Operation guide

XSeries G4 plunger operation with PCCU
2104975-001 rev. AA

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Inquiries regarding this manual should be addressed to ABB Inc., Totalflow Products, Technical Communications, 7051 Industrial Blvd., Bartlesville, Oklahoma 74006, U.S.A.

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1.0 Overview

Operating the ABB Totalflow Plunger application requires the user to understand some basics of our PCCU (Portable Calibration and Collection Unit) software. This guide will give the user basics of interacting with the Plunger application using PCCU.

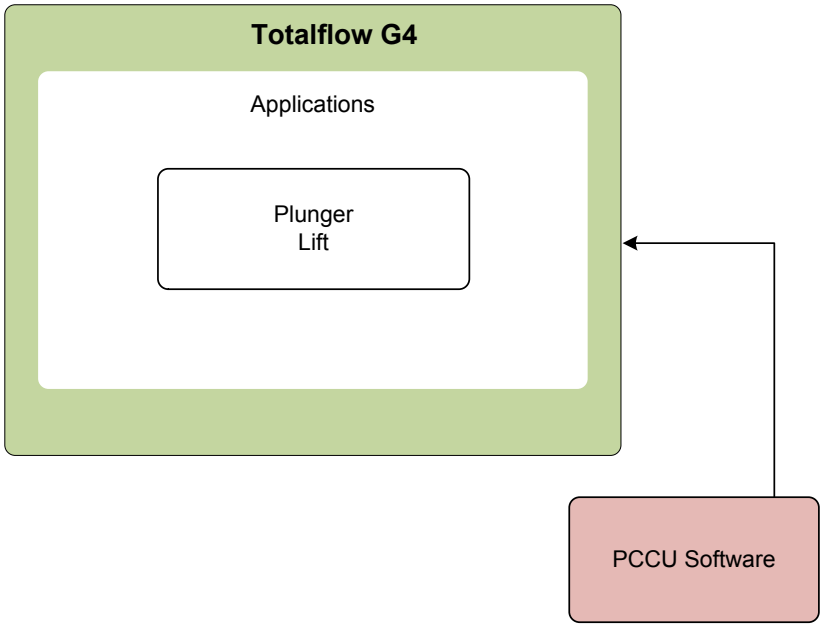

Figure 1 System components

1.1 How to use this guide

This document will instruct the user that is familiar with Plunger Lift, how to operate the PCCU screens within the ABB Totalflow Plunger Lift application. If you are new to the plunger application see reference section for additional information.

1.2 Assumptions

The guide focuses on operating the PCCU screens with the Totalflow Plunger application. The following is assumed

- PCCU is installed
- PCCU cable is connected to Totalflow device
- Totalflow device has Plunger application running
- All external devices required for the application are connected properly and calibrated.

1.3 Prerequisites

The procedures described in this document apply to the following:

- PCCU software version 7.31 and later

- PCCU interface cable; can be serial ,USB or Ethernet
- XRC^{G4} Part# 2103329-001 software version 2103132-039 and later
- XFC^{G4} Part# 2103328-001 software version 2102861-045 and later

1.4 Background

Numerous PCCU screens exist that require the user understanding in the effort of operating the plunger lift application. It is the goal of this document to give the user a quick instruction of navigating the critical screens within the application.

2.0 Setting up connection with PCCU

This instruction will guide the user in initially connecting to the Totalflow device using a serial connection.

2.1 How to setup connection method (serial)

1) From the PCCU initial screen select the “setup” icon in the toolbar.
2) Select “Serial port” radio button to begin serial port setup
3) Next select “PCCU Com. Port” using the drop down menu, set this on your known serial port for your laptop.
4) Finally, in the “Auto Connect’ area in the lower section of the screen, select “Entry”. This will enable your PCCU setup to open and view the Plunger app each time you launch PCCU.
5) Next “Close” out of setup, then click “Entry” in toolbar and go to Plunger lift page.

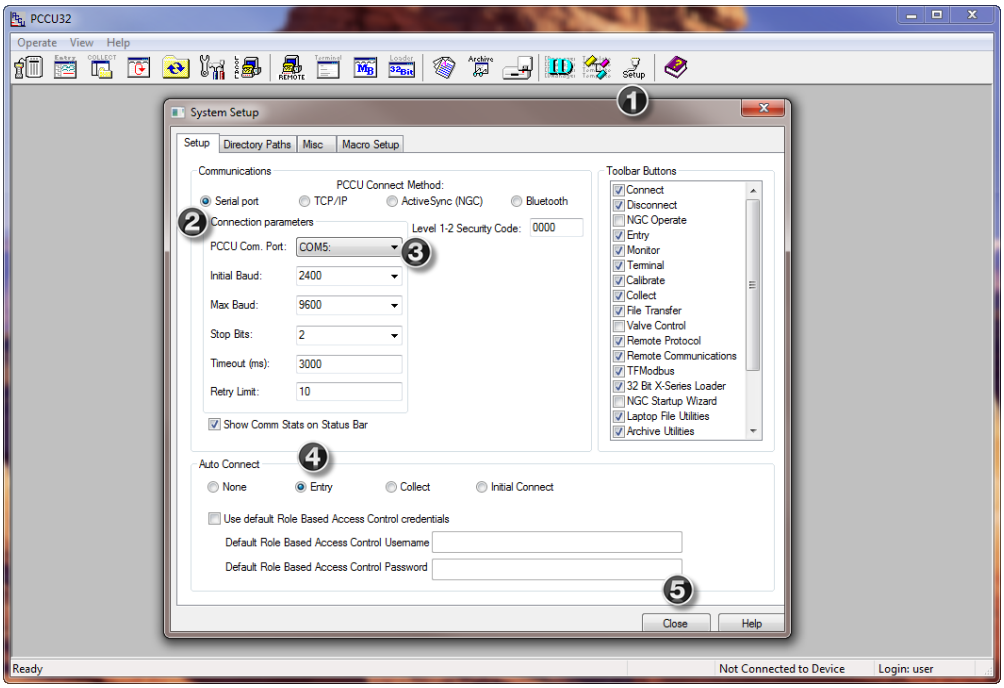

Figure 2 Setup screen

2.2 Setting up view within PCCU

We are now ready to “connect” to the Totalflow device.

1) Next, setup your “View” of what plunger details you can see.

2) Go to “Totalflow” in the tree view and select “Advanced” for the view. The “Basic” view will not give us enough detailed screens and “Expert” has a lot more screens to view, but is not really required for operations.

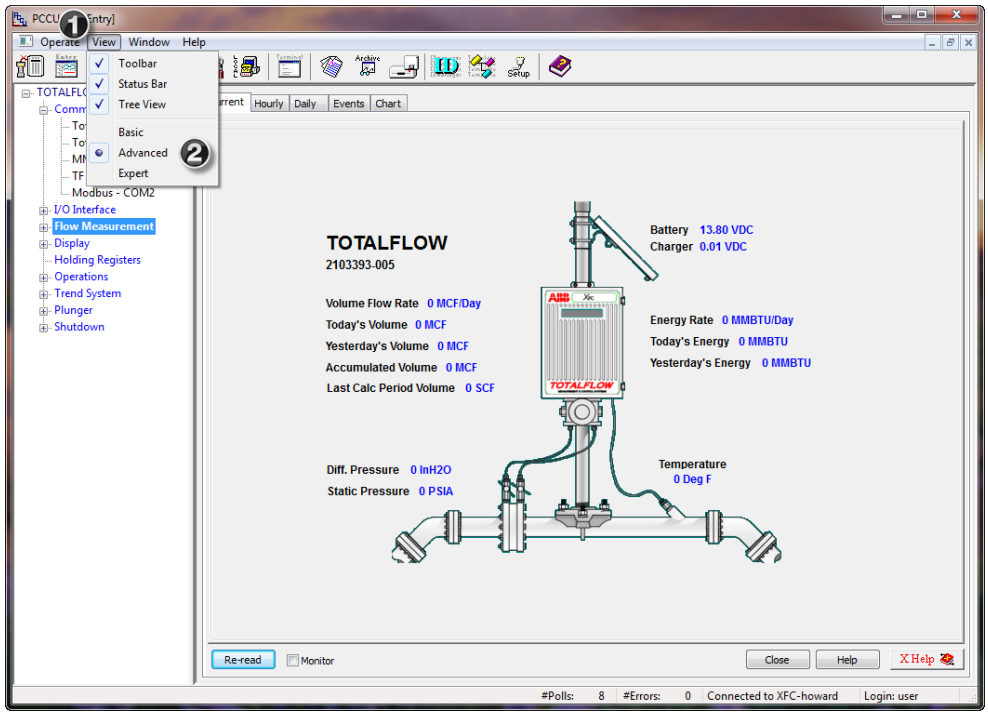

Figure 3 View screen

2.3 View status of main “Shutdown” application

The Shutdown application will affect the plunger application, meaning that it can “shut-in” the site and not allow individual Plunger applications to operate. The following steps will instruct the user in working with the Shutdown system.

1) “Shutdown DO”, displays the status of the Shutdown DO. The two indications are: RUN (system running) and SHUTDOWN (shutdown mode).

2) “Last Event”, indicates shutdown reason encountered by the system. This could be one of the following; AI, DI, POWER, or Reset.

3) “RESET remote”, represents the input PCCU uses to cause a reset. The two options are: 0 Inactive or 1 Reset.

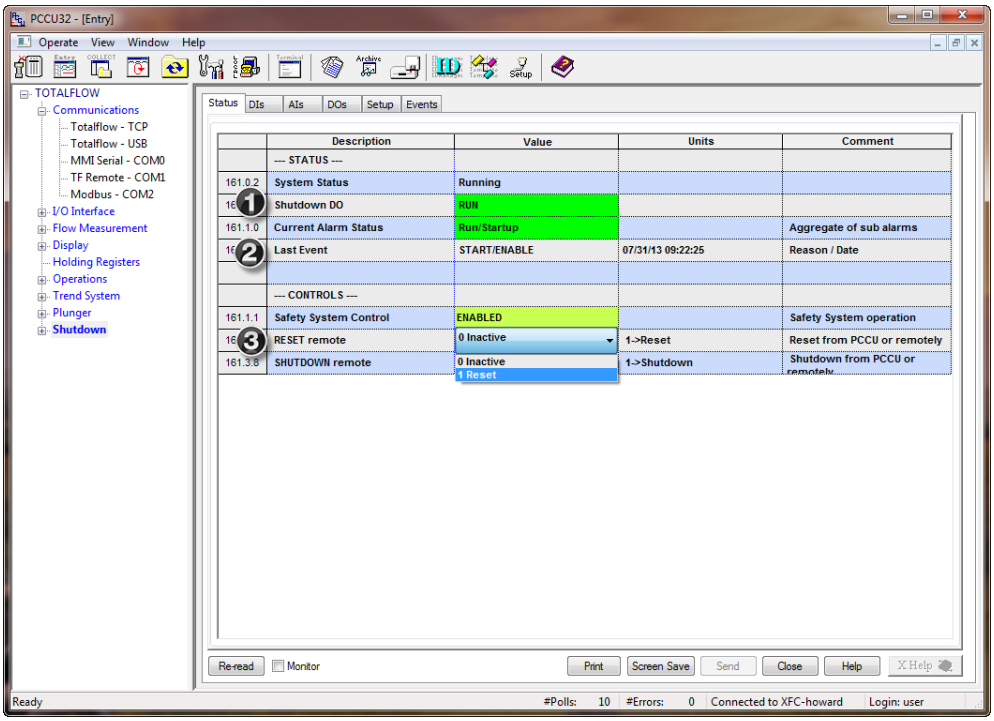

Figure 4 Shutdown screen

2.4 Navigation of Plunger application

2.4.1 Summary screen

Now we are ready to move through the Plunger application screens. Select the correct location of your Plunger application in your tree view and then the “+” sign to expand the view.

FYI

When you first “select” the plunger application in the tree, it may take a few moments for you to be able to view due to the amount of data being read by PCCU

1) Select your Plunger app icon in the tree, and you should see the “Summary Screen”. This is an “Overview” screen in which we can see various updates of activity within the application.

2) To “refresh” the values on the screen use the “Reread” or “Monitor” buttons at the bottom left on your screen.

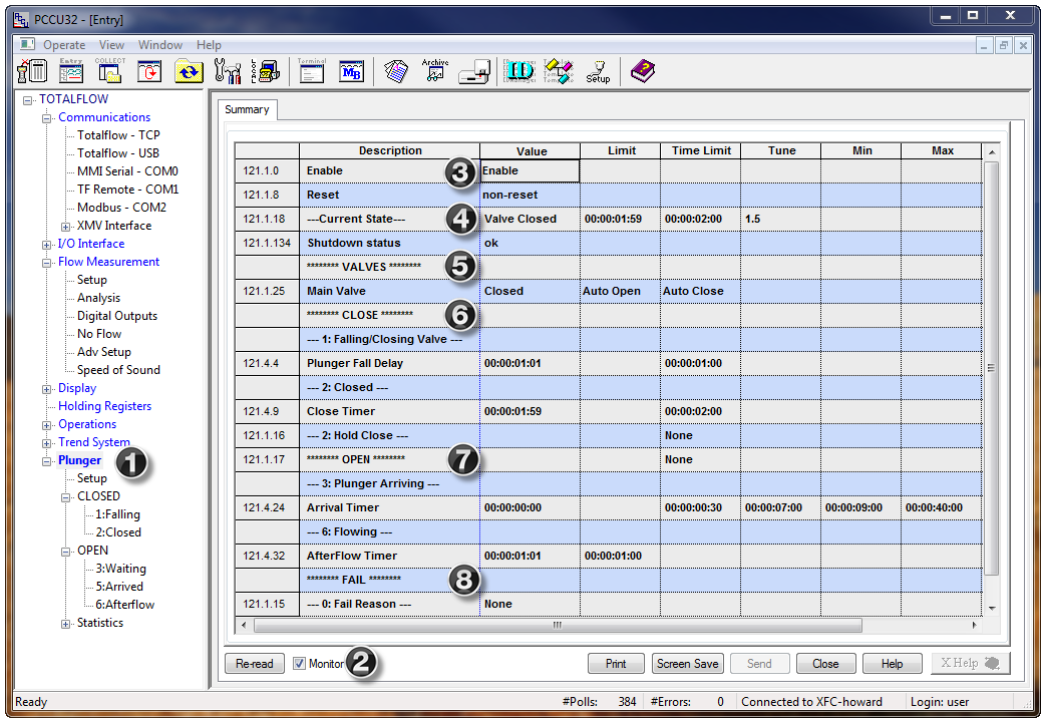

Figure 5 Summary screen

3) The value in the “Enable” field sets the operation “Mode” for the plunger. For example, “Enable”, puts app in ***run mode***, *“Manual”*, puts app in ***pause mode***, ”Disable”, ***stops app*** and leaves valve in position it is currently in.

4) The “Reset” command initializes the logic to the ***startup mode***. Once you select “Reset” and Send command, the value will change back to “non-reset”.

5) “Current State” indicates what state the plunger is currently in. The following table describes the possible states:

State	Description
Fail	Indicates that plunger has failed to arrive
Closing Valve	Indicates that the production valve is closing, and the system is waiting for the plunger fall delay to expire.
Valve Closed	Indicates the plunger fall delay has expired, and the system is waiting for an open valve condition to be initiated.
Plunger Arriving	Indicates that the production valve has opened, and the system is waiting for the plunger to arrive.
Blow Valve	Indicates that the plunger has not yet arrived, blow valve conditions have been met and a secondary valve has been opened.

State	Description
Plunger Arrived	This is an instantaneous state that indicates that the plunger has arrived.
Afterflow	Indicates that the production valve is open, the plunger has arrived and close conditions are waiting to be met.

6) Check “VALVE” position. “Auto Open” indicates that the valve “open” is controlled by the plunger application. If “Force Open” is selected in the drop down list, the valve will be forced “open”. It is suggested that the user perform a “Reset” command to re-start the controller after manually controlling the valve. “Auto Close” command behaves the same as “Auto Open” except controls the “close” condition of the valve.

7) “CLOSE” section, allows the user to view the close options selected and their status.

8) “OPEN” section, allows the user to view the open options selected and their status.

9) “FAIL”, allows the user to view the reason the plunger failed to arrive.

2.4.2 Setup

In the Plunger “Setup” screen, we will setup various parameters concerning startup, valves, and inputs to the Plunger application.

In the “General Setup” tab, we will setup some general information about the well, optimization on/off, and startup conditions.

1) Set the value of “Cycle Start” to “close-close”. This indicates valve position is closed at the beginning of the plunger cycle.

2) Set the value of “Startup Mode” as “1Closing Valve”. This will start the well in its “off time” when it fails and is restarted.

3) Set “Optimization” to: Enable or Disable. Enabling this feature allows for tuning to be running.

4) “Well Geometry”, allows the user to enter data concerning the well parameters.

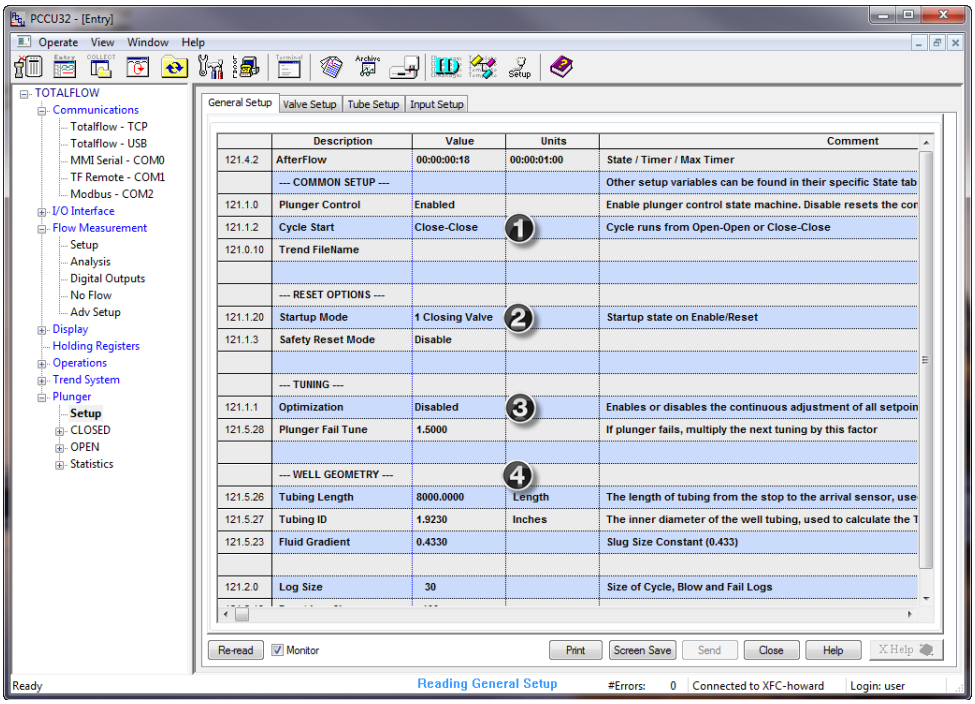

Figure 6 Setup screen

In “Valve Setup”, we can verify or make changes to our valve setup as needed.

5) In “Main Valve fail state”, it is usually desired to set valve to “Close”, if plunger goes into ***fail*** mode.

6) These settings in “Auto”, allows for the plunger application to control the valve. “*Force Open*”, or “*Force Close*” allows for manually forcing the valve into position. It is recommended after manually operating the valve, to “Reset” the controller by using the “Reset” command (Plunger>Summary>Reset) to allow the controller to reset and re-start.

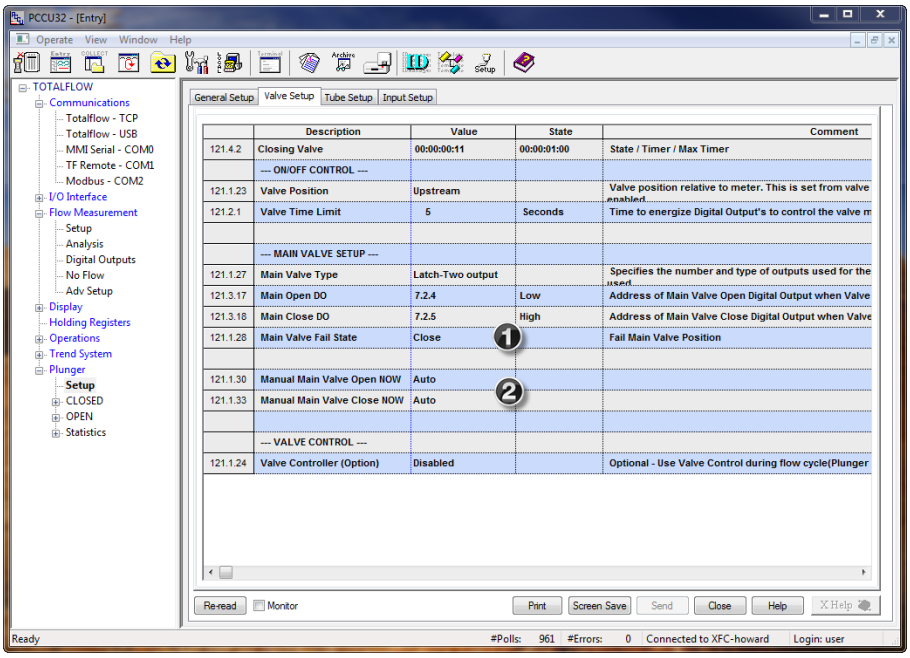

Figure 7 Valve setup

In “Input Setup”, we can verify or make changes to the inputs for our plunger app as needed.

7) In “Detection Type”, make sure that “Plunger” is selected if running a plunger in your application. There is also a setting for “Intermitter” if no plunger is used in your scenario.

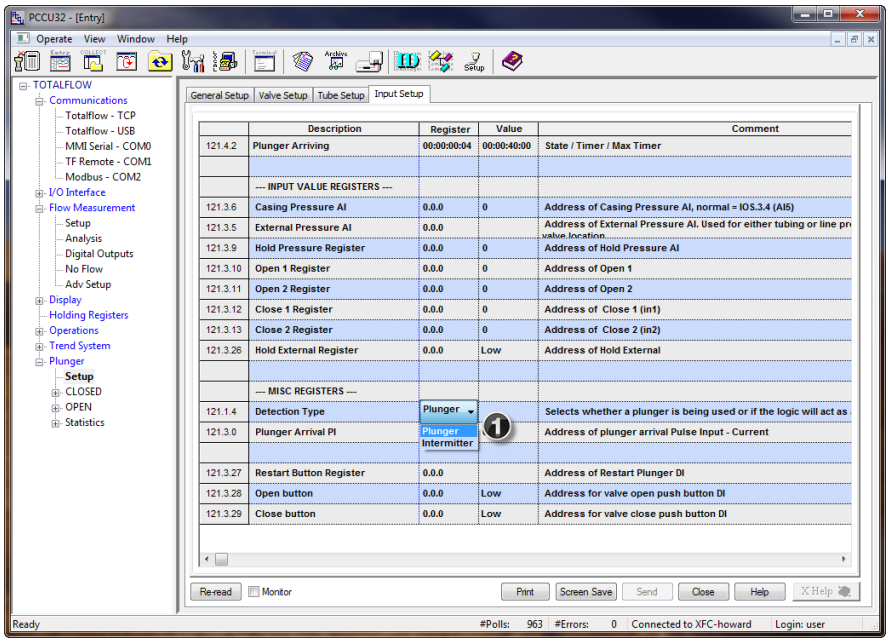

Figure 8 Input setup

2.4.3 “Closed” setup

We now can set the conditions for the valve to “Open”.

1) Several conditions can be enabled to “Open” the valve. To use a “Timer” to open the valve, ***Enable*** “Closed Timer” and set the “Limit” in time.

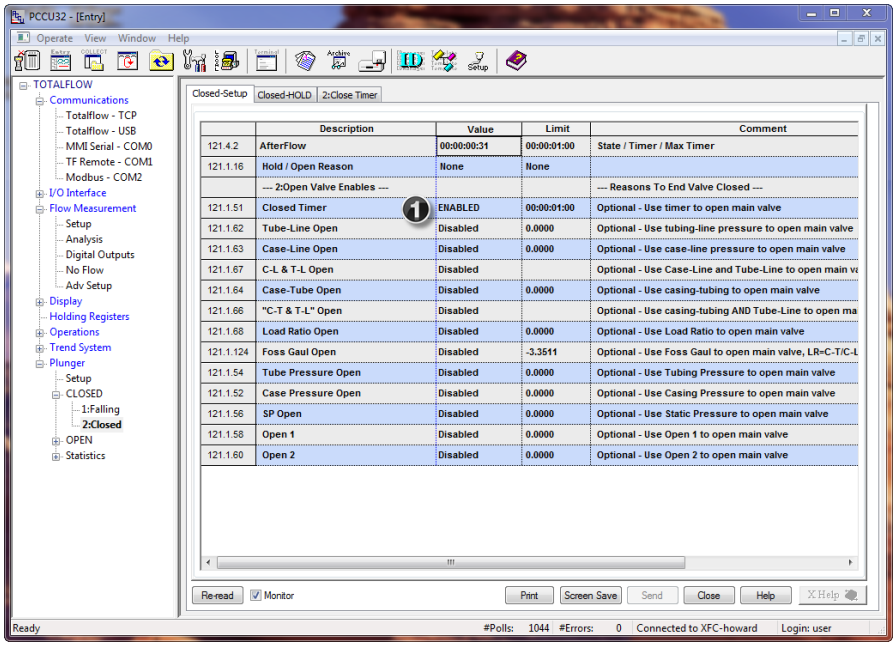

Figure 9 Closed setup

3.0 Reference

Additional information about the ABB Plunger application can be found on our website http://www.abb.com/totalflow. The following chart has direct links to many documents on-line that the user may find helpful concerning plunger lift.

Base Board	I/O Description	Drawing #	ABB Web Site Link
TFIO DIDO Module	Plunger Lift: Direct I/O option	2102981	Plunger DI-DO Wiring
XFC	XFCG4 6410/6411/6413/6414 (2103328 BD) TO DRUCK1040/1240GP/APTRANSDUCER	2104128	XFC to Druck wiring
XFC	XFCG4 (2103328) BOARD PINOUTS	2104122	XFCG4 Board Pinouts
XFC	Plunger Lift Tubing/Casing & ON/OFF for XFC W Versa-Valves(DI-DO Module)	2103174	XFC to Casing-Tubing & Di/Do versa
XFC	XFCG4 (2103328 BOARD) COMM2 TO EXT MULTIVARIABLES W/RTD PROBE	2104126	XFC to XMV on com 2

Base Board	I/O Description	Drawing #	ABB Web Site Link
XRC	Plunger Lift on/off for XRC,Tubing/Casing,DI-DO Module(Arrival Sensor)	2102983	XRC to Tubing/Casing
XRC	Plunger Lift Valve Control(wTubing, Casing, Arrival Sensor) using Valve Control Module	2102985	XRC to Vlv Ctl Module
XRC	XRCG4 (2103022 BD) COMM1 TO Ext MULTIVARIABLE W/RTD PROBE	2104127	XRC to XMV on com 1
XRC	XRCG4 (2103329 BD) AI TO 2-WIRE TRANSMITTER(ANALOG INPUT) W/EXTERNAL 12/24VDC POWER	2104337	XRC to Ext Xmitter with Ext Pwr
All G4 products	Plunger Analysis Software	Web folder with several docs	Plunger Analysis Software
All G4 Products	Automating Wellpad Operations	9AKK105713A5059	Automating Wellpad Operations
All G4 Products	ABB Plunger Lift application sheet	9AKK105713A3836	ABB Plunger application Sheet

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