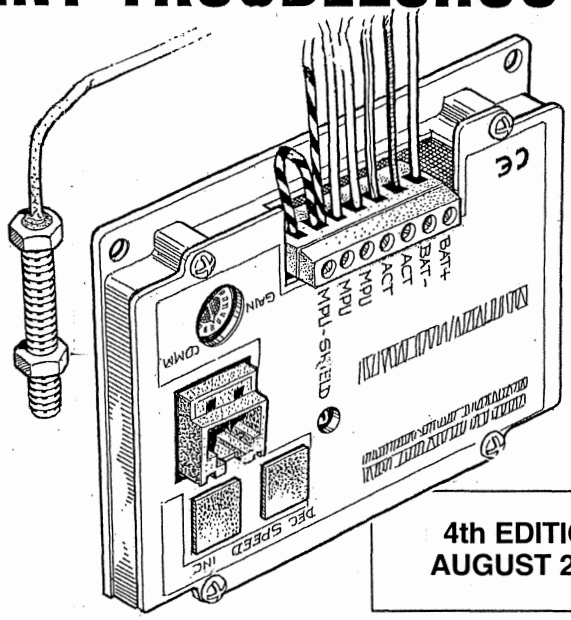
ELECTRONIC GOVERNOR

LOW PROFILE GASOLINE GENERATORS
ADJUSTMENT/CALIBRATION and
COMPONENT TROUBLESHOOTING GUIDE



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GOVERNOR SYSTEM COMPONENTS and OPERATION

DESCRIPTION

The Electronic Governor consists of three components, the **CONTROLLER**, a pc board installed in the control panel. A **MAGNETIC PICK-UP** (MPU) installed in the bellhousing over the engine flywheel and the linear **ACTUATOR** mounted on the engine and attached by linkage to the injection pump throttle control.

SYSTEM OPERATION

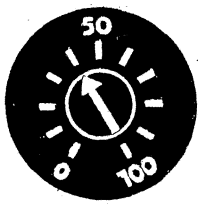
On start up system DC voltage is supplied to the controller to use for actuator operation. When the starter is energized and the engine cranks, the magnetic pick-up (MPU) that is positioned over the engines flywheel ring gear sends a low AC signal to the controller (1.5 - 2.5 AC volts).

The controller interprets this as engine cranking speed and sends a DC voltage to the actuator to operate the carburetor's throttle arm. The position of the throttle by the actuator has been previously determined by the speed adjustment on the speed controller. The engine carries up to a set speed determined by the AC voltage sent by the MPU.

The speed controller maintains this signal no load to full load by varying the DC voltage to the actuator providing more or less throttle depending on the generator load.

Gain Adjustment

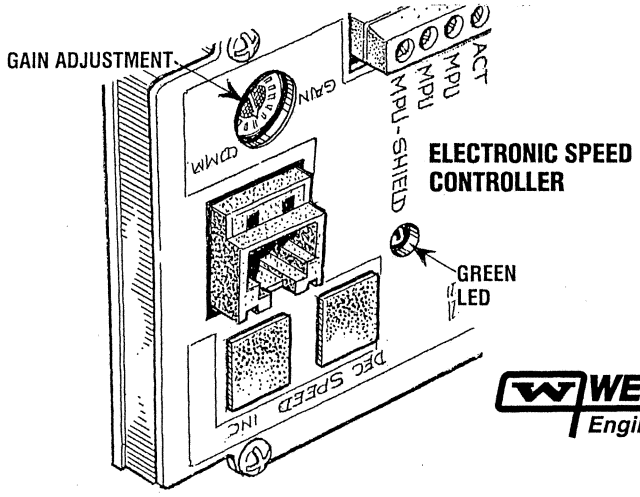
The gain can be adjusted using a small screwdriver. Adjustment should be between 30% and 40% as is required to dampen speed oscillation under load. An adjustment of more than 40% can cause the unit to race (speed up) when the load is removed or go into a hunting mode.



GAIN ADJUSTMENT

Speed Controller

The speed controller has a green LED indicating power to the controller, a plus and minus speed adjustment (buttons) and a gain adjustment. The green LED blinks when the power is turned on and after it receives a signal from the magnetic pick-up, it blinks at a faster rate.

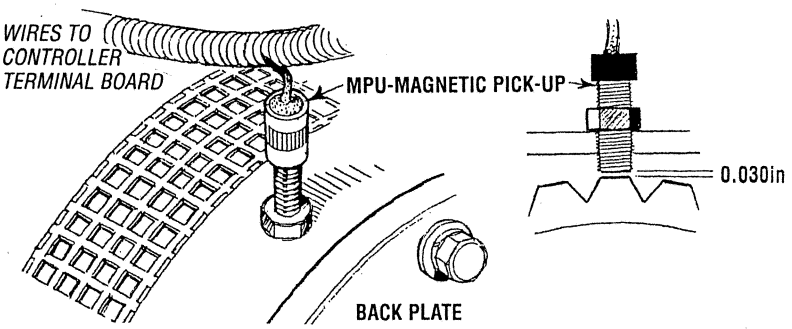


MAGNETIC PICK-UP [MPU] INSTALLATION

The MPU is installed in the threaded opening on the side of the flywheel bellhousing. This positions the MPU over the teeth of the flywheel ring gear.
Viewing through this opening, manually rotate the engine crankshaft so as to position the flat of one of the ring gear's teeth directly under the opening. Thread the MPU into the opening until it gently contacts the flat of this tooth (Thread is 3/8" x 24). Back the MPU out of the opening one turn and then lock it in this position with the jam nut. This will position the end of the MPU approximately 0.030 inches away from the flats of the ring gear teeth.

To ensure the MPU is positioned correctly, slowly rotate the crankshaft by 360° by hand to assure there is no physical contact between the MPU and the ring gear teeth.

If contact is felt between the MPU and the flywheel teeth, the MPU may be damaged. Remove the MPU and inspect it. Replace if necessary and repeat the above installation procedure.



NOTE: *If replacing the Magnetic Pick-Up (MPU) it **MUST** be replaced without cutting and splicing into the existing wiring cable. Doing so will cause a erratic AC signal to the controller.*

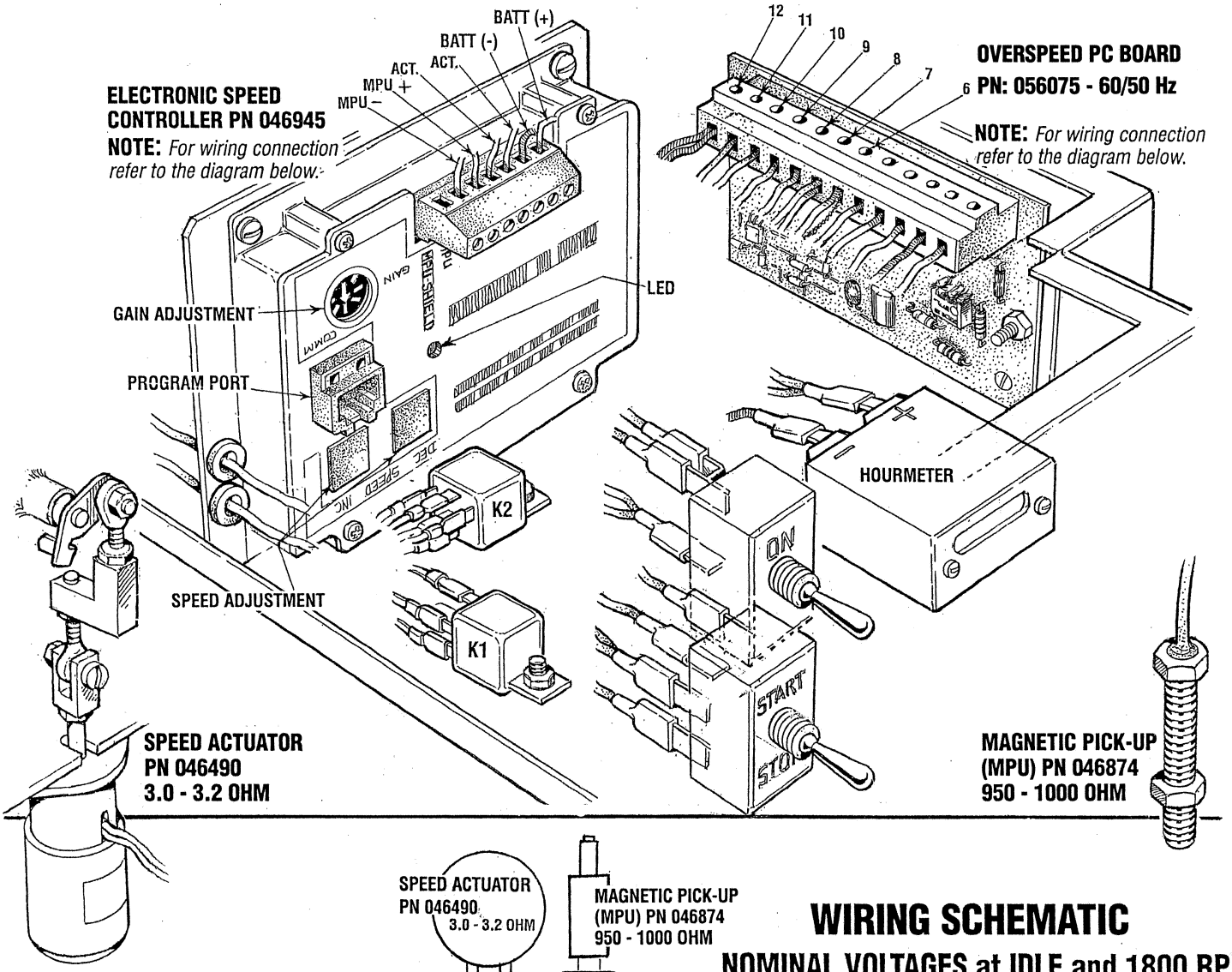
GOVERNOR CIRCUIT VOLTAGES

Monitoring the voltages found in the electronic governor's circuit will be helpful in determining where in the circuit the operating fault lies and with which component.

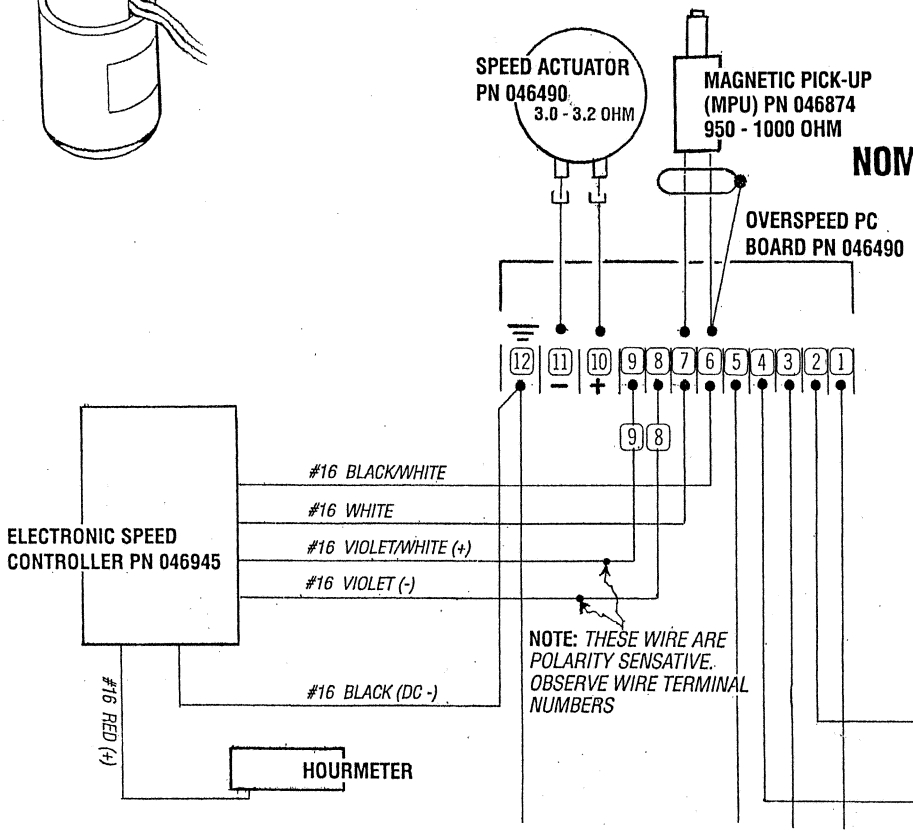
The circuit voltages listed with the circuit "wiring schematic" are the approximate voltages found in the governor circuit with the unit running at idle and at normal 1800rpm.

The electronic governor's circuit voltages can all be read and monitored from the connections on the 12 position terminal strip as illustrated.

PANEL COMPONENTS/WIRING



WIRING SCHEMATIC



NOMINAL VOLTAGES at IDLE and 1800 RPM

IDLE (*700-800 rpm*)

(Use DEC button on Controller to lower engine rpm.)

TERMINALS	
#7 → #6	1.5 - 2.5 VAC
#9 → #8	5.0 - 5.5 DC
#10 → #11	6.5 - 7.0 DC
#16 → #16 *RED BLACK*	12.2 DC

VOLTAGES SHOWN ARE TYPICAL

1800 RPM

TERMINALS	
#7 → #6	4 - 7 AC
#9 → #8	5.5 - 6.5 DC
#10 → #11	6.0 - 6.5 DC
#16 → #16 *RED BLACK*	13.1 DC

NOTE: *SPEED IS ADJUSTED USING INC/DEC PODS ON THE CONTROLLER*

CARBURETOR - LOW PROFILE

CARBURETOR

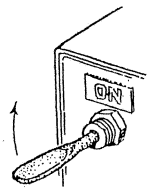
The carburetor is a single barrel, side-draft type with a cleanable metal screen air intake filter/spark arrester.

Air Screen

The air screen can easily be removed. Clean after the first 50 hours of operation and every 100 hours from then on. Clean the air screen in a water soluble cleaner such as GUNK.

CHOKE SOLENOID

The choke solenoid is a 12 volt DC operated unit that functions to close the choke plate in the carburetor when the **ON** switch is depressed during engine start-up.



ON SWITCH [CHOKE ENERGIZED]

The choke solenoid de-energizes once the engine starts and the **ON** switch is released. Some unstable running may be present when the engine starts cold but should smooth out as the engine reaches operating temperature.

Confirm Proper Operation

Start the engine and allow the engine to warm up. Once warm, engage the **ON** switch. If the engine chokes and stops, the choke linkage needs to be lengthened to hold the choke open slightly more. *If the engine slows but continues to run, the adjustment is ok.*

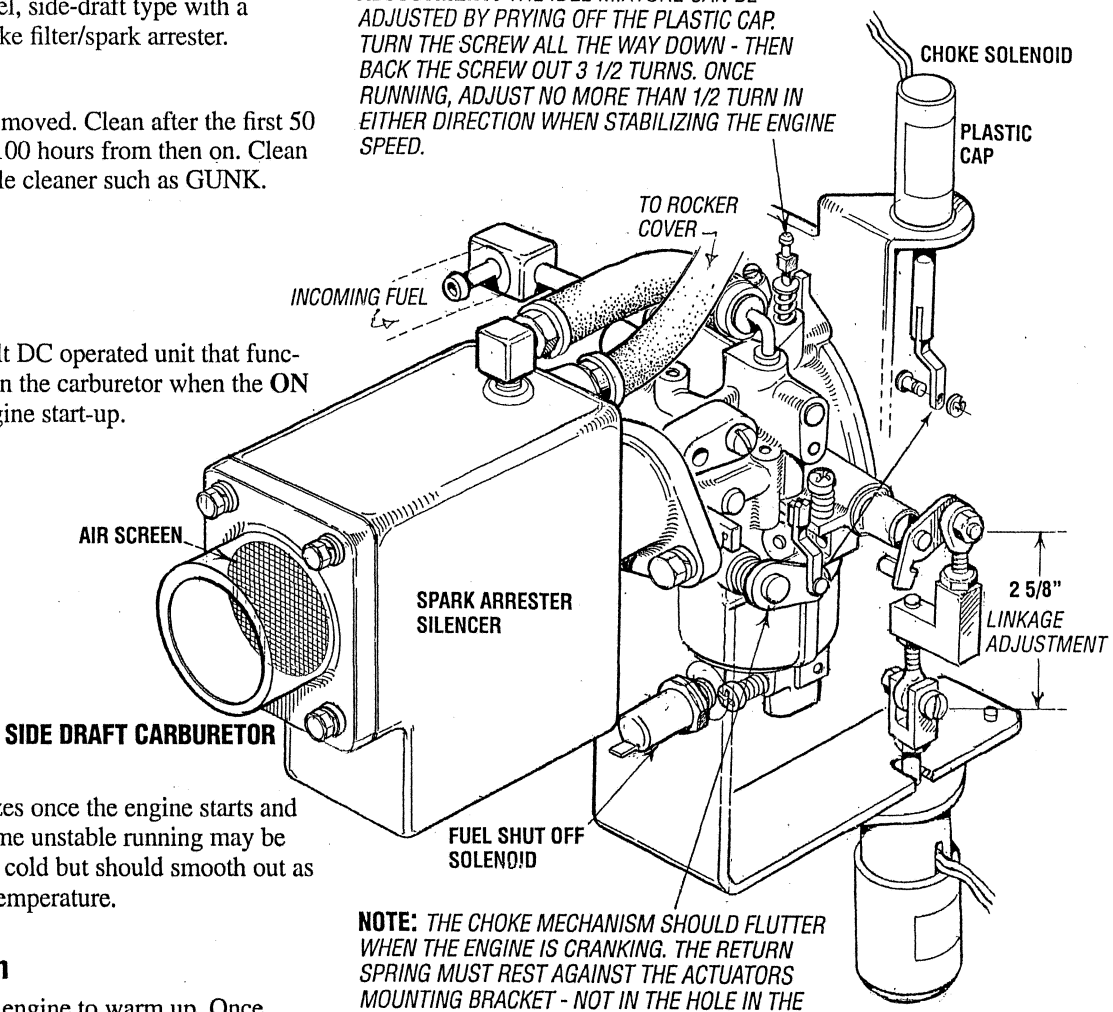
Linkage Adjustment

Adjust the linkage so that when the choke solenoid is energized, the choke butterfly/.lever is open approximately 1/16". Adjust the linkage so the pin hole in the linkage is approximately 1/16" beyond the fully closed choke lever.. then connect the choke lever to the linkage. Refer to the *IDLE MEASURE ADJUSTMENT* at the top of this page.

Speed Actuator Adjustment

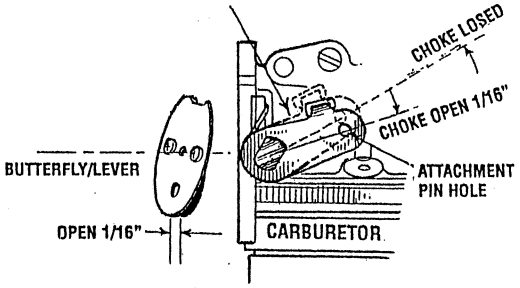
The speed actuator adjustment should be the only device in control of the throttle's position. The throttle linkage's eye bolts must be 2 5/8" apart (see illustration. The throttle should be in full fuel position when the unit is shutdown.

ADJUSTMENT: *THE IDLE MIXTURE CAN BE ADJUSTED BY PRYING OFF THE PLASTIC CAP. TURN THE SCREW ALL THE WAY DOWN - THEN BACK THE SCREW OUT 3 1/2 TURNS. ONCE RUNNING, ADJUST NO MORE THAN 1/2 TURN IN EITHER DIRECTION WHEN STABILIZING THE ENGINE SPEED.*



NOTE: *THE CHOKE MECHANISM SHOULD FLUTTER WHEN THE ENGINE IS CRANKING. THE RETURN SPRING MUST REST AGAINST THE ACTUATORS MOUNTING BRACKET - NOT IN THE HOLE IN THE CASTING BOSS.*

SPEED ACTUATOR: *THE SPEED ACTUATOR SHOULD MOVE FREELY. KEEP THE SOLENOID DRY AND LUBRICATE THE LINKAGE WITH TEFLON OR GRAPHITE LUBRICANT ONLY.*



BATTERY CHARGE CONTROLLER

THE CHARGING SYSTEM

Westerbeke's low profile generators are equipped with a battery charge controller that is powered from a separate winding in the generator. The battery charger controller is an encapsulated, solid-state unit that supplies a DC charging voltage to the generator's starting battery while the generator is operating.

Charging Voltage: 13.0 - 13.1 Volts DC

Charging Amperage: 0 - 12 Amps DC

NOTE: *The battery charging circuit is totally separate from the AC output of the generator. The generator output affects the circuits output, but not the reverse.*

A separate group of stator windings supplies AC voltage to a bridge rectifier which converts the AC current to supply the charging unit. The unit senses the needs of the starting battery and supplies a DC charge when one is needed. If you suspect that the unit is faulty (if the battery's charge is low), check the charging circuit and it's components(see *TESTING THE BATTERY CHARGER*). Check all connections for cleanliness and tightness including the ground before replacing the I.C. charger.

NOTE: *When the generator is first started, the charger will produce a low charging rate. This charging rate will rise as the generator is operated.*

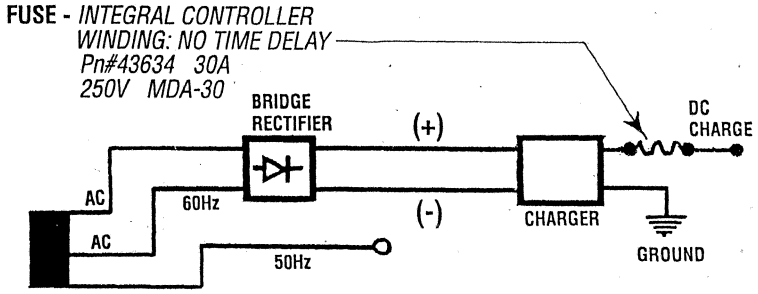
Fuse Protection

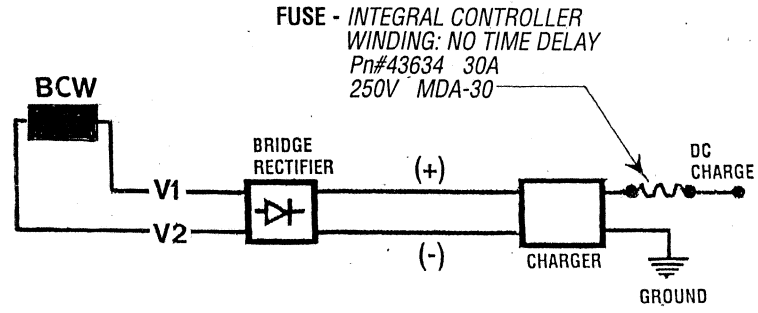
There are two 30 amp fuses protecting the DC charge circuit. One 30 amp buss fuse mounted on the control panel box and a spade type automotive 30 amp fuse in a holder adjacent to the starter motor. Anytime there is an **overspeed** issue, both of these fuses should be checked.

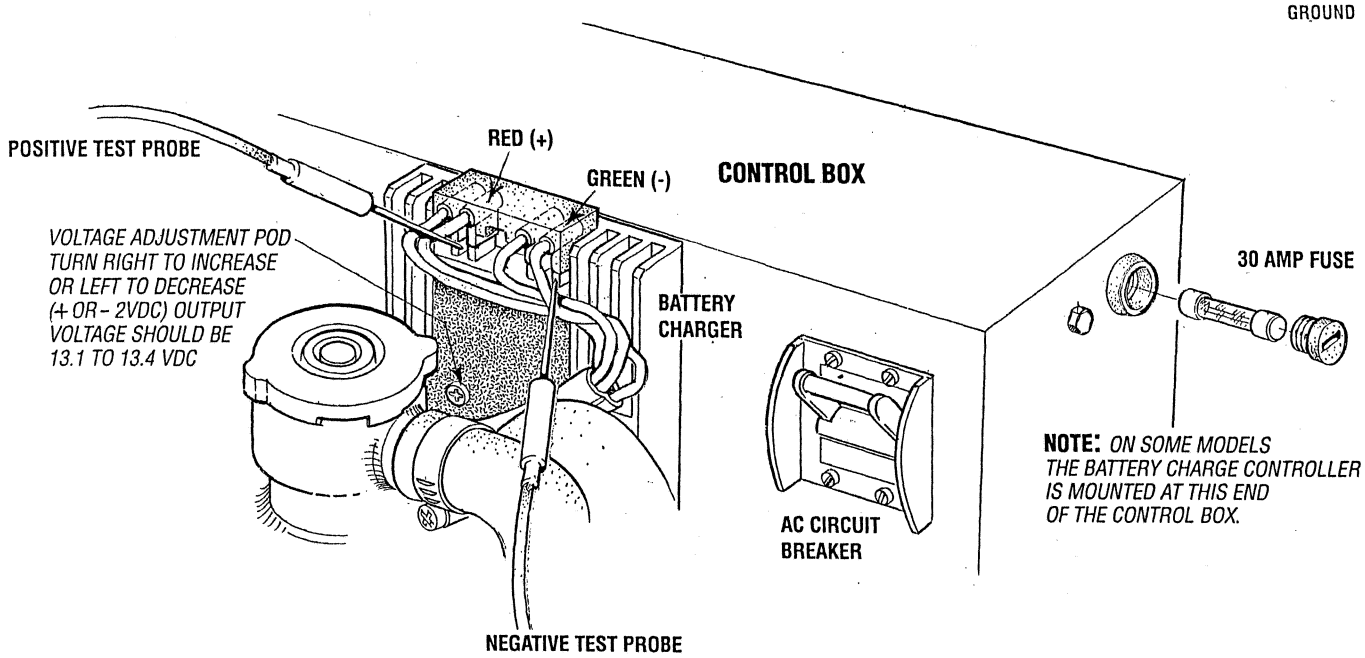
Testing the Battery Charger *(PN:038469)*

To test the battery charger, put a multimeter between the positive (+) and negative (-) leads to the battery. It should indicate 13.0V to 13.1V with the engine running. If only the battery voltage is indicated, check that the battery charger terminal connections are tight. With the unit running, test between the (+) and (-) on the battery charger (as illustrated) for 13.0V to 13.1V. If no charge is indicated, replace the charger.

Use of a dedicated and isolated starting battery is strongly recommended.



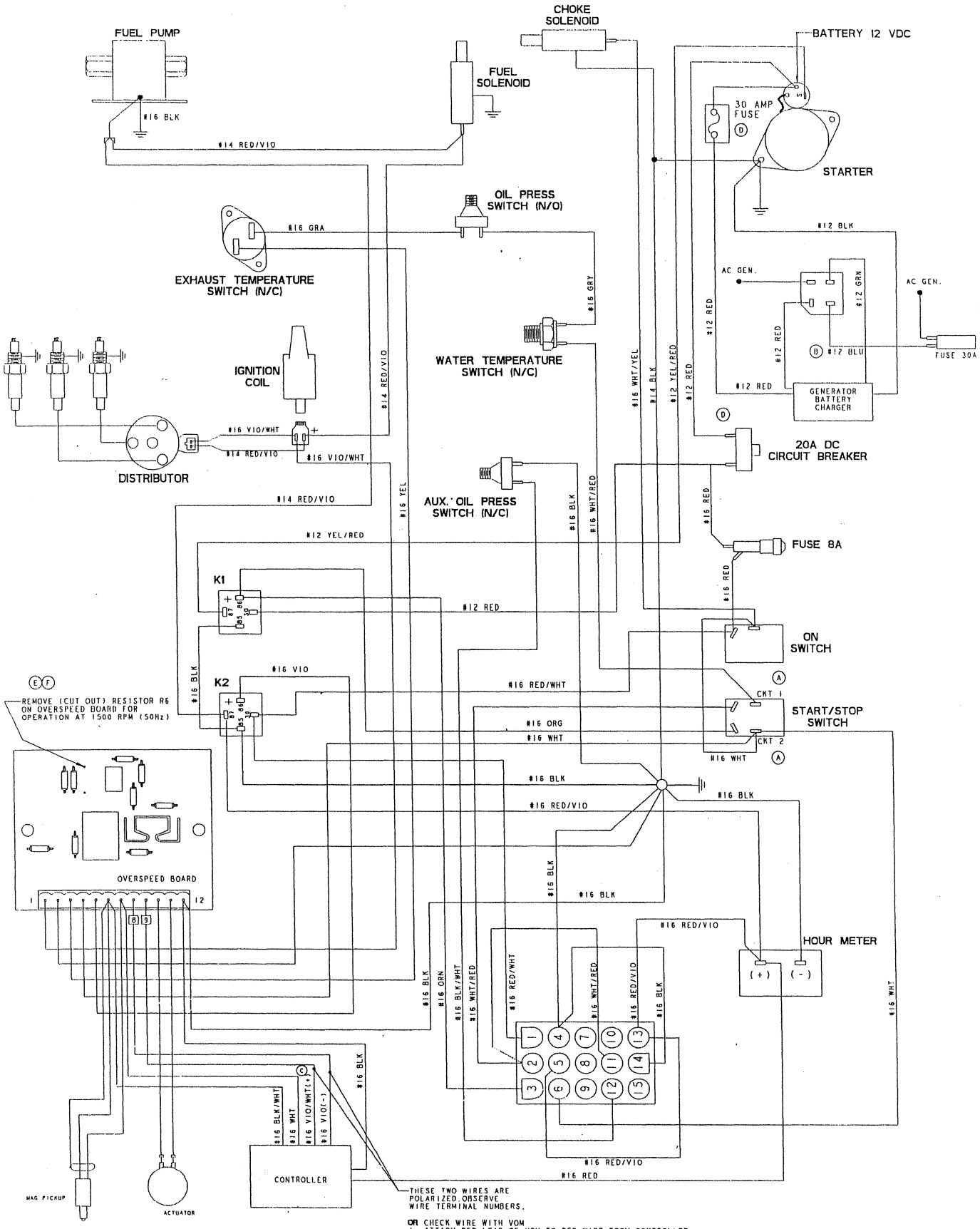




ELECTRONIC GOVERNOR TROUBLESHOOTING

PROBLEM	TEST/CHECK	CORRECTION
Unit starts, then overspeeds and shuts down. **NOTE:** *When troubleshooting manually operate the throttle to prevent an overspeed by disconnecting the throttle from the actuator and operate the throttle manually at 1800rpm.*	**1.** Check DC voltage between terminal #12 and + connection on hourmeter when ON switch is depressed.	**1.** Charge starting battery. Start unit, troubleshoot battery, charge circuit.
	2. Check the AC signal from the MPU while cranking, voltage should be 1.5 - 2.5 VAC.	**2.** Check the MPU resistance value and positioning. Adjust and replace as needed.
	3. Check the actuator.	**3.** Check the resistance value. Apply 12VDC across leds. Should fully retract. Replace as needed.
	4. Check the controller.	**4.** Manually control unit. Start and check DC voltage between #9 and #8, between #11 and #10. Replace controller or OS board as needed.
Unit starts, runs at idle. **NOTE:** *Less than one volt DC found between terminals #9 and #8 and high DC voltage-10 volts or higher between terminals #11 and #10 indicated a faulty controller.*	**1.** Incorrect speed adjustments..	**1.** Check and adjust speed adjustment.
	2. Faulty governor controller..	**2.** Check DC voltages from controller to O/S board and O/S board to actuator.
Actuator hunts during operation. **NOTE:** *Check carburetor adjustments before proceeding.*	**1.** Improper controller adjustment.	**1.** Lessen GAIN adjustment.
	2. Linkage or rod end bearings are sticking or binding.	**2.** Lubricate and replace as needed.
	3. Inadequate DC supply voltage.	**3.** Manually stabilize the unit. Check the DC voltage to the controller. Correct as needed.
	4. MPU positioned marginally too far away from the flywheel teeth, giving an erratic AC input signal to the controller.	**4.** Check the MPU signal. Adjust positioning as needed.
Actuator hunting at no-load and unit under load.	**1.** Battery charge circuit.	**1.** Disable circuit, remove 30 amp fuse' Lower DC voltage charge to 13.0 - 13.1 volts.
	2. Inverter.	**2.** Turn off inverter.

GENERATOR WIRING DIAGRAM #46876



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