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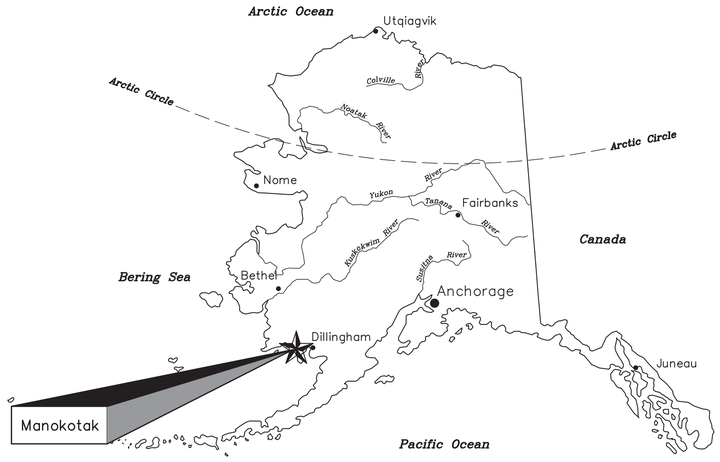
E8.2 HEAT RECOVERY SYSTEM END USER BUILDING WIRING PLANS
E9 POWER PLANT AREA FUEL SYSTEM WIRING MODIFICATION PLAN & DETAILS



MANOKOTAK POWER PLANT UPGRADE PROJECT REVISION #1 ISSUED FOR CONSTRUCTION AUGUST 2025

THIS DRAWING SET SHOWS WORK THAT IS UNDER THE BASE BID AND ADDITIVE ALTERNATES. ALL WORK SHOWN IS INCLUDED IN THE BASE BID UNLESS SPECIFICALLY INDICATED AS ADDITIVE ALTERNATE.

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: SCHEDULE OF DRAWINGS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: BCG
DESIGNED BY: BCG
FILE NAME: MANO PP G1
PROJECT NUMBER:
SCALE: NO SCALE
DATE: 9/28/23
SHEET: G1

ELECTRICAL EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
1	DAY TANK ALARM HORN/STROBE	MULTI-TONE ALARM WITH STROBE, 115V, NEMA 3R, WEATHER RESISTANT SURFACE MOUNT BELL BOX	WHEELOCK MT4-115-WH-VNS
2	DIGITAL THERMOSTAT	MULTIPLE OUTPUT MODULATING DIGITAL THERMOSTAT	HONEYWELL TB7980B
3	LINE VOLTAGE THERMOSTAT	HEATING/COOLING THERMOSTAT, 16 FLA @ 120V, SPDT, 50F TO 80F RANGE.	DAYTON 1UHH2
4	EXTERIOR LIGHT	AREA LIGHT, WIDE DISPERSION WALL PACK WITH PHOTO CONTROL. LED, 17.7W, 120-277V DRIVER	HUBBELL NRG-356L-5K-U-PC
5	EMERGENCY LIGHT	WHITE PLASTIC ENCLOSURE, 120-347V INPUT, DUAL 5.3W LED LAMPS, LITHIUM IRON PHOSPHATE BATTERY	LITHONIA EML6L UVOLT LTP SRDT
6	EMERGENCY/EXIT LIGHT COMBO	WHITE PLASTIC ENCLOSURE, RED EXIT SIGN, 277/120V INPUT, DUAL 1.5W 9.6V LED LAMPS. OPTIONAL HIGH OUTPUT NI-CAD BATTERY	LITHONIA LHQM LED R HO
7	EMERGENCY EXIT REMOTE LIGHT	REMOTE LAMP FIXTURE, DUAL HEAD, RATED FOR EXTERIOR INSTALLATION IN DAMP/WET LOCATIONS, 1.5W 9.6V LED LAMPS.	LITHONIA ELA T QWP L0309
8	INTERIOR LIGHT	SURFACE MOUNTED LED STRIPLIGHT FIXTURE, 48" LONG, 34W, 5000'K WITH SNAP ON FROSTED DIFFUSER	LITHONIA L1N-L48-5000LM-FST
9	TIMER SWITCH	0-5 MINUTE , 120V, 20A, 1HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER.	INTERMATIC FF5M
10	LIGHT SWITCH	SINGLE POLE SNAP SWITCH, 120V, 20A, METAL, 1-1/2HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER, IVORY.	HUBBELL 1221-I
11	1ø SMALL MOTOR DISCONNECT	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
12	NOT USED	NOT USED	
13	*STATION SERVICE TRANSFORMER*	*STATION SERVICE TRANSFORMER - ENERGY STAR COMPLIANT, ENCLOSURE TYPE 1, 45kVA, HV 480 DELTA, LV 208Y/120, 125 AMP*	*EGS ELECTRICAL GROUP CAT. NO. ET2H30*
14	*STATION SERVICE PANELBOARD*	*COPPER BUS, 3 PHASE, 4 WIRE, 120/208V, 125A MAIN BREAKER, 42 CIRCUITS, BOLT-IN BREAKERS, NEMA 1 ENCLOSURE, SURFACE MOUNT, NO KNOCKOUTS*	*SIEMENS TYPE P1*
15	STANDARD RECEPTACLE	SURFACE MOUNT 125V NEMA 5-20R RECEPTACLE. INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	PASS & SEYMOUR 5362W
16	EXTERIOR GFCI RECEPTACLE	125V NEMA 5-20R GFCI RECEPTACLE. MOUNT IN CAST FDA BOX WITH WEATHERPROOF COVER	PASS & SEYMOUR 2095-W
17	BATTERY CHARGER	12/24-VOLT SOLID STATE 20-AMP AUTO-EQUALIZING BATTERY CHARGER FOR 120 VAC INPUT, WITH OPTIONAL HIGH/LOW VOLTAGE, AC POWER FAILURE, & REMOTE SUMMARY ALARM RELAYS	SENS NRG22-20-RCLS OR LEMARCHE ECSR-40/20-12/24V-AV1
18	NOT USED	NOT USED	NOT USED
19	NOT USED	NOT USED	NOT USED
20	RADIATOR/CAC MOTOR DISCONNECT	NON-FUSED LOCKABLE SAFETY SWITCH, NEMA 3R ENCLOSURE, 3PST, 600V, 30A, MIN 5HP RATED	SIEMENS HNF361R OR SQUARE D HU361R
21	NOT USED	NOT USED	NOT USED
22	NOT USED	NOT USED	NOT USED
23	SNAP SWITCH WITH THERMAL UNIT	600VAC, 1HP, 16A MANUAL MOTOR STARTER WITH TYPE S, TYPE A, MELTING ALLOY, CLASS 20 THERMAL UNIT	SQUARE D 2510F01 MOTOR STARTER WITH A14.8 THERMAL UNIT
24	ROUTER - HIGH SPEED INTERNET	4-PORT GIGABIT ROUTER, DUAL 2.4 AND 5 GHz WIFI WITH ADJUSTABLE ANTENNAS, 4 EACH 1 GBPS LAN, 1 GBPS WAN, MINIMUM 256 MB RAM, WITH DDNS AND PORT FORWARDING CAPABILITY, ASUS RT-AX1800S OR APPROVED EQUAL	ASUS RT-AX1800S
25	FOC-1 ENCLOSED CONTACTOR	NEMA 1 ENCLOSURE WITH IEC STYLE CONTACTOR, 5.4-27A ADJUSTABLE RANGE SOLID STATE OVERLOAD, HAND-OFF-AUTO CONTROL, NORMALLY OPEN AUXILIARY CONTACT, 16A, 208V 3-PHASE.	ALLEN-BRADLEY 109-C16AD-OLR ENCLOSED CONTACTOR, 193-EEEB OVERLOAD, 198-3SS HOA, 193-ERA OVERLOAD RESET & 150-CA10 1P, N.O. AUX CONTACT
26	FOC-1 TEMP CONTROLLER	NEMA 1 120/240 VAC PROGRAMMABLE TEMPERATURE CONTROLLER WITH PTC TEMPERATURE SENSOR AND 2m LONG JACKETED CABLE	PENN A421ABC-02C
27	PUMP P-DF3 DISCONNECT	LOCKABLE TUMBLER SWITCH, NEMA 7, FEED THROUGH WITH 3/4" HUBS, 20A, 2 POLE, 120/277V, COMPLETE ASSEMBLY	KILLARK XS-52C

EQUIPMENT NOTES:

1) ALL EQUIPMENT SHOWN IN LIGHT ITALIC TEXT IS EXISTING TO REMAIN AND ARE SHOWN HERE FOR REFERENCE ONLY. SOME EXISTING ITEMS WILL BE DEMOLISHED AND/OR REPLACED WITH NEW AS INDICATED ON THE PAGES THAT FOLLOW.
2) ALL EQUIPMENT SHOWN IN BOLD DARK TEXT IS NEW AND IS TO BE FURNISHED AND INSTALLED UNDER THIS PROJECT INCLUDING REPLACEMENTS FOR EXISTING.
3) SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

ELECTRICAL CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERATOR LEADS (ENGINE STARTER CABLES SIMILAR)	HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, TIN COATED COPPER CONDUCTOR. THERMOSET EPDM INSULATION, UL 3340/3374, MINIMUM 600V, LISTED 150°C FOR NON-FLEXING	COBRA CABLE, BELDEN, OR OMINI	TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 150°C.
GENERAL USE CONDUCTORS	CLASS B CONCENTRIC STRANDED, SOFT DRAWN COPPER. TYPE XHHW2 INSULATION, 600V AND 90C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL & CANBUS CONDUCTORS	#18 AWG STRANDED TINNED COPPER CONDUCTORS, 600V POLYETHYLENE INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE & PVC OUTER JACKET	BELDEN PART #'S SINGLE PAIR: #1120A FOUR PAIR: #1049A SINGLE TRIAD: #1121A	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY.
EHTERNET (CAT5e) COMMUNICATION CONDUCTORS	SOLID BARE COPPER CONDUCTORS, 300V FEP INSULATION & JACKET, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE	FOUR PAIR #24 BELDEN 1585LC	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY. ROUTE ALL DEVICENET & CAT5e CABLES IN SEPARATE DEDICATED RACEWAY.

UNLESS INDICATED OTHERWISE ALL CONDUCTORS SHALL USE THE FOLLOWING COLOR CODE:
- 480-VOLT POWER (PHASE) CONDUCTORS
  - PHASE A: BROWN
  - PHASE B: ORANGE
  - PHASE C: YELLOW
- 120/208-VOLT POWER (PHASE) CONDUCTORS
  - PHASE A: BLACK
  - PHASE B: RED
  - PHASE C: BLUE
- NEUTRAL: WHITE, NO EXCEPTIONS
- GROUND: GREEN OR BARE, NO EXCEPTIONS
- 24 VOLT DC CONDUCTORS
  - +24VDC: RED or RED W/GRAY STRIPE
  - -24VDC: BLACK or BLACK W/GRAY STRIPE

CONTROL AND INSTRUMENT CONDUCTORS MAY BE COLOR CODED PER MANUFACTURER'S STANDARD

NOTES:

1) COLOR CODING FOR NO. 6 AWG AND SMALLER CONDUCTORS SHALL BE BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION.
2) COLOR CODING FOR CONDUCTORS LARGER THAN NO. 6, SHALL BE BY:
   A) CONTINUOUS COLOR EMBEDDED IN THE INSULATION, OR
   B) BLACK CABLE WITH SCOTCH 35 OR APPROVED EQUAL MARKING (PHASE) TAPE. AT EVERY ACCESSIBLE LOCATION A MINIMUM 3" LONG SECTION OF CONDUCTOR SHALL BE SPIRAL WRAPPED. NOTE THAT PHASE TAPE MAY NOT BE USED ON COLORED CABLE, BLACK CABLE ONLY.
3) GROUNDING - PROVIDE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY. DO NOT USE THE CONDUIT AS AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE OF THE SAME TYPE AS THE PHASE CONDUCTORS AND SHALL BE SIZED AS INDICATED ON THE DRAWINGS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

WIRING & DEVICE SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
SS-##	HOME RUN TO PANEL & BREAKER(S) INDICATED. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL CONDUCTOR, CURVED DASH INDICATES GROUND CONDUCTOR. IF NOT SPECIFICALLY INDICATED, PROVIDE 2#12 AWG & 1#12 AWG GROUND.		125V, 20A, DUPLEX RECEPTACLE
		T	LINE VOLTAGE THERMOSTAT
		DT	DIGITAL THERMOSTAT, MODULATING
#	ELECTRICAL ITEM - SEE EQUIPMENT SCHEDULE	$	SNAP SWITCH / SMALL MOTOR DISCONNECT
1/4	MOTOR (HORESPOWER INDICATED)	T$	TIMER SWITCH
MD	MOTORIZED DAMPER - SEE MECHANICAL		GROUND

INSTRUMENTATION LEGEND

NOTE: SEE SCHEDULES SHEET M1.1 FOR EQUIPMENT SPECIFICATIONS.

SYMBOL	SERVICE/FUNCTION	SYMBOL	SERVICE/FUNCTION
TT	TEMPERATURE TRANSMITTER	LCA	GLYCOL TANK LOW COOLANT ALARM
TTH	THERMOMETER/ TEMP TRANSMITTER	FS	DAY TANK/HOPPER FLOAT SWITCH
PTC	COOLING SYSTEM PRESSURE TRANSMITTER	GLS	GLYCOL TANK LEVEL SENSOR PROBE
PTH	HEAT RECOVERY PRESSURE TRANSMITTER	LS	INTERMEDIATE TANK TWO POINT FLOAT TYPE LEVEL SWITCH
DP	DIFFERENTIAL PRESSURE GAUGE/SWITCH		

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: ELECTRICAL LEGENDS & SCHEDULES

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E1-E2	SHEET: E1.1
PROJECT NUMBER:	

1 E1.2 OVERALL ELECTRICAL AREA PLAN

PROJECT OVERVIEW:

1) THE EXISTING POWER PLANT EQUIPMENT HAS REACHED THE END OF ITS USEFUL LIFE AND THIS UPGRADE PROJECT INVOLVES A COMPLETE RENOVATION OF THE PLANT. THE PROJECT INCLUDES BASE BID AND ADDITIVE ALTERNATIVE TASKS. SEE SPECIFICATIONS SECTION 01 11 13 SUMMARY OF WORK FOR DELINEATION OF BASE BID AND ADDITIVE ALTERNATE TASKS.
2) ELECTRICAL UPGRADES INCLUDE BUT ARE NOT LIMITED TO NEW STEP UP TRANSFORMER, NEW DIESEL–ELECTRIC GENERATORS, NEW SWITCHGEAR, NEW POWER AND CONTROL WIRING, NEW CONTROL PANELS, AND MISCELLANEOUS UPGRADES TO THE PLANT STATION SERVICE ELECTRICAL SYSTEM.
3) THE PROJECT ALSO INCLUDES MAJOR RENOVATION OF THE MECHANICAL SYSTEMS AND MINOR RENOVATION OF THE BUILDING. SEE MECHANICAL AND STRUCTURAL.

TEMPORARY GENERATION NOTES:

1) THIS POWER PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF MANOKOTAK. THE UPGRADE PROJECT REQUIRES SUBSTANTIAL MODIFICATIONS TO THE POWER PLANT WHICH WILL RENDER IT UNAVAILABLE FOR PROVIDING COMMUNITY POWER DURING A LARGE PORTION OF THE WORK.
2) AN EXISTING 450kW EMERGENCY STANDBY GENERATOR (E–GEN) HAS BEEN INSTALLED IN A CONNEX ADJACENT TO THE POWER PLANT. THE CONTRACTOR SHALL CONNECT THE E–GEN TO THE ELECTRICAL DISTRIBUTION SYSTEM AS INDICATED ON SHEET E1.3.
3) THE UTILITY WILL OPERATE THE STANDBY GENERATOR TO PROVIDE POWER TO THE COMMUNITY DURING MAJOR RENOVATION OF THE POWER PLANT. THE CONTRACTOR SHALL DEVELOP A SCHEDULE AND WORK PLAN TO LIMIT THE TIME NEEDED TO BE ON STANDBY POWER TO NO MORE THAN THREE CALENDAR MONTHS. THE SCHEDULE MUST BE APPROVED BY THE AUTHORITY AND THE UTILITY PRIOR TO BEGINNING WORK. WRITTEN NOTICE SHALL BE PROVIDED TO THE AUTHORITY AND THE UTILITY OF ANY EVENTS THAT MAY POTENTIALLY ALTER THE APPROVED SCHEDULE.

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ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: OVERALL ELECTRICAL AREA PLAN

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
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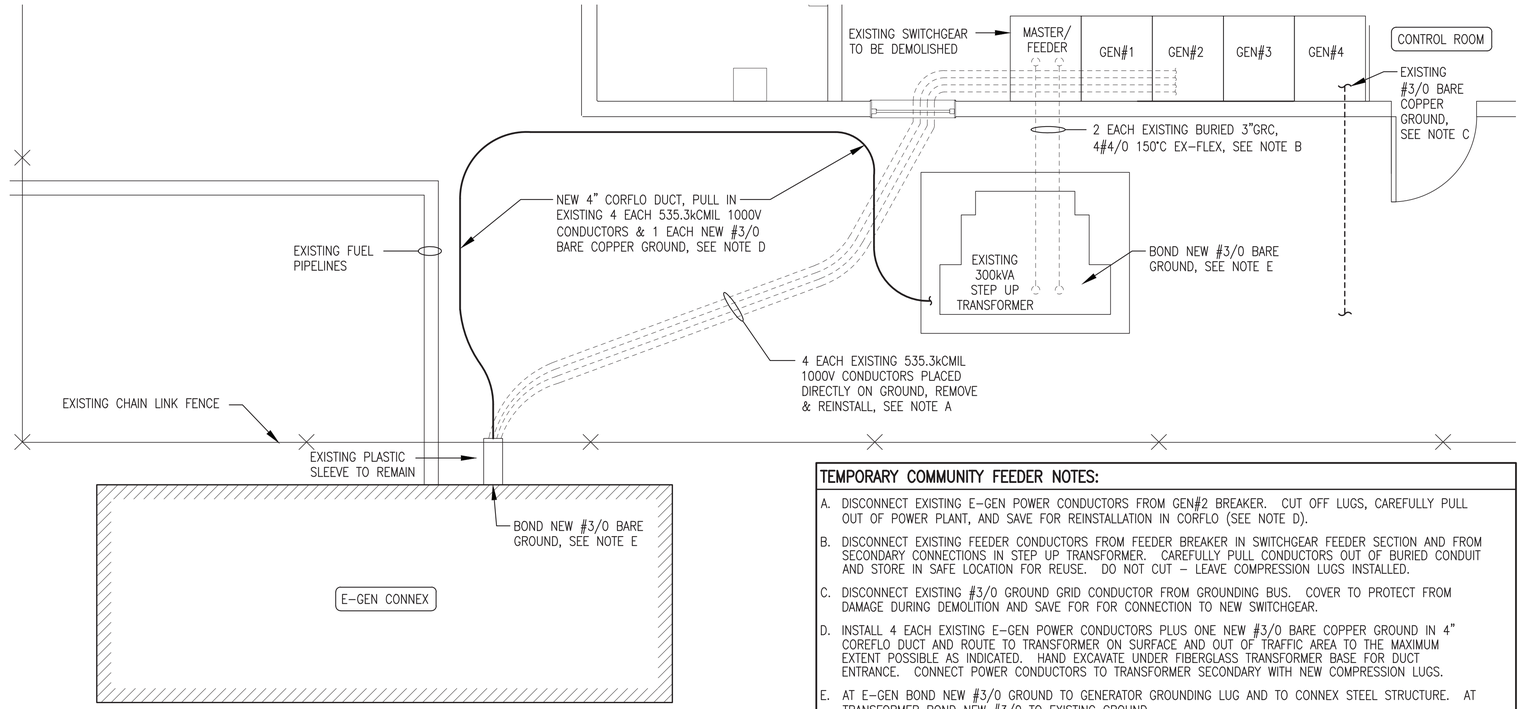
FILE NAME: MANO PP E1–E2 | SHEET: E1.2
PROJECT NUMBER:



TEMPORARY COMMUNITY FEEDER NOTES:

A. DISCONNECT EXISTING E-GEN POWER CONDUCTORS FROM GEN#2 BREAKER. CUT OFF LUGS, CAREFULLY PULL OUT OF POWER PLANT, AND SAVE FOR REINSTALLATION IN CORFLO (SEE NOTE D).

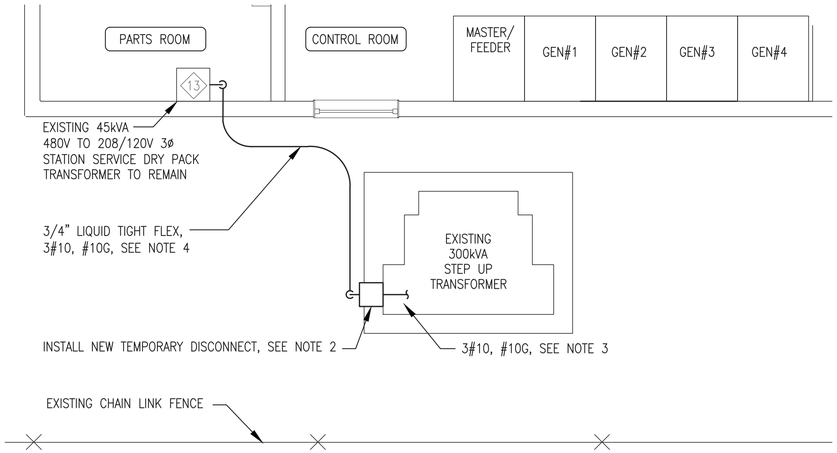
B. DISCONNECT EXISTING FEEDER CONDUCTORS FROM FEEDER BREAKER IN SWITCHGEAR FEEDER SECTION AND FROM SECONDARY CONNECTIONS IN STEP UP TRANSFORMER. CAREFULLY PULL CONDUCTORS OUT OF BURIED CONDUIT AND STORE IN SAFE LOCATION FOR REUSE. DO NOT CUT – LEAVE COMPRESSION LUGS INSTALLED.

C. DISCONNECT EXISTING #3/0 GROUND GRID CONDUCTOR FROM GROUNDING BUS. COVER TO PROTECT FROM DAMAGE DURING DEMOLITION AND SAVE FOR FOR CONNECTION TO NEW SWITCHGEAR.

D. INSTALL 4 EACH EXISTING E-GEN POWER CONDUCTORS PLUS ONE NEW #3/0 BARE COPPER GROUND IN 4" COREFLO DUCT AND ROUTE TO TRANSFORMER ON SURFACE AND OUT OF TRAFFIC AREA TO THE MAXIMUM EXTENT POSSIBLE AS INDICATED. HAND EXCAVATE UNDER FIBERGLASS TRANSFORMER BASE FOR DUCT ENTRANCE. CONNECT POWER CONDUCTORS TO TRANSFORMER SECONDARY WITH NEW COMPRESSION LUGS.

E. AT E-GEN BOND NEW #3/0 GROUND TO GENERATOR GROUNDING LUG AND TO CONNEX STEEL STRUCTURE. AT TRANSFORMER BOND NEW #3/0 TO EXISTING GROUND.

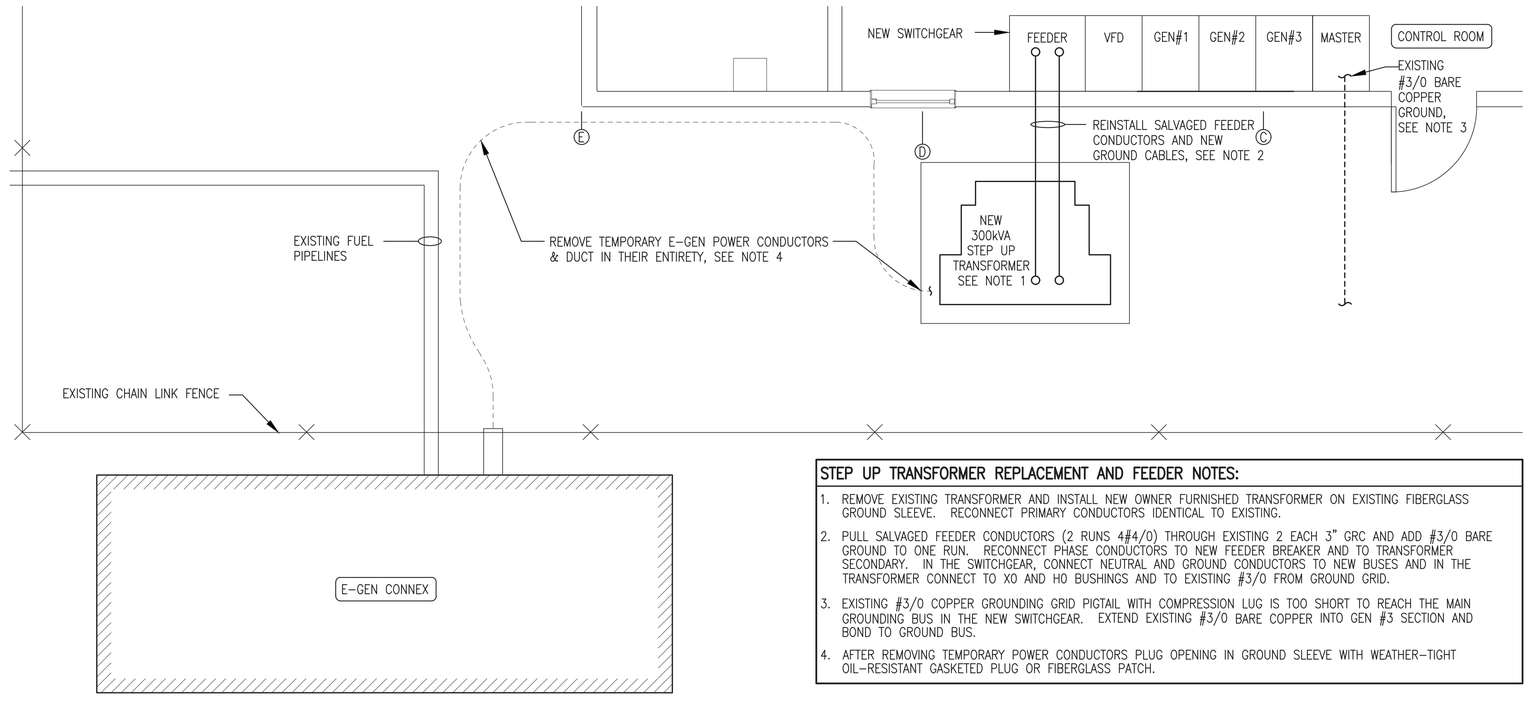
1 E1.3 TEMPORARY COMMUNITY FEEDER PLAN
3/8"=1'-0"



TEMPORARY STATION SERVICE POWER NOTES:

1. THE PRIMARY PURPOSE OF THIS TEMPORARY POWER IS TO PROVIDE 3 PHASE POWER FOR TESTING ALL STATION SERVICE CIRCUITS AND EQUIPMENT IN THE RENOVATED POWER PLANT PRIOR TO STARTING NEW GENERATORS. CONTRACTOR MAY INSTALL AT THE BEGINNING OF THE PROJECT TO PROVIDE CONSTRUCTION POWER FOR TOOLS AND LIGHTS. THE STATION SERVICE MAY NOT BE USED FOR ELECTRIC HEAT.
2. INSTALL TEMPORARY NEMA 3R, 30A, 3P, 600V FUSED DISCONNECT OR ENCLOSED BREAKER ON EXTERIOR OF EXISTING (OLD) PAD-MOUNT TRANSFORMER CABINET.
3. ROUTE CONDUCTORS INTO TRANSFORMER THROUGH CHASE NIPPLE AND CONNECT TO 480V 3ø SECONDARY.
4. ROUTE CONDUCTORS IN 3/4" LIQUID TIGHT FLEX FROM TEMPORARY DISCONNECT THROUGH BUILDING WALL TO PRIMARY ON EXISTING DRY PACK TRANSFORMER.
5. THE ENTIRE TEMPORARY POWER CIRCUIT, INCLUDING DISCONNECT, CONDUIT AND CONDUCTORS TO BE REMOVED ALONG WITH THE OLD PAD-MOUNT STEP UP TRANSFORMER IN PREPARATION FOR INSTALLATION OF THE NEW PAD-MOUNT STEP UP TRANSFORMER AND CONNECTION OF THE EXISTING STATION SERVICE DRY PACK TRANSFORMER TO THE NEW SWITCHGEAR STATION SERVICE BREAKER.
6. PLUG AND PATCH HOLES IN BUILDING EXTERIOR WALLS TO MATCH EXISTING AFTER REMOVING TEMPORARY POWER CONDUCTORS.

2 E1.3 TEMPORARY STATION SERVICE POWER PLAN
3/8"=1'-0"



STEP UP TRANSFORMER REPLACEMENT AND FEEDER NOTES:

1. REMOVE EXISTING TRANSFORMER AND INSTALL NEW OWNER FURNISHED TRANSFORMER ON EXISTING FIBERGLASS GROUND SLEEVE. RECONNECT PRIMARY CONDUCTORS IDENTICAL TO EXISTING.
2. PULL SALVAGED FEEDER CONDUCTORS (2 RUNS 4#4/0) THROUGH EXISTING 2 EACH 3" GRC AND ADD #3/0 BARE GROUND TO ONE RUN. RECONNECT PHASE CONDUCTORS TO NEW FEEDER BREAKER AND TO TRANSFORMER SECONDARY. IN THE SWITCHGEAR, CONNECT NEUTRAL AND GROUND CONDUCTORS TO NEW BUSES AND IN THE TRANSFORMER CONNECT TO XO AND HO BUSHINGS AND TO EXISTING #3/0 FROM GROUND GRID.
3. EXISTING #3/0 COPPER GROUNDING GRID PIGTAIL WITH COMPRESSION LUG IS TOO SHORT TO REACH THE MAIN GROUNDING BUS IN THE NEW SWITCHGEAR. EXTEND EXISTING #3/0 BARE COPPER INTO GEN #3 SECTION AND BOND TO GROUND BUS.
4. AFTER REMOVING TEMPORARY POWER CONDUCTORS PLUG OPENING IN GROUND SLEEVE WITH WEATHER-TIGHT OIL-RESISTANT GASKETED PLUG OR FIBERGLASS PATCH.

3 E1.3 STEP UP TRANSFORMER REPLACEMENT AND FINAL POWER PLAN
3/8"=1'-0"

REVISION #1
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STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
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REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: TEMPORARY POWER & STEP UP TRANSFORMER REPLACEMENT PLANS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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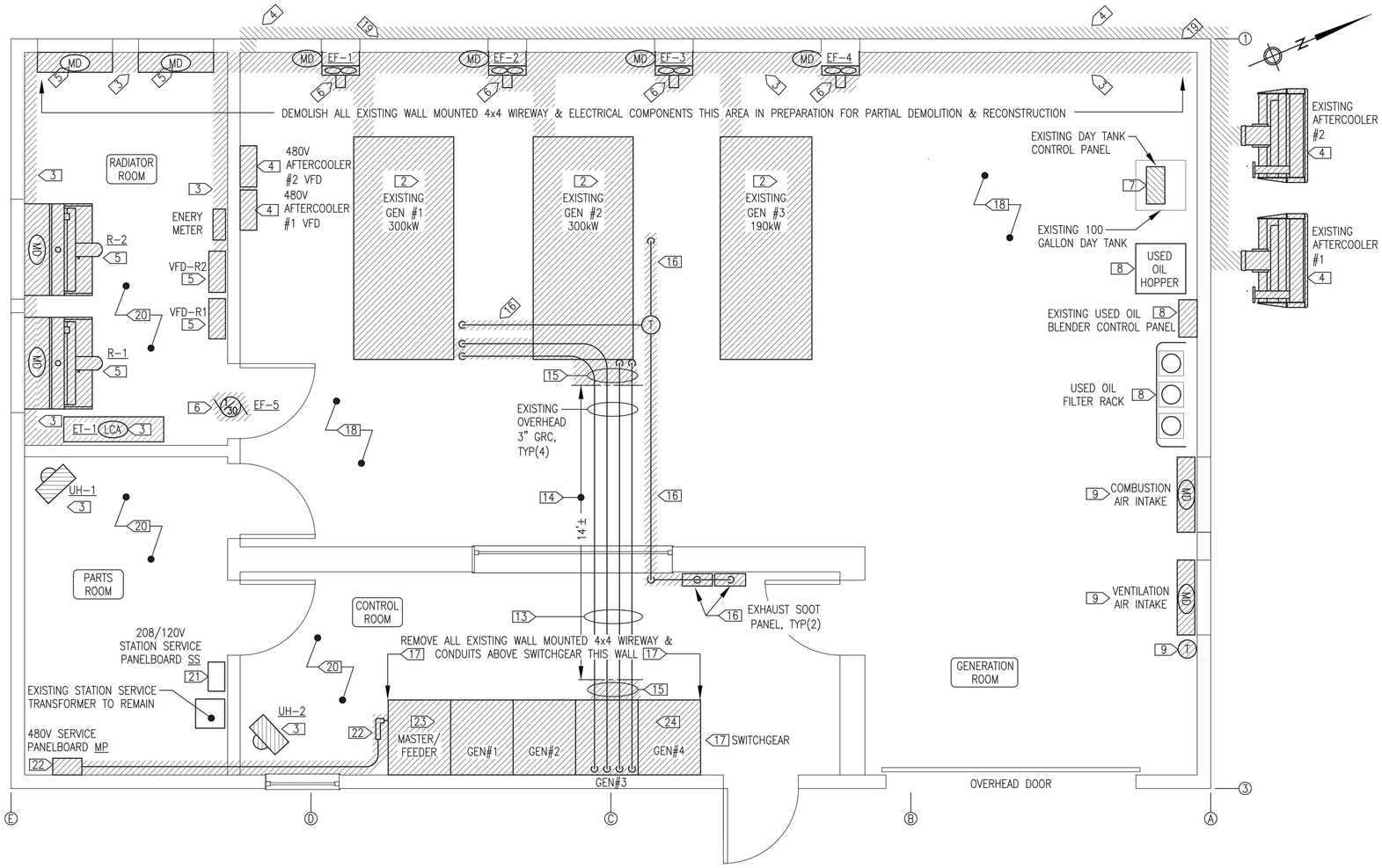
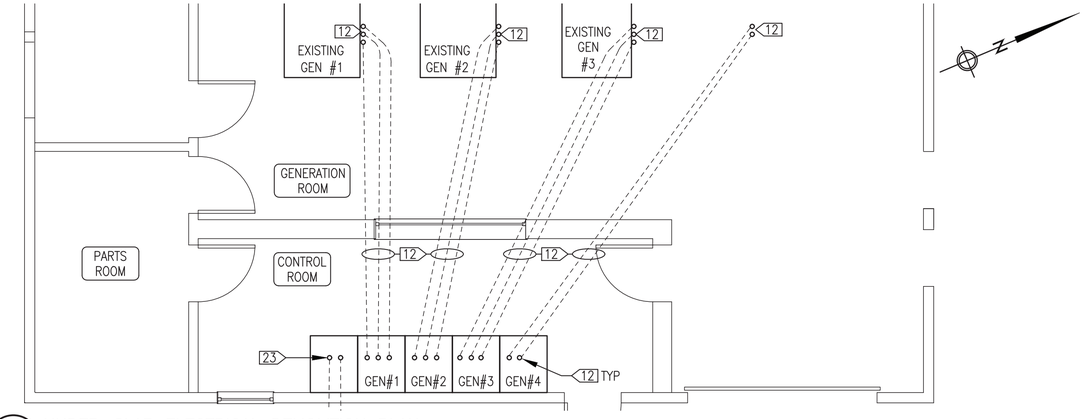


1 E2 ABOVE GRADE ELECTRICAL DEMOLITION PLAN

3/8"=1'



2 E2 UNDER-SLAB ELECTRICAL DEMOLITION PLAN

1/4"=1'

POWER PLANT ELECTRICAL DEMOLITION GENERAL NOTES:

1. THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF MANOKOTAK. KEEP UNPLANNED OUTAGES TO A MINIMUM AND COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY. SEE TEMPORARY POWER GENERATION PLAN SHEET E1.3.
2. THE BACK (WEST) WALL WILL BE SUBSTANTIALLY MODIFIED IN ORDER TO ACCOMMODATE RELOCATED MECHANICAL OPENINGS AND SUPPORTS. THE INTENT IS TO REMOVE ALL EXISTING INTERIOR AND EXTERIOR EQUIPMENT, RACEWAYS AND DEVICES FROM THE WALL PRIOR TO MODIFYING THE STRUCTURE UNLESS SPECIFICALLY INDICATED OTHERWISE. SEE SPECIFIC NOTE 19.
3. ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL. AREAS CONTAINING EXISTING EQUIPMENT TO BE REMOVED INDICATED BY HATCHING.
4. ONLY MAJOR DEMOLITION ITEMS AND AREAS SHOWN THIS SHEET. REMOVAL OF SMALL ELECTRICAL COMPONENTS AS REQUIRED FOR MISCELLANEOUS UPGRADES SHOWN WITH NEW WORK PLANS OR ON DETAILS.
5. ENSURE ALL EQUIPMENT AND CIRCUITS TO BE REMOVED ARE DE-ENERGIZED PRIOR TO BEGINNING DEMOLITION. LOCK AND TAG OUT ALL AFFECTED CIRCUIT BREAKERS AND DISCONNECTS.
6. TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO ELECTRICAL EQUIPMENT AND CONDUCTORS BEING SALVAGED FOR REUSE. TURN ALL REMOVED MATERIALS AND EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION IF NOT REUSED.

POWER PLANT ELECTRICAL DEMOLITION SPECIFIC NOTES:

1. SEE MECHANICAL DEMOLITION
2. DISCONNECT AND DEMOLISH ALL GENERATOR ELECTRICAL COMPONENTS IN THEIR ENTIRETY INCLUDING ALL ASSOCIATED 480V POWER, 24V CONTROL, AND 120/208V STATION SERVICE CONDUCTORS, CABLES, BATTERIES, CONTROLLERS, VOLTAGE REGULATORS, ENGINE "HOTSTART" PREHEATERS, CONDUIT, STRUT RACKS, ETC. REMOVE ALL CONDUCTORS BACK TO SOURCE.
3. DEMOLISH ALL ELECTRICAL EQUIPMENT AND DEVICES AS SPECIFICALLY INDICATED OR WITHIN HATCHED AREAS INCLUDING RECEPTACLES, SWITCHES, THERMOSTATS, BATTERY CHARGERS, THERMOSTATS, MOTOR CONNECTIONS, DAMPER ACTUATORS, CRANK CASE VENTILATION FAN, ETC.. ALONG WITH ASSOCIATED CONDUCTORS BACK TO SOURCE UNLESS INDICATED OTHERWISE OR WHERE REQUIRED FOR NEW EQUIPMENT INSTALLATION. DEMOLISH 4x4 WIREWAY ON BACK WALL AS REQUIRED FOR WALL DEMOLITION AND RECONSTRUCTION. ALL OTHER WALL MOUNTED 4x4 WIREWAY TO REMAIN. REMOVE ALL BRANCH RACEWAY ASSOCIATED WITH DEMOLISHED ITEMS.
4. DEMOLISH WIRING AND DEVICES ASSOCIATED WITH EXISTING CHARGE AIR COOLERS INCLUDING VFD's, DISCONNECTS, CONDUITS, AND CONDUCTORS. REMOVE ALL CONDUCTORS BACK TO SOURCE.
5. DEMOLISH WIRING AND DEVICES ASSOCIATED WITH EXISTING RADIATORS INCLUDING VFD's, DISCONNECTS, CONDUITS, DAMPERS ACTUATORS, AND CONDUCTORS. REMOVE ALL CONDUCTORS BACK TO SOURCE.
6. DEMOLISH FANS (SEE MECHANICAL) AND ASSOCIATED THERMOSTATS AND WIRING.
7. DEMOLISH EXISTING DAY TANK CONTROL PANEL USED OIL BLENDER CONTROL PANEL ALONG WITH ALL ASSOCIATED EQUIPMENT, INSTRUMENTATION, RACEWAY, AND DEVICES. COIL POWER CONDUCTORS IN A SAFE LOCATION AND TAPE ENDS FOR REUSE.
8. DEMOLISH EXISTING USED OIL BLENDER CONTROL PANEL ALONG WITH ALL ASSOCIATED EQUIPMENT, INSTRUMENTATION, RACEWAY, AND DEVICES.
9. TWO EACH EXISTING VENTILATION AIR INTAKE DAMPERS AND ONE EACH LINE VOLTAGE THERMOSTAT TO BE DEMOLISHED IN PREPARATION FOR REPLACEMENT (SEE MECHANICAL). CAREFULLY REMOVE EXISTING CONDUCTORS AND RE-ROUTE TO OLD RADIATOR ROOM FOR REUSE AT NEW VENTILATION LOCATION.
10. SEE MECHANICAL.
11. SEE MECHANICAL NEW WORK.
12. REMOVE EXISTING UNDER-SLAB GENERATOR POWER AND CONTROL CONDUCTORS IN THEIR ENTIRETY AND TURN OVER TO UTILITY. ABANDON ALL EMPTY UNDER-SLAB CONDUIT IN PLACE. CUT OFF CONDUIT SLAB PENETRATIONS FLUSH WITH SLAB BOTH ENDS AND GROUT FULL TO BLEND WITH FLOOR SURFACE. MINIMUM 22 PENETRATIONS TOTAL.
13. REMOVE EXISTING GEN#1 AND GEN#2 POWER CONDUCTORS FROM EXISTING 3" OVERHEAD CONDUIT IN THEIR ENTIRETY AND TURN OVER TO UTILITY.
14. 4 EACH STRAIGHT SECTIONS OF EMPTY 3" OVERHEAD GRC TO REMAIN.
15. DEMOLISH 3" GRC FROM LAST THREADED JOINT ON OVERHEAD STRAIGHT SECTIONS DOWN TO CONNECTIONS TO EXISTING GEN#1 AND GEN#2 ONE END AND DOWN TO ASSOCIATED SWITCHGEAR SECTION OTHER END.
16. DEMOLISH 2 EACH ENGINE EXHAUST SYSTEM SOOT CONTROL PANELS WITH ASSOCIATED OVERHEAD CONDUIT AND CONDUCTORS TO GEN#1 AND GEN#2 PARTICULATE FILTERS. REMOVE PANEL POWER CONDUCTORS BACK TO SOURCE.
17. DEMOLISH EXISTING SWITCHGEAR. REMOVE 4x4 WIREWAY AND CONDUITS ABOVE SWITCHGEAR IN PREPARATION FOR INSTALLATION OF NEW 10x10 WIREWAY AND NEW SWITCHGEAR.
18. REMOVE ALL EXISTING FLUORESCENT LIGHT FIXTURES, CEILING FANS, CAMERAS, AND MISCELLANEOUS DEVICES FROM GENERATION ROOM CEILING IN PREPARATION FOR DEGREASING AND CLEANING. ALL FAN CIRCUITS, INCLUDING CONDUIT, CONDUCTORS AND DISCONNECTS, TO BE DEMOLISHED. LIGHTING CIRCUITS, INCLUDING CONDUIT, CONDUCTOR AND DISCONNECTS, TO REMAIN UNLESS REQUIRED TO BE RELOCATED FOR MODIFICATIONS. COVER AND SEAL ALL CEILING AND WALL MOUNTED ELECTRICAL AND FIRE DETECTION DEVICES TO REMAIN IN PLACE PRIOR TO PRESSURE WASHING. SEE MECHANICAL DEMOLITION.
19. SEE STRUCTURAL AND SHEET M2.2 FOR BACK WALL RENOVATION.
20. REMOVE ALL EXISTING FLUORESCENT LIGHT FIXTURES, CEILING FANS, CAMERAS, AND MISCELLANEOUS DEVICES FROM CONTROL ROOM AND PARTS ROOMS CEILINGS.
21. EXISTING 208/120V 3-PHASE STATION SERVICE PANEL SS TO REMAIN. DISCONNECT AND REMOVE BREAKERS AND CONDUCTORS FOR DEMOLISHED/ABANDONED CIRCUITS.
22. DEMOLISH 480V PANELBOARD MP ALONG WITH ALL ASSOCIATED CONDUCTORS AND CONDUIT INCLUDING TO STATION SERVICE TRANSFORMER, AND TO FEEDER BREAKER IN SWITCHGEAR.
23. 2 EACH EXISTING UNDERGROUND 3" GRC FEEDER CONDUITS TO REMAIN. CAREFULLY REMOVE EXISTING 2 EACH 4#3/0 FEEDER CONDUCTORS FOR PROTECTION. TAPE ENDS, COIL, AND STORE IN SAFE LOCATION TO PROTECT FOR REINSTALLATION IN NEW SWITCHGEAR AND NEW STEP UP TRANSFORMER.
24. DISCONNECT EXISTING #3/0 GROUND GRID CONDUCTOR FROM GROUNDING BUS. COVER TO PROTECT FROM DAMAGE DURING DEMOLITION AND SAVE FOR CONNECTION TO NEW SWITCHGEAR
25. SEE MECHANICAL.
26. SEE MECHANICAL.

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

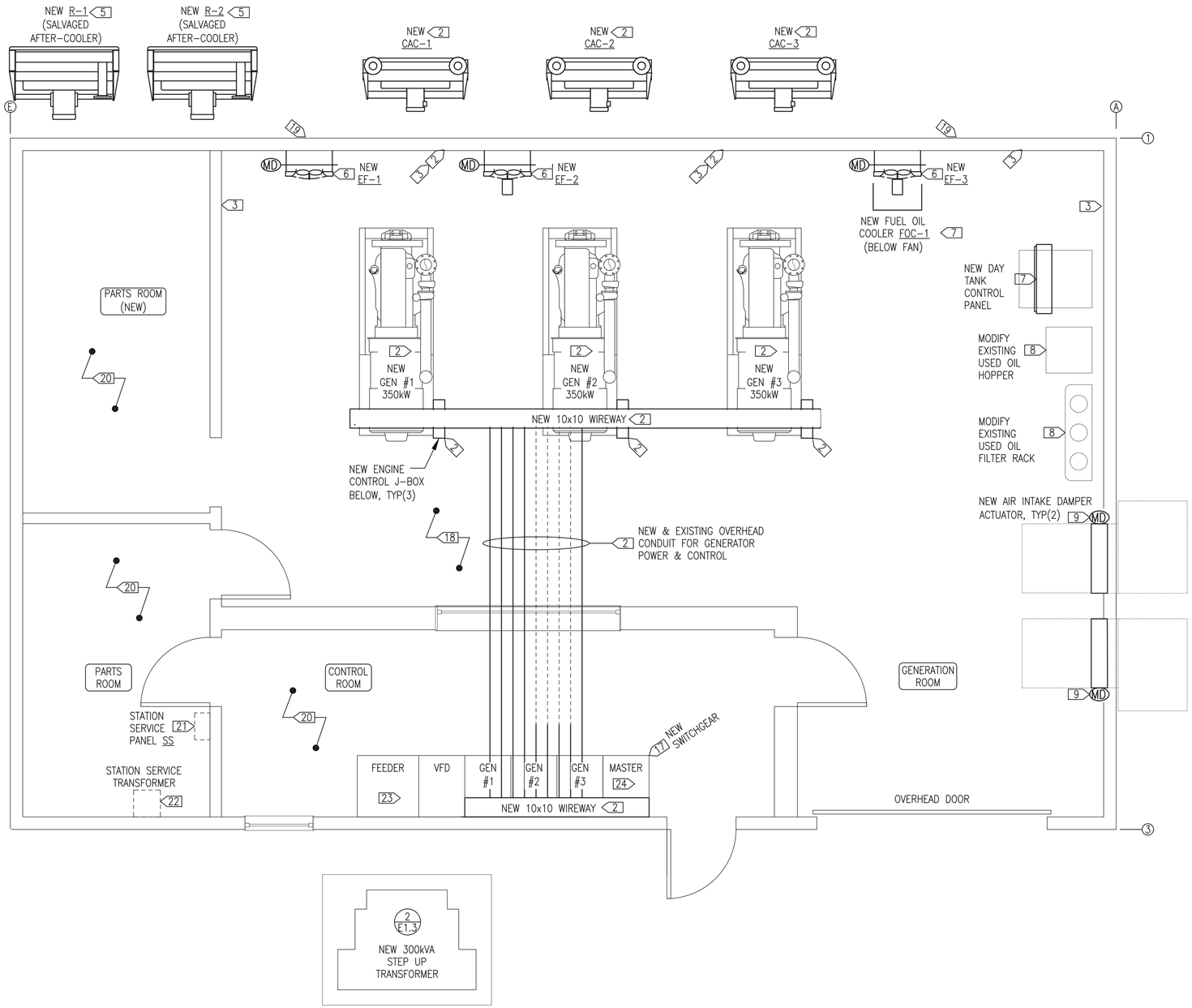
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: ELECTRICAL DEMOLITION PLAN

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E1-2 | SHEET: E2
PROJECT NUMBER:



1 E3.1 ELECTRICAL NEW WORK PLAN
3/8"=1'

POWER PLANT ELECTRICAL NEW WORK GENERAL NOTES:

1. EXISTING EQUIPMENT AND RACEWAYS TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
2. NEW EQUIPMENT AND RACEWAYS SHOWN WITH DARK SOLID LINES.
3. NOT ALL EXISTING EQUIPMENT AND RACEWAYS SHOWN. SEE ATTACHED RECORD DRAWINGS OF ORIGINAL POWER PLANT CONSTRUCTION FOR ADDITIONAL DETAIL ON SYSTEMS NOT BEING MODIFIED.
4. ONLY MAJOR NEW WORK ITEMS SHOWN THIS SHEET. SEE NEW WORK PLANS AND DETAILS FOR ADDITIONAL DETAIL.
5. SEE SHEETS E3.1–3.4 FOR WIREWAY & GENERAL EQUIPMENT LAYOUT, ELEVATIONS, AND DETAILS.
6. SEE SHEETS E4.1–4.2 FOR STATION SERVICE AND LIGHTING MODIFICATION PLANS.
7. SEE SHEET E5 FOR DATA/CONTROL MODIFICATION PLANS.
8. SEE SHEETS E6.1–E6.3 FOR SWITCHGEAR MODIFICATIONS AND NEW GENERATOR J-BOXES.
9. SEE SHEETS E7.1–E7.4 FOR DAY TANK AND INTERMEDIATE TANK CONTROL PANELS.
10. SEE SHEET FS1 FOR FIRE SUPPRESSION SYSTEM DEMOLITION AND NEW WORK.

POWER PLANT ELECTRICAL NEW WORK SPECIFIC NOTES:

1. SEE MECHANICAL DEMOLITION
2. INSTALL NEW POWER, CONTROL, AND SENSING CONDUCTORS AND RACEWAYS AS REQUIRED FOR NEW GENERATORS, CHARGE AIR COOLERS, AND RADIATORS. COORDINATE WITH MECHANICAL.
3. INSTALL NEW RACEWAYS, EQUIPMENT, DEVICES AND CIRCUITS THIS AREA. RECONNECT TO EXISTING WHERE SHOWN ON PLANS AND DETAILS.
4. SEE MECHANICAL AND ELECTRICAL DEMOLITION.
5. INSTALL NEW POWER AND SENSING CIRCUITS FOR SALVAGED RADIATORS FROM NEW VFD's IN SWITCHGEAR.
6. SEE MECHANICAL
7. INSTALL NEW DAY TANK CONTROL PANEL AND ALL ASSOCIATED POWER AND CONTROL CIRCUITS FOR DAY TANK AND USED OIL BLENDER.
8. CONNECT TO NEW INSTRUMENTATION ON REFURBISHED EXISTING USED OIL FILTER BANK.
9. CONNECT NEW AIR INTAKE DAMPER ACTUATORS TO NEW AND/OR EXISTING CIRCUITS.
10. SEE MECHANICAL DEMOLITION.
11. SEE MECHANICAL NEW WORK.
12. SEE ELECTRICAL DEMOLITION.
13. SEE ELECTRICAL DEMOLITION.
14. SEE ELECTRICAL DEMOLITION.
15. SEE ELECTRICAL DEMOLITION.
16. SEE ELECTRICAL DEMOLITION.
17. INSTALL NEW SWITCHGEAR. SEE SHEETS E6.1 AND E6.2.
18. INSTALL NEW LED LIGHTS IN GENERATION ROOM AFTER PRESSURE WASHING CEILING. CONNECT TO NEW AND/OR EXISTING WIRING AS SHOWN ON PLANS.
19. SEE STRUCTURAL AND SHEET M2.2 FOR BACK WALL RENOVATION.
20. INSTALL NEW LED LIGHTS IN CONTROL ROOM AND PARTS ROOMS. CONNECT TO EXISTING WIRING AS SHOWN ON PLANS.
21. REVISE PANELBOARD WIRING AND RE-LABEL CIRCUIT SCHEDULE.
22. CONNECT EXISTING 480V DRY PACK TRANSFORMER TO STATION SERVICE BREAKER IN SWITCHGEAR.
23. PULL SALVAGED FEEDER CONDUCTORS (2 RUNS 4#4/0) THROUGH EXISTING 2 EACH 3" GRC AND ADD #3/0 BARE GROUND TO ONE RUN. RECONNECT PHASE CONDUCTORS TO NEW FEEDER BREAKER AND TO TRANSFORMER. IN THE SWITCHGEAR CONNECT NEUTRAL AND GROUND CONDUCTORS TO NEW BUSES AND IN THE TRANSFORMER CONNECT TO XO AND HO BUSHINGS AND TO EXISTING #3/0 FROM GROUND GRID.
24. EXTEND EXISTING #3/0 FROM GROUND GRID UNDER NEW MASTER SECTION, ROUTE INTO GEN #3 SECTION, AND BOND TO GROUND BUS.
25. SEE MECHANICAL.
26. SEE MECHANICAL.

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

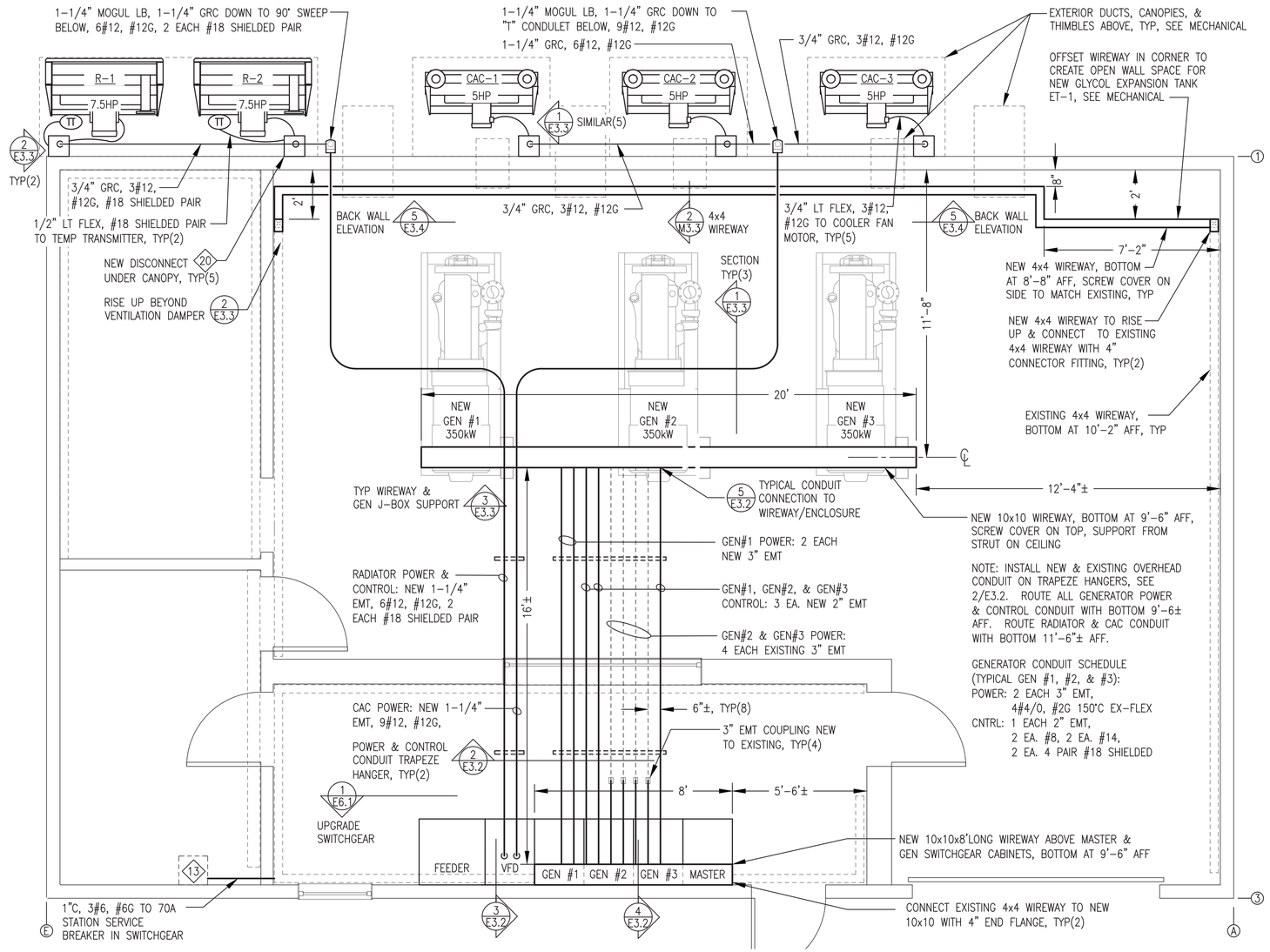
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: ELECTRICAL EQUIPMENT LAYOUT & NEW WORK OVERVIEW

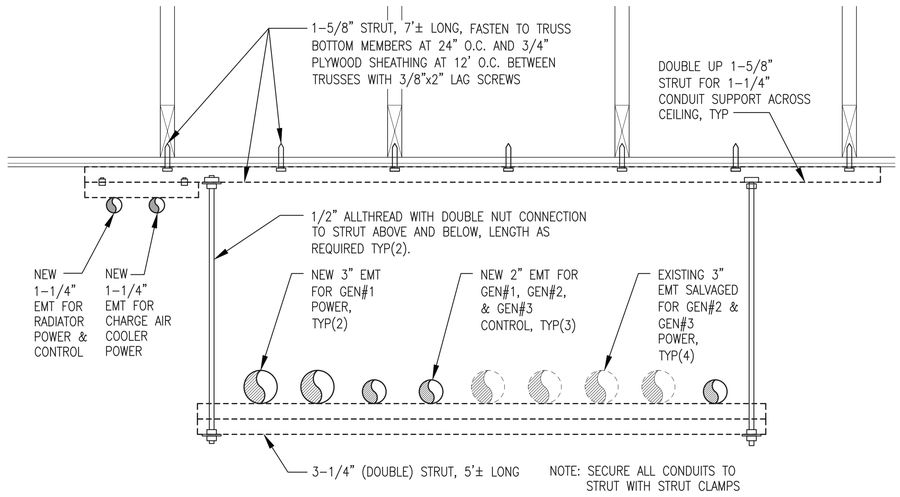
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E3-5 | SHEET: E3.1
PROJECT NUMBER:



1 E3.2 WIREWAY, CONDUIT, & EQUIPMENT LAYOUT PLAN

3/8"=1'



2 E3.2 NEW POWER & CONTROL CONDUIT TRAPEZE HANGER

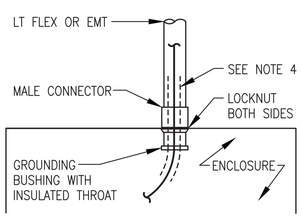
NO SCALE

3 E3.2 TYPICAL SECTION AT VFD

3/8"=1'

4 E3.2 TYPICAL SECTION AT GEN SECTION

3/8"=1'



NOTES:

1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT GROUNDING CONDUCTOR.
3) INSTALL PLASTIC BUSHING WHERE GROUNDING BUSHING IS NOT REQUIRED.
4) ON GENERATOR ENCLOSURES PROTECT CABLES FROM WEAR BY INSTALLING 1 EACH 12" LONG LAYER OF HEAVY WALL HEAT SHRINK CENTERED IN CONNECTOR.

5 E3.2 TYP ENCLOSURE CONNECTION

NO SCALE

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AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

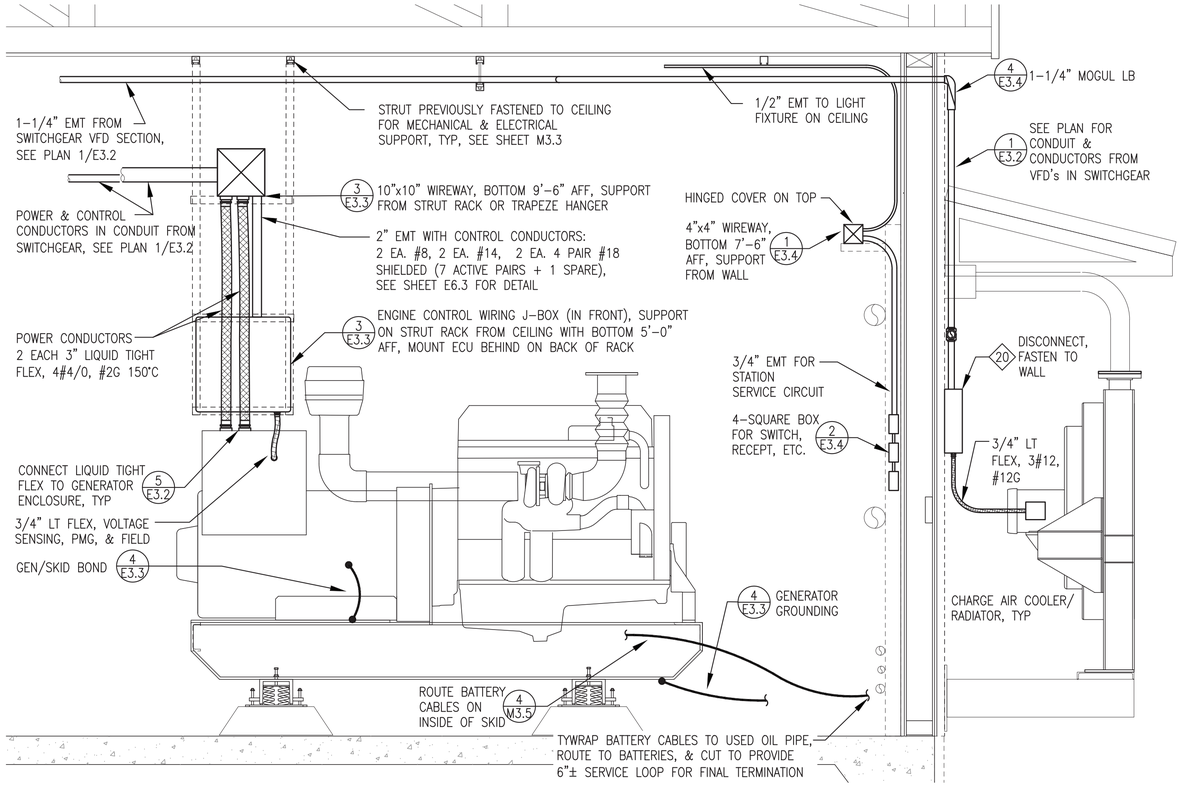
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: WIREWAY, CONDUIT, & EQUIPMENT LAYOUT PLAN & DETAILS

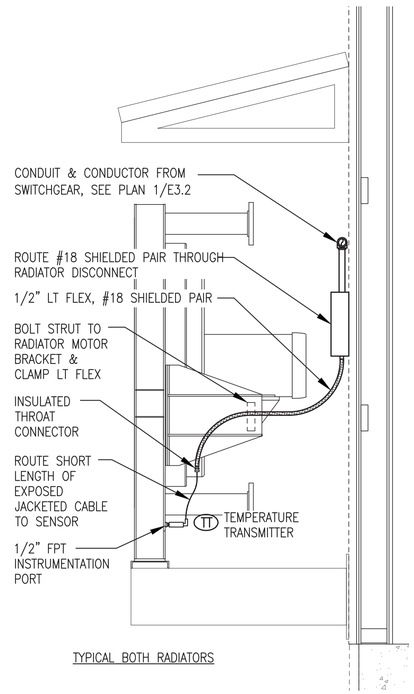
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E3-5	SHEET: E3.2
PROJECT NUMBER:	



1 E3.3 TYPICAL BUILDING SECTION AT GENERATOR (CAC SHOWN, RADIATOR SIMILAR)

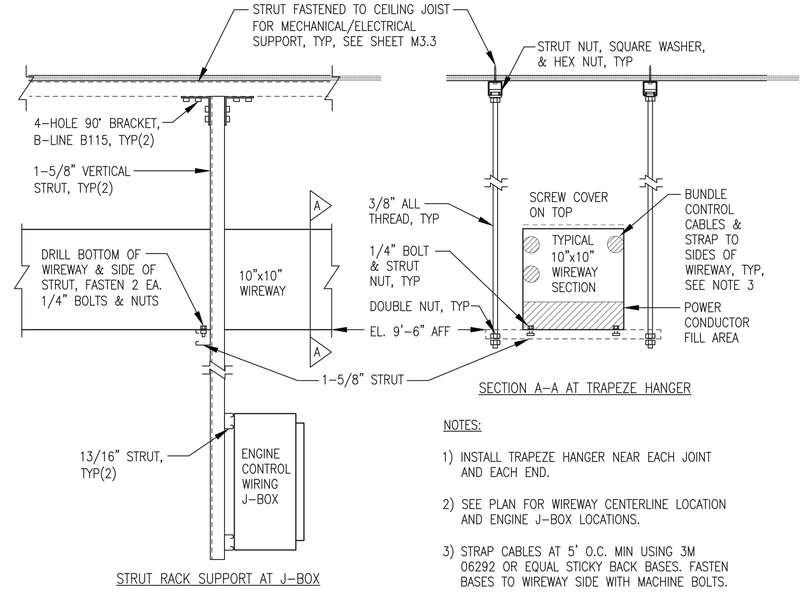
3/4"=1'



TYPICAL BOTH RADIATORS

2 E3.3 RADIATOR TEMP TRANSMITTER

3/4"=1'



SECTION A-A AT TRAPEZE HANGER

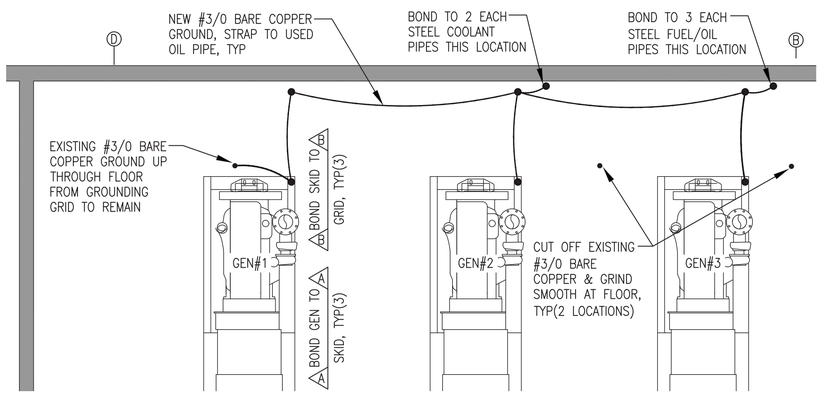
STRUT RACK SUPPORT AT J-BOX

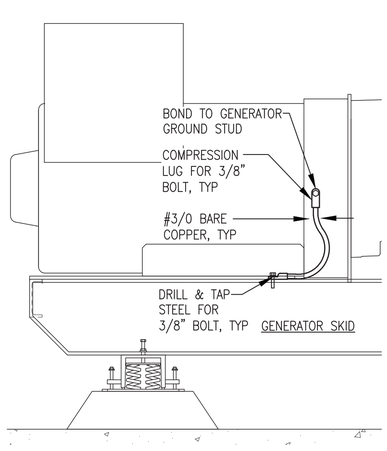
NOTES:

1) INSTALL TRAPEZE HANGER NEAR EACH JOINT AND EACH END.
2) SEE PLAN FOR WIREWAY CENTERLINE LOCATION AND ENGINE J-BOX LOCATIONS.
3) STRAP CABLES AT 5' O.C. MIN USING 3M 06292 OR EQUAL STICKY BACK BASES. FASTEN BASES TO WIREWAY SIDE WITH MACHINE BOLTS.

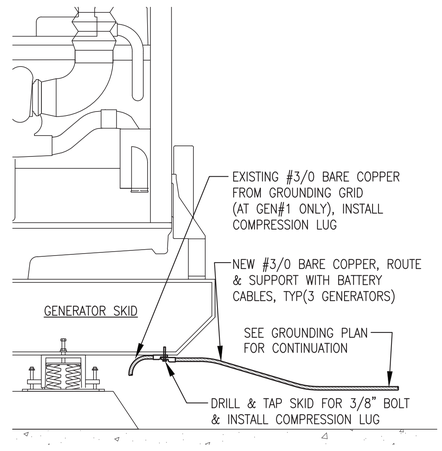
3 E3.3 10x10 WIREWAY AND GENERATOR J-BOX INSTALLATION

NO SCALE





SECTION A-A



SECTION B-B

4 E3.3 GENERATOR GROUNDING PLAN

NO SCALE

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AUGUST 2025

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EE 7802
REGISTERED PROFESSIONAL ENGINEER

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1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: SECTIONS, DETAILS, & GENERATOR GROUNDING

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
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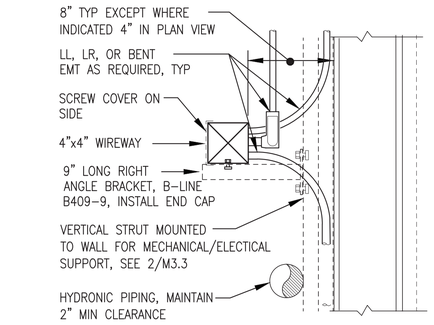
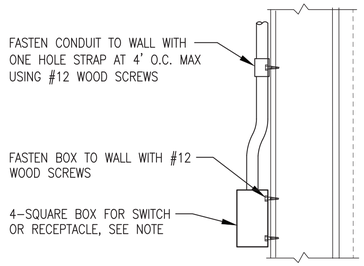
FILE NAME: MANO PP E3-E5	SHEET: E3.3
PROJECT NUMBER:	



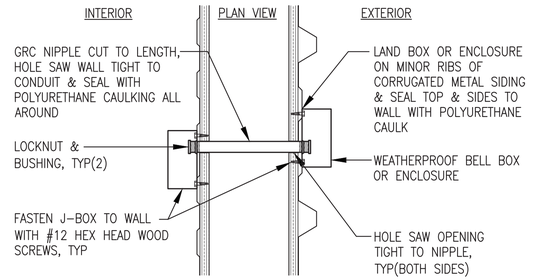
1 E3.4 **4" WIREWAY ARRANGEMENT AT BACK WALL**
NO SCALE



NOTE: INSTALL THERMOSTATS & TIMER SWITCHES IN DEEP SINGLE GANG BELL BOX INSTEAD OF 4-SQUARE BOX.

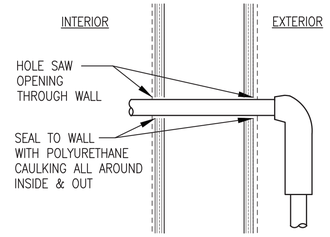
2 E3.4 **TYPICAL INTERIOR DEVICE MOUNTING**
NO SCALE

NOTE: FOR CONDUIT WALL PENETRATIONS WITHOUT BELL BOX, INSTALL CONDUIT BODY & SEAL ALL AROUND CONDUIT WITH POLYURETHANE CAULK.

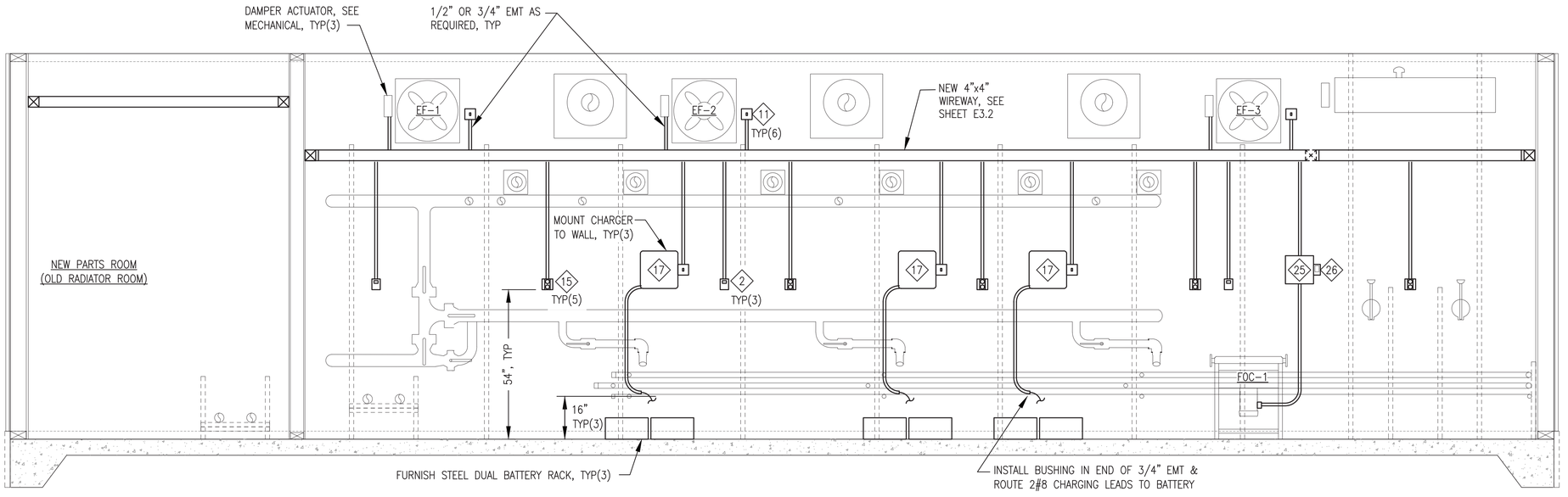


3 E3.4 **TYP EXTERIOR WALL-MOUNT DEVICE**
NO SCALE

NOTES:
1. UPON COMPLETION OF CIRCUIT TESTING PACK GRC NIPPLE THROUGH WALL WITH DUCT SEAL.
2. THIS DETAIL FOR TYPICAL SMALL CONDUIT WALL PENETRATIONS LESS THAN 2" DIAMETER. SEE PLANS & DETAILS FOR CONDUIT WALL PENETRATIONS OF 2" AND LARGER SIZE.



4 E3.4 **TYP CONDUIT WALL PENETRATION**
NO SCALE



5 E3.4 **BACK WALL ELEVATION**
NO SCALE

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

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STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

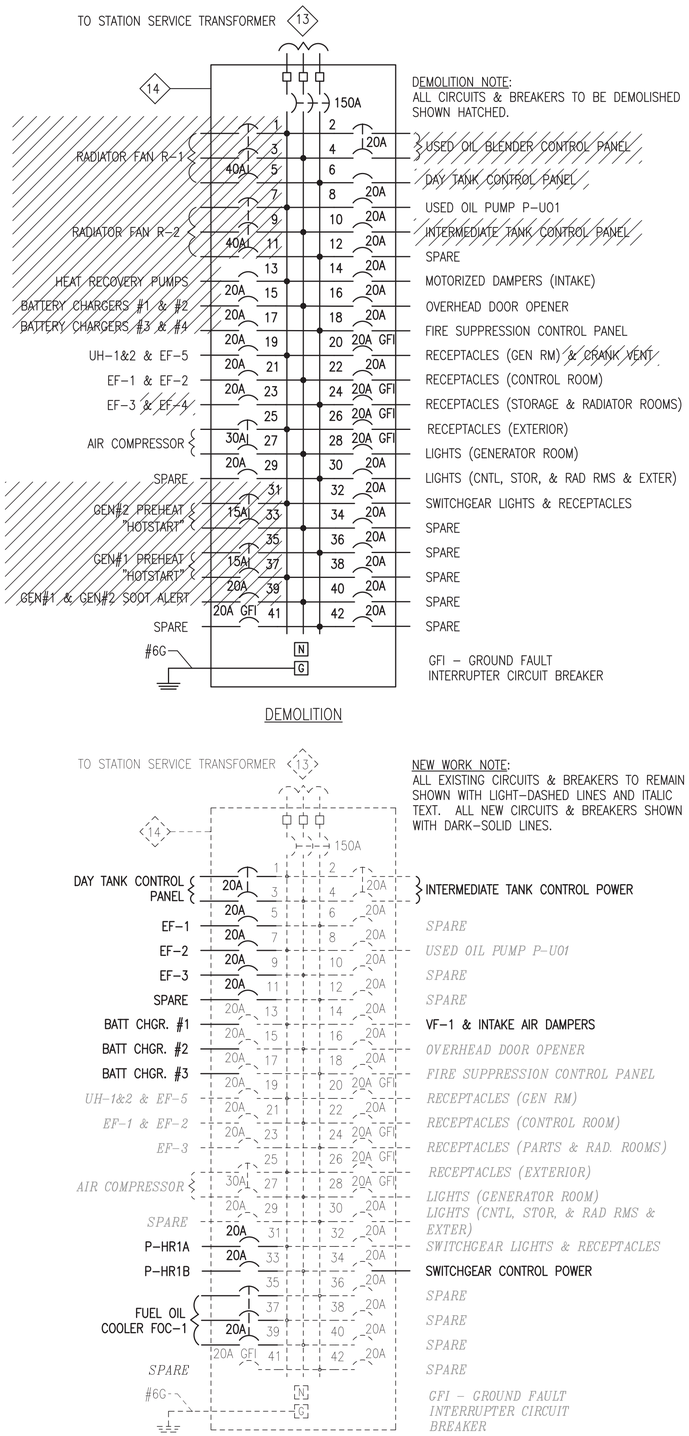
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

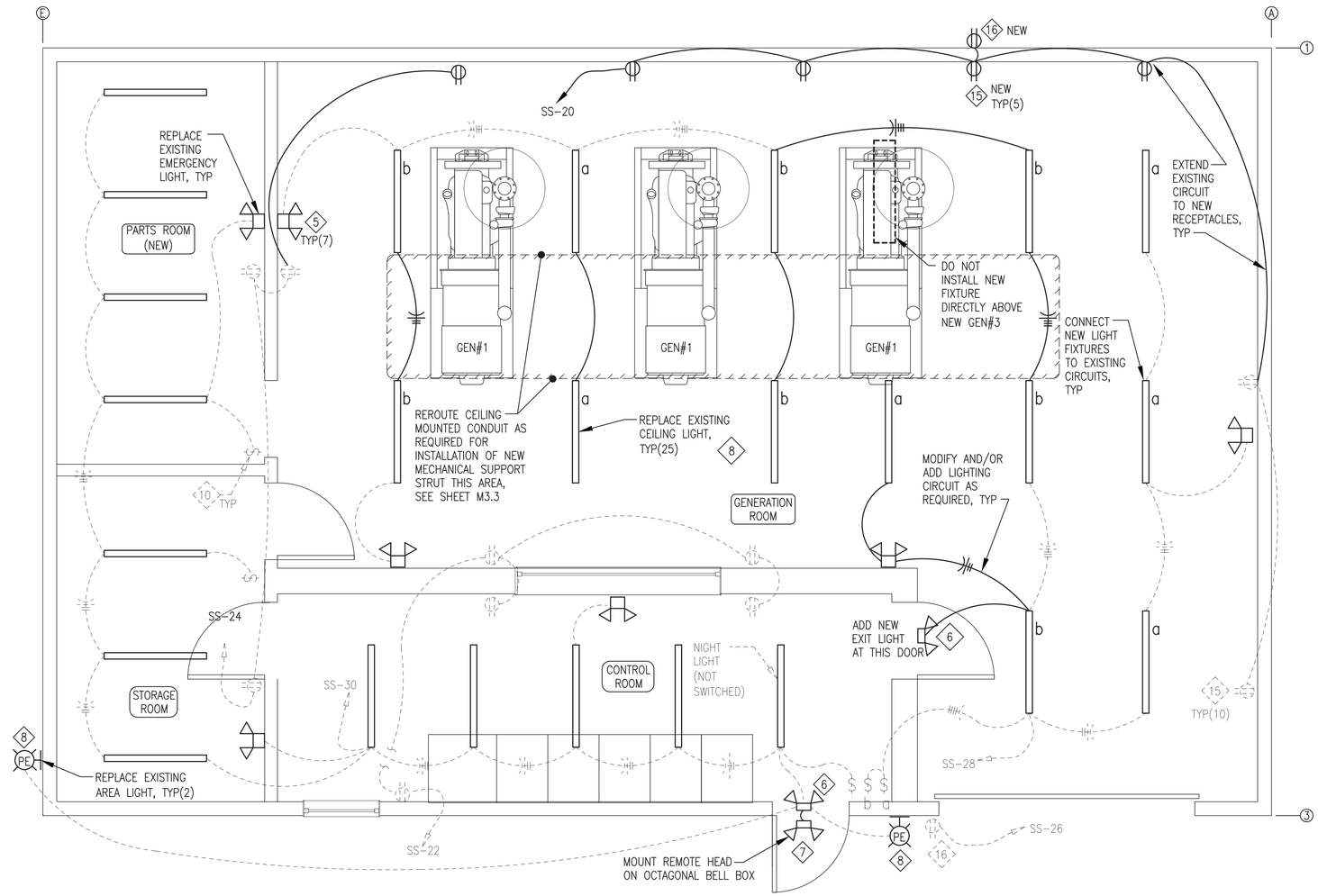
TITLE: BACK WALL ELEVATION & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E3-E5 | SHEET: E3.4
PROJECT NUMBER:



1 E4.1 STATION SERVICE PANELBOARD SS MODIFICATIONS
NO SCALE



2 E4.1 LIGHTING/RECEPTACLE MODIFICATION PLAN
3/8"=1'

LIGHTING/RECEPTACLE MOD NOTES:

1. SEE DEMOLITION NOTES SHEET E2 FOR ALL WORK PRIOR TO PERFORMING THESE MODIFICATIONS.
2. ALL EXISTING CIRCUITS AND DEVICES PROPOSED TO REMAIN SHOWN WITH LIGHT-DASHED LINES. ALL PROPOSED NEW CIRCUITS AND DEVICES SHOWN WITH DARK-SOLID LINES. ADJUST LIGHTING AND RECEPTACLE MODIFICATIONS AS REQUIRED BASED ON FIELD CONDITIONS.
3. ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
4. FASTEN NEW INTERIOR LIGHTS TO CEILING WITH #12 WOOD SCREWS.

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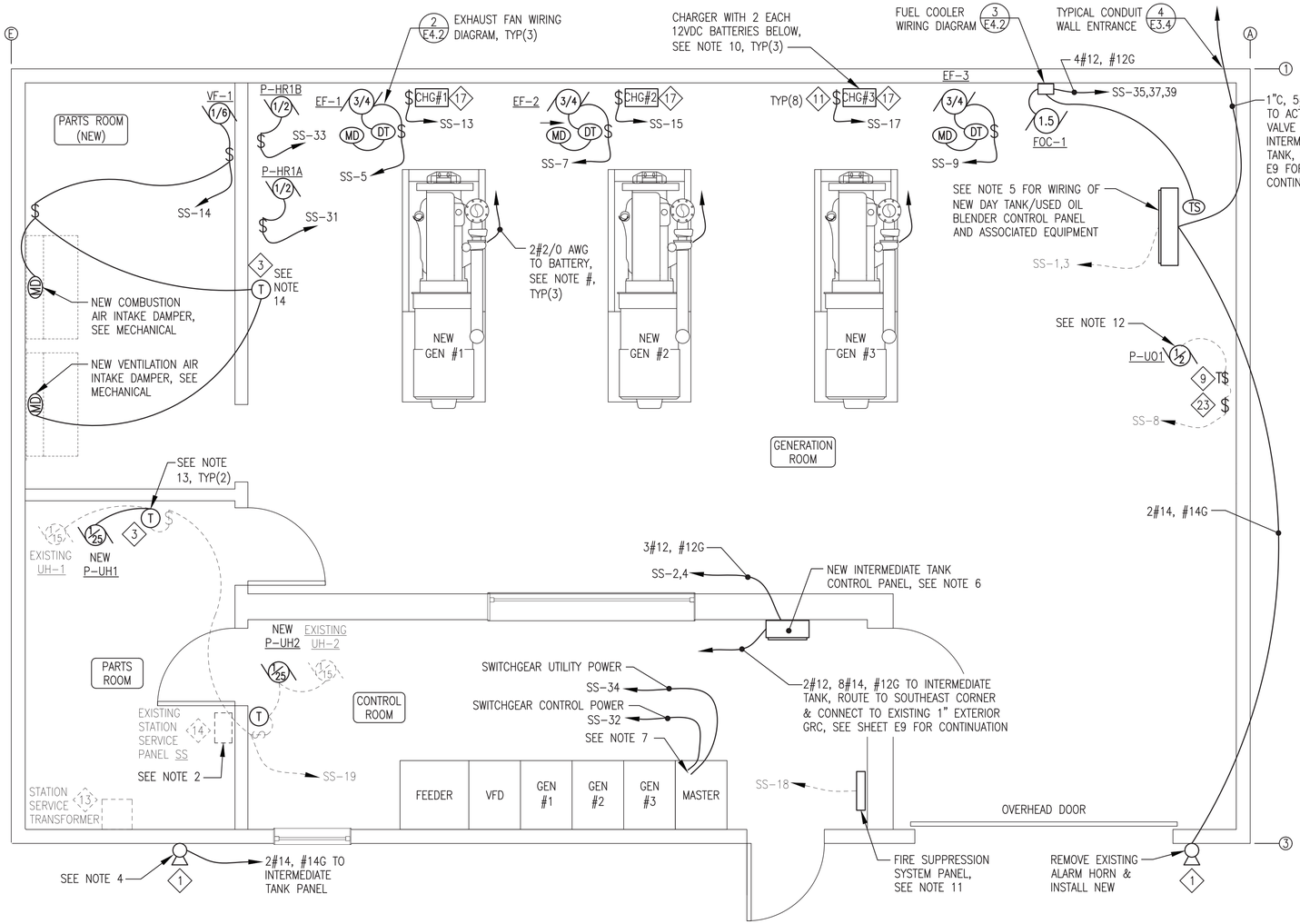
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: STATION SERVICE PANEL SS & LIGHTING/RECEPTACLE MODIFICATIONS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

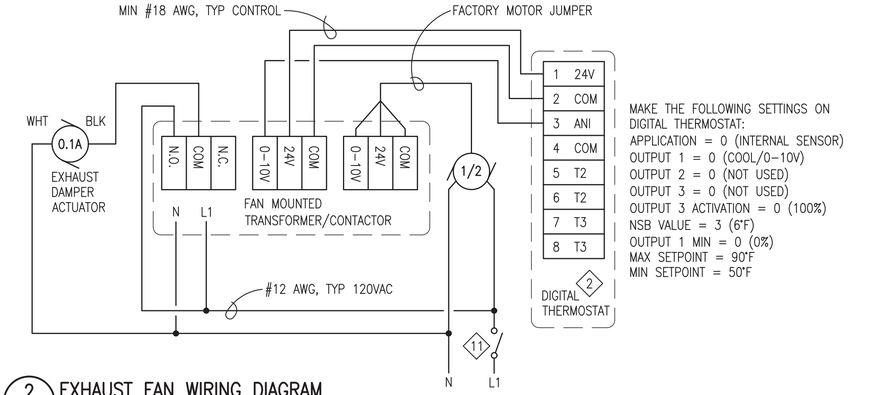
DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: MANO PP E3-E5
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 9/28/23
SHEET: E4.1



1 E4.2 STATION SERVICE MODIFICATION PLAN
3/8"=1'-0"

STATION SERVICE MODIFICATION NOTES:

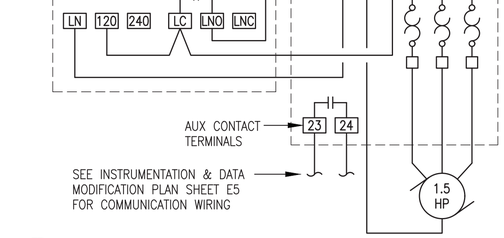
1. NEW OR MODIFIED POWER PLANT STATION SERVICE CIRCUITS SHOWN ONLY FOR CLARITY. ALL STATION SERVICE CIRCUITS TO REMAIN UNALTERED UNLESS SPECIFICALLY INDICATED OTHERWISE ON DEMOLITION AND MODIFICATION PLANS,
2. EXISTING STATION SERVICE PANEL SS TO REMAIN. MODIFY EXISTING CIRCUITS AND INSTALL NEW CIRCUITS AND CIRCUIT BREAKERS AS INDICATED ON PANEL LAYOUT DETAIL 1/E4.1.
3. ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
4. MOUNT NEW ALARM HORN AT 11'± AFF TO MATCH EXISTING HORN AT OTHER END OF BUILDING. SEE DETAIL 3/E3.4.
5. SEE SHEETS E7.1–E7.3 FOR DAY TANK AND USED OIL BLENDER CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ASSOCIATED EQUIPMENT NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
6. SEE SHEET E7.4 FOR INTERMEDIATE TANK CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAILS.
7. SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL POWER AND CONTROL WIRING.
8. NOT USED.
9. ROUTE BATTERY CABLES TO FRONT OF SKID SUPPORTED WITH CUSHIONED CLAMPS, SEE SHEET M3.5. ROUTE FROM SKID DIRECTLY UNDER FUEL HOSES TO WALL AND TYWRAP CABLES TO USED OIL PIPE ALONG WALL, SEE SECTION 1/E3.3. CUT TO PROVIDE 6"± LOOP FOR FINAL TERMINATION ON BATTERIES.
10. MOUNT BATTERY CHARGER TO WALL ON SHALLOW STRUT AND INSTALL BATTERIES IN RACK ON FLOOR BELOW, SEE ELEVATION 5/E3.4.
11. EXISTING FIRE SUPPRESSION PANEL ENCLOSURE TO REMAIN. SEE FIRE SUPPRESSION SYSTEM MODIFICATION DRAWING SHEET FS1 FOR ALL FIRE SYSTEM WORK THIS PROJECT.
12. NEW PUMP UO2, TIMER AND DISCONNECT WITH OVERLOAD INSTALLED THIS PROJECT ON EXISTING CIRCUIT. REUSE EXISTING CONDUCTORS AND RACEWAY TO THE MAXIMUM EXTENT POSSIBLE.
13. REPLACE EXISTING THERMOSTAT WITH NEW AND SET TO HEATING MODE, 70F.
14. REPLACE EXISTING THERMOSTAT WITH NEW AND SET TO COOLING MODE, 70F.



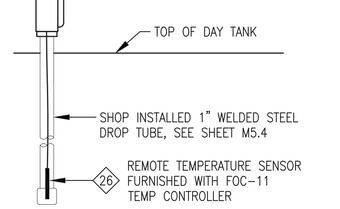
2 E4.2 EXHAUST FAN WIRING DIAGRAM
NO SCALE

NOTES:

1) ALL WIRING #12AWG EXCEPT AS NOTED.
2) PLACE TEMPERATURE CONTROLLER IN COOLING/CUT-IN MODE. SETPOINT = 120'F, DIFFERENTIAL = 10'F
3) MOUNT TEMP CONTROLLER TO WALL ABOVE FOC-1 ADJACENT TO CONTACTOR.



3 E4.2 FOC-1 WIRING DIAGRAM
NO SCALE



4 E4.2 TANK TEMP SENSOR INSTALLATION
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

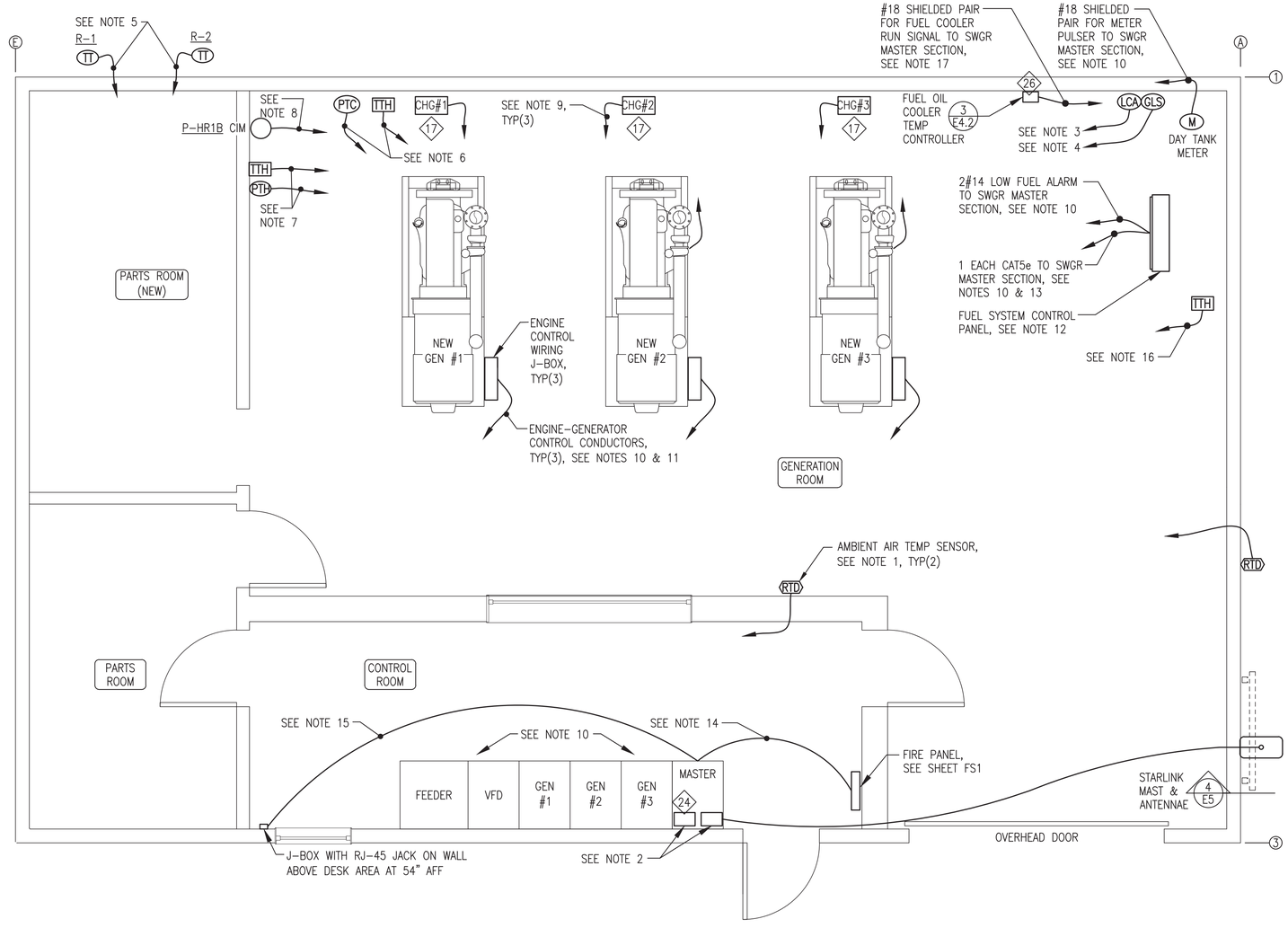
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: STATION SERVICE MODIFICATION PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

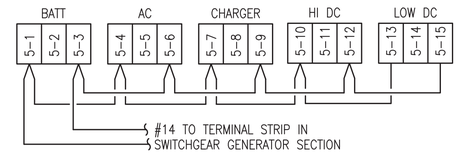
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E3-E5	SHEET: E4.2
PROJECT NUMBER:	



INSTRUMENTATION & DATA PLAN NOTES:

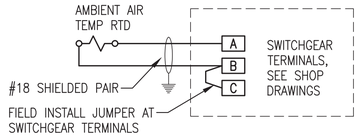
1. RTD TEMPERATURE SENSOR PROVIDED WITH SWITCHGEAR. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE DETAIL 3/E5 AND NOTE 10.
2. INSTALL STARLINK MODEM AND INTERNET ROUTER IN BOTTOM OF MASTER SECTION. CONNECT MODEM TO ROUTER AND CONNECT ROUTER TO ETHERNET SWITCH INSIDE MASTER SECTION. CONNECT BOTH TO 120VAC UPS, SEE NOTE 10.
3. LOW COOLANT LEVEL ALARM SWITCH INSTALLED AT EXPANSION TANK, SEE MECHANICAL. CONNECT TO N.C. SWITCH (WHITE & RED) AND ROUTE 2#14 TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
4. GLYCOL LEVEL SENSOR WITH 4-20mA SIGNAL CONDITIONER IN EXPANSION TANK, SEE MECHANICAL. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR. SEE NOTE 10
5. INSTALL TEMP TRANSMITTER IN EACH RADIATOR, SEE DETAIL 2/E3.3. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR VFD SECTION, SEE NOTE 10.
6. INSTALL COOLANT RETURN TEMP AND COOLING SYSTEM PRESSURE TRANSMITTERS IN PIPING MAIN WHERE SHOWN ON COOLING PIPING ISOMETRIC 1/M4.1. ROUTE #18 SHIELDED PAIRS FROM EACH TRANSMITTER TO SWITCHGEAR MASTER SECTION. LAND TEMP TRANSMITTER PAIR ON TERMINALS 624 AND I04090. LAND PRESSURE TRANSMITTER PAIR ON TERMINALS 624 AND I04091.
7. INSTALL ONE TEMP TRANSMITTER (SUPPLY) AND ONE PRESSURE TRANSMITTER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 1/M4.4. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
8. PUMP P-HR1B HAS INTERNAL MONITORING FOR FLOW RATE AND TEMPERATURE. CONNECT PUMP CIM CARD WITH CAT5e AND ROUTE TO ETHERNET SWITCH IN MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY OR WITH OTHER INSTRUMENT CABLES. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
9. ROUTE 2#14 FROM BATTERY CHARGER ALARM CONTACTS TO ASSOCIATED SWITCHGEAR GENERATOR SECTION, SEE NOTE 10 AND WIRING DIAGRAM 2/E5.
10. SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL INSTRUMENTATION AND DATA WIRING INCLUDING CONTROL POWER.
11. ROUTE ENGINE-GENERATOR CONTROL CONDUCTORS TO SWITCHGEAR IN 10x10 WIREWAY WITH POWER CONDUCTORS AND IN 2" EMT. SEE PLAN 1/E3.2, DETAIL 3/E3.3, SHEET E6.3, AND NOTE 10.
12. SEE SHEETS E7.1-E7.3 FOR DAY TANK CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
13. ROUTE CAT5e CONDUCTOR FROM DAY TANK PANEL REMOTE I/O TO ETHERNET SWITCH IN SWITCHGEAR MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
14. ROUTE CAT5e FOR DATA AND 2#14 FOR GENERATOR SHUT DOWN FROM FIRE PANEL TO SWITCHGEAR MASTER SECTION, SEE SHEET FS1 AND NOTE 10. INSTALL IN SEPARATE DEDICATED RACEWAY, COLOR RED. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
15. ROUTE CAT5e FROM RJ-45 JACK IN DESK AREA TO ETHERNET SWITCH IN MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
16. INSTALL FUEL RETURN TEMP TRANSMITTER IN PIPING MAIN WHERE SHOWN ON COOLING PIPING ISOMETRIC 4/M5.1. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION TERMINALS 624 AND I04110A.
17. ROUTE #18 SHIELDED PAIR FROM CONTACT TO SWITCHGEAR MASTER SECTION TERMINALS 624 AND I04022 FOR SCADA FUEL COOLER RUN INDICATION.

1/E5 INSTRUMENTATION & DATA MODIFICATION PLAN & DETAILS
3/8"=1'



NOTE: PRIOR TO ENERGIZING MAKE THE FOLLOWING SETTINGS ON CHARGER:
1) AC LINE VOLTAGE SWITCH TO "115V".
2) AUTO BOOST JUMPER TO "NORM".
3) FLOAT VOLTAGE JUMPER TO "13.50/27.00" (FOR GEL CELL).
4) BATTERY RANGE JUMPER TO "24V".

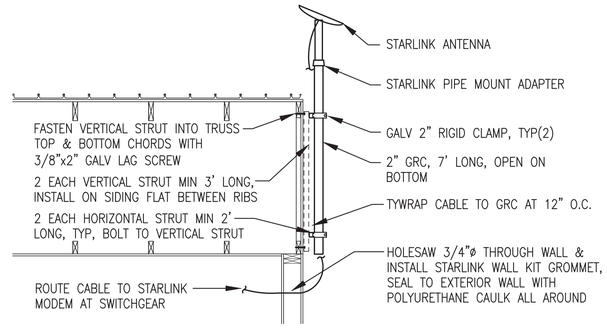
2/E5 BATTERY CHARGER ALARM WIRING DIAGRAM
NO SCALE



3/E5 AMBIENT AIR TEMP RTD TERMINATION
NO SCALE

INTERNET SERVICE GENERAL NOTES:

1) FURNISH AND INSTALL COMPLETE SYSTEM WITH ANTENNA, MOUNTING HARDWARE, MODEM, JACKS, CABLES, CONNECTORS, AND ACCESSORIES REQUIRED TO PROVIDE INTERNET SERVICE TO THE NEW POWER PLANT.
2) THE INTERNET SERVICE SHALL HAVE THE FOLLOWING PERFORMANCE CHARACTERISTICS: 40 MBPS DOWNLOAD, 10 MBPS UPLOAD, 50 GB PRIORITY MONTHLY DATA LIMIT.
STARLINK STANDARD GEN3 KIT WITH BUSINESS LOCAL PRIORITY 50 GB PLAN, NO SUBSTITUTES. CONFIGURE STARLINK ACCOUNT IP POLICY TO "PUBLIC IP" AND ENABLE "BYPASS" MODE.
3) UPON COMPLETION OF INSTALLATION THE INTERNET SYSTEM SHALL BE COMMISSIONED IN ACCORDANCE WITH THE SERVICE PROVIDER'S REQUIREMENTS.
4) IN ADDITION TO FURNISHING AND INSTALLING SYSTEMS, THE CONTRACTOR SHALL PRE-PAY FOR A 1 YEAR INTERNET SERVICE CONTRACT.
5) ROUTER CONFIGURATION: SET SSID TO "MANOKOTAK PP" AND FORWARD INCOMING TRAFFIC ON PORT 8088 TO 192.168.1.142:8088



4/E5 STARLINK ANTENNA & MAST INSTALLATION
1/2"=1'-0

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: INSTRUMENTATION & DATA MODIFICATION PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E3-E5	SHEET: E5
PROJECT NUMBER:	

Final (Permanent) Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	One Gen	350	310	---
Level 2	Two Gens	700	620	280
Level 3	All	1050	---	560
Note: All generators are equal capacity. Manually select priority for each.				
Temporary Demand Control for Load Test with 300kW Load Bank				
Level 1	One Gen	150	135	---
Level 2	Two Gens	300	270	120
Level 3	All	450	---	240
Note: Temporarily set to reduced values in order to test all demand levels.				

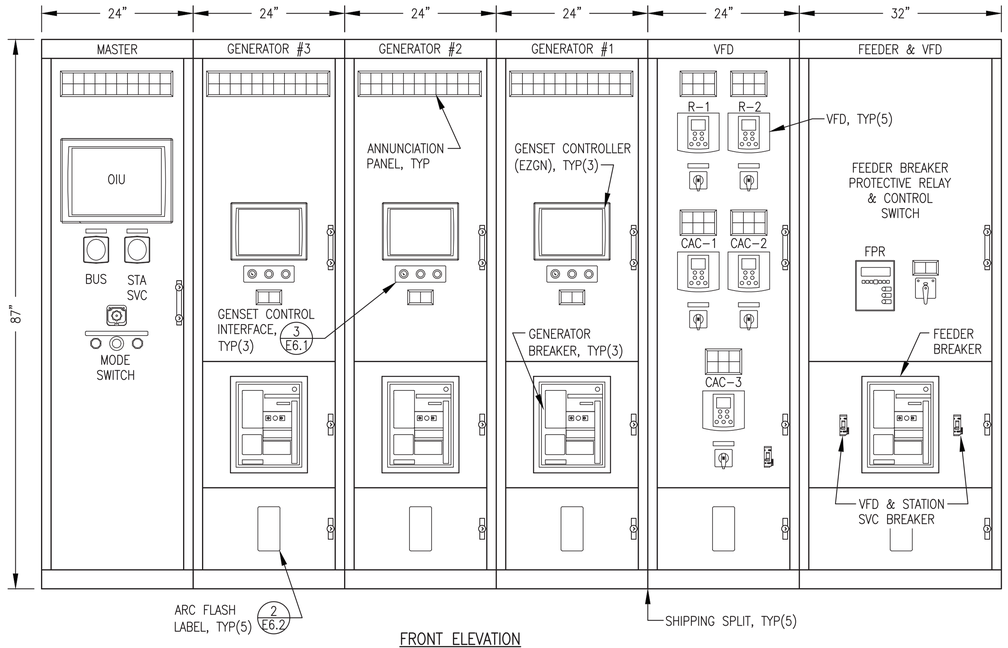
Engine-Generator Alarm Settings (EZGN Genset Controller)			
Function	Normal Range	Alarm	Shut Down
Overspeed	1795-1805	----	1900 RPM
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-850°F	900°F	-----
Charge Air Temp.	100-120°F	140°F	150°F
Under Frequency	59.5-60.5 Hz	----	58.2 Hz
Over Frequency	59.5-60.5 Hz	----	61.8 Hz
Under Voltage	470-490 V	----	432 V
Over Voltage	470-490 V	----	528 V
Reverse Power	0	----	10%

Generator Breaker Settings (EZGN Genset Controller)	
Function	Setting
Gen Breaker Trip Setpoint (EZGN Rated Current)	600 A
Gen Breaker Level 1 (100%) Time Over Current	3 sec.
Gen Breaker Level 2 (120%) Time Over Current	1 sec.
Gen Breaker Level 3 (250%) Time Over Current	0.4 sec.

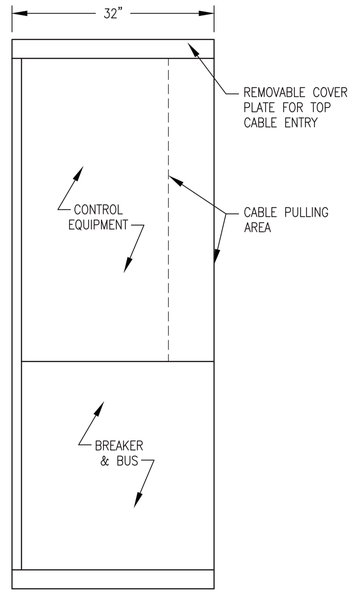
Feeder Breaker Settings (Feeder Protection Relay - FPR)	
Function (Note: Element 1 is the only active element)	Setting
T.O.C. Trip Pickup (amps) Note: 5A = 100% of CT rating	5.0
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

Radiator VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	1
PID Reference Temperature	175°F
Proportional Gain	0.93
Integral Gain	0.3
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	10 sec.
Loss of Phase	Ignore

Charge Air Cooler VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	Not Used
PID Reference Temperature	100°F
Proportional Gain	0.2
Integral Gain	0.1
Derivative	0

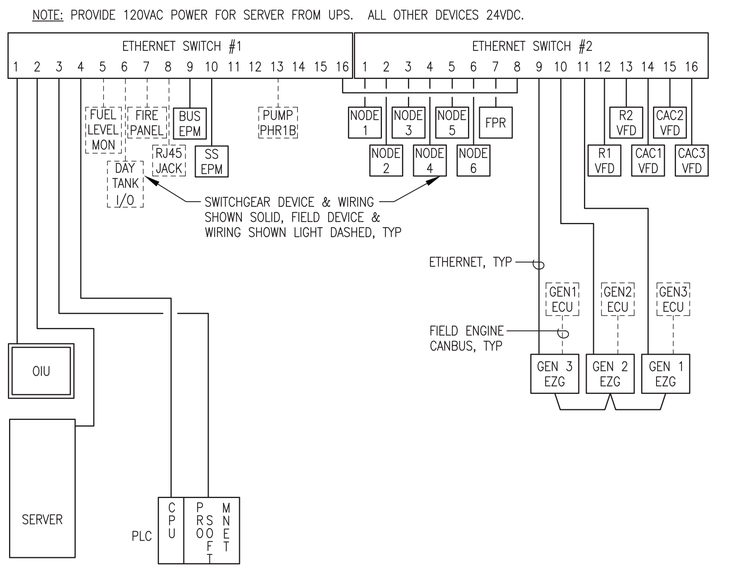


FRONT ELEVATION



TYPICAL CROSS SECTION

1 E6.1 SWITCHGEAR ENCLOSURE LAYOUT
NO SCALE



2 E6.1 COMMUNICATION SCHEMATIC
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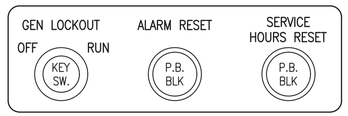


INTERFACE CONTROLS LEGEND:
P.B. PUSH BUTTON
KEY SW. KEY OPERATED LOCKABLE SWITCH

3 E6.1 GENSET CONTROL (EZGN) INTERFACE CONTROLS
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

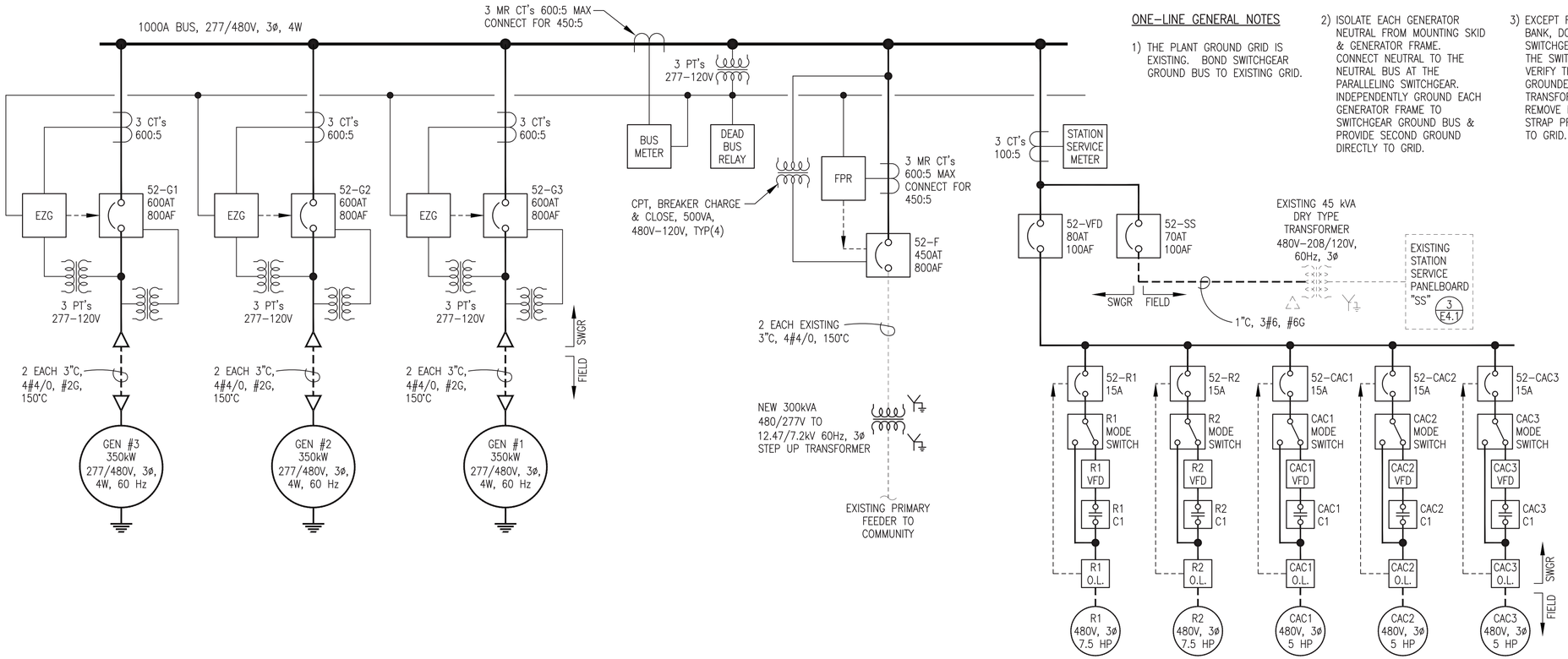
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER SYSTEM UPGRADE

TITLE: SWITCHGEAR ENCLOSURE LAYOUT, SETTING TABLE, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E6	SHEET: E6.1
PROJECT NUMBER:	



ONE–LINE GENERAL NOTES

1) THE PLANT GROUND GRID IS EXISTING. BOND SWITCHGEAR GROUND BUS TO EXISTING GRID.
2) ISOLATE EACH GENERATOR NEUTRAL FROM MOUNTING SKID & GENERATOR FRAME. CONNECT NEUTRAL TO THE NEUTRAL BUS AT THE PARALLELING SWITCHGEAR. INDEPENDENTLY GROUND EACH GENERATOR FRAME TO SWITCHGEAR GROUND BUS & PROVIDE SECOND GROUND DIRECTLY TO GRID.
3) EXCEPT FOR TESTING WITH LOAD BANK, DO NOT BOND SWITCHGEAR NEUTRAL BUS TO THE SWITCHGEAR GROUND BUS. VERIFY THAT NEUTRAL IS GROUNDED AT THE STEP UP TRANSFORMER BANK AND REMOVE NEUTRAL–GROUND STRAP PRIOR TO CONNECTING TO GRID.
4) GENERATOR AND FEEDER CONDUCTORS 150°C CABLE. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT RATED TEMPERATURE. STATION SERVICE CONDUCTORS 90°C.

SWITCHGEAR SYMBOL LEGEND

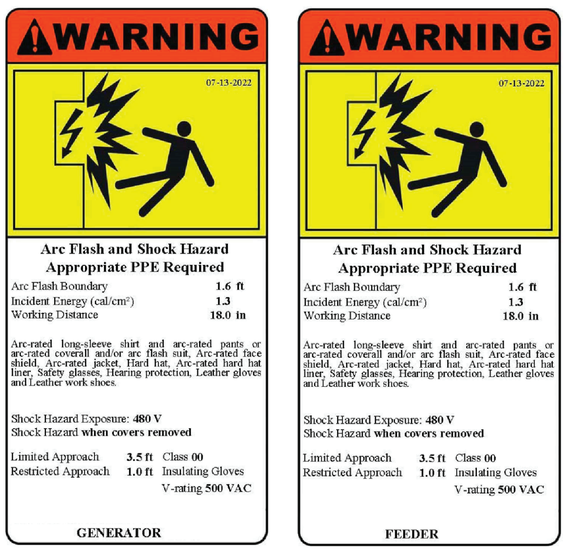
- TRANSFORMER PT=POTENTIAL XFRMR CPT=CONTROL POWER XFRMR
- CURRENT TRANSFORMER M.R. – INDICATES MULTIRATIO CT'S RATING FACTOR RF=2.0
- CIRCUIT BREAKER AT=AMP TRIP RATING AF=AMP FRAME RATING
- EZG — WOODWARD EASYGEN GENSET CONTROLLER
- FPR — FEEDER PROTECTION RELAY
- SHOP INSTALLED POWER WIRING/BUS
- FIELD INSTALLED POWER WIRING
- SHOP INSTALLED CONTROL WIRING

1 E6.2 SWITCHGEAR ONE–LINE DIAGRAM

NO SCALE

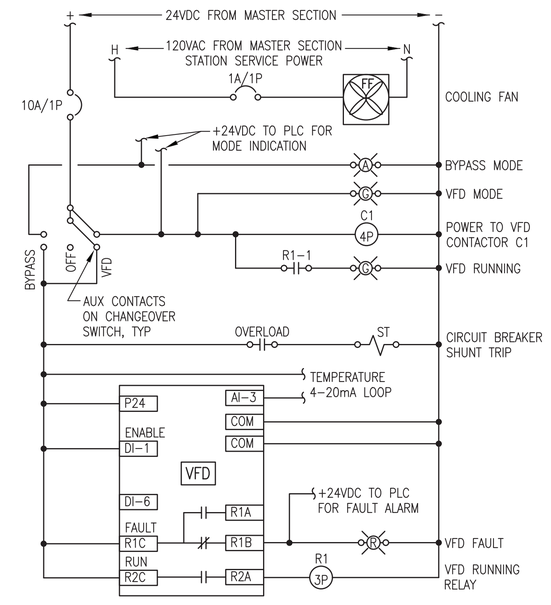
ARC FLASH NOTES:

1) PERMANENTLY AFFIX ARC FLASH LABELS TO EACH SECTION WITH 480V POWER AS INDICATED.
2) SCALED PDF IMAGES OF THESE LABELS WILL BE FURNISHED TO THE FABRICATOR UPON REQUEST.



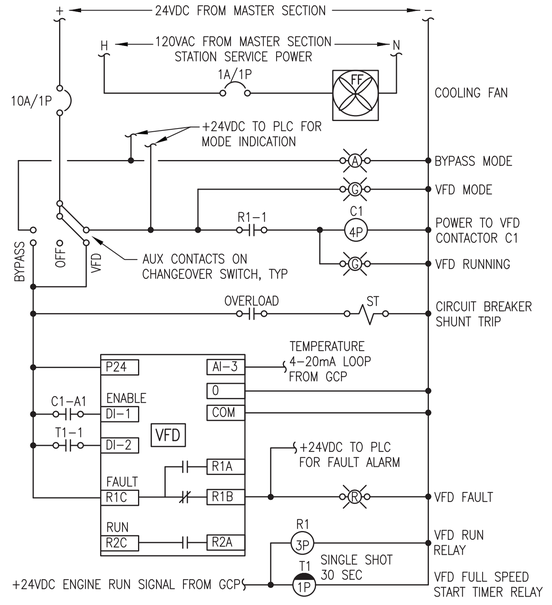
2 E6.2 ARC FLASH LABELS

NO SCALE



3 E6.2 TYPICAL RADIATOR VFD LOGIC DIAGRAM

NO SCALE



4 E6.2 TYPICAL CHARGE AIR COOLER VFD LOGIC DIAGRAM

NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH — CLOIS W. VERSYP EE 7802 — REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER SYSTEM UPGRADE

TITLE: SWITCHGEAR ONE–LINE & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 9/28/23
FILE NAME: MANO PP E6	SHEET: E6.2
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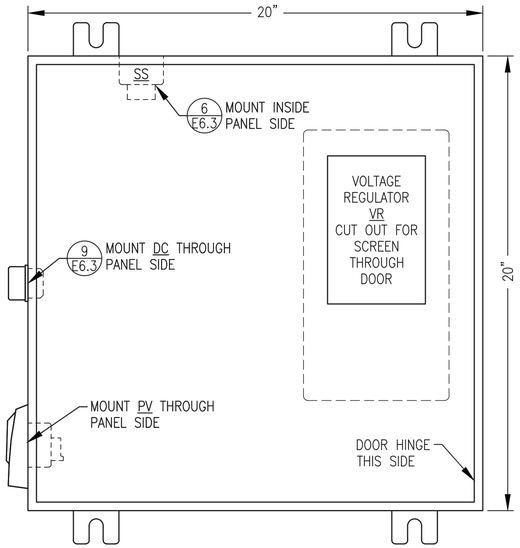
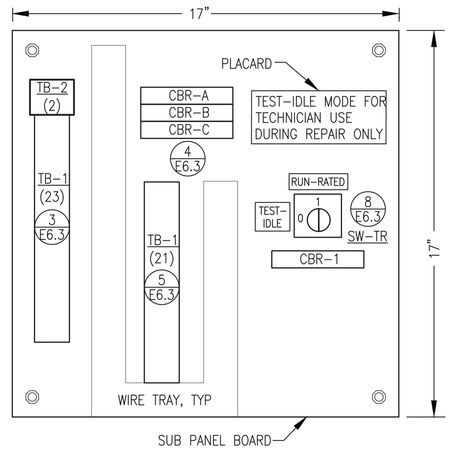


1 E6.3 JUNCTION BOX FRONT PANEL LAYOUT
NO SCALE



2 E6.3 JUNCTION BOX SUB PANEL LAYOUT
NO SCALE

BILL OF MATERIALS			
TAG	MANUFACTURER	MODEL	DESCRIPTION
CBR-A/B/C	ALLEN-BRADLEY	1489-M1-C010	RAIL MOUNT CIRCUIT BREAKER, 1P, 1A
CBR-1	ALLEN-BRADLEY	1489-M1-C050	RAIL MOUNT CIRCUIT BREAKER, 1P, 5A
DC	DEUTSCH	HD10-9-1939P	DIAGNOSTIC CONNECTOR, 9-PIN, CAN-BUS
	DEUTSCH	HD18-009	CONNECTOR STRAIN RELIEF
	DEUTSCH	HDC16-9	CONNECTOR PROTECTIVE DUST CAP
	DEUTSCH	HD10-9-GKT	CONNECTOR GASKET
	DEUTSCH	JDL062397	CONNECTOR LANYARD
ENCL.	HOFFMAN	A20H20ALP	20x20x8" NEMA 12
	HOFFMAN	A20P20	BACK PANEL
PV	MURPHY	PV380-R3	POWER VIEW (NON-TIER 4) WITH HARNESS
SS	JOHN DEERE	AT145341	STARTER AUXILIARY SOLENOID, 24V
SW-TR	ALLEN-BRADLEY	194L-A12-225-2	CHANGEOVER SWITCH, 12A, 2P
	ALLEN-BRADLEY	194L-HE-4A-175	90 DEGREE I-O HANDLE
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK
VR	BASLER	DECS-100-A05	DIGITAL VOLTAGE REGULATOR

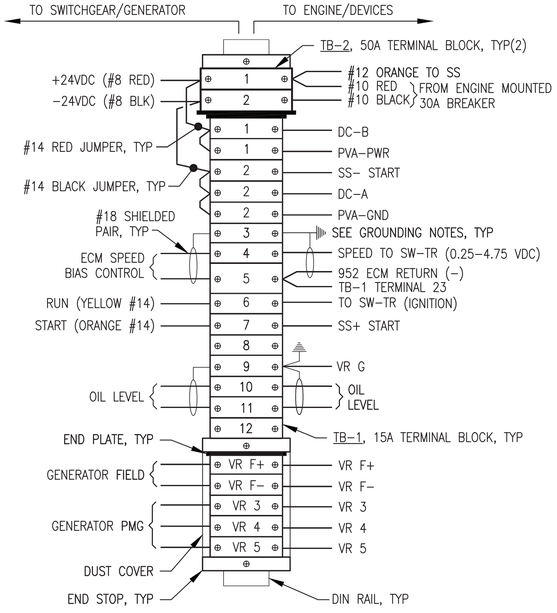
BRAND SPECIFIC NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

SHOP FABRICATION NOTES:

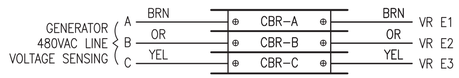
1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
2) INSTALL IN A NEMA 12 ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
3) PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS HARDWARE AS REQUIRED TO MATCH TERMINALS. LABEL ALL TERMINALS EXACTLY AS INDICATED ON THE DETAILS.
4) ALL WIRE #14AWG EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. LABEL BOTH ENDS OF ALL JUMPERS WITH THE ENGINE PANEL TERMINAL NUMBER.
5) PROVIDE MECHANICAL GROUND LUGS FASTENED TO BACK PANEL AND GROUNDED TO ENGINE-GENERATOR. GROUND ALL SHIELD DRAIN WIRES TO LUGS AT BACK PANEL ONLY.
6) PROVIDE WIRING HARNESSES FOR CONNECTION TO GENERATOR AND TO ENGINE. INSTALL WIRES IN LIQUID TIGHT FLEX OR FLEXIBLE PLASTIC WIRE LOOM AND PROVIDE SERVICE LOOPS IN ACCORDANCE WITH SPECIFICATIONS.
7) SHOP TEST EACH NEW ENGINE-GENERATOR WITH ASSOCIATED JUNCTION BOX PERMANENTLY CONNECTED. UPON COMPLETION OF TESTING, COIL WIRING HARNESSES AND SECURE JUNCTION BOX TO GENERATOR FOR SHIPPING.

FIELD INSTALLATION NOTES:

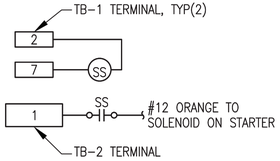
1) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE ENGINE PANEL TERMINAL NUMBER.
2) ON SHIELDED CONDUCTORS GROUND ALL SHIELD DRAIN WIRES AT ENGINE J-BOX ONLY. CLIP DRAIN WIRES AT OPPOSITE ENDS.



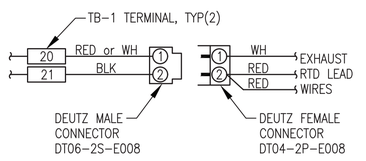
3 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE



4 E6.3 CIRCUIT BREAKER CONNECTIONS
NO SCALE

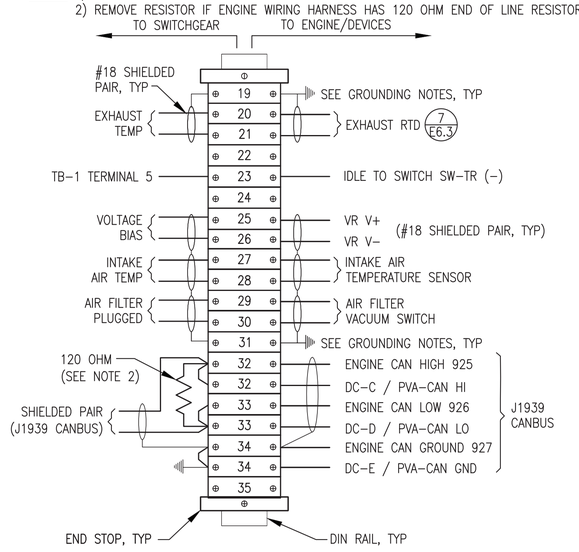


6 E6.3 STARTER AUX SOLENOID SS WIRING
NO SCALE

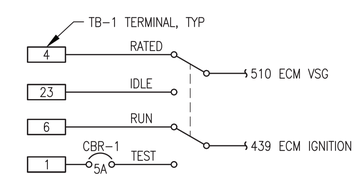


7 E6.3 EXHAUST RTD CONNECTOR
NO SCALE

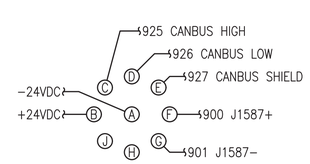
NOTES: 1) ALL RESISTORS 0.25W.
2) REMOVE RESISTOR IF ENGINE WIRING HARNESS HAS 120 OHM END OF LINE RESISTOR.



5 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE



8 E6.3 TEST-IDLE/RUN-RATED SWITCH SW-TR WIRING
NO SCALE



9 E6.3 DIAGNOSTIC CONNECTOR WIRING
NO SCALE

REVISION #1
ISSUED FOR
CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

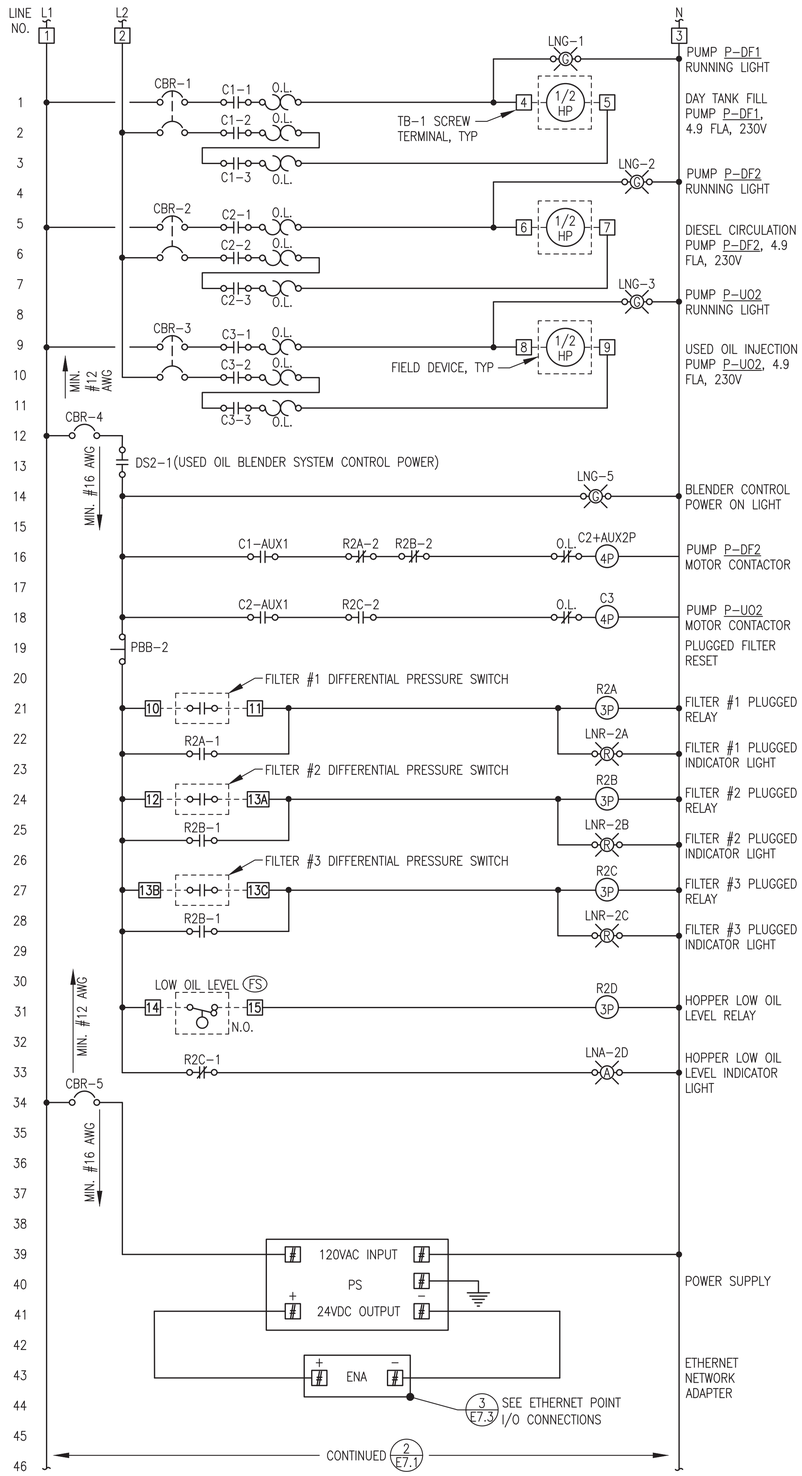
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER SYSTEM UPGRADE

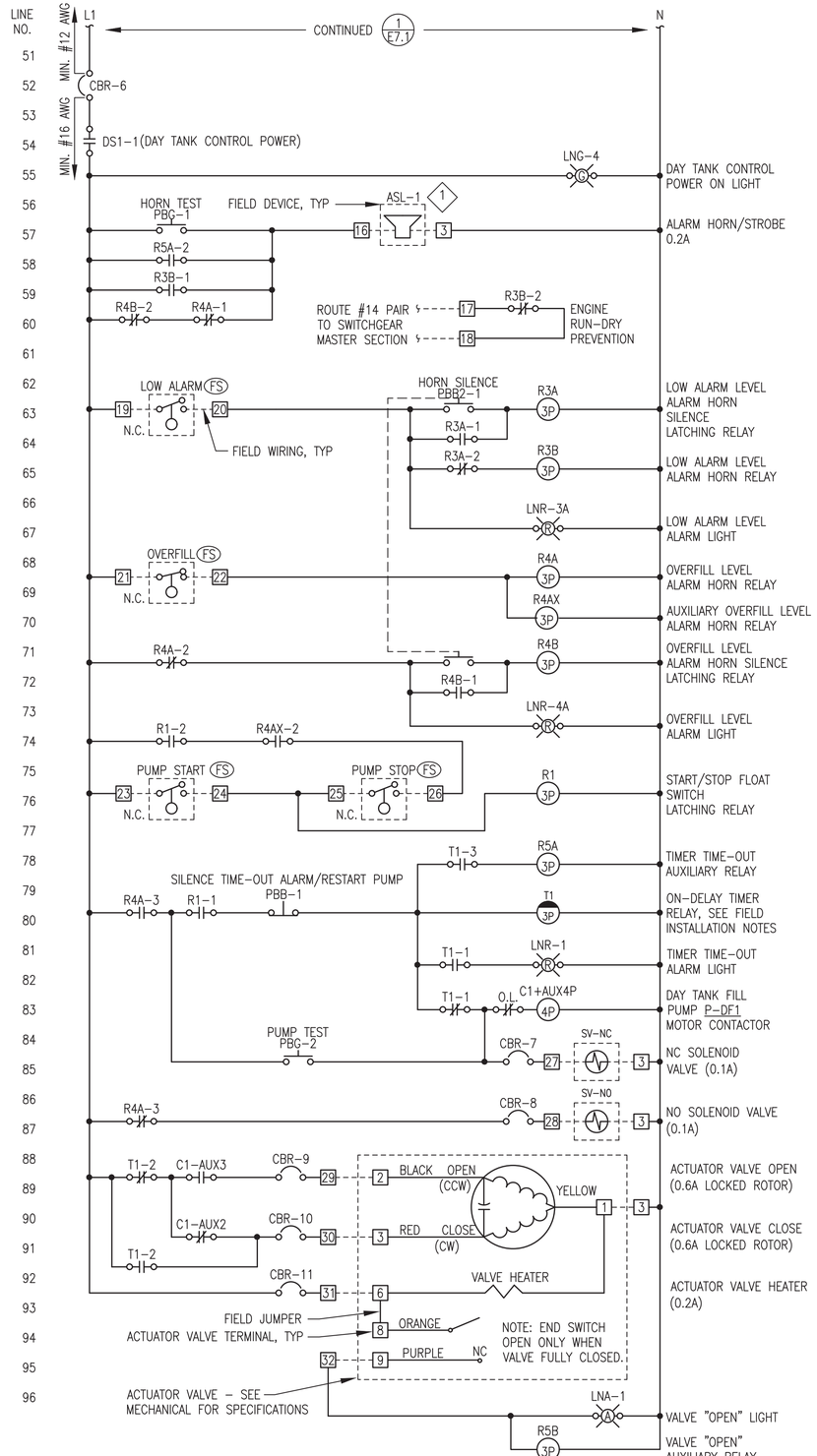
TITLE: 24VDC ENGINE WIRING JUNCTION BOX

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E6 | SHEET: E6.3
PROJECT NUMBER:



1 E7.1 USED OIL BLENDER SYSTEM LOGIC DIAGRAM
NO SCALE



2 E7.1 DAY TANK LOGIC DIAGRAM
NO SCALE

BILL OF MATERIALS

NOTE: ON THIS SHEET AND THE PANEL DRAWINGS THAT FOLLOW SPECIFIC PARTS MANUFACTURER AND MODEL ARE SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX2P	ALLEN-BRADLEY	100FA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC
AUX4P	ALLEN-BRADLEY	100FA31	AUXILIARY CONTACT FOR CONTACTOR, 4 POLE, 3NO, 1NC
C	ALLEN-BRADLEY	100C09D10	CONTACTOR, 120V COIL, 9A, 4 POLE
CBR-1,2,3	ALLEN-BRADLEY	1489-M2-C150	RAIL-MOUNT CIRCUIT BREAKER, 2 POLE, 15A
CBR-4,5,6	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-7,8,9,10,11	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
DS	ALLEN-BRADLEY	194LE201753	DISCONNECT, 2 POSITION, 3 N.O., 20A, FACE MOUNT
	ALLEN-BRADLEY	194LHC4E1751	KNOB ACTUATOR FOR LOAD SWITCH, ON/OFF, LOCKABLE
ENA	ALLAN-BRADLEY	1734-AENTR	I/O DUAL PORT ETHERNET NETWORK ADAPTER
DI8	ALLAN-BRADLEY	1734-IB8	DIGITAL INPUT MODULE, 24VDC, 8 POINT, SINKING
LNG	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-130V, NEMA 4X
LNR	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
LNA	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-130V, NEMA 4X
OL	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1ø, ADJUSTABLE 3.2A-16.0A RANGE
PBB	ALLEN-BRADLEY	800HAR2D2	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, BLACK
PBB2	ALLEN-BRADLEY	800HAR2A2	MOMENTARY PUSH BUTTON, 2 NO, NEMA 4X, BLACK
PBG	ALLEN-BRADLEY	800HAR1D1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
PP	PHOENIX CONTACTS	FLPPRJ45/RJ45	ETHERNET PATCH PANEL, RJ45xRJ45, DIN RAIL MOUNT
PS	PULS	CP5.241-S1	5A, 120VAC/24VDC POWER SUPPLY
R	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
T	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
TB-1,2	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

LEGEND

- PANEL WIRING
- FIELD WIRING
- O.L. OVERLOADS
- R# CONTROL RELAY
- R#-# NORMALLY OPEN CONTACT
- PB-# NORMALLY OPEN MOMENTARY PUSH BUTTON
- SS-# 2-POSITION SELECTOR SWITCH
- T# TIME DELAY RELAY
- R#-# NORMALLY CLOSED CONTACT
- PB-# NORMALLY CLOSED MOMENTARY PUSH BUTTON
- C# CONTACTOR
- SW-# NORMALLY OPEN FLOAT SWITCH
- SV# SOLENOID VALVE
- # TERMINAL BLOCK
- SW-# NORMALLY CLOSED FLOAT SWITCH
- ASL-# ALARM & STROBE LIGHT
- CB-# CIRCUIT BREAKER

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

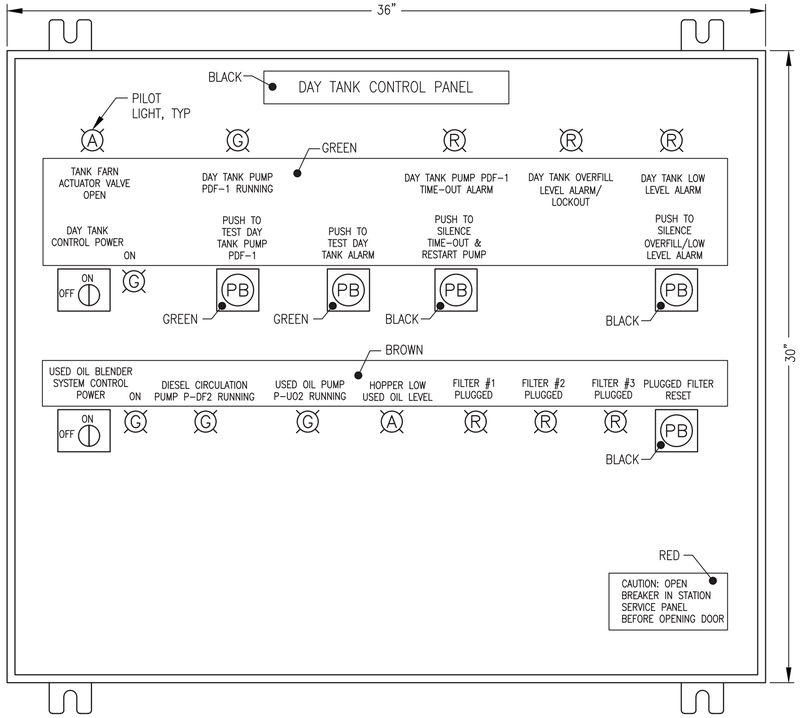
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

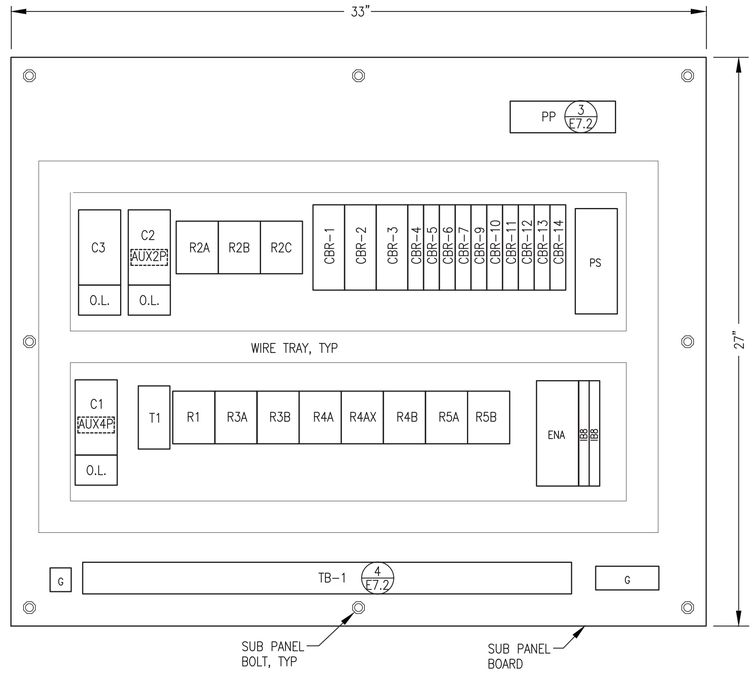
TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

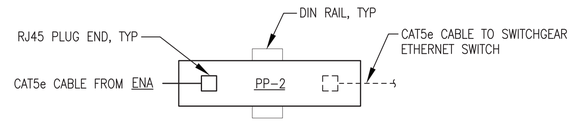
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CW/BCG | DATE: 9/28/23
FILE NAME: MANO PP E7 | SHEET: E7.1
PROJECT NUMBER:



1 E7.2 FRONT PANEL LAYOUT
NO SCALE

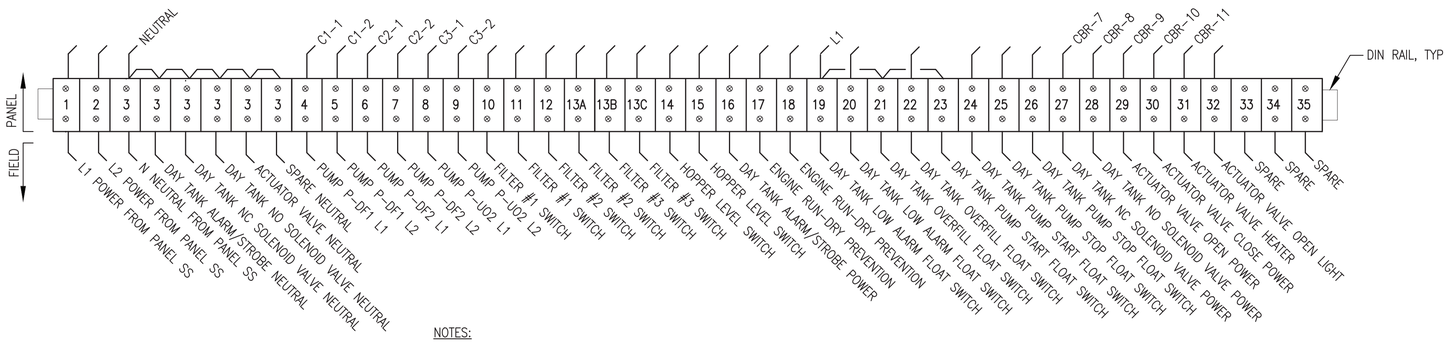


2 E7.2 SUB PANEL LAYOUT
NO SCALE



NOTE: INSTALL ETHERNET PATCH PANEL PP ON DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP IN THE UPPER RIGHT CORNER OF PANEL TO ACCOMMODATE CONDUCTOR ENTRY THROUGH RIGHT SIDE OF PANEL, SEE SUB-PANEL LAYOUT.

3 E7.2 PATCH PANEL PP INSTALLATION
NO SCALE



NOTES:

1) INSTALL TERMINAL STRIP TB-1 ON HORIZONTAL DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP BELOW PANEL DEVICES TO ACCOMMODATE CONDUCTOR ROUTING FROM CONDUITS CONNECTING TO BOTTOM OF PANEL, SEE SUB-PANEL LAYOUT.

2) IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 6 EACH 35A SCREW TERMINAL GROUNDING BUS.

4 E7.2 TB-1 TERMINAL STRIP LAYOUT
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: MANO PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 9/28/23
SHEET: E7.2

PANEL NOTES:

1) PROVIDE COMPLETE LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. INSTALL IN A NEMA 12 ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK. SEE SHEET E7.2 FOR PANEL LAYOUT DETAILS.

2) USE MIN #12 WIRE FOR ALL CIRCUITS UP TO FIRST IN-LINE PANEL BREAKERS (FOR 20A FEED). USE MIN #16 AWG ON ALL 5 AMP CIRCUITS AND MIN #14 AWG WIRE ON ALL 15A CIRCUITS. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).

3) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING. PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES AS SHOWN ON THE PANEL FACE LAYOUT AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS, COLOR AS INDICATED.

4) BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.

5) DEVICES AND WIRING NOTED AS "FIELD" AND SHOWN WITH DASHED LINES WILL BE FIELD INSTALLED AND ARE NOT PART OF THE PANEL SHOP FABRICATION. FOR BENCH TEST, PROVIDE TEMPORARY DEVICES AND WIRING AS REQUIRED TO SIMULATE FIELD DEVICES.

6) POWER TO PANEL PROVIDED FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN LISTED LOAD CENTER. SEE FIELD INSTALLATION NOTE #3.

FIELD INSTALLATION NOTES:

1) SEE MECHANICAL FOR DAY TANK INSTALLATION & PIPING. INSTALL CONTROL PANEL & FIELD DEVICES AS INDICATED TO PROVIDE REDUNDANT HIGH & LOW LIMIT CONTROLS & OVERFILL PROTECTION.

2) FIELD WIRING TO FLOAT SWITCHES, SOLENOID VALVES, ACTUATOR VALVE, & ALARM HORN #14 AWG. ALL OTHER FIELD WIRING #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH CONTROL PANEL TERMINAL BLOCK TERMINATION NUMBERS. WHEN NOT IN CONDUIT, MAKE JACKETED COM CABLE ENCLOSURE ENTRIES WITH CABLE GLAND CONNECTORS.

3) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS. PROVIDE POWER TO DAY TANK PANEL FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN STATION SERVICE PANELBOARD.

4) VERIFY THAT ALL DAY TANK FLOAT SWITCHES ARE ORIENTED FOR N.C. (OPEN ON RISE) OPERATION PRIOR TO INSTALLATION. ALL FLOATS SHOWN ON LOGIC DIAGRAM WITH TANK AT FULL (PUMP STOP) LEVEL. VERIFY THAT THE HOPPER FLOAT SWITCH IS ORIENTED FOR N.O. (CLOSE ON RISE) OPERATION.

5) FILL PUMP CAVITIES WITH LUBE OIL PRIOR TO INITIAL OPERATION. VERIFY PROPER ROTATION OF PUMPS. PRIME SYSTEM WITH HAND PRIMING PUMP PRIOR TO BEGINNING DAY TANK FILL.

6) FIELD TEST COMPLETED UNIT TO VERIFY ALL CONTROL AND ALARM FUNCTIONS. MANIPULATE FLOAT SWITCHES BY REACHING IN THROUGH ADJACENT 4" BUNG. TEMPORARILY SET TIMING RELAY TO 30 SECONDS TO VERIFY TIME-OUT AND RESET FUNCTIONS.

7) SET TIMING RELAY TIME DELAY TO 30 MINUTES (APPROX. 55 GALS. REQUIRED FROM PUMP START TO PUMP STOP LEVEL @ APPROX. 4 GPM). ON THE INITIAL TANK FILL, THE PUMP TEST/RESET BUTTON MAY HAVE TO BE MANUALLY RESET IN ORDER TO GET THE FUEL LEVEL TO WITHIN THE NORMAL OPERATING RANGE. SEE SEQUENCE OF OPERATIONS.

DAY TANK FILL SEQUENCE OF OPERATIONS:

1) WHEN THE DAY TANK CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED, THE POWER LIGHT IS ON AND POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE HEATER/OPEN LIGHT CIRCUIT.

2) WHEN THE DAY TANK IS NOT CALLING FOR FUEL, POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE CLOSE CIRCUIT. WHEN THE ACTUATOR IS IN THE FULLY CLOSED POSITION, THE CLOSING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #2 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT IS OFF.

3) NORMAL FILL OPERATION – WHEN THE FUEL LEVEL DROPS TO THE "PUMP START" SWITCH, THE TIMER IS STARTED, THE N.C. DAY TANK SOLENOID VALVE OPENS, THE REMOTE ACTUATOR VALVE OPENS & THE VALVE "OPEN" LIGHT TURNS ON, THE DAY TANK PUMP IS ENERGIZED, THE PUMP "ON" LIGHT TURNS ON, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT CLOSES. WHEN THE ACTUATOR IS IN THE FULLY OPEN POSITION, THE OPENING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #7 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT REMAINS ON. WHEN FUEL REACHES THE "PUMP STOP" FLOAT SWITCH BEFORE THE TIMER TIMES-OUT, THE TIMER IS RESET, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS.

4) TIMER OPERATION – IF THE TIMER TIMES-OUT THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "TIME-OUT" ALARM LIGHT TURNS ON, AND THE TIME-OUT ALARM HORN SOUNDS. PRESSING THE "TIME-OUT ALARM SILENCE / PUMP RESTART" BUTTON RESETS THE TIMER, SILENCES THE ALARM HORN, AND STARTS THE NORMAL FILL OPERATION. SEE FIELD INSTALLATION NOTES FOR TIMER SETTING.

5) OVERFILL FUEL LEVEL – IF THE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE "OVERFILL" FLOAT SWITCH, THE N.O. DAY TANK SOLENOID VALVE CLOSES, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, AND THE ALARM HORN SOUNDS. PRESSING THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "OVERFILL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL FALLS BELOW THE "OVERFILL" FLOAT SWITCH, THE "OVERFILL LEVEL" ALARM LIGHT TURNS OFF, THE N.O. DAY TANK SOLENOID VALVE OPENS AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED). WHEN THE FUEL LEVEL REACHES THE "PUMP START" FLOAT SWITCH, THE NORMAL FILL OPERATION IS REPEATED.

6) LOW FUEL LEVEL – IF THE FUEL LEVEL FALLS BELOW THE "LOW ALARM" FLOAT SWITCH, THE "LOW FUEL LEVEL" ALARM LIGHT TURNS ON, THE ENGINE RUN-DRY PREVENTION DRY CONTACT OPENS, AND THE ALARM HORN SOUNDS. THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "LOW FUEL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL RISES ABOVE THE "LOW ALARM" FLOAT SWITCH THE "LOW FUEL LEVEL" ALARM LIGHT TURNS OFF, THE ENGINE RUN-DRY PREVENTION DRY CONTACT CLOSES, AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED).

7) PUMP & HORN TEST – MOMENTARY CONTACT BUTTONS ARE PROVIDED TO TEST FUNCTION OF THE DAY TANK PUMP AND ALARM HORN. PRESSING THE "PUSH TO TEST DAY TANK PUMP" BUTTON STARTS THE TIMER, MOMENTARILY OPENS THE N.C. DAY TANK SOLENOID VALVE & ACTUATED BALL VALVE, ENERGIZES THE DAY TANK PUMP, TURNS ON THE DAY TANK PUMP "RUNNING" LIGHT AND CLOSES THE USED OIL BLENDER RUN SIGNAL DRY CONTACT. THE "PUSH TO TEST DAY TANK PUMP" BUTTON IS LOCKED OUT IF THE DAY TANK IS AT THE OVERFILL LEVEL. PRESSING THE "PUSH TO TEST DAY TANK ALARM" BUTTON MOMENTARILY ENERGIZES THE ALARM HORN/STROBE.

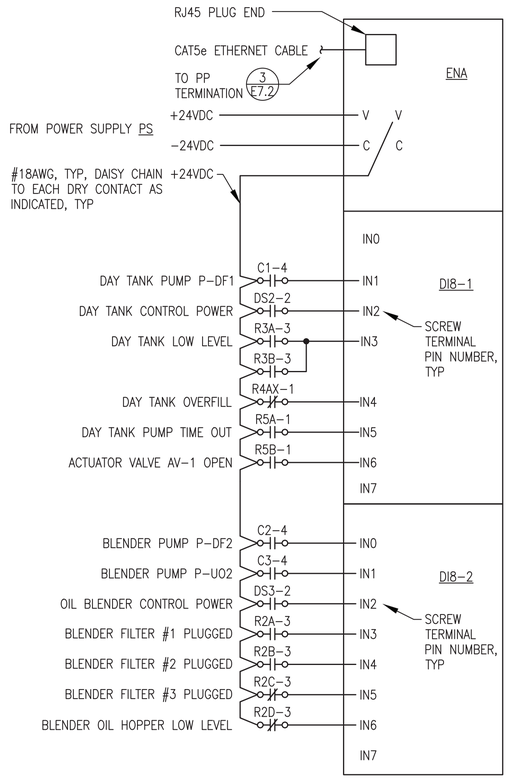
USED OIL BLENDER SYSTEM SEQUENCE OF OPERATIONS:

1) WHEN THE BLENDER CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED; THE GREEN POWER LIGHT IS ON AND POWER IS PROVIDED TO ALL CONTROL DEVICES.

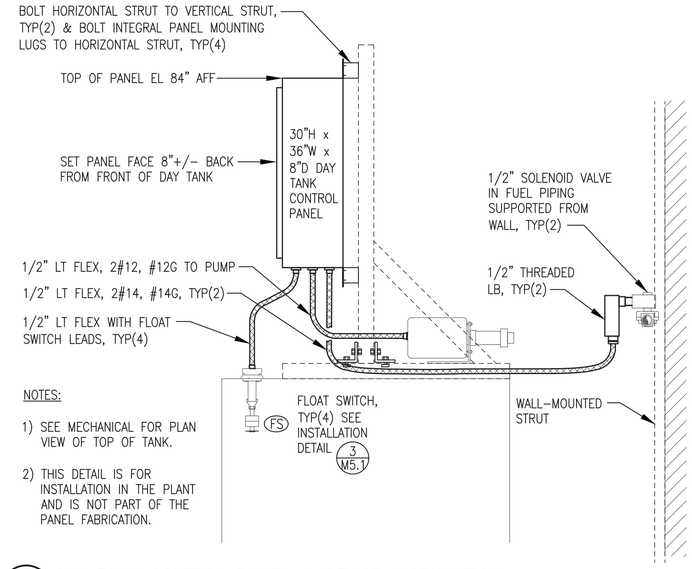
2) NORMAL OPERATION – WHENEVER THE DAY TANK FILL SEQUENCE IS INITIATED, BOTH THE DIESEL CIRCULATING PUMP P-DF2 AND THE USED OIL INJECTION PUMP P-UO2 RUN AND THE ASSOCIATED GREEN PUMP RUNNING LIGHTS ARE ON.

3) PLUGGED FILTER – IF THE DIFFERENTIAL PRESSURE ACROSS A FILTER REACHES THE ALARM SETPOINT, BOTH PUMPS STOP RUNNING AND THE RED FILTER PLUGGED LIGHT FOR THE ASSOCIATED FILTER TURNS ON. THE ALARM LATCHES AND THE SYSTEM WILL NOT OPERATE UNTIL THE PROBLEM IS CORRECTED. AFTER THE FILTER ELEMENT HAS BEEN CHANGED THE BLACK RESET BUTTON MUST BE PRESSED TO RESUME NORMAL OPERATION.

4) HOPPER LOW OIL LEVEL – WHEN THE OIL LEVEL FALLS BELOW THE LOW LEVEL FLOAT SWITCH, USED OIL INJECTION PUMP P-UO2 STOPS RUNNING AND THE AMBER HOPPER LOW OIL LEVEL LIGHT TURNS ON. PUMP P-UO2 WILL NOT OPERATE UNTIL THE USED OIL LEVEL IN THE HOPPER RISES ABOVE THE LOW LEVEL. RESET IS NOT REQUIRED.



1 E7.3 ETHERNET POINT I/O CONNECTIONS
NO SCALE



2 E7.3 DAY TANK CONTROL PANEL & DEVICE INSTALLATION
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

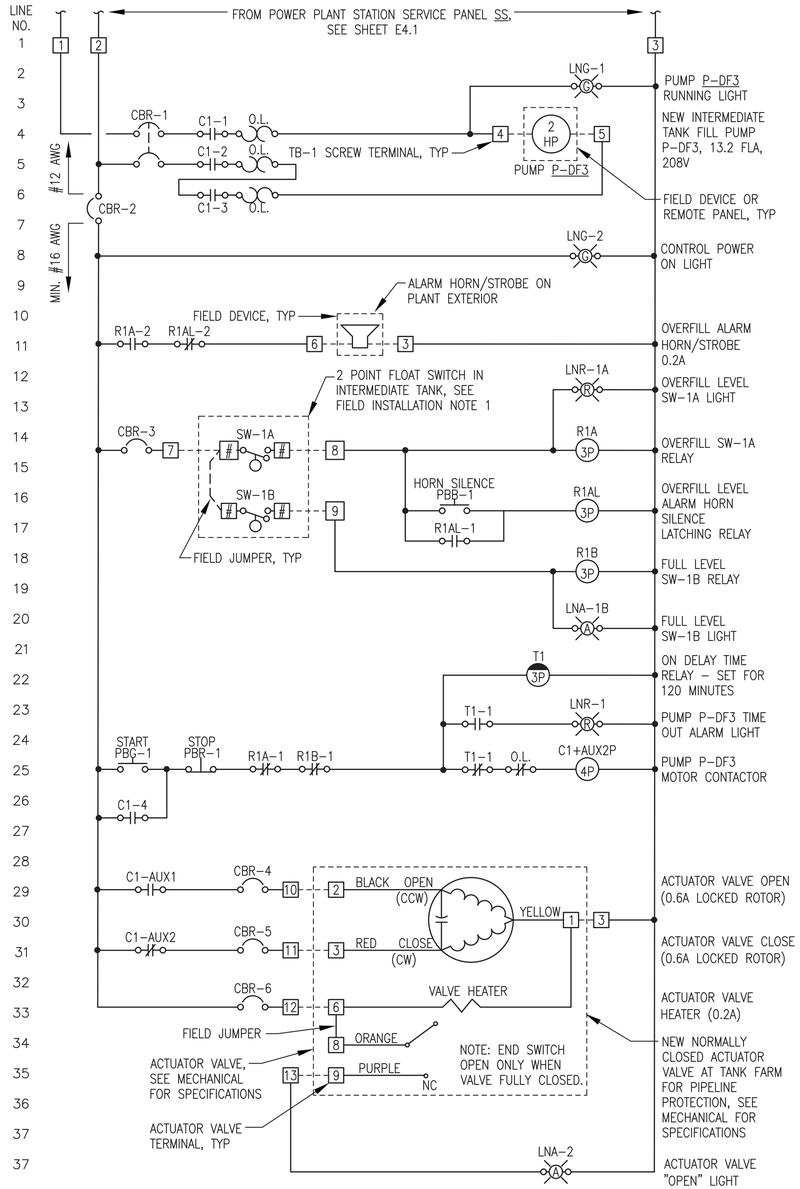
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

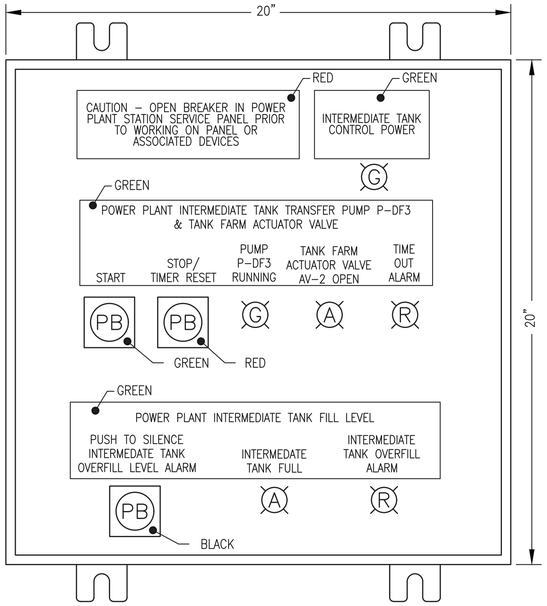
TITLE: DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATIONS & INTERCONNECT DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

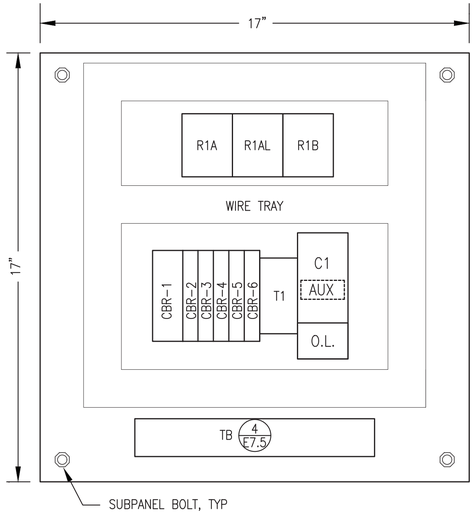
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E7 | SHEET: E7.3
PROJECT NUMBER:



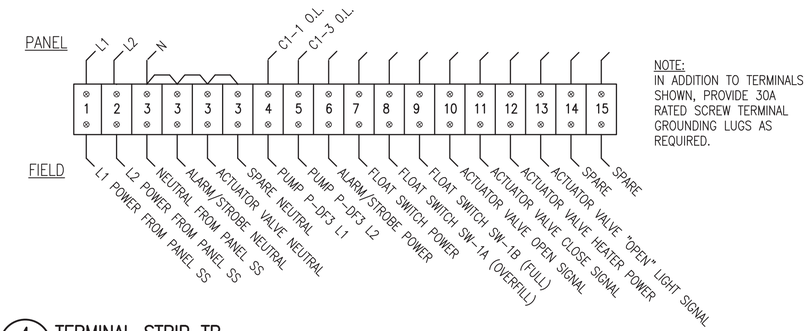
1 E7.4 LOGIC DIAGRAM
NO SCALE



2 E7.4 FRONT PANEL LAYOUT
NO SCALE



3 E7.4 SUBPANEL LAYOUT
NO SCALE



NOTE:
IN ADDITION TO TERMINALS SHOWN, PROVIDE 30A RATED SCREW TERMINAL GROUNDING LUGS AS REQUIRED.

4 E7.4 TERMINAL STRIP TB
NO SCALE

SEQUENCE OF OPERATIONS:

1) WHEN THE CIRCUIT BREAKER IN THE STATION SERVICE PANELBOARD IS CLOSED: POWER IS PROVIDED TO THE CONTROL PANEL. IN NORMAL INACTIVE STATUS POWER IS PROVIDED TO THE ACTUATOR VALVE CLOSE CIRCUIT. WHEN THE ACTUATOR IS IN THE FULLY CLOSED POSITION: THE ACTUATOR CLOSE CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH IN THE ACTUATOR AND THE ACTUATOR VALVE "OPEN" LIGHT IS OFF.

2) NORMAL FILL OPERATION - WHEN THE "START" BUTTON IS PRESSED: THE TIMING RELAY IS STARTED, THE PUMP STARTS, THE PUMP "ON" LIGHT TURNS ON, THE ACTUATOR VALVE BEGINS TO OPEN, AND THE "ACTUATOR VALVE OPEN" LIGHT IS ENERGIZED. WHEN THE ACTUATOR VALVE REACHES THE FULLY OPEN POSITION: THE ACTUATOR OPEN CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH AND THE "ACTUATOR VALVE OPEN" LIGHT REMAINS ON. WHEN THE FUEL LEVEL REACHES THE FULL FLOAT SWITCH: THE "TANK FULL" LIGHT TURNS ON, THE TIMING RELAY IS RESET, THE PUMP STOPS, THE PUMP "ON" LIGHT TURNS OFF, THE ACTUATOR VALVE CLOSES, AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF. PRESSING THE "STOP" BUTTON AT ANY TIME DURING A NORMAL FILL CYCLE WILL PERFORM THE SAME FUNCTION AS THE FUEL LEVEL REACHING THE FULL FLOAT SWITCH EXCEPT THE "TANK FULL" LIGHT WILL NOT BE TURNED ON.

3) TIMER OPERATION - IF THE TIMING RELAY TIMES OUT BEFORE THE FILL CYCLE IS STOPPED THE SEQUENCE IS IDENTICAL TO THE NORMAL PUMP STOP SEQUENCE EXCEPT: THE "TIME OUT" ALARM LIGHT ON THE FACE OF THE PANEL IS TURNED ON. THE "TIME OUT" ALARM LIGHT REMAINS ON AND PUMP P-DF3 CANNOT BE STARTED UNTIL THE TIMER IS RESET BY PRESSING THE STOP BUTTON.

4) OVERFILL ALARM - IF THE INTERMEDIATE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE OVERFILL FLOAT SWITCH: THE "OVERFILL ALARM" LIGHT TURNS ON, THE ALARM HORN SOUNDS, THE TIMING RELAY IS RESET, AND AFTER APPROXIMATELY 10 SECONDS THE "ACTUATOR VALVE OPEN" LIGHT TURNS OFF. PRESSING THE "SILENCE OVERFILL ALARM" BUTTON SILENCES THE ALARM HORN BUT THE "OVERFILL ALARM" LIGHT WILL STAY ON UNTIL THE FUEL LEVEL FALLS BELOW THE OVERFILL FLOAT SWITCH. A NEW FILL CYCLE CANNOT BE STARTED UNTIL THE FUEL LEVEL DROPS BELOW THE FULL LEVEL.

PANEL FABRICATION NOTES:

1) PROVIDE COMPLETE LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. FIELD DEVICES ARE INDICATED BY DASHED OUTLINES. FIELD WIRING AND FIELD INSTALLED DEVICES PROVIDED BY OTHERS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT PART OF THE PANEL SCOPE.
2) INSTALL IN A 20"x20"x8" NEMA 12 STEEL ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR.
3) USE MINIMUM #16AWG FOR ALL WIRING UNLESS SPECIFICALLY NOTED OTHERWISE. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).
4) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.
5) PROVIDE DIN RAIL, END PLATES, HARDWARE AND ACCESSORIES AS REQUIRED FOR MOUNTING ALL DIN RAIL DEVICES AND TERMINAL BLOCKS.
6) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED, AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS.
7) BENCH TEST THE COMPLETED ASSEMBLY PRIOR TO SHIPPING. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES. TEST IN CONJUNCTION WITH TANK FARM AUXILIARY PANEL TO VERIFY FUNCTION.

FIELD INSTALLATION NOTES:

1) SEE SHEETS E4.2 AND E9 FOR FIELD INSTALLATION.
2) PRIOR TO PLACING IN THE TANK, VERIFY THAT BOTH FLOAT SWITCHES ARE ORIENTED NO (CLOSE ON RISE). LABEL FLOAT SWITCH TERMINALS WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE CONTROL PANEL.
3) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE CONTROL PANEL. INSTALL JUMPERS ON FIELD DEVICES AS SHOWN. USE MIN #14AWG FOR CONNECTION TO ALL FIELD DEVICES EXCEPT #12 TO PUMP.
4) TEST ALL CONTROL AND ALARM FUNCTIONS UPON COMPLETION AND PRIOR TO PLACING INTO SERVICE. SET TIMERS TO 10 SECONDS TO VERIFY TIME OUT FUNCTION, THEN RE-SET TO VALUES SHOWN.

BILL OF MATERIALS

NOTE: ON THIS SHEET AND THE PANEL DRAWINGS THAT FOLLOW SPECIFIC PARTS MANUFACTURER AND MODEL ARE SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX2P	ALLEN-BRADLEY	100-FA11	AUX. CONTACT FOR CONTACTOR, 2 POLE NO, NC
C	ALLEN-BRADLEY	100C23D10	CONTACTOR, 120V COIL, 23A, 4 POLE
CBR-1	ALLEN-BRADLEY	1489-M2-C150	RAIL-MOUNT CIRCUIT BREAKER, 2 POLE, 15A
CBR-2,3	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-4,5,6	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
LNA	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-120V, NEMA 4X
LNG	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-120V, NEMA 4X
LNR	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-120V, NEMA 4X
OL	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1ø, ADJUSTABLE 3.2-16.0A RANGE
PBB	ALLEN-BRADLEY	800HAR2	MOMENTARY PUSH BUTTON, 1NO, NEMA 4X, BLACK
PBG	ALLEN-BRADLEY	800HAR1	MOMENTARY PUSH BUTTON, 1NO, NEMA 4X, GREEN
PBR	ALLEN-BRADLEY	800HAR6D2	MOMENTARY PUSH BUTTON, 1NC, NEMA 4X, RED
R	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
T	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
TB	ALLEN-BRADLEY	1492CAM1L	LARGE-HEAD SCREW TERMINALS, 35A, 600V

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

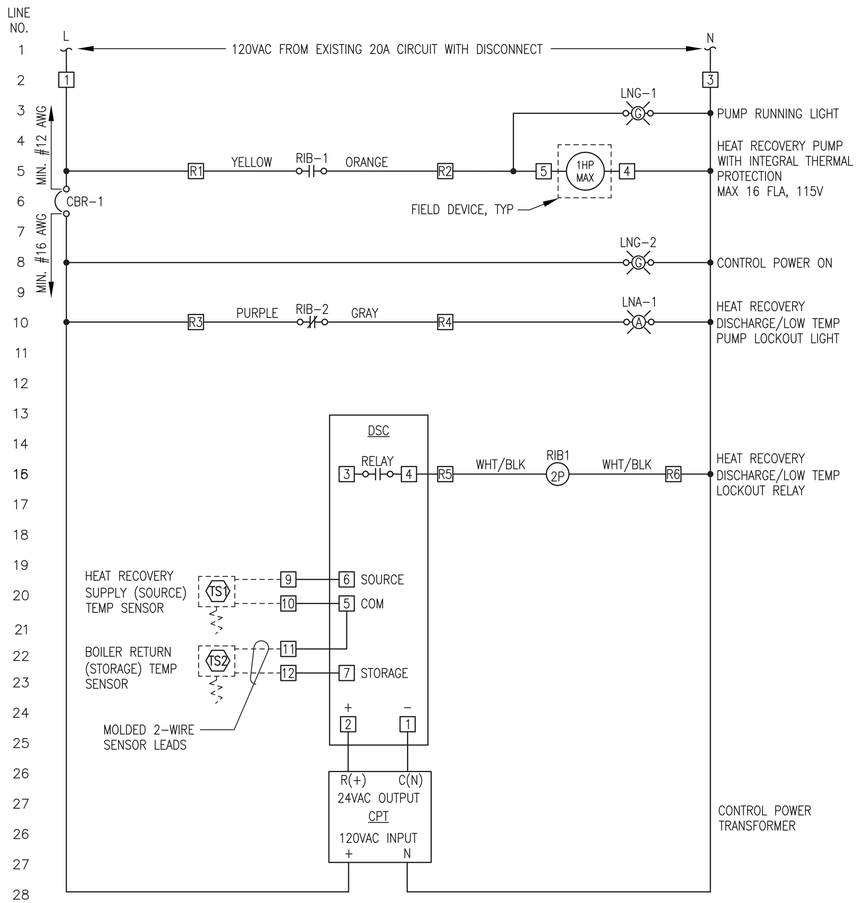
ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

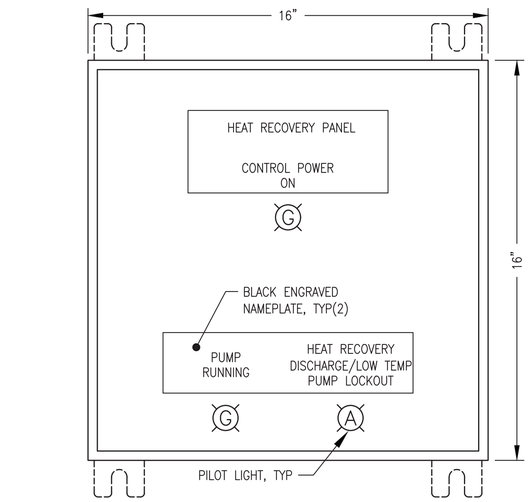
TITLE: INTERMEDIATE TANK CONTROL PANEL

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

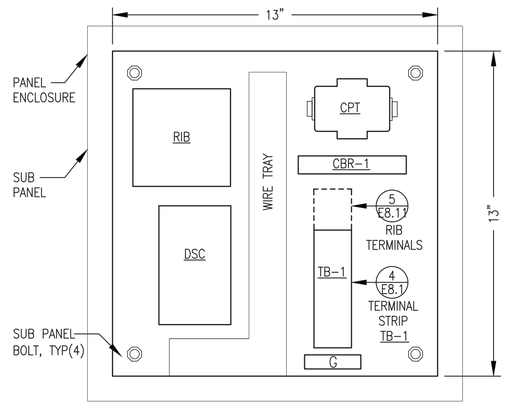
DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: MANO PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 9/28/23
SHEET: E7.4



1 E8.1 HEAT RECOVERY PANEL LOGIC DIAGRAM
NO SCALE



2 E8.1 FRONT PANEL LAYOUT
NO SCALE



3 E8.1 SUB PANEL LAYOUT
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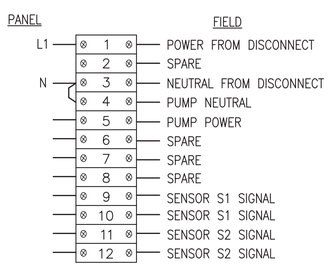

4 E8.1 TERMINAL STRIP TB-1
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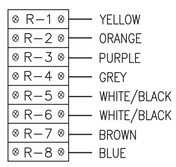

5 E8.1 RIB TERMINAL STRIP
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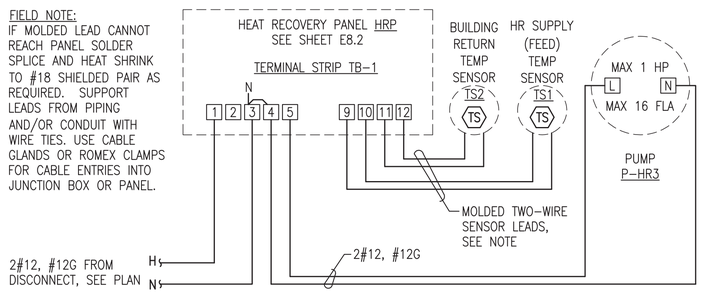

6 E8.1 TYPICAL HEAT RECOVERY PANEL HRP FIELD TERMINAL CONNECTIONS
NO SCALE

LEGEND

R# CONTROL RELAY	R#-# NORMALLY OPEN CONTACT	CB-# CIRCUIT BREAKER	------- FIELD WIRING
# TERMINAL BLOCK	R#-# NORMALLY CLOSED CONTACT		——— PANEL WIRING

BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR	1	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CPT	1	FUNCTIONAL DEVICES	TR40VA002	40VA, 24VAC CONTROL POWER TRANSFORMER
DSC	1	TEKMAR	MODEL 156	DIFFERENCE SETPOINT CONTROLLER WITH MINIMUM AND MAXIMUM TEMPERATURE FUNCTIONS, 24VAC, 1 EACH N.O. RELAY RATED 240V, 10A, 1/3HP
LNG	2	ALLEN-BRADLEY	800HQRH10G	GREEN LED PILOT LIGHT, 120V, NEMA 4X
LNA	1	ALLEN-BRADLEY	800HQRH10A	AMBER LED PILOT LIGHT, 120V, NEMA 4X
RIB	1	FUNCTIONAL DEVICES	RIB01P	DPDT RELAY, 120VAC COIL, 20A, 1HP N.C. RATED
TS1,2	2	TEKMAR	MODEL 085	SOLAR SENSOR, 10K THERMISTOR, 6mm DIA x 45mm LONG, 5' LEAD WIRE
TB		ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

HEAT RECOVERY PANEL SEQUENCE OF OPERATION:

CONTROL POWER: WHEN THE CIRCUIT BREAKER IN THE LOAD CENTER IS CLOSED, THE WALL-MOUNT DISCONNECT IS CLOSED, AND THE INTERNAL CIRCUIT BREAKER CBR-1 IS CLOSED, POWER IS PROVIDED TO CONTROL DEVICES AND THE "CONTROL POWER ON" LIGHT IS ON.

NORMAL OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 (HEAT RECOVERY SUPPLY TEMPERATURE OR "SOURCE") AND SENSOR S2 (BOILER RETURN TEMPERATURE OR "STORAGE") IS GREATER THAN THE DELTA-T SETPOINT (7 DEG F) AND THE HEAT RECOVERY SUPPLY SENSOR S1 TEMPERATURE IS GREATER THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE PUMP WILL RUN AND THE "PUMP RUNNING" LIGHT WILL BE ON.

DISCHARGE LOCKOUT OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 AND SENSOR S2 BECOMES LESS THAN THE DELTA-T SETPOINT (7 DEG F) MINUS THE DELTA-T DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL OPEN, THE RIB1 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON, AND THE PUMP WILL STOP. WHEN THE DIFFERENCE BETWEEN S1 AND S2 BECOMES GREATER THAN THE DELTA-T SETPOINT: THE DSC RELAY WILL CLOSE, THE RIB1 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

DISTRICT HEAT LOW TEMPERATURE LOCKOUT OPERATION: IF THE HEAT RECOVERY SUPPLY TEMPERATURE (SENSOR S1 "SOURCE") FALLS TO LESS THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE DSC RELAY WILL OPEN, THE RIB2 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON AND THE PUMP WILL STOP. WHEN THE HEAT RECOVERY SUPPLY TEMPERATURE (S1) RECOVERS AND BECOMES EQUAL TO THE MINIMUM SOURCE SETPOINT (160 DEG F) PLUS THE MINIMUM SOURCE DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL CLOSE, THE RIB2 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

SHOP FABRICATION NOTES:

1) FURNISH COMPLETE PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM AND BILL OF MATERIALS ALONG WITH ALL PANEL DEVICE ACCESSORIES REQUIRED FOR COMPLETE INSTALLATION. FURNISH TEMPERATURE SENSORS LOOSE SHIP WITH PANEL FOR FIELD INSTALLATION.

2) INSTALL IN A NEMA 12 ENCLOSURE, MIN 14 GAUGE STEEL CONSTRUCTION WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR. PAINT ENCLOSURE ANSI 61 GRAY AND PAINT BACK PANEL WHITE.

3) TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).

4) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.

5) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.

6) PROGRAM THE DIFFERENTIAL SETPOINT CONTROLLER (DSC) WITH THE FOLLOWING SETTINGS:
SET THE DRAINDOWN/DRAINBACK DIP SWITCH TO DRAINDOWN.
△T SETPOINT=7; △T DIFFERENTIAL=5; MINIMUM SOURCE SETPOINT=160; MINIMUM SOURCE DIFFERENTIAL=5;
MAXIMUM STORAGE SETPOINT=200; MAXIMUM STORAGE DIFFERENTIAL=10. SET DISPLAY TO °F.

6) BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.

FIELD INSTALLATION NOTES:

1) SEE FIELD WIRING DIAGRAM 6/E8.1. PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS. FIELD WIRING TO MOTORS MIN #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH PANEL TERMINAL BLOCK TERMINATION NUMBERS.

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1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

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AUGUST 2025

STATE OF ALASKA 49TH — CLOIS W. VERSYP EE 7802 — REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

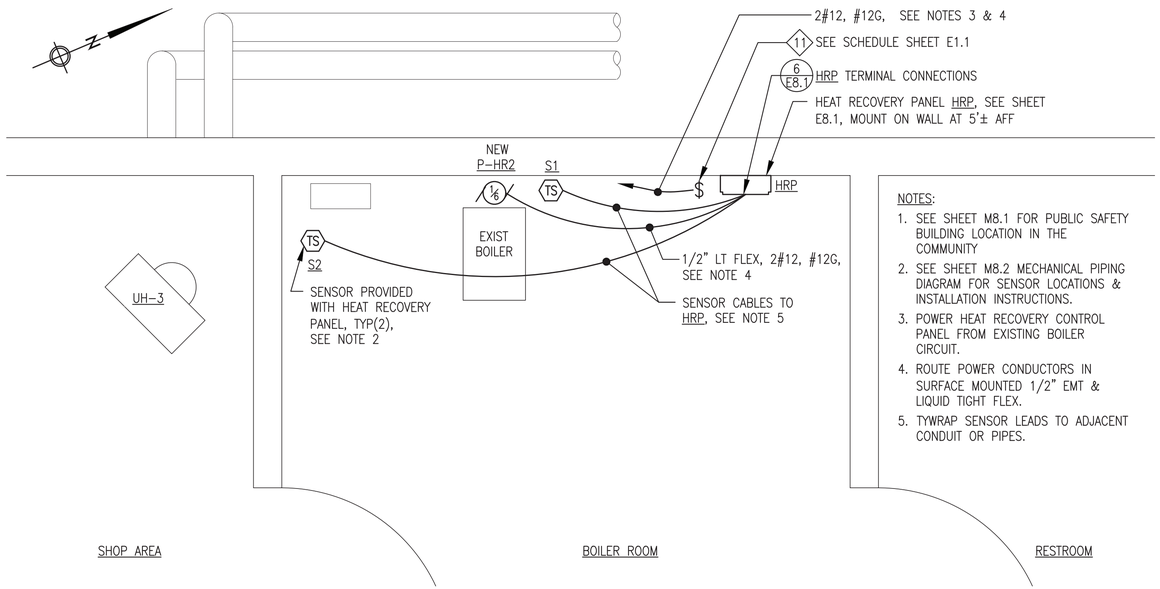
PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: HEAT RECOVERY SYSTEM
HEAT RECOVERY PANEL HRP

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

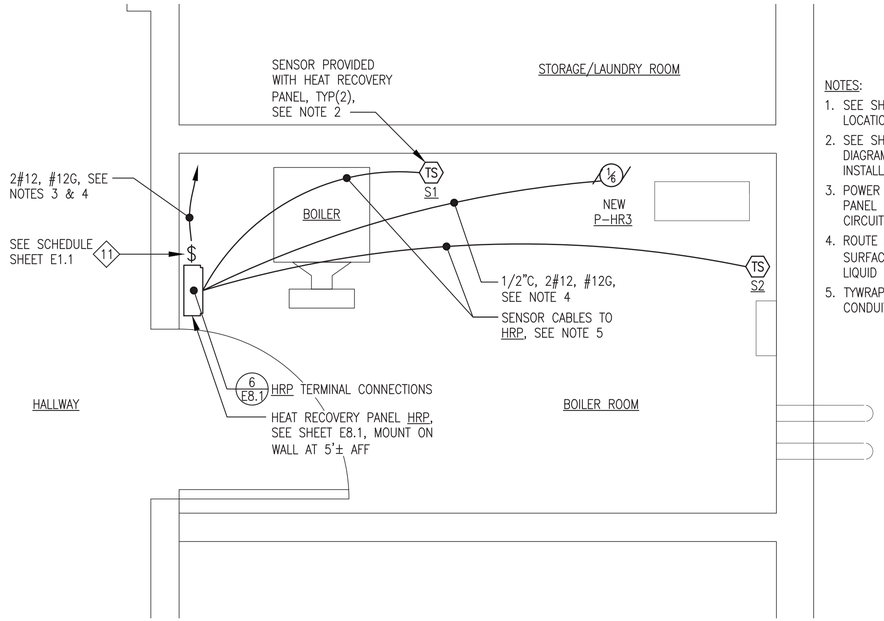
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 9/28/23
FILE NAME: MANO PP E8 | SHEET: E8.1
PROJECT NUMBER:

8/15/25



NOTES:
1. SEE SHEET M8.1 FOR PUBLIC SAFETY BUILDING LOCATION IN THE COMMUNITY
2. SEE SHEET M8.2 MECHANICAL PIPING DIAGRAM FOR SENSOR LOCATIONS & INSTALLATION INSTRUCTIONS.
3. POWER HEAT RECOVERY CONTROL PANEL FROM EXISTING BOILER CIRCUIT.
4. ROUTE POWER CONDUCTORS IN SURFACE MOUNTED 1/2" EMT & LIQUID TIGHT FLEX.
5. TYWRAP SENSOR LEADS TO ADJACENT CONDUIT OR PIPES.

1 E8.2 PUBLIC SAFETY BUILDING HEAT RECOVERY WIRING PLAN
3/4"=1'-0"



NOTES:
1. SEE SHEET M8.1 FOR CLINIC LOCATION IN THE COMMUNITY
2. SEE SHEET M8.4 MECHANICAL PIPING DIAGRAM FOR SENSOR LOCATIONS & INSTALLATION INSTRUCTIONS.
3. POWER HEAT RECOVERY CONTROL PANEL FROM EXISTING BOILER CIRCUIT.
4. ROUTE POWER CONDUCTORS IN SURFACE MOUNTED 1/2" EMT OR LIQUID TIGHT FLEX.
5. TYWRAP SENSOR LEADS TO ADJACENT CONDUIT OR PIPES.

2 E8.2 CLINIC HEAT RECOVERY WIRING PLAN
3/4"=1'-0"

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

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1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: HEAT RECOVERY SYSTEM END USER BUILDING WIRING PLANS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: MANO PP E8
PROJECT NUMBER:
SCALE: AS NOTED
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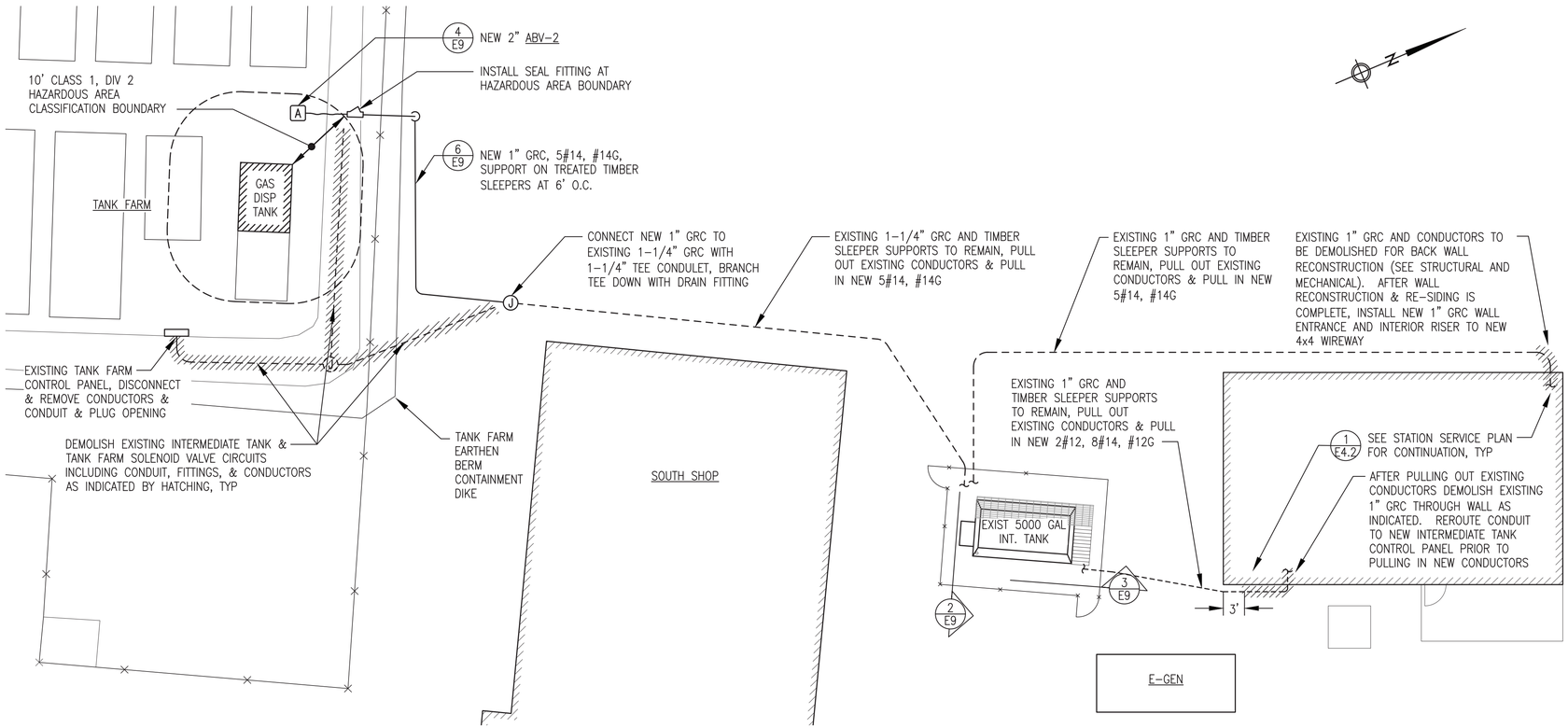
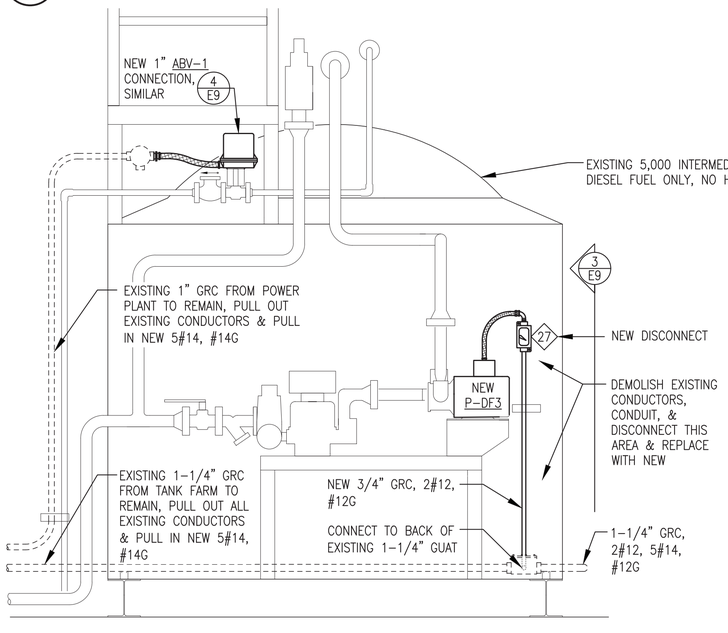
SHEET: E8.2



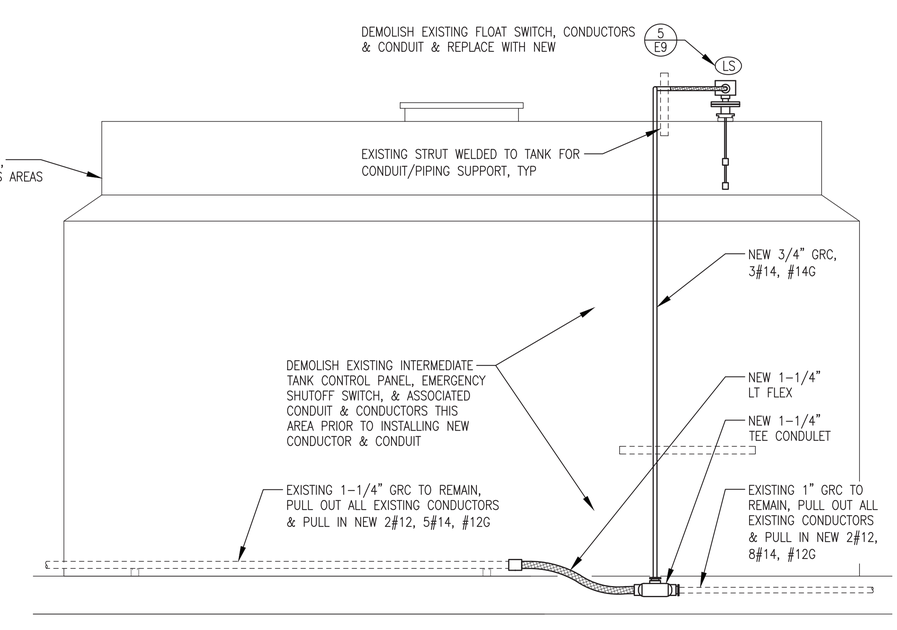
1/E9 POWER PLANT AREA FUEL SYSTEM WIRING MODIFICATION PLAN

1"=10'



2/E9 INTERMEDIATE TANK END ELEVATION

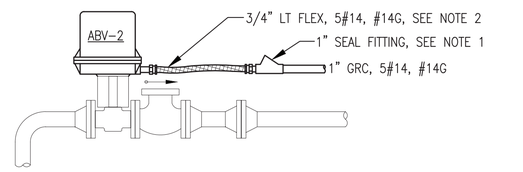
3/4"=1'-0"



3/E9 INTERMEDIATE TANK SIDE ELEVATION

3/4"=1'-0"

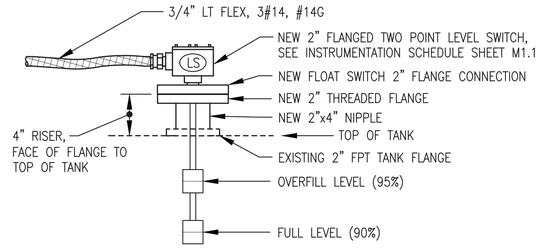
NOTES:
1) ABV-2 SHOWN, ABV-1 SIMILAR WITHOUT SEAL FITTING.
2) AT TANK FARM (ABV-2) INSTALL LIQUID TIGHT FLEX IN ACCORDANCE WITH BONDING REQUIREMENTS FOR CLASS 1, DIV 2 HAZARDOUS AREA.



4/E9 ACTUATOR VALVE CONNECTION

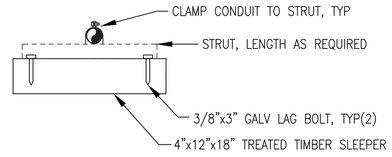
NO SCALE

NOTES:
1) PRIOR TO INSTALLING IN TANK, MAKE TEMPORARY ELECTRICAL CONNECTIONS AND MANUALLY MANIPULATE EACH FLOAT IN ORDER TO VERIFY N.O. ACTUATION (CLOSE ON RISE) IN ACCORDANCE WITH SPECIFICATIONS ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) LABEL FLOAT SWITCH TERMINALS WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE INTERMEDIATE TANK CONTROL PANEL. SEE SHEET E7.4.



5/E9 NEW INTERMEDIATE TANK FLOAT SWITCH INSTALLATION

NO SCALE



6/E9 CONDUIT SLEEPER SUPPORT

NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
AUGUST 2025

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR 2025 AEA STANDARDS	8/15/25	BCG

ALASKA ENERGY AUTHORITY

PROJECT: MANOKOTAK POWER PLANT UPGRADE PROJECT

TITLE: POWER PLANT AREA FUEL SYSTEM WIRING MODIFICATION PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

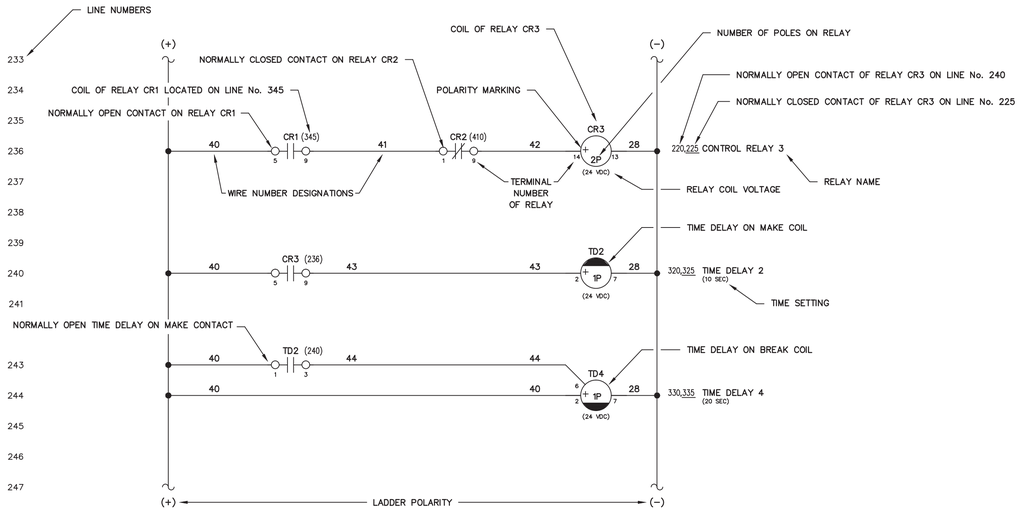
DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: MANO PP E9
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 9/28/23
SHEET: E9

ALASKA ENERGY AUTHORITY
RURAL ENERGY GROUP
813 W. NORTHERN LIGHTS BLVD.
ANCHORAGE, ALASKA 99503
HTTP://WWW.AIDEA.ORG

ENGINEERED & MANUFACTURED BY
Controlled Power, Inc.
BOTHELL, WASHINGTON USA
(425)-485-1778 www.controlledpowerinc.com

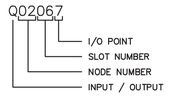
MANOKOTAK POWER SYSTEM UPGRADE
PURCHASE ORDER NUMBER: PO010800
CONTROLLED POWER, INC. JOB No. 9332SG

DRAWING No.	DRAWING TITLE
9332SG-2101-D	COVER SHEET
9332SG-3101-D	SCHEMATIC LEGEND & NOTES
9332SG-4101-D	GENERATOR SWITCHGEAR ELEVATION VIEW, OUTLINE DIAGRAM
9332SG-5101-D	GENERATOR SWITCHGEAR SINGLE LINE, SCHEMATIC DIAGRAM
9332SG-5201-D	GENERATOR 1 AC THREE LINE, SCHEMATIC DIAGRAM
9332SG-5202-D	GENERATOR 2 AC THREE LINE, SCHEMATIC DIAGRAM
9332SG-5203-D	GENERATOR 3 AC THREE LINE, SCHEMATIC DIAGRAM
9332SG-5204-D	MASTER AC THREE LINE, SCHEMATIC DIAGRAM
9332SG-5205-D	VFD AC THREE LINE, SCHEMATIC DIAGRAM
9332SG-5301-D	GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5302-D	GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5303-D	GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5304-D	GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5305-D	GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5306-D	GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5307-D	GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5308-D	GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5309-D	GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5310-D	MASTER DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5311-D	MASTER DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5312-D	MASTER DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5313-D	MASTER DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5314-D	FEEDER/VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5315-D	FEEDER/VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5316-D	VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5317-D	R1 & R2 VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5318-D	CAC1 & CAC2 VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5319-D	CAC3 VFD DC CONTROL, SCHEMATIC DIAGRAM
9332SG-5401-D	GEN 1 & GEN 2 CIRCUIT BREAKER CONTROL, SCHEMATIC DIAGRAM
9332SG-5402-D	GEN 3 & FEEDER CIRCUIT BREAKER CONTROL, SCHEMATIC DIAGRAM
9332SG-5501-D	POINT I/O COMMUNICATION NETWORK, SCHEMATIC DIAGRAM
9332SG-5601-D	COMMUNICATION NETWORK, SCHEMATIC DIAGRAM
9332SG-5602-D	COMMUNICATION NETWORK, SCHEMATIC DIAGRAM
9332SG-5603-D	COMMUNICATION NETWORK, SCHEMATIC DIAGRAM
9332SG-5701-D	AC CONTROL, SCHEMATIC DIAGRAM
9332SG-5702-D	AC CONTROL, SCHEMATIC DIAGRAM
9332SG-6101-D	CONTROL SWITCH TARGET DIAGRAM
9332SG-6201-D	NAMEPLATE ENGRAVING SCHEDULE, FABRICATION DIAGRAM
9332SG-6202-D	ANNUNCIATOR WINDOWS, FABRICATION DIAGRAM
9332SG-7101-D	INTERCONNECTION DIAGRAM
9332SG-7102-D	INTERCONNECTION DIAGRAM
9332SG-7103-D	ETHERNET SHIPPING SPLIT, INTERCONNECTION DIAGRAM

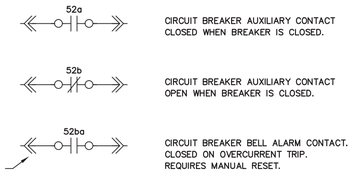


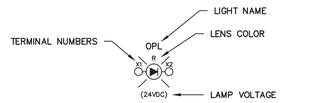
POINT I/O 24VDC
SOURCE OUTPUT MODULE
1734-OB8
NODE 2, SLOT No. 6

(LOCATED ON GENERATOR 2 BACK PAN)

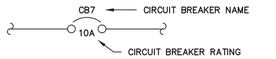


I/O WIRE LEGEND

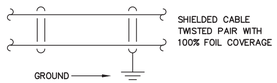




LED PILOT LIGHT



CIRCUIT BREAKER



NOTES:

1. SCHEMATIC IS SHOWN AS FOLLOWS:
   - ALL AC AND DC POWER REMOVED.
   - ALL RELAY CONTACTS DE-ENERGIZED.
   - ALL CIRCUIT BREAKERS IN THE OPEN/RESET POSITION.
   - ALL MODE SWITCHES IN THE "OFF" POSITION.
   - ALL EMERGENCY STOP SWITCHES IN THE "NORMAL" POSITION
   - ALL PRESSURE SWITCHES SHOWN WITHOUT PRESSURE PRESENT.
   - ALL LEVEL SWITCHES SHOWN WITHOUT FLUID PRESENT.
   - ALL TEMPERATURE SWITCHES SHOWN AT AMBIENT.
2. ◎ INDICATES INTERCONNECT TERMINALS IN GENERATOR CONTROL SECTION.
3. ◉ INDICATES FIELD TERMINALS IN GENERATOR CONTROL SECTION.
4. ▣ INDICATES TERMINALS AT ENGINE/GENERATOR.
5. △ INDICATES INTERCONNECT TERMINALS IN MASTER SECTION.
6. ▲ INDICATES FIELD TERMINALS IN MASTER SECTION.
7. ◇ INDICATES INTERCONNECT TERMINALS IN FEEDER SECTION.
8. ◆ INDICATES FIELD TERMINALS IN FEEDER SECTION.
9. ⊞ INDICATES FIELD TERMINALS IN ELECTRIC BOILER SCR PANEL.
10. ⊡ INDICATES INTERCONNECT TERMINALS IN VFD SECTION.
11. ▣ INDICATES TERMINALS IN VFD SECTION.
12. — — INDICATES FIELD WIRING BY OTHERS.
    ALL CONTROL WIRING TO BE No. 14 AWG, 600 VOLT, TYPE SIS EXCEPT AS NOTED.
13. SHIELDED WIRING TO BE No. 18 AWG, 300 VOLT, TWISTED LINE WITH 100% FOIL COVERAGE.
14. ALL DIODES ARE 1N4007 EXCEPT AS NOTED.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: SCHEMATIC LEGEND & NOTES

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-3101-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
RURAL ENERGY GROUP
813 W. NORTHERN LIGHTS BLVD.
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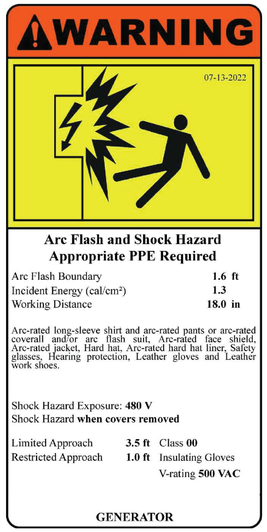
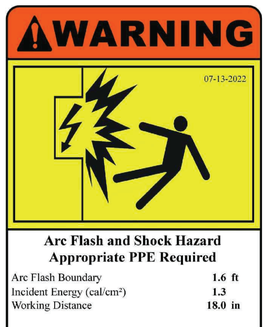
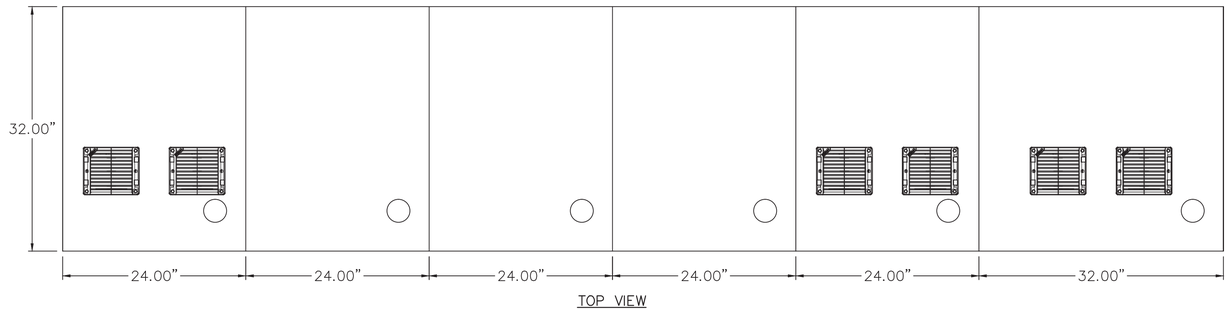


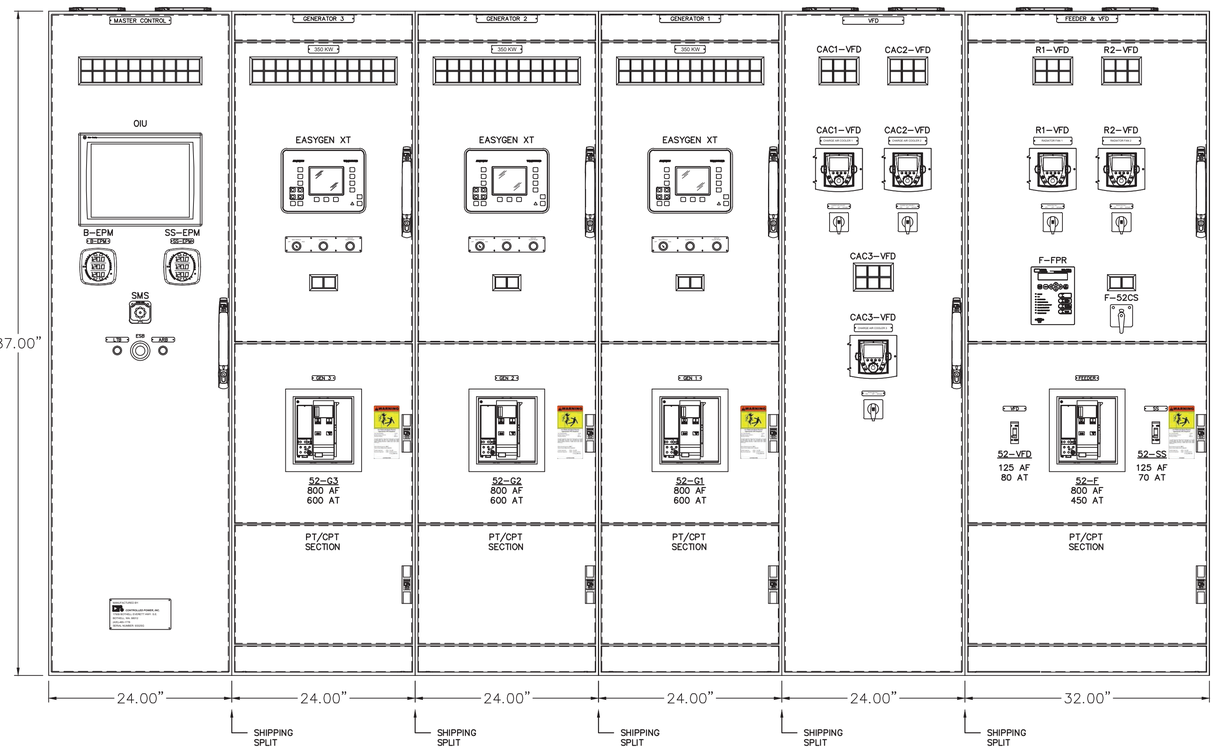
GENERATOR ARC FLASH LABEL



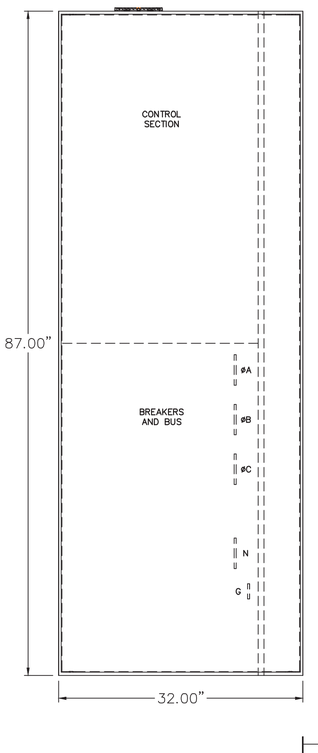
FEEDER ARC FLASH LABEL



TOP VIEW



GENERATOR SWITCHGEAR ELEVATION VIEW



SIDE VIEW

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR SWITCHGEAR ELEVATION VIEW, OUTLINE DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-4101-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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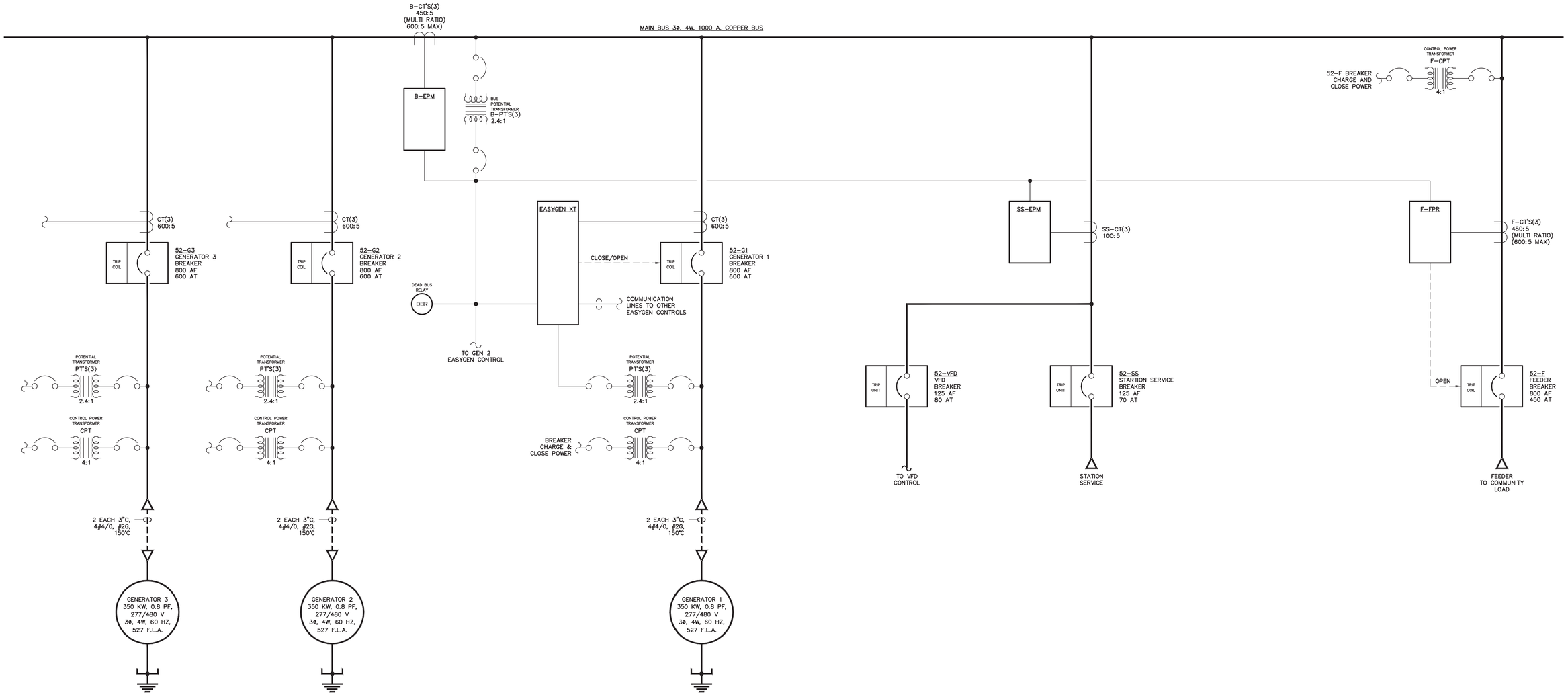

NOTES:

1. GENERATORS 2 & 3 SIMILAR TO GENERATOR 1.

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR SWITCHGEAR SINGLE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5101-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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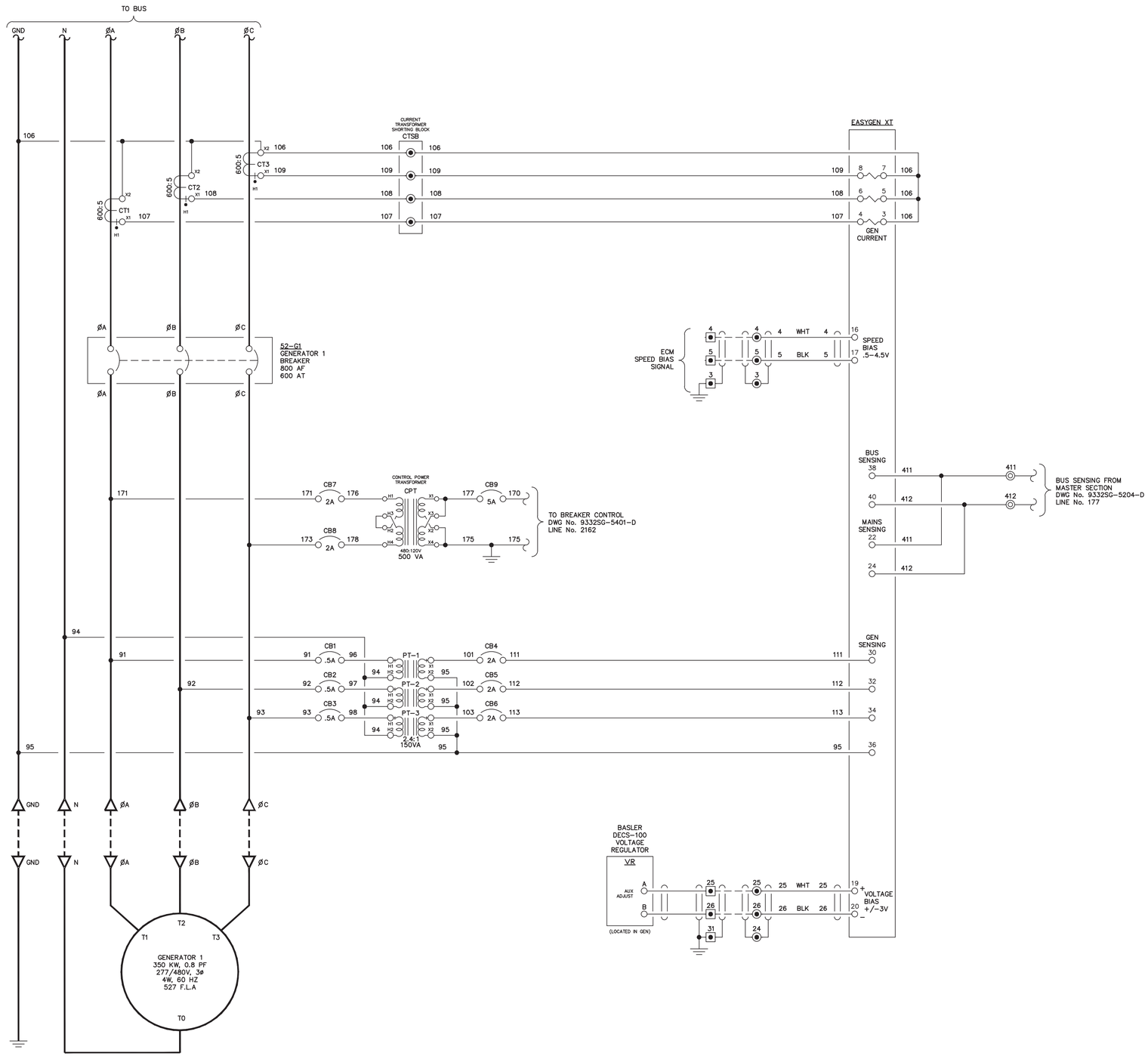

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 1 AC THREE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5201-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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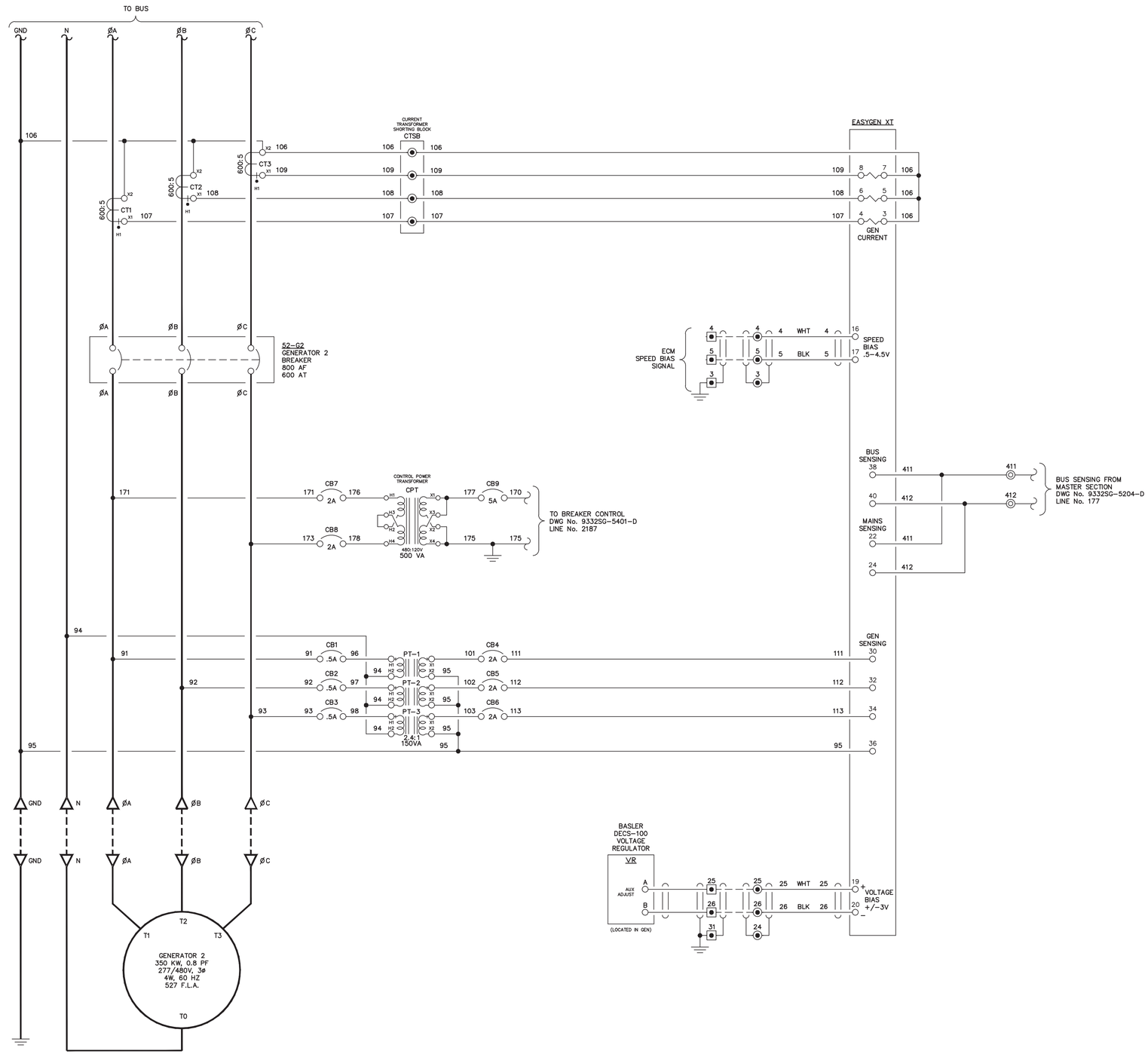

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 2 AC THREE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5202-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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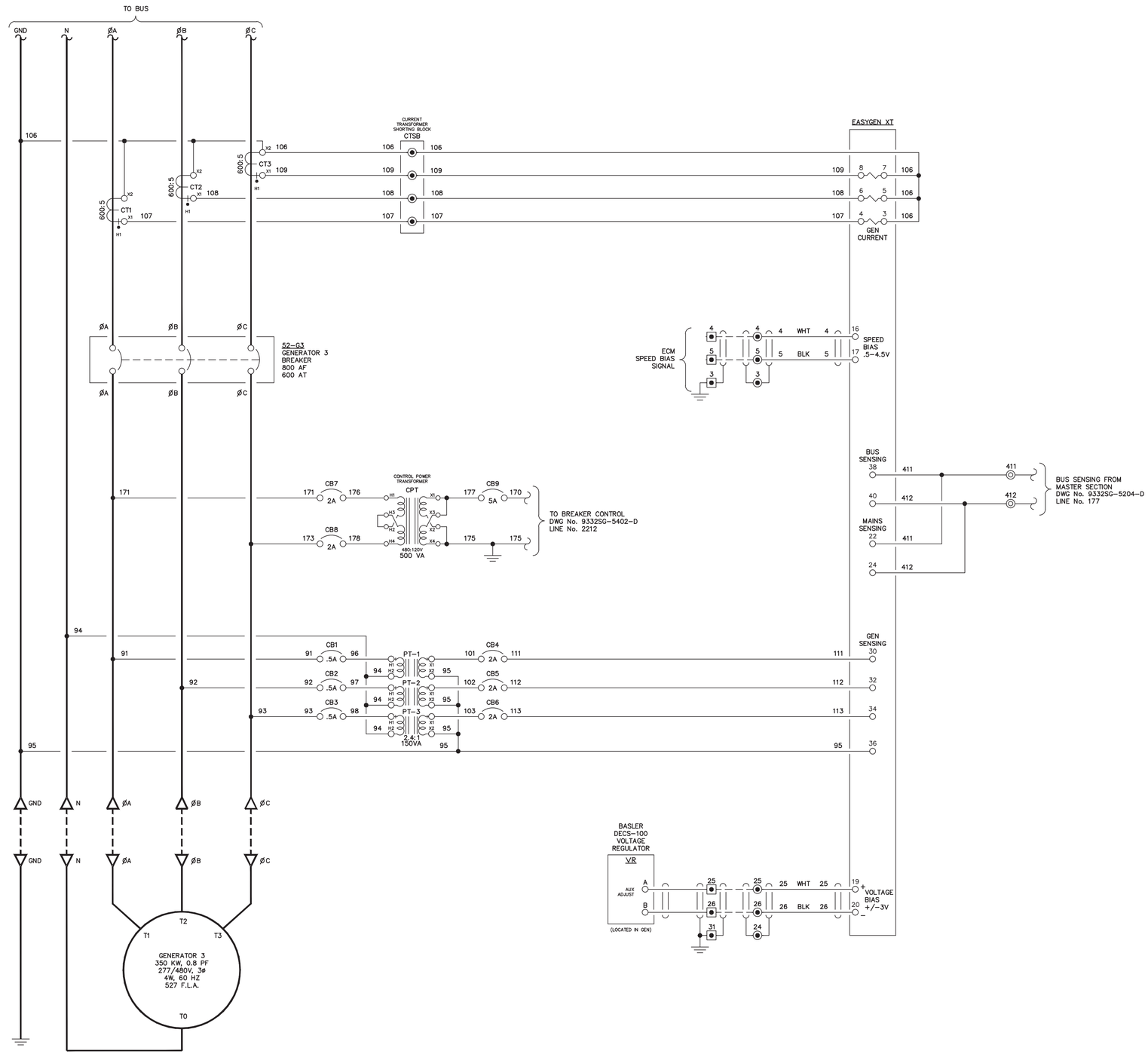

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 3 AC THREE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5203-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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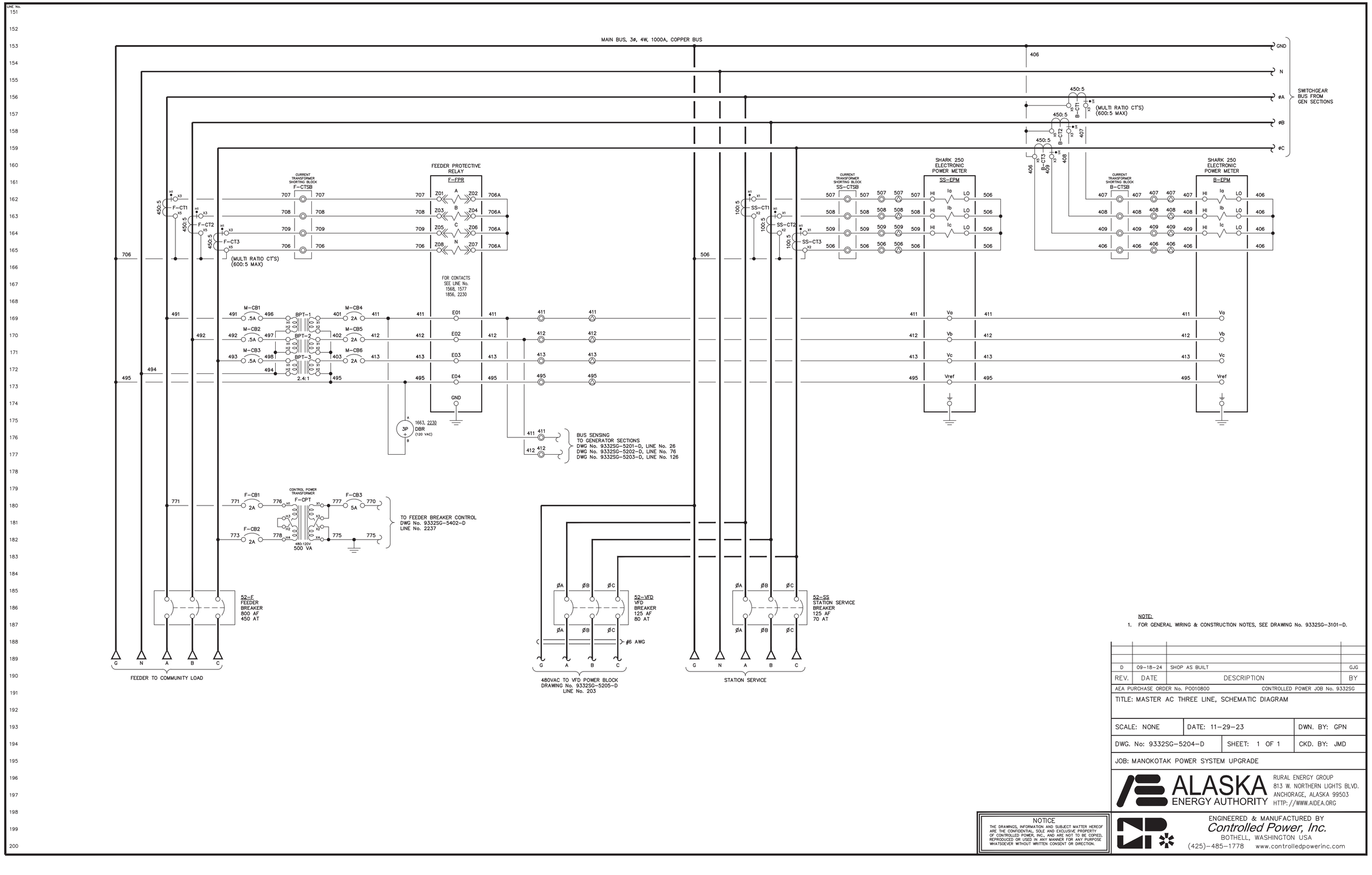

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: MASTER AC THREE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5204-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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CONTINUED FROM
DWG No. 9332SG-5204-D
LINE No. 189

G øA øB øC

#6 AWG

VFD-PSTB1
POWER SPLICER
TERMINAL BLOCK

#6 AWG
øA
øB
øC
G

PDTB-1
POWER DISTRIBUTION
TERMINAL BLOCK

PDTB-2
POWER DISTRIBUTION
TERMINAL BLOCK

#10 AWG

52-R1
15 A

52-R2
15 A

52-CAC1
15 A

52-CAC2
15 A

52-CAC3
15 A

R1 VFD MODE SWITCH
R1-VFDMS
VFD OFF BYPASS

R2 VFD MODE SWITCH
R2-VFDMS
VFD OFF BYPASS

CAC1 VFD MODE SWITCH
CAC1-VFDMS
VFD OFF BYPASS

CAC2 VFD MODE SWITCH
CAC2-VFDMS
VFD OFF BYPASS

CAC3 VFD MODE SWITCH
CAC3-VFDMS
VFD OFF BYPASS

BYPASS MODE

VFD MODE

R1-VFD

R2-VFD

CAC1-VFD

CAC2-VFD

CAC3-VFD

R1-C1

R2-C1

CAC1-C1

CAC2-C1

CAC3-C1

R1-O.L.

R2-O.L.

CAC1-O.L.

CAC2-O.L.

CAC3-O.L.

SEE NOTE 2

480V
7.5 HP

RADIATOR 1
MOTOR

RADIATOR 2
MOTOR

480V
5 HP

GEN 1 CHARGE AIR COOLER
MOTOR

GEN 2 CHARGE AIR COOLER
MOTOR

GEN 3 CHARGE AIR COOLER
MOTOR

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.
2. VFD LOAD WIRES SHALL BE ROUTED SEPARATE FROM ALL OTHER WIRING OR SHIELDED TO AVOID RF INTERFERENCE.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: VFD AC THREE LINE, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5205-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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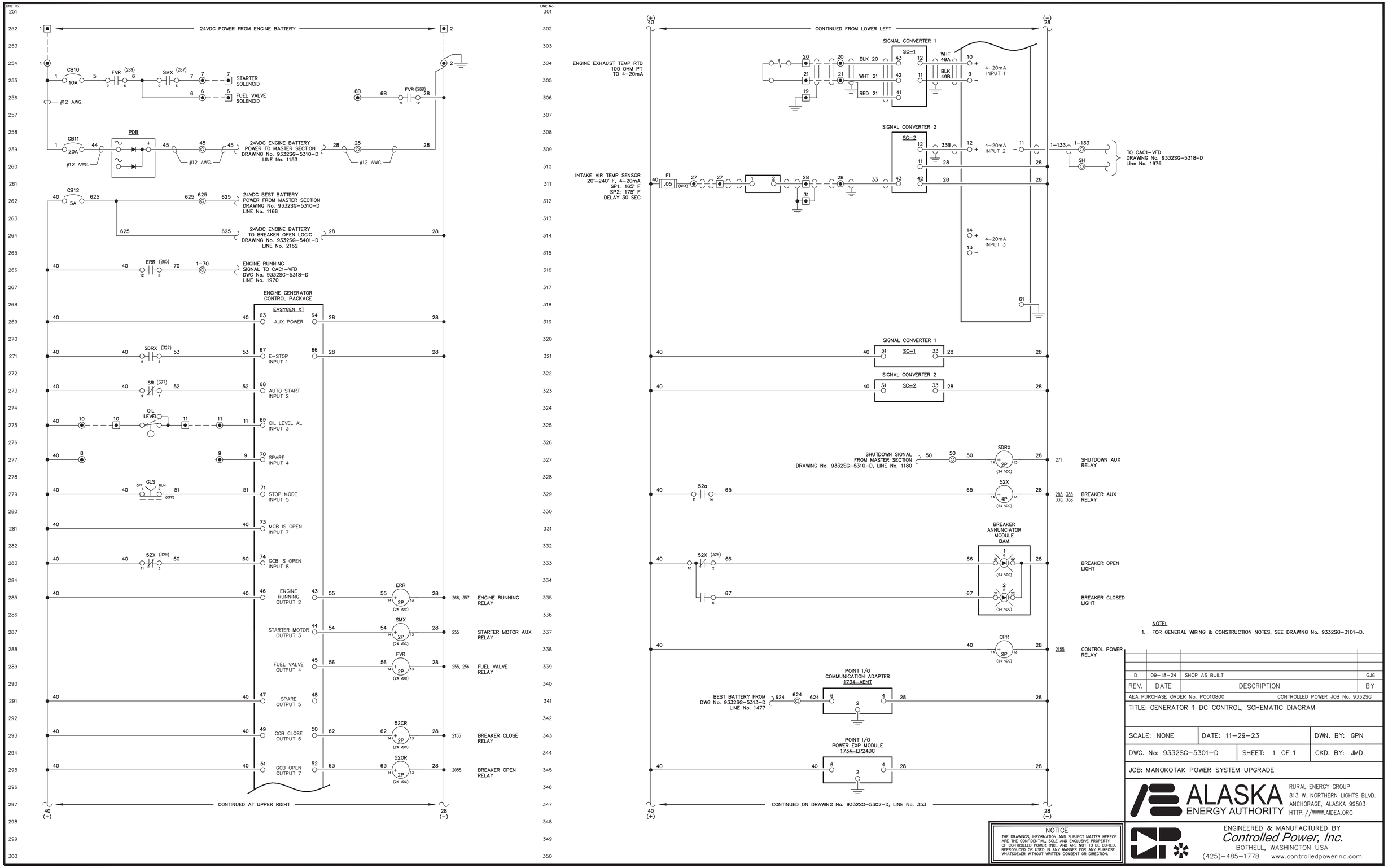

NOTE:

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REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5301-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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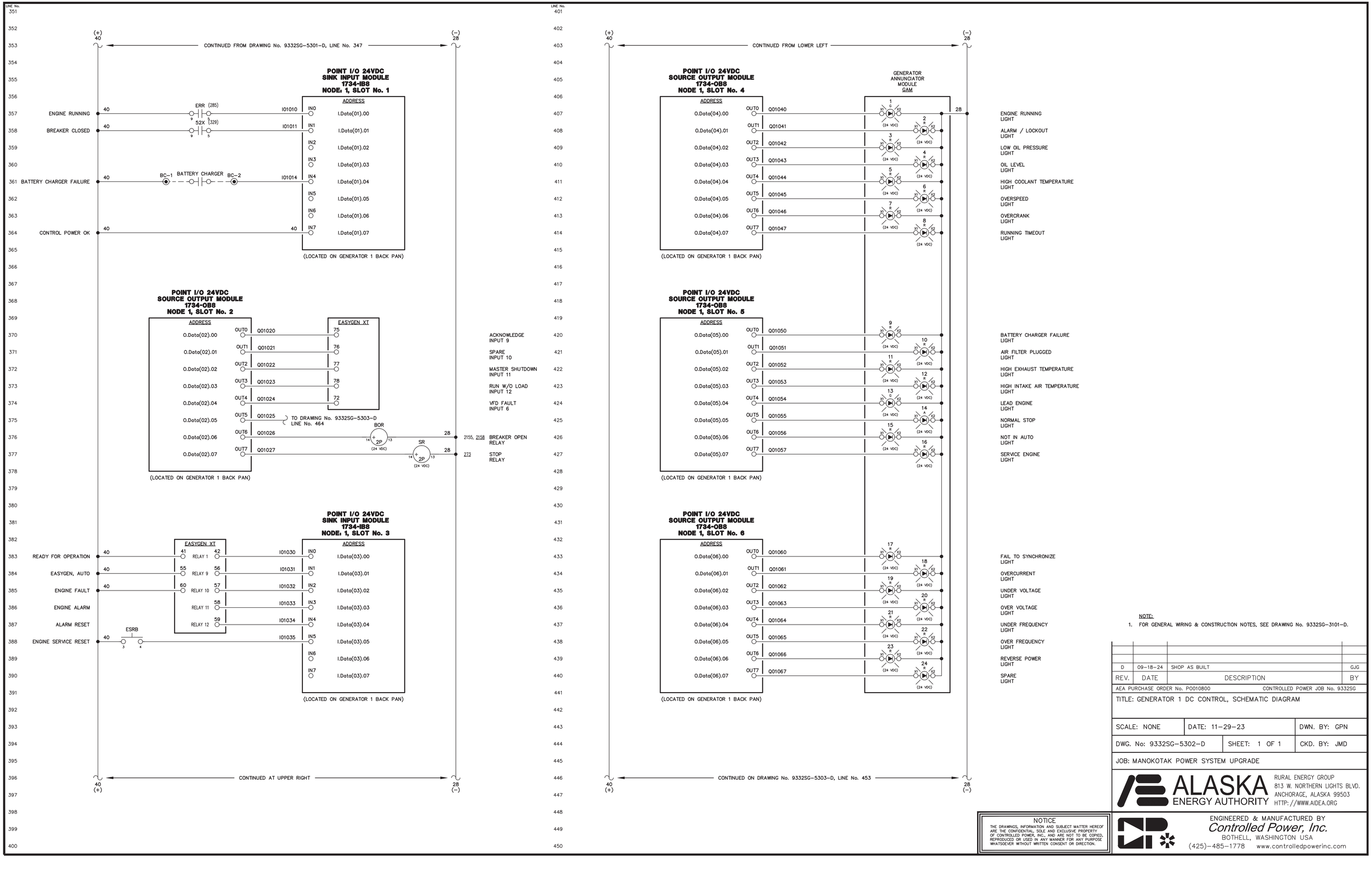

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5302-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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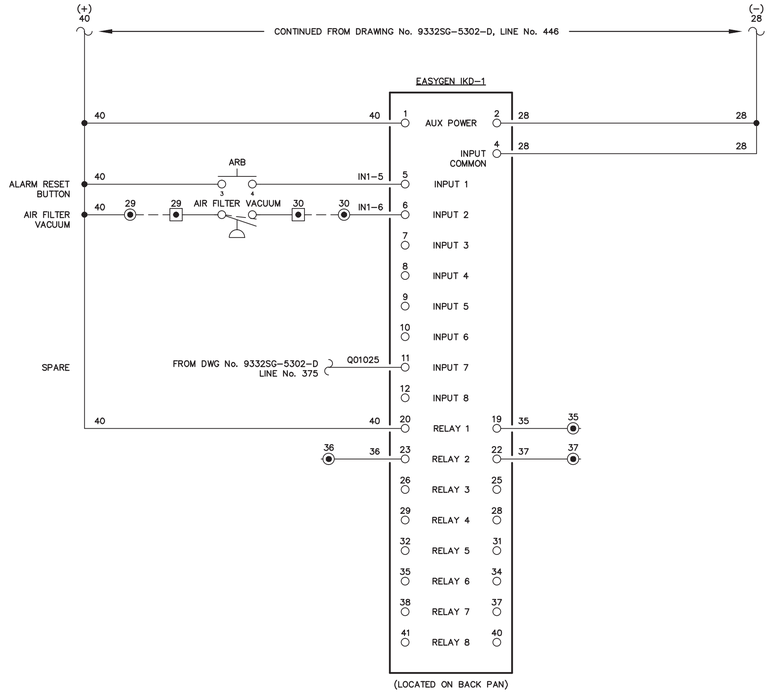

NOTE:

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REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 1 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–5303–D	SHEET: 1 OF 1	CKD. BY: JMD

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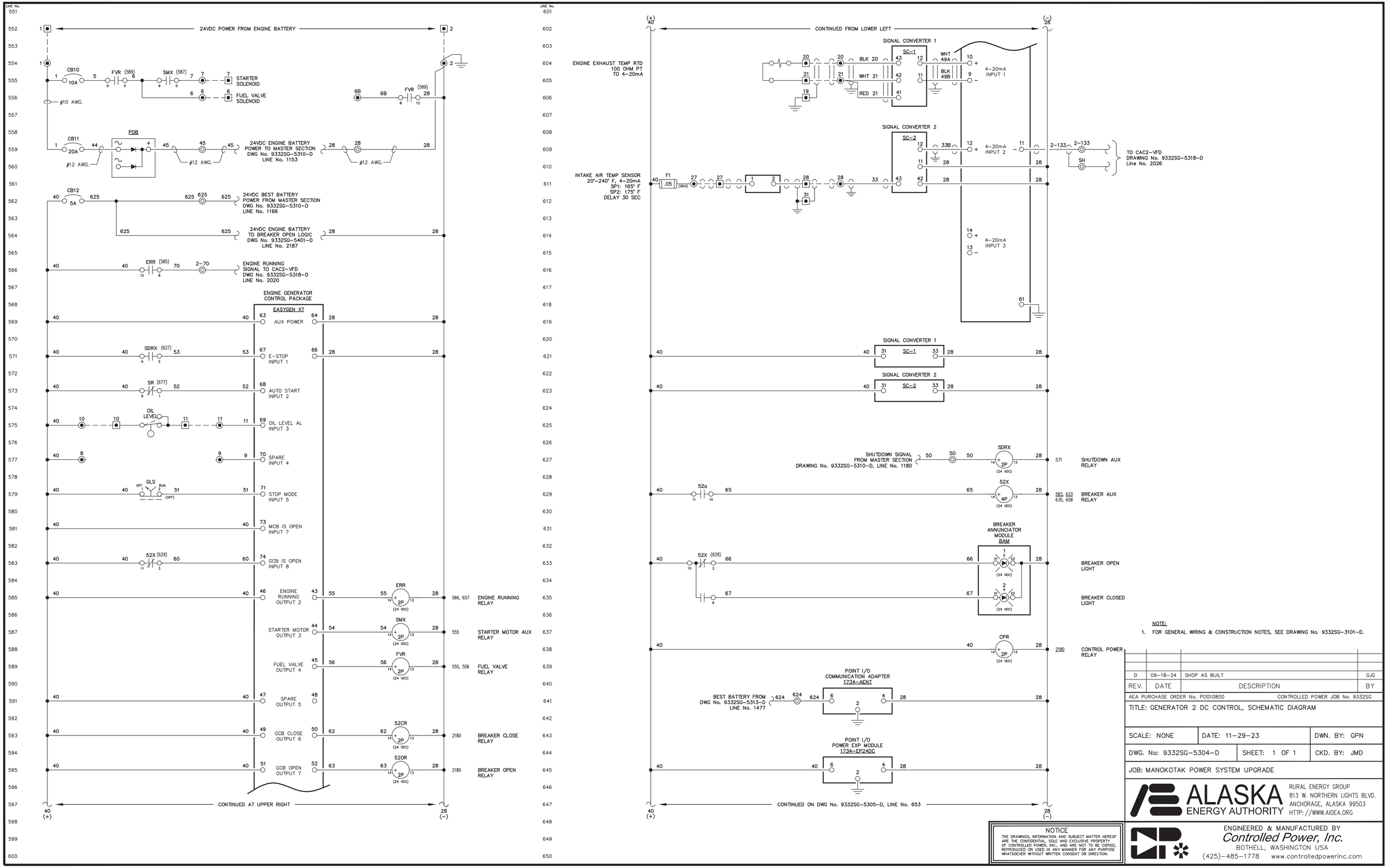

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5304-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
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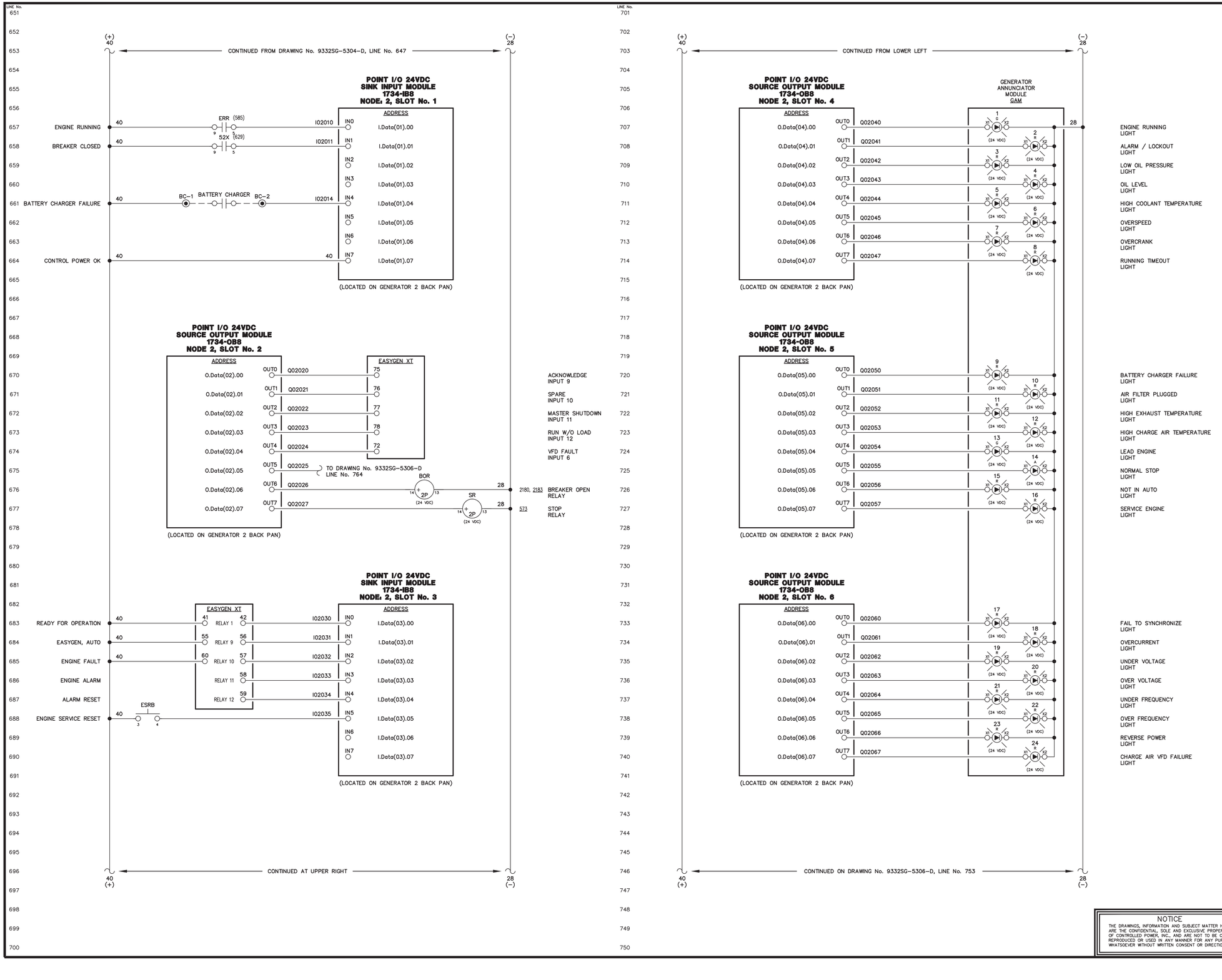

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5305-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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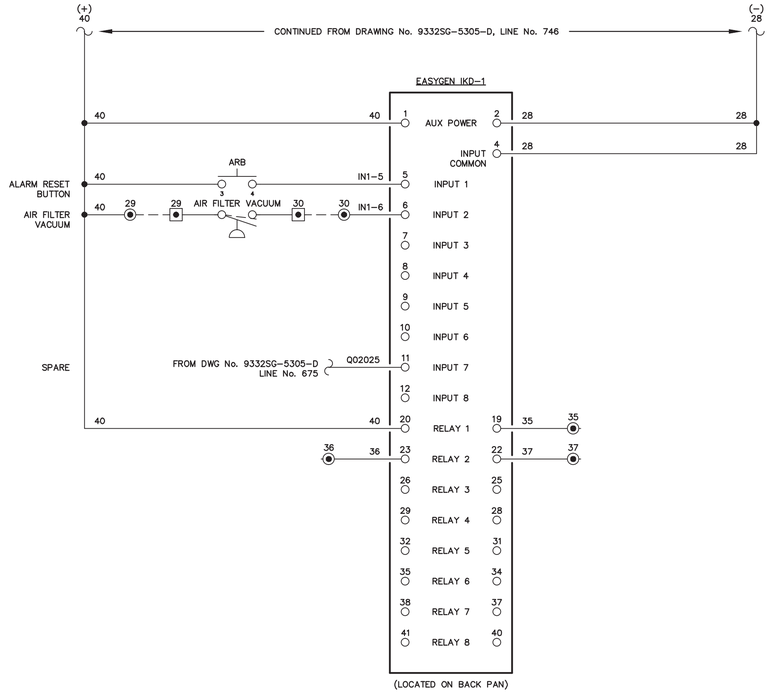

NOTE:

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REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 2 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–5306–D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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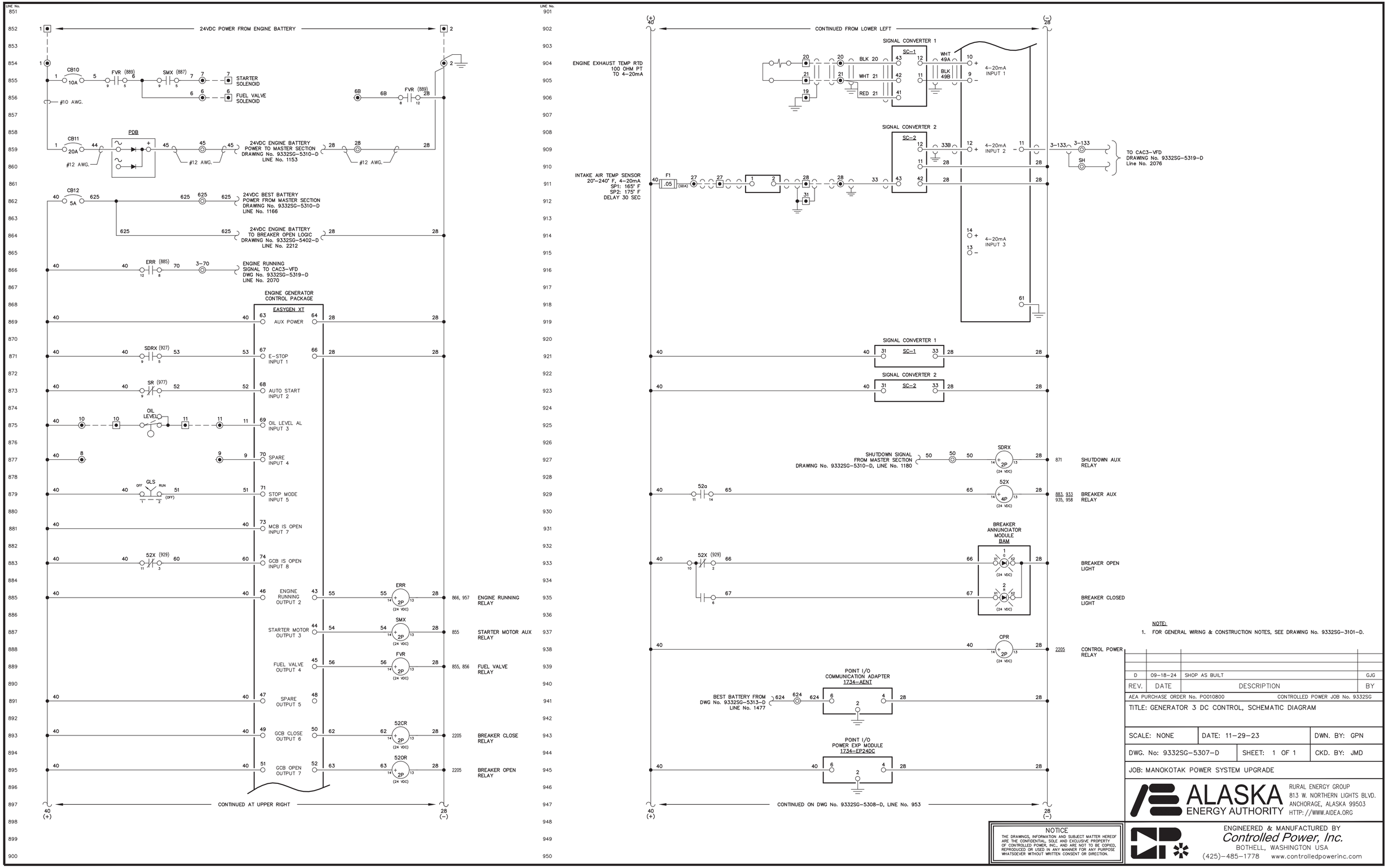

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5307-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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CONTINUED FROM DRAWING No. 9332SG-5307-D, LINE No. 947

(+) 40 — (−) 28

POINT I/O 24VDC SINK INPUT MODULE 1734-IB8 NODE: 3, SLOT No. 1

				ADDRESS
ENGINE RUNNING	40	ERR (885) 9 X 5	I03010 IN0	I.Data(01).00
BREAKER CLOSED	40	52X (929) 9 X 5	I03011 IN1	I.Data(01).01
			IN2	I.Data(01).02
			IN3	I.Data(01).03
BATTERY CHARGER FAILURE	40	BC-1 BATTERY CHARGER BC-2	I03014 IN4	I.Data(01).04
			IN5	I.Data(01).05
			IN6	I.Data(01).06
CONTROL POWER OK	40	40	IN7	I.Data(01).07

(LOCATED ON GENERATOR 3 BACK PAN)

POINT I/O 24VDC SOURCE OUTPUT MODULE 1734-OB8 NODE 3, SLOT No. 2

ADDRESS			EASYGEN XT		
O.Data(02).00	OUT0	Q03020	75		ACKNOWLEDGE INPUT 9
O.Data(02).01	OUT1	Q03021	76		SPARE INPUT 10
O.Data(02).02	OUT2	Q03022	77		MASTER SHUTDOWN INPUT 11
O.Data(02).03	OUT3	Q03023	78		BREAKER LOGIC INPUT 12
O.Data(02).04	OUT4	Q03024	72		VFD FAULT INPUT 6
O.Data(02).05	OUT5	Q03025	TO DRAWING No. 9332SG-5309-D LINE No. 1064		
O.Data(02).06	OUT6	Q03026	BOR 14 2P 13 (24 VDC)	28	2205, 2208 BREAKER OPEN RELAY
O.Data(02).07	OUT7	Q03027	SR 14 2P 13 (24 VDC)	28	873 STOP RELAY

(LOCATED ON GENERATOR 3 BACK PAN)

POINT I/O 24VDC SINK INPUT MODULE 1734-IB8 NODE: 3, SLOT No. 3

		EASYGEN XT		ADDRESS	
READY FOR OPERATION	40	41 RELAY 1 42	I03030 IN0	I.Data(03).00	
EASYGEN, AUTO	40	55 RELAY 9 56	I03031 IN1	I.Data(03).01	
ENGINE FAULT	40	60 RELAY 10 57	I03032 IN2	I.Data(03).02	
ENGINE ALARM		RELAY 11 58	I03033 IN3	I.Data(03).03	
ALARM RESET		RELAY 12 59	I03034 IN4	I.Data(03).04	
ENGINE SERVICE RESET	40 ESRB 3 4		I03035 IN5	I.Data(03).05	
			IN6	I.Data(03).06	
			IN7	I.Data(03).07	

(LOCATED ON GENERATOR 3 BACK PAN)

CONTINUED AT UPPER RIGHT

(+) 40 — (−) 28

CONTINUED FROM LOWER LEFT

(+) 40 — (−) 28

POINT I/O 24VDC SOURCE OUTPUT MODULE 1734-OB8 NODE 3, SLOT No. 4

ADDRESS			GENERATOR ANNUNCIATOR MODULE GAM		
O.Data(04).00	OUT0	Q03040	1 G (24 VDC)	28	ENGINE RUNNING LIGHT
O.Data(04).01	OUT1	Q03041	2 R (24 VDC)		ALARM / LOCKOUT LIGHT
O.Data(04).02	OUT2	Q03042	3 R (24 VDC)		LOW OIL PRESSURE LIGHT
O.Data(04).03	OUT3	Q03043	4 R (24 VDC)		OIL LEVEL LIGHT
O.Data(04).04	OUT4	Q03044	5 R (24 VDC)		HIGH COOLANT TEMPERATURE LIGHT
O.Data(04).05	OUT5	Q03045	6 R (24 VDC)		OVERSPEED LIGHT
O.Data(04).06	OUT6	Q03046	7 R (24 VDC)		OVERCRANK LIGHT
O.Data(04).07	OUT7	Q03047	8 R (24 VDC)		RUNNING TIMEOUT LIGHT

(LOCATED ON GENERATOR 3 BACK PAN)

POINT I/O 24VDC SOURCE OUTPUT MODULE 1734-OB8 NODE 3, SLOT No. 5

ADDRESS					
O.Data(05).00	OUT0	Q03050	9 R (24 VDC)		BATTERY CHARGER FAILURE LIGHT
O.Data(05).01	OUT1	Q03051	10 R (24 VDC)		AIR FILTER PLUGGED LIGHT
O.Data(05).02	OUT2	Q03052	11 R (24 VDC)		HIGH EXHAUST TEMPERATURE LIGHT
O.Data(05).03	OUT3	Q03053	12 R (24 VDC)		HIGH CHARGE AIR TEMPERATURE LIGHT
O.Data(05).04	OUT4	Q03054	13 G (24 VDC)		LEAD ENGINE LIGHT
O.Data(05).05	OUT5	Q03055	14 A (24 VDC)		NORMAL STOP LIGHT
O.Data(05).06	OUT6	Q03056	15 R (24 VDC)		NOT IN AUTO LIGHT
O.Data(05).07	OUT7	Q03057	16 R (24 VDC)		SERVICE ENGINE LIGHT

(LOCATED ON GENERATOR 3 BACK PAN)

POINT I/O 24VDC SOURCE OUTPUT MODULE 1734-OB8 NODE 3, SLOT No. 6

ADDRESS				
O.Data(06).00	OUT0	Q03060	17 R (24 VDC)	FAIL TO SYNCHRONIZE LIGHT
O.Data(06).01	OUT1	Q03061	18 R (24 VDC)	OVERCURRENT LIGHT
O.Data(06).02	OUT2	Q03062	19 R (24 VDC)	UNDER VOLTAGE LIGHT
O.Data(06).03	OUT3	Q03063	20 R (24 VDC)	OVER VOLTAGE LIGHT
O.Data(06).04	OUT4	Q03064	21 R (24 VDC)	UNDER FREQUENCY LIGHT
O.Data(06).05	OUT5	Q03065	22 R (24 VDC)	OVER FREQUENCY LIGHT
O.Data(06).06	OUT6	Q03066	23 R (24 VDC)	REVERSE POWER LIGHT
O.Data(06).07	OUT7	Q03067	24 R (24 VDC)	CHARGE AIR VFD FAILURE LIGHT

(LOCATED ON GENERATOR 3 BACK PAN)

CONTINUED ON DRAWING No. 9332SG-5309-D, LINE No. 1053

(+) 40 — (−) 28

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5308-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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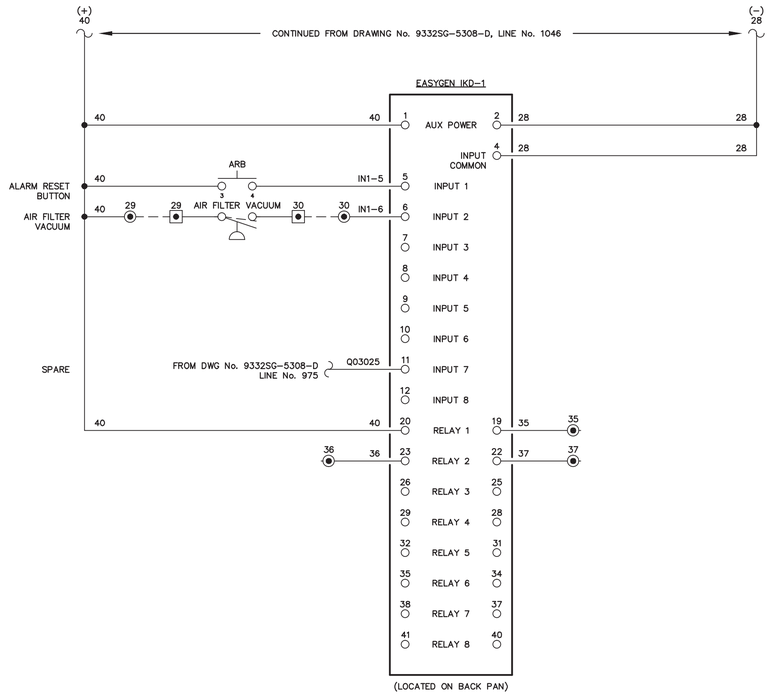

NOTE:

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REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GENERATOR 3 DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–5309–D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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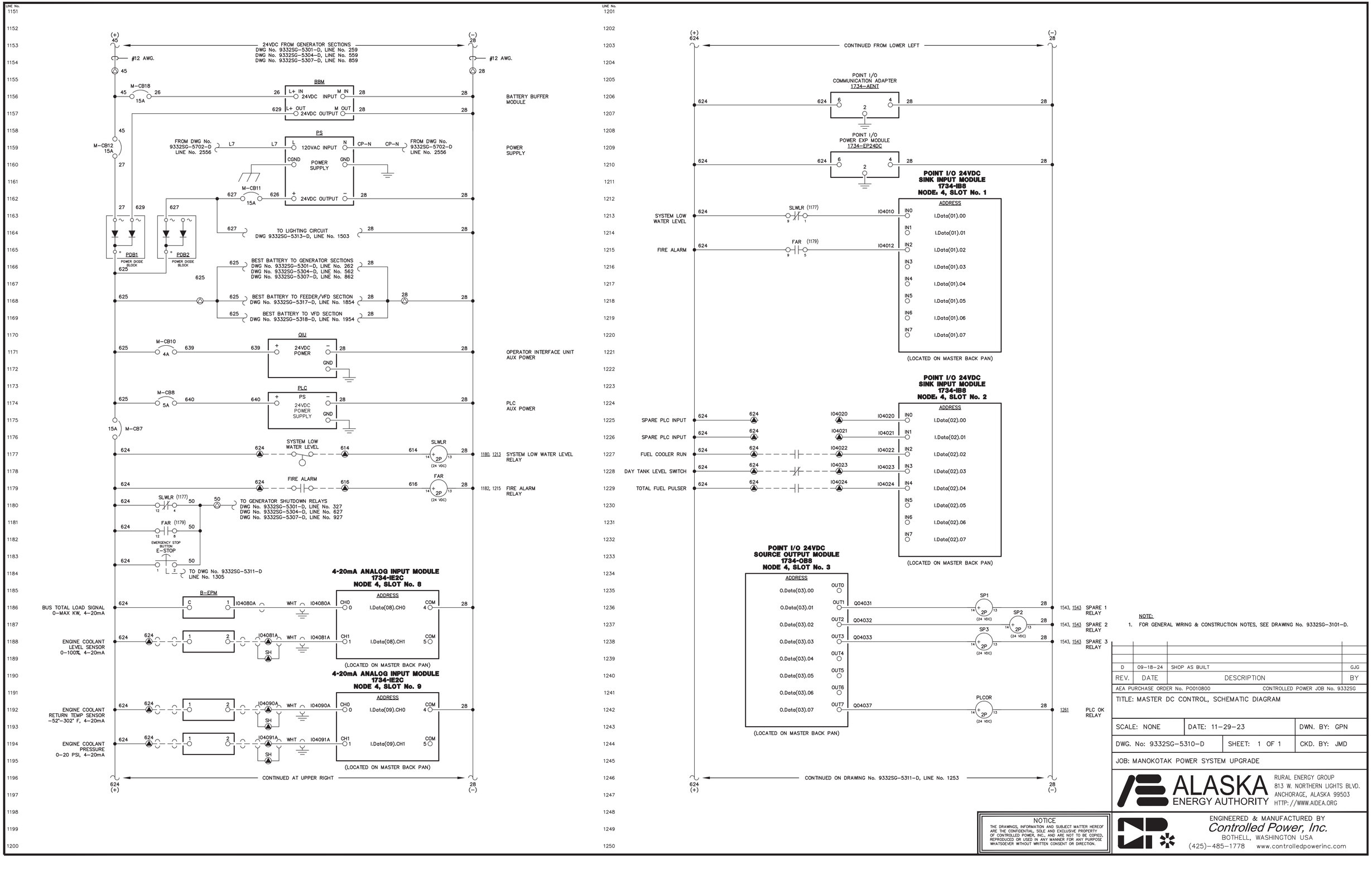
24VDC FROM GENERATOR SECTIONS
DWG No. 9332SG-5301-D, LINE No. 259
DWG No. 9332SG-5304-D, LINE No. 559
DWG No. 9332SG-5307-D, LINE No. 859
#12 AWG.
BBM
M-CB18
15A
L+ IN
M IN
24VDC INPUT
L+ OUT
M OUT
24VDC OUTPUT
BATTERY BUFFER MODULE
PS
M-CB12
15A
FROM DWG No. 9332SG-5702-D LINE No. 2556
L7
CP-N
120VAC INPUT
CGND
GND
POWER SUPPLY
POWER SUPPLY
M-CB11
15A
24VDC OUTPUT
PDB1
PDB2
POWER DIODE BLOCK
TO LIGHTING CIRCUIT
DWG 9332SG-5313-D, LINE No. 1503
BEST BATTERY TO GENERATOR SECTIONS
DWG No. 9332SG-5301-D, LINE No. 262
DWG No. 9332SG-5304-D, LINE No. 562
DWG No. 9332SG-5307-D, LINE No. 862
BEST BATTERY TO FEEDER/VFD SECTION
DWG No. 9332SG-5317-D, LINE No. 1854
BEST BATTERY TO VFD SECTION
DWG No. 9332SG-5318-D, LINE No. 1954
OIU
M-CB10
4A
24VDC POWER
GND
OPERATOR INTERFACE UNIT AUX POWER
PLC
M-CB8
5A
PS
24VDC POWER SUPPLY
GND
PLC AUX POWER
M-CB7
15A
SYSTEM LOW WATER LEVEL
SLWLR
2P
(24 VDC)
1180, 1213 SYSTEM LOW WATER LEVEL RELAY
FIRE ALARM
FAR
1182, 1215 FIRE ALARM RELAY
SLWLR (1177)
TO GENERATOR SHUTDOWN RELAYS
DWG No. 9332SG-5301-D, LINE No. 327
DWG No. 9332SG-5304-D, LINE No. 627
DWG No. 9332SG-5307-D, LINE No. 927
FAR (1179)
EMERGENCY STOP BUTTON
E-STOP
TO DWG No. 9332SG-5311-D LINE No. 1305
4-20mA ANALOG INPUT MODULE
1734-IE2C
NODE 4, SLOT No. 8
B-EPM
BUS TOTAL LOAD SIGNAL 0-MAX KW, 4-20mA
ENGINE COOLANT LEVEL SENSOR 0-100%, 4-20mA
I04080A
I04081A
WHT
SH
ADDRESS
CH0
CH1
COM
I.Data(08).CH0
I.Data(08).CH1
(LOCATED ON MASTER BACK PAN)
4-20mA ANALOG INPUT MODULE
1734-IE2C
NODE 4, SLOT No. 9
ENGINE COOLANT RETURN TEMP SENSOR -52°-302° F, 4-20mA
ENGINE COOLANT PRESSURE 0-20 PSI, 4-20mA
I04090A
I04091A
I.Data(09).CH0
I.Data(09).CH1
(LOCATED ON MASTER BACK PAN)
CONTINUED AT UPPER RIGHT
CONTINUED FROM LOWER LEFT
POINT I/O COMMUNICATION ADAPTER
1734-AENT
POINT I/O POWER EXP MODULE
1734-EP24DC
POINT I/O 24VDC SINK INPUT MODULE
1734-IB8
NODE 4, SLOT No. 1
SYSTEM LOW WATER LEVEL
FIRE ALARM
I04010
I04012
I.Data(01).00
I.Data(01).01
I.Data(01).02
I.Data(01).03
I.Data(01).04
I.Data(01).05
I.Data(01).06
I.Data(01).07
(LOCATED ON MASTER BACK PAN)
POINT I/O 24VDC SINK INPUT MODULE
1734-IB8
NODE 4, SLOT No. 2
SPARE PLC INPUT
SPARE PLC INPUT
FUEL COOLER RUN
DAY TANK LEVEL SWITCH
TOTAL FUEL PULSER
I04020
I04021
I04022
I04023
I04024
I.Data(02).00
I.Data(02).01
I.Data(02).02
I.Data(02).03
I.Data(02).04
I.Data(02).05
I.Data(02).06
I.Data(02).07
(LOCATED ON MASTER BACK PAN)
POINT I/O 24VDC SOURCE OUTPUT MODULE
1734-OB8
NODE 4, SLOT No. 3
O.Data(03).00
O.Data(03).01
O.Data(03).02
O.Data(03).03
O.Data(03).04
O.Data(03).05
O.Data(03).06
O.Data(03).07
Q04031
Q04032
Q04033
Q04037
SP1
SP2
SP3
PLCOR
1543, 1543 SPARE 1 RELAY
1543, 1543 SPARE 2 RELAY
1543, 1543 SPARE 3 RELAY
1261 PLC OK RELAY
(LOCATED ON MASTER BACK PAN)
CONTINUED ON DRAWING No. 9332SG-5311-D, LINE No. 1253
NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.
D 09-18-24 SHOP AS BUILT GJG
REV. DATE DESCRIPTION BY
AEA PURCHASE ORDER No. P0010800 CONTROLLED POWER JOB No. 9332SG
TITLE: MASTER DC CONTROL, SCHEMATIC DIAGRAM
SCALE: NONE DATE: 11-29-23 DWN. BY: GPN
DWG. No: 9332SG-5310-D SHEET: 1 OF 1 CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE
ALASKA ENERGY AUTHORITY
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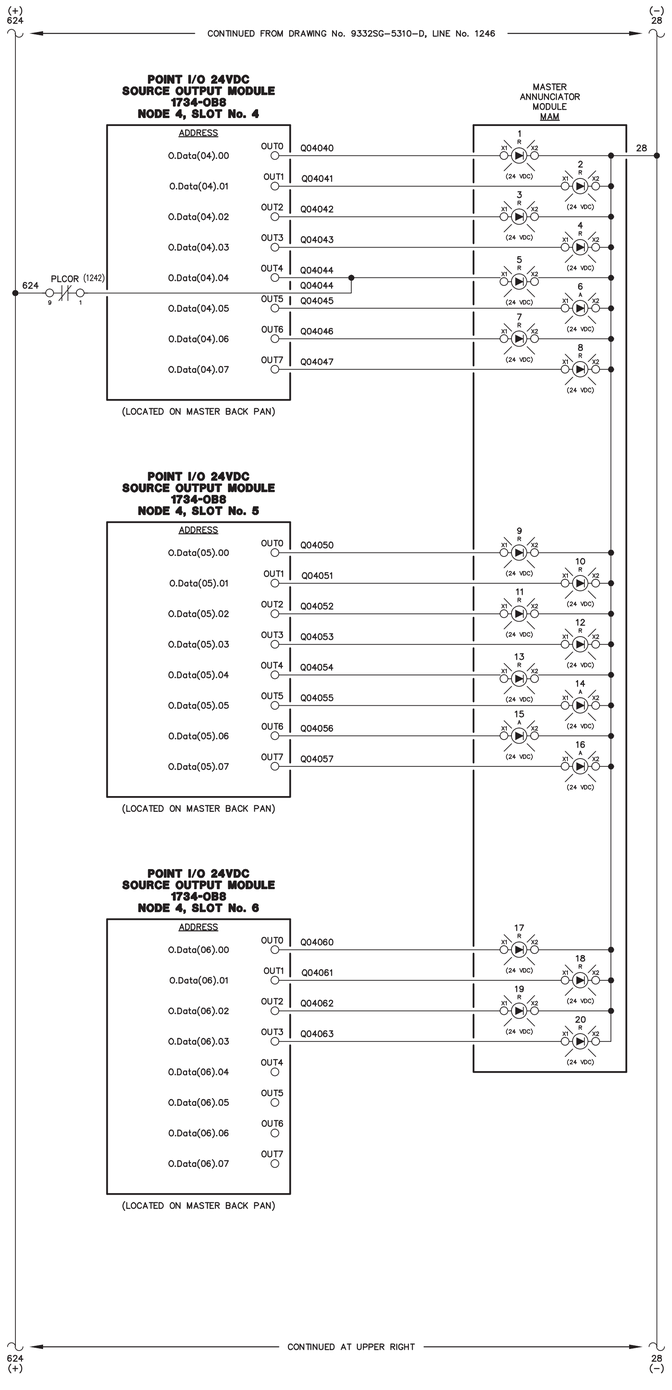

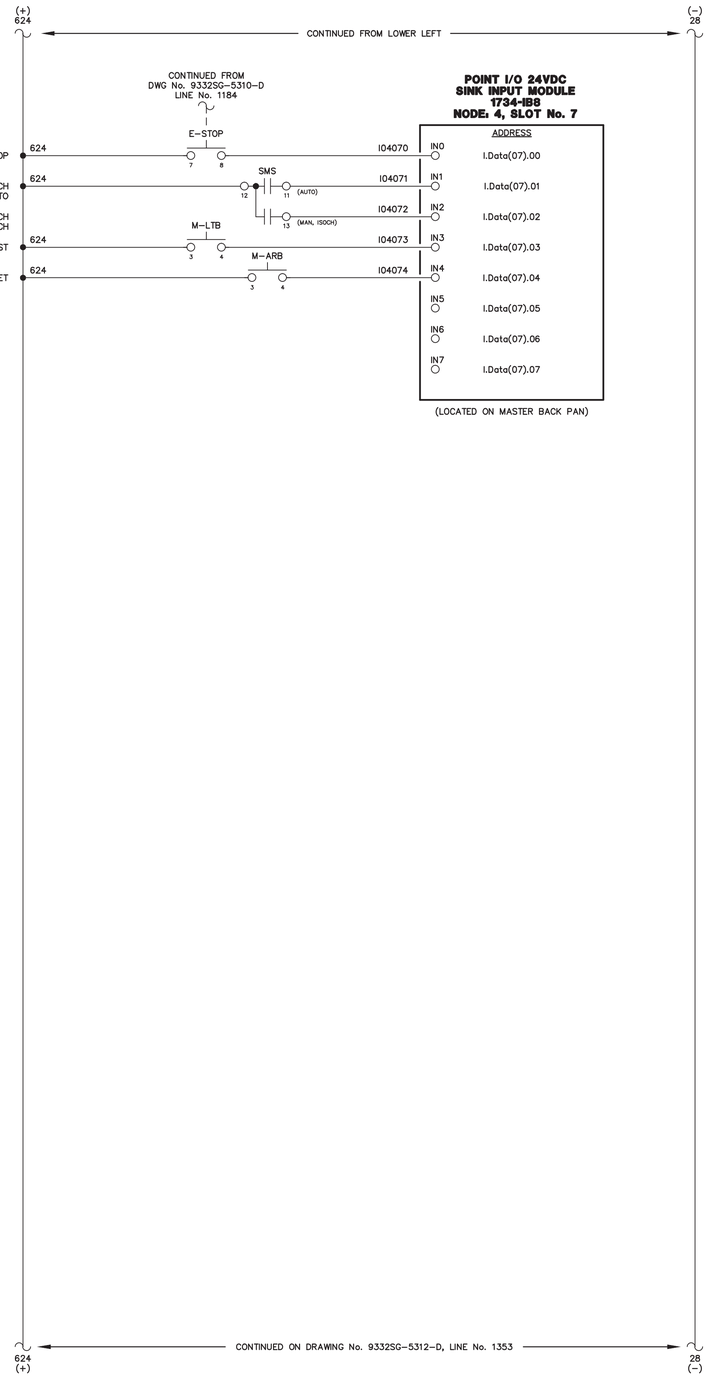

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REV.	DATE	DESCRIPTION	BY
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AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: MASTER DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5311-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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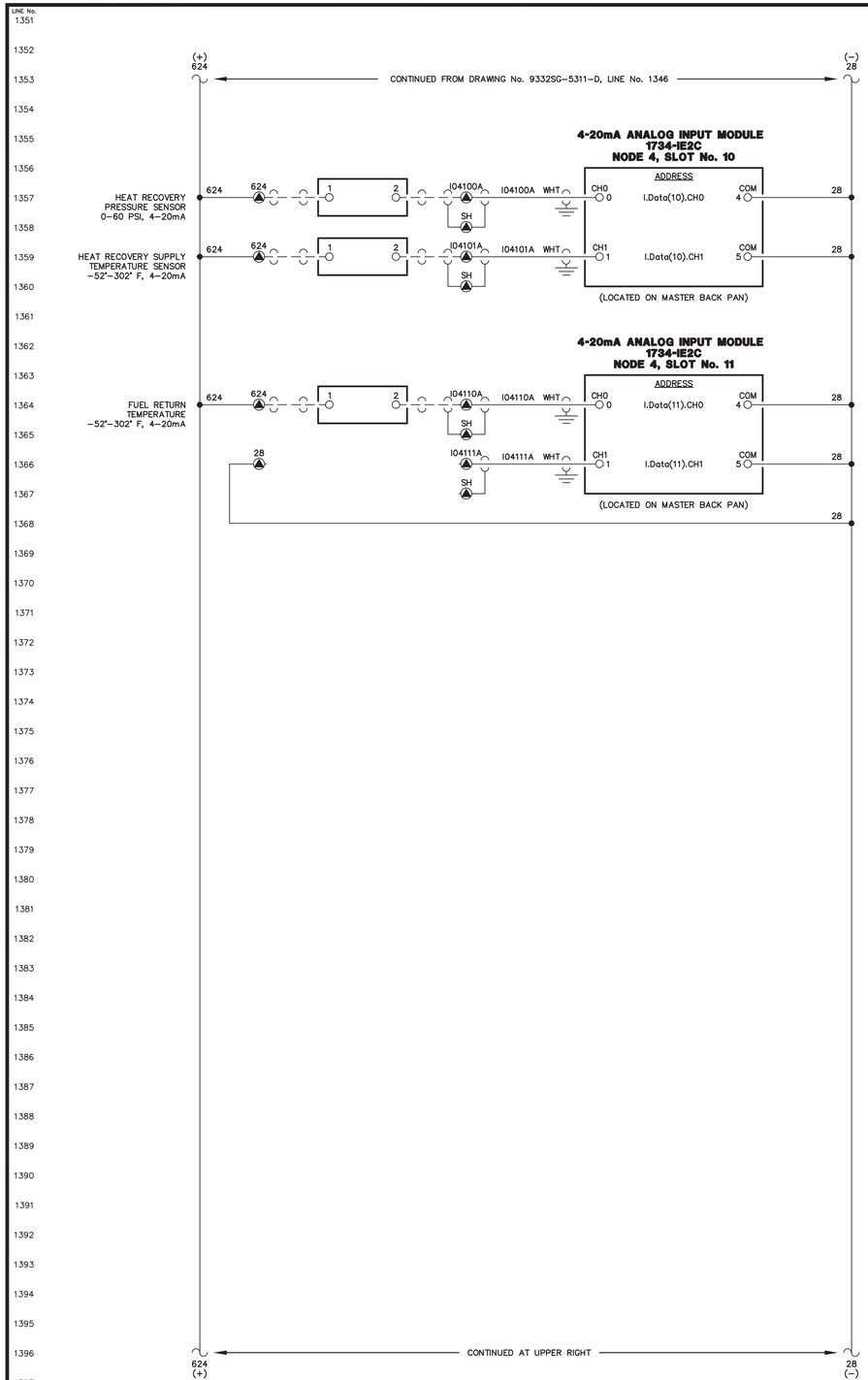

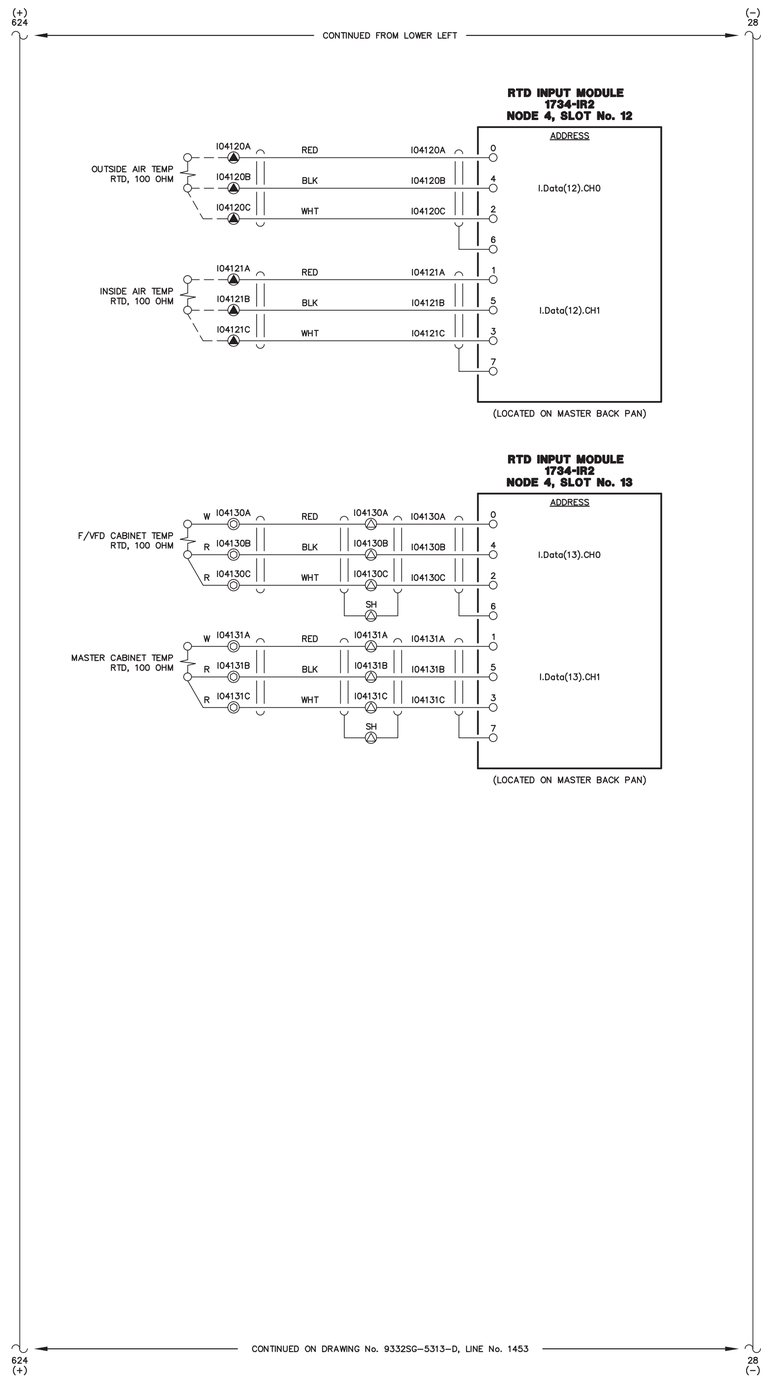

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REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: MASTER DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5312-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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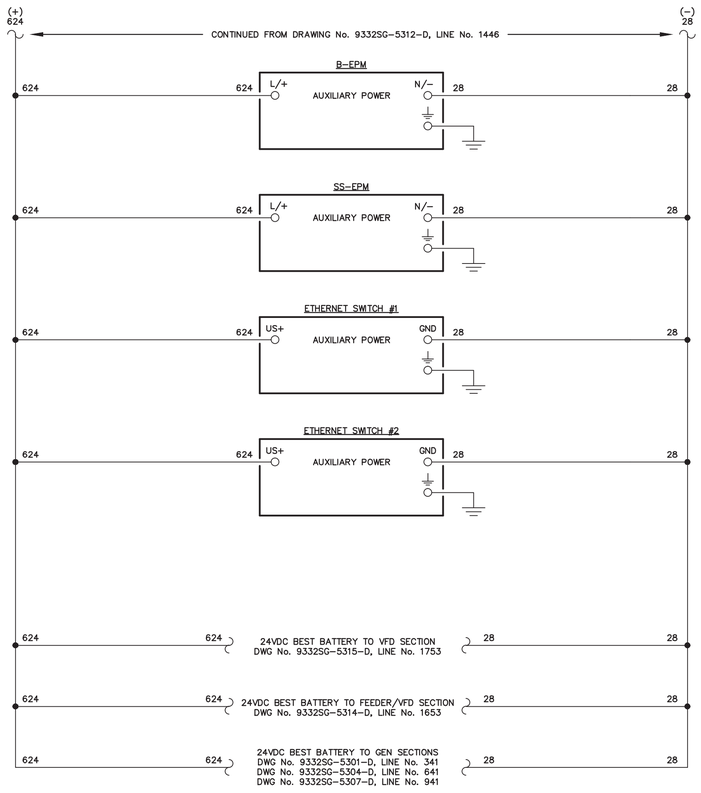

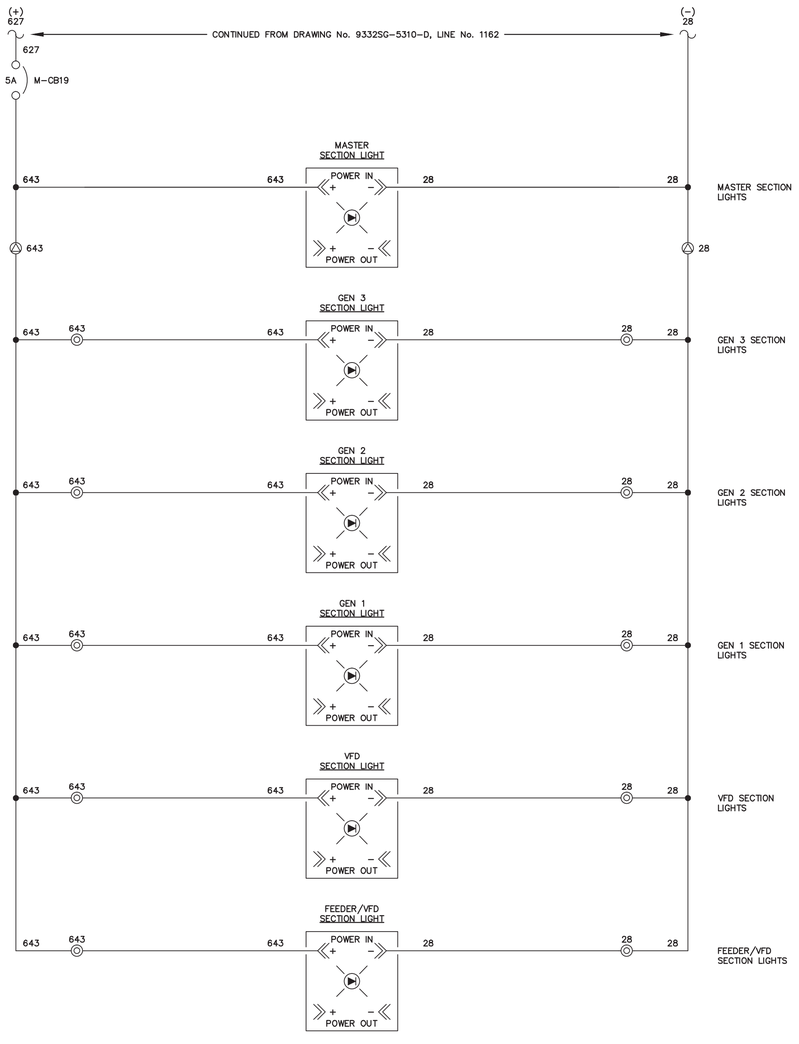

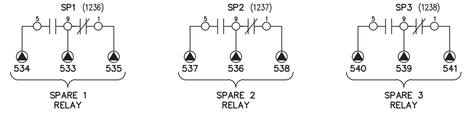

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REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: MASTER DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5313-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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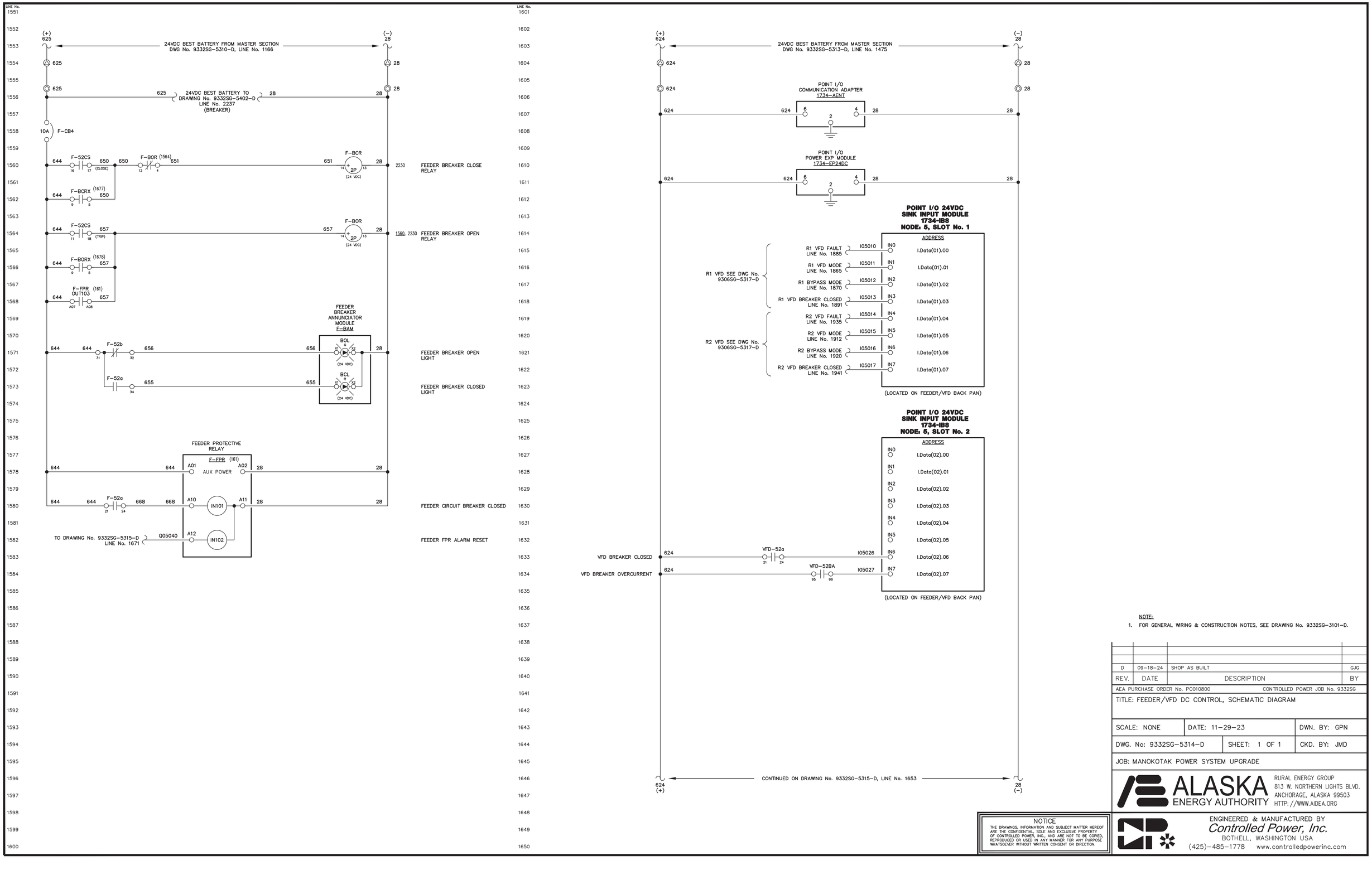

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: FEEDER/VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5314-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
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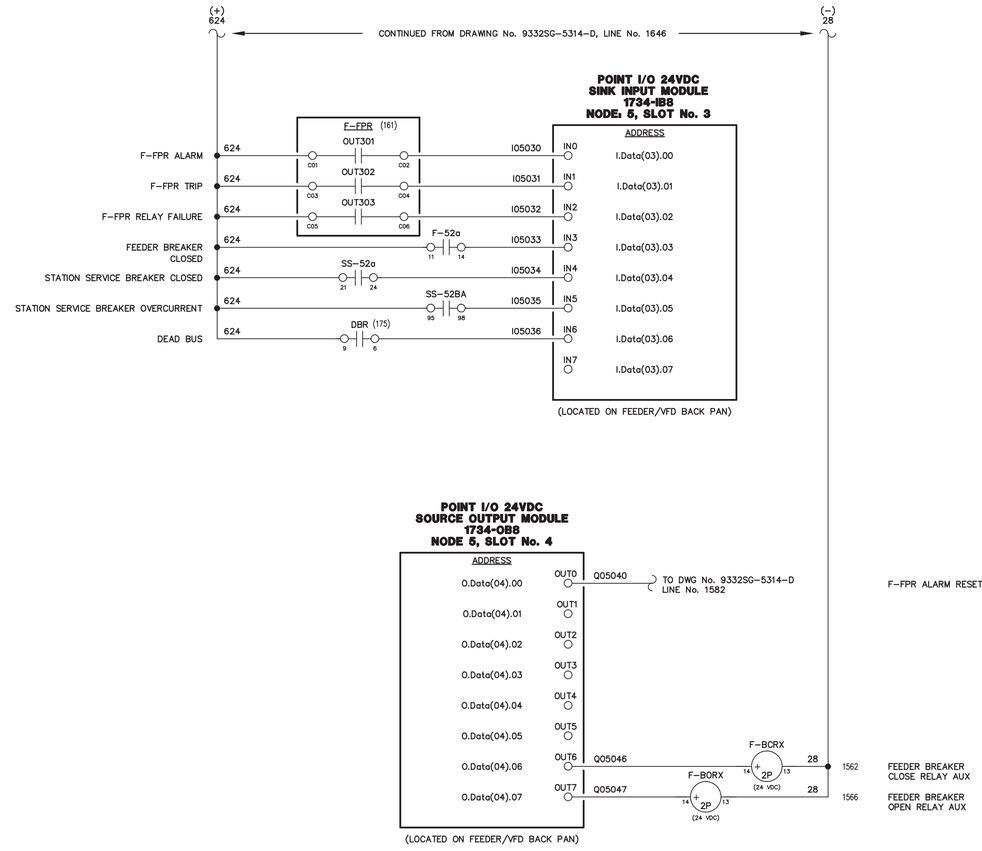

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG−3101−D.

REV.	DATE	DESCRIPTION	BY
D	09−18−24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: FEEDER/VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11−29−23	DWN. BY: GPN
DWG. No: 9332SG−5315−D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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ANCHORAGE, ALASKA 99503
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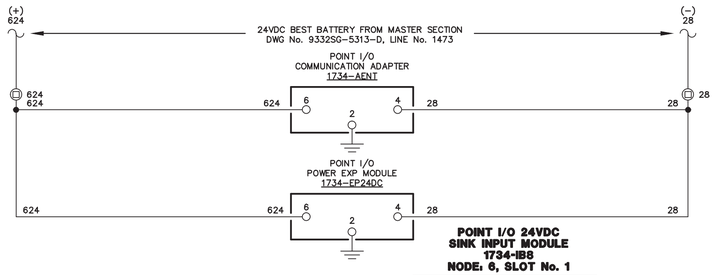
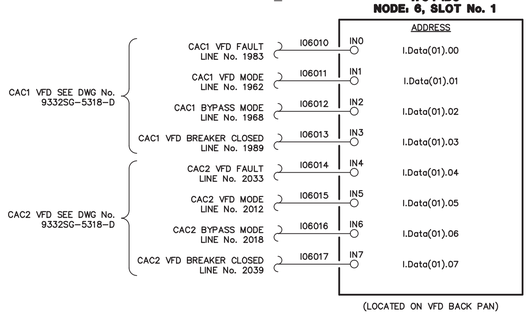
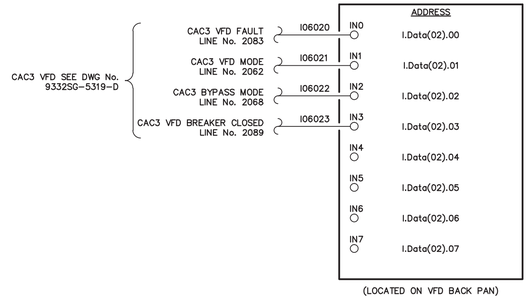


POINT I/O 24VDC SINK INPUT MODULE 1734-IB8 NODE: 6, SLOT No. 1



(LOCATED ON VFD BACK PAN)

POINT I/O 24VDC SINK INPUT MODULE 1734-IB8 NODE: 6, SLOT No. 2



(LOCATED ON VFD BACK PAN)

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5316-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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RADIATOR 1 VFD

R1

(+) 625 — 24VDC BEST BATTERY FROM MASTER SECTION DWG No. 9332SG-5314-D, LINE No. 1557 — (-) 28

625 — R1-CB1 10A — R1-2 — R1-2 — R1-VFDMS RADIATOR 1 VFD MODE (OFF / VFD / BYPASS) 34 — 33 (VFD) — R1-3

VFD ANNUNCIATOR MODULE R1-VAM

R1-3 — 1 C (X1 X2) (24 VDC) — 28 — R1 VFD MODE LIGHT

R1-3 — R1-VFDRR (1873) 9 — 5 — R1-4 — 2 C (X1 X2) (24 VDC) — 28 — R1 VFD RUNNING LIGHT

I05011 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1616

R1-3 — R1-C1 (A1 A2) (24 VDC) — 28 — R1 VFD ISOLATION CONTACTOR 1

64 — R1-6 — 63 (BYPASS) — R1-6 — 3 A (X1 X2) (24 VDC) — 28 — R1 VFD BYPASS MODE LIGHT

44 — R1-11 — 43 (VFD)

54 — R1-11 — 53 (BYPASS)

I05012 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1617

RADIATOR 1 VFD RUNNING

R1-11 — R2C — R2A — R1-70 — R1-70 — 14 3P 13 (24 VDC) — 28 — 1861 — R1 VFD RUNNING RELAY

R1-11 — R1-11 — +24 — R1-VFD ATV320 — COM — 28 — 28

RADIATOR TEMP SENSOR 20°-240° F, 4-20mA — R1-11 — 1 — 2 — R1-56 — W — AI3 — ANALOG INPUT 3 — COM — 28 — 28 — SH

R1-11 — R1-11 — DI1 — RUN

R1-11 — R1-11 — R1C — FAULT — R1-12 — R1B

28 — 4 R (X1 X2) (24 VDC) — R1-12 — R1 VFD FAULT LIGHT

I05010 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1615

R1-11 — 52-R1A/B (11 12) — R1-13 — R1-13 — 5 R (X1 X2) (24 VDC) — R1 BREAKER OPEN LIGHT

6 A (X1 X2) (24 VDC) — R1 SPARE LIGHT

R1-14 (14) — R1-OL (97 98) — R1-15 — R1-15 — 52-R1 (C1 C2) — 28 — R1-52 SHUNT TRIP

I05013 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1818

625 (+) — CONTINUED AT UPPER RIGHT — 28 (-)

RADIATOR 2 VFD

R2

(+) 625 — CONTINUED FROM LOWER LEFT — (-) 28

625 — R2-CB1 10A — R2-2 — R2-2 — R2-VFDMS RADIATOR 2 VFD MODE (OFF / VFD / BYPASS) 34 — 33 (VFD) — R2-3

VFD ANNUNCIATOR MODULE R2-VAM

R2-3 — 1 C (X1 X2) (24 VDC) — 28 — R2 VFD MODE LIGHT

R2-3 — R2-VFDRR (1923) 9 — 5 — R2-4 — 2 C (X1 X2) (24 VDC) — 28 — R2 VFD RUNNING LIGHT

I05015 — TO PLC INPUT DWG No.9332SG-5314-D LINE No. 1620

R2-3 — R2-C1 (A1 A2) (24 VDC) — 28 — R2 ISOLATION CONTACTOR 1

64 — R2-6 — 63 (BYPASS) — R2-6 — 3 A (X1 X2) (24 VDC) — 28 — R2 VFD BYPASS MODE LIGHT

44 — R2-11 — 43 (VFD)

54 — R2-11 — 53 (BYPASS)

I05016 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1621

RADIATOR 2 VFD RUNNING

R2-11 — R2C — R2A — R2-70 — R2-70 — 14 3P 13 (24 VDC) — 28 — 1911 — R2 VFD RUNNING RELAY

R2-11 — R2-11 — +24 — R2-VFD ATV320 — COM — 28 — 28

RADIATOR TEMP SENSOR 20°-240° F, 4-20mA — R2-11 — 1 — 2 — R2-56 — W — AI3 — ANALOG INPUT 3 — COM — 28 — 28 — SH

R2-11 — R2-11 — DI1 — RUN

R2-11 — R2-11 — R1C — FAULT — R2-12 — R1B

28 — 4 R (X1 X2) (24 VDC) — R2-12 — R2 VFD FAULT LIGHT

I05014 — TO PLC INPUT DWG No.9332SG-5314-D LINE No. 1619

R2-11 — 52-R2A/B (11 12) — R2-13 — R2-13 — 5 R (X1 X2) (24 VDC) — R2 BREAKER OPEN LIGHT

6 A (X1 X2) (24 VDC) — R2 SPARE LIGHT

R2-14 (14) — R2-OL (97 98) — R2-15 — R2-15 — 52-R2 (C1 C2) — 28 — R2-52 SHUNT TRIP

I05017 — TO PLC INPUT DWG No. 9332SG-5314-D LINE No. 1622

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: R1 & R2 VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5317-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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CHARGE AIR COOLER 1 VFD

CAC1

(+) 625 — 24VDC BEST BATTERY FROM MASTER SECTION DWG No. 9332SG-5310-D, LINE No. 1169 — (-) 28

625 — CAC1-CB1 10A — CAC1-2 — CAC1-2 — CAC1-VFDMS CHARGE AIR COOLER 1 VFD MODE (OFF / VFD / BYPASS) — 34 — CAC1-3 — 33 (VFD)

CAC1-3 — VFD ANNUNCIATOR MODULE CAC1-VAM — 28 — CAC1 VFD MODE LIGHT

CAC1-3 — CAC1-VFDRR (1970) — CAC1-4 — CAC1 VFD RUNNING LIGHT

I06011 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1763

CAC1-4 — CAC1-C1 — 28 — CAC1 VFD ISOLATION CONTACTOR 1

64 — CAC1-6 — 63 (BYPASS) — CAC1-6 — R1 VFD BYPASS MODE LIGHT

I06012 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1764

44 — CAC1-11 — 43 (VFD)

54 — CAC1-11 — 53 (BYPASS)

ENGINE RUNNING SIGNAL FROM GEN SECTION DWG No. 9332SG-5301-D LINE No. 266 — CAC1-70 — CAC1-70 — CAC1-VFDRR — 28 — 1961 — CAC1 VFD RUN RELAY

CAC1-70 — CAC1-VFDST — 28 — 1979 — CAC1 VFD START FUNC: H 30 SEC.

CAC1-11 — CAC1-11 — +24 — CAC1-VFD ATV320 — COM — 28 — 28

10V — AI1

INTAKE AIR TEMP SIGNAL FROM GEN 1 SECTION DWG No. 9332SG-5301-D LINE No. 309 — CAC1-133 — SH — AI3 — ANALOG INPUT 3 — COM — 28 — 28

CAC1-11 — CAC1-C1 — CAC1-8 — DI1

CAC1-11 — CAC1-VFDST (1972) — CAC1-9 — DI2

CAC1-11 — CAC1-11 — R1C — FAULT

CAC1-12 — R1B — CAC1-12 — CAC1 VFD FAULT LIGHT

I06010 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1762

CAC1-11 — 52-CAC2A/B — CAC1-13 — CAC1-13 — CAC1 BREAKER OPEN LIGHT

CAC1 SPARE LIGHT

CAC1-14 — CAC1-OL — CAC1-15 — CAC1-15 — 52-CAC1 — 28 — CAC1-52 SHUNT TRIP

I06013 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1765

625 (+) — CONTINUED AT UPPER RIGHT — 28 (-)

CHARGE AIR COOLER 2 VFD

CAC2

(+) 625 — CONTINUED FROM LOWER LEFT — (-) 28

625 — CAC2-CB1 10A — CAC2-2 — CAC2-2 — CAC2-VFDMS CHARGE AIR COOLER 2 VFD MODE (OFF / VFD / BYPASS) — 34 — CAC2-3 — 33 (VFD)

CAC2-3 — VFD ANNUNCIATOR MODULE CAC2-VAM — 28 — CAC2 VFD MODE LIGHT

CAC2-3 — CAC2-VFDRR (2020) — CAC2-4 — CAC2 VFD RUNNING LIGHT

I06015 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1767

CAC2-4 — CAC2-C1 — 28 — CAC2 VFD ISOLATION CONTACTOR 1

64 — CAC2-6 — 63 (BYPASS) — CAC2-6 — R1 VFD BYPASS MODE LIGHT

I06016 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1768

44 — CAC2-11 — 43 (VFD)

54 — CAC2-11 — 53 (BYPASS)

ENGINE RUNNING SIGNAL FROM GEN SECTION DWG No. 9332SG-5304-D LINE No. 566 — CAC2-70 — CAC2-70 — CAC2-VFDRR — 28 — 2011 — CAC2 VFD RUN RELAY

CAC2-70 — CAC2-VFDST — 28 — 2029 — CAC2 VFD START FUNC: H 30 SEC.

CAC2-11 — CAC2-11 — +24 — CAC2-VFD ATV320 — COM — 28 — 28

10V — AI1

INTAKE AIR TEMP SIGNAL FROM GEN 2 SECTION DWG No. 9332SG-5304-D LINE No. 609 — CAC2-133 — SH — AI3 — ANALOG INPUT 3 — COM — 28 — 28

CAC2-11 — CAC2-C1 — CAC2-8 — DI1

CAC2-11 — CAC2-VFDST (2022) — CAC2-9 — DI2

CAC2-11 — CAC2-11 — R1C — FAULT

CAC2-12 — R1B — CAC2-12 — CAC2 VFD FAULT LIGHT

I06014 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1766

CAC2-11 — 52-CAC2A/B — CAC2-13 — CAC2-13 — CAC2 BREAKER OPEN LIGHT

CAC2 SPARE LIGHT

CAC2-14 — CAC2-OL — CAC2-15 — CAC2-15 — 52-CAC2 — 28 — CAC2-52 SHUNT TRIP

I06017 — TO PLC INPUT DWG No. 9332SG-5316-D LINE No. 1769

625 (+) — CONTINUED ON DRAWING No. 9332SG-5319-D, LINE No. 2054 — 28 (-)

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: CAC1 & CAC2 VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5318-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
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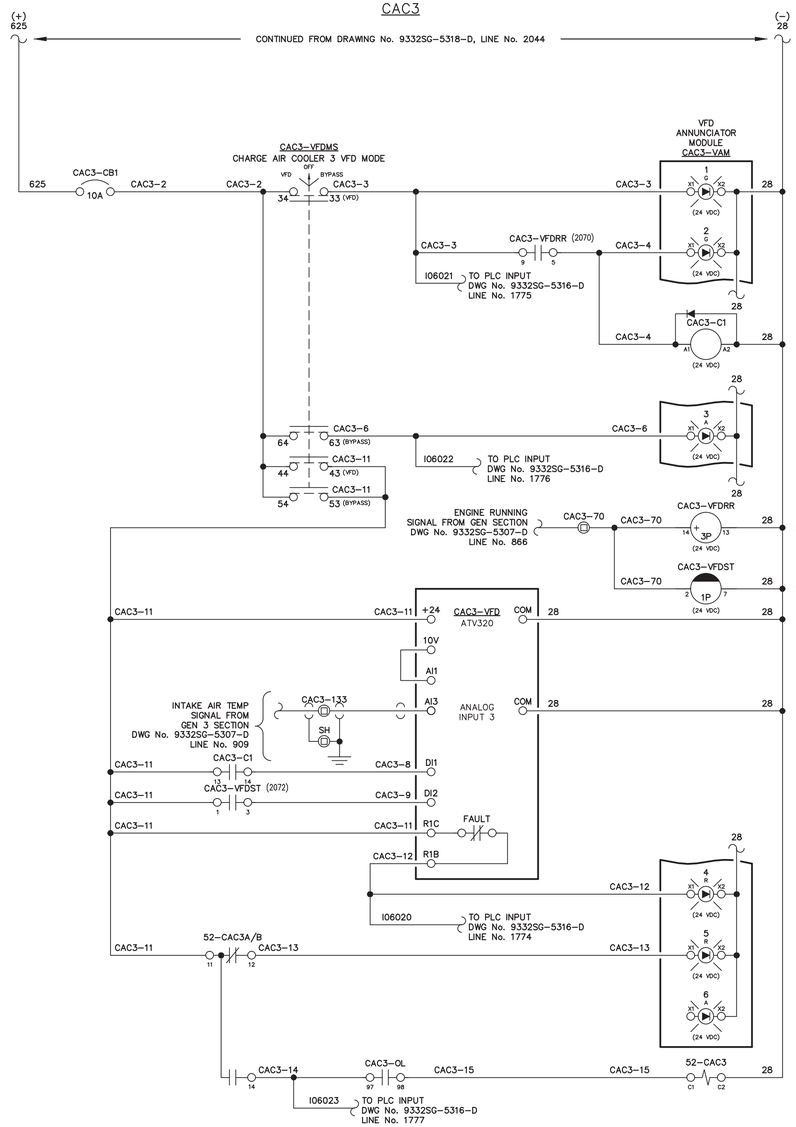
CHARGE AIR COOLER 3 VFD

CAC3



NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: CAC3 VFD DC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5319-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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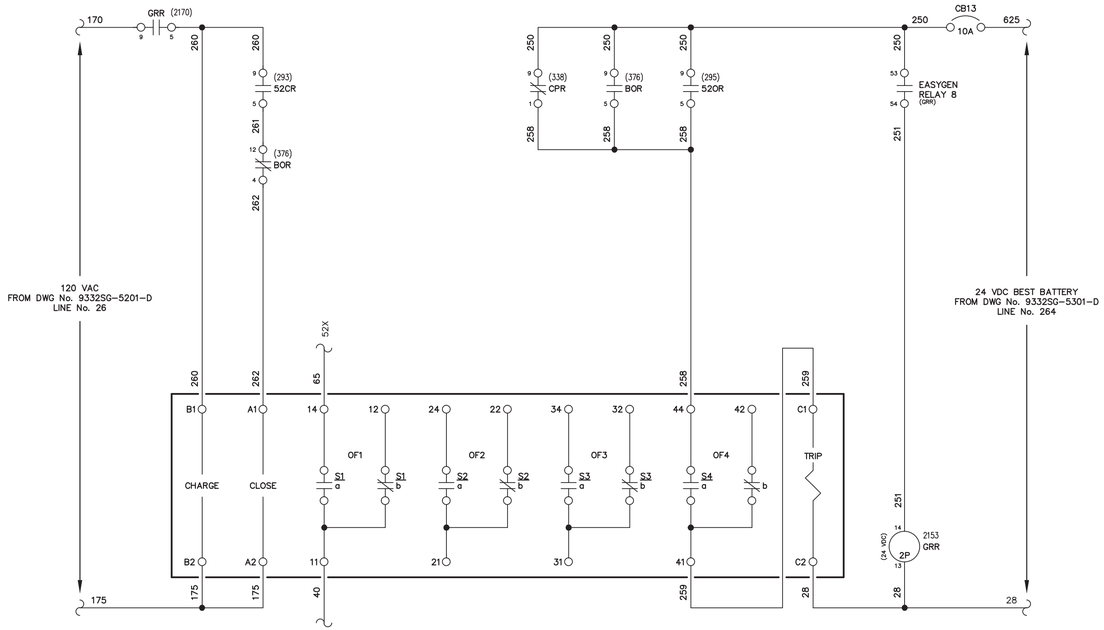
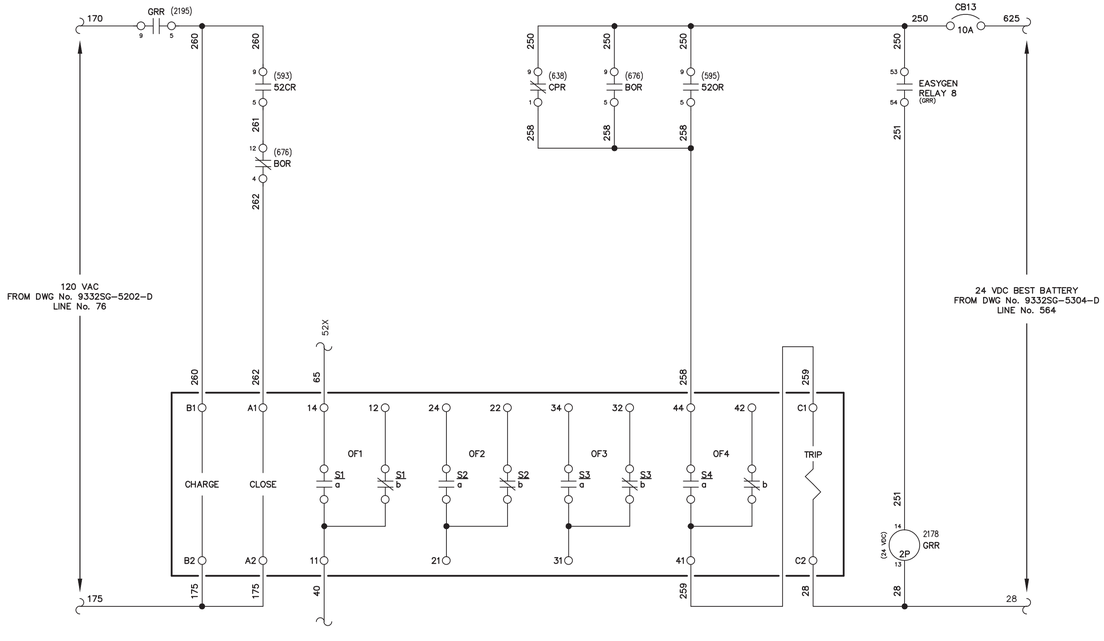


GENERATOR 1 BREAKER
SQUARE D MASTERPACT NT



GENERATOR 2 BREAKER
SQUARE D MASTERPACT NT

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GEN 1 & GEN 2 CIRCUIT BREAKER CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5401-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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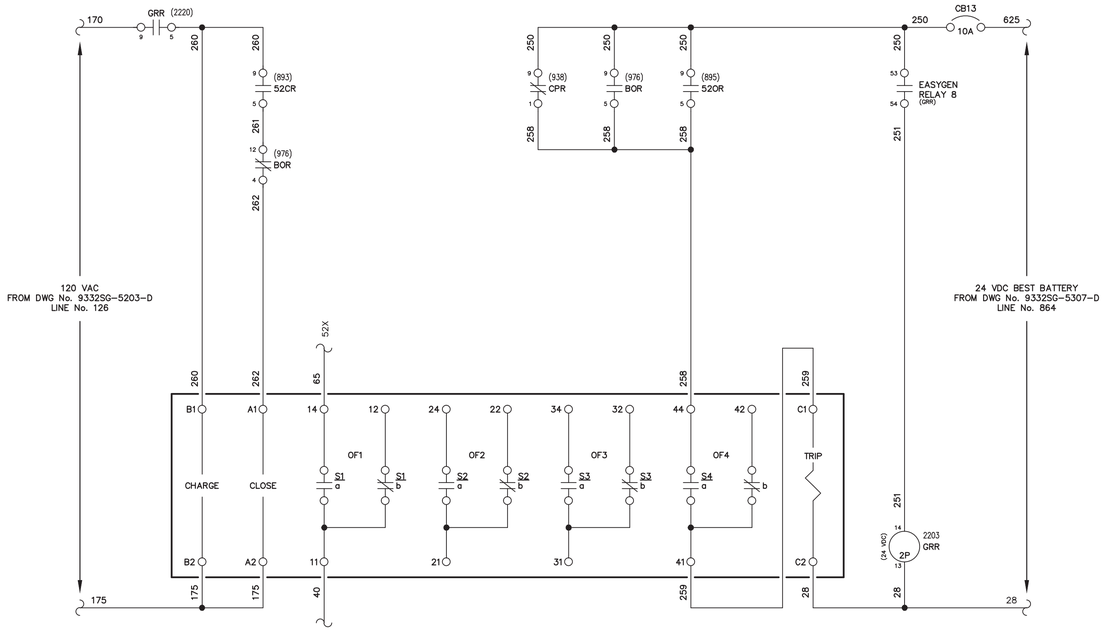
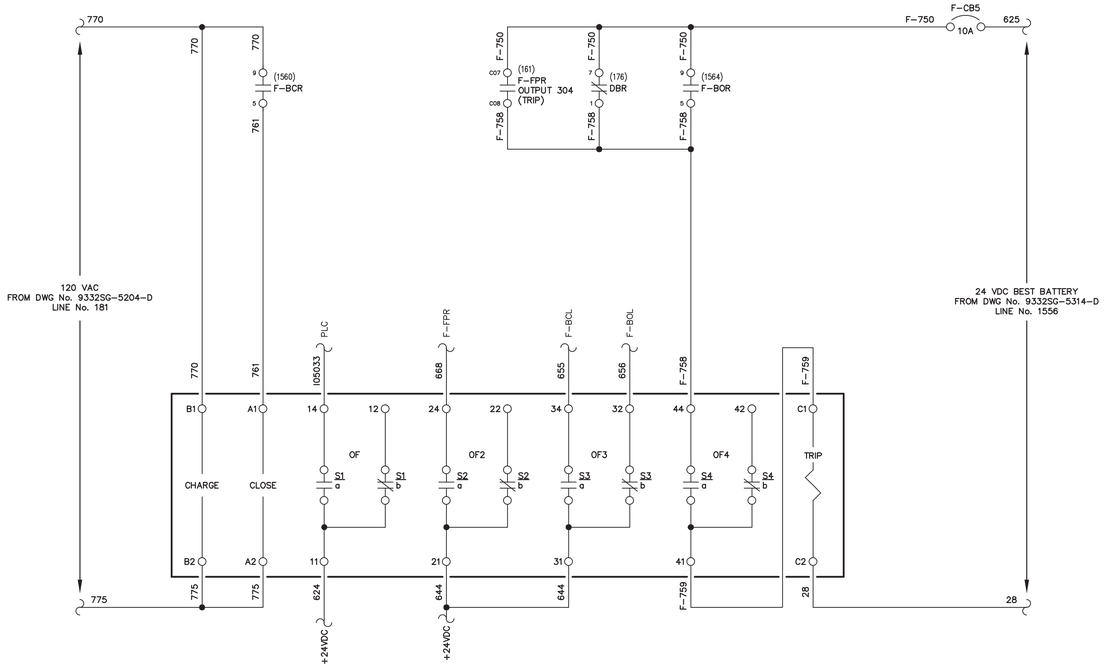


GENERATOR 3 BREAKER
SQUARE D MASTERPACT NT



FEEDER BREAKER
SQUARE D MASTERPACT NT

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: GEN 3 & FEEDER CIRCUIT BREAKER CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5402-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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NODE ADDRESSES		NODE No.
GENERATOR 1	192.168.1.121	BACK PAN 1
GENERATOR 2	192.168.1.122	BACK PAN 2
GENERATOR 3	192.168.1.123	BACK PAN 3
MASTER	192.168.1.126	BACK PAN 4
FEEDER	192.168.1.125	BACK PAN 5
VFD	192.168.1.128	BACK PAN 6
DAY TANK PANEL	192.168.1.127	BACK PAN 10

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: POINT I/O COMMUNICATION NETWORK, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5501-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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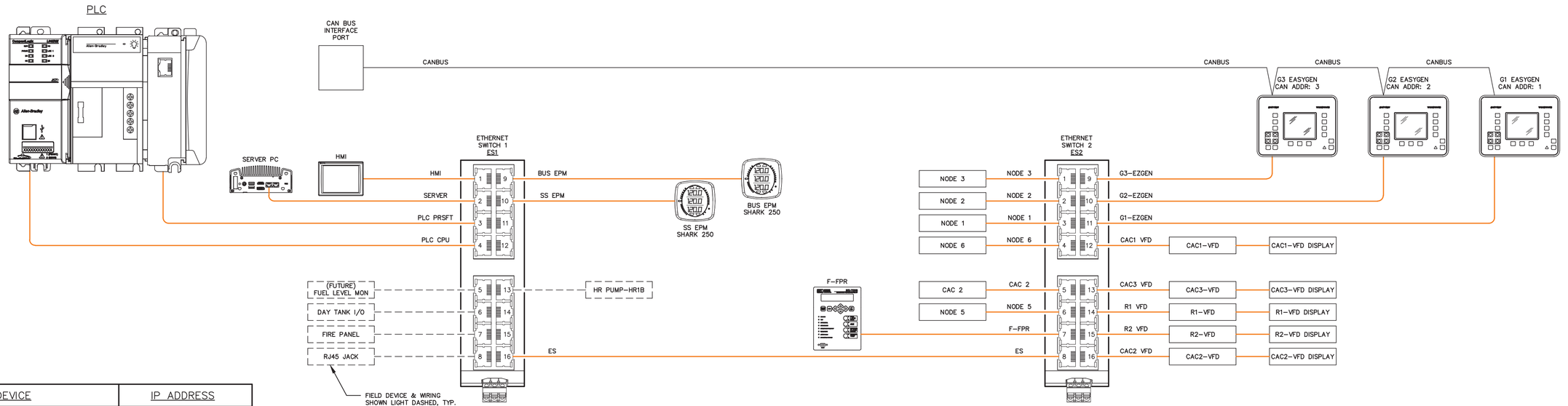

DEVICE	IP ADDRESS
SERVER	192.168.1.142
F-FPR	192.168.1.155
R1 VFD	192.168.1.171
R2 VFD	192.168.1.172
CAC1 VFD	192.168.1.174
CAC2 VFD	192.168.1.175
CAC3 VFD	192.168.1.176
HR PUMP-HR1B	192.168.1.178
HMI	192.168.1.182
PLC CPU	192.168.1.183
PLC PROSOFT	192.168.1.187
BUS EPM	192.168.1.190
SS EPM	192.168.1.191
G1 EASYGEN	192.168.1.161
G2 EASYGEN	192.168.1.162
G3 EASYGEN	192.168.1.163
NODE 1	192.168.1.121
NODE 2	192.168.1.122
NODE 3	192.168.1.123
NODE 4	192.168.1.126
NODE 5	192.168.1.125
NODE 6	192.168.1.128
DAY TANK I/O	192.168.1.127
TANK LEVEL MONITOR	192.168.1.198

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 CONTROLLED POWER JOB No. 9332SG

TITLE: COMMUNICATION NETWORK, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5601-D	SHEET: 1 OF 1	CKD. BY: JMD
JOB: MANOKOTAK POWER SYSTEM UPGRADE		

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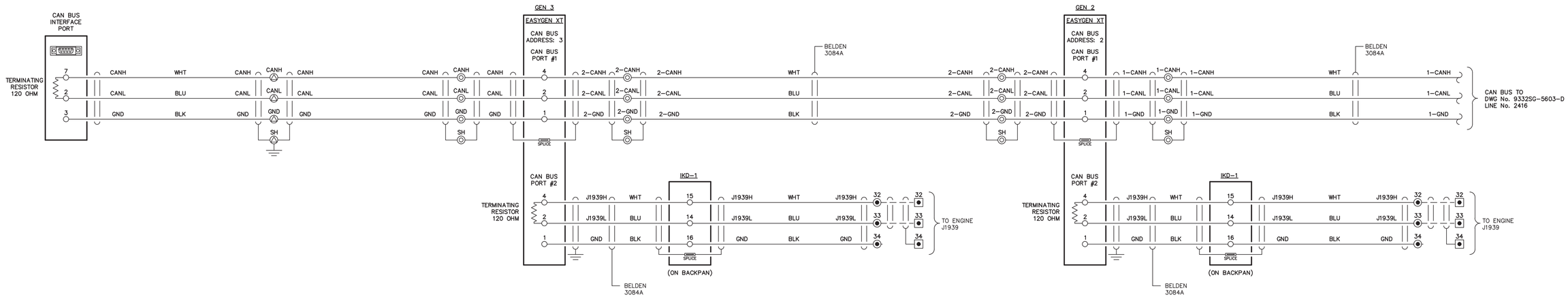

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: COMMUNICATION NETWORK, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5602-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
RURAL ENERGY GROUP
813 W. NORTHERN LIGHTS BLVD.
ANCHORAGE, ALASKA 99503
HTTP://WWW.AIDEA.ORG

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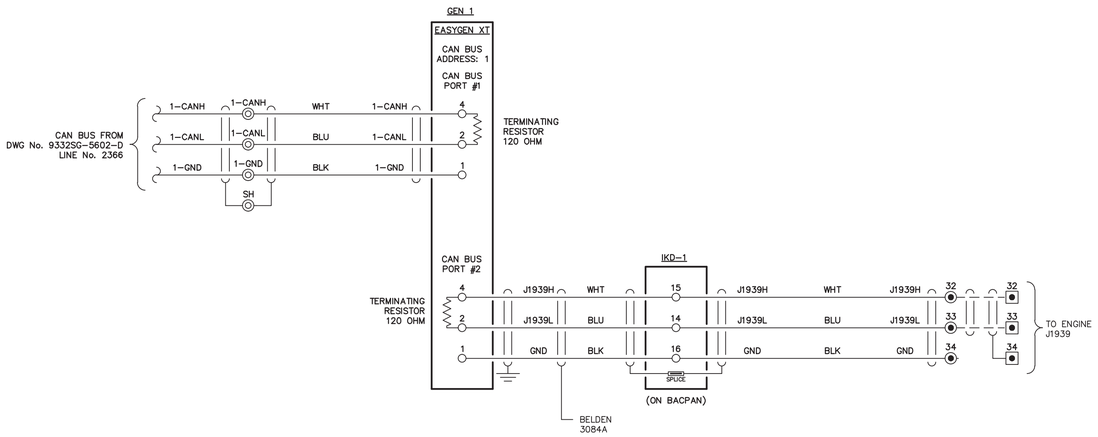

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: COMMUNICATION NETWORK, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5603-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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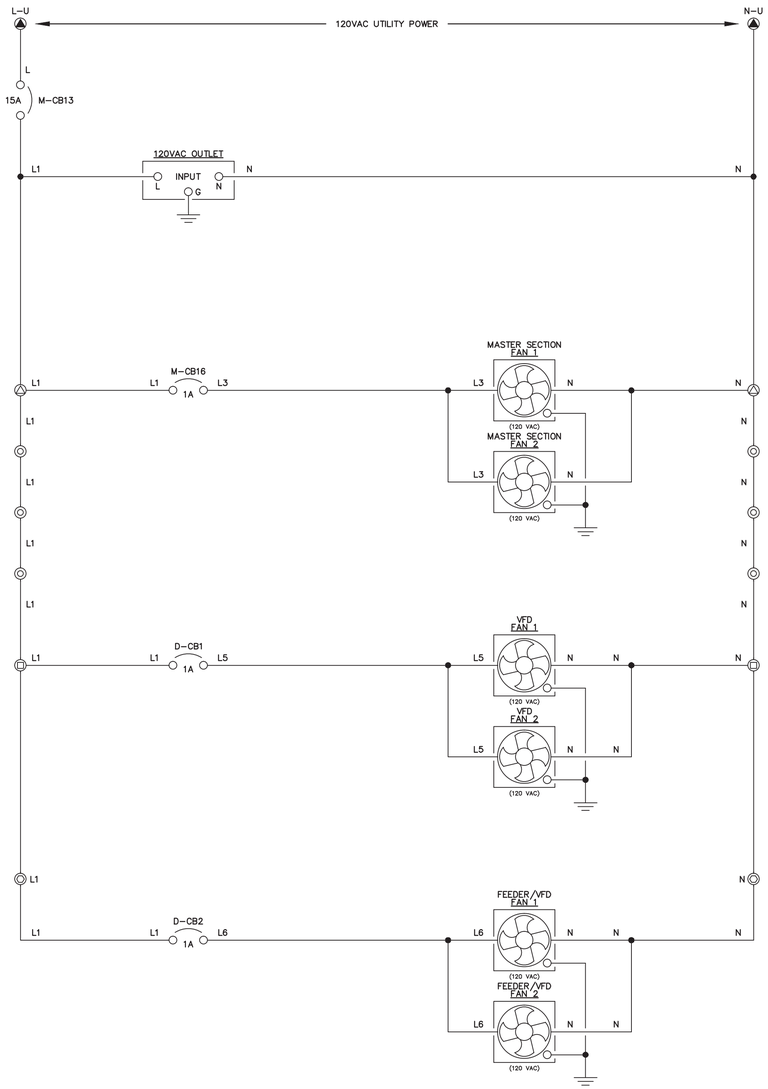

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG–3101–D.

REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: AC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–5701–D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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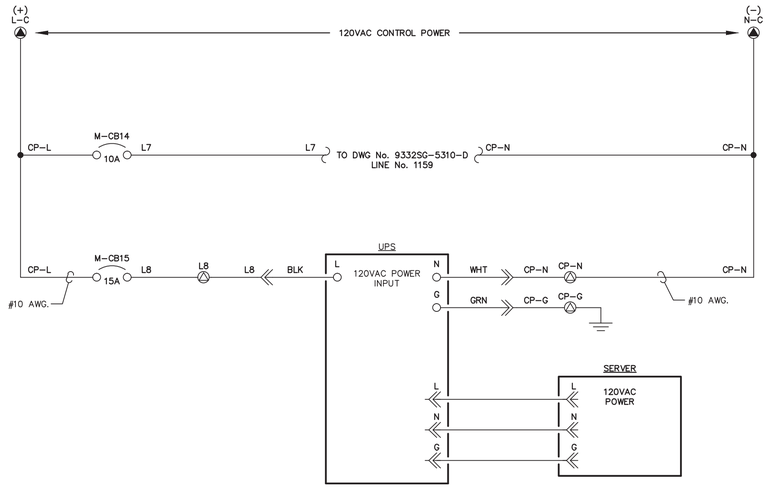

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: AC CONTROL, SCHEMATIC DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-5702-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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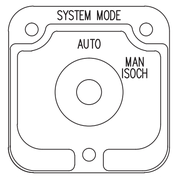
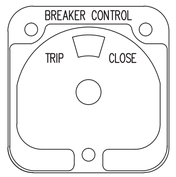
SYSTEM MODE SWITCH – SMS



(ELECTROSWITCH 24201C)
KNURLED HANDLE

DECK	CONTACTS		POS. AUTO	POS. MAN ISOCH
1	12	11	X	
		13		X
	16	15	X	
		17		X
		18		
	11	12	X	
		14		
	15	16	X	

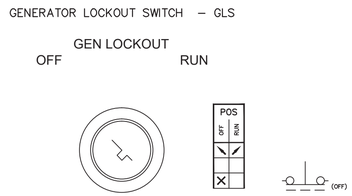
BREAKER CONTROL SWITCH – 52CS



(ELECTROSWITCH 2438D)
PISTOL GRIP HANDLE
SPRING RETURN TO CENTER

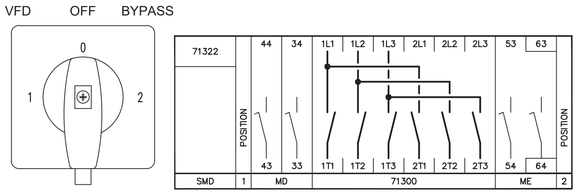
DECK	CONTACTS		POS. TRIP	POS. NORM.	POS. CLOSE
1	11	18	X		
	16	17			X

GENERATOR LOCKOUT SWITCH – GLS



KEY OPERATED
2 POS MAINTAINED

VARIABLE FREQUENCY DRIVE MODE SWITCH – VFDMS



3 POS MAINTAINED

71322		44	34	1L1	1L2	1L3	2L1	2L2	2L3	53	63	
	POSITION	43	33	1T1	1T2	1T3	2T1	2T2	2T3	54	64	POSITION
SMD	1	MD		71300						ME		2

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG–3101–D.

REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: CONTROL SWITCH TARGET DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–6101–D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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NP.
TEXT 1/4"
QUANTITY 1
SCALE 1/1
⚠4 SEE NOTE 4

8" × 4"

MANUFACTURED BY:

CONTROLLED POWER, INC.

17909 BOTHELL EVERETT HWY. S.E.
BOTHELL, WA. 98012
(425)-485-1778
SERIAL NUMBER: 9332SG

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

MASTER CONTROL

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

FEEDER & VFD

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

VFD

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

GENERATOR 1

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

GENERATOR 2

NP.
TEXT 1/2"
QUANTITY 1
SCALE 1/1

8" × 1"

GENERATOR 3

NP. 13
TEXT 1/4"
QUANTITY 1
SCALE 1/1

5" × 1"

RADIATOR FAN 1

NP.
TEXT 1/4"
QUANTITY 1
SCALE 1/1

5" × 1"

RADIATOR FAN 2

NP.
TEXT 1/4"
QUANTITY 1
SCALE 1/1

5" × 1"

CHARGE AIR COOLER 1

NP.
TEXT 1/4"
QUANTITY 1
SCALE 1/1

5" × 1"

CHARGE AIR COOLER 2

NP.
TEXT 1/4"
QUANTITY 1
SCALE 1/1

5" × 1"

CHARGE AIR COOLER 3

NP.
TEXT 1/2"
QUANTITY 3
SCALE 1/1

4" × 1"

350 KW

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

GENERATOR 1

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

GENERATOR 2

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

GENERATOR 3

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

FEEDER

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

VFD MAIN

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

LAMP
TEST

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

ALARM
RESET

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

BUS TOTALIZING

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

STATION SERVICE

NP.
TEXT 3/16"
QUANTITY 1
SCALE 1/1

3" × 1/2"

STATION SERVICE

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

RADIATOR FAN 1
VFD OFF BYPASS

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

RADIATOR FAN 2
VFD OFF BYPASS

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

CHARGE AIR COOLER 1
VFD OFF BYPASS

NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

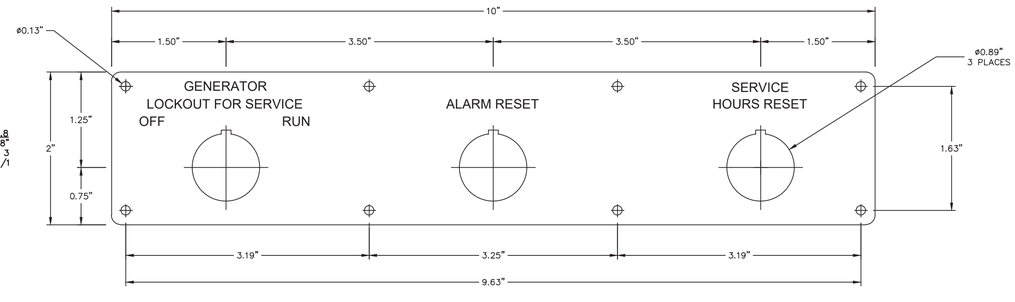
CHARGE AIR COOLER 2
VFD OFF BYPASS

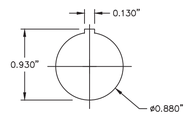
NP.
TEXT 1/8"
QUANTITY 1
SCALE 1/1

3" × 1/2"

CHARGE AIR COOLER 3
VFD OFF BYPASS

NP.8
TEXT 1/8"
QUANTITY 3
SCALE 1/1





CUTOUT DETAIL

NOTES:
1. ALL NAMEPLATES SHALL BE BLACK FACE WITH WHITE LETTERS EXCEPT AS NOTED.
2. ALL NAMEPLATES SHALL HAVE PRESSURE SENSITIVE ADHESIVE ON BACK, 100 % COVERAGE.
3. ALL NAMEPLATES SHALL HAVE MOUNTING HOLES DRILLED AS INDICATED.
⚠4 INDICATES THAT NAMEPLATE SHALL BE BRUSHED ALUMINUM WITH BLACK ENGRAVED LETTERS.

NOTE:
1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: NAMEPLATE ENGRAVING SCHEDULE, FABRICATION DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-6201-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

ALASKA ENERGY AUTHORITY
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G	R
GENERATOR 1 BREAKER OPEN	GENERATOR 1 BREAKER CLOSED

GEN 1 BREAKER ANNUNCIATOR
QTY 1

G	R	R	R	R	R	R	R	R	R	R	R
ENGINE RUNNING	ALARM / LOCKOUT	LOW OIL PRESSURE	OIL LEVEL	HIGH COOLANT TEMPERATURE	OVERSPEED	OVERCRANK	RUNNING TIMEOUT	BATTERY CHARGER FAILURE	AIR FILTER PLUGGED	HIGH EXHAUST TEMPERATURE	HIGH CHARGE AIR TEMPERATURE
G	A	R	R	R	R	R	R	R	R	R	R
LEAD ENGINE	NORMAL STOP	NOT IN AUTO	SERVICE ENGINE	FAIL TO SYNCHRONIZE	OVERCURRENT	UNDER VOLTAGE	OVER VOLTAGE	UNDER FREQUENCY	OVER FREQUENCY	REVERSE POWER	CHARGE AIR VFD FAILURE

GENERATOR ANNUNCIATOR
QTY 3

G	R
GENERATOR 3 BREAKER OPEN	GENERATOR 3 BREAKER CLOSED

GEN 3 BREAKER ANNUNCIATOR
QTY 1

G	R
GENERATOR 2 BREAKER OPEN	GENERATOR 2 BREAKER CLOSED

GEN 2 BREAKER ANNUNCIATOR
QTY 1

R	R	R	R	R	A	R	R	R	R
FIRE ALARM	EMERGENCY STOP	LOW COOLANT LEVEL	FUEL LEVEL	PLC/ POINT I/O FAILURE	SYSTEM NOT IN AUTO	STATION SERVICE BREAKER OPEN	VFD MAIN BREAKER OPEN	FEEDER BREAKER TRIP	FEEDER FAIL TO CLOSE
R	R	R	A	A	A	R	R	R	R
			NO LOAD ON HEAT RECOVERY	HEAT RECOVERY LOSS OF PRESSURE	HEAT RECOVERY LOSS OF FLOW	HIGH COOLANT RETURN TEMPERATURE			

MASTER ANNUNCIATOR
QTY 1

G	R
FEEDER BREAKER OPEN	FEEDER BREAKER CLOSED

FEEDER F1 BREAKER ANNUNCIATOR
QTY 1

G	G	A
VFD MODE	VFD RUNNING	BYPASS MODE
R	R	A
VFD FAULT	VFD BREAKER OPEN	

VFD ANNUNCIATOR
QTY 5

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: ANNUNCIATOR WINDOWS, FABRICATION DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-6202-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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MASTER CONTROL

VFD

FEEDER & VFD

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG–3101–D.

REV.	DATE	DESCRIPTION	BY
D	09–18–24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. P0010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: INTERCONNECTION DIAGRAM

SCALE: NONE	DATE: 11–29–23	DWN. BY: GPN
DWG. No: 9332SG–7101–D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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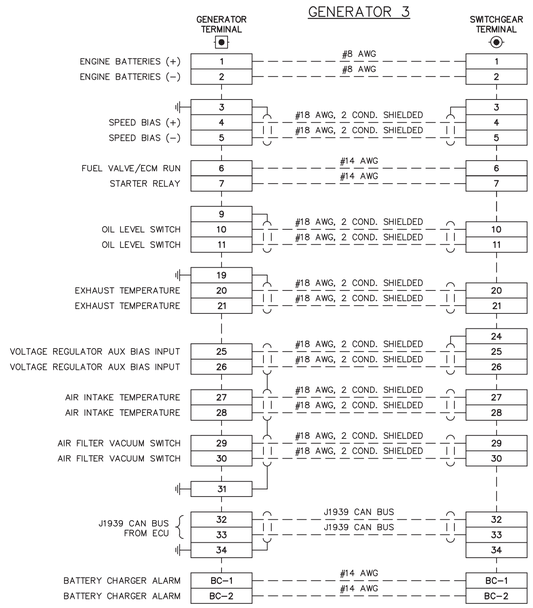

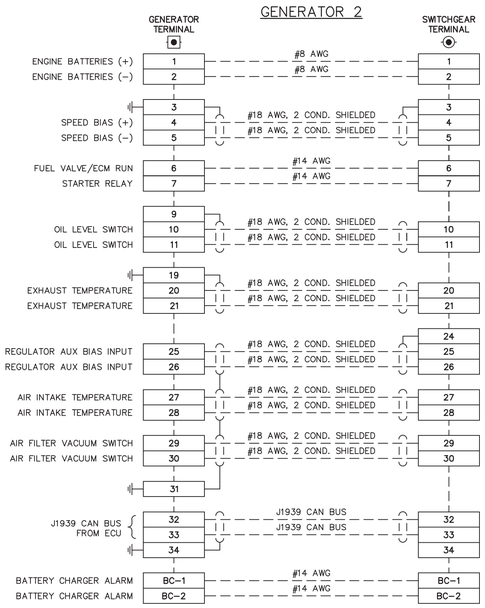

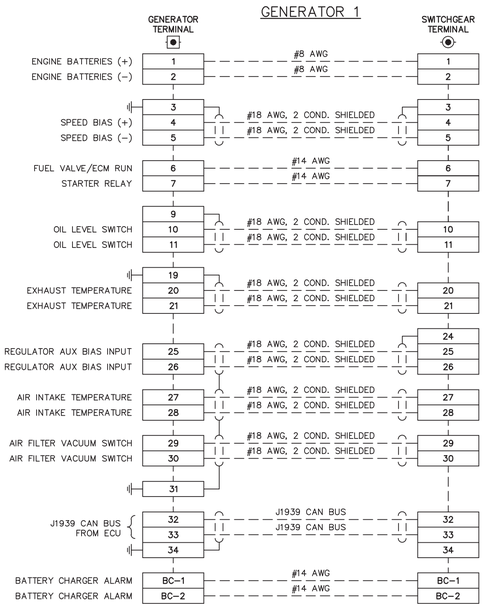

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG−3101−D.

REV.	DATE	DESCRIPTION	BY
D	09−18−24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: INTERCONNECTION DIAGRAM

SCALE: NONE	DATE: 11−29−23	DWN. BY: GPN
DWG. No: 9332SG−7102−D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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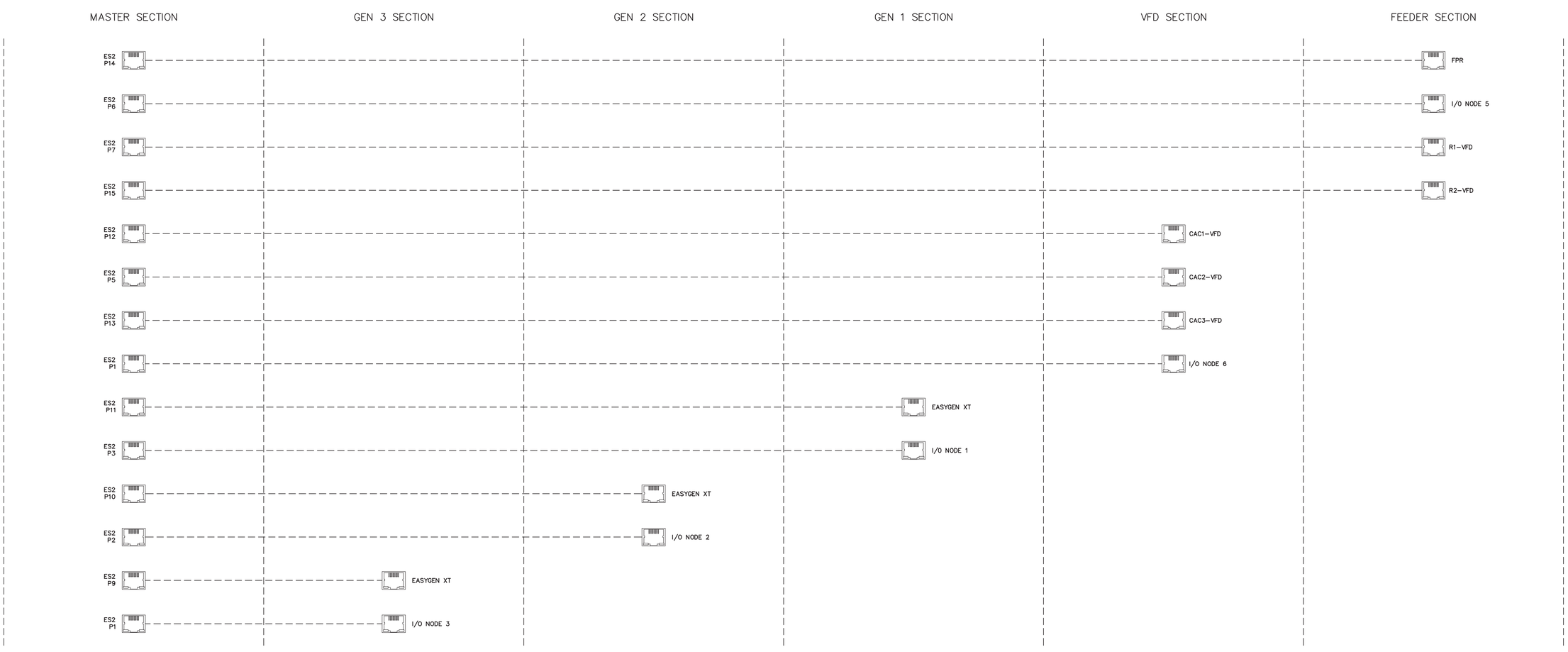

NOTE:

1. FOR GENERAL WIRING & CONSTRUCTION NOTES, SEE DRAWING No. 9332SG-3101-D.

REV.	DATE	DESCRIPTION	BY
D	09-18-24	SHOP AS BUILT	GJG

AEA PURCHASE ORDER No. PO010800 — CONTROLLED POWER JOB No. 9332SG

TITLE: ETHERNET SHIPPING SPLIT, INTERCONNECTION DIAGRAM

SCALE: NONE	DATE: 11-29-23	DWN. BY: GPN
DWG. No: 9332SG-7103-D	SHEET: 1 OF 1	CKD. BY: JMD

JOB: MANOKOTAK POWER SYSTEM UPGRADE

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