Honeywell

Device Series enCore

Flow Computer

Manual
Flow Conversion AFB

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Contents

1 About this manual

The manual for the enCore device series has a modular design. For an overview of the enCore/enSuite concept and the structure of the manual for your device type, please refer to section ➪ 6.9 enCore operating instructions (p. 54).

The present volume describes the basic functionality and operation of the Flow Conversion AFB.

The Flow Conversion AFB in the enCore device deries

Please note that not every AFB is available for every device type of the enCore device series. Which functions a device supports is described in detail in the online help.

Even if the AFB is supported by your device type, it is not always included in the delivery state. If this is the case with your device, then first add the AFB in enSuite with the action **Software configuration** and transfer the additional software to the device.

In addition, some AFBs are subject to a charge. Please contact our technical support if you need assistance. (➪ 6.4 Technical support Flow Computers and Gas analyzers, p. 53)

The meaning of the individual parameters is documented in detail in the online help of enSuite, which is why the parameterization in this document is only described as an example. The examples used may be slightly different for your particular device. Unless otherwise mentioned, the instructions refer to the expert mode.

Online help

In enSuite, you can call the general help via the menu item **Help – Show online help**. Open the context-sensitive help directly from the desired branch in the parameterization window with [F1].

This part of documentation is intended for specialist personnel who are responsible for the service activities of the following tasks after the successful assembly of the device and installation of the current enSuite version on PC:

- adaptation of device parameterization to the measuring task
- test of all data points and commissioning
- other service activities

The illustrations in these instructions serve to depict the facts that are being explained, and therefore deviate depending on the configuration of your device and enSuite.

1.1 Expert and normal mode in enSuite

enSuite distinguishes between two parameterization modes, the expert and the normal mode.

Expert mode

The parameterization window displays all functions, parameters and export values, and all editing possibilities are enabled.
This mode is available for all enCore device types.

Normal mode (for some device types only)

This mode enables you to easily create and configure a parameterization for *standard* applications. The parameterization window is displayed in a simplified view that guides you through the most important settings, step by step.
If necessary, you can switch to the expert mode, which again offers all functions, parameters and export values available for your device.

Certain changes in the expert mode lock the normal mode.

As soon as you open a normal mode parameterization in the expert mode, the expert lock symbol signals that a change in this section or this parameter locks the normal mode.

Parameters that are not marked with this symbol can be changed without further ado and switching back to normal mode is possible.

Use the following menu item to switch between expert and normal mode:[1]

Tools – Expert mode

Details ➪ enSuite online help

1 The menu item is available only for parameterizations of enCore devices that support the normal mode.

2 Functional description

The flow conversion is an *A*pplication *F*unction *B*lock for enCore devices. Its main task is to calculate the measured volumes of natural-gas from measurement conditions to base conditions (flow conversion). In addition, the mass and energy of natural gas are also calculated (energy conversion). The Flow Conversion AFB always carries out this task along with the Basic System and the Gas Quality AFB:

- **Basic System**
  The Basic System comprises the connections, parameterization and management of used measurement devices such as gas meters, pressure and temperature transmitters and, if required, gas quality measurement devices.
  It prepares the input data and provides the volume at measurement conditions V_m and the flow rate `Q` to the Flow Conversion AFB; the temperature `t` and the pressure at measurement conditions `p` as well as optionally the analysis of natural gas to the Gas Quality AFB.
  Define an activation signal in the Basic System for the special case when you use two or multiple flow directions.
  ➪ 5.7 Representing two flow directions (p. 50)
- **Gas Quality AFB**
  This AFB provides the essential gas characteristics such as the volume- and mass-based heating values, the conversion factor `C`, as well as the density at measurement conditions ρ_m and at base conditions ρ_b.
  ➪ 2.3 Flow conversion (p. 20)
- **Flow Conversion AFB**
  The Flow Conversion AFB calculates the flowed volumes at base conditions, the energy and the mass based on the input values from the Basic System and the Gas Quality AFB.
  For accounting and testing purposes, it manages various counters for the volume at measurement conditions V_m and the volume at base conditions V_b as well as for the energy `E` and the mass `M`. Optionally, it can carry out an error curve correction of the gas meter and generate corrected counters V_C.

A flow conversion requires at least one Flow Conversion AFB and one Gas Quality AFB, besides the Basic System. This configuration depicts a single-stream operation with one flow direction.

The modularity of the enCore device facilitates the realization of various extended operational and technical-measurement requirements. The number of measuring streams and their flow directions which the enCore device can process is variable and is determined by the number of board slots as well as the configuration of hardware and software (⇨ "Operating Instructions" of the enCore FC manual). For a single-stream operation with two flow directions, combine, e.g., two Flow Conversion AFBs with only one Gas Quality AFB and the Basic System.

The following is applicable in general:

- You require one Flow Conversion AFB for every stream and for every flow direction.
- For every C calculation which is based on different measured data such as pressure, temperature and/or gas quality (abbreviated as: GQ) or on different calculation specifications, you require another Gas Quality AFB.

The Flow Conversion AFB is divided in the following functional areas:

⇨ 2.1 Monitoring the input values of the gas meter (p. 9)

⇨ 2.2 Meter correction (optional) (p. 17)

⇨ 2.3 Flow conversion (p. 20)

⇨ 2.4 Managing counters (p. 22)

⇨ 2.5.1 Flowchart (p. 33) on the interaction of the individual functional areas

2.1 Monitoring the input values of the gas meter

2.1.1 Overview

You can monitor minimum flow rate (`Qmin`) and/or maximum flow rate (`Qmax`) of the gas meter, distinguish the start and stop of gas streams from failure and control the counters specific to the measurement plant. Optionally, you can activate a valve control.

⇨ 2.1.2 Monitoring the maximum flow rate (p. 12)
⇨ 2.1.3 Monitoring the minimum flow rate (p. 12)
⇨ 2.1.4 Monitoring valves (optional) (p. 16)

Firstly, a brief overview of configuration options in case of `Qmin/Qmax` monitoring:

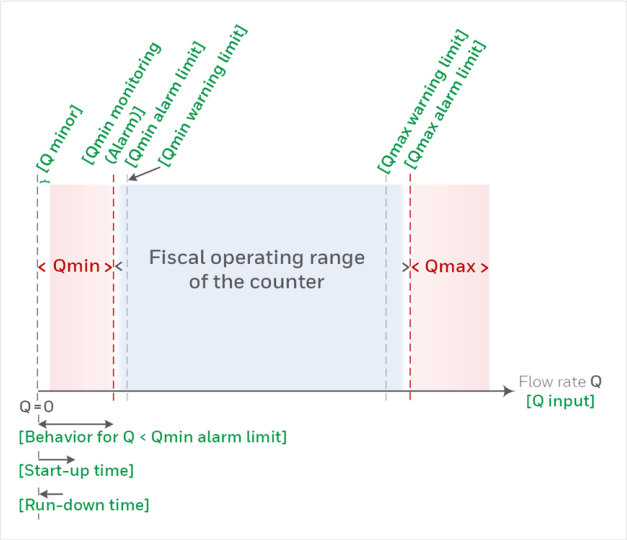

Fig. 2-1: Overview of `Qmin/Qmax` monitoring

The Flow Conversion AFB uses the flow rate and (optional) the volume of natural gas, which is provided by the Basic System, as input values for monitoring.

Steps in enSuite

- ▶ Open the desired parameterization in enSuite.
- ▶ Change to branch **<Device> – [<Group> –] <Flow Conversion AFB>**.
- ▶ On tab **Parameters** go to section **Measurement conditions**.
- ✓ This section contains all parameters that are important for mon-

✓ itoring the input values.

▶ Enter the gas volume from the basic system in the parameter **V Input** – this parameter is *optional*.

EXAMPLE(S)

If the volume is taken from the Basic System, which uses the measurements of a turbine meter, import, for instance, the value of the tab **Export values** from the branch **Basic System – I/O – I/O boards.Board 1: ExMFE5 – Z1+ Z1– – 🎈 Amount**.

This value is used for all volume-based calculations, for example, for increasing of counters.

▶ Enter the flow rate from the Basic System in the parameter **Q Input** – this parameter is *compulsory*.

EXAMPLE(S)

If the flow rate is taken from the Basic System, which uses the measurements of a turbine meter, import, for instance, the value of the tab **Export values** from the branch **Basic System – I/O – I/O boards.Board 1: ExMFE5 – Z1+ Z1– – Flow rate**.

This value is used for all flow rate-based calculations, for example, for monitoring `Qmin` and `Qmax`.

Use of volume and flow rate input

If the gas meter provides the volume and the flow rate via the Basic System, you should assign both the values. The same input sources must be used for both the parameters. This is the normal operating mode.

If the gas meter provides only the flow rate, the **V input** may remain blank. In this case, the volume-based calculations are performed by integrating flow rate via time.

2.1.2 Monitoring the maximum flow rate

The enCore FC can monitor the maximum flow rate (`Qmax`) and generate – depending on the parameterization – corresponding messages when warning or alarm limit is reached. These can for example be used to control a gas plant.

Steps in enSuite

Take the value for the alarm limit from the specific values of the connected gas meter. You can chose the warning limit plant-specific depending on the application.

Prerequisite(s)

- The desired parameterization is opened on branch: **<Device>** – **<Group>** –] < **Flow Conversion**> in section **Measurement conditions**.

▶ To set a warning limit, enter the desired value in the parameter **Qmax warning limit**.

The device generates the message **Qmax warning** as soon as this flow rate value is exceeded.

▶ To set an alarm limit, enter the characteristic value of the gas meter in the parameter **Qmax alarm limit**.

The device generates the message **Qmax alarm** as soon as this limit is exceeded.

2.1.3 Monitoring the minimum flow rate

Also when monitoring the minimum volume flow at measurement conditions, the Flow Conversion AFB distinguishes between a warning and an alarm limit and generates corresponding messages when the monitoring function detects an error.

When monitoring the lower alarm limit, the enCore FC can take into account the start-up and run-down times which the connected gas meters require when starting and stopping the gas plant. An alarm or

warning message is only generated when the flow rate falls below the respective lower limit however is still above the parameterized minor flow limit after the expiry of start-up and run-down time.

If the measured flow rate is below the **Qmin alarm limit**, you have various options to determine the behavior of derived flow rates and counters.

Steps in enSuite

Parameterize (if required) the specific values of the connected gas meter.

Prerequisite(s)

- The desired parameterization is opened on the branch: **<Device>** – **<Group>** –] < **Flow Conversion**> in section **Measurement conditions**

Activating Qmin monitoring

- ▶ Activate the checkbox of the parameter **Qmin monitoring**.
- ▬ The monitoring of minimum flow rate is switched on. All further parameters for Qmin monitoring are taken into account by the device.

Setting a warning limit

- ▶ Enter the desired value in the parameter **Qmin warning limit**.
- ▬ As soon the Qmin monitoring detects that the criteria for the warning are met, taking into account all influencing parameters, the device generates the message **Qmin warning**.

Setting an alarm limit

- ▶ Enter the desired value in the parameter **Qmin alarm limit**.
- ▬ As soon as Qmin monitoring detects that the criteria for the alarm are met, taking into account all influencing parameters, the device generates the message **Qmin alarm**.

- ▶ To set a minor volume limit, enter the desired value in the parameter
  Q minor.
- ▬ If the flow rate drops below this value, all the flow rates are set to the value zero (0) and all the counters are stopped.
  In this case, flow rate related warning and alarm messages are not generated.

> **Special case: minor volume suppression**
>
> The following is applicable in general: Activate the volume suppression by parameterizing **Q minor** only if the resolution of flow rate signals is high enough, for example, if HF pulses are available in case of a turbine meter.

Due to their mass inertia, some gas meter types require some time to adapt to the new conditions after the opening or closing of the gas line. This adaptation time can be taken into account as start-up and run-down time in case of Qmin monitoring.

Prerequisite(s)

- The parameter **Use start-up and run-down time** is set to **for Qmin alarm and Qmin warning**.

- ▶ Select in the drop-down list **Use start-up and run-down time** for which case the start-up and run-down time shall be considered:

  - **only for Qmin alarm** (*default*)
    When evaluating whether a Qmin alarm is set, the start-up and run-down times are taken into account.
  - **for Qmin alarm and Qmin warning**
    The start-up and run-down times are taken into account both when evaluating whether a Qmin warning is present and whether a Qmin alarm is present.

- ▶ If required, enter the time in the parameter **Start-up time** which the gas meter requires for adaptation when starting the gas stream.

- The start-up time begins when the minor volume limit **Q minor** is exceeded.
  If the parameterized time expires and the flow rate still lies between **Q minor** and **Qmin alarm limit**, the message **Qmin alarm** is generated.

▶ If required, enter the time in the parameter **Run-down time** which the gas meter requires for adaptation when stopping the gas stream.

- The run-down time begins when the flow rate falls below **Qmin alarm limit**. If the run-down time expires and the flow rate still lies between...
  - ... **Q minor** and **Qmin alarm limit**, the message **Qmin alarm** is generated.
  - ... **Q minor** and **Qmin warning limit**, the message **Qmin warning** is generated.

▶ If required, enter the time in the parameter **Run-down time** which the gas meter requires for adaptation when the gas stream is being closed.

- If the Run-down time is also taken into account for the evaluation of a Qmin warning (**Use start-up and run-down time** is set to **for Qmin alarm and Qmin warning**), then the Run-down time for alarm and for warning is considered separately.
  The run-down time for alarm begins when the flow rate falls below **Qmin alarm limit**.
  The run-down time for warning, on the other hand, begins when the flow rate falls below **Qmin warning limit**. If the run-down time for warning has expired and the flow rate is still between the **Qmin warning limit** and **Q minor**, the **Qmin warning** message is generated.
  If the run-down time for alarm has expired and the flow rate is still between the **Qmin alarm limit** and **Q minor**, the **Qmin alarm** message is generated.
- (*default behavior*)
  If the Run-down time is only taken into account for the evaluation of a Qmin alarm (**Use start-up and run-down time: only for Qmin alarm**), the run-down time starts as soon as the flow rate falls

below **Qmin alarm limit**. If the run-down time for alarm has expired and the flow rate is still between the **Qmin alarm limit** and **Q minor**, the **Qmin alarm** message is generated.

▶ In parameter **Behavior for Q < Qmin alarm limit**, define the behavior in case the flow rate falls below the parameterized **Qmin alarm limit**.

- **Q_m, ΔV_m as measured** (*default*)
  The current measurement for the volume flow at measurement conditions Q_m is still used and the measured volume progression still entered in the counters.
- **Q_m := 0, ΔV_m := 0**
  The volume flow at measurement conditions Q_m is set to zero (0) and all the counters are stopped.
- **Q_m as measured, ΔV_m := 0**
  The current value for the volume flow at measurement conditions Q_m is still used, however all the counters are stopped.

2.1.4 Monitoring valves (optional)

The valve control function allows you to monitor whether the valves of the measuring section are still functioning without interference. As soon as the AFB receives the information that a stream is closed, it checks whether the currently measured operating flow rate exceeds the parameterized minor flow rate despite a closed valve (`Q > Q minor`). In this case the AFB generates a corresponding message.

Steps in enSuite

Prerequisite(s)

- The desired parameterization is opened on branch:
  <Device> – **<Group>** –] < **Flow Conversion**>

▶ On the **Parameter** tab, switch to the section **Measurement conditions**.

- To activate the function, in the **Valve control** parameter, import the event message indicating whether the associated stream is currently closed or not.
- The function is activated. As soon as the stream is closed, the AFB monitors whether Q is greater than Q minor. In this case it generates the message **Q while closed**.

Reset of message Q while closed

The message ends under the following conditions:

- The valve control is deactivated, i.e., no message is assigned to the parameter **Valve control**.
- The stream is open.
- The measured flow rate falls to the parameterized minor flow rate or below ($Q \leq Q\ minor$).

2.2 Meter correction (optional)

If information about flow-related deviations is available for a gas meter connected to the enCore FC, the Flow Conversion AFB can carry out a meter correction. Based on the parameterized correction points[1] , the Flow Conversion AFB calculates the correction factor C_f for every measured flow rate Q by linear interpolation and carries out a meter correction on this basis.

The correction takes place for main, error and unhaltable counters of operating volumes and is calculated as follows:

$$\Delta V_c = \Delta V_m \cdot C_f$$

$$Q_c = Q_m \cdot C_f$$

where

V_m = volume at measurement conditions

[1] Each calibration point consists of the flow rate in m^3/h and the related deviation in percent (%). From Flow Conversion AFB V 03-14-A on, 20 calibration points are available. In earlier AFB versions, the number of calibration points is limited to 10.

V_c = volume at measurement conditions, gas meter correction applied

You parameterize the calibration points with enSuite.

Special cases for flow rate outside the range defined by calibration points

Outside of the flow rate range defined by the calibration points, no extrapolation is carried out, i.e., if the flow rate Q...

- ... falls below the lowest flow of all calibration points, the correction factor C_f for that flow rate is retained.
- ... exceeds the highest flow rate of all calibration points, the correction factor C_f for that flow rate is retained.

Special cases for minimum and maximum flow rate

If the flow rate Q...

- ... falls below the minimum flow rate Q_{min}., the correction factor C_f gets the value 1, i.e., no gas meter correction is performed.
- ... exceeds the maximum flow rate Q_{max}., the correction factor C_f obtained for Q_{max} is retained..

If the meter correction is not in use, $\Delta V_c = \Delta V_m$

If you do not activate the meter correction, the correction factor C_f automatically gets the value 1. The counters for uncorrected volumes at operating conditions and the counters for corrected volumes at operating conditions then have equal values. Counters for corrected volume are suppressed in the default setting of displays in that case.

2.2.1 Steps in enSuite (optional)

The activation of the meter correction is optional. The necessary information for parameterizing the meter correction is typically provided by an official test certificate for the respective gas meter.

Prerequisite(s)

- The related parameterization is opened on branch:
  <Device> – [<Group> –] < Flow Conversion>

▶ Change to the branch **Meter correction**.

✓ On the tab **Meter correction** is displayed whether and, if any, which type of meter correction is activated.

▶ Determine the type of meter correction in the parameter **Gas meter correction type**:

- **no correction** (*default*)
  Select this entry if no meter correction should be carried out.
- **Q = measured value**
  Select this entry in order to activate correction and the deviations are related to flow rate measured by the gas meter.
- **Q = corrected value**
  Select this entry in order to activate correction and the deviations are related to the target flow rate of reference measurement.

✓ When the correction is deactivated, no further action is necessary.
OR
When the correction is activated, all fields for the input of up to 10 or 20 correction points are displayed, depending on the software version.

Enter the correction points successively:

▶ Enter the flow rate in the column **Q** and the corresponding deviation in the column **Deviation**.

▶ To sort the flow rates in column **Q** in ascending order, click **[Sort first column]**.

If the meter correction is activated, the corrected flow Q_C as well as the corrected operating volume V_C are the basis for all further calculations (derived flow rates, derived counters).

2.3 Flow conversion

On the basis of volume and flow rate – from the Basic System – as well as the conversion factor C, the heating rate (HVol or HMass) and the density (ρ_b or ρ_m) – from the Gas Quality AFB – the Flow Conversion AFB calculates the flowed volumes at base conditions V_b, the energy E and the mass M. Analogous to this, it calculates the base flow rate Q_b, the energy flow rate QE and the mass flow rate QM.

You can specify the sequence in which the Flow Conversion AFB does the calculations. It determines which input values you must parameterize in enSuite.

2.3.1 Steps in enSuite (optional)

Determine the sequence for the calculations in Flow Conversion AFB in enSuite as well as the required input values. The input values are generally generated from the respective Gas Quality AFB.

Prerequisite(s)

- The desired parameterization is opened on branch:
  <Device> – **<Group>** –] < **Flow Conversion**>

▶ Go to the section **Calculations**.

✓ In this section the current parameters for flow conversion are displayed.

▶ Determine the sequence of calculation steps for flow conversion in parameter **Conversion mode**:

- **$V_b = V_c \times C$; $E = V_b \times HVol$; $M = V_b \times \rho_b$** (*default*)
  The following input values are required for calculations:
  - **C** – conversion factor C
  - **HVol** – volume-based heating value
  - **ρ_b** – density at base conditions
- **$M = V_c \times \rho_m$; $V_b = M / \rho_b$; $E = V_b \times HVol$**
  The following input values are required for calculations:

  - **ρ_b** – density at base conditions
  - **ρ_m** – density at measurement conditions
  - **HVol** – volume-based heating value

- **$V_b = V_c \times C$; $M = V_b \times \rho_b$; $E = M \times$ HMass**
  The following input values are required for calculations:

  - **C** – conversion factor C
  - **ρ_b** – density at base conditions
  - **HMass** – mass-based heating value

▶ Configure the appropriate parameters depending on the required input values:

- **C Input** – conversion factor C
- **HVol Input** – volume-based heating value
- **HMass Input** – mass-based heating value
- **ρ_b Input** – density at base conditions
- **ρ_m Input** – density at measurement conditions

Set non-required parameters to "<Not used>"

Set the parameters of non-required input values via the context menu to **<Not used>**. This makes the displays of device and the parameterization in enSuite clearer.

EXAMPLE(S)

In the following example, the first calculation mode was selected; the Gas Quality AFB provides the input values:

Parameter	Sample value
Conversion mode	**$V_b = V_c \times C$; $E = V_b \times$ HVol; $M = V_b \times \rho_b$**
C input	GQ1.End base-conditions.C
HVol input	GQ1.End base conditions.H_sV

Parameter	Sample value
HMass input	<Not used>
ρ_b input	GQ1.End base conditions.ρ_b
ρ_m input	<Not used>

Table 2-1: Example of input values from the Gas Quality AFB

2.4 Managing counters

2.4.1 Counter types

The Flow Conversion AFB manages a total of four counters for the normal operation, for error cases as well as for testing and monitoring purposes. If you use more than one Flow Conversion AFB, e.g., for the dual-stream operation, each manages its own counters.

Main counters

Main counters contain the fiscal values which are typically used for accounting purposes:

- volume at base conditions V_b
- volume at measurement conditions V_m
- corrected volume at measurement conditions V_c
- energy E
- mass M

⇨ Operating mode of main and error counters (p. 23)

Error counters

Error counters are provided for the time periods during alarm (e.g., caused by erroneous measurements):

- volume at base conditions V_be
- volume at measurement conditions V_me
- corrected volume at measurement conditions V_ce
- energy ES
- mass Me

Operating mode of main and error counters

Under what conditions the main counters are stopped and the error counters are activated depends on the parameterization within the branch **<Device> – <Flow Conversion AFB>** in section **Counters' operating mode**.

➪ 2.4.2 Determining the counters' operating mode in normal cases and in case of breakdown (p. 24)

Unhaltable counters

The unhaltable counters are always in use irrespective of the error status of flow conversion:

- volume at base conditions V_bu
- volume at measurement conditions V_mu
- corrected volume at measurement conditions V_cu
- energy Eu
- mass Mu

Held counters

The hold function saves the current main counters, error counters and measurements when certain events occur:

- volume at base conditions V_b held, V_be held
- volume at measurement conditions V_m held, V_me held
- corrected volume at measurement conditions V_c held, V_ce held
- energy E held, Ee held
- mass M held, Me held

➪ 2.4.3 Hold current counters and measurements (p. 26)

2.4.2 Determining the counters' operating mode in normal cases and in case of breakdown

You have different options in a Flow Conversion AFB of enCore device to influence the behavior of main and error counters in case of an error. The measurement is then erroneous if the Flow Conversion AFB has at least one active error of Alarm type.

Thus, the Flow Conversion AFB thematically differentiates two error types:

- Error in flow conversion
  The message **Conversion alarm** is set in case ...
  - ... an input value which is required for the selected flow conversion mode such as the conversion factor C, the heating value (HVol or HMass) or the density (ρ_b or ρ_m) is erroneous.
  - ... a general alarm message, for example, from the System or Time Service is pending in the device. Source of the alarm can for example be the message **Alarm time adjustment** of the Time Service.
- Error in measurement of volume at measurement conditions
  An input value which influences the result of measurement of operating volume flows such as operating volume flows V_m, flow Q and the message for activating counters is erroneous. In such cases, the message **Volume measurement alarm** is set.

In case of an alarm of volume measurement, the flow conversion automatically is taken to the alarm condition because the volume is an input value of the flow conversion. Conversely, the flow conversion can be in an alarm condition while the measurement of volume at measurement conditions continues to work without error.

Determine the behavior of counters in case of an error in the folder **Counters' operating mode**. In case of main and error counters, define the conditions under which the counters should be started or stopped. This determination is executed separately for the counters of volume at measurement conditions as well as the counters for base volume, energy and mass.

Steps in enSuite

Prerequisite(s)

- The desired parameterization is opened on branch:
  <Device> – **<Group>** –] < **Flow Conversion**>

▶ On tab **Parameters** go to section **Counters' operating mode**.

Configuring the behavior for the counters of volumes at measurement conditions in case of error:

▶ In order to determine the behavior of the main counters V_m and V_c, select one of the following entries in the parameter **Stop V_m/V_c counters**.

- **never**
  Main counters are not stopped even in case of an alarm.
- **if affected by alarm** (*default*)
  Main counters are stopped if an alarm is indicated during measurement of volume (at measurement conditions). (see above)
- **during any alarm**
  Main counters are stopped for every Flow Conversion AFB alarm. (see above)

▶ In order to determine the behavior of the error counters $V_m e$ and $V_c e$, select one of the following entries in the parameter **Start $V_m e$/$V_c e$ counters**.

- **never**
  Error counters are not started even in case of an alarm.
- **if affected by alarm** (*default*)
  Error counters are started if an error is indicated during measurement of volume (at measurement conditions). (see above)
- **during any alarm**
  Error counters are started for every alarm of Flow Conversion AFB. (see above)

Configuring the behavior for the counters of volumes at base conditions, energy and mass in case of error:

- In order to determine the behavior of the main counters V_b, E and M, select one of the following entries in the parameter **Stop V_b/E/M counters**.
  - **never**
    Main counters are not stopped even in case of an alarm.
  - **during any alarm** (*default*)
    Main counters are stopped for every Flow Conversion AFB alarm. (see above)

- In order to determine the behavior of the error counters V_be, Ee and Me, select one of the following entries in the parameter **Start V_be/Ee/Me counters**.
  - **never**
    Error counters are not started even in case of an error.
  - **during any alarm** (*default*)
    Error counters are started for every alarm of Flow Conversion AFB. (see above)

2.4.3 Hold current counters and measurements

The hold function facilitates the "freezing" of the conversion-relevant main counters, error counters and measurements of a flow conversion. These values were managed in the frozen values and are labeled with the key word **held**.

The basic configuration of hold function is available in enSuite. Here, you can specifically control freezing via a message, save the data in archive and transfer it via Modbus, e.g., to the superordinate monitoring of measuring device. You can determine whether the current measurements or the average values are frozen for pressure and temperature.
Thus, the hold function is apt for testing and monitoring purposes, e.g., in case of two gas meters connected in series, or in dual-stream operation in case of temporary series connection for testing purposes.

The following counters and values are frozen in every hold set:

- time stamp of the last execution of hold function (`Time stamp held`)
- energy (`E held`, `Ee held`)
- mass (`M held`, `Me held`)
- volume at base conditions (V_b `held`, V_b`e held`)
- corrected volume at measurement conditions (V_c `held`, V_c`e held`)
- volume at measurement conditions (V_m `held`, V_m`e held`)
- pressure (`p held`)
- temperature (`t held`)

Hold sets cannot be extended

Please note that the composition of values in the hold sets is fixed. If more values are added via the display editor of enSuite, these are *not* taken into account for the display on the device.

The values of pressure and temperature are imported from the related Gas Quality AFB. You link the Flow Conversion AFB and the Gas Quality AFB by assigning in the branch **<Flow Conversion AFB> – Calculations** the import values of Gas Quality AFB (⇨ 2.3 Flow conversion, p. 20).

Steps in enSuite (optional)

Prerequisite(s)

- The desired parameterization is opened on branch: **<Device>** – **<Group>** –] < **Flow Conversion**>

▶ On tab **Parameters** go to section **Hold function**.

▶ Determine in parameter **Held measurements** the way in which the measurements of pressure and temperature are taken into account in the hold sets:

- **actual** (*default*)
  In order to hold the current measurements, select this entry from the drop-down list.
- **mean**
  In order to hold the arithmetic average value since the last freezing time, select this entry from the drop-down list.

▶ In order to control the hold function via an event, select the desired message in the export branch and drag the message via drag-and-drop into the parameter **Input to trigger hold function**. The message can be derived, for example, from a digital input. It is always frozen if the assigned message begins.

Alternatively, you can directly trigger the hold function manually at the device.

Executing the hold function at the device

On-site, you can hold the current counters and measurements and easily read and note the values. The hold function is always available to you on the main display of a Flow Conversion AFB (➪ 3 Display and operation, p. 36).

▶ If required, change to the home display.
▶ Open the **Fiscal display** by clicking the symbol of desired Flow Conversion AFB.
▶ With a click on V_b change to the main display.
▶ Activate the hyperlink **Hold function**.

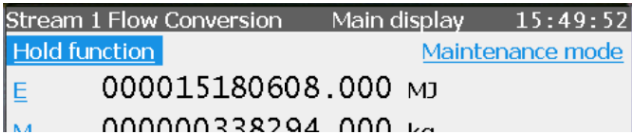

Fig. 2-2: Hyperlink **Hold function**

✓ In the display **Hold function**, the latest frozen values are displayed. The value **Time stamp held** specifies the time at which the values were frozen.

✓ No values are displayed during first call-up or after restarting the device.

▶ Activate the hold function with the action **Hold**.

✓ The current counters are frozen at the same time and the display is updated accordingly.

The held counters are overwritten as soon as you re-trigger the action **Hold**. The hold sets are not maintained in case of a voltage drop.

2.4.4 Activating the maintenance mode for one conversion

With enCore FC1, you have the option to activate the maintenance mode for a flow conversion. During maintenance mode, all main counters of this flow conversion are stopped (V_m, V_c, V_b, M, E) and the error counters are started (V_me, V_ce, V_be, Me, Ee). In addition, all flow-relevant events are suppressed.

The maintenance mode is, for example, useful when the gas meter of this flow conversion is in revision. In principle, you activate the maintenance mode in two ways:

- Automatically when the parameterized event message is pending, for example, an external switch or signal via a communication protocol (parameter **Input for activation of maintenance mode**).
- Manually at the operation panel in the **Maintenance** display of the flow conversion.
  Requirement: The user logged in has the right **Change general system settings**.
  In this case, you can enter a substitute value for the volume flow at the control panel, otherwise the value zero (0).

The maintenance mode supports the operating modes **Type 1** und **Type 2**. In both modes, the maintenance mode can be started and stopped manually as well as automatically. Whereby in mode **Type 1**, activation via the event message has a higher priority and can block the fields for the user inputs in the **Maintenance** display.

You configure the basic configuration of the maintenance mode in enSuite.

Steps in enSuite

Prerequisite(s)

- In the parameterization the folder of the Flow Conversion AFB opened:
  <Device> – **<Group>** –] < **Flow Conversion**>

▶ On tab **Parameter**, switch to the **General** section.

▶ In order to control the maintenance via an event, select the desired event message in the export branch and drag the message via drag-and-drop into the parameter **Input to trigger maintenance mode**, for example, the status message **In revision** of the gas meter, which provides the values for this flow conversion.

As soon as the message begins, the maintenance mode is activated for the selected flow conversion.

▶ Set the operating mode with the drop-down list **Maintenance mode**:

- **Type 1**
  In this mode, activation via the event message has a higher priority. This means: As soon as the maintenance mode is activated via the parameterized message, the AFB blocks the fields for the user inputs in the **Maintenance** display. Even in the case, a user with the right **Change general system settings** is logged in.

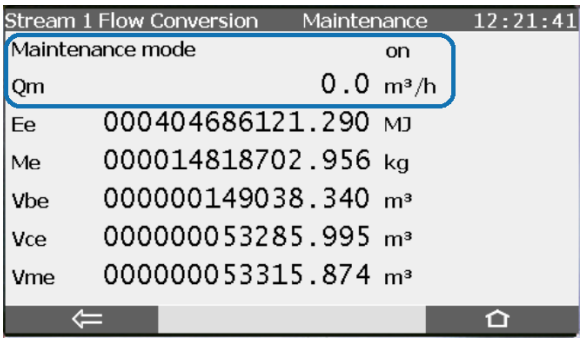

Fig. 2-3: Maintenance mode **Type 1** of a flow conversion is active, input fields are disabled

- **Type 2**
  The maintenance mode can also be started and terminated via the parameterized event message and directly at the control panel.

As soon as you log on to the device having the right **Change general system settings**, you start and stop the maintenance mode via the control panel, and enter a constant value (value range `0..100000`) that simulates the operating flow rate Q_m.

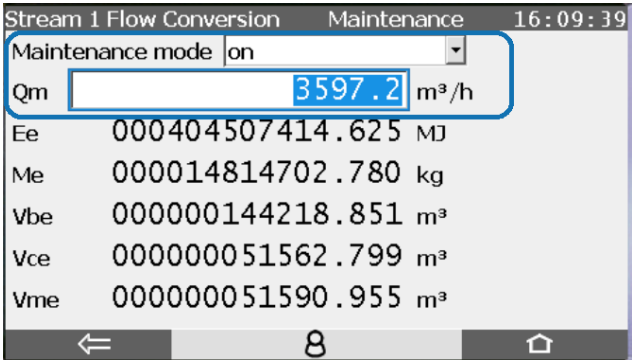

Fig. 2-4: Maintenance mode **Type 2** of a flow conversion is active, input fields are enabled

The maintenance mode stops in the following ways:

- Automatically when the parameterized event message ends (parameter **Input to trigger maintenance mode**).
- Manually at the operation panel in the **Maintenance** display of the flow conversion by selecting the entry **off** from the drop-down list **Maintenance mode**.
  Requirements: The user logged in has the right **Change general system settings** and the maintenance mode is not locked for user input (operating mode **Type 1**).
- after restart of the device, for example, due to power failure

Special feature

The maintenance mode does *not* end (!) when the user logs off or is automatically logged out due to the **Inactivity timeout** (parameter in **Users – General**) for operating mode Type 2.

2.5 Functioning at a glance

2.5.1 Flowchart

The interaction of functional areas and individual configuration parameters is depicted in the following flow chart:

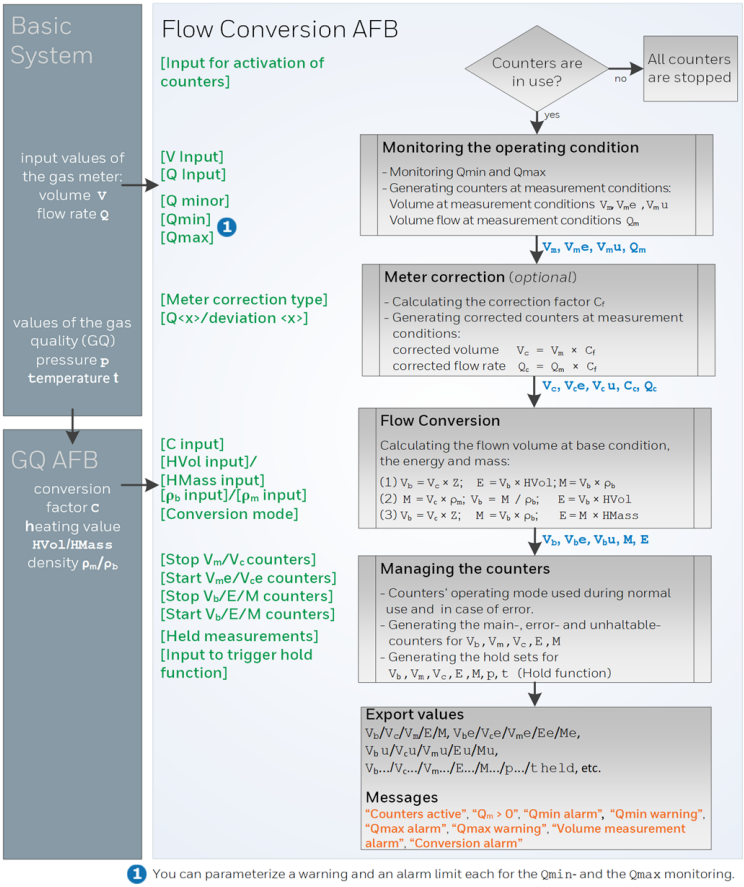

Fig. 2-5: Functional areas at a glance

2.5.2 List of error messages

Depending on the parameterization of the device, the following warning and alarm messages can appear during flow conversion:

Identifier	Type	Cause
`Qmax warning`	Warning	The volume flow at measurement conditions exceeded the warning limit (**Qmax warning limit**).
`Qmax alarm`	Alarm	The volume flow at measurement conditions exceeded the alarm limit (**Qmax alarm limit**).
`Qmin warning`	Warning	The `Qmin` monitoring has generated a warning.
`Qmin alarm`	Alarm	The `Qmin` monitoring has generated an alarm.
`Volume measurement alarm`	Alarm	Error in volume measurement, i.e., an input value of gas meter is erroneous (volume, flow rate or message for the activation of counters) or the `Qmax` or the `Qmin` monitoring has generated an alarm.
`Conversion alarm`	Alarm	This alarm is set in one of the following cases: – An input value which is required for the selected flow conversion mode such as the conversion factor, a heating value or a density is erroneous. – An alarm message from System or Time Service is pending. – The **Volume measurement alarm** is pending.

Table 2-2: Warning and alarm messages of Flow Conversion AFB

The enCore device manages the warning and alarm messages in its error list. For further information, refer to:

- ⇨ 5.4 View error messages (p. 48)
- ⇨ 5.5 Accepting warning and alarm messages (p. 49)

3 Display and operation

The Flow Conversion AFB has different displays in which the values of the flow conversion are shown. The displays are classified as overview, detailed and counter displays.

The overview displays of Flow Conversion AFB include the displays **Fiscal display** and **Main display** which show the most important data of flow conversion at a glance.

Navigate from the main display to the detailed display in which various combinations of counters and measurements are displayed.

In the detailed displays you can access the corresponding counters' display via the main, error or total counters.

As every Flow Conversion AFB manages its own counters, each one has its own separate display.

Display and Navigation with enCore Devices

The general layout of displays for enCore devices and the basic navigation options are documented in detail in in section ⇨ 6.9 enCore operating instructions (p. 54).

Generally, a distinction is made between hyperlinks and actions when operating enCore devices – both are shown with **blue** underline on the device and in the manual. Navigate through the device displays using hyperlinks; carry out a specific functionality with actions.

A list of symbols and names shown below is available.
⇨ 4.1 Nomenclature (p. 42)

3.1 Displays at a glance

The following figure sketches the hierarchical order and the navigation by displays:

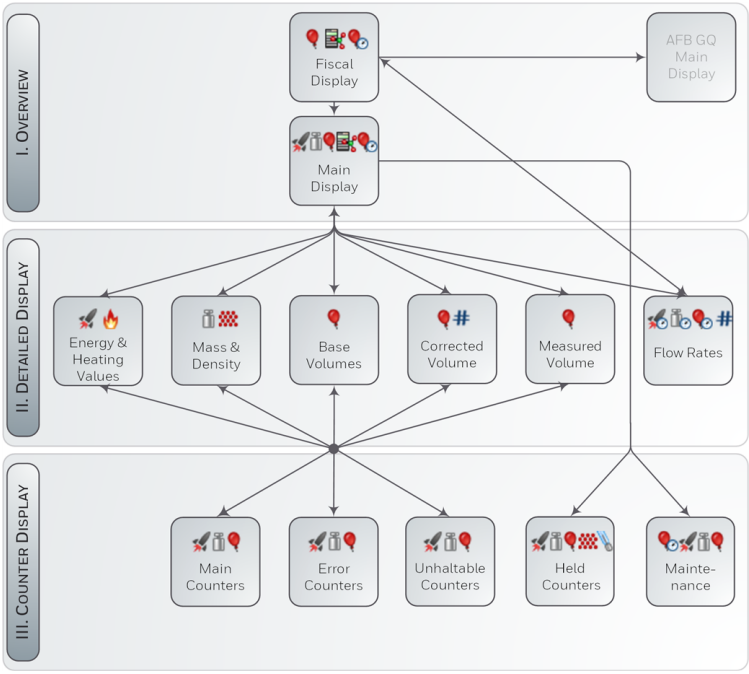

Fig. 3-1: Display – hierarchical structure

3.2 Displays in detail

The first display of every Flow Conversion AFB is the **Fiscal Display**. The main task of the fiscal display is to show the results of flow conversion that are relevant from a fiscal point. It is the standard display of FC1, i.e., the device starts with the fiscal display of the first Flow Conversion AFB.

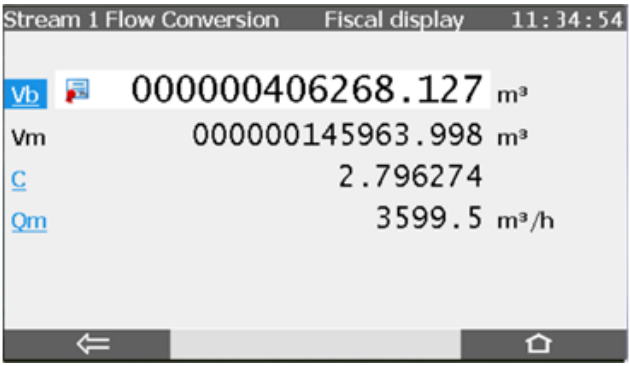

Fig. 3-2: Example – **Fiscal display**

The primary result of a flow conversion is the volume at base conditions. The main counter for the base volume is presented with a larger font size in the fiscal display and marked with the symbol .

From the fiscal display, you can change to the displays **Main display** and **Flow rates** of Flow Conversion AFB as well as to the main display of Gas Quality AFB.

All the important results of flow conversion are presented in an overview in the main display. From this display, you can change to the detailed displays for energy, mass, volumes and flow rates and to the display **Hold function**.

Display editor of enSuite

In this documentation, the layout of individual displays is described in the delivery status.

For some of the displays, you can determine in the display editor of enSuite which values are displayed in which sequence. The fiscal display is subject to some legal restrictions and cannot be edited.

You reach the display editor in an open parameterization in enSuite by opening the branch **Displays – [<Group> –] <Flow Conversion AFB>**.

3.2.1 Fiscal display

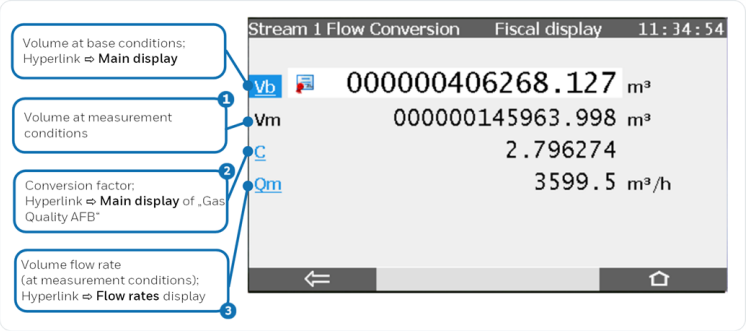

Fig. 3-3: Fiscal display – example

1. V_c(corrected volume) is displayed here instead in case the meter correction is activated.
2. ⇨ "Gas Quality AFB"of FC manual
3. Q_c(corrected volume flow) is displayed here instead in case the meter correction is activated

3.2.2 Main display

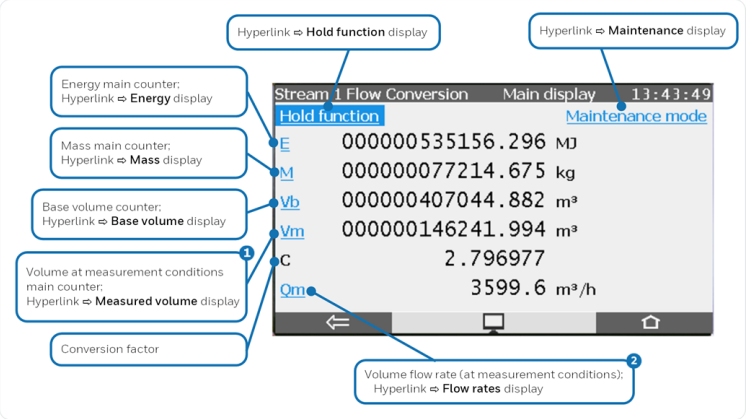

Fig. 3-4: The main display – example

1 V_c (corrected volume) is displayed here instead in case the meter correction is activated.

1 Q_c (corrected volume flow) is displayed here instead in case the meter correction is activated.

3.2.3 Counter displays

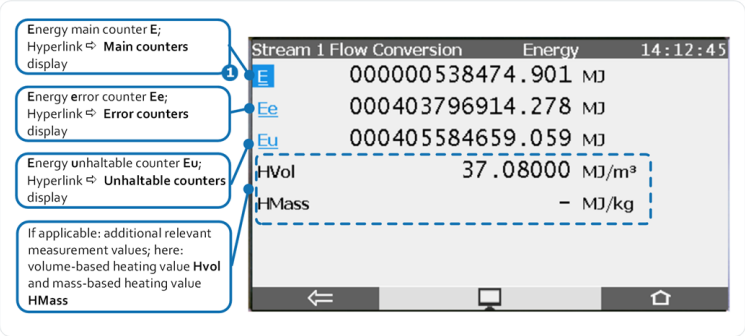

Fig. 3-5: A counter display – example main counters

If a hyphen (–) is displayed instead of a numerical value for a measurement, then no value is available.

3.2.4 Maintenance mode

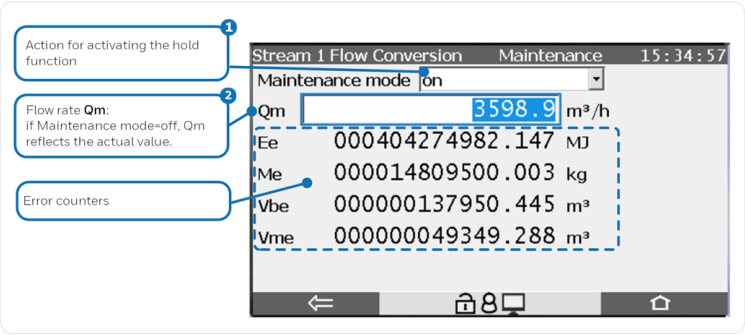

Fig. 3-6: Maintenance mode – example main counters

1. You can start and stop the maintenance mode manually, if you are currently logged on to the device with the right **Change general system settings** and the maintenance mode is not blocked for user input. In this case the drop-down list with the entries **on**/**off** is displayed.
2. Under the following conditions, you can enter a value here and thus simulate a flow rate $\mathbf{Q_m}$: you are currently logged on to the device with the right **Change general system settings**, the maintenance mode is active, and the fields are not blocked for user input.

3.2.5 Hold function

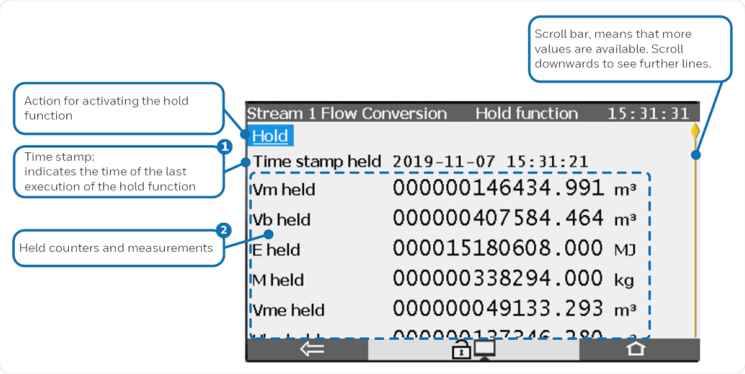

Fig. 3-7: Hold function – example

1. If the time stamp is empty, no activation of the hold function has been executed since the last time the device was switched on, so no held values are available. A question mark is displayed for all held values in that case.
2. For each available counter, held main, error and unhaltable counters are provided. Additionally, the held values for Conversion factor C, presssure p and temperature t are provided.

4 Technical data

4.1 Nomenclature

Following symbols and names are used in the enCore FC and in enSuite for counters and values in the context of Flow Conversion AFB:

Symbol	Abbr.	Description
	ρ_b	density at base conditions
	ρ_m	density at measurement conditions
	E	energy
	HVol	volume-based heating value
	HMass	mass-based heating value
	C_f	correction factor (calculated)
	p	pressure
	Q_m	volume flow rate at measurement conditions
	QE	energy flow rate
	Q_c	corrected volume flow rate at measurement conditions
	QM	mass flow rate
	Q_b	volume flow rate at base conditions
	M	mass
	t	temperature
	V_b	volume at base conditions
	V_m	volume at measurement conditions

Symbol	Abbr.	Description
	V_c	corrected volume at measurement conditions
	C	conversion factor (input value from the Gas Quality AFB)

Table 4-1: Nomenclature

Apart from counters for standard operation, the error and unhaltable counters as well as the frozen counters are always labeled with a suffix:

Suffix	Counter
–	main counter (e.g., V_b)
e	error counter (e.g., V_b e)
u	unhaltable counter (e.g., V_b u)
held	held counter (e.g., V_b held)

Table 4-2: Suffixes of counters

5 FAQ

This section contains the most important settings and issues in order to support you in regular tasks.

Detailed documentation

Detailed documentation of Flow Conversion AFB is available in the sections ⇨ 2 Functional description (p. 8) and ⇨ 3 Display and operation (p. 36).

5.1 Adding another Flow Conversion AFB

Background

The modular design principle of enCore FC allows to even implement applications in which many counter sets must be available separated from one another.

A Flow Conversion AFB maintains exactly one set of counters. For each additional set of counters you need to add Flow Conversion AFB in enSuite.

More sets of counters are necessary, for example, for a dual-stream flow conversion or for an operation with multiple flow directions.

Steps in enSuite

- ▶ Open the desired parameterization .
- ✓ The current AFB Configuration is displayed in the main window.
- ▶ Mark the entry **Flow Conversion** in the column **AFB type**.
- ▶ Click **[Add AFB]**.
- ✓ The branch **Flow Conversion <x>** is added to the parameter tree.
- ▶ Configure the Flow Conversion AFB as per your requirements.

Further Gas Quality AFB necessary?

Every Flow Conversion AFB requires input values of a related Gas Quality AFB. If no related Gas Quality AFB is available the in parameterization for a newly added Flow Conversion AFB, you must add and configure an additional Gas Quality AFB. Thus, two Flow Conversion AFBs can be connected to the same Gas Quality AFB. This is the case if the input values of gas quality are derived from the same source and the same calculation procedures shall be used.

In any case, create the necessary linkages by assigning the corresponding export values of the related Gas Quality AFB to the needed input values within Flow Conversion AFB (⇨ 2.3 Flow conversion, p. 20).

5.2 Combining AFBs in a group

Background

You can combine many AFBs in a functional group and give it a descriptive name. Thus, you can create for the dual-stream operation one group for stream 1 and one group for stream 2, and assign one Flow Conversion AFB and one Gas Quality AFB to each group.

Besides the better clarity of the device display, the grouping provides the advantage that the error list manages their messages group-wise. In case of an error, you can display errors per group. If, e.g., an alarm is generated, it can be quickly assigned to a group of the affected measuring streams.

Steps in enSuite

An Flow Conversion AFB and an Gas Quality AFB are combined in one group below by way of an example:

- Open the desired parameterization in enSuite.
- Mark the desired AFB, for example, the Flow Conversion AFB in the parameter branch.

- Open the context menu.
- Enter the name of the group in the field **Move to group**. Select a distinct and descriptive name, for example, **Stream 1**.
- Confirm your entry with **[Enter]**.

✓ If no group with name exists, then the folder **<Stream 1>** is created in the parameter branch and the Flow Conversion AFB is assigned to it.

- As soon as a group is created, you can assign more AFBs to this group by dragging them in this folder via Drag and Drop, e.g., a Gas Quality AFB in the folder **Stream 1**.

✓ All the AFBs of a group automatically receive the same group name in the field **Move to group**.

OR

- Alternatively, you can assgin an AFB to a group by saving the same group name in the field **Move to group**.

✓ The AFB is automatically assigned to the group having this name.

- The groups in the folders are managed in the device display as the folder **Stream 1** shown here:

Fig. 5-1: Folder for the group **Stream 1**

5.3 Viewing process values of another Flow Conversion AFB

Background

Counters that are fiscally relevant are displayed in the Fiscal display of the respective Flow Conversion AFB. The standard display of device is thus always the Fiscal display of the firstly created Flow Conversion AFB.

Follow the following procedure to access the Fiscal display of every further Flow Conversion AFB.

Steps at the device

- Change with the button to the home display.
- If you manage AFBs in a group structure, go to the corresponding group folder .
- Click the symbol of the desired **<Flow Conversion AFB>**.

> **Assigning names to a Flow Conversion AFB**
>
> In enSuite you can assign a name to every AFB, e.g., open the context menu of the folder **<Flow Conversion AFB>** and modify the field **Rename AFB**.
>
> Generally, enSuite and the enCore FC use the name **AFB name <x>** by default, where **<x>** implies a number which is counted up with every new instance of a repective AFB.

✓ The **Fiscal Display** of this Flow Conversion AFB opens.

You can access all further displays of this Flow Conversion AFB from here.

⇨ 3 Display and operation (p. 36)

5.4 View error messages

Background

If the status LED is flashing yellow or red, or has continous yellow or red light, warning and/or the alarm messages are present in the error list. In this list, the enCore FC manages warning and alarm messages of Basic System and all AFBs.

The error list is sorted chronologically; the most recent message is displayed at first. You can specifically filter the entire list, for example, as per the desired Flow Conversion AFB.

Steps

- ▶ You reach the error list in the home display via the symbol **Error List**.
- ✓ The error list shows all the current warning or alarm messages.

You have many options:

- ▶ If only few errors are included in the entire list, scroll specifically for messages of Flow Conversion AFB.

> **Naming convention of error messages**
>
> AFB messages follow the naming convention:
> **[<Group>.]<Flow Conversion AFB>.<message>**

- ▶ In order to specifically filter messages of a Flow Conversion AFB, select the entry **<Flow Conversion AFB>** from the drop-down list **Filter**.
- ✓ Only the messages of the corresponding Flow Conversion AFB are displayed.
- ▶ In order to specifically filter messages of a Flow Conversion AFB, which are grouped with other AFBs, select the **<Group>** from the drop-down list **Filter**.
- ✓ All the messages of AFBs, which are allocated to this group, are displayed.

⇨ 5.5 Accepting warning and alarm messages (p. 49)

5.5 Accepting warning and alarm messages

Background

Define the acceptance procedure in the parameter **Acceptance procedure** (branch **Basic System – System**, section **Error List**). This parameter checks if only errors, which are no longer currently pending, can be accepted or whether errors can always be accepted irrespective of whether they are currently pending or no longer pending.

Errors are accepted list-wise and not individually.

Details about the acceptance procedure are available in the online help.

For additional information on parameterization of acceptance behavior refer to the online help in enSuite.

Steps at the device

- ▶ Open the error list as described in ⇨ 5.4 View error messages (p. 48).
- ▶ In order to accept messages of a specific list, open it by selecting the corresponding entry **<Flow Conversion AFB>** or **<Group>** from the drop-down list **Filter**.
- ▶ Trigger the action **`Accept all`**.
- ✓ The selected list is accepted and updated according to the parameterized acceptance procedure.
- ▶ If required, repeat these steps for other lists.

5.6 Stopping the main display for reading

Background

The hold function offers you the option to generate a snap-shot of the main counters E, M, V_b, V_c, V_m, error counters Ee, Me, V_be, V_ce, V_me and the measurements for p and t.

This function is available in the main display of Flow Conversion AFB. If you are using further Flow Conversion AFBs, each one has a separate display **Hold function**. The snap-shots of values are labeled with the key word **held**.

When required, you can easily read the held counters and measurements; these are transferred via Modbus or saved in the archive.

Steps

The procedure to configure and manually carry out the hold function is described in detail in section.

➪ 2.4.3 Hold current counters and measurements (p. 26)

5.7 Representing two flow directions

Background

By default, the counters of one Flow Conversion AFB are in use. If you would like to do a flow conversion for two flow directions with one enCore device, use a separate Flow Conversion AFB for every flow direction. In operation, it must be ensured that only the counters of current flow direction are active.

You can use the flow direction manager for this task. It ensures clear activation inputs for the related Flow Conversion AFB. In this way, no nonsensical intermediate statuses are generated when changing the flow direction.

You can define and evaluate groups with up to four incoming flow direction signals using the flow direction manager. As result, the flow direction manager provides the derived consistent signals which can be used as activation signal for the related Flow Conversion AFB.

Steps

The parameterization of flow direction managers is described in detail in the FC manual ➪ “Basic System with SFBs”.

6 Notices

6.1 Third-party trademarks

All used or mentioned brand names are the property of their respective owners. A possible mention of brands is done in good faith and without any intention to derive a claim.

6.2 Third-party licenses

This product may contain or be derived from materials, including software, of third parties. The third party materials may be subject to licenses, notices, restrictions and obligations imposed by the licensor.

The licenses, notices, restrictions and obligations, if any, may be found in the materials accompanying the product, in the documents or files accompanying such third party materials, in a file named `Third_Party_Licenses_enCore.pdf` at:

process.honeywell.com/us/en/site/elster-instromet/about-us

6.3 Warranty Conditions

You will find our current warranty conditions in the General Terms and Conditions, for example, on our website:

process.honeywell.com/us/en/site/elster-instromet/about-us

6.4 Technical support Flow Computers and Gas analyzers

Our support of Elster Gas is available for technical advice as well as repairs.

To find further information visit our support site of Elster Gas:

process.honeywell.com/us/en/site/elster-instromet/support

Use secure communication!

Use secure communication, such as email encryption, to send confidential data.

6.5 Spare parts and repairs

For spare parts and repairs please write an email to our service.

PMT-Reparatur@Honeywell.com

6.6 How to report a security vulnerability

A security vulnerability is defined as an error or weakness in the software that can be exploited to impair the operation or security of the parameterization or device software or to access sensitive data.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services. For details on Honeywell security policy, visit:

www.honeywell.com/us/en/product-security

To report a potential security vulnerability against any Honeywell product, please follow the instructions at:

www.honeywell.com/us/en/product-security#vulnerability-reporting

To view information on current malware threats please visit:

www.honeywell.com/us/en/news

OR

Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or our technical support of Elster Gas.

6.7 How to give feedback to user documentation

We are always interested in your comments, corrections or suggestions for improvement regarding the Elster Gas Flow Computers and Gasanalyzers documentation. Please send your feedback to our technical support of Elster Gas.

ElsterSupport@Honeywell.com

Use this email address to provide feedback, or to report errors and omissions in the documentation.

6.8 Knowledge base articles on Honeywell Support Portal

Elster Gas provides problem-solving approaches and answers to frequently asked questions, as well as tips and tricks in short articles for various product series in our technical knowledge base.

process.honeywell.com/us/en/services-and-support/support-center/technical-support

The knowledge articles are constantly being expanded.

6.9 enCore operating instructions

Only the operating instructions for the individual device types are listed below. In each of these instructions you will find the complete list of other applicable manuals for the respective device type.

Flow Computer

- ZM1, BM1, MC1, FC1, DC1
  "Operating Instructions" (order no.: NFC-OI-EN)
- ZM1, BM1, MC1, FC1, DC1
  "Basic System with SFBs"

Gas analyzers

- EnCal 3000 proChain GC
  "Information for General Use" (order no.: 73024637)
- GasLab Q2
  "Information for General Use" (order no.: 73023638)

Q.Sonic Series 6

- Q.Sonic-plus
  "Operation and Maintenance" (order no.: 73023467)
- Q.Sonic-max8
  "Operation and Maintenance" (order no.: 73023477)

6.9.1 Download latest manuals on Docuthek

Elster Gas provides the user documentation such as manuals, certificates, data sheets, technical information for different device types (in different languages) on the Docuthek. The documents are regularly updated.

www.docuthek.com
Use the device type as search term, for example,
enCore FC1

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The target value of the SHA-1 checksum for a PDF can be found on our Docuthek in the details in section **Remarks**, or – if you have downloaded the PDF from Honeywell website – in brackets next to the download link.

Which manuals are relevant for previous product releases?

Only the latest manuals are available on the Docuthek. If you are using an older software version, you can look up these manuals for each version in the software history on the Honeywell website. The software history is available as a PDF file for product releases since 2020 in the download area of the respective device type.
process.honeywell.com/us/en/site/elster-instromet/support#software-downloads

7 Index