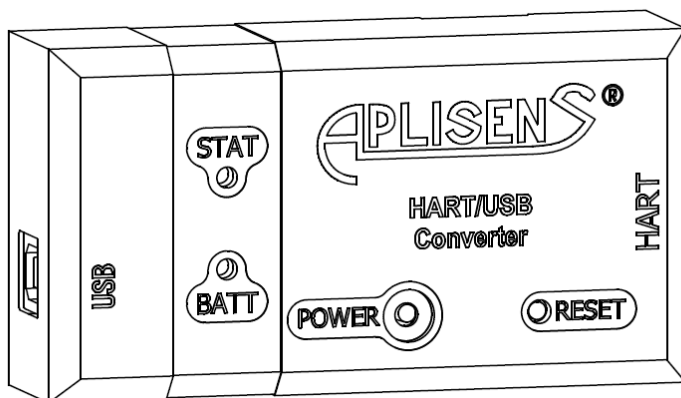





# APLISENS<sup>®</sup>

## USER'S MANUAL

### HART/USB CONVERTER



## Symbols used

Symbol	Description
	Warning to proceed strictly in accordance with the information contained in the documentation in order to ensure the safety and full functionality of the device.
	Information particularly useful during installation and operation of the device.
	Information on disposal of used equipment

## **BASIC REQUIREMENTS AND SAFE USE**



- **The manufacturer will not be liable for damage resulting from incorrect installation, failure to maintain the device in a suitable technical condition, or use of the device other than for its intended purpose.**
- Installation should be carried out by qualified staff having the required authorizations to install electrical devices. The installer is responsible for performing the installation in accordance with these instructions and with the electromagnetic compatibility and safety regulations and standards applicable to the type of installation.
- The device should be configured appropriately for the purpose for which it is to be used. Incorrect configuration may cause erroneous functioning, leading to damage to the device or an accident.
- If a device is not functioning correctly, disconnect it and send it for repair to the manufacturer or to a firm authorized by the manufacturer.



- In order to minimize the risk of malfunction and associated risks to staff, the device is not to be installed or used in particularly unfavourable conditions, where the following dangers occur:
- Possibility of mechanical impacts, excessive shocks and vibration;
  - Excessive temperature fluctuation,
  - Condensation of water vapour, dust, icing.

Changes in the production of transmitters may precede a paper updating for the user. The current user manuals are available at [www.aplisens.com](http://www.aplisens.com)

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## 1. INTRODUCTION

**1.1.** This Manual is intended for users of HART/USB Converters (hereinafter referred to as converters), containing data and guidelines necessary to understand the functioning of converters and how to operate them. It includes essential recommendations concerning installation and use, as well as emergency procedures.

**1.2.** Converters fulfill the requirements of the Directive 2004/108/EC according to the marking on plate and to the relevant “Declaration of Conformity”.

## 2. USER MATERIALS

Converters are delivered in single and/or multiple packs.

Together with the converter are delivered:

- a) Communication cable HART enabling connection of the converter to transmitter.
- b) USB cable enabling connection of the converter with computer or charger equipped with the USB connector.
- c) Software (installation version) with electronic User’s Manual on CD.
- d) Product certificate, which is also a warranty card.
- e) Declaration of Conformity EC - on request.
- f) User’s Manual marked as “IO.HB(ENG)”.

Items c), e), f) are available on the website <http://www.aplisens.com/>.

## 3. APPLICATIONS AND MAIN FEATURES

**3.1.** Converter is intended for communication with components of the automatics system equipped with HART interface:

- Wired - with computer equipped with USB connector.
- Wireless - with computer equipped with built-in or connected external Bluetooth interface.

**3.2.** Converter allows point-to-point connection between transmitters with HART protocol and PC or other device (e.g. smartphone, tablet) equipped with USB socket or Bluetooth module. Bluetooth module should support SPP (Serial Port Profile) mode. Converter is detected as virtual serial port both in case of wired and wireless connection. Transmitters with HART interface connected through the converter can be serviced by a software intended for communication with transmitters through a serial port, e.g. Raport 2, PACTware or FieldCare (through CodeWrights HART Communication DTM) and others. Radio communication is possible using application which are not requiring Carrier Detect (CD) signal. Devices with Android operating system can use “Aplisens Mobile Configurator” software.



**New converter should be connected to computer’s or charger’s USB port in order to charge internal battery.** Battery charging is signalised by BATT diode constant red flashing. Successful charging is signalised by BATT diode constant green flashing.

**User should regularly check state of internal battery’s charge in the converter.**

## 4. IDENTIFYING MARKS. ORDERING PROCEDURE

Each converter is equipped with rating plate containing at least the following information: CE mark, name and address of the manufacturer, marking of the product, serial number, type of battery and supply voltage.

Ordering procedure acc. converter Catalogue Card.



## 5. TECHNICAL DATA

### **5.1. HARDWARE REQUIREMENTS**

#### **5.1.1. Wire connection through USB connector**

- Computer equipped with USB connector; USB 2.0 Full Speed compatible interface
- Operation system, Windows XP or newer
- Microsoft® .NET Framework version 2.0 or newer (for HUBC Configurator application)

#### **5.1.2. Wireless connection**

- Computer with Windows XP (or later) operation system or other device equipped with Android operation system (4.0.3 or later)
- For PC computers: Microsoft® .NET Framework version 2.0 or higher (for HUBC Configurator application)
- Bluetooth module (integrated or included) compatible with Bluetooth 2.1+ EDR with SPP (Serial Port Profile)
- Access to the computer with USB socket or power unit with USB socket (voltage compatible with USB standard) intended for charging of internal battery

### **5.2. ALLOWABLE AMBIENT AND OPERATION PARAMETERS**

Operating temperature:	-20°C ÷ 60°C
Charging temperature	5°C ÷ 45°C
Relative humidity	<95% without condensation

### **5.3. OPERATIONAL PARAMETERS**

Power supply	internal battery Li-Ion 1950 mAh
Maximum charging current of battery	330mA
Operation time on fully charged battery	more than 8h
Maximum storage time with fully charged battery, converter switched off, at room temperature	6 months
Material of housing	polystyrene

### **5.4. WIRELESS EQUIPMENT**

Standard	Bluetooth v2.1 + EDR
Class 1	
RF output power	18 dBm

## **5.5. PERMITTED ENVIRONMENTAL CONDITIONS**

### **5.5.1. Electromagnetic**

#### **Compatibility (EMC), immunity**

Rating according to EN 61326-1-2

#### *Electrostatic Discharge Immunity (ESD):*

EN 61000-4-2

S3 level

Contact  $\pm 6$ kV

Air  $\pm 8$ kV

Criterion A

#### *Conducted Radio Frequency:*

EN 61000-4-6

0,15 ... 80MHz, 10V

Criterion A

#### *Radiated Electromagnetic Field:*

EN 61000-4-3

80MHz... 1GHz – 10V/m

1,4GHz... 2GHz – 3V/m

2GHz... 2,7GHz – 1V/m

Criterion A

#### *Electrical Fast Transient (Burst Immunity):*

EN 61000-4-4

$\pm 1$ kV

Criterion A

#### *Electrical Slow Transient (Surge Immunity):*

EN 61000-4-5

$\pm 1$ kV

Criterion B

### **5.5.2. Electromagnetic Compatibility, emission:**

According to EN 55022

#### *radiated emission:*

Distance to the antenna 3m, quasi-peak measuring:

30MHz ... 1GHz, 50dB $\mu$ V/m;

1GHz ... 3GHz, 70dB $\mu$ V/m;

3GHz ... 6GHz, 74dB $\mu$ V/m;

### **5.5.3. Climatic immunity**

#### *Ambient temperature:*

EN 60068-2-1, EN 60068-2-2

*Dry heat:* T = 60°C, RH = max 55%

*Cold:* T = -20°C

### **5.5.4. Mechanical immunity**

#### *shocks*

EN 60068-2-27

50g/11ms

#### *vibrations*

EN 60068-2-6, test Fc

up to 1,6mm for 2 ... 25Hz

up to 4g for 25 ... 100Hz

### **5.5.5. Insulation Resistance**

>100 M $\Omega$  @110V DC

### **5.5.6. Enclosure ingress protection**

Rating according to EN 60529

IP 20

## 6. CONSTRUCTION

Converter housing is made of polystyrene. Converter is equipped with two sockets: USB type B is used to charging and wired communication. RJ45-8 is used to HART communication cable.



Fig. 1. Front view of the converter

There are two buttons (RESET and POWER) and two LED diodes (STAT and BATT) located on the front. POWER button is intended for use of the converter: turning on and off or calling charge status indication. RESET button is intended for return to the factory settings, therefore button's socket in the enclosure is formed in such way that accidentally pressing of it is very difficult. STAT diode is signalling state of the converter, while BATT diode - state of the battery or battery charging state.

## 7. BUTTONS AND LED DIODES

POWER button can be used to:

- Turning on the converter.  
To turn on converter hold on POWER button for a while. Converter is immediately ready for transmission.  
Turning on process will be signalled by STAT diode flashing for 1 second and then BATT diode signals battery's state of charge.  
When converter is working, STAT diode will emit short 1 second flashes. When converter is connected by USB, BATT diode emit constant light. The colour of BATT diode is addicted by charging process.
- Check charging state of the battery.  
Shortly press button when converter is working. Converter will signal battery's state by blinking of BATT diode. STAT diode lights up when button is pressed and then goes out for the time of indicating the battery charge status.
- Switching off the converter.  
Hold down the button until STAT diode switches off.  
If converter is connected via USB during switching off, battery charging will be still in progress.

RESET button can be used to:

- Returning to the factory settings.  
It should be used only if converter is working not in accordance with this manual. Return to the factory settings can solve problem when all other connection attempts failed.



Approx. 15 seconds are necessary to restart the device. During mentioned operation converter will not react to POWER button. Reboot will be signalled by red light blinking of STAT diode, with period of 0,6s in duty cycle  $\frac{1}{2}$  (diode's light on time the same as switch off time)

STAT diode signalling:

- Converter works – short green flashes repeated after every 1 second.
- Pressing POWER button - constant green light during pressing POWER button.
- Converter reboot - short red flashes repeated every 0,6 s.
- HART transmission – short red flashes (10 times per second) during transmission with transmitter (current loop) and green flashes in the case of the opposite direction transmission.
- "Squawk" / identification- sequence of longer flashes: a cycle of 1 second of green light on and 1 second of pause. Squawk / identification of modem is switched on using HUBC Configurator or HUBC Plugin software. It is used for identification which one converter is currently connected.

BATT diode signalling:

- Battery charging process:
  - o constant red light means that the battery is being charged
  - o constant green light means that the battery is charged
- Battery condition - series of short green flashes. Number of flashes depends on charging state:
  - o state of charge: no less than 80% → 4 flashes
  - o state of charge: no less than 50% → 3 flashes
  - o state of charge: no less than 20% → 2 flashes
  - o state of charge: less than 20% → 1 flash
- Permitted charging temperature was exceed - series of short red flashes repeated after every 0,3s



No converter's reaction on buttons can be a result of battery's discharge – device is protecting battery against deep discharge by automatic switch off.

## 8. POWER SUPPLY

### **8.1. CHARGING CURRENT**

Battery is charged after connection of the converter to the computer's or charger's USB port. The maximum charging current of battery depends on current efficiency of the source. Using HUBC Configurator or HUBC Plugin software user can activate USB 2.0 Compliant mode.

With active compatibility mode, when power supply device was not recognized (e.g. connecting USB charger), the maximum charging current of battery will be reduced to value of 100mA. When power supply device was recognized (e.g. connect the PC), the maximum charging current of battery is equal to 330mA. In USB compliance mode, when host is in suspend mode, charging of battery is stopped.

If USB 2.0 Compliant mode is not active, maximum charging current of battery is 330mA and also converter does not stop charging even when USB host is switching sleep mode (e.g. PC).

### **8.2. TOOL INTENDED FOR CHARGING**

- Computer with USB port
- Charger (e.g. telephone) with USB port - Output voltage DC 5V, 500 mA.

### **8.3. INFLUENCE OF TEMPERATURE ON SUPPLY**

The converter measures the temperature of the battery and allows charging only when the temperature of the battery is higher than +5°C and less than +45°C. When boundary values are exceeded charging is stopped. BATT diode signalling the temperature outside allowable range using short red flashes, repeated every 0,3s. Converter signalling exceeding of allowable temperature during charging attempt only. Converter allows operation within the range of battery's temperatures from -20°C to 60°C. When boundary values are exceeded operation of the converter is stopped.

Return to operation is possible after increasing of temperature by 5°C when lower temperature threshold (operation or charging) is exceed or decreasing it by 5°C when the upper threshold was exceeded.

### **8.4. INFLUENCE OF BATTERY CHARGING ON OPERATION OF THE CONVERTER. CHARGING TIME**

Converter turns off automatically when battery is excessively discharged. In that case, any attempt to start results in a short green flashing STAT diode then the converter turns off. Reset of the converter (by RESET button) will be signalled by short red flashing STAT diode. In result of deep battery discharge converter will not react on RESET and POWER buttons. Device in this state is not operating, the only possible operation is to charge the battery by connecting the converter to the power source e.g. USB port of the computer or charger.



**Caution: user should not allow leaving the converter (even switched off) without charging for longer than 6 month period, especially when battery has not been fully charged.**



**In case when battery cannot be charged the converter should be sent to service in order to replace the battery. Battery can be replaced only by the manufacturer or authorized unit.**

Time required for complete charging of new and completely discharged battery, using 100 mA current, is about to about 20 hours. In case of bigger power (330 mA) this time is shortened to approx. 7 hours (user should get acquainted with option "Compatibility with USB" presented in p. 11).



Fully charged battery is enough for at least 8 hours of continuous operation in room temperature with wireless transmission. This time can be lengthen and depends on radio conditions, distance between devices, time intended for radio transmission as well as of type of cooperating module.

## **8.5. SIGNALING STATE OF CHARGE**

Device is signalling battery's condition on two ways: after short pressing of POWER button the BATT diode will signal battery's charging state by flashing. User can also use HUBC Configurator application to connect with the converter or use Raport 2 application (HUBC Plugin) and then read battery's charging state (bar "Battery")

Light code of the BATT diode is following:

- Four flashes: → state of charge: no less than 80%
- Three flashes: → state of charge: no less than 50%
- Two flashes: → state of charge: no less than 20%
- One flash: → state of charge: below 20%

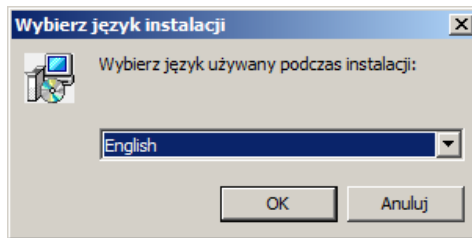
Percentage values of charge are approximate and are based on estimation of charging state on the basis of battery's voltage and its temperature.

## 9. SOFTWARE INSTALLATION

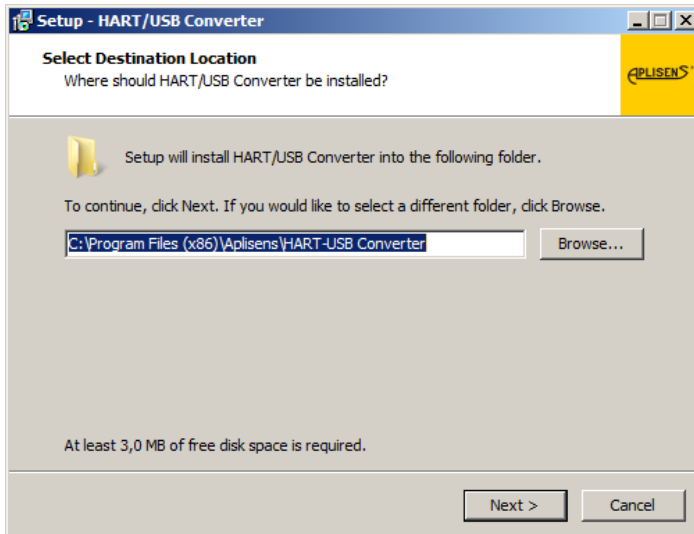
Application package supplied with the converter consists of:

- Configuration application of the converter - HUBC Configurator.
- Tool for update firmware - HUBC Flash Loader.
- USB controller's driver of the converter – Drivers directory.
- Plugin for Raport 2 application – HUBC Plugin (in case of installed application Raport 2).
- Microsoft® .NET Framework 2.0 (optional installation in case when it is not installed in the operating system).

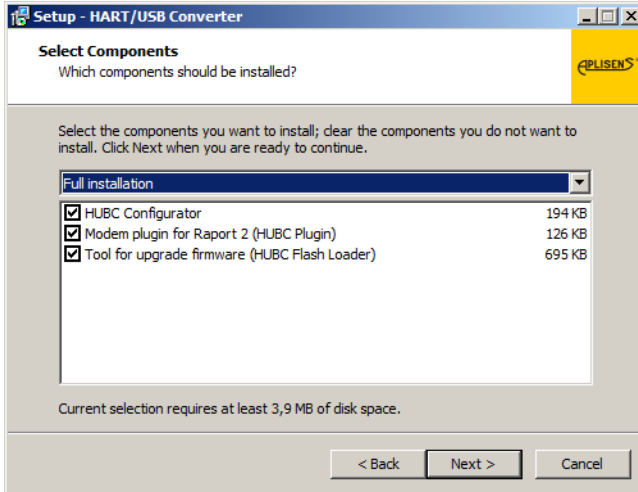
To install software user should execute file **Setup.exe**. Window, where Polish or English language of installation should be selected, will be displayed.



Installation window will be displayed. User should select installation path:



Then user should select version of the installation:



If user does not expect to update converter's firmware on his own, switch next to the option "Tool for upgrade firmware (HUBC Flash Loader)" should be unchecked. Detailed information about exchange of converter's firmware updates are contained in the help file of HUBC Flash Loader.

In case when installer will detect program Raport 2 installed in system, it will install automatically plugin called HUBC Plugin. This plugin enables configuration of the converter from the level of Raport 2 application. During first connection of the converter via USB port the system will automatically install drivers of USB controller which is built-in the converter. If operating system will not find automatically drivers, these should be found manually in subfolder Drivers.



## 10. CONNECTION

Method of connection of the converter to the transmitter and to computer is presented on the figure:

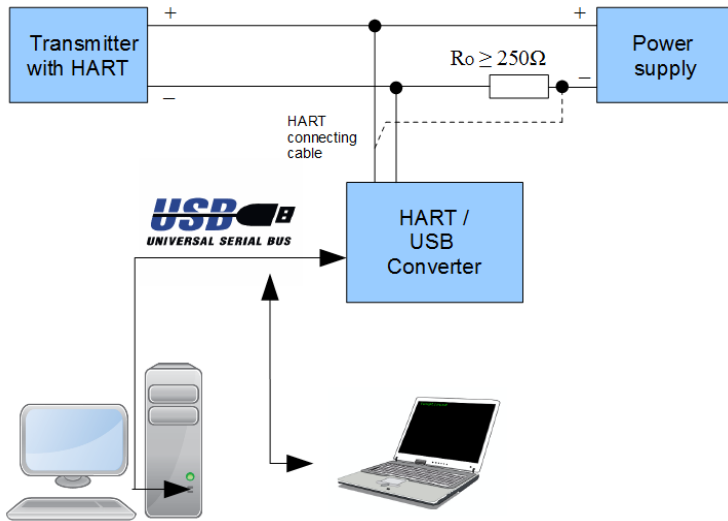


Fig. 2. Example of connection with the computers using USB

**i** Connection of the converter with transmitter should be realized according to the “User’s Manual” of this transmitter.

**i** Converter has a set of internal commands enabling to exchange data between it and computer. It allows checking connection with the converter and it’s configuration, without connected transmitter.

In given moment the converter can operate on one transmission channel: wired via USB or wireless. If converter is connected to USB port in the computer, establishing of radio communication is not possible (radio module is disconnected and relevant serial port is inactive).

**i**

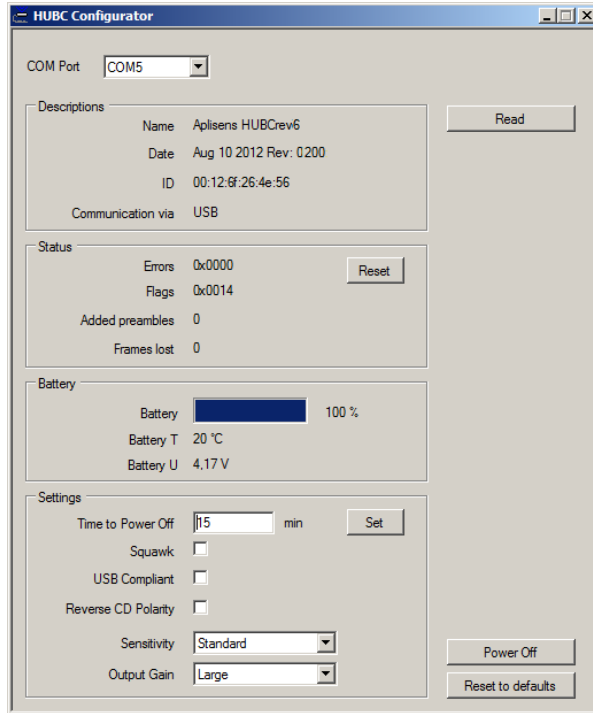
Provided application HUBC Configurator is intended for configuration of the converter. This application can be also used for quick confirmation of the communication. For communication with HART transmitters through the converter any software dedicated for this purpose can be used. Converter’s manufacturer recommends using Raport 2 application.

### CHECKING OF CONNECTION:

After correct installation of the USB drivers new serial port should appear in the system. Serial port is visible only when USB cable is connected to converter. Wireless communication is possible only after previous connection with converter. Wireless connection with converter can be established using Windows operating system tools or with adapter’s dedicated software. After successful connection new serial port should be available in the system. Checking of connection through both types of connection will be discussed on the example of COM5 serial port

To check whether connection between the computer and the converter can be established, user should start application HUBC Configurator (Start Menu \ All programs \ Aplisens \ HART-USB Converter). Application’s window is presented below.

COM5 port should be selected from the list and button “Read” should be pressed.



After several seconds information in application’s window will be refreshed, what means that they are correctly read from the converter and it is ready for operation.



If data cannot be readout and program is signalling error, user should firstly make sure, that the converter is switched on. Troubleshooting information regarding the converter is included in the p. 13

## 11. CONVERTER CONFIGURATION

Converter could be configured using HUBC Configurator or HUBC Plugin. HUBC Plugin is a component of Raport 2 software.



Application opens single window after start. This window is presented below (example of connection using USB).

The screenshot shows the HUBC Configurator window with the following details:

- COM Port:** COM5
- Descriptions:**
  - Name: Aplisens HUBCrev6
  - Date: Aug 10 2012 Rev: 0200
  - ID: 00:12:6f:26:4e:56
  - Communication via: USB
- Status:**
  - Errors: 0x0000
  - Flags: 0x0014
  - Added preambles: 0
  - Frames lost: 0
- Battery:**
  - Battery: 100% (represented by a full blue bar)
  - Battery T: 20 °C
  - Battery U: 4,17 V
- Settings:**
  - Time to Power Off: 15 min
  - Squawk:
  - USB Compliant:
  - Reverse CD Polarity:
  - Sensitivity: Standard
  - Output Gain: Large

Buttons visible in the interface include: Read, Reset, Set, Power Off, and Reset to defaults.

Descriptions of the individual field of the configurator's window are presented in the table:

<b>Field name</b>	<b>Function and operation</b>
<b>COM Port</b>	<p>It contains serial ports currently detected in the system.</p> <p>User should select serial port matched with the converter, switch on converter and make sure that it is operating (STAT diode is flashing), then press <b>Read</b> button. Serial port will be opened and data from converter will be read and then port will be closed. In case of USB it is almost immediately.</p> <p> <b>If incorrect data will be displayed in the program's window or program will issue a message about error, it means that there is no connection with the converter – user should get acquainted with p. 9. Software installation and 13. Troubleshooting.</b></p>
<b>Descriptions frame</b>	<p>The frame presents in turn:</p> <ul style="list-style-type: none"> <li>- Code name of the converter.</li> <li>- Date of last software compilation (firmware) of the converter as well as number of revision of this software.</li> <li>- Unique address of the wireless communication module (readout also during connection through USB, even wireless module is not active).</li> <li>- Currently selected communication channel (wired or wireless).</li> </ul>
<b>Status frame</b>	<p>Frame contains cumulative information concerning wired or wireless transmission, collected from last reset of the converter or deleting errors.</p> <ul style="list-style-type: none"> <li>- Labels <b>Errors</b> and <b>Flags</b> - contains coded information about transmission errors with transmitter.</li> <li>- Labels: <b>Added preambles</b> and <b>Frames lost</b> – gives information about activity mechanism intended for adding HART preambles, which eliminates the results of occurring data holding (especially during wireless transmission) effects of, what can result in transmission stoppage. Label <b>Added Preambles</b> gives information about number of preambles added by converter to HART frame. Label <b>Frames lost</b> gives information about number of HART frames which had been lost, despite extension of preamble.</li> </ul> <p><b>Reset</b> button is used to delete data concerning errors and added preambles which are stored in the device.</p>
<b>Battery frame</b>	<p>Gives information about approximate, expressed in percent, battery state of charge, measured voltage and temperature of battery.</p>
<b>Settings frame</b>	<p>It allows to configure the following parameters of the converter:</p> <ul style="list-style-type: none"> <li>- <b>Time to Power Off</b> – value of time [in min.] after which the converter will be switched off in case of lack of communication via radio. Value 0 indicates switching off the function. Automatic shutdown function is not active during connection through USB.</li> <li>- Option <b>Squawk</b> switches on (if selected) blinking of STAT diode, with period of 2s and duty cycle 50% (diode's flashing time the same as switch off time). It gives an opportunity to distinguish selected converter from others. Switching off or reset of the converter results in switching off this mode.</li> <li>- Option <b>USB Compliant</b> switches on (if selected) compatibility of the converter with USB 2.0. Thanks to USB 2.0 Compliant mode converter will be able to stop battery charging in case of USB host (e.g. laptop) entering sleep mode. This will prevent unwanted discharging the battery of the USB-host when the device is battery powered</li> <li>- Option <b>Reverse CD Polarity</b> switches on (if selected) reversion of CD signal (Carrier Detect) of serial port during transmission via USB. User should switch on this option, if program for communication used requires CD signal and is signalling no connection with this transmitter.</li> </ul> <p> Some program for communication with transmitter with HART protocol can use this signal to confirm presence of HART carrier and to avoid collision with other devices transmitting to the transmitter.</p> <p>Because in case of HART transmission, signal CD has other reference to carrier presence than in case of classic modem transmission RS232, some programs interpret activity of CD signal inversely. Discussed option</p>

(if selected) allows solving this problem.



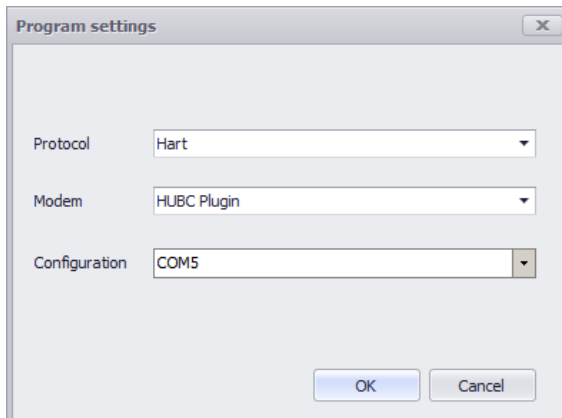
In case when Raport 2 is used and HART carrier must be checked (what means selection of classic HART Modem Plugin and "Check carrier" option – switch Reverse CD Polarity should be turned off.

- Options **Sensitivity** and **Output Gain** allow to set up sensitivity of HART receiver and an amplitude of output voltage HART. The other settings than the standard are helpful in a very disturbed environment or when connection with transmitter using standard sensitivity and amplitude values is impossible.  
Sensitivity value "Higher" has a common meaning, it indicates better sensitivity when weaker signal HART can be received.
- Button **Power Off** results in immediate switching of converter to sleep mode. Another switching on can be made only using button (also in case of hibernation of the converter when there is no transmission).
- Button **Reset to defaults** is used for immediate restart of the converter, what is connected with loss of transmission for approx. 15 seconds and deleting of all settings. Next switching on can be made only when STAT diode will start to flash again – what is an indication that restart is finished.

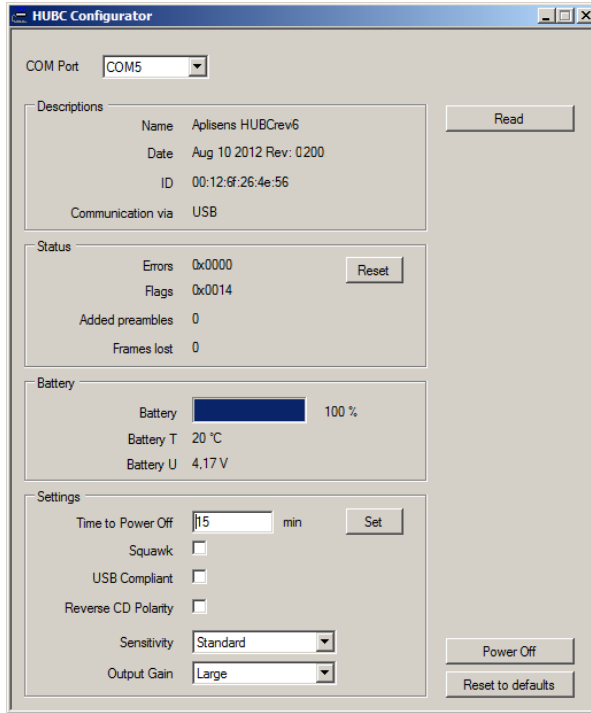
## 12. ESTABLISHING CONNECTION WITH TRANSMITTER WITH HART PROTOCOL

Establishing connection with transmitter through a converter will be described on the example of Raport 2 application created by Aplisens S.A. To establish connection user should perform the following operations:

- Connect HART cable to current loop of the transmitter on resistor's terminals  $R_o \geq 250\Omega$  or in different way according to the user's manual of transmitter.
- Switch on converter and make sure that STAT diode is flashing.
- Establish connection with the converter. If communication is via USB, connect the converter with a computer using a USB cable. In case of wireless connection is not permitted to connect USB cable. Virtual serial port should be created by recommended software (Windows operating system tools or Bluetooth adapter's dedicated software). Number of serial port could be established by Window's "Devices and Printers" panel or in the Bluetooth device properties. After adding new Bluetooth device, pairing procedure should be done. Pairing procedure could be very different. It depends on software used, or it can be done automatically.
- Start Raport 2 application, then select menu item Program settings. The following window will be displayed:



- Select options in turn: Protocol - Hart, Modem - HUBC Plugin
- Clicking selection bar Configuration will open window (presented below) enabling to configure the converter's setting:



It offers the same functions as HUBC Configurator application and can be used interchangeably with HUBC Configurator application (setting made by the user are stored in the converter until the device is reset).

- Select appropriate COM port.
- Make single data readout to ensure that there is connection with converter.
- If changes are needed, user should proceed according to the p.11.
- Close window by pressing OK (if changes were made), then use Raport 2 application according to its servicing instruction.



User can use settings window during work for, among other things, preview battery charging state.



In case when window is used for preview converter's condition during transmission to transmitter, the window should be closed by pressing Cancel button (each pressing OK will result in necessity to detect transmitter one more time and will delete collected measurement data).



Converter is equipped with radio module operating in band 2.4 GHz (ISM) Class 1, what will ensure, together with Bluetooth adapter of the same class, range up to 100m in open space. In case when Bluetooth Class 2 (or built-in module) adapter is used the range of radio communication is reduced to 10m in open space



Range of radio connections can be reduced as a result of interference with near devices transmitting on the band 2.4 GHz, such as mobile phones, wireless networks and other. Presence of such devices will worsen quality of radio connection.

## 13. TROUBLESHOOTING

Typical examples of problems connected with converter's operation and solutions are presented below.

### Converter does not switch on. STAT diode is not flashing.

- Press shortly POWER button.
  - In case when there is no reaction of any LED diodes - connect converter with computer or charger using USB cable.
    - If BATT red diode lights it means that internal battery of the converter is charged. User should leave device connected to USB until battery is fully charged, what will be signalled by change of BATT diode's colour to green. Converter is ready for operation after charging the battery.
    - If green diode is lighting and device can be switched on - it means that there is different problem with battery, e.g. its natural wear. If this problem will occur again - user should contact service.
    - If after connection of USB cable, device cannot be switched on or BATT diode does not light, then device should be restarted by pressing RESET button. If converter cannot be switched on and STAT diode is not signalling correct operation - test should be repeated.

In case when after performing of the above mentioned operations the converter still cannot be switched on - user should contact service.



It is not recommended to establish connection with converter via a wireless connection during restarting the device (connection will not be established).

### It is impossible to establish connection with the transmitter through a HART using USB.

- Establish whether converter is switched on and STAT diode is flashing.
- Search for serial port assigned to the converter in system. It can be determined e.g. by observation of Device Manager window in system, branch "Ports", during connection of the USB cable to the computer. New serial port should be displayed.
  - If converter had not been detected, it can indicate that USB port is damaged, cable is damaged or driver of serial port in system had not been installed.
  - If Windows operating system is signalling device conflicts, not installed drivers or unknown devices (especially USB), such problems should be solved first.
  - If many USB serial devices were connected to computer and a lot of ports were installed (reserved), user can try to uninstall part of them.
- Establish connection with the converter using HUBC Configurator software (this application is described in p. 11 Converter Configuration).
- User should press button Read in the application's window.
- User should check sensitivity and gain settings for HART signal and set:  
Input sensitivity: Standard  
Output gain: High
- Check correctness of HART circuit.
- Check whether transmitter is supplied and operational and whether HART cable is not damaged.

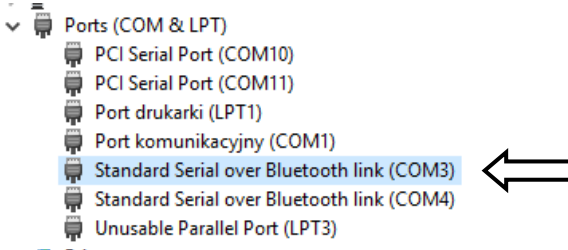
If connection still cannot be established - user should contact service.

### It is impossible to establish connection with the transmitter through a HART using wireless connection with computer devices.

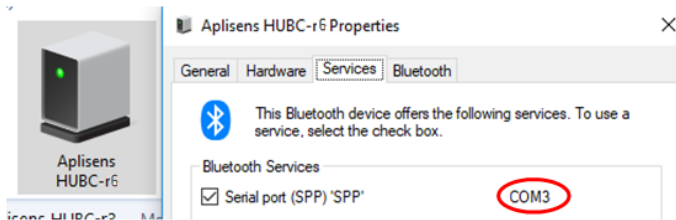
- Disconnect converter from computer, if it was connected (it blocks radio transmission).
- Check whether converter is switched on and it works (STAT diode must flash).
- Establish, whether connection with converter can be established, among other things in the following way:

- Check which serial port is assigned to converter in the Windows system. It can be made in the following way:

- Observing the Device Manager window in system, branch “Ports”, during connection of the USB/Bluetooth adapter to the computer.
  - At least one, new serial port should be displayed as it is presented below.



- Detecting connected Bluetooth devices and checking whether device named **Aplisens HUBC-r6** is present.
  - Check in device properties, which serial ports SPP (Serial Port Profile) are assigned to it, as presented on the below figure.



- If there is no such device in the system, user should search for new Bluetooth devices and add device with proper name to the system, selecting option to manually enter pairing code, which is 1234 (see p. 9. Software installation).
  - If detection of the device is impossible, user can try to reduce distance from the computer to converter.
  - If many Bluetooth devices are connected to computer and/or many serial ports connected with these devices, user should try to remove these devices and serial ports and then repeat searching and adding of new device. Examples of correctly installed HART/USB Converter are presented above.
- When the correct serial port is found, user should connect with it using HUBC Configurator application (application is described in p. 11. Converter Configuration).
  - User should press button Read in the application’s window and check state of the converter.

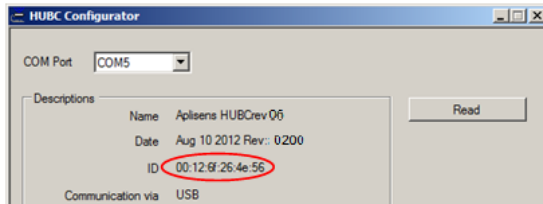
Proceed further, as described in point concerning problem with establishing connection with transmitter via USB.



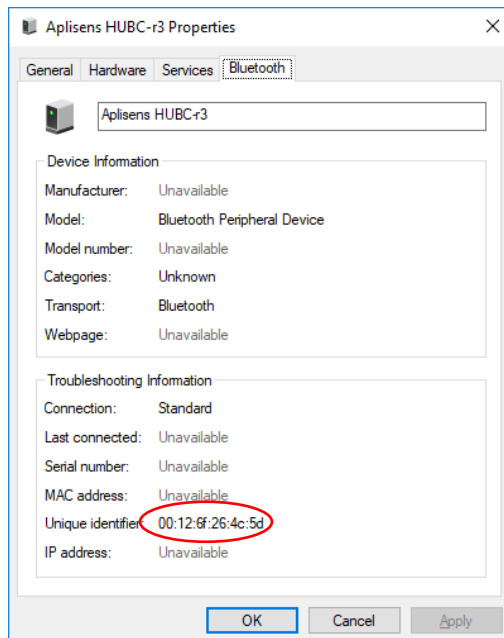
**There are many converters within the range of computer, but only part of them should be installed. How to recognize them?**

It is undesirable to install all converters detected by computer e.g. taking into account further conflicts between computers connecting to the same converter. To identify converter user can use a fact that its address when connected via radio is presented also during USB connection.

- Connect converter via USB.
- Start HUBC Configurator application (remembering to select appropriate serial port).
- Make a readout and note converter's address presented in window (see red highlight):



- Disconnect USB cable and make sure that STAT diode is flashing.
- Proceed to searching for Bluetooth devices.
  - If many converters (Aplisens HUBC-r6) were detected, than user can preview it unique address in properties of each device and then compare it with the noted one. Example of detection of other (incompatible) address is presented below:



As it can be seen, checked converter **is not** the one which was connected via USB cable.

- Check next detected converter, and if the ID is compatible, assign it to the computer.

## 14. INSPECTIONS AND SPARE PARTS

Dirt formed should be removed with damp, soft cloth.

Do not rub enclosure through when it is dry.

Converter's components, which can be worn: USB cable and HART communication cable.

## 15. PACKING, STORAGE AND TRANSPORT

Converters should be packed in such way that they are protected against damaging during transport, in unit and/or omnibus packages.

It should be stored in packaging's, in covered room, free from vapours and aggressive substances in conditions conforming these given in p. 5.2, allowable ambient and operation parameters.

Storage conditions the same as in case of computer and peripheral devices.

## 16. WARRANTY

The Manufacturer warrants under the conditions specified in the Product Certificate which is also a guarantee card.

Manufacturer provide warranty for 12 months, from the date of purchase on batteries

## 17. SCRAPPING, DISPOSAL

Waste or damaged converters should be dismantled and disposed of in accordance with Directive (2012/19/UE) on waste electrical and electronic equipment (WEEE) or returned to the manufacturer.

## 18. REFERENCE DOCUMENTS

- Raport 2 application.
- User's manual of the device with HART interface.



