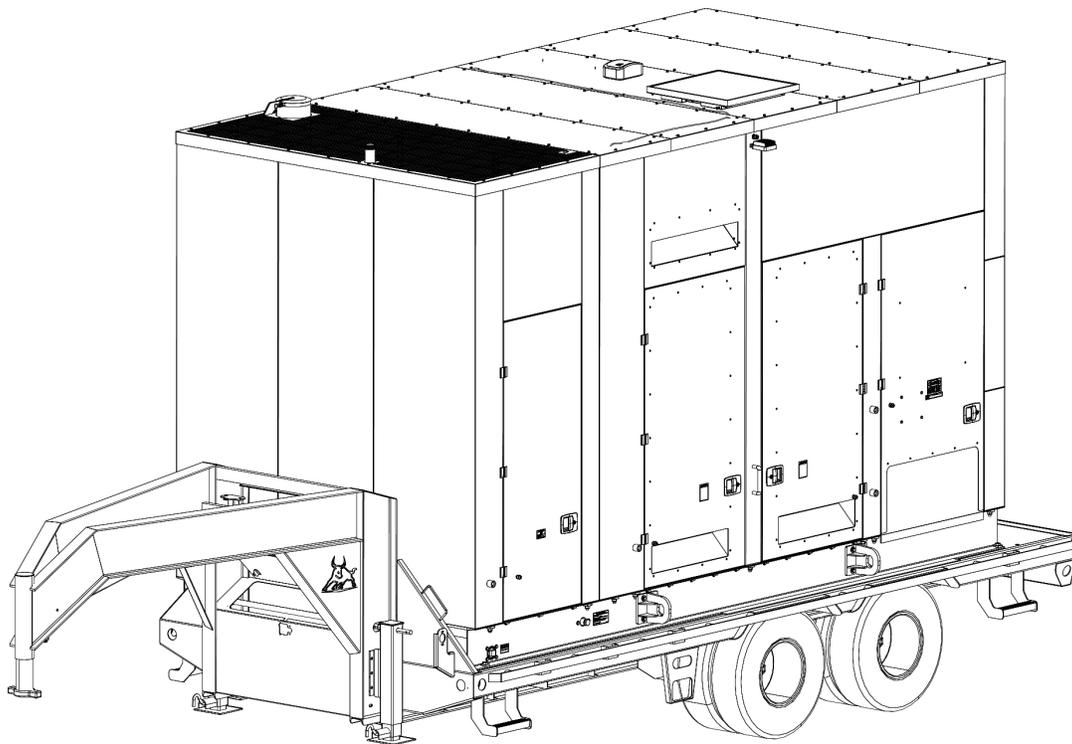




# GRP460P4

## 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

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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

## CALIFORNIA PROPOSITION 65

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](http://www.P65Warning.ca.gov).

## WARNING: 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.

## WARNING: 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.

## NOTICE

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.

## NOTICE

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.

## 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.

## WARNING

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 room (i.e. through windows, walls, floors).

## WARNING: 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.

# SPECIFICATIONS

GRP460P4

LP GAS PRIME				
Wattage	250,000	250,000	250,000	250,000
Volts	120/208	120/240	277/480	346/600
kvA	312.5	312.5	312.5	312.5
Phase	Three	Three	Three	Three
Amps	868	750	375	300
CB Size	-	-	-	-
Hertz	60	60	60	60

LP GAS STANDBY				
Wattage	300,000	300,000	300,000	300,000
Volts	120/208	120/240	277/480	346/600
kvA	375	375	375	375
Phase	Three	Three	Three	Three
Amps	1,041	900	451	361
CB Size	-	-	-	-
Hertz	60	60	60	60

NATURAL GAS PRIME				
Wattage	390,000	390,000	390,000	390,000
Volts	120/208	120/240	277/480	346/600
kvA	462.5	462.5	462.5	462.5
Phase	Three	Three	Three	Three
Amps	1,354	1,171	586	469
CB Size	-	-	-	-
Hertz	60	60	60	60

NATURAL GAS STANDBY				
Wattage	400,000	400,000	440,000	440,000
Volts	120/208	120/240	277/480	346/600
kvA	500.0	500.0	550.0	550.0
Phase	Three	Three	Three	Three
Amps	1,388	1,201	661	529
CB Size	-	-	-	-
Hertz	60	60	60	60

ENGINE	
Model	PSI 22L
Starting System	24 Volt
Muffler	Standard
Fuel Consumption	
LP	
100%	45 GAL/HR - 4,154,000 BTU/HR
50%	25 GAL/HR - 2,287,000 BTU/HR
NG	
100%	5,033 FT <sup>3</sup> /HR - 5,033,000 BTU/HR
50%	3,330 FT <sup>3</sup> /HR - 3,300,000 BTU/HR

## Generator Testing Resistance

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

Model	Stamford S4L1D-G41
Winding Group	311
Resistances:	
Rotor	1.04 Ohms @22°C
Stator (L-L)	0.051 Ohms Per Ph @ 22°C
Exciter Rotor (L-L)	0.118 Ohms Per Ph @ 22°C
Exciter Stator (L-L)	14.6 Ohms @ 22°C
Aux Winding	2.382 Ohms @ 22°C
Voltage Regulator (L-L)	MX341

# 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.

## PRODUCT DESCRIPTION

The Gaseous Redi-Power generator is a flexible system available in configurations for stationary, mobile, standby, prime and well head applications. This manual will include a description of the different features and configurations available.

### ENGINE/GENERATOR

The engine generator set consists of a PSI 21.9L, industrial, 12 cylinder, liquid cooled engine equipped to run on liquid propane and natural gas. The engine operates at 1800 rpm and frequency regulation is maintained by the electronic governor within 0.5 cycles variation, from no load to rated load. The generator is a single bearing, direct drive, rotating field design. The generator is connected to the engine flywheel via flexible drive disks. The engine generator is available mounted in a weather proof enclosure for outside installation. Connection boxes are provided to all customer connections (both AC output and DC control). 2 customer supplied 8D batteries are required to complete the installation. Engine operation is controlled by a Basler 2020HD controller engine mounted in the engine generator enclosure.

### NOTICE

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

# 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 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.

### NOTICE: EQUIPMENT DAMAGE

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

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. Start-up and warranty validation form.
  - d. Battery hold-down brackets & hardware.
  - e. Unit components or accessory items shipped loose for on-site installation.
  - f. Optional accessories.
3. Remove main frame hold-down bolts.
4. Unit can now be lifted from shipping rails.

# INSTALLATION

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The max ambient temperature is 122°F. For derating information, see specification sheet. This unit should be installed in a well ventilated area, ensuring the exhaust air cannot be recirculated back into the engine.

## WARNING

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.

These engine generator sets are designed to be mounted on a pad where there is proper ventilation. The transfer switch is mounted next to your electrical entrance or distribution panel inside or outside the building. Consult a qualified, licensed electrician or contractor to install and wire the transfer switch. The installation must comply with all national, state and local codes. Before beginning the installation process check the rating of the generator set and its transfer switch rating. Be certain they can handle the intended load and are compatible with the entrance voltage, phase and current ratings. Plans for installation should be prepared with proper attention to mechanical and electrical engineering detail to assure a satisfactory system installation. The information in this manual is offered only as a guide to finalizing your installation plans.

## ENGINE-GENERATOR SET MOUNTING

### WARNING: PERSONAL INJURY

The enclosures on these units can become very hot adjacent to the exhaust areas. Special care must be taken when installing these units to insure that the risk of contact by people is minimized.

The unit's main frame should be bolted to a pad that meets local code. Various materials, including concrete and composites, are acceptable as long as they are structurally sound supporting the weight of the unit and preventing movement during operation. The mounting holes on the base of this unit is 0.875" in diameter. The engine-generator is mounted on a sub-frame which is isolated with special shock mounts on the main frame. This allows the engine-generator to vibrate without affecting the control panel on the main frame.

Do not install any shock mounts between the base frame and the pad. Engine vibration will be transmitted to the control panel causing erroneous start/stop cycles and premature control failure.

These units should be mounted a minimum of 36" from a structure. This will allow for ample room to maintain and work on the generator set.

Units must be installed in accordance with all local, state, and national codes. Consult your local agency for specific requirements.

# 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.

To connect the fuel line to the generator set you will connect your incoming fuel line to the fitting located on the left side of the engine-generator set. Fitting sizes are 1" NPT for LP and 2" NPT for utility NG/Wellhead Gas. For all vapor fuel systems the fuel delivery pressure of the fuel to the fuel solenoid on the unit must be four to six ounces per square inch or 7 to 11 inches W.C. (water column). These fuel pressures are critical; failure to provide the proper pressure can cause many problems including failure to start, inability to produce full power, or damage to the equipment.

These generators have been tested with both natural gas and LP at the factory. Before starting the engine you must verify it is configured for the proper fuel. See additional information in the NG/LP conversion section.

## INSTALLING THE FUEL LINE

**NOTICE:** The engine generator sets are properly adjusted before they leave the factory. The electronic control panel will indicate if the LP mode is active

**NATURAL GAS or LP VAPOR PIPE SIZE**  
Size of pipe normally required for generators operating on natural gas or LP vapor. Unit location will determine the size of fuel line that is required to supply the engine with a constant fuel pressure and volume.

## LIQUID PROPANE VAPOR (LP)

Consult your local fuel supplier for your exact requirements. The appropriate line size from the following table is then installed from the low pressure regulator to the generator set.

Fuel Type	Size of pipe
LP	1" pipe
NG/Wellhead Gas	2" pipe

## LP TANK SIZING

Tank size is based off of 75% load, tank level has more than 20% capacity and tank is dedicated for the generator supply.

Tank Temperature	Tank Size
32° F (0° C)	3000 Gallons
0° F (18° C)	6000 Gallons
-10° F (-29° C)	12000 Gallons

## LIQUID WITHDRAWAL SYSTEMS

When installing a unit equipped with the LP liquid withdrawal, a primary regulator is not required on the supply tank. The supply line is connected to a liquid withdrawal valve on the supply tank and runs directly to the fuel lock strainer mounted on the engine generator set. Normally a 3/8 to 1/2 inch copper line is acceptable for this type of fuel installation. You must be sure that the valve you have connected to on the supply tank is in fact a liquid supply valve and has a drop tube inside the tank that is pulling fuel from the bottom of the supply tank. Before starting the unit, you must confirm that you have a good liquid supply at the unit. Engine generator sets equipped for liquid withdrawal will not run properly when supplied with vapor fuel.

Models that are designed for mobile applications and equipped with liquid withdrawal systems have a port plumbed to the outside of the base frame. This connection is designed for an LP liquid withdrawal supply. When disconnecting the LP liquid it is essential to start the engine and run as much LP out of the lines as possible. If the lines are left full temperature changes can dramatically increase the pressure in the system. The unit is equipped with an emergency pressure relief valve. This valve has a cap to protect it from ice and snow. It should be replaced if used.

## NATURAL GAS (NG)

The primary regulator (fuel meter) should deliver the correct volume and pressure to the generator set. This regulator must be sized to deliver the required BTU's to the generator set and all other appliances in the building.

## WARNING: PERSONAL DANGER

Do not use galvanized pipe in fuel line runs. The galvanized coating can become eroded and flake off, causing possible obstructions in the regulator or fuel valve. The results could range from inoperative engine to hazardous fuel leaks.

## NOTICE

Be careful when sealing gas joints. Excessive sealing compound can be drawn into the solenoid, regulator or carburetor causing an engine malfunction.

## FUEL PRESSURE

Correct fuel pressure cannot be stressed enough. The most common cause for inoperative systems is an inadequate or incorrect fuel pressure. Performance of the engine is in direct relation to the correctness of the fuel system. Utility NG must not exceed 11" of Water Column. All Fuel runs should be installed by a licensed fuel supplier. Replacement Fuel System Parts should only be obtained from WINCO.

## NG/LP FUEL CONVERSION

This generator set was tested on both LP and NG at the factory. Ensure proper fuel configuration before operating.

## NOTICE: EQUIPMENT DAMAGE

Do not make any fuel adjustments or governor adjustments until all pressure readings are in compliance with specification.

These engine/generator sets are easy to convert between LP or NG. As the engine timing is controlled by the ECU on the engine you only need to tell it what fuel you want to operate on.

## AUTOMATIC FUEL CHANGEOVER SYSTEM

Some models are equipped with automatic fuel change over systems. In their primary configuration, the engine defaults to natural gas fuel. A pressure switch monitors fuel pressure and if the natural gas supply is insufficient automatically switches the NG valves off, opens the LP fuel valves and signals the engine ECU to operate in LP mode. A delay timer is set in the controller to prevent rapid transfer back to natural gas. Once the time delay is cleared and natural gas fuel pressure is restored, the engine will automatically switch back to natural gas. The time delay can be adjusted in the controller programming.

## 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 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 do so will cause excessive engine wear and shorten its useful life.

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.

## OIL LEVELER KIT

This unit may be equipped with an oil leveling system. It consists of a reserve oil tank and a leveling valve. This system was designed to gradually replace consumed oil. It works on a gravity feed and level valve. The valve is set to add oil only during engine operation. Upon start up, the oil level in the sump drops. If the valve is set to the resting oil level, it will overfill the system during operation.

## WELLHEAD GAS

Some models are equipped with coalescing filters for applications running on wellhead gas. These systems require input pressures supply of 40-100 psi. The filter removes water and impurities.

The filter regulates the output pressure and comes from the factory set at 50 PSI. The pressure should NEVER be set above 50 PSI. The outlet pressure must be greater than 30 PSI for the system to function properly.

The system includes a pneumatic float switch. When the liquid level inside the scrubber reaches a set point the valve opens and allows the water to drain. This valve uses freeze-less technology and will work as long as the liquid inside the scrubber is not frozen.

The generator included a drain port plumbed to the outside frame. All drained liquids must be collected into storage and disposal tanks in accordance with all environment and safety regulations. An electric float switch is also included on this generator. If excessive liquid build up, it will signal the controller to shut down the system to prevent damage to the engine.

### WARNING

Wellhead gas models are equipped with utility-grade natural gas ports after the filter. Care must be taken to ensure that only utility-grade fuel are connected to this port. It is also necessary to isolate the wellhead demand regulator. The regulator vents off excess pressure. If utility pressure exceeds the regulator pressure it will continuously vent fuel. This may result in injury or death.

### WARNING

Utility NG fuel pressure should not exceed 11" WC.

# INSTALLING THE BATTERY

## NOTICE

In the following battery installation procedure, check to be sure the selector switch remains in the 'off' position. This should be your last step before initial start-up.

A customer supplied twelve-volt battery is required to complete the installation. Installation of the highest CCA rated battery, within the correct BCI group (size), will increase cold weather starting performance. Gel batteries should not be used with the battery tender installed in the generator enclosure.

Voltage	BCI Group	MIN. CCA Rating
24	8D	1125

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

## WARNING: EXPLOSIVE FIRE RISK

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

## WARNING: PERSONAL DANGER

NEVER dispose of 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 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 and damage electronic components.

## NOTICE

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

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 immediately and thoroughly with water. 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 biocarbonate of soda (baking soda) to one gallon of water. The biocarbonate of soda 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.

## 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. When refilling the battery with water, use only distilled water. Tap water will shorten the service life of the battery.

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

## BATTERY CHARGING

This generator is equipped with an engine mounted alternator that will maintain the battery during operation. It is not necessary to have the battery charger circuit on the emergency distribution circuit.

## NOTICE: EQUIPMENT DAMAGE

Always connect the positive cable first and the negative cable last. When disconnecting, remove the negative cable first and the positive cable last. Failure to connect and disconnect in the proper sequence can cause equipment damage.

Observe polarities: connect the positive (+) battery terminal to the (+) cable from the engine starter; the negative (-) battery terminal is connected to the negative cable (ground) from the engine generator assembly. All connections must be clean and tight. Check the electrolyte (fluid) in the battery periodically to be sure it is above the plates. Never allow the battery to remain in a discharge condition.

## NOTICE: EQUIPMENT DAMAGE

NEVER JUMP START these units. Doing so will destroy the engine control module, rendering the unit non-operational. Remove and fully recharge the battery before attempting to start.

## **BATTERY CHARGER & BLOCK HEATER**

### **BATTERY CHARGER**

A 5 amp, SENS, electronic battery charger is provided standard on this unit. This charger has three rates of charging. During the first mode, known as Analyze Mode, the charging current is limited to 4 Amps at a voltage of up to 14/27 VDC. If there are any errors, it will trip a battery specific red fault LED, or if there aren't any errors, the red Charge LED will be solid red. Since, the battery system is 24V, the Precharge Mode, or Stage 2, will bypass to Stage 3. During Stage 3, known as the Constant Current Charge Mode, the charger holds the battery voltage at approximately 14/27 VDC. Stage 4, the Constant Voltage Conditioning Stage, each battery is being conditioned at 14V for up to three hours until the battery is fully charged. When complete, the charger will enter Stage 5, the Energy Saver Auto Maintain Mode. Each battery is being monitored while the charger is in standby mode, consuming little to no power until voltage drops below fully charged. The charger will turn on and auto maintain in a fully charged state.

### **BLOCK HEATER**

The block heater on this unit is a 3000 watt heater and can use the same 20 Amp GFCI fused circuit. The circuit will terminate on the 240 Volt terminal block mount in the customer connection cabinet. The engine block heater installed on this unit should also be plugged into this receptacle. The block heater is thermostatically controlled when plugged in will maintain the engine coolant temperature between 100 and 120 degrees F.

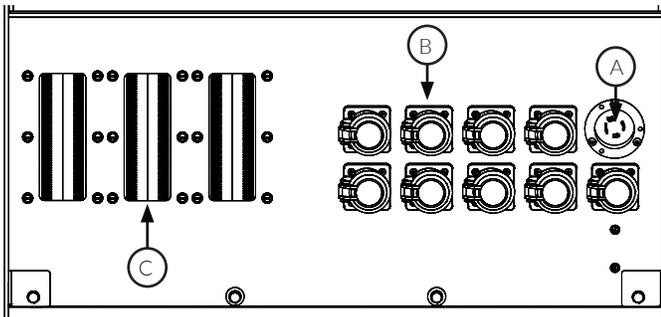
# AC ELECTRICAL CONNECTIONS

NOTICE: CLASS 1 WIRING METHODS ARE TO BE USED FOR ALL FIELD WIRING CONNECTIONS TO TERMINAL 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

A mainline circuit breaker has been provided inside the generator housing. During all wiring installation, make sure the breaker is in the off position and the generator operators switch is in the off position.



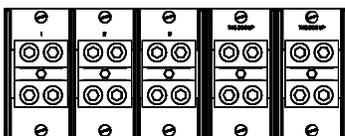
## WARNING: PERSONAL DANGER

Verify the main line circuit breaker and battery are disconnected before making connections. Failure could result in electrocution, which can result in serious injury or death.

A. 125/250V 20 AMP 3-Wire Shore Power Plug: NEMA Spec L14-20. This panel mounted plug is designed to plug directly in a standard 20 amp receptacle on an extension cord. The plug when connected will provide power to the block heater and the battery trickle charger mounted inside the generator enclosure. This can be used when the set is used in a standby application to keep the engine warm and the battery charged or in your rental yard to keep the battery charged up. This receptacle is to be powered by a GFCI circuit and installed in accordance with the United States National Electric Code.

B. Camlock Connections These Cam-Locks are connected to the full load terminal blocks and are capable of providing full generator output in all voltage configurations.

C. Brush strip inlets have been specifically provided for you to route your full power leads through to the output lugs. The routing holes were provided to insure that no small child or curious adult can reach inside and come into contact with the main output lugs with the unit running.



NOTE: The neutral is bonded to ground. This connection can be found in the circuit breaker panel. The table below gives you the circuit breaker size and lug wire sizes (see the actual breaker for additional information and restrictions).

For information on wire sizing refer to tables 310-16 & 310-17 of the National Electrical Code ANSI/NFPA 70.

Ground Lug, These ground lugs are bonded to ground and are provided for you to connect your ground wire. The 1/0 wire connected between the ground and neutral camlock posts is located in the back of the camlock box.

## 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 to neutral). The generator normally carries the high voltage on the G2 lead.

The load current carrying wires (L) and (T) must be sized to handle the maximum load current without excessive voltage drop. By code, the wire must be heavy enough to handle the full current rating of the mainline circuit breaker (or fuse) in the entrance (or sub-panel) protecting the contactor switch.

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

## GROUNDING

A grounding lug has been provided on the engine generator set. Check your local codes for proper grounding requirements.

## MOUNTING THE ATS

See the ASCO installation manual for additional details on proper wiring of the Automatic Transfer Switch.

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

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

If only specific circuits are to be powered under emergency power failure conditions, an additional distribution panel designated "emergency distribution panel" must be installed. All selected emergency circuits are removed from main distribution panels and installed in the emergency distribution panel. The A.T.S. is then installed between the

main panel and the emergency distribution panel. Suggested circuits: freezer, refrigerator, furnace, emergency lights, sump pump, emergency outlet circuits, etc. Total running load must not exceed generator rating.

#### **WARNING**

A service disconnect must be installed in front of the ATS panel if the ATS is not service entrance rated. This will allow you to test the generator under load. Should you ever have to work on the switch, you will be able to disconnect the power and work on the switch cold without having the power company pull your meter.

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

If only specific circuits are to be powered under emergency power failure conditions, an additional distribution panel designated "emergency distribution panel" must be installed. All selected emergency circuits are removed from main distribution panels and reinstalled in 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.

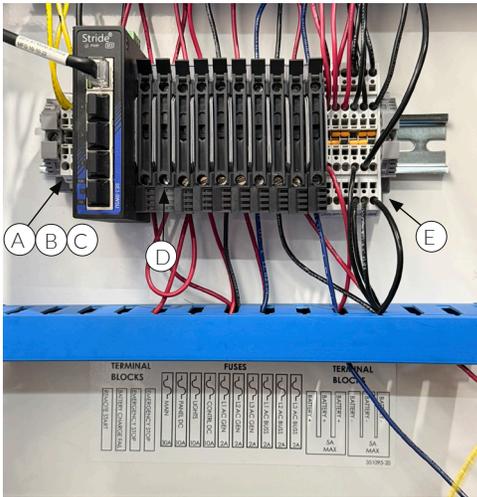
# DC ELECTRICAL INTERCONNECTION

## CAUTION

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

NOTE: There are various DC connectors on the engine that have nothing connected to them. This was done intentionally, the connectors are for END OF THE LINE TESTING and other diagnostic tests. They are not used during normal operations and can just be ignored.

All DC connections are completed on the terminal strip just below the engine control cabinet.



A - Customer Remote Start CONNECTIONS TERMINALS. The two remote start leads from the Automatic Transfer Switch are connected to the two terminals marked 1 & 23. The wire in terminal labeled #1 is Battery Negative/ Ground and the wire in the terminal labeled #23 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.

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 DGC 2020HD

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.

E - Battery Positive and Ground ( battery negative). These terminals are dedicated for any accessory that will be installed. There is a maximum of 7 Amps combined.

## DC INTERCONNECTIONS TO ATS

Two control wires are required between the ATS panel and the generator control terminal box. Depending on the distance, 14 and 16 gauge stranded wire should be used. These wires should be labeled S1 and S23.

## WARNING

Be sure engine generator is in the OFF position before you make any DC interconnections.

## ASCO 300 UL SWITCH

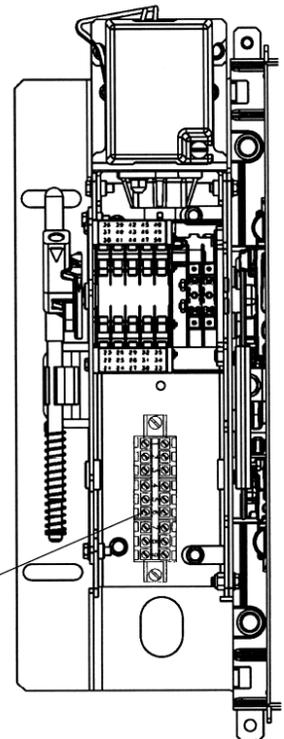
When Normal Source Fails	Terminals On Transfer Switch
Contact Closes	TB1 and TB2
Contact Opens	TB1 and TB3

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

left side of transfer switch

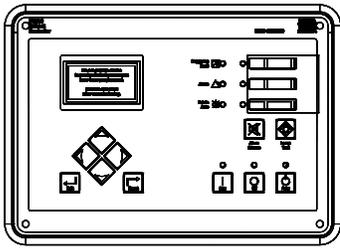
For 3ADTS & 3NDTS the terminal block TB is located in the upper right side of the enclosure.

terminal block TB on 3ATS & 3NTS



# STARTING PROCEDURE

## CONTROL LAYOUT



### POWER INDICATOR

A green LED, located on the rear of the DGC-2020HD, indicates the unit is powered.

	DISPLAY -
	NOT IN AUTO - This red LED lights when the DGC-2020HD is not operating in Auto mode.
	ALARM - This red LED lights continuously during alarm conditions and flashes during pre-alarm conditions.
	SUPPLYING LOAD - This green LED lights when the generator current is greater than emergency power supply (EPS) threshold current.
	PROGRAMMABLE INDICATORS - These red LEDs light when the corresponding logic element is set true. Logic element PROGLED 1 controls the upper LED, PROGLED2 controls the middle LED, and PROGLED3 controls the lower LED. A card is provided for labeling the programmable indicators. See Programmable Indicator Configuration below.
	ALARM SILENCE - Pressing this button opens the relay output programmed as the horn output.
	LAMP TEST - Pressing this button tests the DGC-2020HD indicators by exercising all LCD pixels and lighting all LEDs.
	AUTO MODE - Pressing the Auto button places the DGC-2020HD in Auto Mode. The green Auto Mode LED lights when Auto mode is active.
	OFF MODE - Pressing this button places the DGC-2020HD in Off Mode. The red Off Mode LED lights when the DGC-2020HD is in Off mode. This button also resets the Breaker Management Pre-Alarms and all <i>mtu</i> ECU Alarms.
	RUN MODE - Pressing this button places the DGC-2020HD in Run Mode. The green Run Mode LED lights when Run Mode is active.
	RESET - This button is pressed to cancel a settings editing session and discard any settings changes. When pressed momentarily, this button resets the Breaker Management Pre-Alarms and all <i>mtu</i> ECU Alarms. This button is also used to reset the Maintenance Interval when pressed for 10 seconds while viewing the front-panel Overview screen.

	EDIT - Pressing this button starts an editing session and enables changes to DGC-2020HD settings. At the conclusion of an editing session, the Edit pushbutton is pressed again to save the setting changes.
	ARROWS - These four buttons are used to navigate through the front-panel display menus and modify settings.  The left and right arrow buttons are used to navigate through the menu levels. The right arrow button is pressed to move downward through the menu levels and the left arrow button is pressed to move upward through the menu levels.  Within a level, the up and down arrow buttons are used to move among items within the menu level. Pressing the down arrow button moves to items lower in the list. Pressing the up arrow button moves to items higher in the list.  During a settings editing session, the up and down arrow buttons are used to raise and lower the value of the selected setting. The right and left arrow buttons move to different digits.

DGC-2020HDs monitor ECU data, protection functions, engine senders, contact inputs, analog inputs and outputs, configurable elements, and some programmable functions. When a monitored parameter exceeds its threshold, the status is annunciated in one of three types: alarm, pre-alarm, and status only. An alarm configuration setting determines the type of annunciation that is used.

### ALARM

When an alarm condition exists, the following actions are taken by the DGC-2020HD:

- Stop the engine by opening the fuel contact output.
- Replace the front panel Overview screen with the Active Alarms screen.
- Light the front panel Alarm LED.
- Close the horn output if enabled and programmed.
- Light LEDs and sound horn on the optional remote display panel. If an active alarm is not annunciated by the remote display panel, the Switch Not In Auto LED lights and the horn sounds.
  - Record the alarm into the event log and sequence of events log.

In addition to the standard alarm, three soft alarms are available: alarm with unload, alarm with Cooldown, alarm with unload and Cooldown. To avoid abrupt shutdowns, soft alarms perform a partial or complete normal shutdown.

### PRE-ALARM

When only pre-alarms are active, the front panel Overview screen is alternated with the Active Pre-Alarms screen in one-second intervals, the horn output toggles in one-second intervals, and the engine continues to run.

## STATUS ONLY

If Status Only is selected, the corresponding input is set true in BESTlogicPlus only. The status is always available to BESTlogicPlus Programmable Logic regardless of the Alarm Configuration setting.

## RESETTING ALARMS AND PRE-ALARMS

Most pre-alarms automatically reset when the alarm condition no longer exists.

Pressing the Reset key while viewing the Overview screen will reset certain active indications. The list of indications that can be reset includes the following:

- Breaker Open Fail or Breaker Close Fail pre-alarms
- Synchronizer Fail pre-alarm
- 78 Vector Shift or 81 Frequency trip status for 78 or 81 elements configured on the Gen Bus
- Bus protection trip status for any protection element configured on Bus 1 or Bus 2
- Weak Battery pre-alarm status
- AVR or GOV Analog Bias Output Out-of-Range status
- ARP Ping Fail pre-alarm
- Alarms and faults from mtu MDEC, mtu ECU7/ECU7, and mtu Smart Connect ECUs
- Maintenance Due pre-alarm (hold Reset key for 10 seconds).

Pre-alarms that do not automatically reset are listed below:

- 81 ROC DF/DT Rate of Change of Frequency
- 78 Vector Shift
- Breaker Close Fail
- Breaker Open Fail
- Synchronizer Fail
- Weak Battery

These pre-alarms are reset by navigating to the Overview screen on the front-panel display and pressing the Reset pushbutton or pulsing the Reset logic element in BESTlogicPlus.

Alarms do not automatically reset. Manually reset alarms by pressing the Off pushbutton.

## HORN

The audible horn can be silenced by pressing the Alarm Silence pushbutton. This does not reset the alarm or pre-alarm causing the horn to annunciate.

## MAINTENANCE INTERVAL

To reset the maintenance interval pre-alarm through the front panel, navigate to the Settings > System Parameters > System Settings > Reset Maintenance Timer screen. Operator, Settings, or OEM access level is required to reset the maintenance interval pre-alarm.

Another way to reset the maintenance interval pre-alarm from the front panel is to hold the Reset pushbutton for 10 seconds while the Overview screen is displayed.

To reset the maintenance interval pre-alarm by using BESTCOMSPlus, use the Metering Explorer to open the Run Statistics screen and click on the Reset Maintenance Interval button.

## 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 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.

## OPERATING MODES

Three operating modes provide the versatility to meet the application's needs. The DGC-2020HD operates in Off, Run, or Auto mode. These operating modes are described in the following paragraphs.

### OFF

In Off mode, the DGC-2020HD will not start under any circumstance. It cannot be started automatically. Programmable logic functions normally in this mode.

### RUN

In Run (manual) mode, the DGC-2020HD runs and cannot be shut off automatically. The breaker can be opened or closed through programmable logic inputs. Programmable logic functions normally in this mode.

### AUTO

In Auto mode, the DGC-2020HD may be started automatically or "self-start" from an automatic starting feature described in the following paragraphs. If the DGC-2020HD is not in Auto mode, the self-starting modes will have no effect. The self-starting modes are independent, meaning that if any self-starting mode indicates that the unit should run, it will run. It will not shut down unless all self-starting modes indicate that the unit should not be running. The status of run requests for the self-starting modes can be viewed in BESTCOMSPlus® or through the front panel under Metering > Status.

### ATS CONTACT INPUT

The ATS (automatic transfer switch) programmable function has an input mapped to it through BESTCOMSPlus. The unit will start and run when this contact is closed, and will stop when the contact is open.

### MODBUS® / BESTCOMSPLUS® RUN REQUEST

The unit runs when a manually-initiated request is received over communication lines. This type of request can be initiated with the Start and Stop controls on the BESTCOMSPlus Control Panel screen. See the latest version of the Instruction Manual for DGC-2020HD Digital Genset Controller Modbus® Protocol (Basler Publication 9469300998) for a listing of generator control registers.

## GENERATOR EXERCISER

The unit starts at the designated time and runs for the specified duration. The breaker will be closed if "Run with Load" is checked in the generator exerciser settings.

## MAINS FAIL TRANSFER FUNCTIONALITY

If mains fail transfer is enabled, the unit runs when any phase of the utility is dead or unstable, and will not stop until all phases of the utility are stable and the load has been transitioned to the utility.

## RUN WITH LOAD LOGIC ELEMENT

When the Run with Load logic element start input is energized, the unit starts and closes its breaker. When the Run with Load logic element stop input is energized, the unit opens its breaker and stops.

## PARALLEL OPERATION

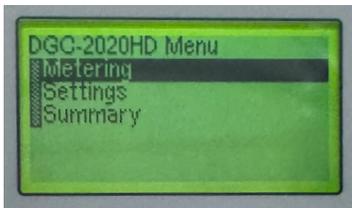
### WARNING

Paralleling should only be set up and monitored by competent technicians that are trained in proper safety protocols. Ensure proper lock out procedures are in use. These generators can start automatically and when connected to a live bus, there will be voltage present at non-running equipment.

This section assumes all proper electrical and Ethernet connections are properly made and the system is ready for parallel operations. If any step fails, correct the problem before proceeding.

Step 1: Connect a computer with Basler software to the network.

Step 2: Go to the controller and verify the number of generators connected to the network.

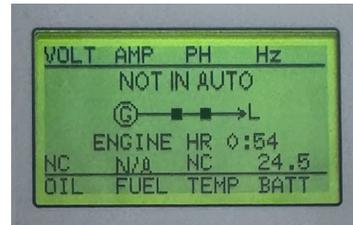


Step 3: With all units in the off position, start a generator.

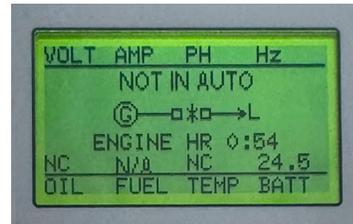
Step 4: Close the breaker on the generator by using the software and verify the controller indicates proper breaker position.

### WARNING

Manually closing a breaker can result in injury, death and equipment damage. Always use the controller to manage the breaker position.



Step 5: Open the breaker on the generator by using the software and verify the controller indicates proper breaker position.



Step 6: Close the breaker. Check that the breaker will open with the shunt trip by pressing the e-stop.

Step 7: Repeat this process for all generators in the system.

Step 8: Set all generators to Auto and send the start signal. Verify each generator individually has started and closed its breaker. Verify load is near zero and that there are no alarms on any controllers.

Step 9: Shut down each generator by pressing the Off button and verify the generator stops and the breaker opens.

Step 10: Test load the system.



# MAINTENANCE

Reasonable care in preventative maintenance will ensure high reliability and a long life for the engine-generator set.

## WARNING

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

## CHANGING THE OIL FILTER

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

## WARNING

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

The filter protects your engine from harmful, abrasive, or sludge particles without blocking the flow of oil to vital engine parts.

To replace the filter, use a proper filter wrench to remove the filter. Clean the filter mounting base and lightly coat the gasket surface of the new filter with engine oil. Hand tighten the filter until the gasket contacts the base, then tighten another ½ turn. Fill the engine with the correct amount of oil and run the engine. Verify oil pressure is okay and check for oil leaks at the drain plug and oil filter gasket. Tighten as necessary to stop any oil leakage noted.

## WARNING

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

## COOLING SYSTEM

## WARNING

Never remove the pressure cap while the engine is running or if cooling system is hot. Scalding coolant or steam can escape, which can cause serious burns.

## NOTICE

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 severe engine damage.

Check the coolant level of the radiator daily and only when the engine is cool. Do this just prior to starting the engine for the first time each day.

Maintain the coolant level at ¾ to 1½ inches below the filler neck seat of the radiator when the coolant is cold. Whenever coolant level checks are made inspect the condition of the radiator cap rubber seal. Make sure it is clean and free of any dirt particles which would keep it from seating on the filler neck seat. Rinse off with clean water if necessary. Also make sure that the filler neck seat is free of any dirt particles.

## WARNING

Never remove the radiator cap under any conditions while the engine is operating or hot. Failure to follow these instructions could result in damage to the cooling system, engine, or cause personal injury. To avoid having scalding hot coolant or steam blow out of the radiator, use extreme caution when removing the radiator cap from a hot radiator. If possible, wait until the engine has cooled, then wrap a thick cloth around the radiator cap and turn slowly to the first stop. Step back while the pressure is released from the cooling system. When all the pressure has been released, press down on the cap, and remove it slowly.

DO NOT add coolant to any engine that has become overheated until the engine cools. Adding coolant to an extremely hot engine can result in a cracked block or cylinder head.

## WARNING

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 cap on the radiator. Once all of the pressure is released, fully remove the cap.
2. Remove the drain plug at the bottom of the radiator and drain the coolant into an approved container. Reinstall plug.
3. Remove the coolant drain plug from the engine block.
4. After draining the engine coolant, flush the radiator and engine block with water to remove any rust, scale and contaminants. Then reinstall and tighten the drain plug.
5. Fill the coolant reservoir tank first. When the coolant is just over the fins in the radiator. Replace cap and securely tighten.
7. Fill the remaining amount of coolant needed in the radiator. Replace cap.
8. Run the engine to check for leaks.

## COOLANT FILL & BURP INSTRUCTIONS

1. Make sure engine is plumbed and all drains/petcocks are closed. Place towel or rag around radiator fill cap area to prevent spills.
2. Remove the hose cap and fill the radiator with coolant.



3. Once coolant starts to drip from the opening, replace the cap and secure it with its hose clamp.
4. Add more coolant mix into radiator until full.
5. Top off radiator to about halfway up the neck. Top off reservoir to fill line. Ensure cap is tightened securely.



7. Test run and inspect for any leaks/verify unit is not overheating.

## CHANGING AIR FILTER

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

### NOTICE

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.

The engine air cleaner filters air entering the engine intake system and acts as a silencer and flame arrester when assembled to the intake system. Air that contains dirt and grit produces an abrasive fuel mixture and can cause severe damage to the cylinder walls and piston rings. Damage to the cylinder walls and piston rings will cause high oil consumption and shorten engine life. Thus, it is extremely important that the air cleaner be serviced properly at the recommended intervals. PSI recommends using only UL recognized filter elements to ensure backfire suppression.

### WARNING

Service the air cleaner more frequently under severe dusty or dirty conditions.

Remove the primary air cleaner element from the air cleaner assembly and inspect the element for foreign material restrictions or signs of excessive wear or damage. Replace the element if necessary. Remove all dust and foreign matter from the air cleaner housing. Reinstall the air cleaner element. Reinstall the air cleaner cup, and securely fasten the retaining clips.

## 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 TO SIX MONTHS

If the engine or machine is to be placed in storage for a period of one to six months, it is recommended that the following steps be followed:

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. Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs and cover all openings into engine with dust-proof caps or shields.
3. 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.
4. Protect the air cleaner inlet from water entry.
5. Check coolant protection. Store indoors in dry area.

At the end of each and every three months storage periods.

1. Carefully check all drive belts, paying particular attention to the point where the straight run of the belt starts to bend around the pulley. Check the vee groove in the pulley for corrosion.
2. Check the level of coolant (must be anti-freeze inhibited).
3. Check the level of oil in the sump on the dipstick.
4. Rotate crankshaft by hand to re-distribute load on the valve train and to keep seals from becoming stuck. Be sure engine rests in a different position (~180 degrees).
5. If battery is still installed in unit, slowly recharge battery. This can be done every month to extend the service life of the battery.

## INFINITE PERIOD

1. Perform the next Preventive Maintenance procedure. For example, if there are 10 hours remaining before the 250 hour maintenance, you should do the maintenance before you place the engine in storage.
2. Drain crankcase completely and refill with recommended engine oil.
3. Run engine until completely out of fuel.
4. Check coolant protection
5. Disconnect and remove the battery.
6. Clean exterior surface of the engine.
7. Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs.
8. Seal all openings in engine and accessories with non-hygroscopic material. Mask off all area to be used

for electrical contacts.

9. Make sure all surfaces are dry, and then spray all taped openings, all engine accessories including ignition wiring, and all exterior surfaces of engine with Insulation Compound.

At the end of each and every six-month storage period:

1. Check that existing preservation of all external surfaces is sound and complete, paying particular attention to crankshaft lip seal surfaces, re-preserve as necessary.
2. Ensure that all open aperture protective covers (air intake, exhaust manifolds, etc.) are securely positioned.
3. Perform all 3-month inspections previously listed. Note: The lubricating oil and fully primed filter must be replaced with oil to the listed specification every twelve months, even though the oil has not been used. Oil left standing in an engine will oxidize and can be contaminated by condensation within the crankcase.

## RETURNING ENGINE TO SERVICE

1. Perform the Daily Checks.
2. The engine should be pre-oiled before startup. Allow engine to run at idle for approximately 5 minutes, then raise engine to a 'high idle', 1000-1500 rpm and bring to full operating temperature. Watch all gauges closely, if any system is out of specification shut down engine immediately and find cause.
  - Proper oil pressure
  - Fuel, engine oil, or coolant leaks
  - Proper operation of the indicators and/or gauges.
4. Avoid prolonged operation at minimum or maximum engine speeds and loads for the remainder of the first hour of operation.

## AUTOMATIC TRANSFER SWITCH

For information on proper maintenance for your transfer switch, see the ATS manufacturer's operator's manual.

## ENGINE-GENERATOR SET

Service the engine in accordance with the engine manufacturer's manual provided with your new equipment. Routinely remove debris and dirt from around the inside generator enclosure. Ensure that the air intakes are free from leaves and other debris at all times.

Clean and inspect battery terminals at least twice a year. Also check the battery water level at least twice a year.

Other than keeping the generator clean and free of debris, there is no other routine or preventative maintenance required as long as the generator is run bi-weekly to keep it dry and in good working order.

## YELLOW WEATHERCAP

Make sure you have the correct size WeatherCap

1. Prior to installing the WeatherCap, you must remove any water or debris that may have accumulated in the opening.

A. The exhaust opening may be cut squarely or at an angle up to 45°.

B. Make certain the pipe surface which will contact the Cap is clean and smooth.

C. Paint or other surface coatings must be fully cured.

2. Installation for sizes 1/2" thru 4"

A. Install the lanyard first. Slip it onto the pipe and slide the collar down the pipe 1 to 2 inches.

B. Place the Cap on the pipe above the lanyard.

C. Slide the Cap down onto the pipe about 1 inch.

D. Slide the lanyard up the pipe until it almost touches the Cap.

If the over pressure device activates, the WeatherCap will "pop" off of the pipe and must be reinstalled:

1. Inspect the Cap and replace if damaged.
2. Inspect the stack/pipe for liquid or debris accumulation and remove any fluids and debris.
3. Reinstall the Cap as noted above.

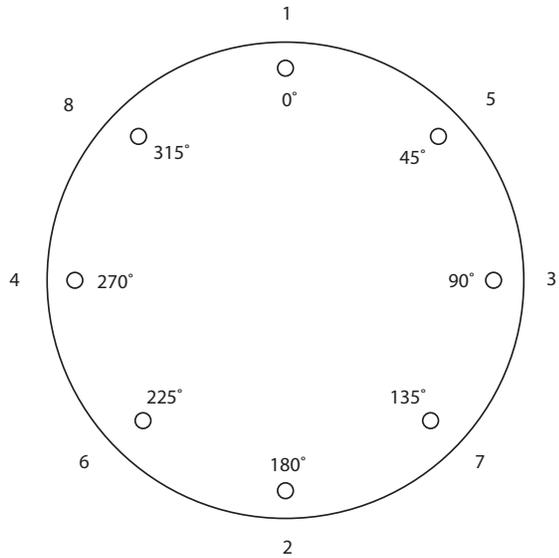


## FILTER SERVICE INSTRUCTIONS

1. Remove the nuts and studs from flange cap using a 1 1/4 socket.
2. Remove the flange cap and old gasket.
3. Remove the filter nut using a 7/8 socket, then remove the washer and steel cap.
4. Pull the old filter out and replace with new one.
5. Put the steel cap back on top of the filter and use the new washer provided, with the filter.
6. Tighten the nut back down until snug.
7. Install a new gasket and gently place flange cap back on top.
8. Install the nuts and hand tighten.

9. After hand tightening, torquing must follow a cross bolting sequence as depicted below. There shall be 3 complete passes (30%, 60%, 100% of final pass torque). Once final torque is achieved, a minimum of 2 clockwise passes to be applied until there is no further nut rotation. **Final bolt torque for Gas Max Scrubbers is 202ft/lbs.**

### 8-BOLTS



# MAINTENANCE SCHEDULE

	SERVICE INTERVALS						
	Initial 50 Hour Service <sup>(1)</sup>	Daily	Every 250 Hours	Every 750 Hours	Every 8,760 Hrs or Annually	Every 24,000 Hrs (Top End)	Every 48,000 Hrs (Overhaul)
Check for fluid leaks	X	X					
Check engine oil level	X	X					
Check coolant level	X	X					
Inspect drive belts for tension, cracks, splits, or glazing	X		X				
Inspect air cleaner filter element, replace as needed	X		X				
Sample engine oil as needed <sup>(2)</sup>	X <sup>(2)</sup>		X <sup>(2)</sup>				
Sample engine oil as needed <sup>(2)</sup>	X <sup>(2)</sup>		X <sup>(2)</sup>				
Change engine oil and filter <sup>(2)</sup>	X <sup>(2)</sup>			X <sup>(2)</sup>			
Inspect all vacuum lines and fittings for cracks, breaks or hardening	X			X			
Inspect automatic belt tensioners, replace if necessary	X			X			
Inspect coolant hoses for cracks, swelling or deterioration	X			X			
Inspect Fuel Shut-off Valves for leaks and proper operation	X			X			
Inspect gas piping and hoses for leaks or damage	X			X			
Inspect air induction piping for leaks	X			X			
Inspect intake manifold for vacuum leaks	X			X			
Inspect exhaust manifold for leaks	X			X			
Inspect exhaust piping for leaks	X			X			
Inspect O2 sensors and harness for damage/performance	X			X			
Inspect catalyst for mechanical damage and performance	X			X			
Clean debris from radiator core	X			X			
Measure intake and exhaust valve clearance, reset as necessary	X			X			
Tighten all hose clamps on CAC piping boots	X			X			
Drain LPL vaporizer oil build up (if LP fuel system is installed)	X			X			
Inspect ignition coils, coil boots, and harness				X			
Replace spark plugs				X			
Check CCV filter, Replace if crankcase pressure is above barometric				X			
Drain, flush, and replace engine coolant <sup>(2)</sup>					X <sup>(2)</sup>		
Inspect O2 sensor performance, replace if necessary <sup>(3)</sup>					X <sup>(3)</sup>		
Inspect catalyst performance, replace if necessary <sup>(3)</sup>					X <sup>(3)</sup>		
Replace fan and water pump belts					X		
Replace ignition coils and boots					X		
Replace throttle bodies					X		
Replace crankcase ventilation impactor (11L only)					X		
Replace coolant pumps						X	
Replace thermostats, gaskets and O-rings						X	
Replace fuel mixers						X	
Replace EPRs						X	
Replace fuel lock-off valves						X	
Replace cylinder heads						X	
Replace rocker arm assemblies						X	
Replace turbocharger assembly						X	
Replace crankcase ventilation assembly						X	
Replace piston and connecting rod assemblies and cylinder liners						X	
Replace crankshaft assembly, bearings and seals							X
Replace camshaft, bearings, seals, lifters, pushrods, and timing gears							X
Replace oil pump							X
Replace exhaust manifold assembly and gaskets							X
Replace front accessory drive pulleys, idlers and seals							X

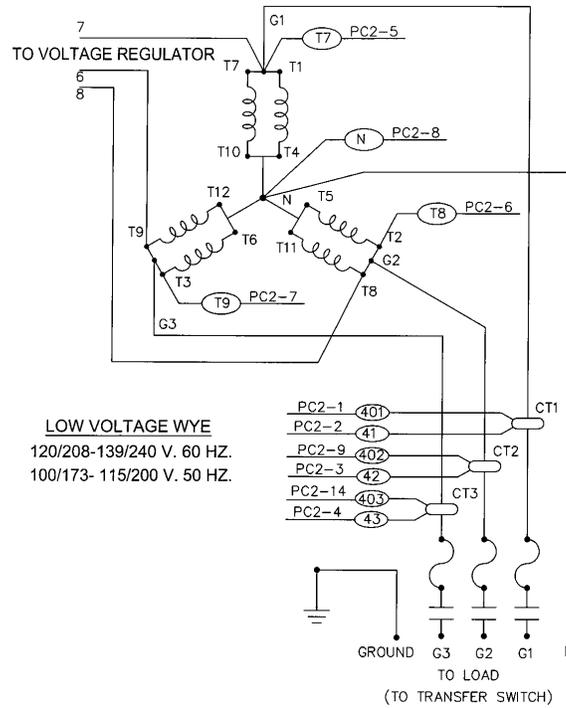
1: Perform after initial 50 hours of engine operation, and 50 hours after top end or overhaul service 2: Oil and filter change should be performed annually or every 750 hours of engine operation, whichever comes first. Oil and coolant change intervals can be extended only with a regularly scheduled sampling and lab analysis program. 3: Expected life of catalysts and O2 sensors is 8760 hours. Actual life may vary based on application. "The service life of an engine is influenced by several factors including correct installation, operating at proper rated load, proper service and inspection by trained technicians, and the use of approved engine oil, filters, and coolant."

# TROUBLESHOOTING TABLES

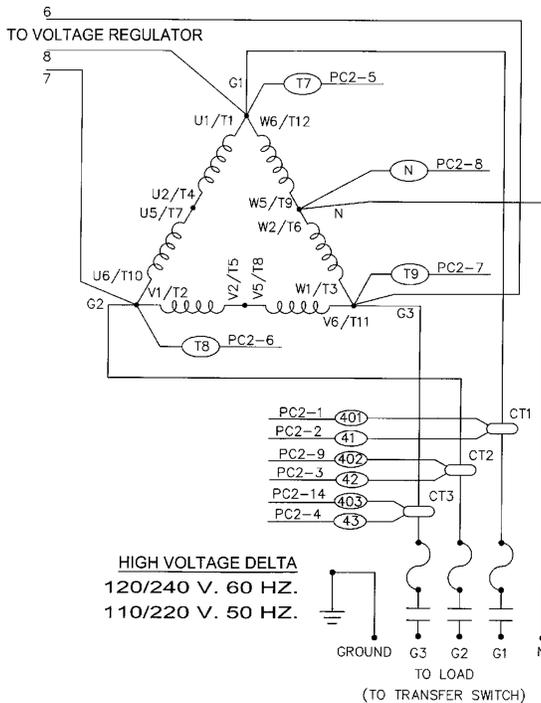
UNIT WILL NOT CRANK WHEN THE POWER FAILS	<ol style="list-style-type: none"> <li>1. Digital genset controller not in "AUTO"</li> <li>2. Transfer control switch not in "AUTOMATIC".</li> <li>3. Incorrect wiring between transfer switch and generator.</li> <li>4. Loose or dirty battery terminals.</li> <li>5. Defective engine control module.</li> <li>6. Defective starter.</li> <li>7. Defective start solenoid.</li> <li>8. Defective start/stop control in the transfer switch.</li> <li>9. ATS panel in fault from previous run cycle.</li> <li>10. Blown fuse on generator control panel.</li> </ol>
ENGINE WILL NOT CRANK USING START BUTTON ON THE GENERATOR	<ol style="list-style-type: none"> <li>1. Low or dead battery, must hold 12 Volts during cranking.</li> <li>2. Blown fuse on generator control panel.</li> <li>3. Loose or dirty battery terminals.</li> <li>4. Defective engine control module.</li> <li>5. Defective starter.</li> <li>6. Defective start solenoid.</li> <li>7. Locked up engine generator set.</li> </ol>
ENGINE WILL NOT COME UP TO SPEED AFTER IT STARTS	<ol style="list-style-type: none"> <li>1. Insufficient fuel volume getting to the unit.             <ol style="list-style-type: none"> <li>a. Fuel line too small. b. Low fuel pressure.</li> </ol> </li> <li>2. AC short circuit.</li> <li>3. Defective ECU on the engine.</li> <li>4. Governor is defective.</li> </ol>
ENGINE CRANKS BUT WILL NOT START	<ol style="list-style-type: none"> <li>1. Improper fuel pressure being delivered to unit.</li> <li>2. Fuel supply shut-off.</li> <li>3. Fuel supply empty.</li> <li>4. Defective spark plug.</li> <li>5. Defective engine ignition module.</li> <li>6. Dirty air cleaner filter</li> <li>7. Defective fuel solenoid valve.</li> <li>8. Low Voltage from battery to fuel solenoid, must hold 12 Volts during cranking.</li> <li>9. Defective fuel regulator.</li> <li>10. Defective starter/fuel solenoid relay(s).</li> </ol>
ENGINE START AND THEN STOPS - Alarm light comes on	<ol style="list-style-type: none"> <li>1. Engine is low on oil</li> <li>2. Engine has high water temperature.</li> <li>3. Engine has overspeed.</li> <li>4. Engine has gone into overcrank.</li> <li>5. No output from engine alternator to engage stop crank cycle.</li> <li>6. Generator is not operating at the correct speed.</li> <li>7. Defective ECU on the engine.</li> </ol>
ATS PANEL WILL NOT TRANSFER TO EMERGENCY SUPPLY	<ol style="list-style-type: none"> <li>1. No AC generator out put from generator.</li> <li>2. See Automatic Transfer Switch Manual.</li> </ol>
ATS PANEL WILL NOT PULL IN ON NORMAL POWER	<ol style="list-style-type: none"> <li>1. See Automatic Transfer Switch Manual.</li> </ol>
NO AC OUTPUT FROM GENERATOR	<ol style="list-style-type: none"> <li>1. Defective diodes.</li> <li>2. Defective voltage regulator.</li> <li>3. Defective rotor.</li> <li>4. Defective stator.</li> <li>5. Defective exciter rotor.</li> <li>6. Defective exciter stator.</li> <li>7. AC short in the input leads.</li> <li>8. Defective/Open breaker.</li> <li>9. Wiring error.</li> </ol>

# AC WIRING

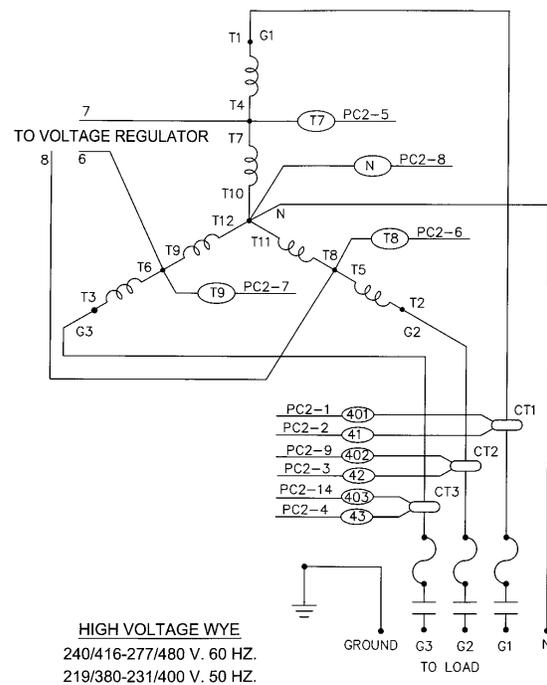
## THREE PHASE - LOW WYE 120/208V



## THREE PHASE DELTA 120/240V



## THREE PHASE - HIGH WYE 277/480V





# LIMITED WARRANTY

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WINCO Incorporated warrants to the original purchaser for the warranty period 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, contact a Winco Authorized Service Center within the warranty period from date of purchase.

\*NOTE: Units that are resold by original owner are not covered under this warranty. Any further warranty, whether expressed or implied, rests solely with the reseller.

## 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 the warranty period 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, INC. WARRANTY EFFECTIVE DATE

Air cooled units purchased for stock have 1 year to be sold. The warranty to the original retail customer commences on the date of sale of the product to them. All liquid cooled units have 180 days from the Winco invoice to submit a start up date. If no startup form is submitted, then warranty period starts on the Winco invoice date unit was sold.

Date of sale is defined as the day the customer takes delivery of the product. This warranty shall remain in effect to the original purchaser for the period stated on the sales literature. The warranty is not transferable and the retail customer must retain his original bill of sale as proof of purchase date.

WINCO, Inc. agrees to the following obligations during the warranty period:

1. To warrant any defect in material or workmanship of products sold under the WINCO and DYNA brand names in accordance with the warranty statements in the operator's manuals.
2. To reimburse authorized WINCO, Inc. Service Centers/Dealers for the cost of parts plus standard ground UPS shipping charges for all valid warranty repairs and to reimburse same said service centers/dealers for reasonable labor charges based on WINCO's current warranty labor reimbursement rate.
3. To furnish its authorized service centers/dealers with the necessary parts to make the repairs. WINCO Generator Warranty Periods & Restrictions

## WINCO GENERATOR WARRANTY PERIODS & RESTRICTIONS INDUSTRIAL PORTABLES

WL Models - 3 Years, See Notes 1 & 2

W Models - 3 Years, See Notes 1, 2, & 5

DP Models - 3 Years, See Notes 1 & 2

HPS Models - 2 Years, Home Use ONLY; Commercial use\* is 90 Day Warranty, See Note 1

## EMERGEN-C (EC) SERIES

2 Years, See Note 1

DE Series

1 Year/2000 hours, No Travel Time

Mobile Diesel Series

1 Year/2000 hours, No Travel Time

## PTO SERIES

15kW & 10kW - 1 Year, Limited Farm Standby Only

25kW thru 165kW - 3 Years, Limited Farm Standby Only/Commercial use\* 1 Year

## TWO BEARING SERIES

1 Year, Bench Labor and Parts only

## GASEOUS/PACKAGED STANDBY SERIES (PSS)

Air-Cooled Models (PSS8, PSS12, & PSS20) - 2 Years/2000 Hours Standby Only See Notes 3 & 4 Prime Power use 1 Year/2000 Hours See Notes 3 & 4

Liquid-Cooled Models (PSS21 - PSS150) - 2 Years/2000 Hours Standby Only See Notes 3 & 4 Prime Power use 1 Year/2000 Hours See Notes 3 & 4

## DIESEL STANDBY SERIES (DR)

Liquid-Cooled Models (DR12 - DR600) - 2 Years/2000 Hours Standby Only See Notes 3 & 4

Prime Power use 1 Year/2000 Hours See Notes 3 & 4

Accessories (Installed on Generator or shipped loose)

1 Year from factory invoice or 2000 Hours (whichever occurs first)

## AUTOMATIC TRANSFER SWITCHES (ATS)

See ATS Manufacturer's Warranty

### NOTES

Note 1: First 2 years of warranty coverage includes Parts and Bench Labor Only, no travel time or labor allowance for removal or reinstallation of the product from its application.

Note 2: 3rd Year warranty coverage is parts only/no labor.

Note 3: Round trip mileage is limited to 200 miles per trip and a total of 2 trips per repair unless authorized in writing by the WINCO Service Dept.

Note 4: Mileage allow on permanently installed units only. Trailer mount units is bench labor only.

Note 5: W3000 is a 1 Year Warranty.

\*Commercial use is defined as Construction, Rental, Prime Power, or use in a business of any type including agricultural and hobby. Prime Power use is defined as any application where the generator set is being used 'off-grid' where there is no utility power present. Standby use is defined as an application where utility power is present -and- the generator set is used as emergency backup during utility power outages.

WINCO reserves the right to change or improve it's products without incurring any obligations to make such changes or improvements on products purchased previously.

### EXCLUSIONS:

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

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

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

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

This warranty does not include travel time, mileage, or labor for removal or reinstallation of WINCO product from its application, unless specifically authorized.

### WHAT IS COVERED BY WARRANTY

1. Generator end including rotor, stator, end brackets, and bearing.
2. Control box including transformers, circuit breakers, wiring, resistors, and switches.
3. LP/NG fuel system including fuel solenoid, demand regulator, carburetor, and hoses.
4. Cradle assembly including cradle, cross member, and shock mounts that fail. Shock mounts damaged from rough handling are not covered.
5. Reasonable travel time for the PSS & DR series generators only, that are permanently installed.
6. Ground shipping charges for warranty parts, no premium service, domestic US shipments only.

### WHAT IS NOT COVERED BY WARRANTY

1. Products which have been subjected to alteration, modification, neglect or unauthorized repairs not approved in writing by Winco, Inc.
2. Products no longer owned by the original purchaser.
3. Products with shipping or freight damage. File a freight claim with the delivery carrier.
4. Products suffering normal wear, accidents, improper maintenance or improper protection in storage. Products damaged by rough handling, such as shock mounts on cradle assemblies.
5. Pressure or steam cleaning of products, cleaning of fuel system, or flushing of cooling system.
6. Replacement of filter, belts, antifreeze, or lubricants.
7. Electrical items, such as light bulbs, receptacles, spark plugs, or any items damaged by welding or jump starting.
8. Any repeat or shop come-back repairs resulting from poor service work or improper diagnosis and testing. Replacement of parts as a trial-and-error method of diagnosis will not be considered for warranty.
9. Replacement parts other than those sold by Winco, Inc.
10. Damage caused by fire, flood, lightning or any other natural disaster.
11. Damage caused by improper protection during installation, (i.e. not protecting contactor in the ATS panel and getting wire trimming or debris from drilling the box in the contactor coil or contacts.)
12. Damage caused by over loading of the generator and failure to adequately provide overload protection.
13. LP/NG fuel adjustments or conversion from one fuel to another.
14. Adjustment of any kind, all units are 100% load tested before shipping.
15. Any damage caused by the use of the equipment for purposes other than for which it was designed.
16. Engines - All engines used by Winco, Inc. are warranted by their respective manufacturer's.
17. Batteries - Must be returned to original battery manufacturer.
18. Damage caused by improper installation or failure to provide adequate ventilation.
19. Cosmetic repairs, such as repainting.
20. Freight charges for transportation to and from a Warranty Service Center.
21. Rental costs of renting replacement generators.
22. Travel time or service calls unless specifically authorized by Winco, Inc. in writing.

### GENERAL INFORMATION

The WINCO, Inc. Service Department is open from 7:30 AM to 4:30 PM Central Standard time.

It is located at 225 South Cordova Ave., Le Center, MN, 56057-1805.

Phone Numbers: Service Department - 507-357-6831 FAX Line - 507-357-4857. Email address is service@wincogen.com

The phone number to for the General Switchboard/Sales Department is 507-357-6821.



**WINCO**<sup>®</sup>  
**GENERATORS**  
 AN AMERICAN COMPANY

225 S. CORDOVA AVE • LE CENTER, MN 56057  
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Service: 507-357-6831 • service@wincogen.com  
[www.wincogen.com](http://www.wincogen.com)

