**INSTALLATION**

See Section 10 for more dimensions

Vertical orientation allows flush to floor in most environments.

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

Avoid Extreme Heat

<table>
<thead>
<tr>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width: 129.6</td>
</tr>
<tr>
<td>Height: 86.4</td>
</tr>
</tbody>
</table>

**WIRING**

See Section 10 for the Wiring Diagram

**GOVERNOR SPEED SETTING**

The governed speed set point is increased by clockwise rotation of the SPEED adjustment control. Remote speed adjustment can be obtained with an optional SK Speed Trim Control.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Gain adjustment clockwise until instability develops.</td>
</tr>
<tr>
<td>B</td>
<td>If instability persists, adjust the next parameter.</td>
</tr>
</tbody>
</table>

**TABLE 1**

<table>
<thead>
<tr>
<th>SPEED RANGE</th>
<th>POTENTIOMETER VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 Hz</td>
<td>540 RPM</td>
</tr>
<tr>
<td>2400 Hz</td>
<td>1440 RPM</td>
</tr>
<tr>
<td>3000 Hz</td>
<td>1800 RPM</td>
</tr>
<tr>
<td>3500 Hz</td>
<td>2100 RPM</td>
</tr>
<tr>
<td>3700 Hz</td>
<td>2220 RPM</td>
</tr>
</tbody>
</table>

NOTE

- Gain adjustments made at no load achieve satisfactory performance. If droop levels experienced are higher or lower than those required, contact GAC for assistance.
- When an accessory is connected to Terminal N, the speed will decrease and the speed adjustment must be reset.

**ADJUSTMENT FOR STABILITY**

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

**STABILITY ADJUSTMENT**

<table>
<thead>
<tr>
<th>PARAMETER</th>
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</tr>
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<td>B</td>
<td>If instability persists, adjust the next parameter.</td>
</tr>
</tbody>
</table>

**ACCESSORY INPUT**

The Auxiliary Terminal N accepts input signals from load sharing system controls and the engine governor system accessories. GAC accessories are directly connected to this terminal.

**NOTE**

- When a speed range potentiometer is used, the desired speed setting may need to be reset. Check the engine's speed setting.
- A short/open in actuator wiring can be detected with an ohmmeter
- Defective actuator, see Actuator Troubleshooting

**ADJUSTMENTS BEFORE ENGINE START**

Make sure the following adjustments are set before starting the engine.

**GOVERNOR IDLE SETTING**

After the governor speed setting was adjusted, place the optional external selector switch in the IDLE position. The idle speed set point is increased by the clockwise rotation of the IDLE adjustment control.

When the engine is at idle speed, the speed control unit applies droop to the governor system to insure stable operation.

**NOTE**

Contact GAC for assistance if difficulty is experienced.

**SYSTEM TROUBLESHOOTING**

If the engine governing system does not function, the fault may be determined by performing the voltage tests described in Steps 1 through 4. Problems (a) and (c) indicate low voltage, which should be indicated during troubleshooting steps, and 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 actuator publication for testing procedure on the actuator.

**NOTE**

- Short on Terminal P?
- Defective control unit.
- Defective actuator, see Actuator Troubleshooting

**INSTALLABILITY**

Instability in a closed loop speed control system can be categorized into two general types. PERIODIC appears to be a swaying and at a regular rate. NON-PERIODIC is a random wandering or an occasional deviation from a steady state band for no apparent reason.

The ESD5101 Speed Control Unit was derived from the standard GAC ESD5111 Speed Control Unit. All specifications, installation procedures, and adjustments, except those noted in this chart, are identical. The difference between the ESD5111 and the ESD5131 lies in the two DIP switches located under the upper access hole.

**NOTE**

- The Low Speed Parameter set to Too Low
- Short/open in actuator wiring
- Defective control speed unit
- Defective actuator, see Actuator Troubleshooting

**SPEED DROOP Operation**

Drop is typically used for the paralleling of engine driven generators. When in drop operation, the governor speed decreases as engine load increases. The percentage of drop is based on the maximum engine speed change from no load to full load.

**NOTE**

- Place the optional external selector switch in the DROOP position.
- DROOP is increased by clockwise rotation of the DROOP adjustment control.

**PROCEDURE**

1. Place the optional external selector switch in the DROOP position. DROOP is increased by clockwise rotation of the DROOP adjustment control.
2. After the droop level has been adjusted, the rated engine speed should be read to be sure. Check the engines speed and adjust that speed setting accordingly.

**NOTE**

- Though a wide range of droop is available with the internal control, droop level requirements of 10% are unusual. If droop levels experienced are higher or lower than those required, contact GAC for assistance.

**ADDRESS**

- Switch controls the “Lead Circuit” found in the ESD5111. The normal position is “ON.” Move the switch to the “OFF” position if there is instability in the system.
- Switch controls a additional circuit added in the ESD5131 that is designed to eliminate fast erratic governor behavior, caused by very soft or worn coupling in the drive train between the engine and generator. The normal position is “ON.” Move to the “OFF” position if fast erratic engine behavior due to a soft coupling is experienced.

**ESD5100 Series Speed Control Unit**

**P10 1000 D**

**ESD5131**

**ESD5111**

**ESD5101**
**Instability**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE OF ABNORMAL READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Periodic</td>
<td>1. The engine seems to start with a 12V or 24V supplied voltage</td>
</tr>
<tr>
<td>Slow Periodic</td>
<td>1. An irregularity of speed below 3 Hz</td>
</tr>
<tr>
<td>Non-Periodic</td>
<td>1. Erratic Engine Behavior</td>
</tr>
</tbody>
</table>

**Unsatisfactory Performance**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>NORMAL READING</th>
<th>PROBABLE CAUSE OF ABNORMAL READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator does not energize fully</td>
<td>1. Measure the voltage at the battery while cranking.</td>
<td></td>
</tr>
<tr>
<td>Engine turns below desired speed &amp; B. while running under governed speed.</td>
<td>1. Measure the actuator current.</td>
<td></td>
</tr>
</tbody>
</table>

**Specifications**

- Isochronous Operation: ± 0.25% or better
- Speed Range / Governor: 1.7 - 7.5 KHz Continuous
- Speed Drift with Temperature: ±0.5% Typical

**PERFORMANCE**

- DC Supply: 12 - 24 VDC Battery Systems
- Transient and Reverse Voltage Protected
- Power Consumption: 100 mA (No Actuator Current)
- Actuator Current Range: 10 A Continuous @ 77°F (25°C)
- Speed Signal Range: 0.5 - 50 VAC

**RELIABILITY**

- Vibration: 10G @ 20 - 100 Hz
- Ambient Temperature: -40°F to 85°F (-40 to 185°F)
- Relative Humidity: up to 95%
- All Surface Finishes: Fungus Proof and Corrosion Resistant

**COMPLIANCE / STANDARDS**

- Agency: CE and RoHS Requirements

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**UNSATISFACTORY PERFORMANCE**

1. Do Not Crank. Apply DC power to the governor system. If unsuccessful in solving instability, contact GAC for assistance.

2. Manually hold the engine at the desired running speed. Measure the DC voltage between Terminals A and F on the speed control unit.

3. If the voltage readings are ± 200 Hz.
4. If the system is still unstable, remove the jumper from E6 to E7 and readjust GAIN and STABILITY.

5. Momentarily connect Terminals A and F (This reduces sensitivity to high frequency).
6. Adjust the DEAD TIME COMPENSATION by adding a capacitor from posts E2 to E3 (negative on E2). Start with 1.0 mfds. and increase until instability is eliminated.

7. If the throttle is slightly erratic, but performance is fast, then remove the jumper from E6 to E7.
8. Readjust the GAIN and STABILITY for performance.

10. Defective actuator
11. Actuator or battery wiring in error
12. Actuator binding
13. Defective governor system, or 14V for a 24V system, or 2 VDC of the battery supply voltage level, then fuel control is restricted from reaching full fuel position.
14. Use a new governor spring, or linkage interferes with actuator or governor system.

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**Environmental**

- Dimensions: See Wiring and Outline Diagram
- Weight: 1.2 lb. (0.545 kg)
- Mounting: Any position, Vertical Preferred

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**ESD5100 Series Speed Control Unit**

**ESD5131, ESD5131H, and ESD5151 only**