Submittal Package

for

Marina Coast Water

Equipment:

(1) NEW CATERPILLAR MODEL C9, 300KW TIER III DIESEL GENERATOR SET.
300KW STANDBY RATED, W/FAN, WEATHER PROTECTIVE ENCLOSURE
1800 RPM, 480/277 VAC,60 HZ, 3 PHASE, UL 2200 APPROVED.

(1) ASCO 800AMP, 480VOLT, 60HZ, 3PHASE, 4 WIRE, 3 POLE, NEMA 3R

Contractor:

_____

Equipment Supplier:

_____

QUINN POWER SYSTEMS CAT

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Bill of Material Generator Set

(1) New Caterpillar Model C9 Diesel Standby Generator Set EPA Certified Tier 3 / UL2200 Listed Generator Set Rated 300 kW with fan, 60Hz, 3 phase, 277/480 volts at 1800 RPM. Generator includes standard equipment and accessories listed in the attached bill of material.

Generator and Attachments

Digital voltage regulator
Permanent magnet excitation
Upsize alternator
Space heater

Engine Control System

Electronic governor

Control Panel and Instrumentation

EMCP 4.2 Auto-start control panel (upgraded to NFPA 110)
Panel mounted voltage adjust potentiometer
Panel mounted audible alarm with mute
Contacts for common fault alarm signal
Contacts for generator set run signal
Local horn
Dust Proof control panel Common alarm / shutdown relay Speed adjustment potentiometer I/O package
Modbus package
Generator running relay
Ground fault relay
Remote annunciator panel (shipped loose) (installed by others) Speed adjustment
Local annunciator panel

Protection System

C9: 600 amp, 3-pole, U.L. listed, main line circuit breaker
Aux contacts

Exhaust System

Silencer system incorporated with the weather enclosure

Fuel System

C9: 660 gallon, dual wall, UL listed, base fuel tank
Wide base
Overfill prevention and spill containment
Flex fuel lines
Fuel rupture alarm
Low fuel level alarm
Fuel level switch

Mounting and Enclosures

Vibration isolators, installed between generator set and base rails
Weather protective, enclosure
Wide base

Starting System

Battery disconnect switch
Oversize batteries

Charging System

UL listed, 10 amp, battery charger

Cooling System

Jacket water heater
Initial fill of coolant
Cooling level sensor

Lube System

Initial fill of lube oil

Documentation

UL 2200 listed package generator set
Factory test reports
Operation and maintenance manual
Delivery to jobsite
Start-up (standard field test) 2 hour Load bank test included

(1) New Asco Transfer Switches Model: 7000

H7ADTSA30800N5XM, 18B, 18G, 31Z, 44G, 125A, 800 amp
(3 **pole**) Service voltage 480 / NEMA 3R

Image shown may not reflect actual package.

STANDBY
300 ekW 375 kVA
60 Hz 1800 rpm 480 Volts

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

FEATURES

FUEL/EMISSIONS STRATEGY
- EPA Certified for Stationary Emergency Application (Emits Equivalent U.S. EPA Tier 3 Nonroad Standards)

DESIGN CRITERIA
- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response
- Cooling system designed to operate in 50°C / 122°F ambient temperatures with an air flow restriction of 0.5 in. water

UL 2200 / CSA – Optional
- UL 2200 Listed
- CSA Certified

Certain restrictions may apply.

Consult with your Cat® Dealer.

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER
- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat S•O•S℠ program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT C9 ATAAC DIESEL ENGINE
- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic controlled governor

CAT GENERATOR
- Matched to the performance and output characteristics of Cat engines
- UL 1446 Recognized Class H insulation
- CSA Certified

CAT EMCP 4 CONTROL PANELS
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway
- Integrated Voltage Regulation

SEISMIC CERTIFICATION*
- Seismic Certification available
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight and concrete strength.

  IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer
- Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010

*Not available with some options – consult with your Cat Dealer.

STANDBY 300 ekW 375 kVA
60 Hz 1800 rpm 480 Volts

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Disposable air filter	[ ] Canister type, dual element [ ] Heavy duty air cleaner
Cooling	• Package mounted radiator	
Exhaust	• Exhaust flange outlet	[ ] Industrial [ ] Residential / Critical
Fuel	• Primary fuel filter with integral water separator • Secondary fuel filters • Fuel priming pump	
Generator	• Matched to the performance and output characteristics of Cat engines • IP23 Protection	[ ] Permanent magnet excitation (PMG) [ ] Anti-condensation space heater [ ] Coastal insulation protection [ ] Internal excitation (IE) / AREP
Power Termination	• Power terminal strips	[ ] Circuit breakers – 100% rated assembly, UL Listed [ ] SUSE (Suitable for use as service equipment)
Control Panels	• EMCP 4.2	[ ] EMCP 4.3 [ ] EMCP 4.4 [ ] Local and remote annunciator modules [ ] Remote monitoring software
Mounting	• Rubber vibration isolators	
Starting/Charging	• 24 volt starting motor & charging alternator • Batteries	[ ] Battery chargers [ ] Oversize batteries [ ] Jacket water heater
General	• Paint – Caterpillar Yellow except rails and radiators gloss black • Narrow skid base	The following options are based on regional and product configuration: [ ] Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010 [ ] UL 2200 Listed package [ ] CSA Certified [ ] Wide skid base [ ] Sound attenuated enclosure [ ] Weather protective enclosure [ ] Integral dual wall UL Listed 8 hr fuel tank [ ] Sub-base dual wall UL Listed 24 hr fuel tank [ ] Sub-base dual wall UL Listed 48 hr fuel tank

STANDBY 300 ekW 375 kVA
60 Hz 1800 rpm 480 Volts

SPECIFICATIONS

STANDARD CAT GENERATOR	
Frame size	~~LC5014J~~ LC6124B
Excitation	~~Self Excitation~~ PMG
Pitch	0.6667
Number of poles	4
Number of bearings	Single bearing
Number of leads	12
Insulation	UL 1446 Recognized Class H
IP Rating	IP23
Alignment	Pilot shaft
Overspeed capability (%)	125
Wave form deviation (%)	2
Voltage regulator	Three phase sensing
Voltage regulation	+/- 0.25% (steady state)
– Consult your Cat dealer for available voltages	
CAT DIESEL ENGINE	
C9 ATAAC, I-6, 4-Stroke Water-cooled Diesel	
Bore	112.00 mm (4.41 in)
Stroke	149.00 mm (5.87 in)
Displacement	8.80 L (537.01 in^3)
Compression ratio	16.1:1
Aspiration	Air-to-air aftercooled
Fuel system	Hydraulic electronic unit injection
Governor type	Caterpillar ADEM™ control system

CAT EMCP 4 SERIES CONTROLS

EMCP 4 controls including:
- Run / Auto / Stop Control
- Speed and Voltage Adjust
- Engine Cycle Crank
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:
- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- ekW, kVA, kVAR, kW-hr, %kW, PF (4.2 only)

Warning/shutdown with common LED indication of:
- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:
- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32) (4.2 only)
- Reverse reactive power (kVAr) (32RV)
- Overcurrent (50/51)

Communications:
- Four digital inputs (4.1)
- Six digital inputs (4.2 only)
- Four relay outputs (Form A)
- Two relay outputs (Form C)
- Two digital outputs
- Customer data link (Modbus RTU) (4.2 only)
- Accessory module data link (4.2 only)
- Serial annunciator module data link (4.2 only)
- Emergency stop pushbutton

Compatible with the following:
- Digital I/O module
- Local Annunciator
- Remote CAN annunciator
- Remote serial annunciator

STANDBY 300 ekW 375 kVA
60 Hz 1800 rpm 480 Volts

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM8168	
EPA Certified for Stationary Emergency Application (Emits Equivalent U.S. EPA Tier 3 Nonroad Standards)		
Generator Set Package Performance		
Genset power rating @ 0.8 pf	375 kVA	
Genset power rating with fan	300 ekW	
Fuel Consumption		
100% load with fan	86.0 L/hr	22.7 gal/hr
75% load with fan	66.8 L/hr	17.6 gal/hr
50% load with fan	51.5 L/hr	13.6 gal/hr
Cooling System[1]		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	600 m³/min	21189 cfm
Engine coolant capacity with radiator/exp. tank	46.7 L	12.3 gal
Engine coolant capacity	22.0 L	5.8 gal
Radiator coolant capacity	24.7 L	6.5 gal
Inlet Air		
Combustion air inlet flow rate	26.0 m³/min	918 cfm
Exhaust System		
Exhaust stack gas temperature	497°C	927°F
Exhaust gas flow rate	69.7 m³/min	2461.4 cfm
Exhaust flange size (internal diameter)	127.0 mm	5.0 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.1 in. water
Heat Rejection		
Heat rejection to coolant (total)	120 kW	6824 Btu/min
Heat rejection to exhaust (total)	320 kW	18198 Btu/min
Heat rejection to aftercooler	92 kW	5232 Btu/min
Heat rejection to atmosphere from engine	23 kW	1308 Btu/min
Heat rejection to atmosphere from generator	21.9 kW	1245 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	682 skV	
Frame	LC5014J	
Insulation class	H	
Temperature rise	150°C	270°F
Lubrication System		
Sump refill with filter	39.0 L	10.3 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	3.95 g/hp-hr	
CO g/hp-hr	0.24 g/hp-hr	
HC g/hp-hr	0.06 g/hp-hr	
PM g/hp-hr	0.032 g/hp-hr	

[1] For site specific ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Generator temperature rise is based on a 40° C (104° F) ambient per NEMA MG1-32.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Applicable Codes and Standards:
AS1359, CSA C22.2 No100-04, UL142,UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22,NEMA MG1-33, 72/23/EEC, 98/37/EC, 2004/108/EC.

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.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16°C or 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.).

Additional Ratings may be available for specific customer requirements. Consult your Cat representative for details.

ENGINE CONTROLLER

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

ENGINE CONTROLLER

DESCRIPTION

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

ENGINE SPEED GOVERNING

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

FUEL LIMITING

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

FUEL INJECTION TIMING

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

ELECTRONIC MONITORING

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

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.

ENGINE CONTROLLER

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 20 g

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

Vibration
withstands 8.0 g @ 24 to 2 kHz

Image shown may not reflect actual package

EMCP 4.2 GENERATOR SET CONTROLLER

Caterpillar is leading the power generation market place with power solutions engineered to deliver unmatched performance, reliability, durability and cost-effectiveness.

FEATURES

GENERAL DESCRIPTION

The Cat® EMCP 4.2 offers fully featured power metering, protective relaying and engine and generator control and monitoring. Engine and generator controls, diagnostics, and operating information are accessible via the control panel keypads; diagnostics from the EMCP 4 optional modules can be viewed and reset through the EMCP 4.2.

FULL RANGE OF ATTACHMENTS

- Wide range of system expansion attachments, designed specifically to work with the EMCP 4.
- Flexible packaging options for easy and cost effective installation.

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

- A 33 x 132 pixel, 3.8 inch, graphical display denotes text alarm/event descriptions, set points, engine and generator monitoring, and is visible in all lighting conditions.
- Textual display with support for 28 languages, including character languages such as Arabic, Chinese, and Japanese.
- Advanced engine monitoring is available on systems with an electronic engine control module.
- Integration with the Cat Digital Voltage Regulator (CDVR) provides enhanced system performance.
- Fully featured power metering, protective relaying, engine and generator parameter viewing, and expanded AC metering are all integrated into this controller.
- Real-time clock allows for date and time stamping of diagnostics and events in the control's logs as well as service maintenance reminders based on engine operating hours or calendar days.
- Up to 40 diagnostic events are stored in the non-volatile memory.
- Ability to view and reset diagnostics on EMCP 4 optional modules via the control panel removes the need for a separate service tool for troubleshooting.
- Set points and software stored in non-volatile memory, preventing loss during a power outage.
- Reduced power mode offers a low power state to minimize battery power requirements.
- Three levels of security allow for configurable operator privileges.
- Selectable units
  - Temperature: °C or °F
  - Pressure: psi, kPa, bar
  - Fuel Consumption: Gal/hr or Liter/hr

STANDARDS

- UL Recognized
- CSA C22.2 No.100,14, 94
- Complies with all necessary standards for CE Certification
  98/37/EC Machinery Directive
  – BS EN 60204-1 Safety of Machinery
  89/336/EEC EMC Directive
  – BS EN 50081-1 Emissions Standard
  – BS EN 50082-2 Immunity Standard
  73/23/EEC Low Voltage Directive
  – EN 50178 LVD Standard
- IEC529, IEC60034-5, IEC61131-3
- MIL STND 461

STANDARD FEATURES

Generator Monitoring	• Voltage (L-L, L-N) • Current (Phase) • Average Volt, Amp, Frequency • kW, kVAr, kVA (Average, Phase, %) • Power Factor (Average, Phase) • kW-hr, kVAr-hr (total) • Excitation voltage and current (with CDVR) • Generator stator and bearing temp (with optional module)
Generator Protection	• Generator phase sequence • Over/Under voltage (27/59) • Over/Under frequency (81 O/U) • Reverse Power (kW) (32) • Reverse Reactive Power (kVAr) (32RV) • Overcurrent (50/51)
Engine Monitoring	• Coolant temperature • Oil pressure • Engine speed (RPM) • Battery voltage • Run hours • Crank attempt and successful start counter • Enhanced engine monitoring (with electronic engines)
Engine Protection	• Control switch not in auto (alarm) • High coolant temp (alarm and shutdown) • Low coolant temp (alarm) • Low coolant level (alarm) • High engine oil temp (alarm and shutdown) • Low, high, and weak battery voltage • Overspeed • Overcrank
Control	• Run / Auto / Stop control • Speed and voltage adjust • Local and remote emergency stop • Remote start/stop • Cycle crank
Inputs & Outputs	• Two dedicated digital inputs • Six programmable digital inputs • Six programmable form A dry contacts • Two programmable form C dry contacts • Two digital outputs
Communications	• Primary and accessory CAN data links • RS-485 annunciator data link • Modbus RTU (RS-485 Half duplex)
Language Support	Arabic, Bulgarian, Chinese, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Icelandic, Italian, Latvian, Lithuanian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Slovak, Slovene, Spanish, Swedish, Turkish
Environmental	• Control module operating temperature: -40°C to 70°C • Display operating temperature: -20°C to 70°C • Humidity: 100% condensing 30°C to 60°C • Storage temperature: -40°C to 85°C • Vibration: Random profile, 24-1000 Hz, 4.3G rms

OPTIONAL MODULES

DIGITAL INPUT/OUTPUT MODULE

The Digital Input/Output (DI/O) module serves to provide expandable Input and Output capability of the EMCP 4 and is capable of reading 12 digital inputs and setting 8 relay outputs. The DI/O module has been designed for use on the accessory Communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of four DI/O modules may be used with a single EMCP 4.2.

RTD MODULE

The RTD module serves to provide expandable generator temperature monitoring capability of the EMCP 4 and is capable of reading up to eight type 2-wire, 3-wire and 4-wire RTD inputs. The RTD Module has been designed for use on the Accessory Communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of one RTD Module may be used with a single EMCP 4.2.

THERMOCOUPLE MODULE

The thermocouple module serves to provide expandable engine and generator temperature monitoring capability of the EMCP 4 and is capable of reading up to twenty Type J or K thermocouple inputs. The thermocouple module has been designed for use on the accessory communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of one thermocouple modules may be used with a single EMCP 4.2 on each datalink.

EMCP 4 RS-485 ANNUNCIATOR

The EMCP 4 RS-485 annunciator serves to display generator set system alarm conditions and status indications. The annunciator has been designed for use on the EMCP 4 RS-485 annunciator data link for remote applications, providing customers with enhanced site flexibility.

The EMCP 4 annunciator is configurable to the standards of NFPA 99/110 for emergency standby generator systems.

FEATURES

- The EMCP 4 annunciator provides sixteen (16) individual points of annunciation, with two (2) LED's included for each point.
- An additional pair of LED's provides status indication of the RS-485 communication network.
- Includes alarm horn with lamp test and alarm acknowledge pushbuttons.
- Configurable to NFPA 99/110 requirements for local and remote annunciation on emergency standby generator systems.
- Provides custom label kit including software for customer's specific alarms and arrangement
- Designed and tested to meet stringent impulse shock and operating vibration requirements
- Uses high quality shielded twisted-triad cable for robust remote communications
- Graphic symbols are provided next to each pair to indicate various alarms and events
- The annunciator can be mounted remotely up to 1200 m (4,000 ft).
- Provides superior visibility of the LED's in direct sunlight

SPECIFICATIONS

Technical Data

Electrical

Battery Voltage Functional Range: 9 to 32 VDC

Power Consumption

Maximum: ≈ 12 watt at 24 VDC

Standby: ≈ 5 watt at 24 VDC

Control Power: 12-24 VDC

Communication: RS-485

Single, 8-pin Connector

Alarm

Sound Level 80 db

PHYSICAL

Weight	2.5 lb or ≈ 1.13 kg

ENVIRONMENTAL

Operating Temperature	–40° C to 70° C –40° F to 158° F
Storage Temperature	–50° C to 70° C –58° F to 158° F
Relative Humidity	90%

CERTIFICATIONS

UL Recognized

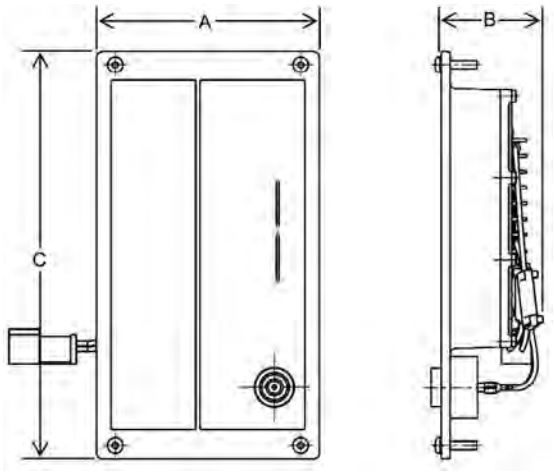
LED COLOR SCHEME

Each pair of LED's on the annunciator consists of two of three colors: green, yellow and red, which allows for custom configuration of status, warning and shutdown conditions.
The available colors and combinations are:

Row	LED 1	LED 2
1	Red	Yellow
2	Red	Yellow
3	Red	Yellow
4	Red	Yellow
5	Red	Yellow
6	Red	Green
7	Red	Yellow
8	Red	Yellow
9	Red	Yellow
10	Red	Yellow
11	Red	Yellow
12	Red	Yellow
13	Green	Yellow
14	Green	Yellow
15	Red	Green
16	Red	Yellow

STANDARD LED CONFIGURATION

- Emergency stop shutdown
- Overcrank shutdown
- Low coolant temperature warning
- High coolant temperature warning/shutdown
- Low oil pressure warning/shutdown
- Overspeed warning/shutdown
- Low coolant level warning/shutdown
- Low fuel level warning/shutdown
- EPS supplying load status
- Control switch not in auto warning
- High battery voltage warning/shutdown
- Low battery voltage warning/shutdown
- BATT charger AC failure warning/shutdown
- Low cranking voltage
- Engine running
- Tier 4 SCR



Annunciator Dimensions		
A	158 mm	6.22 in
B	60 mm	2.37 in
C	288 mm	11.34 in

Manually Operated Circuit Breakers

Current (A)	Frame	Number of Poles	Interrupting Ratings (kA rms) 240V	480V	600V	Trip Units	Lugs	Auxiliary Options
250	T4N	3	65	25	18		6 AWG - 350 kcmil	
400	T5N	3	65	25	18		3/0 - 250 kcmil (LOAD) (1) 250-500 kcmil (LINE)	1 Form C + 1 Bell Alarm 250VAC/VDC
600	T6N	3	65	35	20	Electronic LS/I (S or I)	2/0 - 400 kcmil	Shunt Trip 24VDC
800	T6N	3	65	35	20		2/0 - 400 kcmil	1 Form C + 1 Bell Alarm 400VAC / 250VDC
1200	T7S	3	65	50	25		4/0 - 500 kcmil	Shunt Trip 24VDC

Single Breaker Options (250 – 1200A)

Current (A)	Operation
250	Manually Operated
400	Manually Operated
600	Manually Operated
800	Manually Operated
800	Electrically Operated Motorized Breaker*
1200	Manually Operated
1200	Electrically Operated Motorized Breaker*

*Requires EMCP4.4 Control Panel.

LEHE0485-00 (01-14)

Picture shown may not represent actual package

Molded Case Circuit Breakers: 30A – 1200A

40kW – 600kW Gensets

Features

- 100% UL Listing
- Thermal Magnetic Trip Units (Frames T1N and T3N)
- Electronic Trip Units (Frames T4N, T5N, T6N & T7S/T7M-S)
- Double insulation
- Clear indication of breaker status
- Can be used in normal operation in an ambient of –25° C and +70° C
- Auxiliary contacts available
- Insulating case constructed from fiberglass reinforced synthetic resin
- Anti-corrosion treatment on all metal parts
- Optional Dual Circuit Breakers

Conformity with International Standards

The T1N through T6N and T7S/T7M-S Frame Circuit Breakers have been designed to comply with these major standards:

- UL 489
- CSA22.2 No.5
- IEC 60947-2

Manually Operated Circuit Breakers

Current (A)	Frame	Number of Poles	Interrupting Ratings (kA rms)			Trip Units
			240V	480V	600V	
30	T1N	3	50	22	10	Thermal Magnetic
40	T1N	3	50	22	10	
50	T1N	3	50	22	10	
60	T1N	3	50	22	10	
70	T1N	3	50	22	10	
80	T1N	3	50	22	10	
90	T1N	3	50	22	10	
100	T1N	3	50	22	10	
125	T3N	3	50	25	10	
150	T3N	3	50	25	10	
175	T3N	3	50	25	10	
200	T3N	3	50	25	10	
225	T3N	3	50	25	10	
250	T4N	3	65	25	18	Electronic LS/I (S or I)
400	T5N	3	65	25	18	
600	T6N	3	65	35	20	
800	T6N	3	65	35	20	
1200	T7S	3	65	50	25	

Electrically Operated Circuit Breakers

Current (A)	Frame	Number of Poles	Interrupting Ratings (kA rms)			Trip Units
			240V	480V	600V	
800	T6N	3	65	35	20	Electronic LSI
1200	T7M-S	3	65	50	25	

Electronic LS/I Trip Units offer LS or LI Protection

L-I Mode

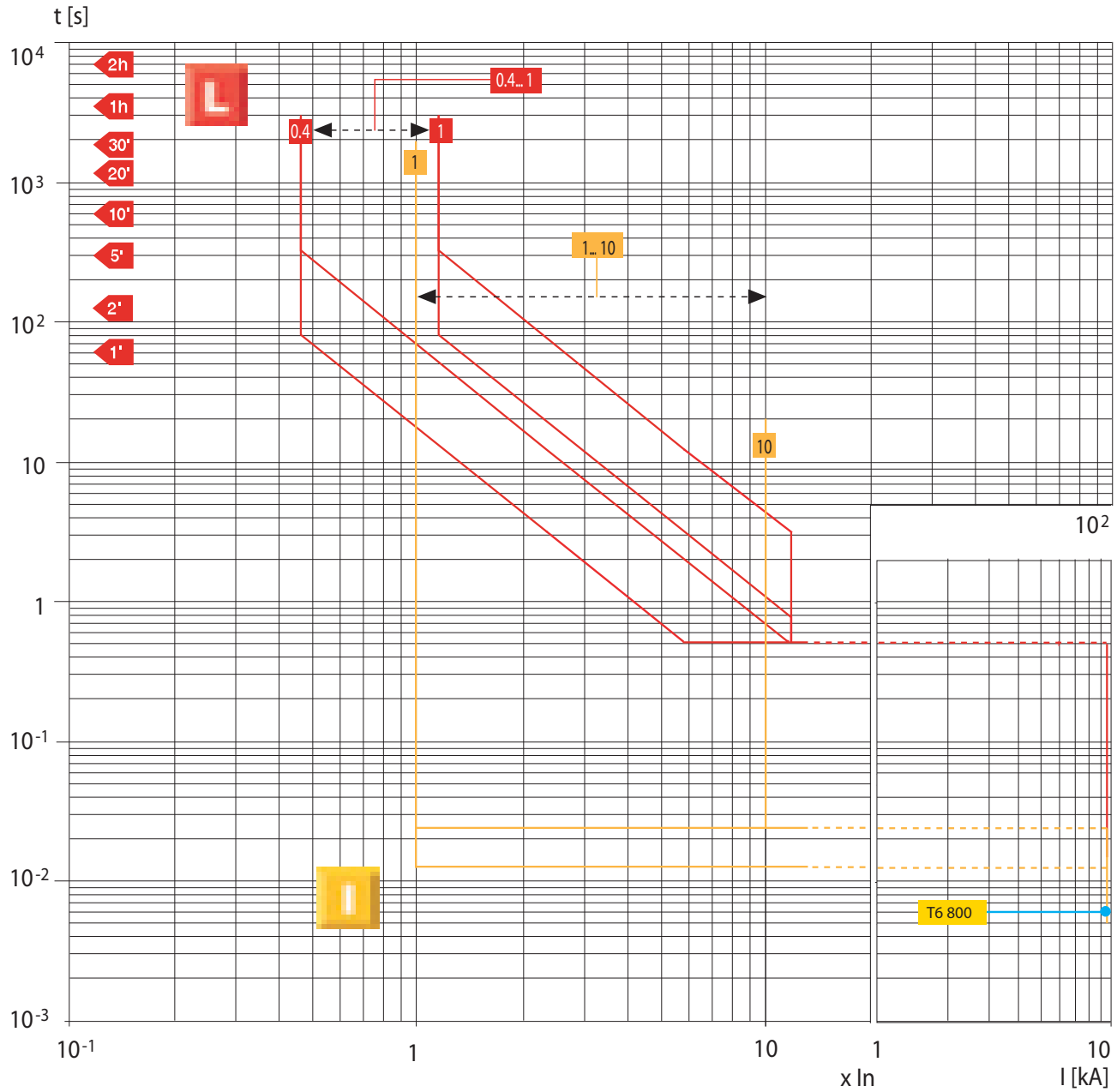
- Long Time / Overload Protection, “L“ has an adjustable trip threshold and adjustable time delay
- Instantaneous Short Circuit Protection, “I“ has an adjustable short circuit trip threshold and once exceeded will cause the circuit breaker to trip instantaneously

L-S Mode

- Long Time / Overload Protection, “L“ has an adjustable trip threshold and adjustable time delay
- Short Circuit Protection, “S“ has an adjustable short circuit trip threshold and adjustable time delay if necessary for coordinating with downstream loads
- Instantaneous Short Circuit Protection, “I“ is still included, but the threshold level is not adjustable and exists at a predetermined level

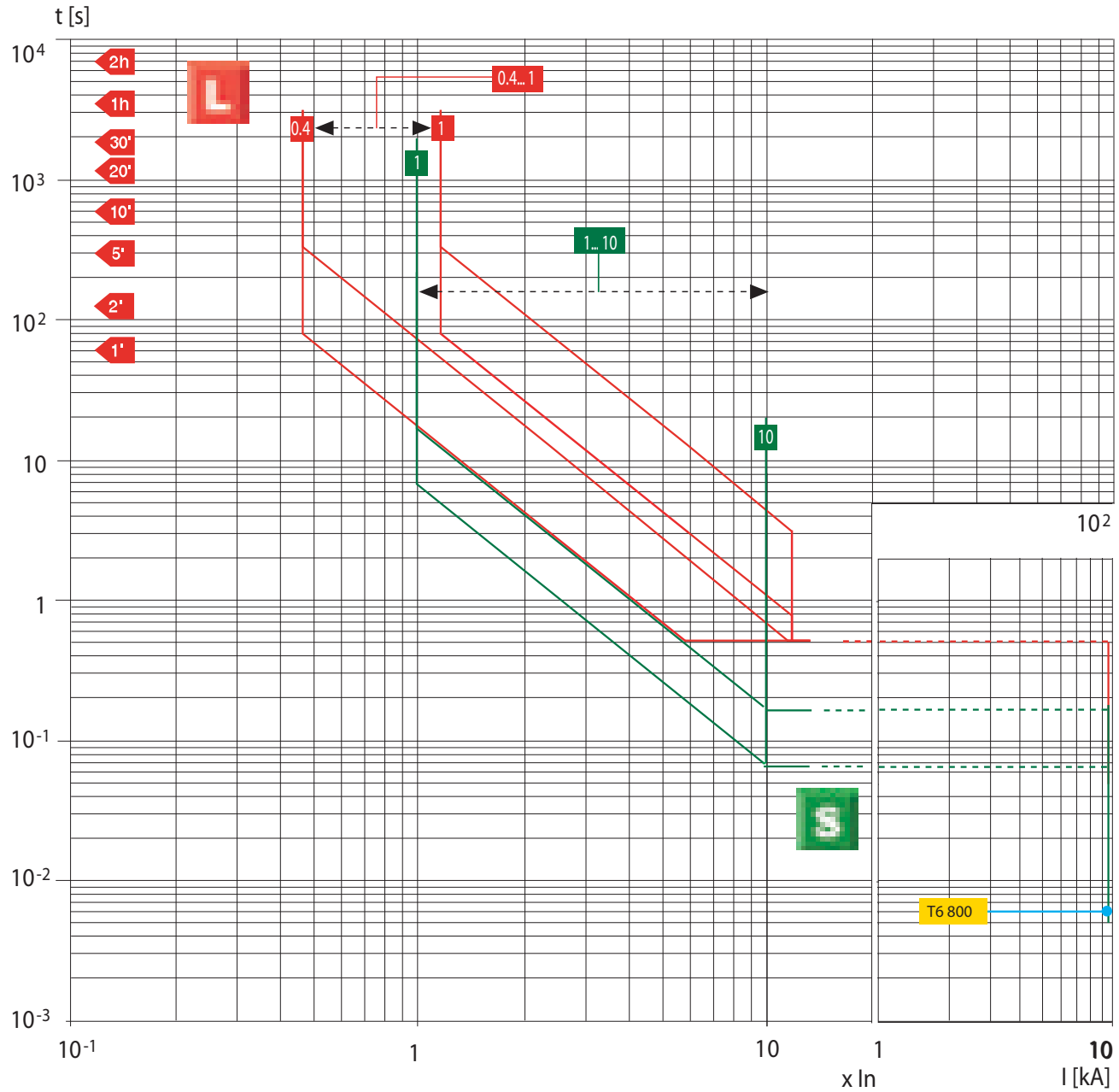
T6 600 / 800 – PR221DS

L-I Functions

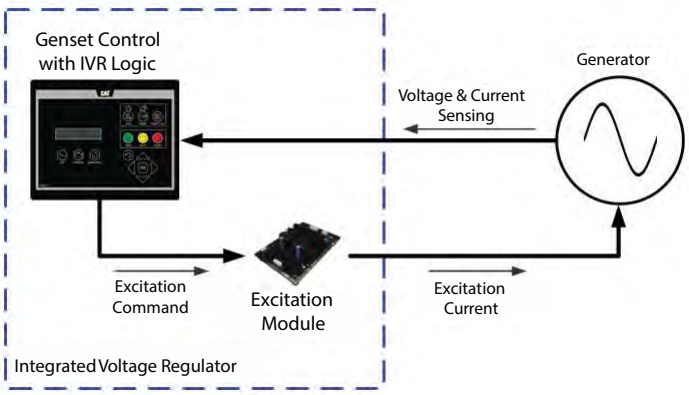


T6 600 / 800 – PR221DS

L-S Functions



INTEGRATED VOLTAGE REGULATOR



INTEGRATED VOLTAGE REGULATOR

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

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

FEATURES

When used with an Excitation Module, EMCP 4.3/4.4 and IVR-compatible EMCP 4.1/4.2 controllers offer:

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

EMCP 4.3/4.4 and IVR-compatible EMCP 4.2 controllers also offer:

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

WORLDWIDE PRODUCT SUPPORT

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

COMPLETE SYSTEM INTEGRATION

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

LEHE0448-00

INTEGRATED VOLTAGE REGULATOR

INTEGRATED VOLTAGE REGULATOR FEATURE SPECIFICATION

	EMCP 4.1	EMCP 4.2	EMCP 4.3	EMCP 4.4
				
SPECIFICATIONS				
No Load to Full Load Regulation	±0.5%	±0.25%	±0.25%	±0.25%
Configurable Volts / Hz Characteristic	•	•	•	•
Configurable Knee Frequency	•	•	•	•
Regulator ResponseTime	10 ms	10 ms	5 ms	5 ms
Single andThree Phase Sensing	•	•	•	•
Voltage Adjustment Range (Configurable up to)	± 30%	± 30%	± 30%	± 30%
CONTROL				
Dual Slope Configurable Volts / Hz Characteristic	•	•	•	•
Excitation Enable / Disable Selection	•	•	•	•
Line Loss (I^2R) Compensation	–	•	•	•
Reactive Droop Compensation	–	•	•	•
Power Factor Control Mode	–	•	•	•
PROTECTION / ALARMS				
Generator Overvoltage	•	•	•	•
Generator Undervoltage	•	•	•	•
Over Excitation	•	•	•	•
Loss of Sensing	•	•	•	•
Generator Reverse VARs	–	•	•	•
Event Log	•	•	•	•
METERING				
EMCP AC Metering	•	•	•	•
EMCP Power Metering	–	•	•	•
Excitation Command Percentage	•	•	•	•
Operating Mode Status Indication	•	•	•	•

INTEGRATED VOLTAGE REGULATOR

INTEGRATED VOLTAGE REGULATOR FEATURE SPECIFICATION (continued)

	EMCP 4.1	EMCP 4.2	EMCP 4.3	EMCP 4.4
				
VOLTAGE ADJUSTMENT				
EMCP 4 Display Voltage Bias	•	•	•	•
Digital Input (Raise / Lower) Voltage Bias[1]	•	•	•	•
Potentiometer Voltage Bias[1]	•	•	•	•
Analog Voltage Bias – Voltage Range[1]	0V to 5V	0V to 5V	-10V to +10V	-10V to +10V
Analog Voltage Bias – Current Range[1]	–	–	0mA to 20mA	0mA to 20mA
Analog Voltage Bias – PWM Range[1]	–	–	0% to 100%	0% to 100%
SCADA (Modbus) Voltage Bias	–	•	•	•

[1]Requires an available input on the EMCP 4.

INTEGRATED VOLTAGE REGULATOR

EXCITATION MODULE SPECIFICATION

The Integrated Voltage Regulator consists of an EMCP 4 interfacing with an Excitation Module. There are a range of Excitation Modules available to match Cat generator sets.

Figure 1:
EM10 Excitation Module

Figure 2:
EM15 Excitation Module

EXCITATION MODULE TECHNICAL SPECIFICATION

	EM10	EM15
Compatible Generator Excitation Types	Self Excitation (SE) Internal Excitation (IE) Permanent Magnet (PMG)	
Nominal Field Current Output	6 Amps	7 Amps
Maximum (forcing) Field Current Output	10 Amps	15 Amps
Maximum AC Voltage Input	180 Vrms	240 Vrms

For more information on the Excitation Module refer to the component spec sheet.

EXAMPLE SCREENS – EMCP 4.1/4.2

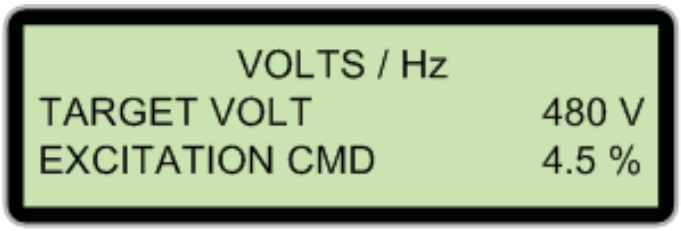


Figure 3: IVR Overview Screen

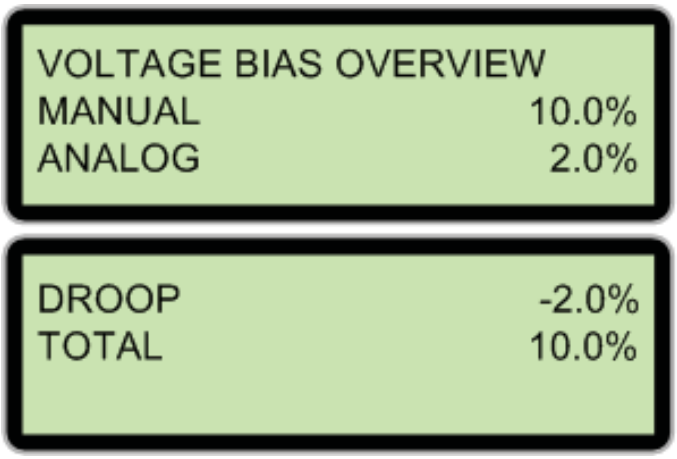


Figure 4: Voltage Bias Overview Screens

EXAMPLE SCREENS – EMCP 4.3/4.4

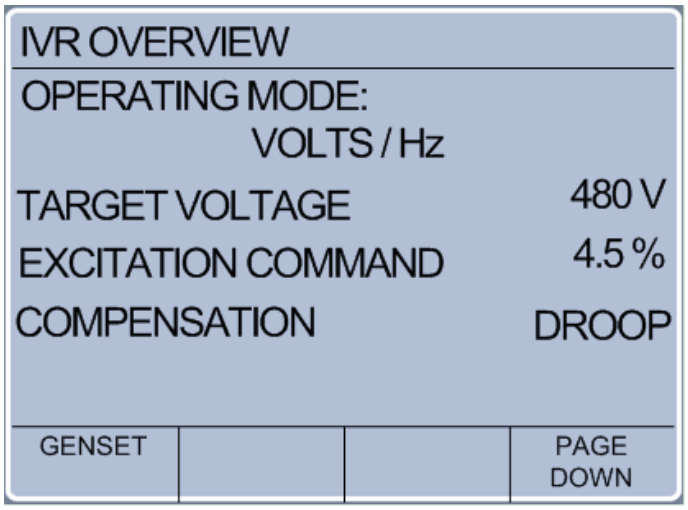


Figure 5: IVR Overview Screen

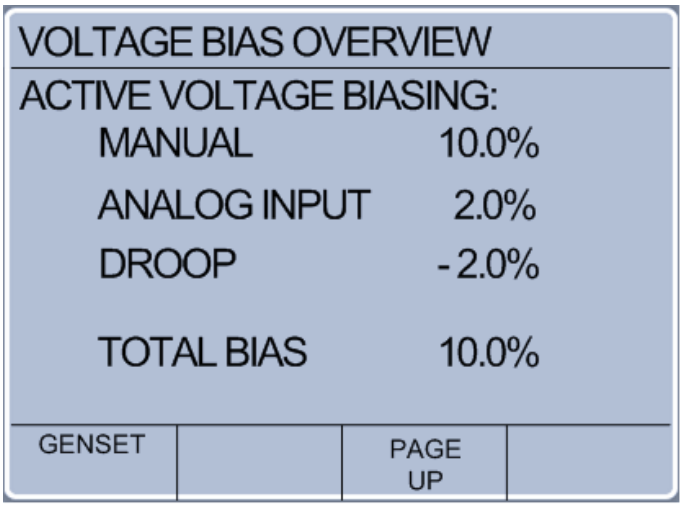


Figure 6: Voltage Bias Overview Screen

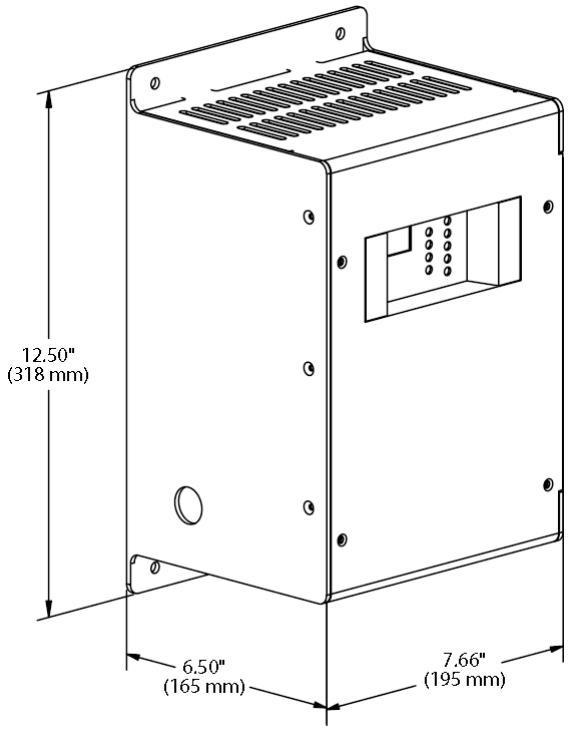


Image Shown may not Reflect Actual Package

UL 10 AMP BATTERY CHARGER

This battery charger offers accurate, automatic charging of lead-acid and nickel cadmium batteries. The output voltage automatically adjusts to changing input, load, battery and ambient conditions. This prevents battery over-charging and consequent loss of battery electrolyte.

Standard features include AC line compensation, precision voltage regulation, current limiting, automatic 2-rate charging, voltmeter and ammeter, temperature compensation and UL Listing.

The user interface is easy to understand with digital metering, NFPA 110 alarms and a battery fault alarm.

SPECIFICATION

Input Supply	110-120 V
	208-240 V
AC and DC Fuses	2 input and 2 output)
Output voltage	24V
Frequency	50/60 Hz
Operating temperature	-20°C (-4°F)
	to +60°C (140°F)

Housing constructed of rustproof anodized aluminum.

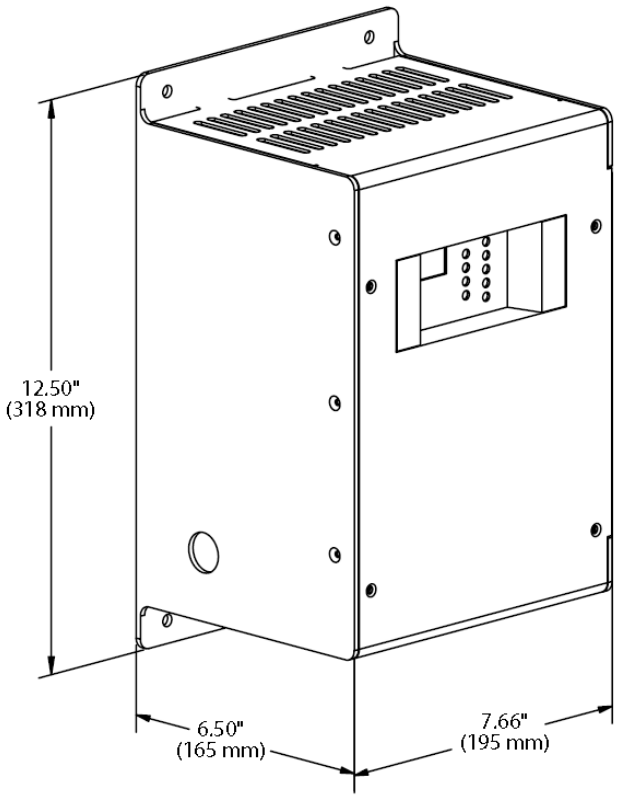
STANDARDS

- C-UL listed to UL 1236
- NFPA 70, NFPA 110
- CSA 22.2 No 107 certified
- UL 1564
- CE DOC to EN 60335
- IBC Seismic Certification

FEATURES

- Electronically current limited at 105% of rated output
- Alarm system
- Digital Display
- Lightning and voltage transient protection
- Protection of connected equipment against load dump protection
- Constant voltage, current limited, 4-rate automatic equalization
- IP 20 housing
- AC isolated from DC
- Temperature Compensation
  - On board temperature sensor with remote port
- Auto AC line compensation
- Output regulated by sensed battery voltage

BATTERY CHARGER



Output		Input	
Amps	Volts	Hz	Volts
10	24	50/60	110-120 208-240
Width	Depth	Height	Weight
195 mm (7.66")	165 mm (6.50")	318 mm (12.50")	10.4 kg (23 lb)
Feature codes			
BTC1024	BTC1028	BTC1035	
BTC1025	BTC1032		

NFPA 110 alarm package as follows:

- AC on — Green led (indication)
- AC fail — Red led and form C contact (2A)
- Float mode — LED
- Fast charge — LED
- Temp comp active — LED
- Low battery volts — Red led and Form C contact
- High Battery Volts — Red led and Form C contact
- Charger fail — Red led and Form C contact
- Battery fault — Red led and Form C contact
  - Battery disconnected
  - Battery polarity reversed
  - Mismatched charger battery voltage
  - Open or high resistance charger to battery connection
  - Open battery cell or excessive internal resistance

Cat® Batteries

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

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

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

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

CATERPILLAR®

Cat® Batteries

World's Toughest Batteries

Premium High Output—Maximum Vibration Resistance

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

Specifications for Cat Premium High Output Batteries-Available Worldwide

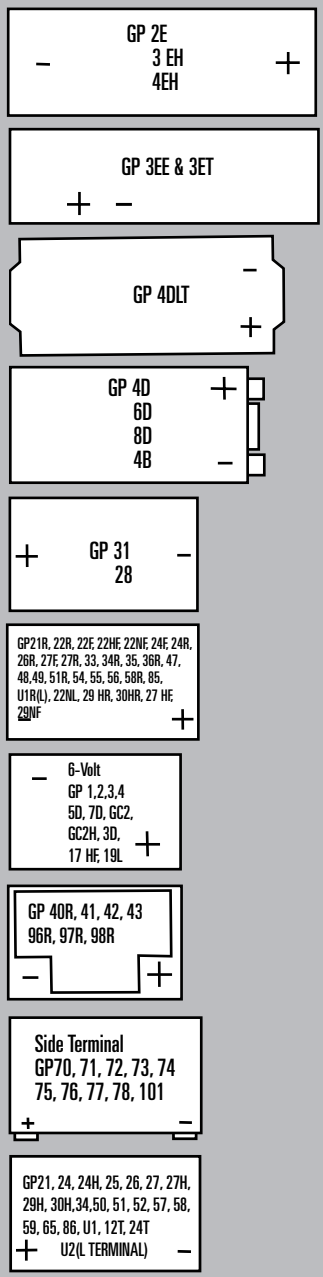
BCI Group Size	Part No.	Cold Cranking Amps"	Reserve Capacity Minutes'	Volts	Amp Hr. Capacity @ 20 Hrs.	Construction	Add Water Maintenance Check Hours	BCI Overall Dimensions			Nominal Weight		Nominal Acid to Fill Qt (liter)
								Length In (mm)	Width In (mm)	Height In (mm)	Wet Lb (kg)	Dry Lb (kg)	
8D	153-5720	1500	465	12	210	C	MF	20.47 (520)	10.8 (275)	9.76 (248)	132 (60)	–	–
8D	101-4000	1400	400	12	190	LAC+	1000	20.7 (526.5)	10.96 (278)	9.76 (248)	132 (60)	86 (39)	18.0 (17.0)
4D	153-5710	1400	425	12	200	C	MF	20.47 (520)	8.58 (218)	9.76 (248)	119 (54)	–	–
4D	153-5700	1125	305	12	145	C	MF	20.47 (520)	8.58 (218)	9.76 (248)	101 (46)	–	–
4D	9X-9730	1300	400	12	190	LAC+	1000	20.75 (527)	8.58 (218)	9.76 (248)	119 (54)	81 (37)	14.8 (14.0)
4D	9X-9720	1000	275	12	140	LAC+	1000	20.75 (527)	8.58 (218)	9.76 (248)	101 (46)	59 (27)	15.9 (15.0)
31	175-4390	1000	180	12	90	C/S	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	175-4370	825	190	12	100	C/S**	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	175-4360	710	185	12	100	C/S***	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	250-0480	710	185	12	100	C/SDT***	MF	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	115-2422	1000	170	12	90	C SAE	MFA	12.9 (328.4)	6.74 (171.2)	9.46 (240.3)	60 (27)	–	–
31	115-2421	950	170	12	90	C SAE +	MFA	12.9 (328.4)	6.74 (171.2)	9.46 (240.3)	60 (27)	44 (20)	6.6 (6.2)
31	9X-3404	950	165	12	100	C SAE	MF	13 (330.2)	6.77 (172)	9.46 (240.3)	58 (26)	–	–
31	3T-5760	750	165	12	100	C SAE	MF	13 (330.2)	6.77 (172)	9.46 (240.3)	55 (25)	–	–
24	153-5656	650	110	12	52	SC	MF	10.98 (278.9)	6.85 (174)	9.0 (229.1)	39 (18)	–	–
65	230-6368	880	140	12	80	SC	MF	11.9 (303.4)	7.5 (190.8)	7.5 (191.4)	45.5 (21)	–	–
74	153-5660	650	110	12	52	SC*	MF	10.98 (278.9)	7.0 (178.2)	8.15 (206.9)	39 (18)	–	–
58	175-4280	500	70	12	35	SC	MF	9.96 (253.1)	7.2 (182.5)	6.9 (176)	31 (14)	–	–
2	153-5690	765	210	6	90	LAC+	1000	10.24 (260)	6.8 (173)	8.72 (221.6)	37 (17)	22 (10)	4.8 (4.5)

Construction Notes:
LAC = Low Maintenance, Hybrid Construction
C=Calcium Lead Alloy Grid Design
MF=Maintenance Free
MFA=Maintenance Free with Accessible Vent Caps
S = Stud Terminals
+ = Shipped Dry Only
* = Side Terminals
** = Starting and Deep Cycle Battery
*** = Deep Cycle and Starting Battery
" = For 30 seconds at 0° F (-18° C)
' = Minimum of 25 amp output at 80° F (27° C)
SAE = Uses SAE Posts
SDT = Dual, Top mounted Terminals, Stud and SAE Post, Marine Deep Cycle/Starting Battery
SC=Silver (Ag) Calcium Alloy Grids for resistance to high underhood temperatures

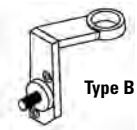
Rugged Design–Built Tough–Reliable Starting

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

BCI Terminal Locations



Transit Bus Terminal for 8D Part # 250-0473
One piece end terminal.
Right end of Battery.
1/2" - 13 Steel Positive Stud
3/8" - 16 Steel Negative Stud



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

100 hour Vibration Testing – Five Times the Industry Standard

- Battery must be able to withstand vibration forces without suffering mechanical damage, loss of capacity, loss of electrolyte or without developing internal/external leaks
- Battery must pass a high rate discharge test after the vibration testing

Five 72-hour Deep Discharge/Recharge Test Cycles

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

30 Day Complete Discharge Test

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

SAE J2185 Life Cycle Test

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

Cold Soak Test

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

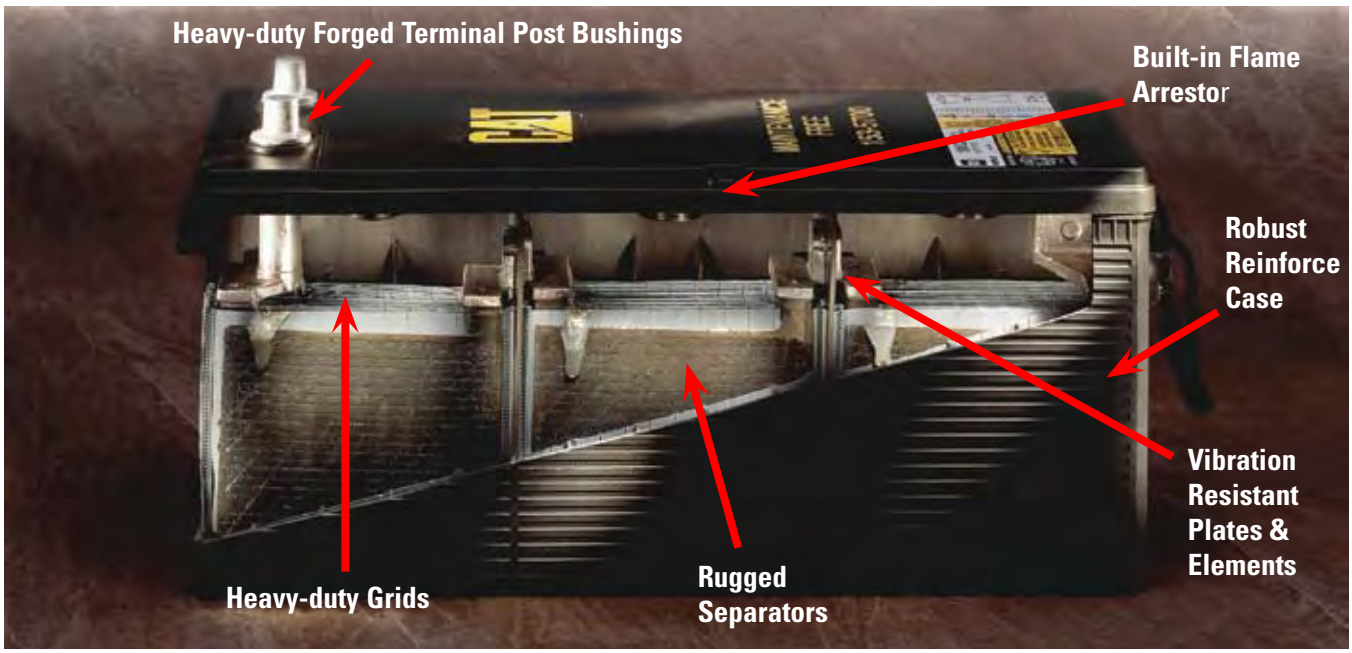
Battery Accessories

Group 31—Charging Posts for Stud Terminals—Part # 4C-5637
Screw-in Charging Posts for Side Terminals—Part # 4C-5638
Wing Nut—Part # 2B-9498 for Part #'s 175-4390/175-4370/175-4360/8C-3628
Wing Nut—Part # 3B-0723 for Part #'s 8C-3638 and 8C-3639
Digital Battery Analyzer—Part # 177-2330
Battery Load Tester—Part # 4C-4911
Booster Cable 12' (3.66 m)—Part # 4C-4933
Booster Cable 20' (6.00 m)—Part # 4C-4937
Heavy Duty Commercial Fast Charger (110V)—Part # 4C-4921
Heavy Duty Commercial Fast Charger (220V)—Part # 4C-4910

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

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

Cat® Batteries



Robust Components = Long Life + Reliable Starts

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

CAT® DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

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

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.

PEHJ0073-02
www.cat.com

CATERPILLAR®
TODAY'S WORK. TOMORROW'S WORLD.™

Cat® DEO™

Diesel Engine Oil for North America (Canada, Mexico, United States).

SAE 15W-40, SAE 10W-30

Recommended Use

- Cat earthmoving, commercial, marine* and on-highway truck diesel engines
- Low-emission diesel engines including Cat engines with ACERT® Technology
- Heavy-duty diesel engines made by other manufacturers that recommend API CI-4 PLUS, CH-4 or CG-4 category oil (See "Typical Characteristics" on page 2 for more information)
- Automotive gasoline engines that require API SL category oils

* Excluding 3600, C280, 3126 and 3116 MUI Marine and MaK diesel engines. The 3116 and 3126 MUI Marine diesel engines with closed crankcase ventilation systems should use Cat SAEO™.

Discover the Difference

Cat DEO is developed, tested and approved by Caterpillar to meet the same high standards as all Genuine Cat Parts.

Factory-Fill—Used as standard factory-fill for Cat machines.

Increased Engine Life—Resists oxidation and prevents build-up of deposits on pistons and rings.

Longer Intervals—Extends oil drain intervals while providing excellent engine protection and performance when used in conjunction with our S•O•S℠ Services oil analysis program.

Proven Performance—Tested thoroughly in Cat diesel engines including Cat engines with ACERT Technology to ensure excellent engine life and performance.

Long-Lasting Protection—Improved soot control and enhanced shear stability enable oil to maintain proper viscosity for longer operating periods in Cat engines with ACERT Technology, especially those equipped with HEUI systems.

Caterpillar. The difference counts.™

Cat Dealers define world-class product support. We offer you the right parts and service solutions, when and where you need them.

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

CATERPILLAR®

Cat DEO

Cat DEO Performance

Performance Requirements	Test	Commercial ECF-1	Cat DEO
Cat 3406E Endurance Test	Cat Proprietary		
Cat C13 ACERT Endurance Test	Cat Proprietary		
Cat 3500 Series Test	Cat Proprietary		
Cat C13 ACERT Wheel Loader Test	Cat Proprietary		
Improved Soot-Viscosity & Shear Control			
High Temperature Shear			
Elastomer Compatibility			
Piston ring & Cylinder liner wear			
Valve train wear, sludge, oil filter plugging			
Aeration Control			
Bearing Corrosion			
Cam roller follower pin wear			
Copper, lead and tin erosion			
Foaming Control			
Viscosity Shear loss			
Viscosity Increase from soot			
Oxidation			
Piston deposits and oil control			

Tested Beyond Industry Standards

In addition to the tests required for the ECF-1 classification, Cat DEO undergoes four proprietary multi-cylinder endurance tests, a variety of quality assurance tests and thousands of hours of field service. Only when it has passed all these tests can it be approved by Caterpillar. The chart to the left indicates the differences between ECF-1 standards and the proprietary standards of Caterpillar.

Typical Characteristics*

	15W-40	10W-30
SAE Viscosity Grade		
API Service Classification		
Diesel	CI-4 PLUS, CI-4, CH-4, CG-4,CF-4/CF	CI-4, CH-4, CG-4, CF-4/CF
Gasoline	SL	SL
OEM Performance Level:		
Caterpillar	ECF-1	ECF-1
Volvo	VDS-3	VDS-2
DDC	93K214	
Cummins	CES 20071/76/78	CES 20071/76
Mack	EO-NPP '03, EO-M Plus	EO-M Plus
Flash Point, °C (ASTM D92)	224	227
Pour Point, °C (ASTM D97)	-30	-33
Viscosity		
cSt @ 40°C (ASTM D445)	120.5	76
cSt @ 100°C (ASTM D445)	15.5	11.5
Viscosity Index (ASTM D2270)	135	145
Sulfated Ash, % wt. (ASTM D874)	1.3	1.3
TBN (ASTM D2896)	11.3	11.3
Zinc, % wt. (ASTM D4951)	0.146	0.146
Gravity @ 16°C		
API (ASTM D287)	29.3	31.8
Specific	0.880	0.867

*The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.

Other Recommended Oils

Cat DEO SYN™ 5W-40

For engines that must be started in extremely low temperatures down to -30°C(-22°F) consider using Cat DEO SYN 5W-40. This is a full synthetic diesel engine oil.

S•O•S Services for early problem detection

Protect your investment with Cat S•O•S oil analysis, the ultimate detection and diagnostic tool for your equipment. S•O•S helps you detect potential problems before they can lead to major failures and costly, unscheduled downtime.

Cat Filters: Complete protection for your machine

Combine Cat Fluids with Cat Filters for the highest level of contamination control and protection for your machine. We recommend Cat Filters for all Cat machine applications.

Health and Safety

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us on the web at www.catmsds.com.

PEHJ0059-02 www.cat.com

Printed in USA

CATERPILLAR®

Cat® ELC

Extended Life Coolant for Caterpillar and original equipment manufacturer (OEM) diesel and gasoline engines

50/50 Premix

Recommended Use

Cat ELC meets or exceeds the requirements of the following specifications and guidelines:

- Cat EC-1
- TMC RP-329
- TMC RP-338
- ASTM D-3306
- ASTM D-6210
- SAE J1034

Cat ELC also meets the performance requirements of Cummins, Detroit Diesel, International, Mack and Volvo.

Discover the Difference

Cat ELC is developed, tested and approved by Caterpillar to meet the same high standards as all Genuine Cat Parts.

- Factory-Fill—Used as standard factory-fill for all Cat machine cooling systems.
- Lower Maintenance Costs—Reduces engine coolant and additive costs by as much as 500% compared to conventional coolants. It eliminates the need for supplemental coolant additives, extends coolant change-out intervals and reduces disposal requirements.
- Advanced Metal Protection—Incorporates an advanced formula technology with organic acid additive corrosion inhibitors, such as a combination of mono and dicarboxylates for maximum protection of copper, solder, brass, steel, cast iron and aluminum.

CATERPILLAR®

Cat ELC for Maximum Coolant Life

Cat DEAC™

3000 Hour Life or
333,000 km (200,000 miles)
Cat Supplemental Coolant Additives Every 250 Hours
or 25,000 km (15,000 miles)

Cat ELC (Machines and Commercial Engines)

Cat Extender Every 6000 Hours*

12,000 Hour Life or 6 Years**
(whichever comes first)

Cat ELC (Truck Engines)

Cat Extender Every 500,000 km (300,000 miles)* **1,000,000 km (600,000 miles) or 6 Years****
(whichever comes first)

* Or one-half of the coolant service life.
** These coolant change intervals are only possible with annual S•O•S Level 2 coolant sampling and analysis.

Typical Characteristics*

Color	Strawberry Red
Boiling protection with 15 psi (1 bar) radiator cap	
50% Cat ELC/50% water	129°C (265°F)
60% Cat ELC/40% water (ELC concentrate added)	132°C (270°F)
Freezing protection	
50% Cat ELC/50% water	-37°C (-34°F)
60% Cat ELC/40% water (ELC concentrate added)	-52°C (-62°F)
Nitrite (50% solution)	500 ppm
Molybdate (50% solution)	530 ppm

*The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.

S•O•S℠ services for early problem detection

Protect your investment with Cat S•O•S Coolant Analysis, the ultimate detection and diagnostic tool for your equipment. We recommend S•O•S Level 1 Coolant Analysis according to the engine's Operation and Maintenance Manual, and Level 2 Coolant Analysis annually for all your Cat equipment.

Cat ELC Extender for Longer Life

- Exceeds Cat EC-1 performance requirements
- Protects against cylinder liner/block pitting and cavitation erosion
- Should be added at 500,000 km (300,000 miles) for Cat powered on-highway trucks and 6,000 hours for commercial engines
- Extender is only necessary once during the life of the coolant
- Ensures Cat ELC performance to 1,000,000 km (600,000 miles) or 12,000 hours

Cat ELC Extender and Flush Intervals

Cat ELC Extender should be added after 6,000 hours or 300,000 miles (500,000 km) of operation, and the system should be drained and flushed with clean water after 12,000 hours or 600,000 miles (1,000,000 km). No cleaning agents are needed. If S•O•S℠ Services are used regularly, safe operation with Cat ELC may extend beyond 12,000 hours.

Health and Safety

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us on the web at www.catmsds.com.

CAT® DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

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

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.

PEHJ0067-02
www.cat.com

CATERPILLAR®
TODAY'S WORK. TOMORROW'S WORLD.™

C9
JACKET WATER HEATER

This is a factory-installed tank-styled jacket water heater for increased cold-starting capability.
The system includes a thermostatically controlled heater, hoses and heater disconnect relay.
The compact design is ideal for location that require minimal mounting space.

FEATURES

- Complete with durable silicone hoses
- Vibration and shock tested to extreme limits to guarantee durability
- Automatically disconnected when engine is running via the generator space heater relay
- Supplied with UL recognized components
- Thermostat OFF TEMPERATURE is factory pre-set to 49°C (120°F)
- Molded from Polyphenylene Sulfide (PPS)
- Rust-free, resists corrosion, exceptional tensile strength
- Compatible with all chemicals
- Thermostatically controlled
- All parts are field replaceable
- Incoloy element for longer service life
- Compact design requires minimal mounting space

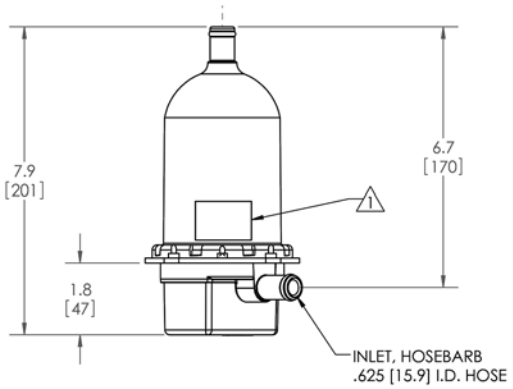
SPECIFICATIONS

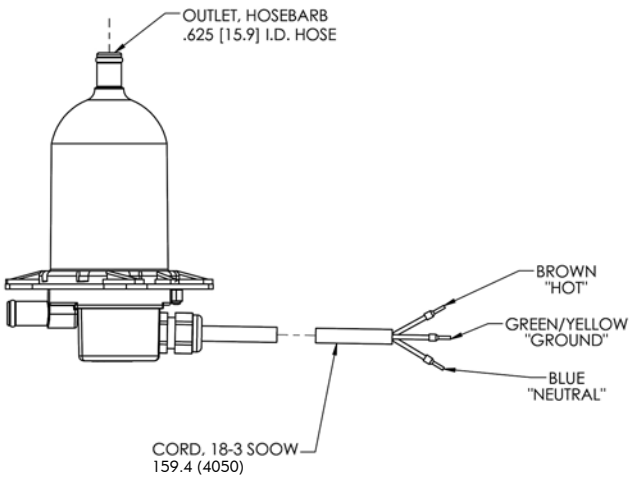
Unit Specifications			
Design Voltage			
	208	220	240
Rating	1.5 kW	1.68 kW	2 kW
Frequency	50/60	50/60	50/60
Phase	1	1	1
Amps	7.22	7.64	8.3
Thermostat Range	37.8° – 48.9°C (100° – 120°F)		
Feature Code	JWH0027		

HEATER OPERATION

The heater uses UL compliant components to (UL1030) and has CSA certification, which is to both CSA and UL standards.

A thermostat controller is included to regulate the output temperature to within safe limits. When the generator set is not running, the heater is automatically connected to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal, the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed and the engine has stopped.





Picture shown may not represent actual package

C9
SOUND ATTENUATED & ~~WEATHER PROTECTIVE~~ ENCLOSURES
US Sourced
180 – 300 kW 60 Hz

Features

ROBUST / HIGHLY CORROSION RESISTANT CONSTRUCTION
- Factory installed on skid base
- Environmentally friendly, polyester powder baked paint
- 14 gauge steel
- Zinc plated or stainless steel fasteners
- Internally mounted critical exhaust silencing system (Sound attenuated only)
- Externally front mounted enclosed exhaust silencing system (weather protective only)
- Designed and tested to comply with UL 2200 Listed generator set package
- Compression door latches providing solid door seal

EXCELLENT ACCESS
- Large cable entry area for installation ease
- Accommodates side mounted single or multiple breakers
- Two doors on both sides
- Vertically hinged allow 180° opening rotation and retention with door stays.
- Lube oil and coolant drains routed to the exterior of the enclosure base

TRANSPORTABILITY

These enclosures are of extremely rugged construction to withstand outdoor exposure and rough handling common on many construction sites.

SECURITY AND SAFETY
- Lockable access doors which give full access to control panel and breaker
- Cooling fan and battery charging alternator fully guarded
- Fuel fill, oil fill, and battery can only be reached via lockable access
- Externally mounted emergency stop button
- Designed for spreader bar lifting to ensure safety
- Stub-up area is rodent proof

OPTIONS (All Enclosures)
- Caterpillar ~~yellow or~~ white paint
- ~~Weather protective~~
- ~~Sound attenuated Level 1~~
- Sound attenuated Level 2
- ~~UL Listed 203 gallon integral fuel tank~~
- UL Listed 660 ~~or 1002 gallon sub-base fuel tanks~~

OPTIONS (Sound Attenuated Only)
- Control panel viewing window
- Seismic certification per applicable building codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010
- IBC Certification for 90 mph wind loading
- Anchoring details are site specific and are dependent on many factors such as generator set size, weight, and concrete strength. IBC Certification requires that the anchoring system used is reviewed and approved by a professional engineer.

Enclosure Sound Levels at Standby Ratings

Enclosure Type	Standby ekW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at					
						1m (3.3 ft)		7m (23 ft)		15m (49 ft)	
		m^3/min	cfm	°C	°F	100% Load	75% Load	100% Load	75% Load	100% Load	75% Load
Sound Attenuated Level 2	300	351	12395	46	115	83.0	82.8	71.3	71.2	65.3	65.2
	250	351	12395	53	127	82.8	82.7	71.2	71.2	65.2	65.2
	200	351	12395	59	138	82.7	82.7	71.2	71.1	65.2	65.1
Weather Protective	300	516	18222	49	120	93.1	93.0	82.4	82.1	76.4	76.1
	250	516	18222	55	131	93.0	92.9	82.2	82.0	76.2	76.0
	200	516	18222	60	140	92.9	92.8	82.0	82.0	76.0	76.0

*Cooling system performance at sea level. Consult your Cat® dealer for site specific ambient and altitude capabilities.

Note: Sound Attenuated Level 1 enclosure is designed for 75 dBA @7m at 100% Standby load.

Enclosure Sound Levels at Prime Ratings

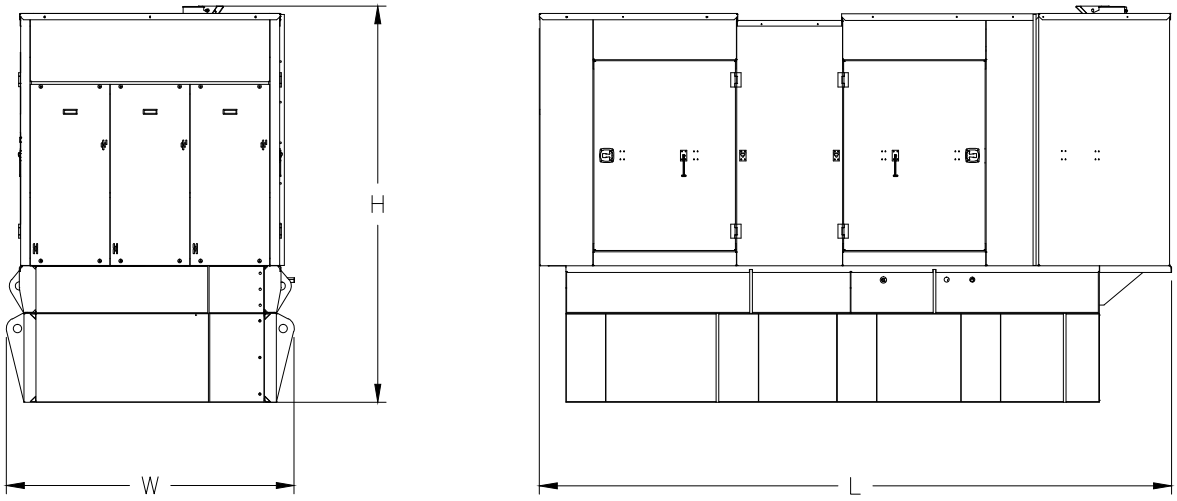
Enclosure Type	Prime ekW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at					
						1m (3.3 ft)		7m (23 ft)		15m (49 ft)	
		m^3/min	cfm	°C	°F	100% Load	75% Load	100% Load	75% Load	100% Load	75% Load
Sound Attenuated Level 2	275	351	12395	50	122	82.9	82.8	71.3	71.2	65.3	65.2
	225	351	12395	56	133	82.8	82.7	71.2	71.1	65.2	65.1
	180	351	12395	60	140	82.7	82.7	71.1	71.0	65.1	65.0
Weather Protective	275	516	18222	52	126	93.1	92.9	82.3	82.1	76.3	76.1
	225	516	18222	59	138	93.0	92.8	82.1	82.0	76.1	76.0
	180	516	18222	60	140	92.9	92.7	82.0	82.0	76.0	76.0

*Cooling system performance at sea level. Consult your Cat dealer for site specific ambient and altitude capabilities.

Note: Sound Attenuated Level 1 enclosure is designed for 75 dBA @7m at 100% Prime load.

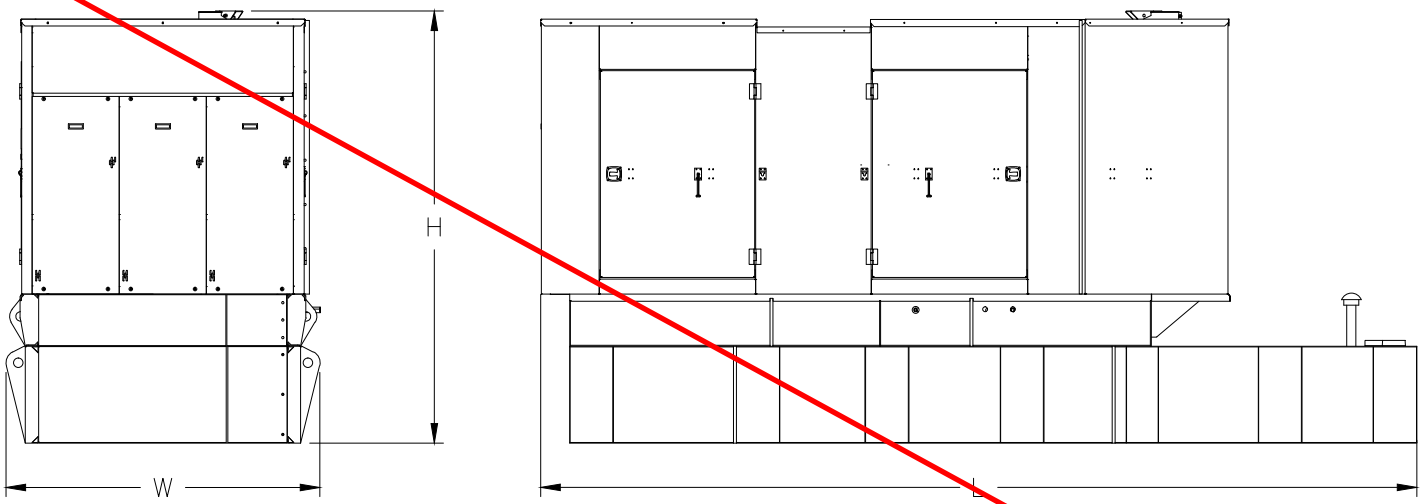
The sound pressure level data shown in the tables above is quoted as free field and is for guidance only.
Actual levels produced may vary according to site conditions.

Enclosure on a UL Listed 660 Gallon Sub Base Fuel Tank Base



Enclosure Type	Length "l"		Width "W"		Height "H"		Weight	
	mm	in	mm	in	mm	in	kg	lb
Sound Attenuated	4515	177.8	2056	80.9	2831	111.5	4875	10748
Weather Protective	4035	158.9	2056	80.9	2777	109.3	4592	10124

Enclosure on a UL Listed 1002 Gallon Sub Base Fuel Tank Base



Enclosure Type	Length "l"		Width "W"		Height "H"		Weight	
	mm	in	mm	in	mm	in	kg	lb
Sound Attenuated	5739	225.9	2056	80.9	2831	111.5	5267	11612
Weather Protective	5739	225.9	2056	80.9	2777	109.3	4984	10988

Image shown may not reflect actual package.

C9
Integral and Sub-Base Fuel Tanks

US Sourced
Diesel Generator Set
180 – 300 kW 60 Hz

FEATURES

- UL listed for United States (UL 142) and Canada (ULC S601)
- Compliant with NFPA 30, 37 & 110 and CSA C282-09 & B139-09 standards.
- Dual wall
- Lockable fuel fill cap, 4" (101.6mm) NPT
- Low fuel level warning standard, customer configurable warning or shutdown
- Primary tank leak detection switch in containment basin
- Tank design provides capacity for thermal expansion of fuel
- Fuel supply dip tube is positioned so as not to pick up fuel sediment
- Fuel return and supply dip tube is separated by an internal baffle to prevent immediate re-supply of heated return fuel
- Pressure washed with an iron phosphate solution
- Interior tank surfaces coated with a solvent-based thin-film rust preventative
- Heavy guage steel gussets with internal lifting rings
- Primary and secondary tanks are leak tested at 20.7 kPa (3 psi) minimum
- Compatible with open packages and enclosures
- Gloss black polyester alkyd enamel exterior paint
- Welded steel containment basin (minimum of 110% of primary tank capacity)
- Direct reading fuel gauge with variable electrical output
- Emergency vents on primary and secondary tanks are sized in accordance with NFPA 30

DESCRIPTION – Sub Base

- The sub-base fuel tank mounts below the generator set wide base

OPTIONS

- Audio/visual fuel level alarm panel
- 5 gal (18.9 L) spill containment
- Overfill prevention valve

INTEGRAL & SUB-BASE FUEL TANK BASE CAPACITIES with Fuel Tank Dimensions & Weights

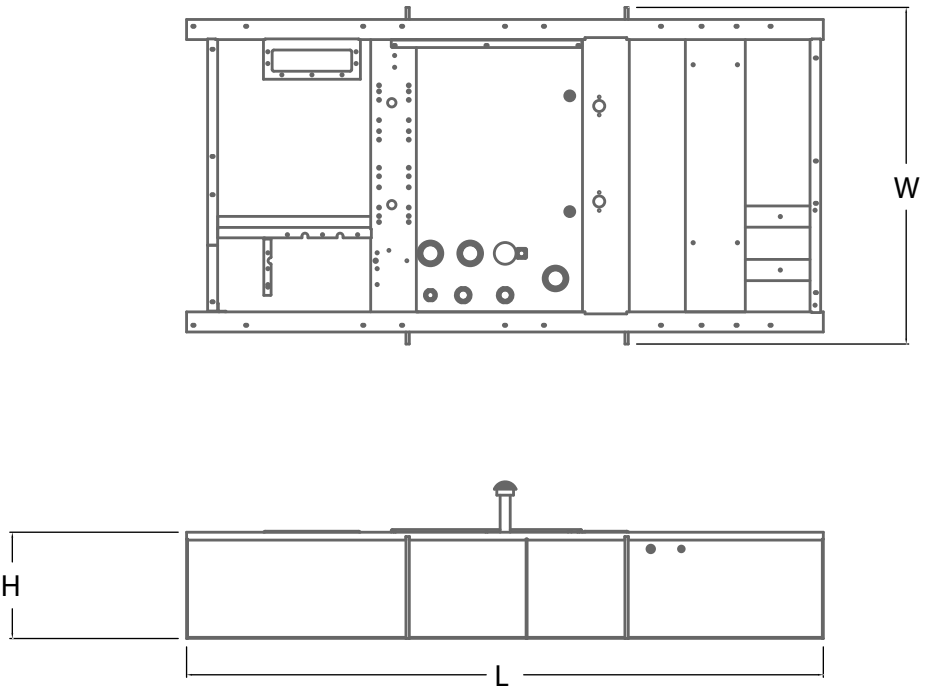
Integral – Width (W) 2014 mm (79.3 in)
Sub-base – Width (W) 2056 mm (81 in)

OPEN SET, WEATHER PROTECTIVE ENCLOSURE & SOUND ATTENUATED

Feature Code	Tank Design	Total Capacity		Useable Capacity		TANK ONLY						TANK AND PACKAGE					
						Dry Weight		Length 'L'		Height 'H'		Open PGS Height		WP PGS Height		SA PGS Height	
		Gallon	Litre	Gallon	Litre	kg	lb	mm	in	mm	in	mm	in	mm	in	mm	in
FTDW010	Integral	212	803	203	768	891	1964	3810	150.0	636	25.0	2360	92.9	2438	96.0	2492	98.1
FTDW008	sub base	730	2763	660	2498	1468	3236	3810	150.0	635	25.0	2699	106.3	2777	109.3	2831	111.5
FTDW009	sub base	1036	3922	1002	3793	1832	4038	5550	218.5	635	25.0	2699	106.3	2777	109.3	2831	111.5

ESTIMATED RUN TIMES (hours) AT 100% LOAD

Feature Code	Tank Design	Standby Ratings (ekW)			Prime Ratings (ekW)		
		300	250	200	275	225	180
FTDW010	Integral		10	13	10	11	15
FTDW008	sub base	29	34	43	31	36	47
FTDW009	sub base	44	52	65	47	55	72



The heights listed above do not include lumber used during manufacturing and shipping.
Tanks with full electrical stub-up area include removable end channel. Tanks with RH/LH stub-up include stub-up area directly below the circuit breaker or power terminal strips. Dimensions include weather-protective enclosure exhaust system.

Dual wall sub-base tanks are UL listed and constructed in accordance with Underwriters Laboratories Standard UL142 "Steel Aboveground Tanks for Flammable and Combustible Liquids" and Canada ULC S601 "Shop Fabricated Steel Aboveground Tanks for Flammable and Combustible Liquids."

Fuel tanks comply with the following United States NFPA Codes:
NFPA 30 – Flammable and Combustible Liquids Code
NFPA 37 – Standard for Installation and Use of Stationary Combustible Engine
NFPA 110 – Standard for Emergency and Standby Power Systems

Fuel tanks comply with the following Canadian Codes:
CSA C282-09 – Emergency Electrical Power Supply for Buildings
CSA B139-09 – Installation Code for Oil-Burning Equipment

PERFORMANCE DATA[DM8168]

September 15, 2014

Performance Number: DM8168 **Change Level: 03**

SALES MODEL:	C9	**COMBUSTION:**	DI
ENGINE POWER (BHP):	480	**ENGINE SPEED (RPM):**	1,800
GEN POWER W/O FAN (EKW):	319.0	**HERTZ:**	60
GEN POWER WITH FAN (EKW):	300.0	**FAN POWER (HP):**	36.5
COMPRESSION RATIO:	16.1	**ASPIRATION:**	TA
RATING LEVEL:	STANDBY	**AFTERCOOLER TYPE:**	ATAAC
PUMP QUANTITY:	1	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
FUEL TYPE:	DIESEL	**INLET MANIFOLD AIR TEMP (F):**	120
MANIFOLD TYPE:	DRY	**JACKET WATER TEMP (F):**	192.2
GOVERNOR TYPE:	ELEC	**TURBO CONFIGURATION:**	SINGLE
CAMSHAFT TYPE:	STANDARD	**TURBO QUANTITY:**	1
IGNITION TYPE:	CI	**TURBOCHARGER MODEL:**	S310-1.25
INJECTOR TYPE:	EUI	**CERTIFICATION YEAR:**	2005
REF EXH STACK DIAMETER (IN):	4	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,759.8
MAX OPERATING ALTITUDE (FT):	3,281		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET

General Performance Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
300.0	100	480	393	0.332	22.7	82.5	122.6	1,247.3	60.6	927.2
270.0	90	430	352	0.334	20.5	78.7	121.1	1,179.5	55.9	877.6
240.0	80	383	314	0.339	18.5	74.9	121.5	1,120.8	51.5	840.4
225.0	75	361	295	0.342	17.6	73.0	121.6	1,094.5	49.4	826.3
210.0	70	339	277	0.347	16.8	71.0	121.7	1,071.1	47.3	817.6
180.0	60	296	242	0.360	15.2	66.4	121.7	1,028.3	43.1	800.8
150.0	50	253	207	0.376	13.6	61.1	121.7	988.0	38.7	784.5
120.0	40	212	173	0.390	11.8	52.8	121.7	944.9	32.8	768.7
90.0	30	170	139	0.403	9.8	42.5	121.6	899.1	25.9	752.9
75.0	25	149	122	0.411	8.7	36.9	121.6	875.4	22.3	745.0
60.0	20	127	104	0.419	7.6	30.8	121.6	850.8	18.7	737.0
30.0	10	82.9	68	0.441	5.2	17.9	121.5	723.0	11.7	650.3

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
300.0	100	480	83	450.8	916.6	2,460.9	3,985.8	4,144.9	872.5	798.0
270.0	90	430	80	428.0	893.4	2,306.9	3,884.5	4,028.0	848.2	780.6
240.0	80	383	76	406.4	870.9	2,173.0	3,772.3	3,902.1	821.8	760.2
225.0	75	361	74	396.1	859.8	2,109.4	3,711.7	3,835.1	806.5	747.8
210.0	70	339	72	386.3	846.8	2,047.1	3,649.5	3,766.9	788.0	732.2
180.0	60	296	67	367.7	814.1	1,926.8	3,499.4	3,605.2	751.6	701.1
150.0	50	253	62	350.2	772.8	1,810.5	3,315.8	3,410.8	715.5	669.7
120.0	40	212	54	321.8	707.1	1,643.7	3,018.0	3,100.6	657.9	617.9
90.0	30	170	43	282.8	623.3	1,424.8	2,642.8	2,711.5	577.7	544.3
75.0	25	149	38	260.3	576.0	1,299.8	2,434.3	2,495.5	530.5	500.6
60.0	20	127	31	235.4	524.5	1,162.9	2,209.5	2,262.9	477.8	451.6
30.0	10	82.9	18	178.8	412.8	851.2	1,728.1	1,764.7	377.1	358.8

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
300.0	100	480	6,838	1,312	18,223	10,196	2,598	5,239	20,357	48,785	51,968
270.0	90	430	6,227	1,100	16,530	8,999	2,344	4,774	18,249	44,009	46,881
240.0	80	383	5,718	954	15,163	8,062	2,120	4,304	16,263	39,804	42,402
225.0	75	361	5,492	885	14,576	7,680	2,017	4,080	15,306	37,868	40,339
210.0	70	339	5,288	827	14,082	7,393	1,922	3,868	14,366	36,078	38,432
180.0	60	296	4,912	823	13,054	6,800	1,739	3,448	12,536	32,644	34,774
150.0	50	253	4,565	786	11,966	6,184	1,555	3,034	10,749	29,195	31,100
120.0	40	212	4,219	770	10,567	5,402	1,348	2,419	8,983	25,307	26,959
90.0	30	170	3,811	699	8,973	4,534	1,120	1,706	7,210	21,028	22,400
75.0	25	149	3,554	623	8,129	4,085	999	1,352	6,312	18,747	19,970
60.0	20	127	3,271	492	7,247	3,625	871	1,008	5,399	16,350	17,417
30.0	10	82.9	2,624	519	4,878	2,172	597	397	3,514	11,200	11,931

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		EKW	300.0	225.0	150.0	75.0	30.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	480	361	253	149	82.9
TOTAL NOX (AS NO2)		G/HR	2,032	1,047	539	288	217
TOTAL CO		G/HR	214	166	242	203	191
TOTAL HC		G/HR	50	54	81	76	65
PART MATTER		G/HR	30.2	29.7	66.7	43.9	28.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,371.7	1,572.5	1,056.2	887.0	1,244.7
TOTAL CO	(CORR 5% O2)	MG/NM3	216.0	218.7	414.7	579.4	974.9
TOTAL HC	(CORR 5% O2)	MG/NM3	43.7	62.4	119.7	182.7	276.3
PART MATTER	(CORR 5% O2)	MG/NM3	24.8	34.3	101.8	98.2	126.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,155	766	514	432	606
TOTAL CO	(CORR 5% O2)	PPM	173	175	332	464	780
TOTAL HC	(CORR 5% O2)	PPM	82	116	223	341	516
TOTAL NOX (AS NO2)		G/HP-HR	4.27	2.92	2.13	1.94	2.61
TOTAL CO		G/HP-HR	0.45	0.46	0.96	1.36	2.30
TOTAL HC		G/HP-HR	0.11	0.15	0.32	0.51	0.79
PART MATTER		G/HP-HR	0.06	0.08	0.26	0.29	0.34
TOTAL NOX (AS NO2)		LB/HR	4.48	2.31	1.19	0.64	0.48
TOTAL CO		LB/HR	0.47	0.37	0.53	0.45	0.42
TOTAL HC		LB/HR	0.11	0.12	0.18	0.17	0.14
PART MATTER		LB/HR	0.07	0.07	0.15	0.10	0.06

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	300.0	225.0	150.0	75.0	30.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	480	361	253	149	82.9
TOTAL NOX (AS NO2)		G/HR	1,881	970	499	267	201
TOTAL CO		G/HR	115	89	129	109	102
TOTAL HC		G/HR	26	29	43	40	35
TOTAL CO2		KG/HR	225	175	135	86	51
PART MATTER		G/HR	15.5	15.2	34.2	22.5	14.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,196.0	1,456.1	978.0	821.3	1,152.5
TOTAL CO	(CORR 5% O2)	MG/NM3	115.5	117.0	221.7	309.8	521.3
TOTAL HC	(CORR 5% O2)	MG/NM3	23.1	33.0	63.3	96.7	146.2
PART MATTER	(CORR 5% O2)	MG/NM3	12.7	17.6	52.2	50.4	64.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,070	709	476	400	561
TOTAL CO	(CORR 5% O2)	PPM	92	94	177	248	417
TOTAL HC	(CORR 5% O2)	PPM	43	62	118	180	273
TOTAL NOX (AS NO2)		G/HP-HR	3.95	2.70	1.98	1.79	2.42
TOTAL CO		G/HP-HR	0.24	0.25	0.51	0.73	1.23
TOTAL HC		G/HP-HR	0.06	0.08	0.17	0.27	0.42
PART MATTER		G/HP-HR	0.03	0.04	0.14	0.15	0.18
TOTAL NOX (AS NO2)		LB/HR	4.15	2.14	1.10	0.59	0.44
TOTAL CO		LB/HR	0.25	0.20	0.29	0.24	0.22
TOTAL HC		LB/HR	0.06	0.06	0.09	0.09	0.08
TOTAL CO2		LB/HR	496	387	297	189	112
PART MATTER		LB/HR	0.03	0.03	0.08	0.05	0.03
OXYGEN IN EXH		%	9.2	11.2	12.6	13.6	15.0
DRY SMOKE OPACITY		%	0.3	0.4	1.0	0.8	0.8
BOSCH SMOKE NUMBER			0.07	0.20	0.90	0.76	0.68

Regulatory Information

EPA TIER 3		2005 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EPA EMERGENCY STATIONARY		2011 - ----		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 4.0 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	480	480	480	480	480	480	480	480	480	480	480	480	480
1,000	480	480	480	480	480	480	480	480	480	480	477	469	480
2,000	480	480	480	480	480	480	480	480	475	467	459	451	480
3,000	480	480	480	480	480	480	474	465	457	449	442	434	480
4,000	480	480	480	480	473	464	456	448	440	432	425	418	478
5,000	480	480	473	464	455	446	438	431	423	416	409	402	463
6,000	473	464	455	446	437	429	421	414	407	400	393	386	448
7,000	455	446	437	428	420	413	405	398	391	384	378	371	434
8,000	437	428	420	412	404	396	389	382	375	369	363	357	420
9,000	419	411	403	395	388	381	374	367	361	354	348	343	406
10,000	403	395	387	379	372	365	359	352	346	340	334	329	392
11,000	386	379	371	364	357	351	344	338	332	326	321	316	379
12,000	371	363	356	349	343	336	330	324	319	313	308	303	366
13,000	355	348	342	335	329	323	317	311	306	300	295	290	354
14,000	341	334	327	321	315	309	303	298	293	288	283	278	342
15,000	326	320	314	308	302	296	291	286	281	276	271	267	330

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
2531644	S9L00001	GS279	-
3950369	S9P00001	GS279	-
4529865	S9P00001	GS857	LS

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K6616		S9L00001	2531644	ELEC		
4150068	PP5547	S9P00001	3950369	ELEC		
4150068	PP5547	S9P00001	4529865	ELEC		

For Help Desk Phone Numbers Click here

Selected Model

Engine: C9 **Generator Frame:** LC6124B **Genset Rating (kW):** 300.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 4183879 **Genset Rating (kVA):** 375.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** PMG **Pwr. Factor:** 0.8 **Rated Current:** 451.1
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 41764 /40476 /41800 /10600

Spec Information

Generator Specification

Frame: LC6124B **Type:** LC **No. of Bearings:** 1
Winding Type: RANDOM WOUND **Flywheel:** 14.0
Connection: SERIES STAR **Housing:** 1
Phases: 3 **No. of Leads:** 12
Poles: 4 **Wires per Lead:** 2
Sync Speed: 1800 **Generator Pitch:** 0.6667

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	75.0	89.5
0.5	150.0	92.7
0.75	225.0	93.7
1.0	300.0	93.7

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1156	0.0710
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1567	0.0963
TRANSIENT - SATURATED X'_d	0.1652	0.1015
SYNCHRONOUS - DIRECT AXIS X_d	2.8711	1.7640
SYNCHRONOUS - QUADRATURE AXIS X_q	1.7227	1.0584
NEGATIVE SEQUENCE X_2	0.1357	0.0834
ZERO SEQUENCE X_0	0.0081	0.0050

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	1.7380
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1000
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0130
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0100
OPEN CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_{q0}	0.1100
SHORT CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_q	0.0100
EXCITER TIME CONSTANT T_e	0.0300
ARMATURE SHORT CIRCUIT T_a	0.0150

Short Circuit Ratio: 0.44 | Stator Resistance = 0.0163 Ohms | Field Resistance = 0.768 Ohms

Voltage Regulation

Voltage level adustment: +/-	5.0%
Voltage regulation, steady state: +/-	0.5%
Voltage regulation with 3% speed change: +/-	0.5%
Waveform deviation line - line, no load: less than	2.0%
Telephone influence factor: less than	50

Generator Excitation

	No Load	Full Load, (rated) pf	
		Series	Parallel
Excitation voltage:	10.2 Volts	41.75 Volts	Volts
Excitation current	1.0 Amps	3.37 Amps	Amps

Selected Model

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Generator Mechanical Information

Center of Gravity

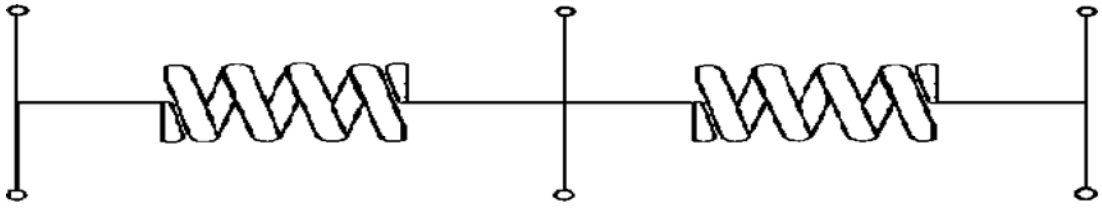
Dimension X	-431.0 mm	-17.0 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

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

Generator WT = 996 kg * Rotor WT = 387 kg * Stator WT = 609 kg
2,196 LB 853 LB 1,343 LB

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

Generator Torsional Data



J1 = Coupling and Fan **J2 = Rotor** **J3 = Exciter End**
TOTAL J = J1 + J2 + J3

K1 = Shaft Stiffness between J1 + J2 (Diameter 1)
K2 = Shaft Stiffness between J2 + J3 (Diameter 2)

J1	K1	Min Shaft Dia 1	J2	K2	Min Shaft Dia 2	J3
17.1 LB IN. s^2	55.5 MLB IN./rad	4.5 IN.	35.4 LB IN. s^2	40.8 MLB IN./rad	4.3 IN.	1.5 LB IN. s^2
1.93 N m s^2	6.27 MN m/rad	115.0 mm	4.0 N m s^2	4.61 MN m/rad	110.0 mm	0.17 N m s^2

Total J
54.0 LB IN. s^2
6.1 N m s^2

Selected Model

Engine: C9	**Generator Frame:** LC6124B	**Genset Rating (kW):** 300.0	**Line Voltage:** 480
Fuel: Diesel	**Generator Arrangement:** 4183879	**Genset Rating (kVA):** 375.0	**Phase Voltage:** 277
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Version: 41764 /40476 /41800 /10600

Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		**Temperature Data: (Ambient 40 ^{0}C)**	
Heat Dissipated:	20.2 kW	**Stator Rise:**	105.0 ^{0}C
Air Flow:	66.0 m^3/min	**Rotor Rise:**	105.0 ^{0}C

Insulation Class: H

Insulation Reg. as shipped: 100.0 MΩ minimum at 40 ^{0}C

Thermal Limits of Generator

Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	384.0 kVA
F BR -105/40	436.8 kVA
H BR - 125/40	480.0 kVA
F PR - 130/40	480.0 kVA
H PR - 150/40	508.8 kVA
H PR27 - 163/27	528.0 kVA

Selected Model

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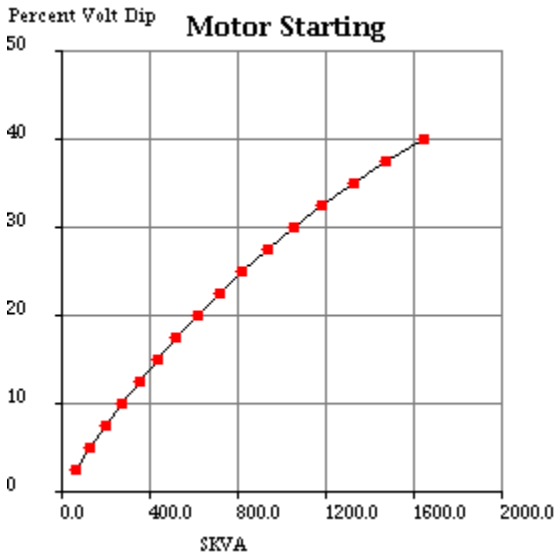
Starting Capability & Current Decrement

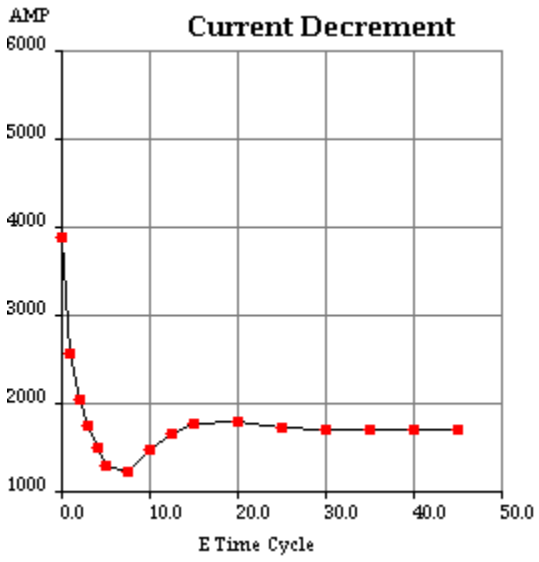
Motor Starting Capability (0.6 pf)

SKVA	Percent Volt Dip
63	2.5
130	5.0
200	7.5
274	10.0
352	12.5
435	15.0
522	17.5
616	20.0
715	22.5
821	25.0
934	27.5
1,055	30.0
1,186	32.5
1,326	35.0
1,477	37.5
1,641	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	3,877
1.0	2,562
2.0	2,054
3.0	1,742
4.0	1,499
5.0	1,299
7.5	1,229
10.0	1,473
12.5	1,649
15.0	1,775
20.0	1,798
25.0	1,734
30.0	1,704
35.0	1,700
40.0	1,706
45.0	1,713



Instantaneous 3 Phase Fault Current: 3877 Amps **Instantaneous Line - Line Fault Current:** 3089 Amps
Instantaneous Line - Neutral Fault Current: 5181 Amps

Selected Model

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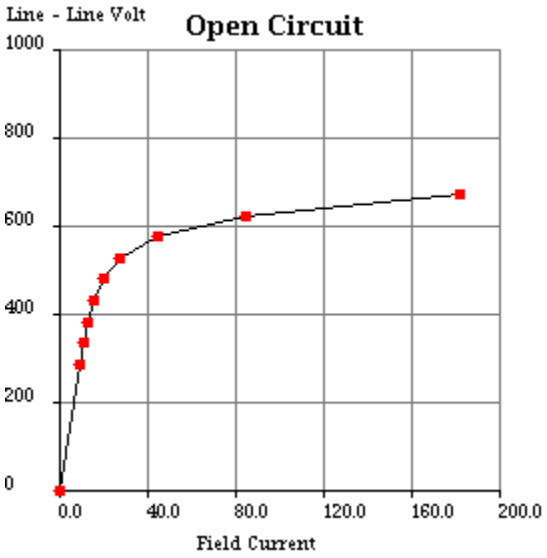
Version: 41764 /40476 /41800 /10600

Generator Output Characteristic Curves

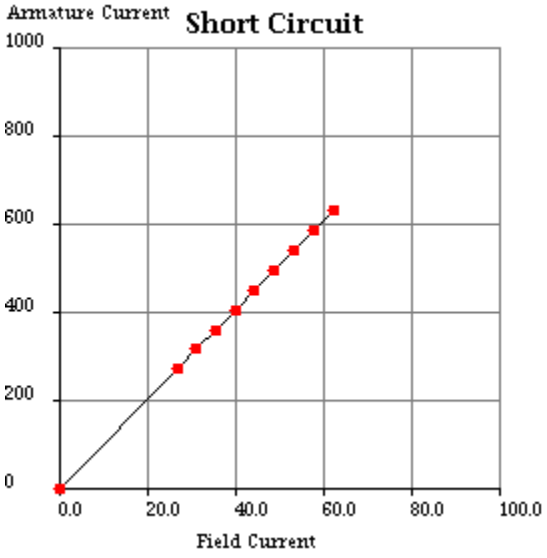
Open Circuit Curve

Field Current	Line - Line Volt
0.0	0
9.4	288
11.1	336
13.0	384
15.5	432
19.6	480
27.3	528
44.2	576
84.2	624
181.6	672



Short Circuit Curve

Field Current	Armature Current
0.0	0
26.6	271
31.0	316
35.5	361
39.9	406
44.3	451
48.8	496
53.2	541
57.6	586
62.1	631



Selected Model

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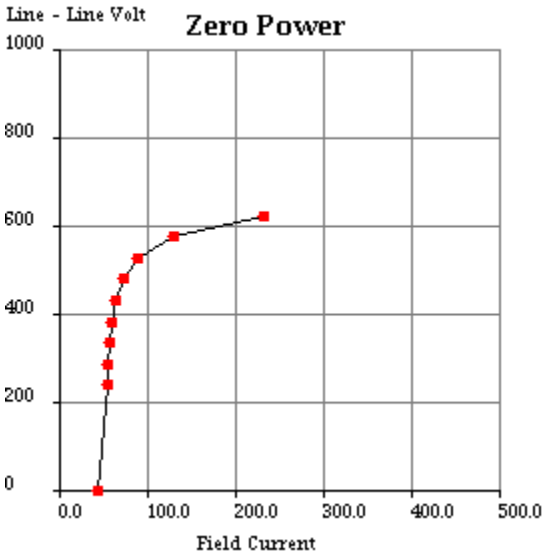
Fuel: Diesel **Generator Arrangement:** 4183879 **Genset Rating (kVA):** 375.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** PMG **Pwr. Factor:** 0.8 **Rated Current:** 451.1
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 41764 /40476 /41800 /10600

Generator Output Characteristic Curves

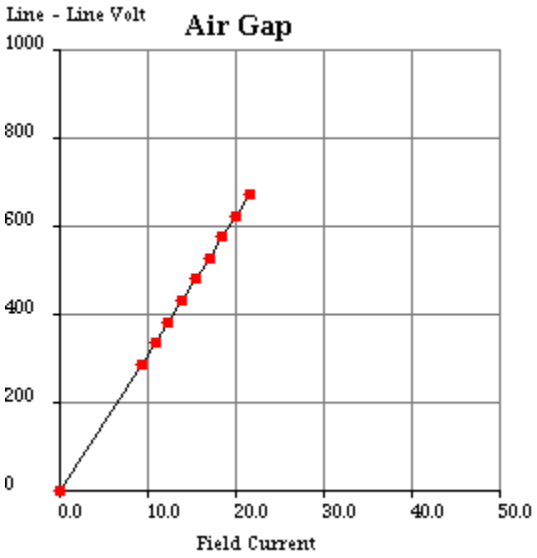
Zero Power Factor Curve

Field Current	Line - Line Volt
44.3	0
53.7	240
55.4	288
57.3	336
59.9	384
64.0	432
71.9	480
89.4	528
130.6	576
231.2	624



Air Gap Curve

Field Current	Line - Line Volt
0.0	0
9.3	288
10.8	336
12.3	384
13.9	432
15.4	480
17.0	528
18.5	576
20.1	624
21.6	672



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Frequency: 60	**Excitation Type:** PMG	**Pwr. Factor:** 0.8	**Rated Current:** 451.1
Duty: STANDBY	**Connection:** SERIES STAR	**Application:** EPG	**Status:** Current

Version: 41764 /40476 /41800 /10600

General Information

GENERATOR INFORMATION (DM7900)

1.Motor Starting
Motor starting curves are obtained in accordance with IEC60034, and are displayed at 0.6 power factor.

2.Voltage Dip
Prediction of the generator synchronous voltage dip can be made by consulting the plot for the voltage dip value that corresponds to the desired motor starting kVA value.

3.Definitions
A)Generator Keys
Frame: abbreviation of generator frame size
Freq: frequency in hertz.
PP/SB: prime/standby duty respectively
Volts: line - line terminal voltage
kW: rating in electrical kilo watts
Model: engine sales model

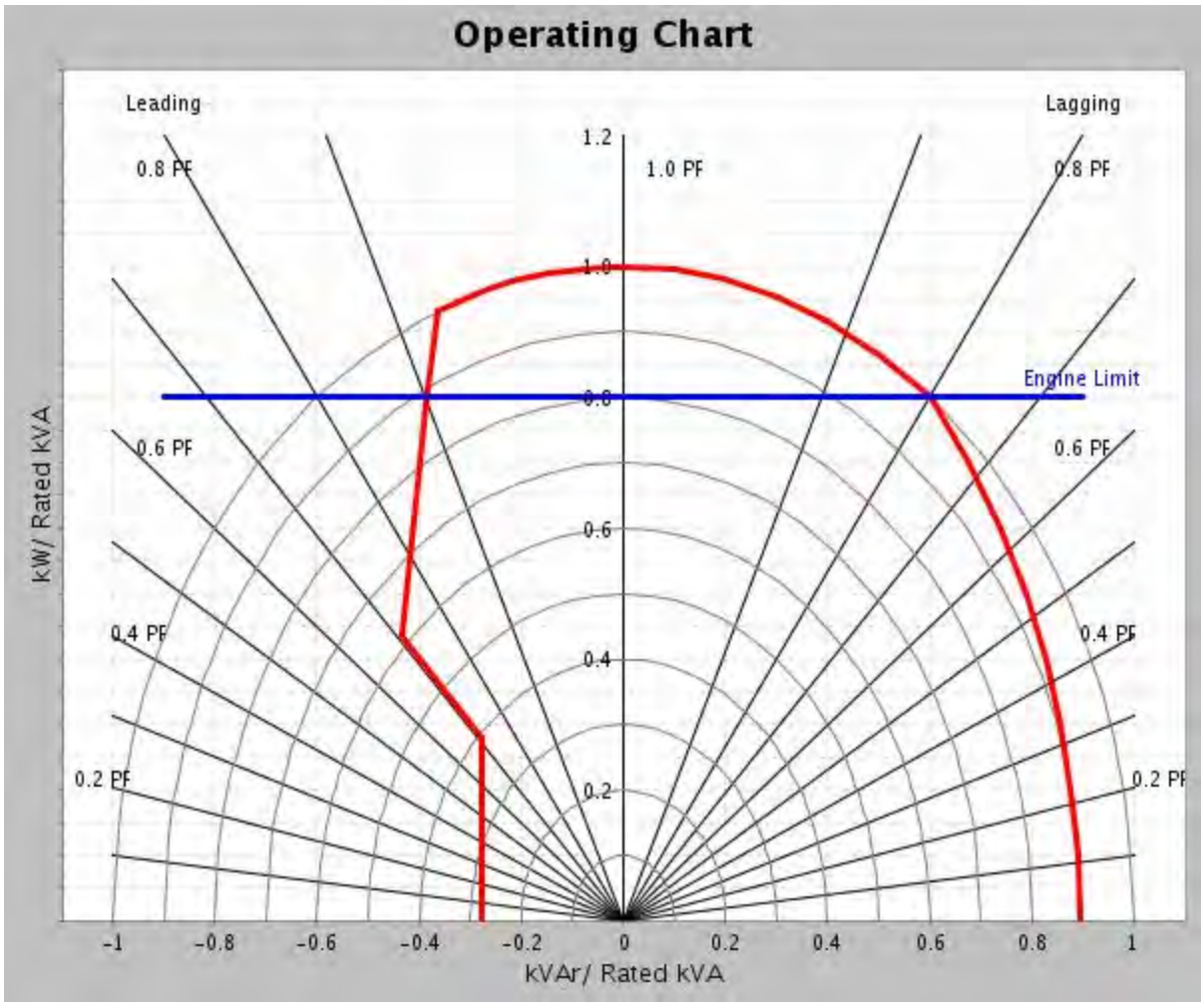
B)Generator Temperature Rise
The indicated temperature rises are the IEC/NEMA limits for standby or prime power applications. The quoted rise figures are maximum limits only and are not necessarily indicative of the actual temperature rise of a given machine winding.

C)Centre of Gravity
The specified centre of gravity is for the generator only. For single bearing, and two bearing close coupled generators, the center of gra vity is measured from the generator/engine flywheel-housing interface and from the centreline 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 t he rotor
shaft.

D)Generator Current Decrement Curves
The generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals. Generators equipped with AREP or PMG excitation systems will sustain 300% of rated armature current for 10 seconds.

E)Generator Efficiency Curves
The efficiency curve is displayed for the generator only under the given conditions of rating, voltage, frequency and power factor. This


Operating Chart
Leading
Lagging
0.8 PF
1.0 PF
0.8 PF
1.2
1.0
0.8
Engine Limit
0.6 PF
0.6 PF
0.6
0.4 PF
0.4 PF
0.4
0.2 PF
0.2 PF
0.2
kW/ Rated kVA
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
kVAr/ Rated kVA

Effective with sales to the first user on or after August 1, 2014

CATERPILLAR LIMITED WARRANTY

Industrial, Petroleum, Locomotive, and Agriculture Engine Products and Electric Power Generation Products

Worldwide

Caterpillar Inc. or any of its subsidiaries ("Caterpillar") warrants new and remanufactured engines and electric power generation products sold by it (including any products of other manufacturers packaged and sold by Caterpillar), to be free from defects in material and workmanship.

This warranty does not apply engines sold for use in on-highway vehicle or marine applications; engines in machines manufactured by or for Caterpillar; C175, 3500 and 3600 series engines used in locomotive applications; 3000 Family engines, C0.5 through C4.4 and ACERT™ (C6.6, C7, C7.1, C9, C9.3, C11, C13, C15, C18, C27, and C32) engines used in industrial, mobile agriculture and locomotive applications; or Cat® batteries. These products are covered by other Caterpillar warranties.

This warranty is subject to the following:

Warranty Period

- For industrial engines, engines in a petroleum applications or Petroleum Power Systems (excluding petroleum fire pump application), or engines in a Locomotive application, or Uninterruptible Power Supply (UPS) systems, the warranty period is 12 months after date of delivery to the first user.
- For engines used in petroleum fire pump and mobile agriculture applications the warranty period is 24 months after date of delivery to the first user.
- For controls only (EPIC), configurable and custom switchgear products, and automatic transfer switch products, the warranty period is 24 months after date of delivery to the first user.
- For new CG132, CG170 and CG260 series power generation products the warranty period is 24 months/16,000 hours, whichever comes first, after date of delivery to first user.
- For electric power generation products other than CG132, CG170 and CG260 series in prime or continuous applications the warranty period is 12 months. For standby applications the warranty period is 24 months/1000 hours. For emergency standby applications the warranty period is 24 months/400 hours. All terms begin after date of delivery to the first user.
- For all other applications the warranty period is 12 months after date of delivery to the first user.

Caterpillar Responsibilities

If a defect in material or workmanship is found during the warranty period, 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, including labor to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems, if required.

For new 3114, 3116, and 3126 engines and electric power generation products (including any new products of other manufacturers packaged and sold by Caterpillar):

- 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 all other products:

- Provide reasonable travel expenses for authorized mechanics, including meals, mileage, and lodging, when Caterpillar chooses 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," including costs beyond those required to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems.
- Travel or transporting costs, except as stated under "Caterpillar Responsibilities."
- 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.
- Performance of the 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 repairs or adjustments, and unauthorized fuel setting changes.
- Damage to parts, fixtures, housings, attachments, and accessory items that are not part of the engine, Cat Selective Catalytic Reduction System or electric power generation product (including any products of other manufacturers packaged and sold by Caterpillar).
- Repair of components sold by Caterpillar that is warranted directly to the user by their respective manufacturer. Depending on type of application, certain exclusions may apply. Consult your Cat dealer for more information.

(Continued on reverse side…)

This warranty covers every major component of the products. Claims under this warranty should be submitted 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.

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, EXCEPT CATERPILLAR EMISSION-RELATED COMPONENTS WARRANTIES FOR NEW ENGINES, WHERE APPLICABLE. 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 electric power generation products, operating in the USA, its territories and 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 other authorized repair facility, call (800) 447-4986. If you have questions concerning this warranty or its applications, call or write:

In USA and Canada: Caterpillar Inc., Engine Division, P. O. Box 610, Mossville, IL 61552-0610, Attention: Customer Service Manager, Telephone (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:

T**HIS 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 40,000 OR LESS,**

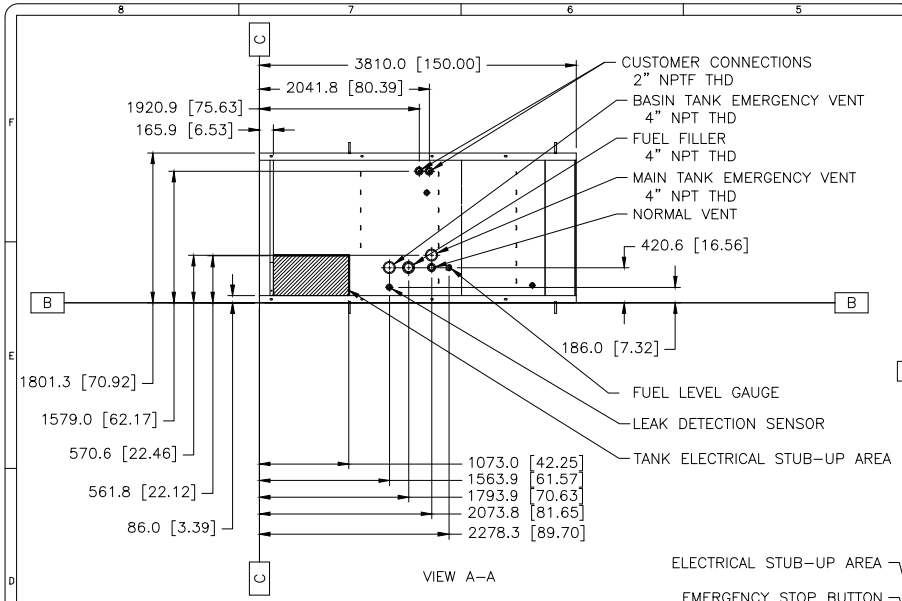
WHERE THOSE PRODUCTS WERE NOT ACQUIRED FOR THE PURPOSE OF RE-SUPPLY OR FOR THE PURPOSE OF USING THEM UP OR TRANSFORMING THEM IN THE COURSE OF PRODUCTION OR MANUFACTURE OR IN THE COURSE OF REPAIRING OTHER GOODS OR FIXTURES, THEN THIS SECTION C APPLIES.

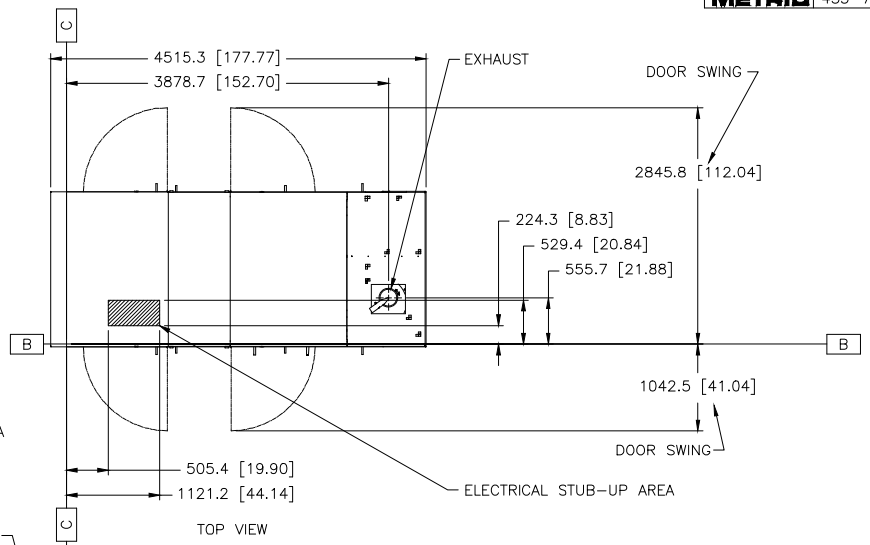
THE FOLLOWING MANDATORY TEXT IS INCLUDED PURSUANT TO THE AUSTRALIAN CONSUMER LAW AND INCLUDES REFERENCES TO RIGHTS THE USER MAY HAVE AGAINST THE DIRECT SUPPLIER OF THE PRODUCTS: OUR GOODS COME WITH GUARANTEES THAT CANNOT BE EXCLUDED UNDER THE AUSTRALIAN CONSUMER LAW. YOU ARE ENTITLED TO A REPLACEMENT 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.

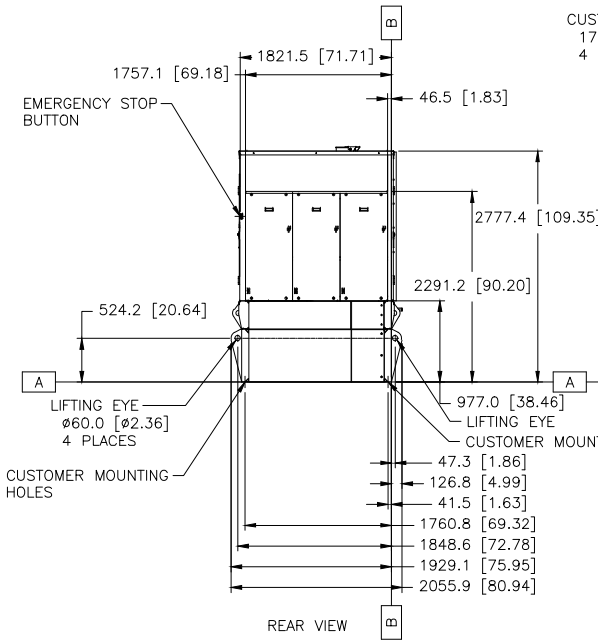
TO THE EXTENT THE PRODUCTS FALL WITHIN THIS SECTION C BUT ARE NOT OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION, CATERPILLAR LIMITS ITS LIABILITY TO THE EXTENT IT IS PERMITTED TO DO SO UNDER THE AUSTRALIAN CONSUMER LAW TO, AT ITS OPTION, THE REPAIR OR REPLACEMENT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

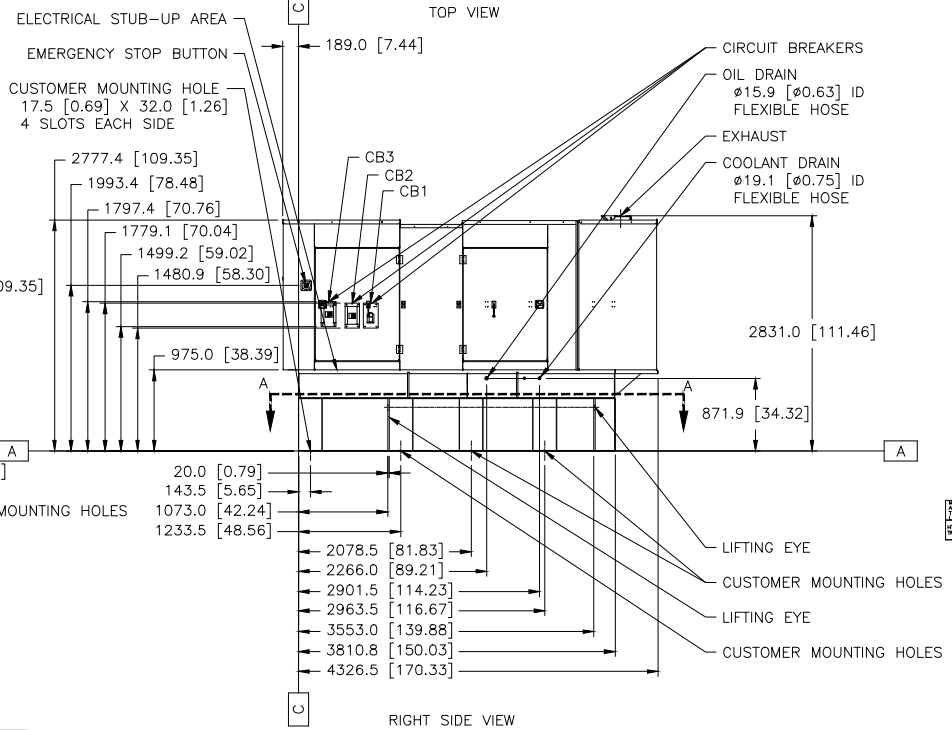
THE WARRANTY SET OUT IN THIS DOCUMENT IS GIVEN BY CATERPILLAR INC. OR ANY OF ITS SUBSIDIARIES, 100 N. E. ADAMS ST, PEORIA, IL USA 61629, TELEPHONE 1 309 675 1000, THE USER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH MAKING A CLAIM UNDER THE WARRANTY SET OUT IN THIS DOCUMENT, EXCEPT AS EXPRESSLY STATED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









MODEL	TYPE	ENGINE	TANK	ENCLOSURE
C9	Y	LS–0249 CHG 00	LS–1845 CHG 00	LS–1838 CHG 00
				LS–1839 CHG 00
				LS–1840 CHG 00
				LS–1841 CHG 00

NOTE: SEE DRAWING 455–7841 FOR DETAIL OF C9 CIRCUIT BREAKER AR.

NOTE: ENCLOSURE ARRANGEMENTS LS–1839 AND LS–1841 COME WITH WINDOW

1E2733 DRAWING–AUTOCAD
1E0011 INTPR & TOL
C.A. THURMAN
C.A. THURMAN
N.P. MOUNTJOY
02 06APR15
CATERPILLAR INC.
INSTALLATION–COMPOSITE
C9 SA SUB TANK 660 GALLON
455–7122 W973 E

CIRCUIT DESCRIPTION TABLE Model: 3901189.DGM		
CIRCUIT #	COLOR	DESCRIPTION
12	WH	AREP 12
9	WH	AREP 9
10	WH	AREP 10
11	WH	AREP 11
14	WH	PMG A
16	WH	PMG C
15	WH	PMG B
14	WH	PMG A
F5	BU	EXCITER 5+
F6	WH	EXCITER 6-
AC199	WH	AC NEUTRAL
AC200	GN	CUSTOMER AC GROUND
AC718	WH	CB-JWH L2 TO RLY
AC702	WH	JWH RLY TO HTR L2
AC701	WH	JWH RLY TO HTR L1
AC717	WH	CB-JWH L1 TO RLY
AC720	WH	CB-ALH L2 TO HTR
AC703	WH	ALT HTR RLY TO HTR L1
AC719	WH	CB-ALH L1 TO RLY
AC102	WH	AC LINE INPUT L2
AC101	WH	AC LINE INPUT L1
101	WH	UNFUSED BTRY (+)
103	WH	+24V BTRY (EMCP)
104	WH	+24V BTRY (ADEM)
106	WH	+24V ALTERNATOR
108	WH	+24V BTRY
200	WH	GROUND
203	WH	-24V BTRY (EMCP)
208	WH	-24V BTRY
229	WH	CLEAN GROUND
304	WH	ENGINE CRANK
344	WH	E-STOPS LINK 1
345	WH	E-STOPS LINK 2
347	WH	REMOTE E-STOP LINK
348	WH	REMOTE E-STOP
390	WH	ADEM KEY SWITCH
A309	WH	FUEL ENABLE
A338	WH	JWH REMOTE T-STAT SIGNAL
A339	WH	JWH REMOTE T-STAT RETURN
A380	SH	RS485 ANN. SHLD
E486	WH	SENSING VOLTAGE - PHASE A
E487	WH	SENSING VOLTAGE - PHASE B
E488	WH	SENSING VOLTAGE - PHASE C
E494	WH	CT SENSING - PHASE A
E495	WH	CT SENSING - PHASE B
E496	WH	CT SENSING - PHASE C
E497	WH	DROOP SENSING CT
E498	WH	CT RETURN COMMON
F409	WH	SENSING VOLTAGE NEUTRAL
F410	WH	DROOP SENSING CT RETURN
F430	WH	GROUND FAULT
F434	WH	GENERATOR PHASE A
F435	WH	GENERATOR PHASE B
F436	WH	GENERATOR PHASE C
G407	RD	RS485 ANN. B (+)
G408	BK	RS485 ANN. A (-)
G409	GY	RS485 ANN. REF
G419	WH	GND FAULT RESET N/C
G420	WH	GND FAULT 4 POLE SW LINK
E560	WH	RLY7 SPARE - CM
E561	WH	RLY7 SPARE - NC
E562	WH	RLY7 SPARE - NO
E563	WH	RLY8 SPARE - CM
E564	WH	RLY8 SPARE - NC
E565	WH	RLY8 SPARE - NO
F541	SH	ANLG INP SHLD 1
F548	WH	+5V ANLG SNSR SUPP
A774	WH	E-STOP
A779	WH	CB BELL ALARM N/O
A780	WH	CB BELL ALARM N/C
A782	WH	CB BELL ALARM COMMON

CIRCUIT DESCRIPTION TABLE Model: 3901189.DGM		
CIRCUIT #	COLOR	DESCRIPTION
E722	RD	S-SPD
E723	BK	D-SPD
M755	GN	CAN (J1939) (-)
M756	YL	CAN (J1939) (+)
M757	SH	CAN (J1939) REF
N702	WH	PMG PHASE A / AREP 11
N703	WH	PMG PHASE B / AREP 9 / SH T4
N704	WH	PMG PHASE C / AREP 12
N705	WH	EXCITER (+)
N706	WH	EXCITER (-)
N713	WH	+/- 10VDC INPUT (A)
N714	WH	+/- 10VDC INPUT (B)
N715	WH	FAULT RESET
N716	WH	EXCITATION DISABLE
N717	WH	VAR/PF ENABLE
N718	WH	VOLTS ADJUST COMMON
N719	WH	VOLTS ADJUST RAISE
N720	WH	VOLTS ADJUST LOWER
N752	WH	ALARM OUTPUT DRIVER
P733	WH	ANALOG INPUT 1 (+)
P734	WH	ANALOG INPUT 1 (-)
X709	WH	CKT BRKR AUX CONTACT (COMMON)
X710	WH	CKT BRKR AUX CONTACT (NO)
X711	WH	CKT BRKR AUX CONTACT (NC)
879	WH	REMOTE START
892	GN	CAT DATA LINK (-)
893	YL	CAT DATA LINK (+)
P853	WH	BRKR SHUNT TRIP
P854	WH	BRKR SHUNT TRIP
X860	WH	STARTER MAGNETIC SWITCH CB
X861	WH	STARTER MAGNETIC SWITCH PS1
X863	WH	STARTER MAGNETIC COIL (+)
J904	WH	FAULT SHUTDOWN DRIVER
J905	WH	DRIVER SUPPLY (50)
R951	RD	MODBUS (+)
R952	BK	MODBUS (-)
R953	GY	MODBUS REF
R956	WH	RLY3 SPARE
R957	WH	RLY4 SPARE
R958	WH	RLY5 SPARE (COM SD)
R959	WH	RLY6 SPARE (GRR SW)
Y983	WH	DI-01 (LOW COOLANT)
Y984	WH	DI-02 (FUEL LEAK)
Y985	WH	DI-03 SPARE
Y986	WH	DI-04 SPARE
Y987	WH	DI-05 SPARE (BTRY CHGR FAIL)
Y988	WH	DI-06 SPARE (GND FAULT)

HARNESS DESCRIPTION TABLE		
IDENT	PART NUMBER	DESCRIPTION
AH	399-9190	ALTERNATOR SPACE HEATER HARNESS
AN	399-9192	RS485 ANNUNCIATOR HARNESS
AX	399-9196	CB AUX CONTACTS HARNESS
EM	399-9211	EM-10 JUMPER HARNESS
EN	390-1198	ENGINE INTERFACE HARNESS
EN	449-0626	ENGINE HARNESS (C9 ENGINE)
ER	399-9218	BATTERY CHARGER HARNESS
ET	390-1219	ENCLOSURE E-STOP HARNESS
EV	399-9212	EM-10 PWM HARNESS
FF	399-9201	SHUNT TRIP CONTROL HARNESS
FL	399-9200	FUEL TANK OPTIONS HARNESS
FT	399-9202	SHUNT TRIP HARNESS
GR	399-9204	GEN ALARM RELAYS HARNESS
JP	390-1201	JACKET WATER HEATER CORD
JW	399-9208	JACKET WATER HEATER HARNESS
PG	443-0637	IVR WITH PMG HARNESS
PL	390-1192	EMCP 4.2 INTERFACE HARNESS
RA	N/A	REMOTE ANNUNCIATOR REPRESENTATION
RC	399-9210	SHORE POWER CONTROL HARNESS
RF	399-9197	R-FRAME CB HARNESS
VA	399-9216	AC SENSING HARNESS
R	453-9691	OPTIONAL DID MODULE
DS	443-7021	OPTIONAL DEVICE SERVER
GF	390-1197	OPTIONAL GROUND FAULT INDICATION
YH	453-9692	HARNESS AS.
DC	N/A	OPTIONAL DEVICE SERVER

SYMBOL	DESCRIPTION
●	BLADE, SPADE, RING, OR SCREW TERMINAL
⊸	CIRCUIT CONNECTED
+	CIRCUIT NOT CONNECTED
⏚	EARTH GROUND
→·→	CONNECTOR
—	ATCH WIRE, CABLE & COMPONENT
CBL-XXX	MULTI-CONDUCTOR CABLE
⊸	NORMALLY CLOSED CIRCUIT
⊸	NORMALLY OPEN CIRCUIT

ABBREV	COLOR
RD	RED
WH	WHITE
OR	ORANGE
YL	YELLOW
CL	CLEAR
BK	BLACK
GY	GRAY
CU	COPPER
BR	BROWN
GN	GREEN
BU	BLUE
GN_YL	GREEN/YELLOW
VI	VIOLET
BK_WH	BLACK/WHITE

NOTE A: REMOVE AND DISCARD THIS JUMPER WHEN INSTALLING REMOTE E-STOP OPTION. REPLACE WITH REMOTE E-STOP WIRES.

NOTE B: RELOCATE TERMINATING RESISTOR FROM TERMINAL STRIP TO FURTHEST REMOTE ANNUNCIATOR OR REMOTE I/O MODULE TO EXTEND ACCESSORY DATA LINK TO ADD REMOTE ANNUNCIATOR(S) AND REMOTE I/O MODULES.

NOTE C: REMOVE AND DISCARD THIS JUMPER WHEN INSTALLING ENCLOSURE E-STOP. REPLACE WITH ENCLOSURE E-STOP WIRES.

NOTE D: TERMINAL BLOCK RAIL IS FUW 250A TO 800A CIRCUIT BREAKERS AND IS LOCATED EXTERNAL TO THE CIRCUIT BREAKER. 1200A CIRCUIT BREAKER HAS TERMINALS LOCATED ON THE CIRCUIT BREAKER. SECOND BREAKER (250A-800A) USES THE SECOND SET OF AUX AND SHUNT HARNESS.

NOTE E: USE PIN 24 WITH SECOND CIRCUIT BREAKER

CROSS REF, SHEET INDEX & NOTES

METRIC 390-1189

INDEX TABLE	
SHEET INDEX	DESCRIPTION
1	CROSS REF, SHEET INDEX & NOTES
2	COMPONENT LAYOUT
3	CUSTOMER CONNECTION
4	AC - WIRING
5	INPUT/OUTPUT - WIRING
6	ENGINE INTERFACE - WIRING
7	COMMUNICATION - WIRING
8	DC/CIRCUIT BREAKERS OPTIONAL - WIRING
9	AC/SHORE POWER OPTIONAL - WIRING
10	OPTIONS-DID MODULE AND GROUND FAULT
11	OPTIONAL DEVICE SERVER

WIRE NAME DEFINITION:

XXXX-XX# XX-XX-UL

- WIRE GAUGE
- WIRE COLOR
- WIRE NUMBER
- HARNESS IDENT
- CIRCUIT IDENT

MATL		
MTG		
	1E2722F	DRAWING
	1E0198W	LETTERS
	1E0013Y	CONFIDENTIALITY
	1E0012A	INTERPRETATION
NOTE	1E0011	INTPR & TOL
	Caterpillar: Confidential Yellow	
	PROD. X OTHER	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm. DIMENSIONS W/O TOL ARE BASIC

VERSION TYPE: PRIMARY X, SECONDARY

THIRD ANGLE PROJECTION

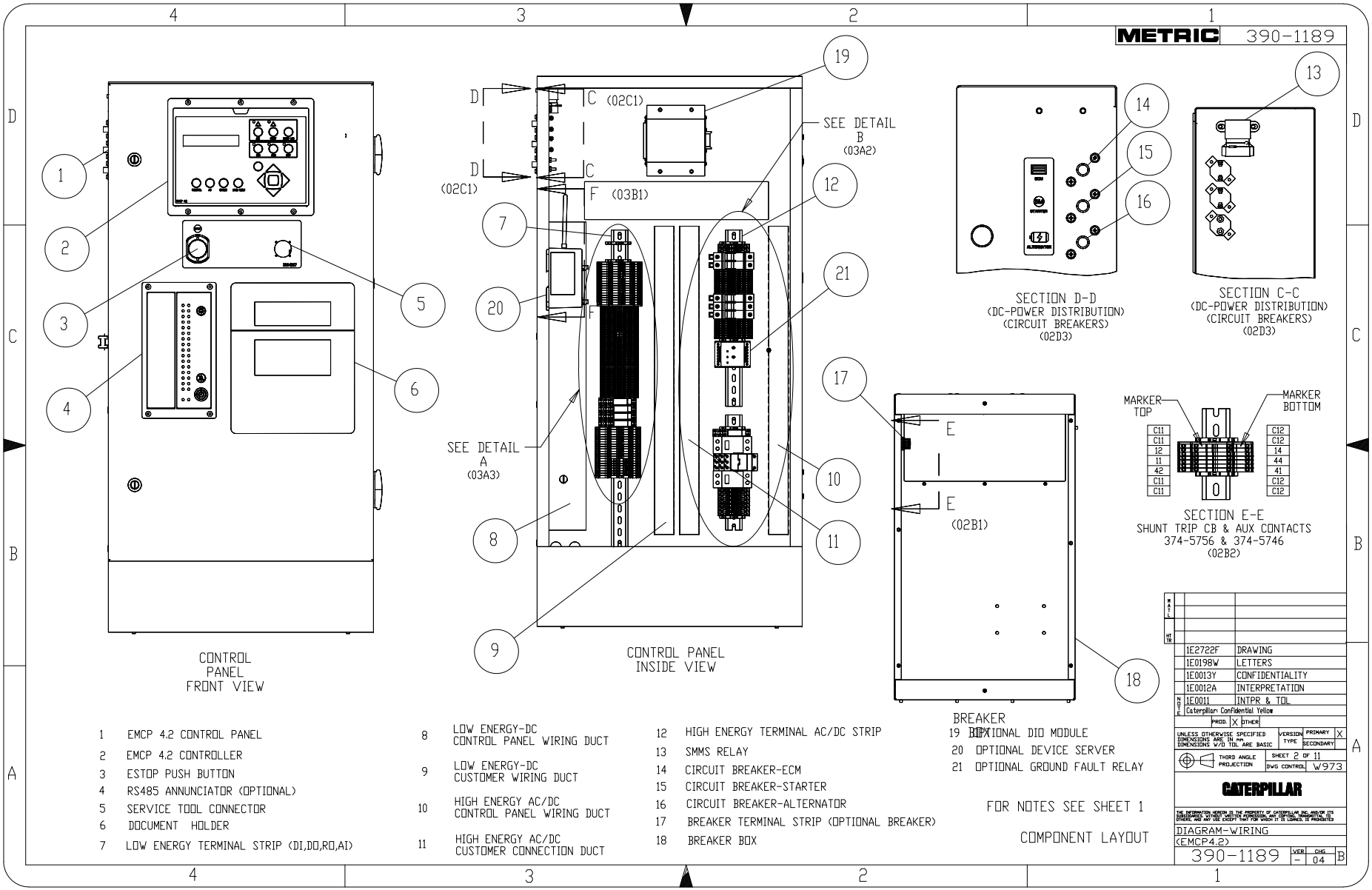
SHEET 1 OF 11

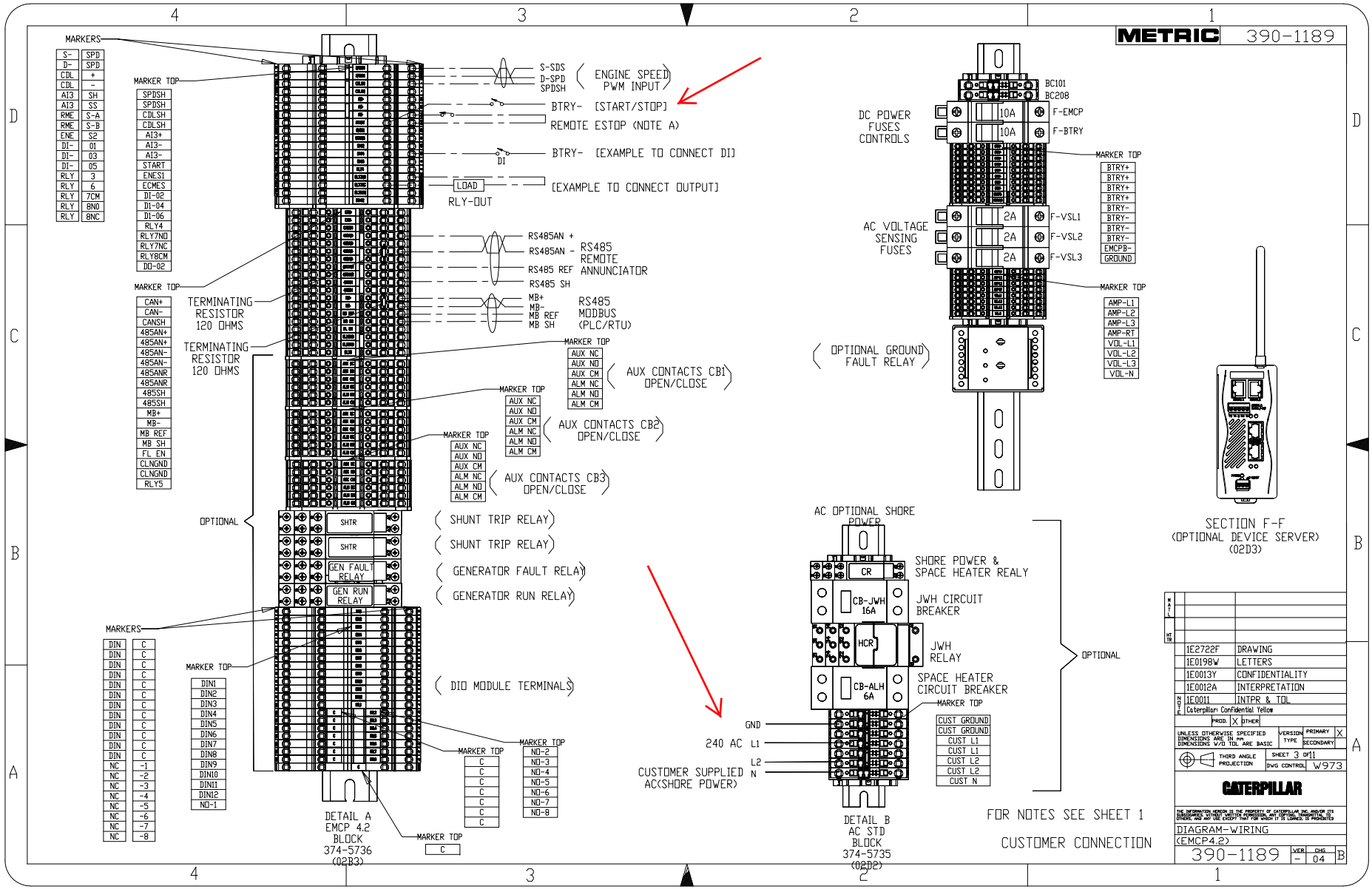
DWG CONTROL W973

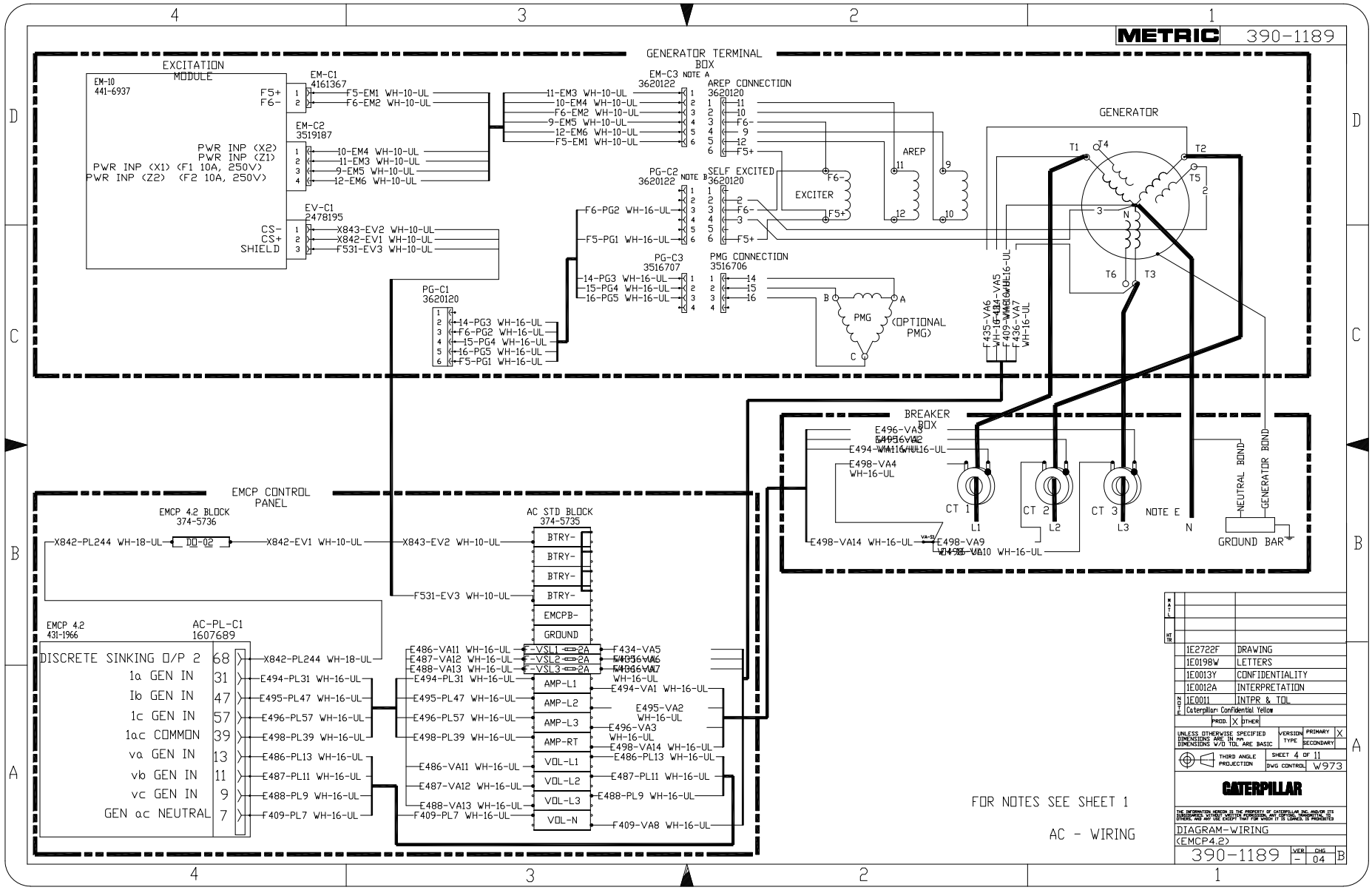
CATERPILLAR

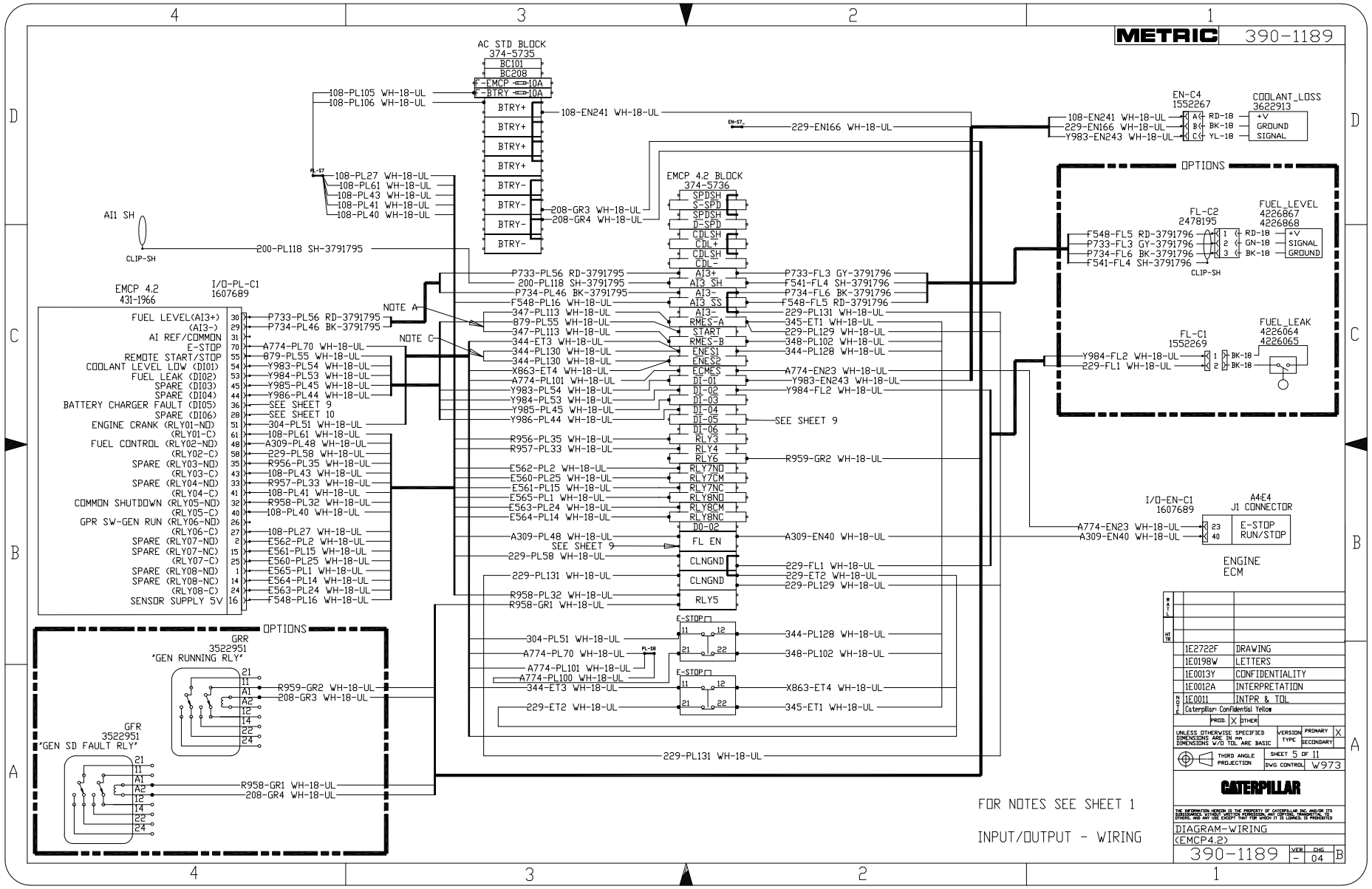
DIAGRAM-WIRING (EMCP4.2)

390-1189 VER - CHG 04 B


METRIC
390-1189
CONTROL PANEL FRONT VIEW
CONTROL PANEL INSIDE VIEW
SECTION D-D
(DC-POWER DISTRIBUTION)
(CIRCUIT BREAKERS)
(02D3)
SECTION C-C
(DC-POWER DISTRIBUTION)
(CIRCUIT BREAKERS)
(02D3)
SECTION E-E
SHUNT TRIP CB & AUX CONTACTS
374-5756 & 374-5746
(02B2)
MARKER TOP
MARKER BOTTOM
SEE DETAIL A (03A3)
SEE DETAIL B (03A2)
(02C1)
(03B1)
(02B1)
BREAKER
1 EMCP 4.2 CONTROL PANEL
2 EMCP 4.2 CONTROLLER
3 ESTOP PUSH BUTTON
4 RS485 ANNUNCIATOR (OPTIONAL)
5 SERVICE TOOL CONNECTOR
6 DOCUMENT HOLDER
7 LOW ENERGY TERMINAL STRIP (DI,DO,RO,AI)
8 LOW ENERGY-DC CONTROL PANEL WIRING DUCT
9 LOW ENERGY-DC CUSTOMER WIRING DUCT
10 HIGH ENERGY AC/DC CONTROL PANEL WIRING DUCT
11 HIGH ENERGY AC/DC CUSTOMER CONNECTION DUCT
12 HIGH ENERGY TERMINAL AC/DC STRIP
13 SMMS RELAY
14 CIRCUIT BREAKER-ECM
15 CIRCUIT BREAKER-STARTER
16 CIRCUIT BREAKER-ALTERNATOR
17 BREAKER TERMINAL STRIP (OPTIONAL BREAKER)
18 BREAKER BOX
19 OPTIONAL DIO MODULE
20 OPTIONAL DEVICE SERVER
21 OPTIONAL GROUND FAULT RELAY
FOR NOTES SEE SHEET 1
COMPONENT LAYOUT
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar: Confidential Yellow
PROD. X OTHER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm DIMENSIONS W/O TOL ARE BASIC
VERSION TYPE PRIMARY X SECONDARY
THIRD ANGLE PROJECTION
SHEET 2 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING (EMCP4.2)
390-1189 VER - CHG 04 B


METRIC 390-1189
MARKERS
MARKER TOP
S-SDS
D-SPD
SPDSH
ENGINE SPEED PWM INPUT
BTRY- [START/STOP]
REMOTE ESTOP (NOTE A)
BTRY- [EXAMPLE TO CONNECT DI]
DI
LOAD
[EXAMPLE TO CONNECT OUTPUT]
RLY-OUT
RS485AN +
RS485AN -
RS485 REF
RS485 SH
RS485 REMOTE ANNUNCIATOR
MB+
MB-
MB REF
MB SH
RS485 MODBUS (PLC/RTU)
TERMINATING RESISTOR 120 OHMS
TERMINATING RESISTOR 120 OHMS
AUX CONTACTS CB1 OPEN/CLOSE
AUX CONTACTS CB2 OPEN/CLOSE
AUX CONTACTS CB3 OPEN/CLOSE
OPTIONAL
SHTR
SHTR
GEN FAULT RELAY
GEN RUN RELAY
SHUNT TRIP RELAY
SHUNT TRIP RELAY
GENERATOR FAULT RELAY
GENERATOR RUN RELAY
DIO MODULE TERMINALS
DETAIL A EMCP 4.2 BLOCK 374-5736 (02B3)
DC POWER FUSES CONTROLS
BC101
BC208
10A F-EMCP
10A F-BTRY
AC VOLTAGE SENSING FUSES
2A F-VSL1
2A F-VSL2
2A F-VSL3
OPTIONAL GROUND FAULT RELAY
AC OPTIONAL SHORE POWER
SHORE POWER & SPACE HEATER REALY
CB-JWH 16A
JWH CIRCUIT BREAKER
HCR
JWH RELAY
CB-ALH 6A
SPACE HEATER CIRCUIT BREAKER
GND
240 AC L1
L2
N
CUSTOMER SUPPLIED AC(SHORE POWER)
DETAIL B AC STD BLOCK 374-5735 (02D2)
OPTIONAL
SECTION F-F (OPTIONAL DEVICE SERVER) (02D3)
FOR NOTES SEE SHEET 1
CUSTOMER CONNECTION
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar: Confidential Yellow
PROD. X OTHER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm. DIMENSIONS W/O TOL ARE BASIC
VERSION TYPE PRIMARY X SECONDARY
THIRD ANGLE PROJECTION
SHEET 3 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING (EMCP4.2)
390-1189 VER - CHG 04 B


METRIC
390-1189
GENERATOR TERMINAL BOX
EXCITATION MODULE
EM-10
441-6937
F5+
F6-
PWR INP (X2)
PWR INP (Z1)
PWR INP (X1) (F1 10A, 250V)
PWR INP (Z2) (F2 10A, 250V)
CS-
CS+
SHIELD
EM-C1
4161367
EM-C2
3519187
EV-C1
2478195
EM-C3 NOTE A
3620122
AREP CONNECTION
3620120
PG-C2 NOTE B
3620122
SELF EXCITED
3620120
EXCITER
AREP
PG-C3
3516707
PMG CONNECTION
3516706
PG-C1
3620120
PMG
(OPTIONAL PMG)
GENERATOR
BREAKER BOX
CT 1
CT 2
CT 3
NOTE E
L1
L2
L3
N
NEUTRAL BOND
GENERATOR BOND
GROUND BAR
EMCP CONTROL PANEL
EMCP 4.2 BLOCK
374-5736
DD-02
AC STD BLOCK
374-5735
BTRY-
EMCPB-
GROUND
EMCP 4.2
431-1966
AC-PL-C1
1607689
DISCRETE SINKING O/P 2
1a GEN IN
Ib GEN IN
1c GEN IN
1ac COMMON
va GEN IN
vb GEN IN
vc GEN IN
GEN ac NEUTRAL
AMP-L1
AMP-L2
AMP-L3
AMP-RT
VOL-L1
VOL-L2
VOL-L3
VOL-N
FOR NOTES SEE SHEET 1
AC - WIRING
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar: Confidential Yellow
PROD. X OTHER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm. DIMENSIONS W/O TOL ARE BASIC
VERSION PRIMARY X
TYPE SECONDARY
THIRD ANGLE PROJECTION
SHEET 4 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING
(EMCP4.2)
390-1189
VER -
CHG 04
B


METRIC
390-1189
AC STD BLOCK
374-5735
BC101
BC208
EMCP 10A
BTRY 10A
BTRY+
BTRY-
108-PL105 WH-18-UL
108-PL106 WH-18-UL
108-EN241 WH-18-UL
229-EN166 WH-18-UL
EN-C4
1552267
COOLANT_LOSS
3622913
108-EN241 WH-18-UL
229-EN166 WH-18-UL
Y983-EN243 WH-18-UL
RD-18
BK-18
YL-18
+V
GROUND
SIGNAL
OPTIONS
FUEL_LEVEL
4226867
4226868
FL-C2
2478195
F548-FL5 RD-3791796
P733-FL3 GY-3791796
P734-FL6 BK-3791796
F541-FL4 SH-3791796
GN-18
SIGNAL
GROUND
CLIP-SH
FUEL_LEAK
4226064
4226065
FL-C1
1552269
Y984-FL2 WH-18-UL
229-FL1 WH-18-UL
108-PL27 WH-18-UL
108-PL61 WH-18-UL
108-PL43 WH-18-UL
108-PL41 WH-18-UL
108-PL40 WH-18-UL
208-GR3 WH-18-UL
208-GR4 WH-18-UL
AI1 SH
CLIP-SH
200-PL118 SH-3791795
EMCP 4.2 BLOCK
374-5736
SPDSH
S-SPD
D-SPD
CDLSH
CDL+
CDL-
AI3+
AI3_SH
AI3-
AI3_SS
RMES-A
START
RMES-B
ENES1
ENES2
ECMES
DI-01
DI-02
DI-03
DI-04
DI-05
DI-06
RLY3
RLY4
RLY6
RLY7NO
RLY7CM
RLY7NC
RLY8NO
RLY8CM
RLY8NC
DO-02
FL EN
CLNGND
CLNGND
RLY5
EMCP 4.2
431-1966
I/O-PL-C1
1607689
FUEL LEVEL(AI3+)
(AI3-)
AI REF/COMMON
E-STOP
REMOTE START/STOP
COOLANT LEVEL LOW (DI01)
FUEL LEAK (DI02)
SPARE (DI03)
SPARE (DI04)
BATTERY CHARGER FAULT (DI05)
SPARE (DI06)
ENGINE CRANK (RLY01-NO)
(RLY01-C)
FUEL CONTROL (RLY02-NO)
(RLY02-C)
SPARE (RLY03-NO)
(RLY03-C)
SPARE (RLY04-NO)
(RLY04-C)
COMMON SHUTDOWN (RLY05-NO)
(RLY05-C)
GPR SW-GEN RUN (RLY06-NO)
(RLY06-C)
SPARE (RLY07-NO)
SPARE (RLY07-NC)
(RLY07-C)
SPARE (RLY08-NO)
SPARE (RLY08-NC)
(RLY08-C)
SENSOR SUPPLY 5V
P733-PL56 RD-3791795
P734-PL46 BK-3791795
A774-PL70 WH-18-UL
879-PL55 WH-18-UL
Y983-PL54 WH-18-UL
Y984-PL53 WH-18-UL
Y985-PL45 WH-18-UL
Y986-PL44 WH-18-UL
SEE SHEET 9
SEE SHEET 10
304-PL51 WH-18-UL
108-PL61 WH-18-UL
A309-PL48 WH-18-UL
229-PL58 WH-18-UL
R956-PL35 WH-18-UL
108-PL43 WH-18-UL
R957-PL33 WH-18-UL
108-PL41 WH-18-UL
R958-PL32 WH-18-UL
108-PL40 WH-18-UL
108-PL27 WH-18-UL
E562-PL2 WH-18-UL
E561-PL15 WH-18-UL
E560-PL25 WH-18-UL
E565-PL1 WH-18-UL
E564-PL14 WH-18-UL
E563-PL24 WH-18-UL
F548-PL16 WH-18-UL
NOTE A
NOTE C
P733-PL56 RD-3791795
200-PL118 SH-3791795
P734-PL46 BK-3791795
F548-PL16 WH-18-UL
347-PL113 WH-18-UL
879-PL55 WH-18-UL
347-PL113 WH-18-UL
344-ET3 WH-18-UL
344-PL130 WH-18-UL
344-PL130 WH-18-UL
X863-ET4 WH-18-UL
A774-PL101 WH-18-UL
Y983-PL54 WH-18-UL
Y984-PL53 WH-18-UL
Y985-PL45 WH-18-UL
Y986-PL44 WH-18-UL
R956-PL35 WH-18-UL
R957-PL33 WH-18-UL
E562-PL2 WH-18-UL
E560-PL25 WH-18-UL
E561-PL15 WH-18-UL
E565-PL1 WH-18-UL
E563-PL24 WH-18-UL
E564-PL14 WH-18-UL
A309-PL48 WH-18-UL
SEE SHEET 9
229-PL58 WH-18-UL
229-PL131 WH-18-UL
R958-PL32 WH-18-UL
R958-GR1 WH-18-UL
304-PL51 WH-18-UL
A774-PL70 WH-18-UL
A774-PL101 WH-18-UL
A774-PL100 WH-18-UL
344-ET3 WH-18-UL
229-ET2 WH-18-UL
P733-FL3 GY-3791796
F541-FL4 SH-3791796
P734-FL6 BK-3791796
F548-FL5 RD-3791796
229-PL131 WH-18-UL
345-ET1 WH-18-UL
229-PL129 WH-18-UL
348-PL102 WH-18-UL
344-PL128 WH-18-UL
A774-EN23 WH-18-UL
Y983-EN243 WH-18-UL
Y984-FL2 WH-18-UL
SEE SHEET 9
R959-GR2 WH-18-UL
A309-EN40 WH-18-UL
229-FL1 WH-18-UL
229-ET2 WH-18-UL
229-PL129 WH-18-UL
344-PL128 WH-18-UL
348-PL102 WH-18-UL
X863-ET4 WH-18-UL
345-ET1 WH-18-UL
229-PL131 WH-18-UL
E-STOP
I/O-EN-C1
1607689
A4:E4
J1 CONNECTOR
A774-EN23 WH-18-UL
A309-EN40 WH-18-UL
E-STOP
RUN/STOP
ENGINE
ECM
OPTIONS
GRR
3522951
"GEN RUNNING RLY"
GFR
3522951
"GEN SD FAULT RLY"
R959-GR2 WH-18-UL
208-GR3 WH-18-UL
R958-GR1 WH-18-UL
208-GR4 WH-18-UL
FOR NOTES SEE SHEET 1
INPUT/OUTPUT - WIRING
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
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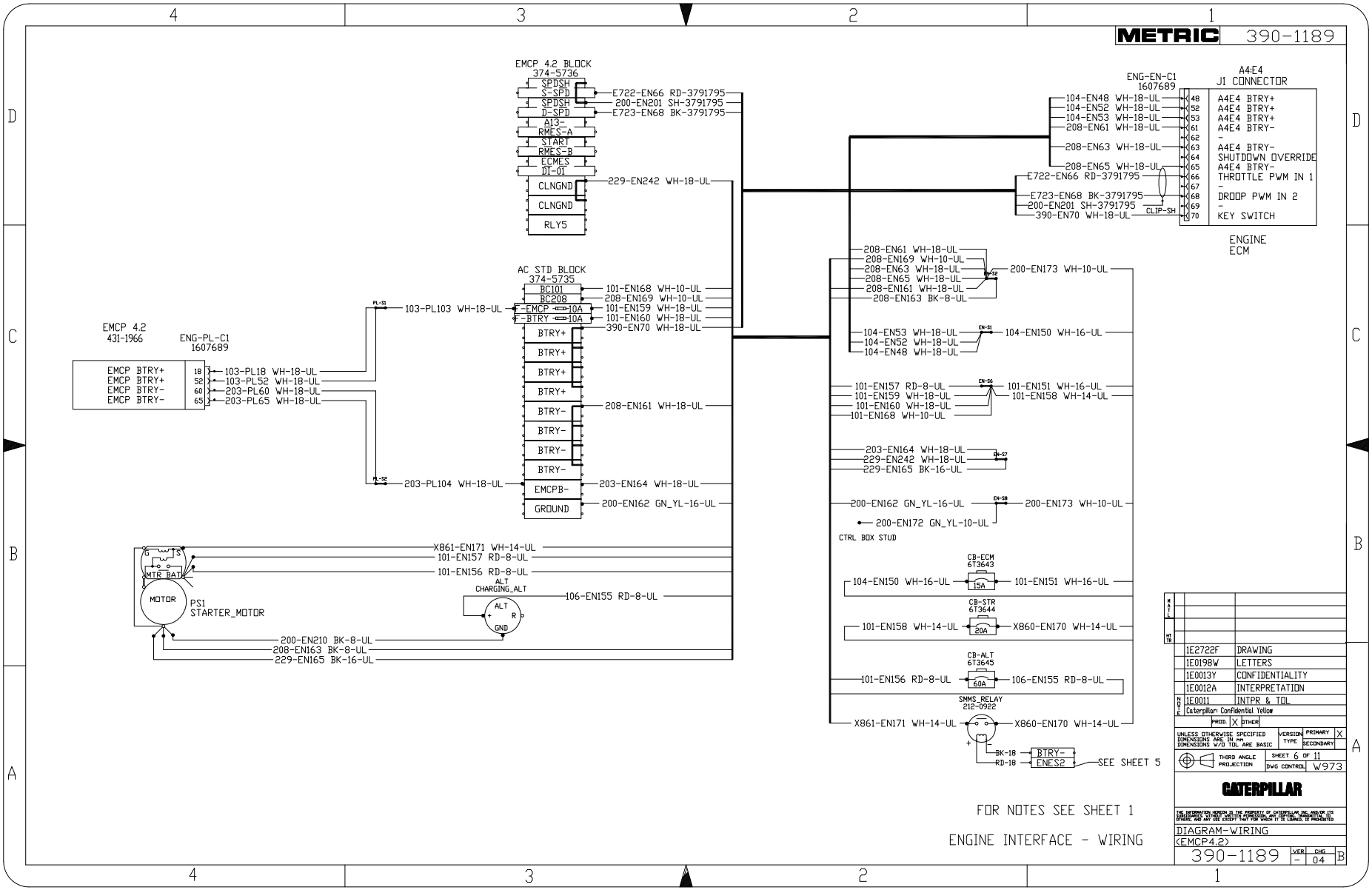
TYPE SECONDARY
THIRD ANGLE PROJECTION
SHEET 5 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING
(EMCP4.2)
390-1189
VER -
CHG 04
B


METRIC 390-1189
EMCP 4.2 BLOCK
374-5736
SPDSH
S-SPD
SPDSH
D-SPD
A13-
RMES-A
START
RMES-B
ECMES
DI-01
CLNGND
CLNGND
RLY5
E722-EN66 RD-3791795
200-EN201 SH-3791795
E723-EN68 BK-3791795
229-EN242 WH-18-UL
ENG-EN-C1
1607689
A4:E4
J1 CONNECTOR
104-EN48 WH-18-UL
104-EN52 WH-18-UL
104-EN53 WH-18-UL
208-EN61 WH-18-UL
208-EN63 WH-18-UL
208-EN65 WH-18-UL
E722-EN66 RD-3791795
E723-EN68 BK-3791795
200-EN201 SH-3791795
390-EN70 WH-18-UL
CLIP-SH
A4E4 BTRY+
A4E4 BTRY+
A4E4 BTRY+
A4E4 BTRY-
A4E4 BTRY-
SHUTDOWN OVERRIDE
A4E4 BTRY-
THROTTLE PWM IN 1
DROOP PWM IN 2
KEY SWITCH
ENGINE
ECM
AC STD BLOCK
374-5735
BC101
BC208
F-EMCP 10A
F-BTRY 10A
BTRY+
BTRY+
BTRY+
BTRY+
BTRY-
BTRY-
BTRY-
BTRY-
EMCPB-
GROUND
101-EN168 WH-10-UL
208-EN169 WH-10-UL
101-EN159 WH-18-UL
101-EN160 WH-18-UL
390-EN70 WH-18-UL
208-EN161 WH-18-UL
203-EN164 WH-18-UL
200-EN162 GN_YL-16-UL
EMCP 4.2
431-1966
ENG-PL-C1
1607689
EMCP BTRY+ 18
EMCP BTRY+ 52
EMCP BTRY- 60
EMCP BTRY- 65
103-PL18 WH-18-UL
103-PL52 WH-18-UL
203-PL60 WH-18-UL
203-PL65 WH-18-UL
PL-S1
103-PL103 WH-18-UL
PL-S2
203-PL104 WH-18-UL
208-EN61 WH-18-UL
208-EN169 WH-10-UL
208-EN63 WH-18-UL
208-EN65 WH-18-UL
208-EN161 WH-18-UL
208-EN163 BK-8-UL
EN-S1
200-EN173 WH-10-UL
104-EN53 WH-18-UL
104-EN52 WH-18-UL
104-EN48 WH-18-UL
104-EN150 WH-16-UL
EN-S6
101-EN157 RD-8-UL
101-EN159 WH-18-UL
101-EN160 WH-18-UL
101-EN168 WH-10-UL
101-EN151 WH-16-UL
101-EN158 WH-14-UL
EN-S7
203-EN164 WH-18-UL
229-EN242 WH-18-UL
229-EN165 BK-16-UL
EN-S8
200-EN162 GN_YL-16-UL
200-EN172 GN_YL-10-UL
200-EN173 WH-10-UL
CTRL BOX STUD
CB-ECM
6T3643
15A
104-EN150 WH-16-UL
101-EN151 WH-16-UL
CB-STR
6T3644
20A
101-EN158 WH-14-UL
X860-EN170 WH-14-UL
CB-ALT
6T3645
60A
101-EN156 RD-8-UL
106-EN155 RD-8-UL
SMMS_RELAY
212-0922
X861-EN171 WH-14-UL
X860-EN170 WH-14-UL
BK-18
RD-18
BTRY-
ENES2
SEE SHEET 5
X861-EN171 WH-14-UL
101-EN157 RD-8-UL
101-EN156 RD-8-UL
ALT
CHARGING_ALT
106-EN155 RD-8-UL
MTR BAT
MOTOR
PS1
STARTER_MOTOR
200-EN210 BK-8-UL
208-EN163 BK-8-UL
229-EN165 BK-16-UL
FOR NOTES SEE SHEET 1
ENGINE INTERFACE - WIRING
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar Confidential Yellow
PROD. X OTHER
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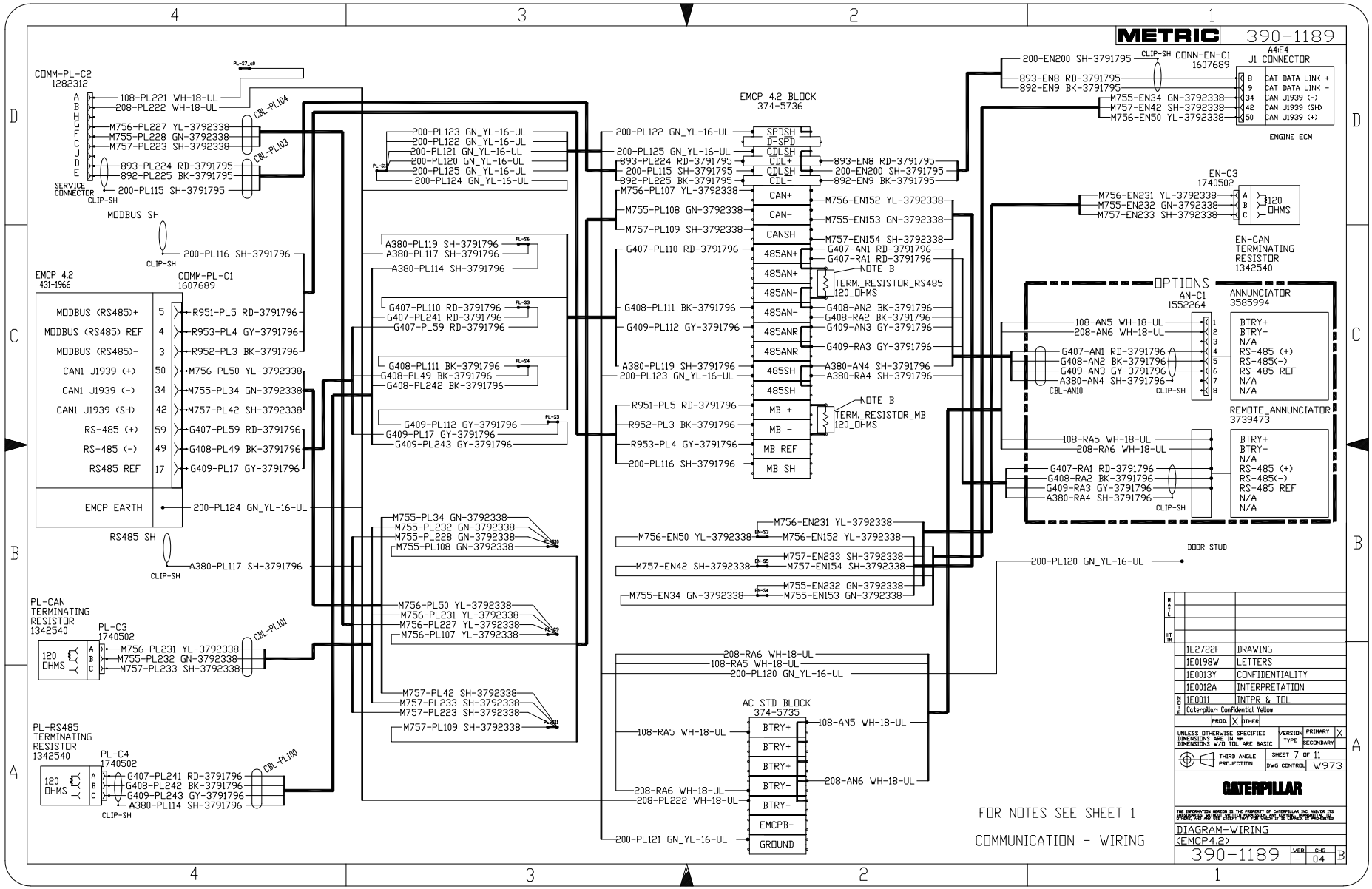
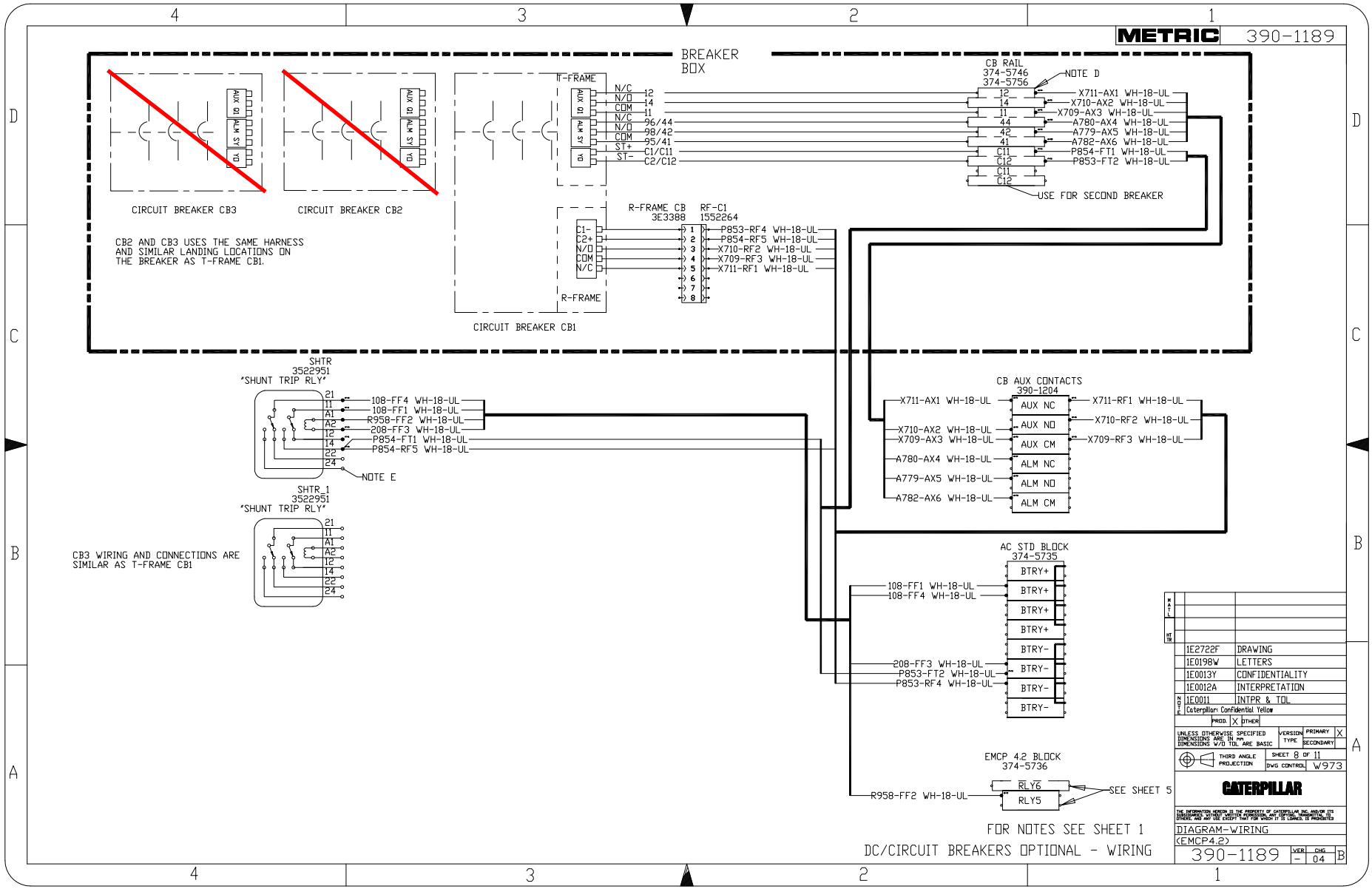
VERSION PRIMARY X
TYPE SECONDARY
THIRD ANGLE PROJECTION
SHEET 6 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING
(EMCP4.2)
390-1189 VER - CHG 04 B


METRIC
390-1189
COMM-PL-C2
1282312
SERVICE CONNECTOR
CLIP-SH
CBL-PL104
CBL-PL103
108-PL221 WH-18-UL
208-PL222 WH-18-UL
M756-PL227 YL-3792338
M755-PL228 GN-3792338
M757-PL223 SH-3792338
893-PL224 RD-3791795
892-PL225 BK-3791795
200-PL115 SH-3791795
MODBUS SH
200-PL116 SH-3791796
EMCP 4.2
431-1966
COMM-PL-C1
1607689
MODBUS (RS485)+ 5 R951-PL5 RD-3791796
MODBUS (RS485) REF 4 R953-PL4 GY-3791796
MODBUS (RS485)- 3 R952-PL3 BK-3791796
CAN1 J1939 (+) 50 M756-PL50 YL-3792338
CAN1 J1939 (-) 34 M755-PL34 GN-3792338
CAN1 J1939 (SH) 42 M757-PL42 SH-3792338
RS-485 (+) 59 G407-PL59 RD-3791796
RS-485 (-) 49 G408-PL49 BK-3791796
RS485 REF 17 G409-PL17 GY-3791796
EMCP EARTH
200-PL124 GN_YL-16-UL
RS485 SH
A380-PL117 SH-3791796
PL-CAN TERMINATING RESISTOR 1342540
PL-C3
1740502
120 OHMS
CBL-PL101
M756-PL231 YL-3792338
M755-PL232 GN-3792338
M757-PL233 SH-3792338
PL-RS485 TERMINATING RESISTOR 1342540
PL-C4
1740502
CBL-PL100
G407-PL241 RD-3791796
G408-PL242 BK-3791796
G409-PL243 GY-3791796
A380-PL114 SH-3791796
200-PL123 GN_YL-16-UL
200-PL122 GN_YL-16-UL
200-PL121 GN_YL-16-UL
200-PL120 GN_YL-16-UL
200-PL125 GN_YL-16-UL
200-PL124 GN_YL-16-UL
A380-PL119 SH-3791796
A380-PL117 SH-3791796
A380-PL114 SH-3791796
G407-PL110 RD-3791796
G407-PL241 RD-3791796
G407-PL59 RD-3791796
G408-PL111 BK-3791796
G408-PL49 BK-3791796
G408-PL242 BK-3791796
G409-PL112 GY-3791796
G409-PL17 GY-3791796
G409-PL243 GY-3791796
M755-PL34 GN-3792338
M755-PL232 GN-3792338
M755-PL228 GN-3792338
M755-PL108 GN-3792338
M756-PL50 YL-3792338
M756-PL231 YL-3792338
M756-PL227 YL-3792338
M756-PL107 YL-3792338
M757-PL42 SH-3792338
M757-PL233 SH-3792338
M757-PL223 SH-3792338
M757-PL109 SH-3792338
EMCP 4.2 BLOCK
374-5736
SPDSH
D-SPD
CDLSH
CDL+
CDLSH
CDL-
CAN+
CAN-
CANSH
485AN+
485AN+
485AN-
485AN-
485ANR
485ANR
485SH
485SH
MB +
MB -
MB REF
MB SH
NOTE B
TERM._RESISTOR_RS485 120_OHMS
NOTE B
TERM._RESISTOR_MB 120_OHMS
893-EN8 RD-3791795
200-EN200 SH-3791795
892-EN9 BK-3791795
M756-EN152 YL-3792338
M755-EN153 GN-3792338
M757-EN154 SH-3792338
G407-AN1 RD-3791796
G407-RA1 RD-3791796
G408-AN2 BK-3791796
G408-RA2 BK-3791796
G409-AN3 GY-3791796
G409-RA3 GY-3791796
A380-AN4 SH-3791796
A380-RA4 SH-3791796
M756-EN231 YL-3792338
M757-EN233 SH-3792338
M755-EN232 GN-3792338
M756-EN50 YL-3792338
M757-EN42 SH-3792338
M755-EN34 GN-3792338
208-RA6 WH-18-UL
108-RA5 WH-18-UL
200-PL120 GN_YL-16-UL
AC STD BLOCK
374-5735
BTRY+
BTRY+
BTRY+
BTRY-
BTRY-
EMCPB-
GROUND
108-AN5 WH-18-UL
208-AN6 WH-18-UL
208-PL222 WH-18-UL
200-PL121 GN_YL-16-UL
200-EN200 SH-3791795
893-EN8 RD-3791795
892-EN9 BK-3791795
M755-EN34 GN-3792338
M757-EN42 SH-3792338
M756-EN50 YL-3792338
CONN-EN-C1
1607689
A4E4
J1 CONNECTOR
8 CAT DATA LINK +
9 CAT DATA LINK -
34 CAN J1939 (-)
42 CAN J1939 (SH)
50 CAN J1939 (+)
ENGINE ECM
EN-C3
1740502
120 OHMS
M756-EN231 YL-3792338
M755-EN232 GN-3792338
M757-EN233 SH-3792338
EN-CAN TERMINATING RESISTOR 1342540
OPTIONS
AN-C1
1552264
ANNUNCIATOR
3585994
108-AN5 WH-18-UL
208-AN6 WH-18-UL
G407-AN1 RD-3791796
G408-AN2 BK-3791796
G409-AN3 GY-3791796
A380-AN4 SH-3791796
CBL-AN10
CLIP-SH
BTRY+
BTRY-
N/A
RS-485 (+)
RS-485(-)
RS-485 REF
N/A
N/A
REMOTE_ANNUNCIATOR
3739473
108-RA5 WH-18-UL
208-RA6 WH-18-UL
G407-RA1 RD-3791796
G408-RA2 BK-3791796
G409-RA3 GY-3791796
A380-RA4 SH-3791796
DOOR STUD
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar Confidential Yellow
PROD. X OTHER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm DIMENSIONS W/O TOL ARE BASIC
VERSION TYPE PRIMARY X SECONDARY
THIRD ANGLE PROJECTION
SHEET 7 OF 11
DWG CONTROL W973
CATERPILLAR
THE INFORMATION HEREIN IS THE PROPERTY OF CATERPILLAR INC. AND/OR ITS SUBSIDIARIES WITHOUT WRITTEN PERMISSION, ANY COPYING, TRANSMITTAL TO OTHERS, AND ANY USE EXCEPT THAT FOR WHICH IT IS LOANED, IS PROHIBITED
DIAGRAM-WIRING
(EMCP4.2)
390-1189 VER - CHG 04 B
FOR NOTES SEE SHEET 1
COMMUNICATION - WIRING


METRIC 390-1189
BREAKER BOX
CIRCUIT BREAKER CB3
CIRCUIT BREAKER CB2
CB2 AND CB3 USES THE SAME HARNESS AND SIMILAR LANDING LOCATIONS ON THE BREAKER AS T-FRAME CB1.
T-FRAME
R-FRAME
CIRCUIT BREAKER CB1
N/C 12
N/O 14
COM 11
N/C 96/44
N/O 98/42
COM 95/41
ST+ C1/C11
ST- C2/C12
R-FRAME CB 3E3388
RF-C1 1552264
C1-
C2+
N/O
COM
N/C
P853-RF4 WH-18-UL
P854-RF5 WH-18-UL
X710-RF2 WH-18-UL
X709-RF3 WH-18-UL
X711-RF1 WH-18-UL
CB RAIL 374-5746 374-5756
NOTE D
X711-AX1 WH-18-UL
X710-AX2 WH-18-UL
X709-AX3 WH-18-UL
A780-AX4 WH-18-UL
A779-AX5 WH-18-UL
A782-AX6 WH-18-UL
P854-FT1 WH-18-UL
P853-FT2 WH-18-UL
USE FOR SECOND BREAKER
SHTR 3522951 "SHUNT TRIP RLY"
108-FF4 WH-18-UL
108-FF1 WH-18-UL
R958-FF2 WH-18-UL
208-FF3 WH-18-UL
P854-FT1 WH-18-UL
P854-RF5 WH-18-UL
NOTE E
SHTR_1 3522951 "SHUNT TRIP RLY"
CB3 WIRING AND CONNECTIONS ARE SIMILAR AS T-FRAME CB1
CB AUX CONTACTS 390-1204
AUX NC
AUX NO
AUX CM
ALM NC
ALM NO
ALM CM
AC STD BLOCK 374-5735
BTRY+
BTRY-
EMCP 4.2 BLOCK 374-5736
RLY6
RLY5
SEE SHEET 5
FOR NOTES SEE SHEET 1
DC/CIRCUIT BREAKERS OPTIONAL - WIRING
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
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SHEET 8 OF 11
DWG CONTROL W973
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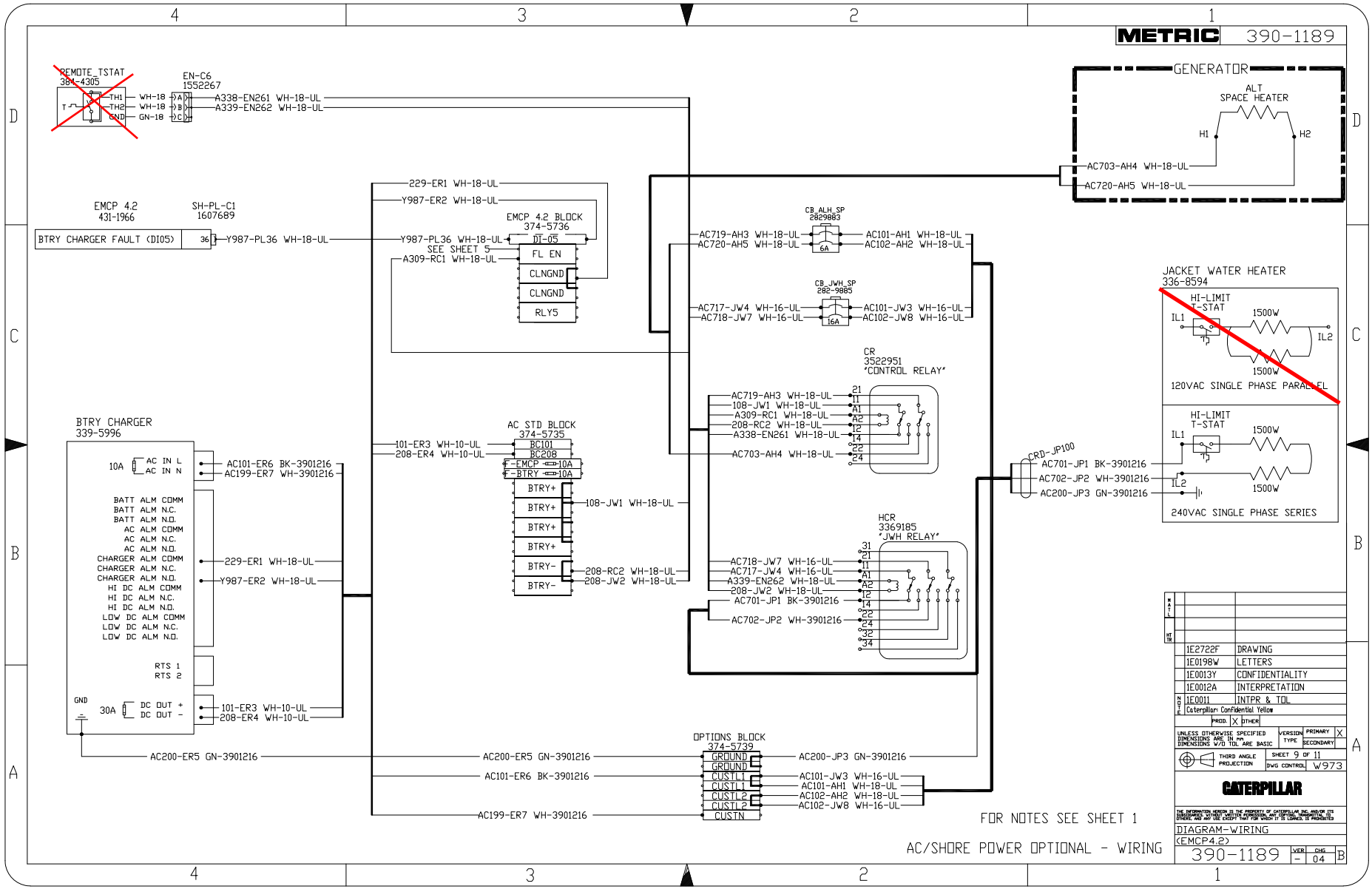
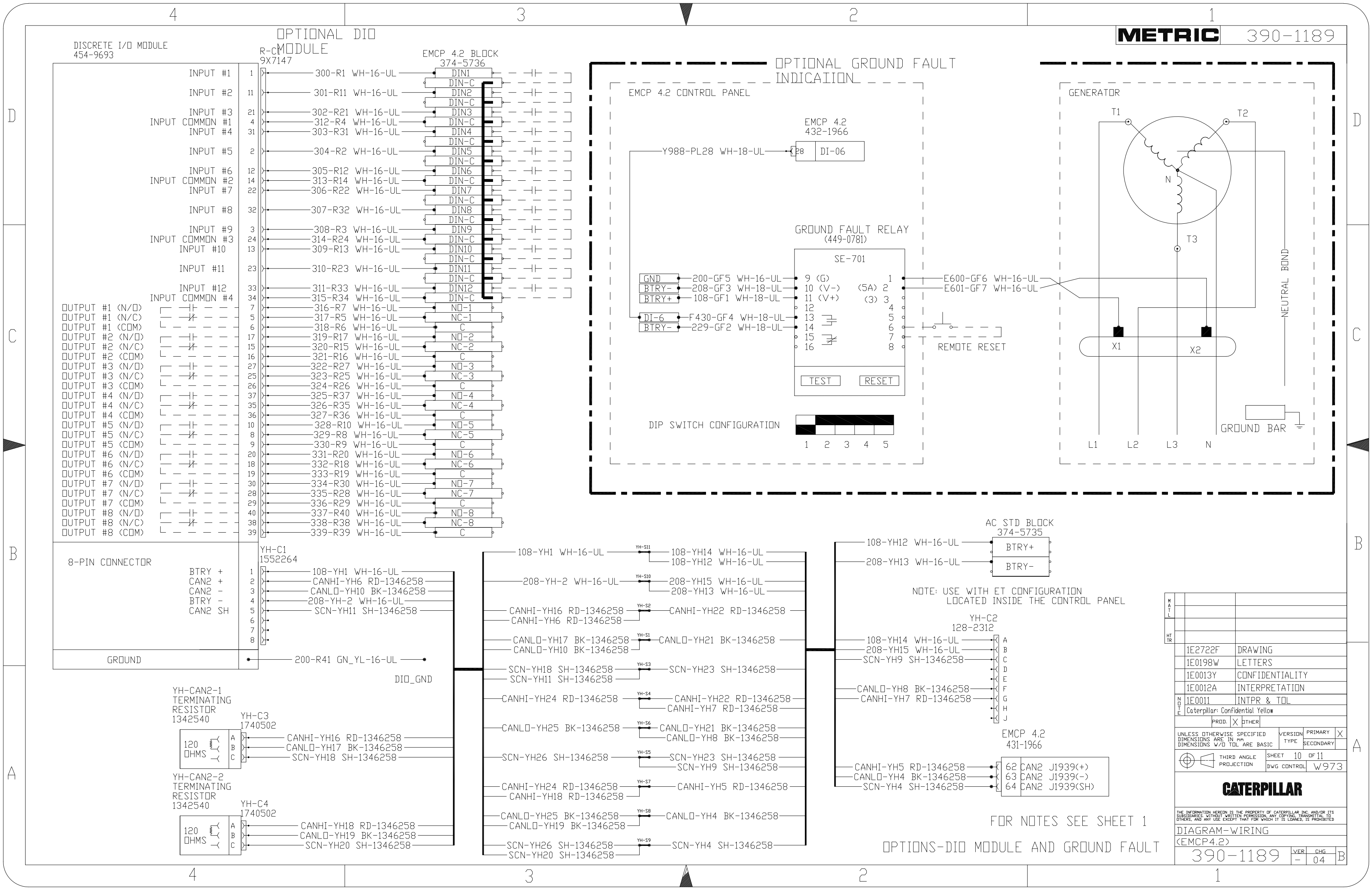

METRIC 390-1189
REMOTE TSTAT
384-4305
EN-C6
1552267
A338-EN261 WH-18-UL
A339-EN262 WH-18-UL
GENERATOR
ALT
SPACE HEATER
H1
H2
AC703-AH4 WH-18-UL
AC720-AH5 WH-18-UL
EMCP 4.2
431-1966
SH-PL-C1
1607689
BTRY CHARGER FAULT (DI05)
Y987-PL36 WH-18-UL
229-ER1 WH-18-UL
Y987-ER2 WH-18-UL
EMCP 4.2 BLOCK
374-5736
DI-05
FL EN
CLNGND
CLNGND
RLY5
SEE SHEET 5
A309-RC1 WH-18-UL
CB_ALH_SP
2829883
6A
AC719-AH3 WH-18-UL
AC720-AH5 WH-18-UL
AC101-AH1 WH-18-UL
AC102-AH2 WH-18-UL
CB_JWH_SP
282-9885
16A
AC717-JW4 WH-16-UL
AC718-JW7 WH-16-UL
AC101-JW3 WH-16-UL
AC102-JW8 WH-16-UL
JACKET WATER HEATER
336-8594
HI-LIMIT
T-STAT
IL1
IL2
1500W
1500W
120VAC SINGLE PHASE PARALLEL
240VAC SINGLE PHASE SERIES
CR
3522951
"CONTROL RELAY"
AC719-AH3 WH-18-UL
108-JW1 WH-18-UL
A309-RC1 WH-18-UL
208-RC2 WH-18-UL
A338-EN261 WH-18-UL
AC703-AH4 WH-18-UL
CRD-JP100
AC701-JP1 BK-3901216
AC702-JP2 WH-3901216
AC200-JP3 GN-3901216
BTRY CHARGER
339-5996
10A
AC IN L
AC IN N
AC101-ER6 BK-3901216
AC199-ER7 WH-3901216
BATT ALM COMM
BATT ALM N.C.
BATT ALM N.O.
AC ALM COMM
AC ALM N.C.
AC ALM N.O.
CHARGER ALM COMM
CHARGER ALM N.C.
CHARGER ALM N.O.
HI DC ALM COMM
HI DC ALM N.C.
HI DC ALM N.O.
LOW DC ALM COMM
LOW DC ALM N.C.
LOW DC ALM N.O.
229-ER1 WH-18-UL
Y987-ER2 WH-18-UL
RTS 1
RTS 2
GND
30A
DC OUT +
DC OUT -
101-ER3 WH-10-UL
208-ER4 WH-10-UL
AC STD BLOCK
374-5735
BC101
BC208
EMCP 10A
BTRY 10A
BTRY+
BTRY+
BTRY+
BTRY+
BTRY-
BTRY-
101-ER3 WH-10-UL
208-ER4 WH-10-UL
108-JW1 WH-18-UL
208-RC2 WH-18-UL
208-JW2 WH-18-UL
HCR
3369185
"JWH RELAY"
AC718-JW7 WH-16-UL
AC717-JW4 WH-16-UL
A339-EN262 WH-18-UL
208-JW2 WH-18-UL
AC701-JP1 BK-3901216
AC702-JP2 WH-3901216
AC200-ER5 GN-3901216
OPTIONS BLOCK
374-5739
GROUND
GROUND
CUSTL1
CUSTL1
CUSTL2
CUSTL2
CUSTN
AC200-ER5 GN-3901216
AC101-ER6 BK-3901216
AC199-ER7 WH-3901216
AC200-JP3 GN-3901216
AC101-JW3 WH-16-UL
AC101-AH1 WH-18-UL
AC102-AH2 WH-18-UL
AC102-JW8 WH-16-UL
FOR NOTES SEE SHEET 1
AC/SHORE POWER OPTIONAL - WIRING
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar: Confidential Yellow
PROD. X OTHER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm DIMENSIONS W/O TOL ARE BASIC
VERSION PRIMARY X
TYPE SECONDARY
THIRD ANGLE PROJECTION
SHEET 9 OF 11
DWG CONTROL W973
CATERPILLAR
DIAGRAM-WIRING
(EMCP4.2)
390-1189
VER -
CHG 04
B


METRIC
390-1189
OPTIONAL DIO MODULE
DISCRETE I/O MODULE
454-9693
R-C
9X7147
EMCP 4.2 BLOCK
374-5736
INPUT #1
INPUT #2
INPUT #3
INPUT COMMON #1
INPUT #4
INPUT #5
INPUT #6
INPUT COMMON #2
INPUT #7
INPUT #8
INPUT #9
INPUT COMMON #3
INPUT #10
INPUT #11
INPUT #12
INPUT COMMON #4
OUTPUT #1 (N/O)
OUTPUT #1 (N/C)
OUTPUT #1 (COM)
OUTPUT #2 (N/O)
OUTPUT #2 (N/C)
OUTPUT #2 (COM)
OUTPUT #3 (N/O)
OUTPUT #3 (N/C)
OUTPUT #3 (COM)
OUTPUT #4 (N/O)
OUTPUT #4 (N/C)
OUTPUT #4 (COM)
OUTPUT #5 (N/O)
OUTPUT #5 (N/C)
OUTPUT #5 (COM)
OUTPUT #6 (N/O)
OUTPUT #6 (N/C)
OUTPUT #6 (COM)
OUTPUT #7 (N/O)
OUTPUT #7 (N/C)
OUTPUT #7 (COM)
OUTPUT #8 (N/O)
OUTPUT #8 (N/C)
OUTPUT #8 (COM)
300-R1 WH-16-UL
301-R11 WH-16-UL
302-R21 WH-16-UL
312-R4 WH-16-UL
303-R31 WH-16-UL
304-R2 WH-16-UL
305-R12 WH-16-UL
313-R14 WH-16-UL
306-R22 WH-16-UL
307-R32 WH-16-UL
308-R3 WH-16-UL
314-R24 WH-16-UL
309-R13 WH-16-UL
310-R23 WH-16-UL
311-R33 WH-16-UL
315-R34 WH-16-UL
316-R7 WH-16-UL
317-R5 WH-16-UL
318-R6 WH-16-UL
319-R17 WH-16-UL
320-R15 WH-16-UL
321-R16 WH-16-UL
322-R27 WH-16-UL
323-R25 WH-16-UL
324-R26 WH-16-UL
325-R37 WH-16-UL
326-R35 WH-16-UL
327-R36 WH-16-UL
328-R10 WH-16-UL
329-R8 WH-16-UL
330-R9 WH-16-UL
331-R20 WH-16-UL
332-R18 WH-16-UL
333-R19 WH-16-UL
334-R30 WH-16-UL
335-R28 WH-16-UL
336-R29 WH-16-UL
337-R40 WH-16-UL
338-R38 WH-16-UL
339-R39 WH-16-UL
DIN1
DIN-C
DIN2
DIN3
DIN4
DIN5
DIN6
DIN7
DIN8
DIN9
DIN10
DIN11
DIN12
NO-1
NC-1
C
NO-2
NC-2
NO-3
NC-3
NO-4
NC-4
NO-5
NC-5
NO-6
NC-6
NO-7
NC-7
NO-8
NC-8
8-PIN CONNECTOR
BTRY +
CAN2 +
CAN2 -
BTRY -
CAN2 SH
GROUND
YH-C1
1552264
108-YH1 WH-16-UL
CANHI-YH6 RD-1346258
CANLO-YH10 BK-1346258
208-YH-2 WH-16-UL
SCN-YH11 SH-1346258
200-R41 GN_YL-16-UL
DIO_GND
YH-CAN2-1
TERMINATING
RESISTOR
1342540
YH-C3
1740502
120 OHMS
CANHI-YH16 RD-1346258
CANLO-YH17 BK-1346258
SCN-YH18 SH-1346258
YH-CAN2-2
TERMINATING
RESISTOR
1342540
YH-C4
1740502
CANHI-YH18 RD-1346258
CANLO-YH19 BK-1346258
SCN-YH20 SH-1346258
108-YH1 WH-16-UL
108-YH14 WH-16-UL
108-YH12 WH-16-UL
208-YH-2 WH-16-UL
208-YH15 WH-16-UL
208-YH13 WH-16-UL
CANHI-YH16 RD-1346258
CANHI-YH6 RD-1346258
CANHI-YH22 RD-1346258
CANLO-YH17 BK-1346258
CANLO-YH10 BK-1346258
CANLO-YH21 BK-1346258
SCN-YH18 SH-1346258
SCN-YH11 SH-1346258
SCN-YH23 SH-1346258
CANHI-YH24 RD-1346258
CANHI-YH22 RD-1346258
CANHI-YH7 RD-1346258
CANLO-YH25 BK-1346258
CANLO-YH21 BK-1346258
CANLO-YH8 BK-1346258
SCN-YH26 SH-1346258
SCN-YH23 SH-1346258
SCN-YH9 SH-1346258
CANHI-YH24 RD-1346258
CANHI-YH18 RD-1346258
CANHI-YH5 RD-1346258
CANLO-YH25 BK-1346258
CANLO-YH19 BK-1346258
CANLO-YH4 BK-1346258
SCN-YH26 SH-1346258
SCN-YH20 SH-1346258
SCN-YH4 SH-1346258
OPTIONAL GROUND FAULT INDICATION
EMCP 4.2 CONTROL PANEL
EMCP 4.2
432-1966
Y988-PL28 WH-18-UL
DI-06
GROUND FAULT RELAY
(449-0781)
SE-701
GND
BTRY-
BTRY+
DI-6
200-GF5 WH-16-UL
208-GF3 WH-18-UL
108-GF1 WH-18-UL
F430-GF4 WH-18-UL
229-GF2 WH-18-UL
9 (G)
10 (V-)
11 (V+)
(5A)
(3)
E600-GF6 WH-16-UL
E601-GF7 WH-16-UL
REMOTE RESET
TEST
RESET
DIP SWITCH CONFIGURATION
GENERATOR
T1
T2
T3
N
X1
X2
NEUTRAL BOND
GROUND BAR
L1
L2
L3
AC STD BLOCK
374-5735
108-YH12 WH-16-UL
208-YH13 WH-16-UL
BTRY+
BTRY-
NOTE: USE WITH ET CONFIGURATION
LOCATED INSIDE THE CONTROL PANEL
YH-C2
128-2312
108-YH14 WH-16-UL
208-YH15 WH-16-UL
SCN-YH9 SH-1346258
CANLO-YH8 BK-1346258
CANHI-YH7 RD-1346258
EMCP 4.2
431-1966
CANHI-YH5 RD-1346258
CANLO-YH4 BK-1346258
SCN-YH4 SH-1346258
62 CAN2 J1939(+)
63 CAN2 J1939(-)
64 CAN2 J1939(SH)
1E2722F DRAWING
1E0198W LETTERS
1E0013Y CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
Caterpillar: Confidential Yellow
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN mm
DIMENSIONS W/O TOL ARE BASIC
THIRD ANGLE PROJECTION
SHEET 10 OF 11
DWG CONTROL W973
CATERPILLAR
FOR NOTES SEE SHEET 1
OPTIONS-DIO MODULE AND GROUND FAULT
DIAGRAM-WIRING
(EMCP4.2)
390-1189
04

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: FCPXL08.8NZS-017

Effective Date: 09/04/2014

Expiration Date: 12/31/2015

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 09/04/2014

Revision Date: N/A

Model Year: 2015
Manufacturer Type: Original Engine Manufacturer
Engine Family: FCPXL08.8NZS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 225<=kW<450
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

November 25, 2015

ASCO Pacific Southwest District Sales Office, 120 S. Chaparral Court, Suite 200 Anaheim, CA 92808 TEL 714-283-4000. FAX (714) 283-4010

Automatic Transfer Switch Bill of Material

MARINA COAST WATER

ATS DESIGNATION	QTY	AMPS/ POLES	BYPASS	TRANSITION	CATALOG NUMBER	OPTIONAL ACC.	ENCL. DRG.	WIRING DRG.	BOM #
-	1	800 / 3	NO	DELAYED	H 7ADTS A3 800 N5XM	18B,18G,31Z, 44G,125A	713200-050	713505-123	TO BE ENGINEERED

Note: Plans and Specifications are not in our possession.

ASCO Power Technologies

MARINA COAST WATER
Amp/Pole: 800 / 3
Delayed Transition
Automatic Transfer Switch

#1	ATS	AMPS : 0800	QTY : 1

Bulletin Number	: 7000 Series Transfer Switches	Catalog Number	: H7ADTSA30800N5XM,18B,18G,31Z,44G,125A
Service Voltage / Hz	: 480V/60Hz	Optional Accessories	: 18B /18G,31Z,44G,125A
By-pass Isolation	: Not Applicable	Product Description	: Automatic Delayed Transition Transfer Switch
No. of Switched Poles : 3		Neutral Configuration	: Solid [A]
Withstand Rating Frame = H, Switch Rating = 0800, Series = 7000	: 50kA 3-Cycle (any breaker rating)	No. of Cables & Lug Size	: 4, #1/0 AWG to 600 MCM
Enclosure	: 3R(M)-UL Type 3R secure double door enclosure (See Disclaimer 3)	Service	: Three Phase, 4-wire

ACCESSORIES DESCRIPTION

#	Accessory Code	Description
1	18B /18G	2pole D/T contacts that operate when emergency and normal source voltage is present at transfer switch terminals
2	31Z	Selective Load disconnect circuit to provide a pre-transfer and/or post transfer signal when transferring from emergency to normal and/or normal to emergency. The signal can be programmed to occur during all transfers or only when the transfer is occurring between two live sources. The length of the pre and post transfer delays can be set to 0-5 minutes 59 seconds.
3	44G	208-240VAC and or 440-480VAC Accessory 44 Strip heater is designed to keep humidity and or temperature within the ATS enclosure at acceptable levels. This accessory consists of a mounting bracket with strip heater, thermostat and terminal block.
4	125A	Seismic 2.5 Certification

DRAWINGS FOR APPROVAL

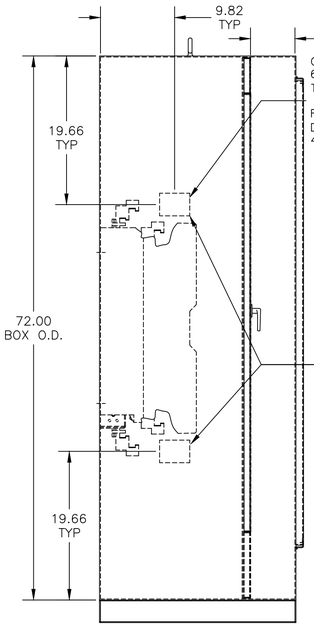
Drawing Number	Description
713200-050	Composite Enclosure Outline and Mounting Diagram
713505-123	Three Phase Wiring Diagram

ASCO UL1008 Withstand and Close On Ratings [1,2] (RMS Symmetrical Amps)

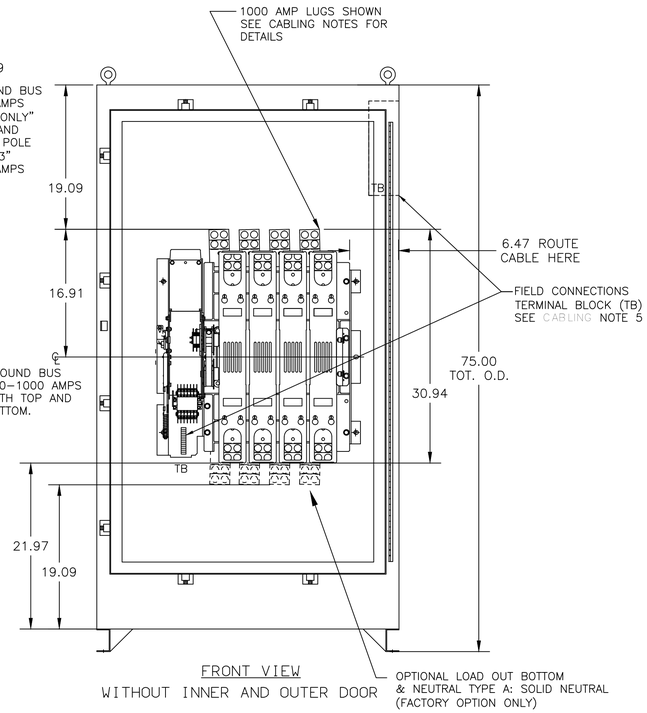
Frame	Switch Rating (Amps)		300, 4000 & 7000 Series											7000 Series							
			Current Limiting Fuses				Specific Breaker			Time Based				Short Time Ratings[3] (sec)							
														480V Max.				600V Max.			
	Transfer Switches	Bypass Switches	480V Max.	600V Max.	Max Size, A	Class	240V Max.	480V Max.	600V Max.	Time (sec)	240V Max.	480V Max.	600V Max.	.1	.13	.3	.5	.1	.13	.3	.5
D	30	-	100kA	-	60	J	22kA	22kA	10kA	0.025	10kA	10kA	10kA	-				-			
D	70, 100	-	35kA	35kA	200	RK1	42kA	22kA	10kA	0.025	10kA	10kA	10kA	-				-			
			200kA	35kA	200	J															
D	150	-	35kA	35kA	200	RK1	65kA	25kA	10kA	0.025	10kA	10kA	10kA	-				-			
			200kA	35kA	200	J															
D	200	-	200kA	-	200	J	65kA	25kA	-	0.025	10kA	10kA	-	-				-			
D	230	-	100kA	-	300	J	65kA	25kA	-	0.025	10kA	10kA	-	-				-			
K[10]	100, 150, 200, 230, 260, 400	-	200kA	-	600	J	50kA	42kA	-	0.025	50kA	42kA	-	-				-			
										0.05	42kA	35kA	-								
E	260, 400	-	200kA	-	600	J	65kA	42kA	35kA	0.05	35kA	35kA	22kA	-				-			
J	150[7], 200[7], 230[7], 260, 400	150[7], 200[7], 230[7], 260, 400	200kA	200kA	600	J	50kA	50kA	42kA	0.05	65kA	42kA[5]	35kA	-				-			
J	600	600	200kA	200kA	800	L	50kA	50kA	42kA	0.05	65kA	42kA[5]	35kA	-				-			
H	600	600	200kA	200kA	800	L	65kA	65kA	65kA	0.05	50kA	50kA	50kA	36kA		-		36kA		-	
P	600	600	200kA	200kA	800	L	65kA	65kA	65kA	0.05	50kA	50kA	50kA	36kA		30kA		36kA		-	
~~P~~	~~800~~	~~800 - 1200~~	~~200kA~~	~~200kA~~	~~1600~~	~~L~~	~~65kA~~	~~65kA~~	~~65kA~~	~~0.05~~	~~50kA~~	~~50kA~~	~~50kA~~	~~36kA~~		~~30kA~~		~~36kA~~		~~-~~	
H	800 - 1200	800 - 1200	200kA	200kA	1600	L	65kA	65kA	65kA	0.05	50kA	50kA	50kA	36kA		-		36kA		-	
~~Q~~	~~600-1600~~	~~600-1600~~	~~200kA~~	~~200kA~~	~~2000~~	~~L~~	~~65kA~~	~~65kA~~	~~65kA~~	~~0.05~~	~~65kA~~	~~65kA~~	~~65kA~~	~~50kA~~				~~50kA~~			
S	800 - 1200	800 - 1200	200kA	200kA	2500	L	100kA	100kA	65kA	0.05	100kA	100kA	65kA	65kA				65kA			
G	1000 - 1200	1000 - 1200	200kA	200kA	2000	L	85kA	85kA	85kA	0.05	85kA	85kA	85kA	-				-			
G	1600 - 2000[4]	-	200kA	200kA	2500	L	85kA[4]	85kA[4]	85kA[4]	0.05	85kA[4]	85kA[4]	85kA[4]	-				-			
G	1600 - 2000	1600 - 2000	200kA	200kA	3000	L	125kA[8]	125kA[8]	100kA	0.05	100kA	100kA	100kA	42kA		-		42kA		-	
S	1600 - 2000	1600 - 2000	200kA	200kA	2500	L	100kA	100kA	85kA	0.05	100kA	100kA	85kA	85kA		65kA		85kA		65kA	
G	2600 - 3000	2600 -3000	200kA	200kA	4000	L	100kA	100kA	100kA	0.05	100kA	100kA	100kA	42kA		-		42kA6		-	
G	3200	-	200kA	-	4000	L	100kA	100kA	-	0.05	100kA	100kA	-	-				-			
G	4000	4000	200kA	200kA	5000	L	100kA	100kA	100kA	0.05	100kA	100kA	100kA	85KA		65kA		65kA			
U	2600 - 4000	2600 - 4000	200kA	200kA	5000	L	125kA[9]	125kA[9]	125kA[9]	0.06	125kA[9]	125kA[9]	125kA[9]	100kA				100kA			

Notes:
1) All WCR values indicated are tested in accordance with the requirements of UL 1008, 7th Edition. See ASCO Pub. 1128 for more WCR information
2) Application requirements may permit higher WCR for certain switch sizes.
3) Short Time ratings are provided for applications involving circuit breakers that utilize trip delay settings for system selective coordination
4) Optional front connected service (Accy 40MY and 40NY) limits WCR on 1600 and 2000A G Frame switches
5) Switches utilizing overlapping neutral (code "C") have 35kA, 0.050 Sec time based rating at 480V Max
6) 3000A ratings are for Transfer Switch configurations only
7) J150, 200, 230 Amp available in 7ACTS, 7ADTS, 7ASLS, & All 7000 Bypass Switches only
8) Rating shown is for Bypass switches only, Transfer Switch rating is 100kA
9) Service Entrance Switches rating is 100kA
10) K Frame is only available on the 300 Series

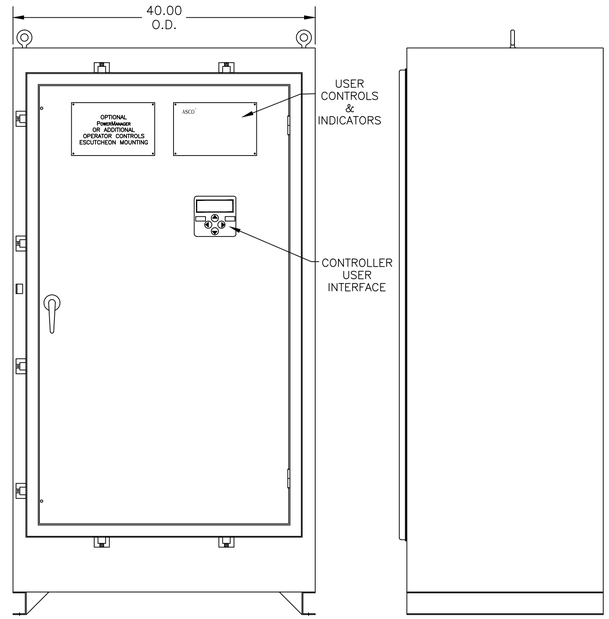
SEISMIC OUTLINE FOR ASCO® 4000 & 7000 SERIES 600-1000 AMPERE "H" FRAME (ATS,ACTS,ADTS) FRONT CONNECTED TRANSFER SWITCHES TYPE 3R, 4, 4X, 12 SECURE ENCLOSURE



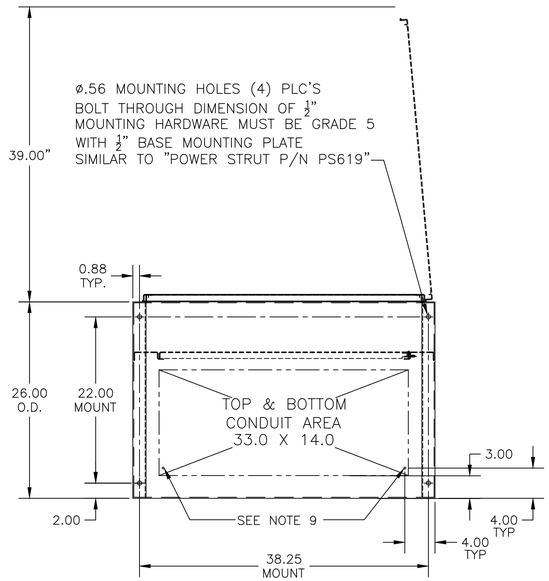
LEFT SIDE



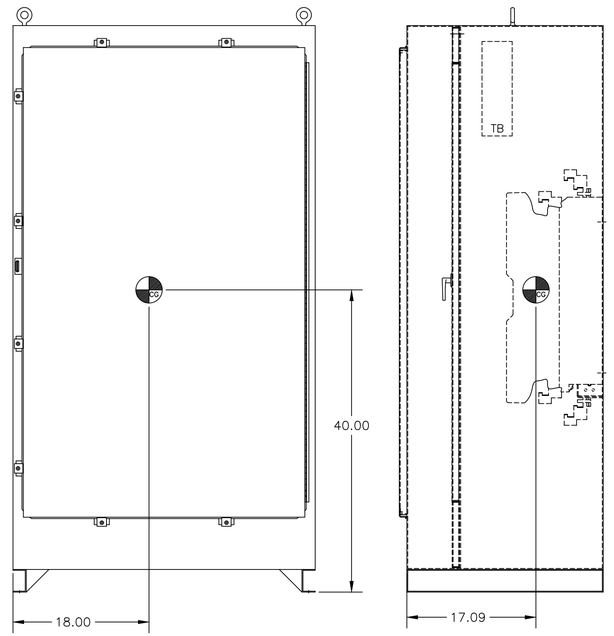
FRONT VIEW
WITHOUT INNER AND OUTER DOOR



FRONT VIEW
WITHOUT OUTER DOOR



BOTTOM VIEW



FRONT VIEW
WITH DOOR

RIGHT SIDE

H7ADTSA30800N5XM 18R 18G 3.17 44G 125A

COMPLIANCE FOR SEISMIC CERTIFICATION FOR NONSTRUCTURAL COMPONENTS

THIS IS TO CERTIFY THAT THE FOLLOWING ASCO POWER TECHNOLOGIES, LP TRANSFER AND INTEGRAL SWITCHGEAR HAS BEEN EITHER SUBJECTED TO TRIAXIAL SHAKE TESTING IN ACCORDANCE WITH 2010 ICC-ES-AC-156 OR BEEN EXTENDED PER SECTION 4.5 OF AC-156.
ACCORDINGLY THE SEISMIC REQUIREMENTS OF 2012 IBC, 2013 CBC, ASCE 7-10 AND OSHPD HAVE BEEN MET. FURTHERMORE THE SUBJECT SWITCHGEAR HAS BEEN PRE-APPROVED AND CARRIES OSHPD APPLICATION NO. OSP-0032-10 WITH AN Sds(g)=2.5, z/h=1.0 WHEN MOUNTED AS INDICATED ON THE SUPPLIED DRAWINGS.

GENERAL NOTES

1. TYPE 3R/4/4X/12 ENCLOSURE. FREE STANDING. FLOOR MOUNTED. CODE GAUGE CONSTRUCTION.
2. DOOR HINGED ON RIGHT SIDE. DOOR CLAMPS AND LOCKABLE HASP ON LEFT SIDE.
3. STANDARD FINISH TYPE 3R/4/12: ANSI 61 GRAY, POLYESTER POWDER STANDARD. TYPE 4X FINISH UNPAINTED BRUSHED STAINLESS STEEL. OTHER ANSI COLORS AVAILABLE CONSULT FACTORY.
4. RECOMMENDED CLEARANCES: FRONT: 40 INCHES
5. A 20% RATED GROUND BUS IS PROVIDED.
6. UNIT IS DESIGNED FOR COMBINATION TOP AND BOTTOM CABLE ENTRY. THE STANDARD SWITCH CONFIGURATION IS FOR TOP LUGS EMERGENCY AND LOAD AND BOTTOM LUGS NORMAL. OPTIONALLY, THE SWITCH MAY BE SUPPLIED WITH REVERSE NORMAL & EMERGENCY LUGS. (REFER TO THE WIRING DIAGRAM FURNISHED WITH EACH TRANSFER SWITCH TO DETERMINE TERMINATION POSITIONS).
7. NEUTRAL CONFIGURATIONS:
   AN OPTIONAL FULL RATED NEUTRAL CONFIGURATION FOR EACH SOURCE AND THE LOAD MAY BE PROVIDED. WHEN EQUIPPED IT IS IN ONE OF THE FOLLOWING FORMATS AS SPECIFIED BY THE CATALOG NUMBER NO. NEUTRAL TYPE:
   (A) SOLID (COPPER BUS) NEUTRAL
   (B) SWTICHED NEUTRAL POLE
   (C) OVERLAPPING NEUTRAL POLE (NOT AVAILABLE ON ACTS/ADTS UNITS)
8. CG CENTER OF GRAVITY.
9. REMOVE BOTTOM KNOCKOUTS FOR TYPE 3R.

SERIES	CATALOG PREFIX
4000	4ATS
	4NTS
	4ACTS
	4NCTS
	4ADTS
	4NDTS
7000	7ATS
	7NTS
	7ACTS
	7NCTS
	7ADTS
	7NDTS

CABLING NOTES

1. ALL SIZES SUPPLIED STANDARD WITH MECHANICAL (SCREW TYPE) LUGS. (SEE AMP SIZE BELOW)
   A. LUG MATERIAL: ALUMINUM ALLOY 6061-T6 WITH ELECTRO TIN PLATED FINISH.
   B. SCREW MATERIAL: ALUMINUM ALLOY 6262-T9 WITH ELECTRO TIN PLATED FINISH.
   C. UL LISTED, CSA CERTIFIED.
   D. LUG SCREW TIGHTENING TORQUE PER UL 486B: 19 FT-LBS.
   E. SUITABLE WIRE BENDING SPACE IS PROVIDED. (SEE AMP SIZE BELOW)
2. OPTIONAL COPPER CRIMP LUGS MAY BE SUPPLIED. (SEE AMP SIZE BELOW)
   A. LUG MATERIAL: HIGH CONDUCTIVITY WROUGHT COPPER FINISH, ELECTRO TIN PLATED.
   B. UL LISTED, CSA CERTIFIED.
   C. LUG MOUNTING HARDWARE TIGHTENING TORQUE: (REFER TO WITHSTAND CURRENT RATING LABEL PROVIDED ON EACH TRANSFER SWITCH).
   D. SUITABLE WIRE BENDING SPACE IS PROVIDED. (SEE AMP SIZE BELOW)
3. CONSULT FACTORY FOR OTHER TERMINATION REQUIREMENTS.
4. GROUND LUGS ARE PROVIDED STANDARD AS FOLLOWS. (SEE AMP SIZE BELOW).
5. CUSTOMER TERMINAL BLOCKS:
   FOR ALL 7000 SERIES AND 4000 SERIES ACTS, ADTS, NCTS, & NDTS UNITS THE TB WILL BE MOUNTED ON THE UPPER RIGHT INSIDE OF ENCLOSURE.
   FOR 4000 SERIES ATS AND NTS UNITS TB WILL BE MOUNTED ON THE TRANSFER SWITCH FRAME AS INDICATED.

NOTES 600 AMP SWITCHES

1. SUPPLIED WITH STANDARD MECHANICAL (SCREW TYPE) LUGS ON THE NORMAL, EMERGENCY & LOAD BUS STABS. ONE (1) LUG PER PHASE AND NEUTRAL EACH SUITABLE FOR CONNECTION OF TWO (2) #2 -600MCM CU/AL CABLE (SEE NOTE "E" BELOW).
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED FOR UP TO TWO (2) 600MCM CABLES PER TERMINAL PER NEC.
2. OPTIONAL COPPER CRIMP LUGS MAY BE SUPPLIED. UP TO TWO (2) TWO HOLE, LONG BARREL CU CRIMP LUGS RATED FOR UP TO 600MCM. (REFER TO CRIMP LUG INSTALLATION DATA PROVIDED WITH UNIT FOR FULL INSTALLATION DETAILS).
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED FOR UP TO TWO (2) 600MCM CABLES PER TERMINAL PER NEC.
3. GROUND LUGS ARE PROVIDED STANDARD AS FOLLOWS;
   (6) 1/0 - 750MCM CU/AL CABLE CONNECTIONS.

NOTES 800-1000 AMP SWITCHES

1. SUPPLIED WITH STANDARD MECHANICAL (SCREW TYPE) LUGS ON THE NORMAL, EMERGENCY & LOAD BUS STABS. ONE (1) LUG PER PHASE AND NEUTRAL EACH SUITABLE FOR CONNECTION OF FOUR (4) 1/0 -750MCM CU/AL CABLE (SEE NOTE "E" BELOW).
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED FOR UP TO FOUR (4) 600MCM CABLES PER TERMINAL PER NEC.
2. OPTIONAL COPPER CRIMP LUGS MAY BE SUPPLIED. UP TO FOUR (4) TWO HOLE, LONG BARREL CU CRIMP LUGS RATED FOR UP TO 600MCM. (REFER TO CRIMP LUG INSTALLATION DATA PROVIDED WITH UNIT FOR FULL INSTALLATION DETAILS).
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED FOR UP TO FOUR (4) 600MCM CABLES PER TERMINAL PER NEC.
3. GROUND LUGS ARE PROVIDED STANDARD AS FOLLOWS;
   (12) 1/0 - 750MCM CU/AL CABLE CONNECTIONS.

NOTES 400A (ADTS"B3" 4 POLE ONLY)

1. GROUND LUGS ARE PROVIDED STANDARD AS FOLLOWS;
   (3) #6 - 250MCM CU/AL CABLE CONNECTIONS.

APPROXIMATE SHIPPING WEIGHT, LBS (KG)

SWITCH RATING (AMPS)	POLES	WEIGHTS LB (KG)
600,800	2	569 (258)
600,800	3	592 (269)
(400A 7ADTS) 600,800	4	615 (279)
1000	2	581 (264)
1000	3	610 (277)
1000	4	639 (290)

REV. TO SHEET	ECN NO.	BY	APP.	DATE
—	251110	TR	BK	10/10/14
	ISSUE			

PROJECT NAME: MARINA COAST WATER

COMPOSITE OUTLINE
4000/7000 SERIES TS "H" ACC. 125 "SEISMIC 2.5"
600-1000 AMP. TYPE 3R, 4, 4X, 12 ENCL. SECURE

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	TR	10/10/14
CHECKED	BK	10/10/14
PROJECT APPROVAL	BK	10/10/14
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055 — ASSEM. REF. NO.

ASCO® ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE 1:1 SIZE DS

DWG. NO. 713200-050

DRAWING REV. — ECN NO. 251110 SHEET 1 OF 1

THREE PHASE WIRING FOR ASCO® 7000 SERIES AUTOMATIC DELAYED TRANSITION TRANSFER SWITCHES TYPE H7ADTS RATED 600, 800, 1000 & 1200 AMPERES

FEATURES, SETTINGS, OPERATION, ACCESSORIES & NOTES

THE FOLLOWING FEATURES AND RELATED SETTINGS ARE PART OF THE GROUP 5 CONTROL PANEL'S USER CONFIGURABLE PARAMETERS. FOR DETAILED INFORMATION REGARDING THE CONFIGURATION OF THESE PARAMETERS AND OTHER FEATURES OF THE GROUP 5 CONTROL PANEL, REFER TO THE GROUP 5 CONTROL PANEL FOR ASCO 7000 SERIES AUTOMATIC TRANSFER SWITCHES USER'S GUIDE (PART NO. 381333-126) PROVIDED WITH EVERY 7000 SERIES AUTOMATIC TRANSFER SWITCH.

THE NOMINAL OPERATING VOLTAGE & FREQUENCY IS PRE-PROGRAMMED AT THE FACTORY BASED ON THE NAMEPLATE DATA PRINTED ON THE TRANSFER SWITCH & CONTROL PANEL NAMEPLATES.

VOLTAGE & FREQUENCY SENSING

THE FOLLOWING SETTINGS ARE EXPRESSED AS A PERCENTAGE OF THE CONTROL PANEL'S NOMINAL VOLTAGE SETTING UNLESS STATED OTHERWISE. ALL SETTINGS ARE ADJUSTABLE IN INCREMENTS OF 1%.

A. RMS VOLTAGE SENSING ON ALL PHASES OF THE NORMAL & EMERGENCY SOURCES.

PARAMETER	RANGE OF SETTINGS	DEFAULT SETTING
NORMAL VOLTAGE DROPOUT	70-98%	85%
NORMAL VOLTAGE PICKUP	85-100%	90%
NORMAL OVER VOLTAGE TRIP	102-115%	OFF
NORMAL VOLTAGE UNBALANCE	YES/NO	NO
NORMAL VOLTAGE UNBALANCE DROPOUT	5-20% OF AVG. NORMAL VOLTAGE	20% (if ON)
NORMAL VOLTAGE UNBALANCE PICKUP	3-18% OF AVG. NORMAL VOLTAGE	10% (if ON)
EMERGENCY VOLTAGE DROPOUT	70-98%	75%
EMERGENCY VOLTAGE PICKUP	85-100%	90%
EMERGENCY OVER VOLTAGE TRIP	102-115%	OFF
EMERGENCY VOLTAGE UNBALANCE	YES/NO	NO
EMERGENCY VOLTAGE UNBALANCE DROPOUT	5-20% OF AVG. EMERGENCY VOLTAGE	20% (if ON)
EMERGENCY VOLTAGE UNBALANCE PICKUP	3-18% OF AVG. EMERGENCY VOLTAGE	10% (if ON)

B. FREQUENCY SENSING OF THE NORMAL & EMERGENCY SOURCES.

PARAMETER	RANGE OF SETTINGS	DEFAULT SETTING
NORMAL FREQUENCY DROPOUT	85-98%	90%
NORMAL FREQUENCY PICKUP	90-100%	95%
NORMAL OVER FREQUENCY TRIP	102-110%	OFF
EMERGENCY FREQUENCY DROPOUT	85-98%	90%
EMERGENCY FREQUENCY PICKUP	90-100%	95%
EMERGENCY OVER FREQUENCY TRIP	102-110%	OFF

TIME DELAYS

THE FOLLOWING TIME DELAY SETTINGS ALL HAVE AN ADJUSTABLE RANGE OF 0-60 min 59 sec UNLESS STATED OTHERWISE. ADJUSTABLE IN INCREMENTS OF 1 sec.
NOTE: SOME TIME DELAYS MAY BE EFFECTED BY CUSTOMER REQUESTED ACCESSORIES PROVIDED WITH THE UNIT. REFER TO THE DESCRIPTIONS PROVIDED UNDER THE "ACCESSORIES" NOTES ON THIS PAGE.

FEATURE	NAME	DEFAULT SETTING
1C	NORMAL SOURCE FAILURE TO ENGINE START	1 sec
2B	TRANSFER TO EMERGENCY ON AVAILABILITY OF EMERGENCY SOURCE	0 sec
1F	EMERGENCY SOURCE FAILURE RETRANSFER (NORMAL SOURCE AVAILABLE)	0 sec
2E	ENGINE COOLDOWN FOLLOWING RETRANSFER TO NORMAL	5 min
3A	RETRANSFER TO NORMAL (NORMAL FAILURE MODE)	30 min
3A	RETRANSFER TO NORMAL (TEST MODE)	30 sec
–	DELAYED TRANSFER (LOAD "OFF" TIME), [0-5 min 59 sec]	3 sec

DESCRIPTIONS OF TIME DELAYS:

FEAT. 1C – DELAY ON NORMAL SOURCE OUTAGE. STARTS ON FAILURE OF NORMAL SOURCE. RESETS IF NORMAL SOURCE IS ACCEPTED BEFORE EXPIRATION. INHIBITS ENGINE STARTING AND AUTOMATIC TRANSFER UNTIL EXPIRATION.

FEAT. 2B – DELAY PRIOR TO TRANSFER TO THE EMERGENCY SOURCE. DELAY STARTS ON EXPIRATION OF FEAT. 1C AND WHEN THE EMERGENCY SOURCE HAS BEEN ACCEPTED. DELAY RESETS IF THE EMERGENCY SOURCE FAILS PRIOR TO EXPIRATION. ON EXPIRATION, TRANSFER TO EMERGENCY IS INITIATED UNLESS THE NORMAL SOURCE HAS RECOVERED AND THE "COMMIT TO TRANSFER" FEATURE IS SET TO "NO" COMMIT. PROVIDES A PERIOD FOR EMERGENCY SOURCE STABILIZATION OR STAGING OF MULTIPLE TRANSFER SWITCH CONTROLLED LOADS TO THE EMERGENCY SOURCE.

FEAT. 1F – DELAY ON RETRANSFER TO NORMAL IN THE EVENT OF EMERGENCY SOURCE FAILURE. DELAY BEGINS ON FAILURE OF THE EMERGENCY SOURCE IF THE NORMAL SOURCE IS ACCEPTABLE. ON EXPIRATION, RETRANSFER TO NORMAL WILL BE INITIATED.

FEAT. 2E – DELAY ON ENGINE SHUTDOWN (ENGINE COOL DOWN PERIOD). DELAY STARTS FOLLOWING RETRANSFER TO THE NORMAL SOURCE. PROVIDES A PERIOD FOR THE ENGINE-GENERATOR SET TO RUN UNLOADED PRIOR TO SHUTDOWN.

FEAT. 3A – RETRANSFER TO NORMAL DELAY (NORMAL FAILURE MODE)
DELAY STARTS WHEN NORMAL SOURCE IS ACCEPTED (FOLLOWING IT'S FAILURE) AND WHILE THE LOAD IS CONNECTED TO EMERGENCY. RESETS IF NORMAL FAILS PRIOR TO EXPIRATION OR IF THE EMERGENCY SOURCE FAILS BEFORE EXPIRATION AND FEAT. 1F EXPIRES (AUTOMATIC BYPASS ON EMERGENCY SOURCE FAILURE). PROVIDES A PERIOD FOR THE NORMAL SOURCE TO STABILIZE PRIOR TO RETRANSFER.

FEAT. 3A – RETRANSFER TO NORMAL DELAY (TEST MODE)
DELAY STARTS WHEN THE "TRANSFER TEST" SWITCH IS RESET TO "AUTO" (FOLLOWING A USER INITIATED TRANSFER TEST) AND WHILE THE LOAD IS CONNECTED TO EMERGENCY. RESETS IF NORMAL FAILS PRIOR TO EXPIRATION OR IF THE EMERGENCY SOURCE FAILS BEFORE EXPIRATION AND FEAT. 1F EXPIRES (AUTOMATIC BYPASS ON EMERGENCY SOURCE FAILURE).

DELAYED TRANSFER (LOAD "OFF" TIME) –
PROVIDES A USER DEFINABLE PERIOD DURING WHICH THE LOAD IS DISCONNECTED FROM BOTH THE NORMAL AND EMERGENCY SOURCES DURING TRANSFER IN EITHER DIRECTION. THE DELAY ("OFF" PERIOD) BEGINS FOLLOWING THE OPENING OF THE SOURCE CONTACTOR, CN OR CE, CONNECTED TO THE SOURCE FROM WHICH TRANSFER IS BEING MADE. UPON EXPIRATION, CLOSURE OF THE OPPOSITE SOURCE CONTACTOR IS INITIATED.

ENGINE EXERCISER

THE ENGINE EXERCISER FEATURE PROVIDES A MEANS TO PERFORM AUTOMATIC EXERCISING OF THE ENGINE-GENERATOR SET EITHER WITH OR WITHOUT LOAD TRANSFER.
THE USER CAN PROGRAM UP TO SEVEN DIFFERENT EXERCISE ROUTINES. EACH ROUTINE INCLUDES;

1. ENABLE OR DISABLE THE ROUTINE
2. ENABLE OR DISABLE TRANSFER OF THE LOAD DURING THE ROUTINE
3. SET START TIME OF ROUTINE –
   - TIME OF DAY
   - DAY OF WEEK
   - WEEK OF MONTH (1st, 2nd, 3rd, 4th, ALTERNATE OR ALL)
4. SET THE DURATION OF THE ROUTINE

PARAMETER	RANGE OF SETTING	DEFAULT SETTING
MONTH (CLOCK SET)	JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC	CURRENT DATE
DAY	1-31	↓
YEAR	00-99	↓
HOUR	0-23	Eastern Standard Time
MINUTE	0-59	↓
ENABLE ROUTINE (ROUTINE 1-7)	YES/NO	NO
TRANSFER LOAD	YES/NO	NO
START HOUR	0-23	0
START MINUTE	0-59	0
RUN WEEK	ALL, ALTERNATE, 1st, 2nd, 3rd, 4th, 5th	ALL
RUN DAY	SUN MON TUE WED THU FRI SAT	SUN
DURATION HOURS	0-23	0
DURATION MINUTES	0-59	0

SIGNALS & AUXILIARIES

A. FEATURES 7 & 8– ENGINE START SIGNAL
SIGNAL INITIATED BY DROPOUT OF CONTROL PANEL RELAY (NR) FOLLOWING EXPIRATION OF THE FEATURE 1C TIME DELAY (DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES). FEATURE 7 CLOSES TO SIGNAL ENGINE START. FEATURE 8 OPENS TO SIGNAL ENGINE START. ENGINE STARTING SIGNAL RESETS FOLLOWING RETRANSFER TO THE NORMAL SOURCE AND EXPIRATION OF THE FEATURE 2E (ENGINE COOL DOWN) TIME DELAY. FEATURES 7 & 8 ARE PROVIDED AS A SINGLE FORM C CONTACT CONNECTED TO THE FIELD CONNECTIONS TERMINAL BLOCK (TB). CONTACT RATED 10 AMPS AT 32 VDC/120 VAC RESISTIVE.

B. FEATURES 14AG & 14BG – TRANSFER SWITCH AUXILIARY POSITION INDICATING CONTACTS.
EIGHT (8) FORM A CONTACTS EACH TO INDICATE CONNECTION OF THE TRANSFER SWITCH TO NORMAL (14A) OR EMERGENCY (14B). CONTACTS CONNECTED TO THE FIELD CONNECTIONS TERMINAL BLOCK (TB). CONTACTS RATED 10 AMPS, 32 VDC, 250 VAC.

C. FEATURE 17 – REMOTE TRANSFER TO EMERGENCY.
REQUIRES A CUSTOMER SUPPLIED NORMALLY OPEN CONTACT. CLOSING OF THE CONTACT CAUSES ENGINE START AND TRANSFER TO THE EMERGENCY SOURCE. OPENING OF THE CONTACT ACTIVATES THE FEATURE 3A (RETRANSFER TO NORMAL) DELAY PRIOR TO RETRANSFER. IN THE EVENT THE EMERGENCY SOURCE FAILS WHILE THE TRANSFER SWITCH IS CONNECTED TO EMERGENCY AND THE REMOTE CONTACT IS CLOSED, THE TRANSFER SWITCH WILL RETRANSFER TO THE NORMAL SOURCE. CONNECTED TO THE FIELD CONNECTIONS TERMINAL BLOCK (TB).

OPERATION

IF THE NORMAL SOURCE FAILS, THE TRANSFER SWITCH INITIATES STARTING OF THE ENGINE-GENERATOR SET. WHEN PROPER VOLTAGE AND FREQUENCY HAVE BEEN ATTAINED, THE LOAD WILL BE TRANSFERRED TO THE EMERGENCY SOURCE BY MEANS OF A DELAYED TRANSITION, (PROGRAMMED LOAD DISCONNECT PERIOD).

DELAYED TRANSITION TRANSFER TO EMERGENCY WILL CAUSE THE NORMAL SOURCE CONTACTOR (CN) TO OPEN. AFTER THE LOAD DISCONNECT DELAY, AS SET VIA THE USER INTERFACE OF THE GROUP 5 CONTROL PANEL, THE EMERGENCY SOURCE CONTACTOR (CE) WILL CLOSE. DURING THE PERIOD THAT BOTH CONTACTORS ARE OPEN AND THE TIME DELAY IS ACTIVE, A "LOAD DISCONNECT ACTIVE" LED WILL BE LIT (AMBER LED).

WHEN THE NORMAL SOURCE IS RESTORED FOR THE DURATION OF THE FEATURE 3A, RETRANSFER TO NORMAL TIME DELAY SETTING, THE LOAD WILL BE RETRANSFERRED TO THE NORMAL SOURCE IN A DELAYED TRANSITION MANNER.

DELAYED TRANSITION RETRANSFER TO NORMAL WILL CAUSE THE EMERGENCY SOURCE CONTACTOR (CE) TO OPEN. AFTER THE LOAD DISCONNECT TIME DELAY EXPIRES, THE NORMAL SOURCE CONTACTOR (CN) WILL CLOSE.

THE ENGINE WILL CONTINUE TO RUN FOR THE ENGINE COOL DOWN PERIOD, FEATURE 2E.

DELAYED TRANSITION TRANSFER WILL ALSO OCCUR DURING TRANSFER TO EMERGENCY BY OPERATING THE TEST SWITCH. RETRANSFER TO NORMAL WILL OCCUR AS PREVIOUSLY DESCRIBED.

USER CONTROLS AND INDICATIONS

A. FEATURES 5 & 6B – TRANSFER TEST/RETRANSFER TIME DELAY BYPASS CONTROLS.

TRANSFER TEST:
OPERATION CAUSES A NORMAL SOURCE FAILURE SEQUENCE.
ACTIVATE AND HOLD FOR AT LEAST 15 SECONDS TO ALLOW TIME FOR THE ENGINE-GENERATOR TO START.

RETRANSFER TIME DELAY BYPASS:
OPERATION WILL BYPASS THE FEATURE 3A (RETRANSFER TO NORMAL DELAY).

B. FEATURES 9A & 9B – TRANSFER SWITCH POSITION INDICATORS.
FEATURE 9A: TRANSFER SWITCH CLOSED ON NORMAL (GREEN LED)
FEATURE 9B: TRANSFER SWITCH CLOSED ON EMERGENCY (RED LED)

C. FEATURES 9C & 9D – SOURCE ACCEPTANCE INDICATORS.
FEATURE 9C: NORMAL SOURCE ACCEPTED (GREEN LED)
FEATURE 9D: EMERGENCY SOURCE ACCEPTED (RED LED)

D. LOAD DISCONNECT ACTIVE – INDICATES THAT THE TRANSFER SWITCH IS IN THE LOAD DISCONNECTED POSITION (BOTH NORMAL (CN) AND EMERGENCY (CE) CONTACTORS OPEN) (AMBER LED).

GENERAL NOTES

1. SWITCH SHOWN DE-ENERGIZED AND CONNECTED TO THE NORMAL SOURCE.
2. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUBLICATION ICS 1-1983, PART 1-101A.
3. ALL WIRING IS #16 AWG, TINNED, STRANDED COPPER UNLESS OTHERWISE INDICATED.
4. O ON TERMINAL BLOCKS INDICATES AVAILABLE FIELD CONNECTION POINT.
5. ● ON TERMINAL BLOCKS INDICATES FACTORY CONNECTION POINT.
6. CONTROL AND ACCESSORY WIRING IS ROUTED IN ACCORDANCE WITH ASCO ASSEMBLY PROCEDURE GS451261.
7. AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE UNIT.

ACCESSORIES

ACC. 18B 2P D/T CONTACTS THAT OPERATE WHEN EMERGENCY SOURCE VOLTAGE IS PRESENT AT TRANSFER SWITCH TERMINALS.

ACC. 18G 2P D/T CONTACTS THAT OPERATE WHEN NORMAL SOURCE VOLTAGE IS PRESENT AT TRANSFER SWITCH TERMINALS.

ACC. 31Z SELECTIVE LOAD DISCONNECT CIRCUIT TO PROVIDE A PRE-TRANSFER AND/OR POST TRANSFER SIGNAL WHEN TRANSFERRING FROM EMERGENCY TO NORMAL AND/OR NORMAL TO EMERGENCY. ADDITIONALLY, THE SIGNAL CAN BE PROGRAMMED TO OCCUR DURING ALL TRANSFERS OR ONLY WHEN THE TRANSFER IS OCCURRING BETWEEN TWO LIVE SOURCES. THE LENGTH OF THE PRE AND POST TRANSFER DELAYS CAN BE SET TO 0-5 MINUTES, 59 SECONDS. FACTORY SETTINGS:

.....PARAMETER.....	SETTING..
PRE-TRANSFER N>E (31F TIMER)	3 SEC
POST TRANSFER N>E (31M TIMER)	3 SEC
BYPASS 31F & 31M ON SOURCE FAIL	NO
PRE-TRANSFER E>N (31G TIMER)	3 SEC
POST TRANSFER E>N (31N TIMER)	3 SEC
BYPASS 31G & 31N ON SOURCE FAIL	NO

REFER TO GROUP 5 CONTROL PANEL USER'S GUIDE (PN 381333-126).

OUTPUT RATING: 6 AMPS, 240 VAC (GENERAL PURPOSE)
10 AMPS, 32 VDC RESISTIVE

ACC. 40*B/ ACC. 40*R – NORMAL SERVICE TERMINALS AT TOP, EMERGENCY SERVICE TERMINALS AT BOTTOM.
(ACC. 40*R) – LOAD AT BOTTOM (ACC. 40*B) – LOAD AT TOP.
*DENOTES H=600A, J=800A, K=1000A, L=1200A

BASE CATALOG NUMBER					CATALOG NUMBER SUFFIXES			
TS FRAME	CATALOG TYPE	NEUTRAL TYPE	PHASE POLES	AMPS	VOLT CODE	CONTROLLER	OPTIONAL ACCESSORY	ENCLOSURE CODE
H	7ADTS	A B	3	600 800 1000 1200	C D E F H J K L M N P Q R	5	X	C E F G H J K L M N P Q BLANK FOR OPEN TYPE
		BLANK FOR NONE					BLANK FOR NONE	

EXPLANATION OF CATALOG NUMBER CODES

NEUTRAL TYPE		VOLTAGE CODES 3 PHASE (3 OR 4 WIRE) 50 OR 60 Hz		ENCLOSURE CODES		
CODE	DESCRIPTION	CODE	NOMINAL VOLTAGE	CODE	TYPE	DESCRIPTION
BLANK	NONE			BLANK		OPEN TYPE (NO ENCLOSURE)
A	SOLID			C	1	GENERAL PURPOSE, INDOOR
B	SWITCHING			E	2	INDOOR, WATER & DUST RESISTANT
		C	208	D	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT
		D	220	F	4	INDOOR/OUTDOOR, WATERTIGHT & DUST TIGHT
		E	230	G	4X	TYPE 4 PLUS CORROSION RESISTANCE (STAINLESS STEEL)
		F	240	H	4X	TYPE 4 PLUS CORROSION RESISTANCE (FIBERGLASS)
				J	7	EXPLOSION PROOF
		H	380	K	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OIL TIGHT & DUST TIGHT
		J	400	L		(SECURE ENCLOSURES)
		K	415	M	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT
		L	440	N	4	INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		M	460	P	4X	TYPE 4 PLUS CORROSION RESISTANCE (STAINLESS STEEL)
		N	480	Q	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		P	550			
		Q	575			
		R	600			

CATALOG NUMBER H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

E CERTIFIED TO ASCO S.O. _____

BY _____

DATE _____

FORM REV C

REV. TO SHEET	ECN NO.	BY	APP.	DATE
B	235327 SEE ECN	AE	BK	6/21/05
A	204910 SEE ECN	KH	WK	6/21/05
—	203238 ISSUE	BK	WK	01/31/05

PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM
7000 SERIES (H7ADTS) 3PH 600-1200 AMPS
"H" FRAME, GROUP 5 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	01/31/05
CHECKED	WK	01/31/05
PROJECT APPROVAL	WK	01/31/05
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

COMPUTER GENERATED DRAWING

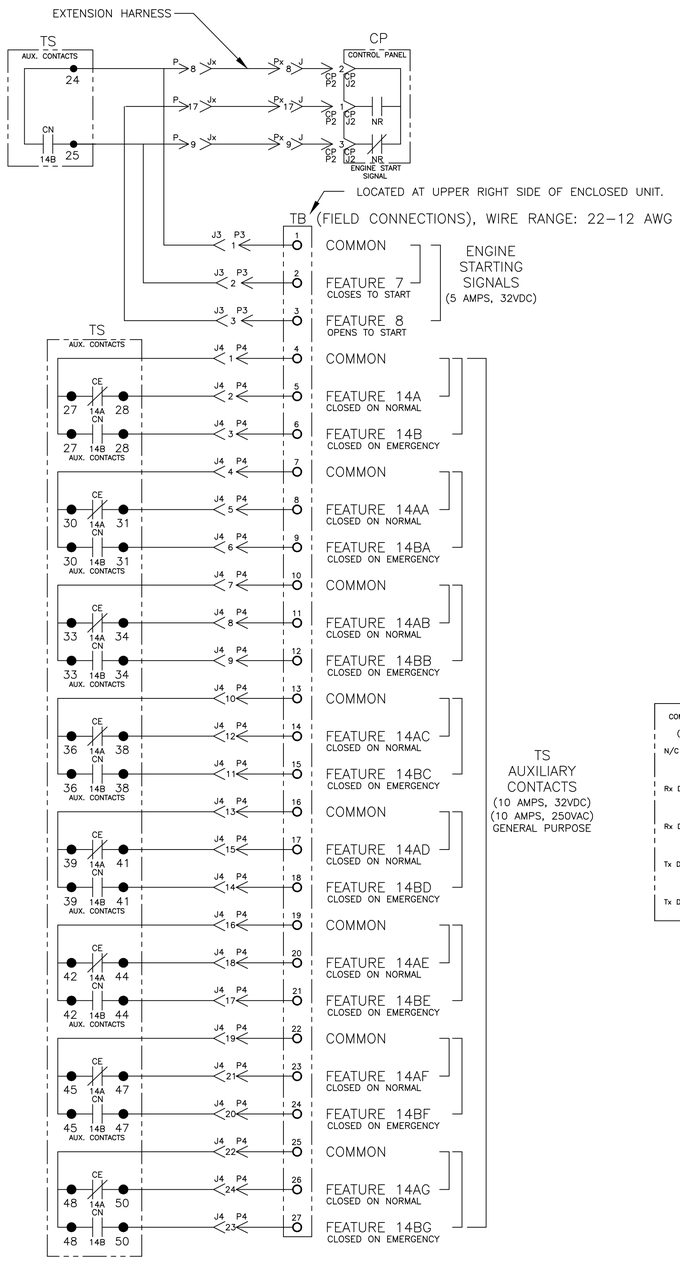
SCALE NONE SIZE DS

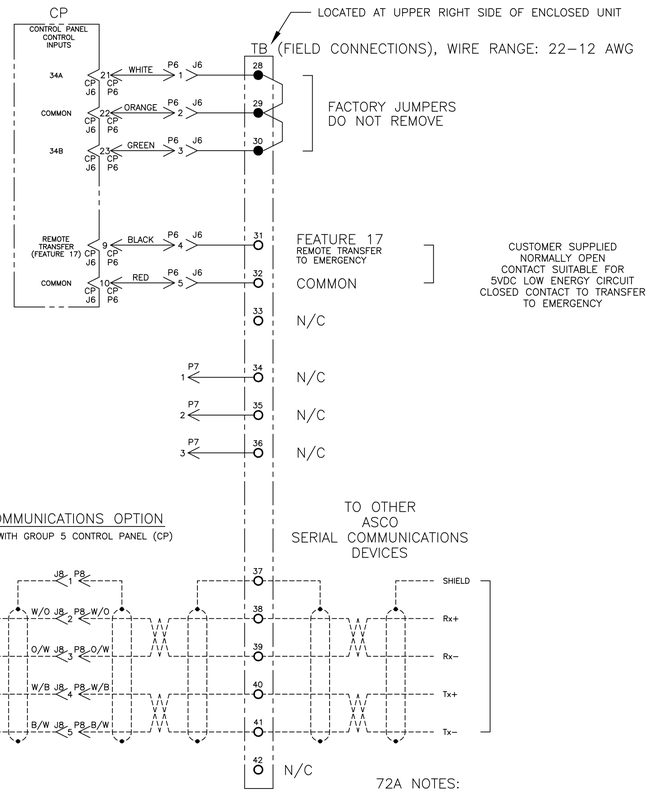
DWG. NO. 713505-123

DRAWING REV. B ECN NO. 235327 SHEET 1 OF 6

ASCO E ASCO POWER TECHNOLOGIES, L.P.
FLORHAM PARK, NEW JERSEY 07932 U.S.A.

FIELD CONNECTIONS



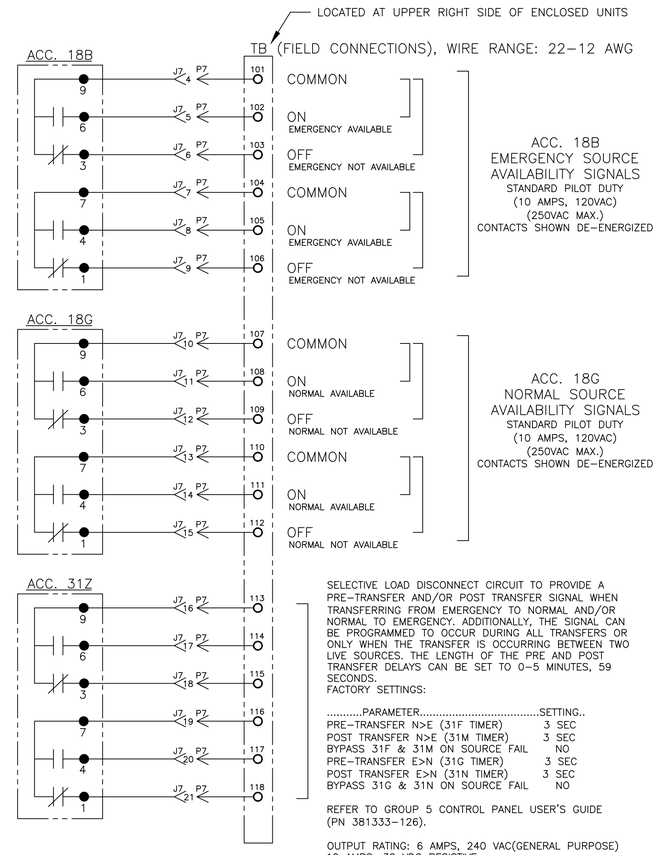


72A NOTES:

1. EARTH GROUND SHIELD AT HOST DEVICE ONLY.
2. FIELD WIRING: USE UL LISTED, STRANDED, TWISTED PAIRS, OVERALL FOIL SHIELD WITH STRANDED DRAIN WIRE SUITABLE FOR RS–422 EQUIVALENT TO:

(STANDARD 80°C) BELDEN 9842 OR 9829 OR ALPHA 6202C OR 6222C

(PLENUM RATED) BELDEN 89729 OR 82729 OR ALPHA 58902



SELECTIVE LOAD DISCONNECT CIRCUIT TO PROVIDE A PRE–TRANSFER AND/OR POST TRANSFER SIGNAL WHEN TRANSFERRING FROM EMERGENCY TO NORMAL AND/OR NORMAL TO EMERGENCY. ADDITIONALLY, THE SIGNAL CAN BE PROGRAMMED TO OCCUR DURING ALL TRANSFERS OR ONLY WHEN THE TRANSFER IS OCCURRING BETWEEN TWO LIVE SOURCES. THE LENGTH OF THE PRE AND POST TRANSFER DELAYS CAN BE SET TO 0–5 MINUTES, 59 SECONDS.
FACTORY SETTINGS:

.....PARAMETER.....	.....SETTING..
PRE–TRANSFER N>E (31F TIMER)	3 SEC
POST TRANSFER N>E (31M TIMER)	3 SEC
BYPASS 31F & 31M ON SOURCE FAIL	NO
PRE–TRANSFER E>N (31G TIMER)	3 SEC
POST TRANSFER E>N (31N TIMER)	3 SEC
BYPASS 31G & 31N ON SOURCE FAIL	NO

REFER TO GROUP 5 CONTROL PANEL USER'S GUIDE (PN 381333–126).

OUTPUT RATING: 6 AMPS, 240 VAC(GENERAL PURPOSE)
10 AMPS, 32 VDC RESISTIVE

REV.	ECN NO.	BY	APP.	DATE
B	235327	AE	BK	6/21/05
	SEE ECN			
A	204910	KH	WK	6/21/05
	SEE ECN			
—	203238	BK	WK	01/31/05
	ISSUE			

H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM
7000 SERIES (H7ADTS) 3PH 600–1200 AMPS
"H" FRAME, GROUP 5 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	01/31/05
CHECKED	WK	01/31/05
PROJECT APPROVAL	WK	01/31/05
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP–1–003. FOR PLASTIC PARTS SEE MP–1–055

ASSEM. REF. NO.

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COMPUTER GENERATED DRAWING

SCALE NONE | SIZE DS

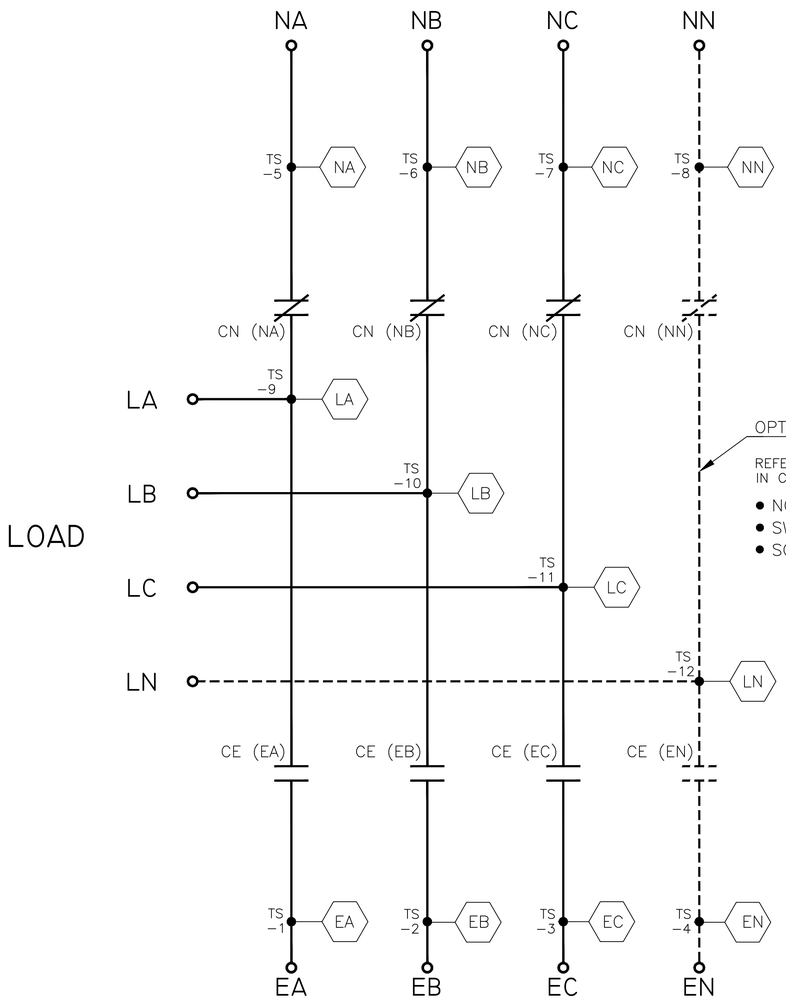
DWG. NO. 713505–123

DRAWING REV. B | ECN NO. 235327 | SHEET 2 OF 6

MAIN POWER POLES

TS OPERATOR CIRCUIT

NORMAL



OPTIONAL NEUTRAL TYPES

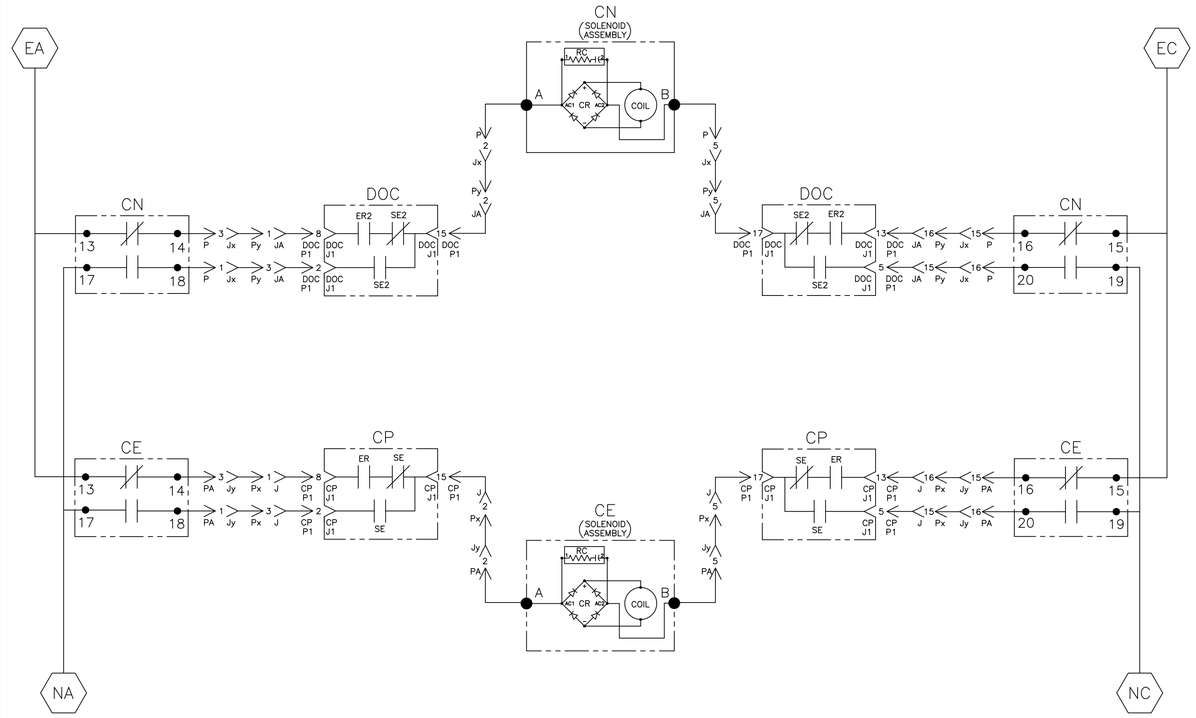
REFER TO "EXPLANATION OF CATALOG NUMBER CODES" IN CATALOG NUMBER CHART ON SHEET 1.

- NONE
- SWITCHING
- SOLID BUS PLATE

EMERGENCY

NOTE:
ATS SHOWN CLOSED ON NORMAL SOURCE.

EMERGENCY



NORMAL

CN CONTROL CONTACTS						
CN	SOLENOID POSITION					
	CLOSED EMERG.	BEFORE TDC*	>	<	BEFORE <TDC	OPEN
13–14						
15–16						
17–18						
19–20						

TDC (TOP DEAD CENTER) TRANSFER SWITCH TEST & ADJUSTMENT PROCEDURE SPECIFIES CONTROL CUT–OFF (CONTACT OPENING) SETTING.

CE CONTROL CONTACTS						
CE	SOLENOID POSITION					
	OPEN	BEFORE TDC*	>	<	BEFORE <TDC	CLOSED NORMAL
13–14						
15–16						
17–18						
19–20						

H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

REV.	TO SHEET	ECN NO.	BY	APP.	DATE
B		235327	AE	BK	6/21/05
		SEE ECN			
A		204910	KH	WK	6/21/05
		SEE ECN			
—		203238	BK	WK	01/31/05
		ISSUE			

PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM

7000 SERIES (H7ADTS) 3PH 600–1200 AMPS
"H" FRAME, GROUP 5 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
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PROJECT APPROVAL	WK	01/31/05
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP–1–003. FOR PLASTIC PARTS SEE MP–1–055

ASSEM. REF. NO.

COMPUTER GENERATED DRAWING

SCALE NONE SIZE DS

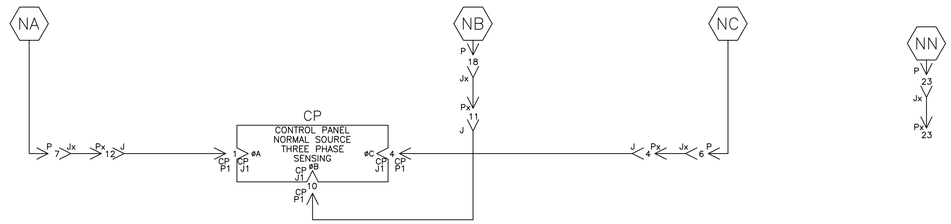
DWG. NO. 713505–123

DRAWING REV. B ECN NO. 235327 SHEET 3 OF 6

ASCO® ASCO Power Technologies, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

NORMAL SOURCE CIRCUITS

NORMAL

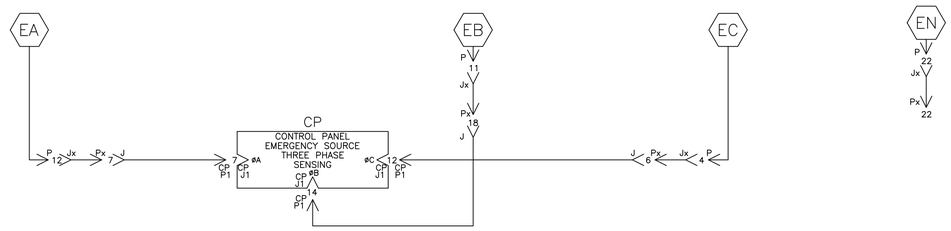


LOAD TERMINAL CIRCUITS

LOAD

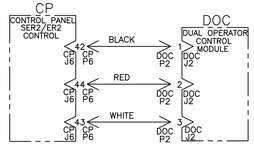
EMERGENCY SOURCE CIRCUITS

EMERGENCY

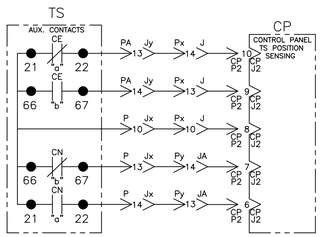


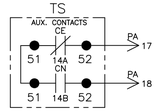
CONTROL CIRCUITS

SER2/ER2 CONTROL



TS POSITION SENSING

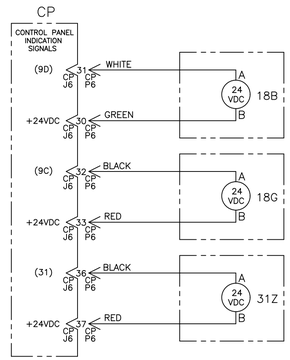




SPARE FOR FACTORY USE

ADDITIONAL CIRCUITS

ACC. 18B, 18G, 31Z



H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

REV. TO SHEET	ECN NO.	BY	APP.	DATE
B	235327 SEE ECN	AE	BK	6/21/05
A	204910 SEE ECN	KH	WK	6/21/05
—	203238 ISSUE	BK	WK	01/31/05

PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM

7000 SERIES (H7ADTS) 3PH 600–1200 AMPS
"H" FRAME, GROUP 5 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
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PROJECT APPROVAL	WK	01/31/05
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

ASCO E ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE NONE SIZE DS

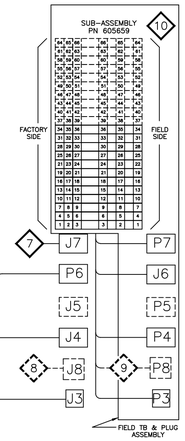
DWG. NO. 713505-123

DRAWING REV. B ECN NO. 235327 SHEET 4 OF 6

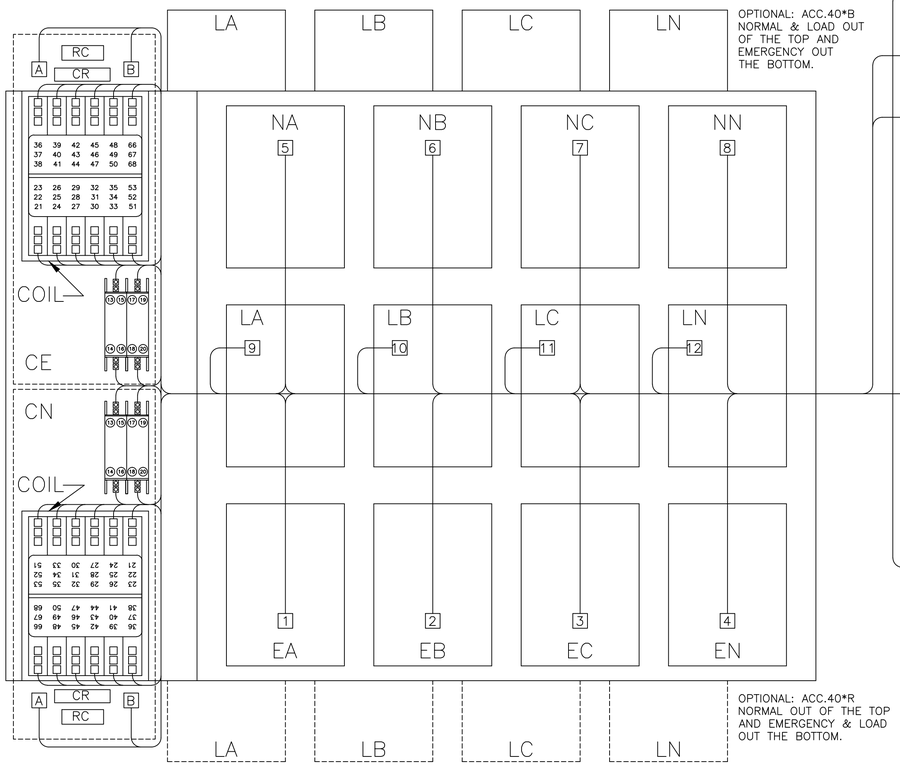
PHYSICAL DIAGRAM

ENCLOSURE

TB



TS (TRANSFER SWITCH) VIEW FROM INSIDE FRONT



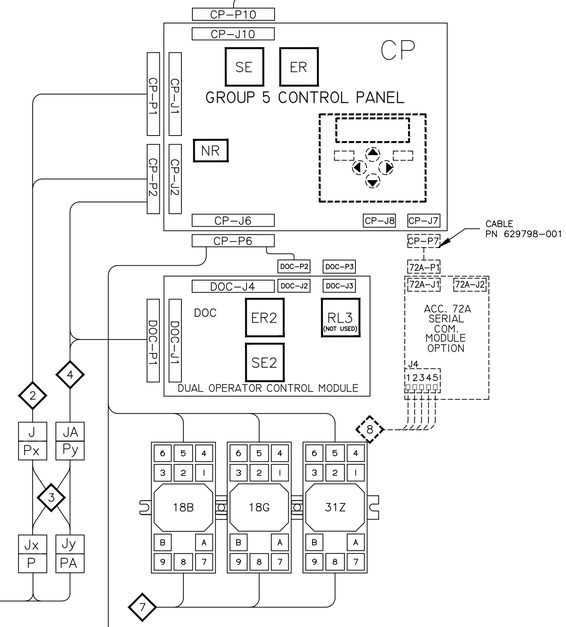
DOOR HINGE

BONDING STRAP
PN 098323-019

DOOR (INSIDE)

OPERATOR CONTROLS
ESCUTCHEON MOUNTING
PN 613655-001
(REFER TO ASSEMBLY DRAWING FOR WIRING)

OPTIONAL
POWERMANAGER
OR ADDITIONAL
OPERATOR CONTROLS
ESCUTCHEON MOUNTING



AP
OPTIONAL
ACCESSORY ADD-ON PANEL
MOUNTING

AP2
OPTIONAL
ACCESSORY ADD-ON PANEL
MOUNTING

AP1
OPTIONAL
ACCESSORY ADD-ON PANEL
MOUNTING

AP3
OPTIONAL
ACCESSORY ADD-ON PANEL
MOUNTING

H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

REV. TO SHEET	ECN NO.	BY	APP.	DATE
B	235327	AE	BK	6/21/05
	SEE ECN			
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	SEE ECN			
—	203238	BK	WK	01/31/05
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PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM

7000 SERIES (H7ADTS) 3PH 600-1200 AMPS
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ASSEM. REF. NO.

ASCO® ASCO POWER TECHNOLOGIES, L.P.
FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE NONE SIZE DS

DWG. NO. 713505-123

DRAWING REV. B ECN NO. 235327 SHEET 5 OF 6

WIRE RUN LISTING

1 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☒

HARNESS 713081 (P,PA,J3,J4) MAIN TS

WIRE No.		CLR	AWG
1	P-1,CN-18		16
2	P-2,CN-A		
3	P-3,CN-14		
4	P-4,TS-3		
4	TS-3,CN-15		
4	CN-15,CE-15		
5	P-5,CN-B		
6	P-6,TS-7		
6	TS-7,CN-19		
6	CN-19,CE-19		
7	P-7,TS-5		
7	TS-5,CN-17		
7	CN-17,CE-17		
8	P-8,CE-24		
8	CE-24,J3-1		
9	P-9,CE-25		
9	CE-25,J3-2		
10	P-10,CN-66		
10	CN-66,CN-21		
10	CN-21,CE-21		
10	CE-21,CE-66		
11	P-11,TS-2		
12	P-12,TS-1		
12	TS-1,CN-13		
12	CN-13,CE-13		
13	P-13,CN-67		
14	P-14,CN-22		
15	P-15,CN-16		
16	P-16,CN-20		
17	P-17,J3-3		
18	P-18,TS-6		
19	P-19,TS-9		
20	P-20,TS-10		
21	P-21,TS-11		
22	P-22,TS-4		
23	P-23,TS-8		
24	P-24,TS-12		
25	J4-1,CN-27		
25	CN-27,CE-27		
26	J4-2,CE-28		
27	J4-3,CN-28		
28	J4-4,CN-30		
28	CN-30,CE-30		
29	J4-5,CE-31		
30	J4-6,CN-31		
31	J4-7,CN-33		
31	CN-33,CE-33		
32	J4-8,CE-34		
33	J4-9,CN-34		
34	J4-10,CN-36		
34	CN-36,CE-36		
35	J4-11,CN-38		
36	J4-12,CE-38		
37	J4-13,CN-39		
37	CN-39,CE-39		
38	J4-14,CN-41		
39	J4-15,CE-41		
40	J4-16,CN-42		
40	CN-42,CE-42		
41	J4-17,CN-44		
42	J4-18,CE-44		
43	J4-19,CN-45		
43	CN-45,CE-45		
44	J4-20,CN-47		
45	J4-21,CE-47		
46	J4-22,CN-48		
46	CN-48,CE-48		
47	J4-23,CN-50		
48	J4-24,CE-50		
107	PA-1,CE-18		
108	PA-2,CE-A		
109	PA-3,CE-14		
111	PA-5,CE-B		
119	PA-13,CE-22		
120	PA-14,CE-67		
121	PA-15,CE-16		
122	PA-16,CE-20		
123	PA-17,CE-52		
124	PA-18,CN-52		
131	CN-51,CE-51		
	REMOVE WIRES		
8	P-8,CE-24		
8	CE-24,J3-1		
9	P-9,CE-25		
9	CE-25,J3-2		
	ADD WIRES		
8	P-8,CN-24		
8	CN-24,J3-1		
9	P-9,CN-25		
9	CN-25,J3-2		
97	J3-4		
110	PA-4		
112	PA-6		
113	PA-7		
114	PA-8		
115	PA-9		
116	PA-10		
117	PA-11		
118	PA-12		
125	PA-19		
126	PA-20		
127	PA-21		
128	PA-22		
129	PA-23		
130	PA-24		

2 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☐

HARNESS 483763 (J,CP-P1,CP-P2) CONTROL PANEL

WIRE No.		CLR	AWG
1	J-1,CP-P1-8		16
2	J-2,CP-P1-15		
3	J-3,CP-P1-2		
4	J-4,CP-P1-4		
5	J-5,CP-P1-17		
6	J-6,CP-P1-12		
7	J-7,CP-P1-7		
8	J-8,CP-P2-2		
9	J-9,CP-P2-3		
10	J-10,CP-P2-8		
11	J-11,CP-P1-10		
12	J-12,CP-P1-1		
13	J-13,CP-P2-9		
14	J-14,CP-P2-10		
15	J-15,CP-P1-5		
16	J-16,CP-P1-13		
17	J-17,CP-P2-1		
18	J-18,CP-P1-14		
	ADD WIRES		
19	J-19		
20	J-20		
21	J-21		
22	J-22		
23	J-23		
24	J-24		

3 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☐

HARNESS 625946-003 ACCESSORY 40*B TYPE 3 HARNESS

WIRE No.		CLR	AWG
1	Jx-1,Py-3		16
2	Jx-2,Py-2		
3	Jx-3,Py 1		
4	Jx-4,Px-6		
5	Jx-5,Py-5		
6	Jx-6,Px-4		
7	Jx-7,Px-12		
8	Jx-8,Px-8		
9	Jx-9,Px-9		
10	Jx-10,Px-10		
11	Jx-11,Px-18		
12	Jx-12,Px-7		
13	Jx-13,Py-14		
14	Jx-14,Py-13		
15	Jx-15,Py-16		
16	Jx-16,Py-15		
17	Jx-17,Px-17		
18	Jx-18,Px-11		
19	Jx-19,Px-19		
20	Jx-20,Px-20		
21	Jx-21,Px-21		
22	Jx-22,Px-22		
23	Jx-23,Px-23		
24	Jx-24,Px-24		
107	Jy-1,Px-3		
108	Jy-2,Px-2		
109	Jy-3,Px 1		
110	Jy-4,Py-4		
111	Jy-5,Px-5		
112	Jy-6,Py-6		
113	Jy-7,Py-7		
114	Jy-8,Py-8		
115	Jy-9,Py-9		
116	Jy-10,Py-10		
117	Jy-11,Py-11		
118	Jy-12,Py-12		
119	Jy-13,Px-14		
120	Jy-14,Px-13		
121	Jy-15,Px-16		
122	Jy-16,Px-15		
123	Jy-17,Py-17		
124	Jy-18,Py-18		
125	Jy-19,Py-19		
126	Jy-20,Py-20		
127	Jy-21,Py-21		
128	Jy-22,Py-22		
129	Jy-23,Py-23		
130	Jy-24,Py-24		

4 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☐

HARNESS 619385 (JA,CP-P2,DOC-P1) CONTROL MODULE

WIRE No.		CLR	AWG
107	JA-1,DOC-P1-8		16
108	JA-2,DOC-P1-15		
109	JA-3,DOC-P1-2		
111	JA-5,DOC-P1-17		
119	JA-13,CP-P2-6		
120	JA-14,CP-P2-7		
121	JA-15,DOC-P1-5		
122	JA-16,DOC-P1-13		
	ADD WIRES		
110	JA-4		
112	JA-6		
113	JA-7		
114	JA-8		
115	JA-9		
116	JA-10		
117	JA-11		
118	JA-12		
123	JA-17		
124	JA-18		
125	JA-19		
126	JA-20		
127	JA-21		
128	JA-22		
129	JA-23		
130	JA-24		

6 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☒

HARNESS 619510-005 (P6) FIELD INPUTS

WIRE No.		CLR	AWG
49	P6-1,CP-P6-21	WHT	22 (12 COND)
50	P6-2,CP-P6-22	ORG	
51	P6-3,CP-P6-23	GRN	
52	P6-4,CP-P6-9	BLK	
53	P6-5,CP-P6-10	RED	
	ADD WIRES		
54	P6-6		16
55	P6-7		
56	P6-8		
57	P6-9		
58	P6-10		
59	P6-11		
60	P6-12		
61	P6-13		
62	P6-14		
63	P6-15		
64	P6-16		
65	P6-17		
66	P6-18		
67	P6-19		
68	P6-20		
69	P6-21		
70	P6-22		
71	P6-23		
72	P6-24		
300	CP-P6-32,18G-A	BLK	22 (4 COND)
301	CP-P6-33,18G-B	RED	
302	CP-P6-31,18B-A	WHT	
303	CP-P6-30,18B-B	GRN	
304	CP-P6-36,31Z-A	BLK	22 (2 COND)
305	CP-P6-37,31Z-B	RED	

7 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☒

HARNESS (J7) OPTIONAL FIELD OUTPUTS

WIRE No.		CLR	AWG
	ADD WIRES		16
73	J7-1		
74	J7-2		
75	J7-3		
76	J7-4,18B-9		
77	J7-5,18B-6		
78	J7-6,18B-3		
79	J7-7,18B-7		
80	J7-8,18B-4		
81	J7-9,18B-1		
82	J7-10,18G-9		
83	J7-11,18G-6		
84	J7-12,18G-3		
85	J7-13,18G-7		
86	J7-14,18G-4		
87	J7-15,18G-1		
88	J7-16,31Z-9		
89	J7-17,31Z-6		
90	J7-18,31Z-3		
91	J7-19,31Z-7		
92	J7-20,31Z-4		
93	J7-21,31Z-1		
94	J7-22		
95	J7-23		
96	J7-24		

8 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☐

HARNESS 605454-005 (J8) OPTIONAL SERIAL I/O

WIRE No.		CLR	AWG
98	J8-1,72A-5	SHLD	22 (4 COND)
99	J8-2,72A-1	WHT/ORG	
100	J8-3,72A-2	ORG/WHT	
101	J8-4,72A-3	WHT/BLU	
102	J8-5,72A-4	BLU/WHT	
	ADD WIRES		
103	J8-6		
104	J8-7		
105	J8-8		
106	J8-9		

9 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☐

HARNESS 605454-007 (P8,TB) OPTIONAL SERIAL I/O

WIRE No.		CLR	AWG
98	P8-1,TB-37	SHLD	22 (4 COND)
99	P8-2,TB-38	WHT/ORG	
100	P8-3,TB-39	ORG/WHT	
101	P8-4,TB-40	WHT/BLU	
102	P8-5,TB-41	BLU/WHT	
	ADD WIRES		
103	P8-6		
104	P8-7		
105	P8-8		
106	P8-9		

10 ◄— HARNESS LOCATOR — BOX CHECKED IF HARNESS IS MODIFIED ☒

SUB-ASSEMBLY 605659 (P3,P4,J6,P7,TB) STD. FIELD TB

WIRE No.		CLR	AWG
8	TB-1,P3-1		16
9	TB-2,P3-2		
17	TB-3,P3-3		
25	TB-4,P4-1		
26	TB-5,P4-2		
27	TB-6,P4-3		
28	TB-7,P4-4		
29	TB-8,P4-5		
30	TB-9,P4-6		
31	TB-10,P4-7		
32	TB-11,P4-8		
33	TB-12,P4-9		
34	TB-13,P4-10		
36	TB-14,P4-12		
35	TB-15,P4-11		
37	TB-16,P4-13		
39	TB-17,P4-15		
38	TB-18,P4-14		
40	TB-19,P4-16		
42	TB-20,P4-18		
41	TB-21,P4-17		
43	TB-22,P4-19		
45	TB-23,P4-21		
44	TB-24,P4-20		
46	TB-25,P4-22		
48	TB-26,P4-24		
47	TB-27,P4-23		
49	TB-28,J6-1		
50	TB-29,J6-2		
51	TB-30,J6-3		
52	TB-31,J6-4		
53	TB-32,J6-5		
73	TB-34,P7-1		
74	TB-35,P7-2		
75	TB-36,P7-3		
	JUMPERS		
–	TB-28,TB-29		
–	TB-29,TB-30		
	ADD WIRES		
97	P3-4		
54	J6-6		
55	J6-7		
56	J6-8		
57	J6-9		
58	J6-10		
59	J6-11		
60	J6-12		
61	J6-13		
62	J6-14		
63	J6-15		
64	J6-16		
65	J6-17		
66	J6-18		
67	J6-19		
68	J6-20		
69	J6-21		
70	J6-22		
71	J6-23		
72	J6-24		
76	P7-4,TB-101		
77	P7-5,TB-102		
78	P7-6,TB-103		
79	P7-7,TB-104		
80	P7-8,TB-105		
81	P7-9,TB-106		
82	P7-10,TB-107		
83	P7-11,TB-108		
84	P7-12,TB-109		
85	P7-13,TB-110		
86	P7-14,TB-111		
87	P7-15,TB-112		
88	P7-16,TB-113		
89	P7-17,TB-114		
90	P7-18,TB-115		
91	P7-19,TB-116		
92	P7-20,TB-117		
93	P7-21,TB-118		
94	P7-22		
95	P7-23		
96	P7-24		

ADDITIONAL WIRING

WIRE No.		CLR	AWG
132	CP-P6-42,DOC-P2-1	BLK	22 (4 COND)
133	CP-P6-43,DOC-P2-3	WHT	
134	CP-P6-44,DOC-P2-2	RED	
			16

H7ADTSA30800N5XM,18B,18G,3,1Z,44G,125A

REV.	TO SHEET	ECN NO.	BY	APP.	DATE
B		235327	AE	BK	6/21/05
		SEE ECN			
A		204910	KH	WK	6/21/05
		SEE ECN			
—		203238	BK	WK	01/31/05
		ISSUE			

PROJECT NAME: MARINA COAST WATER

WIRING DIAGRAM

7000 SERIES (H7ADTS) 3PH 600-1200 AMPS
"H" FRAME, GROUP 5 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	01/31/05
CHECKED	WK	01/31/05
PROJECT APPROVAL	WK	01/31/05
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

ASCO E ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE NONE SIZE DS

DWG. NO. 713505-123

DRAWING REV. B ECN NO. 235327 SHEET 6 OF 6

The Recognized Leader in Power Transfer Switch Technology Offers the Most Advanced Transfer Switches in the World.

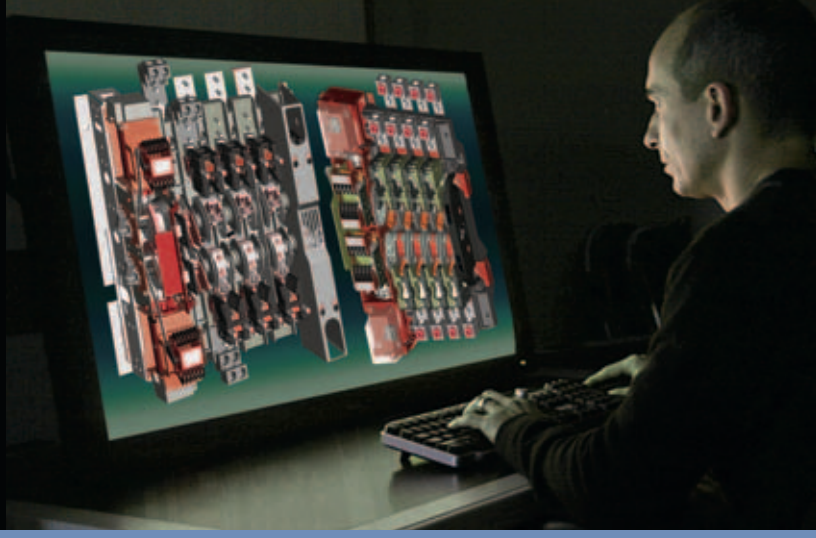


Fig. 1: Three Pole 7000 Series Automatic Transfer Switch rated 1600 Amperes (shown with optional front connected terminals and Power Manager).

7000 Series

ASCO Power Transfer Switches are the standard of the industry. High speed transfer of loads between alternate sources of power, regardless of ampacity size, is achieved by a reliable, field proven solenoid operating mechanism. When combined with a programmable microprocessor controller with keypad and LCD display, they offer the most advanced method of transferring all types of loads, such as motors, electronic drives, UPS's and microprocessor based systems. 7000 Series Power Transfer Switches are available open or enclosed, in ampacity sizes from 30 through 4000 Amperes with the largest selection of optional accessories offered anywhere. All switching configurations are available with an integrally mounted bypass-isolation switch and/or rated for use in service entrance applications.

7000 Series Power Transfer Switches Product Features

- Conventional two-position transfer configuration, plus closed and delayed transition modes of operation. All configurations available with either automatic or non-automatic control.
- UL listed to 1008 Transfer Switch Equipment & CSA certified to CSA 22.2 No.178-1978 Automatic Transfer Switches.
- Qualified and certified to IEC 60947-6-1, CE marked (optional). (Limited to certain accessories.)
- Rated up to 600 VAC, 30 through 4000 Amperes.
- Reliable and field proven solenoid operating mechanism.
- High withstand and close-on ratings including short time withstand current rating for optimum flexibility in circuit breaker coordination (600-4000 Amperes).
- Solid, switched, or overlapping neutral conductor options.
- Front replaceable main and arcing contacts (800-4000 Amperes).
- Programmable microprocessor controller with keypad and LCD display.
- Centrally located terminal block for customer control connections (260-4000 Amperes).
- 16mm, industrial grade control switches and indicating lights.
- Switch position LED indicators and source acceptability lights.
- Standard ground conductor connections.
- Four auxiliary contacts, two contacts closed when switch is in normal position and two contacts closed when switch is in emergency position.
- Local/remote communications capability for interfacing with ASCO POWERQUEST® communication products.

Delayed Transition Transfer Switching

ASCO Delayed Transition Transfer Switches are designed to provide transfer of loads between power sources with a timed load disconnect position for an adjustable period of time. Applications include older style variable frequency drives, rectifier banks, and load management applications.

- Available in 150 through 4000 Amperes.
- Utilizes reliable, field proven solenoid operating mechanisms.
- Mechanical interlocks to prevent direct connection of both sources.
- Indicator light (16mm, industrial grade type LED) for load disconnect position.
- Adjustable time delay for load disconnect position.

Fig. 3: Four pole, Delayed Transition Transfer Switch rated 2000 Amperes.

Fig. 14: 7000 Series Microprocessor Controller.

The 7000 Series Microprocessor Based Controller is used with all sizes of Power Transfer Switches from 30 through 4000 Amperes. It represents the most advanced digital controller in the industry and includes, as standard, all of the voltage, frequency, control, timing and diagnostic functions required for most emergency and standby power applications.

Because of severe voltage transients frequently encountered with industrial distribution systems, the microprocessor logic board is separated and isolated from the power board as shown below. This improves electrical noise immunity performance and helps assure compliance with the rigorous transient suppression standards highlighted below.

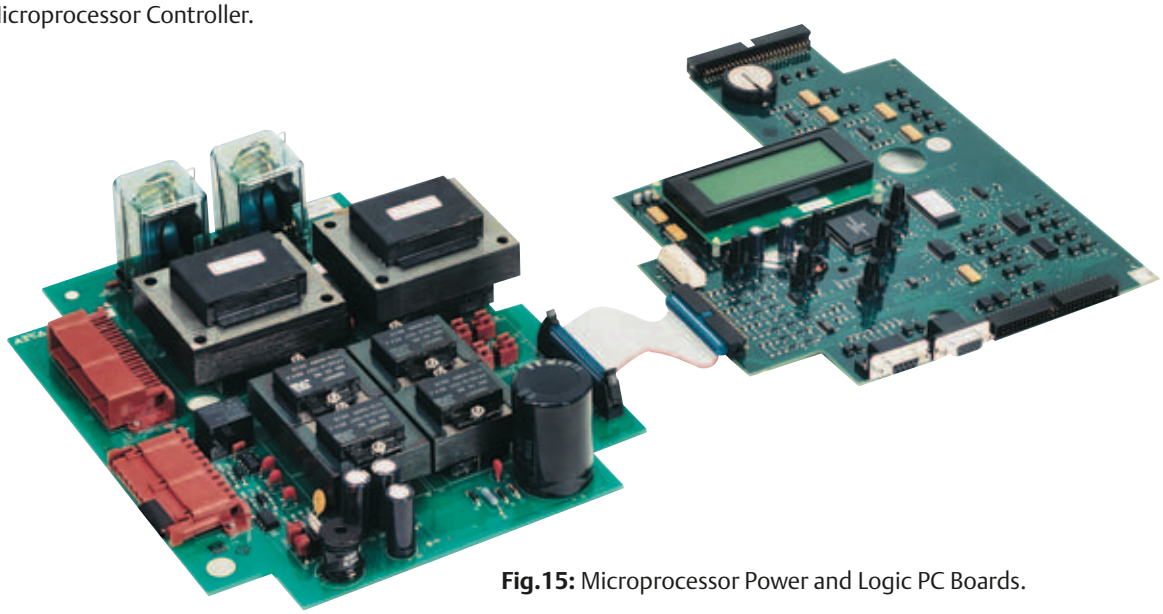


Fig.15: Microprocessor Power and Logic PC Boards.

7000 Series Microprocessor Based Controller

Emission Standard - Group 1, Class A	EN 55011:1991
Generic Immunity Standard, from which:	EN 50082-2:1995
Electrostatic Discharge (ESD) Immunity	EN 61000-4-2:1995
Radiated Electromagnetic Field Immunity	ENV 50140:1993
Electrical Fast Transient (EFT) Immunity	EN 61000-4-4:1995
Surge Transient Immunity	EN 61000-4-5:1995
Conducted Radio-Frequency Field Immunity	EN 61000-4-6:1996
Voltage Dips, Interruptions and Variations Immunity	EN 61000-4-11:1994

ASCO® 7000 Series Microprocessor Controller

Features

- Digital microprocessor.
- Touch pad programming of features and settings without the need for meters, or variable power supplies.
- Sixteen (16) selectable operating voltages available in a single Controller.
- On-board diagnostics provide control panel and ATS status information to analyze system performance.
- Displays and counts down active timing functions.
- Selectable multi-language display (English, German, Portuguese, Spanish, or French. For others contact ASCO).
- Password protection to prevent unauthorized tampering of settings.
- Remote monitoring and control with ASCO POWERQUEST® communications products. Specify optional accessory 72E.
- Load shed option for bus optimization applications. Specify optional accessory 30B.
- Historical event log
- Statistical ATS systems monitoring information

Voltage and Frequency Sensing

- 3-Phase under and over voltage settings on normal and emergency sources.
- Under and over frequency settings on normal and emergency.
- True RMS Voltage Sensing with +/- 1% accuracy; Frequency Sensing Accuracy is +/- 0.2%.
- Selectable settings: single or three phase voltage sensing on normal and emergency; 50 or 60Hz.
- Phase sequence sensing for phase sensitive loads.
- Voltage unbalance detection between phases.

Status and Control Features

- Output contact (N/O or N/C) for engine-start signals.
- Selection between “commit/no-commit” on transfer to emergency after engine start and normal restores before transfer.
- Advanced inphase algorithm which automatically measures the frequency difference between the two sources and initiates transfer at appropriate phase angles to minimize disturbances when transferring motor loads.
- Event log displays 99 logged events with the time and date of the event, event type and event reason.
- Output signals for remote indication of normal and emergency source acceptability
- Statistical ATS/System monitoring data screens which provide:
  - Total number of ATS transfers.
  - Number of ATS transfers caused by power source failure.
  - Total number of days ATS has been in operation.
  - Total number of hours that the normal and emergency sources have been available.

Time Delays

- Engine start time delay - delays engine starting signal to override momentary normal source outages - adjustable 0 to 6 seconds.
- Transfer to emergency time delay - adjustable 0 to 60 minutes.
- Emergency source stabilization time delay to ignore momentary transients during initial generator set loading - adjustable 0 to 6 seconds.
- Retransfer to normal time delay with two settings:
  - Power failure mode - 0 to 60 minutes.
  - Test mode - 0 to 10 hours.
- Unloaded running time delay for engine cooldown - adjustable 0 to 60 minutes.
- Pre and post transfer signal time delay for selective load disconnect with a programmable bypass on source failures - adjustable 0 to 5 minutes. This signal can be used to drive a customer furnished relay, or for (2) sets of double throw contacts rated 3 amps at 480 volts AC, specify ASCO optional accessory 31Z.
- Fully programmable engine exerciser with seven independent routines to exercise the engine generator, with or without loads, on a daily, weekly, bi-weekly or monthly basis.
- Contains all alarm signals, logic and time delays for use with closed transition switches.
  - Insynch time delay - 0 to 3 seconds.
  - Failure to synchronize - 1 to 5 minutes.
  - Extended parallel - 0.1 to 1.0 seconds.
- Delayed transition load disconnect time delay - adjustable 0 to 5 minutes.

Control Switches and Indicating Lights for Conventional 2-Position Switches

- Switch position indicating lights (16 mm, industrial grade LEDs).
- Source acceptability indicating lights with true indication of the acceptability of each source, as determined by the voltage, frequency, voltage unbalance, and phase sequence settings of the control panel (16mm, industrial grade LEDs).
- Three position (16mm, industrial grade type) selector switch:
- Automatic: Normal maintained position.
- Test: Momentary position to simulate normal source failure for system test function.
- Reset Delay Bypass: Momentary position to bypass transfer and re-transfer time delay.

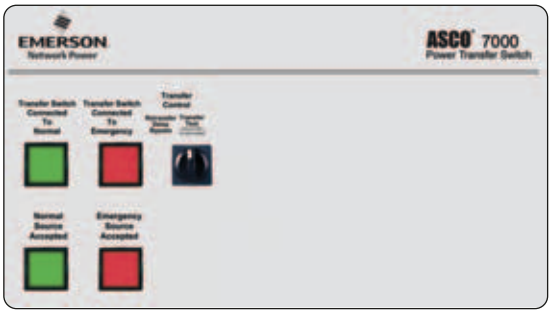


Fig. 16: 7000 Series User Controls and Indicators.

7000 Series Power Control Center

Fig. 18: 7000 Series Power Control Center.

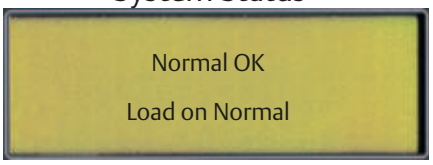
The 7000 Series microprocessor controller is a Power Control Center which allows the user to easily access detailed information on: system status; power source parameters; voltage, frequency and time delay settings; optional feature settings; historical event log; and system diagnostics. A four line, (20) character LCD has a backlit display which enables easy viewing under all conditions. The user can navigate through all screens using only six buttons, which also allows selection of: (18) different source parameter settings; (16) standard time delays; (12) standard feature settings; up to seven independent engine exercise routines; and even the language (English, German, Spanish, French, etc.) which appears on the display.

Since the Power Control Center must be visible and operable through the enclosure door, it has been qualified for use in industrial and outdoor applications. This includes installation in Type 3R (outdoor/rainproof), 4 (weatherproof) and 12 (indoor/industrial) enclosures. For applications with regular exposure to direct sunlight a double door for UV protection is recommended.

ASCO® 7000 Series Power Control Center Screens

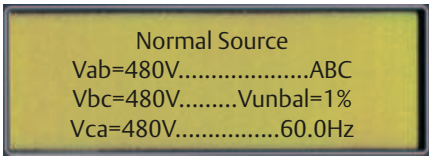
Status

System Status



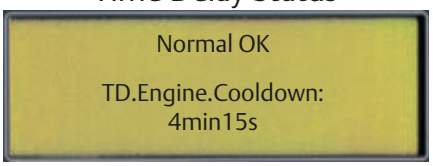
Displays system status in clear, concise language. Message shown indicates normal source is acceptable and the load is connected to the normal source.

Source Status



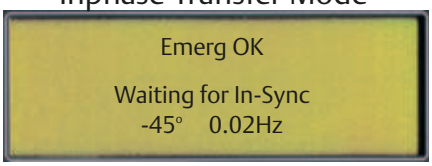
Displays voltage for each phase, frequency, phase rotation and voltage unbalance for both normal and emergency sources.

Time Delay Status



Active time delay status displays time remaining until next control event.

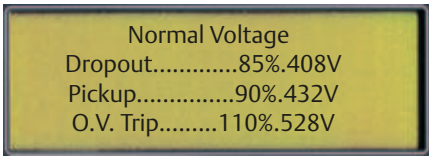
Inphase Transfer Mode



Displays the relative phase angle between sources and frequency differential to indicate the controller is awaiting an inphase condition.

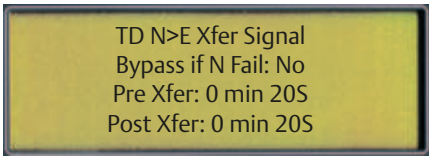
Settings

Voltage and Frequency Settings



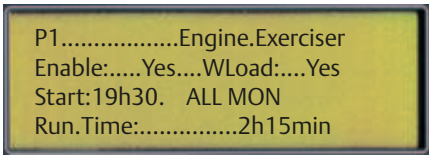
Provides voltage and frequency setting values for normal and emergency sources. Voltage pick-up, dropout and trip settings are set in percentage of nominal voltage and are also displayed in rms voltage values.

Time Delay Settings



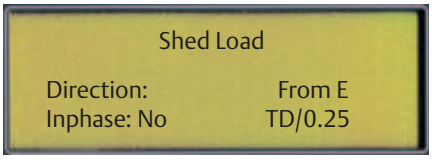
Provides direct reading display for setting time delays.

Engine Exerciser



Seven independent programs, load/no load selection, flexible run times and daily, weekly, bi-weekly and monthly exercise routines.

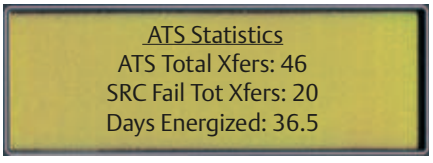
Feature Settings



Standard features can be activated with the keypad. As an example, when enabled, the "shed load" option causes the transfer switch to transfer the load off of the specified source. If desired, the load shed transfer can be made inphase.

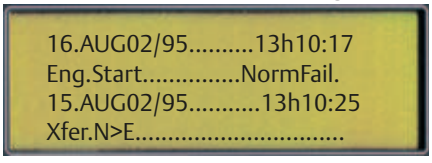
Data Logging

ATS Statistics



Instant availability of statistical information on total number of ATS transfers, number of transfers caused by power failures and total days controller has been energized, plus more.

Historical Event Log



Displays detailed information for last 99 events, including time of occurrence, length of event, date and reason for event.

ASCO® 7000 Series Ordering Information

To order an ASCO 7000 Series Power Transfer Switch, complete the following catalog number:

7 ___A___ ___TS___ + ___A___ + ___3___ + ___400___ + ___N___ + ___5X___ + ___C___

		Product		Neutral Code*		Phase Poles	Amperes	Voltage Code		Grp Code	Enclosure	
A	Automatic	TS	Conventional 2-Position	---	No Neutral	2	30	A	115	5	---	No enclosure
		TB	Open Transition Bypass	A	Solid Neutral	3	70	B	120	5X- optional acces-sories	C	Type 1 enclosure
N	Non-Automatic	CTS	Closed Transition				100	C	208		F	Type 3R enclosure
		CTB	Closed Transition Bypass	B	Switched Neutral		150	D	220		G	Type 4 enclosure
M	Manually Operated	DTS	Delayed Transition				200*	E	230		H	Type 4X enclosure (stainless steel)
		DTB	Delayed Transition Bypass	C	Overlapping Neutral		230*	F	240		L	Type 12 enclosure
							260	H	380		M	Type 3R secure double door
							400	J	400		N	Type 4 secure double door
							600	K	415		P	Type 4X secure double door
							800	L	440		Q	Type 12 secure double door
							1000	M	460		R	Type 3RX secure double door (Stainless Steel)
							1200	N	480			
							1600	P	550			
							2000	Q	575			
							2600	R	600			
							3000					
							4000					

*Notes: Conventional switch neutral is provided on delayed transition transfer products when specified.
200 and 230 amp switch limited to 480 volts maximum, on 7ATS, 7CTS and 7DTS only.

The Example Catalog Number above is 7ATSA3400N5XC
(X is used to specify optional accessories).

Transfer Switch Configurations

7A TS, 7N TS, 7A DTS, 7A CTS, 7N DTS, 7N CTS

Sizes of UL-Listed Solderless Screw-Type Terminals for External Power Connections

Switch Rating amps	Max # of Conductors per Terminal	Range of AL-CU Conductor Sizes
30 -230[3]	One	#14 to 4/0 AWG
150*, 260, 400 *150 for CTS and DTS Only	One	#4 AWG to 600 MCM
	Two	#1/0 AWG to 250 MCM
600	Two	#1/0 AWG to 600 MCM
800-1200[1]	Four	#1/0 AWG to 600 MCM
1600-2000[2]	Six	#1/0 AWG to 600 MCM
2600, 3000[2]	Twelve	#1/0 AWG to 600 MCM
4000[2]	Twelve	#2/0 AWG to 600 MCM

Notes: 1. *Unit is designed for top cable entry of emergency and load and bottom entry of normal. Optionally, the switch may be supplied with reverse source and/or bottom entry load, when specified.*

2. *All main terminals are rear connected.*

Transfer/Bypass Configurations

7A TB, 7N TB, 7A DTB, 7A CTB, 7N DTB, 7N CTB

Sizes of UL-Listed Solderless Screw-Type Terminal for Power Connections

Switch Rating amps	Max # of Conductors per Terminal	Range of AL-CU Conductor Sizes
150, 200, 230 260,400	One	# 4 AWG to 600 MCM
	Two	# 1/0 AWG to 250 MCM
600[4]	Two	# 2 AWG to 600 MCM
800,1000,1200[4]	Four	# 1/0 AWG to 600 MCM
1600-2000[4]	Six	# 1/0 AWG to 600 MCM
2600, 3000[4]	Ten	# 2 AWG to 600 MCM
4000[4]	Twelve	# 2 AWG to 600 MCM

3. *200 and 230 amp rating for copper conductors only for transfer switch configurations only.*

4. *All main terminals are rear connected. A front connected version is available in 600 and 1200 amp ratings only with top cable entry only. See pages **25-27** for dimensional data and additional information.*

5. *Type 304 stainless steel standard. Specify 316 ST. Steel for installations subject to salt water and corrosive environments*

Closed Transition and Delayed Transition Transfer Switching
7A DTS, 7A CTS, 7N DTS, 7N CTS

Switch Rating Amps	Poles	Width inches (mm)	Height inches (mm)	Depth inches (mm)
Enclosed UL Type 1[2]				
150, 260, 400	2, 3 or 3 with neutral A/B	24 (610)	56 (1422)	14 (356)
600	2, 3 or 3 with neutral A/B	24(610)	63 (1600)	17(432)
800, 1000	2, 3 or 3 with neutral A/B	34 (864)	72 (1829)	20 (508)
1200	2, 3 or 3 with neutral A/B	38 (965)	87 (2210)	23 (584)
1600, 2000[1]	2, 3 or 3 with neutral A/B	38 (965)	91 (2311)	48 (1219)
1600, 2000[3] (front connected)	2, 3 or 3 with neutral A/B	38 (965)	87 (2210)	23 (584)
3000[1]	2, 3 or 3 with neutral A/B	38 (965)	91 (2311)	60 (1524)
4000[1]	2, 3 or 3 with neutral A/C	60 (1524)	91 (2311)	72 (1829)
Open Configuration				
150, 260, 400	2, 3 or 3 with neutral B	18-1/2 (470)	25 (635)	8 (203)
600	2, 3 or 3 with neutral B	19 (483)	30 (762)	9-7/8 (251)
800, 1000, 1200	2, 3 or 3 with neutral B	27 (686)	31 (787)	12-7/8 (327)
1600, 2000	2, 3 or 3 with neutral B	33-1/4 (845)	28 (711)	26-1/4 (667)
2600, 3000	2, 3 or 3 with neutral B	33-1/4 (845)	28 (711)	30-3/4 (781)
4000	2, 3 or 3 with neutral C	60 (1524)	70 (1778)	53 (1272)

Notes:
1. Enclosures are free-standing with removable top, sides, and back.
2. Consult ASCO for dimensions on enclosures other than UL type 1.
3. Order accessory 40MY for 1600A and 40NY for 2000A front connected design.

**All dimensions and weights shown are approximate and should not be used for construction purposes. Certified dimensions can be furnished upon request.*

*** For S Frame dimensions contact ASCO.*

Shipping Weights
Closed Transition and Delayed Transition Transfer Switching
7A DTS, 7A CTS, 7N DTS, 7N CTS

Switch Rating Amps	Poles	Enclosed* lb (kg)	Open* lb (kg)
150, 260, 400	2	235 (107)	101 (46)
150, 260, 400	3	242 (110)	108 (49)
150, 260, 400	3 with B	250 (113)	115 (52)
600	2	335 (152)	107 (48)
600	3	343 (156)	115 (52)
600	3 with B	352 (159)	124(56)
800, 1000	2	420 (192)	175 (80)
800, 1000	3	450 (205)	205 (94)
800, 1000	3 with B	480 (219)	235 (108)
1200	2	710 (324)	175 (80)
1200	3	740 (337)	205 (94)
1200	3 with B	770 (351)	235 (108)
1600, 2000	2	1300 (590)	505 (229)
1600, 2000	3	1350 (612)	555 (252)
1600, 2000	3 with B	1400 (635)	605 (274)
2600, 3000	2	1555 (706)	540 (245)
2600, 3000	3	1620 (735)	660 (300)
2600, 3000	3 with B	1685 (765)	725 (329)
4000	2	1969 (893)	1258 (571)
4000	3	2149 (975)	1451 (658)
4000	3 with B/C	2328 (1056)	1623 (736)

Notes:
1. Open weights include transfer switch and control panel. 1200-4000 amp enclosures require ventilation openings, refer to drawings for details. Export shipments may require a wooden box, contact ASCO for weights and dimensions.

**All dimensions and weights shown are approximate and should not be used for construction purposes. Certified dimensions can be furnished upon request.*

*** For S Frame dimensions contact ASCO.*

Limited Guardian Warranty

ASCO Power Technologies®

7000 Series Power Transfer Switches

This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General:

ASCO Power Technologies, LP products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following Limited Guardian Warranty Against Defects in Material and Workmanship.

Please read your Guardian Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

LIMITED WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP

ASCO PRODUCTS COVERED:

Products Covered	7000 Series
Automatic Transfer Switches	7ATS, 7AUS, 7ACUS, 7ADUS
Automatic Transfer & Bypass-Isolation Switches	7ATB, 7AUB, 7ACUB, 7ADUB
Power Transfer Load Center	7000L
Manually-Operated Transfer Switches	7MTS
Automatic Closed-Transition Transfer Switches	7ACTS
Automatic Closed-Transition Transfer & Bypass-Isolation Switches	7ACTB
Non-Automatic Transfer Switches – Electrically Operated	7NTS
Automatic Delayed-Transition Transfer Switches	7ADTS
Automatic Delayed-Transition Transfer & Bypass-Isolation Switches	7ADTB
Automatic Soft Load Transfer Switches	7ASLS,7ASLD,7ASLE, 7ASUD,7ASUS
Automatic Soft Load Transfer & Bypass-Isolation Switches	7ASLB,7ASUB

Terms of Warranty:

The following Limited Warranty is conditioned upon User's compliance with the following:

1. The ASCO 7000 Power Transfer Switch is installed in accordance with ASCO specifications and state and local codes and standards by an electrician licensed in the state of installation.

2. The ASCO 7000 Power Transfer Switch is maintained in accordance with ASCO instructions and used under normal conditions for the purposes intended by ASCO.

As provided herein, the ASCO product is warranted to be free of defects in material and workmanship for a period of two, five, and ten years from date of shipment from ASCO provided that the product has been stored in a suitable environment prior to installation; except, however, for 7AUS, 7AUB, 7ASLD, 7ASLE, 7ASUD, 7ASUS, 7ASUB and 7000L products, the warranty period for the circuit breaker shall be two (2) years from date of shipment from ASCO. The product shipment date will be determined only from the ASCO bill of lading. If any part or portion of the ASCO product fails to conform to the Warranty within the Warranty period, ASCO, at its option, will furnish new or factory remanufactured products for repair or replacement of that portion or part.

YEARS 1 – 2: Covers all replacement parts, labor, and travel expenses necessary to remedy the defects in material and/or workmanship. All warranty repair or replacement of said equipment will be performed at ASCO's option at ASCO's service facility location, factory, or User's installation site by ASCO's certified service personnel as deemed most practical by ASCO.

YEARS 3 – 5: Following expiration of the initial two year warranty period as detailed herein, parts only determined to be defective will be provided at no charge. Customer is responsible for all other related costs (labor and travel expenses). This does not apply to circuit breakers in 7AUS, 7AUB, 7ASLD, 7ASLE, 7ASUD, 7ASUS, 7ASUB and 7000L products.

YEARS 6 – 10: Following expiration of year five warranty period as detailed herein, Main Contacts only determined to be defective will be provided at no charge. Customer is responsible for all other related costs (labor and travel expenses).

Optional Available Extended Warranty:

Optional extended warranty coverage may be purchased from ASCO for a specified fee at the time of the original sale. If purchased, it shall extend the coverage conditions noted for years 1-2 above up to an additional three (3) years, to provide up to five (5) years of coverage applicable to the above referenced products. Extended warranty coverage must be purchased in one (1) year increments. The length of the optional extended coverage shall be reflected on the ASCO invoice and/or order acknowledgement document. The extended warranty coverage does not affect the standard warranty described above for years 3-10 or the 2 year circuit breaker warranty; those warranty periods will remain the same.

All warranty related repairs, replacements or adjustments must be made by ASCO Services Inc. or its duly authorized representative.

Warranty Extends to First Purchaser for Use, Non-transferable:

This Warranty is extended to the first person, firm, association or corporation for whom the ASCO product specified herein is originally installed for use (the "User") in the fifty United States or Canada. This Warranty is not transferable or assignable without the prior written permission of ASCO.

Assignment of Warranties:

ASCO assigns to User any warranties which are made by manufacturers and suppliers of components of, or accessories to, the ASCO product and which are assignable, but ASCO makes NO REPRESENTATIONS as to the effectiveness or extent of such warranties, assumes NO RESPONSIBILITY for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components or accessories.

Drawings, Descriptions:

ASCO warrants for the period and on the terms of the Warranty set forth herein that the ASCO product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, to ASCO's final invoices, and to applicable ASCO product brochures and manuals current as of the date of product shipment ("Descriptions"). ASCO does not control the use of any ASCO product. Accordingly, it is understood that the Descriptions are NOT WARRANTIES OF PERFORMANCE and NOT WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

Warranty Claims Procedure:

Within a reasonable time, but in no case to exceed thirty (30) days, after User's discovery of a defect, User shall contact **ascopowerwarranty@emerson.com**. Subject to the limitations specified herein, (i) during the first two years of the warranty, an ASCO service representative will repair the non-conforming ASCO product warranted hereunder without charge for parts, labor, or travel expenses; (ii) during the remainder of the warranty, ASCO will arrange for an ASCO service representative to repair or replace the non-conforming ASCO product warranted hereunder without charge for covered parts, and User shall bear all labor, travel expenses, and shipping charges associated with repair or replacement of the product herein. Warranty coverage will apply only after ASCO's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty. All defective products and component parts replaced under this warranty become the property of ASCO.

Warranty Performance of Component Manufacturers:

It is ASCO's practice, consistent with its desire to remedy Warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the product components. Accordingly, ASCO may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in ASCO's opinion, such work can be performed in less time, with less expense, or in closer proximity to the ASCO product.

Items Not Covered By Warranty:

THIS WARRANTY DOES NOT COVER DAMAGE OR DEFECT CAUSED BY misuse, improper application, wrong or inadequate electrical current or connection, negligence, inappropriate on site operating conditions, repair by non-ASCO designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, water, or other corrosive liquids or gases, Acts of God, theft or installation contrary to ASCO's recommendations or specifications, or in any event if the ASCO serial number has been altered, defaced, or removed.

THIS WARRANTY DOES NOT COVER shipping costs, installation costs, external circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does NOT include labor costs or transportation charges arising from the replacement of the ASCO product or any part thereof or charges to remove or reinstall same at any premises of User.

REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT OR PART THEREOF DOES NOT EXTEND THE ORIGINAL WARRANTY PERIOD.

THE PRODUCTS LISTED IN THIS WARRANTY ARE NOT FOR USE IN THE CONTROL AREA OR ANY REACTOR CONNECTED OR SAFETY APPLICATIONS OR WITHIN THE CONTAINMENT AREA OF A NUCLEAR FACILITY OR FOR INTEGRATION INTO MEDICAL DEVICES.

Limitations:

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

USER'S SOLE AND EXCLUSIVE REMEDY IS REPAIR OR REPLACEMENT OF THE ASCO PRODUCT AS SET FORTH HEREIN.

IF USER'S REMEDY IS DEEMED TO FAIL OF ITS ESSENTIAL PURPOSE BY A COURT OF COMPETENT JURISDICTION, ASCO'S RESPONSIBILITY FOR PROPERTY LOSS OR DAMAGE SHALL NOT EXCEED THE NET PRODUCT PURCHASE PRICE.

IN NO EVENT SHALL ASCO ASSUME ANY LIABILITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION LOST PROFITS, BUSINESS INTERRUPTION OR LOSS OF DATA, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE.

Miscellaneous:

NO SALESPERSON, EMPLOYEE OR AGENT OF ASCO IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. Warranty terms may be modified, if at all, only in writing signed by an ASCO officer.

ASCO obligations under this Warranty are conditioned upon ASCO timely receipt of full payment of the product purchase price and any other amounts due. ASCO reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to User or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.

This Warranty shall be governed by, and construed under, the laws of the State of New Jersey, without reference to the conflict of laws principles thereof.

This Warranty represents the entire agreement between ASCO and User with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.