

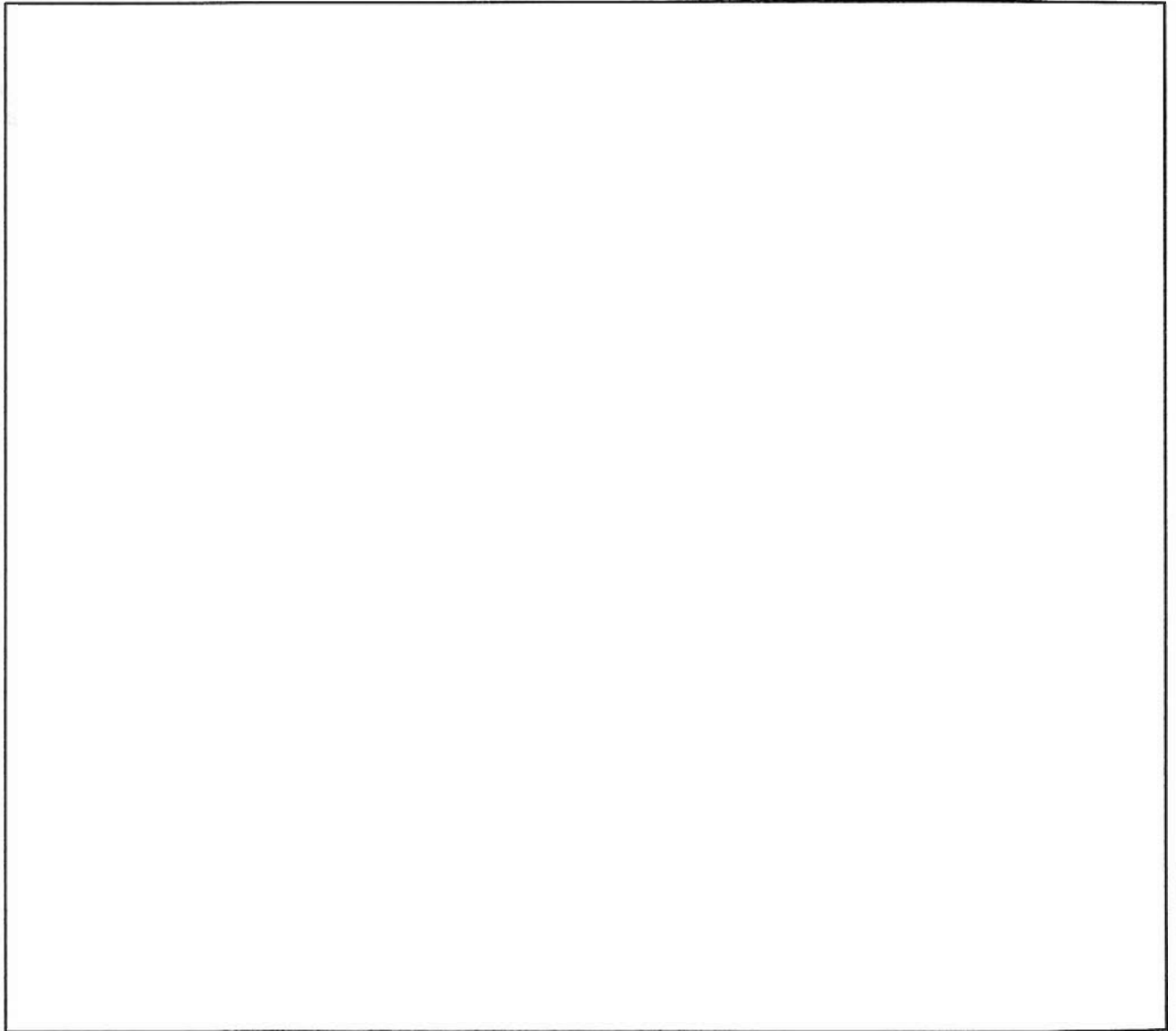
WINGCO®

**EMERGENCY
RESCUE SERIES**

INSTALLATION, OPERATION, and MAINTENANCE INSTRUCTIONS

OWNERS MANUAL

EC6010DR/Q



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

USING THIS MANUAL

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

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

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

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PROPER USE AND INSTALLATION

You must be sure your new engine generator set is:

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

COPY YOUR MODEL AND SERIAL NUMBER HERE

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

MODEL _____

SERIAL NUMBER _____

PURCHASE DATE _____

DEALER _____

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

ANSI SAFETY DEFINITIONS

DANGER:

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

WARNING:

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

CAUTION:

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

NOTE:

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

1. **ELECTRIC SHOCK-** The output voltage present in this equipment can cause a fatal electric shock. This equipment must be operated by a responsible person.
 - a. Do not allow anyone to operate the generator without proper instruction.
 - b. Guard against electric shock.
 - c. Avoid contact with live terminals or receptacles.
 - d. Use extreme care if operating this unit in rain or snow.
 - e. Use only three-prong grounded receptacles and extension cords.
 - f. Be sure the unit is properly grounded to an external ground rod driven into the earth.

2. **FIRE HAZARD-** Gasoline and other fuels always present a hazard of possible explosion and/or fire.

- a. Do not refuel when the engine is running or hot. Allow the engine to cool at least two minutes before refueling.
- 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.

3. **DEADLY EXHAUST GAS -** Exhaust fumes from any gasoline engine contain carbon monoxide, an invisible, odorless and deadly gas that must be mixed with fresh air.

- a. Operate only in well ventilated areas.
- b. Never operate indoors.
- c. Never operate the unit in such a way as to allow exhaust gases to seep back into closed rooms (i.e. through windows, walls or floors).

4. **NOISE HAZARD -** Excessive noise is not only tiring, but continual exposure can lead to loss of hearing.

- a. Use hearing protection equipment when working around this equipment for long periods of time.
- b. Keep your neighbors in mind when permanently installing this equipment.

5. **CLEANLINESS-** Keep the generator and surrounding area clean.

- a. Remove all grease, ice, snow or materials that create slippery conditions around the unit.
- b. Remove any rags or other material that could create potential fire hazards.
- c. Carefully wipe up any gas or oil spills before starting the unit.
- d. Never allow leaves or other flammable material to build up around the engine exhaust area.

6. **SERVICING EQUIPMENT-** All service, including the installation or replacement of service parts, should be performed only by a qualified technician.

- a. Use only factory approved repair parts.
- b. Do not work on this equipment when fatigued.
- c. Never remove the protective guards, cover, or receptacle panels while the engine is running.
- d. Use extreme caution when working on electrical components. High output voltages from this equipment can cause serious injury or death.
- e. Always avoid hot mufflers, exhaust manifolds, and engine parts. They all can cause severe burns instantly.
- f. This generator set is not intended for permanent installation. Consult dealer for units intended for stand-by service. Installing a generator set is not a "do-it-yourself" project. Consult a qualified, licensed electrician or contractor. The installation must comply with all national, state, and local codes.

SPECIFICATIONS

MODEL	EC6010DR/P
Generator	
Surge Watts	6000
Continuous Watts	5500
Volts	120/240
AMPs @ 240 Volts	22.9
Output 4 Wire Re-connectable -	120 or 120/240V
NEMA 5-15 (120V) GFCI	1 (15A Duplex)(convenience)
Engine	
Size	10 HP
Model	L-100-AE 406c.c.
Fuel Capacity	- N/A - External, Customer Supplied Tank
Fuel Consumption	1.7g/hr
Starting System	Auto - Local/Remote W/Start Delay and Cycle Cranking
Muffler	Low Tone
Type -	See Engine Shroud For Type
Stop System	Auto - Local/Remote W/Cool Down Delay Cycle
Complete Unit	
Weight (dry)	275 LBS
Dimensions LxWxH	29x21x23.5
Owner Must Provide	
Fuel	#2 Diesel
Oil Type	10W-30 SF, SE, SD, SC See engine manual for additional information.
Oil Capacity	1.75 Quarts
Battery Size	U1 - 190 CCA (MIN)

INTENDED USES

1. These engine generator sets have been designed specifically for Vehicle mounting and mobile use. The generator output is available in the junction box on the top of the generator shell. Receptacles are not provided in the "control box" since the unit is intended to be wired into the vehicles electrical distribution system. The vehicle electrical distribution system must include a main line circuit breaker (MLCB) to protect the generator and your wiring. The vehicle distribution wiring and receptacles carry the generator output power to the loads (portable lights appliances and tools). These units are dual wound generators, with two separate 120 Volt windings. These windings can be connected for full power 120 volt OR 120/240 volt output. When connected for 120/240 dual voltage, the 120 volt loads must be split and balanced to avoid overloading one of the generator 120 volt windings. See unit capabilities for further explanation.
2. These units require large quantities of fresh air for cooling of both the engine and the generator. Fresh air is drawn from both the engine end and the generator end and is exhausted at the center of the unit. For safety, long life and adequate performance, these units should not be run in small compartments without the access door open to allow positive fresh air flow.

RESTRICTIONS

1. DO NOT remove from the base assembly. Removal of the generator from the base assembly or operating without the shock mounts installed may cause excessive vibration and damage to the engine generator set.
2. DO NOT operate these portable generators without the compartment door open., i.e. generator compartment of rescue vehicles, motor homes or travel trailers. Closed compartments will not allow enough free flow fresh air to reach the engine generator set for cooling. Overheating will cause damage to both the engine and the generator. Small compartments may also develop hot spots where there is very little air flow and could cause fire.
3. DO NOT attempt to operate this unit at 50 cycles. These units are designed and governed to operate at 60 Cycles only.

UNIT CAPABILITIES

1. Generator Connections - The diagram below represents a typical 4000 watt generator. Only 2000 watts at 120 volts (16.7 Amps) can be taken from the generator at receptacle A and up to 2000 watts at 120 volts from receptacle C. CAUTION MUST BE EXERCISED TO PREVENT OVERLOADING EITHER OF THE 120 VOLT CIRCUITS (A OR C).

The Winco EC6010DR series generators have two independent 120 Volt windings to allow for full use of all the power at either 120 Volts, 240 Volts or combinations of 120 and 240 Volts. At the time of initial installation, a generator voltage connection pattern must be selected to use either 120 Volt only or 120/240 dual Voltage. If some of the connected electrical loads require 240 Voltage capability, all remaining 120 Volt loads must be balanced between the two 120 Volt generator legs. If only 120 volt loads are required, the 120 volt connection will deliver the full power. If both 240 volt and large 120 volt individual loads are installed, the load distribution must be carefully considered to prevent overloading the power circuits.

The following currents (measured in amps) are produced at 120 & 240 volts for typical wattage shown.

AMPS AT CONNECTION	120 VOLT CIRCUIT ID		240 VOLT
	A	B	C
120/240	22.9	22.9	22.9
120 ONLY	45.8	- NOT USED -	

2. Starting Electric Motors - Electric motors require much more current (amps) to start them than to run them. Some motors, particularly low cost split-phase motors, are very hard to start and require 5 to 7 times as much current to start them as to run them. Capacitor motors are easier to start and usually require 2 to 4 times as much current to start them as to run them. Repulsion Induction motors are the easiest to start and usually require 1-1/2 to 2-1/2 times as much to start them as to run them.

Most fractional horsepower motors take about the same amount of current to run them whether they are of Repulsion-Induction (RI), Capacitor (Cap), or Split-Phase (SP) type. The chart below shows the approximate current required to start and run various types of sizes of 120 volt 60 cycle electric motors under average load conditions.

HP	RUNNING AMPS			STARTING AMPS	
	SP	CAP		RI	
1/6	3.2	16 To 22		6 To 13	5 To 8
1/4	4.5	22 To 32		9 To 18	7 To 12
1/3	5.2	26 To 35		10 To 21	8 To 17
1/2	7.2	NOT MADE		14 To 29	11 To 18
1.0	13.0	NOT MADE		26 To 52	20 To 33

The figures given above are for average load such as a blower or fan. If the electric motor is connected to a hard starting load such as an air compressor, it will require more starting current. If it is connected to a light load, or no load such as a power saw, it will require less starting current. The exact requirement will also vary with the brand or design of the motor.

For 240 volt motors, the "running" current is half as much as shown for the 120 volt motors of the same size. Some dual voltage 120/240 volt motors are difficult to start on 240 volts when driven by engine/generators and can be started more easily when connected to operate on 120 volts. This is particularly true of "capacitor start-induction run" motors. Sometimes a 240 volt motor which cannot be started on the 240 volt circuit of a 120/240 volt generator can be started on a 120 volt circuit and then quickly switched to the 240 volt circuit after it is started. This can be done in applications where the motor is manually controlled and is started under "no load" conditions.

A self-excited generator responds differently to severe overloading than the power line. To illustrate, suppose that a 240 volt 10 H.P. "capacitor start-induction run" motor is connected to the generator. The engine would not be able to supply enough power to bring the electric motor up to operating speed. The generator would respond with high initial starting current, but the engine would be very severely overloaded. The speed would probably drop sharply and possibly stall the engine. If allowed to operate at very low speeds, the electric motor start winding would burn out in a short time. The generator winding might also be damaged.

On the other hand, suppose a smaller electric motor that requires just a little more output than the generator can produce is connected to it. It will try to run but will not reach a high enough speed for the internal centrifugal switch to disconnect the starting winding. The generator output, instead of being 120 volts, may drop to 70 or 80 volts.

RUNNING THE GENERATOR SET UNDER EITHER OF THESE CONDITIONS COULD RESULT IN DAMAGE TO THE GENERATOR STATOR AS WELL AS THE MOTOR WINDING.

Because the heavy surge of current required for starting motors is required for only an instant, the generator will not be damaged if it can bring the motor up to speed in a few seconds of time. If difficulty is experienced in starting motors, turn all other electrical loads off and if possible reduce the load on the electric motor.

3. Motor Starting Capacity - listed below you will find the motor starting capability of your engine generator set.

Generator Model	Motor Size (code "G" capacitor start)
EC6010DR	3.0 HP

Trying to start a larger motor or higher code (ie. J or K) motor may result in damage to both the generator and the electric motor especially 120 volt motors.

CAUTION: EQUIPMENT DAMAGE

THIS UNIT HAS BEEN SHIPPED WITHOUT OIL. Failure to maintain the engine oil at the proper level will result in serious engine damage.

UNPACKING

When you unpack your new ENGINE GENERATOR, be sure to remove all the information sheets and manuals from the carton.

1. This power plant was in good order when shipped. Inspect the power plant promptly after receiving it. If damage is noted, notify the transportation company immediately; request proper procedures for filing a "concealed damage" claim. Title to the equipment and responsibility for filing claim rests with you when a generator is sent F.O.B. shipping point. Only you can legally file a claim.
2. Before proceeding with the preparation of your new engine generator set for operation, take a couple of minutes to insure that the unit you have received is the correct model and review the specification pages in this manual to insure that this unit fits your job requirements.
3. After removing the engine generator from the carton locate and remove the shipping strap attached to the generator shock mount. See attached tag for removal instructions.

UNIT PREPARATION

Before your engine generator was shipped from our factory it was fully checked for performance. The generator was load tested to its full capacity, and the voltage and frequency were carefully checked and adjusted.

1. Lubrication - Before starting the engine, fill the crankcase to the proper level with a good quality oil. The recommended grade of oil and quantity of oil required is listed in the engine operators manual. The necessity of using the correct oil, and keeping the crankcase full cannot be overemphasized. Engine failures resulting from inadequate or improper lubricant are considered abuse and are not covered by the generator or the engine manufacturers warranty.
2. Diesel Fuel and Fuel Line Connections - Always use a good grade of # 2 diesel fuel. For cold weather, blended # 1 fuel may be used - See engine operators manual for recommendations. Never use gasoline or gasohol. Always insure that the fuel is clean and free of all impurities.

The unit is supplied with a fuel line installation kit. This kit includes the 37 degree flare fittings and a short section of fuel hose for the fuel connections. The hose is used to connect to the vehicle fuel supply and return lines. The fuel pump on the unit is designed to provide a 4 foot lift. If the fuel tank requires a greater lift, the fuel pump may be relocated to the fuel tank level to 'push' the fuel up to 12 feet above the pump outlet. Consult the factory for other special applications.

WARNING: FIRE

Diesel fuel is flammable and can be ignited to cause or enlarge fires when proper precautions are not taken.

Never use fuel that has been stored for an extended period of time. Fuel will lose its volatile properties and you will be left with a 'gum' / varnish residue. This varnish like substance will clog the filters, fuel lines and injectors. Old, contaminated, stale fuel will not burn properly. The use of a fuel additive, such as STA-BIL, or an equivalent will minimize the formation of fuel gum deposits. If a unit has been out of operation for an extended period of time, it is best to drain old fuel from the engine and replace with fresh fuel before attempting to start.

3. **Battery connection** - These remote start engine generator sets require customer supplied battery cables. Connections are made directly to the engine starter solenoid post positive (+) and the engine frame negative (-). The battery cable size is determined by the length of the cable run. The engine starter requires a minimum of 200 Cold Cranking Amps (CCA) for proper starting performance.

These generator sets must be started and operated with a twelve (12) volt battery. The 12 volt battery must be rated at 235 CCA or larger. For units mounted in vehicles, it is recommended that you use the vehicle battery. Follow the battery manufacturers recommendations for servicing and charging prior to use. Connect the battery to the electric start system using cables that are sized for the length of run and voltage drop allowable.

CAUTION: EQUIPMENT DAMAGE

These electric start engines are **NEGATIVE GROUND**. Use extreme **caution** when connecting the battery. Connect the **NEGATIVE** battery terminal to **GROUND**.

For your safety always connect the positive battery cable to the "bat+" terminal first. Then connect the negative battery cable to the "bat-" terminal. Make sure all connections are clean and tight. Reverse the sequence when disconnecting, disconnect the negative cable first. To prevent interference with the vehicle charging circuit, the battery charging circuit on the generator set is removed.

WARNING: PERSONAL INJURY

Lead acid batteries produce explosive hydrogen gas when charging. Keep sparks, flames, and burning cigarettes away from the battery. Ventilate the area when charging or using the battery in an enclosed space. Lead acid batteries contain sulfuric acid, which causes severe burns. If acid contacts eyes, skin or clothing, flush well with water. For contact with eyes, get immediate medical attention.

INITIAL START UP

Use the following checklist to verify the correct preparation of the engine generator before starting.

On All Units Check:

1. Engine oil, fill as required with correct grade and quantity.
2. Connect and prime the fuel line. The electric fuel pump can be used to fill the line and prime the injector pump. **DO NOT RUN THE ENGINE UNTIL THE NEW FUEL LINE HAS BEEN FULLY PRIMED.** Air in the fuel line can be difficult to remove. Avoid the problem by checking the fuel prime before initial start or after fuel system service (replacing fuel filter, fuel lines etc.) The engine requires clean, fresh fuel.
3. Visually check unit for loose parts.

STARTING and STOPPING

The throttle control on these generators is preset and locked to operate at 3600 RPM (nominal) with no load speed set at 3690 RPM. Only a trained service technician should be allowed to adjust this speed setting. See "Operating Speed" section for additional information.

1. **Manual starting** - Provision for manual starting is not provided - This unit has a fuel cut-off solenoid that requires battery power to operate. If the battery is dead or defective, recharge or replace it. Refer to the engine manual for fuel line priming and additional starting, operating, and stopping instructions.

1. **Electric Starting** - If the engine is cold and stiff or if the battery is not fully charged, starting can be made easier by operating the compression release before operating the start control switch. This permits the starter to gain momentum before the heavy load of the compression stroke occurs. This also minimizes the drain on the battery and improves the possibility of starting under such adverse conditions. Always keep the battery charged, but especially during cold weather operation.

- a. Turn on the fuel supply and prime the fuel line up to the injector pump.
- b. Operate the start control switch. The engine controller will provide five start cycles of 12 seconds each. This cycle cranking feature improves the engine starter life by allowing time to cool off between cranking cycles. Repeat if necessary, but wait at least two minutes for the starter to cool before re-initiating the start sequence.
- c. The engine will start and come up to operating speed.

CAUTION: EQUIPMENT DAMAGE

The engine is equipped with a compression release. This starting aid may be used for extreme cold weather starting, but never permit the compression release to remain on after the engine has run for a short time. It is usually not necessary to use the compression release because of the electric starter. It should not be used when the engine is warm unless the battery is in very poor condition.

STARTING HINTS

1. Cold weather
 - a. Use the proper oil for the temperature expected.
 - b. Use fresh winter grade fuel. Winter grade fuel is blended to improve starting. Do not use old or straight summer blend fuel.
 - c. Never use ether or any other starting aides without the specific authorization from the engine manufacturer or their instructions. If in doubt - ASK!!! Serious engine damage or personal injury may result from ignoring this simple warning.
2. Hot weather
 - a. Be sure to use the proper oil for the temperature expected.
 - b. Use only summer blended fuel. Using old fuel left over from winter may cause damage to the engine or clogging of the fuel filters and injection pump. See Engine Manufacturers instructions.

STOPPING AND STORAGE

1. Move the start/run control switch to the off position.
This will allow the controller to close the fuel shut-off valve and stop the engine.
3. Before extended storage (over 30 days) certain precautions must be taken to ensure the fuel doesn't deteriorate and clog the fuel system. Note: The use of a fuel additive, such as STA-BIL, or an equivalent, will minimize the formation of gum deposits during storage. Such an additive may be added to fuel in the engine's fuel tank or to fuel in a bulk storage container. Always shut the fuel off whenever the engine will not be used for a week or more to prevent fuel leakage from the fuel lines pump.
 - a. Remove the generator set fuel line from the fuel supply tank.
 - b. Connect the generator set fuel line to a container of diesel preservative / storage additive. Start the engine and allow it to run on the rich additive mixture until the fuel pump loads up and stalls the engine. The fuel lines and injector pump are now filled with a preservative mixture. Always follow the Engine Manufacturer's latest recommendations for additives and procedures for long term storage.
 - c. While the engine is warm drain oil and refill with fresh oil.
 - d. Remove the fuel injector(s), pour approximately 1/2 ounce (15 cc) of engine oil into (each) cylinder and crank slowly to distribute oil. Replace fuel injector(s).
 - e. Clean dirt and chaff from cylinder, cylinder head fins, blower housing, rotating screen and muffler areas.
 - f. Store in a clean and dry area.

OPERATING SPEED

The engine-generator must be run at the correct speed in order to produce the proper electrical voltage and frequency.

CAUTION: EQUIPMENT DAMAGE

The output voltage should be checked to insure the generator is working properly prior to connecting a load to the generator. Failure to do so could result in damage to equipment plugged into the unit and possible injury to the individual.

1. All engines have a tendency to slow down when a load is applied. When the electrical load is connected to the generator, the engine is more heavily loaded, and as a result the speed drops slightly. This slight decrease in speed, together with the voltage drop within the generator itself, results in a slightly lower voltage when the generator is loaded to

its full capacity than when running no load. The slight variation in speed also affects the frequency of the output current. This frequency variation has no appreciable effect in the operation of motors, lights and most appliances. However, electronic equipment and clocks will be affected if correct RPM is not maintained. See Load vs. Output chart. Although individual units and models may vary slightly, the normal voltage and frequency of the engine-generators described in this book are approximately as follows, under varying loads:

LOAD vs. OUTPUT

Generator Frequency			Generator voltage	
Load Applied*	Speed (RPM)	(Hz)	120V Recpt.	240V Recpt.
None	3690	61.5	129V	258V
Half	3600	60.0	120V	240V
Full	3510	58.5	115V	230V

*Portion of plant's rated output current.

2. The speed of the engine was carefully adjusted at the factory so that the generator produces the proper voltage and frequency. For normal usage, the speed setting should not be changed. If the generator is being run continuously on a very light load, it is often advisable to lower the operating speed slightly. Whenever making any speed adjustments check the unit with a voltmeter or tachometer and be sure the speed is correct.

The engine will govern itself at full speed. Intentionally overriding the governor and operating the generator at low voltage may damage both the generator and any load connected to it. Running the engine at excessively high speeds results in high voltage, which may significantly shorten the life of light bulbs and appliances being used, as well as possibly damaging the engine.

2. Output voltage should be checked periodically to ensure continued proper operation of the generating plant and appliances. If the generator is not equipped with a voltmeter, it can be checked with a portable meter. Frequency can be checked by using an electric clock with a sweep second hand. Timed against a wrist watch or a stop watch the clock should be correct within +/- 2 seconds.

CONNECTING THE LOADS

1. **Applying The Load** - Allow the engine to warm up for two or three minutes before applying any load. This will allow the engine to reach normal operating temperature and oil to circulate throughout the engine. A short warm-up time will permit the engine to work more efficiently when the load is applied and will reduce the wear in the engine, extending its life.

- a. The generator output is provided at the junction box on top of the generator shell. Receptacles may have been provided by the vehicle manufacturer for convenient load connection. The loads should be applied gradually. When starting large electric motor(s), they should be started individually when possible. The largest motor should always be started first.

CAUTION: EQUIPMENT OVERLOAD

Keep the generator load within the generator and receptacle nameplate rating. Overloading may cause damage to the generator and/or the loads

- b. Most electric tools and devices will have the voltage and amperage requirements on their individual nameplates. When in doubt consult the manufacturer or a local electrician. The nameplate amperage rating for electric motors can be misleading. See "Starting Electric Motors" in Specification Section.
- c. These engine generator sets are inherently self regulating based on engine speed. The engine governor will automatically adjust itself to the load. No harm to the generator will result if it is operated with no load connected.
- d. Proper utilization of the generator output power is necessary to prevent damage to either the tools or the generator. The generator is a limited source of electrical power, therefore pay special attention to the generator ratings. The nameplate rating can be obtained through a combination of all four generator leads or a single lead pair as long as the current capacity of the generator windings are not exceeded. Both the 120 and 240 volt capabilities can be utilized at the same time if so wired. See Specification Section for proper load separation.

2. **Grounding** - All stationary units must be grounded. Drive a 3/4 or 1" copper pipe or rod into the ground close to the engine-generator set. The pipe must penetrate moist earth. Connect an approved ground clamp, to the pipe. Run a number 10 Awg wire from clamp to the generator ground lug or the battery negative terminal. Do not connect to a water pipe or to a ground used by a radio system. Mobile equipment is generally not required to be grounded, but may be grounded if practical.

The engine-generators covered in this manual were designed for mobile, vehicular use. **DO NOT OPERATE IN CLOSED COMPARTMENTS.** The unit should be used and stored in a clean, dry location.

WIRING

Before connecting tools and cord sets, recheck the rating of the generator set. Be sure it can handle the intended load and is compatible with the voltage, phase, and current ratings.

Hard Wiring this unit directly into a vehicle power distribution panel is NOT

A SIMPLE DO-IT-YOURSELF JOB. For your safety all wiring must be done by a qualified electrician and conform to the National Electric Code and comply with all state and local codes and regulations. Check with local authorities where the vehicle will be operated before proceeding.

WARNING: PERSONAL DANGER

A fully isolated, double pole double throw manual transfer switch must be installed anytime the generator is being used or demonstrated in conjunction with an existing electrical distribution system.

1. These engine generator sets are designed for mobile vehicular use. The generator output consists of two independent 120 volt windings. These windings may be connected in series to permit 120 and 240 volt dual voltage availability, or in parallel to provide 120 volt only power at higher amperage.

Please note that any standard 3 wire 240 volt receptacle provided by the vehicle manufacturer is designed to power only 240 volt tools. There are two hot and one ground wire.... but no neutral connection in the 3 wire 240 volt receptacle. Split 120/240 volt TemPower service on an extension cord requires the installation of a 4 wire receptacle (2 hot, 1 ground, and 1 neutral). Consult a licensed electrician for wiring a TemPower plug and splitting the cord output into 120 and 240 volt power service.

To connect this unit directly to an un-powered, isolated mobile vehicle distribution panel, have your electrician wire the generator to the load(s) using one of the following methods:

- a. Connect the generator output to a distribution panel using a fine strand (flexible) motor lead wire. Install a mainline circuit breaker at the panel to protect the generator output winding and distribution wiring. The required breaker rating will depend upon the voltage desired. Use a single pole 20 or 23 Amp breaker for the 120/240 volt (series) connection. Use a 40 or 45 Amp single pole breaker for the 120 volt only (parallel) connection.
- b. Wire the generator output to a 120/240 volt, four wire twist-lock receptacle. (NEMA L14-30 {30 Amp} or Hubbell Spec. #CS 6365 {50 Amp}) The use of locking receptacles and locking plugs provides the convenience of quickly disconnecting the wiring for applications requiring the unit to be moved or for and security. The plug also allows non electrical workers to safely reconnect the power after moving the unit and prevents the plug from being accidentally removed by bumping or vibration.

CAUTION: EQUIPMENT DAMAGE

Failure to properly protect and limit the load applied to the generator will cause the generator to produce low voltage and may damage the engine generator set. With the 120/240v connection, the 120 volt loads must be balanced to prevent overloading either of the two generator windings. It may also cause severe damage to the loads connected to the generator at that time due to low voltage. Improper loading of the generator set constitutes abuse and will not be covered by warranty.

ENGINE CARE

If major engine service or repair is required contact an authorized engine service center. The manufacturer of these engines has established an excellent world-wide engine service organization. A listing of service centers is included with the engine operators literature package. Engine service is very likely available from a nearby authorized dealer or distributor. Check the yellow pages of your local telephone directory under "Engines-Diesel" for the closest engine repair center or ask the dealer from whom you purchased the power plant.

1. Change the oil as recommended in the engine operators manual. It is usually required to change oil after the first five hours of operation and every 50 hours thereafter under normal operating conditions. Change engine oil every 25 hours of operation if the engine is operated under heavy load, or in high ambient temperatures.

- a. Remove oil drain plug at base of the engine and drain the oil with the engine warm.
- b. Replace oil drain plug.
- c. Remove oil filler plug and refill with new oil. Refer to the table in the engine manual for the proper grade of oil based on your operating temperature.
- d. Replace filler plug.

2. Checking the Oil Level: The oil level must always be checked before the engine is started. Take care to remove any dirt or debris from around the oil fill plug before removing. Be sure the oil level is maintained. FILL TO POINT OF OVERFLOWING or on units with the extended oil fill to the "FULL" mark on the dipstick.

3. Servicing Air Cleaners

Consult engine operators manual for recommendations, procedures and intervals. Service more often if necessary if very dirty. Replace the cartridge using only original equipment parts available at any engine service center.

LOW OIL LEVEL SHUTDOWN SYSTEM

These engine generator sets come equipped standard with an energize to run low oil pressure safety shut-down/warning system.

This low oil warning system will automatically stop the engine before the oil pressure reaches an operational danger point. This feature is designed to prevent costly repairs and downtime. The lube oil pressure shut-down system uses a special switch mounted in the engine crankcase to sense the oil pressure. If a low oil pressure condition should occur during operation, the switch will open and interrupt the fuel solenoid coil, "killing" the engine.

Use of the oil safety shutdown system on applications that are subject to shock, bumping or severe angles of operation (in excess of 15 degrees) should be avoided. This is especially true if an unexpected shutdown would cause a safety hazard or serious inconvenience for the operator. An operator safety override is provided to disable the low oil pressure safety feature. A toggle switch is installed on the control panel that shorts out the oil pressure switch terminals. THIS SWITCH DISABLES THE LOW OIL SAFETY SHUTDOWN SYSTEM. THIS IS A SAFETY BYPASS AND IS INTENDED ONLY FOR SERVICE AND

EXTREME EMERGENCY OPERATING CONDITIONS. This bypass is useful for initial installation to prime the fuel line to the fuel pump. To operate the fuel pump, disable the starter control wire, operate the control switch to the run position. When the line is primed, restore the starter control wire and oil pressure switch. This switch can be bypassed, if necessary. Consult factory for details.

GENERATOR CARE

Proper care and maintenance of the generator is necessary to insure a long trouble free life.

1. Exercising The Generator - The generator should be operated every three to four weeks. It should be operated for a period of time sufficient to warm the unit up and to dry out any moisture that has accumulated in the windings. If left this moisture can cause corrosion in the winding. Frequent operation of the engine generator set will also insure that the set is operating properly should it be needed in an emergency.

2. Generator Maintenance - Any major generator service including the installation or replacement of parts should be performed only by a qualified electrical service man. USE ONLY FACTORY APPROVED REPAIR PARTS.

a. Bearing - The bearing used in these generators is a heavy duty double sealed ball bearing. They require no maintenance or lubrication.

b. Receptacles - Quality receptacles have been utilized. If a receptacle should become cracked or otherwise damaged, replace it. Using damaged or cracked receptacles can be dangerous both to the operator and to the equipment.

CLEANING

Remove dirt and debris with a cloth or brush. DO NOT use high pressure spray to clean either the engine or the generator. This high pressure spray could contaminate the fuel system and the generator components.

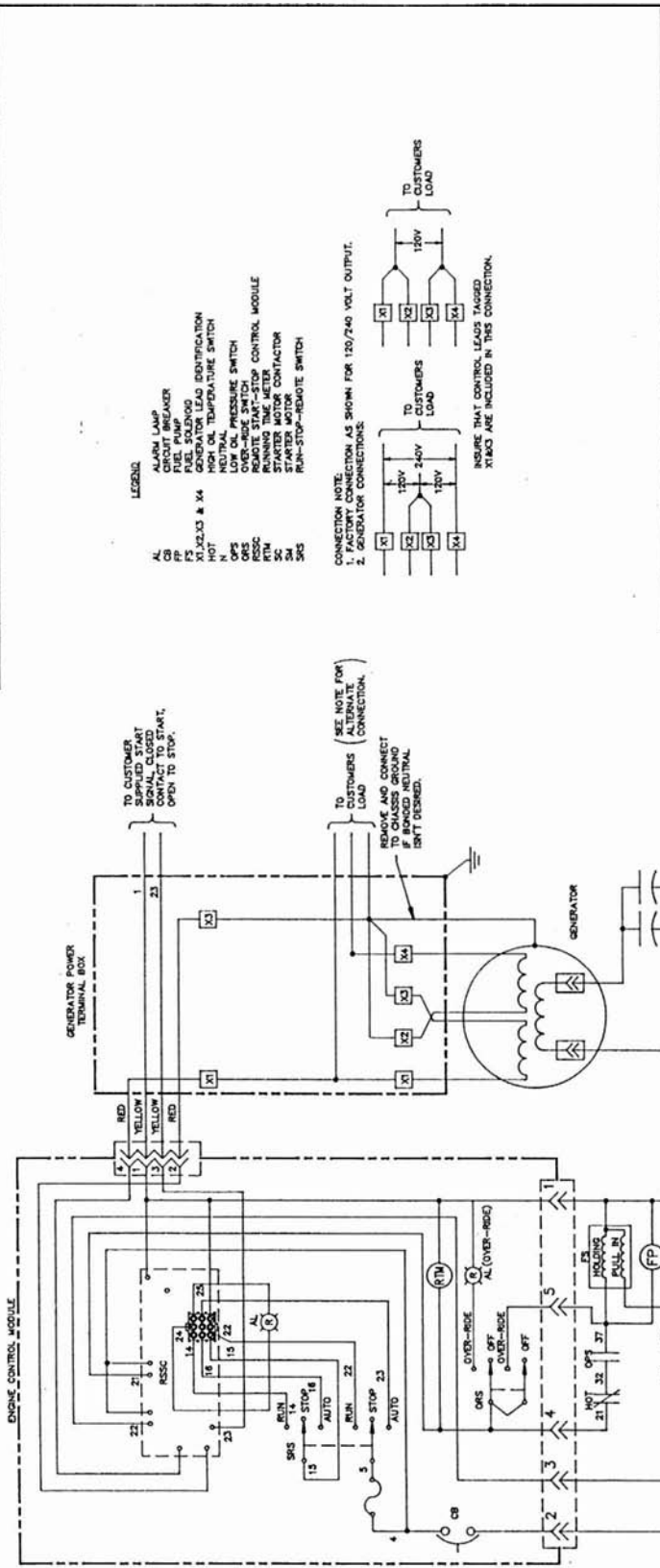
1. Keep the air inlet screen on both the engine and generator free of any dirt or debris to insure proper cooling. At least yearly remove the blower housing on the engine and clean the chaff and dirt out of the engine cooling fins and flywheel. Clean more often if necessary. Failure to keep these areas clean may cause overheating and permanent damage to the unit.

2. Periodically clean muffler area to remove all grass, dirt and combustible debris to prevent a fire.

3. On engine mufflers equipped with spark arresters, the spark arrester must be removed every 50 hours for cleaning and inspection. Replace if damaged.

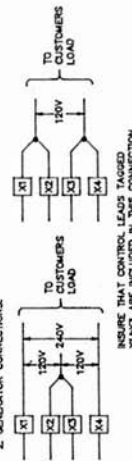
PROBLEM (SYMPTOMS)	POSSIBLE CAUSES
Won't Start (manual)	*Fouled fuel injector. *Out of fuel.
Won't Start (electric)	*Dead battery. *Defective start switch. *Defective start solenoid.
Battery not re-charging	*Broken or loose charging wire. *Defective charging circuit (engine). *Defective battery.
Voltage too low	*Engine speed is too low. *Generator overloaded. *Defective rectifier. *Defective stator. *Defective rotor (field).
Circuit Breaker Trips	*Defective load. *Defective receptacle.
Voltage too high	*Engine speed is too high.
Generator overheating	*Overloaded. *Insufficient ventilation.
No output voltage	*Short in load (disconnect). *Broken or loose wire. *Defective receptacle. *No residual magnetism in generator. *Defective stator. *Defective rotor (field). *Shorted capacitor. *Defective rectifier.

REVISION RECORD					
ISSUE	E.C.O. NO.	DESCRIPTION	DATE	BY	APPR.
1		ORIGINAL			
2		GEN. LEAD I.D. WAS G1,C3 & N	8-19-93	D.W.	<i>[Signature]</i>



- LEGEND**
- AL ALARM LAMP
 - CB CIRCUIT BREAKER
 - FP FUEL PUMP
 - HT HIGH TEMPERATURE SWITCH
 - HO HIGH OIL TEMPERATURE SWITCH
 - N NEUTRAL
 - OP OVER-PRESSURE SWITCH
 - OS OVER-SPEED SWITCH
 - RS REMOTE START-STOP CONTROL MODULE
 - RSM RUNNING METER
 - SM STARTER MOTOR
 - SPS RUN-STOP-REMOTE SWITCH

CONNECTION NOTE:
 1. FACTORY CONNECTION AS SHOWN FOR 120/240 VOLT OUTPUT.
 2. GENERATOR CONNECTIONS

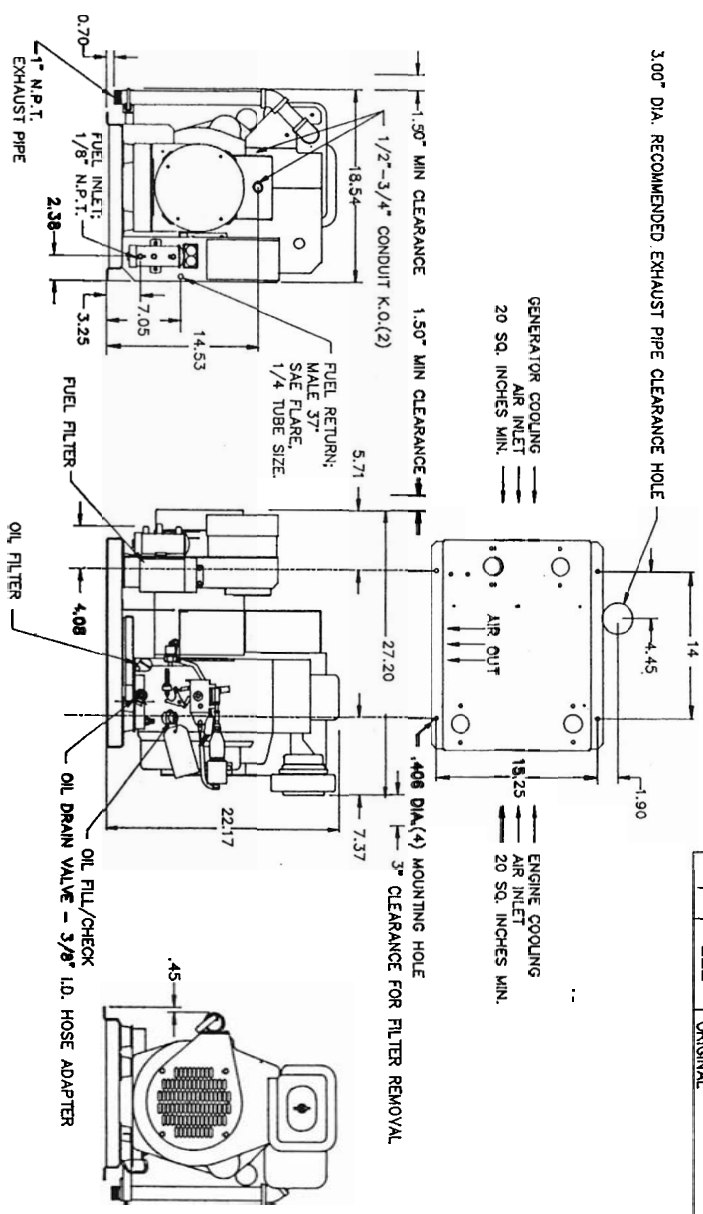


B-15766-1

UNLESS OTHERWISE SPECIFIED		MACHINED SURFACE TEXTURE		ALL DIMENSIONS GIVEN IN INCHES	
FRACTIONS ±	ANGULAR ±	DATE	DRWD BY	DATE	SCALE
1. PLACE DEC. #	±	3/17/93	RH	5/28/93	1"=3"
2. PLACE DEC. #					
3. PLACE DEC. #					
THIS DRAWING CONTAINS PROPRIETARY INFORMATION BELONGING TO WINCO. UNAUTHORIZED USE IS PROHIBITED.					
MATERIAL					
FINISH					
ASSTY					
MODEL EC5010DR					
TITLE					
SCHEMATIC					
PART NO. B-15766-1					

1-09981-B

REVISION RECORD					
ISSUE	E.C.O. NO.	DESCRIPTION	DATE	BY	APPR.
1		ORIGINAL			



EXHAUST SYSTEM:
 - OUTLET SIZE - 1" NPT
 - GAS FLOW - 78 CFM
 - MAX. EXTERNAL BACK PRESSURE 13" OF WATER.

- ADDITIONAL INFORMATION
- DRY WEIGHT - 225 POUNDS
 - FUEL SYSTEM
 - FUEL PUMP (ELECTRIC 12 VDC)
 - LIFT - 18" MAX.
 - MAX. RECOMMENDED RUN - 10' WITH 3/8" I.D. HOSE
 - FUEL FILTRATION: RACOR 120R FILTER/WATER SEPARATOR
 - FUEL CONSUMPTION: 1.8 GPH AT 3500 WATTS
 - ELECTRICAL REQUIREMENTS
 - STARTING MOTOR: 200 CCA
 - RUNNING: APPROX. 2 AMPS FOR FUEL SOLENOID AND FUEL PUMP
 - NO BATTERY CHARGING PROVIDED, MUST BE PROVIDED BY THE HOST VEHICLE.
 - REMOTE START FEATURE: TWO WIRE SYSTEM, CLOSED CONTACT TO START, OPEN TO STOP.

- COOLING REQUIREMENTS
- AIR FLOW
- ENGINE 610 CFM
- GENERATOR 100 CFM
- AIR INLET AREA
- EACH END 20 SQ. IN. MIN.
- AIR DISCHARGE AREA: THIS UNIT IS DESIGNED TO BE RUN WITH THE COMPARTMENT DOORS OPEN.
- PROTECTIVE FEATURES
- LOSS OF GENERATOR VOLTAGE
- LOSS OF ENGINE OIL PRESSURE
- HIGH ENGINE OIL TEMPERATURE
- PROVISION FOR MANUAL OVER-RIDE OF OIL PRESSURE AND TEMPERATURE SHUT DOWNS.

UNLESS OTHERWISE SPECIFIED		MACHINED SURFACE TEXTURE		ALL DIMENSIONS GIVEN IN INCHES	
FRACTIONS & PLACE DEC. #	ANGULAR	TEXTURE	WORK TO DIMENSIONS	DO NOT SCALE	
1. PLACE DEC. # .1	± 1.5°				
2. PLACE DEC. # .031					
3. PLACE DEC. # .005					

THIS DRAWING CONTAINS PROPRIETARY INFORMATION BELONGING TO WINGO UNAUTHORIZED USE IS PROHIBITED.

DATE	BY	DATE	BY	SCALE
6/6/94	RH	6/7/94	RH	1=10

WINGO INCORPORATED

OUTLINE DRAWING

PART NO. B-15860-1

B-15764-1

LEAD WIRE TABLE

REVISION RECORD

ITEM	LEAD WIRE			"A" END			"B" END			REMARKS
	U.D.#	PART NO.	LENGTH	QTY.	TERM.	LUG	STRIP	TERM.	LUG	
13	A-11067	5	1	NONE		1/2	5/32	POSITION 3 OF A-15654		
14	A-11067	7	1	A-81964	1/4	A-64583	5/32	POSITION 7 OF A-15654		
15	A-11067	7	1	A-81964	1/4	A-64583	5/32	POSITION 1 OF A-15654		
16	A-11067	7	1	A-81964	1/4	A-64583	5/32	POSITION 4 OF A-15654		
22	A-11067	7	1	A-81964	1/4	A-64583	5/32	POSITION 5 OF A-15654		
23	A-11067	7	1	A-81964	1/4	A-64583	5/32	POSITION 6 OF A-15654		
24	A-11067	5	1	NONE	1/2	A-64583	5/32	POSITION 8 OF A-15654		
25	A-11067	3.5	1	A-81964	1/4	A-64583	5/32	POSITION 9 OF A-15654		
4	A-12624	3.5	1	B-48602-1	1/4	B-48602-1	1/4	POSITION 2 OF (6) (CONN 1)		
2	A-11067	6	1	A-81964	1/4	A-64583	5/32	POSITION 2 OF (7) (CONN 2)		
1	A-11067	3.5	1	LUG WITH A END OF P	1/4	B-48602-1	1/4	CUT WIRE FROM 95063 IN HALF		
1	A-11067	6	1	A-81964	1/4	A-64583	5/32	POSITION 4 OF (6) (CONN 1)		
1	A-11067	8	1	A-81964	1/4	NONE	1/2			
1	A-12624	7	1	B-48602-1	1/4	B-48602-1	1/4			
22	A-12624	7	1	B-48602-8	1/4	A-96924-1	5/32	POSITION 3 OF (7) (CONN 2)		
21	A-12624	6	1	LUG WITH A END OF X	1/4	A-96924-1	5/32	POSITION 4 OF (7) (CONN 2)		
23	A-11067	5	1	A-81964	1/4	A-96924-1	5/32	POSITION 3 OF (6) (CONN 1)		
1	A-11067	6	1	A-96924-1	5/32	NONE	1/2	POSITION 1 OF (7) (CONN 2)		
1	A-11067	6	1	A-96923-1	5/32	NONE	1/2	POSITION 1 OF (6) (CONN 1)		
G1	A-11067	5	1	LUG WITH A END OF W	1/4	A-81964	1/4			
W	A-11067	3	1	B-48602-1	1/4	B-48602-1	1/4			
X	A-12624	2	1	B-48602-8	1/4	LUG WITH B END OF W	1/4			
Y	A-11067	5	1	A-96924-1	5/32	A-81964	1/4	POSITION 5 OF (7) (CONN 2)		

CLIP AND SEPARATE JUMPERS (2 PLACES)

SPACER W/ ITEM 3.

DETAIL "A"

DETAIL "B"

SEE DETAIL "A"

(CONNECTOR 2) (7) (4) (3)

(CONNECTOR 1) (6)

ITEM	PART NO	QUAN.	DESCRIPTION
1	A-15666-1	1	COVER, ENGINE CONTROL
2	A-15667-1	1	BOX, ENGINE CONTROL
3	A-15655	1	ENGINE CONTROL
4	A-15654	1	PLUG, CONNECTOR
5	A-71216-1	1	SWITCH
6	A-91286	1	C.B.
7	A-64577	2	INDICATOR LIGHT
8	A-95063	1	FUSE ASSY
9	7792	4	RHMS #6-32 X 3/8
10	A-95064-2	2	FUSE-3/4 AMPS
11	B-48602-8	2	LUG
12	394	4	HN, #6-32
13	97322	4	RHMS, 4-40x3/8
14	97327	4	ESN, 4-40
15	A-21698	4	SELF TAP, #10 X 3/8
16	A-96925-1	1	RECEPTACLE, 4 POSITION
17	A-96925-5	1	RECEPTACLE, 9 POSITION
18	A-12624	3.3 FT.	LEADWIRE
19	A-22989	5	EXT. TOOTH LW, #6
20	A-91958	2	ADAPTER
21	A-96936-5	2	WIRE NUT
22	A-64583	4	SOCKET, CONNECTOR
23	A-96923-1	4	SOCKET, PIN
24	B-11067	8.25 FT.	LEADWIRE
25	A-81963	1	TERMINAL LUG
26	A-81964	12	TERMINAL LUG
27	A-71216-2	1	SWITCH
28	B-48602-1	8	TERMINAL LUG
29	A-96936-7	1	WIRE NUT
30	A-58166-6	1	RUNNING TIME METER
31	A-96924-1	5	SOCKET, PIN

UNLESS OTHERWISE SPECIFIED

FRACIONS: 1. PLACE DEC. # .1 ANGLULAR SURFACE TEXTURE

2. PLACE DEC. # .031 ± 1.5°

3. PLACE DEC. # .005

ALL DIMENSIONS GIVEN IN INCHES

WORK TO DIMENSIONS

- DO NOT SCALE -

THIS DRAWING CONTAINS PROPRIETARY INFORMATION BELONGING TO WINCO. UNAUTHORIZED USE IS PROHIBITED.

DRAWN BY: R.H. DATE: 6/1/93

CHKD BY: DATE: 3-31-93

SCALE: 1=4

TITLE: ENGINE CONTROL ASSY

FINISH: C-15866

ASSTY: EC6010R

MODEL: EC6010R

PART NO. B-15764-1

WINCO, INC.

12 Month Limited Warranty

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

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

THERE IS NO OTHER EXPRESS WARRANTY.

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

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

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

EXCLUSIONS:

WINCO does not warrant engines, batteries, or other component parts that are warranted by their respective manufacturers.

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

WINCO[®]
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