DRESSER
ACTARIS GAS

Wincor Evo

for Corus Evo+ Configuration

810-2001-05
AA

EN **User guide**

Contents

1. Important Safety and Compliance Information

This section provides important information for your safety and product compliance.

Modifications and Repairs
To ensure system performance, this device and its components shall not be changed or modified without express approval of Dresser Utility Solutions, unapproved modification or operation beyond or in conflict with test instructions for use could void the user's authority to operate the device.

In case of malfunction, all repairs should be performed by Dresser Utility Solutions. It is the responsibility of user requiring service to report the service need to Dresser Utility Solutions.

Lithium Battery Safety
The lithium battery may cause a fire or chemical burn if it is not disposed of properly. Do not recharge, disassemble, heat above 100 °C, crush, expose to water or incinerate the lithium battery. Keep the lithium battery away from children, fire, explosion, and severe burn hazards.

Intrinsic Safety
The substitution of components may impair intrinsic safety. Externally power connected to Corus Evo+ should comply with the Intrinsic safety recommendation.

2. About Corus Evo+

Corus Evo+ is an electronic volume converter for commercial and industrial natural gas applications. By measuring temperature and pressure from the gas flow in the meter, Corus Evo+ provides extremely accurate data improving billing precision for utilities and gas distributors. With superior accuracy certifications, simplified maintenance, and vast options, Corus Evo+ is the fundamental component of a reliable gas distribution solution for C&I customers.

The converter has been designed and approved according to the harmonized standard EN 12405-1:2018 as a Type 1 converter and can be used as a T, PT or PTZ converter. Corus Evo+ could be offer according to Class A accuracy (0.3 % according to EB12405-2 2012).

It's can also be used without its sensors as a data logger (without performing volume conversion). In this case it does not perform any metrological activity.

It has a built in a housing made of durable plastic with IP66 rating, equipped with a graphic display or segment display and 6-key keypad.

Corus Evo+ is powered by a battery pack, with several options (1 D size battery pack or 2 D size battery pack). Also, it can be powered by an external power supply.

For gas pressure measurement, the device is equipped with a standard digital pressure sensor and a digital temperature transducer. The gas consumption from gas meter is transmitted to Corus Evo+ via gas meter pulse output either LF, HF, Cyble SC or gas meter absolute encoder.

In addition to the pulse inputs, Corus Evo+ has binary inputs that could work as control inputs to check the connection to a gas meter or perform other functions such as monitoring the state of the safety quickly closing valves, condition of the door etc. Also, it has digital outputs that can be configured as pulse, binary, or data output.
Corus Evo+ comes as a standard a serial interface for RS232 or RS485. It has many communication protocols to ease communication to many SCADA systems.

Additionally, it could be installed with a built-in modem either 4G or legacy 2G (GSM/GPRS) networks.

Corus Evo+ modular design allows a wide range of user customization. The device can be configured using the keypad of the device or with Wincor Evo. The software also allows reading, displaying, and archiving both actual measured values and the internal archives contents.

3. Installation Wincor Evo

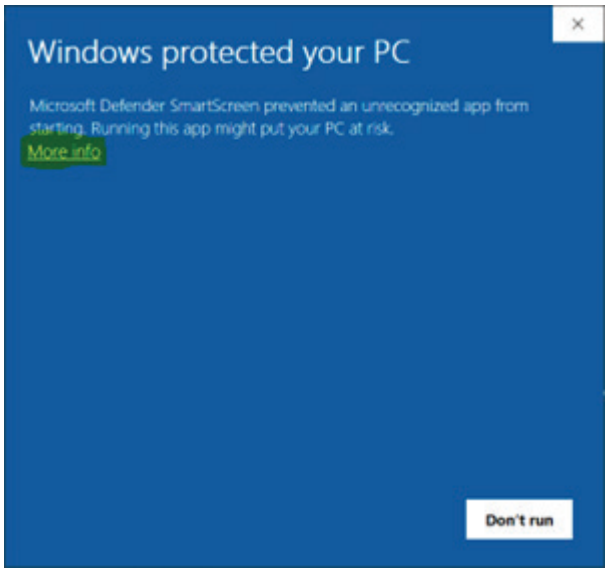
Wincor Evo+ is a local configuration tool for Corus Evo+ reading and programming. The software is dedicated to Windows OS environment. Wincor Evo can be used for local communication either through Optical port (interface type IEC-1107), and RS232 port. In case, the Corus Evo+ is installed in the field, intrinsic safety connection between computers to Corus Evo+ is mandatory.

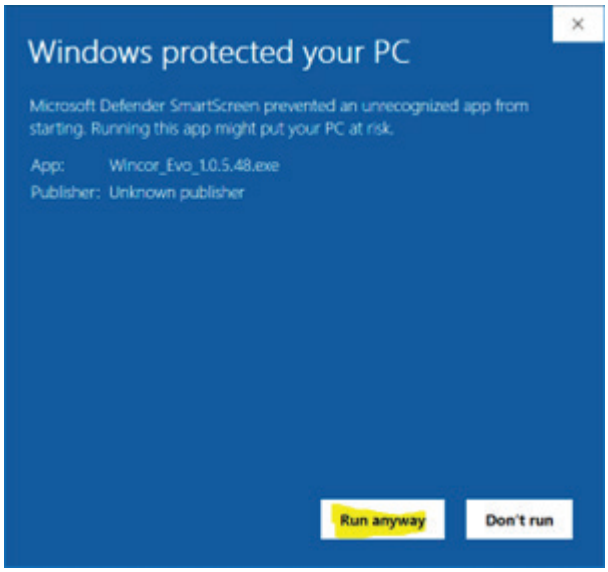
Wincor Evo is tested under Windows 10 OS and Windows 11 OS and require at least 180 MB of free space to proceed with the installation.

Installation Procedure

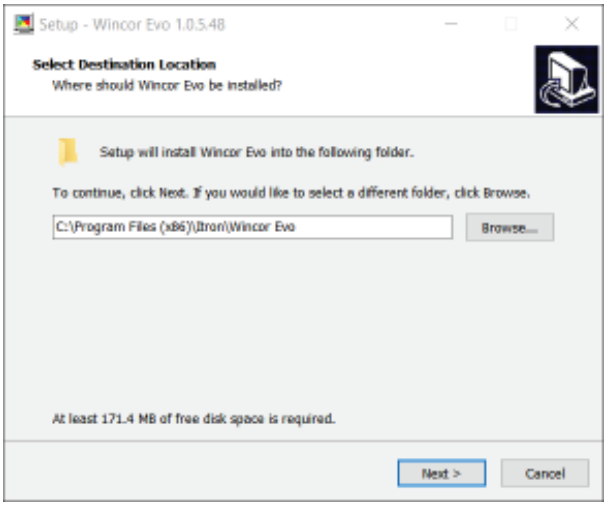
If Wincor Evo is delivered in zip format, make sure you unzip it and then click Wincor_Evo.exe to install the program. It is recommended to run the Wincor Evo.exe as administrator to avoid any complication to run the program later.

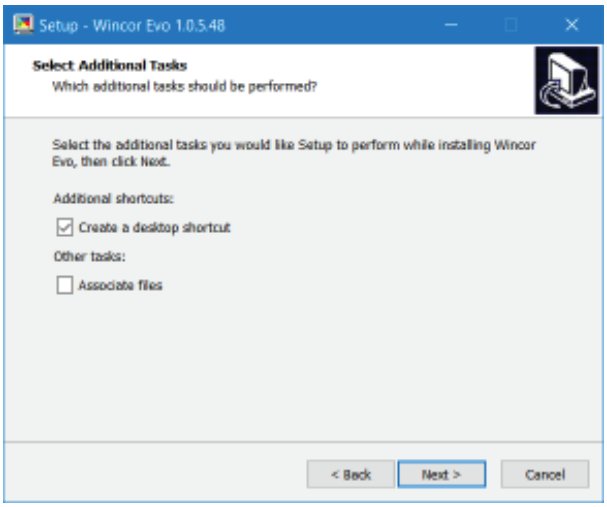
In case Windows OS warning as below, click on "More info" and then click "Run anyway to proceed with the installation.

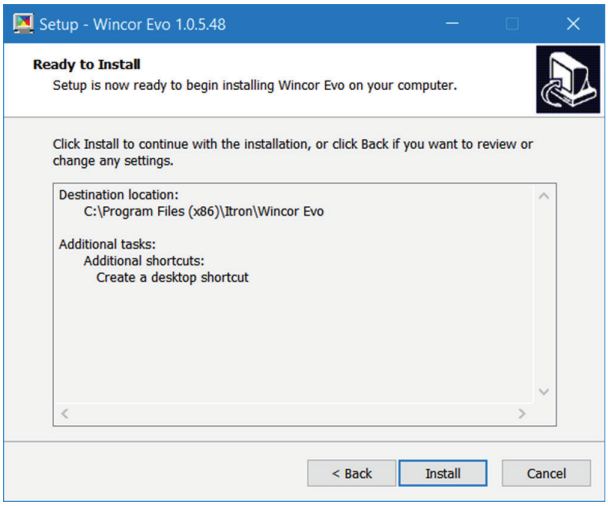


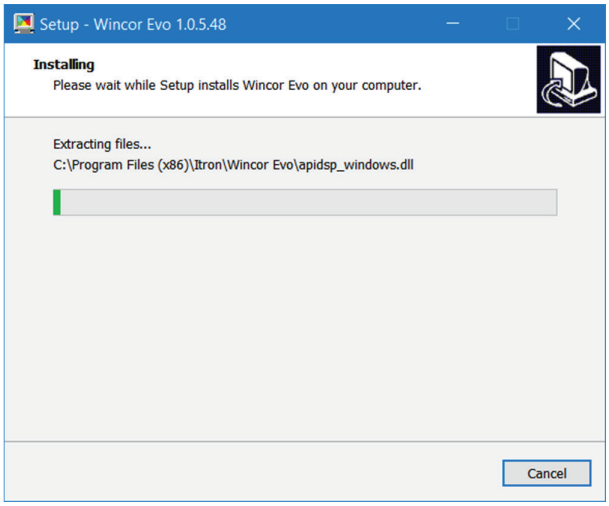


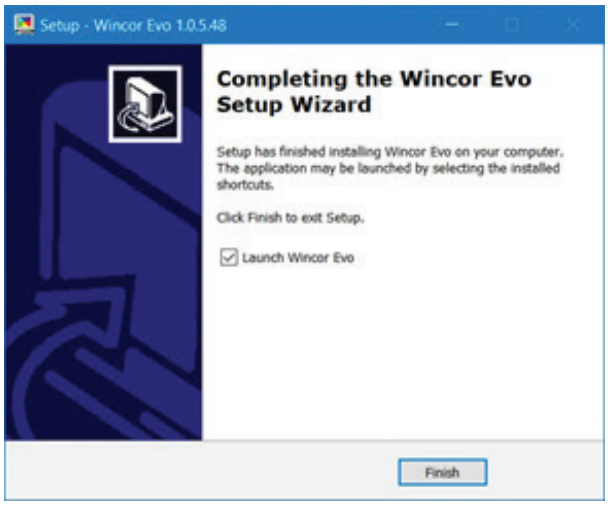
It is recommended to install the Wincor Evo in the default folder, however if you choose to install on another folder, you are free to assign the folder as you like.











Completed the installation by clicking on "**Finish**" to complete and launch Wincor Evo.

4. Wincor Evo Start Up

Wincor Evo has 3 modes (Simple, Standard and Professional). When Wincor Evo start up, the options are available on the main screen:

1. Option to select different user interface language: i.e., English (GB), English (US), Chinese (Simplified), Chinese (Traditional) etc.
2. Wincor Evo mode

   a. **Simple Mode** – this is for basic configuration tool for user, and it is suitable for user in the field. The wizard instruction in the program helps user to get through the basic setting.

   b. **Standard Mode** – having all simple mode option, this mode allows user to perform advanced device setup such as parameters configurations and data viewing, exporting and formatting. This is recommended for users with good knowledge of Corus Evo+.

   c. **Professional Mode** – having all standard mode options and reserve for Dresser Utility Solutions and advanced users.

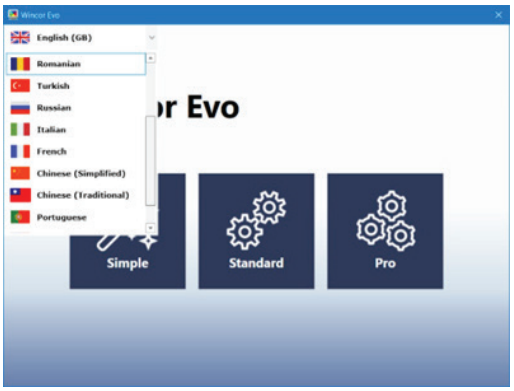


Figure 1 show Wincor Evo main screen user interface.

5. Device Authentication and Access

Corus Evo+ comes with 2 types of security level, High-Level Security (HLS) and Low-Level Security (LLS).

Please take note, it is not possible to switch from Corus Evo+ HLS to LLS or vice versa. It is only possible to reprogram the Corus Evo+ HLS to LLS and vice versa in the factory.

5.1. Corus Evo+ With High Level Security (HLS)

HLS is based on an individual encrypted key applied in factory. This encryption can neither be deactivated nor its key be changed. The key identification is based on installed Wincor Evo and Corus Evo+ serial number.

Under HLS, the device configuration cannot be changed or modified via keyboard. This is a security measure to protect device from being tampered by unidentified users.

The security key must be requested from Dresser Utility Solutions and security key in PGP file format that must be generated in Wincor Evo.

5.1.1. Encryption Keys Generation for Corus Evo+ HLS

The following are procedures to generate Wincor Evo HLS security keys for Corus Evo+ devices.

The generated security key is computer specific for each Wincor Evo installation. Encryption public key sent to Dresser Utility Solutions is computer specific based on installed Wincor Evo and Corus Evo+ serial number.

The encryption public keys must be sent to Dresser Utility Solutions with Corus Evo+ serial number to request for the right HLS security keys. In return, Dresser Utility Solutions will send to requester a security key file in pgp format to be imported on installed Wincor Evo.

Steps to generate Encryption Public keys for Wincor Evo are as described below.

a. Login to Wincor Evo

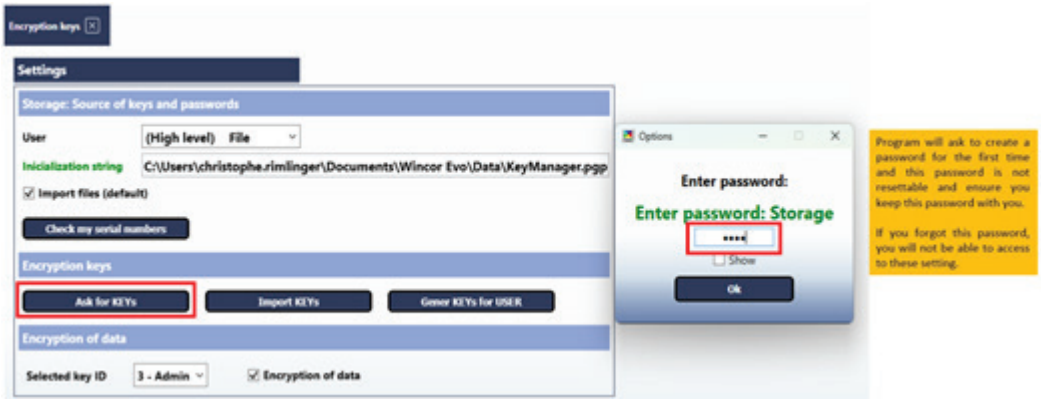
b. Login under either "Standard" or "Pro" mode and then click "Security" tab menu

c. Select "Encryption keys" under "Security" main menu (see screenshot below)

d. Under "Encryption keys" -> "Setting" -> "User", select "File" then click on "Ask for KEYs"

e. Set password and then click "Ok" to continue.

Make sure not to forget the input Wincor Evo "Password", as Wincor Evo will ask for password every time a user try to access Corus Evo+. If password was lost or forgotten, you will not be able to reset and access Corus Evo+ devices.



In the event, the password was lost, the following are the steps to recover the access to the Corus Evo+ device.

*I. Restart your Wincor Evo and follow step 5.1.1 "a" to "e" to re-generate a new encryption public key file and send to Dresser Utility Solutions with Corus Evo+ serial numbers to access for a new encryption key *.pgp file.*

II. Under Wincor Evo "Data" folder (C:\ \Documents\Wincor Evo\Data) delete

- *Previous generated encryption public key file (*.public)*
- *Previous Dresser Utility Solutions provided encryption key file (*.pgp)*

III. Under Wincor Evo "Log" folder (C:\ \Documents\Wincor Evo\Log) delete

- *PGP.log file*

f. Send the new encryption public key with requested Corus Evo+ serial numbers to Dresser Utility Solutions.

The encryption public key is located at C:\User\....\Wincor Evo\Data or click on the link above to locate the folder.

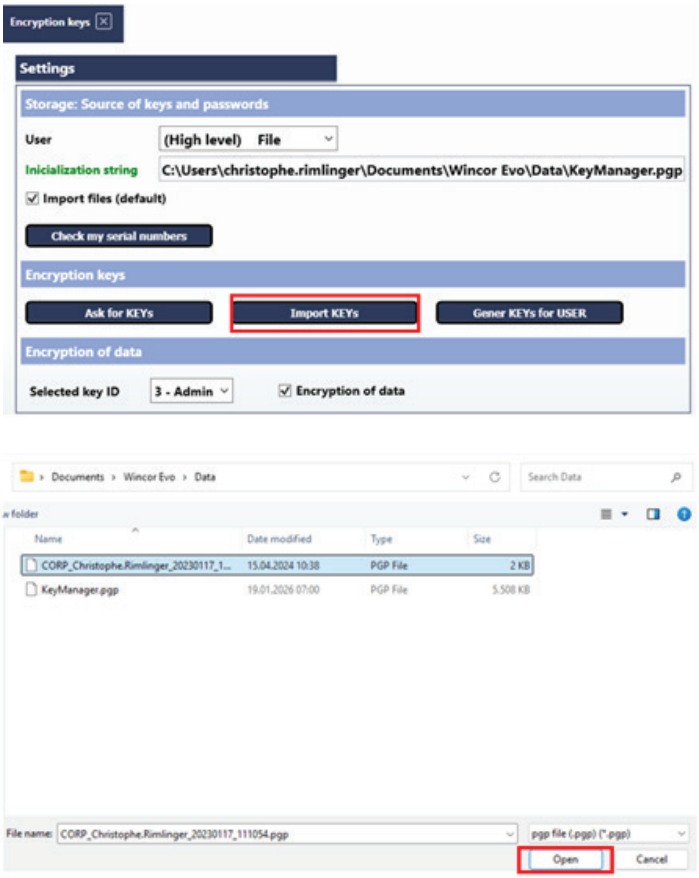
5.1.2. Importing HLS Encryption Keys (*.pgp) file to Wincor Evo

Upon receiving Dresser Utility Solutions *.pgp security keys file, import the file to Wincor Evo by selecting "Import KEYs" (see screenshot below)

To add new Corus Evo+ in future, kindly send the same encryption public key file (*.public) and new Corus Evo+ serial numbers to add to Dresser Utility Solutions.

The following steps are to import security *.pip file in Wincor Evo.

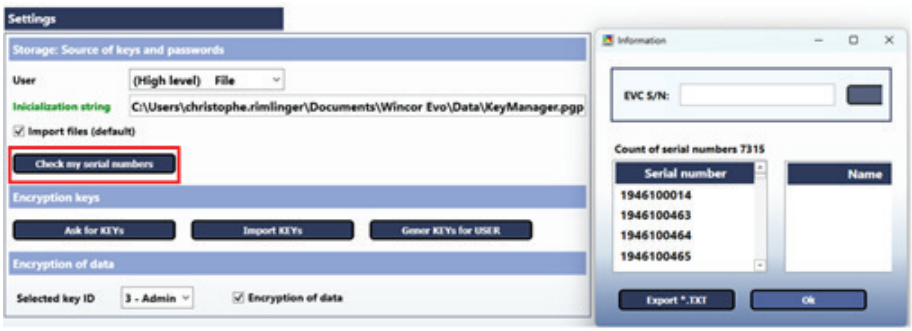
a. Copy received *.pgp files to c:\User\....\Documents\Wincor Evo\Data\. Then select "Import KEYs" and select *.pgp file. Click "Open" to import the security keys.



b. Upon successful importing the security keys, the following dialog box will appear

c. Check imported Corus Evo+ serial number security keys to ensure the request Corus Evo+ device is listed in Wincor Evo.

The password entered previously will remain active until the program is closed.



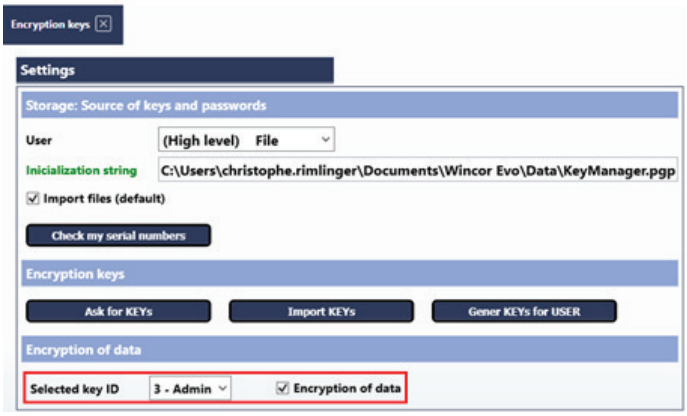
d. Connecting to Corus Evo+.

First set up your communication COM port, relevant device protocol (i.e., IFLAG Evo or Modbus or etc.) then click on "Test connection to device" to determine COM port is well established between your PC and Corus Evo+ device.

e. Wincor Evo will prompt user to enter user password.
The password is the same password when generating the public encryption keys.

f. Before reading Corus Evo+ device, make sure "Encryption of data" box is selected (see screenshot below). When reading Corus Evo+ HLS device a "Key" icon will be displayed in the upper right corner of Wincor Evo.

- The yellow **key** means communication encryption is running
- The green "**P**" symbol means communication with Corus Evo+ is done based Dresser Utility Solutions HLS.

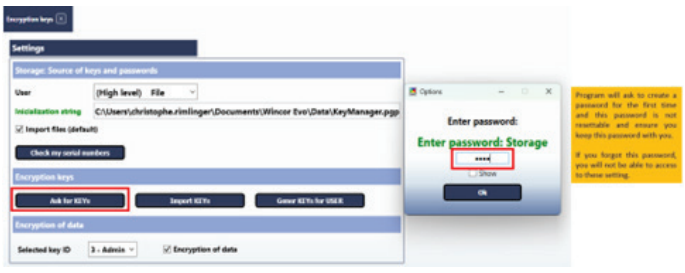


5.1.3. Generating HLS Encryption Keys for Other Users

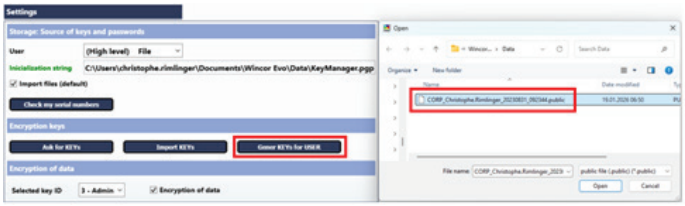
The following are steps to transfer Corus Evo+ security keys for another PC. Make sure you follow these steps strictly to ensure security key (*.pgp) is successfully transferred.

a. Generate encryption of public keys from new computer Wincor Evo then follow steps in section 5.1.1 above.

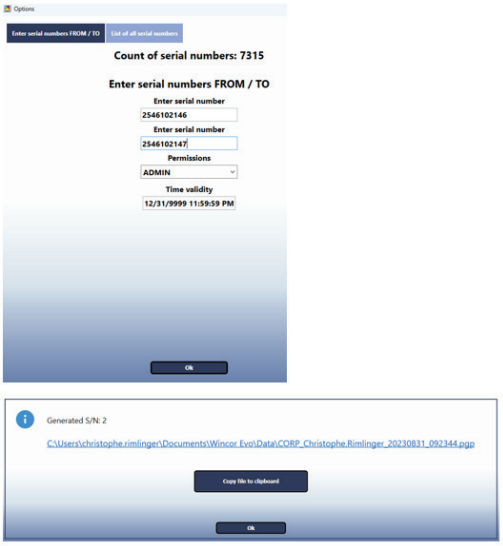
If users forget or lose their password, it will not be possible to access Corus Evo+ devices with previously given encryption keys.



b. In the "administrator laptop" with Corus Evo+ encryption key, click "Gener KEYS for USER", then select the new user encryption public key and click "OPEN" to continue.



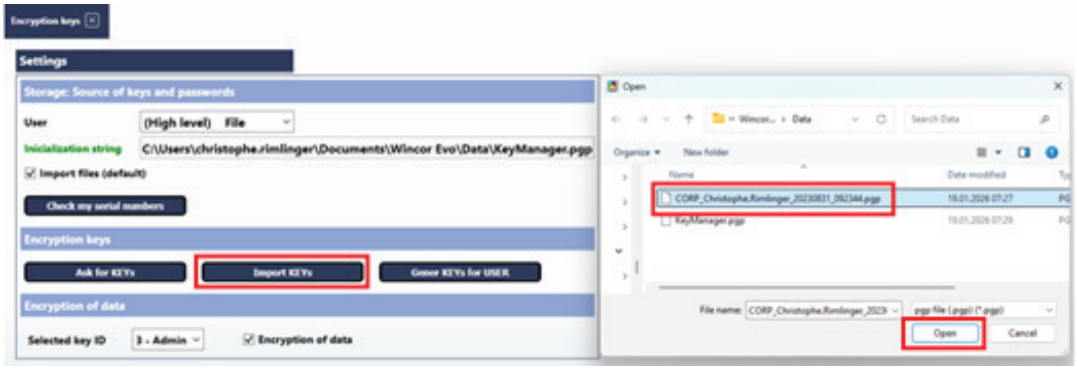
c. Input Corus Evo+ serial numbers to transfer, user permission level and time validity for new user. Click "OK" to continue.



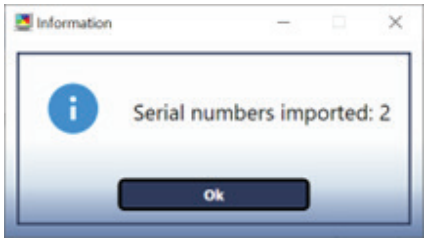
d. Go to the folder where the generated security key *.pgp file was generated and sent it new user, i.e., to c:\user\ \ Wincor Evo\Data\

e. On the new user computer, open Wincor Evo and "run as administrator" and then upload the security keys (*.pgp) file.

f. Go to "Security" and then "Encryption keys" tab and click "Import KEYs". Select the corresponds security *.pgp file and then click "Open" to continue. If prompt for password, input the password created earlier.



Once the generated security keys were generated, the following dialog box will be displayed.



5.2. Corus Evo+ With Low Level Security (LLS)

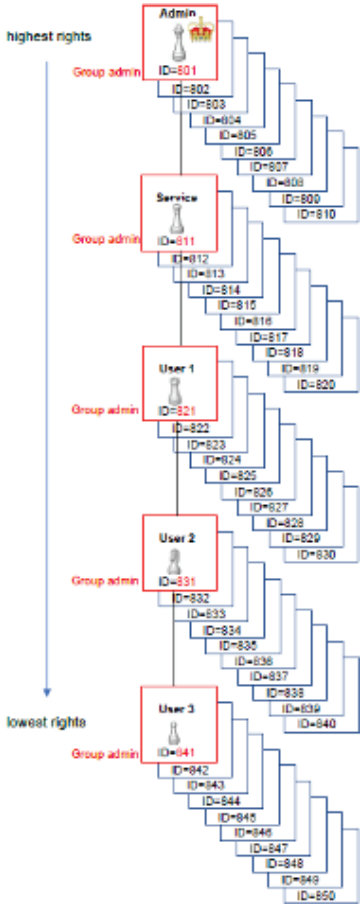
Corus Evo+ under LLS by defaults comes with predefined Password for Administrator (801) and Super User 1 (821). These passwords are defined by user/ partner in technical data sheet (TDS) during the ordering.

Under LLS mode, users have the possibility to change device configuration via Corus Evo+ display + Keyboard.

Corus Evo+ LLS comes with 5 groups (detail please refer to Corus Evo+ section 11.6.2 Password). Under each group there is 1 super user (group administrator) and 9 users. In total Corus Evo+ LLS is managing up to 50 users as listed below:

Password Group	**Password ID**	**Description of rights**
Administrators (10 users)	801 to 810	801 is super administrator. If user disabled the 801 passwords, it would delete all Corus Evo+ LLS passwords which including passwords in other groups. When the metrology switch is set to ON, the metrological properties of the device can be changed • Loading a new firmware using the "Loader" • Loading new MSP processor firmware • Resetting metrological archives (settings archive, status archive, gas composition archive) • Transducer replacement, calibration of the corrector • Creating or removing metrological quantities • Changing the name or prefix of metrological quantities • Setting Tb and Pb • Changing the device status • Changing a restriction • Setting Vb, Vbs • Setting the schedule of the tariff currently active When the metrology switch is set to ON, it is possible to: • Load a new firmware using the "Remote Download" • Setting the system time of the device if the device is used with CTR protocol (in other cases, the settings can be made for lower-lever users)
Service (10 users)	811 to 820	Switching to maintenance mode and back to normal mode

User 1 (10 users)	821 to 830	• Subject to service switch status, this user group is allowed to device metrological properties: • Setting the substitute values to calculate the conversion factor • Setting the units for the system quantities (Tb, Pb, combustion heat), of reference conditions for combustion heat calculation • DST mode setting (summer / winter time) • Setting the parameters for storing the billing archive • Unit and constants of the quantity, configuration of the pulse input of metrological variables • Setting the values for counters of volumes other than Vb, Vbs Assigning the influence of the service switch to parameter entering • Changing the compressibility calculation method other parameters: • Adding to or reducing non-metrological quantities • Setting the parameters of non-metrological quantities - name, marking, unit, constants • Saving to the appropriate data archive • setting the input quantity connection with the output in the form of the user equation • Setting the communication parameters • Setting the descriptive data - station name • Setting the measurement frequency and the archiving frequency
User 2 (10 users)	831 to 840	• Permits gas composition setting via keypad only • Permits setting system time
User 3 (10 users)	841 to 850	• Permits reading data from the device (does not permit writing to the device) • Setting the access password



The user ID highlighted in red (801, 811, 821, 831, 841) are the super admin for each group.

Other rules in LLS:

- Users at a high level have the rights of the users of a lower level as well as other rights.
- Users of all groups can change their own password.
- The administrator of each group could change the password of other users in their group.
- Administrator ID = 801 could change the passwords of other administrators in each group
- Deleting Administrator ID 801 password will deactivate other passwords set in the respective group. Group will be deactivated however their setting will not be lost. As soon as password protection is activated, they will be active again.

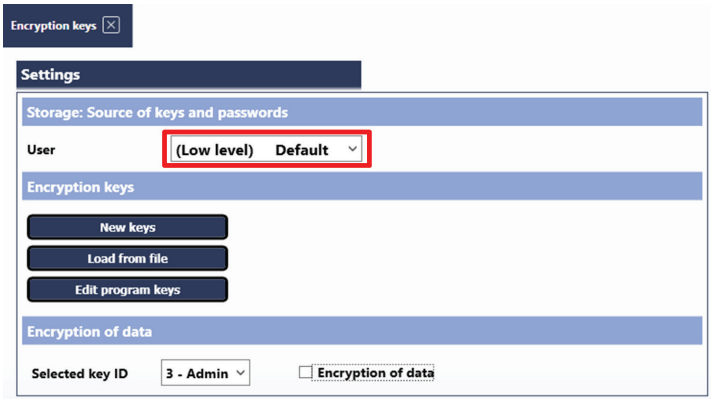
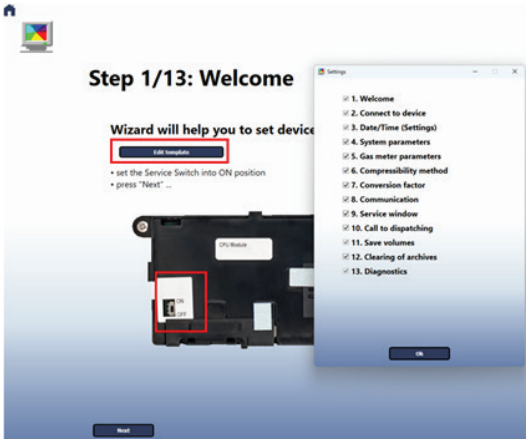


Diagram above shows screenshot on LLS security keys.

6. Wincor Evo (Simple Mode)

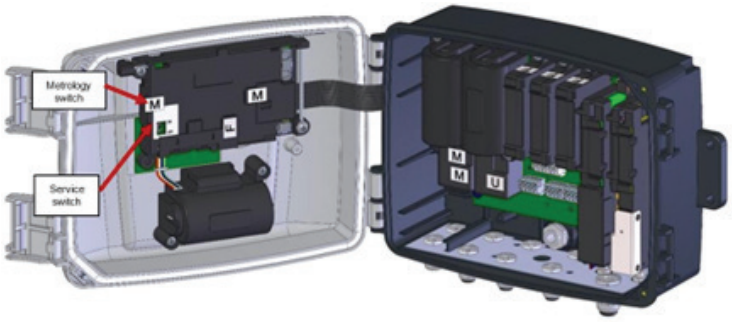
Wincor Evo under simple mode provides user step by step guidance to set up Corus Evo+ for installation. The processes are simple and direct where in each of steps, instructions are given to guide field technicians. Screenshot below show the main screen when user login under **simple mode** and a quick explanation on available steps.

Under simple mode, user must click on "Next" at the bottom of the screen to progress to next steps. Main steps are depending on selected setting in template. Simple mode steps could be configured to fit frequent steps administrator would like field installer to execute. Attached below are **Simple Mode** template setting examples.



Example above is when all the options are selected.

By unselecting some tasks in the settings template, field technician could skip some of the pre- configured activities. For example, if administrator does not want field technician to clear the archives in the database or change communication settings, these settings could be unselected. Using these templates, it is possible to speed up and simplify field installation and eliminating unnecessary potential errors during installation.



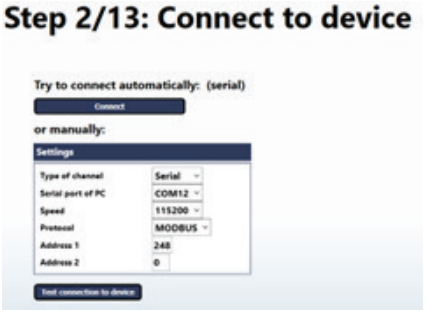
Steps in Figure 2 show Corus Evo+ Metrology and customer switch positions.

Simple mode.

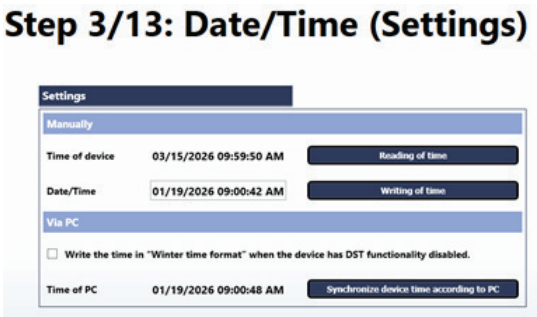
a. **Welcome** – Corus Evo+ service switch position must set to "ON" before device configuration. If user would like to change device metrology parameters, the metrology switch must be switch-on as well.
Screenshot below show metrological & service switches, metrological seals (M), manufacturer seal (F) and user seal (U) positions.

b. **Connect to Device** – when first connecting an USB optical port or communication port from PC to device, it is important to configure communication port setting in Wincor Evo. Wincor Evo could automatically detect install communication port or user could manually set the com port parameters.

When using USB optical probe, make sure the probe is positioned on device optical port and USB connector is connected to PC. Then click "Connect" or Test connection to device" to check the connection. Upon success connection, Wincor Evo will display dialog box of the connected com port, baud rate and protocol.



c. **Date/time** – device will read its current date and time. User could then synchronize device date and time according to PC setting or manually programme it according to required date and time (if the device is to be installed in a different time zone).



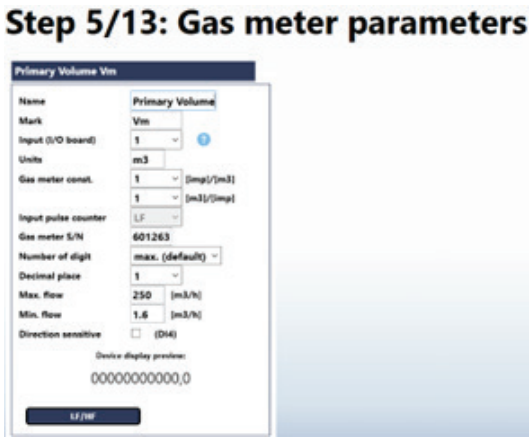
d. **System parameters** – software will read Corus Evo+ current configuration (i.e., Station identification, device SN° and firmware, gas hour, device language, defaults configure units, billing archive setting and battery capacity information. At this step, user could change the setting according to requirement and then click "Next" to continue. Usually, this information could be pre-programmed in the office before handing over the Corus Evo+ to field technician. It is advisable to configure these settings before going to the field to avoid field technician wrongly inputting the information.

At site, technician could validate device is installed at correct site as per determine Station identification and correct this information (if necessary).

Under MID variants, device will have specific pre-defined base pressure and base temperature settings. If base pressure and temperature are not allowed under MID certification, administrator could opt to use "generic variant (see screenshot below). To make change to these settings, the metrology seal needs to be switched-on. **Tampering the metrology seal will void the warranty.**

e. **Gas meter parameters** – under this option, user could set connected gas meter information onto Corus Evo+ such as:

- Meter SN°
- Meter input pulse type (LF, HF, encoder or etc.)
- Meter pulse weight
- Meter serial number
- Meter max/min flow (recommended)
- Meter index display digits and decimals.



Corus Evo+ by default comes with maximum 11 digits + 1 decimal and it is possible to configure its display to various settings such as 8 digits + 4 decimals or 8 digits + 2 decimals etc. If "Number of digit" set to "Max. (default), Corus Evo+ display will always display index reading with 1 decimal point as the priority is set to display max. number of digit" but in the archive the index reading will save to program decimal place.

Thus, it is important to configure the decimal place to tally with mechanical meter index register number of digits

f. **Compressibility method** – under this option, it is possible to change device compressibility method, base value, gas composition etc. User could change or customize this setting according to application.

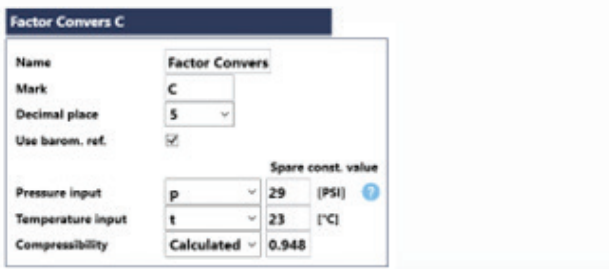
Administrator is advised to fix these settings during ordering as these configurations are controlled by metrology switch and could void the warranty if the seal is tampered. Wrongly configured, these parameters will affect the billing data.

Step 6/13: Compressibility method

g. **Conversion factor C** – under this option, conversion factor parameters are configurable. It is important to configure backup value for pressure, temperature, and compressibility when these parameters are out of tolerance or its transducer is faulty. Device will use these constant values in case of pressure or temperature, or compressibility is out of limits or faulty.

It is advisable to pre-configure these settings before handing over device to field technician for installation.

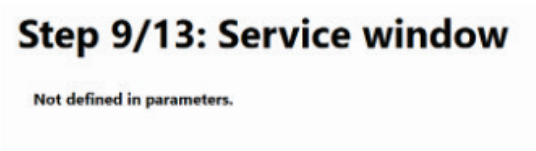
Step 7/13: Conversion factor



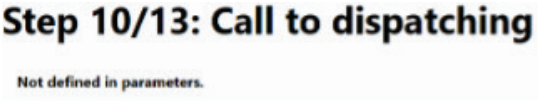
h. **Communication** – under this option, user could add and configure the select communication port or modem setting. Additionally, it is possible to configure protocol for each communication port as well.

This step will be useful if there is a need to configure the modem after inserting a new sim card at site.

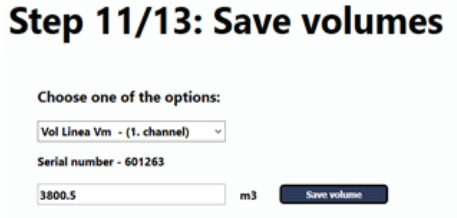
i. **Service window** (if this is pre-defined)
Under this option it is possible to define modem communication windows where modem could be scheduled to wake up at a pre-defined period for automatic data transmission. This will help to conserve the modem battery life as modem only wakes up at pre-determined period instead of always on.



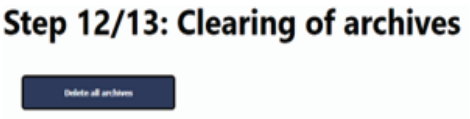
j. **Call to dispatching** (if this is pre-defined)
Under this option it is possible to define modem communication windows where modem will send all data to the AMR server.



k. **Save volumes** – Under this option, user should check gas meter index reading and then tally the reading against device primary volume. Such information will be important to utility and end consumer for checking in case of any disputes in future.



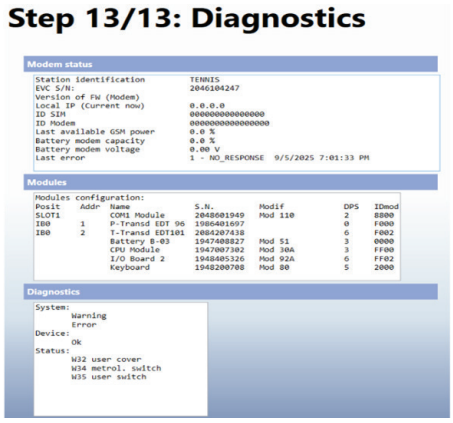
l. **Clearing of Archives** – under this option, user could clear device data storage (archives) to ensure non relevant data could be deleted and device start as new after the installation.



m. **Diagnostics** – under this option, program will display device and modem status.

If there is any error or warning, it will be displayed here.

Example (on the left) show device is detecting system error due to E14 P1 min limit (i.e., pressure transducer is out of range. Additionally, it displays other warning (W34 metrol. Switch and W35 user switch). Both warnings show the switches are turning on and other user with access to Corus Evo+ could then change its configuration.



User should switch-off both switches before leaving the site and click "Finish" to complete the programming.

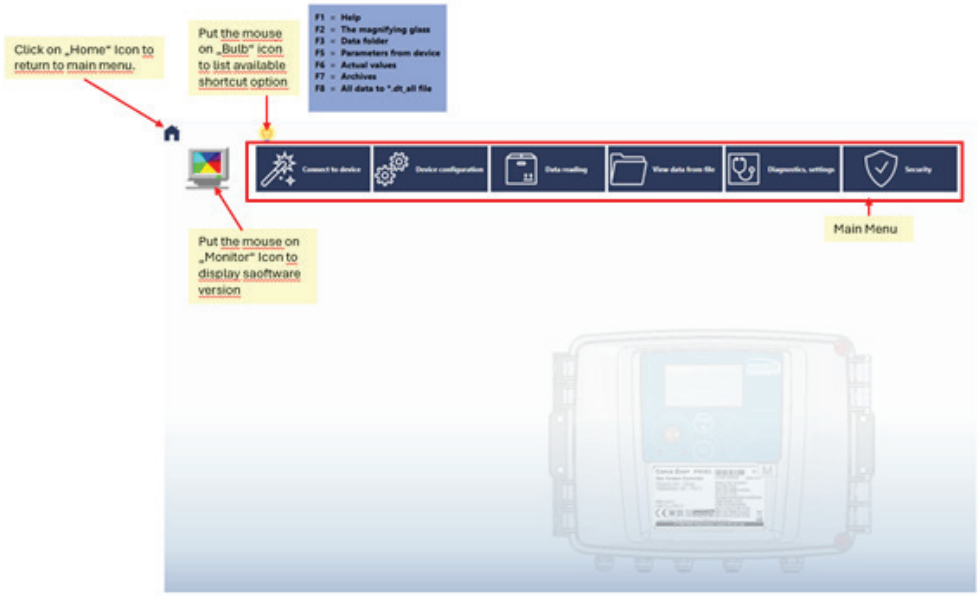
As a last step, technician should secure "User mark" on Corus Evo+ as shown below to avoid any tampering and unauthorized access.

7. Wincor Evo (Standard Mode)

This mode is reserved for authorized service center, trained technicians, and advanced user. Under this mode, user will have capability to access all device parameters, adding new module, update device firmware, download and view device storage data, adding new user access etc.

Therefore, it is important to limit the access to this mode to train user.

When login to Wincor Evo (Standard Mode), the following main menus are display.



1. Home icon to return to main page with option to login to Simple mode, Standard mode or Professional mode

2. Bulb icon to display shortcut key

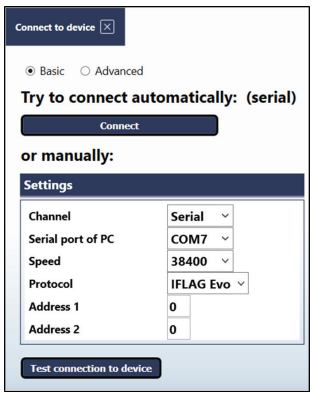
3. Monitor icon to display Wincor Evo version

4. Main menus Connect to device

   a. Device configuration
   b. Data reading
   c. View data from file
   d. Diagnostics, settings
   e. Security

If Wincor Evo has previously detected USB optical port, it is possible to start operation without the need to configure/detect optical port or communication port again.

7.1. Connecting to device (Menu)

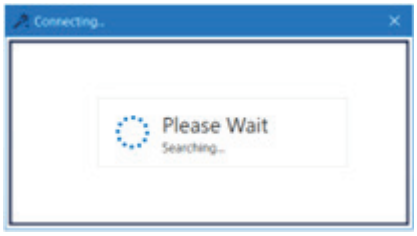


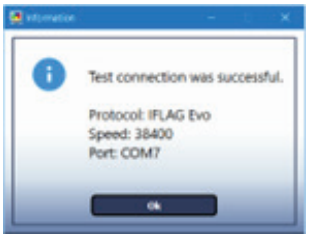
When a new optical port or communication port is connected to laptop, the communication port must be configured. Otherwise, software will not be able to identify which communication port to use.

Under "Connect to device" menu, there are 2 options: basic and advanced.

Under this option, there are 2 modes.

a. **Automatic** – Click on "Connect" and program will automatically detect communication port between computer to Corus Evo+. Upon success of detection, it will display a test connection message including communication protocol, baud rate and com port use.

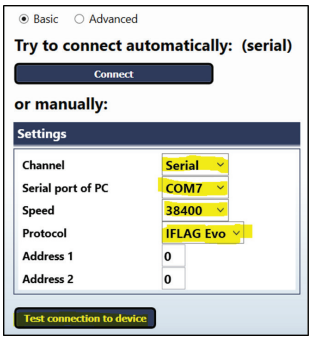




b. **Manual mode via basic comm. setting** – under this option, the following parameters should be defined:

- Channel,
- Serial com port,
- Baud rate speed, and
- Prefer communication protocol.

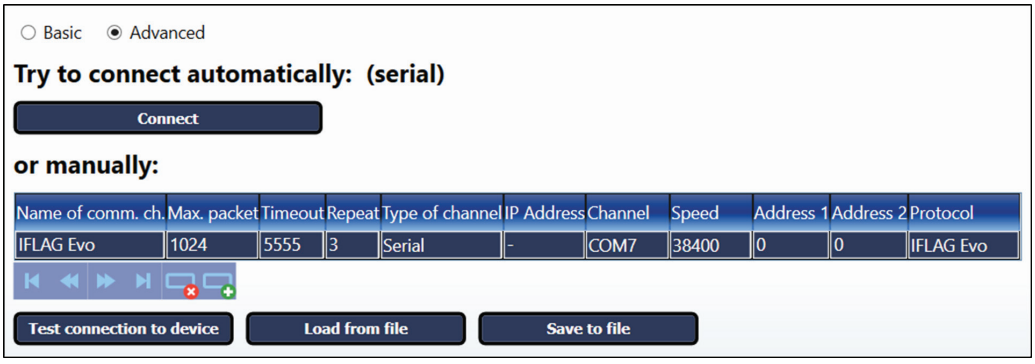
Then click on "Test connection to device" to continue.



c. **Manual mode via advanced comm. setting** – under this advance connection, user could assign a specific communication name, max. packet, timeout, # of try repetition, channel type, IP address, com port, baud rate and desire communication protocol.

Once this is configured, click "Test connection to device" or "Connect" to connect to the selected communication channel. In this mode, it is possible to remotely connect to Corus Evo+ if device IP address is known.

Of course, it is possible to load and save the communicate channel as well and ease user connection using multiple configure connection com instead of manually input each connection parameters.

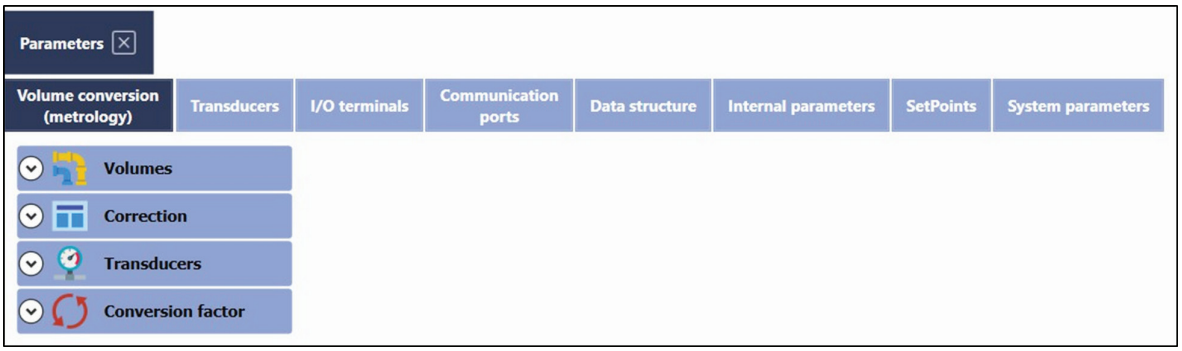


7.2. Device Configuration (Menu)

Under "Device configuration" menu, device parameters could be configure including device display, installed module, update newly install module, updating date and time, device reset and upload new device firmware.

7.2.1. Parameters from device

There are 8 sub-menus under device "Parameters from device" sub-menu and under each sub-menu, there are more configurable options. These settings are important to allow user to retrieve current setting, update new information and etc.



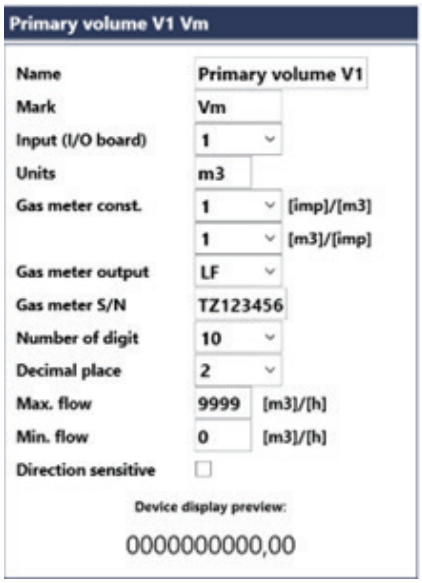
7.2.1.1. Volume conversion (metrology)

Under this sub-menu, the followings parameters are configurable.

A. **Volumes** – there are 2 keys variables in the volumes.

I. **Primary volume** also known as unconverted volume or metering volume should be tally to gas meter mechanical index register. Typically, when Corus Evo+ is connected to 1 or 2 gas meters the following information should be defined for each meter:

a. Gas meter pulse channel **(input (I/O board)**) – it is important to define meter pulses connected to DIN terminal (DIN1, DIN2, DIN3 or DIN4)
b. Gas meter **units** (m^3 or ft^3)
c. Gas meter pulse weight **(Gas meter const.)** in imp/m^3 or m^3/ imp
d. **Gas meter output** (LF, HF, Encoder or instrument drive (Indexer))
e. Gas meter **serial number**
f. Gas meter index register drums **(number of digit and decimal)**

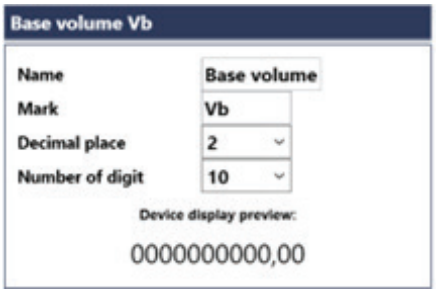


Corus Evo+ LCD could display up to maximum of 11 digits and 1 decimal, if requirement is to display primary volume with 2 decimals, "number of digit" should be set 10 digits or to tally with meter mechanical index digits. When "Number of digit" is configure to "max. (default), the LCD will display Vm with 1 decimal point instead of the configure Decimal place.

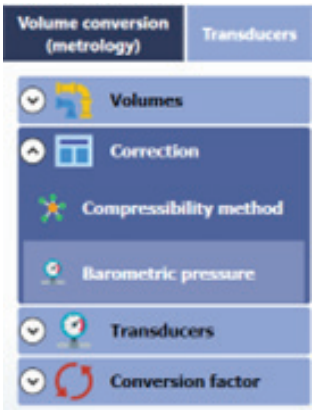
As an example, to display LCD primary volume with 4 decimals, the "number of digits" should be configured to max. 8 digits.

g. It is advisable to configure maximum and minimum gas meter flow rate. This will allow Corus Evo+ to generate the warning if the operating flow rate is beyond the gas meter defined period. Such information will be useful for future meter sizing or identification in case of an issue.
h. Direction sensitive – this is available if gas meter comes with direction input. Dresser Utility Solutions rotary and gas turbine meter should uses **Cyble Sensor** to ensure meter index register always tally with Corus Evo+ unconverted index (primary volume).

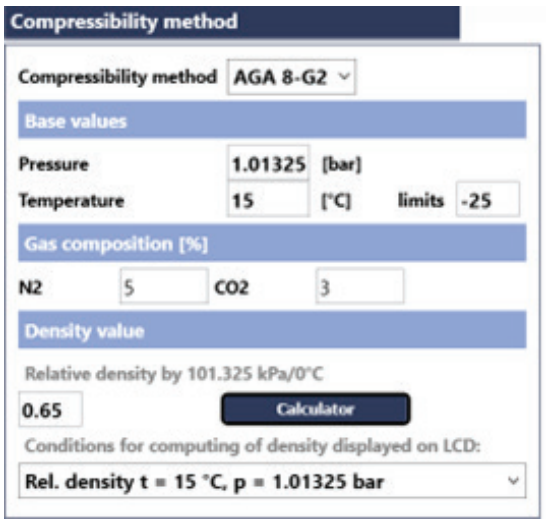
II. **Base volume** also known as converted volume and its counter is configurable based on number of desired display digits and decimal. In this case, it shares the same characteristic as primary volume counter.



B. **Conversion** – under this sub-menu, there are 2 configurators – compressibility method and barometric pressure.

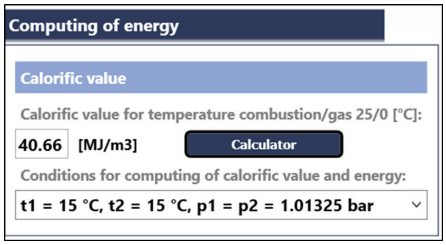


I. **Compressibility method** – The conversion factor was calculated based on selected compressibility method, base values (base pressure and temperature) and gas composition.
Available compressibility methods are:

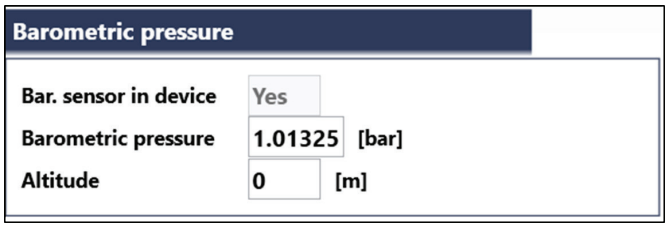


- Constant value (Z= constant)
- SGERG-88
- AGA NX19-mod
- AGA 8-G1
- AGA 8-G2
- AGA 8-Detail
- GOST NX19-mod
- GOST 30319.2
- GOST 30319.3

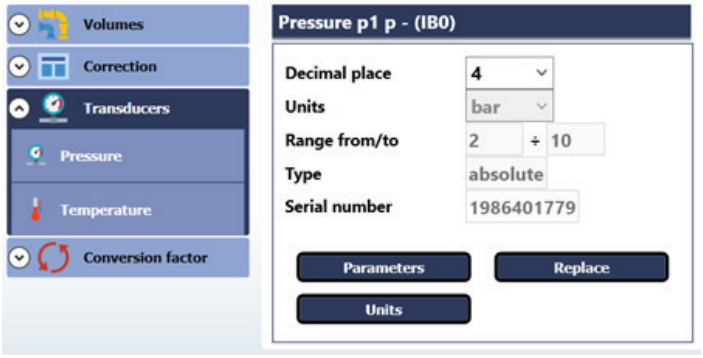
II. **Computing of energy** – Corus Evo+ comes with possibility to calculate and display energy consumption based on consumed volume and gas calorific heating value. In this case, the metering gas calorific value and conditions for computing of calorific value and energy must be configured.

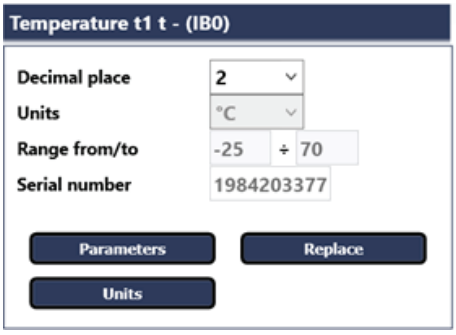


III. **Barometric pressure** – By default Corus Evo+ comes with a barometric pressure and it is possible to configure barometric pressure and set the altitude.



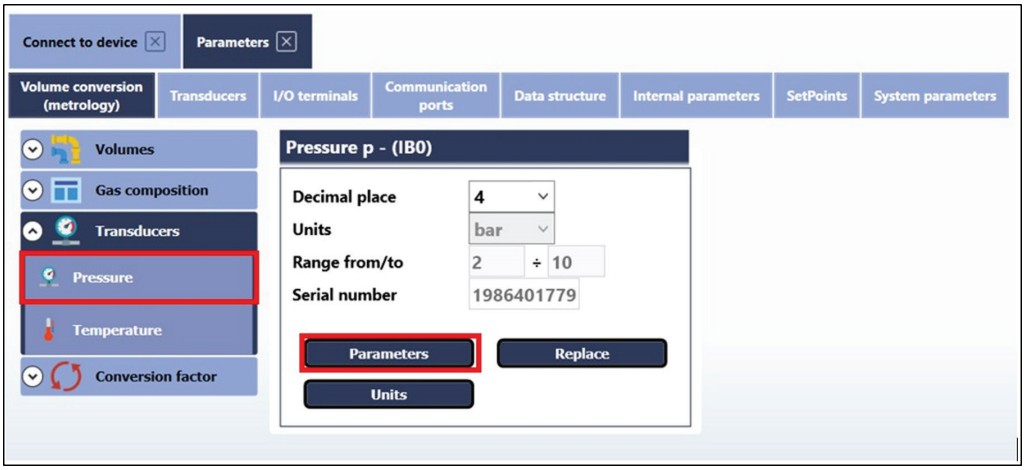
C.**Transducers** – under this option, the installed pressure and temperature transducers are displayed. Since both pressure and temperature transducers are digital transducers with built-in memory, Corus Evo+ will automatically retrieve transducers'information. Also, it is possible to configure transducer display values decimal points.
Both pressure and temperature transducers allow on-site verification and correction.



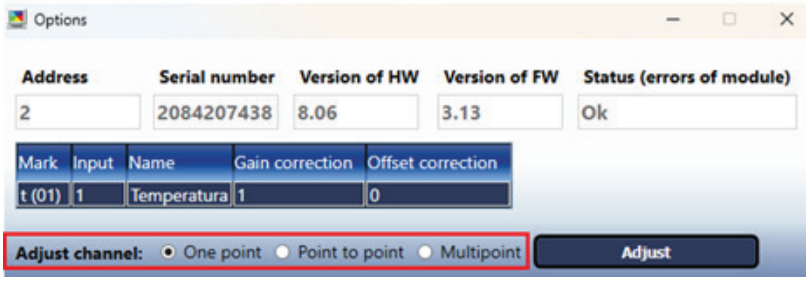


Both pressure and temperature transducers allow on-site verification and correction.
The followings are procedures to do pressure and temperature linearization. In order to do pressure and temperature linearization both metrological and user switch must be switched on.

I. Click on "Pressure" (for pressure linearization) / "Temperature" (for temperature linearization) then "Parameters".

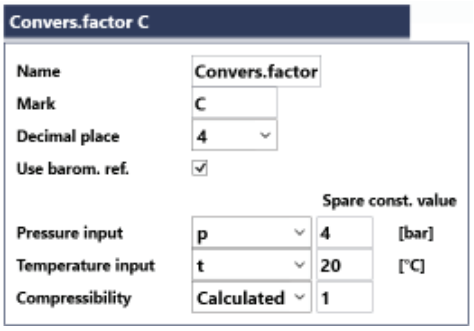


II. Then select adjust channel: choose "One point", "Point to point" or "Multipoint". Then vary input pressure/ temperature to transducer and read pressure / temperature master reference gauge.



Input pressure/ temperature gauge master reference gauge reading onto box below and then click "OK" to go to next verification point and vary again the input pressure or temperature for 2nd point and so on until completion.

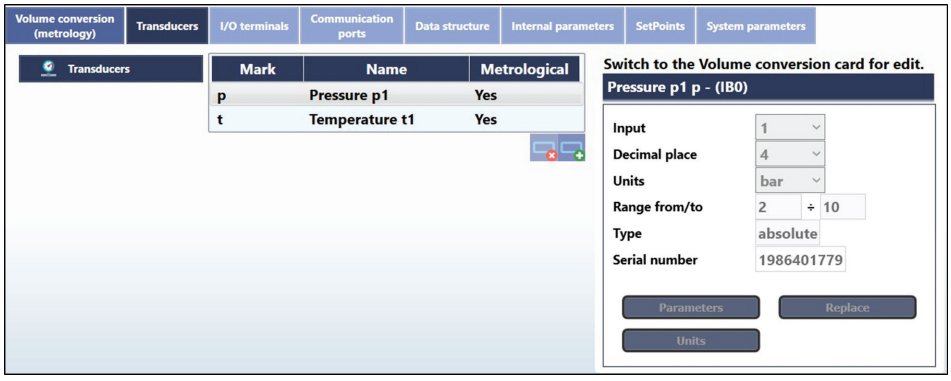
D. **Conversion factor** – under this sub-menu, it is possible to modify conversion factor display decimal points, modifying pressure back-up input, temperature back-up input and compressibility back-up inputs (also known as spare constant values) for conversion factor calculation in case of these parameters are out of measuring ranges or faulty.



It is recommended to set the back-up values based on the normal operating conditions unless there is a binding contract between utility and end user on the pre-define inputs.

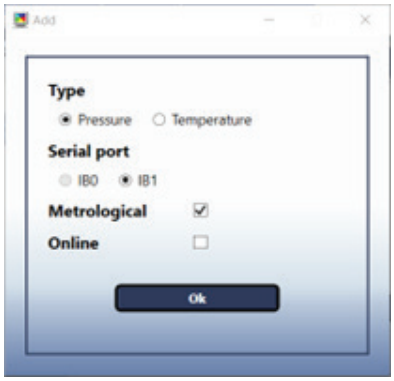
7.2.1.2. Transducers

Under this sub-menu, installed transducers will be displayed and option to add or remove transducer(s). If a new transducer is added, the new transducer's setting should be defined.



A. Adding a new transducer

Click on to add a new transducer and then select transducer type, serial port and its application (metrological or online)



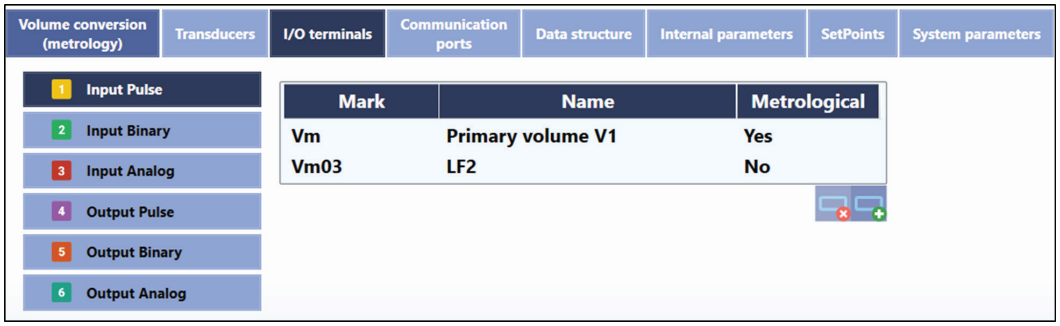
Metrological is when transducers are used for conversion calculation.
Online is for monitoring purpose.

7.2.1.3. I/O terminals

This option allows device input and output terminal configuration.
A basic Corus Evo+ comes as a standard with 4 inputs and 4 output which is extendable with module in SLOT 0 or SLOT 1 or SLOT 2.

Slot	Module	Designation
SLOT 0	S0-SCR	Interface for SCR gas meter encoder
	S0-NAM	Interface for NAMUR gas meter encoder
	S0-EXT1/T	- 2 HF NAMUR pulse inputs, **6 digital inputs**, **2 analogue inputs**, 2 transducers connections
SLOT 1 or SLOT 2	S1-2AI	4-20 mA analogue inputs module (2 inputs)
	S1-2AO	4-20 mA analogue outputs module 4-20 mA (2 outputs)

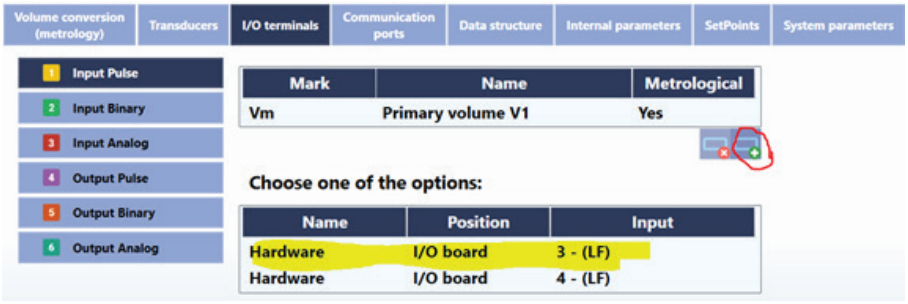
SLOT1 is reserved for RS232/RS485 as standard and this slot could be used for input/input if RS232/RS485 module was removed



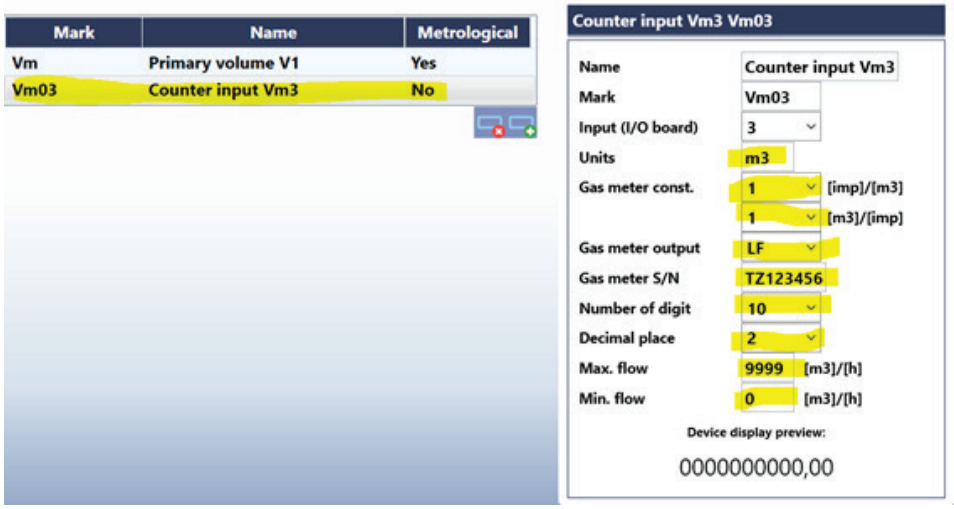
A. Adding a new input pulse

Click on to add a new input pulse and choose the available hardware I/O board terminal (i.e. DIN2 – DIN4). Make sure the selected input pulse fits the purpose.

Please refer to **Corus Evo+ user guide section 6.5.2 Gas meters pulse input connection** for more information.



Then configure the selected input pulse and configure its pulse setting as below



In such case, input 1 (V1) was configured metering input pulse for primary volume / unconverted counter and counter input Vm3 could be used for coherence purpose.

To delete the add a pulse input, select the input to delete and then click delete.

B. Adding a new Binary Input

Some meter come with anti-tampering LF, in such case, it is possible to connect meter anti-tampering pulse to device for monitoring purpose. In this case, the input pulse could be configured to binary input with "normally open" or "normally closed". If there is any tampering on gas meter, the signal will be sent to device and an alarm could be generated and recorded.

It is possible to use binary input as station monitoring or logging. In such application, a magnetic sensor mount on station gate could provide an input to device and configure the input as binary. When station gate open, the signal will be sent to device and a timestamp will be recorded on date and time of the event.

C. Adding a new analog input

SO-EXT1-T extension module could be installed on SLOT 0 or S1-2AI 4-20mA analog input module is installed in SLOT 1 or SLOT 2.

D. Adding a new output pulse

Corus Evo+ comes as standard 4 outputs which could be configured to

- Converted volume consumption.
- Unconverted volume consumption

Additionally, these outputs could be programmed to provide output when a parameter threshold is breached. See Setpoints section for more details.

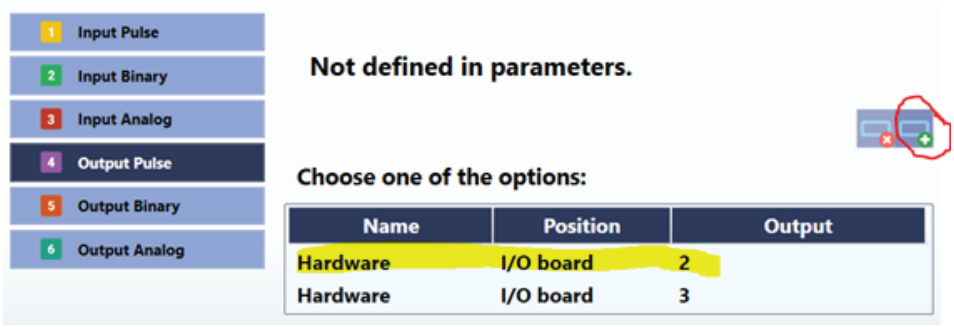


Diagram below shows available output options based on available inputs

E. Adding a new binary output

Same as pulse output, in this case, the output is configured to binary output, and it is possible to set binary output to normally open or normally closed.

F. Adding a new analog output

S1-2AO 4-20mA analog output module is to be installed in SLOT 1 or SLOT 2

7.2.1.4. Threshold (Setpoints)

These settings are non-metrological threshold parameters. When a threshold of a control parameter is breached, it is possible to assign it to a binary output.

It is possible to set threshold for following parameters (not exhaustive)

- unconverted consumption in hour or day
- converted consumption in hour or day
- converted and unconverted flow rate
- pressure
- temperature
- Compressibility, compressibility ratio and compressibility factor
- battery capacity and voltage
- device internal temperature
- barometric and relative pressure sensor

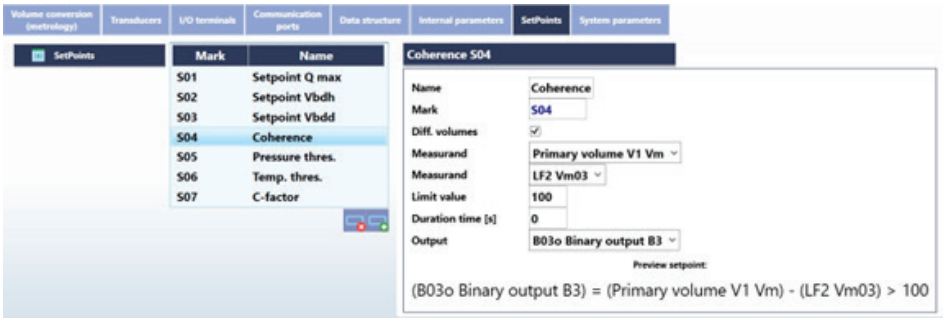


Diagram above shows the coherence that was assigned to an output B3.

7.2.1.5. System Parameters

This section is to program information such as installation site (customer), device display units, billing archive, conversion period, data and etc

The following are the available sub-menu under System parameters

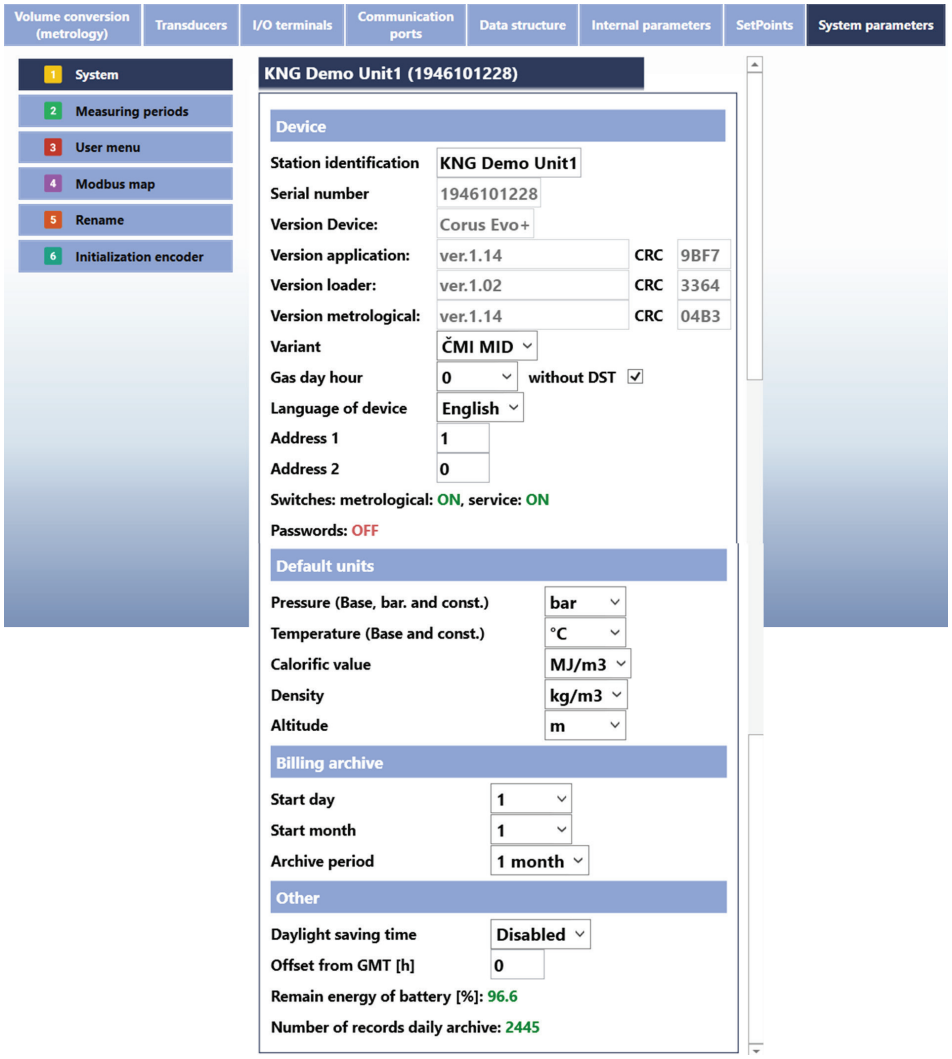
- System
- Measuring periods
- User menu
- Modbus map
- Rename
- Initialization encoder

A. System Setting

Under this sub-menu, the following settings could be configure.

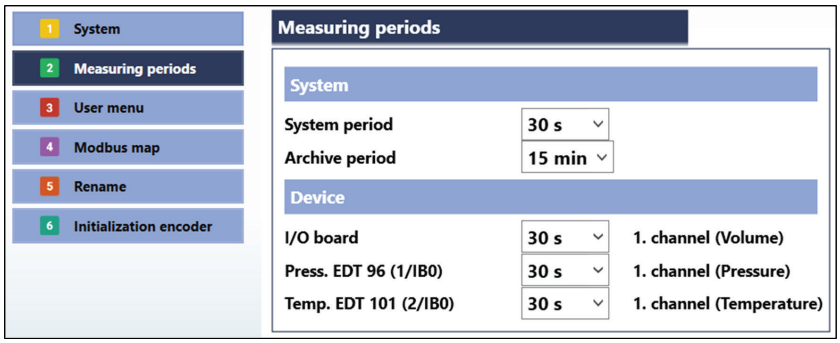
- **Device information** including station identification, device variant (MID or generic model) gas hour, device LCD language and status of device switches (Metrological and service) etc.
- **Device default units** (Pressure, temperature, calorific value, density, and altitude
- **Billing archive** (start day, month, and archive period (1, 2, 3, 4, 6, 12 months))
- **Others** – daylight saving time, offset from GMT (h), remain battery and number of daily archive records.

Device switches status, remaining battery capacity and number of daily archive records are display in this sub menu.



B. Measuring Periods

Under this sub-menu, device system, I/O board, pressure EDT 96 and temperature EDT 101 measuring periods and archiving period could be configured.

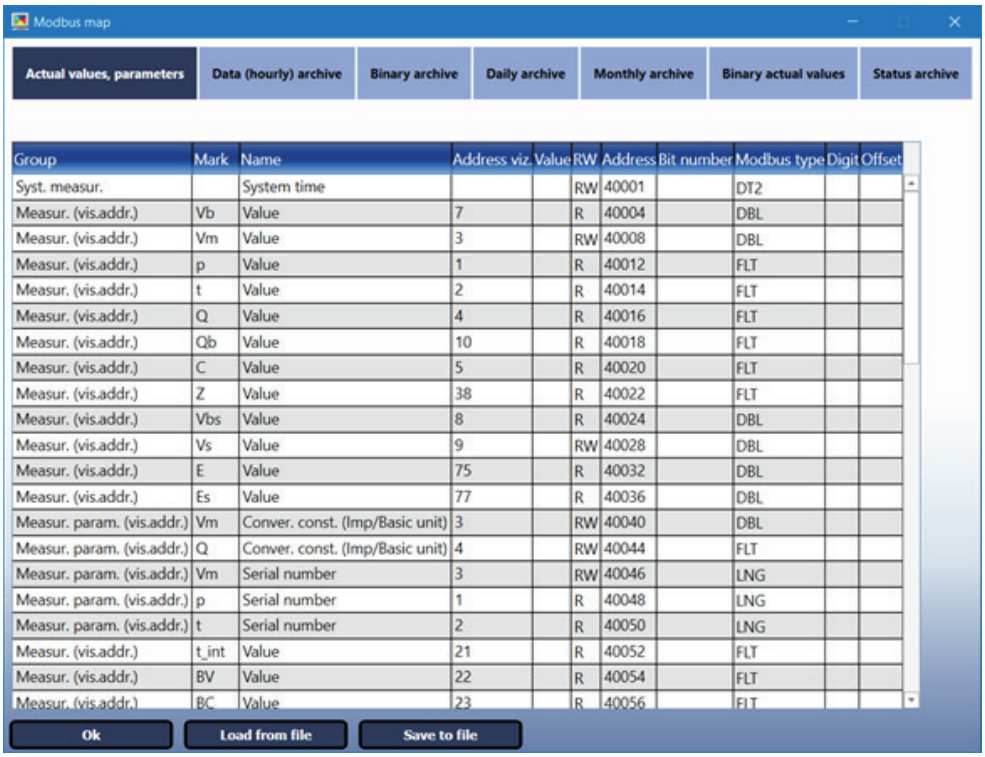


Corus Evo+ system period is configured to 30 s unless it is specifically advice or request in TDS configuration.

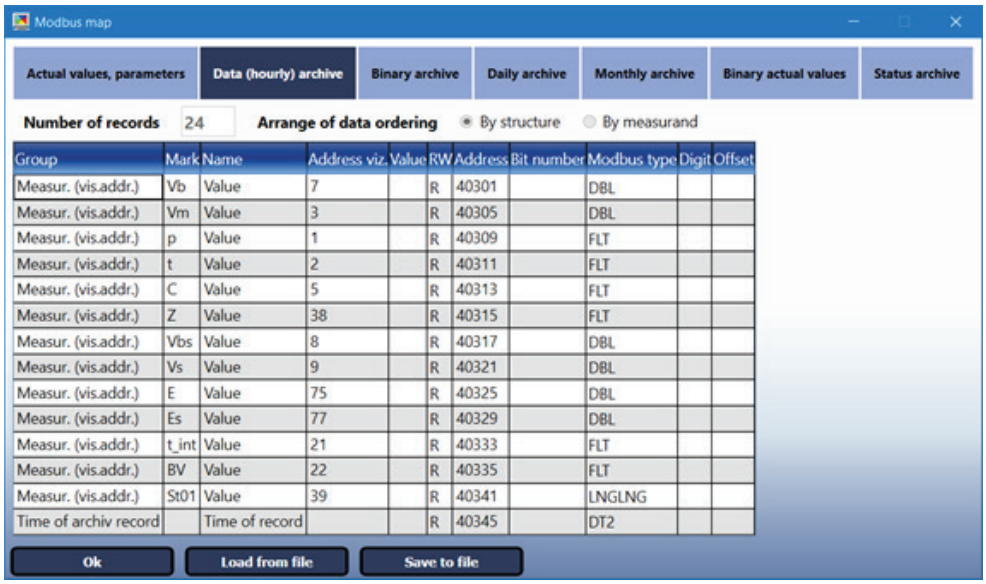
C. Modbus map

Under this sub-menu,
ice Modbus address table, load Modbus address from file and to save the Modbus address to a file. The following are available on the Modbus map:

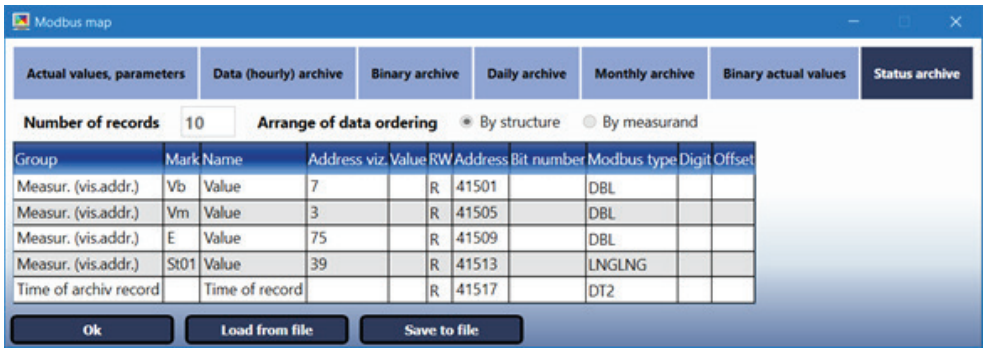
- Actual values, parameters
- Data (interval) archive
- Daily archive
- Monthly archive
- Binary archive
- Binary actual values
- Status archive



Group	Mark	Name	Address viz.	Value	RW	Address	Bit number	Modbus type	Digit	Offset
Syst. measur.		System time			RW	40001		DT2		
Measur. (vis.addr.)	Vb	Value	7		R	40004		DBL		
Measur. (vis.addr.)	Vm	Value	3		RW	40008		DBL		
Measur. (vis.addr.)	p	Value	1		R	40012		FLT		
Measur. (vis.addr.)	t	Value	2		R	40014		FLT		
Measur. (vis.addr.)	Q	Value	4		R	40016		FLT		
Measur. (vis.addr.)	Qb	Value	10		R	40018		FLT		
Measur. (vis.addr.)	C	Value	5		R	40020		FLT		
Measur. (vis.addr.)	Z	Value	38		R	40022		FLT		
Measur. (vis.addr.)	Vbs	Value	8		R	40024		DBL		
Measur. (vis.addr.)	Vs	Value	9		RW	40028		DBL		
Measur. (vis.addr.)	E	Value	75		R	40032		DBL		
Measur. (vis.addr.)	Es	Value	77		R	40036		DBL		
Measur. param. (vis.addr.)	Vm	Conver. const. (Imp/Basic unit)	3		RW	40040		DBL		
Measur. param. (vis.addr.)	Q	Conver. const. (Imp/Basic unit)	4		RW	40044		FLT		
Measur. param. (vis.addr.)	Vm	Serial number	3		RW	40046		LNG		
Measur. param. (vis.addr.)	p	Serial number	1		R	40048		LNG		
Measur. param. (vis.addr.)	t	Serial number	2		R	40050		LNG		
Measur. (vis.addr.)	t_int	Value	21		R	40052		FLT		
Measur. (vis.addr.)	BV	Value	22		R	40054		FLT		
Measur. (vis.addr.)	BC	Value	23		R	40056		FLT		

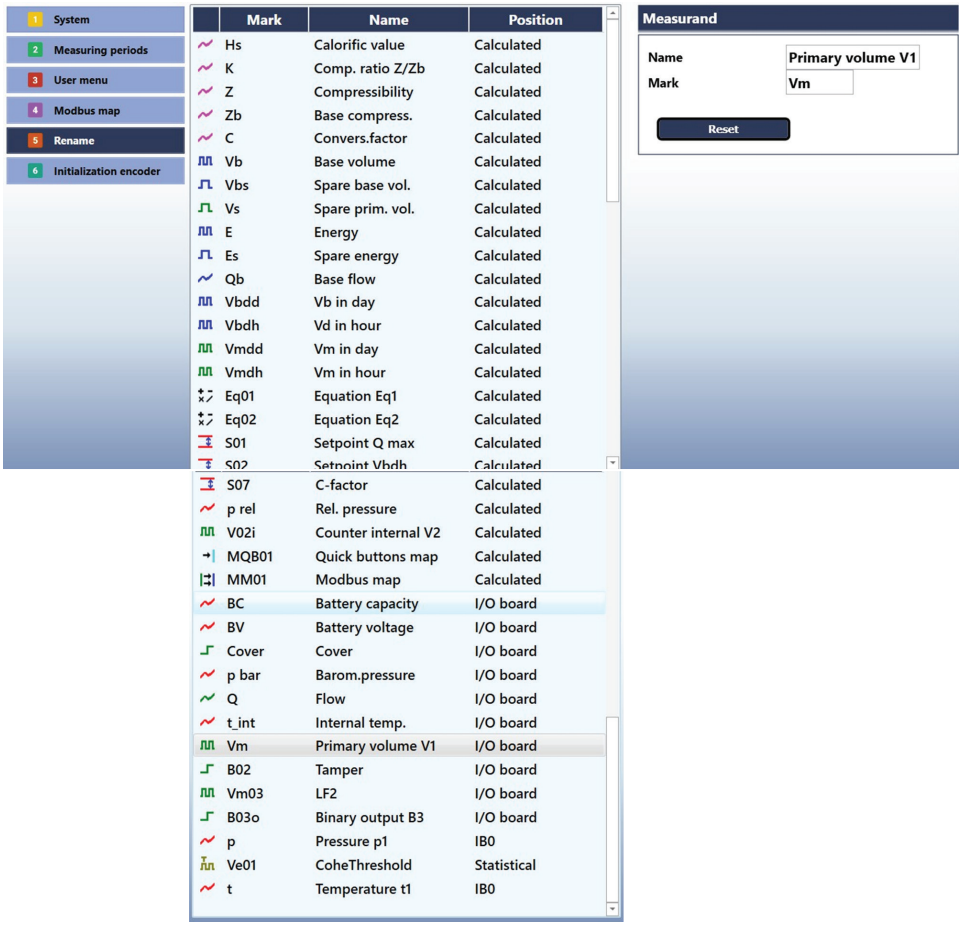


Group	Mark	Name	Address viz.	Value	RW	Address	Bit number	Modbus type	Digit	Offset
Measur. (vis.addr.)	Vb	Value	7		R	40301		DBL		
Measur. (vis.addr.)	Vm	Value	3		R	40305		DBL		
Measur. (vis.addr.)	p	Value	1		R	40309		FLT		
Measur. (vis.addr.)	t	Value	2		R	40311		FLT		
Measur. (vis.addr.)	C	Value	5		R	40313		FLT		
Measur. (vis.addr.)	Z	Value	38		R	40315		FLT		
Measur. (vis.addr.)	Vbs	Value	8		R	40317		DBL		
Measur. (vis.addr.)	Vs	Value	9		R	40321		DBL		
Measur. (vis.addr.)	E	Value	75		R	40325		DBL		
Measur. (vis.addr.)	Es	Value	77		R	40329		DBL		
Measur. (vis.addr.)	t_int	Value	21		R	40333		FLT		
Measur. (vis.addr.)	BV	Value	22		R	40335		FLT		
Measur. (vis.addr.)	St01	Value	39		R	40341		LNGLNG		
Time of archiv record		Time of record			R	40345		DT2		



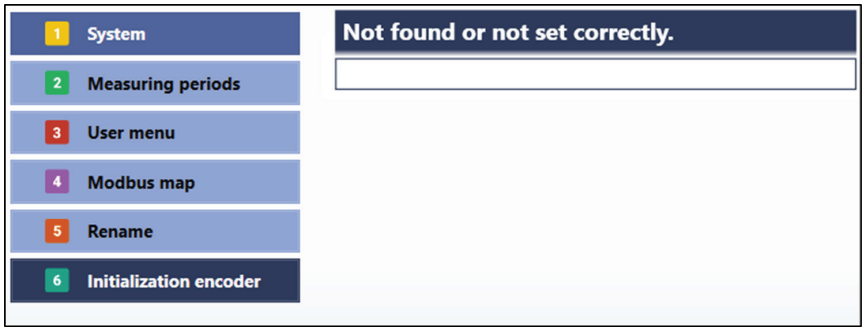
D. Rename

Under sub-menu, it is possible to rename device parameters / measurands.



E. Encoder Initialization

Under this sub-menu, it is possible to initialize the installed encoder.

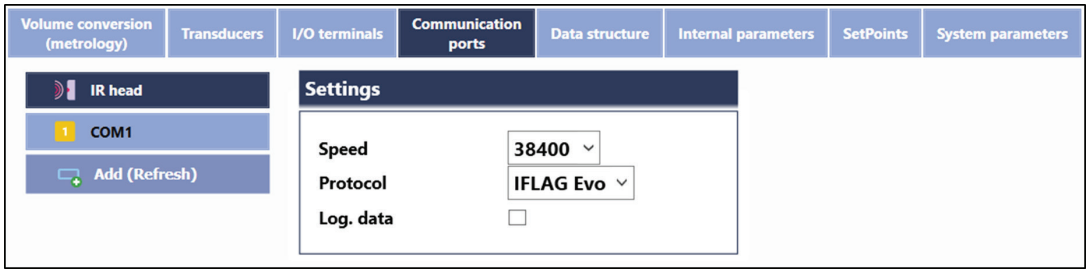


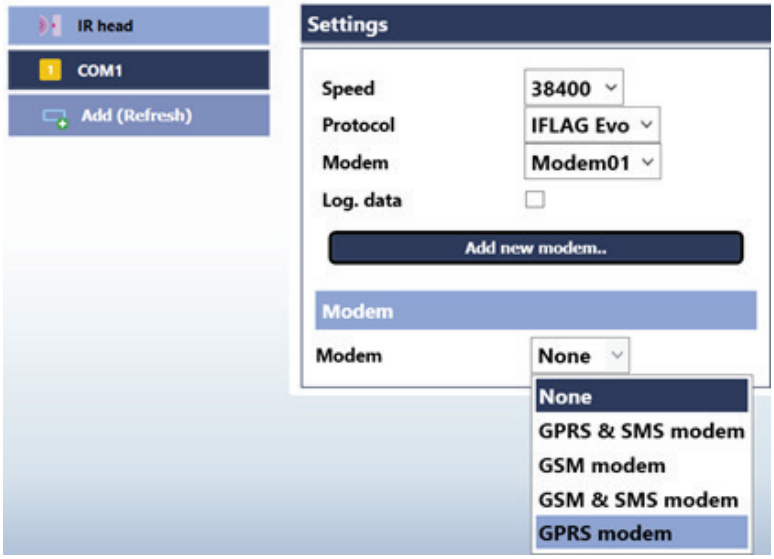
7.2.1.6. Communication Ports

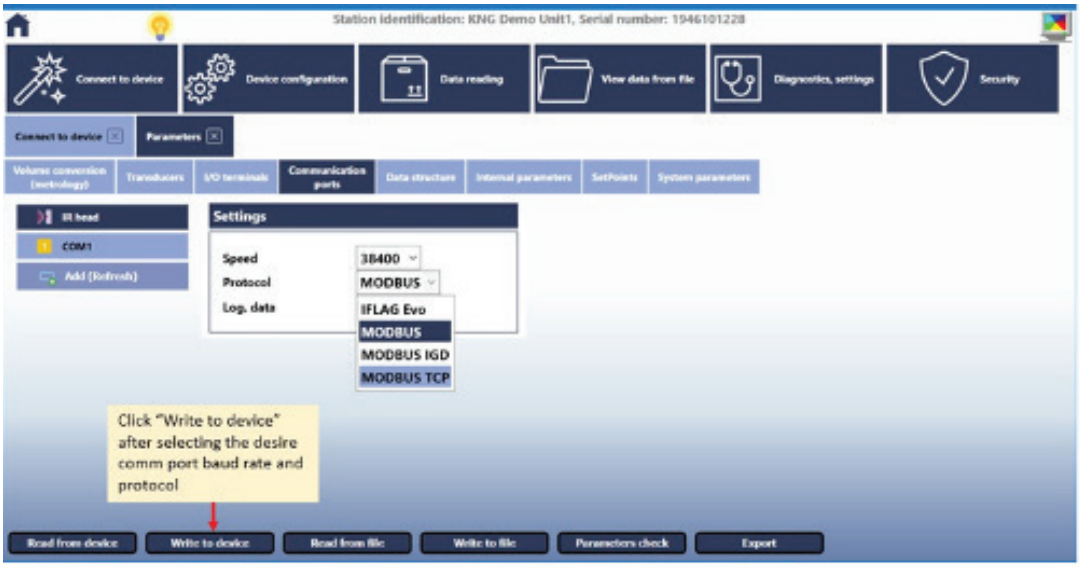
Under this menu it is possible to configure optical head, comm. port and add or refresh install communication port default reading including its protocol.

If a modem is installed, its IP address could be configured as well

Before a comm. port could communicate with desired protocol, the selected comm. port should be configured and saved in device. Corus Evo+ allows each com port protocol to be defined independently with different selected protocol.







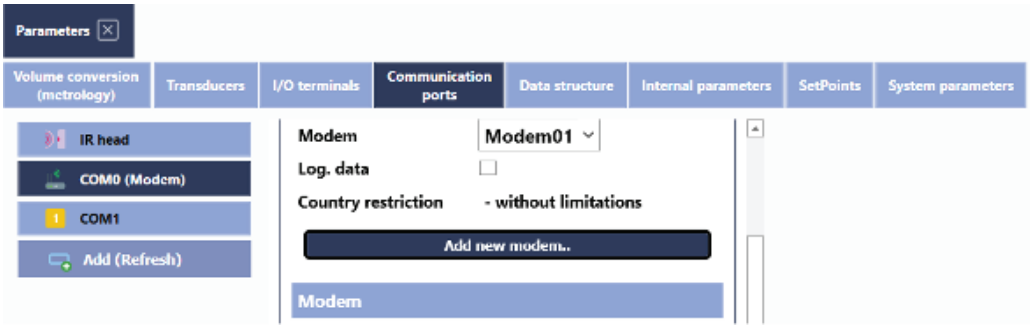
Once a communication port is defined with a specific protocol, click "Write to device" to save the setting and then reconnect the device by changing the communication setting before logging in.

7.2.1.7. Modem configuration

Before configuring modem, service switch must be switched-on.

Corus Evo+ internal modem settings should be configured using Wincor. To configure internal modem settings.

- Go to **Device Configuration -> Parameters from device and then click on Communication ports / COM0 (Modem)**



7.2.1.7.1. GSM modem

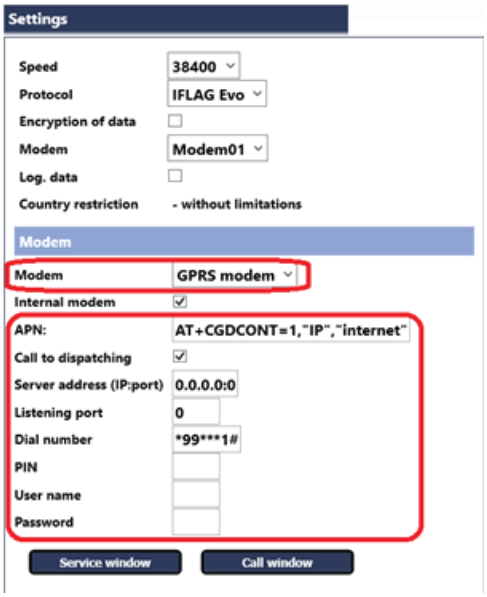
The following parameters must be filled for GSM modem communication.

- **Modem** - selection of communication method - GSM modem
- **Call to dispatching** - enable / disable calls to dial number after turning on modem and registering on GSM network. This option must be enabled to call to control room, in case of changing the value of a binary measurand or from timer (call and service windows)
- **Dial number** - enter the number to which the modem should call
- **PIN** - enter the PIN code if the used SIM card is protected by a PIN code

7.2.1.7.2. GPRS modem

The following parameters must be filled for GPRS modem communication.

- **Modem** - GPRS modem
- **APN** - enter the access point name in the network
- **Call to dispatching** - enable / disable calls to dial number after turning on modem and registering on GPRS network. This option must be enabled to call to control room, in case of changing the value of a binary measurand or from timer (call and service windows)
- **Server address (IP:port)** - enter the IP address and port of the server to which modem should connect to
- **Listening port** - the field must be left unchanged or fill in the port on which Corus Evo+ receives data
- **Dial number** - the field must be left unchanged
- **PIN** - enter the PIN code if the used SIM card is protected by a PIN code
- **Username** - enter a name to access the network, (if required)
- **Password** - enter a password to access the network, (if required0)

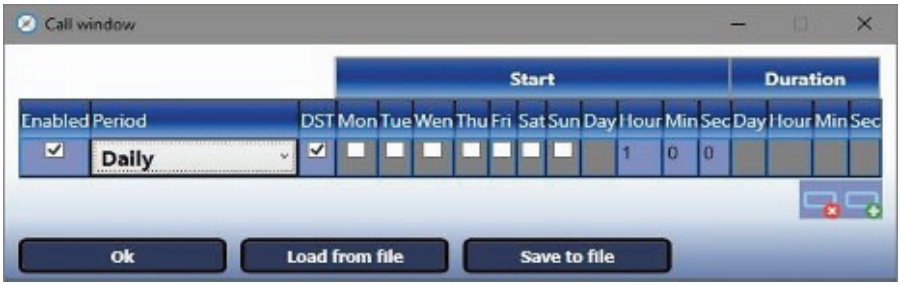


7.2.1.7.3. Call window

It is necessary to set call windows as needed to conserve the modem battery.

If more setting is required, it is possible to add more settings using  buttons.

Call window settings:



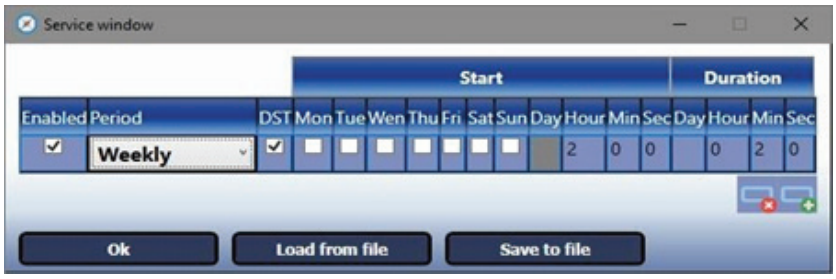
- **Enabled** – to enables/disables the set call window
- **Period** - double-click to display the drop-down menu and select the desire frequency
- **DST** – if enabled this option, the call window will adjust daylight saving time shifting based on Corus Evo+ daylight setting in System Parameters
- **Start** - setting the start of call window depending on selected Period:
  - Hourly - setting call window hourly wake-up call (in minute and second)
  - Daily - setting call window daily wake-up call (in hour, minute and second)
  - Weekly – setting call window weekly call wake-up period (days in a week, hour, minute and second)
  - Monthly – setting call windows monthly call wake-up (in day of the month, hour, minute and second)
- **User defined period** - setting call window based on a predefined Period:
  - User-def. day - setting call window start period within the available day (in hours, minutes, and seconds, including (offset) in hours, minutes, and seconds)
  - User-def. month - setting call window start period within available month (in days, hours, minutes, and seconds, including shift (offset) i.e., starting days, hours, minutes and seconds)

-  adding another call window - another row of the table
-  remove the selected table row

- **Load fro**m file – loading a call window setting from a file
- **Save to file** - save the call window settings to a file
- **OK** – confirm call window settings

7.2.1.7.4. Service window

Service window settings:



The setting in the Service window is similar to the options as described in Call window.

7.2.1.8. Data Structure

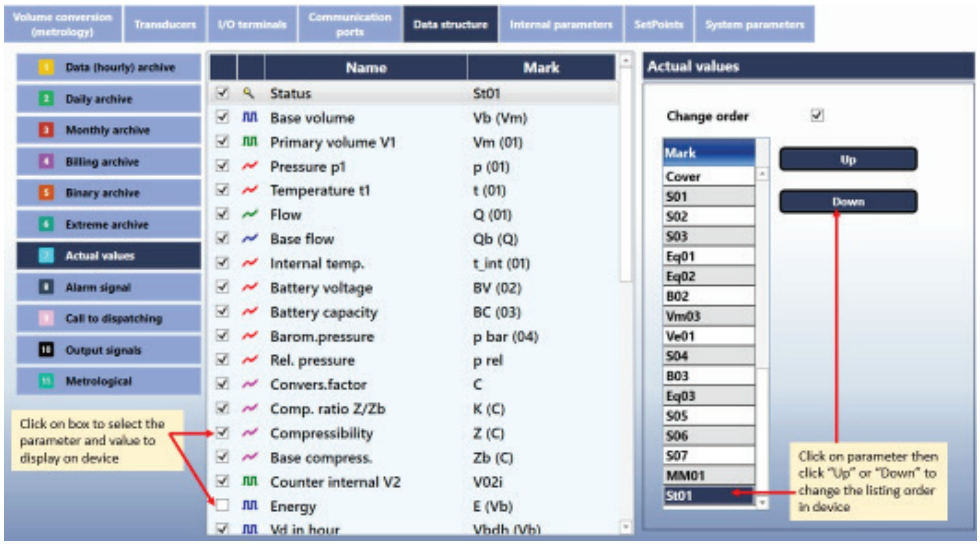
Corus Evo+ could be custom configured with many parameters and measurands, however user could decide whether to save these measurands in the archives. This function will be useful especially if user would like an extend number records save in a particular archive. By unsaved some of uncritical measurands in the archive, the extra space could be used to save more relevant data.

Under this sub-menu, user will have the option to select parameters / measurands to be saved in each archive.

A. Actual Values

Parameters / measurands values display on Corus Evo+ LCD could be re-assign/ re- order in different order based on customer requirement. This can be done under "Actual values" data structure.

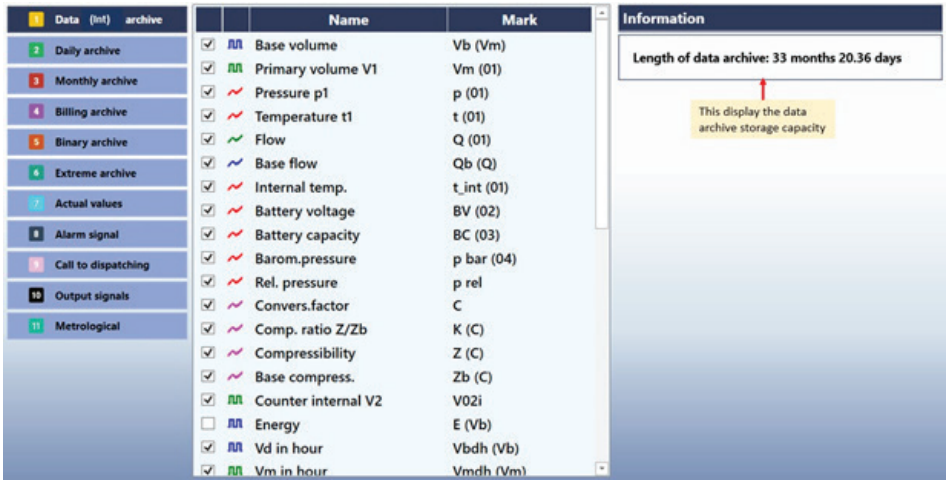
Screenshot below show how to re-assign/reorder Corus Evo+ LCD display measurands.



B. Data (Interval) archive

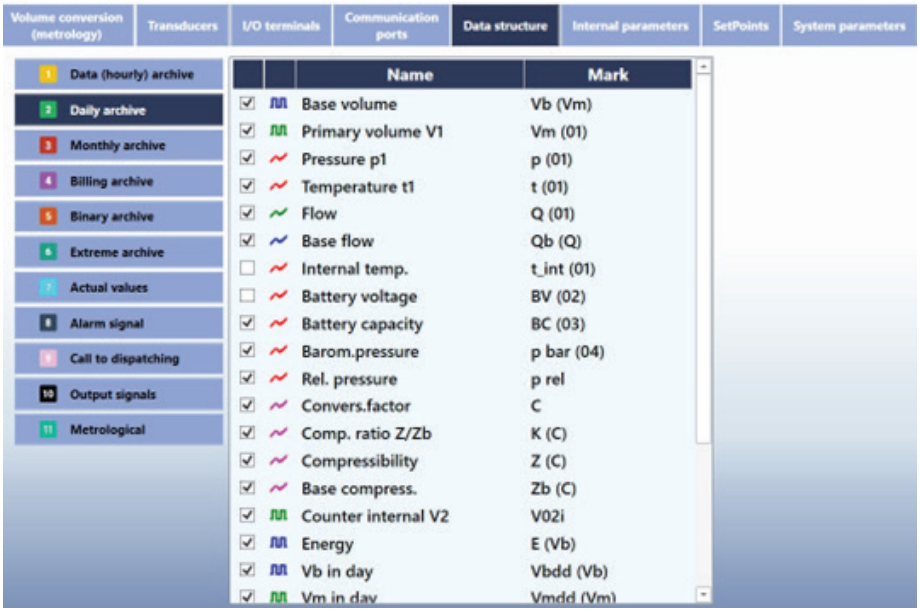
Like "Actual value", it is possible to select parameters/ measurands to be save in device memory. The main difference from other archives (daily, monthly and etc archive) is Data archive saving interval is configure under "Archive period in System parameters ("Measuring periods").

When the selected parameters/measurands and archive period are different, device will automatically calculate the data archive storage periods. (See screenshot below)

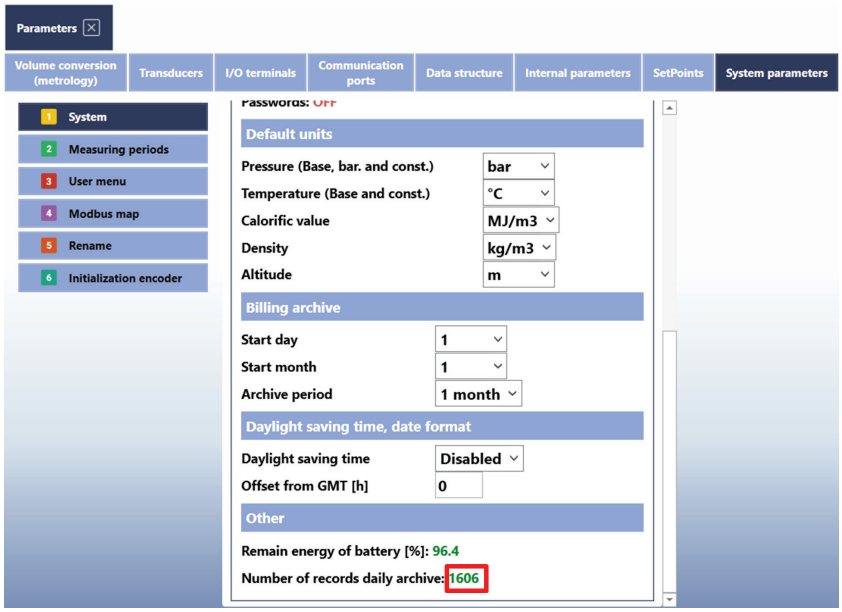


C. Daily, Monthly, Billing, Binary, Extreme, Alarm Signal, Call to dispatching, Output signals and Metrology archives

Like "Actual values" and "Data (Interval) archive", all other archives parameters/measurands and its values are selectable by selecting the tick box on each parameter / measurand.

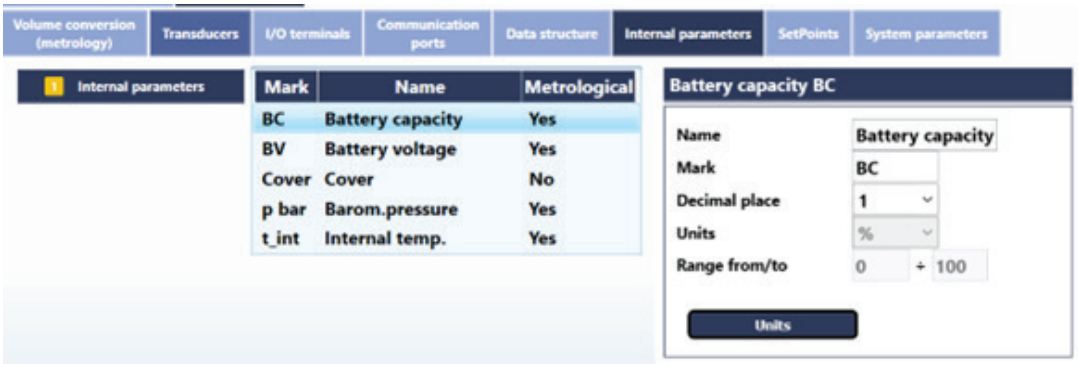


The number of daily archive records are automatically calculated by device based on selected parameters/ measurands and could be check under System parameters (screenshot below)

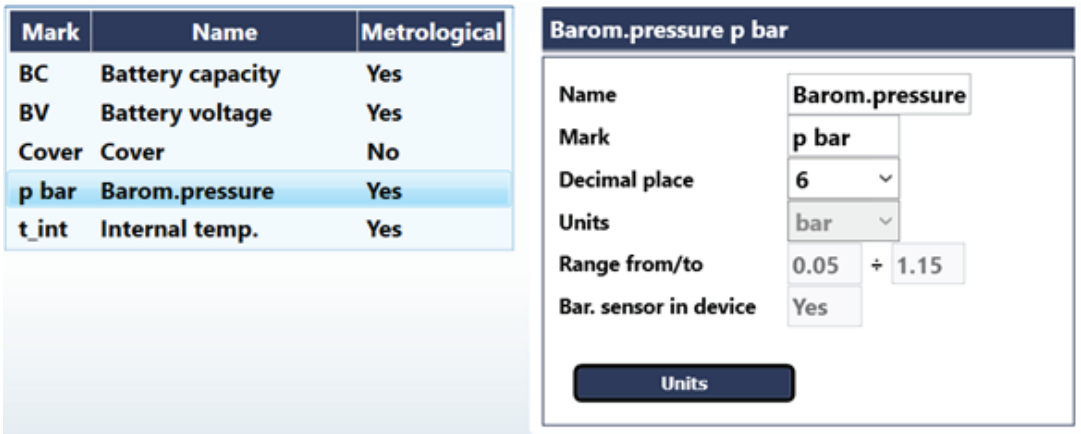


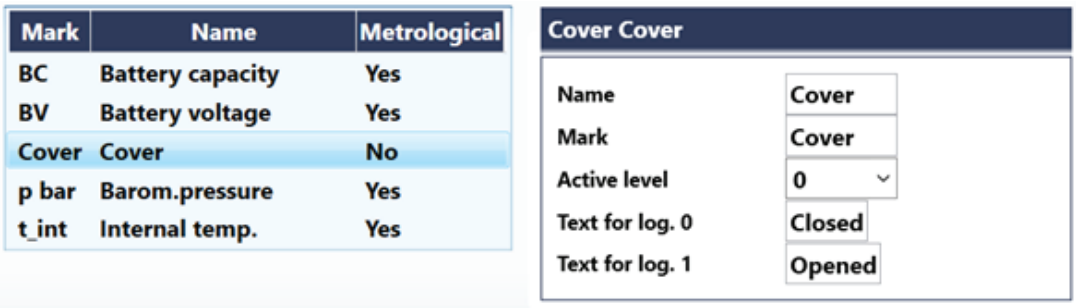
7.2.1.9. Internal Parameters

Internal parameters are device internal components like battery, cover, barometric pressure, and internal temperature.



Under each parameter, it is possible to configure measuring parameters decimal points and for the cover, it is possible to configure the cover status (default as opened or as closed).





Mark	Name	Metrological
BC	Battery capacity	Yes
BV	Battery voltage	Yes
Cover	Cover	No
p bar	Barom.pressure	Yes
t_int	Internal temp.	Yes

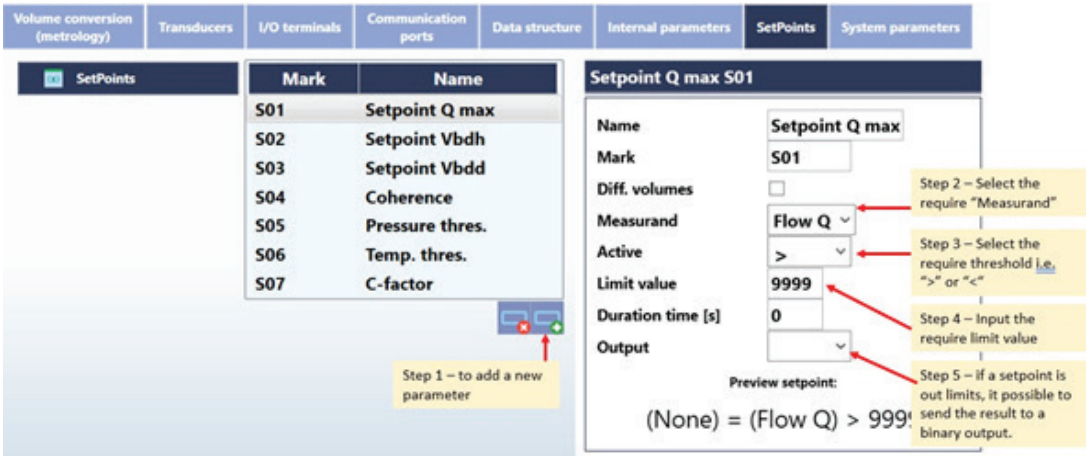
Cover Cover

Name	Cover
Mark	Cover
Active level	0
Text for log. 0	Closed
Text for log. 1	Opened

7.2.1.10. SetPoints

This option allows possibility to set parameter(s) threshold (i.e., the minimum and maximum threshold). These thresholds are non-metrological and not related to transducers measuring range capabilities. In case the parameter threshold is over the limit, it is possible to assign the result to a binary output.
The available setpoint measurands are:

- Battery capacity, BC
- Battery voltage, BV
- Conversion factor, C
- Compressibility ratio Z/Z_b
- Compressibility Z
- Pressure, P_1 or P_2
- Barometric pressure, P_{bar}
- Relative pressure, P_{rel}
- Flow Q
- Base flow, Q_b
- Temperature, T_1 or T_2
- Internal temperature, T_{int}
- Daily converted volume, V_{bdd}
- Hourly converted volume, V_{bdh}
- Daily unconverted volume, V_{mdd}
- Hourly unconverted volume, V_{mdh}

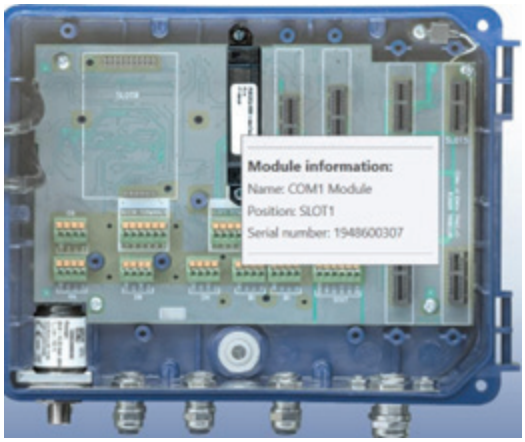


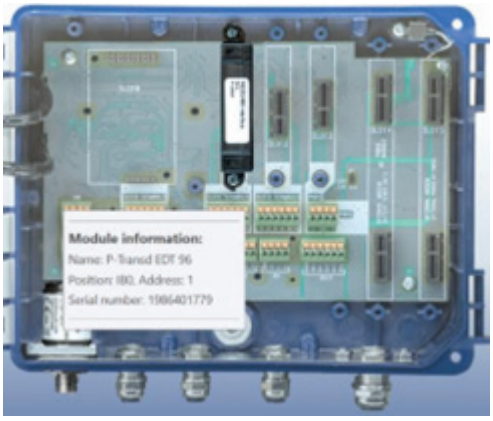
7.2.2. Parameters from file (Menu)

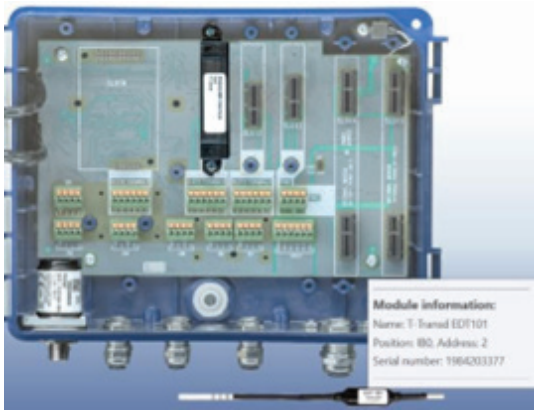
Under this sub-menu, it is possible to upload device parameters from a pre-program file to device. This will be helpful, especially to assist customers to add new parameters.

7.2.3. Modules (Menu)

Under this menu, the install device modules could be displayed to identify installed module, and where it is installed (which SLOT?), description of module, address, serial number etc.



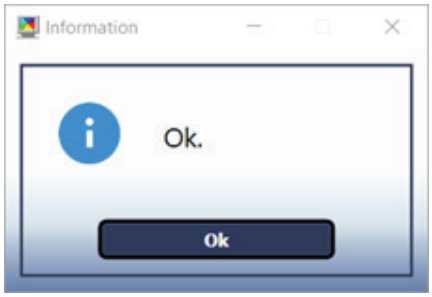




7.2.4. Update Modules (Menu)

When a new module was installed or removed from device, these modules status must be update to device. By clicking "Update Modules", system will check installed hardware and list its installed modules.

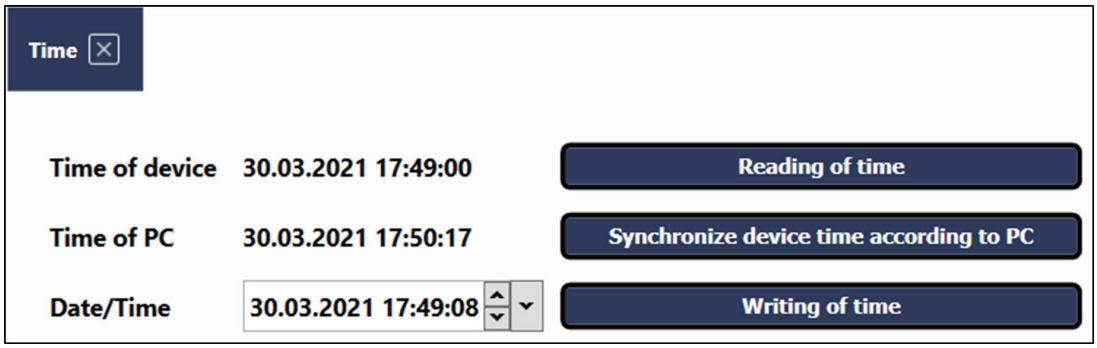
Re-read the device again using "Device configuration" -> "Parameters from device". Then do a "Parameters check". If everything is correct, the following will be displayed.



7.2.5. Time (Menu)

Under this menu, device date and time could be displayed and configured. There are 3 available options:

- Reading of time – to read device current date and time
- Sync device to PC date and time
- Writing a new date and time on device – this is useful, if the device was intended for installation in different time zone.

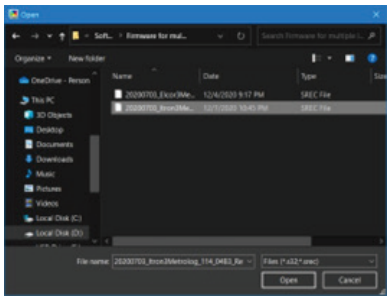


7.2.6. Reset (Menu)

Reset is to restart device without erasing any parameters or archives. This function is useful to refresh device.

7.2.7. Download FW to device (Menu)

This option allows new firmware to update onto device.



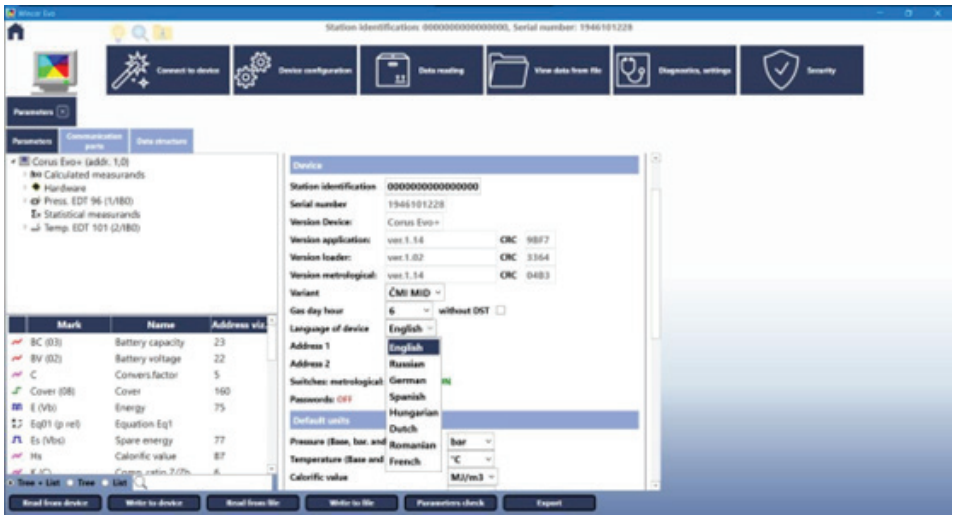


Diagram above shows example of Corus Evo+ after firmware upgrade with on screen multi-language options.

7.3. Data Reading

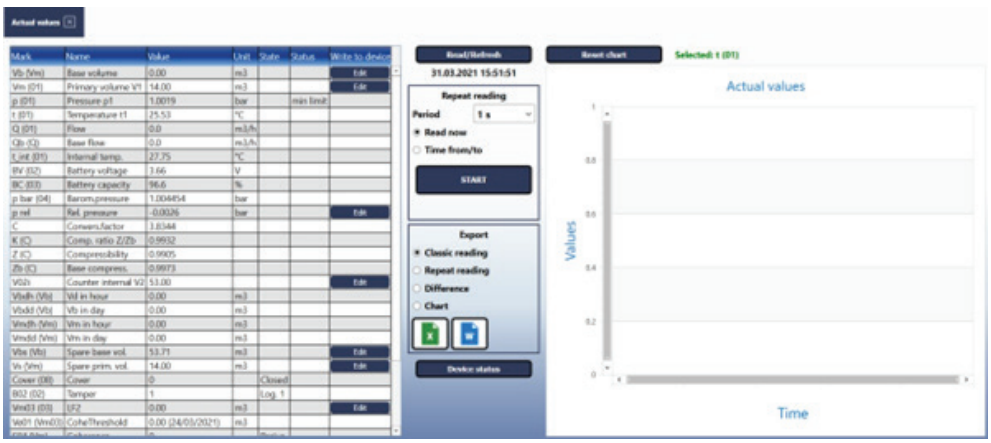
Under "Data Reading", there are 3 options:

- Actual values
- Archives
- Full device database

With these 3 options, it is possible to read device instantaneous data, individual archives and download full device archives to a file which could be viewed by other user later using Wincor Evo. This is especially useful to field technician who need to visit each site to download the device data.

7.3.1. Actual Values (Menu)

Based on configured "Actual Values" under "Data Structure". It is possible to read instantaneous values of all parameters and get an individual parameter to refresh based on a pre-set period.



Under this option, user could tally parameters like Primary volume, base volume and etc. depending on the metrology and service switches positions.

Thus, if user would like to configure the Primary volume to tally with the mechanical index register, click "Edit" in the Primary volume V1 then input the correspond meter index reading. Similarly for other parameters such as base volume etc.

Mark	Name	Value	Unit	State	Status	Write to device
Vb (Vm)	Base volume	0.00	m3			Edit
Vm (01)	Primary volume V1	14.00	m3			Edit
p (01)	Pressure p1	1.0019	bar		min limit	
t (01)	Temperature t1	25.02	°C			
Q (01)	Flow	0.0	m3/h			
Qb (Q)	Base flow	0.0	m3/h			
t_int (01)	Internal temp.	27.62	°C			
BV (02)	Battery voltage	3.62	V			
BC (03)	Battery capacity	96.6	%			
p bar (04)	Barom.pressure	1.004182	bar			
p rel	Rel. pressure	-0.0023	bar			Edit
C	Convers.factor	3.8412				
K (C)	Comp. ratio Z/Zb	0.9932				
Z (C)	Compressibility	0.9905				
Zb (C)	Base compress.	0.9973				
V02i	Counter internal V2	53.00				Edit
Vbdh (Vb)	Vb in hour	0.00	m3			
Vbdd (Vb)	Vb in day	0.00	m3			
Vmdh (Vm)	Vm in hour	0.00	m3			
Vmdd (Vm)	Vm in day	0.00	m3			
Vbs (Vb)	Spare base vol.	53.71	m3			Edit
Vs (Vm)	Spare prim. vol.	14.00	m3			Edit
Cover (08)	Cover	0		Closed		
B02 (02)	Tamper	1		Log. 1		
Vm03 (03)	LF2	0.00	m3			Edit
Ve01 (Vm03)	CoheThreshold	0.00 (24/03/2021)	m3			
S04 (Vm)	Coherence	0		Pasive		
B03o (01)	Binary output B3	1		Log. 1		Edit
S05 (p)	Pressure thres.	0		Pasive		

Table on the left show an example of device actual value parameters list. Please refer to section 7.2.1.7
(A) – Actual Values on how to reorder of the listing.

Some of the measurand values could be set or reset by clicking "Edit" in **"Write to device"** column.

Example of editable measurands are base volume, primary volume, rel. pressure, spare base volume, spare primary volume and etc. (depending on the metrology and service switches position)

By editing these measurands, user could tally gas meter index register against primary volume and reset other editable measurands after installation.

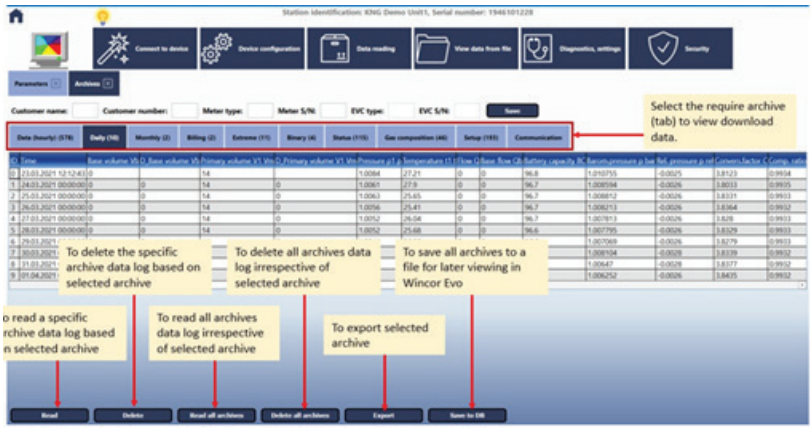
Diagram below shows available option to read device instantaneous values and to monitor a selected measurand.

7.3.2. Archives (Menu)

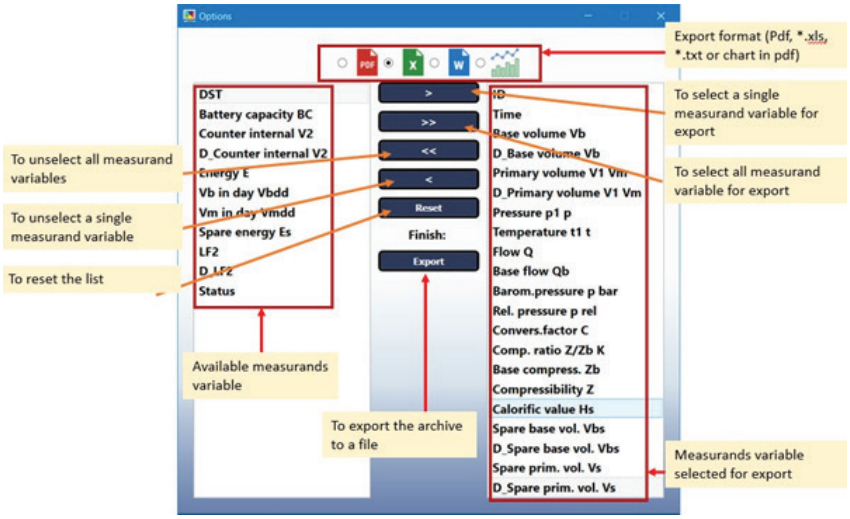
Wincor Evo allows user to download, view, export and save device data log to PC. Downloaded archives could be export/save in following formats:

- Pdf
- Excel sheet (*.xls)
- Word format (*.txt)
- Chart format (*.pdf)
- Wincor Evo format (*.db)

Diagram below shows downloaded archive download user interface.



On each of the archives, it is possible to select measurand variables to export and file format.



7.3.3. Export all archive (Menu)

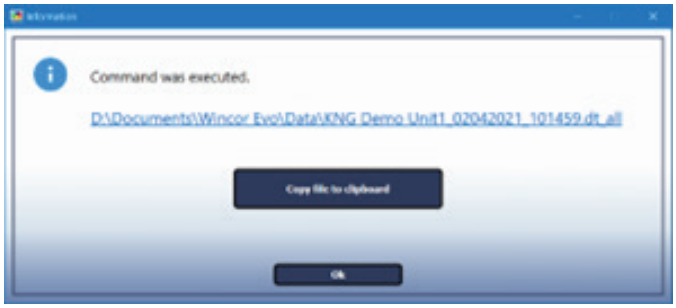
Wincor Evo provides one button solution for field technician to download device full archives by selecting "Data reading" -> "All data to *.dt_all file" as show in the diagram below. This will ease user task at site and avoid forgetting to download a particular database.

Downloaded file will be saved under the file name (Station ID + download date and time).

For example:

Station Id: KNG_Demo_Unit1
Download date and time: 2nd April 2021 10:14:59

The downloaded archive files in this case will be KNG_Demo_Unit1_02042021_101459.dt_all. This is helpful to avoid old file from same station being overwritten by new download



7.4. View data from file

Archive data downloaded from section 7.3.3 can be viewed in Wincor Evo. Based on need, user could export archive files per section 7.3.2.

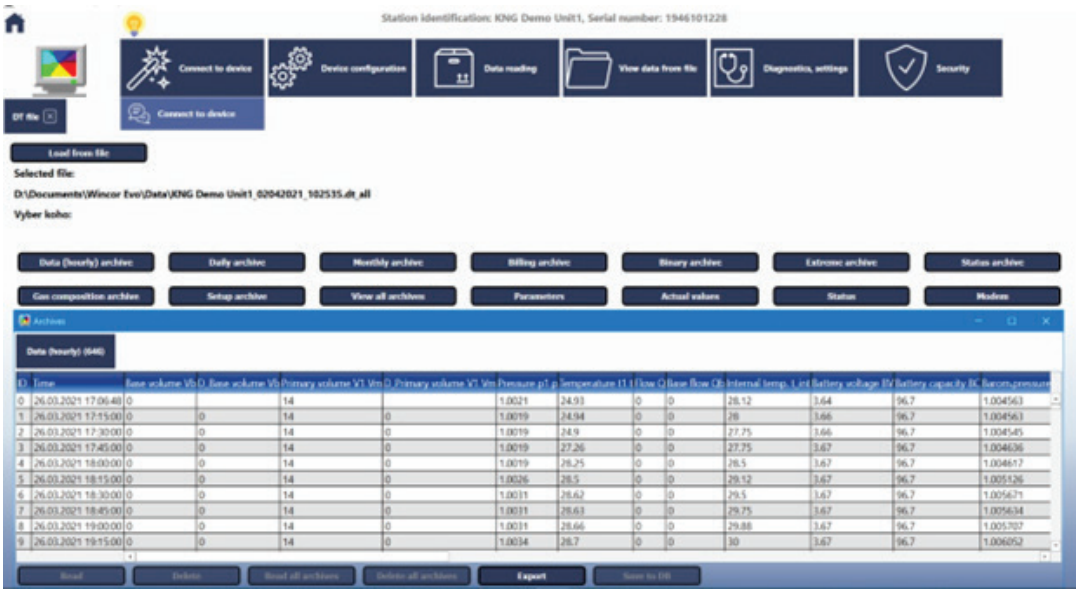
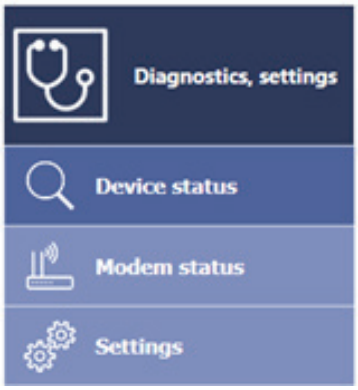


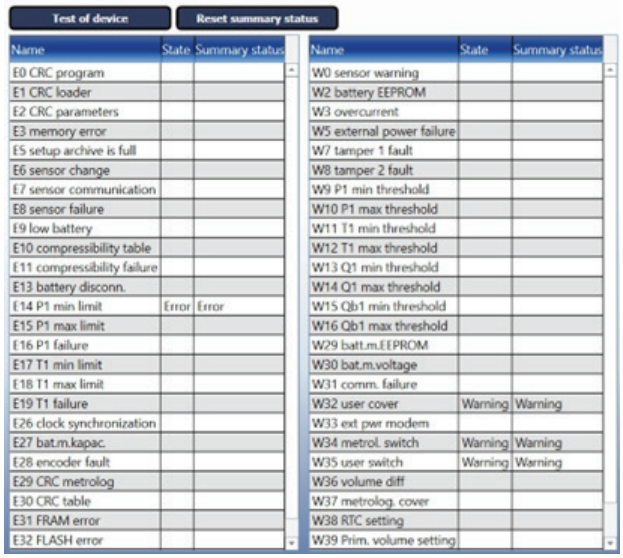
Diagram above shows example of *.dt_all files load from file.

Downloaded file *.dt_all is very useful especially to communicate with customer (for data) or manufacturer (to troubleshoot issues at site). In the *.dt_all, all the archives including Corus Evo+ parameters are stored. This will be easing administrator or manufacturer to analyze data and configuration in Corus Evo+.

7.5. Diagnostics, Settings (Menu)



This option allows user to check device and modem status. After checking device status, it is possible to display device error(s) and warning(s).
To reset old error(s) and warning(s), click on "Reset summary status" and then "Test of device" to get the latest device status.



Name	State	Summary status
E0 CRC program		
E1 CRC loader		
E2 CRC parameters		
E3 memory error		
E5 setup archive is full		
E6 sensor change		
E7 sensor communication		
E8 sensor failure		
E9 low battery		
E10 compressibility table		
E11 compressibility failure		
E13 battery disconn.		
E14 P1 min limit	Error	Error
E15 P1 max limit		
E16 P1 failure		
E17 T1 min limit		
E18 T1 max limit		
E19 T1 failure		
E26 clock synchronization		
E27 bat.m.kapac.		
E28 encoder fault		
E29 CRC metrolog		
E30 CRC table		
E31 FRAM error		
E32 FLASH error		

Name	State	Summary status
W0 sensor warning		
W2 battery EEPROM		
W3 overcurrent		
W5 external power failure		
W7 tamper 1 fault		
W8 tamper 2 fault		
W9 P1 min threshold		
W10 P1 max threshold		
W11 T1 min threshold		
W12 T1 max threshold		
W13 Q1 min threshold		
W14 Q1 max threshold		
W15 Qb1 min threshold		
W16 Qb1 max threshold		
W29 batt.m.EEPROM		
W30 bat.m.voltage		
W31 comm. failure		
W32 user cover	Warning	Warning
W33 ext pwr modem		
W34 metrol. switch	Warning	Warning
W35 user switch	Warning	Warning
W36 volume diff		
W37 metrolog. cover		
W38 RTC setting		
W39 Prim. volume setting		

7.6. Security (Menu)

This section is dedicated to device security and communication encryption.

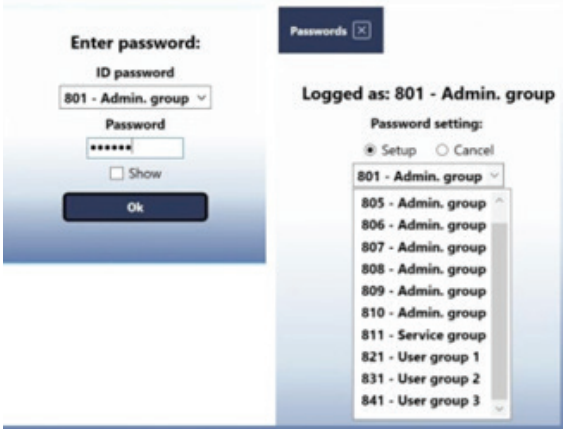
7.6.1. Passwords

Passwords are divided into 5 groups and in each group, it is possible to have maximum 10 users (including administrator for each group)

- Administrators
- Service
- User 1
- User 2
- User 3

If device password is activated, a password window will appear when software is trying to connect to the device. User will have to enter its user ID and password before it could access the device configuration.

A top-level administrator will have the authorization to add, change and remove user. This included the possibility to reset password. The highest administrator is 801 who have the authorization to set password of individual group leaders.



7.6.2. Encryption keys

Encryption keys are necessary to protect access to devices. A new cryptographic key can be written on a device or files. Files with encryption keys are protected by passwords.

Encryption is enabled for device Parameters from device, communication ports and encryption of tab.

8. Wincor Evo (Professional Mode - Reserved for Advanced user)

This is an advance mode that allows advanced users to customize Corus Evo+ according to specific user requirements.

The following are some of the available functions in Pro mode (not exhaustive in this manual). A proper training is advisable before users attempt to use Pro mode.

8.1. Adding a new internal parameter

The procedure below is a general guideline to add a new parameter to displaying a gauge pressure in Corus Evo+.

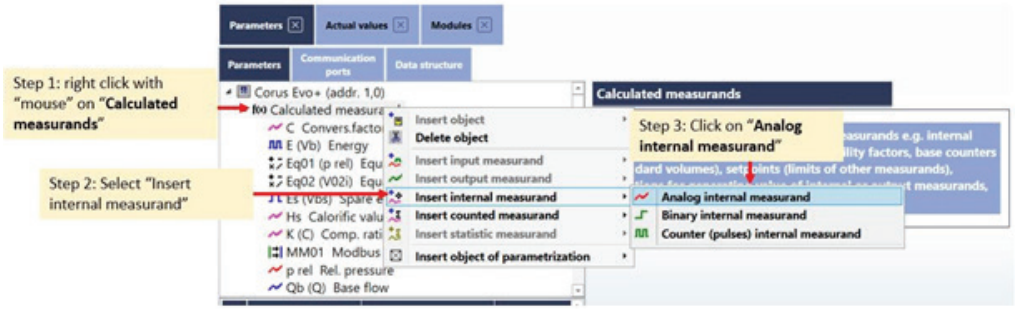
It is possible to display pipeline gas pressure even with installed digital absolute pressure transducer. In this case, the pressure gauge is metering pressure minus barometric pressure minus relative pressure.

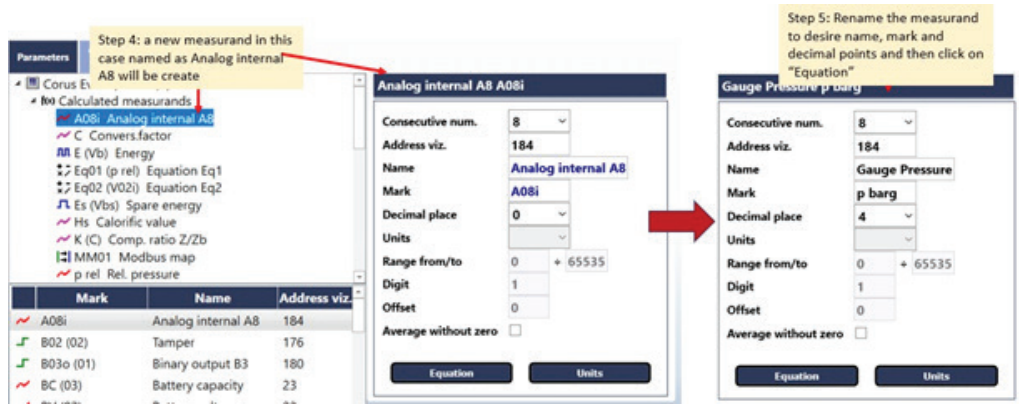
In the example, the followings are read from device:

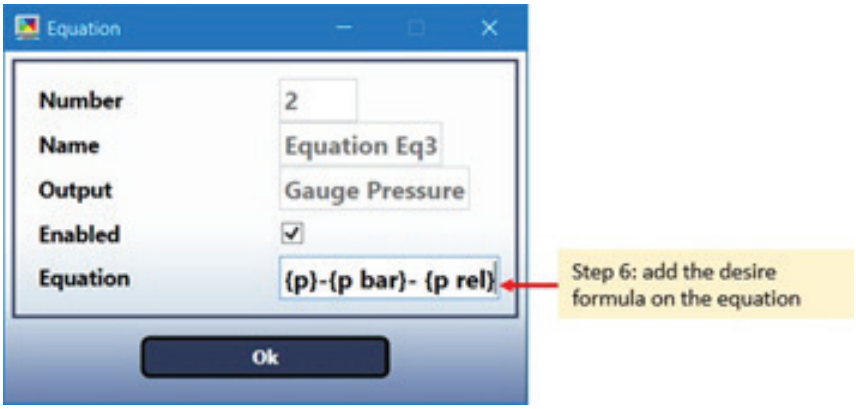
- Metering pressure = p (01) abs
- Barometric pressure = p bar (04) abs
- Relative pressure = p rel abs

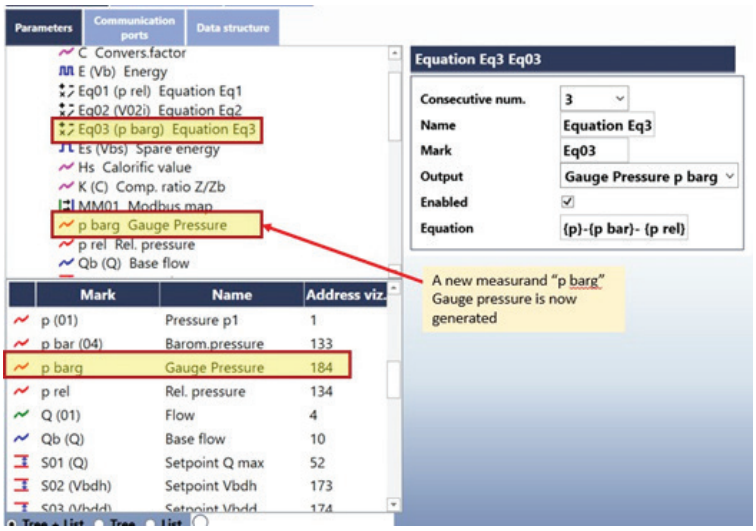
Mark	Name	Address viz.
p (01)	Pressure p1	1
p bar (04)	Barom.pressure	133
p rel	Rel. pressure	134

The first step is to create a pressure gauge measurand and attached an equation to calculate gauge pressure. Diagram below shows how to create an analog internal measurand and then attach an equation to it.

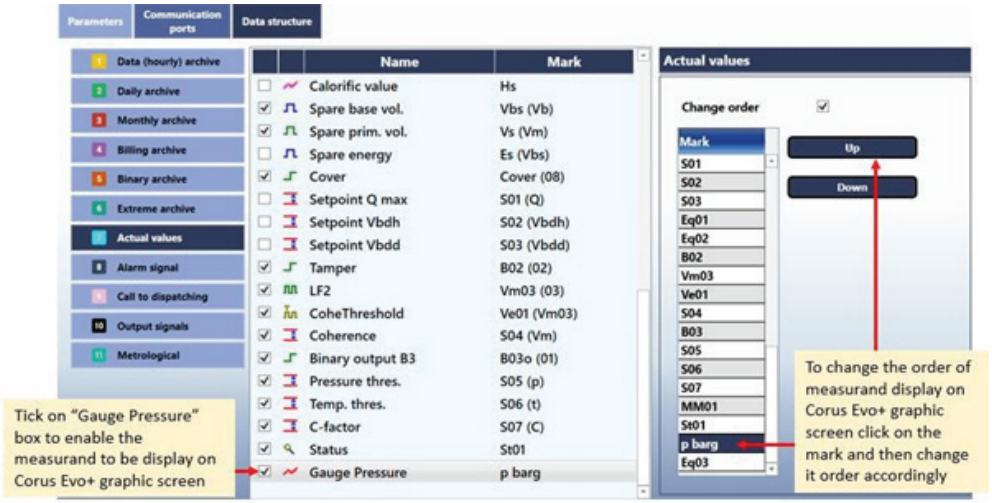




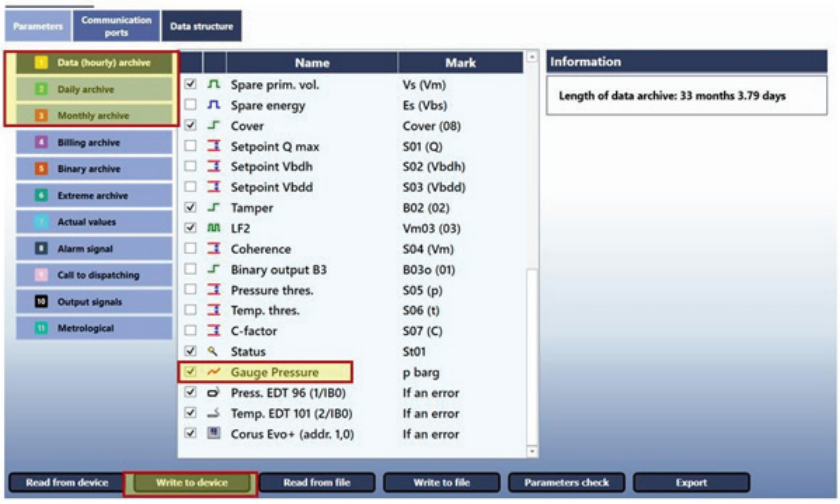




To display the newly created "Gauge Pressure" on Corus Evo+ LCD, go to "Parameters" -> "Data structure" and click on "Actual values".



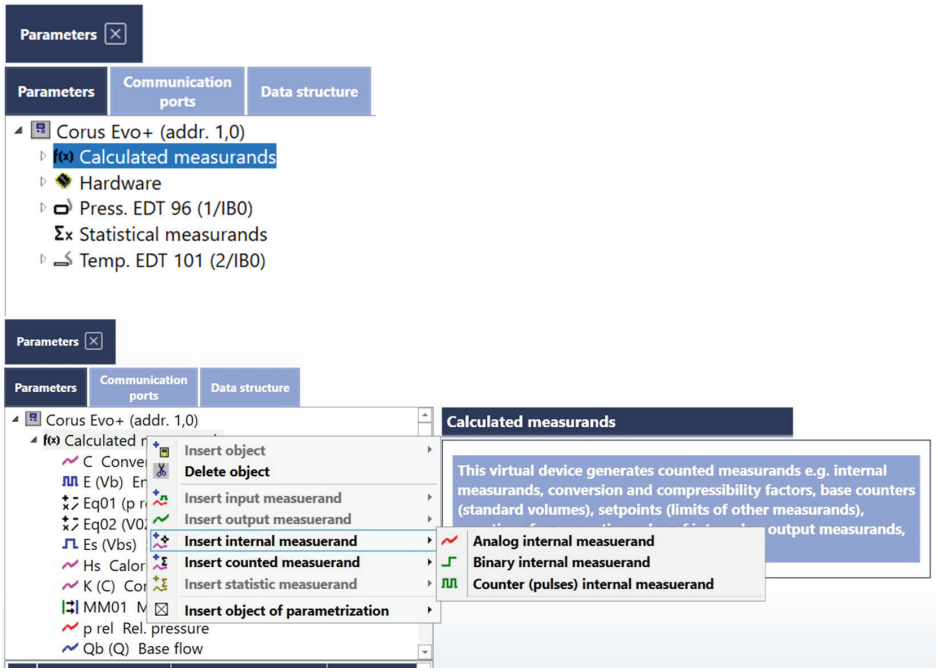
Go to Data, Daily and Monthly archives and ticked on gauge pressure box to enable this parameter storage to archives. Finally save the changes to device by clicking on "Write to device" to complete the task.



Another example (Adding Coherence measurand in Corus Evo+)

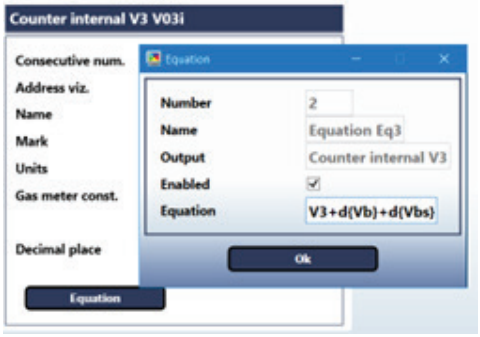
1. Under Wincor Evo (Pro mode), go to "Device configuration" tab, click "Parameters from device" to read the device.

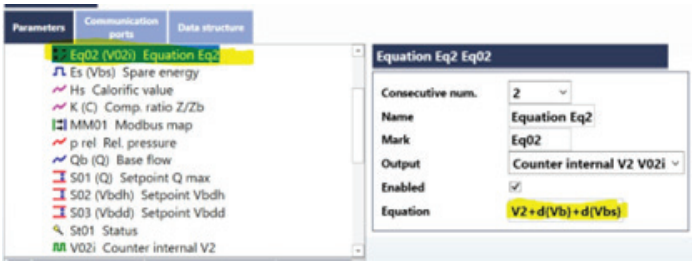
2. Right click on "Calculated measurands" to expand available option then click on "Insert internal measurand" -> "Counter (pulse) internal measurand"



A new Counter internal V3 V03i dialog box will appear and click on "Equation" inside the dialog box to add require equation. Then click "ok" to complete the equation creation.

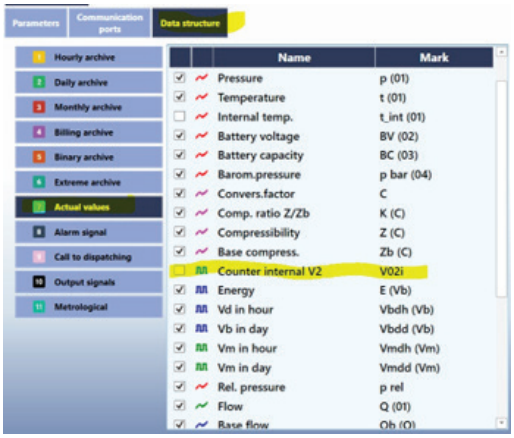
Once the equation is created, you will find a new equation in the dialog box.



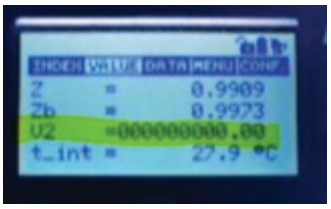


Complete the new equation creation on the device by click "Write to device" and a new formula is saved to equation.

To display the new information in the Corus Evo+ LCD, go to "Data structure" tab and click on "Actual values" then enable the new counter "Counter internal V2".

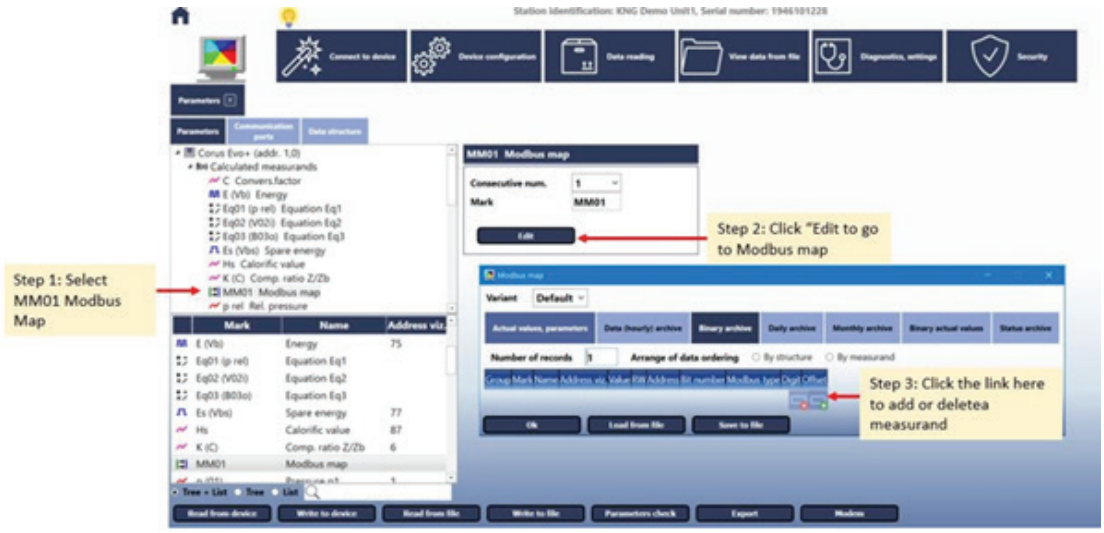


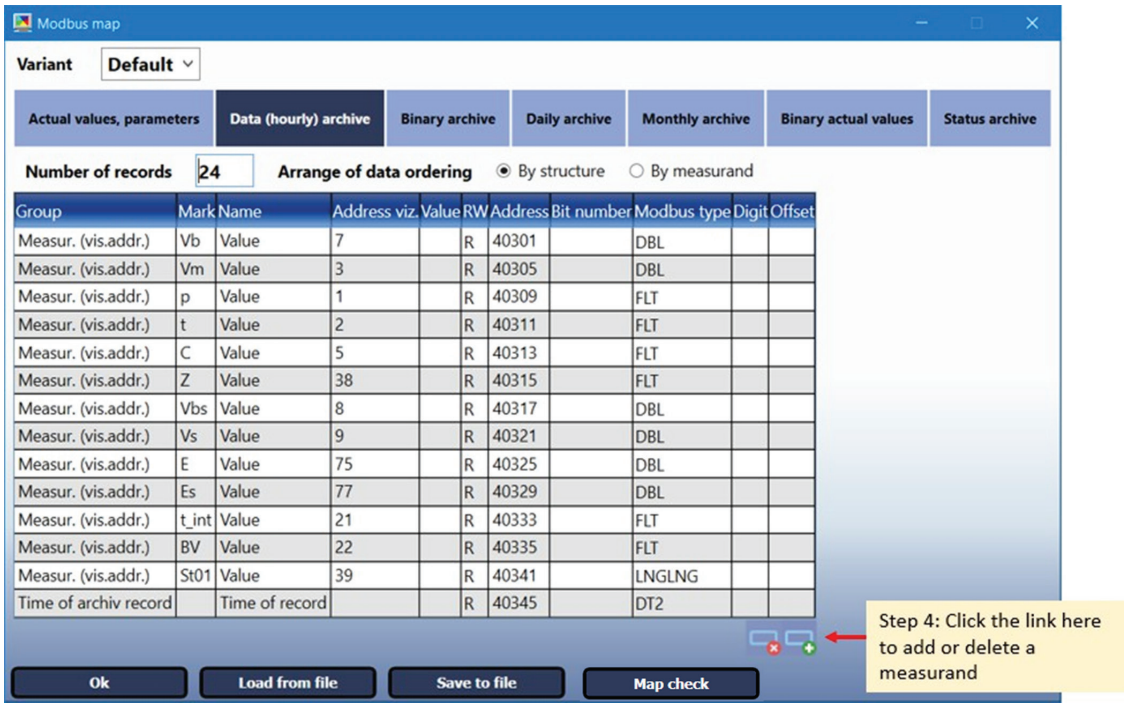
In the Corus Evo+, the new parameter will be display under the "Value" tab,

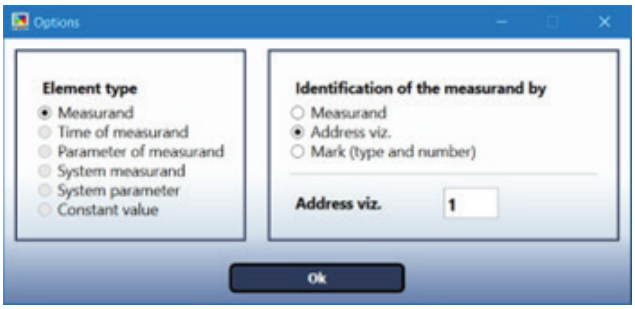


8.2. Creating Modbus Map

It is possible to edit and add new measurands in Modbus map

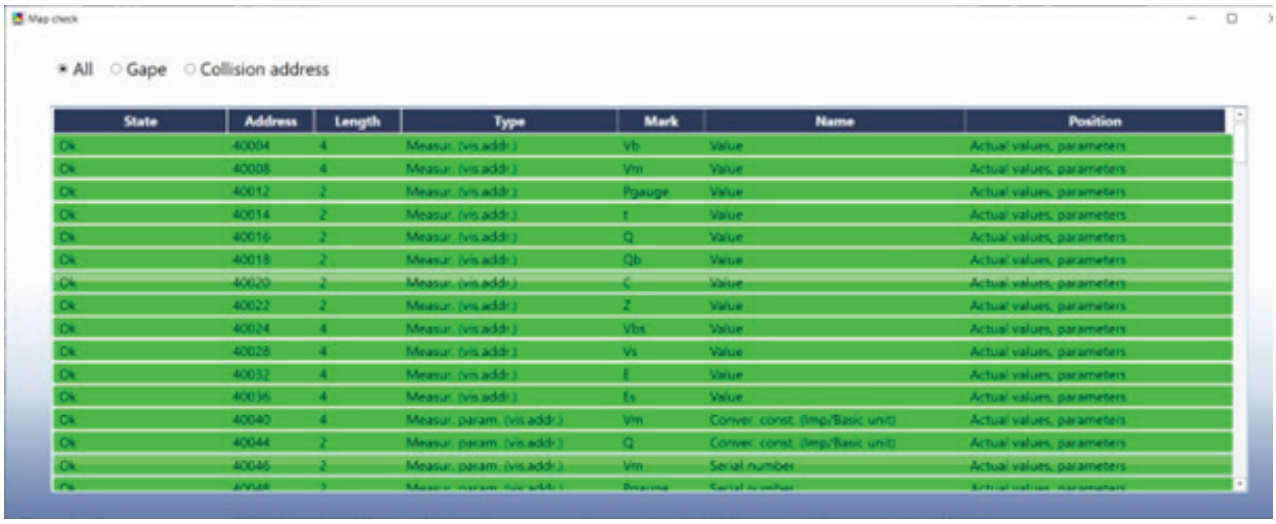






Map check

Map Check allows users to check whether there is any conflict in the modbus address assignment.



Example above shows an example of Modbus map check status (no Collision).

9. Symbols and Terms

Symbol	Meaning	Unit
AGA8-G1	method to calculate gas compressibility factor	
AGA8-G2	method to calculate gas compressibility factor	
AGA8-DETAIL	method to calculate gas compressibility factor (Note: The earlier designation of this method was AGA8- 92DC)	
AGA NX-19 mod	method to calculate gas compressibility factor	
ASC	Authorized Service Centre	
BTS	Base Transceiver Station	
CLO	4-20 mA current output module	
CRC	checksum - for data protection purposes	
CTR	communication protocol	
DC, dc	DC voltage	
dE	energy addition (difference)	MJ
dE_s	energy difference (difference) in error conditions	MJ
dV	addition primary volume V_m or V (difference)	m^3
dV_b	addition converted volume V_b (difference)	m^3
dV_{bs}	increment (difference) of the recalculated volume V_b under the error conditions	m^3
dV_c	addition corrected primary volume V_c (difference)	m^3
dV_m	addition primary volume (difference)	m^3
E	energy	MJ
Es	substitute energy value	MJ
EDTxx	digital transducer of pressure EDT 96 or of temperature EDT 101	
Iflag Evo	Native communication protocol of Corus Evo+	
EMC	electromagnetic compatibility and resistivity	
EMI	electromagnetic radiation	
EVC	Electronic volume converter	
firmware, FW	software in the device	
GOST 30319.2	method to calculate gas compressibility factor	
GOST 30319.3	method to calculate gas compressibility factor	
H_s	combustion heat	MJ/m^3
MID	Measuring Instrument Directive, 2014/32/EU Directive about measuring instruments supply to the market (NV 120/2016 Sb.)	
Modbus	Modicon communication protocol	
MPE	maximum permissible error	
SGERG-88	method to calculate gas compressibility factor	
SW	software – PC program	

C	conversion factor	-
K	gas compressibility factor (Z/Z_b)	-
k_p	gas meter constant (number of pulses per $1m^3$)	imp/m^3
N	number of input pulses from the gas meter	imp
P	absolute pressure at metering conditions	imp
P_b	absolute pressure at base conditions	kPa
Q	flow rate at measurement conditions (primary flow rate)	m^3/h
Q_b	flow rate at base conditions (converted flow rate)	m^3/h
T	absolute temperature at measurement conditions (T = t + 273,15)	K
t	gas temperature	°C
T_b	absolute temperature at base conditions	K
V_m	volume at measurement conditions (primary volume)	m^3
V_c	corrected volume at measurement conditions (volume corrected based on correction profile of the gas meter)	m^3
V_b	volume at base conditions (converted volume)	m^3
V_{bs}	substitute volume at base conditions (substitute converted volume)	m^3
V_s	substitute volume at measurement conditions (substitute primary volume)	m^3
V_d	primary volume difference	m^3
V_{bd}	volume difference at base conditions	m^3
Z	gas compressibility factor at measurement conditions	-
Z_b	gas compressibility factor at base conditions	-

Contact

If you have comments, questions or suggestions about the software or hardware and on how we may improve this documentation, please contact your Sales Representative.

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