PRESYS | Instruments

HART Field Communicator

FCY-15

TECHNICAL MANUAL

EM0386-00

IMPORTANT INSTRUCTIONS:

- Keep the FCY-15 in a dry environment whenever possible.
- The fuse which protects the current measurement circuit, code 01.02.0277-21, is a special part. So, only replace the fuse by another original from factory.
- In case of failure, always contact Presys Technical Support.

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PRELIMS

1

1 - Introduction

1.1. General Description

The FCY-15 configurator allows the reading and configuration of parameters of field devices that have the HART® protocol. It has a complete and updated DD (Device Description) configuration library registered in FieldComm Group. It also allows the inclusion of new DD files through the USB port.

Besides HART® configurator, it has internal 24 Vdc TPS source (Transmitter Power Supply), selectable 250 Ω resistor (min) and input for measurement of current (mAdc), allowing trim and loop test of the field instrument with HART protocol without the need of a calibrator.

Its construction takes into account the use in the field, thus includes items of great value such as: bag with shoulder straps allowing freedom for the hands, 5.7 "display with led backlight facilitating visibility in low light and rechargeable battery.

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1.2. General Specifications

Full HART® Configurator, with the latest complete DD library, registered by FieldComm Group.	
Transmitter Power Supply (TPS)	24.5 ± 1 V (0 to 24 mA), with short-circuit protection (30 mA).
Internal Resistor	For mA Measurement: 100 to 120 Ω. For mA input + HART®: 250 to 280 Ω. Safety condition (startup) / HART® only: open.
Input for current measurement (mA)	Range from -5 to 24.5 mAdc. Resolution of 0.0001 mA. Accuracy of ± 0.02% FS (Full Scale).
Special software functions	*Document*: saves the entire configuration tree of the HART® field instrument. *Download*: loads settings saved to the instrument with HART® protocol. *Quick/Calibration HART®*: easy access to basic HART® commands.
Battery	Rechargeable Lithium Polymer with 4200 mAh and up to 12 hours of continuous use. Full charge in just 3 hours.
Display	5.7" TFT VGA touch screen 640 x 480 pixels.

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Memory	16 GB available to the user. Memory access via USB cable x micro USB.
Processor	Dual Core 1 GHz, with 512 MB of RAM and 1GB of internal Flash.
Operating Environment	Temperature of 0 to 50 °C and Relative Humidity of 90% maximum (without condensation). 5 minutes Warm-up.
Dimensions / Weight	140 mm x 255 mm x 80 mm (HxWxD). 1.5 kg nominal.
Included Accessories	- Technical manual; - Test Leads; - Carrying case; - USB x micro USB cable; - 32 mA reserve fuse; (mA input) - Charger 100 to 240 Vac.

Notes: * FCY-15 is a registered trademark of Presys.
* Changes can be made to the instrument by changing the specifications described in this technical manual.
* HART® is a registered trademark of FieldComm Group.

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2 - Operation

2.1. Parts Identification

Front Panel

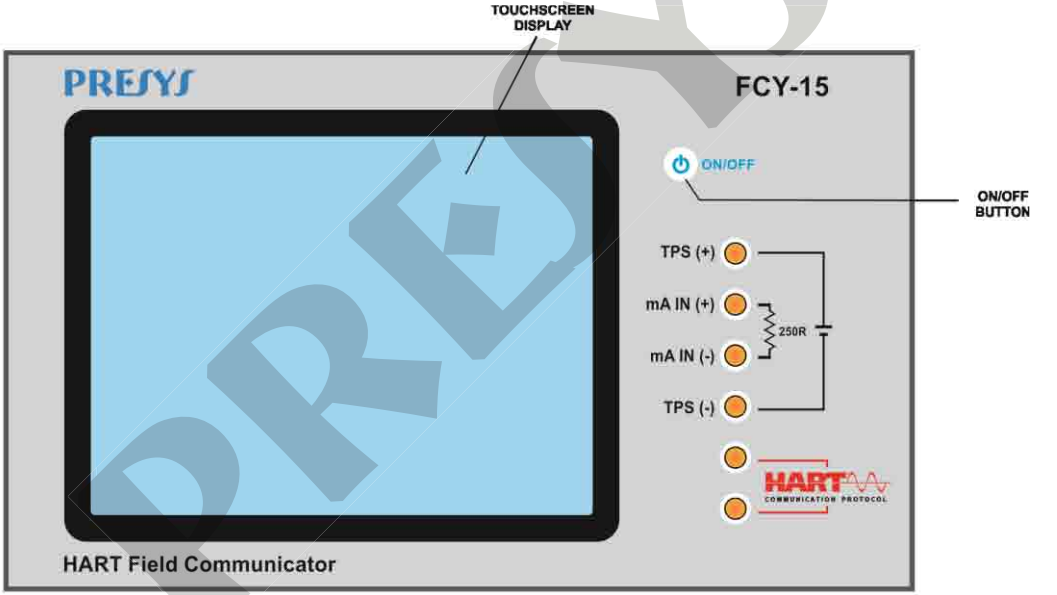

Fig. 01 - Front Panel

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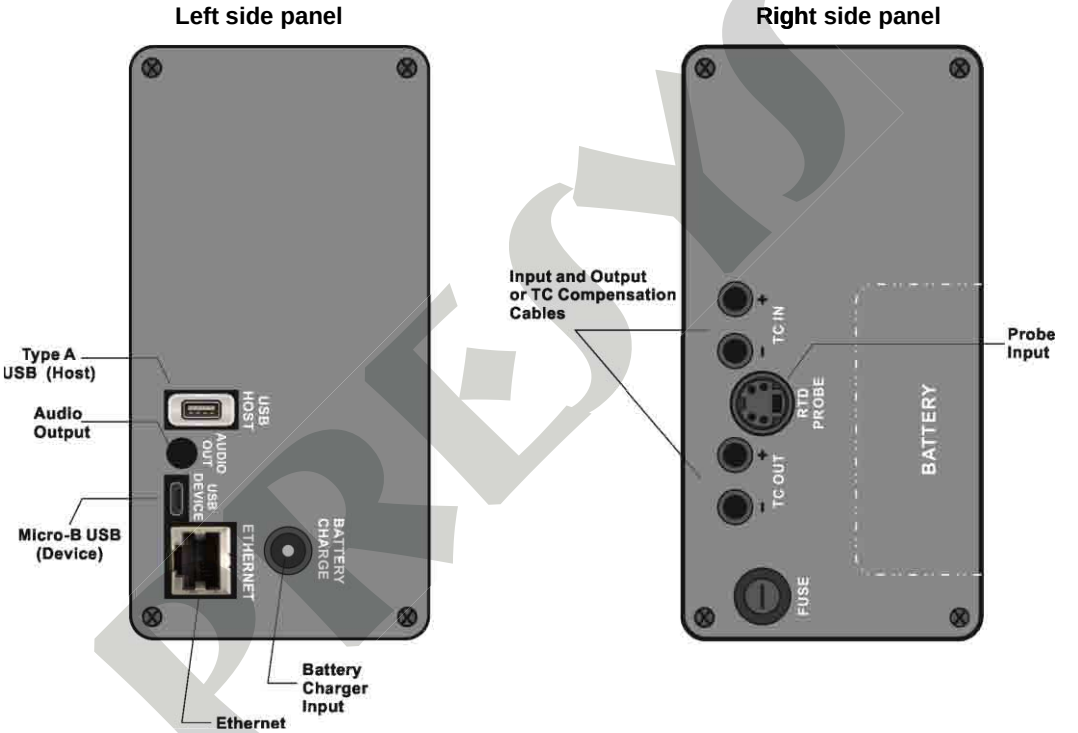

Fig. 02 - Side Panels

How to use the carrying case

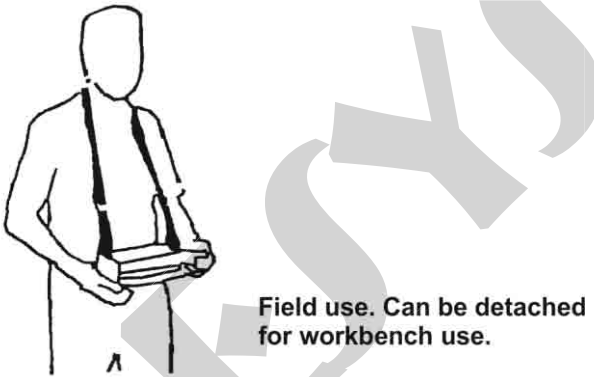

Fig. 03 - Using the carrying case

Accessories: The bag has three compartments; one for accommodate the calibrator and the others to hold various accessories including test leads, spare fuse, handles for transport and field use and technical manual.

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2.2. Battery and charger

The FCY-15 is supplied with rechargeable battery which enables up to 12 hours of continuous use. This autonomy is reduced according to the active functions (for example, using the 24 Vdc TPS source, or increasing screen brightness). A battery charger that can be plugged into power supply from 100 to 240 Vac is included. The time for full charge is 3 hours.

The battery level is displayed in the main menu, as shown below.

Fig. 04 - Main menu

Fig. 05 - Low battery level, charge required

Fig. 06 - Charged battery

Fig. 07 - Charger connected, battery charging

Clicking on the battery icon, the following screen is shown. This screen shows the battery power (in percent), current (positive value if the battery is charging, negative if it is not) and the estimated time of instrument autonomy based on the current consumption.

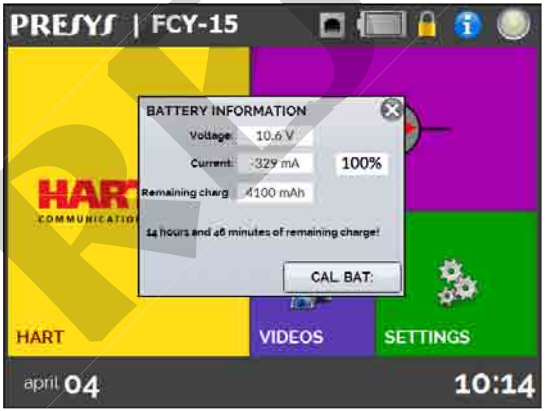

Fig. 08 - Battery information, charger disconnected

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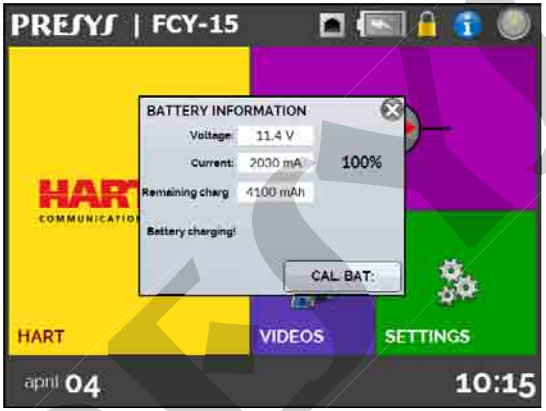

Fig. 09 - Battery information, charger connected

The charger provides the battery charge while it feeds the calibrator, thus permitting the calibrator to be used normally while the battery is being charged.

The batteries used by FCY-15 are made of Lithium Polymer (Li-Po). This new technology for rechargeable batteries does not have the undesirable characteristics of memory effect as their preceding batteries made of Nickel Cadmium (Ni-Cd).

To prevent explosion or fire, use only the battery charger supplied by Presys. Do not short circuit or damage the battery.

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2.3. Main Menu

When powered on, the FCY-15 goes through a self-test routine. In case of failure, it displays a message to indicate error; if that occurs, contact Presys Technical Support.

After the self-test is completed, the display shows the main menu, as showed in **figure 04**.

The main menu is divided into 04 functions:

HART® – allows communication with devices that have Hart® protocol, see **section 2.5**.

MEASURE (mA) – mA input for current measurement up to 24.5 mAdc with high accuracy, see **section 2.6**.

VIDEOS – has videos made by **PRESYS** to assist in the use of the configurator, and can also store videos made by the user, see **section 2.7**.

SETTINGS – general settings of the instrument, see **section 2.8**.

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2.4. Transmitter Power Supply (TPS)

The FCY-15 has a 24 Vdc (24.5 ± 1 V - 0 to 24 mA) Transmitter Power Supply voltage source, with short-circuit protection (current limited to 30 mA).

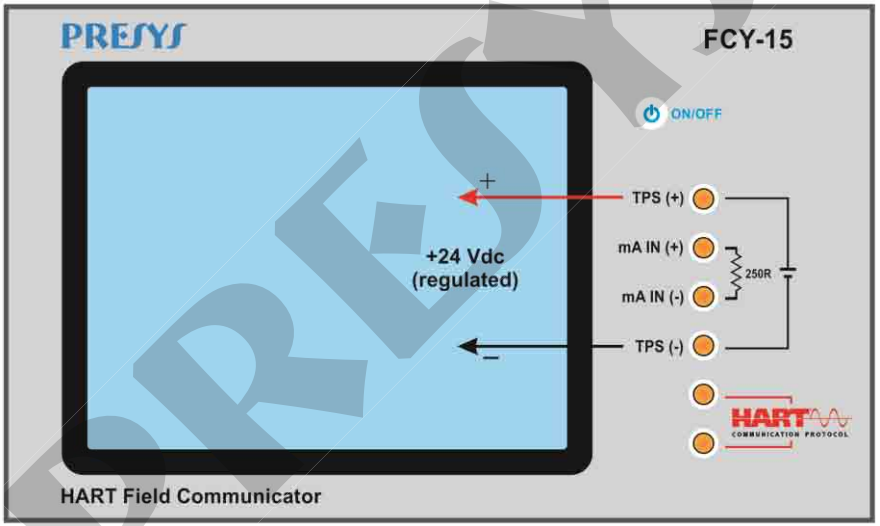

Fig. 10 - 24 Vdc TPS Power Supply

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2.5. HART®

The FCY-15 enables the reading and setting instrument parameters that have HART® communication protocol. The HART® protocol allows digital communication between the master (in this case, the FCY-15 configurator) and the slave (field instrument) superimposed on the 4-20 mA analog signal. To access this function, from the main menu, select the HART® option.

The configurator comes with the latest DD (Device Description) library registered in FieldComm Group, allowing the configuration of instrument-specific parameters.

2.5.1. HART® Connections

When HART® is selected from the main menu, the **mA INPUT + HART®** and **ONLY HART® (INCLUDING NETWORK)** options will be displayed on the screen. The internal resistor (250 Ω min.) can also be enabled. The option must be chosen according to the type of connection that will be made.

PREVIO

mA Input + HART® (mA input of the FCY-15 in series with the HART® instrument)

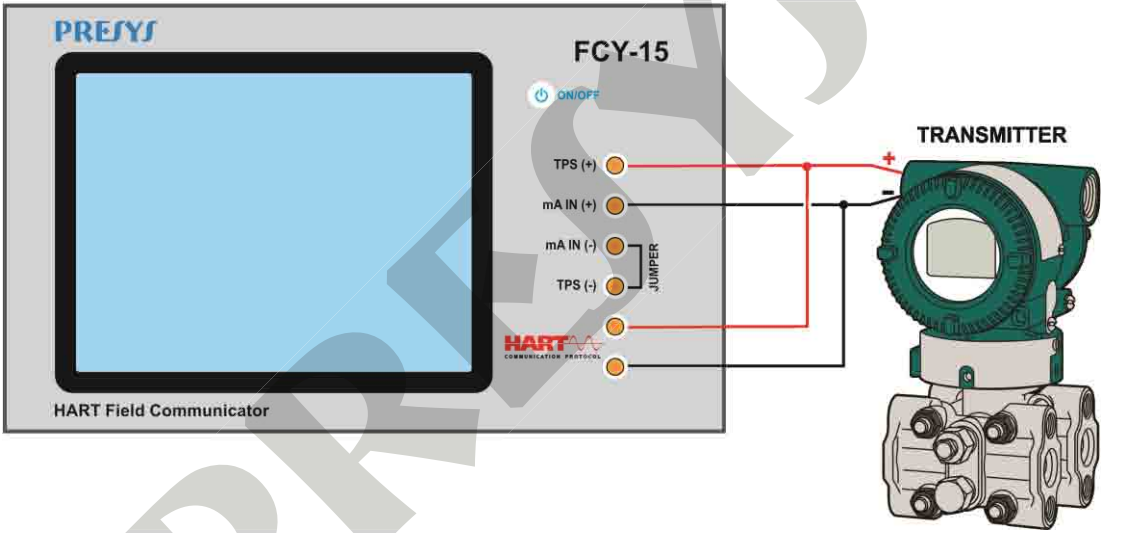

Fig. 11 - mA input + HART® - Example 1
2-wire transmitter powered by internal TPS source. Internal resistor enabled.

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mA Input + HART® (mA input of the FCY-15 in series with the HART® instrument)

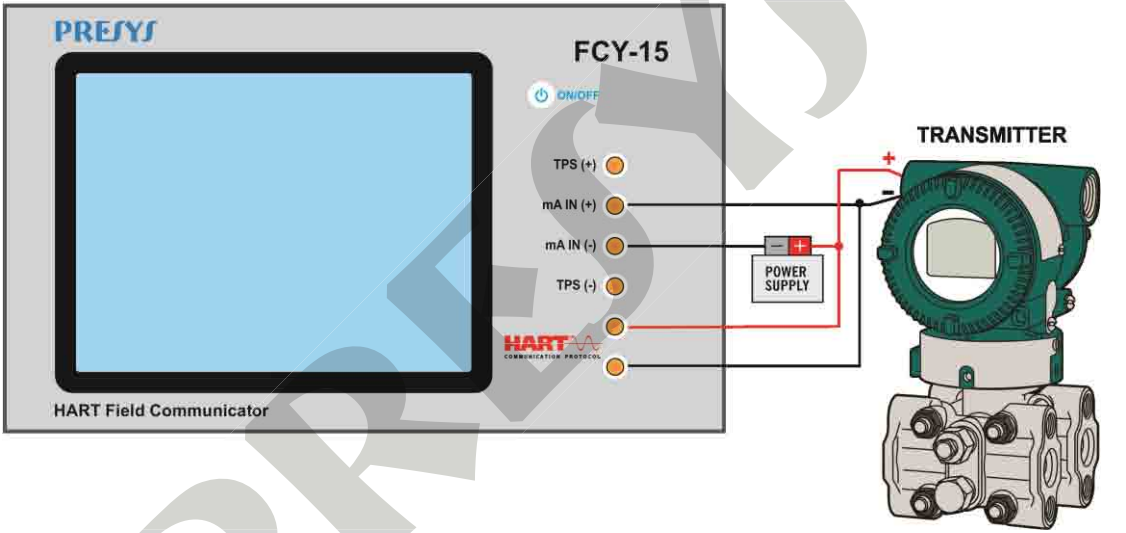

Fig. 12 - mA input + HART® - Example 2
2-wire transmitter, powered by external power supply. Internal resistor enabled.

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mA Input + HART® (mA input of the FCY-15 in series with the HART® instrument)

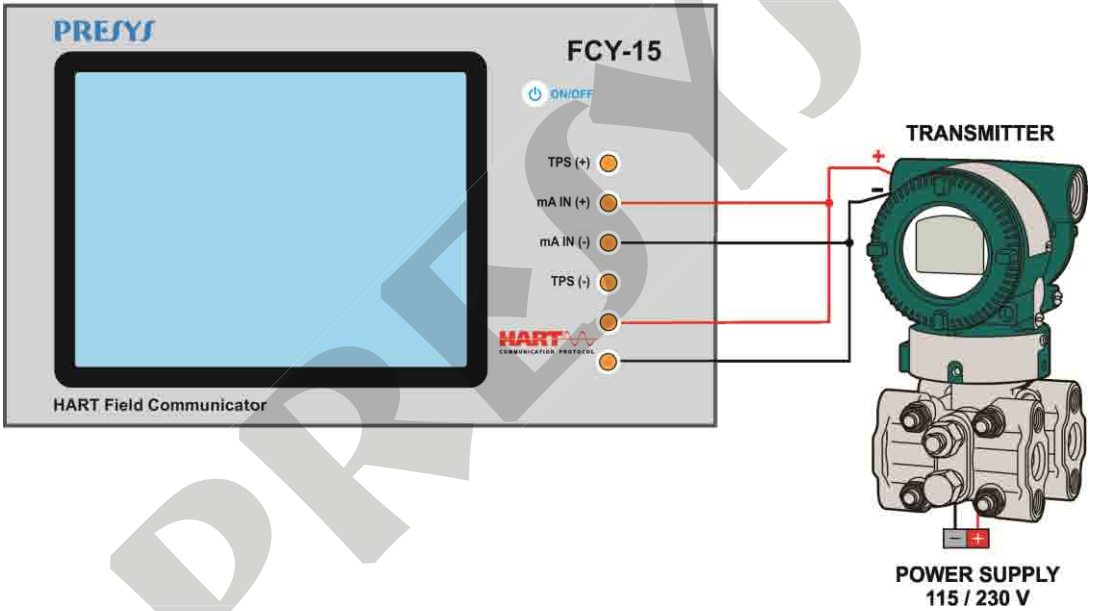

Fig. 13 - mA input + HART® - Example 3
4 wire transmitter with 115/230 Vac power and 4-20 mA output. Internal resistor enabled.

ONLY HART® (INCLUDING NETWORK) (mA input of FCY-15 is not used)

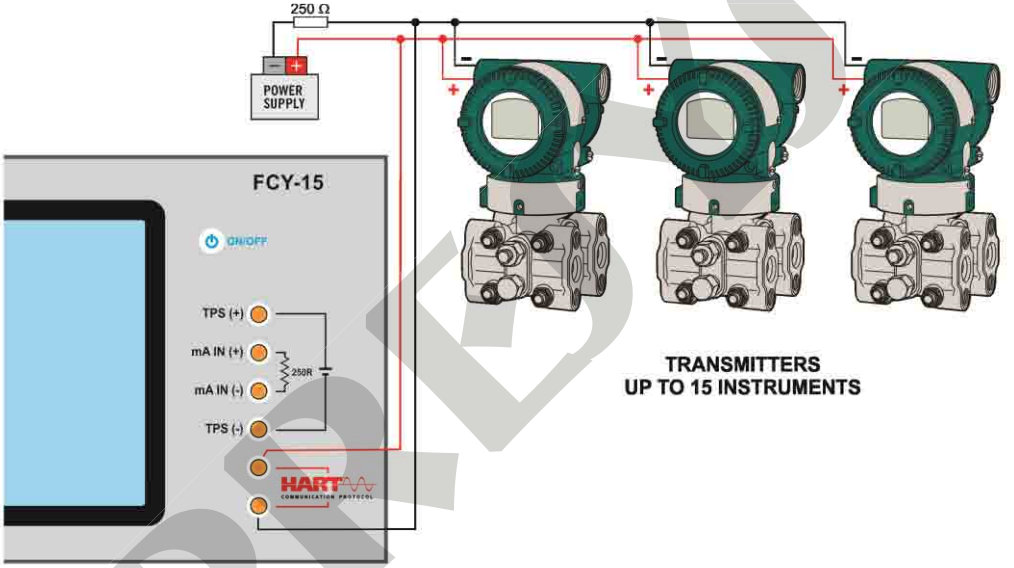

Fig. 14 - HART® only - Example 1
Transmitter powered by external source, resistor of at least 250 Ω in series.

PREV

mA Input + HART® (mA input of the FCY-15 in series with the HART® instrument)

For the connections shown in **figure 11**, **figure 12** and **figure 13**, use the **mA Input + HART®** and **INTERNAL RESISTOR** enabled option. In this mode, the HART® resistor of at least 250 Ω is internally activated, in series with the mA input of the FCY-15. The FCY-15 configurator can measure the transmitter current and also read and configure parameters via HART®. If the internal resistor is not enabled, an external resistor of at least 150 Ω should be inserted in series with the mA input of the FCY-15. To power the two-wire transmitter, the FCY-15 24 Vdc TPS source (**Figure 11**) or an external source (**Figure 12**) can be used. In the case of the 4-wire transmitter, connect the 4-20 mA output of the transmitter to the mA input of the FCY-15, and connect the HART® terminals (**Figure 13**).

ONLY HART® (INCLUDING NETWORK) (mA input of FCY-15 is not used)

For the connection shown **in figure 14**, use the **ONLY HART®** option. In this mode, the internal resistor and mA input are disabled. The HART® resistor of at least 250 Ω must be inserted externally in series with the transmitter. In this case, the configurator does not measure the transmitter current, but can read and configure its parameters via HART®.

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2.5.2. Starting HART® Communication

Entering the **HART** menu, the following screen is displayed.

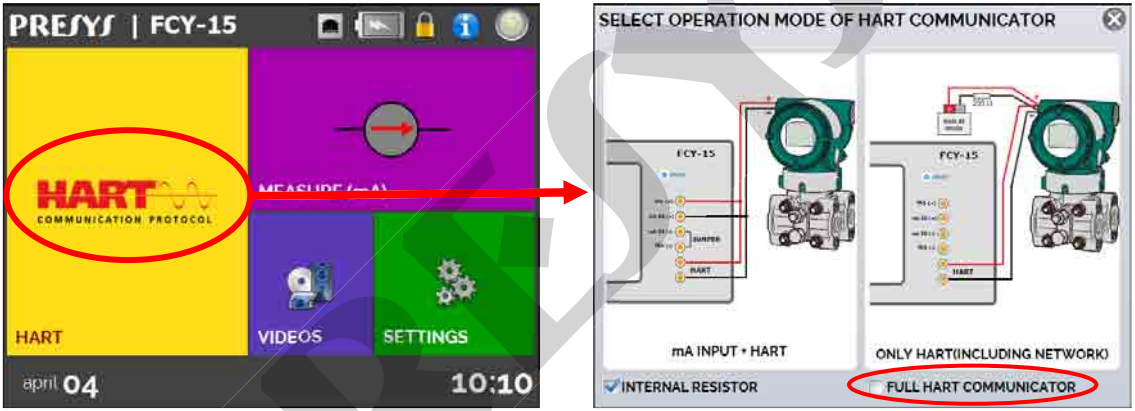

Fig. 15 - Main Menu – HART®

Enabling the **FULL HART® COMMUNICATOR** option will start the **Full HART®** software, allowing access to all parameters of the connected instrument (DD library). By disabling this function, **Calibration HART®** software is started with the basic and universal commands for HART® communication (zero, span, trim-mA, loop test etc.) with ease of use and quick access to these commands.

The internal resistor must be set (250 Ω, enabled or not) and the HART® connection type must be set (if the mA input is used: mA + HART®, if the mA input is not used: HART® only).

For the HART® Calibration option, insert the **ADDRESS** of the instrument with which you want to communicate and press the **CONNECT** button. If the address of the instrument is not known, you can press the button (magnifying) that will search for instruments in the address range from 0 to 15.

For the Full HART® option, the device is automatically found, in the address range from 0 to 15.

Up to 15 instruments in a HART® network (addresses 1 to 15) are allowed. For a single field instrument with address 0, on the **mA Input + HART®** connection, the primary variable can be read both analog (4 to 20 mA) and digital (HART®). In the network connection, the only way to read the primary variable is digitally **(HART® ONLY)**.

2.5.3. Adjusting the HART® Transmitter Measurement Range (CH option)

When the HART® connection is started in Calibration mode, on the **DEVICE INFO** tab appears information about the instrument identification, such as TAG, manufacturer, description, message, date, measuring range and input filter (damping), as shown in the following figure. Some of these parameters can be changed in **DEFAULT SETTINGS**.

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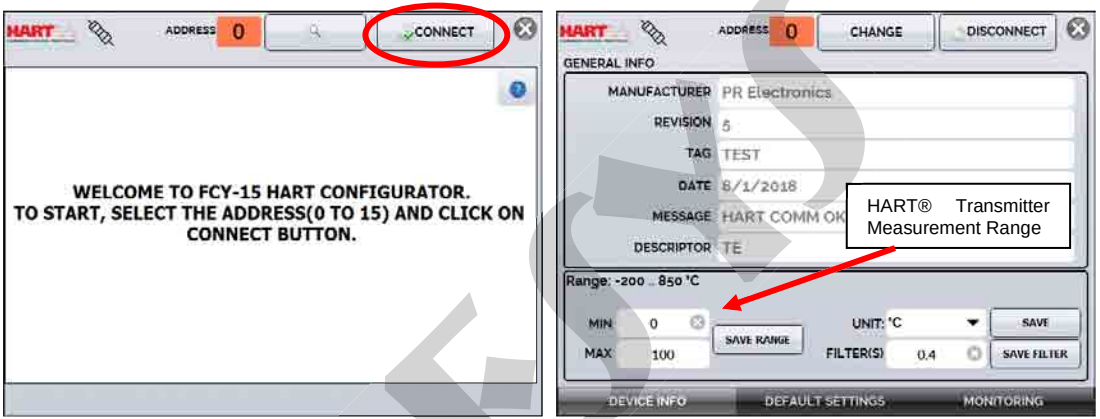

Fig. 16 - HART® Transmitter Measurement Range Adjustment

On the **DEVICE INFO** tab, the **MIN** and **MAX** fields indicate the measuring range of the HART® transmitter. For PV (primary variable) equal to the MIN value, the transmitter must generate 4 mA. For PV (primary variable) equal to MAX, the transmitter must generate 20 mA. The maximum allowed transmitter range is shown just above (**RANGE ...**). To edit the transmitter's working range, change the **MAX** and **MIN** values and press the **SAVE RANGE** button.

In this screen you can also edit the primary variable unit and the input filter (damping).

PRELIMINARY

2.5.4. Adjustment of the HART® transmitter Measurement Range with reference (CH option)

The range of the transmitter can also be adjusted generating the minimum and maximum values of the desired range in the transmitter input and adjusting these values as minimum and maximum (set by reference).

Select **MEASURE (mA)** in the main menu and press the **HART®** button. The reference value should be placed at the transmitter input. The transmitter must be connected to the FCY-15 according to one of the connection examples for **mA input + HART®** (see **section 2.5.1**).

Fig. 17 - Quick Hart® Adjustment with Reference

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Generate at the transmitter input the signal corresponding to the lower value of the range and press the button . The transmitter will generate 4 mA for this value. Generate the signal corresponding to the upper value of the range and press the button . The transmitter will generate 20 mA for this value.

Another way of doing the range adjustment by reference is entering in the HART® option. Back to the main menu by pressing the icon and the **HOME** button. Select **HART®**, set the connection type, address and then press **CONNECT**. For this setting, select the **MONITORING** tab. In this screen are shown the value of the primary variable (PV) read by HART® (digital), the current that the transmitter wants to generate (**AO - DIGITAL OUTPUT**), and the current measured by the FCY-15 (**ANALOGIC READ**).

Fig. 18 - Adjusting the Measuring Range of the HART® Transmitter with Reference

PRELIMINAR

To adjust the transmitter range, generate the signal at the transmitter input corresponding to the lower range value and press the ↓ **Inf. Range** button. The transmitter will generate 4 mA for this value. Generate the signal at the transmitter input corresponding to the upper range value and press ↑ **Sup. Range**. The transmitter should generate 20 mA for this value.

2.5.5. HART® transmitter mA output adjustment - loop test / output trim (CH option)

Select the **DEFAULT SETTINGS**. To check the mA output of the transmitter, press the "**CHECK**" button (Loop Test). The transmitter will generate fixed currents (4, 8, 12, 16, 20 mA) and the FCY-15 configurator will display the measured values for each point.

To make the adjustment automatically (**Output Trim**), press the "**D/A AUTO TRIM**" button. The FCY-15 sends the command to the transmitter to generate 4 and 20 mA (fix), measures these points, and adjusts the output (trim). The TIMEOUT field sets the time (in seconds) for stabilizing each point. The setting is completed when the message "D / A Adjustment Complete" appears.

PREVIOUS

Fig. 19 - Checking / Adjusting the mA Output of the HART® Transmitter

Note: CHECK and D/A AUTO TRIM functions can only be used when the FCY-15 is connected to a single HART® instrument with address 0, with the **mA input + HART®** connection type, since the configurator must measure the current.

2.5.6. Full HART® Communicator (FH option)

If the **HART CONFIGURATOR** option is enabled the **FH** Software is launched. For this option, the device is automatically found and the screen shows the basic, universal and specific parameters (DD library).

To start the HART configurator you should wait the FCY-15 to read the device parameters. The FCY-15 will show the message ***Reading device information. Please wait...***

After connecting, at the bottom of the screen it shows the TAG, connected instrument model and the DD file (Device Description) used.

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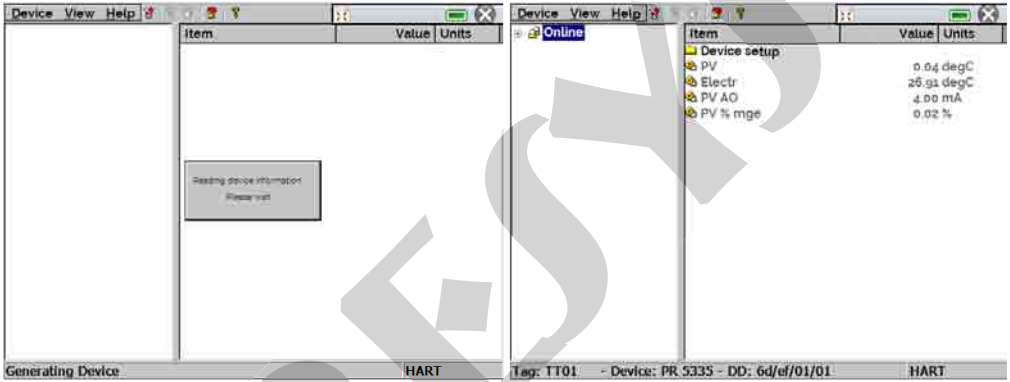

Fig. 20 - Initiating communication with the HART® instrument

To view the mA input measurement of the FCY-15, press the button . This screen can be moved by using the button . To close the program, press .

PRESYS

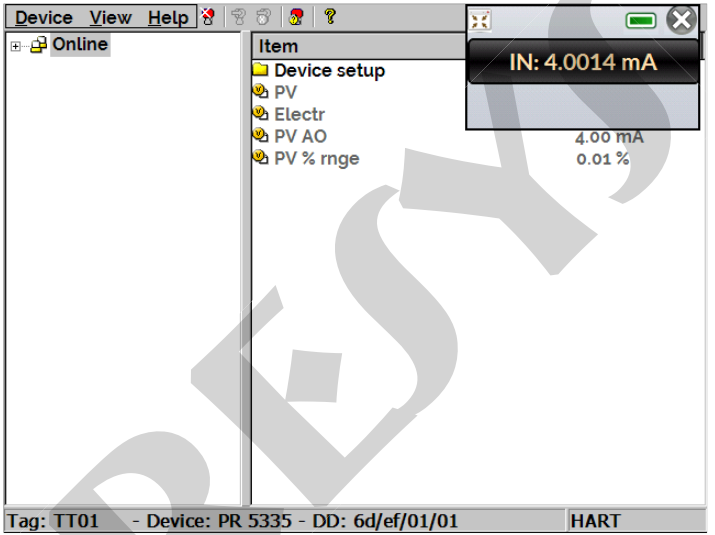

Fig. 21 - mA Measurement Screen in Full HART®

After reading all the parameters, open the configuration tree of the connected instrument, located in the left corner of the screen. This configuration tree changes according to the model of the instrument, since each HART® transmitter has specific commands defined in the DD library. Instrument parameters are grouped into folders. When you select the folder, the parameters are shown in the right corner of the screen.

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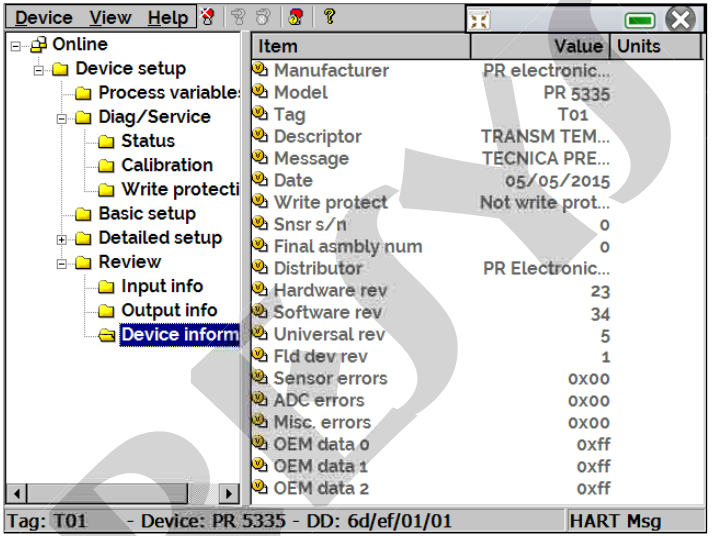

Fig. 22 - HART® Configuration Tree

When you find the parameter you want to change, double-click on this parameter and edit the desired value. Parameters identified with the icon have methods, a sequence of procedures to be changed. To change them, double-click on the parameter and follow the steps shown.

PRELIMINARY

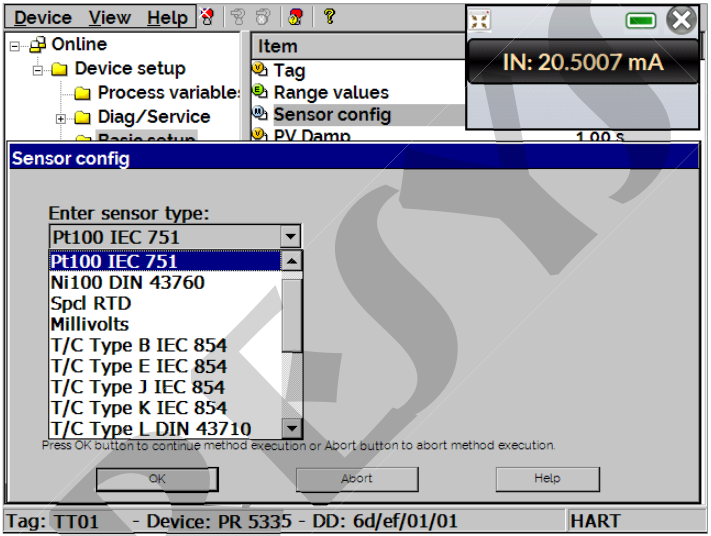

Fig. 23 - Example 1: Setting up a HART® instrument parameter

For other parameters, after editing the value the field becomes yellow, indicating that it has changed but has not yet been saved in the transmitter. To confirm the change, click on the button. If you prefer to cancel the change, click on the button.

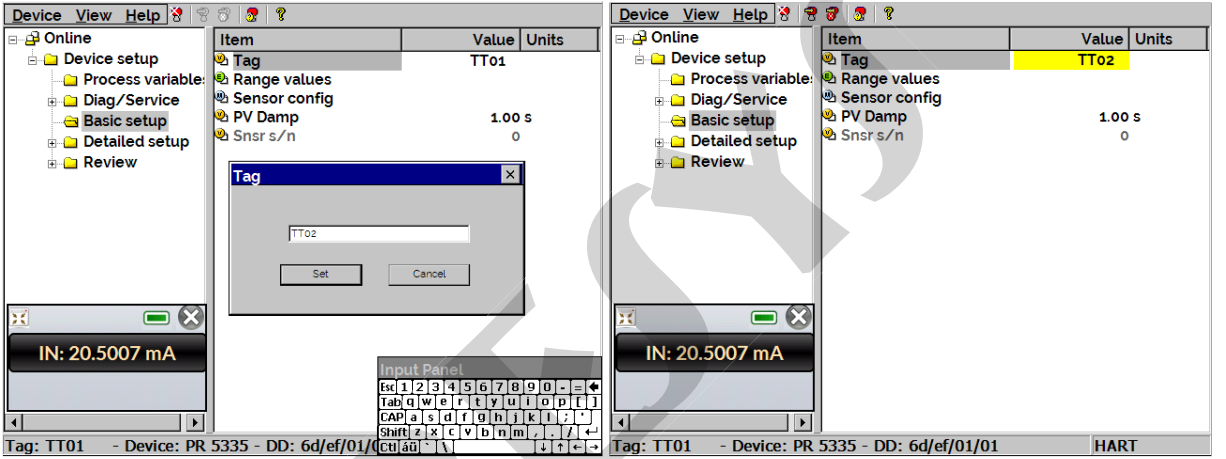

Fig. 24 - Example 2: Setting up a HART® instrument parameter

PROOF

Accessing the menu **View** → **Device Condition** it displays the status of the connected instrument.

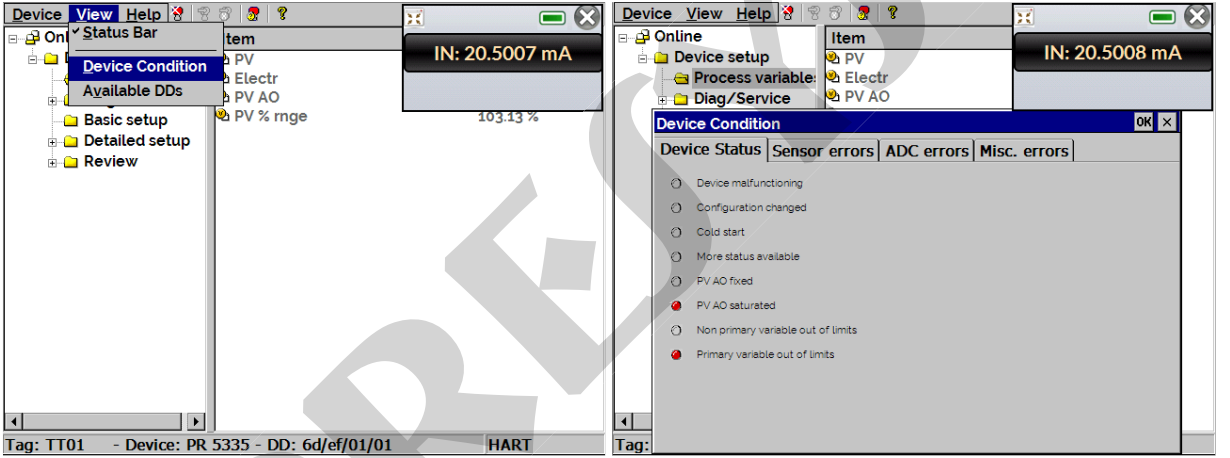

Fig. 25 - Device Condition

PRELIMINARY

2.5.7. Configuration Files (Save / Download)

To save all the configuration of a HART® instrument connected to the FCY-15, the **Document Device** function can be used from the **Device** menu. This function is useful when you want to save the configuration of an instrument and then download these settings to another instrument of the same model, or just to make a backup of the settings made.

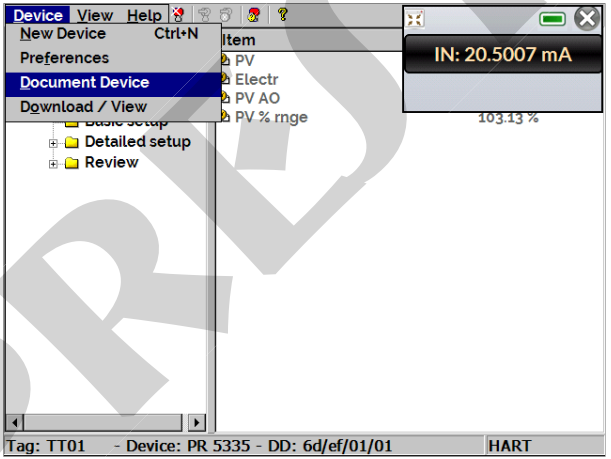

Fig. 26 - Document Device Function

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To save the whole configuration of the connected instrument, press **Device → Document Device**, give this file a name in the **File** field and press the **Save Device Config** button.

Optionally, a description can be given for the configuration file in the **Notes** field.

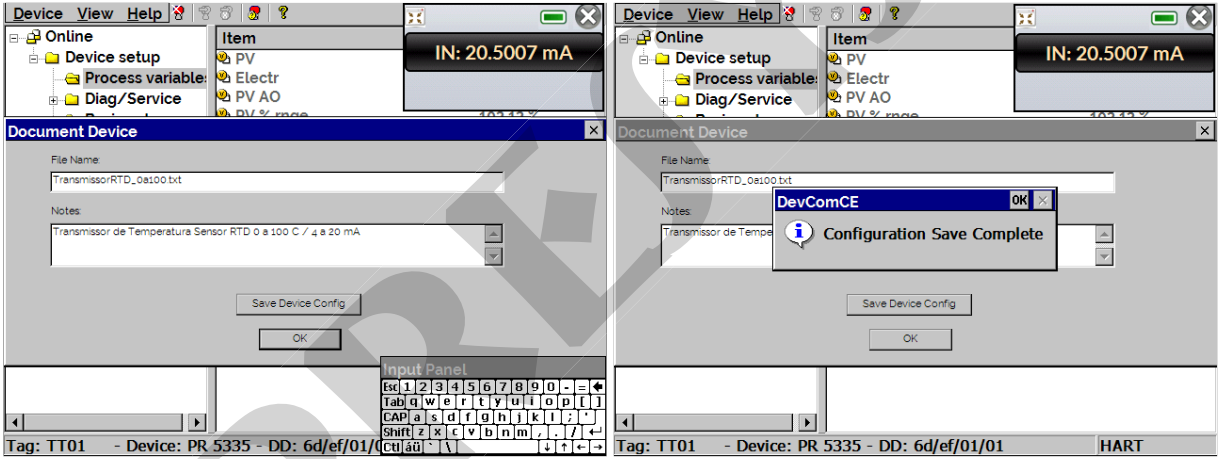

Fig. 27 - Saving a Configuration File

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When you want to load a previously saved configuration for an instrument, go to the **Device → Download / View** menu.

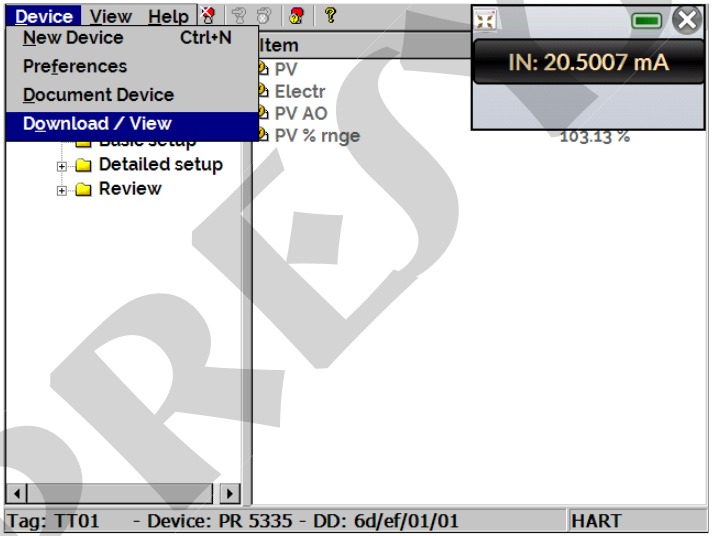

Fig. 28 - Download / View Function

PRELIMINARY

To select the desired configuration file, double click on it. The information in this file will be shown in the fields below.

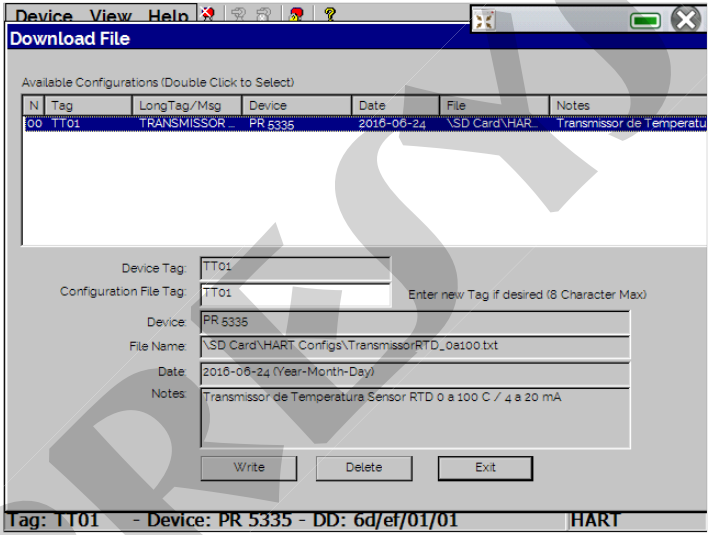

Fig. 29 - Saved configuration files

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Press the **Write** button to download the configuration file for the connected instrument. Before the instrument is fully configured, some confirmation messages will be displayed. If you want to cancel, press **X**. If you want to proceed, press **OK**. At the end of the configuration, the **Configuration Write Complete** message will be displayed.

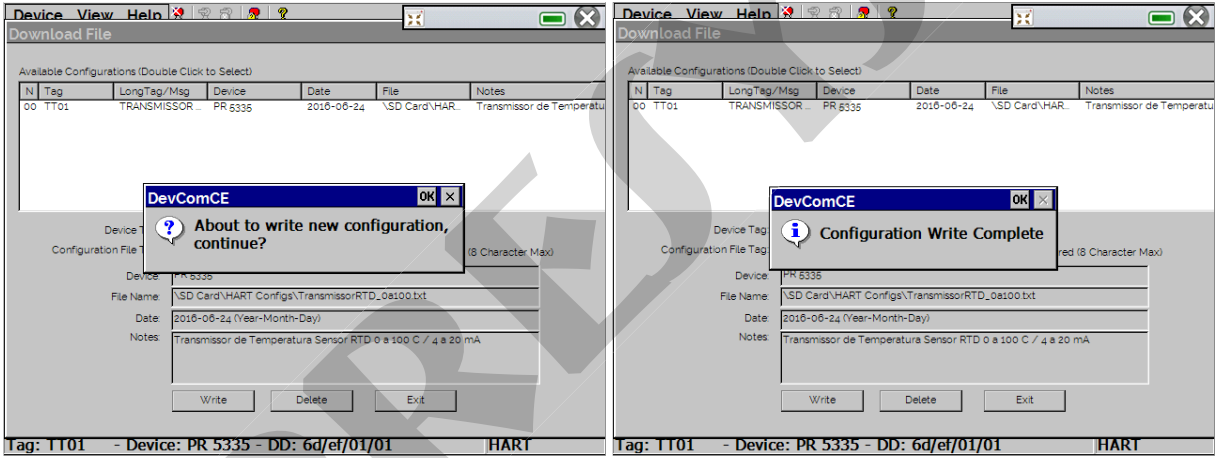


Fig. 30 - Download of the configuration file

PRELIMINARY

2.6. Measure (mA)

To measure the current mA by the FCY-15, access the **MEASURE (mA)** menu in the main menu.

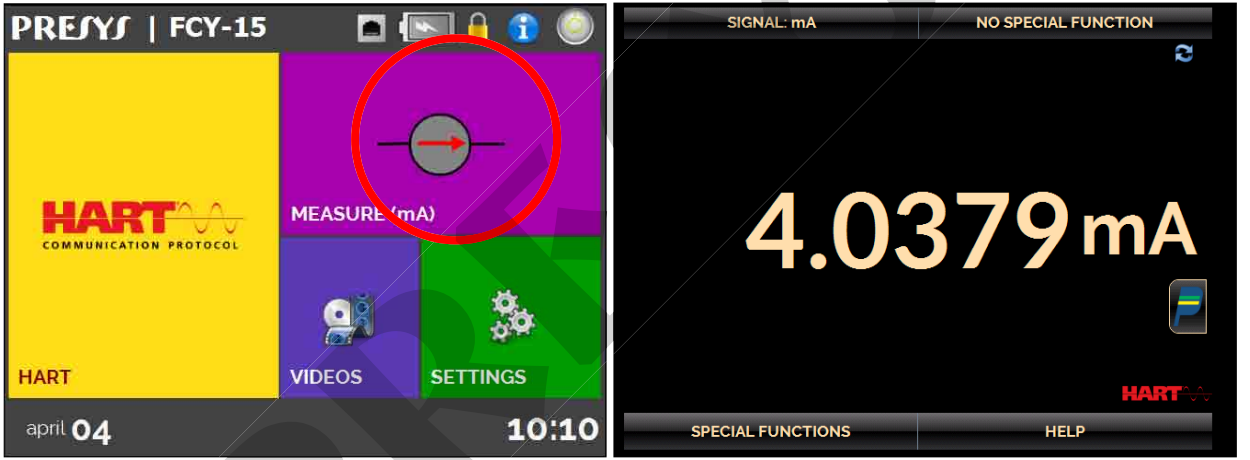


Fig. 31 - Current measurement

To return to the main menu, press the icon and the **HOME** button.

In case of doubt about connecting the instrument to the mA input of the FCY-15, press the **HELP** button, which shows connection examples.

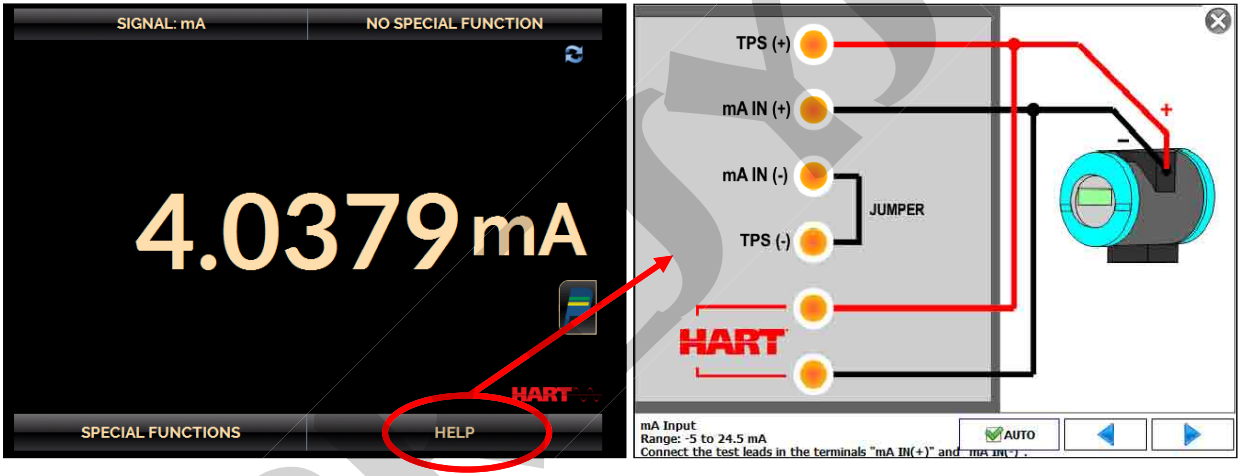
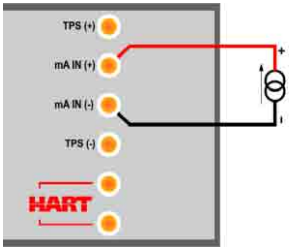


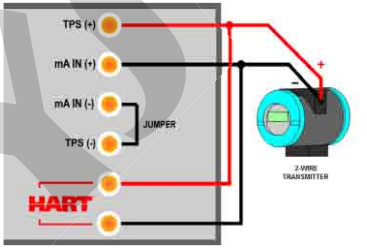
Fig. 32 - Help Menu

Whenever the input signal is below or above the input range (-5 to 24.5 mA), the display will show **UNDER** or **OVER**, respectively.

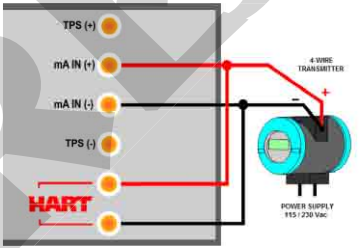
Connection Examples - mA Input



(A) mA Input



(B) mA Input + HART
2-wire transmitter powered by TPS



(C) mA Input + HART
4-wire transmitter

Fig. 33 - Connection Examples - mA Input

PRESS

2.7. Videos

FCY-15 allows viewing of videos. These videos are intended to assist in the use of the configurator.

From the main menu, when selecting **VIDEOS**, a list of video categories will appear. Select the desired category and video. Press the **FULL SCREEN** button to view the video, or the **WINDOW** button to display on a reduced screen.

To insert new videos in the configurator, connect the USB cable to the computer (USB Type A) and FCY-15 (USB Micro-B, see **figure 2**). Open the **VIDEOS** folder. Copy the video (s) to a subfolder (category) of the VIDEOS folder. If you prefer to create a new category, just create a new folder within VIDEOS with the name of the category you want and copy the video to this folder.

IMPORTANT: After **removing the USB cable**, the **FCY-15 must be restarted** to return to normal operation.

PRELIMINAR

2.8. Settings

The **SETTINGS** menu has 3 divisions (tabs at the bottom): **Date and Time**, **Network** and **System**.

a) Date and Time

Setting the time zone, date, current time, and format.

b) Network

In the **Network** tab you can configure the FCY-15's IP address for communication with the computer. The IP address can be configured dynamically (**DHCP**) or can have a fixed address (disable the **DHCP** option and change the desired values).

Connecting the configurator to the network allows remote access to the FCY-15.

c) System

On the **SYSTEM** tab you can configure the configurator volume, touchscreen adjustment, FCY-15 identification, language, and security options.

PRESYS

- **Touchscreen Options**

To adjust the screen, press **TOUCHSCREEN OPTIONS**. Press the center of the + signs on the screen (it is recommended to use the pen for touchscreen). After calibration, press the screen again at any point. Confirm the setting and return to the **SYSTEM** screen.

- **Language**

Select the desired language and confirm with **OK**. The system must be restarted to save the new configuration.

- **Configurator Identification**

In this option you can identify the FCY-15 by choosing a TAG, owner's name and location.

- **Sound Options**

Press "+" or "-" to set a value for the audio volume.

- **Security Options**

Initially, the instrument does not have a password. This setting can be changed in SECURITY OPTIONS.

PREVYS

To create a new user, press the key icon and then the user icon . Fill in the blanks and press **CREATE**.

Attention to the functions that each user has access, as indicated in the following table.

Access Level	Functions			
	HART®	Measure (mA)	Videos	Settings
Operator	✗	✓	✓	✗
Tec	✓	✓	✓	✗
Admin	✓	✓	✓	✓

To limit access to the system, press the lock icon in the **SETTINGS > SYSTEM** menu. The next time the FCY-15 is turned on, login and password will be requested. To release the system, log in as a user Admin level and press the lock icon until it is open again.

PRELIMINARY

3 - Maintenance

3.1. Replacing the battery

To replace the FCY-15 battery, proceed as follows:

- Loosen the screws on the battery cover as shown in figure 34 (A);
- Disconnect the battery and pull it, see figures 34 (B) and (C);
- Insert the new battery and connect it, as shown in figure 34 (D);
- Close the lid, see figure 34 (E).

NOTE: When changing the instrument battery, the battery charge indication must be adjusted. To do this, connect the charger to the FCY-15 and let the instrument charge for at least 3 hours. After the instrument is fully charged, in the main menu press on the battery icon and select **CAL BAT** (password required: 285). This setting indicates for the FCY-15 the 100% charge level of the new battery.

PREVS

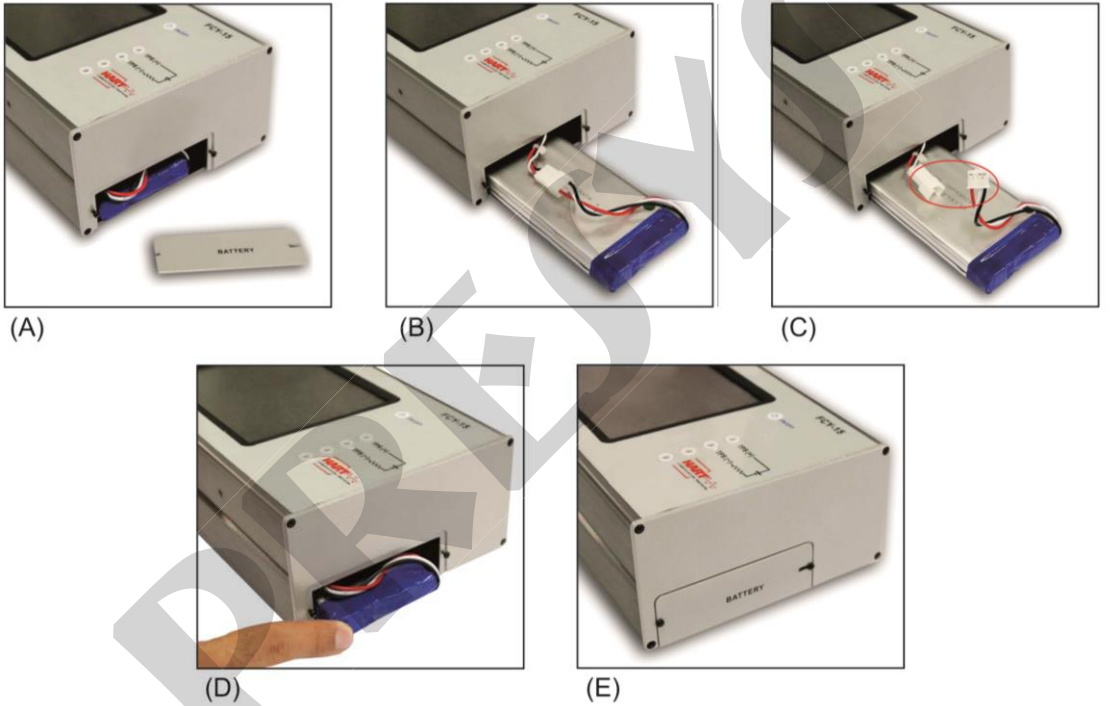


Fig. 34 - Replacing the battery

3.2. Replacing the mA Input Fuse

To replace the current fuse of FCY-15, proceed as follows:

- Rotate the fuse holder counterclockwise, as shown in figure 35 (A). Try to use a plastic tool to avoid damaging the fuse holder;

- The fuse holder will be released. Pull the fuse holder and remove the fuse, see figure 35 (B);

- Place the spare fuse (32 mA). The fuse is in the carrying case;

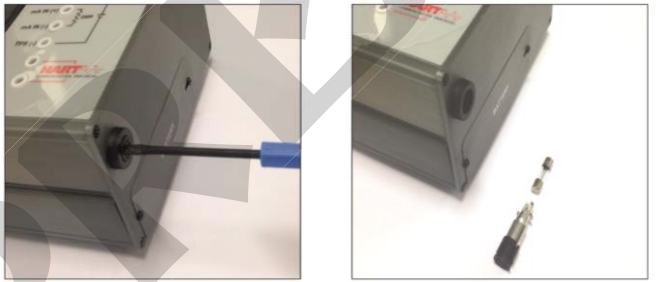


Fig. 35 - Replacing current input fuse

PRELIMINARY

3.3. Inclusion of DD Files (Device Description)

To access the DD library of the FCY-15 plug the USB cable into the computer (USB Type A) and FCY-15 (USB Micro-B, see **figure 2**). Using the USB cable, the internal memory of the FCY-15 can be accessed by the computer.

The DD library is found in the **Library** folder.

To insert a new file, copy it into the "Library" folder, keeping the structure:
"Library \ [folder 1: manufacturer code] \ [folder 2: instrument model code] \ [files]".

IMPORTANT: After **removing the USB cable**, the **FCY-15 must be restarted** to return to normal operation.

PRESYS

PRESYS