1. GENERAL DESCRIPTION

FRER transducers type MCOUP... and MC2UP... are programmable transducers intended to perform electrical measurements on single-phase or three-phases A.C. systems.

Many aspects of their operation (as system type, C.T. and V.T. ratios, measured variables, output ranges and more) are freely programmable by the end user, with a software utility provided by FRER, called FrerTool.

The FrerTool utility runs on a Personal Computer (PC) with Microsoft Windows Operating System. The programmable transducer must be connected to the PC by a standard printer USB cable (not provided), and powered-on.

The USB connection to the transducer is fully isolated, allowing a safe programmability of the transducer itself even if it is completely wired to a live system.

2. PRELIMINARY OPERATIONS

The FrerTool utility normally comes on a mini-CD delivered with the programmable transducer.

On the same CD there are also the drivers for the USB connection to the transducer.

Please proceed in this order:

2.1 Launch FrerToolSetup.exe from the the mini-CD, it will install FrerTool utilities.

2.2 Power-on the transducer and connect it to the PC via the USB cable.

2.3 Usually Windows Operating System recognizes the new connected device and automatically installs the required drivers. If this is not the case, please manually install the drivers you have copied from the mini-CD, following the normal drivers installation procedure (this step is required only the first time that a programmable transducer is connected to a specific PC).

2.4 Launch the FrerTool utility double clicking on the FrerTool.exe file under the installation directory or from the icon on the desktop. Ignore, clicking on "OK", error messages relevant to COM(n) that may appear.

2.5 The following window opens:
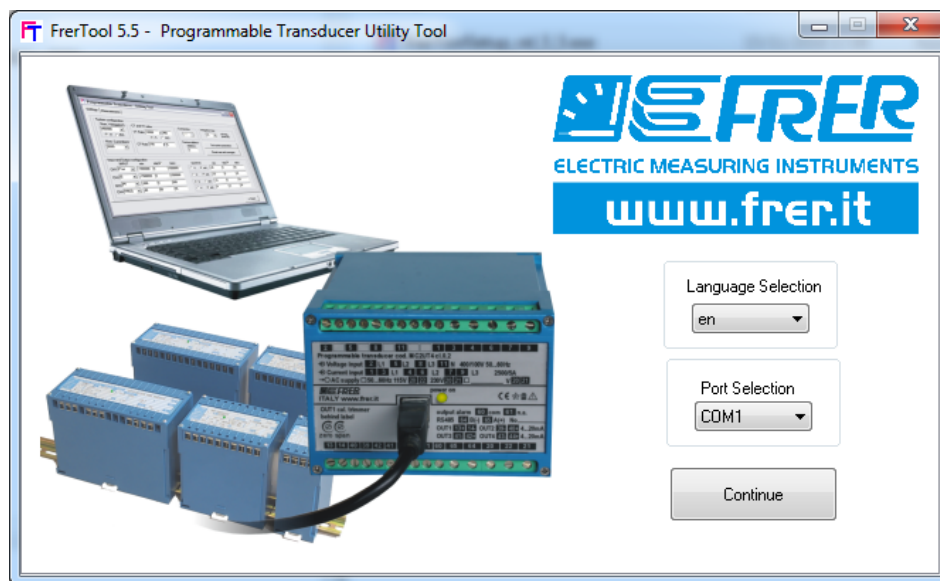
2.6 Select, from the Port Selection drop-down menu, the correct USB-COM port to which the programmable transducer is connected.

2.7 Select the language.

2.8 Press "Continue".

6	04/11/14	Aggiornamento alla rev software 4.1 / *Update to software release 4.1*	G. Muscarella	A. Miori
11	16/11/18	Aggiornamento alla rev software 5.5 / *Update to software release 5.5*	G. Muscarella	A. Miori
10	06/07/16	*Some corrections on Releases table*	G. Muscarella	A. Miori
9	10/05/16	Aggiornamento alla rev software 9.5 / *Update to software release 9.5*	G. Muscarella	A. Miori
8	31/03/16	Aggiornamento alla rev software 4.3 / *Update to software release 4.3*	G. Muscarella	A. Miori
7	21/11/14	Lista compatibilità e cambio numero Com / *Compatibility list and Com number change*	G. Muscarella	A. Miori
Rev.	**Data / Date**	**Descrizione / *Description***	**Preparata / *Prepared***	**Approvata / *Approved***

To know which is the correct USB-Com port, in Windows go to "Control Panel", then "System", then "Device Manager", then "Ports (COM & LPT)": there you should see to which number is associated the USB Serial Com Port (see the example in the next picture).
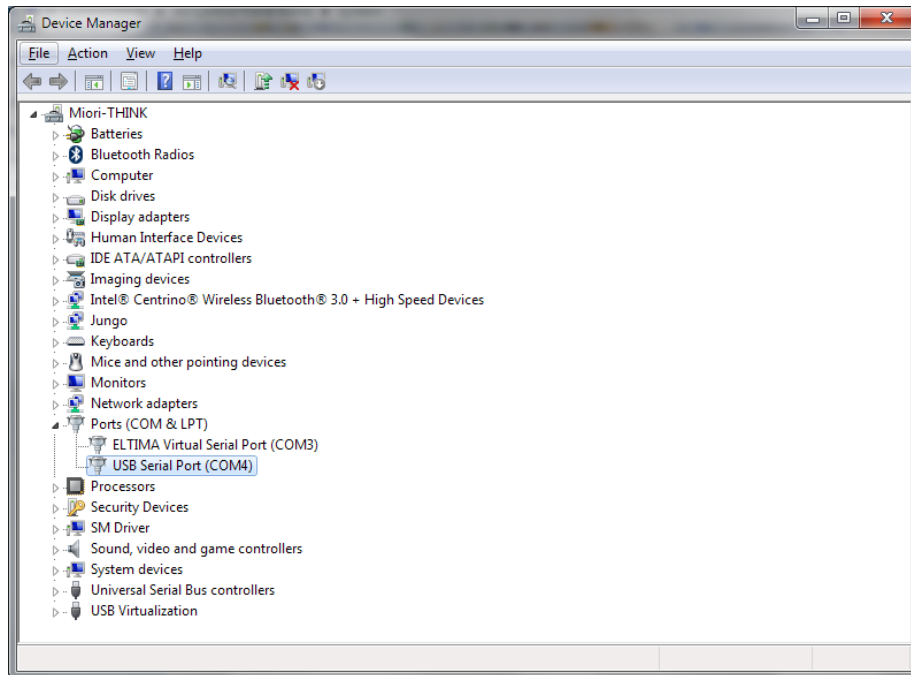
If you need to modify the number of Com port automatically assigned by Windows O.S., you can do it by right-clicking over that USB Serial Port, entering the properties, then selecting the "Port Settings" tab, then "Advanced" and then from the drop-down list select the new Com Port Number (you can also select a number even if it is stated as "in use", as long as this port is not actually connected).

3. SYSTEM SETTINGS

The first page is the general System Settings page where System configuration is made. There are some different areas, with different functions:

CT and VT ratios: Setting of the CT and VT ratios.

THD reference: Selection of the reference value for the percentage indication of the harmonic distortion.

Integration time: Selection of the averaging time for power and currents average measurements.

Connection: Selection of the System type (the wiring diagram picture changes according this setting).

Reset utilities: Resetting of energies and average and maximum powers and currents.

ID and Firmware version: Reading of the ID and version of the firmware installed in the transducer.

File and import utilities: Allows to read all settings from the transducer, or to save and load them to and from a file for later usage.

I Signed: If checked, the output signals related to the Current Measurements becomes bi-directional, indicating the conventional direction of the current flow: positive when the power is consumed, negative when the power is generated.

Output Full Scale: If checked, when an overload condition occurs, the output signal will not exceed the nominal output range limits.

Filtering   (Only for versions with optional 50ms response time); a digital filter can be applied to the output signals, to smooth the output variations in case of rapidly changing measuring variables.

    The filter behaviour is controlled by setting its response time, with the following steps: No Filter, 100ms, 125ms, 160ms, 200ms, 250ms, 315ms, 400ms, 500ms, 630ms, 800ms, 1s, 1.25s, 1.6s, 2s, 2.5s, 3.15s, 4s, 5s, 6.3s, 8s, 10s.
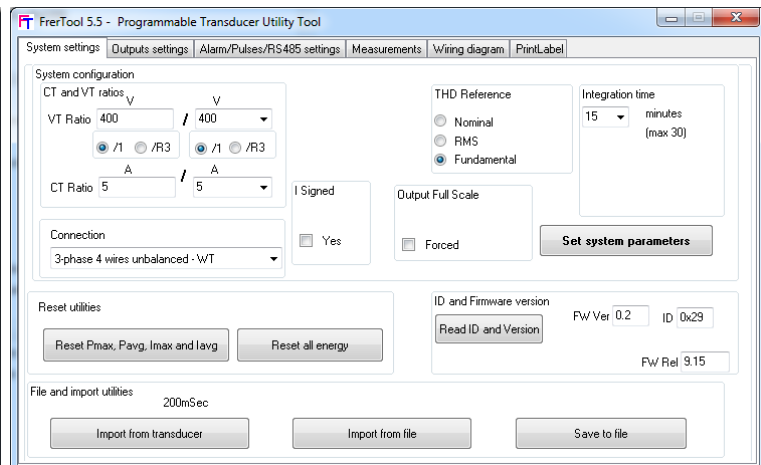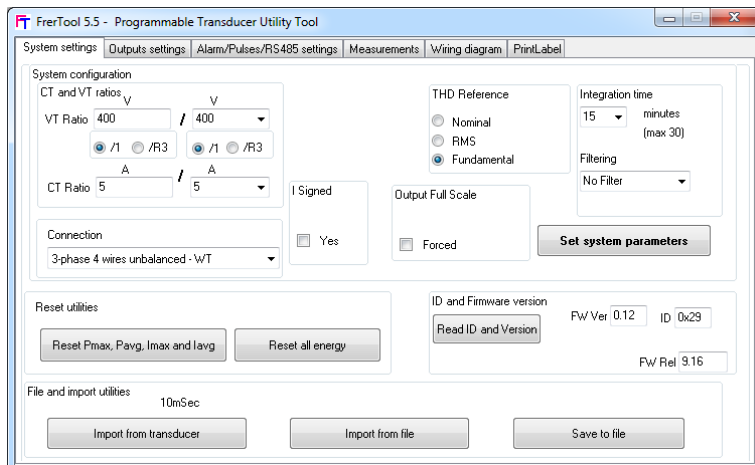
Within the panel File and import utilities will be show the following information:
- 200mSec: Firmware release for response time 200mSec
- 100mSec: Firmware release for response time 100mSec
- 50mSec: Firmware release for response time 50mSec
- 10mSec: Firmware release for response time 10mSec
- DEMO Mode: No devices have been connected, the frertoool run as demonstration mode

4. OUTPUTS SETTINGS

In this page it is possible to select, for each individual output, which measurement is associated to that output and which are the electrical values of the output itself.

Measurement selection:

INPUT: Selection, by a drop-down menu, of the measurement type associated to that output.

Unit: Selection, by a drop-down menu, of the measuring unit associated to that measurement.

Min: Setting of the lower value (start) of the measuring range.

Mid: Setting of an intermediate point of the measuring range (if a kinked transfer characteristic is required).

Mid enable: Enabling of the intermediate point for a kinked characteristic (if not enabled, the transfer characteristic is linear and the mid point is automatically calculated).

Max: Setting of the higher value (end) of the measuring range.

Output configuration:

OUTPUT (V-mA): Selection of the output type (V or mA).

Min: Setting of the lower value (start) of the output range.

Mid: Setting of an intermediate point of the output range (if a kinked transfer characteristic is required).

Mid enable: Enabling of the intermediate point for a kinked characteristic (if not enabled, the transfer characteristic is linear and the mid point is automatically calculated).

Max: Setting of the higher value (end) of the output range.

5. ALARM/PULSES/RS485 SETTINGS

In this page it is possible to select the operating mode of the optional digital output (optically-isolated solid state relay), and the communication parameters of the optional RS485 isolated serial interface.

Digital output:

Mode: Selection of the operating mode of the digital output.

Pulse settings: Setting of the pulses characteristics when the digital output is used to generate energy pulses.

Alarm settings: Setting of the alarm characteristics when the digital output is used as an alarm output.

RS485:

Address: Setting of the device unique address for the RS485 network.

Format: Selection of the baud-rate and parity used in serial communication.
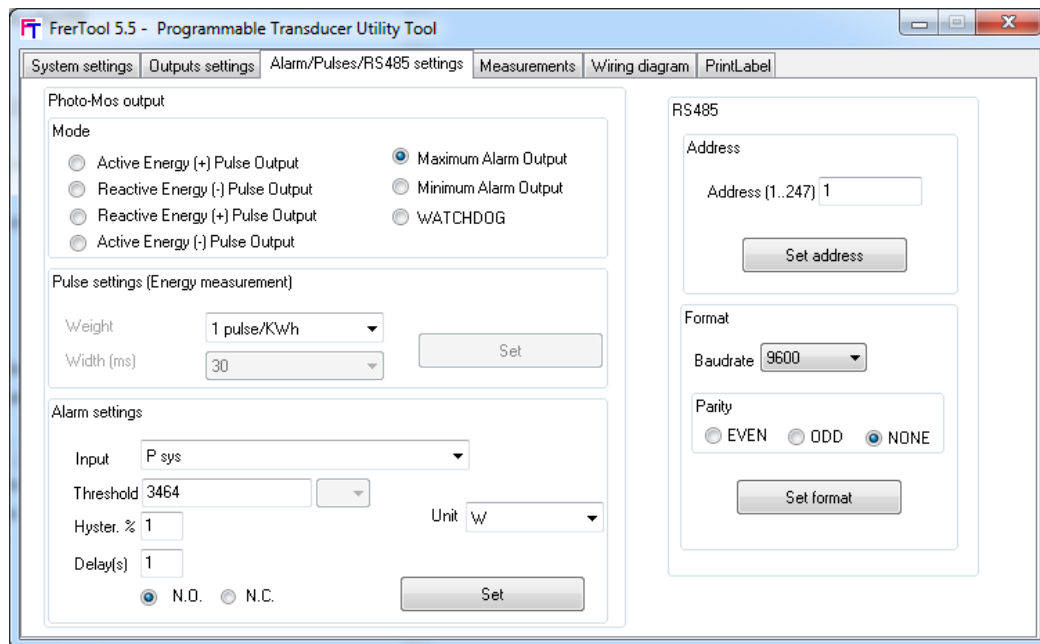
6. MEASUREMENTS

This page is used to read (for test, connection checking or other maintenance purposes) the values of all the variables measured by the transducer.

The shown quantities are expressed as primary values (CT and VT ratios are already included), but their measuring units are those listed in the ModBus registers mapping IPM0178 (as an example, voltages are in mV, currents in mA, powers in W and so on).
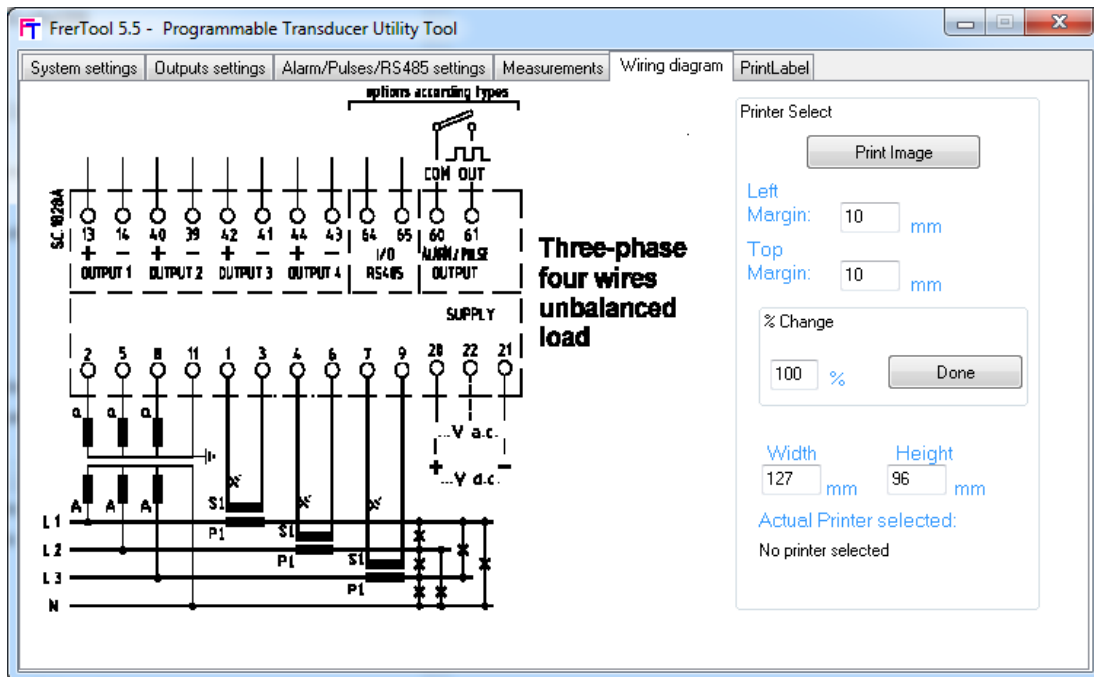
7. WIRING DIAGRAM

In this page the wiring diagram for the system type selected in the System settings page is displayed.

In addition, the wiring diagram can be printed on a selected printer

With the button "Printer…" the user can select one of the printers installed in the system.

Pressing "Print Image" the wiring diagram will be printed.

"Left Margin" and "Top Margin" indicate the distance (in mm) between the top-left image corner and the top-left page corner.

The user can resize the image writing a new value in the "%" window and pressing "Done" to finalize the value; in this way the new values of "Width" and "Height" are calculated.

However, the user can stretch the image writing the new values directly in the "Width" and "Height" windows.

8. PRINT LABEL

In this page a summary label can be printed. The label contains data regarding the system configuration, the output settings, the pulse/alarm settings and the RS485 parameters.

In addition, the first and the last lines of the label can be freely edited by the user.
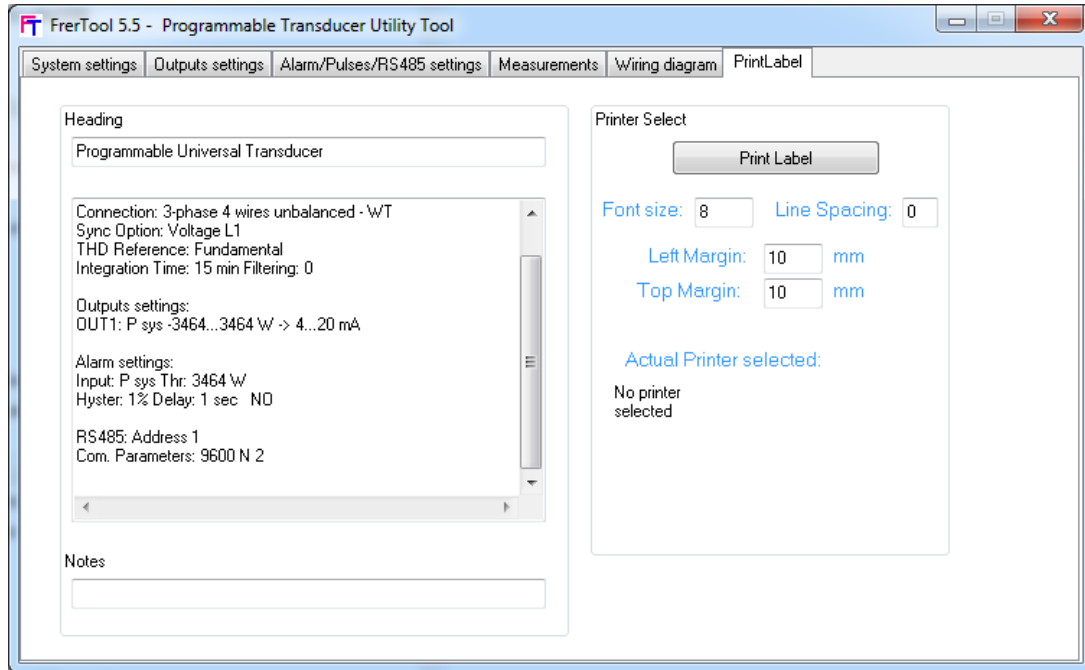
The user can select the printer, the font size, an additional line spacing (in pixels) and the top & left margins (in mm).

9. COMPATIBILITY BETWEEN TRANSDUCER FIRMWARE AND FRERTOOL VERSION.

Frertool is a software utility used to configure the transducer's hardware according to the user's preferences and requirements.

Therefore, there is a very strict connection between the software tool and the transducer firmware: many bug fixes, new features, refinements and improvements made on one side, must be reflected on the other side as well, and this can cause, in some case, problems of compatibility with the older versions.

The following table shows the compatibility level between different firmware versions and different FrerTool versions.

Production Dates	Firmware releases	FreTool releases
From 11/2010 to 04/2011	From 1.0 to 3.4	From 1.0 to 1.1
From 04/2011 to 08/2011	From 3.5 to 3.6	1.2
From 08/2011 to 06/2012	From 3.7 to 4.8	From 1.3 to 1.5
From 06/2012 to 03/2013	From 4.9 to 5.3	From 1.6 to 2.4
From 03/2013 to 02/2014	From 5.4 to 6.7	From 2.5 to 3.0
From 02/2014 to 10/2014	From 6.8 to 6.12	From 3.1 to 4.0
From 10/2014 to 04/2016	From 7.0 to 9.4	From 4.1 to 5.0
From 04/2016	From 6.0	From 5.1