SUMMIT 8800 Handbook

Flow Computer
Volume 3: Configuration

KROHNE

IMPORTANT INFORMATION

KROHNE Oil & Gas pursues a policy of continuous development and product improvement. The Information contained in this document is, therefore subject to change without notice. Some display descriptions and menus may not be exactly as described in this handbook. However, due the straight forward nature of the display this should not cause any problem in use.

To the best of our knowledge, the information contained in this document is deemed accurate at time of publication. KROHNE Oil & Gas cannot be held responsible for any errors, omissions, inaccuracies or any losses incurred as a result.

In the design and construction of this equipment and instructions contained in this handbook, due consideration has been given to safety requirements in respect of statutory industrial regulations.

Users are reminded that these regulations similarly apply to installation, operation and maintenance, safety being mainly dependent upon the skill of the operator and strict supervisory control.

1.1 Volumes

This is Volume 3 of 3 of the SUMMIT 8800 Handbook:

Volume 1
Volume 1 is targeted to the electrical, instrumentation and maintenance engineer
This is an introduction to the SUMMIT 8800 flow computer, explaining its architect and layout - providing the user with familiarity and the basic principles of build. The volume describes the Installation and hardware details, its connection to field devices and the calibration.
The manual describes the operation via its display, its web site and the configuration software. Also the operational functional of the Windows software tools are described, including the configurator, the Firmware wizard and the display monitor.

Volume 2
Volume 2 is targeted to the metering software configuration by a metering engineer.
The aim of this volume is to provide information on how to configure a stream and the associated hardware.
The handbook explains the configuration for the different metering technologies, including meters, provers, samplers, valves, redundancy etc.. A step by step handbook using the Configurator software, on the general and basic setup to successfully implement flow measurement based on all the applications and meters selections within the flow computer.

Volume 3
Volume 3 is targeted to the software configuration of the communication to the outside world.
The manual covers all advance functionality of the SUMMIT 8800 including display configuration, reports, communication protocols, remote access and many more advance options.

1.2 Content Volume 1

Volume 1 concentrates on the daily use of the flow computer
- Chapter 2: Basic functions of the flow computer
- Chapter 3: General information on the flow computer
- Chapter 4: Installation and replacement of the flow computer
- Chapter 5: Hardware details on the computer, its components and boards
- Chapter 6: Connecting to Field Devices
- Chapter 7: Normal operation via the touch screen
- Chapter 8: How to calibration the unit
- Chapter 9: Operation via the optional web site
- Chapter 10: Operational functions of the configuration software, more details in volume 2
- Chapter 11: How to update the firmware
- Chapter 12: Display monitor software to replicate the SUMMIT 8800 screen on a PC and make screen shots

1.3 Content Volume 2

Volume 2 concentrates on the software for the flow computer.
- Chapter 2: General information on the software aspects of the flow computer
- Chapter 3: Details on metering principles
- Chapter 4: Basic functions of configurator
- Chapter 5: Configuration of the hardware of the boards
- Chapter 6: Stream configuration
- Chapter 7: Run switching
- Chapter 8: Watchdog

- Chapter 9: Configure a station
- Chapter 10: Configure a prover or master meter
- Chapter 11: Configure valves
- Chapter 12: Configure a sampler
- Chapter 13: Set-up batching
- Chapter 14: Set two flow computers in redundant configuration

1.4 Content Volume 3

Volume 3 concentrates on the configuration of the SUMMIT 8800

- Chapter 3; Configurator software
- Chapter 4: Date & Time
- Chapter 5: Data Logging
- Chapter 6: Display and web access
- Chapter 7: Reporting
- Chapter 8: Communication
- Chapter 9: General Information

1.5 Information in this handbook

The information in this handbook is intended for the integrator who is responsible to setup and configure the SUMMIT 8800 flow computer for Liquid and or Gas and or Steam application:

Integrators (hereafter designated user) with information of how to install, configure, operate and undertake more complicated service tasks.

This handbook does not cover any devices or peripheral components that are to be installed and connected to the SUMMIT 8800 it is assumed that such devices are installed in accordance with the operating instructions supplied with them.

Disclaimer
KROHNE Oil & Gas take no responsibility for any loss or damages and disclaims all liability for any instructions provided in this handbook. All installations including hazardous area installations are the responsibility of the user, or integrator for all field instrumentation connected to and from the SUMMIT 8800 Flow computer.

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Who should use this handbook?
This handbook is intended for the integrator or engineer who is required to configure the flow computer for a stream including devices connected to it.

Versions covered in this handbook
All Versions

2.1 Software versions used for this guide

This handbook is based on the software versions as mentioned in Appendix 1: software versions

2.2 Terminology and Abbreviations

AGA	American Gas Association
API	American Petroleum Institute
Communication board	Single or dual Ethernet network board
Configurator	Windows software tool to configure and communicate to the SUMMIT 8800
CP	Control Panel
CPU	Central Processing Unit
CRC32	Cyclic Redundancy Check 32 bits. Checksum to ensure validity of information
FAT	Factory Acceptance Test
FDS	Functional Design Specification
HMI	Human-Machine Interface
HOV	Hand Operated Valve
I/O	Input / Output
ISO	International Standards Organization
KOG	KROHNE Oil and Gas
KVM	Keyboard / Video / Mouse
MOV	Motor Operated Valve
MSC	Metering Supervisory Computer
MUT	Meter Under Test
Navigator	360 optical rotary dial
PC	Personal Computer
PRT	Platinum Resistance Thermometers
PSU	Power Supply Unit
PT	Pressure Transmitter
Re-try	Method to repeat communication a number of times before giving an alarm
RTD:	Resistance Temperature Device
Run:	Stream/Meter Run
SAT	Site Acceptance Test
SUMMIT 8800	Flow computer
Timestamp	Time and date at which data is logged
Time-out	Count-down timer to generate an alarm if software stopped running
TT	Temperature Transmitter
UFC	Ultrasonic Flow Converter
UFM	Ultrasonic Flow Meter
UFP	Ultrasonic Flow Processor (KROHNE flow computer)
UFS	Ultrasonic Flow Sensor
VOS	Velocity of Sound
ZS	Ball detector switch
XS	Position 4-way valve
XV	Control 4-way valve

2.3 General Controls and Conventions

In the configurator several conventions are being used:

Numeric Data Entry Box

Clear background, black text, used for entering Numeric Data, a value must be entered here
Optional: Coloured background, black text used for entering optional Numeric Data. If no value is entered then right click mouse key and select Invalidate, box will show and no number will be entered.

An invalid Number will be shown on the SUMMIT 8800 display as "---------" and is read serially as 1E+38

Pull-Down Menu
Select a function or option from a list functions or options

Icon
Selects a function or a page.

Tabs
Allows an individual page, sub-page or function to be selected from a series of pages, sub-pages or functions.
Expanded item -
Fewer items shown.

Non Expanded item +
More items shown.

Option Buttons

Red cross means OFF or No
Green tick means ON or Yes

Data Tree
Items from the Data Tree can be either selected or can be "Dragged and dropped" from the Tree into a selection box; for example when setting up a logging system or a Modbus list, etc.
Yellow Data circle means Read Only. Red data circle means Read and Write.

Hover over
Hold the cursor arrow over any item, button or menu, etc. Do not click any mouse button, the item will be lightly highlighted and information relating to the selection will be illustrated.

Grey Text
Indicates that this item has no function or cannot be entered in this particular mode of the system. The data is shown for information purposes only.

Help Index
Display information that assists the user in configuration.

Naming convention of Variables
In the KROHNE SUMMIT 8800 there are variables used with specific naming.
This naming is chosen to identify a variable and relate it to the correct stream.

The most complex variable is explained below and this explanation can be used to interpret all the other variable names.

Example: + ph uVN . 1

+	Positive (+) or negative (-)
Ph	Previous (P) or Current (C) period Pqh – previous 15 minutes Ph – previous hour Pd – previous Day Pm – previous month Pq – previous quarter of a year Cqh – current 15 minutes Ch – current hour Cd – current Day Cm – current month Cq – current quarter of a year
u	Type of totals u – Unhaltable, counts always m – Maintenance, counts when maintenance is active (optional) n – Normal, fiscal counters during normal operation e – Error, fiscal counters with an accountable error t1 –> t4 – Tarif , fiscal counters based on fiscal thresholds
VN	Type of flow VPulses, pulses counted Vline, gross volume flow Vmon, monitored grass volume flow Vbc (p/t) pressure and temperature corrected gross volume flow Vbc, linearization corrected (Vbc(p/t))gross volume flow VN, Normalized volume flow VN(net), Nett normalized flow VM, Mass flow VE, Energy flow VCO2, carbon dioxide flow
1	Stream/ Run number

2.4 ID Data Tree

When selecting parameters and options in the Configurator software, the user will be presented with a tree structure for instance:

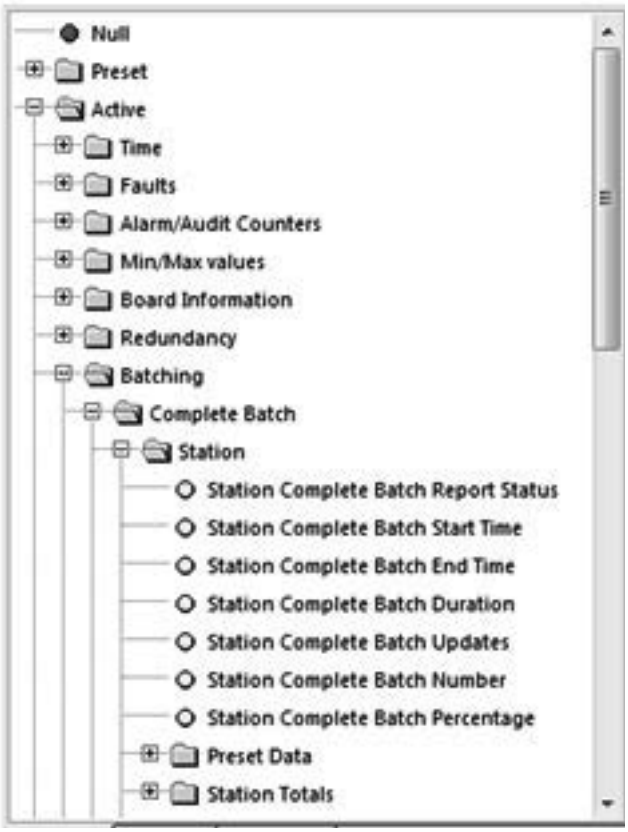


Figure 1 Example ID Tree

This is referred to as the ID tree which, depending on its context, includes folders and several parameters:

2.4.1 Type of data

The rest of this chapter will explain the folders available, the type of selection within the folder and any other corresponding data.

Preset Data
Essential to the configuration of the flow computer. Typical data would be keypad values, operating limits, equation selection, calibration data for Turbines and Densitometers and Orifice plates.
This data would be present in a configuration report, and enables you to see what the flow computer is configured to do.
Used for validation and will form the Data Checksum (visible on the System Information Page). E.g., if a data checksum changes, the setup of the flow computer has changed and potentially calculating different results to what is expected.
Typically configured and left alone, only updated after validation e.g. every 6 month / 1 year.

Active Data
These values cover inputs to the flow computer. E.g. from GC, pressure & temperature transmitters, meters etc..
Also Values calculated in the flow computer. E.g. Flow rates, Z, Averages, Density etc..

Local Data
Data that an operator can change locally to perform maintenance tasks. E.g., turn individual transmitters off without generating alarms. Setting Maintenance mode or Proving Mode.

Totals
Totals for the streams and station.
Contents of this folder are stored in the non-volatile RAM and are protected using the battery.

Custom
User defined variables.
Allows calculations, made in a LUA script, to be used in a configuration.
For details, see volume 3.

2.4.2 Colour codes

With each parameter and option, there are corresponding coloured dots that represent the access and status of the particular selection.

General ID tree

●	Red Dot	Data is Read/Write and can be changed over Modbus.
●	Yellow Dot	Data is Read-Only and cannot be changed over Modbus

Please note that it might be possible to change the values via the screen

90% of the data will be Read Only, but items such as Serial Gas Compositions, Time/Date, MF are commonly written over Modbus.
NOTE: Although the ID may be read/write, the security setting determines whether the ID indeed can be written.

Alarm Tree
The alarm tree is built of all the registers that hold alarm data. Alarm registers are 32-bit integers, where each bit represents a different alarm.

●	Red Dot	Represents an accountable alarm visible on the alarm list.
●	Dark Blue Dot	Represents a non-accountable alarm visible on the alarm list.
●	Orange Dot	Represents a warning visible on the alarm list.
●	Light Blue Dot	Represents a status alarm, not visible on the alarm list.
●	Black/Grey Dot	Represents a hard- or software fault alarm visible on the alarm list.

An example of typical usage would be the General Alarm Register. This is a 32 bit register that indicates up to 32 different alarms in the flow computer. This will contain Status Alarms, for example, 1 bit will indicate if there is a Pressure alarm or not. If the Pressure Status bit is set the user will know that there is a problem with the Pressure.
This should be sufficient information, however if it is not satisfactory, the user can look at the Pressure alarm, this contains 32 different alarms relating to the Pressure measurement, these would be Red Dots as they each can create an entry in the alarm list. By reading this register the user can view exactly what is wrong with the Pressure measurement.

The Light Blue Dots are generally an OR of several other dots. By reading the General register you can quickly see if the unit is healthy, more information can be provided by reading several more registers associated with that parameter.

2.4.3 ID Lookup

When pressing the ID lookup button on top of the screen, a lookup table will be generated:

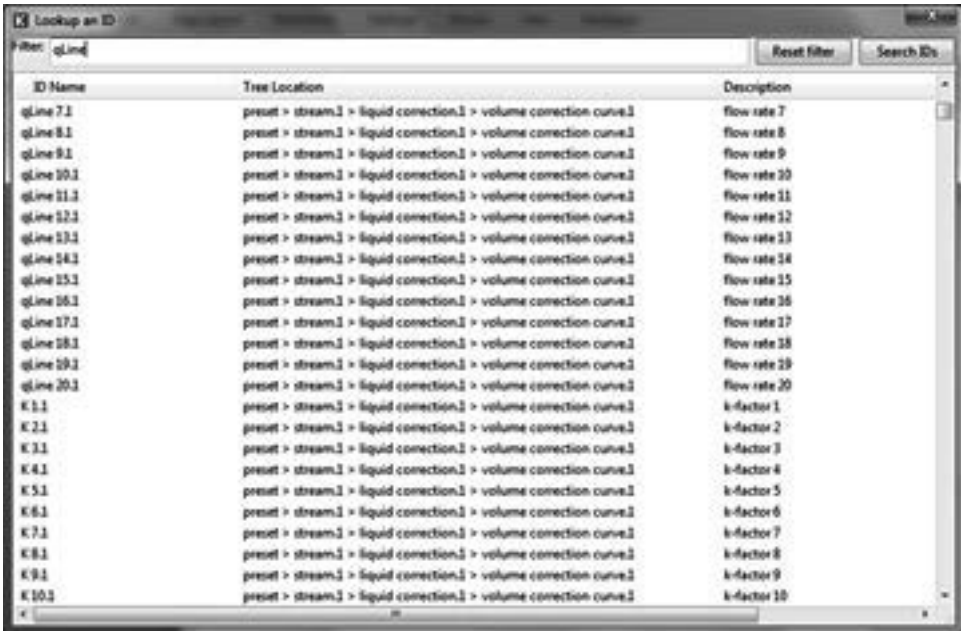


Figure 2 ID lookup

As there are very many ID's, it is possible to filter for a required ID.

2.5 Specific Requirements for Meters and Volume Convertors

2.5.1 Numbering formats

The number formats used internally in the unit are generally IEEE Double Precision floating point numbers of 64 bit resolution.
It is accepted that such numbers will yield a resolution of better than 14 significant digits.
In the case of Totalisation of Gas, Volumes, Mass and Energy such numbers are always shown to a resolution of 8 digits before the decimal point and 4 after, i.e. 12 significant digits.
Depending upon the required significance of the lowest digit, these values can be scaled by a further multiplier.

2.5.2 Alarms

Each of the various modules that comprise the total operating software, are continuously monitored for correct operation. Depending upon the configuration, the flow computer will complete its allotted tasks within the configured cycle time, 250mS, 500mS or 1 second. Failure to complete the tasks within the time will force the module to complete, and where appropriate, a substitute value issued together with an alarm indication.
For example, if a Calculation fails to complete correctly then a result of 1 or similar will be returned, which allows the unit to continue functioning whilst an accountable alarm is raised, indicating an internal problem.

2.5.2.1 Accountable alarm

When the value of any measurement item or communication to an associated device that is providing measurement item to the SUMMIT 8800 goes out of range, the flow computer will issue an Accountable Alarm.
When any calculation module or other item that in some way affects the ultimate calculation result goes outside its operating band, i.e. above Pressure Maximum or below Pressure minimum, then the SUMMIT 8800 will issue an Accountable Alarm.

When the SUMMIT 8800 issues an Accountable alarm a number of consequences will occur as follows:

Front panel accountable alarm will turn on and Flash.
Nature of accountable alarm will be shown on the top line of the alarm log.
Alarm log will wait for user acknowledgement of alarm.
During the period of the alarm, main totalisation will occur on the alarm counters.

2.5.3 Optional consequences

Depending upon the configuration of the SUMMIT 8800 the following optional Consequences will also occur:

An Entry will be made in the Audit Log, with Time and Date of occurrence.
The "Used" value of the Parameter in Alarm will be substituted by an alternative value, either from an alternative measurement source that is in range, or from a pre-set value.
A digital Alarm output will indicate an Alarm condition.

For initial installation of the software refer to Volume 1 of the handbook.
For Hardware and instrumentation, refer to Volume 2 of the handbook

Alter starting the configuration software, the option menu appears:

Figure 3 Configurator option selections

Select Edit Offline, this function allows the user to create or modify a new configuration without actually being connected to the flow computer.

Figure 4 Application firmware version

Select the correct software version. The software must be compliant to the connected Summit 8800 firmware version, details of system information can be found in volume 1. We assume that the version mentioned in append 1 is selected.

The main configuration page of the Configurator software is displayed and will be the starting point for this manual.

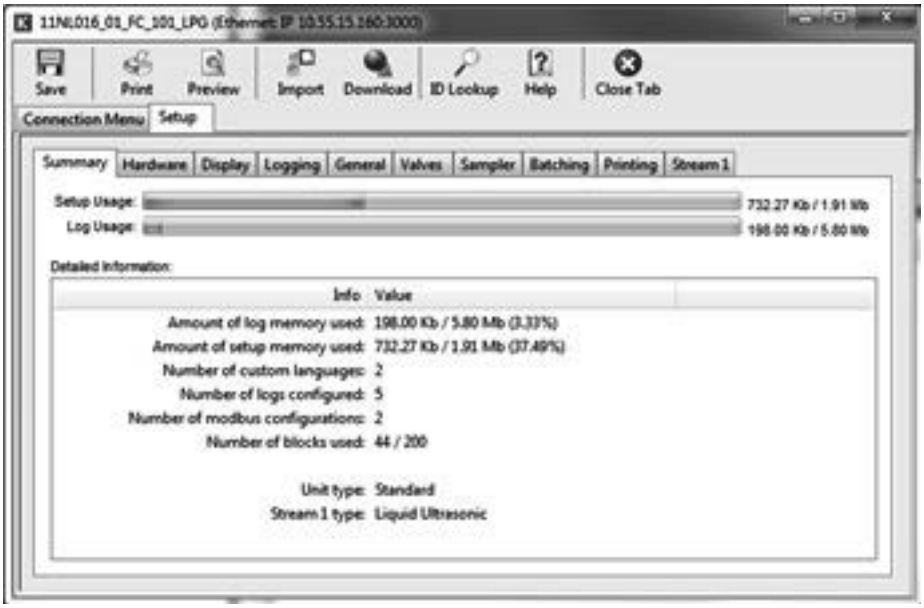


Figure 5 Main Configurator display

The Summit has a battery backed real-time clock. The clock can be set in several ways:
- Initially a fixed value via the configuration software
- Initially the time of the computer downloading the configuration software..
- Automatically synchronized via an SNTP server
- Manually via the screen

The format of the time can be changed to fit international needs.
The Summit also knows a contract time as often a buyer and seller have different moment of a day that they like to generate reports, e.g. at 00:00 hours and 06:00 hours. Only required if more than one report time is needed.

4.1 Initial setting of date and time

In the configuration software the initial settings for date and time can be set together with and the display format and the contract time:

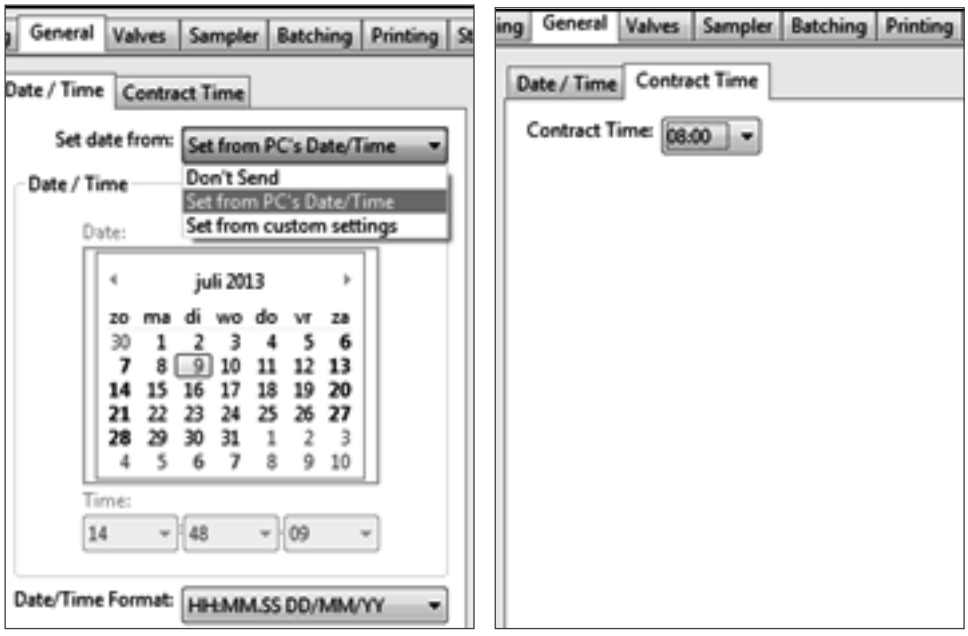


Figure 6 Date & time and contract time selection

Set date from	Select from
• Don't send	Leave the Summit clock untouched.
• Set from PC's date/time	Change the Summit clock to the PC date/time when downloading the software
• Set from custom settings	Change the Summit clock to a manual settings when downloading
Date/ time	Date and time for manual setting
Date / time format	Select the format needed
Contract time	Select the time as per customer needs.

4.2 SNTP Time Synchronisation

The SNTP or Simple Network Time Protocol is available to synchronise the internal clock with a network time server. While the internal clock's accuracy is limited to about 3 ppm/°C, these time servers are based on atomic clocks to guarantee the best accuracy. This function also ensures that all flow computers in a network are using the same time.
The flow computer works with time servers using version 3 or 4 of the SNTP protocol, either Unicast or Broadcast:

- Unicast is where the flow computer will request the time from a specified time server.
- Broadcast is when the flow computer waits for a broadcast packet from a time server, and then confirms the results by using a unicast request.

The SNTP can be setup in the hardware section under the Ethernet SNTP:

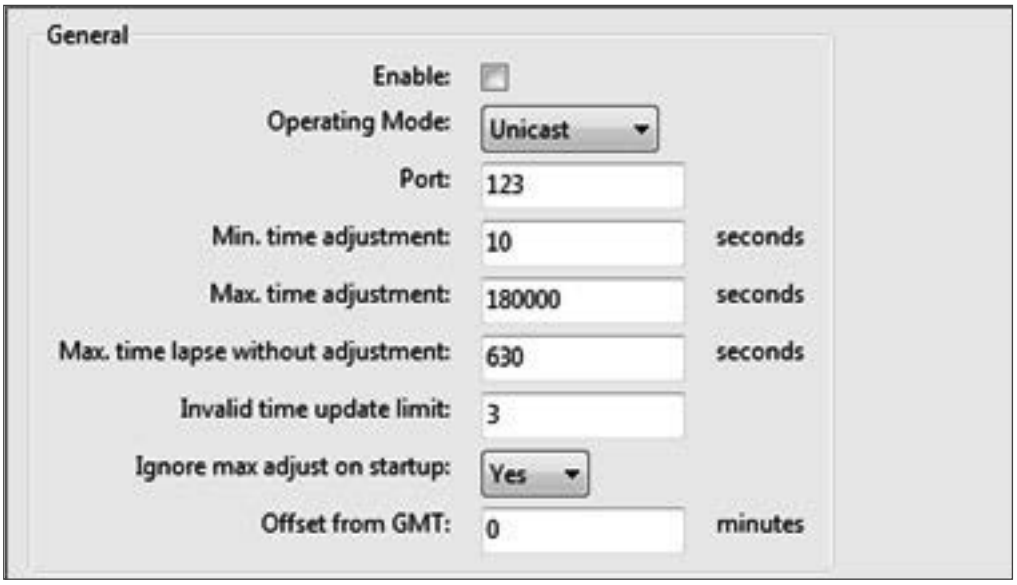


Figure 7 SNTP Date & time general settings

Enable	Click the box to enable SNTP
Operating mode	Set the mode as unicast or multicast
Port	The port used for SNTP standard specifies that this should be 123.
Min time adjustment	Minimum amount of time the flow computer clock can be adjusted
Max time adjustment	Maximum amount of time the flow computer clock can be adjusted
Max time without adjustment	Maximum number of seconds that the flow computer can be expected to operate without receiving a new time from the time server. If this time is exceeded without receiving a new time then the flow computer will give a warning.
Invalid time update limit	Maximum number of bad updates that can be received before a warning is given.
Ignore max adjust on startup	Indicates if the maximum time adjustment value should be ignored for the first valid time received by the flow computer after power up.
Offset from GMT	The time zone of the local time as an offset from the atom clock +/- GMT minutes

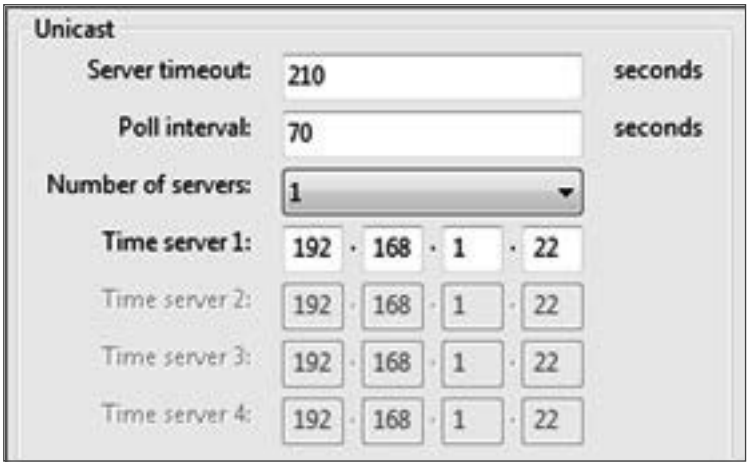


Figure 8 SNTP Date & time unicast settings

Server timeout	The timeout that applies to each server, after which the next available server in the list is tried. It is recommended that this value is a factor of the maximum time without adjustment.
Poll interval	Frequency of the flow computer polling the time server. It is recommended that this value is not divisible by 60.
Number of servers	The number of time servers the flow computer can connect to.
Time server	IP address of each server.

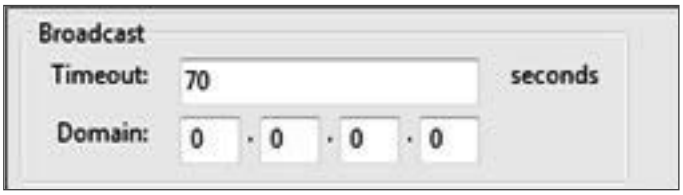


Figure 9 SNTP Date & time broadcast settings

Broadcast timeout	The flow computer the waits for a broadcast before giving an alarm. It is recommended that this value is a factor of the maximum time without adjustment.
Broadcast domain.	IP address on the client subnet for the client operating in broadcast mode to listen for time updates from broadcast servers.

4.3 Manually change date and time

To be able to set the date and time manually, a display item has to be created under “Security” with the time in it. (see also next chapter).

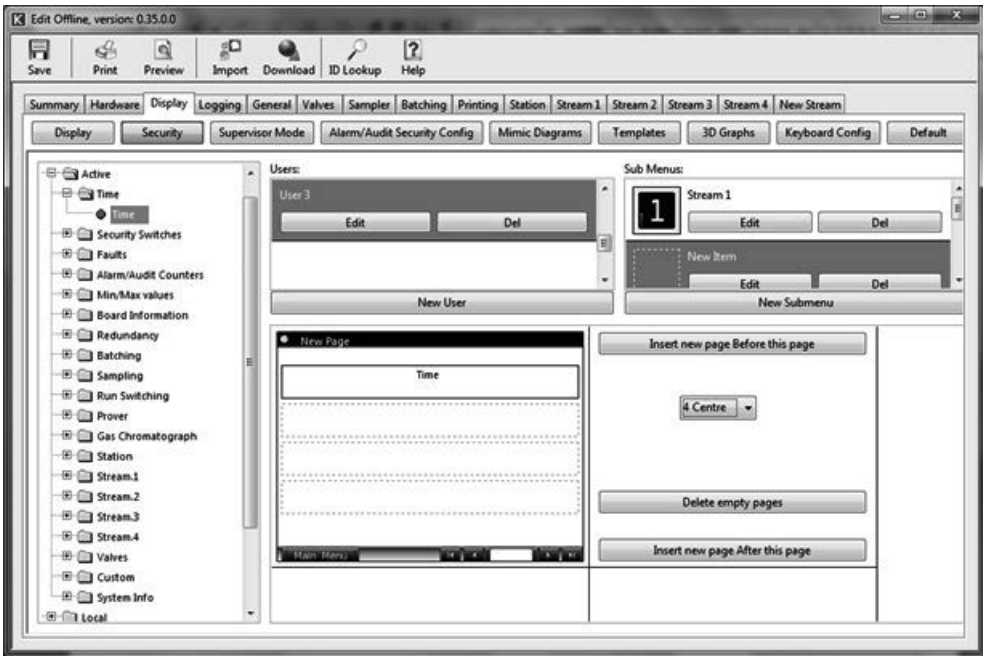


Figure 10 Manual Date & time settings

If the operator then goes into Edit mode, he can change the time as follows:

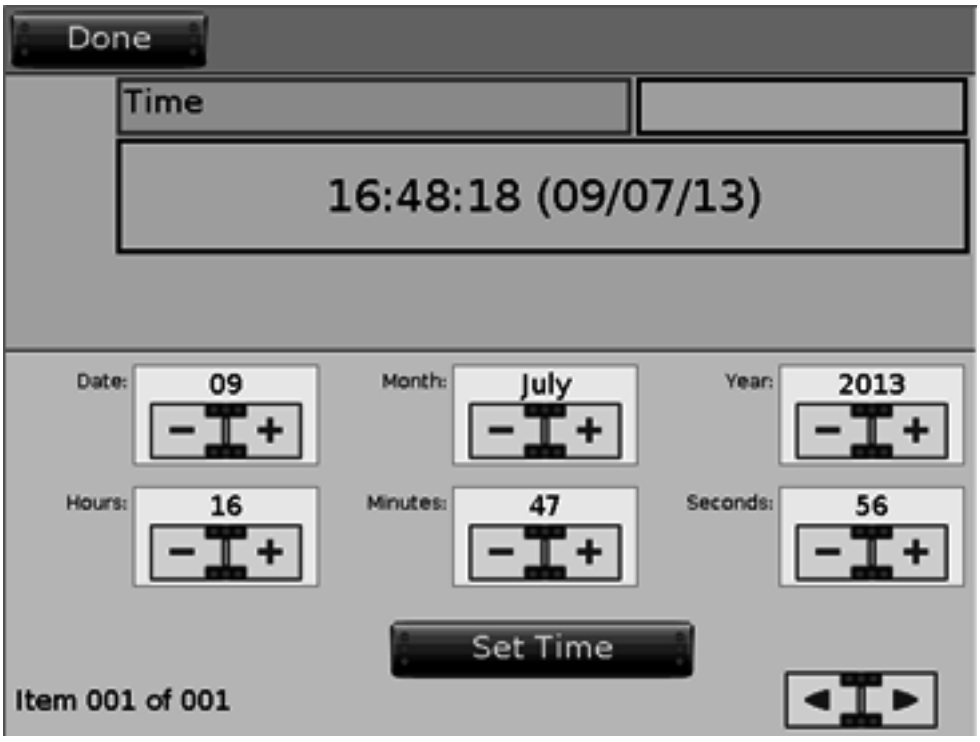


Figure 11 Manual Date & time adjustment

To store historical data is one of the major functions of a flow computer. The Summit 8800 is has 3 types of log's:

Alarm log	Storage of current and historical alarms.
Audit trail log	Storage of any change made to the unit that has metrological significance.
Data log	Storage of user defined data, either periodically or event diven.

The first two are system logs and cannot be changed, however an audit log can be extended with user defined data.

5.1 Alarm and audit log security

It is possible to define what to do with alarm acknowledgment and clearing alarm and audit logs depending on the 4 hardware security switches on the back of the Summit. Two of them determine the security mode of the Summit:

Open	Any changes can be made (using user passwords) and applications can be loaded.
Partial	Changes can be made except calibration data. No new application can be loaded.
Full	No changes in parameters, values or any other data is not possible.

The different security mode also effects the alarm/ audit clearing and acknowledgment and can be set under "display, alarm/audit security configuration"

Figure 12 Display security window

Clear Alarm Log	Determines if the alarm log may be cleared in open/ partial/ full mode.
Acknowledge Alarms	Determines if the alarms may be acknowledged in open/ partial/ full mode.
Clear Audit Log	Determines if the audit log may be cleared in open/ partial/ full mode.

5.2 Alarm log

Every time an alarm or warning occurs, it will be stored in the alarm log. The log contains a maximum of 200 entries consisting of time and date when the alarm occurred and vanished plus a description of the alarm or warning.

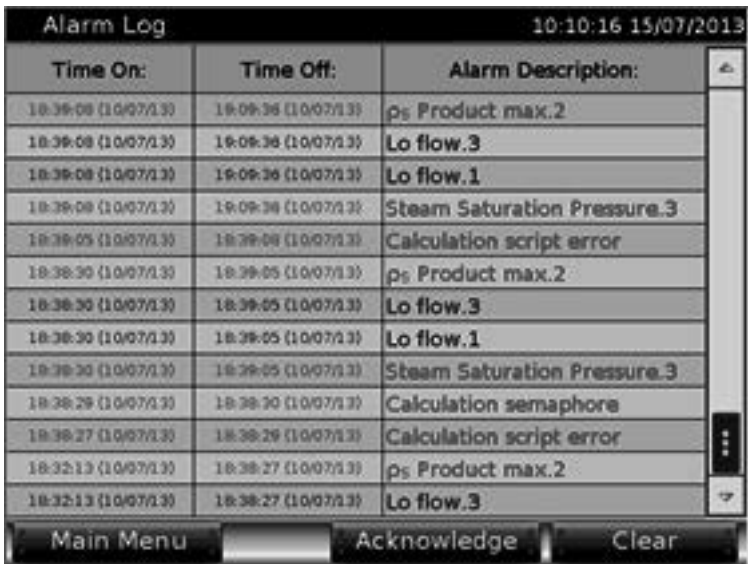


Figure 13 Alarm log

As the alarm log is a system functions, it does not need any configuration, exept for the alarm acknowledge and clear, which is depending on the security configuration (see previous chapter)

All alarm information stored in the Summit's internal data flash memory. Each record contains a CRC 32 check which is generated when the log record is created and checked for validity each time data is read from the Unit.

5.3 Audit trail log

Any change made in the Summit which influences the flow measurement in any way is stored in an audit trail to be able to track back what went wrong and possibly recalculate the results.This log contains a maximum of 200 kbyte of internal memory, typically good at least 2000 entries. Each entry consists of time and date when the event occurred, the operator name, the description of the event and the value before and after change:

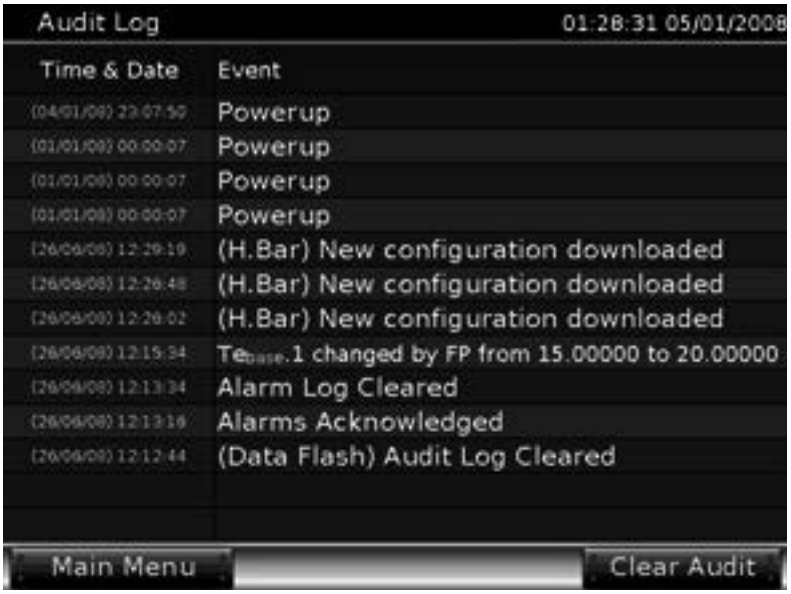


Figure 14 Audit trail log

Each record contains a CRC 32 check which is generated when the log record is created and checked for validity each time data is read from the unit.

As the audit trail log is a system functions, it does not need any configuration. However, configuration of the audit acknowledge, which is depending on the security configuration, is possible (see chapter Alarm and audit log security).

5.3.1 Audit log extension

For diagnostic purposes, the user can extend the audit trail with alarms and with up to 10 additional data items per event. These data will be stored on an external SD card only. Configuration can be done under “general” :

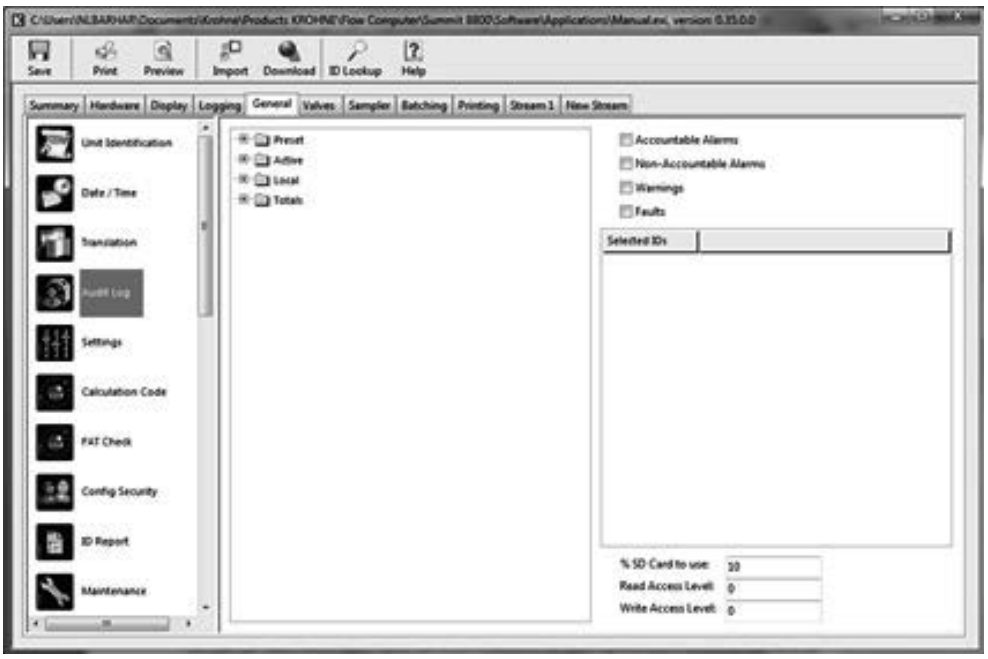


Figure 15 Audit log extension

The user can select which alarm types are to be included in the audit log:

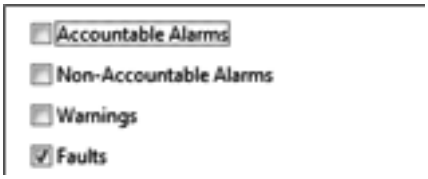


Figure 16 Audit log select alarms

Accountable alarms	Alarms (min or max exceeded) which influence the flow measurements
Non-accountable alarms	Alarms which do not influence the flow measurements
Warnings	Warnings (hi or low exceeded) which do not influence the flow measurements
Faults	Hardware faults, such as wrong hardware cards inserted for this application

Select which additional data is to be recorded for each audit event, often these are the flow totals at time of event:

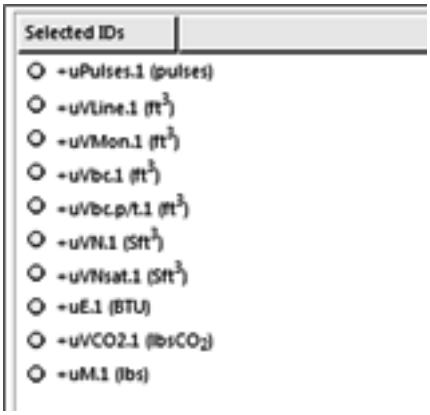


Figure 17 Audit log select variables

Drag the variables from the ID's in the list to record the variable when an audit event occurs.

Determine what to do with the data:

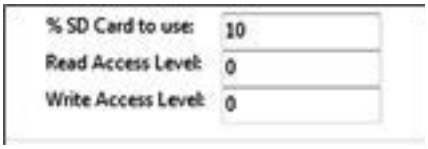


Figure 18 Audit log options

%SD card to use	The % memory on the external SD card before the log start from the beginning
Read access level	An access level for reading these data (for SOAP protocol only yet)
Write access level	An access level for writing these data (for SOAP protocol only yet)

5.4 Data log

It is also possible to create logs to store user defined historical data periodically or at events. Each data log will contain a time and date stamp of the time of the record plus user selected data items:

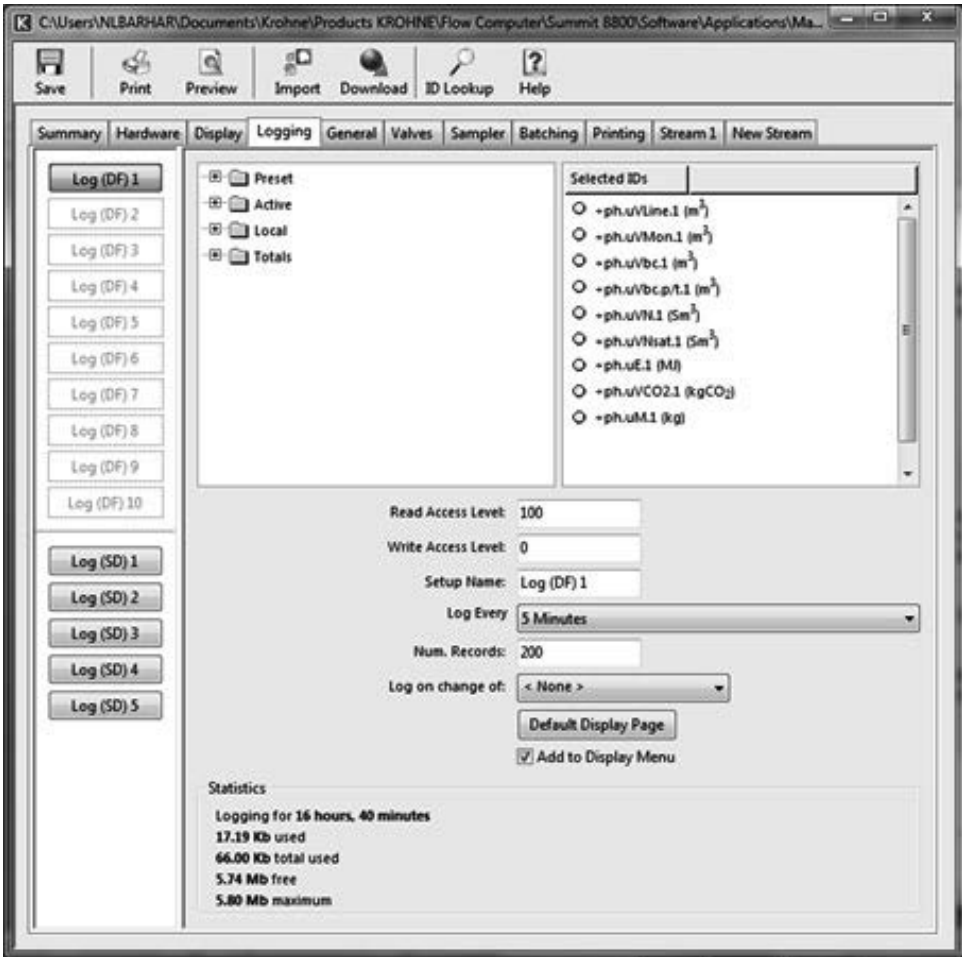


Figure 19 Data logging

In total 10 data logs on internal memory and 5 data logs in external SD memory can be defined, each with:

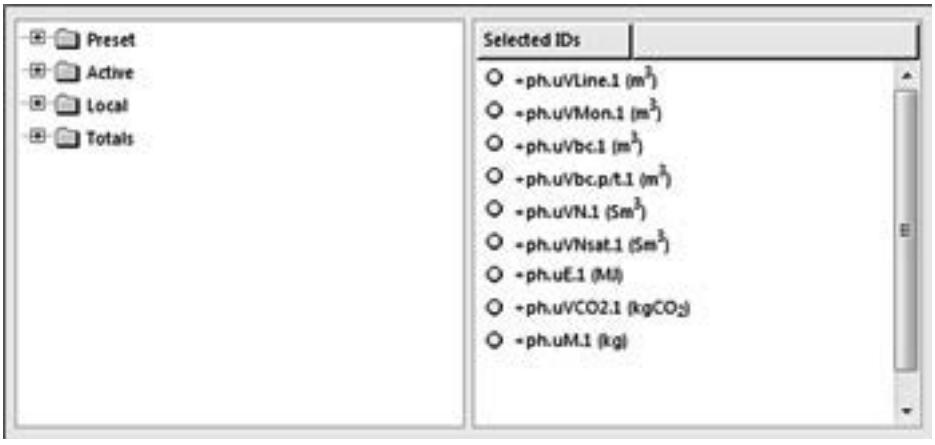


Figure 20 Data log select variables

Up to 50 variables, selectable form the ID tree. The logs settings are:

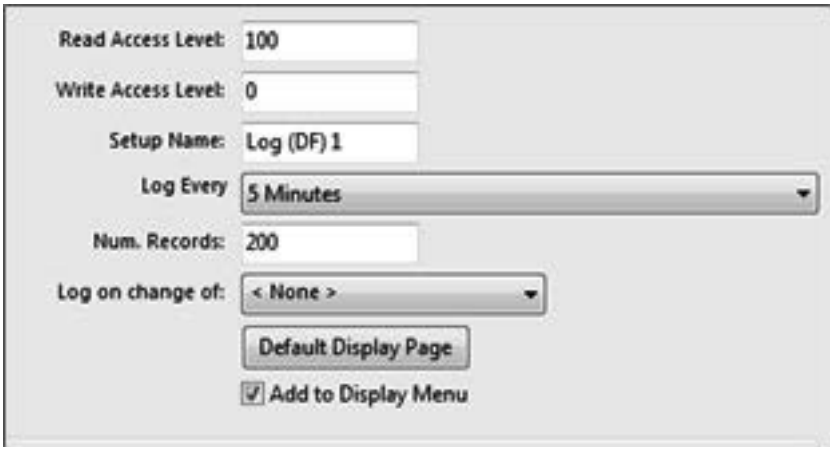


Figure 21 Data log settings

Read access level	An access level for reading these data (for SOAP protocol only)
Write access level	An access level for writing these data (for SOAP protocol only)
Setup name	A name for this data log
Log every	If the log is periodically, set here the log interval between 5 minutes and 1 year
Num. records	The number of records after which the log start from the beginning again
Log change of	If the log is event driven, select which variable, from the ID tree, triggers the event
	Be careful to select an variable which changes state, such as end of prove
Default display page	Press when page must be displayed after the screen is not used for a period of time
Add to display menu	If checked, this mimic will be placed in the menu item "data logs"
	If not checked, the mimic can be used as a display page.

The statistics of memory used is indicated on this page, in terms of time and amount of memory used.

Figure 22 Data log statistics

The period of time the total record will cover
- How much memory is used for this log record
- How much memory is used for all log records
- How much memory is still free
- The maximum amount of memory available for logging.

Please note:
- All data log items are stored in either internal data flash memory or removable SD card memory depending upon the configuration. Each record contains a CRC 32 which is generated when the log record is created and checked for validity each time data is read from the Unit.

- The Internal (DF) memory has a capacity of approximately 6 MB or approximately to 300,000 data records, with time and date for each.
- The SD memory used, depends on the size of the card and the % of SD card to use set for this log record, e.g. 200.000.000 for a 4 GB card.

5.4.1 Access to data log

Log data are available for reporting and communication, but not for display. In many cases, data logs are specifically used to allow re-print of data.

The logs have records with an index. The first index 1 is latest (youngest) record, the highest index is the oldest.
Under the normal local variables there are two for log numbers:

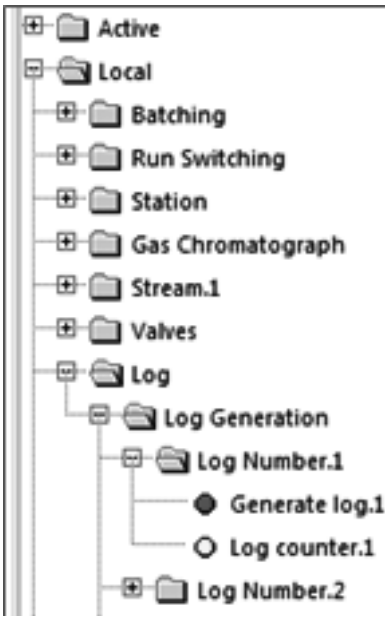


Figure 23 Data log local log numbers

Generate log	Set to generate a log
Log counter	Number of logs generated

For printing, ID's can be added from the data, alarm and audit log after which the log record can be chosen:

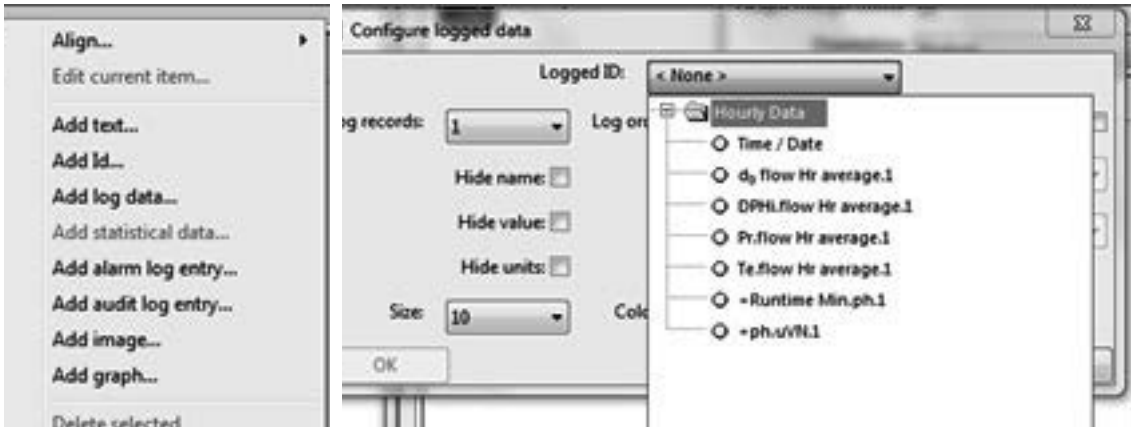


Figure 24 Data log ID's for FTP printing with log record selection

For modbus, there is a special log data tab for ID's from the data log and after entering the index may be changed:

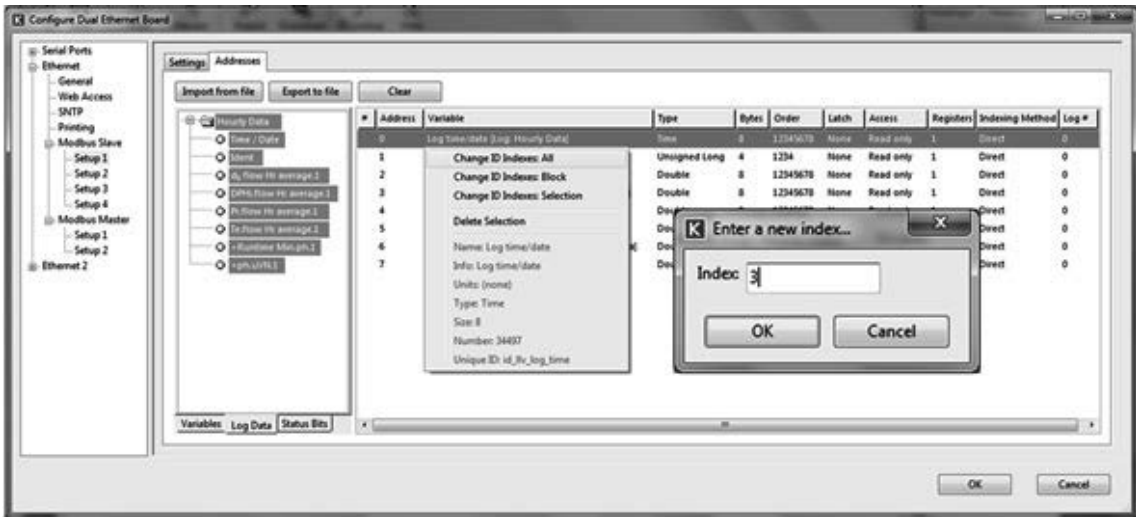


Figure 25 Data log ID's for modbus with index selection

The Summit 8800 display capabilities can be accessed locally via its touch screen or remotely via a web browser connected to the build-in Summit web browser. This means that it can be used via a large local display, a phone, a tablet or a PC. It is also possible to download alarm and audit logs and real-time ID reports. For details on operator display and web access, see volume 1.

The display screen capabilities of the SUMMIT 8800 represents a quantum leap for flow computers. Not only is it a colour display, but it is also fully graphics, presenting text, mimics, trends, X-Y-Z charts etc. and it is also fully configurable.

When starting a new application, the configurator will automatically generate a default menu depending on the type of streams/ prover chosen. Because the menu is created in the default engineering units, it is very important to make sure that the correct engineering units are chosen, otherwise the menu items have to be changed manually. So please check if they are set correctly under "settings" of the configurator start menu:

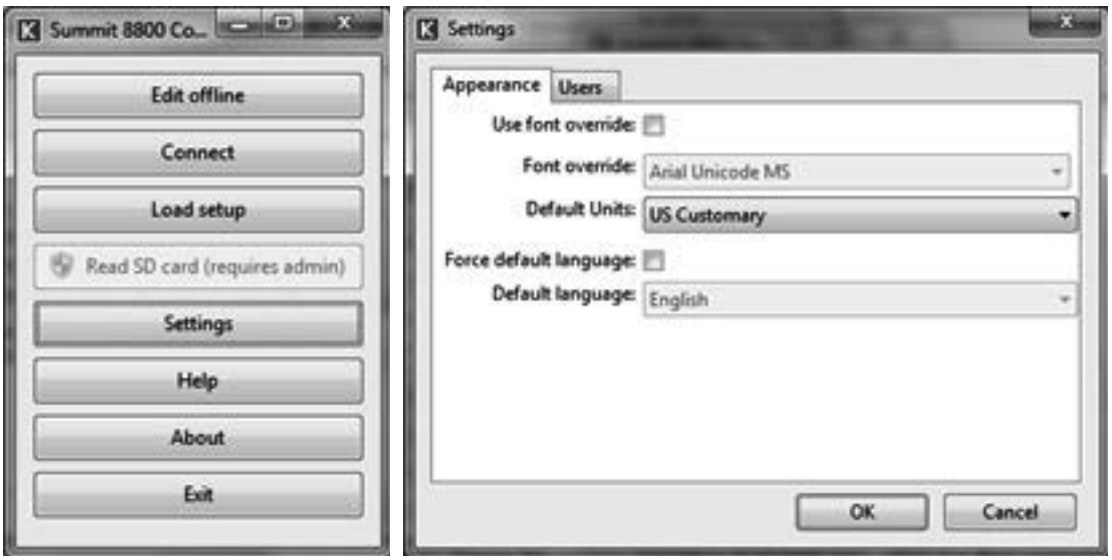


Figure 26 Display, set the correct engineering units

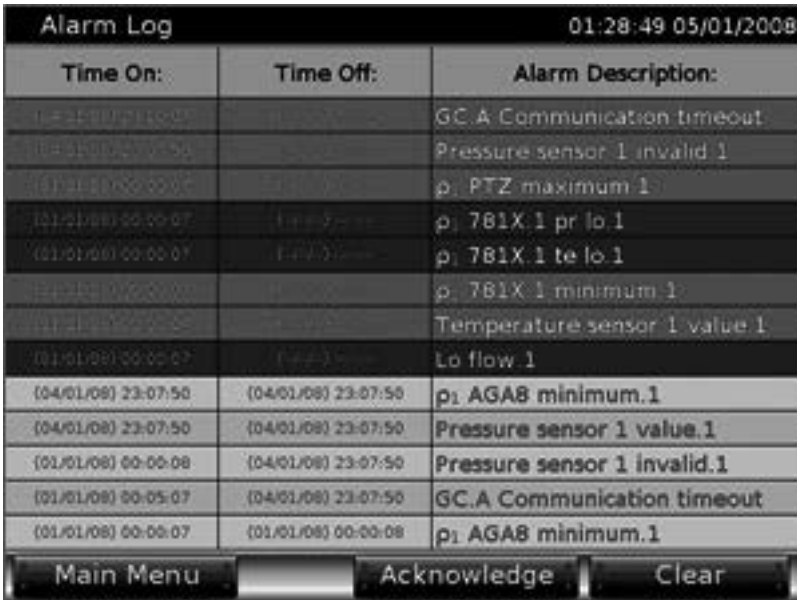
Please note that the menu will not automatically be adjusted when adding a stream to prevent damaging any changes made. If desired, it is possible to create a new application and import any changes desired or just create new menu items using the appropriate templetes.

There are two type of display pages:

System pages	These pages are deemed essential and will always be available
User defined pages	All other pages are fully configurable

6.1 System pages

The Summit has standard pages which cannot be changed and will always be available. They handle the system functions, such as:



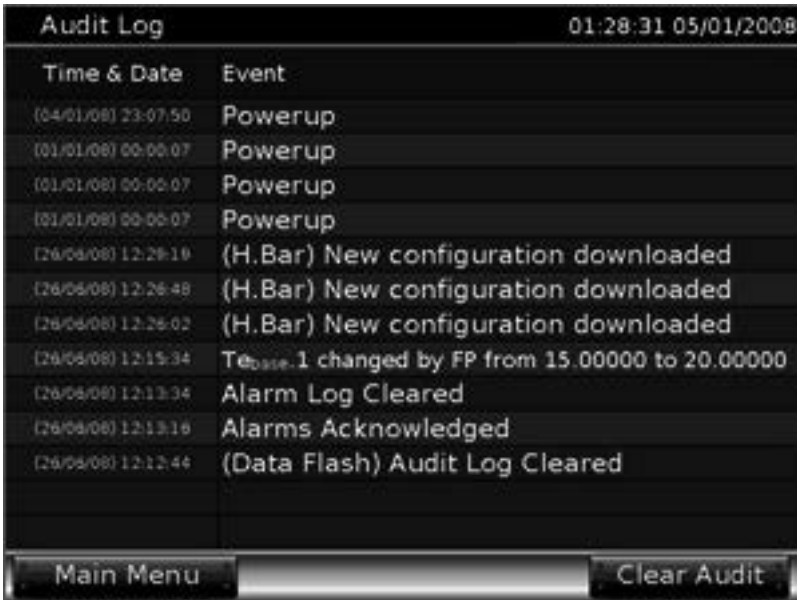


Figure 27 Alarm and audit log

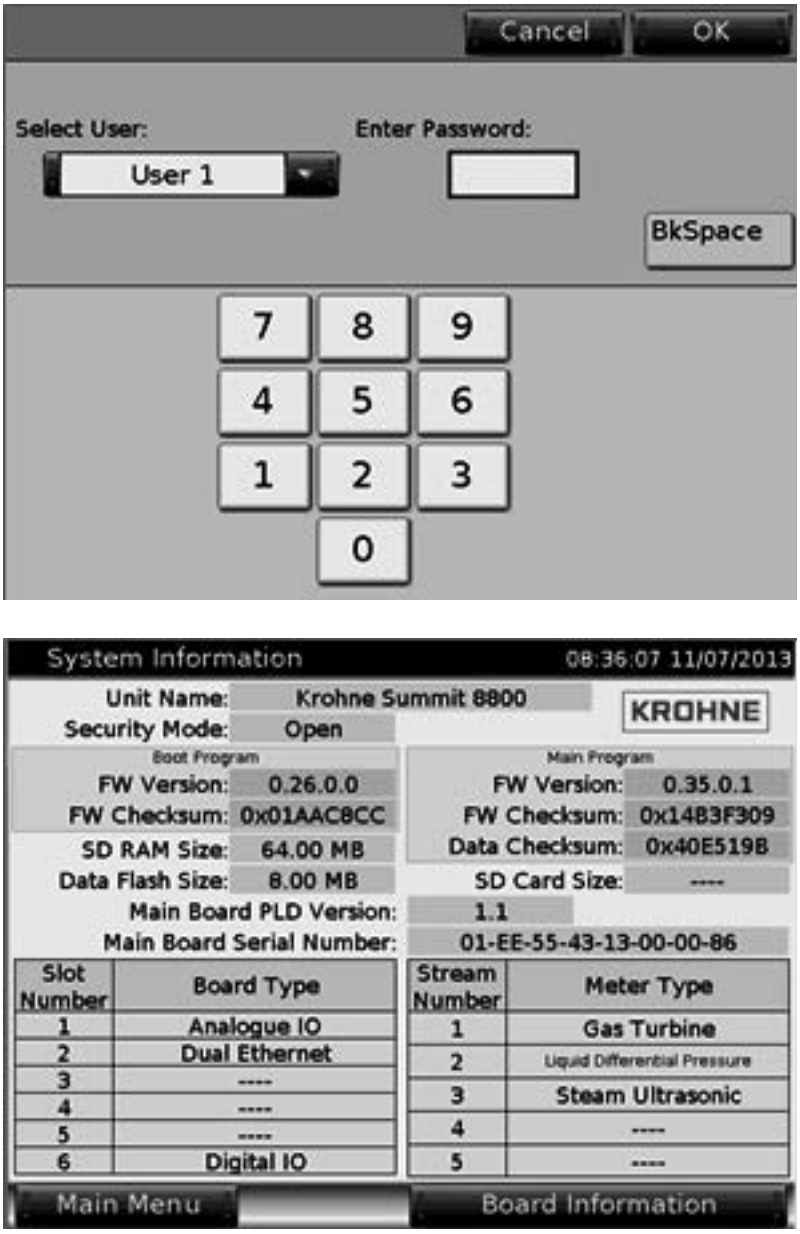


Figure 28 Edit mode and system information

Although the edit mode page to protect secure pages will always be there, the menu and pages behind it are user definable.

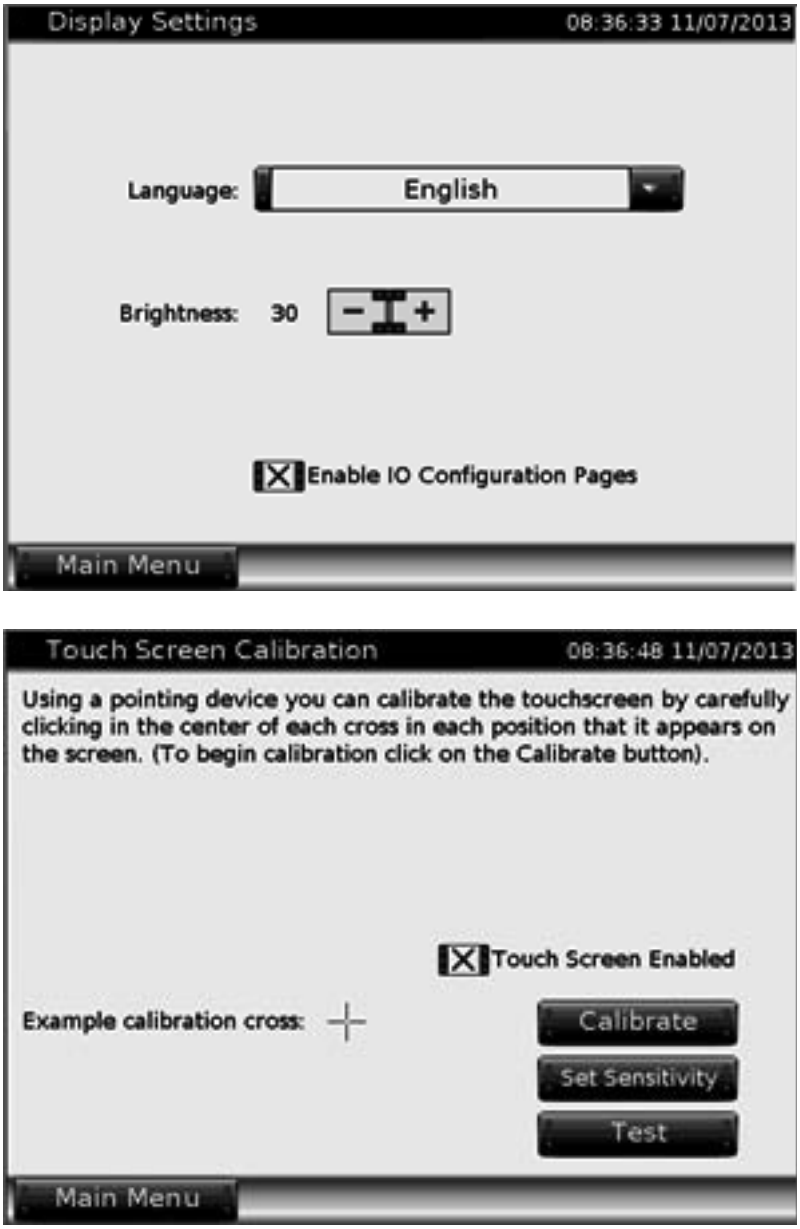


Figure 29 Settings, display settings and touchscreen calibration

6.2 User defined pages

Except for system pages, there are pages which are fully user defined. With the configurator software menu's can be changed, added and deleted:

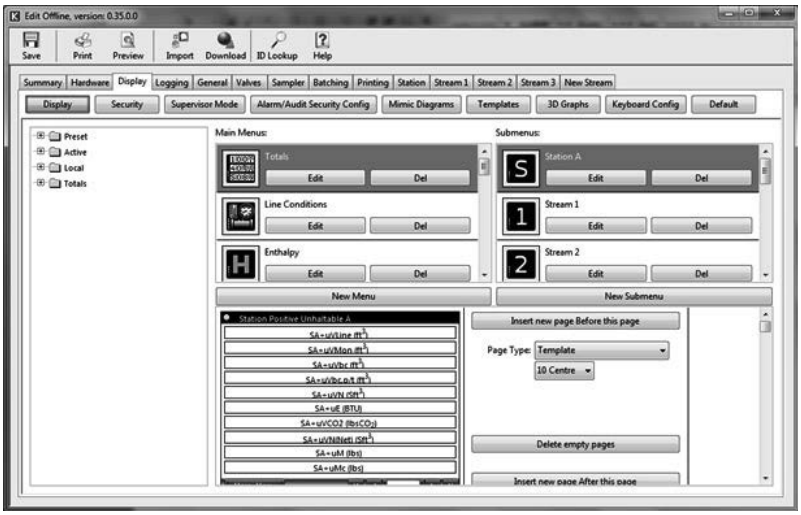


Figure 30 Display main page

There are 9 selections to change the screen navigation to access data within the flow computer:

Display	To define the display pages for normal operation
Security	To define the display pages for secure / edit mode operation
Supervisor Mode	Sets supervisory mode for secure fields in normal operation
Alarm/Audit Security Configuration	Determines actions allowed depending on the security dip switches
Mimic Diagrams	To define graphic pages for normal mode
Templates	Defines templates for formatting display pages
3D Graphs	To define X-Y-Z charts for normal operation
Keyboard Configuration	Defines the keyboard layout to adapt it to international keyboards
Default	Set which page must be displayed when not used for a period of time

6.3 Display

The display main page, as depicted in Figure 30, allows to add, change or delete any display item for normal operation.

The display has the following elements:

Main menu	The vertical menu on the display when "main menu" is pressed
Submenu	The horizontal menu when one of the main menu items with a right arrow is pressed
Display page	One of the information pages that can presented
Display item	One of the items shown on a page

The display has multiple main menu items, each can have a submenus with multiple submenu items. Each menu item can have one or more display pages associated to it. Each display page can have multiple display items.

6.3.1 Main menu & submenus

The top part of the display page defines the main menu and its submenus. They appear unmodified on the Summit display:

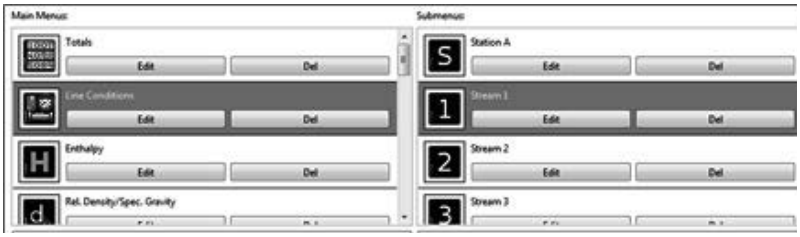


Figure 31 Configurator main menu & submenu

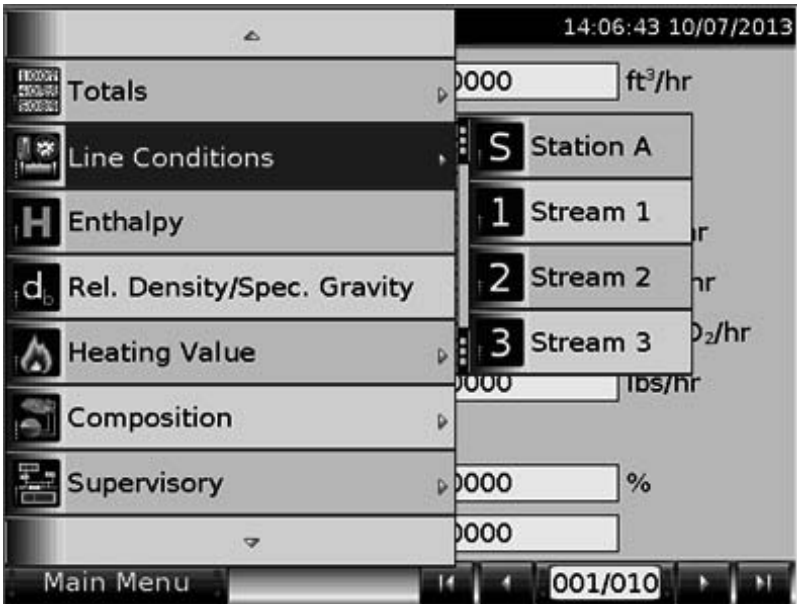


Figure 32 Display main menu & submenu

Both the main menu and submenu have several functions associated with it to modify the menu:

Make a new menu item	Press the new (sub)menu button
Move a menu item	On a menu, click and hold the left mouse button and drag it to another location
Delete a menu item	Press the delete key at the menu item or press the del button
Change a menu name	Click the menu name or press edit , select the menu item and click the name.
Change a menu bitmap	Click the menu bitmap or press edit, select the menu item and press edit.
Delete a menu bitmap	Press edit, select the menu item and press delete.

6.3.1.1 Make a new (sub)menu item

Press "new (sub)menu" to add a new (sub)menu at the end of the list. For submenu's an empty item with one associated empty page will be added. For menu's, there is the choice to create:

- an empty menu item: a menu item with associated submenu and display page will be added, all empty.
- a menu from a template: a predefined menu with submenu and display pages will be added, all populated

Press "new menu" to have the template selection:

Figure 33 New menu, select template

Here for instance a predefined run switching menu can be added.

A newly created menu items may be moved to a another place in the menu by pressing the left mouse button and, while on the menu item, dragging it to the desired location.

6.3.1.2 Change or delete a bitmap

In the main menu, simply click the name or the bitmap to change it or alternatively press edit:

Figure 34 Edit a menu item

From the menu list, select the bitmap to be modified. Press delete to remove the bitmap. Press edit to change the bitmap and a bitmap editor appears:

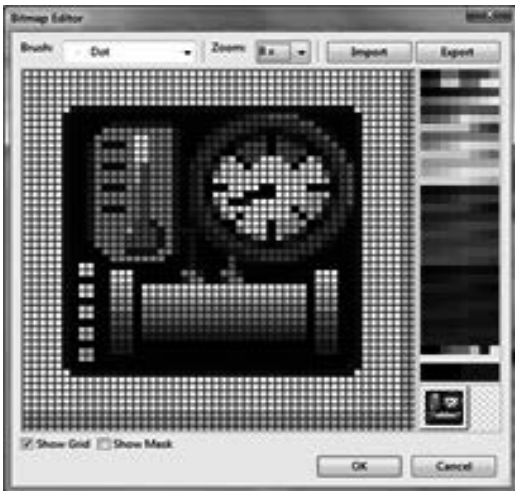


Figure 35 Bit map editor

The bit editor is mostly self explanatory:

Brush	Defines the shape of the "brush", so the way bits are selected
Select colour	Select the colour of the dot from the palette at the right
Zoom	Increases or decreases the size of the picture
Actual icon	Independent from zoom, the icon as appearing in the menu is at the right bottom part.
Show grid / mask	Shows the horizontal/ vertical lines or not. Shows the size of the picture
Import / export	To get a picture from or to disk.

Although an icon only is 48x48 dots, the picture imported may be larger. A section of the picture may be selected to be stretched or cropped, after which it will be scaled down automatically. To do so, a frame is used to select the part to be imported and pressing OK automatically imports the selection:

Figure 36 Import bit map

6.3.2 Display page & items

The bottom part of the display page defines the display pages and their items belonging to the menu and submenu selected. They appear very similar on the Summit display. The display items are dragged from the ID list left:

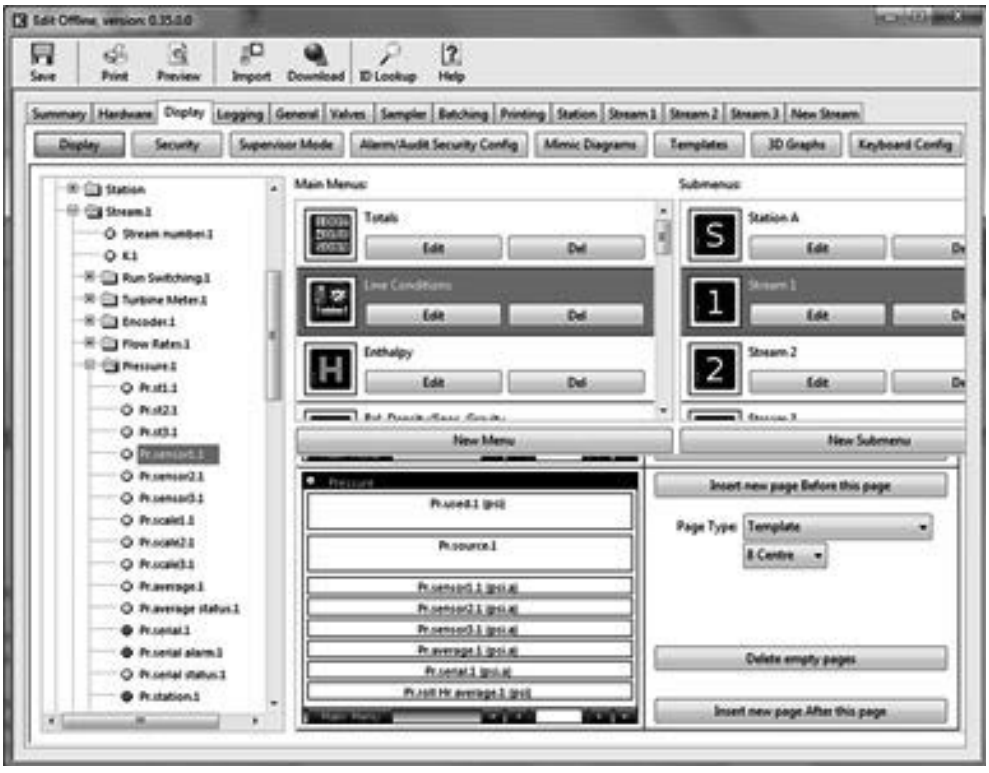


Figure 37 Configure display page

The display page has several functions associated with it to modify its contents:

Make a new page	
Above the page:	press insert new page before this page
Below the page:	press insert new page after this page
At the end:	right click below insert new page and choose “new page” or drag a display item below the very end of the pages
Delete a display page	Delete all items on the page and press delete empty pages
Change the page name	Click on the name on top of the page to change it.
Set display as default	Right click on the page. (for details, see chapter 7.11)
Set the page type	Press the button “page type” and select the desired type, see chapter 7.3.3.
Select a display template	Press the button “page type” and select template (for details, see chapter 0)
Create a display item	From the ID list choose the item to be displayed and drag it to the page.
Delete a display items	Select the correct display item or items and press the delete key,
Get details on display item	Right click on a display item and choose the item name:

Figure 38 Display item details

6.3.3 Set the page type

There are several page types which define the layout of the display page:

Template	Data can be dragged in a fixed layout, a template (see details in chapter 0).
Mimic	A predefined mimic page will be shown (see details in chapter 0)
Log data (list)	Predefined log data will be shown as a table (see details in chapter 6).
Log data (graph)	Predefined log data will be shown as a graph (see details in chapter 6).
Graph	A predefined X-Y-Z chart will be shown (see details in chapter 0).

Below please find examples of different page types.

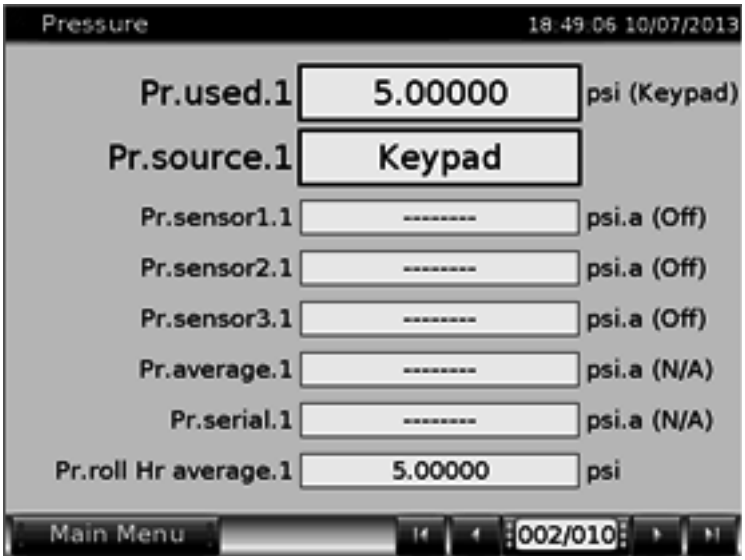


Figure 39 Display page based on 8 centre template

In the above example, the (sub)menu has 10 display pages associated with it. On the Summit, the bottom right hand side is used to select one of the 10 pages. Page 2 is shown and it is populated with 8 display items on a 8 centre template.

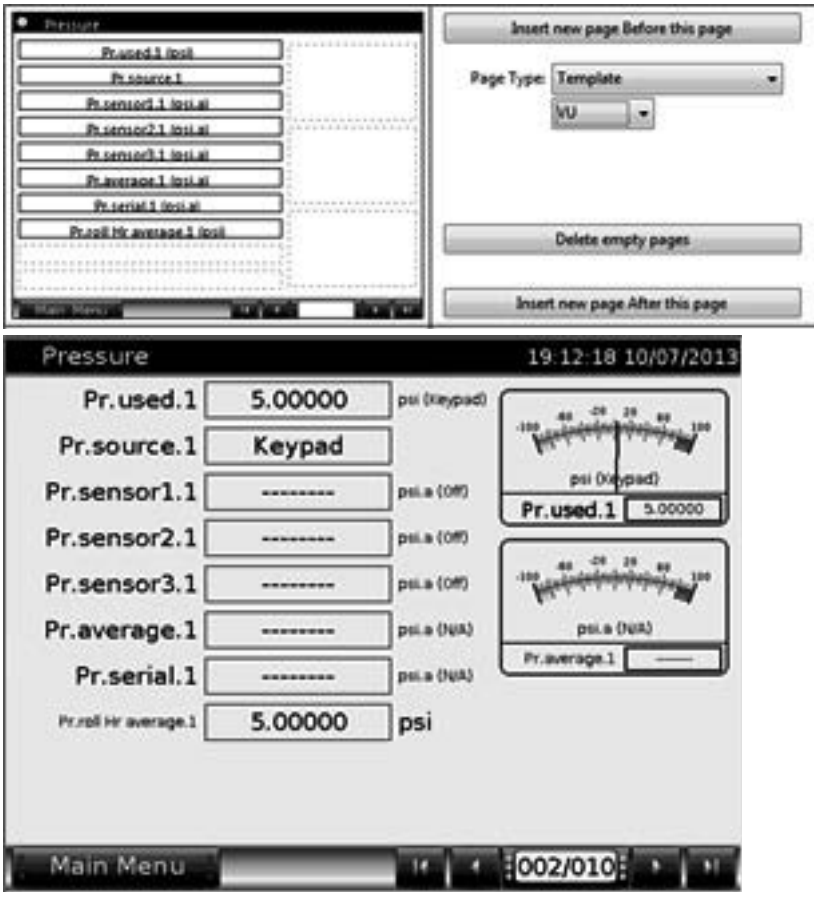


Figure 40 Display page based on VU template

In the above example, page 2 is populated in a VU template with up to 10 display items left and up to 3 VU meters right.

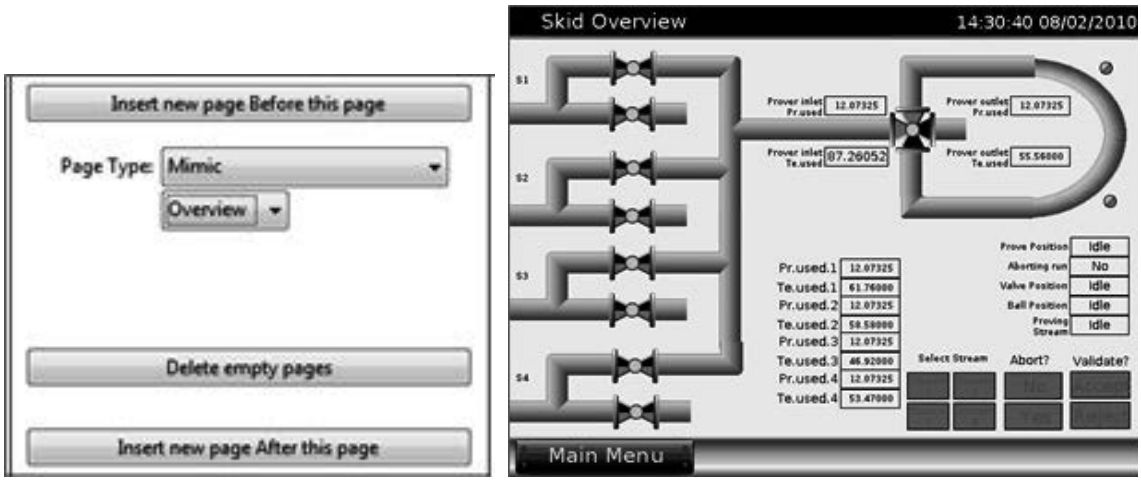


Figure 41 Display page based on a mimic

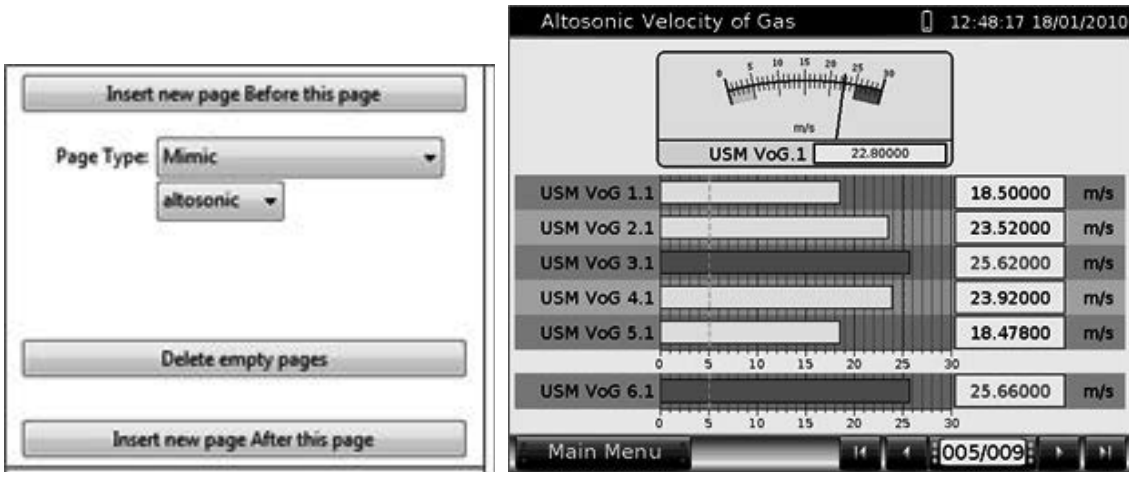


Figure 42 Display page based on a mimic

In the above example the mimic page "ALTOSONIC" is presented.

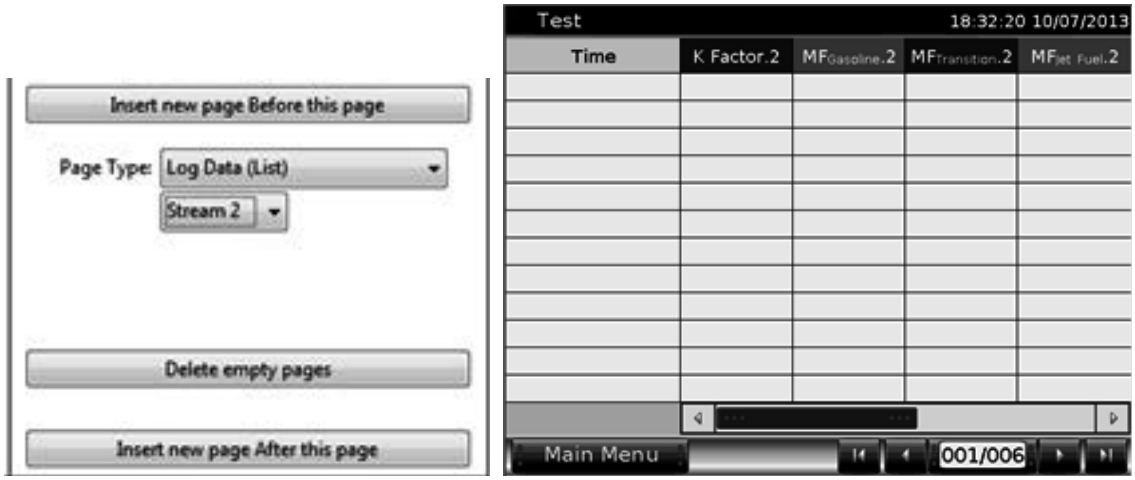


Figure 43 Display page based on log data (list)

In the above example, page 1 of 6 is displaying log date called “Stream 2” as a table.

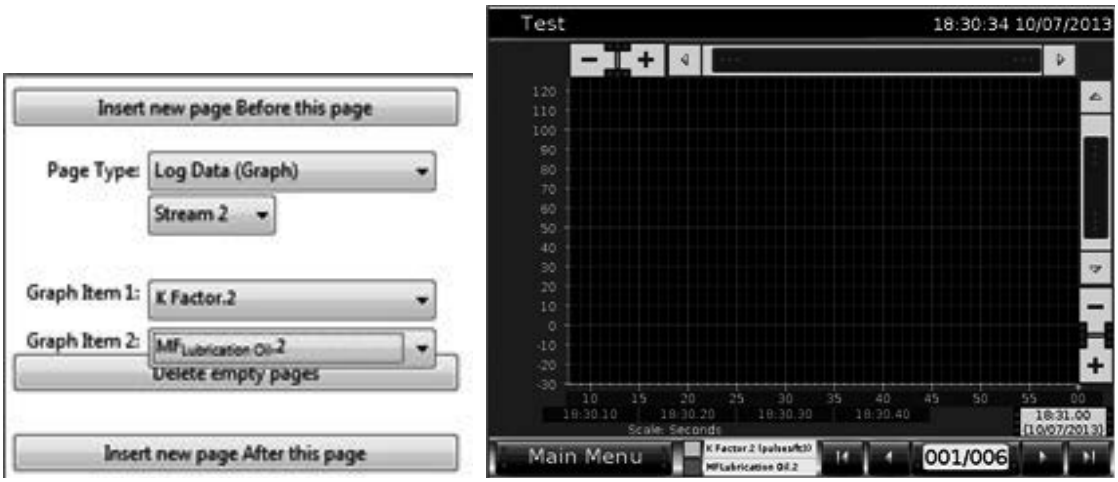


Figure 44 Display page based on log data (Graph)

Here, page 1 of 6 is displaying log data called “Stream 2” and the K- and MF-factor displayed as a graph.

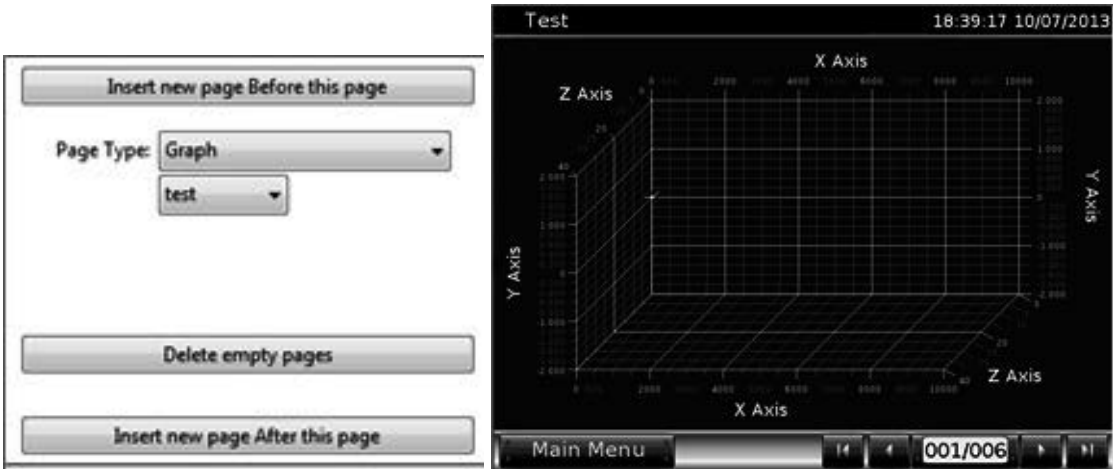


Figure 45 Display page based on a X-Y-Z graph

In the above example, page 1 of 6 is displaying X-Y-Z graph called “test”.

6.4 Security / edit mode

In security or edit mode authorised personnel can change parameters. With the configurator (groups of) users can be created, each with their password and their specific menu of parameters that can be changed by such users.

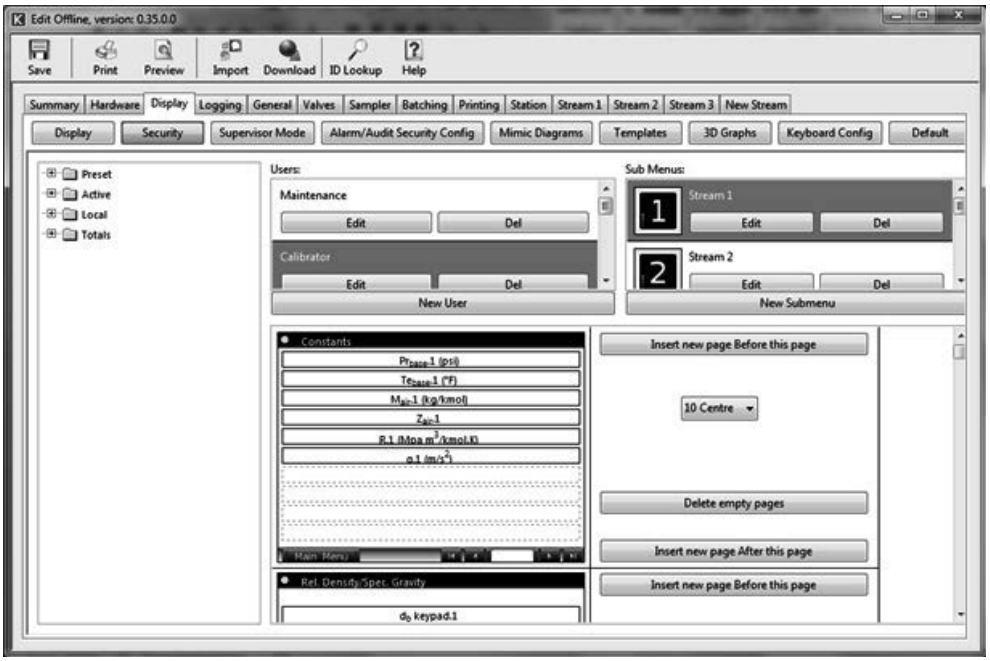


Figure 46 Configurator security window

6.4.1 Users & submenus

The top part of the display page defines the users and their submenus. They appear similarly on the Summit display:

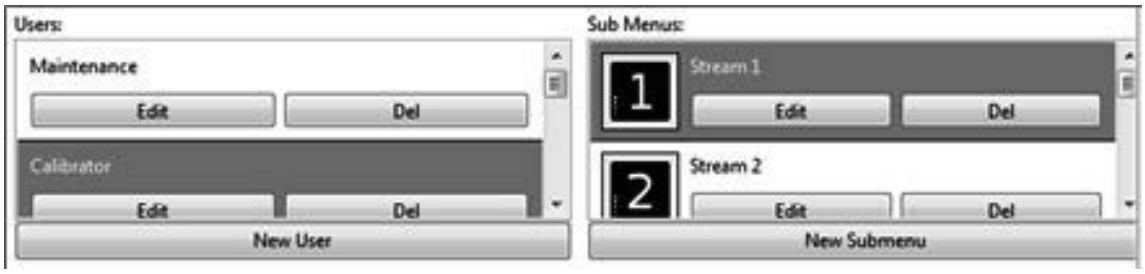


Figure 47 Configurator users & submenus

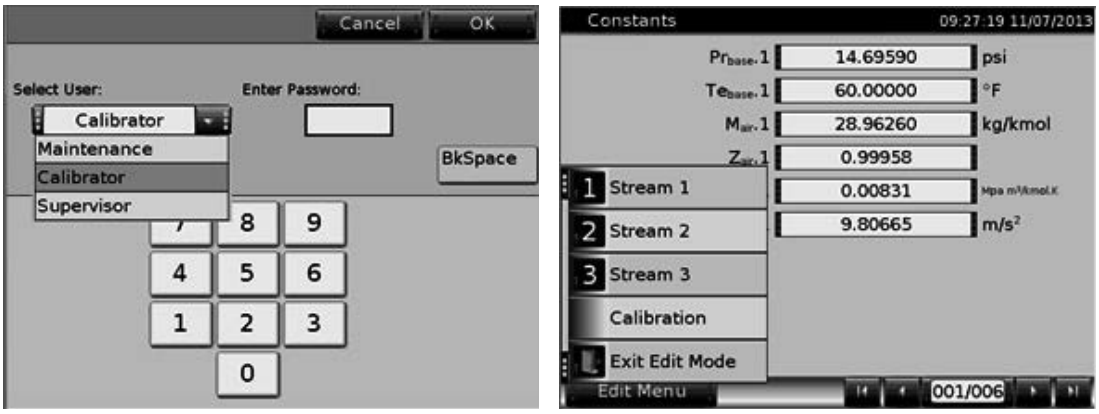


Figure 48 Summit users & submenu

As editing security submenu's is identical to editing display submenu's.
Users can be modified using several functions:

Make a new user	Press the new user button, a new user will be added at the end
Move a user	On a user, click and hold the left mouse button and drag him to another location
Delete a user	Press the delete key at the user or press the del button
Change a user name	Click the user name or press edit and click the name.
Change a user password	Press edit and click the password.
User calibration access	Press edit and click the box

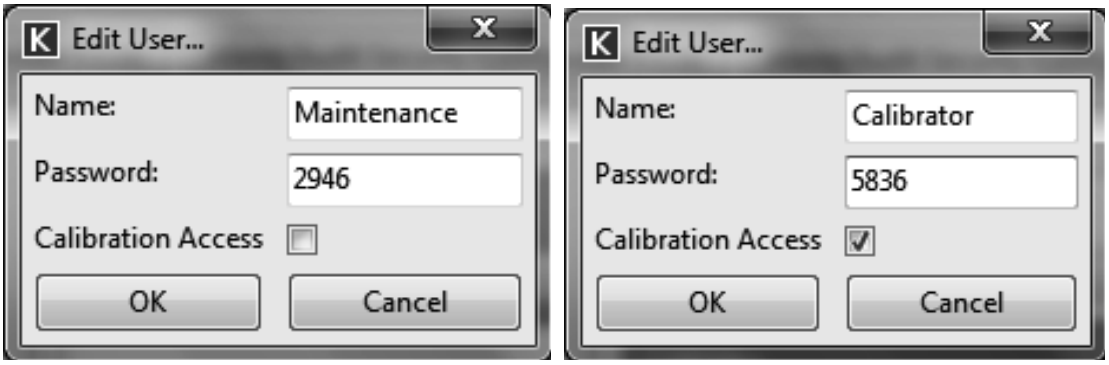


Figure 49 Edit users

By default 3 Users are defined:

User 1	Password 1111
User 2	Password 2222
User 3	Password 3333

6.4.2 Display page and items

As editing security display pages is identical to editing normal display pages. However in this case only the display type "template" is available.

Please be aware only the red coloured ID's in the list can actually be changed by a user via the Summit screen.

6.5 Supervisor Mode

Supervisor mode allows an authorized user to control a system like a normal supervisory or SCADA system, by pressing buttons and by inline editing. For instance the following example shows buttons control the sampler. On the left the supervisor did not log-in yet, so the buttons are not activated, on the right he did, so the buttons can be used:

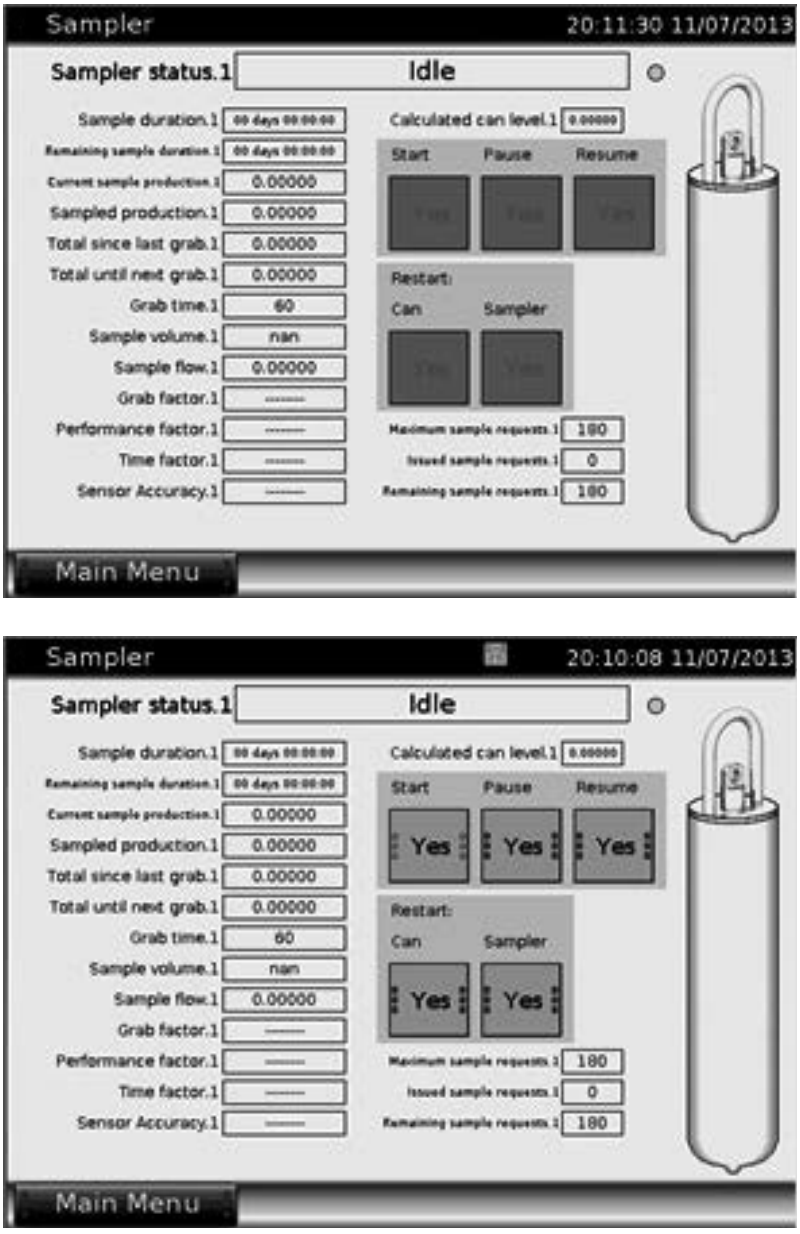


Figure 50 Same page in normal and in supervisor mode

To be able to use the buttons, supervisor mode must be activated as follows:

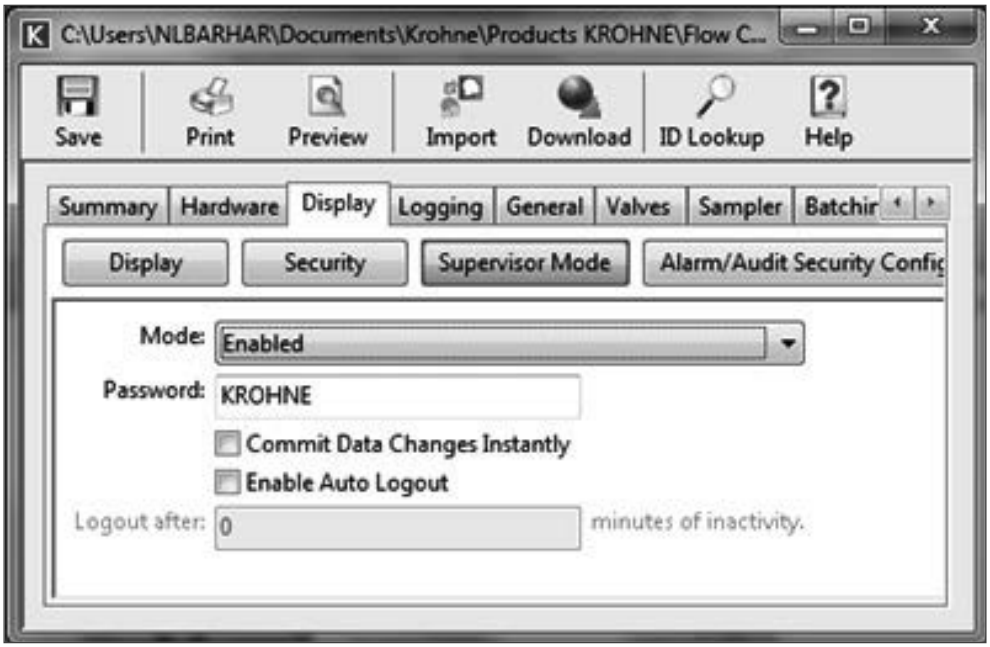


Figure 51 Setup supervisor mode

Mode	Enable or disable supervisory mode
Password	An alphanumeric password of at least 5 characters
Commit data changes instantly	Click if parameter changes may take place immediately or after manual action
Enable auto logout	Click if a password must expire after the Summit is not used for a while
Logout after	If enabled, enter the time to auto logout

Now in the Summit menu, an option "supervisor mode" appears with which a supervisor can log-in and log-out:

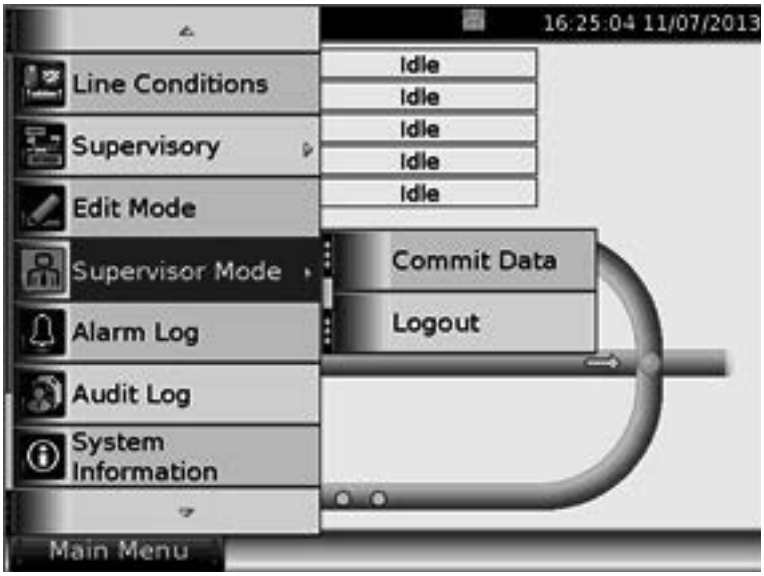


Figure 52 Summit supervisor mode login and logout

If logged-in, the supervisor mode is orange and on the top line, an orange supervisor mode icon appears.

Please note that, as "commit data changes instantly" is not clicked, an option to manually commit data is available under the supervisory mode.

6.6 Alarm/Audit Security Configuration

It is possible to define what to do with alarm acknowledgment and clearing alarm and audit logs depending on the hardware security switches. For details, see chapter 6.1.

6.7 Mimic Diagrams

The mimic screen of the flow computers sets the Summit 8800 apart from any other. Such pages are fully graphical and can depict metering equipment, status, buttons, and any other picture. This makes it a simple supervisory system, but please be aware that mimic diagrams are slower than display pages,

When starting an new application the system automatically generates mimic diagrams, depending on the type of streams/ prover chosen. They are available as templates which can be used as they are or can be changed to your liking. Because the templates are created in the default engineering units, it is very important to make sure that the correct engineering units are chosen, otherwise the mimic items have to be changed manually.

Off course new mimic diagrams can also be made. The basic idea is that there is a coloured canvas on which graphic items can be dragged. These items can then be configured for colour, format, variable, alarms and warnings:

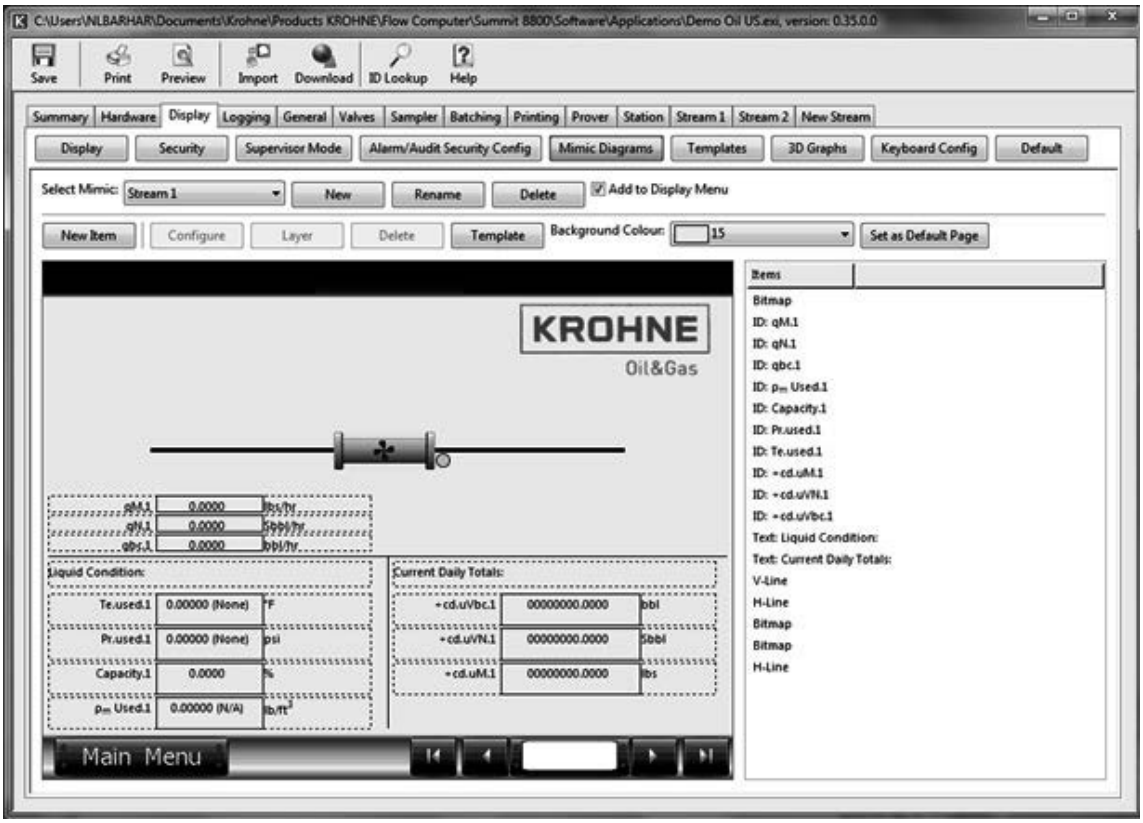


Figure 53 Mimic display definition

6.7.1 Mimic diagram selection

The top part of the display defines the mimic page as a whole:

Figure 54 Create a mimic display canvas

With as functions:

Select an existing mimic	Press “select mimic” to select a mimic from the list of existing mimics
Create a new mimic	Press “new” to create a new mimic from a blank or template, see below
Rename an existing mimic	Press “rename” to change the name of the mimic
Delete a mimic	Press “delete” to remove the mimic. Note that there is no warning.
Add to display menu	If checked, this mimic will be placed in the menu item “supervisory” If not checked, the mimic can be used as a display page. See chapter 7.3.3

A new mimic can be created from:

A blank canvas	An empty canvas will be generated
A template	A predefined system template mimic will be used as a start of the mimic

Of course a name must be given to the new mimic.

Figure 55 New mimic display

Once created, the following main functions can be used to create and display the mimic diagram:

Figure 56 Create a mimic display canvas

Use a template	Press "template" to select one from a list and to put it on the current canvas
Set the background colour	Choose the canvas background colour from a palette of colours
Create a new mimic item	Press "new item" to add one graphic item to the canvas, see next chapter.

6.7.2 New mimic item

By clicking the "new item" button, the canvas can be populated with graphic items fom a list:

Pipe	With a selection from several different pipe segments
Line	With a selection from several different lines
Meter	With a selection from several different type of meters
Equipment	With a selection from several different types of metering equipment
Arrows	With a selection from several different arrows
Miscellaneous	For status, valves, transmitters, solid box, variable, text and button Also any picture and logo's can be loaded from disk.

In this case as an ultrasonic meter is selected:

Figure 57 New mimic item and right mouse click on an item

Several functions can be used to draw a complete page:

Move an item(group)	Left mouse click on the middle dot in the item to drag the item
Scale an item	Left mouse click on a side dot in the item to scale the item
Rotate, mirror or flip an item	Right mouse click on an item and select the function desired
Change the order of items	Right mouse click on an item and select move to front/ back or raise/ lower Or press the button layer and select move to front/ back or raise/ lower
Duplicate an item(group)	Right mouse click on an item and select duplicate
Delete an item(group)	Right mouse click on an item and select delete or press the button delete
Configure an item	Press the button configure to change the behaviour of the item, see next.
Group items	Pressing the left mouse button, drag a square around items to be grouped

Multiple mimic items can be dragged on the canvas to complete the page. The layer button can be used to set the order of the different items: which has to be in front and which should be at the back..

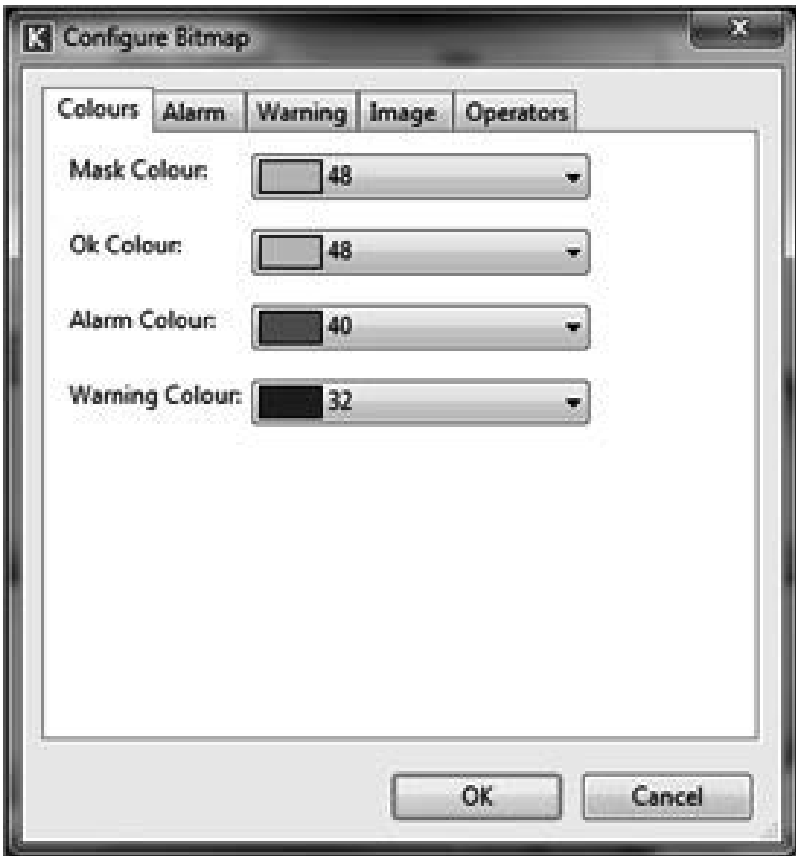
Please note that the item now appears in the right hand side item list.

6.7.3 Configure mimic item

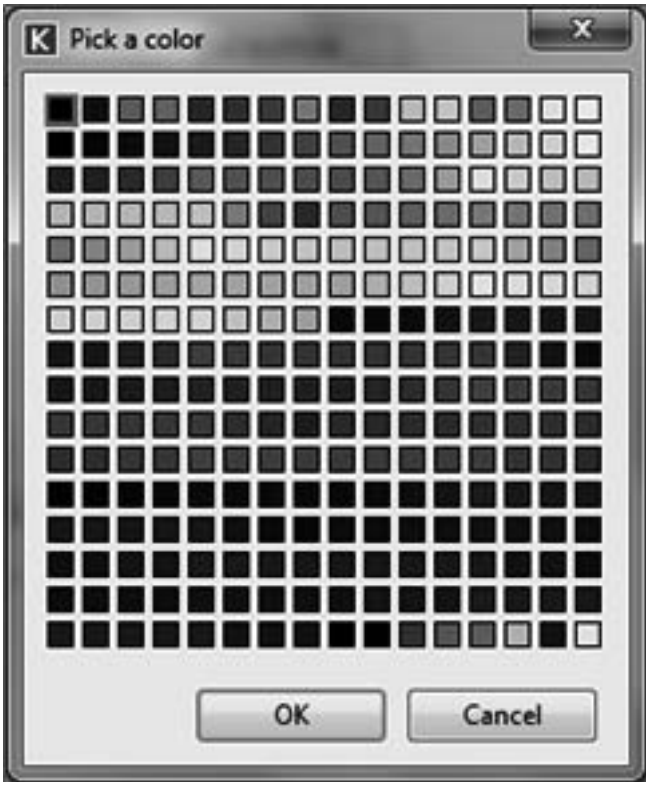
To change the behaviour of the item, press the button "configure". Depending on the type of mimic item, one or more of the following properties may be configured:

Colours	Select the colours for the item for e.g. the foreground, background, alarm and warning
Alarms	Select which ID's must be used for this item to show an alarm
Warnings	Select which ID's must be used for this item to show an warning
Image	The image can be changed, cropped and stretched
Operator	Animate a picture depending on a comparison between an ID and a value
	Operators can be: =, ≠, <, >, ≤, ≥.
Text	Give the item a name
Variable	Select the ID associated with this item
Format	Define what should be shown with a variable: name, value, units, status and border

The most common form is the following:



The simplest form is for line/ thin pipes and solid boxes:



For other items, such as transmitters, text, variables and buttons, slightly different configuration is needed.

6.7.3.1 Colours

All mimic items have a colour associated to it. The configuration page can however be different between items:

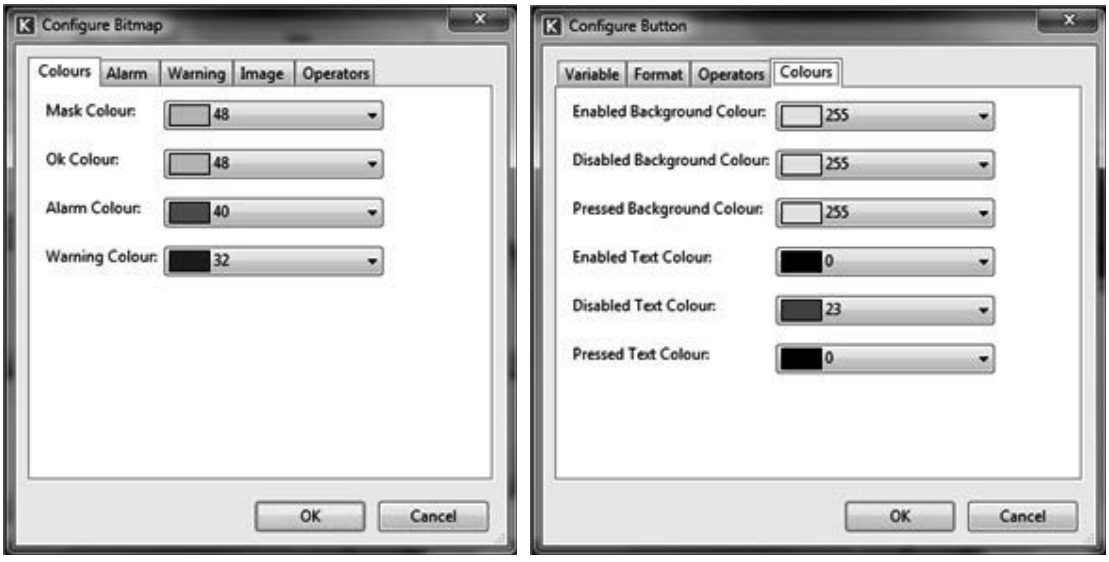


Figure 58 Mimic item configure colour

Select the colours to be used for the mimic items. Normally these are:

Mask Colour	the colour for the base or background of the item.
OK Colour	the colour for the item when its status is OK
Alarm Colour	the colour for the item when in alarm
Warning Colour	the colour for the item when in warning

For buttons, to make them look more dynamic, the colouring of the background and text can change depending if the button is:

Enabled	The colour when the supervisory mode is enabled
Disabled	The colour when the supervisory mode is disabled
Pressed	The colour when the button is pressed

For text there is only a foreground and background colour.
For lines, thin pipes and solid boxes, there is only one colour, so the colour palette will be shown immediately:

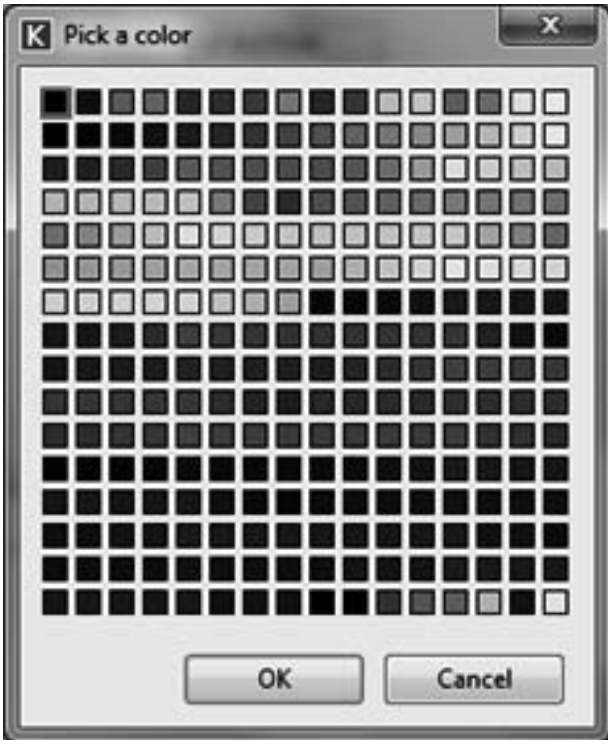


Figure 59 Mimic item colour palette

6.7.3.2 Alarms and warnings

In most mimic items, colours can be depending on alarms or warnings. Here the actual alarm and warning are defined.

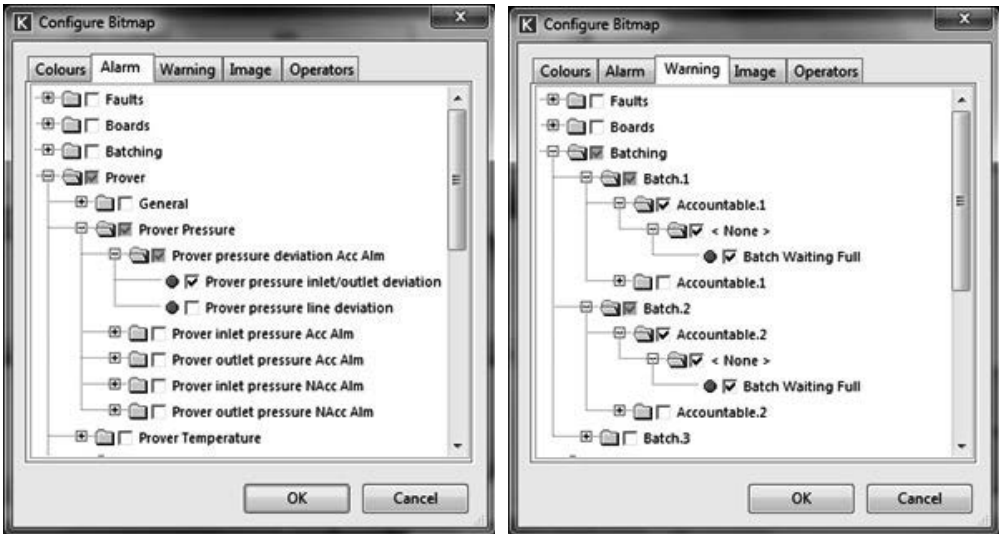


Figure 60 Mimic item configure an alarm and warning

A selection can be made from an ID tree which alarms/ warnings are involved with the colour change. This can be one single alarm, but can also be a combination of several alarms e.g. to create one meter system alarm.

6.7.3.3 Image

Most mimic items have a picture that can be changed:

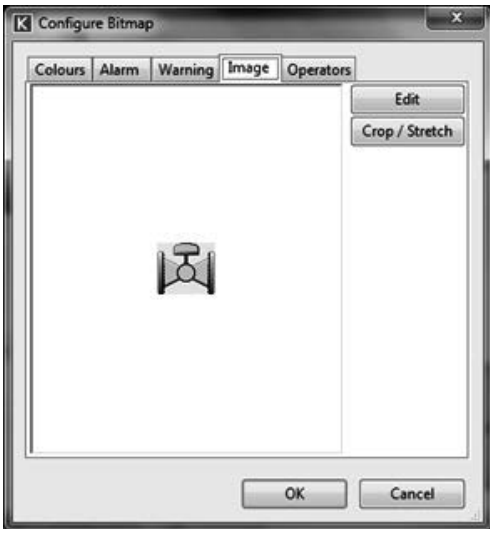


Figure 61 Mimic item configure image

The following options are available:

Edit the bitmap	Change, import or export the bitmap at will.
Crop the bitmap	Make the bitmap smaller

Stretch the bitmap	Make the bitmap wider or higher

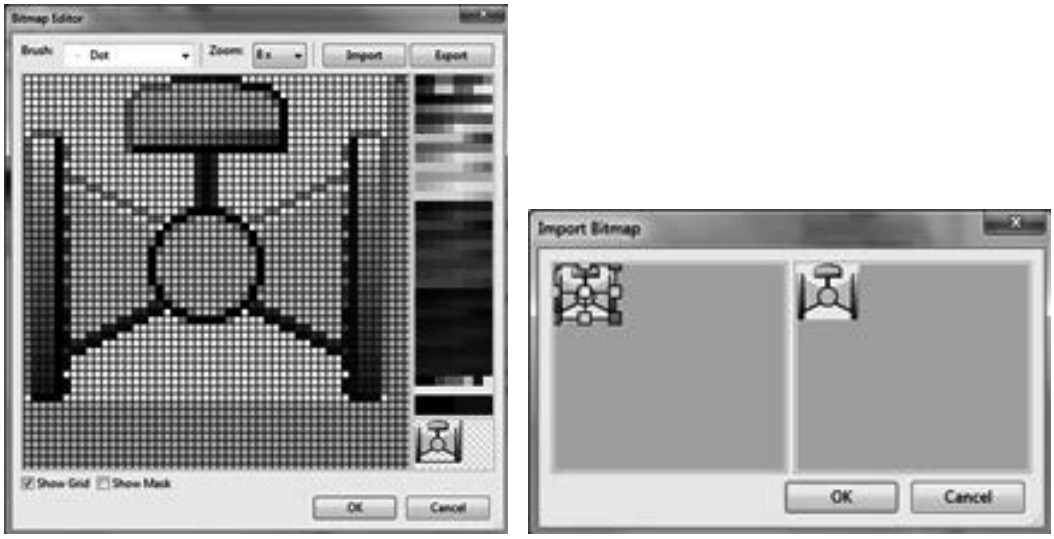


Figure 62 Mimic item edit image and crop/stretch image

For details of editing, cropping and stretching. In this case however, the image is not limited to 48x48 bits

6.7.3.4 Operators

It is also possible to animate pictures. Often this is to change colour depending on the status of the mimic item, but this can also be moving, rotation, sizing or even reshaping depending on any ID in the tree.

For each shape animation one line will be defined with the condition under which the shape should be chosen. This means that one ID must be chosen which animates the shape and multiple lines with

- Operator and value with associated picture
- Operator and ID with associated picture

The operators can be: =, ≠, <, >, ⩽, ⩾, and a condition can e.g. be "Fat simulation equals 0" to turn off a light:

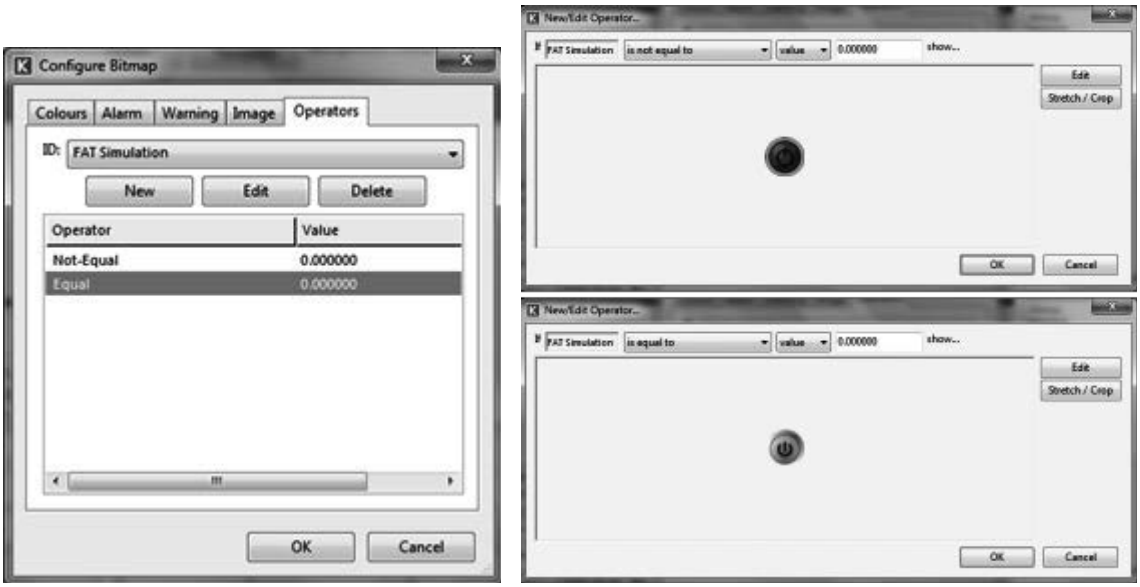


Figure 63 Mimic item configure operators

Functions are:

ID	Select the ID, which animates a mimic item, from a list
New	Create a new line with an operator with value
Edit	Change the line with an operator
Delete	Delete the line with an operator

In case of new or edit, the above right hand side picture will appear. The top part defines the condition in two forms: value and ID:

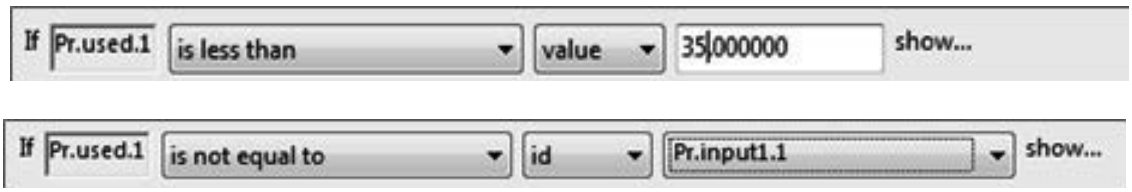


Figure 64 Mimic item configure condition

The lower part shows the image with as options:

Edit the bitmap	Change, import or export the bitmap at will.
Crop the bitmap	Make the bitmap smaller
Stretch the bitmap	Make the bitmap wider or higher

6.7.3.5 Text

For the mimic item “Text” the text must be entered as follows:

Figure 65 Mimic item configure text

6.7.3.6 Variable

A mimic item “variable” off course needs a variable to be defined, but also with a button a variable must be defined:

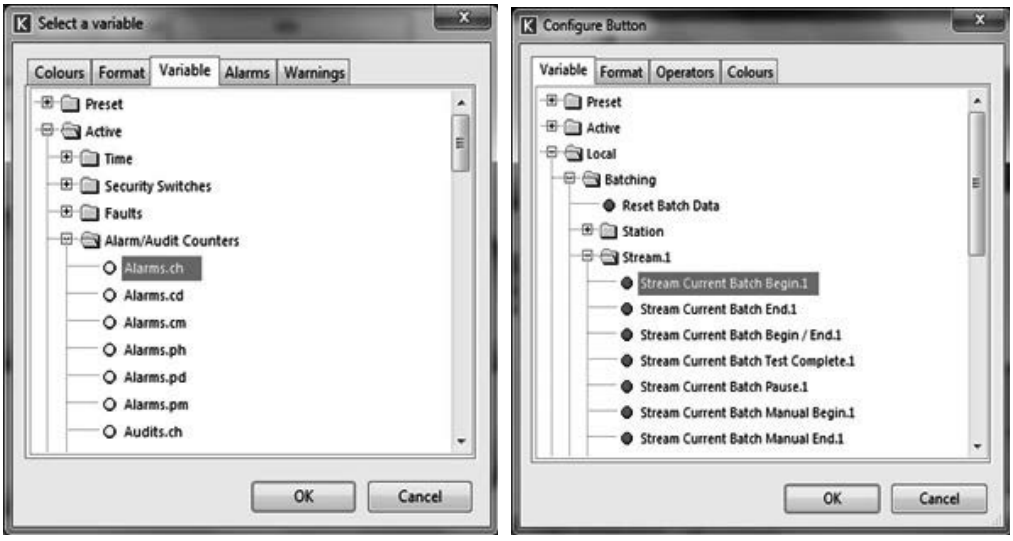


Figure 66 Mimic item configure variable

Select the ID of the variable from the ID list.

6.7.3.7 Format

A few mimic items, such as "variable" and "button" also allow a format to be changed:

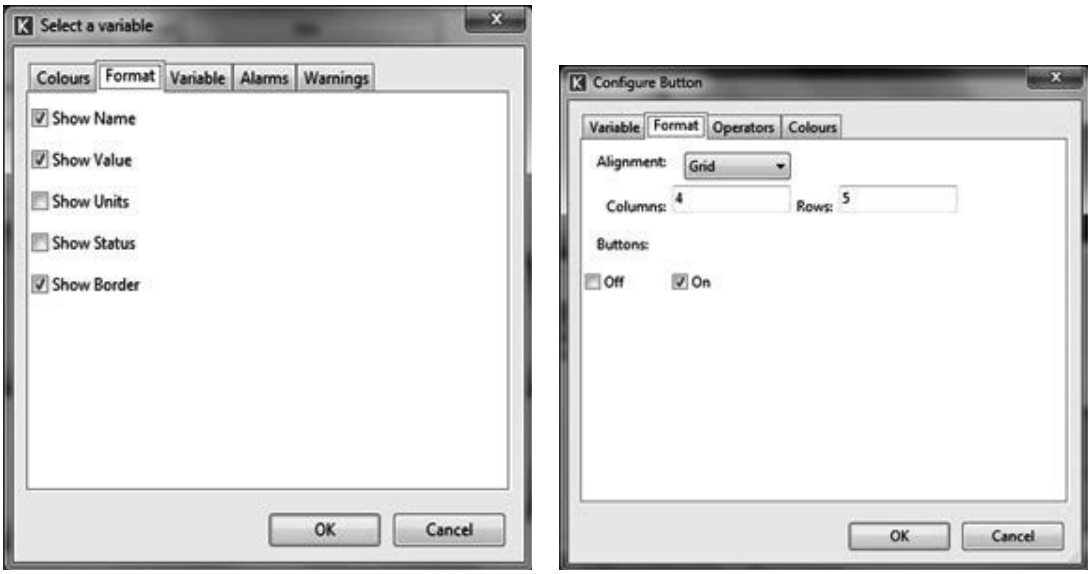


Figure 67 Mimic item configure format for a variable and for a button

The configuration page is different for the mimic item:

Variable	Click the checkbox if the name, value, units, status and/or border must be shown
Button	Define with clicking the checkbox what button(s) must be shown: off or on or both. In case both the off and on buttons are clicked, then the alignment is important. Select if the alignment must be horizontal, vertical or grid. For grid include the colums and rows.

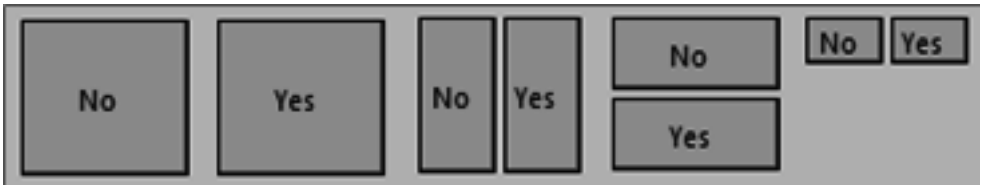


Figure 68 Mimic item configure format for a variable and for a button

In the above case:

Button 1	The no button is clicked
Button 2	The yes button is clicked
Button 3	Both the no and yes buttons are clicked with horizontal alignment
Button 4	Both the no and yes buttons are clicked with vertical alignment
Button 5	Both the no and yes buttons are clicked with grid alignment, 2 columns by 3 rows

6.8 Display templates

As described in the previous chapter, display pages are based on templates. A display template only defines the layout in which variables will be presented and do not contain any values themselves. They will be added in the display itself.
Multiple items may be added to a maximum of 20.
A few templates, 10 centre, 8 centre and 4 centre are system templates and cannot be changed.

The rest of the templates are user defined and configured similarly to a mimic diagram:

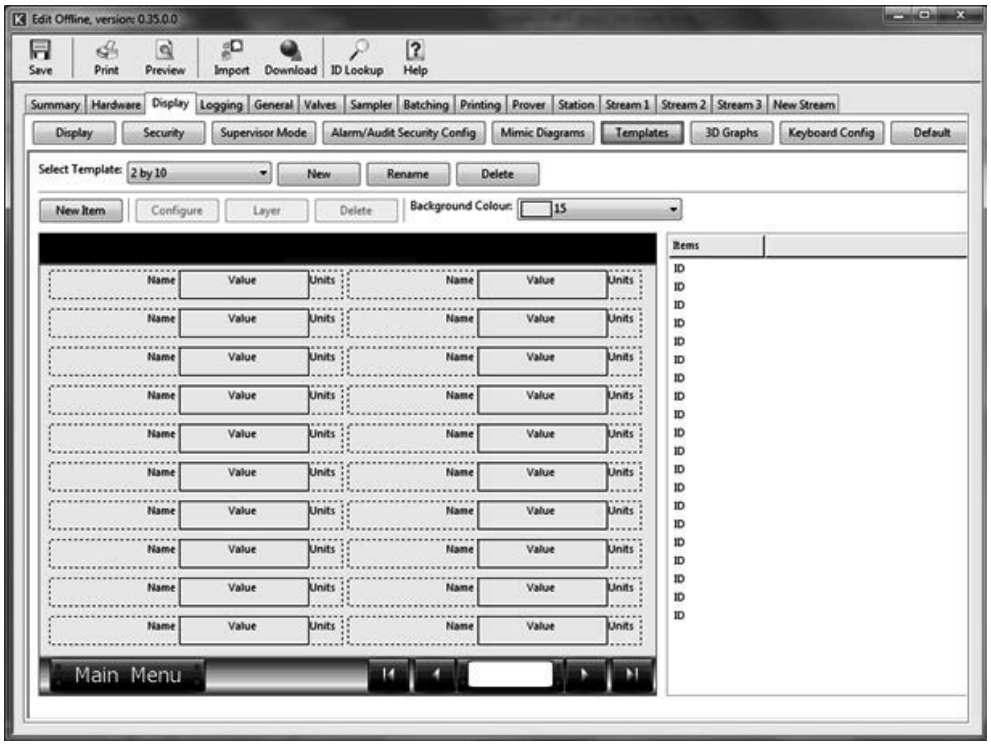


Figure 69 Display templates

6.8.1 Template selection

The top part of the display defines the template as a whole:

Figure 70 Create a template

With as functions:

Select an existing template Press “select template” to select a template from the existing templates

Create a new template	Press “new” to create a new template from a blank, see below
Rename an existing template	Press “rename” to change the name of the template
Delete a template	Press “delete” to remove the template. Note that there is no warning.

For a new template press new. Off course a template should be given a descriptive name to easily identify it.

Figure 71 New display template

Once created, the following main functions can be used to create and display the template:

Figure 72 Create a mimic display canvas

Set the background colour Choose the background colour from a pallet of colours
Create a new template item Press "new item" to add one item to the canvas, see next chapter.

6.8.2 New template item

By clicking the "new item" button, the page can be populated with items from a list:

Variable	An alphanumeric item
VU meter	A traditional meter with analog dial item
Bar graph	A horizontal or vertical bar graph item
Trend	A real-time trend graph item

Here an example of the 4 different template items:

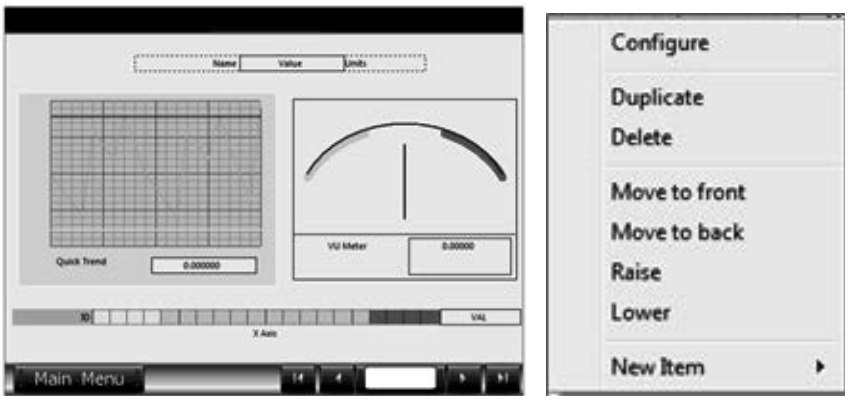


Figure 73 A display template and right mouse click on item

Several functions can be used to draw a complete page:

Move an item(group)	Left mouse click and hold on the middle dot in the item to drag the item
Scale an item	Left mouse click and hold on a side dot in the item to scale the item
Change the order of items	Right mouse click on an item and select move to front/ back or raise/ lower or press the button layer and select move to front/ back or raise/ lower
Duplicate an item(group)	Right mouse click on an item and select duplicate
Delete an item(group)	Right mouse click on an item and select delete or press the button delete
Configure an item	Right mouse click on an item and select configure
	or press the button configure to change the behaviour of the item, see next.
Group items	Pressing the left mouse button, drag a square around items to be grouped Multiple template items can be dragged on the page to complete the page. The layer button can be used to set the order of the different items: which has to be in front and which should be at the back.

To add a variable to the template, select new item then variable. A basic outline will appear on the template.

Left click and hold on the centre dot of this item and it can then be moved.

Left click and hold on one of the corner dots to re-size the item.

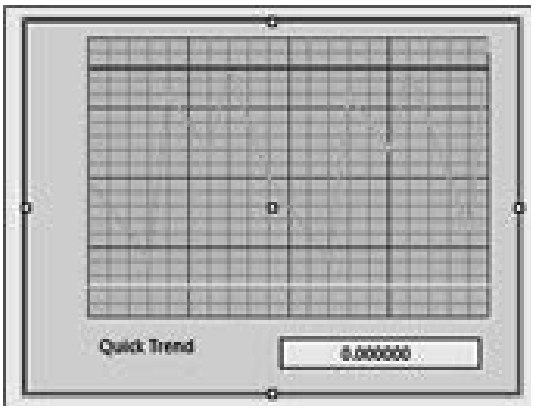


Figure 74 Move and re-size an item

.
Please note that the item now appears in the right hand side item list.

When duplicating an item, the software incorrectly asks if you like to change ID indexes; Use "no change"

6.8.2.1 Variable

The variable item can be used as a place holder for any type of variable:

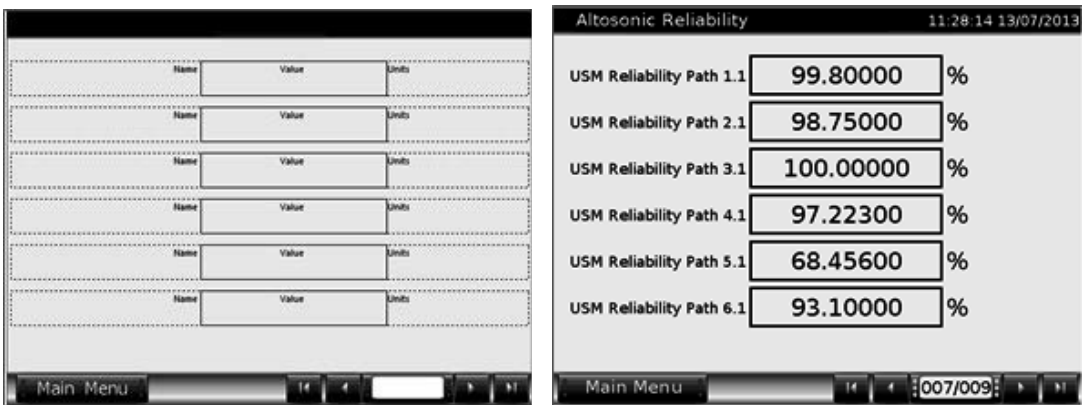


Figure 75 Template: variable configuration and Summit screen

Nothing needs to be configured for a variable.

6.8.2.2 VU Meter

A VU meter is a mimic of an analog panel meter. Multiple meters can be on one page, each with their own settings:

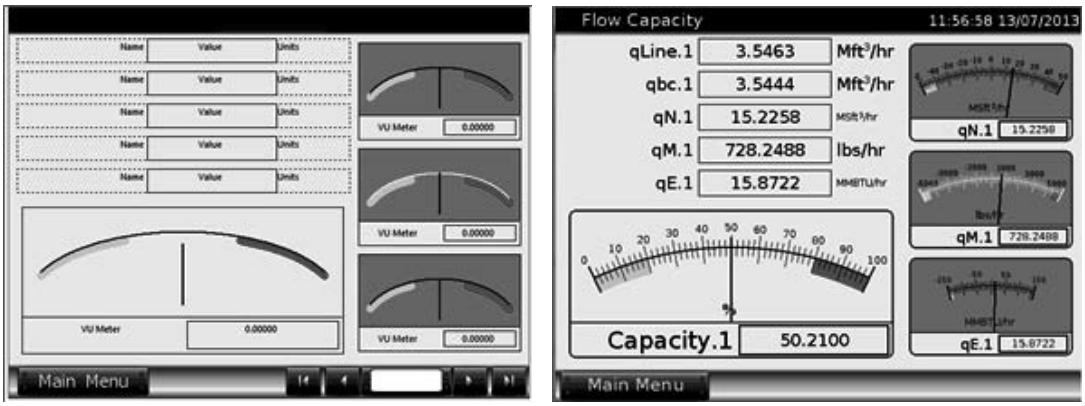


Figure 76 Template: VU meter configuration and Summit screen

The big VU meter below left used the standard settings, the small meter below right uses the settings below.
Right clicking on the VU Meter or pressing “configure”, will bring up the settings:

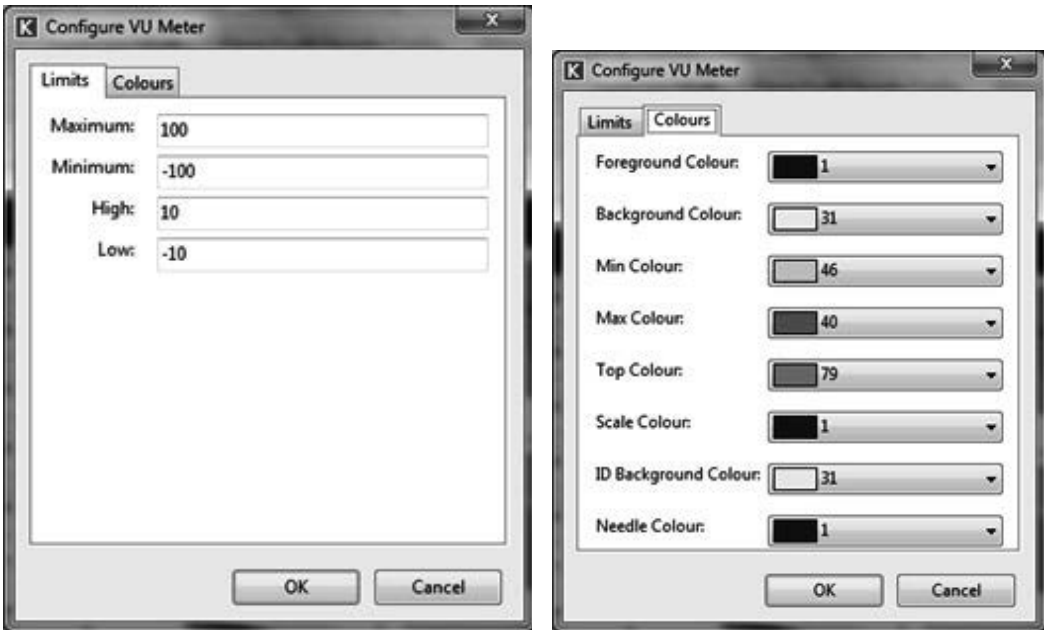


Figure 77 Template: VU meter configure limits and colours

Configure Limits

Maximum	The maximum value for the meter display
Minimum	The minimum value for the meter display
High	The high limit on the meter display
Low	The low limit on the meter display

Configure Colours

Foreground Colour	The Colour for the text of the item and scale
Background Colour	The Colour for the background of the lower meter box with the ID name
Min Colour	The Colour used for a value below the minimum limit
Max Colour	The Colour used for a value above the maximum limit
Top Colour	The Colour used for the background of the top part of the meter
Scale Colour	The Colour for the meter scale.
ID Background Colour	The Colour for the background of the lower meter box with the ID value
Needle Colour	The Colour for the meter needle.

6.8.2.3 Bar Graph

A vertical and horizontal bar graph can be used for one single ID, but can also be configured to have multiple ID's in case the limits and colours are the same:

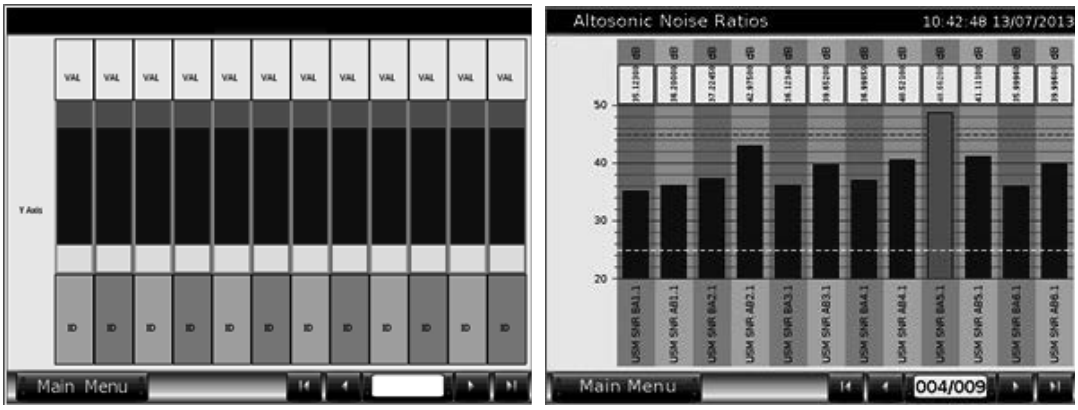


Figure 78 Template: vertical bar graph configuration and Summit screen

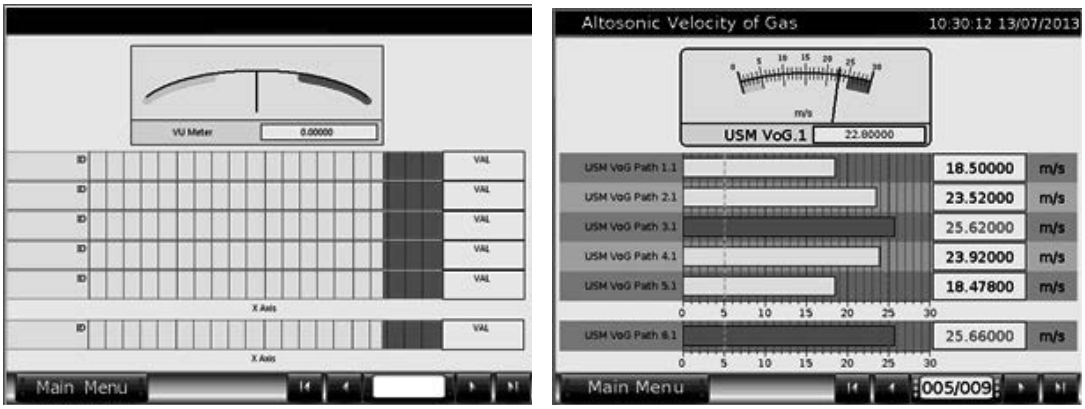


Figure 79 Template: horizontal bar graph configuration and Summit screen

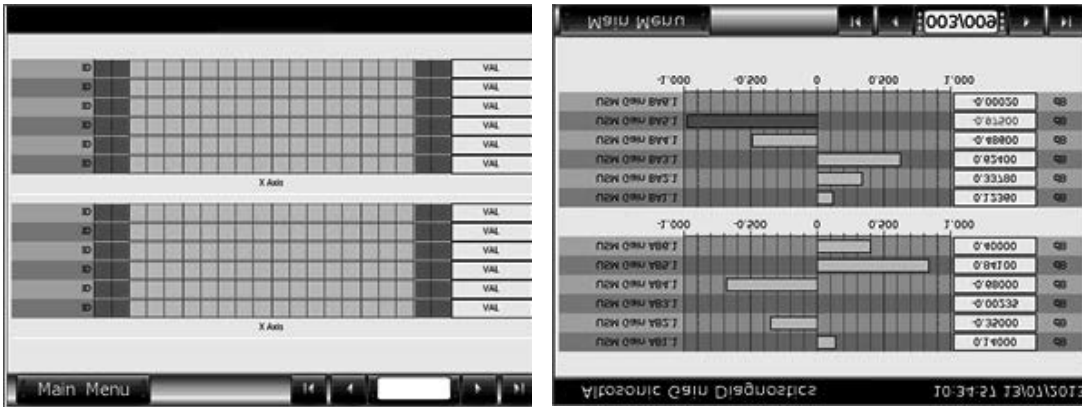


Figure 80 Template: two signed bar graphs for the configurator and Summit screen

Please note that there are odd and even bars. In this case the odd bars have a dark gray, the even bars a light gray background.

The last example, the lower bar graph uses below settings.
Right clicking on the bar graph or pressing "configure", will bring up the settings:

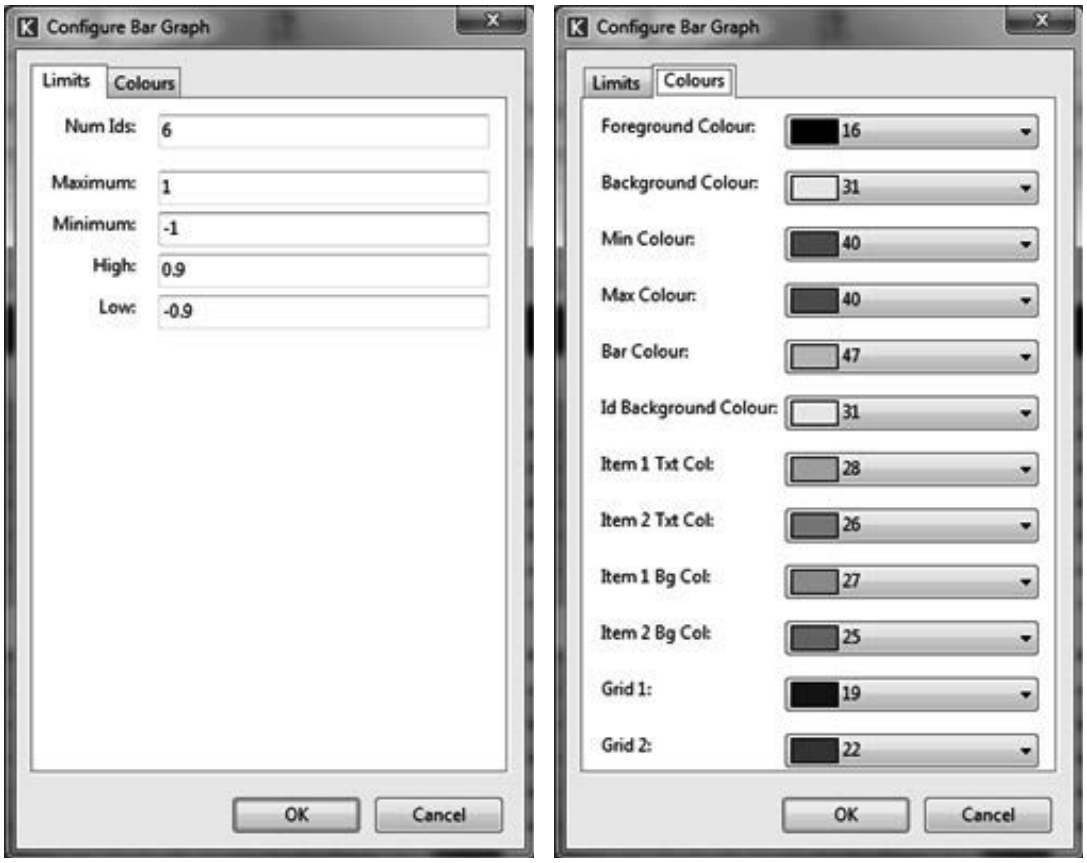


Figure 81 Template: bar graphs configure limits and colours

Configure Limits

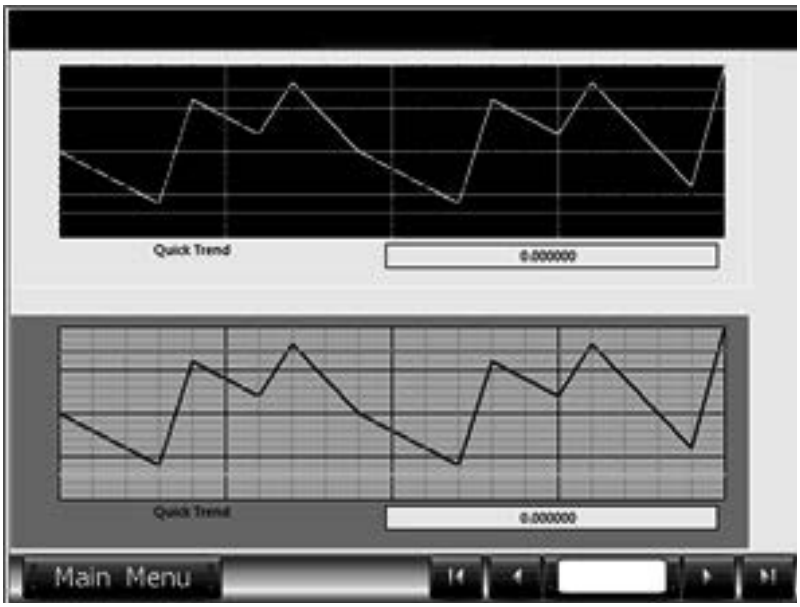
Num ID's	A maximum of 12 bars/variables to be displayed on the graph
Maximum	The maximum value for the bar graph
Minimum	The minimum value for the bar graph
High	The high limit on the bar graph
Low	The low limit on the bar graph

Configure Colours

Foreground Colour	The colour for the text of the item
Background Colour	The background colour of the horizontal or vertical axis
Min Colour	The colour used for a value below the minimum limit
Max Colour	The colour used for a value above the maximum limit
Bar Colour	The colour for the Bar when normal (between min and max).
ID Background Colour	The background colour of the ID value box
Item 1 Txt Colour	The text colour on each odd bar
Item 2 Txt Colour	The text colour on each even bar
Item 1 Bg Colour	The background colour for each odd bar
Item 2 Bg Colour	The background colour for each even bar
Grid 1	The colour for the minor grid lines
Grid 2	The colour for the major grid lines

6.8.2.4 Trend

A trend is electronic pen writer which is blank and start writing at the moment a page is opened.



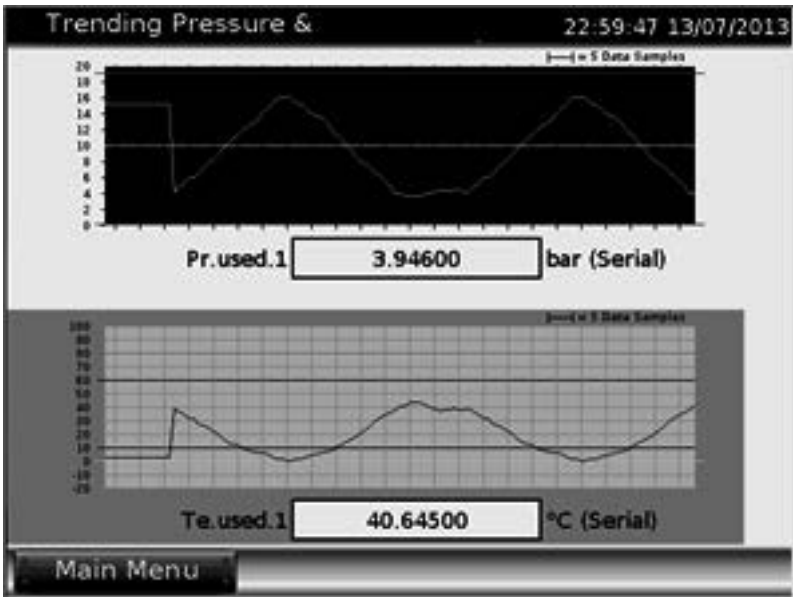
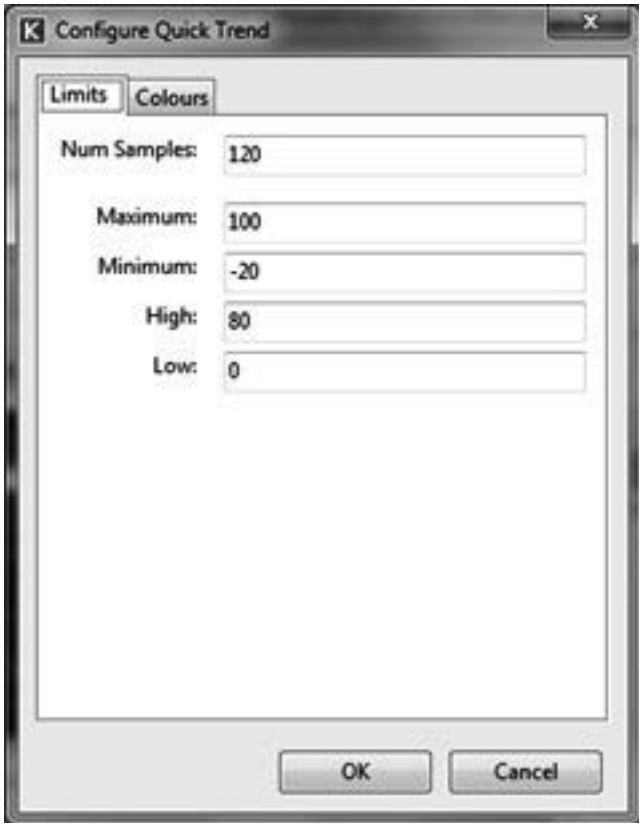


Figure 82 Template: trend configuration and Summit screen

Below the configuration of the lower trend:
Right clicking on the trend or pressing “configure”, will bring up the settings:



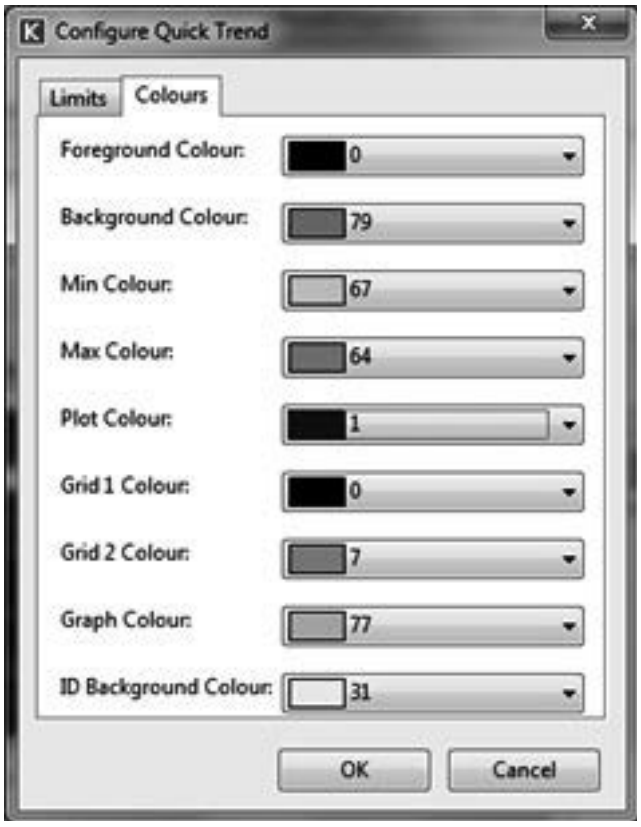


Figure 83 Template: trend configure limits and colours

Configure Limits

Num samples	The number of samples on the trend graph (seconds if the cycle time=1)
Maximum	The maximum value for the trend graph
Minimum	The minimum value for the trend graph
High	The high limit on the trend graph
Low	The low limit on the trend graph

Configure Colours

Foreground colour	The colour for the text of the item
Background colour	The background colour of the variable box
Min colour	The colour used for a value below the minimum limit
Max colour	The colour used for a value above the maximum limit
Plot colour	The pen colour for the trend.
Grid 1 colour	The colour for the major grid lines
Grid 2 colour	The colour for the minor grid lines
Graph Colour	The colour for the background of the graph area
ID background colour	The background colour of the ID value box

6.9 3D Graphs

A 3D graph is an excellent way to present a lot of data in an X-Y chart or an X-Y-Z chart. The actual chart can be build up from sets of X-Y-Z values, but can also be X-Y-Z data from variables. These variables may be dynamic or static.

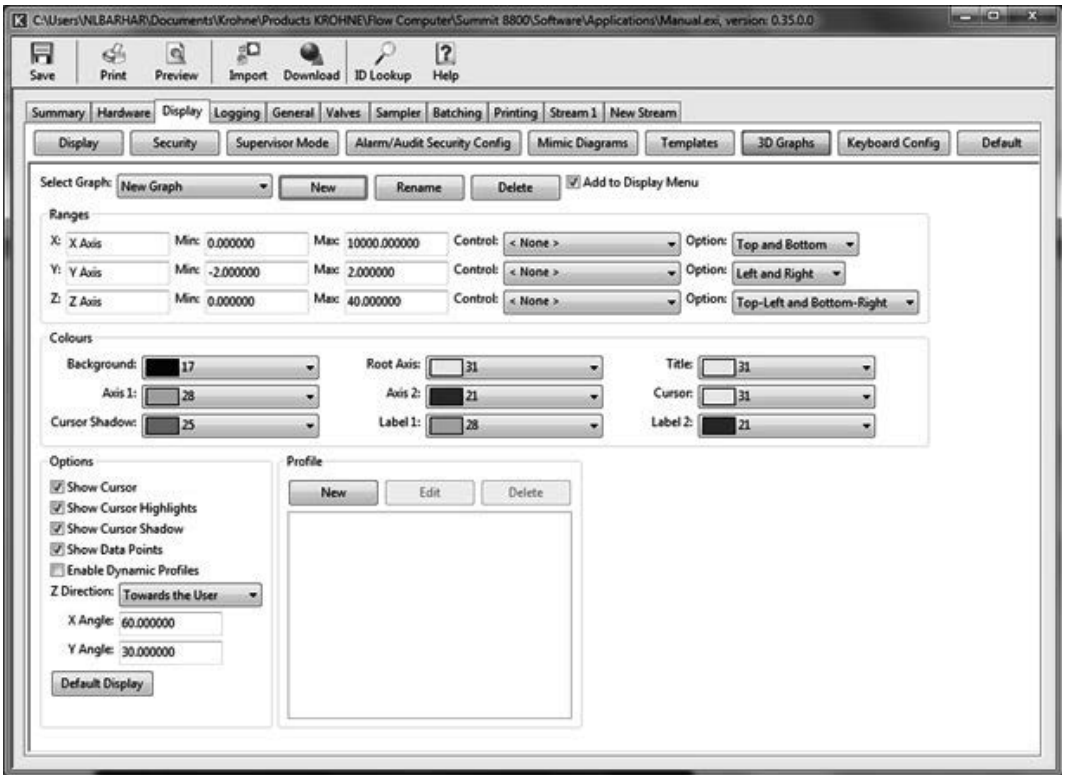


Figure 84 3D graph settings

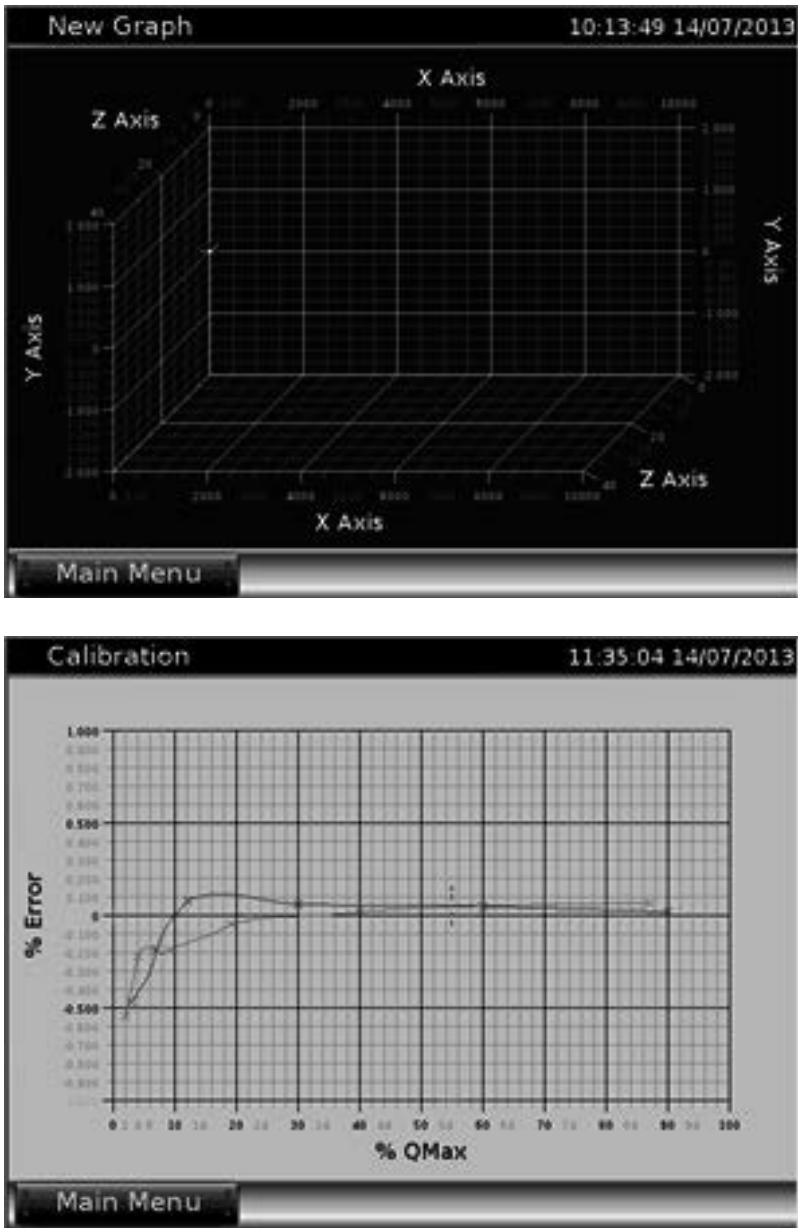


Figure 85 Summit 3D graph; X-Y-Z and X-Y chart example

6.9.1 Graph selection

The top part of the display defines the graph as a whole:

Figure 86 Create a mimic display canvas

With as functions:

Select an existing graph	Press “select graph” to select a graph from the list of existing graphs
Create a new graph	Press “new” to create a new graph from a blank or template, see below
Rename an existing graph	Press “rename” to change the name of the graph
Delete a graph	Press “delete” to remove the graph. Note that there is no warning.
Add to display menu	If checked, this graph will be placed in the menu item “supervisory” If not checked, the graph can be used as a display page.

A new mimic can be created and must be given a name:

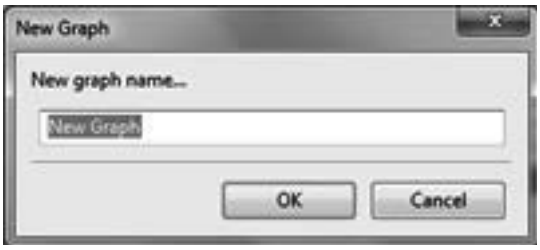


Figure 87 New graph display

Once created, the graph settings and options can be specified. In this case they refer to the above X-Y chart:

6.9.2 Graph settings and options

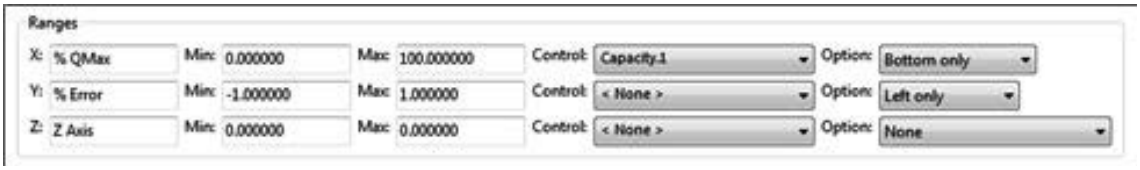


Figure 88 New graph range settings

Range settings:

X-Y-Z	The name of the axis
Min	The minimum value of the axis.
Max	The maximum value of the axis. If for Z min and max are the same, then it is a X-Y graph.
Control	The current value of the ID will be a cursor going over the curve (sie 46% in above X-Y curve)
Option	The location of the axis: on both sides or only one, and which side

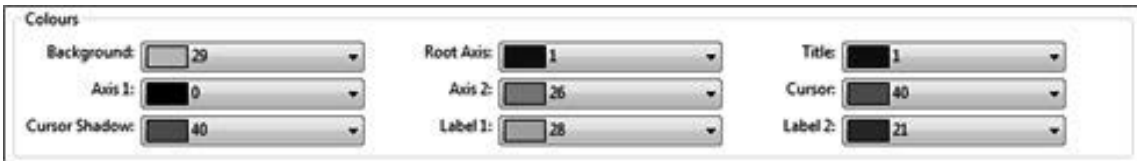


Figure 89 New graph colour settings

Colour settings:

Background	The background colour for the whole graph
Root axis	The colour of the base of the axes (at minimum value)
Title	The colour of the name of the axis
Axis 1	The colour for the major grid lines
Axis 2	The colour for the minor grid lines
Cursor	The colour of the cursor
Cursor shadow	The colour of the shadow of the cursor as it is projected on the axes
Label 1 and 2	Not (yet) in use.

Figure 90 New graph options

Options:

Show cursor	Show the cursor with live values as defined under control
Show cursor highlights	Show the position of the cursor as it is projected on the curves
Show cursor shadow	Show the position of the cursor as it is projected on the axes
Show data points	Show the given data points in the curve as an “x”
Enable dynamic profiles	Normally the graph will be build when the page is accessed. Dynamic means that the graph will be updated continuously. This will take more processing power.
Z direction	Defines the direction of the Z-axis (towards or away from the user) and its angle
Default display	Press when page must be displayed when the screen is not used for a period of time

6.9.3 3D graph profile

Up to 12 profiles can be defined for one graph, each defining a curve for the graph.

For example, profile 1 can be a curve of flow rate (X) against error (Y). Profiles 2 and 3 could be the same curve at different pressures.
These curves can be presented in an X-Y graph or X-Y-Z graph depending on the min and max values in Figure 88: if min and max are the same an X-Y graph will be shown, otherwise an X-Y-Z graph will be shown.

Each profile can be:

Created	Press new
Changed	Select the profile and press edit
Removed	Select the profile and press delete

Figure 91 New graph profile

Then the next window will appear with on top::

Figure 92 Graph profile, Top

With as settings:

Colour	The colour of the graph associated with this profile
Data format	Select if the curve should be based on values to be entered or on variables in the ID list

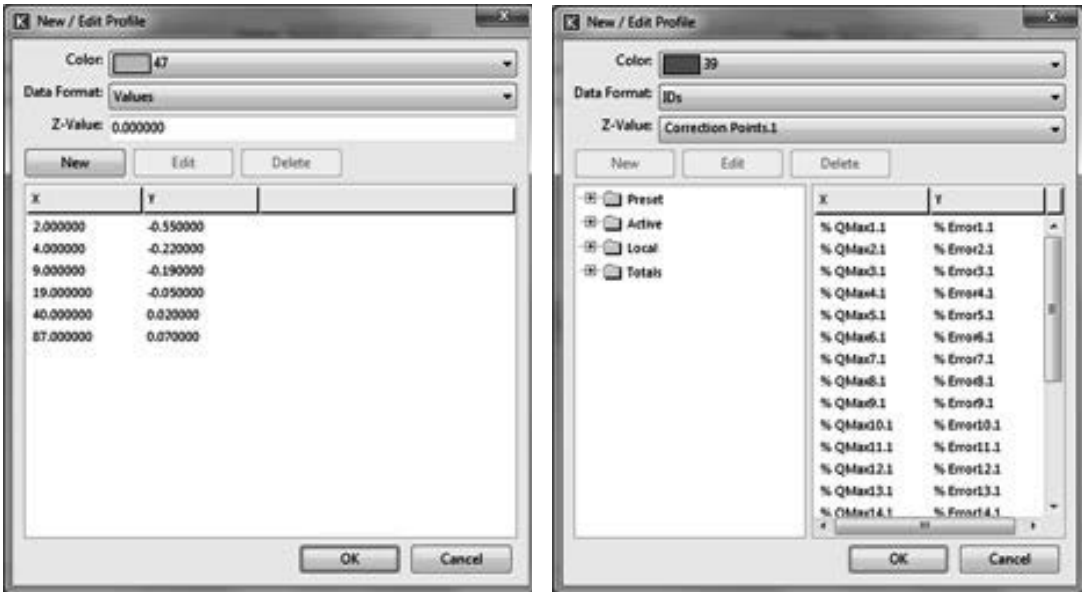


Figure 93 Graph profiles for value and ID's

Depending on the data format selected the following is needed to fill the profile's curve data:

6.9.3.1 3D graph profile values

Per profile multiple one Z-value and multiple lines of X-Y value pairs can be entered:

Figure 94 Graph profile, enter the X-Y pair for one line

Together all values in this profile form one curve.

An X-Y pair can also be changed (press edit) or removed (press delete)

6.9.3.2 3D graph profile ID's

Per profile multiple one Z-variable can and multiple lines of X-Y variable pairs can be dragged-in from the ID tree.

Together all values in this profile form one curve.

A X-Y pair can also be changed (press edit) or removed (press delete)

6.10 Keyboard Configuration

The keyboard is needed to enter the supervisory password. The problem that many country have different keyboard layouts can be solved by fully customizing a keyboard starting from a blank or a QWERTY (UK English) type keyboard:

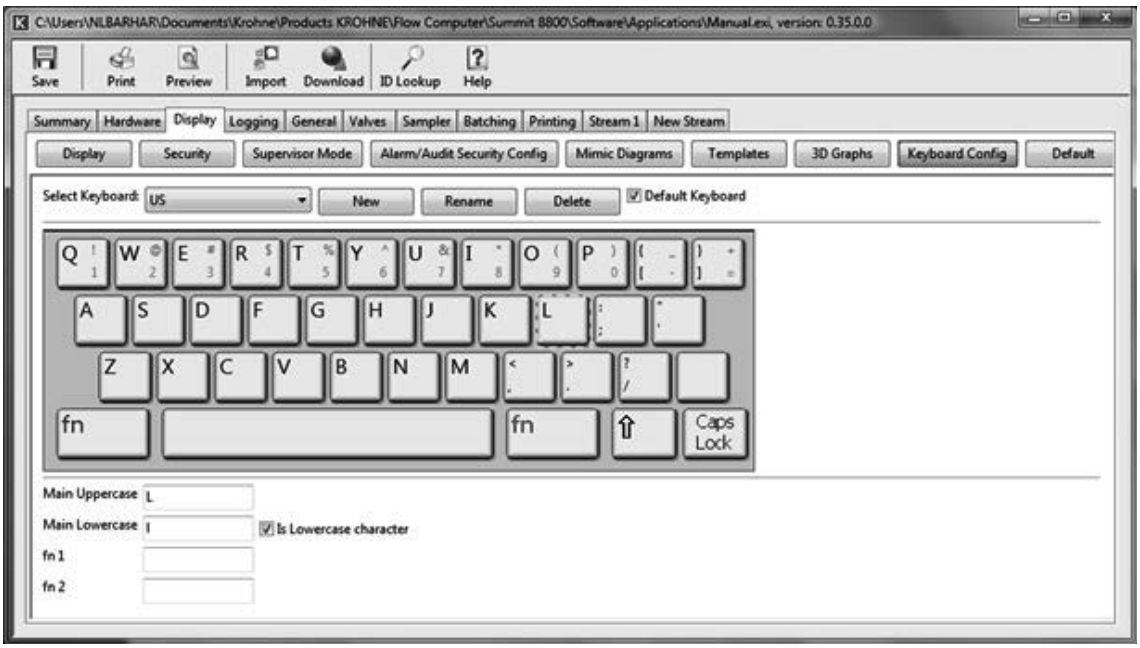


Figure 95 Display keyboard customisation and use

The top part of the display defines the keyboard as a whole:

Figure 96 Create a keyboard

With as functions:

Select an existing keyboard	Press “select keyboard” to select a keyboard from the list
Create a new keyboard	Press “new” to create a new keyboard from a blank or QUERTY, see below
Rename an existing keyboard	Press “rename” to change the name of the keyboard
Delete a keyboard	Press “delete” to remove the keyboard. Note that there is no warning.
Default keyboard	If checked, this keyboard will be the default keyboard

A new keyboard can be created from blank or QWERTY and must be given a name :

Figure 97 New display keyboard

After highlighting a key, four possible characters can now be assigned to the key by entered either directly from the keyboard or by entering a unicode number in the appropriate box:

Figure 98 Display keyboard, key definition

The four character are:

Main uppercase	Character when shift is pressed or when caps lock is on
Main lowercase	Character when shift is not pressed and caps lock is off
Function 1 (blue) Fn1	Character when blue fn is on
Function 2 (red) Fn2	Character when red fn is on.

The supported character set conforms to MES-2 and comprises most common, Latin, Greek and Cyrillic extensions (1013 characters).

For instance a French keyboard could look like:

Figure 99 Display French keyboard in configuration and on the Summit

6.11 Default

Any page that is shown on the main menu can be selected to be the default page; this is a specific screen which the screen will show after a certain time of inactivity on the Summit touch screen. This can be a "screen saver", but more often this will be an important overview screen.

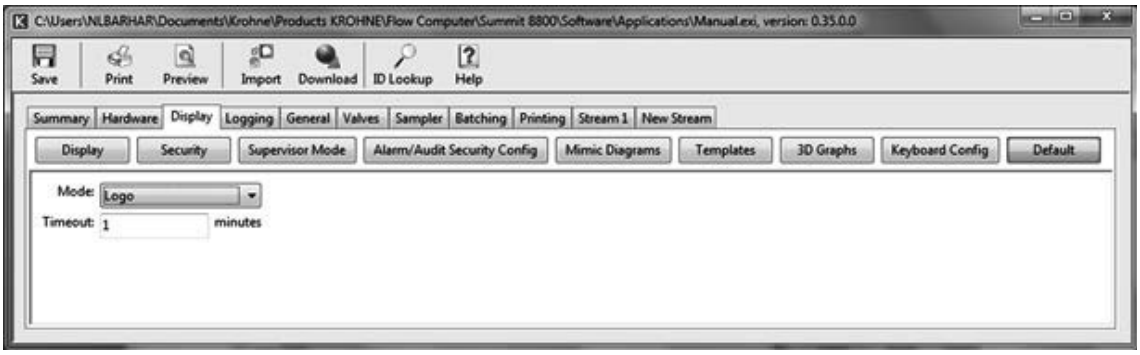


Figure 100 Display default configuration

The settings are:

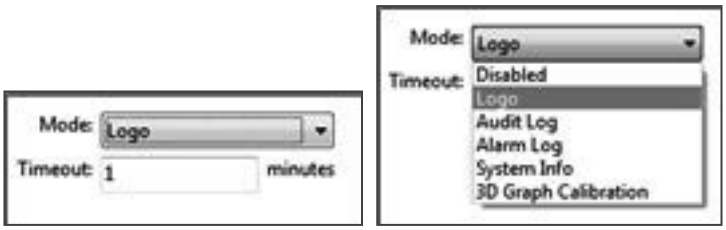


Figure 101 Display default settings

Configure the display default:

Mode	Select one of the pages in the list. See later
Timeout	The time after inactivity when to jump to the default page

The pages in the mode list are normally the system pages. If the desired page is not shown in the list then it can be added. On the mimic panel window and on option part of the 3D graphs window there is a button “set as default” to do so. On the display pages, right mouse click on the desired page and select “set as default” .

6.12 Translation to local language

English is the default language for the Summit, but it is possible to define a new language. This can be done in the configurator:

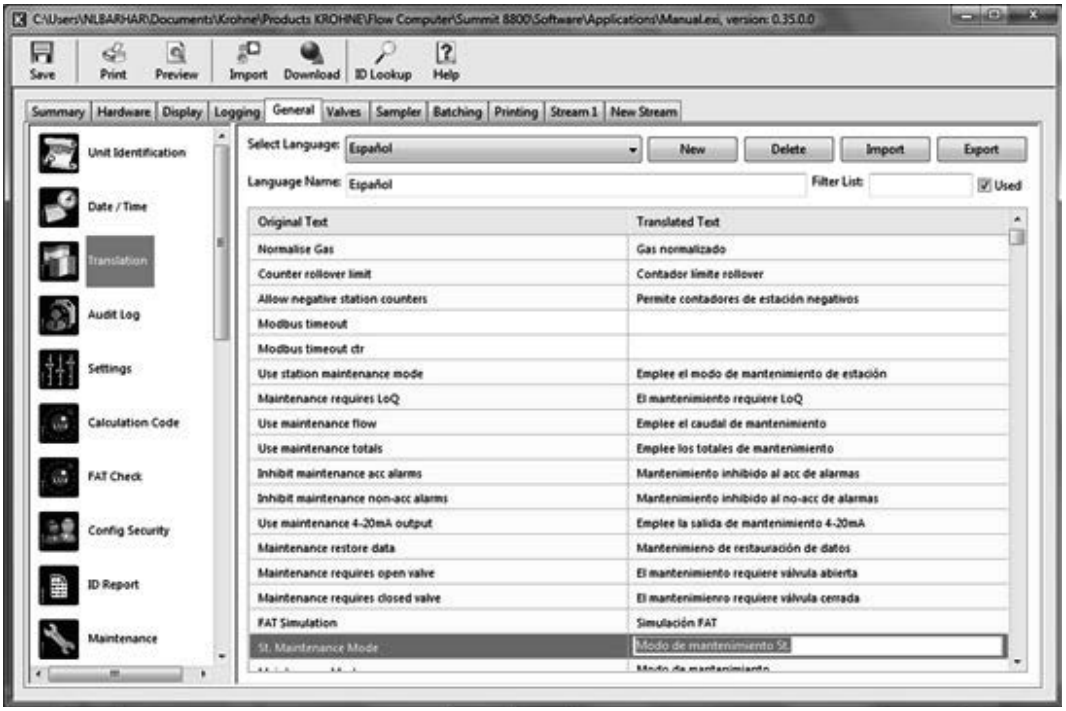


Figure 102 Translation to Spanish

In the Summit, the language can then be selected under “settings/ display settings”:

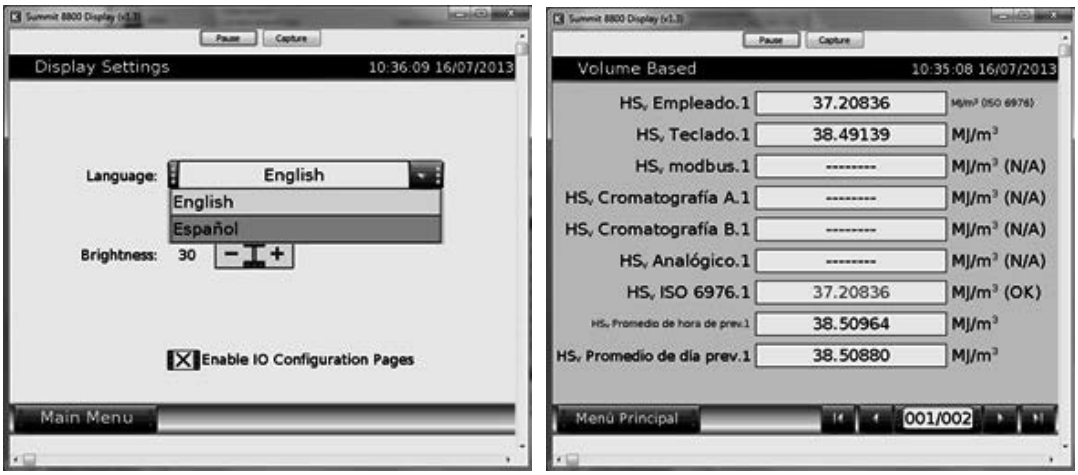


Figure 103 Selection of Spanish

The top part of the display defines the language as a whole:

Figure 104 Create a language

With as functions:

Select an existing language	Press “select language” to select a language from the list
Create a new language	Press “new” to create a new language
Delete a language	Press “delete” to remove the language. Note that there is no warning.
Import a language	Press “import” to read a language file from disk. See below
Export a language	Press “export” to write a language file to disk. See below

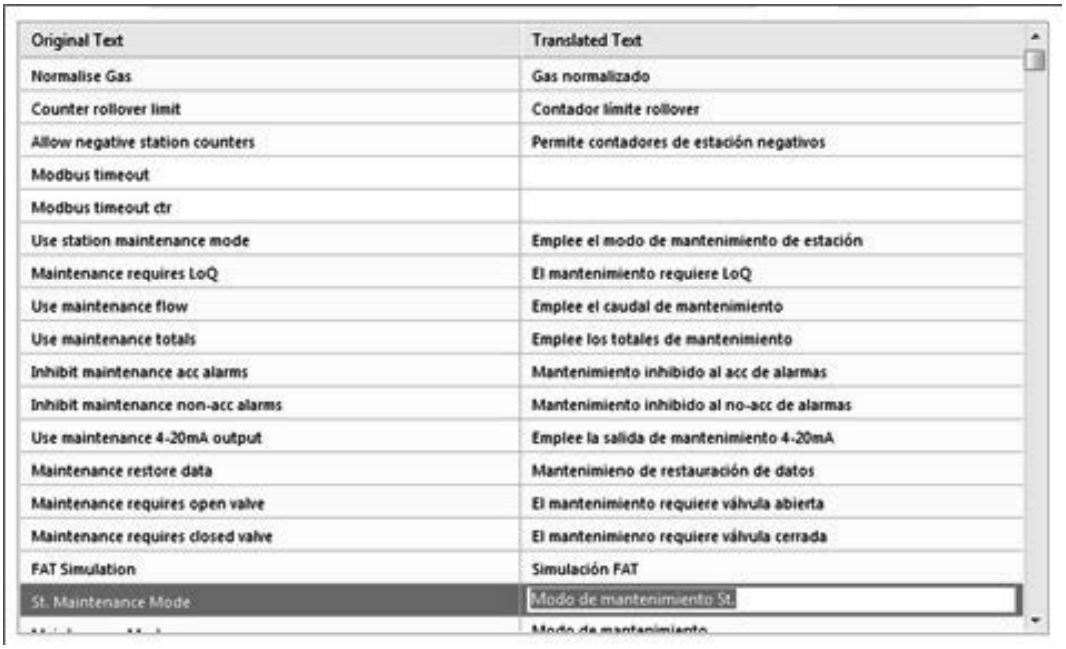
The second line of the display is:

Figure 105 Name and search a language

With the following fields:

Language name	The name for the new language
Filter list	Enter a English text string to find it or reduce the length of the the list below.
Used	Check if this language should actually be used in the Summit

Than the actual list of all text to be translated appears:



Original Text	Translated Text
Normalise Gas	Gas normalizado
Counter rollover limit	Contador límite rollover
Allow negative station counters	Permite contadores de estación negativos
Modbus timeout	
Modbus timeout ctr	
Use station maintenance mode	Emplee el modo de mantenimiento de estación
Maintenance requires LoQ	El mantenimiento requiere LoQ
Use maintenance flow	Emplee el caudal de mantenimiento
Use maintenance totals	Emplee los totales de mantenimiento
Inhibit maintenance acc alarms	Mantenimiento inhibido al acc de alarmas
Inhibit maintenance non-acc alarms	Mantenimiento inhibido al no-acc de alarmas
Use maintenance 4-20mA output	Emplee la salida de mantenimiento 4-20mA
Maintenance restore data	Mantenimieno de restauración de datos
Maintenance requires open valve	El mantenimiento requiere válvula abierta
Maintenance requires closed valve	El mantenimienro requiere válvula cerrada
FAT Simulation	Simulación FAT
St. Maintenance Mode	Modo de mantenimiento St.

Figure 106 Language configuration

For each line to be translated, the target language will be typed in on the right. This is fine, if for a project some operator screens must be translated. In that case it is enough to only translate a selected few lines, all the others will still use English.

However the full translation includes almost 40.000 lines, although not all line need translation. Therefore more often, actual translation will be done outside the configurator, e.g. in Excel by exporting and importing the language file.

6.12.1 Importing a language file

It is possible to import a language from a disk. KROHNE has at this moment translation files for:

- Spanish
- German

Others will become available in time. Please check for availability. Press import to get the file:

Figure 107 Import a language file

6.12.2 Change a language in Excel

When pressing export, the name and location of the language file can be chosen. If there is already a language in the configurator, then the select which language you would like to export:

Figure 108 Select language to be exported

Select:

Yes	To export the default English language text list
No	To export the selected language text list

The file type is CSV with a comma as a separator. To import this into Excel choose “Open”, choose “Text files” and select the correct directory and file to import:

The text import wizard will start. The only change to be made is on the second page: change “Tab” into “Comma”

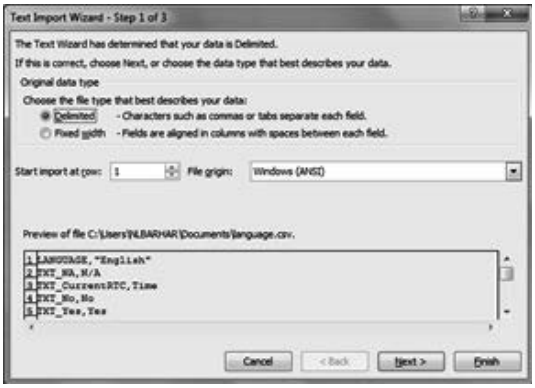


Figure 109 Converting a language file in Excel

To change the language, translate the second column. Here search and replace may be helpful, but be careful to use it correctly as it might change the wrong words.

KROHNE can also provide an Excel file which uses Google translate to change the different lines, but this will never give the quality results needed, so it can only be used as a guide while translating.

When translated, In Excel use save as, choose the file type "CSV (Comma Delimited)" and select the correct directory and file to save:

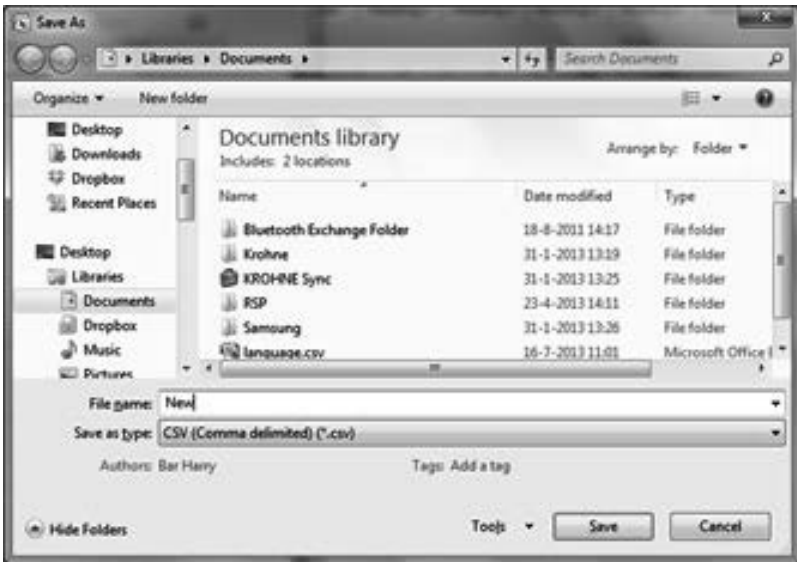


Figure 110 Save as an Excel language CSV file

Then use the configurator Import function to get the new language.

6.13 Web access

The Summit has a build-in web server which provides read-only access to all the displays and allows download of ID reports of active data and of alarm and audit logs (for details, see volume 1). The web site can be accessed by entering its IP address in the browser when web access is enabled:

,

Figure 111 Web access enabled

Assuming the standard setup for Ethernet, this would default be: //192.168.0.100 or any address defined. If a dual Ethernet is used, then even the displays can be viewed (read-only) via the website:

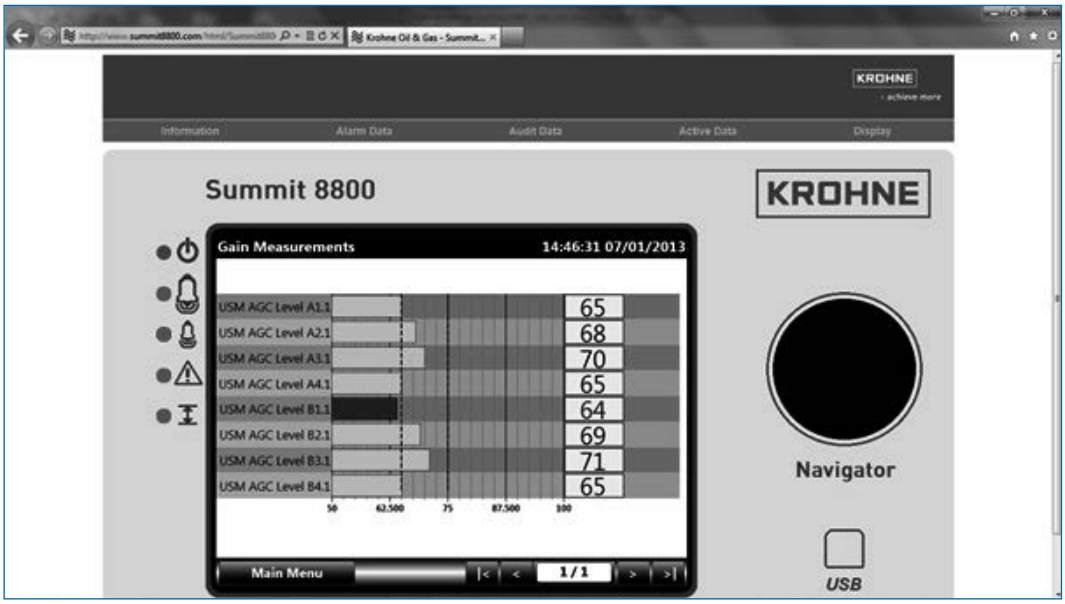


Figure 112 Web access

Setting up web access is very easy as all Summit displays can also be used in the web browser, as they are automatically converted to HTML-5 pages. The only exception is the 3D graphic pages that will not work (yet). All it needs is defining an Ethernet port and enabling the HTTP or Hypertext Transfer Protocol:

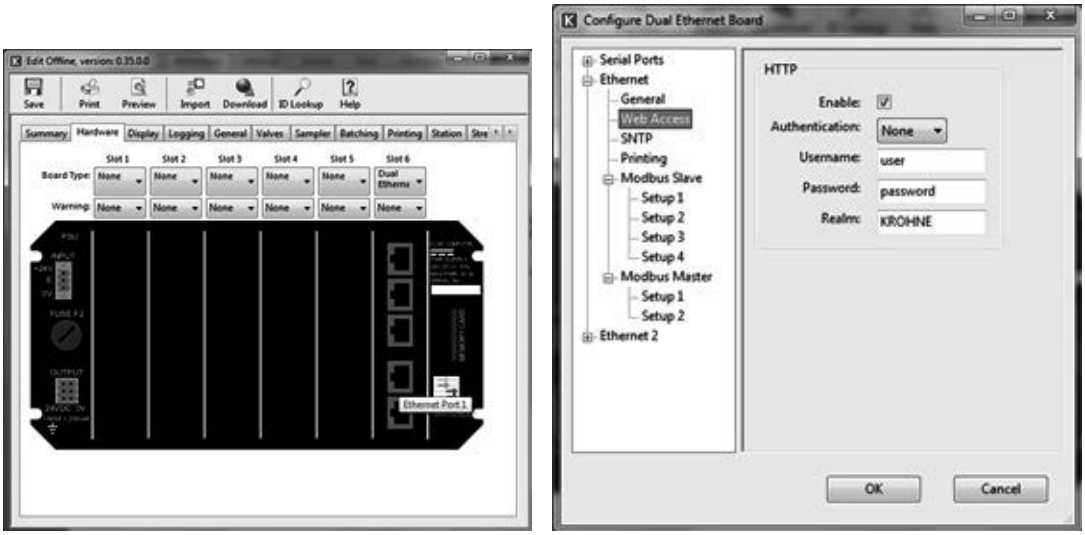


Figure 113 Web access setup for Ethernet port 1

Select the enable tick box to activate the functionality and enter the following details:

Enable	Click the box to enable web access via HTTP
Authentication	Choose “basic” if login is required, otherwise choose “none”
User name	The user name which needs to be entered during login
Password	The password which needs to be entered during login
Realm	The group the user belongs to

The Summit has several ways to report metering information:

- Serial reports
  Ticket printing via a serial port to a black and white, non-graphical printer
- Ethernet reports
  FTP printing via Ethernet to a black and white or colour graphic printer
  E-mailing via Ethernet to a mail server
  XML electronic reporting via FTP to a computer disk
- Download reports
  ID reports via an Ethernet download from a web site or read by the configuration program

Ticket printing can only handle fixed-width or non-proportional characters and printers with RS 232/ 485 serial links. This is ideal for simple panel mounted dot matrix printers.
More modern printers are typically Ethernet based and can handle coloured and proportional fonts. For this FTP printing is more appropriate.

7.1 Serial ticket printing

A ticket printer can be connected to any of the serial ports, but some of the dot matrix printers need a hardware handshake as is available on port 1 of the Ethernet boards:

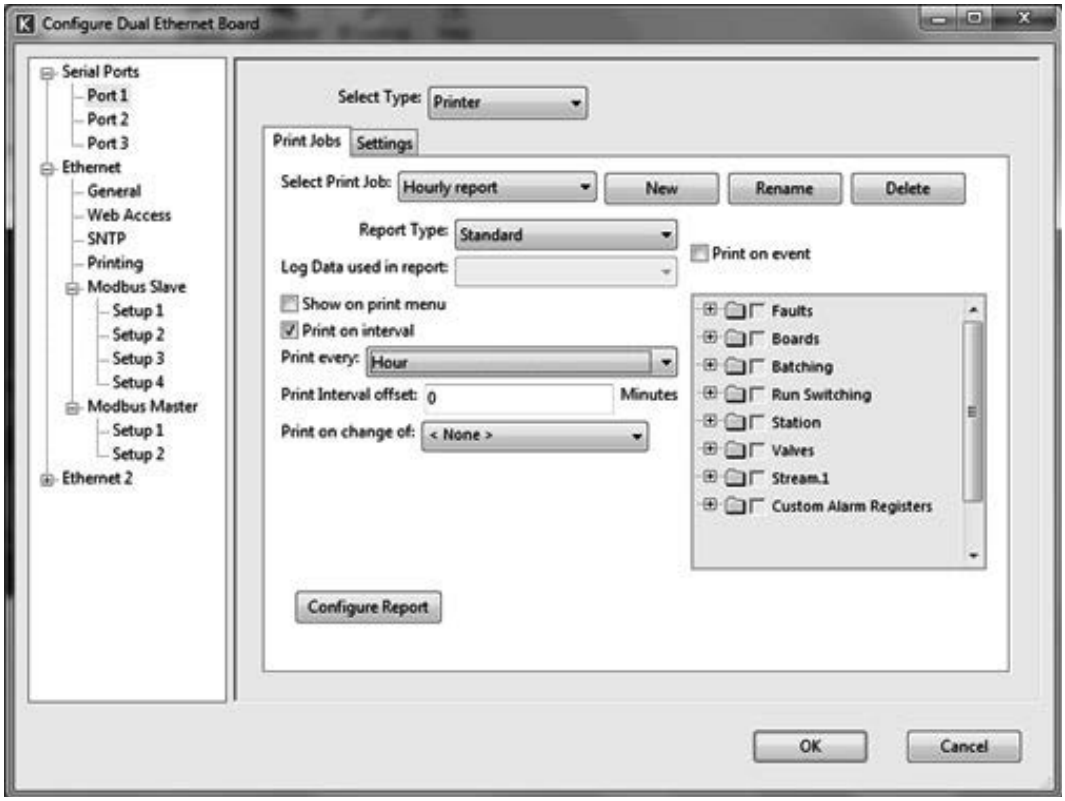


Figure 114 Ticket printer

7.1.1 Serial port settings

Set the serial port to match the printer:

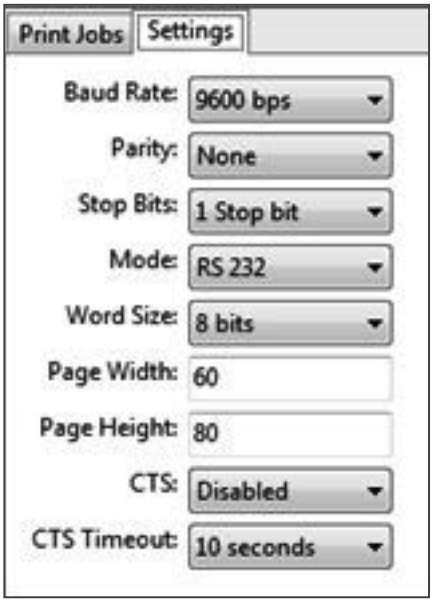


Figure 115 Ticket printer settings

Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of 1 word: 7 or 8 bits
Page width	The height in lines of the paper in the printer. Maximum 255.
Page height	The width in characters of the paper in the printer. Maximum 255.
CTS	Select if handshaking using the Clear To Send line on the RS232 link.
CTS timeout	If handshaking is used, then define the maximum time should be waited before giving an alarm when the printer is not getting ready.

7.1.2 Print jobs

The print Jobs page defines the configuration of the items to be printed and the circumstances:

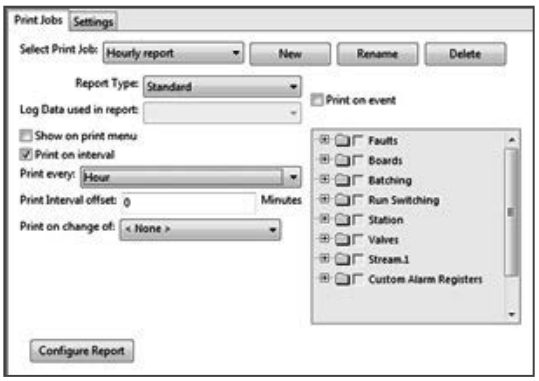


Figure 116 Ticket printer print jobs

There is no limit to the number of print jobs that can be created, each theit own name:

Figure 117 Ticket printer print jobs

With as functions:

Select an existing job	Press “select language” to select a job from the list
Create a new job	Press “new” to create a new job
Rename a job	Press “rename” to change the job name
Delete a job	Press “delete” to remove the job. Note that there is no warning.

The content of a report can be based on the standard variables or on data log values. To be able to re-print the report, it is a good idea to base the report on a data log of print data.

Determine the report type:

Figure 118 Ticket printer print jobs

Report typeIn a standard report, only the row (or record) selected will be printed. In a row based report, the user can choose which row to print.
Log data used in report Select an existing data log from the list

Determine when to print the report:

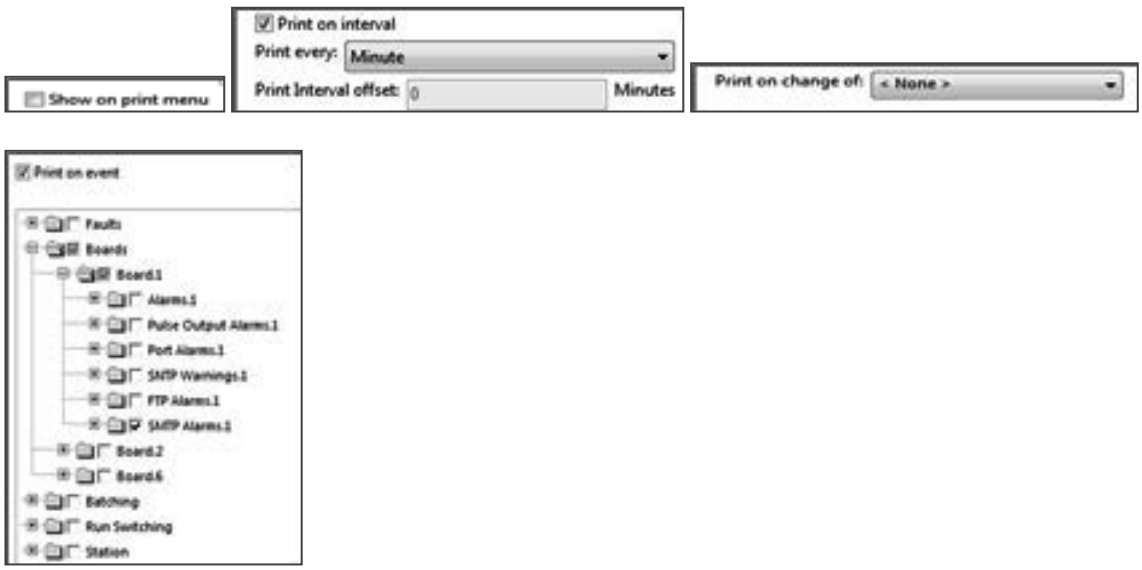


Figure 119 Ticket printer print conditions

There are 4 conditions to start the job:

Manually via the print jobs screen at the SUMMIT 8800	
Show on print menu	Click if the job must be show in print menu of the main menu for manual trigger
On interval, to print the job at a regular time intervals	
Print every	Select the interval between two reports from the list
Print interval offset	Delaying a print by the offset time to prevent 2 Summits printing at the same time.
On change of state of a variable	
Print on change of	Select the variable ID from the list. Care should be taken when selecting the ID as a print will be generated on each change in state.
On an event, like a fault or alarm	
Event variables	Tick on the ID tree one or more boxes on which the event print should occur.

7.1.3 Configure report

To start making the actual content of the report press configure report:

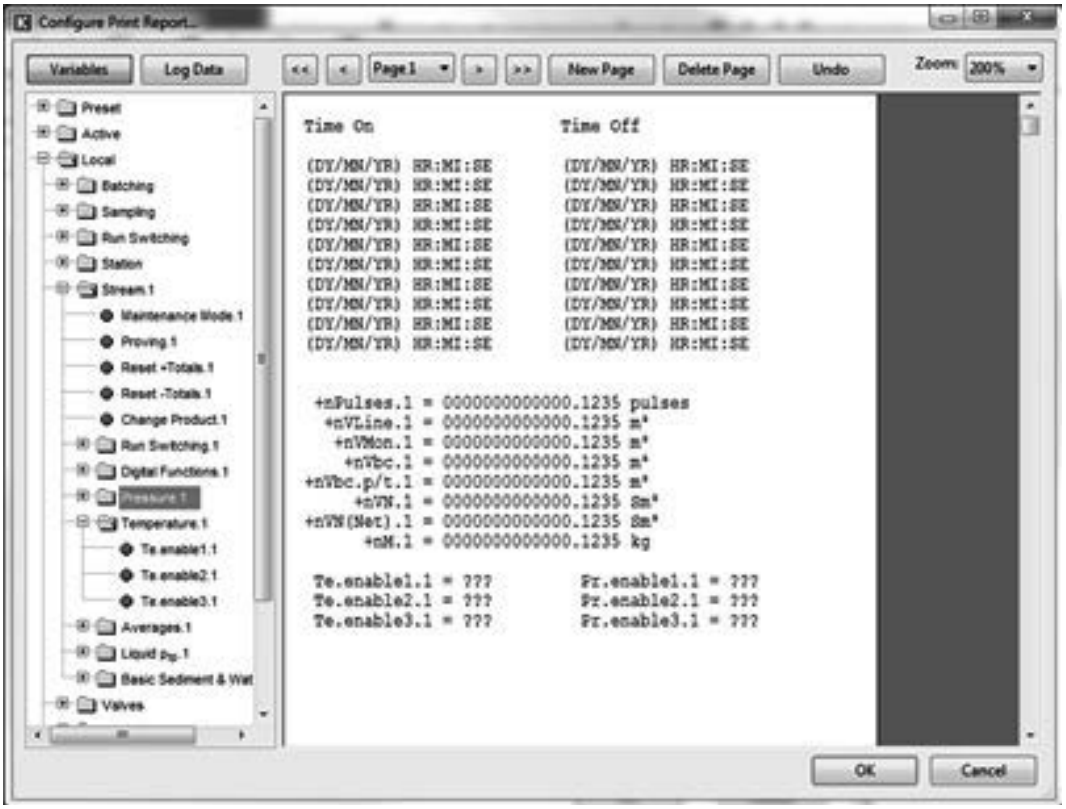


Figure 120 Configure reports

On the right hand side there is the report which will normally be blank for a new report. Now it is possible to drag items from the variable tree on the left hand side to create a report as shown. Items can come from the real-time variables or from the data log and may include alarm and audit data:

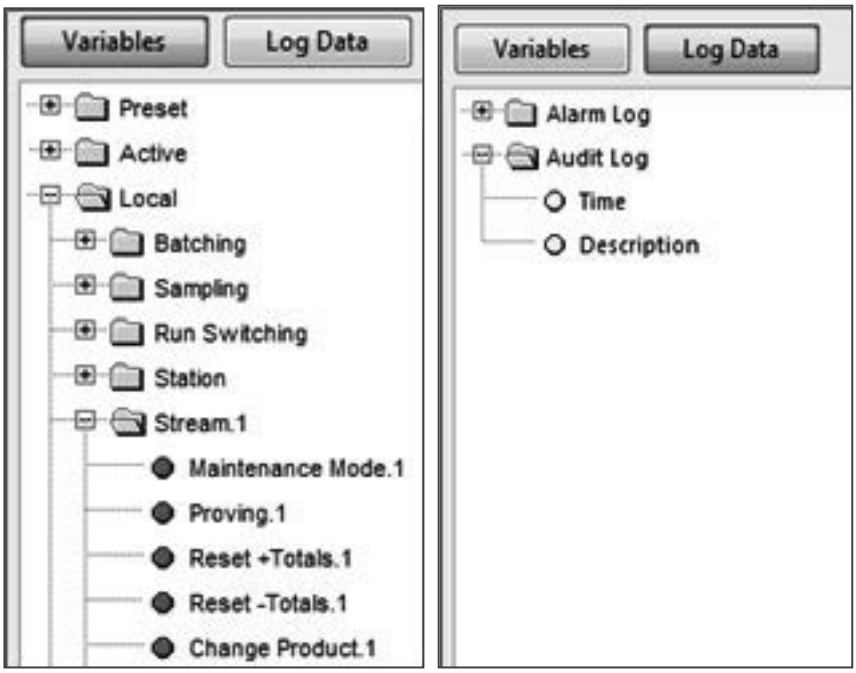


Figure 121 Variable and log data ID selection

Text may be typed anywhere on the page after positioning the cursor to the desired location. To scale a page, use the zoom function:

Figure 122 Zoom function

Zoom	A page can be zoomed from 25% to 400%

7.1.4 Format the items

Options are available upon right clicking an item or a group of items. The content is different for variable items and for data log items and the options are slightly different when selected or not. Here the variable options:

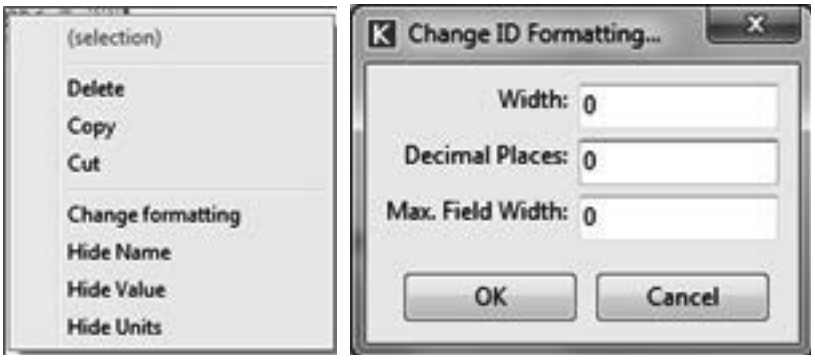


Figure 123 Variable item options with formatting details

Group an item or items	Draw a green square around the item(s) and they will become blue.
Move an item (group)	Group the item(s) and click and drag the item(s)

Right click on a variable:

Item details	Clicking the first line shows the item details
Delete an item (group)	Delete the selected item(s) by selecting the option or press the delete key
Copy an item (group)	Copy the item to paste it elsewhere
Cut an item (group)	Cut the item to paste it elsewhere
Change formatting	Change the way the data is displayed
• Width	The number of characters before the decimal point
• Decimal places	The number of characters after the decimal point
• Max field width	The total number of characters: adds spaces before the item if longer
Hide item name	Do not use the item name and hide it. If desired, a text may be typed instead.
Hide item value	Do not use the item value and hide it
Hide item units	Do not use the item units and hide it. If desired, a text may be typed instead.

And here the data log options:

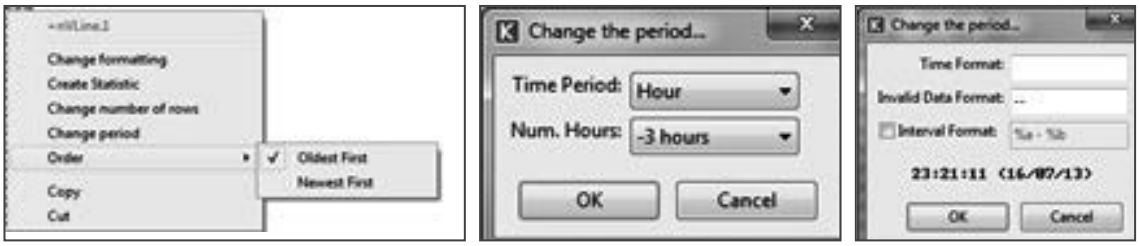


Figure 124 Data log item options with changed time period and format

Group an item or items	Draw a green square around the item(s) and they will become blue.
Move an item (group)	Group the item(s) and click and drag the item(s)
Right click on a log item:	
Item details	Clicking the first line shows the item details
Delete an item (group)	Delete the selected item(s) by selecting the option or press the delete key
Copy an item (group)	Copy the item to paste it elsewhere
Cut an item (group)	Cut the item to paste it elsewhere
Change formatting	Change the way the data is displayed, as with variables, however for the log time:
• Time format	Change the time format to e.g. %D-%M-%y, %h:%m:%s for 16-07-2013, 12:24:32
• Invalid date format	Give a string to indicate an no time is available (size must be equal to the time format)
• Interval format	If selected define how the interval (from/to time) should be presented e.g. 10:00 – 11:00
Create statistics	Select to create statistics on a group of log records with options, see below.
Change number of rows	Change the default number of rows (log size) to a given number of rows
Change period	If not all rows are needed, it is possible to change the time period to:
	Any missing records will be shown be indicated with a "-" for the time
• All	All records to be used
• Hour	Only the records in the last hours will be printed
• Day	Only the records in the last days will be printed
• Month	Only the records in the last months will be printed
Order	Select if the first record will be the oldest or the youngest record.

7.1.5 Add statistics

For a group of log data items choose "create statistics" on the right click menu:

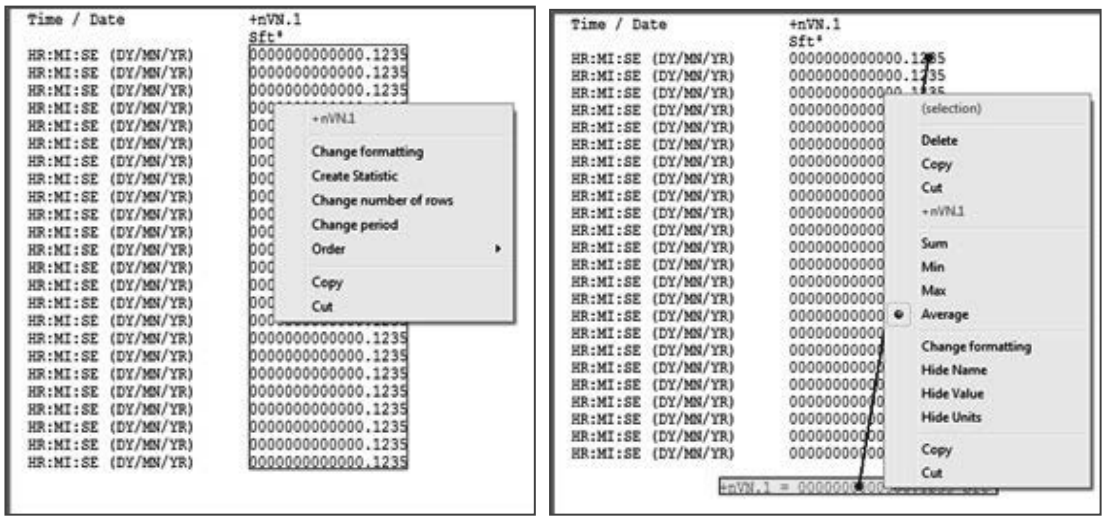


Figure 125 Data log item Select statistics

A new statistical item appears, which is linked to the associated log data and which is the average of the log data items. By right clicking the statistical item the following statistical options can be selected

Sum	Change the statistical item to be the sum of the data log items
Average	Change the statistical item to be the average of the data log items
Min	Change the statistical item to be the minimum of the data log items
Max	Change the statistical item to be the maximum of the data log items

7.1.6 Multiple pages

A report can consist of multiple pages. To navigate through these pages use:

Figure 126 Page selection

Page Selection	
<<	Go to the first page
<	Go to the previous page
Page n	Go to page number n
>	Go to the next page
>>	Go to the last page
New Page	Create a new page
Delete Page	Delete the current page
Undo	Undo an action

7.2 Ethernet reporting

Ethernet reporting uses the FTP and SMTP protocols:

FTP:	FTP printing and file reporting
SMTP:	E-mail reporting

To use them, these protocols must be set-up in the hardware section for single or dual Ethernet boards:

Figure 127 Ethernet port configuration

7.2.1 FTP protocol

FTP or File Transfer Protocol is a standard network protocol used to transfer files from one host to another over a TCP based network. In the Summit FTP is used to transfer reports from the flow computer to a printer or to a file server.

Figure 128 Ethernet port FTP configuration

Enable	Click the box if FTP is used
Printer IP	Provide the IP address of the receiving device
Username	Set the username needed to access the receiving device.
Password	Set the password needed to access the receiving device

For printers a username and password may not be needed, however they must be entered for access to the user's network servers.

Note: When using FTP to print data the printer or print server must (be set to) accept FTP connections. A majority of the more modern network enabled printers and print servers support this protocol.

7.2.2 SMTP E-mail protocol

The SMTP or Simple Mail Transfer Protocol is an standard for electronic mail (e-mail) transmission across IP networks. Two independent SMTP protocols can be used:

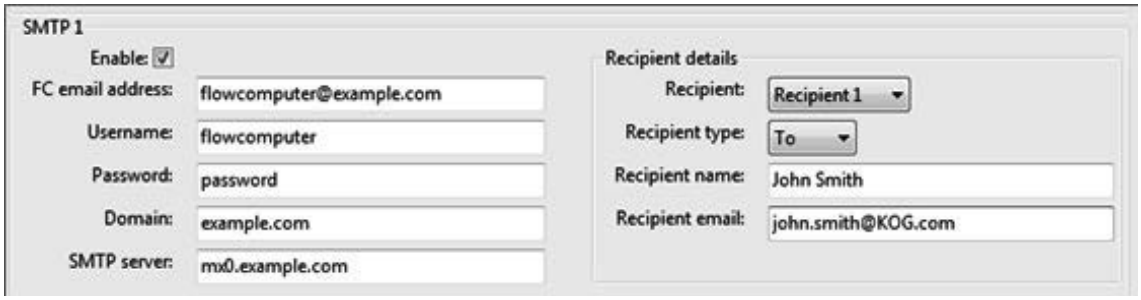


Figure 129 Ethernet port SMTP configuration

Enable	Click the box if this SMTP protocol is used
FC e-mail address	E-mail address of the flow computer
Username & password	Password required to access the mail server
Domain	Domain name of the server
SMTP server	Address of the outgoing mail server
Recipient	The mail can be send to up to 5 different recipients, each with:
Recipient type	The report can be send: directly (To), as a circulation copy (Cc) or as a blind copy (Bcc).
Recipient name	The name of the recipient
Recipient email	The e-mail address of the recipient

7.2.3 Print jobs

Reports can use the HTML XML formatting:

- HTML or HyperText Markup Language, allows for colour, formatting and charts.
- XML or eXtended Markup Language is a standard that allows a wide variety of programs, such as Excel and Word to read and format the information. XML not only provides the actual data but also associated information like the names and formats of the data.

File reports will most often be in XML, printers and E-mails will most commonly use HTML. Please note that for some E-mail programs the HTML format must be enabled.

The print Jobs page defines the configuration of the items to be printed and the circumstances:

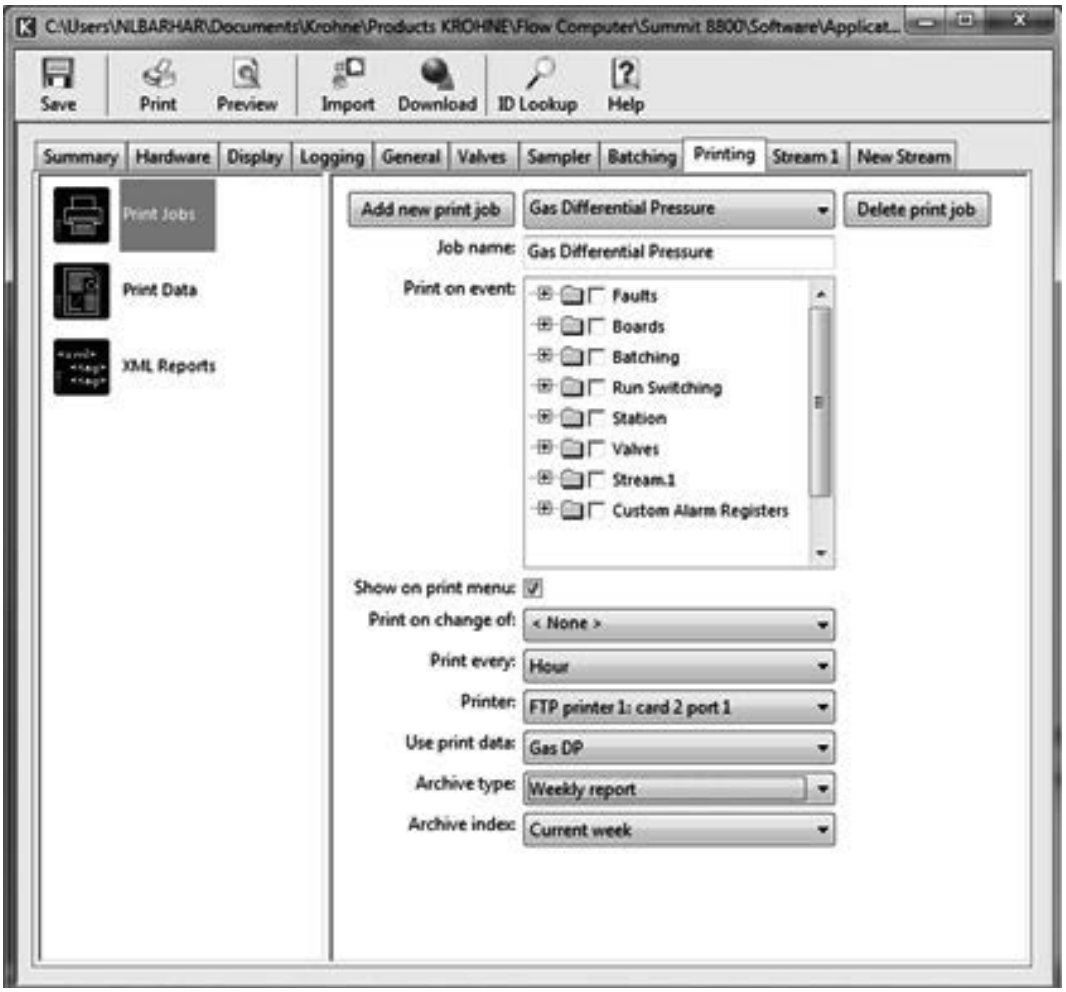


Figure 130 Ethernet printjob configuration

There is no limit to the number of print jobs that can be created, each their own name:

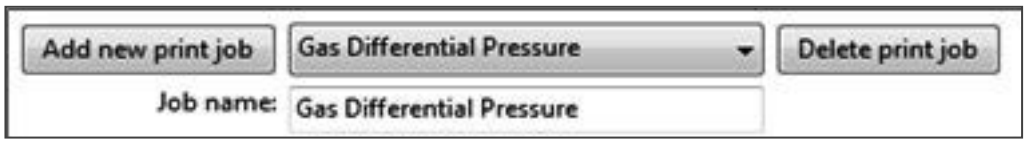


Figure 131 Ethernet reporting print jobs

With as functions:

Add a new job	Press “add” to create a new job
Select an existing job	Select a job from the list
Delete a job	Press “delete” to remove the job. Note that there is no warning.
(Re)name a job	Type in the job name

Determine when to print the report:

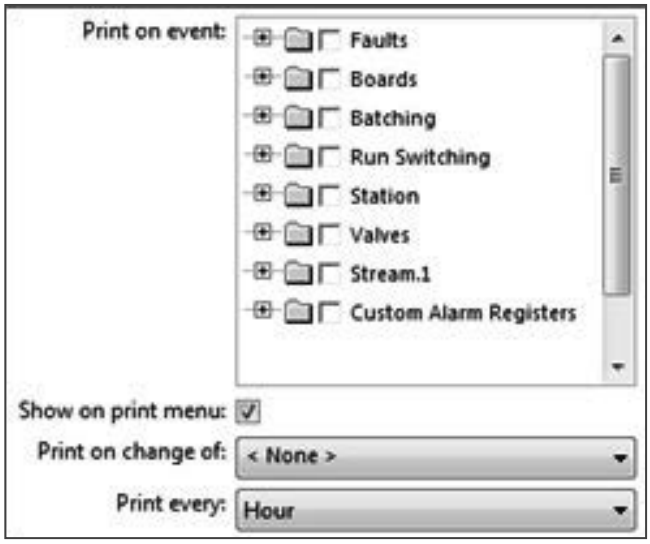


Figure 132 Ethernet reporting print conditions

There are 4 conditions to start the job:

On an event, like a fault or alarm	
Event variables	Tick on the ID tree one or more boxes on which the event print should occur.
Manually via the print jobs screen at the Summit	
Show on print menu	Click if the job must be show in print menu of the main menu for manual trigger
On change of state of a variable	
Print on change of	Select the variable ID from the list. Care should be taken when selecting the ID as a print will be generated on each change in state.
On interval, to print the job at a regular time intervals	
Print every	Select the interval between two reports from the list

The print job also defines where to send the report to and which data to use:

Figure 133 Ethernet reporting select printer and print data

Select the destination and report data

Printer	Select the destination from the list of printer. The printer refers to the hardware settings.
Use print data	Select the report to be sent from the list of print data.

The report may be using actual or archive data. To be able to re-print a report, an archive is needed:

Figure 134 Ticket printer print jobs

Archive type	Standard data log (row based: with all data items from one log record)
• None	No archive to be used
• Row based	The record will be selected as a rows (record number) in the archive
• Daily	Only the records in the last days will be printed
• Weekly	Only the records in the last weeks will be printed
• Month	Only the records in the last months will be printed
Archive index	Define which record in the archive type will be used

7.2.4 Configure HTML report

To start making the actual content of the report data press print data. The result will be a report in HTML format, suitable for a printer or an E-mail message:

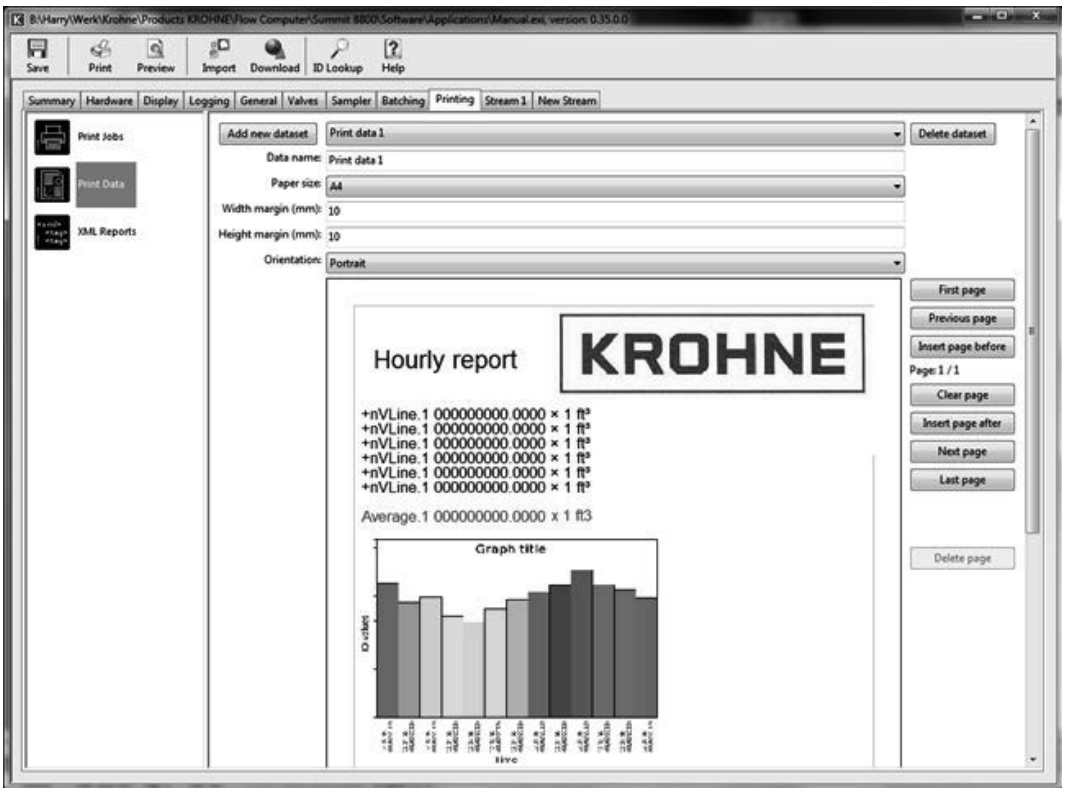


Figure 135 Configure Ethernet reports

The report data must be given a name to be able to identify it in the print job:

Figure 136 Configure Ethernet reports, select report

With as functions:

Create a new dataset	Press "new" to create a new report layout
Select an existing dataset	Select a dataset from the list
Rename a dataset	Type in a new name in the data name field
Delete a dataset	Press "delete" to remove the dataset. Note that there is no warning.

Define the paper formatting:

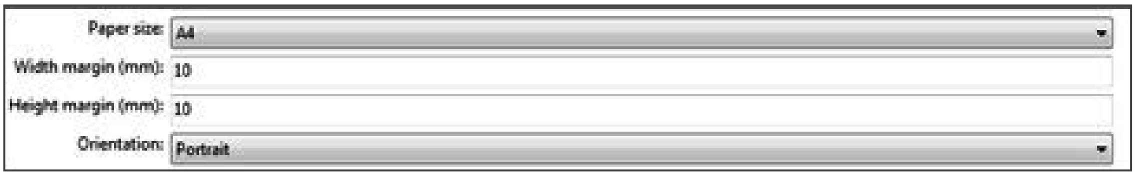


Figure 137 Configure Ethernet reports, format the paper

And the actual report data:

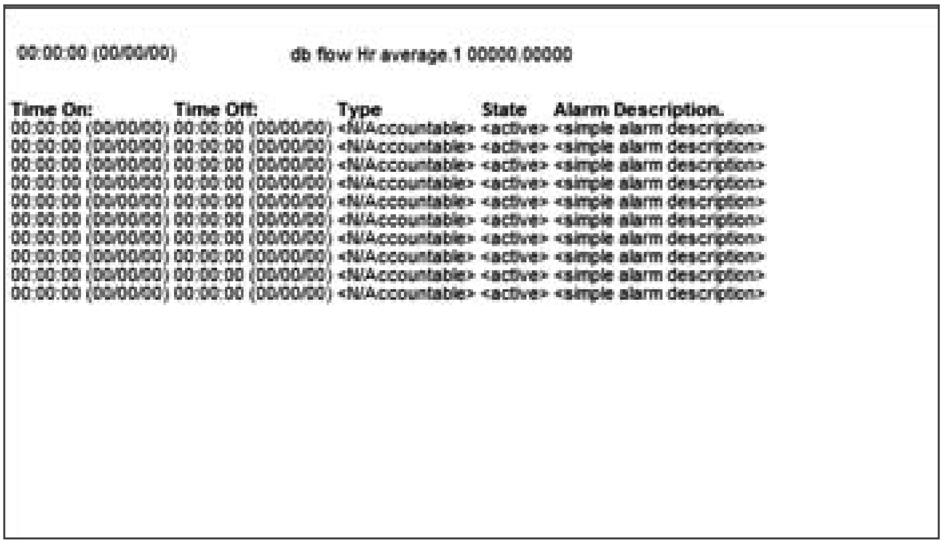


Figure 138 Configure Ethernet reports, format the report data

7.2.4.1 Select the items

The content of a report can be based on the standard variables or on data log values. To be able to re-print the report, it is a good idea to base the report on a data log of print data.
The report is blank for a new report. Now it is possible to put items on the page by right clicking on the paper at the location where the item musat be placed:

Figure 139 Select items

Items can be text, real-time variables, data log, alarm and audit log data, an image or a graph:

Figure 140 Select a text

Text	
Text	Enter the text to be added
Bold/ italic/ underline	Click to set the modifier
Size/ colour	Select the font size and colour

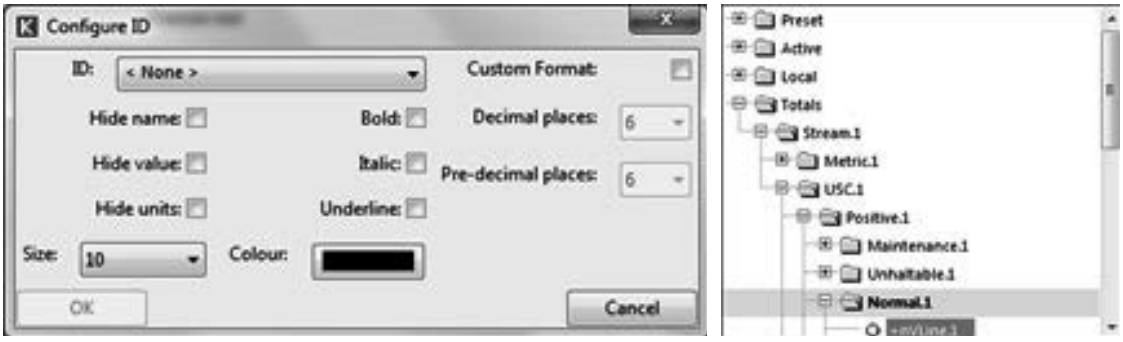


Figure 141 Select a variable from a list

Variable	
ID	Select the variable to be added
Hide name/ value/ units	From the variable to be added, click the box if this part is not needed
Custom format	Click the box for a special format with the number of digits after and before the decimal point

Bold/ italic/ underline	Click to set the modifier
Size/ colour	Select the font size and colour

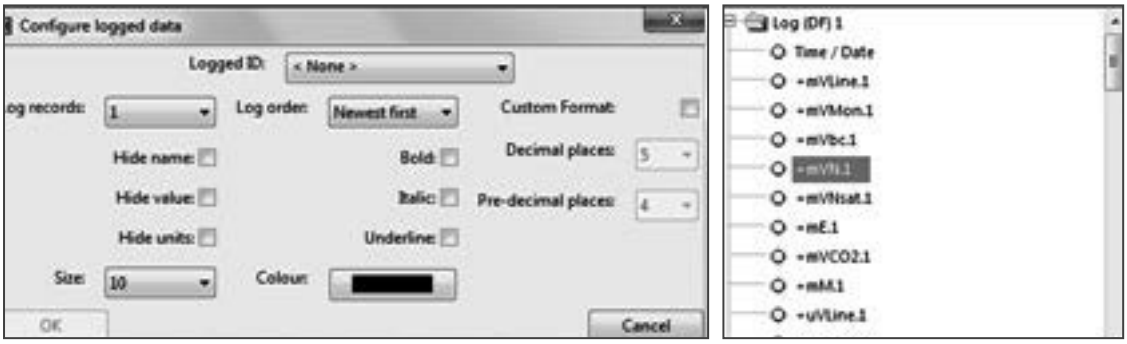


Figure 142 Select log data from a list

Log data:	
Logged ID	Select the variable from a log to be added
Log records and order	Provide the record number and define if it the number counts with the oldest or newest first
Hide name/ value/ units	From the variable to be added, click the box if this part is not needed
Custom format	Click the box for a special format with the number of digits after and before the decimal point
Bold/ italic/ underline	Click to set the modifier
Size/ colour	Select the font size and colour

Figure 143 Select alarm log data

Alarm log data	
Show items	Click if the on and off time, the type and state of the alarm from an alarm record must be shown
Records to show/ order	Define the number of records to be shown counting with the oldest or newest first
Font size	Select the font size

Figure 144 Select audit log data

Audit log data	
Show time/ description	Click if the time or description From an alarm record must be shown
Records to show/ order	Define the number of records to be shown counting with the oldest or newest first
Font size	Select the font size

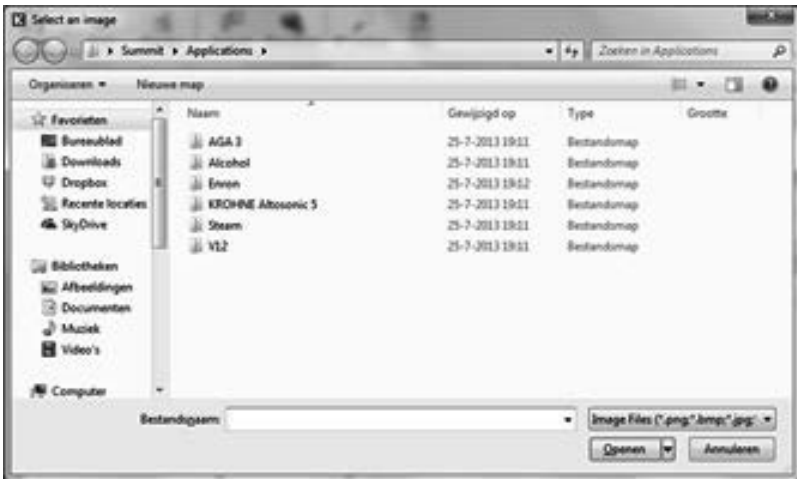
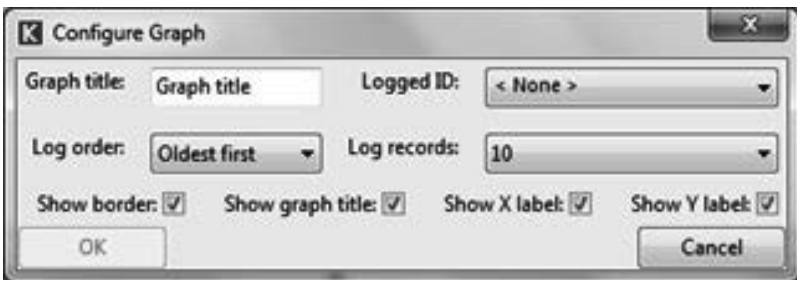


Figure 145 Select an image

Image
Choose an image from disk with as a file type: .png, .bmp, .jpg, .jpeg or .gif.



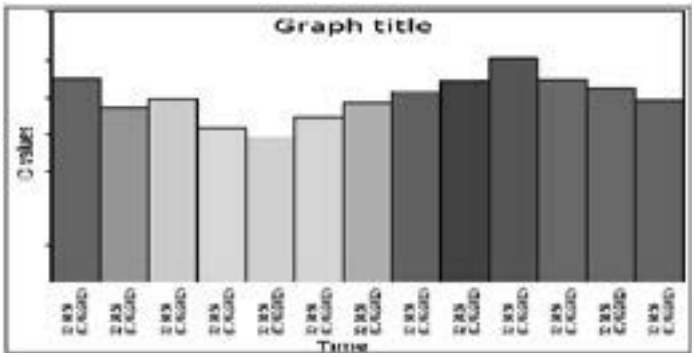


Figure 146 Create a graph

Graph	
Graph title	Give the graph a title
Logged ID	Select the variable from a log to be added
Log records and order	Provide the record number and define if it the number counts with the oldest or newest first
Show border/ title/ label	Click the box if this part must be shown

7.2.4.2 Format the items

Options are available upon right clicking an item or a group of items. The content is different for variable items and for data log items and the options are slightly different when selected or not.

Here the variable options:

Group an item or items	Draw a green square around the item(s) and a red square for each item in the group appears.
Move an item (group)	Group the item(s) and click and drag the item(s)
Re-size a graph	Select the graph and drag the borders to re-size
Delete an item	Select an item and press the delete key or right click and choose delete selected
Edit an item	Select an item, right click on it and choose edit current item
Align an item	Select an item, right click on it and choose align left/ right/ top/ bottom:

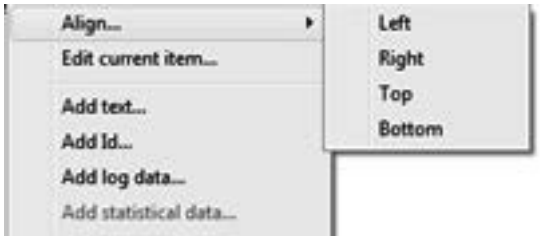


Figure 147 Format an item

7.2.4.3 Add statistics

It is possible to add statistics for the log, but only if a there are log data items in the report. They define how many records will be used.
Go to a location where the statistics have to be added and choose “add statistical data” on the right click menu:

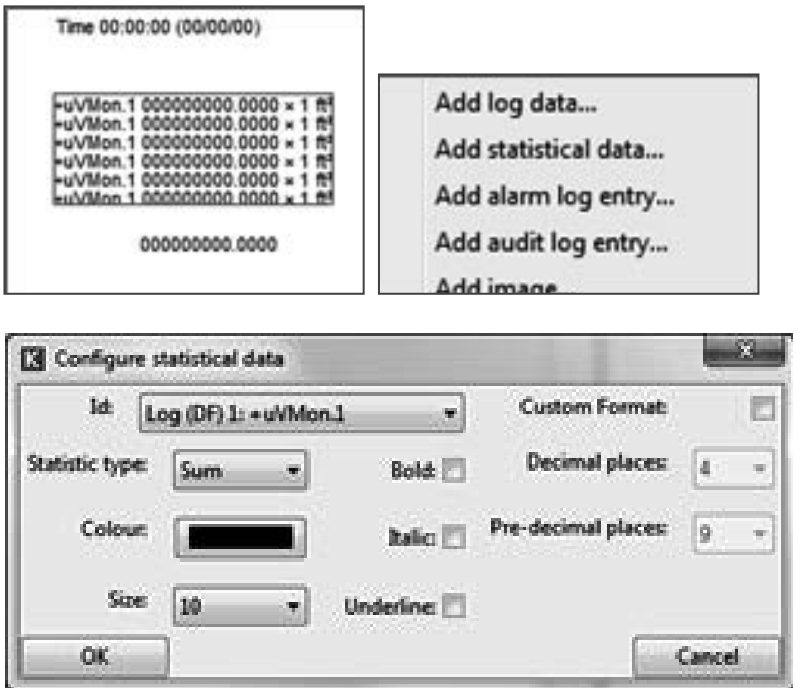


Figure 148 Data log item Select statistics

ID	Select the variable from a log to be added.
Statistic type	Select the statistical calculation needed from:
• Sum	Select the statistical item to be the sum of the data log items
• Average	Select the statistical item to be the average of the data log items
• Min	Select the statistical item to be the minimum of the data log items
• Max	Select the statistical item to be the maximum of the data log items
Custom format	Click the box for a special format with the number of digits after and before the decimal point
Bold/ italic/ underline	Click to set the modifier
Size/ colour	Select the font size and colour

A new statistical item appears, which is linked to the associated log data.

7.2.4.4 Multiple pages

A report can consist of multiple pages. To navigate through these pages use:

Page Selection

First page	Go to the first page
Previous page	Go to the previous page
Insert page before	Create a new page before the current page
Clear Page	Delete the current page
Insert page after	Create a new page after the current page
Next page	Go to the next page
Last page	Go to the last page
Delete Page	Delete the current page

Figure 149 Configure Ethernet reports, page selection

7.2.5 Configure XML Reports

7.2.5.1 Background

XML or Extensible Markup Language is markup language based on a standard XML 1.0 specification. XML is focused on documents but is more generally used for structured data. The major advantage is that it can be used to exchange data which can be used in a wide variety of programs, such as accounting systems, Excel and Word.

XML documents are designed to be read by both humans and machines. They are based on normal Unicode text and can be used in any language. A document is divided into markup, tags and content. Markup has the format <xxxxxx> and surrounds content. Tags is markup that defines the start and end of content:

- Start tags, e.g. <volume>
- End tags, e.g. </volume>
- Empty-element tags, e.g. <line break />

Tags with their contents are called elements. Elements may be empty, may contain one start tag/content/stop tag but may itself contain other elements. It should be noted that in order for the report to be valid XML the entire report must be enclosed within one element:

Not valid XML:	Valid XML:
<section> ... </section> <new_section> ... </new_section>	<report> <section> ... </section> <new_section> ... </new_section> </report>
XML documents may begin by declaring some information about themselves, as in the following example:	
<?xml version="1.0" encoding="UTF-8" ?>	

7.2.5.2 Create an XML report

Press XML reports to start making the actual content. XML report are built by dragging items from the ID tree on the left hand side of the page over to the right hand side. Upon dragging an item into the report the configuration dialog will appear:

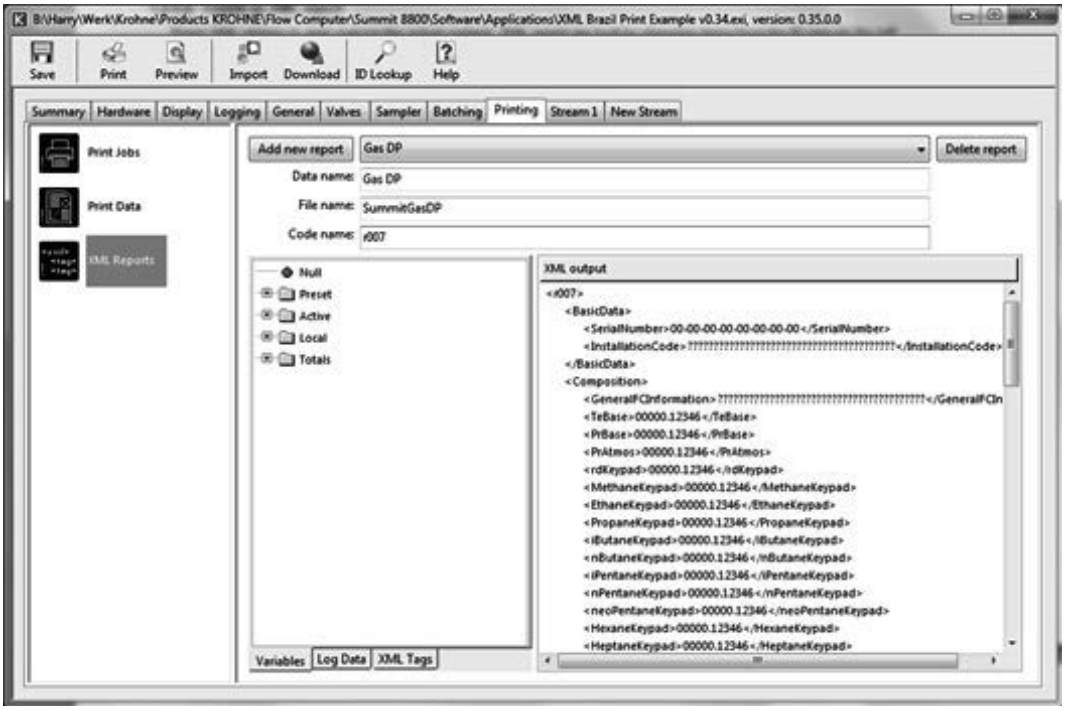


Figure 150 XML report configuration

The report data must be given a name to be able to identify it in the print job:

Figure 151 Configure Ethernet reports, select xml report

With as functions:	
Create a new report	Press “new” to create a new report layout
Select an existing report	Select a report from the list
Rename a report	Type in a new name in the report name field
Delete a report	Press “delete” to remove the report. Note that there is no warning.

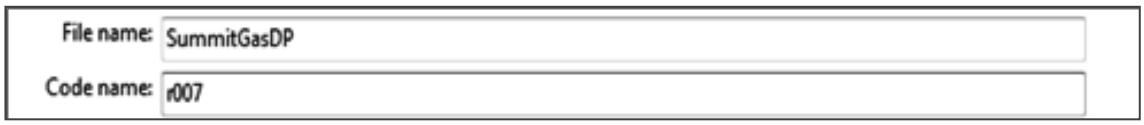


Figure 152 Configure Ethernet reports, select file name

Report details:	
Filename	The name of the file when sent to the data server
Code name	The XML data identifier, such as a revision number for the report

The filename of the generated report starts with the code name, then the file name and ends with the date and time that the report was printed, in the form CCCCMMDDHHMMSS (century, month, day, hours, minutes, seconds). E.g. r007SummitGasDP20130812060001

The actual data are defined:

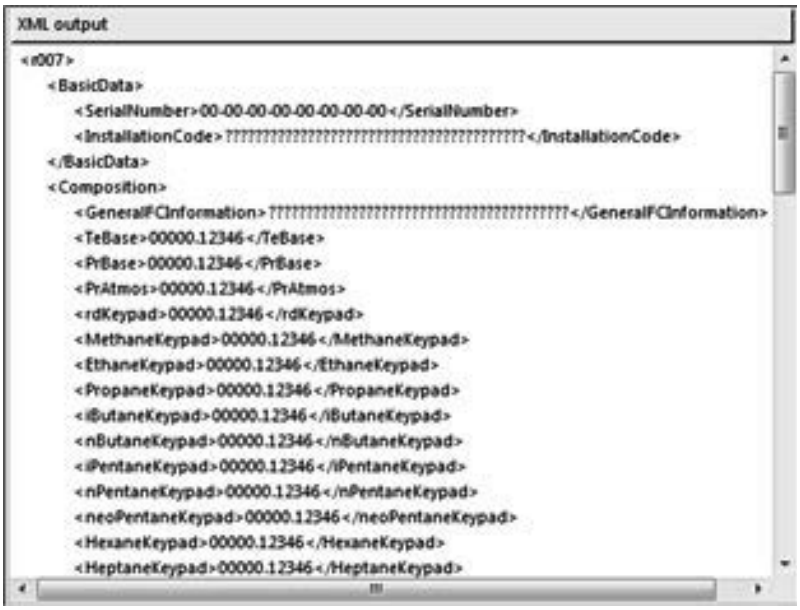


Figure 153 Configure Ethernet reports, xml report data

The XML report can be filled by dragging information from the variables, the data logs and the XML tags: into the report:

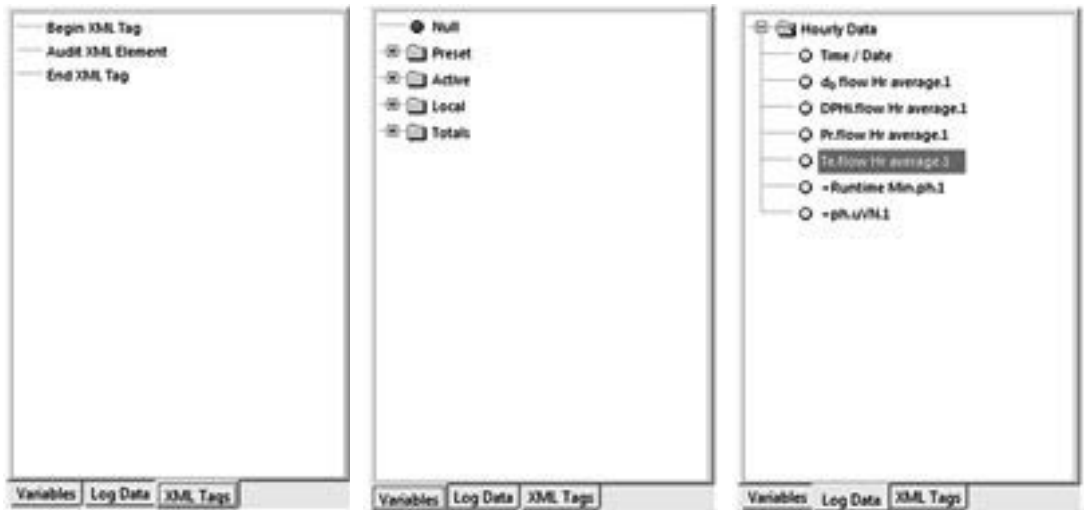


Figure 154 Configure Ethernet reports, xml report data

7.2.5.3 Select the items

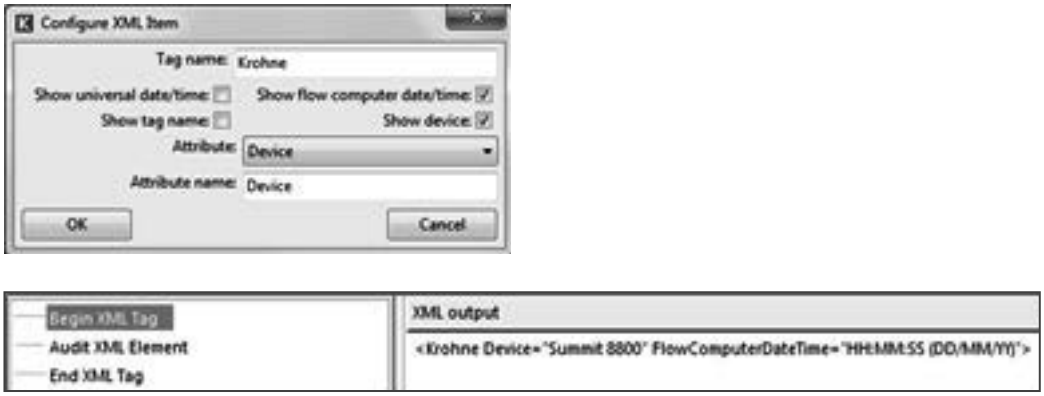


Figure 155 Begin XML tag window and result

Begin tags	
Tag name	The name to identify the tag. The name may not be empty or contain spaces.
Show item	Click the box if the items date/time, name or device must be shown. Please note that the items appear in the order the boxes are clicked. The flow computer time may have an offset from the universal GMT time (see SNTP time)
Attribute	Per item clicked, the item will appear in the attribute list in order of being clicked.
Attribute name	Each attribute can be given a name. The name may not be empty or contain spaces.

Please note that the report will automatically insert TAB's when a new begin tag is inserted between other lines

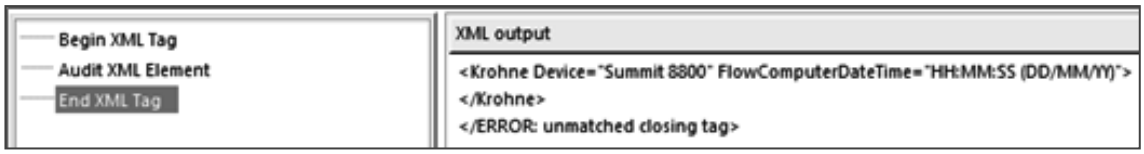


Figure 156 End XML tag normal and error result

End tags
An end xml tag does not need any configuration. Automatically the matching beginning tag will be ended. Make sure there are sufficient end tags. Too many end tags results in an error "/error: unmatched closing tag".

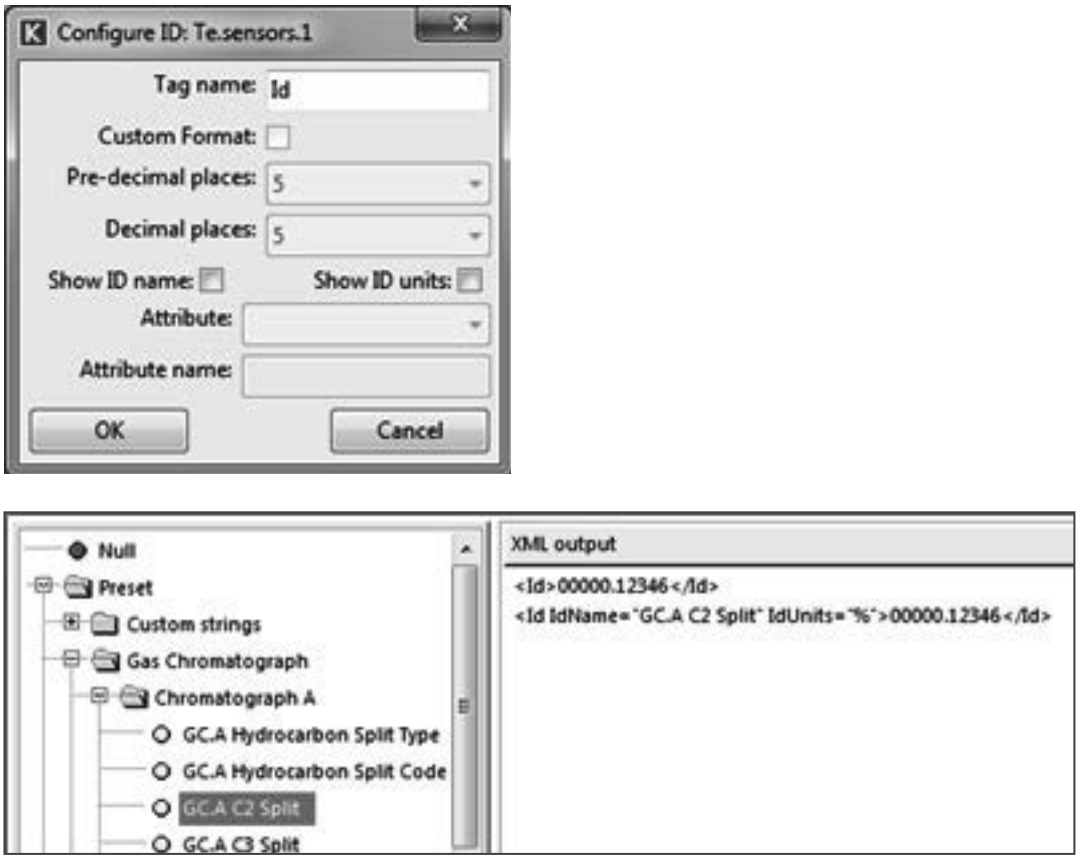


Figure 157 ID configuration window and result

Variable ID's:	
When an ID is dragged into the report, an unformatted line appears. By double clicking on the line, the ID configuration windows appears:	
Tag name	The name to identify the tag. The name may not be empty or contain spaces.
Custom format	Click the box for a custom format and give the number of characters before and after the decimal point
Show item	Click the box if the items ID name or units must be shown. Please note that the items appear in the order the boxes are clicked.
Attribute	Per item clicked, the item will appear in the attribute list in order of being clicked.
Attribute name	Each attribute can be given a name. The name may not be empty or contain spaces.

Figure 158 Log data configuration window and results

Log data	
When an log ID is dragged into the report, an unformatted line appears. By double clicking on the line, the ID configuration windows appears:	
Tag name	The name to identify the tag. The name may not be empty or contain spaces.
Custom format	Click the box for a custom format and give the number of characters before and after the decimal point
Log index	Select the index from the start of the log.
Show item	Click the box if the items ID name or units must be shown. Please note that the items appear in the order the boxes are clicked.
Attribute	Per item clicked, the item will appear in the attribute list in order of being clicked.
Attribute name	Each attribute can be given a name. The name may not be empty or contain spaces.

Within the log data section, the same rules apply here as to the ID tags, but now the log index must be specified. The configuration dialog and the corresponding XML entry are shown below.

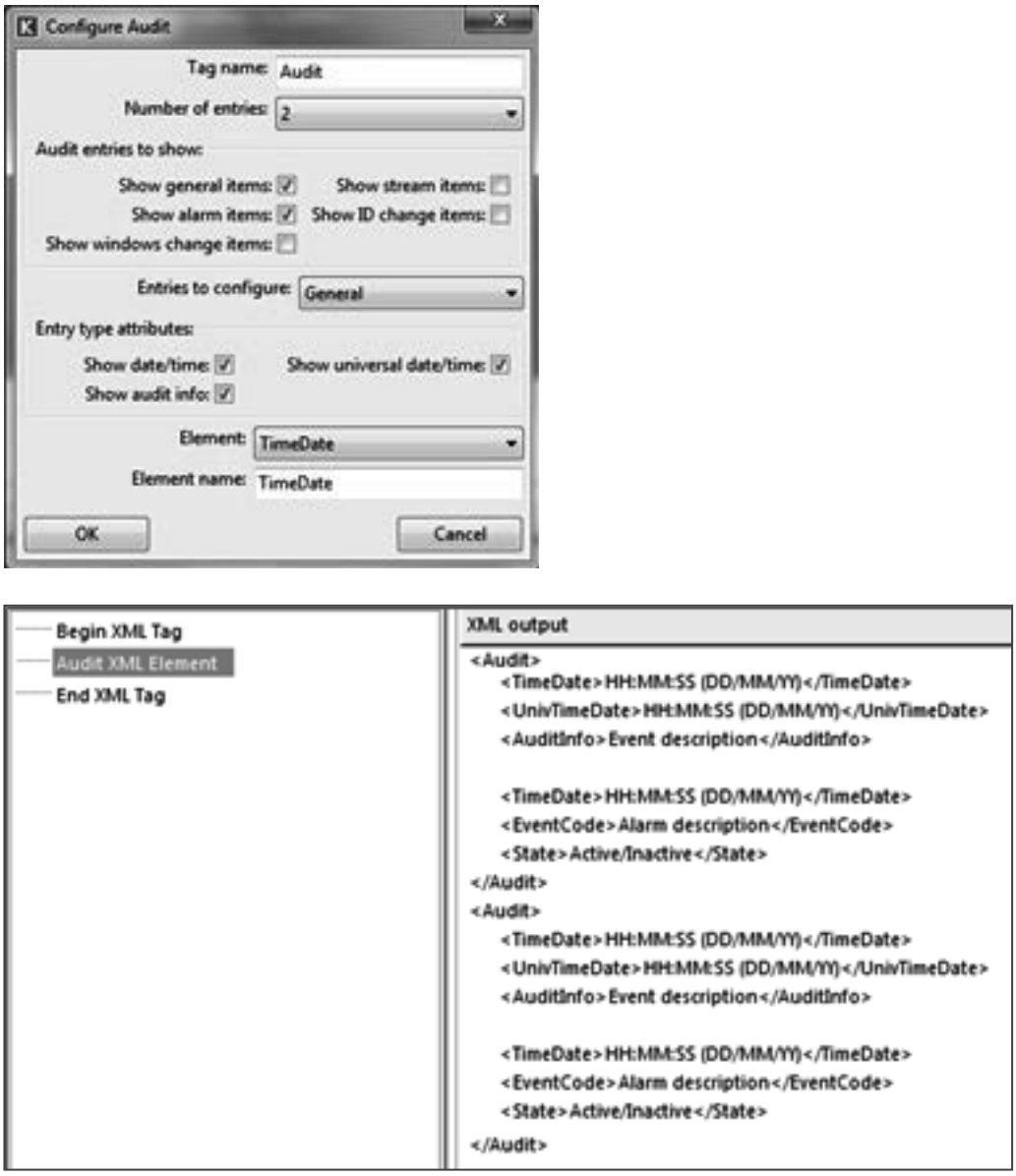


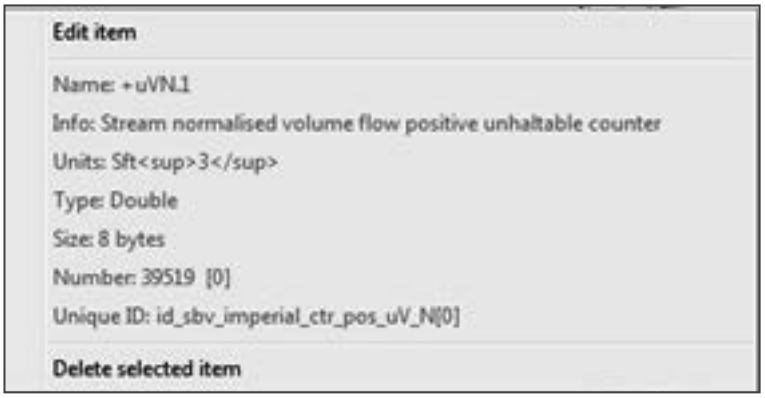
Figure 159 Audit log data configuration window

Audit log data	
When an ID is dragged into the report, an unformatted line appears. By double clicking on the line, the ID configuration windows appears:	
Tag name	The name to identify the tag. The name may not be empty or contain spaces.
Number of entries	Select how many audit log records must be shown.
Show audit item	Click the box if the items: general, alarm, change, stream or ID change must be shown. Please note that the items appear in the order the boxes are clicked.
Entries to config	Per item clicked, the item will appear in the list in order of being clicked.
Show entry item	Click the box if the items: date/time or audit info must be shown. Please note that the items appear in the order the boxes are clicked. The flow computer time may have an offset from the universal GMT time (see SNTP time)
Element	Per item clicked, the item will appear in the list in order of being clicked.
Element name	Each element can be given a name. The name may not be empty or contain spaces.

7.2.5.4 Format the items

Options are available upon right clicking an item or a group of items or on double clicking. Right clicking gives details on an item and the option to edit or delete the item. Double clicking immediately goes to the format menu. Here the variable options:

Group an item or items	Click the first item and hold shift while selecting a last item.
Insert an item	Drag the Item to be inserted onto the report and drop it when the blue line is in place
Delete an item or group	Select an item or group and press the delete key or right click and choose delete selected
Edit an item	Select an item, double click to edit or right click on it and choose edit current item
Show item details	Select an item and press right click. The details show in gray. See below



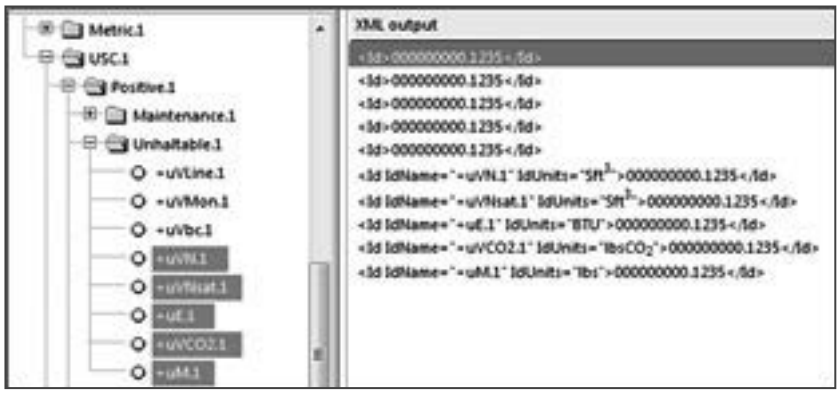


Figure 160 Format an item

7.3 Downloadable ID or active data reports

ID or active data reports can be:

- Downloaded from a website's active data page as a comma separated file
- Read via the configurator by pressing the read data report button on the connection menu and stored under a variety of formats
-

Unlike other reports they will be real time, generated at the customer's request. They are ideal for reading current parameters or for debugging purposes.

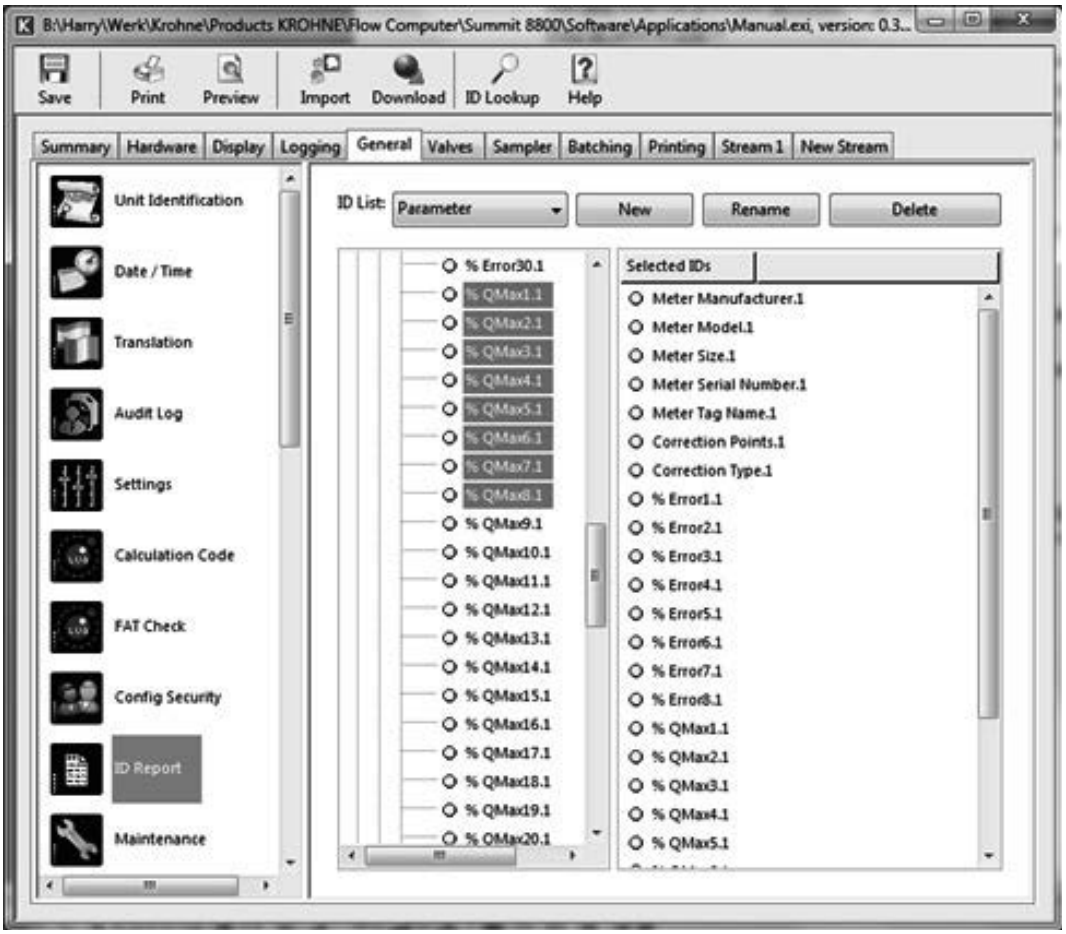


Figure 161 ID report configuration

The ID report must be given a name to be able to identify it when downloading:

Figure 162 Configure ID reports, select report

With as functions:	
Select an existing report	Select a report from the list
Create a new report	Press "new" to create a new report layout
Rename a report	Type in a new name in the report name field
Delete a report	Press "delete" to remove the report. Note that there is no warning.

The actual data are defined:

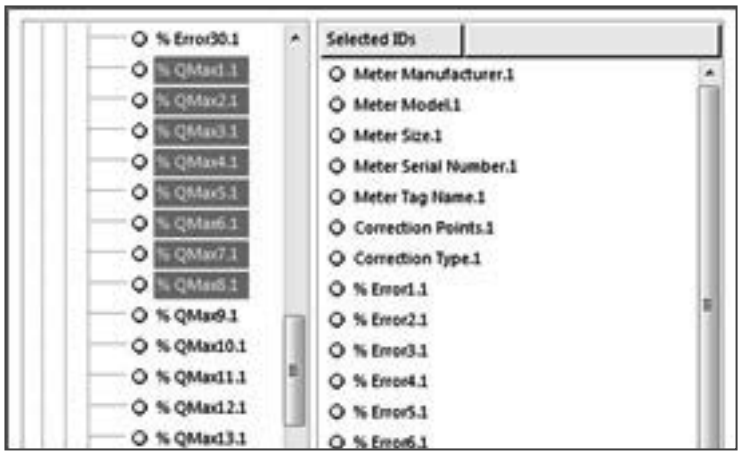


Figure 163 Configure ID reports, report data

The ID report can be filled by dragging information from the variables into the report:

7.3.1 Format the items

Options are available upon right clicking an item. Here the variable options:

Insert an item	Drag the item to be inserted onto the report and drop it when the blue line is in place
Delete an item	Select an item and press the delete key or right click and choose delete
Clear all items	Select an item, right click on it and choose clear
Show item details	Select an item and press right click and select the first option. The details show in gray:

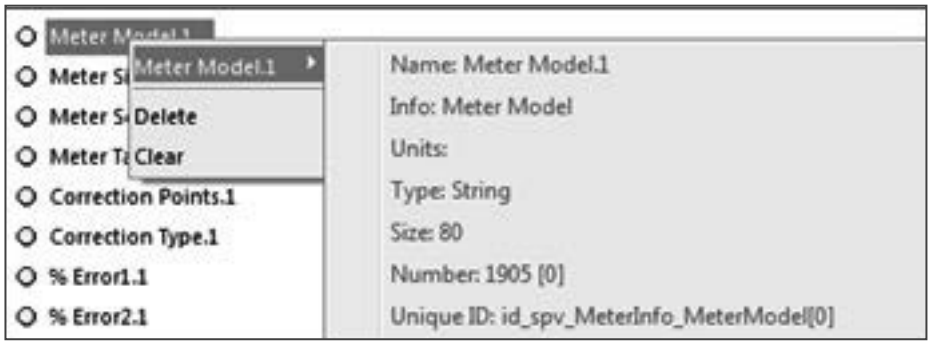


Figure 164 Format an item

7.3.2 Read a report

In the configurator, go to the connect menu, press reds data reports, select the correct report and the data will be shown including the tree structure. The data can now be saved in different formats: .pdf, .html, .rtf, .txt, .xls and .csv.

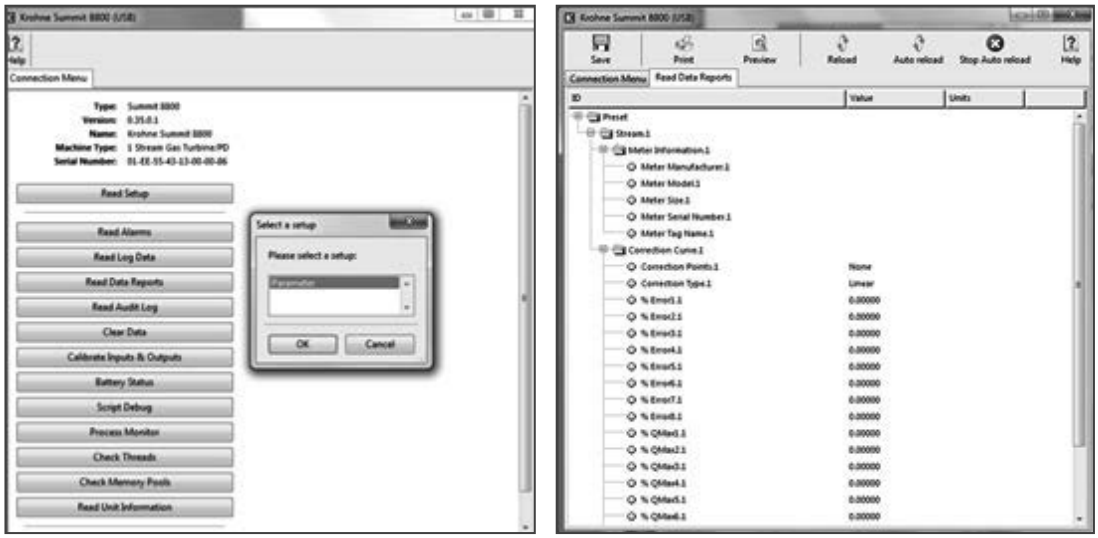


Figure 165 Read an ID report

8.1 Type of protocols

The Summit 8800 uses the following communication protocols and standards for retrieval of data from transmitter devices and for uploading and downloading of configuration or result data to and from host devices.

8.1.1 Standard protocol

Summit Protocol	Used over USB and Ethernet connection, for uploading or downloading of configuration and result data. This communication is default and does not need any configuration.

8.1.2 Meter protocols

HART Protocol	Used to communicate to transmitter devices such as pressure or temperature transmitters to read flow measurement data. For details, see volume 1
Modbus Master	Used to communicate to metering devices such as meters, provers, redundant Summits and gas chromatographs to read measurement data, either via standard serial port or via Ethernet port. Several versions are available, including Modbus RTU and ASCII and Modbus over TCP/IP.
Instromet Protocol	Special protocol for Instromet ultrasonic meters
Encoder	Special serial protocol for smart indexes (typically gas turbine meters)
DSfG protocol	Digitale Schnittstelle für Gasmessgeräte, a protocol for device and host communication in the German market

8.1.3 Host protocols

DSfG protocol	Digitale Schnittstelle für Gasmessgeräte, a protocol for device and host communication in the German market
Modbus Slave	Used to allow remote devices to read result data from the Unit, either via serial port or via Ethernet port. Several versions are available, including Modbus RTU and ASCII and Modbus over TCP/IP. This Modbus also supports Enron Modbus and Modbus Pemex for the America's.
CTE Protocol	Comunicazione a trame estese, a protocol for host communication in the Italian market
SOAP protocol	Simple Object Access Protocol, a standard XML based protocol for host communication over Ethernet using the HTTP protocol.
HTTP web access	The HyperText Transfer Protocol is the protocol between the Summit and a web browser. This allows web access.
HTML/ HTML5 language	The HyperText Markup Language is used by the Summit in its website. HLML5 is used in the website to dynamically present the Summit displays.
SNTP protocol	The Simple Network Time Protocol is used to synchronize the time with time servers
FTP protocol	File transfer protocol to send reports to printers or file severs,
SMTP protocol	Simple mail transfer protocol, to send reports over E-mail.

All Data transmissions are verified by appropriate checksum methods. Where alternatives are available, CRC 32 is used; however often the transmitter device determines the checking method used and this can be alternatives such as CRC16 or LRC.

8.2 Basic Communication setup

The flow computer uses serial communication to transfer information from and to the flow computer. Three serial hardware layers are available:

RS232	Used for short distances, point to point connections
RS485	Used for long distances, either point to point or multi-drop connections.
Ethernet	Ethernet is the preferred way to communicate over a local area network (LAN).

The Summit 8800 I/O boards each have one serial RS board. The communication boards consist of 3 RS serial ports plus one Ethernet port on the single communication board and two Ethernet ports on the dual communication board.

All of them require a basic setup which are described in the following chapters. In further chapters a detailed description will be given for the specific protocol.

8.2.1 Port selection

Select the hardware board and port for the protocol desired:

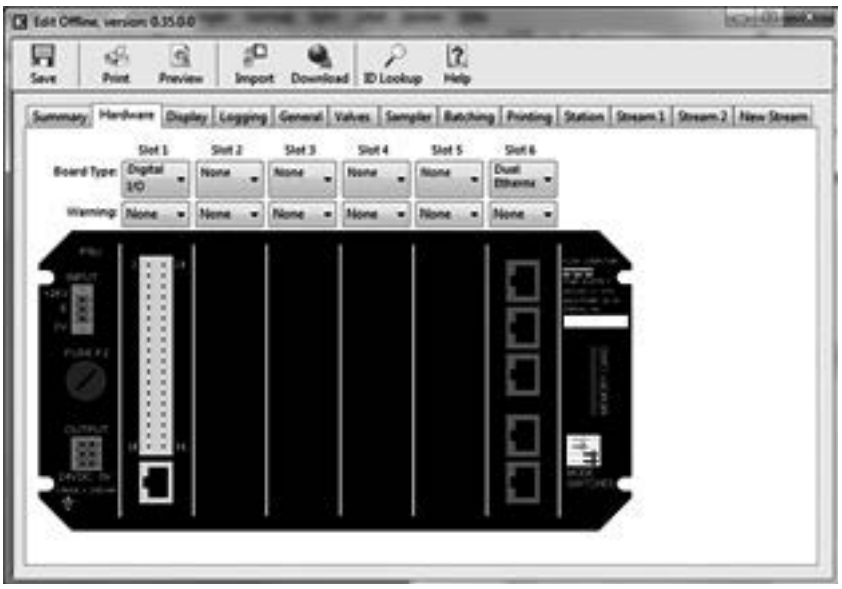


Figure 166 Communication board and port selection

8.2.2 Basic RS 232/485 serial port settings

When selecting the serial ports, the user is presented from the drop down a list of options for various types of communication:

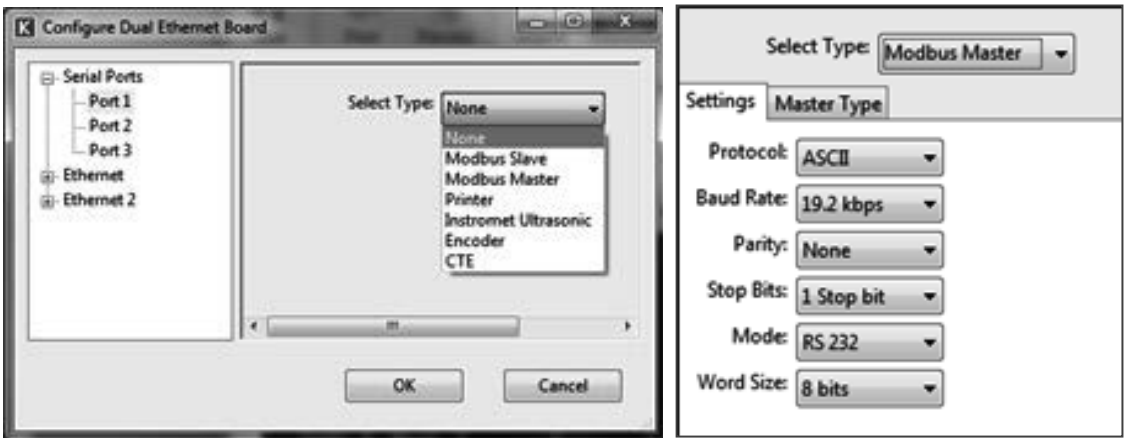


Figure 167 Serial port type selection and a typical setting

For RS232/485 links the following settings are always required:

Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of 1 word: 7 or 8 bits

It is essential to match these settings with the settings of the devices communicating with, otherwise garbled information will be transferred.

8.2.3 Basic Ethernet settings

To establish communication to the SUMMIT 8800 over Ethernet, the basic settings under the general section is always needed:

Figure 168 Ethernet configuration page

Enable Ethernet port	Tick the box if the Ethernet port will be used.
Enable UDP identification	Tick the box if UDP (User Datagram Protocol) is enabled: this allows the Summit configuration software to automatically detect this Summit on the Ethernet.
	Please note that UDP may be blocked by company routers.
IP address	Set the IP address to be allocated to the flow computer
Netmask	Set a corresponding Netmask (e.g. 255.255.255.0).
Gateway	A gateway is the network device that enables data to enter and exit a LAN, such as a router to a Wide Area Network. Leave at default if no gateway is needed.
DNS Server	A DNS (domain name system) server manages the names of websites and other Internet domains, such that you can type in a name instead of an IP number to find a computer Internet. Leave at default if no DNS server is needed.
Configuration software:	
Enable	Tick the box if the configuration software is allowed to access this computer
Port	Provide the Ethernet port address to be used by the configuration software. The default port is 3000, but on some networks another port may be more appropriate.

8.3 Modbus master

In the Summit the modbus master is used to get information from metering devices. Traditionally a serial port is used for devices and therefore each board has one or more serial ports. Nowadays Modbus over TCP/IP becomes more popular, so the Summit also supports this on its ethernet ports where for each Ethernet port 2 modbus masters are available.

8.3.1 Modbus master port selection and settings

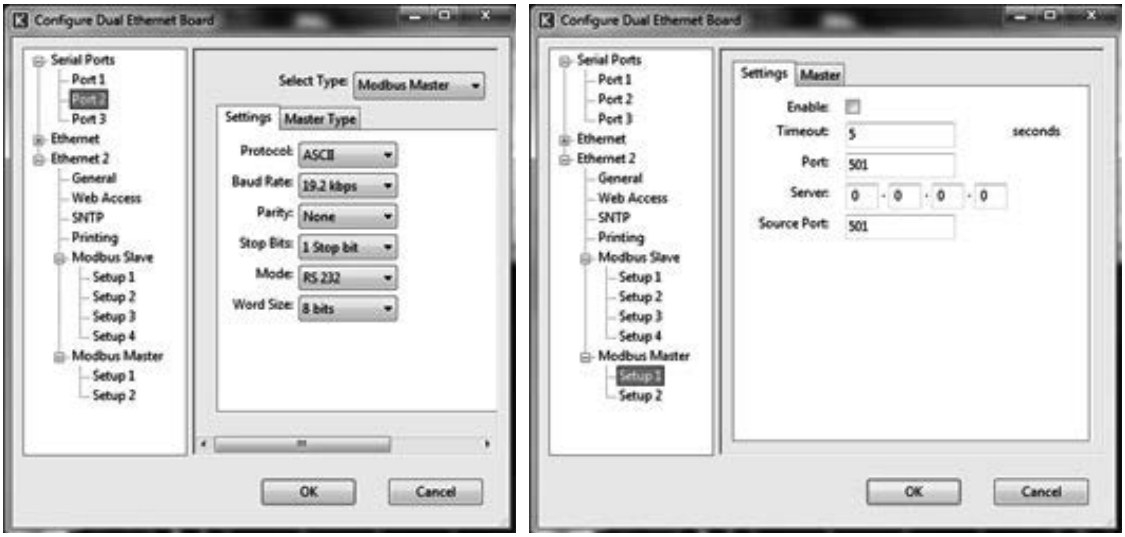


Figure 169 Example Modbus and Modbus over TCP/IP master port settings

The settings page configures all communication parameters associated to the selected port.

For a serial port these are:	
Protocol	ASCII or RTU.
Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of one word: 7 or 8 bits
For a Ethernet port these are:	
Enable	Click the box to enable modbus over TCP/IP
Timeout	Time to stop attempts being made for connectivity
Port	Ethernet port number
Server	Server IP address for communication
Source port	Ethernet port number for the connected device

8.3.2 Modbus Master type

The following devices can be selected for a Modbus master:

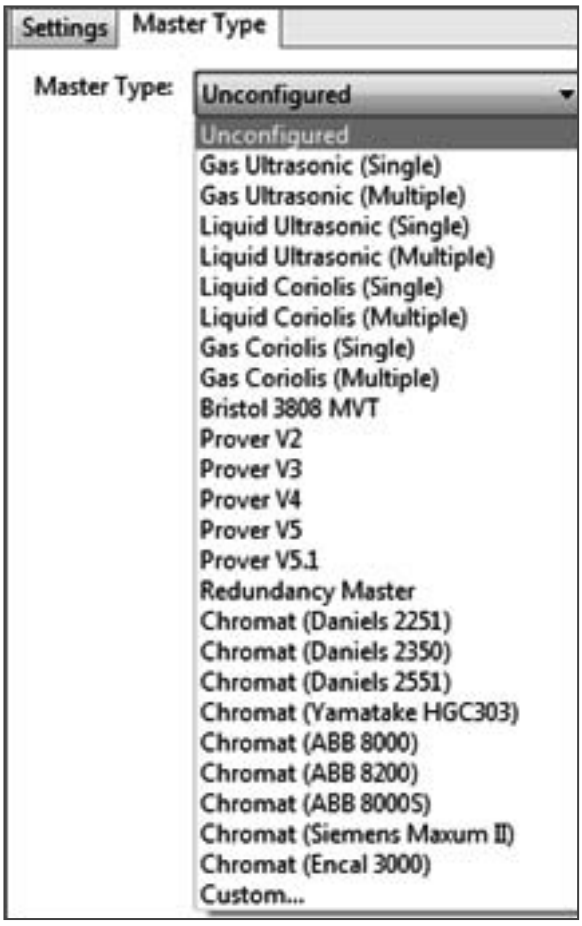


Figure 170 Modbus device selection

Master type	Select the device connected to the port. As field devices are available: meters, provers, redundant Summits or gas chromatographs.

Please note that the master types shown are dependent on the stream type selection.

8.3.3 Differential pressure meters

dP meters often use multi-variable transmitters. Most are Hart based, but some are modbus based, such as the Emerson Bristol 308 is a multivariable transmitter with differential pressure, pressure and temperature.

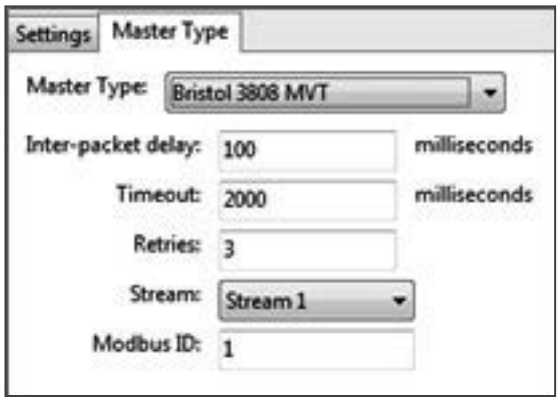


Figure 171 Modbus Bristol 3808 MVT

With as parameters:

Inter-packet delay	In a noisy environment characters may be lost causing two packets frames to be mixed. This is prevented by putting a delay at the end of each packet. Not needed for TCP/IP.
Timeout	Time to stop connectivity attempts between the devices
Retries	Number of attempts to establish communication before an alarm is given
Stream	Select the stream where the transmitter is installed
Modbus ID	Unique identifier for the Modbus device

8.3.4 Ultrasonic and Coriolis meters

Most smart meters are Modbus based with the Summit as the master. Several popular meters are supported:

Gas Ultrasonic meters	KROHNE Altosonic V12
	FlowSIC 600
	Daniels Senior Sonic
	Panametrics GM868
	Panametrics IGM878
	Instromet QSonic
Liquid Ultrasonic meters	KROHNE Altosonic V
	KROHNE UFM 3030
	Caldon
Steam Ultrasonic meters	KROHNE UFM 3030
Gas Coriolis meters	Endress & Hauser Proline Promass 84
Liquid Coriolis meters	KROHNE MFC010
Micro Motion 2000 Series	

Contact KROHNE as your meter may already be available or may be created for you. Other meters can be created using the custom Modbus master.

The choice is whether one single meter or multiple meters are connected to the same modbus link:

Figure 172 Modbus device selection

Inter-packet delay In a noisy environment characters may be lost causing two packets frames to be mixed. This is prevented by putting a delay at the end of each packet. Not needed for TCP/IP.

Timeout	Time to stop connectivity attempts between the devices
Retries	Number of attempts to establish communication before an alarm is given
Stream	Select the stream where the transmitter is installed (for single device only)
Modbus ID 1..5	Unique Modbus identifiers for the 5 meter streams (only one for single device)

The actual meters are selected in the stream meter input section (see volume 2):

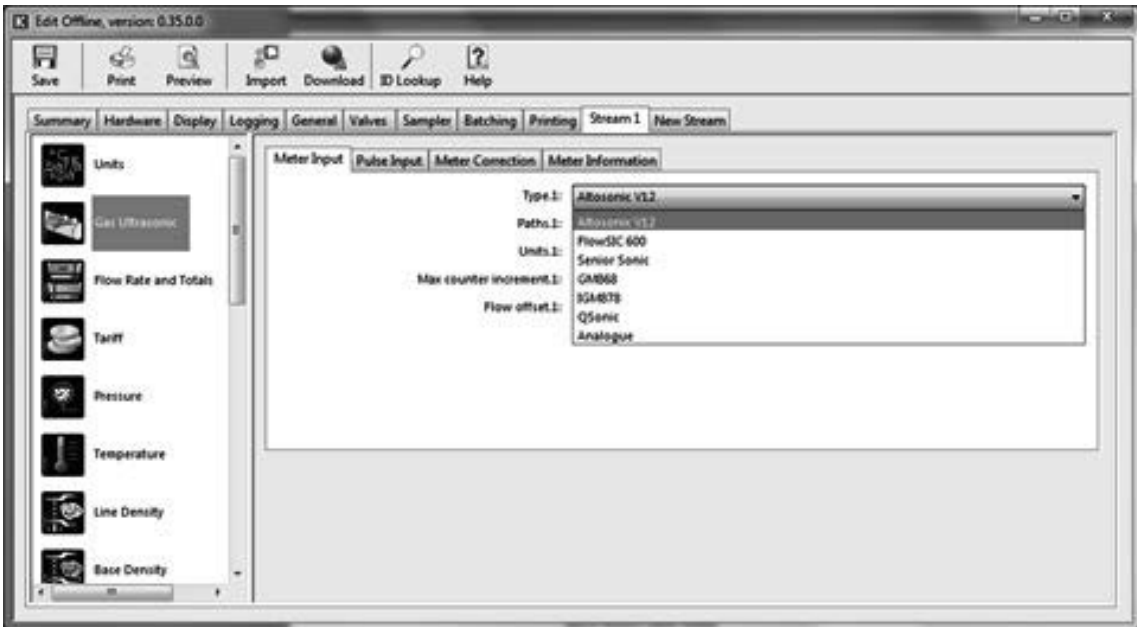


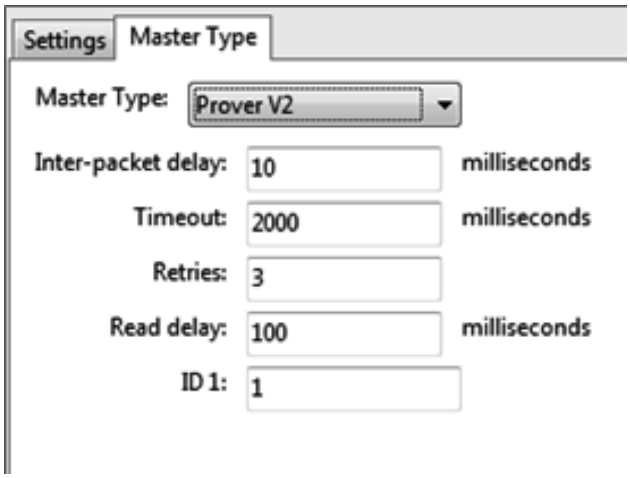
Figure 173 Modbus master, selection of gas coriolis meter

Each meter has their own set of parameters, so please check the meter for details.

8.3.5 Provers

A prover and the streams to be proved may be combined in one Summit. However a prover and the streams to be proved may also be in separate Summits. In the last case a Modbus link is needed to connect the prover computer to the stream flow computers. The prover computer will be master, the stream flow computers will be slaves. See volume 2.

To create the Modbus master, select one of the (gas) prover versions:



The settings needed are:

Inter-packet delay In a noisy environment characters may be lost causing two packets frames to be mixed. This is prevented by putting a delay at the end of each packet. Not needed for TCP/IP.

Timeout	Time to stop connectivity attempts between the devices
Retries	Number of attempts to establish communication before an alarm is given
Read delay	As the device has to process the read command, it might be needed a delay before the actual data arrive.
Modbus ID	Unique identifier for the Modbus device

In the stream flow computers, the Modbus slave is defined in a file with the same name as the master, which can be imported as a modbus list.

8.3.6 Gas chromatographs

For gas measurement a gas chromatograph or GC is often needed. Several popular GC's can be selected:

Emerson	Daniel 2251
	Daniel 2350
	Daniel 2551
Yamatake	HGC303
ABB	ABB 8000
	ABB 8000S
	ABB 8200
Siemens	Maxum II
Instromet	Encal 3000

Contact KROHNE as your GC may already be available or may be created for you. Other GC's can be created using the custom Modbus master.

All chromatographs have very similar settings consisting of device and component settings. The device settings are:

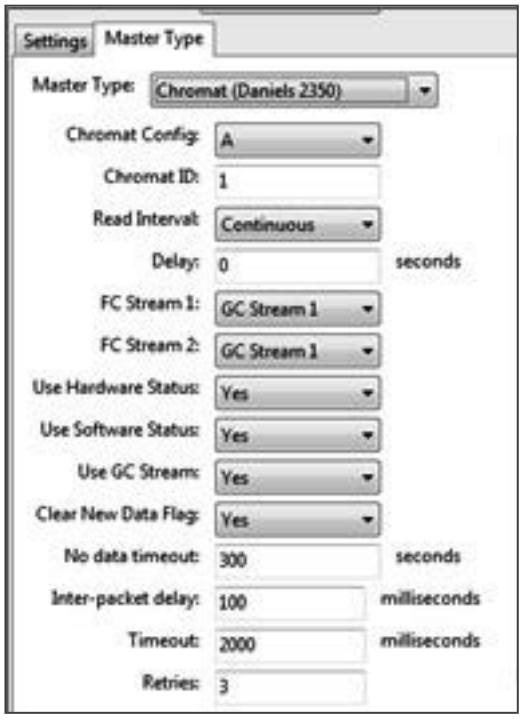


Figure 174 Modbus master GC device settings

With as parameters (depending on a GC, parameters may not be needed):

Chromatograph configuration	Choose which of the two GC's is configured: GC A or B.
Chromatograph ID	The modbus identifier for the GC
Read interval	Select how often the GC data has to be read
Delay	A delay between two reads. Prevents GC to be bombarded when in continuous
FC stream 1	Select the first GC stream (1..9) to be used
FC stream 2	Select the second GC stream (1..9) to be used
Use hardware status	Verify the hardware status to create a Summit alarm
Use software status	Verify the software status to create a Summit alarm
Use GC stream	Use the GC stream to determine for what Summit stream the results must be used
Alarms	Use the GC alarms as alarms or warnings (Encal 3000 only)

The component setting at the right hand side handle the gas component split. GC's have a limited set of components that can be measured, all rest is grouped to one heavy component Cx+. E.g. C6+ is the grouped heavy component for a GC that measures the first 6 components.

In the Summit this grouped heavy component can be assigned to other components to get the best measurement result:

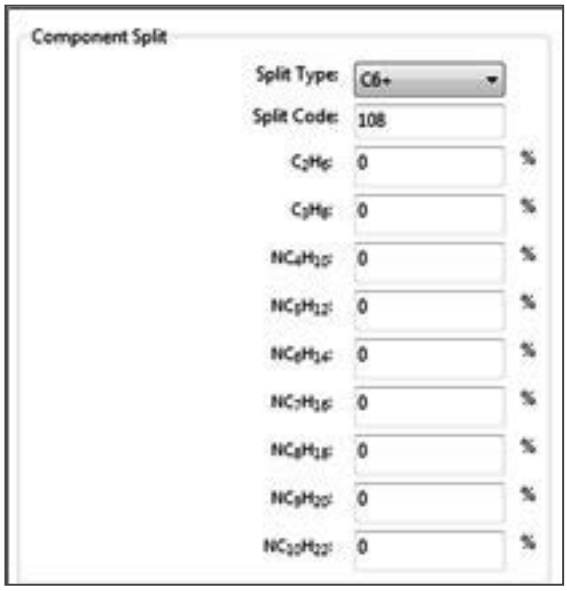


Figure 175 Modbus master GC component settings

Split type	Select what the heavy component Cx+ represents, C2+ to C9+
Split code	The register in the GC modbus list for Cx+
Components	Assign the percentage of Cx+ to the specific component. Total should be 100%

8.3.7 Redundancy master

For redundancy, Modbus is used to connect two Summits in redundancy mode. Each Summit has two modbus ports: a master and a slave which are cross connected. See volume 2.

The Modbus master is defined as the "redundancy master":

Figure 176 Modbus redundancy master

With as parameters:

Inter-packet delay In a noisy environment characters may be lost causing two packets frames to be mixed. This is prevented by putting a delay at the end of each packet. Not needed for TCP/IP.

Timeout	Time to stop connectivity attempts between the devices
Retries	Number of attempts to establish communication before an alarm is given
Modbus ID	Unique identifier for the Modbus device

The Modbus slave is defined in a file “redundancy slave” which can be imported as a modbus list.

8.3.8 Custom Modbus master

Modbus master drivers are created as a programming script. The script programming language is LUA, which allows drivers to be programmed or modified. Further details of this custom programming can be found in the LUA chapter.

Within master type there is a custom option, which opens such script page.

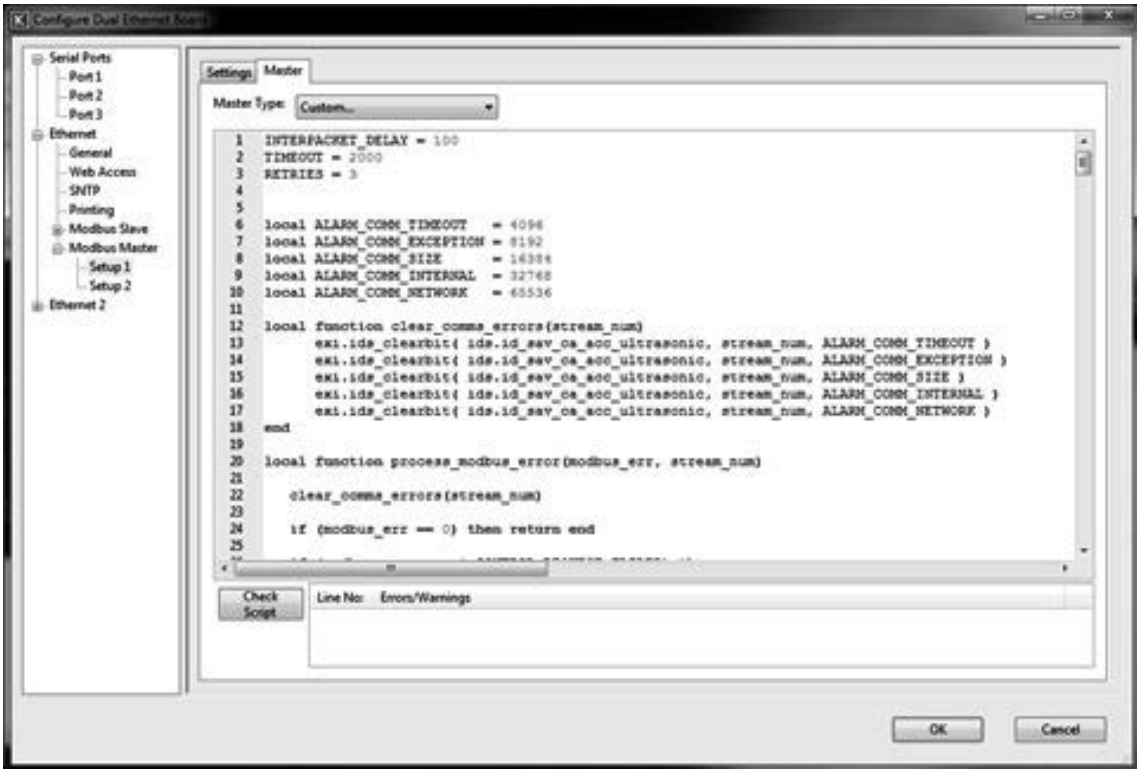


Figure 177 LUA script page

To modify an existing modbus master driver, first select the driver to be modified, then open the custom master. After the changes are made, the driver can be exported and imported to be used in other applications.

8.4 Modbus slave

Select Modbus slave, should the SUMMIT 8800 be the slave device and the field device is the master - where the SUMMIT 8800 is sending data every time it is polled by the master device.

In the Summit the modbus slave is used to allow other devices, such as SCADA systems, to get information from the Summit. Traditionally a serial port is used for Modbus, but nowadays Modbus over TCP/IP becomes more popular, so the Summit also supports this on its ethernet ports where each Ethrnet port has 4 modbus slave links available.

In the Summit, the modbus slave is completely configurable and can be setup to include any Summit information in any of the modbus registers. This means that the Summit is capable to adapt itself to match any of the host devices.

Note: As modbus is not a well defined standard, familiarity with communication and the Modbus protocol is assumed on the part of the user. For further information on modbus please see website: http://www.simplymodbus.ca or http://en.wikipedia.org/wiki/Modbus

8.4.1 Modbus slave port selection and settings

The modbus slave settings are divided in 4 parts: the port settings, the timeout setting, the log settings and the register settings.

8.4.1.1 Modbus slave port settings

In Hardware select the desired board and port from the left hand list and with modbus slave:

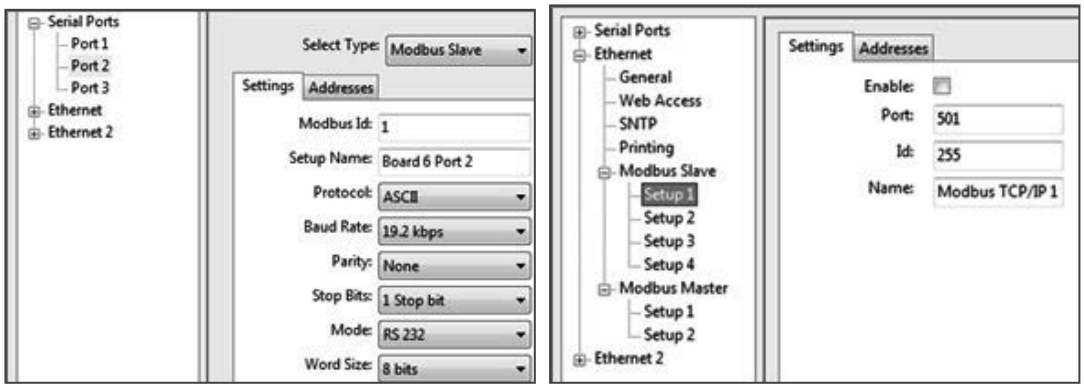


Figure 178 Example RS232/485 Modbus serial and TCP/IP port settings

Settings are needed to match the port with the master device it is intended to be used with. Please consult master device user manual for further details.

For a serial port set the following parameters:

Modbus ID	The modbus identifier for this link (1..255). When multiple SUMMIT's are sharing one RS485 link in a multi-drop configuration, each SUMMIT will need a unique identification.
Setup Name	Any descriptive name to identify communication port
Protocol	ASCII, RTU or RMG. RTU is regarded as the most efficient protocol.
Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of one word: 7 or 8 bits

For a Ethernet port set the following parameters:

Enable	Click the box to enable modbus over TCP/IP
Port	Ethernet port number
ID	The modbus identifier for this link (1..255)
Name	Any descriptive name to identify communication port

8.4.1.2 Modbus timeout setting

In the settings, it is also possible to enable the modbus timeout to create an alarm when the counter exceeds the number of seconds set under the general Modbus Timeout:

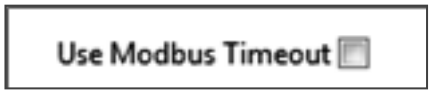


Figure 179 Modbus slave enable timeout

Check the box is the modbus timeout may be used. This setting refers to a general setting for modbus timeout:

Figure 180 Modbus slave timeout settings

Modbus Communication is subject to 3 re-tries and a 1-second timeout on each re-try. If at the end of this no reply or an invalid reply is received then an alarm appropriate to the failure is issued. The Modbus time-out function is designed to identify when any essential Modbus master or slave communication is lost.

To disable the timer, set the timeout value to -1 otherwise enter the maximum time that the SUMMIT 8800 is allowed to be without Modbus communications. An accountable alarm will be raised on every stream that is using the time-out alarm if communication loss occurs longer than the defined time allowed. All Modbus received gas or liquid data will be flagged as an error.

The timer is reset upon receipt of a valid Modbus packet on a Modbus slave port that has the 'use Modbus timeout' option selected.

8.4.1.3 Modbus slave log setting

The 4 log parameters are needed to include record based transfer of historical data from an alarm/event log and data logs into the modbus list. For normal modbus this is not possible, so these parameters are irrelevant.

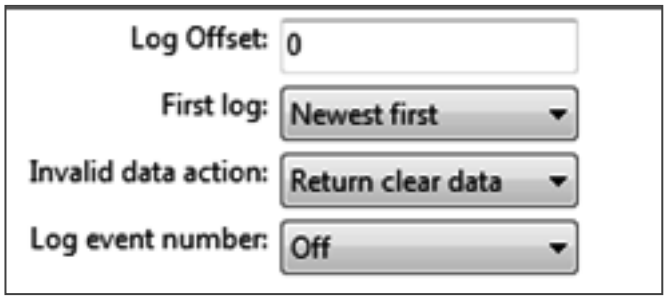


Figure 181 Modbus slave log settings

Log offset	Set to 1 if the master assumes that the first log index is one. Otherwise 0.
First log	Set the order of the log: the newest first or the oldest first
Invalid data selection	What to do with an invalid log request: return clear data, return filled data, or create an exception
Log event number	Select the log which contains the events

8.4.1.4 Modbus address offset setting

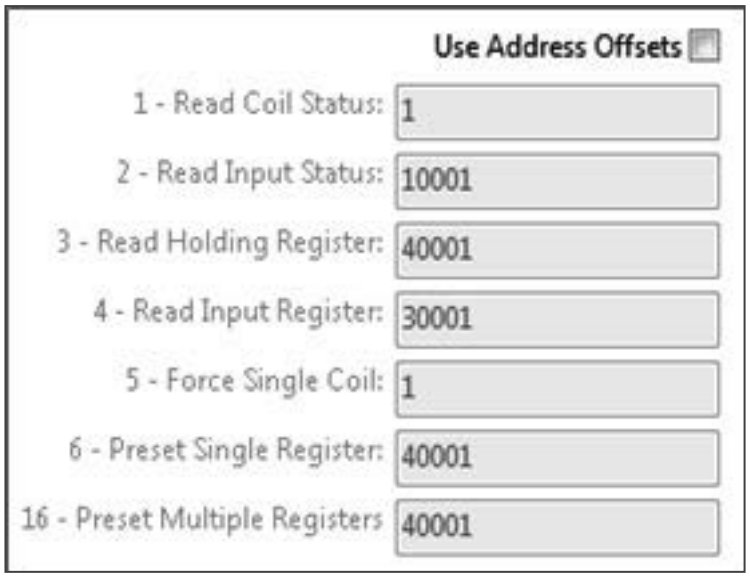


Figure 182 Modbus slave address offset settings

Use address offsets	When enabled, per Modbus function, address offsets can be added to the received modbus starting address. Normally not used.
Function offsets	The address offset for the function

8.4.2 Modbus slave addresses

Registers which can be read by the master can be filled with information. The Summit can be user configured and has very flexible capabilities to ensure that any type of variation is covered.

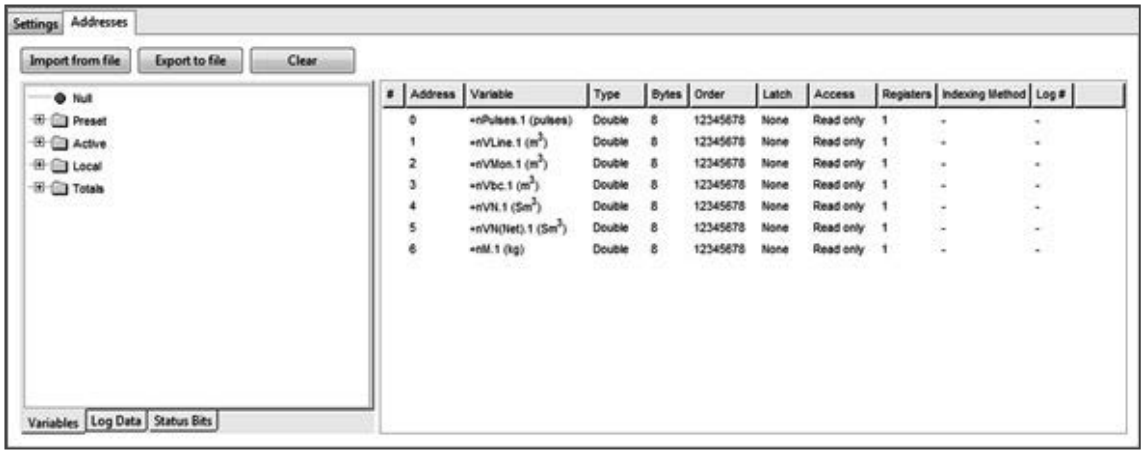


Figure 183 Modbus slave register configuration

From the ID tree, select the registers to be used and drag them into the Modbus list on the right hand side of the window.

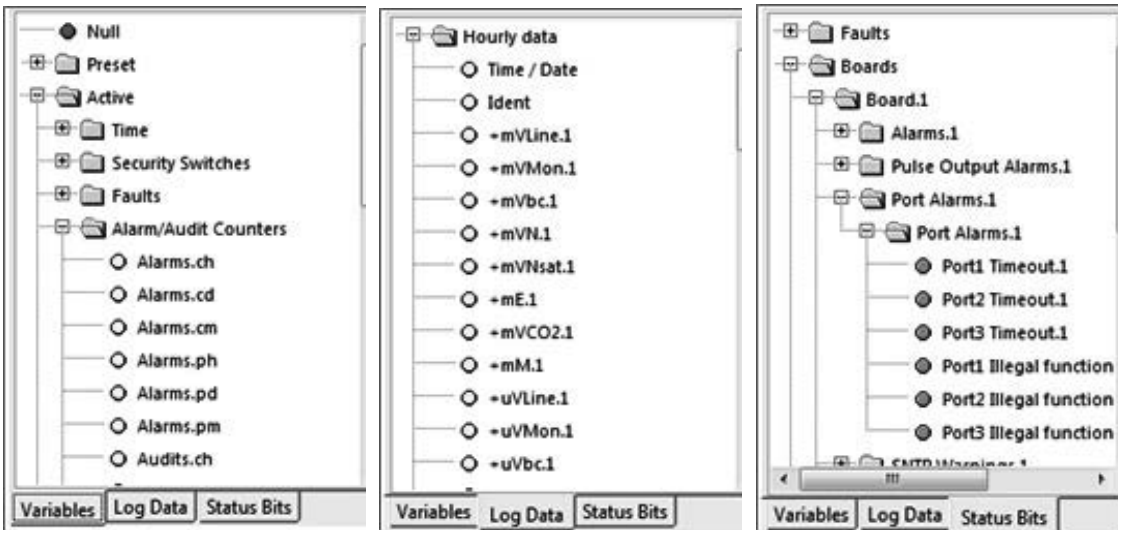


Figure 184 Modbus slave ID lists: variables, log data, status bits

The ID's can be chosen from three ID trees:

Variables	Contains all normal variables
Log data	Contains all data logs configured and its variables
Status Bits	Contains all alarms and status bits which can be read as individual bits

The three trees can be selected below the ID list

8.4.3 Parameters

Modbus is not a well defined standard. It started as a very simple protocol, but has been modified to fit different applications. Such changes have never been included in the standard, resulting in a wide variety of conflicting versions. Therefore, to cover all applications, many parameters have been included in the Summit.

#	Address	Variable	Type	Bytes	Order	Latch	Access	Registers	Indexing Method	Log #
0		+mVLine.1 (ft^3) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
1		+mVMon.1 (ft^3) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
2		+mVbc.1 (ft^3) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
3		+mVN.1 (Sft^3) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
4		+mVNsat.1 (Sft^3) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
5		+mE.1 (BTU) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0
6		+mVCO2.1 ($lbsCO_2$) [Log: Hourly data]	Double	8	12345678	None	Read only	1	Direct	0

Figure 185 Modbus slave registers

Each line represents one register with the following parameters:

Address	Modbus address, any number between 0 to 65535 is valid. There is no standard for addressing registers. Most often blocks of the same type are used, e.g. 10001-19999 for read only bits, but check the capabilities or needs of the master device before defining your addresses.
Variable	Name of the variable from the ID tree
Type	Defines the content of the variable used: available in different types: e.g. character, short integer, long integer (32 bits integers), floating point (32 bit single precision IEEE floating point), double (64 bit: double precision IEEE floating point), time and short string (8 characters). The original standard only defines bits (coils) and integers (inputs). Presently long and floats are very common, while the flow computer stores most values as doubles to have sufficient accuracy. Therefore, not all types may be supported by the master, e.g. older PLC's often do not support doubles. So change the type to fit the Modbus master. The SUMMIT 8800 will automatically scale it to the type selected. Highest accuracy of numbers is achieved using double precision IEEE numbers to 64 bit resolution. All numbers can be cast as types other than their default type, this will be indicated by brackets for the type, e.g., (float) - Indicating the number is not using its default type setting. NOTE: Highest accuracy of numbers is achieved using double precision IEEE numbers to 64 bit resolution.
Bytes	ID size in bytes. Information purposes only and cannot be changed.
Order	Byte order. Default is ascending 12345678. Different computer architectures use their memory in different ways to store data. Example, when a transmitting computer takes a 32-bit computer word composed of four 8 bit bytes and places it on a serial communication line, the receiving computer needs to know how the bytes need to be stored: does it start with the least significant byte first (Little-endian), or the most significant byte first (Big-endian). Motorola and Intel microprocessors are generally incompatible (cannot share the same memory) because of this byte order problem. In most cases, it is impossible to predict how a given system will handle this problem. For this reason the SUMMIT 8800 made this configuration possible, with the same processor it will be able to display the same order, e.g., 1234, or any other combinations needed, e.g., an order of 2143. The byte order will normally be the same for all registers.

Latch	Data can be latched (or frozen) until a new latch command is given. Normally all variables will be updated every calculation cycle. However the variables might be read slower than they are updated. In this case you can read data from two different calculation cycles by latching them as one consistent set of data. To do so, specify "latched" you will then be asked for a register address which is used to latch the data. By specifying the same address to all data from the consistent set, all data will be frozen, until a write to the latch address is performed. The contents of the register can be any variable, e.g., time or none.
Access	Read only or read / write. Access default is read only. Read / write is only applicable to items with write access capabilities and are indicated by a red ID colour, such as time. Access control will be important to ensure the security of the SUMMIT 8800. Only give read/ write access if absolutely required, specifically the Read Write to Data Flash.
Registers	In the different types of Modbus, there are two types of registers: fixed or variable sized registers, relating to the number of bytes in a register. In fixed sized registers the number of bytes is independent of the variable in the register. This means that if the variable is bigger than the register size, multiple addresses must be used. Often the size is 2 bytes, so to transfer a float (4 bytes) two adjacent addresses will be used. In variable sized registers a variable will always use one address. So address 100 may contain an integer (2 bytes) or a double (8 bytes). In the flow computer it is possible to define how many registers are used to retrieve the data. Default is 1 meaning that variable size is assumed. If fixed sized registers are needed, increase the number. Since the number of addresses for a register may change an overlap of addresses might occur, the software will warn the user and ask to update automatically.

For log data such as in Enron or Pemex modbus:

Indexing method There are 3 indexing methods:	
- Direct	The log number is specified in the parameter log number
- Indexed	The log number is specified by the number of records in the modbus request
- Event	The number of records parameter in the modbus request is ignored. The response is the number of log events which have occurred since the Log was last read and acknowledged. If no events have occurred then the response is no data. If many events have occurred, and fill the available modbus response, the oldest events will be transmitted. More recent events will be transmitted after the last request has been acknowledged. To obtain the number of events waiting to be transmitted, this is obtained by accessing the "Modbus Log Event Index"
Log number	In direct indexing method, the record number in the log. Zero is the most recent log record.

To Acknowledge events, the "Force single Coil" command is issued to the event address.

Note:
Log items and non-log items can only share the same address when the indexing method for the logged item(s) is set to direct. Where logged items share an address, they must all have the same indexing method.

Figure 186 Modbus slave im- and export

The register list functions are:	
Import from file	Import a modbus slave setup from a file
Export to file	Export the existing modbus setup to a file
Clear	Clear the full modbus list. Please be aware that there will not be a warning.
The line functions are:	
Inset a line or group	Drag a variable or group of variables to the right and drop it. at the blue line.
Group lines	Hold CTRL and select lines or select a start line and hold shift and select the last line
Delete line or group	Select an item/ group and press the delete key or right click and choose delete selected

Change address and addresses block (group of variables that together have one address):

Figure 187 Modbus serial settings

Change start address	Select a line, right click on address field and select change start address
Create an address block	Select a group of lines and right click on address field and select change addresses
Split an address block	Select the first line in a block, right click on address field and select split addresses

Figure 188 Modbus register parameter functions

The registers parameter functions are:	
Change registers	Change registers from fixed to variable size, give the number of register
Autofit registers	Change registers from variable to fixed size, sets the number of registers automatically

The parameters: type, byte, order, latch, access, indexing and log number functions are:

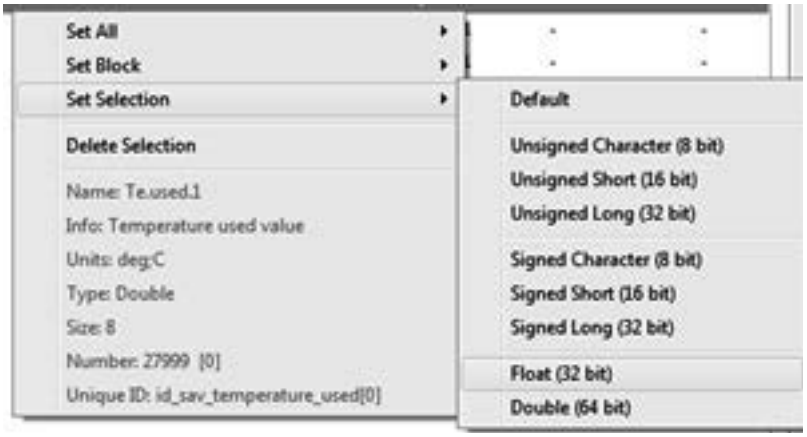


Figure 189 Modbus parameter settings

Change parameter	Select a line, right click on parameter field and select set

The parameters assigned to the variable as listed can be modified individually or for all variables. While a variable is selected, Right click on the parameter and a list of possible options for that parameter or variable will appear:

Edit an item	Double click and item or select an item, right click on it and choose edit current item

8.5 Enron Modbus

Enron modbus is an addition to the normal modbus and was created to be able to transfer tabular data via modbus, such as alarms/ events and log data.
For details, see http://www.simplymodbus.ca/

Enron Modbus is a relatively well defined protocol, so use the following guide to create one.

8.5.1 Enron modbus settings:

Use the following settings:

Protocol	RTU
Log Offset	1
First Log	Oldest first
Invalid data	Return clear data
Log event	Event

As follows:

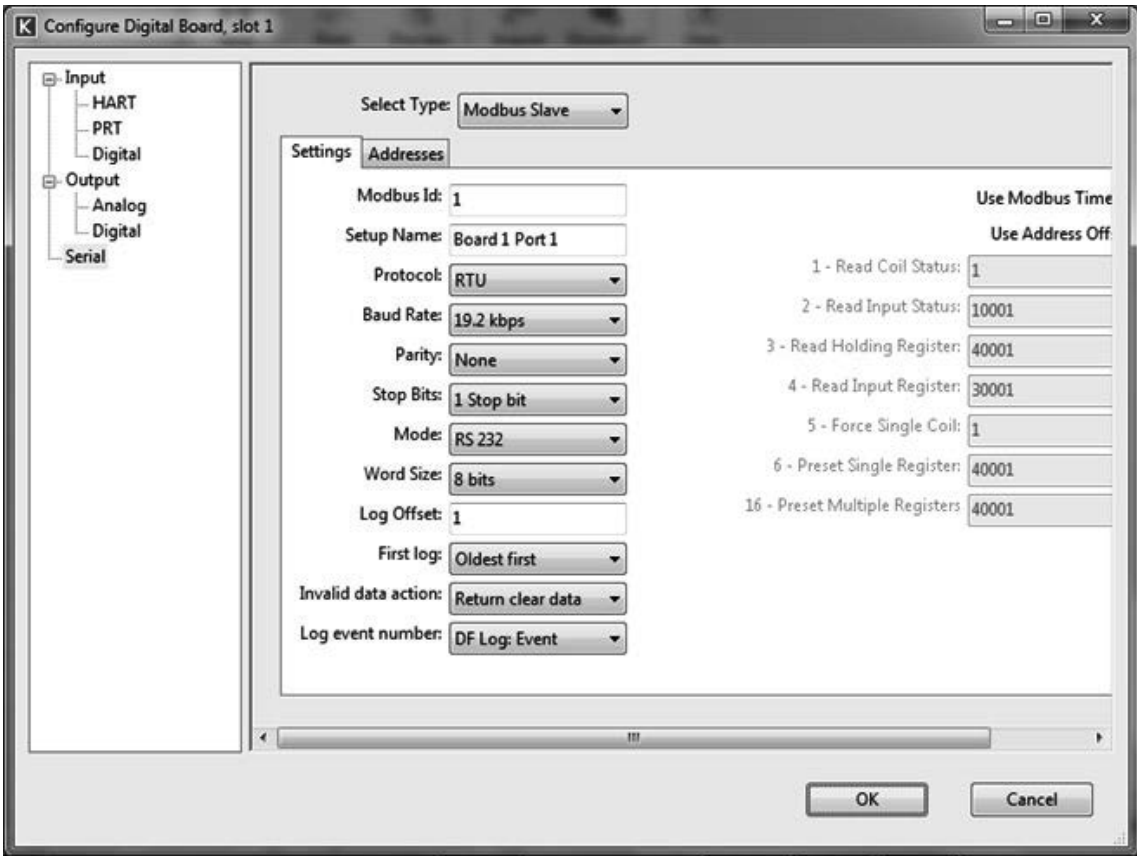


Figure 190 Enron modbus serial settings

8.5.2 Create logs

All logs need to be kept for 31 days. This means that the sizes for:

- Daily logs: 31 entries
- Hourly log: 31x24 = 744 entries
- Event log entries of 255 entries

Start with creating three logs:
- An Event log of (at least) 255 records as follows:

Just drag the Local/ Modbus Log Event folder to the right to have all id's in the log.

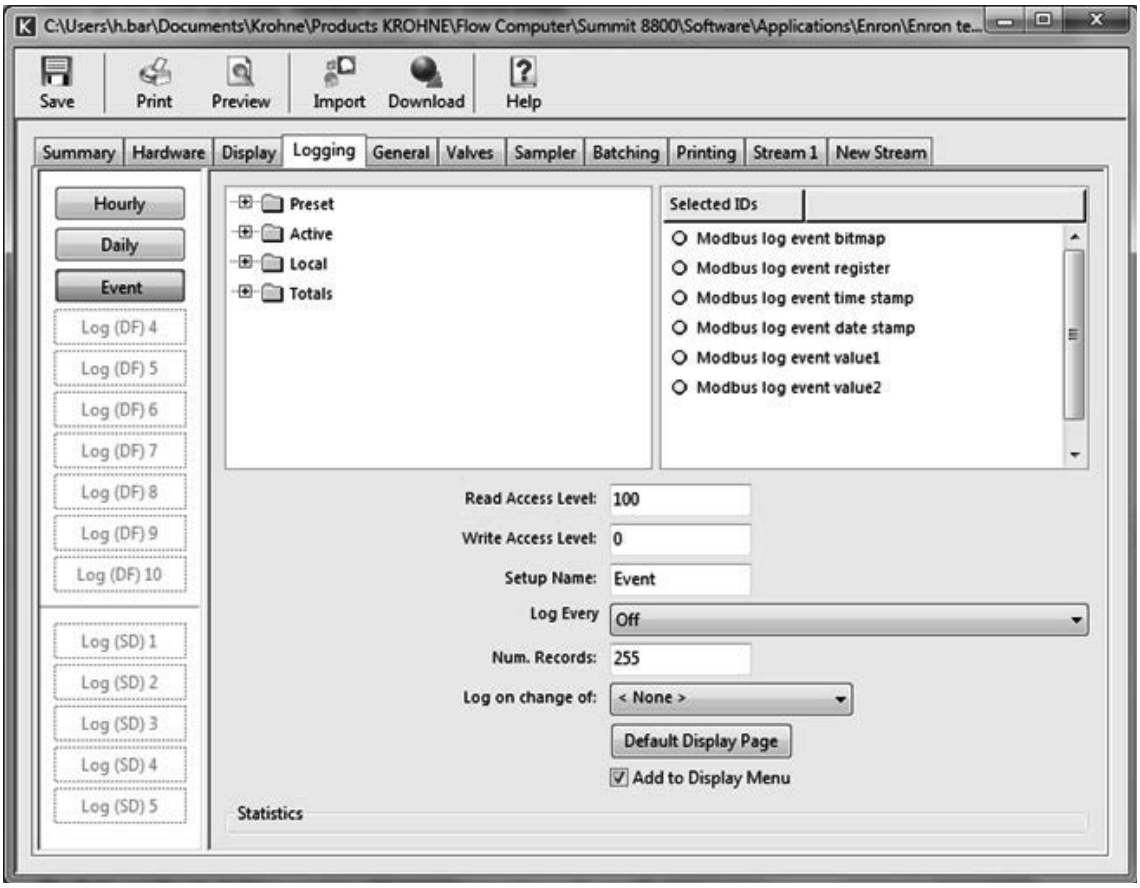


Figure 191 Enron event log

- A daily log of (at least) 31 records as follows:

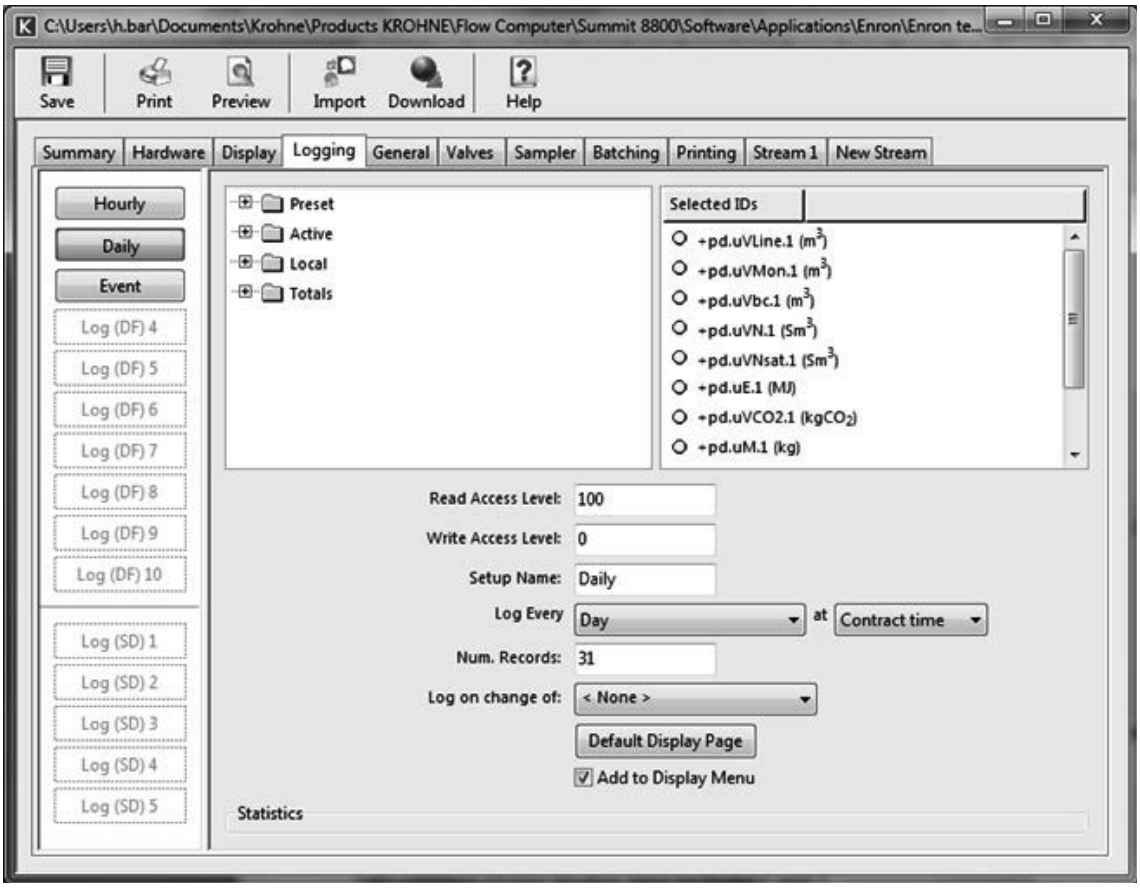


Figure 192 Enron daily log

- An hourly log of (at least) 31*24=744 records as follows:

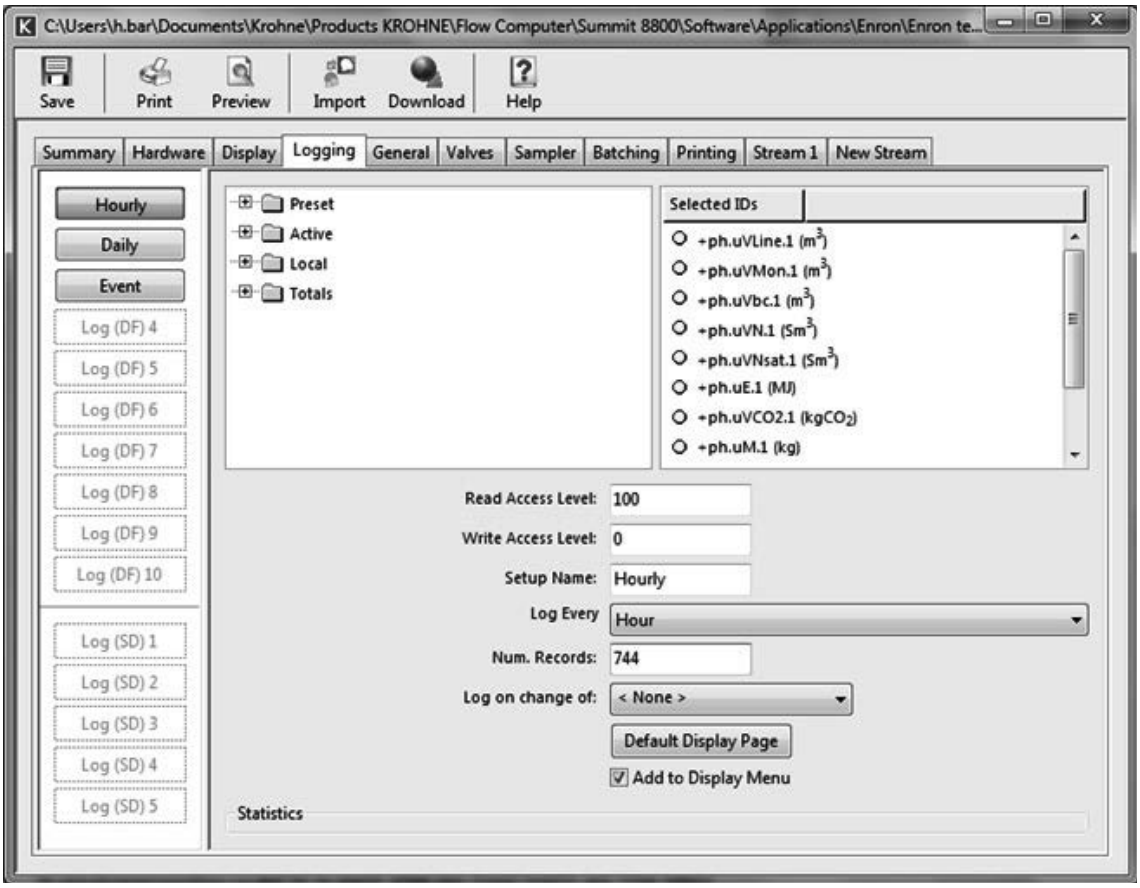


Figure 193 Enron hourly log

8.5.3 Addressing scheme:

The following addressing scheme should be used:

Adresses	Variables	Read command	Write command
32	Event log	03	05 -> (acknowledge)
701	Hourly log	03	
702	Daily log	03	
703..709	Other logs	03	
1001-1999	Boolean values	01	05
3001-3999	16 bit integers	03	06
5001-5999	32 bit integers	03	06
7000	Log event index	03	06
7001..7009	Log history index 1..9	03	06
7010-7999	32 bit floating point	03	06

To create the event list, select "Log data" in the tab below the ID list and select the event log. Select the last items as below and drag then to the beginning.

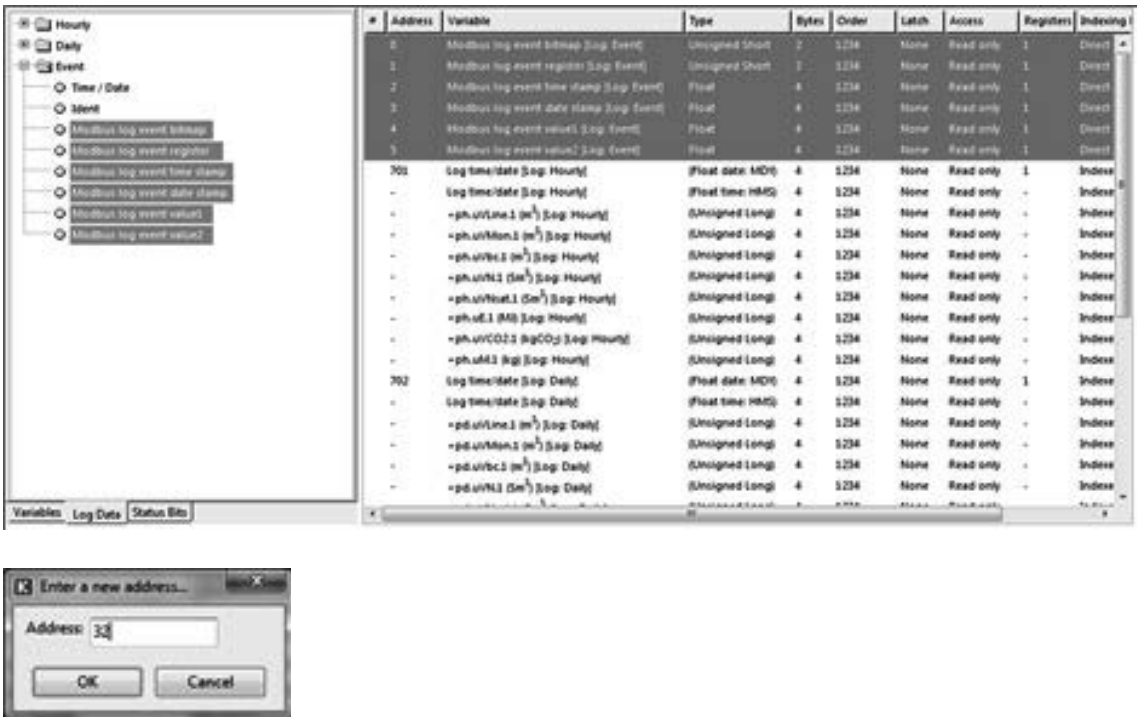


Figure 194 Enron modbus log selections

Select addresses 0..5 and click right on their address region. Klick on Change addresses: Selection and enter 32:

Variable	Type	Bytes	Order	Latch	Access	Registers	Indexing Me
Modbus log event bitmap [Log: Event]	Unsigned Short	2	1234	None	Read only	1	Event
Modbus log event register [Log: Event]	Unsigned Short	2	1234	None	Read only	-	Event
Modbus log event time stamp [Log: Event]	Float	4	1234	None	Read only	-	Event
Modbus log event date stamp [Log: Event]	Float	4	1234	None	Read only	-	Event
Modbus log event value1 [Log: Event]	Float	4	1234	None	Read only	-	Event
Modbus log event value2 [Log: Event]	Float	4	1234	None	Read only	-	Event
Log time/date [Log: Hourly]	(Float date: MDY)	4	1234	None	Read only	1	Indexed
Log time/date [Log: Hourly]	(Float time: HMS)	4	1234	None	Read only	-	Indexed
+ph.uVLine.1 (m^3) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uVMon.1 (m^3) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uVbc.1 (m^3) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uVN.1 (Sm^3) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uVNsat.1 (Sm^3) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uE.1 (MJ) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uVCO2.1 ($kgCO_2$) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+ph.uM.1 (kg) [Log: Hourly]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
Log time/date [Log: Daily]	(Float date: MDY)	4	1234	None	Read only	1	Indexed
Log time/date [Log: Daily]	(Float time: HMS)	4	1234	None	Read only	-	Indexed
+pd.uVLine.1 (m^3) [Log: Daily]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+pd.uVMon.1 (m^3) [Log: Daily]	(Unsigned Long)	4	1234	None	Read only	-	Indexed
+pd.uVbc.1 (m^3) [Log: Daily]	(Unsigned Long)	4	1234	None	Read only	-	Indexed

Figure 195 Enron modbus log addressing

The whole block will now get address 32. This means that if address 32 is requested that all variables will be returned.

Do the same with the hourly, daily log and possible other logs, giving them the address 701 etc. Make sure that all doubles are replaced by unsigned longs as above.

As with any modbus, make sure that the byte order matches your computers.

From Local/ modbus log information, move the modbus log history index for the event (#3 in this case) and modbus log history indexes from #1 and #2 to the right and give them addresses 7001 and following:

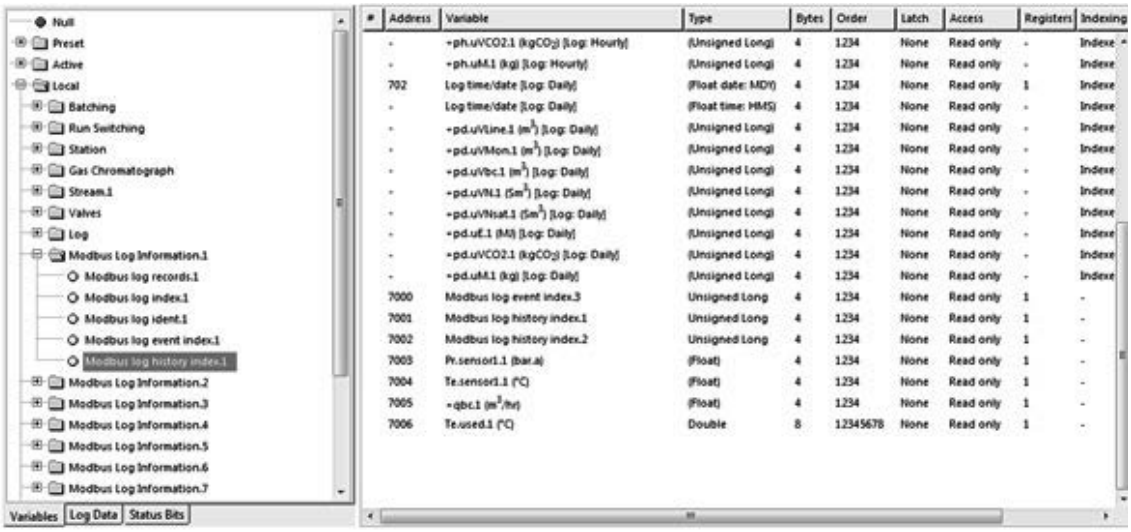


Figure 196 Enron modbus addressing

8.5.4 Define Modbus alarms

The last step is to define the alarms. The reason is because the Summit has far more alarms than traditional machines and then defined in the Enron Modbus specification. Here only the following alarms can be distinguished:

- LoLo limit
- Lo limit
- Hi limit
- HiHi limit
- Rate of change limit

Therefore a remapping of alarms is needed.

For this purpose go to General/ Modbus Alarms. Here all variables, defined in the modbus are listed. Select the ones that need to be alarmed and double click them to be included into the Alarmed Id's.

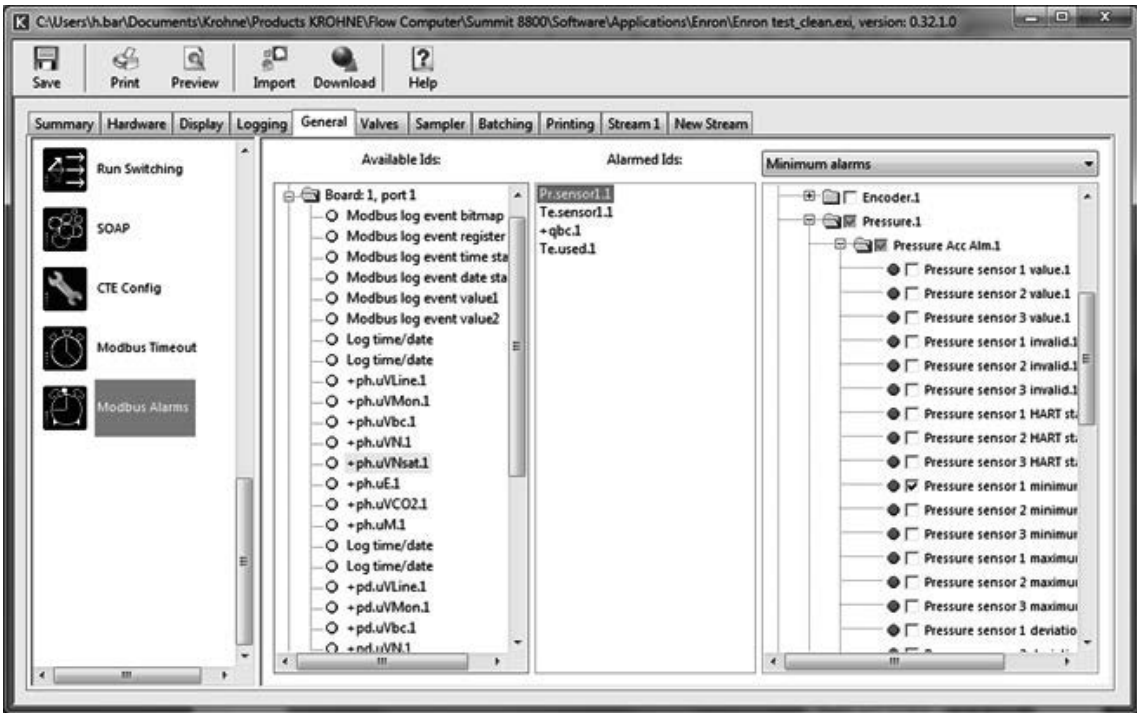


Figure 197 Enron Modbus alarms

For each Alarmed Id a selection can be made from all the possible alarms.

Every cycle the Modbus Alarms are verified, and if the alarm status changes from a previous cycle, an entry is made in the relevant Event Log. The alarms set the following bits within the Modbus Log Event bitmap register.

Events are a result of a preset value change, and are generated by examining values in the Modbus setup. These IDs do not necessarily have to be present in the Alarmed ID list.

8.6 Pemex Modbus

Pemex modbus is, similar to Enron modbus, designed to read logs via Modbus. In this case also batch logs are defined and the addressing scheme is slightly different.

8.6.1 Logs

All logs need to be kept for 35 days. This means that the sizes for:

- Daily logs: 35 entries
- Hourly log: 35x24= 840 entries
- Batch logs 35x10= 350 entries
- Event log entries of 255 entries

8.6.2 Addressing scheme

The following addressing scheme should be used:

Adresses	Variables	Read command	Write command	
0001-1000	History Logs	03		
0032	Event log	03	05	(acknowledge)

761-767	Hourly records	03		
781-787	Batch/ Daily records	03		
1001-1999	Boolean values	01	05 and 15!	
2001-6000	Not assigned			
6001-7000	Log history indexes	03	06	
6301	Log event index	03	06	
7001-7599	32 bit floating point	03	06	
7601-7999	events	03	06	
8001-9000	quality & configuration	03	06 16?	
9999-10000	Time synchronisation	03	06	

Details to be defined.

8.7 Instromet Ultrasonic protocol

The Elster/Instromet Q-sonic ultrasonic gas meter can be set to two protocols:

Instromet protocol	The original protocol specifically designed by Instromet for the Q-sonic
Modbus protocol	The most common protocol, developed later
The SUMMIT 8800 supports both protocols.	

To use the Instromet protocol, go to hardware, select a serial port and choose Instromet ultrasonic:

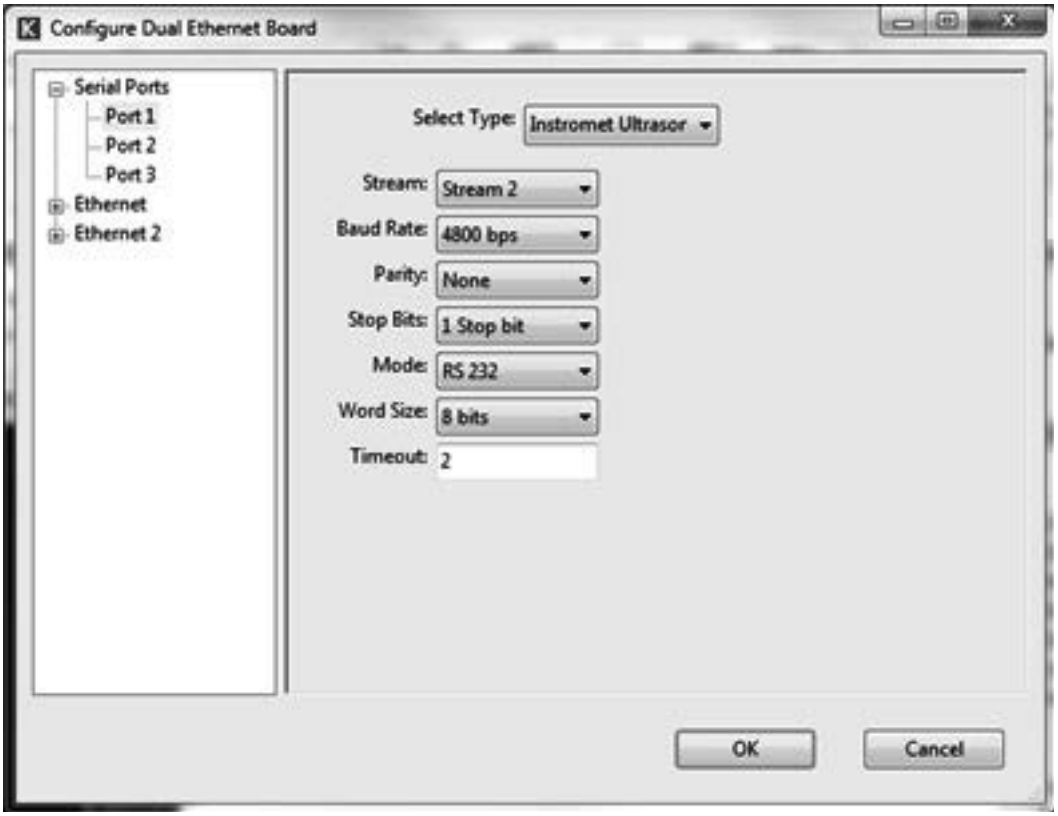


Figure 198 Figure 198 Instromet protocol serial settings

The standard settings need to match the meter settings:

Stream	Select the stream where the encoder is connected to
Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of 1 word: 7 or 8 bits
Timeout	The maximum time to be waiting for a response, after which an alarm is given

8.8 Encoder protocol

Normally meters have an index with totals, but send flow rates to flow computers in the form of pulses. From these pulses, the flow computer calculates then calculates its own totals.

Clearly the problem is that the meter totals are normally different from the totals in the flow computer. Differences occur because the initial meter totals are not copied to the flow computer, not even after a flow computer is stopped.

An encoder solves that problem by including electronics into the meter index which sends the exact the meter totals to the flow computer. Often a 2 wire NAMUR Interface is used to transmit the data via a serial protocol. Via a converter to RS232, the encoder can be connected to the flow computer.

The Summit will use the totals from the encoder to ensure that both totals are identical. However for flow rate the Summit still need the traditional connections, typically pulses.

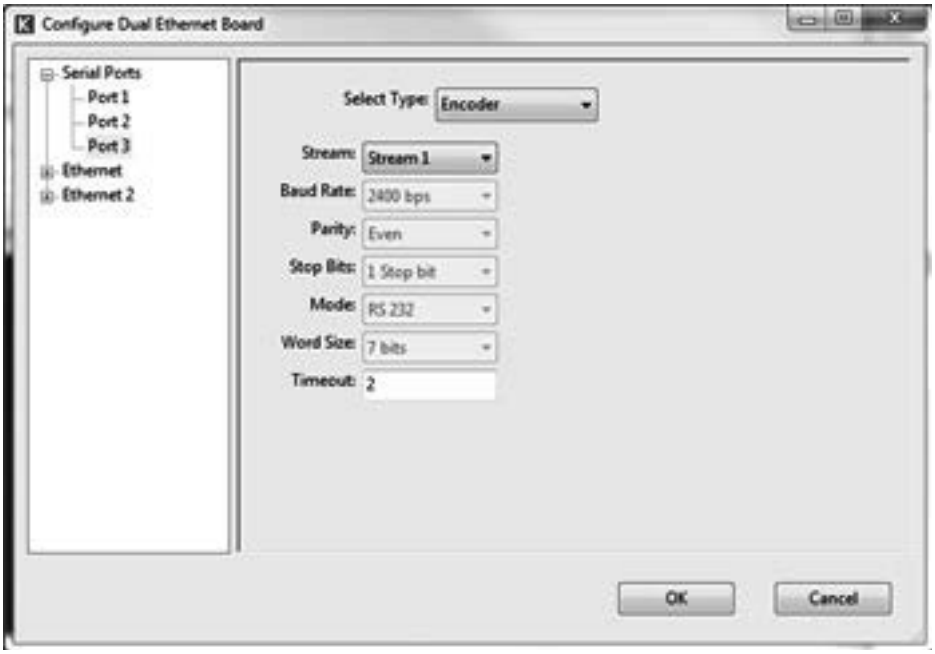


Figure 199 Encoder setting

The standard settings need to match the encoder settings:

Stream	Select the stream where the encoder is connected to
Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.

Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of 1 word: 7 or 8 bits
Timeout	The maximum time to be waiting for a response, after which an alarm is given

8.9 CTE Protocol

The CTE protocol or Comunicazione a Trame Estese (communication for large stations) is in use by the Italian SNAM to transmit the consumption of natural gas. For details, see UNI/TS 11291-2 gas measurement systems - devices for measurement of gas on an hourly basis, Part 2: Protocol CTE.

The CTE must be chosen in the hardware section for one of the serial ports:

Figure 200 CTE protocol hardware setting

The standard settings need to match the CTE communication partner:

Master	Click the box if the Summit is the master
Baud rate	The speed of transmission in bits per second between 300 and 38400.
Parity	A check on correct transmission: none, odd, even, space or mark.
Stop bits	Gap between two transmitted words, 1 or 2 stop bits
Mode	RS232 or RS 485
Word size	Size of 1 word: 7 or 8 bits
Level code 1 to 3	Code used for addressing the flow meter. If omitted the address is not used.
Session timeout	The maximum time to be waiting for a response, after which an alarm is given

More CTE details must be given under general:

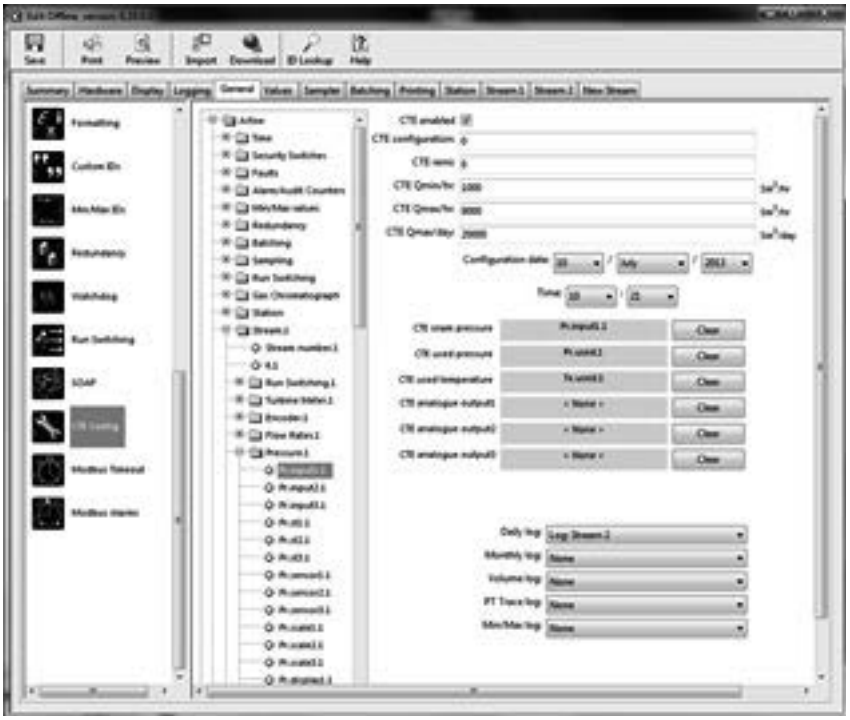


Figure 201 CTE protocol setting

With as configuration data:

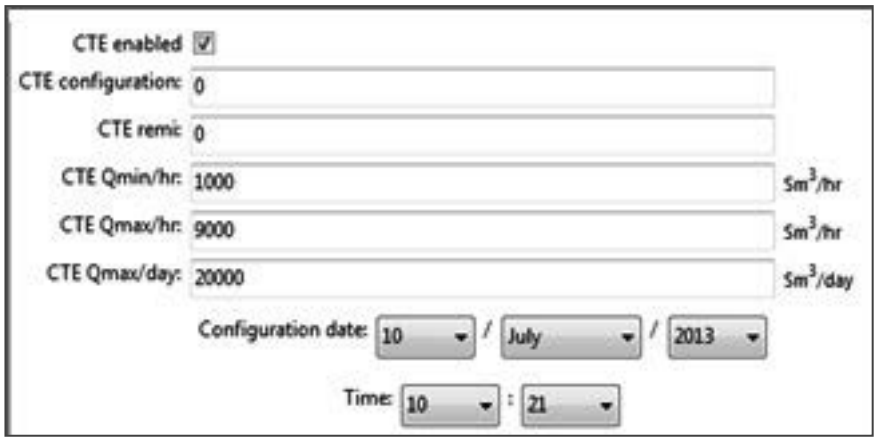


Figure 202 CTE protocol setting

CTE enabled	Click the box to enable the CTE protocol
CTE configuration	Enter the CTE configuration information
CTE remi	Enter the CTE remi information
CTE Qmin/hr	Enter the minimum flow per hour
CTE Qmax/hr	Enter the maximum flow per hour
CTE Qmax/day	Enter the maximum flow per day

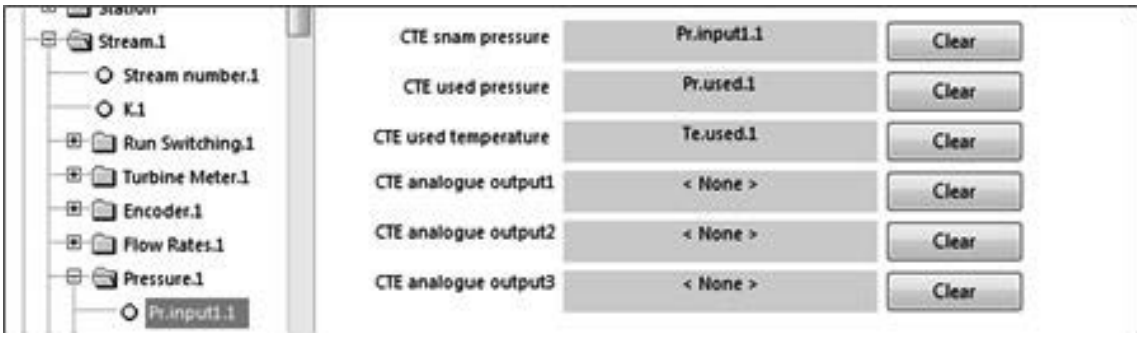


Figure 203 CTE protocol variables

CTE inputs	Drag and drop the SNAM pressure, the used pressure and temperature from the ID list
CTE outputs 1 to 3	Drag and drop the SNAM variables used as outputs 1 to 3 from the ID list

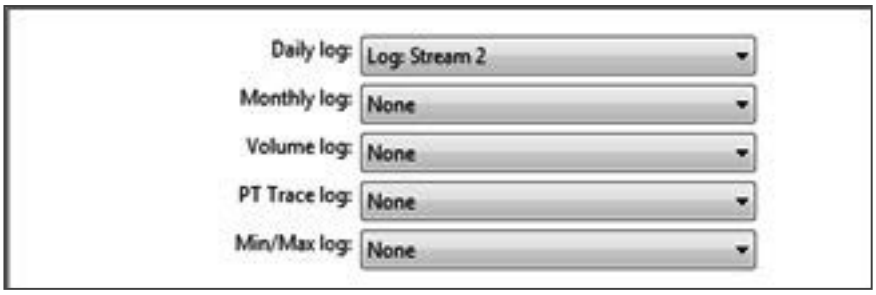


Figure 204 CTE protocol log data

Log data Enter the name of the data logs used for daily, monthly, Volume, PT trace and Min/max

8.10 DSfG Protocol

The DSfG or Digitale Schnittstelle für Gasmessgeräte (Digital protocol for gas measurement equipment) is a German protocol for Gas measurement. This elaborate, but dated protocol is used to communicate between field devices and between a station and host computers. See diagram below:

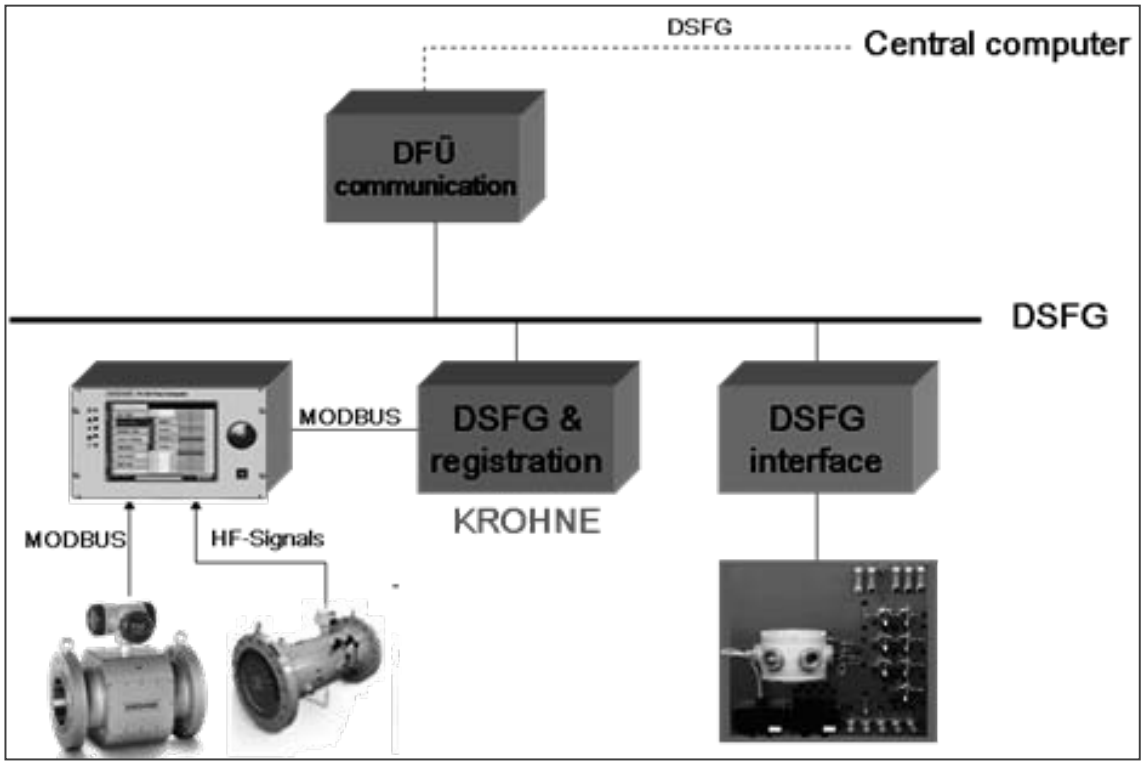


Figure 205 Figure 205 DSfG block diagram

The blue box is a special communication board developed by KROHNE to handle the protocol and data registration. The board is installed in the Summit and internally connected to a modified dual Ethernet board via a modbus link with the Summit as a slave. It comes as a kit containing:

- DSfG communication board
- Dual Ethernet board with port 2 modified as an internal RS232
- A serial cable for internal connection between the two boards
- A software application with DSfG modbus and display configuration for DSfG
- A configuration program for the DSfG board
- A German DSfG manual describing the configuration

Import the modbus and display configuration to ensure proper communication between the boards.

8.11 SOAP protocol

SOAP or Simple object access protocol is a messaging protocol based on XML. The big advantage is that it does not need configuration in the Summit as the host can send a SOAP message with a request for any variable in the Summit database, e.g., flow, temperature and pressure. The Summit will return an XML-formatted document with the resulting data. Because XML is a standardized machine-usable format, it can then be read directly into a SCADA system or an accounting application.

In the SUMMIT 8800 SOAP is using the HTTP protocol, so on the Ethernet port Web access has to be enabled:

Figure 206 Ethernet configuration page

The only further configuration is that for security purposes SOAP users must be defined:

Figure 207 Soap user configuration

Username	A unique alphanumeric name needed to get access to the SOAP database
Password	Any alphanumeric password needed to get access to the SOAP database
Access level	Any value for 0 (no access) to 100 (full access)

A user will automatically be logged out 5 minutes after the last keep alive message is received.

With as functions:

New user	Press add a new soap user and provide the details
Edit user	Select the user to be changed and press edit soap user
Delete user	Select the user to be changed and press delete soap user

Information in this section is used for setting up general items of data that will apply to the overall flow computer rather than specific streams.
The data is divided into groups, which are selected by individual icons.

9.1 Unit Identification

Liquid	Gas	Steam

Allows the user to enter an identification and code for the flow computer. This is useful in a system e.g. to identify the unit via the display, report or communication.

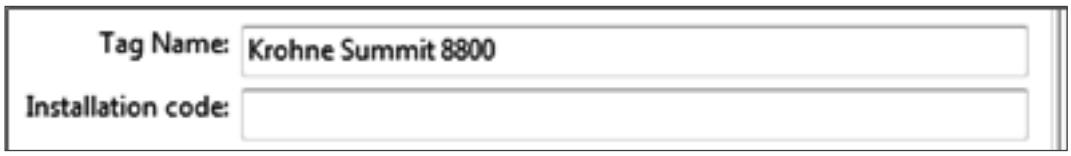


Figure 208 General unit identifier

Tag name	An name of maximum 31 characters to identify this Summit flow computer
Installation code	An code of maximum 36 characters for this Summit flow computer

9.2 Date and time

Liquid	Gas	Steam

In the configuration software the initial settings for date and time can be set together with and the display format and the contract time.

9.3 Translation

	Liquid	Gas	Steam

English is the default language for the Summit, but it is possible to define a new language.

9.4 Audit log

	Liquid	Gas	Steam

For diagnostic purposes, the user can extend the audit trail with alarms and with up to 10 additional data items per event. These data will be stored on an external SD card only.

9.5 Settings

	Liquid	Gas	Steam

General calculation settings are used to set the cycle time (how often all measurement and calculations must be done per second), the maximum counter value and what to do with negative station flow:.:

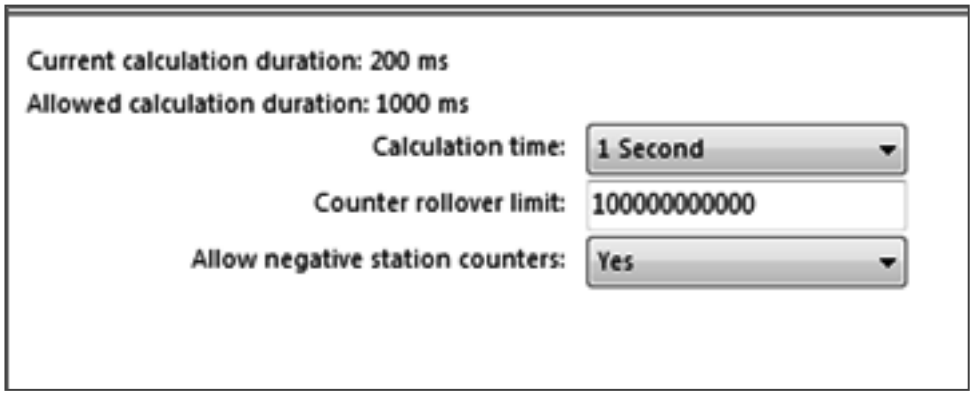
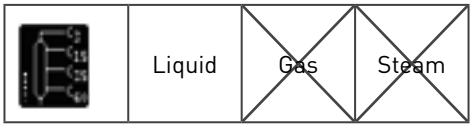


Figure 209 General settings

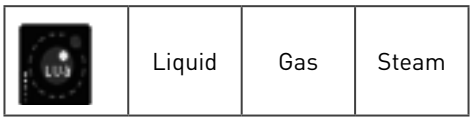
Calculation time	The cycle time or the time after which the Summit will start again with all calculations. This number should be larger than the current calculation duration. At the maximum, the Summit will do 4 full cycles per second.
Counter rollover limit	The maximum counter value after which the counter restarts from zero.
Allow negative station counters	If not, then a negative station flow will be counted as zero.

9.6 Product information



The product information defines the different liquid products that are used in the application. For details, see volume 2

9.7 Calculation code



Although most users happily confirm that the configurator, with all its flexibility, offers all functions needed for their application, some more advanced users like to define their own additional functionality. The Summit is unique in that it offers a full fledged programming language interpreter LUA to those advanced users.

LUA-based programming is mostly used for a simple user defined calculation or procedure. Two entry points are available:

- The modbus master configuration, to change the master configuration
- The calculation code to add a simple calculation.

The last one is shown here:

```
127
128           end
129
130           -- Alarms
131           stream.process_alarms()
132           stream.latch_alarms()
133           -- Counters
134           stream.process_counters()
135           station.process_counter_increments()
136           stream.process_averages()
137           stream.reset_refresh_flags()
138
139        end
140
141     end
142
143     -- Valve Control
144     station.process_valves()
145     -- Station Counters
146     station.process_counters()
147
148   -- Start Simulation
149   exi.putidvalue(ids.id_tlv_fat,0,1)
150 end
151
```

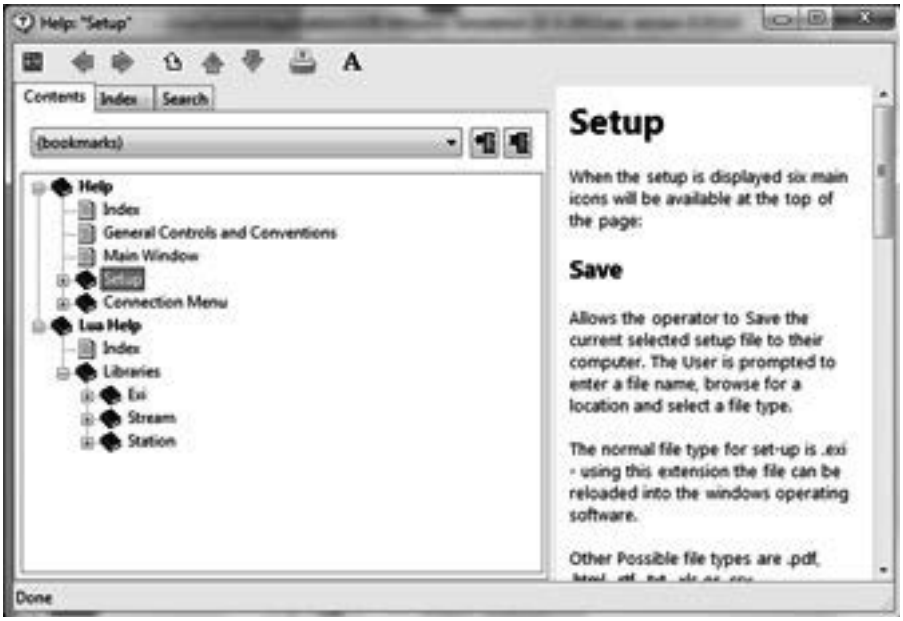


Figure 210 Calculation code and help

Press help on this page to get the full LUA help, including all Summit additions to the language.

For further details, refer to the internet or contact KROHNE.

9.8 Factory acceptance test check

	Liquid	Gas	Steam

To verify a configuration and to do a regular parameter check it is very useful and more accurate to simulate the measurements by software instead of the need for hardware signal generators. Furthermore to check the full range of the calculations, normally these simulated values must regularly be manually. This is time-consuming and error prone.
The FAT check is designed to do all of this automatically. A list of settings and the time to change them can be created and in maintenance mode this list can be processed automatically.

This means that all steps (e.g. a day worth of steps) for an FAT can be done without supervision after which the generated reports can be compared with the expected results.

The configuration of the steps is as follows:

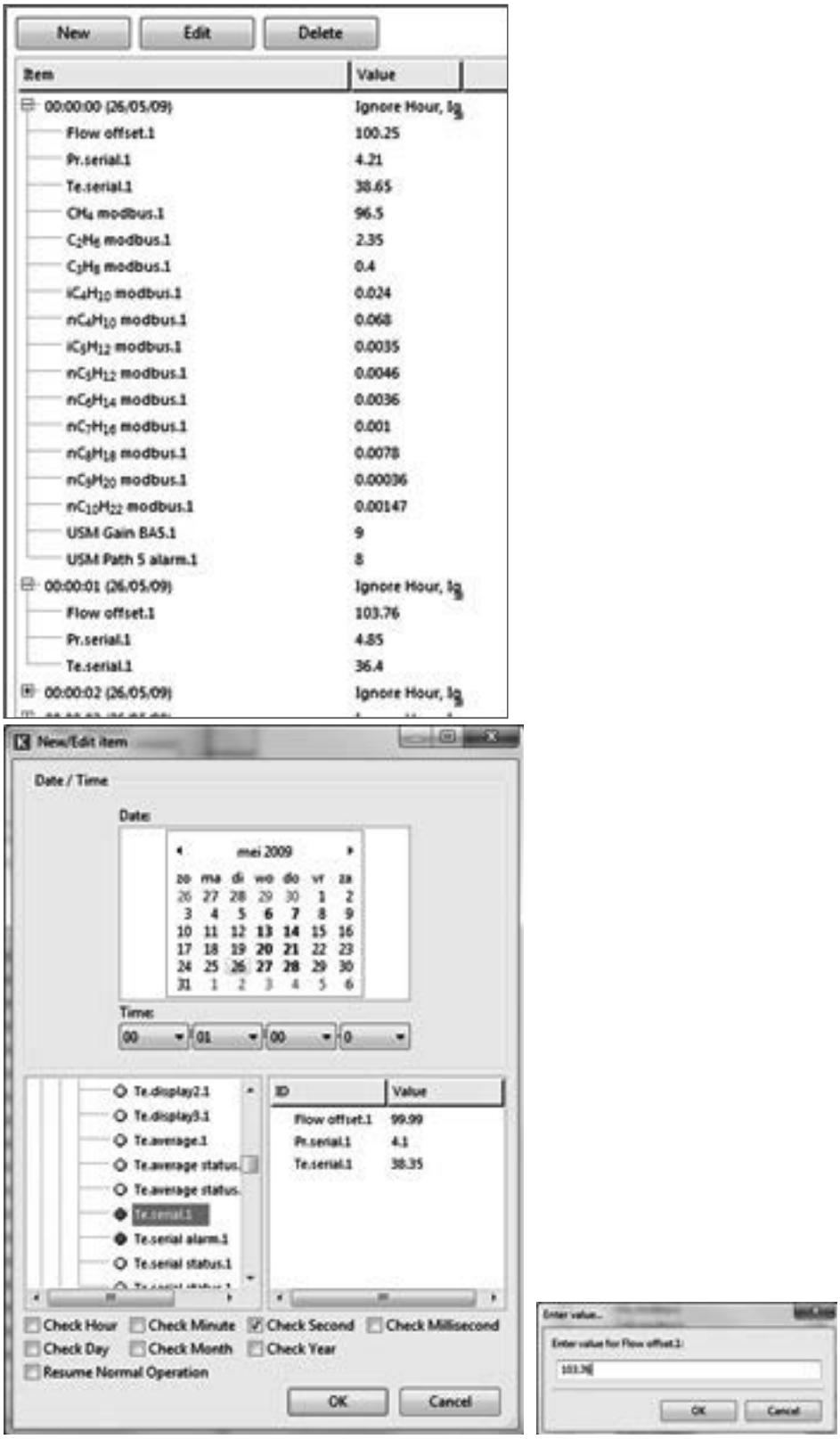


Figure 211 Configure a FAT check

By pressing the new button, a new step with its associated variable settings can be entered:

Date/ time	Set the date and time to start this step
ID/ value	For each ID item, drag and drop a variable in the list and give it the desired value
Check times	As an FAT normally does not start at a fixed time or date, it is possible to ignore checking of the a time element. In this case only the seconds are checked.
Resume normal operation	Define if normal operation should start when the step starts, so if needed this will normally be at the last step.

Please note that in this case the FAT check uses the flow offset to simulate a flow without the need for hardware pulses.

Other functions are:

Create a new step	Press the new button
Edit a step	Select a step and press the edit button
Delete a step	Select a step and press the delete button
Create an ID/ value	Drag and drop a variable from the ID list
Edit an ID/ value	Double click on the ID
Delete an ID/ value	Select an ID and press the delete key

9.9 Security configuration

	Liquid	Gas	Steam

The SUMMIT 8800 can have 3 security modes:

Open	Any changes can be made including download of a new application
Partial	The existing application can be uploaded, changed and downloaded again.
Full	Connection is possible and applications can be uploaded, but cannot be downloaded.

Although an application can be changed in partial mode, there are still security measures to restrict access. First of all, the user be authorized to use the configurator and secondly an application itself can restrict the access to its menu:

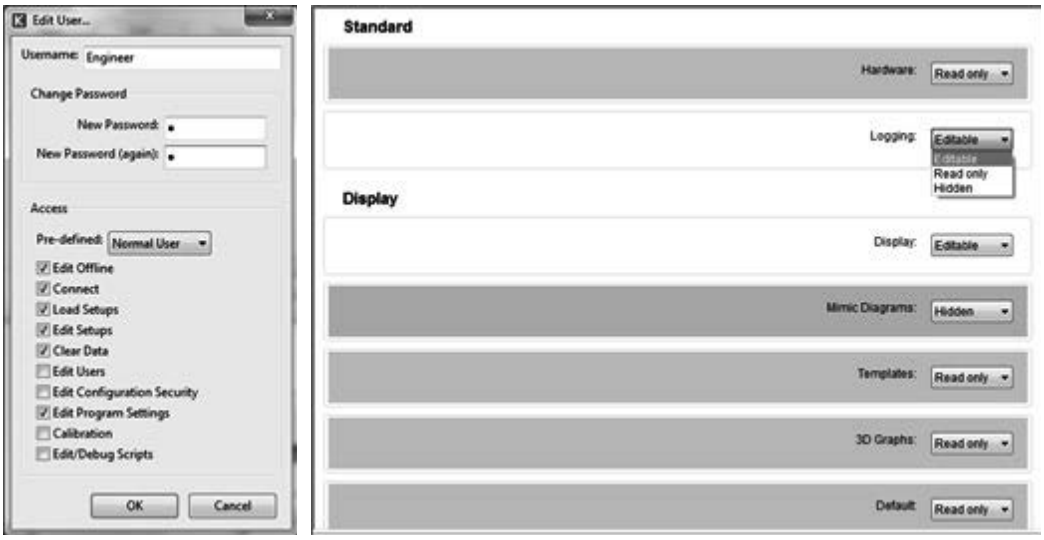


Figure 212 User authorization and security configuration selection

The super user can authorize new users to use the configurator restricting access to certain functions.
With the security configuration any of the menu items can be given a access level of:

Editable	Any change can be made to the menu item	displayed in white
Read only	The menu item can be read but not be changed	displayed in purple
Hidden	The menu item cannot be accessed and will be hidden	displayed in pink

Typically non-critical configuration data, parameters and values.

These settings are only used when the security level of the flow computer is set to partially secure using the rear panel mode switches. Further details on switch settings can be found in volume 1.

An engineer can then use the configurator to change the application, off course with the restrictions given.

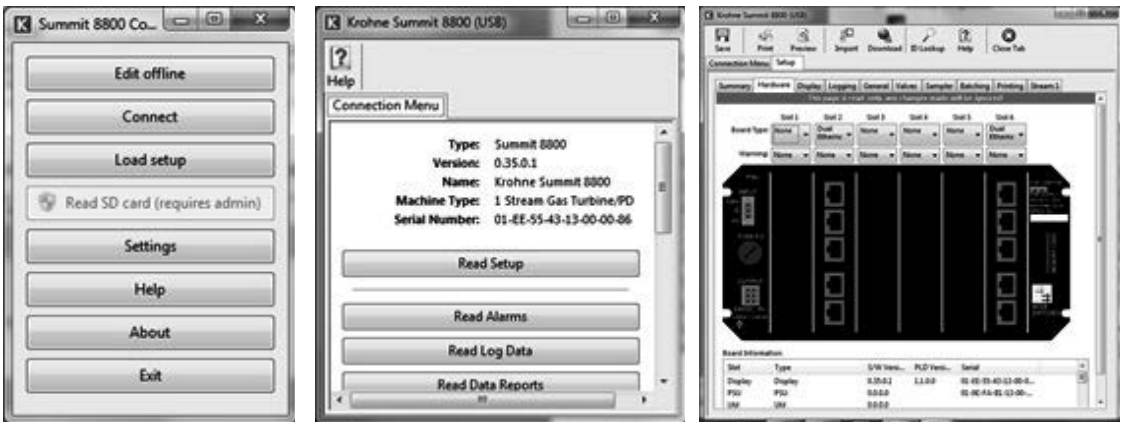


Figure 213 Read and modify a secure configuration in partial mode

In this case, the hardware menu is read-only. When trying to change the hardware a red bar appears:

This page is read-only, any changes made will be ignored!

9.10 ID report

	Liquid	Gas	Steam

This function allows download of an active data report to a host via the Summit website or via the configurator.

9.11 Maintenance

	Liquid	Gas	Steam

Generally, maintenance mode is used for routine configuration or validation procedures, and any changes or any flow recorded will not form part of the normal measurement records. Therefore it might be crucial to define what to do when a stream or a station goes into maintenance.

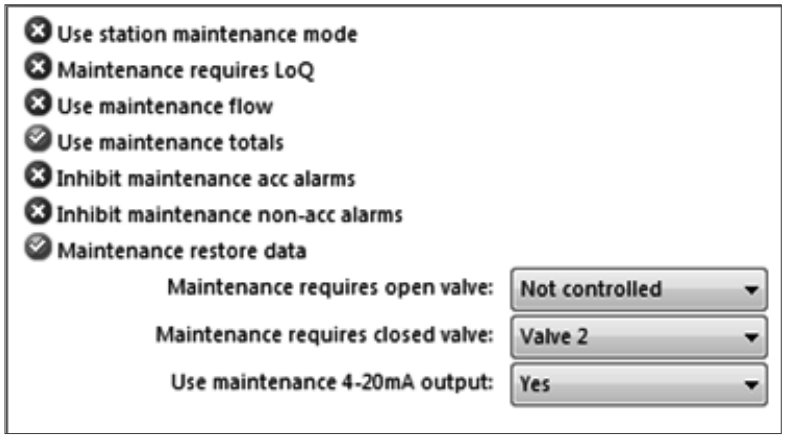


Figure 214 Maintenance configuration

Click the following options (to become green) if appropriate for maintenance mode:

Use station maintenance mode	Set if the maintenance mode applies to the complete station
Maintenance requires LoQ	Set if low flow is required to enter or exit maintenance mode
Use maintenance flow	Set if the maintenance flow rates need to be used
Use maintenance totals	Set if the maintenance flow counter need to be used
Inhibit maintenance acc alarms	Set if accountable alarms may not occur
Inhibit maintenance non-acc alarms	Set if non-accountable alarms may not occur
Maintenance restore data	Set if preset values should be restored when exiting maintenance
The following actions can be chosen when in maintenance mode:	
Maintenance mode requires open valve	Check if the selected vale is open to enter/ exit maintenance
Maintenance mode requires closed valve	Check if the selected vale is closed to enter/ exit maintenance
Use maintenance 4-20mA output	Set the 4-20 mA to min or max when in maintenance mode

9.12 Formatting

	Liquid	Gas	Steam

The Summit has default formatting for all variables. However the user can change such formats. He can define the number of significant figures and decimal places to be formatted for each parameter. This will affect the formatting of the number on the display, printing and logging:

Figure 215 Formatting configuration

Individual IDs can be selected from the parameter tree and dragged and dropped into the formatting window. A pop up window appears:

Width	Give the number of significant figures, the total number of characters.
Decimal places	Number of characters behind the decimal place
Affect all Indexes	Click the box if the format for this variable applies to all streams.

Note that the list is automatically sorted in the order of the variable list.

The following functions are available for this list:

New item	Drag and drop a variable into the list
Edit item	Press edit or double click on a line to get the format window
Delete item	Press delete or use the delete key on a line.

9.13 Customs strings

	Liquid	Gas	Steam

When a standard application is applicable for multiple sites, it is very useful to have variables that contain text which is site dependent. In the Summit up to 50 custom string variable can be created:

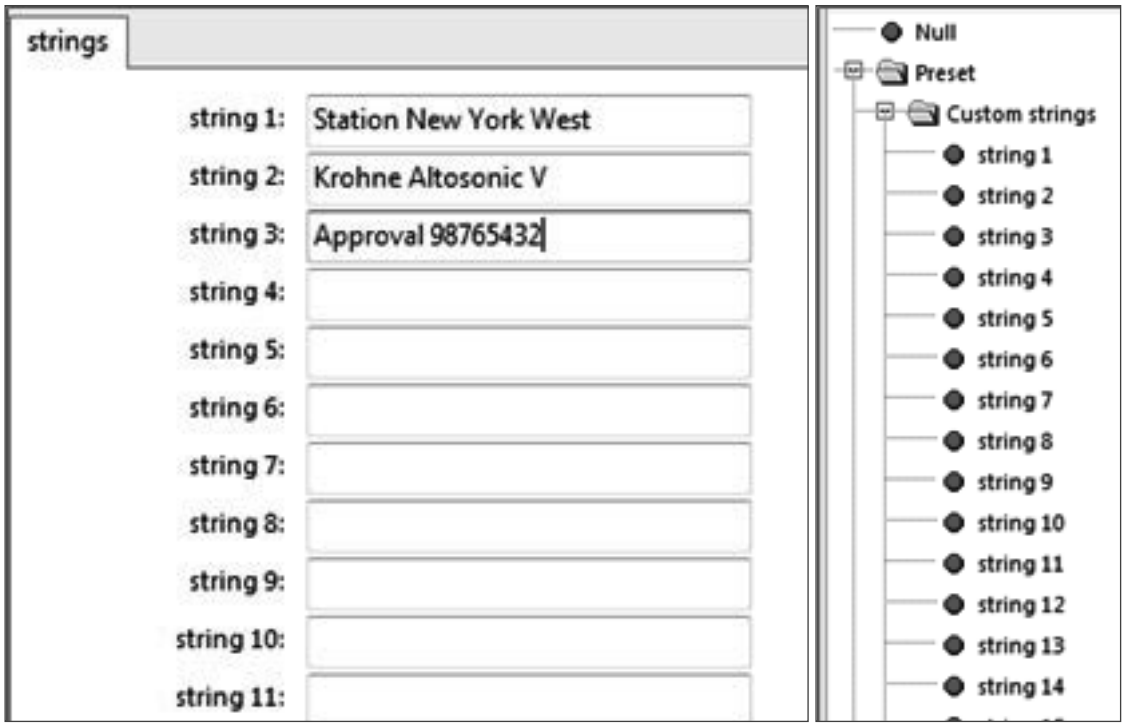


Figure 216 Configure string ID's and resulting variables

Each variables can contain up to 40 unicode characters. These ID's are in the active list and can be used in display, reports and communication.

The strings are read/ writable an can therefore be changed by operators or via communication e.g. from SCADA.

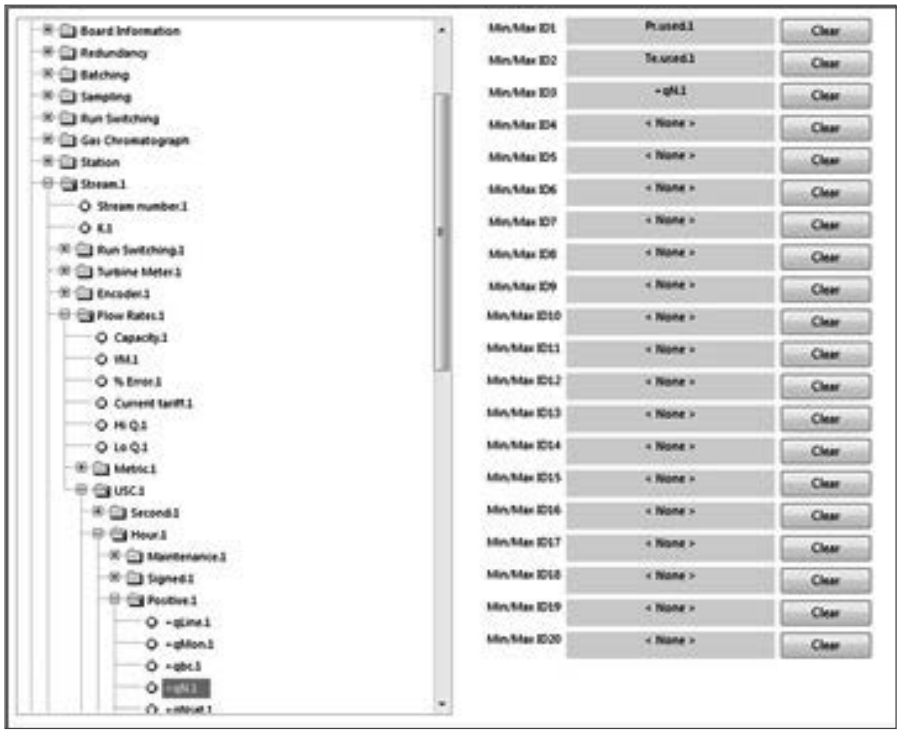
Please note that by right clicking on the string field, the full Unicode character set can be used, including the Unicode control characters:

Figure 217 Configure string ID's formatting

9.14 Minimum & maximum ID's

	Liquid	Gas	Steam

In many cases it is important to know minimum and maximum value of a variable during a certain period. This can be achieved with this function for up to 20 selectable ID's:



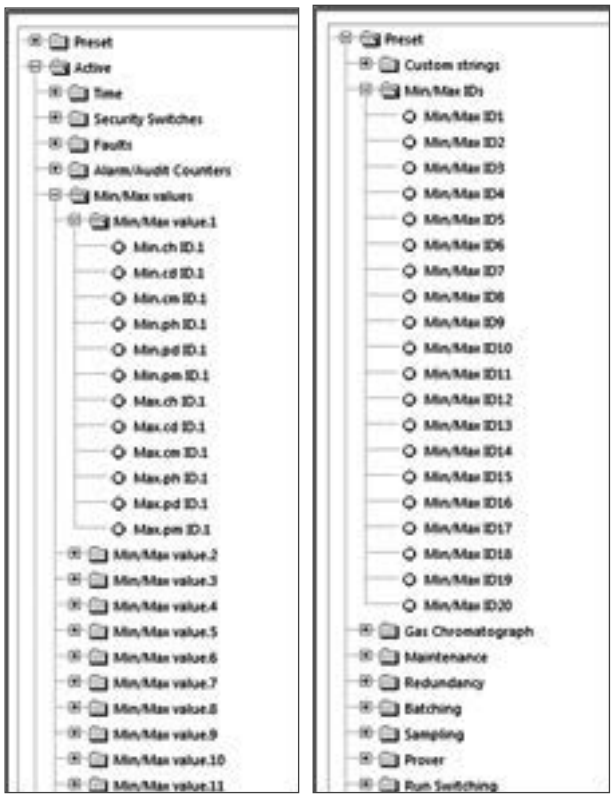


Figure 218 Min/max ID setting and resulting variables

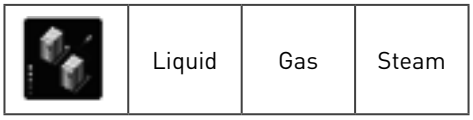
Select a desired variable from the ID tree and drag and drop it into a min/max ID position. The Summit will then calculate the minima and maxima for the active variable for each of the following periods:

Min ch ID.1	Max ch ID.1	Current hour
Min cd ID.1	Max cd ID.1	Current day
Min cm ID.1	Max cm ID.1	Current month
Min ph ID.1	Max ph ID.1	Previous hour
Min pd ID.1	Max pd ID.1	Previous day
Min pm ID.1	Max pm ID.1	Previous month

These ID's are in the active list and can be used in display, reports and communication.
The min/max ID's in the preset list are strings with the ID names associated to the min/max value.

The setting for an item can be cleared by pushing the associated clear button

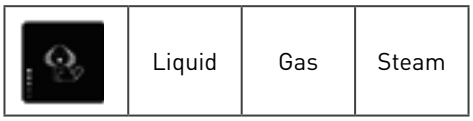
9.15 Redundancy



This page allows a system redundancy function to be enabled.
The default state of the flow computer can be set to be duty or standby, and assumes that a system consists of a duty and a standby flow computer that are in communication with each other.

Further details on configuring a redundancy setup is detailed in volume 2

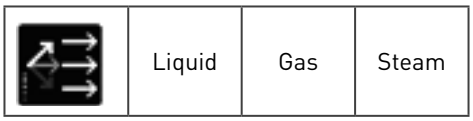
9.16 Watchdog



This function allows a system watchdog to be enabled which will perform a complete system reset after a defined watchdog time-out period has elapsed if any fault condition occurs.

For details. See volume 2

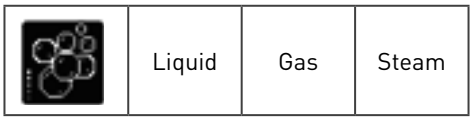
9.17 Run-switching



Run switching allows automatic opening of new runs/ streams when the flow exceeds a preset maximum and automatic closing when the flow is below a preset minimum. With this the best accuracy of a metering station can be guaranteed.

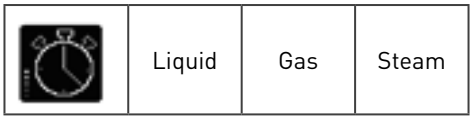
For details, see volume 2

9.18 SOAP



The Soap or Simple object access protocol is used for external servers to access information from the Summit.

9.19 Modbus time-out



The Modbus time-out function is designed to identify when essential Modbus communications is lost.

9.20 Modbus alarms

	Liquid	Gas	Steam

This is used to associate unit alarms with Enron Modbus values. It identifies which values should generate and events within an Enron event Log.

9.21 CTE Configuration

	Liquid	Gas	Steam

Only available in Gas application and is used for configuring CTE communication protocols.

10.1 Versions/ Revisions

First Digit	Major Revision that affects Compatibility of Software with Configuration data, most likely used when new software features are added or hardware features are added.
Second Digit	Minor Revision that affects Compatibility of software with Configuration data, most likely used when major modifications are made to existing software or hardware features.
Third Digit	Bug fix revision, compatibility with any existing configurations or set ups is not affected by such changes.
Forth Digit	Bug fix revision to existing bug fix revision, again compatibility with any existing configuration or set up is not affected by this change type.
Example of coding:	34.2.0.1 Major revision 34, minor revision 2 whch includes minor bug fixes revision 1

10.2 Current versions

There are two sets of versions, the

- Latest version: includes all the features that are available in the Summit 8800.
- Approved MID version: includes only the features that are tested by the certification for MID approval.

The latest version start with a main version revision 0, the MID versions with 1 and above.

10.2.1 Latest version 0.35.0.0

Type Board	Version	Date	Checksum
Summit 8800_Main	0.35.0.0	2013-03-01	0x14B3F2C1
Summit 8800_Boot	0.26.0.0	2011-07-25	0x01AAC8CC
AIOboard_Main	0.4.0.2	2010-11-24	0x004D9958
DIOboard_Main	0.4.0.2	2010-11-24	0x004D588F
DIO2board_Main	0.1.0.1	2010-11-24	0x004BFE39
SIOboard_Main	0.2.0.1	2010-11-24	0x0043DAE2
Commsboard_Main	0.9.0.0	2012-11-06	0x0137E837
DualEthernet_Main	0.5.0.1	2012-12-19	0x00F14370
BoardBoot	0.5.0.0	2011-02-17	0x000CC299
Summit Configurator	0.35.0.0	2013-03-04	N.A.

10.2.2 Approved version MID2.4.0.0

Based on the following versions of firmware and configurator:
Summit 8800 Configurator: 0.32.1.1
Summit 8800 Firmware: 0.32.1.0

Type Board	Version	Date	Checksum
Summit8800_Main	2.4.0.0	2012-07-27	0x13BE3F70
Summit8800_Boot	0.26.0.0	2011-07-25	0x01AAC8CC
AIOboard_Main	2.4.0.0	2012-07-27	0x004C29FA
DIOboard_Main	2.4.0.0	2012-07-27	0x004C0DE0
DIO2board_Main	2.4.0.0	2012-07-27	0x004AC67A
SIOboard_Main	0.2.0.1	2010-11-24	0x0043DAE2
Commsboard_Main	0.8.0.0	2012-05-29	0x0137E837
DualEthernet_Main	0.4.0.0	2012-05-29	0x013DE995
BoardBoot	0.5.0.0	2011-02-17	0x000CC299
Summit Configurator	2.4.0.0	2012-07-27	N.A.

Windows item	SUMMIT8800 main menu	Description	Function Remarks
Units	Preset data	Pressure units	Bar, Kpa, kg/cm2
	Preset data	Temperature units	degree C or degree K
	Preset data	Volume units	
	Preset data	Density units	kg/m3
	Preset data	Energy units	MJ, kw
Turbine	Preset data	Turbine impulse Hf	
	Preset data	Turbine impulse Lf	
	Preset data	Turbine blade ratio	
Flow rates and totals	Preset data	Meter max flow rate	Linearity curve
	Preset data	Meter max alarm value	
	Preset data	Meter linearisation	Up to 20 points
	Preset data	Total scaling factors	Vb, Vn, E, M etc.
Pressure	Preset data	Number of Tx.	
	Preset data	Pressure max	
	Preset data	Pressure min	
	Preset data	Pressure keypad	
	Preset data	Abs or gauge	
Temperature	Preset data	Number of Tx.	
	Preset data	Temperature max	
	Preset data	Temperature min	
	Preset data	Temperature keypad	
Line density	Preset data	Z Factor method	SGERG, Nx19 , AGA8
	Preset data	Z/Zn preset	
Base density	Preset data	Base density method	
Constants	Preset data	Base pressure	
	Preset data	Base temperature	
Options	Preset data	Counter Vb	Stopped on acc alarm
	Preset data	Counter Vn	Stopped on acc alarm
Preset counters	Preset data	Set counter Value	All totals
Hardware	Not available	Board setup	Configure input board
	Not available	Hart loops	Configure Hart loops
	Not available	Analog inputs	Configure analog inputs
	Not available	Digital inputs	Configure digital inputs
Display	Not available	Editable	Assign editable items/ pages
	Not available	Display	Assign display items/ pages

Modbus commands 01, 02, 03, and 04 are supported for data reads and Modbus commands 05 and 10 are supported for Modbus writes.

The highest accuracy of numbers is achieved using double precision IEEE numbers to 64 bit resolution. All numbers can be selected as types other than their default.

Variable address types
Any address in the range 0H to FFFFH or 0D to 65535D ID name of variable from data tree

Note. Read /write is only applicable to items with write access (red ID)

Record
Log record number zero (0) being the most recent log record.

12.1 Number formats

Type	Bits	Range	Description
Unsigned char	8	0..255	Character or boolean
Unsigned short integer	16	0..65535	16 bit short integer format
Unsigned long integer	32	0.. 4294967295	32 bit long Integer format
Char	8	-128..127	8 bit character
Short integer	16	32768..32767	16 bit short integer
Long integer	32	2147483648	32 bit long integer
Float	32	-3.4E+38..3.4e+38	7 decimals, Single precision IEEE floating point
Double	64	-1.7E+308..1.7E+308	16 decimals, Double precision IEEE floating point
Time	64		SSMMHHWDDDmmYYmS

Time format:

	Description	Valid range
SS	Seconds	0 to 59
MM	Minutes	0 to 59
HH	Hours	0 to 23 (0=midnight)
WD	Week day	1 to 7 (1=Sunday)
DD	Day	1 to 31
mm	Month	1 to 12
YY	Years	0 to 99 (assumed to be 20xx)
mS	Milliseconds	
	00	zero
25	250 mS	
50	500 mS	
75	750 mS	
255	Invalid clock (RTC device error)	