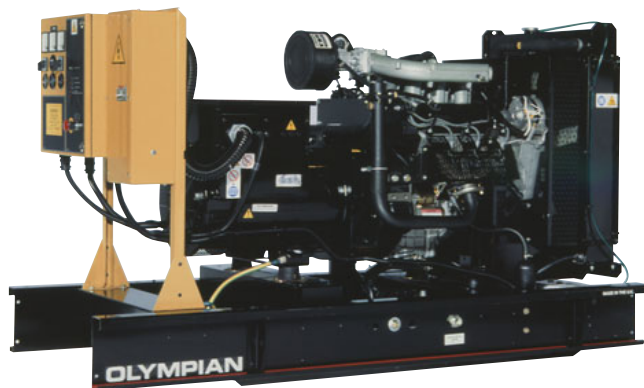


Table of Contents

Ford ESG642 Gas Engine	1
Caterpillar Generator	11
Caterpillar Electronic Modular Control Panel	19
Quantity of one (1) Caterpillar Light Remote Annunciator Module	23
Quantity of one (1) Caterpillar Engine Battery Set	27
Quantity of one (1) Caterpillar 12 VDC Engine Battery Charger	30
Quantity of one (1) Caterpillar Weatherproof Enclosure	33
Quantity of one (1) ASCO Automatic Transfer Switch	36
Startup and Site Testing	45
Warranty	55
Installation Drawings	57

Ford ESG642 Gas Engine

Exclusively from your Caterpillar® dealer



STANDBY 30-50 kW
PRIME 27-42.5 kW
60 Hz

Model	Standby — kW (kVA)		Prime — kW (kVA)	
	LP	Natural	LP	Natural
G30F3	30 (37.5)	30 (37.5)	27 (33.8)	27 (33.8)
G40F3	40 (50)	40 (50)	36 (45)	36 (45)
G50F3	50 (62.5)	45 (56.3)	42.5 (53.1)	37.5 (46.9)
G30F3S	30 (30)	30 (30)	27 (27)	27 (27)
G35F3S	35 (35)	35 (35)	31.5 (31.5)	31.5 (31.5)
G45F3S	45 (45)	42.5 (42.5)	40 (40)	36 (36)

FEATURES

GENERATOR SET

- Complete system designed and built at ISO 9001 certified facilities
- Factory tested to design specifications at full load conditions

ENGINE

- Governor, Isochronous Woodward electronic
- Electrical system, 12 VDC
- Cartridge type filters
- Battery, rack and cables
- Coolant and lube oil drains piped to edge of base

GENERATOR

- Insulation system, class H
- Drip proof generator air intake (NEMA 2, IP23)
- Electrical design in accordance with BS5000 Part 99, IEC60034-1, EN61000-6, NEMA MG-1.33

AUTOMATIC VOLTAGE REGULATOR

- Voltage within $\pm 0.5\%$ 3 Phase and $\pm 1.0\%$ Single Phase at steady state from no load to full load
- Provides fast recovery from transient load changes

COOLING SYSTEM

- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 131° F (55° C)

MOUNTING ARRANGEMENT

- Heavy-duty fabricated steel base with lifting points
- Anti-vibration pads to ensure vibration isolation
- Complete OSHA guarding
- Stub-up pipe ready for connection to silencer pipework
- Weather protective enclosures are available
- Flexible fuel lines to base with NPT connections

CIRCUIT BREAKER

- UL/CSA listed
- 3-pole with solid neutral
- NEMA 1 steel enclosure, vibration isolated
- Electrical stub-up area directly below circuit breaker

CONTROL SYSTEM

- 2001 Autostart control panel
- Vibration isolated NEMA 1 enclosure with lockable hinged door
- AC and DC wiring looms

EQUIPMENT FINISH

- All electroplated hardware
- Anticorrosive protection prior to painting
- High gloss polyurethane paint for durability and scuff resistance

QUALITY STANDARDS

- BS4999, BS5000, BS5514, EN61000-6, NEMA MG1-33, NFPA 110 (with optional equipment)

DOCUMENTATION

- Operation and maintenance manuals provided
- Wiring diagrams included

WARRANTY

- All equipment carries full manufacturer's warranty

STANDBY 30 - 50 kW
PRIME 27 - 42.5 kW
60 Hz

OLYMPIAN™

Exclusively from your Caterpillar® dealer

OPTIONAL EQUIPMENT*

ENCLOSURE

- Weatherproof enclosure (includes internal silencer system)
- Sound attenuated enclosure (includes internal silencer system)
- Panel viewing window
- External emergency stop pushbutton

SILENCER SYSTEM — OPEN UNIT

- Level 1 silencer
- Level 2 silencer
- Level 3 silencer
- Mounting kit
- Through-wall installation kits

ENGINE

- Battery heater
- Lube oil drain pump
- Lube oil sump heater

CIRCUIT BREAKER

- Auxiliary voltfree contacts
- Shunt trip (100+ amp breakers)

GENERATOR

- Anti-condensation heater
- AREP excitation system (3-Phase only)
- Generator upgrade 1 size (3-Phase only)
- Permanent magnet generator (except G30F3)

COOLING SYSTEM

- Coolant heater
- Low coolant temperature alarm
- Low coolant level shutdown
- Radiator transition flange

MOUNTING ACCESSORIES

- Seismic (Zone 4) vibration isolators

*Some options may not be available on all models. Not all options are listed.

CONTROL SYSTEM

- Control Panel Removal, AC and DC wiring looms terminated in sockets
- 4001 Autostart control panel
- 4001E Autostart control panel

FUEL SYSTEM

- LP gas (vapor)
- LP gas (liquid)
- Natural gas/LP gas (vapor) automatic changeover
- Natural gas/LP gas (liquid) automatic changeover
- Low gas pressure alarm

REMOTE ANNUNCIATORS

- 8- and 16-channel remote annunciator panel (supplied loose)
- Remote annunciator upgrade normal/run control switch
- Remote annunciator upgrade lockdown emergency stop button

MISCELLANEOUS ACCESSORIES

- Toolkit
- Additional operator's manual pack
- Special enclosure color
- UL listing / CSA certification
- French Language labels

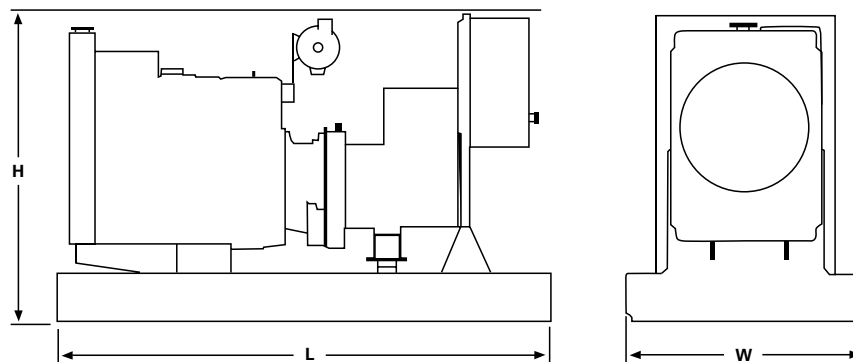
EXTENDED SERVICE CONTRACTS

- Extended Service Coverage available

TESTING

- Factory witness test (restricted to 6 hours — full load, 1.0 pf)

GENERATOR SET DIMENSIONS AND WEIGHTS



Model	Length in (mm)	Width in (mm)	Height in (mm)	Weight lbs (kg)**
G30F3	86.6 (2200)	39.4 (1000)	47.5 (1206)	1422 (645)
G40F3	86.6 (2200)	39.4 (1000)	47.5 (1206)	1543 (700)
G50F3	86.6 (2200)	39.4 (1000)	47.5 (1206)	1698 (770)
G30F3S	86.6 (2200)	39.4 (1000)	47.5 (1206)	1543 (700)
G35F3S	86.6 (2200)	39.4 (1000)	47.5 (1206)	1587 (720)
G45F3S	86.6 (2200)	39.4 (1000)	47.5 (1206)	1698 (770)

NOTE: General configuration not to be used for installation. See specific dimensional drawings for detail.

**Includes oil and coolant

STANDBY 30 - 50 kW
PRIME 27 - 42.5 kW
60 Hz

OLYMPIAN™

Exclusively from your Caterpillar® dealer

SPECIFICATIONS



GENERATOR

Voltage Regulation... ±0.5% 3 Phase and 1.0 % Single
 Phase at steady state from no load to full load
 Frequency ±0.25% for constant load,
 no load to full load
 Waveform Distortion THD less than 4%,
 Radio Interference Compliance with BS800 and
 VDE Class G&N
 Telephone Influence Factor TIF <50
 per NEMA MG 1-32.11
 Telephone Harmonic Factor THF <2%
 Stator 2/3 pitch
 Type Brushless, self excited, self-regulated,
 drip proof, 4-pole, sealed bearings,
 direct coupled by flexible disk,
 12 reconnectable leads
 Insulation Class H per NEMA MG1-1.66
 Temperature Rise Within Class H limits
 Overspeed Capability 125%
 Available Voltages 1-Phase — 120/240,
 110/220
 3-Phase — 277/480, 120/240,
 120/208,
 Deration Please consult factory
 for available outputs
 Ratings At 77° F (25° C), 500 ft. (152.4 m),
 60% humidity, 1.0 pf (1-Phase),
 0.8 pf (3-Phase)



ENGINE

Manufacturer Ford Motor Co.
 Model ESG642
 Type 4-Cycle
 Aspiration Natural
 Cylinder Configuration V6

Displacement — cu in (L) 256 (4.2)
 Bore — in (mm) 3.81 (96.8)
 Stroke — in (mm) 3.74 (95.0)
 Compression Ratio 9.3:1
 Governor
 Type Electronic
 Class A1

Piston Speed — ft/sec (m/sec) 18.7 (5.7)
 Air Cleaner Type Dry, light duty

LP Gas

Engine Speed — rpm 1800
 Max Power at Rated rpm — hp (kW)
 Standby 77.4 (57.8)
 Prime 66.2 (49.4)
 BMEP — psi (kPa)
 Standby 133.2 (918)
 Prime 114 (786)

Natural Gas

Engine Speed — rpm 1800
 Max Power at Rated rpm — hp (kW)
 Standby 69.6 (51.9)
 Prime 59.4 (44.3)
 BMEP — psi (kPa)
 Standby 119.8 (826)
 Prime 102.2 (705)



CONTROL PANEL

NEMA 1 steel enclosure with lockable hinged door
 Vibration isolated mounted Autostart control panel
 Single location customer connector point
 Electrical stub-up area directly below control panel

RATING DEFINITIONS

Standby — Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO8528-3).

Prime — Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10 percent overload power for 1 hour in 12 hours.

Consult your Olympian representative for more information.

www.CAT-ElectricPower.com

© 2005 Caterpillar
 All rights reserved.
 Printed in U.S.A.

STANDBY 30/30 kW
PRIME 27/27 kW
60 Hz

OLYMPIAN™

Exclusively from your Caterpillar® dealer

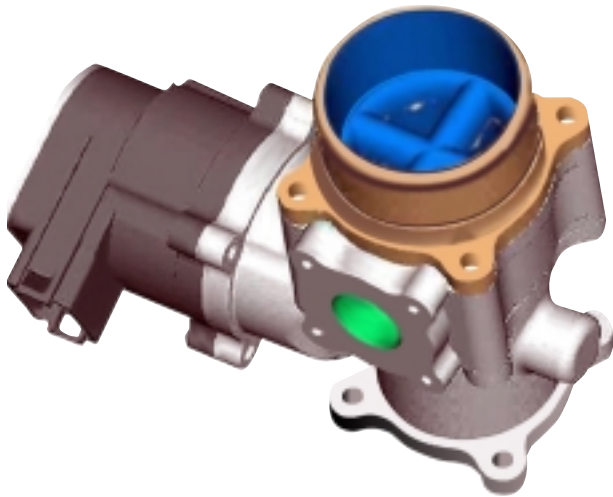
G30F3 (3-Phase)

Materials and specifications are subject to change without notice.

Generator Set Technical Data — 1800 rpm/60 Hz		LP Gas		Natural Gas	
		Standby	Prime	Standby	Prime
Power Rating	kW (kVA)	30.0 (37.5)	27.0 (33.8)	30.0 (37.5)	27.0 (33.8)
Lubricating System Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Type Required: API CF-4 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	1.5 (5.7) 1.2 (4.7)	1.5 (5.7) 1.2 (4.7)	1.5 (5.7) 1.2 (4.7)	1.5 (5.7) 1.2 (4.7)
Fuel System Generator Set Fuel Consumption 100% Load 75% Load 50% Load	Cfh (m³/hr) Cfh (m³/hr) Cfh (m³/hr)	164 (4.7) 124 (3.5) 85 (2.4)	147 (4.2) 112 (3.2) 74 (2.1)	454 (12.9) 345 (9.8) 236 (6.7)	410 (11.6) 306 (8.7) 204 (5.8)
Engine Electrical System Ignition System: Electronic, Distributorless Voltage/Ground: 12/Negative Battery Charging Generator Ampere Rating	Amps	95	95	95	95
Cooling System Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Water Temperature to Engine Temperature Rise Across Engine (Air) Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H ₂ O (m H ₂ O) U.S. gal/hr (L/min) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	5.3 (20) 32.4 (9.8) 1236 (79.5) 169 (76) 9 (5) 1182 (20.8) 932 (16.4) 1.88 (1.4)	5.3 (20) 32.4 (9.8) 1236 (79.5) 169 (76) 9 (5) 1069 (18.8) 847 (14.9) 1.88 (1.4)	5.3 (20) 32.4 (9.8) 1236 (79.5) 169 (76) 9 (5) 1182 (20.8) 932 (16.4) 1.88 (1.4)	5.3 (20) 32.4 (9.8) 1236 (79.5) 169 (76) 9 (5) 1069 (18.8) 847 (14.9) 1.88 (1.4)
Air Requirements Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Generator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m³/min) In H ₂ O (kPa) Cfm (m³/min) Cfm (m³/min) In H ₂ O (kPa) Cfm (m³/min)	53 (1.5) 10.1 (2.5) 6356 (180) 381 (10.8) 0.5 (0.125) 4238 (120)	50 (1.4) 10.1 (2.5) 6356 (180) 381 (10.8) 0.5 (0.125) 4238 (120)	53 (1.5) 10.1 (2.5) 6356 (180) 381 (10.8) 0.5 (0.125) 4238 (120)	50 (1.4) 10.1 (2.5) 6356 (180) 381 (10.8) 0.5 (0.125) 4238 (120)
Exhaust System Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m³/min) °F (°C)	4.5 (15.3) 141 (4) 1080 (584)	4.5 (15.3) 131 (3.7) 1054 (570)	4.5 (15.3) 141 (4) 1080 (584)	4.5 (15.3) 131 (3.7) 1054 (570)
Generator Set Noise Rating* (Without Attenuation) at 3 ft (1 m)	dB(A)	88	88	88	88

Generator Technical Data	277/480V	120/240V	120/208V
Motor Starting Capability: (kVA) (30% Voltage Dip) Self Excited AREP Excited	72 85	54 64	54 64
Full Load Efficiencies (LPG): Standby Prime	90.1 90.4	89.0 89.5	89.0 89.5
Reactances (per unit): Reactances shown are applicable to the LPG standby rating	X _d 2.21 X' _d 0.12 X'' _d 0.058 X _q 1.10 X'' _q 0.083 X ₂ 0.071 X ₀ 0.006	2.94 0.16 0.078 1.47 0.110 0.094 0.007	2.94 0.16 0.078 1.47 0.110 0.094 0.006
Time Constants:	t' _d 25 ms	t'' _d 2.5 ms	t' _{do} 469 ms t _a 4 ms

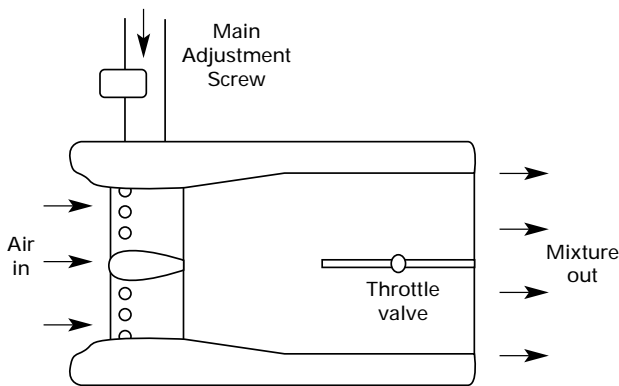
* dB(A) levels are for guidance only



LC50

The LC-50 is a fuel mixer standard on all Isuzu and Ford gas powered generator sets. It consists of a die-cast aluminum throttle body, integrated gas mixer featuring a venturi style annular ring mixer with no moving parts for superior mixing, plus a fully programmable; integrated digital speed control and bi-directional actuator. The actuator connects directly to the butterfly throttle valve which regulates the amount of air/fuel mix being supplied to the engine.

When the engine is cranked, the flow of air through the venturi ring mixer draws in gas. As the airflow increases, more gas is drawn in, maintaining the air/fuel ratio under all load conditions. This system requires that the pressure of the gas be regulated to zero pressure and that the flow of gas can be metered as required. For this reason, a Zero Pressure Regulator (ZPR) is incorporated between the gas supply and the LC50 unit, during running the gas flow to the LC50 is metered by means of the main adjustment screw (MAS), which is adjusted to give good air/fuel ratio for all load conditions.



The system operates using a tailored software configuration for the specific engine to which it is fitted and can operate using both natural gas (NG) and LPG.

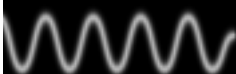
When using LP liquid, the regulator is replaced with a vaporizer, which uses the heat from the engine coolant to assist in vaporizing the fuel before reaching the LC50 unit.

www.CAT-ElectricPower.com

© 2003 Caterpillar
All rights reserved.
Printed in U.S.A.

LEHF1867-03 (08-03)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

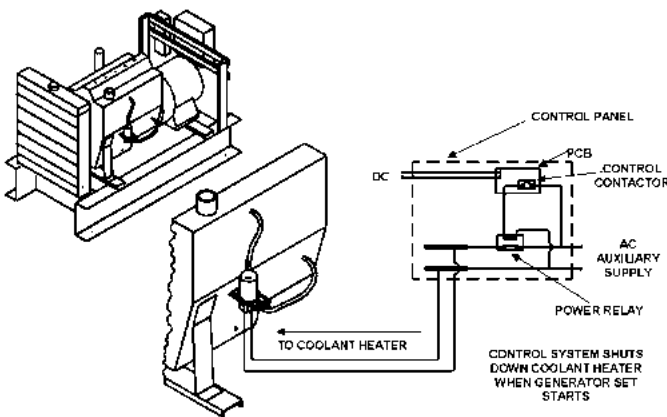




COOLANT HEATER WHH

Appropriate when the generator set is to be sited in a low ambient environment, the heater maintains the engine coolant at a temperature (typically 100°F (38°C)) which facilitates rapid starting and load acceptance. The heater assembly uses UL compliant components (to UL1030) and has CSA certification which is to both CSA & UL standards.

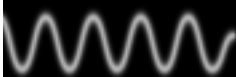
The heater itself is powered by a 110/120 (VAC 120) volt or 208/240 volt (VAC 240) AC auxiliary supply protected by a safeguard breaker inside the main control panel. A thermostatic controller is included to regulate the output temperature to within safe limits. When the generator set is not running, 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.



FEATURES

- Molded from Polyphenylene Sulfide
- Rust free, corrosion resistant with exceptional tensile strength
- Vibration and shock tested to extreme limits to ensure durability
- Compatible with all coolant additives
- Incoloy element for longer service life

LEHX0484-05 (02-05)



WHERE THE WORLD TURNS FOR POWER

VAC 120

3 Phase Generator Set Models Diesel	3 Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D13P2-D20P4, D20P1-D75P3	G12U3-G50F3	750	1000
D90P1 - D150P1, D125P2	G60F3-G125G1	1125	1500
D200P3	NA	1500	2000
Single Phase Generator Set Models Diesel	Single Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D13P2S - D20P4S	G10U3S - G25UH3S	750	1000
D20P1S - D60P3S, D25P4S-D100P4S	G20F3S-G45F3S	1125	1500
D75P1S - D100P1S,	G55F3S-G100F3S	1125	1500

VAC 240

3 Phase Generator Set Models Diesel	3 Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D20P1 - D75P3, D25P4 - D100P4	G30F3-G50F3	750	1000
D90P1 - D150P1, D125P2	G60F3-G125G1	1125	1500
D200P3	NA	1500	2000
Single Phase Generator Set Models Diesel	Single Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D20P1S - D60P3S, D25P4S - D100P4S	G30F3S-G45F3S	750	1000
D75P1S - D100P1S,	G55F3S-G100F3S	1125	1500

www.CAT-ElectricPower.com

© 2005 Caterpillar
All rights reserved.
Printed in U.S.A.



**ULCERT
UL2200 LISTING**

Includes the following:

ALTERNATOR

An alternator manufactured by Leroy Somer with UL Recognized insulation system (UL1446).

PMG Alternators are available. The automatic voltage regulators used on Olympian sets are UL Recognized.

ELECTRONICS

The AC and DC wiring harnesses are made with UL Listed cable. The power wiring harnesses are made with UL Listed cable and UL Recognized lugs, and Circuit breakers are UL Listed.

CONTROL PANEL

The control panel wiring is made with UL Listed cable. Control Panel components are UL Listed and used in line with UL Listed or Recognized approval (UL508A).

NOTE: UL Listing is applicable to the 2001C, 4001C, 4001EC, EMCP 3.1 and EMCP 3.2 control panels.

TESTING

All UL Listed sets are rigorously tested in line with UL certification requirements.

LABELING

Labeling meets UL requirements. UL listing on Rating Plate, generally affixed to the alternator, example below.



MANUFACTURED IN THE UNITED KINGDOM EXCLUSIVELY
FOR CATERPILLAR DEALERS

OLYMPIAN™  **OLYMPIAN POWER SYSTEMS**
 OLYMPIAN is a trademark of CATERPILLAR Inc. LISTED 30 FN 114 MAWSONS WAY
 NEWBERRY
 SOUTH CAROLINA 29108

LEHF1263-10 (02-05)

Exclusively from your Caterpillar® dealer

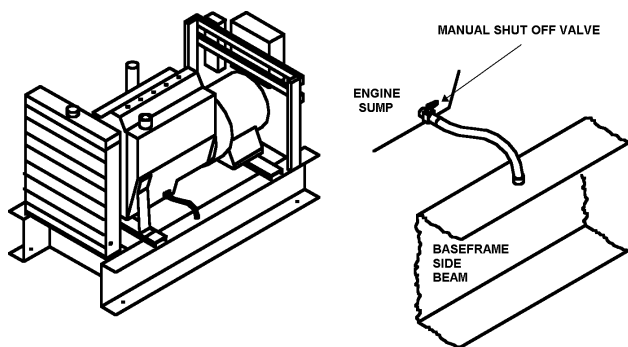


LUBV1 LUBE OIL DRAIN

The engine lubrication oil sump is piped to the edge of the generating set skidbase using a heavy duty non-hydrscopic flexible hosing.

A manual shutoff valve is installed between the engine lubrication oil sump and the flexible hosing. By ensuring the valve remains shut when not in use, the risk of oil leaks due to typical wear and tear of the hosing is removed. This arrangement provides access for the convenient drainage of the lubrication oil at the edge of the generating set skidbase, and therefore removing the need to place specially designed trays under the engine sump.

The LUBV1 is installed as standard on all generating sets fitted with sound attenuated or super sound attenuated enclosures.



www.CAT-ElectricPower.com

© 2003 Caterpillar
All rights reserved.
Printed in U.S.A.

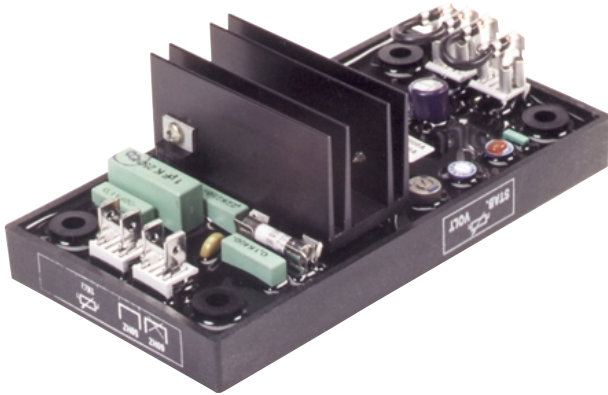
European Sourced

LEHF1164-02 (07/03)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

Caterpillar Generator

Exclusively from your Caterpillar® dealer



AUTOMATIC VOLTAGE REGULATOR – R230

The circuitry of the R230 Automatic Voltage Regulator (AVR) provides closed loop control of the generator output voltage by regulating the exciter field current. The R230 is powered by the shunt field excitation system and is fitted as standard on :

- 1000 Series generators
- 2000 Series generators
- 3000 Series generators

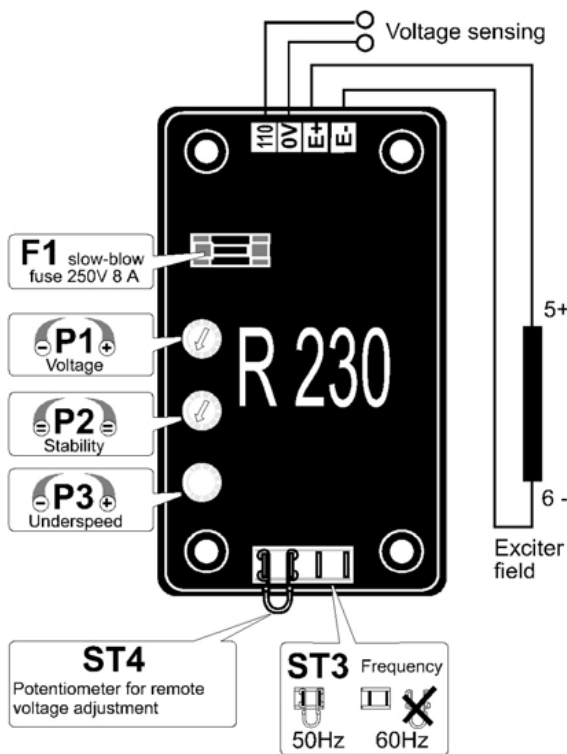
SPECIFICATION

- Steady state voltage regulation $\pm 0.5\%$
- Voltage supply and sensing 85 to 139 volts (50/60 Hz)
- Rapid response time (500ms) for a transient voltage variation amplitude of $\pm 20\%$
- Capable of remote voltage adjustment: $\pm 5\%$

ADJUSTMENT CAPABILITY

The R230 AVR features the following adjustment capabilities. (Please note that no adjustments should be made prior to careful consultation of the generator installation and maintenance manual)

- Generator output voltage adjustment
- Stability adjustment
- Underspeed threshold adjustment
- 50Hz or 60Hz frequency option
- Remote voltage adjustment option



www.CAT-ElectricPower.com

© 2003 Caterpillar
All rights reserved.
Printed in U.S.A.

Global Sourced

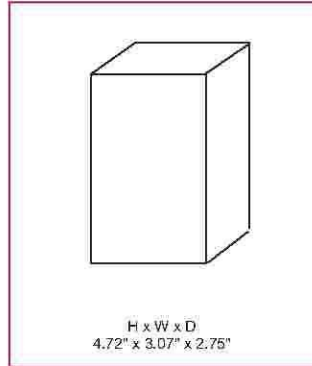
LEHX0479-04 (05/03)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

S1

100A

Standard thermal-magnetic



General

The S1 breaker family ranges from 15 through 100 amperes. The S1 trip mechanisms are non-interchangeable and use sensitive electromagnetic relays for overcurrent trip protection. Heat sensitive bimetals are used for thermal rating of the breaker. Lugs are included with the S1 breaker.

Number of poles

The S1 is available in three pole or four pole versions. The four pole version is IEC only. For price estimate of a four pole device, add 35% to list price of selected version three pole breaker, contact ABB Control for details.

Accessory mounting

Shunt trips or undervoltage releases mount in the left cavity. Auxiliary or bell alarm switches mount in the right cavity.

Reverse feeding

All versions of the S1 family are suitable for reverse feed applications.

UL489 / CSA C22.2 Interrupting capacity (kA RMS)

Voltage	Continuous rating	N
240VAC	15 – 100A	50kA
277/480VAC	15A 20 – 100A	14kA 20kA

IEC-947 Interrupting capacity (kA RMS)

Voltage	Continuous rating	N
230VAC 380/400/415VAC 440VAC 500VAC	15 – 100A	40kA 25kA 16kA 12kA

S1N

Breaker	IC at 480 VAC	Rating	Magnetic	3 pole catalog number
S1N	14kA	15A	500A	S1N015TL
		20A	500A	S1N020TL
	20kA	25A	500A	S1N025TL
		30A	500A	S1N030TL
		40A	500A	S1N040TL
		50A	500A	S1N050TL
		60A	600A	S1N060TL
		70A	700A	S1N070TL
		80A	800A	S1N080TL
		90A	900A	S1N090TL
		100A	1000A	S1N100TL

15

© Not UL approved for field installation.

GAS GENERATOR SET ENGINE/GENERATOR CORRELATION TABLES

GAS FUELED THREE PHASE							
MODEL	ENGINE	STANDARD GENERATOR			OVERSIZE GENERATOR		
		SHUNT	AREP	PMG	SHUNT	AREP	PMG
G12U3	4ZB1	LUA1014HX	None	None	None	None	None
G15U3	4ZB1	LUA1014NX	None	None	None	None	None
G20UH3	4ZB1	LUA1012JX	None	None	None	None	None
G25UH3	4ZB1	LUA1012NX	None	None	None	None	None
G20F3	LRG425	LF1014NX	None	None	LF1014Q	None	None
G25F3	LRG425	LF1014QX	None	None	LL1014S	None	None
G30F3	ESG642	LL1014S	LL1024S	None	LL2014B	LL2024B	LL2034B
G40F3	ESG642	LL2014B	LL2024B	LL2034B	LL2014D	LL2024D	LL2034D
G50F3	ESG642	LL2014D	LL2024D	LL2034D	LL2014H	LL2024H	LL2034H
G60F3	WSG1068	LL2014H	LL2024H	LL2034H	LL2014J	LL2024J	LL2034J
G80F3	WSG1068	LL3014B	LL3024B	LL3034B	LL3014F	LL3024F	LL3034F
G100F3	WSG1068T	LL3014B	LL3024B	LL3034B	LL3014F	LL3024F	LL3034F
G125G1	GM8100	LL3014F	LL3014F	LL3024F	LL3014H	LL3024H	LL3034H

GAS FUELED SINGLE PHASE							
MODEL	ENGINE	STANDARD GENERATOR			OVERSIZE GENERATOR		
		SHUNT	AREP	PMG	SHUNT	AREP	PMG
G10U3S	4ZB1	LUB1014HX	None	None	None	None	None
G15U3S	4ZB1	LUB1014NX	None	None	None	None	None
G17.5UH3S	4ZB1	LUB1012JX	None	None	None	None	None
G25UH3S	4ZB1	LUB1012NX	None	None	None	None	None
G20F3S	LRG425	LF1014QX	None	None	None	None	None
G25F3S	LRG425	LFB1014SX	None	None	None	None	None
G30F3S	ESG642	LL2014B	None	LL2034B	None	None	None
G35F3S	ESG642	LL2014D	None	LL2034D	None	None	None
G45F3S	ESG642	LL2014H	None	LL2034H	None	None	None
G55F3S	WSG1068	LL2014J	None	LL2034J	None	None	None
G75F3S	WSG1068	LL3014B	None	LL3034B	None	None	None
G100F3S	WSG1068T	LL3014H	None	LL3034H	None	None	None

None- not in pricebook

LEHX0647-04 (10-03)



FRAME 1014S / 1024S WINDING 6



MODELS LL1014S(X) / LL1024S(X) (inc LF)

REF: F1004SW6-0 AUGUST 2002

WINDING DETAILS

Code	6	Insulation class	H
Phase	3	Leads	12
Pole number	4	Pitch	2/3

MECHANICAL DETAILS

Standard protection	IP23	
Overspeed	rpm	2250
Air flow 50Hz/60Hz	m ³ /s	0.15 / 0.18

EXCITATION DETAILS

Excitation system	SHUNT	AREP
AVR model	R230	R438
Sustained short-circuit current	-	300%:10s
Steady state voltage regulation	±0.5%	±0.5%

WAVEFORM

Line voltage on no load or balanced linear rated load

Total harmonic content THC	<4%
Telephone influence factor TIF (NEMA)	<50
Telephone harmonic factor THF (IEC)	<2%

LINE VOLTAGE *No overvoltage tolerance for 440V 50Hz excitation level*

Frequency / speed	V	50Hz / 1500rpm				60Hz / 1800rpm					
		380	400	415	440	380	400	416	440	460	480
Series star	V	380	400	415	440	380	400	416	440	460	480
Series delta	V	220	230	240		220	230	240			
Parallel star	V		200	208	220		200	208	220	230	240

RATING *Power factor 0.8, Altitude ≤1000m*

Class	Rating	kVA	380	400	415	440	380	400	416	440	460	480
Class H rise BR	125/40	kVA	30.0	30.0	30.0	30.0	34.0	35.0	36.0	37.0	38.0	39.0
		kW	24.0	24.0	24.0	24.0	27.2	28.0	28.8	29.6	30.4	31.2
Class H rise PR	150/40	kVA	31.8	31.8	31.8	31.8	36.0	37.1	38.2	39.2	40.3	41.3
		kW	25.4	25.4	25.4	25.4	28.8	29.7	30.6	31.4	32.2	33.0
Class H rise PR	163/27	kVA	33.0	33.0	33.0	33.0	37.0	39.0	40.0	41.0	42.0	43.0
		kW	26.4	26.4	26.4	26.4	29.6	31.2	32.0	32.8	33.6	34.4
Class F rise BR	105/40	kVA	27.3	27.3	27.3	27.3	30.9	31.9	32.8	33.7	34.6	35.5
		kW	21.8	21.8	21.8	21.8	24.8	25.5	26.2	26.9	27.7	28.4

EFFICIENCIES *Power factor 0.8*

Efficiency	Class	%	380	400	415	440	380	400	416	440	460	480
110%	Class H BR	%	88.9	89.3	89.4	89.4	88.4	88.8	89.1	89.5	89.7	89.9
100%	Class H BR	%	89.3	89.6	89.7	89.6	88.9	89.3	89.5	89.9	90.0	90.2
75%	Class H BR	%	90.2	90.3	90.2	89.9	90.0	90.3	90.4	90.6	90.7	90.7
50%	Class H BR	%	90.4	90.1	89.8	89.0	90.6	90.5	90.6	90.6	90.4	90.3
25%	Class H BR	%	87.8	87.1	86.3	84.7	88.6	88.4	88.2	87.7	87.3	86.8

CHARACTERISTIC PARAMETERS *Reactance base class H BR rating*

Parameter	Unit	380	400	415	440	380	400	416	440	460	480
K _c Short-circuit ratio		0.49	0.54	0.65	0.74	0.35	0.37	0.38	0.42	0.49	0.54
X _d D-Axis synchronous reactance (unsaturated)	pu	2.14	1.93	1.79	1.59	2.91	2.70	2.57	2.36	2.22	2.09
X _d ['] D-Axis transient reactance (saturated)	pu	0.11	0.10	0.10	0.08	0.15	0.14	0.14	0.13	0.12	0.11
X _d ^{''} D-Axis sub-transient reactance (saturated)	pu	0.057	0.051	0.048	0.042	0.077	0.072	0.068	0.063	0.059	0.055
X _q Q-Axis synchronous reactance (unsaturated)	pu	1.07	0.96	0.90	0.80	1.45	1.35	1.28	1.18	1.11	1.04
X _q ['] Q-Axis sub-transient reactance (saturated)	pu	0.079	0.072	0.067	0.059	0.108	0.100	0.095	0.088	0.082	0.078
X ₂ Negative-sequence reactance (saturated)	pu	0.068	0.061	0.057	0.051	0.093	0.086	0.082	0.075	0.071	0.067
X ₀ Zero-sequence reactance (independent)	pu	0.005	0.005	0.004	0.004	0.007	0.006	0.006	0.006	0.005	0.005
T _d D-Axis transient time constant	ms		25					25			
T _d ['] D-Axis sub-transient time constant	ms		2.5					2.5			
T _{do} D-Axis open-circuit time constant	ms		469					469			
T _a Armature time constant	ms		4					4			
T _r Voltage recovery time	ms		< 500					< 500			

EXCITATION VOLTAGE AND CURRENT

Quoted for SHUNT. For AREP multiply voltage by 0.5 and multiply current by 2

Parameter	Unit	380	400	415	440	380	400	416	440	460	480
No load excitation voltage	V	10.6	11.6	12.5	14.2	8.3	8.7	9.2	9.9	10.6	11.6
No load excitation current	A	0.45	0.49	0.53	0.60	0.35	0.37	0.39	0.42	0.45	0.49
Class H BR excitation voltage	V	32.3	32.5	32.7	33.9	32.1	31.8	32.2	32.3	32.8	33.3
Class H BR excitation current	A	1.37	1.38	1.39	1.44	1.36	1.35	1.36	1.37	1.39	1.41

WINDING RESISTANCE *At 20°C*

Parameter	Ω	Value	Parameter	Ω	Value
Stator line-to-line (series star)	Ω	0.381	Exciter field (series connection -SHUNT)	Ω	23.60
Main field	Ω	3.70	Exciter field (parallel connection -AREP)	Ω	5.90

According to: IEC 60034, UTE NFC51.111, VDE 0530, BS 4899/5000, NEMA MG 1-33

Values quoted are typical. In line with our policy of continuous improvement, we reserve the right to change specification without notice.

FRAME 1014S / 1024S WINDING 6

OLYMPIAN™
GENERATOR SETS

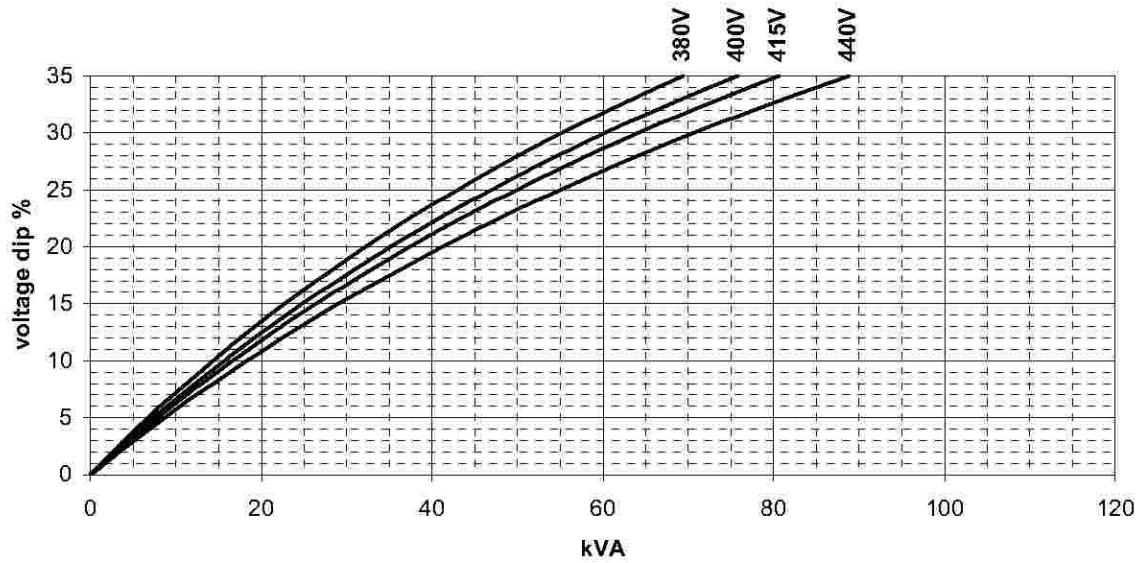
MODELS LL1014S(X) / LL1024S(X) (inc LF)

REF: F1004SW6-0 AUGUST 2002

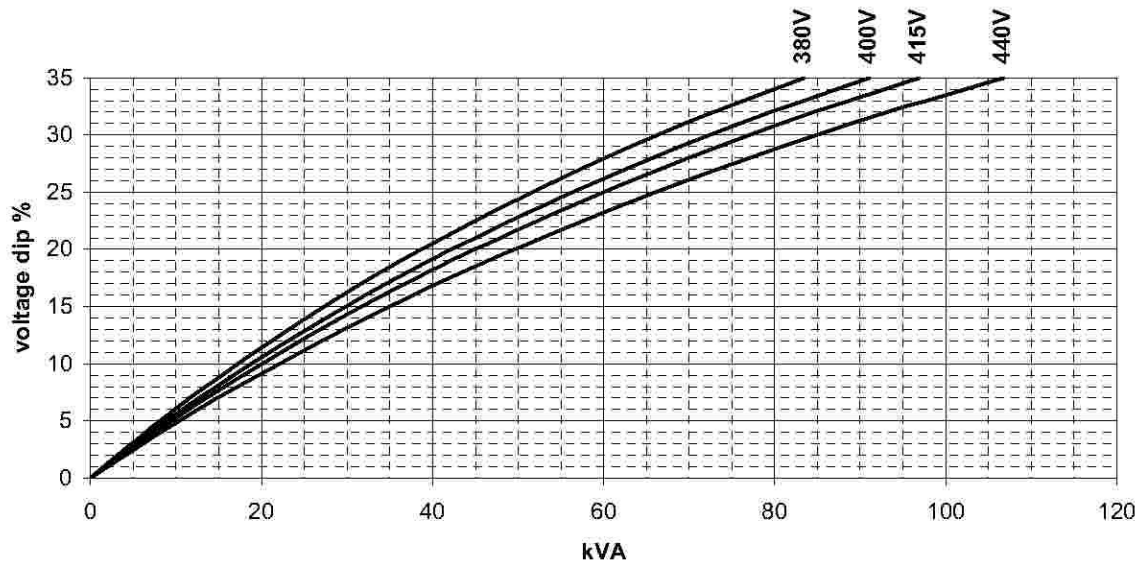
LOCKED ROTOR MOTOR STARTING CURVES

Power factor 0.6

50 Hz SHUNT



50 Hz AREP



According to: IEC 60034, UTE NFC51.111, VDE 0530, BS 4999/5000, NEMA MG 1-33

Values quoted are typical. In line with our policy of continuous improvement, we reserve the right to change specification without notice.

FRAME 1014S / 1024S WINDING 6

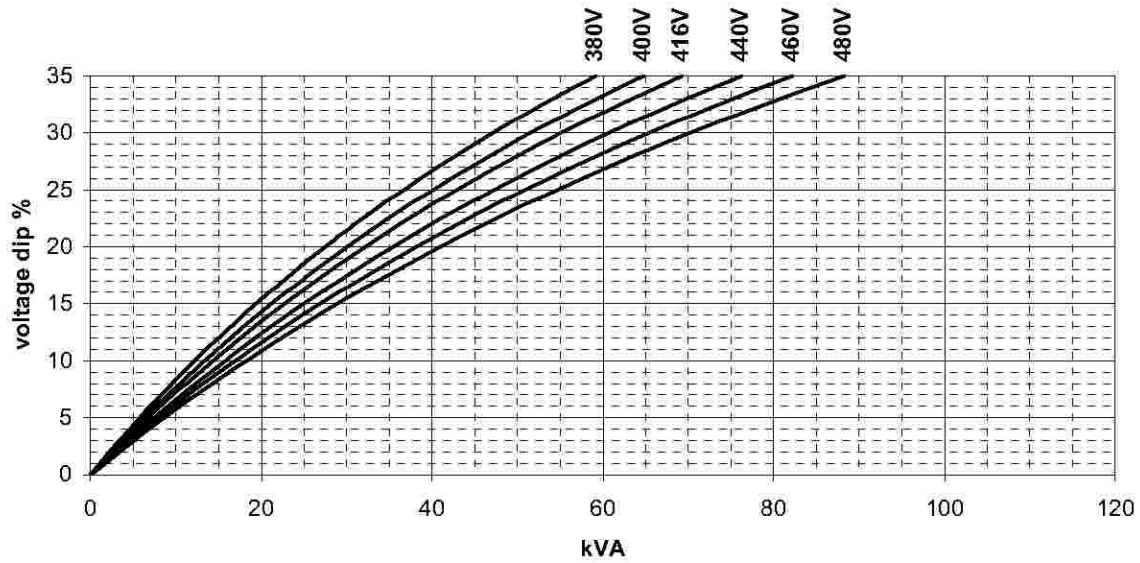


MODELS LL1014S(X) / LL1024S(X) (inc LF)

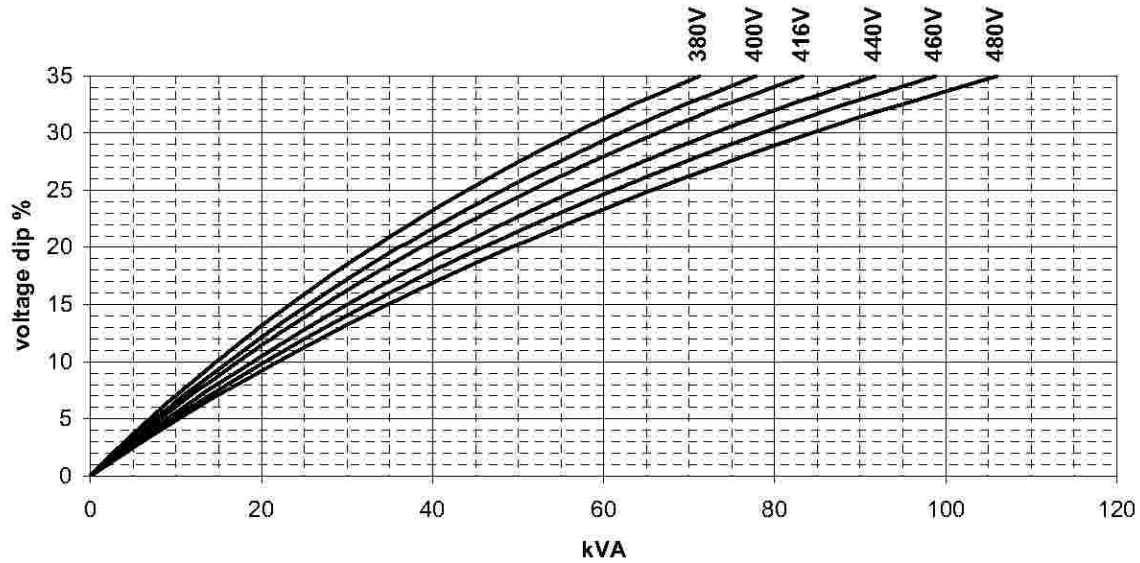
REF: F1004SW6-0 AUGUST 2002

LOCKED ROTOR MOTOR STARTING CURVES Power factor 0.6

60 Hz SHUNT



60 Hz AREP



According to: IEC 60034, UTE NFC51.111, VDE 0530, BS 4999/5000, NEMA MG 1-33
Values quoted are typical. In line with our policy of continuous improvement, we reserve the right to change specification without notice.

MODELS LL1014S(X) / LL1024S(X) (inc LF)

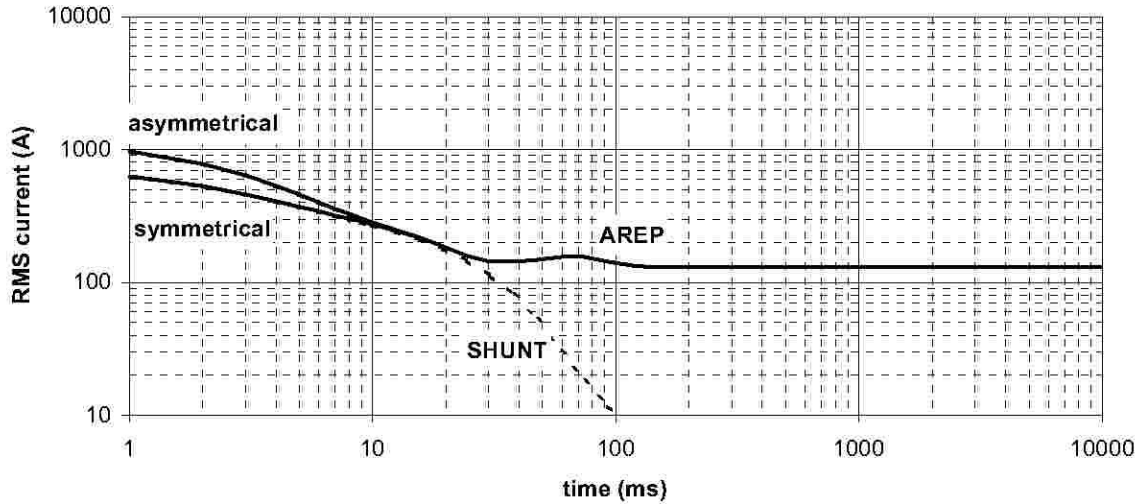
REF: F1004SW6-0 AUGUST 2002

THREE-PHASE SHORT-CIRCUIT DECREMENT CURVES

No-load excitation at rated speed

400V 50Hz, 480V 60Hz

Series Star



Multiplication Factors

50Hz Voltages	380	400	415	440
Multiplication Factor	0.95	1.00	1.04	1.10

Apply factor up to 2xT'd, remainder of curve unchanged

60Hz Voltages	380	400	416	440	460	480
Multiplication Factor	0.79	0.83	0.87	0.92	0.96	1.00

Apply factor up to 2xT'd, remainder of curve unchanged

Winding Connection	Series Star	Parallel Star	Series Delta
Multiplication Factor	1.00	2.00	1.73

Apply factor to the complete curve

According to: IEC 60034, UTE NFC51.111, VDE 0530, BS 4999/5000, NEMA MG 1-33

Values quoted are typical. In line with our policy of continuous improvement, we reserve the right to change specification without notice.

Caterpillar Electronic Modular Control Panel

EMCP 3.2 GENSET CONTROLLER



EMCP 3.2

The EMCP 3.2 control panel is a feature packed solution to control, monitor and communicate with your generator set. It includes both manual and automatic start / stop and an engine cool down timer. The 32-bit microprocessor-based system eliminates individual meters, gauges and switches, reduces wiring and results in a highly durable and robust system.

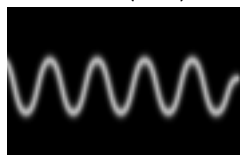
The EMCP 3.2 panel combines generator set control and monitoring in one module for easy access to controls, metering, protection device settings and diagnostic information.

The EMCP 3.2 panel has an accessory data link allowing the connection of annunciator modules and a Modbus data link allowing remote customer monitoring.

FEATURES

- Fully featured power metering, protective relaying and expanded AC metering
- Real-time clock allows for time stamping of diagnostics & events in the control's logs
- Programmable protective relaying, available as alarm and shutdown, protects against undervoltage, overvoltage, underspeed, overspeed, underfrequency, overfrequency
- Expanded remote customer communications are supported by MODBUS protocol using RS-485, which easily interfaces with existing plant systems and equipment
- Digital, 32-bit microprocessor-based system eliminates the need for multiple switches, meters, transducers, relays, and sending units, which translates to less wiring and fewer opportunities for mechanical failures
- Simultaneous viewing of all AC L-L voltages, all AC L-N voltages, or all AC line currents saves time
- User-friendly, convenient, customer programmability directs the customer to logical parameter groups (Ex. AC metering, protective relaying, engine monitoring) for quick keypad access
- Set points & software are stored in nonvolatile memory, preventing loss during a power outage
- True RMS sensing ensures AC metering accuracy of 1% for AC voltage, current, and power parameters
- Five levels of security allow operators to have different access privileges
- Display available in English, French or Spanish, switchable to Technician English for Service

LEXF4914-01 (10-04)



WHERE THE WORLD TURNS FOR POWER

STANDARD FEATURES

EMCP 3.2	
STANDARD FEATURES	
Panel construction and finish	Components installed in a heavy duty sheet steel enclosure Phosphate chemical pre-coating of steel provides corrosion resistant surface Polyester composite powder topcoat forms high gloss and extremely durable finish
Mounting	Mounted to generating set baseframe on robust steel stand Vibration isolated from generating set
Instrumentation	LCD Display with adjustable contrast and backlight with auto power off AC metering: Volts 3-phase (L-L & L-N); Amps (per phase & average); Frequency; kW (total & per phase); kVA (total & per phase); kVAR (total & per phase); Power Factor (overall & per phase); kW hours; kVAR hours DC metering: Battery Volts; Engine Hours run; Engine Jacket Water Temperature (in °C or °F); Lube Oil Pressure (in psi, kPa or bar); Engine Speed (rpm); Crank attempt counter; Start counter
Protection	Fail to start shutdown Low oil pressure shutdown High engine temperature Approaching high coolant temperature alarm Approaching low oil pressure alarm Not in auto mode alarm Underspeed / Overspeed Loss of Engine Speed Detection Low / High battery voltage Battery charger failure (if fitted) Under volts, Over volts Under frequency, Over frequency Overcurrent 4 spare fault channels 20 Event fault log (name of event, engine hours at first occurrence of event, time stamp at first occurrence, engine hours at latest occurrence of event, time stamp at latest occurrence, number of occurrences of event)
Controls	2 LED status indicators (1 red shutdown, 1 amber warning) Run key and LED indicator Auto key and LED indicator Stop key and LED indicator Lamp test key Alarm acknowledge key Menu navigation keys Engine and AC metering shortcut keys All control module keys have tactile feedback Lock down emergency stop push button
Languages	English, French or Spanish
Other features	Real time clock Service interval counter CAN 2 accessory data link – for additional modules: remote annunciator, discrete input/output module Modbus communications on 2 wire half duplex RS485 connection for remote customer monitoring

OPTIONAL FEATURES

EMCP 3.2
OPTIONAL FEATURES
MCM5 Remote annunciator
MCM2 Close remote monitoring and control, MCM3 Distance remote monitoring and control via telephone line
Battery chargers: PBC5L 120V AC, PBC3UL UL 3A 120V AC, PBC10UL UL 10A 120V AC, PBC5 240V AC, PSB3 240V AC + Boost, PSB3L 110V AC + boost, PMBCUL5 UL 5A 120V AC
WHL Engine coolant heater controls
PAC1 Volt free contacts for common alarm
PGR1 Volt free contact for genset running
PAA1 Audible alarm
PSB5 Lockdown emergency stop button with security key
PSV1 Volts adjust potentiometer
PSS1 Speed adjust potentiometer
Spare shutdown/alarm channel can include FSS2 Low fuel level alarm, PFS2 Panel circuit for low fuel level alarm, FSS1 Low fuel level shutdown, PFS1 Panel circuitry for low fuel level shutdown, FSS5 High fuel level, PFS5 Panel circuitry for high fuel level alarm, LGA1 Low gas pressure alarm, LUBS1 High lube oil temperature shutdown, WCA1 Low coolant temperature alarm, WSS1 Low coolant level shutdown

Note: All options are not available on all genset models.

NFPA 110 requirements include:
PFS2/FSS2 Low fuel level alarm
WSS1 Low coolant level shutdown
WCA1 Low coolant temperature alarm
PSV1 Volts adjust potentiometer
PAA1 Panel mounted audible alarm
A battery charger and battery charger ammeter, an engine heater or battery heater may be required depending on the application

Quantity of one (1) Caterpillar Light Remote Annunciator Module



ANNUNCIATOR

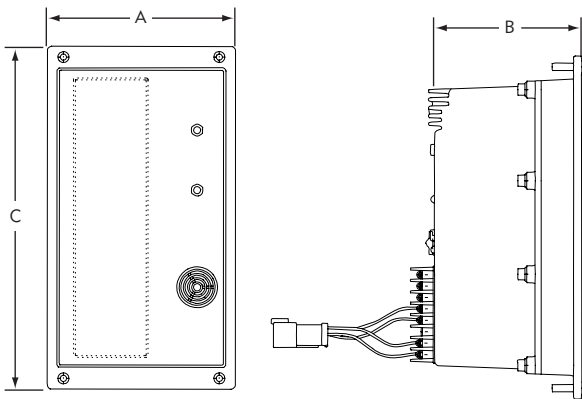
The EMCP Annunciator is a 16-channel display unit for remotely indicating the status of a generating set fitted with the EMCP3.2 panel. The annunciator communicates with the EMCP3.2 panel via the accessory J1939 data link and can be mounted up to 800 feet away from the generating set.

Each channel on the annunciator has two LED's and can be individually configured to read status and alarm signals from the EMCP3.2 panel using Electronic Technician (ET). An additional pair of LED's displays status indication of the J1939 data link.

The annunciator includes an audible alarm, an alarm acknowledge pushbutton and a lamp test pushbutton.

Configurable to NFPA 99/110 requirements for local and remote annunciation on Emergency Standby Generator Systems.

Provides a simple means to change the labels for the annunciation LED's for site specific requirements.



Annunciator Dimensions		
A	B	C
mm (in)	mm (in)	mm (in)
158 (6.22)	130 (5.12)	288 (11.34)

www.CAT-ElectricPower.com

© 2005 Caterpillar
All rights reserved. Printed in U.S.A.

Market: N. America
LEHX4915-02 (02-05)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

MILTON CATERPILLAR

TO BE SUPPLIED BY OTHERS

RAYCHEM J1939 DATA LINK ANNUNCIATOR CABLE

SPECIFICATIONS

Cable-----2 CONDUCTOR WITH DRAIN AND SHIELD
Jacket Color-----BLACK
Insulation Colors-----YELLOW AND GREEN
Conductors-----0.75 MM/SQ. (19 AWG 19 x 0.23MM)
STRANDS TINNED COPPER
Wire Insulation-----POLYALKENE
Wire insulation Diameter-----3.18 MM NOMINAL
Jacket-----MODIFIED POLYOLEFIN
Jacket Diameter-----9.78 MM NOMINAL
Drain-----0.75 MM/SQ. (19 AWG 19 x 0.23MM)
STRANDS TINNED COPPER UNDER SHIELD
Shield-----ALUMINUM POLYESTER ALUMINUM

REMOTE ANNUNCIATOR CABLE SPEC - TO BE SUPPLIED BY OTHERS

SPECIFICATION CONTROL DRAWING

2019D0309

CHEMINAX

120 OHM, RADIO FREQUENCY, 0.75 mm², 19 STRANDS,
TWIN CONDUCTOR CABLE

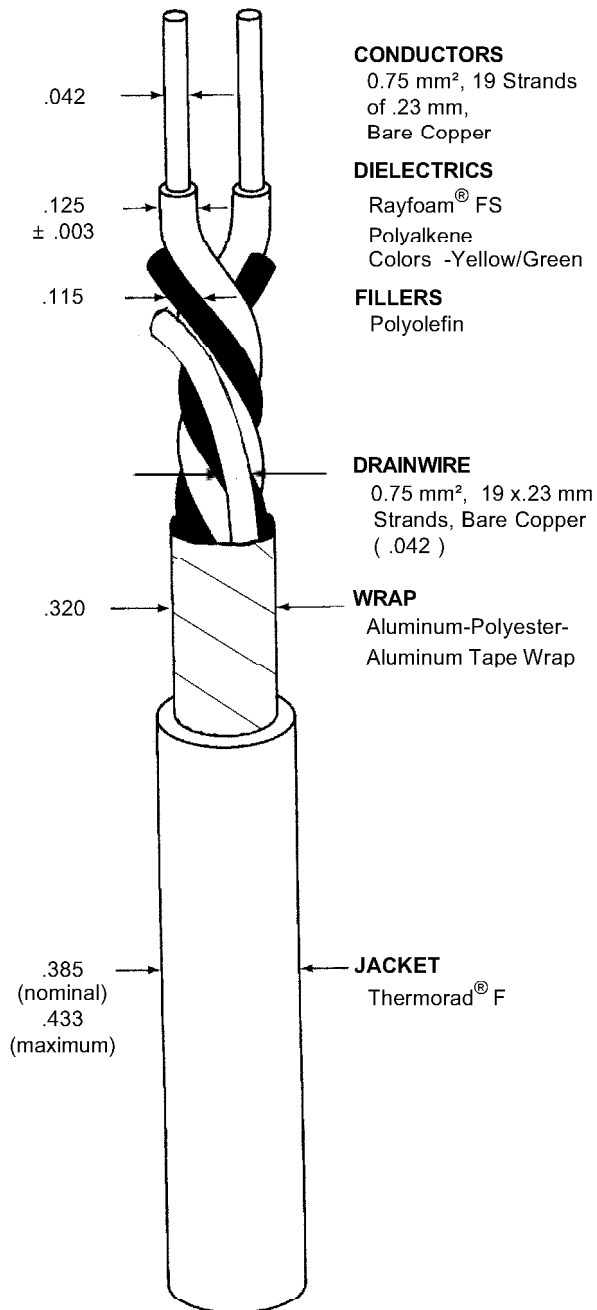
Date: 10-27-05
Revision: D

THIS SPECIFICATION SHEET FORMS A PART OF THE LATEST ISSUE OF RAYCHEM SPECIFICATION 1200.

CONSTRUCTION DETAILS

ELECTRICAL CHARACTERISTICS

DIMENSIONS ARE NOMINAL VALUES IN INCHES UNLESS OTHERWISE DESIGNATED.



CHARACTERISTIC IMPEDANCE	120 ± 12 ohms, Method D at 1 MHz (with shield grounded)
CAPACITANCE- MUTUAL	10.5 pF/ft. (nominal)
VELOCITY OF PROPAGATION	74% (nominal)
SURFACE TRANSFER IMPEDANCE	225 milliohms/meter (maximum) at 0.1 to 1 MHz (Per MIL-C-85485)

ADDITIONAL REQUIREMENTS

ELECTRICAL

CONDUCTOR RESISTANCE	7.74 ohms/1000 ft. (nominal)
INSULATION RESISTANCE	10,000 megohms (minimum) for 1000 ft.
VOLTAGE WITHSTAND (DIELECTRIC)	1000 volts (rms) (minimum)

ENVIRONMENTAL

FLAMMABILITY	Method C
HEAT SHOCK	225°C
LOW TEMPERATURE- COLD BEND	-55°C/11.00 inch mandrel
VOLTAGE WITHSTAND (POST ENVIRONMENTAL)	1000 volts (rms), 60 Hz, 1 minute

PHYSICAL

CONCENTRICITY DIELECTRIC	Not Applicable
ELONGATION	100% (minimum)
TENSILE STRENGTH	1250 lbf/in ² (minimum)
JACKET ELONGATION	300% (minimum)
TENSILE STRENGTH	2500 lbf/in ² (minimum)
CONCENTRICITY	70% (minimum)
JACKET THICKNESS	.030 ± .005 inch
WRAP	.0035 inch thick (nominal)

JACKET MARK: Mark outer jacket at 12 inch (nominal) intervals in white ink as follows:

" RAYCHEM J1939-11 0.75mm² "

WEIGHT	53.6 lbs/1000 ft. (nominal)
--------	-----------------------------

Outer jacket will be Black (designated by a -0 appended to the part number, e.g., 2019D0309-0) unless otherwise specified.

Designate outer jacket color with a dash number in accordance with MIL-STD-681. Other codes and suffixes may be added to the part number, as necessary, to capture any additional requirements imposed by the purchase order.

Users should evaluate the suitability of this product for their application. Specifications are subject to change without notice.

Tyco Electronics also reserves the right to make changes in materials or processing, which do not affect compliance with any specification, without notification to Buyer.

tyco
Electronics

Raychem
Wire & Cable

501 Oakside Avenue
Redwood City, California 94063-3800
1-800-227-8816 Fax: 1-650-361-6297

THIS SPECIFICATION SHEET TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BID.

Quantity of one (1) Caterpillar Engine Battery Set

LEAD ACID STARTING BATTERIES

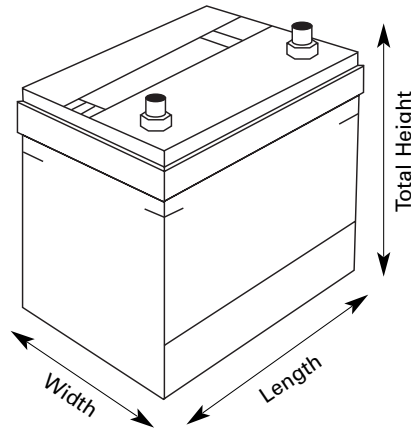
Maintenance-free batteries produced using hybrid technology. The batteries are manufactured using containers produced from high impact resistant polypropylene which is both durable and fully recyclable.



BATTERY SPECIFICATION GUIDE

Generator Set Models	Volts	Battery Type	No. of Batteries	Cell Assembly	Type of Terminal
D25P1, D25P4, D30P3, D30P6, D40P3, D40P4, D50P3, D50P4, D60P3, D60P4, D75P3, D80P4, D90P1, D100P1, D100P4, D125P1, D125P2, D150P1, D25P1S, D25P4S, D30P3S, D30P4S, D40P3S, D40P4S, D50P3S, D50P4S, D60P3S, D60P4S, D75P1S, D75P4S, D90P1S, D90P4S, D100P1S, D100P4S	12	SAE 780	1		
D200P3	24	SAE 780	2		
G12U3, G15U3, G20UH3, G20F3, G25UH3, G25F3, G30F3, G40F3, G50F3, G60F3, G80F3, G100F3, G125G1, G10U3S, G15U3S, G17.5UH3S, G20F3S, G25UH3S, G25F3S, G30F3S, G35F3S, G45F3S, G55F3S, G75F3S, G100F3S	12	SAE 780	1		

LEHX0492-04 (02-05)



BATTERY SPECIFICATIONS (PER BATTERY)

Battery Type	Dimensions				Cold Cranking Amps/Din	Amp Hours	Cold Crankin Amps/SAE	Reserve Capacity
	Length (inch)	Width (inch)	Height (inch)	Weight (lbs)				
SAE 780	13.9	6.9	7.5	52.9	440	92	780	170

CCA / SAE - Society of Automotive Engineers;

This is the High Current test carried out in line with the Society of Automotive Engineers specification in which the battery is cooled to -18°C (0°F) and discharged at the current indicated.

The requirement is for the battery voltage after 30 seconds to be 7.2 volts or above.

RC - Reserve Capacity;

These capacity test shows the time in minutes, which the battery at 25°C can supply, a current of 25 amps before the voltage falls to 10.5 volts.

This is an indication of the period during which the battery can provide sufficient power to maintain the headlights and normal controls in the event of a failure of the alternator.

www.CAT-ElectricPower.com

© 2005 Caterpillar
All rights reserved.
Printed in U.S.A.

Quantity of one (1) Caterpillar 12 VDC Engine Battery Charger



5A/12V, 5A/24V, 10A/12V
Battery Charger



10A/24V
Battery Charger

UL & CSA LISTED BATTERY CHARGERS

PBC3UL (5 amps)

PBC10UL (10 amps)

Olympian UL & CSA battery chargers (5 amp) and (10 amp) are factory mounted and offer accurate, fast automatic charging of batteries. The output voltage automatically adjusts to changing input, load and ambient conditions. This prevents battery over-charging and consequent loss of battery electrolyte.

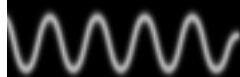
FEATURES

- Automatic 2-rate float/ equalize charging without manual switching. Quickly restores charge after power failures and prevents over charging
- Temperature compensated to eliminate a major cause of premature battery failure
- Current limited to protect from charger overload
- Rugged stainless steel enclosure gives modern appearance and corrosion protection
- Output Voltage Regulation $\pm 1\%$ from no load to full load
- After battery discharge or AC failure, the charger operates in the high-rate constant current mode until the battery voltage rises to the pre-set Boost level. Once this level is reached, the charger operates in constant voltage boost mode until the battery's current acceptance falls to less than 80% (for 5 amp chargers) or 70% (for 10 amp chargers) of the charger's rated output. At this point, the charger reverts to the lower float voltage, where it remains until another battery discharge or AC failure
- Current Limiting and Overload Protection — Electronically current limited at 110% of rated output. AC and DC fuses
- Adjustment — Internal adjustment for float voltage. Internal adjustment for boost voltage on 10 amp chargers (5 amp chargers have a boost voltage fixed at 5% above float voltage)
- Indicators — DC ammeter DC voltmeter: (10 amp, 24V chargers only)
- Ambient — Operating temperature: 14° F (-10° C) to 122° F (55° C). Humidity: 5% to 95% non-condensing
- Approvals — UL listed, CSA listed

SPECIFICATION

- 120 Volt, 60 Hz input
- 12 or 24 Volt DC output. Float voltage adjustable from 100% to 120%. Boost voltage is fixed at approximately 5% above float voltage for 5 amp chargers and adjusts to 15% above float voltage for 10 amp chargers

LEHX0439-08 (02-05)



UL & CSA LISTED BATTERY CHARGERS 5 AMPS & 10 AMPS DIMENSIONS AND WEIGHTS

Option Code	Output		Input		Weight	Dimensions		
	Amps	Volts	Hz	Volts		Width	Depth	Height
PBC3UL	5	12	60	120	11.9 lb (5.6 kg)	4.5" (115 mm)	5.5" (140 mm)	11.1" (281 mm)
PBC3UL	5	24	60	120	11.9 lb (5.6 kg)	4.5" (115 mm)	5.5" (140 mm)	11.1" (281 mm)
PBC10UL	10	12	60	120	20.9 lb (9.5 kg)	4.5" (115 mm)	5.5" (140 mm)	11.1" (281 mm)
PBC10UL	10	24	60	120	18.5 lb (8.4 kg)	11.0" (280 mm)	4.7" (120 mm)	10.9" (278 mm)

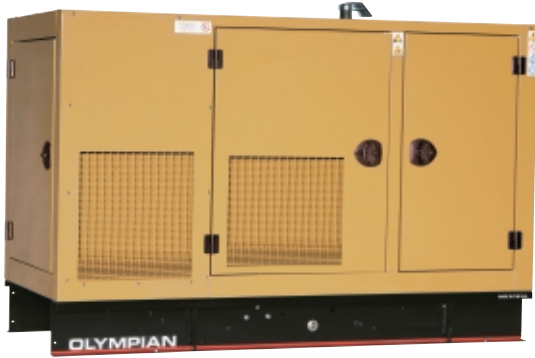
www.CAT-ElectricPower.com

© 2005 Caterpillar
All rights reserved.
Printed in U.S.A.

Market: N. America
LEHX0439-08 (02-05)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

Quantity of one (1) Caterpillar Weatherproof Enclosure



Photograph may show optional equipment

CAWB – WEATHERPROOF ENCLOSURES

These weatherproof, factory installed enclosures incorporate internally mounted critical level silencers, designed for safety and aesthetic value on fabricated steel skidbases on diesel models. Optional UL listed tanks are available. These enclosures are of extremely rugged construction to withstand exposure to the elements of weather and rough handling common on many construction sites. They are designed on modular principles with many interchangeable components permitting on-site repair.

Note: Options FSS1, FSS2, FSS5 and FSS6 (fuel level alarms) are not available on non-UL "B Series" base tanks.

FEATURES

ROBUST/HIGHLY CORROSION RESISTANT CONSTRUCTION

- Black zinc die cast hinges tested and proven to withstand extreme conditions of corrosion
- Zinc plated or stainless steel fasteners
- Body made from steel components treated with polyester powder coating

EXCELLENT ACCESS

- Large cable entry area for installation ease
- Doors located convenient to controls and service areas
- Double doors on both sides
- Vertically hinged doors allow 180° opening rotation
- "Lift-off" doors, removable with 45° opening in confined locations
- Lube oil and coolant drains piped to exterior of enclosure and terminated with drain valves
- Radiator fill cover

SECURITY AND SAFETY

- Lockable access doors with standard key utilization
- Cooling fan and battery charging alternator fully guarded
- Fuel fill can only be reached via lockable access doors (only provided when optional fuel tank is ordered)
- Exhaust silencing system totally enclosed for operator safety
- Roof outlet exhaust with sealed roof aperture and rain cap
- Stub-up cover sheets for "rodent proofing"

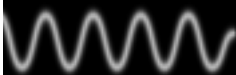
TRANSPORTABILITY

- Lifting points on baseframe
- Optional tested and certified single point lifting facility

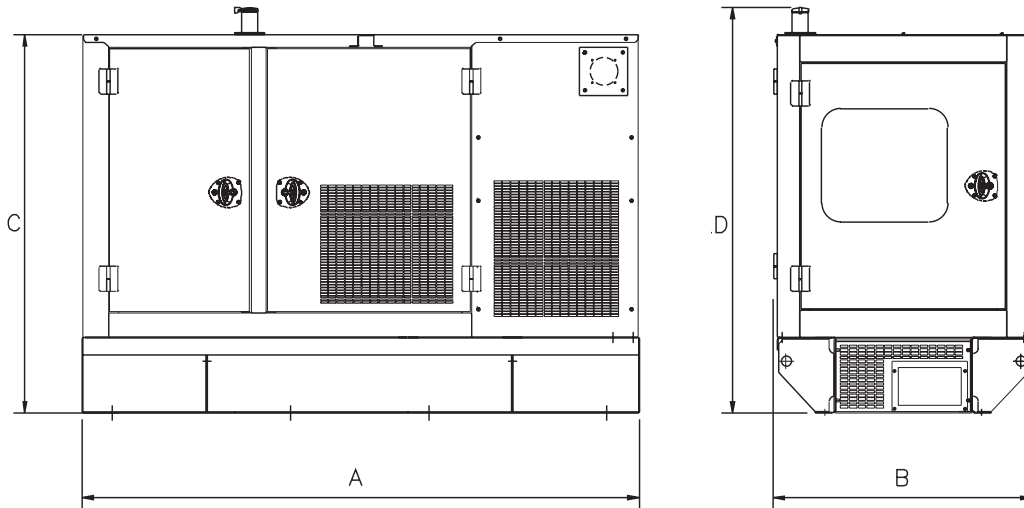
OPTIONS

- PVW2 Panel Viewing Window for CAWB
- CSB2 External Emergency stop push button (red) mounted flush on exterior enclosure wall
- FTP Integral metal fuel tank

LEHX0109-10 (02-05)



WHERE THE WORLD TURNS FOR POWER



CAWB — WEATHERPROOF ENCLOSURES DIMENSIONS AND WEIGHTS (with non-UL listed base tanks)

Generator Set Model	A in (mm)	B in (mm)	C in (mm)	D in (mm)	Fuel Capacity US Gal (L)	Weight* lb (kg)
D20P1, D25P1	73.1 (1856)	36.3 (923)	61.4 (1560)	57.1 (1450)	28.8 (109)	1750 (794)
D25P4	86.9 (2208)	39.4 (1000)	63.3 (1608)	59.1 (1500)	43.6 (165)	2313 (1065)
D30P6	86.9 (2208)	39.4 (1000)	63.3 (1608)	59.1 (1500)	43.6 (165)	2365 (1075)
D30P3	85.5 (2171)	36.3 (923)	63.4 (1610)	59.1 (1502)	43.6 (165)	2321 (1053)
D40P3	85.5 (2171)	36.3 (923)	63.4 (1610)	59.1 (1502)	43.6 (165)	2366 (1073)
D40P4	86.9 (2208)	39.4 (1000)	63.3 (1608)	59.1 (1500)	43.6 (165)	2486 (1130)
D50P3	85.5 (2171)	36.3 (923)	63.4 (1610)	59.1 (1502)	43.6 (165)	2476 (1123)
D50P2	86.9 (2208)	39.4 (1000)	63.3 (1608)	59.1 (1500)	43.6 (165)	2563 (1165)
D60P3	85.5 (2171)	36.3 (923)	63.4 (1610)	59.1 (1502)	43.6 (165)	2564 (1163)
D60P4	86.9 (2208)	39.4 (1000)	63.3 (1608)	59.1 (1500)	43.6 (165)	2673 (1215)
D75P3	85.5 (2171)	36.3 (923)	63.4 (1610)	59.1 (1502)	43.6 (165)	2674 (1213)
D80P4, D100P4	102.4 (2600)	44.4 (1129)	63.8 (1637)	50.8 (1290)	79.3 (300)	3164 (1435)
D90P1, D100P1	115.5 (2934)	44.4 (1128)	73.2 (1859)	67.7 (1720)	77.9 (295)	4895 (2221)
D125P1, D125P2, D150P1	115.4 (2934)	44.4 (1128)	73.2 (1859)	67.7 (1720)	77.9 (295)	5182 (2351)
D200P3	129.5 (3290)	51.4 (1305)	78.0 (1978)	72.9 (1852)	145.3 (550)	5834 (2647)
G30F3, G40F3, G50F3	86.7 (2202)	39.4 (1000)	56.3 (1430)	60.6 (1540)	N/A	2028 (920)
G60F3	103 (2615)	43.3 (1100)	59.5 (1510)	64.4 (1635)	N/A	2716 (1232)
G80F3, G100F3	103 (2615)	43.3 (1100)	59.5 (1510)	64.4 (1635)	N/A	2939 (1333)
G125G1	103 (2615)	43.3 (1100)	59.5 (1510)	64.4 (1635)	N/A	3556 (1613)


* Net weight with lube oil and coolant, no fuel, quoted for the largest model in range.

Quantity of one (1) ASCO Automatic Transfer Switch

ASCO SERIES 300 Power Transfer Switches



ASCO Power Technologies®


EMERSON
Network Power

Maximum Reliability & Excellent Value

With a SERIES 300 Transfer Switch, you get a product backed by ASCO Power Technologies, the industry leader responsible for virtually every major technological advance in the Transfer Switch industry.

The ASCO SERIES 300 was designed for one purpose—to automatically transfer critical loads in the event of a power outage. Each and every standard component was designed by ASCO engineers for this purpose.

The rugged construction and proven performance of the ASCO SERIES 300 assure the user of many years of complete reliability. The SERIES 300 is even designed to handle the extraordinary demands placed on the switch when starting or restarting stalled motors and switching high inrush loads.

ASCO's SERIES 300 modular, compact design makes it easy to install, inspect and maintain. All parts are accessible from the front so switch contacts can be easily inspected.

Features

- The SERIES 300 is listed to UL 1008 standard for Transfer Switch Equipment and CSA standard C22.2 for automatic transfer switches.
- Meets NFPA 110 for Emergency and Standby Power Systems and the National Electrical Code (NEC) Articles 700, 701 and 702.
- 30 through 3000 amps in a compact design.
- Available to 600 VAC, single or three phase.
- True double-throw operation: The single solenoid design is inherently interlocked and prevents contacts from stopping between sources or from being in contact with both sources at the same time.

UL Listed Withstand & Close-On Ratings

Switch Ratings amps	Available Symmetrical Amperes RMS		
	When Used With Current Limiting Fuses	Maximum Voltage	When Used With Specific Circuit Breakers
30	100,000	480v/60Hz	10,000
70 - 200	200,000	480v/60Hz	22,000
230	100,000	480v/60Hz	42,000
260, 400	200,000	480v/60Hz	42,000
600	200,000	600v/60Hz	42,000
600	200,000	480v/60Hz	50,000
600	200,000	240v/60Hz	65,000
800,1000,1200	200,000	600v/60Hz	65,000
1600, 2000	200,000	600v/60Hz	85,000
2600, 3000	200,000	600v/60Hz	100,000

Notes: 1. Current – limiting fuse should be Class J type through 400 amps: use Class L type above 400 - amp fuse rating
2. Refer to publication 1128 for specific manufacturer's breakers



Fig. 1: ASCO Power Transfer Switch rated 200 amperes shown in Type 3R enclosure

- There's no danger of the SERIES 300 ATS transferring loads to a dead source because the unique ASCO single-solenoid operator derives power to operate from the source to which the load is being transferred.
- Easy-to-read flush-mounted control and display panel provides LED indicators for switch position and source availability. It also includes test and time-delay bypass switches as standard features.
- Standard engine exerciser for weekly automatic testing of engine generator set with or without load.
- Adjustable time-delay feature prevents switch from being activated due to momentary utility power outages and generator dips.
- Supplied with solid neutral termination.
- Optional switched neutral pole available.
- Accessory kits available.
- Available for immediate delivery.
- Now available for service entrance applications. Contact ASCO for assistance.

ASCO[®] SERIES 300 Power Transfer Switches

Designed to Fit Anywhere

The ASCO SERIES 300 product line represents the most compact design of automatic power transfer switches in the industry. With space in electrical closets being at a premium, the use of wall or floor-mounted ASCO Power Transfer Switches assures designers optimum utilization of space.

All transfer switches through 2000 amps are designed to be completely front accessible. This permits the enclosures to be installed flush to the wall and still allows installation of all power cabling and connections from the front of the switch. Cable entrance plates are also standard on the 1600 and 2000 amp units to install optional side-mounted pull boxes for additional cable bending space.



Fig. 2: ASCO Power Transfer Switch rated 200 amperes



Fig. 3: ASCO Power Transfer Switch rated 400 amperes



Fig. 4: ASCO Power Transfer Switch rated 600 Amperes



Fig. 5: ASCO Power Transfer Switch rated 1000 amperes



Fig. 6: ASCO Power Transfer Switch rated 2000 amperes shown in Type 3R enclosure



Fig. 7: ASCO Power Transfer Switch rated 3000 amperes

ASCO® SERIES 300 Microprocessor Controller

The ASCO Microprocessor Controller is used with all sizes of Power Transfer Switches. It represents the most reliable microprocessor controller in the industry and includes, as standard, all of the voltage, frequency, control, timing and connectivity functions required for most emergency and standby power applications.



Fig. 8: ASCO SERIES 300 Microprocessor Controller

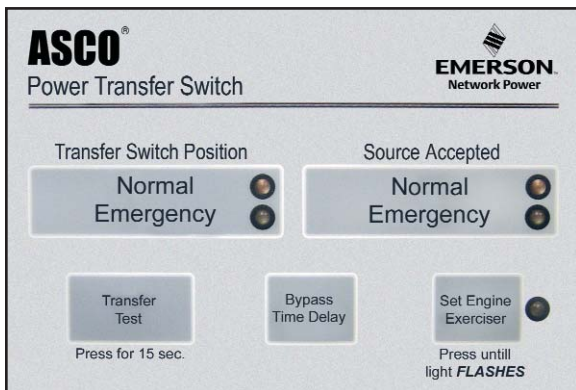


Fig. 9: Door-Mounted Control & Display Panel

Control and Display Panel

- Easy-to-read flush-mounted control and display panel provides LED indicators for switch position and source availability. It also includes test and time-delay bypass switches.

Voltage & Frequency Sensing

- Adjustable three-phase, close-differential voltage sensing on normal source.
- Normal source pickup voltage is adjustable to 95% of nominal; drop-out is adjustable from 70% to 90% of nominal.
- Frequency sensing on emergency source. Pickup at 95% and dropout at 85% of nominal.

Time Delays

- Adjustable time delay to override momentary normal source outages to delay all transfer switch and engine-starting signals.
- Transfer to emergency time delay--Adjustable from 0 to 5 minutes for controlled timing of load transfer to emergency.
- Retransfer to normal time delay--Adjustable to 30 minutes.
- Five-minute unloaded running time delay for emergency engine generator cool down.
- Four-second time delay to ignore momentary voltage and frequency transients during initial genset loading.

Standard Selectable Features

- Inphase monitor to transfer motor loads, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Engine exerciser to automatically test backup generator each week--Includes control switch for testing with or without load.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second adjustable time delay prior to transfer and reset 0 to 20 seconds after transfer.
- 60 Hz or 50 Hz selectable switch.
- Three-phase/single-phase selectable switch.

Remote Control Features

Terminal provisions for connecting:

- Remote test switch.
- Remote contact for test or for peak shaving applications. Circuit will be automatically bypassed if emergency source fails.
 - Inhibit transfer to emergency.
 - Remote time-delay bypass switch.

ASCO® SERIES 300 Microprocessor Controller

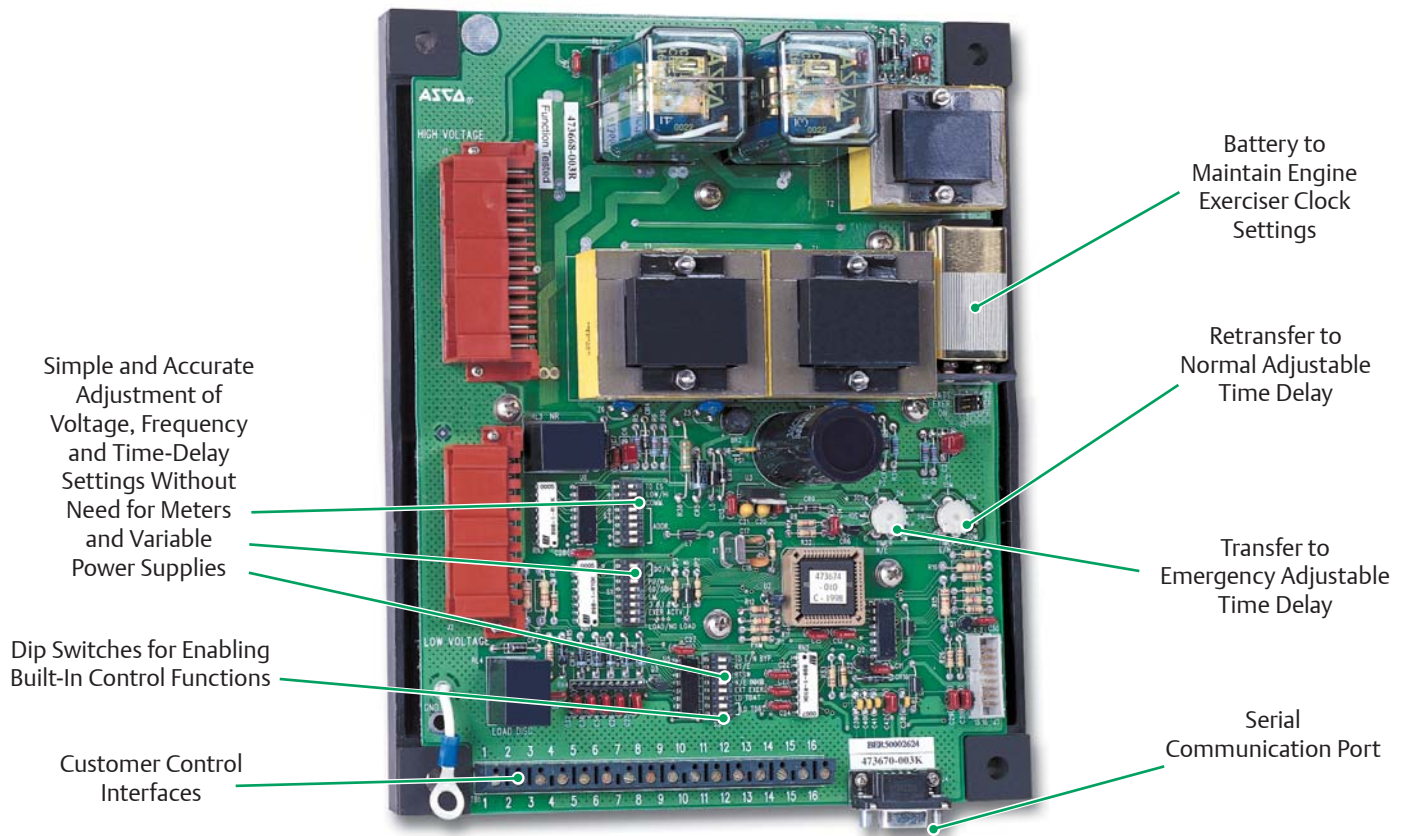


Fig. 10: Microprocessor Controller

Performance Features

- 600 volt spacing per UL and CSA standards.
 - Interfacing relays are industrial grade, plug-in type with dust covers.
 - Meets or exceeds the requirements for Electromagnetic Compatibility (EMC).
- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ● ANSI C37.90A/IEEE472 Voltage Surge Test ● NEMA ICS-109.21 Impulse Withstand Test ● Digital circuitry isolated from line voltages ● IEC 801-2 Electrostatic discharge (ESD) immunity ● ENV50140 and IEC 803-1: Radiated electromagnetic field immunity | <ul style="list-style-type: none"> ● IEC 801-4 Electrical fast transient (EFT) immunity ● ENV50142 Surge transient immunity ● ENV50141: Conducted radio-frequency field immunity ● EN55011: Group 1, Class A conducted and radiated emissions ● Optically isolated RS-485 Serial Port ● EN61000-4-11 voltage dips and interruptions immunity |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ASCO® SERIES 300 ATS Optional Accessories

Accessory 11BG

A programmable engine exerciser that provides for weekly or bi-weekly operation, includes one form C contact for source availability of normal and one contact for availability of emergency (contact rating 2 amps @ 30 Vdc, 0.5 amp @ 125 Vac resistive). The programmable engine exerciser incorporates a 7 day or 14 day time base with a digital readout display. Includes “with or without” load control selection for exerciser period.

Accessory 14AA/14BA

Auxiliary contacts to indicate position of main contacts. Two (2) for normal and two (2) for emergency position (one set is standard).

Accessory 44A

Strip Heater with thermostat for extremely cold areas to prevent condensation and freezing of this condensation. External 120 volt power source required.

Accessory 44G

Strip Heater with thermostat, wired to load terminals: 208-240, 360-380, 460-480, 550-600 volts. Contains wiring harnesses for all transfer switch sizes.

Accessory 72A/72E

*See “Power Connectivity Products”, Page 18

Accessory 123

A protective window that includes a polycarbonate frame and weather gasket to provide secure access to the membrane interface for the type 1 enclosures. This lockable cover is an alternative to providing 3R secure enclosures.



Fig. 11: Programmable Engine Exerciser with Source Availability Contacts (Accessory 11BG)



Fig. 12: Strip Heater Kit (Accessory 44G)

Field Conversion Kits for SERIES 300 Transfer Switches

Kit No.	Description
K629830	Engine Exerciser and source availability contacts (Acc. 11BG)
K613127-001	Strip Heater Kit (125 watt) 120 volt (Acc. 44A)
K613127-002	Strip Heater Kit (125 watt) 208-480 volt (Acc. 44G)
K609027	Cable Pull Box (1600-2000 amp)
K473872-001	6 FT Extension Harness ¹
K755257-001	Serial Module with or without power manager (Acc. 72A)
K754603-001	Connectivity Module with or without power manager (Acc. 72E)
K778330-001	Window Kit (Acc. 123)

1. For 30-200 Amp switches only, not available for 300SE, or 300L



Fig. 13: Window Kit (Accessory 123)

ASCO® SERIES 300 & 386 Transfer Switch Ordering Information

To order an ASCO SERIES 300 Power Transfer Switch, complete the following catalog number:

300 + B + 3 + 600 + N + 1 + X + C + 11CD + 480V 60Hz											
Product	Neutral Code	Poles	Amperes	Voltage Code		Controller	Options	Enclosure		Optional Accessories	Specific Volt & Freq
				Blank	Open Type						
300	Blank Solid Neutral B ¹ Switched Neutral	2 poles, 1Ø 3 poles, 3Ø	Continuous rating 30, 70, 104, 150, 200 ⁴ , 230 ⁴ , 260, 400, 600, 800, 1000, 1200, 1600, 2000 2600 ⁵ , 3000 ⁵	A ³ 115 B ³ 120 C 208 D 220 E 230 F 240 H 380 J 400 K 415 L 440 M 460 N 480 Q 575 R 600	1	Insert "X" If optional accessories are required	C F G H L M N	Type 1 (Standard) Type 3R Enclosure Type 4 Enclosure ² Type 4X Enclosure Type 12 Enclosure ² Type 3R Secure Enclosure Type 4 Secure Enclosure	11BG Programmable Engine Exerciser 14AA/14BA Auxiliary Contacts (2 sets) 44A, 44G Strip Heater w/Thermostat 72A Serial Module 72E Connectivity Module 123 Window Kit	This information is necessary to allow correct control settings prior to shipment	

To order an ASCO SERIES 386 Transfer Switch, complete the following catalog number:

386 + B + 3 + 600 + N + 1 + X + C + 9C/9D + 480V 60Hz											
Product	Neutral Code	Phase Poles	Amperes	Voltage Code		Controller	Options	Enclosure		Optional Accessories	Specific Volt & Freq
				Blank	Open Type						
386	A Solid Neutral B ¹ Switched Neutral	2 poles, 1Ø 3 poles, 3Ø	Continuous rating 30, 70, 100, 150, 200 ⁴ , 230 ⁴ , 260, 400, 600, 800, 1000, 1200, 1600, 2000, 3000 ⁵	A ³ 115 B ³ 120 C 208 D 220 E 230 F 240 H 380 J 400 K 415 L 440 M 460 N 480 Q 575 R 600	1	Insert "X" If optional accessories are required	C F G H L M	Type 1 (Standard) Type 3R Enclosure Type 4 Enclosure ² Type 4X Enclosure Type 12 Enclosure ² Type 3R Secure Enclosure	6Q Key-Operated Control 9C/9D Source Availability Lights 14AA/14BA Auxiliary Contacts 72A Serial Module All Accessories 72E Connectivity Module	This information is necessary to allow correct control settings prior to shipment	

- Note:**
1. Specify neutral code "C" for 260 and 400 amperes only.
 2. Available 30-1000, and 1600 amps. Use Type 3R for 1200, 2000, 2600 and 3000 amp applications.
 3. 115-120 volt available 30-400 amps only. For other voltages contact ASCO.
 4. 200 and 230 amp rated switches for use with copper cable only.
 5. Secure 3R type provided as standard for 2600-3000 amp when outdoor enclosure is required.

Extended Warranties for SERIES 300 Transfer Switches

Catalog No.	Description
2EXW300	Two-Year Extended Warranty (Parts & Labor)
3EXW300	Three-Year Extended Warranty (Parts & Labor)
4EXW300	Four-Year Extended Warranty (Parts & Labor)
5EXW300	Five-Year Extended Warranty (Parts & Labor)

ASCO® SERIES 300 & 386 Transfer Switch Dimensions and Shipping Weights

UL Type 1 Enclosure (See notes below for information on Type 3R, 4 & 12 Enclosures)

Switch Rating amps	Phase Poles	Neutral Code	Dimensions, In. (mm) ³			Approx. Shipping Weight Lb. (kg) ⁴
			Width	Height	Depth	
30, 70, 100*, 104 150, 200 <small>*SERIES 386 only</small>	2	A	17 1/2 (445)	31 (787)	11 5/8 (295)	69 (32)
	2	B	17 1/2 (445)	31 (787)	11 5/8 (295)	73 (33)
	3	A	17 1/2 (445)	31 (787)	11 5/8 (295)	73 (33)
	3	B	17 1/2 (445)	31 (787)	11 5/8 (295)	75 (34)
230, 260, 400	2	A	18 (457)	48 (1219)	13 (330)	100 (45)
	2	B ⁷ or C	18 (457)	48 (1219)	13 (330)	110 (50)
	3	A	18 (457)	48 (1219)	13 (330)	100 (45)
	3	B ⁷ or C	18 (457)	48 (1219)	13 (330)	120 (55)
600	2	A	24 (610)	63 (1600)	17 (432)	263 (119)
	2	B	24 (610)	63 (1600)	17 (432)	270 (122)
	3	A	24 (610)	63 (1600)	17 (432)	270 (122)
	3	B	24 (610)	63 (1600)	17 (432)	277 (126)
800, 1000	2	A	34 (864)	72 (1829)	20 (508)	450 (204)
	2	B	34 (864)	72 (1829)	20 (508)	475 (217)
	3	A	34 (864)	72 (1829)	20 (508)	475 (217)
	3	B	34 (864)	72 (1829)	20 (508)	500 (228)
1200	2	A	38 (965)	87 (2210)	24 (610)	685 (312)
	2	B	38 (965)	87 (2210)	24 (610)	705 (321)
	3	A	38 (965)	87 (2210)	24 (610)	705 (321)
	3	B	38 (965)	87 (2210)	24 (610)	725 (328)
1600, 2000 ^{1,6}	3	A	38 (965)	87 (2210)	24 (610)	925 (419)
	3	B	38 (965)	87 (2210)	24 (610)	975 (441)
2600, 3000 ²	3	A	38 (965)	91 (2311)	60 (1524)	1700 (771)
	3	B	38 (965)	91 (2311)	60 (1524)	2135 (969)

Notes:

- Unit is designed for top cable entry of emergency & load and bottom entry of normal. A cable pull box is also available for all top or bottom cable access when required (optional accessory kit #K609027). Not required for type 3R, 4X & 12 enclosures where available.
- Enclosures for 2600, 3000 amps are free-standing with removable top, sides & back.
- For type 3R, 4X & 12 dimensions, add the following values to the type 1 dimensions:
 - 30, 70, 100, 104, 150, 200A—add 1.5 in (38 mm) to the height.
 - 230, 260, 400A - add 1.5 in (38 mm) to the depth.
 - 1200A—type 4, 4X & 12 not available—use 1600 amp switch
 - 1600A, 2000A—add 3 in (76 mm) to the height and 10 in to (253mm) to the width.
 - 2600, 3000A—type 4X & 12 not available.
(Consult ASCO) Type 3R add 4.68 in (118 mm) to the height add 2.0 in (51 mm) to the width and add 13 in (329 mm) to the depth.
- For type 3R, 4X & 12 weights, add the following values to the type 1 weights:
 - 30, 70, 100, 104, 150, 200A—add 15 lbs. (6.8 kg).
 - 230, 260, 400, 600, 800, 1000A—add 40 lbs. (18.1 kg).
 - 1600A—add 60 lbs. (27 kg).
 - 2000A–3000A Type 4 & 12 not available. (Consult ASCO)
- When temperatures below 32°F can be experienced, special precautions should be taken, such as the inclusion of space heaters, to prevent condensation and freezing of this condensation. This is particularly important when environmental enclosures (Type 3R, 4 & 12) are ordered for installation outdoors.
- Front connected design for 300's and 386's.
Non secure enclosure for type 3R, 4X and 12 provided as standard.
- Neutral Code "B" for 230 amperes only.

ASCO® SERIES 300 & 386 External Power Connections

Sizes UL-Listed Solderless Screw-Type Terminals

Switch Rating (amps)	Ranges of AL-CU Wire Sizes (Unless Specified Copper Only)
30 - 230 ²	One #14 to 4/0 AWG
260, 400	Two 1/0 AWG to 250 MCM or One #4 AWG to 600 MCM
600	Two 2/0 AWG to 600 MCM
800, 1000, 1200	Four 1/0 to 600 MCM
1600, 2000	Six 1/0 to 600 MCM
2600, 3000	Twelve 3/0 to 600 MCM

Note:

- All SERIES 300 switches are furnished with a solid neutral plate (unless switched neutral configuration is specified) and terminal lugs. Specify "A" in catalog number to order a neutral plate on the series 386 switches.
- 200 and 230 amp rated switches for use with copper cable only. Refer to paragraph 310.15 of the NEC for additional information.
- Use wire rated 75°C minimum for all power connections.

Startup and Site Testing



Power Systems Division

101 Quarry Drive
Milford, MA 01757
Tel: (508) 634.5559
Fax: (603) 746.4630

General Engine-Generation Installation Information and Guidelines

General

All connections must be flexible and self-supporting. No weight or strain may be applied to cast elbows.

All wiring must be a minimum of #14 THHN or equal. Wiring must be stranded. Solid-core wire must not be used.

The maximum allowable air temperature in the generator area is 125 F. Sufficient airflow through the engine area is required to dissipate heat from engine block radiation, generator radiation, and provide adequate combustion air. Engine roof louvers must not restrict airflow to an engine-mounted radiator by more than 1/2" of water column. As a rule of thumb, the air outlet "Free Air Area" must be 1.5x the radiator core area, and the air inlet "Free Air Area" must be 2x the radiator core area.

All fuel and water piping must be thoroughly flushed and cleaned before final connections to the engine are made.

Any fire protection devices must be set for high enough temperatures to compensate for ambient temperature rises caused by engine-generator heat radiation. Likewise, engine room ventilation control thermostats must be mounted unconventionally to allow accurate readings of the temperatures affecting engine operation.

For remotely mounted cooling systems only, all external piping systems must rise continuously to the surge tank of the remote radiator or heat exchanger system. Standard heating system diaphragm-type surge tanks will not function properly in the engine jacket water circuit. In cases where piping cannot rise, bleed lines to the riser must be installed where air traps occur.

Fuel Systems

Diesel Engines Only:

Two fuel lines are required from the main tank: one supply and one return. Fuel lines must be separately run from the main tank to each unit or day tank. Boiler feed lines may not be tapped for engine fuel supplies or returns. Some concessions may be made for high-pressure fuel manifolds. Each supply line must have a foot valve, and return lines must not be restricted in any way.

Diesel Engines with Day Tanks:

The bottom of the main fuel tank must be less than 15' below the inlet to the day tank pumps, and less than 200' away from the day tank. The top of the main tank must be below the level of the engine fuel injectors. If either of these pose a problem, additional design work will be required to accommodate the physical configuration.

Natural Gas Engines Only:

Low Pressure Gas Engines and Olympian generator sets require gas pressure of at least 7 in. water column. If site gas pressure is below 7 in H2O, please contact your project manager for assistance. NG engines require one fuel supply line, as indicated on the installation drawing. For High Pressure Gas Engines consult your project manager for pressure requirements

Milford, MA 508.634.3400	Cranston, RI 401.946.6350	Warner, NH 603.746.4671	Scarborough, ME 207.883.9586	Clifton Park, NY 518.877.8000	Buffalo, NY 716.694.7200	Binghamton, NY 607.772.6500
Wareham, MA 508.291.1200	Hopkinton, NH 603.746.4611	Brewer, ME 207.989.1890	Richmond, VT 802.443.4228	Syracuse, NY 315.426.1358	Rochester, NY 585.475.1330	



Power Systems Division

101 Quarry Drive
 Milford, MA 01757
 Tel: (508) 634.5559
 Fax: (603) 746.4630
 Att: _____

Start-up and Testing Checklist – Outdoor Olympian Generator

Project Name:	Project Address:
Customer Name:	Project Contact:
Engine Serial Number	Project Telephone:
Model:	Date:

The following Checklist must be completed and returned to Milton CAT ten days prior to a Start-up being scheduled. Start-ups will not be scheduled until this completed checklist is returned.

Electrical

- _____ Main AC power connections complete.
- _____ Electrical conduit isolated with flexes.
- _____ Jacket water heater and battery charger connected but **not energized**.
- _____ Automatic transfer switch mounted, wired w/normal, emergency, & load connections.
- _____ ATS stranded start wires pulled and connections made at generator and ATS.
- _____ Remote annunciator panel mounted stranded wires pulled, marked, and connected at generator and annunciator.
- _____ Automatic Exercise from ATS? Yes _____ No _____
 - Exercise with or without load? With _____ Without _____
 - Exercise Run time: _____ minutes.
 - ASCO 300 Series w/out deluxe exerciser
 - Day and time of weekly exercise: _____
 - All others
 - Day and time of exercise: _____
 - Weekly _____ Every other week _____

Mechanical

- _____ Generator set mounted on concrete pad.
- _____ Diesel fuel in main tank or gaseous fuel available at a minimum pressure of 7 inches of water column.

Other

- _____ Fuel is on site and available to engine.
- _____ Distance from generator to temporary load banks if applicable.
- _____ All system related equipment, material and components are installed and accounted for. List discrepancies below.

Comments or Discrepancies

Customer Representative Name and Title

Customer Representative Signature

_____ Date _____



Electric Power Application and Installation Guide

Mounting Systems

LEBX0045



WHERE THE WORLD TURNS FOR POWER

Mounting Systems

Proper generator set installation is crucial to ensuring the efficient, long and dependable life of a system, as well as minimizing time spent on maintenance.

Caterpillar Gas Engines are rigid, self-contained structures which will operate and maintain inherent alignment unless subjected to extreme external stresses.

Due to the diversity of installation types, no one mounting system or method is universally acceptable. The engine must be mounted in a manner suited to the specific application, taking into account the characteristics of the engine, the driven loads, and the operating cycle of the machine. One or more of the following results will occur if mounting method is inadequate.

Foundations

Major functions of a foundation are to:

- Support the total weight of the generator set, which includes accessory equipment and liquids (coolant, oil and fuel)
- Maintain alignment between engine, generator and accessory equipment.
- Isolate generator set vibration from surrounding structures

The equipment foundation is not the responsibility of Caterpillar Inc., nor is the driven equipment attachment to the foundation. The customer or customer's agent familiar with local site conditions and application requirements bears foundation design responsibility. Foundation comments published herein are intended only as general guidelines for consideration. Further engine foundation general guidelines can be found in Engine Data Sheet 30.0, Form LEHQ1172.

Soil, Gravel, or Rock Mounting

Firm, level soil, gravel, or rock provides satisfactory support for single-bearing generator sets used in stationary or portable service. This support can be used where the weight-bearing capacity of the supporting material exceeds pressure exerted by the equipment package, and where alignment with external machinery is unimportant.

Soil, such as fine clay, loose sand, or sand near the ground water level, is particularly unstable under dynamic loads and requires substantially larger foundations. Information concerning bearing capacity of soils at the site may be available from local sources and must comply with local building codes.

Where support rails or mounting feet have insufficient bearing area, flotation pads can distribute the weight. The underside area and stiffness of the pad must be sufficient to support the equipment.

Seasonal and weather changes adversely affect mounting surfaces. Soil changes considerable while freezing and thawing. To avoid movement from seasonal changes, extend foundations below the frost line.

Concrete

Several basic foundations are applicable for generator sets. The foundation chosen will depend on factors previously outlined as well as limitations imposed by the specific location and application.

Massive concrete foundations are unnecessary for modern multicylinder medium speed generator sets. Avoid excessively thick, heavy bases to minimize subfloor or soil loading. Bases should be only thick enough to prevent deflection and torque reaction, while retaining sufficient surface area for support. Non-parallel units require no foundation anchoring.

If a concrete foundation is required, minimum design guidelines include:

- Strength must support wet weight of units plus dynamic loads.
- Depth sufficient to attain a minimum weight equal to generator set wet weight (only if large mass, i.e. inertia block, is specified for vibration control).
- Outside dimensions exceed that of the generator set, a minimum of 304.8 mm (12 in.) on all sides.

Before calculating the depth of the concrete foundation, certain issues must be considered:

- When effective vibration isolation equipment is used, floor concrete must only be deep enough to provide structural support of the static load.
- If isolators are not used, dynamic loads transmit to the facility floor and require it to support 125 percent of the generator wet weight.
- If generator sets are paralleled, possible out-of-phase paralleling and resulting torque reactions demand foundations that are able to withstand twice the wet weight of the generator set.

Estimate foundation depth that will accommodate generator set weight using the formula:

$$FD = \frac{W}{D \times B \times L}$$

FD = Foundation depth (m), (ft)

W = Total wet weight of generator set (kg), (lb)

D = Density of concrete (kg/m³), (lb/ft³)
(2402.8 kg/m³), (150 lb/ft³)

L = Foundation length (m), (ft)

Suggested concrete mixture by volume is 1:2:3 of cement, sand, aggregate, with maximum 100 mm (4 in.) slump and 28-day compressive strength of 20 MPa (3000 psi).

Ground Loading

Initial considerations include generator set weight and material supporting this weight.

The wet weight of the total package must be calculated. This includes accessory equipment and weight of all liquids (coolant, oil, and fuel) supported by the foundation. Engine and attachments dry weights can be found in the price list. Liquid densities are given in Table 1.

Liquid	kg/m ³	lb/U.S. gal	lb/ft ³	Specific Gravity
Water, Fresh	994.6	8.3	62.1	1.00
Water, Sea	1018.3	8.5	63.6	1.02
Water/Glycol	1024.4	8.55	64.0	1.03
Diesel Fuel	850.7	7.1	53.1	0.855
Lube Oil	909.7	7.6	56.8	0.916
Kerosene	802.7	6.7	50.1	0.807

Table 1. Densities of liquids [@ 16°C (60°F)].

Material supporting the foundation must carry the total weight (see Table 2) shows bearing load capabilities of common materials.

Material	Safe Bearing Load kPa (psi)
Rock, Hardpan	482.6 (70)
Hard Clay, Gravel and Coarse Sand	386 (56)
Loose Medium Sand and Medium Clay	193 (28)
Loose Fine Sand	96.5 (14)
Soft Clay	0-96.5 (0-14)

Table 2. Bearing load capability.

The area of load-bearing support is adjusted to accommodate surface material. To determine pressure (P) exerted by the generator set, divide total weight (W) by total surface area (A) of the rails, pads, or vibration mounts.

$$P = \frac{W}{A}$$

Where: P = pressure (kPa), (psi)

W = weight (kg), (lb)

A = area (m²), (in²)

Pressure imposed by the generator set weight must be less than the load-carrying capacity of supporting material.

Where support rails or mounting feet have insufficient bearing area, flotation pads can distribute the weight. The underside area and stiffness of the pad must be sufficient to support the equipment.

With vibration isolation between the baseframe and the floor, if the load is equally distributed over all isolators, the floor loading is:

$$\text{Floor Loading} = \frac{\text{Total Generating Set Weight}}{\text{Pad Area} \times \text{Number of Pads}}$$

Thus, floor loading can be reduced by increasing the number of isolation pads.

If load is not equally distributed, the maximum floor pressure occurs under the pad supporting the greatest proportion of load (assuming all pads are the same size):

$$\text{Max Floor Pressure} = \frac{\text{Load on Heaviest Loaded Pad}}{\text{Pad Area}}$$

Seasonal and weather changes adversely affect mounting surfaces. Soil changes considerable while freezing and thawing. To avoid movement from seasonal change, extend foundations below the frost line.

Grounding

The generator set must be properly ground before operation startup. NEC recommends maximum 25 Ohm resistance to the ground (reference ANSI/IEEE C37-101-1985 "Guide for Generator Ground Protection").

Bases

The first design consideration for an engine base is its physical dimensions. The base must provide the proper mounting holes for the engine and all other base-mounted components. The holes must also make allowance for servicing of the engine and other components. They must provide clearance and provisions for proper alignment.

Design the base to maintain the original alignment between engine and driven equipment under all operational and environmental conditions. Misalignment between an engine and driven equipment can cause vibration and

shorten the life of couplings and bearings. Bases designed and fabricated by dealers, or others, must meet design requirements of the Caterpillar supplied base to assure strength and vibration resistance.

The major cause of misalignment is flexing of the base due to lack of torsional rigidity. Other causes are poor installation methods and incorrect alignment procedures.

The base must offer rigidity adequate to oppose the twist due to torque reaction on drives where the driven equipment is mounted on the base assembly, but not bolted directly to the engine flywheel housing (see Figure 1).

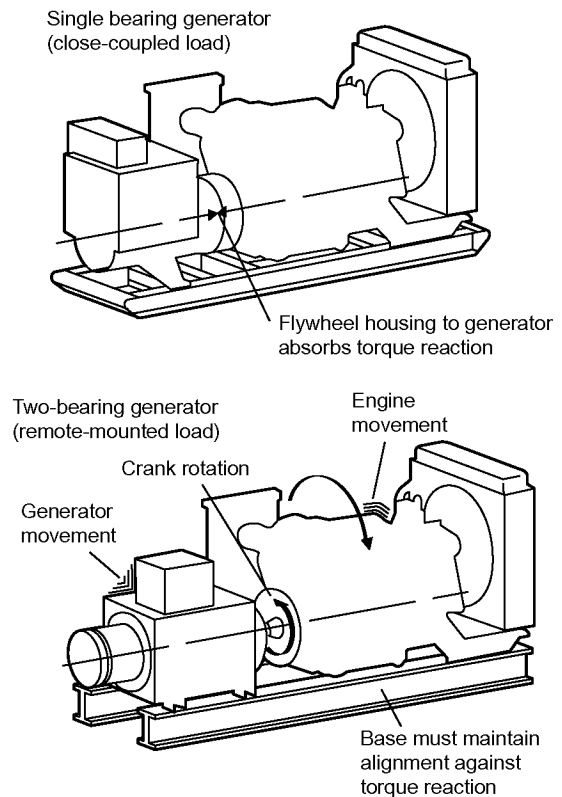


Figure 1. Absorption of torque.

Caterpillar bases are designed to eliminate frequent, periodic realignment of the engine and driven unit. A properly installed Caterpillar base will meet the following criteria:

- Engine torque does not cause excessive misalignment.
- Flexing of the foundation or substructure under the base during operation does not cause bending of the base.

In larger multiple engine sites the normal 8.5° C (15° F) temperature rise guidelines for engine rooms require unobtainable or uncomfortable air velocities.

For larger sites, a ventilation system that gives priority to the five items listed above and provides a bottom to top air flow similar to that shown in Figure 4 can be designed for a temperature rise of 17° C (30° F).

Air Velocity for Personnel Comfort

Maintain air velocity of at least 1.5 m/s (5 ft/s) in working areas adjacent to sources of heat, or where air temperatures exceed 100°F (35°C). This does *not* mean that all the air in the engine room should be agitated so violently. High air velocity around engines and other heat sources is not good ventilation practice. High velocity air aimed at engines will hasten transfer of heat to the air, raising average engine room air temperature.

Table 1 lists typical air motions:

Air Velocity		Conditions
m/min	(fpm)	
15.2	50	Offices, seated worker
30.5	100	Factory, standing worker
45.7	150	Capture velocity, light dust
61	200	Maximum continuous worker exposure
396	1300	Capture velocity, rain
306 – 610	1000-2000	Maximum intermittent exposure

Table 1. Air velocity.

Radiators

Installations with engine-mounted radiators using engine room air for cooling (Figure 7), generally provide more air flow than is needed for adequate ventilation. The high air flow combined with low ambient temperatures, below 21° C (70° F), may cause water to condense inside exposed engine components, like valve covers. This can result in oil and maintenance problems. Therefore, special installation considerations must be made in cold climates.

There are two methods that can be used to overcome this problem.

- Remote mounted and specially ducted engine-mounted radiators do not require engine room air for cooling (see Figure 8). One advantage of such a system is that the air used to cool the radiator is not pre-heated by the engine, thus increasing the ambient capability (or reducing the size) of the unit. The disadvantage is that motor-driven fans must be installed to provide ventilation for the engine, generator and other equipment which increases the overall cost of the system. This system is suitable for continuous duty applications.

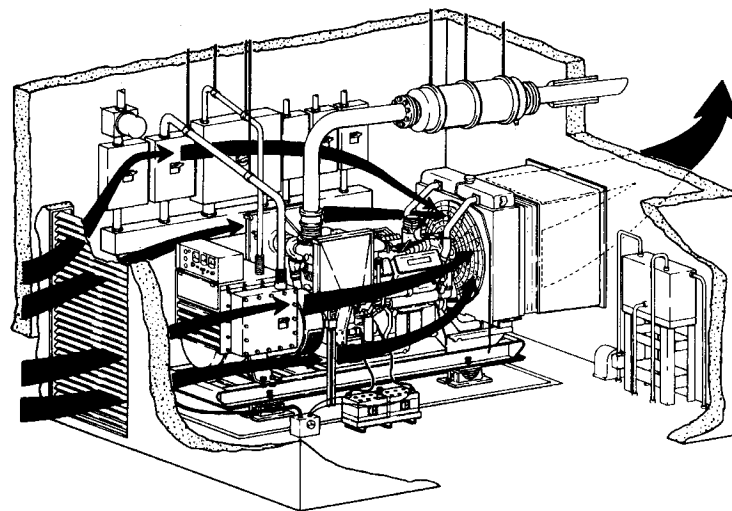


Figure 7. Engine driven fan arrangement.

OLYMPIAN GENERATOR SET WIRING PRIOR TO STARTUP

1. Run appropriate sized cables from generator set mainline circuit breaker(s) to automatic transfer switch(s) (ATS) emergency-side terminals. These cables must be in their own conduit, separate from items # 3 & # 4 below.
2. Run appropriate sized AC supply wires to auxiliary AC supply terminals on control panel (terminal #'s generally 12 & 13) to supply power to battery charger, coolant heater, & battery heater (if so equipped).
3. Run two wires from ATS (paralleled together for multi-ATS systems) to terminals 1 & 2 on control panel for genset start signal. No smaller than 18 ga., no larger than 12 ga. These wires must be in a separate conduit from those in # 1 above (to prevent unwanted genset startups). These wires can be in same conduit as # 4 below.
4. Run multistrand wiring for remote annunciator, if so equipped. No smaller than 16 ga., no larger than 12 ga. These wires must be in a separate conduit from those in #1 above. These wires can be in same conduit as # 3 above.
 - a. For 16-Channel Annunciator, run 4 wires with 2 spares:
 1. Battery Power Qty 2 - positive/negative voltage –12 ga. wire:
 - a. Positive:
 - Control Panel (Pin #1) to Remote Annunciator (Pin #26)
 - b. Negative:
 - Control Panel (Pin #2) to Remote Annunciator (Pin #2)
 2. Control Wiring – 16 ga. twisted shielded pair:
 - a. Control Panel to Remote Annunciator
 1. Both use (Pin #20 & Pin #21)

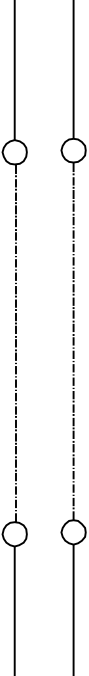
BATTERY CHARGER
& BLOCK HEATER

132 120VAC
131 COMMON

NOTE: AUXILIARY TERMINAL
BLOCK #12 & #13

TRANSFER
SWITCH
N.D. CONTACT

PIN #14
PIN #15



PIN #2
WIRE #5
WIRE #24
PIN #1

GENERATOR
START SIGNAL

REVISION HISTORY		
REV	BY	DATE
04	—	—
03	—	—
02	—	—
01	TGS	—
00	—	—

BLOCK DIAGRAM EMCP3.2 CONTROL PANEL
WITH ASCO 300 SERIES ATS

ALL DIMENSIONS IN INCHES

NOT TO SCALE

DATE: 21 OCTOBER 2005

DWG. No.



DRAWN BY: I. STANLEY

CHECKED BY: I. STANLEY

APPROVED: _____

SHEET 1 OF 1

DIMENSIONS WITHOUT ARROWHEADS ARE
LOCATED FROM PARALLEL ZERO PLANE.

Warranty

OLYMPIAN WARRANTY STATEMENT (US and Canada Only)

This is a warranty which applies to Electric Power Generation Products sold by OLYMPIAN (herein after referred to as "the Company"). The products are warranted against defects in material and workmanship for a period of 12 months* (24 months for standby application limited to 500 hrs per annum) from the date of delivery to first user.

The Company's Responsibilities

- If a defect in material or workmanship arises during the warranty period the Company will during normal working hours and through a place of business of a OLYMPIAN Dealer or other source approved by OLYMPIAN:
- Replace or at the Company's discretion repair the defective parts.
- Provide for reasonable and customary labor costs to correct the defect.
- Provide for the cost of service supplies such as coolant oil and filters which are made unserviceable by the defect.
- Provide travel labor, up to six hours and 250 miles/400km round trip, if the generator set is inoperative due to a defect and, in the opinion of the Company, it cannot reasonably be transported to an appropriate service location.

* D8L1-D25LH1 and D8L1S-D24LH1S have a running hour limitation as follows: Prime Power 5000 hrs at 1500/1800rpm;

Standby 2000 hrs at 1500/1800/3000 rpm and 1000 hrs at 3600 rpm.
 * Gas powered generating set models have an additional running hour limitation as follows:— 1000 hrs at 3000/3600rpm.

Either the 12 months limitations or the running hour limitation is applicable, whichever occurs first.

This warranty is expressly in lieu of all other warranties, express or implied, including, but not limited to, any warranty of merchantability or fitness for a particular purpose. All warranties which exceed the aforementioned obligations are hereby disclaimed by the Company and excluded from this warranty. The Company shall, under no circumstances, be held liable for any special direct, indirect, incidental or consequential damages. All claims made under this warranty should be made by contacting your local dealer or the Company who will outline the administration and scope.

The User's Responsibilities

The User is responsible for:

- Installing, operating and maintaining the generator set in accordance with the manufacturer's instructions.
- Returning the Warranty Registration Form within one month of delivery.
- Ensuring initial startup is performed by an authorized representative of the Company or its dealers.
- Making the equipment available for repair as soon as the defect has become apparent.
- Accepting the Company's sole judgement as to whether the faulty part is defective in material or workmanship.
- Labor costs, except as stated under "The Company's Responsibilities," including costs beyond those required to disconnect the product from and reconnect the product to its attached equipment, mountings and support systems.
- The costs and risks for transport/shipping and other charges associated with the replacement of the repair parts.
- Any costs in excess of the purchase price of the product.

- Other miscellaneous costs including but not limited to courier, travel, mileage, tolls, lodging, taxes, telephone calls, overtime, etc., except as stated under "The Company's Responsibilities."
- Completing any outstanding payments for the purchase of equipment, parts or services relating to the equipment under warranty.

Limitations

This warranty does not cover:

- Defects due to the user's improper installation, maintenance or use as adjudged by the Company
- Incidental costs such as tires, fuses and lamps.
- Modifications or repairs not authorized by the Company in writing.
- Any operation in excess of the Company's rating or outside the stated site conditions.
- Damage or costs caused through prolonged operation of equipment where a defect has been, or ought reasonably to have been, discovered,
- Normal wear and tear.
- Damage to parts, fixtures, housings, attachments and accessory items that are not part of the Electric Power Generation Product.
- Any product specific hours limitations

276-973

Effective with sales to first user on or after 1 September 2002.

LEXF3074-00

ONAWARSTAT2003

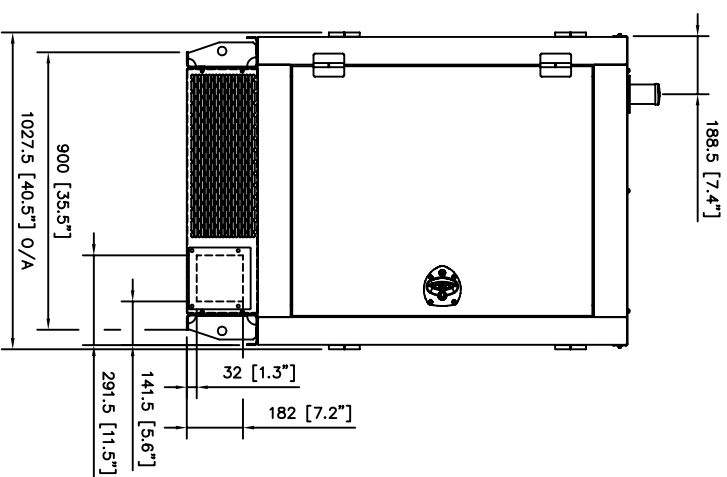
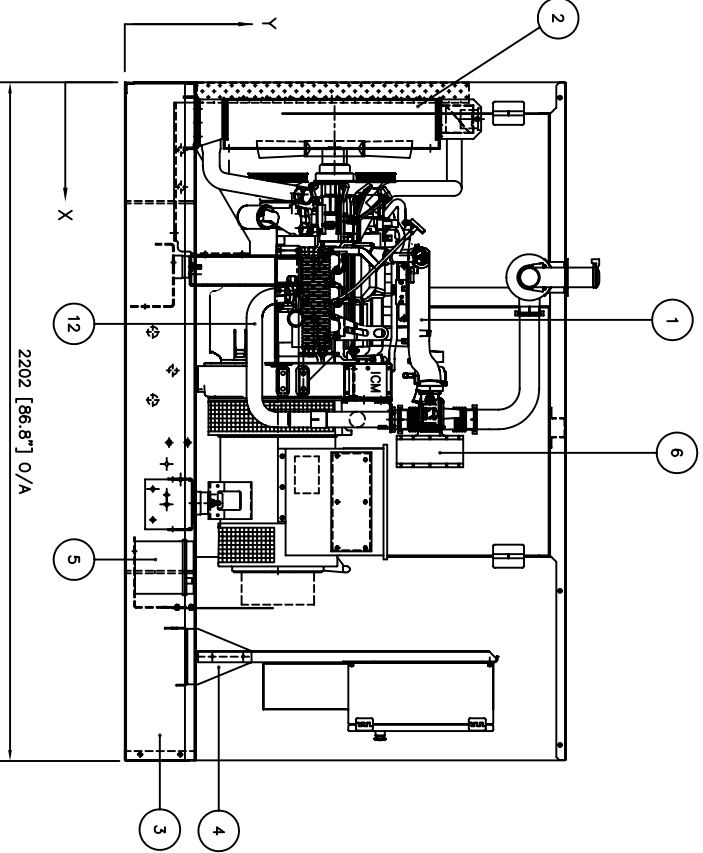
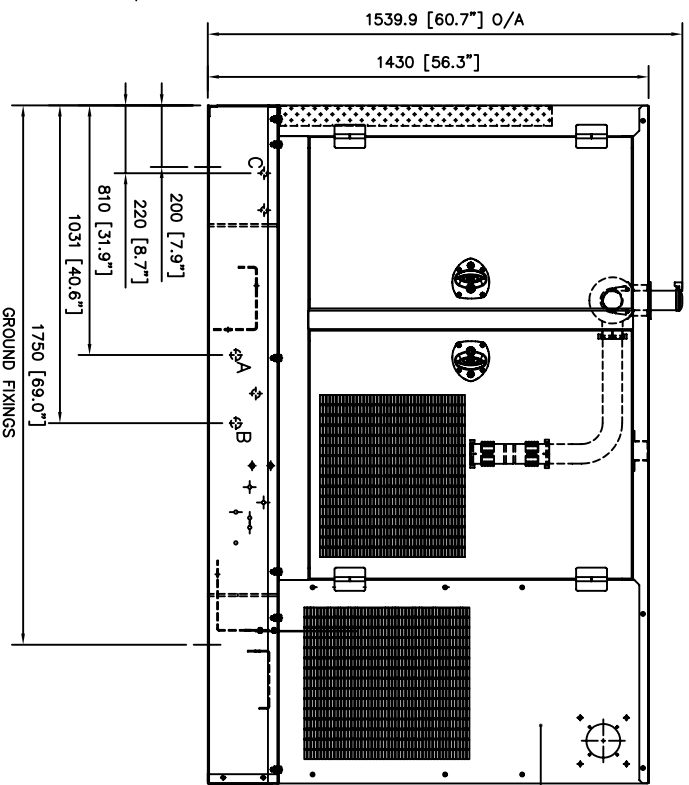
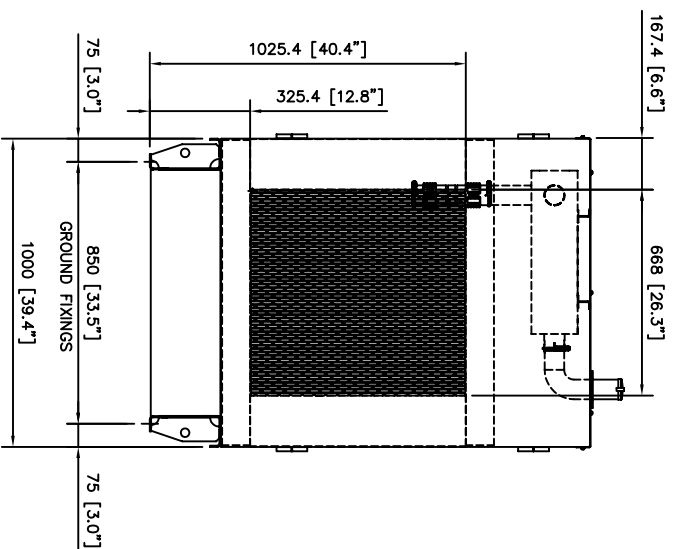
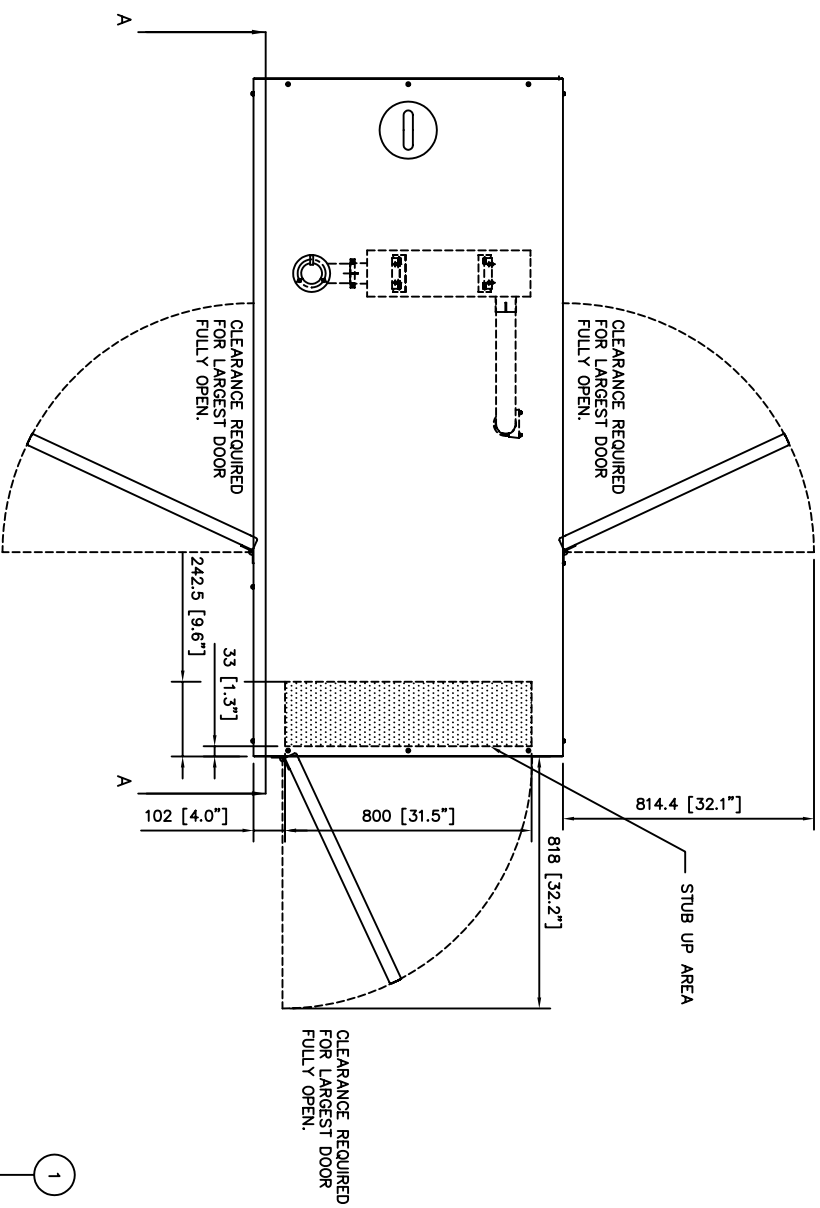
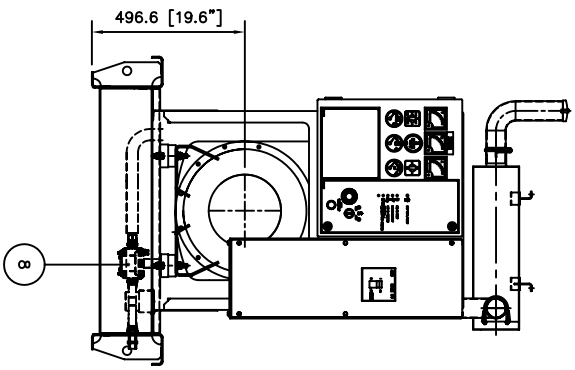
Installation Drawings

GENSET	WEIGHT			CENTRE OF GRAVITY	
	DRY	WITH LUBE OIL	WITH OIL & WATER	DIM. X	DIM. Y
FORD 4.2L / LL2014 B	TBA	TBA	TBA	900	1984
FORD 4.2L / LL2014 D	TBA	TBA	TBA	920	2028
FORD 4.2L / LL2014 H	TBA	TBA	TBA	970	2138
FORD 4.2L / LL1014 S	TBA	TBA	TBA	845	1863

REF.	FUEL TYPE	BULKHEAD FITTING
A	NATURAL GAS	¾" NPT FEMALE
B	LPG (VAPOUR)	¾" NPT FEMALE
C	LPG (LIQUID)	¼" NPT FEMALE

ITEM QTY.	DESCRIPTION	DWG./PART NUMBER
1	ENGINE / ALTERNATOR COMBINATIONS	MGS4161
1	RADIATOR ASSEMBLY	MGS3745
1	BASEFRAME ASSEMBLY	MGS5892
1	PANEL STAND ASSEMBLY	MGS3782
1	BATTERY TRAY ASSEMBLY	MGS4033
1	AIR FILTER ASSEMBLY	MGS4065
1	FAN & PULLEY GUARD ASSEMBLY	MGS3763
1	GAS TRAIL (NATURAL GAS)	MGS4067
1	COUPLING ARRANGEMENT	MGS492
1	STARTING MOTOR HEAT SHIELD	MGS5483
1	EXHAUST MANIFOLD HEAT SHIELD	MGS495
1	EXHAUST MANIFOLD PREWORK	MGS3818
1	E.I.M. UPRIT	MGS4110
1	OIL PRESSURE SENSOR	MGS3927
1	HIGH COOLANT TEMP. SENDER/SWITCH	MGS3926
1	MAGNETIC PICK-UP SENSOR	MGS3928
1	LUB OIL DRAIN PIPED TO BASEFRAME	MGS3886
1	COOLANT DRAIN PIPED TO BASEFRAME	MGS3888
1	DECALS - UNIVERSAL LABELS (CANOPIED)	MGS2983
1	B2 SERIES CANOPY ASSEMBLY	MGS5890
1	OIL COOLER GROUP	MGS4055
1	IGNITION CONTROL MODULE GROUP	MGS4466
22		

*ITEMS NOT SHOWN.



SECTION A-A

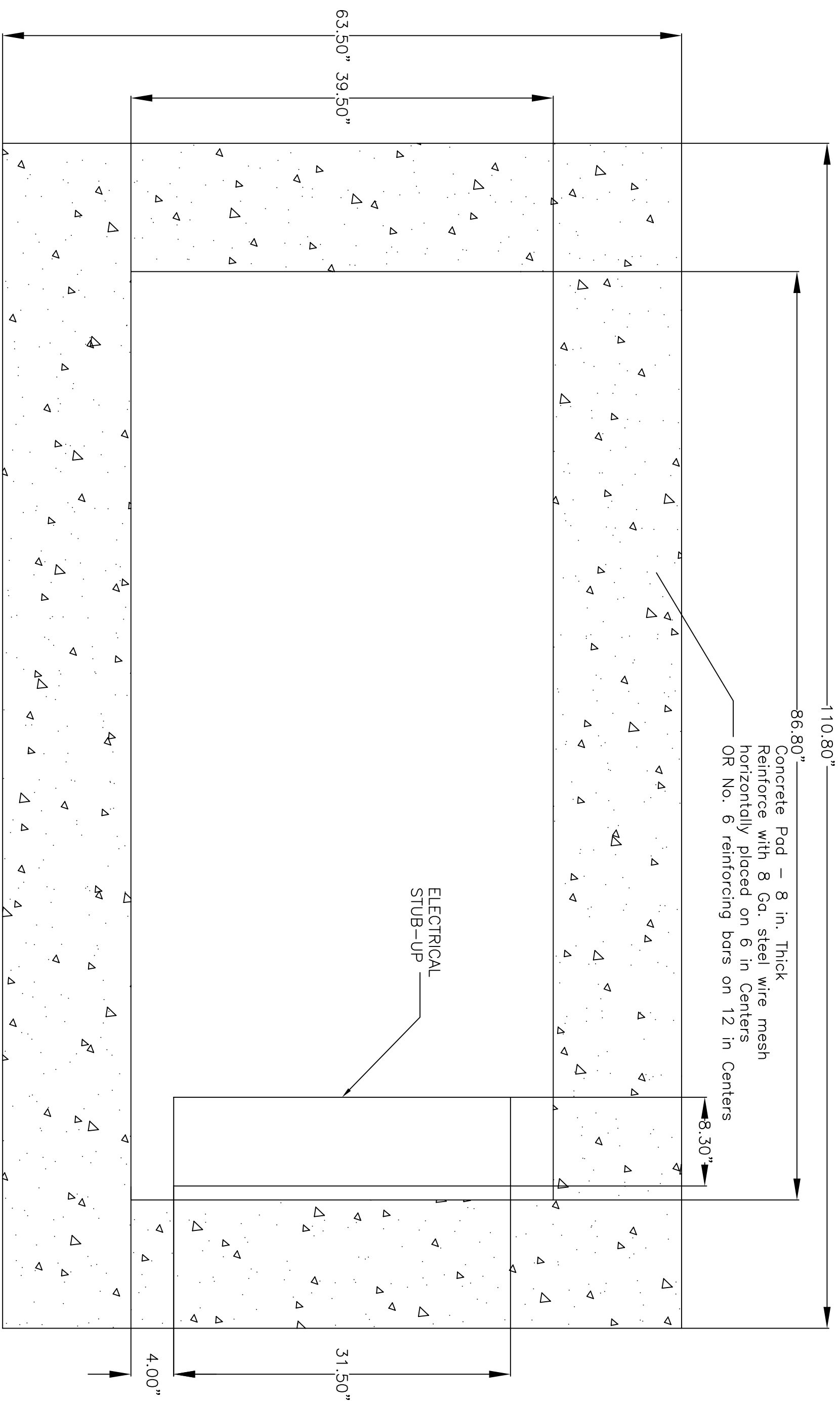
NOTE: ALL DIMENSIONS ARE IN MM OR (INCHES)

ISSUE	DESCRIPTION	1	2	3	4	5	6	7	8
A	FIRST ISSUE	1							
	DESCRIPTION								
	228337	228337	LIB.	15/12/03					
	ECR/DOR	BY	DATE						

DO NOT SCALE	ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
TOLERANCES EXCEPT WHERE OTHERWISE STATED	0 - 500mm ± 1mm
500 - 2000mm ± 2mm	OVER 2000mm ± 3mm
ANGULAR	± 1°
ASSEMBLY	± 1°

DRN. BY	LIBROWN
DATE	15/12/03
APPD. BY	Alan Mackay
DATE	16/12/03

TITLE	DRWG. NO.	ISSUE
FORD E56642/LEROY LL2014B/D/H & LL1014S NEW WEATHERPROOF CANOPY - FUEL TYPE GAS	MGA6523	A
SHEET SIZE	ORIGINAL SCALE	
A1	1:12	



110.80"
86.80"
Concrete Pad - 8 in. Thick
Reinforce with 8 Ga. steel wire mesh
horizontally placed on 6 in Centers
OR No. 6 reinforcing bars on 12 in Centers

ELECTRICAL
STUB-UP

63.50" 39.50"

8.30"

31.50"

4.00"

REV	BY	DATE
04	—	—
03	—	—
02	—	—
01	—	—
00	—	—

G30-50F3 CAWB PAD LAYOUT
MILTON-CAT POWER SYSTEMS

ALL DIMENSIONS IN INCHES

NOT TO SCALE

DATE: JULY 2005

DWG No. 6523

DRAWN BY: H. CHRISTENSEN

CHECKED: -

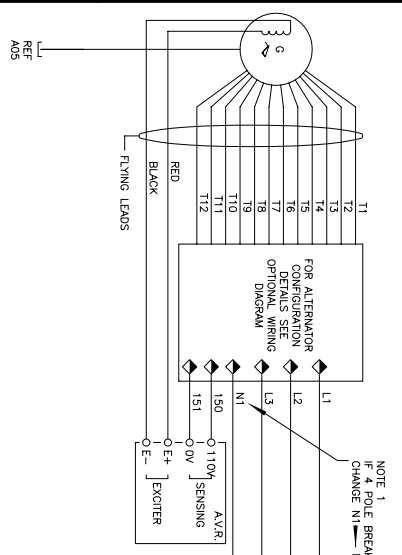
APPROVED: _____

SHEET 1 OF 1



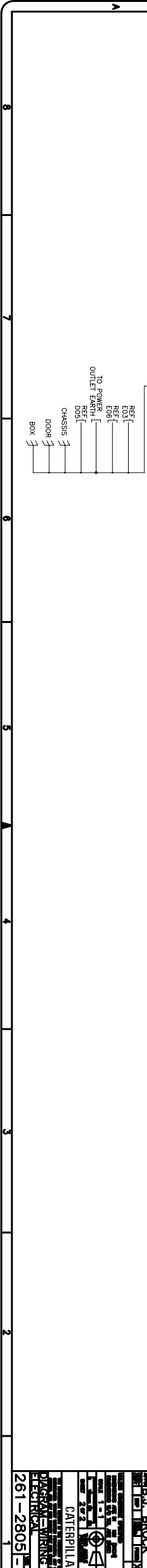
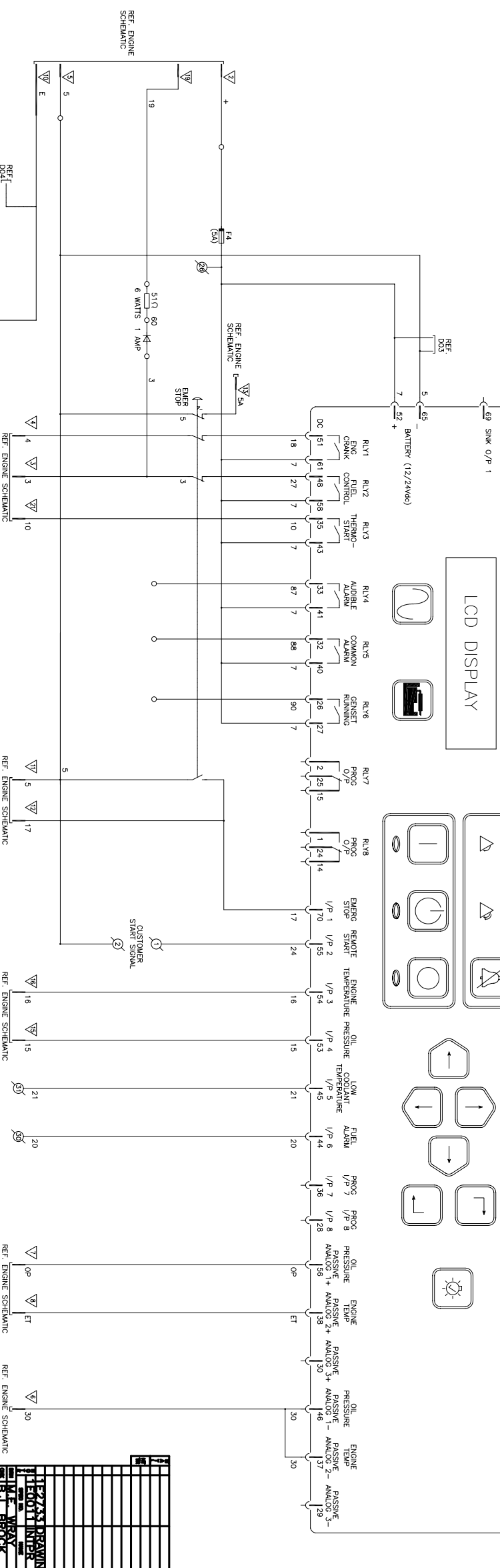
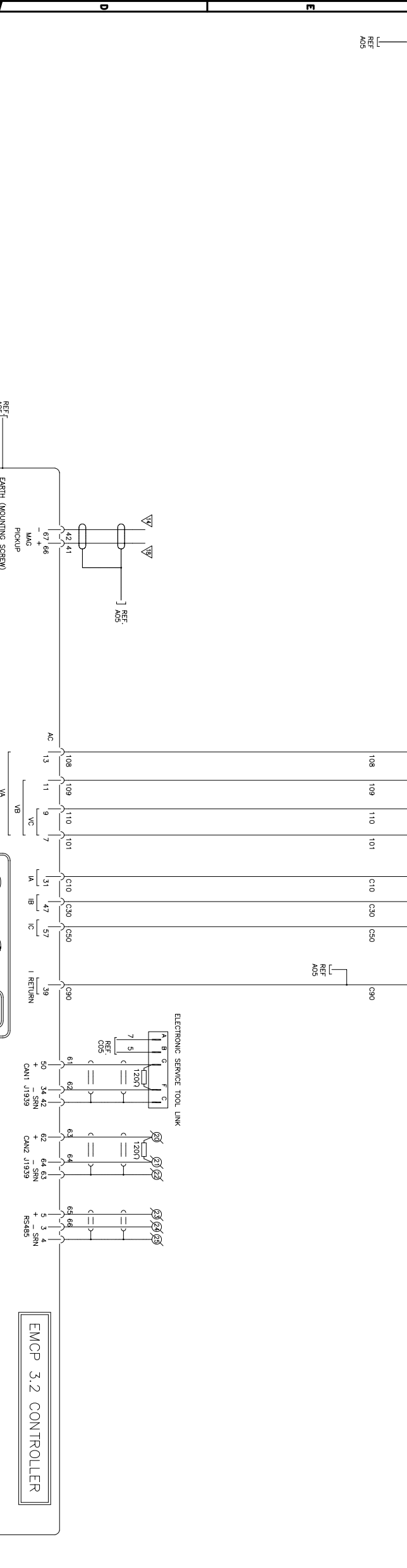
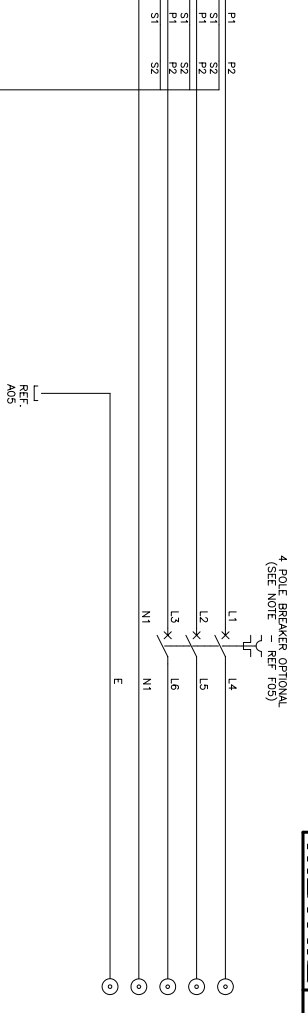
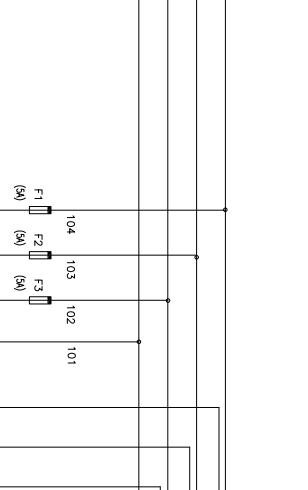
DIMENSIONS WITHOUT ARROWHEADS ARE
LOCATED FROM PARALLEL ZERO PLANE.

POWER
SYSTEMS
DIVISION

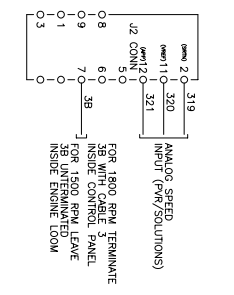
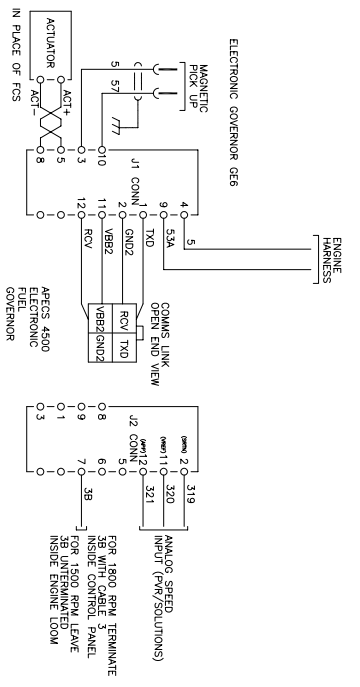
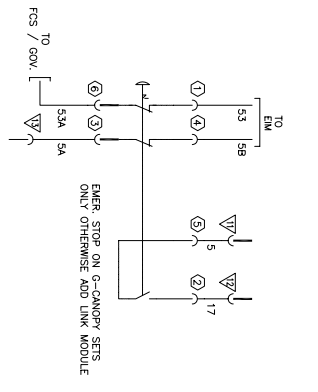
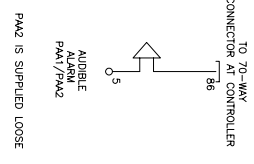
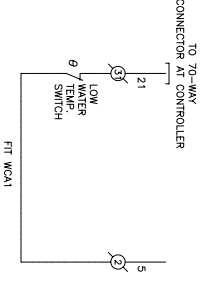
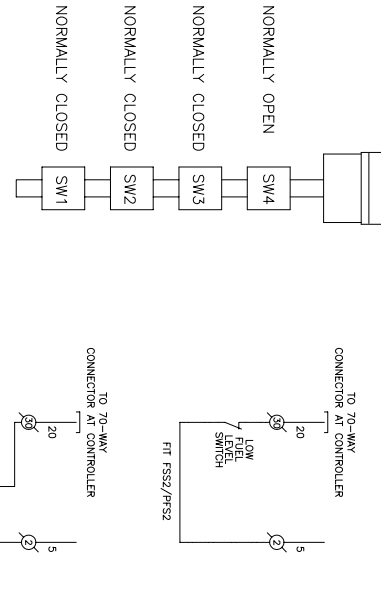
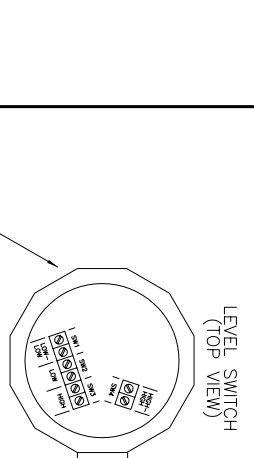
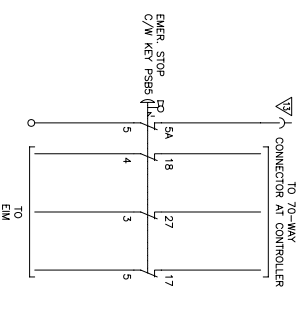
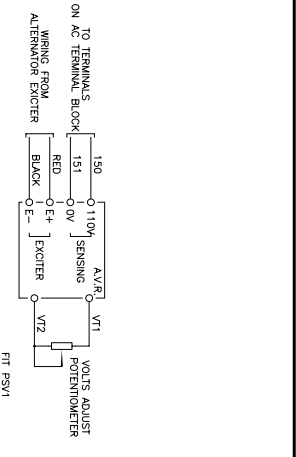
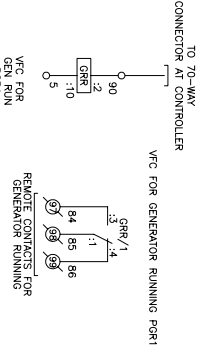
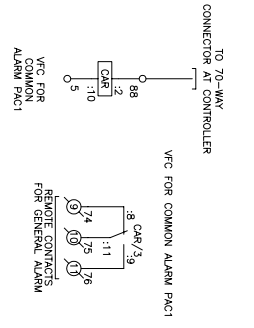
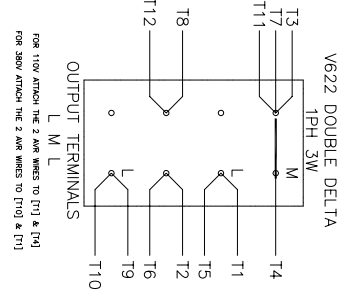
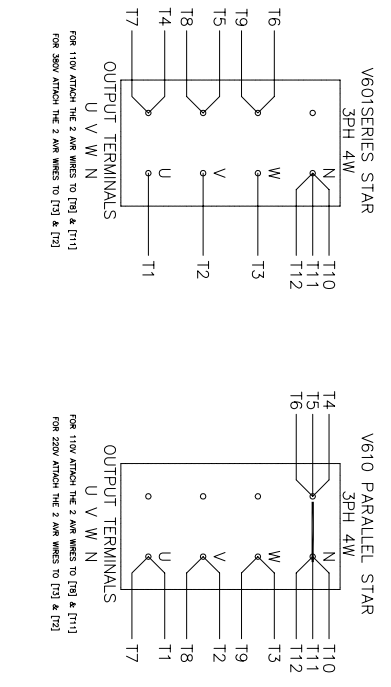


FOR ALTERNATOR
WIRING DETAILS SEE
OPTIONAL WIRING
DIAGRAM

AV/R
SENSING
OV
EXCITER

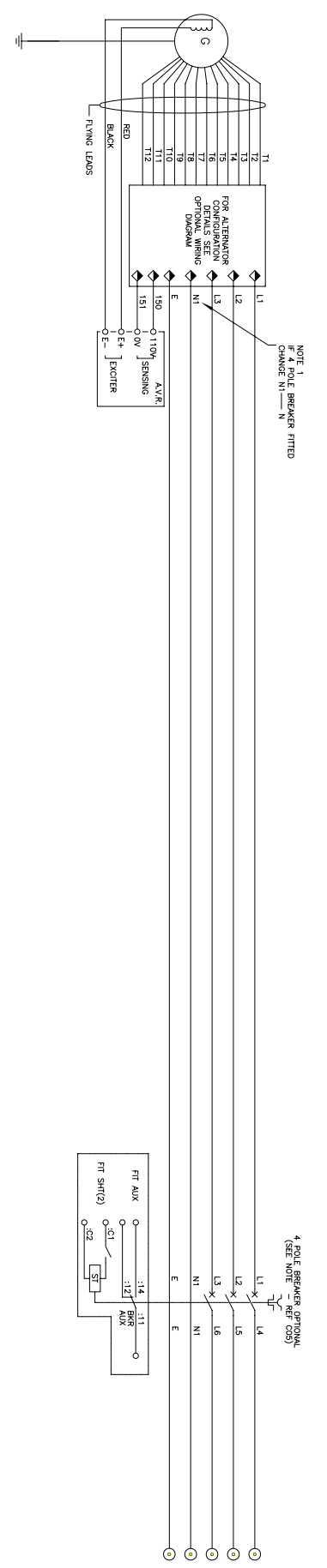
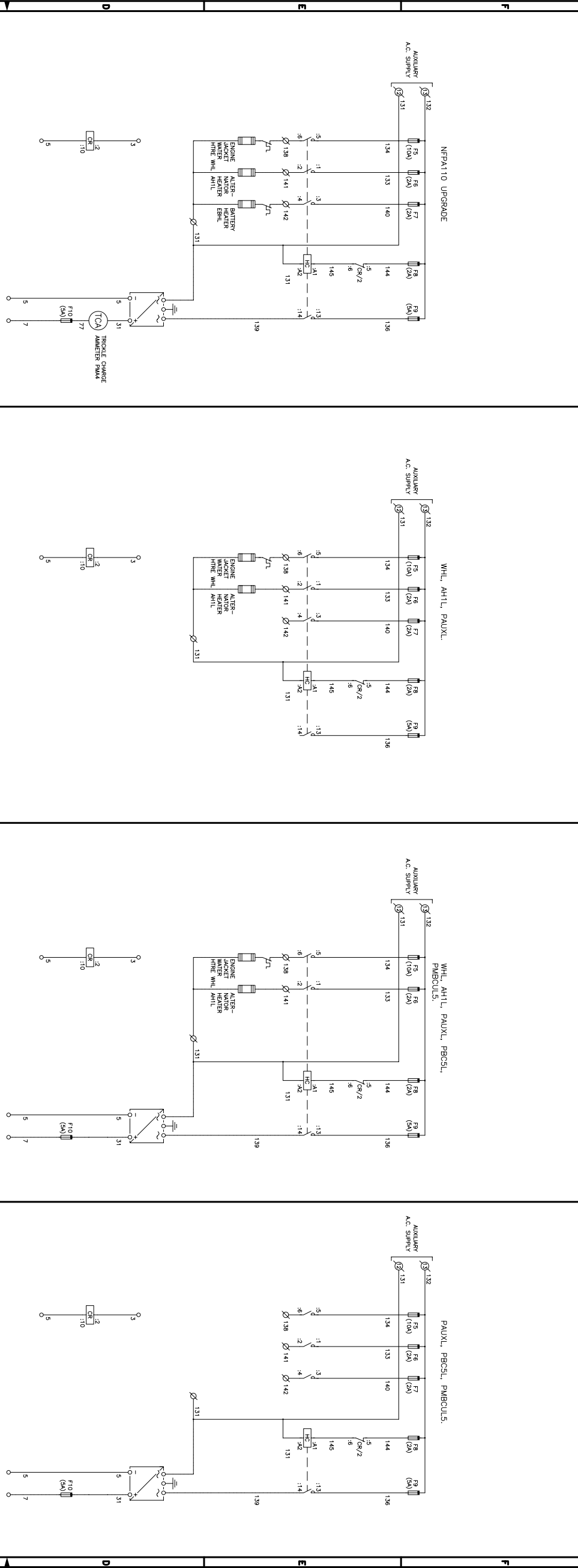


1127233 DRAWING - AUTOCAD		
1127233 INTER & TOOL		
NO.	REV.	DATE
1	1	07/25/09
2	1	08/12/09
3	1	09/15/09
4	1	10/15/09
5	1	11/15/09
6	1	12/15/09
7	1	01/15/10
8	1	02/15/10
9	1	03/15/10
10	1	04/15/10
11	1	05/15/10
12	1	06/15/10
13	1	07/15/10
14	1	08/15/10
15	1	09/15/10
16	1	10/15/10
17	1	11/15/10
18	1	12/15/10
19	1	01/15/11
20	1	02/15/11
21	1	03/15/11
22	1	04/15/11
23	1	05/15/11
24	1	06/15/11
25	1	07/15/11
26	1	08/15/11
27	1	09/15/11
28	1	10/15/11
29	1	11/15/11
30	1	12/15/11
31	1	01/15/12
32	1	02/15/12
33	1	03/15/12
34	1	04/15/12
35	1	05/15/12
36	1	06/15/12
37	1	07/15/12
38	1	08/15/12
39	1	09/15/12
40	1	10/15/12
41	1	11/15/12
42	1	12/15/12
43	1	01/15/13
44	1	02/15/13
45	1	03/15/13
46	1	04/15/13
47	1	05/15/13
48	1	06/15/13
49	1	07/15/13
50	1	08/15/13
51	1	09/15/13
52	1	10/15/13
53	1	11/15/13
54	1	12/15/13
55	1	01/15/14
56	1	02/15/14
57	1	03/15/14
58	1	04/15/14
59	1	05/15/14
60	1	06/15/14
61	1	07/15/14
62	1	08/15/14
63	1	09/15/14
64	1	10/15/14
65	1	11/15/14
66	1	12/15/14
67	1	01/15/15
68	1	02/15/15
69	1	03/15/15
70	1	04/15/15
71	1	05/15/15
72	1	06/15/15
73	1	07/15/15
74	1	08/15/15
75	1	09/15/15
76	1	10/15/15
77	1	11/15/15
78	1	12/15/15
79	1	01/15/16
80	1	02/15/16
81	1	03/15/16
82	1	04/15/16
83	1	05/15/16
84	1	06/15/16
85	1	07/15/16
86	1	08/15/16
87	1	09/15/16
88	1	10/15/16
89	1	11/15/16
90	1	12/15/16
91	1	01/15/17
92	1	02/15/17
93	1	03/15/17
94	1	04/15/17
95	1	05/15/17
96	1	06/15/17
97	1	07/15/17
98	1	08/15/17
99	1	09/15/17
100	1	10/15/17
101	1	11/15/17
102	1	12/15/17
103	1	01/15/18
104	1	02/15/18
105	1	03/15/18
106	1	04/15/18
107	1	05/15/18
108	1	06/15/18
109	1	07/15/18
110	1	08/15/18
111	1	09/15/18
112	1	10/15/18
113	1	11/15/18
114	1	12/15/18
115	1	01/15/19
116	1	02/15/19
117	1	03/15/19
118	1	04/15/19
119	1	05/15/19
120	1	06/15/19
121	1	07/15/19
122	1	08/15/19
123	1	09/15/19
124	1	10/15/19
125	1	11/15/19
126	1	12/15/19
127	1	01/15/20
128	1	02/15/20
129	1	03/15/20
130	1	04/15/20
131	1	05/15/20
132	1	06/15/20
133	1	07/15/20
134	1	08/15/20
135	1	09/15/20
136	1	10/15/20
137	1	11/15/20
138	1	12/15/20
139	1	01/15/21
140	1	02/15/21
141	1	03/15/21
142	1	04/15/21
143	1	05/15/21
144	1	06/15/21
145	1	07/15/21
146	1	08/15/21
147	1	09/15/21
148	1	10/15/21
149	1	11/15/21
150	1	12/15/21
151	1	01/15/22
152	1	02/15/22
153	1	03/15/22
154	1	04/15/22
155	1	05/15/22
156	1	06/15/22
157	1	07/15/22
158	1	08/15/22
159	1	09/15/22
160	1	10/15/22
161	1	11/15/22
162	1	12/15/22
163	1	01/15/23
164	1	02/15/23
165	1	03/15/23
166	1	04/15/23
167	1	05/15/23
168	1	06/15/23
169	1	07/15/23
170	1	08/15/23
171	1	09/15/23
172	1	10/15/23
173	1	11/15/23
174	1	12/15/23
175	1	01/15/24
176	1	02/15/24
177	1	03/15/24
178	1	04/15/24
179	1	05/15/24
180	1	06/15/24
181	1	07/15/24
182	1	08/15/24
183	1	09/15/24
184	1	10/15/24
185	1	11/15/24
186	1	12/15/24
187	1	01/15/25
188	1	02/15/25
189	1	03/15/25
190	1	04/15/25
191	1	05/15/25
192	1	06/15/25
193	1	07/15/25
194	1	08/15/25
195	1	09/15/25
196	1	10/15/25
197	1	11/15/25
198	1	12/15/25
199	1	01/15/26
200	1	02/15/26
201	1	03/15/26
202	1	04/15/26
203	1	05/15/26
204	1	06/15/26
205	1	07/15/26
206	1	08/15/26
207	1	09/15/26
208	1	10/15/26
209	1	11/15/26
210	1	12/15/26
211	1	01/15/27
212	1	02/15/27
213	1	03/15/27
214	1	04/15/27
215	1	05/15/27
216	1	06/15/27
217	1	07/15/27
218	1	08/15/27
219	1	09/15/27
220	1	10/15/27
221	1	11/15/27
222	1	12/15/27
223	1	01/15/28
224	1	02/15/28
225	1	03/15/28
226	1	04/15/28
227	1	05/15/28
228	1	06/15/28
229	1	07/15/28
230	1	08/15/28
231	1	09/15/28
232	1	10/15/28
233	1	11/15/28
234	1	12/15/28
235	1	01/15/29
236	1	02/15/29
237	1	03/15/29
238	1	04/15/29
239	1	05/15/29
240	1	06/15/29
241	1	07/15/29
242	1	08/15/29
243	1	09/15/29
244	1	10/15/29
245	1	11/15/29
246	1	12/15/29
247	1	01/15/30
248	1	02/15/30
249	1	03/15/30
250	1	04/15/30
251	1	05/15/30
252	1	06/15/30
253	1	07/15/30
254	1	08/15/30
255	1	09/15/30
256	1	10/15/30
257	1	11/15/30
258	1	12/15/30

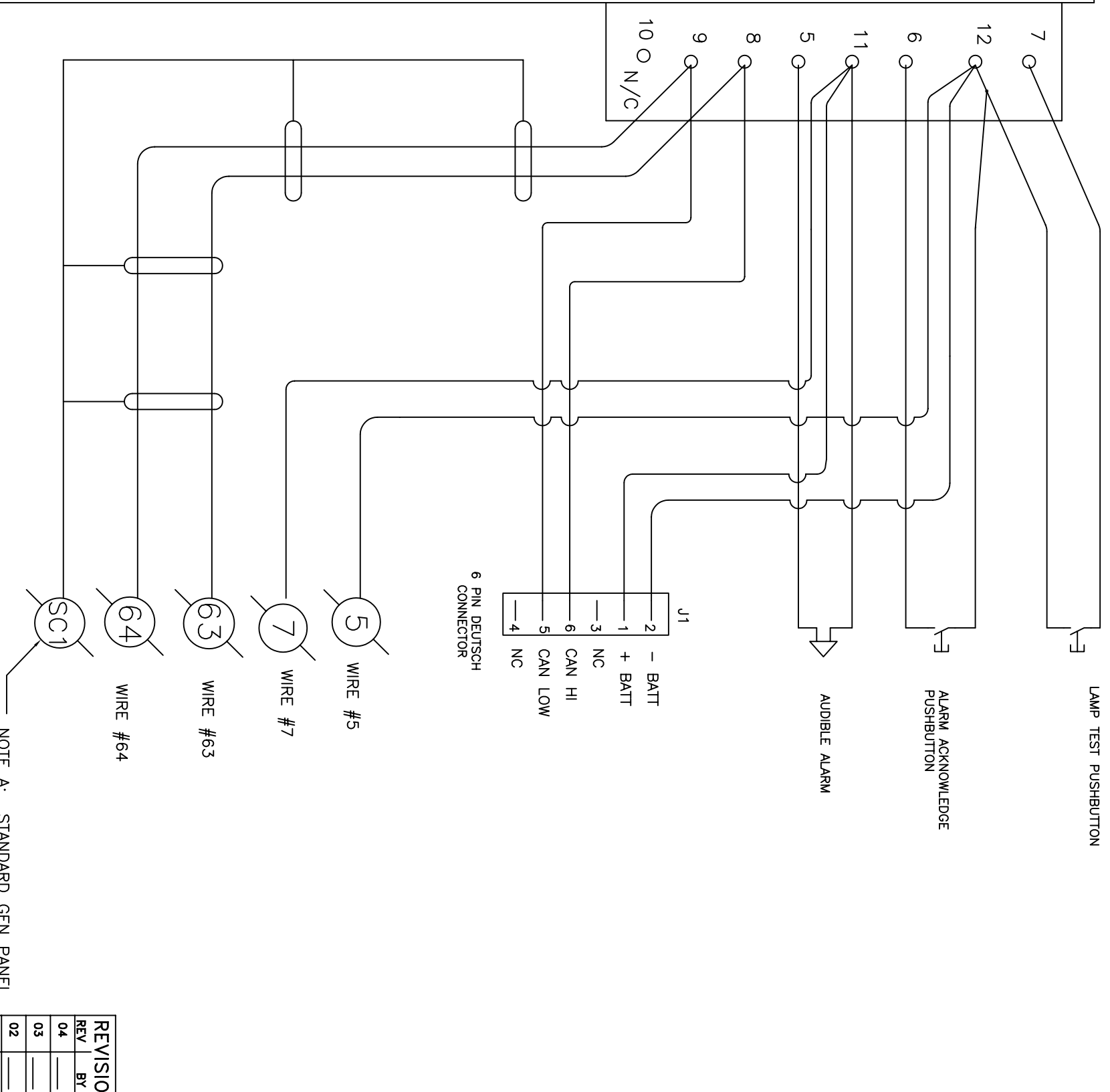
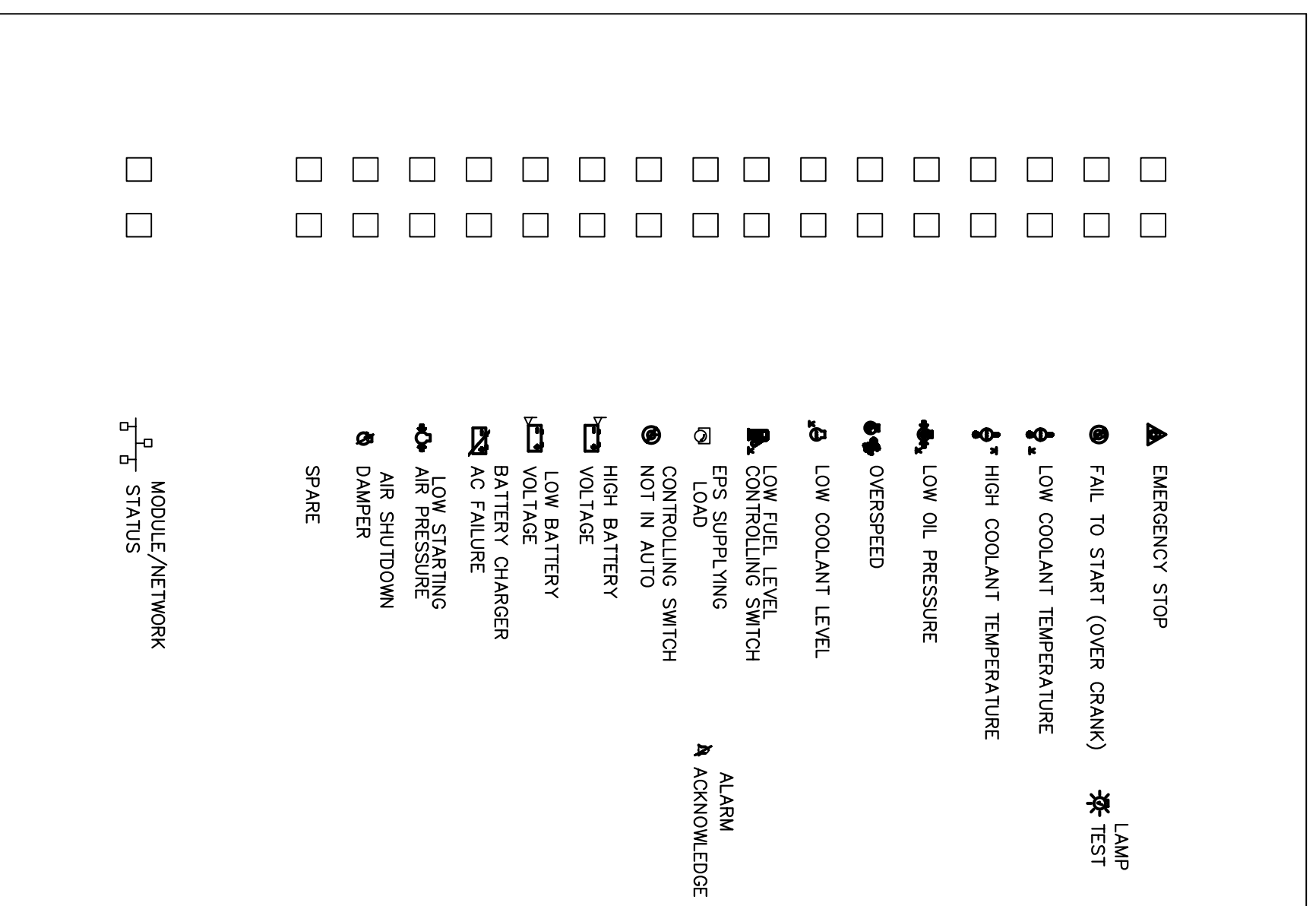


1	11E2733 DRAWING-AUTOCAD
2	11E0011 INTER & TOL
3	11E0010 WIRING
4	11E0009 ELECTRICAL
5	11E0008 DIAGNOSIS
6	11E0007 ELECTRICAL
7	11E0006 WIRING
8	11E0005 ELECTRICAL
9	11E0004 WIRING
10	11E0003 ELECTRICAL
11	11E0002 WIRING
12	11E0001 ELECTRICAL

CATERPILLAR INC.
 CATERPILLAR INC.
 CATERPILLAR INC.
 CATERPILLAR INC.
 261-2807



1127233 DRAWING - AUTOCAD
1150011 INTER & TOI
DATE: 11/11/11
BY: J. W. W. W.
CHECKED: J. W. W. W.
CATERPILLAR INC.
DIGITAL WIRING
ELECTRICAL
261-2807



REV	BY	DATE
04	—	—
03	—	—
02	—	—
01	—	—
00	—	—

16 LIGHT REMOTE ANNUNCIATOR FOR EMCP 3.2 CONTROL PANEL

MILTON CAT
POWER SYSTEMS DIVISION

ALL DIMENSIONS IN INCHES
NOT TO SCALE
DATE: 2-10-06
DWG No. X0XXXX

DRAWN BY: H. CHRISTENSEN
CHECKED: H. CHRISTENSEN
APPROVED: _____

SHEET 1 OF 1

DIMENSIONS WITHOUT ARROWHEADS ARE LOCATED FROM PARALLEL ZERO PLANE.

CONTROL FEATURES

- VOLTAGE AND FREQUENCY SENSING**
- A. DIFFERENTIAL TYPE VOLTAGE SENSING ON ALL PHASES OF NORMAL SOURCE. DROPOUT SETTING SELECTABLE AT 90, 85, 80 OR 70% OF NOMINAL. FACTORY SET AT 85%. PICKUP VOLTAGE ADJUSTABLE AT 90 OR 95% OF NOMINAL. (DEFAULT IS 95% IF DROPOUT IS SET TO 90%).
- B. FREQUENCY SENSING OF EMERGENCY SOURCE. NON-ADJUSTABLE DROPOUT SETTING AT 85% OF NOMINAL. NON-ADJUSTABLE PICKUP SETTING AT 95% OF NOMINAL.
- TIME DELAYS**
- A. MOMENTARY NORMAL SOURCE OUTAGE DELAY - ACTIVATED WHEN THE NORMAL SOURCE FAILS. DEACTIVATED WHEN THE NORMAL SOURCE IS ACCEPTABLE. PROVIDES A SELECTABLE (1 OR 3 SECOND) DELAY ON TRANSFER AND ENGINE STARTING SIGNALS. FACTORY SET AT 3 SECONDS. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).
- B. TRANSFER TO EMERGENCY DELAY - ACTIVATED AFTER THE MOMENTARY NORMAL SOURCE OUTAGE DELAY EXPIRES AND THE EMERGENCY SOURCE IS SENSED TO BE ACCEPTABLE. TRANSFER TO EMERGENCY IS COMMITTED ON INITIATION OF DELAY. DEACTIVATED WHEN THE EMERGENCY SOURCE IS UNACCEPTABLE. PROVIDES AN ADJUSTABLE DELAY FROM 0 TO 5 MINUTES. FACTORY SET AT 0 MINUTES. (REFER TO OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).
- C. RETRANSFER TO NORMAL DELAY - ACTIVATED WHEN THE NORMAL SOURCE IS ACCEPTABLE. DEACTIVATED WHEN THE NORMAL SOURCE FAILS WITH NO TRANSFER TO NORMAL. ALSO DEACTIVATED WHEN THE EMERGENCY SOURCE FAILS WHILE THE NORMAL SOURCE IS ACCEPTABLE WITH TRANSFER TO NORMAL. ADJUSTABLE DELAY FROM 1 SECOND TO 30 MINUTES. FACTORY SET TO 30 MINUTES. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).
- D. UNLOADED RUNNING (ENGINE COOL DOWN) DELAY - ACTIVATED ON EXPIRATION OF RETRANSFER TO NORMAL DELAY OR FOLLOWING EXPIRATION OF THE NORMAL SOURCE OUTAGE DELAY WITHOUT A COMMIT TO TRANSFER TO EMERGENCY. NON-ADJUSTABLE DELAY OF 5 MINUTES.
- E. MOMENTARY EMERGENCY SOURCE OUTAGE DELAY - ACTIVATED WHEN THE SWITCH IS IN THE EMERGENCY POSITION AND THE EMERGENCY SOURCE FAILS. FACTORY SET AT 4 SECONDS. RESET IF EMERGENCY RESTORES WITHIN 4 SECONDS.
- ENGINE CONTROL CONTACTS**
- ONE SET OF FORM C CONTACTS (1 N/O & 1 N/C) THAT CHANGE POSITION ON EXPIRATION OF THE NORMAL SOURCE OUTAGE DELAY AND RESET ON EXPIRATION OF THE UNLOADED RUNNING (ENGINE COOL DOWN) DELAY. OUTPUT CONTACTS (N/R) ARE RATED 5 AMPS RESISTIVE AT 28V DC OR 120V AC MAXIMUM.

OPERATOR INTERFACE INDICATORS & CONTROLS

- MEMBRANE TYPE**
- A. TRANSFER SWITCH TEST - MOMENTARY PUSH-BUTTON TO SIMULATE NORMAL SOURCE FAILURE. SEQUENCE OF OPERATION. PRESS AND HOLD FOR AT LEAST 15 SECONDS TO ALLOW TIME FOR ENGINE-GENERATOR SET TO START.
- B. BYPASS TIME DELAY - MOMENTARY PUSH-BUTTON TO BYPASS EITHER THE RETRANSFER TO EMERGENCY DELAY, ENGINE EXERCISER PERIOD OR THE RETRANSFER TO NORMAL DELAY DEPENDING ON WHICH DELAY IS ACTIVE AT THE TIME THE PUSH-BUTTON IS ACTIVATED.
- C. SET ENGINE EXERCISER - MOMENTARY PUSH-BUTTON TO ACTIVATE A SEVEN (7) DAY TIMER FOR AUTOMATIC WEEKLY TESTING OF THE ENGINE GENERATOR SET EITHER WITH OR WITHOUT LOAD TRANSFER. THE TIMER IS GENERATED BY A NON-RECHARGEABLE 9V BATTERY WHEN NORMAL AND EMERGENCY SOURCES ARE UNAVAILABLE. DEPRESSING THE MOMENTARY PUSH-BUTTON FOR 5 SECONDS SETS THE TIME OF WEEK AT WHICH TESTING IS TO OCCUR. THE FEATURE IS ACTIVATED BY SETTING A DIP SELECTOR SWITCH ON THE CONTROL PANEL. ENGINE START WITH OR WITHOUT LOAD TRANSFER IS SELECTED WITH A SECOND DIP SELECTOR SWITCH ON THE CONTROL PANEL. FACTORY SET TO DISABLED, NO LOAD. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).
- D. LOAD CONNECTED TO INDICATORS GREEN LED INDICATOR TO INDICATE WHEN THE TRANSFER SWITCH LOAD IS CONNECTED TO THE NORMAL SOURCE. RED LED INDICATOR TO INDICATE WHEN THE TRANSFER SWITCH IS CONNECTED TO THE EMERGENCY SOURCE.
- E. SOURCE AVAILABLE INDICATORS GREEN LED INDICATOR TO INDICATE WHEN THE NORMAL SOURCE IS AVAILABLE. RED LED INDICATOR TO INDICATE WHEN THE EMERGENCY SOURCE IS AVAILABLE.
- LOAD DISCONNECT FEATURE**
- ONE SET OF FORM C CONTACTS (1 N/O & 1 N/C) THAT CHANGE POSITION ON ACTIVATION OF SELECTABLE TIME DELAY BEFORE TRANSFER (LD-TB) AND RESET EITHER IMMEDIATELY FOLLOWING TRANSFER OR FOR THE SAME DELAY AS SET FOR PRE-SIGNAL BEFORE TRANSFER. SELECTABLE AS 0, 3, 10, OR 20 SECONDS. FACTORY SET AT 0. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS). OUTPUT CONTACTS (OP) ARE RATED 5 AMPS RESISTIVE AT 28 VDC OR 120 VAC MAXIMUM.
- MOTOR LOAD TRANSFER FEATURE**
- INPHASE TRANSFER CONTROL LOGIC TO INITIATE AN INPHASE TRANSFER OF MOTOR LOADS BETWEEN LIVE SOURCES. USED TO HELP PREVENT NUISANCE TRIPPING OF DISTRIBUTION CIRCUIT BREAKERS AND POSSIBLE DAMAGE TO MECHANICAL LOADS ASSOCIATED WITH OUT OF PHASE TRANSFER. ACTIVATED BY SETTING A DIP SWITCH ON THE CONTROL PANEL. FACTORY SET AS DISABLED. (REFER TO OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

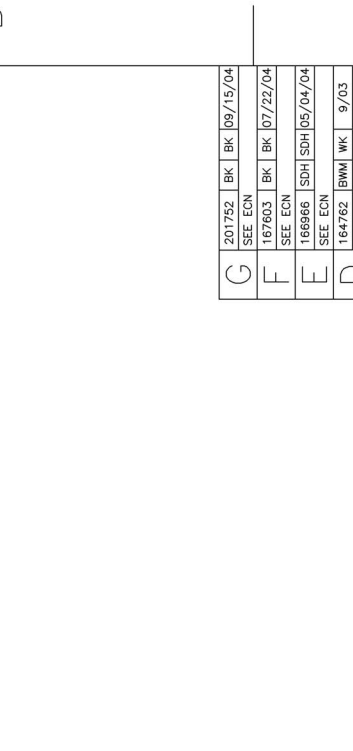
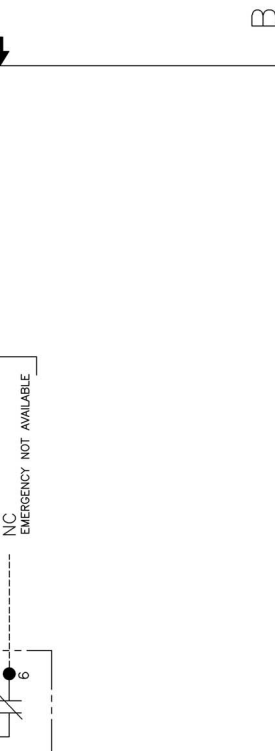
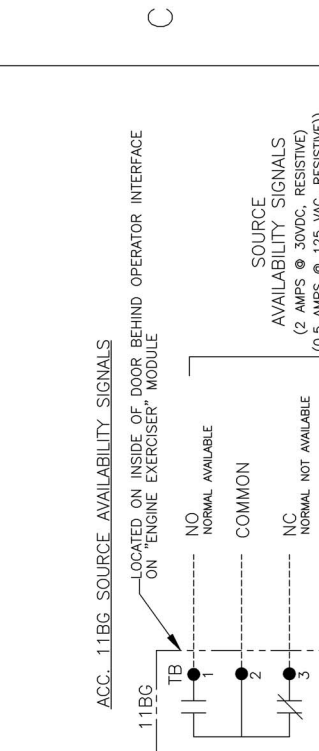
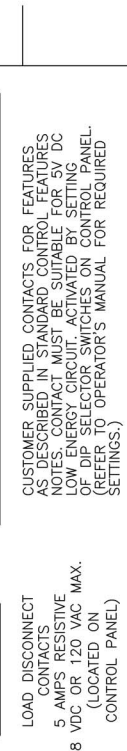
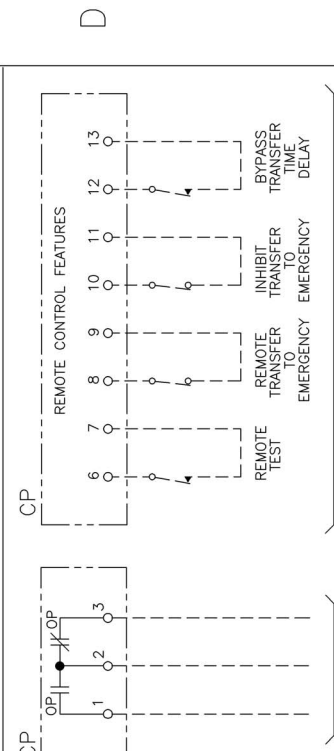
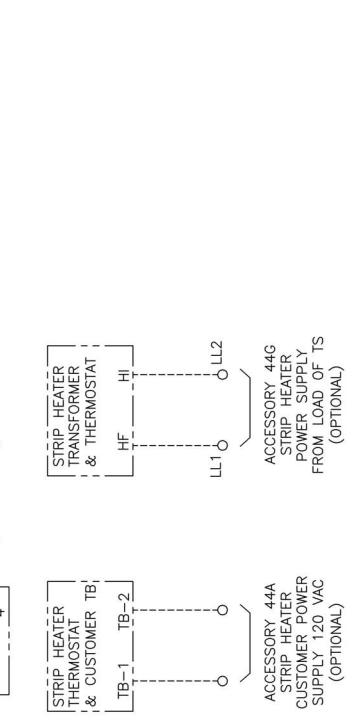
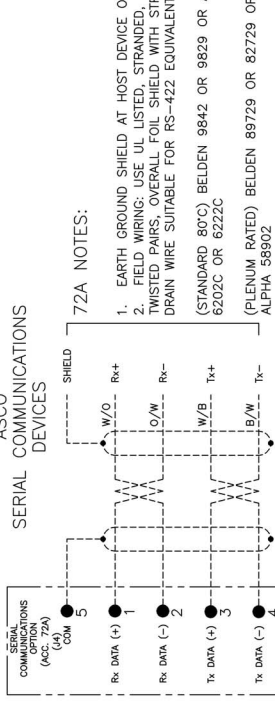
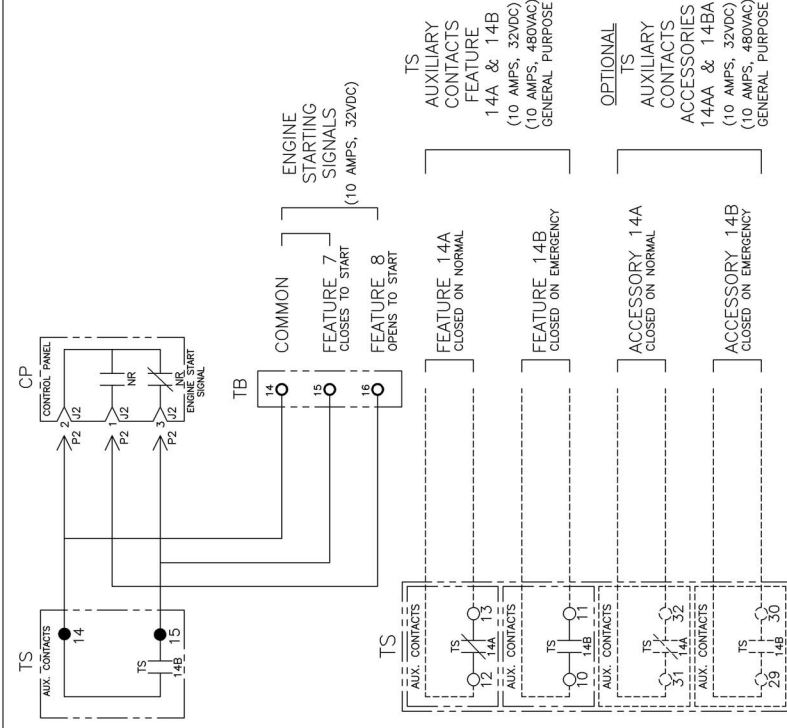
- REMOTE CONTROL FEATURES**
- THE FOLLOWING CONTROL PANEL INPUTS PROVIDE REMOTE CONTROL FUNCTIONS FOR THE AUTOMATIC TRANSFER SWITCH. EACH CONTROL FUNCTION CAN BE IMPLEMENTED BY THE CUSTOMER PROVIDING THE FORM OF CONTROL CONTACT DESCRIBED. EACH CONTROL CONTACT MUST BE SUITABLE FOR A 5 VDC LOW ENERGY CIRCUIT. EACH CONTROL FEATURE IS ACTIVATED BY SETTING A DIP TYPE SELECTOR SWITCH ON THE CONTROL PANEL. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).
- A. REMOTE TEST FEATURE - REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT SIMULATES A FAILURE OF THE NORMAL SOURCE SIMILAR TO THE SEQUENCE OUTLINED FOR THE TRANSFER SWITCH TEST PUSH-BUTTON. THE TRANSFER SWITCH WILL REMAIN CONNECTED TO THE EMERGENCY SOURCE UNDER ALL CONDITIONS WHILE THE CONTACT IS OPEN.
- B. REMOTE TRANSFER TO EMERGENCY FEATURE - REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT CAUSES ENGINE START AND TRANSFER TO THE EMERGENCY SOURCE. RECLOSURE OF THE CONTACT ACTIVATES THE RETRANSFER TO NORMAL DELAY PRIOR TO RETRANSFER. IN THE EVENT THAT THE EMERGENCY SOURCE FAILS WHILE THE TRANSFER SWITCH IS CONNECTED TO EMERGENCY AND THE REMOTE CONTACT IS OPEN, THE TRANSFER SWITCH WILL AUTOMATICALLY RETRANSFER TO THE NORMAL SOURCE.
- C. INHIBIT TRANSFER TO EMERGENCY FEATURE - REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT WILL PROHIBIT THE TRANSFER SWITCH FROM TRANSFERRING TO THE EMERGENCY SOURCE WHILE CONNECTED TO THE NORMAL SOURCE.
- D. BYPASS TRANSFER TIME DELAY FEATURE - REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT BYPASSES THE RETRANSFER TO NORMAL DELAY IF ACTIVE.

GENERAL NOTES

- SWITCH SHOWN DE-ENERGIZED. CONNECTED TO NORMAL SOURCE. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUB. ICS 1-1983, PART 1-101A.
- ALL WIRING IS #16 AWG. TINNED, STRANDED COPPER UNLESS OTHERWISE INDICATED.
- INDICATES CUSTOMER CONNECTION POINTS.
- INDICATES FACTORY CONNECTION POINTS.
- CONNECTION POINTS THAT HAVE BOTH CUSTOMER CONNECTIONS AND FACTORY CONNECTIONS ARE SHOWN OPEN AS CUSTOMER CONNECTION POINTS.
- THE TRANSFER UNIT IS MOUNTED ON THE BACK INSIDE SURFACE OF THE ENCLOSURE. THE CONTROL PANEL AND ANY OPTIONAL ACCESSORIES ARE MOUNTED ON THE INSIDE OF THE ENCLOSURE.
- AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
- GROUND STRAP ON CONTROL PANEL IS AFFIXED TO CHASSIS (ENCLOSURE)
- AT LOWER LEFT CONTROL PANEL MOUNTING STUD.

OPTIONAL ACCESSORIES

- ACCESSORY 11BG - PROGRAMMABLE ENGINE EXERCISER & SOURCE AVAILABILITY SIGNAL MODULES
- PROGRAMMABLE ENGINE EXERCISER: A PROGRAMMABLE SEVEN (7) DAY OR FOURTEEN (14) DAY ELECTRONIC TIME SWITCH FOR AUTOMATIC WEEKLY TESTING OF THE ENGINE GENERATOR SET EITHER WITH OR WITHOUT LOAD.
- EACH DAY OF THE WEEK IS INDIVIDUALLY PROGRAMMABLE. THE TIME OF DAY IS PRESERVED BY A BATTERY BUILT INTO THE GROUP 1 TRANSFER SWITCH CONTROL PANEL.
- THE FEATURE IS ACTIVATED BY SETTING A DIP SELECTOR SWITCH ON THE CONTROL PANEL. ENGINE START WITH OR WITHOUT LOAD TRANSFER IS SELECTED WITH A SECOND DIP SELECTOR SWITCH ON THE CONTROL PANEL. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL AND TIMER SETTINGS).
- SOURCE AVAILABILITY SIGNALING**: ONE FORM C CONTACT EACH FOR THE NORMAL & EMERGENCY SOURCES. THE ACCEPTABILITY OF THE SOURCE AS SENSED BY THE GROUP 1 CONTROL PANEL. THE SIGNAL CONTACTS OPERATE IN CONJUNCTION WITH THE SOURCE AVAILABILITY LED STATUS INDICATION PROVIDED ON THE OPERATOR INTERFACE. FIELD WIRING TERMINALS ARE PROVIDED AS SHOWN, LOCATED ON THE INSIDE DOOR BEHIND THE OPERATOR INTERFACE. CONTACTS RATED 2 AMPS @ 30VDC, 0.5 AMPS @ 125 VAC (RESISTIVE).
- SERIAL COMMUNICATIONS INTERFACE (ACCESSORY 72A)**
- RS-485 SERIAL INTERFACE TO CONTROL PANEL. FOR REMOTE MONITORING AND CONTROL FROM ASCO COMMUNICATIONS BASED PRODUCTS.
- ACC. 144A (2) AUXILIARY CONTACT CLOSED ON NORMAL.
- ACC. 148A (2) AUXILIARY CONTACT CLOSED ON EMERGENCY.
- ACC. 44A STRIP HEATER, THERMOSTAT & TB. CUSTOMER POWER SUPPLY 120VAC.
- ACC. 44G STRIP HEATER, THERMOSTAT & TRANSFORMER. POWER SUPPLY FROM LOAD TERMINALS OF TRANSFER SWITCH.



TS FRAME	CATALOG NUMBER	NEUTRAL TYPE	DESCRIPTION	CODE	NOMINAL VOLTAGE	TYPE	ENCLOSURE CODES
D	300	B	SOLID SWITCHING OVERLAPPING	C	208	1	OPEN TYPE (NO ENCLOSURE) GENERAL PURPOSE, INDOOR
		C		F	220	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		E		G	230	4	
		F		L	240	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		H			380		
		J			400		
		K			415		
		L			440		
		M			480		
		N			480		
		P			550*		
		O			575*		
		R			600*		

* 200 & 230 AMP SIZES ARE 480V MAX.

TS FRAME	CATALOG NUMBER	NEUTRAL TYPE	DESCRIPTION	CODE	NOMINAL VOLTAGE	TYPE	ENCLOSURE CODES
D	300	B	SOLID SWITCHING OVERLAPPING	C	208	1	OPEN TYPE (NO ENCLOSURE) GENERAL PURPOSE, INDOOR
		C		F	220	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		E		G	230	4	
		F		L	240	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		H			380		
		J			400		
		K			415		
		L			440		
		M			480		
		N			480		
		P			550*		
		O			575*		
		R			600*		

* 200 & 230 AMP SIZES ARE 480V MAX.

TS FRAME	CATALOG NUMBER	NEUTRAL TYPE	DESCRIPTION	CODE	NOMINAL VOLTAGE	TYPE	ENCLOSURE CODES
D	300	B	SOLID SWITCHING OVERLAPPING	C	208	1	OPEN TYPE (NO ENCLOSURE) GENERAL PURPOSE, INDOOR
		C		F	220	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		E		G	230	4	
		F		L	240	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		H			380		
		J			400		
		K			415		
		L			440		
		M			480		
		N			480		
		P			550*		
		O			575*		
		R			600*		

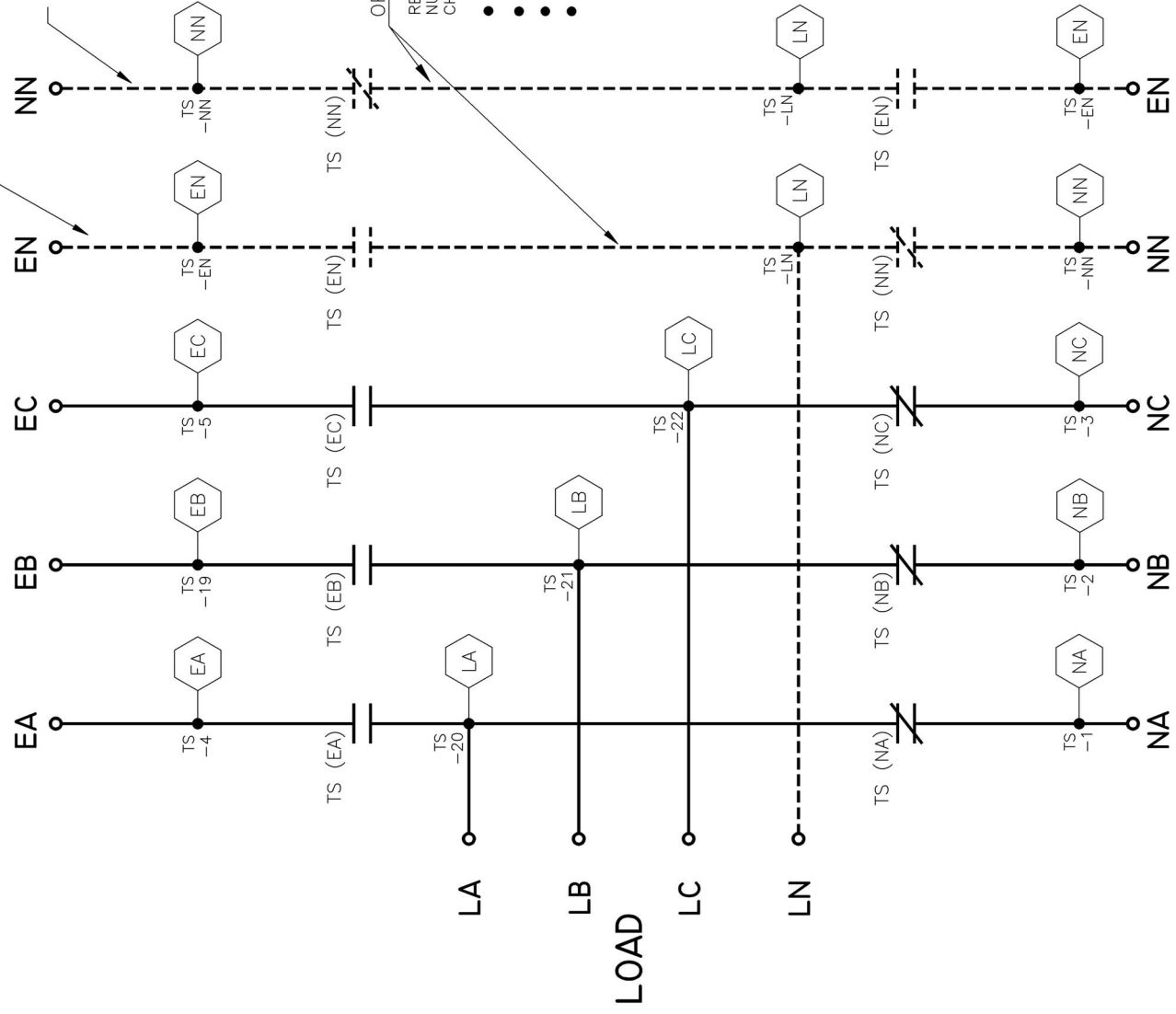
* 200 & 230 AMP SIZES ARE 480V MAX.

TS FRAME	CATALOG NUMBER	NEUTRAL TYPE	DESCRIPTION	CODE	NOMINAL VOLTAGE	TYPE	ENCLOSURE CODES
D	300	B	SOLID SWITCHING OVERLAPPING	C	208	1	OPEN TYPE (NO ENCLOSURE) GENERAL PURPOSE, INDOOR
		C		F	220	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		E		G	230	4	
		F		L	240	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		H			380		
		J			400		
		K			415		
		L			440		
		M			480		
		N			480		
		P			550*		
		O			575*		
		R			600*		

* 200 & 230 AMP SIZES ARE 480V MAX.

MAIN POWER POLES

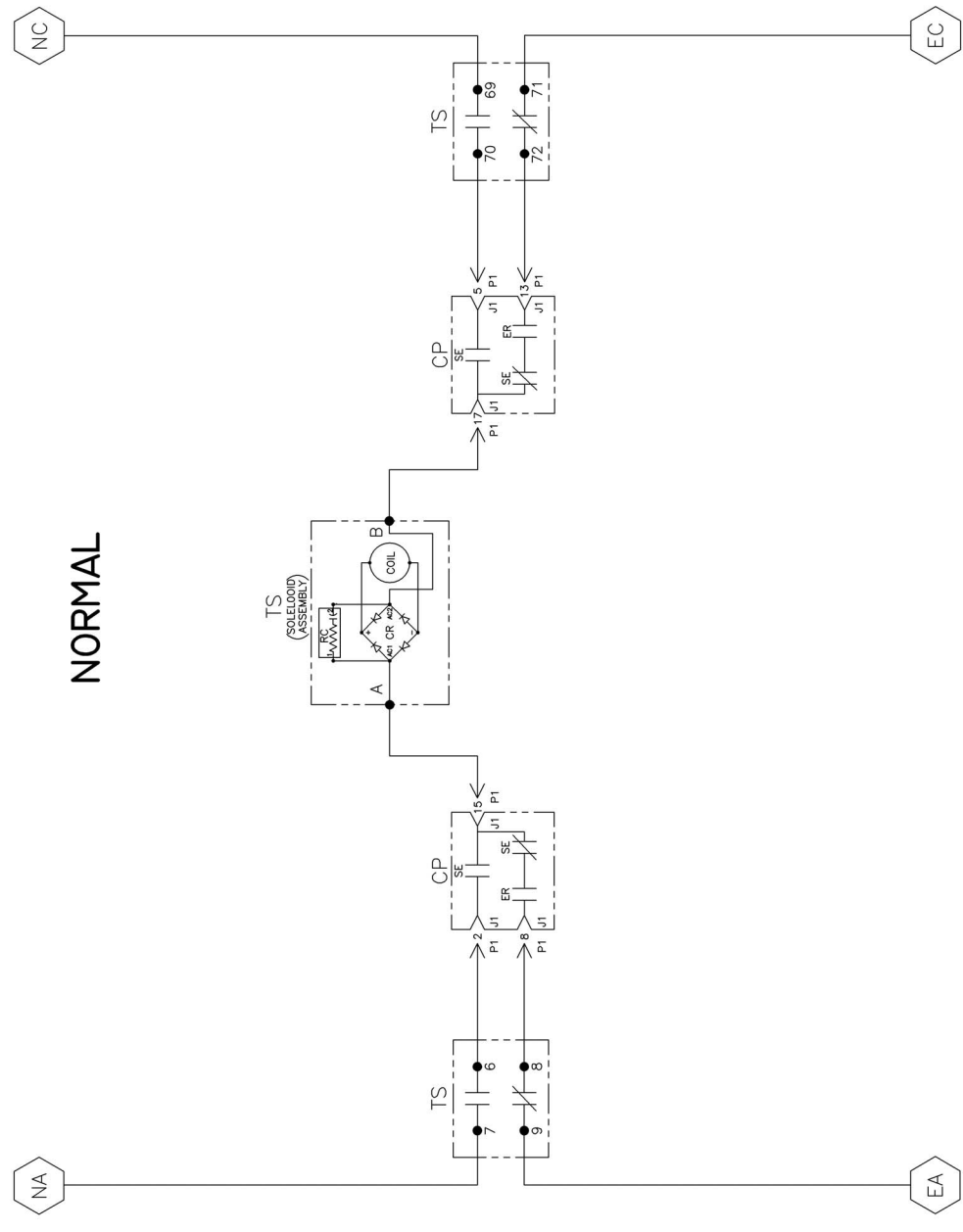
EMERGENCY



NOTE:
ATS SHOWN CLOSED ON NORMAL SOURCE.

TS OPERATOR CIRCUIT

NORMAL



EMERGENCY

TS	TS CONTROL CONTACTS	
	SOLENOID POSITION	BEFORE CLOSED
6-7	>	<
69-70	>	<
8-9	>	<
71-72	>	<

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

PROJECT NAME:		DIAGRAM	THIRD ANGLE PROJECTION
WIRING SERIES 300 ATS GROUP 1 CONTROLS		MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR POSITIVE PARTS SEE MP-1-003.	
BY	DATE	ASSEMBLY REF. NO.	SCALE
SDH	9/02		1:1
APPROVAL		PROPERTY OF ASCO POWER TECHNOLOGIES. USE PERMITTED FOR OUR WORK ONLY. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	FILE
SDH	9/02	ASCO POWER TECHNOLOGIES, L.P.	DS718517
FINAL APPROVAL		FLORHAM PARK, NEW JERSEY 07932 U.S.A.	REV. 201752

G	201752	BK	09/15/04
F	167603	BK	07/22/04
E	166966	SDH	05/04/04
D	164762	BWM	9/03
C	164537	BWM	08/08/03
B	163086	BWM	03/05/03
A	162068	BWM	10/29/02
-	160948	BWM	SDH 6/02

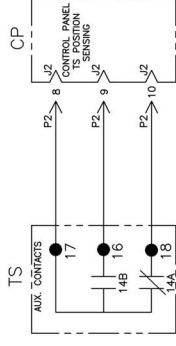
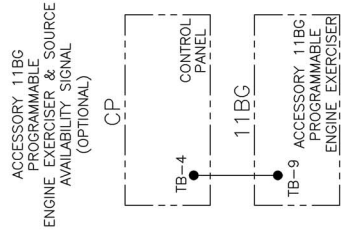
WIRE RUN LISTING

FOR 30-230 AMPS

WIRE No.	HARNESS LOCATOR	CONDUCTOR SIZE	CLR	AWG
1	TS-8,P1-8	16		16
2	TS-A,P1-8	16		16
3	TS-6,P1-2	16		16
4	TS-3,P1-4	16		16
5	TS-B,P1-17	16		16
6	TS-5,P1-12	16		16
7	TS-4,P1-7	16		16
8	TS-14,P2-2	16		16
9	TS-17,P2-3	16		16
10	TS-19,P2-8	16		16
11	TS-2,P1-10	16		16
12	TS-1,P1-1	16		16
13	TS-16,P2-9	16		16
14	TS-18,P2-10	16		16
15	TS-70,P1-5	16		16
16	TS-72,P1-13	16		16
17	TS-4,TS-9	16		16
18	TS-7,TS-1	16		16
19	TS-3,TS-69	16		16
20	TS-5,TS-71	16		16
23	TS-16,P2-1	16		16
ADD WIRES				
21	TS-14,TS-14	16		16
22	TS-15,TS-15	16		16

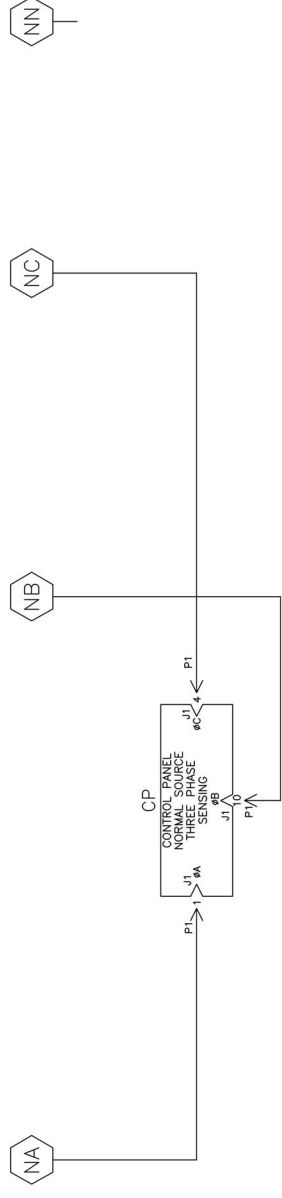
WIRE No.	ACC. 11BG	CLR	AWG
28	CP-TB-4,11BG-TB-9		16

CONTROL SIGNALS & INDICATION



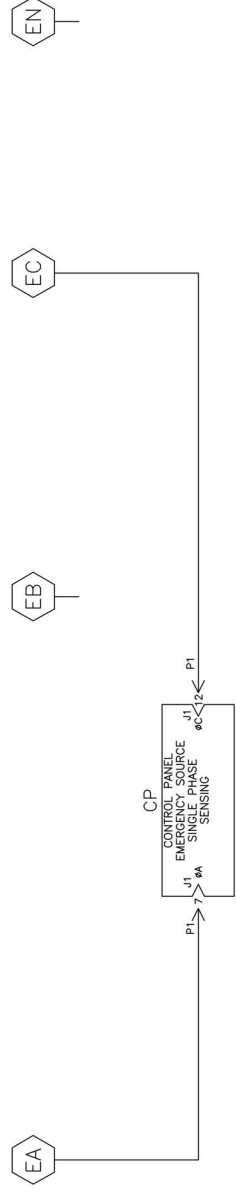
NORMAL SOURCE CIRCUITS

NORMAL



EMERGENCY SOURCE CIRCUITS

EMERGENCY



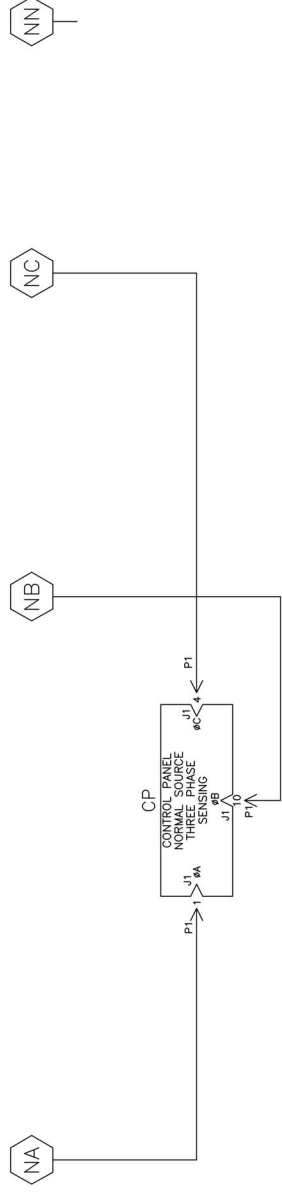
LOAD TERMINAL CIRCUITS

LOAD



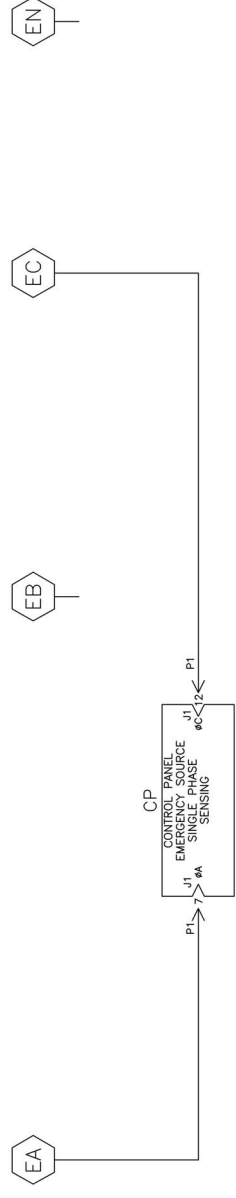
NORMAL SOURCE CIRCUITS

NORMAL



EMERGENCY SOURCE CIRCUITS

EMERGENCY



LOAD TERMINAL CIRCUITS

LOAD



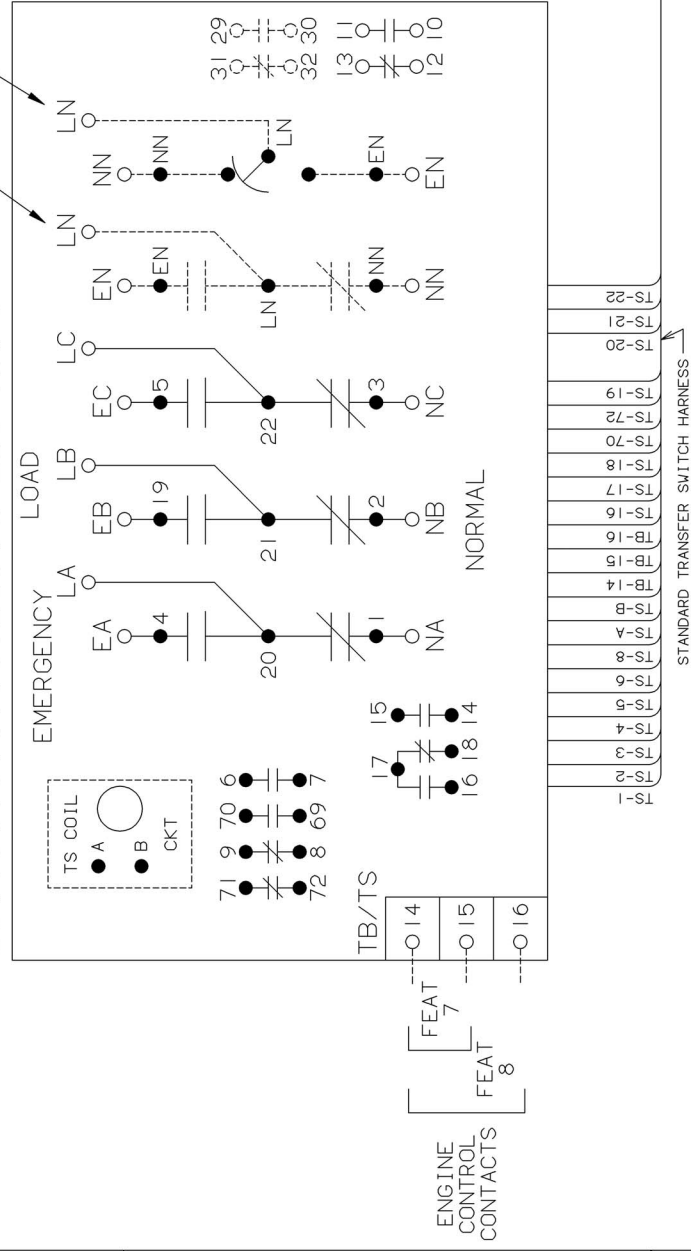
PROJECT NAME:		WIRING DIAGRAM	
SERIES 300 ATS		THIRD ANGLE PROJECTION	
GROUP 1 CONTROLS		COMPUTER GENERATED DRAWING	
BY	DATE	MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASQC PROCEDURE MP-1-003. FOR POSITIVE PARTS SEE MP-1-003.	ASSEMBLY NO.
SDH	9/02		
APPROVAL		PROPERTY OF ASCO POWER TECHNOLOGIES. USE PERMITTED FOR OUR WORK ONLY. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
SDH	9/02		
FINAL APPROVAL		ASCO POWER TECHNOLOGIES, L.P.	
		FLORHAM PARK, NEW JERSEY 07932 U.S.A.	

G	201752	BK	BK	09/15/04
F	167603	BK	BK	07/22/04
E	166966	SDH	SDH	05/04/04
D	164762	BWM	WK	9/03
C	164537	BWM	WK	08/08/03
B	163086	BWM	WK	03/05/03
A	162068	BWM	WK	10/29/02
-	160948	BWM	SDH	6/02

PHYSICAL DIAGRAM

ENCLOSURE

TS (TRANSFER SWITCH)
VIEW FROM INSIDE FRONT
30, 70, 100, 150, 200, & 230 AMPS



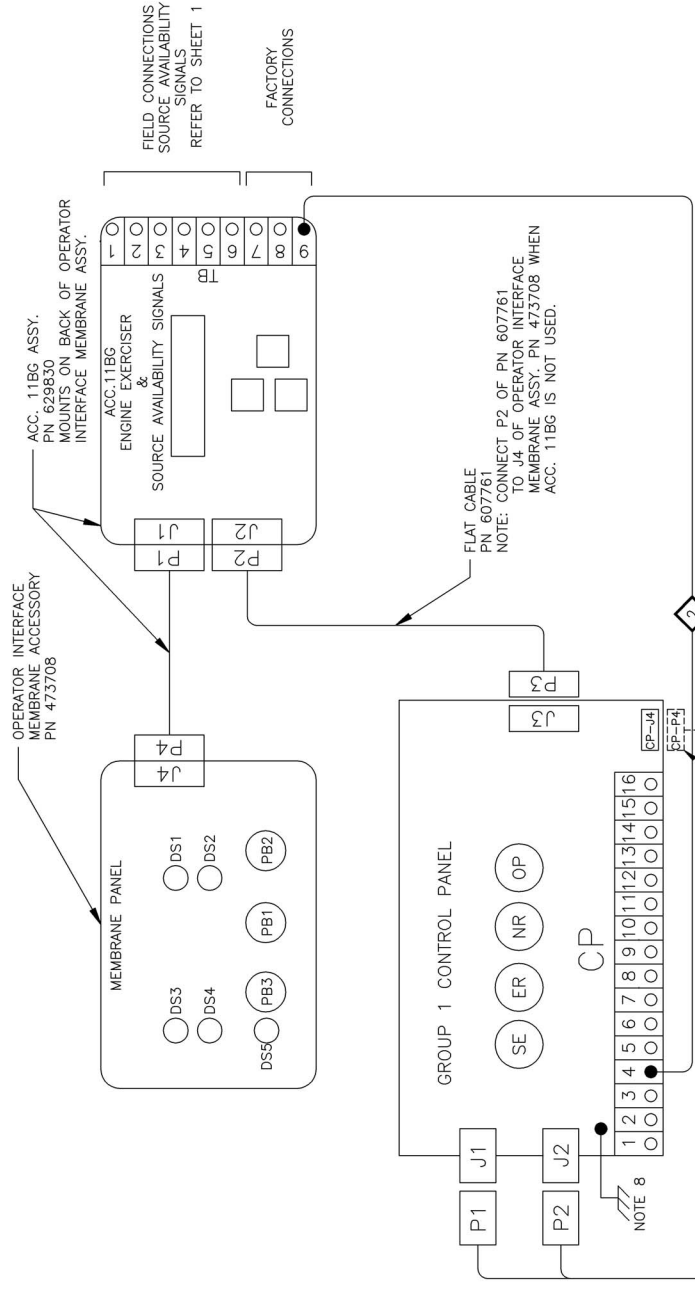
TO LOAD OF ATS
(OPTIONAL ACC. 44G)
OR
TO CUSTOMER POWER
SUPPLY 120VAC
(OPTIONAL ACC. 44A)



DOOR HINGE

BONDING STRAP
PN 098323-019

DOOR (INSIDE)



ASCO OPTIONAL
SERIAL COMMUNICATION
DEVICE

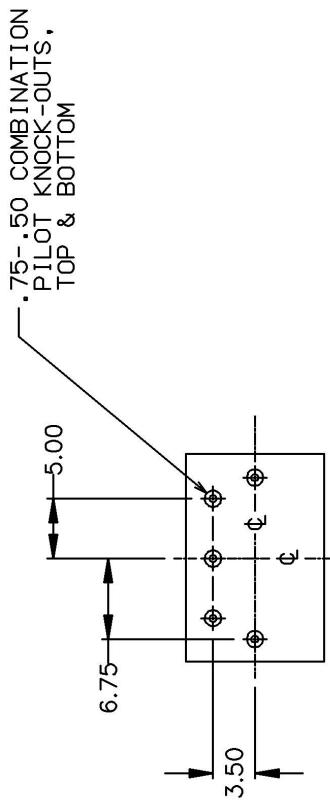
OPERATOR CONTROLS

ID	DESCRIPTION
DS1	TS CONNECTED TO NORMAL
DS2	TS CONNECTED TO EMERGENCY
DS3	NORMAL SOURCE AVAILABLE
DS4	EMERGENCY SOURCE AVAILABLE
DS5	ENGINE EXERCISER
PB1	BYPASS TIME DELAY
PB2	TRANSFER SWITCH TEST
PB3	SET ENGINE EXERCISER

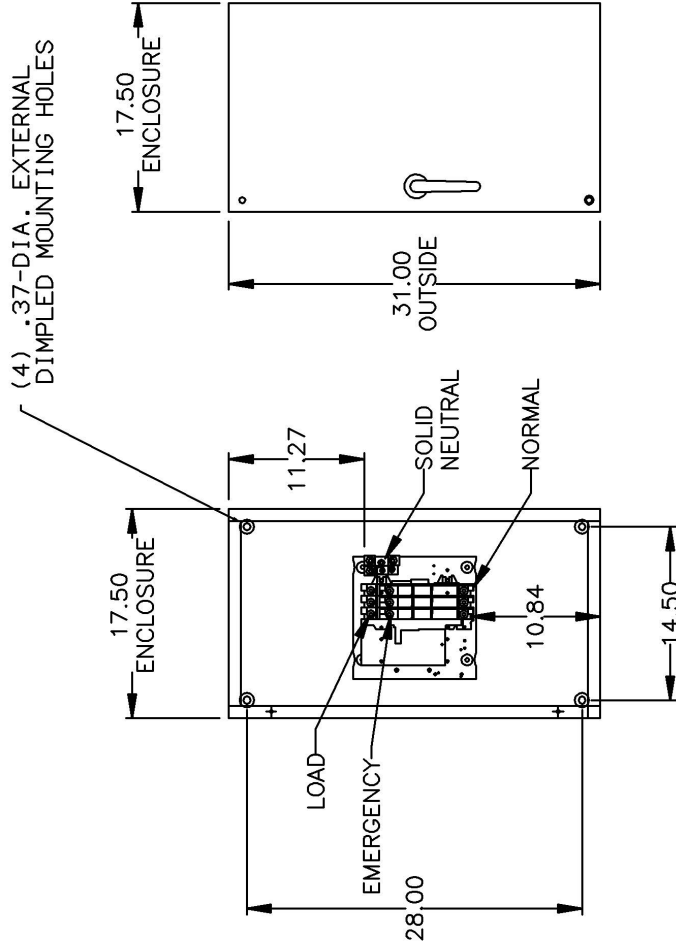
PROJECT NAME:		WIRING DIAGRAM	
SERIES 300 ATS		THIRD ANGLE PROJECTION	
GROUP 1 CONTROLS		SCALE 1:1	
BY	DATE	MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-001. FOR PLASTIC PARTS SEE MP-1-005.	ASSEM. REF. NO.
SDH	9/02		
SDH	9/02		
SDH	9/02		
FINAL APPROVAL:		PROPERTY OF ASCO POWER TECHNOLOGIES. USE PERMITTED FOR OUR WORK ONLY. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
ASCO		ASCO POWER TECHNOLOGIES, L.P.	
FLORHAM PARK, NEW JERSEY 07932 U.S.A.		DWG. NO. DS718517	
		COMPUTER GENERATED DRAWING	
		SIZE 1:1	
		ACAD FILE	
		SUBSIDIARY DISTRIBUTION	
AE	AM	AN	AL
CH	AW	AW	AR
AP	AS	AS	AS
AP	AS	AS	AS

G	201752	BK	BK	08/15/04
F	167603	BK	BK	07/22/04
E	166966	SDH	SDH	05/04/04
D	164762	BWM	WK	9/03
C	164537	BWM	WK	08/08/03
B	163086	BWM	WK	03/05/03
A	162068	BWM	WK	10/29/02
-	160948	BWM	SDH	6/02
ISSUE		BY		DATE
CHANGE LETTER		APP.		DATE

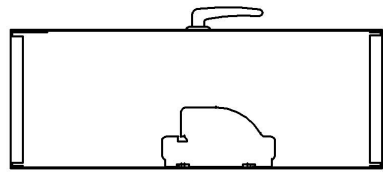
OUTLINE & MOUNTING FOR ASCO (D300, D386) SERIES TRANSFER SWITCHES, TYPES 7ATS RATED 30, 70, 100, 150, & 200 AMPERES



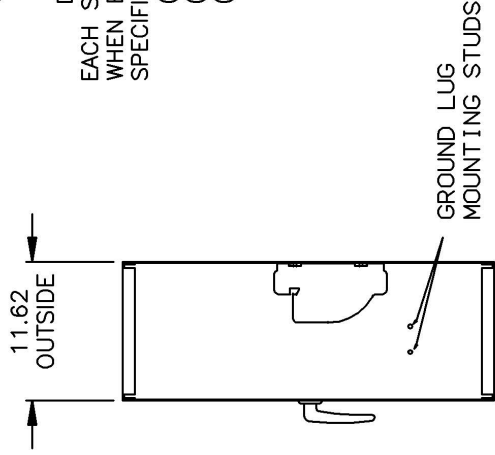
TOP VIEW
TOP & BOTTOM



FRONT VIEW
WITHOUT DOOR



LEFT SIDE



RIGHT SIDE

GENERAL NOTES

1. TYPE 1 WALL MOUNTED ENCLOSURE.
2. STANDARD FINISH - LIGHT GREY, ANSI 61.
3. KEY LOCKABLE HANDLE.
4. SINGLE DOOR HINGED ON RIGHT.
5. TERMINALS - SCREW TYPE LUGS FOR EXTERNAL POWER CONNECTIONS.
6. THREE POLE SWITCH WITH SOLID NEUTRAL SHOWN FOR REFERENCE.
7. NEUTRAL CONFIGURATIONS:

D300-A FULL RATED SOLID NEUTRAL CONFIGURATION FOR EACH SOURCE AND THE LOAD IS PROVIDED STANDARD. OPTIONALLY A SWITCHED NEUTRAL POLE MAY BE PROVIDED AS SPECIFIED BY THE CATALOG NUMBER:

- (B) SWITCHED NEUTRAL POLE
- (C) OVERLAPPING NEUTRAL POLE

D386-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 NEUTRAL
- (B) SWITCHED NEUTRAL POLE
- (C) OVERLAPPING NEUTRAL POLE

SWITCH RATING (AMPS)	RANGE OF WIRE
30-150	(1) #14 TO 4/0 AWG AL-CU WIRE
200	(1) #14 TO 4/0 AWG COPPER WIRE

APPROXIMATE SHIPPING WEIGHT, LBS (KG)

AMP SIZE	POLES	WEIGHT
30-200	2	69 (32)
	B2*	72 (33)
	C2*	72 (33)
	3	72 (33)
	B3*	75 (34)
	C3*	75 (34)

* ALPHA POLE PREFIX DESCRIBES OPTIONAL NEUTRAL POLE:
 B=SWITCHED TYPE NEUTRAL.
 C=OVERLAPPING TYPE NEUTRAL.

CATALOG NO. _____
 CERTIFIED To **ASCO** s.o. _____
 DATE _____ BY _____

PROJECT NAME:	OUTLINE & MOUNTING	THIRD ANGLE PROJECTION
DATE:	D300-D386	SCALE: NONE
BY:	30-200 AMPS TYPE 1	ASSEMBLY NO.:
CHECKED:		DATE:
APPROVED:		DATE:
ASCO Power Technologies, L.P.	ASCO	ASCO