DGC-2020 Product Notes

PRNote 125
April, 2015

DGC-2020 Initial Setup

In order to provide the desired machine control and protection, the DGC-2020 must be set up with parameters specific to the machine it is controlling. The following parameters must be configured before starting the machine. They are listed according to where they are found in BESTCOMS*Plus*® in the Settings Explorer. These parameters can also be set through the front panel of the DGC-2020, but generally BESTCOMS*Plus* is more convenient.

In BESTCOMS*Plus*, if you are connected to the DGC-2020 and communicating with it, after changing settings you must click the *Send Settings* button in BESTCOMS*Plus* to send the settings to the DGC-2020. If you do not do this, or you do not save the modified settings to a settings file, setting information may be lost.

Initial Setup Required to Operate Unit

Once the following parameters are configured in the DGC-2020, it should be possible to run the machine. Only those parameters required are presented in this discussion.

General Settings

Style Number (Figure 1)

Connect BESTCOMS*Plus* to the DGC-2020. Check the style number of the DGC-2020 unit and verify that it has all the features required for the machine being configured. For example, if it is expected that the machine perform synchronization, the synchronizer option must exist in the style number.

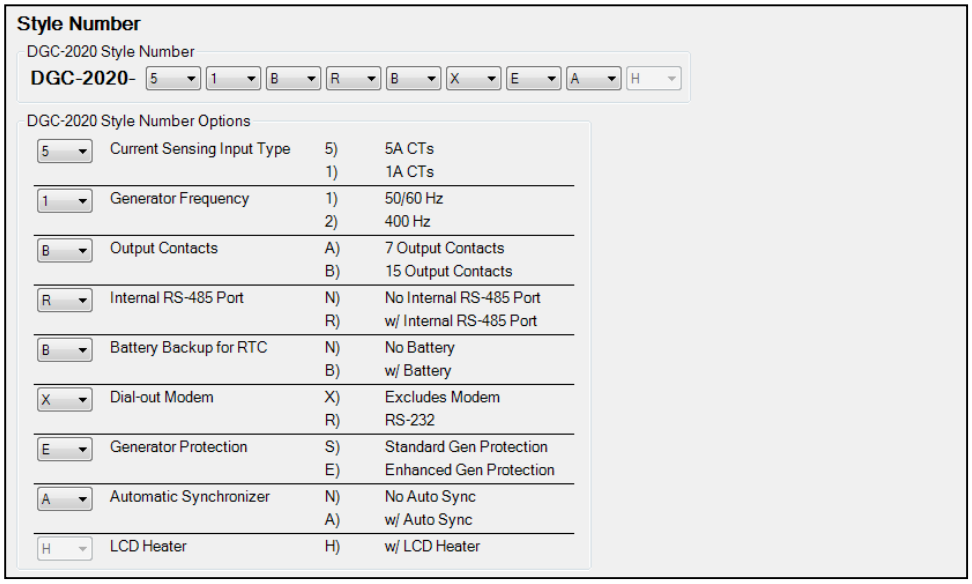

Figure 1: Settings Explorer, General Settings, Style Number

Communications

If the engine has an ECU (Electronic Control Unit) and the DGC-2020 is to communicate with it, the communications must be set up.

CAN Bus Setup (Figure 2)

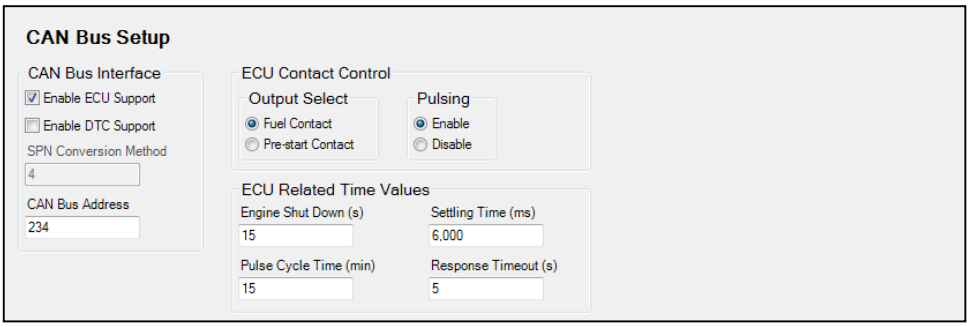

Figure 2: Settings Explorer, Communications, CAN Bus Setup

1. Enable ECU Support – Set to Enabled for the DGC-2020 to communicate with the ECU.
2. Enable DTC (Diagnostic Trouble Code) Support – If the ECU is a J1939 ECU, enable DTC support. If the engine ECU does not support it, no diagnostic trouble codes will be logged by the DGC-2020.
3. SPN Conversion Method – If the ECU's Conversion Method (CM) Bit is 0, the default valve of 4 can remain. However, if the CM Bit is 1, the engine manufacturer needs to provide this value.
4. CAN Bus Address – The address number for the DGC-2020 in the CAN Bus network. While most ECU's accept the default address of 234, some ECU's do specify the address they are looking at for control.
5. ECU Contact Control - Output Select – Select whether the RUN output relay or the PRE (Prestart) output relay will close to give the ECU its "energize to run" signal. In some implementations, this relay may actually provide ECU power.
6. ECU Contact Control - Pulsing Enable – Select this option if the ECU is not to be online at all times. Often ECUs are allowed to go "offline" to conserve battery drain when the engine is not running. The DGC-2020 will "pulse" it periodically to force it to be active to allow the DGC-2020 to read data such as coolant temperature and coolant level. This is required if the DGC-2020 is to report low coolant temperature conditions (which may indicate a failure of a block heater), or low coolant level conditions (if a leak occurs while the machine is not running). Pulsing also is used to check the integrity of CAN Bus communications when the machine is not running.
7. ECU Related Time Values - Engine Shut Down – Set this parameter for a value longer than the duration required to stop the engine after being shut down. The ECU is pulsed after this time expires. If the time is too short, the pulse may occur while the engine is still turning, which could cause a brief restart and possibly damage the flywheel and starter system.
8. ECU Related Time Values - Pulse Cycle Time – Set this parameter for the desired time between ECU pulse cycles.
9. ECU Related Time Values - Settling Time – This parameter is the duration of the "online" time of the pulse cycle during which the DGC-2020 reads data from the ECU. The settling time should be set long enough so that any ECU parameters that require time to "settle down" after the ECU is online can do so. Because the DGC-2020 may use some of the ECU data for alarm or pre-alarm annunciation, it is important that the data have time to settle.
10. ECU Related Time Values - Response Timeout – This setting defines the length of time that the DGC-2020 will wait to receive data from the ECU during a pulse cycle or start attempt. If no data is received during this time in a pulse cycle, a LOSS OF ECU COMMS pre-alarm is annunciated. If no data is received in this time during an engine starting attempt, a LOSS OF ECU COMMS alarm is annunciated.

ECU Setup (Figure 3)

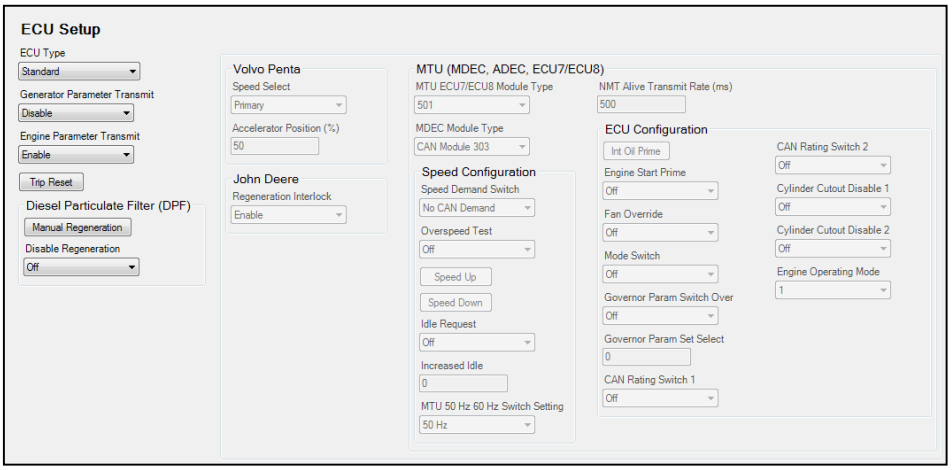

Figure 3: Settings Explorer, Communications, ECU Setup

1. ECU Type – For most engines, select *Standard*. However, there are exceptions. If your engine is a Volvo, select *Volvo-Penta*. If you have an MTU MDEC, ADEC, ECU7/ECU8, GM/Doosan, Cummins, or MTU Smart Connect, make the appropriate selection. Depending on the ECU type selected, some parameters may become enabled, allowing them to be configured for the specific engine. No modification of these parameters is required for the initial setup. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software*, for additional information.

System Parameters

System Settings (Figure 4)

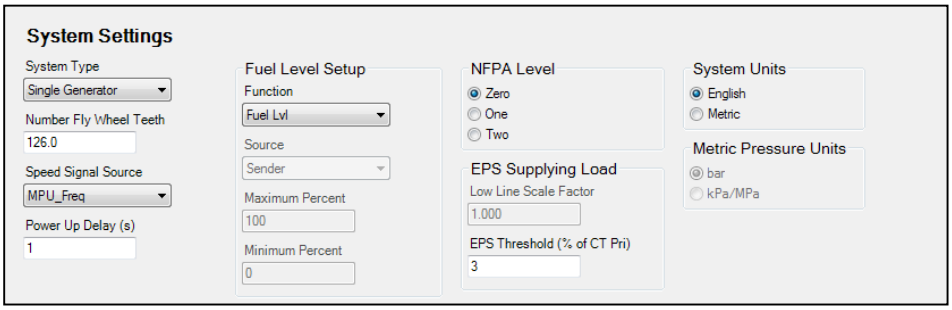

Figure 4: Settings Explorer, System Parameters, System Settings

1. System Type – This setting is used with breaker management. For more information, refer to Section 3, *Functional Description, Breaker Management.*
2. Number of Flywheel Teeth – This setting defines the number of teeth on the flywheel for engines equipped with a magnetic pickup sensor (MPU) for engine speed detection.
3. Speed Signal Source – Select whether the rpm source for the DGC-2020 should be the magnetic pickup sensor (MPU), the generator frequency, or both (MPU_Freq). If MPU or generator frequency is selected as the rpm source, and the DGC-2020 cannot detect engine rpm, an MPU FAIL alarm is announced. If MPU-GEN is selected as rpm source, if the MPU input does not provide valid speed information, the DGC-2020 switches to generator frequency as the rpm source, annunciates an MPU FAIL pre-alarm, and continues running.
4. Power Up Delay – Time the DGC-2020 will wait after power up to pulse the ECU. Useful if the DGC-2020 powers up faster than the ECU.
5. Fuel Level Setup - Function – This parameter selects the fuel type of the machine. If a fuel level sender is available in a tank, select *FUEL LVL*. If liquid propane or natural gas is used, set accordingly. Otherwise, select *Disable*. This informs the DGC-2020 to display N/A for fuel level on the overview screen unless a transducer is used (see #6).
6. Fuel Level Setup - Source – If the DGC-2020 has an AEM-2020 enabled, this allows for a transducer to be used. This is the only way to measure fuel on liquid propane or natural gas units.
7. Maximum and Minimum Percent – When using an analog input as the source, provides the range based on the transducer's input.
8. NFPA Level – Set this if NFPA level 1 or 2 compliance is required for the machine.
9. EPS Threshold – The percentage of primary current that indicates the generator is supporting a load.

10. System Units – Select *English* or *Metric*.
11. Metric Pressure Units – Select *Bar* or *kPa*.

Rated Data (Figure 5) *Note: Click the* Edit *button to change settings.*

1. Rated Volts – This parameter defines the voltage rating of the machine.
2. Rated Power Factor – This parameter defines the power factor rating of the machine.
3. Genset kW Rating – This parameter defines the kW rating of the machine.
4. Rated Engine RPM – This parameter defines the engine rpm rating of the machine.
5. Rated Frequency of the unit – This parameter defines the frequency rating of the machine.
6. Battery Voltage – Select *12* or *24*.

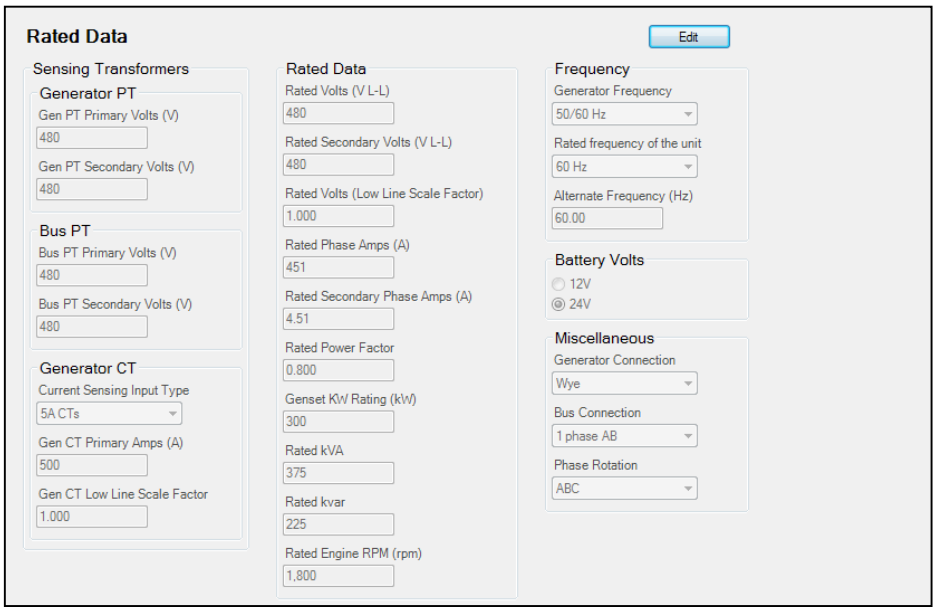

Figure 5: Settings Explorer, System Parameters, Rated Data

7. Generator Connection – Select *WYE, DELTA, 1 PHASE AB, 1 PHASE AC,* or *GROUNDED DELTA* etc. based on the generator configuration.
8. Bus Connection – Select 1 phase AB, 1 phase AC, or 3 phase based on the bus sensing configuration.
9. Phase Rotation – Select ABC for forward, clockwise rotation or ACB for reverse, counter-clockwise rotation.

Remote Module Setup (Figure 6)

This screen is used to enable any I/O modules that are to be used with the DGC-2020. Refer to the appropriate sections in the DGC-2020 manual for more details regarding the individual I/O modules. Disable all if no modules are present.

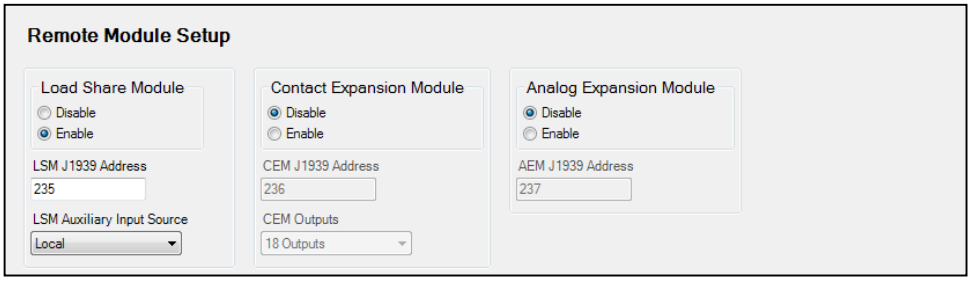

Figure 6: Settings Explorer, System Parameters, Remote Module Setup

Crank Settings (Figure 7)

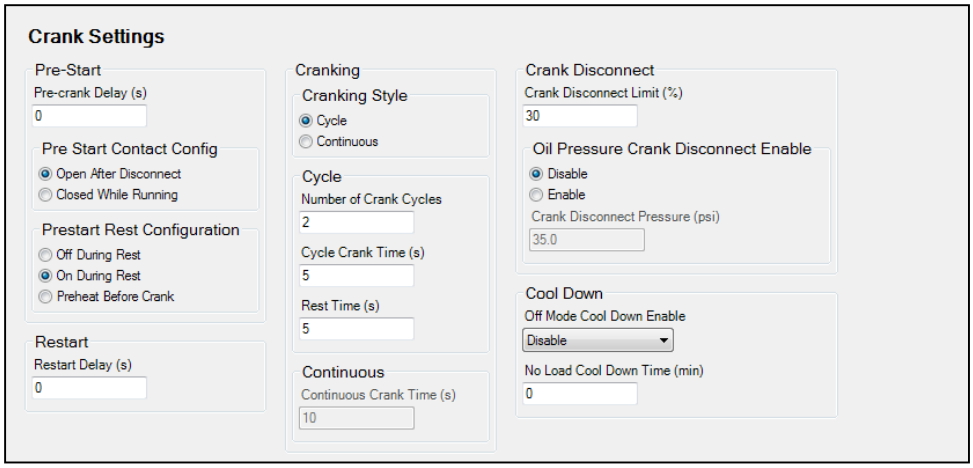

Figure 7: Settings Explorer, System Parameters, Crank Settings

1. Pre-Crank Delay – This setting specifies the amount of time for pre-cranking to occur. The PRE relay will be closed during this time. This is typically used for engine preheat and/or pre-lubrication.
2. Prestart Contact Config – Select whether the PRE relay should remain closed after the engine starts, or if it should open.
3. Prestart Rest Configuration – There may be situations when it is desired to have the PRE relay closed during engine cranking but open for all or part of a crank resting cycle. Configure this accordingly. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information.
4. Restart Delay – Timer that prevents the starting of a unit after a normal shutdown.
5. Cranking Style – Select Cycle Cranking or Continuous Cranking.
    a. Cycle
        i. Number of Crank Cycles: This parameter defines the number of crank cycles if *Cycle* is selected as the crank style. Note if NFPA level 1 or 2 has been selected under SYSTEM PARAMETERS > NFPA LEVEL, this cannot be programmed; it is set to a fixed value to satisfy the NFPA compliance.
        ii. Crank Cycle Time: This parameter defines the length of the crank cycle if *Cycle* is selected as the crank style. Note if NFPA level 1 or 2 has been selected under SYSTEM PARAMETERS > NFPA LEVEL, this cannot be programmed; it is set to a fixed value to satisfy the NFPA compliance.
        iii. Rest Time: Length of time following a crank cycle, before another is initiated. Typically, this equals the crank cycle time.
    b. Continuous
        i. Continuous Crank Time: This parameter defines the length of the crank cycle if *Continuous Cranking* is selected as the crank style.
6. Crank Disconnect Limit – This parameter defines the engine rpm threshold in percentage of rated rpm at which crank disconnect should occur.
7. Oil Pressure Crank Disconnect – This setting provides an alternate method to determine conditions under which crank disconnect should occur. If the machine has no magnetic pick up (MPU) for rpm detection or a failed MPU, and the DGC-2020 cannot read generator frequency to obtain rpm information, it will use oil pressure as criterion for crank disconnect. This prevents long starter engagement if the engine starts but the DGC-2020 cannot determine engine speed for crank disconnect purposes.
8. Off Mode Cooldown Enable – When this setting is disabled, pushing the OFF button stops the unit immediately. When enabled, pushing the OFF button once will start a cool down cycle and the RUN LED flashes. The unit completes the cool down cycle and stops in OFF mode. If the OFF button is pushed a second time, the unit stops immediately.
9. No Load Cool Down Time – Length of time unit runs with the generator breaker open before shutting down.

Sensing Transformers (Figure 8)

Note: Click the Rated Data *button to make changes.*

Figure 8: Settings Explorer, System Parameters, Sensing Transformers

1. Generator PT Primary Volts – This parameter defines the voltage of the potential transformer (PT) primary. If no PT is used, leave this parameter at its default value.
2. Generator PT Secondary Volts – This setting defines the voltage of the potential transformer (PT) secondary. The parameter must be less than 576 Vac because that is the maximum voltage that can be metered by the DGC-2020 voltage inputs. If no PT is used, leave this parameter at its default value.
3. Bus PT Primary Volts – This parameter defines the voltage of the potential transformer (PT) primary. If the bus connection is not utilized, leave this parameter at its default value.
4. Bus PT Secondary Volts – This parameter defines the voltage of the potential transformer (PT) secondary. This must be less than 576 Vac because that is the maximum voltage that can be metered by the DGC-2020 voltage inputs. If the bus connection is not utilized, leave this parameter at its default value.
5. Generator CT Primary Amps – This parameter defines the current transformer (CT) primary current in amps. The secondary must be 1A or 5A, and is determined by the DGC-2020 configuration as indicated in the DGC-2020 style code.
6. Gen CT Low Line Scale Factor – This setting is used to automatically adjust the Gen CT Primary Amps setting in applications that may utilize more than one type of genset connection.

Relay Control (Figure 9)

This selects the operation mode for the PRE, START, and RUN relays on the back of the DGC-2020. In general, most machines use preconfigured functionality; more advanced users may select logic usable. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information.

Figure 9: Settings Explorer, System Parameters, Relay Control

Auto Config Detection (Figure 10)

If the machine connection type is not reconfigurable, disregard this setting. However, if a machine is reconfigurable, these parameters define how automatic detection of the generator connection type for some machines is accomplished. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information.

Figure 10: Settings Explorer, System Parameters, Auto Config Detection

Alarm Configuration

Horn Configuration (Figure 11)

1. Horn Enable – This setting enables or disables the output for the external alarm horn.
2. Not In Auto Horn Enable – This setting enables or disables the horn when not in auto mode.

Figure 11: Settings Explorer, Alarm Configuration, Horn Configuration

Pre-Alarms (Figure 12)

Examine each of the pre-alarms. Pre-alarm setup is not required to operate the machine, but is likely to be desired to provide warnings for machine protection. Enable any desired pre-alarms and enter an appropriate threshold. Set the activation delay where possible. The activation delay is the duration that a condition remains in effect before annunciating a pre-alarm. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information regarding pre-alarm configuration.

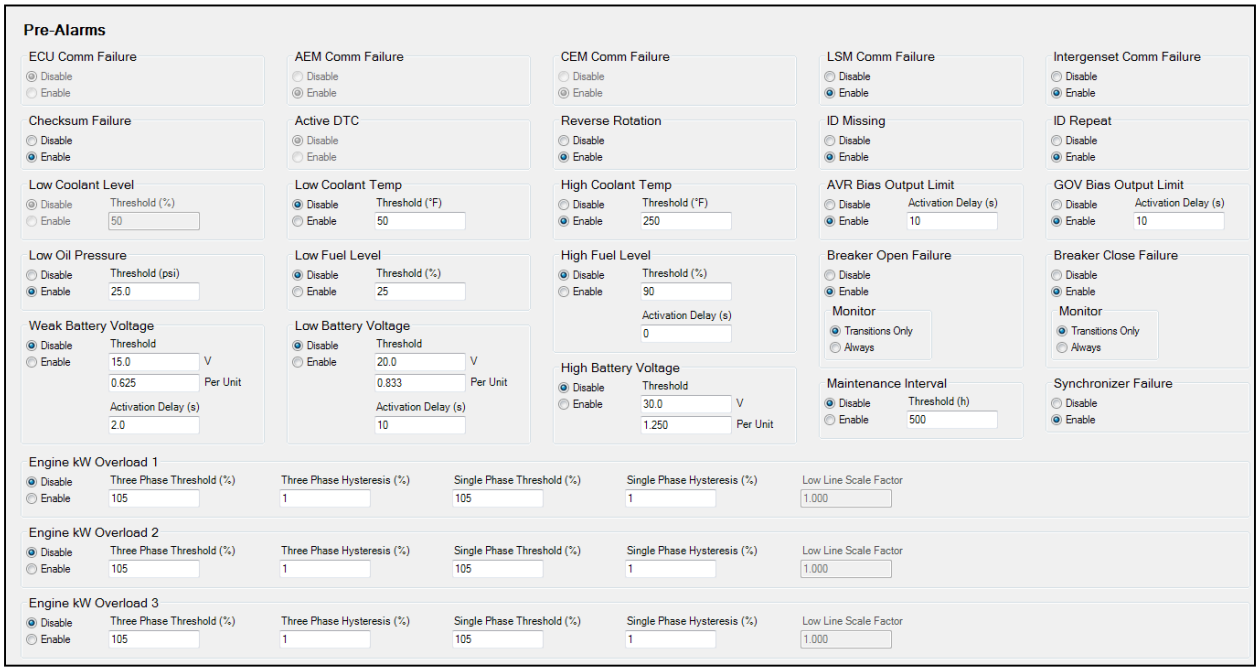

Figure 12: Settings Explorer, Alarm Configuration, Pre-Alarms

Alarms (Figure 13)

Examine each of the alarms. Alarm setup is not required to operate the machine, but is likely to be desired to provide shutdowns for machine protection. Enable any desired alarms and enter an appropriate threshold. Set the *Activation Delay* where possible. The activation delay is the duration that a condition remains in effect before annunciating an alarm. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information regarding alarm configuration.

Figure 13: Settings Explorer, Alarm Configuration, Alarms

Sender Fail (Figure 14)

Enable each sender type as desired by configuring it as an alarm or pre-alarm. Set an activation delay. The activation delay is the duration that the condition remains in effect before annunciating an alarm or pre-alarm. Refer to the appropriate paragraphs in Section 4, *BESTCOMSPlus® Software,* for additional information regarding sender fail configuration. If a DGC-2020 is receiving engine information from an engine ECU, the sender fail for coolant temperature and oil pressure do not need to be configured because they have no effect. They are appropriate for resistive senders only.

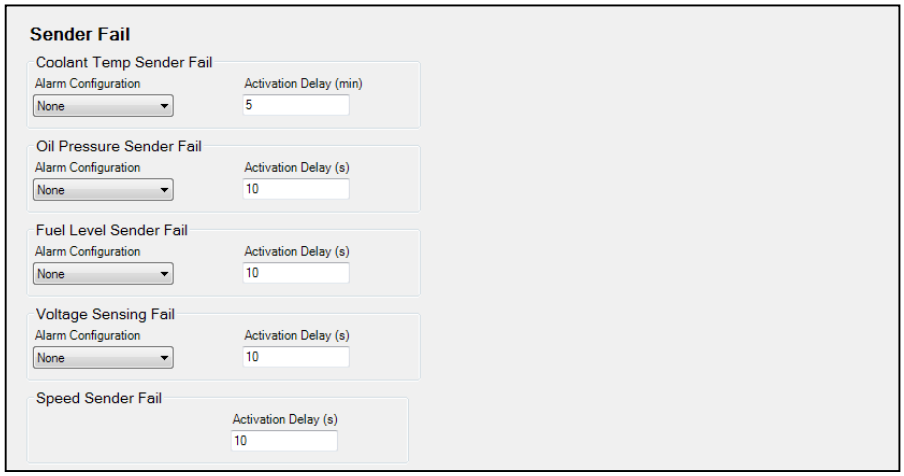

Figure 14: Settings Explorer, Alarm Configuration, Sender Fail

Programmable Senders

If a DGC-2020 is receiving engine information from an engine ECU, the programmable sender parameters for the coolant temperature and oil pressure senders do not need to be configured because they have no effect. They are appropriate for resistive senders only.

Coolant Temperature (Figure 15)

1. The coolant temperature sender can be configured by selecting one of the sender types that are included in the BESTCOMS*Plus* sender library by clicking on *Load Cool Settings File* and selecting the appropriate sender.
2. If no sender file matches the sender being used, the individual points that map resistance points to coolant temperature may be modified by setting numeric values in the table, or by dragging the points of the graph to the desired characteristic. Information on sender characteristics should be obtained from the sender manufacturer.
3. Select *Positive* or *Negative* sender slope as required for the desired sender graph.
4. Click *Save Cool Data* to save the data in the current settings file.

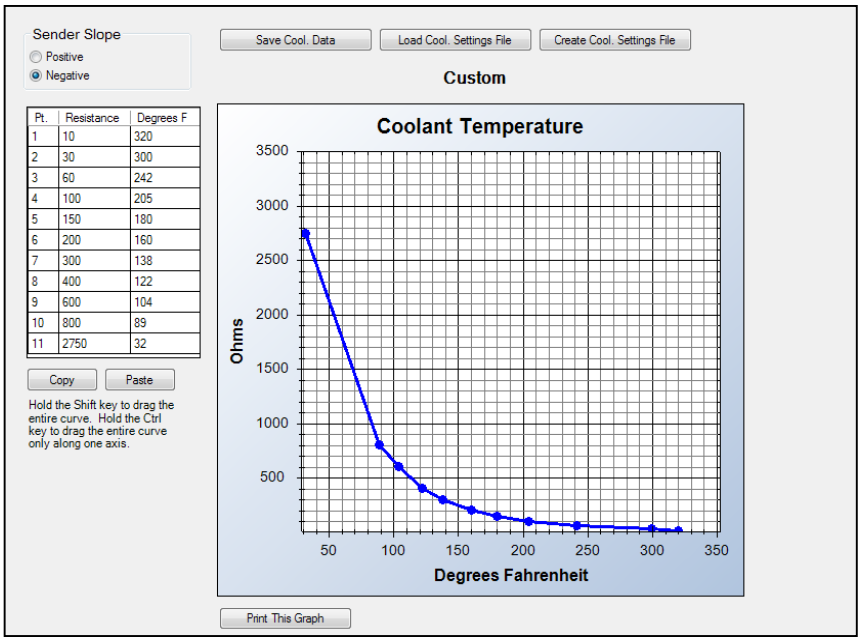

Figure 15: Settings Explorer, Programmable Senders, Coolant Temperature

5. If you want to save newly entered sender data as a sender library file, click *Create Cool Settings File* and enter a file name and location to save the file.
6. Click the *Send Settings* button in BESTCOMS*Plus* to send the sender settings to the DGC-2020.

Oil Pressure (Figure 16)

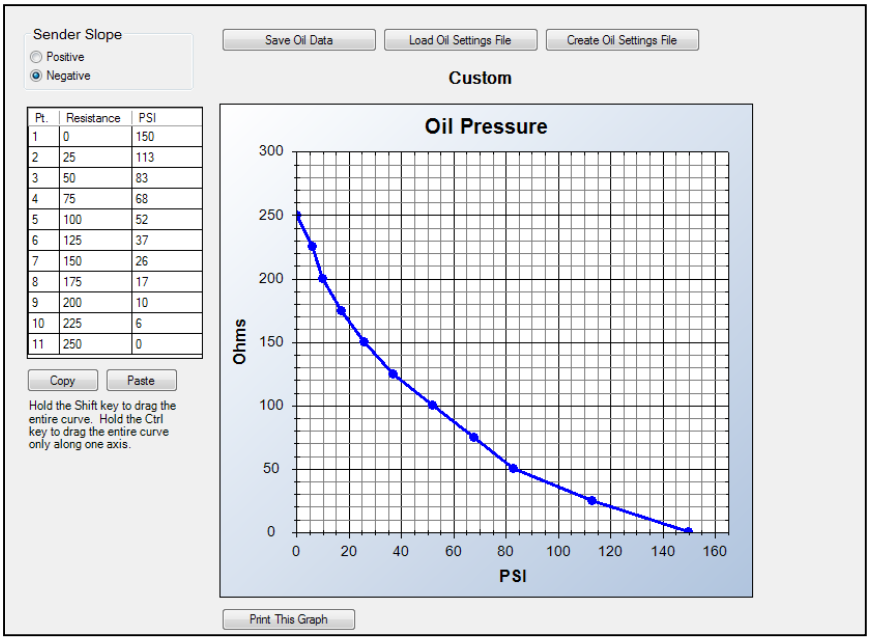

Figure 16: Settings Explorer, Programmable Senders, Oil Pressure

1. The oil pressure sender can be configured by selecting one of the sender types that are included in the BESTCOMS*Plus* sender library by clicking on *Load Oil Settings File* and selecting the appropriate sender.
2. If no sender file matches the sender being used, the individual points that map resistance points to oil pressure may be modified by setting numeric values in the table, or dragging the points of the graph to the desired characteristic. Obtain information on sender characteristics from the sender manufacturer.
3. Select *Positive* or *Negative* sender slope as required for the desired sender graph.
4. Click *Save Oil Data* to save the data in the current settings file.
5. If you want to save newly entered sender data as a sender library file, click *Create Oil Settings File* and enter a file name and location to save the file.
6. Click the *Send Settings* button in BESTCOMS*Plus* to send the sender settings to the DGC-2020.

Percent Fuel Level (Figure 17)

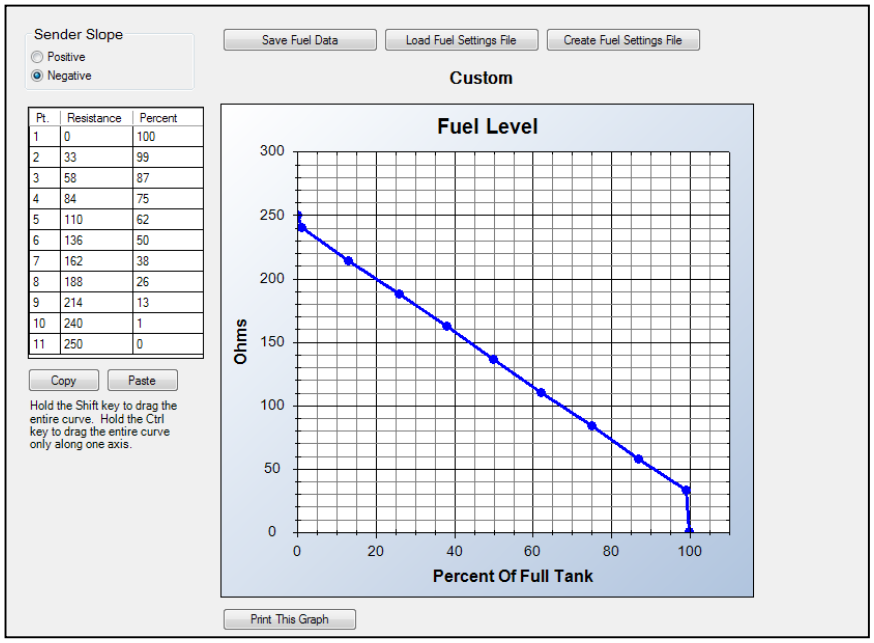

Figure 17: Settings Explorer, Programmable Senders, Fuel Level

1. The percent fuel level sender is configured by selecting one of the sender types that come as a part of the BESTCOMS*Plus* sender library by clicking on *Load Fuel Settings File* and selecting the appropriate sender.
2. If no sender file matches the sender being used, the individual points that map resistance points to fuel level may be modified by setting numeric values in the table, or dragging the points of the graph to the desired characteristic. Information on sender characteristics should be obtained from the sender manufacturer.
3. Select *Positive* or *Negative* sender slope as required for the desired sender graph.

4. Click *Save Fuel Data* to save the data in the current settings file.
5. If you want to save newly entered sender data as a sender library file, click *Create Fuel Settings File* and enter a file name and location to save the file.
6. Click the *Send Settings* button in BESTCOMS*Plus* to send the sender settings to the DGC-2020.

This completes the discussion of initial DGC-2020 setup parameters that are required prior to running a unit.

Initial Setup (Optional)

This section discusses some of the basic setup parameters that are not required to start and run the unit, but may be set up to further customize the DGC-2020 to the application. This discussion is not comprehensive; it presents some of the basic setup parameters. Advanced users can customize the DGC-2020 through the BESTlogic™*Plus* Programmable Logic, configurable inputs, configurable protection, configurable elements, and numerous other features designed for DGC-2020 configurability.

The parameters are listed according to how they are listed in the Settings Explorer of BESTCOMS*Plus*. These parameters can also be set from the front panel of the DGC-2020.

General Settings

Front Panel HMI (Figure 18)

1. LCD Contrast - Change this setting if the contrast needs adjustment.
2. Front Panel Sleep Mode - Select enable if desired. In sleep mode, the LEDs and LCD backlight turn off after 15 minutes of inactivity on the front panel to minimize battery drain.
3. One Line Diagram – Displays the one line diagram with breaker states.

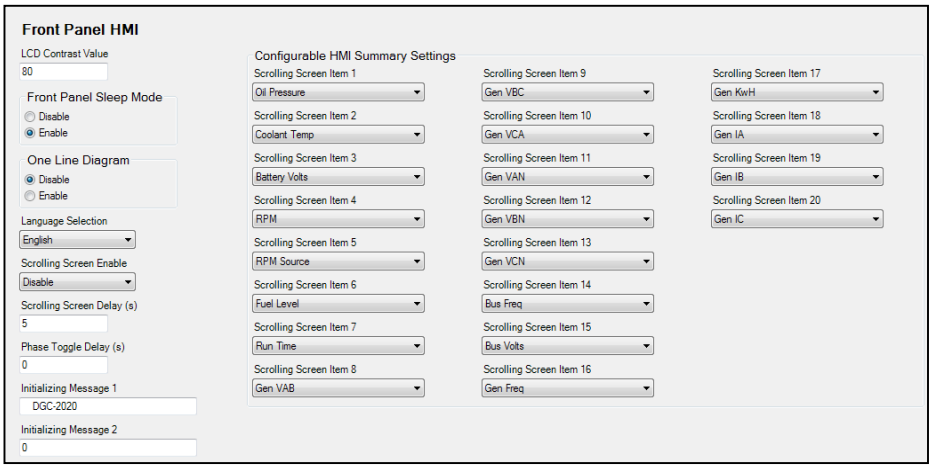

Figure 18: Settings Explorer, General Settings, Front Panel HMI

4. Language Selection - Select the desired language.
5. Scrolling Screens - These settings are not accessible via the front panel. If a different overview screen for the front panel LCD is desired, specify the scrolling screens in which parameters are configured to appear on the front panel LCD display.
    a. Configure the *Configurable HMI Summary Settings.*
    b. Set the *Scrolling Screen Enable* to *Enable*.
    c. Set the *Scrolling Screen Scroll Delay* parameter to the desired value.
6. Phase Toggle Delay - Set the phase toggle delay to a nonzero value if automatic scrolling through the phase information in the standard overview screen on the front panel is desired. If it remains at zero, scrolling through phase information is accomplished using the up and down arrow buttons.
7. Initializing Message 1 - This parameter defines the first line of text that appears on the front panel of the DGC-2020 as it is going through its power up and initializing sequence.
8. Initializing Message 2 - This parameter defines the second line of text that appears on the front panel of the DGC-2020 as it is going through its power up and initializing sequence.

Device Security Setup (Figure 19)

If passwords other than default are desired, use BESTCOMS*Plus* to connect to the DGC-2020 and change the passwords. Click on *Upload Security* from the *Communications* pull-down menu to load the new passwords.

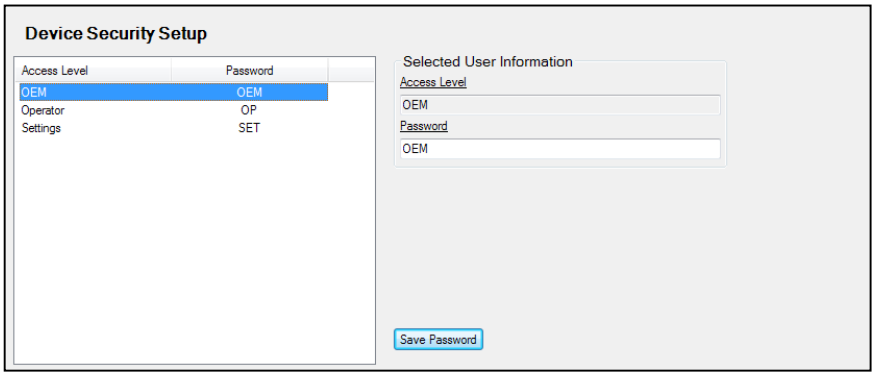

Figure 19: Settings Explorer, General Settings, Device Security Setup

Clock Setup (Figure 20)

Configure the date and time for the DGC-2020. The daylight-savings time parameters are also configured on this screen.

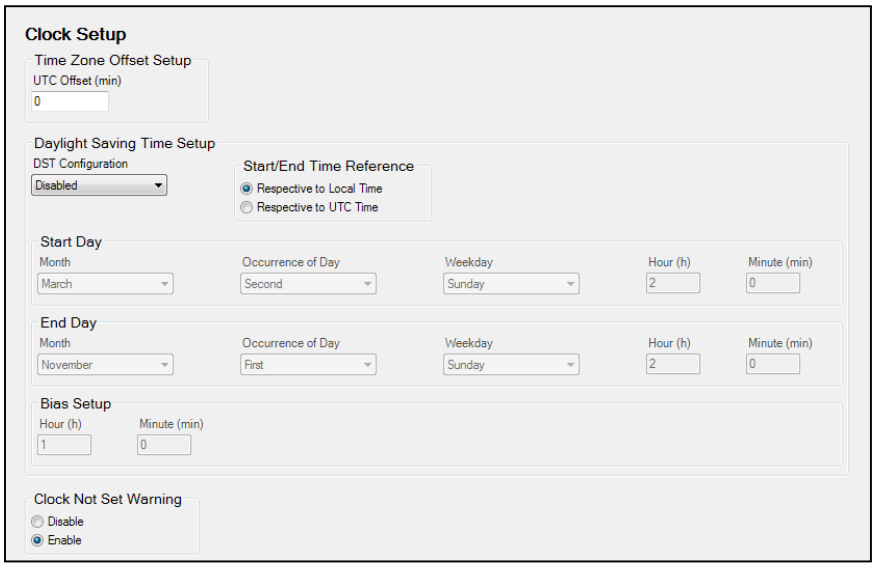

Figure 20: Settings Explorer, General Settings, Clock Setup

This completes the discussion of optional DGC-2020 setup parameters. This discussion is not comprehensive; it presents some of the basic setup parameters. Advanced users can customize the DGC-2020 through the BESTlogic*Plus* Programmable Logic, Configurable Inputs, Configurable Protection, Configurable Elements, and numerous other features designed for DGC-2020 configurability. For more information on the DGC-2020, consult the Basler factory at 618/654-2341 or visit www.basler.com.

NOTE: Basler Electric attempts to make settings and configuration updates as easy as possible for the user. However, product enhancements, updates, and feature additions may create differences between devices. It is recommended that all settings are reviewed and system performance is verified. It is not the intention of this document to identify all changes or differences between devices. For more information, please refer to the appropriate instruction manual. If there are questions or concerns, contact our Technical Sales Support staff for assistance.

Basler Electric®

12570 State Route 143, Highland, Illinois U.S.A. 62249-1074 US
Tel +1 618.654.2341 Fax +1 618.654.2351
e-mail: info@basler.com

www.basler.com

No. 59 Heshun Road Loufeng District (N),
Suzhou Industrial Park, 215122, Suzhou, P.R.China
Tel +86.512.8227.2888 Fax +86.512.8227.2887
e-mail: chinainfo@basler.com

111 North Bridge Road,
15-06 Peninsula Plaza, Singapore 179098
Tel +65.68.44.6445 Fax +65.68.44.8902
e-mail: singaporeinfo@basler.com