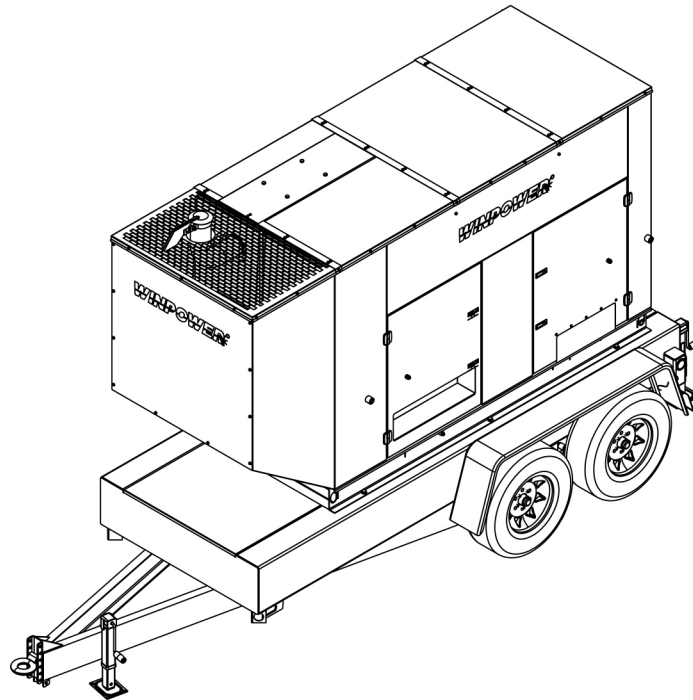




**DX90F4-
DX350F4
GENERATORS**



INSTALLATION AND OPERATORS MANUAL

DSE 7310 MKII ELECTRIC START

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SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the generator. Read and understand all instructions in the manual before starting and operating the generator.

USING THIS MANUAL

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

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

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

COPY YOUR MODEL AND SERIAL NUMBER HERE

No other WINCO generator has the same serial number as yours. 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 NAME _____

DEALER PHONE # _____

SAFETY INFORMATION

This engine generator set has been designed and manufactured to allow safe, reliable performance. Poor maintenance, improper or careless use can result in potentially 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.

1. ELECTRICAL SHOCK -

The output voltage present in this equipment can cause 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-pronged 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 -

Gasoline and other fuels present a hazard of possible explosion and/or fire.

- A. Do not refuel when the engine is running or hot.
- B. Keep fuel containers out of reach of children.
- C. Do not smoke or use open flame near the generator set or fuel tank.
- D. Keep a fire extinguisher nearby and know its proper use. Fire extinguishers rated ABC by NFPA are appropriate.
- E. Store fuel only in an approved container, and only in a well ventilated area.
- F. Follow local codes for closeness to combustible material.

3. DEADLY EXHAUST GAS -

Exhaust fumes from any gasoline 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 including attached garages
- 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, floors).

4. NOISE HAZARD -

Excessive noise is not only tiring, but continual exposure can lead to loss of hearing.

- A. Use hearing protection when working around this equipment for long periods of time.
- B. Keep your neighbors in mind when using 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 materials that could create a potential fire hazard.
- C. Carefully clean up any gas or oil spills before starting the unit.

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, covers, or receptacle panels while the engine is running.
- D. Use extreme caution when working on electrical components. High output voltage from this equipment can cause serious injury or death.
- E. Always avoid hot mufflers, exhaust manifolds, and engine parts. They can cause severe burns instantly.
- F. The use of the engine-generator set must comply with all national, state, and local codes.

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 generator 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 applicable engines.

This unit comes factory set for either key start or manual start. With the DSE 7310 MKII controller used in the manual start option it is possible to wire the control for remote start. Wiring instructions can be found further in this manual. The key start version does not have this option.

SPECIFICATIONS

DX90F4

Generator				
Wattage	67,000	90,000	90,000	90,000
kVa	67	113	113	113
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	281	312	256	135
CB Size	400	400	400	150
Hertz	60	60	60	60
Engine				
Model	FPT N45 TM2 4.5L			
Starting System	12 Volt			
Muffler	Standard			
Fuel Consumption (full load)	6.94 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	13.5 Quarts
Cooling System	50/50 mix

DX100F4

Generator				
Wattage	79,000	105,000	100,000	115,000
kVa	79	131	125	143
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	328	364	294	172
CB Size	400	400	400	175
Hertz	60	60	60	60
Engine				
Model	FPT N67 TM1X 6.7L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	7.71 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	17.9 Quarts
Cooling System	50/50 mix

DX130F4

Generator				
Wattage	109,000	130,000	123,000	130,000
kVa	109	162	154	102
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	453	450	370	195
CB Size	400	400	400	400
Hertz	60	60	60	60
Engine				
Model	FPT N67 TM1X 6.7L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	8.8 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	17.9 Quarts
Cooling System	50/50 mix

DX175F4

Generator				
Wattage	94,000	175,000	175,000	175,000
kVa	94	219	219	219
Volts	240/480	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	395	607	525	263
CB Size	600	600	600	600
Hertz	60	60	60	60
Engine				
Model	FPT N67 TE2 6.7L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	12.42 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	17 Quarts
Cooling System	50/50 mix

DX250F4

Generator				
Wattage	137,000	250,000	250,000	250,000
kVa	137	312	312	312
Volts	240/480	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	570	868	752	376
CB Size	1000	1000	1000	1000
Hertz	60	60	60	60
Engine				
Model	FPT C87 TE1D 8.7L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	16.98 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	29.6 Quarts
Cooling System	50/50 mix

DX300F4

Generator				
Wattage	300,000	300,000	300,000	
kVa	375	375	375	
Volts	120/208	120/240	277/480	
Phase	Three	Three	Three	
PF	.80	.80	.80	
Amps	1041	900	451	
CB Size	800	800	800	
Hertz	60	60	60	
Engine				
Model	FPT C10 TE1D 10.3L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	20.2 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	37 Quarts
Cooling System	50/50 mix

DX350F4

Generator				
Wattage	350,000	350,000	350,000	
kVa	438	438	438	
Volts	120/208	120/240	277/480	
Phase	Three	Three	Three	
PF	.80	.80	.80	
Amps	1215	1051	526	
CB Size	800	800	800	
Hertz	60	60	60	
Engine				
Model	FPT C13 TTE3X 13L			
Starting System	24 Volt			
Muffler	Standard			
Fuel Consumption (full load)	24.5 Gal/Hr			

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	77 Quarts
Cooling System	50/50 mix

GENERATOR ENDS

NOTE: Review the Stamford Newage nameplate on your generator. Some custom applications use other models. Check the generator nameplate for actual model number. Additional generator information available on line at www.wincogen.com under Service Support.

Stamford Newage Model# UCI274C (12 lead)	
Voltage Regulator	SX460
Rotor Resistance	1.12 ohms
Stator Resistance	0.059 ohms/phase
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.091 ohms/phase

Stamford Newage Model# UCI274D (12 lead)	
Voltage Regulator	SX460
Rotor Resistance	1.26 ohms
Stator Resistance	0.044 ohms/phase
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.091 ohms/phase

Stamford Newage Model# UCI274E (12 lead)	
Voltage Regulator	SX460
Rotor Resistance	1.334 ohms
Stator Resistance	0.0317 ohms/phase
Excitor Stator Resistance	20.0 ohms
Excitor Rotor Resistance	0.091 ohms/phase

Stamford Newage Model# UCI274H (12 lead)
Voltage Regulator SX460
Rotor Resistance 1.82 ohms
Stator Resistance 0.0155 ohms/phase
Excitor Stator Resistance 20.0 ohms
Excitor Rotor Resistance 0.091 ohms/phase

Stamford Newage Model# HCI434D (12 lead)
Voltage Regulator MX341
Rotor Resistance 1.05 ohms
Stator Resistance 0.00124 ohms/phase
Excitor Stator Resistance 18.0 ohms
Excitor Rotor Resistance 0.068 ohms/phase

INTRODUCTION

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 Hz (cps), from no load to rated load for standard mechanical governors and to within +/- .5 Hz 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. Generator set is skid mounted with isolation mounts between the engine and base on all units.

A customer supplied 12 Volt battery is required to complete the installation, the DX250-350 are 24 Volt systems. Battery requirements are listed later under the battery installation section.

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.

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 5 minute cool-down delay. The cool-down delay can be changed in the field from 0 to 30 minutes by your installer. 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 exercise mode.

GENERATOR SET

Every WINCO 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 data plates providing additional information to document build data for warranty and replacement parts.

ENGINE

Refer to the engine operators manual for more detailed operation and maintenance information.

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. Go to the WINCO website for a list of engine dealers (http://wincogen.com/Engine_Support) or contact the WINCO Service Department.

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 may decrease 3½% for each 1000 feet above sea level, and will decrease an additional 1% for each 10 degrees Fahrenheit above 60° Fahrenheit. Units should not be operated in ambient temperature greater than 125° Fahrenheit.

GENERATOR

WINCO generator sets use brushless, AVR (Auto-Voltage Regulator) controlled broad-range generator ends. The generator converts rotational mechanical energy into electrical energy. These WINCO units are equipped with generators manufactured by Cummins Generator Technology. Each generator 'end' has its own data tag. A unique serial number is on the data plate.

MODEL NUMBER STRUCTURE

The WINPOWER alpha-numerical numbering 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 set's ratings and specifications.

D	D = Diesel
X	X = Prime/Switchable Voltage
175	Generator Output Rating in kW
F	Engine Manufacturer: F = FPT
4	Number of Generator Poles
-	Base Unit - Options Separator
X	See ES-503 OR ES-504
A	HOUSING TYPE A = Sound Attenuated/Weather Protective * = No Housing
M	Fuel Tank Size: S = Small; M = Medium; L = Large; * = None
T	T = Trailer; * = None
D	Battery Charger Options A = 12V/1.75A; B = 12V/3.5A; 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

TRAILER/HOUSING

These switchable voltage generators are normally shipped fully enclosed & mounted on a trailer. The size of the trailer may vary by both model and fuel tank size requirements. All the trailers are DOT approved and you should receive a certificate of origin with each unit. This will allow you to register the equipment and obtain tags from your state. If you should encounter any problems registering the trailer, contact the WINCO Service Dept at 507-357-6831.

AUTOMATIC TRANSFER SWITCH

A wall mounted ASCO 300 Automatic Transfer Switch (ATS) designed for inside or outside installation. The transfer switch is UL 1008 approved. A fourteen day electronic exerciser circuit is installed in the ATS as standard equipment. The ATS also contains the power failure sensing circuitry necessary to start and stop the engine generator set. The transfer switch is also equipped standard with a 3 second start delay, and a 15 second transfer delay to allow the engine to warm up before transferring the load to the generator. When the line power is restored the ATS has a 5 minute transfer delay to allow the incoming utility to stabilize before transferring back to line power and then an additional 1 minute engine cool down delay before the engine shuts down. Read and understand the ATS owners manual before installing, servicing or operating the transfer switch.

PREPARING THE UNIT

UNPACKING

1. As you receive your unit, it is critical to check it for any damage. If any damage is noted, it is always easiest to refuse the shipment and let WINCO take care of the freight claim. If you sign for the unit, the transfer of the ownership requires that you file the freight claim

2. Before proceeding with the preparations of your new generator for operation, take a couple of minutes to ensure the unit you have received is the correct model and review the specification pages in this manual to ensure that this unit meets your job requirements.

CAUTION: EQUIPMENT DAMAGE:

This unit is 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.

Once generator set is on-site:

After inspecting the engine-generator for external, physical damage, locate and check the following items packed with the unit:

- Installation and Operator's Manual.
- Engine manufacturer's instruction manual.
- Battery hold-down brackets & hardware.
- Unit components or accessory items shipped loose for on-site installation.
- Optional accessories.

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 generator line. It is the responsibility of the installing party to follow the lifting equipment's operator's 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 the use during the manufacturing process and are designed for lifting of the individual generator set components.

WARNING:

NEVER attempt to lift the fuel tank 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.

INSTALLATION

WARNING: PERSONAL INJURY:

PERSONAL INJURY - Before proceeding with the installation, be sure the DSE7310 MKII 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

This engine-generator set is supplied as weather enclosed, trailered packages. The DOT certified trailer is required for mobile applications. Consult a qualified, licensed electrician or contractor to install and wire the gen-set. The installation must comply with all national, state, and local codes. The factory weather enclosures are acoustical housing intended for outdoor use only. Units are not intended to be used indoors and no support is available to assist in re-engineering finished packaged units.

Before beginning the installation process, recheck the voltage, phase, and amperage rating of the generator set. Be certain it can handle the intended load and are compatible with the intended loads. 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.

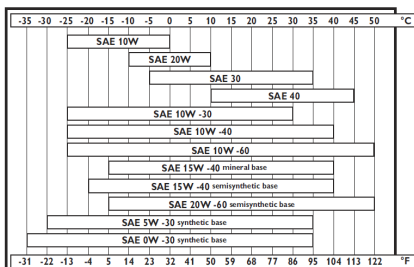
FUEL REQUIREMENTS

During periods of normal operations, these engines will all use #2 diesel fuel. Seasonally blended fuel should be used during time of extreme cold to ensure proper engine operation. See the engine operator's manual for more specific information on requirements.

NOTE: When starting the unit for the time it may be necessary to prime the engine before engaging the starter. The internal tank on the unit was not used during testing so there may be some air in the fuel lines that will have to be bled out.

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.



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 manufacturer's maintenance instructions.

INSTALLING THE BATTERY

CAUTION:

In the following battery installation procedure, check to be sure the DSE 7310 MKII is in the "stop" position. This should be your last step before initial start-up.

These units require 4D batteries, The DX90-175 is a 12 volt system and requires a single battery and the DX250-350 are 24 volt and require 2 batteries. The batteries should be rated at a minimum of 1100 CCA. 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 only be preformed or supervised 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:

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

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.
4. 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 first and then the positive cable.
5. Be sure all connections are tight and coat the terminals and cable ends with dielectric grease.

WARNING:

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

1. Always wear full eye protection and protective clothing.
2. Where electrolyte contacts skin, wash off immediately with water.
3. If electrolyte contacts the eyes, flush thoroughly and immediately with water and seek immediate medical attention
4. 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:

1. Never smoke when near batteries.
2. Do not cause a flame or spark in the battery area.
3. Always discharge static electricity from your body before touching batteries by first touching a ground metal surface.

SERVICING BATTERIES

Batteries used on these units may, over time, lose water. This is especially true if you are using a trickle charger to maintain your battery. Different types of batteries require various types of maintenance. Refer to the battery manufacturer for specific recommendations.

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. Depending on your battery type, check the electrolyte in the battery periodically to be sure it is above the plates. Never allow the battery to remain in a discharged condition.

CONNECTING BATTERY CHARGER & BLOCKHEATER

A three-stage battery charger is provided standard on this unit. The charger is an Automatic Battery Charger & Maintainer. This charger has three rates of charging. During the first mode, known as Bulk charging, the charging current is limited to 10 Amps at a voltage of up to 14/27 Volts. The yellow LED will be on constantly during this stage. When the charging rate drops to 2.5 Amps, the charge will enter the ABSORPTION charging mode. During this mode, the yellow LED will be flashing. The charging voltage is held at 14/27 Volts and the charging rate gradually reduces the amount of current (Amps) flowing to the battery to 100% charged state. The battery can be left on 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 15 amps. The blockheaters on these units are 1000 watt on the DR175 and 2250 watt on the larger units. The 2250 watt heaters and will require a separate 20 amp GFCI fused circuit. They are labeled Battery Charger Circuit and Blockheater Circuit.

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**WARNING: FIRE HAZARD:**

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

INSTALLATION NOTES:

Because of 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 ATS Control and safety system will eliminate all paths and feedback.

To wire the automatic transfer switch into existing wiring, first determine which circuits will be on the emergency load circuit. If the entire load is transferred, the transfer switch can be wired 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 ATS 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

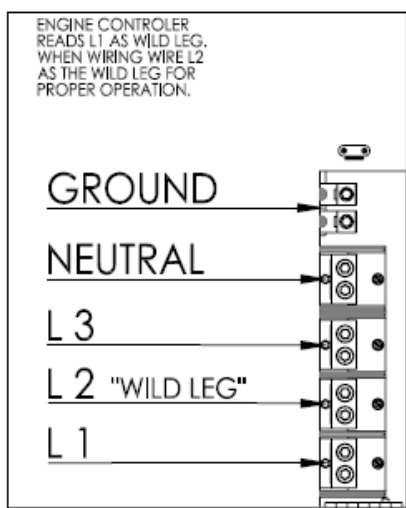
All wiring must be completed in accordance with the National Electric Code as well as any state and local codes.

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

WARNING:

Make sure the generator is disconnected from the battery to prevent accidental starting.

This AC terminal block is covered by a lockable access cover. Access for routing the wires into the terminal block is provided via a small access door just to the left of the main control panel door. You will also find your convenience receptacles located behind this small door. All receptacles located here have their own circuit breaker for protection.



NEUTRAL LUGS:

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

The 1200 Amp terminal block lugs on the 300-350kW will handle wire sizes #3/0 to 600 MCM and should be torqued to 28 ft. lbs.

The 1000 Amp terminal block lugs on the 250kW will handle wire sizes #3/0 to 500 MCM and should be torqued to 28 ft. lbs. (Rated for 900 Amp for AL)

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 will accommodate #6 AWG to 300 MCM and should be torqued to 22 ft. lbs. Two lugs are provided for your use.

L1, L2, & L3 POWER OUTPUT LUGS:

These lugs will handle wire sizes from #4 to 600 MCM and should be torqued to 22 ft. lbs. Two lugs per generator output leg are provided for your use. These lugs are isolated from the generator frame.

In the 120/240V 3-Ph configuration with the wild leg (208 line to neutral) is wired to the L2 position. ALSO NOTE THAT BECAUSE OF A CONFIGURATION PROBLEM, THE DEEP SEA CONTROLLER WILL SHOW THE WILD LEG ON L1 BUT IT IS WIRED TO THE L2 POSITION.

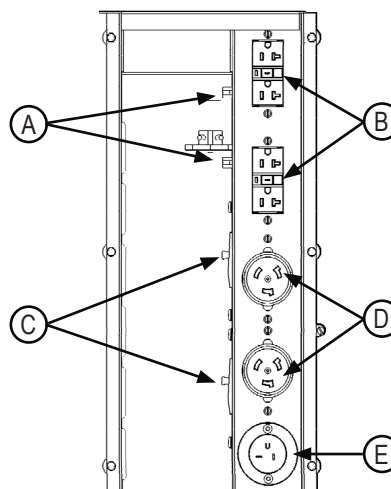
WARNING: PERSONAL DANGER:

This unit is shipped with the neutral and ground unbonded. If the unit is to be used as a stand-alone generator, you must bond neutral and ground together either at this terminal block or somewhere in your system.

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 an 8 foot copper rod driven into the earth will provide a proper earth ground.

RECEPTACLE PANEL



A: 20 AMP CIRCUIT BREAKERS:

2-20 Amp circuit breakers provide circuit breaker protection for the 2-20 Amp GFCI 120V receptacles.

B: 20 AMP/120V GFCI RECEPTACLES:

These 2-20 Amp (NEMA 5-20) GFCI protected receptacles are powered only when the selector switch is in the 240 or 208V position. They are dead when the voltage selector switch is in the 480V position.

C: 50 AMP CIRCUIT BREAKERS:

2-50 Amp circuit breakers provide circuit breaker protection for the 2-50 Amp 120/240V twist lock receptacles.

D: 50 AMP 120/240V TWISTLOCK RECEPTACLES:

2-50 Amp receptacles are powered only when the selector switch is in the 208 or 240V position. They are dead when the selector switch is in the 480V position. These two receptacles are 4-wire 120/240V. (Mating plug is a CS6365)

E: 15 AMP 120V REVERSE PLUG:

This plug is provided to power the block heater and battery charger mounted inside the unit when the unit is used for standby. It also allows battery charging during periods of long term storage.

WARNING:

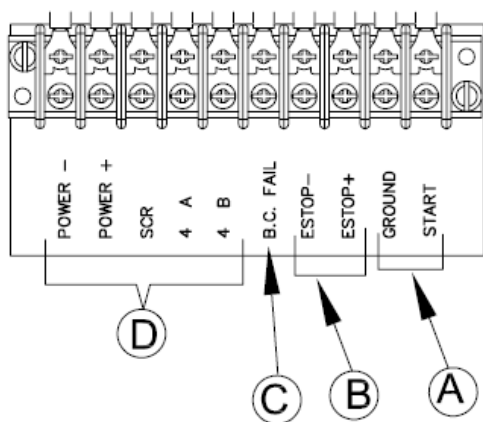
A mainline circuit breaker has been provided inside the generator housing. During all wiring installations, make sure the breaker is in the OFF position and the generator operating switch is in the OFF position.

D.C. ELECTRICAL CONNECTIONS

All DC connections are completed on the terminal strip just below the engine control. All DC connection must be separate conduit. You cannot mix AC and DC leads at 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 and Start. The wire in terminal labeled 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 MKII to go into an autostart 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 and S23. 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 MKII controller.

D - Remote Display Panel Interface Terminals. These interface terminals are pre-wired 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 annunciations requirements in applications requiring NFPA 110 level one protection).

DC INTERCONNECTIONS TO THE ATS

WARNING:

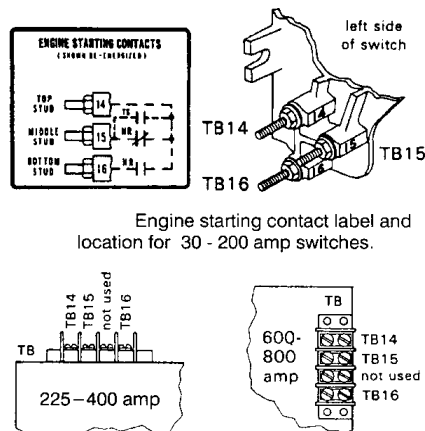
Be sure Engine/Generator is in the OFF position before you make any DC interconnections.

CAUTION:

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

ASCO 300 UL SWITCH

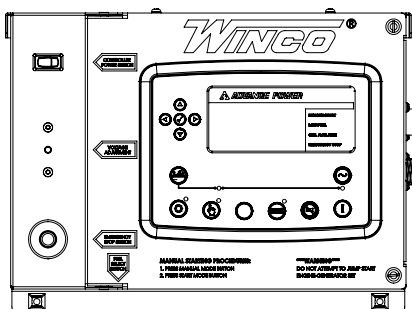
Your DC connection points in the ASCO 300 ATS terminals "14" and "15". Depending on the size of the switch, they are located in different locations.



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.

STARTING PROCEDURE

CONTROL LAYOUT



	STOP/RESET - This button places the module into its Stop/Reset mode. This will clear any alarm conditions for which the triggering criteria have been removed. The fuel supply de-energizes and the engine comes to a standstill. Should a remote start signal be present while operating in this mode, a remote start WILL NOT occur.
	MANUAL MODE - This button places the module into its Manual Mode. Once in Manual Mode, the model responds to the Start button to start the generator and run it off load.
	START - Pressing this button from STOP/RESET will start the engine and run the load.
	AUTO MODE - This button places the module into its Auto Mode. This mode allows the module to control the function of the generator automatically.
	ALARM/LAMP TEST - This button silences the audible alarm in the controller, de-activates the Audible Alarm output (if configured) and illuminates all of the LEDs on the module's face as a lamp test function.
	MENU NAVIGATION - Used for navigating the instrumentation, event log, and configuration screens.

PROTECTIONS

When an alarm is present, the common alarm LED if configures will illuminate. The LCD display will show an icon to indicate the failure.

WARNINGS

Warnings are non-critical alarm conditions and do not affect the operation of the generator system, they serve to draw the operator's attention to an undesirable condition. Warning alarms are self-resetting when the fault condition is removed. The icon will appear steady in the display.

SHUTDOWN

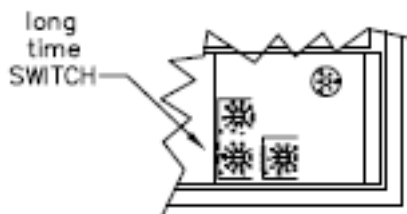
Shutdowns are critical alarm conditions that stop the engine and draw the operator's attention to an undesirable condition. Shutdown alarms are latching. The fault must be removed and the STOP/RESET button pressed to reset the module. The icon will be flashing in the display.

SELECTING THE CORRECT VOLTAGE

A variety of three phase voltages are available from the three position selector switch. The three basic connection patterns are Delta (120/240). Low or Parallel Wye (120/208), and High Wye (277/480). Before wiring and starting this unit, be sure you have the selector switch set for the right voltage. You must depress the safety switch below the selector switch to change the position of the voltage selector switch. If the unit is running, depressing this switch will shutdown the engine-generator set.

At the same time you are making the voltage selection, you must also adjust the setting on the mainline circuit breaker to give the proper breaker protection. See the following diagram for proper adjustments. The DX90-DX130 have a two circuit breaker system installed on them, you must ensure the correct breaker is turned closed.

SELECTOR SWITCH POSITION	VOLTAGE /PHASE	long time SETTING
277/480	480/3	.32
120/240	240/3	.66
120/208	208/3	.76



If you have any doubts also the voltage in your area, compare your incoming power or load name plates to the following voltage tables.

1. 120/240 Volt three phase* (Delta/Series configuration)

This configuration will produce the following line-to-line and line-to-neutral voltage. In this selector switch position, all of the receptacles on the front panel are powered.

G1 - G2 - G3	240V three phase
G1 - G2	240V single phase
G2 - G3	240V single phase
G1 - N	120V
G2 - N	208V
G3 - N	120V

WARNING: POTENTIAL EQUIPMENT DAMAGE:

This Delta configuration has a wild leg that produces 208V line to neutral on G2. Be sure when connecting to your panel or load that you match the wild phase on the generator to the wild phase in your panel or load. Failure to do so will result in 120V devices receiving 208V. you must also match your rotation.

*120/240V single phase output also uses this switch position. When connecting for single phase, the wild leg of 120/240V three phase connection is not used (G2).

2. 120/208 Volt three phase (Low/Parallel Wye configuration)
this configuration will produce the following line-to-line and line-to-neutral voltage. Use of this selector switch position allows utilization of the 120V receptacle only. The 240V receptacles cannot be used as the voltage is only 208V.

G1 - G2 - G3	208V three phase
G1 - G2	208V single phase
G2 - G3	208V single phase
G1 - G3	208V single phase
G1 - N	120V
G2 - N	120V
G3 - N	120V

3. 277/480 Volt three phase (High/Series Wye configuration)
This configuration will produce the following line-to-line and line-to-neutral outputs.

NOTE: Convenience receptacles

The 120 or 240 Volt receptacles are disconnected with the selector switch in this position.

G1 - G2 - G3	480V three phase
G1 - G2	480V single phase
G2 - G3	480V single phase
G1 - G3	480V single phase
G1 - N	277V
G2 - N	277V
G3 - N	277V

INITIAL START UP

WARNING: EQUIPMENT DAMAGE:

Before attempting to start this unit, complete your pre-start checklist and ensure 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.

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.

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

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

MANUAL MODE

WARNING: EQUIPMENT DAMAGE:

Before attempting to start this unit, complete your prestart checklist and ensure the generator mainline circuit breaker is in the proper position prior to starting. Starting this unit without it being properly connected, can cause serious personal injury or equipment damage.

1. Press and release the MANUAL MODE button. The small LED light next to it should come on.

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

2. Press and release the green START ENGINE button. The DSE 7310 MKII will send a start signal to the ECU on the engine. The engine ECU will then energize the fuel solenoid and start the cranking cycle (10 seconds on and 15 seconds off)

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'.

3. All engine functions are controlled by the ECU on the engine. The ECU on the engine will send information signals to the DSE 7310 MKII via the CAN connections to indicate oil pressure, water temperature, etc. for the display on the engine control. All shutdown functions are controlled by the ECU on the engine, what you see displayed on the DSE 7310 MKII display is what is happening inside the ECU on the engine.

The AC output readings displayed on the DSE 7310 MKII are collected through the AC interface harness wired in the generator control box. Any shutdowns related to the AC output are not a function of the engine ECU, but are based on information collected in the DSE 7310 MKII via this AC harness.

4. 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 58.5 to 62 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).

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.

5. 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 mode.

To test the Automatic Transfer Switch, follow the instruction on the operator's manual that came with the transfer switch. If you get a fault during the initial start up or prior to start up, it is most likely a false warning light. Simply reset the ATS start over.

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

NOTE: For setting the exerciser circuit, for all ATS, see the operator's manual shipped with the ATS.

MAINTENANCE SCHEDULE

SERVICE	INTERVALS
Check Engine Oil Level	Daily
Check Coolant Level and for Leakage	Daily
Check Air Filter	Daily
Check Electrolyte Level in Battery and Clean Terminals	6 Months
Drain Water from Fuel Pre-Filter	150 Hours
Check Belts and Belt Tension	300 Hours
Check Oil Vapor Filter	300 Hours
Change Oil	600 Hours
Change Oil Filters	600 Hours
Change Fuel Filters	600 Hours
Change Fuel Prefilter	600 Hours
Check Exhaust System for Damage	6 Months
Clean Fuel Tank	6 Months
Change Auxiliary Member Belt	1200 Hours
Change Air Filter (depending on conditions)	1200 Hours
Change Coolant	1200 Hours
Change Oil Vapor Filter	2 Years
Clean Turbocharger	1200 Hours
Adjust Play in Valve-Rocker Arms and Pump-Rocker Arms	1200 Hours

* There are additional maintenance items and explanations in the engine operator's manual. Read thoroughly before operating this unit.

TROUBLESHOOTING TABLE

NOTE: Before doing any trouble shooting, check the digital display on the DSE 7310 MKII. Normally, it will tell why the unit has failed. This will shorten your trouble shooting time and in many cases, prevent the replacement of parts that may not be defective.

Problem	Possible Causes
Unit will not crank when power fails	Digital genset not in AUTO Transfer control switch not in AUTOMATIC position Incorrect wiring between ATS and genset Defective control relay in ATS Fuse(s) blown in the DSE 7310 MKII Defective DSE 7310 MKII Loose or dirty battery terminals Defective starter Defective start solenoid Low/dead battery
Engine won't crank	Low/dead battery Blown DC fuses Defective DSE 7310 MKII Defective key switch Loose or dirty battery terminals Defective starter Defective start solenoid Locked up engine genset Defective engine harness Improper battery voltage to start solenoid, fuel pump, or fuel solenoid
Engine cranks but will not start	Improper fuel delivery to the unit Fuel supply shut off Fuel tank empty Air in the fuel system Engine fuel solenoid has not opened Defective fuel pump Defective fuel solenoid Defective engine harness Improper battery voltage to fuel pump or fuel solenoid
Engine starts, then stops and alarm light comes on	Engine oil pressure is low Engine has high water temperature Engine has overspeed Engine has gone into overcrank No output from AC generator Loss of speed signal Loss of run signal
Engine will not come up to speed after it starts	Insufficient fuel volume getting to the unit <ol style="list-style-type: none"> 1. Too small of fuel line 2. Fuel racks not open properly Governor is defective AC short in generator components
ATS will not transfer to Emergency Supply (generator)	No AC generator output Defective ATS control board. See ATS manual Circuit breaker open or defective
ATS will not re-transfer to normal power	Proper power line not available at line terminals in ATS panel Defective ATS control board. See ATS manual
No AC output from generator	Defective diode Defective voltage regulator Defective rotor Defective stator Defective exciter rotor Defective exciter stator AC short in the output leads Defective/open generator output breaker Wiring error

VOLTAGE REGULATOR WIRING

AS440 Automatic Voltage Regulator

The following is a list of connections on the AVR. These have been factory set and other than voltage adjustment, should never be changed.

VOLTS

To adjust generator output voltage.
Clockwise to increase voltage.

STABILITY

To prevent voltage hunting.
Clockwise to increase the dampening effect.

STANDARD CONNECTIONS

Terminals 1 & 2 will be fitted with a shorting link if no hand trimmer is required.

Terminals La & Lb are linked only for special low voltage applications.

UFRO - Under Frequency Roll Off

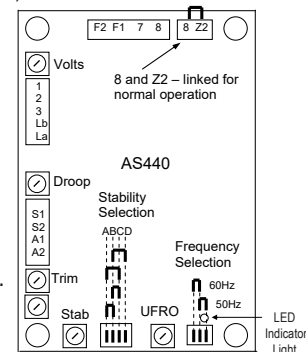
Terminal S1 is connected to the C.T., S2 on the AVR.

DROOP - Normally preset in the works to give 5% voltage droop at full load zero power factor.

Terminal A1 is connected to the AVR 0 Volts. Positive on A2 increases excitation, negative on A2 decreases excitation.

TRIM - allows the user to adjust the sensitivity of the input.

LED Indicator Light - indicates over excitation condition or under speed running.



MX341 Automatic Voltage Regulator

Under normal conditions only two adjustments are made to the voltage regulator.

VOLTS

To adjust generator output voltage.
Clockwise to increase voltage.

STABILITY

To prevent voltage hunting.
Clockwise to increase the
dampening effect.

STANDARD CONNECTIONS

(Top Row, Right to Left)

1 -2 Are linked together.

2 - Lead #9 from AC terminal block.*

3 - Lead #8 from AC terminal block.*

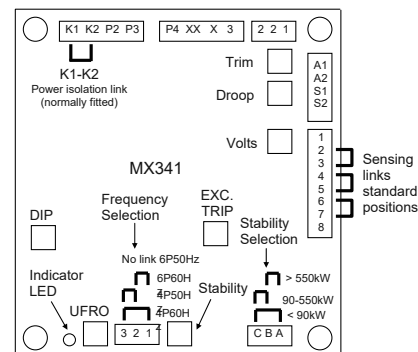
X - F1 from generator exciter

XX - F2 from generator exciter

P4, P3, P2 all come from the PMG

* voltage between these to leads must be between 190 & 264.

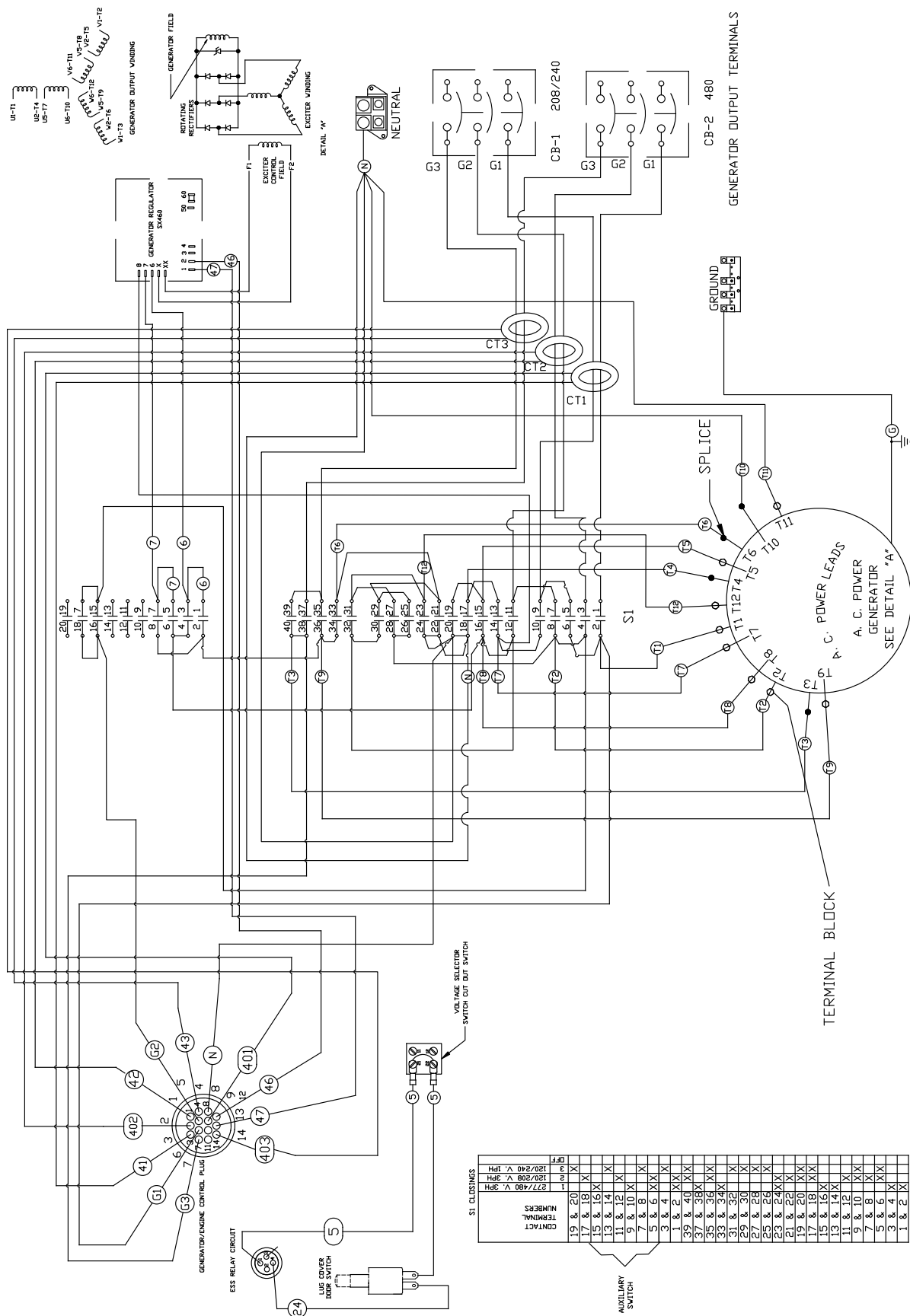
(Center tapped on 480 Volt)

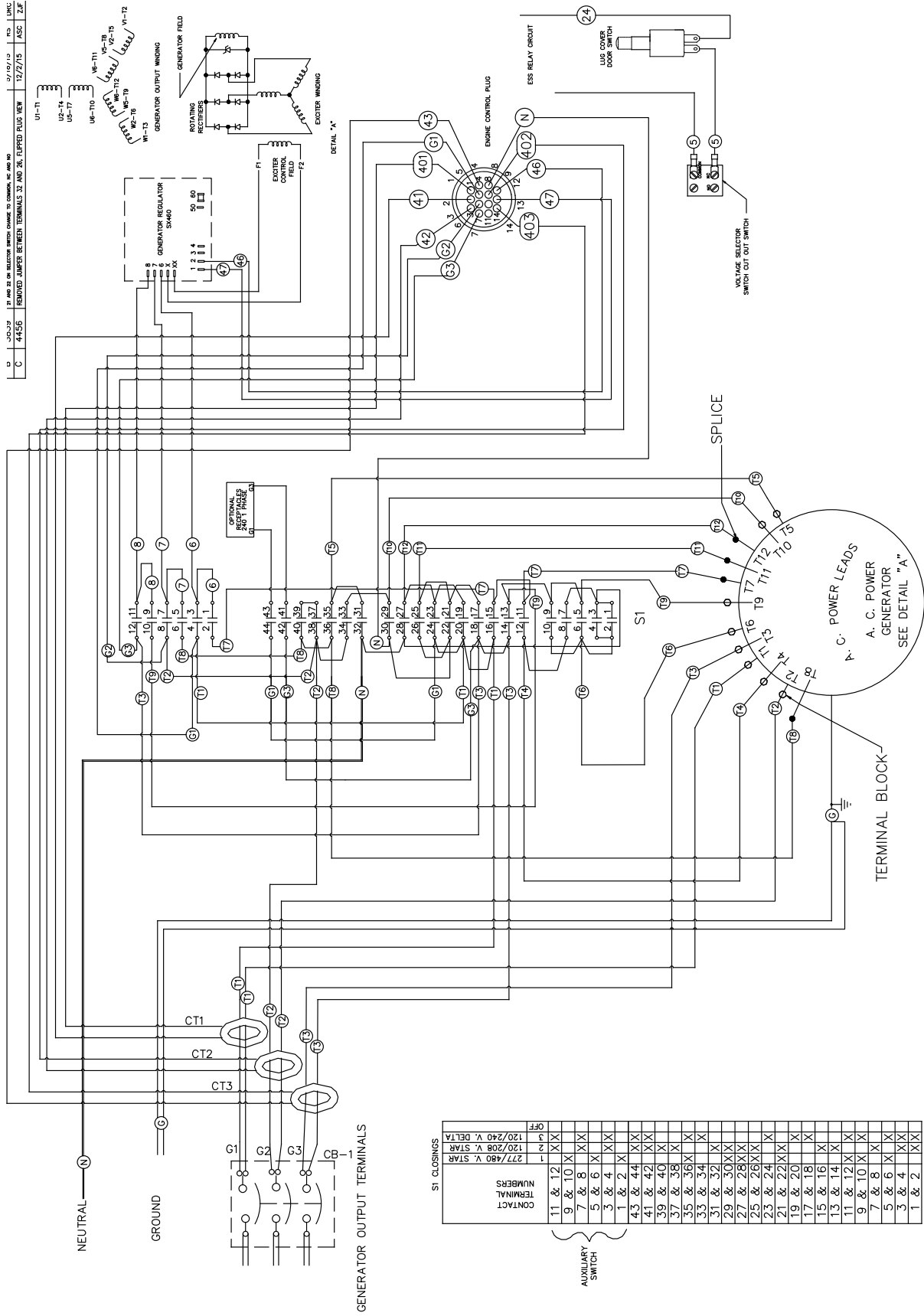


WIRING SIZE TABLE

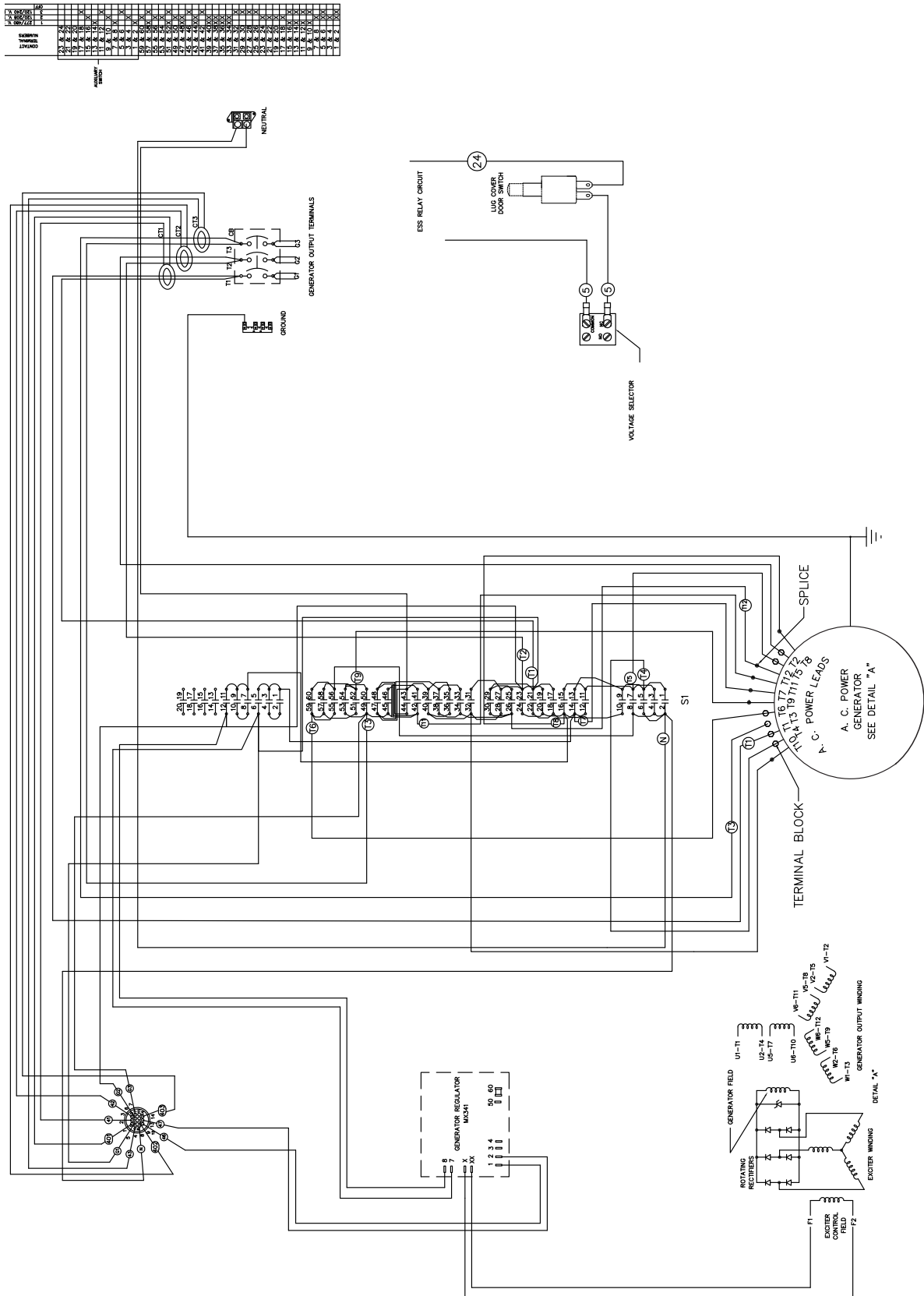
The table below is based on Table 310.15 (B) (16) un the National Electric Code 2014 edition. Allowable ampacities of insulated conductors rated 0 through 2000V, 75°C through 90°C. Not more than three current-carrying conductors in Raceway, Cable, or Earth (direct buried). Adjust for 40°C (104°F) ambient temperature.				
Copper 75°C	Copper 90°C		Aluminum Copper Clad Aluminum 75°C	Aluminum Copper Clad Aluminum 90°
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, 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.				

SELECTOR SWITCH WIRING DIAGRAM DX90-DX130



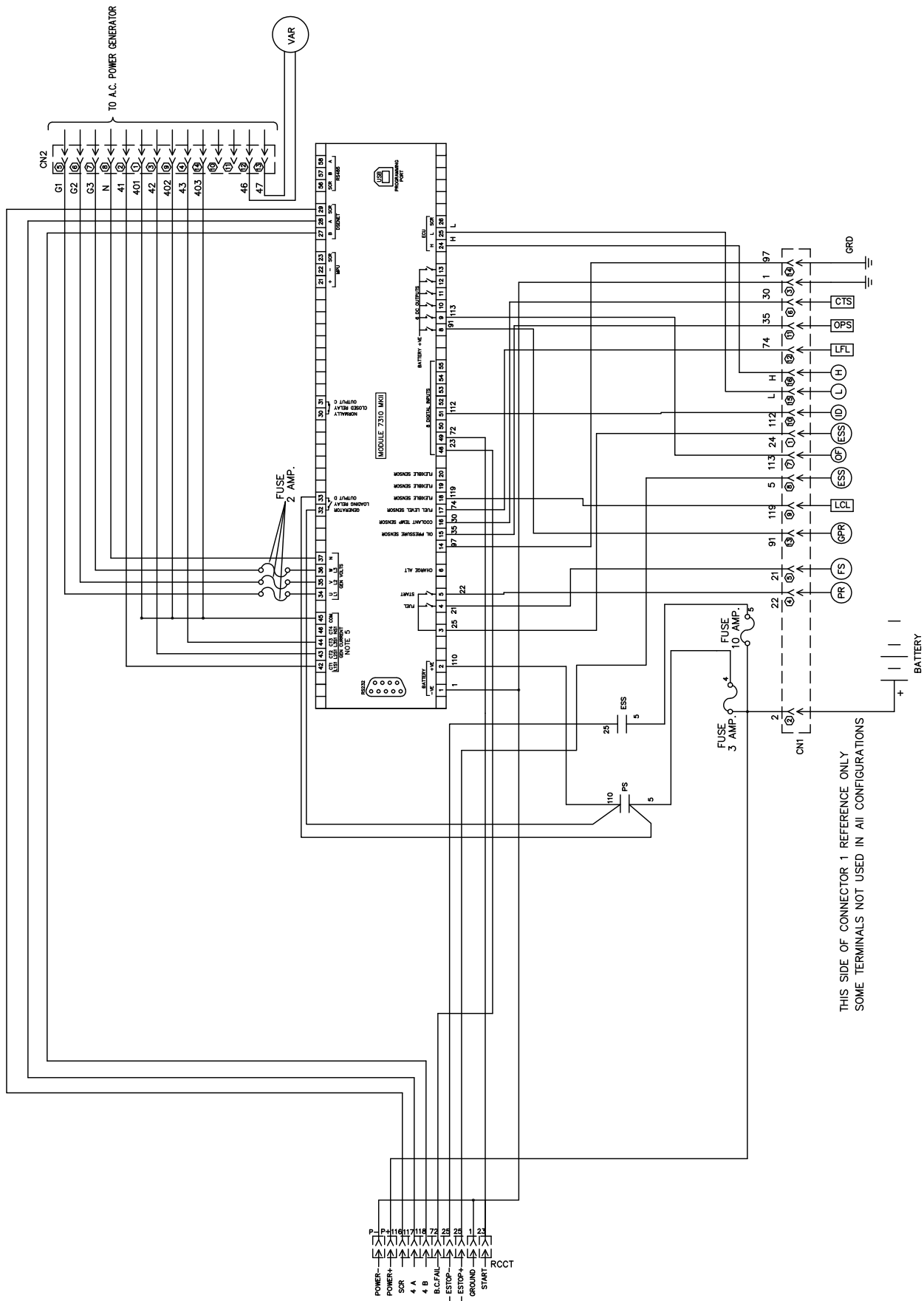


DX250

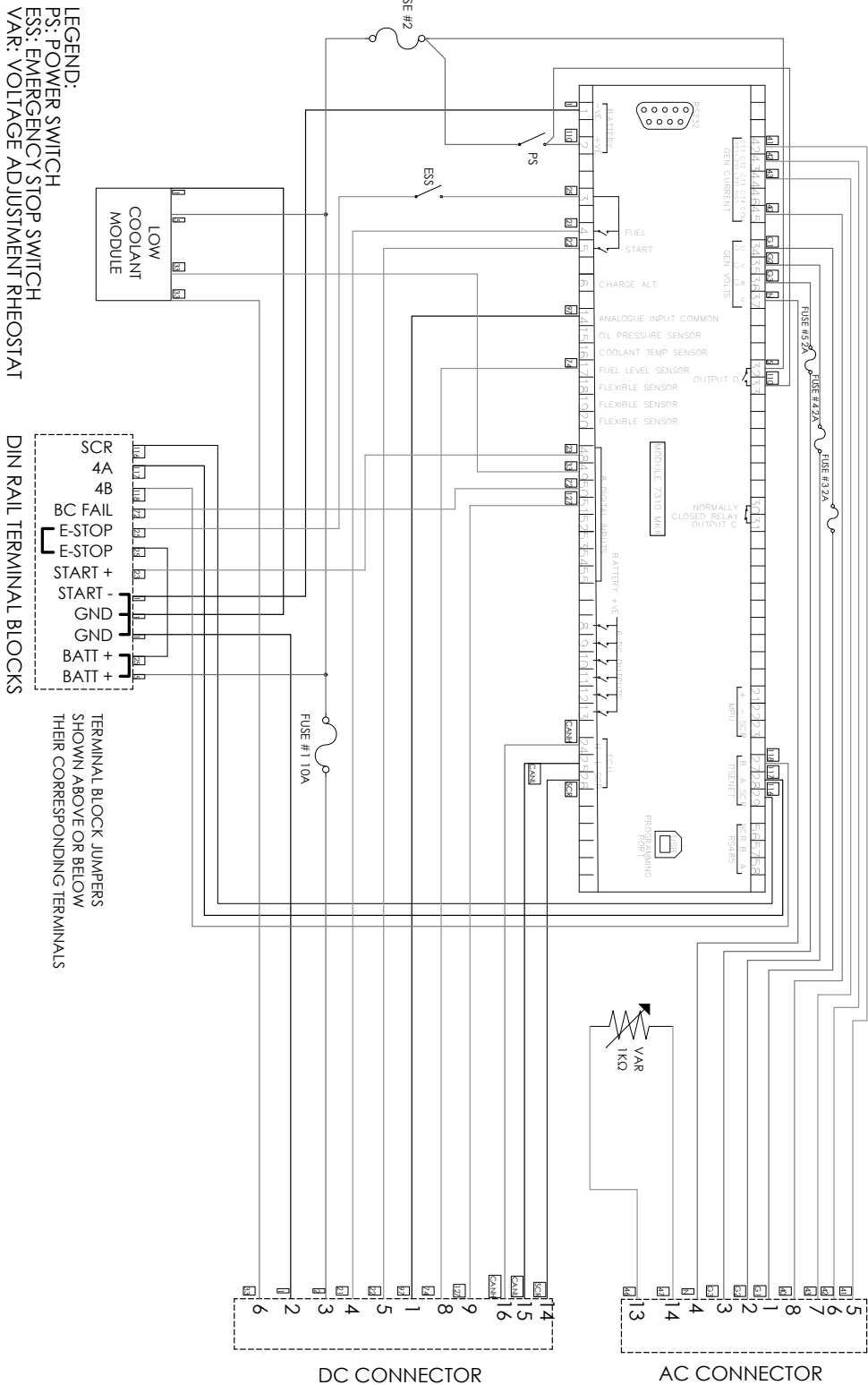


DSE 7310 MKII WIRING DIAGRAM

DX90F4-DX130F4

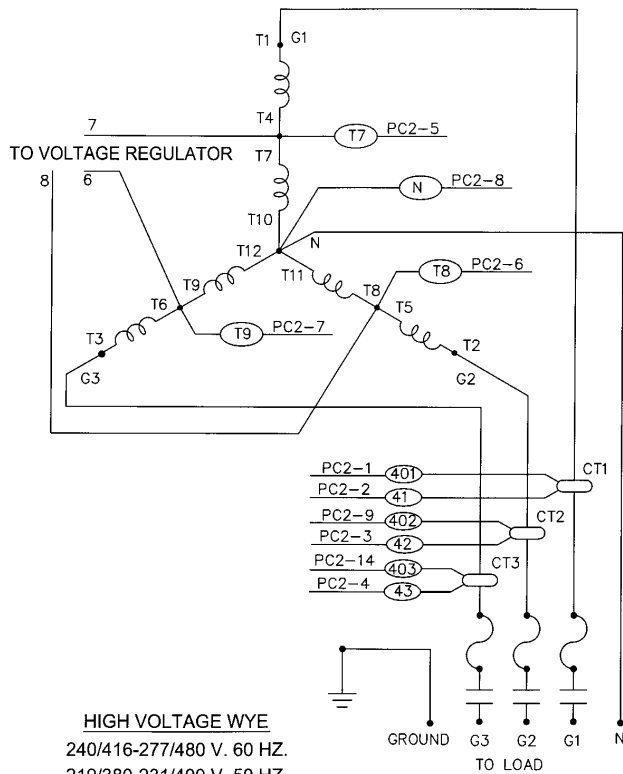


DSE 7310 MKII WIRING DIAGRAM

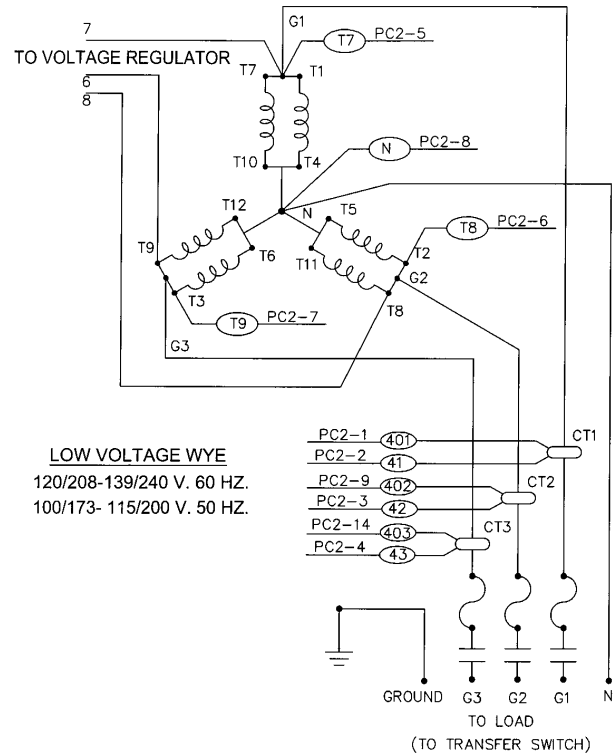


THREE PHASE AC WIRE HIGH AND LOW WYE

THREE PHASE - HIGH WYE 277/480V

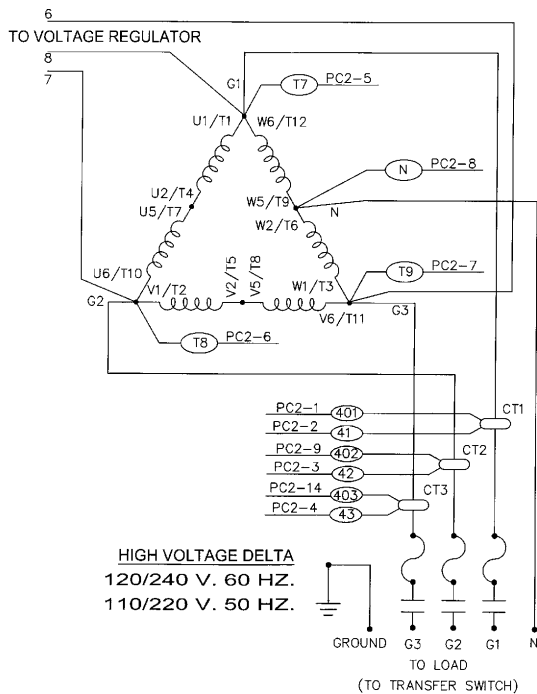


THREE PHASE - LOW WYE 120/208V



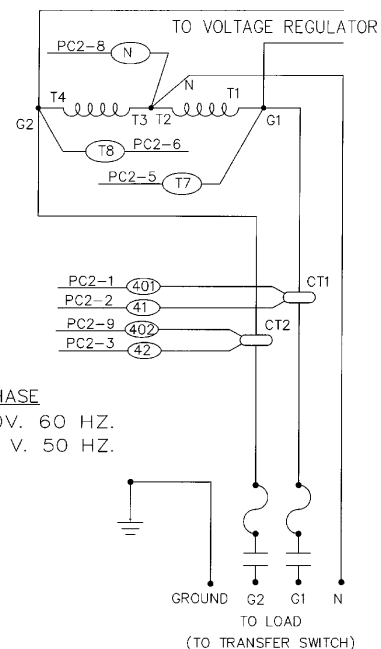
THREE PHASE WIRING - DELTA

THREE PHASE DELTA 120/240V



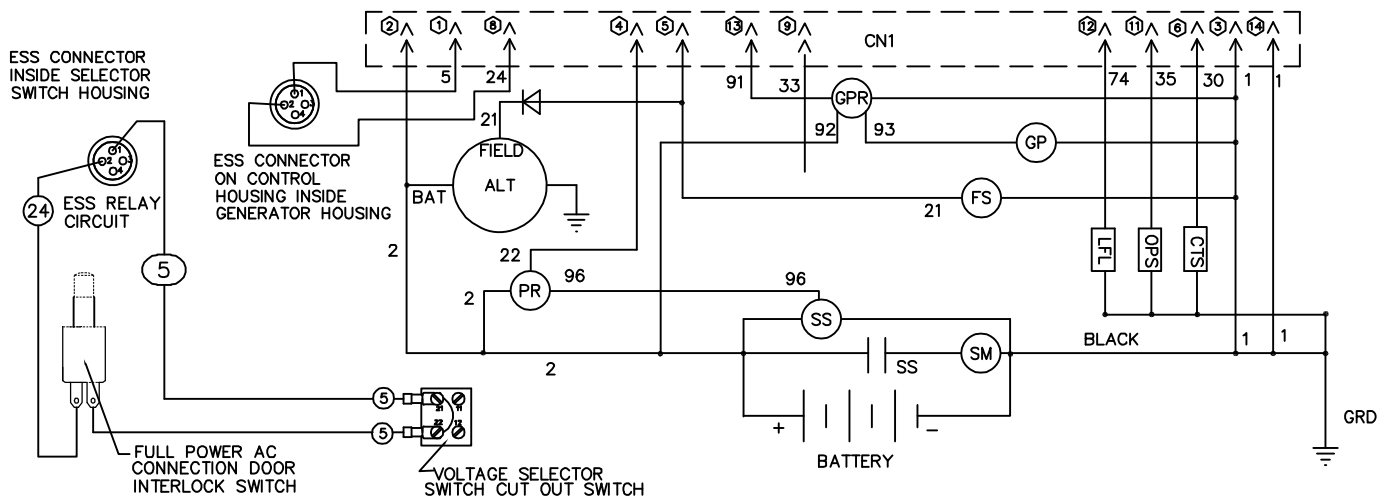
SINGLE PHASE AC WIRING - 4 LEAD

SINGLE PHASE 120/240V

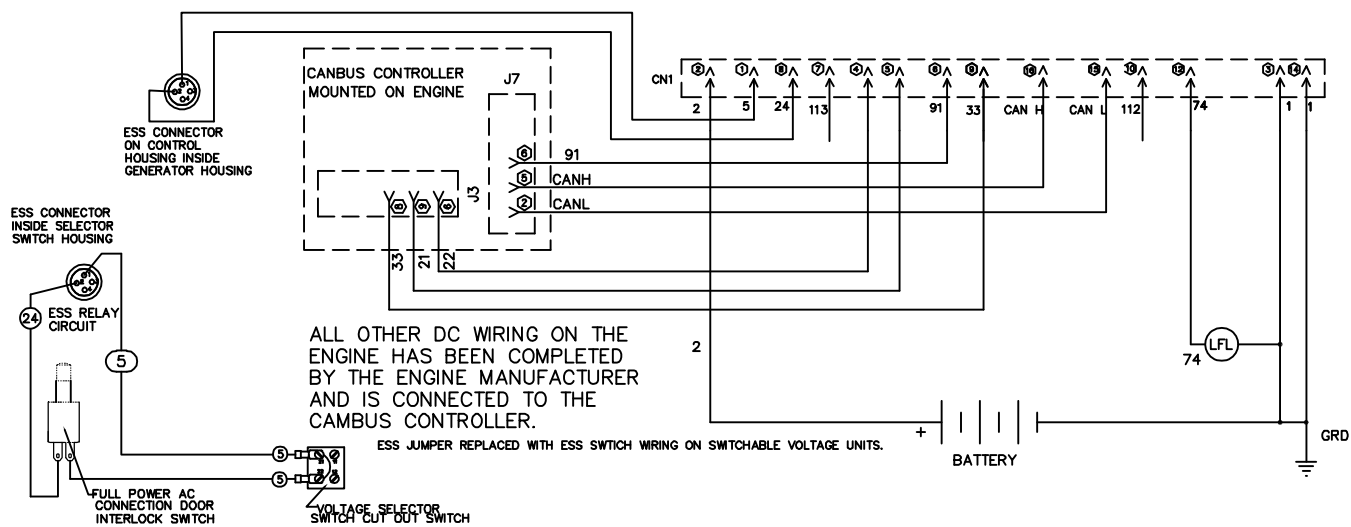


ENGINE WIRING HARNESS

DX90F4-DX130F4



DX175F4-DX350F4





12 MONTH 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 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.

This warranty does not include travel time, mileage, or labor for removal or re-installation of WINCO product from its application.