

Emergency Generator Set Engineering Submittals

(2) Caterpillar Model V12 (C32) D1250 GC Diesel Engine Driven Generator Set

Standby Generator Rated for 1250kW

- ☐ Approved, release order for production
- ☐ Approved as noted, release order for production
- ☐ Not approved, make changes and resubmit

COMMENTS

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PLEASE SIGN AND DATE FOR APPROVAL

Signature _____ Date _____



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Bill of Materials

NOTE: Please review the document "Coordinated Services" found immediately after the bill of materials.

We are pleased to offer the following bill of materials for equipment and services listed below, provided for the above referenced project.

This is based on standard CATERPILLAR equipment, the email received from your office and limited to this BOM. Later issued specifications and drawings may cause a change in pricing.

CATERPILLAR 1250 kW Diesel Generator Set

Two (2) New CATERPILLAR Model V12GC Diesel Engine Driven Generator Set, rated 1250 kW standby, 1562kVA at 0.8 PF, 480/277 Volts, 3 phase, 4 wire, 60 Hertz at 1800 RPM.

Emissions

- This engine is US EPA Emergency Standby Rated.

Cooling System

- Radiator for 122 degree F ambient, unit mounted.
- Jacket water heater, one 9000 watt heater with thermostatic controls, 480 VAC single phase input.

Starting System

- Electric Starting Motor, 24VDC.
- Battery set, CAT High Output 24 volt DC lead acid type, with rack and cables.
- Automatic Dual Rate Battery Charger, 20 amps, Installed in genset enclosure, 120 VAC input required. Includes DC voltmeter, DC ammeter, AC fuse, DC fuse, automatic float/equalize control, and low voltage alarm.

Instrumentation & Controls

- CAT Electronic governor, with solid state speed control board, +/- 0.25% regulation.
- CAT Genset Controller
 - **Instrumentation:** LCD Display with adjustable contrast and backlight with auto power off. AC metering: Volts 3-phase (L-L & L-N); Amps (per phase & average); Frequency; kW (total & per phase); kVA (total & per phase); kVAR (total & per phase); Power Factor (overall & per phase); kW hours; kVAR hours DC metering: Battery Volts; Engine Hours run; Engine Jacket Water Temperature (in °C or °F); Lube Oil Pressure (in psi, kPa or bar); Engine Speed (rpm); Crank attempt counter; Start counter
 - **Protection:** Fail to start shutdown, Low oil pressure shutdown, High engine temperature, Approaching high coolant temperature alarm, Approaching low oil pressure alarm, Not in auto mode alarm, Underspeed / Overspeed, Loss of Engine Speed Detection, Low / High battery voltage, Battery charger failure (if fitted), Under volts, Over volts, Under frequency, Over frequency, Overcurrent, 4 spare fault channels 20 Event fault log (name of event, engine hours at first occurrence of event, time stamp at first occurrence, engine hours at latest occurrence of event, time stamp at latest occurrence, number, of occurrences of event)
 - **Controls:** 2 LED status indicators (1 red shutdown, 1 amber warning), Run key and LED indicator, Auto key and LED indicator, Stop key and LED indicator, Lamp test key, Alarm acknowledge key, Menu navigation keys, Engine and AC metering shortcut keys, All control module keys have tactile feedback, Lock down emergency stop push button

Generator (Alternator)

- CATERPILLAR AC power single bearing generator standby rated at 130 degree C rise, 3 phase, 4 wire, direct connected with:
 - PM Excitation System.
 - 3 phase voltage regulator +/- .25% regulation from 0% load to 100% load.
 - Circuit Breaker, Unit Mounted: One (1) 100% rated, 2000 Amps, 3 pole, LSIG

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Generator Information

Cat® D1250 GC

Diesel Generator Sets



Image shown may not reflect actual configuration.

Engine	C32B
Bore – mm (in)	145 (5.7)
Stroke – mm (in)	162 (6.4)
Displacement – L (in ³)	32.1 (1959)
Compression Ratio	14.0:1
Aspiration	TA
Fuel System	EUI
Governor Type	ADEM™ A4

Model	Standby 60 Hz ekW (kVA)	Emissions Performance
D1250 GC	1250 (1562)	U.S. EPA Emergency Stationary Use only (Tier 2)

Standard Features

Cat® Diesel Engine

- Meets U.S. EPA Emergency Stationary Use only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide

Generator Set Package

- Meets NFPA 110 start time & block load requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability is verified through prototype testing, which includes torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

Alternators

- Superior motor starting capability minimizes the need for oversizing the generator
- Designed to match the 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

GCCP Control Panels

- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility

Warranty and Extended Service Coverage (ESC)

- 24 months/1000-hour warranty for standby ratings
- Complimentary 5-Year Platinum Cat® Extended Service Coverage (ESC) available on eligible products*

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

Starting

- ☐ Standard batteries
- ☐ Oversized batteries
- ☐ Dual electric starter
- ☐ Jacket water heater

Engine attachments

- ☐ 6" Exhaust Flexible Fittings
- ☐ 6" Exhaust Flange Kits
- ☐ Radiator Duct Flange

Alternator

Output voltage

- ☐ 480V
- ☐ 600V

Temperature Rise (over 40°C ambient)

- ☐ 125 °C/
- ☐ 105 °C

Winding type

- ☐ Random wound

Excitation

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

Attachments

- ☐ Anti-condensation heater

Power Termination

Type

- ☐ Circuit breaker (Primary)
- ☐ 1200A ☐ 1600A ☒ 2000A
- ☐ Circuit breaker (Auxiliary)
- ☐ 250A ☐ 400A
- ☒ 3-pole
- ☒ Manually operated

Trip Unit

- ☒ LSI ☐ LSI-G ☐ LSI-G-P

Factory Enclosure

- ☐ Sound attenuated
- ☐ Weatherproof

Attachments

- ☐ DC lighting package

Fuel Tank

- ☐ Intergrated 2100 gal (7950 L)
- ☐ Sub base 3000 gal (11356 L)
- ☐ Sub base 4200 gal (15876 L)

Control System

Controller

- ☐ GCCP 1.2

Attachments

- ☐ Remote annunciator module
- ☐ Expansion I/O module
- ☐ 100A Load Center
- ☐ 20A GFCI AC Receptacle
- ☐ Ground Fault Indication
- ☐ Audible Alarm

Charging

- ☐ Battery charger – 10A (Installed)
- ☐ Battery charger – 20A (Shipped loose)

Telematics

Connectivity

- ☐ Ethernet
- ☐ Cellular

Extended Service Options

Terms

- ☐ 3 year
- ☐ 5 year
- ☐ 10 year

Coverage

- ☐ Silver
- ☐ Gold
- ☐ Platinum

Certifications

- ☐ UL 2200 Listed
- ☐ cUL CSA 22.2 No. 100-14
- ☐ IBC seismic certification

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

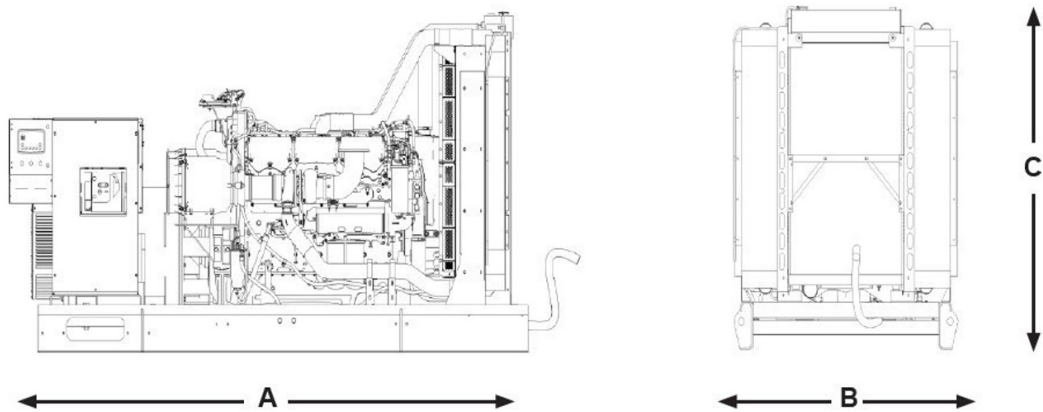
Package Performance – D1250 GC

Performance		Standby	
Frequency		60 Hz	
Genset power rating with fan		1250 ekW	
Genset power rating with fan @ 0.8 power factor		1562 kVA	
Fueling strategy		EPA ESE (Tier 2)	
Performance number		EM7601	
Fuel Consumption			
100% load with fan – L/hr (gal/hr)		321.9	(85)
75% load with fan – L/hr (gal/hr)		261.6	(69.1)
50% load with fan – L/hr (gal/hr)		176.2	(46.5)
25% load with fan – L/hr (gal/hr)		99.4	(26.2)
Cooling System			
Radiator air flow restriction (system) – kPa (in. water)		0.12	(0.48)
Radiator air flow – m³/min (CFM)		1109	(39164)
Engine coolant capacity – L (gal)		55	(14.5)
Radiator coolant capacity – L (gal)		61	(16.1)
Total coolant capacity – L (gal)		116	(30.6)
Inlet Air			
Combustion air inlet flow rate – m³/min (CFM)		118.0	(4168.3)
Exhaust System			
Exhaust stack gas temperature – °C (°F)		430.3	(806.6)
Exhaust gas flow rate – m³/min (CFM)		283.4	(10005.8)
Exhaust system backpressure (maximum allowable) – kPa (in. water)		6.7	(27.0)
Heat Rejection			
Heat rejection to jacket water – kW (BTU/min)		403	(22908)
Heat rejection to exhaust (total) – kW (BTU/min)		1097	(62361)
Heat rejection to aftercooler – kW (BTU/min)		452	(25715)
Heat rejection to atmosphere from engine – kW (BTU/min)		222	(12620)
Heat rejection from alternator – kW (BTU/min)		58.9	(3350)
Emissions* (Nominal)			
NO _x mg/Nm³ (g/hp-h)		2662.7	(5.20)
CO mg/Nm³ (g/hp-h)		44.5	(0.09)
HC mg/Nm³ (g/hp-h)		20.8	(0.05)
PM mg/Nm³ (g/hp-h)		5.3	(0.01)
Emissions* (Potential Site Variation)			
NO _x mg/Nm³ (g/hp-h)		3221.8	(6.29)
CO mg/Nm³ (g/hp-h)		83.2	(0.18)
HC mg/Nm³ (g/hp-h)		39.4	(0.10)
PM mg/Nm³ (g/hp-h)		10.4	(0.03)

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



Weights and Dimensions



Model	Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
D1250 GC	4175 (164.3)	2090.5 (82.3)	2268 (89.3)	7156 (15776)

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 power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Fuel Rates

Fuel rates are 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 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Applicable Codes and Standards

AS 1359, UL 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. Site level review needed for NFPA70. Please consult your local Cat dealer for availability.

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[Spec Info](#) [Mechanical Data](#) [Cooling Data](#) [Motor Starting Curve](#)
[Reactive Capability Chart](#) [General Information](#)

Selected Model

Engine: C32 **Generator Frame:** E3875L4 **Genset Rating (kW):** 1250.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 6145658 **Genset Rating (kVA):** 1563.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Permanent Magnet **Pwr. Factor:** 0.8 **Rated Current:** 1880
Duty: STANDBY **Connection:** PARALLEL STAR **Application:** EPG **Status:** Current
Version: 20239 /20239 /20239 /677642

Spec Information

Generator Specification			Generator Efficiency		
Frame: E3875L4	Type: SR500	No. of Bearings: 1	Per Unit Load	kW	Efficiency %
Winding Type: RANDOM WOUND					
Flywheel: 18					
Connection: PARALLELSTAR					
Housing: 0					
Phases: 3			0.25	312.5	92.5
No. of Leads: 12			0.5	625	95.2
Poles: 4			0.75	937.5	96.5
Sync Speed: 1800			1	1250	96.4
Generator Pitch: 0.6667					

Reactances		Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X" _d		0.0726	0.0107
SUBTRANSIENT - QUADRATURE AXIS X" _q		0.1655	0.0244
TRANSIENT - SATURATED X' _d		0.1539	0.0227
SYNCHRONOUS - DIRECT AXIS X _d		3.9164	0.5775
SYNCHRONOUS - QUADRATURE AXIS X _q		1.5042	0.2218
NEGATIVE SEQUENCE X ₂		0.1180	0.0174
ZERO SEQUENCE X ₀		0.0407	0.0060

Time Constants		Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T' _{d0}		8.9000
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T' _d		0.2710
OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS T" _{d0}		0.0384
SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS T" _d		0.0180
ARMATURE SHORT CIRCUIT T _a		0.0260

Short Circuit Ratio: 0.3793	Stator Resistance = 0.006Ohms	Field Resistance = 2.8 Ohms
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Voltage Regulation		Generator Excitation	
Voltage level adjustment: +/-	5.0%	No Load	Full Load, (rated) pf
Voltage regulation, steady state: +/-	0.5%		Series
Voltage regulation with 3% speed change: +/-	0.5%	Excitation voltage:	12.8 Volts 41.6 Volts
Waveform deviation line - line, no load: less than	2.0%	Excitation current	1.2 Amps 3.9 Amps
Telephone influence factor: less than	40		

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Generator Mechanical Information

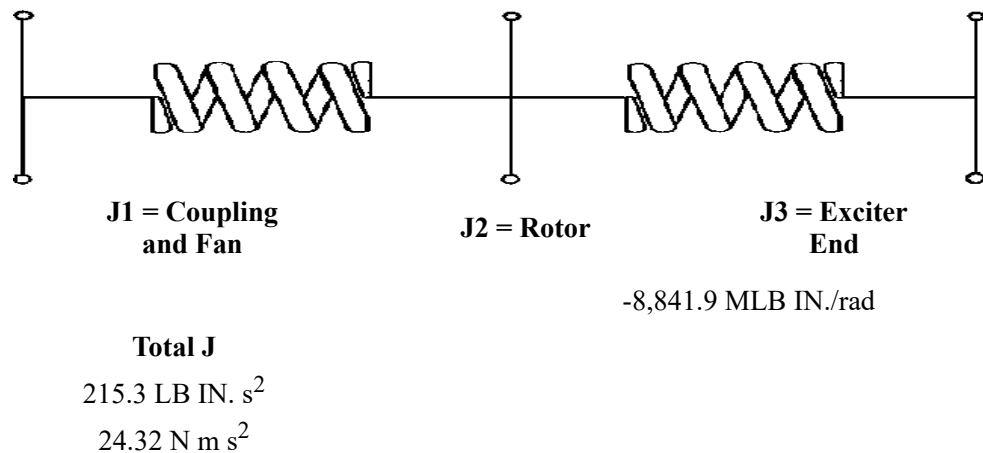
Center of Gravity		
Dimension X	-750 mm	-29.5 IN.
Dimension Y	0 mm	0.0 IN.
Dimension Z	0 mm	0.0 IN.

- "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 = 2700 kg	* Rotor WT = 1026 kg	* Stator WT = 1424 kg
5,952 LB	2,262 LB	3,139 LB

Rotor Balance = 0.016 mm deflection PTP
 Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data



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Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		Temperature Data: (Ambient 40 °C)	
Heat Dissipated: 46.8 kW		Stator Rise:	125 °C
Air Flow: 108 m ³ /min		Rotor Rise:	125 °C
Insulation Class: H			
Insulation Reg. as shipped: 100MΩ minimum at 40 °C			

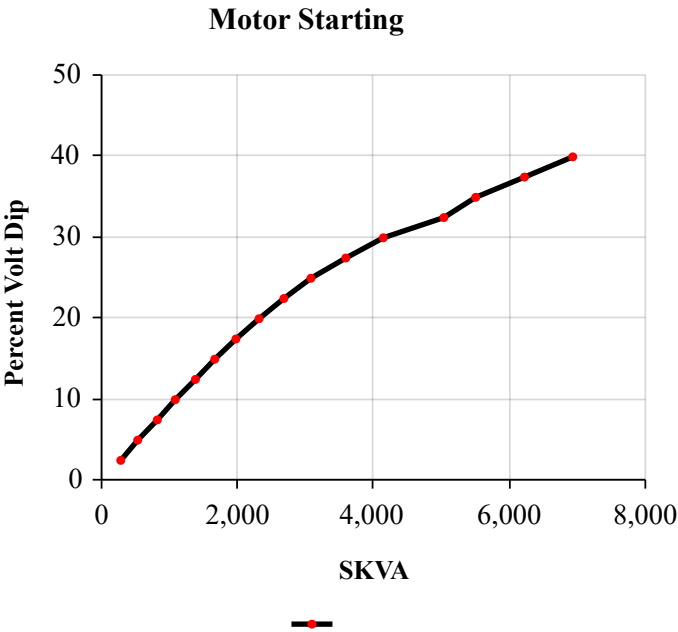
Thermal Limits of Generator	
Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	1248 kVA
F BR -105/40	1440 kVA
H BR - 125/40	1563 kVA
H PR - 150/40	1630 kVA

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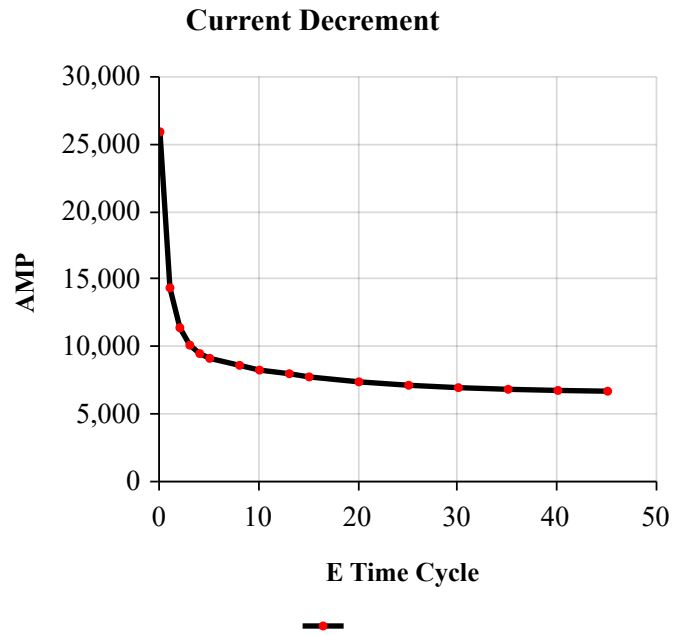
Starting Capability & Current Decrement
Motor Starting Capability (0.6 pf)

SKVA Percent Volt Dip	
269	2.5
519	5.0
807	7.5
1,071	10.0
1,368	12.5
1,652	15.0
1,964	17.5
2,304	20.0
2,669	22.5
3,067	25.0
3,580	27.5
4,132	30.0
5,023	32.5
5,491	35.0
6,209	37.5
6,919	40.0



Current Decrement Data

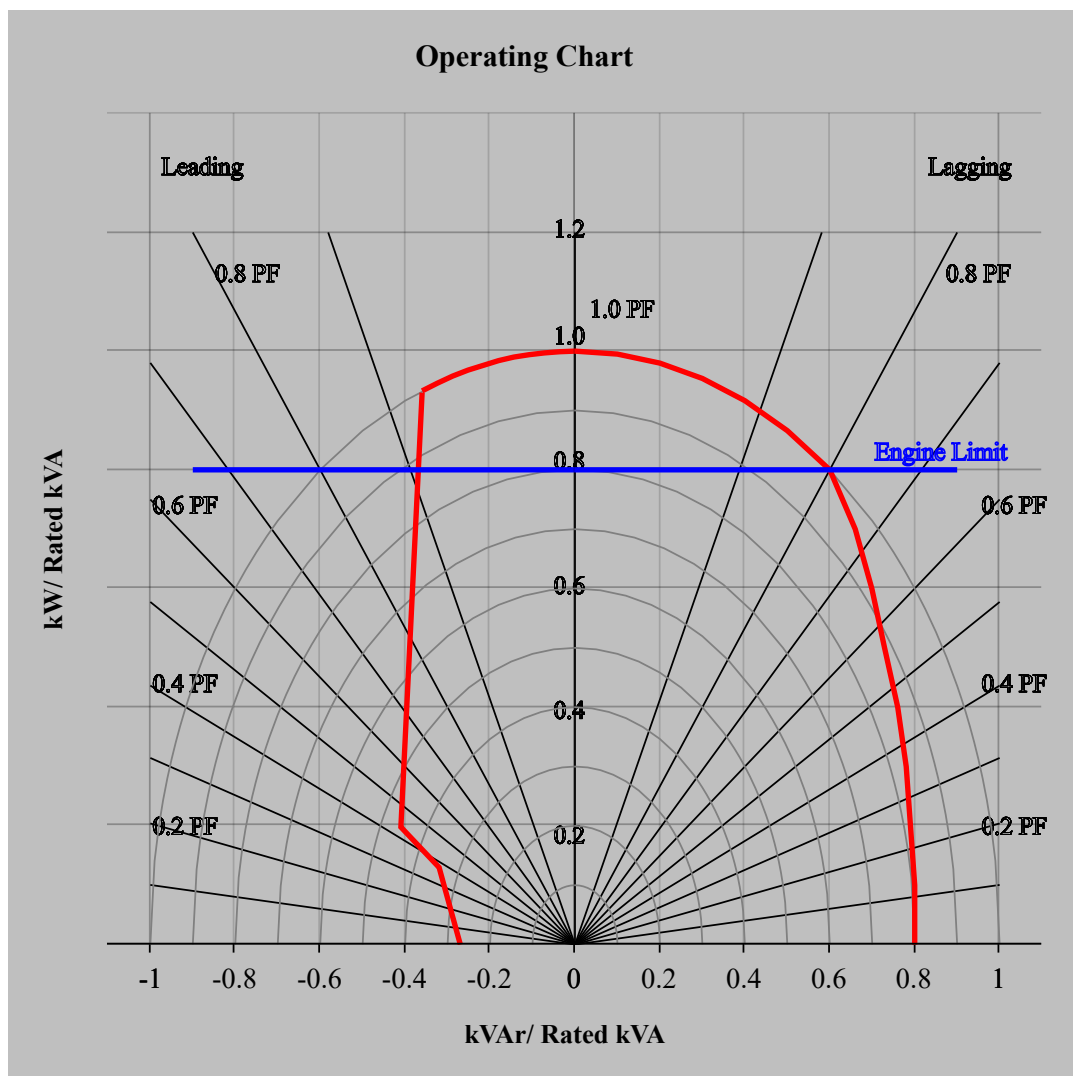
E Time Cycle	AMP
0.0	25,990
1.0	14,427
2.0	11,469
3.0	10,177
4.0	9,553
5.0	9,200
8.0	8,681
10.0	8,331
13.0	8,062
15.0	7,823
20.0	7,459
25.0	7,205
30.0	7,028
35.0	6,906
40.0	6,822
45.0	6,765



Instantaneous 3 Phase Fault Current: 25990 Amps **Instantaneous Line - Line Fault Current: 22611 Amps**
Instantaneous Line - Neutral Fault Current: 33786 Amps

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Reactive Capability Curve			



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General Information

DM7802

GENERATOR GENERAL INFORMATION

1. GENERATOR MOTOR STARTING CAPABILITY CURVES
- A. THE MOTOR STARTING CURVES ARE REPRESENTATIVE OF THE DATA OBTAINED BY THE FOLLOWING PROCEDURE:
 1. THE CATERPILLAR GENERATOR IS DRIVEN BY A SYNCHRONOUS DRIVER.
 2. VARIOUS SIZE THREE PHASE INDUCTION MOTORS (NEMA CODE F) ARE STARTED ACROSS THE LINE LEADS OF THE UNLOADED GENERATOR.
 3. THE RESULTING VOLTAGE DIPS ARE RECORDED WITH AN OSCILLOSCOPE.
 4. MOTOR HORSEPOWER HAS BEEN CONVERTED TO STARTING KILOVOLT AMPERES (SKVA).
 5. RECORDED VOLTAGE DIPS HAVE BEEN EXPRESSED AS A OF GENERATOR RATED VOLTAGE.

generator run at 1200 RPM will produce 60 Hz alternating current.)

B. GENERATOR TEMPERATURE RISE:

The indicated temperature rise indicated the NEMA limits for standby or prime power applications. These rises are used for calculating the losses and efficiencies and are not necessarily indicative of the actual temperature rise of a given machine.

C. CENTER OF GRAVITY

The specified center of gravity is for the generator only.

For single bearing, and two bearing close coupled generators, the center of gravity is measured from the generator/engine flywheel housing interface and from the centerline of the rotor shaft.

For two bearing, standalone generators, the center of gravity is measured from the end of the rotor shaft and from the centerline of the rotor shaft.

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D. GENERATOR DECREMENT CURRENT CURVES

The generator decrement current curve gives the symmetrical current supplied by the generator for a three phase bolted fault at the generator terminals. Generators equipped with the series boost attachment or generators with PM excitation system will supply 300% of rated current for at least 10 seconds.

E. GENERATOR EFFICIENCY CURVES

The efficiency curve is representative of the overall generator efficiency over the normal range of the electrical load and at the specified parameters. This is not the overall engine generator set efficiency curve.

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Content Owner: Commercial Processes Division

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Component Performance Number: DM8513**Water Pump:** 2160657 , 2304172 , 3520202 , 2160657 , 2304172 , 3520202**Drive Ratio:** 1.0**Sales Model:** C32**A/C:****Engine Equipped with:** DRY MANIFOLD

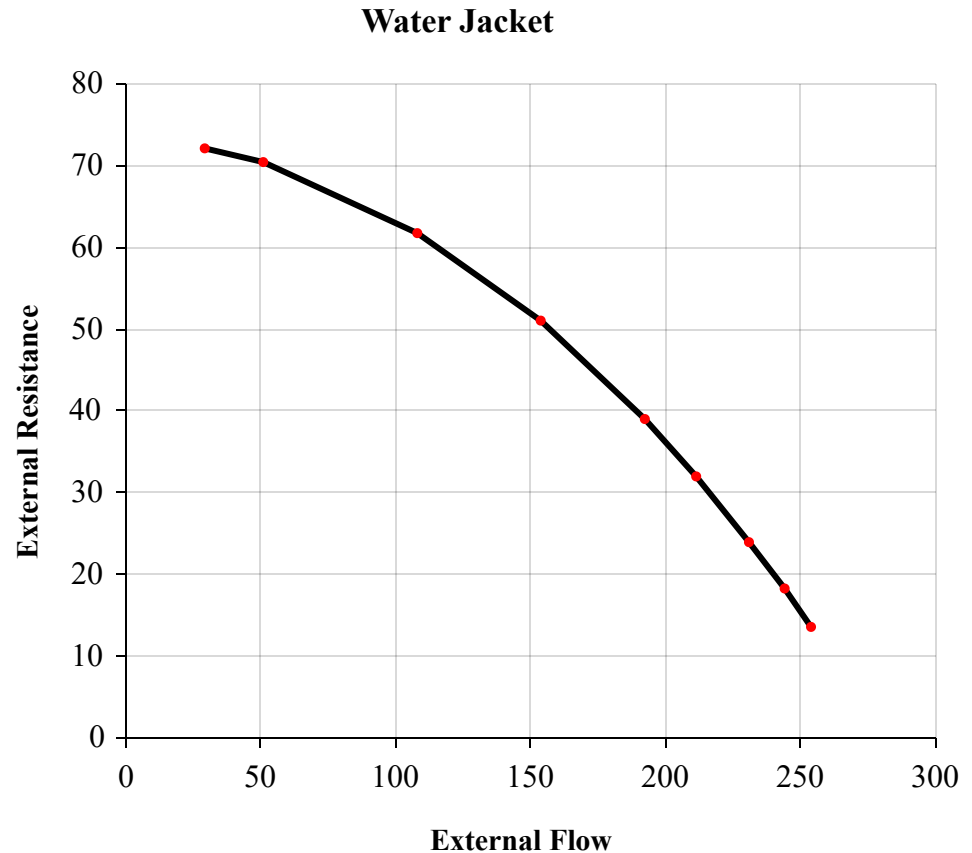
Engine Speed RPM:

2,100

Pump Speed RPM:

2,100

EXT RESIST FT H2O	EXT FLOW GPM
13.71	253.34
18.41	243.57
24.08	230.36
32.12	210.81
39.14	191.79
51.18	153.22
61.88	107.52
70.57	50.46
72.25	28.79



II. USE OF THE MOTOR STARTING CAPABILITY CURVES.

A. CALCULATE THE SKVA REQUIRED BY THE MOTOR FOR FULL VOLTAGE STARTING ACROSS THE LINE IF THE VALUE IS NOT LISTED ON THE MOTOR DATA PLATE.

1. MOTORS CONFORMING TO NEMA STANDARDS

MULTIPLY THE MOTOR HORSEPOWER BY THE NEMA SKVA/HP FIGURE. FOR NEMA CODE F, USE 5.3 SKVA/HP; FOR NEMA CODE G, USE 6.0 SKVA/HP.

2. ALL OTHER MOTORS:

MULTIPLY THE RATED VOLTAGE BY THE LOCKED ROTOR AMPERE AND BY 0.001732. (IF THE LOCKED ROTOR AMPERES ARE NOT LISTED, MULTIPLY THE FULL LOAD (RUNNING) AMPERES BY B. USE THE ABOVE SKVA WITH THE MOTOR STARTING TABLE.

1. ACROSS LINE STARTING:

READ ACROSS THE ROW OF "ACROSS THE LINE STARTING SKVA IF THE DESIRED VALUE OF SKVA IS NOT GIVEN, CALCULATE THE DIP BY FINDING THE PROPER SKVA INTERVAL AND INTERPOLATING AS FOLLOWS:

SKVA1 IS THE SKVA TABLE ENTRY JUST SMALLER THAN THE DESIRED SKVA, DIP1 IS THE DIP FOR SKVA2, AND SKVA2 IS THE SKVA TABLE ENTRY JUST GREATER THAN THE DESIRED SKVA. THE DIP (IN PERCENT) AT THE DESIRED SKVA IS:

$$\text{DIP} = \text{DIP1} + (\text{SKVA} - \text{SKVA1}) * 2.5 / (\text{SKVA2} - \text{SKVA1})$$

NOTE: VOLTAGE DIPS GREATER THAN 35% MAY CAUSE MAGNETIC CONTACTORS TO DROP OUT.

2. REDUCED VOLTAGE STARTING:

REFER TO THE FOLLOWING TABLE. MULTIPLY THE CALCULATE ACROSS LINE SKVA BY THE MULTIPLIER LISTED FOR THE SPECIFIC STARTING METHOD. APPLY THE RESULT TO THE STARTING TABLE AS IN II A, TO CALCULATE THE EXPECTED VOLTAGE DIP:

TYPE OF REDUCED VOLTAGE STARTING	MULTIPLY LINE SKVA BY
80% TAP	.80
65% TAP	.65
50% TAP	.50
45% TAP	.45
Wye start, delta run	.33

AUTOTRANSFORMER

80% TAP	.68
65% TAP	.46
50% TAP	.29

NOTE: REDUCE VOLTAGE STARTING LOWERS THE MAXIMUM REQUIRED MOTOR SKVA.

3. Part winding starting:

Most common is half-winding start, full-winding run. Multiply the full motor, across line starting SKVA by 0.6. Apply the result to the selected curve as in ii. A above. Read the expected voltage dip, for the required SKVA.

III. DEFINITION:

A. GENERATOR TERMS

MODEL: Engine Sales model

ENG TYPE: DI = Direct Injection,

NA = Naturally aspirated, etc

HZ: Running frequency, hertz

RATING TYPE: PP, SB (prime power or standby)

KW: Base rating electrical kilowatts (ekW)

VOLTS: Rating terminal, line to line

GEN ARR: Cat generator arrangement part number

GEN FRAME: Generator frame size designation

CONN: Generator output connection

(star, wye, delta, ect.)

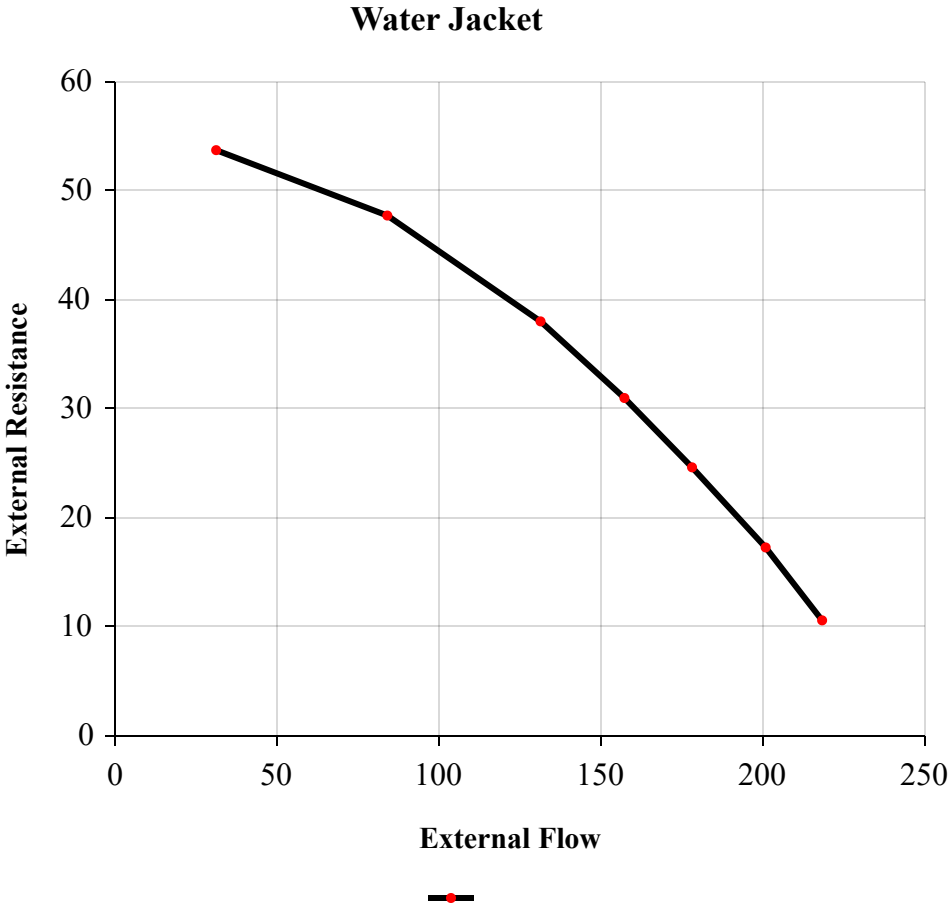
POLES: Number of pole pieces on rotor.

(eg. A 4 pole generator run at 1800)

RPM will produce 60 Hz alternating current. A 6 pole

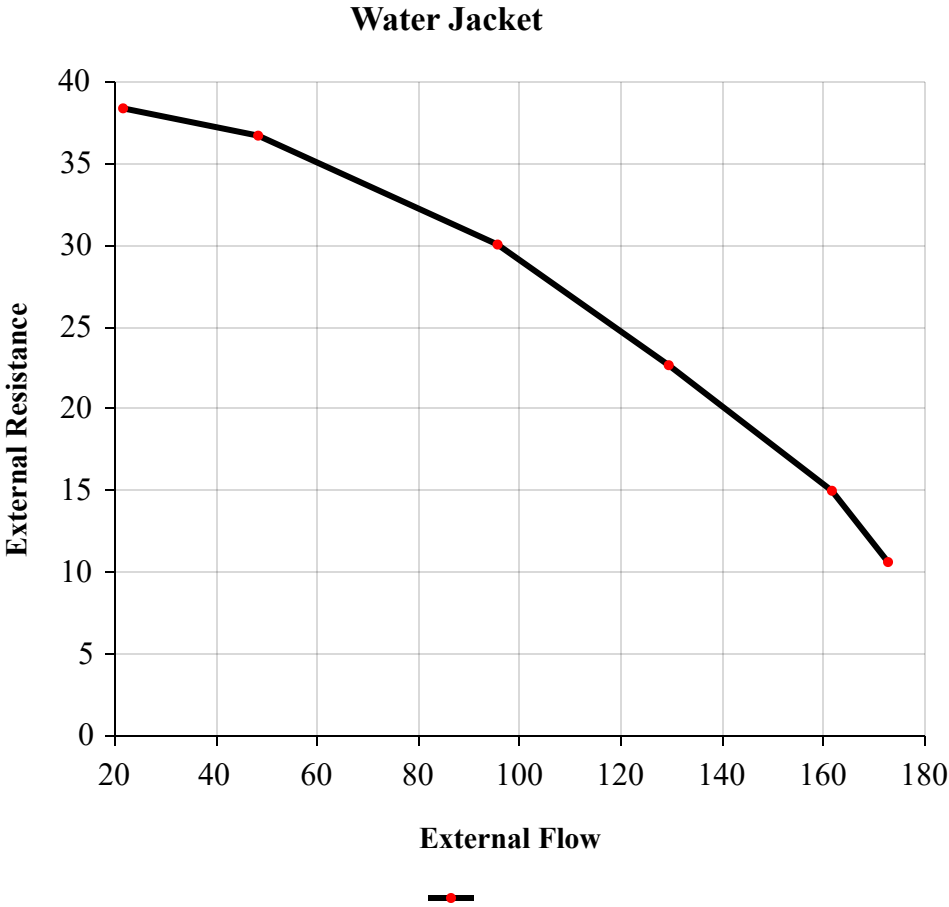
Engine Speed RPM:
1,800
Pump Speed RPM:
1,800

EXT RESIST FT H2O	EXT FLOW GPM
10.7	217.94
17.39	200.51
24.74	177.79
31.1	156.92
38.13	131.03
47.84	83.74
53.84	30.91



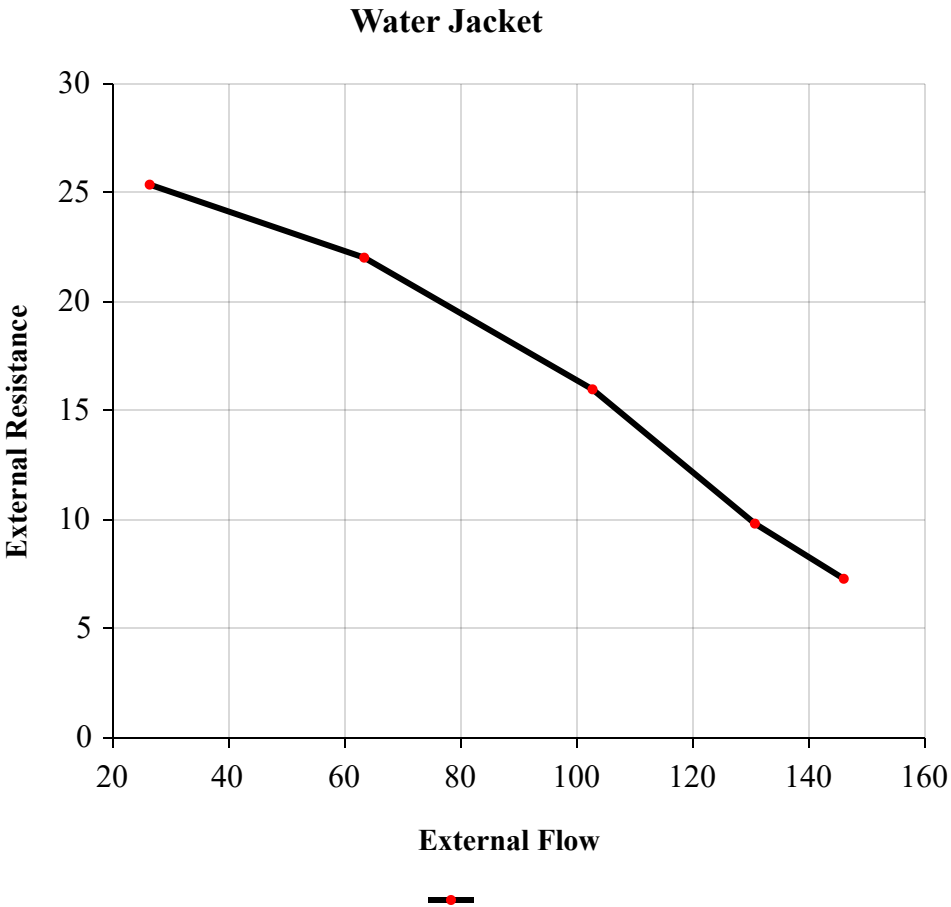
Engine Speed RPM:
1,500
Pump Speed RPM:
1,500

EXT RESIST FT H2O	EXT FLOW GPM
10.7	172.5
15.06	161.41
22.74	129.18
30.12	95.37
36.78	48.08
38.45	21.4



Engine Speed RPM:
1,200
Pump Speed RPM:
1,200

EXT RESIST FT H2O	EXT FLOW GPM
7.35	145.82
9.88	130.5
16.04	102.5
22.08	63.14
25.43	26.15

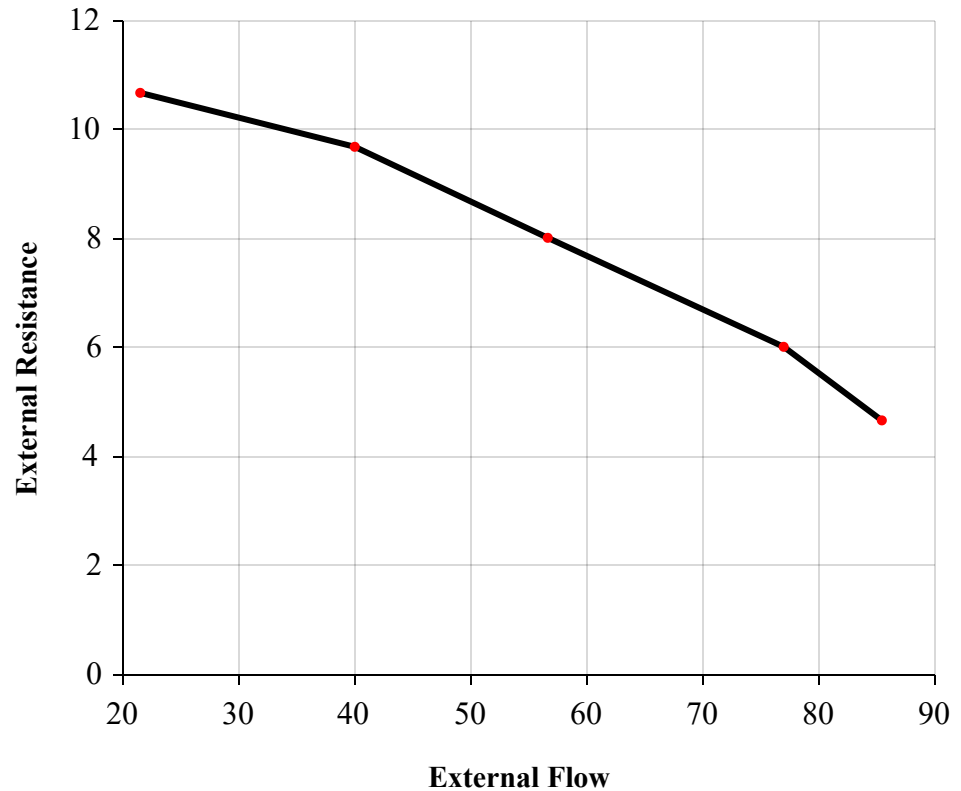


Engine Speed RPM:
700

Pump Speed RPM: 700

EXT RESIST FT H2O	EXT FLOW GPM
4.69	85.33
6.04	76.87
8.04	56.53
9.71	39.89
10.7	21.4

Water Jacket



Reference

Number: DM8513

JACKET WATER PUMP PERFORMANCE FOR C32 ACERT IND/PETROLEUM

Parameters

Reference: TM6020

JACKET WATER PUMP PERFORMANCE

DEFINITIONS:

EXTERNAL RESISTANCE IS THE TOTAL COOLANT FLOW RESTRICTION BEYOND THE ENGINE COOLANT OUTLET INCLUDING ANY RESTRICTION ORIFICE.

EXTERNAL RESISTANCE WOULD INCLUDE:

COOLANT PIPING TO AND FROM THE JACKET COOLANT PIPING.

THE JACKET COOLANT HEAT EXCHANGER SUCH AS A RADIATOR, BUNDLE COOLER OR SIMILAR DEVICE.

INTERNAL RESISTANCE IS THAT COOLANT FLOW RESTRICTION CAUSED BY THE:

ENGINE OIL COOLER

CYLINDER BLOCK

CYLINDER HEAD

THERMOSTAT AND HOUSING

FLOW RESTRICTION ORIFICE

TOLERANCE: +/- 5%

Web Master(s): [PSG Web Based Systems Support](#)

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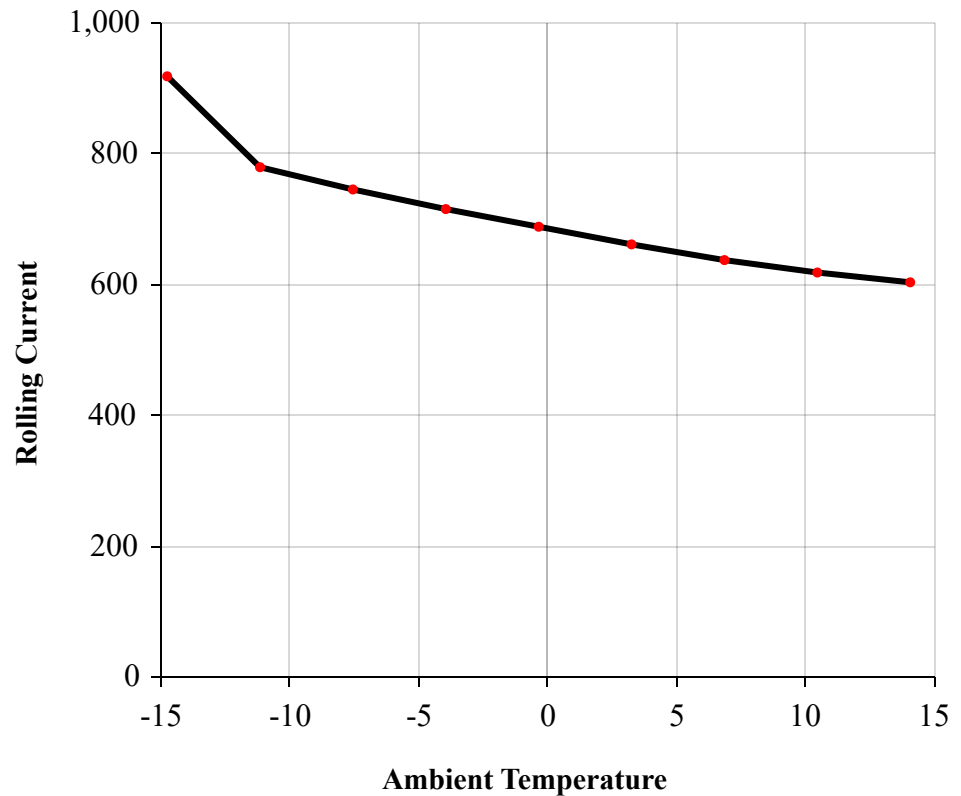
Component Performance Number: TM4822**Voltage:** 24.0**Motor Qty Per Group:** 1**Battery Capacity for 90 sec. Crank:** 870 CCA**Motor Body Diameter:** 5.559044 IN**Cranking Current:** 525 AMPS@21 Deg C (70 Deg F)**Cranking Current:** 670 AMPS@0 Deg C (32 Deg F)**Sales Model:** 3412, C27, C32**Motor Group:** 2490635, 3N4581, 3T2780, 3T8967, 4N1061, 5N4801, 6N9677

Oil SAE Grade:

10W

AMBIENT ROLLING**TEMP CURRENT**
DEG F AMP

14	605
10.4	620
6.8	639
3.2	663
-0.4	690
-4	717
-7.6	747
-11.2	781
-14.8	920

Starting Motor Cranking

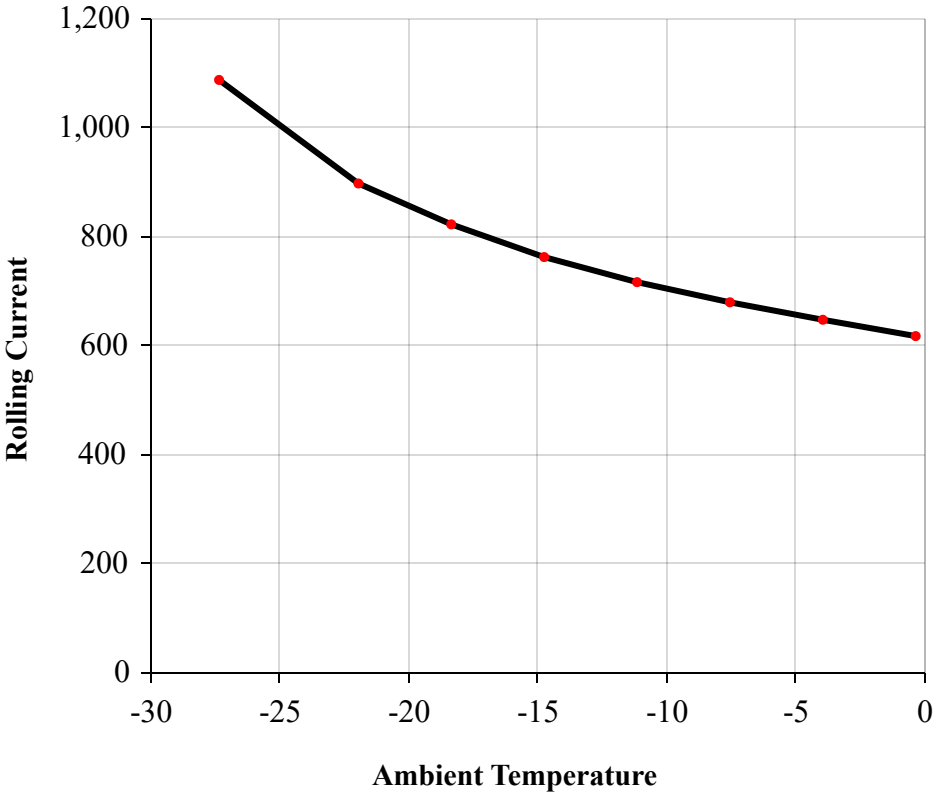
—●—

Oil SAE Grade:
5W/20

AMBIENT ROLLING
TEMP CURRENT
DEG F AMP

-0.4	620
-4	650
-7.6	682
-11.2	719
-14.8	765
-18.4	825
-22	900
-27.4	1,090

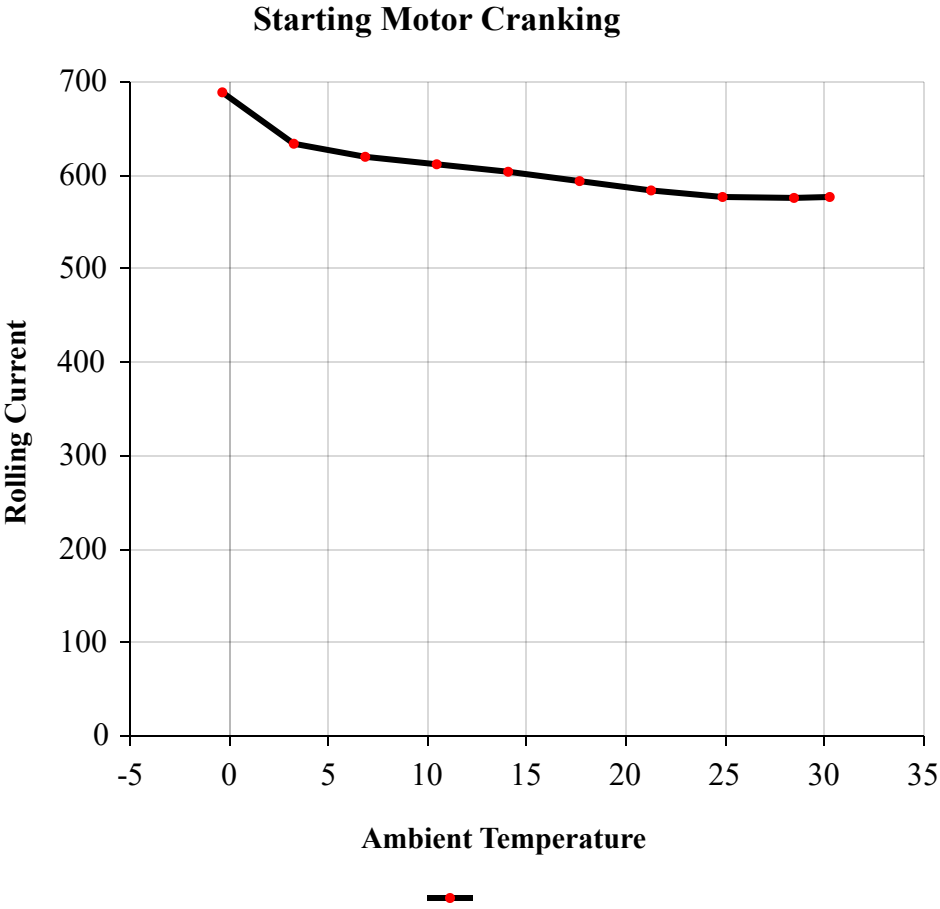
Starting Motor Cranking



—●—

Oil SAE Grade:
10W/30

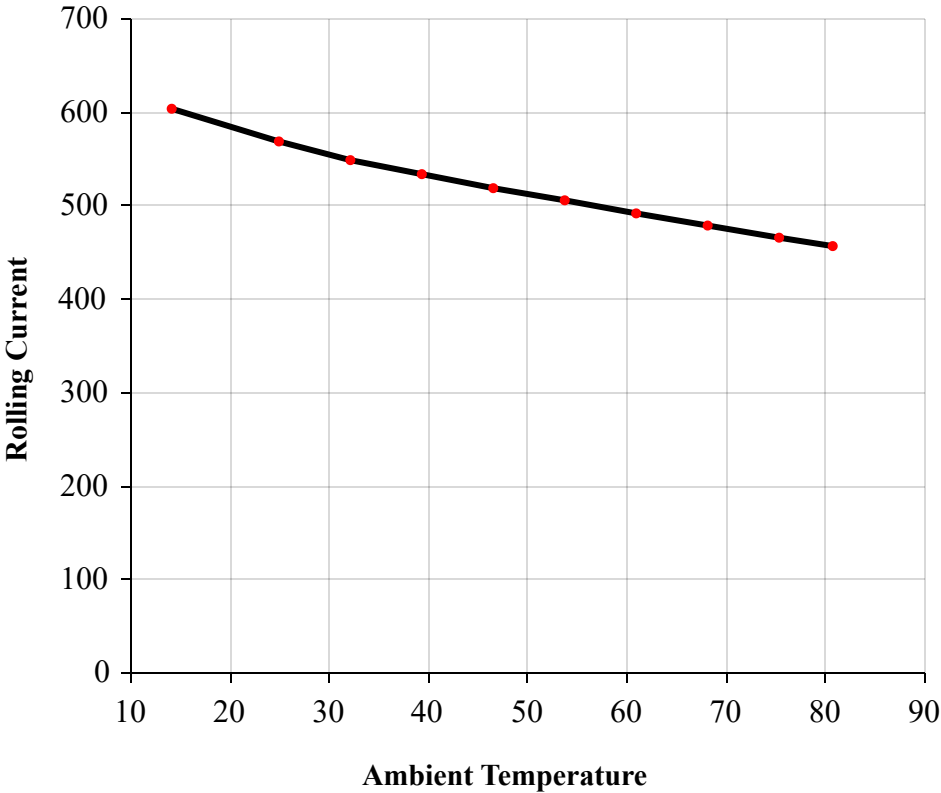
AMBIENT TEMP DEG F	ROLLING CURRENT AMP
30.2	578
28.4	577
24.8	578
21.2	585
17.6	595
14	605
10.4	613
6.8	621
3.2	635
-0.4	690



Oil SAE Grade:
10W/40

AMBIENT TEMP DEG F	ROLLING CURRENT AMP
80.6	458
75.2	467
68	480
60.8	493
53.6	507
46.4	520
39.2	535
32	550
24.8	570
14	605

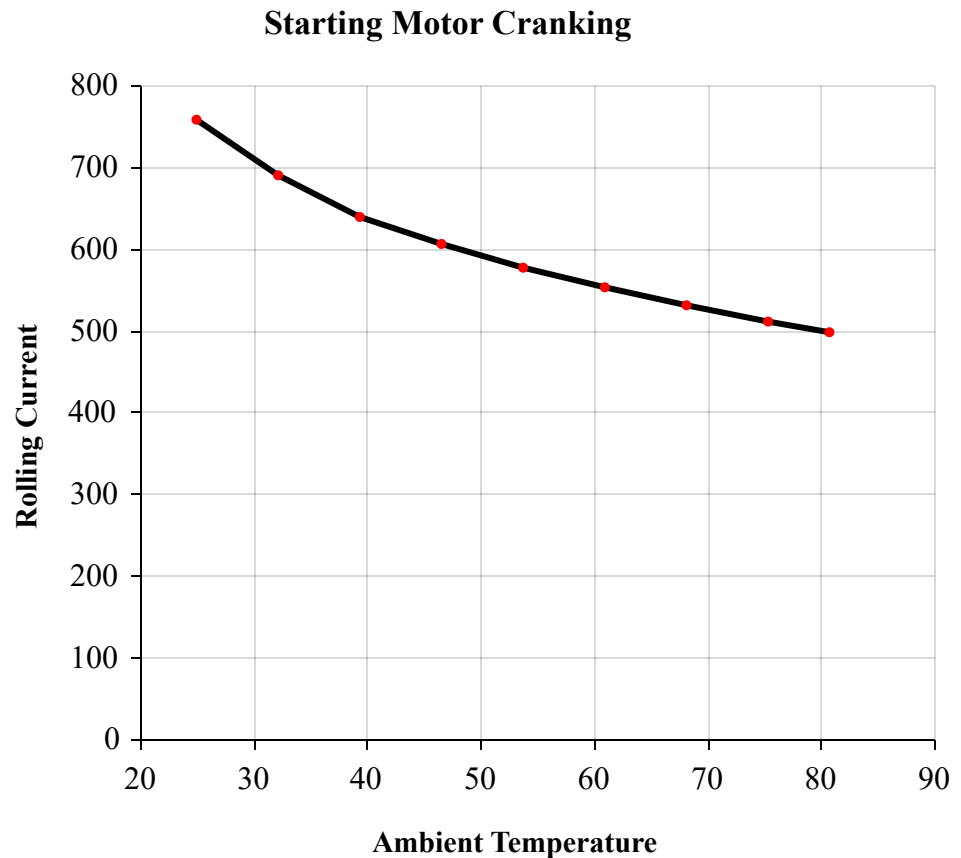
Starting Motor Cranking



—●—

Oil SAE Grade:
30W

AMBIENT TEMP DEG F	ROLLING CURRENT AMP
80.6	500
75.2	513
68	533
60.8	555
53.6	579
46.4	608
39.2	641
32	692
24.8	760



Reference

Number: TM4822 No notes found...

Parameters

Reference: TM6017 ELECTRIC STARTING MOTOR DATA
THE CURRENT (ROLLING AMPERAGE) SHOWN IS THE AMOUNT OF AMPERAGE PER ENGINE MEASURED AFTER 5 SECONDS OF CRANKING.

THE ENGINE IS EQUIPPED WITH FUEL, LUBE OIL AND JACKET WATER PUMPS; WITH RADIATOR COOLING FAN; WITH POWER GENERATOR OR INERTIA MASS OF EQUIVALENT SIZE.

THE TEMPERATURE OF THE ENGINE STARTING SYSTEM AND BATTERY PACK ARE STABILIZED AT THE INDICATED VALUE.

THE LUBRICATING OIL EXHIBITS A VISCOSITY AS DEFINED BY SAE J300B SPECIFICATIONS.

THE CABLES FOR BATTERY LEADS ARE SIZED FOR MAXIMUM VOLTAGE DROP OF 0.12 VOLTS PER 100 AMPS IN A 12 VOLT SYSTEM AND 0.2 VOLTS PER 100 AMPS IN A 24 OR 30/32 VOLT SYSTEM.

THE RECOMMENDED BATTERY PACK IS SIZED TO CRANK A MINIMUM OF 90 SECONDS AT 0 DEG C (32 DEG F) WITH 30 WEIGHT OIL AFTER BEING FULLY CHARGED.

INCREASING THE AMP/HR (CCA) RATING OF THE BATTERY WILL NOT SIGNIFICANTLY AFFECT CRANKING CURRENT DRAW. IT WILL PERMIT A

LONGER CRANKING PERIOD.

THE BREAKAWAY CURRENT (LOCKED ROTOR) IS THE AMOUNT OF AMPERAGE SURGE INITIALLY DRAWN BY THE MOTOR AS CRANKING BEGINS. THIS SURGE IS SELDOM USED TO SIZE BATTERIES BECAUSE OF ITS SHORT DURATION. IT IS USUALLY ESTIMATED AT 250% OF THE ROLLING CURRENT.

DUAL MOTORS WILL SLIGHTLY DECREASE THE STARTING TIME ACHIEVED BY ONE SUCH MOTOR BUT WILL INCREASE THE TOTAL CRANKING CURRENT.

STARTING AIDS SUCH AS GLOW PLUGS, JACKET WATER HEATERS AND ETHER INJECTION WILL ENCOURAGE QUICKER STARTING BUT WILL HAVE NO EFFECT ON THE CRANKING CURRENT.

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Content Owner: Commercial Processes Division

Web Master(s): [PSG Web Based Systems Support](#)

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770.941.2411 fax
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Generator Control Information

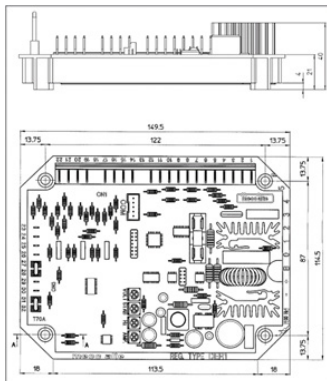


Image shown might not reflect actual configuration

Technical Specifications

Maximum current	5A (Continuous)
Forced excitation current for 1 minute	10A
Power Input (Aux winding or PMG)	Voltage: 40Vac to 270Vac
	Frequency: 12Hz to 72Hz
Sensing voltage	Range 1: 75Vac to 150Vac
	Range 2: 150Vac to 300Vac
Voltage Regulation (Steady state)	<±0.54%
Analog input (A1-A2)	0Vdc - 2.5V dc
	-10Vdc to +10Vdc
External Volts Adjustment	±10% with 100k ohm Pot
Operating temperature:	-25°C to +70°C
Dimensions (L x W x H)	149.5mm x 114.5mm x 40mm

DER1- Automatic Voltage Regulator

The DER1 is a voltage regulator for 50 or 60 Hz synchronous alternators Internally excited brushless type SR500 frame generators. The AVR circuitry includes under speed and overload protection.

Features

- All parameters on the AVR can be programmed using a USB connector and a computer or through potentiometers
- Genset output voltage can be altered by adjusting the onboard potentiometer "VOLT"
- Onboard overload setting can be altered by adjusting the onboard potentiometer "AMP" which allows the user to set the overload limit and has LED indication to show overload condition & Protection activated* (after time delay)
- "HZ" potentiometer adjusts the under speed protection with respect to the nominal speed value set by the 50/60 hz jumper
- "STAB" potentiometer adjusts the dynamic response of the alternator under transient response
- Remote control of voltage available with a range of 0Vdc to 2.5Vdc or -10Vdc to +10Vdc.

*flash rate varies in each protection activated!

LET'S DO THE WORK.™

LEHE20369-00 (09/21)

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ADEM™ A4 Engine Controller

The ADEM™ A4 is the main Electronic Control Module (ECM) used on select diesel engines. The ADEM A4 provides a higher degree of control over a large number of combustion variables. The ADEM A4 is designed to control/interface Electronic Unit Injector (EUI) equipped engines. The ADEM A4 engine system is composed of the ADEM A4 ECM, control software, sensors, actuators, fuel injectors, and interface to the generator system. The prime benefit of an ADEM A4 engine system is to better control and maintain the particulate emissions, both steady state and transient, while improving engine performance.

Features

Reliable, Durable

All ADEM A4 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 A4 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 A4 ECM

Self Diagnostics

Each ADEM A4 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

Description

The ECM is housed in an environmentally sealed cast-iron. 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.

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

System tests are available to assist in electronic troubleshooting. These tests include: injector activation, injector cutout, and override of control outputs.

Data Link Interfaces

The ADEM A4 communicates with the EMCP via a dedicated communication network.

Electronic Sensing

The following sensing is available on the ADEM A4: 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.

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)

18 to 32 VDC

Mounting

Engine mounted

Reverse polarity protected

Shock, withstands 20g

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 8.0g @ 24 to 2 kHz

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Image shown may not reflect actual configuration.

GCCP 1.2 – Control Panel

GCCP 1.2 is an Auto Start Control Module suitable for a wide variety of diesel gen-set applications. Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs and remote PC.

Description

The controller is compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications & PLC functionality. The modules can be easily configured using a configuration suite PC software.

Full Range of Attachments

- Wide range of system expansion attachments, designed specifically to work with the GCCP controller
- Flexible packaging options for easy and cost effective installation

Benefits

- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility
- PLC editor allows user configurable functions to meet user specific application requirements
- RS485 Communication port can be used for the Remote Monitoring Communication (Compatible with Cat PLG)

World Wide Product Support

- Cat dealers provide extensive pre and post sale support
- Cat dealers have over 1,600 dealer branch stores operating in 200 countries

Features

- 4-line back-lit LCD text display
- Multiple display languages
- Five-key menu navigation
- LCD alarm indication
- Customisable power-up text and images
- Data logging facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB & RS485 communication
- Front panel configuration with PIN protection
- Power save mode
- 3-phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf) kW and kvar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN Support for 0V to 10V & 4 mA to 20 mA sensors
- 8 Configurable digital inputs (3 available for Customer use)
- 8 Configurable digital outputs (5 available for Customer use)
- 4 Configurable analogue inputs (3 available for Customer use)
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- 3 Configurable maintenance alarms
- MODBUS RTU support
- User configurable MODBUS pages

SPECIFICATIONS

DC SUPPLY

CONTINUOUS VOLTAGE RATING

8V to 35V continuous
5V for upto 1 minute

CRANKING DROPOUTS

Able to survive 0V for 100 mS, providing supply was at least 10V before dropout and supply recovers to 5V. This is achieved without the need for internal batteries.

LEDs and backlight will not be maintained during cranking

MAXIMUM OPERATING CURRENT

260 mA at 12V, 150 mA at 24V

MAXIMUM STANDBY CURRENT

145 mA at 12V, 85 mA at 24V

CHARGE FAIL/EXCITATION RANGE

0V to 35V

GENERATOR & MAINS (UTILITY) VOLTAGE RANGE

15V to 415 V AC (Ph to N)
26 V to 719 V AC (Ph to Ph)

MAGNETIC PICK-UP VOLTAGE RANGE

+/- 0.5V to 70V

FREQUENCY RANGE

10,000 Hz (max)

INPUTS

DIGITAL INPUTS A TO H

Negative switching

ANALOGUE INPUTS A & D

Configurable as:
Resistive / Voltage (0 - 10V) / Current (4 - 20mA)

ANALOGUE INPUTS B & C

Configurable as:
Resistive sensor input only

OUTPUTS

OUTPUT A and B (FUEL & START)

15A DC at supply voltage

AUXILIARY OUTPUTS C, D, E, F, G, H, I & J 2

A DC at supply voltage

DIMENSIONS

OVERALL

216 mm x 158 mm x 43 mm
8.5" x 6.2" x 1.5"

PANEL CUTOUT

184 mm x 137 mm
7.2" x 5.3"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

OPERATING TEMPERATURE

-30°C to +70°C
-22°F to +158°F

STORAGE TEMPERATURE RANGE

-40°C to +85°C
-40°F to +185°F

STANDARDS

UL, cUL Listed

NFPA 70#

Electro-Magnetic Compatibility: BS EN 61000-6-2/6-4 Electrical Safety: BS EN 60950

Temperature: BS EN 60068-2-1, BS EN 60068-2-2

Vibration: BS EN 60068-2-6

Humidity: BS EN 60068-2-30, BS EN 60068-2-78 Shock: BS EN 60068-2-27

Degrees of protection provided by enclosures: BS EN 60529 Ingress Protection:

IP65 – Front of module when installed into the control panel with the optional sealing gasket

Applicable codes and standards facilitate compliance to NFPA 70

OPTIONAL MODULES

Remote annunciator



The Remote annunciator with an integral sounder is an output LED expansion module designed to display a maximum of eight individual LED indications up to a maximum distance of 1 km (0.6 miles). The annunciator will consist of two modules to provide a 16 Channel Fault annunciation. The Panels are fitted with removable label cards which can be used to identify the standard NFPA alarms

Key Features:

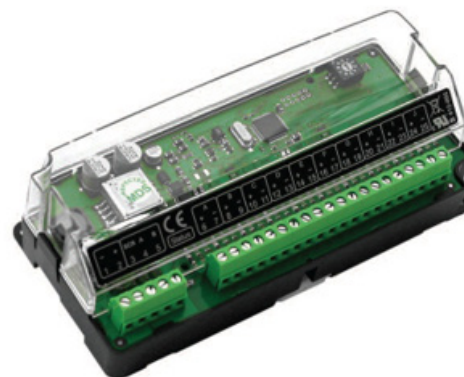
- Panel mount
- Vertical design
- In-built alarm
- Alarm mute button
- Max of 80 configurable LED's

Input Expansion Module

The Input Expansion module is used in conjunction with supported GCCP controllers to provide additional, flexible, input functionality. The module's ID switch is configurable from the module and the 10 inputs can be configured from within the 'host controller'. The inputs can be configured in a number of ways to connect to digital switches, resistive sensors, 0-10V DC signals or 4-20 mA sig.

Key Features:

- DIN rail & chassis mount
- Power on/link lost LED
- 1.2 km (0.75 Mile) working range
- Connect maximum of 4 x Input Modules to a single host controller
- Max of 40 configurable inputs



Output Expansion Module

The output relay expansion module for use with compatible GCCP control modules has been designed to extend a host module's output capabilities. A maximum of 10 relays can be connected to an individual module at any one time. All outputs are configurable via the host controller.

Key Features:

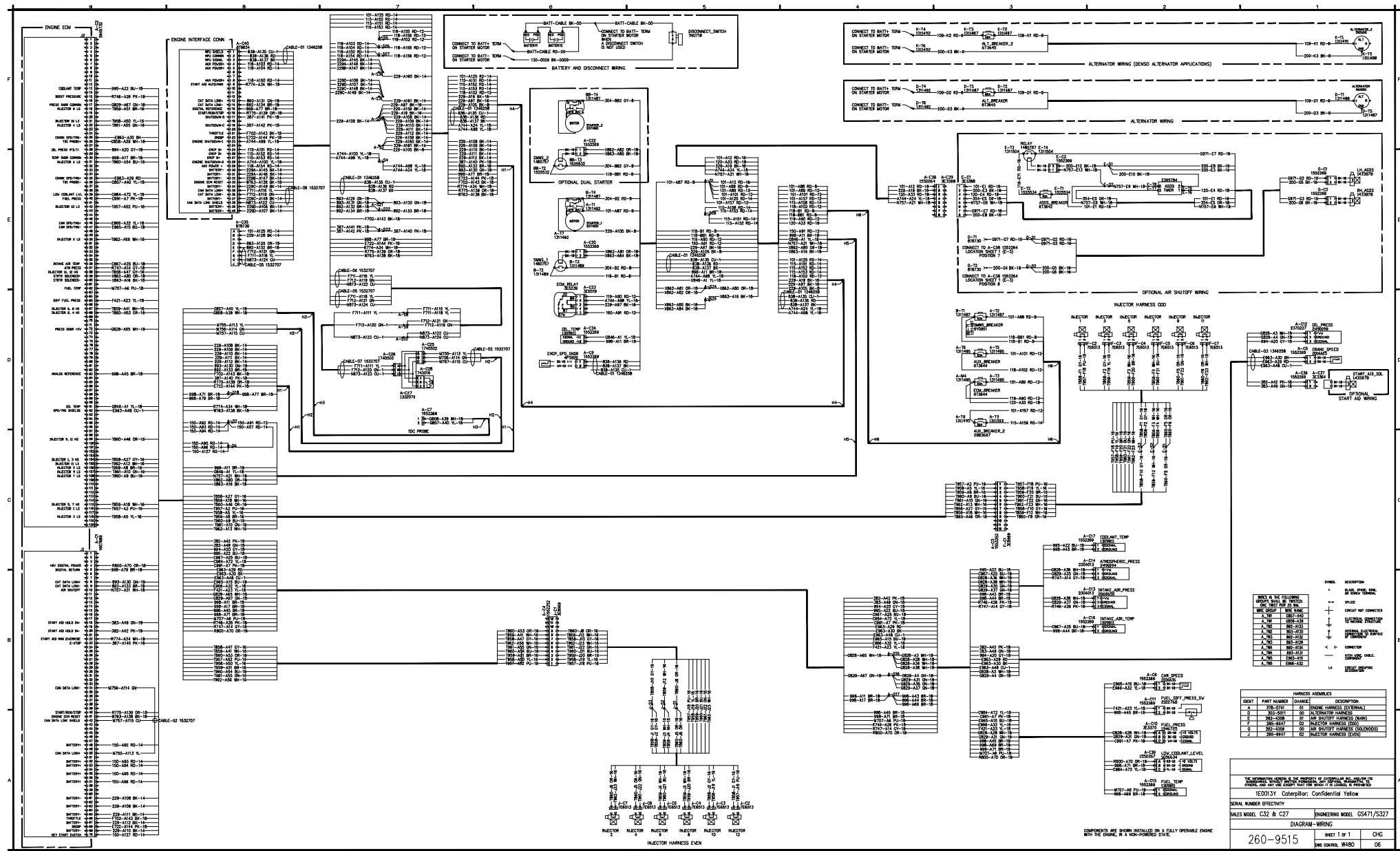
- Power On/Link Lost LED ID SWITCH
- 10 Expansion modules can be connected to 1 host controller at a time
- 8 Configurable relay contacts with LED indicators:
 - o 4 Normally Open (N/O)
 - o 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up





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877.278.6235 toll free
www.YanceyPower.com

Generator Drawings *&* *Wiring Schematics*



YANCEY ENGINEERED SOLUTIONS

GRIFFIN, GA

DRAWINGS PREPARED FOR: YANCEY POWER SYSTEMS

PROJECT NAME: QTS UNIVERSAL C32 PHASE 2

CAT C32 1,250kW W/ ALUMINUM PANELS UL2200 WALK IN DESIGN ENCLOSURE

YES JOB # 23-0739

DATE: 12/5/2023

PROJECT NOTES:

- GENSET: CATERPILLAR C32, 1,250KW
WEIGHT: 16,755 LBS. (DRY)
DIMENSIONS: 172.70" L x 87.70" W x 86.40" H
ENGINE DWG NO.: 621-3216
- ENCLOSURE WALLS: ALUMINUM PANELS
- ENCLOSURE FRAME: 2" x 2" x 0.125" AL TUBING
- ENCLOSURE COLOR: TRAFFIC GRAY
- TOTAL PACKAGE WEIGHT (WET): 47,000 LBS
- INTERIOR LINING: PERFORATED GALVANIZED STEEL
- SOUND ATTENUATION LEVEL: LEVEL 1, 85dBA @ 23FT (AVG FREE FIELD).
- SOUND ATTENUATION MATERIAL: 2" MINERAL WOOL
- TANK SHALL BE PROVIDED WITH 4 LIFTING EYES.
- ENCLOSURE UL 2200 LISTED, 150MPH WIND LOAD
- DESIGN AIR FLOW:
INTO ENCLOSURE: 57,280 ACFM, 0.0710 LBS./FT3
OUT OF ENCLOSURE: 63,610 ACFM, 0.0651 LBS./FT3
MAX AMBIENT SPEC: 118°F @ 2460FT ASL.
- TANK INFORMATION:
TANK UL-142 LISTED,
USABLE GALLONS: 4,200
NOMINAL GALLONS: 4,420
TANK WEIGHT (DRY): 12,450 LBS

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DRAWING SET OUTLINE

SHEET 1	COVER SHEET
SHEET 2	BILL OF MATERIALS
SHEET 3	ELEVATION VIEWS
SHEET 4	ELEVATION VIEWS
SHEET 5	ELECTRICAL DETAILS
SHEET 6	TANK DETAILS
SHEET 7	NFPA 30 PANEL DETAILS
SHEET 8	CONTROL AND WIRING DETAILS
SHEET 9	P&ID DETAILS
SHEET 10	DIODE LAYOUT DETAILS
SHEET 11	DIODE LAYOUT DETAILS
SHEET 12	LIFTING CONCEPT

DRAWING FOR APPROVAL NOT FOR CONSTRUCTION PURPOSES

APPROVED AS DRAWN ☐
APPROVED AS NOTED ☐
REVISE AS NOTED, RESUBMIT ☐

SIGNATURE

DATE

NAME (PLEASE PRINT)

TITLE

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

DIMENSIONS ARE IN INCHES. ALL INFORMATION ON THIS DRAWING IS FOR REFERENCE ONLY.	Tolerances: DECIMAL +/- 2.00" FRACTIONAL +/- 2"	 THIRD-ANGLE PROJECTION

REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

CUSTOMER:
YANCEY POWER SYSTEMS

Drawing Title:
QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL

Sheet Title:
COVER SHEET

Scale:	N.T.S.	Dwg No.:	23-0739
Drawn by:	ASH	Checked by:	JPR
Approved by:	KYB	Revision:	A
Sheet No.	1 OF 12	Date:	12/5/2023

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ITEM	QTY.	ITEM DESCRIPTION	SHT #	SUPPLIER	MFG. DWG. #
1	1	CUSTOMER PROVIDED CATERPILLAR C32 1250KW 60HZ GENSET. YES TO ARRANGE TRANSPORT FOR CUSTOMER UNIT FROM CAT GRIFFIN TO YES FACILITY IN GRIFFIN, GEORGIA	3,4,6,8	YPS	621-3216
2	1	ENCLOSURE: 2" x 2" x 0.125" ALUM. TUBING COVERED IN 0.080" ALUMINUM PANELS. SLOPED ROOF. WALK-IN DESIGN. 2" MINERAL WOOL. LEVEL 1 ENCLOSURE, 85dBA AVERAGE @ 23' FT. FREE FIELD. 150 MPH WIND RATED.	3,4,8	YES	
3	4	2" MAINTENANCE ACCESS SINGLE DOORS FITTED WITH WATERTIGHT RUBBER SEALS, DRIP LEDGES AND ALL FITTED WITH HEAVY DUTY REFRIGERATOR STYLE STAINLESS STEEL HANDLES, KEYED-ALIKE & PAD LOCKABLE, HEAVY DUTY ALUMINIM PIANO HINGE. FITTED WITH 488L PUSH BAR PANIC RELEASE & A DOOR-HOLD-BACK LATCH AND BULB SEALS.	3,8	YES	
4	1	18" x 36" ACCESS DOOR	3,8	YES	
5	2	YES TO INSTALL REMOVABLE TANK ACCESS PANEL FOR DOCKING STATION ELECTRICAL ACCESS	3,6,8	YES	
6	1	FRONT PLENUM WITH BIRDSCREENING FOR VERTICAL RADIATOR AIR DISCHARGE. FITTED WITH GRAVITY DISCHARGE LOUVERS	3,8	YES	
7	8	REAR FIXED DRAINABLE INTAKE LOUVERS FOR HORIZONTAL AIR INTAKE	3,8	YES	
8	1	CRITICAL GRADE "DISK" STYLE EXHAUST SILENCER	3,4	YES	
9	2	STAINLESS STEEL FLEXIBLE CONNECTOR TO ENGINE	3,4	YES	
10	1	EXHAUST 90° ELBOW W/ RAINGUARD (SHIP LOOSE)	3,4	YES	
11	1	RAINCAP (SHIP LOOSE)	3,4	YES	
12	1	4,200 GALLON SUBBASE TANK, NFPA-30 COMPLIANT. UL 142 LISTED, NFPA 30 COMPLIANT, 3/16" STEEL DESIGN DIESEL FUEL TANK WITH HEAVY DUTY SIDE CHANNELS. PAINTED W/ TWO COATS OF BLACK FINISH. DOUBLE WALL W/ 110% RUPTURE BASIN FOR SECONDARY CONTAINMENT. VENT/FILL/ALARM PACKAGE INCLUDING: ULC RATED EMERGENCY VENTS & 2" NORMAL VENT, MULTIPLE FUEL ALARM SWITCHES, MANUAL LOCKING FILL CAP, VISUAL FUEL LEVEL GAUGE AND LEAK DETECTION SWITCH. INSTALL AND WIRE FUEL TANK LEVEL SWITCHES, HIGH-LOW FUEL LEVEL ALARMS AND LEAK DETECTION ALARM TO ENGINE TERMINAL STRIP. PROVIDE AND INSTALL FUEL SUPPLY AND RETURN LINE TO AND FROM ENGINE. SITE PIPING BY OTHERS.	3,4,6,8	YES	
13	1	NFPA 30 PANEL	3	YES	MORRISON 918
14	1	100AMP, 120/208V, 3Ø, BASIC CIRCUIT BREAKER TYPE LOAD CENTER	3	YES	
15	1	30KVA TRANSFORMER	3	YES	
16	1	480V, 60AF/45AT, 3Ø DISCONNECT SWITCH	3	YES	
17	1	YES TO MOUNT AND INSTALL TRYSTAR DUAL BREAKER DUAL PURPOSE DOCKING STATION 2000A	3,8	YES	SBDS-40SF-LLMF-ADF2K2QS4
18	1	YES TO PROVIDE AND INSTALL HEAT DETECTOR	3	YES	
19	1	YES TO SUPPLY AND INSTALL DIODE BOX FOR BBS	3	YES	
20	1	YES TO PROVIDE SENS BATTERY SYSTEM COMPLETE WITH CHARGER AND BATTERY RACK AND CABLES.	3	YES	
21	1	7.5 GALLON SPILL BUCKET WITH 4" NPT FILL PORT	3,4,6	YES	
22	1	YES TO PROVIDE AND INSTALL UPGRADED OVERFILL PREVENTION VALVE	3,4,6	YES	
23	1	YES TO PROVIDE AND INSTALL TRIPLEX RACOR FUEL FILTER WITH ISOLATION VALVES	3	YES	791000FV10
24	2	YES TO PROVIDE 2" N.P.T. FITTINGS FOR CUSTOMER SUPPLIED FUEL POLISHING SYSTEM	N/S	YES	
25	1	YES TO PROVIDE AND RUN CONTROL WIRE/CONDUIT FROM FUEL POLISHER TO EMCP	N/S	YES	
26	1	YES TO PROVIDE AND INSTALL FUEL POLISHING SYSTEM	3	YES	FPS MX-F / SFC-70
27	1	YES TO PROVIDE AND INSTALL FUEL FLOW METER	3	YES	CMS-2M-SA-DLR
28	4	120VAC INTERIOR, 48" LED LIGHT FIXTURES	3	YES	VT3005450P
29	2	3-WAY SWITCHES	3	YES	
30	3	GFCI DUPLEX RECEPTACLE	3	YES	
31	2	DAYTON 484X38 EXHAUST FAN INSTALLED IN DISCHARGE WALL	3	YES	484X38
32	1	THERMOSTAT FOR EXHAUST FAN	3	YES	8426
33	2	24VDC VAPOR PROOF LIGHT FIXTURES	3	YES	VT100GD
34	1	60 MINUTE TIMER FOR DC LIGHTS	3	YES	FD60MHW
35	1	CHECK VALVE ON FUEL SUPPLY	3	YES	7746K822
36	1	OIL & WATER DRAIN BULKHEAD FITTINGS (3/4" JIC FITTINGS)	3	YES	2700-12-12
37	1	SMALL DOCUMENT HOLDER	3	YES	9000-07
38	3	ALUMINUM PERSONAL TRAVEL RESTRAINT SYSTEM TIE-OFF	3	YES	
39	1	ALL WIRING TO AND FROM ELECTRICAL ACCESSORIES IS TO BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) WITH SET SCREW FITTINGS AND LIQUID TIGHT FLEXIBLE CONDUIT. SHORE POWER TO BE PROVIDED BY CUSTOMER.	N/S	YES	
40	1	YES TO MODIFY GENSET RAIL AS REQUIRED	N/S	YES	
41	1	YES TO PROVIDE AND INSTALL 300A LSI 100% RATED FIRE PUMP BREAKER	3,5	YES	
42					
43					
44					
45					
46					
47					
48					
49					
50					



96 ETHRIDGE MILL IND PARK
GRIFFIN, GA 30224

SHIP LOOSE ITEMS TO BE
INSTALLED AT SITE BY OTHERS

ITEM	QTY.	ITEM DESCRIPTION
10	1	EXHAUST 90° ELBOW
11	1	RAINCAP
	1	CAT BOX

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

DIMENSIONS ARE IN INCHES.
ALL INFORMATION ON THIS
DRAWING IS FOR REFERENCE
ONLY.

Tolerances:
DECIMAL +/- 2.00"
FRACTIONAL +/- 2"



THIRD-ANGLE
PROJECTION

REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

CUSTOMER:

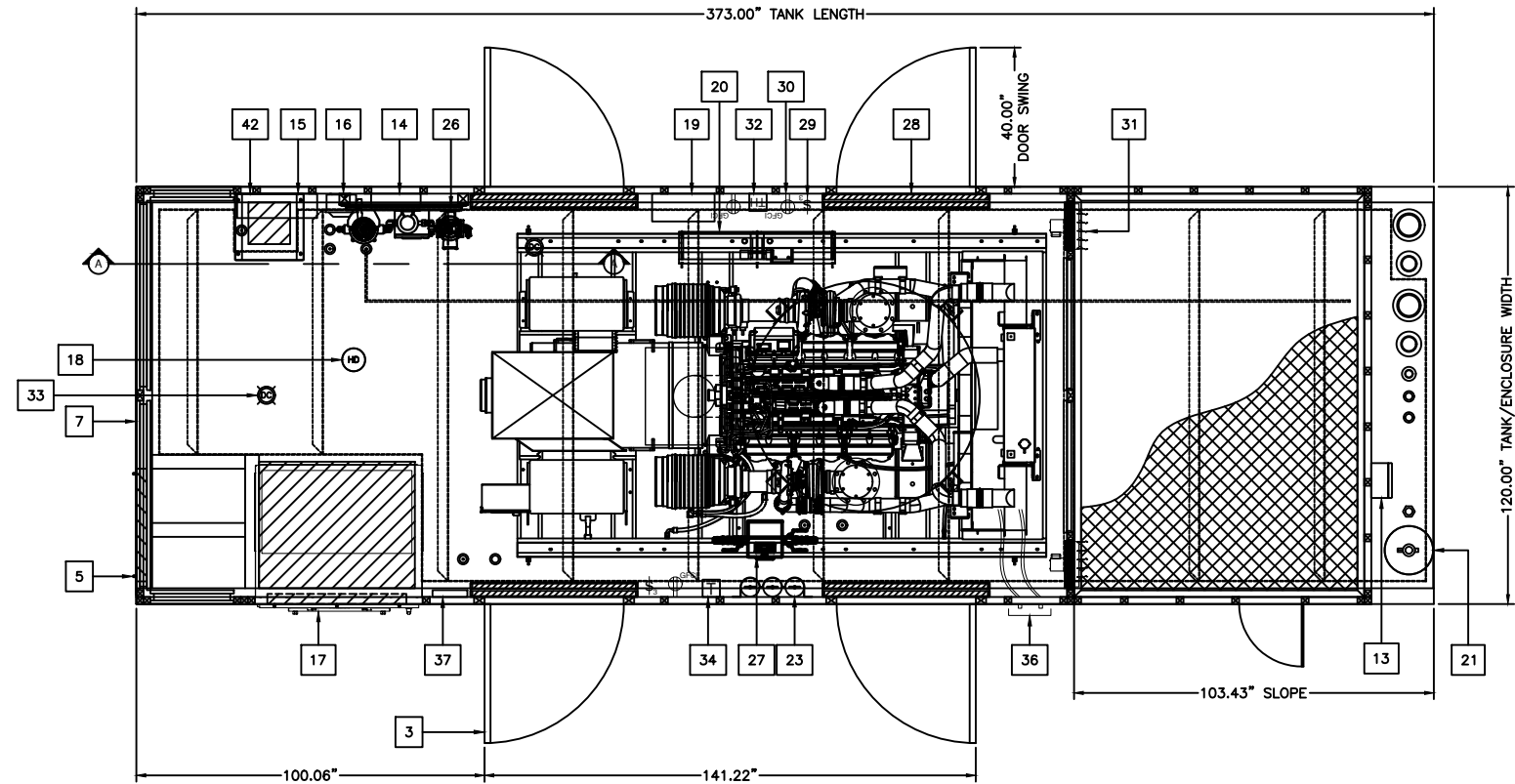
YANCEY POWER SYSTEMS

Drawing Title:
QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL

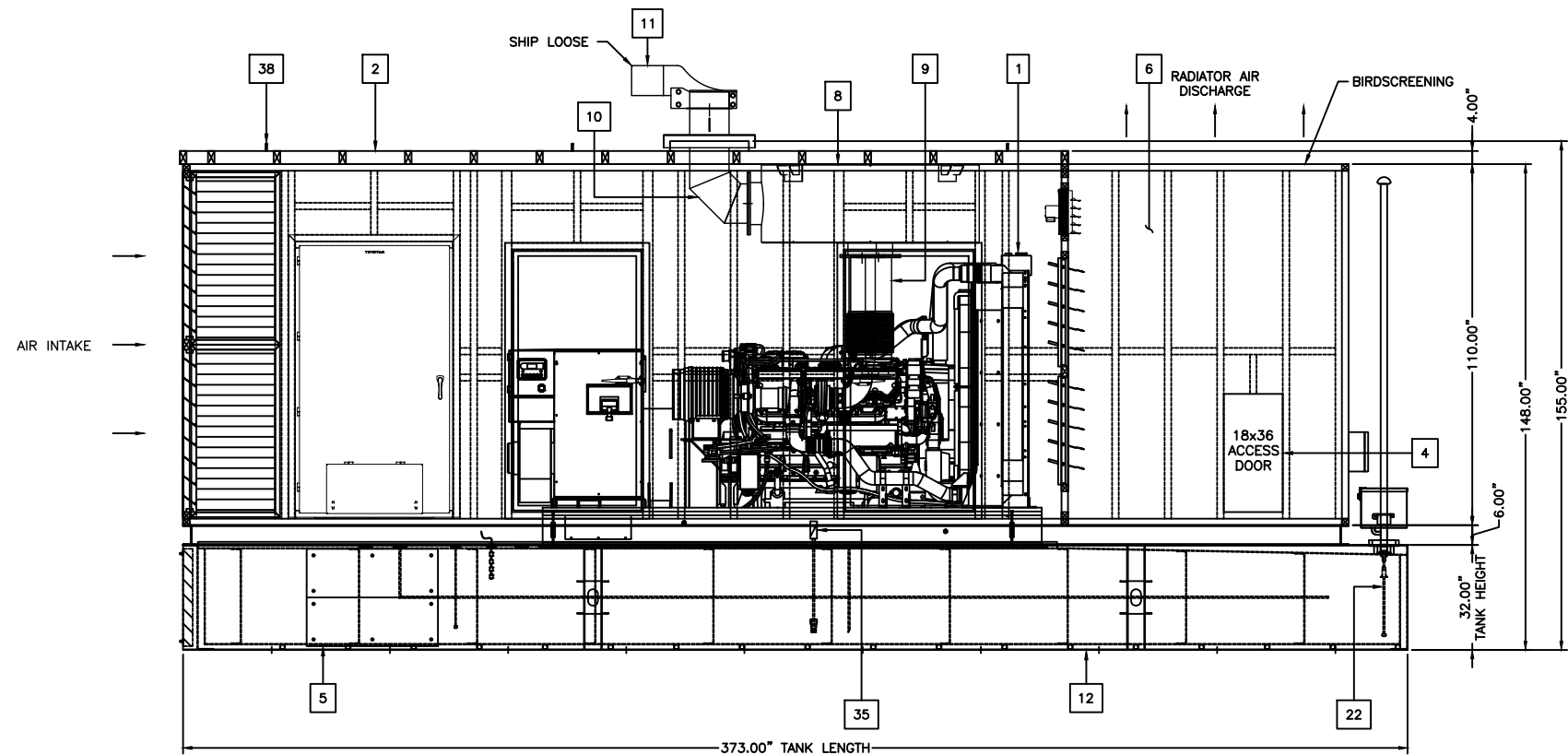
Sheet Title:
BILL OF MATERIALS

Scale: N.T.S		Dwg No.: 23-0739	
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision
Sheet No. 2 OF 12		Date: 12/5/2023	A

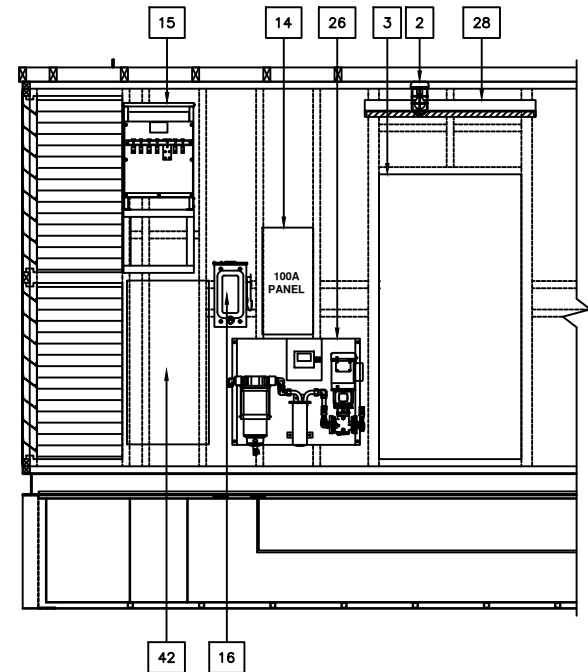
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TOP VIEW



RIGHT SIDE VIEW



SECTION A-A
SCALE: N.T.S.

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

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	DECIMAL +/- 2.00"	FRACTIONAL +/- 2"	

REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

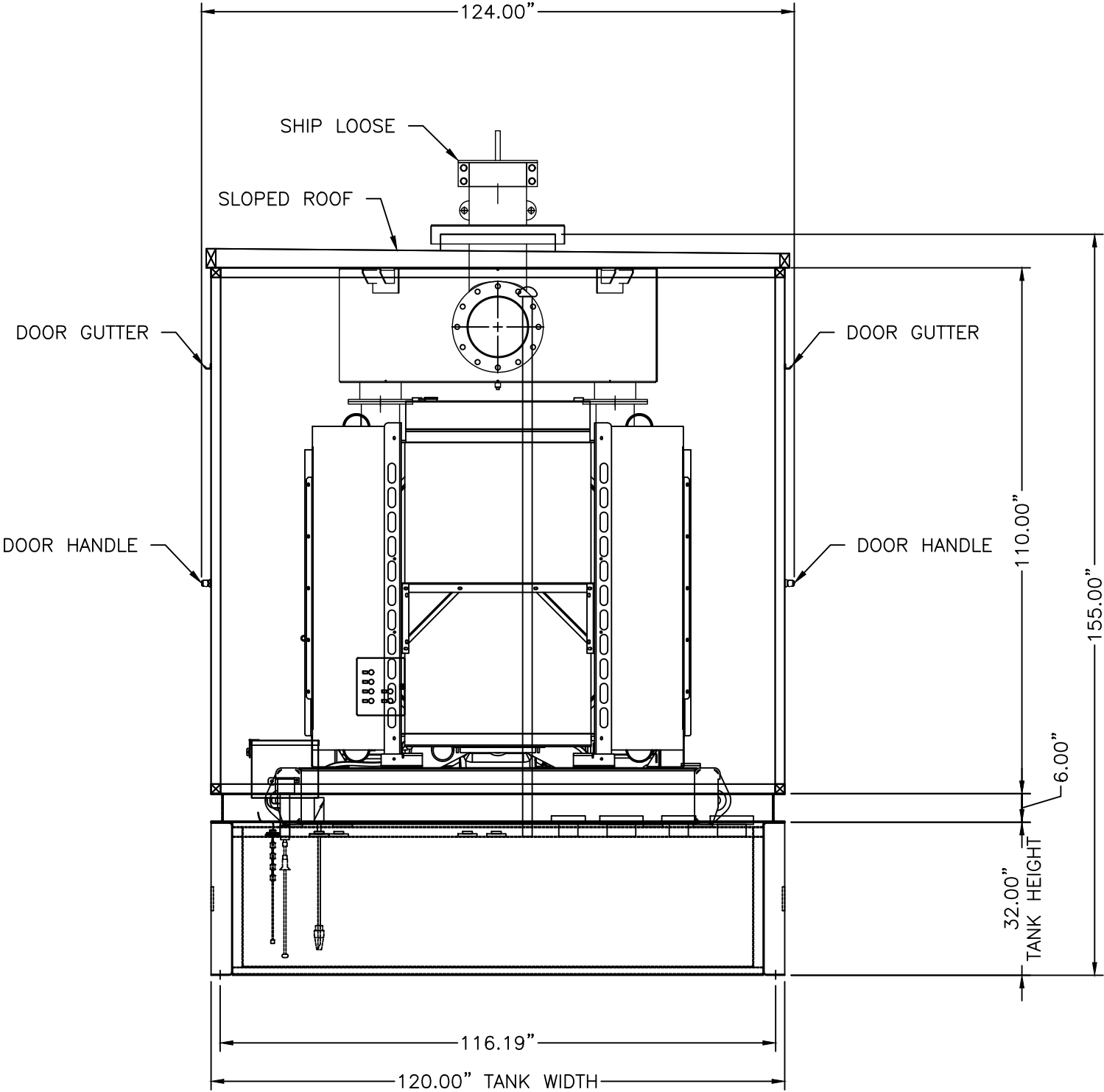
CUSTOMER:
YANCEY POWER SYSTEMS

Drawing Title:
QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL

Sheet Title:
ELEVATION VIEWS

Scale: N.T.S.		Dwg No.: 23-0739	
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision
Sheet No. 3 OF 12		Date: 12/5/2023	A

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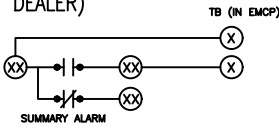
FRONT VIEW

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH
DIMENSIONS ARE IN INCHES. ALL INFORMATION ON THIS DRAWING IS FOR REFERENCE ONLY.		Tolerances: DECIMAL +/- 2.00" FRACTIONAL +/- 2"	 THIRD-ANGLE PROJECTION
REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING UNITS REQ'D: 15			
CUSTOMER: YANCEY POWER SYSTEMS			
Drawing Title: QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL			
Sheet Title: ELEVATION VIEWS			
Scale: N.T.S		Dwg No.: 23-0739	
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision
Sheet No. 4	OF 12	Date: 12/5/2023	A

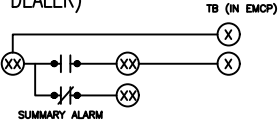
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DC OPTIONS:

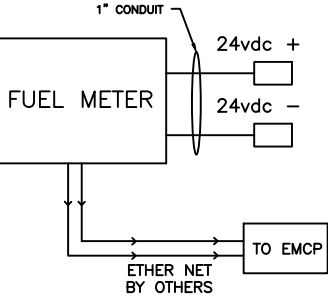
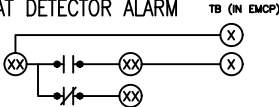
BATTERY CHARGER #1 ALARMS
(BY DEALER)



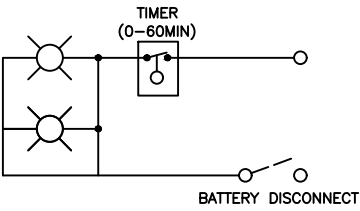
BATTERY CHARGER #2 ALARMS
(BY DEALER)



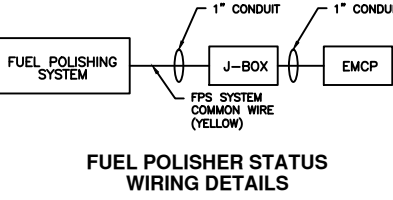
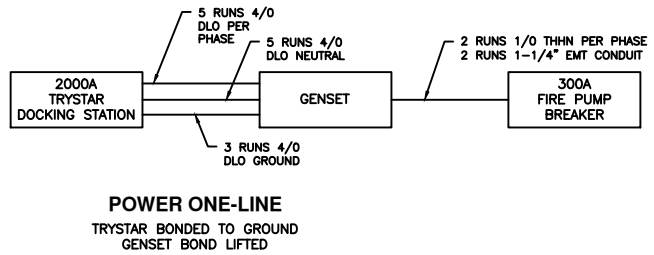
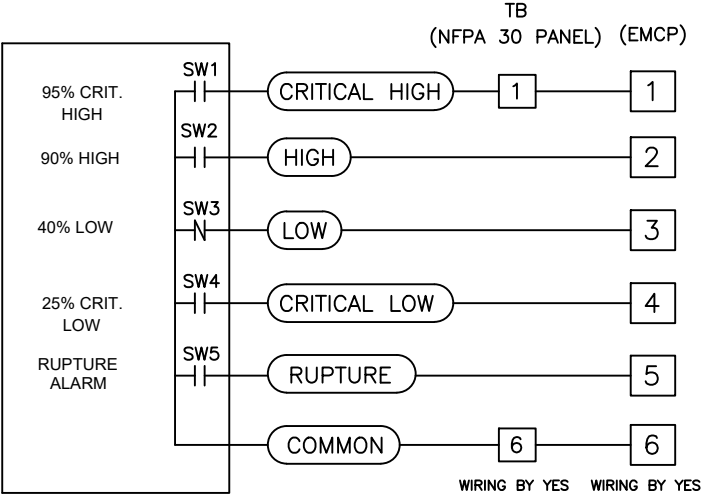
HEAT DETECTOR ALARM



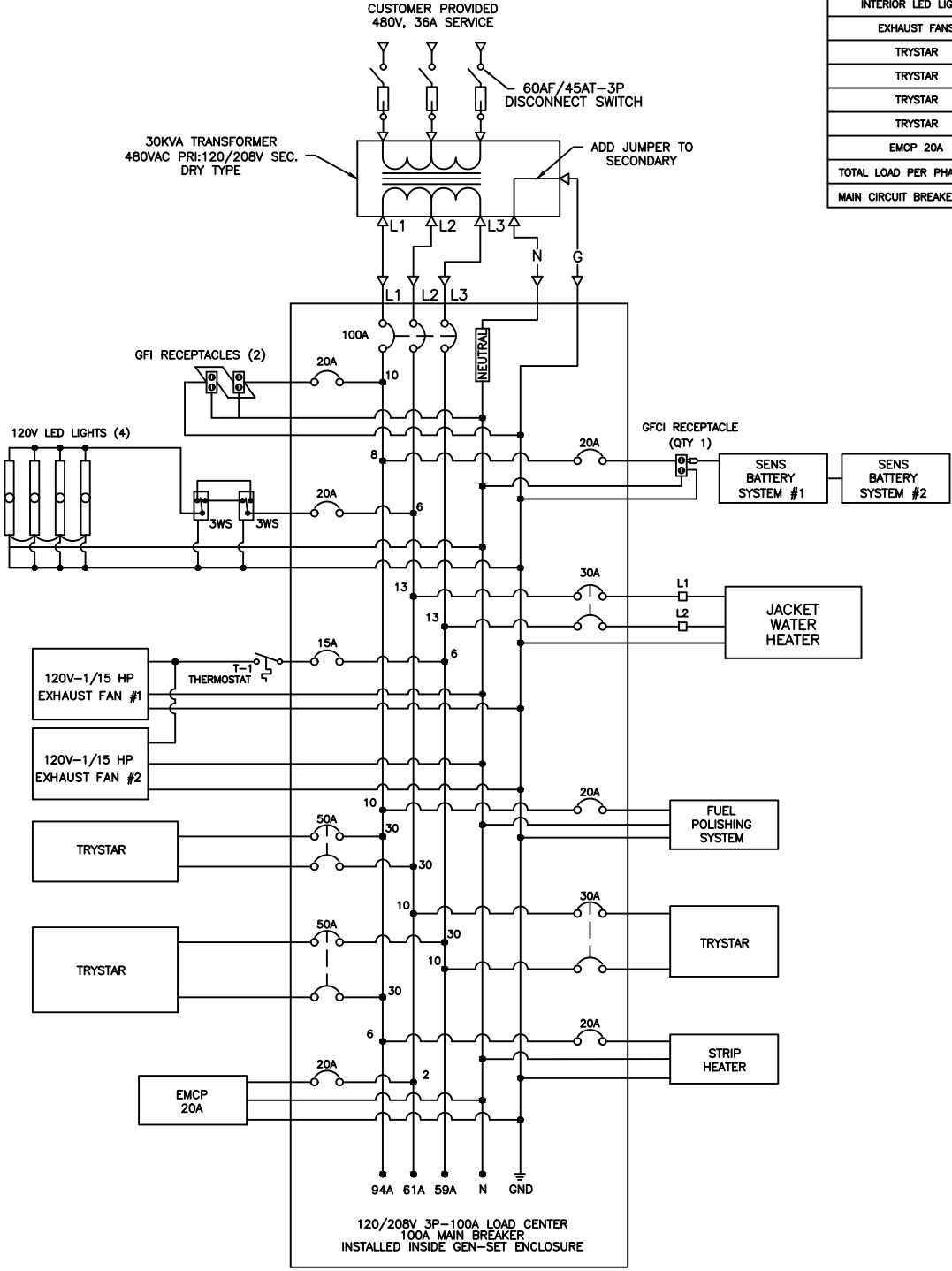
DC LED LIGHTING



TANK ALARM SCHEMATIC



LIGHTING & POWER PANEL LOAD SCHEDULE									
DESCRIPTION	TRIP	POLE	AMP LOAD			TRIP	POLE	DESCRIPTION	
			PHASE L1	PHASE L2	PHASE L3				
RECEPTACLES (GFCI)	20	1	10	8		1	20	RECEPTACLES FOR SENS	
INTERIOR LED LIGHTS	20	1		8		2	30	JACKET WATER HEATER	
EXHAUST FANS	15	1		13				JACKET WATER HEATER	
TRYSSTAR	50	2	30	10		1	20	FUEL POLISHING SYSTEM	
TRYSSTAR				30		2	30	TRYSSTAR	
TRYSSTAR				10				TRYSSTAR	
TRYSSTAR				30				TRYSSTAR	
EMCP 20A	20	1	6	2		1	20	STRIP HEATER	
TOTAL LOAD PER PHASE			94A	61A	59A				
MAIN CIRCUIT BREAKER SIZE			100A						

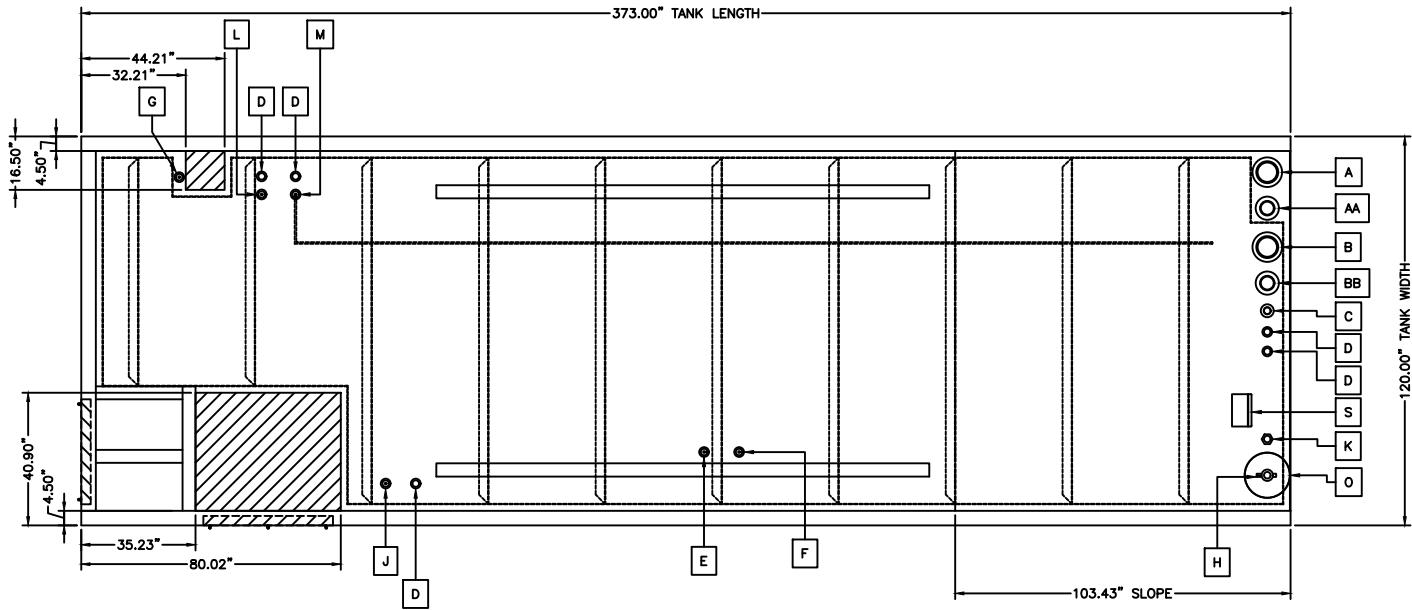


NOTE:
ALL WIRING TO AND FROM ELECTRICAL ACCESSORIES IS TO BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) AND LIQUID TIGHT FLEXIBLE CONDUIT. ALL ELECTRICAL FITTINGS TO BE COMPRESSION STYLE. SHORE POWER TO BE PROVIDED BY CUSTOMER.

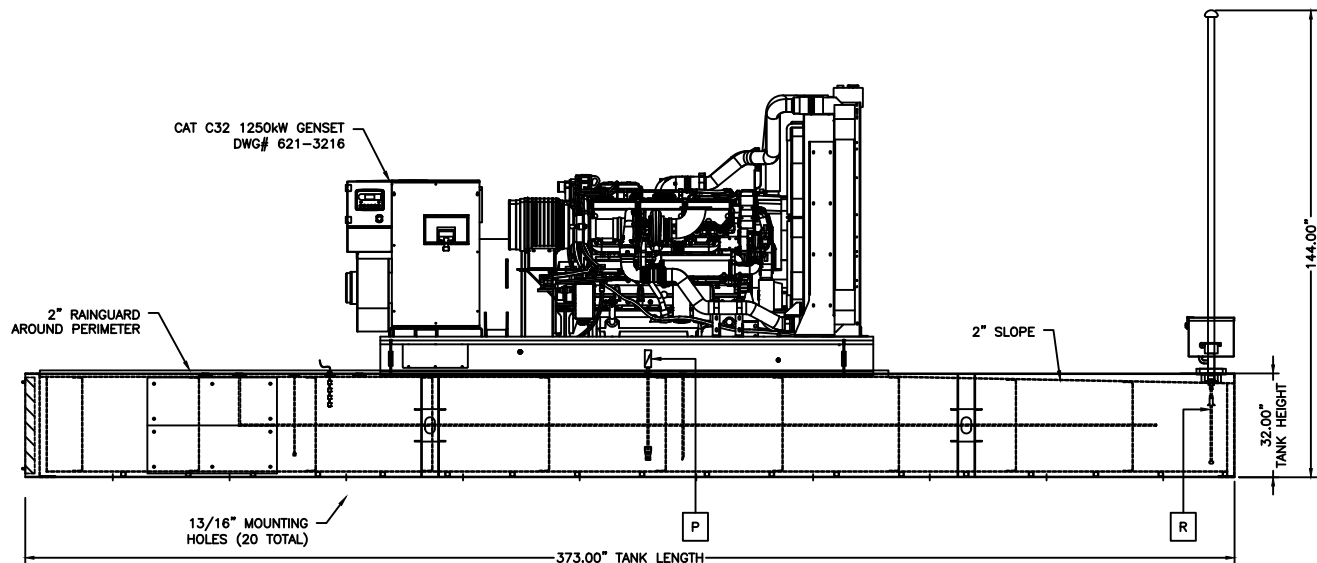
REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

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REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING UNITS REQ'D: 15				
CUSTOMER: YANCEY POWER SYSTEMS				
Drawing Title: QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL				
Sheet Title: ELECTRICAL DETAILS				
Scale:	N.T.S	Dwg No.:	23-0739	
Drawn by:	ASH	Checked by:	JPR	Approved by:
Sheet No.	5	OF	12	Date:
				12/5/2023
				A

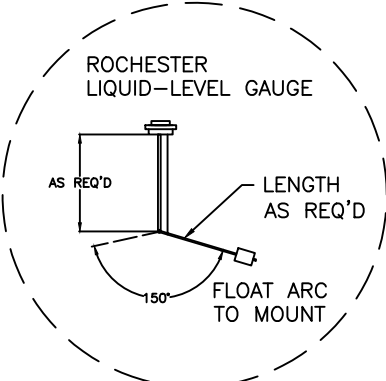
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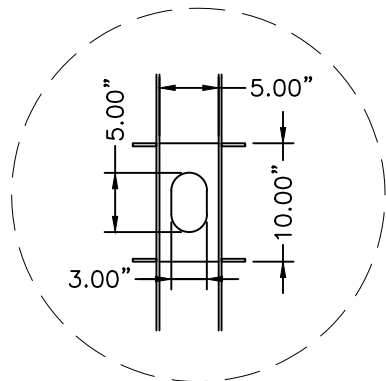
TOP VIEW



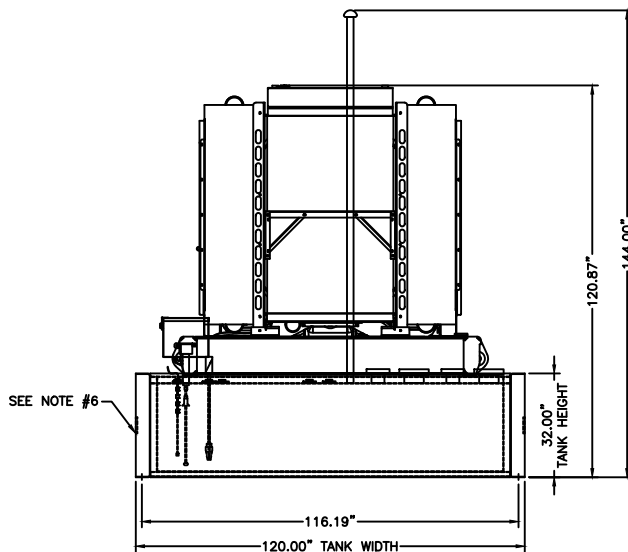
RIGHT SIDE VIEW



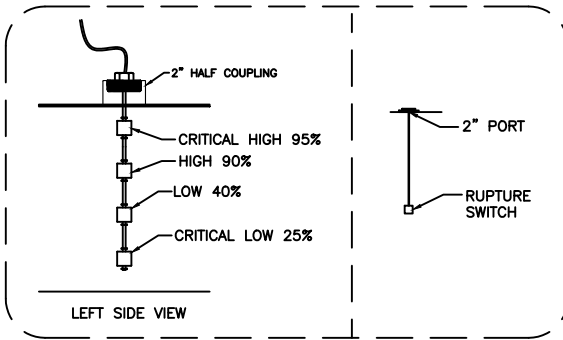
DETAIL A



LIFTING EYE DETAIL
DETAIL B



FRONT VIEW



DETAIL C
SCALE: NTS

LEGEND		
ITEM	QTY.	DESCRIPTION
A	1	6" N.P.T. OUTER TANK EMERGENCY VENT
AA	1	4" N.P.T. OUTER TANK EMERGENCY VENT
B	1	6" N.P.T. INNER TANK EMERGENCY VENT
BB	1	4" N.P.T. INNER TANK EMERGENCY VENT
C	1	2" N.P.T. INNER TANK NORMAL VENT (EXTENDED 144" ABOVE GRADE)
D	5	2" N.P.T. SPARE PORTS PLUGGED
E	1	2" N.P.T. FUEL SUPPLY W/ 1" DOWNPIPE
F	1	2" N.P.T. FUEL RETURN W/ 1" DOWNPIPE
G	1	2" N.P.T. TOP MOUNT RUPTURE BASIN ALARM SWITCH
H	1	4" N.P.T. FILL PORT, WITH LOCKABLE FILL CAP
J	1	2" N.P.T. - CRITICAL LOW LEVEL SW (25%), LOW LEVEL SW (40%), HIGH LEVEL SW (90%) CRITICAL HIGH LEVEL SW (95%) (SEE DETAIL C)
K	1	2" N.P.T. FUEL LEVEL GAUGE (ROCHESTER) (SEE DETAIL A)
L	1	2" N.P.T. FUEL POLISHING SUPPLY PORT W/ 1" DOWNPIPE
M	1	3/4" N.P.T. - FUEL POLISHING RETURN PORT W/ INTERNAL PIPING
O	1	7.5 GALLON SPILL BUCKET
P	1	CHECK VALVE ON ENGINE FUEL SUPPLY
R	1	OVERFILL PREVENTION VALVE (MORRISON)
S	1	NFPA 30 PANEL

NOTE: 4,200 USEABLE GALLON - SUB BASE TANK

- 1) TANK CONSTRUCTION: 3/16" ASTM A36 STRUCTURAL PLATE CARBON STEEL. TANK EXTERIOR IS PAINTED GLOSS BLACK. DOUBLE WALL TANK WITH 200% RUPTURE BASIN FOR SECONDARY CONTAINMENT.
- 2) UL142 RATED TANK DESIGN CERTIFIED, PRESSURIZE MAIN AND RUPTURE BASIN PRIOR TO SHIPMENT.
- 3) TO DRAIN INNER TANK, CUSTOMER MUST PROVIDE PUMP (BY OTHERS).
- 4) TANK DRY WEIGHT: 12,450 LBS.
- 5) TANK CAPACITIES: USEABLE: 4,200 GALLONS
NOMINAL: 4,420 GALLONS
- 6) CONTRACTOR TO LIFT PACKAGE WITH YES PROVIDED TANK LIFTING EYES. (SEE DETAIL B)

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

DIMENSIONS ARE IN INCHES. ALL INFORMATION ON THIS DRAWING IS FOR REFERENCE ONLY.	Tolerances:		 THIRD-ANGLE PROJECTION
	DECIMAL +/- 2.00"	FRACTIONAL +/- 2"	

REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

CUSTOMER:
YANCEY POWER SYSTEMS

Drawing Title:
**QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL**

Sheet Title:
TANK DETAILS

Scale: N.T.S.		Dwg No.: 23-0739	
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision
Sheet No. 6 OF 12		Date: 12/5/2023	A

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NOTES:

- 1) PANEL IS RATED FOR USE OUTDOORS.
- 2) RUPTURE SWITCH WIRED TO THE PANEL, AND FROM THE PANEL TO THE EMCP.
- 3) PANEL IS INTRINSICALLY SAFE AND MUST BE WIRED PER NEC 504.

918S-, 918D-, 918Q-, 918SB, 918DB, 918QB ALARM BOX CONTROL DRAWING

MOUNT/INSTALL ALARM

The opening in the enclosure (for connection to simple switch apparatus) shall be made through the bottom of the alarm box, such that a minimum of IP20 is maintained.

BATTERY PACK REPLACEMENT

- A) Carefully open the enclosure by loosening the phillips head fasteners at the four corners of the cover.
- B) Turn the alarm power switch located in the upper left corner of the control board to the "OFF" position.
- C) Disconnect battery pack harness located to the right of the power switch.
- D) Remove the two phillips head screws holding the battery pack in place.
- E) Remove the battery pack.

- To install battery pack, repeat steps in reverse order.

Model 918** where ** represents any model in the following table. Please note that manufacturer specifiers and internal indicators should have a higher level terminology and UL will need additional information to verify what these specifiers and indicators are.

1. Model

A- 918 Alarm Box

2. Number of Channels

- A. Q -4 Channels
- B. D -2 Channels
- C- S -1 Channel
- D- T -3 Channels

3. With or Without Beacon

- A. B -With beacon
- B. - -Without beacon

4. Overlay

- A. X -Any alphanumeric character representing a customer specific overlay artwork.
- B. - -Standard offering overlay

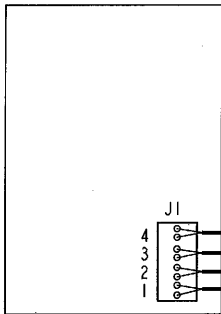
5. External Packaging

- A. XXXX -Any alphanumeric characters representing manufacturing packaging

6. Internal Packaging

- A. XX -Any alphanumeric characters representing manufacturing internal packaging

HAZARDOUS (CLASSIFIED) LOCATION
CLASS 1, DIVISION 1, GROUP D, T4
ZONE 2, GROUP IIA, T4
-40°C <= Tamb <= +60°C



918** SERIES ALARM BOX

WHERE ** REPRESENTS ANY MODEL IN THE NOMENCLATURE TABLE

TERMINAL	INTRINSIC SAFETY PARAMETER
J1	Voc (Uo) = 7.525 VDC
	Isc (Lo) = 0.031 A
	Po = 0.06 W
	Ca (Co) = 700 µF
	La (Lo) = 105 µH

The Ca and La values assigned to the terminal J1 are the maximum total combined values of each of the four channels of the capacitance and inductance permitted for connection to the simple apparatus and the cable.

STANDARD TOLERANCES

UNLESS OTHERWISE SPECIFIED
1 PL DECIMAL ±.1 2 PL DECIMAL ±.045 3 PL DECIMAL ±.045
ANGULAR ±.5° CASTING ±.025
SURFACE FINISH 125MICRO INCH RMS MAX
.035 INSIDE RADIUS MAX .065 OUTSIDE RADIUS MAX
BREAK AND DEBURR ALL SHARP EDGES
DIMENSIONS ARE IN INCHES

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CONTROL DRAWING

918S, 918D, 918Q, 918SB, 918DB, 918QB
FIG. NO. 918SB

SCALE
1/1

MATERIAL:
N/A

MORRISON BROS. CO.

DRAWN: CRC DATE: 2-JAN-15

CHECKED: [Signature] DATE: 7-27-16

PART ID. NO.

918SB-0135 PP

DWG. NO. B-7785-35.U.L

SHEET 1 OF 2

REV.	DATE	DESCRIPTION	APP'D
A	12/5/23	ORIGINAL SUBMITTAL	ASH

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	DECIMAL +/- 2.00" FRACTIONAL +/- 2"	

REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

CUSTOMER:

YANCEY POWER SYSTEMS

Drawing Title:

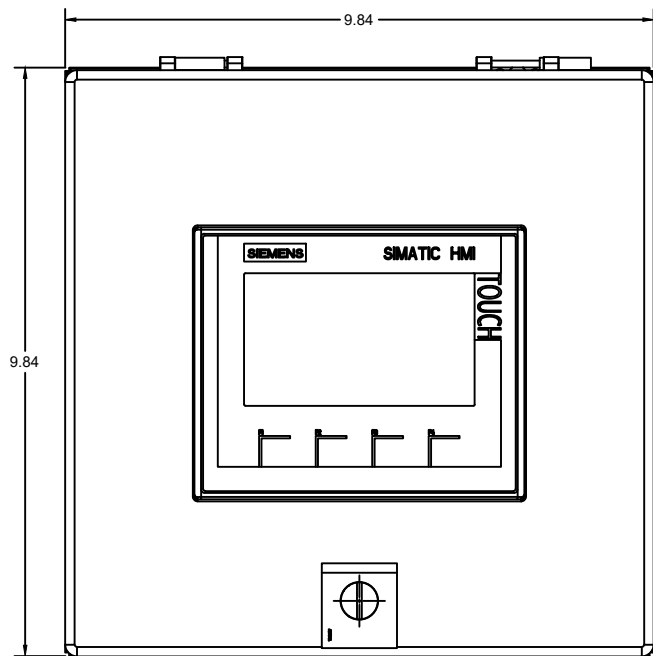
QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL

Sheet Title:

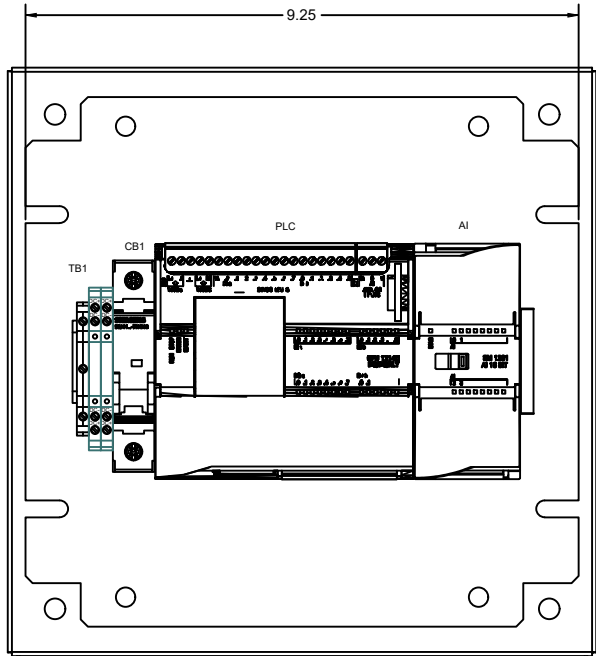
NFPA 30 PANEL DETAILS

Scale:	N.T.S	Dwg No.:	23-0739
Drawn by:	ASH	Checked by:	JPR
		Approved by:	KYB
Sheet No.	7 OF 12	Date:	12/5/2023
			A

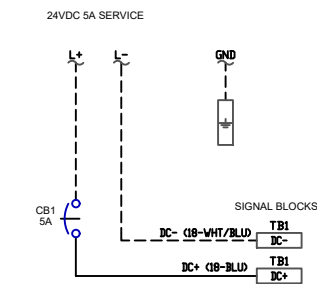
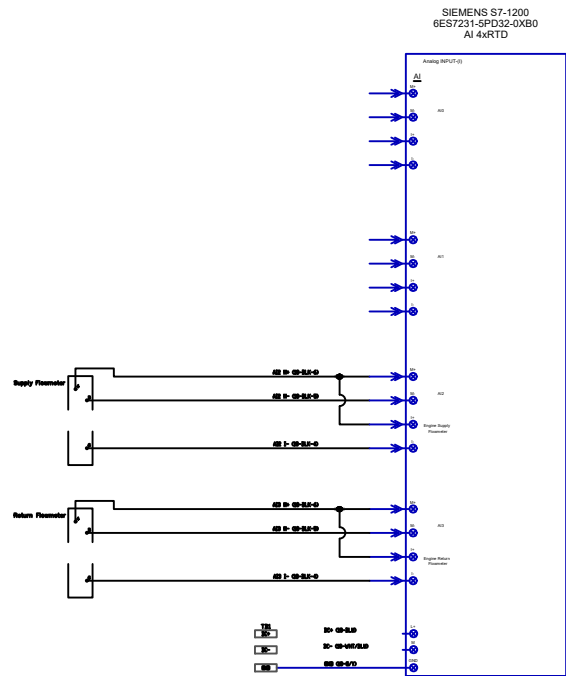
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ENCLOSURE FRONT VIEW
SCALE: NONE

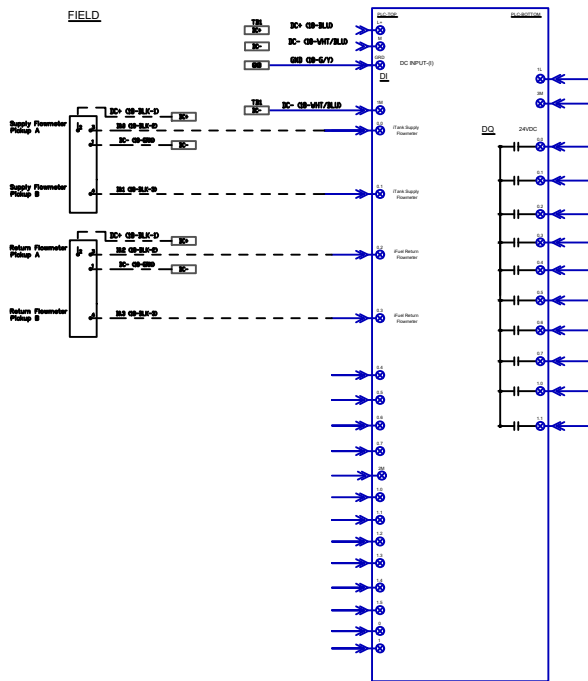
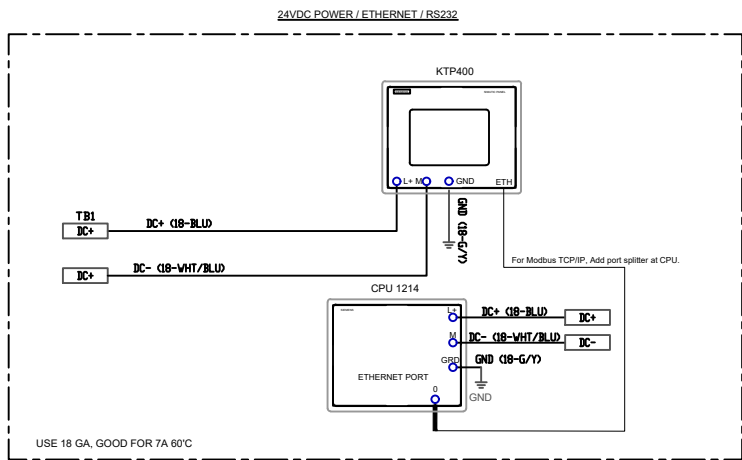


ENCLOSURE DEVICE LAYOUT
SCALE: NONE



Modbus Registers:
Register - Description
40001-40002 - Total Consumption Gal
40003-40004 - Consumption Rate GPH
40005-40006 - Total Supply Gal
40007-40008 - Total Return Gal
40009-40010 - Supply Rate GPH
40011-40012 - Return Rate GPH
40013-40014 - Supply Temp Degrees F
40015-40016 - Return Temp Degrees F
40017-40018 - Consumption This Run

All points are real data type, 4 bytes in length. iFuel data format is Siemens standard Big-endian format.



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REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

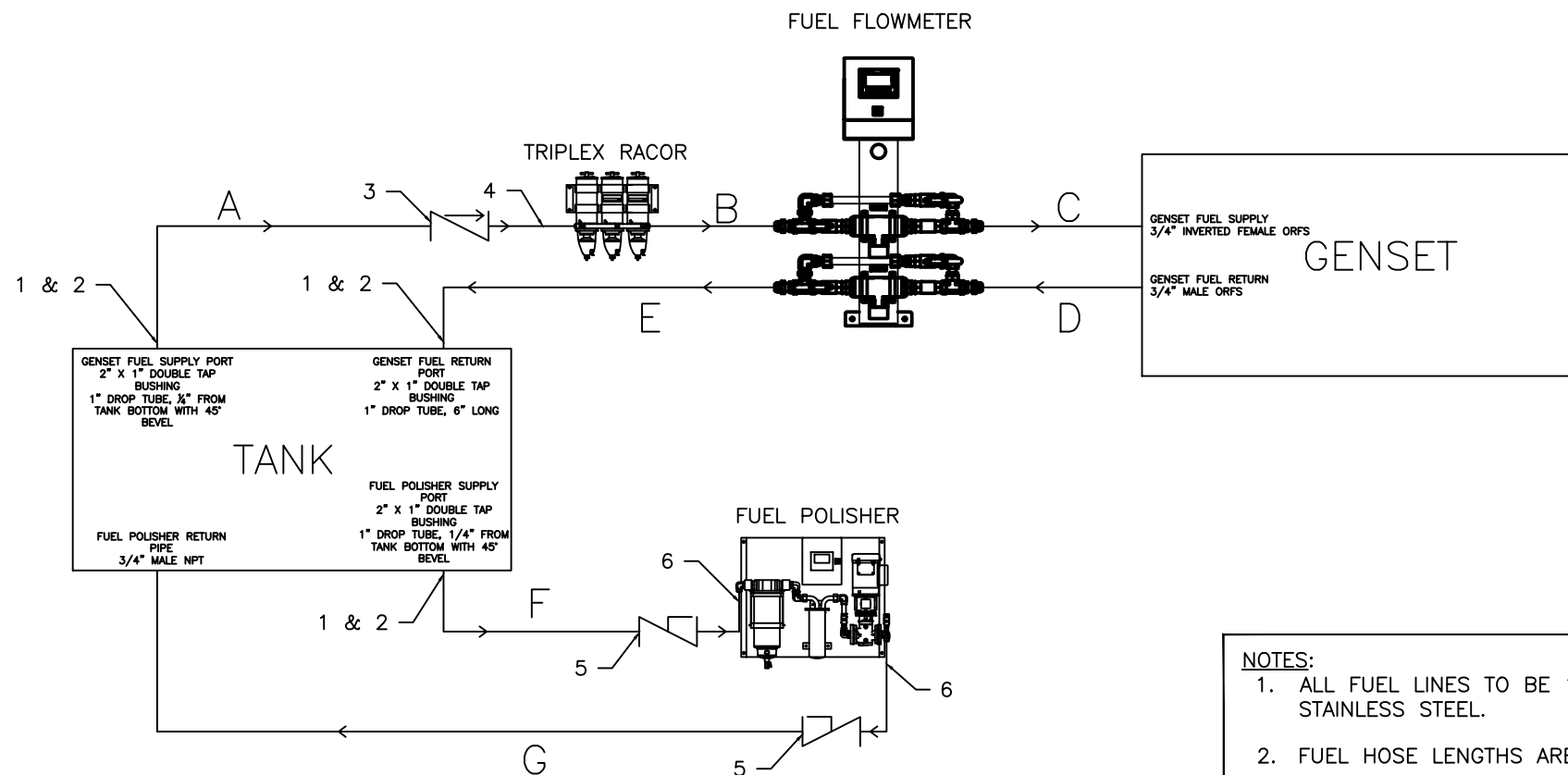
CUSTOMER:
YANCEY POWER SYSTEMS

Drawing Title:
**QTS UNIVERSAL C32 PHASE 2
GENERAL ARRANGEMENT SUBMITTAL**

Sheet Title:
CONTROL AND WIRING DETAILS

Scale:	N.T.S	Dwg No.:	23-0739
Drawn by:	ASH	Checked by:	JPR
Approved by:	KYB	Date:	12/5/2023
Sheet No.	8 OF 12	Revision	A

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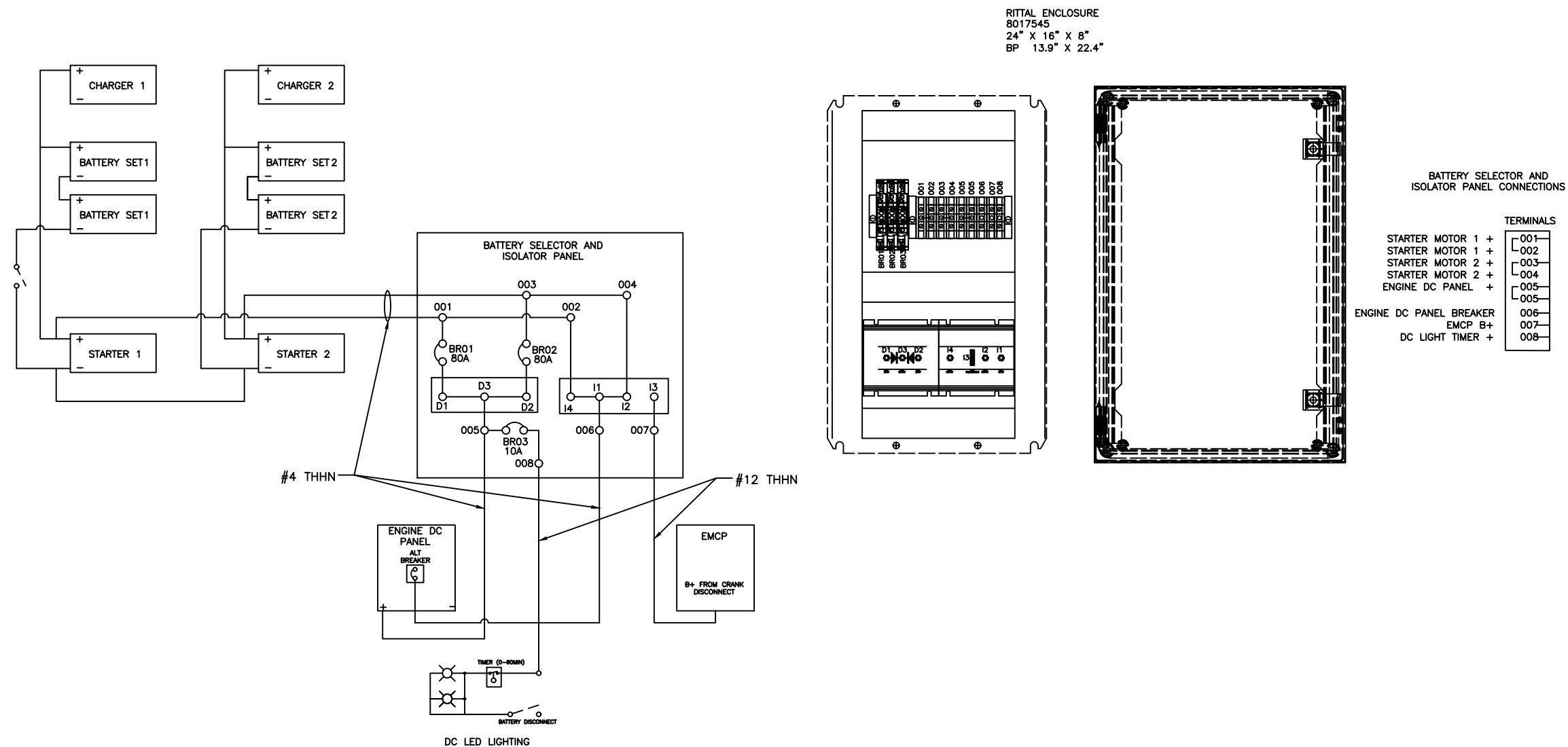


HOSE SCHEDULE		
NO.	LENGTH	DESCRIPTION
A		1" MALE NPT X 1" MALE NPT
B		3/4" FEMALE NPT X 1" FEMALE ORFS
C		1" FEMALE ORFS X 3/4" INVERTED MALE ORFS
D		3/4" FEMALE ORFS X 1" FEMALE ORFS
E		1" FEMALE ORFS X 1" MALE NPT
F		1" MALE NPT X 1" MALE NPT
G		1" MALE NPT X 3/4" FEMALE NPT

PARTS LIST		
NO.	QTY	DESCRIPTION
1	3	2" NPT X 1" NPT DOUBLE TAP BUSHING
2	102"	1" PIPE
3	1	1" NPT SPRING CHECK VALVE
4	1	1" NPT X 3/4" NPT BUSHING
5	2	1" NPT BALL VALVE
6	2	1" FEMALE ORFS X 3/4" MALE NPT FITTING

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REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING UNITS REQ'D: 15				
CUSTOMER: YANCEY POWER SYSTEMS				
Drawing Title: QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL				
Sheet Title: P&ID DETAILS				
Scale: N.T.S		Dwg No.: 23-0739		
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision	
Sheet No. 9 OF 12		Date: 12/5/2023		A
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[illegible]

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REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING
UNITS REQ'D: 15

CUSTOMER:

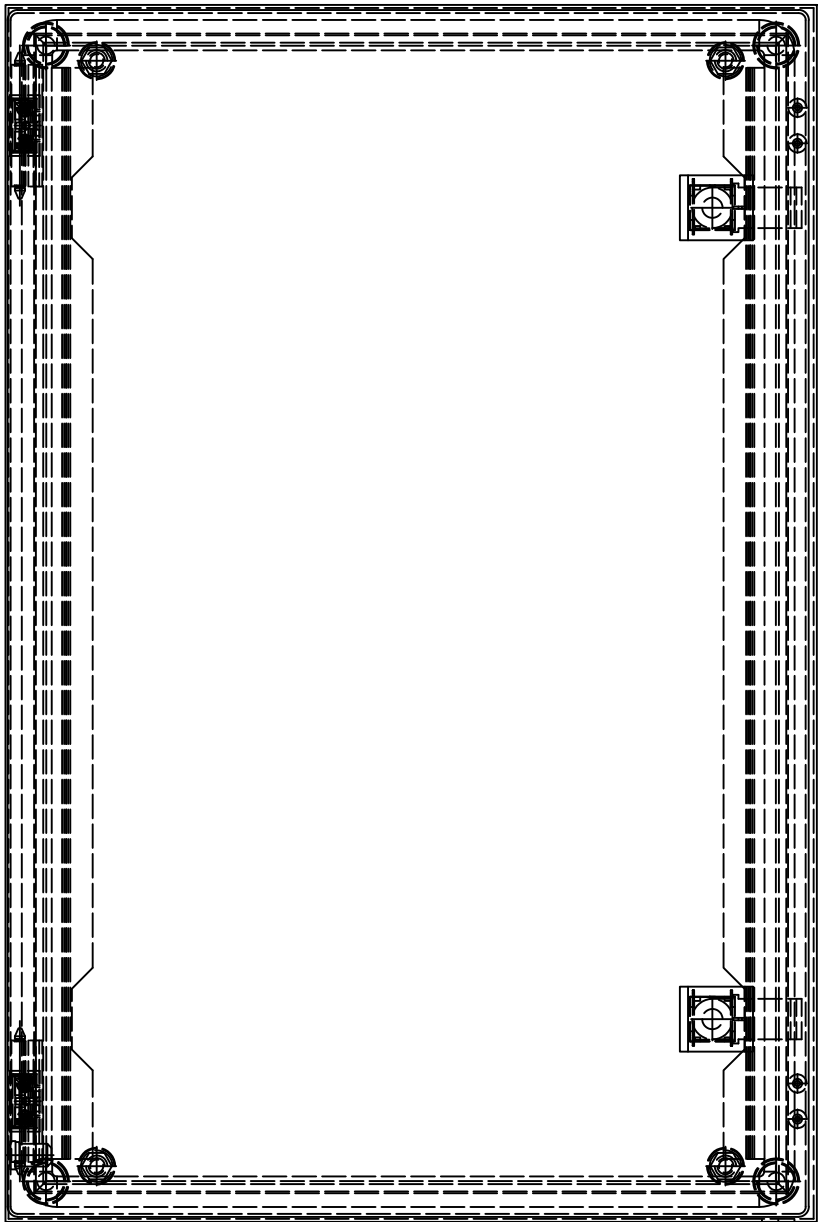
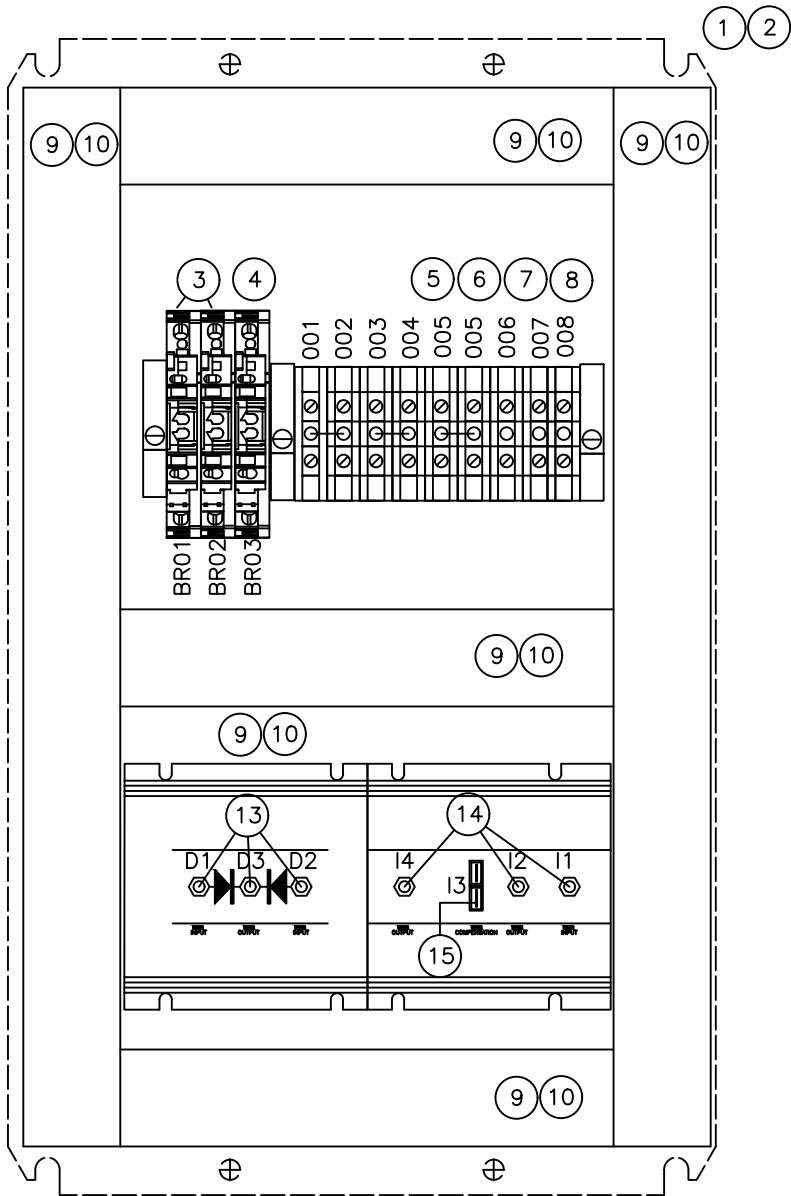
YANCEY POWER SYSTEMS

Drawing Title: QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL
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Sheet Title: WIRING DIAGRAM AND PANEL LAYOUT
FOR BATTERY DIODE

Scale: N.T.S		Dwg No.: 23-0739	
Drawn by: ASH	Checked by: JPR	Approved by: KYB	Revision
Sheet No. 10 OF 12		Date: 12/5/2023	A

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BOM				
ITEM #	QUNT	MANUFACTURE	PART #	DESCRIPTION
1	1	RITTAL	8017545	WM241608NC 24" X18" X 8" ENCLOSURE
2	1	RITTAL	2508010	WALL MOUNTS
3	2	CBI	QY126DM280A80V10kA	80 AMP 1 POLE
4	1	CBI	QY18U210B0	10 AMPS 1 POLE
5	9	WEIDMULLER	1020500000	WDU35 TERMINAL
6	1	WEIDMULLER	1050100000	END PLATE
7	3	WEIDMULLER	1053060000	JUMPER 2 POLE
8	4	WEIDMULLER	1059000000	END BRACKET
9	12	MC-MC	F1.53LG6	WIRE DUCT
10	12	MC-MC	C1.5LG6	DUCT COVER
11	1	ARGODIODE	BCD-802	DIODE BATTERY COMBINDER
12	1	ARGODIODE	120-2AC	BATTERY ISOLATOR
13	3	FERRULE DIRECT	RNYBL22-6	#4 X M6 RING TERMIAL
14	4	FERRULE DIRECT	RNYB22-8	#4 X M8 RING TERMIAL
15	1	FERRULE DIRECT	RV5-8	# 12 X M8 RING TERMINAL

BATTERY SELECTOR AND
ISOLATOR PANEL CONNECTIONS

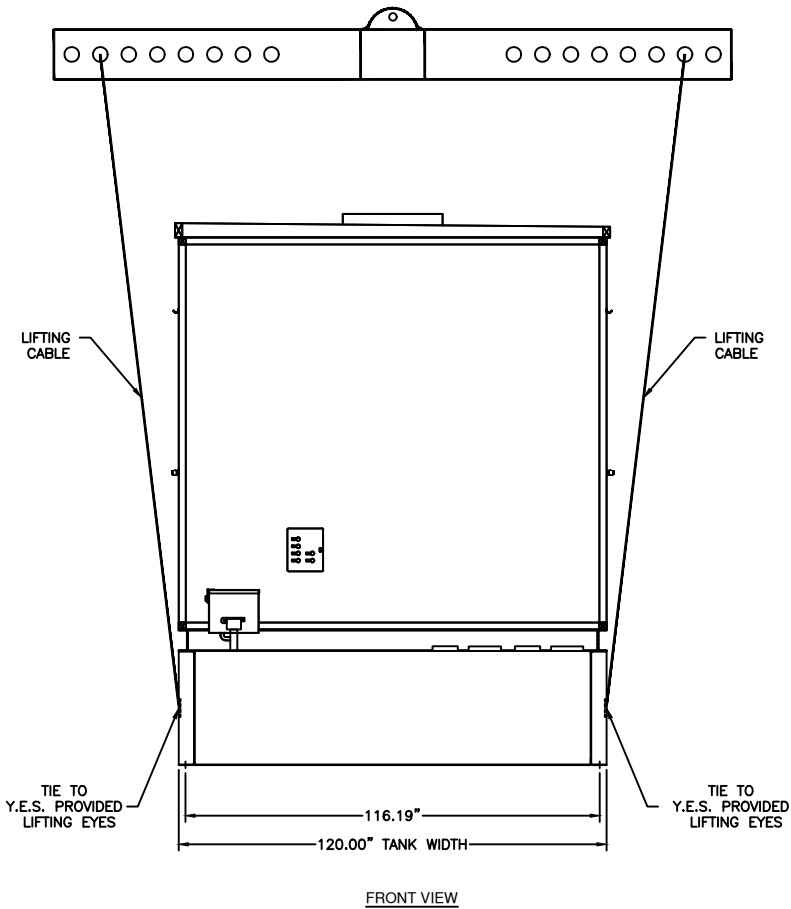
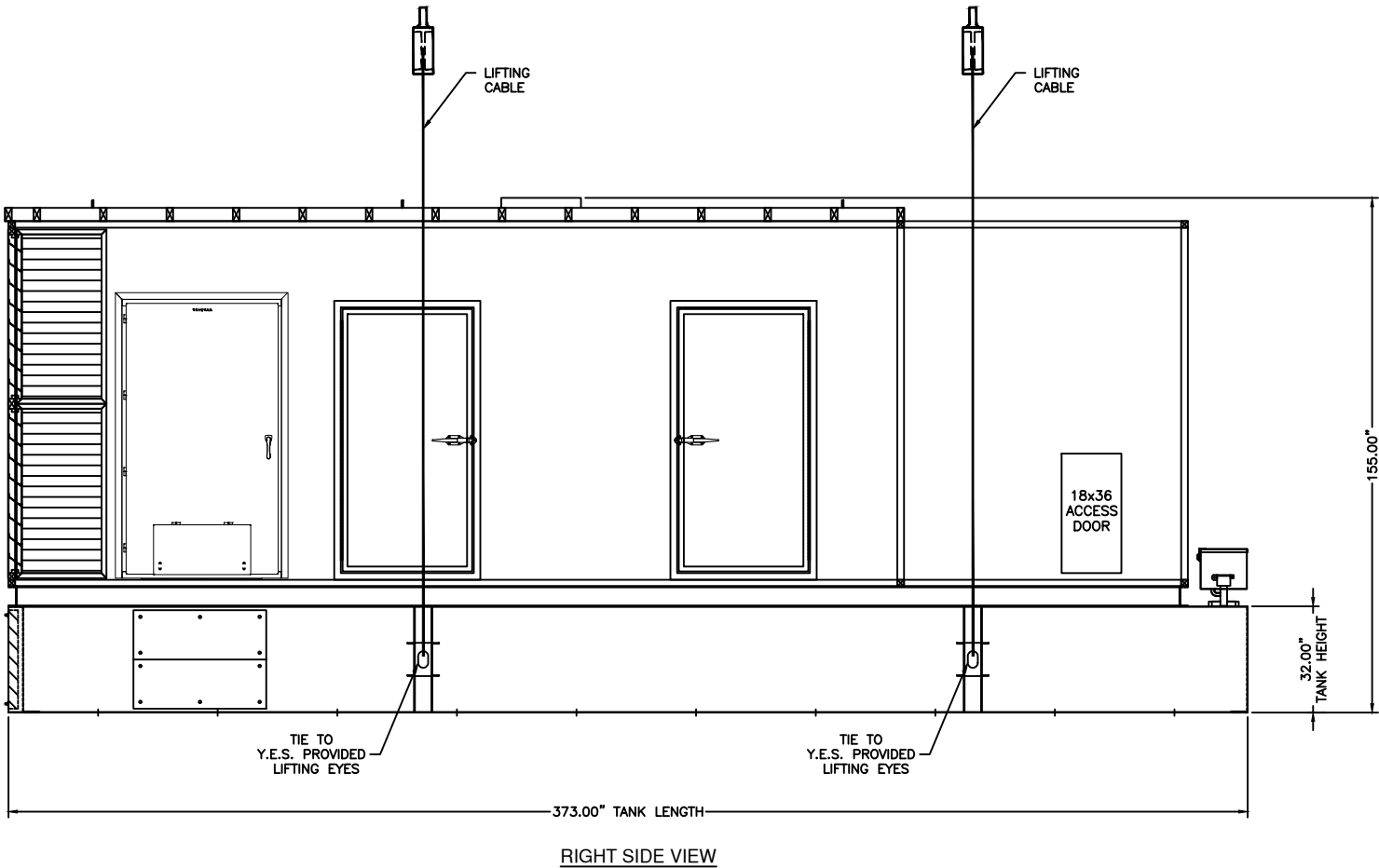
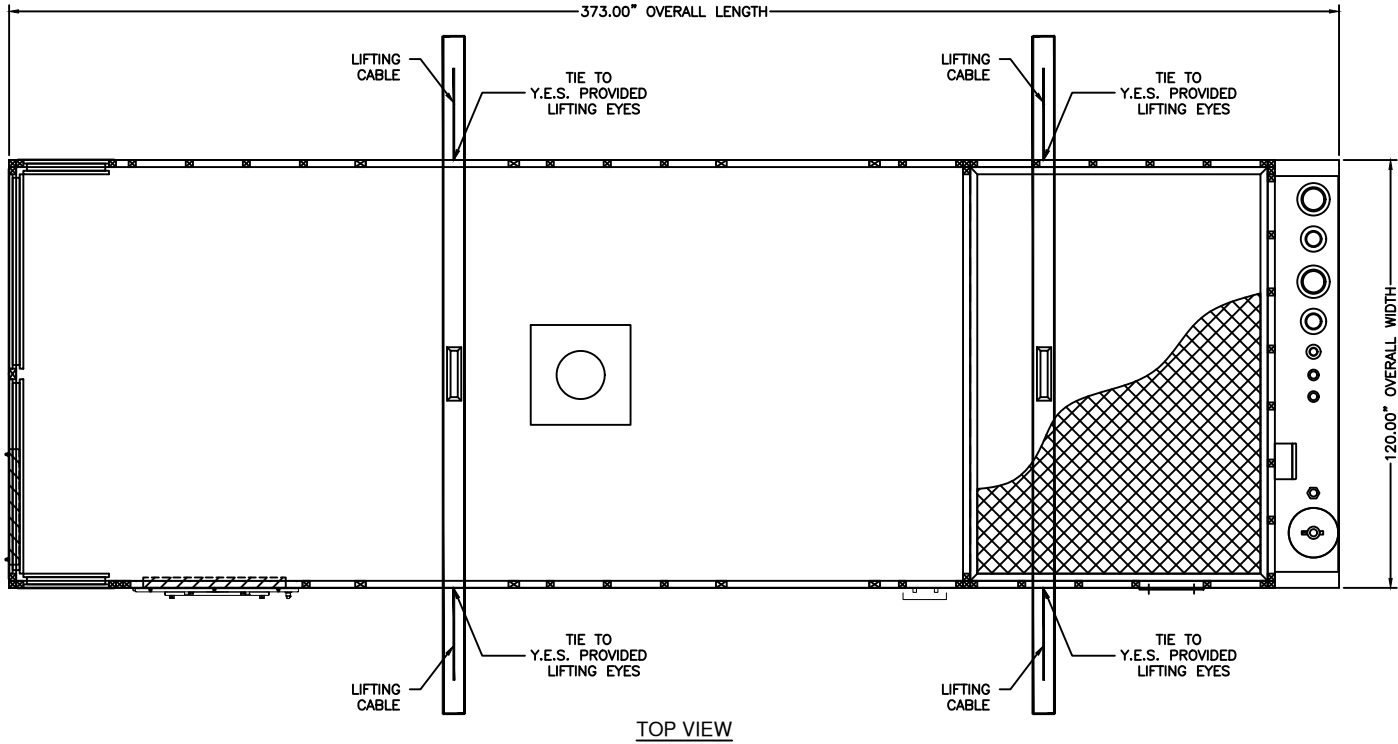
TERMINALS	
STARTER MOTOR 1 +	001
STARTER MOTOR 1 +	002
STARTER MOTOR 2 +	003
STARTER MOTOR 2 +	004
ENGINE DC PANEL +	005
ENGINE DC PANEL +	005
ENGINE DC PANEL BREAKER	006
EMCP B+	007
DC LIGHT TIMER +	008

REV.	DATE	DESCRIPTION	APP'D
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REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING UNITS REQ'D: 15				
CUSTOMER: YANCEY POWER SYSTEMS				
Drawing Title: QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL				
Sheet Title: WIRING DIAGRAM AND PANEL LAYOUT FOR BATTERY DIODE				
Scale: N.T.S		Dwg No.: 23-0739		
Drawn by: ASH	Checked by: JPR	Approved by: KYB		Revision A
Sheet No. 11 OF 12		Date: 12/5/2023		

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- NOTES:
- 1) THIS DETAIL IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR TO DECIDE FINAL SETUP AS PER AVAILABLE RIGGING EQUIPMENT AND SITE CONDITIONS.
 - 2) CONTRACTOR MUST LIFT ENCLOSURE USING Y.E.S. PROVIDED LIFTING EYES (4 EACH SIDE, 8 POINTS TOTAL).
 - 3) CENTER OF GRAVITY LOCATIONS PROVIDED FOR REFERENCE ONLY. PROPER ADJUSTMENTS TO BE MADE AT TIME OF INSTALLATION.
 - 4) APPROXIMATE TOTAL ENCLOSURE WEIGHT: 47,000 LBS



REV.	DATE	DESCRIPTION	APP'D
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	DECIMAL +/- 2.00" FRACTIONAL +/- 2"			
REFERENCE: ALUM. 0.080" SKIN ON ALUM. 2" x 2" x 0.125" TUBING				
UNITS REQ'D: 15				
CUSTOMER:				
YANCEY POWER SYSTEMS				
Drawing Title:				
QTS UNIVERSAL C32 PHASE 2 GENERAL ARRANGEMENT SUBMITTAL				
Sheet Title:				
LIFTING CONCEPT				
Scale:		Dwg No.:	23-0739	
N.T.S				
Drawn by:	Checked by:	Approved by:		Revision
ASH	JPR	KYB		A
Sheet No.	Date:			
12 OF 12	12/5/2023			

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Yancey Power Systems
259 Lee Industrial Blvd.
Austell, GA 30168-7406
770.941.2424 tel
770.941.2411 fax
877.278.6235 toll free
www.YanceyPower.com

Generator Accessories



L Frame



P Frame



R Frame

Molded Case Circuit Breakers

C27 – C32 North America built packages (60 Hz)

L-Frame
250A-400A (UL)

P-Frame
1200A (UL)

R-Frame
1600-2000A (UL)

Features

Design Specifications:

- 100% rated breakers
- 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

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
CSA 22.2 No 5-02
Federal Specification W-C-375B/GEN
NEMA AB1
NMX J-266

Standard Features

Standards

- UL-CSA
 - o L-Frame
 - o P-Frame
 - o R-Frame

Shunt trip

- The shunt trip provides a means of tripping the circuit breaker electronically
- Shunt trip ratings
 - o Voltage: 24VDC
 - o Coil Burden (Holding/Inrush): 4.5/200 VA
 - o 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, 50/60 Hz

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

Extension bus bars or mechanical lugs are provided for installation of load cables.

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
611-4994	250A L-Frame MCCB	UL	3	MO	3.3S LSI	Table 3	1 Aux Contact, Shunt Trip	—
421-3235	400A L-Frame MCCB	UL	3	MO	3.3S LSI	Table 3	1 Aux Contact, Shunt Trip	—
421-3237	400A L-Frame MCCB	UL	3	MO	6.3A LSIG	Table 3	1 Aux Contact, Shunt Trip	—
244-9774	1200A P-Frame MCCB	UL	3	MO	5.0A LSI	Table 1	1 Aux Contact, Shunt Trip	24
244-9864	1600A R-Frame MCCB	UL	3	MO	5.0A LSI	Table 2	1 Aux Contact, Shunt Trip	57
244-9868	2000A R-Frame MCCB	UL	3	MO	5.0A LSI	Table 2	1 Aux Contact, Shunt Trip	57
244-9778	1200A P-Frame MCCB	UL	3	MO	6.0A LSIG	Table 1	1 Aux Contact, Shunt Trip	24
244-9865	1600A R-Frame MCCB	UL	3	MO	6.0A LSIG	Table 2	1 Aux Contact, Shunt Trip	57
244-9869	2000A R-Frame MCCB	UL	3	MO	6.0A LSIG	Table 2	1 Aux Contact, Shunt Trip	57
244-9790	1200A P-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	30
585-8063	1600A R-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 2	1 Aux Contact, Shunt Trip, Modbus	57
585-8064	2000A R-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 2	1 Aux Contact, Shunt Trip, Modbus	57

Note: Arc flash energy reduction maintenance mode switch kit shipped loose for 1200A breakers.

Circuit Breakers Characteristics

TABLE 1

Model		P-Frame	
Number of Poles		3	
Rated Current (Amps)		1200A (UL)	
Voltage Rating (VAC)		600UL/ 690 IEC	
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 60947-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

TABLE 3

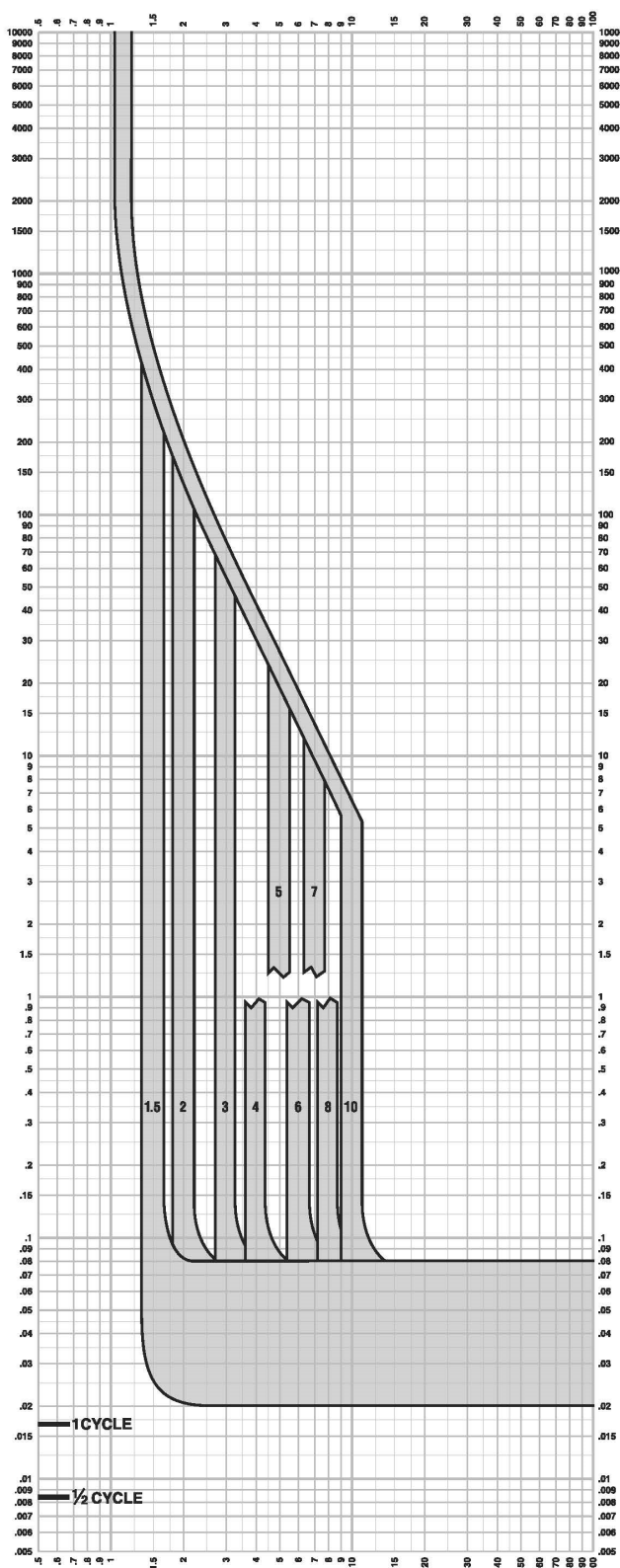
Model		L-Frame	
Number of Poles		3	
Rated Current (Amps)		250A – 400A (UL)	
Voltage Rating (VAC)		600UL/ 525 IEC	
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 647-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

TABLE 2

Model		R-Frame	
Number of Poles		3	
Rated Current (Amps)		1600A – 2000A (UL)	
Voltage Rating (VAC)		600UL/ 690 IEC	
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 60947-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

L-Frame Long-Short Trip Curve

CURRENT IN MULTIPLES OF I_r



3.3S Long Time/Short Time Trip Curve 250A, 400A L-Frame

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

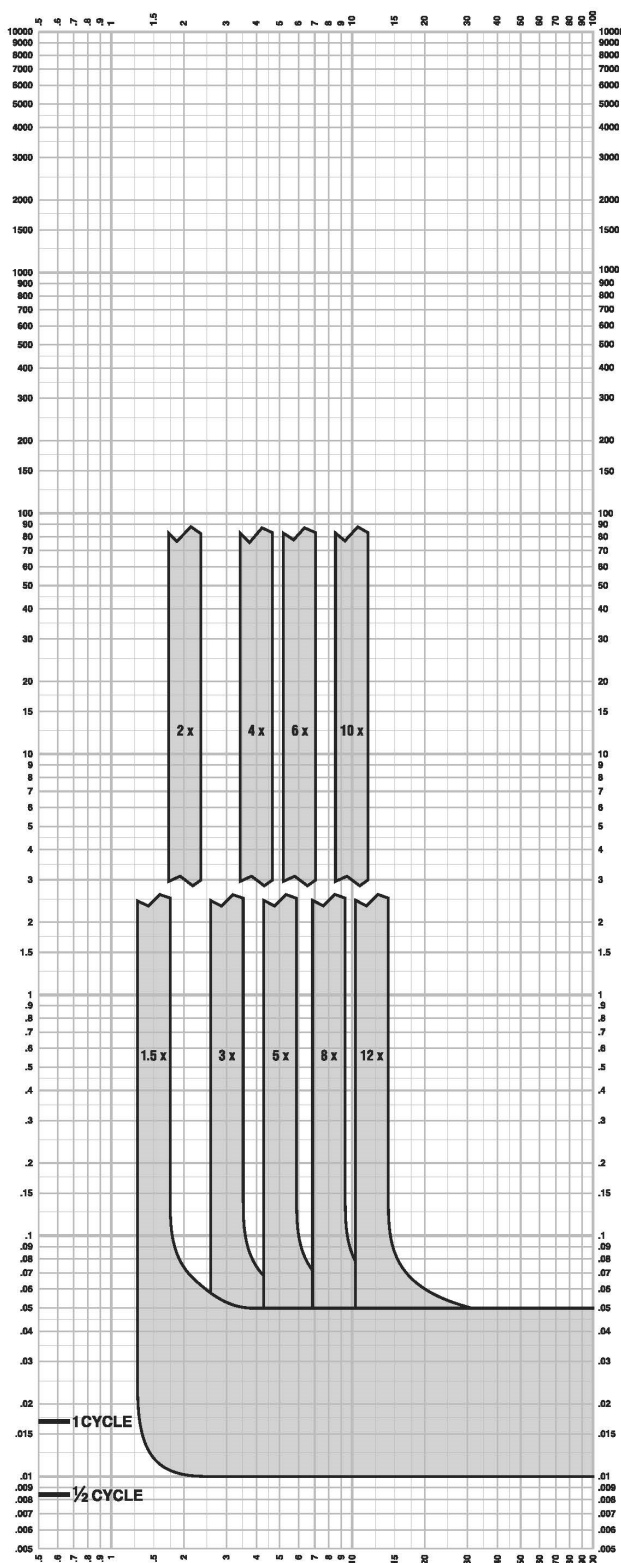
Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging 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. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.

Curves apply from -35°C to +70°C (-31°F to +158°F) ambient temperature.

L-Frame Instant Trip Curve

CURRENT IN MULTIPLES OF I_r



3.3/3.3S Instantaneous Trip Curve 250A L-Frame

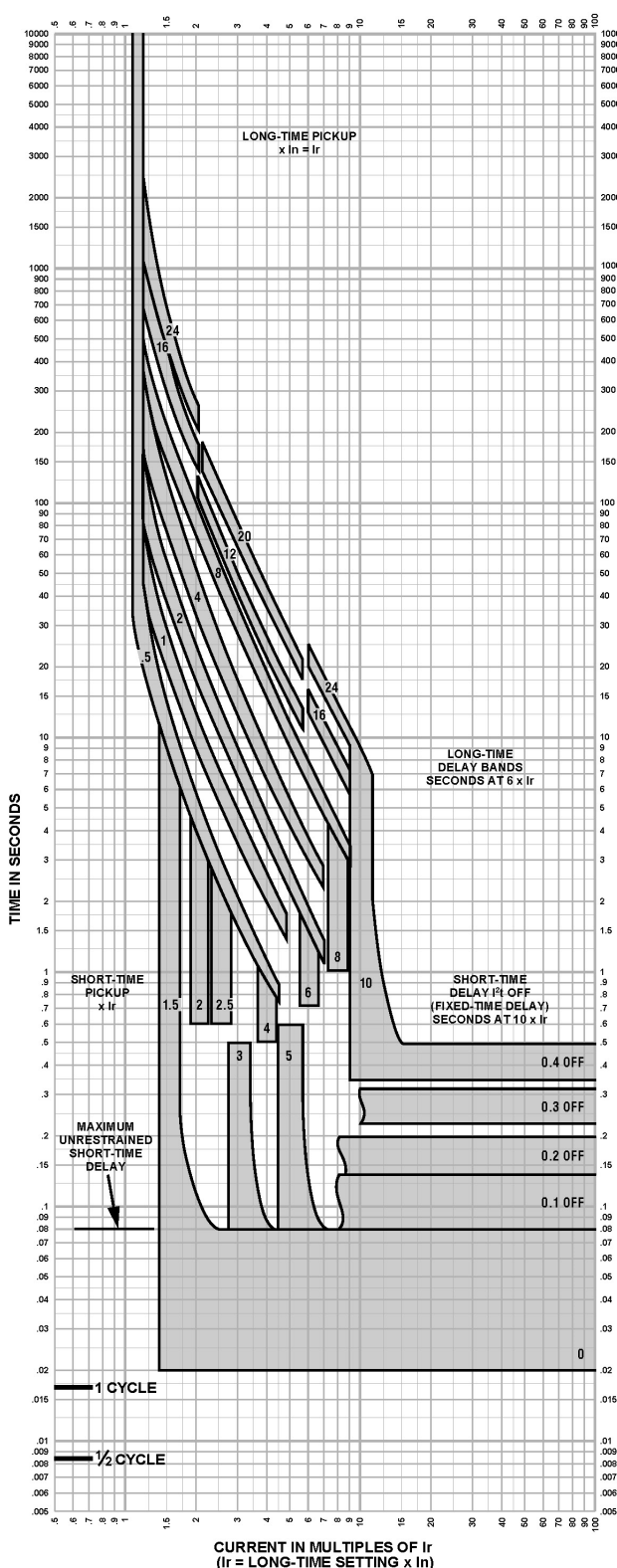
The time-current curve information is to be used for application and coordination purposes only.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the longtime 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. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
3. I_n = Maximum dial setting of I_r . 250A L-Frame:
 $I_n = 250A = \text{Max } I_r$ setting Curves apply from -35°C to $+70^\circ\text{C}$ (-31°F to $+158^\circ\text{F}$) ambient temperature.

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

CURRENT IN MULTIPLES OF I_r (I_r = Long-time setting $\times I_n$)



Long-time Pickup and Delay Short-time Pickup and I^2t OFF Delay

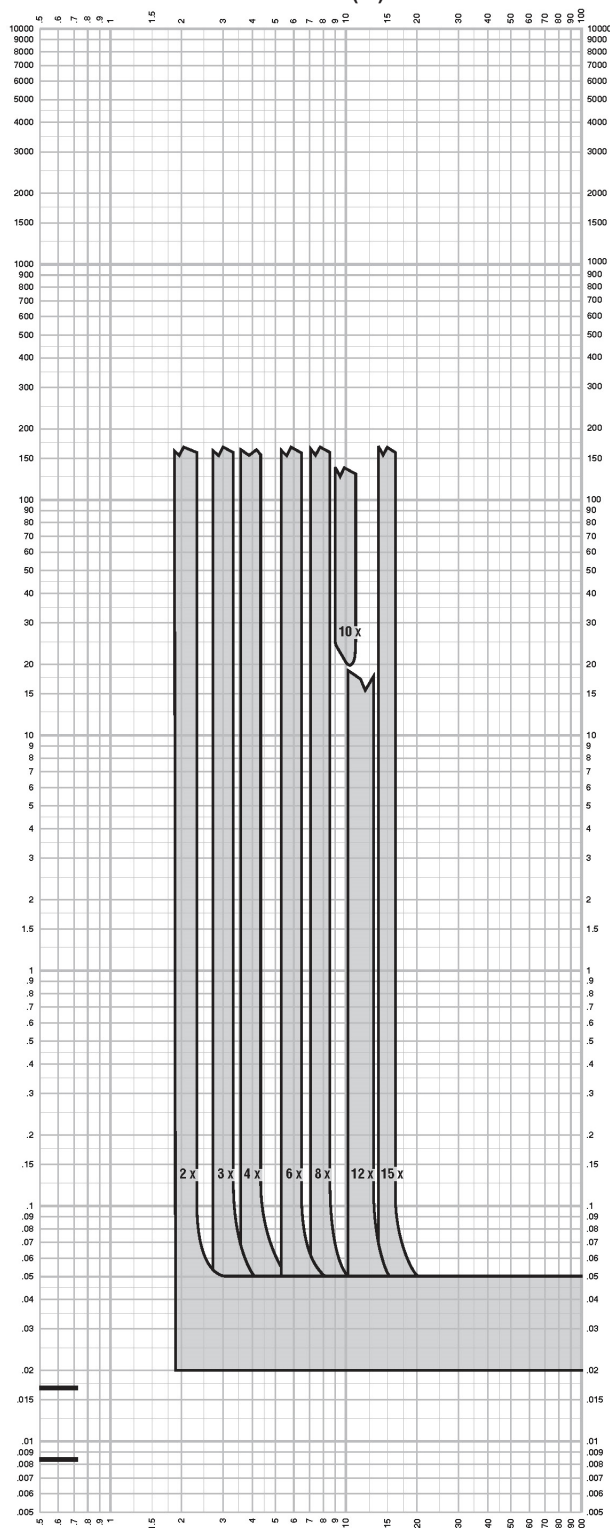
The time-current curve information is to be used for application and coordination purposes only. Curves apply from -30°C to $+60^\circ\text{C}$ ambient temperature.

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 thermalimaging.
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.
6. Overload indicator illuminates at 100%.

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

MULTIPLES OF SENSOR RATING (In)



Instantaneous Pickup 2x–15x and OFF

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

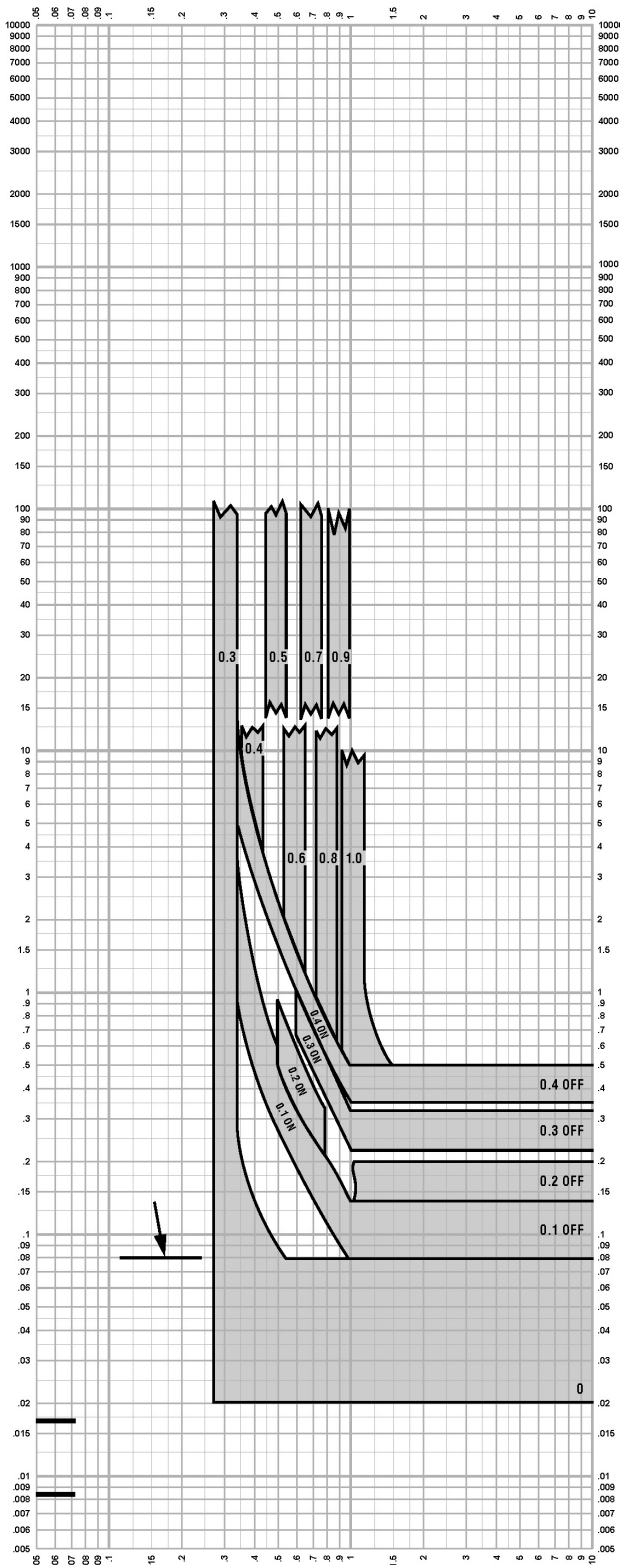
Curves apply from -30° to +60°C ambient temperature.

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. \

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

MULTIPLES OF SENSOR RATING (I_n)



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° to $+60^\circ$ C ambient temperature.



Image shown may not reflect actual configuration.

20A Tamper-Resistant, Weather-Resistant GFCI Receptacles

Features and Benefits

- Automatically tests the GFCI every time the reset button is pushed in. The GFCI will not reset if the GFCI circuit is not functioning properly.
- By blocking reset of the GFCI if protection has been compromised, SmartLockPRO reduces the possibility of end-users incorrectly assuming that a reset GFCI outlet is providing ground fault protection when it actually is not.
- A line-load reversal diagnostic feature is provided which prevents the GFCI from being reset and stops power from being fed to the GFCI receptacle face or through to downstream devices. A green LED indicator on the GFCI's face also illuminates to alert the installer to the line-load wiring reversal.

Weather-Resistant GFCIs

- Meet UL 498 requirements for weather-resistant receptacles.

Tamper-Resistant GFCIs

- Shutter mechanism inside the receptacle blocks access to the contacts unless a two-prong plug is inserted, helping ensure foreign objects will be locked out.

Product Features

- Grounding: GFCI ground fault
- Feature: Weather and tamper-resistant
- Amperage: 20 Amp
- Voltage: 125 Volt
- NEMA: 5-20R
- Trip Level: Class A, 5mA plus or minus 1mA
- Pole: 2
- Wire: 3
- Color: White

Standards and Certifications

- NEMA: WD-6
- ANSI: C-73
- UL498: File E13399
- CSA C22.2 No. 42: File LR-57811
- NOM: 057
- UL 943: File E48380

Receptacles contained in a
weather resistant box
and in-use cover.



www.Cat-ElectricPower.com

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GROUND FAULT RELAY (GFR)

Picture shown may not reflect actual configuration

GENERAL DESCRIPTION

GFR is a microprocessor-based ground-fault relay for resistance- and solidly-grounded systems. In addition to common systems, it is uniquely suited for use on systems with significant harmonic content. GFR can provide main-plant protection, feeder-level protection, or individual-load protection. Proper current transformer selection provides the desired pickup range. The output contacts can be connected for use in protective tripping circuits or in alarm indication circuits. The analog output can be used with a PLC or a meter.

FEATURES & BENEFITS

Benefits

- Trip setting based on input CT primary, allows use with any CT. Minimum 50 mA with EFCT Series.
- Adjustable trip delay allows quick protection and system coordination
- Form A and Form B ground-fault output contacts for operation of separate annunciation and trip circuits
- Alarms when CT is not connected
- Compatible with variable-speed drives
- Eliminates nuisance tripping
- Retains trip state while de-energized to simplify troubleshooting
- No calibration required, saves on maintenance cost
- Allows operation in application where one side of PT is faulted, provides flexibility for numerous applications

Features

- Adjustable pickup (1-99%)
- Adjustable time delay (50 ms - 2.5 s)
- Output contacts
- Analog output (0 - 5 V)
- CT-Loop monitoring
- Selectable DFT or peak detection filtering
- Harmonic filtering
- Non-volatile trip memory
- Microprocessor based
- Universal power supply

FRONT-PANEL CONTROLS

Ground-fault trip level

The % CT PRIMARY selector switches are used to set the ground-fault trip level as a percentage of the CT-primary rating. In tripping systems, a ground-fault trip level of 10 to 20% of the prospective ground-fault current is often used. In alarm-only systems, a value of 50% of the prospective ground-fault current is often used. To avoid sympathetic tripping, the trip level must be above the charging current of the protected feeder. A 0% selection provides protection at 1%.

Ground-fault trip time

GFR has a definite-time trip characteristic. The TIME (s) selector switch is used to set the ground-fault trip delay time for coordination with upstream and downstream ground-fault devices. Coordination requires the same trip level for all ground-fault devices in a system and the trip time to progressively increase upstream. The amount of equipment removed from the system will be a minimum if the first ground-fault device to operate is the one immediately upstream from the fault.

Reset

If the Reset Mode switch is in the LATCHING position, a trip remains latched until the RESET button is pressed or the remote-reset terminals are momentarily connected. In the non-fail-safe mode, cycling the supply voltage will also reset the GFR.

If the Reset Mode switch is in the AUTORESET position, a trip will reset when the fault is removed. The reset circuit responds only to a momentary closure so that a jammed or shorted button will not prevent a trip. The front-panel RESET button is inoperative when the remote-reset terminals (6 and 7) are connected

Test

The TEST button is used to test the ground-fault circuit, the indication, and the output relay. When the TEST button is pressed for one second, a test signal is applied to the ground-fault-detection circuit, the circuit will trip, the TRIP LED will light, and the output relay will operate. If high-current inhibit has been selected, the INHB LED will light.

Front-panel indication

- **Power**
The green LED labelled PWR indicates the presence of supply voltage.
- **Trip**
The red LED labelled TRIP indicates a trip. A solid red LED indicates a ground-fault trip. A flashing LED indicates a trip initiated by a CT fault. Two fast flashes indicate a diagnostic trip.

Self diagnostics

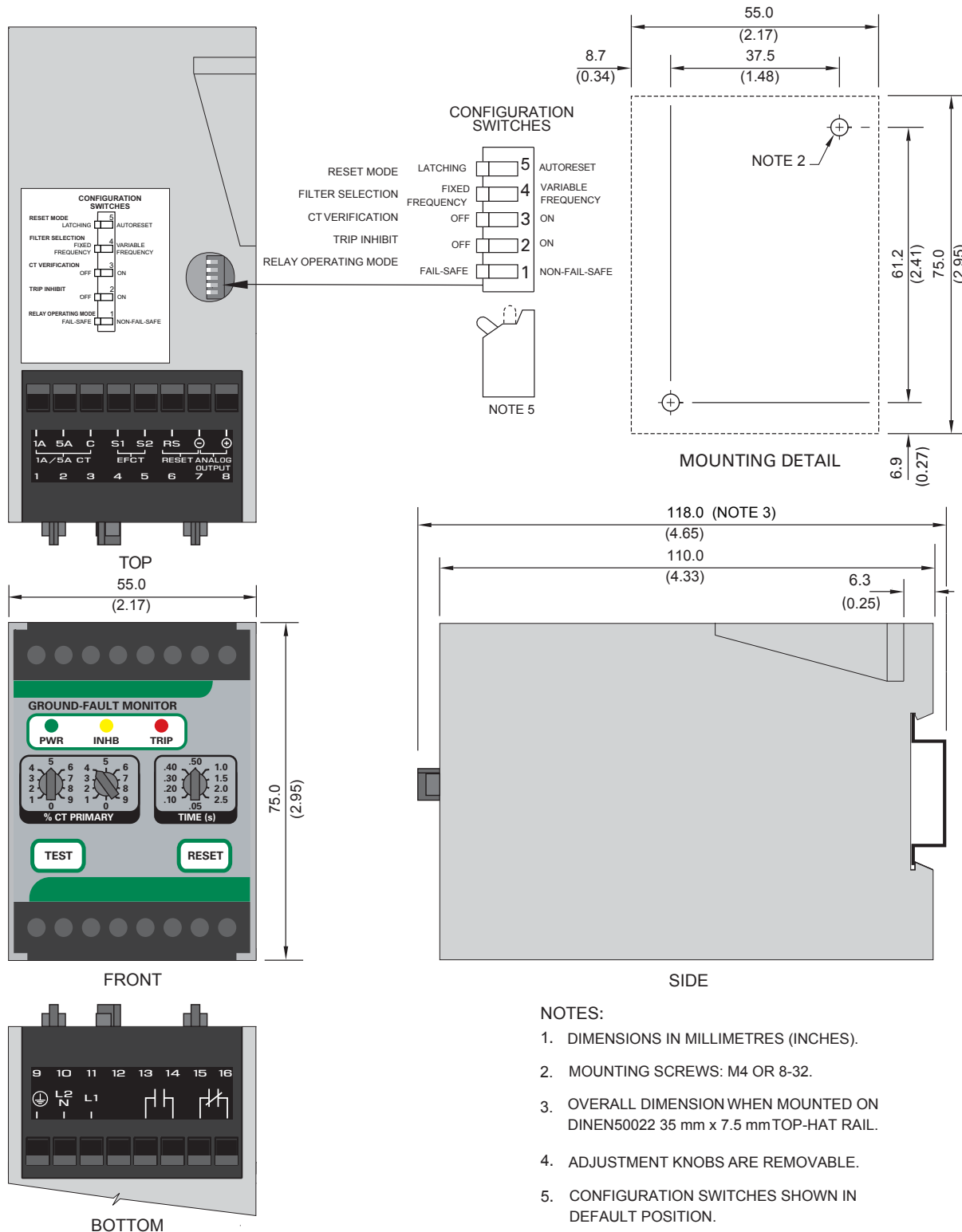
A diagnostic trip is indicated by two fast flashes of the TRIP LED. It can be caused by a diagnostic problem detected by the watchdog timer or from an incorrect reading from non-volatile memory. Press RESET or cycle supply voltage.

- **Trip inhibit**
The yellow LED labelled INHB indicates that output relay operation was inhibited during a high-current ground fault. When a ground-fault trip occurs during a high-current ground fault, both the TRIP and INHB LED's will be ON. Inhibit indication is reset when the ground-fault trip is reset. Inhibit operation and indication will not respond if the trip-inhibit switch is in the OFF position.

SPECIFICATIONS

- IEEE Device Numbers - Ground fault (50G/N, 51G/N)
- Dimensions
 - o H 75 mm (3.0")
 - o W 55 mm (2.2")
 - o D 115 mm (4.5")
- Trip Level Settings - 1-99% CT-Primary Rating
- Trip Time Settings - 0.05-2.5 s
- Contact Operating Mode - Selectable fail-safe or non-fail-safe
- Output Contacts Isolated Form A and Form B
- Approvals CSA certified, UL Listed (E340889), CE (European Union), C-Tick (Australian)
- Analog Output 0-5 V

OUTLINE AND MOUNTING DETAILS



NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. MOUNTING SCREWS: M4 OR 8-32.
3. OVERALL DIMENSION WHEN MOUNTED ON DINEN50022 35 mm x 7.5 mm TOP-HAT RAIL.
4. ADJUSTMENT KNOBS ARE REMOVABLE.
5. CONFIGURATION SWITCHES SHOWN IN DEFAULT POSITION.

Materials and specifications are subject to change without notice.

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Picture shown may not reflect actual configuration.

Remote Annunciator Module

It is an LED expansion module that can be used with compatible control modules. The module has been designed to display a maximum of eight individual LED indications up to a maximum distance of 1 KM (0.6 miles).

The Annunciator will consist of two modules to provide a 16 Channel Fault annunciation.

It is presented in a vertical enclosure. It includes an alarm sounder that is triggered when the host controller detects an alarm condition. The alarm can be muted using the front push button.

The Panels will be fitted with removable label cards which can be used to identify the standard NFPA alarms if desired.

It includes individual LEDs for each channel and a 'Power On' LED that flashes when the link with the host controller is lost.

Features

- The Remote annunciator has an integral Sounder/Horn
- Eight configurable LEDs (per module)
- Works up to 1 KM (0.6 miles) from the host controller
- A single controller can support five Caterpillar configured remote annunciator control boxes

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including
Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

IP65 – Front of module when installed into the control panel with the supplied sealing gasket.

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

112 mA at 12 V, 53 mA at 24 V

MAXIMUM STANDBY CURRENT

74 mA at 12 V, 35 mA at 24 V

DIMENSIONS OVERALL

355 mm x 369 mm x 90 mm
13.6" x 14.5" x 3.5"

PANEL CUT-OUT

286 mm x 326 mm x 93 mm
11.2" x 12.8" x 3.6"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

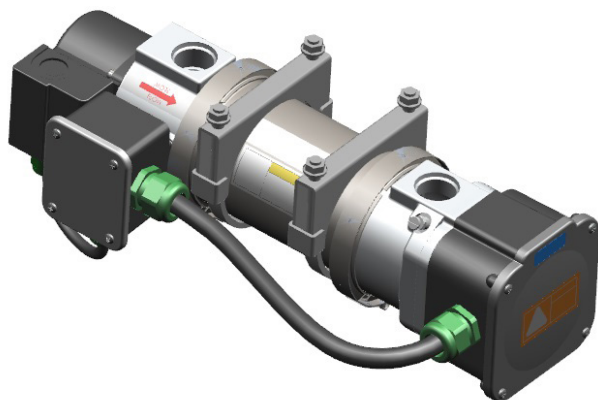
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Features

Factory Installed

- Complete with Hoses, Thermostat (Control and Hi-Limit) and Pump
- Base Frame mounting minimizes Engine induced vibration
- Temperature Controlled Pump operation
- Supplied with UL, C (UL) US and CE recognized components
- Control Thermostat is Factory preset to 49°C (120°F)

Heater Design Description

- Jacket Water Heater Package is designed to efficiently preheat the engine by circulating the heated coolant onto engine
- This design results in following benefits
- Increase life of Heater Hoses, Engine Seals and Heating Elements
- Improves Heat Transfer efficiency from Elements to Engine Coolant
- Uniform Engine temperature distribution
- Application of Thermostat with a reduced thermal differential
- Lower Customer utility costs and increased Heater reliability
- Heater's Control Thermostat set point is preset

Jacket Water Heater with Pump C27 and C32

Caterpillar offers a factory installed Jacket Water Heater for improved Engine Cold-Starting capability

This Jacket Water Heater is a Thermostatically controlled Heater with an integrated pump, built in bleed screw and High Limit Thermostat that can be manually reset

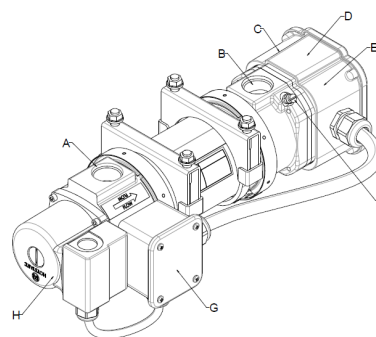
Forced circulation of the coolant delivers uniform heating throughout the entire engine, reduces wear from Cold spots and offers significant reduction of Electrical consumption

Heater Operation

A 34 L/pm (9 GPM) Pump is located at the Heater Inlet to push the coolant through the Heater
A Control Thermostat is located inside a Plastic Enclosure near the Inlet of Heater and responds to the temperature of coolant entering the tank
A High Limit Thermostat is located inside a Plastic Element Enclosure near the Outlet of Heater opens and cuts off supply to Heating Element, if tank attains 96°C (205°F). This Thermostat can be manual reset to close position.

Temperature Controlled Pump Operation – Pump runs only with Heating Elements.

Air release valve (Bleed Screw) provided to allow vent air from Heater, prior to energizing the Heater.



A. Suction Port
(SAE Dash 16)

B. Discharge Port
(SAE Dash 16)

C. Power in Wiring Entrance

D. Element Assembly

E. High-limit Thermostat
with manual reset (in
Element assembly)

F. Air Release Valve

G. Control Thermostat
(in enclosure)

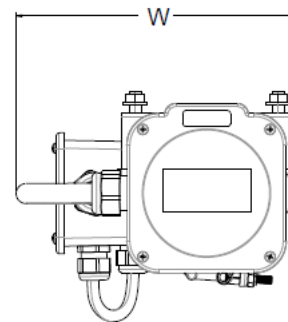
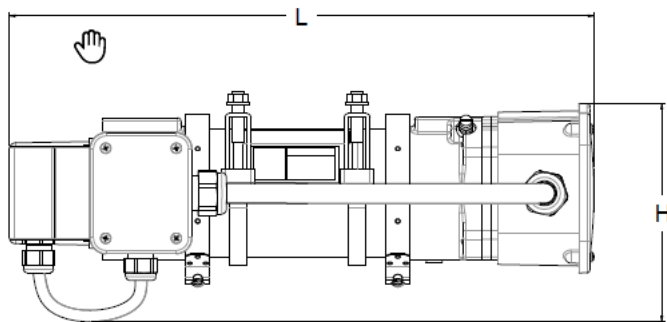
H. Pump/Motor

Jacket Water Heater



Specifications

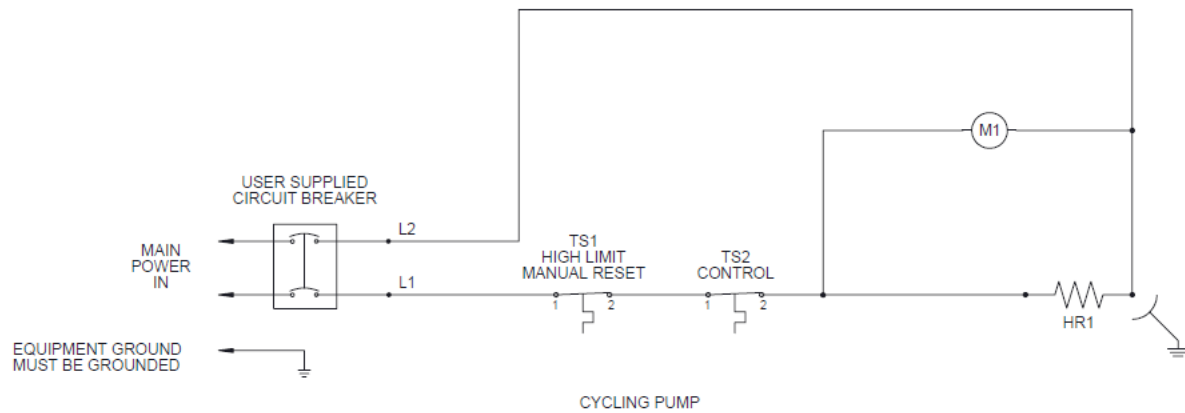
	Voltage	
	240	220
Heater Power	6kW	6kW
Frequency	60	50
Phase	Single	Single
Amps	25A	26A
Flow Rate	34 L/pm (9 GPM)	
Pump Rating	230 VAC 97W	230 VAC 70W
Control Thermostat (Set Point)	38°C – 49°C (100°F – 120°F)	
High Limit Thermostat (Set Point)	96°C (205°F), Manual Reset	
Length	466 mm (18.3")	
Width	216 mm (8.5")	
Height	183 mm (7.2")	
Weight	6.5 Kg	



Jacket Water Heater

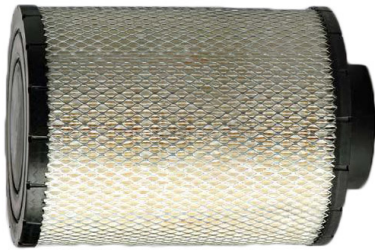


Wiring Diagram



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Air Cleaner - Open Element

3412

Picture shown may not reflect actual configuration

General Description

Air cleaners reduce contaminants flowing into the air intake system, provide a high level of engine protection from harmful contaminants, and help maintain optimal performance of the engine.

The open element air cleaner is a cost-effective alternative to heavy duty air cleaners in installations where protection is not required for the filter element.

Features

- Lightweight materials
- Completely disposable
- Easy to install, durable, and reliable
- Air cleaner housing and filter are one unit
- Designed to withstand severe intake pulsations
- Polyurethane end caps

Specification

Cleaner

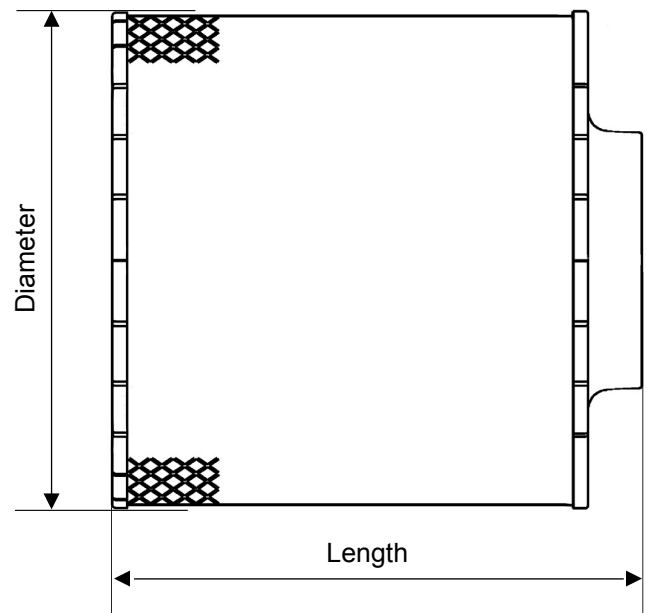
Length 339.3 mm (13.4")

Diameter 317.5 mm (12.5")

Weight 1.74 kg (3.83 Lbs.)

Overall Efficiency	99.9%
Effective Filtering Area (m ²)	8.08
Number of Convolutions	267±2
Depth of Convolutions	50.8

General Dimension Drawing



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Effective with sales to the first user on or after July 1, 2021

CATERPILLAR LIMITED WARRANTY

New and Remanufactured 3000 Family, C0.5 through C4.4, and ACERT™ Engines Worldwide

Caterpillar Inc. or any of its subsidiaries ("Caterpillar") warrants new and remanufactured 3000 Family, C0.5 through C4.4, and ACERT industrial engines sold by it, to be free from defects in material and workmanship. ACERT industrial engines refer to the C6.6, C7, C7.1, C9, C9.3, C11, C13, C15, C18, C27, and C32 engine models.

This warranty does not apply to engines sold for use in marine, petroleum, electric power generation and on-highway vehicle applications, engines in machines manufactured by Caterpillar, or Cat® batteries. These products are covered by other Caterpillar warranties.

This warranty is subject to the following:

Warranty Period

The standard warranty period for new and remanufactured 3003, 3011, 3013, 3014, 3024, C0.5, C0.7, C1.1, C1.5, C1.6, C1.7, and C2.2 engines used in mobile agricultural, industrial and locomotive applications is 24 months or 2000 hours, whichever occurs first (with the first 12 months at unlimited hours) after the date of delivery to the first user.

The standard warranty period for new and remanufactured 3034, 3044, 3054, 3056, C2.8, C3.4, C3.6, C4.4, C6.6 and C7.1 engines used in mobile agricultural, industrial, and locomotive applications is 24 months or 3000 hours, whichever occurs first (with the first 12 months at unlimited hours) after the date of delivery to the first user.

For new and remanufactured 3034, 3044, 3054, 3056, C0.5, C0.7, C1.1, C1.5, C1.6, C1.7, C2.2, C2.8, C3.4, C3.6, C4.4, C6.6 and C7.1 engines:

- Low Usage: In cases where the engine use does not exceed 500 hours per year, the warranty period is extended for one additional year or until the engine use reaches a total of 1500 hours in the 3rd year of warranty, whichever occurs first, after the date of delivery to the first user.

The standard warranty period for new and remanufactured C7, C9, C9.3, C11, C13, C15, C18, C27, and C32 engines (i) for use in mobile agricultural applications, 24 months after the date of delivery to the first user and (ii) for industrial, and locomotive applications 24 months or 3000 hours, whichever occurs first (with the first 12 months at unlimited hours), after the date of delivery to the first user.

The standard warranty period for rotating electrics (i) used on new and remanufactured 3000 Family, C0.5 through C4.4, C6.6 and C7.1 engines is 12 months from the date of engine delivery to the first user, and (ii) used on new and remanufactured C7, C9, C9.3, C11, C13, C15, C18, C27, C32 engines is 24 months or 3000 hours, whichever occurs first (with the first 12 months at unlimited hours) after the date of engine delivery to the first user.

For all other applications the warranty period is 12 months after date of delivery to the first user.

Extended Warranty

For all new and remanufactured 3000 Family, C0.5 through C4.4, and ACERT engines:

- **Major Components:** A major components extended warranty applies solely to the following components: cylinder block casting, cylinder head casting, crankshaft (excluding bearings), camshaft, and connecting rods. These parts are warranted against defects in material and workmanship for 36 months after the date of delivery to the first user. This warranty runs concurrently with the standard warranty period.

Caterpillar Responsibilities

If a defect in material or workmanship is found during the standard warranty period or the extended warranty period, as applicable, Caterpillar will, during normal working hours and at a place of business of a Cat dealer or other source approved by Caterpillar:

- Provide (at Caterpillar's choice) new, remanufactured, or Caterpillar approved repaired parts or assembled components needed to correct the defect.

Note: New, remanufactured, or Caterpillar approved repaired parts or assembled components provided under the terms of this warranty are warranted for the remainder of the warranty period applicable to the product in which installed as if such parts were original components of that product. Items replaced under this warranty become the property of Caterpillar.

- Replace lubricating oil, filters, coolant, and other service items made unusable by the defect.

Provide reasonable and customary labor needed to correct the defect.

For new and remanufactured 3003, 3011, 3013, 3014, 3024, C0.5, C0.7, C1.1, C1.5, C1.6, C1.7, and C2.2 engines:

- A maximum of 10 hours of labor to disconnect and reconnect the product to its attached equipment, mounting, and support system

For new and remanufactured 3034, 3044, 3054, 3056, C2.8, C3.4, C3.6 C4.4, C6.6 and C7.1 engines:

- A maximum of 15 hours of labor to disconnect and reconnect the product to its attached equipment, mounting, and support system

For new and remanufactured 3000 Family and C0.5 through C7.1 engines:

- Provide travel labor, up to four hours round trip, if in the opinion of Caterpillar, the product cannot reasonably be transported to a place of business of a Cat dealer or other source approved by Caterpillar (travel labor in excess of four hours round trip, and any meals, mileage, lodging, etc. is the user's responsibility).

For new and remanufactured C9, C9.3, C11, C13, C15, C18, C27, and C32 engines:

- Provide reasonable travel expenses for authorized mechanics, including meals, mileage, and lodging when Caterpillar elects to make the repair on-site.

User Responsibilities

The user is responsible for:

- Providing proof of the delivery date to the first user.
- Labor costs, except as stated under "Caterpillar Responsibilities."
- Travel expenses not covered under "Caterpillar Responsibilities."
- All costs associated with transporting the product to and from the place of business of a Cat dealer or other source approved by Caterpillar.
- Premium or overtime labor costs.
- Parts shipping charges in excess of those that are usual and customary.
- Local taxes, if applicable.
- Costs to investigate complaints, unless the problem is caused by a defect in Caterpillar material or workmanship.
- Giving timely notice of a warrantable failure and promptly making the product available for repair.
- Performing all required maintenance (including use of proper fuel, oil, lubricants, and coolant) and items replaced due to normal wear and tear.
- Allowing Caterpillar access to all electronically stored data.

Limitations

Caterpillar is not responsible for:

- Failures resulting from any use or installation that Caterpillar judges improper.
- Failures resulting from attachments, accessory items, and parts not sold or approved by Caterpillar.
- Failures resulting from abuse, neglect, and/or improper repair.
- Failures resulting from user's delay in making the product available after being notified of a potential product problem.
- Failures resulting from unauthorized repair or adjustment, and unauthorized fuel-setting changes.
- Damage to parts, fixtures, housings, attachments, and accessory items, which are not part of the engine.

(Continued on reverse side...)

This warranty covers every major component of the products. Claims under this warranty should be limited to a place of business of a Cat dealer or other source approved by Caterpillar. For further information concerning either the location to submit claims or Caterpillar as the issuer of this warranty, write Caterpillar Inc., 100 N.E. Adams St., Peoria, IL USA 61629, telephone 1 (309) 675-1000, or go to URL, www.cat.com, Find Your Dealer.

Caterpillar's obligations under this Limited Warranty are subject to, and shall not apply in contravention of, the laws, rules, regulations, directives, ordinances, orders, or statutes of the United States, or of any other applicable jurisdiction, without recourse or liability with respect to Caterpillar.

A) For products operating outside of Australia, Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the Solomon Islands, and Tahiti, the following is applicable:

NEITHER THE FOREGOING EXPRESS WARRANTY NOR ANY OTHER WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED, IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS THAT IS WARRANTED DIRECTLY TO THE USER BY ITS MANUFACTURER.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISION OF MATERIAL AND SERVICES, AS SPECIFIED HEREIN.

CATERPILLAR IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

CATERPILLAR EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN RESPECT OF THE MANUFACTURE OR SUPPLY OF GOODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

IF OTHERWISE APPLICABLE, THE VIENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS EXCLUDED IN ITS ENTIRETY.

For personal or family use engines, or marine transmissions operating in the USA, its territories and its possessions, some states do not allow limitations on how long an implied warranty may last nor allow the exclusion or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary by jurisdiction. To find the location of the nearest Cat dealer or authorized repair facility, call (800) 447-4986. If you have questions concerning this warranty or its application, call or write: In USA and Canada: Caterpillar Inc, Engine Division, P. O. Box 610, Mossville, IL 61552-0610, Attention: Customer Service Manager (800) 447-4986. Outside the USA and Canada: Contact your Cat dealer.

B) For products operating in Australia, Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the Solomon Islands, and Tahiti, the following is applicable:

THIS WARRANTY IS IN ADDITION TO WARRANTIES AND CONDITIONS IMPLIED BY STATUTE AND OTHER STATUTORY RIGHTS AND OBLIGATIONS THAT BY ANY APPLICABLE LAW CANNOT BE EXCLUDED, RESTRICTED, OR MODIFIED ("MANDATORY RIGHTS"). ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED (BY STATUTE OR OTHERWISE), ARE EXCLUDED. WITHOUT LIMITING THE FOREGOING PROVISIONS OF THIS PARAGRAPH, WHERE A PRODUCT IS SUPPLIED FOR BUSINESS PURPOSES, THE CONSUMER GUARANTEES UNDER THE CONSUMER GUARANTEES ACT 1993 (NZ) WILL NOT APPLY.

NEITHER THIS WARRANTY NOR ANY OTHER CONDITION OR WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED (SUBJECT ONLY TO THE MANDATORY RIGHTS), IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS THAT IS WARRANTED DIRECTLY TO THE USER BY ITS MANUFACTURER.

IF THE MANDATORY RIGHTS MAKE CATERPILLAR LIABLE IN CONNECTION WITH SERVICES OR GOODS, THEN TO THE EXTENT PERMITTED UNDER THE MANDATORY RIGHTS, THAT LIABILITY SHALL BE LIMITED AT CATERPILLAR'S OPTION TO (a) IN THE CASE OF SERVICES, THE SUPPLY OF THE SERVICES AGAIN OR THE PAYMENT OF THE COST OF HAVING THE SERVICES SUPPLIED AGAIN AND (b) IN THE CASE OF GOODS, THE REPAIR OR REPLACEMENT OF THE GOODS, THE SUPPLY OF EQUIVALENT GOODS, THE PAYMENT OF THE COST OF SUCH REPAIR OR REPLACEMENT OR THE ACQUISITION OF EQUIVALENT GOODS.

CATERPILLAR EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN RESPECT OF THE MANUFACTURE OR SUPPLY OF GOODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

CATERPILLAR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNLESS IMPOSED UNDER MANDATORY RIGHTS.

IF OTHERWISE APPLICABLE, THE VIENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS EXCLUDED IN ITS ENTIRETY.

C) For products supplied in Australia:

IF THE PRODUCTS TO WHICH THIS WARRANTY APPLIES ARE:

I. PRODUCTS OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION; OR

II. PRODUCTS THAT COST AUD 100,000 OR LESS,

WHERE THOSE PRODUCTS WERE NOT ACQUIRED FOR THE PURPOSE OF RE-SUPPLY OR FOR THE PURPOSE OF USING THEM UP OR TRANSFORMING THEM IN THE COURSE OF PRODUCTION OR MANUFACTURE OR IN THE COURSE OF REPAIRING OTHER GOODS OR FIXTURES, THEN THIS SECTION C APPLIES.

THE FOLLOWING MANDATORY TEXT IS INCLUDED PURSUANT TO THE AUSTRALIAN CONSUMER LAW AND INCLUDES REFERENCES TO RIGHTS THE USER MAY HAVE AGAINST THE DIRECT SUPPLIER OF THE PRODUCTS: OUR GOODS COME WITH GUARANTEES THAT CANNOT BE EXCLUDED UNDER THE AUSTRALIAN CONSUMER LAW. YOU ARE ENTITLED TO A REPLACEMENT OR REFUND FOR A MAJOR FAILURE AND COMPENSATION FOR ANY OTHER REASONABLY FORESEEABLE LOSS OR DAMAGE. YOU ARE ALSO ENTITLED TO HAVE THE GOODS REPAIRED OR REPLACED IF THE GOODS FAIL TO BE OF ACCEPTABLE QUALITY AND THE FAILURE DOES NOT AMOUNT TO A MAJOR FAILURE. THE INCLUSION OF THIS TEXT DOES NOT CONSTITUTE ANY REPRESENTATION OR ACCEPTANCE BY CATERPILLAR OF LIABILITY TO THE USER OR ANY OTHER PERSON IN ADDITION TO THAT WHICH CATERPILLAR MAY HAVE UNDER THE AUSTRALIAN CONSUMER LAW.

TO THE EXTENT THE PRODUCTS FALL WITHIN THIS SECTION C BUT ARE NOT OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION, CATERPILLAR LIMITS ITS LIABILITY TO THE EXTENT IT IS PERMITTED TO DO SO UNDER THE AUSTRALIAN CONSUMER LAW TO, AT ITS OPTION, THE REPAIR OR REPLACEMENT OF THE PRODUCTS, THE SUPPLY OF EQUIVALENT PRODUCTS, OR THE PAYMENT OF THE COST OF SUCH REPAIR OR REPLACEMENT OR THE ACQUISITION OF EQUIVALENT PRODUCTS.

THE WARRANTY SET OUT IN THIS DOCUMENT IS GIVEN BY CATERPILLAR INC. OR ANY OF ITS SUBSIDIARIES, 100 N. E. ADAMS ST, PEORIA, IL USA 61629, TELEPHONE 1 309 675 1000, THE USER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH MAKING A CLAIM UNDER THE WARRANTY SET OUT IN THIS DOCUMENT, EXCEPT AS EXPRESSLY STATED OTHERWISE IN THIS DOCUMENT, AND THE USER IS REFERRED TO THE BALANCE OF THE DOCUMENT TERMS CONCERNING CLAIM PROCEDURES, CATERPILLAR RESPONSIBILITIES AND USER RESPONSIBILITIES.

TO THE EXTENT PERMISSIBLE BY LAW, THE TERMS SET OUT IN THE REMAINDER OF THIS WARRANTY DOCUMENT (INCLUDING SECTION B) CONTINUE TO APPLY TO PRODUCTS TO WHICH THIS SECTION C APPLIES.

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Dealer and Dealers are defined as any Cat Authorized Dealer or Cat Authorized Repair Representative

259 LEE INDUSTRIAL BLVD.
AUSTELL, GA 30168
TEL: 770.941.2424

DESCRIPTION OF MAINTENANCE SERVICES INCLUDED

LEVEL 1

VISUAL CHECK:

- Anti-freeze and Coolant Level
- Radiator (leaks, damage, blockage)
- Fan Assembly (cracks, bent blades, grease bearings)
- V Belts (proper tension, condition)
- Water Hoses (condition, leaks)
- Fuel System Day Tank (operation, lines, leaks)
- Fuel Injection System (leaks, condition)
- Fuel Priming Pump (operation, leaks, condition)
- Air Cleaner Assembly (leaks, cracks, gaskets)
- Manifold and Piping (leaks, condition)
- Exhaust Manifold and Piping (leaks, condition)
- Electrical DC Wiring (engine, condition, connections)
- Service Batteries and Cables (water level, condition, connections)
- Battery Charger (condition, operation, AC/DC)
- Balancer (leaks, condition)

AT OPERATING TEMPERATURE:

- Re-Check Lubrication System (leaks)
- Re-Check Cooling System (leaks)
- Re-Check Air Induction System (leaks, condition)
- Re-Check Exhaust System (leaks)
- Re-Check Fuel System (leaks)
- Re-Check Governor (stability, response)
- Re-Check Voltage and Frequency
- Perform Minor Adjustments as Necessary

DURING OPERATION CHECK:

- Battery Voltage Drop While Cranking (condition)
- Engine Smoke (critical system indicator)
- Safety Shutdowns and Pre-Alarms (condition, operation)
- Fuel Transfer Pump (PSI, condition, leaks)
- Oil Pump (PSI)
- Lubrication System (leaks)
- Entire Cooling System (leaks)
- Temperature Regulators (operation)
- Gauges and Indicators (operation, condition)
- Governor (operation, stability, response, frequency)
- Turbo Charger (operation)
- Aftercooler (leaks)
- Control Panel (condition, operation)
- Electrical Power Generator (operation, voltage)
- Engine Room Ventilation
- Service (Hour) Meter (condition, operation)
- Transfer Power to the Generator
- Perform Minor Adjustments As Necessary

Level 2

Green Oil:

- Complete Level 1 inspection with the below included
- Check Generator Alignment
- Grease Generator Bearings (as required)
- Change Oil Filters
- Change Fuel Filters
- Top Off Oil (as required)

*One Level 1 and One Level 2 Green Oil Included in the first year