FUJI HART EXPLORER
INSTRUCTION MANUAL

Contents

Versions

Date	Date	Modification	Author
11/2005	Version 1.0	Creation	P.DURIEZ, J.LAMESCH
01/03/2007	Version 1.1	Add warning	P.DURIEZ

About this guide

Purpose

This guide introduces the features of the software “FUJI HART EXPLORER”, and shows you how to configure, monitor and manage Hart devices.
This software is designed for communicating with devices using Hart protocol. The software gives full functionalities to some devices like “FUJI FCX A-C II pressure transmitter”. The others devices can be used in generic mode.
In the future, the software can be extended by developing plug-in for specific devices.

Audience

This guide is intended for those responsible for setting up Hart devices, and especially Fuji Hart devices. It assumes that you are familiar with the devices and Hart protocol.

Scope

“FUJI HART EXPLORER” allows you to

- work in English or French
- work directly with a device connected (online mode) or work on files (offline mode)
- monitors dynamics variables

FUJI ELECTRIC FRANCE Contact Information

To contact FUJI ELECTRIC FRANCE SA by	Use :
World Wide Web	http://www.fujielectric.fr
Email	sales@fujielectric.fr
Telephone (France)	04 73 98 26 98
Telephone (other locations)	+33 4 73 98 26 98

Installing the application

Using the serial Hart Modem

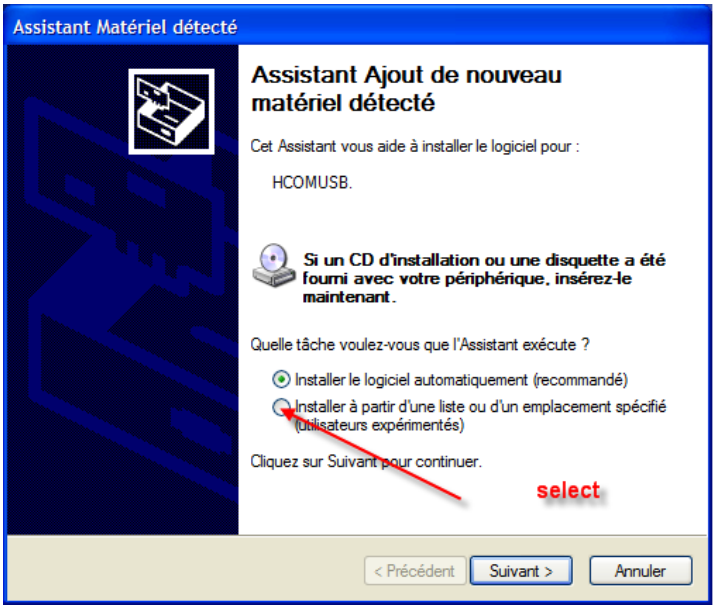
You need not to install the modem, only to connect it. (compatible Windows 98, 2000, XP)

Using the USB Hart Modem

You need to install the driver for the USB Hart Modem.

- Power on your computer.
- Plug in the modem. Windows will detect a new device named “HCOMUSB”.
- Follow the instructions displayed :

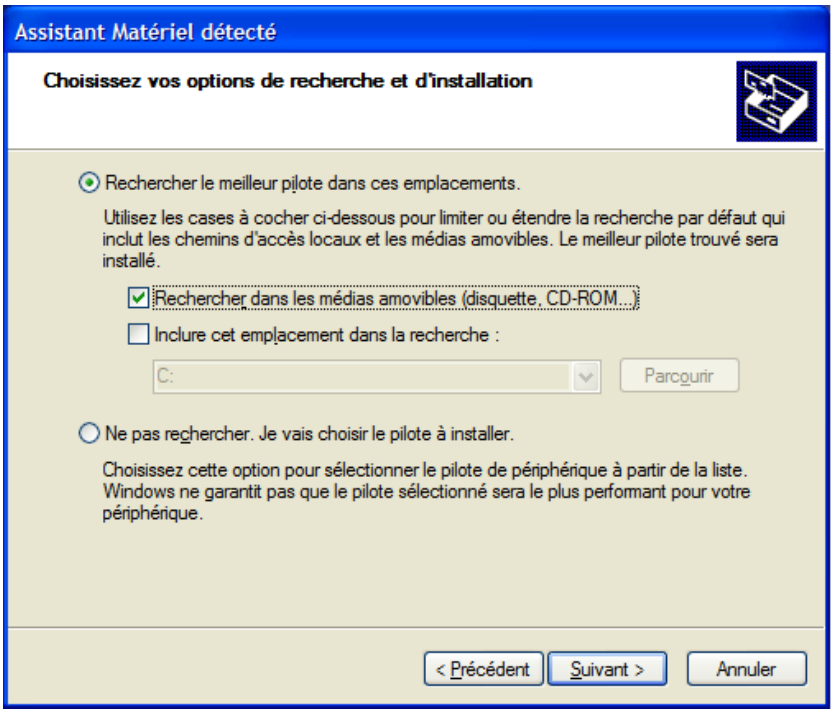
Installation example for Windows 2000, XP :



Insert CD for installation

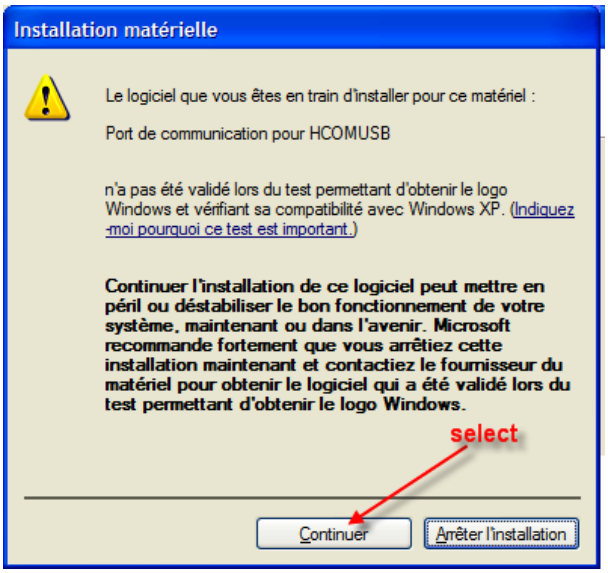
Installation possibilities :

- **STANDARD AND AUTOMATICALLY INSTALLATION (RECOMMENDED)**
- Select to install from a specific location.

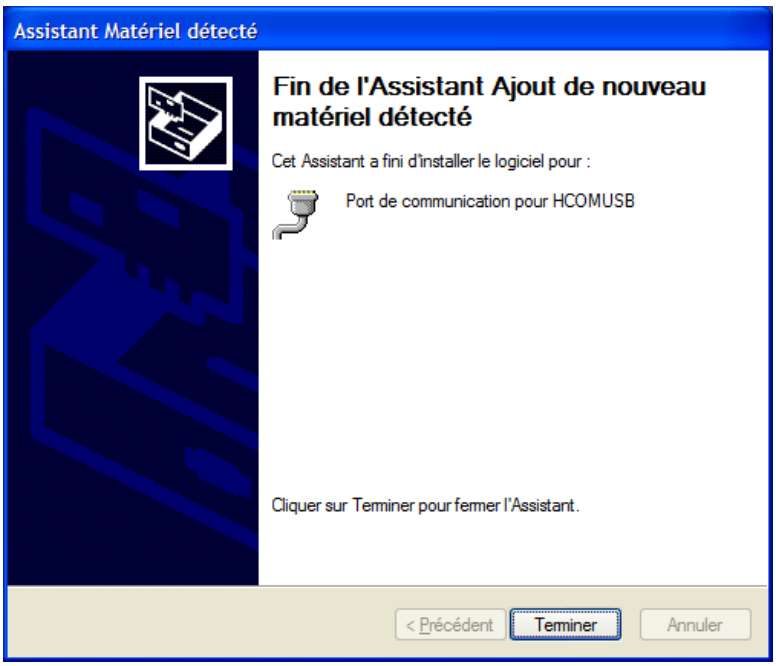


Select the path of the driver named ‘AP3CDC.inf” for windows 2000, XP.

Let Windows go on.



If there is a warning message concerning the software, please choose to continue.

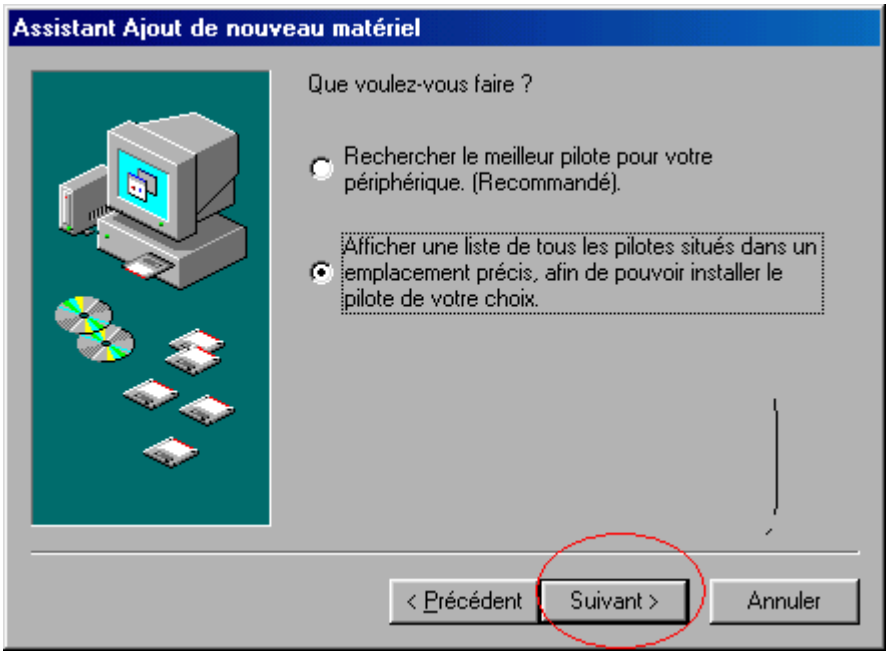


At the end of the installation, a new communication port is added to your system. You can see it using the configuration panel.

Installation example for Windows 98 :

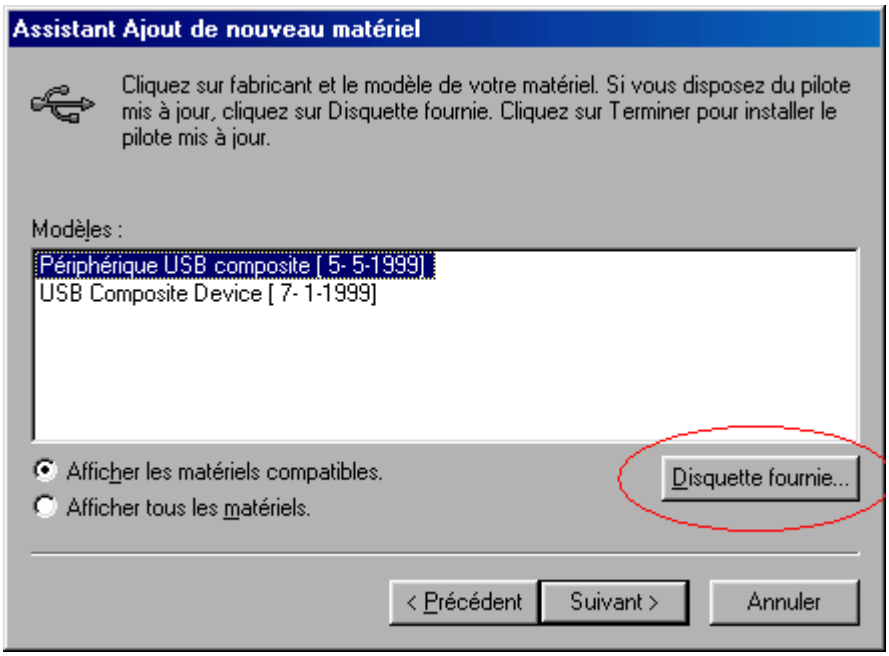
The new device is detected.

Please go on.



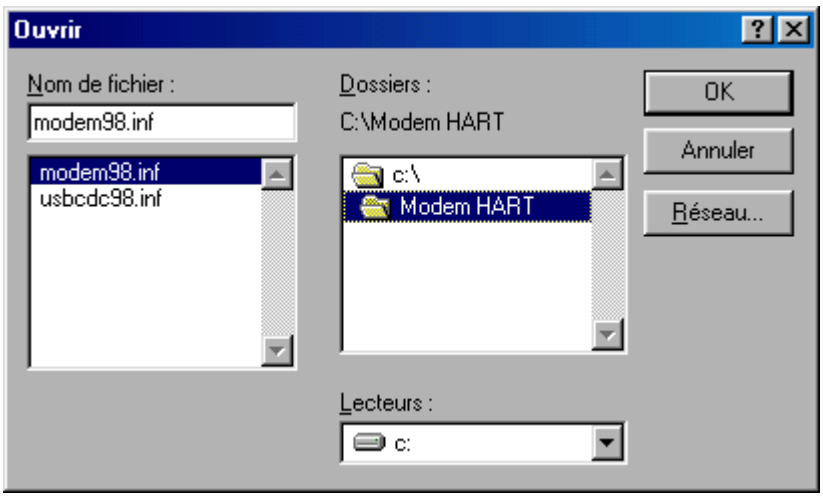
Select the second choice to select the path of the drivers.

Please go on.



Windows show you a list of available drivers.

Click on the “drive” button.

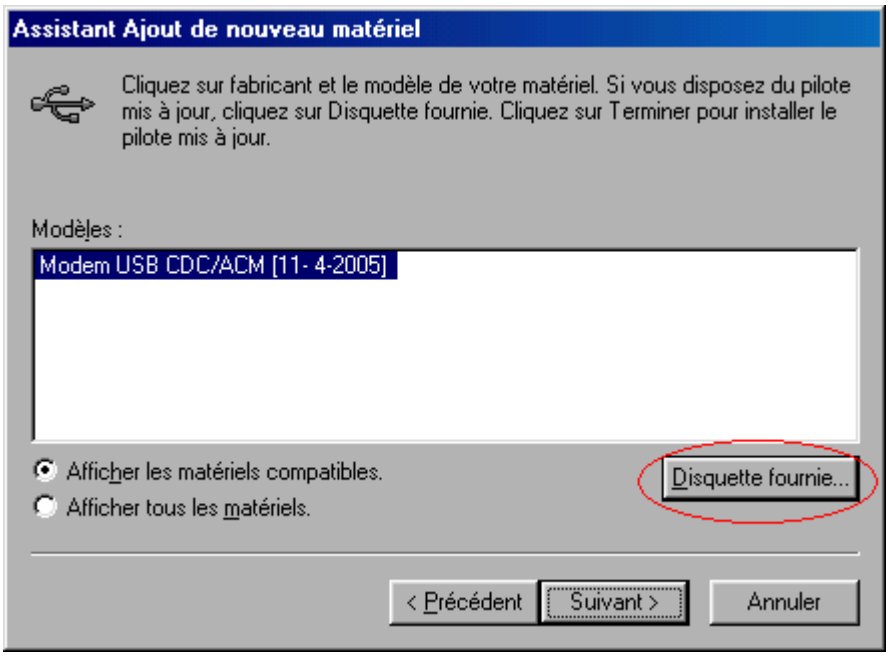


Browse your CD :

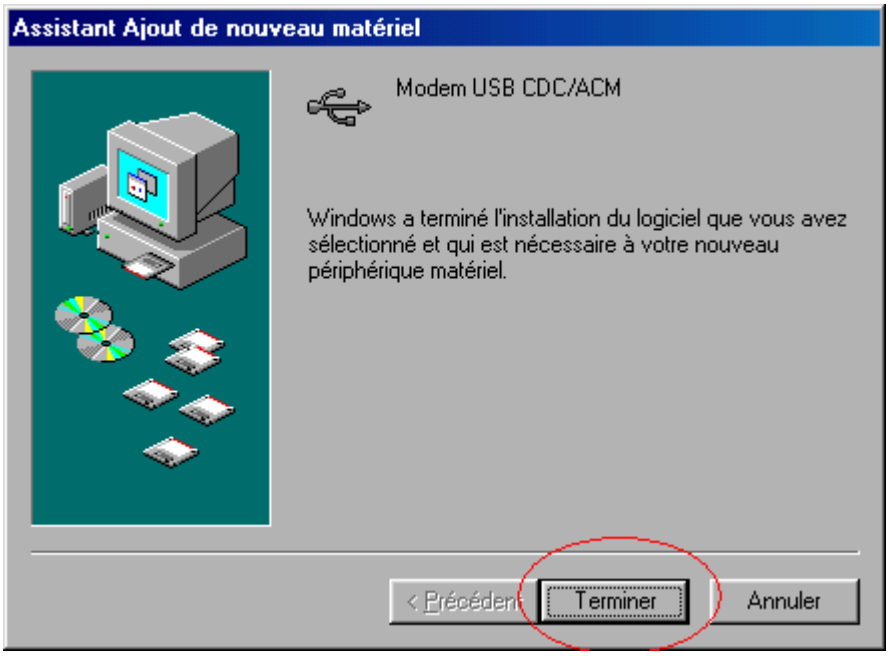
Example: D:\\Hart Modem A3\Win 98.

You have to see following files :

- Modem98.inf
- Usbcdc98.inf

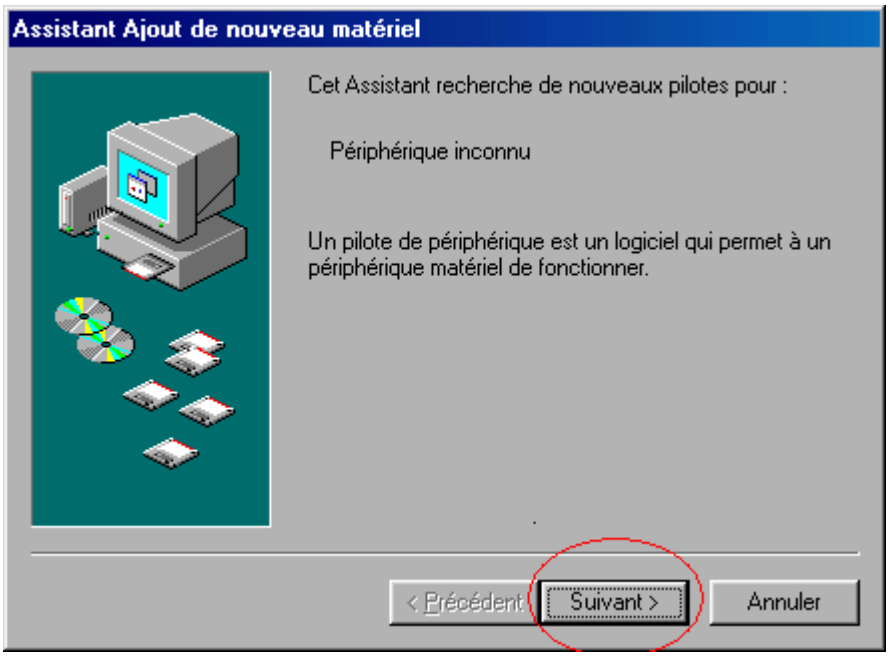


The USB modem will be installed.

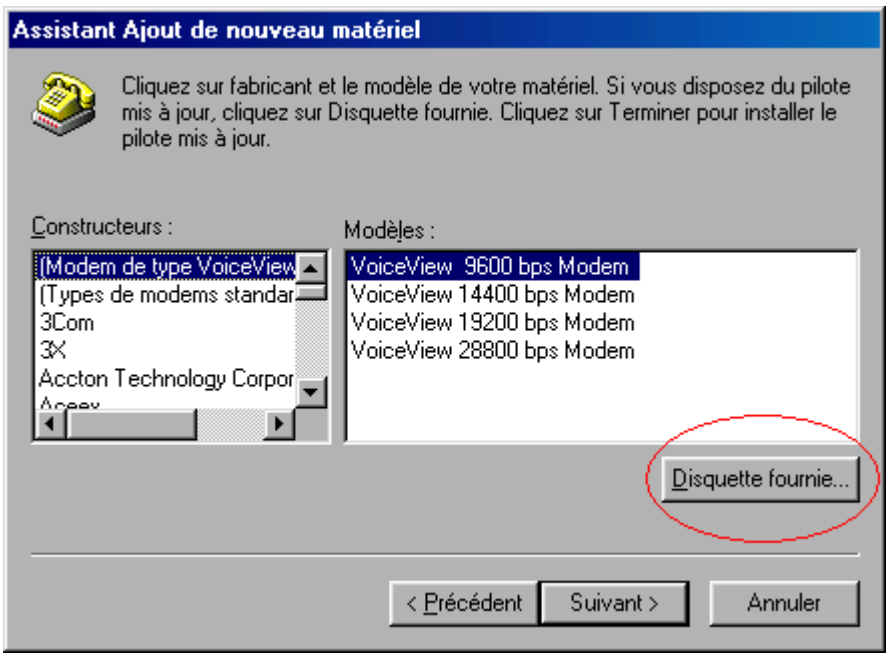


The modem is installed.

A new device is detected.

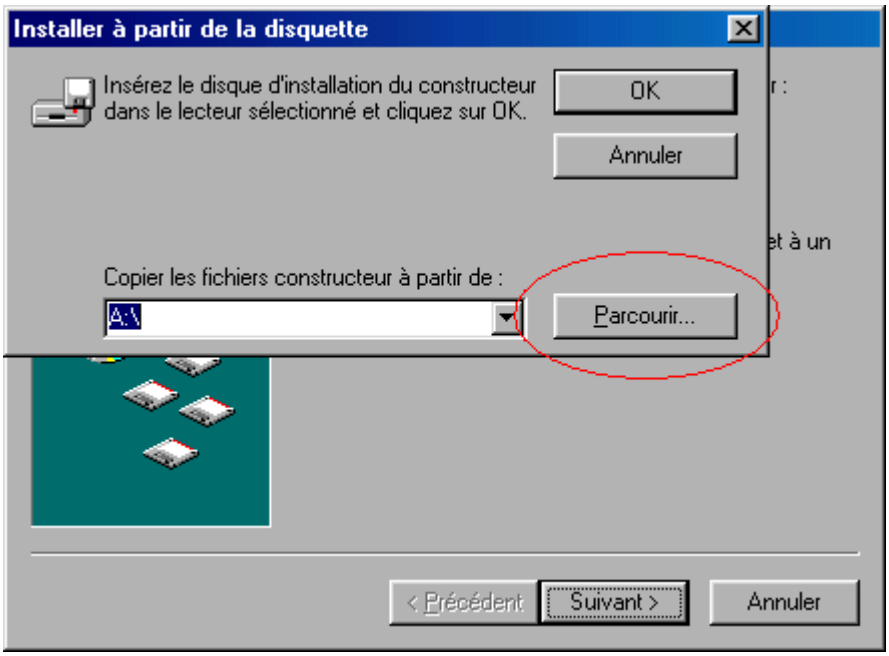


The communication port is detected.

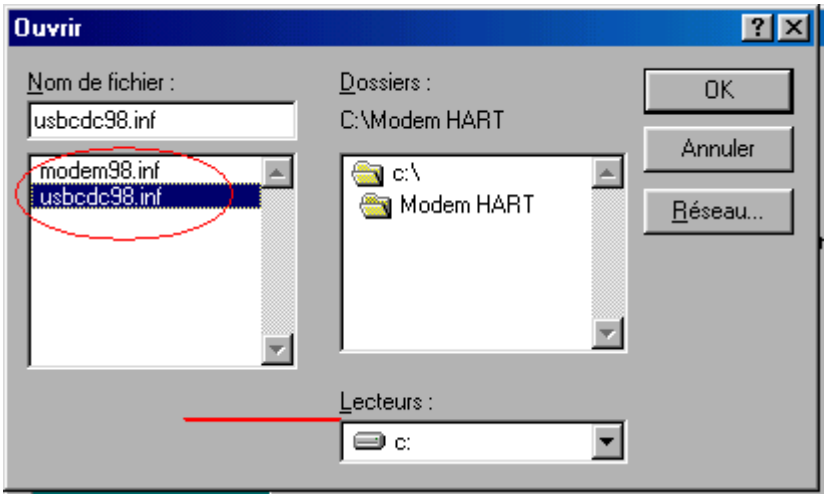


Windows show you different kinds of drivers.

Pleas click on the “drive” button.

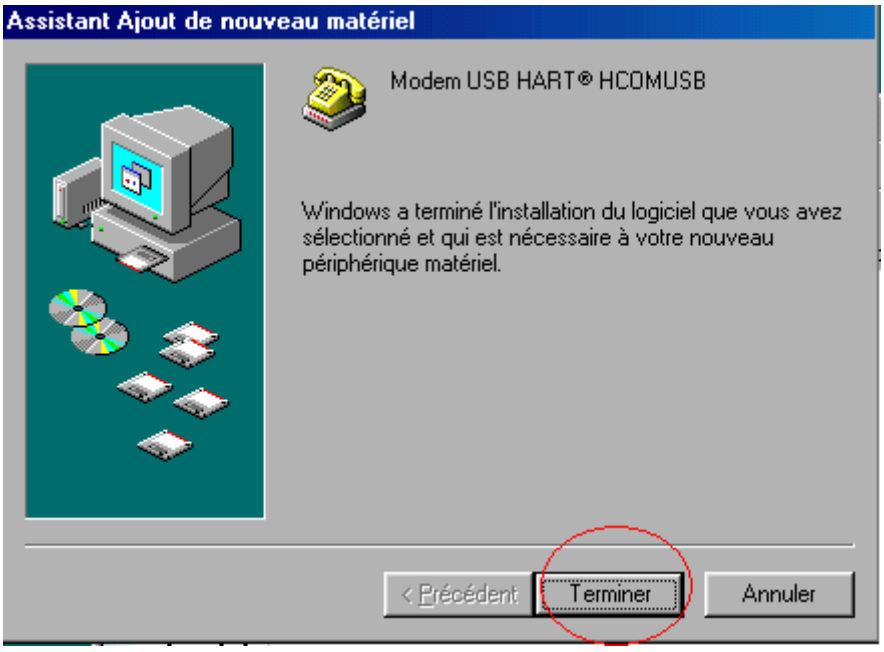


Click on “browse” button.

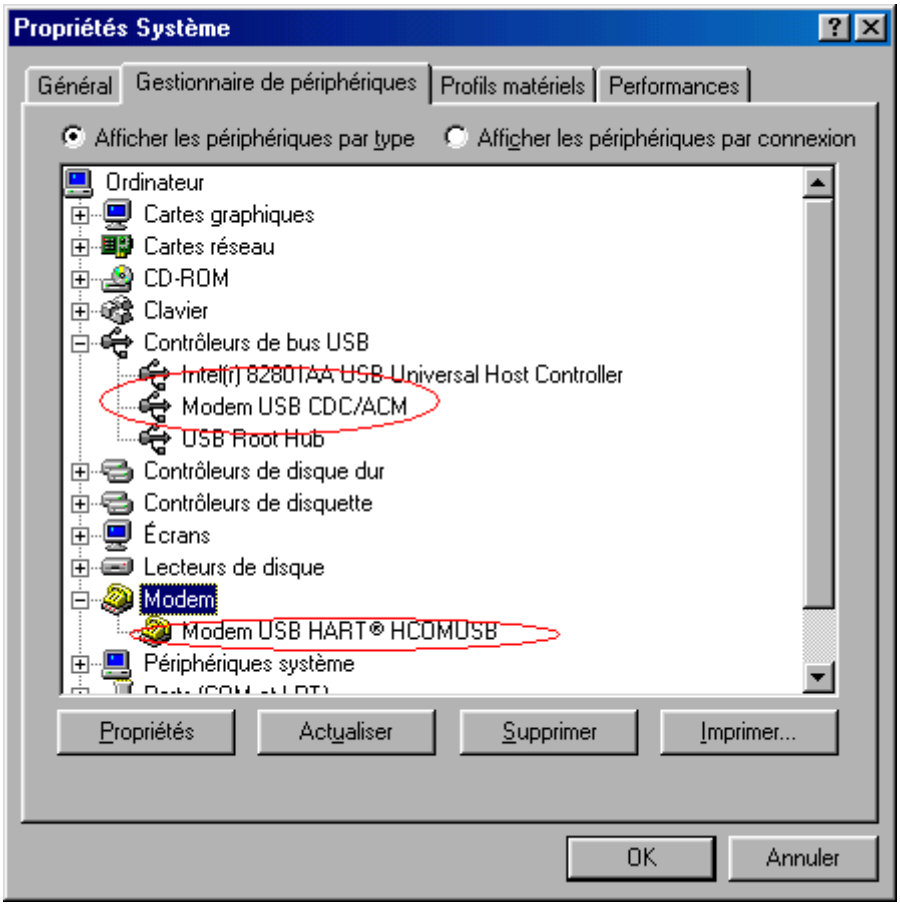


Browse to display the following files :

- Modem98.inf
- Usbcdc98.inf



The port is installed.



Using the panel configuration >> System icon >> System drivers you can verify that the modem is installed.

You have to see :

- Modem USB CDC
- Modem USB hart

Installing the application (FUJI HART EXPLORER)

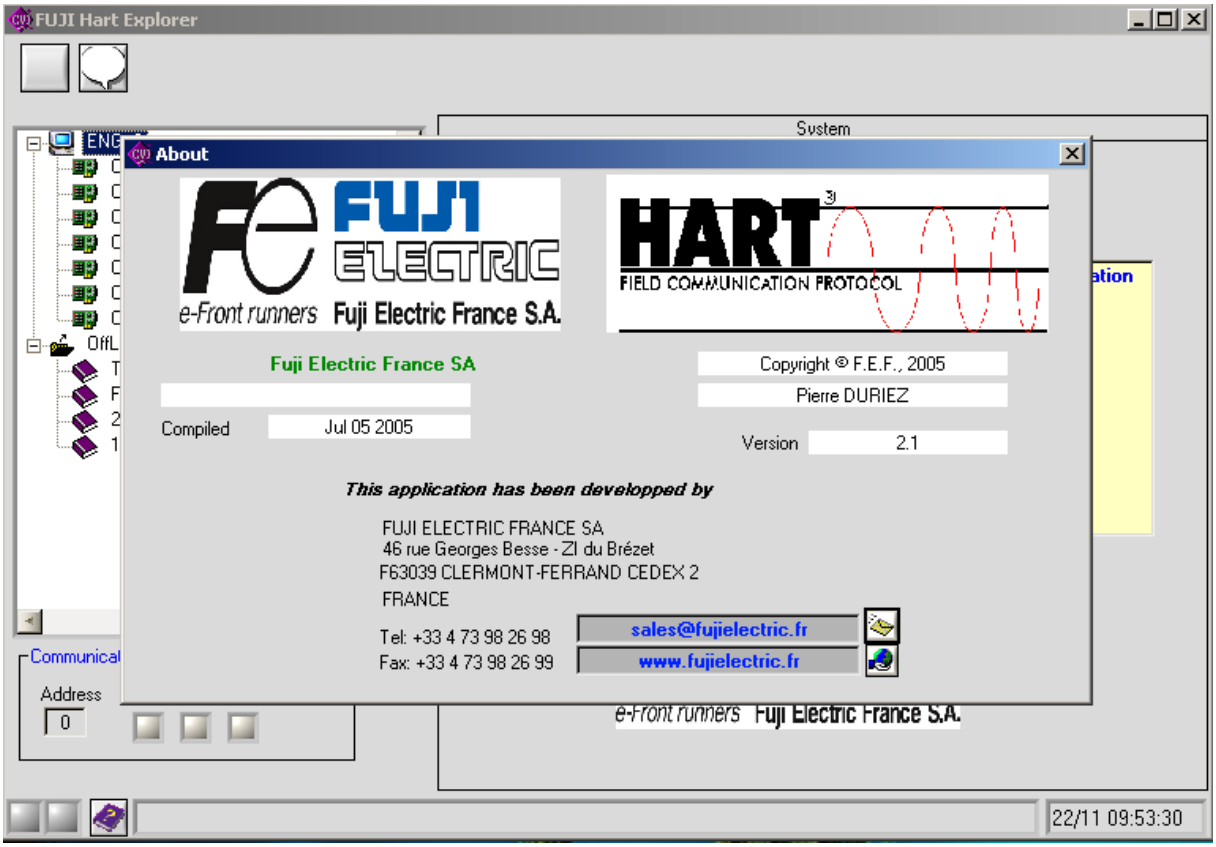
Double click on the file named “setup.exe” and follow the instructions.

Uninstalling the application

If you have already installed the application , you can uninstall it by launching “setup.exe” one more time or by using the classical uninstall procedure from the configuration panel.

Starting the application

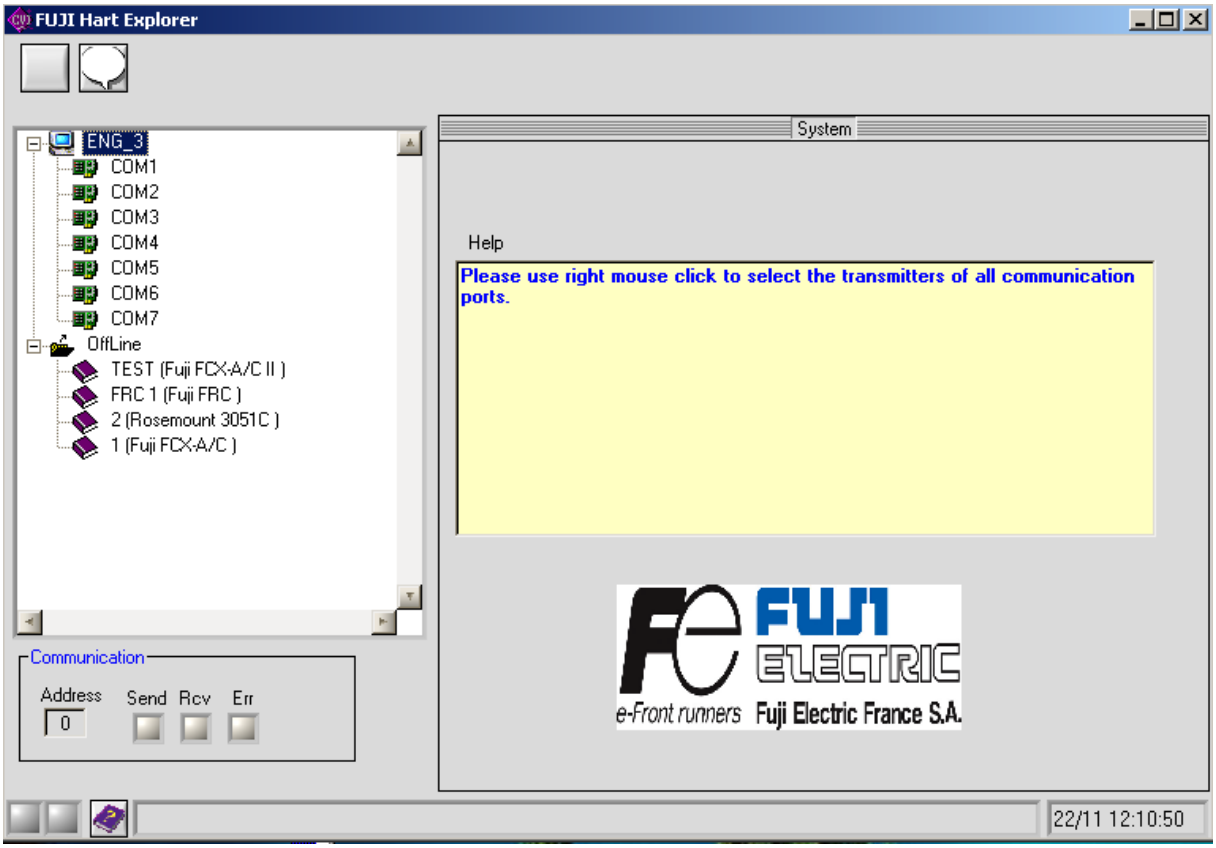
After started the application you've got the "About windows" :



What can you do ?

See the actual version number		Version 2.1
Contact Fuji Electric	click on the email button	
	Or double click one the address	sales@fujielectric.fr
See our web site	click on the web button	
	Or double click one the URL	www.fujielectric.fr
Close the windows		

Main windows



Description

The windows contains

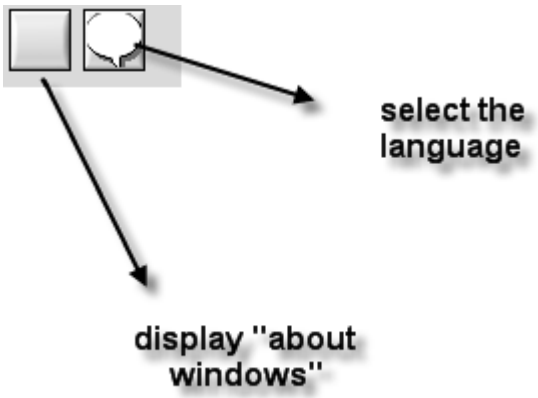
- a toolbar
- a tree view
- a communication area
- a general information area

The toolbar

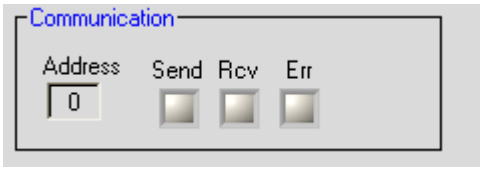
What can you do ?

The toolbar gives you the possibility to

- display the “About Windows”
- select the interface language



Communication area

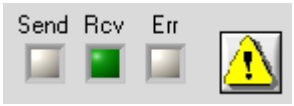


The communication area show you :

THE ADDRESS OF THE DEVICE FOR THE ACTUAL COMMUNICATION

- a send indicator
- a receive indicator
- an error indicator

- some time an error button 



What can you do ?

You can get information about the communication.

Indicator		**Meaning**
Send	is flashing green	Data are sent to the device during the green state.
Rcv	Is flashing green	A device is sending data back
Rcv	Is flashing red	A response was expected but the device doesn't answer
Err	Is flashing red	A communication error occurs. **THE COMMAND IS REJECTED BY THE DEVICE (VALUE/COMMAND REJECTED)** **AN ERROR IS DETECTED DURING THE COMMUNICATION**

When an error occurs in a Hart command, the error button appears. You can click on it to get the Hart Error Code. See "Communication error" in the paragraph "Annexes".

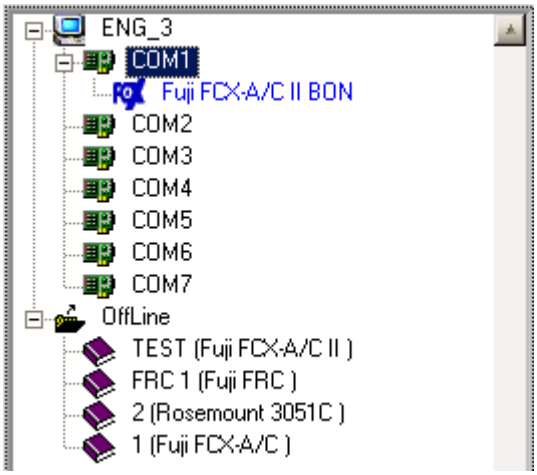
General information area

This area show you :

THE CURRENT DATE AND TIME

- a button to display help file
- an area for process and error messages

The tree view



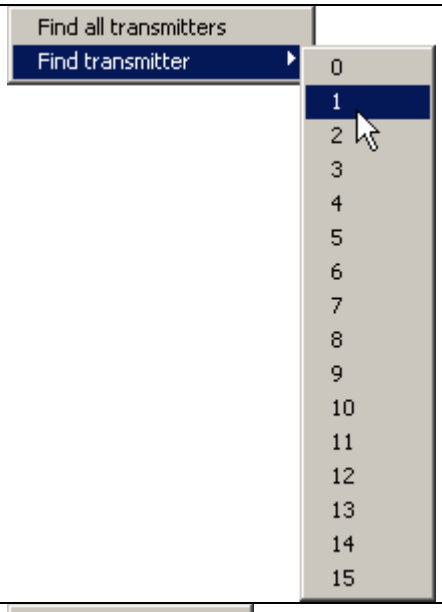
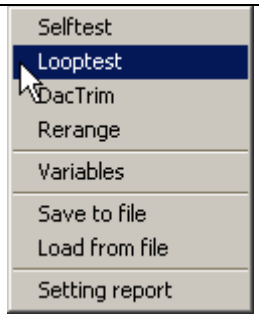
The tree view show you

- the computer name
- the available serial communication ports
- the connected devices
- the files saved for offline mode

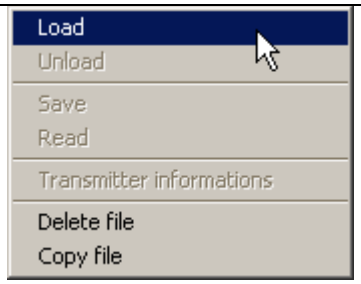
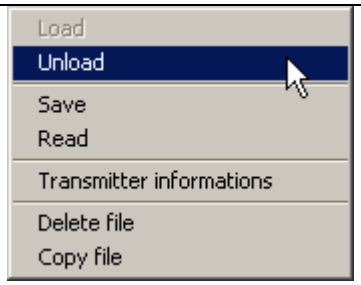
Functionalities

When you select an item of the tree view , the right panel of the window is refreshed and display information depending on the kind of the selected item (computer, communication port, device, file).

Right clicking on the item displays a contextual menu :

Item	Contextual menu (right click)	Functionality
Computer		Detect all devices for all addresses and all communication ports
Communication port		Find all transmitters for all addresses for that communication port. Find a transmitter for a specific address.
Device generic		**SELFTEST** **LOOPTEST** **DAC TRIM** **RE RANGE** **MONITORING OF PROCESS** **SAVE PARAMETERS** **LOAD PARAMETERS** **MAKE A REPORT OF ALL PARAMETERS**

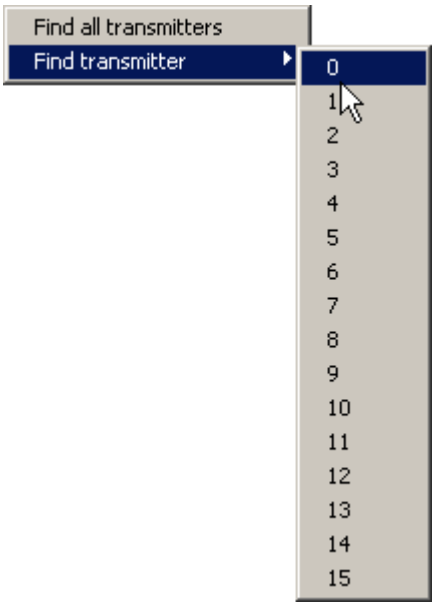
Other Device	See specific documentation	

Offline		
File <u>File not loaded</u>		**LOAD FILE AS DEVICE** **DELETE FILE** **COPY THE FILE**
File File loaded		**UNLOAD FILE** **SAVE ALL PARAMETERS** **REFRESH ALL PARAMETERS FROM FILE** **MAKE A REPORT** **DELETE FILE** **COPY THE FILE**

Loading a device (online mode)

Right click on the port and select “Find all transmitters” if you don’t know its address or select “Find transmitter” with the good address.

Finding a transmitter with address 0



You will see the communication indicators flashing. If “Recv” indicator turns in green a device is detected and is sending frame.

Please mind :

- For the point to point communication the address (poll address) is always “0”.

- **FOR COMMUNICATION IN MULTIDROP MODE THE ADDRESSES FROM 1 TO 15 HAVE TO BE PROGRAMMED.**

IF A DEVICE IS DETECTED A NEW ITEM IS CREATED UNDER THE COMMUNICATION PORT ITEM.

Example of generic device :

Example of FCX device :

The item is defined with

A ICON ?

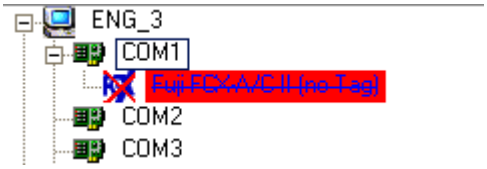
- the manufacturer name — Fuji
- the device name — FCX-A/C II
- the tag — BON

If the device is not especially implemented in the software, it can be manage in generic mode. The icon is ?. Otherwise, if the device is fully implemented, like "FUJI FCX pressure transmitter", the icon is .

Device in error :

If a device is detected and a diagnostic problem occurs during the detection, the textual information is barred.

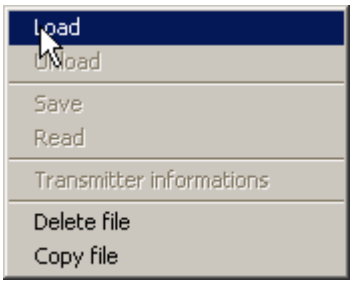
You will see



Loading a device in offline mode

Introduction
Offline mode allows you to work on a file that contains all the parameters of a device of any kind. Those files are created by using a connected device and saving all its parameters. You can modify the parameters inside that file directly, like if the device were connected. After, you can download your file to a device of the same kind.

To load a device
You have to select a file under the root named “Offline”, right click and select “Load” option.



The file is loaded exactly like if the device was really connected. You can modify settings values and save them. The main differences are :

THE CONTEXTUAL MENU IS SPECIFIC TO THE OFFLINE MODE, NOT TO THE DEVICE KIND. SO, YOU CAN’T DO SELF TEST, LOOP TEST …

THE INPUT OUTPUT FUNCTIONS ARE DIRECTED TO AND FROM THE FILE INSTEAD OF THE DEVICE. USUALLY, PARAMETER VALUES ARE CHECKED (AND MAY BE REJECTED) BY THE DEVICE. IN OFFLINE MODE, INCORRECT VALUES OR COMBINATIONS CAN’T BE DETECT. YOU WILL GET AN ERROR ONLY WHEN YOU WILL DOWNLOAD THE FILE TO A DEVICE.

Working on a device

In online and offline, you can work on a device by selecting it and open a contextual menu with a right click.

Working in generic mode

Introduction

The “Fuji Hart Explorer” is able to manage any kind of Hart devices. If a device is fully implemented, the software give you access to device specific functions. Otherwise, you can work in generic mode. It does mean that you can only use Hart generic functions. In the future, Fuji can develop plug in for implementing new device.

Parameters panels

The parameters are group by panel. You can select a group by clicking on the associated button. In generic mode, there are 4 parameters panels.

HART GENERAL INFORMATIONS PANEL

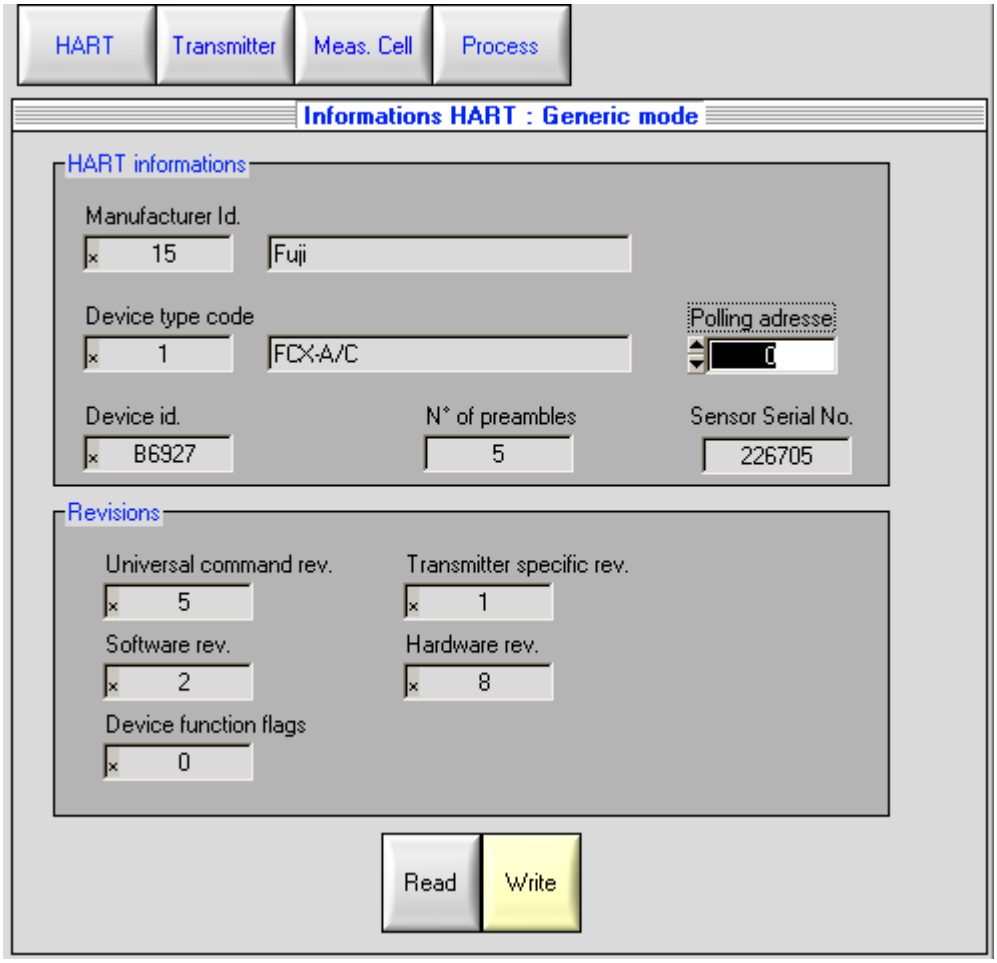
TRANSMITTER / DEVICE INFORMATIONS PANEL

MEASUREMENT CELL INFORMATIONS PANEL

PROCESS INFORMATIONS PANEL

The panels are refreshed only if necessary, and commands are sent to the device to take back needed data. Only readable data are dimmed. When you change a writable parameter, the “Write” button become available. At any time, if you need to read back data, click on read button.

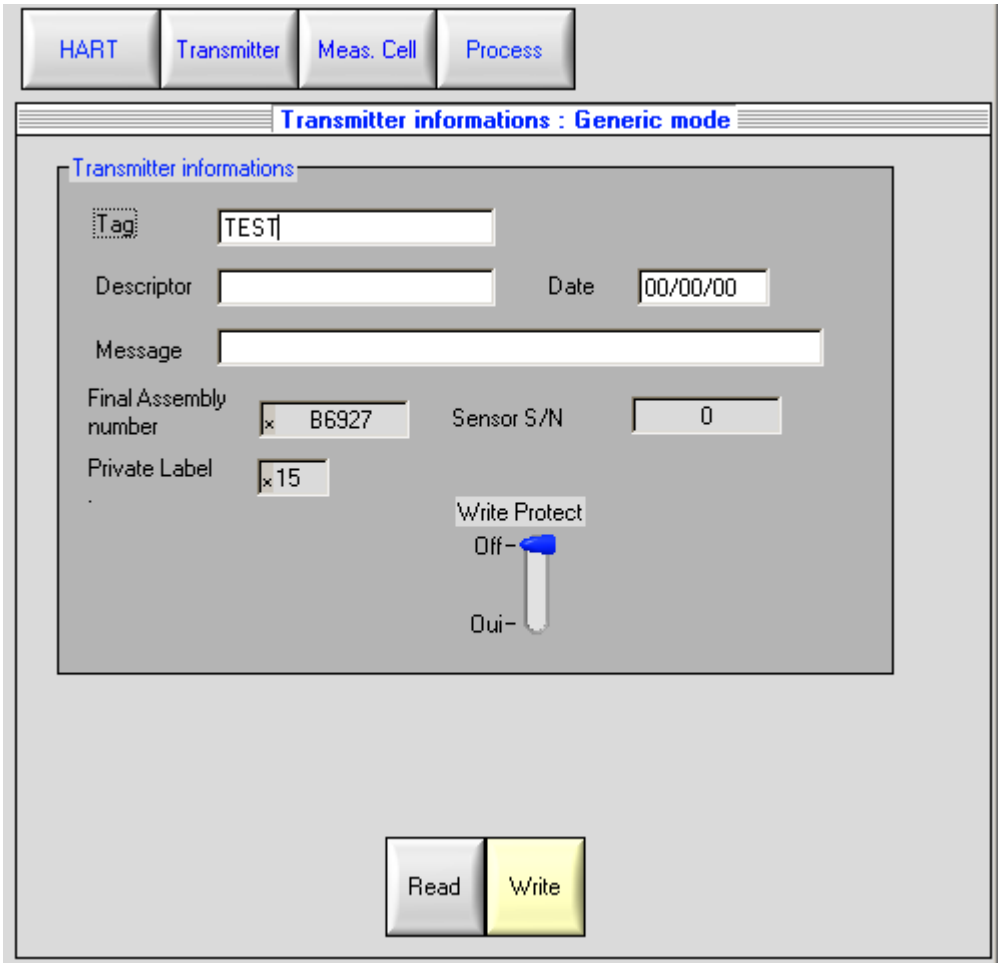
HART general information panel



Hart general information	
Manufacturer Id	Official code of the manufacturer in hexadecimal. The next field is the name associated .
Device type code	Official code associated with the device. (in hexadecimal). The next field is its name.
Polling address	Address of the device. (selectable, see page 19)
Device id.	Device Code identification.
N° of preambles	Number of preambles used by the device
Sensor Serial No.	Serial Number of the sensor
Revisions	
Universal command rev.	
Transmitter command rev.	
Software command rev.	
Hardware command rev.	
Device function flags	

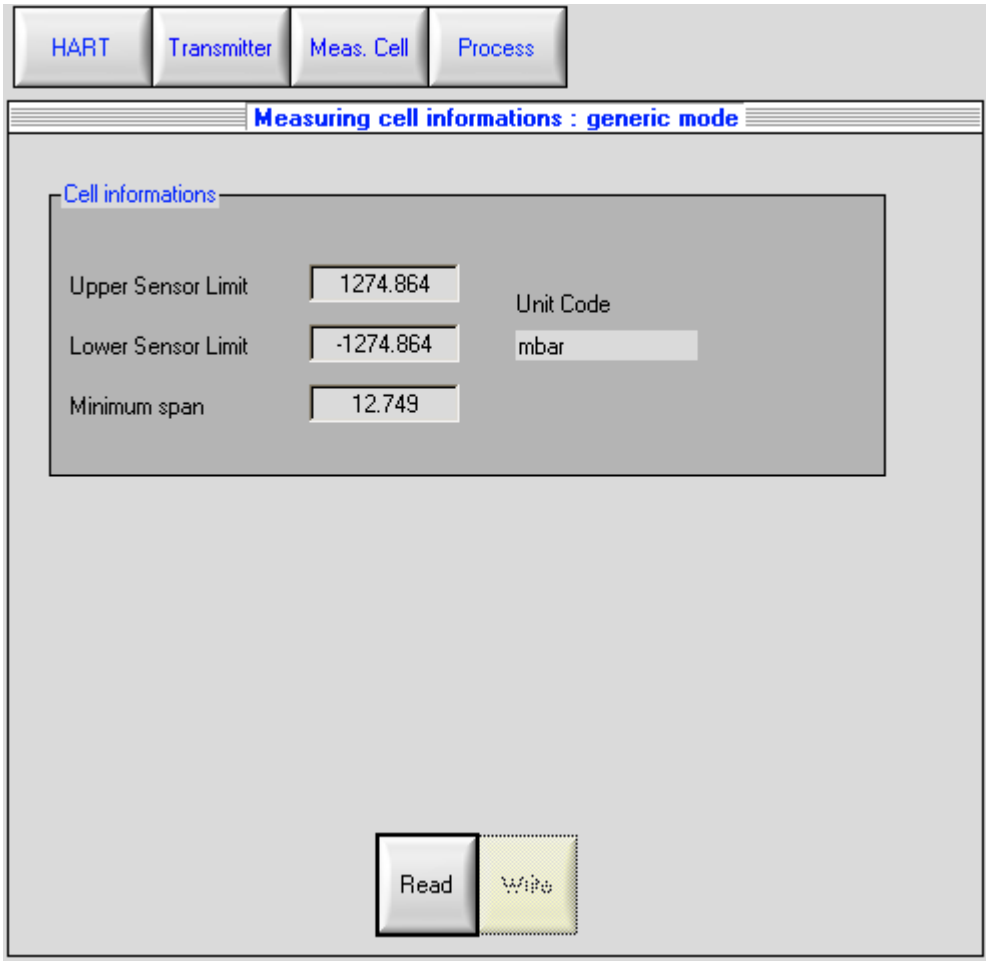
Warning : if you change the “polling address” parameter, it’s recommended to restart the application.

Transmitter information panel



Transmitter information	
Tag	Tag number of the measuring device
Descriptor	Description of the measuring point
Date	Date
Message	Possible message can be written in 32 digits
Final Assembly number	
Sensor S/N	
Private Label	
Write Protect	Enables or inhibits the write function in the different panels

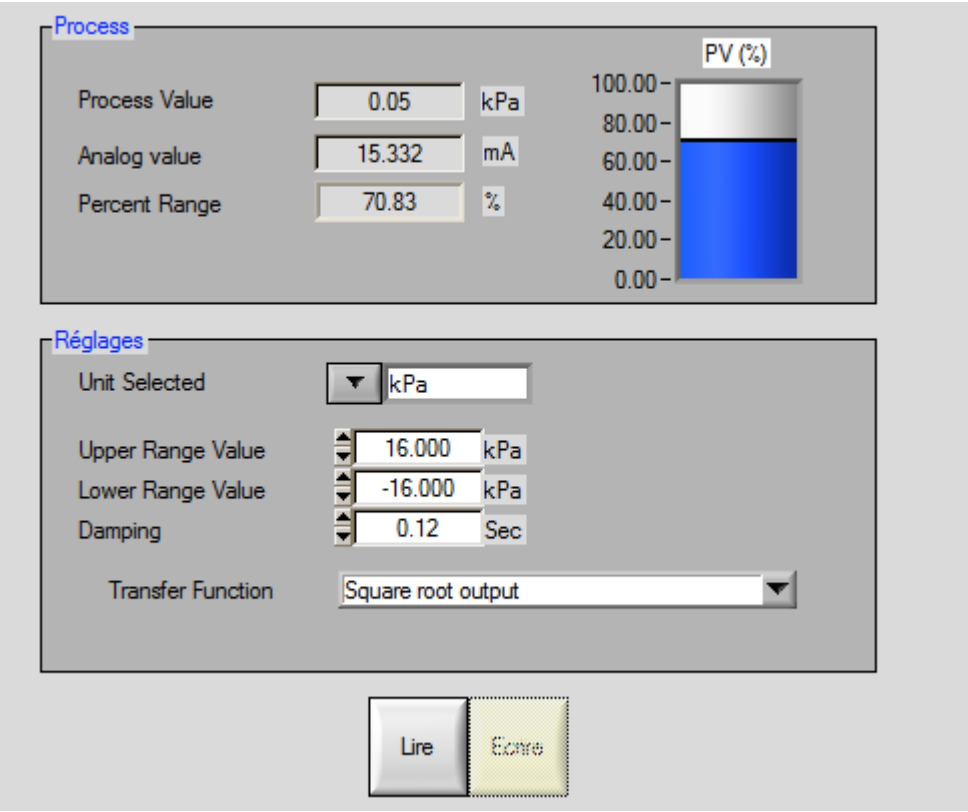
Measurement cell information panel



Measurement cell information	
Upper sensor limit	Maximum setting limit
Lower sensor limit	Minimum setting limit
Minimum span	Minimum span
Unit code	Unit (can not be changed)

Please mind :
Upper/lower sensor limit corresponds to the interval between upper and lower sensor limits for the possible setting of the span of the measuring device. This interval does not correspond to the max. range of the device.

Process information panel

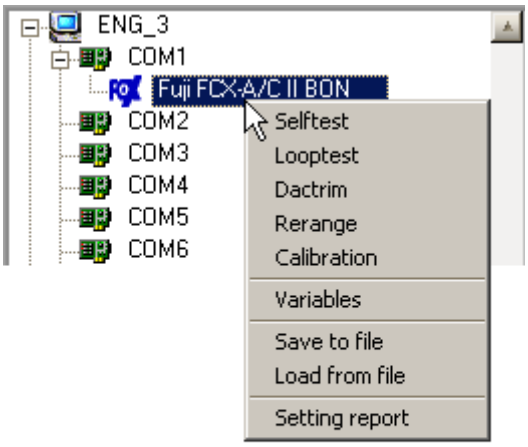


Process information	
Process value	Process value indicated in the programmed unit
Analog value	Analog output signal
Percent range	Output in % - also indicated on the bar graph
Unit	Programmable unit for the software
URV	Upper range value (20mA)
LRV	Low range value (4 mA)
Damping	Damping of the output signal
Transfer function	Not supported by the Hart protocol in generic mode

Device functions

Introduction

You can access the device functions in online mode by right clicking on the device item in the tree view.



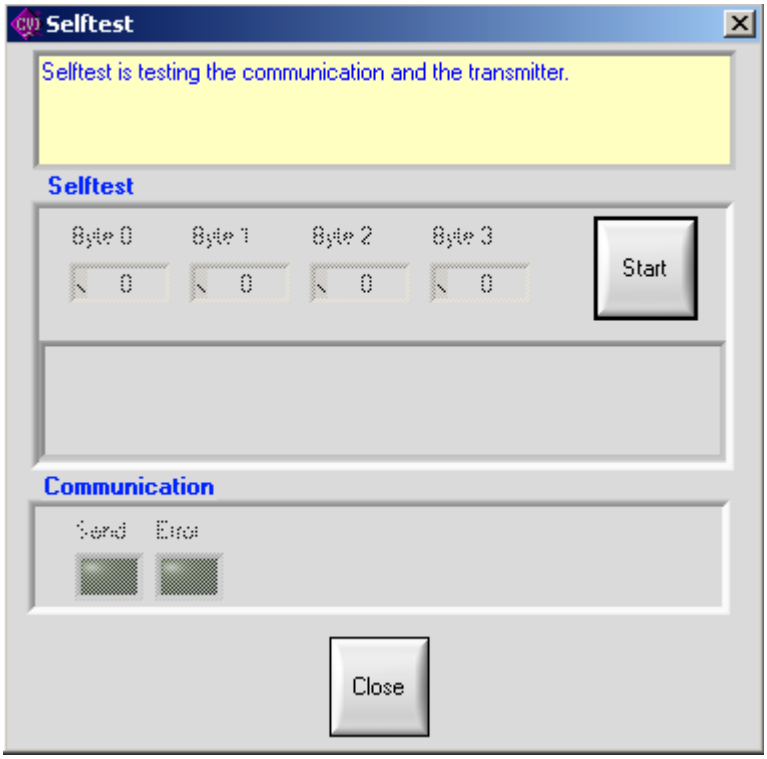
Self test function

Introduction

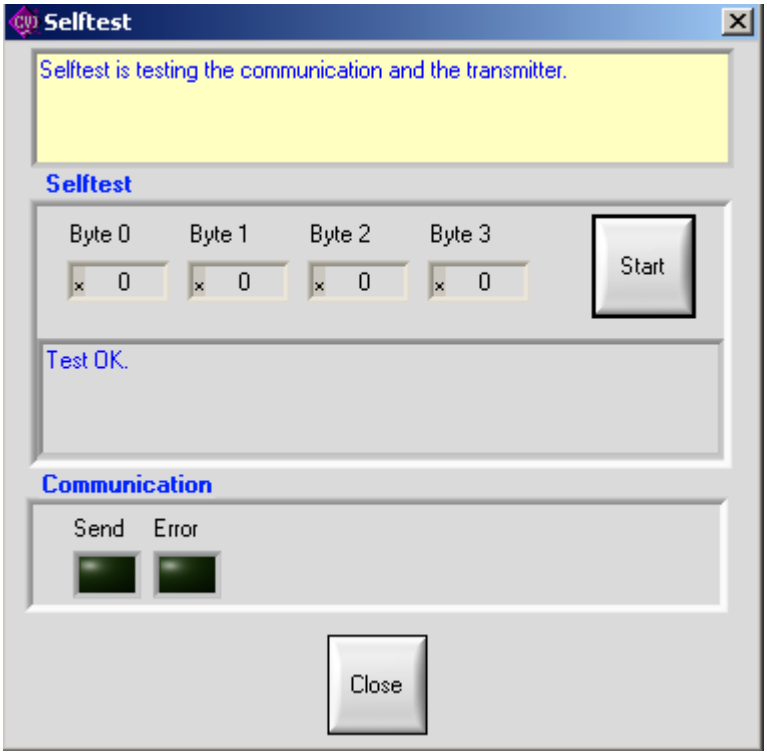
Initiates the Self-test function in the device. The device responds immediately to the command and then performs the Self Test. Refer to the device specific Hart documentation for specific implementation details.

Procedure

This panel is very simple. Just click on start button to proceed the test.



After the test, you can read the 4 status bytes. Please refer to the Hart documentation of the device to get the meaning of those status bytes.



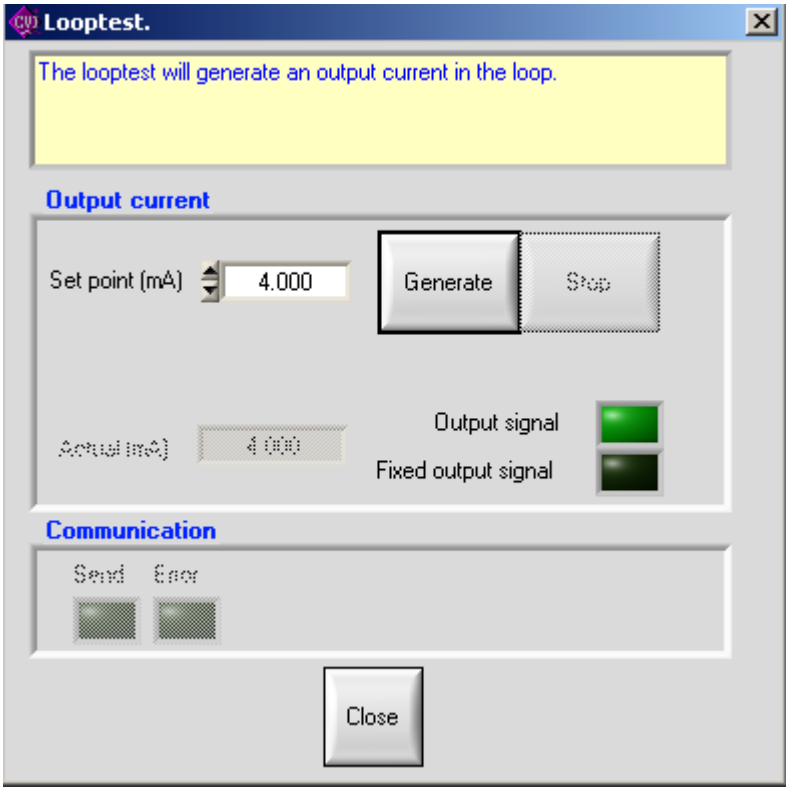
Loop test function

Introduction

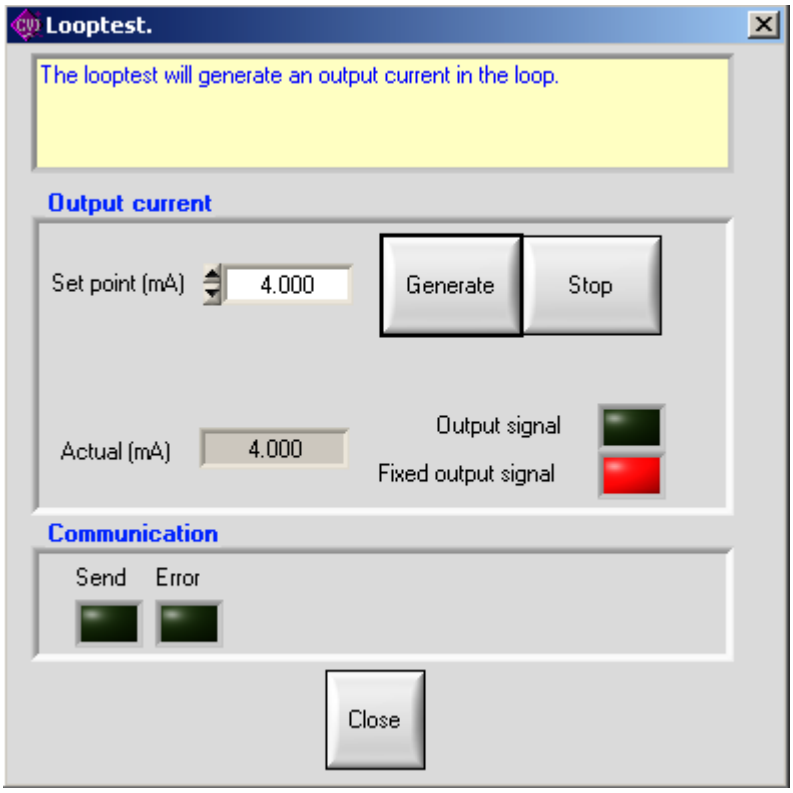
This test will fix the analog current at specified value.

Procedure

Type in the set point value, and click on generate button :



The device is in fixed output signal and the actual value is displayed. Click on stop button or close button to go back in output signal.



Dactrim function

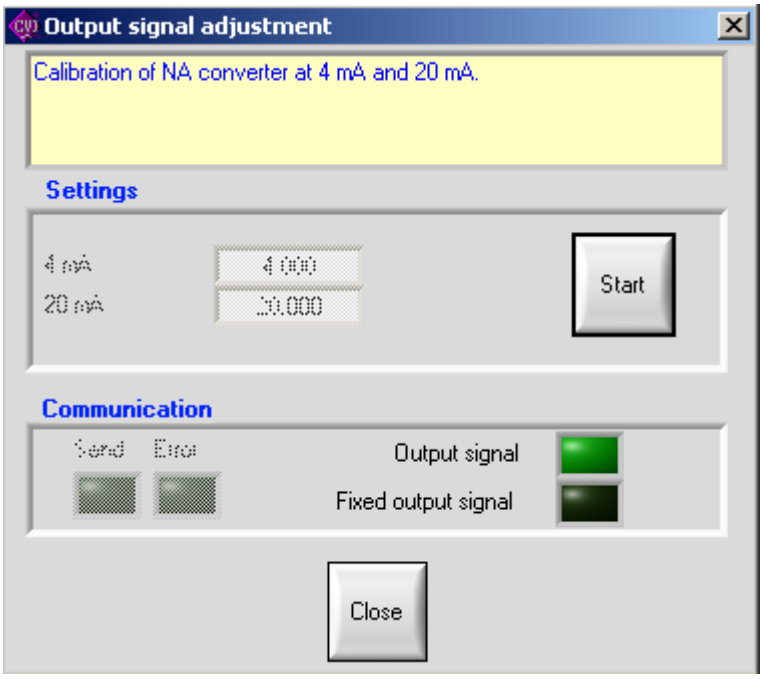
Introduction

This function will adjust the output signal. It will

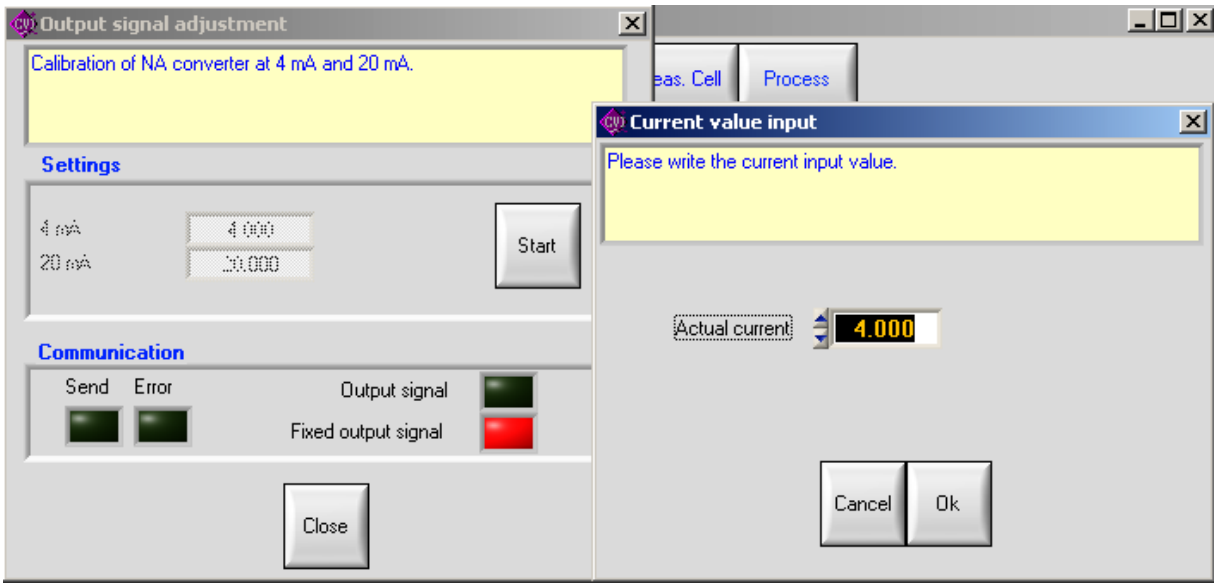
TRIM THE ZERO OR 4 MILLIAMP POINT OF THE DIGITAL TO ANALOG CONVERTER SO THAT THE CONNECTED CURRENT METER READS 4 MILLIAMP.

TRIM THE GAIN OR 20 MILLIAMP POINT OF THE DIGITAL TO ANALOG CONVERTER SO THAT THE CONNECTED CURRENT METER READS 20 MILLIAMP.

Procedure



When clicking on START button, the following window is displayed.



Enter the output signal displayed on the milliamp – meter connected to the transmitter in the “actual current” space.

- first for the LRV
- next for the URV

Calibrate the output signal only with a high accurate milliamp – meter (3 digits after the point)
Close the window on “Close” button.

Re range function

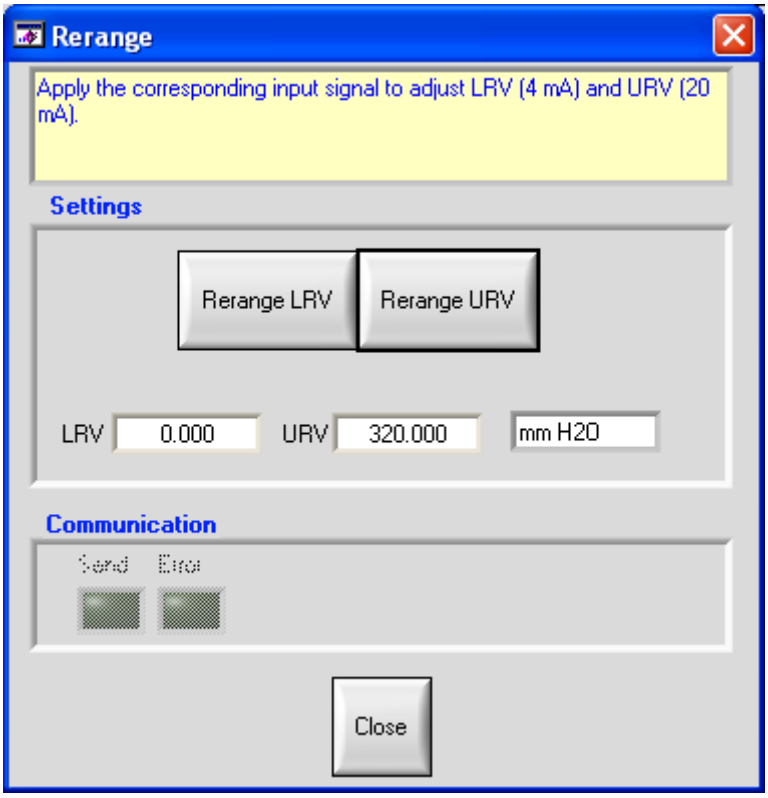
Introduction

This function is mainly used for an easy adjustment of the zero elevation or suppression for example on a liquid level measurement.
The reference pressure needs to be applied on the transmitter for zero and adjusted span to use this function. (for example : wet leg has to be filled for a level measurement)
When the zero elevation/suppression (on Rerange LRV button) is adjusted, the calibrated span will also be elevated or suppressed of the same value than the zero.

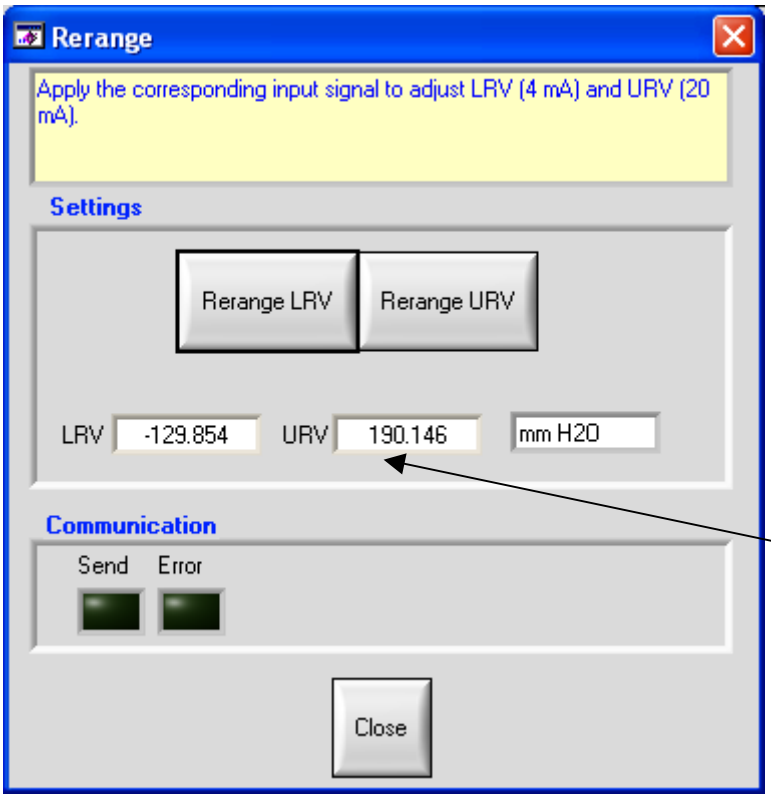
Procedure

Mount the transmitter in the application condition.
Click on Rerange LRV for the 4 mA output adjustment (reference pressure is required)
Click on Rerange URV for the 20 mA output adjustment (reference pressure is required)
Close the window after adjustment.

Example : Transmitter before Re ranging of LRV for zero suppression or elevation :



Example : Zero elevation is done by clicking on LRV button :



Please mind LRV and URV values showing the zero elevation without changing the transmitter span

Process values monitoring function

Introduction

This panel allows you to monitor the process values. The maximum duration depends on your free disk space.

You can set the following parameters :

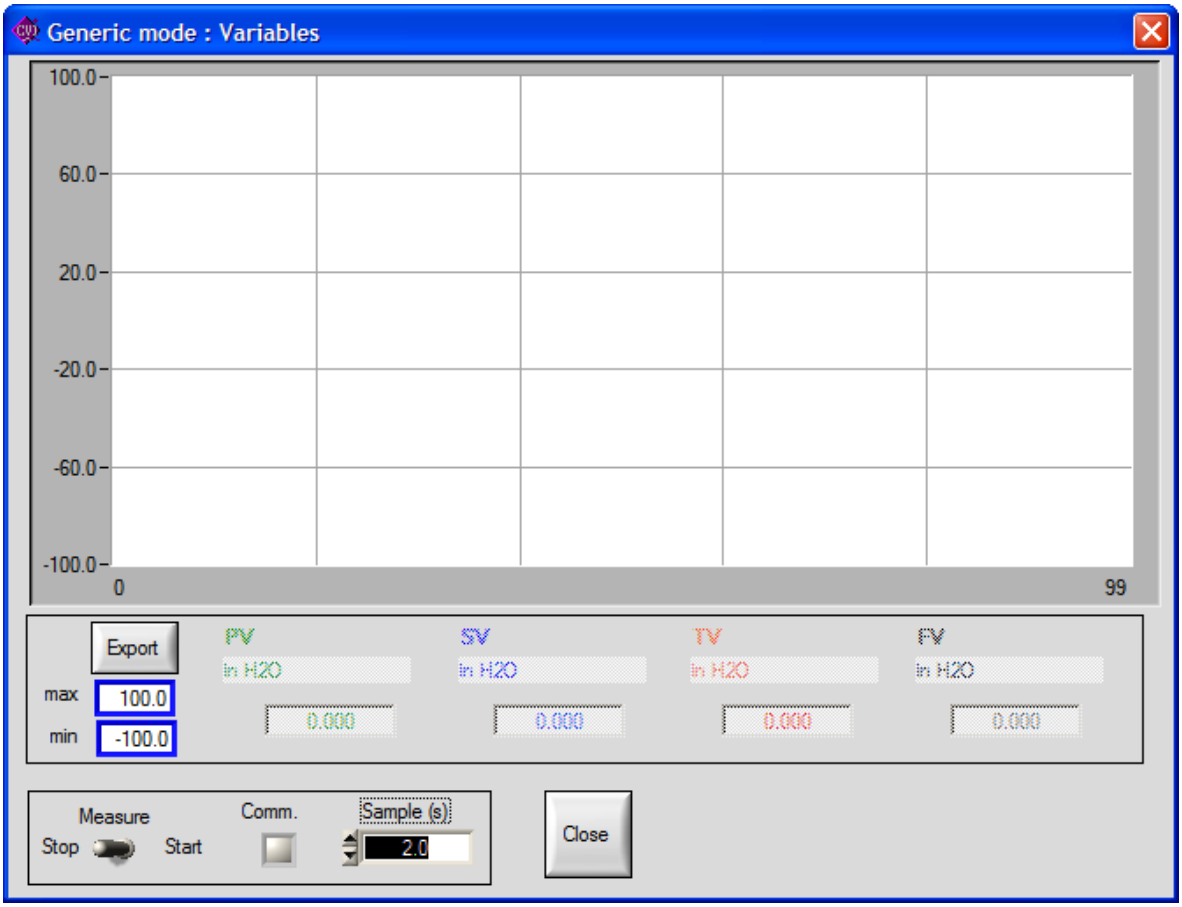
SAMPLE (IN SECOND)

MINIMUM AND MAXIMUM AXIS VALUES OF THE GRAPH

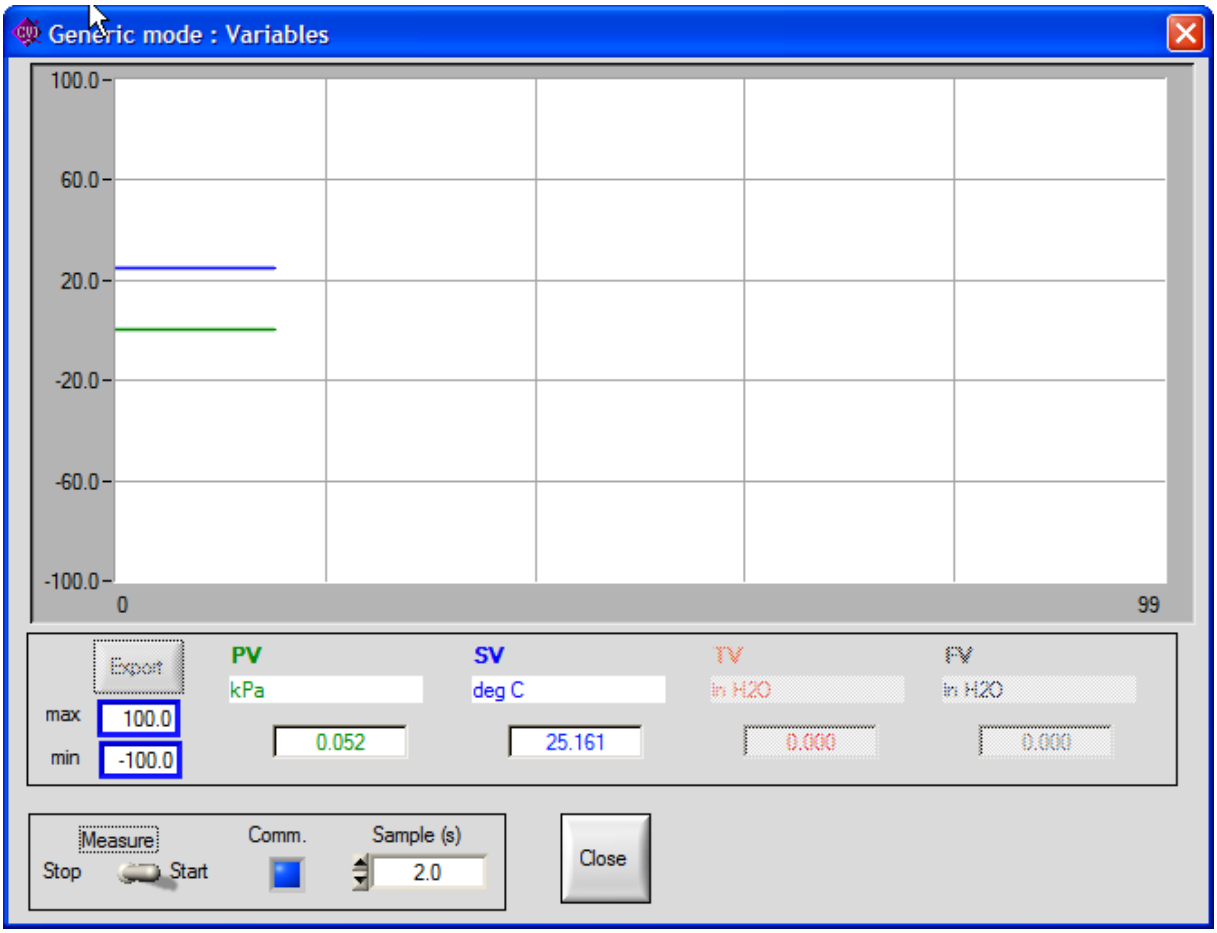
After the monitoring, you can export data to a CSV (Comma Separated Value) file compatible with Excel.

Procedure

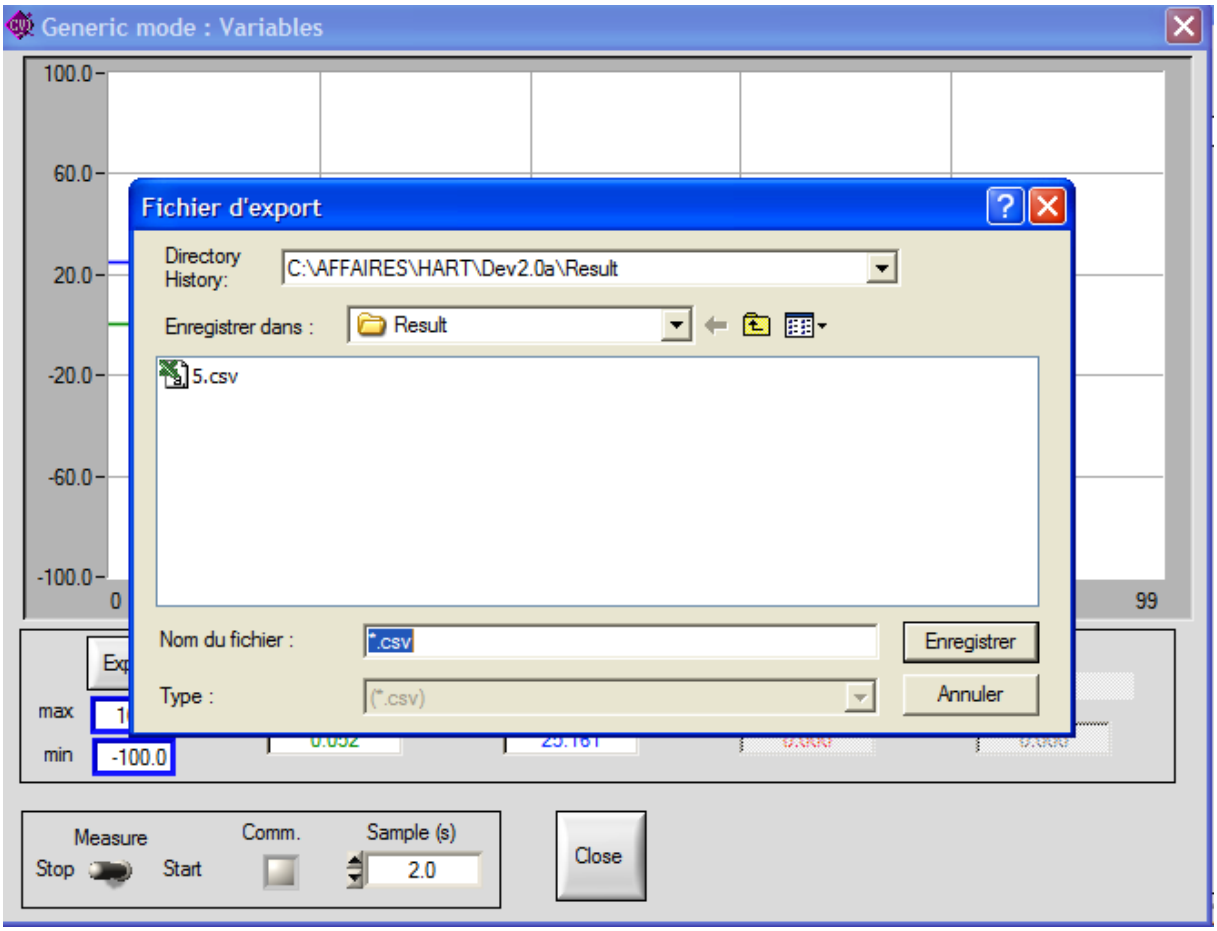
Set the parameters and click on start button.



Example of monitoring every 2 seconds.



Click on stop button, stops the monitoring. Export button is available. If you click on it, you will be asked to name the file.


Generic mode : Variables
100.0
60.0
20.0
-20.0
-60.0
-100.0
0
99
Fichier d'export
Directory History:
C:\AFFAIRES\HART\Dev2.0a\Result
Enregistrer dans :
Result
5.csv
Nom du fichier :
*.csv
Enregistrer
Type :
(*.csv)
Annuler
max
min
-100.0
Measure
Stop
Start
Comm.
Sample (s)
2.0
Close

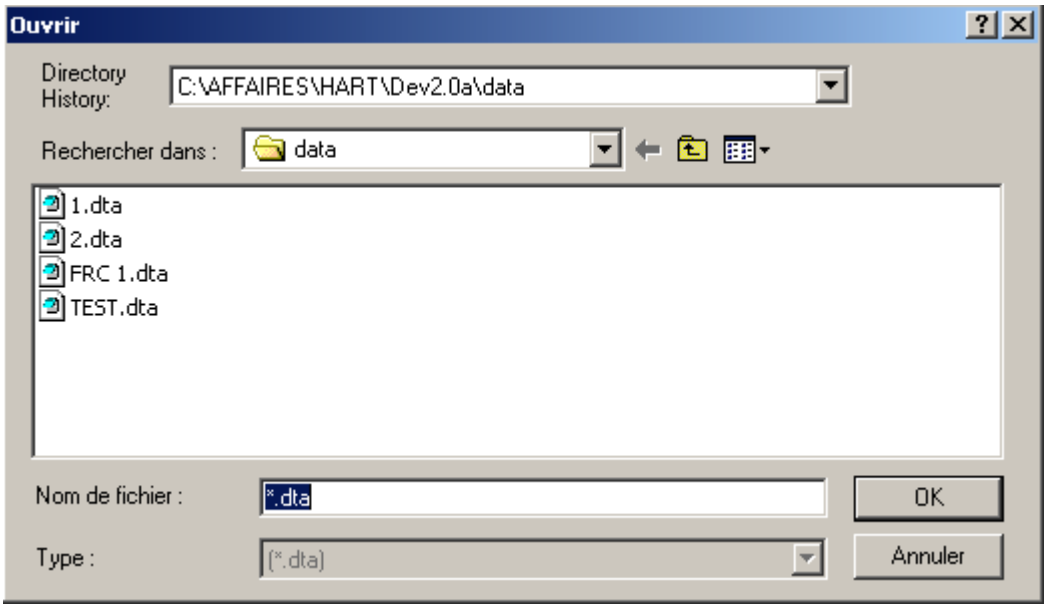
Saving parameters function

Introduction

This function allows you to save all the parameters displayed in the panels into a file. After that operation, you can download the file in the device or work on it using the offline mode.

Procedure

Select the menu and choose a name file.



The saved parameter file will be displayed in the tree view under “off line”.

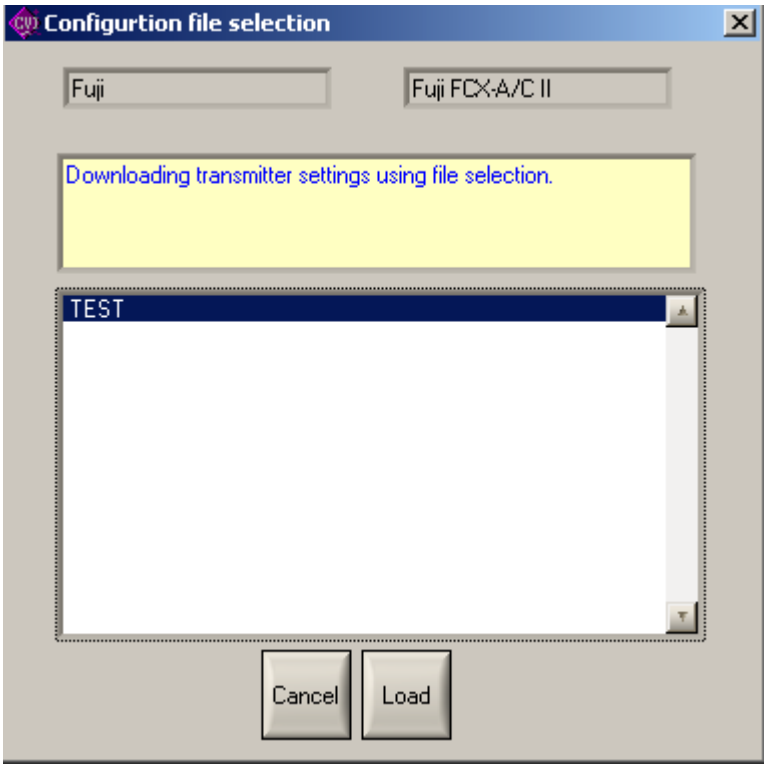
Loading parameters function

Introduction

This function allows you to write all parameters already saved into an existing device. Only the parameters of saved transmitter configurations are displayed in the panels.

Procedure

Select the function and choose the file corresponding to the kind of your device.



Load an transmitter configuration by clicking on the Load button.

Warning: it's impossible to load a parameter file if you don't use the same language.

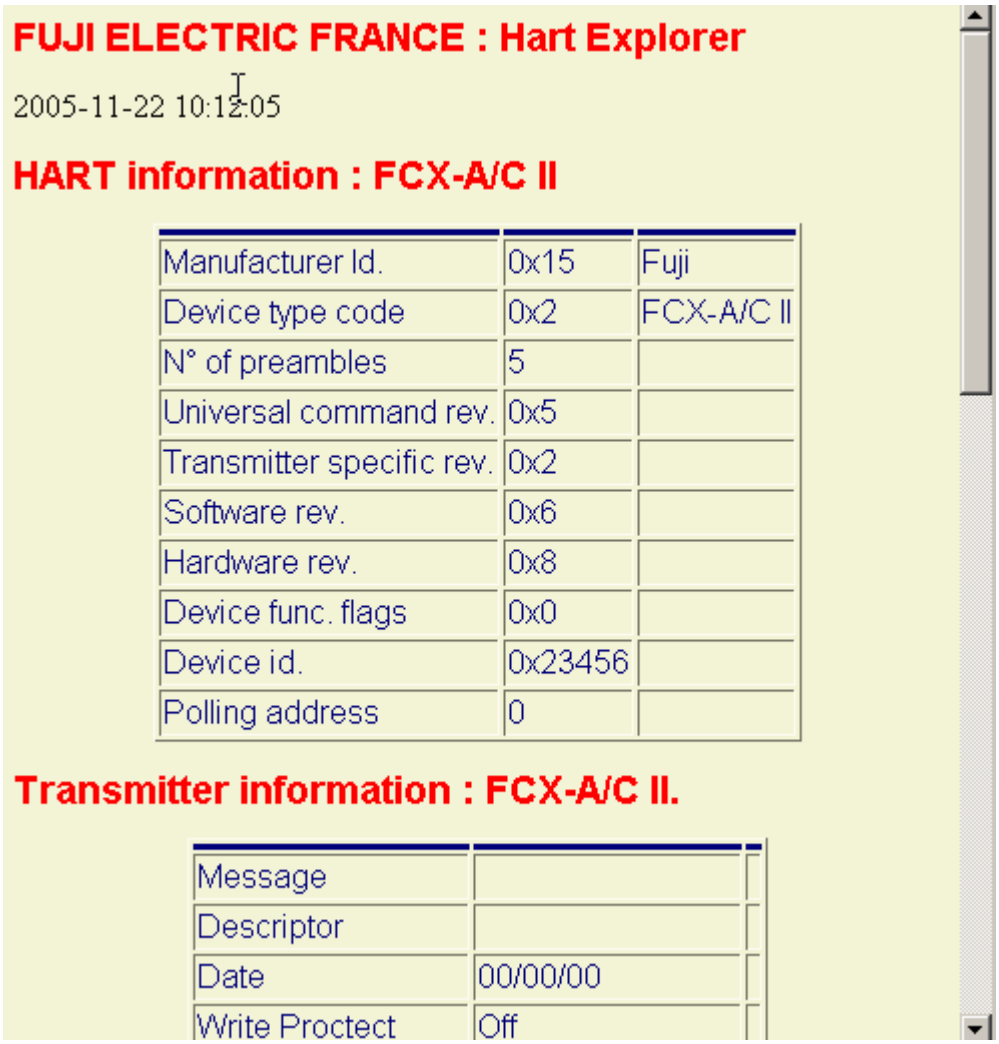
Parameters reporting function

Introduction

The report function is useful for taking a picture of your parameters. This function displays the parameters of all the panels into your browser. So you can print it, saved it using your browser.

Procedure

After selection in the menu, a new window is opened in your browser. You can see a title and a 3 column tab of parameters for each panel. The tab show you the parameter description, value and value meaning.



FUJI ELECTRIC FRANCE : Hart Explorer

2005-11-22 10:12:05

HART information : FCX-A/C II

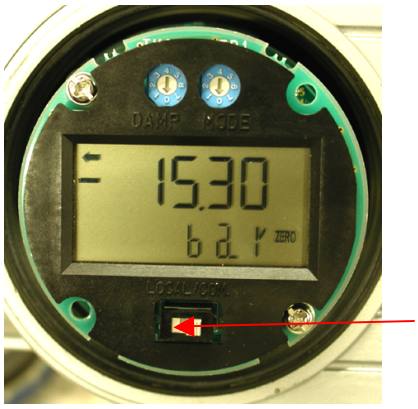
Manufacturer Id.	0x15	Fuji
Device type code	0x2	FCX-A/C II
N° of preambles	5	
Universal command rev.	0x5	
Transmitter specific rev.	0x2	
Software rev.	0x6	
Hardware rev.	0x8	
Device func. flags	0x0	
Device id.	0x23456	
Polling address	0	

Transmitter information : FCX-A/C II.

Message	
Descriptor	
Date	00/00/00
Write Proctect	Off

Working with a “Fuji FCX A-C II pressure transmitter”

Please mind : If the transmitters has the local LCD indicator option, please check that the switch “LOCAL/COMM” is in COMM position.



LOCAL/COMM switch

Introduction

The “Fuji Hart Explorer” includes a plug in for totally implementing the device “Fuji FCX A-C II Pressure Transmitter”.

Parameters panels

The parameters are grouped by panel. You can select a group by clicking on the associated button. There are 5 parameters panels.

HART GENERAL INFORMATION PANEL

TRANSMITTER / DEVICE INFORMATION PANEL

MEASUREMENT CELL INFORMATION PANEL

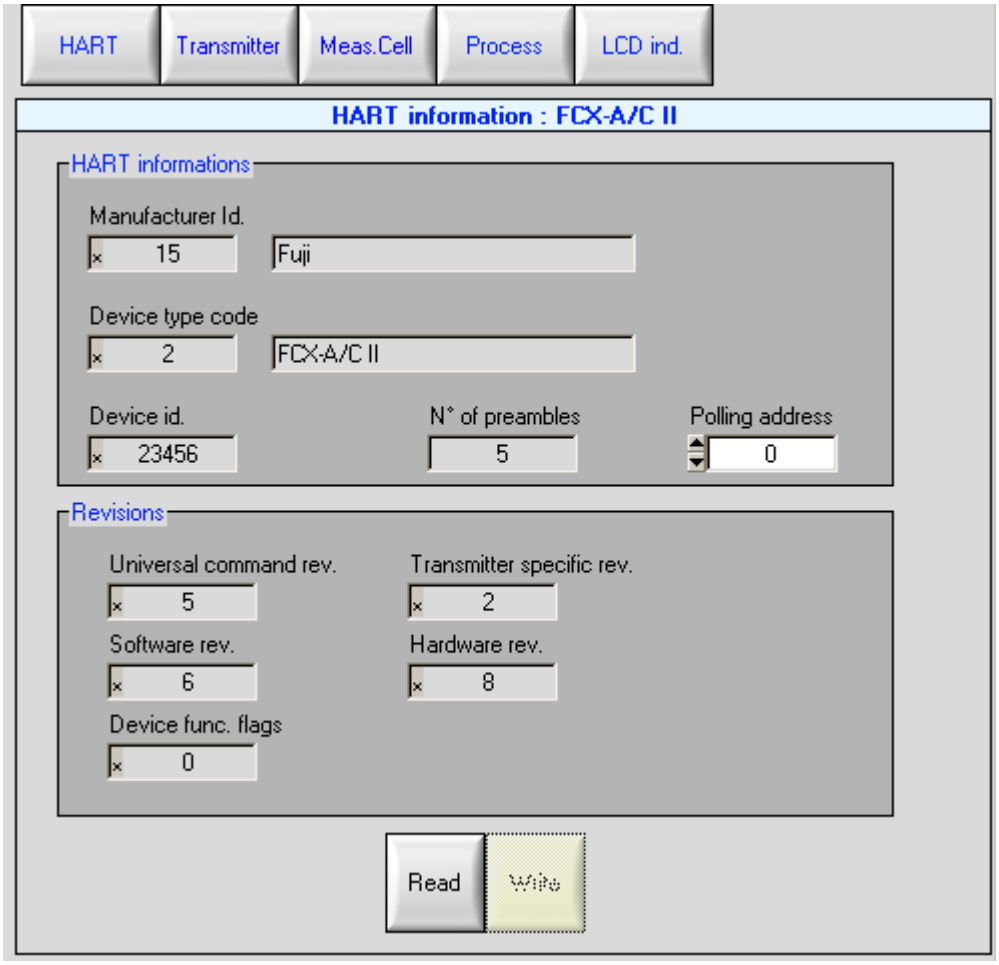
PROCESS INFORMATION PANEL

LDC INDICATOR PANEL

The panels are refreshed only if necessary, and commands are sent to the device to take back needed data. Fields associated with only readable data are dimmed. When you change a writable parameter, the “Write” button becomes available to really write the data. At any time, if you need to read back data, click on read button.


Read
Write

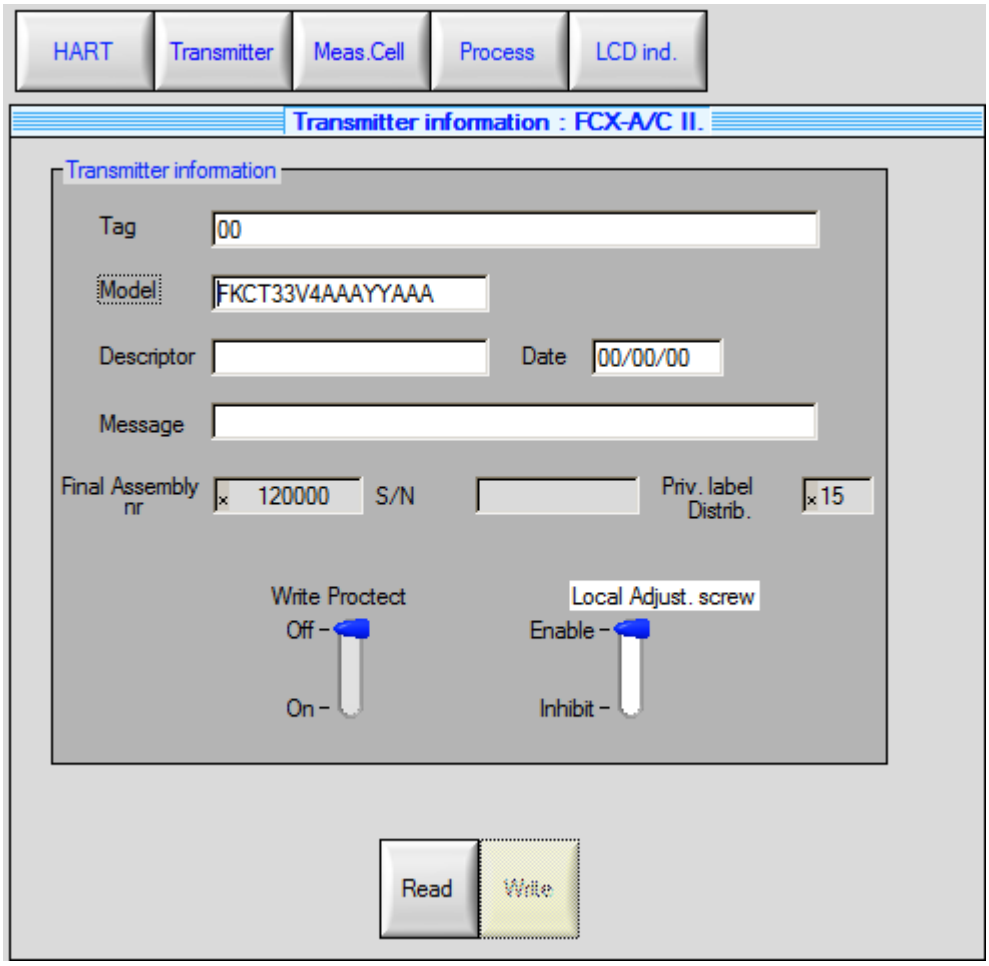
HART general information panel



Hart general informations	
Manufacturer Id	Official code of the manufacturer in hexadecimal. The next field is the name associated.
Device type code	Official code associated with the device. (in hexadecimal). The next field is its name.
Polling address	Address of the device. (selectable, see page 19)
Device id.	Device Code identification.
N° of preambles	Number of preambles used by the device
Revisions	
Universal command rev.	
Transmitter command rev.	
Software command rev.	
Hardware command rev.	
Device function flags	

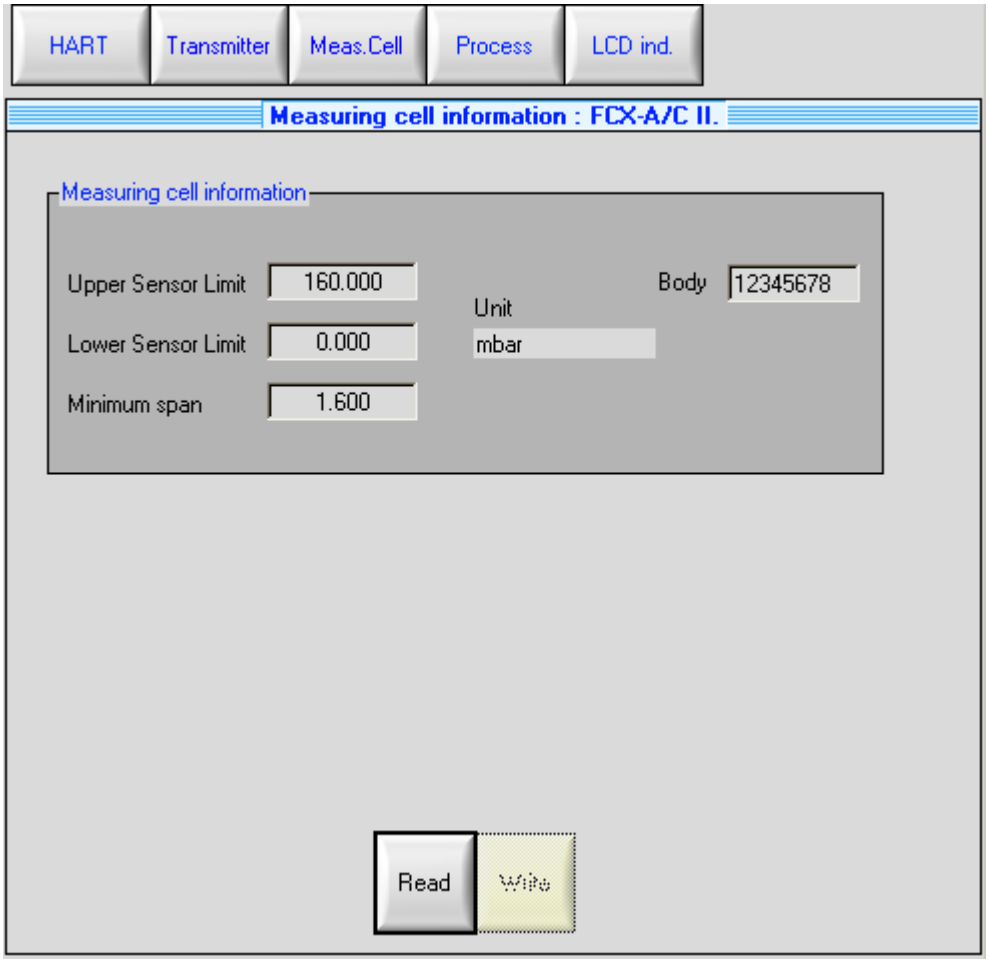
Warning: if you change the “polling address” parameter, it’s recommended to restart the application.

Transmitter information panel



Transmitter information	
Tag	Tag number of the measuring device
Model	Fuji transmitter model number
Descriptor	Description of the measuring point
Date	Date
Message	Possible message can be written in 32 digits
Final Assembly number	
S/N	
Private Label	
Write Protect	Enables or inhibits the write function in the different panels
Local Adjust. screw	Enables or inhibits the adjustment screw on the transmitter electronics housing

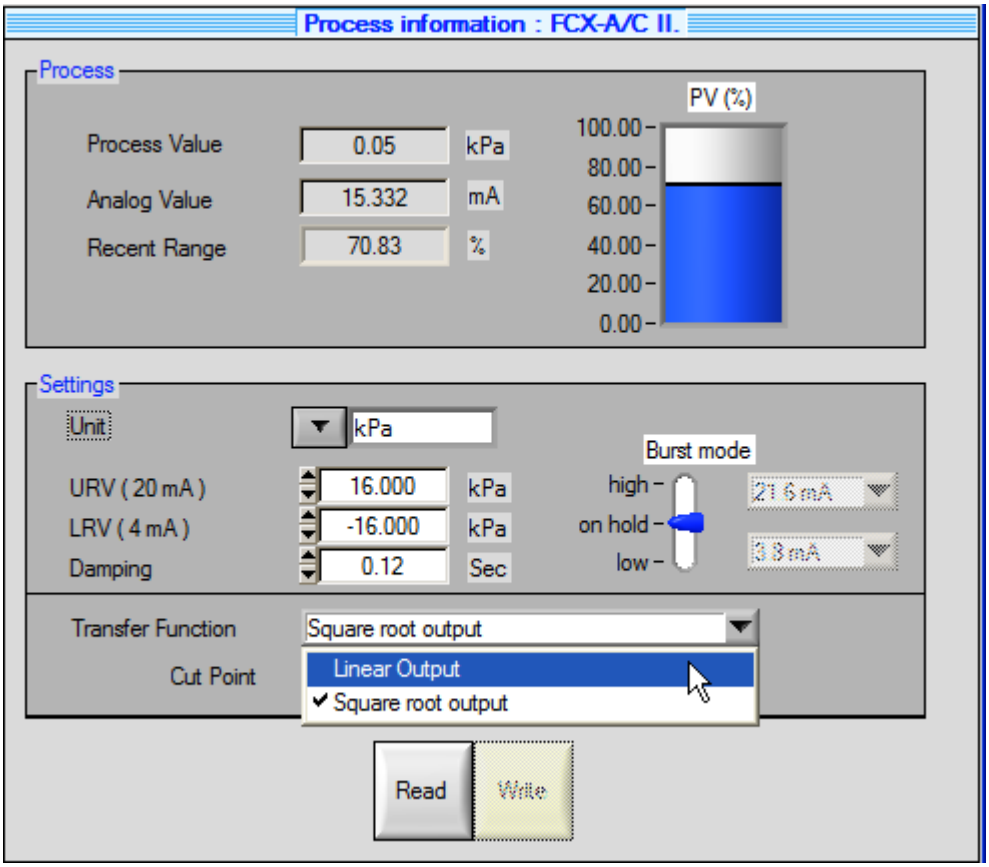
Measurement cell information panel



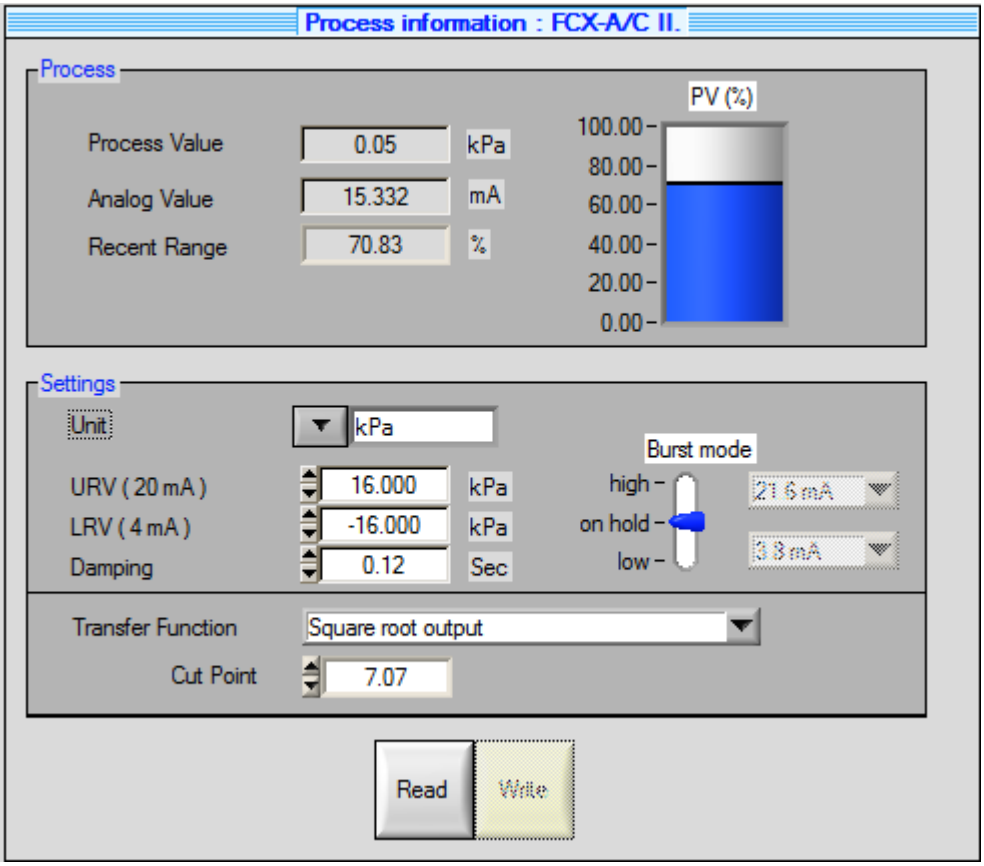
Measurement cell information	
Upper sensor limit	Maximum setting limit
Lower sensor limit	Minimum setting limit
Minimum span	Minimum span
Unit code	Unit (can not be changed)
Body	

Please mind :
Upper/lower sensor limit corresponds to the interval between upper and lower sensor limits for the possible setting of the span of the measuring device. This interval does not correspond to the max. range of the device.

Process information panel

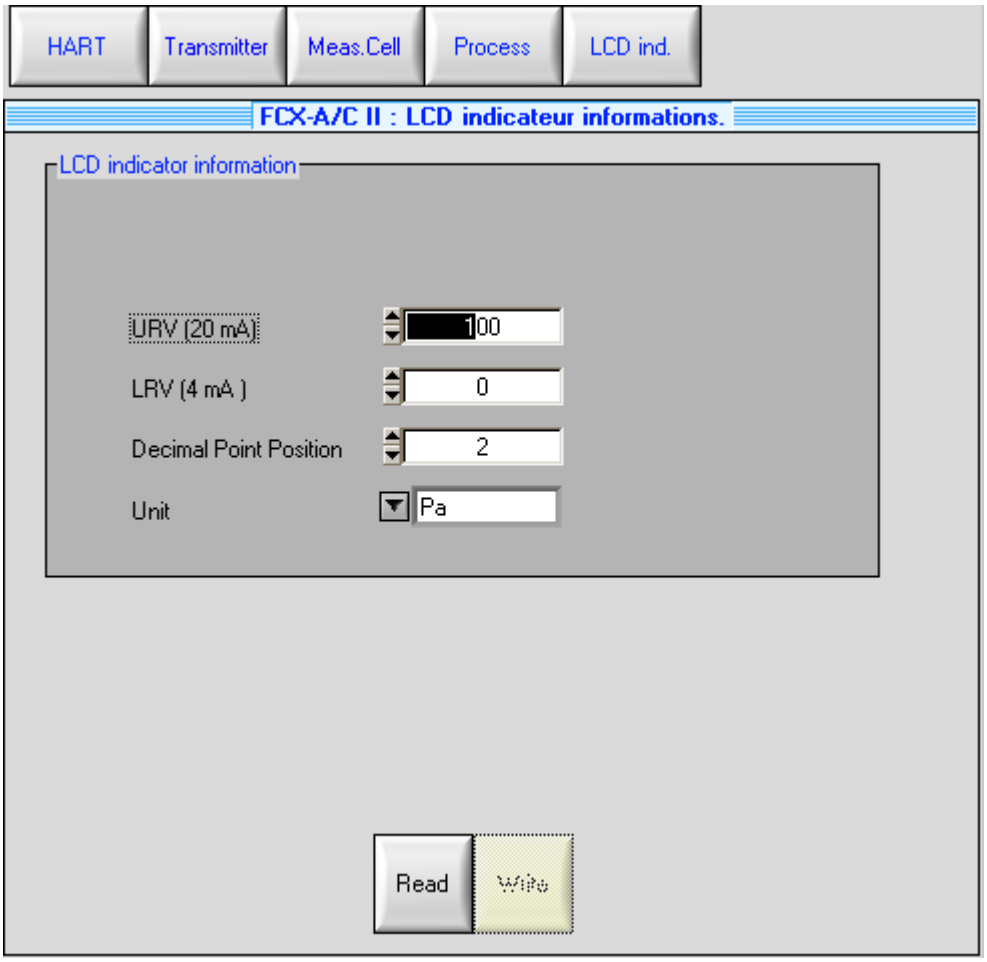


Process information	
Process value	Process value indicated in the programmed unit
Analog value	Analog output signal
Percent range	Output in % - also indicated on the bar graph
Unit	Programmable unit for the software
URV	Upper range value (20mA)
LRV	Low range value (4 mA)
Damping	Damping of the output signal
Burnout	Burnout mode is selectable between high (over scale), hold, and low (under scale). In case on high and low burnout, the burnout values are programmable for high between 20.8 to 21.6 and for low between 3.2 and 3.8 mA output signal
Transfer function	Transfer function allows to program the output signal in linear or square root.
Cut Point	Cut point, (the start of the output signal in square root) for square root output is programmable between 0 and 20% of output.


Process information : FCX-A/C II.
Process
Process Value
0.05
kPa
Analog Value
15.332
mA
Recent Range
70.83
%
PV (%)
100.00
80.00
60.00
40.00
20.00
0.00
Settings
Unit
kPa
URV (20 mA)
16.000
kPa
LRV (4 mA)
-16.000
kPa
Damping
0.12
Sec
Burst mode
high
on hold
low
21.6 mA
3.8 mA
Transfer Function
Square root output
Cut Point
7.07
Read
Write

LCD indicator information panel

The LCD indicator can be configured concerning the values to be indicated and the units.

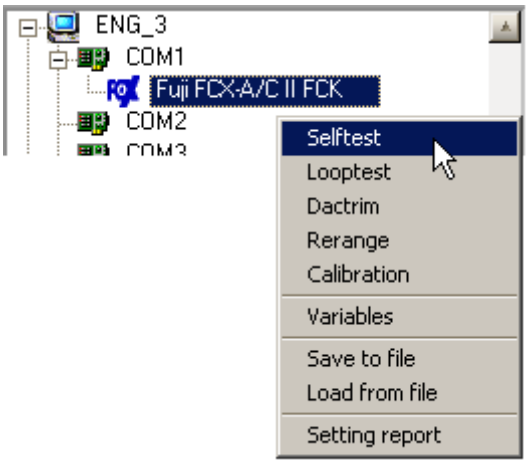


Process information	
URV (20mA)	Indication for 20 mA output signal
LRV (0mA)	Indication for 4 mA output signal
Decimal Point Position	Configure the decimal point position of the indication
Unit	Unit of the indicator A large quantity of LCD indicator units are available for pressure, flow and level indications. If you choose a flow unit, the indicated value will be **automatically a flow indication in square root independent of the output signal** mode. (see transfer function). If a pressure or level unit is programmed, the indication will be linear.

Device functions

Introduction

You can access the device functions in online mode by right clicking on the device item in the tree view.

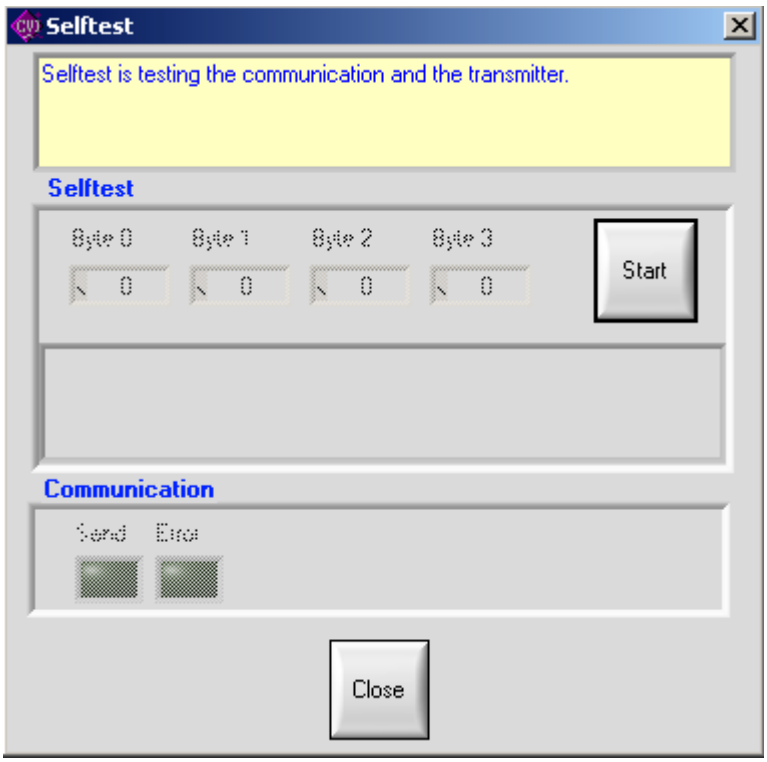


Self test function

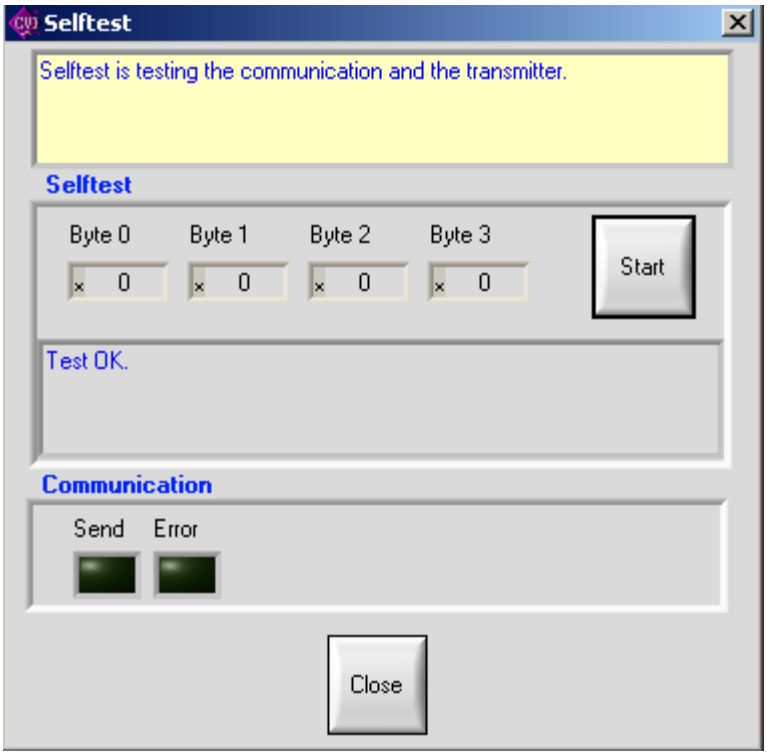
Introduction

Procedure

This panel is very simple. Just click on start button to proceed the test.



After the test, you can read the response code (4 status bytes).



Response code	
0	No command-specific errors
6	Transmitter-Specific command error

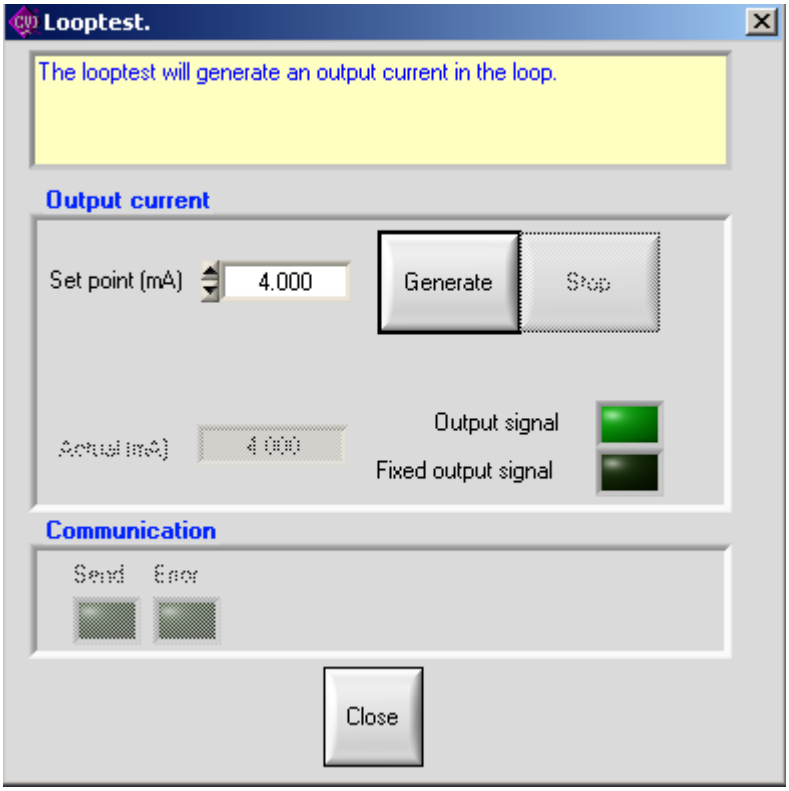
Loop test function

Introduction

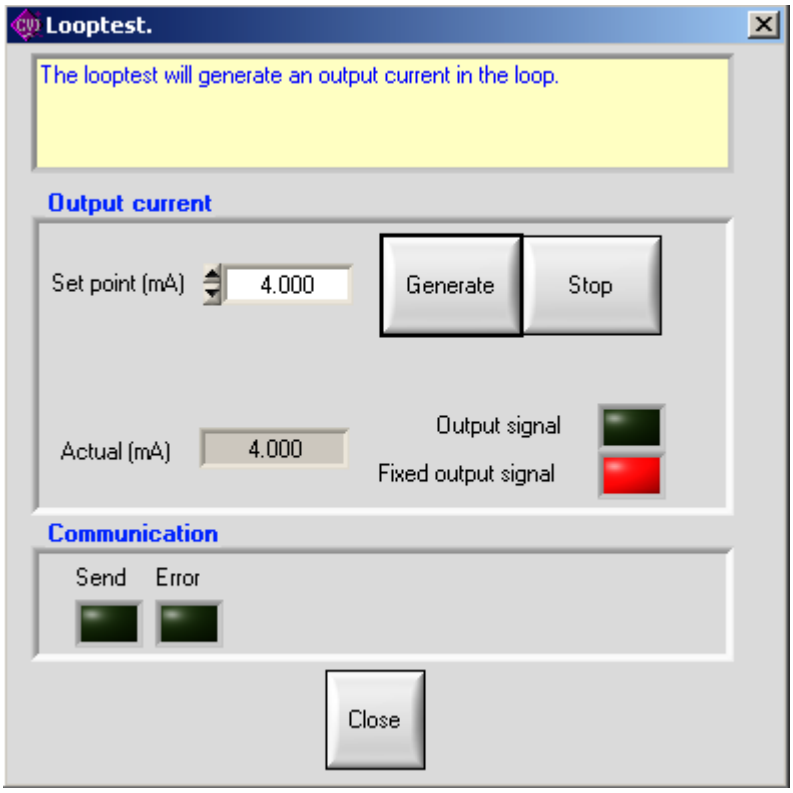
Fix the analog current at specified value.

Procedure

Type in the set point value, and click on generate button :



The device is in fixed output signal and the actual value is displayed. Click on stop button or close button to go back in output signal.



Dactrim function

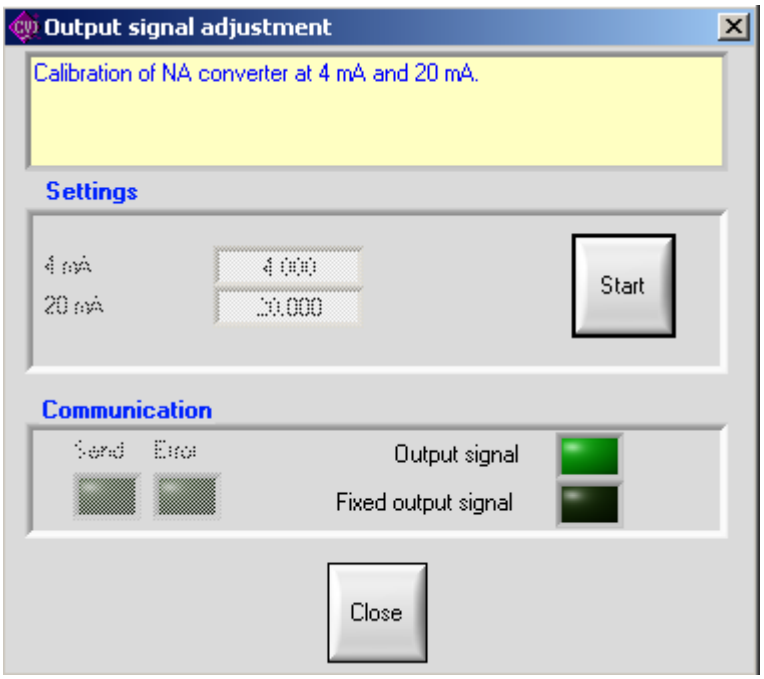
Introduction

This function will adjust the output signal. It will

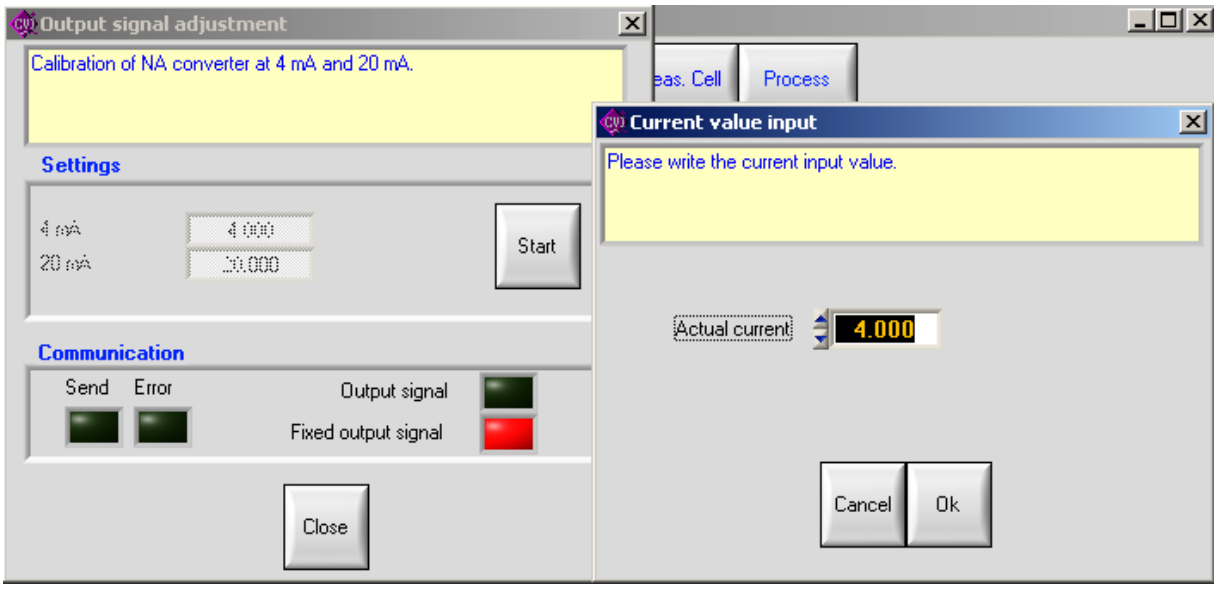
TRIM THE ZERO OR 4 MILLIAMP POINT OF THE DIGITAL TO ANALOG CONVERTER SO THAT THE CONNECTED CURRENT METER READS 4 MILLIAMP.

TRIM THE GAIN OR 20 MILLIAMP POINT OF THE DIGITAL TO ANALOG CONVERTER SO THAT THE CONNECTED CURRENT METER READS 20 MILLIAMP.

Procedure



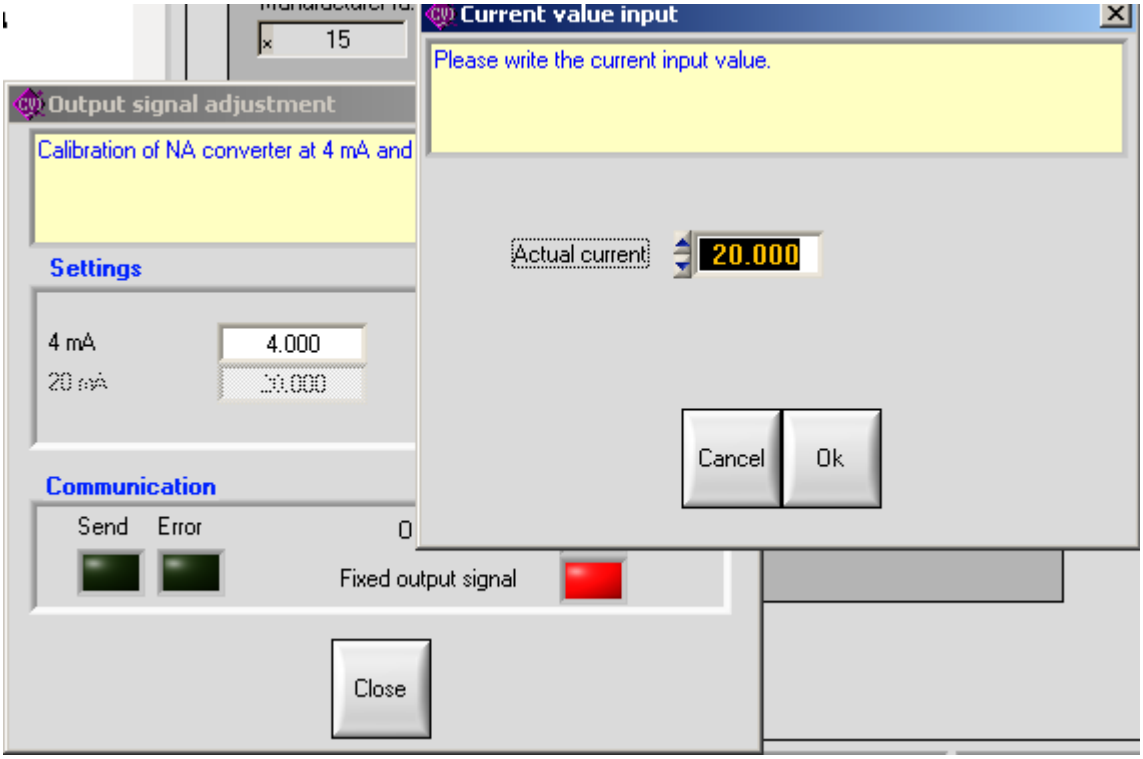
When clicking on START button, the following window is displayed.



Enter the output signal displayed on the milliamp – meter connected to the transmitter in the "actual current" space.

- first for the LRV
- next for the URV

Calibrate the output signal only with a high accurate milliamp – meter (3 digits after the point)
Close the window on "Close" button.



Re range function

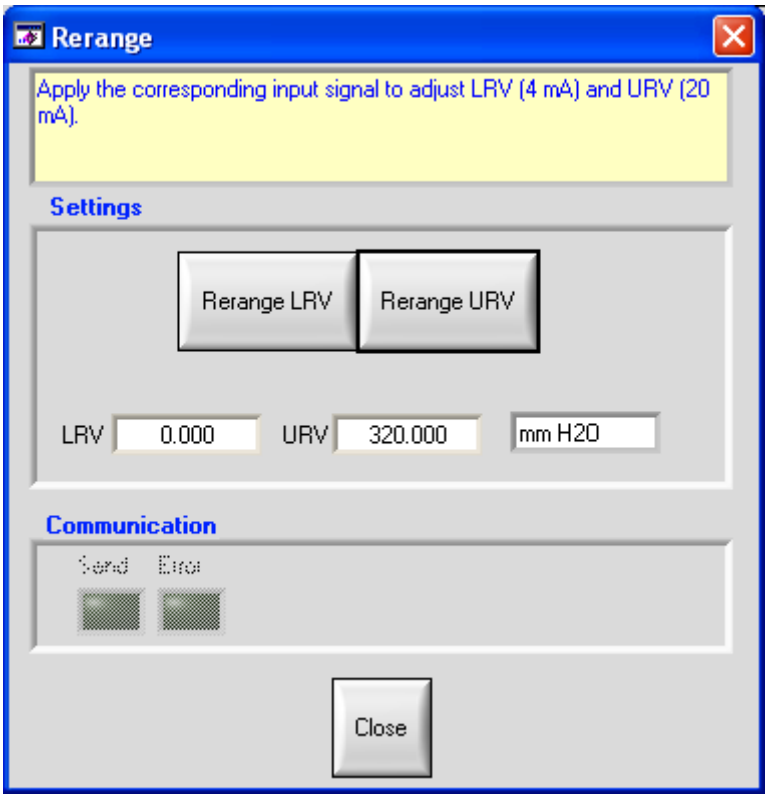
Introduction

This function is mainly used for an easy adjustment of the zero elevation or suppression for example on a liquid level measurement.
The reference pressure needs to be applied on the transmitter for zero and adjusted span to use this function. (for example : wet leg has to be filled for a level measurement)
When the zero elevation/suppression (on Rerange LRV button) is adjusted, the calibrated span will also be elevated or suppressed of the same value than the zero.

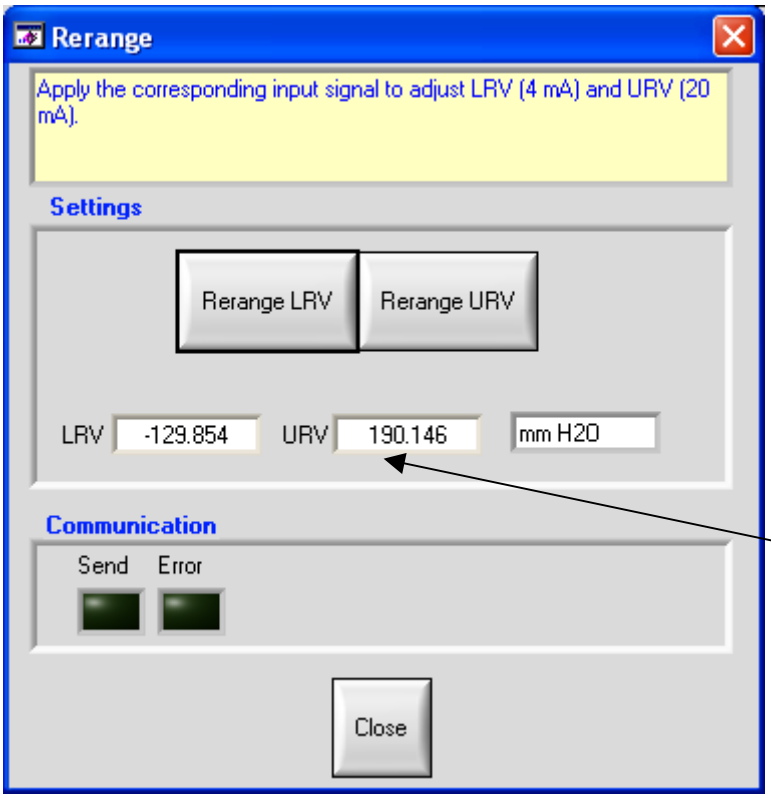
Procedure

Mount the transmitter in the application condition.
Click on Rerange LRV for the 4 mA output adjustment (reference pressure is required)
Click on Rerange URV for the 20 mA output adjustment (reference pressure is required)
Close the window after adjustment.

Example : Transmitter before Re ranging of LRV for zero suppression or elevation :



Example : Zero elevation is done by clicking on LRV button :



Please mind LRV and URV values showing the zero elevation without changing the transmitter span

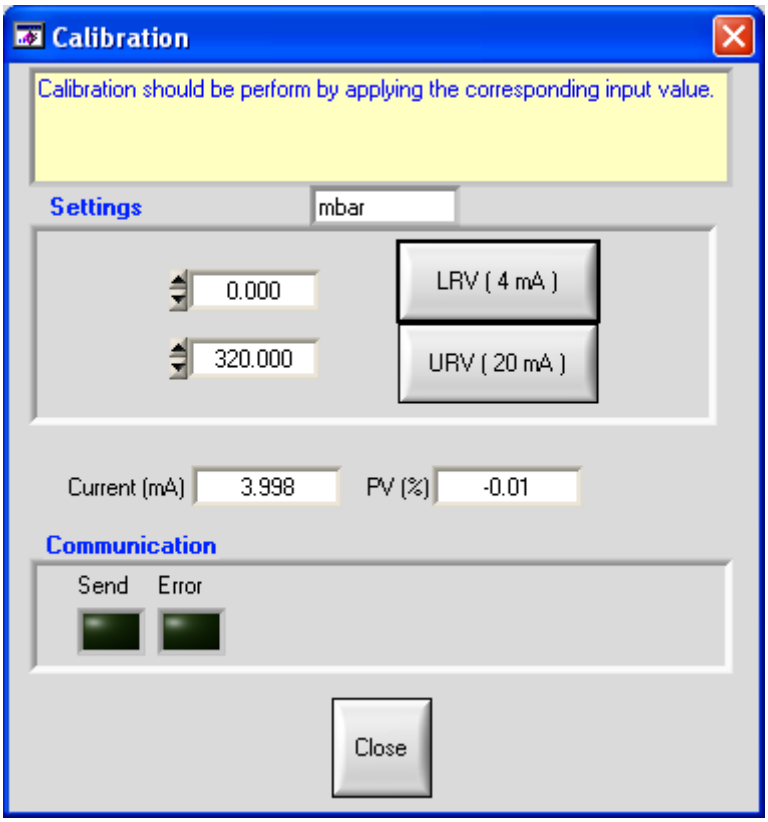
Calibration function

Introduction

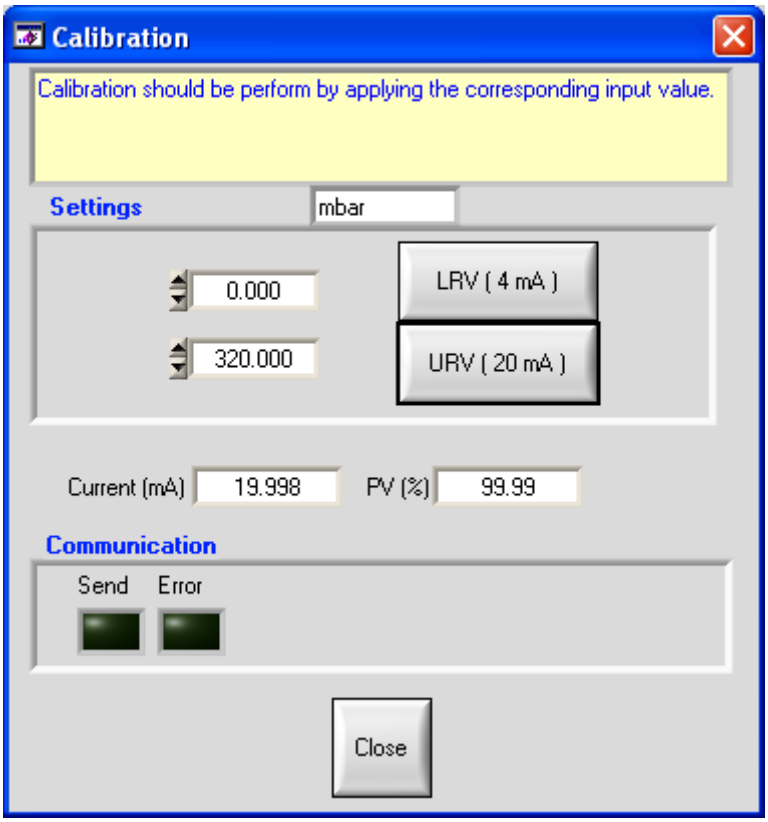
Zero and span can be calibrated by applying the accurate reference pressure and by applying on the concerned buttons.
Accurate reference pressure is required corresponding to zero and span.

Procedure

Zero calibration example :



Span calibration example :



Process values monitoring function

Introduction

This panel allows you to monitor the process values. The maximum duration depends on your free disk space.

You can set the following parameters :

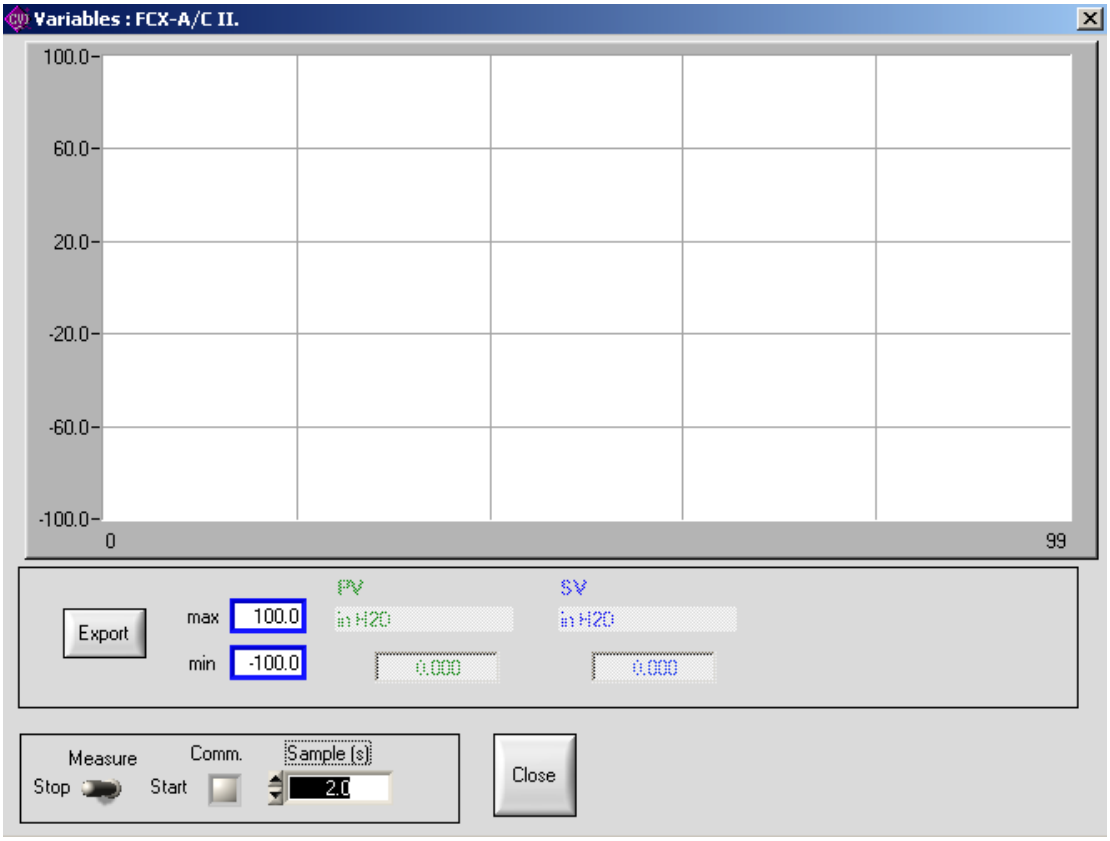
PERIOD (IN SECOND)

MINIMUM AND MAXIMUM AXIS VALUES OF THE GRAPH

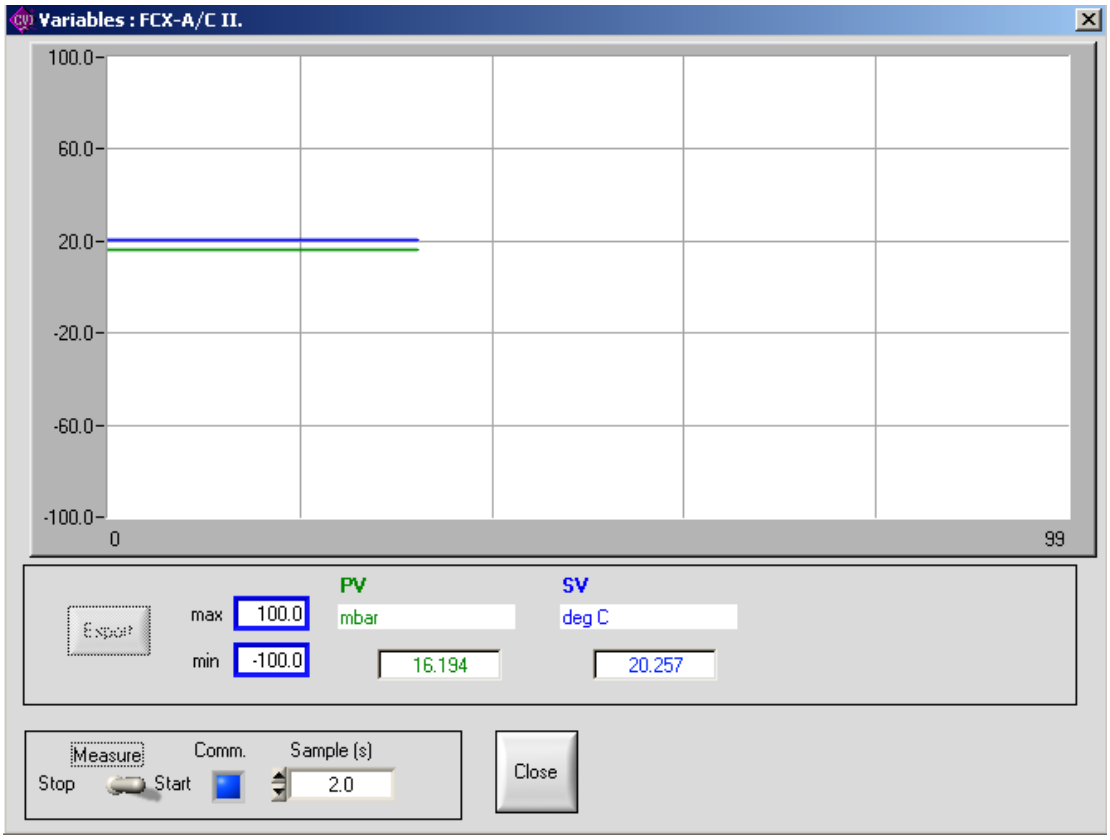
After the monitoring, you can export data to a CSV (Comma Separated Value) file compatible with Excel.

Procedure

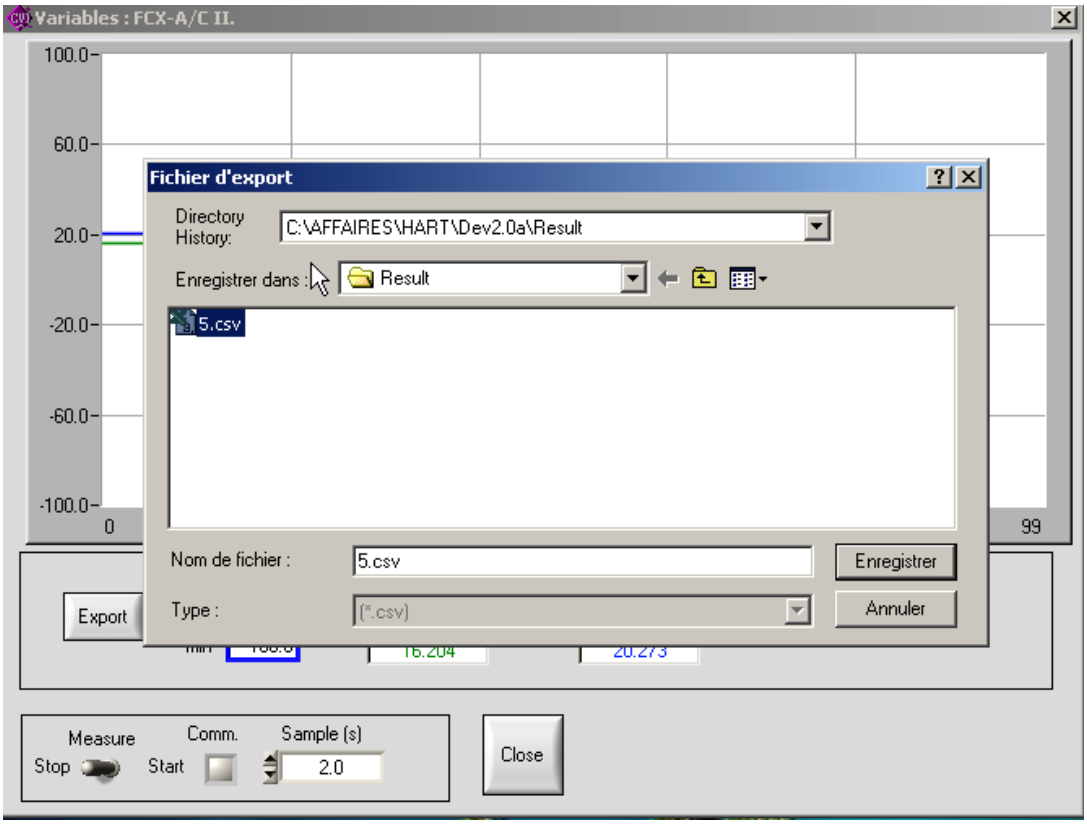
Set the parameters and click on start button.



Example of recoding the process values every 2 seconds.



Click on stop button, stops the monitoring. Export button is available. If you click on it, you will be asked to name the file.


Variables : FCX-A/C II.
100.0
60.0
20.0
-20.0
-60.0
-100.0
0
99
Fichier d'export
Directory History:
C:\AFFAIRES\HART\Dev2.0a\Result
Enregistrer dans :
Result
5.csv
Nom de fichier :
5.csv
Enregistrer
Type :
(*.csv)
Annuler
Export
16.204
20.273
Measure
Stop
Start
Comm.
Sample (s)
2.0
Close

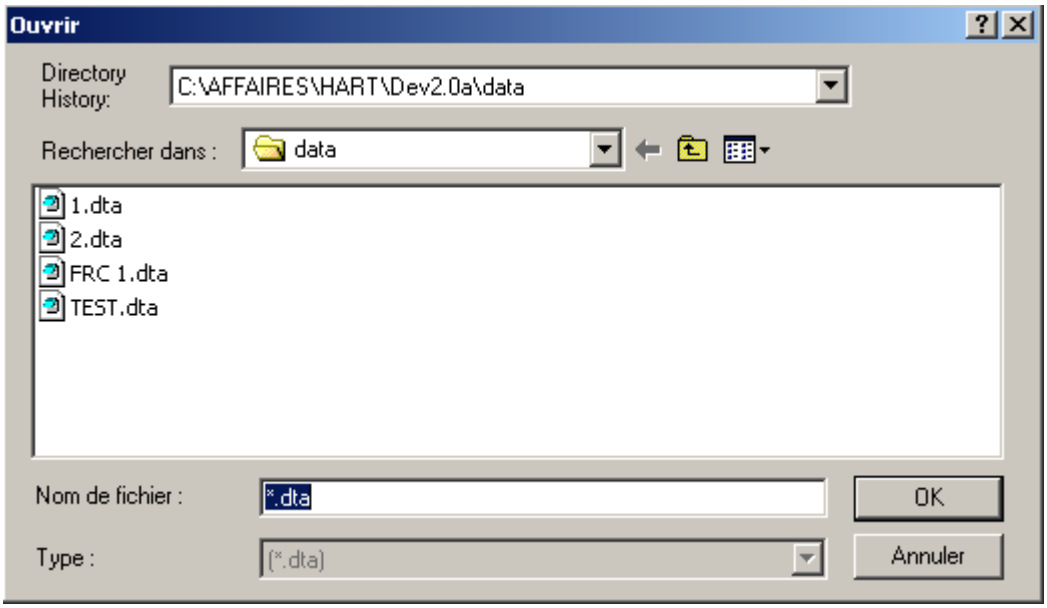
Saving parameters function

Introduction

This function allows you to save all the parameters displayed in the panels into a file. After that operation, you can download the file in the device or work on it using the offline mode.

Procedure

Select the menu and choose a name file.



The saved parameter file will be displayed in the tree view under “off line”.

Warning: it’s impossible to load a parameter file if you don’t use the same language.

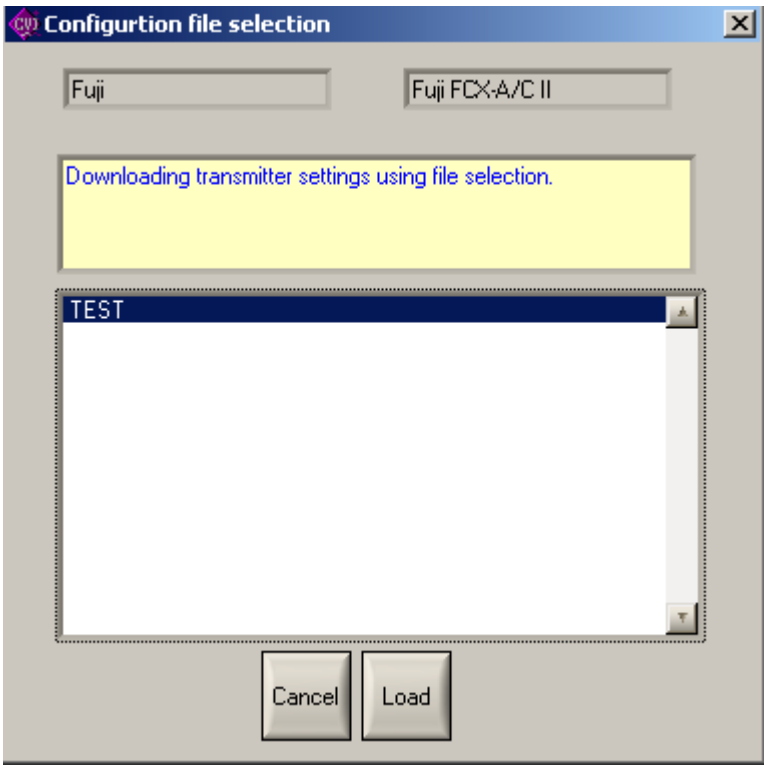
Loading parameters function

Introduction

This function allows you to write all parameters already saved into an existing device. Only the parameters of saved transmitter configurations are displayed in the panels.

Procedure

Select the function and choose the file corresponding to the kind of your device.



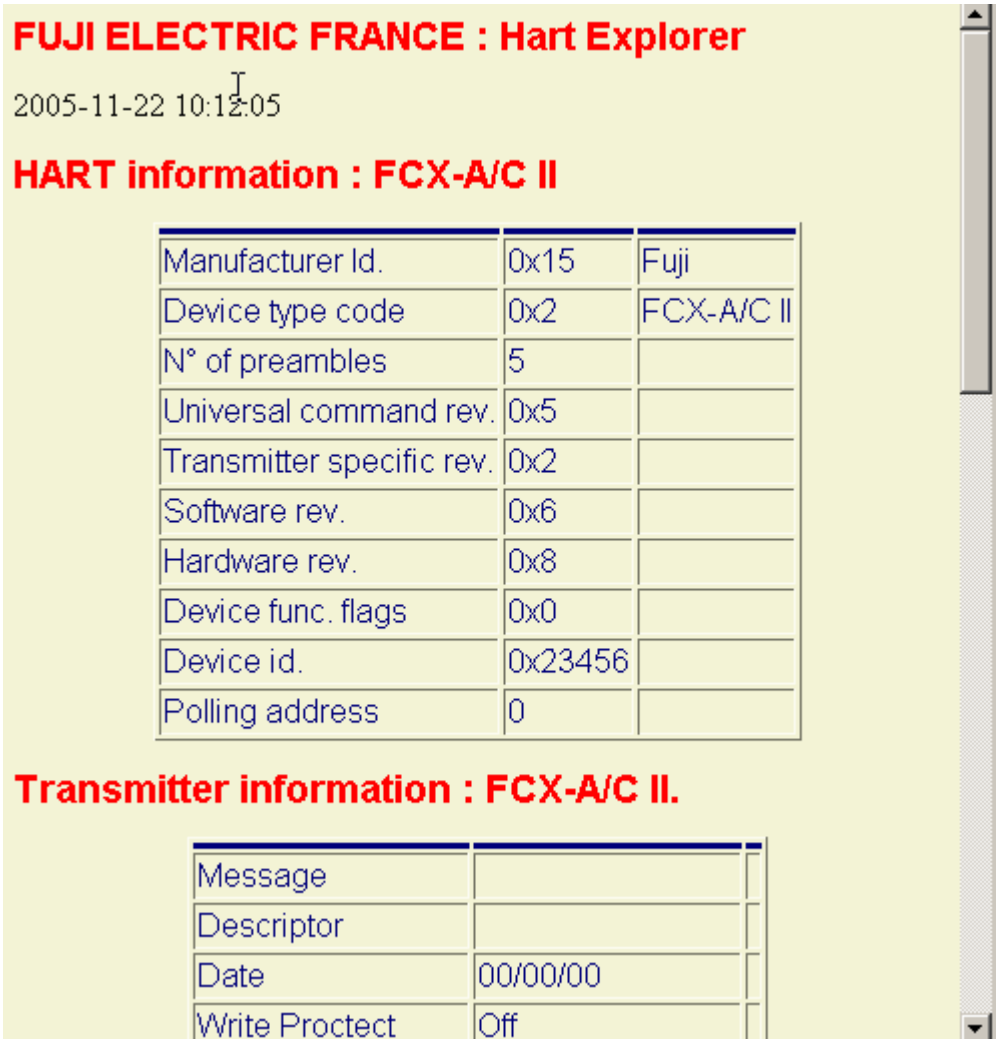
Parameters reporting function

Introduction

The report function is useful for taking a picture of your parameters. This function displays the parameters of all the panels into your browser. So you can print it, saved it using your browser.

Procedure

After selection in the menu, a new window is opened in your browser. You can see a title and a 3 column tab of parameters for each panel. The tab show you the parameter description, value and value meaning.



FUJI ELECTRIC FRANCE : Hart Explorer

2005-11-22 10:12:05

HART information : FCX-A/C II

Manufacturer Id.	0x15	Fuji
Device type code	0x2	FCX-A/C II
N° of preambles	5	
Universal command rev.	0x5	
Transmitter specific rev.	0x2	
Software rev.	0x6	
Hardware rev.	0x8	
Device func. flags	0x0	
Device id.	0x23456	
Polling address	0	

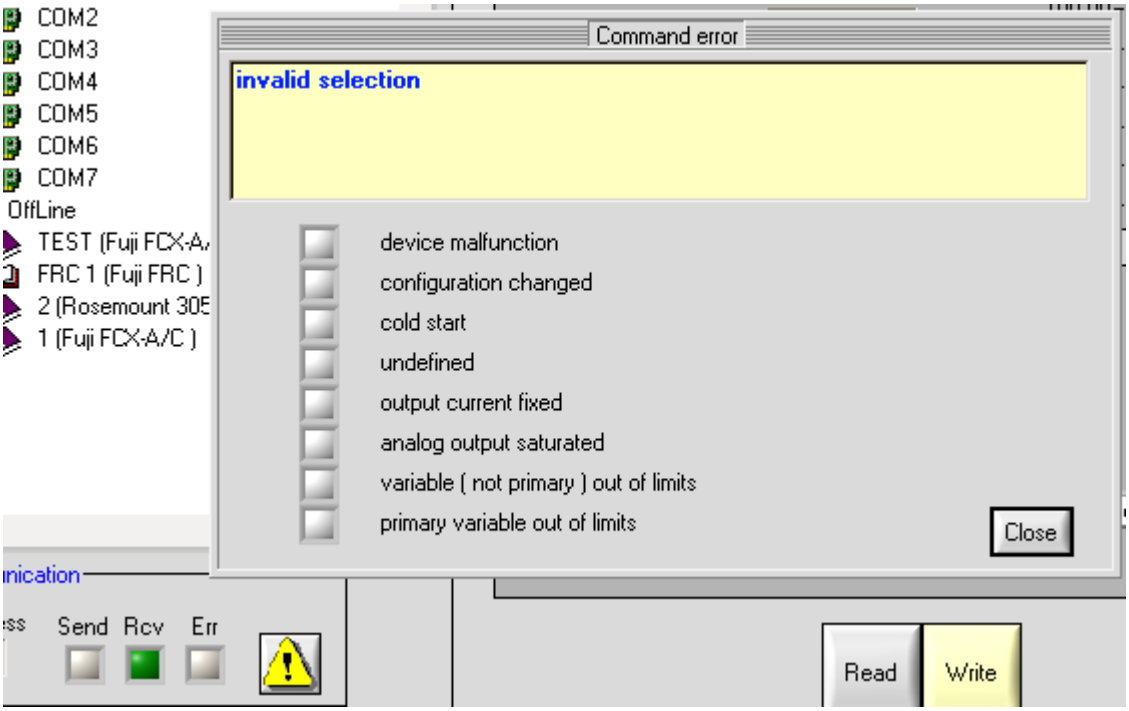
Transmitter information : FCX-A/C II.

Message	
Descriptor	
Date	00/00/00
Write Proctect	Off

Annexes

Communication error

If an error occurs during the communication with the device a button appears. If you press that button, you will see a panel explaining the error.



This window can show you multiple error messages : maybe only one is correct in your case.