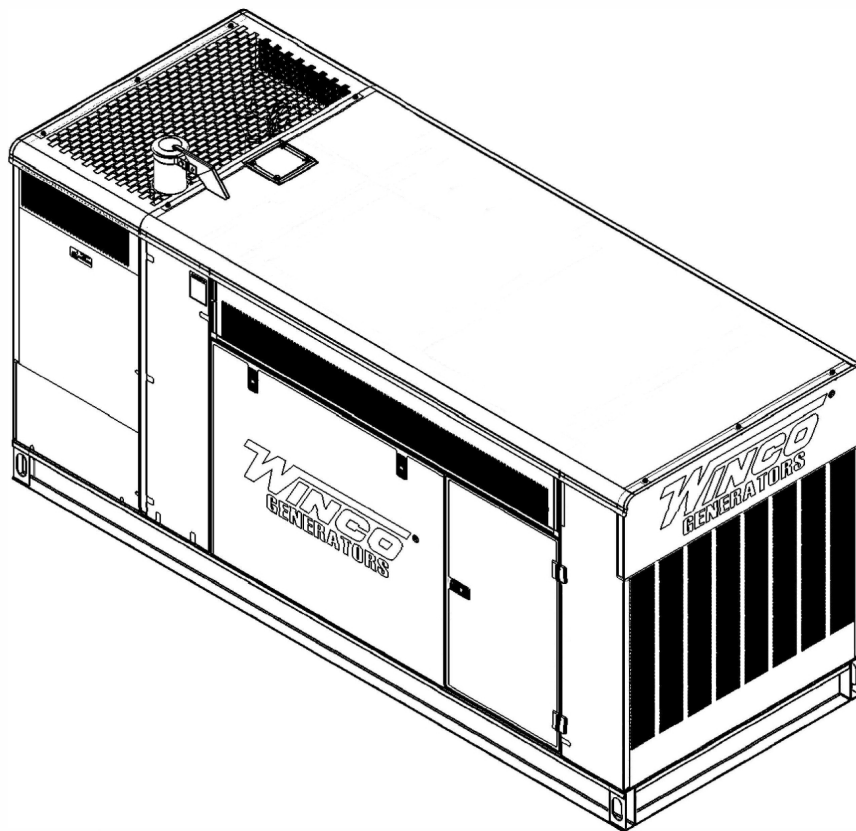


INSTALLATION & OPERATORS MANUAL



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 # _____



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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.

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.

SAFETY DEFINITIONS

DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
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.

CALIFORNIA PROPOSITION 65



WARNING: This product contains crude oil, gasoline, diesel fuel and other petroleum products, Antifreeze to which can expose you to chemicals including toluene and benzene, Ethylene glycol (ingested) which are known to the State of California to cause cancer, birth defects or other reproductive harm and developmental issues. For more information go to www.P65Warning.ca.gov.

DANGER: 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 for your application.

DANGER: 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).

WARNING: 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.

CAUTION: PERSONAL INJURY

The muffler becomes very hot during operation and for a period after the unit has been turned off. Do not touch the muffler until it has completely cooled off.

CAUTION: 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.

CAUTION

- 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.

CAUTION

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.

SPECIFICATIONS

DR35F4

Generator				
Wattage	35,000	35,000	35,000	35,000
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	145	121	105	52
CB Size	150	125	125	50
Hertz	60	60	60	60

Engine	
Model	FPT N45 SM1 4.5L
Starting System	12 Volt
Muffler	Standard
Fuel Consumption (full load)	3.2 Gal/Hr

Generator Testing Resistance

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

Model	Stamford UCI224C
Winding Group	06
Resistances:	
Rotor	0.59 Ohms @ 22°C
Stator	0.059 Ohms Per Ph @ 22°C
Exciter Rotor	0.071 Ohms Per Ph @ 22°C
Exciter Stator	21 Ohms @ 22°C
Voltage Regulator	SX460

Model	Stamford UCI224D
Winding Group	311
Resistances:	
Rotor	0.64 Ohms @ 22°C
Stator	0.129 Ohms @ 22°C
Exciter Rotor	0.071 Ohms Per Ph @ 22°C
Exciter Stator	21 Ohms @ 22°C
Voltage Regulator	SX460

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	8.98 Quarts
Cooling System	50/50 mix

DR45F4

Generator				
Wattage	45,000	45,000	45,000	45,000
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	187	156	135	68
CB Size	175	150	125	70
Hertz	60	60	60	60

Engine	
Model	FPT N45 SM1 4.5L
Starting System	12 Volt
Muffler	Standard
Fuel Consumption (full load)	4.09 Gal/Hr

Generator Testing Resistance

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

Model	Stamford UCI224E
Winding Group	06
Resistances:	
Rotor	0.69 Ohms @ 22°C
Stator	0.101 Ohms Per Ph @ 22°C
Exciter Rotor	0.078 Ohms Per Ph @ 22°C
Exciter Stator	20 Ohms @ 22°C
Voltage Regulator	SX460

Model	Stamford UCI224D
Winding Group	311
Resistances:	
Rotor	0.64 Ohms @ 22°C
Stator	0.129 Ohms @ 22°C
Exciter Rotor	0.071 Ohms Per Ph @ 22°C
Exciter Stator	21 Ohms @ 22°C
Voltage Regulator	SX460

Engine Fluid Specifications

Fuel	ASTM D-975 -1D or 2D EN590 or equivalent
Oil Type	SEE LUBRICATION SECTION
Oil Capacity	8.98 Quarts
Cooling System	50/50 mix

DR65F4

Generator				
Wattage	62,000	62,000	62,000	62,000
Volts	120/240	120/208	120/240	277/480
Phase	Single	Three	Three	Three
PF	1.0	.80	.80	.80
Amps	258	215	186	93
CB Size	250	225	175	100
Hertz	60	60	60	60

Engine	
Model	FPT N45 SM2 4.5L
Starting System	12 Volt
Muffler	Standard
Fuel Consumption (full load)	4.57 Gal/Hr

Generator Testing Resistance

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

Model	Stamford UCI224G
Winding Group	06
Resistances:	
Rotor	0.83 Ohms @ 22°C
Stator	0.065 Ohms Per Ph @ 22°C
Exciter Rotor	0.078 Ohms Per Ph @ 22°C
Exciter Stator	20 Ohms @ 22°C
Voltage Regulator	SX460

Model	Stamford UCI224F
Winding Group	311
Resistances:	
Rotor	0.69 Ohms @ 22°C
Stator	0.039 Ohms @ 22°C
Exciter Rotor	0.078 Ohms Per Ph @ 22°C
Exciter Stator	20 Ohms @ 22°C
Voltage Regulator	SX460

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

DR90F4

Generator					
Wattage	86,000	87,000	87,000	87,000	87,000
Volts	120/240	120/208	120/240	277/480	346/600
Phase	Single	Three	Three	Three	Three
PF	1.0	.80	.80	.80	.80
Amps	358	302	261	130	104
CB Size	350	300	300	125	100
Hertz	60	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

Generator Testing Resistance

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

Model	Stamford UCI274C
Winding Group	06
Resistances:	
Rotor	1.34 Ohms @22°C
Stator	0.015 Ohms @ 22°C
Exciter Rotor	0.091 Ohms Per Ph @ 22°C
Exciter Stator	20 Ohms @ 22°C
Voltage Regulator	SX460

Model	Stamford UCI274C
Winding Group	311
Resistances:	
Rotor	1.34 Ohms @22°C
Stator	0.0317 Ohms Per Ph @ 22°C
Exciter Rotor	0.091 Ohms Per Ph @ 22°C
Exciter Stator	20 Ohms @ 22°C
Voltage Regulator	SX460

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

INTRODUCTION

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.

PRODUCT DESCRIPTION

This engine-generator set is designed for unattended remote start operation. It must be operated as part of a fully automatic standby power system.

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. 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. 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.

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 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 3% for each 1000 feet above sea level, and will decrease an additional 3% for each 10 degrees Fahrenheit above 60° Fahrenheit. Units should not be operated in ambient temperature greater than 122° 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.

PREPARING THE UNIT

START-UP CHECK LIST

A Start-Up Completion & Warranty Validation Form was sent along with this manual. This must be completed and returned to WINCO Inc. within 180 days of the factory invoice date.

If this form is not returned, the Warranty may be voided.

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:

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. Installation and Operator's Manual.
 - b. Engine manufacturer's instruction manual.
 - c. Battery hold-down brackets & hardware.
 - d. Unit components or accessory items shipped loose for on-site installation.
 - e. Optional accessories.
3. Remove main frame hold-down bolts.
4. Unit can now be lifted from shipping rails.

LIFTING THE GENERATOR SET

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

The max continuous coolant temperature for this unit is 250°F. This unit should be installed in a well ventilated area, ensuring the exhaust air cannot be recirculated back into the engine.

CAUTION

This unit will get hot while it is running and for some time afterward.

WARNING: PERSONAL INJURY

Before proceeding with the installation, be sure the engine control is in the "stop" position and the emergency stop depressed. Also, 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 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, properly ventilated, supplied by the installer. The factory weather enclosures are 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. 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.

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.

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 solid base. The engine-generator is mounted on channels which are attached with special shock mounts to the main frame. This allows the engine-generator free movement without affecting the base or surrounding equipment.

WARNING: EQUIPMENT DAMAGE

Never mount these engine-generator sets to a wooden base/structure. Over time, the wood will deteriorate and the unit mountings will come loose. These units must be mounted to a steel or concrete base.

The unit should be mounted to allow ample working room around it. A general rule to follow is to allow 24 inches or more of clearance for maintenance. Follow local codes for clearance from combustible surfaces.

VENTILATION REQUIREMENTS

OPEN SKID

WARNING: EQUIPMENT DAMAGE

It is the installer's responsibility to ensure that there is sufficient cooling air available to prevent the engine and generator from over heating. Damage caused by overheating is not covered by warranty.

Providing proper air movement during your installation planning is essential.

The WINCO installation manual OPM-112 contains information on indoor, open skid installations and is available electronically through our website or by requesting a copy from the factory.

EXHAUST INSTALLATION

WARNING: PERSONAL INJURY

Improper exhaust installation will allow dangerous gases to seep into enclosed spaces causing a hazard to your health and/or death.

All exhaust must be piped out of the enclosure. When selecting a location to exhaust fumes make sure that the potential for contact with people is controlled. Exhaust can enter buildings through windows, ventilation systems and other openings if proper precautions are not followed.

The exhaust must be isolated from the vibration of the engine. If the exhaust is connected in a rigid system it will result in damage to the engine. The generator comes equipped with an engine mounted flex pipe to aid your installation. Ensure proper alignment with the generator. The flex can be eliminated if it is pushed to one side to make a connection.

The most direct path possible should be used to get to the outside of the enclosure. Each bend restricts the pipe and

increases back pressure. It may be necessary to increase the exhaust pipe diameter in some applications.

The exhaust pipe is very hot. When passing through the structure it is critical that a thimble or other appropriate technique is used to dissipate the heat and prevent the structure from catching on fire.

It is preferable to exhaust out the side of the enclosures. Slope the pipe slightly downward away from the engine to cause any water in the exhaust to run away from the engine. Do not exhaust near intake. Once outside the enclosure a rain cap or other technique must be used to keep water out of the exhaust. In mobile applications make sure the rain flap faces to the rear of the vehicle so that it is not blown open during transportation.

The generator ships with a critical grade muffler that should be installed to decrease noise. It can be mounted either internally or externally to the enclosure. The muffler cannot increase back pressure to more than 0.725 psi.

FUEL INSTALLATION

The fuel supply should be as close as possible to the engine. This will reduce the installation cost of fuel runs. 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 and information provided be interpreted to conflict with any local, state or national codes. If in doubt, always consult your local fire marshal, gas supplier or building inspector.

WARNING: FIRE HAZARD

All fuel runs should be installed by a licensed fuel supplier.

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

WARNING: 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.

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.

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 sustainable 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.

LUBRICATION & COOLANT

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. Failure to use the proper oil and keep the crankcase properly filled will cause excessive engine wear and shorten its useful life.

See LUBRICATION section under STARTING PROCEDURE for oil specifications and recommended oil information.

WARNING: PERSONAL INJURY

Hot coolant and steam can cause serious injury or death. Allow the engine to cool. Loosen the radiator cap to release pressure before fully removing the cap.

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.

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.

A customer supplied Group 24 CCA battery is required to complete the installation. Installation of the highest CCA rated battery, within the correct BCI group, will increase cold weather starting performance.

BATTERY REQUIREMENTS

Model	Voltage	BCI Group	Min. CCA Rating
DR45F4 & DR65F4	12	24	650
DR90F4	12	31	900

Installation and servicing of batteries must only be performed 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

CAUTION: EQUIPMENT DAMAGE

Voltage spikes can damage the DC control circuits. Disconnect the battery charger from the AC power source prior to disconnecting the battery.

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 & BLOCK HEATER

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 5 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 charge 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 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 hard wired to the AC connection.

The block heater on this unit is a 1800 watt heater and is hard wired to the AC connection. The block heater is thermostatically controlled and will maintain the engine coolant temperature between 100 and 120 degrees F.

MOUNTING THE 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.

AC CONNECTIONS

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

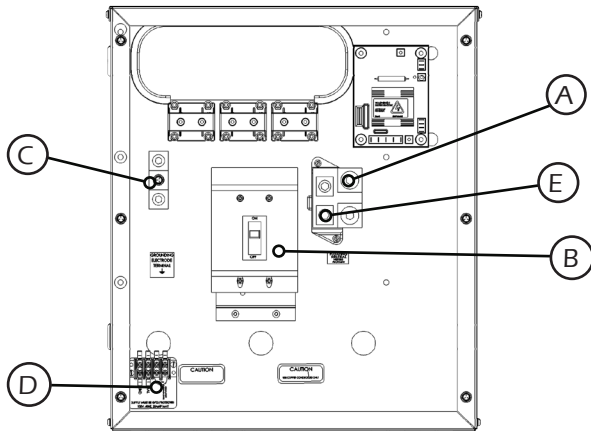
All wiring must be completed in accordance with the National Electric Code as well as any state and local codes.

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.

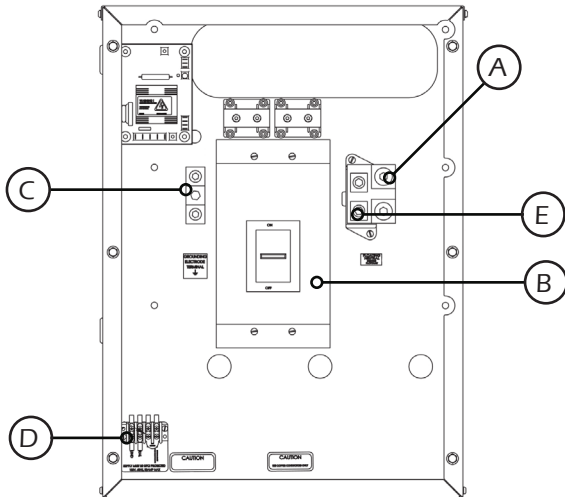
WARNING

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

Typical arrangements for 45 and 65kW Circuit Breaker Box.



Typical arrangements for 90kW Circuit Breaker Box



A. NEUTRAL LUGS:

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

B. GENERATOR CIRCUIT BREAKER:

This circuit breaker provides overload protection for the generator. Your power feeds from the transfer switch

OPM-134/C

will connect the bottom lugs on the circuit 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, found further in this manual. Then refer to Appendix "2" for guidance on wire sizing based on both wire type and amperage.

For additional information on wire sizes, 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 will accommodate #10 AWG to 2/0 AWG and should be torqued to 200 in. lbs.

D: 120V GFCI CIRCUIT TERMINAL BLOCK:

These terminals are rated for 85 Amps and will handle wire sizes #4 AWG to 18AWG. 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 block heater and the battery charger.

E: NEUTRAL TO GROUND LEAD LUG:

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 a 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 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.

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).

GROUNDING

Proper grounding of your generator is application dependent. Carefully evaluate your planned use of your generator to understand which grounding you require. If you are not sure what to do, contact a competent professional to assist you. The NFPA 70 250:34-35 are good technical references.

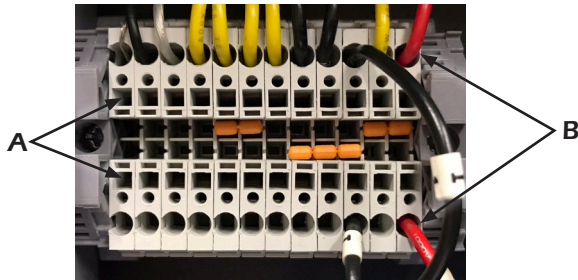
PERMANENTLY INSTALLED GENERATORS

This WINCO portable generator ships with a bonded neutral and overcurrent protection. NFPA 70 refers to this as a "separately derived system." When connecting it to a building a transfer switch specifically designed for GFCI and bonded neutral generators is required.

DC 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.

To install the wires, reference the following picture. Use a small flat head screwdriver to push the release spring inside the square hole (A). While the release is being pushed, insert the wire into the larger circular hole (B). Remove the screwdriver to secure the wire into place.

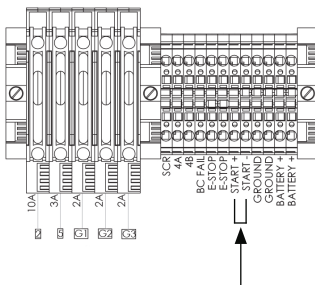


REMOTE START

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 MKII to go into an autostart mode and start up the generator.

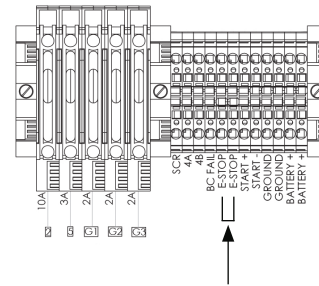
Depending on the distance, 14 to 16 gauge standard wire should be used. It is suggested that these wires be labeled S1 (ground) and S2 (start). The terminal blocks are designed to use terminal lugs on all wires and the screws should be torqued to 9.6 in. lbs.

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



E STOPS

In some applications additional emergency stops may be desired or necessary. The controller has terminals designed allowing the addition of multiple remote emergency stops. E-stops must be normally closed to work properly in this system. The e-stop circuit supplies power to the fuel solenoid and the starter circuit. Opening any switch in the series prevents the engine from cranking or from receiving fuel to run.



To wire additional emergency stop switches first remove the orange jumper between the two Emergency Stop terminal blocks. Failure to remove the jumper will prevent the remote switches from working properly. Add wires between the terminal block to the new switch(s). The switches must be wired in series for proper function. Test each e-stop after wiring to ensure they function properly.

SERIAL COMMUNICATION

DSE provides a series of remote accessories that can help provide useful information to operators. These accessories communicate over the DSE Net. Terminal blocks are wired to the distribution panel to aid in installation. Follow the instructions included with each accessory.

The generator controller can communicate with a variety of controls and monitoring systems, including RS232 and RS485. The ports are wired onto the back of the DSE7310. In order to finalize communication the program will need to be adjusted using the free DSE configuration software to enable the communication. Contact Winco service for a list of register values.

DC INTERCONNECTIONS TO THE ATS

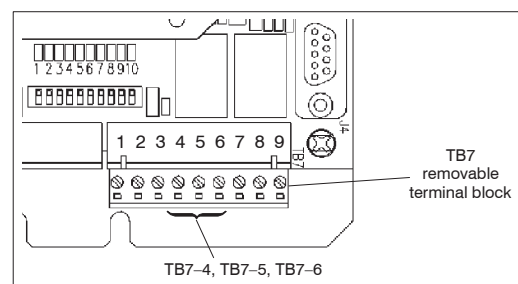
WARNING

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 185 UL SWITCH



TB7 Generator starting contact terminals

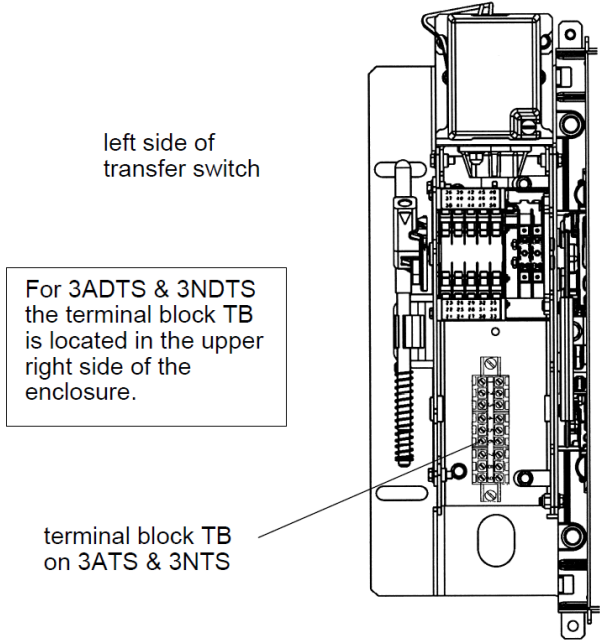
Table A. Generator Start Connections

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

ASCO 300 UL SWITCH

When Normal Source Fails	Terminals On Transfer Switch
Contact Closes	TB1 and TB2
Contact Opens	TB1 and TB3

Engine start and auxiliary circuit terminal block TB located on 3ATS & 3NTS transfer switch.



STARTING PROCEDURE

WARNING: PERSONAL INJURY

Improper maintenance, or failure to fix any problems during operation, could cause equipment damage and possible serious injury. Always inspect unit prior to operation.

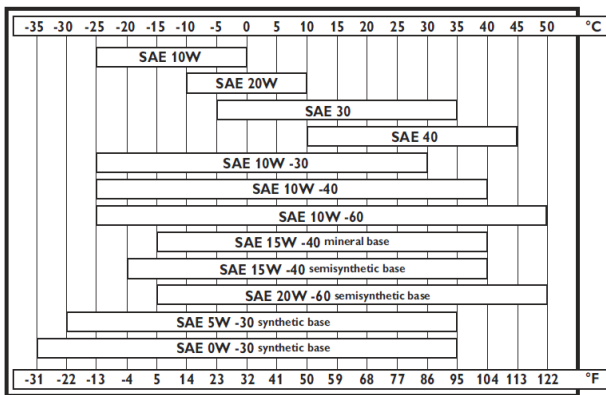
CAUTION

For the first 10 seconds of operation all of the oil, coolant, and electrical shutdowns are disabled. This is enough time to cause catastrophic damage to the equipment if the pre-start checklist is not properly completed and proper maintenance isn't consistently followed.

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.

Winco recommends our 5W-40 fully synthetic heavy duty engine oil to give you maximum cold weather protection while maintaining excellent performance in warmer weather. We have partnered with a national lubrication oil manufacturer to give you access to Winco private branded premium oil available at comparable prices to conventional oils. See your dealer for additional information.



CAUTION: PERSONAL INJURY

Only check oil when the engine is not running and is at a low temperature in order to avoid the risk of burns.

1. Remove the dipstick and ensure the oil level is between the Min and Max limits.
2. If it is difficult to assess the level of the oil, clean the dipstick using a clean cloth and then put it back into its seat. Remove the dipstick again and check the level.

3. If level is low, unscrew the oil cap and refill with suitable oil using the previous table.

COOLANT

Before starting the engine, check the coolant level in the radiator. If it is low, refer to Refilling Coolant in the Maintenance section of this manual. 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.

PRE-START CHECK LIST

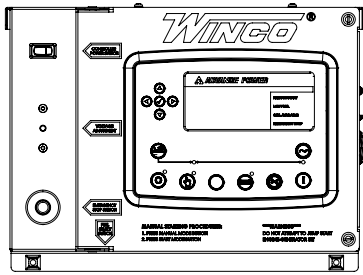
F-153 Pre-Start & Warranty Form was sent with your generator. This form must be filled out by an Authorized WINCO Service Center and submit it to our WINCO Service Department for your warranty to become valid. After completing the checklist, the engine-generator set is ready for initial start-up.

WARNING: EQUIPMENT DAMAGE

Before attempting to start this unit, complete your pre-start checklist and ensure the generator mainline circuit breaker (if installed) 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.

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.
	A small rocker switch is located on the underside of the engine control cabinet. On gaseous models, the engine timing is controlled by the ECU on the engine and you need to tell it what fuel you want to operate on; LP or NG. On diesel models, this switch has been disconnected and will do nothing.

PROTECTIONS

When an alarm is present, the common alarm LED if configured 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.

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.

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.

MANUAL MODE

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 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 DSE 7310 will start the cranking cycle (10 seconds on and 10 seconds off).

Note: 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".

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 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 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

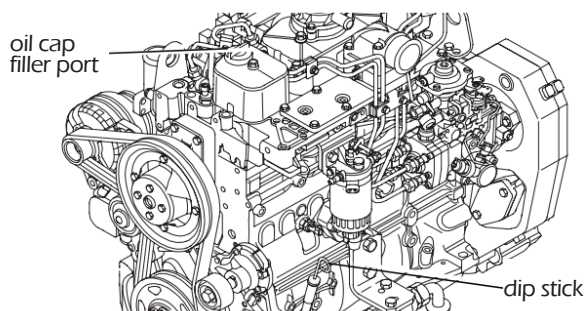
WARNING: PERSONAL INJURY/EQUIPMENT DAMAGE

Place controller in manual mode, e-stop applied first and disconnect the battery. If an auto start signal comes on during maintenance, it may result in injury, death and equipment damage.

WARNING: PERSONAL INJURY/EQUIPMENT DAMAGE

Incorrect service or part replacement can result in personal injury or death and/or equipment damage

CHANGING THE OIL



WINCO pipes the oil to drain to the outside for convenient maintenance.

Winco recommends our 5W-40 fully synthetic heavy duty engine oil to give you maximum cold weather protection while maintaining excellent performance in warmer weather. We have partnered with a national lubrication oil manufacturer to give you access to Winco private branded premium oil available at comparable prices to conventional oils. See your dealer for additional information.

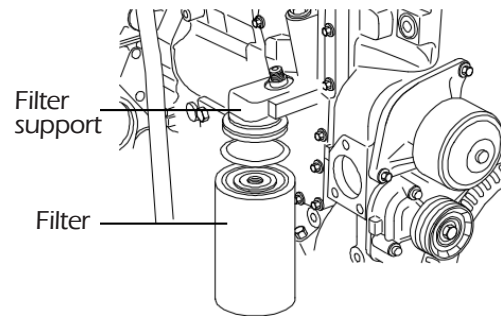
CAUTION: PERSONAL INJURY

Only change oil when the engine is not running and is at a low temperature in order to avoid the risk of burns.

1. Remove the oil cap to vent the engine crankcase and allow the oil to drain more easily.
2. WINCO has supplied a 1/2" NPT threaded fitting onto the skid frame to conveniently drain the oil.
3. Drain the oil into a drip pan or suitable container.
4. Once the oil has fully drained, close the valve.
5. Top-off through the filler port using lubricant oil with the suitable oil table in the LUBRICATION section of this manual.
6. Use the dip stick to ensure the level of oil does not exceed the "MAX" limit.
7. Insert the dipstick and close the lubricant oil cap.

8. Dispose of oil in accordance to local codes. DO NOT dispose or allow oil to seep into the ground or sewer systems, doing so will cause environmental damage.

CHANGING OIL FILTER



The filter must be replaced when the lubricant oil is changed.

Only use filters with a filtering degree equal to the original filter.

CAUTION: PERSONAL INJURY

Only change oil when the engine is not running and is at a low temperature in order to avoid the risk of burns.

1. Use an oil filter wrench to unscrew and remove the oil filter.
2. Lightly coat the gasket on the new oil filter with engine oil.
3. Install the new engine oil filter manually by screwing on new oil filter canister until sealing ring abuts the filter head and tighten a further 3/4 turn. Do NOT use a strap wrench or similar tool to tighten the filter canister.
4. Warm up the engine by running it for 5 minutes and check for any oil leaks.
5. Recheck the oil level using the dipstick.
6. Add engine oil to engine oil filler port as needed until the level is between the maximum and minimum lines shown on the dipstick.

CHANGE FUEL FILTER

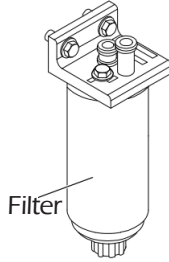
WARNING

Do not fill up the new filter before it is fitted to the support, to avoid inserting harmful impurities into the injection system and circuit.

CAUTION: PERSONAL INJURY

Only change fuel filter when the engine is not running and is at a low temperature in order to avoid the risk of burns.

1. Remove the filter by unscrewing it.
2. Damp the new filter seal with diesel or engine oil.
3. Hand screw the new filter into place until the seal gasket touches the support, then lock by a further 3/4 of a turn.



FILLING COOLANT

CAUTION: PERSONAL INJURY

Only fill coolant when the engine is not running and is at a low temperature in order to avoid the risk of burns.

CAUTION: EQUIPMENT DAMAGE

Never use a cold coolant mixture to top up the radiator of a hot engine if the coolant level is very low; this could cause serious engine damage.

1. Ensure the radiator plug located at the bottom of the radiator and the plug on the engine block are secure.
2. Remove the cap and slowly pour the coolant into the radiator until it is even with the lip of the filler port. Ensure no air bubbles develop.
3. Reinstall radiator cap.

CHANGING COOLANT

Engine coolant contaminated with rust or water scale reduces the cooling effect. Even when extended life engine coolant is properly mixed, the engine coolant gets contaminated as its ingredients deteriorate. Drain, flush and refill the cooling system with new coolant every 1200 hours or every 2 years, whichever comes first.

CAUTION: PERSONAL INJURY

Only proceed when the engine is not running and is at a low temperature in order to avoid the risk of burns.

1. Loosen the seal elements, remove the sleeves connecting the engine circuit to the heat exchanger and wait until it has emptied completely. When empty, repair the circuit making sure that the sleeves are

perfectly sealed

2. Refill the engine and the heat exchanger until complete top-off.
3. With the filler cap open, start the engine and keep it idling for nearly one minute. This phase facilitates the cooling liquid air bleed.
4. Stop the engine and top up again.
5. Dispose of coolant in accordance to local codes. DO NOT dispose or allow oil to seep into the ground or sewer systems, doing so will cause environmental damage.

CLEANING RADIATOR

The surfaces of the radiator come into contact with the outside air and can be subject to deposits and impurities. Clean in accordance to the maintenance schedule with compressed air or steam.

1. Check that the radiator air inlets are free from dirt (dust, mud, straw, etc.).
2. Clean them if necessary, using compressed air or steam.

CHANGING AIR FILTER

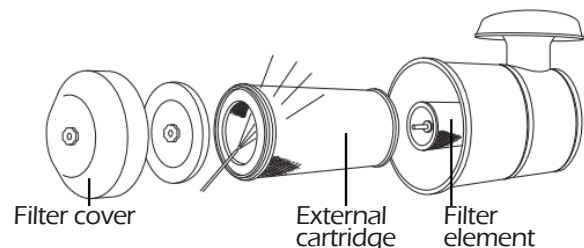
The engine performance is adversely affected when the air cleaner element is clogged with dust.

WARNING: EQUIPMENT DAMAGE

Never operate the engine with the air cleaner element removed. This may allow foreign material to enter the engine and damage it. Do NOT remove filter while engine is running.

WARNING: EQUIPMENT DAMAGE

Take care to ensure that the parts are reassembled correctly. Imperfect assembly might result in unfiltered air being sucked into the engine, causing serious damage.



1. Remove the filter cover after first unscrewing the locking handle.
2. Remove the external cartridge, after unfastening the second locking handle; during this operation, take care to ensure that no dust gets into the sleeve.
3. Check that there is no dirt. If there is, clean the filter element. Blow dry compressed air through the filter

element, from the inside outward (maximum pressure 200 kPa). Do not use detergents; do not use diesel.

4. Replace the filter if any breakages or tears are found.
5. Reassemble by repeating the above operations in reverse order
6. Reinstall the element into the air cleaner case.

ADJUSTING THE GOVERNOR

Never attempt to adjust the low or high idle speed limit screw. This may impair the safety and performance of the machine and shorten its life. If adjustment is ever required, contact an authorized service center.

1. Check that the governor lever (1) makes firm contact with the high idle stop (2) and the low idle speed limit screw (3) when the engine speed control is in the full speed or low idle speed positions.
2. If the governor lever does not make proper contact with the high idle stop or the low idle speed limit screw, adjust the throttle cable or linkage as necessary.

WARNING: EQUIPMENT DAMAGE

Do not force the throttle cable or linkage to move. This may damage the governor lever, the throttle cable or linkage and cause irregular operation of the engine speed control.

STORAGE

PREPARING THE ENGINE FOR A LONG PERIOD OF INACTIVITY

In the case of a planned period of inactivity that lasts longer than one month, to prevent the interior parts of the engine and some components of the injection system from oxidizing, prepare the engine as follows:

One Month

1. While the engine is running, treat upper cylinders by spraying engine fogging agent into the air intake for about two minutes. Open throttle for short bursts of speed, shut off engine and allow it to come to a stop while continuing to spray into air intake.
2. If engine is less transmission, spray flywheel and ring gear with mixture of one part recommended engine oil, and one part Stoddard Solvent or equivalent.
3. Check coolant protection. Store indoors in dry area.

Infinite period

In order to prevent oxidation of the internal parts of the engine and of certain components in the injection system, when the engine is expected to be inoperative for periods of more than two months, the following operations must be carried out in preparation for this:

1. Drain the lubricant from the sump, after first warming

up the engine.

2. Fill the engine with protective oil type 30/M (or alternatively oil that complies with MIL 2160B type 2 specifications), up to the "minimum" level indicated on the dipstick. Start the engine and keep it running for approximately 5 minutes.
3. Drain the fuel from the injection circuit, from the filter and from the injection pump pipes.
4. Connect the fuel circuit to a tank containing CFB (ISO 4113) protective fluid, and feed in the fluid by putting the circuit under pressure and running the engine for approximately 2 minutes, after first disabling the injection system. This operation can be performed by polarizing terminal 50 of the starter motor with a positive voltage equivalent to the rated voltage of the system, using a conductor provided for that purpose.
5. Nebulise approximately – g of 30/M protective oil (10 g per liter displacement) into the turbocharger suction inlet, during the pressurized filling operation described in the previous point.
6. Close all the suction, delivery, ventilation and bleeder openings in the engine with suitable plugs, or seal them with adhesive tape.
7. Drain the residual 30/M protective oil from the sump. This oil can be used again for a further 2 preparation operations.
8. Attach signs reading "ENGINE WITHOUT OIL" to the engine and to the on-board control panel.
9. Drain the coolant, if it has not been mixed with suitable antifreeze and corrosion inhibitors, and affix a sign to indicate the fact. In the event of prolonged inactivity, the operations described must be repeated every 6 months, following the procedure given below:
 - A) drain the 30/M protective oil from the sump;
 - B) repeat the operations described from point 2 to point 7.

Should you intend to protect external parts of the engine, proceed by spraying OVER 19 AR protective liquid on unpainted metal parts, such as the flywheel, pulleys and the like, avoiding belts, connector cables and electrical equipment.

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 Pre-Filter	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.

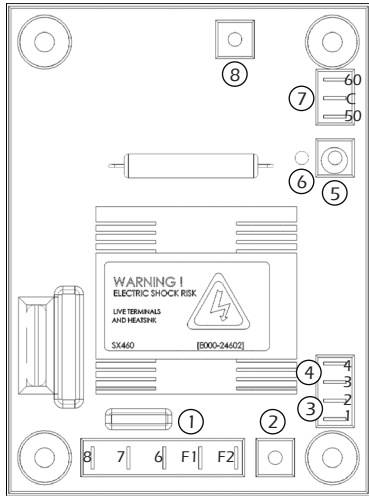
TROUBLESHOOTING TABLE

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

AVR WIRING

SX460 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.



1. Generator AC sensing connection (6,7, & 8)
Field voltage DC (F1 & F2)
2. Voltage adjustment
3. External voltage treatment 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 - link 3 & 4
5. Under Frequency Roll Off adjustment
6. Under Frequency Roll Off indication light
7. Frequency selection:
50 Hz operation - link C to 50
60 Hz operation - link C to 60
8. Stability control

WIRING SIZE TABLE

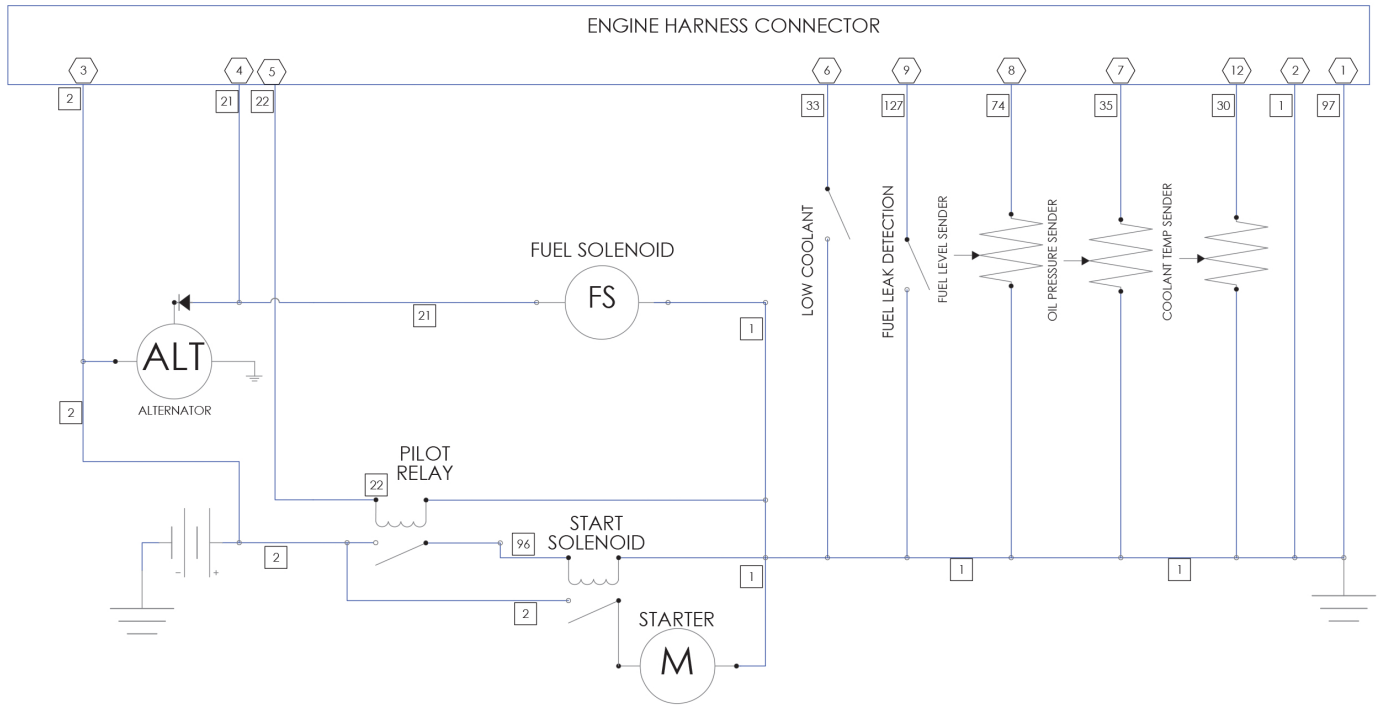
The table below is based on Table 310.15 (B) (16) in the National Electric Code 2014 edition. Allowable ampacity of insulated conductors rated 0 through 2000V, 75°C through 90°C. Not more than three current-carrying conductors in Raceway, Cable, or Earth (direct buried). Adjust for 40°C (104°F) ambient 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
50	55	8	40	45
65	75	6	50	55
85	95	4	65	75
100	115	3	75	85
115	130	2	90	100
130	145	1	100	115
150	170	1/0	120	135
175	195	2/0	135	150
200	225	3/0	155	175
230	260	4/0	180	205
255	290	250	205	230
285	320	300	230	260
310	350	350	250	280
335	380	400	270	305
380	430	500	310	350
420	475	600	340	385
460	520	700	375	425
475	535	750	385	435
490	555	800	395	445
520	585	900	425	480
545	615	1000	445	500
590	665	1250	485	545
625	705	1500	520	585
650	735	1750	545	615
655	750	2000	560	630

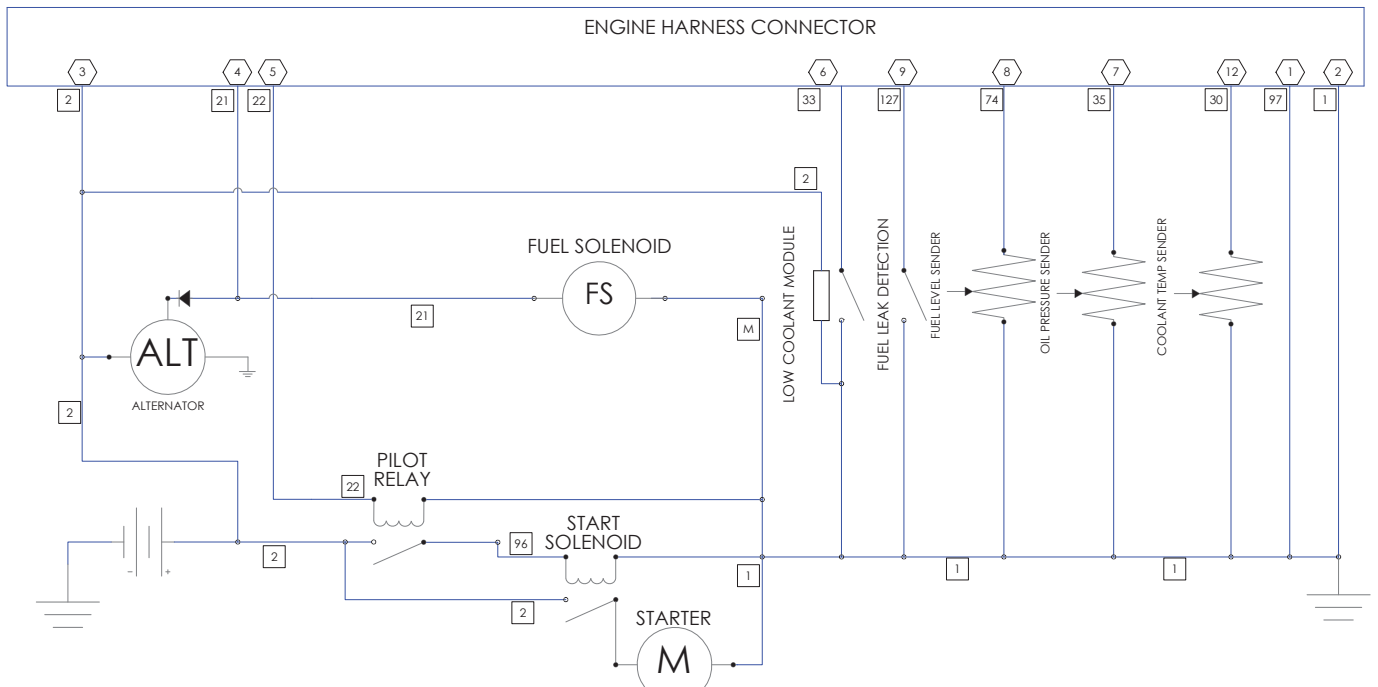
For additional information, see table 310.15 of the National Electric Code.

ENGINE HARNESS SCHEMATICS

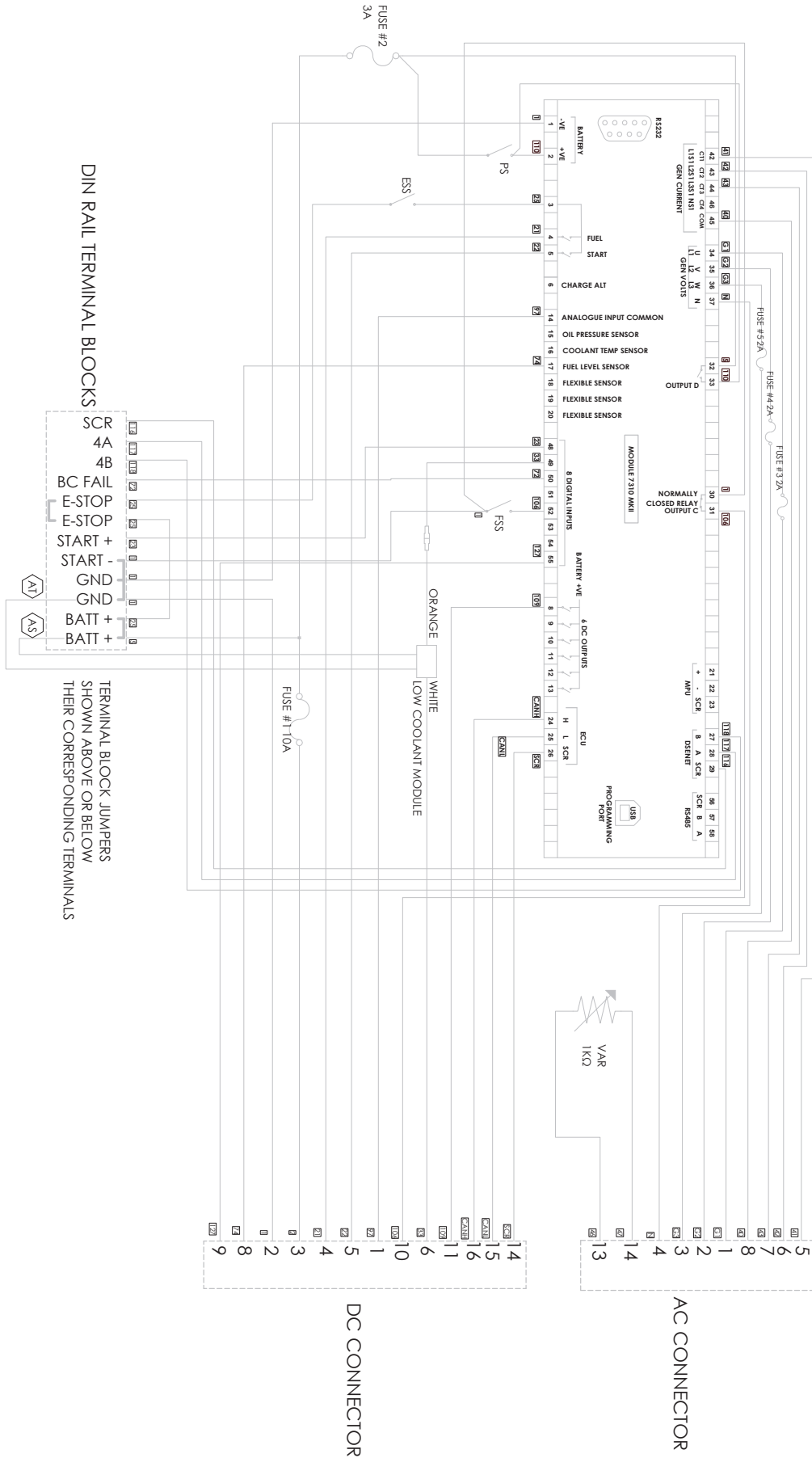
DR35, DR45 & DR65



DR90



DSE 7310 MKII WIRING DIAGRAM



DIN RAIL TERMINAL BLOCKS

- SCR
- 4A
- 4B
- BC FAIL
- F-STOP
- E-STOP
- START +
- START -
- GND
- GND
- BATT +
- BATT +

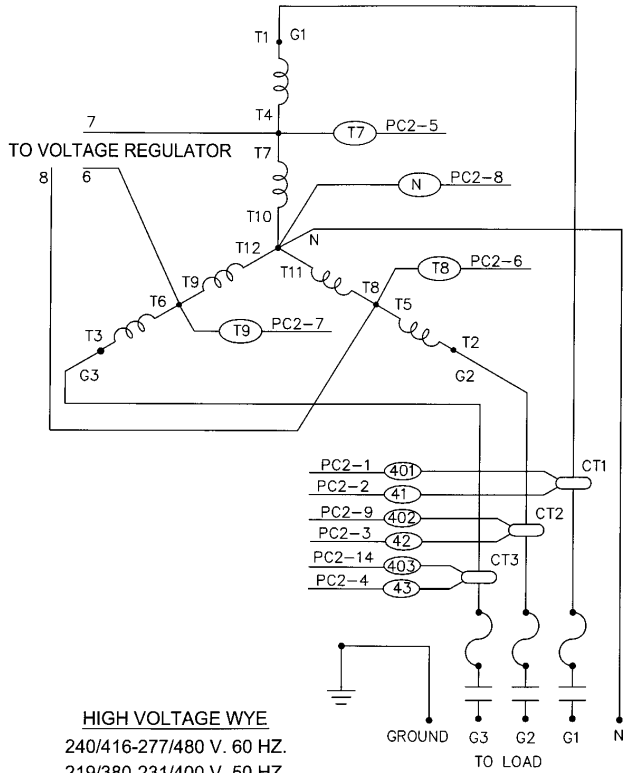
TERMINAL BLOCK JUMPERS SHOWN ABOVE OR BELOW THEIR CORRESPONDING TERMINALS

DC CONNECTOR

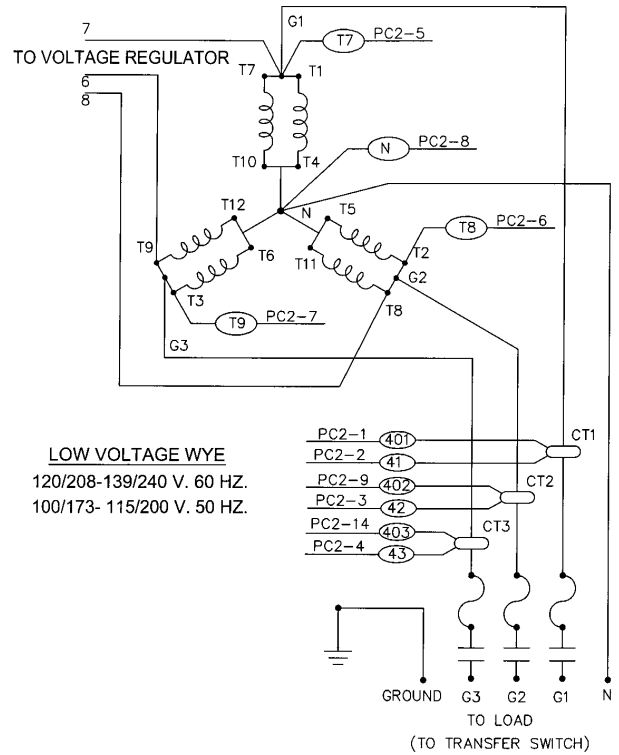
AC CONNECTOR

AC WIRING

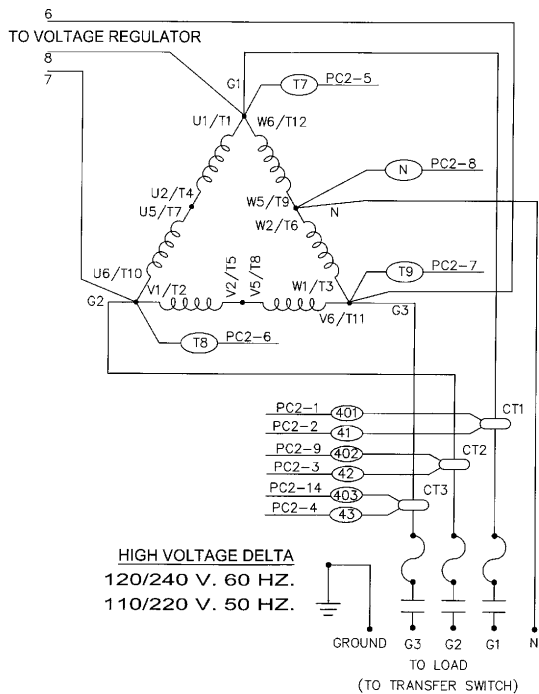
THREE PHASE - HIGH WYE 277/480V



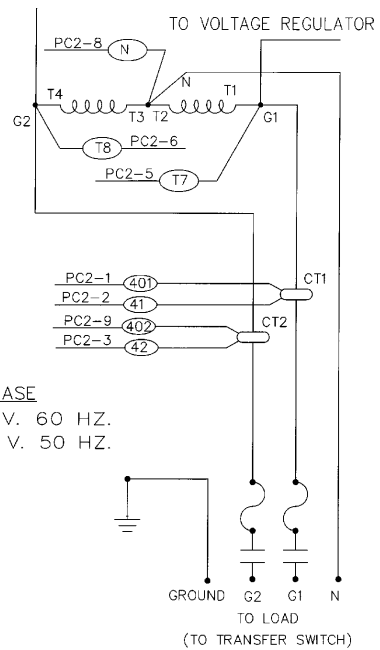
THREE PHASE - LOW WYE 120/208V



THREE PHASE DELTA 120/240V



SINGLE PHASE 120/240V



WINCO Inc. has been engineering and manufacturing high quality generators since 1927. WINCO Inc. warrants to the original owner that the purchased product is free from defects in materials and/or workmanship for the period of time outlined below. If the product should prove defective within the time period outlined below, it will be repaired, adjusted or replaced at the option of WINCO Inc., provided that the product, upon inspection by an authorized WINCO Inc. service center, has been found to have been properly installed, maintained and operated in accordance with WINCO Inc.'s Installation and Operating Manuals, engine manufacturer installation and operation guidelines, and National and local code. This limited warranty is not valid or enforceable unless:

1. All supporting product maintenance records are kept on file and made available upon request from WINCO Inc.
2. A copy of the WINCO Inc. Start-up Completion and Warranty Validation Checklist is properly and completely filled out and returned to WINCO Inc. within 30 days of start-up.
3. The product is routinely exercised in accordance with operating instructions. This warranty does not apply to malfunctions caused by physical damage, misuse, improper installation, repair or service by unauthorized persons; or normal wear and tear. The warranty is not assignable.

Standby WINCO Inc. Product Warranty Period:

- Engine generator set: Parts and Labor for two (2) years from the date of factory invoice or 2,000 hours (whichever occurs first).
- Accessories (installed on the product or shipped loose): Parts and Labor for one (1) year from the date of factory invoice or 2,000 hours (whichever occurs first).

The start of the warranty period can be adjusted to the date of unit start-up (limited up to 180 days from invoice date) provided that the following information is provided to WINCO Inc. at the time of start-up:

1. A copy of the WINCO Inc. Start-up Completion and Warranty Validation Checklist is properly and completely filled out and returned to WINCO Inc. within 30 days of start-up.
2. Some engines may require revalidation after long-term storage. The engine revalidation process if included in the manual must be followed.

To obtain warranty service:

Contact your nearest authorized WINCO Inc. service center. For assistance in locating your nearest authorized service center, contact WINCO Inc.'s Service Department.

Warranty service may be performed by an authorized WINCO Inc. service center only. Service work performed by unauthorized persons will void all warranties.

WINCO Inc. shall not be liable for any claim in an amount greater than the purchase price of the product. In no event shall WINCO Inc. be held liable for any special, indirect, consequential or liquidated damages.

WINCO Inc. shall not be liable for any claim that requires replacement of engine, part, or component of the product that is no longer manufactured or available. Additionally, WINCO Inc. will not be liable for any engine replacement that may require an emissions tier-level change.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE DESCRIBED HEREIN. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, OR OTHERWISE CREATED UNDER THE UNIFORM COMMERCIAL CODE, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, OR WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

The following items and/or circumstances are excluded from this limited warranty:

- Engine starting batteries: The battery manufacturers' warranty applies. Consult your local battery supplier for warranty service.
- Fuel system and/or governing system adjustments performed during or after start-up.
- Normal maintenance items: Consumable items such as belts, filters and hoses.
- Damage caused by over-loading the generator and failure to adequately provide over-load protection.
- LP/NG fuel adjustments or conversion from one fuel to another.
- Any repeat or shop come-back repairs resulting from poor service work or improper diagnosis and testing. Replacement of parts as a trail-and-error method of diagnosis will not be considered for warranty.
- Adjustments and tune-ups performed during start-up or thereafter.
- Loose connections (electrical and mechanical) not found during start-up.
- All fluid level related items including low coolant not found during start-up or checked during regular maintenance intervals.
- Equipment modifications made without the written consent of WINCO Inc. will void all warranties.
- Shipping damage of any type. All equipment is shipped F.O.B. factory and risk of loss transfers to the carrier once loaded for shipment. It is the responsibility of the receiving party to sign for the receipt of, and note any shipping damage to the equipment. Freight damage claim filing is the responsibility of the receiving party. In the rare event that damage occurs during shipment, WINCO Inc. will not warrant any damage to the unit resulting from packaging material.
- Any special access fees, requirements or after hours scheduling to gain access to the equipment for warranty service purposes.
- Rental generators used while warranty work is being performed.
- Damages caused by acts of nature, such as lightning, wind, flood, wild fires, or earthquake.
- Any damage due to situations beyond the control of the manufacturing and/or workmanship of the product.
- Use of non-protected steel enclosure within 25 miles of the coast.
- Damage caused by improper installation or failure to provide adequate ventilation.
- Misapplication of the equipment such as usage outside the original design parameters as stated on the nameplate of the equipment.
- Equipment purchased at the standby rating that is being used in a prime power application(s).
- Diesel engine "Wet Stacking" due to lightly loaded diesel engines.
- Travel time or service calls unless given written authorization by WINCO Inc.