

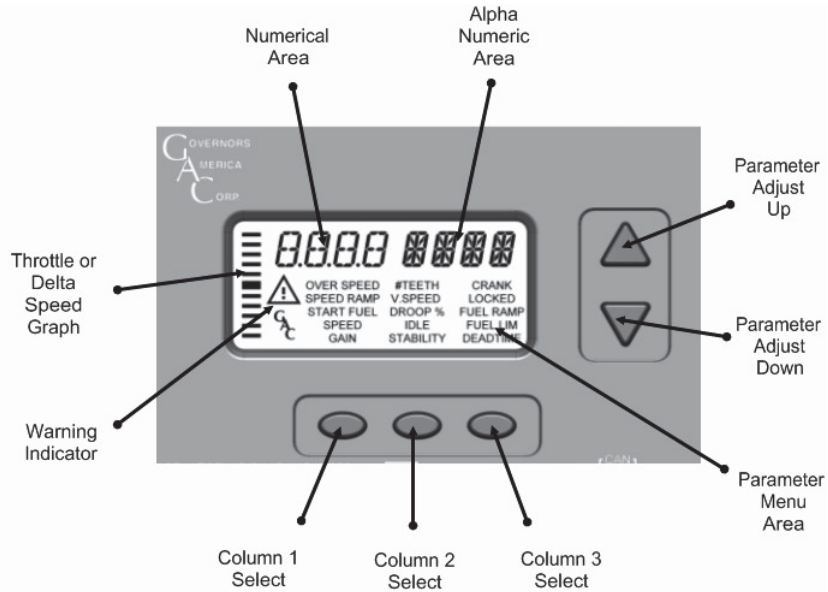
4.0 THE USER INTERFACE

4.1 THE DISPLAY AND BUTTONS

The DPI100 is the user interface for configuring the either the DPG100-FX or DPG100-VS governors. All adjustments are made using the LCD and five buttons – 3 COLUMN select buttons, 1 UP ARROW, 1 DOWN ARROW.

DPI Layout

- The numerical area displays the value of a selected parameter or live running parameter. The alpha numeric area displays the units for the parameter (e.g., 1500 RPM).
- When running, the DPG will by default display the engine RPM, throttle position, or actuator current.



4.2 LOCKING AND UNLOCKING THE DISPLAY

To unlock and enable the display, simultaneously press and holding the UP and DOWN buttons for 2 seconds. The LOCKED indicator will the turn off. Locking the display is accomplished by performing the same operation. If the lock is enabled, the display will lock after 5 minutes of non-use.

Lock / Unlock

Simultaneously press and hold the up and down arrows for 2 seconds.



5.0 Quikset, Special, and Advanced Menus

The DPG100-FX has three configuration menus, QuikSet, Special, and Advanced configuration menus.

5.1 QUIKSET MENU

The DPG100-FX is designed to have the most frequently adjusted parameters on the main display. Selecting and modifying these parameters is performed using the patented Quikset method.

5.1.1 Viewing/Changing Quikset Parameters

All of the Quikset parameters are on the LCD display in five rows with three parameters in each row. The active row is indicated by the parameters in the row being displayed.

To view the value of a parameter in the current row, press and hold the COLUMN button under the parameter. To change that value of the parameter, while still holding the COLUMN button, tap the UP ARROW to increase the value, or tap the DOWN ARROW to decrease the value. Release the COLUMN button to return to the normal display. Holding down the UP or DOWN ARROW, while changing the value of a parameter, will scroll through the values.

Modify a QuikSet Parameter

In this example, GAIN is being modified. Press and hold the button under the parameter, then tap the up or down arrow to increase or decrease the value.



Changing Parameter Row

To change to the next row, press and release any of the column keys.



5.2 QUIKSET MENU PARAMETERS

Name	Definition	Valid Range & Default
<p>OVER SPEED</p> <p>Over Speed: RPM at which to automatically shuts off the actuator</p> <p>Range: 500 RPM - 9999 Default: 2250 (RPM'S)</p>	<p>#TEETH</p> <p>Number of gear teeth on flywheel</p> <p>Range: 50-255 Default: 120 (teeth)</p>	<p>CRANK (termination)</p> <p>Crank termination: RPM at which DPG switches from starting to governing</p> <p>Range: 0-9999 (RPM's) Default: 400 (RPM's)</p>
<p>SPEED RAMP</p> <p>Speed Ramp: Rate throttle is ramped open during start</p> <p>O= slowest acceleration</p> <p>Range: 0-9999 RPM's/ sec Default: 150 (RPM's/sec)</p>	<p>V.SPEED (See Note1)</p> <p>Variable Speed Control - Maximum speed change allowed from trim input</p> <p>Range: 0-9999 RPM's Default: 5 (RPM's)</p>	<p>LOCKED</p> <p>Lock Configuration: Indicates whether DPG is to be locked when not in use</p> <p>Range: OFF, ON Default: OFF</p>
<p>START FUEL</p> <p>Starting Fuel: Percent of power to apply to actuator when cranking starts</p> <p>Range: 0-100% Default:65 (%)</p>	<p>DROOP%</p> <p>Droop Percent: Droop to apply under maximum load (based on current to the actuator)</p> <p>Range: 0-25.0 % (increments by 0.1) Default: 5.0 (%)</p>	<p>FUEL RAMP</p> <p>Percent per second to apply fuel as engine starts</p> <p>0=No fuel increase</p> <p>Range: 0-100 %/ sec Default: 0 (%/ sec)</p>
<p>SPEED (See Note1)</p> <p>Fixed speed of engine, expressed in RPM</p> <p>Range: 0-9999 RPM's Default: 1500 (RPM's)</p>	<p>IDLE</p> <p>Speed (in RPM) of engine when IDLE input is closed</p> <p>Range: 0-9999 RPM's Default: 1000 (RPM's)</p>	<p>FUEL LIM</p> <p>Fuel Limit: Maximum actuator percentage allowed</p> <p>Range: 0-100% Default: 99 (%)</p>
<p>GAIN</p> <p>Proportional (P) set point of the PID control</p> <p>Range: 0-100, 100=Max Gain Default: 30</p>	<p>STABILITY</p> <p>Integral (I) set point of the PID control</p> <p>Range: 0-100, 100= Shortest Time Default: 25</p>	<p>DEADTIME (Compensation)</p> <p>Derivative (D) set point of the PID control</p> <p>Range: 0-100 Default: 5</p>

Note 1: V.SPEED only applies to DPG100-VS only. In Variable Speed Mode, **V.SPEED** represents the maximum speed and **IDLE** parameter represents the minimum speed. For example, VSPD is ON, and **IDLE** is set to 1000 and V. SPEED set to 2000, then the lower end of the pot is set to 1000 and the upper end is set to 2000. The center of the pot is 1500 (assuming linear taper).

5.3 SPECIAL MENU

The “Special Menu” is used to view and change lesser used parameters. These parameters include Variable Speed / Trim select, Soft Coupling (on / off), Lead (on / off), and Dither percent (0-10%).and Filter sampling (1-64)

5.3.1 Entering and Using the Special Menu

To change a value in the Special Menu, tap or hold down the UP ARROW to increase the value, or the DOWN ARROW to decrease the value.

The next parameter in the “Special Menu” is selected by pressing the third COLUMN button. The previous parameter is selected by pressing first COLUMN button.

To return to the Quikset Menu Parameters, simultaneously press and hold all three COLUMN keys for 2 seconds.



5.3.2 Special Menu Parameters

Param	Definition	Range / Default
VSPD	Variable speed or trim select (On=Variable speed, Off=Trim)	Off, On, Default=Off
SOFT	Soft coupling – dampening of system (slow down response)	Off, On, Default=Off
LEAD	Lead circuit – response increase	Off, On, Default=Off
D SW	Sets the droop mode (On=Auto Offset, Off=Manual Offset)	Off, On, Default=On
DITH	Dither – add white noise to actuator to prevent sticking in the fuel rack	0-10%, Default=0
DRNG	System current to the actuator that represents full load	0.0-10.0, Default=3.9 (A)
DSPD	Speed to manual adjust droop offset when D SW is set to Off	0-9999, Default=1500 RPM

5.4 ADVANCED MENU

The “Advanced Configuration Menu” is used to manipulate the operating characteristics of the PID control. These parameters include PID update rate, Filter, Gain, Stability, and Deadtime Compensation scale adjustments.

 **WARNING**

Modifying the advanced parameters without thorough knowledge of their use can damage the engine or cause injury.

5.4.1 Entering and Using the Advanced Menu

To display the Advance Parameters, simultaneously press and hold all three column buttons until **RATE** appears in the text area of the display (this requires holding the buttons for 10 seconds, **SOFT** will first appear (“Special Menu” . Continue holding until **RATE** appears).

To change a value in the Special Menu, tap or hold down the UP ARROW to increase the value, or the DOWN ARROW to decrease the value. Some functions are just On or Off.

The next parameter is selected by pressing the third COLUMN button. The previous parameter is selected by pressing first COLUMN button.

To return to the Quikset Menu Parameters simultaneously press and hold the left and right COLUMN keys.



5.4.2 Advanced Menu Parameters

Parameter	Definition	Range / Default
RATE	The time between calls to the PID control loop (in mS).	4-250mS, Default=4
FLTR	Number of speed samples in frequency calculation. Filter is active when soft coupling (SOFT) is set to ON. Lower numbers filter high frequency noise..	1-62, Default=40
GMUL *	Gain multiplier – If the GAIN value is at maximum and more gain is required, <u>increase GMUL</u> . This will make changes in GAIN more responsive. If small changes in the GAIN parameter are over responsive, <u>decrease GMUL</u> .	1-20, Default 17
SMUL *	Stability multiplier – If the STABILITY value is at maximum and more stability is required, <u>increase SMUL</u> . This will make changes in STABILTY more responsive. If small changes in STABILITY parameter are over responsive, <u>decrease SMUL</u> .	1-20, Default 16
DMUL *	Deadtime multiplier – If the DEADTIME COMPENSATION value is at maximum and more deadtime is required, <u>increase DMUL</u> . This will make changes in DEADTIME more responsive. If small changes in DEADTIME COMPENSATION parameter are over responsive, <u>decrease DMUL</u> .	1-20, Default 9

- When a multiplier is changed (e.g. **GMUL**) the corresponding parameter (e.g., **GAIN**) on the QUIKSET menu will normalize. If the multiplier is decreased by 1, the corresponding QUIKSET value will double in value (i.e., if **GMUL** is changed from 17 to 16, and **GAIN** was 2, **GAIN** will normalize to 4). Increasing the multiplier halves the corresponding QUIKSET value (i.e., if **GMUL** is changed from 16 to 17, and **GAIN** was 15, **GAIN** will normalize to 7).
- **CAUTION:** Multiplier Changes can make drastic changes to the ranges and even overflow at the top and bottom.

6.0 Monitoring the Engine / DPG Using the DPI

The DPI is capable of displaying engine RPM, actuator duty cycle and current to actuator.

At power up, the DPI displays engine RPM in the main display area, and actuator duty cycle on the bar graph.



To change the display, press and release either the up or down arrow.



The next display is the actuator duty cycle in the main display area, and difference in RPM on the bar graph.

To switch to the next display, press and release either the up or down arrow.



The final real time display is the actuator current on the main display and difference in RPM on the bar graph.



7.0 Commissioning the Engine

7.1 PRE-START SETUP

7.1.1 Basic Parameters

Before starting the engine, the following parameters, at a minimum, must be set (refer to Quikset Menu parameters for more detail):

- **#TEETH** (Number of teeth on flywheel)
- **CRANK** (Crank Termination RPM)
- **SPEED** (Set the SPEED RPM)

7.2 RUNNING THE ENGINE

7.2.1 Starting the Engine

Crank the engine with DC power applied to the governor system. The actuator/ fuel to the engine will be positioned to the level set by the **START FUEL** parameter (default is maximum fuel). **Starting Ramp** will then control the rate at which fuel is increased to start the engine.

If the engine is unstable after starting, adjust the **GAIN**, **STABILITY**, and **DEADTIME COMPENSATION** Quikset Menu parameters below until the engine is stable.

7.2.2 Governor Performance

Once the engine is at operating speed and at no load, the following governor performance adjustment can be made.

A. Increase the **GAIN** parameter on the Quikset menu until instability develops. Gradually decrease the Gain until stability returns. Decrease the adjustment one count further to insure stable performance

B. Increase the **STABILITY** parameter on the Quikset menu until instability develops. Gradually decrease the **STABILITY** until stability returns. Decrease the parameter by one to insure it is stable. If No instability leave set at 50.

C. Increase the **DEADTIME** (compensation) parameter on the Quikset menu until instability develops. Gradually decrease the **DEADTIME** until stability returns. Decrease the parameter by one to insure it is stable.

D. **GAIN**, **STABILITY**, and **DEADTIME** (compensation) parameter adjustments may require minor changes after engine load is applied. Normally, adjustments made at no load achieve satisfactory performance. A strip chart recorder can be used to further optimize the adjustments.

If instability cannot be corrected or further performance improvements are required, refer below to the **SYSTEM TROUBLESHOOTING** section. In this section, information can be found regarding troubleshooting procedures as well as instructions on adjusting the Special and Advanced Parameters.