

WINPOWER

**DIESEL
GENERATOR
SYSTEMS**

**DR20I4 DR90F4
DR30I4 DR100F4
DR45F4 DR130F4
DR65F4**



DR130F4

SHOWN WITH OPTIONAL BASE TANK

**INSTALLATION AND
OPERATORS MANUAL**

**WINCO INC.
225 S. CORDOVA AVE.
LE CENTER, MN 56057
507-357-6821
SERVICE DEPT.**

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries.

Read and understand all instructions in the manual before starting and operating the generator set.

USING THIS MANUAL

Congratulations on your choice of a Winpower generator set. You have selected a high-quality, precision-engineered generator set designed and tested to give you years of satisfactory standby service.

To get the best performance from your new engine generator set, it is important that you carefully read and follow the operating instructions in this manual.

Should you experience a problem please follow the "Things To Check" near the end of this manual. The warranty listed in this manual describes what you can expect from WINCPOWER should you need service assistance in the future.

COPY YOUR MODEL AND SERIAL NUMBER HERE

No other WINPOWER generator has the same serial number as yours. It is important that you record the number and other vital information here. If you should ever need to contact us on this unit it will help us to respond to your needs faster.

MODEL _____

SERIAL NUMBER _____

PURCHASE DATE _____

DEALER _____

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PROPER USE AND INSTALLATION

You must be sure your new engine generator set is:

- * Properly serviced before starting
- * Operated in a well ventilated area
- * Properly exhausted and gases safely dispersed
- * Wired by a qualified electrician
- * Operated only for its designed purposes
- * Used only by operators who understand its operation
- * Properly maintained

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTION

This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries.

Read and understand all instructions in the manual before starting and operating the generator set.

This engine generator set has been designed and manufactured to allow safe, reliable performance. Poor maintenance, improper or careless use can result in potential deadly hazards; from electrical shock, exhaust gas asphyxiation, or fire. Please read all safety instructions carefully before installation or use. Keep these instructions handy for future reference. Take special note and follow all warnings on the unit labels and in the manuals.

ANSI SAFETY DEFINITIONS

DANGER:

*DANGER indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury. This signal word is to be limited to the most extreme situations.*

WARNING:

*WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.*

CAUTION:

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE:

CAUTION is also used on the unit labels and in this manual to indicate a situation that could result in serious damage or destruction of the equipment and possible personal injury.

1. **ELECTRIC SHOCK** - The output voltage present in this equipment can cause a fatal electric shock. This equipment must be operated by a responsible person.
 - a. Do not allow anyone to operate the generator without proper instruction.
 - b. Guard against electric shock.
 - c. Avoid contact with live terminals or receptacles.
 - d. Use extreme care if operating this unit in rain or snow.
 - e. Use only three-prong grounded receptacles and extension cords.
 - f. Be sure the unit is properly grounded to an external ground rod driven into the earth.
2. **FIRE HAZARD** - Deisel fuel presents a hazard of possible explosion and/or fire.
 - a. Do not smoke or use open flame near the generator set.
 - b. Keep a fire extinguisher nearby and know its proper use. Fire extinguishers rated ABC by NFPA are appropriate.
3. **DEADLY EXHAUST GAS** - Exhaust fumes from any diesel engine contain carbon monoxide, an invisible, odorless and deadly gas that must be mixed with fresh air.
 - a. Operate only in well ventilated areas.
 - b. Never operate indoors.
 - c. Never operate the unit in such a way as to allow exhaust gases to seep back into closed rooms (i.e. through windows, walls or floors).
4. **NOISE HAZARD** - Excessive noise is not only tiring, but continual exposure can lead to loss of hearing.
 - a. Use hearing protection equipment when working around this equipment for long periods of time.
 - b. Keep your neighbors in mind when permanently installing this equipment.
5. **CLEANLINESS** - Keep the generator and surrounding area clean.
 - a. Remove all grease, ice, snow or materials that create slippery conditions around the unit.
 - b. Remove any rags or other material that could create potential fire hazards.
 - c. Carefully wipe up any fuel or oil spills before starting the unit.
 - d. Never allow leaves or other flammable material to build up around the engine exhaust area.
6. **SERVICING EQUIPMENT** - All service, including the installation or replacement of service parts, **should be performed only by a qualified technician.**
 - a. Use only factory approved repair parts.
 - b. Do not work on this equipment when fatigued.
 - c. Never remove the protective guards, cover, or receptacle panels while the engine is running.
 - d. Use extreme caution when working on electrical components. High output voltages from this equipment can cause serious injury or death.
 - e. Always avoid hot mufflers, exhaust manifolds, and engine parts. They all can cause severe burns instantly.
 - f. Installing a generator set is not a "do-it-yourself" project. Consult a qualified, licensed electrician or contractor. The installation must comply with all national, state, and local codes.
 - g. Always make sure unit is disabled before placing your hands anywhere near the fan, belts, alternator or water hoses.

TESTING POLICY:

Before any generator is shipped from the factory, it is fully checked for performance. The generator is loaded to its full capacity, and the voltage, current, and frequency are carefully checked.

Rated output of generators is based on engineering tests of typical units, and is subject to, and limited by, the temperature, altitude, fuel, and other conditions specified by the manufacturer of the applicable engines.

INTRODUCTION AND DESCRIPTION

PRODUCT DESCRIPTION:

This engine-generator set is designed for unattended remote start operation. It can be operated as part of a fully automatic standby power system or independently as a local start unit in a prime power system. The engine-generator set is fully tested at the factory prior to shipment to insure proper operation of each individual component as well as the total system's performance and reliability.

The engine generator set consists of a multi-cylinder, liquid cooled engine nominally operating at 1800 rpm. The generator frequency regulation is maintained by the engine governor to within +/- 1.5 hertz (cps), from no load to rated load for standard mechanical governors and to within +/- .5 hertz or better for units equipped with an electronic governor. The generator is a single bearing, direct drive, rotating field design. The generator is connected to the engine flywheel via flexible drive disks. The Generator Set is skid mounted with isolation mounts between the engine and base on all units.

Unit Orientation Note: All references used in this manual for unit familiarization, access and component locations on the Generator Set are oriented from a TOP (plan) VIEW with engine at the FRONT and generator to the REAR.

WINPOWER uses a common junction box for all customer control and power connections (both AC output and DC control). The common electrical junction box is always on the left side at the generator end of the machine.

A customer supplied 12 Volt battery is required to complete the installation.

The engine is controlled and Generator Set operation is monitored for safe operation by a programmable microprocessor based Electronic Engine Control Module (ECM) with an LCD digital display. The Generator Set ECM control is mounted on a vertical pedestal on the right side of the generator. The ECM is programmed with a cycle cranking sequence - 3 cycles of 15 seconds on / 15 seconds off, and a 5 minute cool down delay. The cool down delay can be changed in the field from 0 to 30 minutes by your dealer. Other features, timing cycles, set points and signal output capabilities are possible. Consult factory for procedure and passwords.

** NOTICE **

These units will automatically transfer if a power outage occurs while running in an exercise mode.

MODEL NUMBER STRUCTURE:

The WINPOWER alpha-numerical numbering system consists of a base model designation, followed by an options section, separated by a dash mark. The base component of the model numbering system identifies an engine type, engine starting method, fuel type, kilowatt rating, engine manufacturer, and number of generator poles. Following the separation dash mark is the voltage connection and optional installed equipment. Options include features like weather enclosures (housing), base mounted fuel tank sizes, and trailer options.

Please note that some features or packages, such as NFPA level I & II, do not have an indication place in this numbering system. They are issued and built with an M-Spec (i.e. M-10372) number which can be found on the WINPOWER data tag. When the M-Spec is present, supplemental inserts will accompany this standard manual providing information about the special equipment and features installed. The standard model numbering key that can be used along with the data tag information and/or M-spec supplements to determine the generator sets ratings and specifications.




MODEL NUMBERING SYSTEM

D	FUEL TYPE D = DIESEL G = GASEOUS
R	R = REMOTE START E = ELECTRIC START X = PRIME POWER
	GASEOUS FUEL TYPE N = NATURAL GAS P = LP VAPOR L = LP LIQUID WITHDRAWAL BLANK FOR DIESEL FUEL
45	GENERATOR OUTPUT RATING IN KILOWATTS
F	ENGINE MANUFACTURE: V = VOLVO D = DEUTZ I = ISUZU (10 & 20 KW) F = FPT (ALL OTHERS) G = GM N = NG (DOOSAN) K = KOHLER P = PERKINS
4	NUMBER OF GENERATOR POLES 2 = 2 POLES (3600 rpm) 4 = 4 POLES(1800 rpm)
-	BASE UNIT - OPTIONS SEPERATOR
A	VOLTAGE X = SWITCHABLE A (3) = SINGLE PHASE 120/240 J (17) = THREE PHASE 120/240 D (4) = THREE PHASE 120/208 L (18) = THREE PHASE 277/480
H	HOUSING TYPE H = WEATHER HOUSING (WEATHER-PAK) A = SOUND ATTENUATED/WEATHER PROTECTIVE (SOUND-PAK) * = NO HOUSING
M	FUEL TANK SIZE S = Small M = Meduim L = Large * = None See current pricing sheet to determine capacity.
T	TRAILER OPTION If present unit is mounted on a trailer with fuel tank.
D	BATTERY CHARGER OPTIONS A - 12V/.75A B - 12V3.5A C - 12V/6A D - 12V/10A E - 12V/6A NFPA F - 12V/10A NFPA G - 24V/3.5A H - 24V/10A I - 24V/10A NFPA J - 12V/2A

SPECIFICATIONS

GENERATOR SET:

Every WINPOWER Generator Set has its own unique identity data plate. This data plate identifies the complete unit model number, the system serial number and has links to the individual components that form the generator set in our factory records. Several of the major components also have their own individual identity plates providing additional information to document build data for warranty and replacement parts.

WINPOWER®															
507-357-6821 - LE CENTER MN 56057 U.S.A. - www.wincogen.com															
MODEL DR45F4-LAM*K		P/N M10759	REV A												
VOLTS 277/480	PHASE 3														
P.F. 0.8	HERTZ 60														
<table border="1"><thead><tr><th>DUTY</th><th>CONT.</th><th>STANDBY</th></tr></thead><tbody><tr><td>AMPS</td><td>60</td><td>68</td></tr><tr><td>K.W.</td><td>40</td><td>45</td></tr><tr><td>K.V.A.</td><td>50</td><td>56</td></tr></tbody></table>	DUTY	CONT.	STANDBY	AMPS	60	68	K.W.	40	45	K.V.A.	50	56	R.P.M. 1800	INS. H	
DUTY	CONT.	STANDBY													
AMPS	60	68													
K.W.	40	45													
K.V.A.	50	56													
		TEMP. 40 C													
SERIAL NO. 169029 M14		JOB NO. 062431													
															
MAX LOAD UNBALANCED - 50%															

Be sure to have the main WINPOWER unit data plate information recorded inside the front cover of this manual for future reference and for identification whenever requesting field or factory technical assistance. Sample data plate is shown for reference. Primary fields needed for assistance are complete model number, serial number and especially the M-Spec number and REV number. The M-Spec number and REV # is recorded in the 'P/N' block at the top of the plate.

ENGINE:

Each engine has a nameplate on it that gives the specific engine model number, build specification and the serial number for the engine. See the technical data pages in the back of this manual for individual engine specifications, fuel consumptions and wiring diagram references.

This manual covers specific operation of the combined engine generator set. Refer to engine operating and maintenance instructions for specific instruction on the care and maintenance of the engine. Oil and fuel requirements along with maintenance schedules and engine warranty information are provided by the individual engine manufactures.

**** CAUTION ****

EQUIPMENT DAMAGE - Be sure to check the engine oil level frequently as specified in the engine manual.

The engine manufacturer has established an excellent worldwide engine service organization; engine service is available from a nearby authorized dealer or distributor; check the Yellow Pages of the telephone directory under "engines," or ask the dealer from whom you purchased the power plant. In addition WINCO maintains a link to all our engine suppliers on our web site at <http://wincogen.com/Engine Support/>. You can log into each of our engine suppliers through this site to get operators manual, parts list and service/dealer listing. If you fail to find the support you need contact the WINCO service department at 507-357-6831 for assistance.

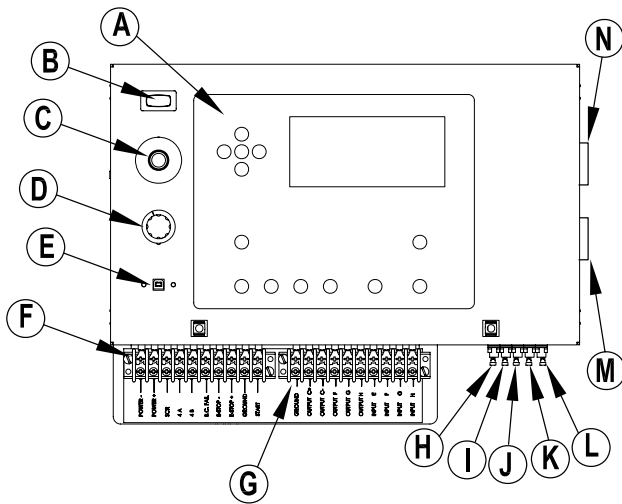
The rated power of each engine-generator is limited by the temperature, altitude and all other ambient conditions specified by the engine manufacturer. Engine power will decrease 3-1/2% for each 1000 ft. above sea level, and will decrease an additional 1% for each 10 degrees Fahrenheit above 60 degrees Fahrenheit. Units should not be operated in ambient temperature greater than 125 degrees Fahrenheit.

GENERATOR:

WINPOWER Generators Sets use totally brushless, AVR (Auto-Voltage Regulator) controlled broad-range generator ends. The generator converts rotational mechanical energy into electrical energy. Standard WINPOWER units are equipped with generators manufactured by Stamford/Newage. Each generator 'end' has its own data tag. The unique serial number is stamped on the data plate and into the upper section of the mounting adapter of the generator frame. The data label is affixed to the main frame of the generator on the lower left side, similar to the sample shown.

STAMFORD	
SERIAL NUMBER M14L502111	DUTY Continuous (S1)
FRAME/CORE UC122401	EXCITATION VOLTAGE 38
BASE RATING KVA 60	EXCITATION CURRENT 1.8
BASE RATING KW 48	INSULATION CLASS H
AMPERES(BR) 166.5	AMBIENT TEMPERATURE 40 C
FREQUENCY 60 Hertz	TEMPERATURE RISE 120 C
RPM 1800	THERMAL CLASSIFICATION 180 C
VOLTAGE 208	ENCLOSURE IP23
PHASE 3	STATOR WINDING 311
PF 0.80	STATOR CONNECTION Parallel Star
BS 5000, PART 3 IEC 34-1 ISO 8528-3	
NEMA MG 1-32 BS EN 60034-1	
BARNACK ROAD, STAMFORD, Lincs. PE9 2NB, UK	
Manufacturer's I.D. Marking: 100549-689	

ENGINE CONTROL PANEL LAYOUT



A. DSE7310 CONTROLLER - See controller explanation below.

B. GENERATOR CONTROL POWER - Battery disconnect switch for engine control. Used during long term storage to prevent battery discharge

C. Emergency Stop Switch - When depressed this switch will disconnect all the 12 volt power to the DSE7310 shutting the engine down. The display on the controller will annunciate "Emergency Stop".

D. Voltage Adjustment Rheostat - Use to fine turn the voltage output of the generator. This rheostat is connected directly to the voltage regulator and is designed for fine turning only. If a course adjustment is required it must be done via the voltage adjustment pot on the voltage regulator.

E. USB PROGRAMMING PORT - USB port for computer interface. Used for programming the DSE7310 controller.

F. CUSTOMER DC INTERCONNECTIONS - See page 13 for additional details.

G. CUSTOMER EXPANDED INTERFACE CONNECTIONS - Provides connection for programmable inputs and output for the DSE7310

H, I, J. 2 AMP FUSE- These fuses are in the AC input line from the generator. These are the feeds that provide the AC voltage reading on the display. If one of these is blown the controller will not show the proper voltage on one leg and may shutdown for low voltage. (Replacement AGC-2A-250V)

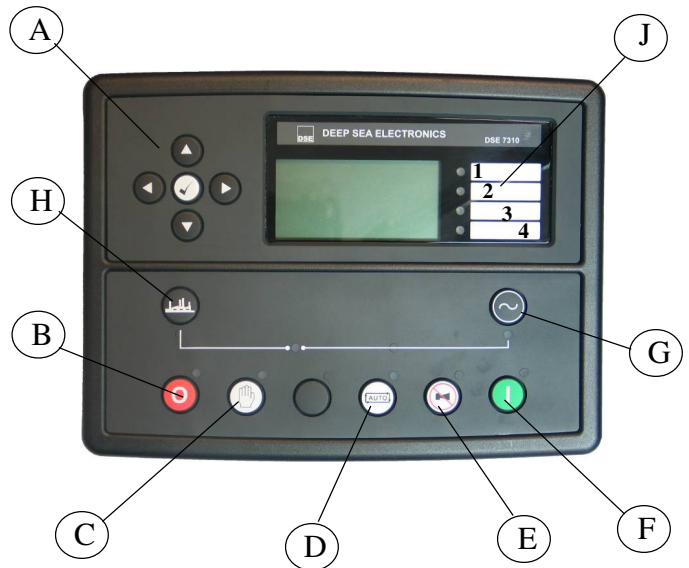
K. 3 AMP FUSE -This fuse supplies the 12 volt DC to power the DSE7310 controller circuitry on the board. (Replacement AGC-3A-250V)

L. 10 AMP FUSE This fuse supplies the DSE7310 controller 12 Volt DC for all controller switching functions. (Replacement AGC-10A-250V)

M. DC INTERFACE CONNECTOR - This connector provides all the interface connections for the engine. Including the DC power supply to operate the DSE7310 controller. Engine CAN connections are also made through this connector providing the controller with the engine operational reading.

N. AC INTERFACE CONNECTOR - This connector is used to interface with the AC generator end. It provides the controller with the voltage, amperage and frequency reading for the display.

DSE 7310 Series CONTROLLER



A. MENU NAVIGATION BUTTONS – Left and Right buttons select different grouping (i.e. Engine reading, Generator reading, etc.) Up and down buttons scroll through the different reading for each group.

B. STOP/RESET – This button places the module into its STOP/RESET mode. This will clear an alarm conditions for which the triggering criteria have been removed. If the engine is running and this button is pushed the module will shut off the fuel solenoid and the engine will come to a stop. If a remote start signal is received while this switch is activated, the unit will not start.

C. MANUAL - This mode allows manual control of the generator functions. Once in the MANUAL mode the module will allow you to start the unit using the START button. The unit will continue to run until either the STOP/RESET or AUTO button is pressed. If the unit receives a remote start signal during manual operation, the generator will remain running even after the remote start signal has been lost. You must use the STOP/RESET or AUTO button to stop the unit once you have started it in manual mode.

**** CAUTION ****

IF THE POWER FAILS WHILE RUNNING IN THE MANUAL MODE THE TRANSFER SWITCH WILL TRANSFER THE LOAD TO THE GENERATOR. TO PREVENT THIS THE MAINLINE CIRCUIT BREAKER ON THE GENERATOR MUST BE OPENED.

D. AUTO – This button places the module into its AUTOMATIC mode. This module will monitor the remote start input for a relay closure. When the remote start signal is received it will time out the start delay (5 Seconds) and then start the engine generator set. When the remote start signal is lost (relay opened up) the module will shut the engine generator set down after the cool down timer has time out. The module will return to the auto start mode and await the next start signal.

E. LAMP TEST/HORN RESET - This button silences the audible alarm if it is sounding and illuminates all of the LEDs as a lamp test feature. When configured and fitted to a compatible engine ECU, pressing this button in STOP/RESET mode after pressing the START button (to power the ECU) will cancel any “passive) alarms on the engine ECU.

F. START – This button is active only in the MANUAL or STOP/RESET mode. Pressing this button in the MANUAL mode will start the engine locally for testing. The engine will continue to run until either the STOP/RESET or the AUTO button is pressed. Pressing this button with the control in the STOP/RESET mode will turn on the CAN engine ECU (when correctly configured and fitted to a compatible engine ECU)

G. CLOSE GEN-SET – NOT USED IN THIS APPLICATION

H. OPEN GEN-SET – NOT USED IN THIS APPLICATION

J. USER CONFIGURABLE INDICATORS –

1. Remote Start.
2. Low Fuel
3. Generator Available
4. Emergency Stop

NOTE: STOP/RESET, MANUAL mode and AUTO mode buttons all have indicator lamps next to them to tell you what mode you are in. Pressing buttons out of sequence will cause the engine not to function properly.. See button operation sequencing above.

RECEIVING THE GENERATOR

The generator set will generally be shipped by a commercial ‘common freight carrier’. Large and bulky units are often shipped on a dedicated or specially contracted ‘Flat-Bed’ truck. The means of shipment is determined in consultation between the WINPOWER Sales and Shipping staff and the customer. Routing is determined by the bulk, size, and a means available to unload the generator at the receiving end. WINPOWER recommends units that are shipped by common carrier be delivered to a commercial dock to allow the Generator Set to be unloaded in a safe, efficient manner and to minimize handling damage to the unit.

Locate the packing slip on the side of the crate or request it from the truck driver. When receiving the unit take special care in examining the unit for damage during shipment. Avoid signing for the equipment until a full visual assessment and inventory have been made. Verify that you have received the right equipment and the proper amount by matching up the equipment to the packing list. Larger units may ship with the fuel tank and muffler removed. Verify that those components are undamaged and removed from the truck prior to their release.

The keys for doors of the enclosed generators sets are typically attached to lifting eye on the base of the machine. These keys are matched to all the doors on the generator set housing.

UNPACKING INSTRUCTIONS:

When unpacking the generator set, be sure to inspect it carefully for freight loss or damage. If loss or damage is noted at the time of delivery, require that the person making the delivery make note of the loss or damage on the freight bill, or affix his signature under the consignee’s memo of the loss or damage. Contact the carrier for claim procedures.

When loss or damage is noted after delivery, segregate the damaged material, and contact the carrier for claim procedures.

“Concealed Damage” is understood to mean damage to the contents of a package which is not in evidence at the time of delivery by the carrier, but which is discovered later. The carrier or carriers are responsible for merchandise lost or damaged in transit. The title to goods rests with the consignee when generators are shipped fob factory, and only the consignee can legally file a claim.

***** **CAUTION** *****

EQUIPMENT DAMAGE - These units are shipped with oil, and a 50/50 mix of coolant. Be sure to check all fluid levels before operating. See engine manufacturer’s instruction manual for recommended oil requirements before initial starting.

UNPACKING:

(Not recommended until the unit is on-site)

1. Carefully remove the crate.
2. After inspecting the engine-generator for external physical damage, locate and check the following items packed with the unit.
 - a. Owner’s operators manual.
 - b. Engine manufacturer’s instruction manual.
 - c. Stamford generator manual
 - d. Battery hold-down brackets & hardware.
 - e. Unit components or accessory items shipped loose for on-site installation.
 - f. Optional accessories (i.e. remote annunciator)
3. Remove main frame hold down bolts.
4. Unit can now be lifted from shipping rails.

LIFTING THE GENERATOR SET

NOTICE - Personal Injury

To prevent injury to persons or equipment, observe the following guidelines when lifting the generator:

Due to the different designs, configurations, options, weights, site conditions, and available material handling equipment, specific lifting instructions are not provided for each individual generator set model. General guidelines provided are applicable to the entire standby generator line. It is the responsibility of the installing party to follow the lifting equipment's operators manual to prevent injury to personnel and damage to the generator. Smaller generator sets may not require use of overhead lifting equipment and may be placed on the pad with basic material handling equipment, i.e. a forklift.

CAUTION: - Do not attempt to lift the generator set by the means of the lifting eyes on the engine or generator end.

These lifting points are only for use during the manufacturing process and are designed for lifting of the individual generator set components.

WINPOWER has designed all of its generators sets to be lifted at the corners with an appropriate lifting rig. The lifting points are located on the side rails of the generator base or on the optional base mounted fuel tank of a diesel generator set.

The generator set can be lifted with properly rated chains or cables along with the use of spreader bars. The spreader bars should be long enough so that the lift cables or chains do not come into contact with the generator set. Use of commercially available lifting fixtures may also be used. Always be sure that the equipment is properly rated for the weight of the generator. Failure to do so can cause damage to the generator, injury to personnel or even death.

The generator set and fuel tank may or may not be shipped as a complete unit. If the fuel tank is shipped separate from the generator, place the tank on the cement pad first, and then place the generator on top of the fuel tank.

**** **WARNING** ****

NEVER - attempt to lift the fuel tank while filled with fuel. Sloshing of the fuel can cause a shift in the balance of the fuel tank, making for a DANGEROUS, unbalanced lifting load. If the generator was shipped on the fuel tank, use the lifting points located on the fuel tank to move the entire generator set into place. DO NOT place fuel in the tank prior to lifting.

Depending on generator set size and configuration, the exhaust system may 'ship loose' with the generator set for installation on site. The muffler and its attaching brackets must be mounted on top of the generator housing prior to operating the engine generator set.

INSTALLATION

**** **WARNING** ****

PERSONAL INJURY - Before proceeding with the installation, be sure the DSE7310 is in the "stop" position. Before proceeding with the installation, be sure the Generator MLCB (Main Line Circuit Breaker) is in the 'OFF' position and the unit starting battery is disconnected.

GENERAL INFORMATION

These engine/generator sets are generally supplied as weather enclosed packages for quick installation on an outdoor concrete pad. They are also available as open skid mounted units for indoor installation in a building or protective enclosure supplied by the installer. The factory weather enclosures are available as standard or acoustical housing intended for outdoor installation only. **Factory weather enclosed units are not intended to be used indoors and no support is available to assist in re-engineering finished packaged units.**

All versions must be bolted to a solid base for proper operation. A properly designed concrete pad is necessary for stationary operation. A substantial DOT certified trailer is required for mobile applications. Consult a qualified, licensed electrician or contractor to install and wire this Generator Set. **The installation must comply with all national, state, and local codes.**

Before beginning the installation process, recheck the voltage, phase and amperage rating of the Generator Set and ATS (Automatic Transfer Switch). Be certain they can handle the intended load and are compatible with the entrance voltage, phase and current ratings. Plans for installation should be prepared with proper attention to mechanical and electrical engineering detail to assure a satisfactory system installation.

The information in this manual is offered only as a guide to finalizing your installation plans.

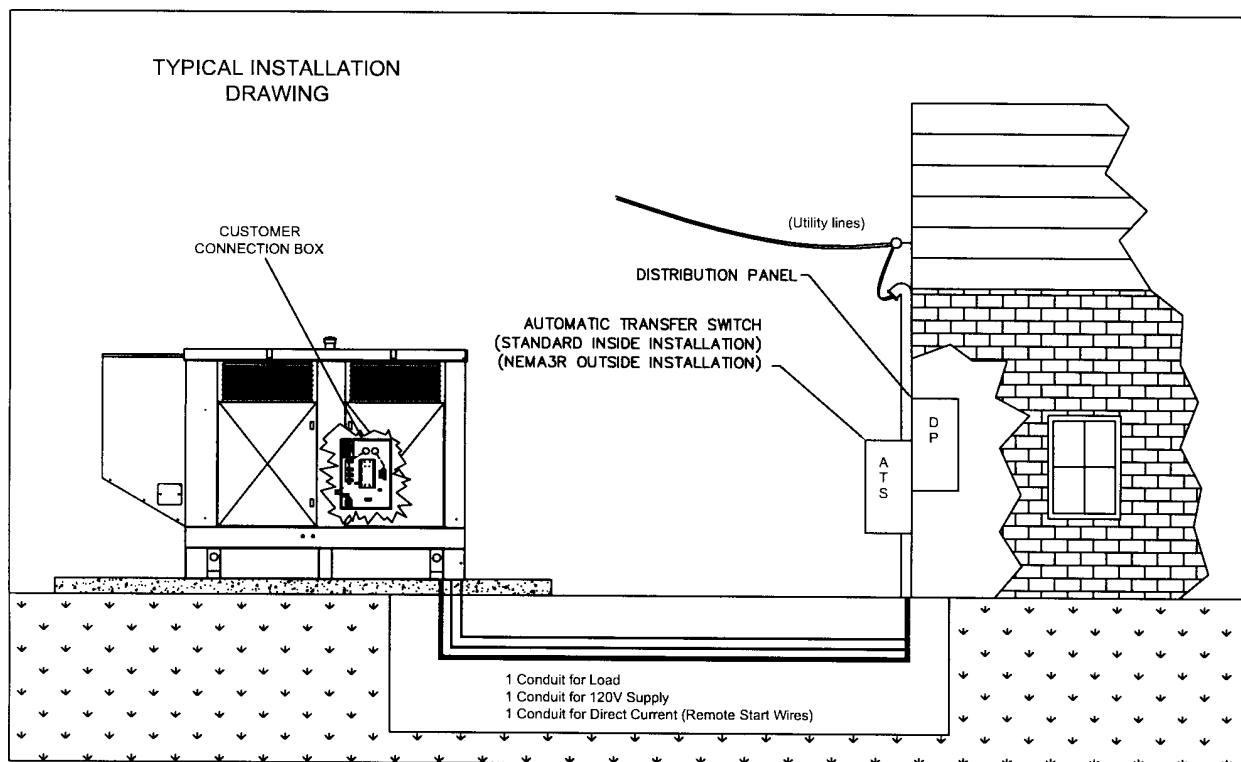
**** NOTICE ****
For full service switching of the entire load, the ATS must be 'SE' (Service Entrance) rated or must have a properly rated fusible disconnect installed before the ATS to protect the contacts.

ENGINE GENERATOR SET MOUNTING

The unit's main frame must be bolted solidly to a 4 to 6 inch thick cement pad. The engine-generator is mounted on a sub-frame which is attached with special shock mounts to the main frame. This allows the engine-generator free movement without affecting the control panel which is mounted on the main frame.

Do not shock mount the main frame. Engine vibration will be transmitted to the control panel causing erroneous start/stop cycles and premature control failure.

These units should be mounted a minimum of 24" from a structure. This will allow for ample room to maintain and work on the generator set. Units must be installed in accordance with all local, state, and national codes. Consult your local agency having jurisdiction for specific requirements.



***** **WARNING** *****

FUEL INSTALLATION

The fuel supply should be as close to the engine as possible. This will reduce the installation cost of fuel runs and minimize line losses. The diesel fuel supply should be no more than 3 feet below the fuel inlet on the pump. If your fuel supply is lower than three feet you may have to install an additional lift pump to bring the fuel up to the mechanical fuel pump on the engine.

The information in this manual is offered to assist you in providing the proper fuel for your engine. However, this information is only provided to inform you of the engine's requirements and assist in making you aware of the decisions you must make. In no case should the instructions or information provided be interpreted to conflict with any local, state or national codes. If in doubt, always consult your local fire marshal or fuel supplier.

INSTALLING THE FUEL LINE

Engine generator sets are properly adjusted before they leave the factory. Connecting a fuel supply with adequate supply volume is critical to reliable operation. Diesel units with optional base mounted fuel tanks are pre-plumbed to the mechanical fuel pump on the engine.

Open skid mounted Diesel units are often supplied with capped inlet and return lines. The use of a suitable customer supplied flexible fuel line is essential between the engine and fuel supply to provide a vibration break between your fuel supply and the engine.

FIRE DANGER - Connecting rigid fuel line (i.e. steel or copper line) directly to the inlet fuel filter or fuel pump may cause the fuel line to crack during operation creating a serious fire hazard.

LUBRICATION

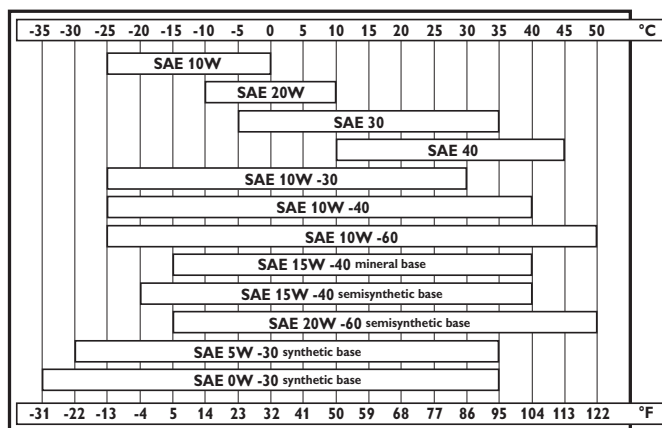
Before starting the engine, check the oil level in the crankcase. If it is low, refill to the full mark with the proper weight/grade of oil as recommended by the engine manufacturer's maintenance instructions. The necessity of using the correct oil, and keeping the crankcase full cannot be over emphasized. Failure to use the proper oil and keep the crankcase properly filled will cause excessive engine wear and shorten its useful life. See tables below for oil capacity and grade.

ISUZU	DR20	DR30
QTY	8.5 qt.	8.5 qt.
GRADE	CC or CD	CC or CD

ENGINE OIL VISCOSITY GRADE - AMBIENT TEMPERATURE							
[Single-grade]	SAE 20,20W			SAE 40			
	SAE 10W		SAE 30				
Ambient Temperature	-25°C (-13°F)	-20°C (-4°F)	-15°C (5°F)	-0°C (32°F)	15°C (59°F)	25°C (77°F) 30°C (89°F)	
[Multi-grade]	SAE 10W-30						
	SAE 15W-40, 20W-40						
	SAE 5W-20						

FIAT	DR45	DR65	DR90	DR100	DR130
QTY	13.5 qt.	13.5 qt.	13.5 qt.	18 qt.	18 qt.

API CF - CH4



COOLANT

Before starting the engine, check the coolant level in the radiator. If it is low, refill as specified in the engine manufacturer's maintenance instructions. The radiator should be filled to about 1 inch below the filler neck. For additional information on engine coolant requirements see engine manufacturer's maintenance instructions.

ISUZU	DR20	DR30
VOLUME	3.0 gal	3.0 gal

FIAT	DR45	DR65	DR90	DR100	DR130
VOLUME	4.9 gal	4.9 gal	4.9 gal	6.6 gal	6.6 gal

INSTALLING THE BATTERY

**** CAUTION ****

In the following battery installation procedure, check to be sure the DSE7310 is in the "stop" position. This should be your last step before initial start-up.

The DR 20 - DR65 require a **BCI group 24/650 CCA** battery and the DR90, DR100 & DR130 require a **BCI group 31/900 CCA** battery. Installation of the highest CCA rated battery, within the correct BCI group, will increase cold weather starting performance. **Gel batteries should not be used** with the battery tender installed in the generator enclosure.

Installation and servicing of batteries must be performed or supervised only by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When installing or replacing batteries, use the proper group/size **starting** battery. The battery should be a Maintenance Free lead acid design. **Deep cycle batteries will not work for this application.**

CAUTION – PERSONAL DANGER

CAUTION - NEVER dispose of a battery in a fire. The battery is capable of exploding.

CAUTION -DO NOT open or mutilate the battery. Released electrolyte is known to be harmful to the skin and eyes and to be very toxic.

These engine generator sets are all **NEGATIVE** ground. Be very careful not to connect the battery in reverse polarity, as this may short circuit the battery charging system on the engine.

CAUTION – A battery presents a risk of electrical shock and high short circuit current. The following precautions must be observed when working with batteries:

1. Remove watches, rings and other metal objects.
2. Use tools with insulated handles.
3. Check both the battery cable ends and the battery posts to be sure they are free of corrosion.
3. Always connect the battery positive cable first and then connect the battery negative cable. When removing the battery cables from the battery reverse the procedure, disconnect the negative cable first and then the positive cable.
4. Be sure all connections are tight and coat the terminals and cable ends with dielectric grease.

WARNING – The electrolyte is a diluted sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following precautions must always be taken:

- * Always wear full eye protection and protective clothing
- * Where electrolyte contacts the skin, wash off immediately with water
- * If electrolyte contacts the eyes, flush thoroughly and immediately with water and seek immediate medical attention
- * Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of one pound of bicarbonate of soda (baking soda) to one gallon of water. The bicarbonate of soda solution is to be added until the evidence of reaction, foaming, has ceased. The resulting liquid is to be flushed with water and the area dried.

DANGER – Explosive Fire Risk

- * Never smoke when near batteries
- * Do not cause a flame or spark in the battery area
- * Always discharge static electricity from your body before touching batteries by first touching a grounded metal surface

SERVICING BATTERIES

Batteries used on these units may, over time, lose water. This is especially true when using a trickle charger to maintain your battery. When refilling the battery with water use only distilled water. Tap water will shorten the service life of the battery.

Never fill the battery above the fill line. Over filling above the upper level line may cause the electrolyte to overflow, resulting in corrosion to the engine or nearby parts. Immediately wash off any spilled electrolyte following the procedure above.

NOTE: Always make sure that a new battery is fully charged before installing it on a generator set. Failure to do so can cause damage to the engine control module in the generator set.

All connections must be clean and tight. Check the electrolyte (fluid) in the battery periodically to be sure it is above the plates. Never allow the battery to remain in a discharged condition.

CONNECTING THE BATTERY CHARGER & BLOCKHEATER

A three-stage battery charger is provided standard for all 12 volt standby systems. The standard charger is a Automatic Battery Charger & Maintainer. This Charger has three rates of charging. During the first mode, know as BULK Charging, the charging current is limited to 10 Amps at a voltage of up to 14 volts.

The yellow LED will be on constantly during this stage. When the charging rate drops to 2.5 amps the charger will enter the ABSORPTION charging mode. During this mode the yellow LED will be flashing. The charging voltage is held at 14 volts and the charging rate gradually reduces the amount of current (amps) flowing to the battery bring the battery to 100% charged status. The final mode is the float mode, in this mode the charger will provide a small amount of current to the battery, to overcome internal losses and keep the battery at it's 100% charged state. The battery can be left in this mode indefinitely. During this mode the green LED will be on constantly.

This charger is mounted under the customer connection on the control side of the generator and plugged into the receptacle mounted in the AC connection cabinet.

The battery charger receptacle is to be powered by a GFCI circuit and installed in accordance with the United States National Electric Code. It is suggested that this circuit be fused for 20 amps. The blockheaters on these units are 750/1000 watt heaters can use the same 20 amp GFCI fused circuit. This circuit will terminate on the 120 volt terminal block mount in the customer connection cabinet.

The engine blockheater installed on this unit should also be plugged in this receptacle. The block heater is thermostatically controlled and when plugged in will maintain the engine coolant temperature between 100 and 120 degrees F.

MOUNTING THE AUTOMATIC TRANSFER SWITCH (A.T.S.)

***** **WARNING** *****

FIRE HAZARD - All wiring must be done by a licensed electrician, and must conform to the National Electrical Code and comply with all state and local codes and regulations. Check with the local authorities before proceeding!

INSTALLATION NOTES

Because of the many different types of service, feeder, and distribution equipment, no specific wiring instructions can be provided. It is recommended that only copper wire be used. In all cases it is essential that while the load is connected to the generator, there can be absolutely no feedback from the generator to the power line or the power line to the generator. When properly installed, the normal A.T.S. Control and safety systems will eliminate all paths for feedback.

To wire the automatic transfer switch into the existing wiring, first determine which circuits will be on the emergency load circuit. If the entire load is to be transferred, the transfer switch can be wired in directly after the watt-hour meter and the service entrance, providing the service entrance ampere rating is within the transfer switch's rated capability.

If only specific circuits are to be powered under emergency power failure conditions, an additional distribution panel designated "emergency distribution panel" must be installed.

All selected emergency circuits are removed from main distribution panels and installed in the emergency distribution panel. The A.T.S. is then installed between the main panel and the emergency distribution panel. Suggested circuits: freezer, refrigerator, furnace, emergency lights, sump pump, emergency outlet circuits, etc. Total running load must not exceed generator rating.

A.C. ELECTRICAL CONNECTIONS

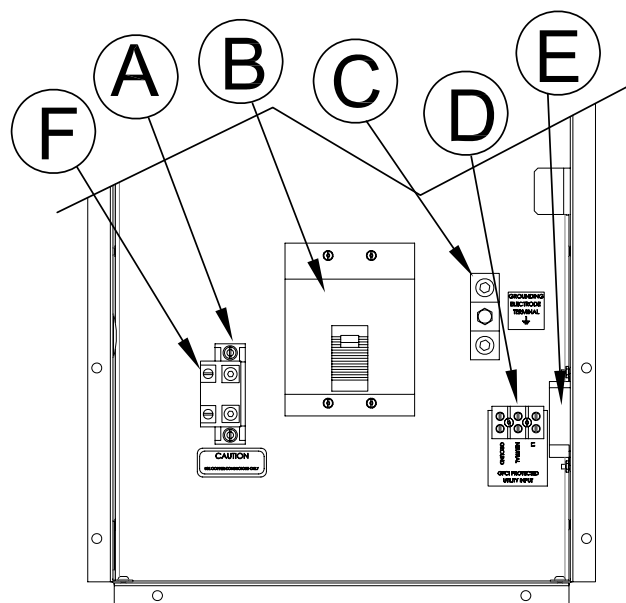
NOTICE - CLASS 1 WIRING METHODS ARE TO BE USED FOR ALL FIELD WIRING CONNECTIONS TO TERMINALS OF A CLASS 2 CIRCUIT

All wiring must be completed in accordance with the Nation Electric Code as well as any state or local codes.

You must pay particular attention to wire size requirement for the amperage of service you are dealing with. Appendix "2" provides you guidance on wire sizing based on both wire type and amperage. **Wire amperage's have been derated for 40° C ambient temperatures operation.**

The connection boxes shown are typical arrangements. Some units and designs have additional box configurations.

A - Neutral Lugs, These neutral lugs are isolated from ground and provided for you to connect your neutral wire from the transfer switch to the generator.



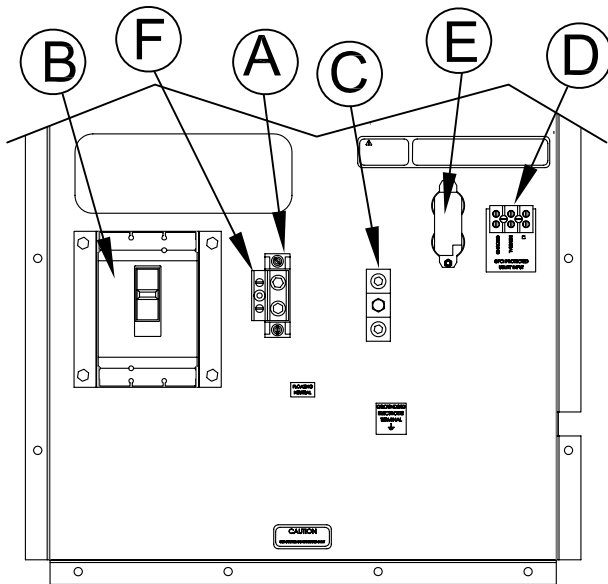
Typical 20 to 45KW Circuit Breaker Box

The 1000 amp terminal block lugs on the 130 kW will handle wire sizes #3/0 to 500 MCM and should be torqued to 28 ft. lbs. (Rated for 900 AMP for AL)

The 400 amp terminal block lugs on the 65 & 90 kW will handle wire sizes #1 AWG to 400 MCM and should be torqued to 300 in. lbs.

The 225 amp terminal block lugs on the 20 kW to 45 kW will handle wire sizes #4 to 300 MCM and should be torqued to 250 in. lbs

B- Generator Circuit Breaker, This circuit breaker provides overload protection for the generator. Your power feeds from the transfer switch will connect to the bottom lugs on the circuit



Typcial 65 to 135 kW Circuit Breaker Box

breaker. The generator power feeds have already been wired into the upper lugs.

Please refer to the circuit breaker installed on your unit for breaker lug capacities and proper torque specifications.

To select the proper conductor size between the Generator and the ATS, first look your model up in Table 1 of Appendix "A" for your generator amperage. Then refer to Appendix "2" for guidance on wire sizing based on both wire type and amperage. **Wire amperages have been derated for 40°C ambient temperatures operation.**

For additional information on wire sizing refer to table 310-16 of the National Electrical Code ANSI/NFPA 70.

C - Ground Lug, These ground lugs are bonded to ground and are provided for you to connect your ground wire from the transfer switch to. The lugs a the 65 kW and larger will handle wire sizes #6 AWG to 300 MCM and should be torqued to 21 ft. lbs. The lugs on the 45 kW and smaller will accommodate #10 AWG to 2/0 AWG and should be torqued to 200 in. lbs.

D - 120 VOLT GFCI CIRCUIT TERMINAL BLOCK, These terminals are rated for 85 amps and will handle wire sizes #4 AWG to 18 AWG. They should be torqued to 16 in. lbs This circuit must be fed from a fused circuit in the distribution panel and provides power for the blockheater and the battery charger.

E - 120 VOLT/20 AMP DUPLEX RECEPTACLE, This convenience receptacle is used to power both battery charger and the blockheater. This circuit must be fed from a GFCI fused circuit in the distribution panel.

G - This lug is provided on the neutral terminal block to allow you to run a neutral to ground lead if you are using the generator in a stand alone application. This would be an application where there is not distribution panel and **no other ground to neutral bond** in the wiring system. If a grounding wire is attached here remove the floating neutral label in the panel. **This will not be used when you are wiring a generator and transfer switch into an existing power system.**

 ***** **WARNING** *****

A main line circuit breaker has been provided inside the generator housing. During all wiring installations make sure the breaker is in the OFF position and the generator operation switch is in the OFF position.

 ***** **WARNING** *****

EQUIPMENT DAMAGE - When installing a Three Phase 240 volt system be sure you know which lead is the high voltage "wild" leg (208 Volt line to neutral). The generator normally carries the high voltage on the G2 lead.

All wires should be installed in rigid or flexible conduit. (Knockouts are provided in the control box).

See the manual shipped with the Automatic Transfer Switch for connection locations in the switch. Connections in each switch will vary depending on the type of switch and the manufacturer.

GROUNDING

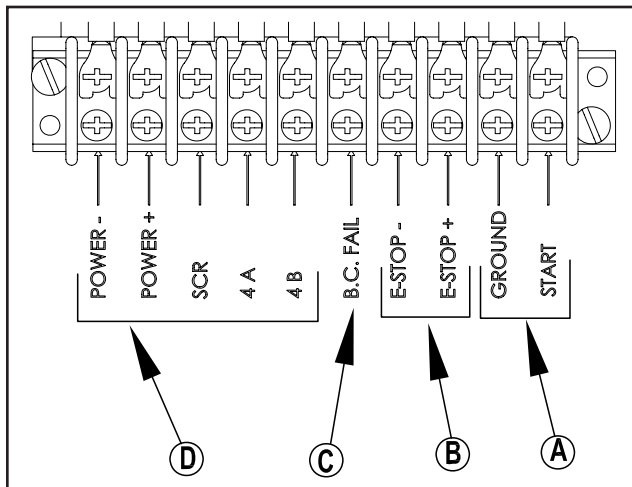
A grounding lug has been provided on the engine generator set and the generator set must be properly grounded to good earth ground. Generally a 8 foot copper rod driven into the earth will provide a proper earth ground.

D.C. ELECTRICAL CONNECTIONS

All DC connections are completed on the terminal strip just below the engine control. All DC connection **must be run in separate conduit**. You can not mix AC and DC leads in the same conduit.

CONNECTION BOX TERMINALS

Wire size requirements for each of the connections may vary but terminal lugs should be used for all connections. Torque spec for terminal lugs is 9 in. lbs.



A - Customer Remote Start CONNECTIONS TERMINALS. The two remote start leads from the Automatic Transfer Switch are connected to the two terminals marked GROUND & START. The wire in terminal GROUND is Battery Negative and the wire in the terminal labeled START is your Remote Start lead. Closing these two leads together will signal the DSE 7310 to go into an auto-start mode and start up the engine generator.

Depending on the distance, 14 to 16 gauge stranded wire should be used. It is suggested that these wires be labeled S1 (ground) and S23 (start). The terminal blocks are designed to use terminal lugs on all wires and the screws should be torqued to 9.6 in. lbs.

Note: Any relay closure can be used to start and stop this generator. As long as the contact stays closed the engine generator set will continue to run. Once the relay is opened the unit will shut down and remain in the standby mode until the remote start relay is closed again.

B - ESTOP- & ESTOP+. Remote Emergency Stop terminals. These two terminals are shipped with a jumper installed. If your application requires the installation of a Remote Emergency Stop switch, remove the jumper and wire your switch to these terminals. **This unit will not start and run without either the jumper installed or a remote N/C switch installed.**

C. - Battery Charger Failure. Battery charger failure relay input from remote battery charger to DSE7310 controller.

D - Remote Display Panel Interface Terminals. These interface terminals are prewired to allow for the connection of a remote display. This display allows for the remote annunciation of alarms at a location such as a nurses station or a control room. This display can be used to meet the remote annunciation requirements of NFPA 110 standards. (This feature meets the annunciation requirements in applications requiring NFPA110 level one protection.)

DC Interconnections to the Automatic Transfer Switch

WARNING

Be sure Engine Generator is in the "OFF" position before you make any DC interconnections.

*******CAUTION*******
 Never run the AC and DC wiring in the same conduit.

ASCO 185 UL SWITCH

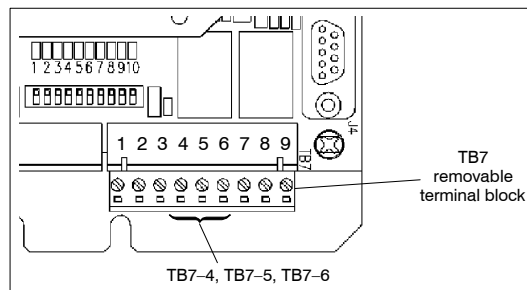


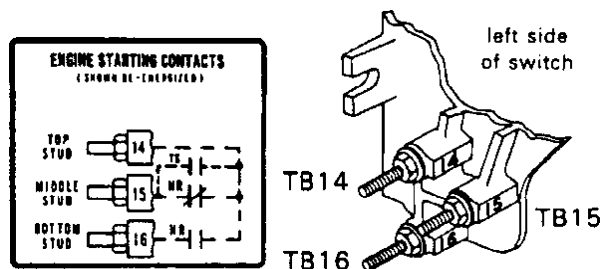
Figure 4. TB7 generator starting contact terminals.

Table A. Generator Start Connections

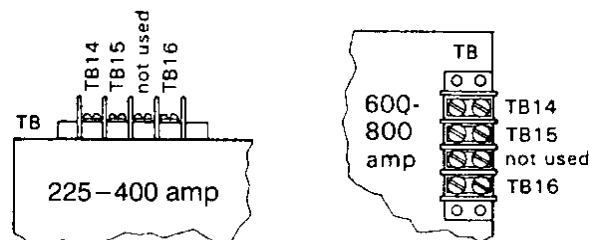
When the Utility fails	Terminals on Controller
contact closes	TB7-4 and TB7-5
contact opens	TB7-5 and TB7-6

Your DC connection points in the ASCO 165 ATS are terminals "4" and "5" on the interface terminal block.

ASCO 300 UL SWITCH



Engine starting contact label and location for 30 - 200 amp switches.



Your DC connection points in the ASCO 300 ATS are terminals "14" and "15". Depending on the size of the switch they are located in different locations.

INITIAL START UP

***** **WARNING** *****

EQUIPMENT DAMAGE - DO NOT jump start these engine generator sets. Starting these units on a low battery or jump starting them will cause damage to the engine control module.

Use the following check list to verify correct installation before starting the engine:

1. Engine oil. Fill as required with proper grade/qty.
2. Engine coolant. Fill as required with proper mixture.
3. Unit mounting base properly bolted down.
4. Clearance for service and maintenance on all sides.
5. Proper fuel line material and size.
6. All fuel line connections tight.
7. Battery connections clean and tight.
8. Battery fully charged.
9. All AC and DC wiring installed and properly protected.

After completing the above checklist, the engine-generator set is ready for the initial start-up test.

STARTING PROCEDURE

MANUAL MODE

***** **WARNING** *****

EQUIPMENT DAMAGE - BEFORE ATTEMPTING TO START THIS UNIT COMPLETE YOUR PRESTART CHECKLIST AND INSURE THE GENERATOR MAINLINE CIRCUIT BREAKER IS IN THE PROPER POSITION PRIOR TO STARTING. STARTING THIS UNIT WITHOUT IT PROPERLY CONNECTED CAN CAUSE SERIOUS PERSONAL INJURY OR EQUIPMENT DAMAGE.

1. Depress the manual mode button on the control panel. The small LED light next to it should come on.

NOTE: There is no start delay in this mode of operation.

2. Press the start button- The DSE7310 will send two signals to the engine. The first signal wire #21 will engage the fuel solenoid, the second wire, #22 will engage the starter on the engine. At this point the DSE7310 will start the cranking cycle (10 seconds on and 10 seconds off).

NOTE: On the DR20 and DR30 model generator sets the starting sequence is slightly different. Before Wire #21 and #22 are energized to start the unit, wire #93 is energized to turn on the glow plugs for 15 seconds first and then the starter and fuel solenoid are engaged.

If the engine fails to start during this cranking period the starter motor is disengaged and goes into a rest mode after which a second attempt is made to start the engine. Should this sequence continue through 3 cranking cycles the start sequence will be stopped and the display will show 'FAILED TO START'.

All engine functions are controlled by the DSE7310 controller. Engine harness connections between the DSE7310 and senders on the engine, send information signals to the DSE7310 to indicate and monitor oil pressure, water temperature, etc for the display on the engine control.

The AC output readings displayed on the DSE7310 are collected through the AC interface harness wired in the generator control box.

All shutdown functions are controlled the DSE7310. Should either the AC generator reading or the engine sensor reading drop below or above the norms programmed into the DSE7310 controller, the DSE7310 controller will shut the unit down and display a clear text message of the reason for the shutdown. The actual shutdown trip points are set in the DSE7310 and can be managed with the use of a computer and the download of the DSE7310 program from DeepSea.

3. During manual operation the load will not normally be applied to the generator. But caution must be used, if the line power should fail or be turned off to the transfer switch during manual operation the load may be applied to the generator.

With the engine running smoothly check the no load voltage and frequency on the digital display. The voltage should be 208/240/480 AC depending on which model you have and a frequency of 59.5 To 60.5 hertz (Hz).

If you have the proper voltage at the generator the next step is to check the voltage at the generator terminals in the Automatic Transfer Switch. The voltage between the G1 and the G3 terminals should be the same as it was on the generator front panel. The voltage should also be checked between the hot terminals (G1 and G3) and the G-N to be certain of a balanced voltage output and a solid neutral connection. The voltage between G1 and G-N should be about 120 volts AC (277 on 480 units). The same approximate voltage should be found between terminals G3 and G-N (120 volts AC).

On three phase panels the G2 voltage level should also be checked. ON 240 VOLT (DELTA) SYSTEMS BE SURE YOU KNOW WHERE THE HIGH VOLTAGE "WILD" LEG IS. IT MUST BE IN THE SAME LOCATION ON THE LINE SIDE AS IT IS ON THE GENERATOR SIDE. (i.e. if it's on L-3 on the line side it must be on G-3 on the generator side. **Also on three phase systems make sure that the rotation is the same on the generator as it is on your line power. Failure to insure proper rotation will cause three phase motors to spin backwards possibly damaging them.**

**** Notice ****

If for any reason during the check out procedure the voltage and frequency are not correct, depress the STOP/RESET button and correct the trouble before proceeding.

4. Stopping – There are two ways to stop the unit when it is in the manual mode. Pressing the STOP/RESET button will stop the unit immediately. Pressing the AUTO mode button will stop the unit but only after the cool down timers have timed out and there is no remote start signal being sent to the unit.

AUTO MODE

To activate the automatic start mode you will just need to depress the AUTO button, the LED indicator beside the button confirms that the unit is in automatic start mode.

To test the automatic start Transfer Switches follow the instruction in the operator's manual you received with your transfer switch. If you get a fault light during the initial start up or prior to start up it is most likely a false warning light. Simply reset the ATS and start over.

Once you have completed testing of the ATS, be sure you ALWAYS leave the system in standby mode unless servicing the unit. For standby operation, press the AUTO button on the front of the engine control. The green light should light up next the AUTO button.

SETTING THE EXERCISER CIRCUIT

For all ATS see the instruction manual shipped with the ATS for instruction on setting the exercise circuit in your ATS.

TROUBLESHOOTING TABLES

Note: Before doing any troubleshooting, check the digital display on the DSE7X10. Normally it will tell why the unit has failed. This will shorten your troubleshooting time and in many cases prevent the replacement of parts that may not be defective.

UNIT WILL NOT CRANK WHEN THE POWER FAILS.

1. Digital Genset Controller not in "AUTO"
2. Transfer control switch not in "AUTOMATIC" position.
3. Incorrect wiring between transfer switch and generator.
4. Defective control relay in the transfer switch.
5. Fuse (s) blown in the Digital Genset Controller.
6. Defective Digital Genset Controller
7. Loose or dirty battery terminals.
8. Defective starter.
9. Defective start solenoid.
10. Dead Battery

ENGINE WILL NOT CRANK WITH GENERATOR RUN PUSH-BUTTON DEPRESSED.

1. Battery dead.
2. Blown DC fuses on the Digital Genset Controller tripped.
3. Defective Digital Genset Controller.
4. Loose or dirty battery terminals.
5. Defective "Run/Auto" switch on generator.
6. Defective starter.
7. Defective start solenoid.
8. Locked up engine genset.

ENGINE CRANKS BUT WILL NOT START

1. Improper fuel delivery to the unit.
2. Fuel supply shut off.
3. Fuel tank empty.
4. Air in the injection system.
5. Engine fuel rack has not opened.
6. Defective CANBus on the engine

ENGINE STARTS AND THEN STOPS AND ALARM LIGHT COMES ON

1. Engine is low on oil.
2. Engine has high water temperature.
3. Engine has overspeed.
4. Engine has gone into overcrank.
5. No output from AC generator.
6. Loss of speed signal.
7. Loss of run signal.

ENGINE WILL NOT COME UP TO SPEED AFTER IT STARTS

1. Insufficient fuel volume getting to the unit.
 - a. Too small of fuel line.
 - b. Fuel racks not opened properly
2. Governor is defective.
3. AC short in generator components.

ATS PANEL WILL NOT TRANSFER TO EMERGENCY SUPPLY (GENERATOR)

1. No AC generator output from generator.
2. Defective ATS control board. See applicable transfer switch manual .
3. Circuit breaker between generator and transfer switch is either open or defective.

ATS PANEL WILL NOT RETRANSFER TO NORMAL POWER

1. Proper normal line power not available at line terminals in ATS panel.
2. Defective ATS control board. See applicable transfer switch manual .

NO AC OUTPUT FROM GENERATOR

1. Defective diode.
2. Defective voltage regulator.
3. Defective rotor.
4. Defective stator.
5. Defective exciter rotor.
6. Defective exciter stator.
7. AC short in the output leads.
8. Defective field circuit breaker.
9. Wiring error

GENERATOR SPECIFICATIONS

Review the Stamford Newage nameplate on your generator before selecting the correct information below.

DR20

Stamford Newage Model# PI144D (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350005-16
Voltage Regulator	AS480
Rotor Resistance	0.657 ohms
Stator Resistance	0.353 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.228 ohms

Stamford Newage Model# PI1144D (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350005-017
Voltage Regulator	AS480
Rotor Resistance	0.657 ohms
Stator Resistance	0.138 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.228 ohms

DR30

Stamford Newage Model# PI144H (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350005-020
Voltage Regulator	AS480
Rotor Resistance	0.89 ohms
Stator Resistance	0.179 ohms
Excitor Stator Resistance	22.9 ohms
Excitor Rotor Resistance	0.21 ohms

Stamford Newage Model# PI144G (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350005-025
Voltage Regulator	AS480
Rotor Resistance	0.857 ohms
Stator Resistance	0.073 ohms
Excitor Stator Resistance	20.3 ohms
Excitor Rotor Resistance	0.201 ohms

DR45

Stamford Newage Model# UCI224D (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350003-702
Voltage Regulator	SX460
Rotor Resistance	0.64 ohms
Stator Resistance	0.065 ohms
Excitor Stator Resistance	21.0 ohms
Excitor Rotor Resistance	0.142 ohms

Stamford Newage Model# UCI224E (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350003-731
Voltage Regulator	SX460
Rotor Resistance	0.69 ohms
Stator Resistance	0.02 ohms
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.156 ohms

DR65

Stamford Newage Model# UCI224F (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350003-704
Voltage Regulator	SX460
Rotor Resistance	0.83 ohms
Stator Resistance	0.033 ohms
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.156 ohms

Stamford Newage Model# UCI224G (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350003-751
Voltage Regulator	SX460
Rotor Resistance	0.94 ohms
Stator Resistance	0.1 ohms
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.156 ohms

DR90

Stamford Newage Model# UCI274C (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350003-701
Voltage Regulator	SX460
Rotor Resistance	1.19 ohms
Stator Resistance	0.0045 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.136 ohms

Stamford Newage Model# UCI274C (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350003-711
Voltage Regulator	SX460
Rotor Resistance	1.37 ohms
Stator Resistance	0.0037 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.136 ohms

DR100

Stamford Newage Model# UCI274D (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number	350003-702
Voltage Regulator	SX460
Rotor Resistance	1.19 ohms
Stator Resistance	0.0045 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.136 ohms

Stamford Newage Model# UCI274D (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number	350003-721
Voltage Regulator	SX460
Rotor Resistance	1.37 ohms
Stator Resistance	0.0037 ohms
Excitor Stator Resistance	18.0 ohms
Excitor Rotor Resistance	0.136 ohms

DR130

Stamford Newage Model# UC1274F (311 WINDING)

(Three phase 12 lead reconnectable generator)

Winco Part Number 350003-710
Voltage Regulator SX460
Rotor Resistance 1.19 ohms
Stator Resistance 0.0045 ohms
Excitor Stator Resistance 18.0 ohms
Excitor Rotor Resistance 0.136 ohms

Stamford Newage Model# UC1274F (06 WINDING)

(Single phase 4 lead generator)

Winco Part Number 350003-741
Voltage Regulator SX460
Rotor Resistance 1.37 ohms
Stator Resistance 0.0037 ohms
Excitor Stator Resistance 18.0 ohms
Excitor Rotor Resistance 0.136 ohms

GENERATOR Maintenance Schedule

SERVICE ACTIVITY	250 hrs .5 year	1000 hrs 1 year	10,000 hrs 2 years	30,000 hrs 5 years
CLEANLINESS	X	X	X	X
LOOSE/ DAMAGED PARTS	X	X	X	X
GUARD, SCREENS	X	X	X	X
VIBRATION	X	X	X	X
INSULATION & RE- SISTANCE	X	X		
BEARING				X
AC CONNECTIONS	X	X	X	X
CONDITION OF FAN	X	X	X	X

Additional service items are list in the generator operators manual shipped with this unit.

SPECIAL NOTE: If possible, turn the rotor of an out of service generator at least six revolutions every month to lubricate the bearing surfaces with grease and re-position the rotating elements to avoid false brinelling.

ENGINE INFORMATION

ISUZU Maintenance Schedule *

Check engine oil level	Daily
Check coolant level/leakage	Daily
Check air filter	Daily
Check electrolyte level in batteries and clean terminals	3 Months
Drain water from fuel pre-filter	Daily
Check belts and belt tension	Daily
Check preheating operation	Daily
Change oil (initial)	50 hours
After the initial	250 hours
Change oil filters (initial)	50 hours
After the initial	500 hours
Change fuel filters	500 hours
Check exhaust system for damage	6 months
Clean fuel tank	6 months
Change air filter- depending on conditions	600 hours
Check valve clearance	1000 hours
Clean crankcase ventilation valve	1500 hours
Change coolant/clean system	1000 hours

* **There are additional maintenance items and explanations in the engine operators manual. Read thoroughly before operation this generator.**

FIAT Maintenance Schedule

Check engine oil level	Daily
Check coolant level	Daily
Check air filter	Daily
Check electrolyte level in batteries and clean terminals	6 Months
Drain water from fuel pre-filter	150 hours (1)
Check belts and belt tension	300 hours (2)
Check oil vapor filter	300 hours (3)
Change oil	600 hours (3)(4)(8)
Change oil filters	600 hours (3)(4)(5)
Change fuel filters	600 hours (3)(1)(5)
Change fuel prefilter	600 hours (3)(1)
Check exhaust system for damage	6 months
Clean fuel tank	6 months
Change auxiliary member belt	1200 hours
Change air filter	1200 hours
Change coolant	1200 hours
Change oil vapor filter	2 years
Clean turbocharger	1200 hours (7)
Adjust play in valves-rocker arms and pumps-rocker arms	1200 hours

- 1) Maximum period when using good quality fuel (EN590 standard) this is reduced if the fuel is contaminated and alarms are triggered due to a blockage and presence of water in the pre-filter. When a blockage of the filter is indicated, it must be replaced. If the water in pre-filter indicator does not go out after drainage, the prefilter must be replaced.
- 2) Refers to engines with traditional and automatic tensioning devices.
- 3) Must be performed annually, even if the required number of working hours are not reached.
- 4) Replace lubricants according to the frequency indicated in the table. Check levels daily.
- 5) Use only original manufacture filters or equal.
- 6) The frequency with which operations are carried out will depend on the working conditions and efficiency/wear of the product.
- 7) Required by oil vapor recirculation.
- 8) Low load applications may require oil changes at half this number of hours.

These service frequency times are maximum under ideal working condition. Your working condition may require increased frequency of service.

Engine Replacement Parts

DR2014

Engine Model Number	ISUZU 4LE1
Oil Filter	8-944569-741-2
Fuel Filter	8-97172-549-1
Air Filter Element	P821575
Alternator Belt	8-97224-99-1
Alternator	8-97226-840-5
Starter Motor Assembly	8-97112-865-2
Radiator Hoses	X-89214-030
	X-89214-029

DR3014

Engine Model Number	ISUZU 4LE1T
Oil Filter	8-98-75-676-1
Water Sep	8-97213-381-0
Water Sensor	8-97215-6000-1
Fuel Filter	8-97172-549-1
Air Filter Element	P822768
Alternator Belt	8-98049-034-0
Alternator	8-94423-756-0
Starter Motor Assembly	8-97112-865-2
Radiator Hose Kit	
Upper & Lower	GRP-5F1-116

DR45F4

Engine Model Number	FIAT NEF45SM1X-A010
Oil Filter	2992242
Fuel Pump	2830266
Complete Fuel Filter Assembly	504107583
Fuel Filter Elements	504107584
Air Filter Element	8041642
Alternator Belt	504065880
Alternator	504225814
Starter Motor Assembly	504031929
Upper Radiator Hose	8037610
Lower Radiator Hose	8037612

DR65F4

Engine Model Number	FIAT NEF45SM2X-A010
Oil Filter	2992242
Fuel Pump	2830266
Complete Fuel Filter Assembly	504107583
Fuel Filter Elements	504107584
Air Filter Element	8041642
Alternator Belt	504065880
Alternator	504225814
Starter Motor Assembly	504031929
Upper Radiator Hose	8037610
Lower Radiator Hose	8037612

DR90F4

Engine Model Number	FIAT NEF45TM2X-A009
Oil Filter	2992242
Fuel Pump	2830266
Complete Fuel Filter Assembly	504107583
Fuel Filter Elements	504107584
Air Filter Element	8041322
Alternator Belt	504065880
Alternator	504225814
Starter Motor Assembly	504031929
Radiator & Intercooler Hoses:	
Short Upper & Lower (2)	8036102
Lower at Engine	98433199
Upper at Engine	4863960
Left Air Cooler Rubber Sleeve	98433199
Right Air Cooler Rubber Sleeve	8042285

DR100F4 & DR130F4

Engine Model Number	FIAT NEF67TM1X-R981
Oil Filter	2992242
Fuel Pump	2830266
Complete Fuel Filter Assembly	504107583
Fuel Filter Elements	504107584
Air Filter Element	8041322
Alternator Belt	504078558
Alternator	504010576
Starter Motor Assembly	504031929
Radiator & Intercooler Hoses:	
Lower Hoses (2)	8048357
Upper Hose at Radiator	8048889
Upper at Engine	8040142
Left Air Hose at Inter Cooler	8047693
Left Air Hose at Turbocharger	98443275
Right Air Hose at inter Cooler	8047693

APPENDIX

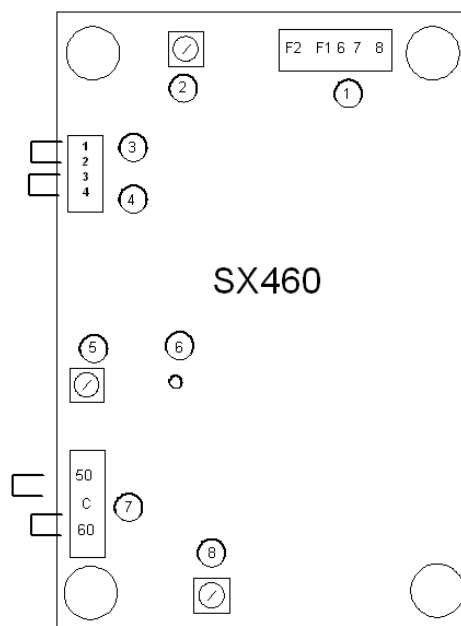
UNIT SPECIFICATIONS	PAGE 21
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VOLTAGE REGULATOR WIRING

SX460 Automatic Voltage Regulator

The following is a list of connections on the AVR. These have been factory set and other that volt adjustment should never have to be changed.

1. Generator AC sensing connection (6, 7, 8)
Field voltage DC (F1 & F2)
2. Voltage Adjustment
3. External voltage adjustment rheostat
No external rheostat link 1 & 2
With external rheostat, 1 & 2 unlinked
Connect external rheostat leads to 1 & 2.
4. AVR input selection.
High Voltage 208/240/277 no link between 3 & 4
Low voltage 120 volt link 3 & 4.
5. Under Frequency Roll Off adjustment
6. Under Frequency Roll Off indication LED
7. Frequency selection:
50 Hz operation Link C to 50
60 Hz operation Link C to 60
8. Stability control



SPECIFICATIONS TABLE

MODEL	WATTS	VOLTS	PF	AMP	HZ	PH	ENGINE	FULL LOAD FUEL
DR20I4-A	20,000	120/240	1.0	83	60	1	ISUZU 4LE1	1.80 GAL
DR20I4-D	20,000	120/208	0.8	69	60	3	ISUZU 4LE1	1.80 GAL
DR20I4-J	20,000	120/240	0.8	60	60	3	ISUZU 4LE1	1.80 GAL
DR20I4-L	20,000	277/480	0.8	30	60	3	ISUZU 4LE1	1.80 GAL
DR30I4-A	30,000	120/240	1.0	120	60	1	ISUZU 4LE1T	3.13 GAL
DR30I4-D	30,000	120/208	0.8	104	60	3	ISUZU 4LE1T	3.13 GAL
DR30I4-J	30,000	120/240	0.8	90	60	3	ISUZU 4LE1T	3.13 GAL
DR30I4-L	30,000	277/480	0.8	45	60	3	ISUZU 4LE1T	3.13 GAL
DR45F4-A	45,000	120/240	1.0	187	60	1	FIAT NEF45SMIX.A010	4.09 GAL
DR45F4-D	45,000	120/208	0.8	156	60	3	FIAT NEF45SMIX.A010	4.09 GAL
DR45F4-J	45,000	120/240	0.8	135	60	3	FIAT NEF45SMIX.A010	4.09 GAL
DR45F4-L	45,000	277/480	0.8	68	60	3	FIAT NEF45SMIX.A010	4.09 GAL
DR65F4-A	65,000	120/240	1.0	258	60	1	FIAT NEF45SM2X.A010	4.57 GAL
DR65F4-D	65,000	120/208	0.8	215	60	3	FIAT NEF45SM2X.A010	4.57 GAL
DR65F4-J	65,000	120/240	0.8	186	60	3	FIAT NEF45SM2X.A010	4.57 GAL
DR65F4-L	65,000	277/480	0.8	93	60	3	FIAT NEF45SM2X.A010	4.57 GAL
DR90F4-A	86,000	120/240	1.0	358	60	1	FIAT NEF45TM2X.A010	6.94 GAL
DR90F4-D	90,000	120/208	0.8	312	60	3	FIAT NEF45TM2X.A010	6.94 GAL
DR90F4-J	90,000	120/240	0.8	271	60	3	FIAT NEF45TM2X.A010	6.94 GAL
DR90F4-L	90,000	277/480	0.8	135	60	3	FIAT NEF45TM2X.A010	6.94 GAL
DR100F4-A	100,000	120/240	1.0	416	60	1	FIAT NEF67TM1X.AR981	7.71 GAL
DR100F4-D	105,000	120/208	0.8	364	60	3	FIAT NEF67TM1X.AR981	7.71 GAL
DR100F4-J	105,000	120/240	0.8	315	60	3	FIAT NEF67TM1X.AR981	7.71 GAL
DR100F4-L	115,000	277/480	0.8	172	60	3	FIAT NEF67TM1X.AR981	7.71 GAL
DR130F4-A	123,000	120/240	1.0	512	60	1	FIAT NEF67TM1X.AR981	8.80 GAL
DR130F4-D	130,000	120/208	0.8	451	60	3	FIAT NEF67TM1X.AR981	8.80 GAL
DR130F4-J	130,000	120/240	0.8	391	60	3	FIAT NEF67TM1X.AR981	8.80 GAL
DR1130F4-L	130,000	277/480	0.8	195	60	3	FIAT NEF67TM1X.AR981	8.80 GAL

Note: De-rate unit power ratings by 3-1/2 % per 1000 feet elevation above sea level.

WIRING SIZING TABLE

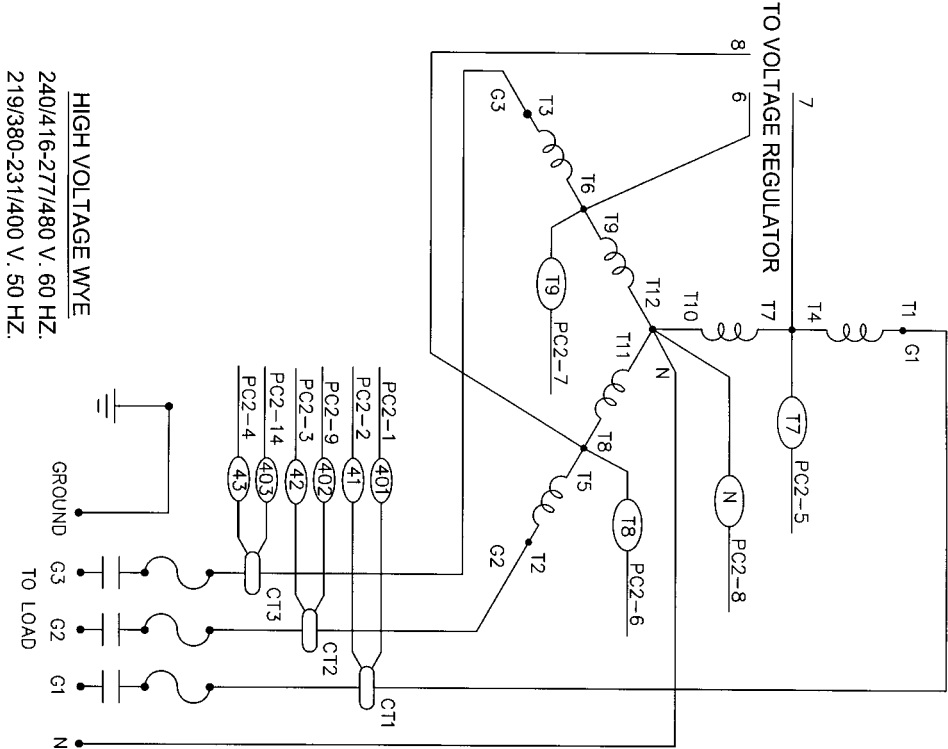
The table below is based on Table 310.15 (B) (16) in the National Electric Code 2014 Edition

Allowable ampacity of insulated conductors rated 0 through 2000 volts, 75°C through 90°C. Not more than three current-carrying conductors in Raceway, Cable or Earth (Direct Buried). Adjusted for 40°C (104°F) ambient temperature.

Copper 75°C	Copper 90°C		Aluminum Copper Clad Aluminum 75°C	Aluminum Copper Clad Aluminum 90°C
Wire Type: RHW THHW, THW THWN, XHHW USE, ZW	Wire Type: TBS, SA, SIS FEP, FEPB, MI, RHH RHW-2, THHN THHW, THW-2 XHH, XHHW XHHW-2, ZW-2	SIZE AWG OR kcmil	Wire Type: RHW THHW, THW THWN, XHHW USE	Wire Type: TBS, SA, SIS, THHN THHW, THW-2 THWN-2, RHH RHW-2, USE-2 XHH, XHHW XHHW-2, ZW-2
44	50	8	35	41
57	68	6	44	55
75	86	4	57	68
88	100	3	66	77
101	118	2	79	91
114	137	1	88	105
132	155	1/0	106	123
154	177	2/0	119	137
176	205	3/0	136	159
202	237	4/0	158	187
224	264	250	180	209
251	291	300	202	232
273	319	350	220	255
295	346	400	238	278
334	391	500	273	319
370	432	600	299	350
405	473	700	330	382
418	487	750	339	396
431	505	800	348	410
458	532	900	374	437
480	560	1000	392	455
519	605	1250	427	496
550	642	1500	458	532
572	669	1750	480	560
585	683	2000	493	573
For additional information see table 310.15 of the National Electric Code				

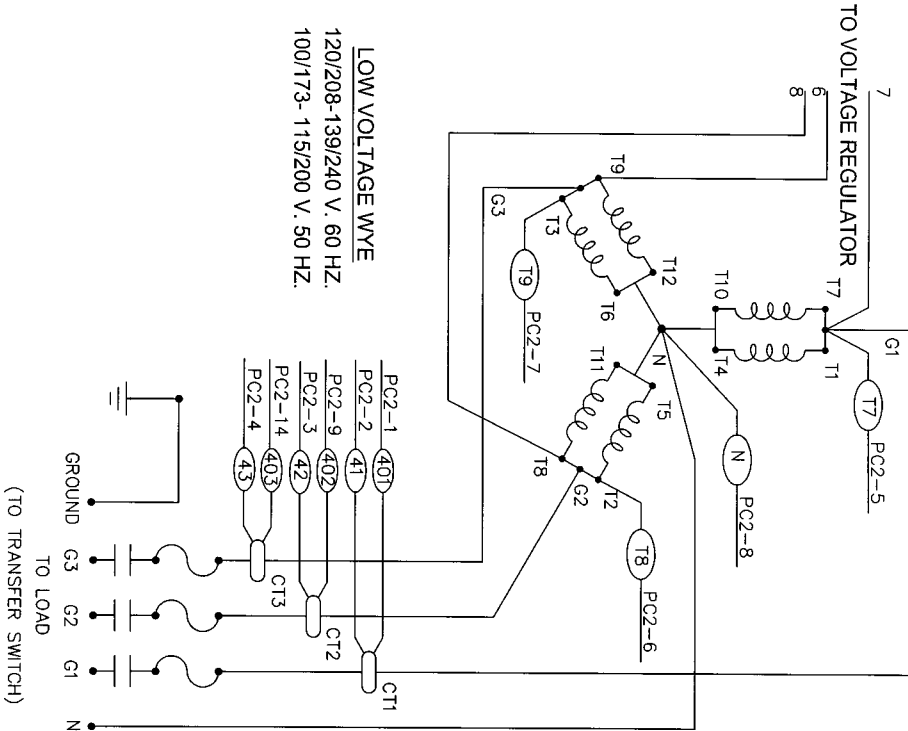
THREE PHASE AC WIRING HIGH AND LOW WYE

THREE PHASE-HIGH WYE 277/480 VOLTS



HIGH VOLTAGE WYE
240/416-277/480 V. 60 HZ.
219/380-231/400 V. 50 HZ.

THREE PHASE-LOW WYE 120/208 VOLTS

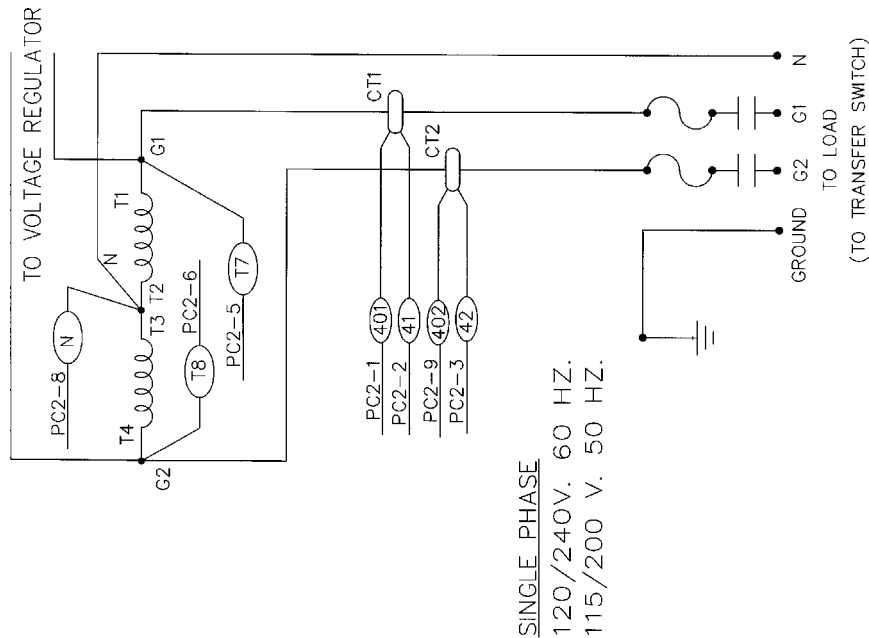


LOW VOLTAGE WYE
120/208-139/240 V. 60 HZ.
100/173-115/200 V. 50 HZ.

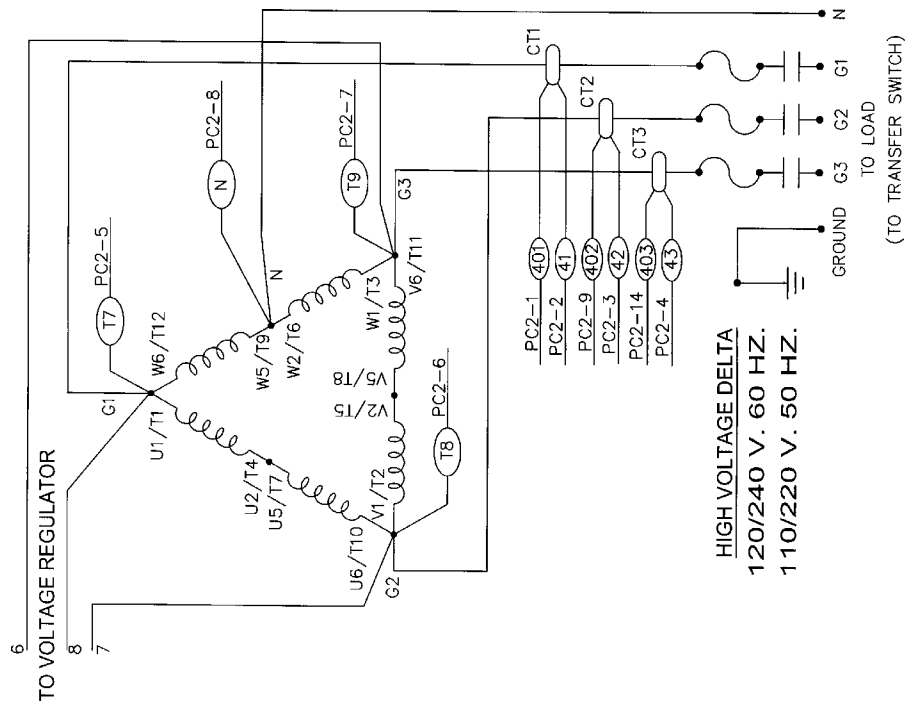
(TO TRANSFER SWITCH)

SINGLE PHASE AC THREE PHASE AC WIRING - 4 LEAD THREE PHASE - DELTA

SINGLE PHASE 120/240 VOLTS

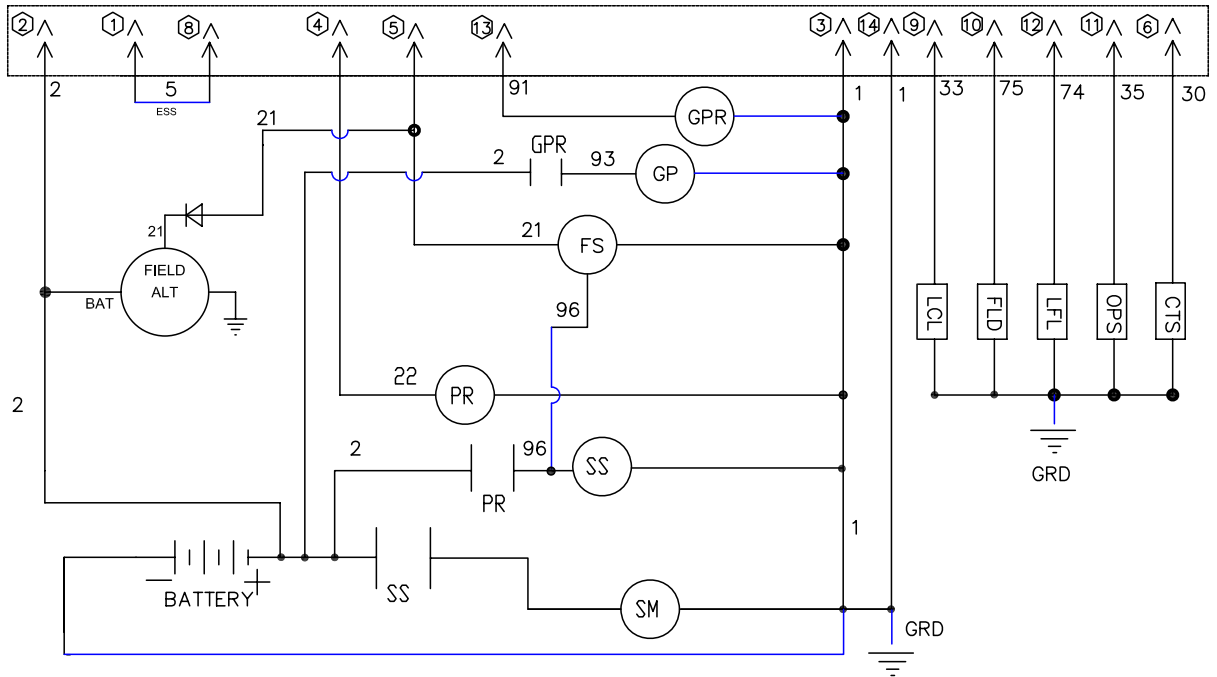


THREE PHASE - DELTA 120/240 VOLTS



ENGINE WIRING HARNESS

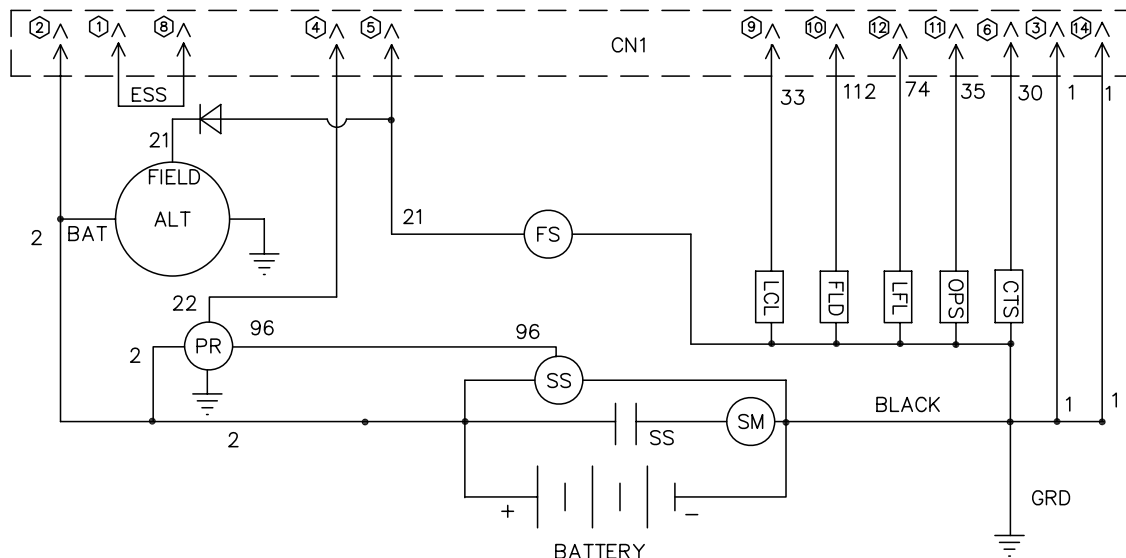
DR2014 AND DR3014



LEGEND

ALT	ALTERNATOR
CN1	16 PIN (LARGE CONNECTOR) ENGINE CONTROL HARNESS
CTS	COOLANT TEMPERATURE SENDER
ESS	EMERGENCY STOP SWITCH
FS	FUEL SOLENOID
GRD	GROUND (CHASSIS OR FRAME)
GP	ENGINE GLOW PLUGS
GPR	ENGINE GLOW PLUGS RELAY
LCL	LOW COOLANT LEVEL (OPTIONAL)
LFL	FUEL LEVEL SENDER
FLD	FUEL LEAK DETECTOR (OPTIONAL)
OPS	OIL PRESSURE SENDER
RR	RUN RELAY
SM	ENGINE STARTER MOTOR
SS	START SOLENOID
PR	PILOT RELAY

DR45F4 THROUGH DR130F4



WINCO INC[®]

LIMITED WARRANTY

WINCO, Incorporated warrants to the original purchaser for 12 months or 1000 hours which ever occurs first, that goods manufactured or supplied by it will be free from defects in workmanship and material, provided such goods are installed, operated and maintained in accordance with WINCO written instructions.

WINCO's sole liability, and Purchaser's sole remedy for a failure under this warranty, shall be limited to the repair of the product. At WINCO's option, material found to be defective in material or workmanship under normal use and service will be repaired or replaced. For warranty service, return the product within 12 months or 1000 hours which ever occurs first from the date of purchase, transportation charges prepaid, to your nearest WINCO Authorized Service Center or to WINCO, Inc. at Le Center Minnesota.

THERE IS NO OTHER EXPRESS WARRANTY.

To the extent permitted by law, any and all warranties, including those of merchantability and fitness for a particular purpose, are limited to 12 months or 1000 hours which ever occurs first, from date of purchase. In no event is WINCO liable for incidental or consequential damages.

Note: Some states do not allow limitation on the duration of implied warranty and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply in every instance. This warranty gives you specific legal rights which may vary from state to state.

WINCO reserves the right to change or improve its products without incurring any obligations to make such changes or improvement on products purchased previously.

EXCLUSIONS:

WINCO does not warrant Engines. Engines are covered exclusively by the warranties of their respective manufacturers, see enclosed warranties.

WINCO does not warrant Batteries, or Other Component Parts that are warranted by their respective manufacturers.

WINCO does not warrant modifications or alterations which were not made by WINCO, Inc.

WINCO does not warrant products which have been subjected to misuse and/or negligence or have been involved in an accident.

**WINCO INC.
225 S. CORDOVA AVE.
LE CENTER, MN 56057
507-357-6821
SERVICE DEPT.
507-357-6831
service@wincogen.com**