

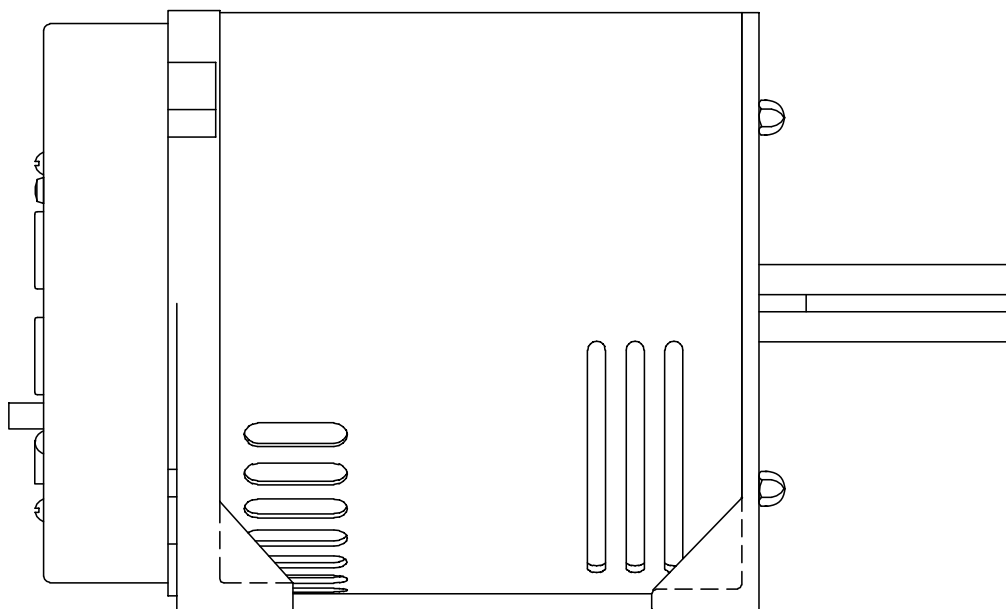
# TWO-BEARING GENERATOR

INSTALLATION AND  
OPERATORS MANUAL



RECOGNIZED COMPONENT  
CONFORMS TO  
UL STD 1004-1  
UL STD 1004-4

# ULTB4000C



## SAVE THESE INSTRUCTIONS

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

## USING THE 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.

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## PROPER USE AND INSTALLATION

You must be sure your new generator set is:

- \* Properly serviced before starting.
- \* Operated in a well ventilated area.
- \* Properly exhausted and gases safely dispersed.
- \* 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 \_\_\_\_\_

DEALER PHONE # \_\_\_\_\_

## UNIT SPECIFICATIONS

### GENERATOR

Surge Watts	4000
Continuous Watts	4000
Volts	120/240
Amps	33.3/16.6
Receptacles	2 - NEMA 5-15R 1 - NEMA L14-30R
UL Listed	UL STD 1004-1 UL STD 1004-4

# SAFETY INFORMATION

This generator 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, 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

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### 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.*

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### WARNING:

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

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### 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. 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 only three-pronged grounded receptacles and extension cords.
- e. Be sure the unit is properly grounded.

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

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

**3. 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.

**4. CLEANLINESS** Keep the generator and surrounding area clean.

- a. Remove all grease, ice, snow or materials that create slippery conditions around the unit.
- b. Remove any rags or other materials that could create a potential fire hazard.
- c. Carefully clean up any gas or oil spills before starting the unit.

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

- a. Use only factory approved repair parts.
- b. Do not work on this equipment when fatigued.
- c. Never remove the protective guards, covers, or receptacle panels while the engine is running.
- d. Use extreme caution when working on electrical components. High output voltage from this equipment can cause serious injury or death.
- e. Always avoid hot mufflers, exhaust manifolds, and engine parts. They can cause severe burns instantly.
- f. The use of the engine-generator set must comply with all national, state, and local codes.

# TESTING POLICY

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

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

# DESCRIPTION

The generator is a 3600 rpm two bearing, belt driven, brushless, revolving field design. The generator is self excited and inherently regulated to +/- (plus or minus) 7% - no load to full rated load. It can be operated under any load within its rating without being damaged. The frequency regulation is determined by the sensitivity of the customer supplied prime movers' governor. It is desirable to maintain this speed to within 3 cycles variation (61.5 Hz - 58.5 Hz) no load to full rated load (3690 rpm - 3510 rpm).

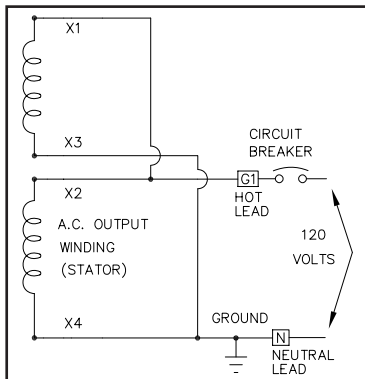
# UNIT CAPABILITIES

## GENERATOR CONNECTIONS

This generator is designed for 120/240 volt alternating current (AC). Two circuit breaker protected duplex outlets and one 240 volt twist lock receptacle are provided for connection to various loads. This generator can be spun in either direction.

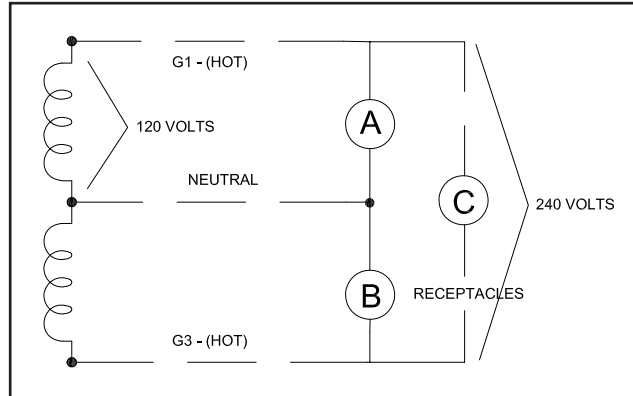
### FULL POWER 120 VOLT ONLY

This generator can be converted to full power 120 volt only. **Replacement of the circuit breaker and receptacle is required.** A 30 amp 1-pole circuit breaker and a 3-wire 30 amp twist-lock receptacle is recommended for full power applications. See wiring schematic below.



Check the appliance or tool nameplate for the current and voltage to insure compatibility. Although a circuit breaker is provided, damage due to overloading constitutes abuse and will not be warranted. Refer to the generator nameplate for unit's capabilities.

The diagram below represents a 4,000 watt generator. Only 2,000 watts at 120 volts (16.6 Amps) can be taken from the generator at receptacle A and up to 2,000 watts at 120 volts from receptacle C. On an ordinary generator, CAUTION MUST BE EXERCISED TO PREVENT OVERLOADING EITHER OF THE 120 VOLT CIRCUITS (A OR C).



## 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 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 Repulsion Induction (RI), Capacitor (Cap), or Split-Phase (SP) type. The chart below shows the approximate current required to start and run various types and sizes of 120 volt 60 cycle electric motors under average load conditions.

HP	AMPS RUNNING	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	13.0	not made	26 to 52	20 to 33

The figures given on the previous page are an 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.

Self-exciting generators respond to severe overloading differently than utility power. When overloaded, the engine is not able to supply enough power to bring the electric motor up to operating speed. The generator responds with high initial starting current, but the engine speed drops sharply. The overload may stall the engine. If allowed to operate at very low speeds, the electric motor starting winding will burn out in a short time. The generator winding might also be damaged.

#### **CAUTION: EQUIPMENT DAMAGE**

*RUNNING THE GENERATOR SET UNDER THESE CONDITIONS MAY RESULT IN DAMAGING 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.

## **PREPARING THE UNIT**

### **UNPACKING**

#### **CAUTION: EQUIPMENT DAMAGE**

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

1. This generator was in good order when shipped. Inspect the generator-set promptly after receiving it. If any 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 a claim rests with you when a generator-set is sent F.O.B. shipping point. Only you can legally file a claim.

2. Before proceeding with the preparations of your new generator for operation, take a couple of minutes to insure the unit you have received is the correct model and review the specification pages in

this manual to insure that this unit meets your job requirements.

## **UNIT INSTALLATION**

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 as a guide to finalizing your installation plans. The installation sequence is summarized below.

### **PLAN THE INSTALLATION**

Generally these two-bearing generators are used on portable equipment. For best service consider the following:

1. All electrical equipment should be protected from excessive moisture. Failure to do so will result in deterioration of the insulation and short circuits and grounds.
2. The generator should be installed in a sheltered area. If the unit must be left in the open it should always be protected with a weather cover such as a tarp or large piece of canvas after each use to keep out water and dust.

#### **CAUTION: EQUIPMENT DAMAGE**

*Always allow the generator and prime mover to cool before covering with a flammable weather covering.*

### **MOUNTING**

#### **CAUTION: EQUIPMENT DAMAGE**

*The generator must be mounted with the engine to a common rigid base to prevent stress on the engine and generator shafts and bearings due to vibration displacement. For permanent installations, the engine-generator is usually mounted on a sub-frame which can be shock mounted with special neoprene pads on the main frame.*

#### **CAUTION: EQUIPMENT DAMAGE**

*Before proceeding with the installation, be sure that you have completely read and understood the assembly and installation instructions.*

An engine with adequate horsepower and a close regulated (fixed speed) governor is required for satisfactory operation of this generator.

About 1.4 horsepower is required to produce each 1,000 watts of generator output power assuming 100% efficiency of both the engine and the genera-

tor. However, due to engine and generator efficiencies of 80 to 90%, the loss of power due to engine driving accessories such as cooling fans, battery charging alternators, etc., friction losses and slippage in the drive pulleys and belts, the general conservative rule of thumb allowing approximately two (2) horsepower for every 1,000 watts of generator output is much more realistic. For example, this 2,000 watt generator output will require a 4 or 5 H.P. engine for full output, good speed/voltage regulation, and satisfactory load performance. When determining the prime mover/generator pulley ratio to drive the generator at the correct operating speed, bear in mind that the power rating of most prime movers (usually an engine) varies with the speed. It produces more power at higher speeds, less when slowed. The prime mover must be run fast enough to reach the desired horsepower for good generator operation.

The drive belt system must be of adequate size and must be tight enough to power the generator without slippage. Be careful not to overtighten to the extent that it puts excessive strain on the bearings. Doing so can cause bearing failure and other possible damage to the generator.

Alignment of the generator to the prime mover is important. Misalignment of the pulleys will cause excessive belt and pulley wear and unnecessary stress on the prime mover.

The following table shows the effect of various operating speeds and electrical loads on a typical generator when matched and mounted to an adequate prime mover.

Although individual units and models may vary slightly, the normal voltage and frequency of typical 60 cycle engine-driven generators described in this manual are approximately as follows when powered by a typical prime mover (engine) run first with no load applied, then at half the generator capacity and finally when loaded to its full capacity as rated on the nameplate.

LOAD VS. OUTPUT			
Generator Load*	Speed (RPM)	Frequency (Hz)	Voltage
None	3690	61.5	129V
Half	3600	60.0	120V
Full	3510	58.5	115V

\* NOTE: Required generator speed must be maintained at 3600 +/- 90 RPM under all load conditions.

All engines have a tendency to slow down when a load is applied. The governor on the engine is designed to hold the engine speed nearly constant.

When the electrical load connected to the generator is increased, the engine is more heavily loaded and as a result the speed drops slightly. This slight decrease in speed together with the natural "voltage drop" within the generator itself due to load current and heating of the windings, results in a slightly lower voltage than when the generator is running idle.

The normal slight variations in speed also directly affect the frequency of the output current. This frequency variation has no appreciable effect in the operation of most loads (such as motors, lights and most small appliances). However, timing devices and clocks will not keep perfect time unless the engine can keep the generator running at exactly 3600 RPM at all times. Since this is not usually possible, minor time errors in clocks occur.

The speed of the engine is usually adjusted so that the generator produces proper voltage. If the adjustment is made "cold," set the voltage a little higher than normal since it will drop a few volts as the generator warms up.

NOTE: When operating continuously at full load the generator shell becomes very warm. It will be uncomfortable to the touch. This is normal for any high performance inherently regulated generator. Output voltage should be checked periodically to ensure proper operation of the generator and appliances.

#### CAUTION: EQUIPMENT DAMAGE

*Low voltage may damage any motors or appliances connected to it. Running the generator at excessively high speeds results in too high voltage which will also damage electrical devices connected to it. Excessively high speed may also cause damage to the generator armature windings.*

## CONNECTING THE LOADS

**Applying The Load** - A short warm-up time will permit the engine to work more efficiently when the load is applied and will reduce the wear and extend its life. Receptacles have been provided on the end cover to connect the loads on this generator.

#### 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.*

Most electric tools and appliances 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.

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.

Proper utilization amperage is necessary to prevent damage to either the receptacles/breakers or the generator. The generator is a limited source of electrical power, therefore pay special attention to the receptacle and generator ratings. The nameplate rating can be obtained through a combination of receptacles or a single receptacle as long as the receptacle amperage rating is not exceeded. Both the 120 and 240 volt output can be utilized at the same time. See specification section for proper load separation.

Plug your tools such as drills, saws, blowers, sump pump and other items to be powered directly into the generator receptacles. Before plugging in all the tools and cord sets, recheck the rating of the generator. Be sure it can handle the intended load and is compatible with voltage, phase and current ratings.

'Hard Wiring' this unit directly into a temporary construction site electrical system 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 before proceeding.

**WARNING: PERSONAL DANGER**

*A fully isolated, double pole double throw manual transfer switch must be installed any time a generator is being connected to an existing distribution system.*

**CAUTION: EQUIPMENT DAMAGE**

*Failure to properly limit and balance the load applied to the generator will cause the generator to produce low voltage and may damage the engine generator set. It may also cause severe damage to the loads connected to the generator at that time. Improper loading of the generator set constitutes abuse and will not be covered by warranty.*

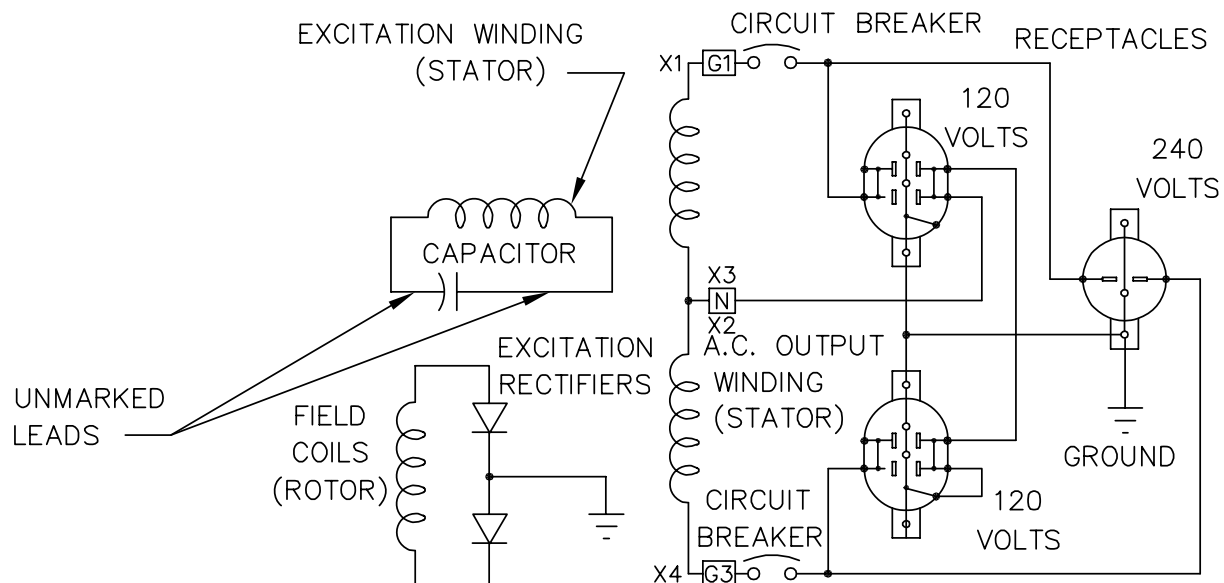
**WINGO INC**<sup>®</sup>  
A Division of **DTE** Dyna Technology Inc

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SERVICE DEPT.  
507-357-6831**

# TROUBLESHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Low voltage.	<ol style="list-style-type: none"> <li>1. Generator operating below correct RPM speed.</li> <li>2. Generator overloaded.</li> <li>3. Defective stator</li> <li>4. Defective rotor</li> </ol>	<ol style="list-style-type: none"> <li>1. Generator must be operated at 3600 RPM +/- 90 RPM for proper output voltage.</li> <li>2. Reduce load to generator nameplate.</li> <li>3. Repair or replace stator.</li> <li>4. Repair or replace rotor.</li> </ol>
Output voltage too high.	Engine speed too high.	See engine manual.
Generator overheating.	<ol style="list-style-type: none"> <li>1. Generator overloaded.</li> <li>2. Poor ventilation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce load.</li> <li>2. Clear inlet and outlet air vents of debris. If unit is housed, ensure at least 2 ft. clearance on all sides and that inlet and outlet vents are of adequate size.</li> </ol>
No output voltage.	<ol style="list-style-type: none"> <li>1. Short in load.</li> <li>2. Broken or loose wire.</li> <li>3. Defective receptacles.</li> <li>4. Defective capacitor.</li> <li>5. Defective diode(s).</li> <li>6. No residual magnetism in generator.</li> <li>7. Defective stator.</li> <li>8. Defective rotor</li> </ol>	<ol style="list-style-type: none"> <li>1. Disconnect load and find fault in load.</li> <li>2. Repair or replace wire.</li> <li>3. Replace receptacle(s).</li> <li>4. Replace capacitor.</li> <li>5. Replace diode(s).</li> <li>6. Flash the field.</li> <li>7. Repair or replace stator.</li> <li>8. Repair or replace rotor.</li> </ol>

## WIRING SCHEMATIC

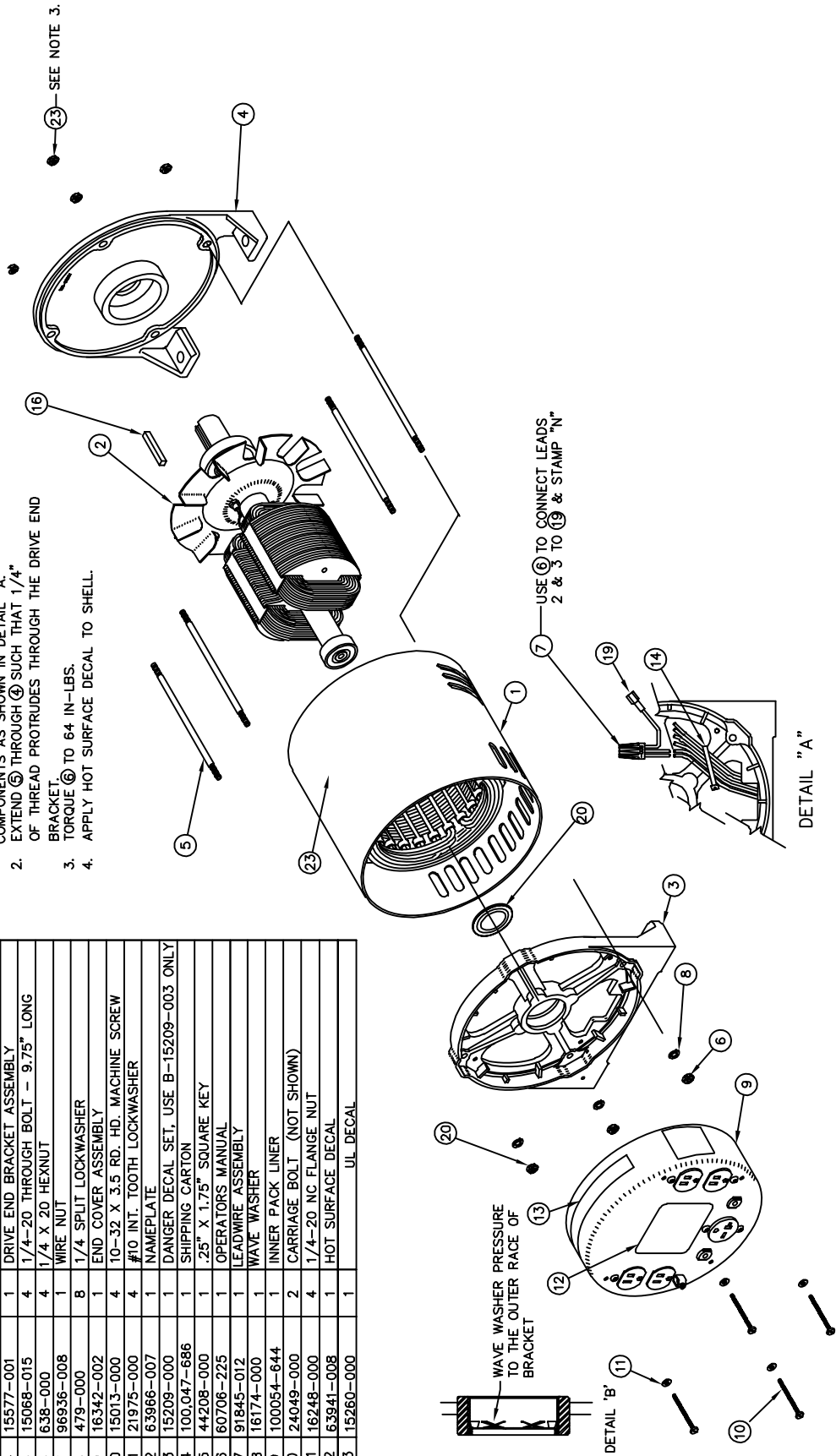


# ILLUSTRATED PARTS LIST

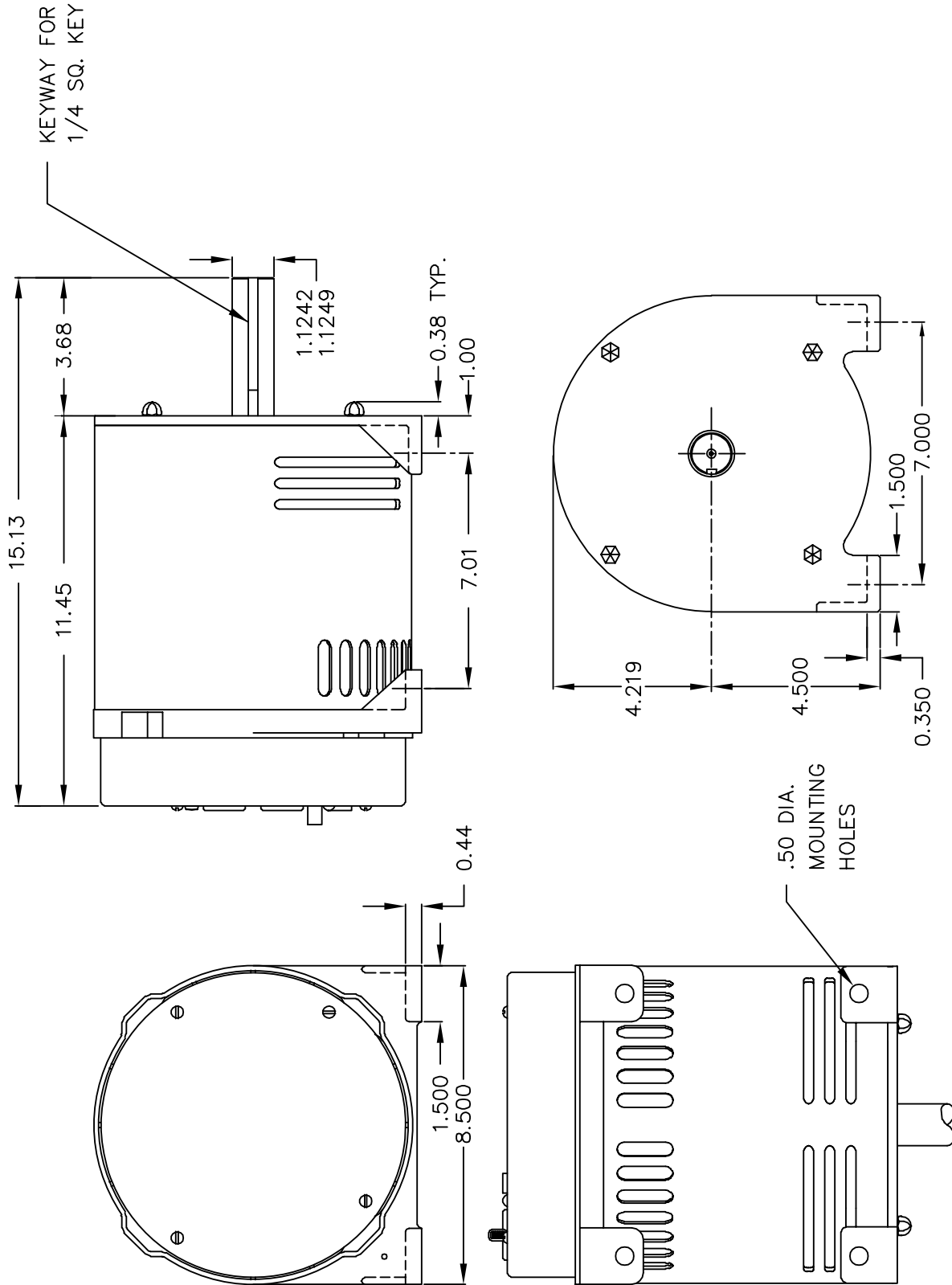
**NOTES:**

1. SECURE GENERATOR LEADS TO SPOKE OF END BRACKET TO PREVENT THEM FROM COMING IN CONTACT WITH ROTATING COMPONENTS AS SHOWN IN DETAIL "A." EXTEND ⑤ THROUGH ④ SUCH THAT 1/4" OF THREAD PROTRUDES THROUGH THE DRIVE END BRACKET. ⑥ TO 64 IN.-LBS.
2. TORQUE ⑥ TO 64 IN.-LBS.
3. APPLY HOT SURFACE DECAL TO SHELL.

ITEM	PART NO	QUAN.	DESCRIPTION
1	15621-000	1	STATOR ASSEMBLY
2	15581-000	1	ROTOR ASSEMBLY
3	15561-000	1	BEARING BRACKET ASSEMBLY
4	15577-001	1	DRIVE END BRACKET ASSEMBLY
5	15068-015	4	1/4-20 THROUGH BOLT - 9.75" LONG
6	638-000	4	1/4 X 20 HEXNUT
7	96936-008	1	WIRE NUT
8	479-000	8	1/4 SPLIT LOCKWASHER
9	16342-002	1	END COVER ASSEMBLY
10	15013-000	4	10-32 X 3.5 RD. HD. MACHINE SCREW
11	21975-000	4	#10 INT. TOOTH LOCKWASHER
12	63966-007	1	NAMEPLATE
13	15208-000	1	DANGER DECAL SET, USE B-15209-003 ONLY
14	100.047-686	1	SHIPPING CARTON
15	44208-000	1	.25" X 1.75" SQUARE KEY
16	60706-225	1	OPERATORS MANUAL
17	91845-012	1	LEADWIRE ASSEMBLY
18	16174-000	1	WAVE WASHER
19	100054-644	1	INNER PACK LINER
20	24049-000	2	CARRIAGE BOLT (NOT SHOWN)
21	16248-000	4	1/4-20 NC FLANGE NUT
22	63941-008	1	HOT SURFACE DECAL
23	15260-000	1	UL DECAL

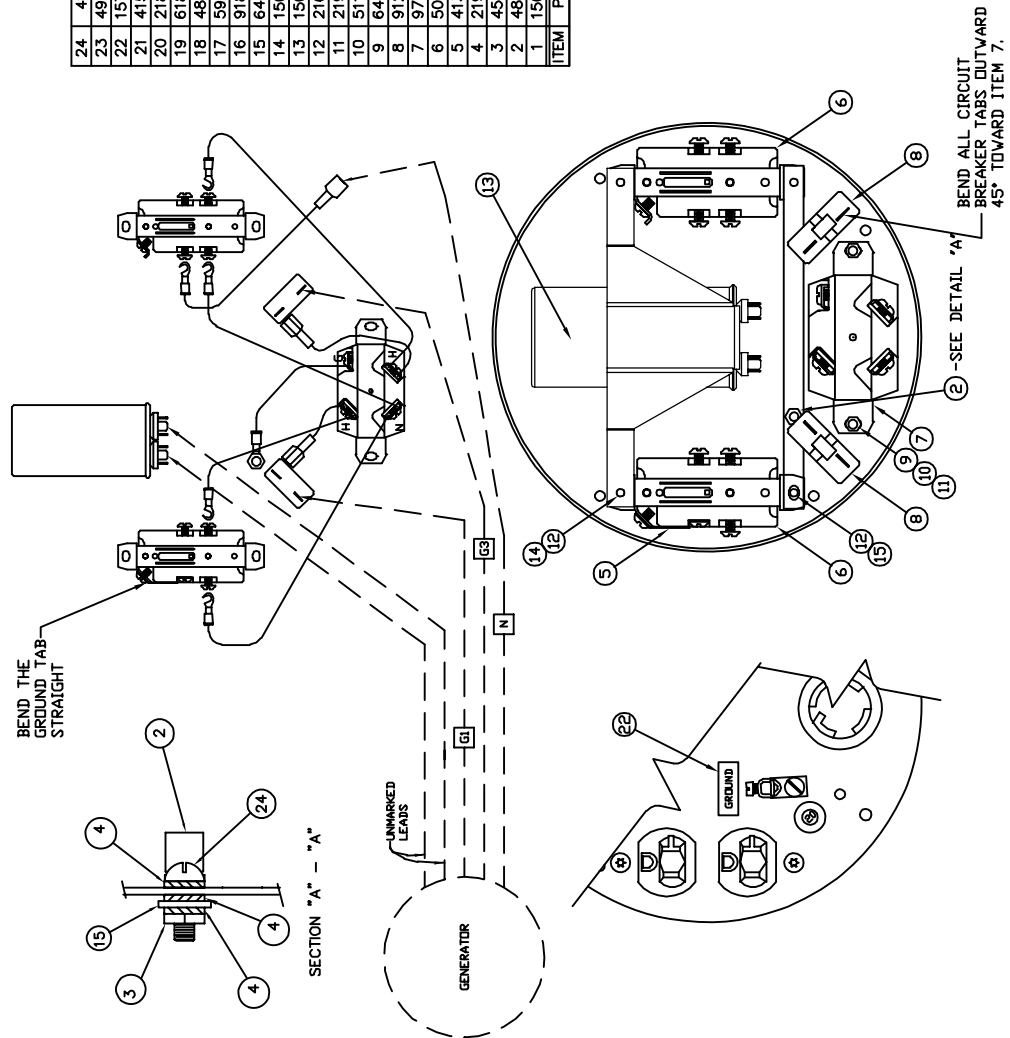


# OUTLINE DRAWING



# END COVER ASSEMBLY & WIRING CONNECTIONS

ITEM	PART NO	QTY	DESCRIPTION
24	419-000	1	#10-24 X 1/2 ROUND HEAD SCREW
23	49975-010	2	CABLE TIE
22	15750-000	1	DECAL, GROUND
21	4158-000	1	TERMINAL LUG
20	21850-002	12	TERMINAL LUG
19	61898-000	2	TERMINAL LUG
18	48602-004	1	TERMINAL LUG
17	59341-000	.375 FT	LEAD WIRE, #14 GA. GREEN
16	91815-000	3.125 FT	LEAD WIRE, #14 GA. BLACK
15	64045-029	1	MOUNTING STRAP
14	15088-001	1	CAPACITOR STRAP
13	15051-000	1	CAPACITOR
12	21698-001	4	TORX SHEET METAL SCREW, #10 X 3/8
11	21976-000	2	LW, #8 EXTERNAL TOOTH
10	5113-000	2	HN #8-32
9	6402-001	2	BHMS #8-32 X 3/8
8	91286-020	2	CIRCUIT BREAKER, 20 AMP
7	97360-000	1	30 AMP, 120/240 RECEPTACLE (L14-30)
6	50766-000	2	20 AMP, 120 VOLT DUPLEX RECEPTACLE
5	41387-009	1	GROUND STRAP
4	21975-000	3	LW, #10 EXTERNAL TOOTH
3	456-000	1	HN #10-24
2	48042-001	1	GROUND LUG
1	15050-002	1	END COVER





## 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 LeCenter 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 improvements on products purchased previously.

### EXCLUSIONS:

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

WINCO does not warrant Component Parts that are warranted by their respective manufacturers.

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

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

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