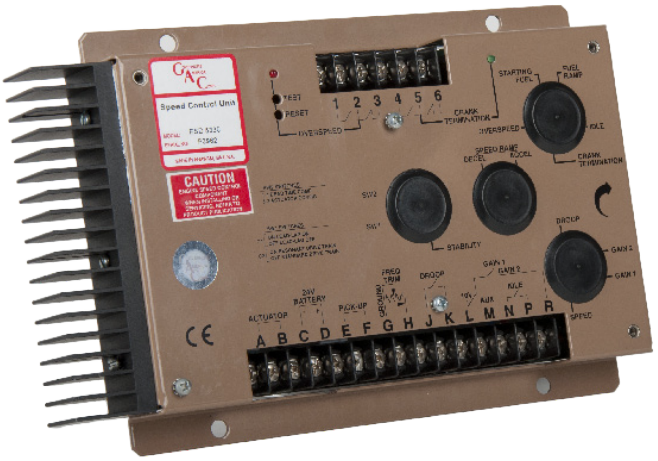
Analogue Speed Governors

ESD-5330 Series

Features and Benefits

- A Two Element Speed Switch (overspeed sensing and crank termination)
- Speed Ramping from Idle to Operating Speed
- Starting Fuel Control for lower engine exhaust emissions
- A unique actuator power drive circuit



Manufactured by:

Governors America Corp.

Speed Control Unit

The **ESD-5330 Series** speed control unit is designed to precisely Control engine speed and provide fast precise response to transient engine loads.
This speed control is intended to be used with all GAC Actuators including the ACB2000. A complete closed loop control system is formed with the addition of a magnetic pickup signal sensing engine speed and 24 Volt DC power.

Other standard features include; adjustable Droop, Accessory inputs for Load Sharing, Variable Speed Governing, protection against reverse battery voltage and transient voltages, and a fail safe design in the event of loss of speed signal or battery supply.

ESD-5330

Description

Engine speed information for the speed control unit is usually received from a magnetic speed sensor which is mounted in close proximity to the engine driven flywheel ring gear.
As teeth pass the pickup, a signal is generated which is proportional to engine speed.
The strength of this signal must be in the range of 0.5 - 50 VRMS.
When the speed signal is low or absent, the output from the controller will be shut off.

Speed Setting is via the 25 turn SPEED potentiometer in the controller.
The setting of this adjustment determines the operating speed of the engine.

Performance Adjustments are provided to match and optimize the controller to specific engine characteristics.
The basic control is e PID type with continuous adjustments for the Gain (P) and Stability (I), and DIP switches to adjust the Dead Time Compensation (D).
In Addition, a special circuit is included for applications with resonant drive trains.
Switch SW1, C2 compensates for this situation.

The Unique Power Drive Circuit controls the current to the actuator.
The ACB2000 actuator's performance is enhanced by the ability of the ESD-5330 to supply high current at appropriate times without any danger of overheating the actuator coils.
Maximum response from the governor system is then obtained.

A Two Element Speed Switch is incorporated in the unit for overspeed sensing and crank termination.
These independent monitors have set points with limited adjustable ranges.
Relay outputs (6 AMP) are available to operate crank termination circuits and fuel or air shutoff devices.

Droop Operation is available by adding a switch across Terminals J and K.
Droop is proportional to actuator current changes, from zero to maximum engine power.

Idle Operation can be obtained by adding a switch across Terminals N and P.
The Idle speed is adjustable over a wide range.

Smooth Speed Ramping is provided automatically during each engine startup.
Once the engine speed has reached the crank termination setting, ramping automatically takes place unless the idle switch is closed.
The speed ramping will raise the engine speed to the operating speed set point.
The ramp time acceleration rate is adjustable.

Start Fuel Limiting results in lower emissions from the engine during the starting and the run up cycle by reducing excess fuel to the engine.
The STARTING FUEL adjustment will allow the actuator current to set the starting fuel.
Once the engine has started and passed the cranking termination point, it is controlled by the fuel ramping circuit until the speed ramping takes over and smooth acceleration results.

For generator set applications, the ESD-5330 Series is compatible with GAC's Load Sharing and Auto Synchronizing modules.
With the use of other interfaces and control devices, the ESD-5330 Series can be used in a wide variety of industrial engine applications.

Application and Installation Information

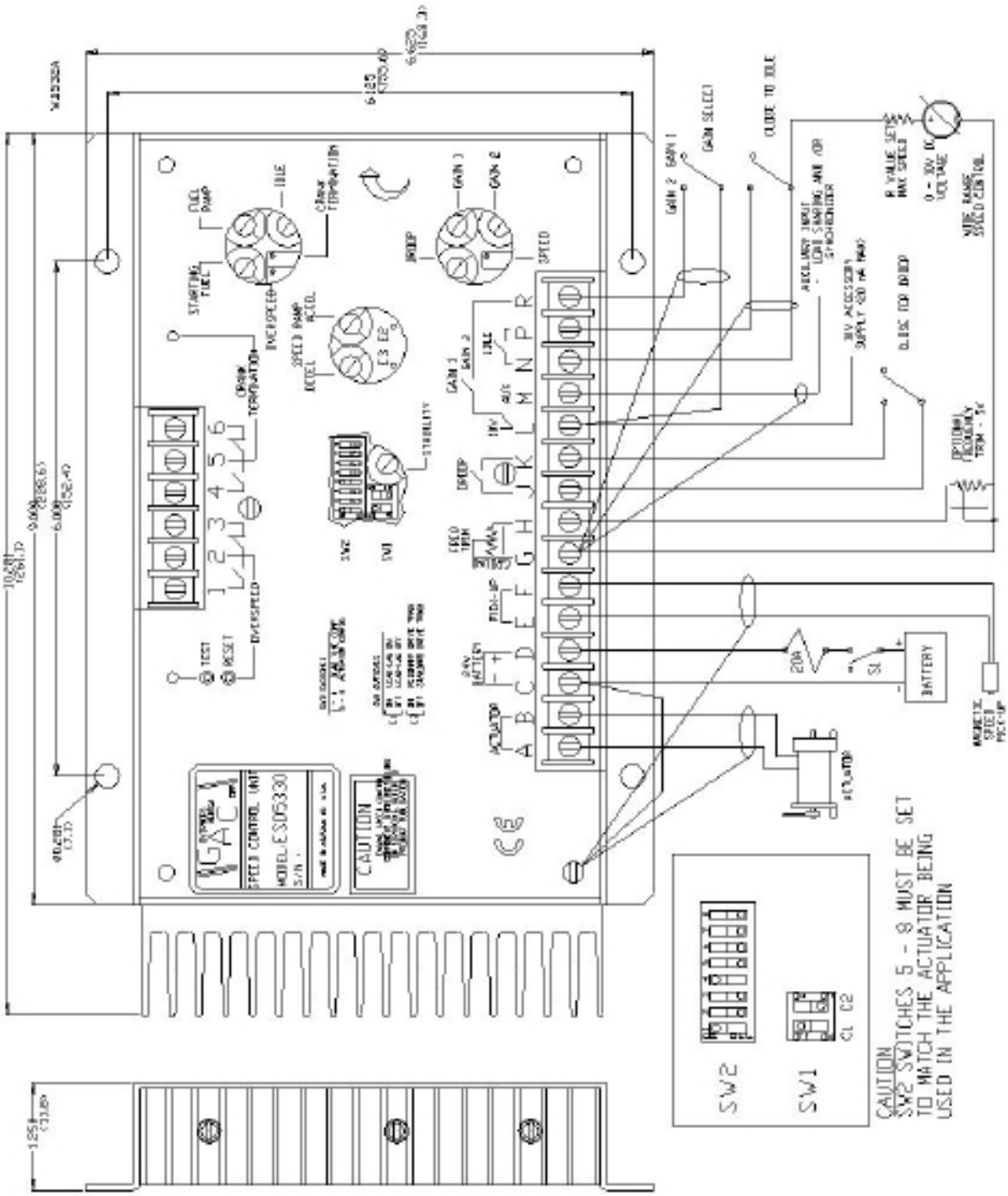
The ESD-5330 Series speed control unit is rugged enough to be placed in a control cabinet or engine mounted enclosure with other dedicated control equipment.
The circuit board is conformally coated to seal out moisture and resist vibration.
If water, mist or condensation can come in contact with the controller, it should be mounted vertically.
This will allow any accumulated fluids to drain away from the speed control unit.

Warning

An overspeed shutdown device, independent of this controller, should be provided to prevent loss of engine control which may cause personal injury or equipment damage.
Do not rely exclusively on deenerization of the governor system actuator to prevent overspeed.
A secondary shutoff device such as a fuel or air solenoid should be used.

ESD-5330

Diagram 1. System Wiring/Outline



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ESD-5330 Series Speed Control Unit

ESD-5330.....Standard Unit, 24 Volt operation
ESD-5330-12.....12 Volt operation
E505331.....use w/EFC Actuator
ESD-5331-12.....use w/EFC Actuator

Specifications

Performance

Isochronous.....± 0.25% or bettor
Operating Speed Range.....1K - 7.5 Hz continuous
Speed Drift with Temperature.....± 1% maximum
Idle Speed Adjust Range.....25 – 85% of rated speed
Droop Range.....Adjustable from 0-5% for
..... a 1.5 actuator current change
Speed Trim Range.....± 200 Hz
Remote Variable Speed Range.....25 to 100% of rated speed
Speed Ramp Time
Acceleration adjustment range.....266 Hz/Sec to 1300 Hz/Sec
Deceleration adjustment range.....250 Hz/Sec to 1000 Hz/Sec
Starting Fuel Adjustment
0 - 1.5A.....120, 175, 225, 275 Actuators/SW2-7 "OFF"
0.3 - 4A.....2000 Aduator/SW2-7 "ON"
0verspeed Set Point.....2400 Hz to 8300 Hz
Crank Termination Set Point.....200 Hz t0 2050 Hz
Terminal Sensitivity
H.....-105 Hz, ±15 Hz/Volt @ 5 K Impedance
M.....-130 Hz, ±15 Hz/Volt @ 1 M Impedance
K.....-685 Hz, ±40 Hz/Volt @ 225 K Impedance
N.....+1000 Hz, ±50 Hz/Volt @ 8 K Impedance

Environmental

Ambient Operating Range.....-40° to +85°C (-40° to +185°F)
Relative Humidity (Noncondensing).....up to 95%
All Surface Finishes .....Fungus proof and corrosion resistant

Input Power – Nominal Ratings

DC Supply.....24 ±20% VDC battery systems
.....(transient and reverse voltage protected)
Maximum Continuous DC Supply Voltage.....32 Volts
Polarity.....Negative ground (case isolated)
Power Consumption (Engine Stopped).....
.....100 MA (No actuator current)
Speed Signal Range.....0.5-50 VAC
Maximum Actuator Current .....
.....Internally limited to 9 A continuous
Maximum Current, Speed Switch Contact (Terminals 1-6).....
.....6 Amps

Reliability

Vibration.....1 G @ 20-100 Hz
Shock.....10 G (11 ms)
Testing.....100% functionally tested

Physical

Dimensions.....See FIGURE 1
Wiring Diagram and Outline (page X)
Weight .....2.0 lbs (0.91 grams)
Mounting.....Any position, vertical preferred

EMC

Conforms to CE directive for light and heavy industrial usage when installed in accordance with special instructions and as per the wiring diagram which is found in PIB 1041.

Local Distributor / Partner:

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