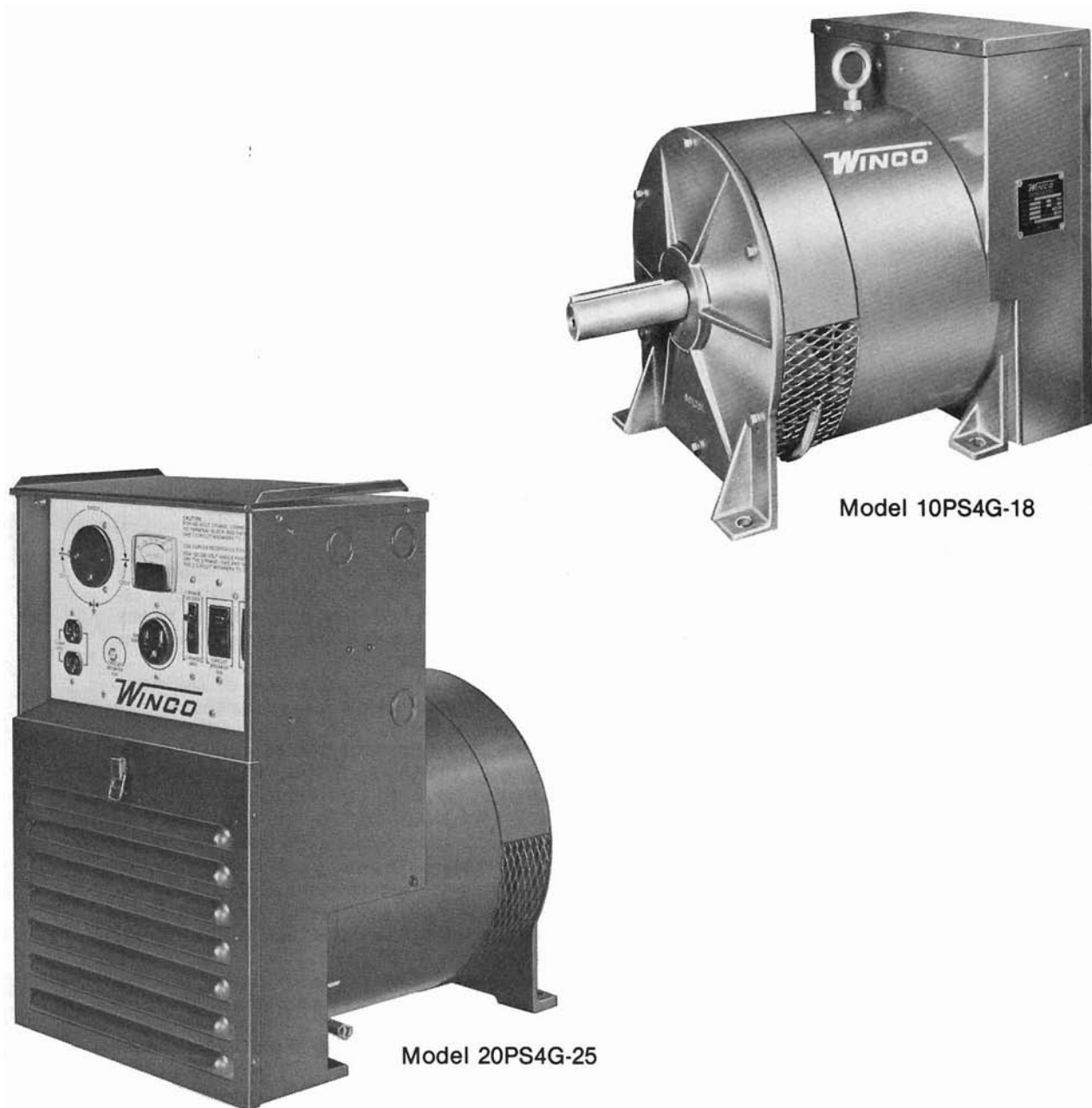


INSTALLATION, OPERATION, & MAINTENANCE INSTRUCTIONS



Model 10PS4G-18

Model 20PS4G-25

Typical Models

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Limited Warranty

Winco Division of Dyna Technology, Inc., warrants that for one year from date of shipment it will repair or replace for the original user the whole or any part of the product found upon examination by Winco at its factory at 225 South Cordova Street, LeCenter, Minnesota, or by any Factory-Authorized Service Station to be defective in material or workmanship under normal use and service.

For warranty service, please return the product within one year from date of shipment, transportation charges prepaid, to the Winco factory or to your nearest Factory-Authorized Service Station as listed in the 'Yellow Pages' under Generator-Electric.

THERE IS NO OTHER EXPRESS WARRANTY. TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT, AND LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR EXPENSES IS EXCLUDED. Some states do not allow limitations on the duration of an implied warranty, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights; you may have other rights which vary from state to state.

Winco does not warrant engines, batteries, or certain other component parts of the product since such items are warranted by their manufacturers.

Winco does not warrant alterations or repairs which were made by someone other than the Winco factory or a Factory-Authorized Service Station and which affect the stability or reliability of the product.

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

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

General Information

Description and Features

This three phase generator is designed specifically for the irrigation market with a forcing circuit which provides motor starting capability in excess of one horsepower per generator KW.

The following standard features are included:

1. A clearly marked insulated terminal block for convenient load connections.
2. A box with ample room for wiring.
3. Drip-proof construction of generator and junction box.
4. Adjustable voltage control to compensate for line voltage drop.
5. Excellent serviceability was designed into the generator with all normal serviceable items thoughtfully placed and easily accessible in the junction box.
6. Double sealed bearings of ample size assure long maintenance free life.
7. Voltage surge suppressors are provided to protect the generator from voltage transients resulting from switching motor loads, lightning, etc.
8. Screened cooling vents to prevent field mice from entering generator.

Safety Information

CAUTION: Possible damage to equipment



Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the equipment.

WARNING: Personal danger



Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible loss of life.

Safety Suggestions

1. **Warning**—A drive system guard should be installed to prevent possible personal injury.
2. Always use care when operating any mechanical or powered equipment.
3. Never work on the unit with the engine running.
4. Keep clear of all moving parts.
5. Keep your equipment clean. Periodically check for loose bolts, nuts, and fasteners.

Unpacking

When unpacking the machine, be sure to inspect it carefully to see that no damage occurred in transit. If damage is noted, notify the transportation company immediately and have them write the nature of the damage on the freight bill, so that a claim can be filed if necessary.

Installation

Location

This generator was designed specifically for the irrigation market to be installed outdoors near the center pivot irrigation pump drive engine.

No special care is required; however, if the unit is to be left in the open during the off season, it should be covered with a canvas tarp to keep out excess water, ice and dust.

Mounting

The generator should be mounted on slotted rails to allow for belt adjustment. The rail should be bolted securely to a substantial base such as steel channel or concrete to prevent vibration and flexing. The mounting base should be located in an elevated position to protect from possible accumulation of moisture, mud and dirt.

Drive

This generator is designed to operate at 1800 RPM only. An engine of adequate size and equipped with a sensitive governor is required for satisfactory operation of the generator. Approximately 1.8-2.2 horsepower (based on engine rating and design) should be allowed for every 1000 watts of generator capacity. That is, a 20,000 watt generator requires approximately 40 additional engine horsepower.

A 10,000 watt generator requires approximately 20 additional engine horsepower.

When determining the pulley ratio, bear in mind that the power rating of the engine varies with the speed and that it must maintain a nearly constant drive speed for the generator.

Since all engines have a tendency to slow down when a load is applied, the governor on the engine must be sensitive enough to hold the speed constant within $\pm 2\frac{1}{2}$ percent. When the electrical load connected to the generator is increased, the engine is more heavily loaded and as a result the speed drops slightly. Although this slight decrease in speed normally results in a lower output voltage when the generator is loaded, the unique forcing circuit boosts the generator voltage to compensate for this loss. Slight variations in speed affect only the frequency of the output voltage. This frequency variation has no appreciable effect in the operation of motors, lights and most appliances; however timing devices and clocks will not keep perfect time unless the generator shaft is turning at **exactly** 1800 RPM.

Load

Lethal voltages are present inside the generator junction box. Use extreme care whenever the generator box is opened. Consult a qualified electrician for all wiring.

This generator is equipped with a terminal block for convenient connection of electrical loads. The output voltage and maximum load of each generator is clearly marked on the nameplate. Do not

connect any load whose electrical characteristics differ from those specified on the nameplate or that exceed the rating of the generator.

This four pole generator operates @ 1800 RPM Shaft Speed and produces 60 Hertz (60 cycles per second) power. Typical generator output voltages under no load and full load conditions are listed below:

No Load		480-490 *Volts AC
Full Load	@ 0.8 PF	480-490 Volts AC

*Voltage is adjustable between 400 & 520 volts.

NOTE: All wiring must be done in conformance with the national code and the state and local regulations.

Generator terminal block is labeled T1, T2 and T3. 480 volt three phase power is available at these terminals. Also 480 volts single phase is available between any two terminals. 277 volts single phase is available between any terminal and neutral/ground.

A ground lug is also provided on the shelf. The generator neutral is bonded at the factory to the generator frame.

Overload Protection

This entire irrigation generator employs components operating at far less than their rated capacity. For example: The exciter forcing field bridge rectifier on the 10 KW 15 amp. generator is rated to carry 122 amps. continuously and can handle one cycle surge currents up to 700 amps. Although these components were selected to allow ample surge capacity for motor starting, overload protection such as circuit breakers or fuses should be installed to protect the equipment from load faults such as single phasing and stalled motors.

Installation Procedure Summary

- Mount the generator
- Install drive system
- Install drive safety guards
- Connect load

The generator is now connected to the system. Before proceeding, recheck all work.

Final Preoperational Checklist

- Are each of the unit leads insulated and terminated properly?
- Is the neutral properly connected at both the generator and the pivot junction box?
- Is the drive system aligned and adjusted properly?
- Are all belts tightened?
- Check mounting bolts.
- Voltage adjust rheostat mounting nut and shaft lock nut tight.

When all checks have been made successfully, start the engine and bring it up to normal operating speed.

Carefully check the generator shaft speed. It must be 1800 RPM \pm 45 RPM (61.5-58.5 Hz).

Check generator output voltage at generator and pivot junction box. Adjust the generator no load voltage if necessary. Apply loads—start the tower motors.

If the tower motors turn backwards, interchange the load leads connected @ T1 and T2.

Recheck the generator voltage at the middle tower motor terminals. To compensate for line drop, adjust the rheostat in the generator junction box. Retighten shaft locknut to prevent unintentional rotation.

When voltage checks okay, replace the generator junction box cover and set the system controls for the normal operation mode.

CAUTION

Be certain all ventilation screens are in place before leaving generator. Field mice can do serious damage to the generator electrical insulation.



A belt or drive system guard should be installed to protect operators from accidental injury.

Operation

The output voltage should be checked periodically with a portable voltmeter to insure proper operation of the generator and motor loads.

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

The drive belt system must be of the correct drive ratio and of adequate size to carry the load. The belts must be tight enough to drive the generator without slippage but not to the extent that it puts excessive strain on the bearings—doing so will cause bearing failure and possible damage to the generator.

Use of Electric Motors

The power required to start any electric motor is considerably more than is required for keeping it running once it is started. The current required to start any motor varies with the load connected to it. An electric motor connected to an air compressor, for example, will require more than a motor to which no load is connected.

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. Due to underrated components and its unique forcing circuit, this three phase generator has the ability to start at least one horsepower per generator KW.

Preventive Maintenance

Bearings used in this generator are prelubricated and double sealed—no further greasing is required. If they become rough or worn they should be replaced.

Drive components should be checked periodically for wear. Keep generator cooling air intake and exhaust areas clear of obstruction. No other routine maintenance is anticipated.

Troubleshooting

If the generator does not work properly, first check the conditions under which it has been operating.

CAUTION

This machine uses solid state rectifiers in various circuits. **Do not use high voltage to check for resistance** or insulation breakdown without first disconnecting **all voltage sensitive devices**. If necessary make the electrical tests outlined.

1. **Check the speed** of the generator with a tachometer or frequency meter and adjust the engine governor if necessary. If the generator speed cannot be kept within the specified range when it is loaded to rated capacity, the engine is overloaded, or is not working properly or the engine speed governor is not sensitive enough to hold the speed constant over the generator load range.
2. **Check the generator nameplate** and specifications for maximum safe load. If you are uncertain about the amount of load, have it checked with an ammeter and voltmeter.
3. **Check for sufficient ventilation.** Be sure all ventilation holes and slots are cleaned periodically.
4. **If no output voltage is obtained** at the output wires, disconnect all electrical loads from the AC term block. If the generator operates properly with these wires disconnected, there is a short circuit in the load. Isolate and correct the short circuit.
5. **If no output voltage is obtained**—separately excite the generator as outlined below:

Separate Excitation (Dynamic check)—The generator can be checked by separately exciting the exciter control field with a 12 volt

automotive battery, or by use of two “D” size flashlight batteries:

Procedure: Locate the positive (+) lead (Marked 3) from the exciter control field (connected to the exciter rectifier terminal marked with a red dot or (+)). This positive (+) field lead should be disconnected from the rectifier and connected to the positive (+) side of the battery. The negative (–) lead from the exciter control field is connected to ground. The negative (–) side of the battery should be connected to ground. With 12 volt DC excitation, output from the generator should be approximately 400 volts AC with the generator turning @ 1800 RPM and no load applied.

Resistance Static Checks—Rectifiers—Check with an ohmmeter by marking and removing the lead wires from the rectifier. Connect the lead wires from the ohmmeter to adjacent rectifier terminals. A high resistance reading will be obtained when the ohmmeter leads are connected one way. When they are reversed, a low resistance reading will be obtained. All adjacent terminals should be checked in this manner.

Exciter Control Field—Disconnect positive (+) field lead. Field resistance should be approximately 40 ohm. With both control field leads disconnected, the resistance measured to ground should be infinity.

Main Rotary Field—Disconnect one main rotary field lead from the main terminal point. Resistance of field should be 4 to 5 ohm and measure infinity to ground with both fields disconnected.

Exciter Rotor—Lift three exciter arm leads. Readings between any two leads should be a very low resistance. Reading between each lead and ground should be infinity.

Main Stator Winding—Disconnect load. Reading should be less than one ohm between any two leads. Use the ohmmeter to check the windings (with all leads disconnected) to the generator frame to determine if the winding is grounded. If a high voltage tester is available, it should be checked for grounds at 1100 volts.

Troubleshooting Table

This machine uses solid state rectifiers in various circuits. **Do not use high voltage to check for**

resistance or insulation breakdown without first disconnecting *all voltage sensitive devices*.

Symptom	Possible Cause	Remedy
No output	Rheostat dirty or defective	Rotate knob back and forth, then reset. Repair or replace if necessary.
	Defective exciter rectifier	Replace
	No residual voltage	Flash field as described on Page 7
	Defective or incorrectly installed exciter surge suppressor	Replace or repair
	Broken lead wire to exciter field or rheostat	Repair or replace
	Defective exciter field	Repair or replace
	Defective or incorrectly installed rotating surge suppressor.	Repair or replace
	Defective rotary field	Repair or replace
Low Voltage (No load and full load)	Defective rotating rectifier	Replace
	Defective exciter field	Repair or replace
	Defective rotary field	Repair or replace
	Defective exciter arm	Repair or replace
	Defective output stator winding	Repair or replace
Low Voltage (Full load only)	Defective compound forcing rectifier	Replace
	Defective compound field	Repair or replace
	Broken or poor forcing circuit connections	Repair
Slightly Lower Voltage (Full load only)	Generator overload (Defective load)	Repair or reduce load
	Defective stator	Repair or replace
	Defective rotary field	Repair or replace
Generator Overheating	Generator overloaded (Defective load)	Repair or reduce
	Cooling vents blocked	Remove obstructions
	Loads single phasing (Defective load)	Repair broken line
Generator howls or vibrates badly (when load is applied)	Load short circuited (Defective load or improper connection).	Repair load or connection
Generator is noisy and vibrates (No load)	Defective bearing	Replace
	Generator stator shorted internally	Repair or replace
	Rotor unbalanced	Rebalance or replace
	Rotor rubbing	Repair or replace defective parts

