

# EEG6550 Enhanced Electronic Governor

With Quikset Display

+1-413-233-1888

www.governors-america.com

## 1 INTRODUCTION

GAC's EEG6550 Series enhanced electronic governor controller is designed to regulate engine speed on diesel and gasoline reciprocating engines. With flexibility, precision, and accurate control of governed speed, the EEG is designed for industrial engine applications from generator sets and mechanical drives, to pumps or compressors. The EEG6550 Series Quikset Display allows its operator to monitor and configure parameters without needing configuration software or a PC.

- Simple LCD User Interface; No potentiometer, No PC required
- 2 Fixed (Rated, Idle) and Variable Speed; Selectable Isochronous, Droop, & Variable Governing
- 5K  $\Omega$  resistive, 0-5 V or 4-20 mA Variable Speed Input
- Speed Range to 12 KHz (6000 RPM) with Frequency Display
- Configurable Speed Switch
- AUX Input for Synchronization and Load Sharing; Selectable AUX Input Polarity
- Speed Ramping (Any Transient Speed Change)
- Fault Protection with Overcurrent Sensing
- Adjustable Starting Fuel Strategy (Black Smoke Reduction)
- Hour Meter and Service Reset Hour Meter
- J1939 Engine Speed Output Variable Speed/Load Input with Service Info and Fault Condition
- Compatible with all GAC actuators except ATB T4 Series, ADB335, and ACB2001.

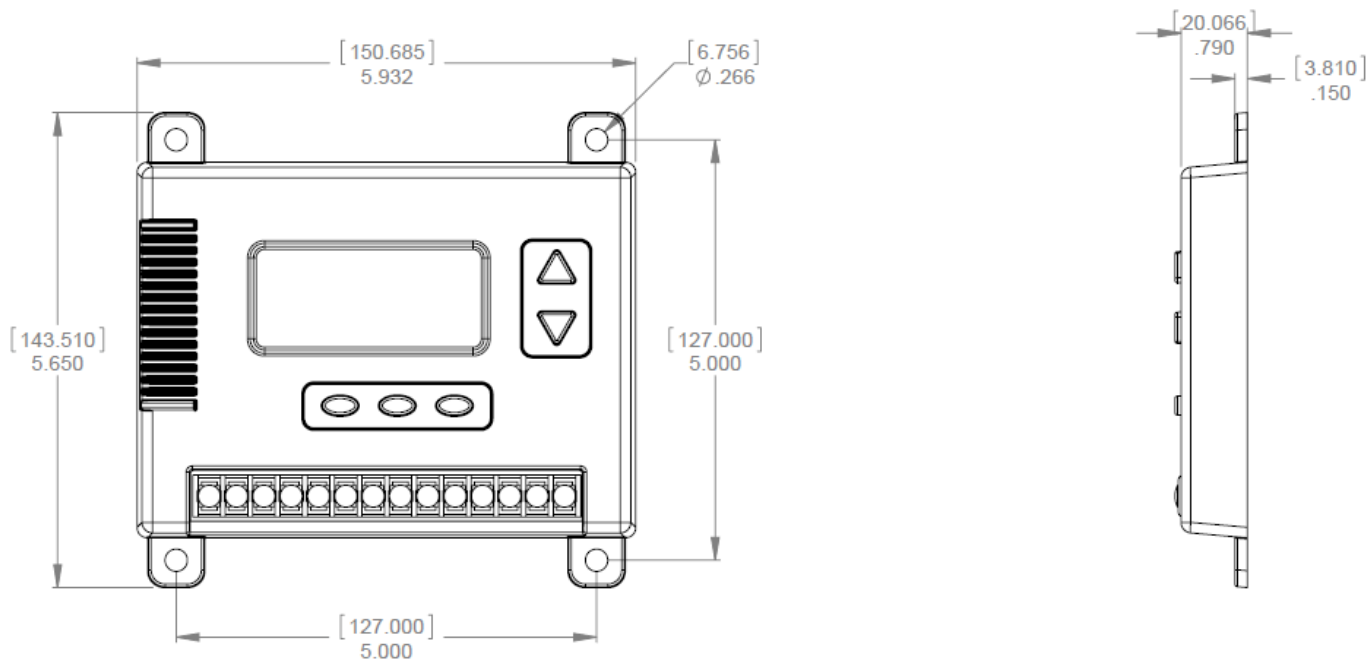


## 2 SPECIFICATIONS

| PERFORMANCE                    |   |
|--------------------------------|---|
| Isochronous Operation          | $\pm 0.25\%$  |
| Speed Range / Governor         | 100 Hz -12 kHz (200 - 6000 RPM w/120 tooth flywheel) continuous   |
| Idle Adjust                    | Up to 1500 RPM  |
| Droop Range                    | 1 - 25 % regulation   |
| Speed Trim                     | Programmable $\pm 120$ Hz   |
| INPUT / OUTPUT                 |   |
| Supply                         | 12 - 24 V DC Battery Systems (7.0 to 32.0 V DC)                   |
| Polarity                       | Negative Ground (Case isolated)                                   |
| Power Consumption              | 200 mA MAX continuous plus actuator current                       |
| Speed Sensor Signal            | 1.0 - 60.0 V RMS  |
| Actuator Current               | 8 -10 A Continuous, Momentary 12A MAX. PWM output constant 500 Hz |
| Load Share/ Synchronizer Input | 0 - 10 V DC (5 V nominal, reversed polarity, 145 Hz / V )         |
| Reverse Power Protection       | Yes   |
| Transient Voltage Protection   | 60 V  |

| ENVIRONMENTAL          |  |
|------------------------|--|
| Ambient Temperature    | -40 to 85 °C [-40 to 185 °F]           |
| Relative Humidity      | up to 90 %                             |
| All Surface Finishes   | Fungus Proof and Corrosion Resistant   |
| PHYSICAL               |  |
| Dimension              | See Section 3 , Installation           |
| Weight                 | 1.8 lbf (820 gf)                       |
| Mounting               | Any position, Vertical Preferred       |
| RELIABILITY            |  |
| Vibration              | 7 g, 10 - 2000 Hz                      |
| Shock                  | 20 g Peak                              |
| Testing                | 100 % Functional Test                  |
| COMPLIANCE / STANDARDS |  |
| Agency                 | CE, (EN55011, EN50081-2 and EN50082-2) |
| Communications         | SAE J1939 (Optional)                   |

### 3 INSTALLATION



Mount in a cabinet, engine enclosure, or sealed metal box.



Vertical orientation allows for the draining of fluids in moist environments.

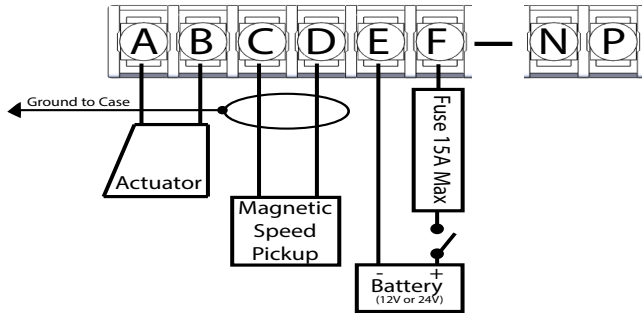


Avoid Extreme Heat

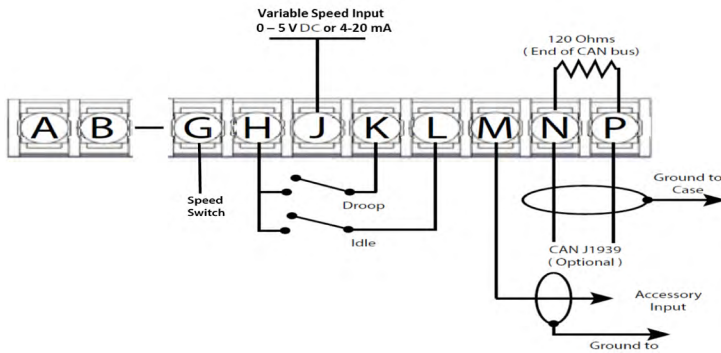


- Use an overspeed shutdown device, independent of the governor system, to prevent loss of engine control which may cause personal injury or equipment damage.
- Do not rely exclusively on the governor system electric actuator to prevent overspeed. A secondary shutoff device, such as a fuel solenoid must be used.

## 4 WIRING

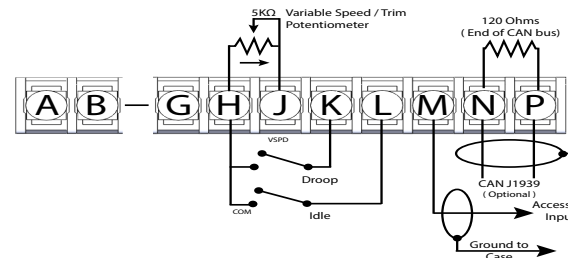


### 0 - 5 V DC OR 4-20 MA\* VARIABLE SPEED INPUT



\* 4-20mA input requires an external 200  $\Omega$  resistor across Terminals H & J

### 5K $\Omega$ RESISTIVE SPEED TRIM POT



If EEG detects no input from the magnetic pickup, the EEG will set the actuator to 0 V and set the speed to 0 RPM. The display will flash the RPM along with the Warning Indicator. Parameters will be unchangeable.

#### IMPORTANT

When installing controller be sure there's a good connection between the case of the EEG6550 and the chassis / battery ground.

| TERMINAL | DEFINITION           | GAUGE / mm <sup>2</sup> | NOTES   |
|----------|----------------------|-------------------------|---|
| A        | Actuator (+)         | 16 / 1.31               |   |
| B        | Actuator (-)         | 16 / 1.31               |   |
| C        | Magnetic Pickup (+)  | 20 / 0.52               | * Twisted wires 14 turns per foot. 0.02in (.51mm) gap between sensor and gear teeth.                        |
| D        | Magnetic Pickup (-)  | 20 / 0.52               |   |
| E        | Battery (-)          | 16 / 1.31               |   |
| F        | Battery (+)          | 16 / 1.31               | A 15 A fuse must be installed in the positive battery lead to protect against any overload or short circuit |
| G        | Speed Switch (SSW)   |                         | Speed switch relay; normally open (nO) or normally closed (nC)  |
| H        | Ground Signal        | 16 / 1.31               | Reference for variable speed/trim input & switches  |
| J        | Variable Speed Input | 20 / 0.52               | 5K $\Omega$ Resistive, 0 - 5 V DC or 4-20 mA. Increasing voltage or resistance of current increases speed.  |
| K        | Droop Select         | 16 / 1.31               | Active when connected to Terminal H   |
| L        | Idle Select          | 16 / 1.31               | Active when connected to Terminal H   |
| M        | Aux Input            | 20 / 0.52               | Load sharing / synchronizing, 5V nominal (0 -10 V DC), configurable polarity                                |
| N        | CAN L                | 20 / 0.52               | Twist wires 14 turns per foot.  |
| P        | CAN H                | 20 / 0.52               |   |

#### RECOMMENDATIONS

1. Shielded cable should be used for all external connections to the EEG control. One end of each shield, including the speed sensor shield, should be grounded to a single point on the EEG case.
2. Case should be grounded

## 5 DISPLAY & CONTROLS

### PARAMETER VALUE

Displays the value of a selected parameter or live running parameter. This area will blink if a system shutdown and restart is required.



### PARAMETER UNITS

Displays the units for the parameter (e.g. RPM)



### QUICKSET MENU

The quickset menu displays one row of parameters at a time.

#### COLUMN SELECT BUTTONS



To change displayed parameters:

Tap any

To view a specific parameter value row:

Hold

For: SPEED      Hold button: 1  
For: IDLE      Hold button: 2  
For: FUEL LIM      Hold button: 3



### ADJUST PARAMETER VALUE

Parameter Adjust Up

Increment a Parameter Value:

HOLD and TAP or



Rapidly Increment a Value:

HOLD and HOLD or

Parameter Adjust Down

### LOCKED / ON - OFF

Locked is set to On or OFF from the LOCKED parameter in the C menu. The system automatically locks the system

### OVERCURRENT



If the EEG detects an actuator overcurrent it will terminate power to the actuator, the display will flash Actuator Current along with the warning indicator. You must power cycle to restart.

### FUEL LIMIT



If the EEG detects that the FUEL LIMIT setting has been exceeded, the display will flash the FUEL LIMIT along with the warning indicator. Parameters will be unchanged.

## MENU DETAILS

### PRIMARY PARAMETER VALUE

(Blinks if restart required)

### PRIMARY PARAMETER UNITS

### SECONDARY PARAMETER

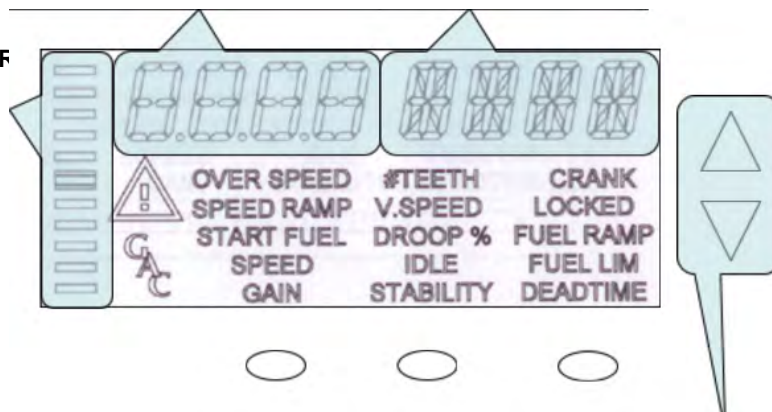
#### ACTUATOR DUTY CYCLE

Example:

- 100 % = 11 Bars
- 90 - 99 % = 10 bars
- 10 - 19 % = 2 bars
- 1 - 95 % = 1 bar
- 0 % = 0 bars

#### ENGINE SPEED

- Middle bar = set point
- Top bar = Set point + 10 RPM
- Bottom bar = set point - 10 RPM



### PRIMARY PARAMETER (UNITS)

- Engine Speed (RPM)
- Duty Cycle (%)
- Actuator Current (A)
- Engine Speed (Hz)
- Battery Voltage (V DC)
- Hour Meter (Hrs)
- Service Time (SHR)

### SECONDARY PARAMETER

- Actuator Duty Cycle
- Engine Speed relative to set point

Press UP or DOWN arrow to move between the primary and secondary parameters to the next parameter set. The list moves in one direction.

## 6 ADJUSTMENT FEATURES

### TRIM or VARIABLE SPEED OPERATION

**Trim Function** - Performs finer adjustments (e.g. generator frequency) The resistive input speed function is active when the VSPD (Variable Speed) parameter is OFF (default value is OFF). 5K  $\Omega$  potentiometer typical.

**Variable Speed Function** - Operates over a larger RPM range. Variable speed 0 - 5.0 V DC input to Terminal J is active when VSPD (Variable Speed) parameter is ON.

| SPECIAL MENU<br>PARAMETER |                   |   | QUIKSET MENU<br>PARAMETERS  |
|---------------------------|-------------------|---|---|
| VSPD                      | MODE              | SPEED   | V. SPEED  |
| OFF                       | Trim<br>(Default) | Application Rated Speed<br>(e.g., 1500 RPM)                                     | Speed Trim (10 = $\pm 10$ Hz)   |
| ON                        | Variable<br>Speed | Minimum speed when potentiometer<br>is at lowest resistance<br>(e.g., 1000 RPM) | Maximum Speed when potentiometer is at the highest resistance<br>(e.g., 2000 RPM) |

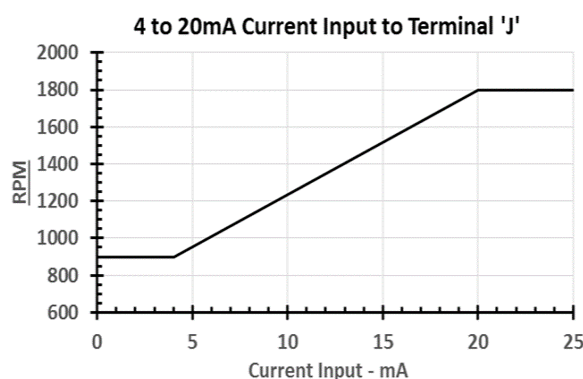
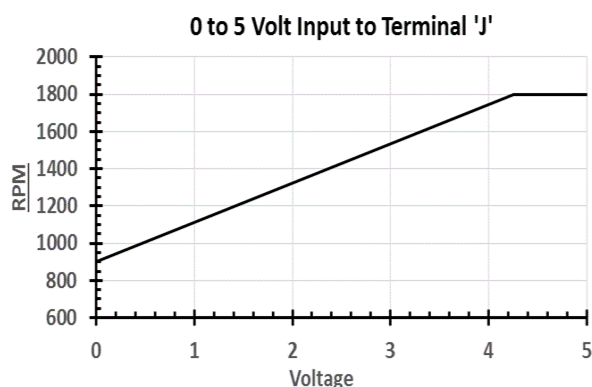


Increasing voltage, resistance or current increases speed.

Variable Speed Input Signal, the EEG6550 controller accepts Resistive, Current and Voltage input signals selected from the VSMD parameter on the Advanced Menu page.

Variable Speed Response to External Voltage Input Variable Speed Parameter (VSPD)- ON, 5 K Potentiometer Between Terminal H & J Configured for 900 to 1800 RPM.

- **Current Input:** (Select CUr) Add an external 200  $\Omega$  resistor across Terminals H and J for a 4-20 mA input signal. The SPEED parameter sets the low speed at 4 mA, V.SPEED parameter sets the high speed at 20 mA. If the input current drops below 4 mA, variable speed will be clamped at 0 %. If the input current level exceeds 20 mA, variable speed will be clamped at 100 %. RPM response to current is linear.
- **Voltage Input:** (Select 5dc) voltage to 4.25 V, above 4.25 V the variable speed function will be clamped at 100 %, RPM response to voltage is linear.
- **Resistive Input:** (Select rES) Connect a 5K potentiometer between Terminals H and J. Maximum operating voltage is 5.0 V DC, response to this input is slightly non-linear.



#### IMPORTANT

Increasing voltage or resistance increases speed.

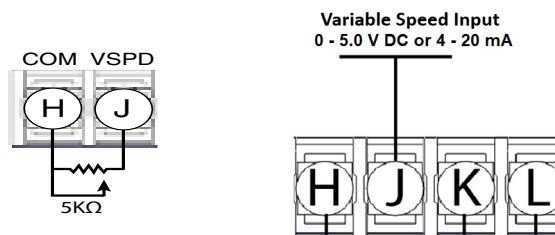
## 6 ADJUSTMENT FEATURES (CONTINUED)

### POTENTIOMETER, VOLTAGE OR MILLIAMPERE INPUT TO TERMINAL J

#### Conversion Formulas:

$$\text{Hertz}_{\text{MAG PICKUP}} = \frac{(\text{RPM} \times \# \text{ Teeth})}{60\text{sec}}$$

$$\text{RPM} = \frac{(\text{Hertz}_{\text{MAG PICKUP}} \times 60\text{sec})}{\# \text{ Teeth}}$$



4 - 20 mA input requires an external 200 Ω resistor across Terminals H & J

### LIGHT FORCE GOVERNOR

Turning the Light Force Governor, (LFG) feature ON (default is OFF) scales the governor's proportional response (GAIN) for the best resolution when controlling small actuators, including the **ATBT1, ALR, ALN, 100, 103, or 104** series and normally closed Cummins EFC actuators. Turn the LFG feature ON for use with these low current actuators.

The letters LFG display in place of the Primary Parameter Units when adjusting GAIN and STABILITY to indicate the feature is ON. The LFG Feature can only be turned ON or OFF when the engine is not running.

### LEAD CIRCUIT

Turning the Lead Circuit (LEAD) ON (default is ON) enables the governor to be more responsive and typically increases the range of GAIN adjustment. Turn Lead Circuit ON when there is slow or moderate hunting at higher GAIN settings.

### SPEED ANTICIPATION

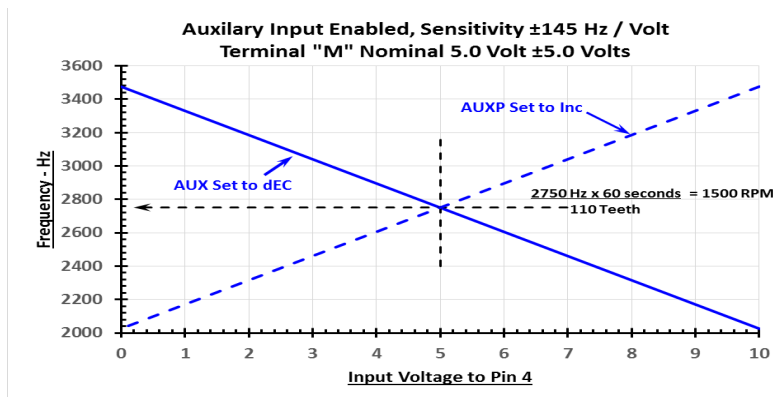
Turning the Speed Anticipation feature (**SANT**) ON (default is OFF) reduces RPM recovery time during high load transients, it requires both no load (NLCU) and full load current (FLCU) values to be entered correctly.

### IDLE SPEED

The optional external switch must be connected between Terminals H and L. A pressure switch may also be used as a method of enabling. When enabled, IDLE has an independent Gain adjustment.

### AUXILIARY INPUT

The Auxiliary (Aux) input, Terminal M, accepts signals from auto synchronizers, load sharing units, and other GAC accessories. Auxiliary Input Polarity (AUXP) set for InC: Increases Speed w/ Increased Voltage or dEC: Decreases Speed w/ Increased Voltage. Aux input is nominally 5.0 V +/-



### SPEED SWITCH SETTINGS

SSWS is the SPEED SWITCH setting, RPM range is 250 to 4000 RPM. Default setting is 2000 RPM.

SSWP sets the output polarity at either nO (normally open) or nC (normally closed). Default is set at nO.

SSWL sets the speed switch LATCH. With the Latch ON and the speed switch setting exceeded (based on SSWP) the output state is latched until power is cycled. With the Latch setting OFF, the output state of the terminal automatically resets at 0 RPM. Default is ON.



## 6 ADJUSTMENT FEATURES (CONTINUED)

### SERVICE HOUR METER

SRVT sets the hour meter for an alert at the selected service interval. Range of adjustment is 1 to 2000 hours, the default value is 500 hours. If the service time is expired, the displayed number will be '0' or negative.


Disable SRVT by selecting OFF on the Advanced Menu parameter page. Default is Disabled - OFF.

## 7 ADVANCED FEATURES



### Display Special Menu Parameters:

Hold ALL  until  
AUX appears in display

### Selecting Parameters:

  
Previous Parameter      Next Parameter

### Adjust Parameters:

Increase Parameter   
Decrease Parameter 

### Return to Quikset Menu:

Hold ALL  for 2 seconds

1. After 3 minutes of no user input, EEG switches to Quikset Menu.
2. Lock is displayed when attempt to change a Read-Only parameter.

### ADVANCED MENU PARAMETERS (CONFIGURABLE)

| PARAMETER | DEFINITION  | RANGE           | DEFAULT |
|-----------|---|-----------------|---------|
| AUX       | Auxiliary Input Enable<br>145 Hz/V, 5 V nominal Range: 1-9 V  | Off, On         | Off     |
| AUXP      | Auxiliary Input Polarity<br>V DC: Speed Increases w/ Increased Voltage or dEC: Speed Decreases w/ Increased Voltage | dEC, InC        | dEC     |
| VSPD      | Variable Speed or Trim Select<br>(On=Variable Speed, Off=Trim)  | Off, On         | Off     |
| VSMD      | Variable Speed Input Signal<br>Resistive / Current / Voltage  | rES/<br>Cur/5dc | 5dc     |
| VGLO      | Variable speed GAIN, low speed setting  | 1 - 100         | 50      |
| VGHI      | Variable speed GAIN, high speed setting   | 1 - 100         | 50      |
| LFG       | Light Force Governor  | Off, On         | Off     |
| LEAD      | Lead Circuit - For Increased Response / Increased GAIN Adjustment   | Off, On         | ON      |
| SANT      | Speed Anticipation<br>Improved Transient Performance  | Off, On         | Off     |
| NLCU      | No Load Current - Amps  | 0.0 - 9.5       | 0.5     |
| FLCU      | Full Load Current - Amps  | 0.5 - 10.0      | 4.0     |
| SSWS      | Speed Switch Setting - RPM  | 100 to 4000     | 2000    |
| SSWP      | Speed Switch: Normally Closed (nC) or Normally Open (nO)  | nC / nO         | nO      |
| SSWL      | Speed Switch Latch On - Resets after Cycling Power, Latch Off Automatically Resets at '0' RPM                       | On / Off        | ON      |
| JADR      | CAN J1939 Address   | 0 - 253         | 0       |
| SRVT      | Service Reset - Hours   | 1 - 2000        | Off     |

### ADVANCED MENU PARAMETERS (READ ONLY)

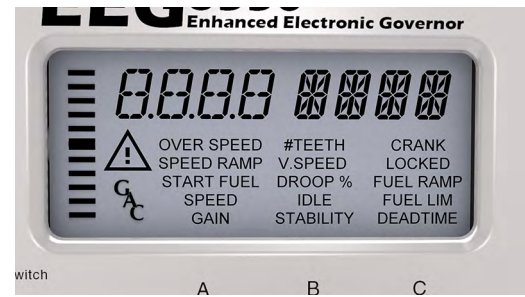
| PARAMETER | DEFINITION  |
|-----------|---|
| SREV      | Software revision number  |
| BID       | Software build identifier   |
| AREV      | Assembly revision: Identifies board hardware configuration, not software.       |
| FLTH      | Highest fault code since power up. Aids in trouble shooting.                    |
| DATL      | Supplemental data associated with last fault code. Aides in troubleshooting.    |
| FLTL      | Last fault code detected. Associated data is DATL and aids in trouble shooting. |

JADR parameter identifies J1939 addresses, 0 to 253. Default set to '0'. See Section 13, J1939 CAN Information, for a description of the transmittable data.

## 8 PRE-START SET-UP & QUICKSET PARAMETERS

Set the following parameters before starting the engine:

|               |   |
|---------------|---|
| <b>#TEETH</b> | Input the Number of Teeth on the Flywheel. This can not be changed while engine is running. |
| <b>CRANK</b>  | Input the Crank Termination (RPM)   |
| <b>SPEED</b>  | Input the Fixed Speed of the Engine (RPM)   |



| ADJUSTABLE QUIKSET PARAMETERS   |  |   |
|---|--|---|
| OVER SPEED *  | #TEETH   | CRANK *   |
| Range: 400 - 6000 RPM<br>Default: 2000 RPM  | Range: 60 - 250<br>Default: 120  | Range: 100 - 1000 RPM<br>Default: 400 RPM   |
| RPM to automatically shutoff the actuator   | Number of teeth on flywheel  | RPM which EEG switches from starting fuel limit to fuel limit   |
| SPEED RAMP  | V.SPEED *  | LOCKED  |
| Range: 25 - 2000<br>Default: 300  | Range: 0-6000 RPM (vspd) 0-120 Hz (trim)<br>Default: 1800 RPM (vspd) : 0 Hz (trim) | Range: OFF, ON<br>Default: OFF  |
| Rate at which speed changes from idle to set speed and back, or rate change in variable speed mode. | Maximum speed change allowed from trim input                                       | Enables Manual/Auto locking of display. Press and hold UP and DOWN arrows simultaneously for 3 seconds to UNLOCK or LOCK the display. |
| START FUEL  | DROOP%   | FUEL RAMP   |
| Range: 0 - 100 %<br>Default: 100 %  | Range: 0 - 25.0 %<br>Default: 5.0 %  | Range: 1 - 100 % / Sec.<br>Default: 10 %  |
| Initial actuator position at the start of cranking  | Droop to apply under maximum load (based on current of actuator)                   | Actuator position increase in percent per second from cranking to low idle speed, starting from the Start Fuel position               |
| SPEED *   | IDLE *   | FUEL LIM  |
| Range: 0-6000 RPM (fixed)<br>0-6000 RPM (droop)<br>Default: 1500 RPM (fixed)<br>50 RPM (droop)      | Range: 150 - 1500 RPM<br>Default: 900 RPM  | Range: 0 - 100%<br>Default: 100%  |
| Operating speed of engine   | Speed of engine when IDLE input is closed  | Maximum actuator percentage allowed   |
| GAIN  | STABILITY  | DEADTIME  |
| Range: 1 - 100, 100 = Max Gain<br>Default: 50 (rated)<br>: 10 (idle)                                | Range: 1 - 100, 100 = fastest response<br>Default: 50                              | Range: LOW, HI<br>Default: HI   |
| Proportional (P) set point of the PID control at operating SPEED and IDLE                           | Integral (I) set point of the PID control  | Derivative (D) set point of the PID control   |

\* 12 KHz MAX



## 9 ADJUSTING FOR STABILITY

Once the engine is running at operating speed and at no load, the following controller performance adjustments can be made to increase engine stability.

### GAIN - RATED SPEED & IDLE SPEED

The EEG6550 is equipped with two separate gains, one for rated speed, the other for idle speed. Both are set using the GAIN setting on the Quikset Menu.

| GAIN TYPE   |    | ADJUSTMENT PROCEDURE   |
|-------------|----|--|
| RATED SPEED | 1. | Selected when IDLE input is disconnected.  |
| IDLE SPEED  | 1. | Connect the idle input to ground.  |
|             | 2. | Change GAIN value.   |
|             | 3. | Disconnect Idle input from ground to switch back to rated. Idle icon will blink. |

| QUIKSET MENU |           |                      |  |
|--------------|-----------|----------------------|--|
| PARAMETER    |           | ADJUSTMENT PROCEDURE |  |
| A.           | GAIN      | 1.                   | Increase this parameter until instability develops.                                  |
|              |           | 2.                   | Then, gradually decrease this parameter until stability returns.                     |
|              |           | 3.                   | Finally, decrease this parameter one increment further to ensure stable performance. |
|              |           | 4.                   | If instability persists, adjust the next parameter.                                  |
| B.           | STABILITY | 1.                   | Follow the same adjustment procedure as the GAIN parameter.                          |
|              |           | 2.                   | If instability persists, adjust the next parameter.                                  |
| C.           | DEADTIME  | 1.                   | If fast instability occurs, switch DEADTIME to low and repeat steps A & B.           |

**NOTE** Normally adjustments made at no load achieve satisfactory performance. For further performance see Section 14, System Troubleshooting.

## 10 ADJUSTING FOR DROOP

After the initial set up is completed and the # of Teeth, Crank Termination Speed and Rated Speed are set, position the external switch connecting Terminals H and K on to activate the DROOP mode following these sequence steps.

1. On the EEG, press and hold all three buttons simultaneously for two seconds to switch to Advanced Menu.
2. Confirm that the VSPD (Variable Speed / Fixed Speed Control) is OFF. Default position is off.
3. Confirm that the LEAD circuit is OFF. Default position is on.
4. Set the NLCU (No Load Current) to the measured / displayed current value when operating at no load rated speed (default value is 0.5 amps.)
5. Set the FLCU (Full Load Current) to the measured / displayed current value when operating at full load rated speed (default value is 4.0 amps.)
6. Return to the Main Menu: Press and hold all three buttons simultaneously for two seconds to switch to the Main Menu.
7. Select and set DROOP to the desired percentage.
8. Change the Speed parameter, this now displays DROOP OFFSET. This sets the RPM, above operating speed; this is used when DROOP is enabled. This is an offset value.

**EXAMPLE** 1500 RPM operating speed x 0.05 (5.0% droop) = 75 RPM Input 75 RPM, this is the offset value.

## 11 VARIABLE SPEED GAIN

When in variable speed operation, the PID will use the VGLO (Variable Gain Low) and VGHI (Variable Gain High) in place of the GAIN parameter on the main screen. These variable speed Gain values are used to interpolate between the low and high points in parallel with speed to provide gain ramping as speed is adjusted.

**NOTE** If the GAIN on the main menu is changed while in variable speed mode, the unit will flash LOCK to indicate the parameter is not available in that mode.

## 12 FAULT CODES

| ADVANCED MENU PARAMETERS (CONFIGURABLE) |   |  |   |
|---|---|--|---|
| CODE                                    | CAUSE   | EFFECT   | CUSTOMER ACTION   |
| 1                                       | Actuator over current (continuous)  | Actuator turned off for 30 s.  | Check actuator wiring.                                      |
| 2                                       | Loss of speed signal (inc/dec in speed by more than 64 Hz in 4 ms, 16 K Hz/s) | WARNING indicator blinks then system shutdown  | Check speed pickup.   |
| 3                                       | Over speed (speed exceeds OVER SPEED setting for 12 ms)                       | WARNING and OVER SPEED indicators blink then system shutdown.                              | Check fuel system as well as OVER SPEED, SPEED, and V.SPEED |
| 203                                     | Variable Speed settings are reversed. V.SPEED is lower than SPEED.            | WARNING indicator blinks, speed set to V.SPEED setting, variable speed input unresponsive. | Flip V.SPEED and SPEED settings.                            |
| 206                                     | No potentiometer/signal detected on variable speed input when VSPD enabled.   | WARNING indicator blinks, speed set to SPEED setting.                                      | Check potentiometer wiring.                                 |
| 241                                     | New software loaded. Configuration not compatible.                            | Default configuration used.  | Reset configuration.  |
| 251                                     | Software loaded on incompatible hardware.                                     | WARNING indicator blinks then System shutdown.   | Return unit to GAC  |
| 307                                     | FLCU / NLCU Setting invalid   | Load calculation done with 0.5 & 4.0 A values  | Adjust NLCU / FLCU  |

**IMPORTANT** For all other codes, note the condition and contact GAC. The WARNING indicator will blink and failures will cause a system shut down.

## 13 J1939 CAN INFORMATION

Data transmitted on the J1939 Bus:

| PGN   | DEFINITION   | NOTES   |
|-------|--|---|
| 61443 | Variable Speed (SPN91) / Load Input (SPN92)            | 0 - 100 %   |
| 61444 | Engine Speed (SPN190)                                  | 0 - 100 %   |
| 64914 | Operating State (SPN3543) / Shutdown Request (SPN3607) | Stopped, Starting, Running, Post-Run                                |
| 65216 | Service Information (SPN916)                           | Service Time, +/- 20,000 Hours                                      |
| 65252 | Fault Condition (SPN2814)                              | Engine Alarm Output Command Status, No Shutdown Requested (SPN1110) |
| 65253 | Engine Run Time (SPN247)                               | 0 - 65,500 Hours  |
| 65271 | Battery Voltage (SPN158)                               | 0 - 64.0 V DC   |

## 14 SYSTEM TROUBLESHOOTING

### SYSTEM INOPERATIVE

If the engine governing system does not function, the fault may be determined by performing the voltage tests described in Steps 1 through 3. Positive (+) and negative (-) refer to meter polarity. Should normal values be indicated during troubleshooting steps, then the fault may be with the actuator or the wiring to the actuator. Tests are performed with battery power on and the engine off, except where noted. See your actuators installation manual for testing procedures for that actuator.

| STEP | WIRES       | NORMAL READING                            | PROBABLE CAUSE OF ABNORMAL READING  |
|------|-------------|---|---|
| 1    | F(+) & E(-) | Battery Supply Voltage<br>(12 or 24 V DC) | 1. DC battery power not connected. Check for blown fuse<br>2. Low battery voltage<br>3. Wiring error  |
| 2    | C & D       | 1.0 V AC RMS min.<br>While Cranking       | 1. Gap between speed sensor and gear teeth too great<br>2. Improper or defective wiring to the speed sensor<br>3. Resistance between Terminals D and C should be 130 to 1200 Ω.<br>4. Defective speed sensor.                     |
| 3    | F(+) & A(-) | 1.0 - 2.0 V DC<br>While Cranking          | 1. SPEED or IDLE parameter set incorrectly<br>2. CRANK or START FUEL set incorrectly<br>3. Short/open in actuator wiring<br>4. Defective speed control<br>5. Defective actuator, see your actuator troubleshooting documentation. |

### INSTABILITY

| INSTABILITY   | SYMPTOM  | PROBABLE CAUSE OF ABNORMAL READING   |
|---------------|--|--|
| Fast Periodic | The engine seems to jitter with a 3Hz or faster irregularity of speed. | 1. Readjust the GAIN and STABILITY for optimum control.<br>2. In extreme cases, change the DEADTIME parameter.   |
| Slow Periodic | Speed irregularity below 3Hz. (Sometimes severe)                       | 1. Check fuel system linkage during engine operation for:<br>a. binding<br>b. high friction<br>c. poor linkage<br>2. DEADTIME Parameter set too high.  |
| Non-Periodic  | Erratic Engine Behavior  | 1. Increasing the GAIN should reduce the instability but not totally correct it. If this is the case, there is most likely a problem with the engine itself. Check for:<br>a. engine mis-firings<br>b. an erratic fuel system<br>c. load changes on the generator set voltage regulator. |

### UNSATISFACTORY PERFORMANCE

| SYMPTOM   | NORMAL READING  | PROBABLE CAUSE OF ABNORMAL READING  |
|---|---|---|
| Engine Over Speeds  | 1. Do Not Crank. Apply DC power to the governor system.   | 1. If the actuator is at minimum fuel position and there exists an erroneous speed signal, then check speed sensor.   |
|   | 2. Manually hold the engine at the desired running speed. Measure the DC voltage between Terminals A(-) & F(+) on the speed control unit. | 1. If the voltage reading is 1.0 to 2.0 V DC:<br>a. SPEED parameter set above desired speed<br>b. Defective speed control unit<br>2. If voltage reading is > 2.0 V DC then check for:<br>a. actuator binding<br>b. linkage binding<br>3. If the voltage reading is below 1.0 V DC then defective speed control unit |
|   | 3. Check #TEETH parameter.  | 1. Incorrect tooth count entered.   |
| Over Speed shuts down engine before or after running speed is reached | 1. Examine the SPEED and OVER SPEED operating parameters for the engine   | 1. SPEED parameter set too high.<br>2. OVER SPEED set too close to SPEED.<br>3. Check SPEED RAMP parameter.<br>4. Check if VSPD is ON by mistake<br>5. Check if AUX is ON by mistake<br>6. Actuator or linkage binding.<br>Speed Control unit defective.<br>Gain too low.   |
| Over Speed shuts down engine before running speed is reached          | 1. Check resistance between Terminals C&D. Should be 130 to 1200 Ω. See specific Magnetic Pick-up data for resistance.                    | 1. OVER SPEED set too low<br>2. If the speed sensor signal is erroneous, then check the wiring.   |

## 14 SYSTEM TROUBLESHOOTING (CONTINUED)

### UNSATISFACTORY PERFORMANCE

| SYMPTOM                                     | NORMAL READING  | PROBABLE CAUSE OF ABNORMAL READING  |
|---|---|---|
| Actuator does not energize fully            | 1. Measure the voltage at the battery while cranking.   | 1. If the voltage is less than:<br>a. 7 V for a 12 V system, or<br>b. 14 V for a 24 V system,<br>Then: 1. Check wiring<br>2. Check circuit protection/relay<br>3. Check charging system<br>4. Check battery   |
|   | 2. Momentarily connect Terminals A and F. The actuator should move to the full fuel position. | 1. Actuator or battery wiring in error<br>2. Actuator or linkage binding<br>3. Defective actuator<br>4. Fuse open. Check for short in actuator or harness.<br>5. Check START FUEL and CRANK   |
| Engine remains below desired governed speed | 1. Measure the actuator output, Terminals A & B, while running under EEG control.             | 1. If voltage measurement is within 2 V DC of the battery supply voltage level, then fuel control is restricted from reaching full fuel position, possibly due to mechanical governor, carburetor spring, or linkage interference.<br>2. Check SPEED, IDLE, GAIN, START FUEL, and CRANK |

### DISPLAY ACCESS - LOCK / UNLOCK

To lock or unlock the display, press and hold both the UP and DOWN arrows simultaneously for 3 seconds.



If unsuccessful in solving instability, contact [GAC for assistance](mailto:GAC@governors-america.com).  
[GAC@governors-america.com](mailto:GAC@governors-america.com) or call: 1-413-233-1888

# EEG6550 Technical Assistance Worksheet

Please provide the following information so we assist you with timely, technical recommendations:

Date: \_\_\_\_\_

Company Name: \_\_\_\_\_

Contact Info: E-Mail Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Reported Problem: \_\_\_\_\_

Engine Make, Model & Application: \_\_\_\_\_

Controller Model and Serial Number: \_\_\_\_\_

Actuator Model and Serial Number: \_\_\_\_\_

| EEG6550 CONTROLLER SETTINGS |                             |                   |
|-----------------------------|-----------------------------|-------------------|
| Parameter                   | Factory Settings            | Customer Settings |
| # of Teeth                  | 120                         |                   |
| Crank                       | 400 RPM                     |                   |
| Speed Ramp                  | 300 RPM/s                   |                   |
| Overspeed                   | 2000 RPM                    |                   |
| V.Speed                     | 1800 RPM (VSPD) 0 Hz (Trim) |                   |
| Start Fuel %                | 100                         |                   |
| Droop %                     | 5.0                         |                   |
| Fuel Ramp %                 | 10                          |                   |
| Speed                       | 1500 RPM                    |                   |
| Idle                        | 900 RPM                     |                   |
| Fuel Limit %                | 100                         |                   |
| Gain                        | 50 (Rated) 10 (Idle)        |                   |
| Stability                   | 50                          |                   |
| Deadtime                    | HI                          |                   |

| ELECTRICAL CHECKS |                                |  |
|-------------------|--------------------------------|--|
| F(+) & E (-)      | 12 or 24 V DC                  |  |
| C & D             | 1.0 V AC RMS MIN at Cranking   |  |
| F (+) & A (-)     | 1.0 to 2.0 V DC While Cranking |  |

| ADVANCED SETTINGS |                  |                   |
|-------------------|------------------|-------------------|
| Parameter         | Factory Settings | Customer Settings |
| AUX               | Off              |                   |
| AUXP              | dEC              |                   |
| VSPD              | Off              |                   |
| VSMD              | 5dc              |                   |
| VGLO              | 50               |                   |
| VGHI              | 50               |                   |
| LFG               | Off              |                   |
| LEAD              | ON               |                   |
| SANT              | Off              |                   |
| NLCU              | 0.5              |                   |
| FLCU              | 4.0              |                   |
| SSWS              | 2000 RPM         |                   |
| SSWP              | nO               |                   |
| SSWL              | ON               |                   |
| JADR              | 0                |                   |
| SRVT              | OFF              |                   |
| FLTL              | -----            |                   |
| DATL              | -----            |                   |

| ADVANCED MENU PARAMETERS (READ ONLY) |                  |                          |
|--------------------------------------|------------------|--------------------------|
| Parameter                            | Factory Settings | Software Revision Number |
| SREV                                 | -----            |                          |