

DOCKETED	
Docket Number:	26-SPPE-02
Project Title:	Silver Creek Back-up Generating Facility (SFBGF)
TN #:	272838
Document Title:	Prologis SPPE Application Silver Creek Backup Generating Facility - App D and E
Description:	N/A
Filer:	Scott Galati
Organization:	DayZenLLC
Submitter Role:	Applicant Representative
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APPENDIX D

Caterpillar 3512C Specifications



6387 Old Washington Road
Elkridge, MD 21075
800-449-9813

INSTALLING CONTRACTOR
PRE-START UP & TESTING SITE
EVALUATION

***(To be completed by installing contractor prior to
scheduling Alban technician for startup)***

Project Name: _____ Project Number: _____

Customer Name: _____ Customer Contact: _____

Contact Phone Number: _____ Cell Number: _____

Site Address: _____

Equipment Delivery Date: _____ Startup Date: _____

Parking For:

Technicians Truck: _____

Load Bank: _____

Miscellaneous: _____

Air Permit: **Received []** **Not Received []**

Equipment Information

Genset Model / KW _____ Serial Number _____

Generator Serial # _____ Generator Arrangement # _____

Engine Serial # _____ Fuel Type _____

ATS Model # _____ Serial Number: _____

ATS Model # _____ Serial Number: _____

Note: Below is a list of items the contractor must check prior to start-up. This is a Generic List for most installations and some of these items may not pertain to every project, but mark them as NA if it does not apply to your particular project.



Site and Equipment Inspection / Accessibility

	OK	NO	N/A	Comments
Any visible Damage	☐	☐	☐	☐
All equipment easily assessable	☐	☐	☐	☐
Area clean of all debris / dirt / etc.	☐	☐	☐	☐
Security clearance required?	☐	☐	☐	☐
Permanent access to:				
Control panels, switchgear and / or ATS(s)	☐	☐	☐	☐
All filters: air, fuel, oil, water	☐	☐	☐	☐
Piping valves and solenoids	☐	☐	☐	☐
Fuel priming pump	☐	☐	☐	☐
Day tank controls	☐	☐	☐	☐
Day tank fuel fill port	☐	☐	☐	☐
Temporary access for:				
Placing Portable Load bank(s)	☐	☐	☐	☐
Load cables, routing, and connection	☐	☐	☐	☐
Technician truck(s) parking	☐	☐	☐	☐

Comments:

Enclosure Mounting:

	OK	NO	N/A	Comments
Enclosure or fuel base tank is mounted on vibration isolators (spring or rubber)	☐	☐	☐	☐
Vibration isolators are located properly	☐	☐	☐	☐
Mounting pad is level to within 1/8" across generator length and width	☐	☐	☐	☐
Mounting pad is proper thickness for support	☐	☐	☐	☐
Appropriate hold down bolts used for isolators and/or for mounting of enclosure to mounting pad	☐	☐	☐	☐
Flexible connections to genset	☐	☐	☐	☐
Proper free air clearance all around genset	☐	☐	☐	☐
All shipped loose items installed, i.e., exhaust elbow, rain cap, rain shield exterior lighting, air intake / discharge hoods, sound baffles, platforms & stairs, battery racks and batteries	☐	☐	☐	☐
Crankcase vent hoses installed and ran to exterior	☐	☐	☐	☐

Comments:



Ventilation:

	OK	NO	N/A	Comments
Air louvers in place and clear of shipping braces	☐	☐	☐	☐
No obstructions within 10 feet (free air) of air intake or radiator discharge	☐	☐	☐	☐
Condensate trap properly located and installed	☐	☐	☐	☐
Provisions exist for supplying the proper amount of cooling air, at a maximum temperature of 100°F for engine intake air and to remove the radiated heat from the engine block and from the exhaust system	☐	☐	☐	☐
<i>Refer to the specification sheet within the Submittal for airflow recommendations</i>				
All screens on intake and discharge louvers in place	☐	☐	☐	☐
Sufficient air inlet size for necessary air into room	☐	☐	☐	☐
Louver dampers are powered and operating properly	☐	☐	☐	☐
Louver and fans wired: powered to close, failed to open	☐	☐	☐	☐

Comments:

Generator Mounting:

	OK	NO	N/A	Comments
Genset or fuel base tank is mounted on vibration isolators (spring or rubber)	☐	☐	☐	☐
Vibration isolators are proper location	☐	☐	☐	☐
Vibration isolation shipping blocks & hold-downs removed	☐	☐	☐	☐
Spring Isolators are adjusted for height & deflection	☐	☐	☐	☐
Floor mounting pad is level to within 1/8" across generator length and width	☐	☐	☐	☐
Floor mounting pad is proper thickness for support	☐	☐	☐	☐
Appropriate hold down bolts used for isolators and for mounting of genset to fuel base tank	☐	☐	☐	☐
Flexible connections to genset	☐	☐	☐	☐
Crankcase vent hoses installed and ran to exterior	☐	☐	☐	☐
Proper free air clearance all around genset	☐	☐	☐	☐

Comments:



Engine Exhaust System:

	OK	NO	N/A	Comments
Silencer properly located and connected	☐	☐	☐	☐
Muffler is properly supported from the enclosure structure or Building structure without the weight bearing on the exhaust flange of the engine	☐	☐	☐	☐
NOTE: It is the contractor's responsibility to install shipped loose mufflers and flex connections				
Exhaust piping is secure, properly supported and piped to the exterior with a rain cap installed	☐	☐	☐	☐
Flexible fittings are installed at the engine to isolate the engine vibration from the exhaust system piping	☐	☐	☐	☐
Only long radius "sweep" elbows are used in the exhaust system and there are no system restrictions.	☐	☐	☐	☐
System must be below the allowable backpressure limit.	☐	☐	☐	☐
Exhaust piping discharge is positioned away from outside "ventilation" air intakes to the building, generator air intakes and radiator inlets	☐	☐	☐	☐
Exhaust piping is positioned away from the generator control panel to protect it from any heat related damage to the electronic circuitry	☐	☐	☐	☐
Exhaust piping includes all necessary expansion joints required to compensate for thermal growth	☐	☐	☐	☐
Exhaust insulation installed	☐	☐	☐	☐

Comments:

Lubrication System:

	OK	NO	N/A	Comments
Shipping plugs removed from crankcase breather	☐	☐	☐	☐
Crankcase breather pipe hoses connected and routed smoothly to discharge to building exterior	☐	☐	☐	☐
Crankcase sump full of oil – verify using dipstick	☐	☐	☐	☐
No visible oil leaks	☐	☐	☐	☐
Oil make-up system installed, filled and operational	☐	☐	☐	☐
Verify oil dipstick is properly seated after crank case check	☐	☐	☐	☐

Comments:



Diesel Fuel System:

	OK	NO	N/A	Comments
Flexible fuel lines used to all connections on the Generator Set	☐	☐	☐	☐
Fuel day tank plumbed to engine	☐	☐	☐	☐
Fuel day tank plumbed to main tank	☐	☐	☐	☐
Fuel lines are to match the material of the tank, either black iron or steel.	☐	☐	☐	☐
NOTE: Zinc alloy or galvanized pipe should not be used as it will react with the fuel				
Plumbed fuel supply lines are correct size	☐	☐	☐	☐
Fuel return line has been checked from engine to day tank and from day tank to storage tank to ensure that no restrictions exist	☐	☐	☐	☐
IMPORTANT: Restrictions in return line can cause severe damage to engine				
Confirm that there are no stop valves in the return line between the engine and day / main tank	☐	☐	☐	☐
IMPORTANT: If closed during operation, this will restrict flow and cause engine damage				
Fuel lines purged	☐	☐	☐	☐
Fuel tank vent lines installed properly	☐	☐	☐	☐
Fuel tank vent lines are correct height	☐	☐	☐	☐
Day tank pump operational	☐	☐	☐	☐
System pressure test completed	☐	☐	☐	☐
Fuel day tank full of fuel	☐	☐	☐	☐
No visible leaks in fuel day tank	☐	☐	☐	☐
All fuel alarms and monitoring connected	☐	☐	☐	☐
Water separators installed	☐	☐	☐	☐
Sufficient fuel available in main tank	☐	☐	☐	☐
<u>Comments:</u>				

Natural or LP Gas Fuel System:

	OK	NO	N/A	Comments
Gas lines connected	☐	☐	☐	☐
Correct gas pressure regulator installed	☐	☐	☐	☐
What size is incoming gas line				<u>Inch</u>
How long of a gas line run from Genset to main regulator				<u>Feet</u>
Flexible connections between engine and piping	☐	☐	☐	☐
Gas meter (is used) connected to high pressure side of regulator	☐	☐	☐	☐
Dirt traps installed upstream of all Gas Regulators	☐	☐	☐	☐
<u>Comments:</u>				



Cooling System:

	OK	NO	N/A	Comments
System full of proper antifreeze solution	☐	☐	☐	☐
Low level gauges installed and connected	☐	☐	☐	☐
Remote radiator pipes plumbed and valves installed	☐	☐	☐	☐
Expansion tanks are installed at the highest point in piping system	☐	☐	☐	☐
System is pressure tested at 15psi for a 24-hour period	☐	☐	☐	☐
No coolant leaks visible anywhere in system	☐	☐	☐	☐
Remote radiator fan motor starter wired	☐	☐	☐	☐
Electric discharge louvers connected	☐	☐	☐	☐
Radiator ducts properly sized	☐	☐	☐	☐
On cooling systems with remote radiators, the piping system has been designed such that no air will be trapped in the lines	☐	☐	☐	☐

Comments:

DC Electrical System:

	OK	NO	N/A	Comments
Battery racks installed and batteries in place	☐	☐	☐	☐
Battery cables connected	☐	☐	☐	☐
Battery charger installed and connected to power	☐	☐	☐	☐
<i>On batteries that are not sealed, do not energize battery charger until batteries have been filled with acid</i>				
Day tank solenoids installed and connected	☐	☐	☐	☐
Remote annunciator(s) installed and connected	☐	☐	☐	☐
Discrete Input/Output Module(s) (DIO) installed and connected	☐	☐	☐	☐
All DC wiring installed in dedicated conduit	☐	☐	☐	☐
All DC control wiring is stranded type	☐	☐	☐	☐
Engine start wires connected	☐	☐	☐	☐
Additional DC wiring installed as required	☐	☐	☐	☐

Comments:



AC Electrical System:

	OK	NO	N/A	Comments
Transfer switch(s) installed and connected	☐	☐	☐	☐
Power cables from genset connected	☐	☐	☐	☐
Control wiring to genset connected	☐	☐	☐	☐
Power wiring to jacket water heater connected	☐	☐	☐	☐
<i>Do not energize jacket water heater until the engine coolant has been installed</i>				
Power wiring to strip heaters connected	☐	☐	☐	☐
Power wiring to battery charger connected	☐	☐	☐	☐
Power wiring to fuel oil cooler connected	☐	☐	☐	☐
Power wiring to genset enclosure panel board connected	☐	☐	☐	☐
All AC wiring installed in dedicated conduit	☐	☐	☐	☐
All AC control wiring is stranded type	☐	☐	☐	☐
Generator grounding connected to common ground	☐	☐	☐	☐
Generator neutral connected to ground (If system is bonded)	☐	☐	☐	☐
All low voltage power wiring on the load side bus	☐	☐	☐	☐
Utility power available	☐	☐	☐	☐
All low voltage accessories energized	☐	☐	☐	☐
For voltages above 600 VAC, all cables and connected items to be hi-pot tested	☐	☐	☐	☐

Comments:

NOTE: *To prevent damage during transportation, some items are shipped loose and should be mounted, wired, piped, etc. by the installing contractor as part of the unit installation procedure.*



Additional Comments and Notes:

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

All deficiencies noted above must be completed and/or corrected by the customer prior to start-up so that we can effectively start up and test the product we have supplied. Discrepancies that are out of Alban's scope of supply will require a change order to the existing contract to complete.

Signature

Signature

Printed

Printed

CarterCAT Power Systems

Customer

Date

Date _____

Generator Set Load Test



Project #:

Project Name:

Date:

System Model #:

System S/N:

Site Location:

Witnessed By: _____

[illegible]

Service Tech: _____

Signature: _____

Certified By: _____

Electric Power Service Manager



STACK TOR01 Ph3 Page 21 of 356

CARTER POWER SYSTEMS

Section Two PACKAGE TECHNICAL DATA

**Caterpillar (3512C)(1500 KW)Package Brochure
Engine Specific Performance Data
Generator Cutsheet
Generator Specific Technical Data
Voltage Regulator
Governor
Control Panel**

Cat® 3512C

Diesel Generator Sets



Bore – mm (in)	170 (6.69)
Stroke – mm (in)	190 (7.48)
Displacement – L (in³)	51.8 (3161)
Compression Ratio	14.7:1
Aspiration	TA
Fuel System	EUI
Governor Type	ADEM™ A3

Image shown may not reflect actual configuration

Standby 60 Hz ekW (kVA)	Mission Critical 60 Hz ekW (kVA)	Prime 60 Hz ekW (kVA)	Continuous 60 Hz ekW (kVA)	Emissions Performance
1500 (1875)	1500 (1875)	1360 (1700)	1230 (1537)	U.S. EPA Stationary Emergency Use Only (Tier 2)

Features

Cat® Diesel Engine

- Meets U.S. EPA Stationary Emergency Use Only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide
- Certified alternative fuels including Hydrotreated Vegetable Oil (HVO), Renewable Diesel (RD) and Hydrotreated Renewable Diesel (HRD) which meet EN 15940 or ASTM D975 can be used or blended with EN 590 diesel

Generator Set Package

- Accepts 100% block load in one step
- Meets NFPA 110 loading requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability verified through torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

Alternators

- Superior motor starting capability minimizes need for oversizing generator
- Designed to match performance and output characteristics of Cat diesel engines

Cooling System

- Cooling systems available to operate in ambient temperatures up to 50°C (122°F)
- Tested to ensure proper generator set cooling

Cat Energy Control System (ECS)

- User-friendly interface and navigation
- Scalable system to meet a wide range of installation requirements
- Expansion modules and site specific programming for specific customer requirements
- Graphical touchscreen display
- Easily upgradeable

Warranty

- 24 months/1000-hour warranty for standby and mission critical ratings
- 12 months/unlimited hour warranty for prime and continuous ratings
- Extended service protection is available to provide extended coverage options

Worldwide Product Support

- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

Financing

- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

Standard and Optional Equipment

Engine

Air Cleaner

- ☒ Single element
- ☐ Dual element
- ☐ Heavy duty

Muffler

- ☐ Industrial grade (15 dB)

Starting

- ☒ Standard batteries
- ☐ Oversized batteries
- ☒ Standard electric starter(s)
- ☐ Dual electric starter(s)
- ☐ Air starter(s)
- ☒ Jacket water heater

Alternator

Output voltage

- ☐ 380V ☐ 6600V
- ☐ 440V ☐ 6900V
- ☒ 480V ☐ 12470V
- ☐ 600V ☐ 13200V
- ☐ 4160V ☐ 13800V
- ☐ 6300V

Temperature Rise (over 40°C ambient)

- ☐ 150°C
- ☐ 125°C/130°C
- ☒ 105°C
- ☐ 80°C

Winding type

- ☐ Random wound
- ☒ Form wound

Excitation

- ☐ Internal excitation (IE)
- ☒ Permanent magnet (PM)

Attachments

- ☒ Anti-condensation heater
- ☐ Stator and bearing temperature monitoring and protection

Power Termination

Type

- ☐ Bus bar
- ☒ Circuit breaker
- ☐ 1600A ☐ 2000A
- ☒ 2500A ☐ 3200A
- ☐ 3000A
- ☐ UL ☐ IEC
- ☒ 3-pole ☐ 4-pole
- ☐ Manually operated
- ☒ Electrically operated

Trip Unit

- ☐ LSI ☐ LSI-G
- ☒ LSIG-P

Control System

Controller

- ☒ Cat ECS 100
- ☐ Cat ECS 200
- ☐ EMCP 4.4

Attachments

- ☒ Local annunciator module
- ☐ Remote annunciator module
- ☐ Expansion I/O module
- ☐ Remote monitoring software

Charging

- ☐ Battery charger – 10A
- ☐ Battery charger – 20A
- ☐ Battery charger – 35A

Battery
Charger - 30A

Vibration Isolators

- ☒ Spring
- ☐ Seismic rated

Cat Connect

Connectivity

- ☒ Ethernet
- ☐ Cellular

Extended Service Options

Terms

- ☐ 2 year (prime)
- ☐ 3 year
- ☐ 5 year
- ☐ 10 year

Coverage

- ☐ Silver
- ☐ Gold
- ☐ Platinum
- ☐ Platinum Plus

Ancillary Equipment

- ☐ Automatic transfer switch (ATS)
- ☐ Paralleling switchgear
- ☐ Paralleling controls

Certifications

- ☒ ULC 2200 Listed
- ☐ IBC seismic certification
- ☐ OSHPD pre-approval

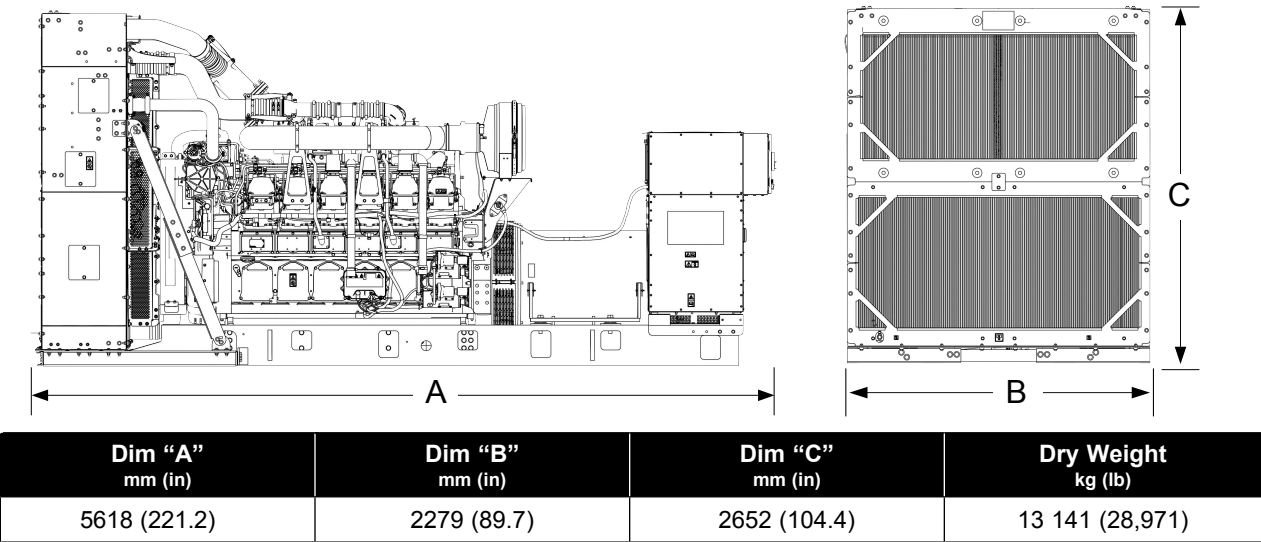
Note: Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.

Package Performance

Performance	Standby	
Frequency	60 Hz	
Gen set power rating with fan	1500 ekW	
Gen set power rating with fan @ 0.8 power factor	1875 kVA	
Emissions	EPA ESE (Tier 2)	
Performance number	EM1898-01	
Fuel Consumption		
100% load with fan – L/hr (gal/hr)	383.3	(101.3)
75% load with fan – L/hr (gal/hr)	300.6	(79.4)
50% load with fan – L/hr (gal/hr)	212.7	(56.2)
25% load with fan – L/hr (gal/hr)	124.3	(32.8)
Cooling System		
Radiator air flow restriction (system) – kPa (in. water)	0.12	(0.48)
Radiator air flow – m³/min (cfm)	1745	(61624)
Engine coolant capacity – L (gal)	156.8	(41.4)
Radiator coolant capacity – L (gal)	128.0	(33.8)
Total coolant capacity – L (gal)	284.8	(75.2)
Inlet Air		
Combustion air inlet flow rate – m³/min (cfm)	135.8	(4794.6)
Exhaust System		
Exhaust stack gas temperature – °C (°F)	402.6	(756.6)
Exhaust gas flow rate – m³/min (cfm)	323.0	(11406.4)
Exhaust system backpressure (maximum allowable – kPa (in. water)	6.7	(27.0)
Heat Rejection		
Heat rejection to jacket water – kW (Btu/min)	499	(28363)
Heat rejection to exhaust (total) – kW (Btu/min)	1431	(81392)
Heat rejection to aftercooler – kW (Btu/min)	504	(28646)
Heat rejection to atmosphere from engine – kW (Btu/min)	125	(7084)
Heat rejection from alternator – kW (Btu/min)	74	(4208)
Emissions* (Nominal)		
NOx mg/Nm³ (g/hp-h)	2303.5	(5.32)
CO mg/Nm³ (g/hp-h)	230.3	(0.47)
HC mg/Nm³ (g/hp-h)	50.3	(0.12)
PM mg/Nm³ (g/hp-h)	12.6	(0.03)
Emissions* (Potential Site Variation)		
NOx mg/Nm³ (g/hp-h)	2764.3	(6.38)
CO mg/Nm³ (g/hp-h)	414.5	(0.84)
HC mg/Nm³ (g/hp-h)	66.9	(0.16)
PM mg/Nm³ (g/hp-h)	17.7	(0.04)

*mg/Nm³ levels are corrected to 5% O₂. Contact your local Cat dealer for more information.

Weights and Dimensions



Note: For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.

Ratings Definitions

Standby
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby rated ekW. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Mission Critical
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 85% of the mission critical rated ekW. Typical peak demand up to 100% of rated ekW for up to 5% of the operating time. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Prime
Output available with varying load for an unlimited time. Average power output is 70% of the prime rated ekW. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Continuous
Output available with non-varying load for an unlimited time. Average power output is 70-100% of the continuous rated ekW. Typical peak demand is 100% of continuous rated ekW for 100% of the operating hours.

Applicable Codes and Standards
AS 1359, ULC 2200 3rd edition, UL 489, UL 869A, IBC, IEC 60034-1, ISO 3046, ISO 8528, NEMA MG1-22, NEMA MG1-33, 2014/35/EU, 2006/42/EC, 2014/30/EU and facilitates compliance to NFPA 37, NFPA 70, NFPA 99, NFPA 110.

Note: Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

Data Center Applications

- All ratings Tier III/Tier IV compliant per Uptime Institute requirements.
- All ratings ANSI/TIA-942 compliant for Rated-1 through Rated-4 data centers.

Fuel Rates
Fuel consumption reported in accordance with ISO 3046-1, based on fuel oil of 35° API [16°C (60°F)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 15°C (59°F) and weighing 850 g/liter (7.0936 lbs/U.S. gal.) All fuel consumption values refer to rated engine power.

Perf No: EM1898Change Level: 02

General

Heat Rejection

Sound

Emissions

Regulatory

Altitude Derate

Cross Reference

Supplementary Data

Perf Param Ref

View PDF

SALES MODEL:	3512C	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	2,206	FAN POWER (HP):	88.5
GEN POWER WITH FAN (EKW):	1,500.0	ASPIRATION:	TA
COMPRESSION RATIO:	14.7	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	STANDBY	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
PUMP QUANTITY:	1	INLET MANIFOLD AIR TEMP (F):	122
FUEL TYPE:	DIESEL	JACKET WATER TEMP (F):	210.2
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	PARALLEL
GOVERNOR TYPE:	ADEM3	TURBO QUANTITY:	4
ELECTRONICS TYPE:	ADEM3	TURBOCHARGER MODEL:	GTB4708BN-52T-0.96
CAMSHAFT TYPE:	STANDARD	CERTIFICATION YEAR:	2006
IGNITION TYPE:	CI	CRANKCASE BLOWBY RATE (FT3/HR):	2,203.4
INJECTOR TYPE:	EUI	FUEL RATE (RATED RPM) NO LOAD (GAL/HR):	9.8
FUEL INJECTOR:	3920220	PISTON SPD @ RATED ENG SPD (FT/MIN):	2,244.1
UNIT INJECTOR TIMING (IN):	64.34		
REF EXH STACK DIAMETER (IN):	10		
MAX OPERATING ALTITUDE (FT):	3,937		

INDUSTRY	SUB INDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

General Performance Data

Top

Note(s)

THIS STANDBY RATING IS FOR A STANDBY ONLY ENGINE ARRANGEMENT. RERATING THE ENGINE TO A PRIME OR CONTINUOUS RATING IS NOT PERMITTED.

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
1,500.0	100	2,206	307	0.332	0.326	103.2	101.3	0.488	0.479
1,350.0	90	1,983	276	0.336	0.330	94.0	92.2	0.494	0.484
1,200.0	80	1,768	246	0.343	0.336	85.5	83.8	0.505	0.496
1,125.0	75	1,662	232	0.346	0.339	81.0	79.4	0.510	0.501
1,050.0	70	1,556	217	0.348	0.341	76.4	74.9	0.516	0.506
900.0	60	1,349	188	0.352	0.346	67.0	65.7	0.528	0.518
750.0	50	1,144	159	0.355	0.349	57.3	56.2	0.542	0.532
600.0	40	940	131	0.359	0.352	47.6	46.7	0.563	0.552
450.0	30	736	103	0.368	0.361	38.1	37.4	0.601	0.590
375.0	25	632	88	0.376	0.368	33.5	32.8	0.633	0.621
300.0	20	527	73	0.388	0.380	28.8	28.3	0.681	0.668
150.0	10	312	43	0.443	0.434	19.5	19.1	0.920	0.902

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
1,500.0	100	2,206	77.5	120.9	1,145.6	74.6	756.6	82	449.8
1,350.0	90	1,983	72.2	116.1	1,102.7	68.8	727.5	77	428.8
1,200.0	80	1,768	66.9	113.2	1,069.1	63.0	713.4	71	409.0
1,125.0	75	1,662	63.4	111.5	1,052.3	59.5	706.7	68	396.6
1,050.0	70	1,556	59.7	109.8	1,035.2	55.8	700.0	64	382.6
900.0	60	1,349	51.1	107.1	1,000.5	47.6	687.3	55	350.3
750.0	50	1,144	40.6	107.5	963.6	38.4	696.7	44	309.9
600.0	40	940	30.0	108.4	921.9	29.4	702.2	33	266.6
450.0	30	736	20.9	107.1	856.0	21.9	685.3	23	224.6
375.0	25	632	16.9	106.2	809.5	18.8	664.9	19	204.3
300.0	20	527	13.3	105.2	754.5	16.0	636.4	15	184.2
150.0	10	312	7.3	103.2	609.7	11.4	540.6	9	148.8

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,500.0	100	2,206	4,794.6	11,406.4	21,167.1	21,899.0	4,610.8	4,188.7
1,350.0	90	1,983	4,598.6	10,640.5	20,285.8	20,952.1	4,406.6	4,013.7
1,200.0	80	1,768	4,378.0	9,981.4	19,285.7	19,892.1	4,183.4	3,822.5
1,125.0	75	1,662	4,246.6	9,595.7	18,674.6	19,249.2	4,045.1	3,700.9
1,050.0	70	1,556	4,098.2	9,181.5	17,984.1	18,526.3	3,892.6	3,565.4
900.0	60	1,349	3,753.0	8,273.8	16,379.2	16,854.4	3,546.8	3,254.6
750.0	50	1,144	3,280.4	7,230.6	14,251.7	14,658.2	3,074.4	2,822.7
600.0	40	940	2,787.5	6,155.4	12,057.0	12,394.7	2,604.7	2,394.2
450.0	30	736	2,363.4	5,134.0	10,186.4	10,456.9	2,204.7	2,032.9
375.0	25	632	2,179.8	4,645.2	9,382.2	9,619.6	2,030.9	1,877.5
300.0	20	527	2,011.4	4,165.1	8,648.1	8,852.3	1,868.3	1,733.0
150.0	10	312	1,730.9	3,244.5	7,428.8	7,566.8	1,594.8	1,494.1

Heat Rejection Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
1,500.0	100	2,206	28,363	7,084	81,392	37,320	11,956	28,646	93,547	224,476	239,123
1,350.0	90	1,983	26,596	6,665	74,128	33,028	10,882	26,053	84,110	204,315	217,647
1,200.0	80	1,768	24,935	6,360	68,257	30,111	9,897	23,350	74,958	185,825	197,950
1,125.0	75	1,662	24,035	6,215	64,979	28,563	9,376	21,735	70,466	176,039	187,526
1,050.0	70	1,556	23,095	6,074	61,624	26,950	8,845	20,016	66,004	166,069	176,905
900.0	60	1,349	21,108	5,797	54,723	23,576	7,759	16,292	57,205	145,683	155,189
750.0	50	1,144	18,963	5,518	47,678	21,085	6,636	11,959	48,509	124,586	132,716
600.0	40	940	16,710	5,240	40,505	18,108	5,512	7,849	39,882	103,489	110,241
450.0	30	736	14,361	4,818	33,056	14,499	4,416	4,829	31,201	82,917	88,327
375.0	25	632	13,131	4,577	29,249	12,494	3,876	3,681	26,809	72,772	77,520
300.0	20	527	11,848	4,331	25,396	10,418	3,336	2,726	22,353	62,628	66,715
150.0	10	312	9,052	3,821	17,619	5,853	2,253	1,342	13,214	42,301	45,061

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EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	117.0	107.0	122.0	118.0	110.0
1,350.0	90	1,983	116.0	106.0	121.0	117.0	109.0
1,200.0	80	1,768	115.0	105.0	120.0	116.0	108.0
1,125.0	75	1,662	114.0	104.0	119.0	115.0	107.0
1,050.0	70	1,556	114.0	104.0	119.0	115.0	107.0
900.0	60	1,349	112.0	103.0	117.0	113.0	105.0
750.0	50	1,144	111.0	101.0	116.0	112.0	104.0
600.0	40	940	110.0	100.0	115.0	111.0	103.0
450.0	30	736	108.0	99.0	113.0	109.0	101.0
375.0	25	632	108.0	98.0	113.0	109.0	101.0
300.0	20	527	107.0	97.0	112.0	108.0	100.0
150.0	10	312	105.0	95.0	110.0	106.0	98.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	108.0	109.0	109.0	107.0
1,350.0	90	1,983	107.0	108.0	108.0	106.0
1,200.0	80	1,768	106.0	107.0	107.0	105.0
1,125.0	75	1,662	106.0	107.0	107.0	105.0
1,050.0	70	1,556	105.0	106.0	106.0	104.0
900.0	60	1,349	104.0	105.0	105.0	103.0
750.0	50	1,144	103.0	104.0	104.0	102.0
600.0	40	940	101.0	103.0	102.0	101.0
450.0	30	736	100.0	101.0	101.0	99.0
375.0	25	632	99.0	100.0	100.0	98.0
300.0	20	527	98.0	99.0	99.0	97.0
150.0	10	312	96.0	97.0	97.0	95.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	103.0	95.0	111.0	106.0	97.0
1,350.0	90	1,983	102.0	94.0	110.0	104.0	96.0
1,200.0	80	1,768	101.0	93.0	109.0	103.0	95.0
1,125.0	75	1,662	101.0	92.0	109.0	103.0	94.0
1,050.0	70	1,556	100.0	92.0	108.0	102.0	94.0
900.0	60	1,349	99.0	90.0	107.0	101.0	93.0
750.0	50	1,144	98.0	89.0	106.0	100.0	91.0
600.0	40	940	96.0	88.0	104.0	99.0	90.0
450.0	30	736	95.0	86.0	103.0	97.0	89.0
375.0	25	632	94.0	86.0	102.0	96.0	88.0
300.0	20	527	93.0	85.0	101.0	96.0	87.0
150.0	10	312	91.0	83.0	99.0	93.0	85.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	95.0	96.0	96.0	93.0
1,350.0	90	1,983	94.0	95.0	95.0	92.0
1,200.0	80	1,768	93.0	94.0	94.0	91.0
1,125.0	75	1,662	93.0	93.0	93.0	91.0
1,050.0	70	1,556	92.0	93.0	93.0	90.0
900.0	60	1,349	91.0	92.0	92.0	89.0
750.0	50	1,144	90.0	91.0	90.0	88.0
600.0	40	940	88.0	89.0	89.0	86.0
450.0	30	736	87.0	88.0	88.0	85.0
375.0	25	632	86.0	87.0	87.0	84.0

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
300.0	20	527	85.0	86.0	86.0	83.0
150.0	10	312	83.0	84.0	84.0	81.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	97.0	88.0	105.0	99.0	90.0
1,350.0	90	1,983	96.0	87.0	104.0	98.0	89.0
1,200.0	80	1,768	95.0	86.0	103.0	97.0	88.0
1,125.0	75	1,662	94.0	85.0	102.0	96.0	88.0
1,050.0	70	1,556	94.0	85.0	102.0	96.0	87.0
900.0	60	1,349	92.0	84.0	100.0	95.0	86.0
750.0	50	1,144	91.0	83.0	99.0	93.0	85.0
600.0	40	940	90.0	81.0	98.0	92.0	83.0
450.0	30	736	88.0	80.0	96.0	91.0	82.0
375.0	25	632	88.0	79.0	96.0	90.0	81.0
300.0	20	527	87.0	78.0	95.0	89.0	80.0
150.0	10	312	85.0	76.0	93.0	87.0	78.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	89.0	89.0	89.0	86.0
1,350.0	90	1,983	88.0	88.0	88.0	85.0
1,200.0	80	1,768	87.0	87.0	87.0	84.0
1,125.0	75	1,662	86.0	87.0	87.0	84.0
1,050.0	70	1,556	86.0	86.0	86.0	83.0
900.0	60	1,349	84.0	85.0	85.0	82.0
750.0	50	1,144	83.0	84.0	84.0	81.0
600.0	40	940	82.0	83.0	82.0	80.0
450.0	30	736	80.0	81.0	81.0	78.0
375.0	25	632	80.0	80.0	80.0	77.0
300.0	20	527	79.0	79.0	79.0	76.0
150.0	10	312	77.0	77.0	77.0	74.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	104.0	91.0	99.0	100.0	98.0
1,350.0	90	1,983	104.0	91.0	99.0	100.0	98.0
1,200.0	80	1,768	104.0	91.0	99.0	100.0	98.0
1,125.0	75	1,662	104.0	91.0	99.0	100.0	98.0
1,050.0	70	1,556	104.0	91.0	99.0	100.0	98.0
900.0	60	1,349	104.0	91.0	99.0	100.0	98.0
750.0	50	1,144	104.0	91.0	99.0	100.0	98.0
600.0	40	940	104.0	91.0	99.0	100.0	98.0
450.0	30	736	104.0	91.0	99.0	100.0	98.0
375.0	25	632	104.0	91.0	99.0	100.0	98.0
300.0	20	527	104.0	91.0	99.0	100.0	98.0
150.0	10	312	104.0	91.0	99.0	100.0	98.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	99.0	100.0	98.0	102.0
1,350.0	90	1,983	99.0	100.0	98.0	102.0
1,200.0	80	1,768	99.0	100.0	98.0	102.0
1,125.0	75	1,662	99.0	100.0	98.0	102.0

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
1,050.0	70	1,556	99.0	100.0	98.0	102.0
900.0	60	1,349	99.0	100.0	98.0	102.0
750.0	50	1,144	99.0	100.0	98.0	102.0
600.0	40	940	99.0	100.0	98.0	102.0
450.0	30	736	99.0	100.0	98.0	102.0
375.0	25	632	99.0	100.0	98.0	102.0
300.0	20	527	99.0	100.0	98.0	102.0
150.0	10	312	99.0	100.0	98.0	102.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	92.0	80.0	87.0	88.0	86.0
1,350.0	90	1,983	92.0	80.0	87.0	88.0	86.0
1,200.0	80	1,768	92.0	80.0	87.0	88.0	86.0
1,125.0	75	1,662	92.0	80.0	87.0	88.0	86.0
1,050.0	70	1,556	92.0	80.0	87.0	88.0	86.0
900.0	60	1,349	92.0	80.0	87.0	88.0	86.0
750.0	50	1,144	92.0	80.0	87.0	88.0	86.0
600.0	40	940	92.0	80.0	87.0	88.0	86.0
450.0	30	736	92.0	80.0	87.0	88.0	86.0
375.0	25	632	92.0	80.0	87.0	88.0	86.0
300.0	20	527	92.0	80.0	87.0	88.0	86.0
150.0	10	312	92.0	80.0	87.0	88.0	86.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	87.0	88.0	86.0	90.0
1,350.0	90	1,983	87.0	88.0	86.0	90.0
1,200.0	80	1,768	87.0	88.0	86.0	90.0
1,125.0	75	1,662	87.0	88.0	86.0	90.0
1,050.0	70	1,556	87.0	88.0	86.0	90.0
900.0	60	1,349	87.0	88.0	86.0	90.0
750.0	50	1,144	87.0	88.0	86.0	90.0
600.0	40	940	87.0	88.0	86.0	90.0
450.0	30	736	87.0	88.0	86.0	90.0
375.0	25	632	87.0	88.0	86.0	90.0
300.0	20	527	87.0	88.0	86.0	90.0
150.0	10	312	87.0	88.0	86.0	90.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	87.0	74.0	81.0	82.0	80.0
1,350.0	90	1,983	87.0	74.0	81.0	82.0	80.0
1,200.0	80	1,768	87.0	74.0	81.0	82.0	80.0
1,125.0	75	1,662	87.0	74.0	81.0	82.0	80.0
1,050.0	70	1,556	87.0	74.0	81.0	82.0	80.0
900.0	60	1,349	87.0	74.0	81.0	82.0	80.0
750.0	50	1,144	87.0	74.0	81.0	82.0	80.0
600.0	40	940	87.0	74.0	81.0	82.0	80.0
450.0	30	736	87.0	74.0	81.0	82.0	80.0
375.0	25	632	87.0	74.0	81.0	82.0	80.0
300.0	20	527	87.0	74.0	81.0	82.0	80.0
150.0	10	312	87.0	74.0	81.0	82.0	80.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,500.0	100	2,206	81.0	83.0	80.0	84.0
1,350.0	90	1,983	81.0	83.0	80.0	84.0
1,200.0	80	1,768	81.0	83.0	80.0	84.0
1,125.0	75	1,662	81.0	83.0	80.0	84.0
1,050.0	70	1,556	81.0	83.0	80.0	84.0
900.0	60	1,349	81.0	83.0	80.0	84.0
750.0	50	1,144	81.0	83.0	80.0	84.0
600.0	40	940	81.0	83.0	80.0	84.0
450.0	30	736	81.0	83.0	80.0	84.0
375.0	25	632	81.0	83.0	80.0	84.0
300.0	20	527	81.0	83.0	80.0	84.0
150.0	10	312	81.0	83.0	80.0	84.0

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Units Filter

All Units ▾

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	1,500.0	1,125.0	750.0	375.0	150.0
ENGINE POWER		BHP	2,206	1,662	1,144	632	312
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	11,615	5,877	3,912	2,972	2,290
TOTAL CO		G/HR	1,019	634	898	1,060	1,024
TOTAL HC		G/HR	257	278	262	207	241
TOTAL CO2		KG/HR	1,063	828	584	342	198
PART MATTER		G/HR	67.7	68.8	104.8	127.8	77.9
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,303.5	1,458.7	1,352.5	1,792.1	2,400.6
TOTAL CO	(CORR 5% O2)	MG/NM3	230.3	181.4	384.5	802.1	1,284.5
TOTAL HC	(CORR 5% O2)	MG/NM3	50.3	69.9	90.2	128.2	263.2
PART MATTER	(CORR 5% O2)	MG/NM3	12.6	16.3	37.9	76.2	80.1
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	854.8	541.3	501.9	665.0	890.8
TOTAL CO	(CORR 15% O2)	MG/NM3	85.5	67.3	142.7	297.6	476.6
TOTAL HC	(CORR 15% O2)	MG/NM3	18.7	25.9	33.5	47.6	97.7
PART MATTER	(CORR 15% O2)	MG/NM3	4.7	6.0	14.1	28.3	29.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,122	711	659	873	1,169
TOTAL CO	(CORR 5% O2)	PPM	184	145	308	642	1,028
TOTAL HC	(CORR 5% O2)	PPM	94	130	168	239	491
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	416	264	244	324	434
TOTAL CO	(CORR 15% O2)	PPM	68	54	114	238	381
TOTAL HC	(CORR 15% O2)	PPM	35	48	62	89	182
TOTAL NOX (AS NO2)		G/HP-HR	5.32	3.57	3.45	4.73	7.39
TOTAL CO		G/HP-HR	0.47	0.39	0.79	1.69	3.30
TOTAL HC		G/HP-HR	0.12	0.17	0.23	0.33	0.78
PART MATTER		G/HP-HR	0.03	0.04	0.09	0.20	0.25
TOTAL NOX (AS NO2)		G/KW-HR	7.13	4.79	4.62	6.35	9.92
TOTAL CO		G/KW-HR	0.63	0.52	1.06	2.26	4.43
TOTAL HC		G/KW-HR	0.16	0.23	0.31	0.44	1.04
PART MATTER		G/KW-HR	0.04	0.06	0.12	0.27	0.34
TOTAL NOX (AS NO2)		LB/HR	25.61	12.96	8.62	6.55	5.05
TOTAL CO		LB/HR	2.25	1.40	1.98	2.34	2.26
TOTAL HC		LB/HR	0.57	0.61	0.58	0.46	0.53
TOTAL CO2		LB/HR	2,344	1,825	1,289	753	436
PART MATTER		LB/HR	0.15	0.15	0.23	0.28	0.17
OXYGEN IN EXH		%	10.9	12.0	12.7	13.7	15.7
DRY SMOKE OPACITY		%	1.0	1.3	2.9	5.0	3.0
BOSCH SMOKE NUMBER			0.77	0.79	1.02	1.30	1.04

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		EKW	1,500.0	1,125.0	750.0	375.0	150.0
ENGINE POWER		BHP	2,206	1,662	1,144	632	312
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	13,938	7,053	4,695	3,567	2,748
TOTAL CO		G/HR	1,834	1,142	1,617	1,908	1,843
TOTAL HC		G/HR	341	370	348	276	320
PART MATTER		G/HR	94.8	96.4	146.7	178.9	109.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,764.3	1,750.5	1,623.0	2,150.5	2,880.8
TOTAL CO	(CORR 5% O2)	MG/NM3	414.5	326.5	692.0	1,443.8	2,312.1
TOTAL HC	(CORR 5% O2)	MG/NM3	66.9	93.0	119.9	170.5	350.1
PART MATTER	(CORR 5% O2)	MG/NM3	17.7	22.8	53.1	106.7	112.2

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	1,500.0 2,206	1,125.0 1,662	750.0 1,144	375.0 632	150.0 312
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	1,025.7	649.6	602.2	798.0	1,069.0
TOTAL CO	(CORR 15% O2)	MG/NM3	153.8	121.2	256.8	535.8	857.9
TOTAL HC	(CORR 15% O2)	MG/NM3	24.8	34.5	44.5	63.3	129.9
PART MATTER	(CORR 15% O2)	MG/NM3	6.6	8.5	19.7	39.6	41.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,346	853	791	1,047	1,403
TOTAL CO	(CORR 5% O2)	PPM	332	261	554	1,155	1,850
TOTAL HC	(CORR 5% O2)	PPM	125	174	224	318	654
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	500	316	293	389	521
TOTAL CO	(CORR 15% O2)	PPM	123	97	205	429	686
TOTAL HC	(CORR 15% O2)	PPM	46	64	83	118	243
TOTAL NOX (AS NO2)		G/HP-HR	6.38	4.28	4.14	5.68	8.87
TOTAL CO		G/HP-HR	0.84	0.69	1.42	3.04	5.95
TOTAL HC		G/HP-HR	0.16	0.22	0.31	0.44	1.03
PART MATTER		G/HP-HR	0.04	0.06	0.13	0.28	0.35
TOTAL NOX (AS NO2)		G/KW-HR	8.56	5.75	5.55	7.62	11.90
TOTAL CO		G/KW-HR	1.13	0.93	1.91	4.07	7.98
TOTAL HC		G/KW-HR	0.21	0.30	0.41	0.59	1.39
PART MATTER		G/KW-HR	0.06	0.08	0.17	0.38	0.47
TOTAL NOX (AS NO2)		LB/HR	30.73	15.55	10.35	7.86	6.06
TOTAL CO		LB/HR	4.04	2.52	3.56	4.21	4.06
TOTAL HC		LB/HR	0.75	0.82	0.77	0.61	0.71
PART MATTER		LB/HR	0.21	0.21	0.32	0.39	0.24

Regulatory Information [Top](#)

EPA EMERGENCY STATIONARY		2011 - ----		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
Locality U.S. (INCL CALIF)	Agency EPA	Regulation STATIONARY	Tier/Stage EMERGENCY STATIONARY	Max Limits - G/BKW - HR CO: 3.5 NOx + HC: 6.4 PM: 0.20

Altitude Derate Data [Top](#)

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BHP)													
AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,096	2,206
1,000	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,162	2,074	2,206
2,000	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,176	2,118	2,007	2,206
3,000	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,173	2,135	2,098	2,052	1,919	2,206
4,000	2,201	2,201	2,201	2,201	2,201	2,171	2,132	2,094	2,057	2,021	1,963	1,831	2,201
5,000	2,129	2,129	2,129	2,129	2,129	2,092	2,054	2,017	1,982	1,947	1,875	1,743	2,129
6,000	2,059	2,059	2,059	2,059	2,053	2,015	1,978	1,943	1,909	1,876	1,765	1,677	2,059
7,000	1,992	1,992	1,992	1,992	1,976	1,940	1,904	1,870	1,838	1,787	1,677	1,588	1,992
8,000	1,927	1,927	1,927	1,927	1,902	1,867	1,833	1,800	1,769	1,699	1,610	1,522	1,927
9,000	1,865	1,865	1,865	1,865	1,831	1,797	1,764	1,733	1,699	1,610	1,522	1,412	1,865
10,000	1,805	1,805	1,805	1,795	1,761	1,729	1,697	1,667	1,610	1,522	1,368	1,279	1,805
11,000	1,522	1,522	1,522	1,522	1,522	1,522	1,522	1,522	1,434	1,324	1,213	1,125	1,522
12,000	1,478	1,478	1,478	1,478	1,478	1,478	1,478	1,390	1,279	1,169	1,081	993	1,478
13,000	1,434	1,434	1,434	1,434	1,434	1,434	1,346	1,235	1,147	1,037	971	882	1,434
14,000	1,390	1,390	1,390	1,390	1,390	1,279	1,191	1,103	1,015	927	860	794	1,390
15,000	1,346	1,346	1,346	1,346	1,235	1,147	1,059	971	882	816	772	728	1,346

Cross Reference [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
4577179	LL1861	5084278	GS656	LS	CT200463	
4577179	LL1861	5157729	PG242	-	LYH00001	

Supplementary Data [Top](#)

Type	Classification	Performance Number
SOUND	SOUND PRESSURE	DM8779

Performance Parameter Reference [Top](#)

Parameters Reference: DM9600 - 15

PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION: Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

PERFORMANCE PARAMETER TOLERANCE FACTORS: Power +/- 3% Torque +/- 3% Exhaust stack temperature +/- 8% Inlet airflow +/- 5% Intake manifold pressure-gage +/- 10% Exhaust flow +/- 6% Specific fuel consumption +/- 3% Specific fuel consumption (C7-C18) +/- 4% Fuel rate +/- 5% Specific DEF consumption +/- 3% DEF rate +/- 5% Heat rejection +/- 5% Heat rejection exhaust only +/- 10% Heat rejection CEM only +/- 10% Heat Rejection values based on using treated water. Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications. On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed. On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed. These values do not apply to C280/3600. For these models, see the tolerances listed below.

C280/3600 HEAT REJECTION TOLERANCE FACTORS: Heat rejection +/- 10% Heat rejection to Atmosphere +/- 50% Heat rejection to Lube Oil +/- 20% Heat rejection to Aftercooler +/- 5%

TEST CELL TRANSDUCER TOLERANCE FACTORS: Torque +/- 0.5% Speed +/- 0.2% Fuel flow +/- 1.0% Temperature +/- 2.0 C degrees Intake manifold pressure +/- 0.1 kPa OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

REFERENCE ATMOSPHERIC INLET AIR FOR 3500 ENGINES AND SMALLER SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

FOR 3600 ENGINES Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

REFERENCE EXHAUST STACK DIAMETER The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

REFERENCE FUEL DIESEL Reference fuel is #2 distillate diesel with a 35API gravity; A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).

GAS Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

ALTITUDE CAPABILITY Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001. When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet. Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for

atmospheric pressure and temperature conditions outside the values defined, see TM2001. Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.
REGULATIONS AND PRODUCT COMPLIANCE TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative. Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.
EMISSION CYCLE LIMITS: Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.
WET & DRY EXHAUST/EMISSIONS DESCRIPTION: Wet - Total exhaust flow or concentration of total exhaust flow Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded
EMISSIONS DEFINITIONS: Emissions : DM1176
EMISSION CYCLE DEFINITIONS 1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied. 2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied. 3. For constant-speed auxiliary engines test cycle D2 shall be applied. 4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.
HEAT REJECTION DEFINITIONS: Diesel Circuit Type and HHV Balance : DM9500
HIGH DISPLACEMENT (HD) DEFINITIONS: 3500: EM1500
RATING DEFINITIONS: Agriculture : TM6008 Fire Pump : TM6009 Generator Set : TM6035 Generator (Gas) : TM6041 Industrial Diesel : TM6010 Industrial (Gas) : TM6040 Irrigation : TM5749 Locomotive : TM6037 Marine Auxiliary : TM6036 Marine Prop (Except 3600) : TM5747 Marine Prop (3600 only) : TM5748 MSHA : TM6042 Oil Field (Petroleum) : TM6011 Off-Highway Truck : TM6039 On-Highway Truck : TM6038
SOUND DEFINITIONS: Sound Power : DM8702 Sound Pressure : TM7080
Date Released : 03/12/24

Systems Data

Reference Number: EM1898



August 25, 2025
For Help Desk Phone Numbers
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AIR INTAKE SYSTEM

THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.

MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH CLEAN ELEMENT	15	IN-H2O
MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH DIRTY ELEMENT	25	IN-H2O
MAXIMUM PRESSURE DROP FROM COMPRESSOR OUTLET TO MANIFOLD INLET (OR MIXER INLET FOR EGR)	4.4	IN-HG
CHARGE AIR FLOW AT RATED SPEED	337.7	LB/MIN
TURBO COMPRESSOR OUTLET TEMPERATURE AT RATED SPEED	451	DEG F
MAXIMUM ALLOWABLE STATIC WEIGHT ON AIR INLET	59.5	LB
MAXIMUM ALLOWABLE STATIC WEIGHT ON AIR INLET (AIR SHUT OFF INCLUDED)	17.6	LB
MAXIMUM ALLOWABLE STATIC BENDING MOMENT ON AIR INLET	9.6	LB-FT
MAXIMUM ALLOWABLE STATIC WEIGHT ON TURBO OUTLET CONNECTION	0	LB
MAXIMUM ALLOWABLE STATIC BENDING MOMENT ON TURBO OUTLET CONNECTION	0	LB-FT

COOLING SYSTEM

ENGINE ONLY COOLANT CAPACITY	41.4	GAL
MAXIMUM ALLOWABLE JACKET WATER OUTLET TEMPERATURE	210	DEG F
REGULATOR LOCATION FOR JW (HT) CIRCUIT	OUTLET	
MAXIMUM UNINTERRUPTED FILL RATE	5.0	G/MIN

ENGINE SPEC SYSTEM

CYLINDER ARRANGEMENT	VEE	
NUMBER OF CYLINDERS	12	
CYLINDER BORE DIAMETER	6.7	IN
PISTON STROKE	7.5	IN
TOTAL CYLINDER DISPLACEMENT	3161	CU IN
STANDARD CRANKSHAFT ROTATION FROM FLYWHEEL END	CCW	
STANDARD CYLINDER FIRING ORDER	1-12-9-4-5-8-11-2-3-10-7-6	
NUMBER 1 CYLINDER LOCATION	RIGHT FRONT	
STROKES/COMBUSTION CYCLE	4	

EXHAUST SYSTEM

THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.

MAXIMUM ALLOWABLE SYSTEM BACK PRESSURE	27	IN-H2O
MANIFOLD TYPE	DRY	
MAXIMUM ALLOWABLE STATIC WEIGHT ON EXHAUST CONNECTION	63.9	LB
MAXIMUM ALLOWABLE STATIC BENDING MOMENT ON EXHAUST CONNECTION	31.7	LB-FT

FUEL SYSTEM

MAXIMUM FUEL FLOW FROM TRANSFER PUMP TO ENGINE	332.9	G/HR
MAXIMUM ALLOWABLE FUEL SUPPLY LINE RESTRICTION	8.9	IN-HG
MAXIMUM ALLOWABLE FUEL TEMPERATURE AT TRANSFER PUMP INLET	151	DEG F
MAXIMUM FUEL FLOW TO RETURN LINE FROM ENGINE	322.3	G/HR
MAXIMUM ALLOWABLE FUEL RETURN LINE RESTRICTION	8.0	IN-HG
NORMAL FUEL PRESSURE IN A CLEAN SYSTEM	60.2	PSI
FUEL SYSTEM TYPE	EUI	
MAXIMUM TRANSFER PUMP PRIMING LIFT WITHOUT PRIMING PUMP	12.1	FT
MAXIMUM HEAT REJECTION TO FUEL	540	BTU/MIN
LUBE SYSTEM		
CRANKCASE VENTILATION TYPE	TO ATM	
MOUNTING SYSTEM		
CENTER OF GRAVITY LOCATION - X DIMENSION - FROM REAR FACE OF BLOCK - (REFERENCE TM7077)	37.4	IN
CENTER OF GRAVITY LOCATION - Y DIMENSION - FROM CENTERLINE OF CRANKSHAFT - (REFERENCE TM7077)	9.8	IN
CENTER OF GRAVITY LOCATION - Z DIMENSION - FROM CENTERLINE OF CRANKSHAFT - (REFERENCE TM7077)	0.0	IN
MASS MOMENT OF INERTIA - X AXIS	8851	LB IN SEC2
MASS MOMENT OF INERTIA - Y AXIS	61955	LB IN SEC2
MASS MOMENT OF INERTIA - Z AXIS	61955	LB IN SEC2
STARTING SYSTEM		
MINIMUM CRANKING SPEED REQUIRED FOR START	120	RPM



Image Shown may not Reflect Actual Package.

SR5 — 1600 Frame

Standby Power

50 Hz, 1500 rpm 1440 – 2750 kVA

60 Hz, 1800 rpm 1320 – 2600 ekW

Prime Power

50 Hz, 1500 rpm 1440 – 2500 kVA

60 Hz, 1800 rpm 1320 – 2250 ekW

Continuous Power

50 Hz, 1500 rpm 1440 – 2000 kVA

60 Hz, 1800 rpm 1320 – 2250 ekW

Features

General

- Standards: meets the requirements of NEMA,
- IEC, ISO, IEEE, BS, AS
- Industry leading insulation technology
- Proven mechanical and electrical design
- Reliable and durable construction
- Improved excitation system for high power quality
- Improved motor starting capability
- Radio frequency noise suppression better than industry standards
- Superior construction and testing

Standard

- 3 Phase brushless, salient pole
- NEMA Class H insulation
- Class H Temperature rise at 40°C ambient
- 2/3 Winding pitch
- Low voltage: Random Wound and Internal
- Excitation
- Medium voltage: Form Wound and Permanent Magnet
- Standard voltages:
 - 60 Hz: 480V, 4160V
 - 50 Hz: 400V, 3300V
- Busbar connections:
 - 60 Hz models: NEMA standard hole pattern
 - 50 Hz models: EC standard hole pattern
- Cat® Digital Voltage Regulator (Cat DVR)

Optional

- PM excitation capability to IE excitation
- Low Voltage: Form Wound
- Space heater kit
- Bearing temperature detectors
- Optional voltages:
 - 60 Hz: 380V, 440V, 600V, 2400V
 - 50 Hz: 380V, 415V
- Oversized generators for Class F or Class B temperature rise
- UL Listing
- CSA test and certification

NEMA MG-1 Temperature Rise

(Over 40°C ambient)

	Class A	Class B	Class F	Class H
Standby	85°C	105°C	130°C	150°C
Prime / Continuous	60°C	80°C	105°C	125°C

Specifications

Type

Brushless, revolving field solid-state automatic voltage regulator

Construction

One bearing 3 phase, series star connected

Enclosure

Drip proof IP23, guarded

Alignment

Cat pilot shaft, single bearing only

Over-speed capability

60 Hz — 125% of synchronous speed

50 Hz — 150% of synchronous speed

Waveform deviation, line to line, no load

Less than 2%

Paralleling capability

Standard with adjustable voltage droop

Voltage level adjustment

+/- 5%

Voltage regulator

3 Phase sensing with variable Volts-Per Hertz response

Voltage regulation, steady state

+/- 0.5%

Voltage regulation with 3% speed change

+/- 0.5%

Voltage gain

Adjustable to compensate for engine speed droop and line loss

TIF Less than 50

Number of leads 6

Product Support

- Standard Caterpillar warranty
- Optional extended Caterpillar warranty
- Serviceable parts available through Caterpillar Parts System
- Service intervals agree with recommended engine practices

Serviceability

- Stator leads exit top
- Replaceable bearing sleeve(s) for longer life and lower repair cost
- Easy access to serviceable parts
- Improved wire and terminal identification ensuring reliable connection

Cable Entry

- Top cable entry on LV package
- Bottom cable entry on MV packages

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Main Stator Construction

The 1600 frame generators use Round lamination stator design.

Stator coil pitch, coil distribution designed to produce optimum waveform and minimum total harmonic distortion. Stator slots are insulated by slot liners and coil separators. Slot liners, coil separators, and top sticks provide a minimum of 25 mm (1 in) distance from the coil to ground. The thickness of liners, separators, and phase sheets provides superior protection between phases and ground.

Low voltage stator windings are given a 3000 volt "high pot" test (150% of the NEMA and IEC requirements for 460 volt generators) before the insulation is applied.

The stators are then given a vacuum impregnation treatment of polyester material, followed by an application of epoxy resin. This sealed stator is then given a final 2000 volt "high pot" test.

Rotor Construction

The main rotor is constructed using a precision "wet" layer winding process with epoxy painted on the bare rotor and on each layer. This ensures bonding of all the wire layers together, bonding of the coils to the rotor laminations, and a sealed insulation system. The rotor is put in the oven for curing the epoxy.

The exciter rotor is machine wound and receives a trickle coat of a fungus-resisting resin. Numerically controlled turning and grinding machines produce rotor shafts with close repeatable tolerances. Grade-8 bolts are used wherever joints are subject to induced stresses. A complete coating of red sealer is applied to protect the rotors and shaft from corrosion.

Every production rotor is dynamically balanced in two planes to within 0.0508 mm deflection peak-to-peak amplitude and run at rated speed before assembly into the stator.

GENERATOR DATA**OCTOBER 01, 2025**For Help Desk Phone Numbers [Click here](#)**Selected Model**

Engine: 3512 **Generator Frame:** 1622 **Genset Rating (kW):** 1500.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 2523932 **Genset Rating (kVA):** 1875.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Permanent Magnet **Pwr. Factor:** 0.8 **Rated Current:** 2255.3
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 20232 /20232 /20232 /660451

Spec Information

Generator Specification			Generator Efficiency		
Frame: 1622	Type: SR5	No. of Bearings: 1	Per Unit Load	kW	Efficiency %
Winding Type: FORM WOUND			0.25	375.0	90.5
Flywheel: 21.0			0.5	750.0	93.8
Connection: SERIES STAR			0.75	1125.0	94.7
Housing: 00			1.0	1500.0	94.7
Phases: 3					
No. of Leads: 6					
Poles: 4					
Wires per Lead: 4					
Sync Speed: 1800					
Generator Pitch: 0.67					

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1204	0.0148
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1506	0.0185
TRANSIENT - SATURATED X'_d	0.1986	0.0244
SYNCHRONOUS - DIRECT AXIS X_d	2.0312	0.2496
SYNCHRONOUS - QUADRATURE AXIS X_q	1.2191	0.1498
NEGATIVE SEQUENCE X_2	0.1351	0.0166
ZERO SEQUENCE X_0	0.0285	0.0035

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	1.6600
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1910
OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS T''_{d0}	0.0200
SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS T''_d	0.0120
OPEN CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T''_{q0}	0.0760
SHORT CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T''_q	0.0110
EXCITER TIME CONSTANT T_e	0.0940
ARMATURE SHORT CIRCUIT T_a	0.0300

Short Circuit Ratio: 0.57

Stator Resistance = 0.002 Ohms

Field Resistance = 0.427 Ohms

Voltage Regulation		Generator Excitation		
Voltage level adjustment: +/-	5.0%	No Load	Full Load, (rated) pf	
Voltage regulation, steady state: +/-	0.5%		Series	Parallel
Voltage regulation with 3% speed change: +/-	0.5%	Excitation voltage:	15.33 Volts	50.69 Volts
Waveform deviation line - line, no load: less than	2.0%	Excitation current	1.6 Amps	4.35 Amps
Telephone influence factor: less than	50			

Selected Model

Engine: 3512 **Generator Frame:** 1622 **Genset Rating (kW):** 1500.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 2523932 **Genset Rating (kVA):** 1875.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Permanent Magnet **Pwr. Factor:** 0.8 **Rated Current:** 2255.3
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 20232 /20232 /20232 /660451

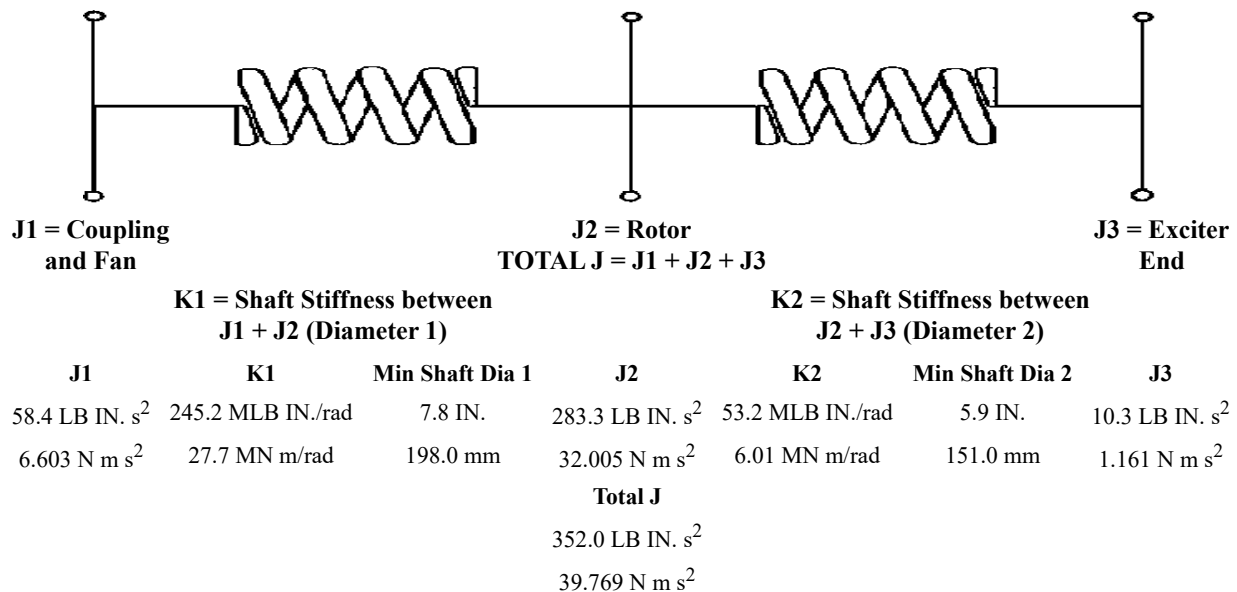
Generator Mechanical Information**Center of Gravity**

Dimension X	-897.6 mm	-35.3 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 3480 kg * Rotor WT = 1346 kg * Stator WT = 1697 kg
 7,672 LB 2,967 LB 3,741 LB

Rotor Balance = 0.0508 mm deflection PTP
 Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data**Selected Model**

Engine: 3512 **Generator Frame:** 1622 **Genset Rating (kW):** 1500.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 2523932 **Genset Rating (kVA):** 1875.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Permanent Magnet **Pwr. Factor:** 0.8 **Rated Current:** 2255.3
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 20232 /20232 /20232 /660451

Generator Cooling Requirements - Temperature - Insulation Data		
Cooling Requirements:	Temperature Data: (Ambient 40 °C)	
Heat Dissipated: 83.9 kW	Stator Rise:	105.0 °C
Air Flow: 168.0 m ³ /min	Rotor Rise:	105.0 °C
Insulation Class: H		
Insulation Reg. as shipped: 100.0 MΩ minimum at 40 °C		
Thermal Limits of Generator		
Frequency:	60 Hz	
Line to Line Voltage:	480 Volts	
B BR 80/40	1750.0 kVA	
F BR -105/40	1991.0 kVA	
H BR - 125/40	2188.0 kVA	
F PR - 130/40	2188.0 kVA	
H PR - 150/40	2319.0 kVA	

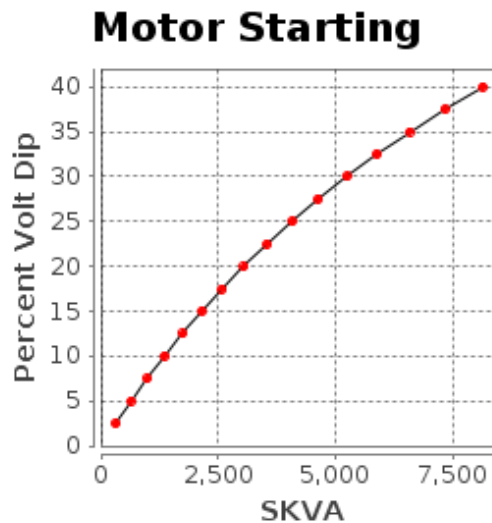
Selected Model

Engine: 3512	Generator Frame: 1622	Genset Rating (kW): 1500.0	Line Voltage: 480
Fuel: Diesel	Generator Arrangement: 2523932	Genset Rating (kVA): 1875.0	Phase Voltage: 277
Frequency: 60	Excitation Type: Permanent Magnet	Pwr. Factor: 0.8	Rated Current: 2255.3
Duty: STANDBY	Connection: SERIES STAR	Application: EPG	Status: Current

Version: 20232 /20232 /20232 /660451

Starting Capability & Current Decrement Motor Starting Capability (0.4 pf)

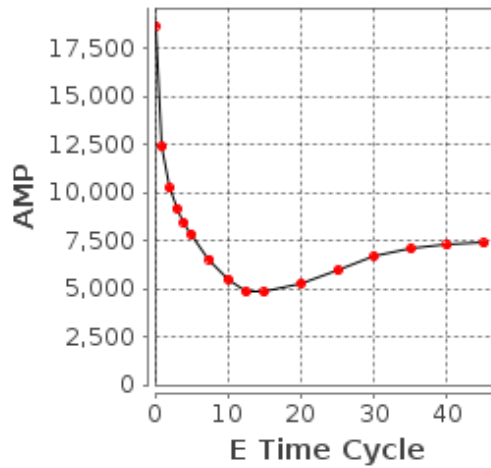
SKVA	Percent Volt Dip
313	2.5
643	5.0
991	7.5
1,358	10.0
1,746	12.5
2,157	15.0
2,593	17.5
3,056	20.0
3,549	22.5
4,075	25.0
4,637	27.5
5,239	30.0
5,886	32.5
6,583	35.0
7,335	37.5
8,150	40.0



Current Decrement Data

Current Decrement

E Time Cycle	AMP
0.0	18,665
1.0	12,379
2.0	10,221
3.0	9,168
4.0	8,433
5.0	7,817
7.5	6,532
10.0	5,504
12.5	4,828
15.0	4,806
20.0	5,276
25.0	5,939
30.0	6,669
35.0	7,073
40.0	7,252
45.0	7,352



Instantaneous 3 Phase Fault Current: 18665 Amps

Instantaneous Line - Line Fault Current: 15235 Amps

Instantaneous Line - Neutral Fault Current: 23750 Amps

Selected Model

Engine: 3512

Generator Frame: 1622

Genset Rating (kW): 1500.0

Line Voltage: 480

Fuel: Diesel

Generator Arrangement: 2523932

Genset Rating (kVA): 1875.0

Phase Voltage: 277

Frequency: 60

Excitation Type: Permanent Magnet

Pwr. Factor: 0.8

Rated Current: 2255.3

Duty: STANDBY

Connection: SERIES STAR

Application: EPG

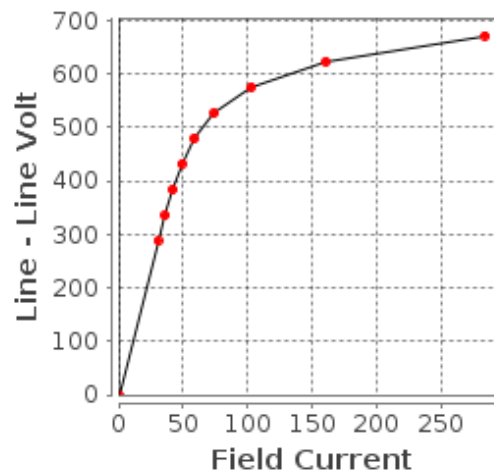
Status: Current

Version: 20232 /20232 /20232 /660451

Generator Output Characteristic Curves
Open Circuit Curve

Open Circuit

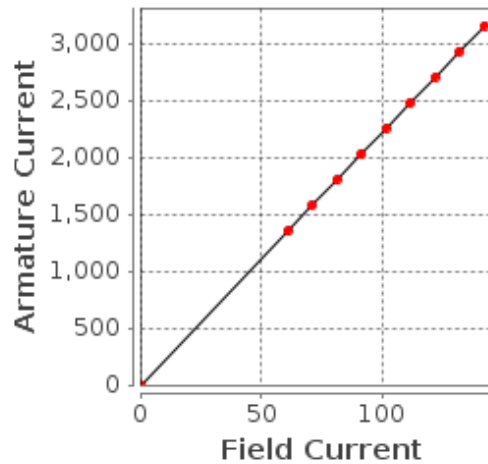
Field Current	Line - Line Volt
0.0	0
30.5	288
35.9	336
41.9	384
49.0	432
58.7	480
74.3	528
103.0	576
160.8	624
284.2	672



Short Circuit Curve

Short Circuit

Field Current	Armature Current
0.0	0
60.9	1,353
71.0	1,579
81.2	1,804
91.3	2,030
101.5	2,255
111.6	2,481
121.8	2,706
131.9	2,932
142.1	3,157



Selected Model

Engine: 3512 **Generator Frame:** 1622 **Genset Rating (kW):** 1500.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 2523932 **Genset Rating (kVA):** 1875.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Permanent Magnet **Pwr. Factor:** 0.8 **Rated Current:** 2255.3
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

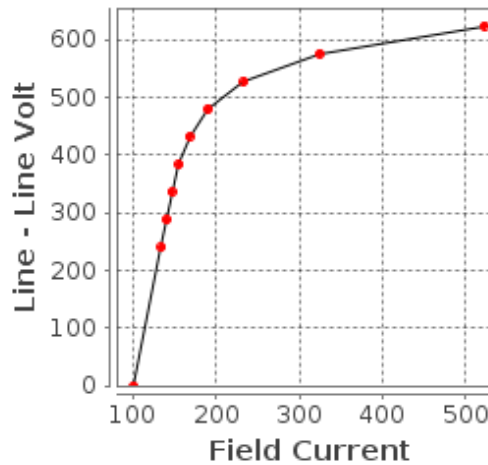
Version: 20232 /20232 /20232 /660451

Generator Output Characteristic Curves

Zero Power Factor Curve

Zero Power

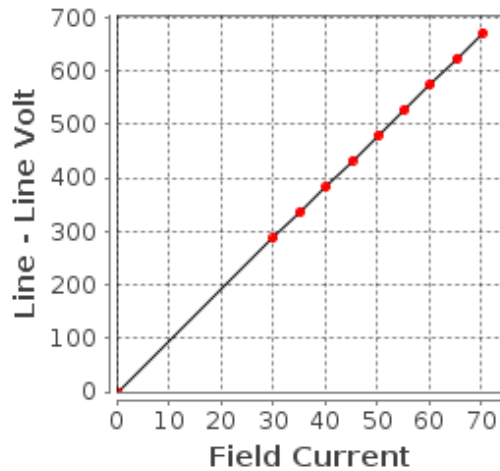
Field Current	Line - Line Volt
101.5	0
134.5	240
140.3	288
146.9	336
155.4	384
168.1	432
190.3	480
233.7	528
324.5	576
521.7	624



Air Gap Curve

Air Gap

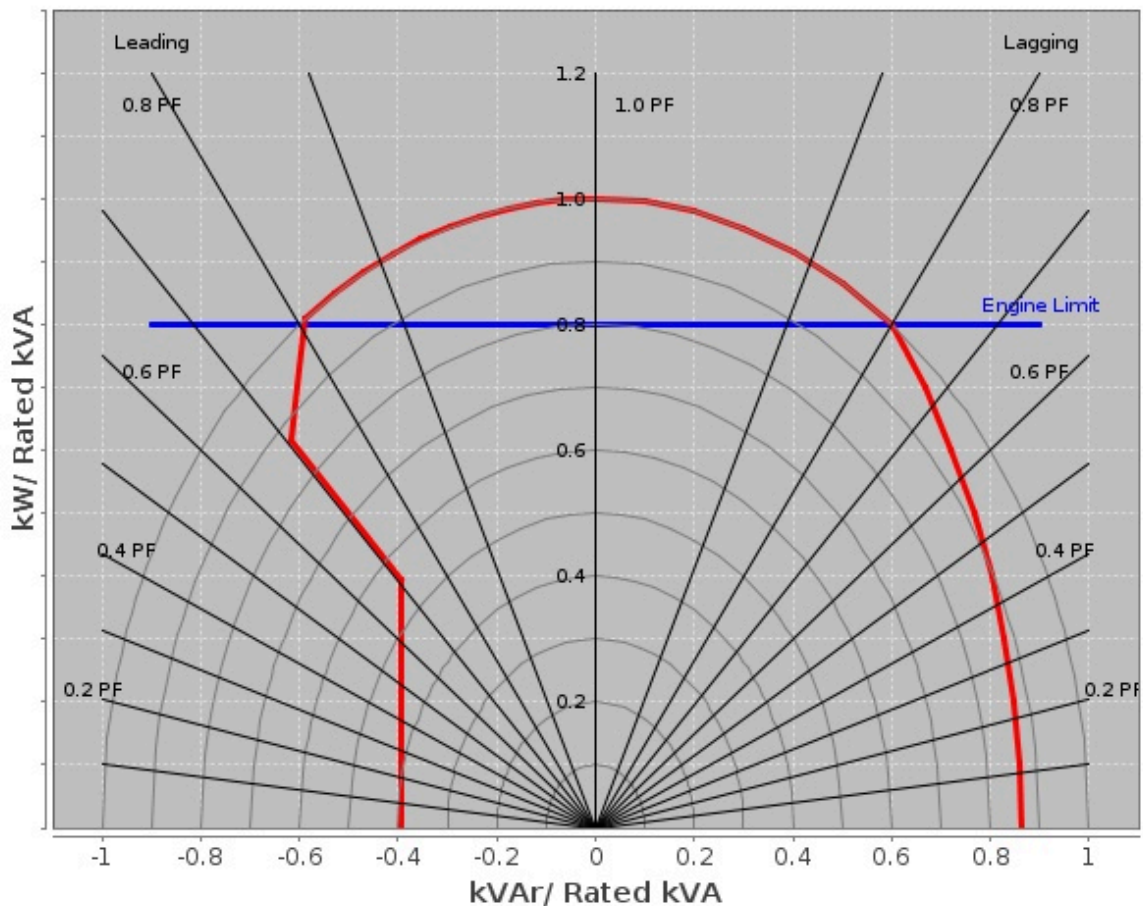
Field Current	Line - Line Volt
0.0	0
30.1	288
35.1	336
40.2	384
45.2	432
50.2	480
55.2	528
60.2	576
65.3	624
70.3	672



Selected Model

Engine: 3512 Generator Frame: 1622 Genset Rating (kW): 1500.0 Line Voltage: 480
Fuel: Diesel Generator Arrangement: 2523932 Genset Rating (kVA): 1875.0 Phase Voltage: 277
Frequency: 60 Excitation Type: Permanent Magnet Pwr. Factor: 0.8 Rated Current: 2255.3
Duty: STANDBY Connection: SERIES STAR Application: EPG Status: Current

Version: 20232 /20232 /20232 /660451

Reactive Capability Curve
Operating Chart

Selected Model

Engine: 3512	Generator Frame: 1622	Genset Rating (kW): 1500.0	Line Voltage: 480
Fuel: Diesel	Generator Arrangement: 2523932	Genset Rating (kVA): 1875.0	Phase Voltage: 277
Frequency: 60	Excitation Type: Permanent Magnet	Pwr. Factor: 0.8	Rated Current: 2255.3
Duty: STANDBY	Connection: SERIES STAR	Application: EPG	Status: Current

Version: 20232 /20232 /20232 /660451

General Information

DM7825 Caterpillar SR5 Generators (50 Hz, 60 Hz)
Data for 1400, 1600, 1700, 1800 and 1900 frames Caterpillar SR5
generators built by Leroy Somer - USA and Leroy Somer ☐ France.

Refer to DM7821 for explanation of all generator data in Technical
Marketing Information (TMI) except generator efficiency for which the
explanation is given below.

GENERATOR EFFICIENCY

Generator efficiency is the percentage of engine flywheel (or other
prime mover) power that is converted into electrical output. The
generator efficiency shown is calculated by the summation of all
losses method, and is determined in accordance with the IEC Standard
60034. The efficiency considers only the generator. There is no
consideration of engine or parasitic losses here.

Refer to DM7829 for low and medium voltage protective setting values a
nd limits.

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Cat® Energy Control System (ECS) 100

The Cat ECS 100 generator set controller uses system graphic icons and labels that allow for simple, comprehensive generator set operation. The easy-to-use 203 mm (8") color LED touchscreen display features scroll navigation. Generator set and remote-mount options are available.

FEATURES

- Island mode – single unit operation
- High visibility graphical touchscreen display with alarm/event descriptions, set points, engine and generator monitoring
- Meets UL 2200, 3rd Edition requirements including UL 6200
- Local annunciation to meet NFPA 110 (subject to local authority having jurisdiction approval)
- Ethernet Modbus TCP for external communications
- Intuitive navigation for display of power metering, protection, engine and generator parameters and tuning
- Lockout security provision to assure platform integrity with three programmable security levels
- Support of up to four (4) remote HMI's (sold separately)
- Multi-language support.
- Compatible with Cat Connect Product Link™ devices
- IVR or CDVR voltage regulation compatibility
- Emergency Override

Advanced Functionality

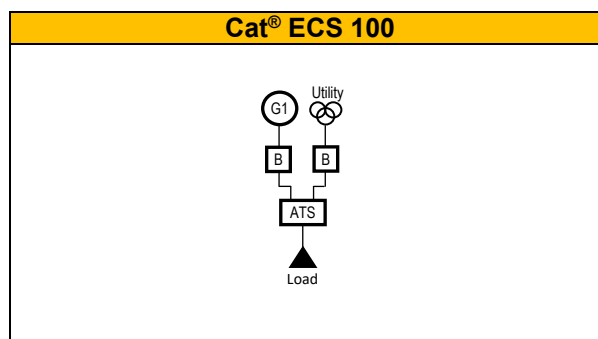
- Automatic mains failure with utility voltage sensing capability (open transition) and remote breaker or contactor control/monitoring
- Engine remote start integrity monitoring
- Single genset transient load relief (TLR)
- Basic programmable logic control (PLC) function
- Embedded webserver
- EPA Tier 4 integration
- Real (kW) load histograms
- Status event log
- Supports Dynamic Gas Blending™ (DGB™)

Control Module and Display

The Cat A6L3 is the base module controller utilizing the high-resolution display for the human machine interface (HMI).



Typical⁽¹⁾ Single Line Diagram (SLD)



⁽¹⁾ - More single line diagrams (SLD's) are available to meet application requirements. Contact your local Cat dealer for more information.

Standard Features

Controls	• Auto / Start / Stop • Emergency stop • Engine cooldown timer • Engine cycle crank • Programmable cycle timer • Speed and voltage adjust
Generator Set Monitoring	• Generator AC voltage monitoring (+/- 0.25% controller lifetime accuracy) • Utility/Bus AC voltage monitoring (+/- 0.25% controller lifetime accuracy) • 3 phase/4 wire (L-L&L-N) sensing • Current sensing (3 phase/6 wire) (+/- 0.1% up to 100% of rated current controller accuracy) • Generator AC current (per phase & avg) • Generator frequency • Power metering (kW, kVA, kVA_r, pf) • kW-hr (export), kVA_r-hr (import and export), total and trip • Generator stator and bearing temp (with optional RTD module) • kW load histogram
Generator Protection	• Generator phase sequence (47G) • Over/Under voltage (27/59) • Over/Under frequency (81 O/U) • Overcurrent timed & inverse (50/51) • Overcurrent (Thermal Damage Curve) (51) • Reverse power real (kW) (32) • Reverse power reactive (kVA_r) (32RV) • Current balance (46) • Overload (49)
Engine Monitoring	• Engine oil pressure (kPa or psi) • Engine oil temperature (°C or °F) • Engine coolant temperature (°C or °F) • Engine speed (RPM) • Battery voltage • Crank attempt and successful start counter • Run hour meter • Real time clock
Engine Protection	• Control switch not in auto (alarm) • Low oil pressure • High coolant temperature (alarm and shutdown) • Low coolant temp (alarm) • Low coolant level (alarm and shutdown) • High engine oil temp (alarm and shutdown) • Low/High/Weak battery voltage • Fail to start • Overspeed • Overcrank • Low gas pressure (alarm and shutdown)

Standard Features *(continued)*

Digital Inputs	• Emergency Stop • Remote Start • 16 programmable inputs (4 used for functional safety)⁽²⁾
Digital Outputs	• 12 programmable outputs (4 used for functional safety)⁽²⁾
Analog Outputs	• 2 analog outputs
PWM Outputs	• 3 Total (1 used for IVR - standard)
Analog Inputs	• 3 programmable inputs (0-5V, 0.5-4.5V, 1-5V, or resistive)⁽²⁾
Communication	• Primary & accessory CAN data link • Remote annunciator data link up to 1219 m (4000 ft) • Cat® Data Link (CDL) - with optional PLE702 • Ethernet (Modbus TCP/IP) - 100 baseT • USB- touchscreen display • Four 4-wire ports for internal and customer use • Two 2-wire ports for internal device network
Environmental	• HMI (front touchscreen) IP66 • A6L3 Controller Operating Temp. -40°C to + 70°C • Control module box: - Ingress protection IP23 - Health Care Access and Information (HCAI) ground and roof seismic certification
Languages	• Chinese Danish English French German Italian Japanese • Portuguese Russian Spanish additional languages on request

⁽²⁾ - Generator set configuration may affect available features.

Enhanced Control Features

Advanced overcurrent protection

The Cat ECS 100 provides advanced overcurrent protection of the generator set system via programmable Definite Time and Inverse Time curves.

For the Inverse time curve the following four selections are available:

- Normally Inverse
- Very Inverse
- Extremely Inverse
- Thermal Damage Curve - the Thermal Damage curve may be more closely aligned to specific generators.

Arc Flash Maintenance mode

The Cat ECS 100 Programmable Arc Flash Energy Reducing Maintenance Mode feature provides a method to reduce clearing time via two functions that work together to meet the 2023 edition of NFPA 70, Section 240.87 (Arc Energy Reduction).

- A means to accept an energy-reducing maintenance switch and provide means to connect a local status indicator.
- An instantaneous overcurrent setting that can be set below the available arcing current.

Integrated programmable logic controller (PLC)

This feature set of the Cat ECS 100 allows the user to create custom logic functions in similar fashion to that of the capability of a PLC controller. These logic functions allow for increased capability of the Cat ECS 100 through interaction and control of internal signals within the control software as well as the programmable inputs/outputs of the device.

Programmable kW relay

The Cat ECS 100 includes three programmable kW relay outputs configured based on the % kW of the generator set. The configurable set points of the kW relay include: trigger condition, percentage threshold, hysteresis percentage and trip activation & deactivation delay time. These output functions may also be used to trigger events, recordable within the event log and included in the remote monitoring of the generator set.

Real-time clock

The real-time clock allows for date and time stamping of diagnostics and events in the control's logs as well as service maintenance reminders based on engine operating hours or calendar days.

Diagnostic System and Status Event Logs

Up to 40 unique diagnostic events (e.g., warnings, shutdowns, etc.) are stored in the non-volatile memory. It also allows for the creation of a status event log. This log holds the last 500 control events such as Engine Control Switch Position, Remote Initiate, Load Shed, etc. Events are stored in a "first in, first out" strategy.

Programmable cycle timer

The programmable cycle timer (PCT) feature allows for programming of seven independent times, when tasks (called PCT outputs), will be activated or deactivated automatically during the week. This is useful for exercising generator sets, or cases where two or more generators are required to automatically share the duty of supplying a load throughout the week. Using the PCT, each generator set can be programmed to start and stop at pre-set times. The PCT can handle a seven-day sequence with seven independent starts happening one or more times each week. Each of the seven timers has the following set points: activation day of the week, activation start time, active time and includes three (3) independent activation outputs.

Real (kW) load histogram

The Cat ECS 100 is equipped with a real (kW) load histogram. This feature keeps track of the amount of time the generator percent kW is within certain predefined ranges. The ranges monitored are in 10% steps (0 to <10%, 10% to <20%, ..., 90% to 100%).

HMI Webserver

The Cat ECS 100 HMIs include an embedded web server. The embedded web server allows the operator to operate a virtual HMI with the same control and permissions as the host HMI (local or remote, if applicable) over an Ethernet connection to a local and/or remote station. Custom screen creation is also available. Each HMI webserver is independent.

Dimensions

Package-Mounted or Ship Loose (with harness)

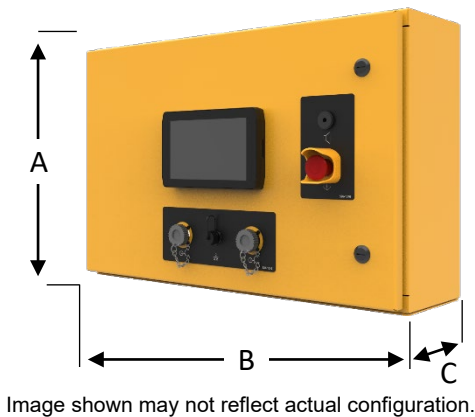


Image shown may not reflect actual configuration.

Dimensions				
Control Box Dimensions	A	B	C ⁽³⁾	Weight
Units	mm (in)	mm (in)	mm (in)	kg (lbs)
Cat ECS 100	515 (20.28)	794 (31.27)	273 (10.73)	43 (95)

⁽³⁾ - Dimension including E-Stop button is 263 mm (10.35 in).

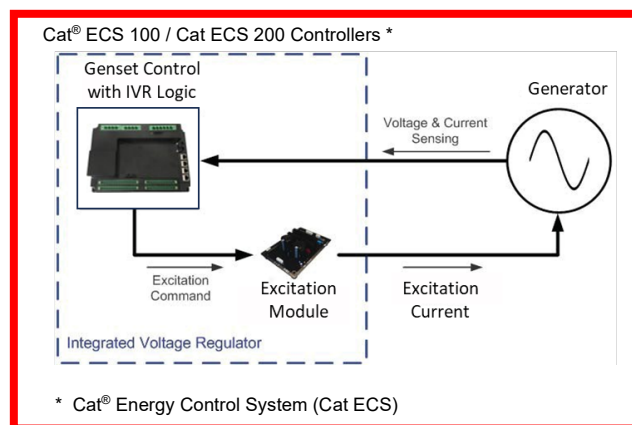
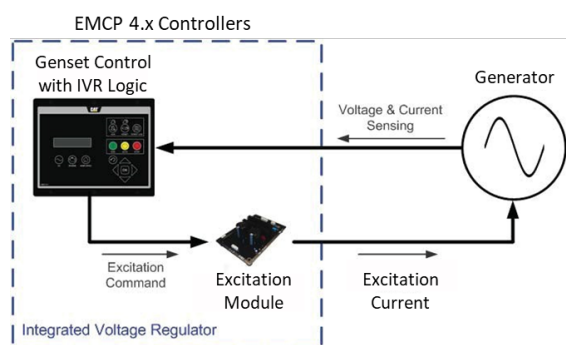
Worldwide Product Support

Cat dealers have over 1,800 dealer branch stores operating in 200 countries and offer extensive post-sale support including maintenance and repair agreements

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www.cat.com/electricpower



INTEGRATED VOLTAGE REGULATOR

The Integrated Voltage Regulator (IVR) is designed to provide robust, precise closed-loop control of the generator voltage, optimized transient performance and industry leading feature specification.

Caterpillar is leading the power generation marketplace with power solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

When used with an Excitation Module, EMCP 4.3/4.4 and IVR-compatible EMCP 4.1/4.2 (B), and Cat ECS 100 / Cat ECS 200 controllers offers:

- Automatic Voltage Regulation (AVR)
- Programmable stability settings
- Soft start control with an adjustable time setting in AVR control mode
- Dual Slope, Configurable Under Frequency (Volts/Hz) regulation
- Three-phase or single-phase generator voltage (RMS) sensing/regulation in AVR mode
- Setpoint adjustment from the EMCP / Cat ECS display or Cat ET Service Tool
- IVR Operating Status and Voltage Bias Overview screens to provide an enhanced level of user interface
- Integrated Voltage Regulator event monitoring

EMCP 4.3/4.4 and IVR-compatible EMCP 4.2 (B), and Cat ECS 100 / Cat ECS 200 controllers also offer:

- Power Factor Regulation (PF)
- Reactive Droop compensation
- Line drop compensation

WORLDWIDE PRODUCT SUPPORT

- Worldwide parts availability through the Cat dealer network
- Over 1,800 dealer branch stores operating in 200 countries
- The best product support record in the industry
- Cat dealers provide extensive post sale support including maintenance and repair agreements

COMPLETE SYSTEM INTEGRATION

Fully designed and factory tested to work seamlessly with Cat generators using Self Excitation (SE), Internal Excitation (IE) or Permanent Magnet (PMG) excitation systems and EMCP and Cat ECS controls.

INTEGRATED VOLTAGE REGULATOR FEATURE SPECIFICATION

	EMCP 4.1	EMCP 4.2(B)	EMCP 4.3	EMCP 4.4	Cat® ECS 100 / Cat ECS 200
					
SPECIFICATIONS					
No Load to Full Load Regulation	±0.5%	±0.25%	±0.25%	±0.25%	±0.25%
Configurable Volts / Hz Characteristic	•	•	•	•	•
Configurable Knee Frequency	•	•	•	•	•
Regulator ResponseTime	10 ms	10 ms	5 ms	5 ms	5 ms
Single and Three Phase Sensing	•	•	•	•	•
Voltage Adjustment Range	± 30%	± 30%	± 30%	± 30%	± 100%
CONTROL					
Characteristic	•	•	•	•	•
Excitation Enable I Disable Selection	•	•	•	•	•
Line Loss (I²R) Compensation	—	•	•	•	•
Reactive Droop Compensation	—	•	•	•	•
Power Factor Control Mode	—	•	•	•	•
PROTECTION I ALARMS					
Generator Overvoltage	•	•	•	•	•
Generator Under voltage	•	•	•	•	•
Over Excitation	•	•	•	•	•
Loss of Sensing	•	•	•	•	•
Generator Reverse VARs	—	•	•	•	•
Event Log	•	•	•	•	•
METERING					
AC Metering	•	•	•	•	•
Power Metering	—	•	•	•	•
Excitation Command Percentage	•	•	•	•	•
Operating Mode Status Indication	•	•	•	•	•
VOLTAGE ADJUSTMENT					
Display Voltage Bias	•	•	•	•	•
Digital Input (Raise I Lower) Voltage Bias¹	•	•	•	•	•
Potentiometer Voltage Bias¹	•	•	•	•	•
Analog Voltage Bias -Voltage Range¹	0V to 5V	0V to 5V	-10V to +10V	-10V to +10V	-10V to +10V
Analog Voltage Bias - Current Range¹	-	-	0mA to 20mA	0mA to 20mA	0mA to 20mA
Analog Voltage Bias - PWM Range¹	-	-	0% to 100%	0% to 100%	0% to 100%
SCADA (Modbus) Voltage Bias	-	•	•	•	•

¹Requires an available input on the EMCP 4.

EXAMPLE SCREENS – Cat ECS 100 / Cat ECS 200



Figure 7: Cat ECS 100 / Cat ECS 200 IVR Overview

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ADEM™ III Engine Controller

The ADEM™ III controller is the main Electronic Control Module (ECM) used on select diesel engines.

The ADEM III control is designed to control/ interface electronic unit injector (EUI) equipped engines. The ADEM III controller is composed of the ADEM III ECM, control software, sensors, actuators, fuel injectors, and interface to the generator system.

The prime benefit of an ADEM III engine system is to better control and maintain the particulate emissions, both steady state and transient, while improving engine performance over the Mechanical Unit Injector (MUI) engines.

Features

Reliable and Durable

- All ADEM III controllers are designed to survive the harshest environments.
- Environmentally sealed, die-cast aluminum housing isolates and protects electronic components from moisture and dirt contamination.
- Rigorous vibration testing ensures product reliability and durability.
- Accuracy maintained from -40°C to 85°C
- Electrical noise immunity to 100 volts/meter
- Internal circuits are designed to withstand shorts to +battery and -battery.

Simple Servicing

- Each ADEM III system works in combination with the Cat® ET service tool software to keep the engine operating at peak performance.
- Displays measured parameters
- Retrieves active and logged event code documenting abnormal system operation
- Performs calibrations and diagnostic tests
- Supports flash programming of new software into the ADEM III ECM

Self Diagnostics

- Each ADEM III ECM has a full compliment of diagnostics. The ECM can detect faults in the electrical system and report those faults to the service technician for quick repair.
- Self-diagnostic capability pinpoints operational problems in need of attention.

Advanced Features

- Enhanced performance from fuel injection timing and limiting
- Adjustable monitoring of vital engine parameters
- Programmable speed acceleration ramp rate
- Data link interfaces

Options

The ECM is housed in an environmentally sealed casting. All wiring connections to the ECM are made using two sealed connectors: a single seventy-pin connector and a single one hundred twenty-pin connector.

Engine Speed Governing

Desired engine speed is calculated by the ECM and held within ± 0.2 Hz for isochronous and droop mode. The ECM accounts for droop that is requested. The proper amount of fuel is sent to the injectors due to these calculations. The ECM also employs cooldown/shutdown strategies, acceleration delays on startup, acceleration ramp times and speed reference

Fuel Limiting

Warm and cold fuel-air ratio control limits are controlled by the ECM. Electronic monitoring system derates, torque limit, and cranking limit, programmable torque scaling, and cold cylinder cutout mode are standard features.

Fuel Injection Timing

Master timing for injection is controlled by the ECM control. Temperature dependencies are accounted for in the fuel injection calculations.

Electronic Monitoring

Electronic monitoring of vital engine parameters can be programmed. Warning, derate, and shutdown event conditions may be customized by the user.

Specifications

Impervious to:

- Salt spray, fuel, oil and oil additives, coolant, spray cleaners, chlorinated solvents, hydrogen sulfide and methane gas, and dust

Input and Output Protection

- All inputs and outputs are protected against short circuits to +battery and –battery

Input Voltage Range (24 VDC nominal)

- All inputs and outputs are protected against

Mounting

- Engine mounted

Information Management

The ECM stores information to assist with electronic troubleshooting. Active and logged diagnostic codes, active events, logged events, fuel consumption, engine hours, and instantaneous totals aid service technicians when diagnosing electronic faults and scheduling preventive maintenance.

Calibrations

Engine performance is optimized through injection timing. Auto/manual sensor calibrations are standard features.

On-board System Tests

Engine performance is optimized through injection timing. Auto/manual sensor calibrations are standard features.

Data Link Interfaces

The ADEM III communicates with the EMCP 4 via a dedicated communication network.

Electronic Sensing

The following sensing is available on the ADEM III: oil pressure, fuel pressure, fuel temperature, atmospheric pressure, air inlet temperature, turbo outlet pressure, engine coolant temperature, engine speed, throttle, position, exhaust temperature, oil filter pressure differential, fuel filter pressure differential, air filter pressure differential and crankcase pressure.

Reverse Polarity Protected

Shock – Withstands 20 g

Temperature Range

- Operating: -40°C to 85°C (-40°F to 185°F)
- Storage: -50°C to 120°C (-58°F to 248°F)

Vibration

- Withstands 8.0 g @ 24 to 2 kHz

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CARTER POWER SYSTEMS

Section Three ACCESSORIES CUTSHEETS

Circuit Breaker

Vibration Isolators

Generator Space Heater

Discrete I/O Module

Customer Interface Module

Remote Annunciator and Alarm Modules

Safety Indication and/or Shutdown

Batteries

Battery Charger

Best Battery Selector

Jacket Water Heater

Warranty



Picture shown may not reflect actual configuration

Features

- Moisture and fungus protection
- Clear indication of breaker status
- Reinforced insulation
- Shunt trip
- Auxiliary contacts
- Load side extension bars
- Maintenance-free operation
- Exceptional characteristics under short-circuit conditions
- Adjustable trip settings

NS-Frame

- Federal Specification W-C-375B/GEN
- NEMA AB1
- UTE, VDE, BS, CEI, UNE

Molded Case and Insulated Case Circuit Breakers:

C27-C175 North America built packages (50/60Hz)

L-Frame

400A (UL)

P-Frame

800-1200A (UL)

R-Frame

1600-3000A (UL)

NS-Frame

1600-3200A (IEC)

NW-Frame

1200-5000A (UL), 1600-5000A (IEC)

Conformity with International Standards

Circuit Breakers have been designed to comply with the international standard IEC 60947-2 as well as these other major standards:

L-Frame

UL 489

CSA 22.2 No 5

Federal Specification W-C-375B/GEN

NEMA AB1

NMX J-266

CCC

CE Marking

P-Frame & R-Frame

UL 489

IEC Standard 60947-2

CSA 22.2 No 5-02

Federal Specification W-C-375B/GEN

NEMA AB1

NMX J-266

UTE, VDE, BS, CEI, UNE

NW-Frame

UL 489

NEMA AB1

CSA 22.2 No. 5096

NMX J-266-ANCE

ANSI C37.13, C37.16, C37.17, C37.50

UL 1066 (cULus Listed)

NEMA SG3

Standard Features

Standards

- UL-CSA
 - L-Frame
 - P-Frame
 - R-Frame
 - NW-Frame
- IEC
 - NS-Frame

Shunt trip

- The shunt trip provides a means of tripping the circuit breaker electronically
- Shunt trip ratings
- Voltage: 24VDC
- Coil Burden (Holding/Inrush): 4.5/200 VA
- Power Consumption: 4.5 VA

Auxiliary contacts

The auxiliary contacts provide a means of remote circuit breaker position indication and consists of (1) Form C Contact (1 Normally open and 1 Normally closed contact) with the following current ratings:
6A @ 240-480 VAC, 50/60Hz

Trip units

All circuit breakers come equipped with True RMS Current Sensing.
The trip units for each of the circuit breaker ratings sample the current waveform to provide true RMS protection through the 15th harmonic. This true RMS sensing gives accurate values for the magnitude of a nonsinusoidal waveform. Therefore, the heating effects of harmonically distorted waveforms are accurately evaluated. The trip system comes equipped with a set of current transformers (CT's) to sense current, a trip unit to evaluate the current, and a tripping solenoid to trip the circuit breaker. Additionally, each trip unit comes equipped with Active Thermal Imaging which is active 20 minutes before and after tripping.

Customer cable connections

Connections include bus for installation flexibility.

Optional Features

Electrically-operated Circuit Breakers

Circuit breakers that are electrically-operated come with a two-step stored energy mechanism and come standard with a motor assembly. Motor assemblies provide on and off control from remote locations. These assemblies contain a spring-charging motor, a shunt trip, and shunt close. Motor Assembly Voltage Rating: 24-30VDC

Undervoltage trip

Undervoltage trip option trips the circuit breaker when the voltage drops to a value between 35% and 70% of the control voltage. An attempt to close the circuit breaker when the UV is not energized produces no movement in the main contacts. Closing is allowed when the supply voltage of the UV trip reaches 85% of the rated voltage.

- Voltage Rating: 24-30VAC/VDC
- Operating Threshold:
 - Opening: 0.35 to 0.7Vn
 - Closing: 0.85 Vn
- Power Consumption: 4.5VA
- Circuit Breaker Response Time at Vn: 50ms +/- 10

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
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2449893	2500ANW-Frame ICCB	UL	3P	EO	6.0P LSIG-P	Table 8	4 Aux Contact, Shunt Trip, Modbus	65
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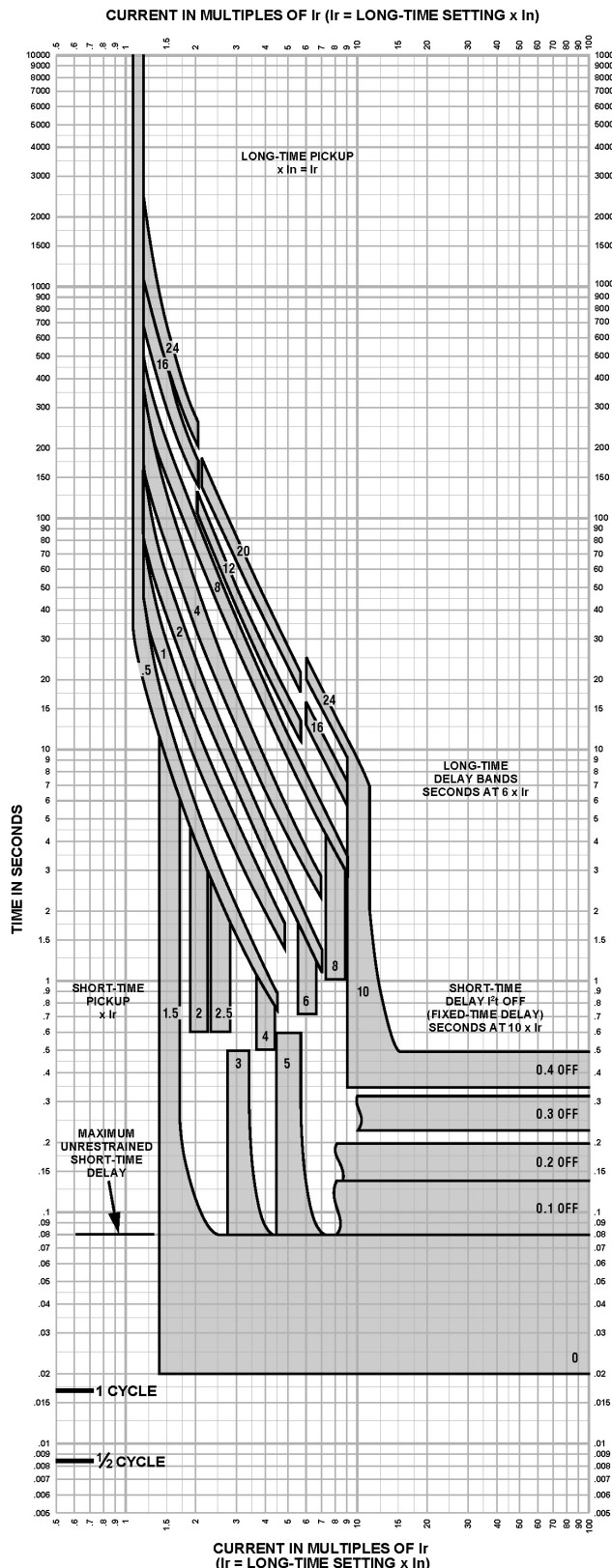


Circuit Breakers Characteristics (Continued)

Model		NW-Frame
Number of Poles		3 & 4
Rated Current (Amps)		2500-5000A (UL)
Voltage Rating (VAC)		600UL
Interrupt Rating (UL/CSA) (60Hz) - kA RMS	240V	100
	480V	100
	600V	85

Table 8

P, R, NS-Frame Long-Short Trip Curve and NW-Frame Long-Short Trip Curve



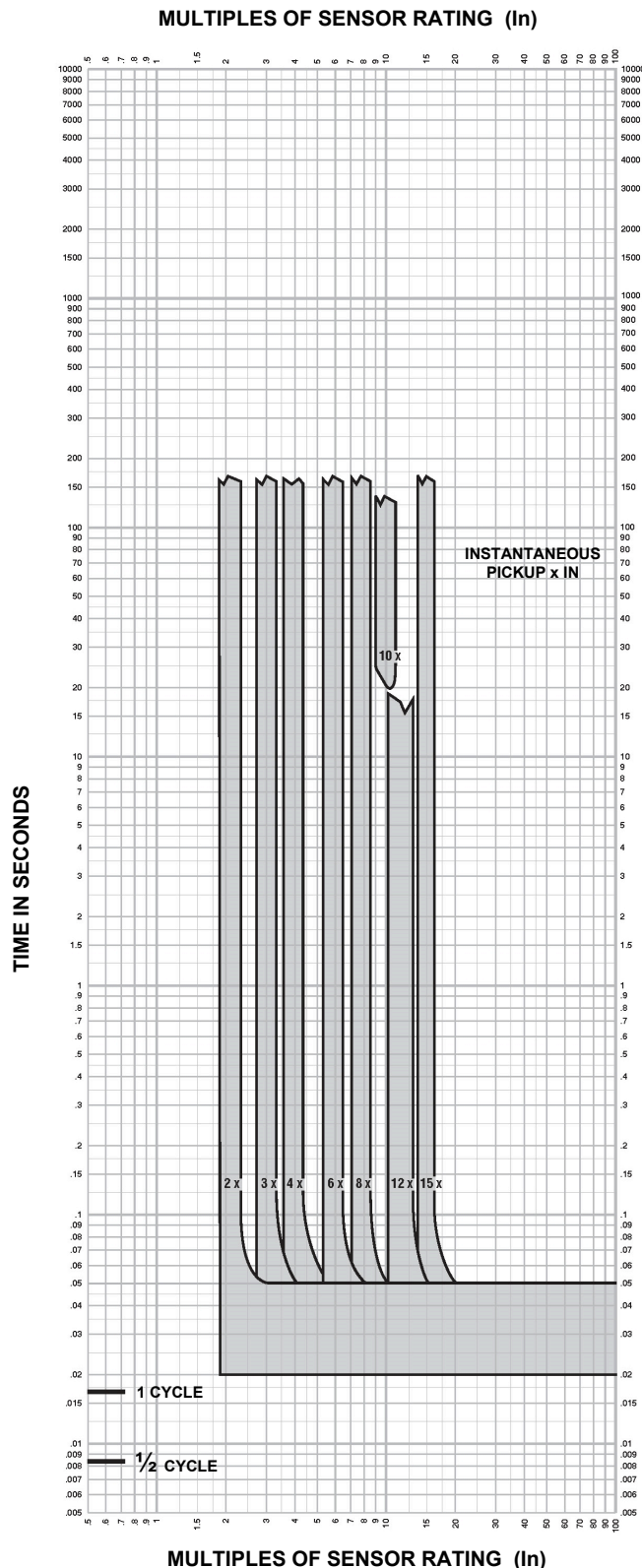
Long-time Pickup and Delay Short-time Pickup and I²t OFF Delay

The time-current curve information is to be used for application and coordination purposes only. Curves apply from -30°C to +60°C ambient temperature.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermalimaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. With zone-selective interlocking on, short-time delay utilized and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
4. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
5. For a withstand circuit breaker, instantaneous can be turned OFF. See Page 22 for instantaneous trip curve. See tables on pages 03-18 for instantaneous override values..
6. Overload indicator illuminates at 100%.

P, R, NS-Frame Instant Curve and NW-Frame Instant Trip Curve



Instantaneous Pickup 2x–15x and OFF

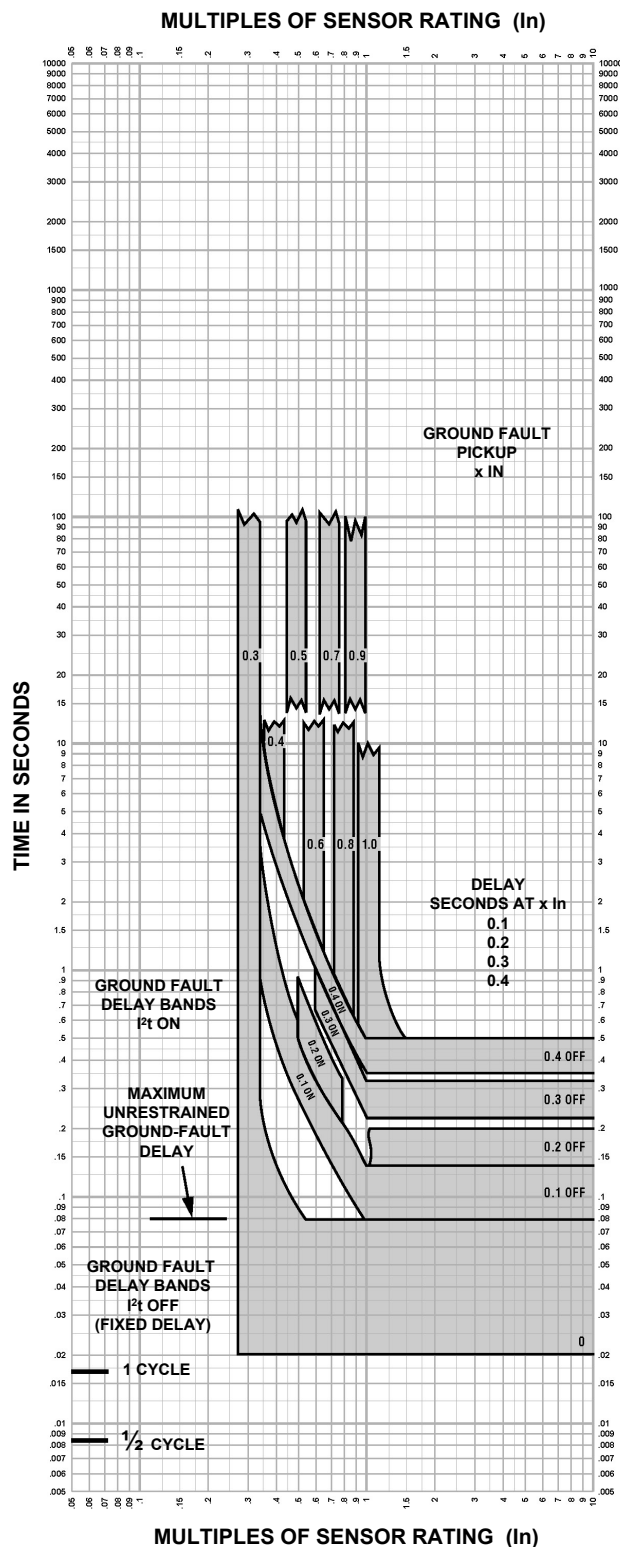
The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30° to $+60^{\circ}\text{C}$ ambient temperature.

Notes:

1. The end of the curve is determined by the interrupting rating of the circuit breaker.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
3. The instantaneous region of the trip curve shows maximum total clearing times. Actual clearing times in this region can vary depending on the circuit breaker mechanism design and other factors. The actual clearing time can be considerably faster than indicated. Contact your local Sales Office for additional information.
4. For a withstand circuit breaker, instantaneous can be turned OFF. See tables on pages 03-18 for instantaneous override values.
5. See page 22 for long-time pickup, long-time delay, short-time pickup, and short time delay trip curves.

P, R, NS-Frame Ground Curve and NW-Frame Ground Fault Trip Curve



Ground-fault I^2t OFF and ON $I_n \leq 400$ A

The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30°C to $+60^\circ\text{C}$ ambient temperature.

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Seismically Restrained Vibration Isolators

Picture shown may not reflect actual configuration

GENERAL DESCRIPTION

This series of isolator combines the open spring mountings within a rugged welded steel housing. The housing is designed to limit equipment motion in all directions due to seismic loads. An external adjusting bolt allows for full levelling capability of the equipment.

Features and Benefits

- Housings are welded steel construction
- Isolator weight – Standard Capacity (22 kg [48.5 lb]) & High Capacity (40 kg [88.2 lb])
- Mounts are strategically placed under the factory designed base to support the generator, engine, and radiator
- Installation spacer between the upper and lower housings ensures accurate installation height
- Springs are not welded to cups or housings
- Neoprene spring cups are used under each spring, eliminating metal-to-metal contact
- The lower housing incorporates an oversized base plate that spreads the anchor bolts over a wider area
- Mounts are designed to be anchored to a concrete or steel base
- Pre-drilled holes in the housing base are easily accessible and simplify installation
- All zinc-electroplated hardware provides superior corrosion resistance
- Shipped loose for customer installation
- Facilitates seismic certification
- Side loading capability of isolators is matched to the package certification level
- Anchoring details are site specific and are dependent on many factors such as generator set size, weight, and concrete strength. Seismic certification requires that the anchoring system used is reviewed and approved by a Professional Engineer.

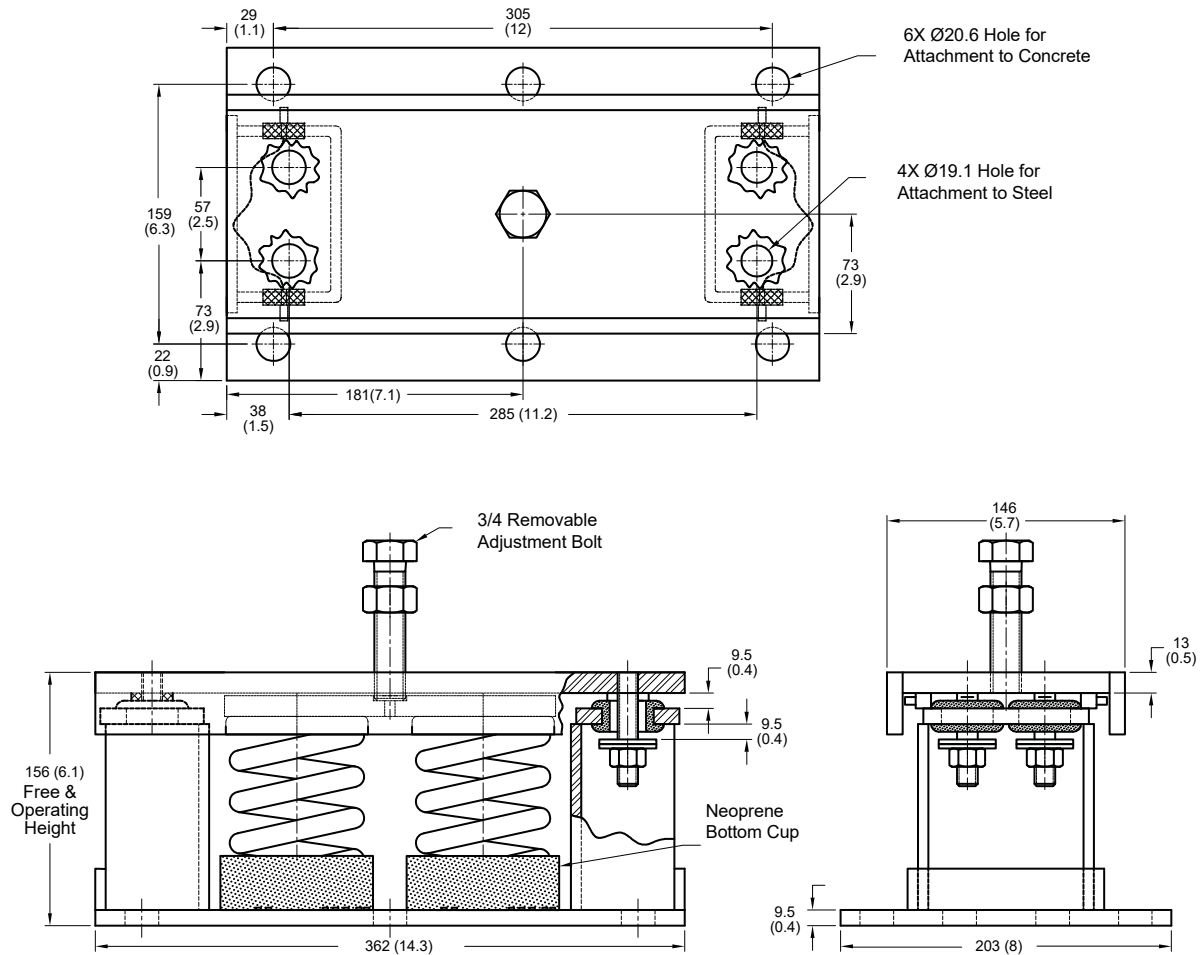
High Capacity Isolators - Isolator Data

	Part Number	Rated Capacity kg (lb)*	Rated Deflection mm (in)	Spring Rate kg/cm (lb/in)	Solid Load kg (lb)	Springs Color Code
Qty 6	616-5719	2336 (5150)	28.2 (1.11)	325 (4626)	3508 (7734)	White/Dark Purple
Qty 6	627-5582	2712 (5980)	28.2 (1.11)	377 (5364)	4068 (8968)	White/Dark Green
	627-5583	2948 (6500)	26.4 (1.04)	439 (6250)	4423 (9750)	White/Gray

*value per isolator

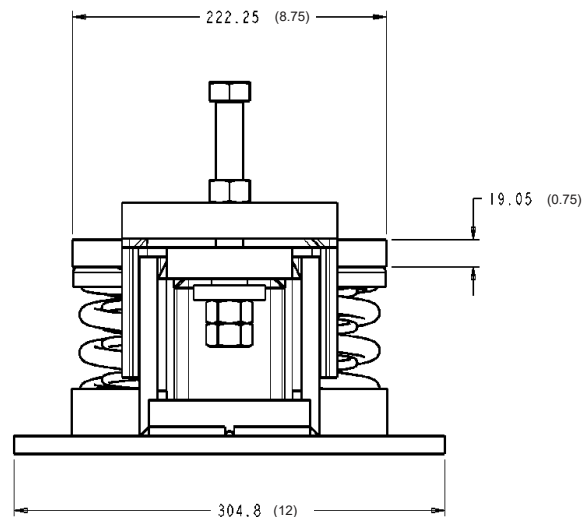
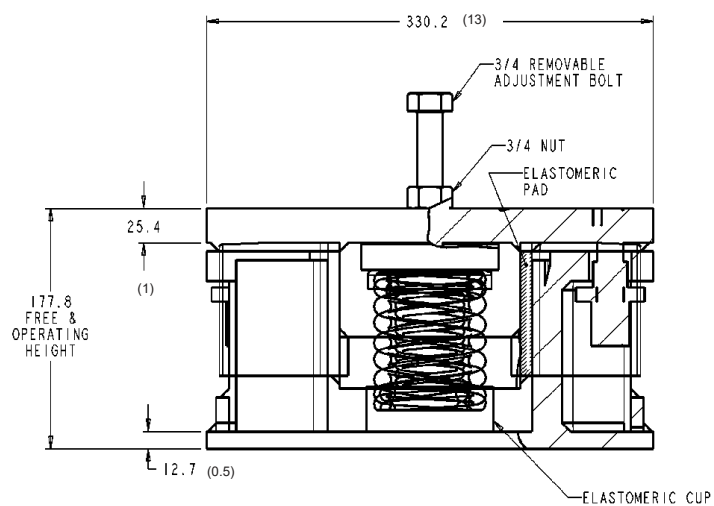
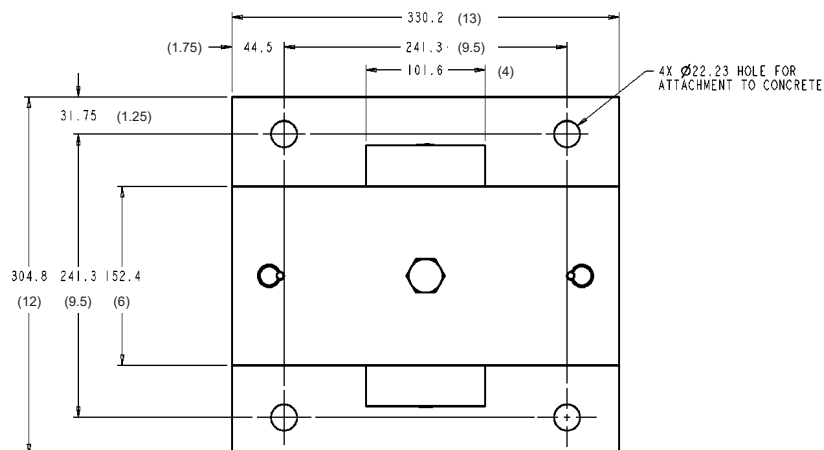
Standard Capacity - Isolator Drawing

Dimensions mm (in)



High Capacity - Isolator Drawing

Dimensions mm (in)



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Picture shown may not reflect actual configuration

Generator Space Heater

for 1200, 1400*, 1600 and 1800 Frames

*only with 3512C

GENERAL DESCRIPTION

Humidity is a natural enemy of generators and all electrical equipment.

Space heaters are designed to protect generator windings from abnormally high humidity conditions when the generator is idle. The heater maintains the air around the windings at a suitable temperature to prevent winding corrosion due to condensation.

Generator space heaters use electrical resistance and are located within the generator stator housing.

Space heaters are particularly recommended for generator sets located in a low ambient and/or high humidity environment. As a further benefit, space heaters provide an excellent method of drying out a generator after long transit or storage.

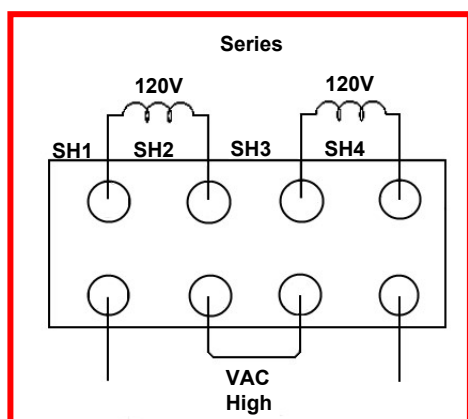
Because space heaters are required only during non-operative periods, they require availability of a power source separate from the generator set itself.

When the generator set is not running the heater automatically connects to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed.

The generator space heater uses two heating elements.

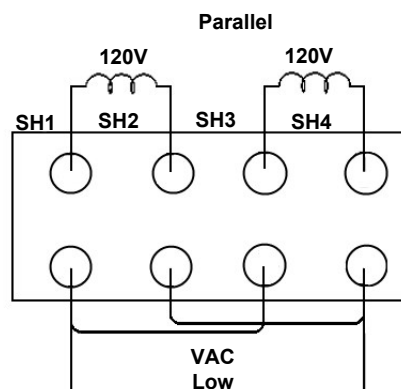
Heater element electrical data: Voltage - 120V, Power - 600W.

Space Heaters Connection Diagram



240V
220V

60Hz
50Hz



120V
110V

1200 W total

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Cat® Batteries



Cat® Batteries—Greater Starting Power— Lower Maintenance—Longer Life

Cat Premium High Output (PHO) batteries are used in all Cat Machines and Engine Gen-Sets. They are designed to meet stringent Caterpillar design specifications, which provide industry leading cold cranking amps (CCA) capability and maximum vibration resistance.

Maintenance Free Accessible or low maintenance designs are available in wet and dry configurations.

General Service Line batteries are available in Maintenance Free Accessible or low maintenance designs. Wide selections of BCI group sizes are available for automotive, light truck, bus, industrial, agricultural, marine, recreational and valve regulated (VRLA-AGM & Gel) applications.

World's Toughest Batteries



Premium High Output—Maximum Vibration Resistance

- Vibration Resistance...five times the Industry Standard
- Exclusive "flat top" BCI group 4D & 8D batteries are Maintenance Free Accessible and have the industries highest cold cranking amps (CCA)
- Popular BCI group 31 Maintenance Free Accessible batteries with industry leading cold cranking amps...up to 1000 (CCA), for electric power, machine or on-highway truck and bus applications. Deep cycle models are available for truck, marine or recreational usage

Specifications for Cat Premium High Output Batteries-Available Worldwide

BCI Group Size	Part No.	CCA ≈	RC Mins †	Volts	Amp Hr. Capacity @ 20 Hrs.	Construction Notes	Accessibility - Fluid Level Check Hours	Length In (mm)	BCI Overall Dimensions		Nominal Weight		
									Width In (mm)	Height In (mm)	Wet Lb (kg)	Dry Lb (kg)	Nominal Acid to Fill Qt (liter)
8D	153-5720	1500	465	12	210	C/MFA	A - 1000	20.5 (520)	10.8 (275)	9.8 (248)	132 (59.9)	-	-
8D	101-4000	1400	400	12	190	LAC+	A - 1000	20.8 (527)	11.0 (278)	9.8 (248)	132 (59.9)	86 (39.0)	18.0 (17.0)
4D	153-5710	1400	425	12	200	C/MFA	A - 1000	20.5 (520)	8.6 (218)	9.8 (248)	119 (54.0)	-	-
4D	9X-9730	1300	400	12	190	LAC+	A - 1000	20.8 (527)	8.6 (218)	9.8 (248)	120 (54.0)	81 (36.8)	14.8 (14.0)
4D	153-5700	1125	305	12	145	C/MFA	A - 1000	20.5 (520)	8.6 (218)	9.8 (248)	101 (45.8)	-	-
4D	9X-9720	1000	275	12	140	LAC+	A - 1000	20.8 (527)	8.6 (218)	9.8 (248)	102 (45.8)	59 (26.8)	15.9 (15.0)
31	175-4390	1000	180	12	90	C/MFA/S	A - 1000	12.9 (329)	6.8 (172)	9.3 (236)	60 (27.2)	-	-
31	175-4370	825	190	12	100	C/MFA/S**	A - 1000	12.9 (329)	6.8 (172)	9.3 (236)	61 (27.2)	-	-
31	175-4360	710	185	12	100	C/MFA/S***	A - 1000	12.9 (329)	6.8 (172)	9.3 (236)	62 (28.1)	-	-
31/30H	115-2422	1000	170	12	90	C/MFA	A - 1000	12.9 (329)	6.8 (172)	9.5 (241)	63 (28.6)	-	-
31/30H	115-2421	950	170	12	90	C/MFA+	A - 1000	12.9 (329)	6.8 (172)	9.5 (241)	64 (29.1)	44 (20.0)	6.6 (6.2)
31/30H	9X-3404(1)	950	165	12	95/100	C/MF	NA	13.0 (331)	6.8 (172)	9.5 (241)	58 (26.3)	-	-
31/30H	3T-5760	750	165	12	95/100	C/MF	AV - 1000	13.0 (331)	6.8 (172)	9.5 (241)	56 (25.4)	-	-
65	230-6368	880	140	12	70	C/MF	NA	11.9 (304)	7.5 (191)	7.5 (191)	46 (20.9)	-	-
24	153-5656	650	110	12	52	C/MF	NA	11.0 (279)	6.9 (174)	9.0 (229)	39 (17.7)	-	-

Construction Notes:

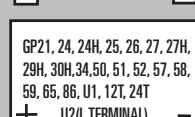
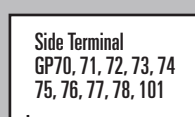
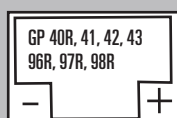
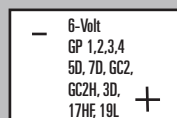
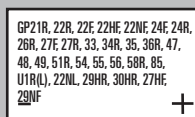
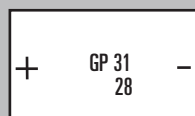
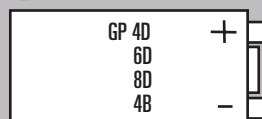
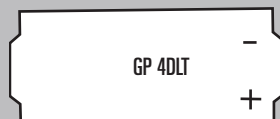
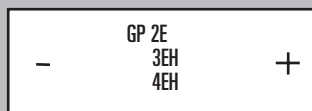
Batteries use SAE taper post design and are shipped wet except as:

- LAC = Low Maintenance - Hybrid Construction
- C = Calcium Lead Alloy Grid Design
- MF = Maintenance Free Non-Accessible
- MFA = Maintenance Free Accessible
- A = Accessible
- NA = Non-Accessible
- AV = Accessibly Varies - Accessibility varies depending on supplier used. If it has caps, it is accessible and fluid levels should be checked.
- S = Stud Terminals
- + = Shipped Dry Only
- * = Side Terminals Only
- ** = Starting and Deep Cycle Battery
- *** = Deep Cycle and Starting Battery
- ≈ = Cold Cranking Amps for 30 seconds at 0° F (-18° C)
- † = Reserve Capacity Minutes minimum of 25 amp output at 80° F (27° C)
- SDT = Dual, Top mounted Terminals - Stud and SAE Post. Marine Deep Cycle/Starting Battery
- 1 = Available in EAME and China only

Rugged Design—Built Tough—Reliable Starting

- Positive and negative plates are anchored to container bottom and locked at the top of cell element for maximum vibration resistance.
- Heavy-duty forged terminal post bushings provide maximum strength and resistance to acid seepage.
- Hefty full-frame grids, no sharp edges, optimum acid/paste combination provides better charge acceptance after deep discharge.
- Manifold vented cover with built-in Flame Arrestor...a safety feature that directs corrosive gases away from the battery and hold-downs.
- Thick, robust container resists rugged treatment typical of heavy-duty commercial use. Embossed part number & descriptors for easy serviceability.

BCI Terminal Locations



Transit Bus Terminal for 8D Part # 250-0473
One piece end terminal.
Right end of Battery.
1/2" - 13 Steel Positive Stud
3/8" - 16 Steel Negative Stud
Terminal not serviceable

Cat Premium High Output Batteries — Built Tough to Exceed Demanding Performance Test Requirements:

• 100 hour Vibration Testing – Five Times the Industry Standard

Battery must be able to withstand vibration forces without suffering mechanical damage, loss of capacity, loss of electrolyte or without developing internal/external leaks

Battery must pass a high rate discharge test after the vibration testing

• Five 72-hour Deep Discharge/Recharge Test Cycles

Battery must recover to 25 charging amps within 20 minutes and meet Industry Electrical Performance Standards

• 30 Day Complete Discharge Test

Battery must recover to 25 charging amps within 60 minutes and meet Industry Electrical Performance Standards after recharging

• SAE J2185 Life Cycle Test

Battery subject to deeper discharge and charge cycles at extreme temperatures not normally encountered in starting a machine or vehicle

• Cold Soak Test

Battery cold soaked at sub-freezing temperatures and then tested by starting an equally cold engine



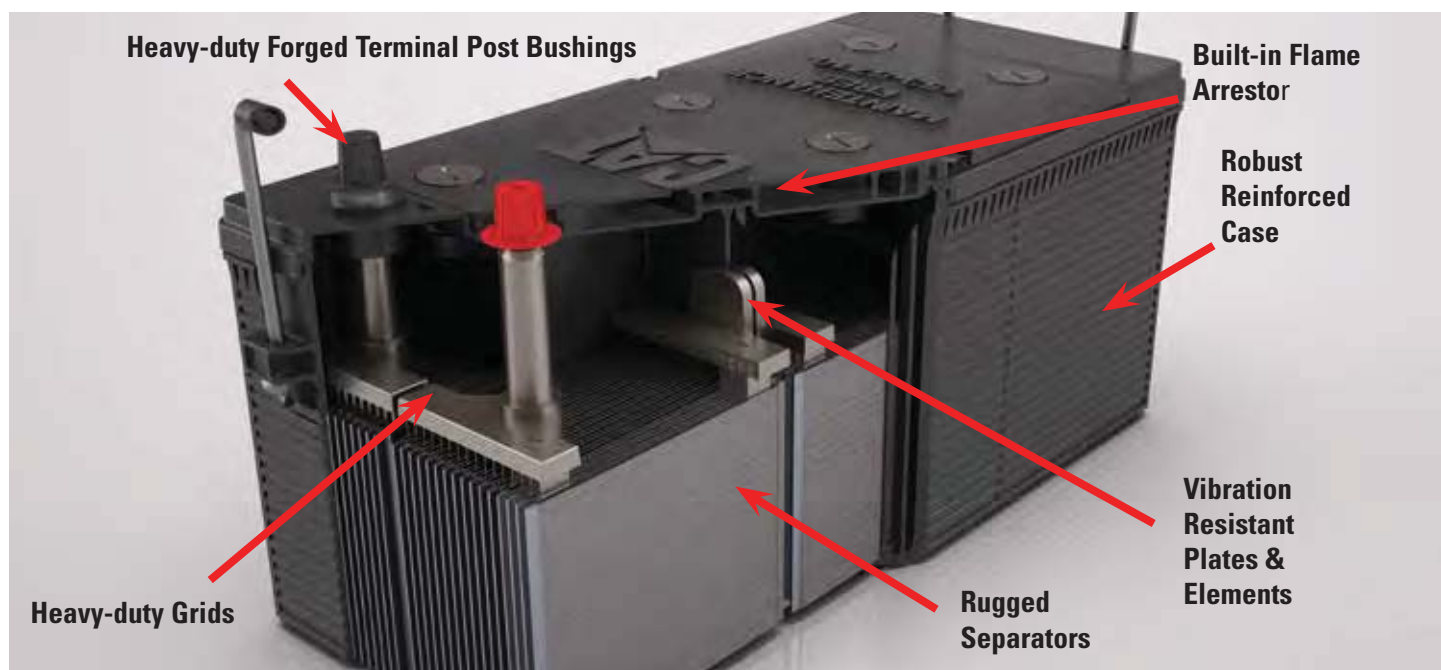
Battery Accessories

- Group 31 - Charging Posts for Stud Terminals - Part # 4C-5637
- Screw-in Charging Posts for Side Terminals - Part # 4C-5638
- Wing Nut - Part # 2B-9498 for Part #'s 175-4390/175-4370/175-4360/8C-3628
- Wing Nut - Part # 3B-0723 for Part #'s 8C-3638 and 8C-3639
- Booster Cable 12' (3.66 m) - Part # 4C-4911
- Booster Cable 20' (6.00 m) - Part # 4C-4933
- Heavy Duty Commercial Fast Charger (110V) - Part # 4C-4921
- Heavy Duty Commercial Fast Charger (220V) - Part # 4C-4910

Note: Ratings and Part Numbers are subject to change without notice.



Recycle all scrap batteries.
We accept lead-acid batteries for recycling.



Robust Components = Long Life + Reliable Starts

- Heavy-duty forged terminal post bushings provide maximum strength and resistance to acid seepage that causes corrosion and black posts. Thicker internal terminal posts provide lower electrical resistance and higher cold cranking amp output.
- Rugged micro porous polyethylene envelope separators protect against “shorts” and vibration damage. Deep Cycle batteries utilize double insulated Glass mat separators for longer cycling life.
- Maintenance Free Accessible batteries utilize calcium lead alloy on both positive and negative plates that reduces gassing and water consumption. Automotive batteries have Silver (Ag) Calcium Alloy Grids for resistance to high underhood temperatures.
- Heavy-duty, full frame battery grids with no sharp edges. An optimum acid/paste combination provides better charge acceptance after a deep discharge.
- Positive and Negative plates are anchored to the container bottom and the cell element is locked at the top for maximum vibration resistance. Straps are thicker, heavier and cast (not welded) into the plates.
- Manifold vented cover with built-in Flame Arrestor...a safety feature that directs corrosive gases away from the battery and hold-downs.
- Robust reinforced case provides extra strength in all temperature extremes. Brickwork design on sides reduces chance of punctures and case flexing. Embossed part number and descriptors for easy serviceability.

CAT DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investment.



**laMARCHE®**

ISO 9001:2015 CERTIFIED

MSM

High Frequency Battery Charger / Rectifier



The MSM is a Smart High Frequency Switch Mode battery charger specifically developed for Marine and Engine Starting applications. MSM series incorporates Power Factor Correction (PFC) Circuitry with a wide input voltage range in order to accommodate many marine charging applications.

The MSM has an Integrated Battery Charge Divider / Isolator which provides connections for charging up to three independent batteries simultaneously with a three-stage charge cycle. MSM's filtered output is suitable to charge different types of batteries for Marine/Industrial applications. This series is equipped with an LCD display for ease of navigation through the configurations menu. The LCD also displays Input AC voltage, Output DC Voltage & Current, and Alarm Status. The front of the unit provides three status LED indicators for the overall status of the system.

The MSM charger is built in a robust, non-corrosive enclosure that withstands harsh environments, meeting stringent safety and regulatory standards. MSM chargers can be used inside engine rooms as this series is ignition protected 33 CFR 183.410 compliant.



Standard Features

Smart Microprocessor Controlled High Frequency Charging Technology

Single Phase AC Input 102-264VAC, 45-65Hz

Complete Isolation from AC to DC

LCD Digital Voltmeter & Ammeter

Current Limit Protection

Filtered Output for VRLA (Gel-Cell & AGM) Batteries

Battery Isolator (Charge Divider allows for charging up to three Batteries Simultaneously)

Input & Output Fuses (Output Fuses Accessible)

On/Off Switch

AC Voltage Metering

Conformal Coated Circuit Boards

Internal or External Temp. Compensation w/Disable Option

Audible Charger Failure Alarm with LED Indicator and Form "C" Dry Relay Contacts

IP22/NEMA Type 2 (with dripshield)

33 CFR 183.410 - Ignition Protection

Corrosion Resistant

Meets ABS & USCG Requirements

CE Certified

2-Year Warranty

Optional Accessories

11Y External Temperature Probe 100 feet

11W External Temperature Probe 24 Feet

57Y Modbus (Ethernet) TCP/IP

551 VFD Display

57B 5 Isolated Output Terminals

18W Water Tight Connectors

19P AC Cord (9.84ft) 14 AWG NEMA 5-15P

35F External Termination Box (5 Outputs)

35G Expanded Cable Entry Box

--- EAB-JBOX: Provides Low/High Voltage and Ground Fault alarm contacts (ordered separately)

Specifications subject to change without notice

P25-DSMSM-1
ECN 23600
08/24

La Marche Mfg. (A U.S. Company)

106 Bradrock Drive, Des Plaines, IL 60018

Tel: 847.299.1188 Fax: 847.299.3061

sales@lamarchemfg.com

www.lamarchemfg.com

Model Number	AC Input 100% (load)		DC Output		Case No.	Net Weight*	
	Volts (Nominal)	Amps	Volts (Nominal)	Amps		lbs	kgs
MSM-10-12V-U1	120	1.5	12	10	201	5	2.3
	240	0.8					
MSM-20-12V-U1	120	3.1	12	20	201	5	2.3
	240	1.6					
MSM-30-12V-U1	120	4.6	12	30	203	11	5.0
	240	2.4					
MSM-40-12V-U1	120	6.0	12	40	203	11	5.0
	240	3.2					
MSM-60-12V-U1	120	9.2	12	60	205	18	8.2
	240	4.8					
MSM-80-12V-U1	120	12.0	12	80	205	18	8.2
	240	6.4					

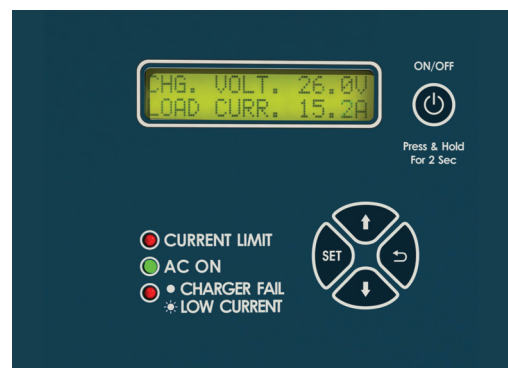
*Weight does not include shipping packaging

Model Number	AC Input 100% (load)		DC Output		Case No.	Net Weight*	
	Volts (Nominal)	Amps	Volts (Nominal)	Amps		lbs	kgs
MSM-10-24V-U1	120	2.6	24	10	201	5	2.3
	240	1.4					
MSM-20-24V-U1	120	5.2	24	20	203	11	5.0
	240	2.7					
MSM-25-24V-U1	120	6.5	24	25	203	11	5.0
	240	3.1					
MSM-30-24V-U1	120	7.8	24	30	203	11	5.0
	240	3.8					
MSM-35-24V-U1	120	9.1	24	35	203	11	5.0
	240	4.4					
MSM-50-24V-U1	120	13	24	50	205	18	8.2
	240	6.3					
MSM-65-24V-U1	120	16.9	24	65	205	18	8.2
	240	8.2					
MSM-100-24V-U1	120	26.0	24	100	207	32.6	14.8
	240	12.6					

Charger Specifications

- AC Input**
 Wide AC Input Range 102 - 264VAC
 Single Phase 45 - 65 Hz
- DC Output**
 10 - 80A / 12V
 10 - 100A / 24V
- Power Factor**
 0.99
- Load Regulation**
 $\leq \pm 0.5\%$
- Input Protection**
 Fuse with Surge and Transient Protection
 AC Over Voltage Protection
- Output Protection**
 Current Limit Protection
 Fuse with Surge Protection
 Reverse Current Polarity
 Thermal Protection
 Short Circuit Protection
- LED Indicators**
 Current Limit
 AC ON
 Charger Fail
 Low Current
- Alarm Contacts**
 Charger Failure
- LCD Digital Display**
 AC Input Voltmeter
 DC Output Voltmeter and Ammeter (2%)
- Environmental**
 Operating: -20° to 50°C (-4° to 122°F)
 Storage: -40° to 85°C (-40° to 185°F)
 Relative Humidity: 0 to 95% non condensing
- Adjustable Voltage Range**
 10.4 to 14.1 (12V)
 20.8V to 28.2V (24V)
- Mounting**
 Wall mount
- Cable Entry**
 Bottom
- Finish**
 Powder coated aluminum enclosure (corrosion resistant)
- Standards**
 UL 1236, ABS & USCG Requirements
 EN 60335-1 (Electrical Safety)
 IEC 60335-2-29 (Electrical Safety)
 IEC 60068-2-6 (Sinusoidal Vibration)
 EN 55011 (Radiated EMI)
 IEC 1000-4-2 (Electrostatic Discharge)
 IEC 1000-4-4 (Electrical Fast Transient)
 33 CFR 183.410 (Ignition Protection)

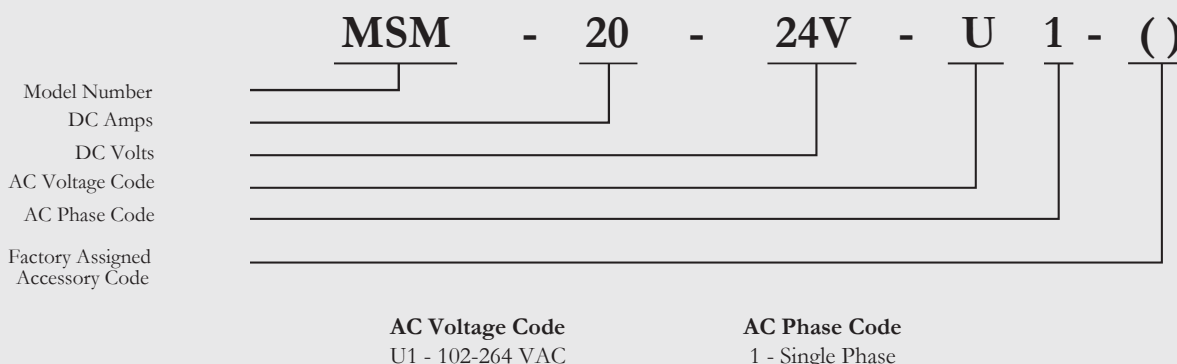
LCD Display



Case Specifications

Case No.	Overall Dimensions					
	Width		Depth		Height	
	in	mm	in	mm	in	mm
201	9.63	244	6.16	156	14.20	360
203	9.63	244	6.16	156	18.30	464
205	9.63	244	9.85	250	18.30	464
207	15.38	391	11.67	297	20.42	519

Model Number Nomenclature

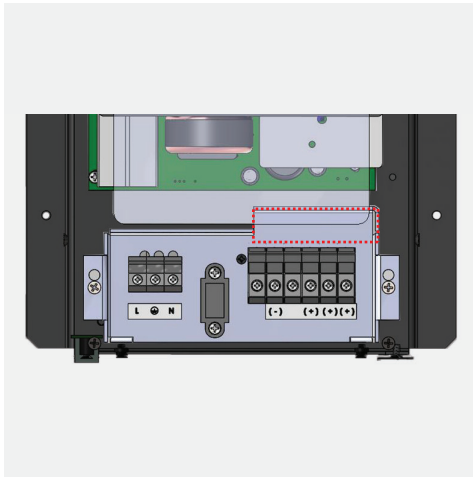


OPTIONAL ACCESSORIES



Termination Box

The optional termination box provides external space for managing the cables of multiple output/battery connections to the MSM battery charger. The termination box provides an easy carefree solution for installations that require additional space for connecting thicker cabling and multiple outputs.



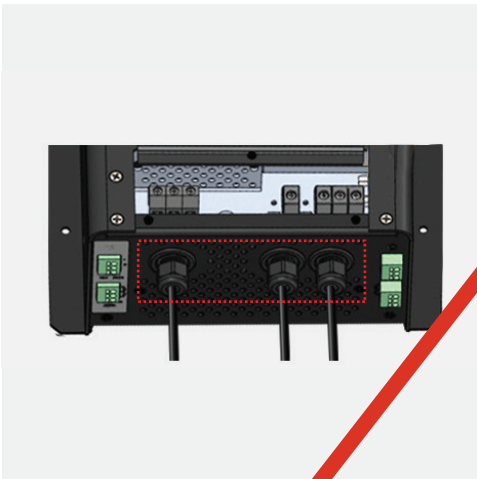
Expanded Cable Entry Box

The optional Expanded Cable Entry Box provides an extra 0.70 inches of space for input/output connections. This makes connecting to the MSM battery charger easier for installations with multiple outputs or thicker cabling.



MODBUS Ethernet TCP/IP

Optional Modbus Ethernet allows for remote monitoring of the battery charger. This allows for easier servicing and maintenance of the battery charger by receiving alerts and battery charger data points remotely.



Water Tight Connectors

The optional watertight connectors offer robust protection against moisture, water, and dust. By forming a secure seal around cable connections, these connectors significantly reduce the risk of electrical faults, corrosion, and damage caused by environmental elements.



EAB-JBOX Alarm Box

The optional external alarm box is connected to the battery charger and includes one form "C" contact each for High DC Voltage, Low DC Voltage and Ground Fault (Positive or Negative) in addition to the charger fail alarm that is integrated into the MSM battery charger by default.



laMARCHÉ
ISO 9001:2015 CERTIFIED

ARBS

Automatic Redundant Battery Selector Diode Isolator



Model Shown: ARBS-1600-50

Standard Features

- Fully Automatic
- Convection Cooled
- Isolation From One Battery to Another
- Diodes Designed to Carry 100% of the Starter/Load
- Surge Protection
- Two Diodes, Common Cathode
- Finish - ANSI - 61 gray paint
- 1 Year Warranty

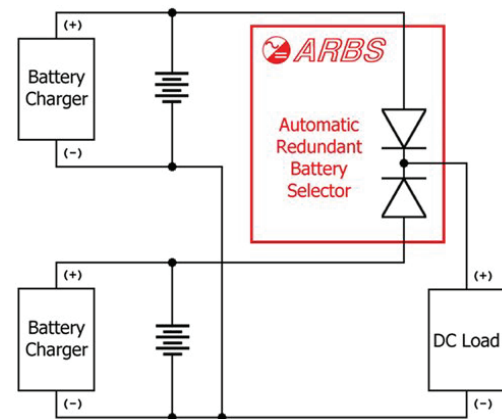
Optional Feature

- 65F Alternator Battery Recharge Option*
(Charge Divider and Control Circuit for connecting Single Alternator to two Batteries)
- *Case size subject to change, please consult factory

The La Marche ARBS is a solid state device that controls redundant power in engine starting switchgear applications. Our product is designed with high powered diodes to select the higher voltage of the two isolated DC power sources.

The ARBS selects power from the best available battery while isolating the alternate battery bank. The special heat sink diode assembly is manufactured to handle high output requirements with safety margin to spare. This Automatic Redundant Battery Selector is also known in the market as Best Battery Selector, Diode Isolator, and Automatic Battery Selector.

The diodes in the ARBS allows the current to flow from the DC power source to the load. The ARBS is sized based on the maximum load inrush current



Model Number	Nominal Voltage	Rated DC Inrush Current per NFPA 110	Continuous DC Rated Current	Dimensions W x D x H	Approx. Weight (lbs)	Case No.	Mounting
ARBS-500-50	(max: 300VDC)	500A	50A @ +50C	12.8" x 10" x 17.12" 326 x 254 x 435mm	36	2	Wall
ARBS-500-100	(max: 300VDC)	500A	100A @ +50C	15.4" x 11" x 23.75" 391 x 279 x 603mm	57	3	Wall/Floor
ARBS-500-200	(max: 300VDC)	500A	200A @ +50C	25.58" x 13.93" x 28" 650 x 354 x 711mm	CF	4	Wall/Floor/Rack
ARBS-1000-50	(max: 300VDC)	1000A	50A @ +50C	14.25" x 10.62" x 19.87" 362 x 270 x 505mm	50	7	Wall/Floor
ARBS-1000-100	(max: 300VDC)	1000A	100A @ +50C	25.58" x 13.93" x 28" 650 x 354 x 711mm	120	4	Wall/Floor/Rack
ARBS-1000-200	(max: 300VDC)	1000A	200A @ +50C	27.24" x 15.25" x 32.5" 691 x 387 x 826mm	180	8A	Floor
ARBS-1600-50	(max: 300VDC)	1600A	50A @ +50C	14.25" x 10.62" x 19.87" 362 x 270 x 505mm	46	7	Wall/Floor
ARBS-2600-85	(max: 300VDC)	2600A	85A @ +50C	25.58" x 13.93" x 28" 650 x 354 x 711mm	115	4	Wall/Floor/Rack
ARBS-3000-85	(max: 300VDC)	3000A	85A @ +50C	25.58" x 13.93" x 28" 650 x 354 x 711mm	115	4	Wall/Floor/Rack
ARBS-4800-150	(max: 300VDC)	4800A	150 @ +50C	25.58" x 13.93" x 28" 650 x 354 x 711mm	124	4	Wall/Floor/Rack

Note: Models Available with Common Positive Arrangement.

Specifications subject to change without notice

La Marche Mfg. (A U.S. Company)

106 Bradrock Drive, Des Plaines, IL 60018

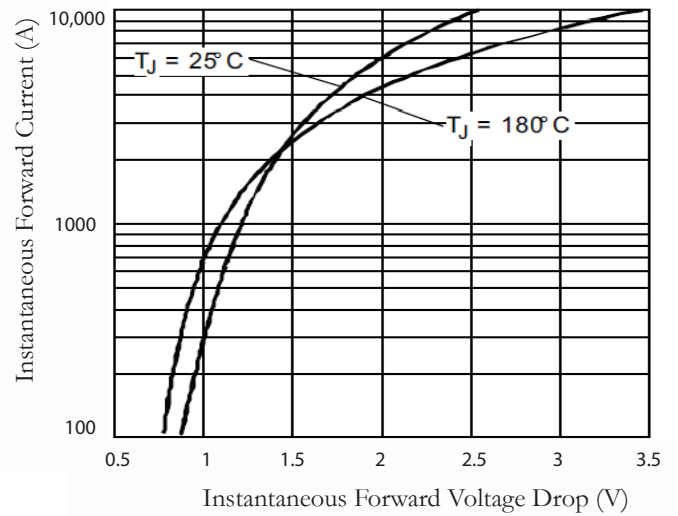
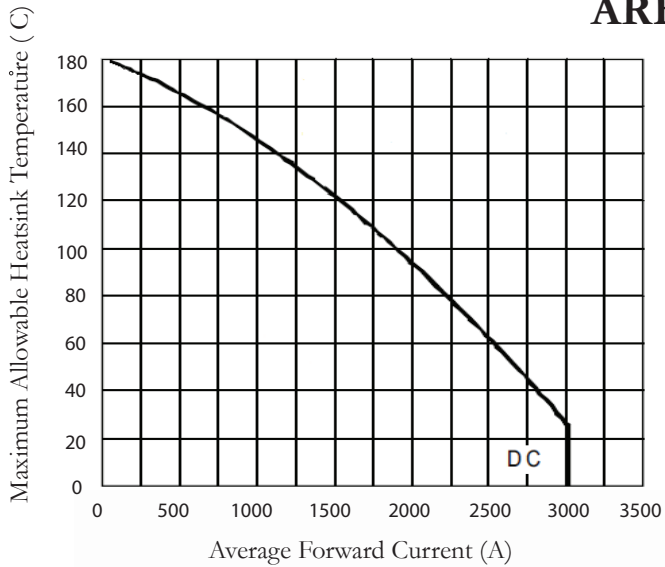
Tel: 847.299.1188 Fax: 847.299.3061

sales@lamarchemfg.com

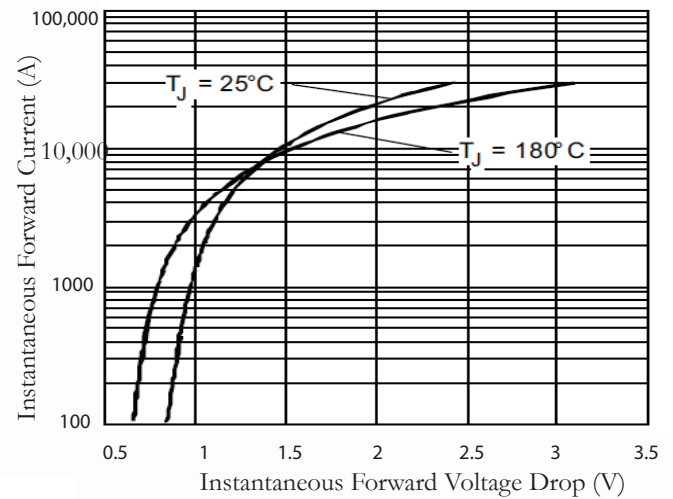
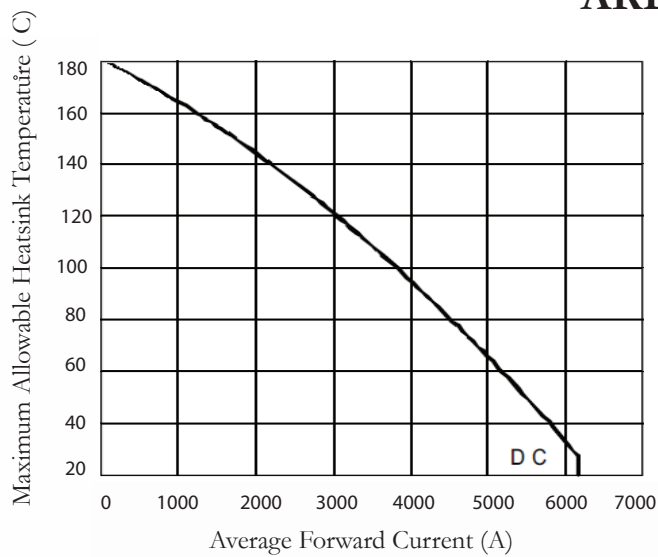
www.lamarchemfg.com



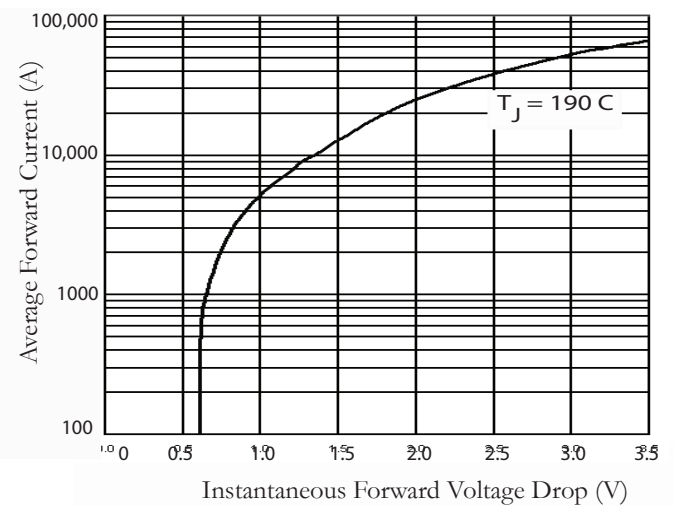
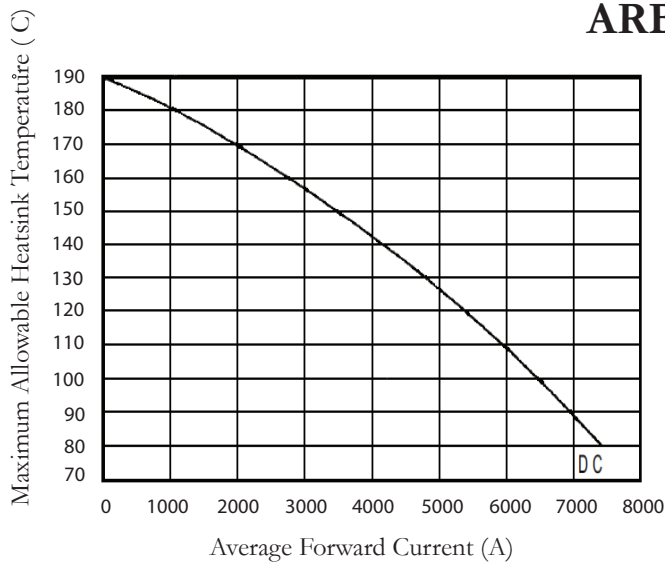
ARBS-1600

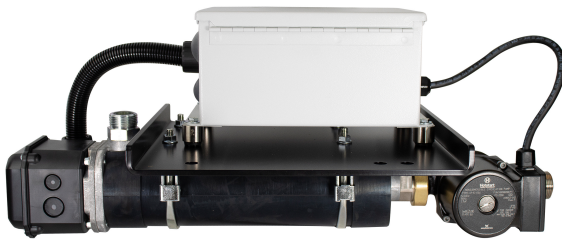


ARBS-3000



ARBS-4800





Picture shown may not reflect actual configuration

JACKET WATER HEATER With Pump

Diesel Gensets: 3512, 3516 and C175-16
Gas Gensets: G3412, G3512 and G3516

Caterpillar offers a factory-installed jacket water heater for improved cold-starting capability.

The Jacket Water Heater is a complete coolant preheater with thermostat, pump and all required controls. Forced circulation of the coolant delivers uniform heating throughout the entire engine, reduces wear from cold spots and offers a significant reduction in electrical consumption.

The Jacket Water Heater operates automatically when provided contacts are supplied with a 24 Volt DC signal from the engine.

FEATURES

- Factory Installed
- Complete with hoses, thermostat and pump
- Base frame mounting minimizes engine induced vibration
- Automatically disconnected when engine is running via the generator jacket water heater relay
- Supplied with UL recognized components
- Standard thermostat is factory preset to 54°C (130°F)
 - o Optional High Temperature thermostat is available with factory preset to 71°C (160°F)

HEATER DESIGN DESCRIPTION

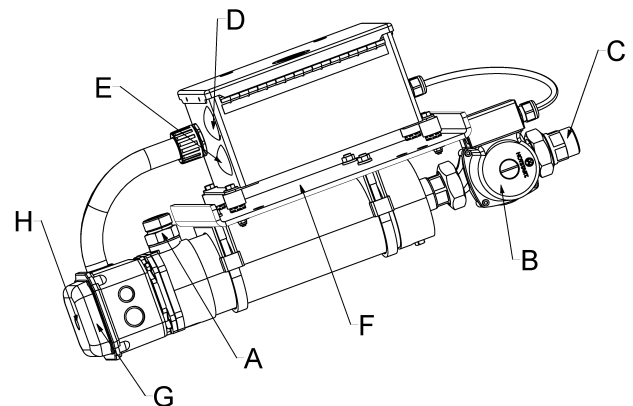
The jacket water heater package is designed to efficiently pre-heat the engine by heating and circulating the engine's coolant.

This design results in the following benefits

- Increase life of heater hoses, engine seals, and heating elements.
- Improve heat transfer efficiency from elements to engine coolant.
- More uniform engine temperature distribution.
- Application of a thermostat with a reduced thermal differential.
- Lower customer utility costs and increased heater reliability.
- Heater thermostat's setpoint is preset from the factory.

HEATER OPERATION/WIRING

A 38 L/pm (10 gpm) pump is located at the heater inlet to push the coolant through the heater. A fixed thermostat is located inside Element enclosure box, near the outlet of the heater and responds to the temperature of the coolant inside the tank. The figure below shows the general heater design.



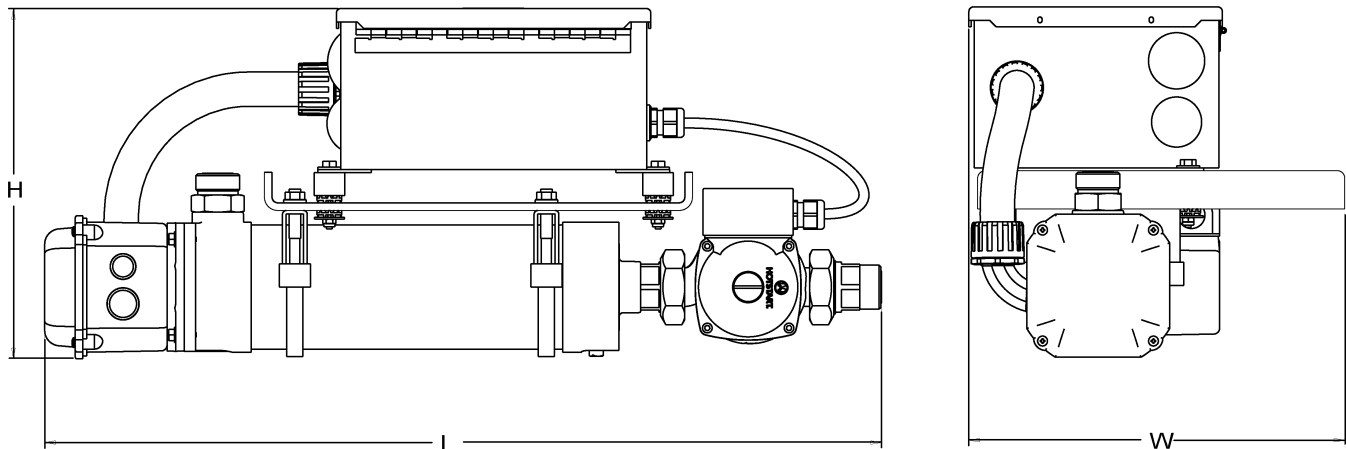
- | | |
|---------------------------------|-----------------------------------|
| A. Discharge port | E. Control Wiring Entrance |
| B. Pump/motor | F. Mounting base |
| C. Suction Port | G. Element assembly |
| D. Power Wiring Entrance | H. Thermostat |

SPECIFICATIONS

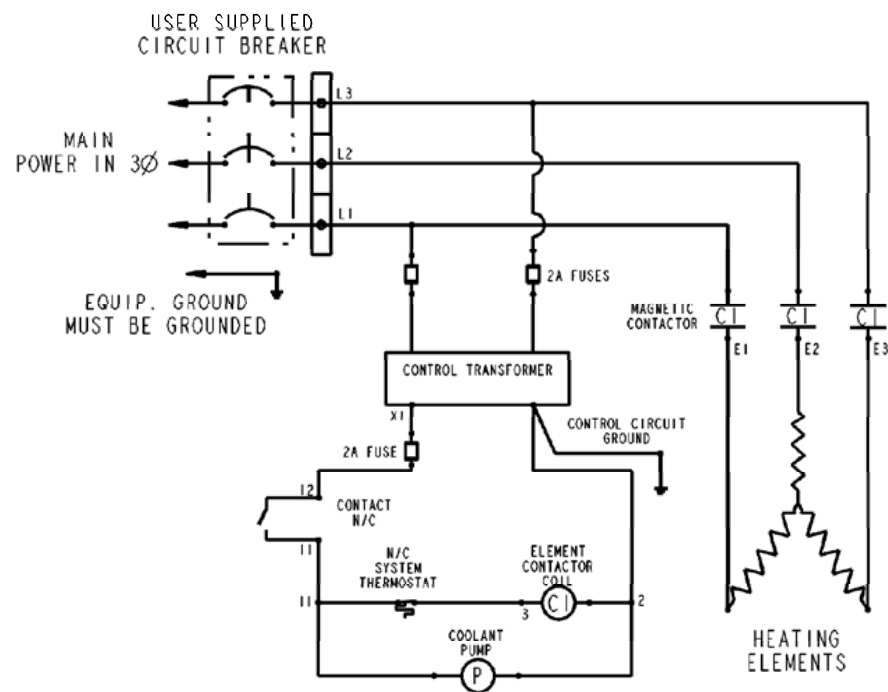
Voltage (VAC)	480	400*	240	220	208
Fixed Thermostat (Standard)	38°C - 54°C (100°F - 130°F)				
Power (with Standard Thermostat)	9 kW / 12 kW	9 kW / 12 kW	9 kW / 12 kW	9 kW	9 kW / 10.5 kW
Amperage (with Standard Thermostat)	10.8 A / 14.4 A	13.0 A / 17.4 A	37.5 A / 50.0 A	40.9 A	43.3 A / 50.5 A
Fixed Thermostat (High Temperature)	60°C - 71°C (140°F - 160°F)				
Power (with High Temperature Thermostat)	9 kW / 12 kW	9 kW	9 kW / 12 kW	9 kW / 12 kW	9 kW / 10.5 kW
Amperage (with High Temperature Thermostat)	10.8 A / 14.4 A	13.0 A	37.5 A / 50.0 A	40.9 A / 54.5 A	43.3 A / 50.5 A
Frequency	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Phase	Three Phase		Single Phase		
Flow Rate	38 LPM (10 GPM)				
Pump Power	97 W	95 W	97 W	95 W	97 W
Length (L)	695 mm (27.4")				
Width (W)	312 mm (12.3")				
Height (H)	291 mm (11.4")				
Weight	24.0 kg (52.8 lbs)	24.2 kg (53.4 lbs)	21.5 kg (47.5 lbs)	21.4 kg (47.2 lbs)	24.2 kg (53.4 lbs)

*Only available with diesel gensets

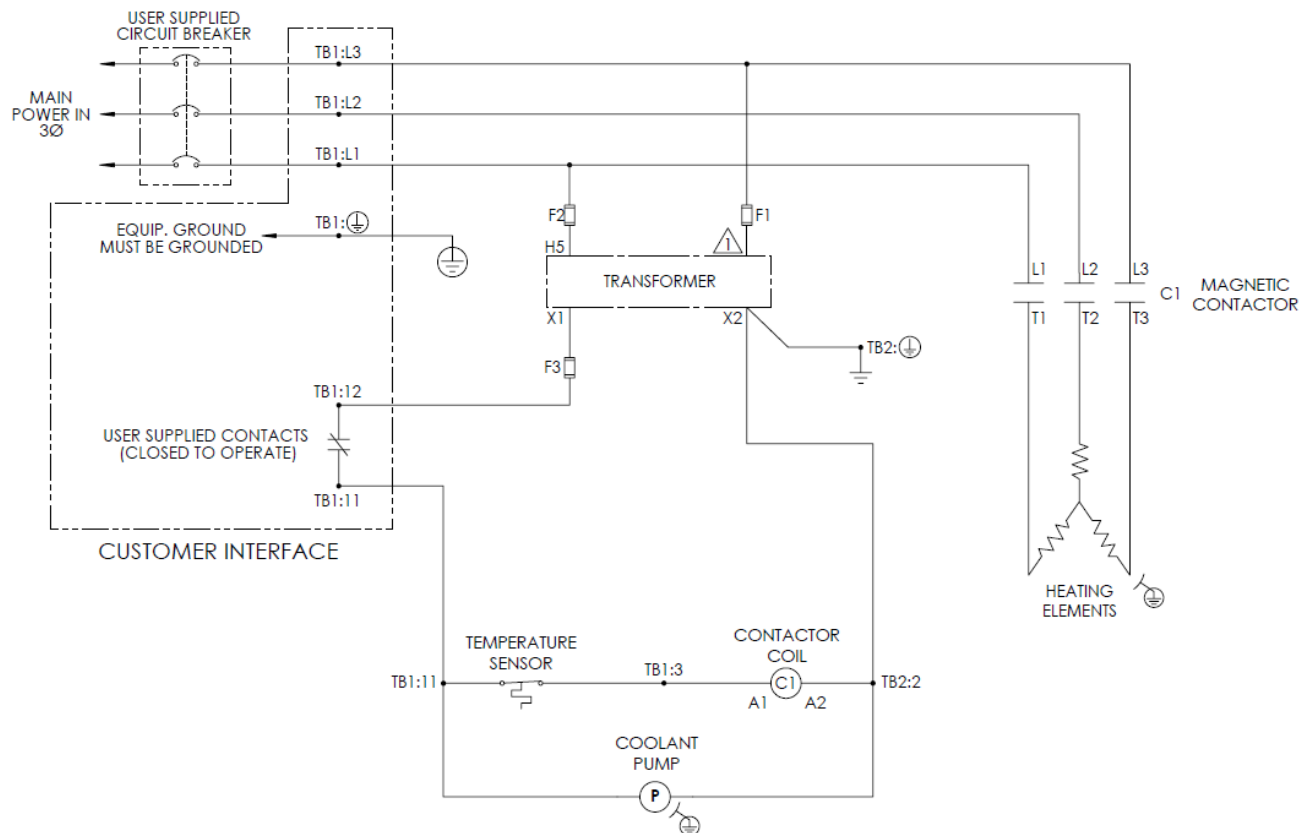
GENERAL DRAWING



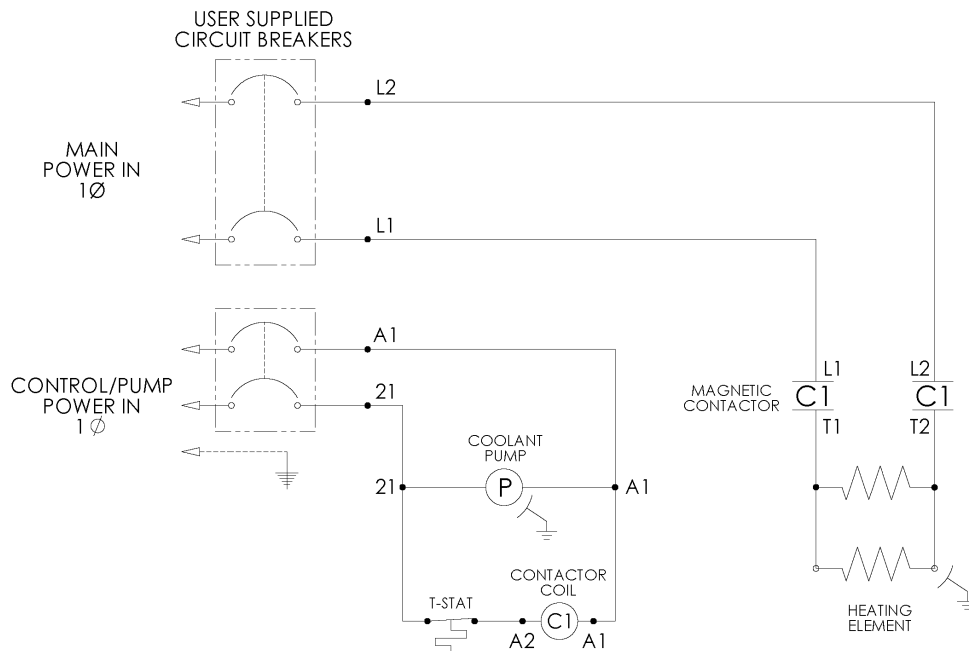
Wiring Diagram - 480 V Three Phase JWH (9 kW and 12 kW Heating Systems)



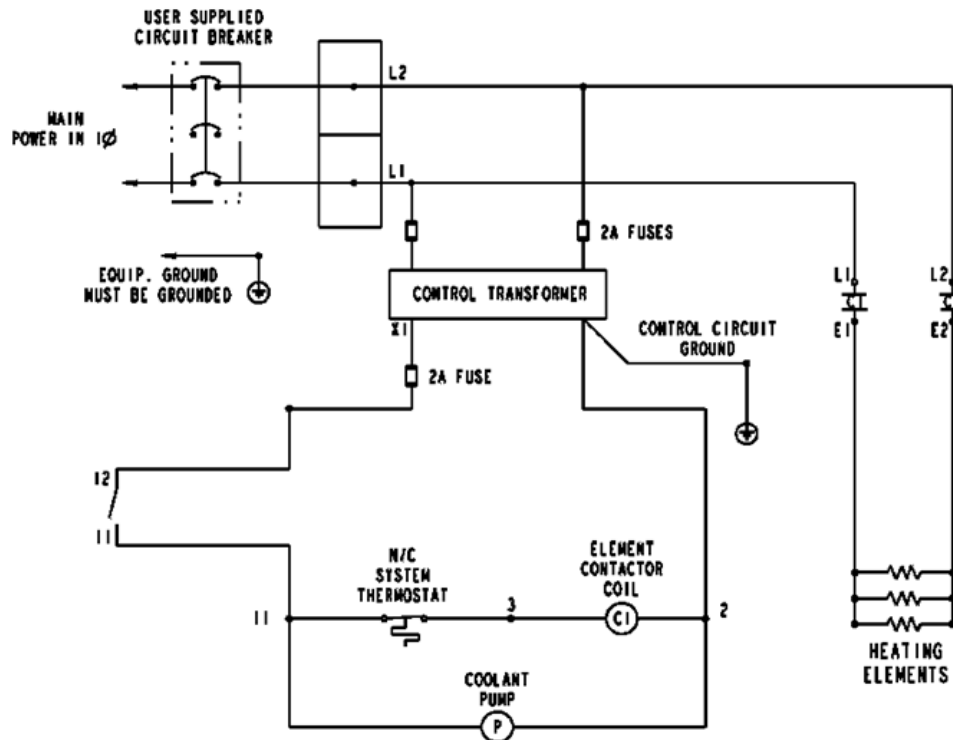
Wiring Diagram - 400 V Three Phase JWH (9 kW and 12 kW Heating Systems)



Wiring Diagram - 208, 220 and 240 V Single Phase JWH (9 kW Heating Systems) and 240 V Single Phase JWH (12 kW Heating Systems)



Wiring Diagram - 208 V Single Phase JWH (10.5 kW Heating Systems)



Materials and specifications are subject to change without notice.

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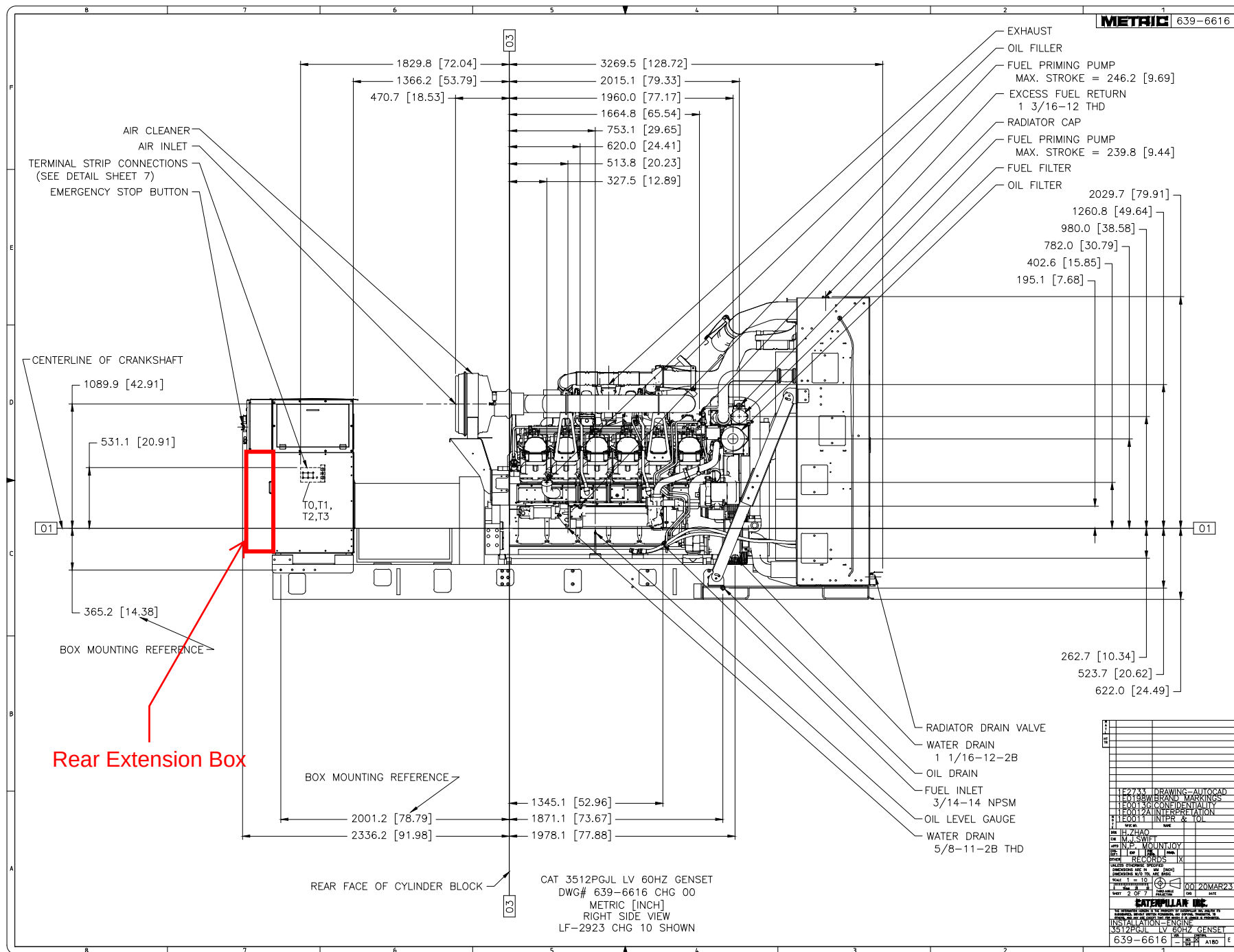
CARTER POWER SYSTEMS

Section Four DRAWINGS

Layout Assembly Drawings

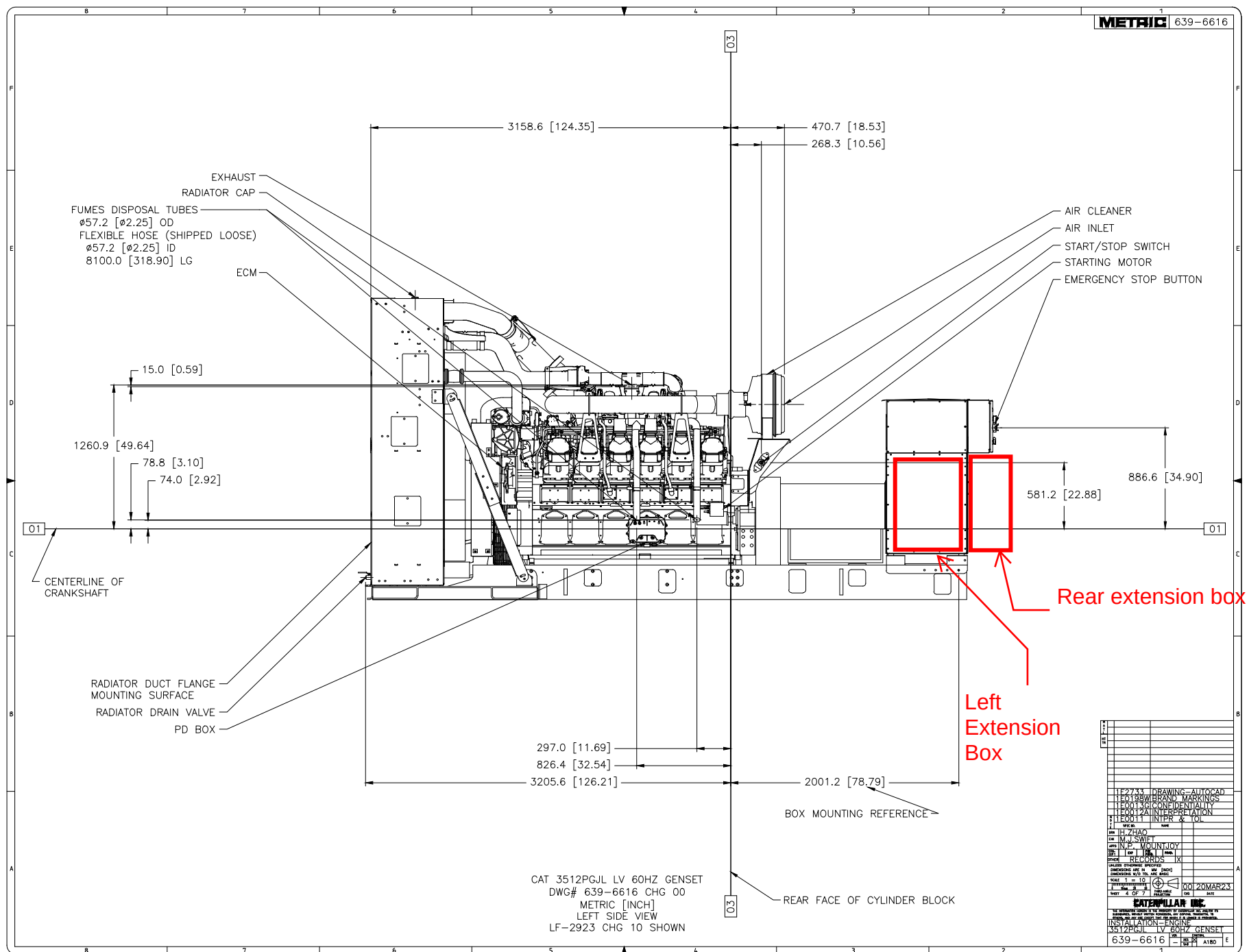
Radiator Drawings

CAT Energy Control Systems (ECS) 100 Wiring Diagram

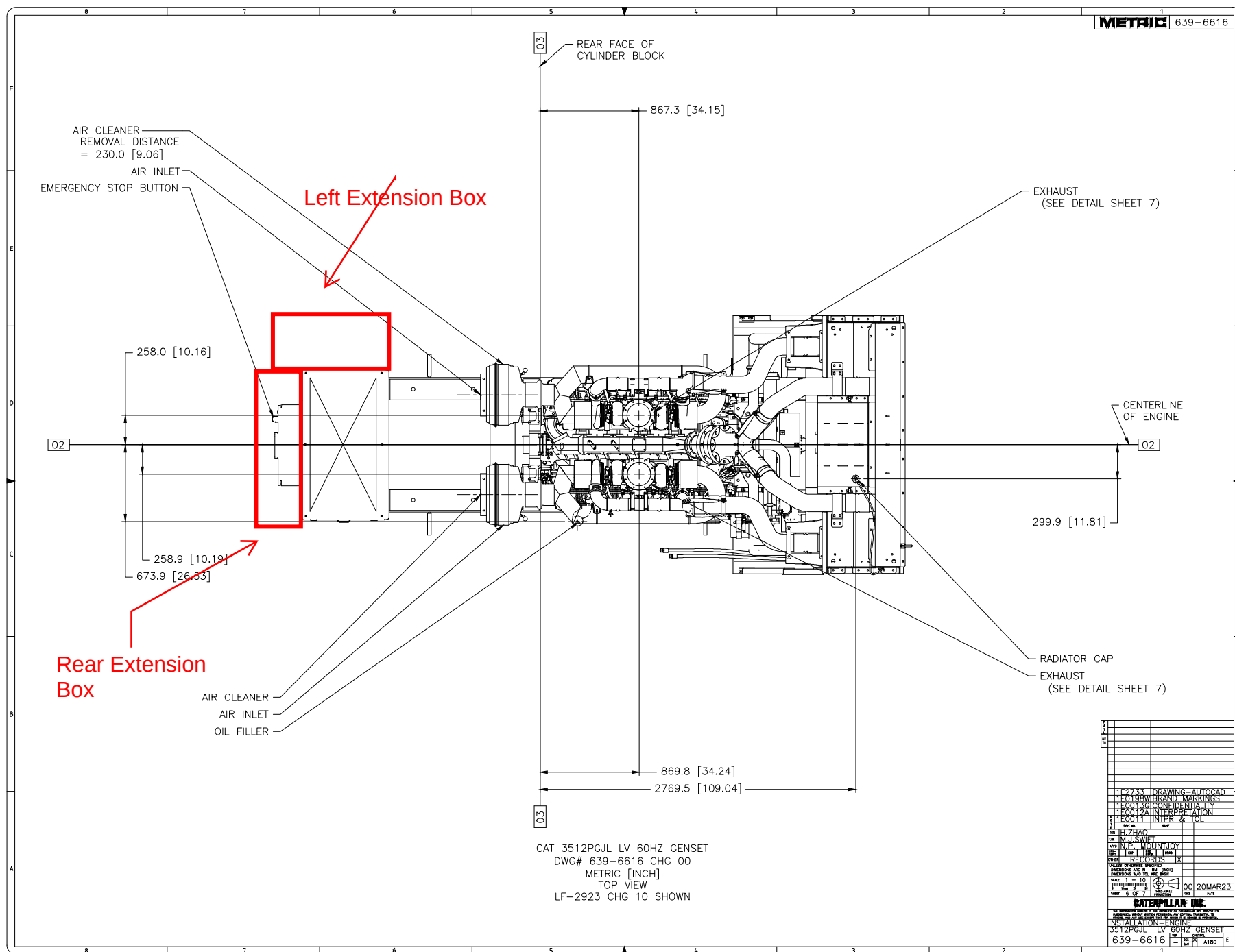


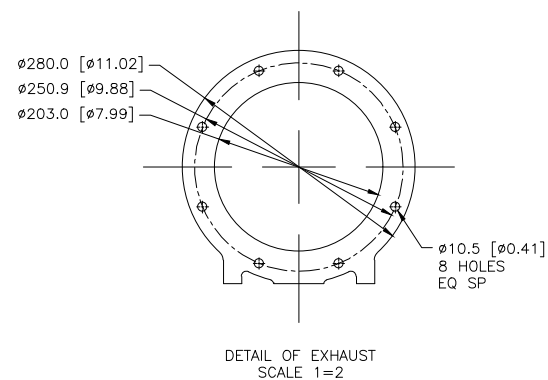
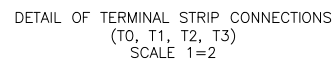
METRIC 639-6616	
1	2
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67	68
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99	100

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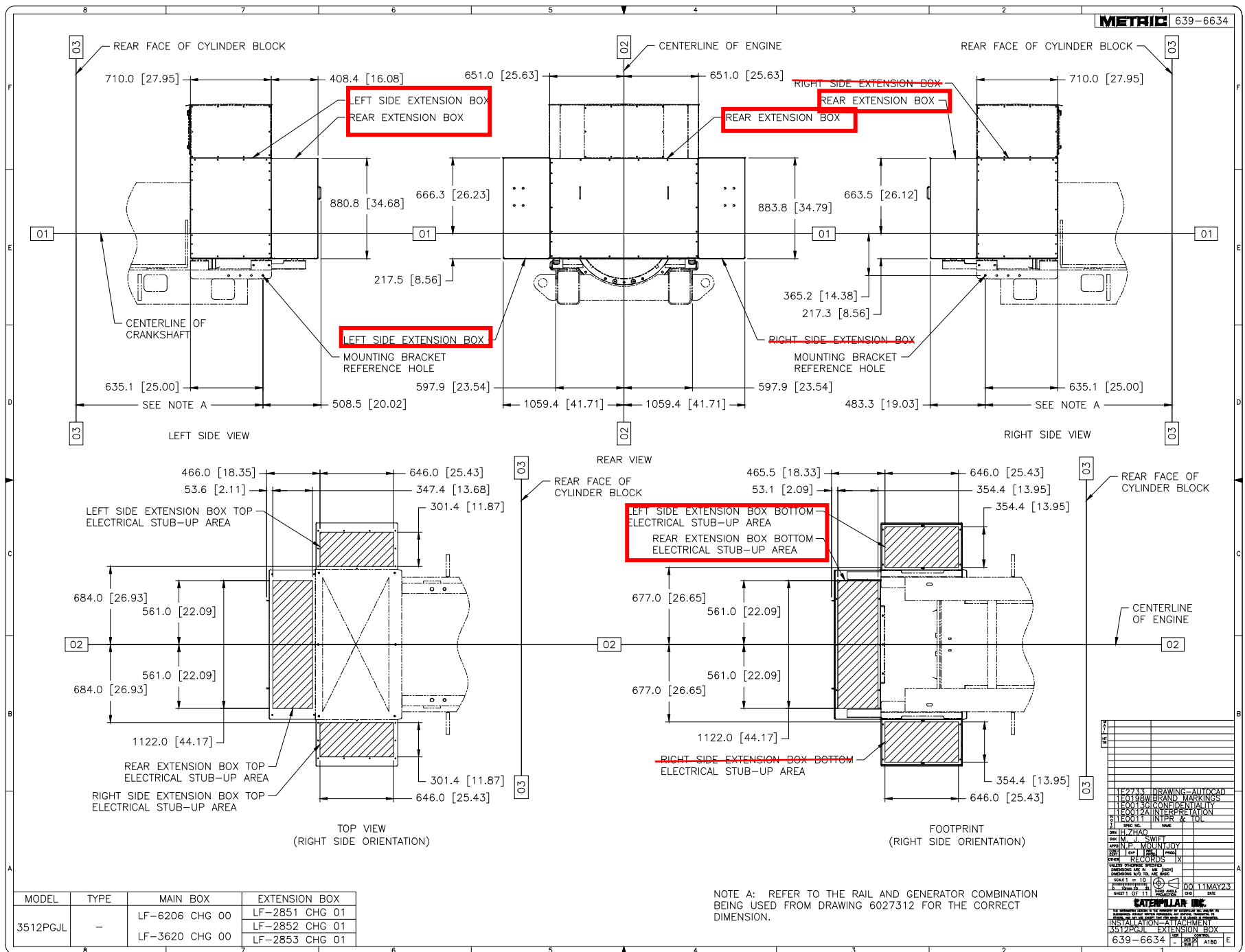


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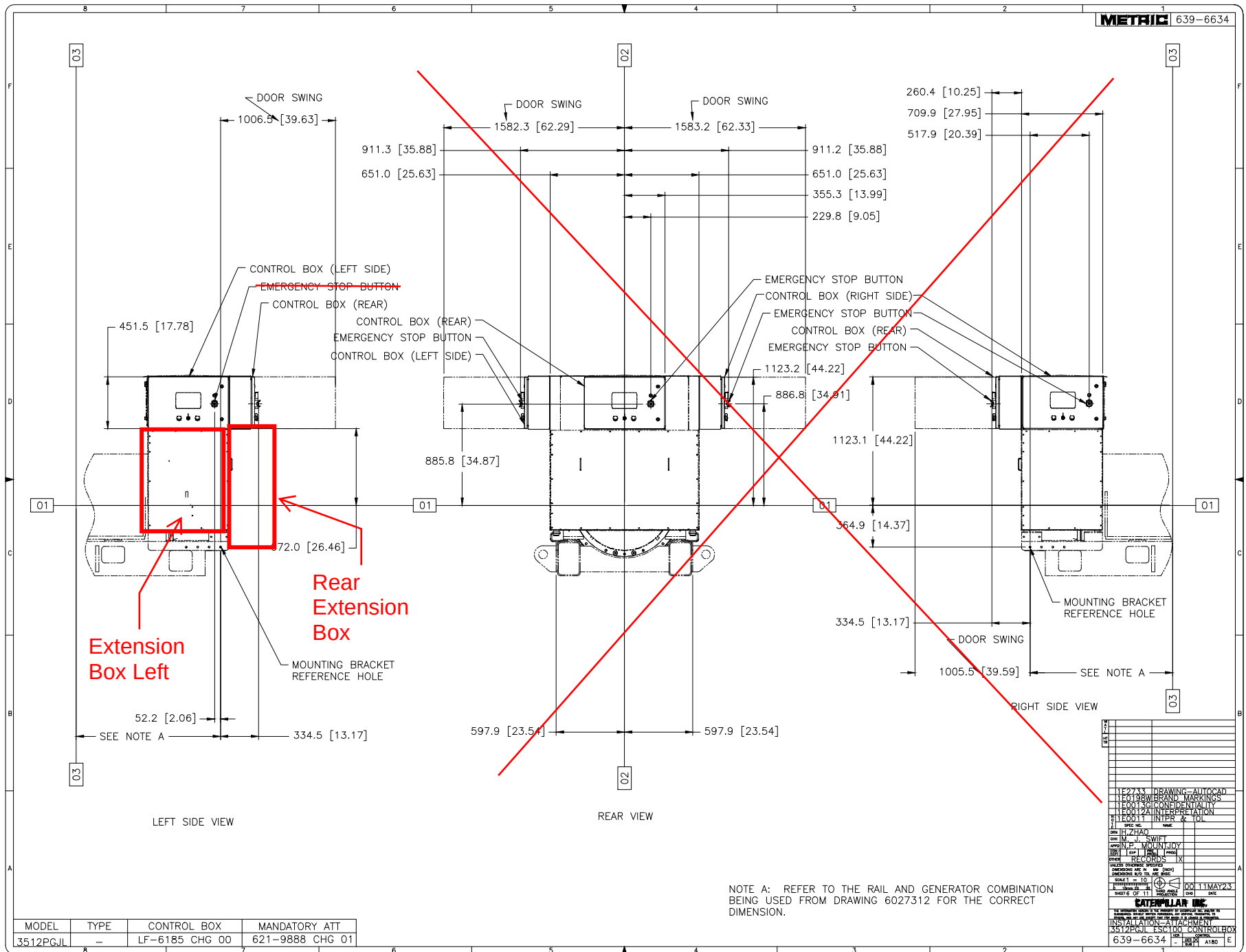
ECS100 - Mounted Left
Breaker - Mounted Rear



MODEL	TYPE	TOP CABLE SHROUDS
3512PGJL	—	LF-6200 CHG 00
		LF-6201 CHG 00
		LF-6202 CHG 00

NOTE A: REFER TO THE RAIL AND GENERATOR COMBINATION
BEING USED FROM DRAWING 6027312 FOR THE CORRECT
DIMENSION.

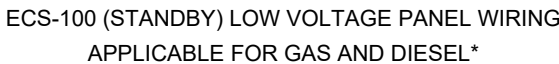
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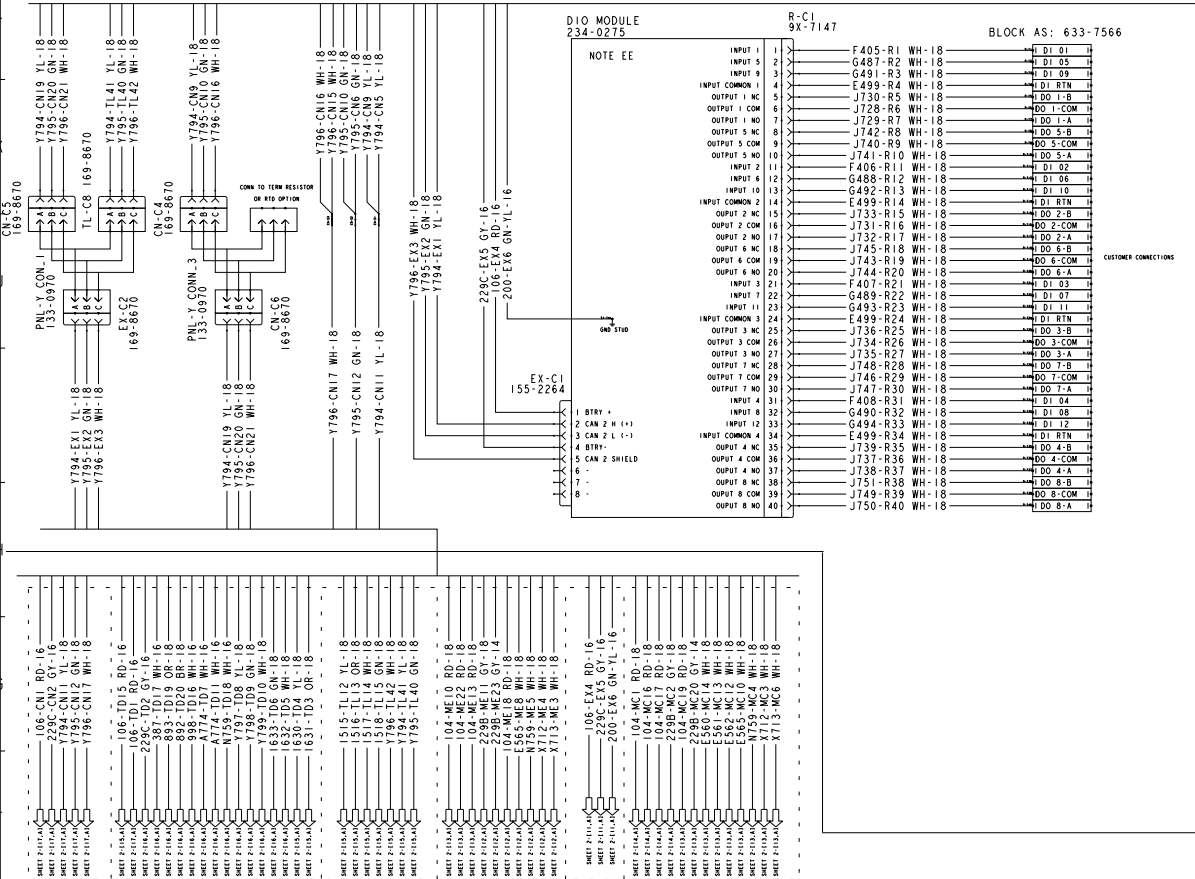
MODEL	TYPE	CNTL PANEL MTG	CONTROL BOX	HMI PANEL
3512PGJL	-	LF-6280 CHG 01	LF-6189 CHG 01	621-9888 CHG 01
		LF-6191 CHG 00		
		LF-6282 CHG 01		

NOTE A: REFER TO THE RAIL AND GENERATOR COMBINATION
BEING USED FROM DRAWING 6027312 FOR THE CORRECT
DIMENSION.

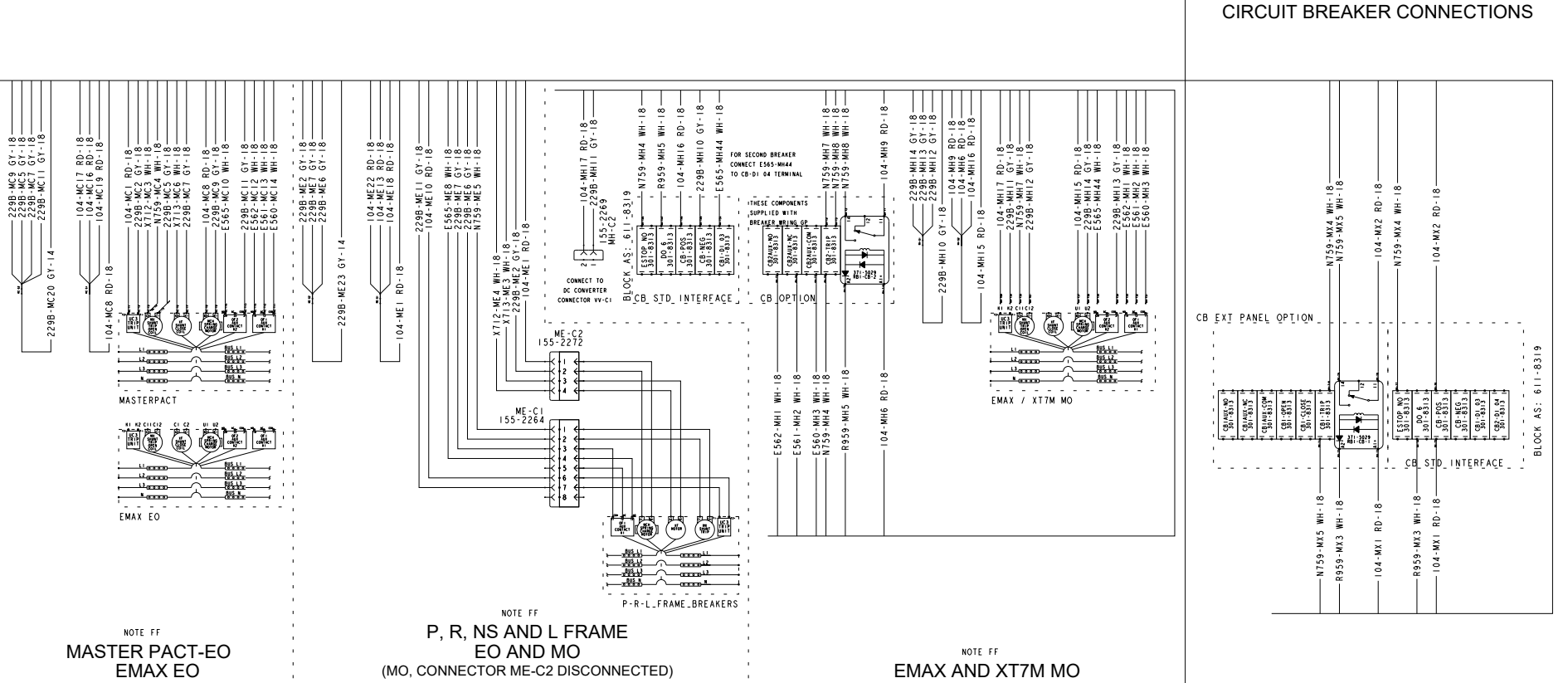
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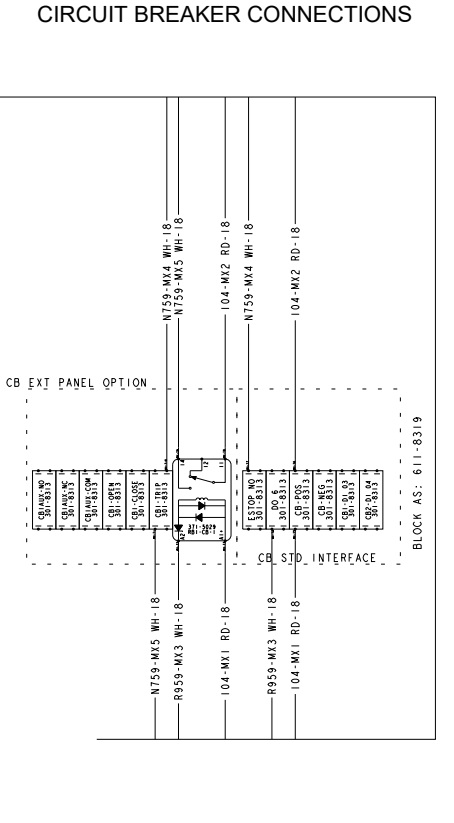
CAN-2 OPTIONS: DIO MODULE/RTD MODULE



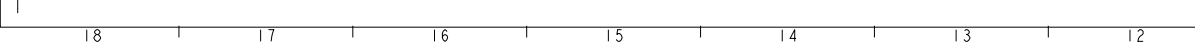
NON-PARALLELING CIRCUIT BREAKER OPTIONS



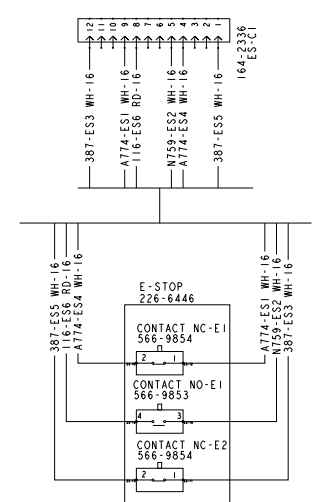
EXTERNAL CONTROL PANEL CIRCUIT BREAKER CONNECTIONS



PANEL DOOR WIRING

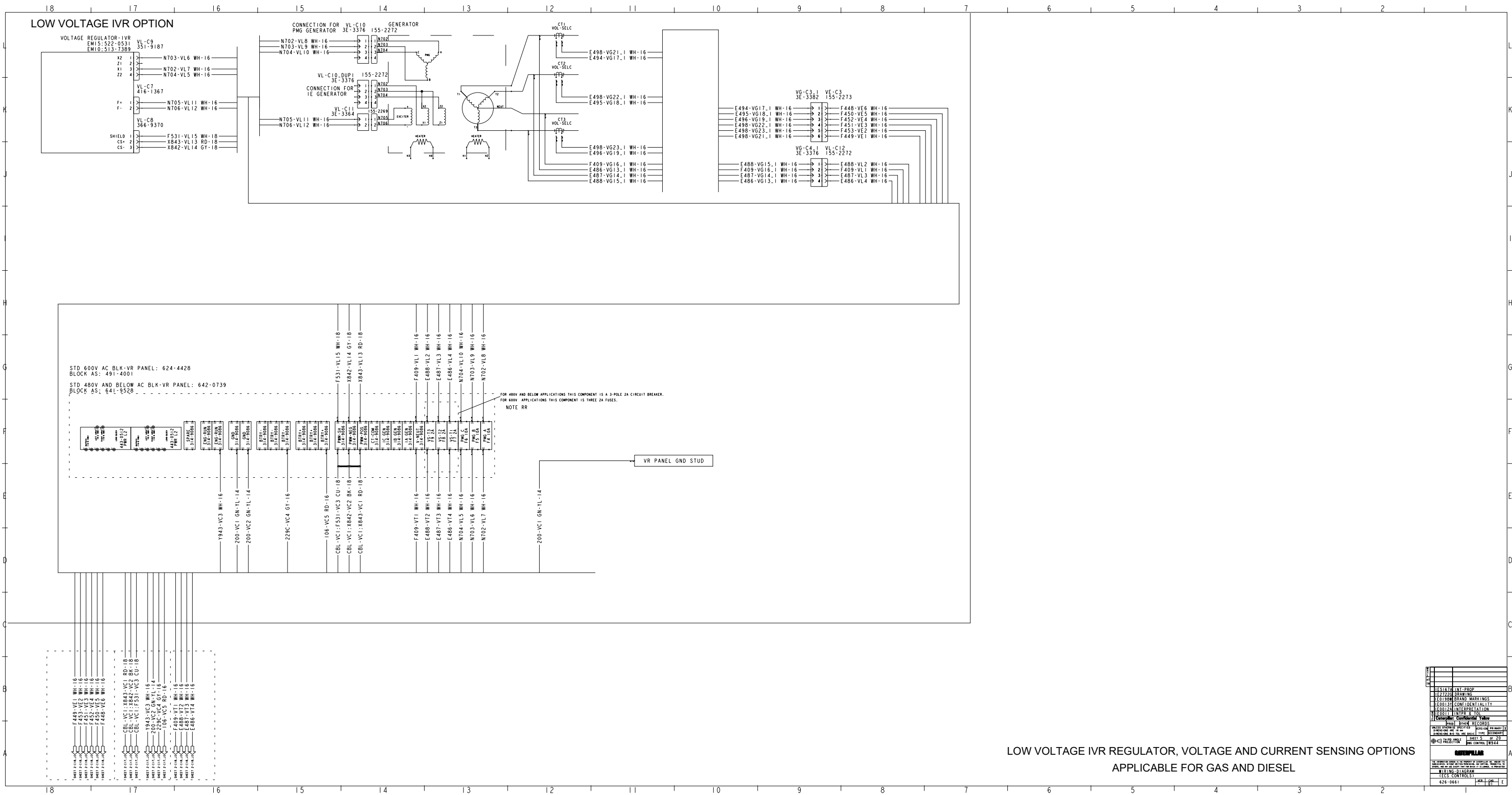


ENGINE E-STOP WITH EXTERNAL PANEL OPTION



OPTIONS: DISPLAY, CAN-2, DIO, NON-PARALLELING BREAKERS, ENGINE ESTOP APPLICABLE FOR GAS AND DIESEL

626-0661	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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ECS-100

DESCRIPTION	RELAY	3500 EUI	C175-16/C175-20	C27 & C32	G3500
RELAY		A6L3-SINGLE GEN (1)	A6L3-SINGLE GEN (1)	A6L3-SINGLE GEN (1)	A6L3-SINGLE GEN (1)
PROG ISO DI		START (DEDICATED)	START (DEDICATED)	START (DEDICATED)	START (DEDICATED)
PROG DI-1	RST1	ESTOP-NC	ESTOP-NC	ESTOP-NC	ESTOP-NC
PROG DI-2	RST1	ESTOP-NO	ESTOP-NO	ESTOP-NO	ESTOP-NO
PROG DI-3		#1 CB OPEN WARNING	#1 CB OPEN WARNING	#1 CB OPEN WARNING	#1 CB OPEN WARNING
PROG DI-4		#2 CB OPEN WARNING	#2 CB OPEN WARNING	#2 CB OPEN WARNING	#2 CB OPEN WARNING
PROG DI-5		GEARBOX OIL PRESSURE	JW COOLANT LEVER	SPARE	GEARBOX OIL PRESSURE
PROG DI-6		GEARBOX FILTER BYPASS PRESSURE	SCAC LEVEL	SPARE	GEARBOX FILTER BYPASS PRESSURE
PROG DI-7		SAFETY SHUTDOWN INPUT-NO	SAFETY SHUTDOWN INPUT-NO	SAFETY SHUTDOWN INPUT-NO	SAFETY SHUTDOWN INPUT-NO
PROG DI-8		SAFETY SHUTDOWN INPUT-NC	SAFETY SHUTDOWN INPUT-NC	SAFETY SHUTDOWN INPUT-NC	SAFETY SHUTDOWN INPUT-NC
PROG DI-9		SPARE	SPARE	FUEL RUPTURE (ENCLOSURE)	COOLAND LOSS SENSOR-1
PROG DI-10		DIFFERENTIAL AIR FILTER	SPARE	BATTERY CHARGE ALARM (ENCLOSURE)	COOLAND LOSS SENSOR-2
PROG DI-11		SPARE	SPARE	SPARE	ENGINE ALARM
PROG DI-12		SPARE	SPARE	SPARE	ENGINE FAIL
PROG DI-13		SPARE	SPARE	SPARE	SPARE
PROG DI-14		SPARE	SPARE	SPARE	SPARE
PROG DI-15		SPARE	SPARE	SPARE	SPARE
PROG DI-16		SPARE	SPARE	SPARE	SPARE
DO-1	R1	STARTER MOTOR MAG RELAY	SPARE	SPARE	STARTER MOTOR MAG RELAY
DO-2	R2	GEARBOX PLC	SPARE	SPARE	START (FUEL ENABLE)
DO-3	R3	SPARE	SPARE	DISABLE AUX AC SUPPLY (ENCLOSURE)	KEYSWITCH-ECU FAULT RESET
DO-4	R4	SPARE	SPARE	SPARE	SPARE
DO-5 DEDICATED	R5	FUNCTIONAL SAFETY-HARD ESTOP	FUNCTIONAL SAFETY-HARD ESTOP	FUNCTIONAL SAFETY-HARD ESTOP	FUNCTIONAL SAFETY-HARD ESTOP
DO-6 DEDICATED	R61-CB	COMMON SHUT DOWN (SHUNT TRIP)	COMMON SHUT DOWN (SHUNT TRIP)	COMMON SHUT DOWN (SHUNT TRIP)	COMMON SHUT DOWN (SHUNT TRIP)
DO-7 DEDICATED	R7	FUNCTIONAL SAFETY-GSOV	FUNCTIONAL SAFETY-GSOV	FUNCTIONAL SAFETY-GSOV	FUNCTIONAL SAFETY-GSOV
DO-8	R8	SPARE	SPARE	SPARE	SPARE
DO-9	R9	SPARE	SPARE	SPARE	SPARE
DO-10	R10	START AID (ENGINE PRELUBE)	SPARE	SPARE	SPARE
DO-11	R11	SPARE	IDLE SPEED COMMAND	IDLE SPEED COMMAND	RATED/ IDLESPEED
DO-12	R12	DISABLE AUX AC SUPPLY	DISABLE AUX AC SUPPLY	DISABLE AUX AC SUPPLY	DISABLE AUX AC SUPPLY
ANALOG INPUT-1		GEAR OIL TEMPERATURE (GEARBOX)	SPARE	SPARE	GEAR OIL TEMPERATURE (GEARBOX)
ANALOG INPUT-2		SPARE	SPARE	SPARE	SPARE
ANALOG INPUT-3		SPARE	SPARE	FUEL LEVEL (ENCLOSURE)	SPARE
ANALOG OUTPUT-1		SPARE	SPARE	SPARE	KILOWATT TRANSDUCER
ANALOG OUTPUT-2		SPARE	SPARE	SPARE	SPARE
PWM OUTPUT-1		SPARE	SPARE	SPARE	SPARE
PWM OUTPUT-2		SPARE	SPARE	SPARE	SPARE
PWM OUTPUT-3		IVR VOLTAGE CONTROL	IVR VOLTAGE CONTROL	IVR VOLTAGE CONTROL	IVR VOLTAGE CONTROL
MPU INPUT		SPARE	SPARE	SPARE	MAG PICKUP-SPEED SENSOR

ETHERNET I/O

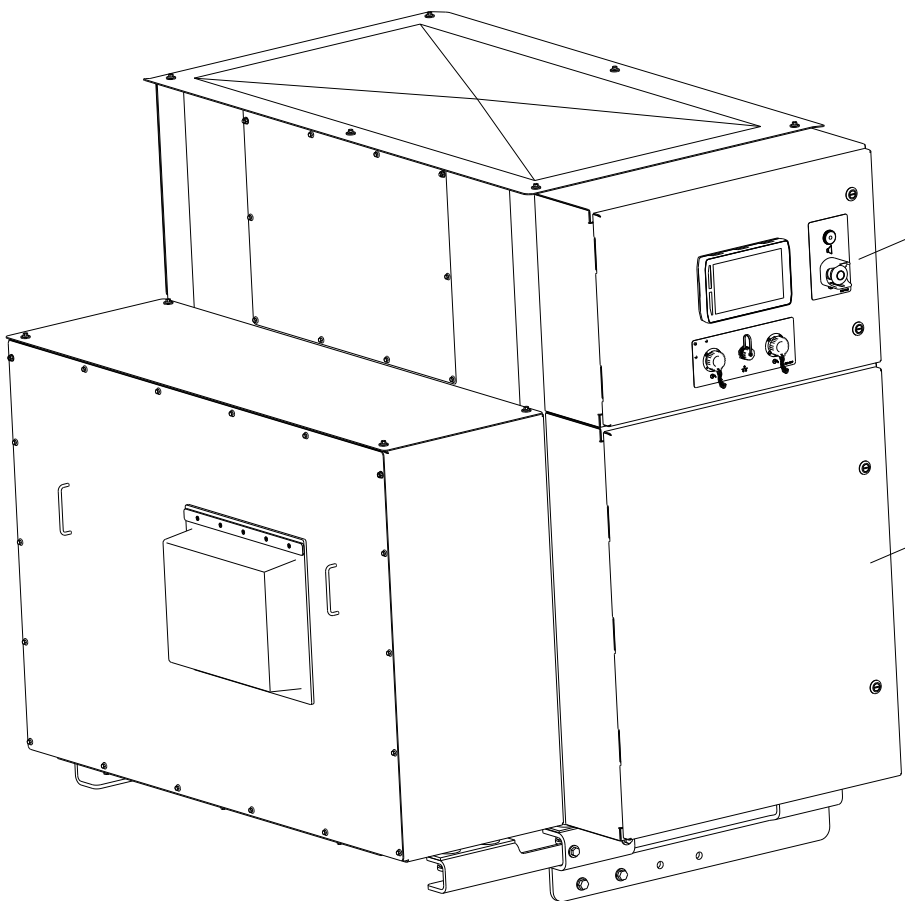
PRELOADED MODULE CONFIGURATIONS					
NOTE HH					
ETHERNET I/O	DIGITAL INPUT	DIGITAL OUTPUT	ANALOG INPUT	ANALOG OUTPUT	RTD
MODULE PN	I6 PER CARD	I6 PER CARD	4 PER CARD	4 PER CARD	4 PER CARD
622-9250 (GENSET CONF-A)	1X	1X	0	0	0
622-9251 (GENSET CONF-B)	1X	1X	1X	1X	1X
622-9252 (GENSET CONF-C)	2X	2X	1X	1X	0
622-9253 (GENSET CONF-D)	1X	1X	2X	2X	0
622-9244 (PARALLELING CONF-A)	1X	1X	0	0	0
622-9245 (PARALLELING CONF-B)	1X	1X	1X	1X	1X
622-9246 (PARALLELING CONF-C)	2X	2X	1X	1X	0
622-9248 (PARALLELING CONF-D)	1X	1X	2X	2X	0
622-9233 (GRID CODE)	2X	1X	2X	1X	0

ECS-200

DESCRIPTION	RELAY	3500 EUI	RELAY_1	3500 EUI-1	RELAY_2	C175-16/C175-20	RELAY_3	C175-16/C175-20-1	RELAY_4	C27 & C32	RELAY_5	C27 & C32-1	RELAY_6	G3500	RELAY_7	G3500-1
RELAY		A6L3-GENSET (1)		A6L3-PARALLELING (2)		A6L3-GENSET (1)		A6L3-PARALLELING (2)		A6L3-GENSET (1)		A6L3-PARALLELING (2)		A6L3-GENSET (1)		A6L3-PARALLELING (2)
PROG ISO DI		START (DEDICATED)		GROUP START		START (DEDICATED)		GROUP START		START (DEDICATED)		GROUP START		START (DEDICATED)		GROUP START
PROG DI-1	RST1	ESTOP-NC		SPARE		ESTOP-NC		SPARE		ESTOP-NC		SPARE		ESTOP-NC		SPARE
PROG DI-2	RST1	ESTOP-NO		SPARE		ESTOP-NO		SPARE		ESTOP-NO		SPARE		ESTOP-NO		SPARE
PROG DI-3		#1 CB OPEN WARNING		CIRCUIT BREAKER ALARM		#1 CB OPEN WARNING		CIRCUIT BREAKER ALARM		#1 CB OPEN WARNING		CIRCUIT BREAKER ALARM		#1 CB OPEN WARNING		CIRCUIT BREAKER ALARM
PROG DI-4		#2 CB OPEN WARNING		CIRCUIT BREAKER AUX3-NO		#2 CB OPEN WARNING		CIRCUIT BREAKER AUX3-NO		#2 CB OPEN WARNING		CIRCUIT BREAKER AUX3-NO		#2 CB OPEN WARNING		CIRCUIT BREAKER AUX3-NO
PROG DI-5		GEARBOX OIL PRESSURE		CIRCUIT BREAKER AUX3-NC		JW COOLANT LEVER		CIRCUIT BREAKER AUX3-NC		SPARE		CIRCUIT BREAKER AUX3-NC		GEARBOX OIL PRESSURE		CIRCUIT BREAKER AUX3-NC
PROG DI-6		GEARBOX FILTER BYPASS PRESSURE		SPARE		SCAC LEVEL		SPARE		SPARE		SPARE		GEARBOX FILTER BYPASS PRESSURE		SPARE
PROG DI-7	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO	R-P3	SAFETY SHUTDOWN INPUT-NO
PROG DI-8	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC	R-P3	SAFETY SHUTDOWN INPUT-NC
PROG DI-9		SPARE		SPARE		SPARE		SPARE		FUEL RUPTURE (ENCLOSURE)		SPARE		COOLAND LOSS SENSOR-1		SPARE
PROG DI-10		DIFFERENTIAL AIR FILTER		SPARE		SPARE		SPARE		BATTERY CHARGE ALARM (ENCLOSURE)		SPARE		COOLAND LOSS SENSOR-2		SPARE
PROG DI-11		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		ENGINE ALARM		SPARE
PROG DI-12		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		ENGINE FAIL		SPARE
PROG DI-13		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PROG DI-14		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PROG DI-15		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PROG DI-16		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
DO-1	R1	STARTER MOTOR MAG RELAY	R-P1	CIRCUIT BREAKER OPEN	R1	SPARE	R-P1	CIRCUIT BREAKER OPEN	R1	SPARE	R-P1	CIRCUIT BREAKER OPEN	R1	STARTER MOTOR MAG RELAY	R-P1	SPARE
DO-2	R2	GEARBOX PLC	R-P2	CIRCUIT BREAKER CLOSE	R2	SPARE	R-P2	CIRCUIT BREAKER CLOSE	R2	SPARE	R-P2	CIRCUIT BREAKER CLOSE	R2	START (FUEL ENABLE)	R-P2	SPARE
DO-3	R3	SPARE	R-P3	SAFETY SHUTDOWN	R3	SPARE	R-P3	SAFETY SHUTDOWN	R3	DISABLE AUX AC SUPPLY (ENCLOSURE)	R-P3	SAFETY SHUTDOWN	R3	KEYSWITCH-ECU FAULT RESET	R-P3	SPARE
DO-4	R4	SPARE	R-P4	SPARE	R4	SPARE	R-P4	SPARE	R4	SPARE	R-P4	SPARE	R4	SPARE	R-P4	SPARE
DO-5 DEDICATED	R5	FUNCTIONAL SAFETY-HARD ESTOP	R-P5	SPARE	R5	FUNCTIONAL SAFETY-HARD ESTOP	R-P5	SPARE	R5	FUNCTIONAL SAFETY-HARD ESTOP	R-P5	SPARE	R5	FUNCTIONAL SAFETY-HARD ESTOP	R-P5	SPARE
DO-6 DEDICATED	R61-CB	COMMON SHUT DOWN (SHUNT TRIP)	R-P6	COMMON SHUT DOWN (SHUNT TRIP)	R61-CB	COMMON SHUT DOWN (SHUNT TRIP)	R-P6	COMMON SHUT DOWN (SHUNT TRIP)	R61-CB	COMMON SHUT DOWN (SHUNT TRIP)	R-P6	COMMON SHUT DOWN (SHUNT TRIP)	R61-CB	COMMON SHUT DOWN (SHUNT TRIP)	R-P6	COMMON SHUT DOWN (SHUNT TRIP)
DO-7 DEDICATED	R7	FUNCTIONAL SAFETY-GSOV	R-P7	SPARE	R7	FUNCTIONAL SAFETY-GSOV	R-P7	SPARE	R7	FUNCTIONAL SAFETY-GSOV	R-P7	SPARE	R7	FUNCTIONAL SAFETY-GSOV	R-P7	SPARE
DO-8	R8	SPARE	R-P8	SPARE	R8	SPARE	R-P8	SPARE	R8	SPARE	R-P8	SPARE	R8	SPARE	R-P8	SPARE
DO-9	R9	SPARE	R-P9	SPARE	R9	SPARE	R-P9	SPARE	R9	SPARE	R-P9	SPARE	R9	SPARE	R-P9	SPARE
DO-10	R10	START AID (ENGINE PRELUBE)	R-P10	SPARE	R10	SPARE	R-P10	SPARE	R10	SPARE	R-P10	SPARE	R10	SPARE	R-P10	SPARE
DO-11	R11	SPARE	R-P11	SPARE	R11	IDLE SPEED COMMAND	R-P11	SPARE	R11	IDLE SPEED COMMAND	R-P11	SPARE	R11	RATED/ IDLESPEED	R-P11	SPARE
DO-12	R12	DISABLE AUX AC SUPPLY	R-P12	SPARE	R12	DISABLE AUX AC SUPPLY	R-P12	SPARE	R12	DISABLE AUX AC SUPPLY	R-P12	SPARE	R12	DISABLE AUX AC SUPPLY	R-P12	SPARE
ANALOG INPUT-1		GEAR OIL TEMPERATURE (GEARBOX)		SPARE		SPARE		SPARE		SPARE		SPARE		GEAR OIL TEMPERATURE (GEARBOX)		SPARE
ANALOG INPUT-2		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
ANALOG INPUT-3		SPARE		SPARE		SPARE		SPARE		FUEL LEVEL (ENCLOSURE)		SPARE		SPARE		SPARE
ANALOG OUTPUT-1		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		KILOWATT TRANSDUCER		SPARE
ANALOG OUTPUT-2		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PWM OUTPUT-1		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PWM OUTPUT-2		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE
PWM OUTPUT-3		SPARE		IVR VOLTAGE CONTROL		SPARE		IVR VOLTAGE CONTROL		SPARE		IVR VOLTAGE CONTROL		SPARE		IVR VOLTAGE CONTROL
MPU INPUT		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		MAG PICKUP-SPEED SENSOR		SPARE

INPUT & OUTPUT CHART

REVISION	DATE	BY	CHKD	APPD
1	11/11/2011	MM	MM	MM
2	11/11/2011	MM	MM	MM
3	11/11/2011	MM	MM	MM
4	11/11/2011	MM	MM	MM
5	11/11/2011	MM	MM	MM
6	11/11/2011	MM	MM	MM
7	11/11/2011	MM	MM	MM
8	11/11/2011	MM	MM	MM
9	11/11/2011	MM	MM	MM
10	11/11/2011	MM	MM	MM
11	11/11/2011	MM	MM	MM
12	11/11/2011	MM	MM	MM
13	11/11/2011	MM	MM	MM
14	11/11/2011	MM	MM	MM
15	11/11/2011	MM	MM	MM
16	11/11/2011	MM	MM	MM
17	11/11/2011	MM	MM	MM
18	11/11/2011	MM	MM	MM
19	11/11/2011	MM	MM	MM
20	11/11/2011	MM	MM	MM
21	11/11/2011	MM	MM	MM
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86	11/11/2011	MM	MM	MM
87	11/11/2011	MM	MM	MM
88	11/11/2011	MM	MM	MM
89	11/11/2011	MM	MM	MM
90	11/11/2011	MM	MM	MM
91	11/11/2011	MM	MM	MM
92	11/11/2011	MM	MM	MM
93	11/11/2011	MM	MM	MM



ENERGY CONTROL SYSTEM (ECS) - 100 PANEL

~~ENERGY CONTROL SYSTEM (ECS) - 200 PANEL~~

EXAMPLE CONFIGURATION. SEE ORDER OR PRICELIST FOR ALL AVAILABLE
OPTIONS FOR PANEL, DISPLAY AND POWER CONNECTION LOCATIONS.

- NOTE AA: SEE LEBE20718 TO PROGRAM A6L3 INPUTS AND OUTPUTS.
- NOTE BB: REMOVE JUMPER BAR BETWEEN ESTOP-A AND ESTOP-B TERMINAL BOARD POINTS AFTER INSTALLATION OF C27/C32 ENCLOSURE OR ENGINE MOUNTED EMERGENCY STOP. REMOVE THE JUMPER WIRE FROM BTRY POS AND ESTOP-A WITH THE INSTALLATION OF THE CUSTOMER SUPPLIED ESTOP. (CUSTOMER ESTOP IS CONNECTED ACROSS TERMINALS BTRY POS AND ESTOP-A)
- NOTE CC: CUSTOMER LOADING FROM TERMINAL STRIP SHOULD BE LIMITED TO 5A RESISTIVE ONLY AND FOR EXCESS DEMAND USE BATTERY CONNECTION.
- NOTE DD: SEE LEBE20718 FOR A6L3 SCADA DATA LINKS.
- NOTE EE: SEE LEBE20714 TO PROGRAM DISCRETE I/O MODULE INPUTS AND OUTPUTS.
- NOTE FF: REFERENCE 524-1257 FOR CIRCUIT BREAKER INSTALLATION DRAWINGS.
- NOTE GG: SEE LEBE20717 FOR HMI INFORMATION.
- NOTE HH: SEE LEBE20714 FOR ETHERNET I/O INFORMATION.
- NOTE JJ: DIGITAL INPUT 3 IS ONLY AVAILABLE ON PACKAGES WITHOUT A CIRCUIT BREAKER.
- DIGITAL INPUT 5 AND 6 ARE USED BY THE FACTORY FOR THE C175 GENSET.
- NOTE KK: ANALOG INPUT (-)'S MUST BE REFERENCED TO BATTERY (-).
- NOTE LL: THE A6L3 CONNECTORS USES SPRING CLAMP TERMINAL INTERFACE CONNECTIONS.
- NOTE MM: CIRCUIT BREAKER TERMINAL LABELS ARE LOCATION BASED, LF=LEFT, RT=RIGHT, RR=REAR.
- NOTE NN: RECOMMENDED WIRING FOR ACTIVE SENSORS.
- NOTE PP: RECOMMENDED WIRING FOR RESISTIVE SENSORS.
- NOTE RR: FUSES ARE DEDICATED TO A6L3 VOLTAGE SENSING ONLY. NOT FOR OTHER USES.

SCHEMATIC INDEX TABLE

Generator Set Product	Control System	Serial Number Prefix	Modular Panel	ECS Panel	GCCP Panel	12V ENCLOSURE	GAS WM PANEL	Diesel EIH	Diesel A6 ECM	GAS EIH 12 & 20 DSL	GAS EIH 50Hz	GAS EIH 60Hz	GAS EIH C & E	GAS EIH A	GAS WM EIH
C27/C32	EMCP 4.2B/4.3/4.4	JSJ, TZJ, 2A3	491-3960	626-0661	634-4123	430-2803	443-5152	491-3960	645-5502	548-7730	540-6381	552-5603	540-0807	542-6472	443-5152
C27/C32	ECS 100	JSJ, TZJ, 2A3	X	X		X	X	X							
C27/C32	GCCP1.2/1.3	JSJ, TZJ, 2A3	X	X	X	X		X							
3512-Diesel	EMCP 4.2B/4.3/4.4	LTP, LY7, LY8, LY9, LYH, JM2, JM3, JM4	X			X		X	X						
3512-Diesel	ECS 100 & 200	LYP, LY7, LY8, LY9, LYH, JM2, JM3, JM4	X	X				X	X						
3512-MUT Diesel	EMCP 4.2B/4.3	LY7, JM2	X					X							
3516-Diesel	EMCP 4.2B/4.3/4.4	LY3, LY4, LY4, LY5, LY6, LYM, JD7, FF2, F4H, ZNL, JCH, JCN, JH8, PXY, ZNZ, GBZ, GWZ	X					X	X						
3516-Diesel	ECS 100 & 200	LY3, LY4, LY4, LY5, LY6, LYM, JD7, FF2, F4H, ZNL, JCH, JCN, JH8, PXY, ZNZ, GBZ, GWZ	X	X				X	X						
3516-MUT Diesel	EMCP 4.2B/4.3	LY2, JCG	X					X							
C175	EMCP 4.2B/4.3/4.4	TB8, TE8, TZ8	X					X							
C175	ECS 100 & 200	TB8, TE8, TZ8	X	X				X							
G3512H NL	EMCP 4.3/4.4	GF4, GF5, RNK	X								X	X			
G3512 DSL	EMCP 4.3/4.4	E26, E27, E2T, E2N	X							X					
G3512 DSL	ECS 100 & 200	E26, E27, E2T, E2N	X	X						X					
G3516CNPL	EMCP 4.3/4.4	NWD, NWE, NWF	X										X		
G3516CLPB	EMCP 4.3 WALLMOUNT	HCV					X								X
G3516HNPL	EMCP 4.3/4.4	NWH, NWJ, RNH	X								X	X			
G3516 NGL	EMCP 4.3/4.4	E6R	X											X	
G3516LNGL	EMCP 4.3/4.4	E6W	X												X
G3516LNPL	EMCP 4.3/4.4	E6W, E6Y	X												X
G3516 DSL	EMCP 4.3/4.4	E24, F6S, F6T	X					X							
G3516 DSL	ECS 100 & 200	E24, F6S, F6T	X	X				X							
G3520HNPL	EMCP 4.3/4.4	GF6, GFP	X								X	X			
G3520DSL	EMCP 4.3/4.4	E28, E29, E2J, E2K, JF4, E33, E37, E32, E36, E42	X								X		X		
G3520DSL	ECS 100 & 200	E28, E29, E2J, E2K, JF4, E33, E37, E32, E36, E42	X	X						X					
G3520CLPL	EMCP 4.3/4.4	LGS, RLP	X											X	
G3520CNPL	EMCP 4.3/4.4	G2N, G2A	X												X
G3520CLPB	EMCP 4.3/4.4	R8C	X											X	
G3516PTPL	EMCP 4.3/4.4	E62, E6Z	X												X
G3520PTPL	EMCP 4.3/4.4	PZJ, GAW	X								X				

GENERATOR TERMINAL BOX PICTORIAL
NOTES AND REFERENCES
APPLICABLE FOR GAS AND DIESEL

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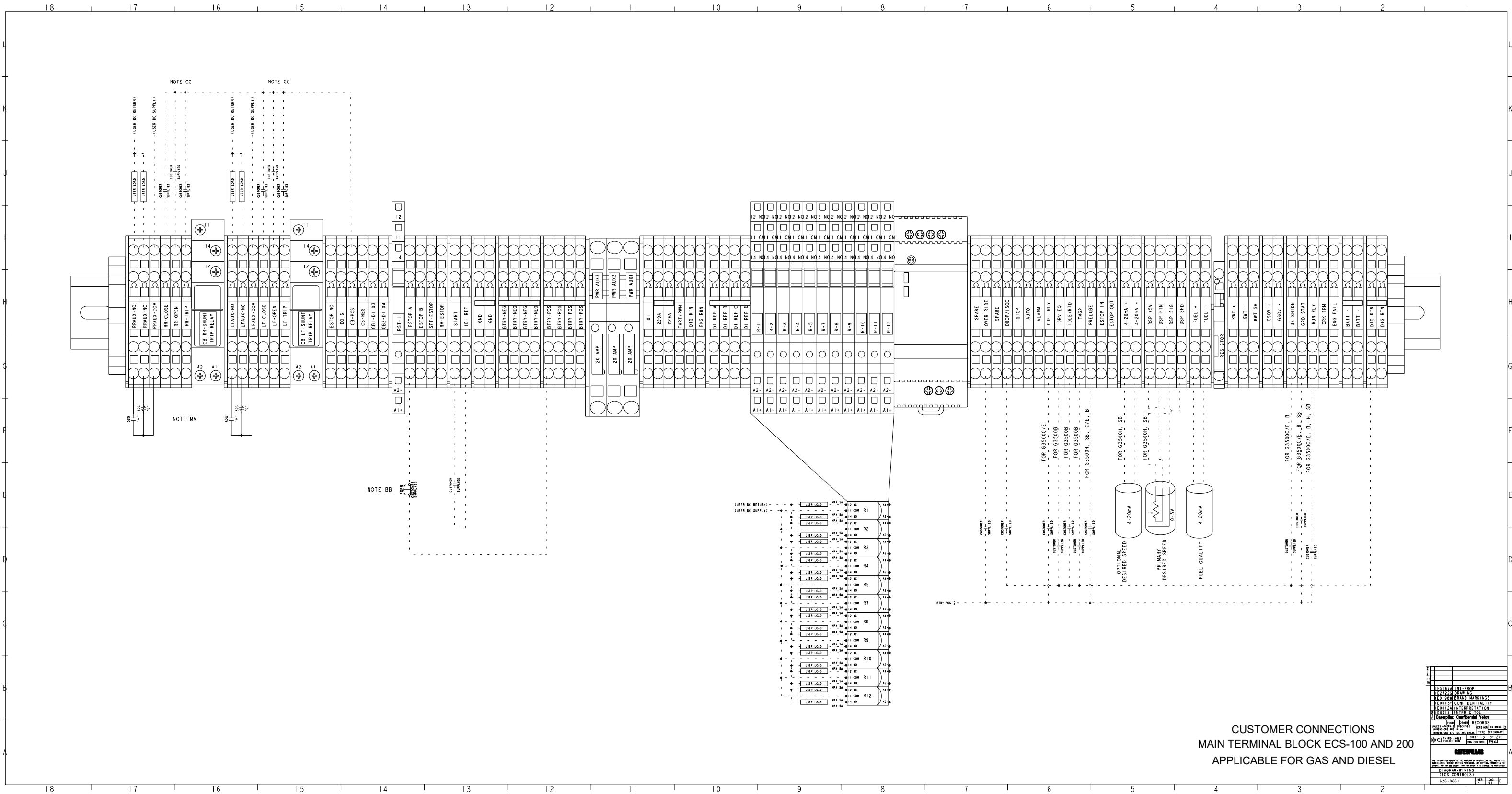
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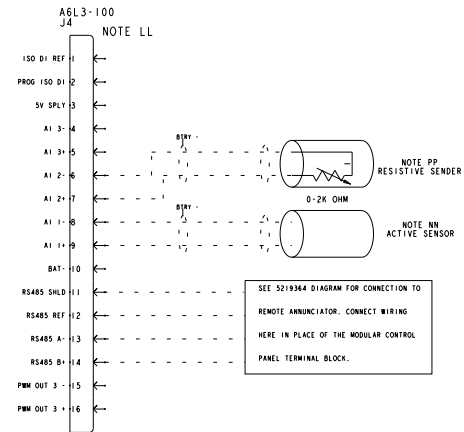
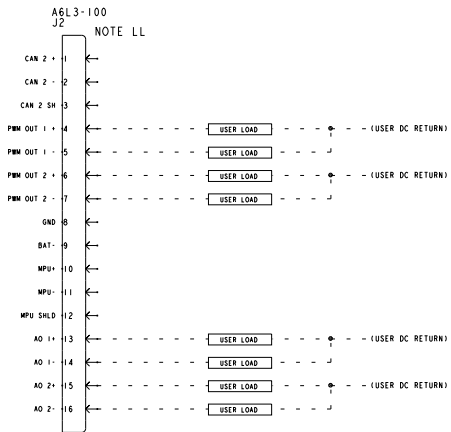
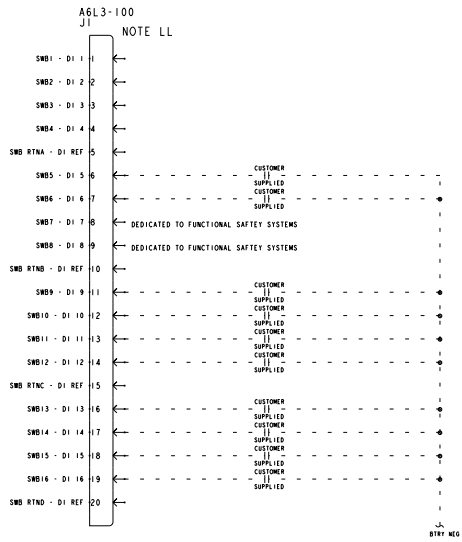
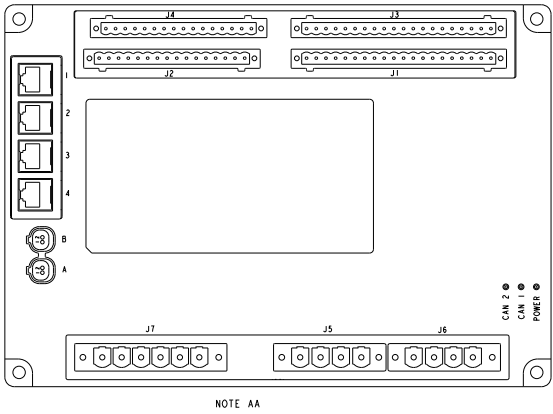
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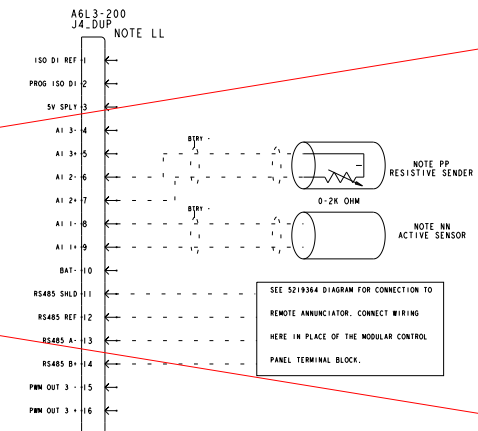
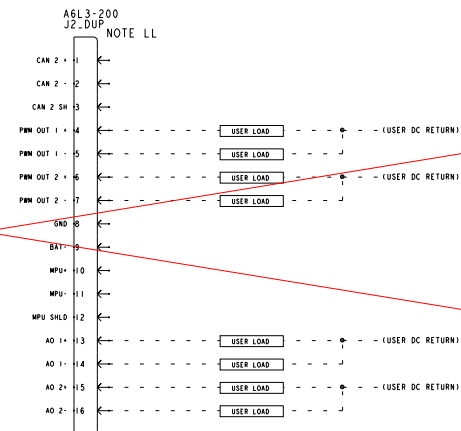
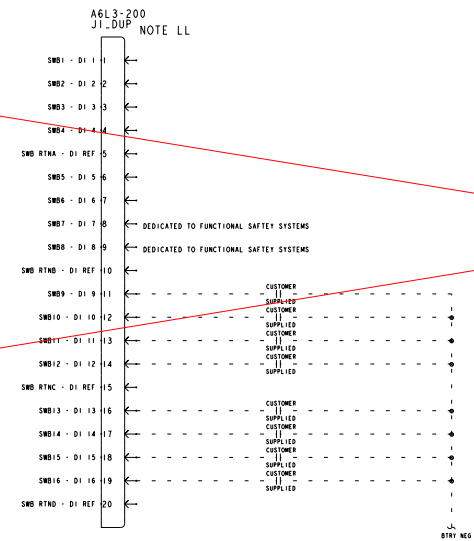
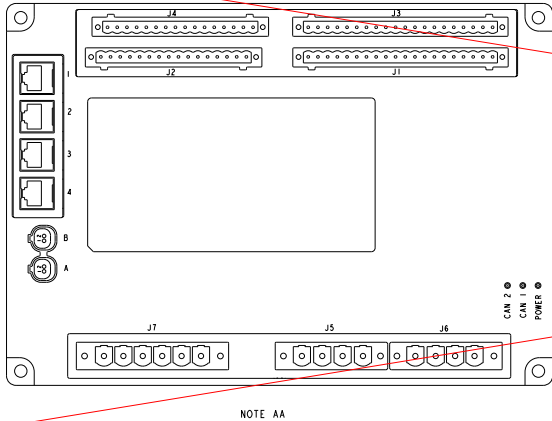
CUSTOMER CONNECTIONS
MAIN TERMINAL BLOCK ECS-100 AND 200
APPLICABLE FOR GAS AND DIESEL

NO.	REV.	DATE	BY	CHKD.	APP.
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A6L3 GENSET BASE CONTROL MODULE: ECS -100



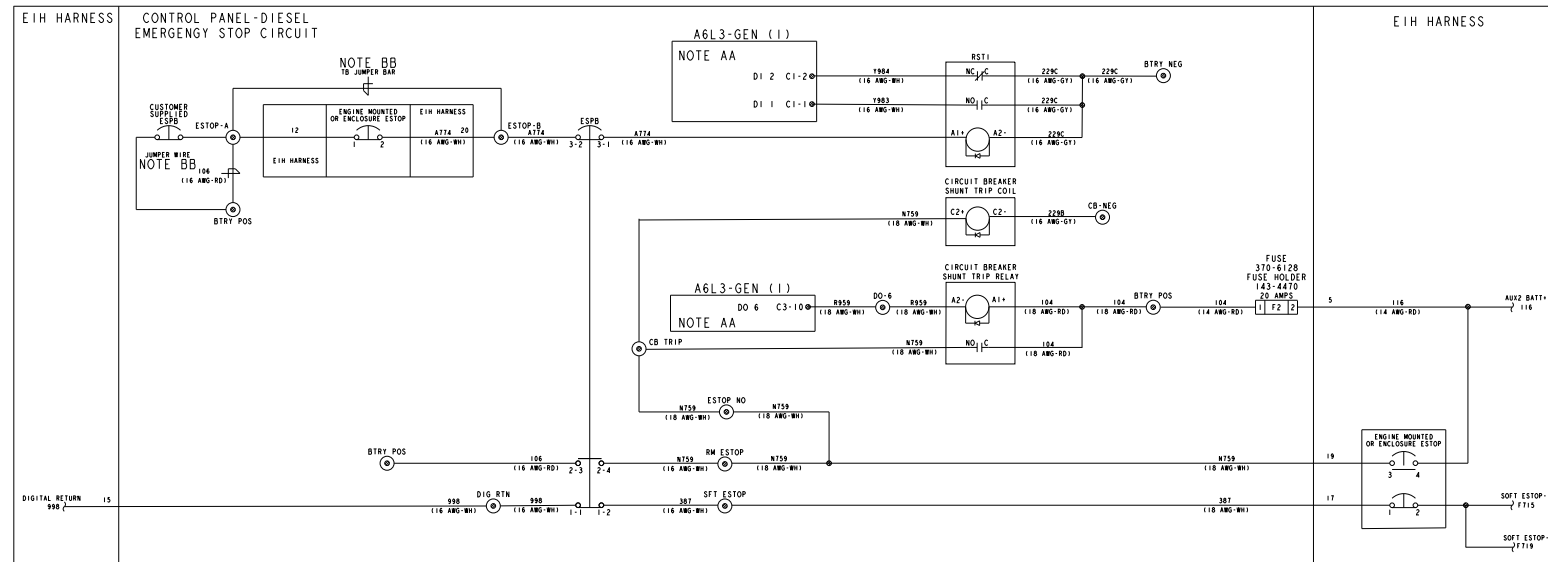
A6L3 GENSET PARALLELING CONTROL MODULE: ECS -200



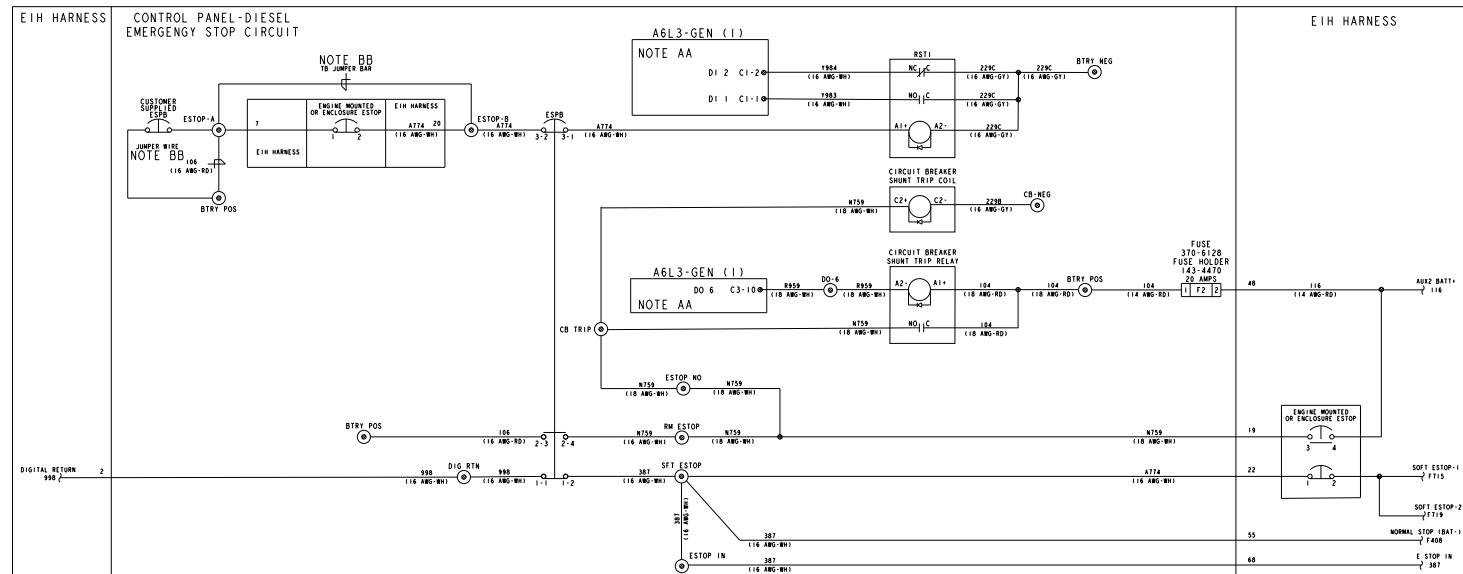
CUSTOMER CONNECTIONS
A6L3 CONTROL MODULE
APPLICABLE FOR GAS AND DIESEL

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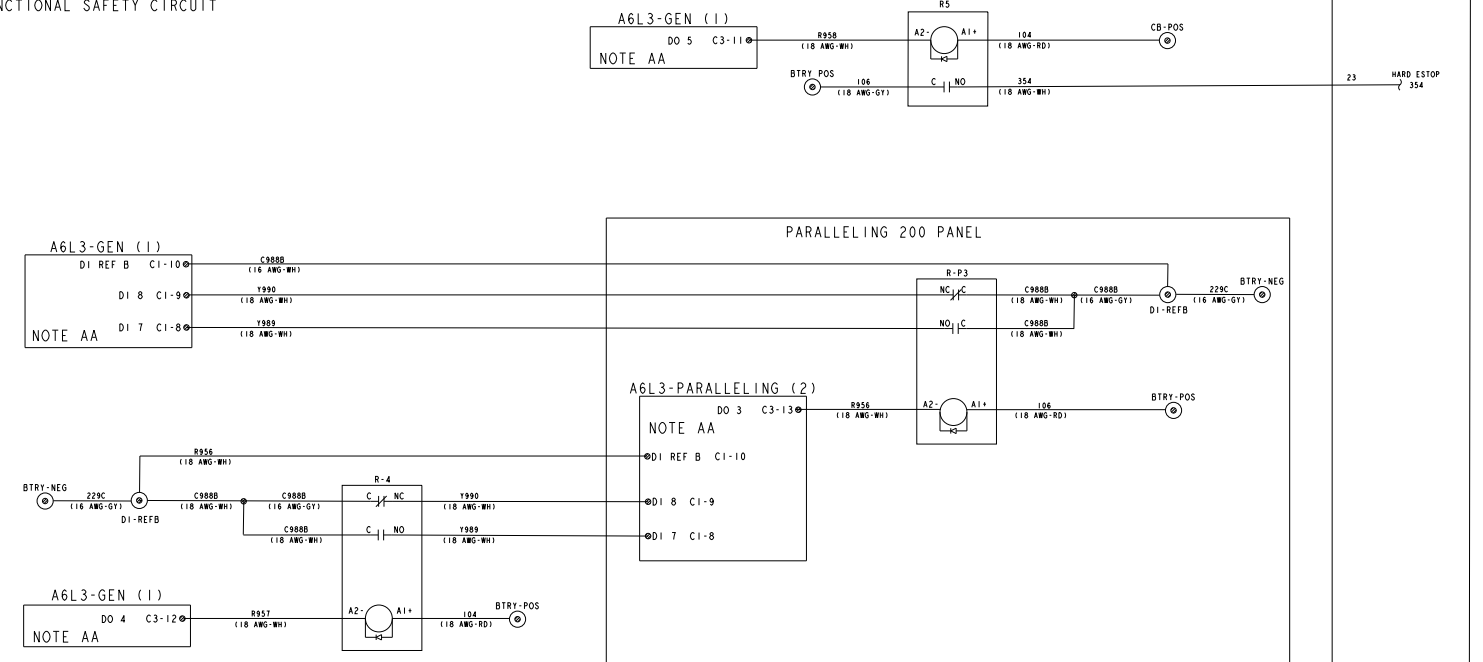
E-STOP & F-SAFETY CIRCUIT DIESEL



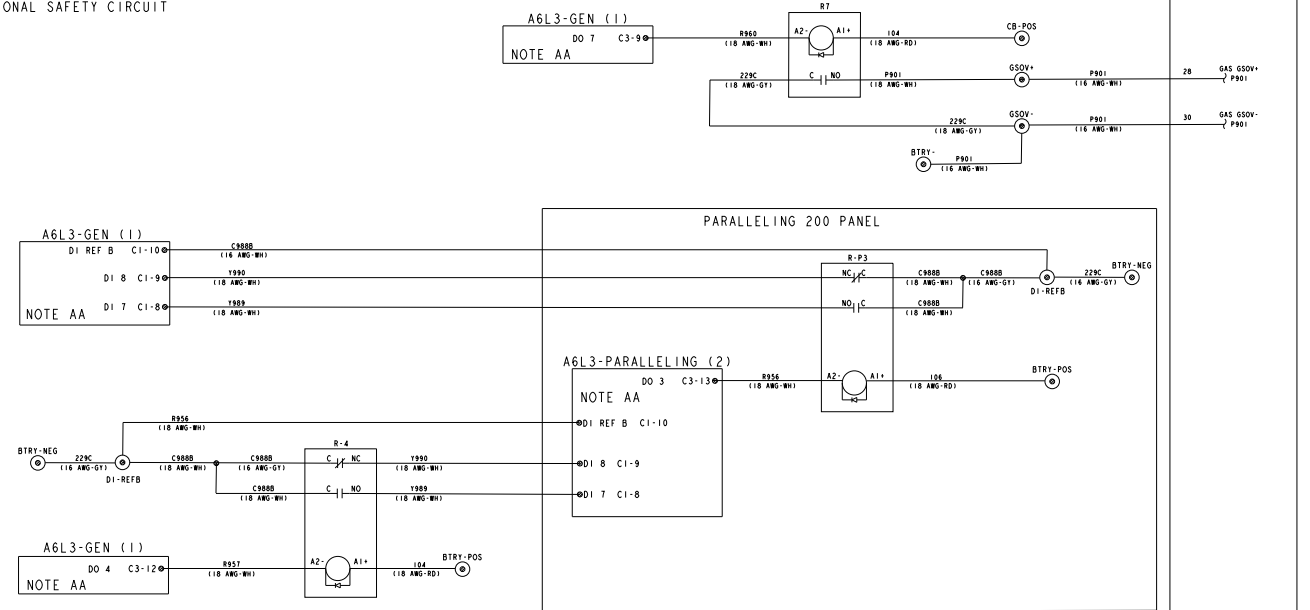
E-STOP & F-SAFETY CIRCUIT GAS



GEN 100 CONTROL PANEL-DIESEL
FUNCTIONAL SAFETY CIRCUIT



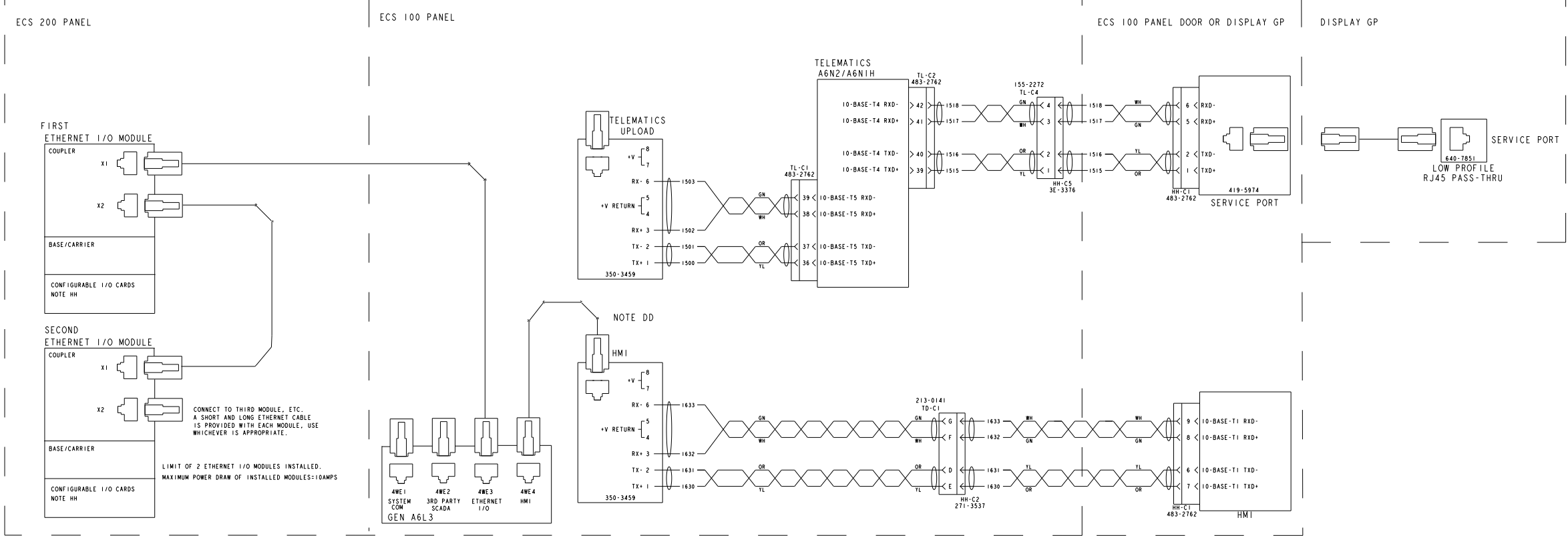
GEN 100 CONTROL PANEL-GAS
FUNCTIONAL SAFETY CIRCUIT



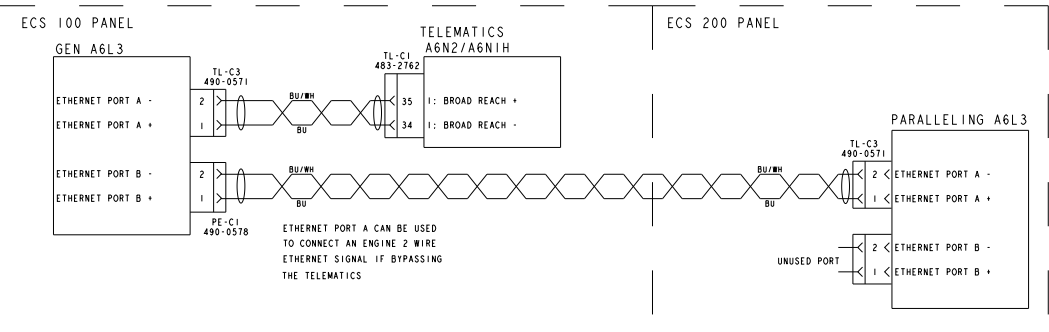
ESTOP AND FUNCTIONAL SAFETY CIRCUIT

[illegible]

4 WIRE ETHERNET

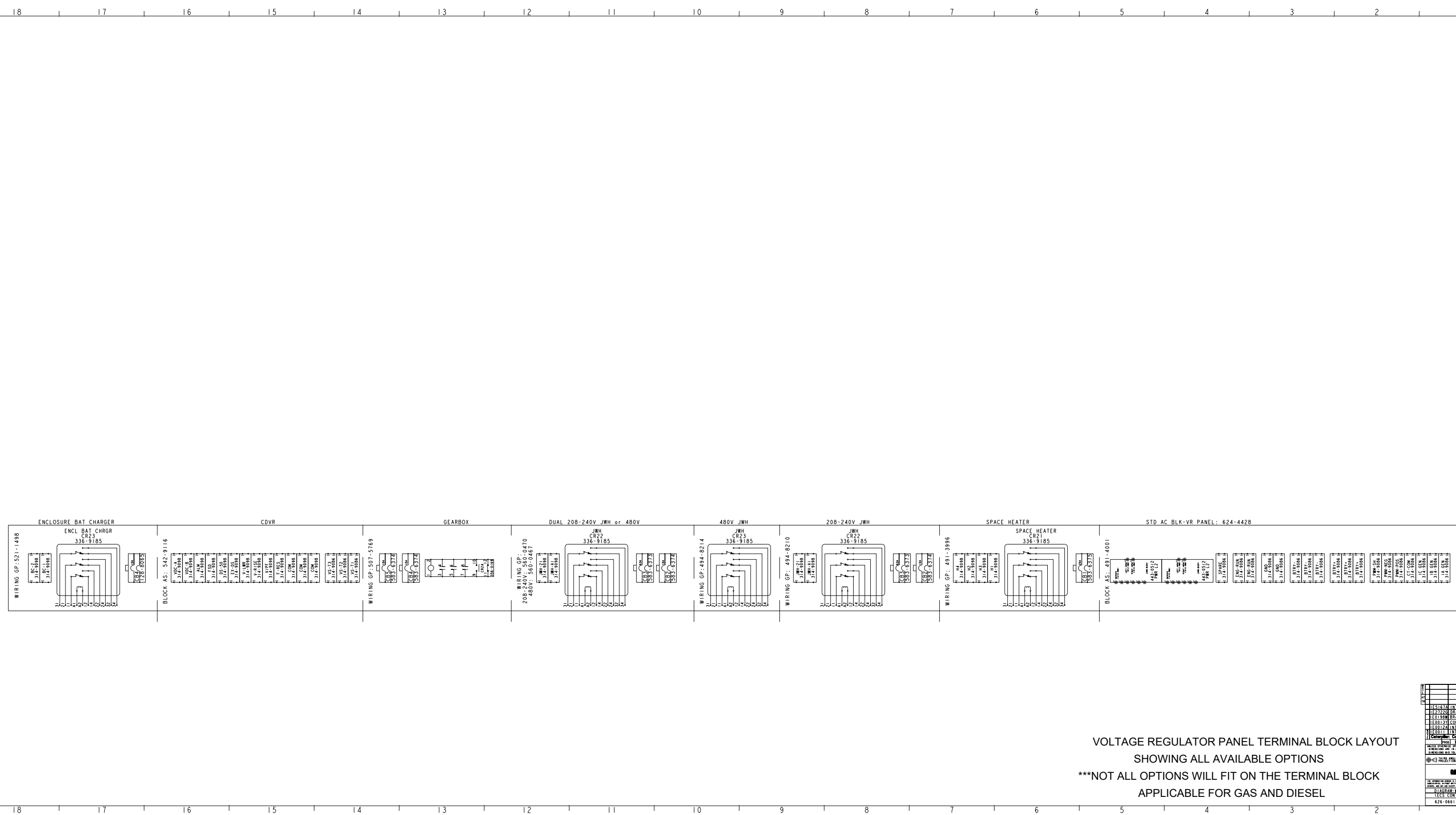


2 WIRE ETHERNET



ETHERNET CIRCUIT

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100	10/10/10	10/10/10	10/10/10



CARTER POWER SYSTEMS

Section Five Enclosure

ACS Custom Enclosure

NOTES:

1. ENCLOSURE ASSEMBLY:

a.) FOR A CATERPILLAR 1500KW 3512C GEN-SET. (480VAC)

b.) FULLY ASSEMBLED ACOUSTICAL ENCLOSURE TO BE MOUNTED TO THE SUB BASE FUEL TANK THEN ANCHORED TO THE FOUNDATION.

c.) PANEL JOINTS ARE SKIP WELDED AND CAULKED.

d.) WIND LOAD: 120 MPH

e.) SEISMIC RATING: IBC RATED FOR JOB SITE w/ PE STAMP & SEAL (ANCHORING CALCS NOT INCLUDED)
2. ENCLOSURE CONSTRUCTION:

a.) SKIN – 14 GA. GALVANNEAL STEEL (WALLS).

14 GA. GALVANNEAL STEEL (ROOF).

b.) FRAMING – A36 STRUCTURAL ANGLE & A500-B TUBING

c.) INNER LINER – 22 GA. GALVANIZED PERFORATED STEEL.

d.) INSULATION – MINERAL WOOL

e.) DOORS – THREE (3) SINGLE ACCESS SERVICE DOORS & TWO (2) DOUBLE ACCESS SERVICE DOOR WITH STAINLESS STEEL HINGES & CHROME PLATED REFRIGERATOR STYLE DOOR LATCHES w/ INSIDE RELEASE.

f.) INLET HOOD ASSEMBLY (GALVANNEAL CONSTRUCTION).

g.) INLET BAFFLE PANELS – (GALVANNEALED CONSTRUCTION).

h.) MOTORIZED INTAKE DAMPER ASSEMBLY (ALUMINUM CONSTRUCTION-CD356).

i.) GRAVITY BACKDRAFT DAMPERS – (ALUMINUM CONSTRUCTION – CBD2).

j.) INTERNAL DISCHARGE ELBOW – (GALVANNEAL INSULATED CONSTRUCTION).
3. DESIGN CONSTRUCTION:

a.) AIR FLOW RATES;

RADIATOR – 61,624 CFM

COMBUSTION – 4,794 CFM

b.) PRESSURE DROPS;

INLET & DISCHARGE LOUVERS/BAFFLES 0.5” W.G. OR LESS (TOTAL).

c.) PERFORMANCE;

DESIGNED TO REDUCE THE GEN-SET EQUIPMENT NOISE LEVEL TO 75 dBA WHEN MEASURED AT A DISTANCE OF 23 FEET FROM THE ENCLOSURE AND 5 1/2 FEET ABOVE GRADE IN A FREE FIELD ENVIRONMENT. (PROVIDING THE EQUIPMENT NOISE DOES NOT EXCEED 119 dB @ 3 FEET).
4. PAINT:

a.) ALL EXTERIOR GALVANNEAL SURFACES TO BE SOLVENT CLEANED

* PER SSPC-SP1 AND PAINTED AS FOLLOWS;

* FINISH – ONE COAT OF AMERSHIELD VOC.

b.) ALL CARBON STEEL SURFACES TO BE POWER TOOL CLEANED PER SSPC-SP3 AND PAINTED AS FOLLOWS;

* PRIMER – ONE COAT AMERCOAT 370.

* FINISH – ONE COAT OF AMERSHIELD VOC.

* INTERIOR WALL AND ROOF SURFACES WILL NOT BE PAINTED.

c.) COLOR: ENCLOSURE: T.B.D.

TANK: BLACK

5. ELECTRICAL: SEE SHEET 13869-10E
6. QUANTITY REQUIRED:

TWO (2) GEN-SET ENCLOSURE ASSEMBLIES AS SHOWN

TWO (2) U.L. LISTED 142 DAY FUEL TANKS AS SHOWN
7. WEIGHTS:

ESTIMATED WEIGHTS ARE AS FOLLOWS:

a.) ENCLOSURE ASSEMBLY

- 26,000 LBS

b.) GEN-SET

- 38,000 LBS WET (CUSTOMER TO CONFIRM)

c.) SUB BASE FUEL TANK

- 16,000 LBS

TOTAL

- 80,000 LBS

d.) LIFTING SKID w/SCR

- 14,000 LBS
8. PACKAGED ASSEMBLY SHIPPING SIZES:

a.) ENCLOSURE PACKAGE ASSEMBLY - 518”L x 132”W x 146”H

b.) LIFTING SKID w/SCR - 203”L x 128”W x 116”H

9. ACS CONTACT INFORMATION

SALES: WESLEY RITCHIE

TELEPHONE: 903.462.2034

E-MAIL: wesley.ritchie@acsmanufacturing.com

PROJECT MANAGER: JIMMAY MUNDINE

TELEPHONE: 903.462.2001 EXT. 10089

E-MAIL: jimmayshun.mundine@acsmanufacturing.com

*CUSTOMER TO VERIFY ALL NOTES AND DIMENSIONS

☐ APPROVED AS IS – Manufacturing may proceed.

☐ APPROVED WITH NOTED CHANGES – Resubmit drawing; manufacturing may proceed.

☐ NOT APPROVED – Correct drawing as noted and resubmit for approval before manufacturing begins.

BY: _____

DATE: _____

COMPANY: _____

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QUOTE NO.: 202507107

PO NO.: 425504PRP1-1

ACS MFG LOC.: TX

JOB NAME: PROLOGIS ATHENA



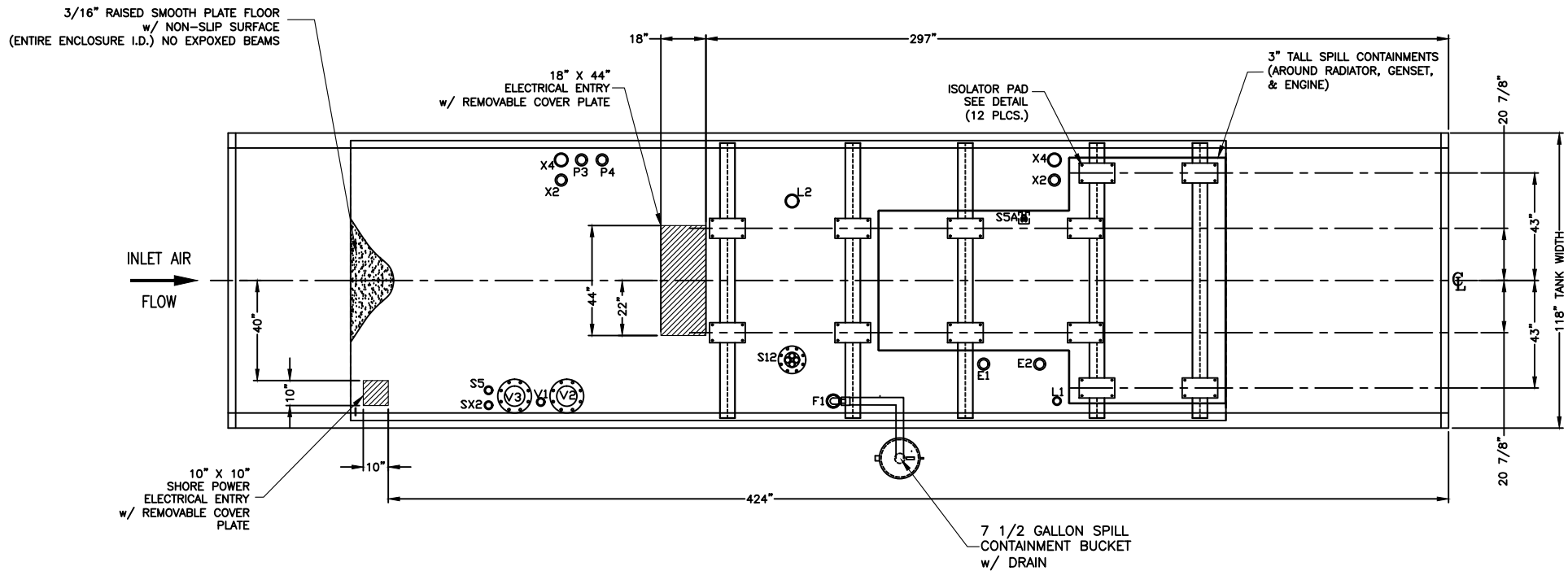
ACS MANUFACTURING, INC.
1601 COMMERCE BLVD. – DENISON, TEXAS – 75020

TOLERANCES (EXCEPT AS NOTED)		DRAWN BY: CE	
DECIMAL ± 0.125"	CARTER CAT		CHECKED BY:
FRACTIONAL ± 1/8"	TITLE		CHECKED BY:
ANGULAR ± 3°	ACOUSTICAL ENCLOSURE ASSEMBLY		APPROVED BY: JM
SCALE 48:1	DRAWING NUMBER		SHEET
DATE 09/23/25	13869-10		REV.
			1 OF 5
			—

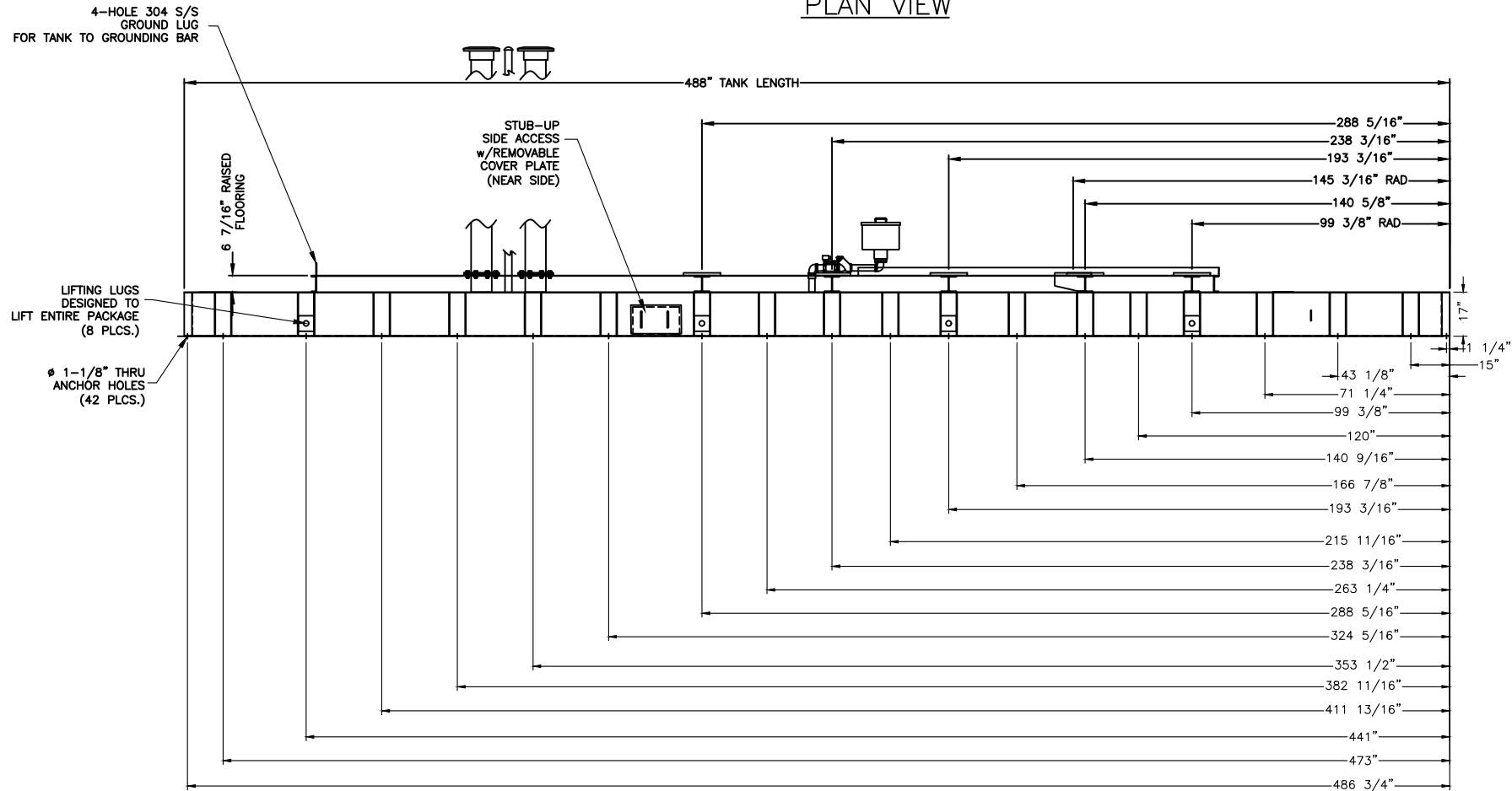
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REV	ECO NUMBER	DESCRIPTION	BY	APPD	DATE
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PLAN VIEW

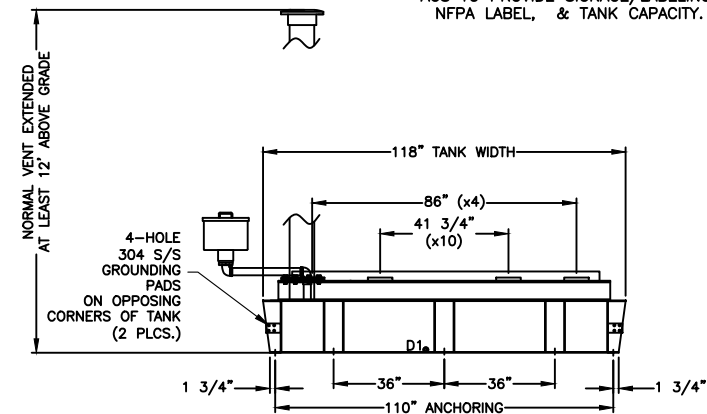


ELEVATION VIEW

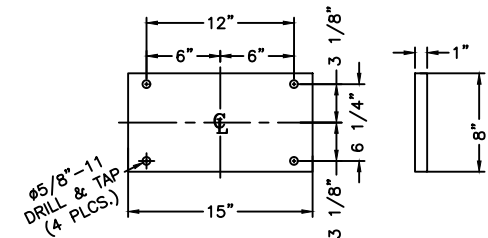
U.L. 142 SUB BASE FUEL TANK
2,900 CAPACITY / 2,500 GALLON USABLE
w/ INTERNAL SCH40 BLACK IRON PIPING REACHING OPPOSING CORNERS
(FOR CUSTOMER SUPPLIED FUEL POLISHING SYSTEM)

REF.	FITTING SIZE	DESCRIPTION
D1	1" NPT	TANK DRAIN - SECONDARY
E1	4" NPT	ENGINE FUEL SUPPLY - w/ 1" NPT DIP TUBE
E2	2" NPT	ENGINE FUEL RETURN - w/1" NPT DIP TUBE
F1	2" NPT	FUEL FILL w/ 2" CAMLOCK & OPV @ 95%
L1	2" NPT	LEVEL GAUGE - DIRECT SITE READING
L2	4" NPT	LEVEL SENSOR - ROCHESTER 240-30 OHM (WIRE TO GCP)
P3	2" PIPE	FUEL POLISHER SUPPLY - w/ INTERNAL PIPING (FOR CUSTOMER FPS)
P4	2" PIPE	FUEL POLISHER RETURN - w/ INTERNAL PIPING (FOR CUSTOMER FPS)
S5	2" NPT	LEAK DETECTOR SWITCH - N.O. (WIRE TO FTA THEN TO GCP)
S5A	-	SIDE MOUNTED LEAK DETECTOR SWITCH - N.O. (WIRE TO GCP)
S12	6" FLANGE	CRITICAL LOW LEVEL SWITCH - N.C. - 20%
(WIRE TO FTA THEN TO GCP)		LOW LEVEL SWITCH - N.C. - 25%
		HIGH LEVEL SWITCH - N.O. - 90%
		CRITICAL HIGH LEVEL SWITCH - N.O. - 95%
SX2	2" NPT	SPARE FITTING, SECONDARY - (1)
V1	2" NPT	PRIMARY TANK NORMAL VENT - EXTEND ABOVE ENCLOSURE ROOF LINE (AT LEAST 12' ABOVE GRADE) SHIPPED LOOSE & INSTALLED BY OTHERS
V2	8" NPT	EMERGENCY VENT - PRIMARY - EXTEND ABOVE ENCLOSURE ROOF LINE (AT LEAST 12' ABOVE GRADE) SHIPPED LOOSE & INSTALLED BY OTHERS
V3	8" NPT	EMERGENCY VENT - SECONDARY - EXTEND ABOVE ENCLOSURE ROOF LINE (AT LEAST 12' ABOVE GRADE) SHIPPED LOOSE & INSTALLED BY OTHERS
X2	2" NPT	SPARE FITTING, PRIMARY - w/ CAP (2)
X4	4" NPT	SPARE FITTING, PRIMARY w/ CAP (2)

* EXTEND TANK ALARMS TO REACH GENSET CONTROL PANEL VIA FLEX CONDUIT
* ACS TO PROVIDE SIGNAGE/LABELING: "DIESEL FUEL, FLAMMABLE, NO SMOKING", NFPA LABEL, & TANK CAPACITY.



END VIEW



ISOLATOR PAD DETAIL

12 REQ'D
SCALE: 4X

QUOTE NO.: 202507107
PO NO.: 425504PRP1-1
ACS MFG LOC.: TX
JOB NAME: PROLOGIS ATHENA

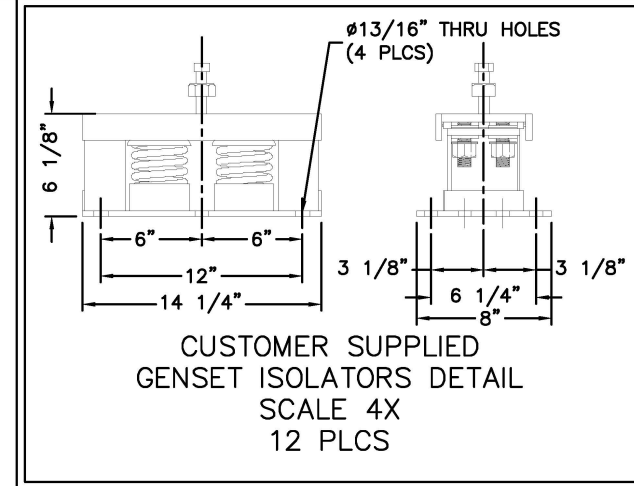
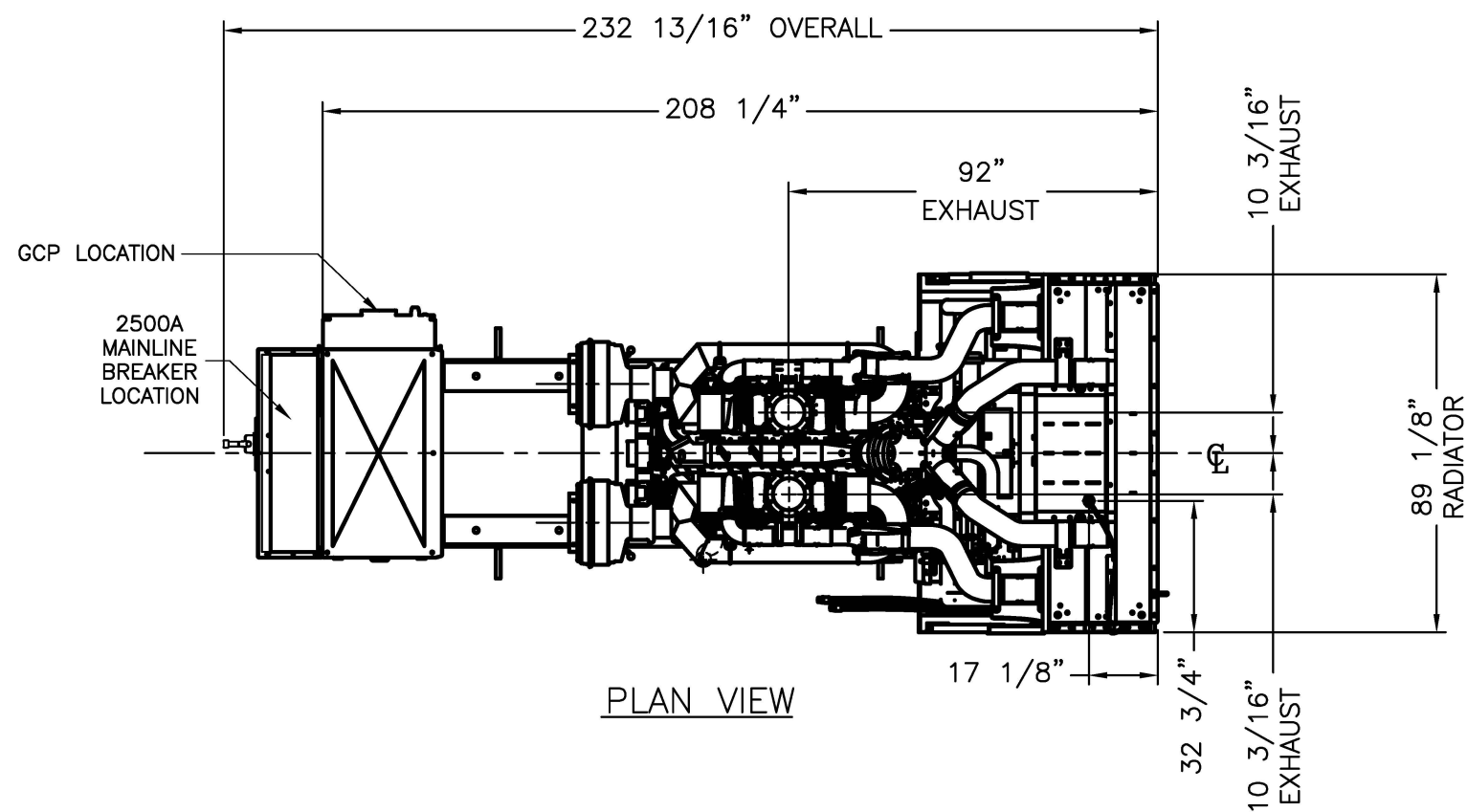


TOLERANCES (EXCEPT AS NOTED) DECIMAL ± 0.125 FRACTIONAL $\pm 1/8$ ANGULAR $\pm 3^\circ$ SCALE 1 TO 1 DATE 09/23/25	TITLE CARTER CAT U.L. 142 SUB BASE FUEL TANK DRAWING NUMBER 13869-10	DRAWN BY: CE CHECKED BY: CHECKED BY: JM APPROVED BY: JM SHEET 3 OF 5 REV. —
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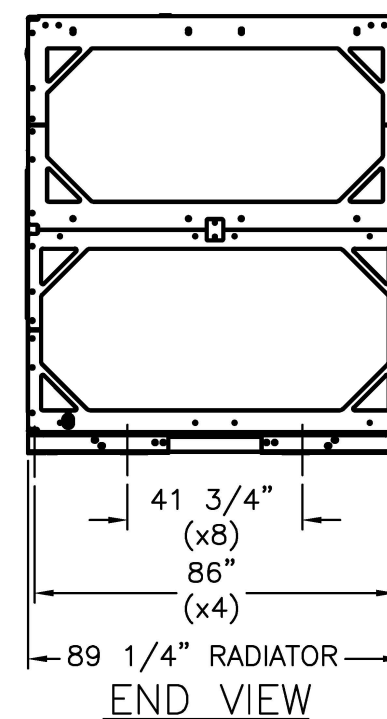
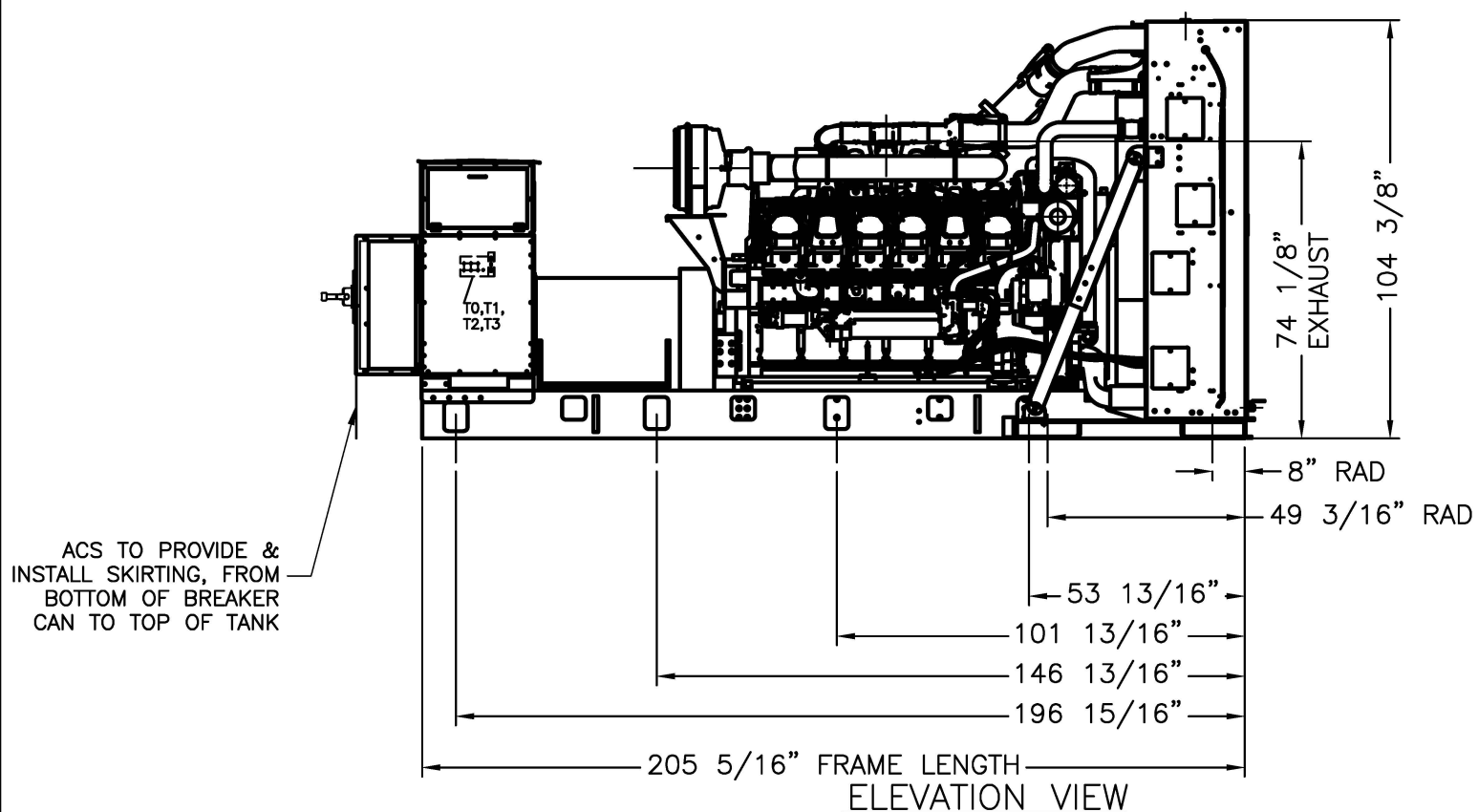
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REV	ECO NUMBER	DESCRIPTION	BY	APPD	DATE
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CATERPILLAR 1500KW 3512C GENSET



☐ APPROVED AS IS – Manufacturing may proceed.

☐ APPROVED WITH NOTED CHANGES – Resubmit drawing; manufacturing may proceed.

☐ NOT APPROVED – Correct drawing as noted and resubmit for approval before manufacturing begins.

BY: _____ DATE: _____

COMPANY: _____

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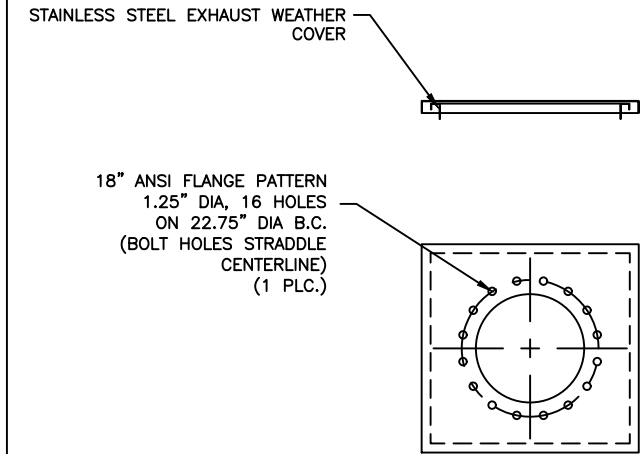
QUOTE NO.: 202507107
PO NO.: 425504PRP1-1
ACS MFG LOC.: TX
JOB NAME: PROLOGIS ATHENA



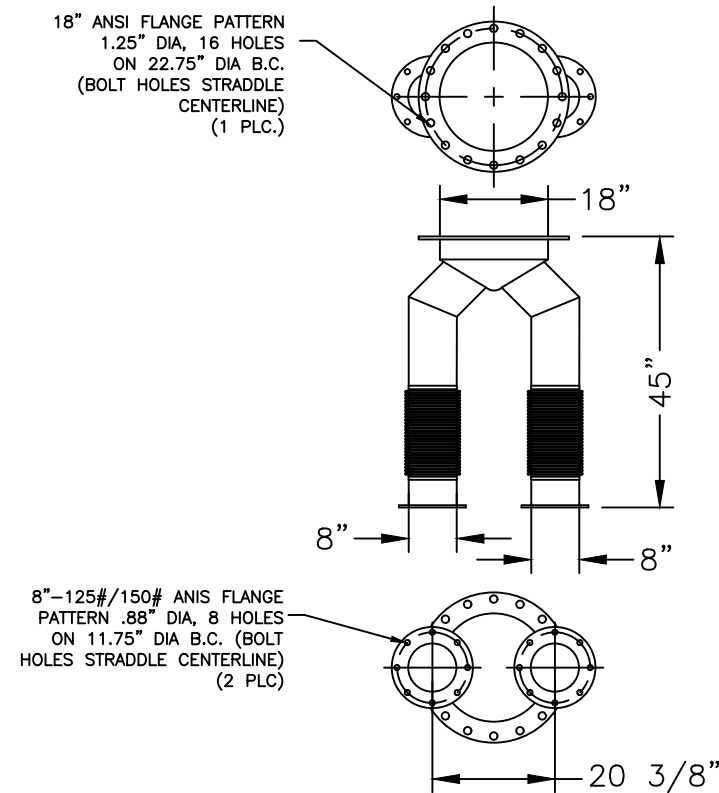
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The gen-set was NOT available for physical review when this drawing was created. Please verify all dimensions prior to fabrication of parts connected to the location of the gen-set. If the dimensions do not match please contact Engineering.

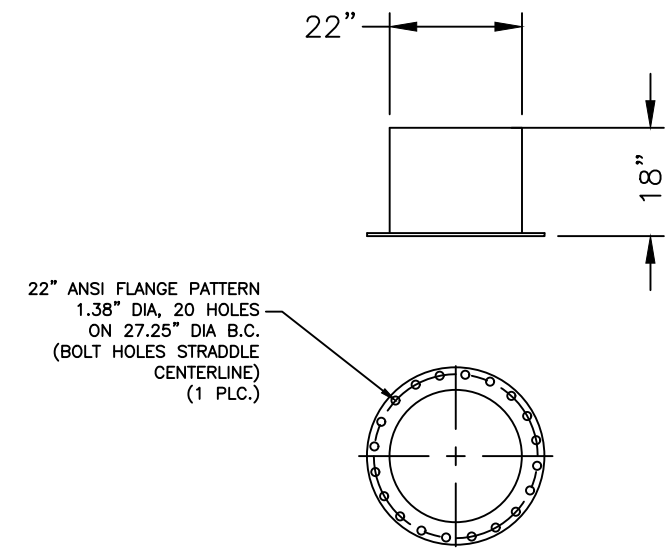
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						DECIMAL ± 0.125"	CARTER CAT	13869-10	CE		JM	4 OF 5	—
						FRACTIONAL ± 1/8"	GENSET ENCLOSURE ASSEMBLY						
						ANGULAR ± 3°	GENSET DETAILS						
						SCALE 1 TO 1							
						DATE 09/23/25							



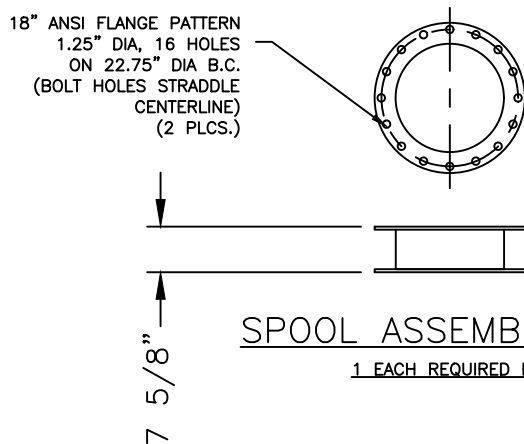
EXHAUST WEATHER CAP
DETAIL
1 REQUIRED PER UNIT



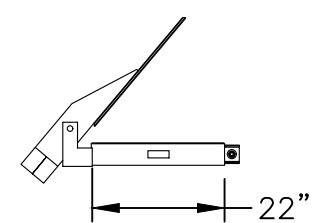
WYE FLEX ASSEMBLY DETAIL
1 EACH REQUIRED PER UNIT



TAIL PIPE DETAIL
1 REQUIRED PER UNIT



SPOOL ASSEMBLY DETAIL
1 EACH REQUIRED PER UNIT



22" RAIN CAP DETAIL
1 EACH REQUIRED PER UNIT

- ACS TO PROVIDE PER ENCLOSURE:
1. ONE (1) WYE FLEX ASSEMBLY AS SHOWN.
 2. TWO (2) 10" ANSI NBG KITS.
 3. TWO (2) 8" ANSI NBG KITS.
 4. TWO (2) 18" ANSI NBG KIT.
 5. ONE (1) 18" ANSI GASKET KIT.
 6. ONE (1) 22" ANSI NBG KIT.
 7. ONE (1) TAIL PIPE AS SHOWN.
 8. ONE (1) STAINLESS STEEL EXHAUST WEATHER CAP AS SHOWN.
 9. ONE (1) 22" RAIN CAP AS SHOWN.
 10. ONE (1) EXTERNAL SPOOL ASSEMBLY AS SHOWN.
 11. ONE (1) REMOVABLE BLANKETS (FOR WYE FLEX ASSEMBLY, & FLANGES)

- ☐ APPROVED AS IS – Manufacturing may proceed.
- ☐ APPROVED WITH NOTED CHANGES – Resubmit drawing; manufacturing may proceed.
- ☐ NOT APPROVED – Correct drawing as noted and resubmit for approval before manufacturing begins.

BY: _____ DATE: _____

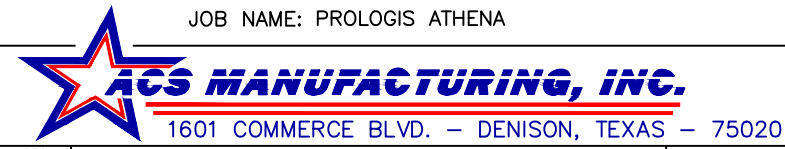
COMPANY: _____

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REQUIRED BEFORE ACS WILL BEGIN
MANUFACTURING PROCESS

PROPRIETARY NOTICE

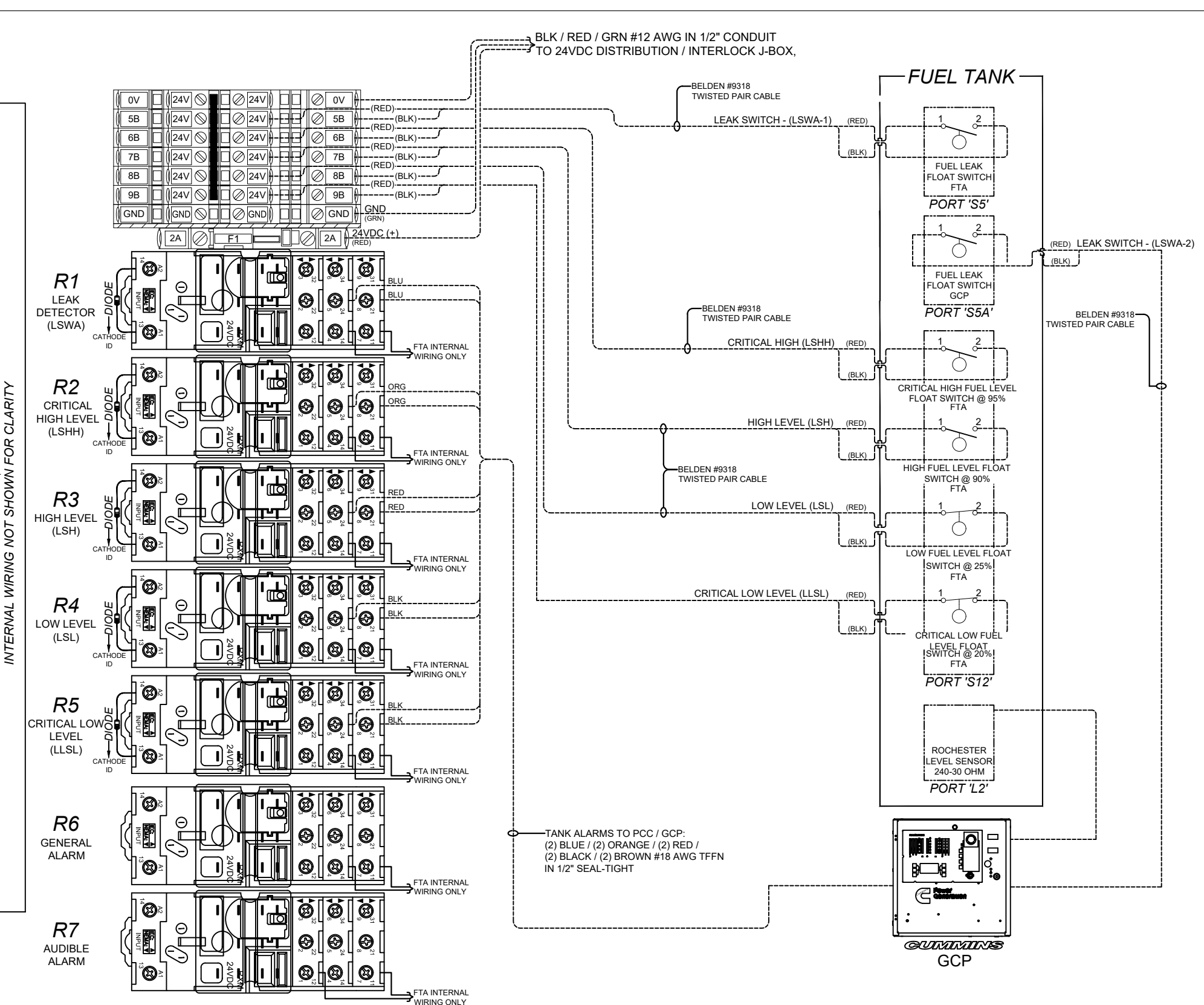
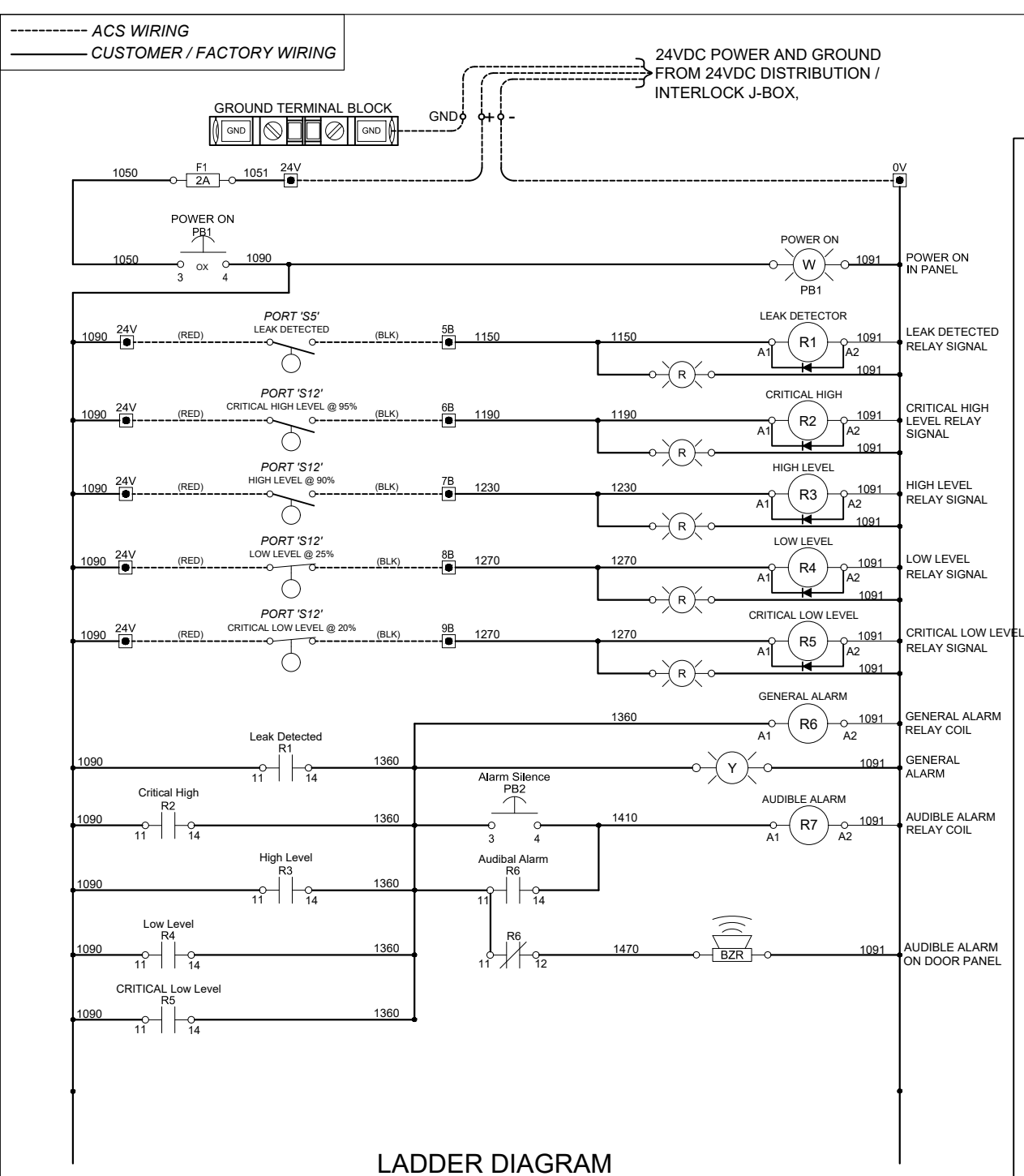
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QUOTE NO.: 202507107
PO NO.: 425504PRP1-1
ACS MFG LOC.: TX
JOB NAME: PROLOGIS ATHENA



TOLERANCES (EXCEPT AS NOTED)		CARTER CAT EXHAUST COMPONENTS DETAIL SHEET	DRAWN BY: CE	
DECIMAL + 0.125"			CHECKED BY:	
FRACTIONAL + 1/8"			CHECKED BY:	
ANGULAR + 3°			APPROVED BY: JM	
SCALE 1 TO 1		DRAWING NUMBER	SHEET 5 OF 5	
DATE 09/23/25		13869-10		REV. —

REV	ECO NUMBER	DESCRIPTION	BY	APPD	DATE
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LEVEL SENSOR AND LEAK SWITCH WIRING:
FROM LEAK SWITCH TO FTA: BELDEN 9318.
FROM ECHOPOD TO FTA, #18 AWG TFFN w COLORS AS NOTED BELOW:

CRITICAL HIGH:	RED WIRING
HIGH LEVEL:	YELLOW WIRING
LOW LEVEL:	ORANGE WIRING
CRITICAL LOW:	BLUE WIRING
GROUP COMMON:	BROWN WIRING

FROM FTA TO GENSET: #18AWG TFFN w/ COLORS AS NOTED BELOW:

LEAK DETECTED:	BLUE WIRING
CRITICAL HIGH:	ORANGE WIRING
HIGH LEVEL:	RED WIRING
LOW LEVEL:	BLACK WIRING
CRITICAL LOW:	BROWN WIRING

- ☐ APPROVED AS IS - Manufacturing may proceed.
- ☐ APPROVED WITH NOTED CHANGES - Resubmit drawing; manufacturing may proceed.
- ☐ NOT APPROVED - Correct drawing as noted and resubmit for approval before manufacturing begins.

BY: _____ DATE: _____

COMPANY: _____

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REQUIRED BEFORE ACS WILL BEGIN
MANUFACTURING PROCESS

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WIRING DIAGRAM

FUEL TANK ANNUNCIATOR
WIRING DIAGRAM w/ CRITICAL LOW

QUOTE NO.: 202507107
PO NO.: 425504PRP1-1
ACS MFG LOC.: TX
JOB NAME: PROLOGIS ATHENA



1601 COMMERCE BLVD. – DENISON, TEXAS – 75020

TOLERANCES (EXCEPT AS NOTED)		CARTER CAT		DRAWN BY: CE	
DECIMAL	+ N/A			CHECKED BY:	
FRACTIONAL	+ N/A	TITLE	ELECTRICAL SYSTEM DETAIL SHEET		CHECKED BY:
ANGULAR	+ N/A				
SCALE	N/A				
DATE	09/23/25	DRAWING NUMBER		APPROVED BY: JM	
		13869-10E		SHEET 2 of 2	REV. —

REV	ECO NUMBER	DESCRIPTION	BY	APPD	DATE
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CARTER POWER SYSTEMS

Section Six

Catalytic Combustion Corporation SCR

Catalytic Combustion Corporation SCR

CUSTOMER APPROVAL PAGE

<i>Submittal Date:</i>	9/16/2025
<i>Catalytic Combustion Project No.:</i>	WO241269
<i>Submittal Revision No.:</i>	0

Contact and Shipping Information			
<i>Company Name:</i>	Carter CAT		
<i>Contact Name:</i>	Mackenzie Young	<i>Phone:</i>	785-917-0048
<i>E-Mail:</i>	Mackenzie_Young@cartermachinery.com		
<i>Shipping Address:</i>	TBD		

Comments / Site Specific Information
<u>Project/Design Specifications (Per CCC Quote 306232 Rev 1):</u> <u>(2) Sized for Caterpillar 3512C rated at 1500kW to meet tier IV emissions:</u> SCR Reactor • 304 Stainless Steel reactor housing, Insulation Blanket, Oxidation, DPF, SCR Catalysts, Rain Cap, Short Exhaust Stack, Urea Injection, and Mixing duct. • Factory installed pressure, temperature NOx sensor(s), junction panel, and dosing panel. • Bottom Inlet, Top Outlet • Reactor Shipping Dimensions ○ Height = 86" Width = 108" Length = 204" ○ Weight (approximate) = 10,000 lbs. ADC Skid • Air Compressor • 300 Gallon Poly urea day tank • Urea flow rate (32.5% concentration) is 6.98 gallons per hour. • Sensor/Dosing Control Panel

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Emissions

- Guaranteed Emissions for EPA Tier IV Compliance:
 - NOx at 0.5 gr/bhp-hr.
 - CO at 2.6 g/bhp-hr
 - THC at 0.14 g/bhp-hr
 - PM at 0.022 g/bhp-hr
- Noise is controlled. Integrated attenuation is 35-45 dBA.
- Warranty = 24 months after startup or 27 months after delivery, whichever is sooner.

Documents Included

<i>Description</i>	<i>Drawing / Document No.</i>
SCR System	727821_00
SCR Assembly	727819_00
ADC Skid Assembly	727819_00
P&ID	727783_00
Control Panel Schematics	727020_00
Junction Panel Schematics	727796_00
Field Interconnect Schematics	727807_00

- APPROVED** ☐ No exceptions or comments noted.
- APPROVED** ☐ Requested changes noted in red ink.
- RESUBMIT** ☐ Unacceptable as submitted. Make requested changes and resubmit.

Please review and return
to: Cal Fadness

cfadness@catalyticcombustion.com

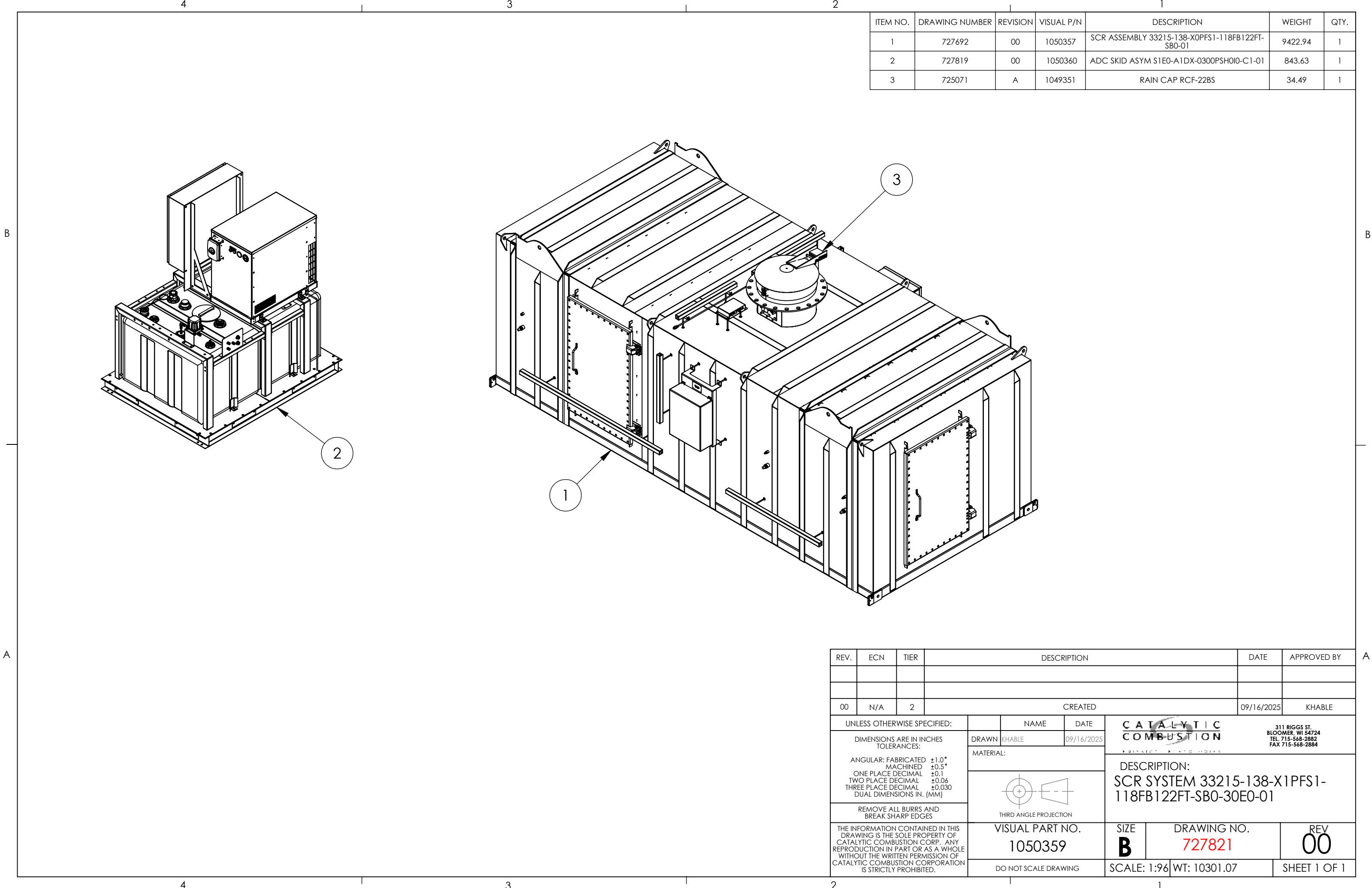
Date

Signature

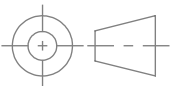
Company

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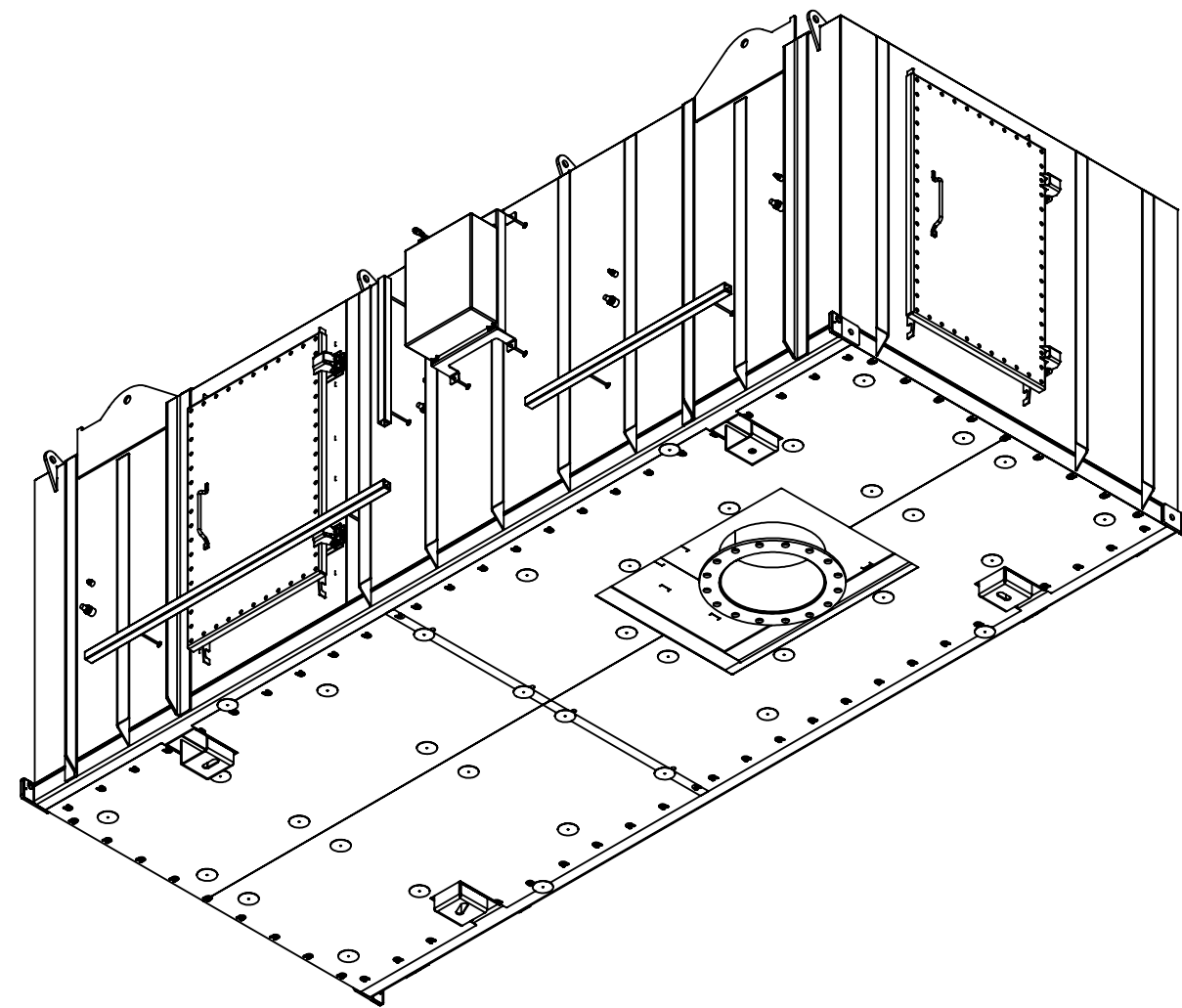
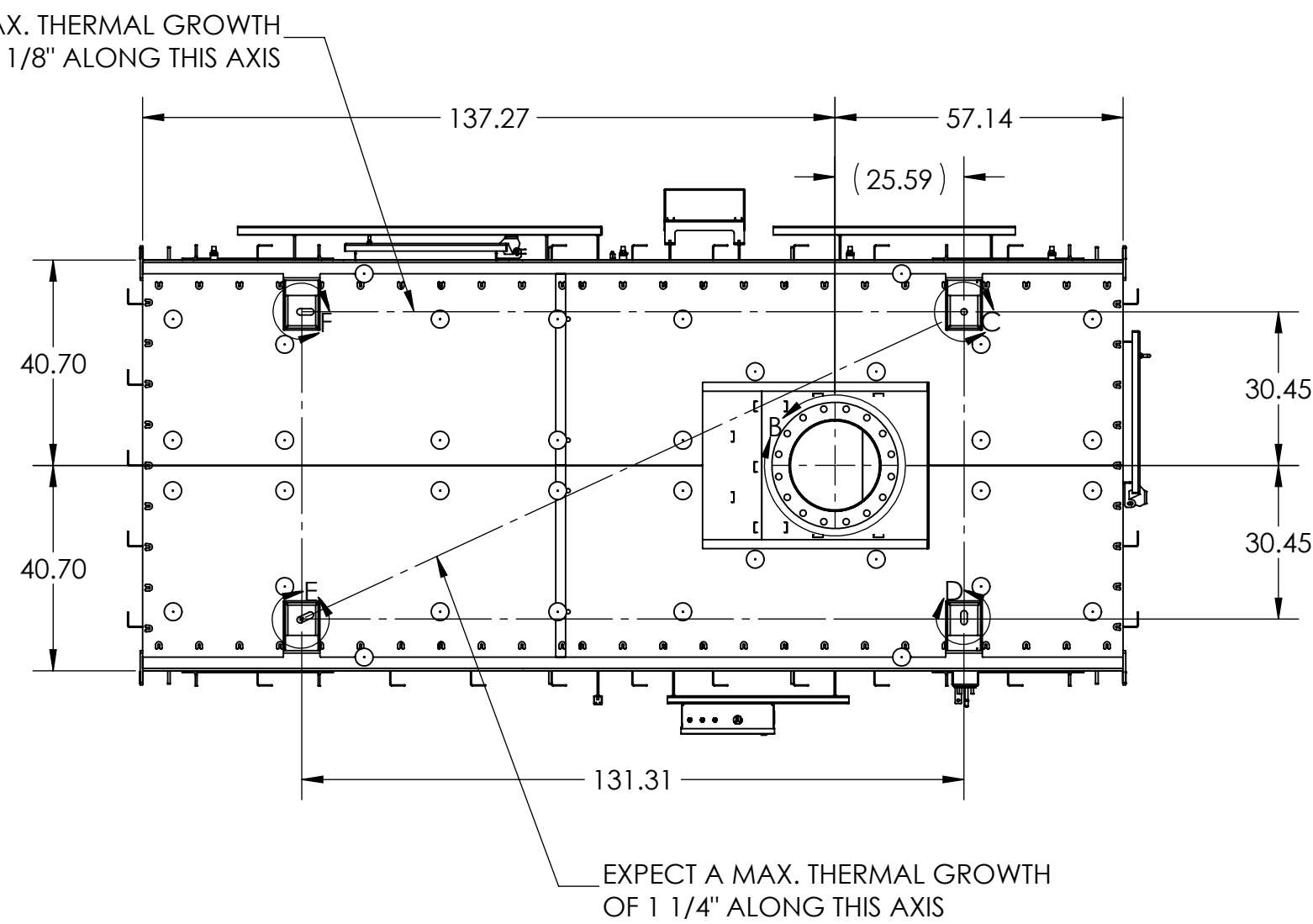
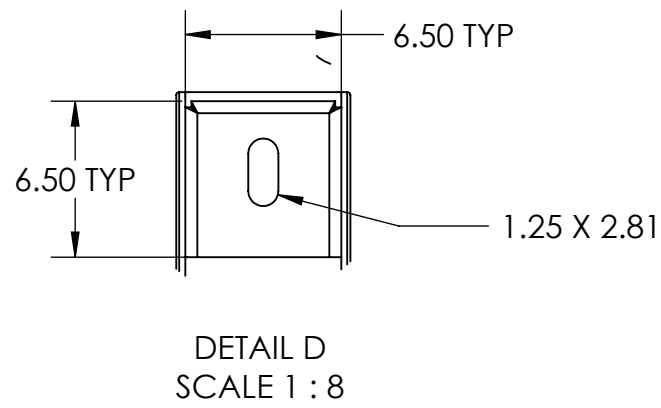
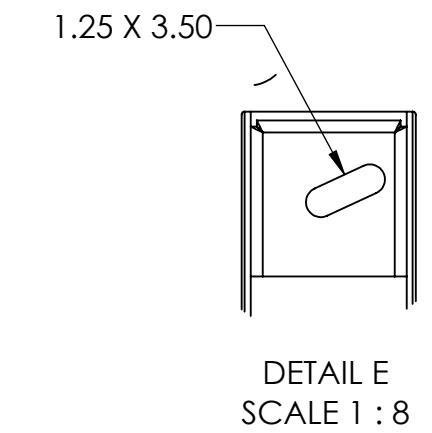
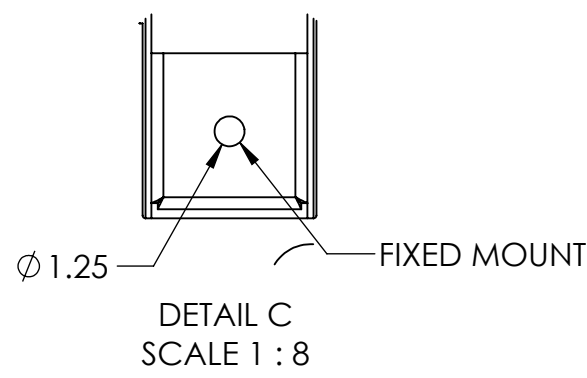
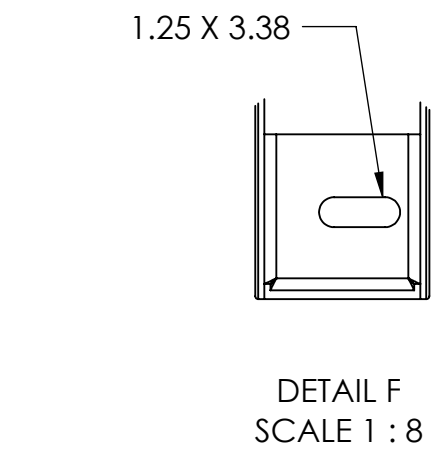
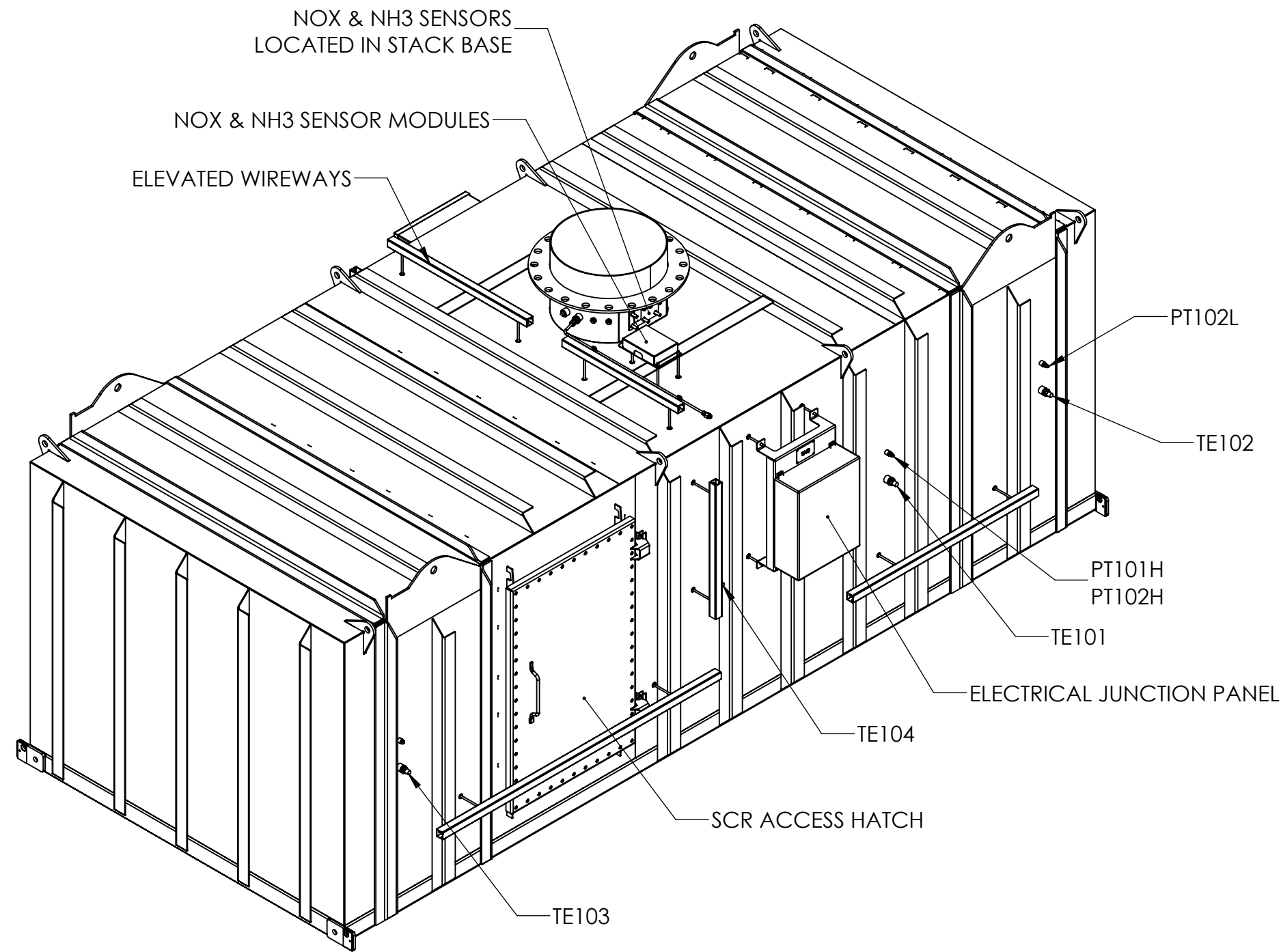
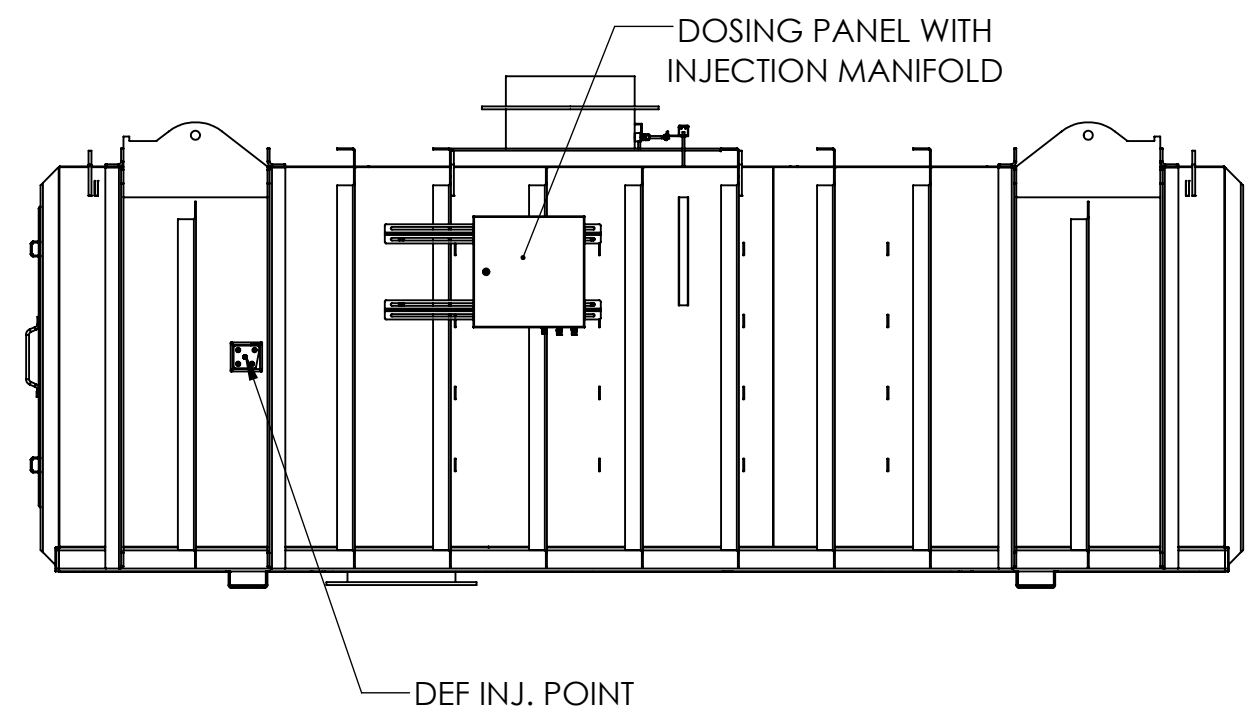
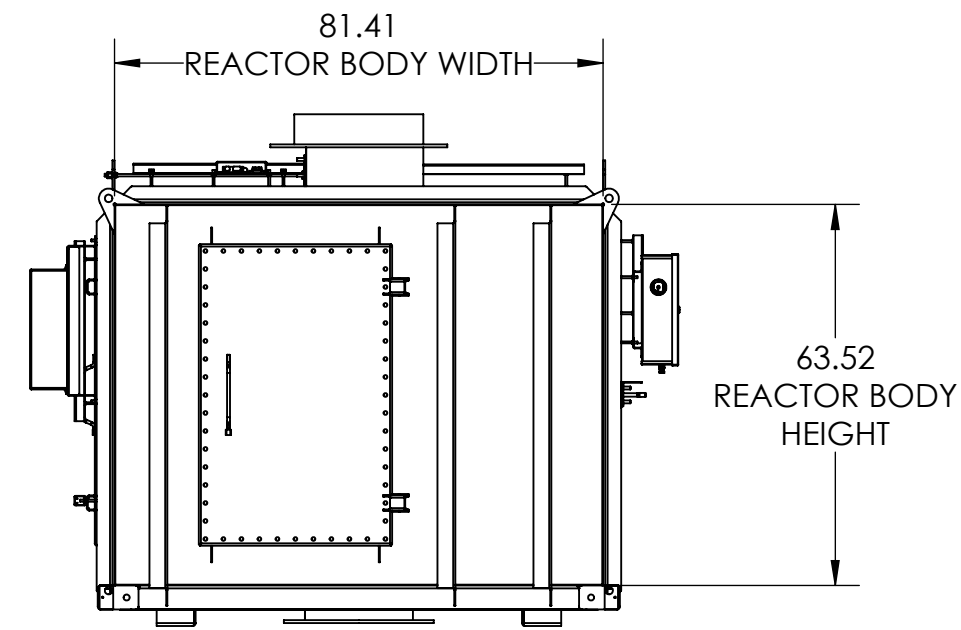
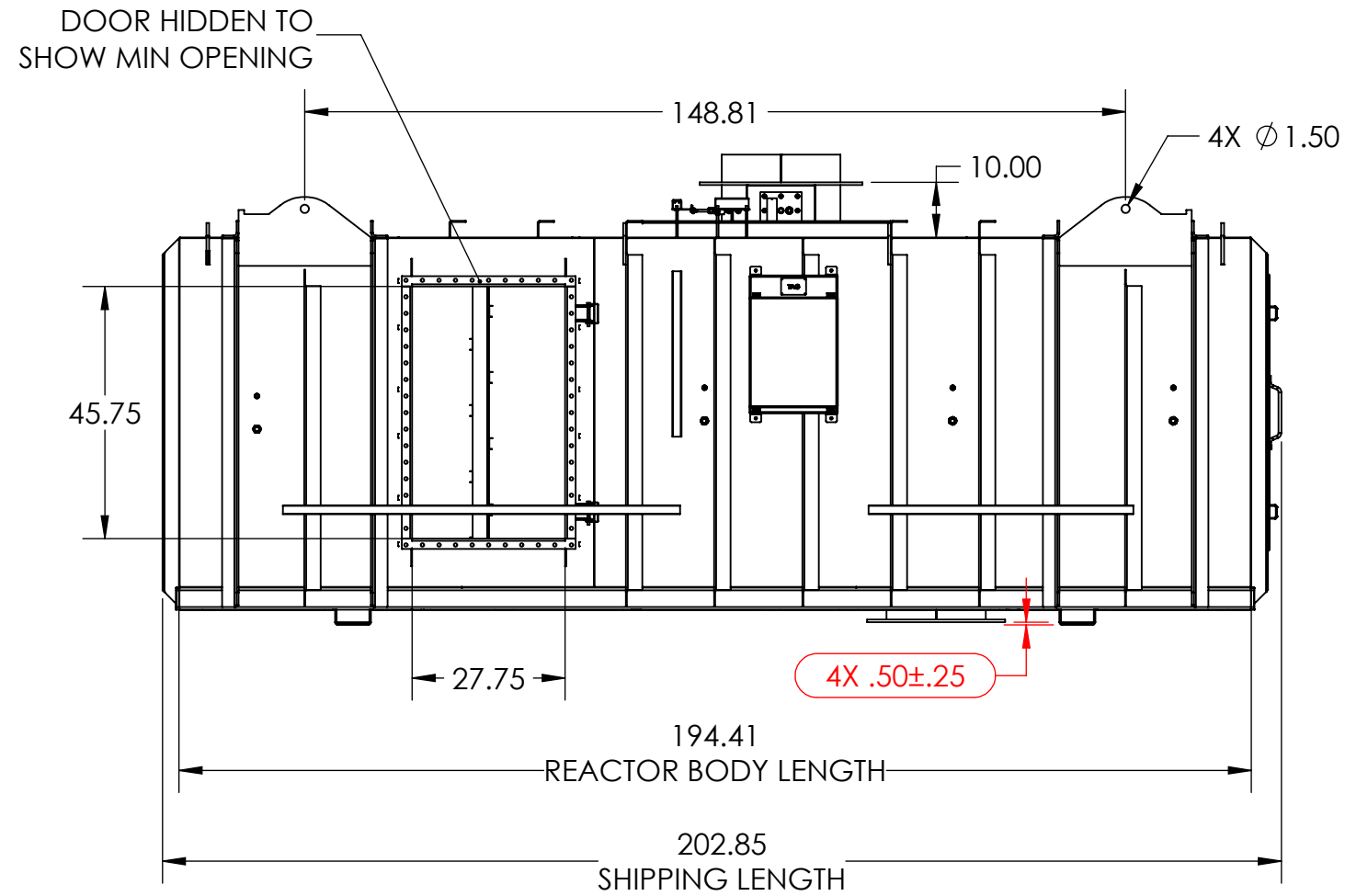
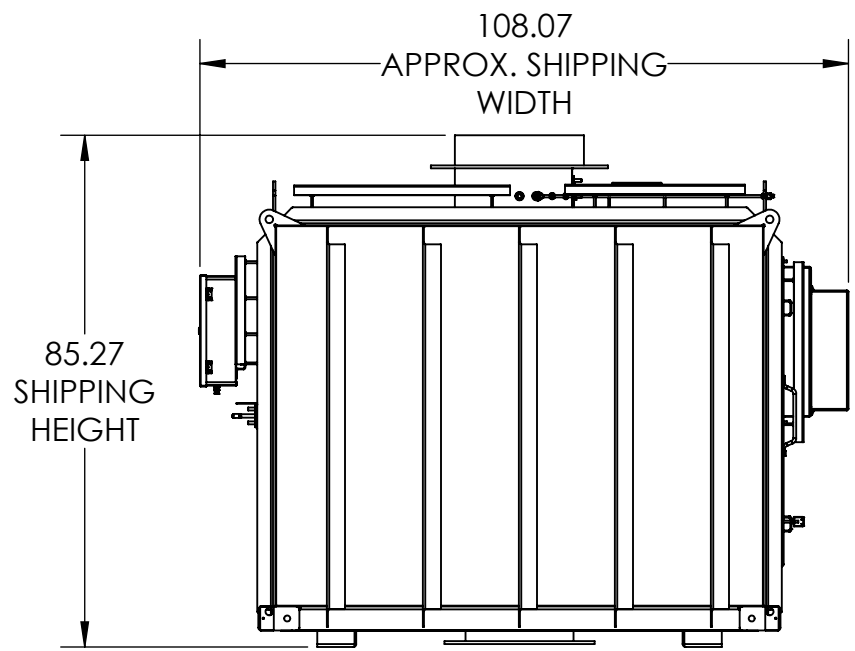
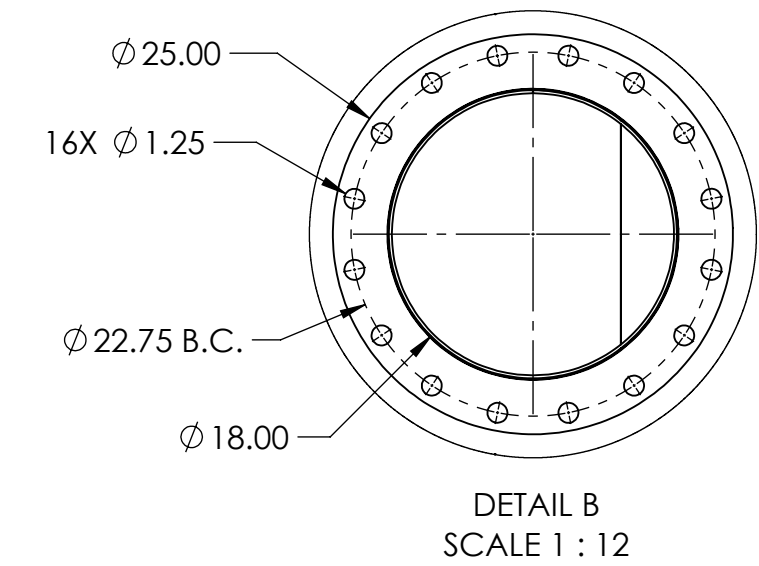
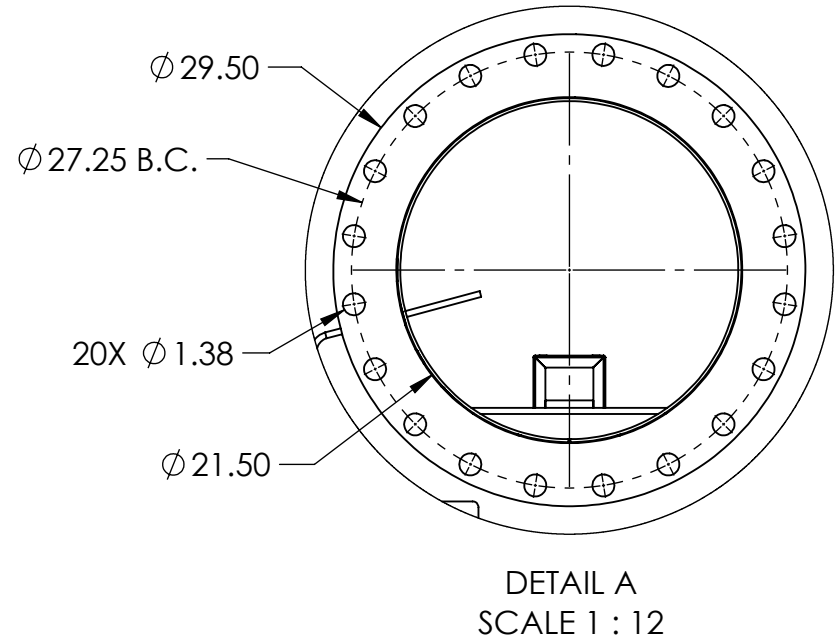


ITEM NO.	DRAWING NUMBER	REVISION	VISUAL P/N	DESCRIPTION	WEIGHT	QTY.
1	727692	00	1050357	SCR ASSEMBLY 33215-138-X0PFS1-118FB122FT-SB0-01	9422.94	1
2	727819	00	1050360	ADC SKID ASYM S1E0-A1DX-0300PSH010-C1-01	843.63	1
3	725071	A	1049351	RAIN CAP RCF-22BS	34.49	1

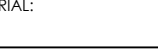
REV.	ECN	TIER	DESCRIPTION			DATE	APPROVED BY
00	N/A	2	CREATED			09/16/2025	KHABLE
UNLESS OTHERWISE SPECIFIED:				NAME	DATE	CATALYTIC COMBUSTION 311 RIGGS ST. BLOOMER, WI 54724 TEL 715-568-2882 FAX 715-568-2884	
DIMENSIONS ARE IN INCHES TOLERANCES:			DRAWN	KHABLE	09/16/2025		
ANGULAR: FABRICATED ±1.0° MACHINED ±0.5° ONE PLACE DECIMAL ±0.1 TWO PLACE DECIMAL ±0.06 THREE PLACE DECIMAL ±0.030 DUAL DIMENSIONS IN. (MM)			MATERIAL:			DESCRIPTION: SCR SYSTEM 33215-138-X1PFS1-118FB122FT-SB0-30E0-01	
REMOVE ALL BURRS AND BREAK SHARP EDGES			 THIRD ANGLE PROJECTION				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED.			VISUAL PART NO. 1050359		SIZE B	DRAWING NO. 727821	REV 00
			DO NOT SCALE DRAWING		SCALE: 1:96	WT: 10301.07	SHEET 1 OF 1

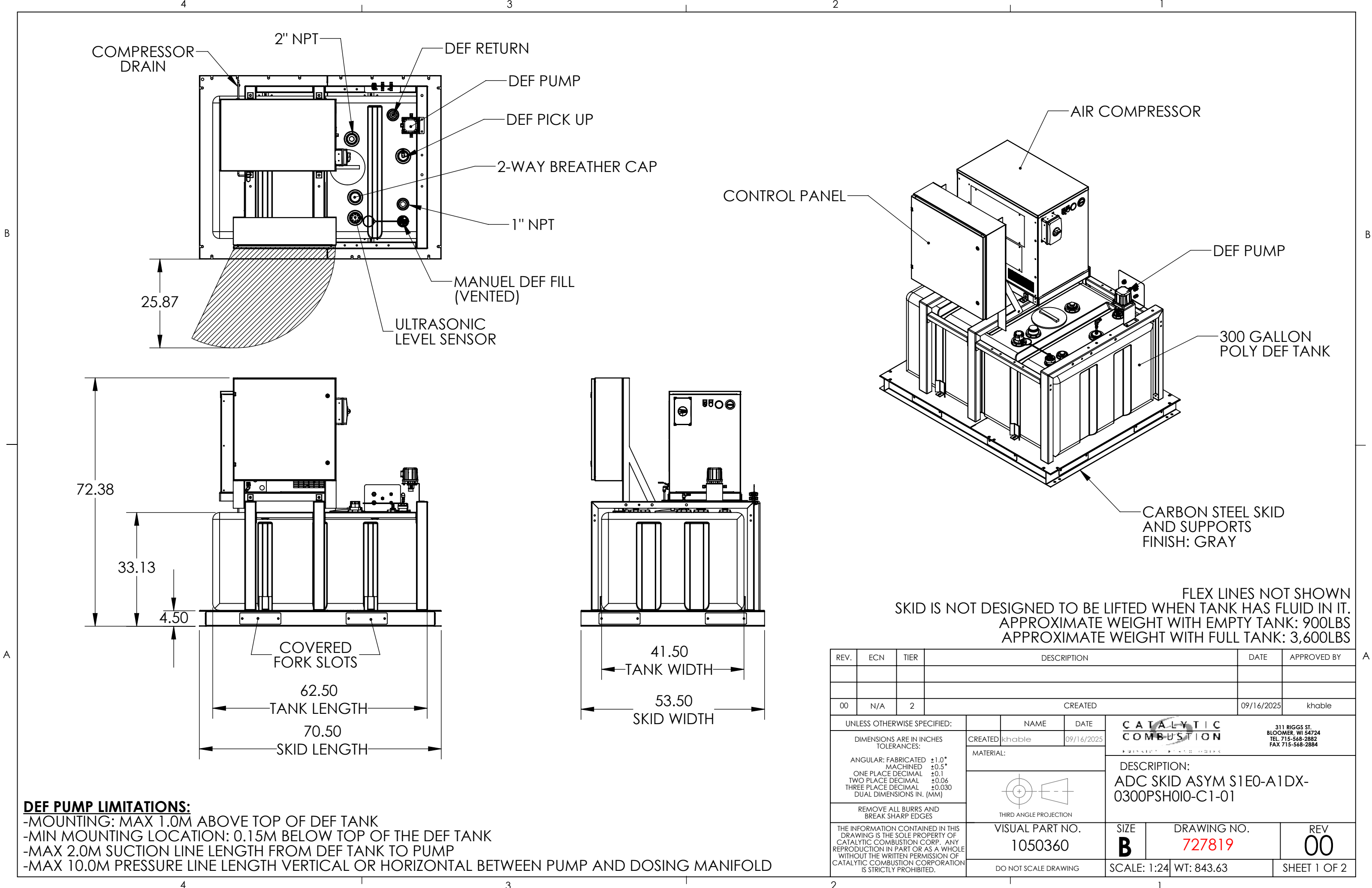
F
E
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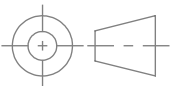
- NOTES:
- 1) APPROXIMATE WEIGHT: 10,000LBS
 - 2) EXTERIOR WILL BE COVERED WITH FABRIC INSULATION BLANKET, INSULATION OUTER COVER WILL BE GRAY WITH SS FASTENERS
 - 3) ALLOW 5" FROM THE OUTSIDE FACES OF REACTOR TO CLOSEST OBSTRUCTION

REV.	ECN	TIER	DESCRIPTION		DATE	APPROVED BY
00	N/A	2	CREATED		09/16/2025	khoblie
UNLESS OTHERWISE SPECIFIED:			NAME	DATE	CATALYTIC COMBUSTION	
DIMENSIONS ARE IN INCHES TOLERANCES:			DRAWN thoblie	09/11/2025	311 800-55 55 RECEIVED: 09/24/24 TEL: 715-568-2862 FAX: 715-568-2864	
ANGULAR: FABRICATED ±1.0° MACHINED ±0.01			MATERIAL:		DESCRIPTION:	
ONE PLACE DECIMAL ±0.1					SCR ASSEMBLY 33215-138-XOPFS1-118FB122FT-SB0-01	
TWO PLACE DECIMAL ±0.04						
THREE PLACE DECIMAL ±0.005						
DUAL DIMENSIONS IN (MM)						
REMOVE ALL BURRS AND BREAK SHARP EDGES			THIRD ANGLE PROJECTION		REV	
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED.			VISUAL PART NO. 1050357		DRAWING NO. 727692	
			DO NOT SCALE DRAWING		SCALE: 1:32	
					SHEET 1 OF 3	



DEF PUMP LIMITATIONS:

- MOUNTING: MAX 1.0M ABOVE TOP OF DEF TANK
- MIN MOUNTING LOCATION: 0.15M BELOW TOP OF THE DEF TANK
- MAX 2.0M SUCTION LINE LENGTH FROM DEF TANK TO PUMP
- MAX 10.0M PRESSURE LINE LENGTH VERTICAL OR HORIZONTAL BETWEEN PUMP AND DOSING MANIFOLD

REV.	ECN	TIER	DESCRIPTION			DATE	APPROVED BY
00	N/A	2	CREATED			09/16/2025	khable
UNLESS OTHERWISE SPECIFIED:				NAME	DATE	CATALYTIC COMBUSTION 311 RIGGS ST. BLOOMER, WI 54724 TEL 715-568-2882 FAX 715-568-2884	
DIMENSIONS ARE IN INCHES TOLERANCES: ANGULAR: FABRICATED ±1.0° MACHINED ±0.5° ONE PLACE DECIMAL ±0.1 TWO PLACE DECIMAL ±0.06 THREE PLACE DECIMAL ±0.030 DUAL DIMENSIONS IN. (MM)			CREATED	khable	09/16/2025		
			MATERIAL:				
REMOVE ALL BURRS AND BREAK SHARP EDGES			 THIRD ANGLE PROJECTION			DESCRIPTION: ADC SKID ASYM S1E0-A1DX-0300PSH010-C1-01	
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED.			VISUAL PART NO. 1050360		SIZE B	DRAWING NO. 727819	REV 00
			DO NOT SCALE DRAWING		SCALE: 1:24	WT: 843.63	SHEET 1 OF 2

VALVES AND PIPING

GLOBE

BALL

BUTTERFLY

CHECK

GATE

ORIFICE METERING

LUBRICATED PLUG

VACUUM RELIEF

PRESSURE RELIEF

PRESSURE REDUCING INTERNAL RELIEF

PRESSURE REDUCING EXTERNAL PRESSURE

PRESSURE REDUCING DIFFERENTIAL PRESSURE

PRESSURE REDUCING VENTED

3 WAY

REDUCER

Y-STRAINER

SAMPLE/TEST PORT

FLANGE

UNION

ORIFICE PLATE

VALVE NORMALLY OPEN

VALVE NORMALLY CLOSED

EQUIPMENT

VAPOR/LIQUID SEPARATOR

AIR STRIPPER

HEAT EXCHANGER

CENTRIFUGAL FAN

OIL/WATER SEPARATOR

PARTICULATE SCRUBBER

GAS QUENCH/SCRUBBER

CONTROL PANEL

VANE COMPRESSOR

CENTRIFUGAL PUMP

PROGRESSIVE CAVITY PUMP

GAS BURNER

ELECTRIC HEATER

LIQUID RING PUMP

METERING PUMP

REGENERATIVE BLOWER

ROTARY CLAW BLOWER

CERAMIC HEAT EXCHANGE MEDIA

CATALYST REACTOR

INTAKE SCREEN

INLINE SILENCER

AIR INTAKE FILTER/SILENCER

PANEL FILTER

CATALYST REACTOR

FLAME ARRESTOR

FLAME TRAP

FLEX CONNECTOR

COMPRESSED AIR FILTER WITH DRAIN

LIQUID FLOW METER

SPARK IGNITOR

FLAME ROD

SELF CHECKING UV SCANNER

PITOT STATIC

DOUBLE-ACTING PNEUMATIC ACTUATOR

SPRING-RETURN SINGLE-ACTING PNEUMATIC ACTUATOR

COMPRESSED AIR RESERVOIR

OBSERVATION VIEW PORT

SIGHT TUBE

MECHANICAL LINK

TYPE, ACTION, OR CONTROL ABBREVIATIONS

AAH ANALYTICAL ALARM HIGH

AAL ANALYTICAL ALARM LOW

AC ALTERNATING CURRENT

AE ANALYTICAL ELEMENT

AI ANALOG INPUT

AM AUTO MANUAL

AO ANALOG OUTPUT

AT ANALYTICAL TRANSMITTER

B BURNER

CV CONTROL VALVE

DC DIRECT CURRENT

DI DIGITAL INPUT

DO DIGITAL OUTPUT

DPI DIFFERENTIAL PRESSURE INDICATOR

DPS DIFFERENTIAL PRESSURE SWITCH

EH ELECTRIC HEATER

ENET ETHERNET

F FAN

FAR FORWARD AUTO REVERSE

FE FLOW ELEMENT/SENSOR

FI FLOW INDICATOR

FIR FLOW INDICATING RECORDER

FIT FLOW INDICATING TRANSMITTER

FS FLOW SWITCH

HOA HAND OFF AUTO

HS HAND SWITCH

HV HAND VALVE

LAH LEVEL ALARM HIGH

LAL LEVEL ALARM LOW

LEL LOWER EXPLOSIVE LIMIT

LSH LEVEL SWITCH HIGH

LSHH LEVEL SWITCH HIGH HIGH

LSL LEVEL SWITCH LOW

LSLL LEVEL SWITCH LOW LOW

LT LEVEL TRANSMITTER

M MOTOR

MV MOTORIZED VALVE

N NOZZLE

NC NORMALLY CLOSED

NO NORMALLY OPENED

OC OPEN-CLOSE

OCA OPEN-CLOSE-AUTO

OO ON-OFF

OOA ON-OFF-AUTO

OOR ON-OFF-REMOTE

P PUMP

PAH PRESSURE ALARM HIGH

PAL PRESSURE ALARM LOW

PC PRESSURE CONTROL

PCV PRESSURE CONTROL VALVE

PI PRESSURE INDICATOR

PIR PRESSURE INDICATING RECORDER

PIS PRESSURE INDICATING SWITCH

PIT PRESSURE INDICATING TRANSMITTER

PLC PROGRAMMABLE LOGIC CONTROLLER

PRV PRESSURE RELIEF VALVE

PRX PRESSURE RELIEF RUPTURE DISK

PS PRESSURE SWITCH

PSH PRESSURE SWITCH HIGH

PSL PRESSURE SWITCH LOW

PT PRESSURE TRANSMITTER

SR SPRING RETURN

SS START-STOP

SSOV SAFETY SHUT OFF VALVE

SV SOLENOID VALVE

TAH TEMPERATURE ALARM HIGH

TAL TEMPERATURE ALARM LOW

TCV TEMPERATURE CONTROL VALVE

TE TEMPERATURE ELEMENT

TI TEMPERATURE INDICATOR

TIC TEMPERATURE INDICATING CONTROLLER

TIR TEMPERATURE INDICATING RECORDER

TIT TEMPERATURE INDICATING TRANSMITTER

TS TEMPERATURE SWITCH

TSH TEMPERATURE SWITCH HIGH

TSL TEMPERATURE SWITCH LOW

TT TEMPERATURE TRANSMITTER

VFD VARIABLE FREQUENCY DRIVE

VRV VACUUM RELIEF VALVE

XCV CHECK VALVE

XDA DETONATION ARRESTOR

XFA FLAME ARRESTOR

XFT FLAME TRAP

XHE HEAT EXCHANGER

XIF INLET FILTER

XIS INLET SCREEN

XJ FLEX CONNECTOR/EXPANSION JOINT

XS SILENCER

XSI SPARK IGNITER

XUV UV DETECTOR

XV UNCLASSIFIED VALVE

YC EVENT CLOSED

YI EVENT INDICATOR

YO EVENT OPEN

ZAC POSITION ALARM CLOSED

ZAO POSITION ALARM OPEN

ZS POSITION SWITCH

ZSC POSITION SWITCH CLOSED

ZSO POSITION SWITCH OPEN

ZT POSITION TRANSMITTER

TRANSDUCERS

EXAMPLE:
 CURRENT TO PNEUMATIC TRANSDUCER (MOUNTED BEHIND-THE-PANEL)

A ANALOG

D DIGITAL

E VOLTAGE

F FREQUENCY

I CURRENT

P PNEUMATIC

PF PULSE FREQUENCY

PD PULSE DURATION

BUBBLE SYMBOL

ABBREVIATION

OOA

TYPE, ACTION OR CONTROL

INSTRUMENT IDENTIFICATION

INSTRUMENT LOCATION, TYPE OR ABSENCE OF LINE DENOTES LOCATION (SEE RIGHT)

INSTRUMENT IDENTIFICATION

FIELD MOUNTED INSTRUMENT

PANEL MOUNTED INSTRUMENT

BEHIND-THE-PANEL MOUNTED INSTRUMENT

PILOT LIGHT/ALARM LIGHT (LIGHT COLOR)

PROGRAMMABLE LOGIC CONTROLS

SPECIAL CASES

ON AND OFF EVENT LIGHTS

OPENED AND CLOSED POSITION LIGHTS

OPENED AND CLOSED POSITION SWITCHES

INTERLOCKS

OPERATORS

M 01 MOTOR

PA 01 PNEUMATIC ACTUATOR

VFD 01 VARIABLE FREQUENCY DRIVE

T MANUAL

MV 01 MOTORIZED VALVE

PV 01 PNEUMATIC VALVE

SV 01 SOLENOID VALVE

MV 01 MANUAL VALVE

LINE LEGEND

PIPING

PROCESS DUCTWORK

COMPRESSED AIR

PNEUMATIC SIGNAL

ELECTRICAL SIGNAL OTHER

ANALOG SIGNAL

NON CONNECTING LINES

CONNECTING LINES

DATA LINK

HOSE

FLOW DIRECTION

OTHERS

CCC

PROCESS FLOW DIAGRAM LEGEND

F TEMPERATURE DEGREES FAHRENHEIT

PPM CONCENTRATION PARTS PER MILLION

SCFM VAPOR FLOW STANDARD CUBIC FEET PER MINUTE

GPM WATER FLOW GALLONS PER MINUTE

PSIG PRESSURE POUNDS PER SQUARE INCH GAGE

PROCESS NO.

NOTES

1. SPECIFICATIONS AND DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTIFICATION.

2. REFERENCE ANSI/ISA-S5.1 FOR SYMBOLS NOT SHOWN ON THIS LEGEND.

3. THIS IS A STANDARD LEGEND, THEREFORE, NOT ALL OF THIS INFORMATION MAY APPLY.

4. THESE SYMBOLS AND ABBREVIATIONS ARE SPECIFIC TO CATALYTIC COMBUSTION CORPORATION AND MAY DIFFER FROM ISA.

REV	DESCRIPTION	DATE	BY	DRAWING STATUS:	DATE:	BY:	MATERIAL:	Catalytic Combustion Corporation 311 Riggs Street Bloomer, WI 54724 Telephone: 715-568-2882 Fax: 715-568-2884 www.catalyticcombustion.com		DATE:	CUSTOMER:
00	CREATED	9/15/2025	BL				SEE BOM	CARTER CAT PROLOGIS		09/15/2025	
.				X PRELIMINARY	9/15/2025	BL	WEIGHT:				
.				FOR APPROVAL			N/A				
.				APPROVED FOR FAB			TOLERANCES:				
.				AS BUILT			.X = 0.06 .XX = 0.03 .XXX = 0.015 L = 0.5"				
.				AS FIELD MODIFIED							

THIRD ANGLE PROJECTION

INCH [mm]

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORPORATION ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED.

DO NOT SCALE THIS DRAWING.

PROJECT/PRODUCT:	DRAWING:	REV:	SIZE:
W0241269	500	0	B

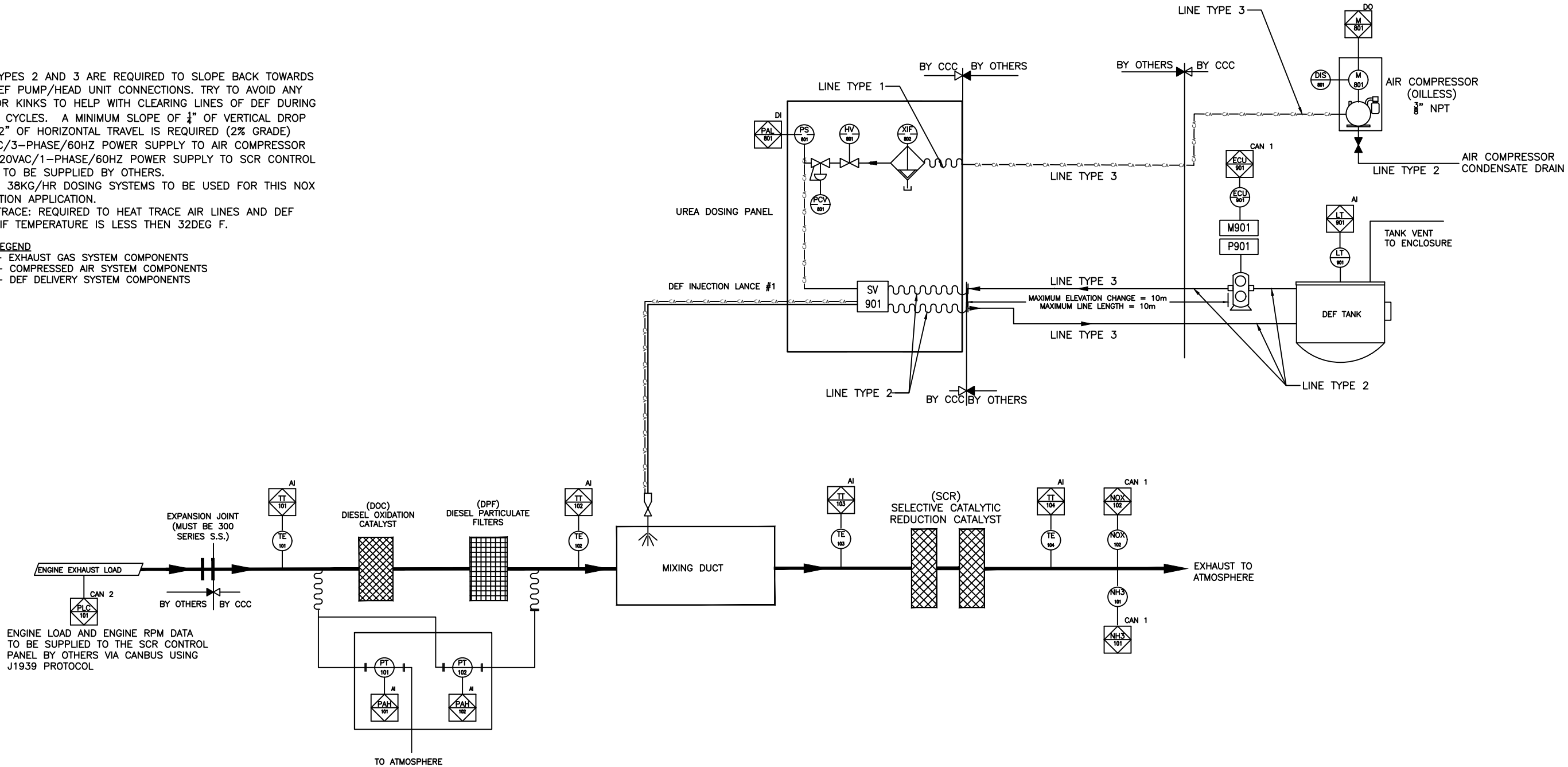
LEGEND OF PIPING, HOSE, & TUBING SYSTEMS		
LINE TYPE	MATERIAL	CONNECTION TYPE
1	1/2" OD NYLON BLACK TUBE, UV STABLE, SEMI-FLEXIBLE	N/A
2	3/8" PTFE TUBING .063 WALL THK	3/8" COMPRESSION
3	3/8" OD SS TUBE 0.035" MIN. WALL THICKNESS	3/8" COMPRESSION

NOTES:

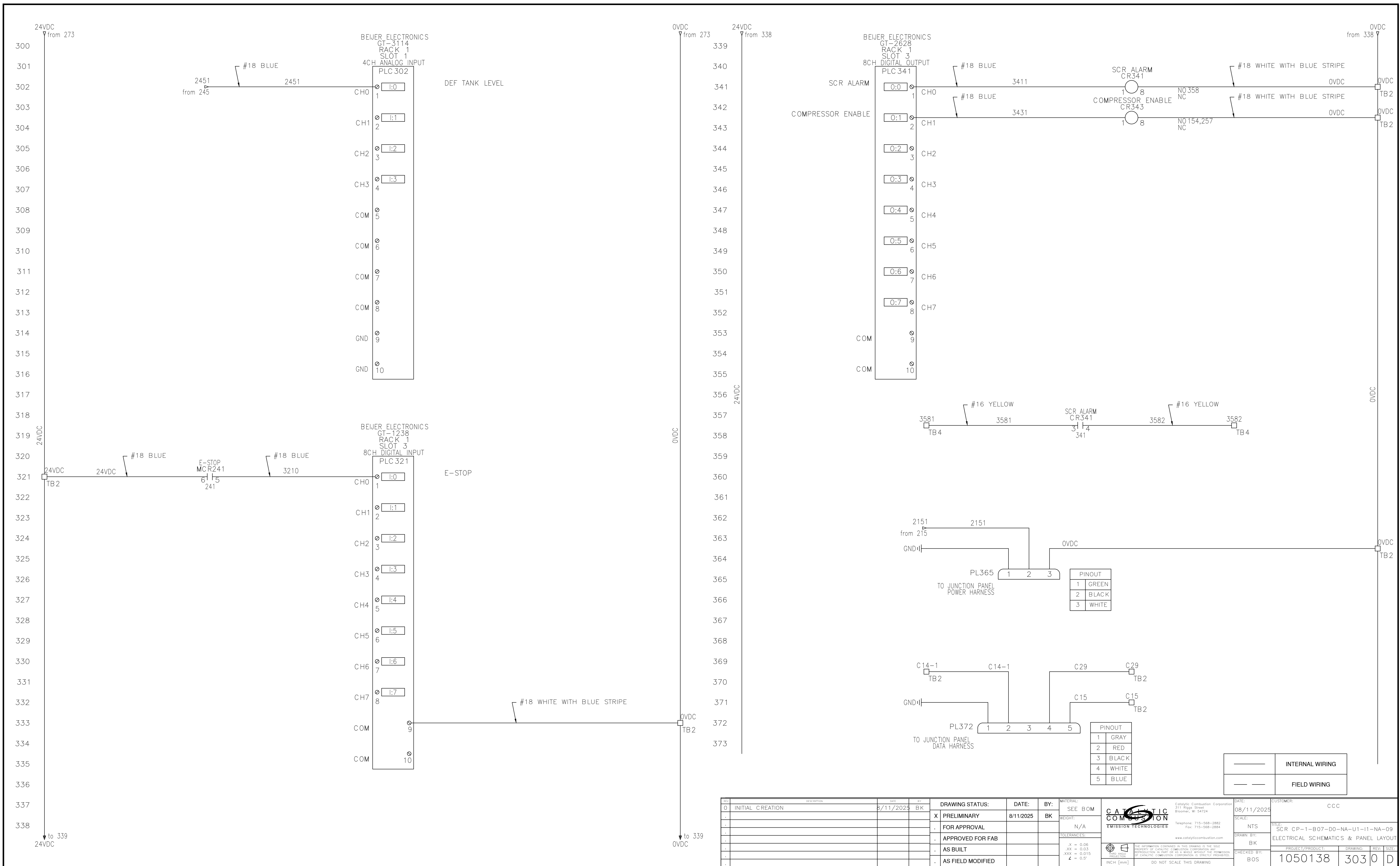
1. LINE TYPES 2 AND 3 ARE REQUIRED TO SLOPE BACK TOWARDS THE DEF PUMP/HEAD UNIT CONNECTIONS. TRY TO AVOID ANY DIPS OR KINKS TO HELP WITH CLEARING LINES OF DEF DURING PURGE CYCLES. A MINIMUM SLOPE OF 1/4" OF VERTICAL DROP PER 12" OF HORIZONTAL TRAVEL IS REQUIRED (2% GRADE)
2. 208VAC/3-PHASE/60HZ POWER SUPPLY TO AIR COMPRESSOR AND 120VAC/1-PHASE/60HZ POWER SUPPLY TO SCR CONTROL PANEL TO BE SUPPLIED BY OTHERS.
3. SINGLE 38KG/HR DOSING SYSTEMS TO BE USED FOR THIS NOX REDUCTION APPLICATION.
4. HEAT TRACE: REQUIRED TO HEAT TRACE AIR LINES AND DEF LINES IF TEMPERATURE IS LESS THEN 32DEG F.

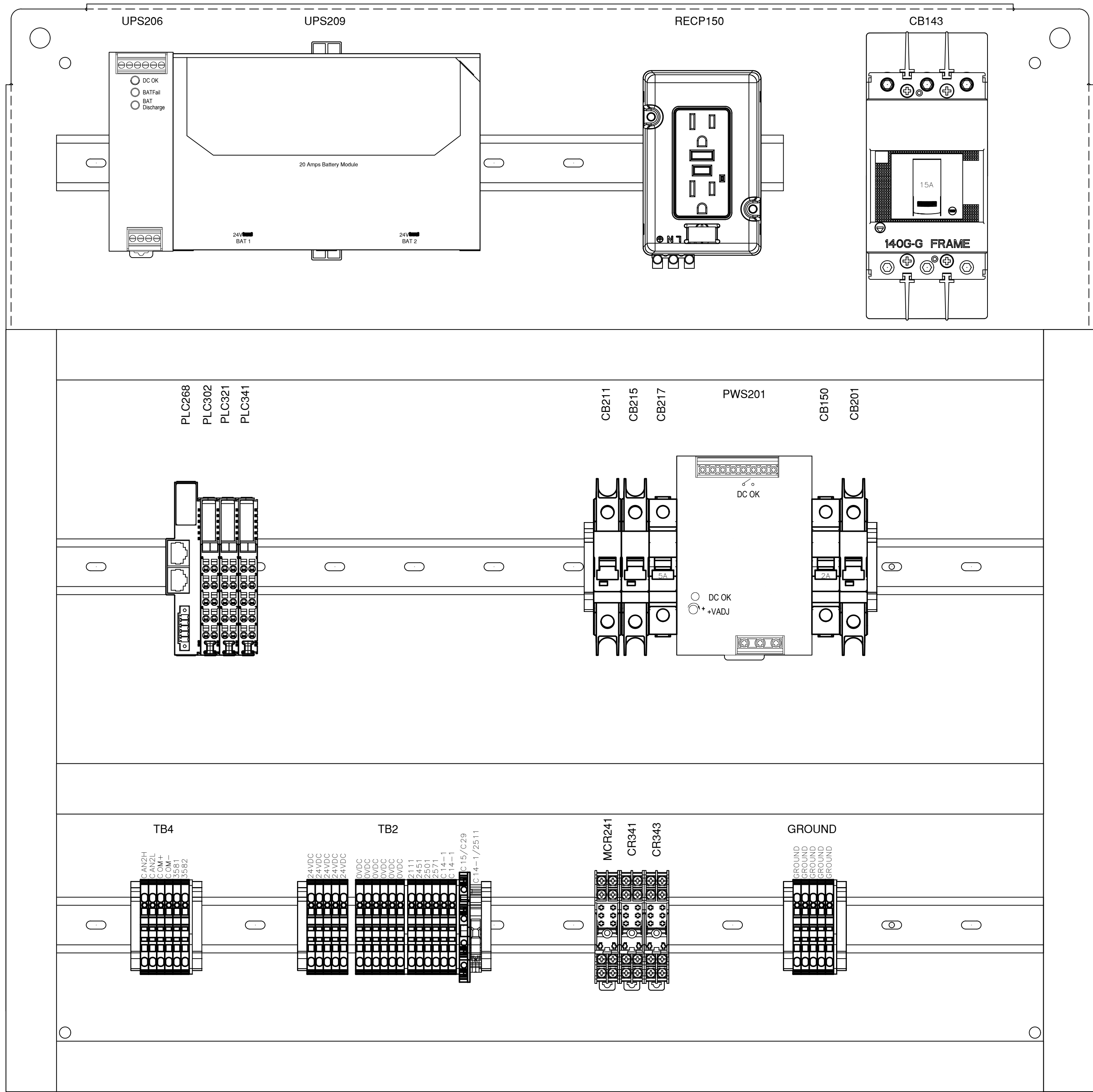
TAG SERIES LEGEND

100 SERIES - EXHAUST GAS SYSTEM COMPONENTS
800 SERIES - COMPRESSED AIR SYSTEM COMPONENTS
900 SERIES - DEF DELIVERY SYSTEM COMPONENTS

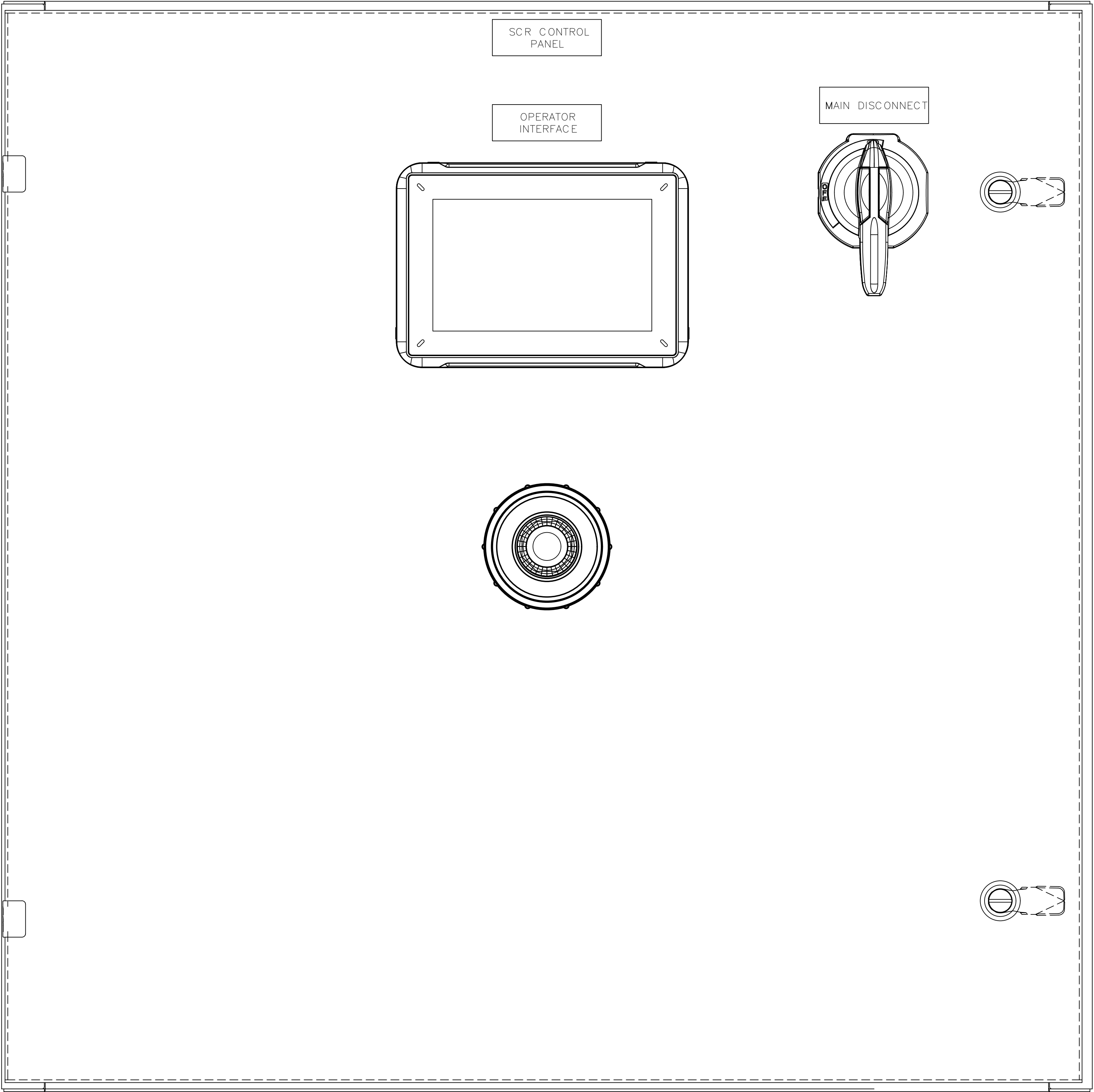


REV	DESCRIPTION	DATE	BY	DRAWING STATUS:		DATE:	BY:	MATERIAL:	CATALYTIC COMBUSTION EMISSION TECHNOLOGIES THIRD ANGLE PROJECTION INCH [mm] THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORPORATION ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED. DO NOT SCALE THIS DRAWING.	Catalytic Combustion Corporation 311 Riggs Street Bloomer, WI 54724 Telephone: 715-568-2882 Fax: 715-568-2884 www.catalyticcombustion.com	DATE:	CUSTOMER:			
00	CREATED	9/15/2025	BL					SEE BOM		09/15/2025	CARTER CAT PROLOGIS				
.				X	PRELIMINARY	9/15/2025	BL	WEIGHT:		NTS	SCALE:	TITLE: PROCESS & INSTRUMENTATION DIAGRAM			
.				.	FOR APPROVAL			N/A							
.				.	APPROVED FOR FAB			TOLERANCES:		BL	DRAWN BY:	PROJECT/PRODUCT: DRAWING: REV: SIZE:			
.				.	AS BUILT			.X = 0.06 .XX = 0.03 .XXX = 0.015 L = 0.5"							
.				.	AS FIELD MODIFIED					CHECKED BY:	W0241269	501	0	B	

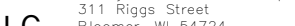




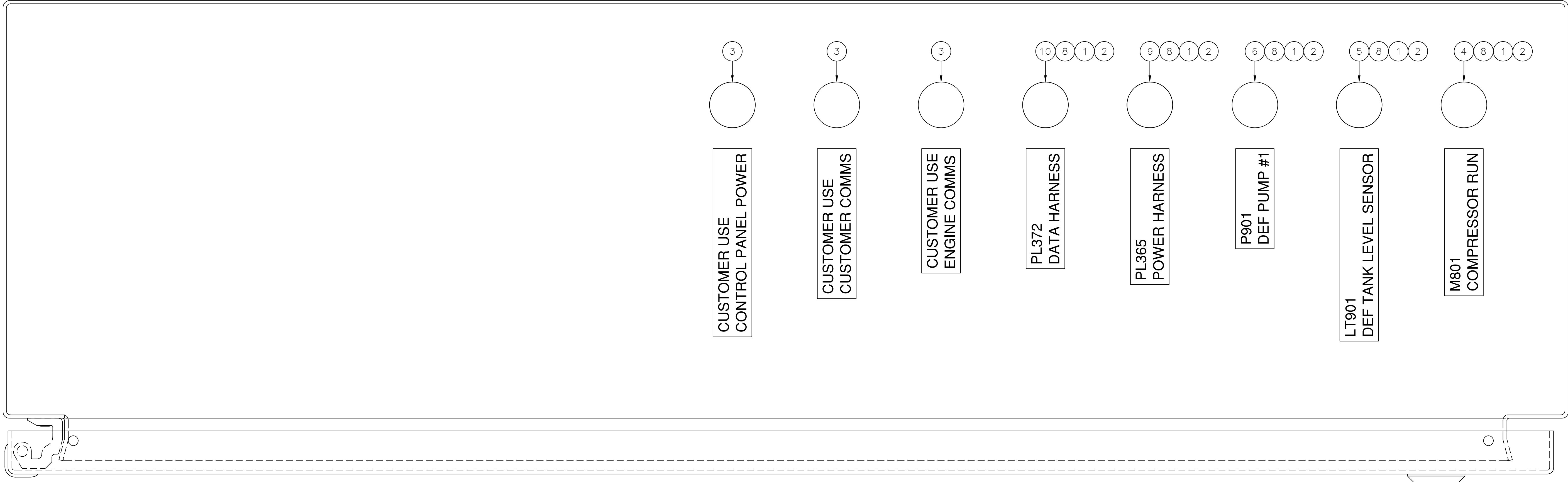
SUBPANEL FRONT
VIEW



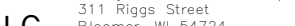
FRONT
VIEW

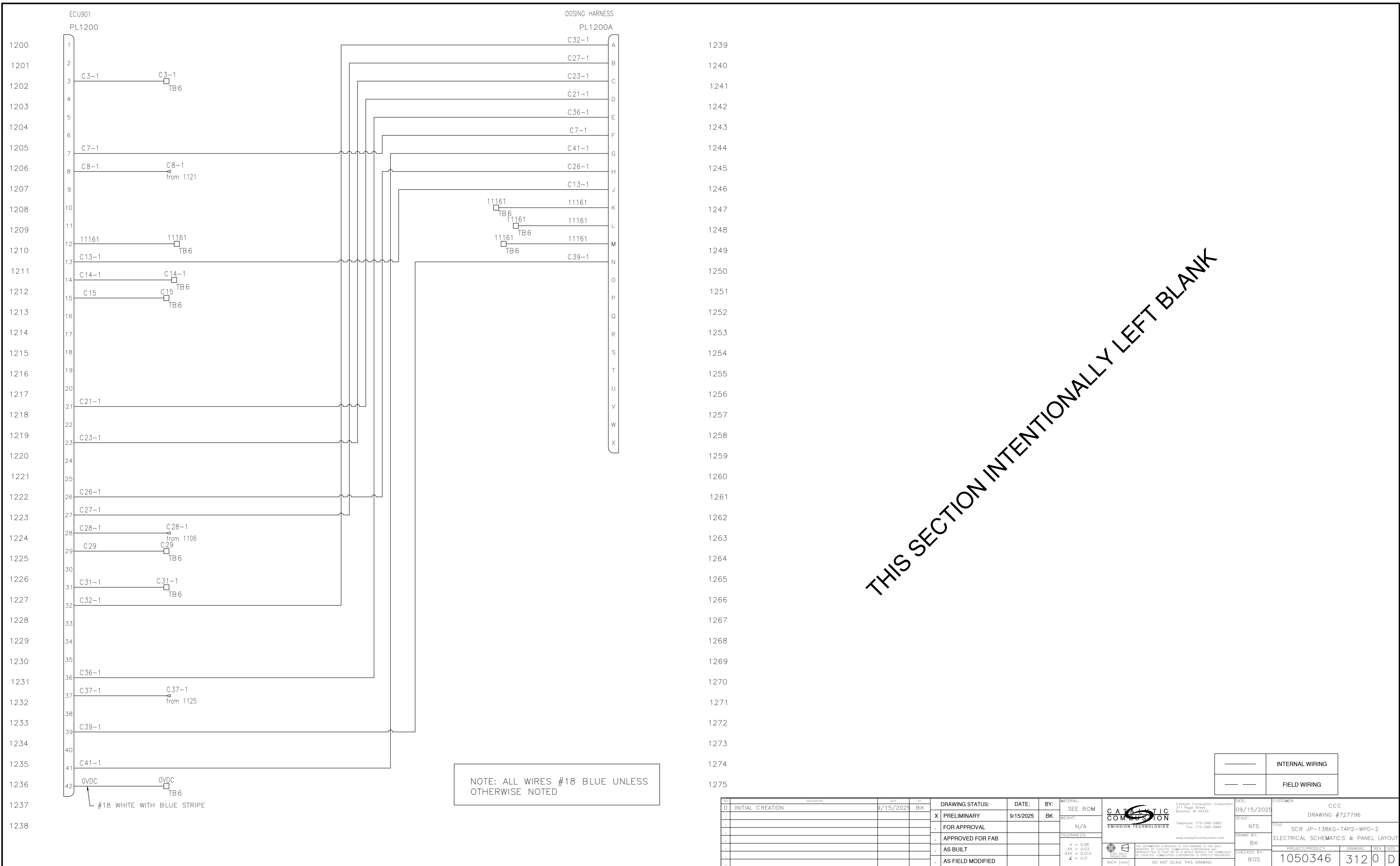
REV	DESCRIPTION	DATE	BY	DRAWING STATUS:	DATE:	BY:	MATERIAL:	 Catalytic Combustion Corporation 311 Roger Street Bloomer, WI 54724 Telephone: 715-568-2882 Fax: 715-568-2884 www.catalyticcombustion.com	DATE:	CUSTOMER:		
0	INITIAL CREATION	8/11/2025	BK	X PRELIMINARY	8/11/2025	BK	SEE BOM		08/11/2025	CCC		
-				FOR APPROVAL			WEIGHT: N/A		SCALE: NTS	TITLE: SCR CP-1-B07-D0-NA-U1-I1-NA-09		
-				APPROVED FOR FAB			TOLERANCES: .X = 0.06 .XX = 0.03 .XXX = 0.015 Z = 0.5°		DRAWN BY: BK	ELECTRICAL SCHEMATICS & PANEL LAYOUT		
-				AS BUILT				 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORPORATION. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS STRICTLY PROHIBITED. DO NOT SCALE THIS DRAWING	CHECKED BY: BOS	PROJECT/PRODUCT: 1050138	DRAWING: 3090	REV: D
-				AS FIELD MODIFIED					INCH (mm)			

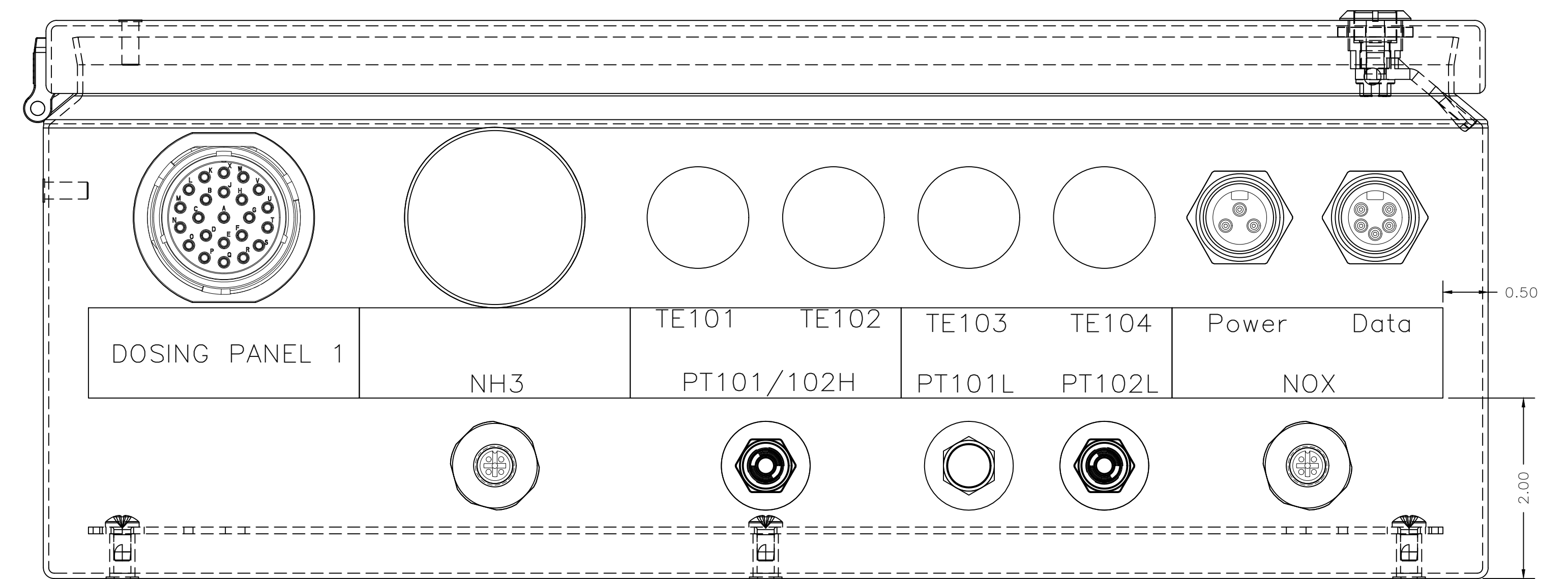
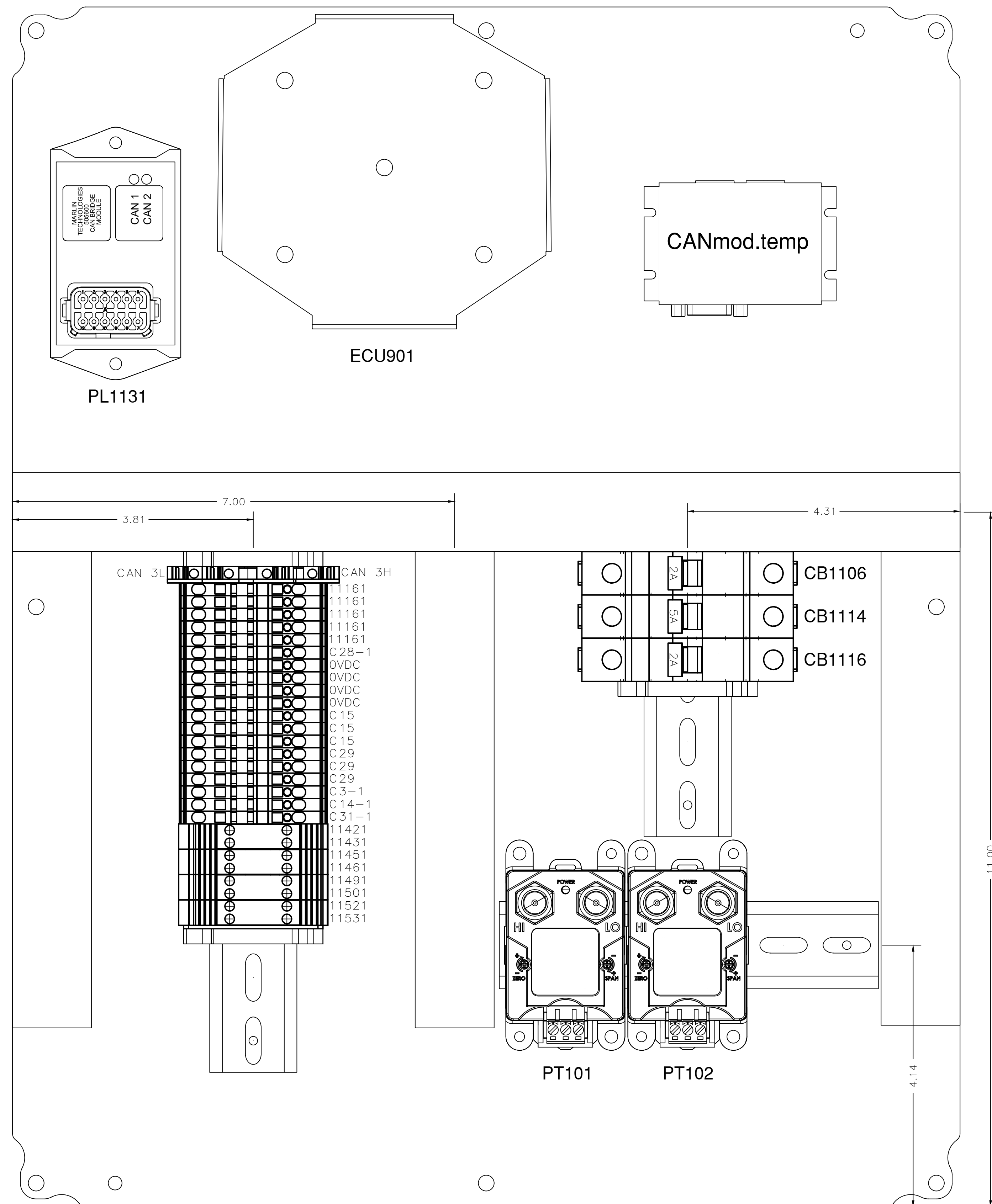
ITEM	CCC P/N	QTY	CATALOG	MFG	DESCRIPTION
1	1041227	5	101-S	BRIDGEPORT	CONDUIT LOCKNUT 1/2"
2	1001589	5	321	BRIDGEPORT	CONDUIT BUSHING PLASTIC 1/2"
3	1045068	3	SCE-HPSERIES15	SCE	HOLE SEAL 0.875" NEMA 4X
4	1001541	1	2520	THOMAS & BETTS	LIQUIDTIGHT CORD GRIP 1/2" 0.125-0.250
5	1000481	1	2521	THOMAS & BETTS	LIQUIDTIGHT CORD GRIP 1/2" 0.250-0.375
6	1001542	1	2522	THOMAS & BETTS	LIQUIDTIGHT CORD GRIP 1/2" 0.375-0.500
8	1005941	5	5262	THOMAS & BETTS	LIQUIDTIGHT SEALING GASKET 1/2"
9	1044983	1	RKF 34-1M/NPT	TURCK	CONNECTOR BULKHEAD 3 POSITION FEMALE 7/8-16 TO FLYING LEAD
10	1044984	1	RKF 57-1M/14.5	TURCK	CONNECTOR BULKHEAD 5 POSITION FEMALE 7/8-16 TO FLYING LEAD



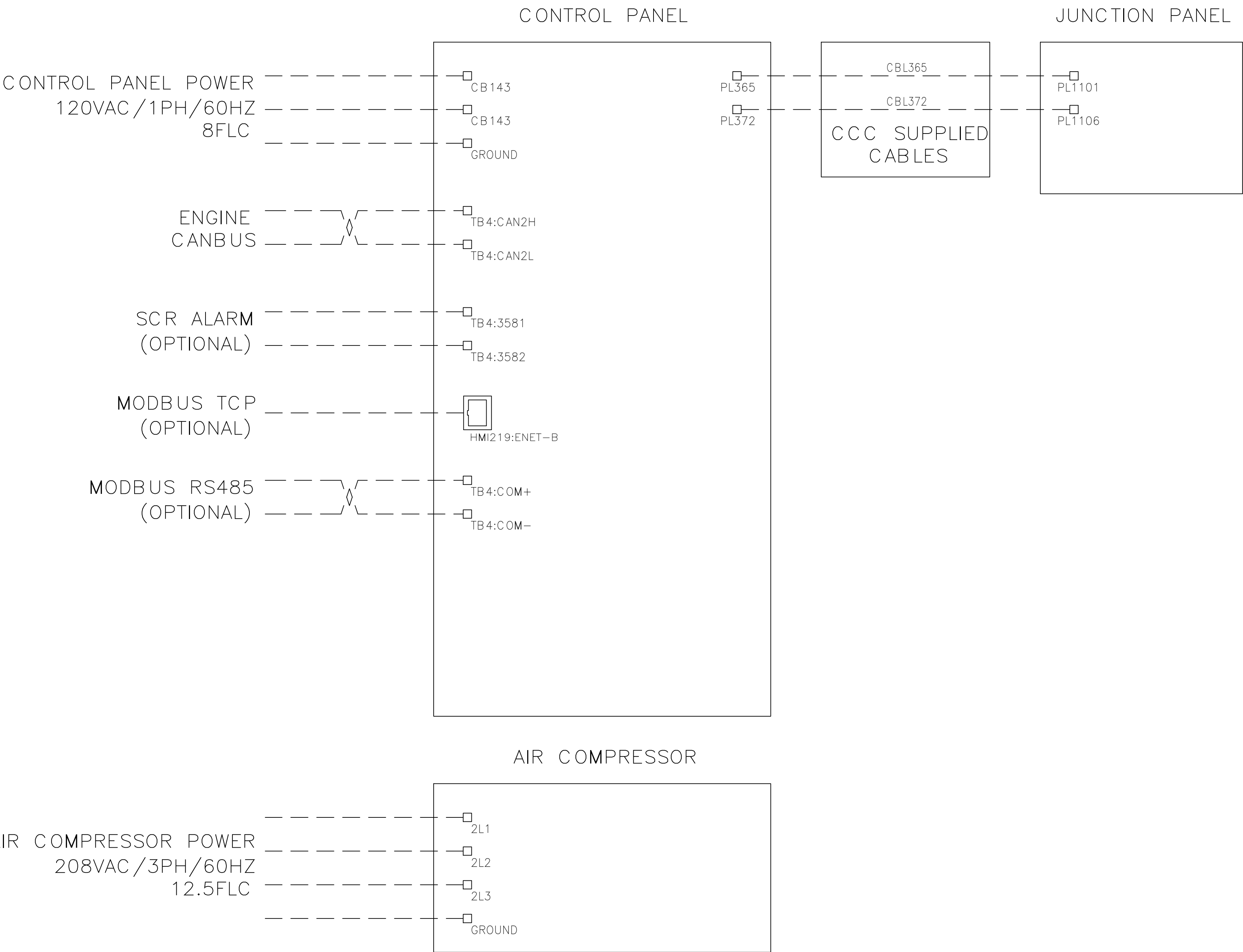
TOP VIEW (FROM INSIDE ENCLOSURE)

REV		DESCRIPTION	DATE	BY	DRAWING STATUS:		DATE:	BY:	MATERIAL:	 Catalytic Combustion Corporation 311 Roger Street Bloomer, WI 54724 Telephone: 715-568-2882 Fax: 715-568-2884 www.catalyticcombustion.com	DATE:	CUSTOMER:			
0	INITIAL CREATION		8/11/2025	BK	X	PRELIMINARY	8/11/2025	BK	SEE BOM		08/11/2025	CCC			
-					-	FOR APPROVAL			WEIGHT:		SCALE:	TITLE:			
-					-	APPROVED FOR FAB			N/A		NTS	SCR CP-1-B07-DO-NA-U1-I1-NA-09			
-					-	AS BUILT			TOLERANCES:	DRAWN BY:	BK	ELECTRICAL SCHEMATICS & PANEL LAYOUT			
-					-	AS FIELD MODIFIED			.X = 0.06 .XX = 0.03 .XXX = 0.015 Z = 0.5"	CHECKED BY:	BOS	PROJECT/PRODUCT:	DRAWING:	REV:	SIZE:
-					-				INCH (mm)	DO NOT SCALE THIS DRAWING		1050138	310	0	D



[illegible]

FIELD INTERCONNECT WIRING

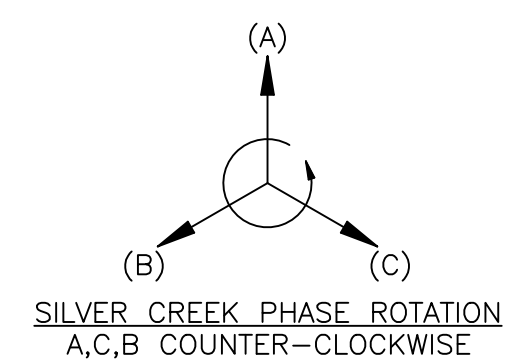
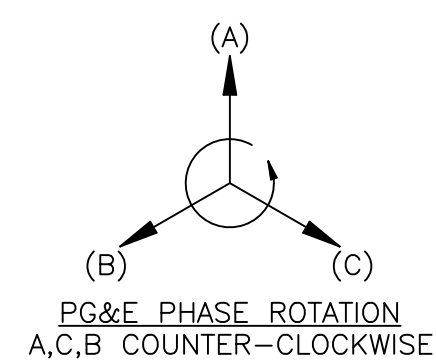
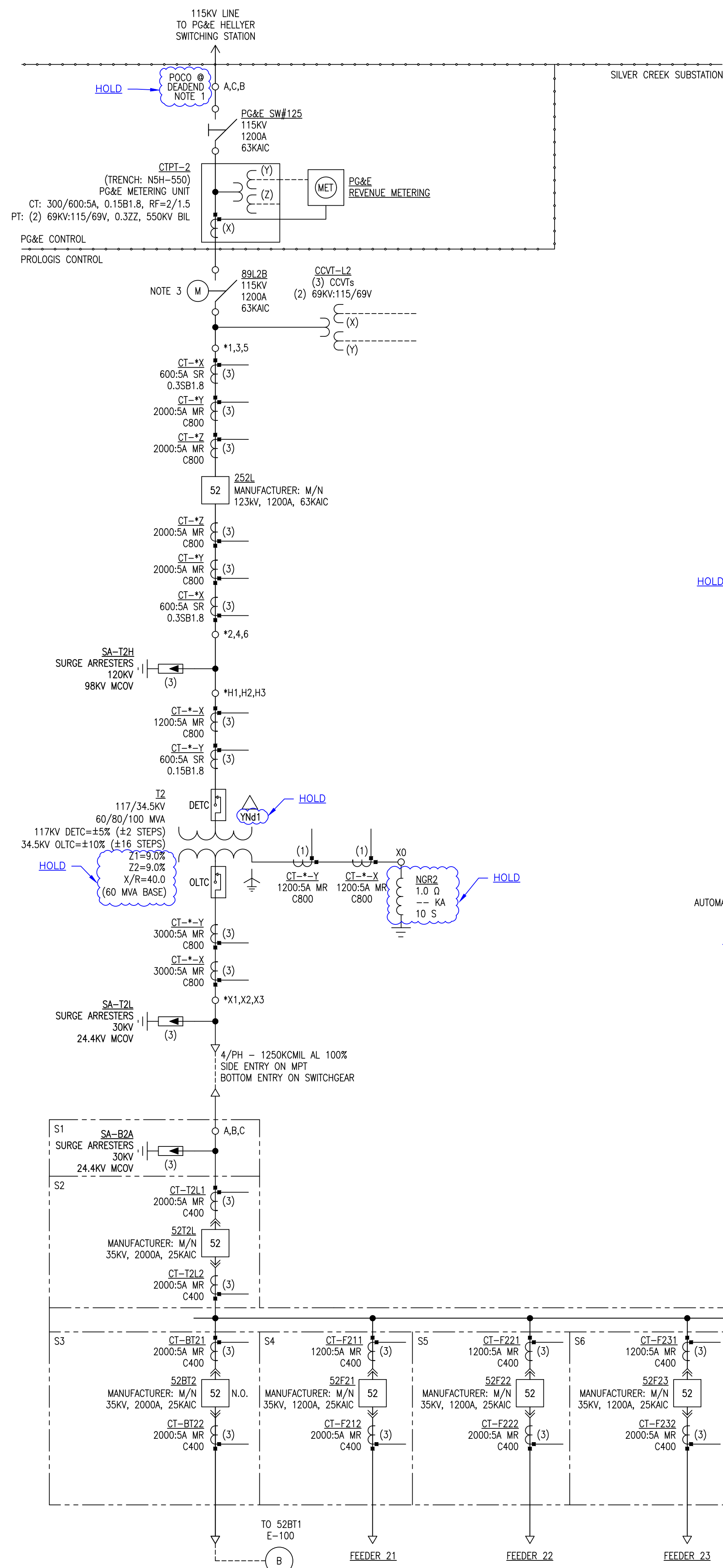


_____	INTERNAL WIRING
_____	FIELD WIRING

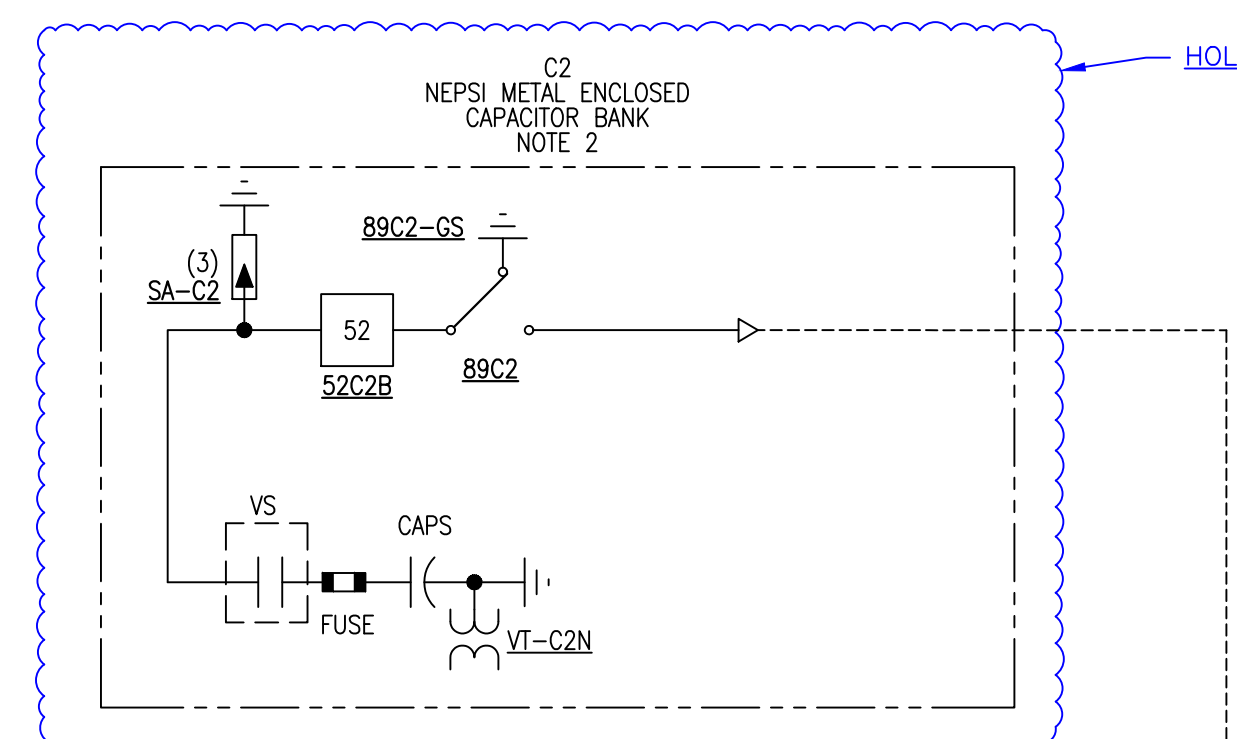
REV			DESCRIPTION		DATE	BY	DRAWING STATUS:		DATE:	BY:	MATERIAL:	 Catalytic Combustion Corporation 311 Roger Street Bloomer, WI 54724 Telephone: 715-568-2882 Fax: 715-568-2884 www.catalyticcombustion.com	DATE:	CUSTOMER:
0	INITIAL RELEASE				9/16/2025	BK					SEE BOM		09/16/2025	CCC
-							X	PRELIMINARY	9/16/2025	BK	WEIGHT:		SCALE:	TITLE:
-								FOR APPROVAL			N/A		NTS	SCR
-								APPROVED FOR FAB			TOLERANCES:	DRAWN BY:	FIELD INTERCONNECT WIRING	
-								AS BUILT			.X = 0.06 .XX = 0.03 .XXX = 0.015 Z = 0.5"	BK	PROJECT/PRODUCT:	
-								AS FIELD MODIFIED			 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CATALYTIC COMBUSTION CORPORATION. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE PERMISSION OF CATALYTIC COMBUSTION CORPORATION IS EXPRESSLY PROHIBITED.	CHECKED BY:	DRAWING:	
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											DO NOT SCALE THIS DRAWING		3910	D

APPENDIX E

SCDC Substation One-Line Diagrams



- NOTES:
1. POINT OF CHANGE OF OWNERSHIP (POCO) IS AT THE 115KV DEADEND STRUCTURE.
 2. CAPACITOR BANK DESIGN, INCLUDING PROTECTIVE ELEMENTS WITHIN THE CAPACITOR BANK, ARE IN THE NEPSI'S DESIGN SCOPE AND ONLY FOR ILLUSTRATIVE PURPOSES. FINAL DESIGN SHOULD BE BY NEPSI BASED ON CAPACITOR SIZE AND CONFIGURATION AS DETERMINED DURING DETAILED DESIGN.
 3. 252L CAN BE OPENED BY THE OPERATOR OR LOCKED OUT. IT IS ALSO ELECTRICALLY INTERLOCKED WITH 252L SUCH THAT THE SWITCH CANNOT BE OPERATED (OPENED OR CLOSED) UNLESS 252L IS OPEN.
 4. THE OPENED BREAKER IS HARD INTERLOCKED WITH OTHER MAINS AND THE MAIN BREAKERS IN SUCH A WAY THAT THE UTILITY SOURCES SHALL NOT BE TIED TOGETHER.



ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
IDP 11/28/2025

B	CLR/SME	11/28/2025	ISSUED FOR IDP REVIEW (NOT FOR CONSTRUCTION)
A	CLR/SME	10/14/2025	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)
REV.	BY	DATE	STATUS
			PROLOGIS SILVER CREEK SUBSTATION TBD, SAN JOSE, CA 95138
			POWER ONE-LINE (T2)
 ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE 4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021 Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com			DESIGN BY: CLR/SME
			DRAWN BY: LPL/SME
			CHECKED BY: CLR/SME
			APRVD BY: CLR/SME
			DATE: 10/14/2025
			SCALE: NON
JOB NO. 251107.01 DWG FILE SC1-E-101			REV A