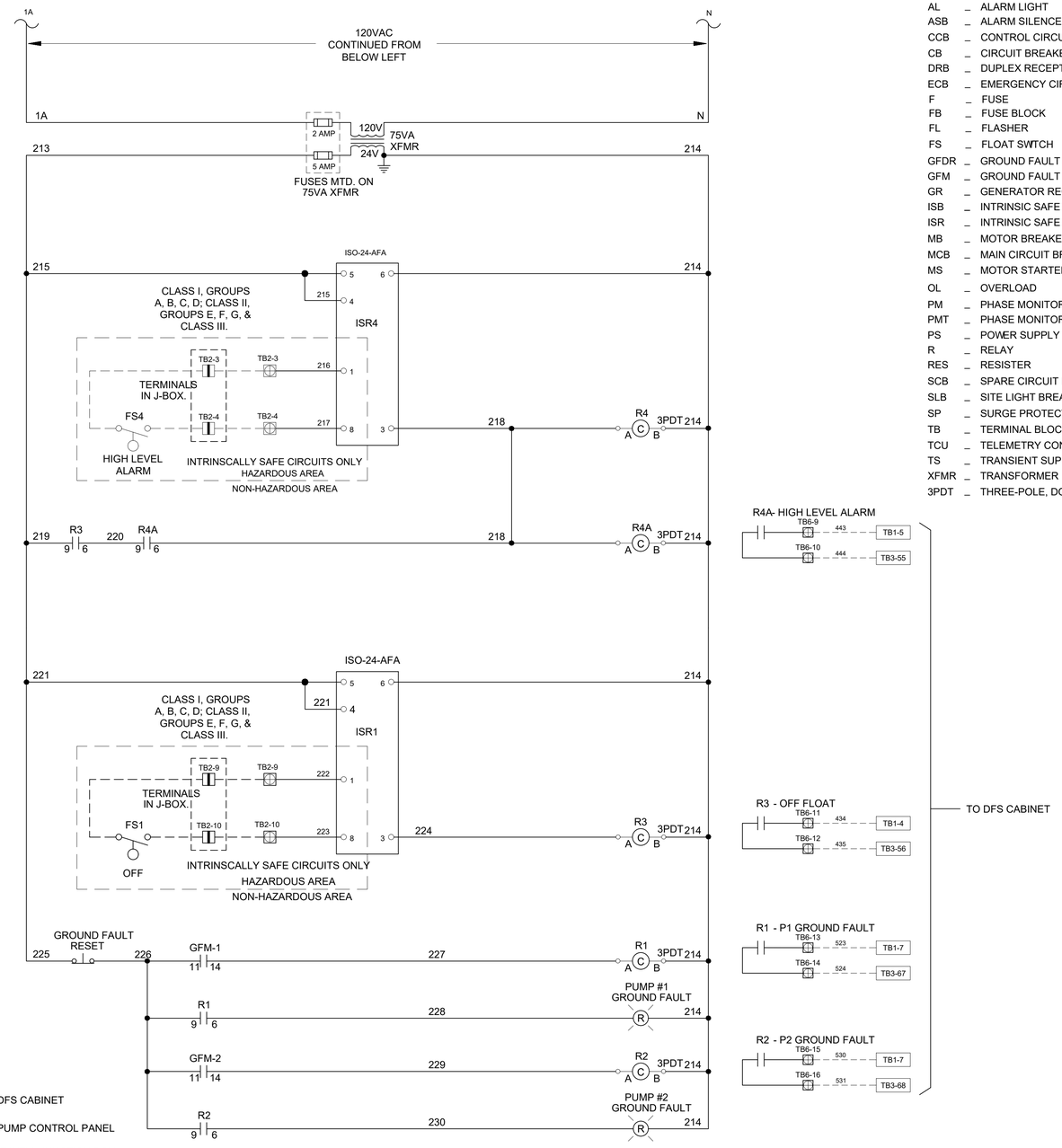
1. PANEL SHALL BE U.L. 698A LABELED FOR HAZARDOUS LOCATIONS AND SERVICE ENTRANCE RATED.
2. ANTENNA CABLE SURGE SUPPRESSOR SHALL NOT BE LOCATED OR MOUNTED IN THE INTRINSICALLY SAFE AREA.
3. CONTROL WIRING SHALL BE #14 AWG.
4. INTRINSICALLY SAFE WIRING TO BE LIGHT BLUE IN COLOR.
5. REFER TO MANUFACTURER'S TECHNICAL DATA SHEET FOR PROPER WIRING OF THIS DEVICE PER INTRINSICALLY SAFE DEVICES.
6. ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**480V 3-PH, DUPLEX 15 TO 20 HP**	**TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM**	INDEX NO. 805 / PAGE NO. 5 OF 21 LATEST REVISION 11/2022





LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

LEGEND:

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2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 15 TO 20 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS

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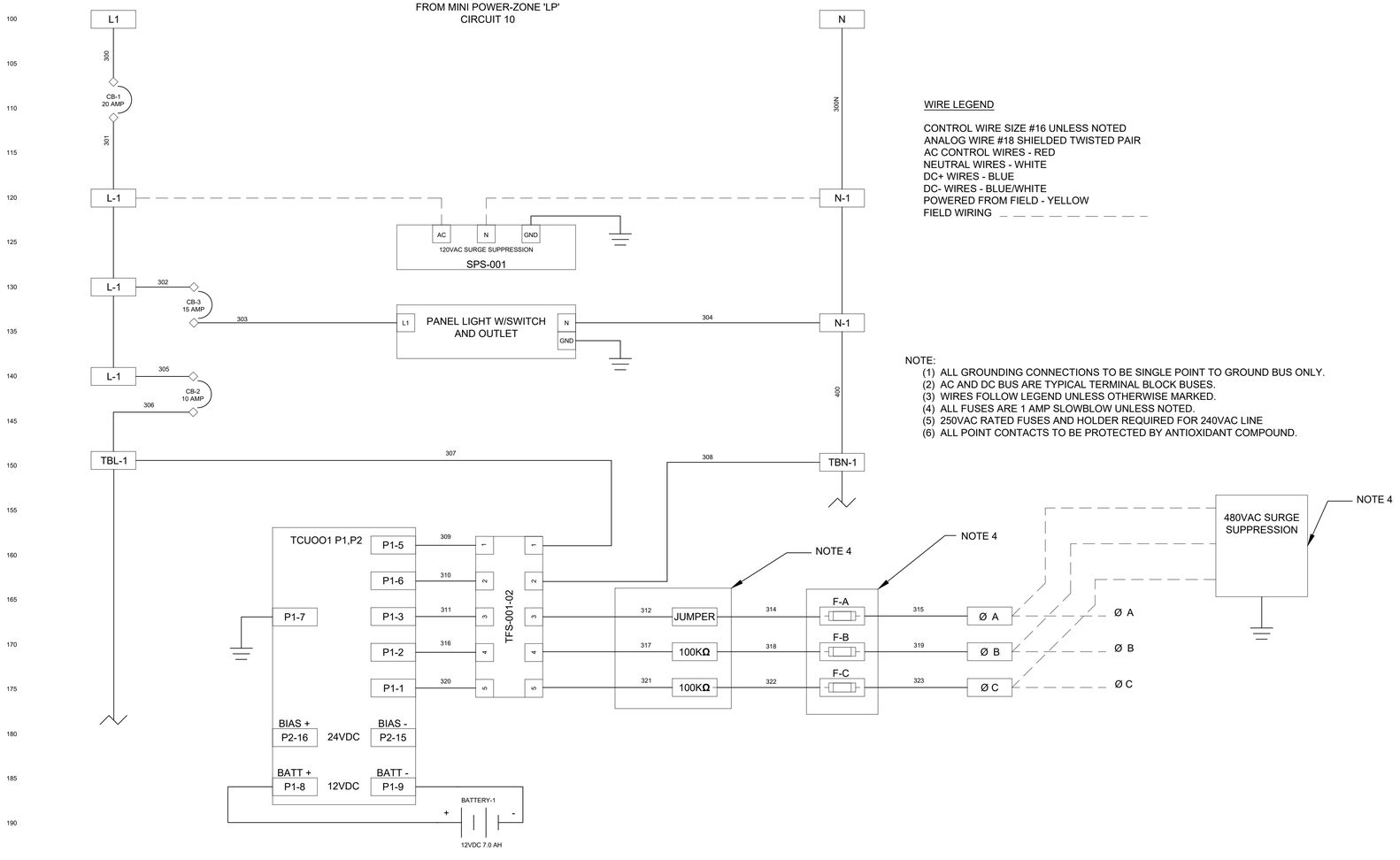
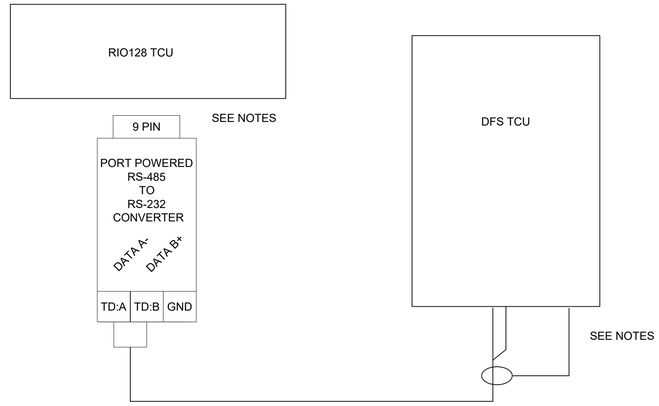


WIRE LEGEND

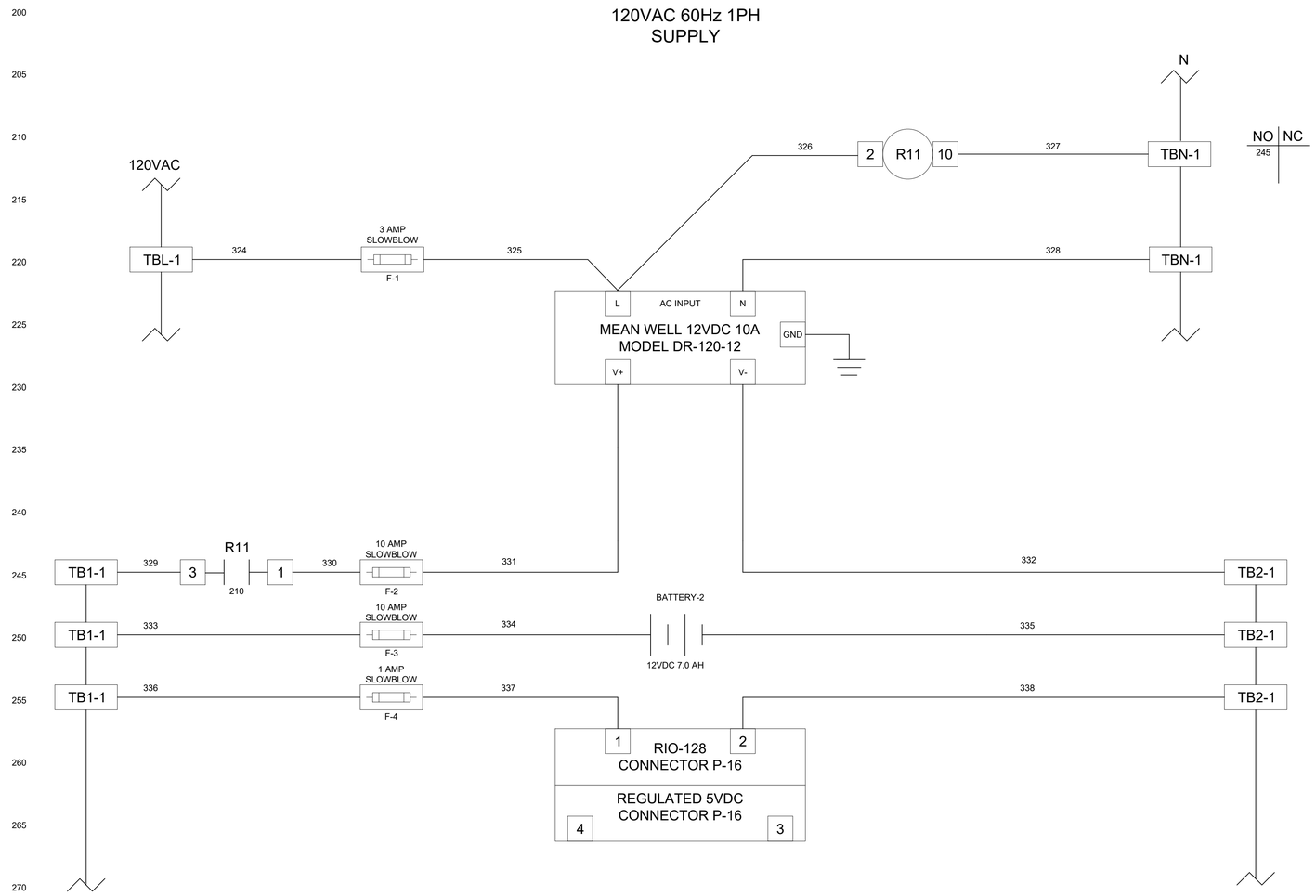
CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5



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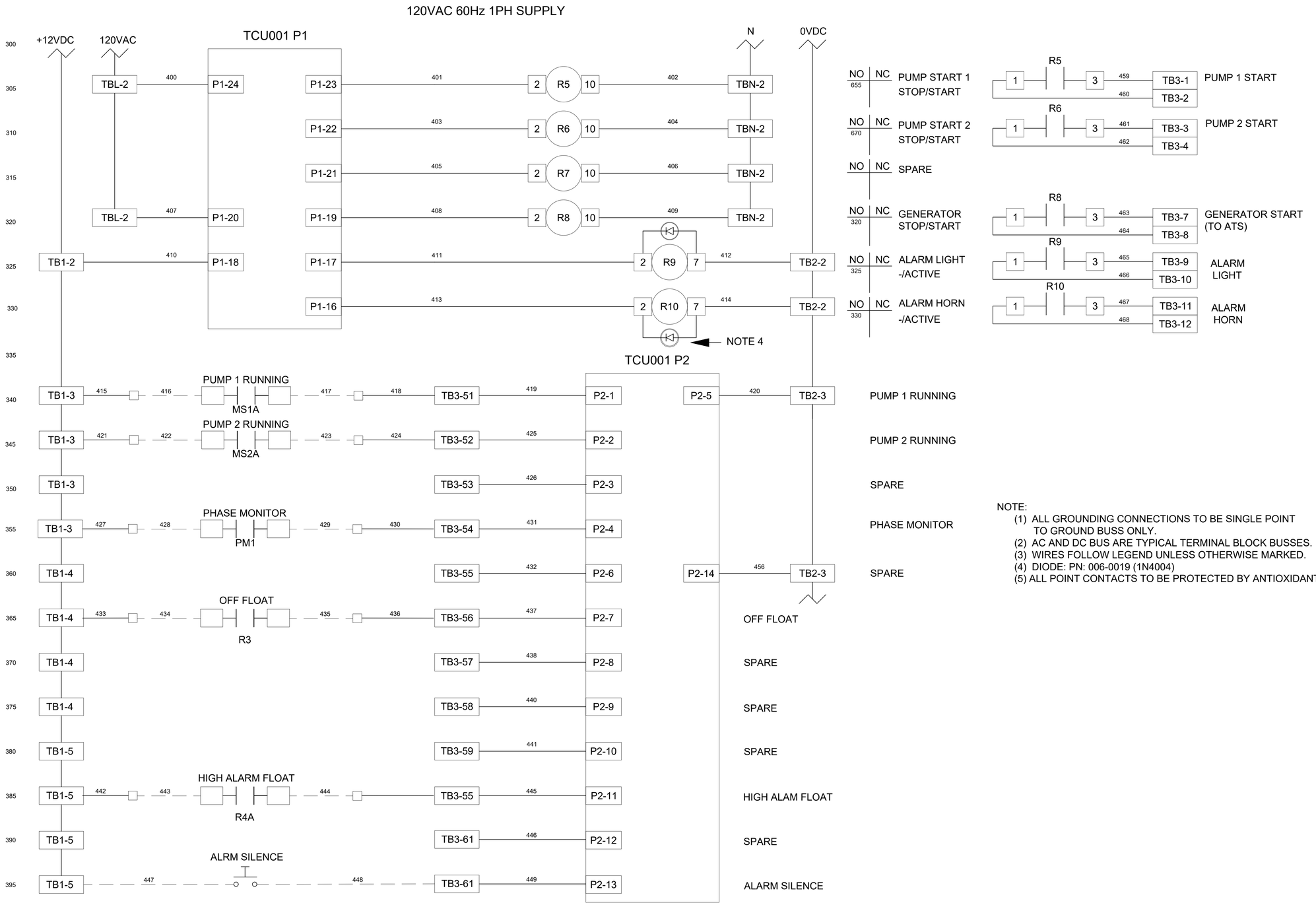

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480V 3-PH, DUPLEX 15 TO 20 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM

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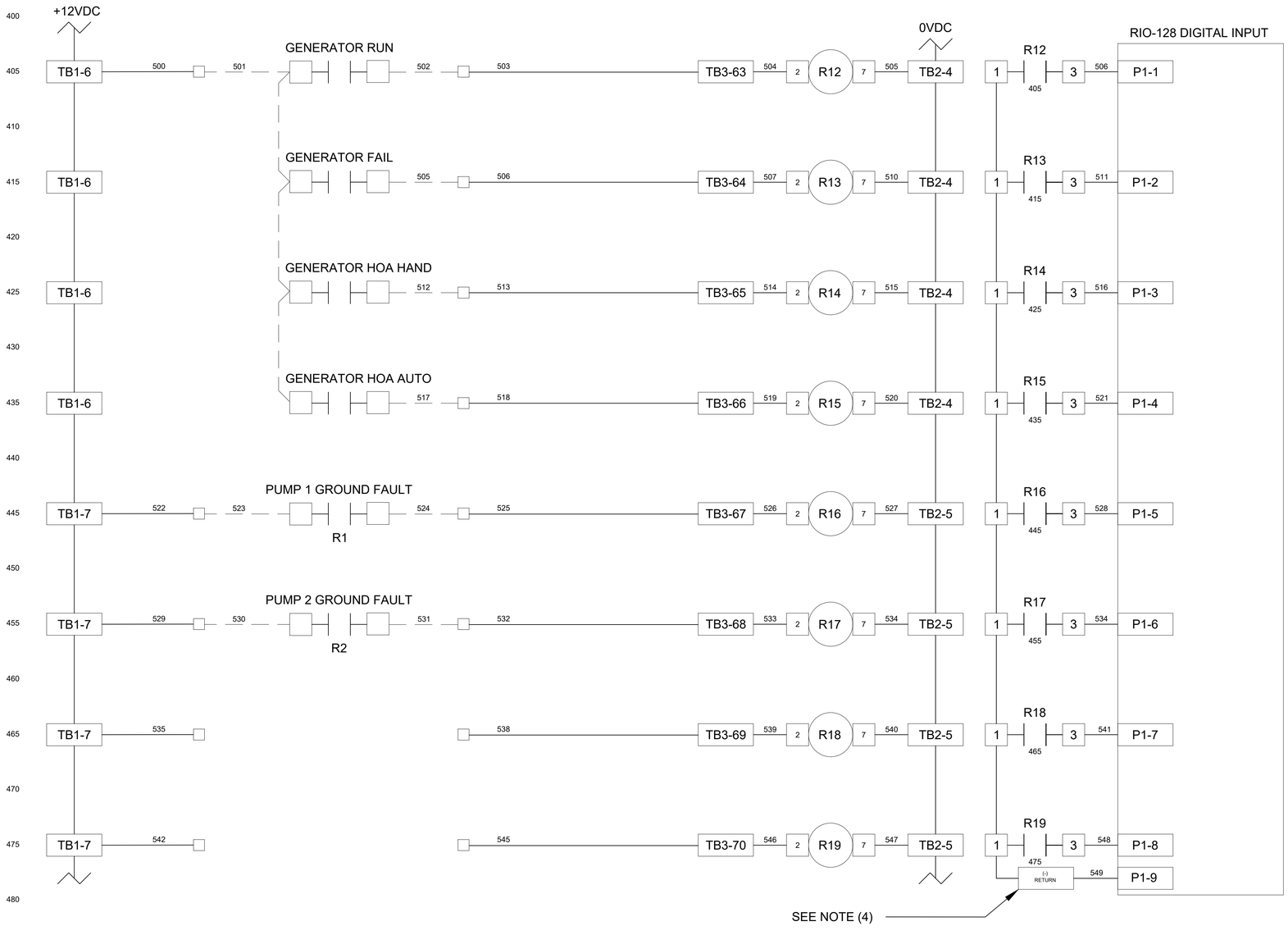

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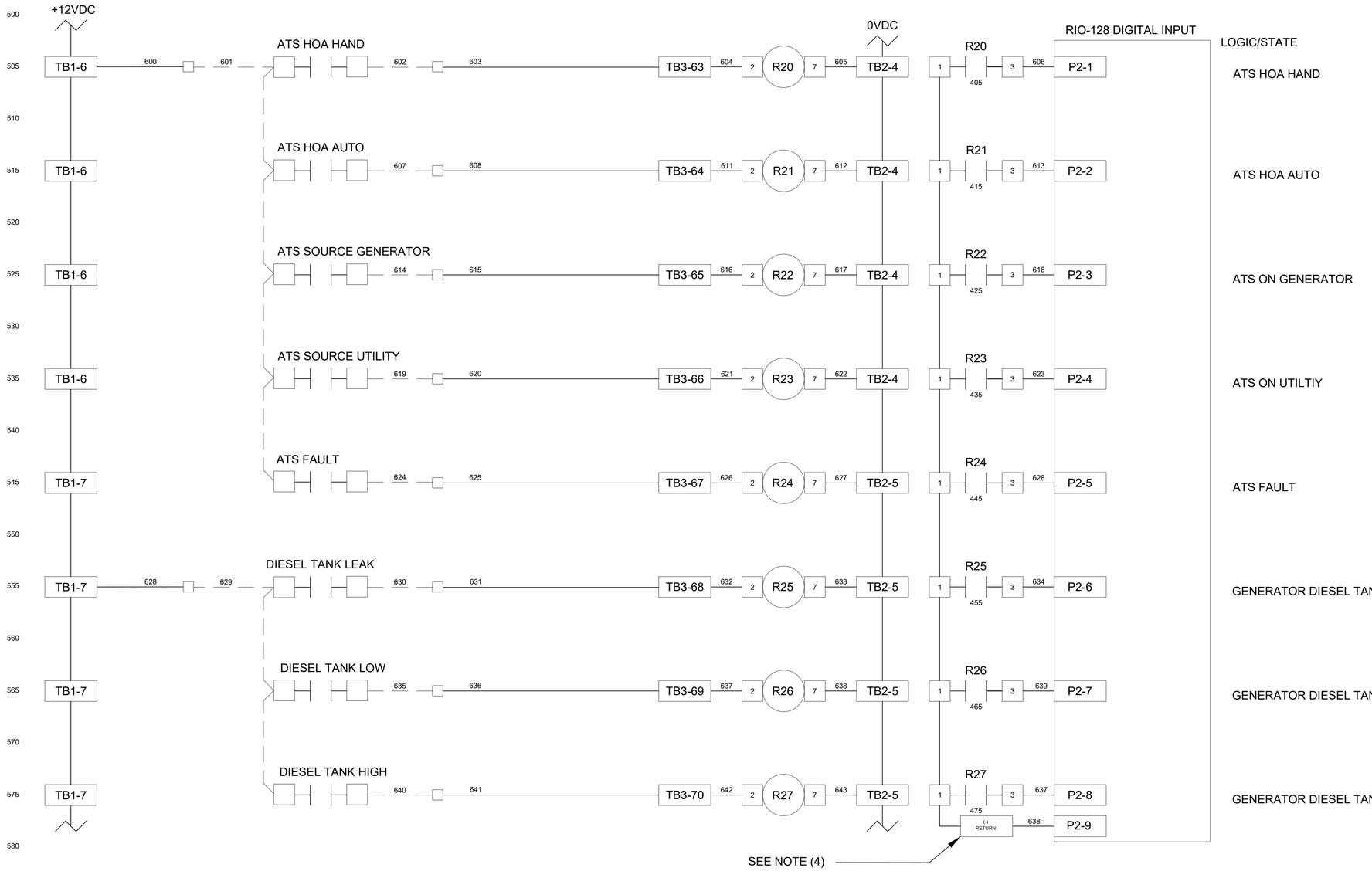
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) TERMINAL BLOCKS ARE FOR THE DC RETURN (-) BUS FOR THE RIO-128 DIGITAL INPUTS.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



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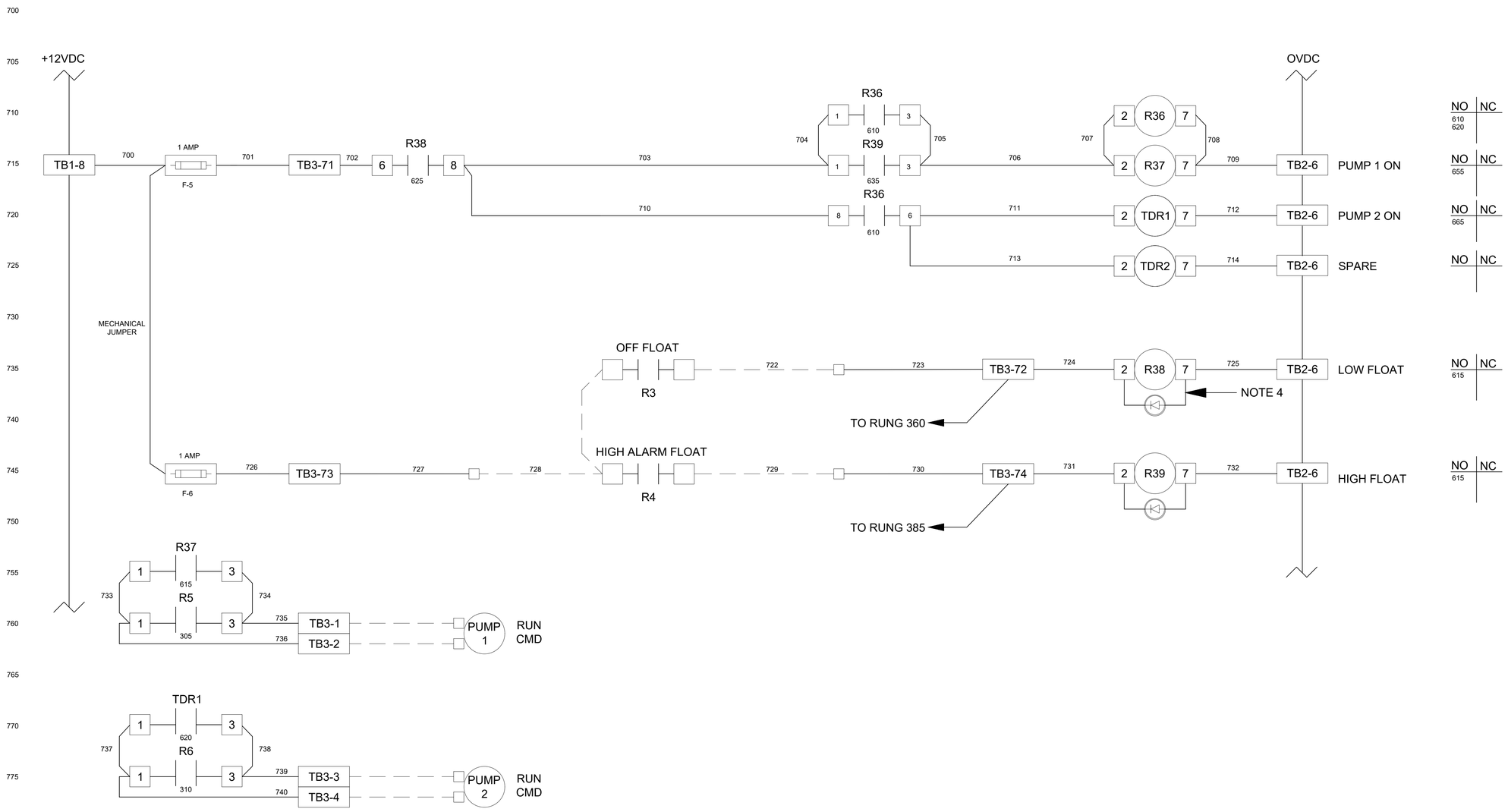
2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 15 TO 20 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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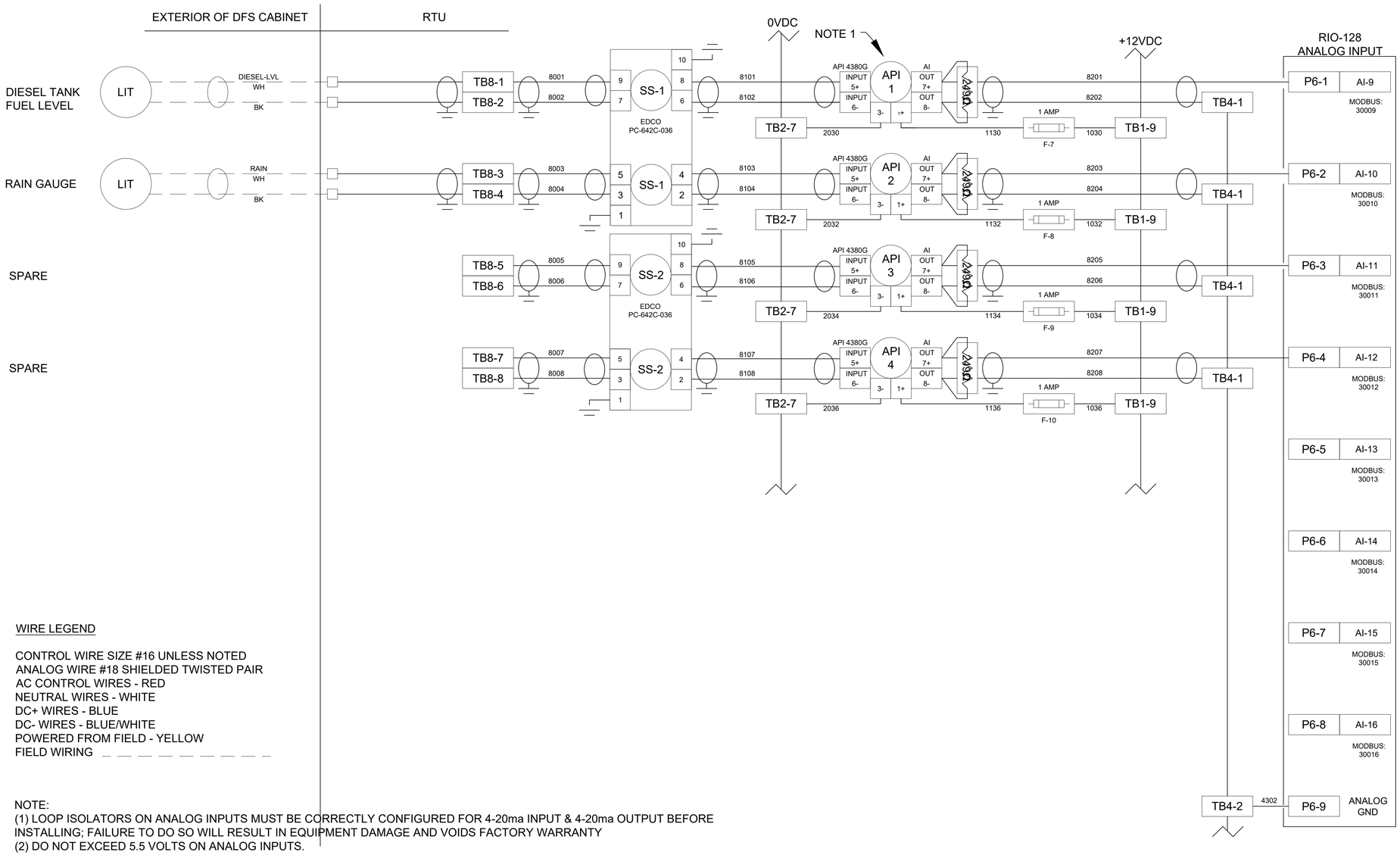
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) DIODE: PN: 006-0019 (1N4004)
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



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FIELD WIRING _ _ _ _ _ _ _ _ _ _

NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

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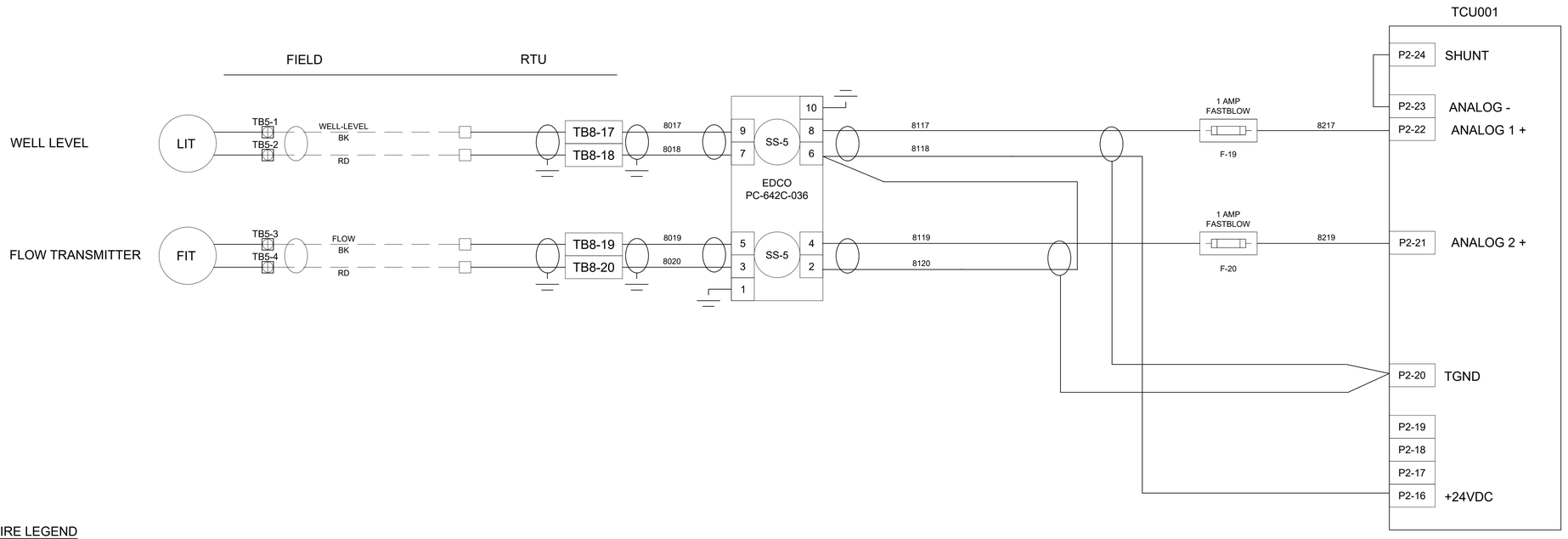
2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 15 TO 20 HP

PUMP STATION PROPOSED STRUCTURAL LAYOUT



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NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
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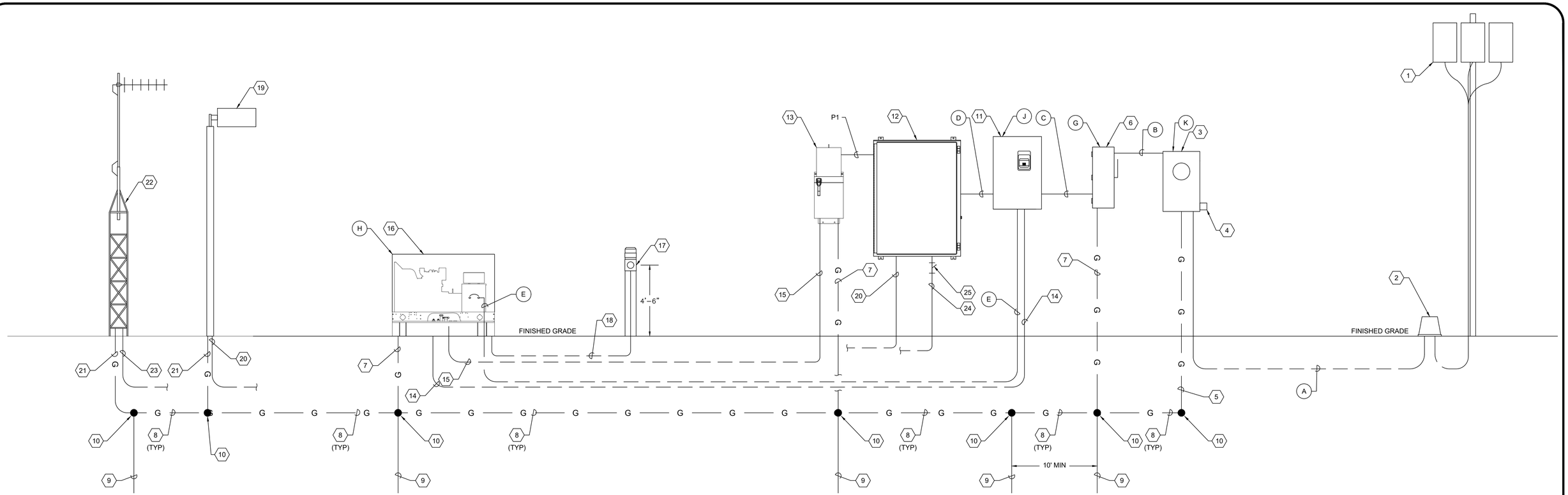


ONE LINE DIAGRAM NOTES:

1. UTILITY TRANSFORMERS. COORDINATE ALL WORK WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED PEDESTAL.
3. PROVIDE AND INSTALL NEW 480V, 3Ø, METER SOCKET. GROUND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE NEW ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH UTILITY. REFER TO SCHEDULE FOR SIZE REQUIRED PER SITE.
4. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
5. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR. COORDINATE REQUIREMENTS WITH UTILITY.
6. PROVIDE AND INSTALL NEW 480, 3-POLE DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. PROVIDE SOLID NEUTRAL AND GROUND LUG KITS TO MAKE DISCONNECT SERVICE ENTRANCE RATED. REFER TO SCHEDULE FOR AMPERE AND FUSING REQUIREMENTS.
7. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR.
8. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
9. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
10. EXOTHERMIC WELD.
11. PROVIDE AND INSTALL 3-POLE, S/N, 480V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SCHEDULE FOR SIZE.
12. PROVIDE AND INSTALL PUMP CONTROL PANEL.
13. PROVIDE AND INSTALL 10 KVA, 480V-120/240V, SINGLE-PHASE MINI-POWER ZONE IN NEMA 3R STAINLESS STEEL ENCLOSURE. SQUARE D MPZB10S40FSS. REFER TO SHEET 18 FOR PANEL SCHEDULE.
14. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
15. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
16. PROVIDE AND INSTALL NEW 480V, 3Ø, 4-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
17. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
18. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
19. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
20. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
21. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
22. NEW DFS ANTENNA.
23. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
24. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
25. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT.

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	15 HP STATIONS		18 HP STATIONS		20 HP STATIONS				
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	**FROM:**	**TO:**	**NOTES:**
(A)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL	1-1/2" C.	UTILITY	METER	
(B)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	METER	MAIN DISCONNECT	
(C)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	MAIN DISCONNECT	AUTOMATIC TRANSFER SWITCH	
(D)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	PUMP CONTROL PANEL	
(E)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	AUTOMATIC TRANSFER SWITCH	GENERATOR SET	
(F)	3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		3-#3 THWN CU + 1-#3 THWN CU NEUTRAL + 1-#8 THWN CU GND		PUMP CONTROL PANEL	GENERATOR RECEPTACLE	
(P2)	3-#10 THWN CU + 1-#12 THWN CU GND	2" C.	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	3-#8 THWN CU + 1-#10 THWN CU GND	2" C.	AUTOMATIC TRANSFER SWITCH	GENERATOR SET	

EQUIPMENT				**NOTES:**
(G)	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	100 AMPERE DISCONNECT FUSED AT 100 AMPERES	ALL DISCONNECTS SHALL BE PADLOCKABLE
(H)	480V, 3Ø, 4-WIRE 60 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	480V, 3Ø, 4-WIRE 60 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	480V, 3Ø, 4-WIRE 80 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	
(J)	480V, 100 AMPERE TRANSFER SWITCH	480V, 100 AMPERE TRANSFER SWITCH	480V, 100 AMPERE TRANSFER SWITCH	
(K)	100 AMPERE, 480V, 3-PHASE METER	100 AMPERE, 480V, 3-PHASE METER	100 AMPERE, 480V, 3-PHASE METER	
PUMP CONTROL PANEL				**NOTES:**
(L)	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	100 AMPERE MAIN CIRCUIT BREAKER	
(M)	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	100 AMPERE EMERGENCY CIRCUIT BREAKER	
(N)	40 AMP MOTOR CIRCUIT BREAKERS	50 AMP MOTOR CIRCUIT BREAKERS	60 AMP MOTOR CIRCUIT BREAKERS	
(O)	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	ALLEN BRADLEY 509 NEMA SIZE 2 MOTOR STARTER	
(P)	#10 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	#8 AWG CU MOTOR CONDUCTORS	

LOAD CALCULATION: 15 HP

MOTORS:

PUMP NO. 1: 15 HP, 480 VAC, 3 Ø, 21.0 A

PUMP NO. 2: 15 HP, 480 VAC, 3 Ø, 21.0 A

MOTOR SUB-TOTAL 42.0 A

+ 25% OF LARGEST MOTOR 5.3 A

SUB-TOTAL 47.3 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 67.3 A

SERVICE SIZE:

100 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 18 HP

MOTORS:

PUMP NO. 1: 18 HP, 480 VAC, 3 Ø, 25.2 A

PUMP NO. 2: 18 HP, 480 VAC, 3 Ø, 25.2 A

MOTOR SUB-TOTAL 50.4 A

+ 25% OF LARGEST MOTOR 6.3 A

SUB-TOTAL 56.3 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 76.3 A

SERVICE SIZE:

100 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 20 HP

MOTORS:

PUMP NO. 1: 20 HP, 480 VAC, 3 Ø, 27 A

PUMP NO. 2: 20 HP, 480 VAC, 3 Ø, 27 A

MOTOR SUB-TOTAL 54 A

+ 25% OF LARGEST MOTOR 6.8 A

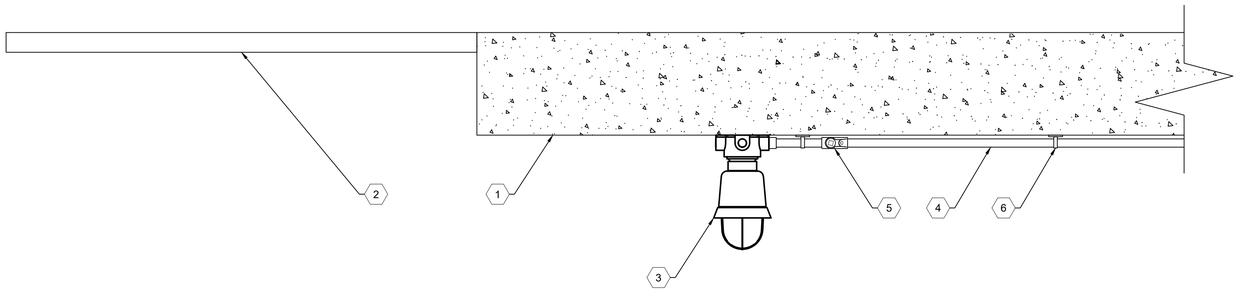
SUB-TOTAL 60.8 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 80.8 A

SERVICE SIZE:

100 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

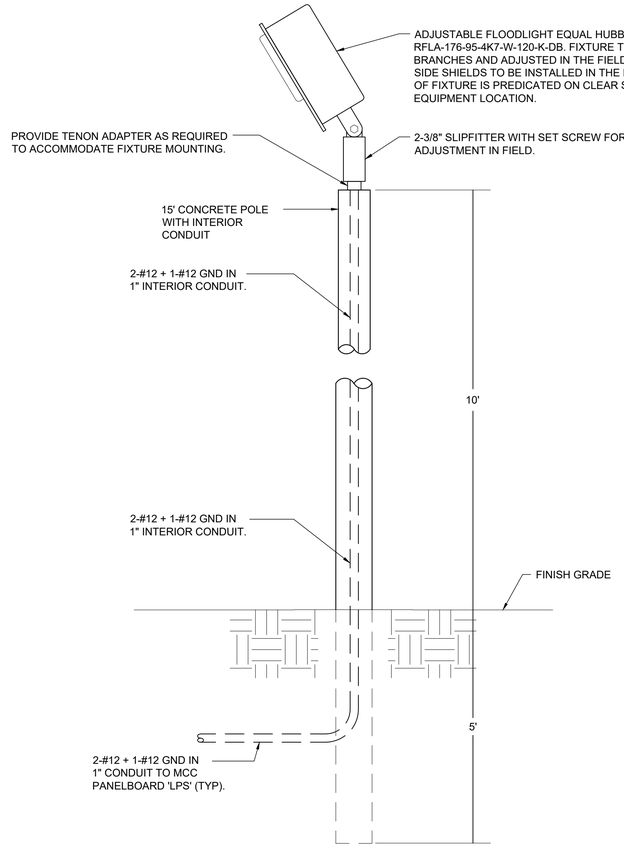


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL. CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	1"	2-#10 + 1-#10 GND	PUMP CONTROL PANEL	MINI POWER-ZONE 'LP'	MINI POWER-ZONE 'LP' 480V FEEDER FROM THE PUMP CONTROL PANEL.
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	QUANTITY OF AREA LIGHTS DIFFERS BETWEEN LS 54 AND LS 65.
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	MINI POWER-ZONE 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	3/4"	2-#10 + 1-#10 NEU + 1-#10 GND	MINI POWER-ZONE 'LP'	POWER-ZONE 'LP' SURGE PROT	CONNECT SURGE PROTECTION DEVICE VIA NON-METALLIC FLEXIBLE CONDUIT.
P7	1"	6-#12 + 2-#12 NEU + 1-#12 GND	MINI POWER-ZONE 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P8	3/4"	2-#12 + 1-#12 GND	MINI POWER-ZONE 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P9	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #1 POWER.
P10	2"	REFER TO 'P2' ON SHEET 16	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #2 POWER.
P11	3/4"	2-#12 + 1-#12 GND	MINI POWER-ZONE 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P12	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #1 POWER.
P13	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #2 POWER.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1"	TWO (2) 2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	DFS CABINET	4-20mA FLOW METER SIGNAL AND LEVEL TRANSMITTER SIGNAL. BOTH CABLES SHALL BE BELDEN 8719.
C8	1-1/4"	20-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/4"	14-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO DFS SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C16	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. QO ; 120/240 VOLTS, 1Ø, 3W ; 60 AMP MAIN CIRCUIT BREAKER ; 35K AIC RATING ; SURFACE ENCLOSURE TOP AT 5'-6" AFF

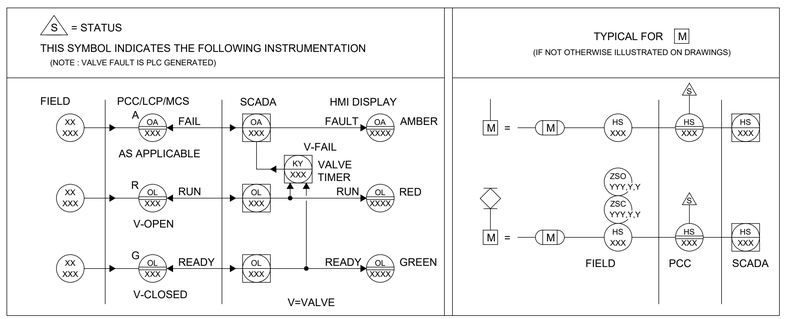
EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE		CIRC.	CIRC.	KVA/PHASE		CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	NO.	NO.	A	B	POLE	AMPS	FRAME	
SURGE PROTECTION DEVICE	2	30	QOB	.	/	1	2	0.8	/	1	20	QOB	PUMP CONTROL PANEL RECEPTACLE
" "	-	-	-	/	.	3	4	/	1.0	1	20	QOB	PUMP CONTROL PANEL LIGHTS
GENERATOR BLOCK HEATER	2	20	QOB	1.2	/	5	6	0.4	/	1	20	QOB	PUMP CONTROL PANEL CONTROLS
" "	-	-	-	/	1.2	7	8	/	0.4	1	20	QOB	PUMP CONTROL PANEL CONTROLS
GENERATOR ALTERNATOR HEATER	1	20	QOB	0.8	/	9	10	0.6	/	1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB	/	1.0	11	12	/	.				SPACE
FLOW METER TRANSMITTER	1	20	QOB	0.2	/	13	14	.	/	--	--	--	SPACE
SPARE	1	20	QOB	/	.	15	16	/	.	--	--	--	SPACE
SUB-TOTAL KVA				2.2	2.2			1.8	1.4				

TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS					
	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK —— D —— D ——

RADIO LINK —— R —— R ——

FIBER OPTIC DATA —— F —— F ——

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT
SP = SET POINT INPUT
C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DISCRETE INPUT
DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO
S/S = START/STOP
SEL = SELECTOR
O/C = OPEN/CLOSE
O/O = ON/OFF
LOS = LOCKOUT-START
LOR = LOCAL-OFF-REMOTE
OAC = OPEN-AUTO CLOSE
CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN
O/R = OVERRIDE
MCS = MASTER CONTROL STATION
VFD = VARIABLE FREQUENCY DRIVE
PCC = PROCESS CONTROL CABINET
LCP = LOCAL CONTROL PANEL
ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN
E = ENGINE
G = GENERATOR
F = FILTER
GS = GRINDER/SCREEN
K = COMPRESSOR
H = HOIST
ME = MECHANICAL EQUIPMENT
MX = MIXER
P = PUMP
T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

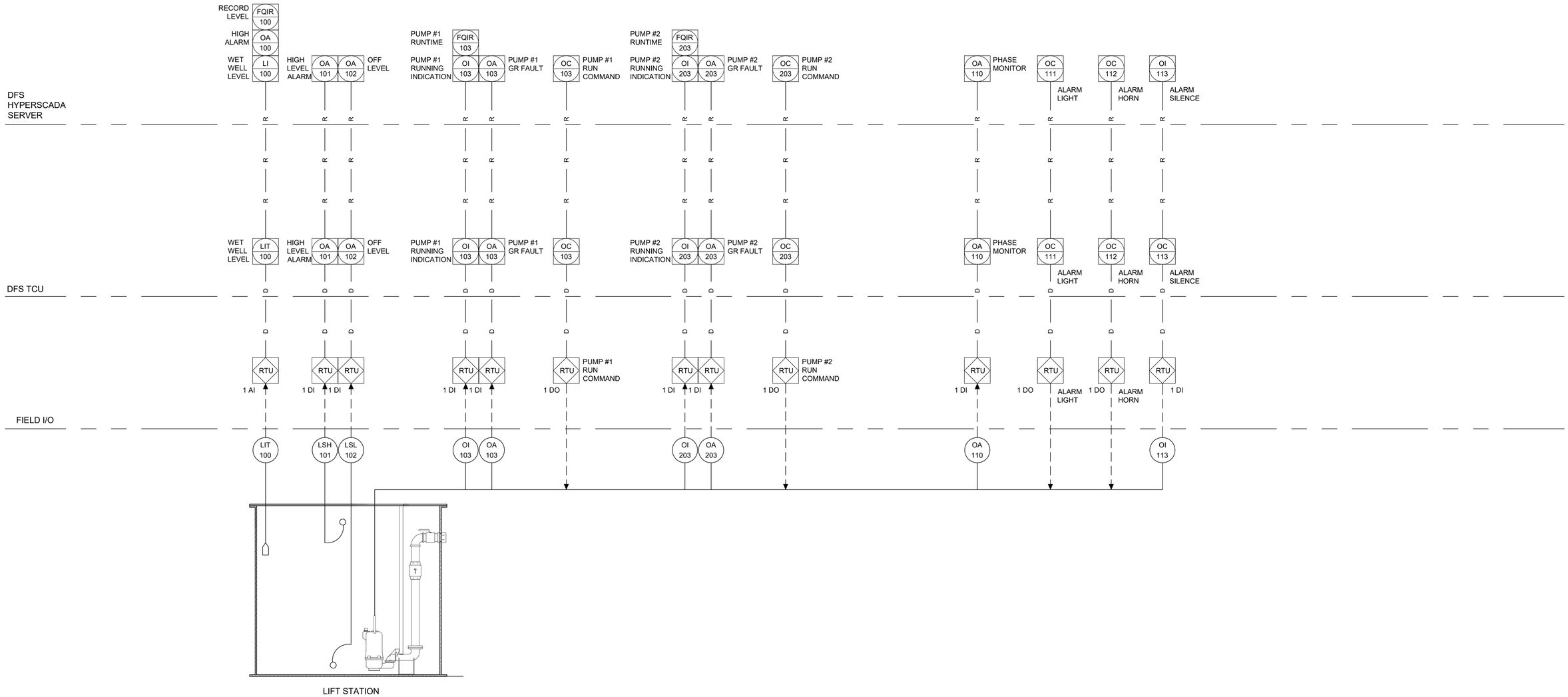
SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.
PLC - PROGRAMMABLE LOGIC CONTROL
SA - SURGE SUPPRESSOR DEVICE

I — INTERLOCK

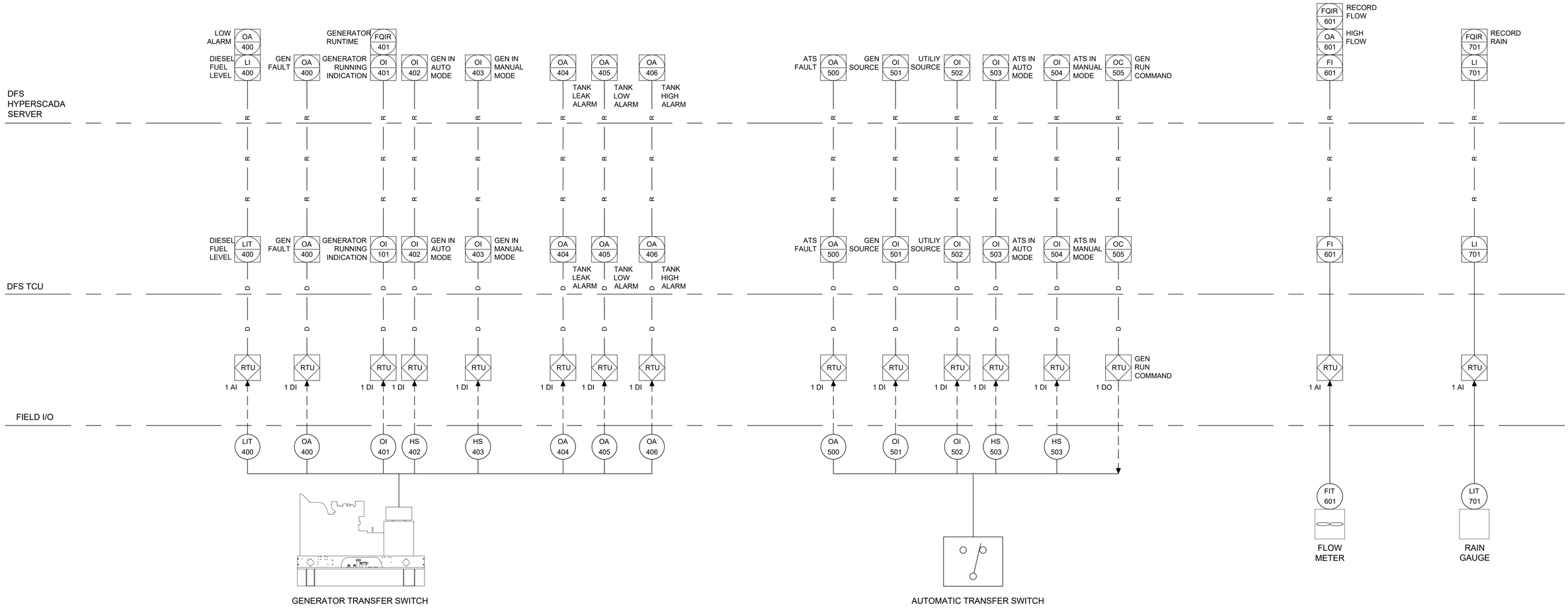
I-3 — CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊖	OR	⊖⊖	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**480V 3-PH, DUPLEX 15 TO 20 HP**	**TYPICAL LIFT STATION P&ID'S**	INDEX NO. 805 / PAGE NO. 20 OF 21 LATEST REVISION 11/2022



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CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 15 TO 20 HP

TYPICAL LIFT STATION P&ID'S

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SHEET INDEX

CLEARWATER

BRIGHT AND BEAUTIFUL · BAY TO BEACH

INDEX 806:
PUMP STATION STANDARD ELECTRICAL DETAILS
480V 3-PH PUMP 25 TO 30 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER. 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:

NEUTRAL WIRE

ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX

MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R

INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

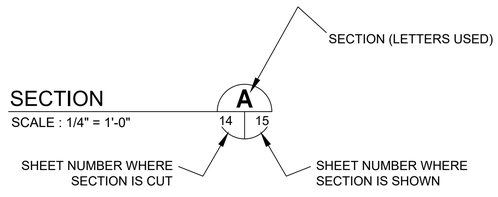
PUMP THERMAL SENSOR

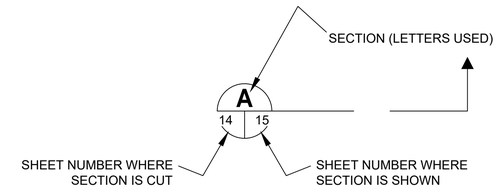
FAN THERMOSTAT

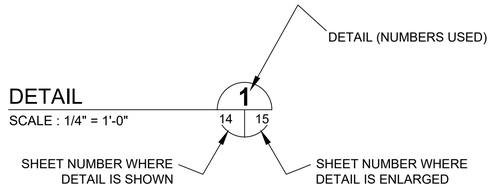
ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL







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CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 25 TO 30HP

480V 3-PHASE, DUPLEX PUMP LIFT STATION 25 TO 30 HP ELECTRICAL STANDARDS WITH VFD'S

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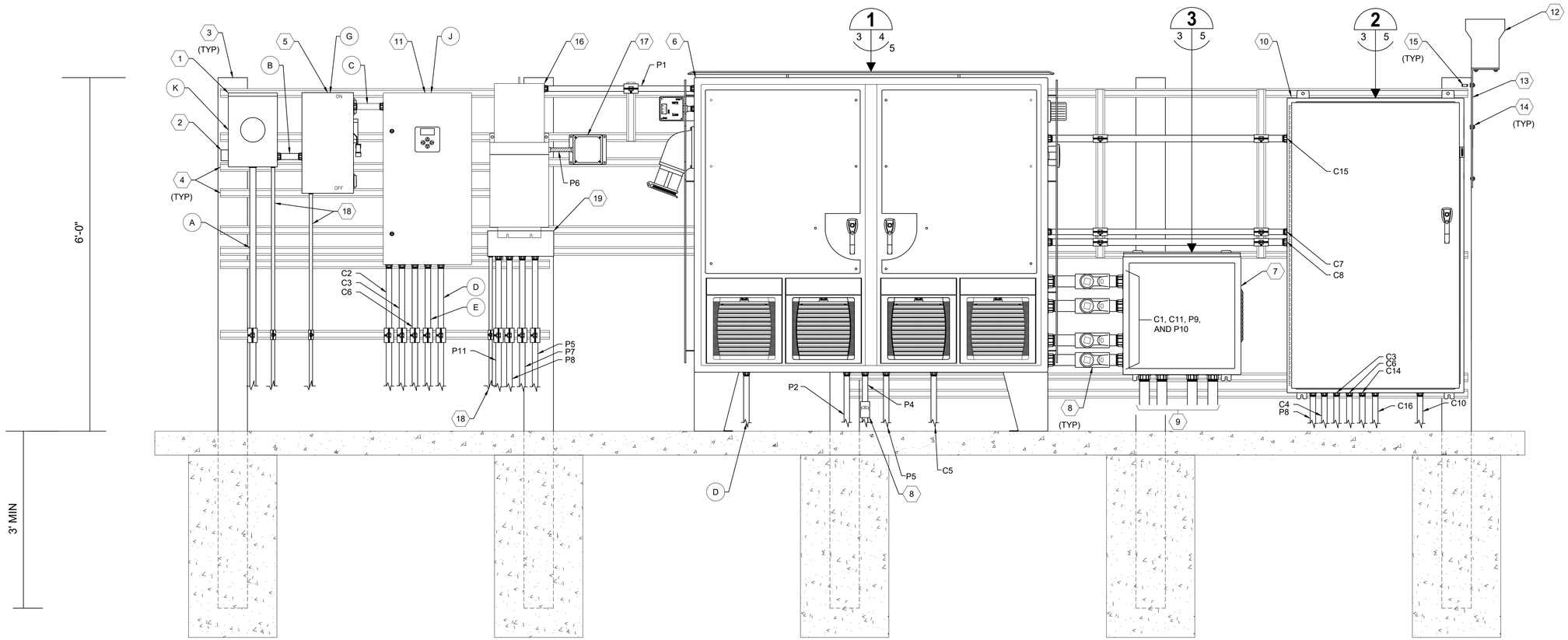


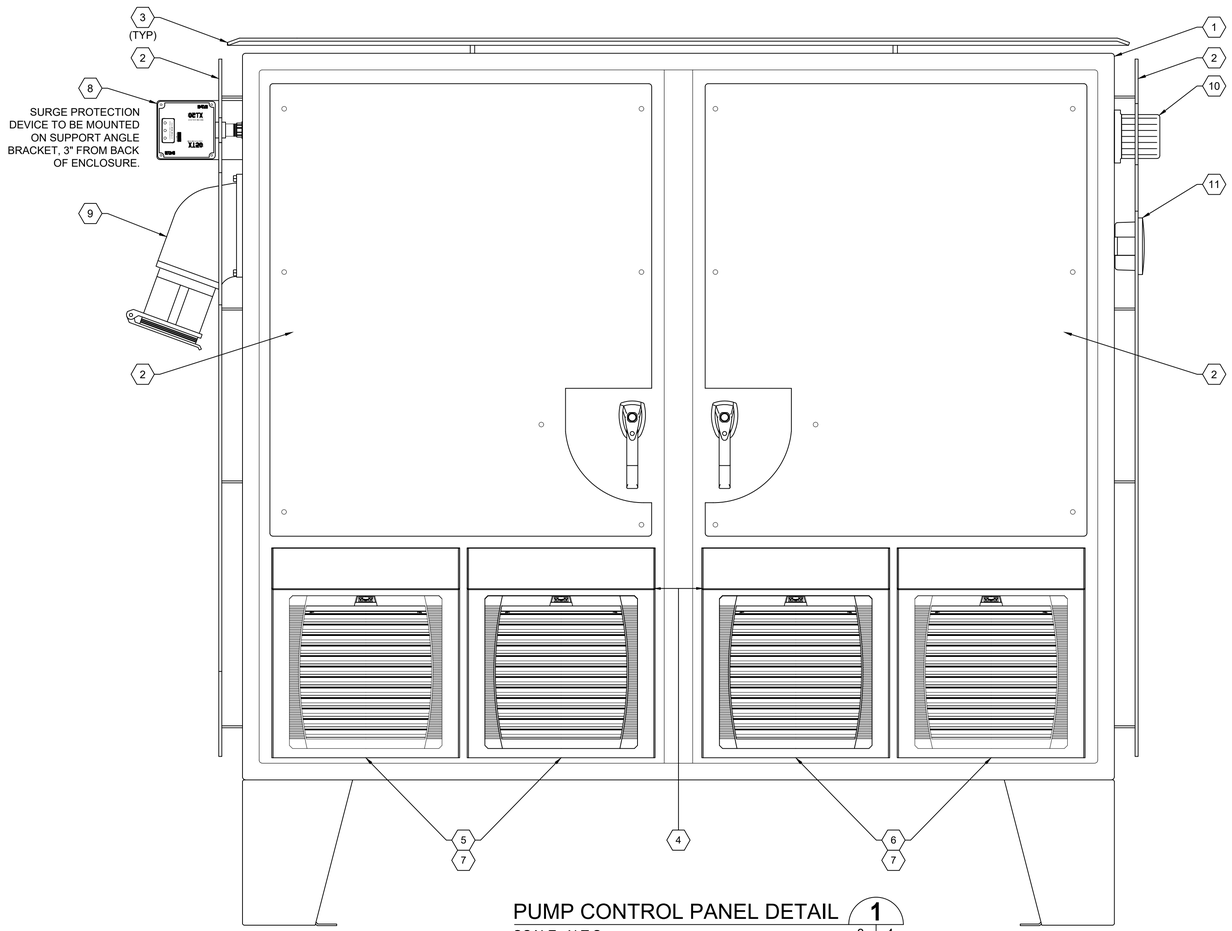
480V 3-PHASE DUPLEX PUMP STATION
EQUIPMENT RACK FRONT ELEVATION
SCALE : NONE

KEYED NOTES:

1. PROVIDE AND INSTALL METER SOCKET. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. COORDINATE REQUIREMENTS WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
3. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
4. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
5. PROVIDE AND INSTALL 3-POLE, 480V, FUSED DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED. DISCONNECT SHALL BE PAD-LOCKABLE.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAILS ON SHEETS 4 AND 5.
7. PROVIDE AND INSTALL NEW 24" x 24" x 8" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 5.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12, C13, P12 AND P13. CABLES FOR PUMP MOTORS, LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.
10. DATA FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 5.
11. PROVIDE AND INSTALL NEW 480V, 3-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH (ATS). REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
12. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA 00 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
13. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
14. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
15. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).
16. PROVIDE AND INSTALL 10 KVA, 480V-120/240V, SINGLE-PHASE MINI-POWER ZONE IN NEMA 3R STAINLESS STEEL ENCLOSURE. SQUARE D MPZB10S40FSS. REFER TO SHEET 22 FOR PANEL SCHEDULE.
17. PROVIDE AND INSTALL SURGE PROTECTION DEVICE (SPD) UNIT, 120/240V, 3Ø, TYPE 1, ASCO SERIES 400, IN NEMA 4X ENCLOSURE.
18. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT.
19. PROVIDE AND INSTALL NEMA 3R STAINLESS STEEL WIREWAY TO ACCOMMODATE REQUIRED CONDUITS (IF NECESSARY). SIZE WIREWAY IN ACCORDANCE WITH NEC REQUIREMENTS.

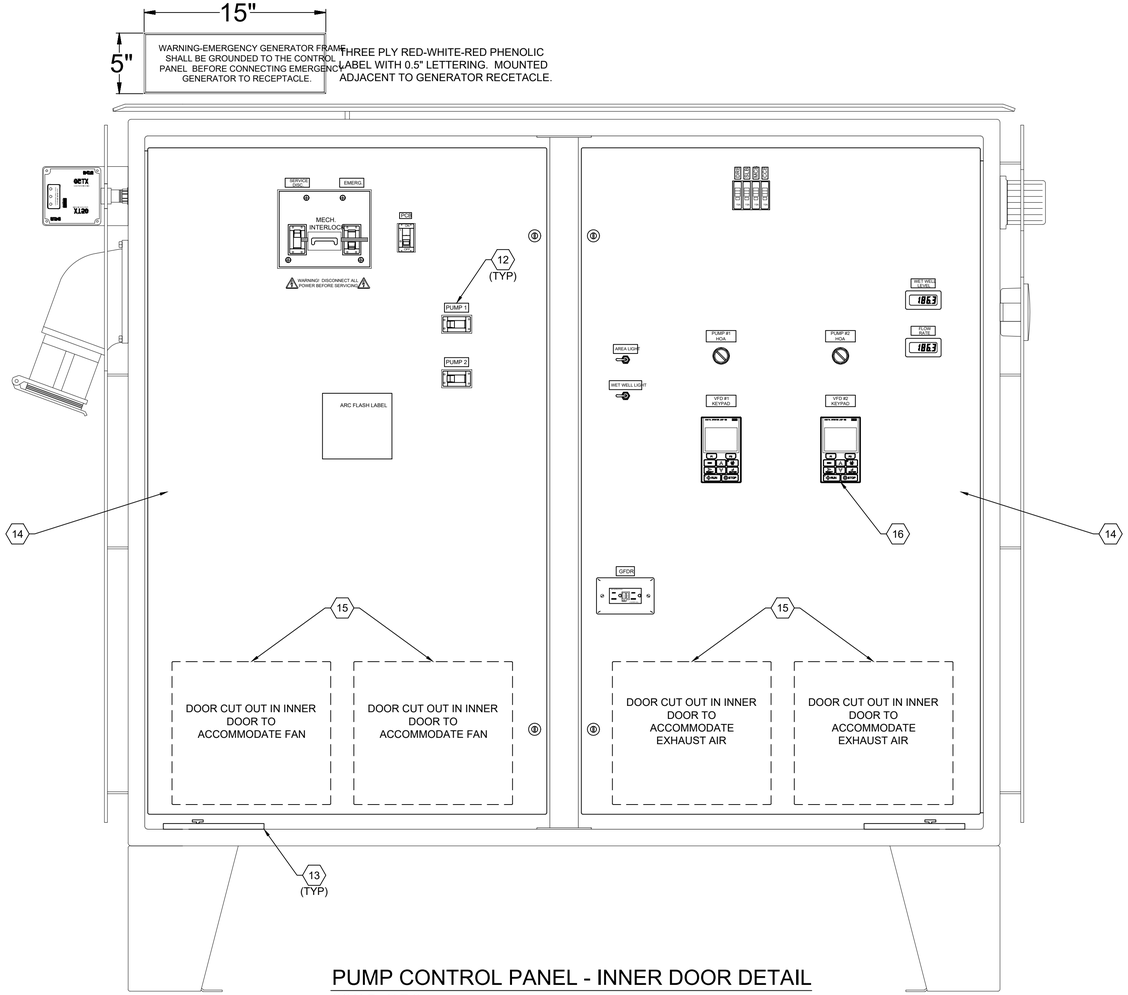
GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. PROVIDE CONDUIT AND CONDUCTOR BETWEEN PUMP CONTROL PANEL AND NEW DFS RTU ENCLOSURE AS REQUIRED (NOT SHOWN FOR CLARITY).



PUMP CONTROL PANEL DETAIL 1

SCALE : N.T.S.



PUMP CONTROL PANEL - INNER DOOR DETAIL

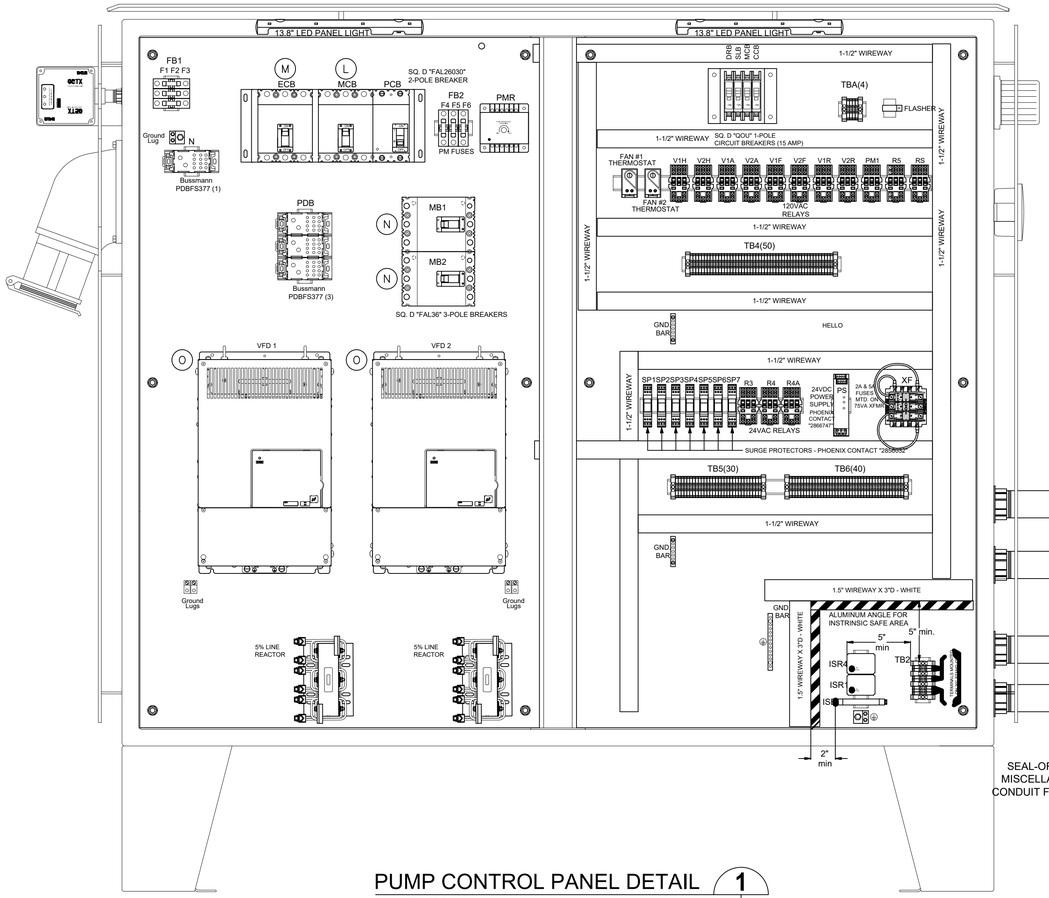
SCALE : N.T.S.

KEYED NOTES:

1. PROVIDE AND INSTALL PUMP CONTROL PANEL, 72"H X 72"W X 24"D, TWO-DOOR, NEMA 4X, 316 STAINLESS STEEL, 3-PT LATCHES, 68" X 68" BACK PANEL. PROVIDE DOOR STOP KIT FOR EACH DOOR. HAMMOND HN4FM727218S24.
2. PROVIDE AND INSTALL ALUMINUM SUN-SHIELDS ON TOP, SIDES AND FRONT OF ENCLOSURE.
3. INSURE SUN-SHIELD INSTALLED ON TOP OF ENCLOSURE HAS FULL DRIP SHIELD FOR FRONT OF ENCLOSURE.
4. INSURE CLEARANCE FROM EDGE OF DOOR TO EXHAUST CUT-OUT TO AVOID CONFLICT WITH DOOR LATCH MECHANISM
5. PROVIDE AND INSTALL VFD FAN, UL TYPE 12, 368 CFM, 115V, 50/60 HZ. PFANNENBERG PART NUMBER PF-11667I54055.
6. PROVIDE AND INSTALL EXHAUST FILTER AND FILTER MEDIA. PFANNENBERG PART NUMBER PFA-11760004055.
7. PROVIDE AND INSTALL 304 STAINLESS STEEL WASHDOWN RAINHOOD. PFANNENBERG MODEL PF-RH-60000-WD-SS.
8. PROVIDE AND INSTALL SURGE PROTECTION DEVICE. 50 KA PEAK SURGE CURRENT, 277/480V WYE. EATON XT50-3Y201.
9. PROVIDE AND INSTALL 200A, 480V, GENERATOR AND ANGLE ADAPTER. RUSSELLSTOLL CAT# FCF3144R
10. PROVIDE AND INSTALL 120V RED ALARM LIGHT. COMPONENT DESIGN INCORPORATED MODEL # R40-XLS-40F.
11. PROVIDE AND INSTALL 120V ALARM HORN. FEDERAL SIGNAL MODEL #350WB-120.
12. ENGRAVED NAMEPLATE MOUNTED ABOVE DEVICE AS SHOWN (TYPICAL).
13. PROVIDE AND INSTALL DOOR STOP (TYPICAL OF TWO).
14. PROVIDE AND INSTALL ALUMINUM INNER DOOR.
15. PROVIDE CUT-OUT FOR FAN AND EXHAUST AIR CIRCULATION.
16. PROVIDE AND INSTALL UL RATED REMOTE OPERATOR KIT KEYPAD FOR VFD MONITORING AND CONTROL ON INNER DOOR. YASKAWA PART NUMBER UUX000527.

GENERAL NOTES:

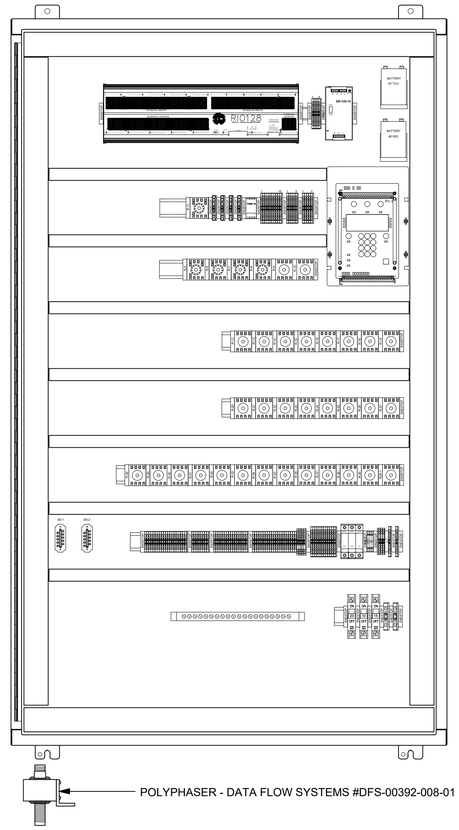
1. REFER TO SHEET 5 FOR DEADFRONT AND REAR PANEL ELEVATIONS FOR PUMP CONTROL PANEL.



PUMP CONTROL PANEL DETAIL 1

SCALE : N.T.S.

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.



DFS CABINET DETAIL 2

SCALE : N.T.S.

TCU ENCLOSURE:

(OUTER DOOR REMOVED FOR CLARITY)

JUNCTION BOX ENCLOSURE DETAIL 3

SCALE : N.T.S.

JUNCTION BOX:

SPN4SS6-24248 (24"H x 24"W x 8"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD. OUTER DOOR HAS STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:

SPP-2424 (21"H x 21"W) FABRICATED FROM 12GA. WHITE ENAMELED STEEL.

LOUVER:

WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.

ENCLOSURE:

(60"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

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2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 25 TO 30HP

TYPICAL PUMP CONTROL PANEL

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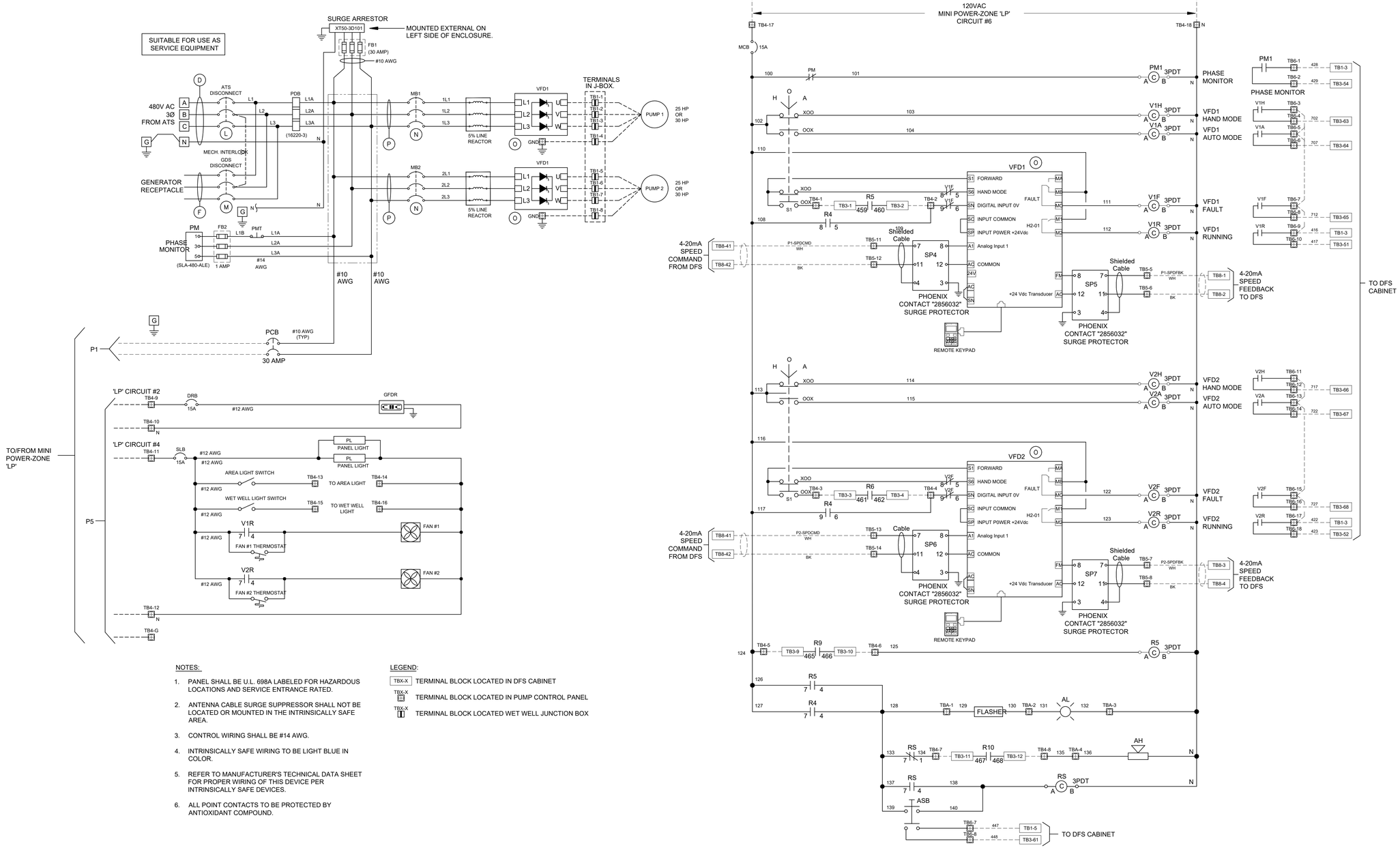

NOTES:

1. PANEL SHALL BE U.L. 698A LABELED FOR HAZARDOUS LOCATIONS AND SERVICE ENTRANCE RATED.
2. ANTENNA CABLE SURGE SUPPRESSOR SHALL NOT BE LOCATED OR MOUNTED IN THE INTRINSICALLY SAFE AREA.
3. CONTROL WIRING SHALL BE #14 AWG.
4. INTRINSICALLY SAFE WIRING TO BE LIGHT BLUE IN COLOR.
5. REFER TO MANUFACTURER'S TECHNICAL DATA SHEET FOR PROPER WIRING OF THIS DEVICE PER INTRINSICALLY SAFE DEVICES.
6. ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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480V 3-PH, DUPLEX 25 TO 30HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAM

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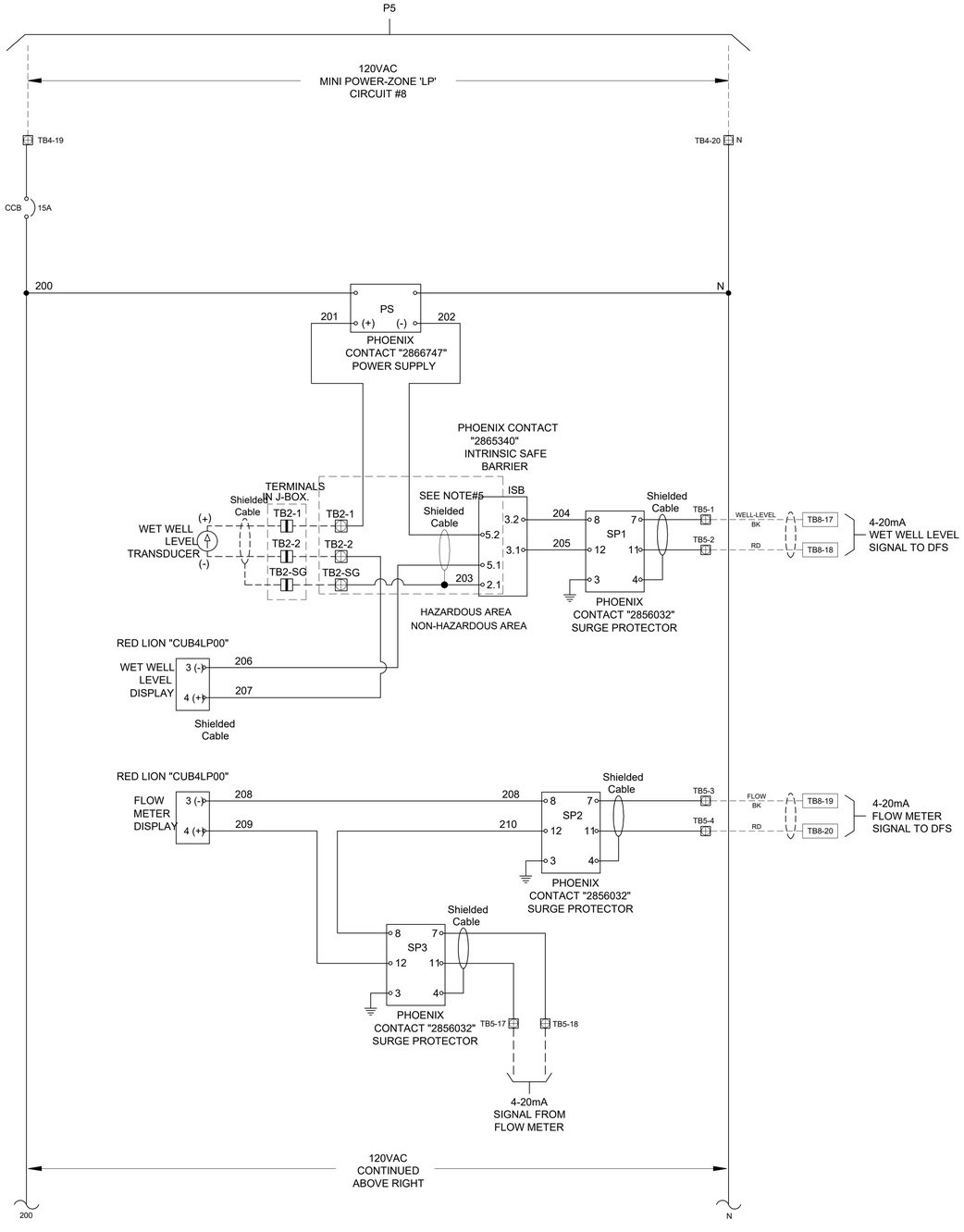

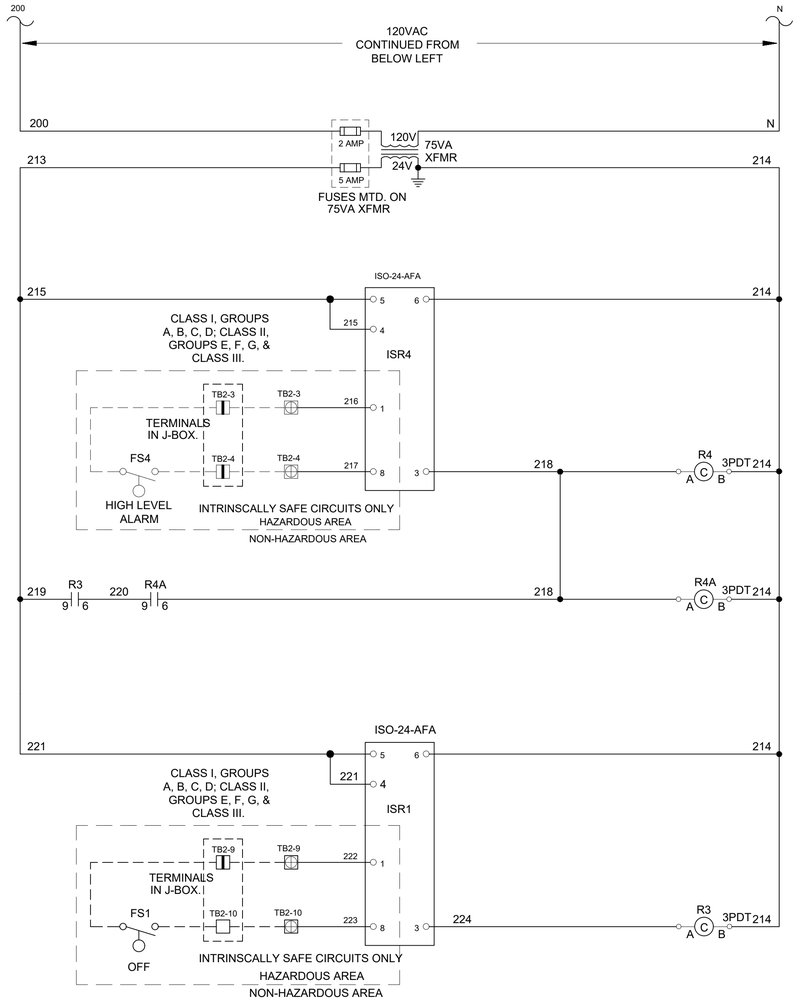

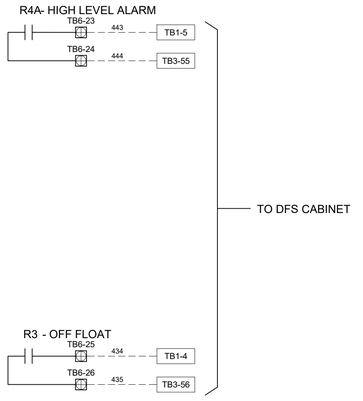

LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

LEGEND:

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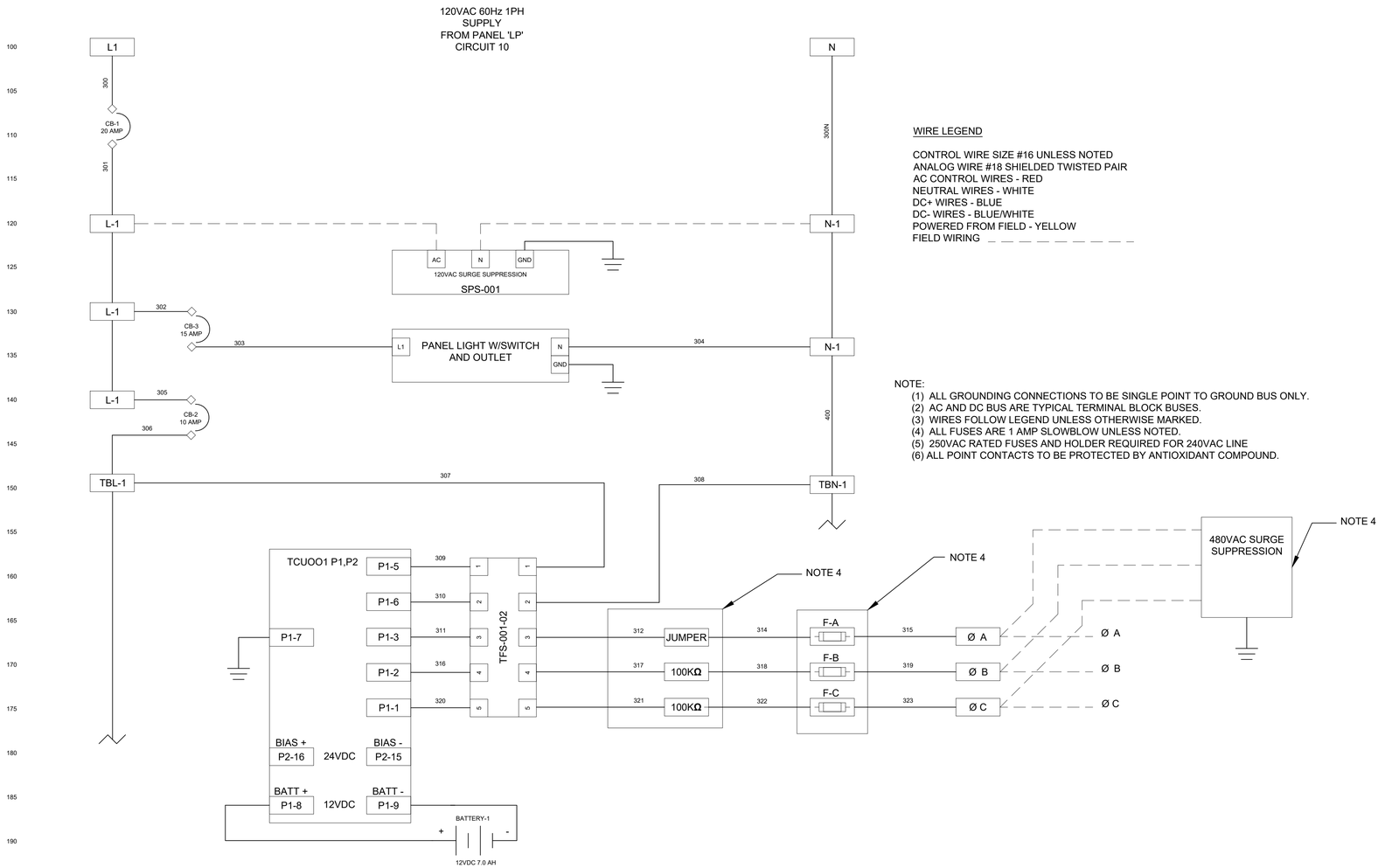
2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 25 TO 30HP

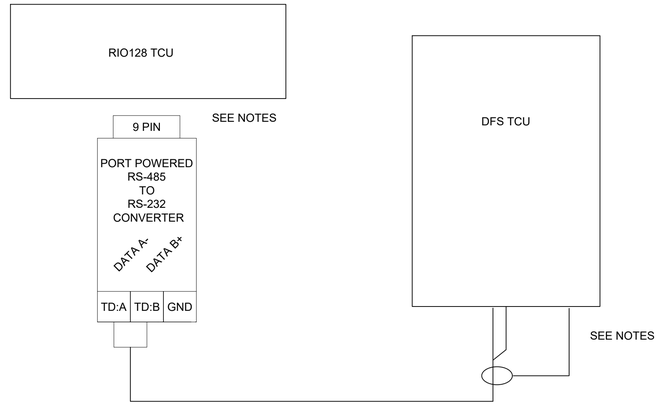
TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS



WIRE LEGEND

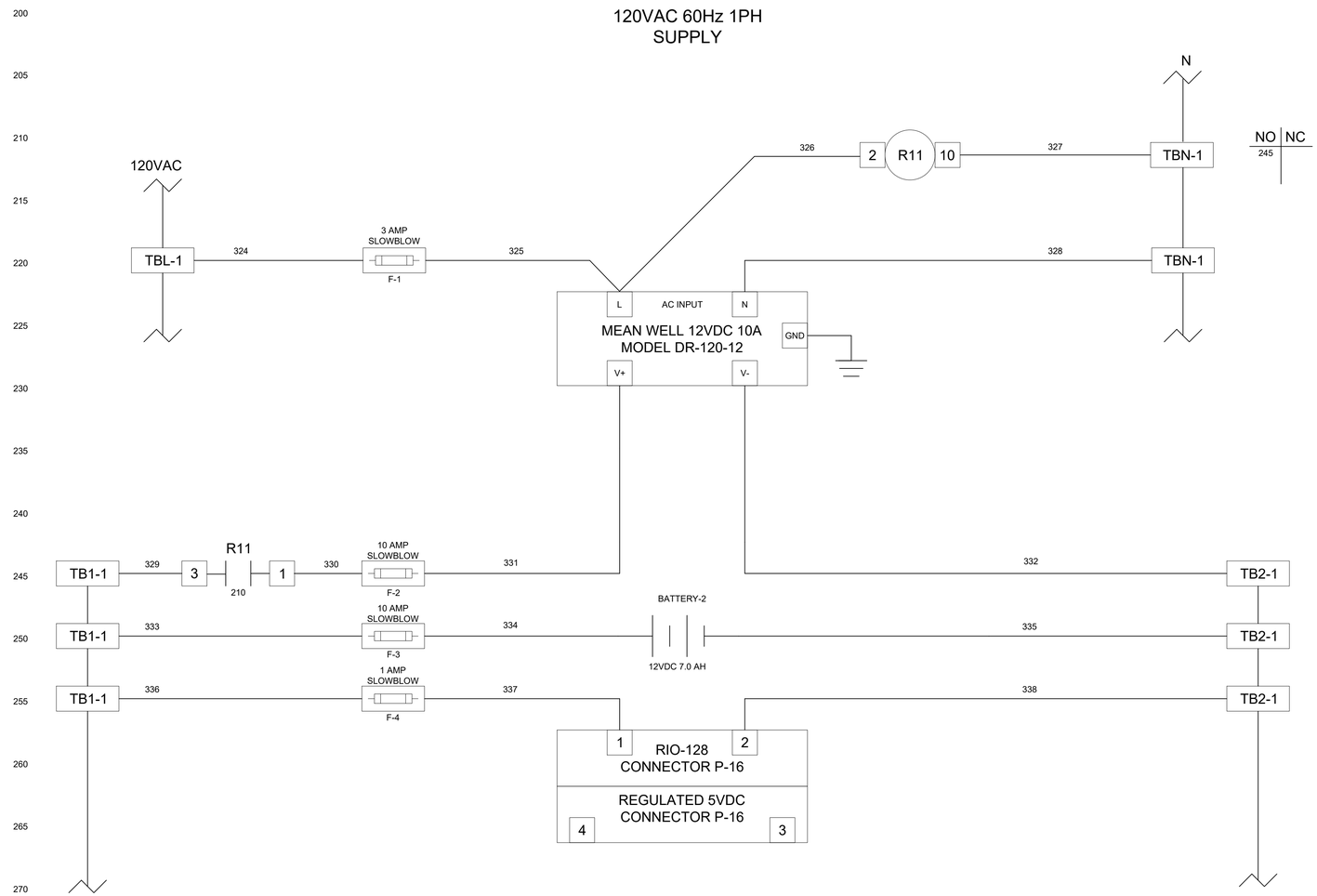
CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5



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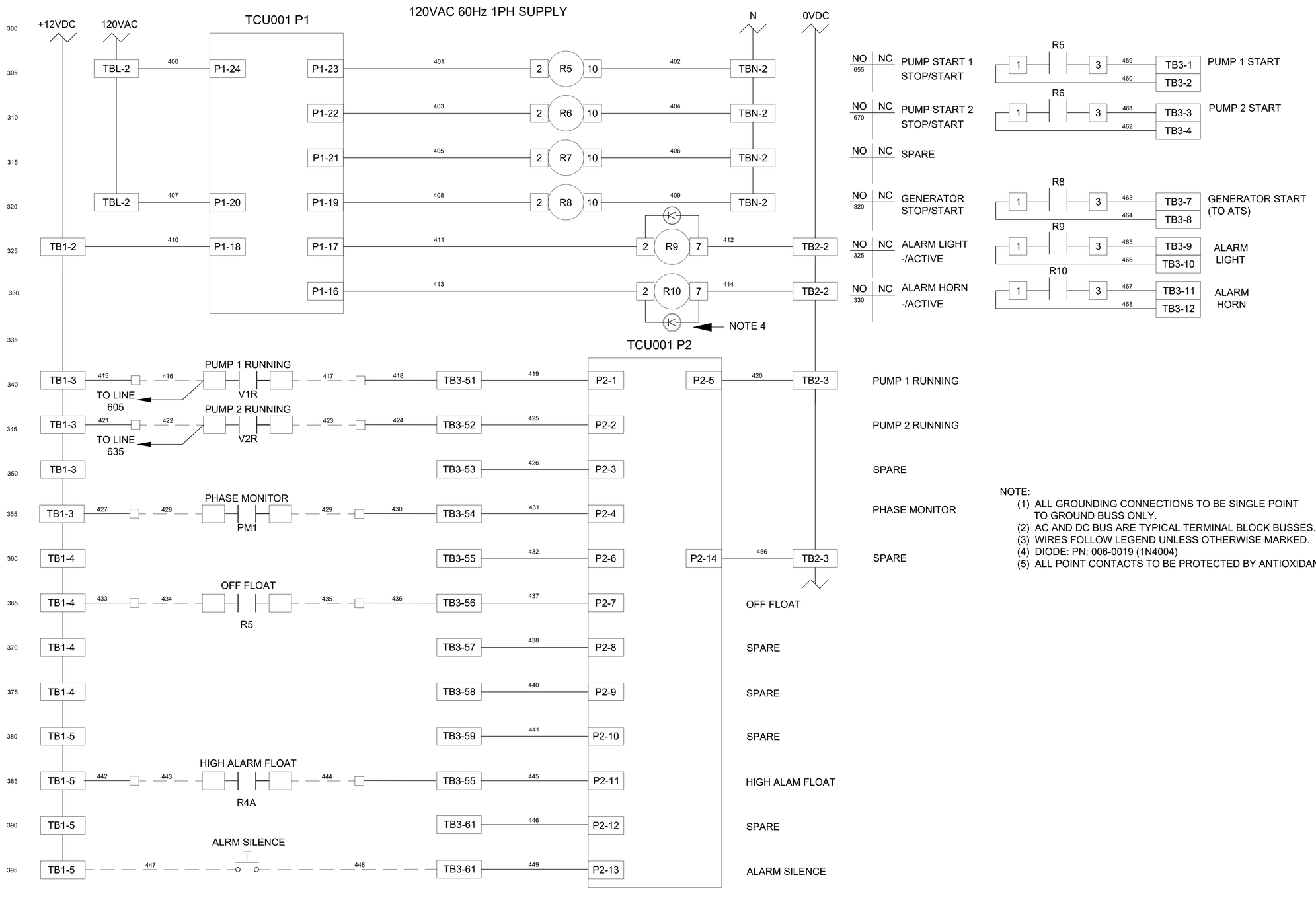

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(4) DIODE: PN: 006-0019 (1N4004)
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TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM

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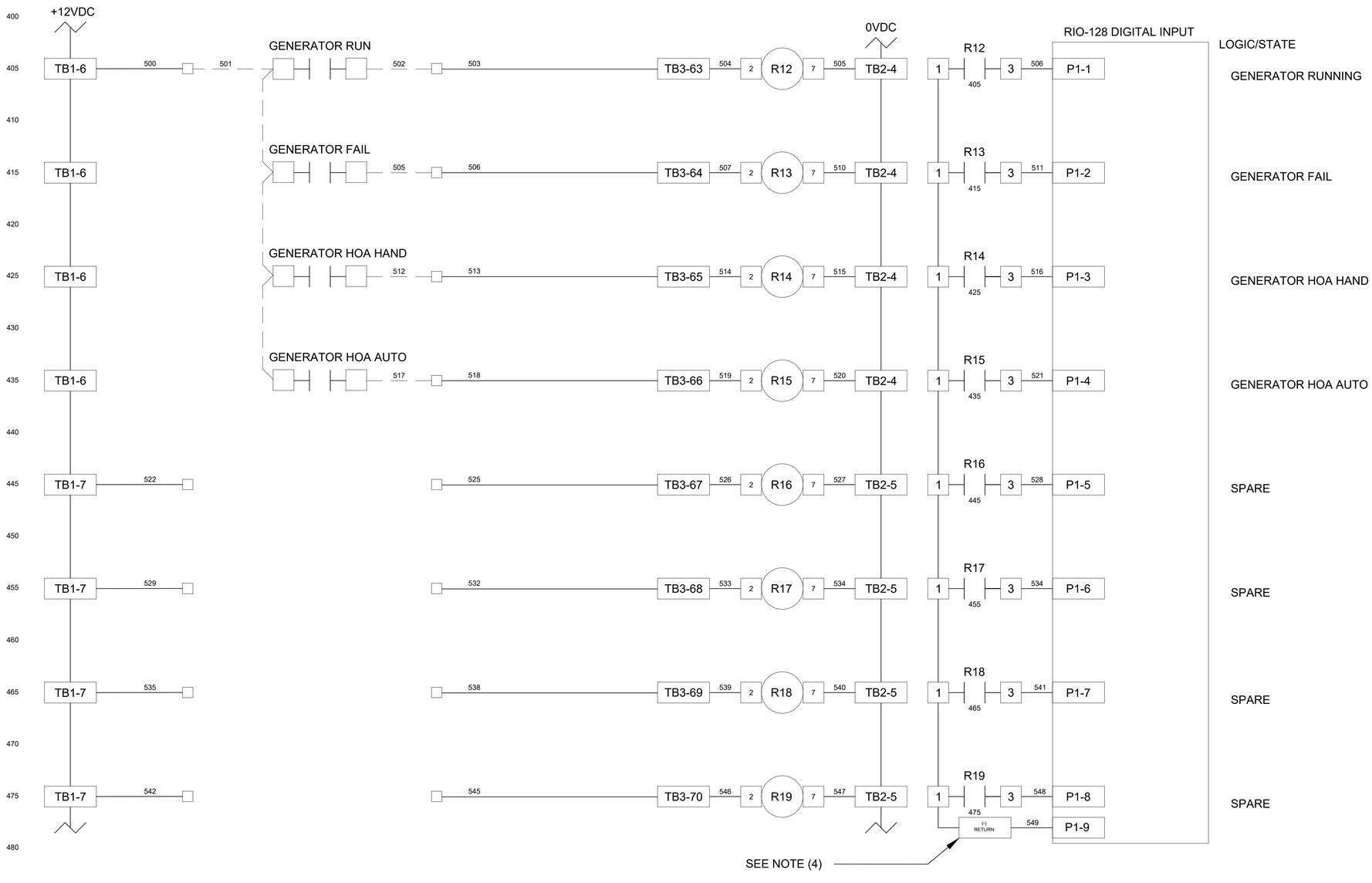

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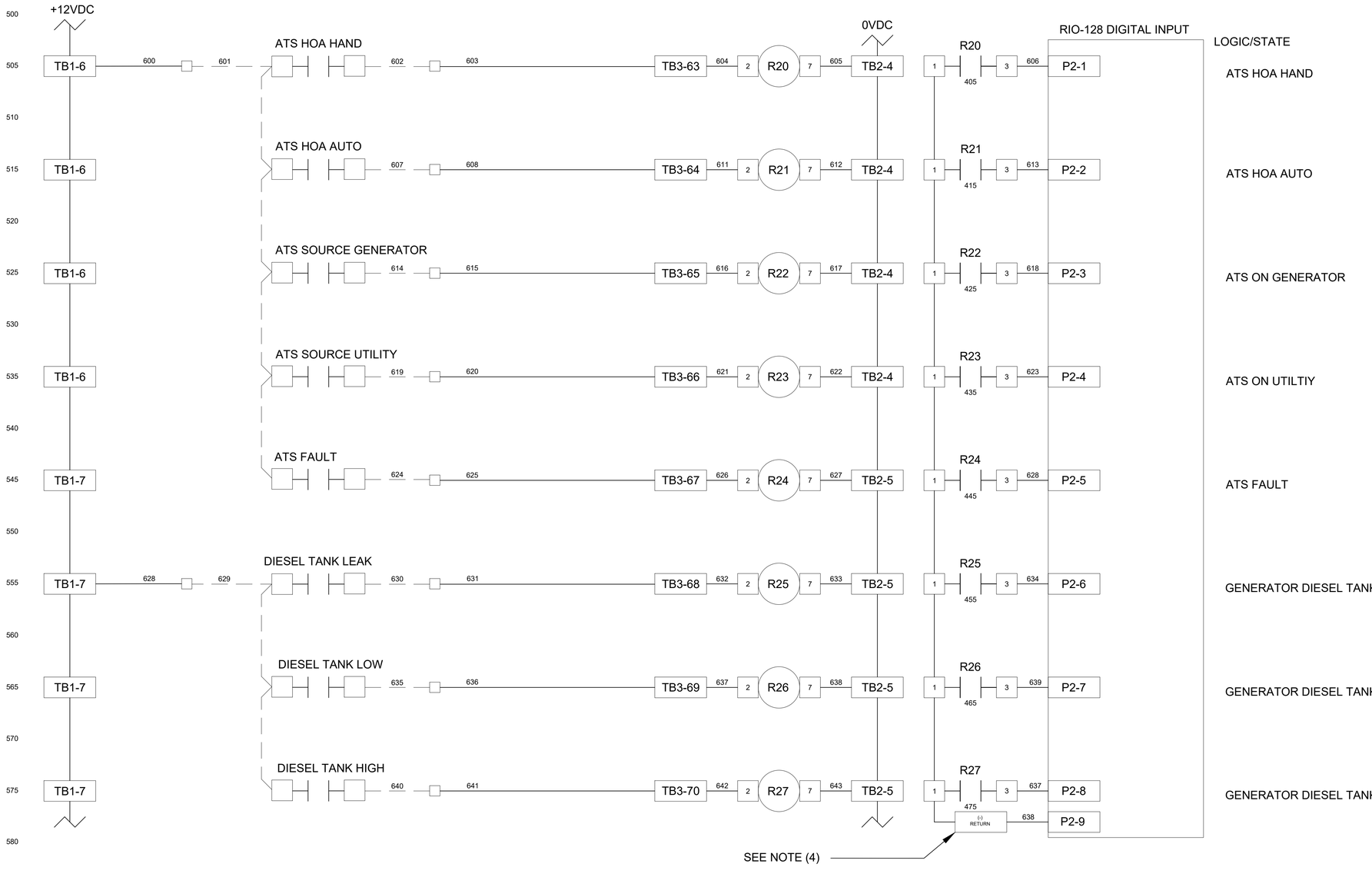

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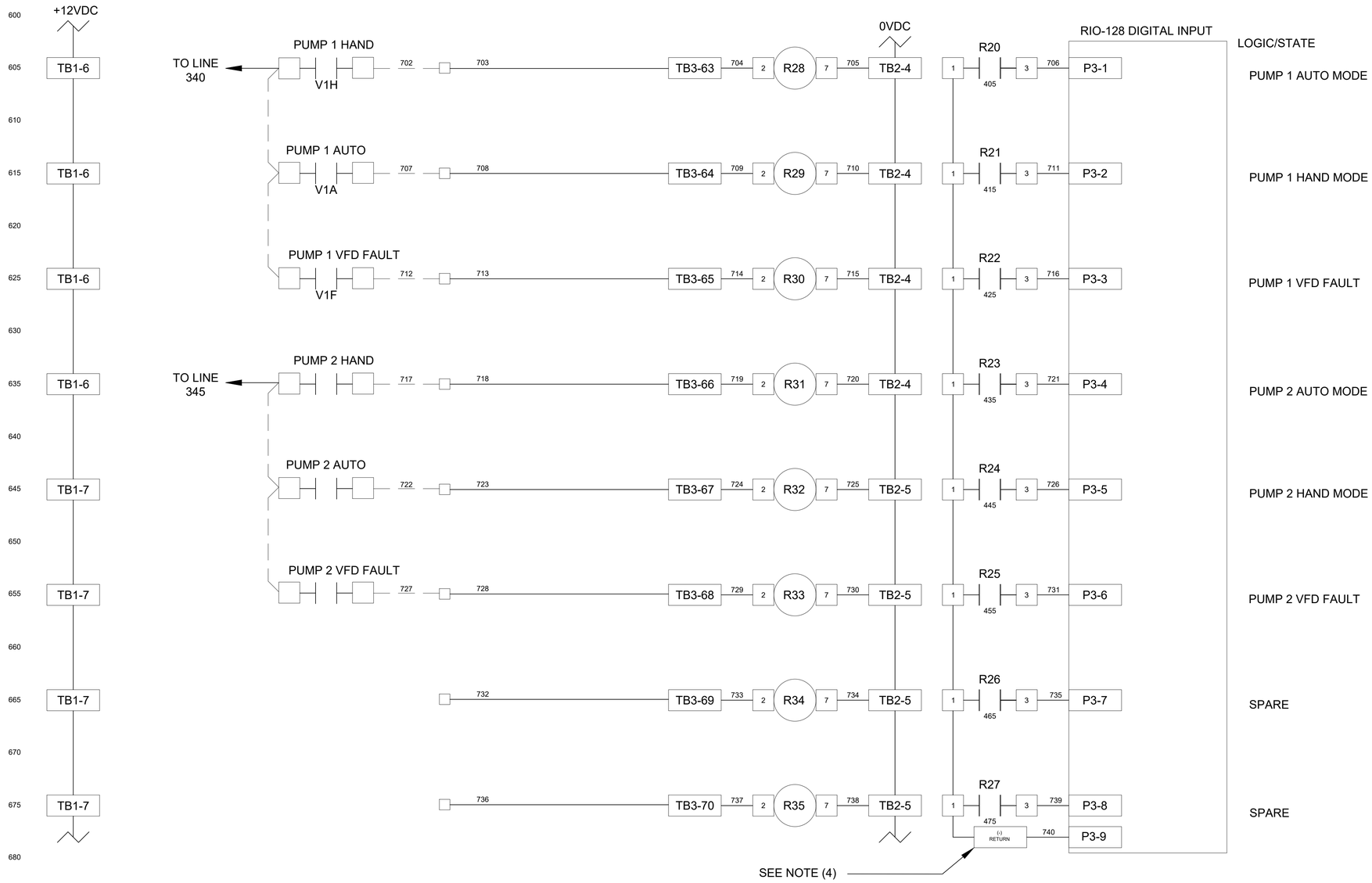

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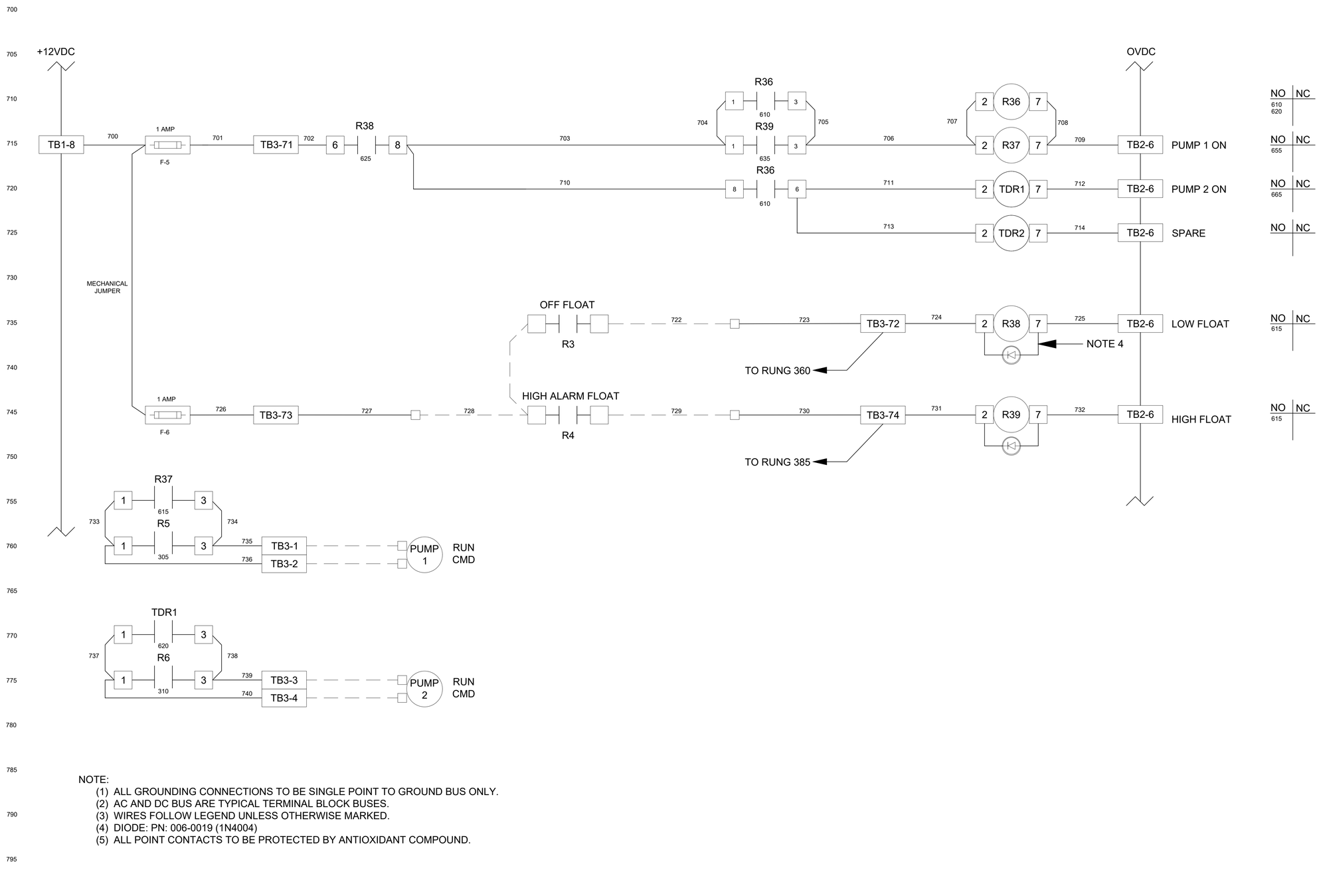

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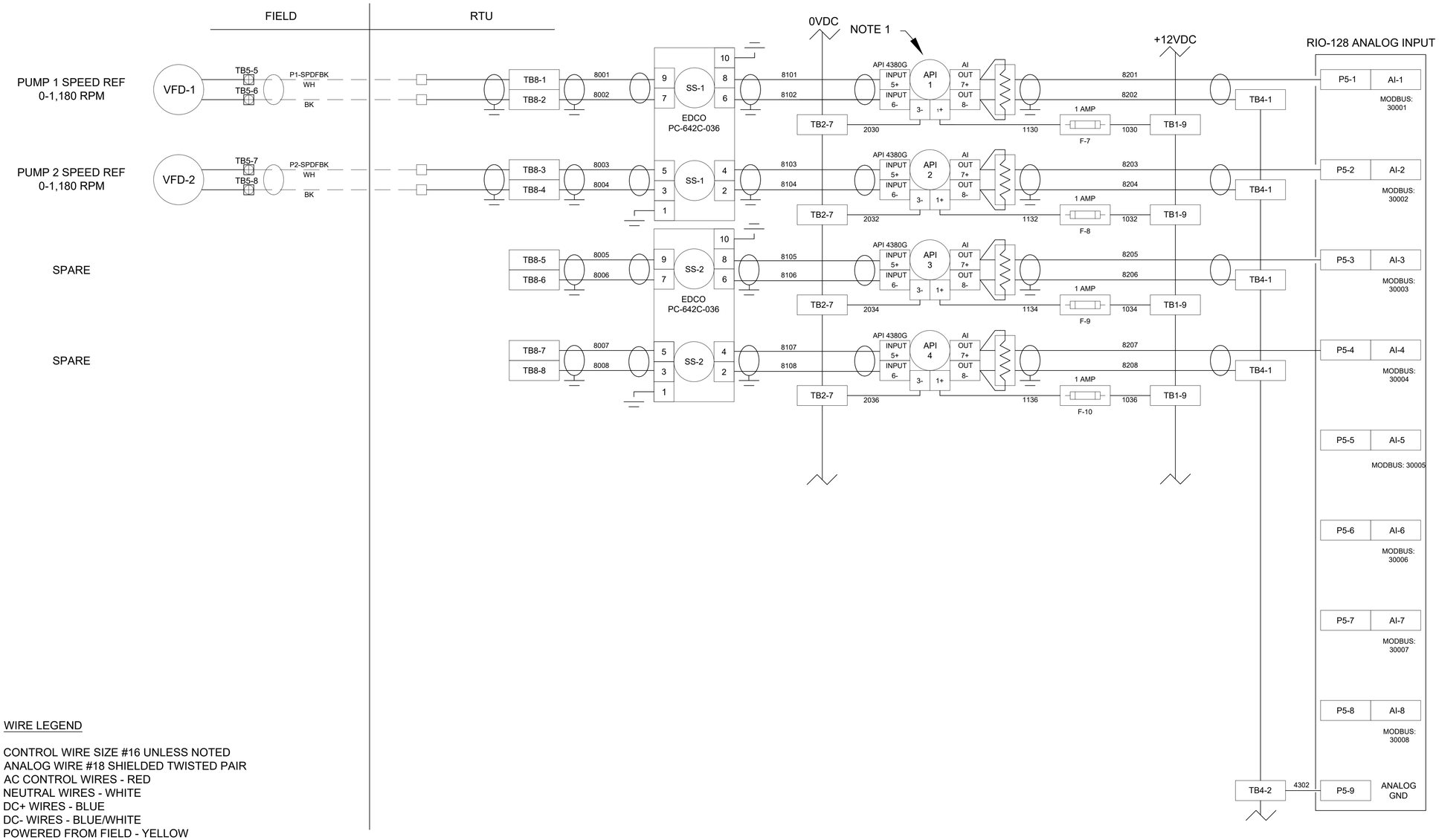

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(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
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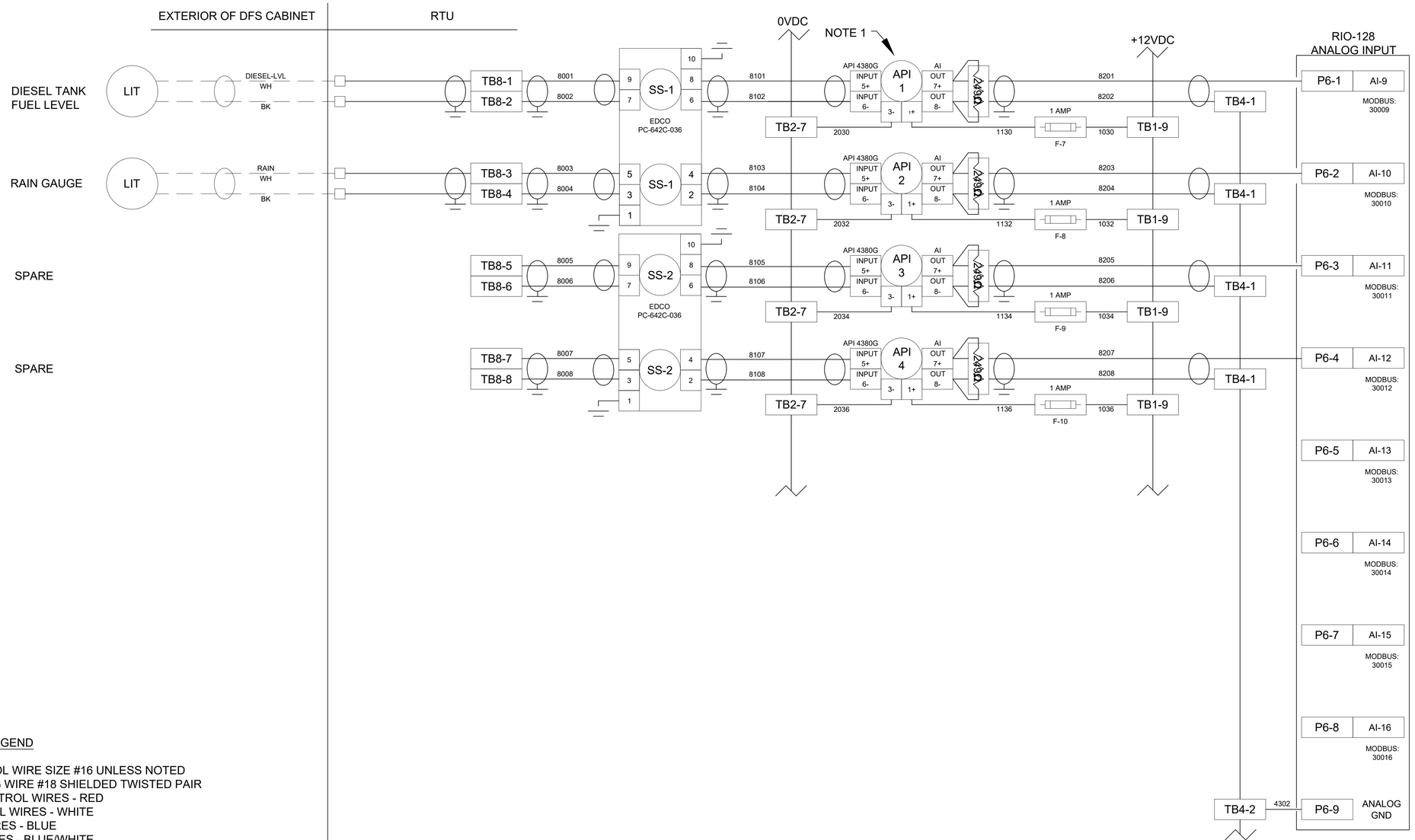
TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



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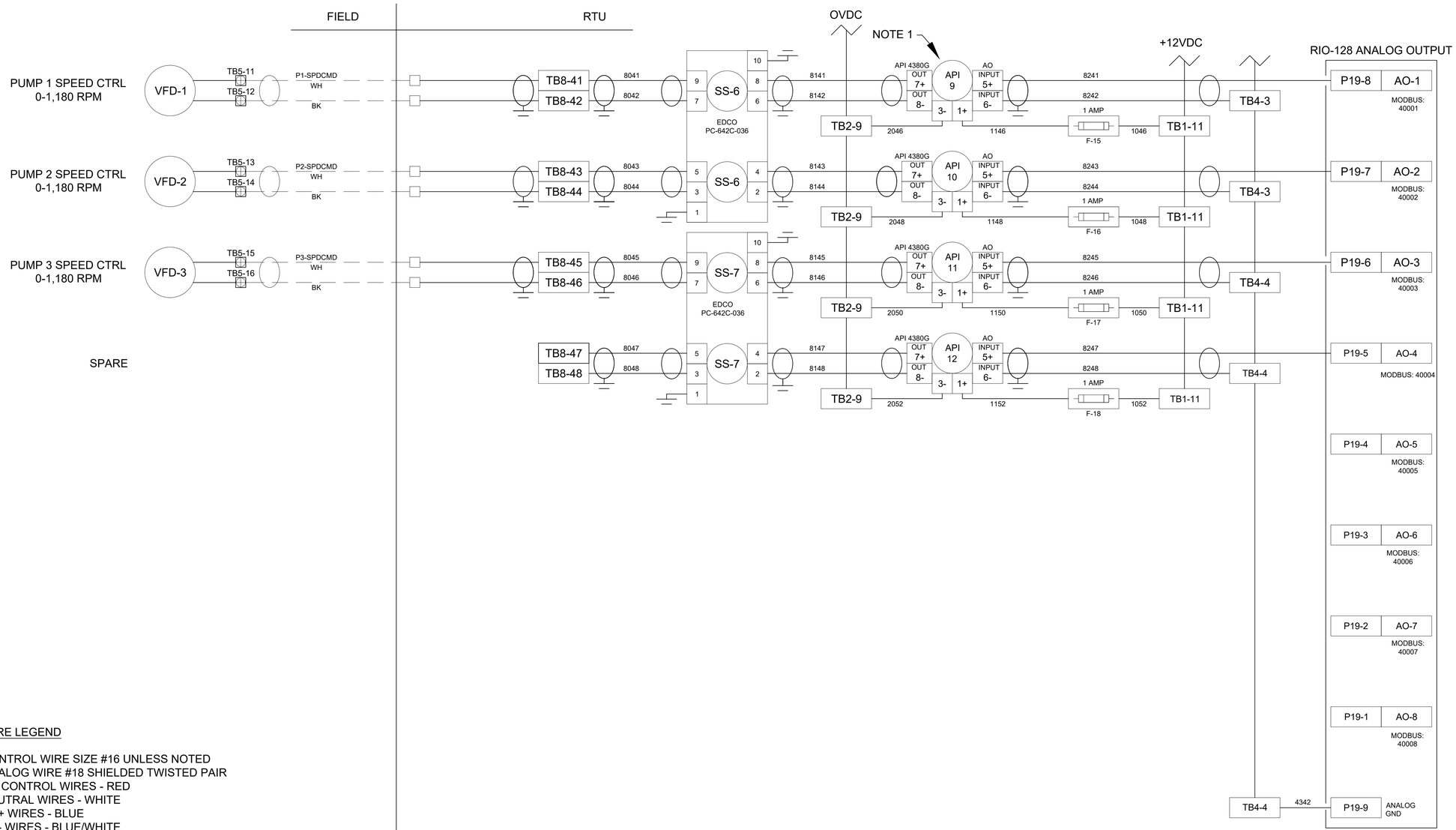

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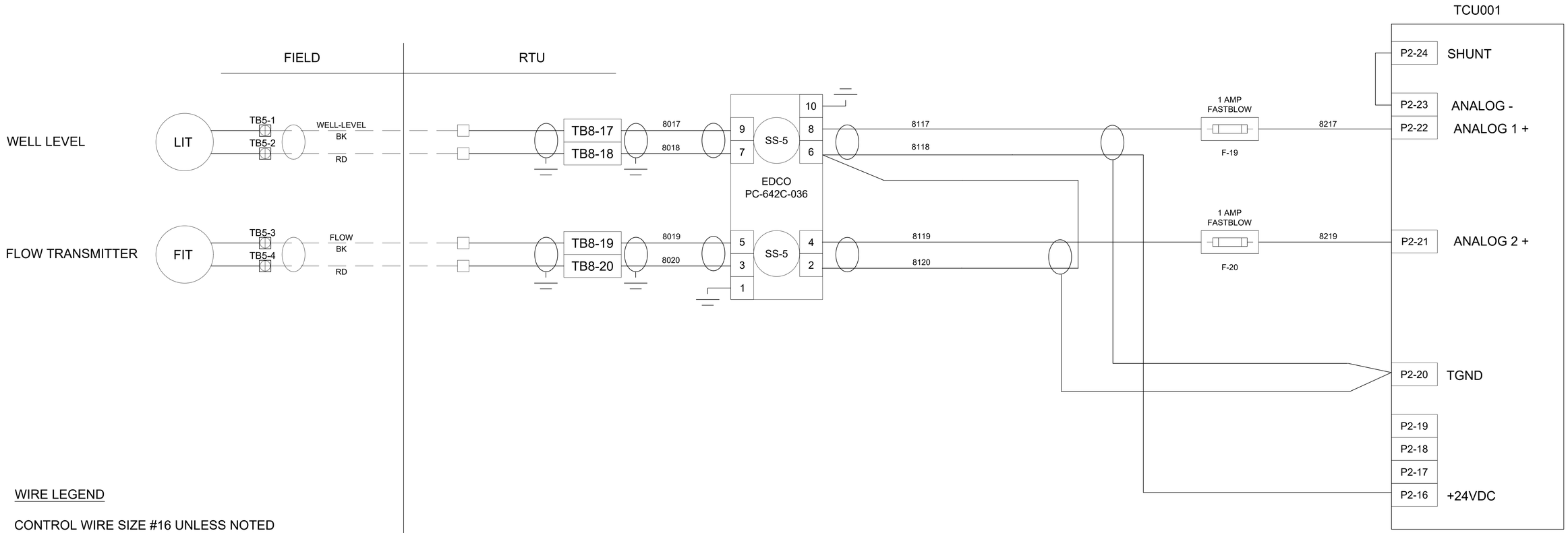

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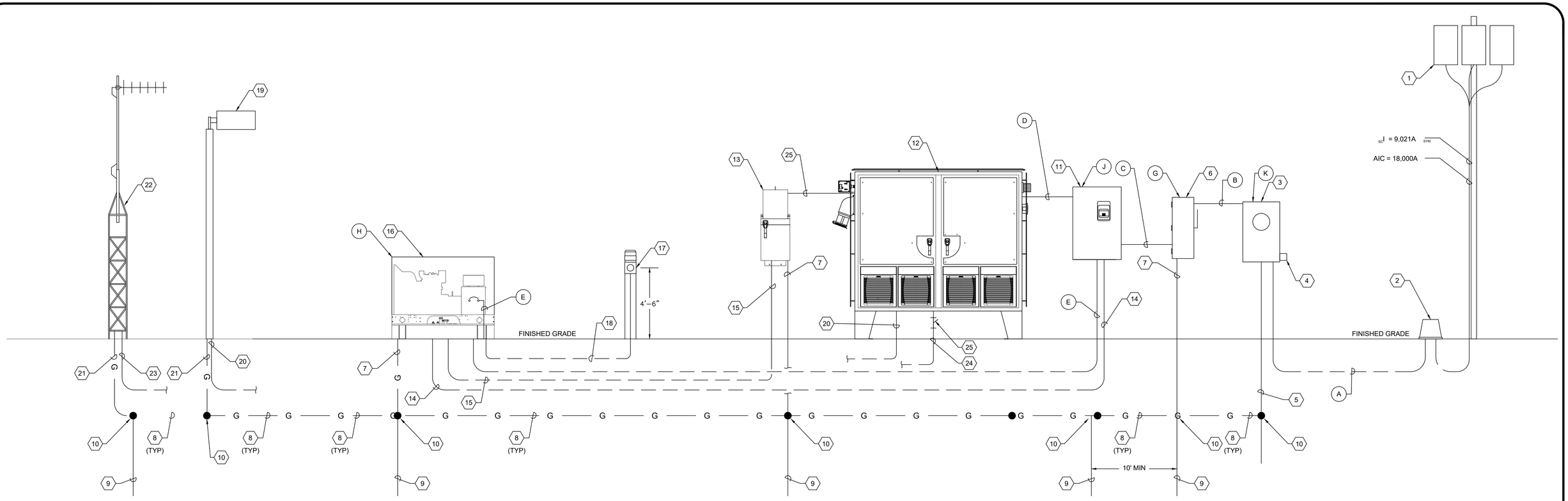


ONE LINE DIAGRAM NOTES:

1. UTILITY TRANSFORMERS. COORDINATE ALL WORK WITH UTILITY.
2. PROVIDE AND INSTALL UTILITY APPROVED PEDESTAL.
3. PROVIDE AND INSTALL NEW 480V, 3Ø, METER SOCKET. GROUND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE NEW ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH UTILITY. REFER TO SCHEDULE FOR SIZE REQUIRED PER SITE.
4. PROVIDE AND INSTALL UTILITY APPROVED LIGHTNING PROTECTION DEVICE.
5. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR. COORDINATE REQUIREMENTS WITH UTILITY.
6. PROVIDE AND INSTALL NEW 480, 3-POLE DISCONNECT IN NEMA 4X STAINLESS STEEL ENCLOSURE. PROVIDE SOLID NEUTRAL AND GROUND LUG KITS TO MAKE DISCONNECT SERVICE ENTRANCE RATED. REFER TO SCHEDULE FOR AMPERE AND FUSING REQUIREMENTS.
7. PROVIDE AND INSTALL #4 CU GROUNDING ELECTRODE CONDUCTOR.
8. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
9. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
10. EXOTHERMIC WELD.
11. PROVIDE AND INSTALL 3-POLE, S/N, 480V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO SCHEDULE FOR SIZE.
12. PROVIDE AND INSTALL PUMP CONTROL PANEL.
13. PROVIDE AND INSTALL 10 KVA, 480V-120/240V, SINGLE-PHASE MINI-POWER ZONE IN NEMA 3R STAINLESS STEEL ENCLOSURE. SQUARE D MPZB10S40FSS. REFER TO SHEET 22 FOR PANEL SCHEDULE.
14. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
15. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
16. PROVIDE AND INSTALL NEW 480V, 3Ø, 4-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
17. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
18. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
19. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
20. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
21. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
22. NEW DFS ANTENNA.
23. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
24. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
25. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT.

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	25 HP STATIONS		30 HP STATIONS				
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	FROM:	TO:	NOTES:
(A)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL	1-1/2" C.	3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL	2" C.	UTILITY	METER	
(B)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	2" C.	METER	MAIN DISCONNECT	
(C)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	2" C.	MAIN DISCONNECT	AUTOMATIC TRANSFER SWITCH	
(D)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	2" C.	AUTOMATIC TRANSFER SWITCH	PUMP CONTROL PANEL	
(E)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#8 THWN CU GND	1-1/2" C.	3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	2" C.	AUTOMATIC TRANSFER SWITCH	GENERATOR SET	
(F)	3-#1 THWN CU + 1-#1 THWN CU NEUTRAL + 1-#8 THWN CU GND		3-1/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND		PUMP CONTROL PANEL	GENERATOR RECEPTACLE	
(P2)	3-#6 THWN CU + 1-#8 THWN CU GND		3-#4 THWN CU + 1-#6 THWN CU GND		PUMP CONTROL PANEL	WET WELL JUNCTION BOX	

EQUIPMENT			NOTES:
(G)	200 AMPERE DISCONNECT FUSED AT 125 AMPERES	200 AMPERE DISCONNECT FUSED AT 150 AMPERES	ALL DISCONNECTS SHALL BE PADLOCKABLE
(H)	480V, 3Ø, 4-WIRE 60 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	480V, 3Ø, 4-WIRE 60 KW GENERATOR WITH 100 AMPERE MAIN CIRCUIT BREAKER	
(J)	480V, 125 AMPERE TRANSFER SWITCH	480V, 150 AMPERE TRANSFER SWITCH	
(K)	200 AMPERE, 480V, 3-PHASE METER	200 AMPERE, 480V, 3-PHASE METER	

PUMP CONTROL PANEL			NOTES:
(L)	125 AMPERE MAIN CIRCUIT BREAKER	150 AMPERE MAIN CIRCUIT BREAKER	
(M)	125 AMPERE EMERGENCY CIRCUIT BREAKER	150 AMPERE EMERGENCY CIRCUIT BREAKER	
(N)	70 AMP MOTOR CIRCUIT BREAKERS	80 AMP MOTOR CIRCUIT BREAKERS	
(O)	YASKAWA VFD - PW4A044FAA RATED OUTPUT - 44 AMPERES	YASKAWA VFD - PW4A058FAA RATED OUTPUT - 58 AMPERES	
(P)	#6 AWG CU MOTOR CONDUCTORS	#4 AWG CU MOTOR CONDUCTORS	

LOAD CALCULATION: 25 HP

MOTORS:

PUMP NO. 1: 25 HP, 480 VAC, 3 Ø, 34 A

PUMP NO. 2: 25 HP, 480 VAC, 3 Ø, 34 A

MOTOR SUB-TOTAL 68 A

+ 25% OF LARGEST MOTOR 8.5 A

SUB-TOTAL 76.5 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 96.5 A

SERVICE SIZE:

125 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 30 HP

MOTORS:

PUMP NO. 1: 30 HP, 480 VAC, 3 Ø, 40 A

PUMP NO. 2: 30 HP, 480 VAC, 3 Ø, 40 A

MOTOR SUB-TOTAL 80 A

+ 25% OF LARGEST MOTOR 10 A

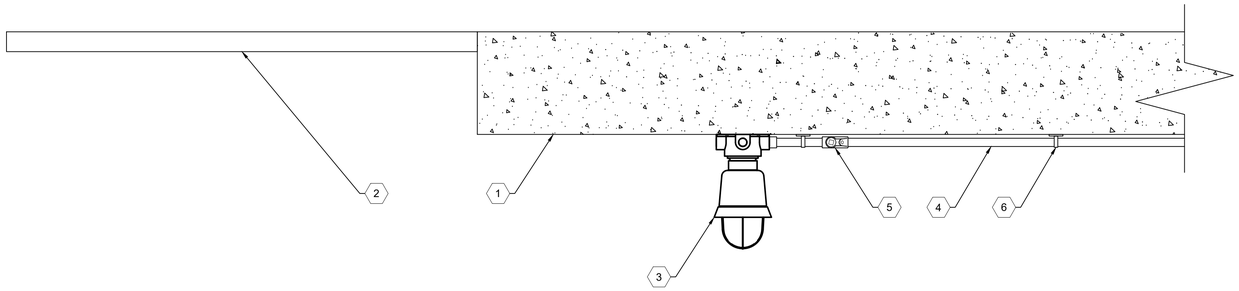
SUB-TOTAL 90 A

AUXILIARY EQUIPMENT 20.0 A

TOTAL MAXIMUM PHASE AMPERES 110 A

SERVICE SIZE:

150 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

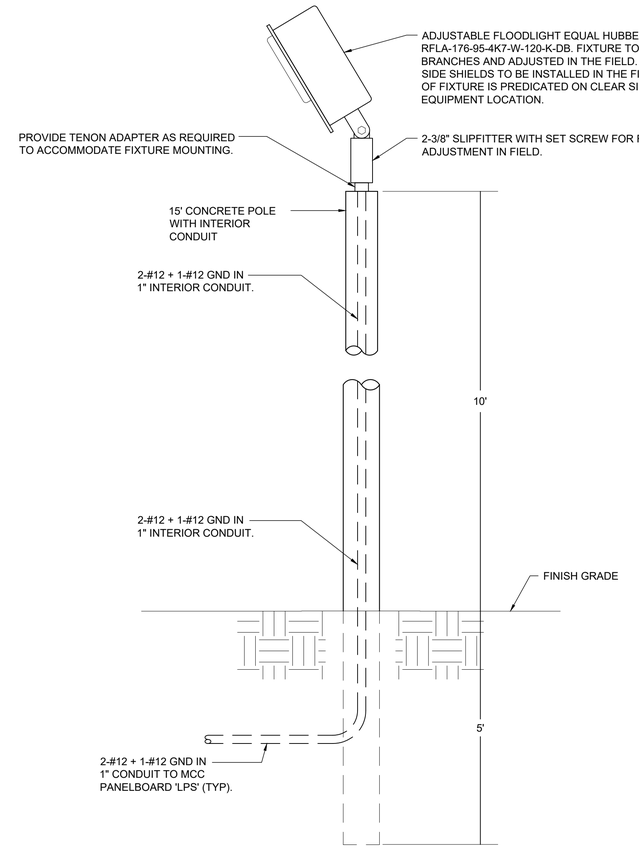


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL: CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	1"	2-#10 + 1-#10 GND	PUMP CONTROL PANEL	MINI POWER-ZONE 'LP'	MINI POWER-ZONE 'LP' 480V FEEDER FROM THE PUMP CONTROL PANEL.
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	QUANTITY OF AREA LIGHTS DIFFERS BETWEEN LS 54 AND LS 65.
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	MINI POWER-ZONE 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	3/4"	2-#10 + 1-#10 NEU + 1-#10 GND	MINI POWER-ZONE 'LP'	POWER-ZONE 'LP' SURGE PROT	CONNECT SURGE PROTECTION DEVICE VIA NON-METALLIC FLEXIBLE CONDUIT.
P7	1"	6-#12 + 2-#12 NEU + 1-#12 GND	MINI POWER-ZONE 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P8	3/4"	2-#12 + 1-#12 GND	MINI POWER-ZONE 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P9	2"	REFER TO 'P2' ON SHEET 20	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #1 POWER.
P10	2"	REFER TO 'P2' ON SHEET 20	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	PUMP #2 POWER.
P11	3/4"	2-#12 + 1-#12 GND	MINI POWER-ZONE 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P12	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #1 POWER.
P13	2"	CABLE SUPPLIED WITH PUMP	WET WELL JUNCTION BOX	WET WELL	PUMP #2 POWER.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1-1/2"	SIX (6) 2/C-#16 TWISTED SHIELDED PUMP	CONTROL PANEL	DFS CABINET	4-20mA FLOW METER, LEVEL TRANSMITTER VFD #1 SPEED REFERENCE, VFD #2 SPEED REFERENCE, VFD #1 SPEED COMMAND AND VFD #2 SPEED COMMAND SIGNALS. ALL CABLES SHALL BE BELDEN 8719.
C8	1-1/4"	20-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/4"	14-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C16	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. QO ; 120/240 VOLTS, 1Ø, 3W ; 60 AMP MAIN CIRCUIT BREAKER ; 35K AIC RATING ; SURFACE ENCLOSURE TOP AT 5'-6" AFF

EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE		CIRC.	CIRC.	KVA/PHASE		CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	NO.	NO.	A	B	POLE	AMPS	FRAME	
SURGE PROTECTION DEVICE	2	30	QOB	.		1	2	0.8		1	20	QOB	PUMP CONTROL PANEL RECEPTACLE
" "	-	-	-		.	3	4		1.0	1	20	QOB	PUMP CONTROL PANEL LIGHTS
GENERATOR BLOCK HEATER	2	20	QOB	1.2		5	6	0.4		1	20	QOB	PUMP CONTROL PANEL CONTROLS
" "	-	-	-		1.2	7	8		0.4	1	20	QOB	PUMP CONTROL PANEL CONTROLS
GENERATOR ALTERNATOR HEATER	1	20	QOB	0.8		9	10	0.6		1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB		1.0	11	12		.				SPACE
FLOW METER TRANSMITTER	1	20	QOB	0.2		13	14	.		--	--	--	SPACE
SPARE	1	20	QOB		.	15	16		.	--	--	--	SPACE
SUB-TOTAL KVA				2.2	2.2			1.8	1.4				

TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

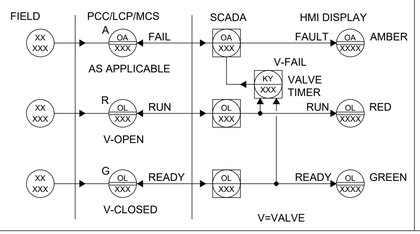
FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS					
	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED

S = STATUS

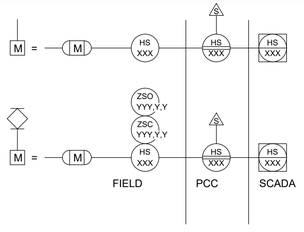
THIS SYMBOL INDICATES THE FOLLOWING INSTRUMENTATION

(NOTE : VALVE FAULT IS PLC GENERATED)



TYPICAL FOR M

(IF NOT OTHERWISE ILLUSTRATED ON DRAWINGS)



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK — D —— D —

RADIO LINK — R —— R —

FIBER OPTIC DATA — F —— F —

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT

SP = SET POINT INPUT

C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT

AO = ANALOG OUTPUT

DI = DISCRETE INPUT

DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO

S/S = START/STOP

SEL = SELECTOR

O/C = OPEN/CLOSE

O/O = ON/OFF

LOS = LOCKOUT-START

LOR = LOCAL-OFF-REMOTE

OAC = OPEN-AUTO CLOSE

CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN

O/R = OVERRIDE

MCS = MASTER CONTROL STATION

VFD = VARIABLE FREQUENCY DRIVE

PCC = PROCESS CONTROL CABINET

LCP = LOCAL CONTROL PANEL

ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN

E = ENGINE

G = GENERATOR

F = FILTER

GS = GRINDER/SCREEN

K = COMPRESSOR

H = HOIST

ME = MECHANICAL EQUIPMENT

MX = MIXER

P = PUMP

T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.

PLC - PROGRAMMABLE LOGIC CONTROL

SA - SURGE SUPPRESSOR DEVICE

I — INTERLOCK

I-3 — CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊡	OR	⊡⊡	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊡	OR	⊡⊡	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT

CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 25 TO 30HP

INSTRUMENTATION LEGEND ABBREVIATIONS AND SYMBOLS

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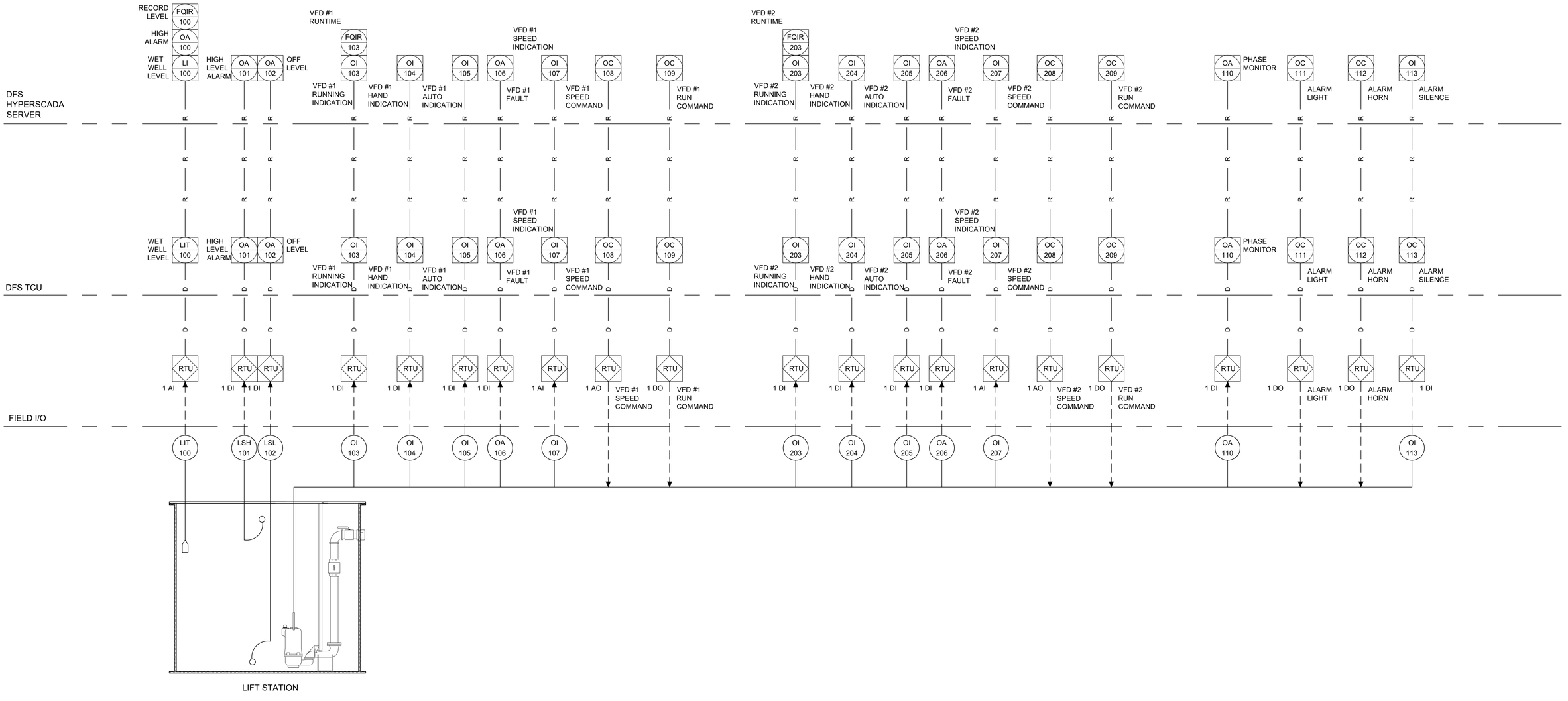
LATEST REVISION	11/2022



CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 25 TO 30HP

TYPICAL LIFT STATION P&ID'S

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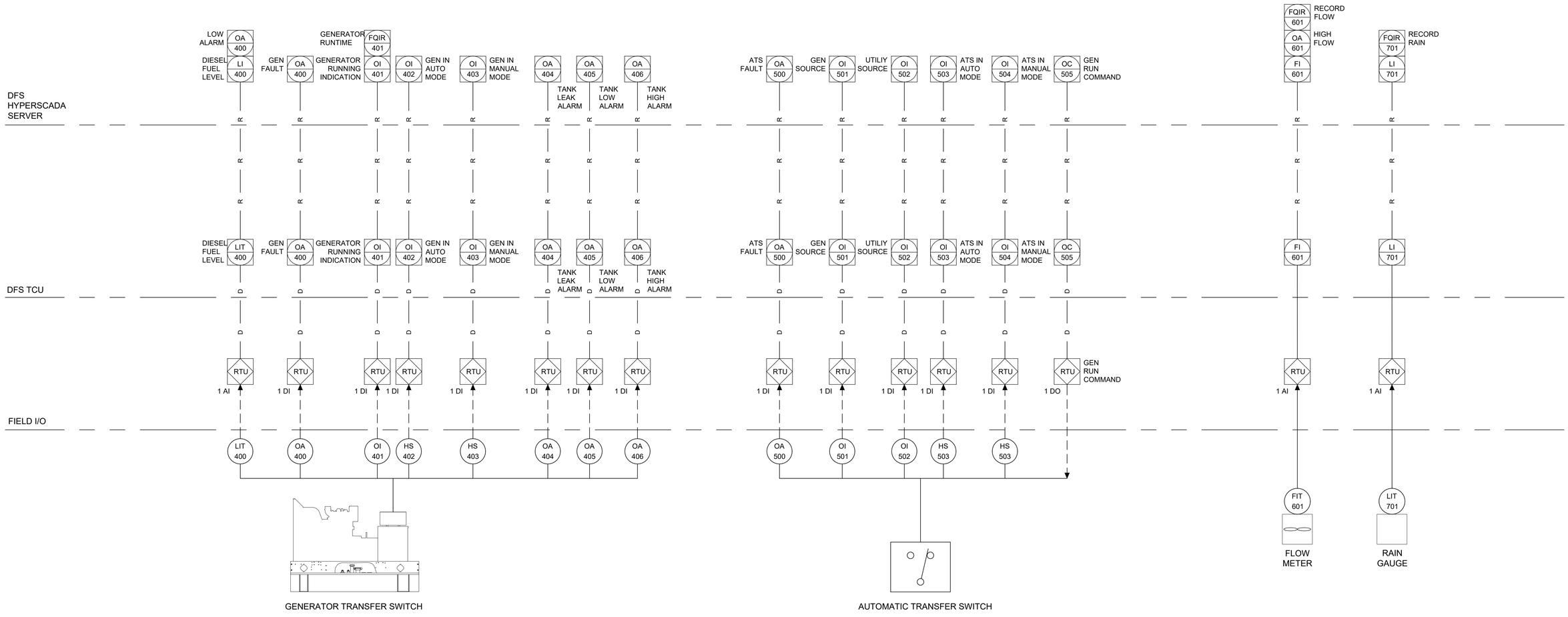


CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**480V 3-PH, DUPLEX 25 TO 30HP**	**TYPICAL LIFT STATION P&ID'S**	INDEX NO. 806 / PAGE NO. 25 OF 25 LATEST REVISION 11/2022

SHEET INDEX

CLEARWATER

BRIGHT AND BEAUTIFUL • BAY TO BEACH

INDEX 807:
PUMP STATION STANDARD ELECTRICAL DETAILS
480V 3-PH PUMP 47 TO 88 HP

CONDUIT RUN EXPOSED

CONDUIT RUN CONCEALED OR UNDERGROUND

CONDUIT RUN CONCEALED IN FLOOR OR SLAB

G — GROUNDING ELECTRODE CONDUCTOR

CONDUIT STUB OUT AND CAP

GROUND ROD

GROUND TEST WELL

JUNCTION BOX

JUNCTION BOX WITH FLEXIBLE CONNECTION

480V
15 KVA, 1*
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

XX

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE :
N - NON-REVERSING
R - REVERSING
2S - TWO-SPEED
C - CONTACTOR
SS - SOLID STATE SOFT START

XXX

XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO
LD	LEAK DETECTION
LLS	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE
PB	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT
SS	SOFT STARTER
SS/B	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSTION SENSOR (LIMIT SWITCH)

FUSE

UTILITY METER

TRANSFER SWITCH

ELECTRIC PANELBOARD

DISCONNECT OR SAFETY SWITCH

CHAIN HUNG 8' INDUSTRIAL FLUORESCENT LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

$ SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.

DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.

LB CONDUIT BODY/FITTING.

HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.

WIRES INDICATED AS FOLLOWS :

TWO WIRES:

THREE WIRES:

FOUR WIRES ETC:

NEUTRAL WIRE

ISOLATED GROUND WIRE

OVIDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

XX MOTOR

THERMAL OVERLOAD

FIELD WIRING

FLOAT SWITCH. OPENS ON LOW LEVEL.

FLOAT SWITCH. CLOSES ON LOW LEVEL.

NORMALLY OPEN (N.O.) CONTACT

NORMALLY CLOSED (N.C.) CONTACT

FUSE

GROUND CONNECTION

R INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS

DISCONNECT OR TOGGLE SWITCH

NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC

LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED

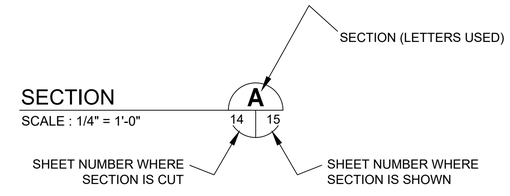
PUMP THERMAL SENSOR

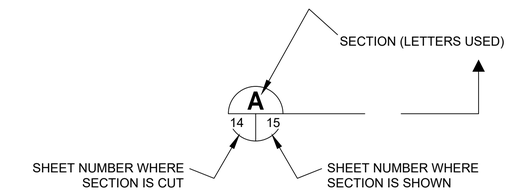
FAN THERMOSTAT

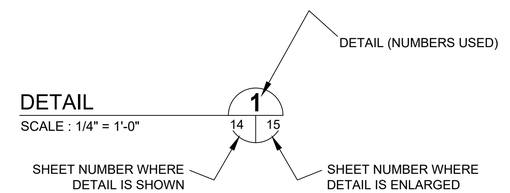
ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EXIST	EXISTING
ELEC	ELECTRICAL
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RGSC	RIGID GALVANIZED STEEL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL







CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 47 TO 88 HP

480V 3-PHASE, DUPLEX PUMP LIFT STATION 47 TO 88 HP ELECTRICAL STANDARDS WITH VFD'S

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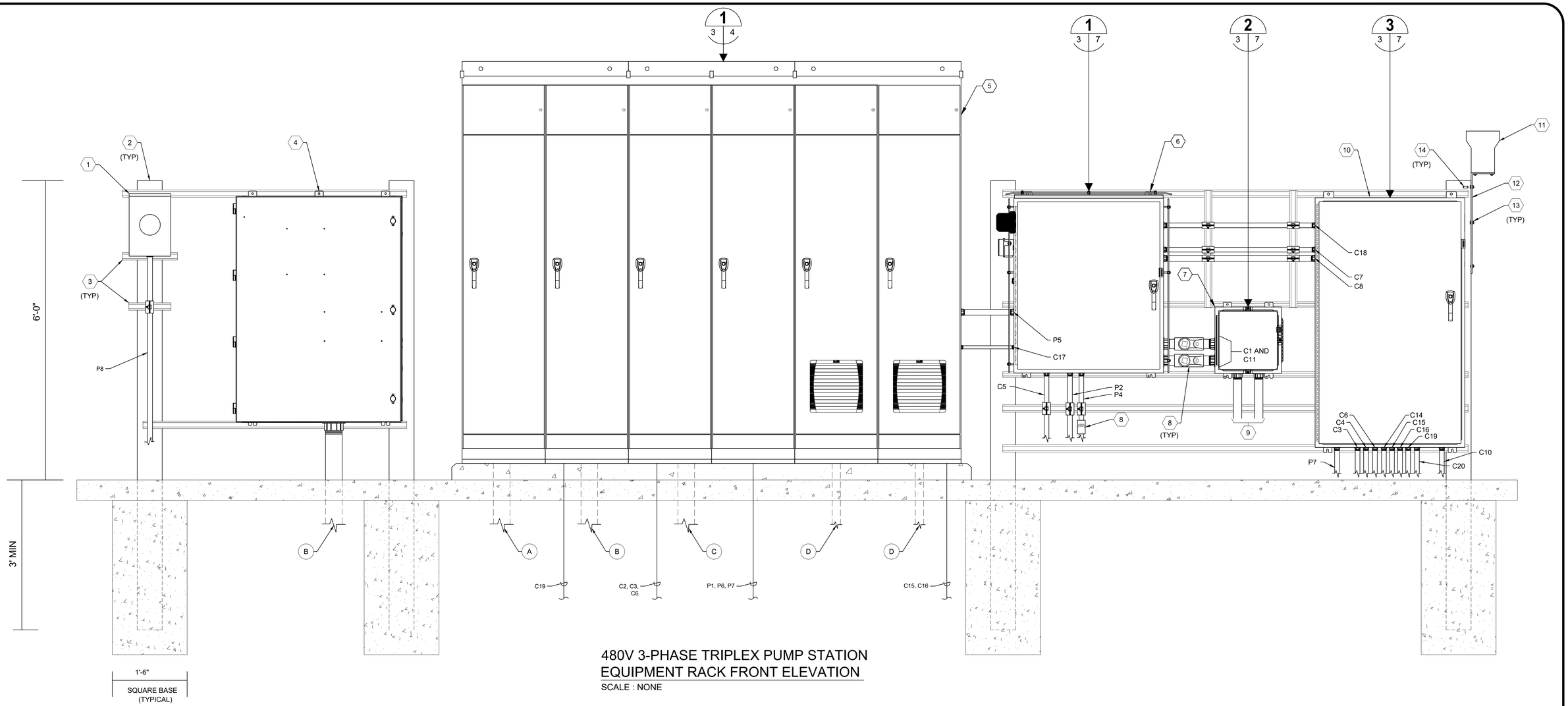


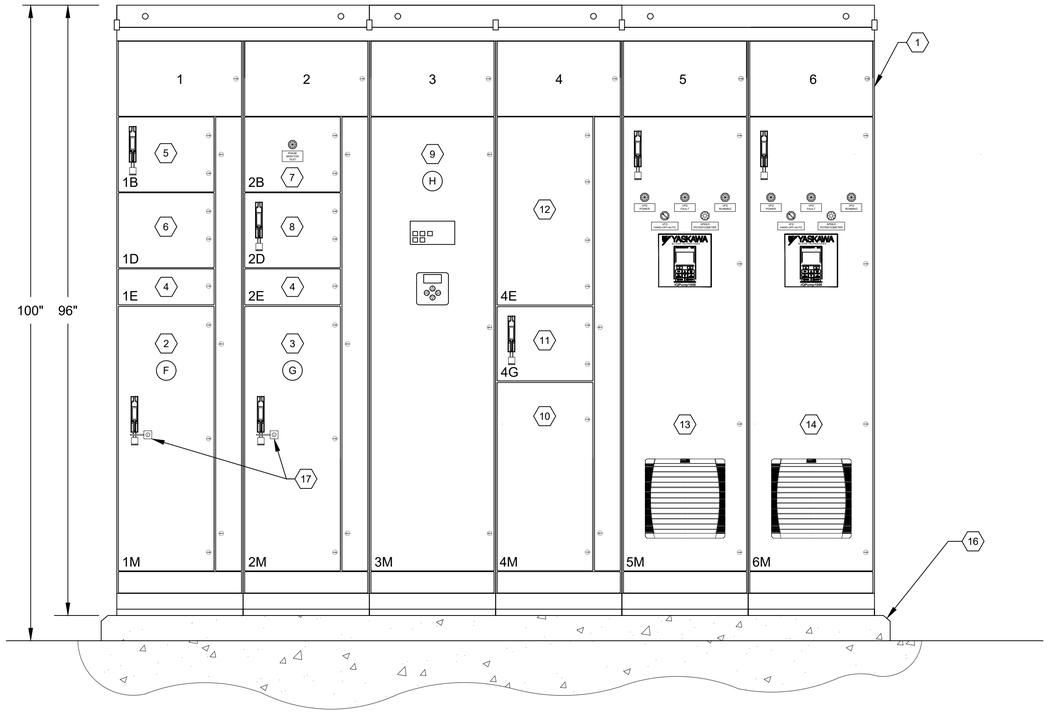
480V 3-PHASE TRIPLEX PUMP STATION
EQUIPMENT RACK FRONT ELEVATION
SCALE : NONE

KEYED NOTES:

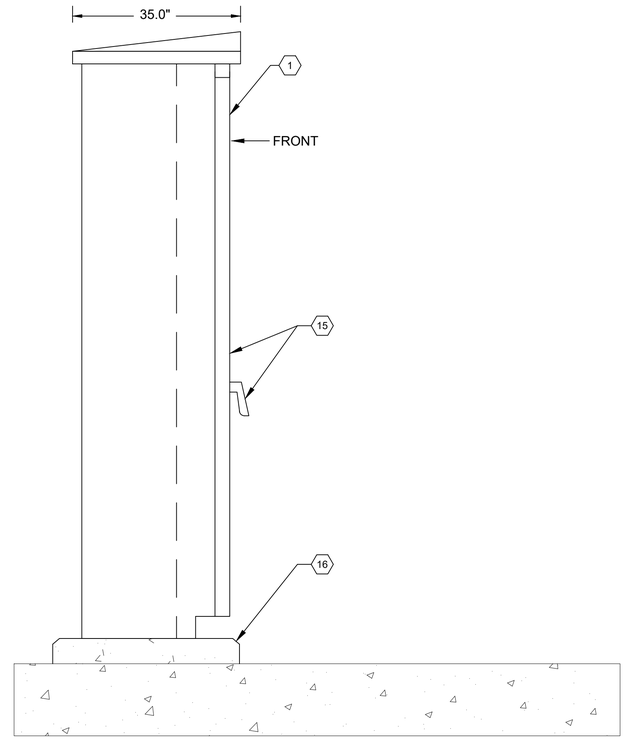
1. DUE TO THE SERVICE ENTRANCE SIZE, IT IS ASSUMED CT METERING WILL BE REQUIRED BY THE UTILITY. IF REQUIRED BY THE UTILITY, THE CONTRACTOR SHALL PROVIDE A FEED-THROUGH METER AND A DISCONNECT ON THE LINE SIDE OF THE ELECTRIC METER FOR UTILITY PURPOSES. COORDINATE ALL REQUIREMENTS WITH THE UTILITY INCLUDING SURGE PROTECTION AND EQUIPMENT GROUNDING.
2. PROVIDE AND INSTALL 6" X 6" X 9' REINFORCED SQUARE CONCRETE POST.
3. PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS.
4. PROVIDE AND INSTALL 480V, 3-POLE, SOLID NEUTRAL GENERATOR DOCKING STATON IN WEATHERPROOF ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
5. PROVIDE AND INSTALL LIFT STATION MOTOR CONTROL CENTER (MCC) IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER ALSO DETAIL ON SHEET 4.
6. PROVIDE AND INSTALL NEW PUMP CONTROL PANEL. REFER TO DETAILS ON SHEET 7.
7. PROVIDE AND INSTALL NEW 16" x 16" x 6" NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH STEEL BACKPANEL. PROVIDE STAINLESS STEEL LOUVER PLATE AND FILTER. REFER TO DETAIL ON SHEET 7.
8. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEALS W/CHICO COMPOUNDS.
9. 2" CONDUITS TO WET WELL. C12 AND C13. CABLES FOR LEVEL TRANSDUCER AND FLOATS ARE ALL BY RESPECTIVE MANUFACTURER.DATA
10. FLOW SYSTEMS (DFS) CABINET. REFER TO DETAIL ON SHEET 7.
11. PROVIDE AND INSTALL NEW 8" RAIN GAUGE. XYLEM RG600 WITH 4-20MA 00 4-20MA OUTPUT TIPPING BUCKET CONVERTER MODULE, XYLEM ELA000.
12. PROVIDE AND INSTALL 10" SQUARE 1/4" ALUMINUM BRACKET, OVERFLOW LIGHT ALUMINUM BRACKET.
13. PROVIDE AND INSTALL 3/4" STAINLESS STEEL NUT AND BOLT (TYP).
14. PROVIDE AND INSTALL STAINLESS STEEL WEDGE ANCHOR IN CONCRETE POST TO SECURE RAIN GAUGE BRACKET (TYP).

GENERAL NOTES:

1. ALL PANELS SHALL BE LABELED FOR THE ARC FLASH RISK HAZARD PRESENT AT EACH PIECE OF EQUIPMENT.
2. REFER TO ONE LINE DIAGRAM FOR REQUIRED GROUNDING ELECTRODE CONDUCTORS. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT.



480V 3-PHASE TRIPLEX PUMP STATION
MOTOR CONTROL CENTER FRONT ELEVATION (1 | 3 | 4)
SCALE : NONE



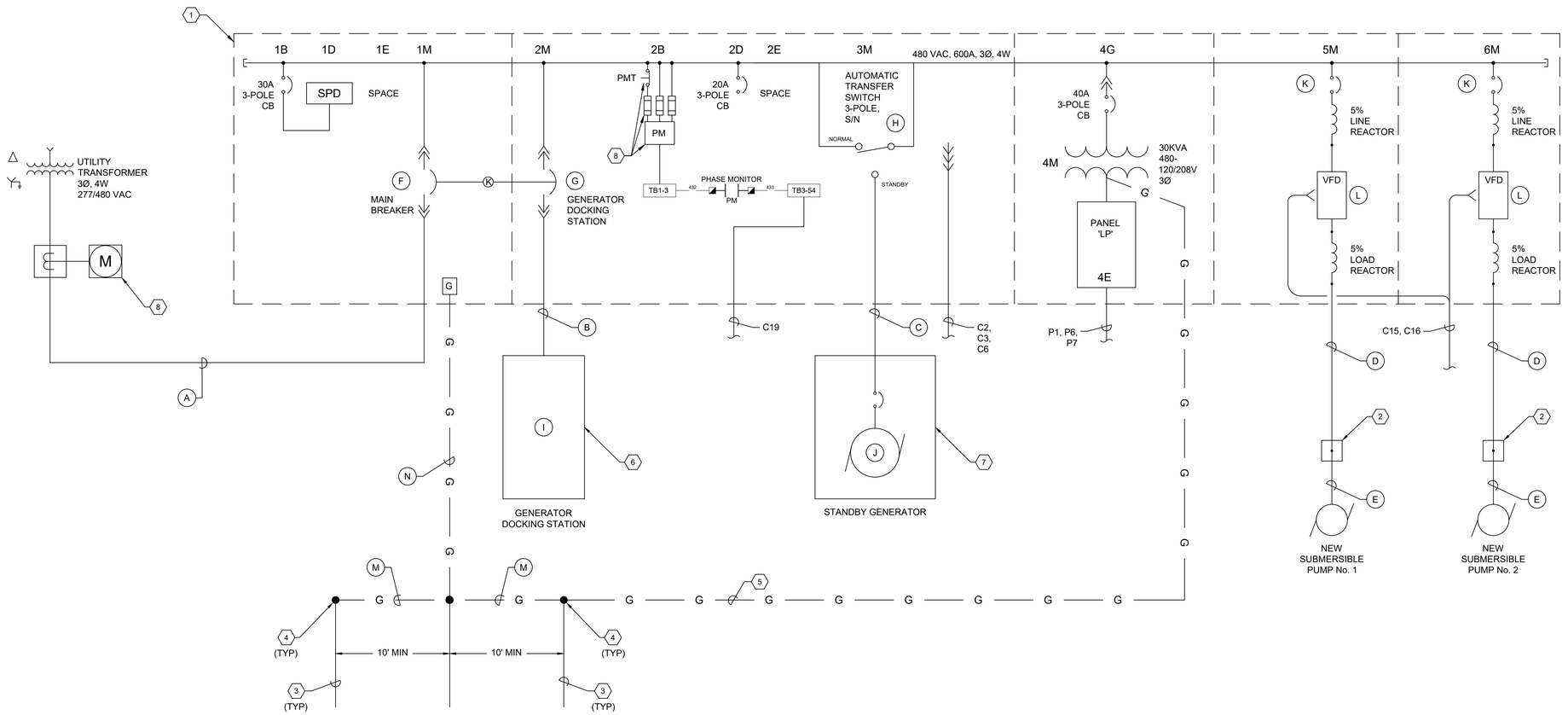
480V 3-PHASE TRIPLEX PUMP STATION
MOTOR CONTROL CENTER SIDE ELEVATION
SCALE : NONE

KEYED NOTES:

1. PUMP STATION MOTOR CONTROL CENTER (MCC) IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER ALSO TO ONE LINE DIAGRAM ON SHEET 21.
2. 480V, 3-POLE MAIN CIRCUIT BREAKER. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
3. 480V, 3-POLE CIRCUIT BREAKER FOR DOCKING STATION FEEDER. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
4. SPACE
5. 30A, 480V, 3-POLE CIRCUIT BREAKER FOR SURGE PROTECTION DEVICE (SPD).
6. SURGE PROTECTION DEVICE (SPD).
7. CUBICLE FOR PHASE MONITORING EQUIPMENT AND TEST PUSHBUTTON.
8. SPARE 20A, 480V, 3-POLE CIRCUIT BREAKER.
9. 3-POLE, SOLID NEUTRAL AUTOMATIC TRANSFER SWITCH. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
10. 15 KVA, 3Ø, 480V-120/208V TRANSFORMER.
11. 40A, 480V, 3-POLE CIRCUIT BREAKER FOR 15 KVA TRANSFORMER.
12. NEW 120/208V, 3Ø, 4-WIRE PANELBOARD WITH 60A M.C.B. PANELBOARD DESIGNATION 'LP'. REFER TO SHEET 25 FOR SCHEDULE.
13. 480V, VFD FOR NEW SUBMERSIBLE PUMP No. 1. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
14. 480V, VFD FOR NEW SUBMERSIBLE PUMP No. 2. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
15. PROVIDE GASKETED RAIN TIGHT DOOR WITH LOCKING HANDLE.
16. PROVIDE 4" CONCRETE HOUSKEEPING PAD WITH CHAMFERED EDGES.
17. PROVIDE KIRK-KEY INTERLOCKS FOR MAIN CIRCUIT BREAKER AND GENERATOR RECEPTACLE.

GENERAL NOTES:

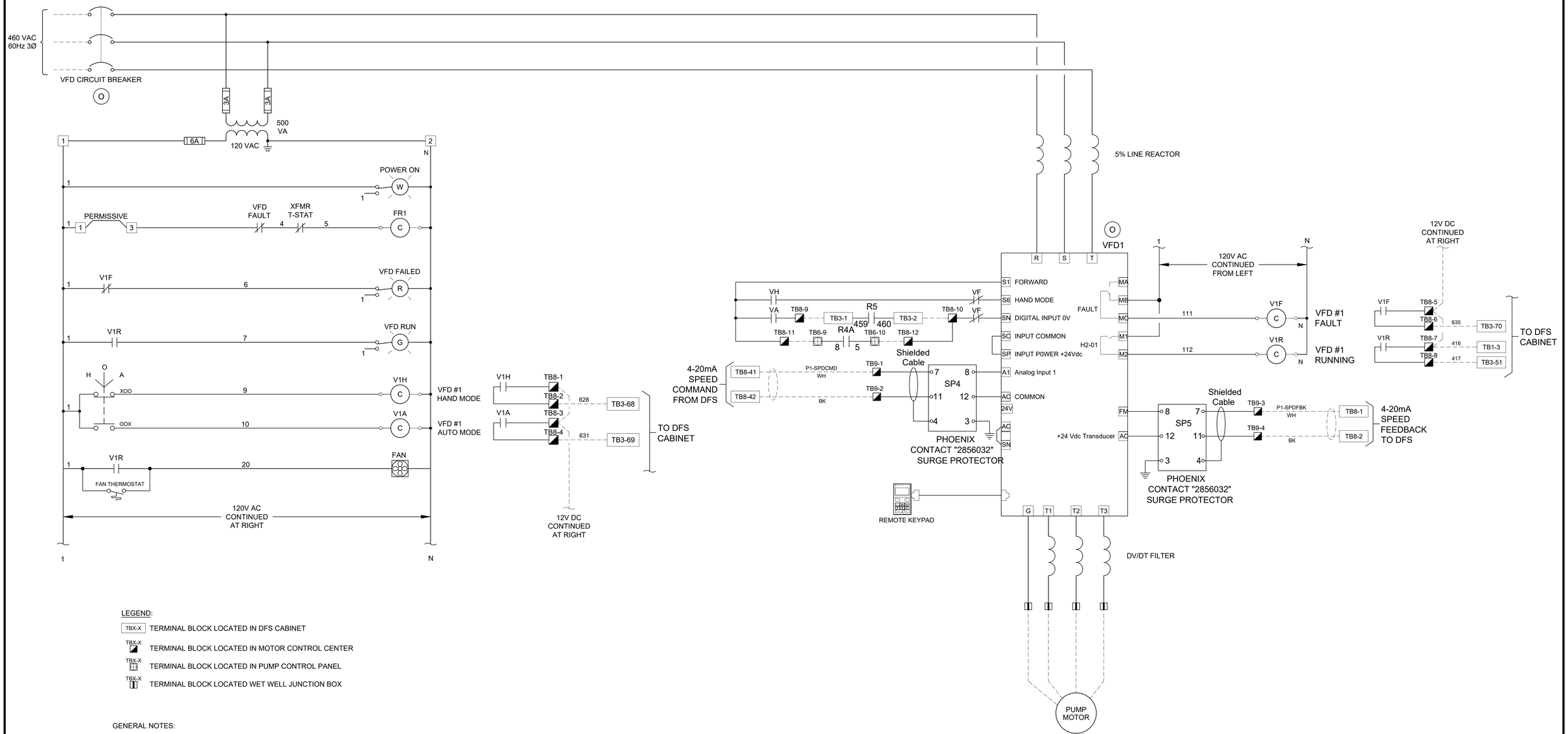
1. MCC DIMENSIONS SHOWN ARE BASED ON THE INFORMATION FROM A SPECIFIC MANUFACTURER. DIMENSIONS MAY VARY BASED ON THE MCC PROVIDED BY THE CONTRACTOR.



TYPICAL ONE-LINE DIAGRAM

KEYED NOTES:

1. PROVIDE AND INSTALL NEW PUMP STATION MOTOR CONTROL CENTER.
2. SUBMERSIBLE PUMP MOTOR WET WELL JUNCTION BOX.
3. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
4. PROVIDE AND INSTALL EXOTHERMIC WELDS.
5. PROVIDE AND INSTALL #8 BARE COPPER GROUNDING CONDUCTOR IN 1" C. FROM TRANSFORMER TO GROUNDING ELECTRODE GRID.
6. PROVIDE AND INSTALL 480V, 3-POLE, SOLID NEUTRAL GENERATOR DOCKING STATON IN WEATHERPROOF ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
7. PROVIDE AND INSTALL 480V, 3Ø, 4-WIRE STANDBY GENERATOR IN WEATHERPROOF ENCLOSURE. GENERATOR TO BE PROVIDED WITH SUB-BASE FUEL STORAGE TANK. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
8. DUE TO THE SERVICE ENTRANCE SIZE, IT IS ASSUMED CT METERING WILL BE REQUIRED BY THE UTILITY. IF REQUIRED BY THE UTILITY, THE CONTRACTOR SHALL PROVIDE A FEED-THROUGH METER AND A DISCONNECT ON THE LINE SIDE OF THE ELECTRIC METER FOR UTILITY PURPOSES. COORDINATE ALL REQUIREMENTS WITH THE UTILITY INCLUDING SURGE PROTECTION AND EQUIPMENT GROUNDING.

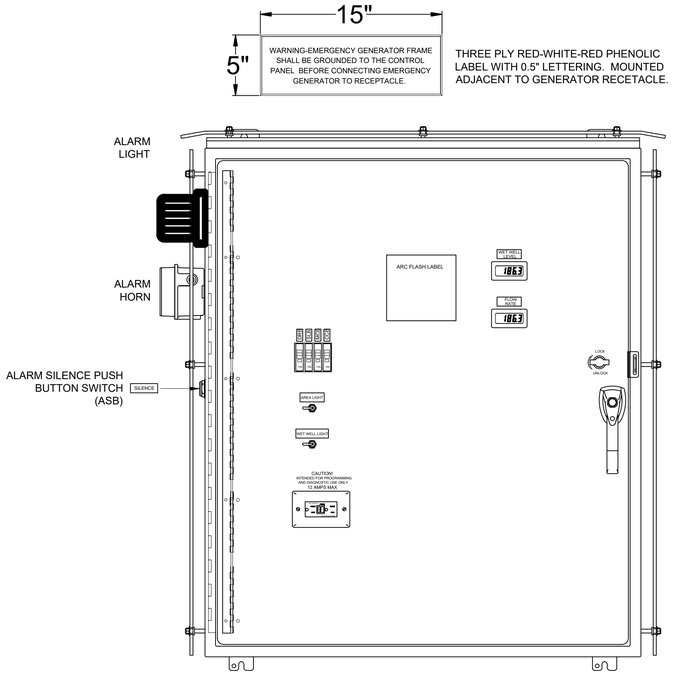


LEGEND:

TBX-X	TERMINAL BLOCK LOCATED IN DFS CABINET
TBX-X	TERMINAL BLOCK LOCATED IN MOTOR CONTROL CENTER
TBX-X	TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
TBX-X	TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

GENERAL NOTES:

1. WIRING DIAGRAM SHOWN IS TYPICAL FOR ALL VFD'S.



PUMP CONTROL PANEL DETAIL

SCALE : N.T.S.

1 | 3 | 7

INNER DOOR VIEW

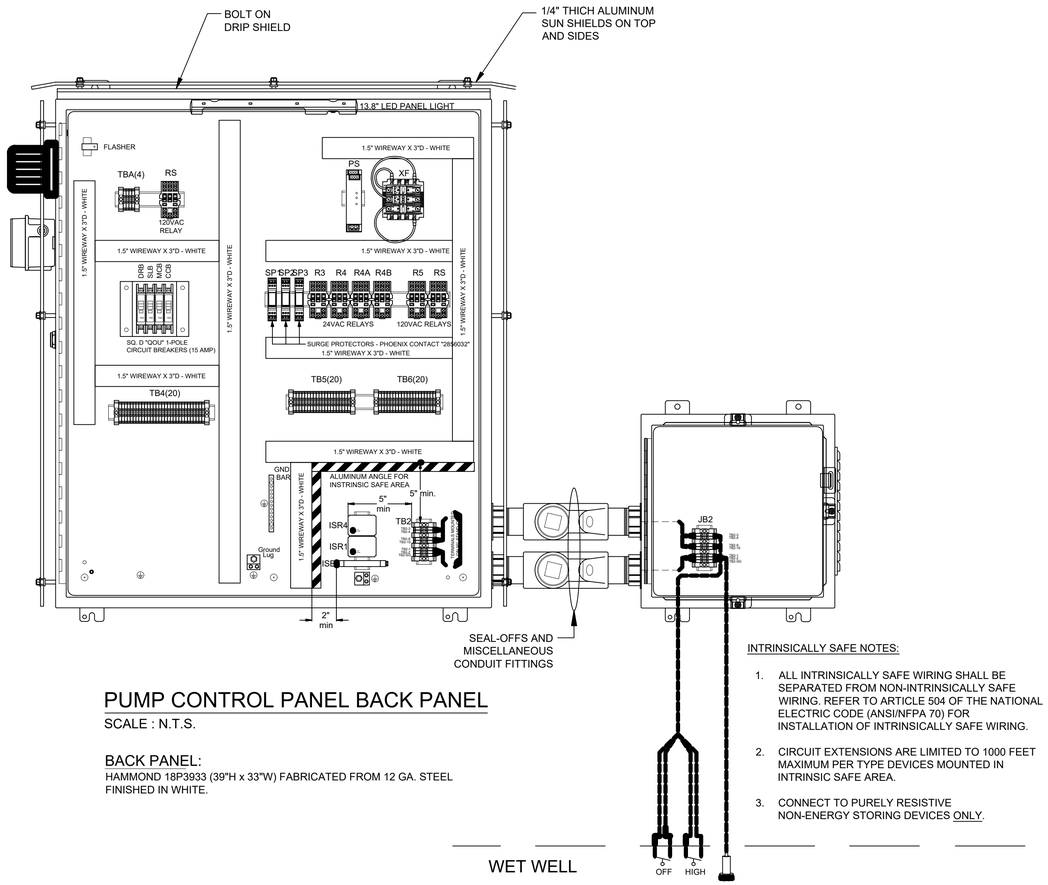
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:

HAMMOND HW42368S16HK (42"H x 36"W x 8"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD, PAD-LOCKING HASP AND 0.25" THICK ALUMINUM SUN SHIELDS ON TOP AND SIDES. OUTER DOOR SHALL HAVE ROLLER CAM TYPE 3-POINT, PAD-LOCKABLE HANDLE, WELDED ON STUDS FOR PRINT POCKET AND 90° STOP.

INNER DOOR:

HID-4836, 0.125 BLACK ENGRAVED ALUMINUM WITH CONTINUOUS HINGE, TWIST LATCHES, AND 90° STOP.



PUMP CONTROL PANEL BACK PANEL

SCALE : N.T.S.

BACK PANEL:

HAMMOND 18P3933 (39"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

INTRINSICALLY SAFE NOTES:

1. ALL INTRINSICALLY SAFE WIRING SHALL BE SEPARATED FROM NON-INTRINSICALLY SAFE WIRING. REFER TO ARTICLE 504 OF THE NATIONAL ELECTRIC CODE (ANSI/NFPA 70) FOR INSTALLATION OF INTRINSICALLY SAFE WIRING.
2. CIRCUIT EXTENSIONS ARE LIMITED TO 1000 FEET MAXIMUM PER TYPE DEVICES MOUNTED IN INTRINSIC SAFE AREA.
3. CONNECT TO PURELY RESISTIVE NON-ENERGY STORING DEVICES ONLY.

JUNCTION BOX ENCLOSURE DETAIL

SCALE : N.T.S.

2 | 3 | 7

JUNCTION BOX:

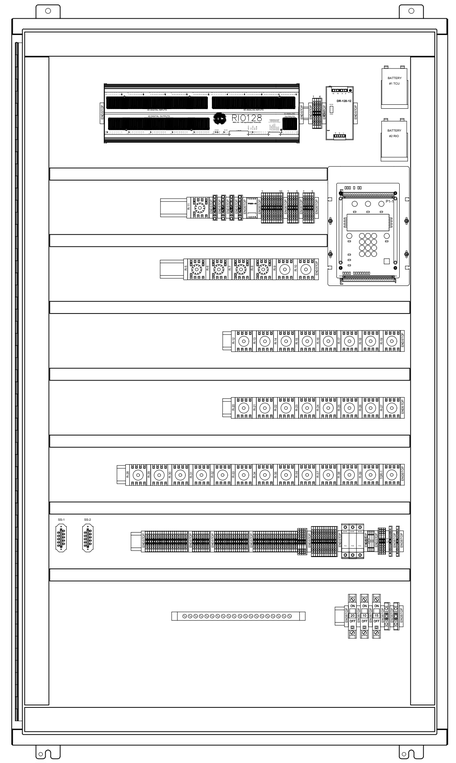
HAMMOND 1418N4S16G6 (16"H x 16"W x 6"D) NEMA 4X RATED TYPE 316 STAINLESS STEEL WITH BOLT-ON DRIP SHIELD AND INTEGRAL 12 GA. INNER PANEL. OUTER DOOR SHALL HAVE STAINLESS STEEL 1/4-TURN LATCHES AND PAD-LOCKING HASP.

BACK PANEL:

HAMMOND EP1616 (14.2"H x 14.2"W) FABRICATED FROM 12 GA. WHITE ENAMELED STEEL.

LOUVER:

WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



DFS CABINET DETAIL

SCALE : N.T.S.

3 | 3 | 7

TCU ENCLOSURE:

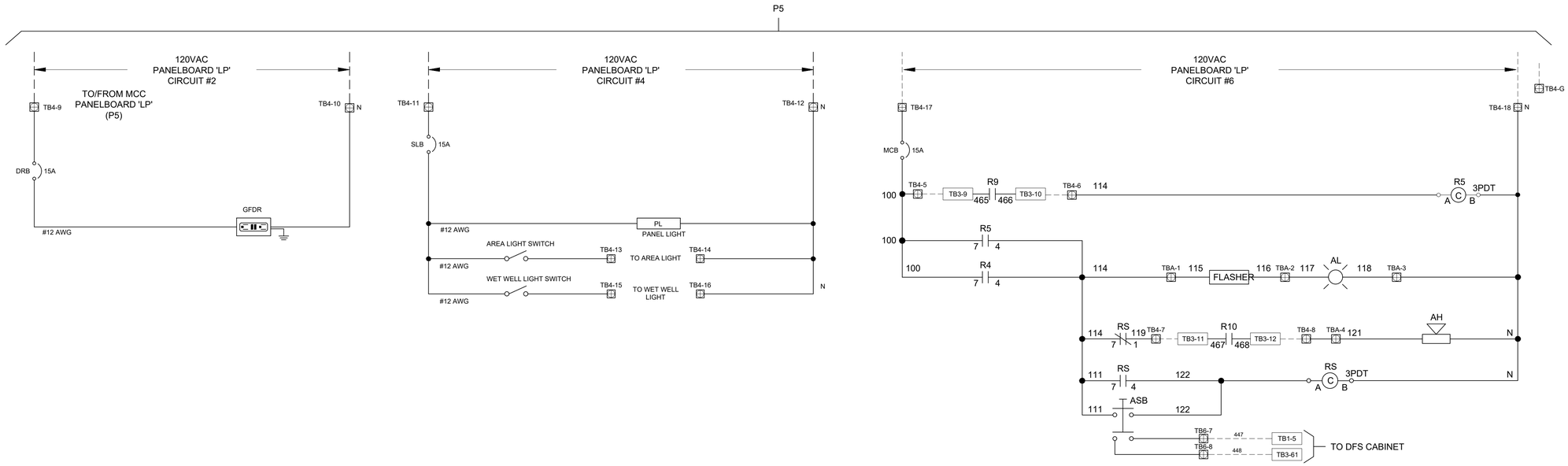
(OUTER DOOR REMOVED FOR CLARITY)

ENCLOSURE:

HAMMOND HW603612S16HK (60"H X 36"W X 12"D) NEMA 4X RATED, FABRICATED FROM 14 GA. MILD STEEL WITH 3-POINT LATCHING SYSTEM. ENCLOSURE SHALL BE POWDER COATED WHITE. HASP AND STAPLE SHALL BE PROVIDED FOR PADLOCKING.

BACK PANEL:

HAMMOND 18P5733 (57"H x 33"W) FABRICATED FROM 12 GA. STEEL FINISHED IN WHITE.

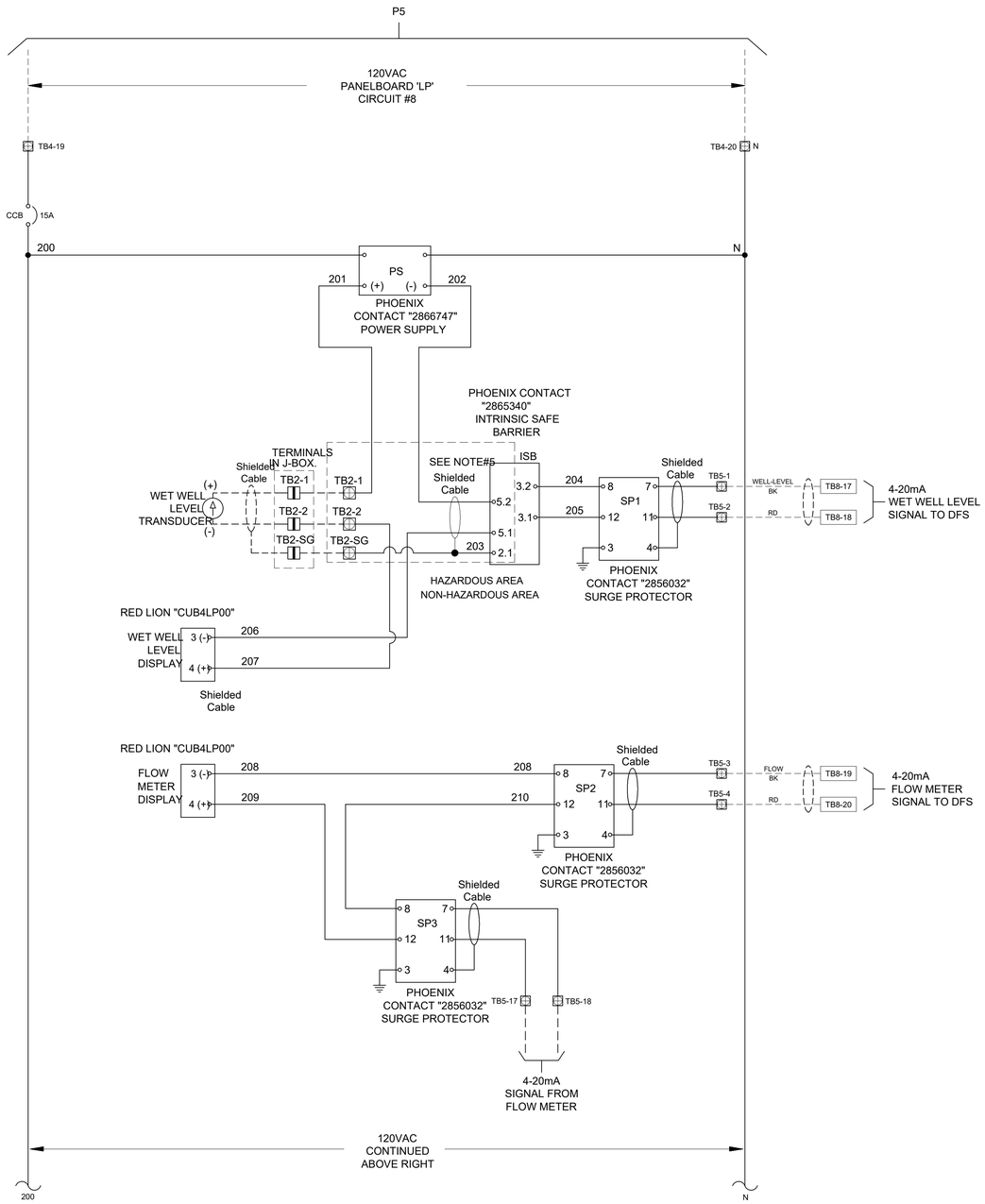


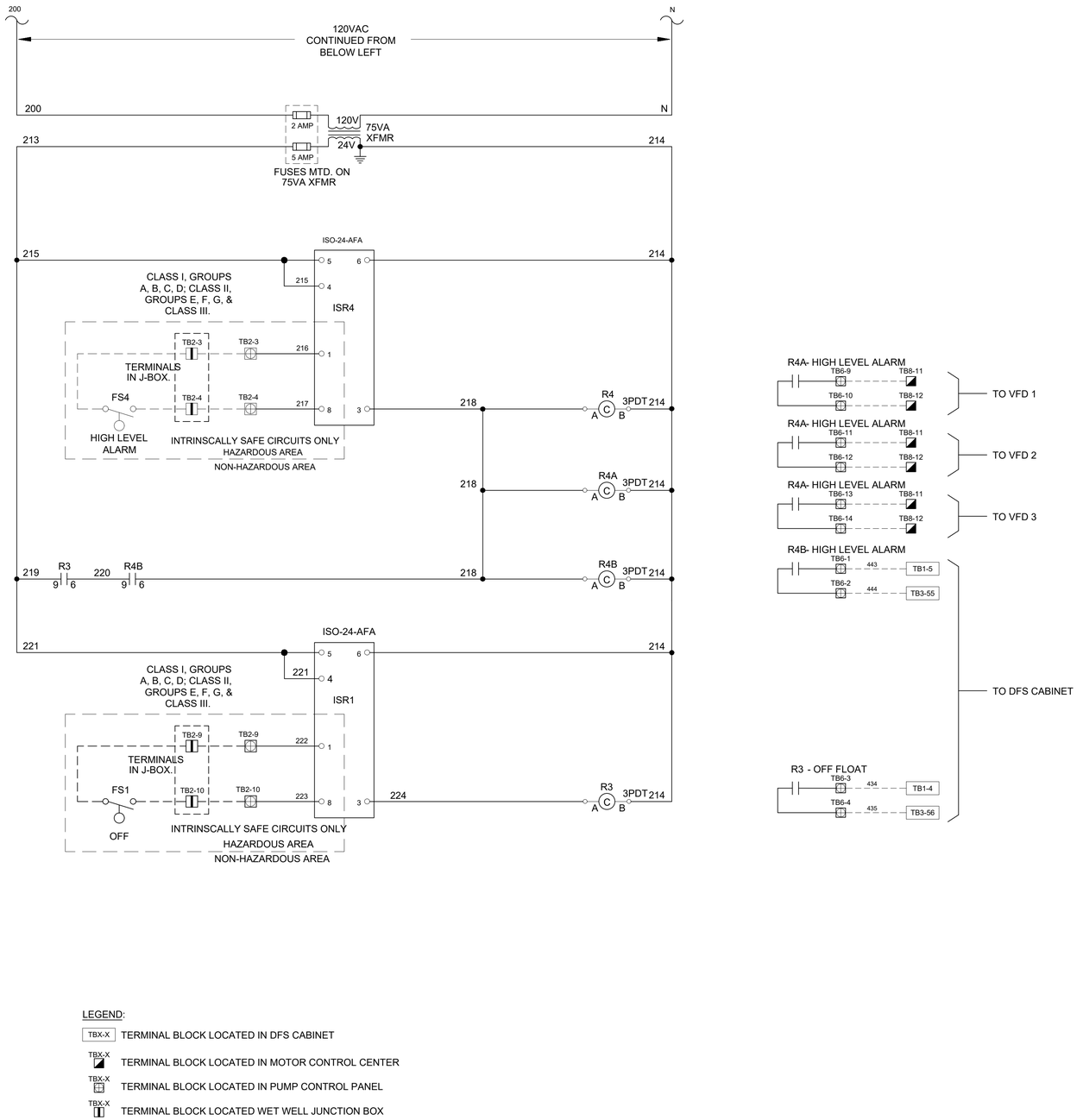
LEGEND

AH	_	ALARM HORN
AL	_	ALARM LIGHT
ASB	_	ALARM SILENCE BUTTON
CCB	_	CONTROL CIRCUIT BREAKER
CB	_	CIRCUIT BREAKER
DRB	_	DUPLEX RECEPTACLE BREAKER
ECB	_	EMERGENCY CIRCUIT BREAKER
F	_	FUSE
FB	_	FUSE BLOCK
FL	_	FLASHER
FS	_	FLOAT SWITCH
GFDR	_	GROUND FAULT DUPLEX RECEP.
GFM	_	GROUND FAULT MONITOR
GR	_	GENERATOR RECEPTACLE
ISB	_	INTRINSIC SAFE BARRIER
ISR	_	INTRINSIC SAFE RELAY
MB	_	MOTOR BREAKER
MCB	_	MAIN CIRCUIT BREAKER
MS	_	MOTOR STARTER
OL	_	OVERLOAD
PM	_	PHASE MONITOR
PMT	_	PHASE MONITOR TEST
PS	_	POWER SUPPLY
R	_	RELAY
RES	_	RESISTER
SCB	_	SPARE CIRCUIT BREAKER
SLB	_	SITE LIGHT BREAKER
SP	_	SURGE PROTECTOR
TB	_	TERMINAL BLOCK
TCU	_	TELEMETRY CONTROL UNIT
TS	_	TRANSIENT SUPPRESSOR
XFMR	_	TRANSFORMER
3PDT	_	THREE-POLE, DOUBLE-THROW

LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN MOTOR CONTROL CENTER
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX





LEGEND:

- TBX-X — TERMINAL BLOCK LOCATED IN DFS CABINET
- TBX-X — TERMINAL BLOCK LOCATED IN MOTOR CONTROL CENTER
- TBX-X — TERMINAL BLOCK LOCATED IN PUMP CONTROL PANEL
- TBX-X — TERMINAL BLOCK LOCATED WET WELL JUNCTION BOX

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2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 47 TO 88 HP

TYPICAL PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS

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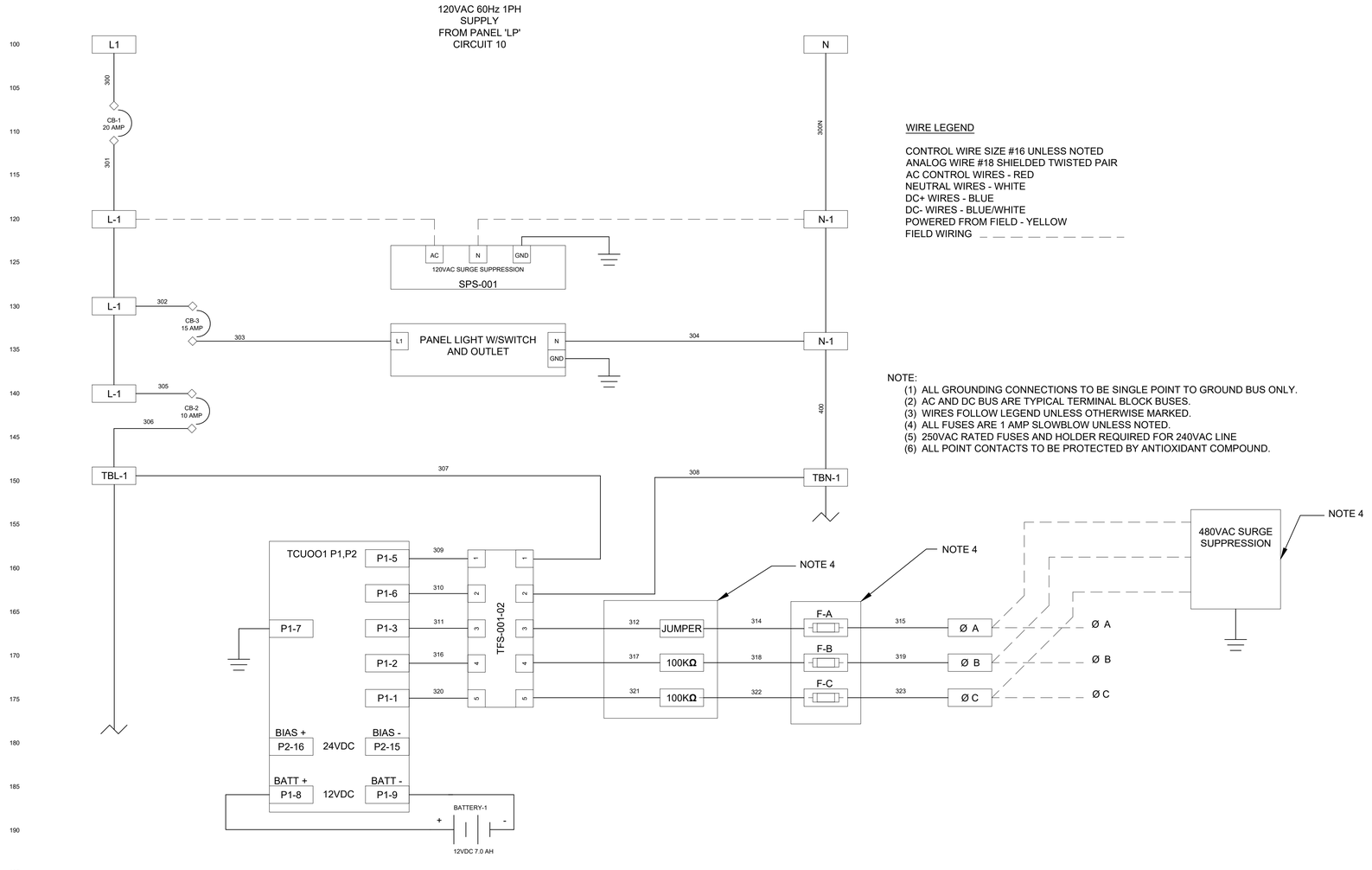
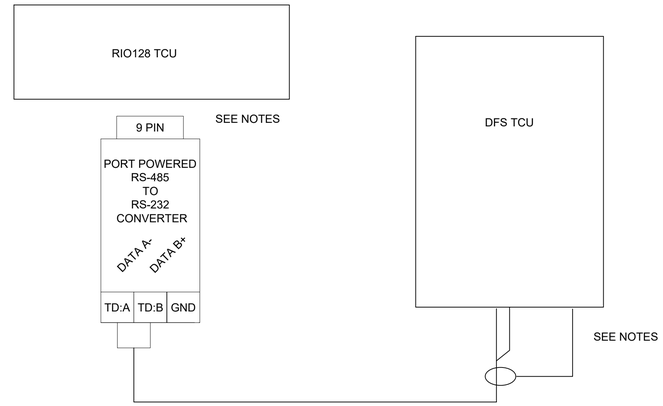


WIRE LEGEND

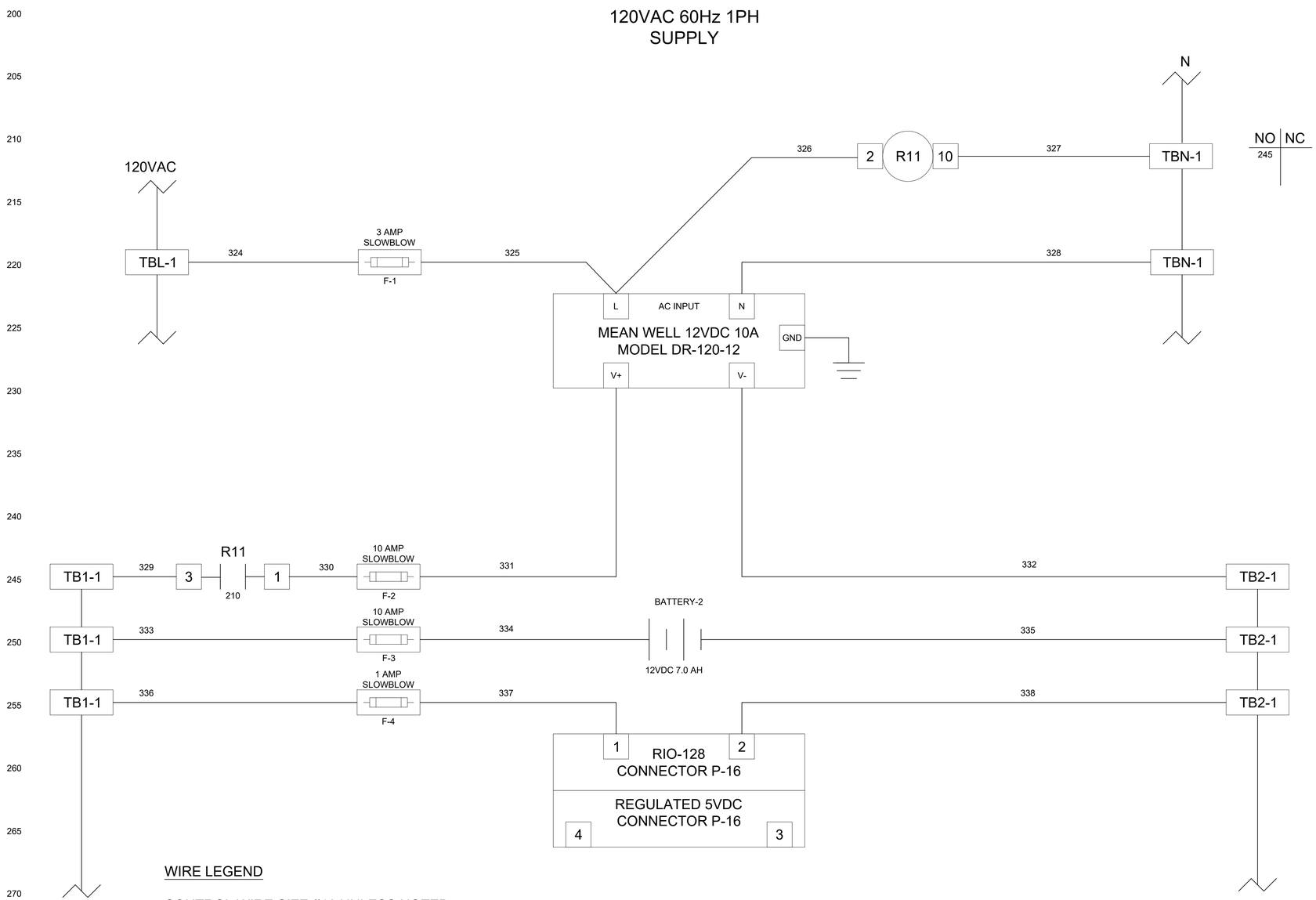
CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _ _

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL FUSES ARE 1 AMP SLOWBLOW UNLESS NOTED.
(5) 250VAC RATED FUSES AND HOLDER REQUIRED FOR 240VAC LINE
(6) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



COMMUNICATIONS RISER DIAGRAM

NOTE:
(1) RIO-128 CONNECTOR J1 (RS-232) CONNECT RS-485 PORT POWERED CONNECTOR
(2) RS-485 TERMINAL BLOCK TD:B (DATA B+) TERMINATES TO TCU CONNECTOR P4-3
(3) RS-485 TERMINAL BLOCK TD:A (DATA A-) TERMINATES TO TCU CONNECTOR P4-4
(4) TERMINATE THE SHIELD OF THE COMMUNICATION CABLE TO TCU CONNECTOR P4-5

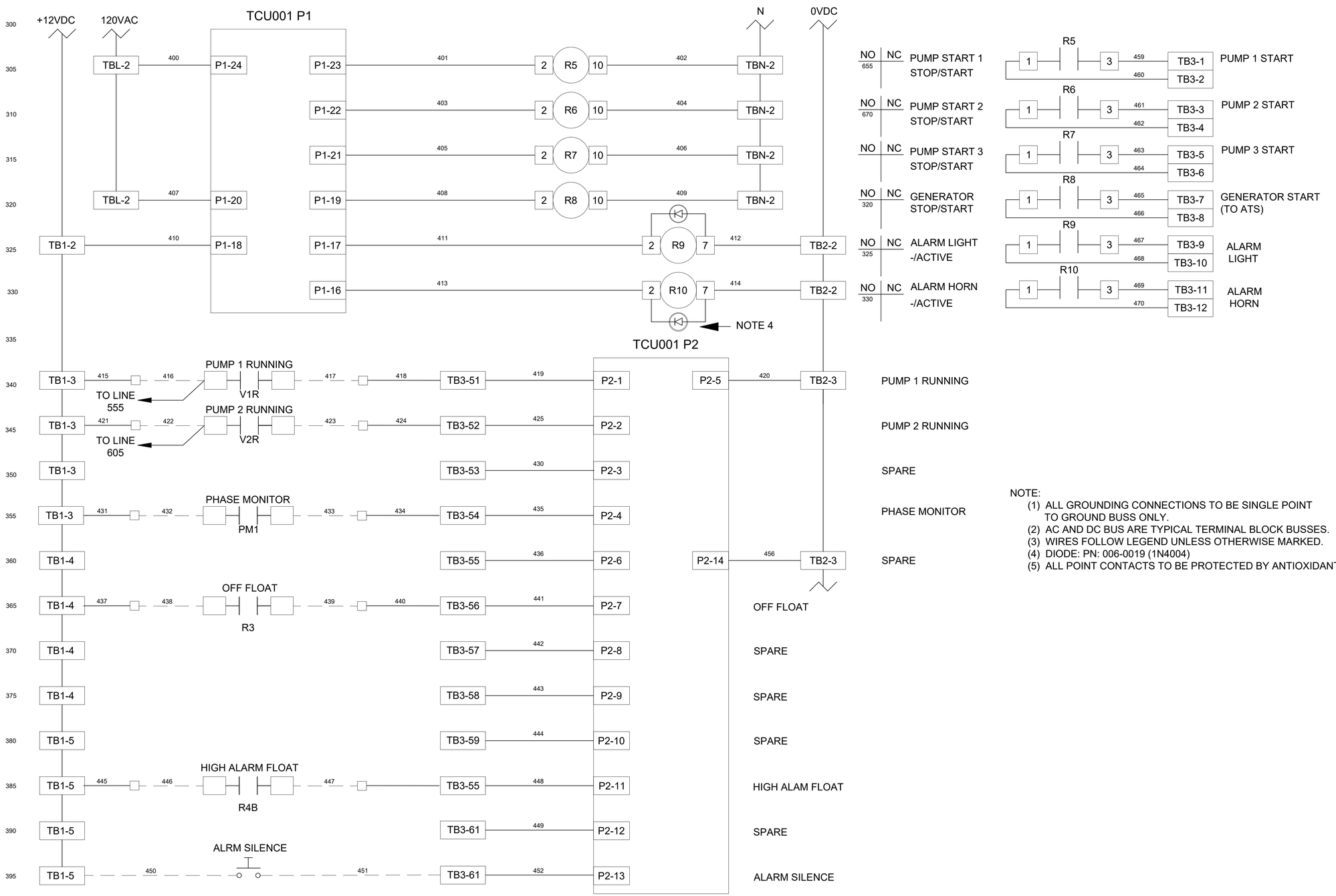


WIRE LEGEND

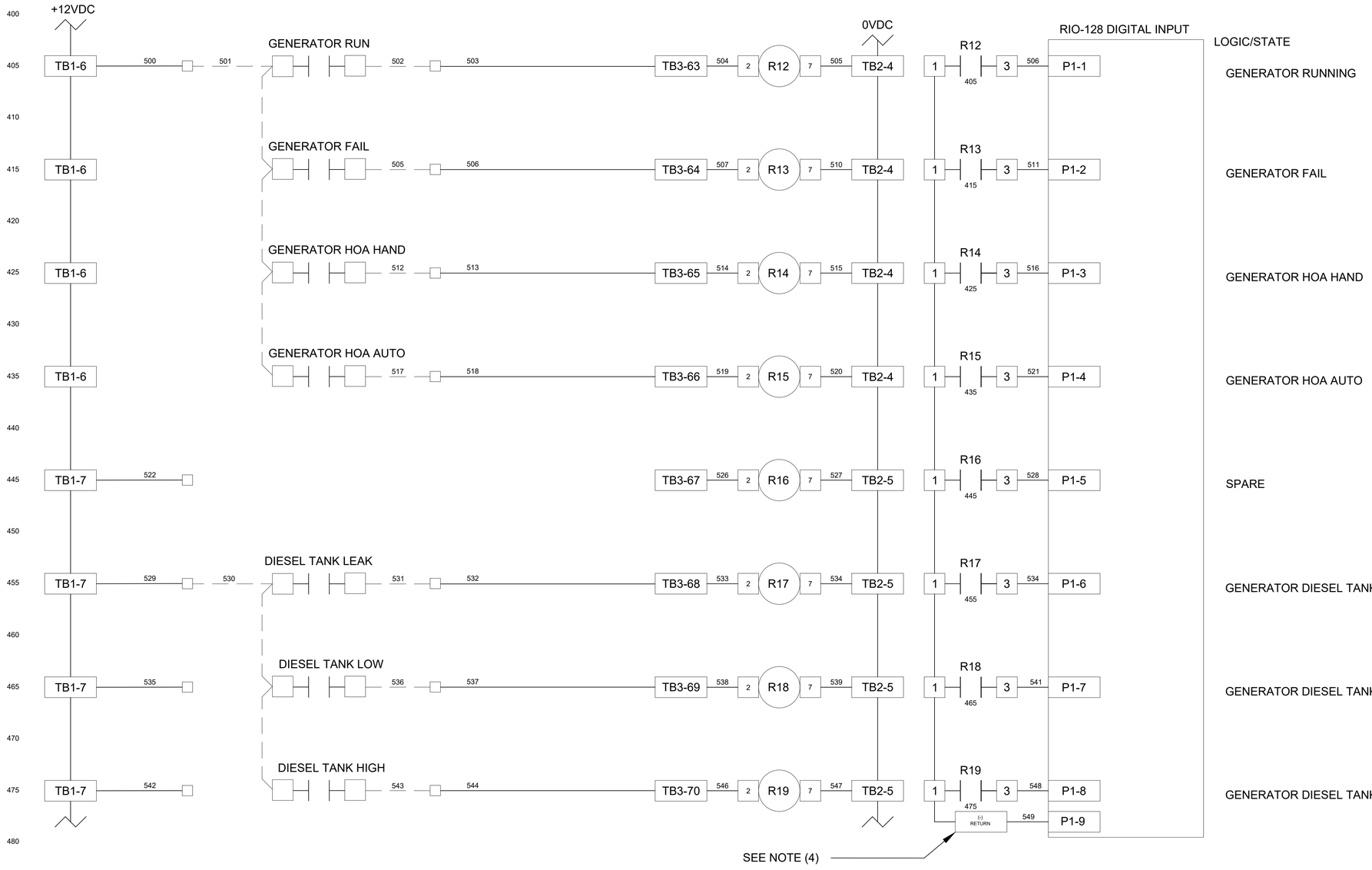
CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING — — — — — — — — —

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.

120VAC 60Hz 1PH SUPPLY



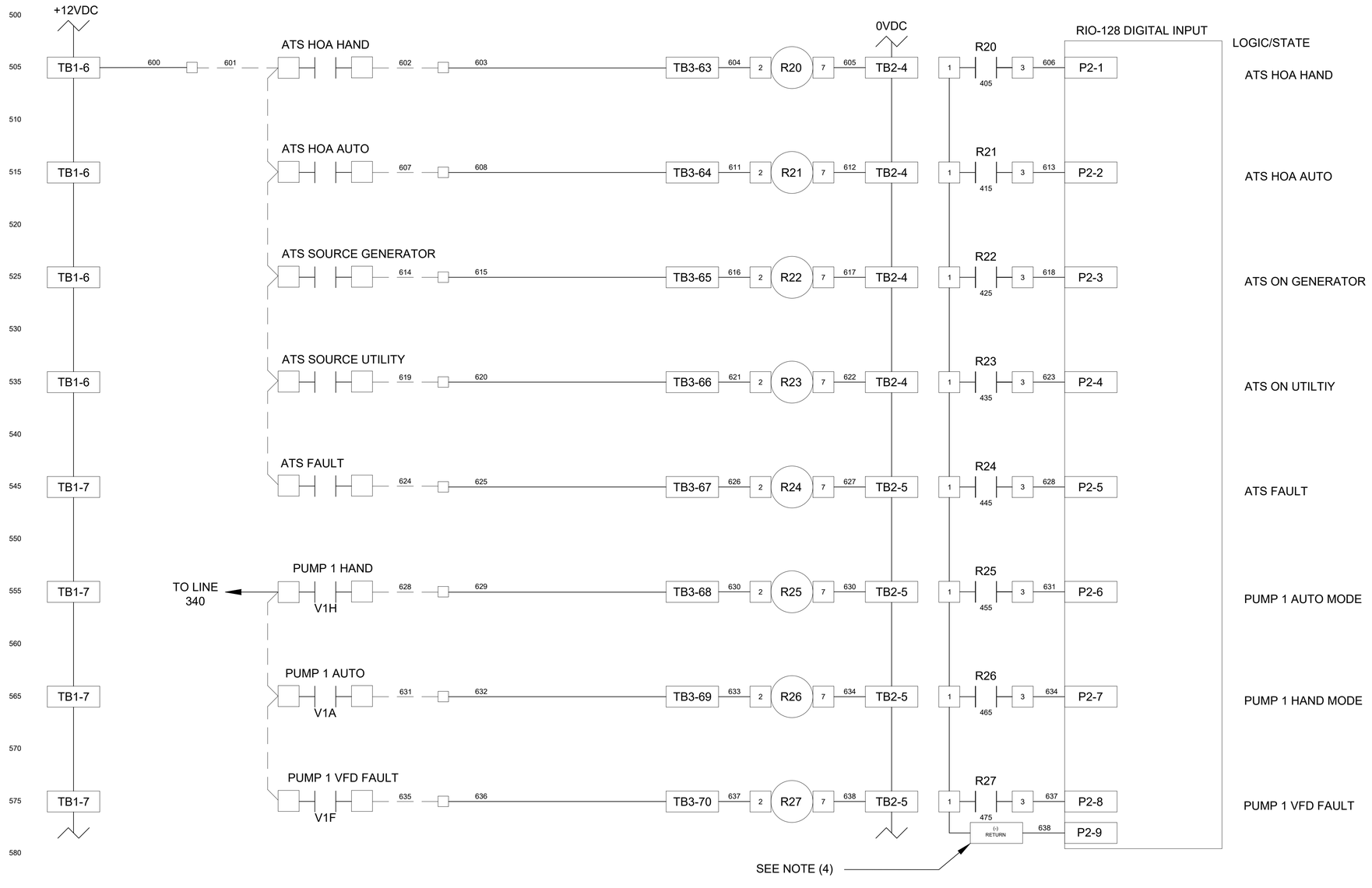
NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUSS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) DIODE: PN: 006-0019 (1N4004)
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) TERMINAL BLOCKS ARE FOR THE DC RETURN (-) BUS FOR THE RIO-128 DIGITAL INPUTS.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
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FIELD WIRING _ _ _ _ _ _ _ _ _

NOTE:
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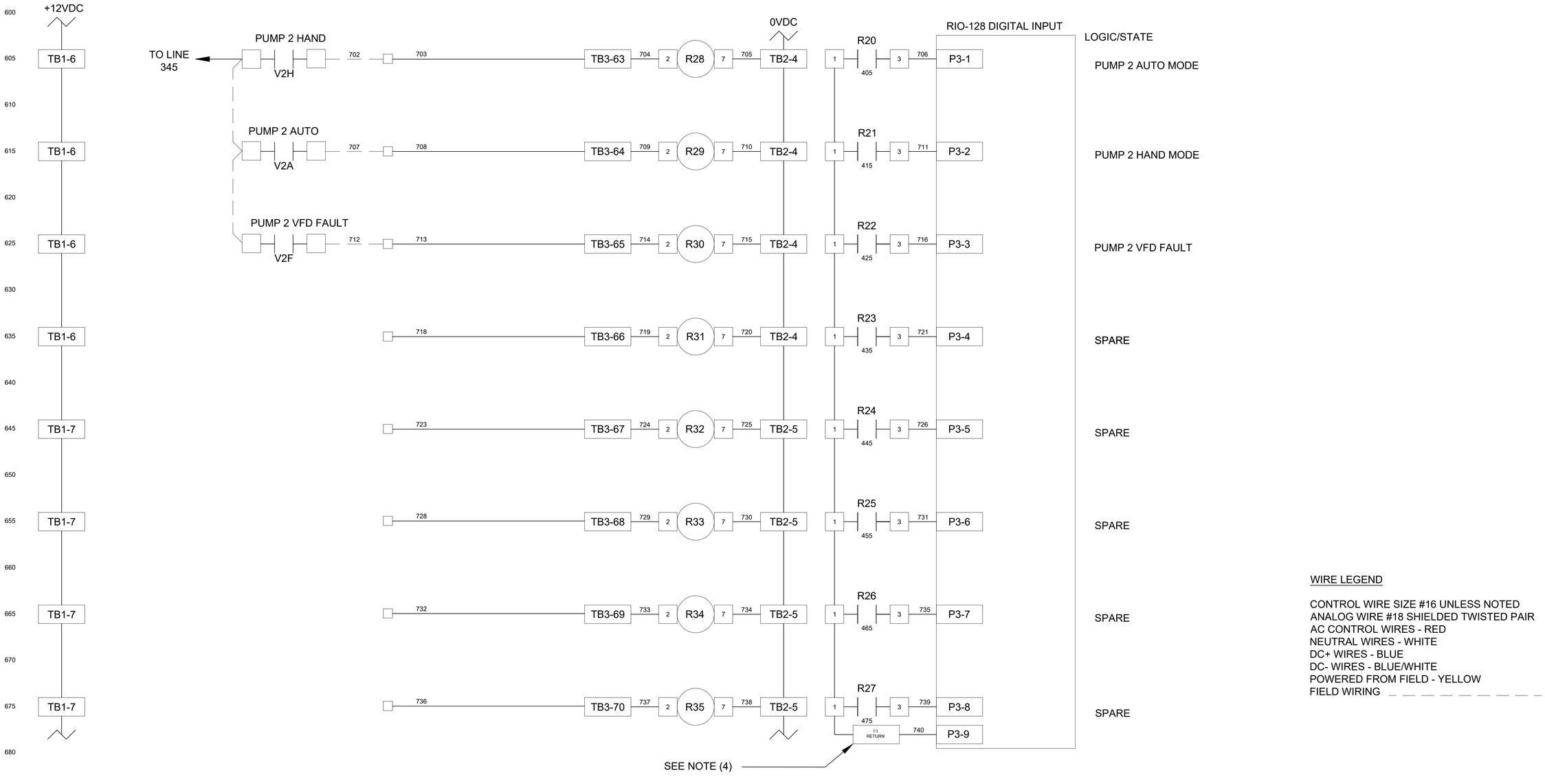
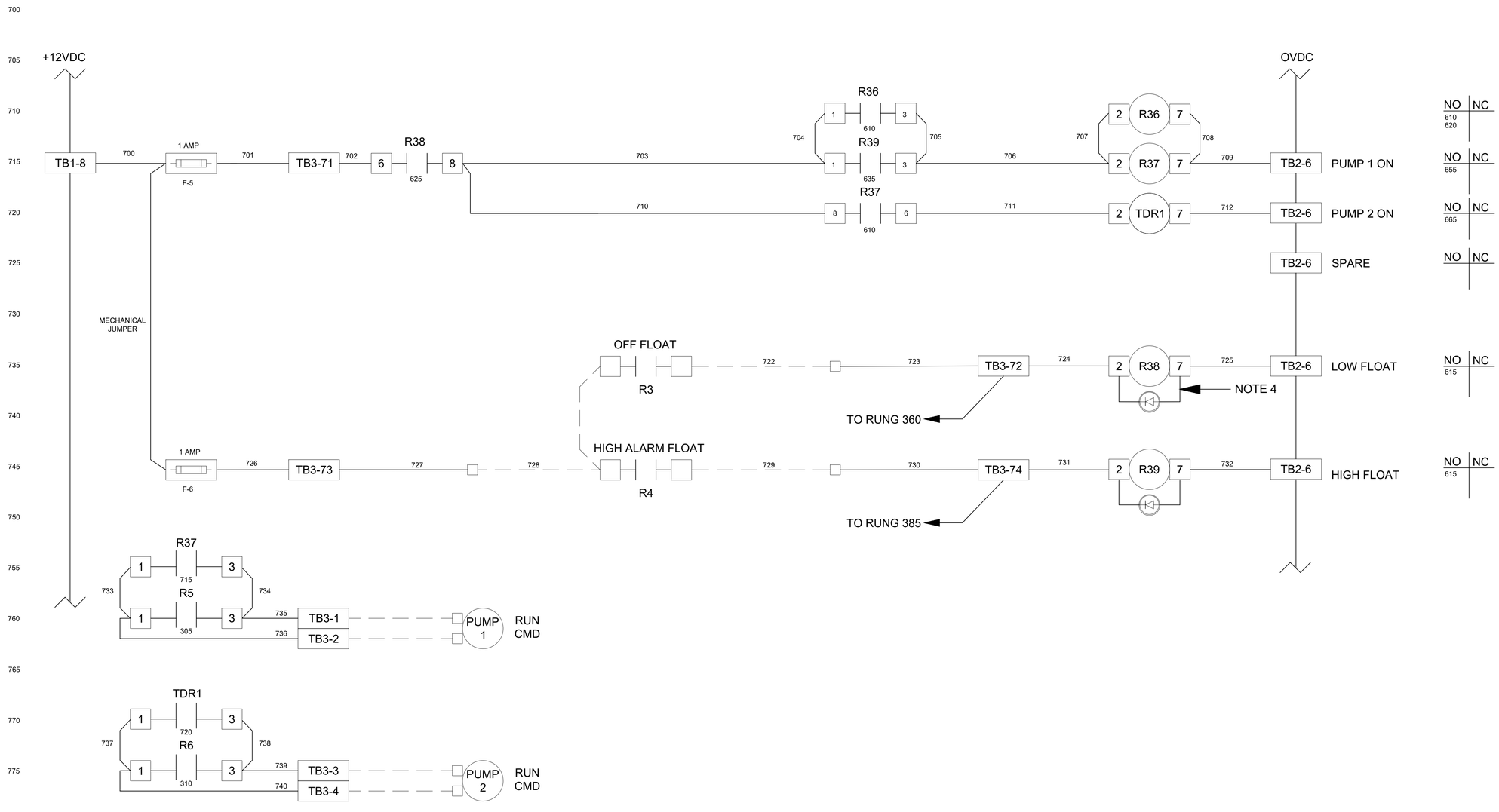


WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING

NOTE:
(1) ALL GROUNDING CONNECTIONS TO BE SINGLE POINT TO GROUND BUS ONLY.
(2) AC AND DC BUS ARE TYPICAL TERMINAL BLOCK BUSES.
(3) WIRES FOLLOW LEGEND UNLESS OTHERWISE MARKED.
(4) TERMINAL BLOCKS ARE FOR THE DC RETURN (-) BUS FOR THE RIO-128 DIGITAL INPUTS.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



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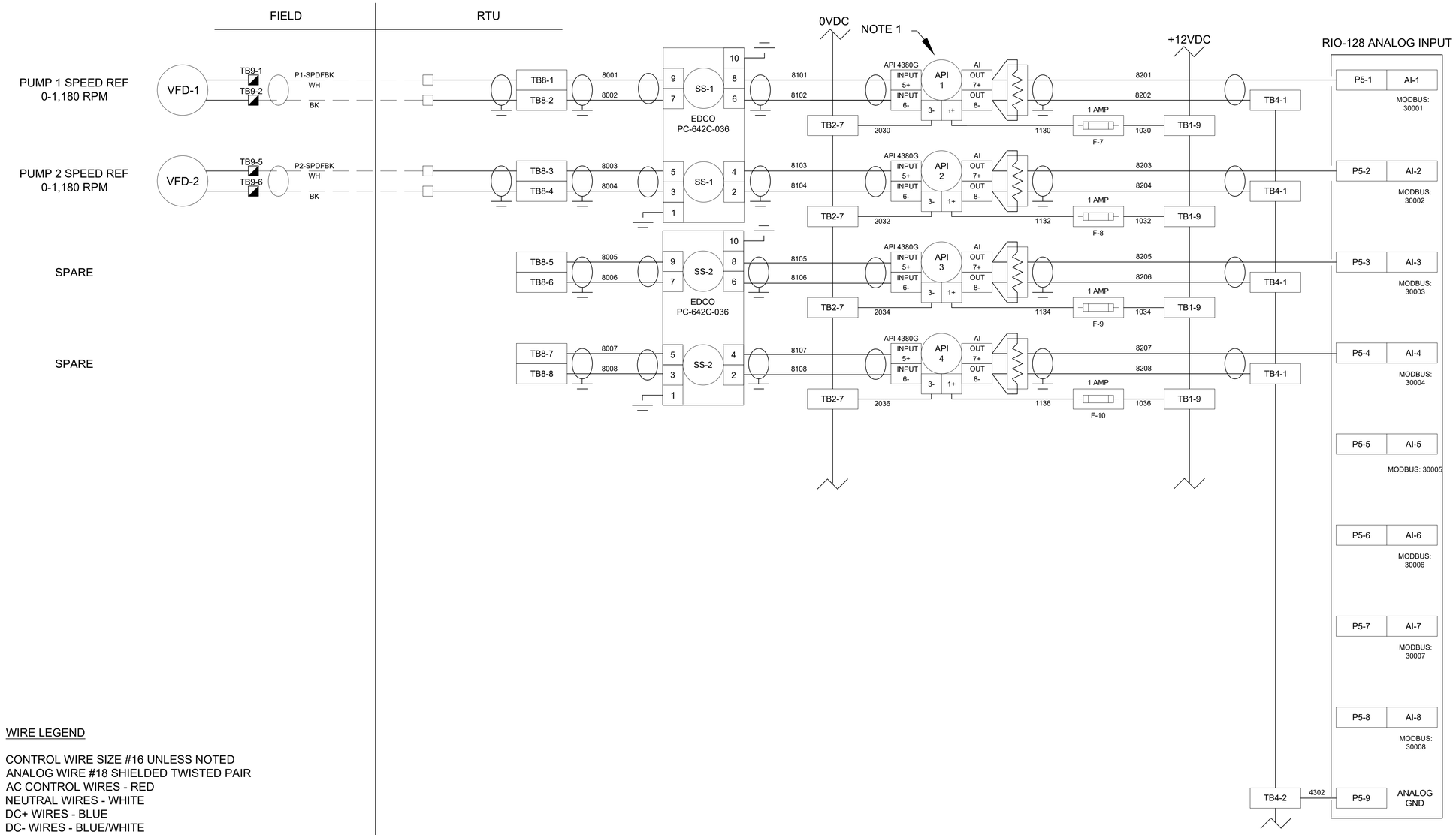
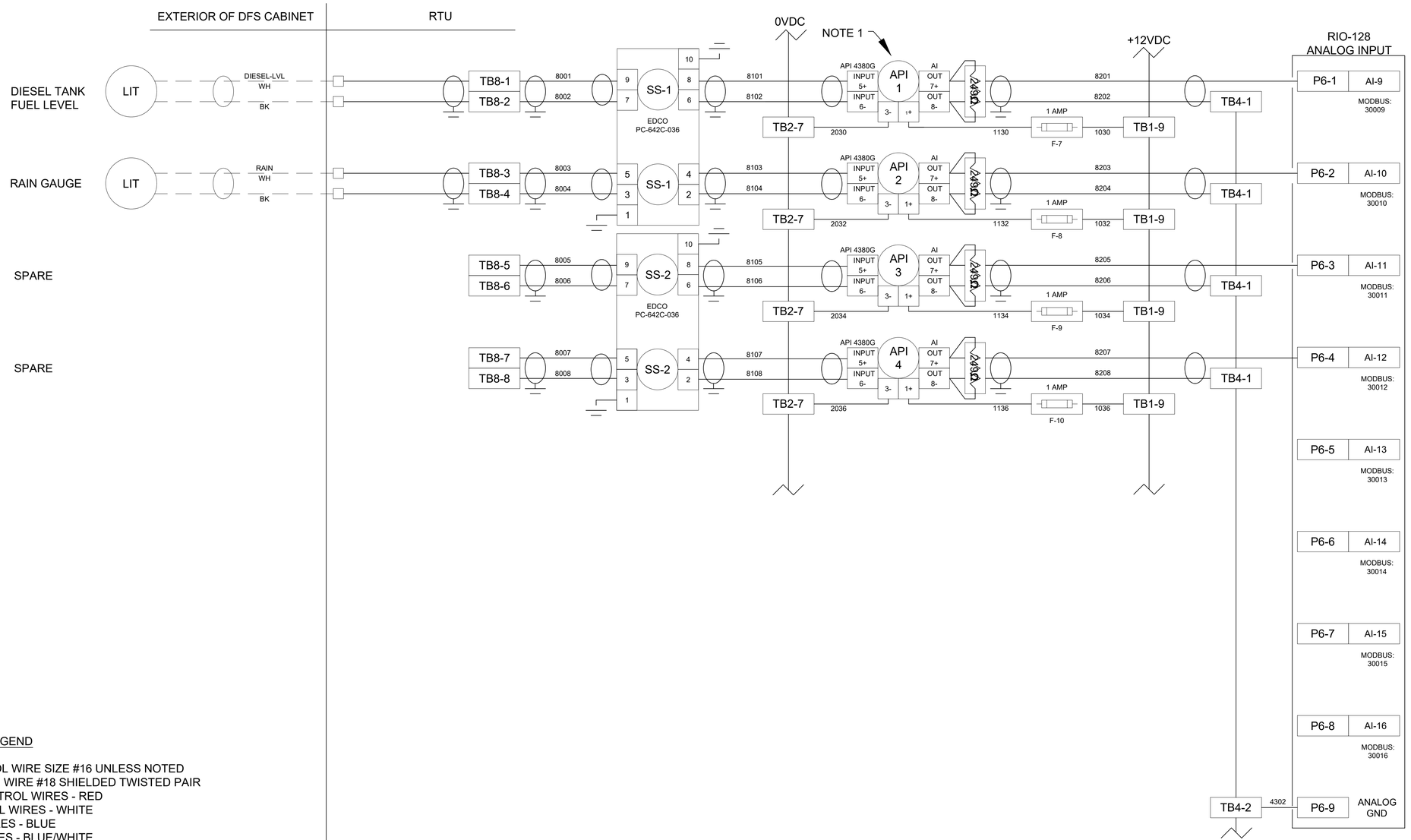


WIRE LEGEND

CONTROL WIRE SIZE #16 UNLESS NOTED
ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
NEUTRAL WIRES - WHITE
DC+ WIRES - BLUE
DC- WIRES - BLUE/WHITE
POWERED FROM FIELD - YELLOW
FIELD WIRING _ _ _ _ _ _ _ _ _ _

NOTE:
(1) LOOP ISOLATORS ON ANALOG INPUTS MUST BE CORRECTLY CONFIGURED FOR 4-20ma INPUT & 4-20ma OUTPUT BEFORE INSTALLING; FAILURE TO DO SO WILL RESULT IN EQUIPMENT DAMAGE AND VOIDS FACTORY WARRANTY
(2) DO NOT EXCEED 5.5 VOLTS ON ANALOG INPUTS.
(3) LOOP ISOLATORS ARE RECOMMENDED FOR CIRCUIT PROTECTION.
(4) STATIC SENSITIVE DEVICES; OBSERVE PROPER ESD PROCEDURES DURING INSTALLATION.
(5) ALL POINT CONTACTS TO BE PROTECTED BY ANTIOXIDANT COMPOUND.



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ANALOG WIRE #18 SHIELDED TWISTED PAIR
AC CONTROL WIRES - RED
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CITY OF CLEARWATER
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100 S. MYRTLE AVENUE
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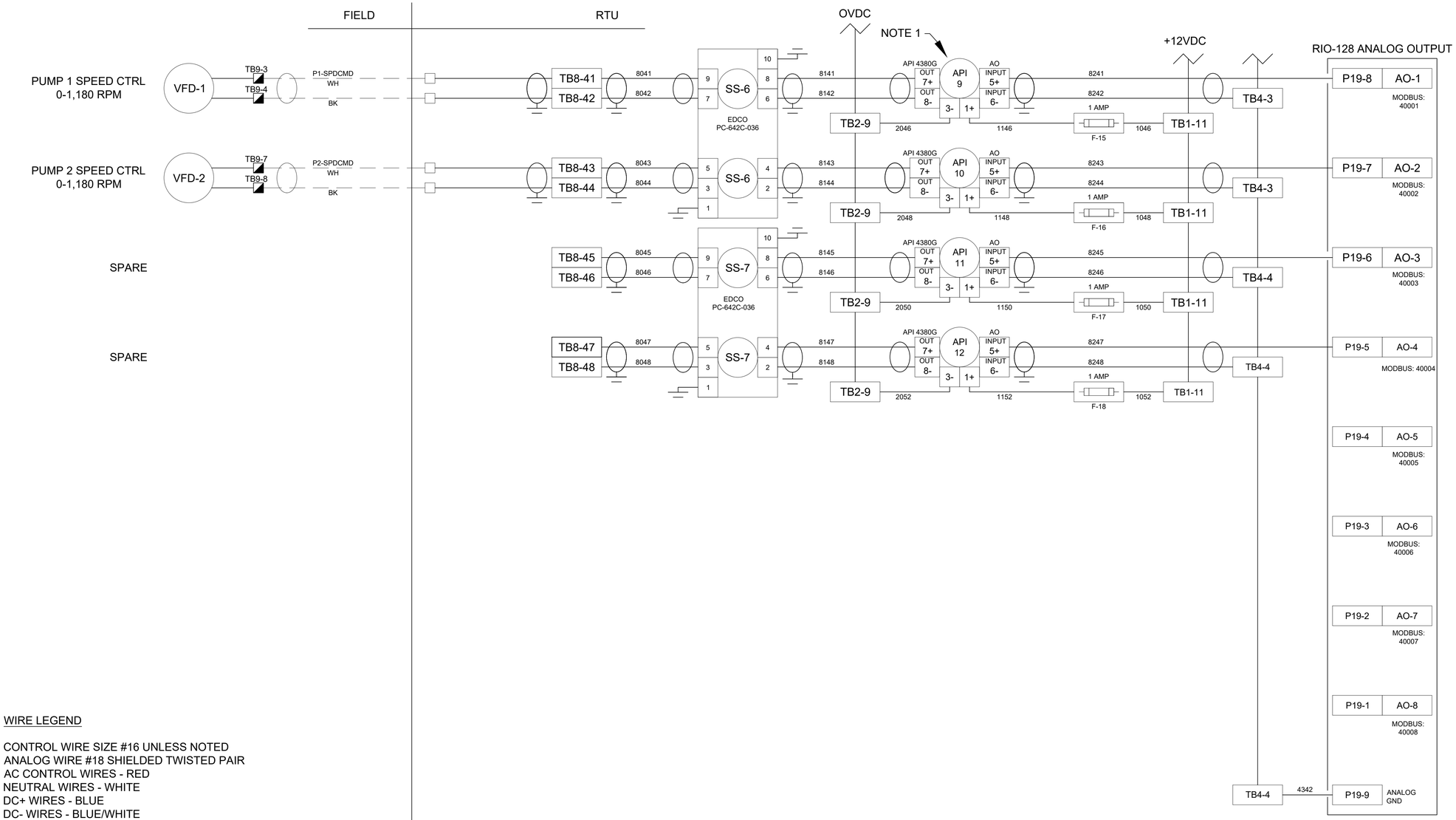
2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 47 TO 88 HP

TYPICAL DFS CABINET SCHEMATIC WIRING DIAGRAM



WIRE LEGEND

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AC CONTROL WIRES - RED
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FIELD WIRING _ _ _ _ _ _ _ _ _ _

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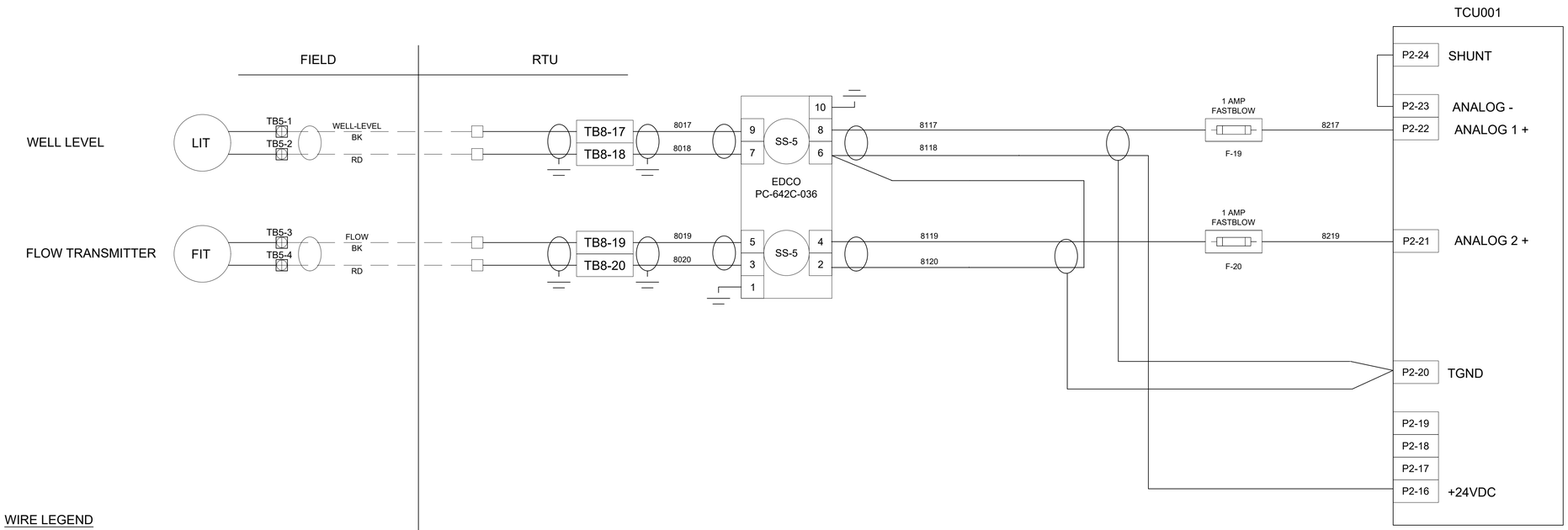

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AC CONTROL WIRES - RED
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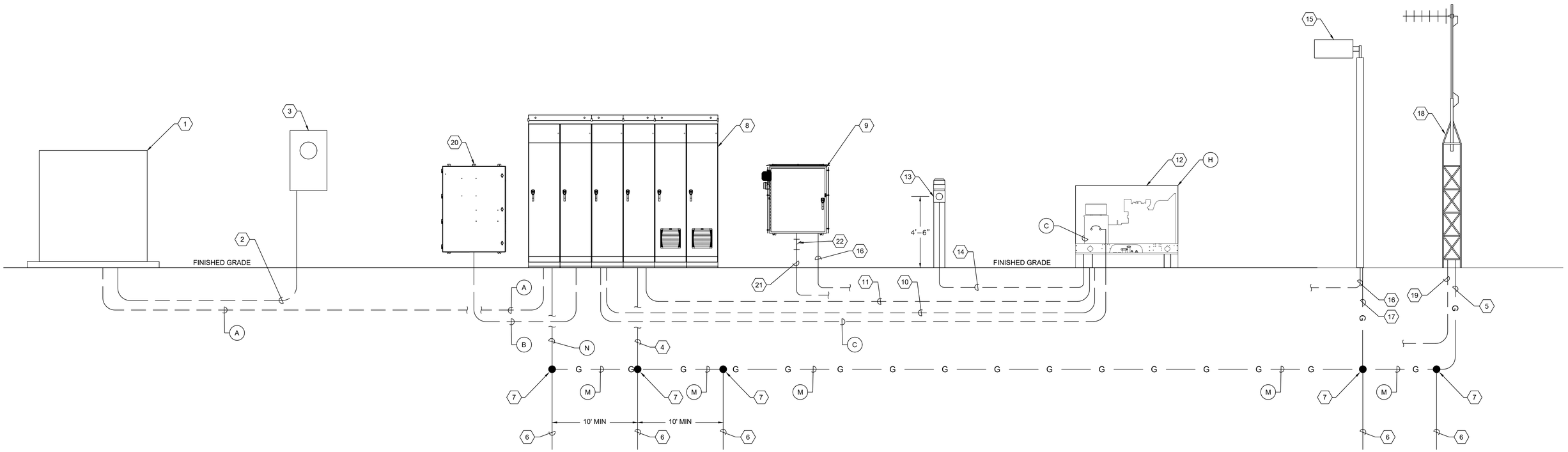

TYPICAL ONE LINE DIAGRAM

ONE LINE DIAGRAM NOTES:

1. UTILITY PAD-MOUNTED TRANSFORMERS.
2. PROVIDE AND INSTALL SPARE CONDUIT FOR UTILITY CT METERING (P8).
3. DUE TO THE SERVICE ENTRANCE SIZE, IT IS ASSUMED CT METERING WILL BE REQUIRED BY THE UTILITY. IF REQUIRED BY THE UTILITY, THE CONTRACTOR SHALL PROVIDE A FEED-THROUGH METER AND A DISCONNECT ON THE LINE SIDE OF THE ELECTRIC METER FOR UTILITY PURPOSES. COORDINATE ALL REQUIREMENTS WITH THE UTILITY INCLUDING SURGE PROTECTION AND EQUIPMENT GROUNDING.
4. PROVIDE AND INSTALL #8 CU GROUNDING ELECTRODE CONDUCTOR FOR PANELBOARD 'LP' TRANSFORMER.
5. PROVIDE AND INSTALL 1/O AWG CU GROUNDING ELECTRODE CONDUCTOR.
6. PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
7. EXOTHERMIC WELD.
8. PROVIDE AND INSTALL MOTOR CONTROL CENTER. 3-POLE, S/N, 480V, TRANSFER SWITCH IN NEMA 3R STAINLESS STEEL ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR BREAKER SIZES, ETC. REQUIRED.
9. PROVIDE AND INSTALL PUMP CONTROL PANEL.
10. PROVIDE AND INSTALL 4-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR START CONTROL. VERIFY/COORDINATE REQUIREMENTS WITH TRANSFER SWITCH/GENERATOR MANUFACTURER.
11. PROVIDE AND INSTALL THE FOLLOWING CIRCUITS FOR GENERATOR AUXILIARY EQUIPMENT : 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR ALTERNATOR HEATER. 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BLOCK HEATER. 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR BATTERY CHARGER. CONFIRM/COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
12. PROVIDE AND INSTALL NEW 480V, 3Ø, 4-WIRE GENERATOR IN WEATHERPROOF ENCLOSURE. REFER TO SCHEDULE FOR SIZE. REFER ALSO TO SPECIFICATIONS.
13. GENERATOR EMERGENCY SHUT DOWN PUSH BUTTON STATION. MAINTAINED 2 POSITION SWITCH w/ 1-5/8" DIA. OPERATOR, 1 N.O. & 1 N.C. CONTACT MOUNTED IN A NEMA 4X SS ENCLOSURE, 4'-6" ABOVE FINISHED GRADE ON 6" X 6" X 9' CONCRETE POST. PROVIDE PHENOLIC NAMEPLATE ABOVE PUSH BUTTON STATION. NAMEPLATE SHALL BE THREE-PLY PHENOLIC RED-WHITE-RED ENGRAVED THROUGH THE FIRST RED LAYER. LETTERING SHALL BE 1/2" MIN., EDGES OF NAMEPLATE SHALL BE BEVELED 45 DEG. NAMEPLATE SHALL READ AS FOLLOWS: "GENERATOR EMERGENCY SHUT DOWN".
14. PROVIDE AND INSTALL 2#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. FOR GENERATOR EMERGENCY SHUT DOWN CIRCUIT.
15. PROVIDE AND INSTALL AREA LIGHT. QUANTITY VARIES PER LIFT STATION SITE.
16. PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C. TO PUMP CONTROL PANEL FOR AREA LIGHT POWER.
17. PROVIDE AND INSTALL #8 CU BONDING CONDUCTOR.
18. NEW DFS ANTENNA.
19. PROVIDE AND INSTALL COAXIAL CABLE IN 2"C. TO DFS CONTROL CABINET.
20. PROVIDE AND INSTALL 480V, 3-POLE, SOLID NEUTRAL GENERATOR DOCKING STATION IN WEATHERPROOF ENCLOSURE. REFER TO EQUIPMENT SCHEDULE FOR SIZE/TYPE REQUIRED.
21. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT. THE RIGID ALUMINUM CONDUIT EXTENDING BELOW GRADE SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT ALONG ITS ENTIRE LENGTH BELOW GRADE, EXTENDING 6" ABOVE GRADE (OR ABOVE THE TOP OF THE FINISHED SLAB) AND IN ITS ENTIRETY WITHIN THE WET WELL.
22. PROVIDE AND INSTALL 3/4" EYS SEAL FOR CONDUIT TO WET WELL FOR WET WELL LIGHT

GENERAL NOTES:

1. NOT ALL CONDUITS AND CONDUCTORS REQUIRED SHOWN FOR CLARITY. REFERENCE OTHER SHEETS FOR ADDITIONAL REQUIREMENTS.

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2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 47 TO 88 HP

TYPICAL LIFT STATION ONE LINE DIAGRAMS

EQUIPMENT, CONDUIT AND CONDUCTOR SCHEDULES

	47 HP STATIONS		60 HP STATIONS		88 HP STATIONS				
CONDUIT/CONDUCTORS	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	CONDUCTORS	CONDUIT	FROM:	TO:	NOTES:
(A)	3-3/0 THWN CU + 1-1/0 THWN CU NEUTRAL	3" C.	3-#250 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL	3" C.	3-#350 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL	4" C.	UTILITY TRANSFORMER	MOTOR CONTROL CENTER	
(B)	3-3/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	3" C.	3-#250 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL + 1-#4 THWN CU GND	3" C.	3-#350 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL + 1-1/0 THWN CU GND	4" C.	MOTOR CONTROL CENTER	GENERATOR DOCKING STATION	
(C)	3-3/0 THWN CU + 1-1/0 THWN CU NEUTRAL + 1-#6 THWN CU GND	3" C.	3-#250 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL + 1-#4 THWN CU GND	3" C.	3-#350 MCM THWN CU + 1-#250 MCM THWN CU NEUTRAL + 1-#4 THWN CU GND	4" C.	MOTOR CONTROL CENTER	GENERATOR SET	
(D)	3-#4 THWN CU + 1-#8 THWN CU GND	3" C.	3-#3 THWN CU + 1-#6 THWN CU GND	3" C.	3-1/0 THWN CU + 1-#6 THWN CU GND	3" C.	MOTOR CONTROL CENTER	SUBMERSIBLE PUMP WET WELL JUNCTION BOX	
(E)	SUBMERSIBLE PUMP CABLE PROVIDED BY MANUFACTURER	3" C.	SUBMERSIBLE PUMP CABLE PROVIDED BY MANUFACTURER	3" C.	SUBMERSIBLE PUMP CABLE PROVIDED BY MANUFACTURER	3" C.	SUBMERSIBLE PUMP WET WELL JUNCTION BOX	SUBMERSIBLE PUMP	CONDUIT SIZE TO BE VERIFIED BASED ON SUBMERSIBLE PUMP MOTOR POWER CABLE PROVIDED

MOTOR CONTROL CENTER				NOTES:
(F)	200 AMPERE MAIN CIRCUIT BREAKER	250 AMPERE MAIN CIRCUIT BREAKER	300 AMPERE MAIN CIRCUIT BREAKER	MAIN CIRCUIT BREAKERS SHALL BE 100% RATED.
(G)	200 AMPERE DOCKING STATION CIRCUIT BREAKER	250 AMPERE DOCKING STATION CIRCUIT BREAKER	300 AMPERE DOCKING STATION CIRCUIT BREAKER	DOCKING STATION CIRCUIT BREAKERS SHALL BE 100% RATED.
(H)	480V, 200 AMPERE TRANSFER SWITCH	480V, 250 AMPERE TRANSFER SWITCH	480V, 300 AMPERE TRANSFER SWITCH	
(I)	300 AMPERE, 480V, 3-POLE GENERATOR DOCKING STATION	300 AMPERE, 480V, 3-POLE GENERATOR DOCKING STATION	300 AMPERE, 480V, 3-POLE GENERATOR DOCKING STATION	
(J)	480V, 3Ø, 4-WIRE 100 KW GENERATOR WITH 200 AMPERE MAIN CIRCUIT BREAKER	480V, 3Ø, 4-WIRE 150 KW GENERATOR WITH 250 AMPERE MAIN CIRCUIT BREAKER	480V, 3Ø, 4-WIRE 200 KW GENERATOR WITH 300 AMPERE MAIN CIRCUIT BREAKER	
(K)	100 AMP MOTOR CIRCUIT BREAKERS	110 AMP MOTOR CIRCUIT BREAKERS	200 AMP MOTOR CIRCUIT BREAKERS	
(L)	YASKAWA VFD - PW4A088FAA RATED OUTPUT - 88 AMPERES	YASKAWA VFD - PW4A103FAA RATED OUTPUT - 103 AMPERES	YASKAWA VFD - PW4A0139FAA RATED OUTPUT - 139 AMPERES	

GROUNDING				NOTES:
(M)	1/0 AWG COPPER	1/0 AWG COPPER	1/0 AWG COPPER	GROUNDING GRID CONDUCTOR
(N)	#4 AWG COPPER	#4 AWG COPPER	#2 AWG COPPER	ELECTRICAL SERVICE GROUNDING ELECTRODE CONDUCTOR

LOAD CALCULATION: 47 HP

MOTORS:

PUMP NO. 1: 47 HP, 480 VAC, 3 Ø, 62 A

PUMP NO. 2: 47 HP, 480 VAC, 3 Ø, 62 A

MOTOR SUB-TOTAL 124 A

+ 25% OF LARGEST MOTOR 15.5 A

SUB-TOTAL 139.5 A

AUXILIARY EQUIPMENT 10.0 A

TOTAL MAXIMUM PHASE AMPERES 149.5 A

SERVICE SIZE:

200 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 60 HP

MOTORS:

PUMP NO. 1: 60 HP, 480 VAC, 3 Ø, 77 A

PUMP NO. 2: 60 HP, 480 VAC, 3 Ø, 77 A

MOTOR SUB-TOTAL 154 A

+ 25% OF LARGEST MOTOR 19.3 A

SUB-TOTAL 173.3 A

AUXILIARY EQUIPMENT 10.0 A

TOTAL MAXIMUM PHASE AMPERES 193.3 A

SERVICE SIZE:

250 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

LOAD CALCULATION: 88 HP

MOTORS:

PUMP NO. 1: 88 HP, 480 VAC, 3 Ø, 112 A

PUMP NO. 2: 88 HP, 480 VAC, 3 Ø, 112 A

MOTOR SUB-TOTAL 224 A

+ 25% OF LARGEST MOTOR 28 A

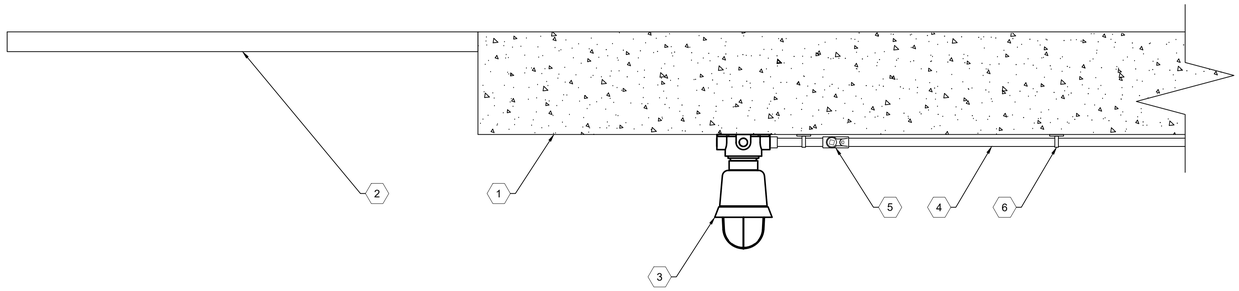
SUB-TOTAL 252 A

AUXILIARY EQUIPMENT 10.0 A

TOTAL MAXIMUM PHASE AMPERES 262 A

SERVICE SIZE:

300 A, 480 VAC, 3 Ø, 4 - WIRE MINIMUM.

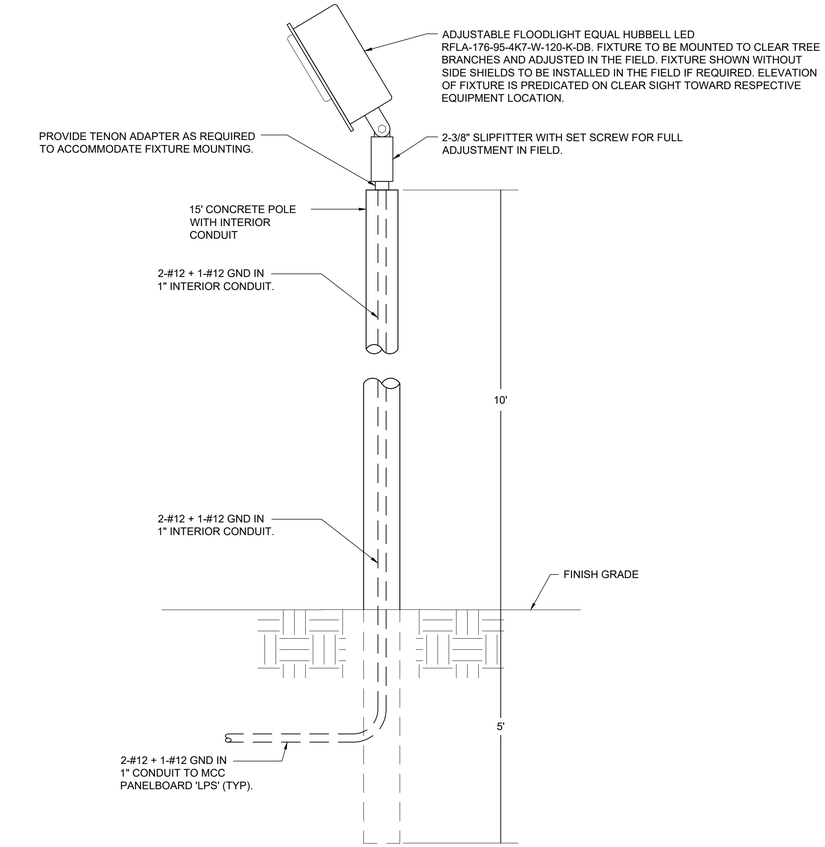


TYPICAL WET WELL LIGHT DETAIL

SCALE: NONE

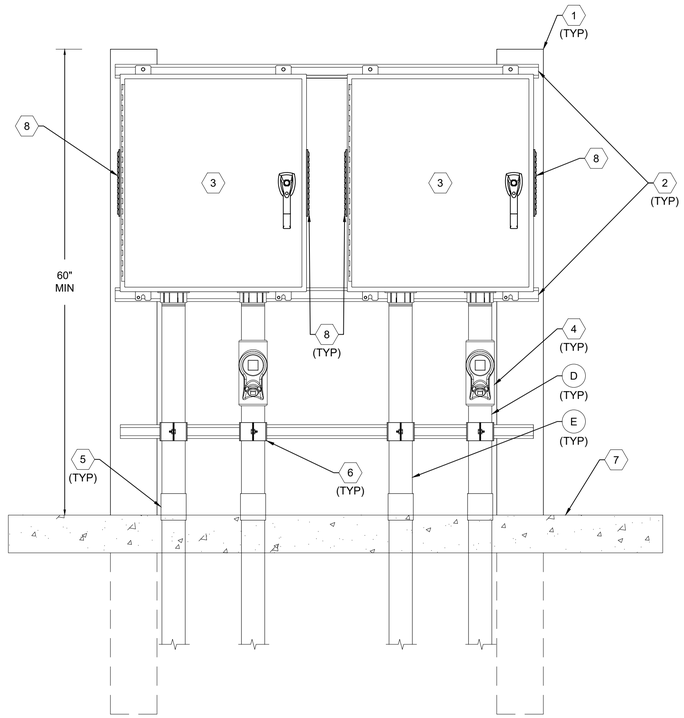
KEYED NOTES:

1. UNDERSIDE OF PROPOSED WET WELL SLAB.
2. PROPOSED WET WELL HATCH.
3. PROVIDE AND INSTALL WET WELL LED LIGHT. CROUSE HINDS 120V WITH 19W LED DRIVER. PROVIDE GLOBE AND GUARD. SUITABLE FOR USE IN CLASS 1, DIVISION 1 ENVIRONMENT. UL WET LABEL. CROUSE HINDS MODEL #EVLEDBX2C701.
4. 2-#12 THWN + 1-#12 THWN CU GND IN 3/4" C. TO WET WELL LIGHT. 3/4" CONDUIT SHALL BE A CONTINUOUS RUN OF RIGID ALUMINUM CONDUIT TO PUMP CONTROL PANEL. THE RIGID ALUMINUM CONDUIT SHALL BE COATED WITH TWO COATS OF AN ASPHALTUM-TYPE PAINT IN ITS ENTIRETY.
5. PROVIDE AND INSTALL 3/4" EYS SEAL.
6. PROVIDE AND INSTALL STAINLESS STEEL CONDUIT STRAPS SECURED WITH STAINLESS STEEL TAPCONS AND STAINLESS STEEL WASHERS.



TYPICAL AREA LIGHT DETAIL

SCALE: NONE

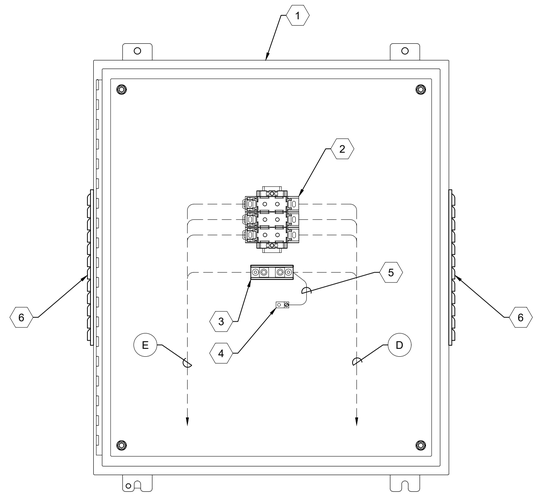


TYPICAL WET WELL JUNCTION BOX RACK DETAIL

SCALE: NONE

KEYED NOTES:

1. PROVIDE AND INSTALL 6" X 6" REINFORCED SQUARE CONCRETE POSTS. LENGTH AS REQUIRED. BURY POSTS TO A DEPTH OF 3'-0".
2. PROVIDE AND INSTALL 1-5/8" x 1-5/8" 316 STAINLESS STEEL UNISTRUT WITH 316 STAINLESS STEEL HARDWARE. NOTE: INSTALL ALL BOLTS FOR UNISTRUT COMPLETELY THROUGH CONCRETE POSTS. PROVIDE END CAPS FOR UNISTRUT.
3. PUMP MOTOR CONNECTIONS JUNCTION BOX USED AS A DEMARCATION BOX TO PROVIDE ISOLATION BETWEEN THE WET WELL AND MOTOR CABLE. PROVIDE AND INSTALL A 24" x 24" x 8" NEMA 4X, STAINLESS STEEL JUNCTION BOX WITH HINGED DOOR, HAMMOND HW24248S16 HK WITH BACK PANEL 18P2121. REFER ALSO TO JUNCTION BOX DETAIL ON THIS SHEET.
4. PROVIDE AND INSTALL CROUSE-HINDS EYS TYPE SEAL W/CHICO COMPOUNDS. EYS SIZE TO MATCH REQUIRED CONDUIT.
5. TRANSITION FROM PVC CONDUIT (BELOW GRADE) TO RIGID ALUMINUM CONDUIT (ABOVE GRADE).
6. PROVIDE AND INSTALL ALUMINUM CONDUIT STRAPS (TYPICAL).
7. PROPOSED CONCRETE SLAB (TYP).
8. PROVIDE AND INSTALL LOUVER. WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.



TYPICAL WET WELL JUNCTION BOX DETAIL

SCALE: NONE

KEYED NOTES:

1. PUMP MOTOR CONNECTIONS JUNCTION BOX USED AS A DEMARCATION BOX TO PROVIDE ISOLATION BETWEEN THE WET WELL AND MOTOR CABLE. PROVIDE AND INSTALL A 24" x 24" x 8" NEMA 4X, STAINLESS STEEL JUNCTION BOX WITH HINGED DOOR, HAMMOND HW24248S16 HK WITH BACK PANEL 18P2121. REFER ALSO TO JUNCTION BOX DETAIL ON THIS SHEET.
2. PROVIDE AND INSTALL THREE (3) FINGER-SAFE POWER DISTRIBUTION BLOCKS. BUSSMANN PDBFS204 FOR 47 HP AND 88 HP STATIONS. BUSSMANN PDBFS303 FOR 160 HP STATIONS.
3. PROVIDE AND INSTALL POWER DISTRIBUTION BLOCK FOR GROUND CONDUCTORS. BUSSMANN 16204.
4. PROVIDE AND INSTALL GROUND LUG FOR #8 AWG BONDING CONDUCTOR.
5. PROVIDE AND INSTALL #8 AWG BONDING CONDUCTOR.
6. PROVIDE AND INSTALL LOUVER. WIEGMANN WAVK0808SSA (10.56"H x 9.5"W) FABRICATED FROM 316 STAINLESS STEEL. PROVIDE WIEGMANN WAFLT88 FILTER KIT FOR LOUVER.

POWER CONDUIT AND CABLE SCHEDULE

CONDUIT No.	QTY/SIZE	NUMER OF CONDUCTORS/SIZE	FROM	TO	REMARKS
P1	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	FLOW METER TRANSMITTER	120V POWER FOR FLOW METER TRANSMITTER. COORDINATE CONNECTION REQUIREMENTS WITH FLOW METER MANUFACTURER. 'LP' CIRCUIT 13.
P2	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	AREA LIGHT(S)	
P3	3/4"	2-#12 + 1-#12 GND	1ST AREA LIGHT	2ND AREA LIGHT	WHEN REQUIRED.
P4	3/4"	2-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL LIGHT	
P5	3/4"	4-#12 + 4-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	PUMP CONTROL PANEL	120V POWER CIRCUITS FOR RECEPTACLE, LIGHTS AND CONTROLS. 'LP' CIRCUITS 2, 4, 6 AND 8.
P6	1"	6-#12 + 2-#12 NEU + 1-#12 GND	PANELBOARD 'LP'	GENERATOR	POWER FOR GENERATOR BLOCK HEATER, ALTERNATOR HEATER AND BATTERY CHARGER. 'LP' CIRCUITS 5/7, 9 AND 11.
P7	3/4"	2-#12 + 1-#12 GND	PANELBOARD 'LP'	DFS CABINET	120V POWER FOR DFS CABINET. 'LP' CIRCUIT 10.
P8	1-1/4"	COORDINATE WITH UTILITY	UTILITY TRANSFORMER	CT METER	COORDINATE CONDUIT SIZE AND ALL OTHER REQUIREMENTS WITH THE UTILITY.
C1	2"	4-#12 + 1-#12 GND	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR FLOATS.
C2	3/4"	4-#12 + 1-#12 GND	ATS	GENERATOR	GENERATOR STOP/START SIGNAL. COUNT INCLUDES SPARES.
C3	1"	16-#12 + 1-#12 GND	ATS	DFS CABINET	SIGNALS FOR ATS IN AUTO, ATS IN MANUAL, SOURCE - UTILITY, SOURCE - GENERATOR, ATS FAIL AND SCADA START GENERATOR. COUNT INCLUDES SPARES.
C4	1"	10-#12 + 1-#12 GND	GENERATOR	DFS CABINET	SIGNALS FOR GENERATOR RUNNING, GENERATOR IN AUTO, GENERATOR IN MANUAL AND GENERATOR FAIL. COUNT INCLUDES SPARES.
C5	3/4"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	FLOW METER TRANSMITTER	4-20mA FLOW METER SIGNAL.
C6	3/4"	2-#12 + 1-#12 GND	ATS	DFS CABINET	GENERATOR STOP/START SIGNAL FROM DFS (SCADA REMOTE START SIGNAL).
C7	1"	TWO (2) 2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	DFS CABINET	4-20mA FLOW METER AND LEVEL TRANSMITTER SIGNALS. BOTH CABLES SHALL BE BELDEN 8719.
C8	1"	10-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	12V DC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C9		2/C-#16 TWISTED SHIELDED	DFS CABINET	RAIN GAUGE	CABLE BY RAIN GAUGE MANUFACTURER. CABLE NOT SHOWN ON PLANS FOR CLARITY. PROVIDE CABLE GROMMET FOR DFS CABINET.
C10	2"	EMPTY	DFS CABINET	DFS ANTENNA	CONDUIT FOR ANTENNA COAXIAL CABLE. CABLE TO BE INSTALLED BY DFS.
C11	2"	2/C-#16 TWISTED SHIELDED	PUMP CONTROL PANEL	WET WELL JUNCTION BOX	CONDUCTORS FOR LEVEL TRANSMITTER. BELDEN 8719.
C12	2"	FLOAT CABLES SUPPLIED WITH FLOAT	WET WELL JUNCTION BOX	WET WELL	OFF AND HIGH FLOAT CABLES.
C13	2"	CABLE SUPPLIED WITH TRANSMITTER	WET WELL JUNCTION BOX	WET WELL	LEVEL TRANSMITTER CABLE.
C14	3/4"	2/C-#16 TWISTED SHIELDED	DFS CABINET	GENERATOR	4-20mA GENERATOR DIESEL TANK LEVEL SIGNAL.
C15	1-1/2"	FOUR (4) 2/C-#16 TWISTED SHIELDED	VFD 1 & VFD 2	DFS CABINET	4-20mA VFD #1 SPEED REFERENCE, VFD #2 SPEED REFERENCE, VFD #1 SPEED COMMAND AND VFD #2 SPEED COMMAND SIGNALS. BELDEN 8719.
C16	1-1/2"	20-#14 + 1-#14 GND	VFD 1 & VFD 2	DFS CABINET	12V DC I/O SIGNALS BETWEEN VFD'S AND DFS CABINET. REFER TO TYPICAL VFD WIRING SCHEMATIC DRAWING. COUNT INCLUDES SPARES.
C17	3/4"	10-#14 + 1-#14 GND	PUMP CONTROL PANEL	VFD 1, VFD 2 & VFD 3	HIGH FLOAT ALARMS TO VFD RUN CIRCUITS.
C18	3/4"	10-#14 + 1-#14 GND	PUMP CONTROL PANEL	DFS CABINET	120V AC I/O SIGNALS BETWEEN PUMP CONTROL PANEL AND DFS CABINET. REFER TO PUMP CONTROL PANEL SCHEMATIC WIRING DIAGRAMS. COUNT INCLUDES SPARES.
C19	3/4"	2-#14 + 1-#14 GND	MOTOR CONTROL CENTER	DFS CABINET	PHASE MONITOR SIGNAL.
C20	1"	8-#14 + 1-#14 GND	DFS CABINET	GENERATOR	I/O SIGNALS BETWEEN GENERATOR AND DFS CABINET FOR LEAK, LOW LOW LEVEL AND HIGH LEVEL ALARM SIGNALS. COUNT INCLUDES SPARES.

PROPOSED PANEL SCHEDULE

PANEL `LP' ; SQUARE D CO. TYPE NQOB ; 120/208 VOLTS, 3Ø, 4W ; 100 AMP MAIN CIRCUIT BREAKER ; 42K AIC RATING ; INSTALLED IN MCC

EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE			CIRC.	CIRC.	KVA/PHASE			CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	C	NO.	NO.	A	B	C	POLE	AMPS	FRAME	
SPARE	1	20	QOB	0.0			1	2	0.8			1	20	QOB	PUMP CONTROL PANEL REC
SPARE	1	20	QOB		0.0		3	4		1.0		1	20	QOB	PUMP CONTROL PANEL LTS
GENERATOR BLOCK HEATER	1	20	QOB			1.2	5	6			0.4	1	20	QOB	PUMP CONTROL PANEL CNTLS
" "	-	-	-	1.2			7	8	0.4			1	20	QOB	PUMP CONTROL PANEL CNTLS
GENERATOR ALT HEATER	1	20	QOB		0.8		9	10		0.6		1	20	QOB	DFS CABINET
BATTERY CHARGER	1	20	QOB			1.0	11	12			.	1	20	QOB	SPARE
FLOW METER TRANSMITTER	1	20	QOB	0.2			13	14	.			1	20	QOB	SPARE
SPACE	--	--	--		.		15	16		.		1	20	QOB	SPARE
SPACE	--	--	--			.	17	18			.	1	20	QOB	SPARE
SPACE	--	--	--	.			19	20	.			--	--	--	SPACE
SPACE	--	--	--		.		21	22		.		--	--	--	SPACE
SPACE	--	--	--			.	23	24			.	--	--	--	SPACE
SPACE	--	--	--	.			25	26	.			--	--	--	SPACE
SPACE	--	--	--		.		27	28		.		--	--	--	SPACE
SPACE	--	--	--			.	29	30			.	--	--	--	SPACE
SUB-TOTAL KVA				1.4	0.8	2.2			1.2	1.6	0.4				

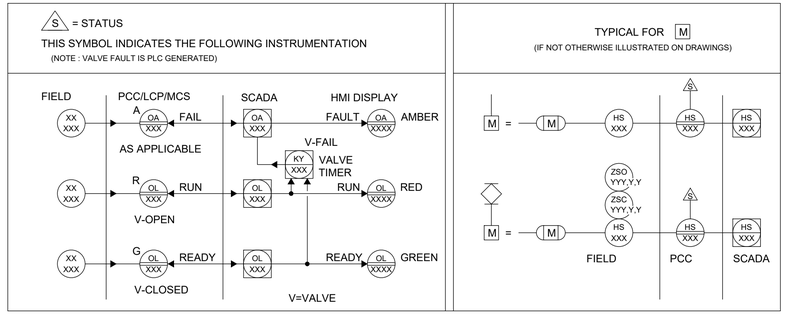
TOTAL CONNECTED LOAD = 7.6 KVA

TOTAL DEMAND LOAD = 7.6 KVA

FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		PROGRAMMER		
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING		GLASS VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR	
O	OPERATION	OFFSET	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE		
R	RADIATION		RECORD, PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y				RELAY, COMPUTE, CONVERT	
Z	POSITION			FINAL CONTROL ELEMENT	UNCLASSIFIED



LINE DESIGNATIONS

INSTRUMENTATION SIGNAL ————————

ELECTRICAL POWER ————————

DATA LINK —— D —— D ——

RADIO LINK —— R —— R ——

FIBER OPTIC DATA —— F —— F ——

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT
SP = SET POINT INPUT
C = CONTROL OUTPUT

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DISCRETE INPUT
DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO
S/S = START/STOP
SEL = SELECTOR
O/C = OPEN/CLOSE
O/O = ON/OFF
LOS = LOCKOUT-START
LOR = LOCAL-OFF-REMOTE
OAC = OPEN-AUTO CLOSE
CAO = CLOSED-AUTO OPEN

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN
O/R = OVERRIDE
MCS = MASTER CONTROL STATION
VFD = VARIABLE FREQUENCY DRIVE
PCC = PROCESS CONTROL CABINET
LCP = LOCAL CONTROL PANEL
ES = ELECTRICAL SUPPLY (120VAC)

EQUIPMENT NOTATION

B = BLOWER OR FAN
E = ENGINE
G = GENERATOR
F = FILTER
GS = GRINDER/SCREEN
K = COMPRESSOR
H = HOIST
ME = MECHANICAL EQUIPMENT
MX = MIXER
P = PUMP
T = TANK OR SUMP

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

GENERAL ABBREVIATIONS

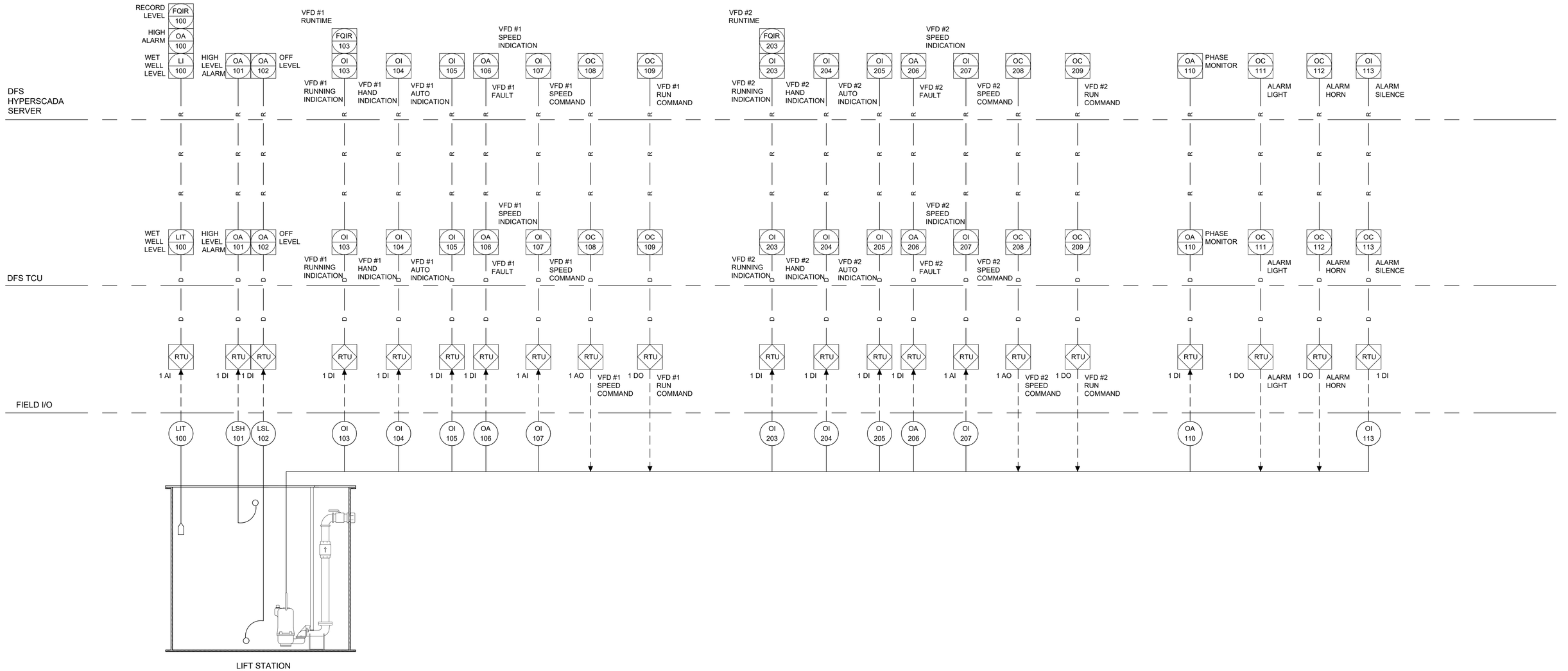
SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION.
PLC - PROGRAMMABLE LOGIC CONTROL
SA - SURGE SUPPRESSOR DEVICE

BASIC SYMBOLS

I — INTERLOCK

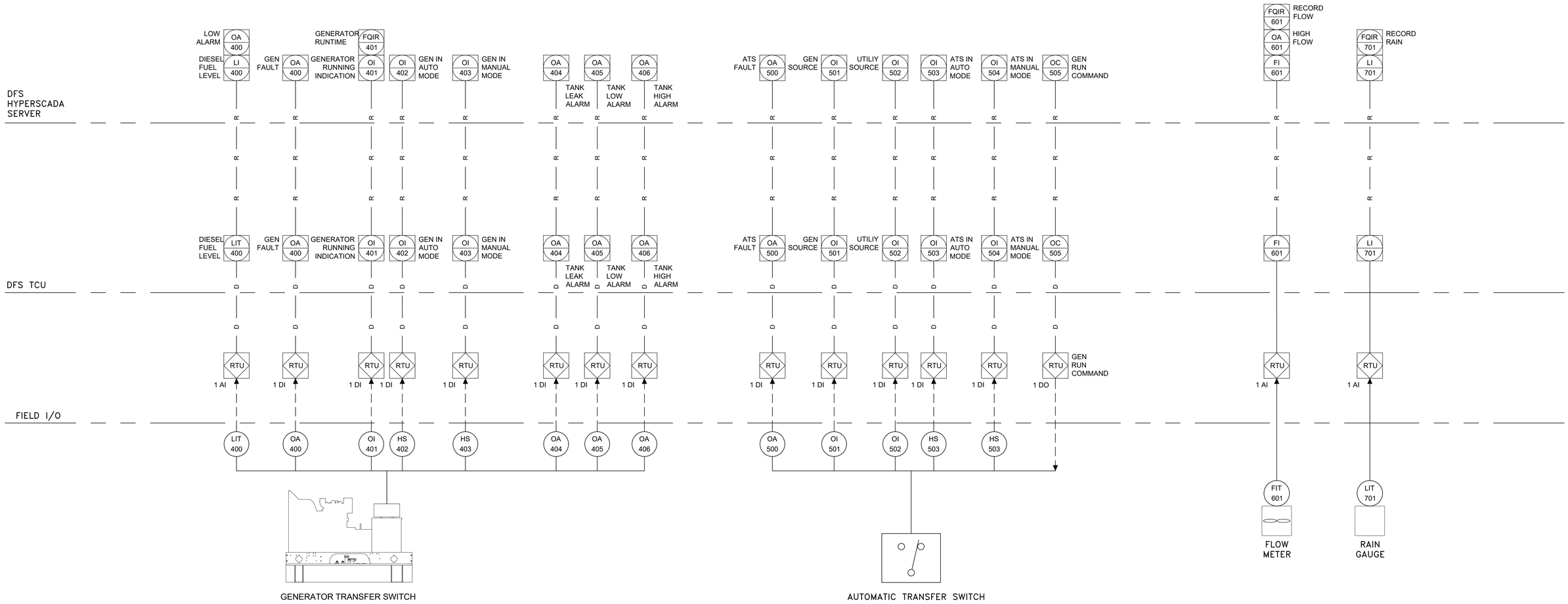
I-3 — CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

SINGLE FUNCTION		MUTIPLE FUNCTION	
○	OR	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	OR	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊖	OR	⊖⊖	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊡	OR	⊡⊡	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
⊡	OR	⊡⊡	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	OR	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



LIFT STATION

CITY OF CLEARWATER DEPARTMENT OF PUBLIC WORKS - ENGINEERING 100 S. MYRTLE AVENUE CLEARWATER, FL 33756	**2022 STANDARD ELECTRICAL DETAILS**	**480V 3-PH, DUPLEX 47 TO 88 HP**	**TYPICAL LIFT STATION P&ID'S**	INDEX NO. 807	PAGE NO. 27 OF 28
				LATEST REVISION	11/2022



CITY OF CLEARWATER
DEPARTMENT OF PUBLIC WORKS - ENGINEERING
100 S. MYRTLE AVENUE
CLEARWATER, FL 33756

2022 STANDARD ELECTRICAL DETAILS

480V 3-PH, DUPLEX 47 TO 88 HP

TYPICAL LIFT STATION P&ID'S

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