This integrated speed control system is a high performance multi-functional isochronous digital speed control. The governor can be used for wide range variable speed applications or constant speed Generator Sets.

The front panel keypad allows direct settings and security without a laptop or special software.

The monitoring and protection capability of the IGC700 includes inputs for up to 10 sensors that are setup through the front panel keypad. Oil Pressure, Engine Coolant Temperature and Charge Level are dedicated standard inputs, which can be configured for either digital or analog inputs.

All faults and failures are indicated by bright, multi-colored LED’s located on the front Annunciator Panel. The IGC700 is designed to warn the operator of the faulty/failed condition and to shutdown the system if the condition is potentially damaging or dangerous. The controllers response to each condition is set during initial system calibration.

The IGC700 Series has three normally open 20 Amp relays with outputs that are common to battery voltage for Crank Termination, Fuel Solenoid (shut down signal) and Glow Plug Preheating.

Engine speed functions are easily set up through the keypad. The use of an external potentiometer for trim or wide range speed setting can also be configured with the keypad with general purpose inputs to switch between fixed speed settings. The internal actuator driver circuit can power most proportional actuators that have current ratings up to 10 Amps. If you are unsure of the actuators compatibility, contact GAC or a qualified GAC representative.

The IGC700 provides a simple 2 button control for operation under normal conditions. Depressing the STOP button will shut down the engine immediately by cutting the engine’s fuel supply and turning off power to the actuator. Depressing the START button will begin the crank cycle and govern the engine at set speed while providing protection according the parameters that were set during installation.

The electrical connections for the IGC700 are illustrated in Diagram 1. Terminals R and S are switched to select from the three available fixed speeds or for variable speed operation as described in Table 1. Actuator and battery connections to terminals A, B, C, D and E should be #14 AWG (18mm) or larger. Long cables require an additional wire size to minimize voltage drops. Battery positive (+) inputs to Terminals A and C should be fused for a maximum 20 Amps as shown in Diagram 1.

The magnetic Speed Sensor connections to terminals L and M must be twisted and/or shielded for their entire length, shielding should be connected to terminal B to prevent unwanted signals from being introduced into the IGC700 causing erratic operation of the unit.
NOTE 1: Terminals G and H Source power thru Terminal A and based on configuration, they could be on simultaneously. In this case they should only be derated to no more than 10 Amps each.

NOTE 2: Terminal F shares Power with Actuator and Control Unit and that power is sourced thru Terminal C.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Interface Connections shown for Switch Type.</td>
<td>Switch type sensor (Closed to GND When Active)</td>
<td>Switch type sensor (Closed to Batt + When Active)</td>
<td>Switch type sensor (Closed to Batt + When Active)</td>
<td>Switch type sensor (Closed to GND When Active)</td>
</tr>
<tr>
<td>If properly configured a 0-10V signal could be used instead of Switches.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Configurable Inputs</td>
<td>None</td>
<td>Inputs R,S,W</td>
<td>Inputs Y,Z</td>
<td>Input X</td>
</tr>
<tr>
<td>Alternates Interface Recommendation, If used, the associated input above is disabled (not available)</td>
<td>Fixed Speeds set by R, S Batt Short enable by W</td>
<td>Secondary Control Loop Input(s).</td>
<td>NTC Sensor for auto Preheat Adjust</td>
<td></td>
</tr>
</tbody>
</table>

0-10VDC representing Control Parameter Value
**User Interface**

Before configuring the IGC700 you should familiarize yourself with the front panel. The IGC700 allows direct access from the keypad to the menus and parameters you will use. Diagrams 2 & 3 on the next two pages offer a graphical representation of the keypad and examples of how to read and understand the LED's on the front panel. 

The next few pages provide a detailed description of the Front Panel of the IGC700. To access the various parameters available, you must first be in SETUP mode. Once in SETUP mode, choose which MENU you need access to and then press the number button on the keypad that corresponds to the parameter you wish to make changes to.

**Warning**

Before starting the engine safely, the IGC700 must be properly configured.

An overspeed shutdown device, independent of the governor system, should be provided to prevent loss of engine control that may damage equipment or cause personal injury. Do not rely exclusively on the governor system electric actuator to prevent overspeed. A secondary shut off device, such as a fuel solenoid, must be used.

**Important Note:**

You can access the SETUP mode with engine OFF or while the engine is running.

- With the engine OFF, steps 1 & 2 below describe the LED activity when accessing setup mode.
- If the engine is RUNNING you will not see any LED activity until after you've entered the correct security code, then the Bar Graph will begin to flash the 4 digit software version as stated in step 2.
- If an incorrect Security Code is entered while the engine is running you will not see any LEC activity (the RUN/SETUP LED remains ON) and the IGC700 will return to RUN mode.

This is a safety feature that prevents any accidental tampering with the IDG700.

---

**TABLE: 1 - SPEED SELECT SETTINGS**

<table>
<thead>
<tr>
<th>TERMINALS</th>
<th>SELECTED SPEED</th>
<th>SELECTED DROOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Open</td>
<td>Variable Speed</td>
</tr>
<tr>
<td>Open</td>
<td>Battery (+)</td>
<td>Fixed Speed 1</td>
</tr>
<tr>
<td>Battery (+)</td>
<td>Open</td>
<td>Fixed Speed 2</td>
</tr>
<tr>
<td>Battery (+)</td>
<td>Battery (+)</td>
<td>Fixed Speed 3</td>
</tr>
</tbody>
</table>

**Internal / External (Battle Short) Enable**

When terminal W is left open, the IGC700 will be in normal operation. The IGC700 will respond to preset sensory inputs and take the appropriate action based on these inputs. This means all shutdown signals are active.

When terminal W is connected to battery +, the IGC700 will be in Battle Short mode and will not shutdown for critical faults. Only Overspeed will be monitored. Remote Shutdown must be triggered to command a shutdown.

Terminal X can be configured as an independent, general-purpose input or it can be configured to use a Temperature Sensor for PreHeat time. Terminals Y & Z can be configured as independent, general-purpose inputs. Or their alternate functions are as Voltage and Current inputs, respectively, for Voltage control applications.

**Charge Fail (D+)**

When the voltage signal drops below Battery minimum, the Charge Fail LED will illuminate and the Alarm Output (Terminal O) will activate. The threshold levels for this input is dependent on the system battery voltage.

<table>
<thead>
<tr>
<th>SYSTEM BATTERY</th>
<th>THRESHOLD LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Volts</td>
<td>23.6 Volts</td>
</tr>
<tr>
<td>12 Volts</td>
<td>11.4 Volts</td>
</tr>
</tbody>
</table>

**Driver Output for AUX Control**

Terminal V is the output for the AUX button on the front panel. It can sink up to 500mA and can be used to control any device based on the following options:

<table>
<thead>
<tr>
<th>AUX DRIVER CONFIGURATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1 Alternate action On/Off with AUX button</td>
</tr>
<tr>
<td>Option 2 Turns ON when engine is running</td>
</tr>
<tr>
<td>Option 3 Disabled and will never turn ON</td>
</tr>
</tbody>
</table>
1. To access SETUP mode, press and hold SETUP button until the RUN/SETUP LED begins to flash. This will take about two seconds, the flashing RUN/SETUP LED indicates that you are in SETUP mode and it will continue to flash as long as you are in SETUP mode.

2. Enter the 4-digit Security Code (1221) and then press ENTER Note: Each time a button is depressed as you are entering the Security Code, the entire Bar Graph display will flash. The IGC will validate that the correct Security Code has been entered. Once the correct Security Code has been entered, the Bar Graph will begin to flash the 4-digit software version number. If not, you must repeat this step (2).

3. In SETUP mode, the parameters listed under each numeric button can be accessed by pressing the MENU button and then pressing a Number button (See page 5).

4. Pressing the MENU button repeatedly will cycle through the menus. Do this until the appropriate LED illuminates for the menu you want to access. You can verify which MENU you are in by looking at the LED Bar Graph on the left side of the front panel. Currently, there are six MENUS to choose from. These menus correspond to LED 0, LED 1, LED 2, LED 3, LED 4 and LED 5 respectively.

5. Next, press the numeric button on the keypad for the parameter you want to access. For example: pressing the MENU button twice and then pressing the 5-button will access the Overspeed parameter.

6. Remember that a flashing RUN/SETUP LED indicates that you are in SETUP mode. To exit SETUP mode and save changes to parameters, press and hold the RUN/SETUP button until the RUN/SETUP LED stops flashing and stays ON.

GAC recommends that the user take time to fully understand the following items before attempting to start the engine or going any further:

1. Understanding the Keypad, Menus and Parameters (Pages 4, 5 & 6).
2. Understanding the LED Display Modes (Page 5 & 6).
4. Configuring the necessary basic parameters and saving changes.

---

**Bar Graph Display and Flash Codes**

**Bar Graph Display**

The Bar Graph displays the “approximate” percentage from 0 to 100%. Pressing the +/- arrow buttons, increases or decreases the value. You may have to press the +/- button several times to illuminate the next LED. This is due to the difference in resolution between the LED’s and the actual parameter being adjusted.

**EXAMPLE 1:**

Bar Graph displaying between 50% and 59%.

If only LED 0 is on, the value is between 0% and 9%

This indicates the value is between 50% and 59%

**EXAMPLE 2** – Code Flash mode displaying the number 1500.

All IGC values that are flashed out are always 4 digits. The LED’s are labeled as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Code Flash mode can display any value between 0 and 9999. They would be displayed by flashing 0-0-0-0 thru 9-9-9-9 respectively. Please review the example below of displaying the value 1500.

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Front panel: Menus, Parameters and LED’s

1. Press and hold SETUP until RUN/SETUP LED flashes.
2. Press MENU to access the Menu 1, 2, 3, 4, 5 or 6 (LED 0, 1, 2, 3, 4 or 5).
3. Press NUMERIC button for parameter you want access to.
   • Use the + or – buttons for fine adjustments. The LED Bar Graph will indicate your change. Remember, the resolution is a scale of approximately 10:1. (press +/- 10 times for next LED to come on. Do Not press ENTER.
   • You can also use the numeric buttons to make larger changes. Any changes this way must be made with a 4-digit number (99 becomes 0099). Press ENTER.
4. Press and hold the RUN button until the RUN/SETUP LED becomes steady ON.

ACCESSING PARAMETERS

When entering large numbers into parameter settings, it is much easier to enter the number as a 4-digit number. For example, to enter 125 teeth into the Flywheel Teeth parameter, it is easier and faster to press 0-1-2-5 and then press the ENTER button than it is to press to + button one hundred twenty five times.

For smaller changes and for fine-tuning certain parameters such as RPM settings, the +/- buttons are more useful.

To access the following parameters, you must be in SETUP mode.

Flywheel Teeth

NOTE: This is a critical parameter because the IGC700 uses it to calculate Speed and Overspeed values. Please take extreme care when modifying this value.

TIP: The value can be directly entered by using the number buttons on the keypad. All numeric keypad entries must contain 4 digits. For values of less than 4 digits you must enter zero(s).

Example: pressing 0,1,0,9 and then the ENTER button will set the FLYWHEEL TEETH parameter to 109.

Overspeed

1. Press the MENU button illuminating LED 1. When LED 1 comes on, you will be in MENU 1.
2. Press the 5 button to select the OVERSPEED parameter. The Bar Graph will flash the current value for this parameter.
3. Enter the correct number of teeth and press the ENTER button.
4. If you are configuring the IGC700 for the first time or you have changed the Flywheel Teeth parameter, you must proceed to the next step, OVERSPEED. If not, save and exit the setup routine by holding down the RUN button until the RUN/SETUP LED stops flashing.

Note:
The fault light also comes on when a menu is active. This is useful if you are unsure if you’ve selected a menu.

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PIB 1061 A
3. Using the numeric keypad, enter the 4-digit RPM value of the desired OVERSPEED setting. If you make a mistake just re-enter the complete 4-digit number again.

4. Press the ENTER button to apply the new RPM value.

**Speed Settings**

Connect the SPEED SELECT terminals R & S according to one of the four settings shown in Table 1 on page 3. If you have selected Variable Speed mode, then skip over Fixed Speed Operation and go directly to Variable Speed Operation below.

**Fixed Speed Operation**

1. Access Menu 0 (LED 0)

2. Press the 4 button to access the FIXED SPEED parameter. The Bar Graph will flash out the current RPM.

3. For small RPM changes, use the +/- buttons to adjust the current RPM setting of the FIXED SPEED. DO NOT press Enter.

4. For a large RPM change, use the Numeric keypad Entry method.

5. Re-configure the SPEED SELECT connections according to Table 1 to set up additional fixed speed settings and repeat steps 1 - 5 until all fixed speeds are configured.

**Variable Speed Operation**

1. Make sure the potentiometer is attached as shown in Diagram 1 on page 2.

2. Turn the Potentiometer such that maximum voltage is present on Terminal E. This can be verified by using the IGC700 Bar Graph Display in the next steps.

3. Access Menu 0. (LED 0).

4. Press the 7 button to gain access to the VARIABLE UPPER LIMIT parameter. This step also causes the IGC700 to remember the Potentiometer's maximum position. At this point, the Bar Graph display also shows a representation of the voltage on Terminal I. If this reads zero then turn the wiper on the pot all the way in the other direction and repeat steps 3 and 4. If the Bar Graph now reads higher, then you must swap the wires at terminal J and K. Repeat steps 3 and 4.

5. The current maximum RPM setting for this parameter will be flashed by the LED's.

6. Use the +/- buttons or 4-digit keypad numerical entry method to set a new RPM value for the VARIABLE UPPER LIMIT.

7. Turn the Potentiometer such that the minimum voltage is present on Terminal F.

8. Access Menu 1 (LED 1).

9. Press the 7 button to access the VARIABLE LOWER LIMIT parameter. This step also causes the IGC700 to remember the potentiometer's minimum position. At this point the Bar Graph should display a lower RPM than it did for the maximum position.

10. The current minimum RPM setting will be flashed by the Bar Graph.

11. Use the +/- buttons or 4-digit keypad entry numerical entry method to enter a new value for the VARIABLE LOWER LIMIT.

**Crank Termination Setting**

This parameter must be set higher than the maximum cranking speed (RPM). This helps the IGC700 to determine if the engine is cranking or running. Otherwise the IGC700 will invoke its Speed Control algorithms instead of its Starting Fuel algorithms during the starting cycle. When the IGC700 is in the RUN mode (the SETUP LED will be steady on), the LED labeled ‘DERIVATIVE’ illuminates as an indicator to notify you that the IGC700 is in the Start cycle. Once the engine is running, the LED labeled ‘GAIN’ illuminates indicating the IGC700 is in the Engine Running mode and is therefore invoking the Speed Control algorithms.

If you are attempting to start the engine and you notice the Gain LED lighting you may need to increase the Crank Termination Setting. To increase the Crank Termination Setting:

1. Gain access to MENU 2 (Press and release the MENU button until Menu 2 is active).

2. Press the 7 button to select the CRANK TERMINATION parameter. The Bar Graph will flash the present RPM value for this parameter.

3. Enter the desired RPM value as a four-digit number. For example, 275 RPM would be entered as 0,2,7,5 and press ENTER. After pressing the Enter button, the Bar Graph will flash the new setting for CRANK TERMINATION.

**Saving IGC700 Settings**

Press and Hold the RUN button until the RUN/SETUP LED stops flashing. This causes the IGC700 to save all settings into permanent memory. Without doing this all settings will be lost when the IGC700 is turned off. The IGC700 will now be in RUN mode, which is verified by a steady RUN/SETUP LED.

**Advanced Configuration**

Additionally, there is a group of Advanced Configurations that do not necessarily need to be preset for basic engine operation. These are listed below. (Their factory default states should not hamper basic operation.)

1. Starving Fuel Inhibitor control. (SFI is disabled per factory configuration.)

2. Speed Ramping for acceleration and deceleration rates.

3. Droop settings (All Droop settings are preset to 0%).

**Starting Fuel Inhibit Control**

This parameter gradually increases the amount of fuel during the engine start cycle, which eliminates unnecessary smoke. The higher the setting the more time it takes to reach full fuel.

**Tip:** You may have to press the + or - button several times before you will see any change in Bar Graph LED’s. This is due to the fine-tune resolution between LED indicators.

1. Enter SETUP mode.

2. Enter the START FUEL RAMP parameter. (Press and release the MENU button until MENU 0 is active, then press the 6 button).

3. Use the +/- buttons to adjust the Bar Graph.

**Tip:** The Engine should start more quickly as this value is decreased. Therefore a value of zero will not restrict any fuel.

**Starting Fuel Preset Point**

This parameter determines how much fuel to begin with before fuel ramping engages.

1. You must be in SETUP mode.

2. Enter the START FUEL BEGIN POINT parameter. (Press and release the MENU button until MENU 1 is active then press the 6 button).

3. Use the +/- buttons to adjust the Bar Graph indicating what percentage of fuel the cranking cycle will begin with.

**Speed Ramping Control**

Speed Ramping Control provides acceleration and deceleration ramping during RPM input changes.

**Acceleration Ramp**

1. Enter SPEED RAMPING ACCELERATION parameter. (Press and release the MENU button until Menu 0 is active then press the 9 button).

2. Use the +/- buttons to set a new Acceleration Ramp rate.
Deceleration Ramp
1. Enter SPEED RAMPING DECELERATION parameter. (Press and release the 
MENU button until Menu 1 is active then press the 9 button).
2. Use the +/- buttons to set a new Deceleration Ramp rate.

Droop Setting
Each of the four speed settings also has a corresponding droop setting. When 
the IGC700 ramps from Fixed Speed 1 to Fixed Speed 2, the Droop value also 
ramps from Droop 1 to Droop 2. This type of operation provides maximum 
stability performance.
1. The Droop value is automatically selected based on which Speed is 
selected by terminals Q and R (Table 1).
2. Enter the DROOP parameter. (Press and release the MENU button until 
Menu 1 is active then press the 4 button.
3. Use the +/- buttons to select desired Droop amount in percent.

Saving IGC700 Settings
Press and Hold the RUN button until the RUN/SETUP LED stops flashing. This 
causes the IGC700 to save all settings into permanent memory. Without doing 
this, all settings will be lost when the IGC700 is turned off. The IGC700 will 
now be in the RUN mode indicated by the RUN/SETUP LED being steady ON.

9 OPERATING AND TUNING
Verify Settings
Before starting the engine with the IGC700 connected please follow the steps 
listed below:
1. Apply power but do not start the engine.
2. Enter SETUP mode and verify that all parameters are set to what you 
expected. Pay particular attention to Flywheel Teeth, Overspeed, Speed 
configuration and Crank Termination.
3. Once you are satisfied that ALL parameters are correctly set, press and 
hold the RUN button to exit SETUP mode.
4. Now you are ready to start the engine.

Starting the Engine
Press and release the green START button. This will initiate the startup se-
quence based on the parameters you have installed. Once the engine has started, you must set the Gain, Stability and Derivative (PID) parameters in order to obtain peak engine performance. The following section will assist you in adjusting these parameters.

Tuning Engine (Adjusting PID)
*****Important Note*****
When the engine is running and you enter the SETUP mode, there will be 
no LED activity until after you have entered the correct Security Code. Once 
the correct Security Code is entered the Bar Graph will display the software 
version number. If the wrong code is entered, nothing will happen. The engine 
will continue to run and you will have to attempt to enter SETUP mode again.

The key here is to press and hold the RUN/SETUP button for 2-3 seconds,
then enter the 4-digit Security Code and press the ENTER button. If done 
correctly, the Bar Graph will flash the software version number.

TIP: The longer you hold the + or - button down, the faster the value will 
change.

Gain
Press and release the MENU button until Menu 0 is active, then press the 1 
button. The LED labeled GAIN will illuminate and the Bar Graph will display the 
current setting of Gain. Use the +/- buttons to adjust the Gain parameter.

Stability
Press and release the MENU button until Menu 0 is active, then press 2 button. 
The LED labeled STABILITY will illuminate and the Bar Graph will display the 
current setting of Stability. Use the +/- buttons to adjust the Stability parameter.

Derivative
Press and release the MENU button until Menu 0 is active, then press the 3 
button. The LED labeled DERIVATIVE will illuminate and the Bar Graph will 
display the current setting of Derivative. Use the +/- buttons to adjust the 
Derivative parameter.

Range Setting
This function will double or triple the Gain and Stability parameter ranges by 
reducing the resolution. This is useful when large amounts of gain and stability 
are needed. This function basically multiplies the Gain and Stability parameters 
by 1, 2 or 3. The normal setting for the Range is 1. By changing it to 2 or 
3, the values are doubled or tripled. To access Range adjustment press and 
release the MENU button until Menu 2 is active, then press the 1 button. The 
current Range parameter setting will be flashed on the Bar Graph as either 
0,0,0,1 or 0,0,0,2 or 0,0,0,3. Use the +/- buttons to adjust the Range. Again, 
do not press ENTER.

Saving Values (While Engine is Running)
When all tuning and engine configuration is complete, press and hold the RUN 
button to save all changes.
Troubleshooting Guide 1: IGC Powered ON and Engine OFF.

- With Power applied to IGC, Is Fault LED on? NO → Is RUN/SETUP LED Blinking? NO → Are any LED’s on? NO → Is RUN/SETUP LED steady On? NO → Indicates the Overspeed limit was exceeded during starting. Recheck Flywheel Teeth, Overspeed, and Speed settings. Cycling the power on the IGC will remove the Overspeed Fault Condition. Try Restarting.
- With Power applied to IGC, Is Fault LED on? NO → Is RUN/SETUP LED Blinking? YES → IGC is in SETUP Mode. Press and hold the RUN Button to exit Setup mode. The Fault LED should turn off. If it doesn’t, that means the Overspeed limit was exceeded during starting. Recheck Flywheel Teeth, Overspeed, and Speed settings. Cycling the power on the IGC will remove the Overspeed Fault Condition. Try Restarting.
- With Power applied to IGC, Is Fault LED on? NO → Connect Battery → Measure Voltage across Terminals A (+) and B (-) To verify sufficient voltage (12V or 24V0. Cycle Power. If still no LED’s turn on, the controller needs to be replaced.

Troubleshooting Guide 2: IGC Powered ON and Engine Cranking.

- When Cranking Engine, Are Any LED’s ON? NO → Measure Voltage across Terminals A (+) & B (-) while cranking the engine. Verify sufficient voltage of approximately 8.0V. If not, make sure the battery is properly charged.
- When Cranking Engine, Are Any LED’s ON? YES → Is the GAIN LED Turning ON? YES → This indicates either the Crank Termination or the Fuel Limit Setting is too low. Typically the Crank Termination value should be at least 50 RPM higher than the maximum cranking speed of the engine. Enter the SETUP Mode and configure the Crank Termination Setting (MENU 3, Button 7) to a higher value, try 100 RPM increments. If the engine appears to start and the STABILITY LED illuminates, the FUEL LIMIT setting may be too low. Enter the Fuel Limit function (SETUP Mode) then (MENU 2, Button 3). The Bar Graph displays the Fuel Limit Setting, use the + button to set the FUEL LIMIT to 100% which disables the feature.
- When Cranking Engine, Are Any LED’s ON? YES → Is the Derivative LED Turning ON? NO → If neither the Derivative nor the Gain LED’s are ON during cranking, the IGC700 is not receiving the pickup signal. Verify the pickup sensor is connected to Terminals L & M. Measure the pickup signal while the engine is cranking, it must be a minimum of 0.5VAC at cranking and greater than 5.0VAC while running at rated speed.
- When Cranking Engine, Are Any LED’s ON? YES → Does the Bar Graph Display show more than 0% while cranking? YES → This indicates the Starting Fuel Function is engaged and can be remedied by entering the Start Fuel Inhibit Function and setting the Fuel Ramp to 0000. Enter the SETUP Mode and access the Starting Fuel Function (MENU 0, Button 6). Then press 0,0,0,0 and press ENTER. This is verified by the Bar Graph displaying 0%.

This indicates the IGC700 is seeing the Pickup Sensor and is invoking the Start Algorithm. Make sure the actuator is connected to Terminals D and E. Measure the voltage across these terminals while the engine is cranking. The voltage should be no more than 2.0VDC lower than the supplied battery voltage. Confirm the number of flywheel teeth is entered correctly and the selected Speed Setting (Fixed or Variable) is correct.

Extremely long fuel ramp settings can contribute to hard/no start conditions. The value can be displayed by entering the ETUP Mode and accessing the Start Fuel Function (Menu 0, Button 6), then enter 0,0,0,0 and press ENTER. This is verified by the Bar Graph displaying 0%.
Bar Graph flashing when power is applied to IGC700
This indicates the IGC700 configuration is corrupt. Reconfigure the unit before attempting to start the engine.

Discrete Output Not Working
This terminal sinks current. The typical amount of sink current is 20mA. This means the device being controlled with this terminal must be tied to a positive voltage and must not require more than 20mA to operate. This terminal turns on when the IGC700 is running under normal conditions. If the IGC700 overspeeds then this terminal switches to an open circuit.

Engine Not Running at Correct Fixed Speed
1. Are Terminals R and S properly configured? If nothing is connected to these terminals the IGC700 is configured for Variable Speed. Please refer to TABLE 1 on page 3.
2. Make sure the correct number of flywheel teeth has been entered. This function is accessed in the SETUP mode under MENU 0, button 5. The IGC700 will flash out the current number of teeth as a 4-digit code. If this number is not correct then enter the correct number of teeth as a 4-digit number followed by the ENTER button.
3. Make sure the Fixed Speed is correctly set. Access SETUP mode and select MENU 0, Button 4. The IGC700 will flash out the present RPM speed. If this is not correct, enter the 4-digit speed in RPM and press ENTER. The IGC700 will then flash the updated RPM Speed.

Engine Not Running at Correct Variable Speed
Make sure potentiometer is connected properly to terminals I, J and K. Refer to the configuration section in this manual to setup the potentiometer. When configuring the potentiometer verify the RPM value entered for MAXIMUM RPM SPEED (MENU 0, Button7) is greater than the RPM entered for MINIMUM RPM SPEED (MENU 1, Button 7). When doing this you should also verify the Bar Graph displays a higher reading for MAX. RPM SPD than for MIN. RPM SPD.

Make sure the FLYWHEEL TEETH parameter is correct. This function is accessed in the SETUP mode (MENU 0, Button 5). The IGC700 will flash out the current number of teeth as a 4-digit code. If this number is not correct then enter the correct number of teeth as a 4-digit number followed by the ENTER button.

Overspeed During Starting (Tripping Fault LED)
Note: Each time one of these parameters is selected, you must enter a 4-digit value.
This condition is caused by the OVERSPEED parameter being too low, or the IGC700 not properly tuned for the application or the CRANK TERMINATION parameter being set too high. Recheck these parameters.

Overspeeding During Load Transient (Tripping Fault LED)
OVERSPEED parameter is set too low or the IGC700 is not properly tuned for the application. Recheck the OVERSPEED setting and try retuning the engine.

Overspeeding During Speed Changes (Tripping Fault LED)
OVERSPEED parameter is set too low or the SPEED RAMP ACCELERATION parameter is set too low. You can increase the Speed Ramp Value in SETUP mode (MENU 0, Button 9). The Bar Graph will display the current Speed Ramp setting. Press the + button to increase this value. This causes the engine to accelerate more slowly reducing the overshoot.

SETUP mode is not accessible
Press and hold the SETUP button until the RUN/LED lamp starts to flash. Now you must enter the valid 4-digit Security Code [1] [2] [3] [4] followed by the ENTER button. Each unit has a specific Security Code. If you forgot the code you must contact your GAC distributor from where the IGC700 was purchased.

Note: Once you’ve entered the proper code the IGC700 will flash of the Software Version Number.
### TABLE: 2 - Description of Front Panel Buttons

<table>
<thead>
<tr>
<th>Button</th>
<th>Button Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Stop</td>
<td>Stops the engine and will stop any start cycle.</td>
</tr>
<tr>
<td>B2</td>
<td>AUX</td>
<td>Turns AUX Driver On or Off</td>
</tr>
<tr>
<td>B3</td>
<td>Fault</td>
<td>Clears all faults in the IGC</td>
</tr>
<tr>
<td>B4</td>
<td>Start</td>
<td>Initiates Crank Cycle. Pressing and holding this button will bypass the Crank Cycle and begin cranking.</td>
</tr>
<tr>
<td>B5</td>
<td>Enter</td>
<td>Used to Enter any 4-digit number. <strong>DO NOT</strong> use with +/- buttons.</td>
</tr>
<tr>
<td>B6</td>
<td>Run</td>
<td>Pressing and Holding until Run/Setup LED stops flashing saves changes.</td>
</tr>
<tr>
<td>B7</td>
<td>Setup</td>
<td>Press this button until Run/setup LED starts to flash. Enter 4-digit access code and press Enter. Note: If IGC is running the Run/Setup LED will not flash.</td>
</tr>
<tr>
<td>B8</td>
<td>Menu</td>
<td>Press this button sequentially to access the parameter you want to adjust. Each time this button is pressed, the next LED will come on indicating you are in the menu selection mode. Also, the Fault LED will come on indicating menu selection mode.</td>
</tr>
</tbody>
</table>

### TABLE: 3 - Description of Front Panel LED's

<table>
<thead>
<tr>
<th>LED</th>
<th>LED Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Run/Setup</td>
<td>Steady ON = IDC is operating; Flashing = SETUP Mode</td>
</tr>
<tr>
<td>L2</td>
<td>Engine Run</td>
<td>ON = Engine speed has exceeded the Crank Termination Setting.</td>
</tr>
<tr>
<td>L3</td>
<td>Engine Temperature</td>
<td>ON = Engine temperature has exceeded the temperature setting.</td>
</tr>
<tr>
<td>L4</td>
<td>Oil Pressure</td>
<td>ON = Oil pressure has exceeded the oil pressure setting.</td>
</tr>
<tr>
<td>L5</td>
<td>Charge Fail</td>
<td>ON = Batteries have failed to charge (Failed alternator, broken belt, etc.)</td>
</tr>
<tr>
<td>L6</td>
<td>Error 1,2,3 &amp; 4</td>
<td>User configurable. Use with any of the configurable inputs. (R, S, T, W, X, Y &amp; Z)</td>
</tr>
<tr>
<td>L7</td>
<td>Bar Graph</td>
<td>During crank cycle the graph will sequence from 1 to 10 (0-100%) indicating preheat time and pause between crank time. In SETUP mode, it shows 0-100% of the parameter value and depending on the parameter, will flash a 4-digit code to show the exact value of that parameter.</td>
</tr>
<tr>
<td>L8</td>
<td>Gain, Stability &amp; Derivative</td>
<td>These LED's will come on individually when their respective parameters are being accessed for adjustment. The Derivative LED also lights during the Cranking Cycle.</td>
</tr>
<tr>
<td>L9</td>
<td>Fault</td>
<td>ON = Overspeed has been tripped, or - IGC Self-test failed (bad checksum or invalid configuration parameter) or - IGC stopped by local Stop button when remote Start/Stop is latched on.</td>
</tr>
</tbody>
</table>

### TABLE: 4 - Accessing Menus

<table>
<thead>
<tr>
<th>Button #</th>
<th>Menu 0</th>
<th>Menu 1</th>
<th>Menu 2</th>
<th>Menu 3</th>
<th>Menu 4</th>
<th>Menu 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gain Speed</td>
<td>Gain Secondary</td>
<td>Scale</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
</tr>
<tr>
<td>2</td>
<td>Stability Speed</td>
<td>Stability Secondary</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
</tr>
<tr>
<td>3</td>
<td>Derivative Speed</td>
<td>Derivative Secondary</td>
<td>Current Limit</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
</tr>
<tr>
<td>4</td>
<td>Fixed Speed</td>
<td>Droop</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
<td>Not Used</td>
</tr>
<tr>
<td>5</td>
<td>Flywheel Teeth</td>
<td>Overspeed</td>
<td>Input 'P' Trip Point</td>
<td>Input 'P' Delay</td>
<td>Input 'Q' Trip Point</td>
<td>Input 'Q' Delay</td>
</tr>
<tr>
<td>6</td>
<td>Start Fuel Ramp</td>
<td>Start Fuel Begin Point</td>
<td>Input 'R' Trip Point</td>
<td>Input 'R' Delay</td>
<td>Input 'S' Trip Point</td>
<td>Input 'S' Delay</td>
</tr>
<tr>
<td>7</td>
<td>Variable Upper Limit</td>
<td>Variable Lower Limit</td>
<td>Crank Termination</td>
<td>Crank Attempts</td>
<td>Crank Pause</td>
<td>Crank Time</td>
</tr>
<tr>
<td>8</td>
<td>Voltage Reference</td>
<td>Not Used</td>
<td>Input 'T' Trip point</td>
<td>Input 'T; Delay</td>
<td>Input 'X' Trip Point</td>
<td>Input 'X' Delay</td>
</tr>
<tr>
<td>9</td>
<td>Speed Ramp Up</td>
<td>Speed Ramp Down</td>
<td>Input 'Y' Trip Point</td>
<td>Input 'Y' Delay</td>
<td>Input 'Z' Trip point</td>
<td>Input 'Z' Delay</td>
</tr>
</tbody>
</table>