GE Energy

Becker* Digital Natural Gas Positioner (DNGP) Dashboard PC Interface Software

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Setup Instructions

Computer Settings

1. Download the DNGP Dashboard PC Interface online at http://www.dresser.com/index.cfm/go/product-detail/product/DNGP-Firmware-Update/

2. Save the program executable file to a location on the computer that it will be easily accessible.

   Note: This program requires Microsoft® .NET Framework to be installed on the computer. For the latest version, visit www.microsoft.com/net

3. Configure serial port settings. Click Windows Start button and open the Control Panel. Double-Click the Device Manager and expand the Ports (COM & LPT) device. Double-click the COM port that will be used to connect to the DNGP positioner.

   Note: For computers not equipped with a serial port, a USB-to-Serial Adapter is required.

4. Click on the General tab and make note of the COM port number near the top of the window. The example in the figure below shows COM4.
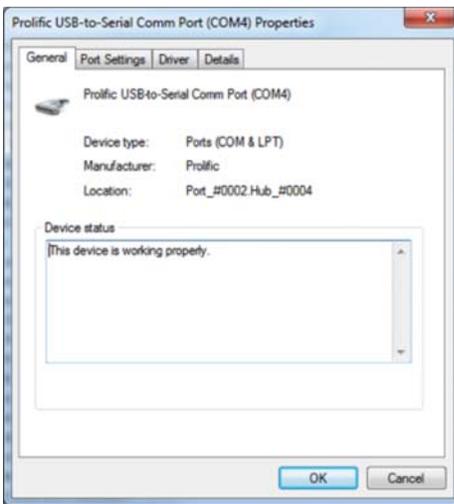
5. Click on the Port Settings tab and edit the dropdown fields to match the following settings:

Bits per second:	19200
Data bits:	8
Parity:	Even
Stop bits:	1
Flow control:	None
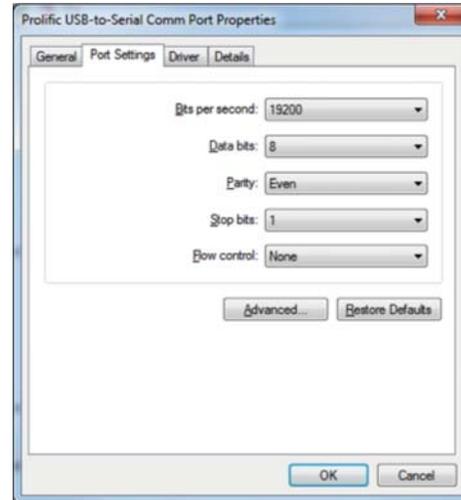
6. Click the OK button to save the settings for this port. Close the Device Manager window.

Positioner Settings

7. On the DNGP positioner control board, enter the menu screen by pushing the Enter button. Navigate to the Serial Baud Rate by entering the following menu options:

8. If necessary, select 19200 as the Serial BAUD Rate. This should match the setting of the PC COM Port. Press the exit button once to go back to the Serial & Modbus Menu

```
Serial BAUD Rate:

              9600
             19200
```

9. Select Modbus Protocol menu option.

```
Serial & Modbus Menu
Serial Baud Rate
Modbus Protocol
Modbus Address
```

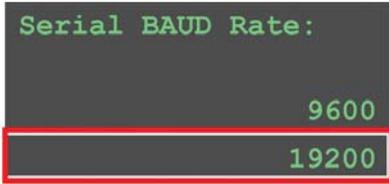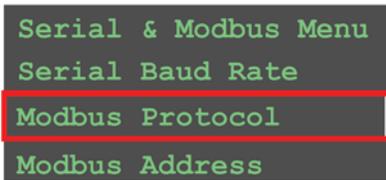10. If necessary, select RTU as the Modbus Protocol. Press the exit button once to go back to the Serial & Modbus Menu.

```
Modbus Protocol:
Disabled
RTU
ASCII
```
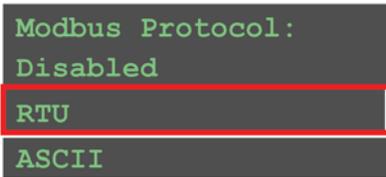
11. Select Modbus Address menu option.

```
Serial & Modbus Menu
Serial Baud Rate
Modbus Protocol
Modbus Address
```
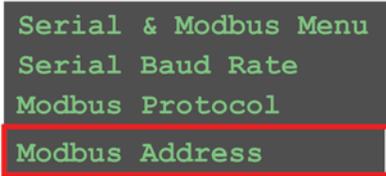
12. If necessary, change the Modbus Address as desired (1 to 247). Make note of the Modbus Address assigned

```
Modbus Address:

                  1
```
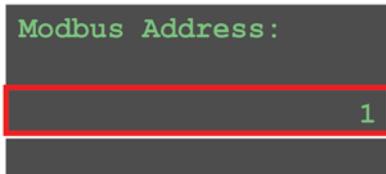
13. Push the Exit button until the DNGP home screen is displayed.

DNGP Dashboard Settings

14. Open the DNGP Dashboard by double-clicking the program icon.
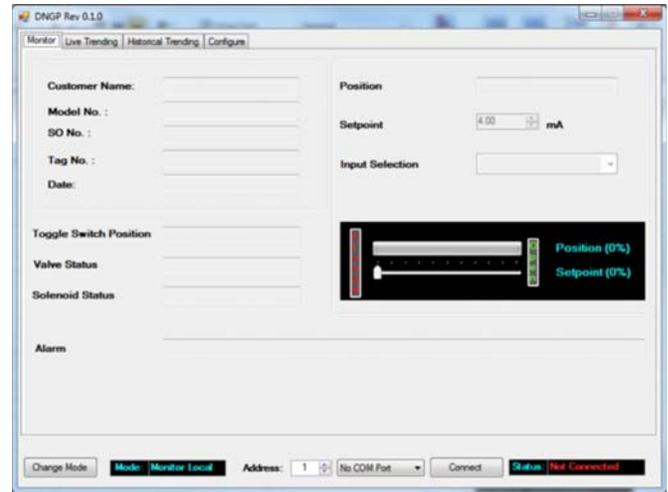
15. Change the Address dropdown field to match the Modbus Address entered on the DNGP positioner.

16. Change the COM Port dropdown field to match the PC COM Port being used to connect to the DNGP.

17. Click the Connect button to start communication. The Status field should now show Connected.

General

Software Modes

The DNGP software can be used in one of four modes: Local Monitor, Remote Monitor, Manual, and Configure

- Local Monitor
  - o Intended for use when only viewing valve operation and do not intend to change valve setpoint or alter settings of the DNGP.
  - o Allows for live trending and historical trending

Figure 1: Software Modes

- Remote Monitor
  - o Similar to Local Monitor, but intended for use when viewing valve over a low bandwidth network.
  - o Only polls DNGP once to retrieve current configuration and historical log so as not to overwhelm any communication lines with constant polling.
- Manual
  - o This mode allows for the user to control the valve and to view subsequent movements through the live trending screen
  - o Setpoint is controlled on the **Monitor Tab** by either manually entering a setpoint in the Setpoint box or by using the setpoint slider below it.
  - o Setpoint can also be controlled through the slider on the **Live Trending Tab** for easier viewing of the valve's reaction to changes
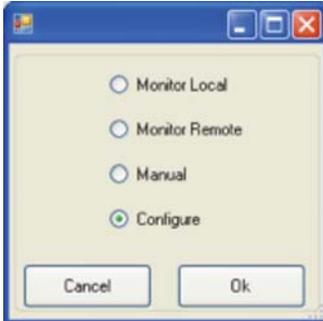- Configure
  - o This mode allows for changes to the internal settings of the DNGP through the **Configure Tab**
  - o The setpoint cannot be changed in this mode, but live trending and historical trending are both accessible.

Connection Settings and Procedure

- Along the bottom of the software, you will see Change Mode, Current Mode, Modbus Address, Communication Port, Connect/Disconnect Button, and Connection Status

Figure 2: Connection Settings Area

  - o Change Mode
    - — Allows user to toggle between each of the modes described in **Software Modes**
  - o Current Mode
    - — Displays current mode
  - o Modbus Address
    - — Modbus address of DNGP meant to be connected to software
    - — User entered value between 1 and 247
    - — Must match Modbus address located in DNGP Menu→Utilities/Firmware→Serial & Mobus→ Modbus Address
  - o Communication Port
    - — Communication/Serial Port which is connected to DNGP
  - o Connect/Disconnect Button
    - — Allows user to connect to DNGP once all settings are entered in correctly or to disconnect when done with the software
  - o Connection Status
    - — Displays "Status: Connected" when connected or "Status: Disconnected" when disconnected

Monitor

Changing the input selection

When in **Manual Mode,** a user can adjust which source the DNGP uses to determine the setpoint. The options are:

- 4-20mA Signals
  - o This option allows for an RTU or other signal generating device to dictate the setpoint of the DNGP and valve. This is the traditional method of operation of the DNGP when not diagnosing problems or troubleshooting.
  - o User will not be able to control the setpoint through the PC software when 4-20mA control is selected
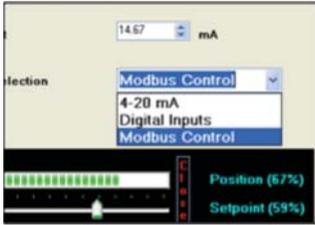
Figure 3: Input Selection Area

- Modbus Control
  - o This option allows the user to modulate the setpoint of the DNGP through the PC application using either the setpoint slider or by manually entering a setpoint value.]
- Digital Inputs
  - o This option allows the user to manually attach a device to the DNGP logic board that indicates when the solenoid should be increasing current or decreasing current.
  - o Pin-outs for the logic board can be located in the DNGP technical manual

Entering and Adjusting DNGP setpoint

When in **Manual Mode**, and **Input Selection** is set to Modbus Control, the user can operate the valve through the PC software

- Entering or adjusting the setpoint using the text box
  - o The user can enter any setpoint between 4mA and 20mA as they would on a traditional 4-20mA signal generating device
- Adjusting the setpoint using the slider
  - o The setpoint slider can also be used to adjust the setpoint. It is controlled by clicking on the arrow and dragging either towards **open** or **closed** which will then instruct the valve to move to that position

Alarms

The DNGP is set up to acknowledge certain situations as alarm conditions. A list of the possible alarms is below and will show up on the Monitor Tab just below the customer information.

- Valve Motion Fault
  - o This alarm will display if the DNGP is indicating that the valve should be moving, but it is not. This could happen if there is a loss of power gas or if there is a failure within the body of the valve assembly.

- Lost Control Loop
  - o A lost control loop alarm indicates that the 4-20mA control signal has been lost or is below the allowable threshold of the device.
- Lost Feedback Loop
  - o A lost feedback loop alarm indicates that the signal generated by the position transmitter is not being received properly by the DNGP and therefore will result in inaccurate readings.
- Simultaneous Digital Open/Close
  - o When utilizing the **Digital Inputs** input selection method, this alarm indicates that both the discrete open and discrete close pins are being activated, resulting in a conflict

Description of Other Monitor Functions

- Toggle Switch Position
  - o This register indicates what position the toggle switch on the DNGP is currently in. The options are:
    — Manual
      - Allows for adjustment of the setpoint through the interface on the front of the DNGP. No changes can be made by Modbus
    — Automatic
      - Default running mode, allows for changes in setpoint and DNGP settings through Modbus and through manual entry through the DNGP
    — Standby
      - Does not allow for solenoid to be activated, but changes can be made to the settings of the DNGP
- Valve Status
  - o This register shows what the valve is currently doing. It's possible displays are: moving, coasting, halted, waking, and faulted
- Solenoid Status
  - o This register displays the current state of the solenoid valve working in conjunction with the DNGP.
  - o Possible displays are:
    — Idle
    — Decreasing Current
    — Increasing Current

Live Trending

Setpoint Slider

Functions identically to the slider on the monitor tab.

Start/Stop Graph

When attempting to diagnose a valve problem or to just get a better look at a section of data, the user is able to stop the trending graph from updating by clicking the **Stop Graph** button. Subsequently, this will allow the user to save the data points into a file that can then be exported into a spreadsheet editor such as Microsoft Excel.

Export data to .csv

Once live trending has been suspended, the user is able to export the data currently displayed on the live trending graph to a .csv (comma-seperated values) by pressing the "Save CSV File" button. This will then prompt the user to enter a file name and location to save the file. The user is then able to import this data into a spreadsheet or graphing program to further analyze the valve movement.

Setting upper and lower limits for y-axis

In order to more closely analyze valve motion, the user can zoom in to a certain area of the graph while the trend is still updating. Ymax represents the upper limit of the y-axis and Ymin represents the lower limit of the y-axis. Both Ymax and Ymin must be in multiples of 10 and the minimum difference between the two is 10 units.

Historical Trending

Generating historical graph

The DNGP is capable of logging up to 45 hours of past data. This data encompasses the 4-20mA control and feedback signals. In order to populate the historical trending graph, the user must click on the "Update Graph" button, at which point 300 data points will be updated on the screen.

Time Scale

Due to the fact that the DNGP has the ability to log in intervals of either 5 seconds or 60 seconds, the historical trending graph is based on the current **Logging Interval Setting**. For example, if the DNGP is set at "Log every 60 seconds" when the historical trending graph is generated, the trend will represent 300 minutes of data. This has the potential to be inaccurate if at some point in the past the logging interval was altered.

Start time and Y-axis scale

Because there is a significantly greater amount of data than what can be shown on the screen at any one time, the user is able to select a starting time for the trend. If logging interval is set to 5 seconds, the "starting time" is in seconds, whereas if logging interval is set to 60 seconds, the "starting time" is in minutes. Additionally, as with **Live Trending**, the user has the ability to zoom in on the y-axis to more closely analyze certain periods of movement of the valve.

Export data to .csv

Once the graph has been updated (see above), the user is able to export the data currently displayed on the live trending graph to a .csv (comma-seperated values) by pressing the "Save CSV File" button. This will then prompt the user to enter a file name and location to save the file. The user is then able to import this data into a spreadsheet or graphing program to further analyze the valve movement

Configuration

Customer Info Area

This area is for customer reference only and is not inherently tied to the DNGP in any way.

Descriptions of all settings

- Split Limit
  - o Split mode is used to alter the lower and upper limits of the effective setpoints for the DNGP
  - o For example, by changing the lower split limit from 4mA to 8mA, there will be no valve movement until the setpoint reaches 8mA, at which point the position will increase progressively between 8mA and the upper split limit
- Limit Alarm
  - o Through the logic board of the DNGP, the user can attach a device that receives power once the position has reached a predetermined upper or lower limit.
  - o The pin-outs for the logic board can be found in the technical manual for the DNGP.
  - o The percentages at which these alarms go off are set by the user in the Upper Limit and Lower Limit registers.

- Dead Band
  - The dead band represents the allowable percentage difference between the setpoint and the position.
  - The deadband is measured in % of full travel, making 1% = 0.16mA
- Split Mode
  - Enables or disables Split Mode, explained above.
- Bypass Mode
  - Under normal operation, when a valve is within 1.5% of its fully open or fully closed position, the solenoid valve will remain activated to ensure that there is no valve movement due to leaks or other issues. With bypass mode enabled, that feature is overridden and the solenoids turn off at the end of the stroke.
- Positioner Action
  - Available options are Close on Increase or Open on Increase
  - Indicates which way the position transmitter was calibrated and represents the resulting action when the setpoint/current is increased or decreased
- Loss of Signal Action
  - Represents the default action of the valve in the case of a loss of signal (either feedback or control)
  - Available options are Close on Loss of Signal, Open on Loss of Signal, or Remain Unchanged on Loss of Signal
- Logging Interval
  - This option corresponds with the historical data logged onto the DNGP itself. The available options are:
    — Log Data Every 5 Seconds
      - Total of ~3.7 hours of historical data
    — Log Data Every 60 Seconds
      - Total of ~45 hours of data, at a less frequent polling rate
    — Logging Disabled
      - Disables all data logging into the DNGP

- Cycle Count and Clear Cycle Count
    — The DNGP logs each activation of the solenoid valve to determine when service or solenoid replacement is necessary
    — In order to clear cycle count after a new solenoid has been added, the user can check the "Clear Cycle Count" and then click "Apply" to reset the count
- Pulse Mode On/Off Time
  - Pulse mode allows the valve to more slowly approach the setpoint by "pulsing" the solenoid valve rather than attempting to stop exactly on the setpoint number and risking overshooting.
  - The pulse mode On/Off time represents how long the solenoid should be "on" during the pulsing and "off" respectively
- Pulse Mode Threshold
  - The pulse mode threshold corresponds with how close (in percentage) to the setpoint the position must be before the solenoids begin pulsing.

Application of settings

Configuration settings can be sent to the DNGP at any time, either individually or with multiple changes. Once the user is ready to apply any changes that have been made, the "Apply" button simply needs to be pressed and all settings will be sent to the DNGP.

Save/Load configuration files

If the user needs to save a specific configuration for later use or for troubleshooting, they can do so by clicking "File Save" which will then prompt for a file name. The settings will be saved in a comma separated values file which can then be accessed by the DNGP PC software to revert to the saved configuration values by clicking "File Load."