DGC-2020 Product Notes

PRNote 136
November, 2009

Setting Up DGC-2020 Programmable Inputs and Outputs

The DGC-2020 along with the CEM-2020 Contact Expansion Module and AEM-2020 Analog Expansion Module provides a variety of programmable input and output capabilities. The DGC-2020 and the CEM-2020 include contact inputs that can be configured as pre-alarms or alarms and are available as inputs to the BESTLogic*Plus* Programmable Logic. They also contain dry contact relay outputs that also are driven by the BESTLogic*Plus* Programmable Logic.

The AEM-2020 Analog Expansion Module has eight Analog Inputs, eight Resistive Temperature Device (RTD) Inputs, two Thermocouple Inputs, and four Analog Outputs. Each analog input can be configured as a 4 to 20 mA current input or a 0 to 10 VDC voltage input to accommodate most readily available industrial transducers; the RTD and Thermocouple inputs are pre-configured for temperature measurement. Each analog, RTD, and/or Thermocouple input can be programmed with a user adjustable range and assignable label along with up to four thresholds to implement protective schemes or BESTLogic*Plus* logic programming utilizing the measured parameter. This allows for enhanced protection of the engine and generator, and protection of external devices.

The analog outputs can be configured as 4 to 20 mA current outputs or 0 to 10 VDC voltage outputs. Each output can be mapped to metered parameters in the DGC-2020 to implement meter driver functionality or provide signals for analog inputs of other equipment.

Instructions regarding configuration and setup of each type of programmable input and output are presented, along with instructions for enabling the expansion modules.

Enable LSM-2020, CEM-2020 and AEM-2020 Expansion Modules:

The parameters for Remote Inputs and Remote Outputs are grayed out and cannot be configured in BESTCOMS*Plus* unless the appropriate expansion module has been enabled. Thus, expansion modules connected to the DGC-2020 must be enabled before the parameters associated with them can be modified.

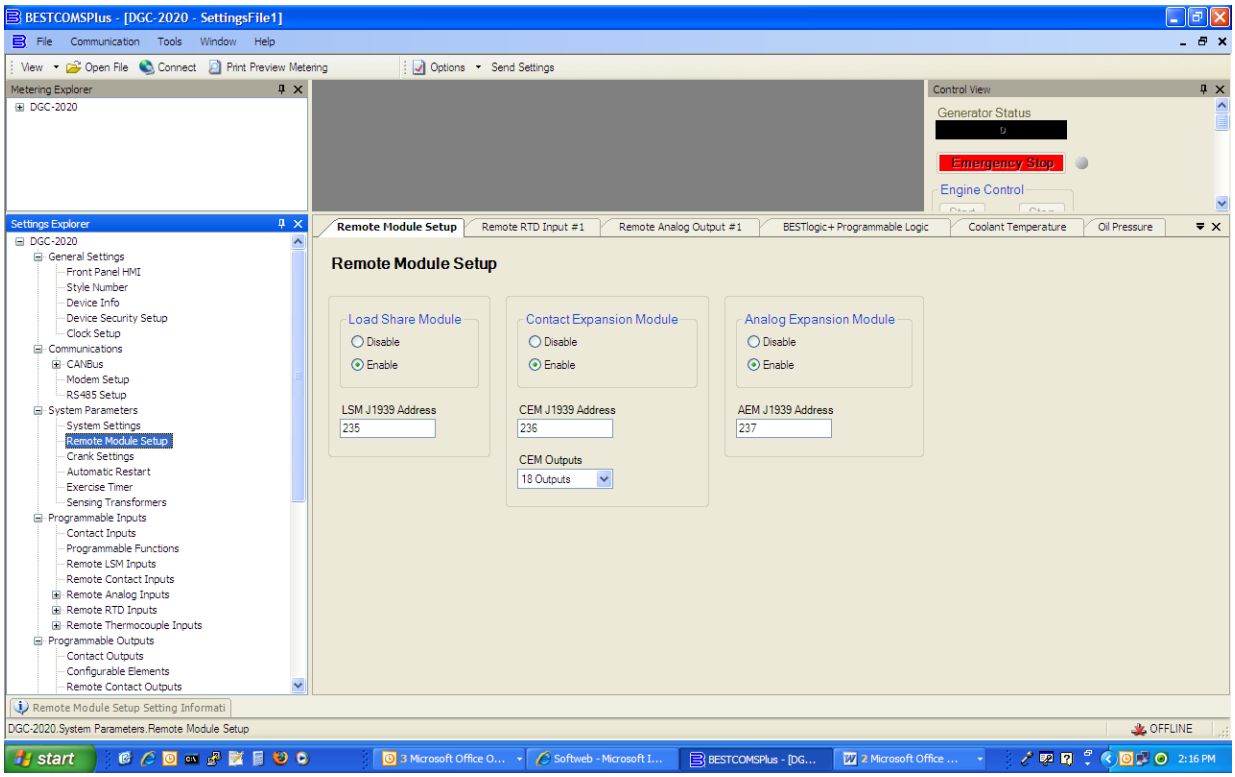

Figure 1: Remote Module Setup Screen

Configure the following parameters:

1. Load Share Module Enable/Disable – Click “Enable” if the module is present in the system.
2. LSM J1939 Address – Set the J1939 address to be used by the LSM-2020. Normally this will not have to be changed unless the address is already in use elsewhere on the CANbus Network.
3. Contact Expansion Module Enable/Disable – Click “Enable” if the module is present in the system.
4. CEM J1939 Address – Set the J1939 address to be used by the CEM-2020. Normally this will not have to be changed unless the address is already in use elsewhere on the CANbus Network.
5. CEM Outputs – Set this to match the number of output relays on the CEM-2020. The two possibilities are “18” and “24”.

Programmable Inputs:

The programmable inputs consist of:

- Contact Inputs on the DGC-2020
- Programmable Functions on the DGC-2020. The programmable functions allow one to map particular inputs to certain functions. For instance, one can select an input for the ATS (Automatic Transfer Switch) input function, or a Low Fuel Level indication function.
- Remote LSM Inputs on the LSM-2020 Load Sharing Module. The LSM-2020 has one analog input.
- Remote Contact Inputs on the CEM-2020
- Remote Analog Inputs on the AEM-2020
- Remote RTD Inputs on the AEM-2020
- Remote Thermocouple Inputs on the AEM-2020

Configuration Instructions:

1. Configuring Contact Inputs on the DGC-2020

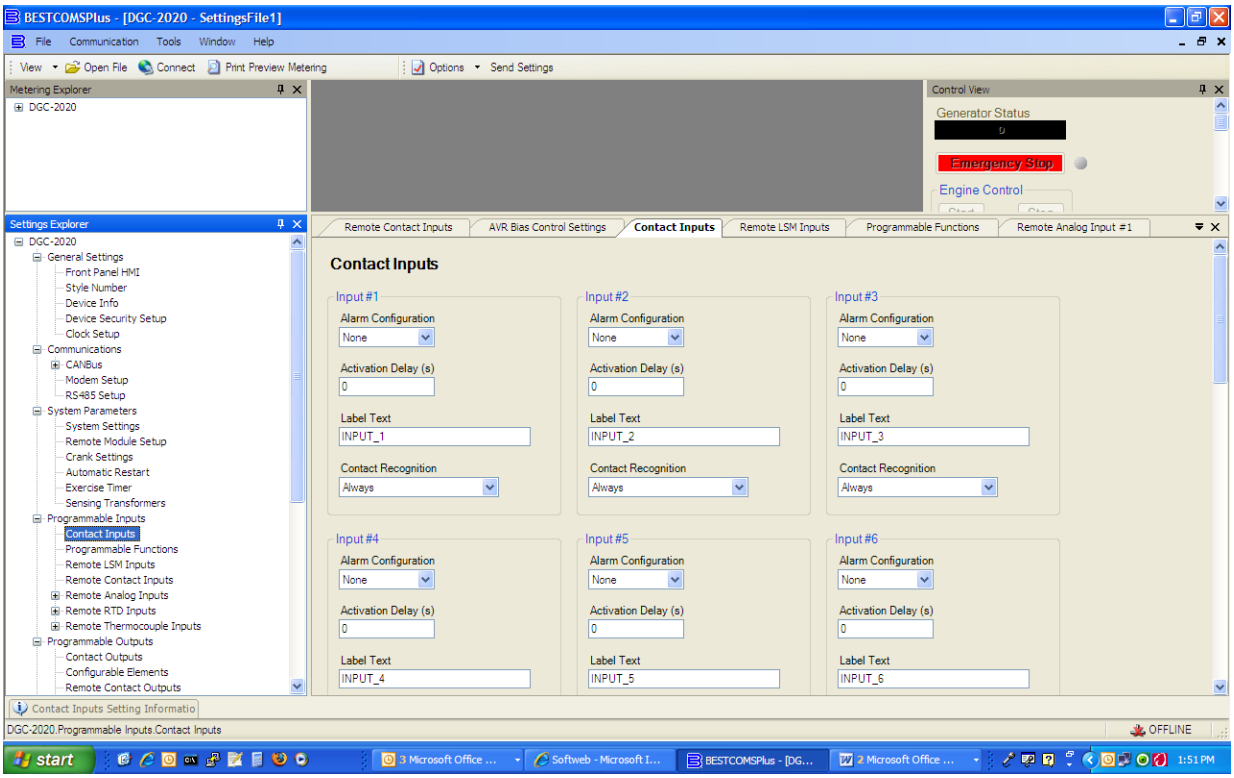

Figure 2: Contact Input Screen

For each contact input, configure the following parameters

a) Alarm Configuration – Select the alarm configuration of “None”, “Alarm”, or “Pre-Alarm”. When an alarm occurs the horn output annunciates with a constant beep and the engine shuts down. When a Pre-Alarm occurs, the horn output annunciates with an alternating on off beep and engine can remain running. If “None” is selected, the input is status only. The status is available to the BESTLogicPlus Programmable Logic regardless of the setting of the Alarm Configuration.

b) Activation Delay – If it is desired that the input remain on for some period of time before any annunciation occurs, enter that time as the activation delay.

c) Label Text – Type in some descriptive text that signifies the use of the input. This text will appear next to the input in the BESTLogicPlus Programmable Logic and will also appear in the event log if the input is configured as an alarm or pre-alarm.

d) Contact Recognition – Select whether the contact input should be recognized always or only while the engine is running. An example of something that should be monitored only while the engine is running is a switch that closes when the oil pressure is low. Such a switch would be closed when the engine is not running but a low oil pressure alarm or pre-alarm should not be annunciated unless the switch is closed while the engine is running. A selection of “While Engine Running Only” prevents spurious annunciation when the engine is not running.

2. Configuring Programmable Functions on the DGC-2020

Programmable functions are pre-defined functions in the DGC-2020 are initiated by a contact input. An input must be mapped to a programmable function for that function to operate. Furthermore, some of the programmable functions can be configured as alarms or pre-alarms and cause annunciation to occur on the RDP-110 remote panel display.

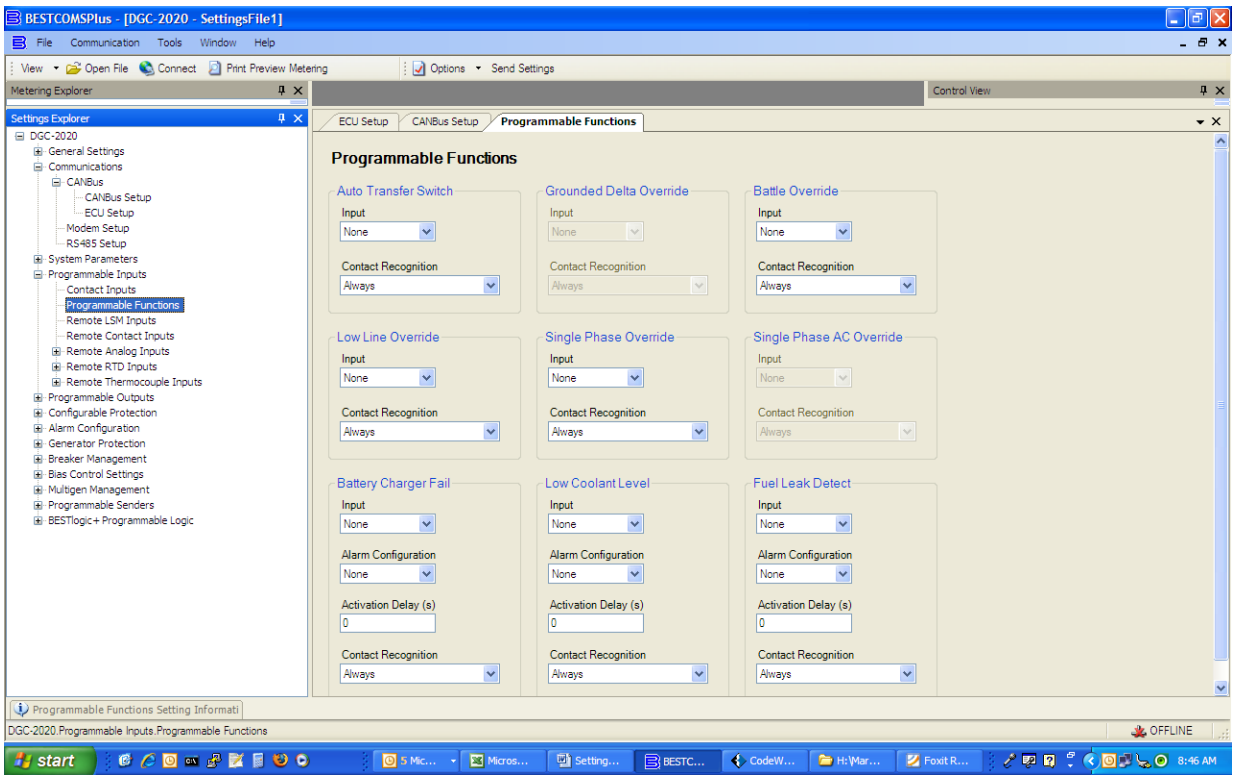

Figure 3: Programmable Functions Screen

Configure the following parameters:

a. Auto Transfer Switch
   i. Input – this function is used to start the generator from a Contact Input when the DGC-2020 is in AUTO mode. Select the desired input or select “None” to disable the programmable function.
   ii. Contact Recognition – set this to “Always”.
b. Grounded Delta Override
   i. Input – If a reconfigurable machine can operate sometimes in a Grounded Delta configuration and sometimes in other configurations, select an input for this function to indicate to the DGC-2020 when the machine is in the grounded delta configuration. When the machine is Grounded Delta, the DGC-2020 will display Line to Neutral as well as Line to Line voltages. In a normal Delta, the Line to Neutral voltages are not displayed. Select “None” to disable the programmable function.
   ii. Contact Recognition – Select “Always”.
c. Battle Override
   i. Input – Select an input for this function if a Battle Override initiated from a Contact Input is required. For some very critical applications, the ability to remove all

system shutdowns may be a requirement. If it is, selecting Battle Override will prevent all alarms from shutting down the engine. Extreme caution should be taken before selecting this option as machine warranties can be voided if enabled. Select "None" to disable the programmable function.

ii. Contact Recognition – Select "Always".

d. Low Line Override
   i. Input – If a reconfigurable machine can operate sometimes in a low line configuration machine and sometimes as high line, select an input for this function to indicate to the DGC-2020 that the machine is in low line operation. When this is in effect, the Low Line Scale Factor settings (found in various protection elements and bus stable/failed detection elements) will be applied to the metered parameter used for the protection. Select "None" to disable the programmable function.
   ii. Contact Recognition – Select "Always".
e. Single Phase Override
   i. Input – If a reconfigurable machine can operate sometimes in a single phase configuration and sometimes as three phase, select an input for this function to indicate to the DGC-2020 that the machine is in single phase operation. When this is in effect, single phase settings apply in the generator protection elements and only single phase voltages and currents are displayed on the front panel. Select "None" to disable the programmable function.
   ii. Contact Recognition – Select "Always".
f. Single Phase AC Override
   i. Input – If a reconfigurable machine can operate sometimes in a single phase AC (as opposed to single phase AB) configuration and sometimes as a three phase or single phase AB configuration, select an input for this function to indicate to the DGC-2020 that the machine is in single phase AC operation. When this is in effect and the single phase override is in effect, single phase settings apply in the generator protection elements and the metering uses phase C current and phase AC voltage for power factor calculations. Otherwise phase A current and phase AB voltage are used for power factor calculations. Select "None" to disable the programmable function.
   ii. Contact Recognition – Select "Always".
g. Battery Charger Fail
   i. Input – Select an input for this function to indicate a battery charger failure. When this input is true, an alarm or pre-alarm will be announced based on the alarm configuration, and the Battery Charger Fail indicator on the RDP-110 Remote Display Panel will light up. Select "None" to disable the programmable function.
   ii. Alarm Configuration – Select "None", "Alarm" or "Pre-Alarm" for the desired behavior of this function. Regardless of the selection, the indicator on the RDP-110 will light up if an input has been assigned and the input is on.
   iii. Activation Delay – Set the delay for which the input must be true before the alarm or pre-alarm will be annunciated. This can be used to prevent "glitches" on the input from causing spurious annunciation.
   iv. Contact Recognition – Select "Always".
h. Low Coolant Level
   i. Input – Select an input for this function to indicate a low coolant level. When this input is true, an alarm or pre-alarm will be announced based on the alarm configuration, and the Low Coolant Level indicator on the RDP-110 Remote Display Panel will light up. Select "None" to disable the programmable function.
   ii. Alarm Configuration – Select "None", "Alarm" or "Pre-Alarm" for the desired behavior of this function. Regardless of the selection, the indicator on the RDP-110 will light up if an input has been assigned and the input is on.

iii. Activation Delay – Set the delay for which the input must be true before the alarm or pre-alarm will be annunciated. This can be used to prevent "glitches" on the input from causing spurious annunciation.
iv. Contact Recognition – Select "Always".

i. Fuel Leak Detect
   i. Input – Select an input for this function to indicate a fuel leakage has been detected. When this input is true, an alarm or pre-alarm will be announced based on the alarm configuration, and the Fuel Leak indicator on the RDP-110 Remote Display Panel will light up. Select "None" to disable the programmable function.
   ii. Alarm Configuration – Select "None", "Alarm" or "Pre-Alarm" for the desired behavior of this function. Regardless of the selection, the indicator on the RDP-110 will light up if an input has been assigned and the input is on.
   iii. Activation Delay – Set the delay for which the input must be true before the alarm or pre-alarm will be annunciated. This can be used to prevent "glitches" on the input from causing spurious annunciation.
   iv. Contact Recognition – Select "Always".

3. Configuring Remote LSM Inputs on the LSM-2020 Load Sharing Module.

   The LSM-2020 has a single analog input. It is reserved for use with KW and/or kVar Control and can be used as a source for the KW Base Load (%) setting, the kVar Setpoint (%) setting, or the PF Setpoint Setting. However, the input type (4-20 mA or 0 to 10 VDC) and the input range must be set under the Remote LSM Inputs screen.

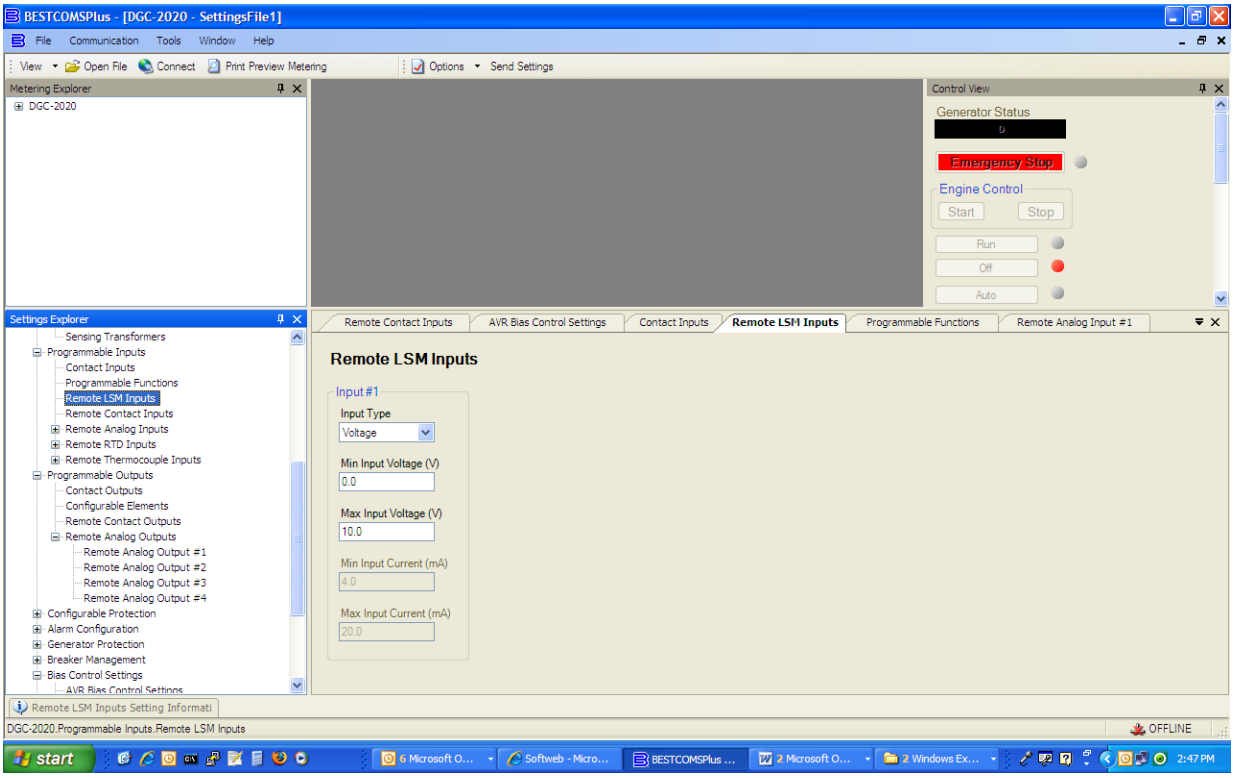

Figure 4: Remote LSM Inputs screen

The parameters to be configured are:

a. Input Type – Select voltage for 0 to 10 VDC input or Current for 4-20 mA current input.
b. Min Input Voltage (V) – Set this for the minimum valid voltage expected from the transducer or device connected to this input. Voltage below this will be limited to this value. This can be set only when the Input Type parameter is set to Voltage.
c. Max Input Voltage (V) – Set this for the maximum valid voltage expected from the transducer or device connected to this input. Voltage above this will be limited to this value. This can be set only when the Input Type parameter is set to Voltage.
d. Min Input Current (mA) – Set this for the minimum valid current expected from the transducer or device connected to this input. Current below this will be limited to this value. This can be set only when the Input Type parameter is set to Current.
e. Max Input Current (mA) – Set this for the maximum valid current expected from the transducer or device connected to this input. Current above this will be limited to this value. This can be set only when the Input Type parameter is set to Current.

4. Configuring Remote Contact Inputs on the CEM-2020

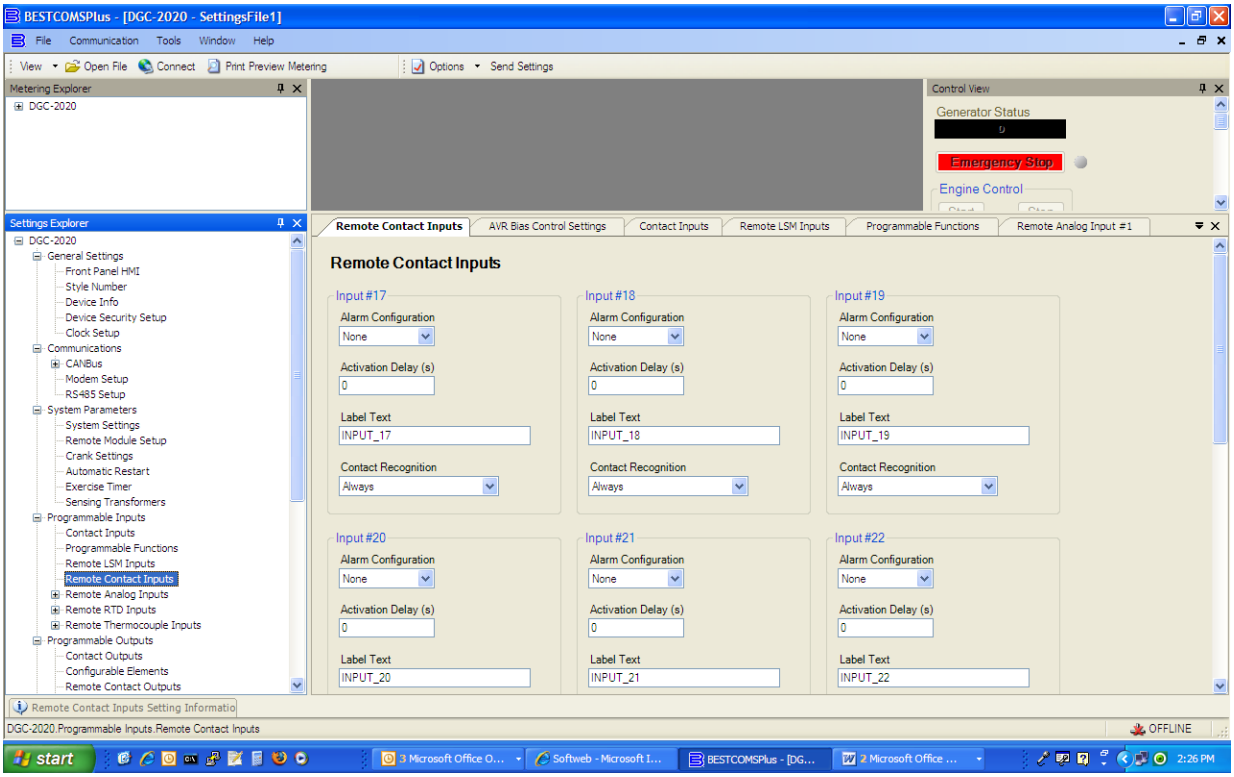

Figure 5: –Remote Contact Inputs Screen

This screen will be grayed out and the parameters cannot be changed unless the CEM-2020 expansion module has been enabled as previously explained.

For each contact input, configure the following parameters:

a. Alarm Configuration – Select the alarm configuration of “None”, “Alarm”, or “Pre-Alarm”. When an alarm occurs the horn output annunciates with a constant beep and the engine shuts

down. When a Pre-Alarm occurs, the horn output annunciates with an alternating on/off beep and the engine can remain running. If “None” is selected, the input is status only. The status is available to the BESTLogic*Plus* Programmable Logic regardless of the setting of the Alarm Configuration.

b. Activation Delay - If it is desired that the input remain on for some period of time before any annunciation occurs, enter that time as the activation delay.

c. Label Text – Type in some descriptive text that signifies the use of the input. This text will appear next to the input in the BESTLogic*Plus* Programmable Logic and also will appear in the event log if the input is configured as an alarm or pre-alarm.

d. Contact Recognition – Select whether the contact input should be recognized always or only while the engine is running. An example of something that should be monitored only while the engine is running is a switch that closes when the oil pressure is low. Such a switch would be closed when the engine is not running and should be blocked. But a low oil pressure alarm or pre-alarm should be annunciated when a low oil pressure occurs and the switch is closed while the engine is running. A selection of “While Engine Running Only” prevents spurious annunciation when the engine is not running.

5. Configuring Remote Analog Inputs on the AEM-2020

Each input is configured with a user assignable string and parameter range to map the analog input signal range to a user-defined parameter range. Thus, external conditions can be metered and displayed on the DGC-2020. Each input can be configured with up to four thresholds (two over-thresholds and two under-thresholds) that make their status available to the BESTLogic*Plus* Programmable Logic. In addition. each threshold can trigger alarms or pre-alarms to protect the generator and associated equipment, based on these measured external conditions.

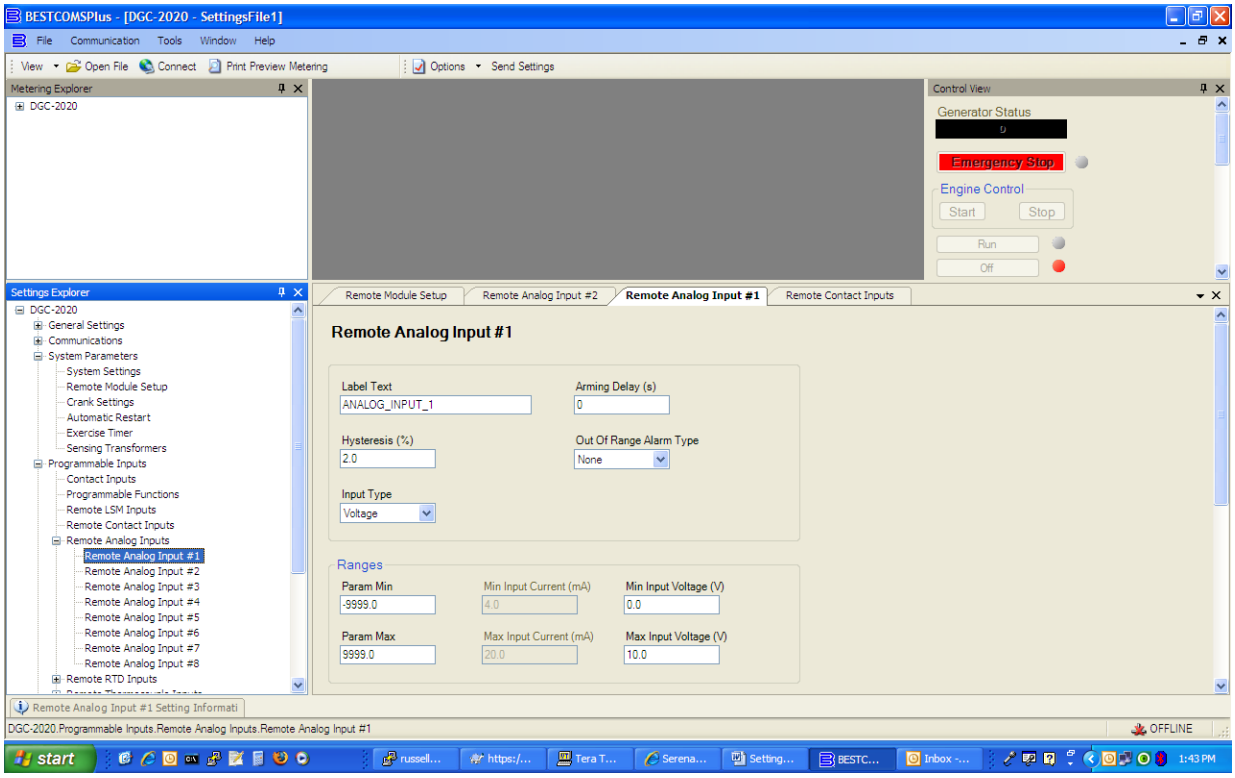

Figure 6: BESTCOMSPlus screen showing the parameters for labeling and assigning ranges to Remote Analog Input 1

Configure the following parameters:

a. Label Text – Type in some descriptive text that signifies the use of the input. This text will appear next to the threshold status and associated alarm and pre-alarm status in the BESTLogic*Plus* Programmable Logic and will also appear in the event log if any of the input thresholds are configured as an alarm or pre-alarm.
b. Hysteresis (%) – Enter a value for the desired hysteresis for the threshold detection. This will help prevent intermittent detection of thresholds.
c. Input Type – Set to “Voltage” for 0 to 10 VDC inputs; set to ”Current” for 4 to 20 mA current inputs.
d. Arming Delay – The Arming Delay is the wait time after engine startup before the input starts being monitored. Set to 0 if monitoring all the time is desired, including while the engine is not running. Non-zero values will cause the input to be monitored after the programmed time has elapsed after an engine startup.
e. Out of Range Alarm Type – When the analog input goes outside its programmed range (as determined by the Min and Max Input voltage or current settings) an Out of Range Indication can be annunciated. If “Alarm” or “Pre-Alarm” is selected, annunciation will occur. If “Status Only” is selected the status will be available to the BESTLogic*Plus* Programmable Logic but no annunciation will occur.
f. Parameter Minimum (Param Min) – This is the value that the measured parameter will assume when the analog input is at its programmed minimum level.
g. Parameter Maximum (Param Max) – This is the value that the measured parameter will assume when the analog input is at its programmed maximum level.
h. Min Input Current (mA) – Set this for the minimum input current level expected for the input. When the input current is below this level, the Out of Range condition will be annunciated if it is configured as alarm or pre-alarm. If the Input Type is set for “Voltage” this setting is grayed out.
i. Max Input Current (mA) – Set this for the maximum input current level expected for the input. When the input current is above this level, the Out of Range condition will be annunciated if it is configured as alarm or pre-alarm. If the Input Type is set for “Voltage” this setting is grayed out.
j. Min Input Voltage (V) – Set this for the minimum input voltage level expected for the input. When the input is below this level, the Out of Range condition will be annunciated if it is configured as alarm or pre-alarm. If the Input Type is set for “Current” this setting is grayed out.
k. Max Input Voltage (V) – Set this for the maximum input voltage level expected for the input. When the input is above this level, the Out of Range condition will be annunciated if it is configured as alarm or pre-alarm. If the Input Type is set for “Current” this setting is grayed out.

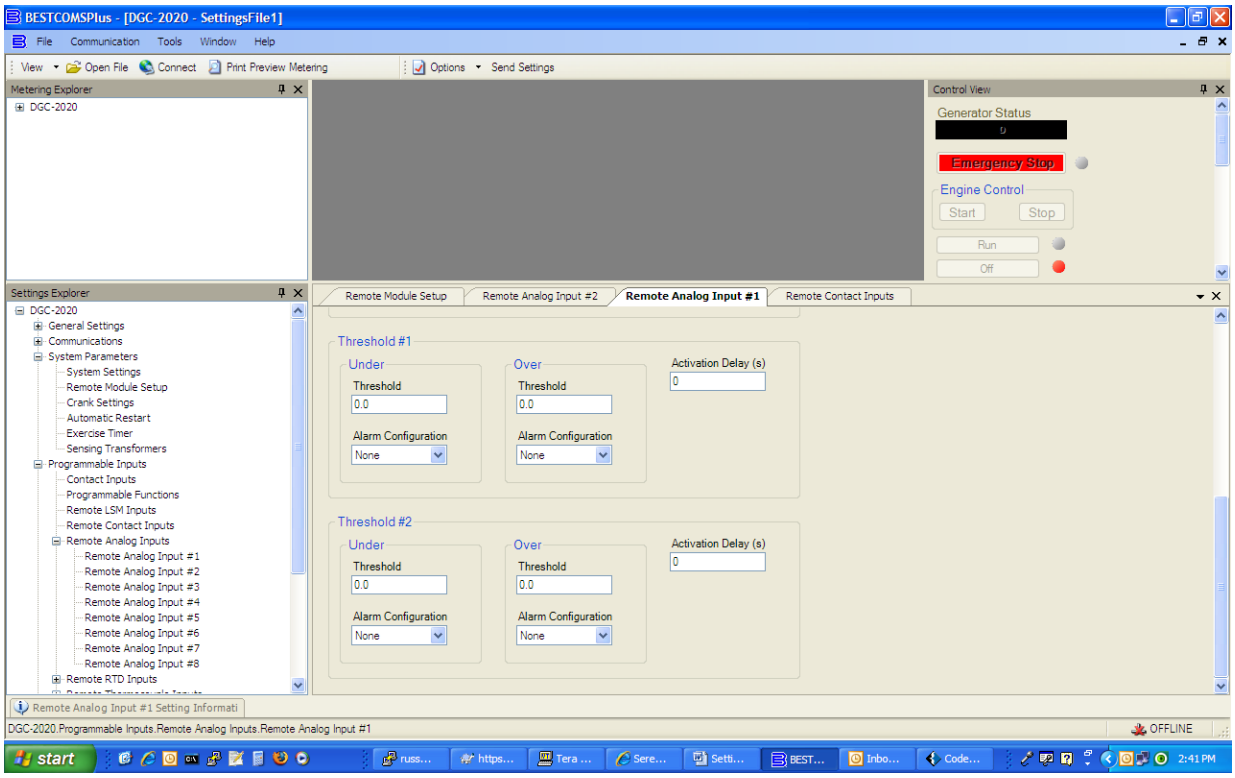

Figure 7: BESTCOMSPlus screen for settings thresholds for Remote Analog Input 1

There are up to four thresholds that can be set for each analog input. There can be two "Over" thresholds and two "Under" thresholds. Each can be configured as an Alarm, Pre-Alarm or as Status Only. If any type other than "None" is selected, the threshold status is available to the BESTLogic*Plus* Programmable Logic. This allows the user to set up an over and under Pre-alarm threshold, and over and under Alarm threshold.

An Activation Delay can be set for the thresholds. It should be noted, however, that Over Threshold 1 and Under Threshold 1 share a common activation delay. Similarly, Over Threshold 2 and Under Threshold 2 share a second activation delay.

1) Threshold 1
   a) Under Threshold – Set a threshold below which Status, Alarm or Pre-Alarm annunciation is desired.
   b) Under Threshold Alarm Configuration – select "None" to disable, "Status Only" to make the threshold status available to the BESTLogic*Plus* Programmable Logic, "Pre-Alarm" to annunciate a Pre-Alarm, or "Alarm" to annunciate an Alarm.
   c) Over Threshold – Set a threshold above which Status, Alarm or Pre-Alarm annunciation is desired.
   d) Over Threshold Alarm Configuration – select "None" to disable, "Status Only" to make the threshold status available to the BESTLogic*Plus* Programmable Logic, "Pre-Alarm" to annunciate a Pre-Alarm, or "Alarm" to annunciate an Alarm.
   e) Activation Delay(s) – set the time for which a Threshold 1 condition must be true before an Alarm or Pre-Alarm is annunciated. This time is shared by both Over Threshold 1 and Under Threshold 1detection.

2) Threshold 2
   a) Under Threshold – Set a threshold below which Status, Alarm or Pre-Alarm annunciation is desired.
   b) Under Threshold Alarm Configuration – select "None" to disable, "Status Only" to make the threshold status available to the BESTLogic*Plus* Programmable Logic, "Pre-Alarm" to annunciate a Pre-Alarm, or "Alarm" to annunciate an Alarm.
   c) Over Threshold – Set a threshold above which Status or Alarm or Pre-Alarm annunciation is desired.
   d) Over Threshold Alarm Configuration – select "None" to disable, "Status Only" to make the threshold status available to the BESTLogic*Plus* Programmable Logic, "Pre-Alarm" to annunciate a Pre-Alarm, or "Alarm" to annunciate an Alarm.
   e) Activation Delay(s) – set the time for which a Threshold 2 condition must be true before an Alarm or Pre-Alarm is annunciated. This time is shared by both Over Threshold 2 and Under Threshold 2 detection.

6) Configuring Remote RTD Inputs on the AEM-2020

Many of the settings for the Remote RTD Inputs are similar to settings for the Remote Analog Input settings.

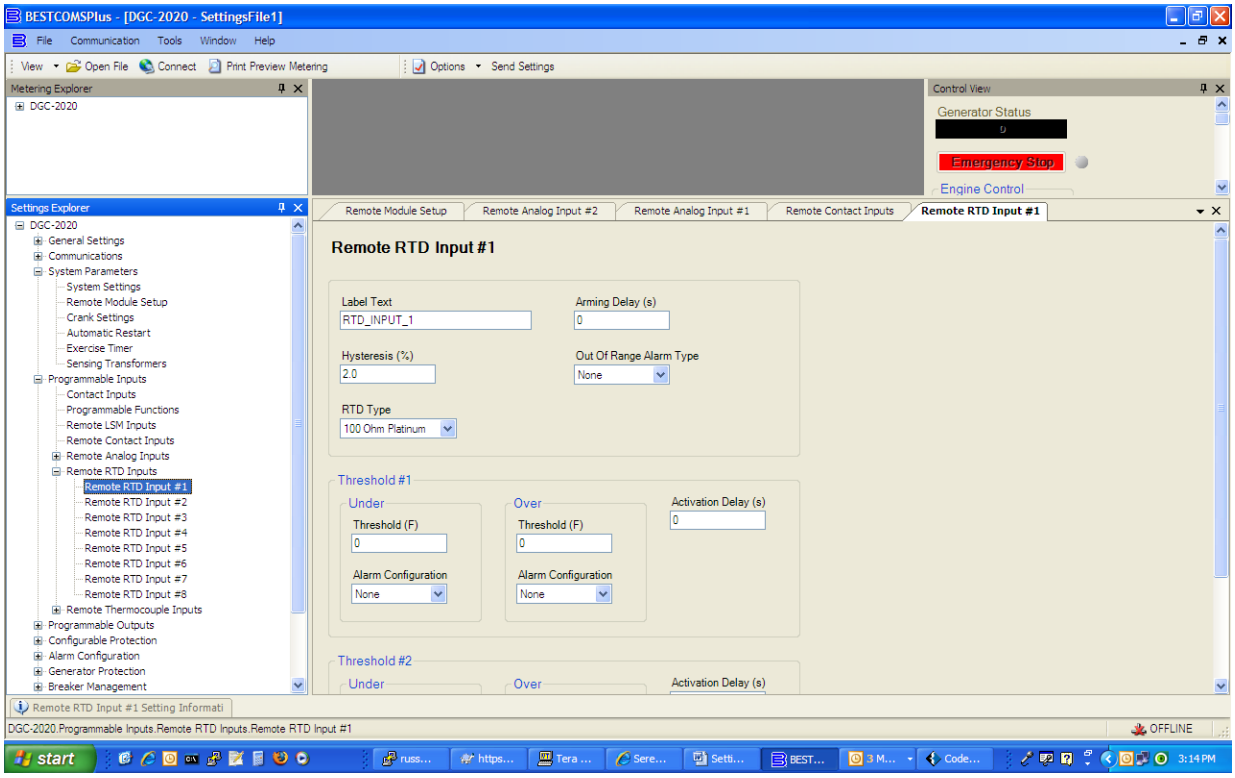

Figure 8: BESTCOMSPlus screen showing the parameters for Remote RTD Input 1

Configure the following parameters:

a) Label Text – type in some descriptive text that signifies the use of the input. This text will appear next to the threshold status and associated alarm and pre-alarm status in the BESTLogic*Plus* Programmable Logic and also will appear in the event log if any of the input thresholds are configured as an alarm or pre-alarm.

b) Hysteresis (%) – Enter a value for the desired hysteresis for the threshold detection. This will help prevent intermittent detection of thresholds.
c) RTD Type – Select “100 Ohm Platinum” or “10 Ohm Copper” to match the RTD that is driving the input.
d) Arming Delay – the Arming Delay is the wait time after engine startup before the input starts being monitored. Set to 0 if monitoring at all times is desired, including when the engine is not running. Non-zero values will cause the input to be monitored after the programmed time has elapsed after an engine startup.
e) Out of Range Alarm Type – An out of range condition occurs when the DGC-2020 detects that the input is outside the normal range of what would be detected for the RTD type. Primarily this provides indication that the RTD circuit is open or shorted. If “Alarm” or “Pre-Alarm” is selected, annunciation will occur. If “Status Only” is selected, the status will be available to the BESTLogic*Plus* Programmable Logic but no annunciation will occur.
f) Threshold 1 and Threshold 2 settings – The threshold settings are identical to those for the Remote Analog Inputs. Refer to the setup instructions in paragraphs presenting the thresholds for the Remote Analog Inputs to configure these thresholds.

7. Configuring Remote Thermocouple Inputs on the AEM-2020

Many of the settings for the Remote Thermocouple Inputs are similar to settings for the Remote Analog Input settings.

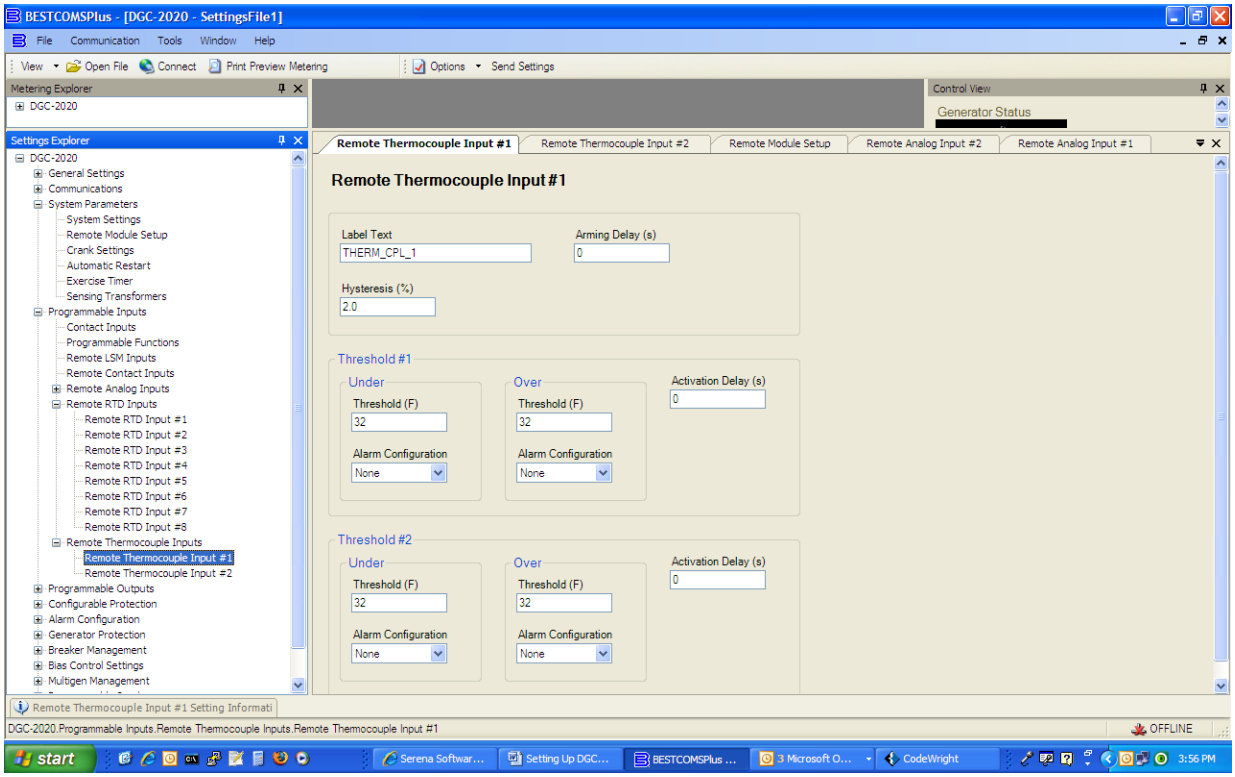

Figure 9: BESTCOMSPlus screen showing the parameters for Remote Thermocouple Input 1

Configure the following parameters:

a) Label Text – type in some descriptive text that signifies the use of the input. This text will appear next to the input status and associated alarm and pre-alarm status in the BESTLogic*Plus*

Programmable Logic and also will appear in the event log if any of the input thresholds are configured as an alarm or pre-alarm.

b) Hysteresis (%) – Enter a value for the desired hysteresis for the threshold detection. This will help prevent intermittent detection of thresholds.

c) Arming Delay – the Arming Delay is the wait time after engine startup before the input starts being monitored. Set to 0 if monitoring at all times is desired, including when the engine is not running. Non-zero values will cause the input to be monitored after the programmed time has elapsed after an engine startup.

d) Threshold 1 and Threshold 2 settings – The threshold settings are identical to those for the Remote Analog Inputs. Refer to the setup instructions in paragraphs presenting the thresholds for the Remote Analog Inputs to configure these thresholds.

Programmable Outputs:

The programmable outputs consist of:

- Contact outputs internal to the DGC-2020
  - Programmable Contact Outputs
  - Run Relay, Pre-Start Relay and Run Relay Outputs
- Remote Contact Outputs on the CEM-2020
- Remote Analog outputs on the AEM-2020
- Configurable Elements in the DGC-2020. The configurable elements allow one to take an output from the BESTLogic*Plus* Programmable Logic and set it up as a pre-alarm or alarm condition, as well as an input for subsequent logic in the PLC program.

Programmable Output Configuration Instructions:

1. Configuring Contact Outputs on the DGC-2020
   a) Programmable Contact Outputs

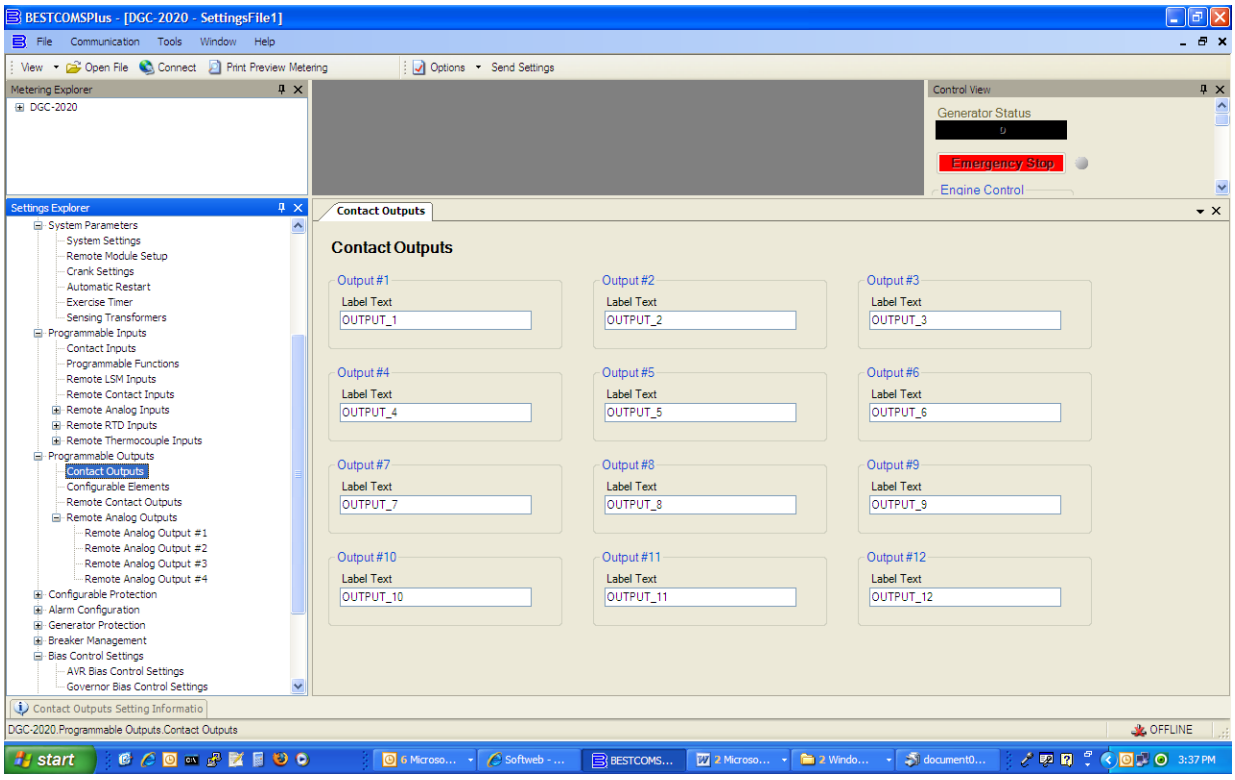

Figure 10: Contact Outputs Screen

Each output can be programmed with a text label describing its use; this label appears in the BESTLogic*Plus* Programmable Logic where the output is used to aid in program clarity and ease of programming.

b) Run Relay, Pre-Start Relay and Start Relay

In some systems it may be beneficial to modify the standard functionality implemented by the DGC-2020 for the Run, Pre-Start or Start relays. Also, if your generator does not require a pre-start function, it may be desired to use the 30A relay assigned to it for other purposes. These relays can be configured in one of two ways. The first is to operate under their predefined functionality, making them a dedicated output. The second way is to select them to be programmable, in which case they become available to the BESTLogic*Plus* Programmable Logic to be used in same manner as the programmable relay outputs.

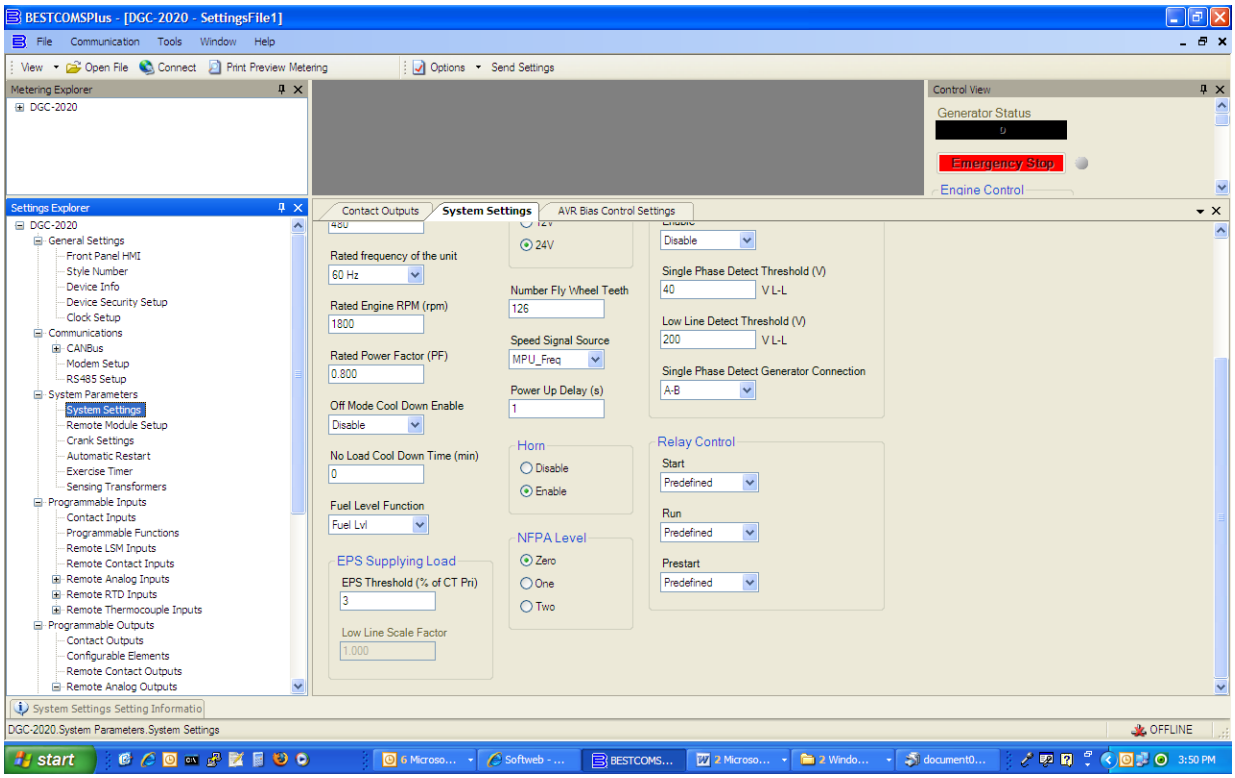

Figure 11: Relay Control portion of the System Settings screen used to set the operation of these relays to predefined or programmable operation.

For each relay (Start, Run and Pre-Start), select whether it should use its predefined functionality or be made programmable.

When “programmable” is selected for the relays, they become available to the BESTLogic*Plus* Programmable Logic as logic elements. The elements are titled “Start Output”, “PreStart Out” and “Run Output”. The predefined functionality is available as an input to the logic. If you select “programmable” as the Relay Control mode for a relay then connect the corresponding predefined input function to it, it will behave exactly as if “predefined” were selected as its relay control type. However, other logic can be combined with it to create more versatile operation. Note if “programmable” is selected for a relay, but it is not used in the logic, that relay will never close.

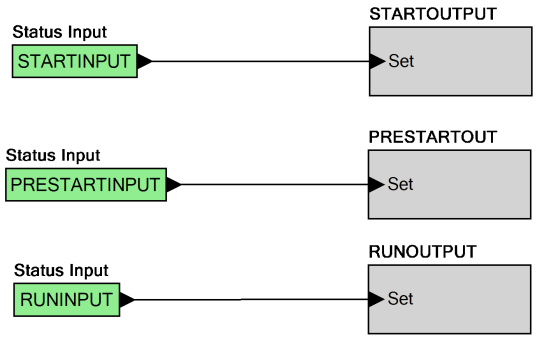

Figure 12: A logic example connecting the predefined inputs directly to the "programmable" relay outputs for all three relays

2. Setting Up Configurable Elements in the DGC-2020

Configurable Elements are used with the BESTLogic*Plus* Programmable Logic to allow a user to implement logic to cause an alarm or pre-alarm. This can be used to build protection that is not part of the standard protection in the DGC-2020.

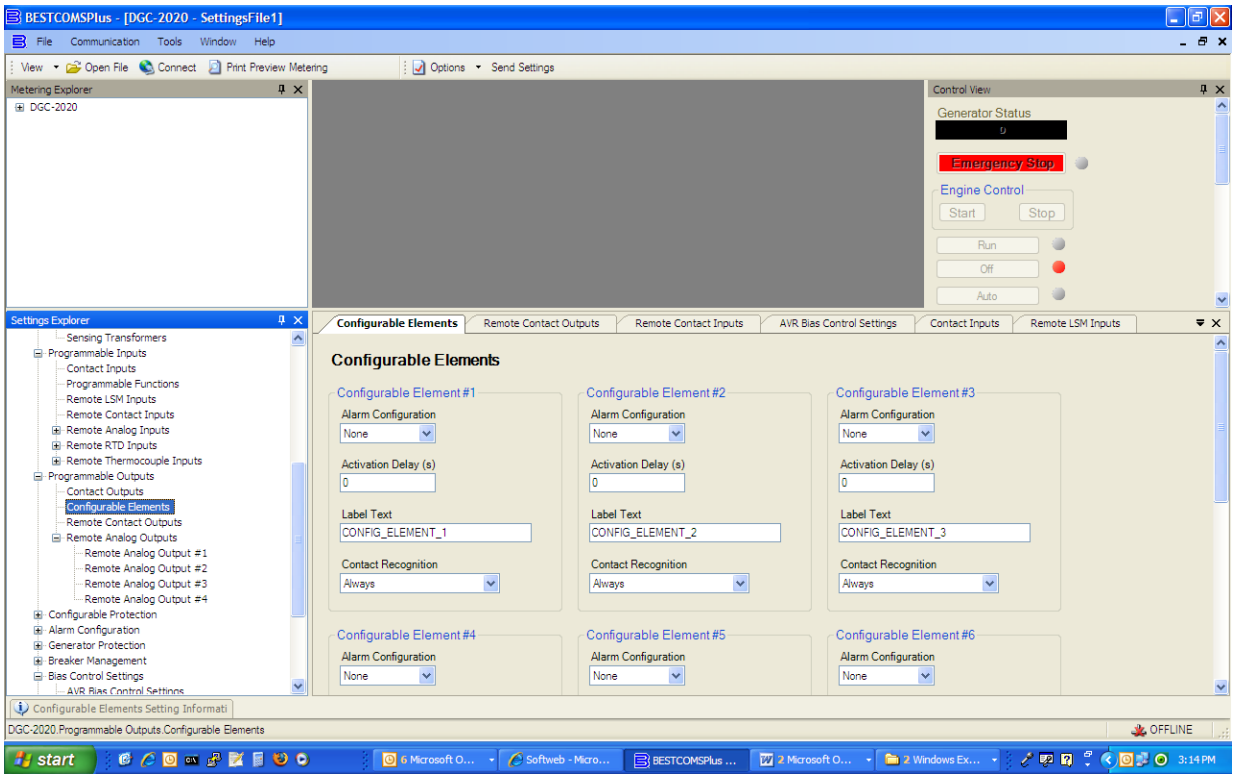

Figure 13: Configurable Elements Contact Screen

The parameters for each configurable element are similar to those for a programmable input. Set the following parameters for each Configurable Element:

a. Alarm Configuration – Select the alarm configuration of “None”, “Alarm”, or “Pre-Alarm”. When an alarm occurs the horn output annunciates with a constant beep and the engine shuts down. When a Pre-Alarm occurs, the horn output annunciates with an alternating on/off beep and the engine can remain running. If “None” is selected, the element is status only. The status is available as an input to the BESTLogic*Plus* Programmable Logic, regardless of the setting of the Alarm Configuration.
b. Activation Delay – If it is desired that the Configurable Element be driven true for some period of time before any alarm or pre-alarm annunciation occurs, enter that time as the activation delay.
c. Label Text – Type in some descriptive text about how the Configurable Element is used. This text will appear next to the Configurable Element Status in the BESTLogic*Plus* Programmable Logic and also will appear in the event log if the Alarm Configuration is set as an alarm or pre-alarm.
d. Contact Recognition – Select whether the Configurable Element should be recognized always or only while the engine is running. A selection of “While Engine Running Only” prevents spurious annunciation when the engine is not running.

As an example of using a configurable element, suppose it is desired that if the door of the generator room is opened a pre-alarm should occur to alert the control room that someone is in the generator room. In addition, suppose for safety reasons any running machines should be shut down anytime someone enters the generator room. Assume Input 5 is setup to indicate “DOOR OPEN” and it is configured as a pre-alarm. In the BESTLogic*Plus* Programmable Logic, Input 5 could be AND’ed with ENGINE RUNNING to drive Configurable Element 1, which is configured as an alarm.

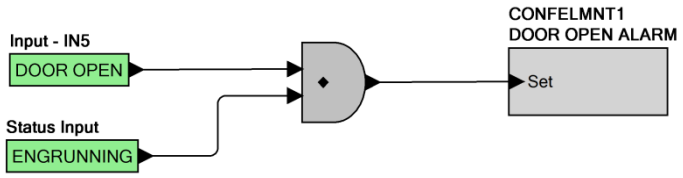

Figure 14: Sample logic diagram

Input 5, configured as a pre-alarm, takes care of the pre-alarm annunciation if the door is opened whether the engine is running or not. Configurable Element 1, configured as an alarm, takes care of the alarm annunciation if the door is opened while the engine is running.

3. Configuring Remote Contact Outputs on the CEM-2020

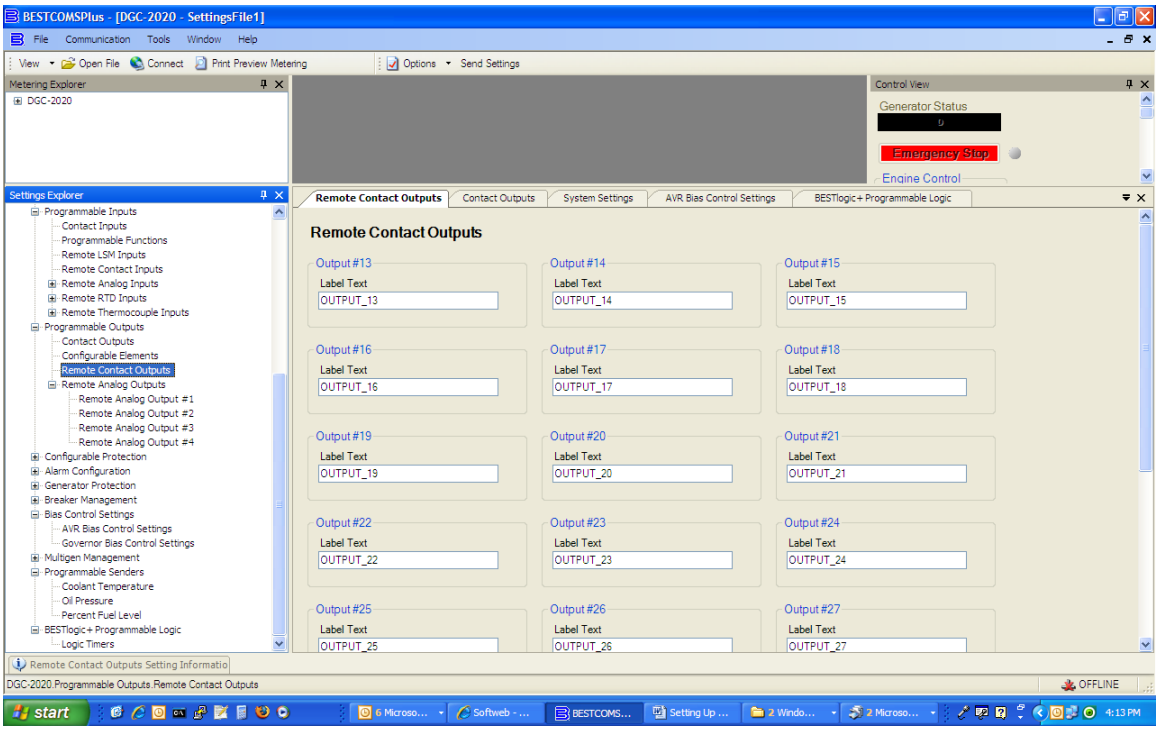

Figure 15: Remote Contact Outputs Screen

Each output can be programmed with a text label describing its use; this label appears in the BESTLogic*Plus* Programmable Logic where the output is used to aid in program clarity and ease of programming.

4. Configuring Remote Analog Outputs on the AEM-2020

There are four Remote Analog Outputs, each of which is configured on its own screen in BESTCOMS*Plus*. Parameters metered by the DGC-2020 are mapped to these outputs, enabling them to be used as meter drivers or they can drive analog inputs of external equipment. Ranges for the metered parameter and the analog output are set up so that when the metered parameter is at the minimum of the parameter range, the analog output is at the minimum of its output range. Similarly, when the metered parameter is at the maximum of the parameter range, the analog output is at the maximum of its output range.

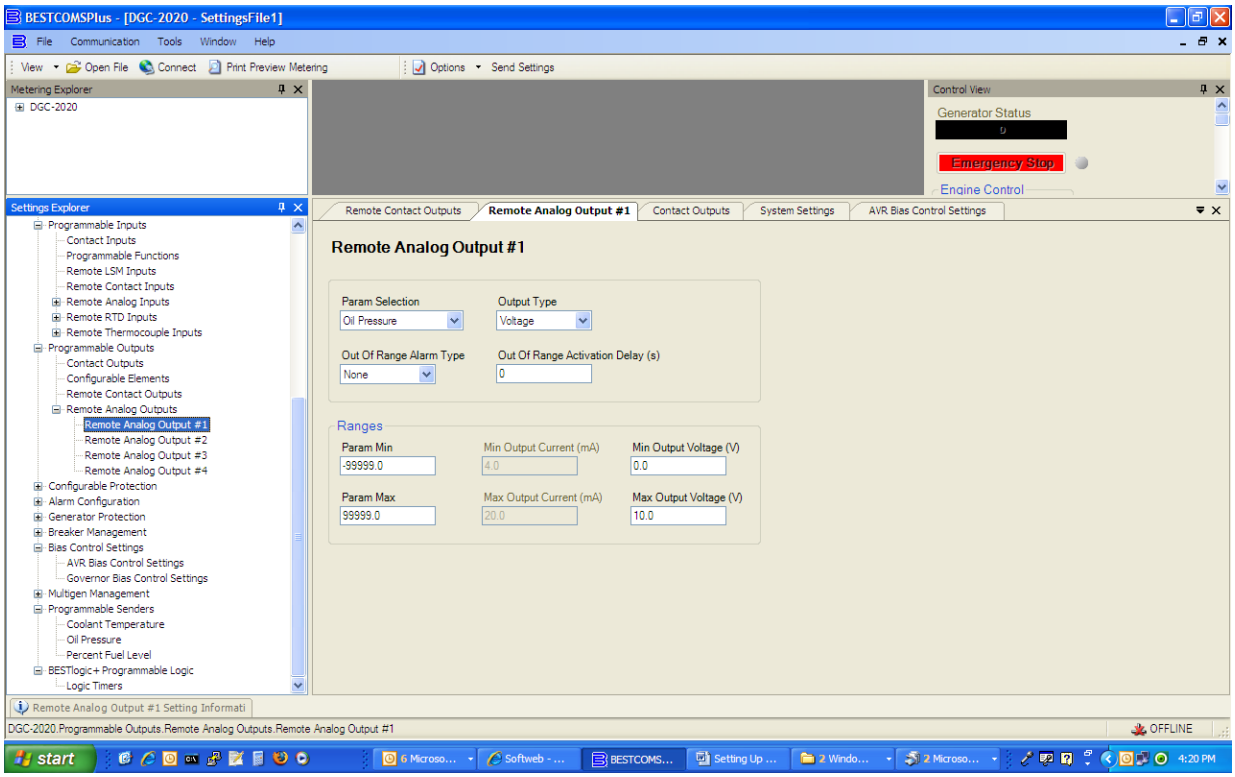

Figure 16: Screen from BESTCOMSPlus showing the parameters for Remote Analog Output 1

Configure the following parameters:

a) Parameter Selection – This is the metered parameter within the DGC-2020 (e.g. oil pressure, coolant temp, etc.) that is assigned to drive the analog output. The parameter range and the output range are configured so that the range of the metered parameter is scaled to the range of the analog output. Thus, when the metered parameter is at the minimum of the parameter range, the analog output is at the minimum of its output range. Similarly, when the metered parameter is at the maximum of the parameter range, the analog output is at the maximum of its output range.

b) Output Type – Select “Voltage” or “Current” as the analog output type.

c) Out of Range Alarm Type – This specifies what to annunciate (alarm or pre-alarm) if the metered parameter is outside the range assigned by the parameter minimum and parameter maximum settings.

d) Out of Range Alarm Activation Delay – Set the time delay for which an out of range condition must be true before it is annunciated as an alarm or pre-alarm.

e) Parameter Minimum – Set this to the minimum value that will occur on the parameter being metered.

f) Parameter Maximum– Set this to the maximum value that will occur on the parameter being metered.

g) Min Output Current (mA) – If the analog output type is configured as “Current”, set this to the output current level to be sourced when the metered parameter is at its minimum level. This is grayed out when the output type is set to “Voltage”.

h) Max Output Current (mA)) – If the analog output type is configured as “Current”, set this to the output current level to be sourced when the metered parameter is at its maximum level. This is grayed out when the output type is set to “Voltage”.

i) Min Output Voltage (V) – If the analog output type is configured as “Voltage”, set this to the output voltage to be sourced when the metered parameter is at its minimum level. This is grayed out when the output type is set to “Current”.

j) Max Output Voltage (V)) – If the analog output type is configured as “Voltage”, set this to the output voltage level to be sourced when the metered parameter is at its maximum level. This is grayed out when the output type is set to “Current”.

For more information on the DGC-2020, consult the Basler factory at 618/654-2341 or visit **www.basler.com**.

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