SUMMIT 8800 Handbook

Flow Computer
Volume 1: Operation

KROHNE

KROHNE Oil & Gas

Declaration of Conformity

We

KROHNE Oil & Gas

of
Minervum 7441
PO Box 9310, 4801 LH Breda
The Netherlands

Declare under our sole responsibility that the product (s)

SUMMIT 8800 flow computer

to which this declaration relates is in conformity with the following standards or other normative documents.

EMC Directive 2004/108/EC	Environment Industrial environments
EN 61326-1:2006	Equipment for measurement, control and laboratory use,
from which:	
EN 55011:2007	Emission Class A
EN 61000-4-2:2001	Electrostatic discharge (ESD) immunity
EN 61000-4-3:2006	Radiated Electro-Magnetic field immunity
EN 61000-4-4:2004	Electrical fast transient (EFT) immunity
EN 61000-4-5:2006	Surge transient immunity
EN 6100-4-6:1996 +A1:2001	Conducted Radio-Frequency disturbances
EN 61000-4-8:1993 +A1:2001	Power Frequency magnetic field immunity
EN 61000-4-11:2004	Voltage dips immunity
Additional EMC requirements	
OIML R117-1:2007	International Recommendation. Dynamic measuring systems for liquids other than water. Part 1 metrological and technical requirements Clause A.11 electrical disturbance tests.
IEC 61000-4-17:2002	EMC part 4-17 ripple on DC input power port immunity
MID Directive 2004/22/EC	
EN 12405-1:2005	Gas meters Conversion devices Volume Conversion
LVD Directive 2006/95/EC	
EN 61010-1:2001	Safety requirements for electrical equipment for measurement, control and lab use.

Date and Place of Issue:
Breda, The Netherlands, 2013

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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 1 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.
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

3.1 SUMMIT 8800 Hardware

3.1.1 SUMMIT 8800 Flow Computer

The SUMMIT 8800 is an advanced hydrocarbon computing precision instrument for measuring and calculating flow of gases and liquids, using various connected metering devices, including transmitters, transducers with internal algorithms to International standards.

The SUMMIT 8800 is configured using the supplied configurator running on a PC or laptop.

Initially there are a number of basic decisions that need to be made in order to configure the device. The configurator will guide the operator through the various choices that need to be made. Primary important objectives are defined by types:

Device type	Standard run and/or liquid prover or gas prover
Measurement type	Gas turbine, rotary or other pulse meter type
	Gas ultrasonic Meter
	Gas differential pressure orifice or Venturi type
	Gas Coriolis
	Liquid turbine or other pulse meter type
	Liquid ultrasonic meter
	Liquid Coriolis meter
	Steam ultrasonic meter
Number of streams	1, 2, 3, 4 or 5 plus prover
Secondary transducer types	Pressure
	Temperature
	Density
	Relative Density
	Differential Pressure
	Gas Component
	BS&W
Secondary transducer connections	HART
	4-20mA
	PRT/RTD
	Digital – pulse/frequency Input
	Serial Connection.

3.1.2 SUMMIT 8800 basic functions

The SUMMIT 8800 flow computer comprises a standard size half width 19 inch rack which contains plug-in printed circuit boards connected to a mother board. The power supply is +24 VDC.

It is designed to calculate the total energy, volume and instantaneous flow rates of gas and alternatively liquids. Calculation is carried out using inputs from pulse generating turbine meters,

ultrasonic gas meters or from differential pressure measurement across orifice plates together with temperature sensors and transmitters for line pressure.

The SUMMIT 8800 uses pre-set or active input values of relative density, gas composition data and heating value, active values can be received directly from a gas chromatograph or can be written serially from a supervisory system.
The flow of gas is calculated using gas compressibility (Z factor) methods selected from a list of which includes AGA 8, ISO 12213 and AGA 3 NX19 as well as fixed factors for certain applications. As an alternative, the flow of gas can be calculated using a transducer input for line density.

The flow of liquid is calculated using fixed or measured factors for density and relative density and correction based upon measured temperature and pressure of the liquid in accordance with API standard chapters 11.1, 11.2.1M, 11.2.2M & 12.

The flow computer has the facility of both high and low alarms on all active input signals, the alarms can be selected to enable a default value to be used in flow calculation for the parameter in the alarm condition. Indication is given of the time of occurrence and clearance of the alarm state, alarm output signals are also provided. It uses digital communication to the differential pressure, pressure and temperature transmitters using the HART protocol eliminating the need for calibration of the flow computer. This feature also eliminates the errors in flow measurement due to ambient temperature effects on the flow computer, only the temperature coefficient of the transmitters contribute to the error.

Alternatively the SUMMIT 8800 can be operated from transmitters that supply a 4–20mA current output and also direct from a 100 ohm platinum resistance thermometer for temperature measurement, these types of input are measured using analogue inputs and a high resolution A-D converter. The analogue inputs are calibrated using software.

The SUMMIT 8800 has 3 optional RS232/RS485 serial data ports which can provide Modbus RTU or ASCII communication protocols for operation with system devices and a serial ASCII protocol compatible with most printers.

The SUMMIT 8800 has 2 optional Ethernet port which can provide TCP/IP or Modbus over TCP/IP protocols for supervisory system communication, and includes 5 programmable solid state pulse/alarm outputs and 2 analogue output signals for process monitoring and status control.

3.1.3 SUMMIT 8800 front panel layout

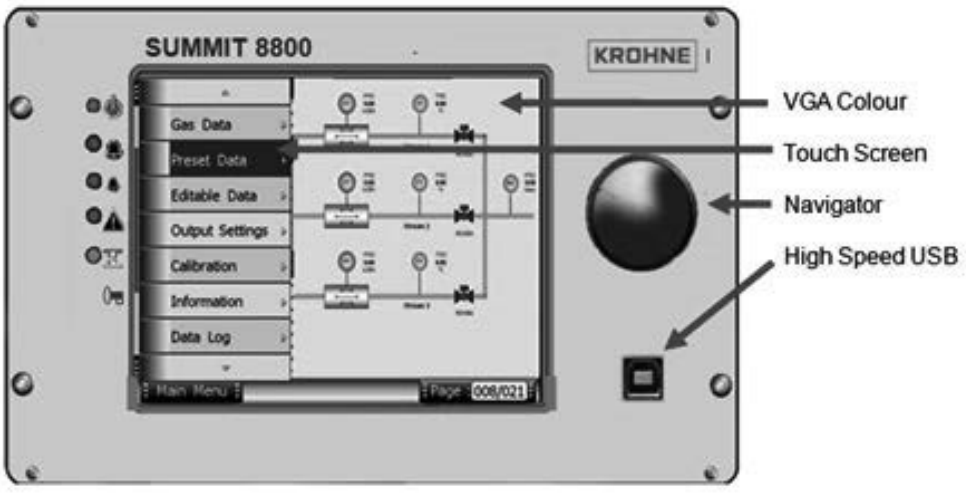


Figure 1 Front view of Summit 8800

3.1.4 Rear Panel Layout

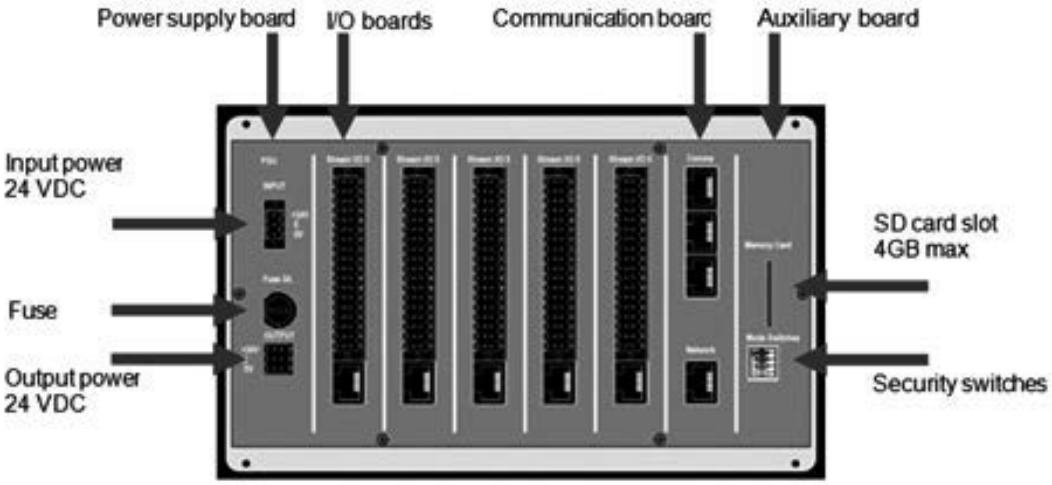


Figure 2 Rear view of SUMMIT 8800

3.1.5 Alarms & LED's

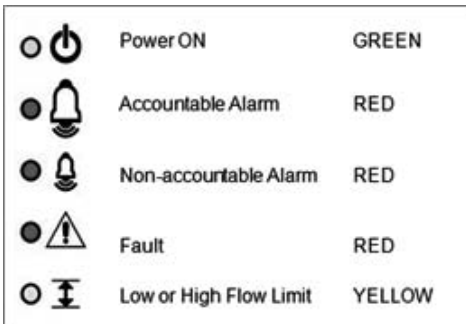


Figure 3 LED indicators

Power ON
This indicates that the SUMMIT 8800 is receiving an input power and is operating.

Accountable Alarm
These are alarms that need direct action because they could have effect on the result of the calculations.

Accountable alarms are red and can be defined via the Configurator under stream n.
These are user defined values set within variable parameters such as temperature, pressure, density. Within each run, the user can configure the minimum and maximum value for the variable operating range. This alarm typically indicates that the full operating range has been reached.

Non-accountable Alarm
These are user defined values set within variable parameters such as temperature, pressure, density. Within each run, the user can configure the high and low value for the variable operating range which typically is always less than the maximum and minimum values entered. This alarm typically indicates that the desirable operating range is being exceeded.

NOTE: These values (Max, Min, Hi and Lo) can be placed into a security display, where they can be accessed by the "Edit" mode on the SUMMIT 8800.

Fault
Operational self-checking status.
In normal operation the self-checking routine, tests all memory components for data corruption. The watchdog circuit is also provided to detect a failure on the processor.

Faults will also be indicated for each board slot that contains a board that is either faulty, missing a critical board or the wrong type of board.

In case of a fault the LED will illuminate and all calculations will stop – an indication that a hardware error has been detected, that has affected the operation of the flow computer.

Flow Limits
An alarm that indicates that the user-defined low and high flow limits have been reached. These limits are expressed as a percentage of the maximum and minimum flow rate, and are typically lower than the maximum and minimum values.

Flow alarm will come on when the uncorrected flow is above the HiQ value (% of the max flow rate) or below LoQ (% of the maximum flow rate).

When an alarm occurs, the yellow LED will illuminate.

The HiQ is an accountable alarm and the LoQ is a non-accountable alarm.

Further details on how to set these parameters are explained in Volume 2.

3.1.6 Description of Hardware memory devices

The SUMMIT 8800 contains the following types of hardware memory storage devices which are integrated on the board and cannot be removed from the unit.

Flash Memory
- Used to store the operating program (legally relevant software) of the device
- Non-volatile memory requires no power source to maintain integrity of data.
- Can only be externally accessed (Read or Write) when the unit is in the boot mode for programming. This mode can only be accessed when a hardware switch seal is broken and removed.
- Requires unique software tool to download and upload the program file via the USB port.
- Cannot be accessed using any common software tools.
- Integrity of program is maintained by the use of a CRC32 checksum.

Data Flash Memory (Configuration Data)
- Used to store all configuration and set-up parameters (legally relevant parameters).
- Non-volatile memory requires no power source to maintain integrity of data.
- Can only be externally written to when in open security mode. This mode can only be entered when a hardware switch seal is broken and removed.
- Requires unique software tool to download and write the program file via the USB or ethernet port
- Cannot be accessed using any common software tools.
- Integrity of data is maintained by the use of a CRC32 checksum.

Data Flash Memory (Recorded Data)
- Used to store all data log parameters
- Used to store all audit trail data and parameters

- Used to store all alarm record data and parameters
- Non-volatile memory requires no power source to maintain integrity of data.
- Cannot be written to from any external source: it is read only memory.
- Requires unique software tool to upload the data files via the USB or ethernet port
- Cannot be accessed using any common software tools.
- Integrity of each individual data, audit or alarm record is maintained by the use of a recorded time stamp and an individual CRC32 checksum for each individual record.

Static RAM Memory (Recorded Data)

- Used to store calculation results. Data that can change on every calculation cycle, e.g. flow measurement totals and parameter averages.
- Non-volatile memory that requires internal lithium back-up battery to maintain integrity of data.
- Backup battery is integrated inside the unit and cannot be switched off or removed without breaking a hardware seal and removing the rear panel of the unit.
- Backup battery capacity is sufficient to maintain data for at least 5 years of normal operation.
- Backup battery condition is continuously monitored and indication is given when replacement is due.
- Cannot be written to from any external source: it is read only memory.
- Requires a unique software tool to upload the data files via the USB port or ethernet port
- Cannot be accessed using any common software tools.
- Integrity of the data is maintained by the use of duplicate records for each value which are verified against individual CRC32 checksums for each individual record block.

The SUMMIT 8800 also contains the following types of optional hardware memory storage devices which are integrated in the design of the SUMMIT 8800 but can be removed from the unit.

SD memory Card

- Used to store data log parameters (separate from data logs stored in data flash memory)
- Up to 4GB of data storage or typically lifetime storage.
- Used to store all audit trail data and parameters (duplicate copy of audit trail data stored in data flash memory)
- Non-volatile memory requires no power source to maintain integrity of data.
- Cannot be written to from any external source: it has an internal coding.
- Requires a unique software tool to upload the data files via the USB or ethernet port or via a SD slot in a PC
- Cannot be accessed using any common software tools.
- Integrity of each individual data, audit or alarm record is maintained by the use of a recorded time stamp and an individual CRC32 checksum for each individual record.
- Can be removed from the unit at any time.

3.2 Features SUMMIT 8800

3.2.1 Key Features

- Touch screen
- VGA colour graphics & Navigator dial.
- Multi-processing makes the unit 10-50x faster than traditional flow computers
- 50-2000 times more memory
- Years of data storage
- More accuracy due to more frequent calculations
- Modular design hard- and software, Pay only for what is needed
- Up to 6+ runs, Affordable for allocation metering
- Supervisory like functions, More capabilities for lower price
- Audit trail up to person
- Network capabilities, Metering info available centrally

- Pulse handling: API5.5 level A, B, C, D, E, Dual chronometry, pulse interpolation
- Calibration up to 20 points linear, meter factor or K-curve, 5 products (future at present 1)
- Density/ specific gravity: frequencies Solartron 781x, 783x, Sarasota ID900
- Counters: Unhaltable, Normal, Period, Error, Maintenance, Positive and negative, Prover
- Averages: Time weighted, Flow weighted.
- Provers: Bi-directional, 2 / 4 detector inputs, piston prover, master provers
- Control: up to 18 valves, Prover, PID
- TCP/IP and serial Modbus protocols for
  Ultrasonic meters: KROHNE AIII, AV, V12, Daniel, Elster, GE, Sick
  Chromatographs: ABB, Daniel, Elster, Siemens
- And custom configurable protocols.

3.2.2 Calculations & Compliance standards

AGA3	(Orifice meters) gas flow calculations.
AGA5	(Natural Gas Energy Measurement)
AGA7	(Measurement of Natural Gas by Turbine Meter)
AGA8	(Compressibility Factor of Natural Gas and Related Hydrocarbon Gases)
AGA9-support	(Measurement of Gas by Multipath Ultrasonic Meters)
AGA10	(Speed of Sound in Natural Gas and Other Related Hydrocarbon Gases)
API MPMS (Manual of Petroleum Measurement Standards):	Chapter 5.6 (Measurement of Liquid Hydrocarbons by Coriolis Meters)
	Chapters 11.1, 11.2, 21.1 & 21.2 etc
	Chapters 12.2.5.1 & 2
	Chapter 12.2.5.3 Table 54, 54A, 54B, 54D
API 2540	
ASTM D1250 IP200	
GPA 2172, TP-27	
GOST NX19	
ISO 5167 (2003 , 1997, 1991)	
ISO 6976	
NX19, NX19 G9	
OIML R117-1 Edition 2007	
PTZ, NX19, NX19 G9, SGERG	(all types), User-defined Z-factor Tables, fixed
SGERG	(all types)
WELMEC guide 8.8	

... and more to come

3.3 Integration possibilities

3.3.1 System Integration

The SUMMIT 8800 can be integrated as a component within a fully automated system.
When within a system, the SUMMIT 8800 is usually an intermediate device interacting with all field devices and supervisory systems.

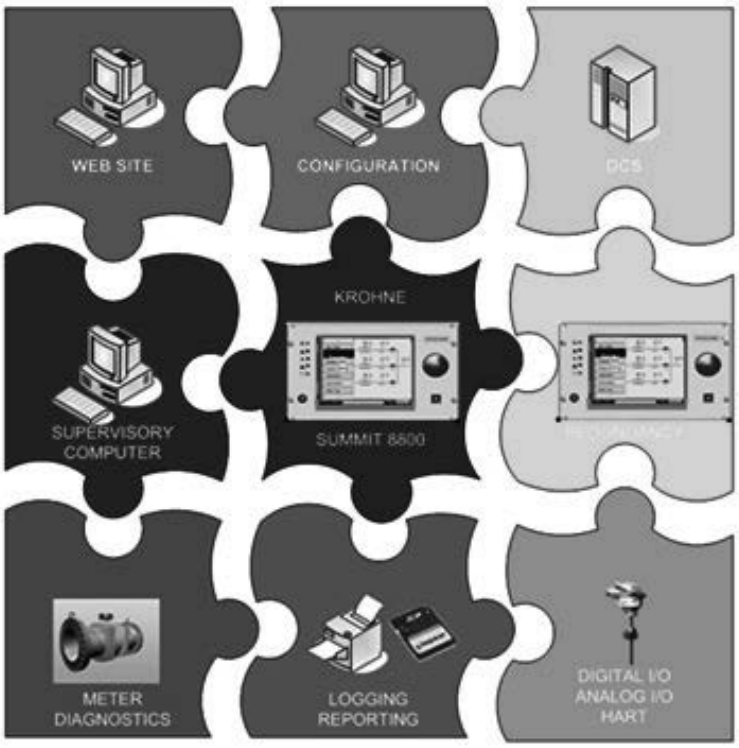


Figure 4 SUMMIT 8800 system integration overview

3.3.2 Application integration

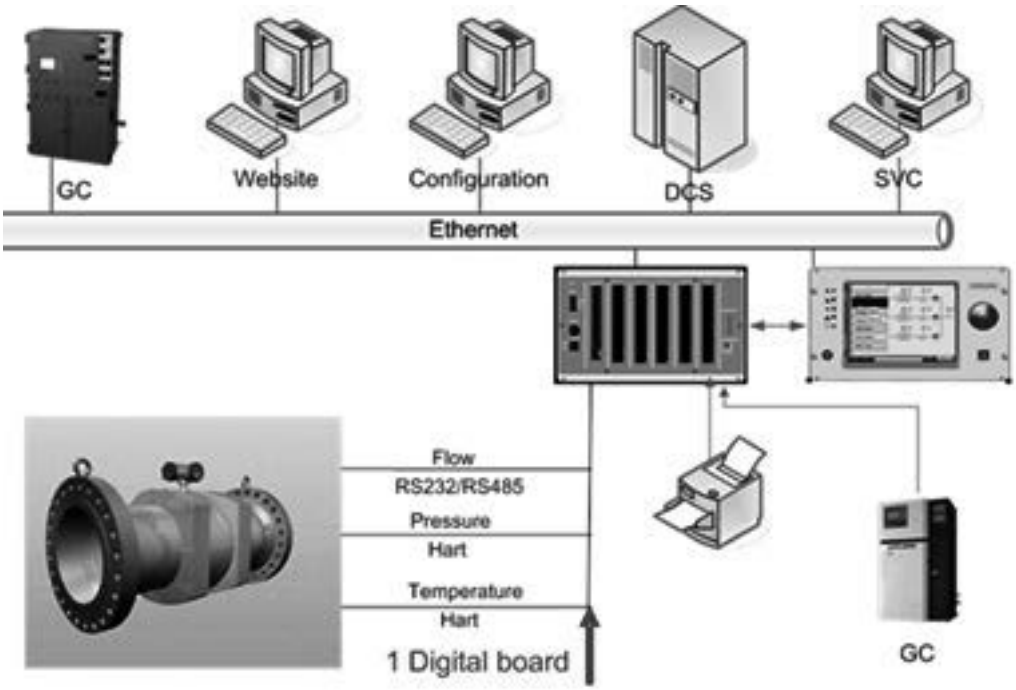


Figure 5 Stream application integration

Please read these instructions carefully before assembling or installing this product to avoid danger to people, pets and damage to connecting devices and the SUMMIT 8800. Installation of this product may only be performed by qualified personnel.

The SUMMIT 8800 comes with all links and internal switches set to factory default see Chapter Hardware Details: Rear panel Mode Switches.

Before any power or signal connections are applied to the SUMMIT 8800 the qualified personnel should ensure that all links are set at the correct position for the appropriate and intended use. Failure to do so may result in damage to the SUMMIT 8800 and any associated equipment.

The flow computer device is powered with +24VDC.

Do not touch any of the internal components whilst the unit is powered.

Turn off the power to the SUMMIT 8800 before opening the device or installing the product. Only energize the device when it is wired, installed and all covers are securely in place.

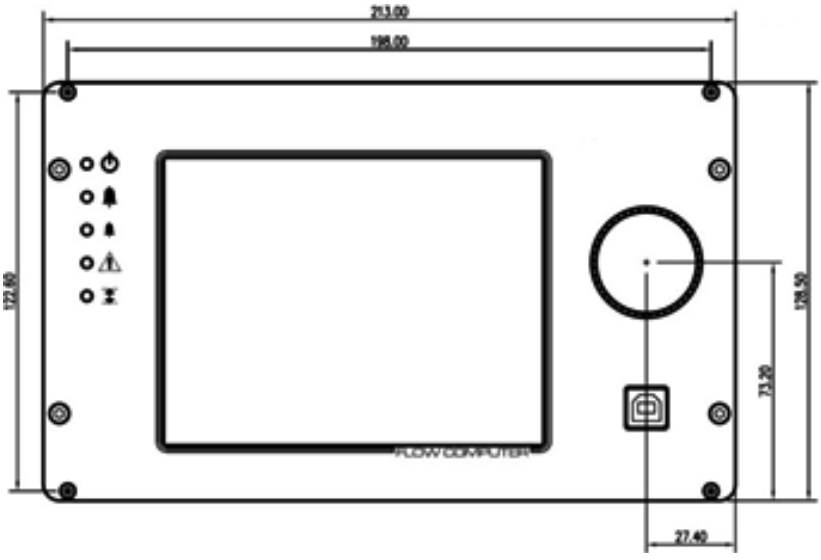
4.1 Mechanical Specifications

4.1.1 Mechanical Installation

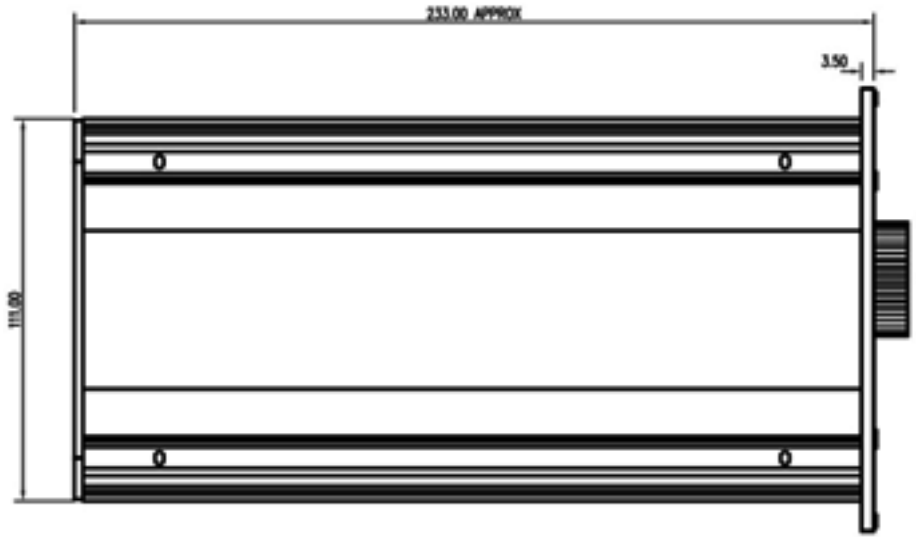
All installation tasks should be performed by qualified personnel. The external chassis dimensions (for panel or rack mounting) are given in the figure below. Ensure that the ventilation slots on the upper and lower surfaces on the SUMMIT 8800 are kept clear from any obstruction. Ensure that ventilation and shading is provided when the SUMMIT 8800 is subjected to high ambient temperatures (such as being near heat producing apparatus) or to direct sunlight. The operating environment must be clean, dry and free from corrosive elements.

NOTE: When used as part of MID approval which states the use of the SUMMIT 8800 to be indoors and in a controlled environment where it is subject to the requirements of EN 12405, the SUMMIT 8800 must be mounted in an enclosure with an ingress protection rating of IP65 or better.

Front



Side



Panel cut-out

Figure 6 Dimensions & Outlines

4.1.2 Panel Mounting

Figure 7 Panel mounted installations

The SUMMIT 8800 can be mounted in a panel. For this, use the dimensions for the panel cut-out as described in the previous paragraph. Please note that the SUMMIT 8800 is fixed to the panel using the bolts on top and bottom of the SUMMIT 8800.

4.1.3 Rack mounting options

For the SUMMIT 8800 optional rack mounting kits are available to ease cabinet, rack or panel installation. Please consult your local KROHNE sales department or major suppliers such as Farnell and Rittal.

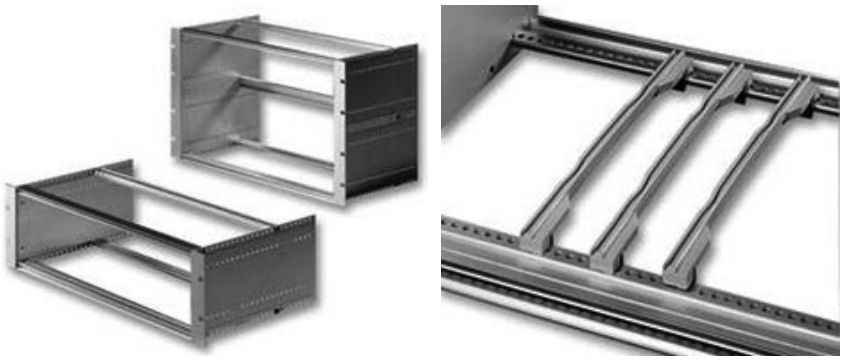


Figure 8 Rack mounting kit

Ordering code:

Rittal	RP 3688115 Subrack RIPAC ECO 3Ux235
Farnell	3688115 - SUBRACK, ECO, 3U, 235MM, 84HP 1198862
RS components	PCB guide kit, 500-566 (4*)

Figure 9 Rack mounted installation

4.1.4 Cable Assembly

For rack mounted installations, a 2.5m rail mounted terminal cable loom assembly is available for the SUMMIT 8800 flow computer.

Figure 10 Cable assembly

4.2 Electrical Specifications

4.2.1 Electrical Installation

The SUMMIT 8800 is certified to be in compliance with IEC 61010-1:2001 provided it is installed in accordance with the instructions supplied.

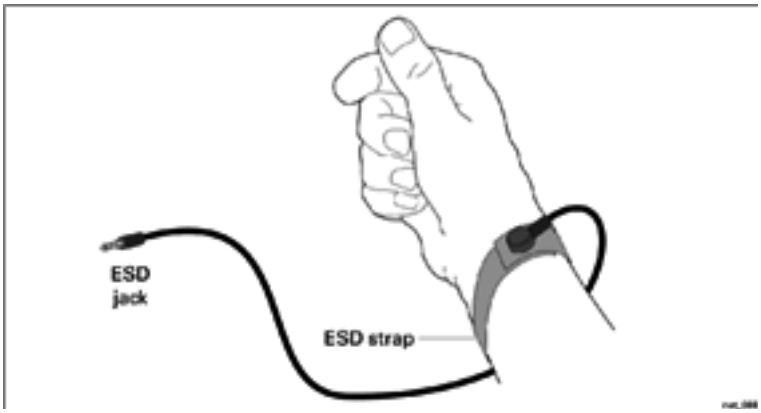
The SUMMIT 8800 must be powered by:

Power Supply Type

Power Supply :24VDC +/- 10%
NEC Class 2 (LV/LC)
Currents limited to 8A
Power limited to 150VA

A Class 2 power supply is defined by article 725.41 of the National Electrical Code (NEC Code book) and has limited output power.
In addition the wiring between the SUMMIT 8800 and its power supply must be sufficiently rated (10A) with a minimum cross section area of 1.5mm2 and PVC insulation. A suitable rated switch or circuit breaker must be included to allow isolation of power supply to the SUMMIT 8800. The device should be mounted as near to the equipment as practically possible.

No routine maintenance is required to ensure continuous operation; however, should a system failure occur during operations, then the most likely cause of malfunction is that of a requirement not being fully or correctly implemented. If a fault or warning occurs, the cause should be determined in a logical and systematic manner following the guide given below. All maintenance tasks should be carried out by qualified personnel only.



Some parts of the instrument such as circuit boards may be damaged by static electricity. When handling internal parts of the instruments, ensure that anti-static precautions are taken. It is therefore essential when carrying out any maintenance or installation work that an earthed wrist strap be worn, or other such precautions, whenever internal parts of the instrument are handled.

4.2.2 Earthing Requirements

The SUMMIT 8800 must be connected to a suitable ground or earth connection via the M4 earth stud located at the rear of the chassis. See below for details.

4.2.3 Fuses and Battery

The SUMMIT 8800 has an internal fuse F1 and an externally accessible fuse F2 on the rear panel. Fuse F1 protects the DC input circuits and can only be replaced by qualified personnel. Isolate the main power to the SUMMIT 8800. Remove the rear panel as specified under Hardware Details. Withdraw the PSU board and identify F1 as detailed in the figure below. Replace fuse F1 only with a replacement fuse type:

Fuse F1 Type

SCHURTER Type SPT
DC Voltage: 300VDC
Current 3.15A
Type: SPT 5 x 20mm Ceramic
Characteristics: Time-Lag T
Applicable Standards: IEC60127-2/5, UL248-14, CSA22.2 no248.14

Fuse F2 protects the DC output and can be replaced by all personnel. Isolate the main power

to the Flow Computer SUMMIT 8800. Rotate the cap of fuse holder F2 counter clockwise and replace fuse F2 only with a replacement fuse type:

Fuse F2 Type

SCHURTER Type SPT
DC Voltage: 300VDC
Current 1.6A
Type: SPT 5 x 20mm Ceramic
Characteristics: Time-Lag T
Applicable Standards: IEC60127-2/5, UL248-14, CSA22.2 no248.14

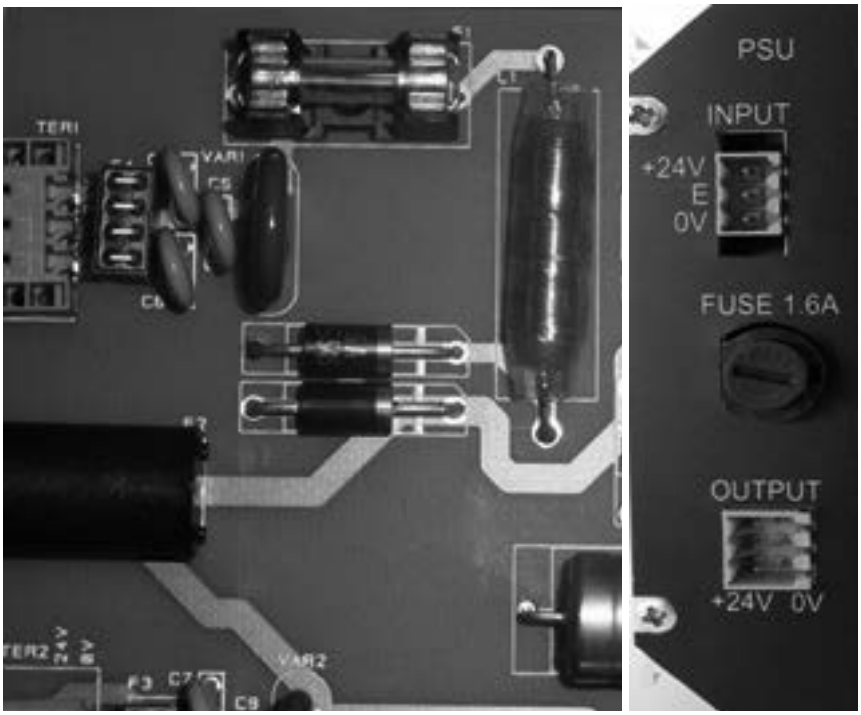


Figure 11 Fuse F1 (left) en F2 (right)

4.2.4 Power Supply Terminals

POWER SUPPLY INPUT CONNECTOR TER 1		
Terminal	FUNCTION	
1	+24V DC	+24V DC positive power supply Terminal
2	E	Earth connection terminal
3	0V	Power Supply 0V terminal

AUXILIARY POWER SUPPLY OUTPUT CONNECTOR TER 2		
Terminal	FUNCTION	
1	+24V DC	+24V DC Auxiliary output supply
2	+24V DC	+24V DC Auxiliary output supply
3	+24V DC	+24V DC Auxiliary output supply I max = 200mA

4	0V	0V Auxiliary output supply
5	0V	0V Auxiliary output supply
6	0V	0V Auxiliary output supply
CHASSIS EARTH SCREW TERMINAL		
 Earth stud terminal M4		

Figure 12 Power & M4 earth connections

4.2.5 Back Up Battery

The SUMMIT 8800 contains a backup battery on the auxiliary card, this battery keeps the real time clock and internal totals when DC power to the unit is disconnected. Replacement of this battery should only be carried out by qualified personnel.

If the SUMMIT 8800 is kept continuously powered, the back-up battery estimated life is 10 years. If the SUMMIT 8800 is powered down for periods exceeding 30 days, the battery should be removed and stored separately. The battery needs to be replaced when its service life exceeds 10 years or when it has been left in an un-powered unit for a time period of greater than 2 months. A "BAD" battery condition is indicated via the Windows software.

When a "BAD" battery condition is indicated via the Windows software or on the front panel:

Figure 13 Configurator good and bad battery indicator

Illustration of bad battery as shown on the front panel of the SUMMIT 8800:

Figure 14 Bad battery indicator on front panel

NOTE: When the battery is missing or requires replacement the flashing battery symbol as above shown adjacent to the Time and Date on all display screens. When the Battery is within operating parameters no symbol is shown.

4.2.5.1 Copy and Restore Main Totals

After switching off the power, the totals will be lost and cannot be recalled from memory anymore.
Therefore the user must first take note of all totalizer values before switching off the power to the SUMMIT 8800 and replace a backup battery

The totals can be read but cannot be preset or changed via the front screen, this can only be done by using the Configurator.

- So before replacing the battery, make a copy of all totals.
- After replacing the battery, load the application into the Configurator software (see load setup in Chapter Configuration Software: Working with Configuration Setups). Under stream/Totals, populate the preset totals with the last total and download the application to the SUMMIT 8800.

The totalizers should only be restored when replacing the backup battery or in extreme cases.

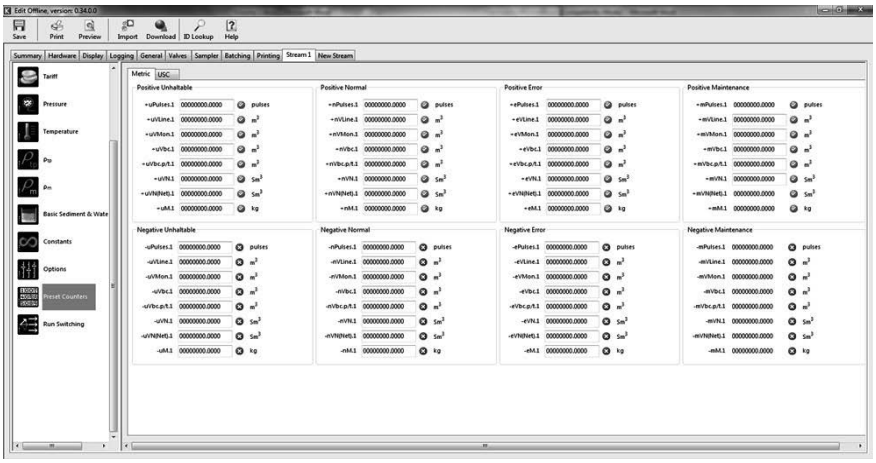


Figure 15 Totalizers enter field

4.2.5.2 Back Up Battery Replacement

To replace or install the backup battery please follow the instructions detailed.

- Record main totals as these will be lost during power down.
- Disconnect all cables from the rear of the SUMMIT 8800 and remove the rear panel as shown under Hardware Details.
- Withdraw the auxiliary card from the chassis and then remove the battery as previously shown.
- Replace the battery only with a new replacement type as detailed below:

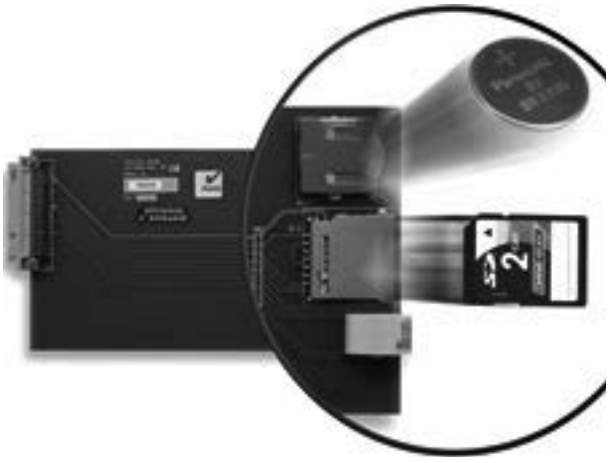
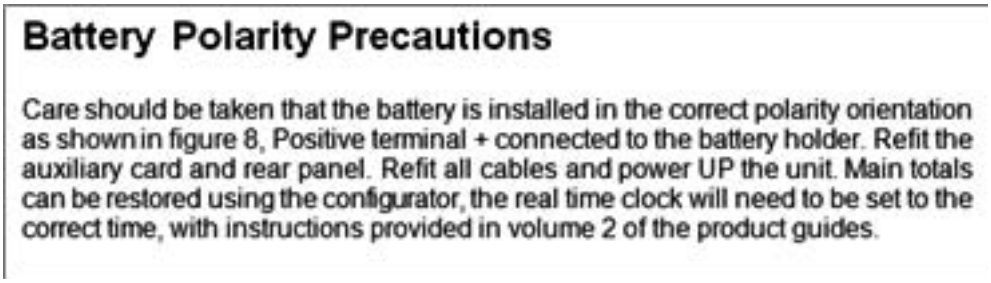


Figure 16 Auxiliary board

Battery Replacement Type

Type Panasonic Lithium battery CR2032 or BR2032
Maximum voltage: 3V
Maximum current (Charge / Discharge): 5mA
Dimensions: 20mm Dia. by 3.2mm height
Capacity: BR2032 200mA, CR2032 220mA
Approvals UL1642 file MH12210



Battery Polarity Precautions

Care should be taken that the battery is installed in the correct polarity orientation as shown in figure 8, Positive terminal + connected to the battery holder. Refit the auxiliary card and rear panel. Refit all cables and power UP the unit. Main totals can be restored using the configurator, the real time clock will need to be set to the correct time, with instructions provided in volume 2 of the product guides.

NOTE: Under CSA the correct battery type must be used.

4.2.6 Real time clock

The real time clock is powered by the backup battery. If the battery is replaced, make sure that the time is set correctly afterwards.

The date and time can be set within "edit" mode on the SUMMIT 8800, if the "time" parameter has been made available in the display by the integrator.
The same can be done from the Configurator within the general tab under date/time. See volume 2.

The accuracy of the clock is optimized for 20°C and deviates +/- 3 ppm/°C, (it is recommended that the ambient temperature around the flow computer is maintained as close as possible to 20°C), it is therefore a good habit to synchronise the clocks.

The most effective way to synchronise the clock is by the network using a time server and SNTP. It is also possible to synchronise via a supervisory system using Modbus.

Care should be taken using summer- and wintertime. Change-over will result in longer or shorter days and associated different daily totals.

5.1 Front Panel

The front panel of the SUMMIT 8800 is a clean and simple design utilising a 5.7" VGA touch screen, an optical rotary dial for navigation, five LED's and front USB port for ease of communication.
Clean the Front Panel Touch Screen with water moist cloth only.

Figure 17 Front panel of SUMMIT 8800 & USB port

5.1.1 Associated software

The programming port on the front panel is a standard USB type B version. The programming port is used for the transfer of configuration and setup data and for downloading of results, tables and report data. See Chapter: Configuration Software.

When new firmware (operating software) is required for the unit or one of the boards, updates can be performed via the USB port and using the firmware wizard software. More information on this software can be found in Chapter: Firmware.

When people are trained in a class room environment on the use of a SUMMIT 8800 flow computer, the flow computer screen data can be forwarded to a laptop and can then be projected on a large screen via the USB SUMMIT 8800 display monitor software. See Chapter: Display Monitor.

If an optional dual Ethernet is available, a web site can be used that mimics the SUMMIT 8800 display but also enables to get alarm, audit log and parameter data. See Chapter: Web Access.

5.2 Rear Panel

5.2.1 Removal of the Rear Panel

- Remove all cables and plug in connectors from the sockets on the rear of the SUMMIT 8800.
- Remove the 4 cross screws at each corner.
- Carefully pull the rear panel away from the chassis.

- Re-fitting is the reverse of this procedure.

When refitting, care should be taken to ensure that all terminals, switches and connectors protrude through the rear panel and are not trapped behind it before tightening the fixing screws.

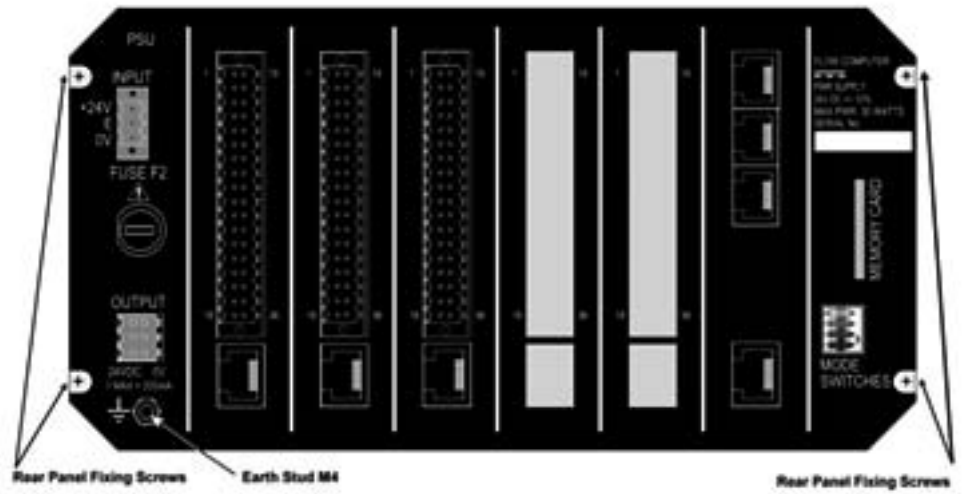
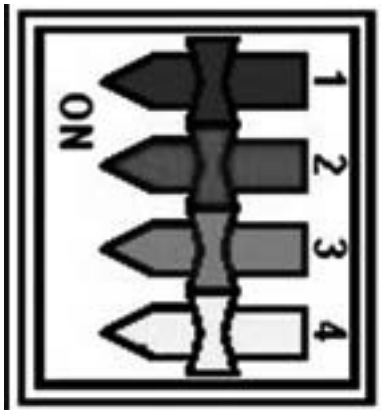


Figure 18 Rear panel of SUMMIT 8800 and removal screws

5.2.2 Rear panel Mode Switches

On the rear panel there are 4 Mode or Function switches located on the Auxiliary board. These switches determine the basic operating mode of the SUMMIT 8800.
The designation and function of the mode switches is as follows:



Switch	ON	OFF
1	Run Mode	Boot Mode
2	No function	-
3	Security 2 On	Security 2 Off
4	Security 3 On	Security 3 Off
Switch 3	Switch 4	Security mode
OFF	OFF	Open
OFF	ON	Partial
ON	OFF	Partial
ON	ON	Full

Figure 19 Mode Switch settings

The switches control the operation mode of the SUMMIT 8800:
Run mode Used for normal operation of the computer
Boot mode Boot Mode should only be used for uploading new firmware Versions in conjunction with the supplied Windows operating software

They also control the security level of the SUMMIT 8800:

OPEN	The SUMMIT 8800 is fully open and changes can be made without restrictions. However, user passwords are required.
PARTIAL	In this mode the front panel Edit mode can be accessed with the proper user password, but calibration data cannot be changed. New application information cannot be uploaded or downloaded. The existing configuration can be downloaded, changed and uploaded again. The type of changes allowed can be defined using the configurator Software and will typically be non-critical configuration data, parameters and values.
FULL	Connection is possible and applications can be uploaded, but cannot be downloaded to and from the SUMMIT 8800 as it is in Read only mode. Change in parameters, values or any other data is not possible. Configuration data cannot be changed with the GUI software. Edit menu cannot be accessed. Calibration data cannot be changed. Alarms and audit data cannot be cleared.

It is possible to define in the configuration in which mode alarms can be acknowledged or cleared and audit data can be cleared.

The settings of the Security mode, can be found on the System information page:

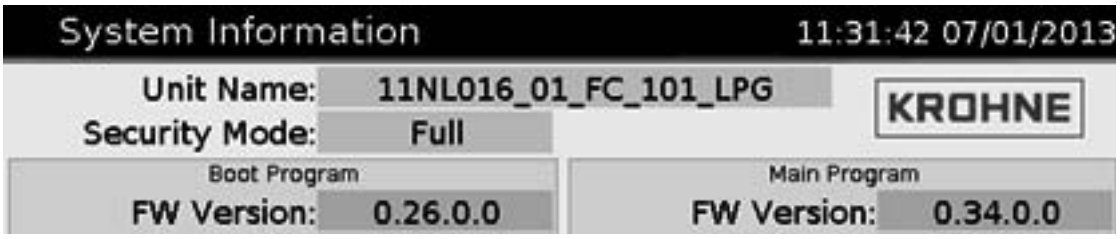


Figure 20 System information screen

5.2.3 SD Card

The SUMMIT 8800 contains a replaceable SD memory card on the Auxiliary board, this card can be used to store Audit and Data Log Information. It can be replaced at any time by withdrawing from the connector on the rear panel and a new card can be inserted. When a new card is inserted it is automatically detected. Depending upon its formatting and use, possible messages and instructions will appear on the main screen.

Follow the on-screen instructions, and the card should be prepared ready for use.
Once removed, a filled or partially filled card can have its data read using a standard PC card reader and the supplied Windows software.
The SD can also be read whilst installed in the SUMMIT 8800 by using the configuration software.

Maximum SD capacity is 4GB

Figure 21 Illustration of inserted SD card

5.3 Standard hardware components

The SUMMIT 8800 is a modular design flow computer made up of various hardware components based on your input and output requirements. There are mandatory components which are required for the operation of the flow computer such as the CPU, PSU, auxiliary board and at least one I/O and communication board which are positioned within a chassis.

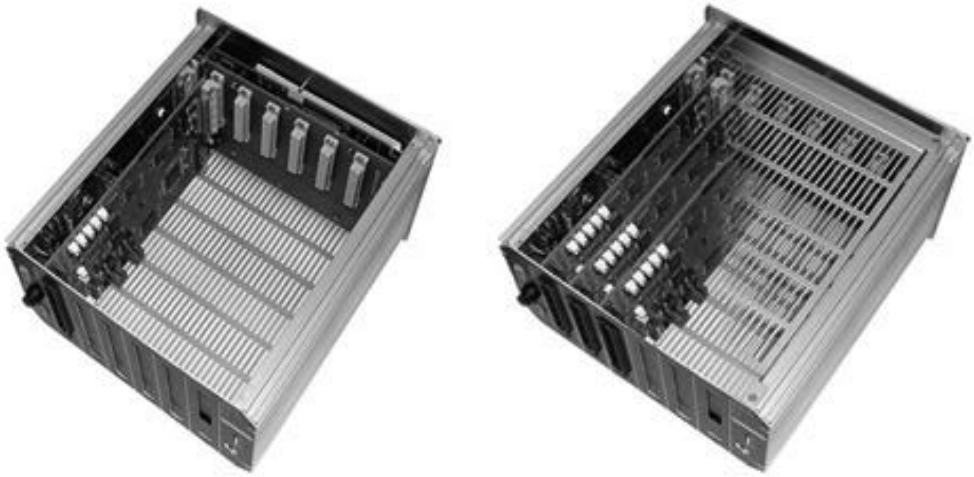


Figure 22 Modular design chassis

The SUMMIT 8800 is a modular based flow computer, consisting of a main CPU, PSU, Auxiliary board and 1 - 6 I/O and communication boards

When viewed from the rear, the CPU is positioned directly behind the front panel and sits between the front panel and mother board ports where the PSU, Auxiliary board, I/O and communication boards slot into.

Figure 23 Board slots with mother board & rear view panel

The PSU board sits in the first port on the far left, and the Auxiliary board sits into the slot on the far right.
All I/O boards including communication boards can be positioned in any slot, however good engineering practice it is recommended that all I/O boards are positioned on the left and the communication boards to the right.

5.3.1 CPU Board Description

The Central Processing Unit board is the computational process board and is the main processing component for the SUMMIT 8800.

5.3.2 PSU Board Description

The PSU board can only be exchanged by qualified personnel. Only one of these cards is required in a chassis and this card must be positioned in the first left hand chassis slot position. The function of the PSU card is to provide the power supply requirements of the SUMMIT 8800.

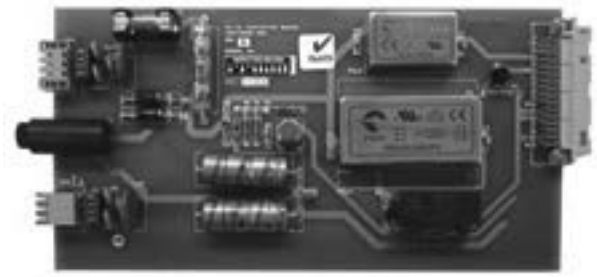


Figure 24 Power supply unit

5.3.2.1 PSU Board Settings

Details of position of PSU Board Fuses

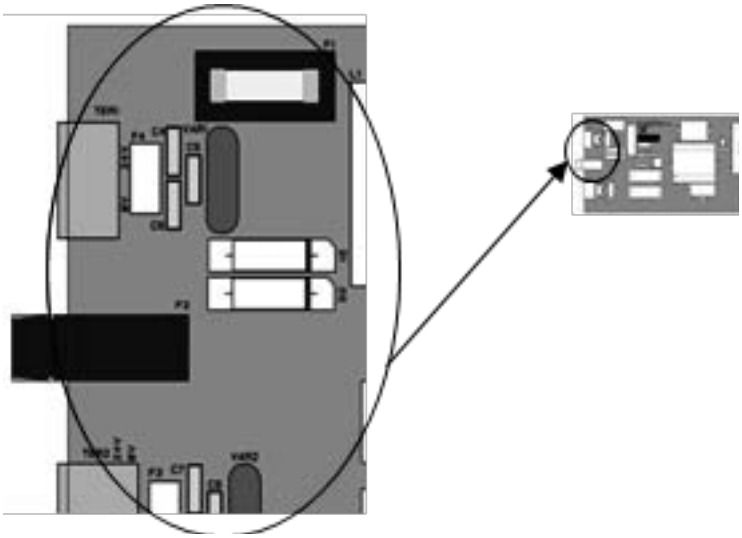


Figure 25 PSU board components

Fuse	Function	Fuse Type
1	Unit main fuse	See Chapter Installation and Replacement: Fuses and Batteries
2	External +24V fuse (user equipment)	See Chapter Installation and Replacement: Fuses and Batteries

Table 1 Location of fuses on PSU

5.3.3 Auxiliary Board Description

The Auxiliary board can only be exchanged by qualified personnel. Only one of these cards is required in a chassis and this card must be positioned in the last most right hand chassis slot position. The function of the Auxiliary card is to provide the mounting for the backup battery, mounting for an optional SD memory card and the rear panel mode dipswitches.

Figure 26 Auxiliary board

5.3.3.1 Auxiliary Board Settings

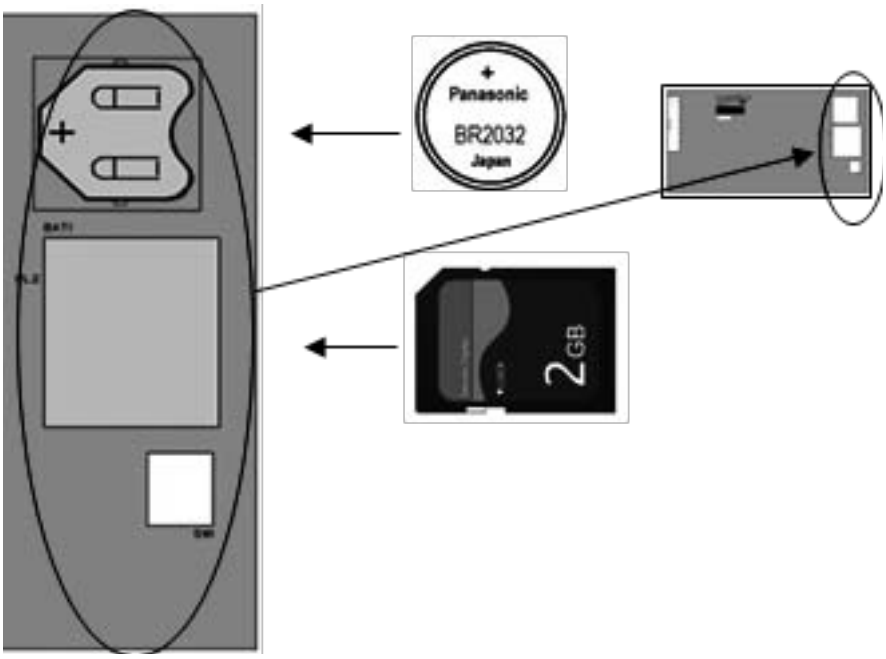


Figure 27 Auxiliary board components

The figure above shows the position of the Auxiliary board user replaceable parts:
- Backup battery
- SD memory card optional

5.4 Optional Plug-in boards

There are seven different types of optional boards available for the SUMMIT 8800, four of which are I/O boards. Our sales team can advise and select the appropriate board for your application. There are several factors that are taken into consideration when selecting the correct I/O board(s) such as the number of field instruments, type of signals used, and output required including communication. Each I/O board is featured with a single serial communication port.

Figure 28 Typical I/O board

5.4.1 Board Selection

The I/O board selected is determined by the number of inputs and outputs required for the number of Runs being configured. The table below illustrates the type and number of inputs and outputs for each I/O board.

I/O	Analog Input	Digital Input	HART Input	Analog Output	Digital Output	PRT	Select-able*	Serial	USB	Ethernet
Board										
Analog	*4	5	1	3	*5	1	2	1	-	-
Digital 1	-	5	2	2	5	1	-	1	-	-
Digital 2	-	4	2	4	6	-	-	1	-	-
Switch	-	12	-	-	12	-	*6	1	-	-
Single comms	-	-	-	-	-	-	-	3	-	1
Dual Comms	-	-	-	-	-	-	-	3	-	2
DSfG**								4	1	

Table 2 Boards with available Inputs & Outputs

*Selectable explanation
Analog: 2x digital outputs or 2 analog inputs
Switch: 6x digital inputs or 6 digital outputs

** Please note that the DSfG board is dedicated to the German DSfG protocol only.

5.4.2 Terminal Connectors

The input transmitter circuits are connected to the SUMMIT 8800 via the 36-pole terminal connections on the rear panel of the flow computer. Before any of transmitters are connected, refer to the instrument instruction manual applicable to the individual transmitter.

Connection methods are simply a basic indication of how the devices can be connected together.

Warning:
In hazardous environments a transmitter must be connected in accordance with the safety certificate conditions specified for the individual transmitter.

Tension clamps are used in the SUMMIT 8800. This means that the wires can be inserted without the need of a screw driver.

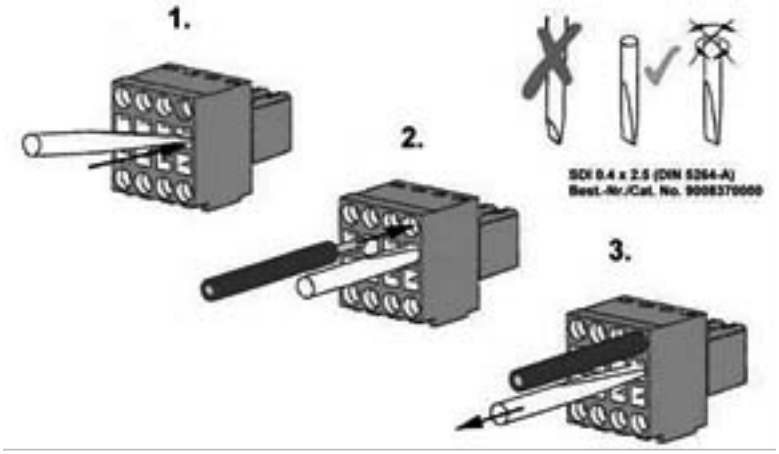
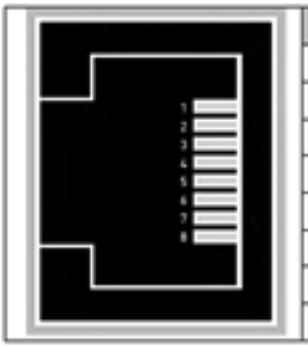


Figure 29 Illustration method of cable insertion into clamp

5.4.3 Serial Communication Connection

A serial port is available on all I/O boards and terminal connections are universal for digitals, analogue and switch I/O boards.



	RS 232 / RS 485	Direction
1	RS 485 A	
2	RS 485 B	
3	0V	
4	0V	
5	RS 232 Rx (Receive)	8800 ◄ Source
6	RS 232 Tx (Transmit)	8800 ► Source
7	Not Used	
8	Not Used	

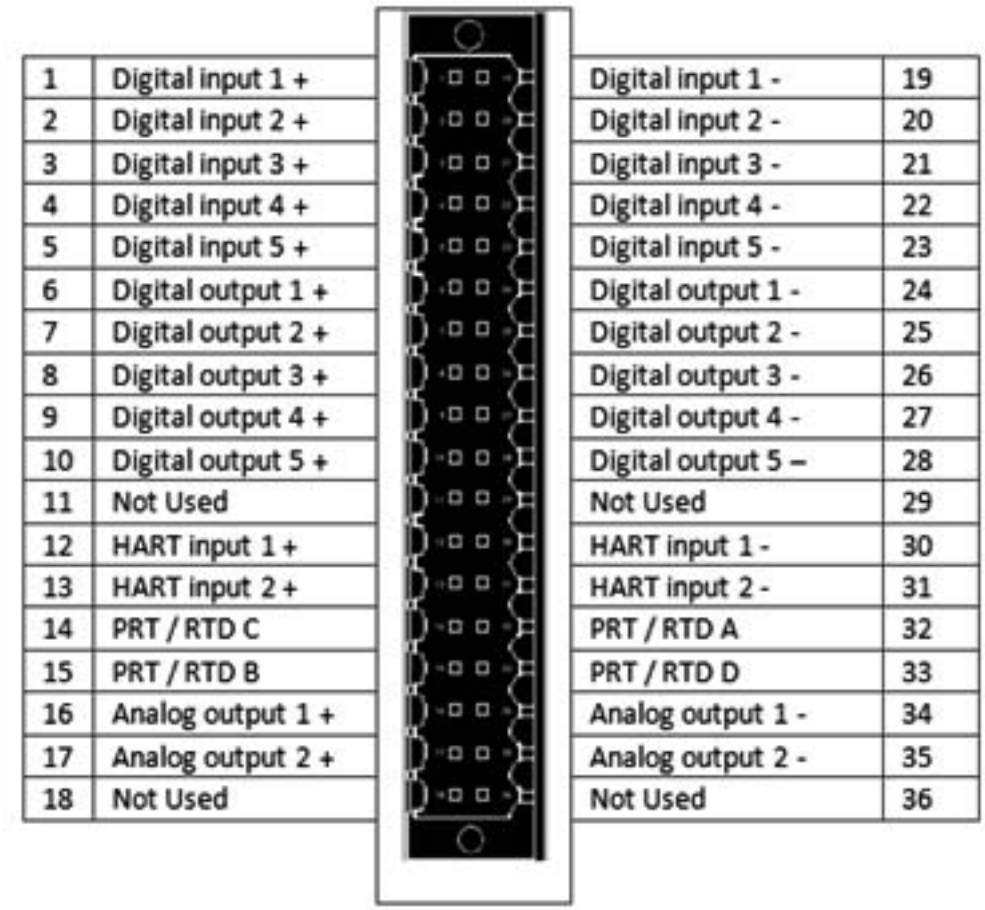
Figure 30 Serial port I/O boards rear terminal pin allocation

5.5 Digital I/O Board

The digital I/O board 1 can only be exchanged by qualified personnel. Up to a maximum of 6 cards can be inserted in any of the plug in slots in the SUMMIT 8800 chassis. A board can provide input and output functions as detailed:

- 3 pulse counting/frequency measuring inputs (for use with turbine meters, rotary meters, density or relative density transducers).
- 2 digital status inputs for use with switch or contact inputs.
- 2 Smart transmitter (HART) loops. Each loop can provide connections for up to 3 transmitters each with four variables such as pressure, temperature or differential pressure transmitters.
- 1 Direct 4 wire RTD input for direct measurement of temperature.
- 5 digital transistor switched outputs for use in telemetry systems or for alarm indication.
- 2 analog 4-20 mA outputs for use in telemetry or control systems.
- 1 Serial communication port using either (RS232 or half duplex RS485), providing connection to gas meters, gas chromatographs or other equipment that transfers data via serial communication.

5.5.1 Digital I/O Board 1 terminal connections



1	Digital input 1 +	Digital input 1 -	19
2	Digital input 2 +	Digital input 2 -	20
3	Digital input 3 +	Digital input 3 -	21
4	Digital input 4 +	Digital input 4 -	22
5	Digital input 5 +	Digital input 5 -	23
6	Digital output 1 +	Digital output 1 -	24
7	Digital output 2 +	Digital output 2 -	25
8	Digital output 3 +	Digital output 3 -	26
9	Digital output 4 +	Digital output 4 -	27
10	Digital output 5 +	Digital output 5 –	28
11	Not Used	Not Used	29
12	HART input 1 +	HART input 1 -	30
13	HART input 2 +	HART input 2 -	31
14	PRT / RTD C	PRT / RTD A	32
15	PRT / RTD B	PRT / RTD D	33
16	Analog output 1 +	Analog output 1 -	34
17	Analog output 2 +	Analog output 2 -	35
18	Not Used	Not Used	36

Figure 31 Digital I/O board 1 rear terminal pin allocation

5.5.1.1 Serial communication connection

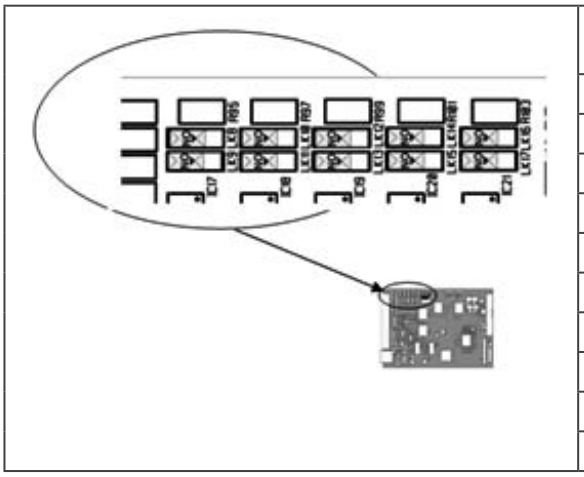
For the serial communication connection, refer to appropriate section given in Contents.

5.5.2 Digital I/O Board 1 Settings

The following sections contain details of the user controls and settings for the digital I/O 1 board.

5.5.2.1 Digital Input Settings

Position of digital input links shown on top edge of digital I/O boards

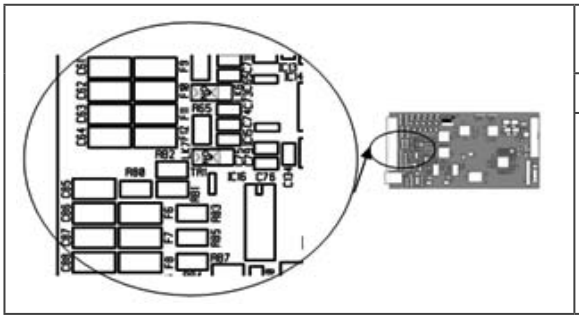


Link	Function	Factory setting
8	Digital input 1 resistor bypass	OFF
9	Digital input 1 0V24 connection	OFF
10	Digital input 2 resistor bypass	OFF
11	Digital input 2 0V24 connection	OFF
12	Digital input 3 resistor bypass	OFF
13	Digital input 3 0V24 connection	OFF
14	Digital input 4 resistor bypass	OFF
15	Digital input 4 0V24 connection	OFF
16	Digital input 5 resistor bypass	OFF
17	Digital input 5 0V24 connection	OFF

Figure 32 Digital I/O board digital input link setting
Table 3 Digital I/O board 1 link settings

5.5.2.2 HART Loop Settings

Position of HART loop links shown on left hand edge of digital I/O board

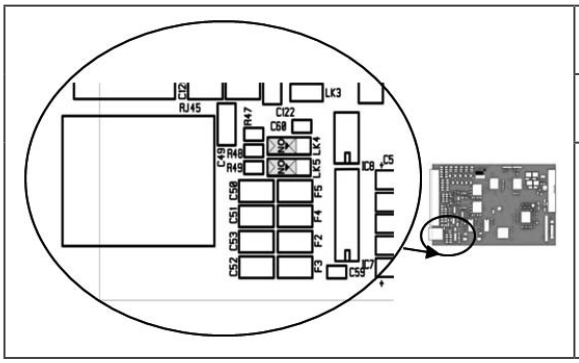


Link	Function	Factory setting
6	HART loop 1 0V24 connection	ON
7	HART loop 2 0V24 connection	ON

Figure 33 Digital I/O board HART loop link settings
Table 4 HART loop settings on digital I/O board 1

5.5.2.3 RS485 Settings

Position of RS485 termination network links shown on left hand edge of digital I/O board



Link	Function	Factory setting
4	RS485 termination network connection	OFF
5	RS485 termination network connection	OFF

Figure 34 Digital I/O board RS485 termination link setting
Table 5 Serial settings on digital I/O board 1

5.6 Digital I/O Board 2

The digital I/O board 2 can only be exchanged by qualified personnel. Up to a maximum of 6 cards can be inserted in any of the 6 plug in slots in the SUMMIT 8800 chassis. A board can provide input and output functions as detailed:

- 3 pulse counting/frequency measuring inputs (for use with turbine meters, rotary meters, density or relative density transducers).
- 1 Digital status inputs for use with switch or contact inputs.
- 2 Smart transmitter (HART) loops. Each loop can provide connections for up to 3 transmitters each with four variables such as pressure, temperature or differential pressure transmitters.
- 6 digital transistor switched outputs for use in telemetry systems or for alarm indication.
- 4 analog 4-20 mA outputs for use in telemetry or control systems.
- 1 Serial communication port using either (RS232 or half duplex RS485), providing connection to gas meters, gas chromatographs or other equipment that transfers data via serial communication.

NOTE: Only configure pulse output 1 for Prover corrected bus.

An individual stream (or run) can be monitored by one digital I/O board as it provides all the necessary inputs and outputs. Note that individual inputs and outputs can be configured separately and are not limited to a specific measurement run.

5.6.1 Digital /O Board 2 Terminal Connections

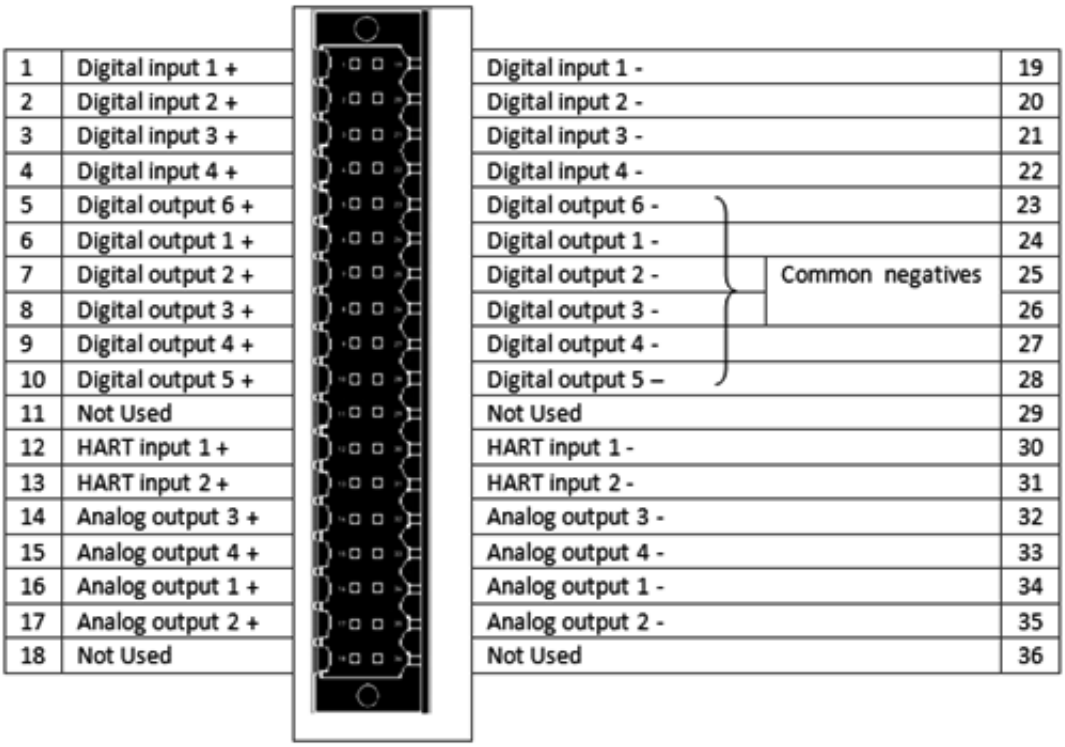


Figure 35 Digital I/O board 2 rear terminal pin allocation

5.6.1.1 Serial communication connection

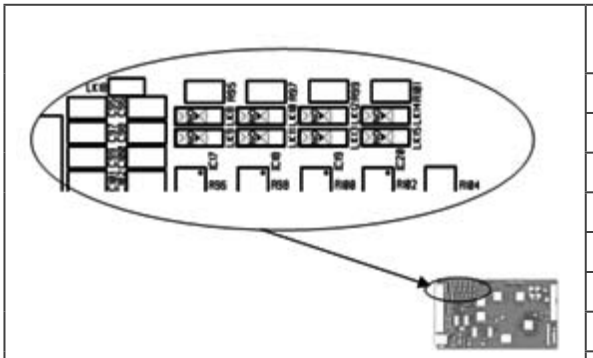
For the serial communication connection, refer to the appropriate section given in Contents.

5.6.2 Digital I/O Board 2 Settings

The following sections contain details of the user controls and settings for the digital I/O 2 board.

5.6.2.1 Digital Input Settings

Position of digital input links shown on top edge of digital I/O board2

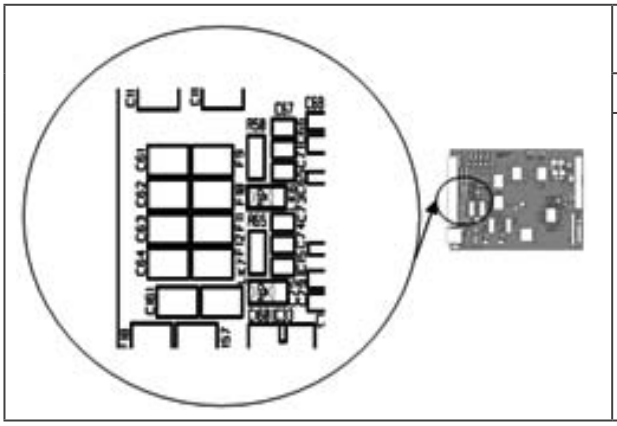


Link	Function	Factory setting
8	Digital Input 1 resistor bypass	OFF
9	Digital Input 1 0V24 connection	OFF
10	Digital Input 2 resistor bypass	OFF
11	Digital Input 2 0V24 connection	OFF
12	Digital Input 3 resistor bypass	OFF
13	Digital Input 3 0V24 connection	OFF
14	Digital Input 4 resistor bypass	OFF
15	Digital Input 4 0V24 connection	OFF

Figure 36 Digital I/O board digital input link setting
Table 6 Digital I/O board 2 settings

5.6.2.2 HART Loop Settings

Position of HART loop links shown on left hand edge of digital I/O board 2

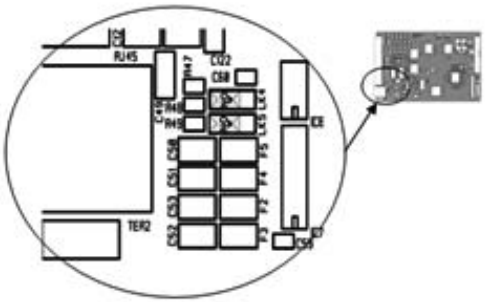


Link	Function	Factory setting
6	HART loop 1 0V24 connection	ON
7	HART loop 2 0V24 connection	ON

Figure 37 Digital I/O board 2 HART loop link settings
Table 7 HART loop settings on digital I/O board 2

5.6.2.3 RS485 Settings

Position of RS485 termination network links shown on left hand edge of digital I/O board 2



Link	Function	Factory setting
4	RS485 termination network connection	OFF
5	RS485 termination network connection	OFF

Figure 38 Digital I/O board 2 RS485 termination link setting
Table 8 Serial settings on digital I/O board 2

5.7 Analog I/O Board

The analog I/O board can only be exchanged by qualified personnel. Up to a maximum of 6 cards can be inserted in any of the plug in slots in the SUMMIT 8800 chassis. A board can provide input and output functions as detailed:

- 3 pulse counting/frequency measuring inputs (for use with turbine meters, rotary meters, density or relative density transducers).
- 2 Digital Status inputs for use with switch or contact inputs.
- 1 Smart transmitter (HART) loop. The loop can provide connections for up to 3 transmitters each with four variables such as pressure, temperature or differential pressure transmitters.
- 1 Direct 4 wire RTD Resistance Thermometer Input for direct measurement of temperature.
- 4 Analog 4-20mA current inputs for use with such devices as analog transmitters for pressure, temperature and differential pressure.
- 3 digital transistor switched outputs for use in telemetry systems or for alarm indication.
- 3 Analog 4-20 mA outputs for use in telemetry or control systems.
- 1 Serial communication port using either (RS232 or half duplex RS485), providing connection to gas meters, gas chromatographs or other equipment that transfers data via serial communication.

NOTE: Only configure pulse output 1 for Prover corrected bus.

NOTE: Configuration of the selectable inputs and outputs require the setting of the analog board. This applies to digital outputs 4, 5, Analog Input 4, and Analog Output 3 .Care should be taken to ensure the links are set to the correct position, BEFORE power is applied to the SUMMIT 8800. Refer to Board Configuration for link details.

5.7.1 Analog I/O Board Terminal Connections

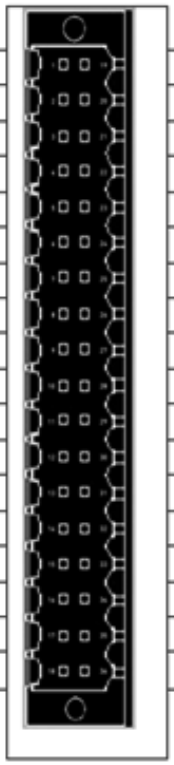
1	Digital input 1 +		Digital input 1 -	19
2	Digital input 2 +		Digital input 2 -	20
3	Digital input 3 +		Digital input 3 -	21
4	Digital input 4 +		Digital input 4 -	22
5	Digital input 5 +		Digital input 5 -	23
6	Digital output 1 +		Digital output 1 -	24
7	Digital output 2 +		Digital output 2 -	25
8	Digital output 3 +		Digital output 3 -	26
9	Digital output 4 + Analog input 4 +		Digital output 4 - Analog input 4 -	27
10	Digital output 5 + Analog output 3 +		Digital output 5 – Analog output 3 -	28
11	Analog input 2 +		Analog input 2 -	29
12	HART input 1 +		HART input 1 -	30
13	Analog input 1 +		Analogue input 1-	31
14	PRT / RTD C		PRT / RTD A	32
15	PRT / RTD B		PRT / RTD D	33
16	Analog output 1 +		Analog output 1 -	34
17	Analog output 2 +		Analog output 2 -	35
18	Analog input 3 +		Analog input 3 -	36

Figure 39 Analog I/O board rear terminal pin allocation

5.7.1.1 Serial communication connection

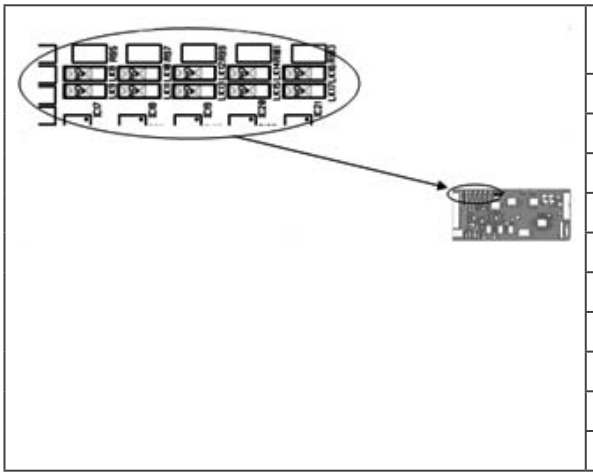
For the serial communication connection, refer to appropriate section given in Contents.

5.7.2 Analog I/O Board Settings

The following sections contain details of the user controls and settings for the analog I/O board.

5.7.2.1 Digital Input Settings

Position of digital input links shown on top edge of analog I/O board



Link	Function	Factory setting
8	Digital Input 1 resistor bypass	OFF
9	Digital Input 1 0V24 connection	OFF
10	Digital Input 2 resistor bypass	OFF
11	Digital Input 2 0V24 connection	OFF
12	Digital Input 3 resistor bypass	OFF
13	Digital Input 3 0V24 connection	OFF
14	Digital Input 4 resistor bypass	OFF
15	Digital Input 4 0V24 connection	OFF
16	Digital Input 5 resistor bypass	OFF
17	Digital Input 5 0V24 connection	OFF

Figure 40 Analog I/O board digital input link settings
Table 9 Digital input link settings on analog board

5.7.2.2 HART Loop and I/O Function Settings

Position of HART loop and I/O function links shown on left hand edge of the analog I/O board.

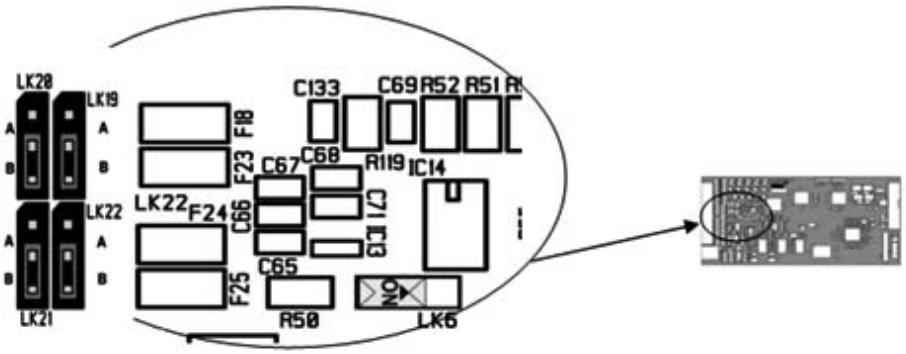


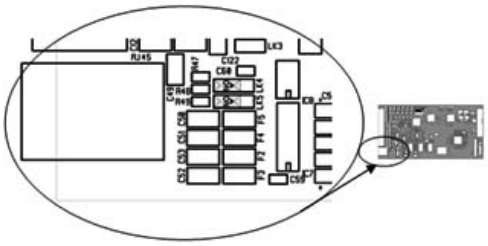
Figure 41 Analog I/O board HART loop and I/O function link settings

Link	Function	Factory setting	
6	HART loop 1 0V24 Connection	ON	
19	Digital output 4 position A fit	Analog input 4 position B fit	B
20	Digital output 4 position A fit	Analog input 4 position B fit	B
21	Digital output 5 position A fit	Analog output 3 position B fit	B
22	Digital output 5 position A fit	Analog output 3 position B fit	B

Table 10 HART and I/O functions settings on analog board

5.7.2.3 RS485 Settings

Position of RS485 termination network links shown on left hand edge of analog I/O board



Link	Function	Factory setting
4	RS485 termination network connection	OFF

Figure 42 Analog I/O board RS485 termination link setting
Table 11 Serial settings on analog I/O board

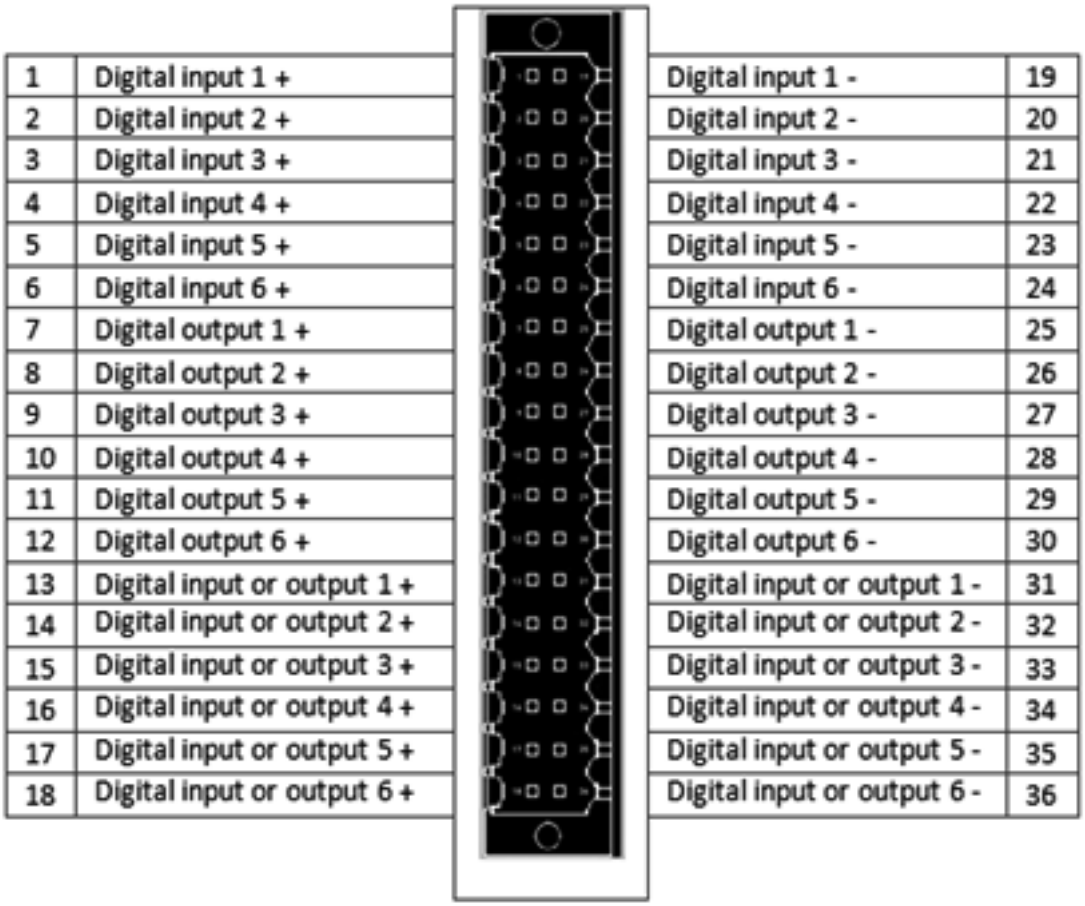
5.8 Switch I/O Board

The Switch Input Output board is a qualified personnel exchangeable plug in card, up to a maximum of 6 can be inserted in any of the user plug in slots in the SUMMIT 8800 chassis. It provides switch input and output functions as follows:

- 3 Pulse counting/frequency measuring inputs for use with turbine /rotary meters and frequency output density or relative density transducers.
- 3 Digital Status inputs for use with switch or contact inputs.
- 6 Digital transistor switch outputs for use in Telemetry systems or for alarm indication.
- 6 Digital I/O connections which can be set to Digital transistor switch outputs for use in Telemetry systems or for alarm indication or Digital Status inputs for use with switch or contact inputs.
- 1 Serial Communication Port using either RS232 or RS485 standards providing connection to gas meters, gas chromatographs or other equipment that uses serial communication for data transfer.

It is normally intended that each Switch I/O board provides additional switch inputs and outputs over and above that required for an individual measurement Run, for example when used in a prover configuration. However as the function of each individual switch input and output can be separately configured, the use of any particular function is not limited to any particular function.

5.8.1 Switch I/O Board Terminal Connections



1	Digital input 1 +			Digital input 1 -	19
2	Digital input 2 +			Digital input 2 -	20
3	Digital input 3 +			Digital input 3 -	21
4	Digital input 4 +			Digital input 4 -	22
5	Digital input 5 +			Digital input 5 -	23
6	Digital input 6 +			Digital input 6 -	24
7	Digital output 1 +			Digital output 1 -	25
8	Digital output 2 +			Digital output 2 -	26
9	Digital output 3 +			Digital output 3 -	27
10	Digital output 4 +			Digital output 4 -	28
11	Digital output 5 +			Digital output 5 -	29
12	Digital output 6 +			Digital output 6 -	30
13	Digital input or output 1 +			Digital input or output 1 -	31
14	Digital input or output 2 +			Digital input or output 2 -	32
15	Digital input or output 3 +			Digital input or output 3 -	33
16	Digital input or output 4 +			Digital input or output 4 -	34
17	Digital input or output 5 +			Digital input or output 5 -	35
18	Digital input or output 6 +			Digital input or output 6 -	36

Figure 43 Switch I/O board rear terminal pin allocation

5.8.1.1 Serial communication connection

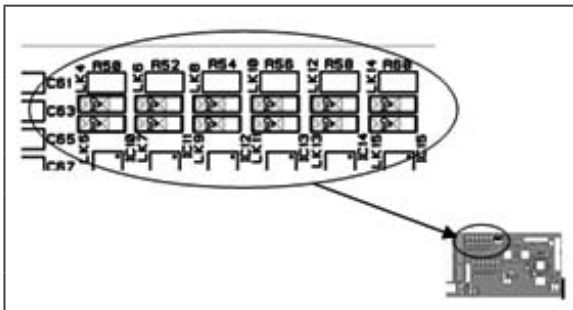
For the serial communication connection, refer to appropriate section given in Contents.

5.8.2 Switch I/O Board Settings

The following sections contain details of the user controls and settings for the switch I/O board.

5.8.2.1 Digital Input Settings

Position of digital input links shown on top edge of switch I/O board

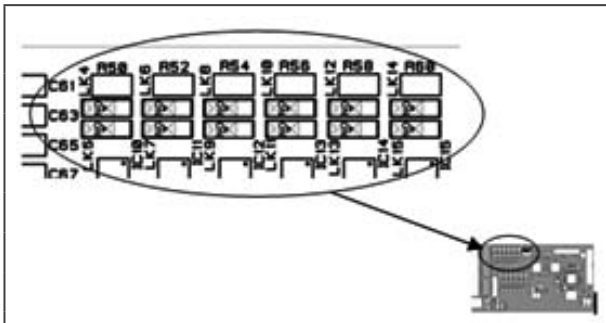


Link	Function	Factory setting
4	Digital Input 1 resistor bypass	OFF
5	Digital Input 1 0V24 connection	OFF
6	Digital Input 2 resistor bypass	OFF
7	Digital Input 2 0V24 connection	OFF
8	Digital Input 3 resistor bypass	OFF
9	Digital Input 3 0V24 connection	OFF
10	Digital Input 4 resistor bypass	OFF
11	Digital Input 4 0V24 connection	OFF
12	Digital Input 5 resistor bypass	OFF
13	Digital Input 5 0V24 connection	OFF
14	Digital Input 6 resistor bypass	OFF
15	Digital Input 6 0V24 connection	OFF

Figure 44 Switch I/O board digital input link setting
Table 12 Switch I/O digital input settings

5.8.2.2 Digital I/O (When set as Inputs) Settings

Position of digital input links shown in the centre of switch I/O board

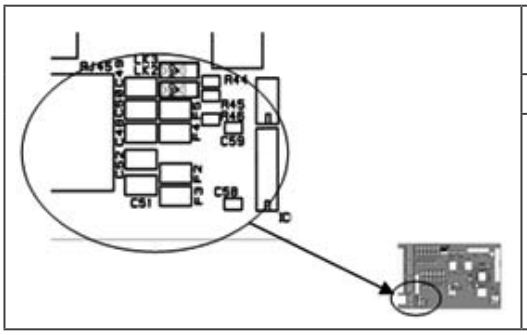


Link	Function	Factory setting
16	Digital I/O 1 resistor bypass	OFF
17	Digital I/O 1 0V24 connection	OFF
18	Digital I/O 2 resistor bypass	OFF
19	Digital I/O 2 0V24 connection	OFF
20	Digital I/O 3 resistor bypass	OFF
21	Digital I/O 3 0V24 connection	OFF
22	Digital I/O 4 resistor bypass	OFF
23	Digital I/O 4 0V24 connection	OFF
24	Digital I/O 5 resistor bypass	OFF
25	Digital I/O 5 0V24 connection	OFF
26	Digital I/O 6 resistor bypass	OFF
27	Digital I/O 6 0V24 connection	OFF

Figure 45 Switch I/O board digital input link settings
Table 13 Switch I/O board digital settings

5.8.2.3 RS485 Settings

Position of RS485 termination network links shown on the left hand edge of the switch I/O board

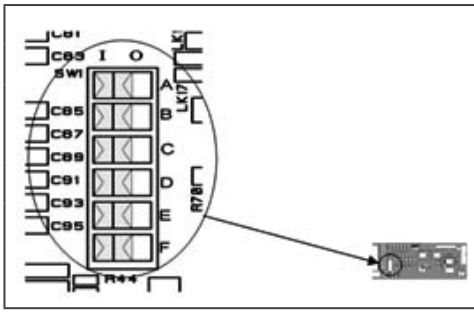


Link	Function	Factory setting
3	RS485 termination network connection	OFF
2	RS485 termination network connection	OFF

Figure 46 Switch I/O board RS485 termination link settings
Table 14 Serial settings on switch I/O board

5.8.2.4 Digital Input / Outputs Settings

Position of digital I/O links shown in the centre of the switch I/O board



Link	Function		Factory setting
	Input	Output	
SW1-A	Digital I/O 1 input	Digital I/O 1 output	Input
SW1-B	Digital I/O 2 input	Digital I/O 2 output	Input
SW1-C	Digital I/O 3 input	Digital I/O 3 output	Input
SW1-D	Digital I/O 4 input	Digital I/O 4 output	Input
SW1-E	Digital I/O 5 input	Digital I/O 5 output	Input

Figure 47 Switch I/O board digital input / output link settings
Table 15 Switch I/O board digital settings

5.9 Ethernet boards

Two types of Ethernet boards are available: Dual and single Ethernet.

The dual ethernet network board is a qualified personnel exchangeable plug in card, up to a maximum of 6 can be inserted in any of the user plug in slots in the SUMMIT 8800 chassis. It provides system communication functions as follows:

- 1 galvanically isolated Serial Communication Port using either RS232 with full hand shaking or RS485 standards providing connection to a serial printer.
- 2 galvanically isolated Serial Communication Ports using either RS232 with software hand-shaking or RS485 standards providing connections to data logging or supervisory devices.
- 2 of Communication Port using Ethernet 10/100 providing connection to other Network enabled equipment.

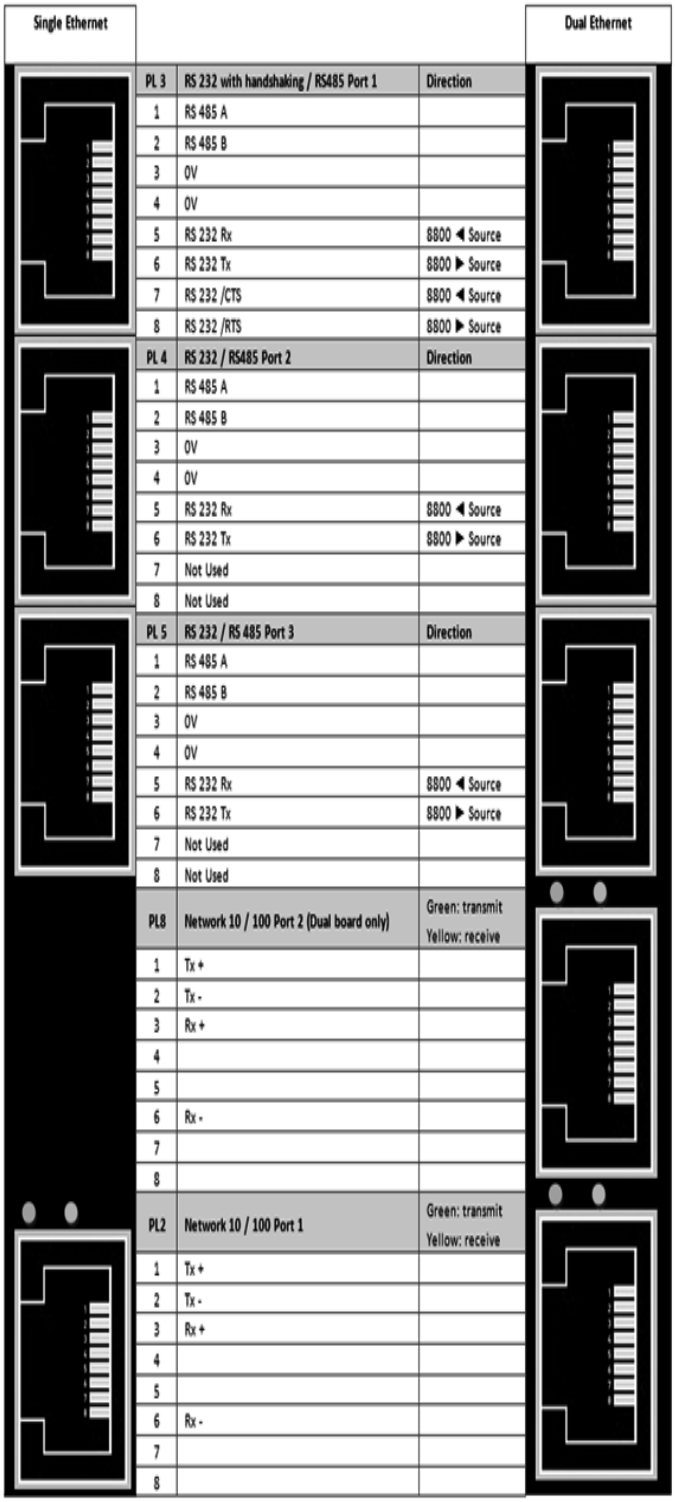
The single Ethernet board is identical except that it only has one Ethernet port.

Comms Board	Serial connection	Ethernet ports	Advance Capabilities
Single Ethernet	3	1	No
Dual Ethernet	3	2	Yes*

Table 16 Communication board configuration

*The Dual Ethernet communication board also provides additional capabilities such as redundancy for networks, separated fiscal communication from maintenance data, user defined websites, SOAP (simple object access protocol) communication protocol, secure data transfer and encrypting of data.
Further details can be found in volume 2 of the service handbooks.

5.9.1 Ethernet Board Terminal Connections



PL 3	RS 232 with handshaking / RS485 Port 1	Direction
1	RS 485 A	
2	RS 485 B	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	RS 232 /CTS	8800 ◀ Source
8	RS 232 /RTS	8800 ▶ Source
PL 4	RS 232 / RS485 Port 2	Direction
1	RS 485 A	
2	RS 485 B	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	Not Used	
8	Not Used	
PL 5	RS 232 / RS 485 Port 3	Direction
1	RS 485 A	
2	RS 485 B	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	Not Used	
8	Not Used	
PL8	Network 10 / 100 Port 2 (Dual board only)	Green: transmit Yellow: receive
1	Tx +	
2	Tx -	
3	Rx +	
4		
5		
6	Rx -	
7		
8		
PL2	Network 10 / 100 Port 1	Green: transmit Yellow: receive
1	Tx +	
2	Tx -	
3	Rx +	
4		
5		
6	Rx -	
7		
8		

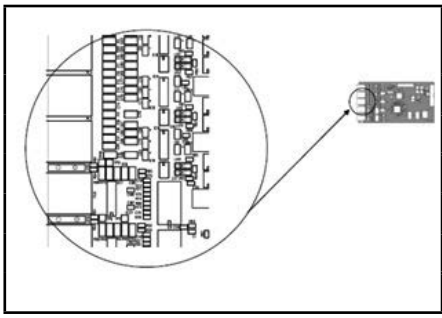
Figure 48 Ethernet boards rear terminal pin allocation

*Dual Ethernet: YELLOW 100M Network, GREEN Network Activity
*Single Ethernet: RED Network Collision, YELLOW 100M Network, GREEN Network Activity

5.9.2 Dual Ethernet Board Settings

5.9.2.1 RS232/485 setting

Position of RS485 termination network links shown on left hand edge of communication board



Link	Function	Factory setting
3	RS485 termination network connection port 1	OFF
4	RS485 termination network connection port 1	OFF
5	RS485 termination network connection port 2	OFF
6	RS485 termination network connection port 2	OFF
7	RS485 termination network connection port 3	OFF
8	RS485 termination network connection port 3	OFF

Figure 49 Dual Ethernet communication board link setting
Table 17 Dual Ethernet serial settings

5.9.2.2 6LED indications

LED	Function	Note
4	YELLOW 100M network ethernet port 1	Normally ON for 100M
4	GREEN network activity ethernet port 1	Normally Flash
2	YELLOW 100M network ethernet port 2	Normally ON for 100M
2	GREEN network activity ethernet Port 2	Normally Flash

Table 18 Dual Ethernet port LED indicators

5.9.3 Single Ethernet Board Settings

5.9.3.1 RS 232/5485 setting

Position of RS485 termination network links shown on left hand edge of communication board

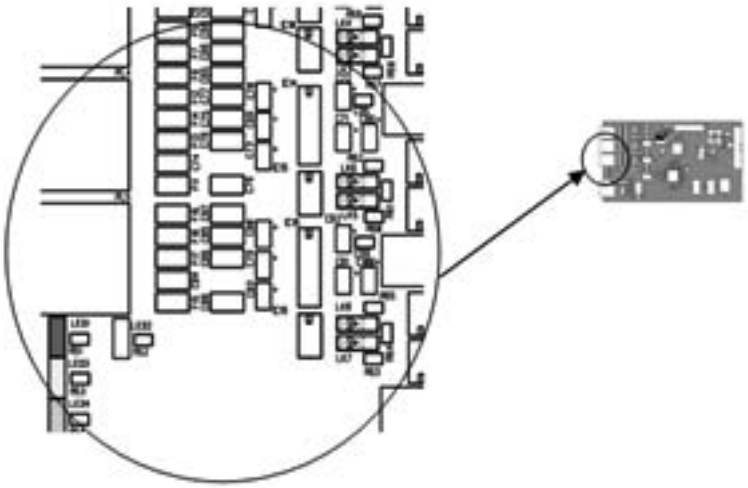


Figure 50 Communication board link setting

Link	Function	Factory setting
3	RS485 termination network connection port 1	OFF
4	RS485 termination network connection port 1	OFF
5	RS485 termination network connection port 2	OFF
6	RS485 termination network connection port 2	OFF
7	RS485 termination network connection port 3	OFF
8	RS485 termination network connection port 3	OFF

Table 19 Single Ethernet serial settings

5.9.3.2 LED indications

LED	Function	Note
1	RED network collision	Normally OFF
2	Not fitted no function	
3	YELLOW 100M network	Normally ON for 100M
4	GREEN network activity	Normally flash

Table 20 Single Ethernet port LED indicators

5.10 DSfG Board

The DSfG board handles the German DSfG protocol and is a qualified personnel exchangeable plug in card, up to a maximum of 3 can be inserted in any of the user plug in slots in the SUMMIT 8800 chassis. Normally one will be installed together with a Dual Ethernet board where one of the serial links is used to internally connect both boards.

Figure 51 DSfG communication board

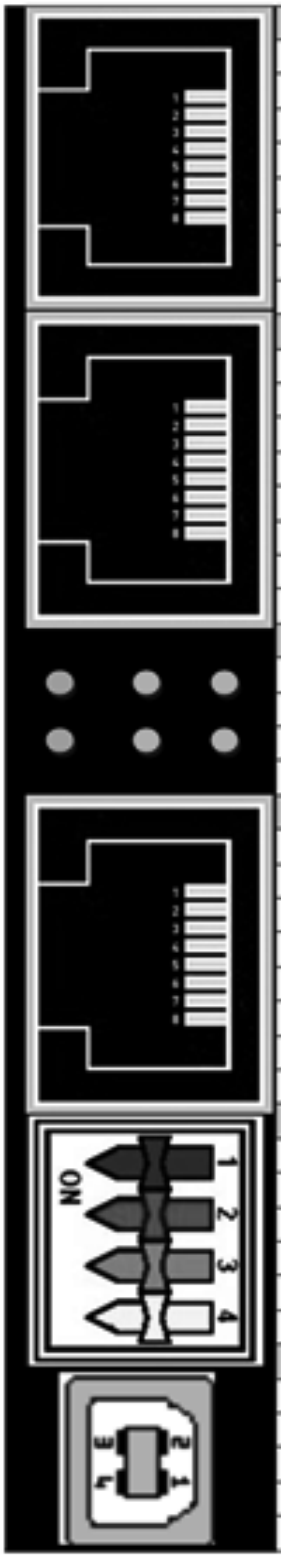
It provides system communication functions as follows:
- 1 galvanically isolated Serial Communication Port for external devices, e.g. modem
- 1 internal non-isolated serial Modbus port to connect to serial port 2 of a dual Ethernet port
- 1 external serial Modbus port, optionally connected to the internal serial port
- 6 LED's to monitor the communication progress
- 1 galvanically isolated Serial Communication Port using either DSfG.
- 4 DIP switches: bus termination / Bus power + and - / flash mode
- 1 USB port to configure the DSfG board and to access internal data

5.10.1 DSfG Board installation

The DSfG board will normally be combined with a dual Ethernet board. A special version of the dual Ethernet can be ordered which has an internal serial port 2. In that case, an internal cable can be used to interconnect the serial ports as follows:

Figure 52 DSfG communication installation

5.10.2 DSfG Board Terminal Connections



PL 1	RS 232 Port 1	Direction
1	Not Used	
2	Not Used	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	Not Used	
8	Not Used	
PL 2	RS232 Port 2 (optional parallel to internal port)	Direction
1	Not Used	
2	Not Used	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	Not Used	
8	Not Used	
	Activity lights	
PL 3	DSfG Port	Direction
1	Not Used	
2	Not Used	
3	0V	
4	0V	
5	RS 232 Rx	8800 ◀ Source
6	RS 232 Tx	8800 ▶ Source
7	Not Used	
8	Not Used	
SW		
1	Bus termination	
2	Power +	
3	Power -	
4	Flash mode	
USB	USB type B	
1	+5 Volt	
2	USB Data-	
3	USB Data+	
4	0V	

5.10.3 Boards block diagram

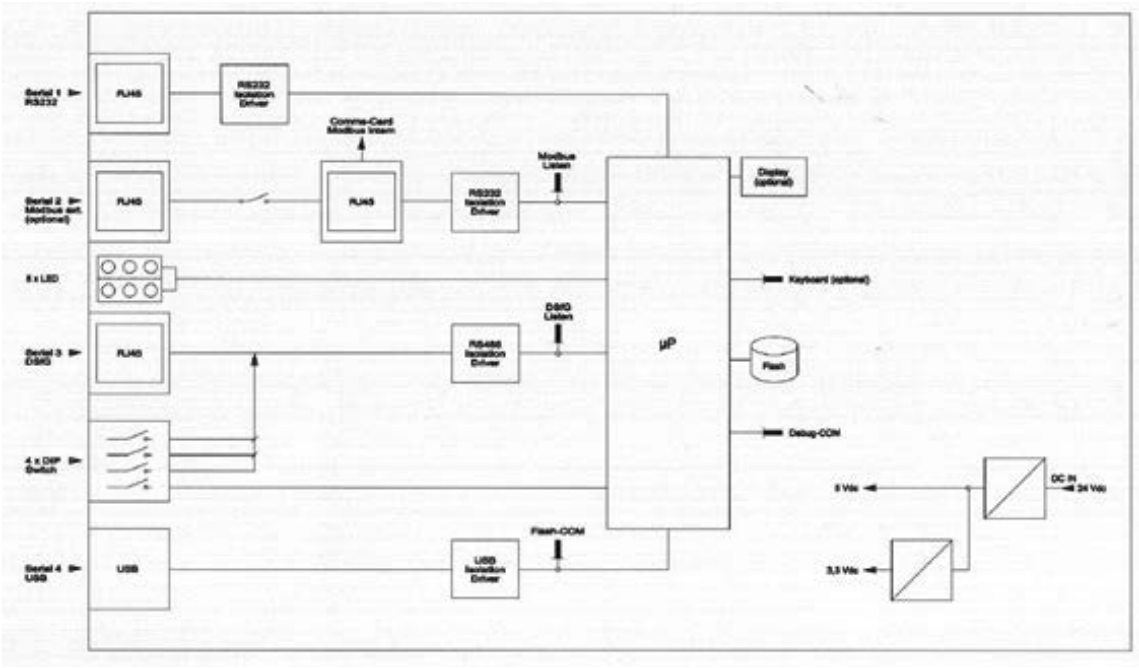


Figure 53 DSfG boards block diagram

This chapter details connectivity to the commonly available field instruments that can be connected to the SUMMIT 8800. The following connections are generic, not specific to any brand or manufacturer. For detailed connections, please refer to the instruments manufacturer installation manual.

6.1 Transmitters & Transducers

Typically these devices will be used for temperature, pressure, density.

6.1.1 HART Transmitter Input Connections

The HART transmitters are connected in parallel as a multidrop system and each transmitter must have a unique address.
It is essential that the transmitters have their address programmed and the burst mode operation turned off before they are connected to the SUMMIT 8800. All transmitters on the same HART Loop must be assigned different short addresses. It is recommended that the pressure transmitter be programmed with a short address of 01 and the temperature transmitter with a short address of 02.

Refer to the transmitter operating manual for their programming procedures.

A typical method of connecting transmitters is given in the figure below and the terminal pin designations refer to the connections of the I/O board used.

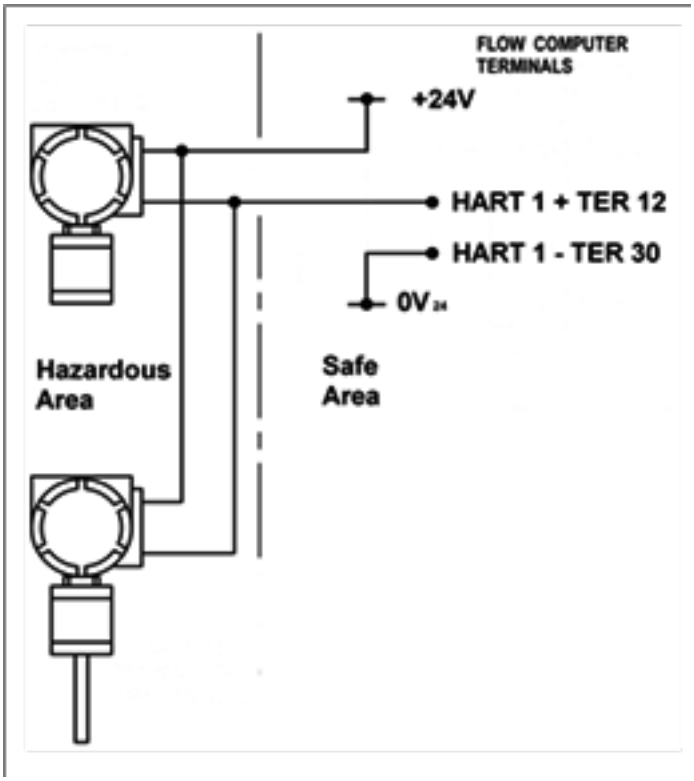


Figure 54 Typical HART transmitter connections

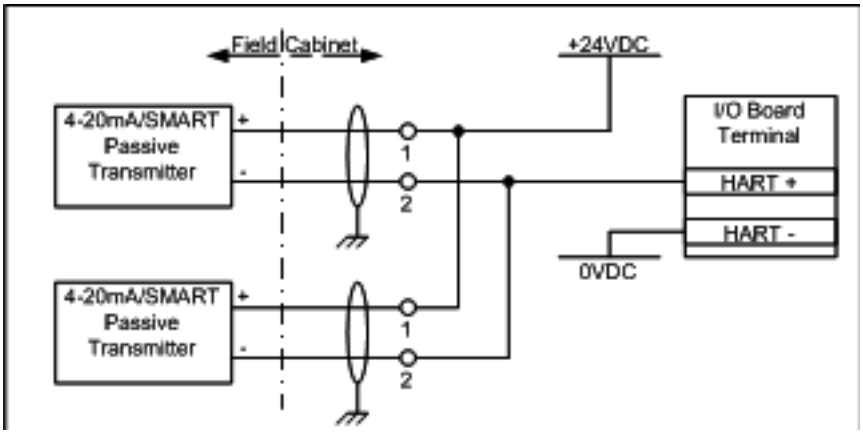


Figure 55 HART multidrop

6.1.2 Digital Transmitter Input Connections

These inputs are generally used for connection to pulse-counting meters such as Rotary or Turbine meters, frequency measuring transmitters such as Density or Relative Density transmitters or simple switch inputs. In all cases the required connections is typically as shown in the figure below.

It is intended that the Input be connected to a +24V pulse input with Link LK8 in the off position, this allows an input current of 10mA to flow. If the pulse source is operated from different voltage sources then LK8 should be switched to the ON position and an external resistor of value that will allow 10mA to flow should be fitted in series with the D I/P 1+ Terminal.

Typical voltages and resistor values are given in the next table.

Voltage	Resistor
15V	1k5
12V	1k1
5V	510

Table 21 Digital transmitter reference voltage and resistance

For terminal pin designations refer to the connections of the I/O board used.
Reference should be made to the meter or transmitter manual for correct installation and connectivity guidance.

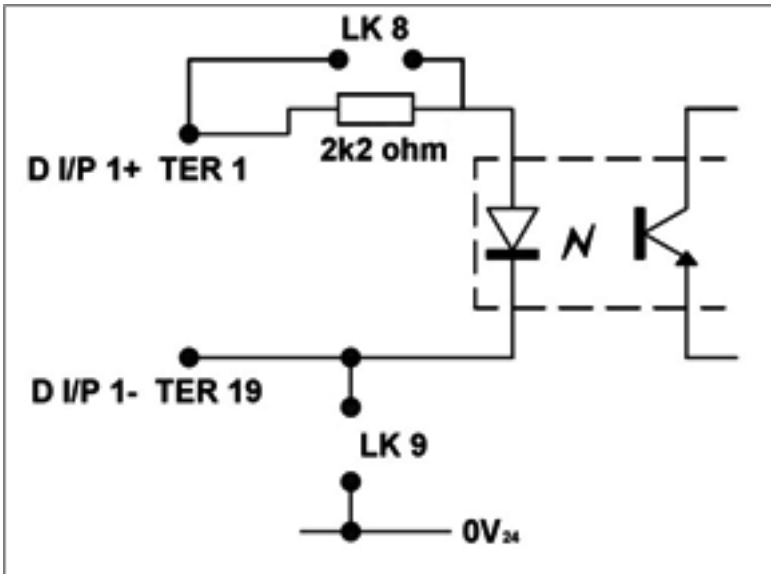


Figure 56 Digital Input internal circuit

The connections for the different type of digital signals are:

Frequency e.g. Density,	see figure below: Digital input density transducer
Status input via optocoupler	see figure below: Digital input status optocoupler
Status input direct,	see figure below: Digital input pulse status

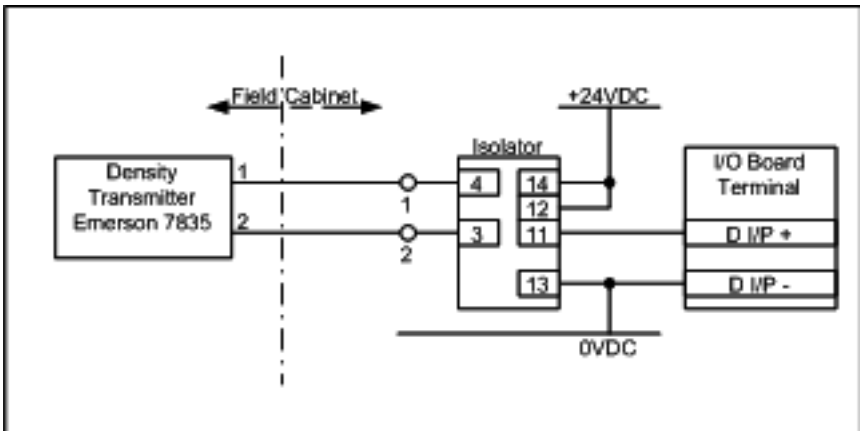


Figure 57 Digital input density transducer

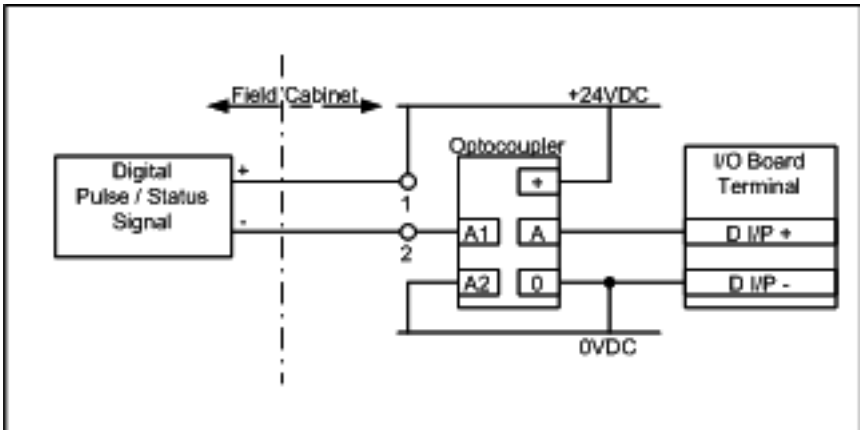


Figure 58 Digital input status optocoupler

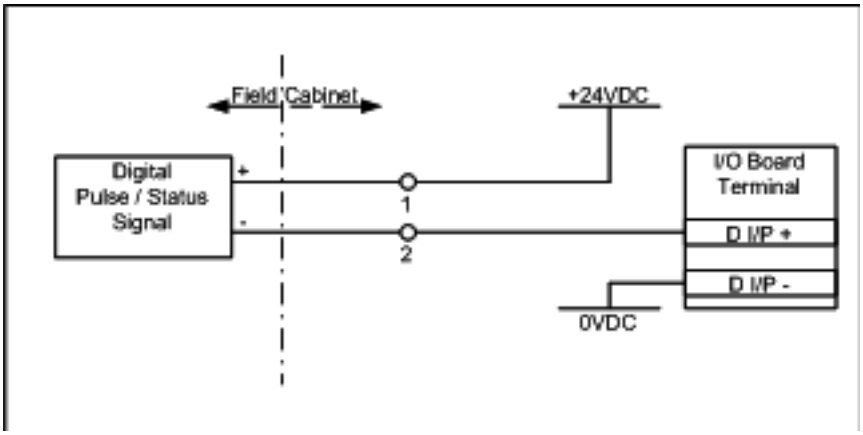


Figure 59 Digital input pulse status

6.1.3 Digital Transmitter Output Connections

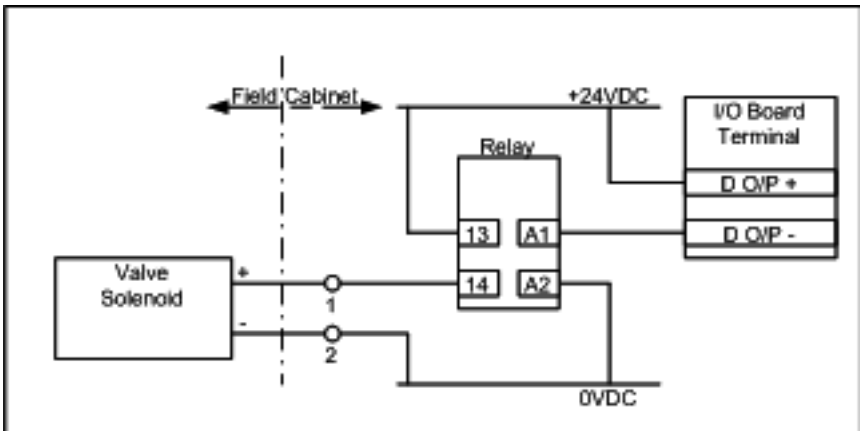


Figure 60 Digital output valve solenoid

6.1.4 Analog Transmitter Input Connections

NOTE:
Only available when analog I/O board fitted.

Any analog inputs used are generally used for connection to 4-20mA type transmitters for measurement of pressure, temperature or similar.

Refer to the transmitter operating manual for installation procedures.

A typical method of connecting transmitters is shown in the figure below and for the terminal pin designations refer to the analog I/O board connection in section 7.1 of this chapter

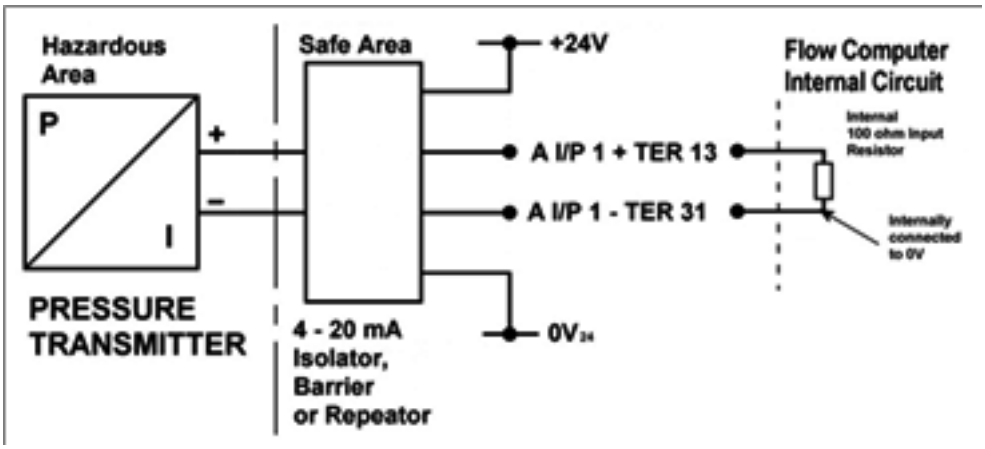


Figure 61 Typical analog input connections

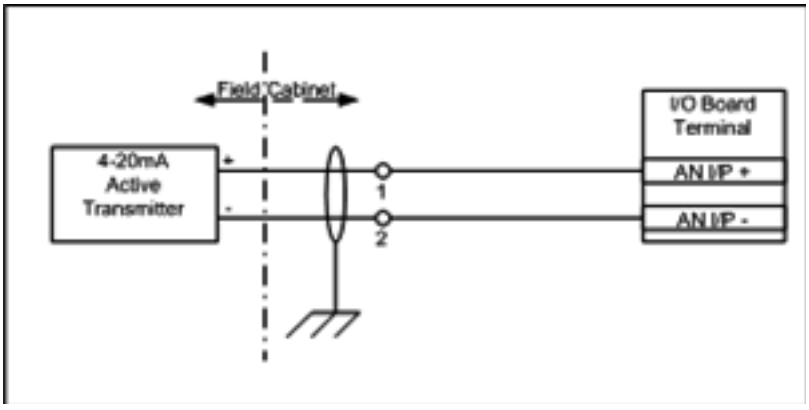


Figure 62 Analog input active transmitter loop

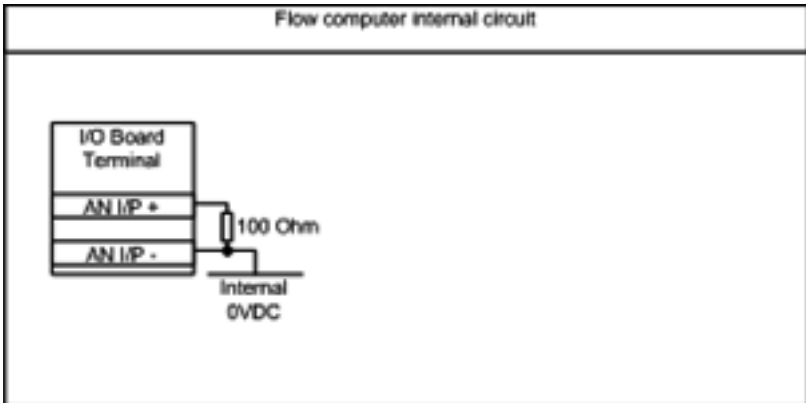


Figure 63 Analog input internal circuit

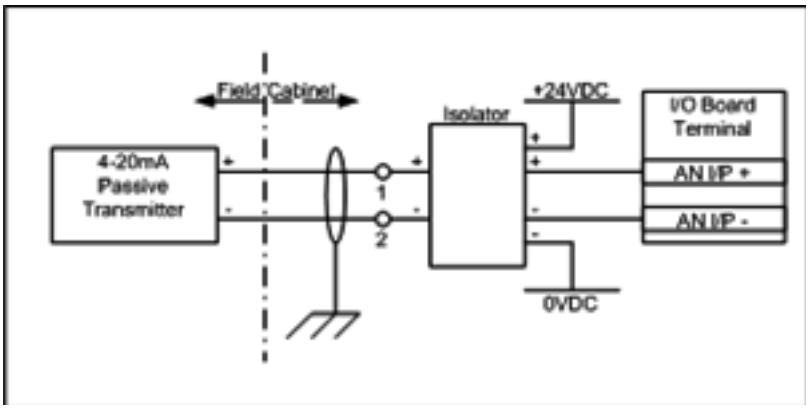


Figure 64 Analog input transmitter isolator loop

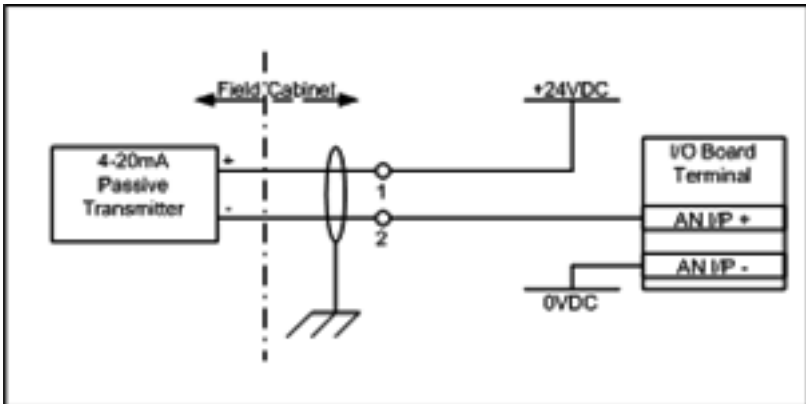


Figure 65 Analog input passive transmitter loop

6.1.5 Analog Transmitter Output Connection

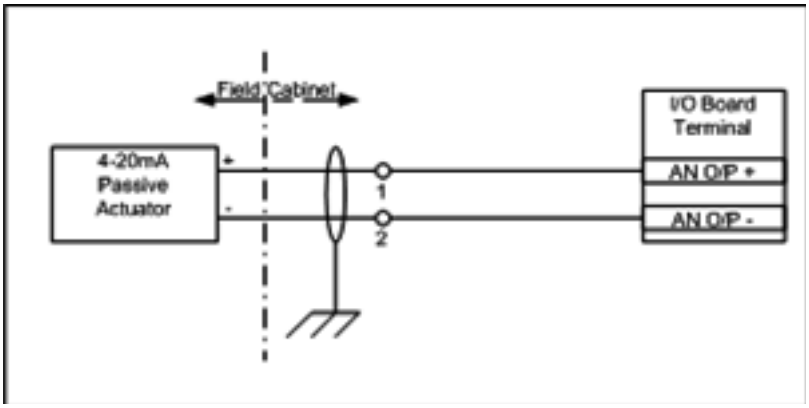


Figure 66 Analog output passive actuator

6.1.6 Direct RTD Input Connections

The PT100 temperature input can be a direct 3 or 4 wire Resistance 100 ohms at 0°C.

Refer to the transmitter operating manual for the installation procedure.

A typical method of connecting transmitters is shown in the figure below and for the terminal pin designations refer to section 7.1 of this chapter

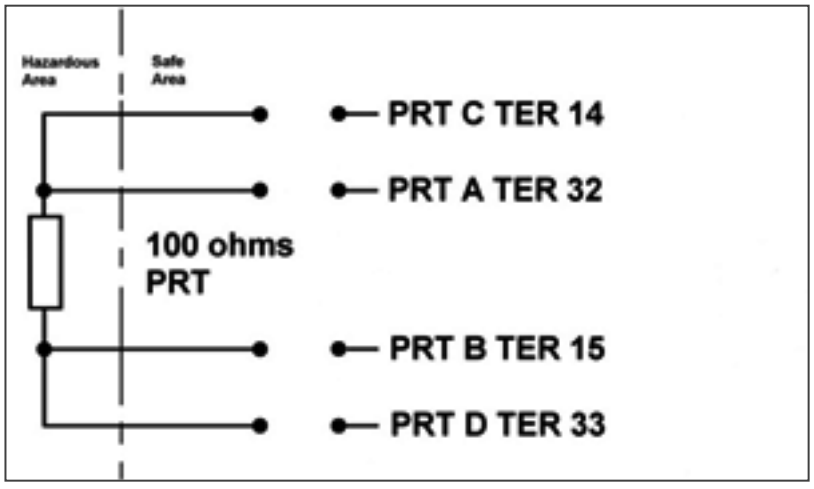


Figure 67 Direct RTD connection

6.1.7 Pulse Bus

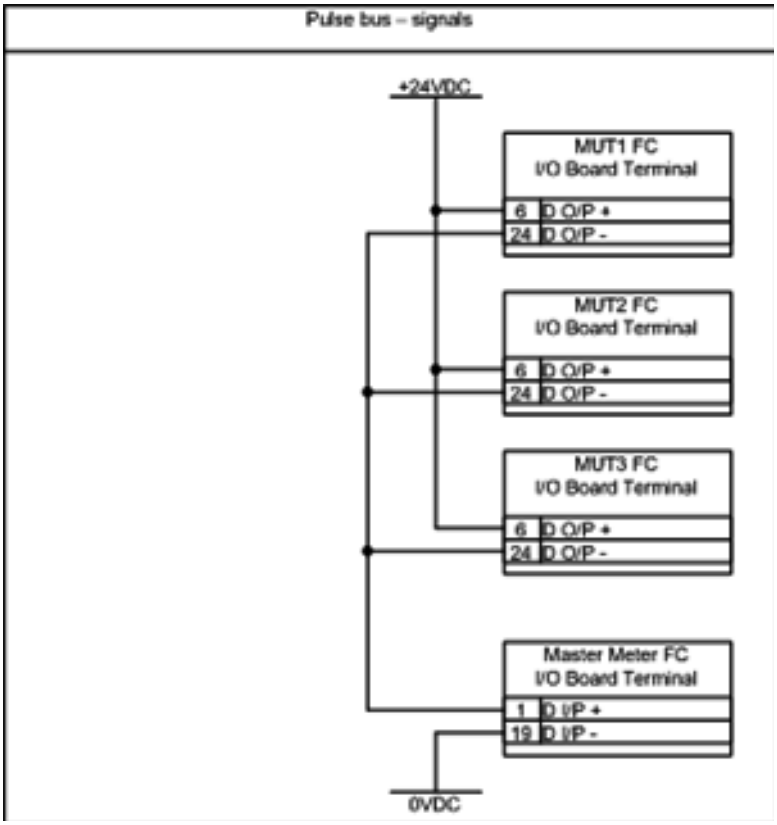


Figure 68 Pulse bus loop

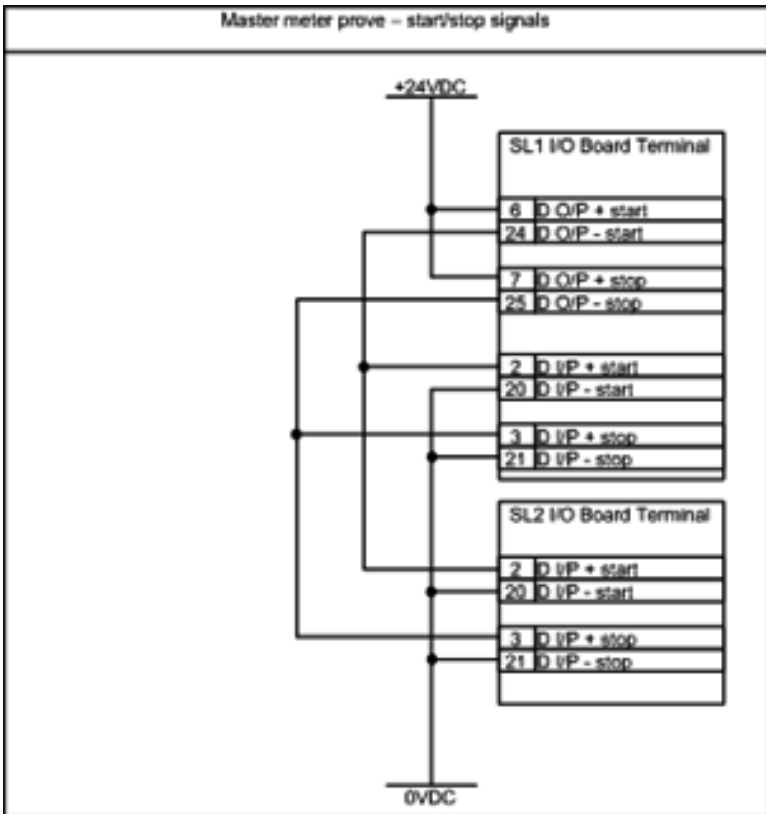


Figure 69 Start/stop signals loop

6.2 RS 232/RS485 Communications Connections

All I/O boards - Digital, Digital 2, Switch and Analog have an RS232/RS485 connection for serial communications, with e.g., smart meters or similar devices. These connections are not galvanically isolated from the internal supplies of the SUMMIT 8800; it is, therefore, recommended that external barrier devices are used in conjunction with these connections.

RS232 connection:	Phoenix Contact PSM-ME-RS232/RS232-P
RS485 connections:	Phoenix Contact PSM-ME-RS485/RS485-P
	Phoenix Contact PSM-ME-RS232/RS485-P

The communication boards have 3 separate galvanically isolated RS232/RS485 connections for such as serial communication to printers, supervisory systems or gas chromatographs.

If RS485 communication is to be used on any of the boards, string termination must be considered.
To connect the termination resistor chain both links associated with the RS485 connection should be set to the ON position.

NOTE: The figure below shows link references for the digital and analog I/O board only. Refer to Contents for section on link references for the communication board.

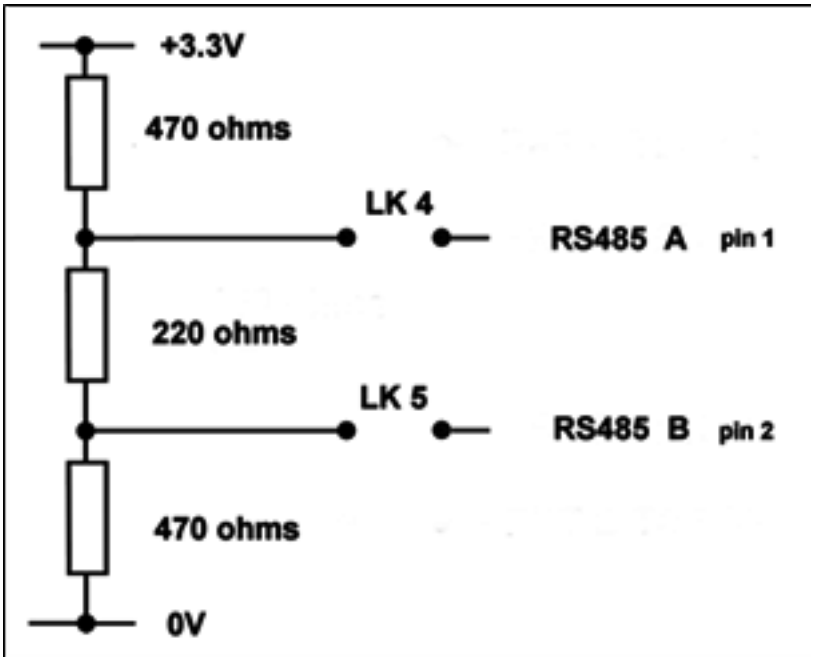


Figure 70 Internal RS485 Termination network

Configuration and connection must be done in accordance with the manufacturer's guidance of any connected device.

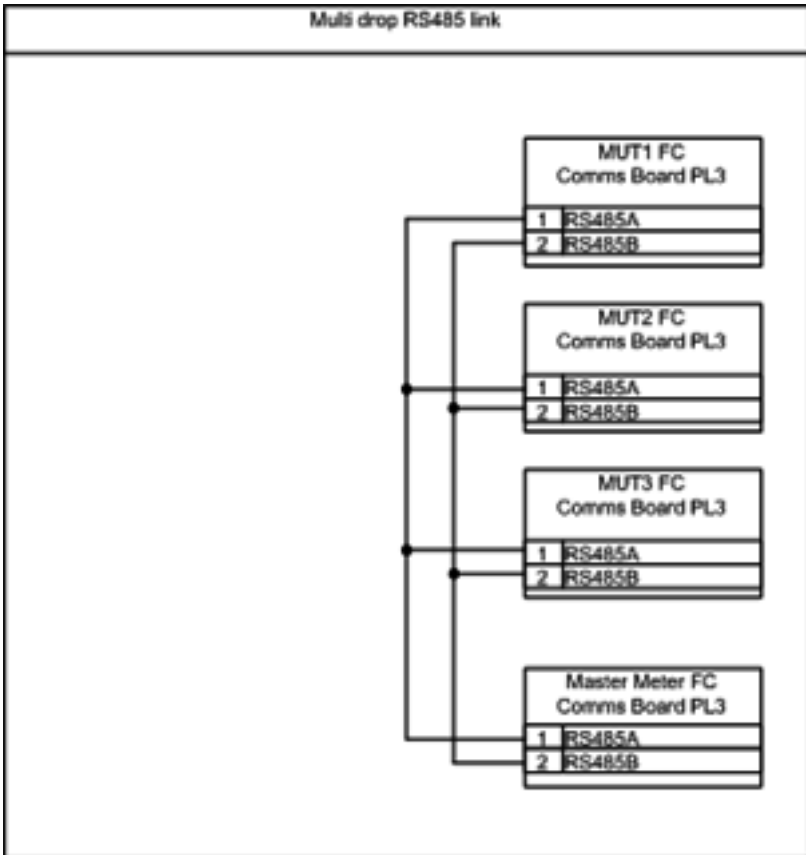


Figure 71 RS485 multidrop

7.1 Initialising

When the flow computer has been successfully mounted and installed correctly, it is recommended that all electric connections are verified prior to powering up the flow computer. The SUMMIT 8800 does not have an ON/OFF switch, and unless such a switch has been integrated into the installation, once the 24V input is connected, the flow computer will begin an initialization procedure.

Start-up Procedure

- Check that the power supply is of the correct type and value.
- Check to see that the earth connection to the rear point is made and secure.
- Check the internal fuse F1 and external fuse F2 and that the power supply polarity is correct
- Ensure that all input and output connections to the plugs and sockets at the rear of the SUMMIT 8800 are satisfactory and the plugs are engaged firmly and in the correct sockets.
- Check that all of the circuit boards are fully engaged in their sockets and are positioned in the correct location within the SUMMIT 8800
- Carry out a visual inspection of all wires and cables for obvious loose or broken connections.
- When ready to power up, insert the 24V connector

Figure 72 SUMMIT 8800 initialization

7.2 Front Panel Operation

There are two basic front panel controls on the SUMMIT 8800, the touch screen and the Navigator - 360 degree rotary dial. Both these controls allow the user to access the main menu, view, edit and manipulate items of data shown on the main display panel.

7.2.1 Touch Panel

The touch panel is the display area, any buttons, or menu items shown on the display can be touched to operate or perform the specified function e.g. if the Main Menu button is pressed, then the main menu will appear on the display on the left hand side. A button will generally indicate it has been pressed by either changing colour or by giving the appearance of movement or by highlighting the function selected.

7.2.2 Navigator

The rotary control Navigator operates in two ways, firstly as a continuously variable 360 degree dial that step through each of the possible parameters on a display page highlighting each button in turn with red indicators on the sides. To use the rotary control, rotate either clockwise or counter clockwise until the desired item is highlighted or shown with the red indicators. To select or operate the selected control, press the rotary control until it clicks. The selected item will then be highlighted or shown with green indicators as shown below.

Figure 73 Parameter highlighted by Navigator

Figure 74 Parameter selected by Navigator

7.2.3 Navigation Controls Main Menu

The main menu can be selected by pressing the Main Menu button which is available on every screen in the bottom left hand corner of the display.

The menu items will appear as a list on the right hand side of the display screen Navigation controls at the top of the list and at the bottom allow access to all items in the menu.
If a menu item or sub-menu is selected and has more than one page, then page navigation controls will appear at the bottom of the screen as shown below.

The indicator shows the current page number and how many pages are within that menu item. The arrow keys give access to the first page, last page and allow the numbers to be incremented or decremented.

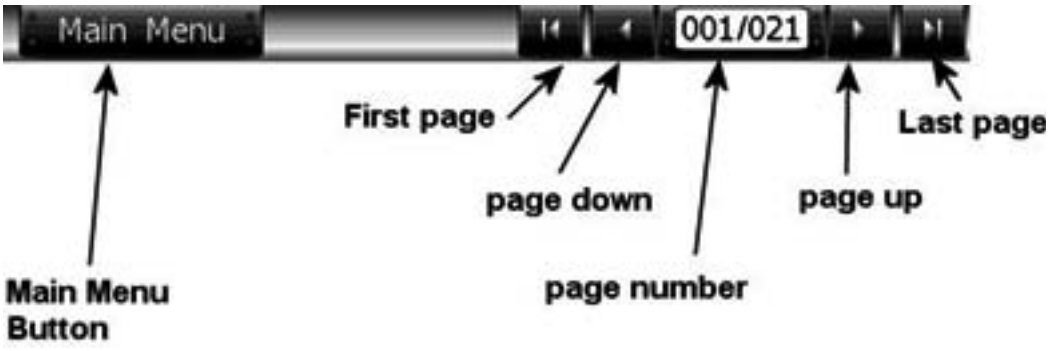


Figure 75 Screen navigation and control indicators

7.2.4 Main Menu Display

The main operating menu of the SUMMIT 8800 can be accessed by selecting the Main Menu But-

ton which is always on the bottom left corner of the display screen.

The majority of Main Menu items are basically short cuts to groups of display pages, e.g. Totals is a short cut to pages that include totals of all types. The following pages however, have additional functions:

- Totals
- Line Conditions
- Relative Density
- Heating Value
- Composition
- Meter
- Supervisory
- Data Logs
- Alarm Log
- Audit Log
- Print Jobs
- System Information

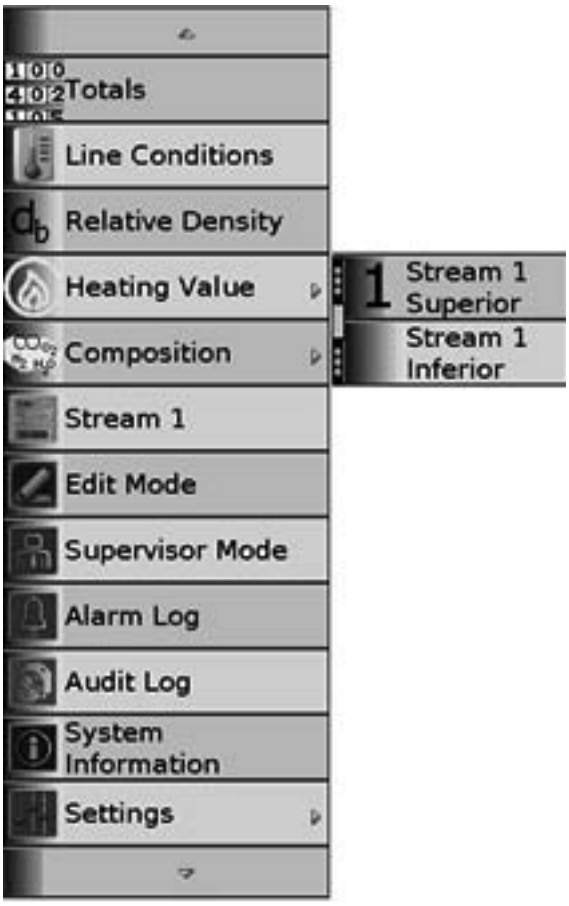


Figure 76 Main menu parameters

NOTE: The display of the menu structure will change depending on the configuration and application selected

7.2.4.1 Edit Mode

The Edit Mode allows the user to choose items to be altered using the front panel controls.

When this menu item is selected the user will be prompted to enter a four digit numeric password to access the calibration pages.
It is possible to set-up a maximum of three different passwords and each of these passwords can be set to allow access permissions or to restrict the user to the calibration pages, these passwords are the same as used in the EDIT mode.

In its factory default condition there are three available users with passwords 1111, 2222 and 3333.

The user must select an item to be edited from the list of available items, then using the Navigator or Keyboard keys 0-9, a new value can be entered. Once all items to be changed have been updated, Edit mode can be exited using the Main Menu key and at this point data can be committed into the operational memory of the SUMMIT 8800.

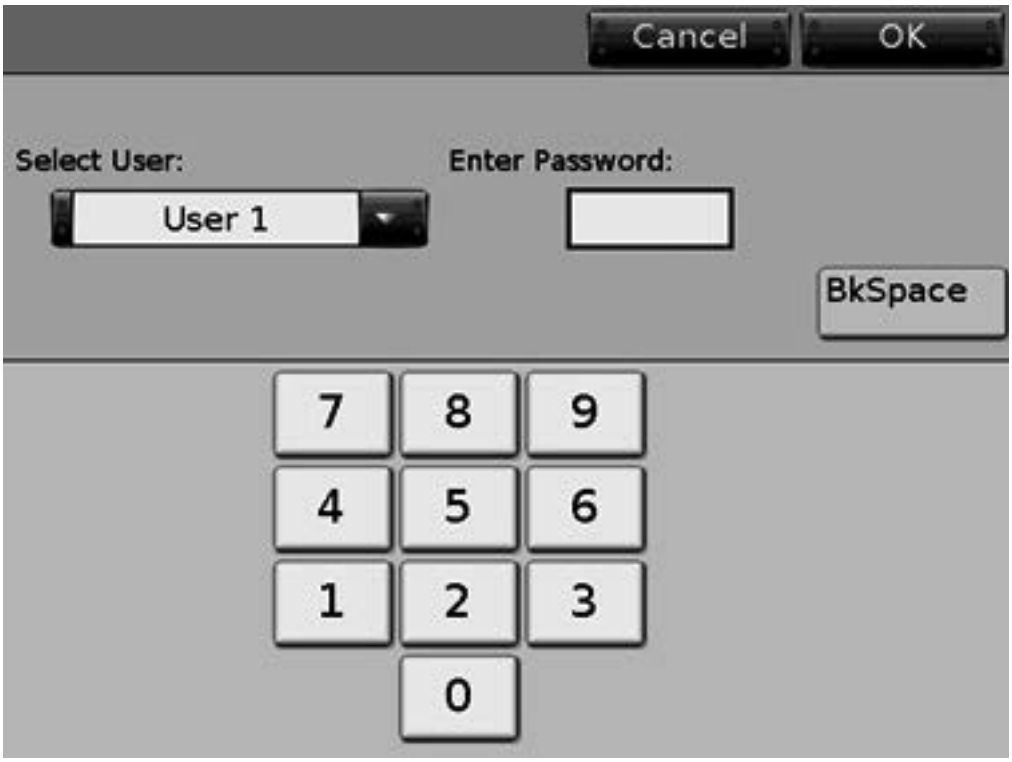


Figure 77 Edit mode login screen

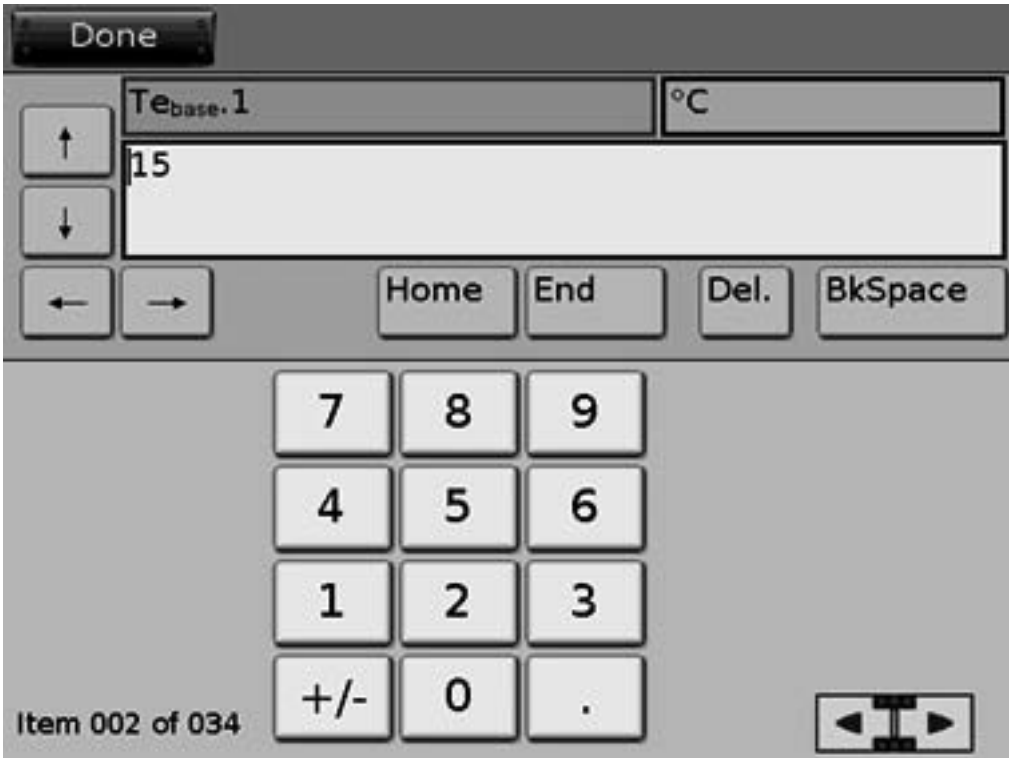


Figure 78 Enter values screen

Figure 79 Exit edit screen

7.2.4.2 Calibration

The Edit Mode also allows access to the Calibration page under the same password entry. Calibration allows the user to calibrate the inputs and outputs on specific I/O Board. Details of Calibration procedures for all available input and output types can be found in the relevant section.

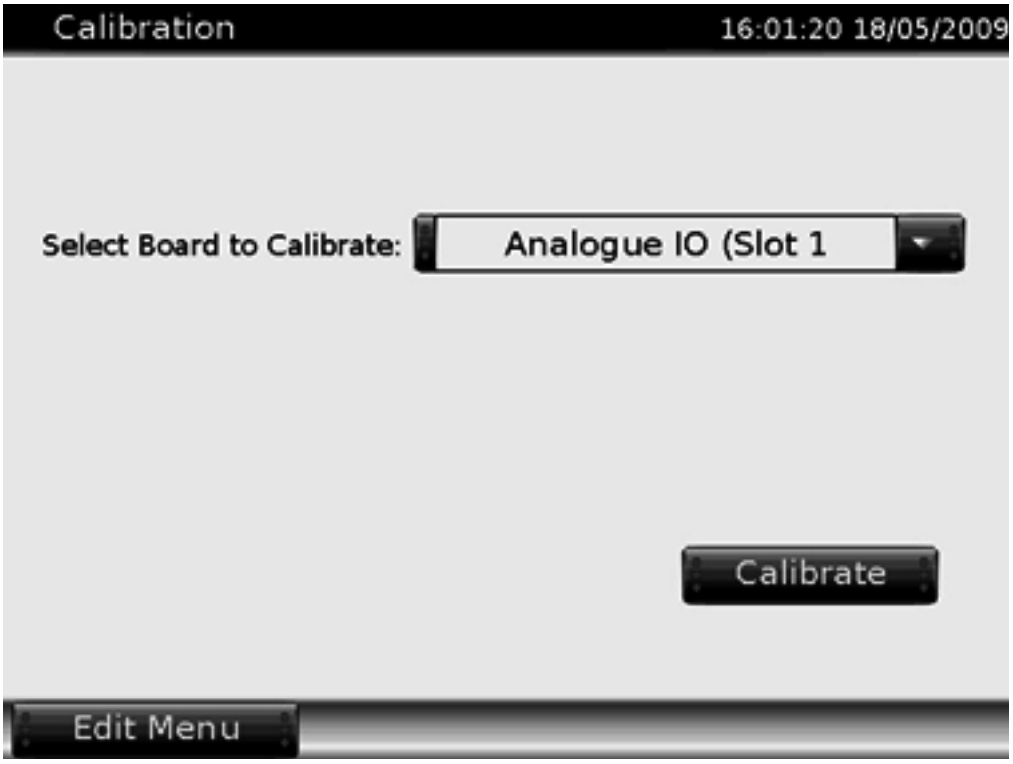


Figure 80 Calibration menu

7.2.4.3 Alarm Log

A typical Alarm log display is shown below.

Figure 81 Alarm page

Accountable alarms are shown in Red and Non-accountable alarms and warnings in Blue.
Any current Alarm will be accompanied by a FLASHING LED of the corresponding alarm type stating that an Alarm occurrence has not been acknowledged.
An Alarm can be acknowledged by selecting the Acknowledge button at the bottom of the Alarm Log page. Once acknowledged, the corresponding Alarm LED will stop flashing and will be on continuously.
Past alarms can be cleared from the Alarm Log by pressing the Clear button at the bottom of the Alarm Log page.

7.2.4.4 Audit Log

A typical Audit Log display is shown below, the audit log, logs all changes made to the flow computer parameters including items that could affect the operation of the flow computer.

Time & Date	Event
(28/02/08) 17:09:46.000	Powerup
(28/02/08) 17:09:48.000	I/O standard board 1 changed
(03/03/08) 12:09:48.000	Log (Log 1) changed
(05/03/08) 15:19:48.000	Display configuration changed
(05/03/08) 18:19:18.000	Te keypad.1 changed from 5.00000 to 7.00000

Figure 82 Audit Log Example

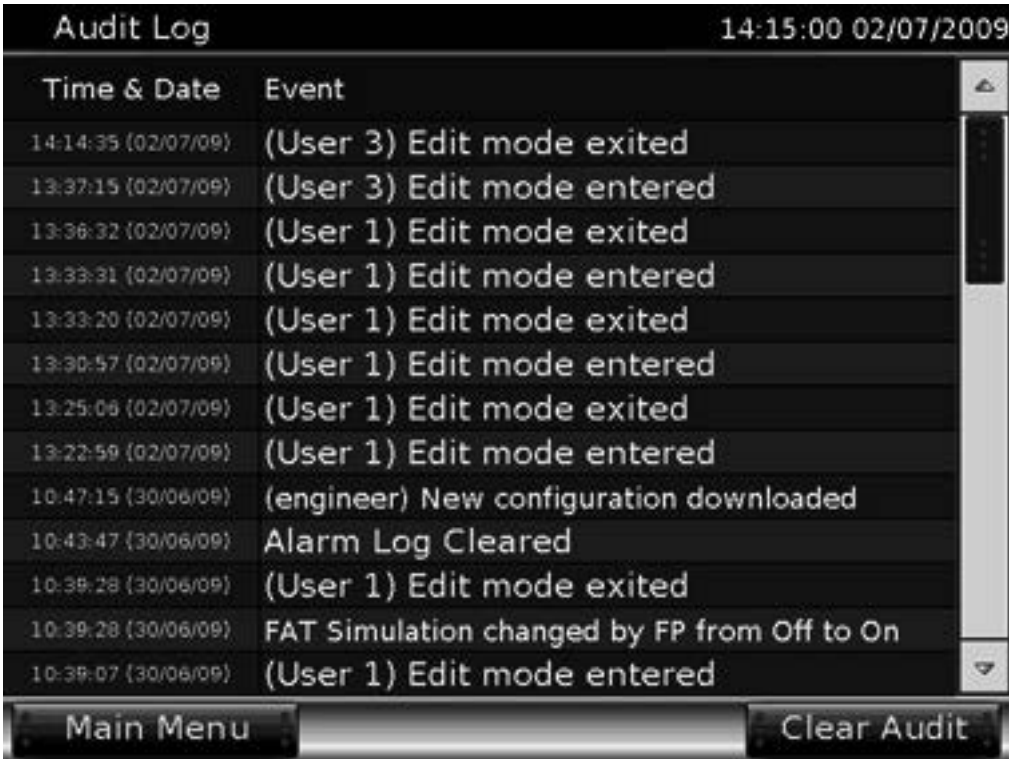


Figure 83 Audit log trail

7.2.4.5 Supervisory

The Supervisory or Mimic Diagram page shows a diagrammatical view of the basic system set-up. Such a display would include Meters, Transmitters and can give a summary of the flowing conditions. Depending upon the device type configured this page can appear in the main menu list as Run/stream N, Station or Prover.

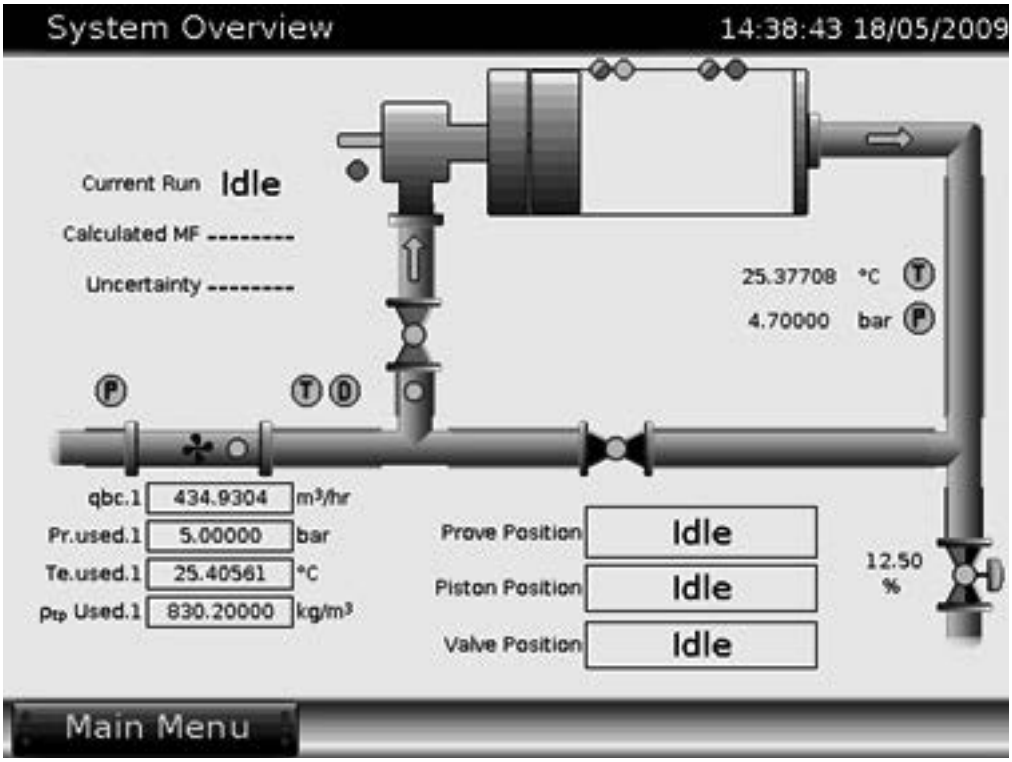


Figure 84 Supervisory screen display

7.2.4.6 Supervisor Mode

The Supervisor Mode is an advanced Edit Mode feature - it allows the user to log into the flow computer, once logged in the user has open access to all display pages and permission to alter any preset data or operate any function buttons or commands without having to login for every operation.

When the Supervisor Mode is first entered the user will be prompted to enter a previously entered alpha numeric Password of at least 5 characters. If the password is correctly entered a system message of Supervisor Mode "enabled" is displayed which must be acknowledged, a Supervisor Mode Icon will be shown in the top edge of the display. See figure below.

Depending on the initial configuration of the Supervisor Mode, the user can opt to either commit any data changes instantly as they occur or commit any data changes via a single sub menu item option with an acknowledgement.
Depending upon the initial configuration of the Supervisor mode Logout can be set to occur automatically after a user defined time in minutes of no keyboard activity, or upon command of a sub menu button under the Supervisor mode main menu item.

Figure 85 Supervisory Mode Enabled

7.2.4.7 System Information

The System Information Page and Board information page, contains all relevant information for firmware and Hardware versions fitted in the SUMMIT 8800, together with Silicon Serial Numbers of all fitted circuit boards.

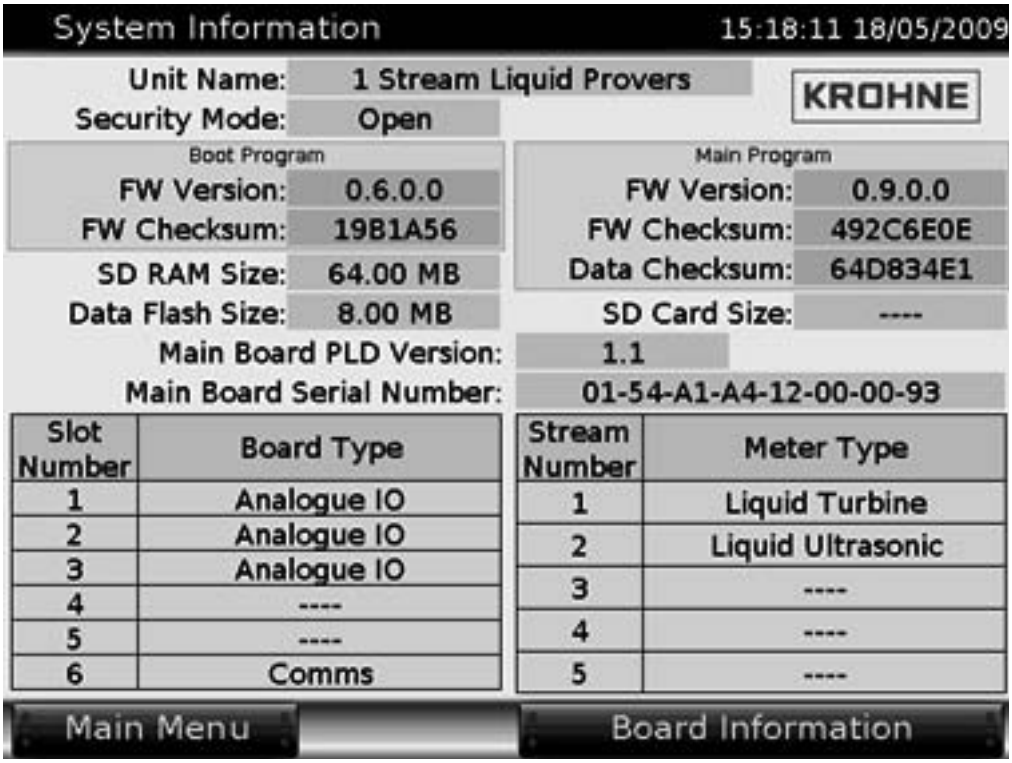


Figure 86 System information screen

Unit Name:	Flow computer tag
Security Mode:	Dipswitch defined
Boot Program:	Information related to boot firmware for CPU
Main Program:	Information related to configuration revision and software version
Main Board Serial Number:	Serial number for CPU
Slot Number:	I/O and communication boards installed
Stream Number:	Flow computer run configuration
Board Information:	I/O and communication board details

Each board has a Boot Program and Main Program. The firmware versions and firmware checksum are unique for each program mode. Further details on correct versions and releases can be requested from koghelpdesk@krohne.com

Boot Program – Level 1
This program operates the start-up and initialization of all signals, relevant read/ write commands and storage space.

Main Program – Level 2
This program operates all computing signal handling and conversions including calculations.

7.2.4.8 Settings

The Settings page contains non critical display controls:

Display Settings: Language Selection & Display Brightness

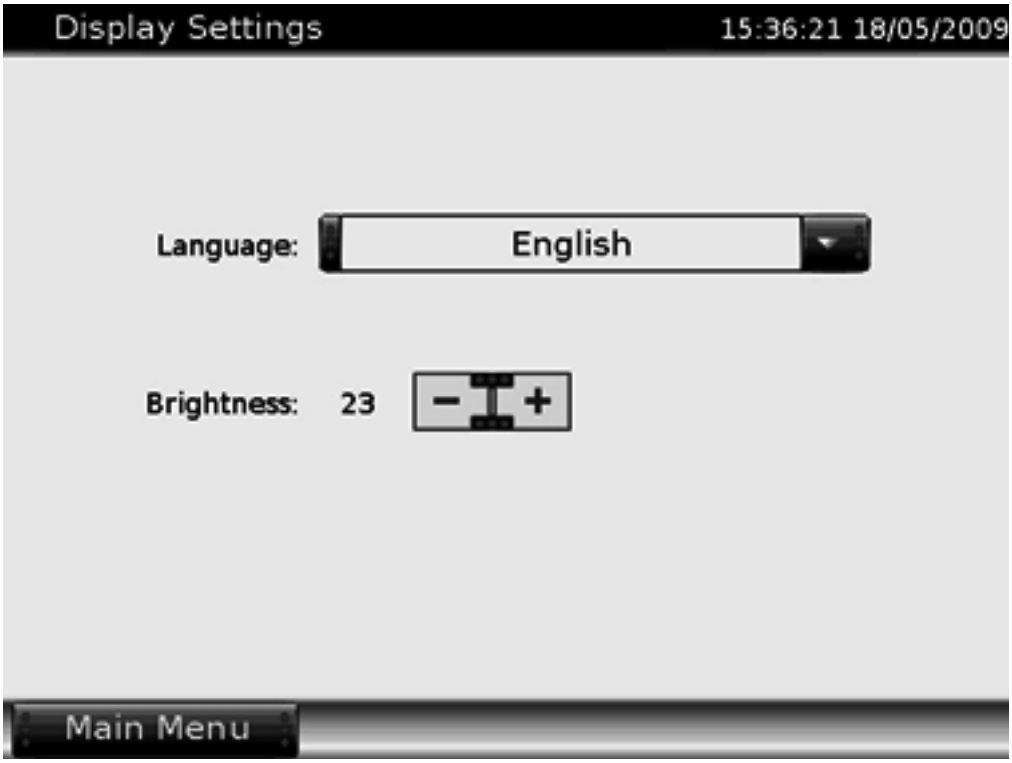


Figure 87 Display settings screen

Display Test - Display On (white Screen), Display Off (black Screen) & Test Card.

Figure 88 Display test screen

7.2.4.9 Touch Screen Calibration

Touch screen is a resistive device and is therefore pressure sensitive. It can be operated with a finger, a pointing device or a glove. The Touch screen comes factory calibrated.

Further Test and Touch screen operation calibration can be performed by screen procedure as illustrated below.

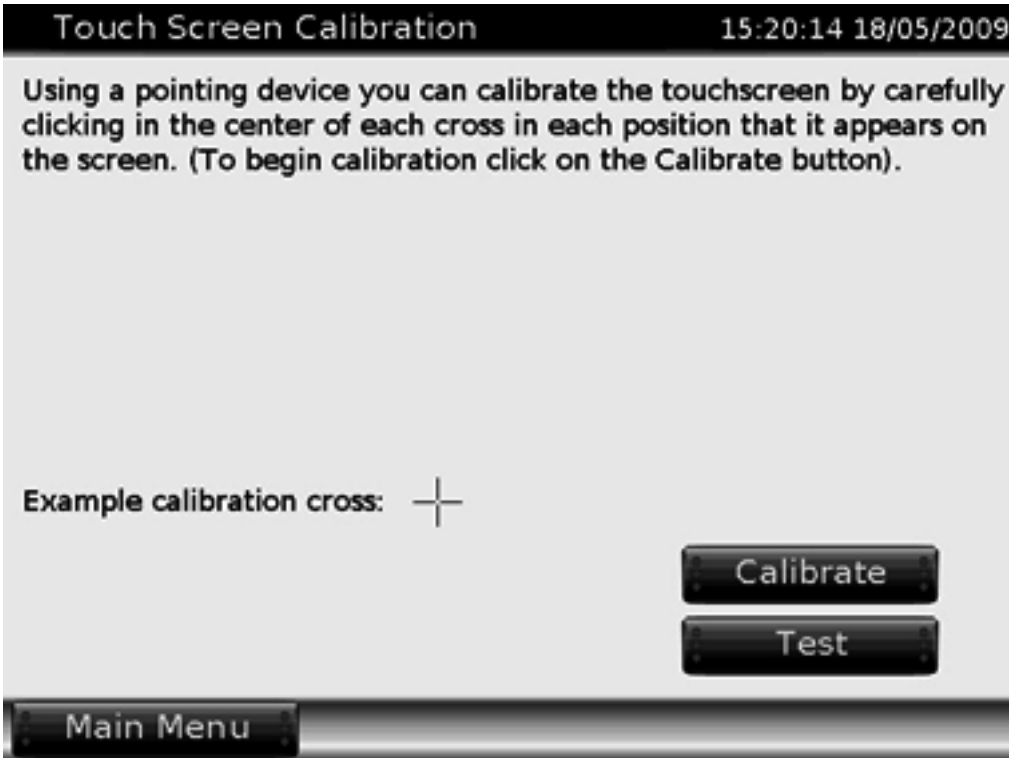


Figure 89 Touch screen calibration

Calibrate	Follow the on screen instruction for touch screen calibration
Set Sensitivity	Follow the on screen instruction for touch screen sensitivity
Test	Follow the on screen instruction for touch screen test

Touch Screen Enabled when unselected disables the touch screen navigation so all display navigation is performed using the Rotary control. When the touch screen is disable an icon is displayed in the top display bar. See figure below.

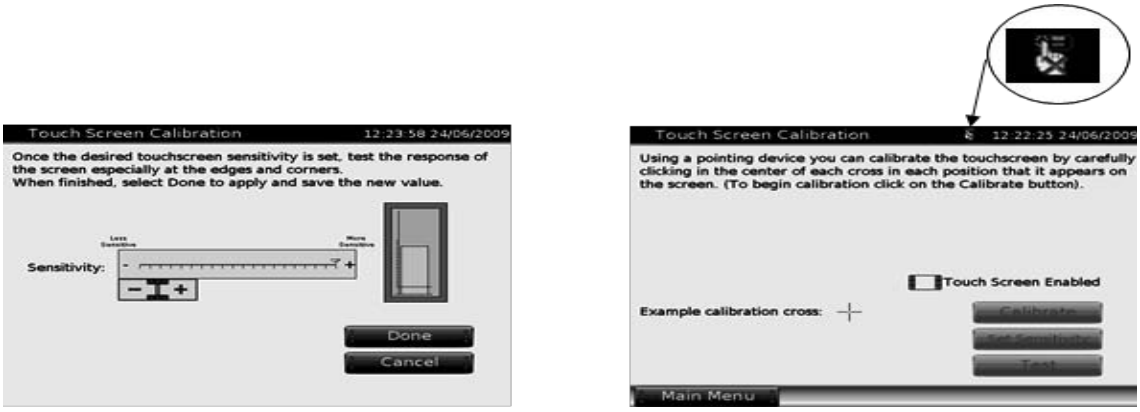


Figure 90 Touch Screen Calibration pages

7.2.4.10 MID Information

The MID Information page(s) is a read only screen, with all essential data related to MID approval.

Calibration should be carried out by qualified personnel. This function allows certain available Inputs and Outputs to be calibrated for accuracy, which is performed using the Windows configuration software.
The procedure is described in the Help Menu and from the front panel of the flow computer. Calibrate mode is entered as a sub-menu from the Edit Mode, the entry procedure is described later in this chapter.

The I/O card to be calibrated is selected from a list of available cards in the flow computer. The Calibrate button should then be operated. Status of the selected Card will be read and a Calibration window will appear.

The following types of different Inputs and Outputs can be Calibrated, and are selected by the individual items in the Calibration list.

8.1 Input Calibration

8.1.1 HART Input

Calibration of the HART Transmitter Inputs is performed using a Digital Handheld or other similar calibration device supplied by the transmitter's manufacturer. The transmitters are connected to the flow computer in parallel as a multidrop system and as such, each transmitter must have a different address.
It is essential that the transmitters have their addresses programmed and the burst mode operation turned off before they are connected to the flow computer.

In the flow computer it is necessary to suspend HART Communication to the HART transmitters whilst they are being calibrated. Communication on any one connection loop can be suspended to all transmitters, or individually. The Start Communication and Stop Communication buttons are used for this purpose.
All transmitter communication will automatically be re-started irrespective of the button status, when the Close button is selected.

Figure 91 Calibrate HART screen

8.1.2 RTD Input

To calibrate the PT-100 temperature input.

Main Controls	
Start Calibrate	Starts the calibration process
Write	Write the new calibration data to the flow computer
Discard	Discards any calibration changes made.
Default	Reverts to default factory calibration.
Stop Calibrate	Stops the calibration process.

Figure 92 RTD Input calibration screen

RTD Calibration Procedure

- Apply the Lower Calibration input to the unit (e.g. set the RTD input to 0°C)
- Type in 0 to the Wanted box for Point 1 above.
- Press the Set button for Point 1
- Wait for stabilization.
- Apply the Upper Calibration input to the unit (e.g. set the RTD input to 100°C)
- Type in 100 to the Wanted box for Point 2 above.
- Press the Set button for Point 2.
- Wait for Stabilization.

NOTE: Other calibration points can be used.

It may be necessary to repeat the above steps a number of times until the predicted value is stable and correct for both the lower and upper calibration points.
Once the Calibration is correct and stable for both points, select the Write button to commit the calibration to memory.

Select Close button to exit the RTD Calibration menu.

8.1.3 Analog Input Calibration

0/4-20mA calibration

Main Controls:	
Start Calibrate	starts the calibration process
Write	write the new calibration data to the connected flow computer
Discard	discards any calibration changes made.
Default	reverts to default factory calibration.
Stop calibrate	stops the calibration process.

Figure 93 Calibrate analog input

Adjusting the input range:

- Evaluate the field instrument data sheet and take particular note of its range setting for minimum and maximum process values. Assume that a board arrives factory calibrated for 4 and 20mA. In below example a field temperature sensor ranges -50 to 150 degrees Celsius. Alter the two wanted field record accordingly (as shown below). Do not click either of the SET buttons but click the WRITE button.

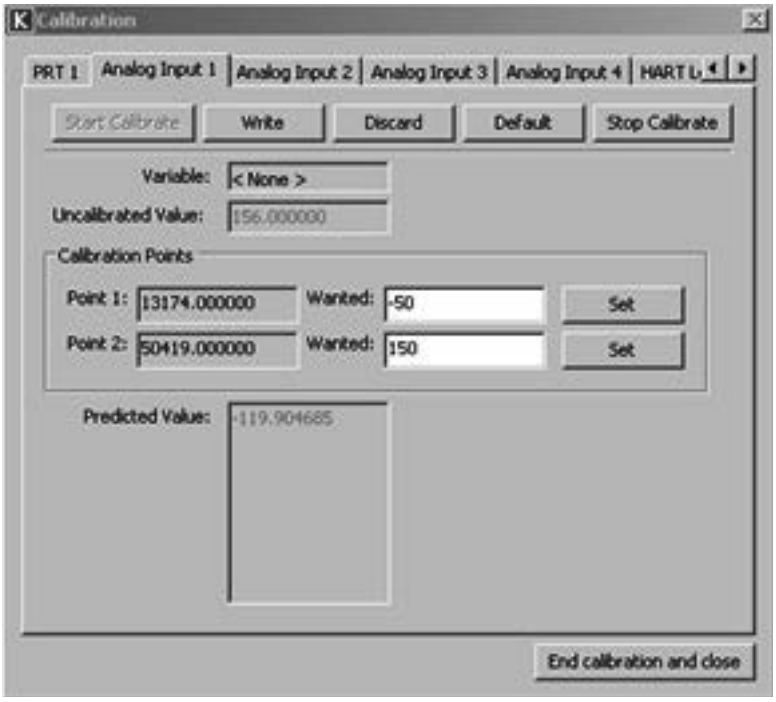


Figure 94 Calibration selection screen

- Apply the current that corresponds with the minimum process value to the unit. Note that only 0% (4mA) and 100% (20mA) values will be accepted. It is not possible to calibrate a range with e.g. 40% and 75% as minimum and maximum calibration values. Set the field instrument in simulation mode and simulate 0% (4mA). For below two adjustments allow for input value stabilisation (e.g. 30 seconds) and assume that stabilisation is reached when input values have oscillated 5 times around the assumed final value. In above example: type in -50C and click the upper SET button. Simulate 100% (20mA) and click the lower SET button. Repeat above two steps 3 times over. Click the WRITE button to store the results.
- Calibrate the input by simulating 0%. Does the uncalibrated value field read -50 degrees Celsius? Simulate 100%.
- Does the uncalibrated value field read 150 degrees Celsius?
- Click the END CALIBRATION AND CLOSE button to leave the analog input calibration menu.

Analog Input Calibration Procedure

- Apply the Lower Calibration input to the unit (e.g. set the 4-20mA Input to 4.8mA i.e. 5% - 5 bar)
- Type in 5.0 to the Wanted box for Point 1 above.
- Press the Set button for Point 1
- Wait for stabilization.
- Apply the Upper Calibration input to the unit (e.g. set the 4-20mA Input to 19.2 mA i.e. 95% - 95 bar)
- Type in 95.0 to the Wanted box for Point 2 above.
- Wait for Stabilization.
- Press the Set button for Point 2.

It will be necessary to repeat the above steps a number of time until the predicted value is stable and correct for both the lower and upper calibration points.
Once the Calibration is correct and stable for both points press the Write button to commit the calibration to memory.

Select the Close button to exit the Analog Input Calibration menu.

8.1.4 Digital Input

The Digital Inputs do not require any customer calibration.

8.2 Output Calibration

8.2.1 Analog Output

The factory calibrated analog output signals normally do not require customer adjustment. It is recommended that the SUMMIT 8800 outputs be calibrated and adjusted if necessary.

Main Controls:	
Start calibrate	starts the calibration process
Write	write the new calibration data to the connected flow computer
Discard	discards any calibration changes made.
Default	reverts to default factory calibration.
Stop calibrate	stops the calibration process.

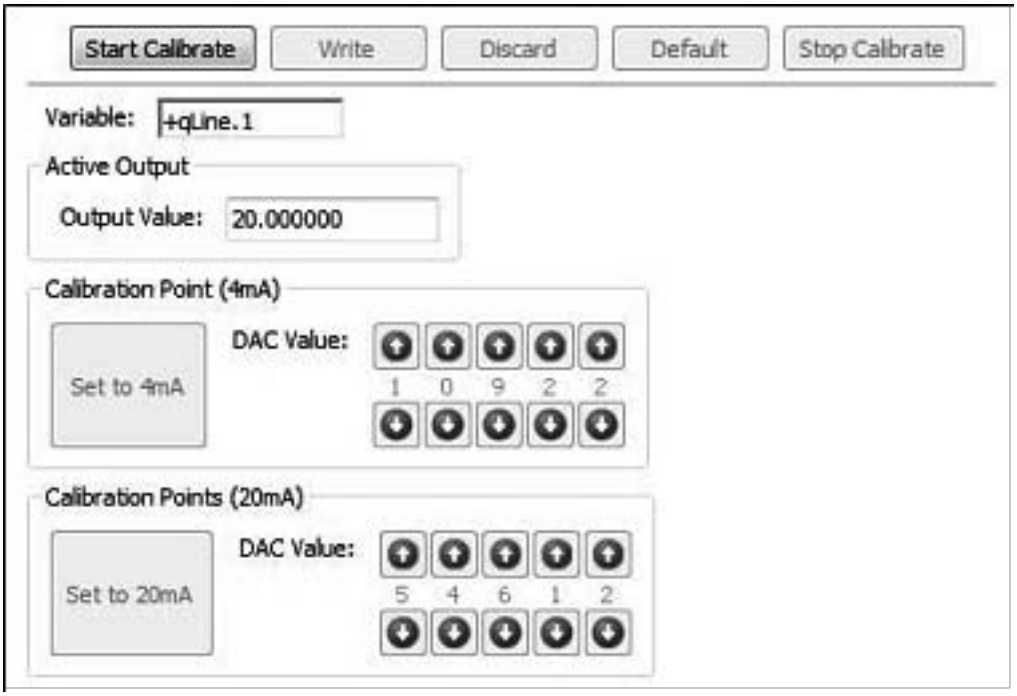


Figure 95 Analog output calibration screen

Analog Output Calibration Procedure

NOTE: Output accuracy is specified as 0.15% FSD or an absolute error of 30 uA.

- Connect a reference precision 100 Ohm resistance (0.05% accuracy or better) to the target analog output.
- Connect a reference calibrated digital meter with a 0-2V range (0.05% accuracy or better) across the resistor.
- Click the SET TO 4mA button on the START CALIBRATE page.
- For below two adjustments allow for input value stabilisation (e.g. 30 seconds) and assume that stabilisation is reached when output values have oscillated 5 times around the assumed final value.
- Use the up and down arrow buttons to raise and lower the output until 0.4000V is indicated on the meter.
- Click the SET TO 20mA button on the START CALIBRATE page.
- Use the up and down arrow buttons to raise and lower the output until 2.0000V is indicated on the meter.
- Repeat above two steps 3 times over. Click the WRITE button to store the results.
- Calibrate the output by simulating 4mA. Does the output value field read 0.4000V? Simulate 100%.
- Does the output value field read 2.0000V?
- Click the STOP CALIBRATE button to exit the analog output calibration menu.

8.2.2 Digital Output

The Digital Outputs do not require any customer calibration.

To start the web site via a web browser on the PC or phone go type the IP address of the SUMMIT 8800 to be accessed: e.g. //10.5.3.212.
To find out its IP address go to the SUMMIT 8800 system information page and select the Ethernet board information.

9.1 Login

Figure 96 Website login

After a correct login, the default information webpage will appears. On this page the user can view configured hardware I/O boards, security mode and the flow computer tag name.

9.2 The main page / display page

Figure 97 Main Page

In the display page the SUMMIT 8800 can be viewed remotely. The display operates very similar to the actual SUMMIT 8800 with all the same pages. No special configuration is needed.

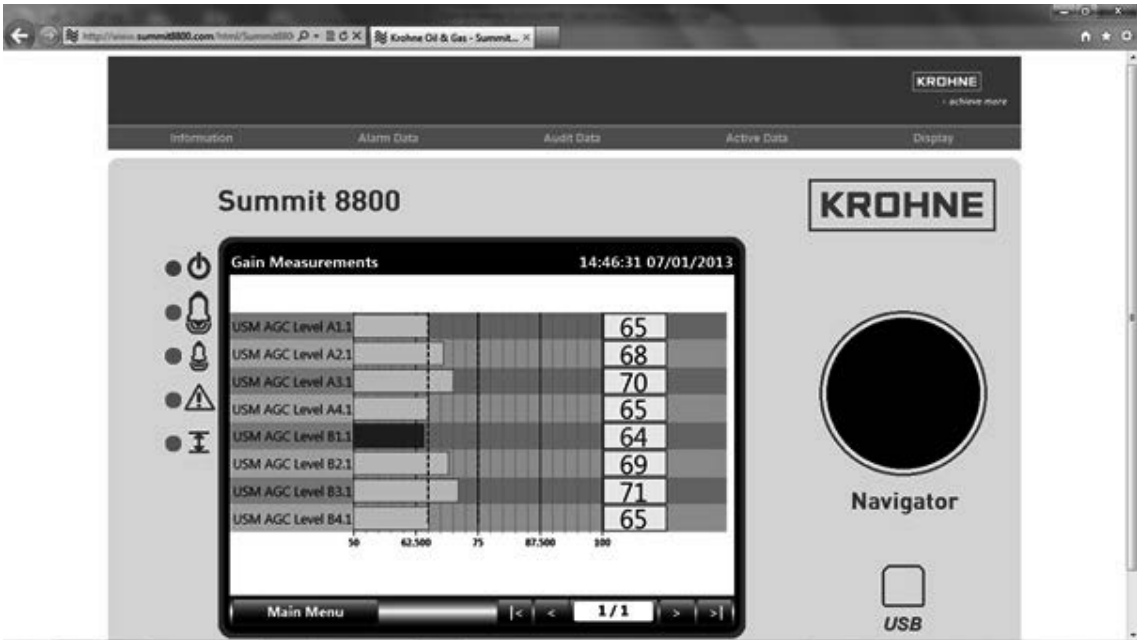


Figure 98 Main page bar chart

9.3 The information page

Figure 99 Information page

The information page provides some general information on the Summit at hand.

9.4 The alarm page

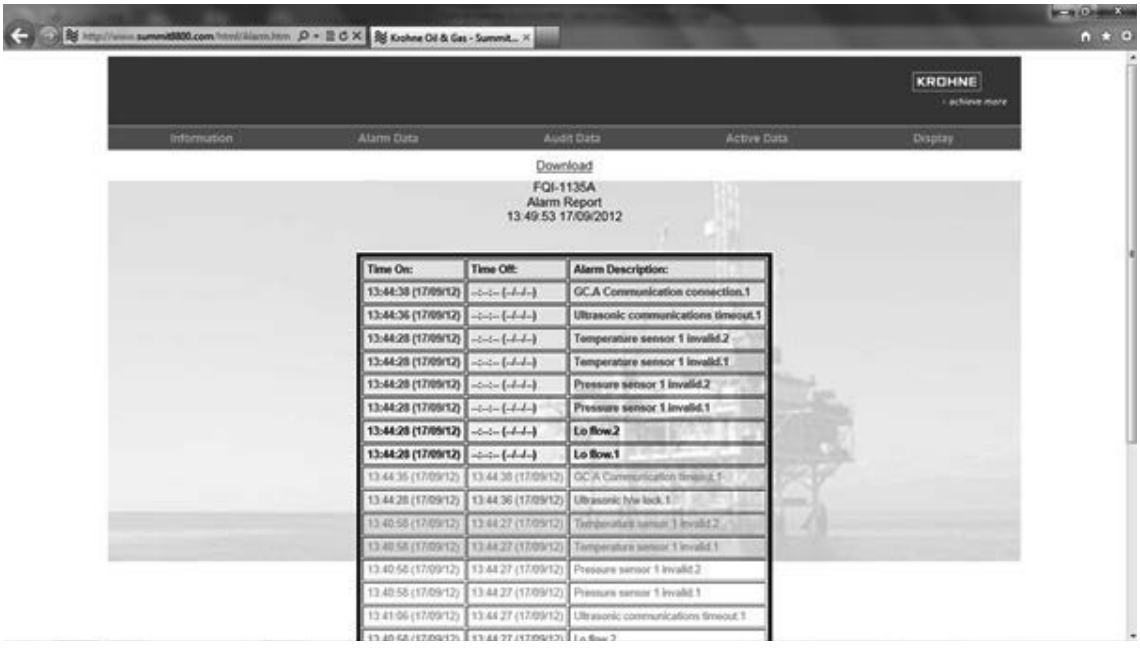


Figure 100 Alarm page

The alarm page gives an overview of all alarms in the unit. This list can be downloaded to the PC, see chapter Web Access: Section Download.

9.5 The Audit page:

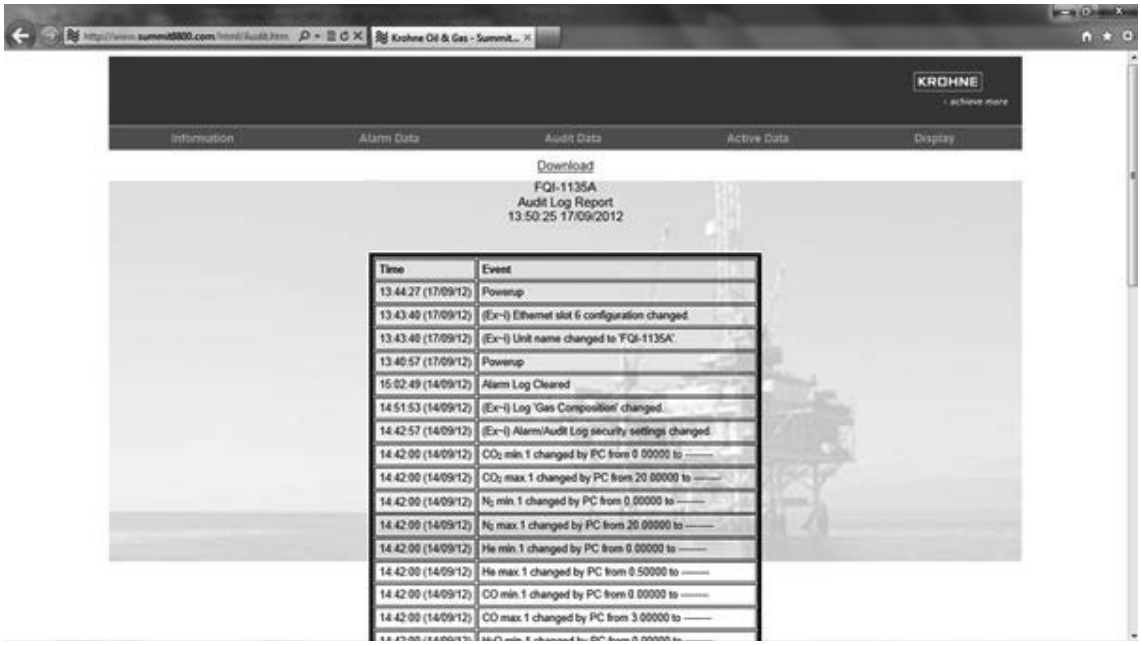


Figure 101 Audit log

This page shows the audit log. This list can be downloaded to the PC, see chapter Web Access: Section Download.

9.6 The active data page

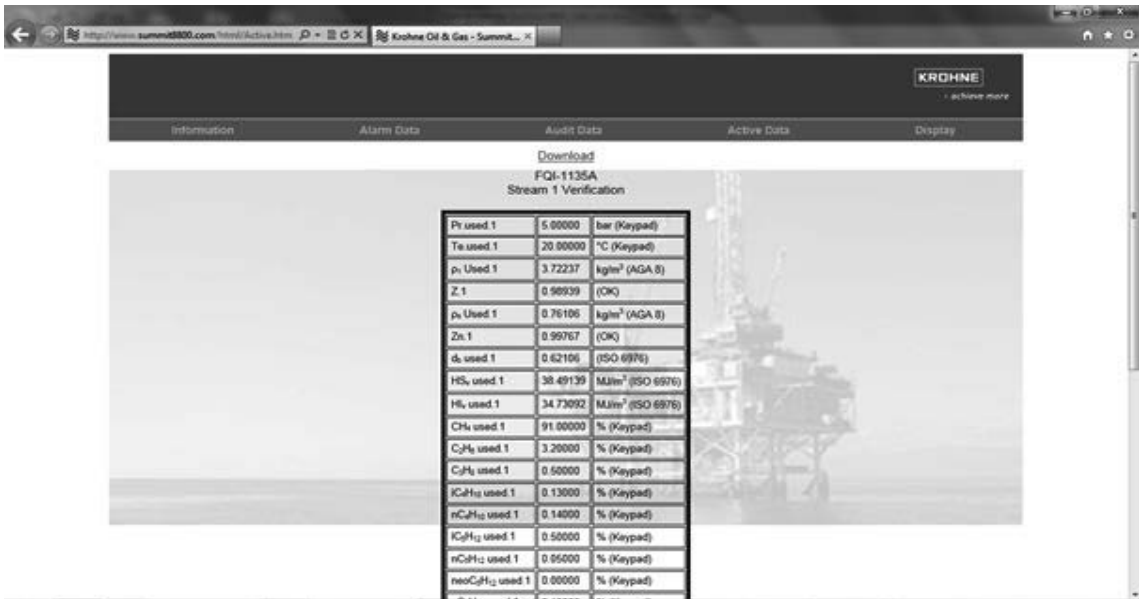


Figure 102 Active data page

The Active Page gives an overview of all ID reports configured. In this case the parameter report “Stream 1 verification”. This list can be downloaded to the PC, see chapter Web Access: Section Download.

9.7 Download

The alarm log, audit log and all ID reports can be downloaded into a CSV file which can be read e.g. in Excel:

Figure 103 Downloading CSV file

In Excel, Choose under Get external data : "Data/ From Text", change in the second page
- The delimiter from TAB to Comma
- The text qualifier to '

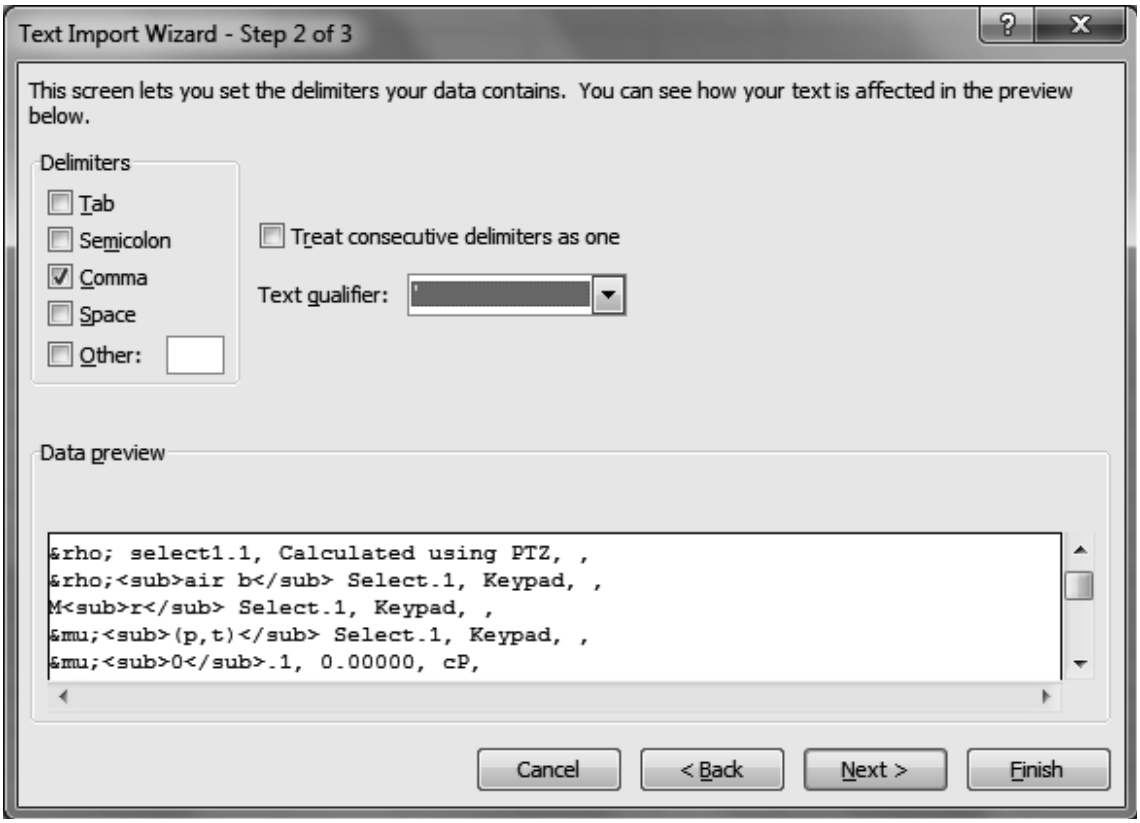


Figure 104 Import wizard

Finish the wizard and the parameter file will be available in Excel:

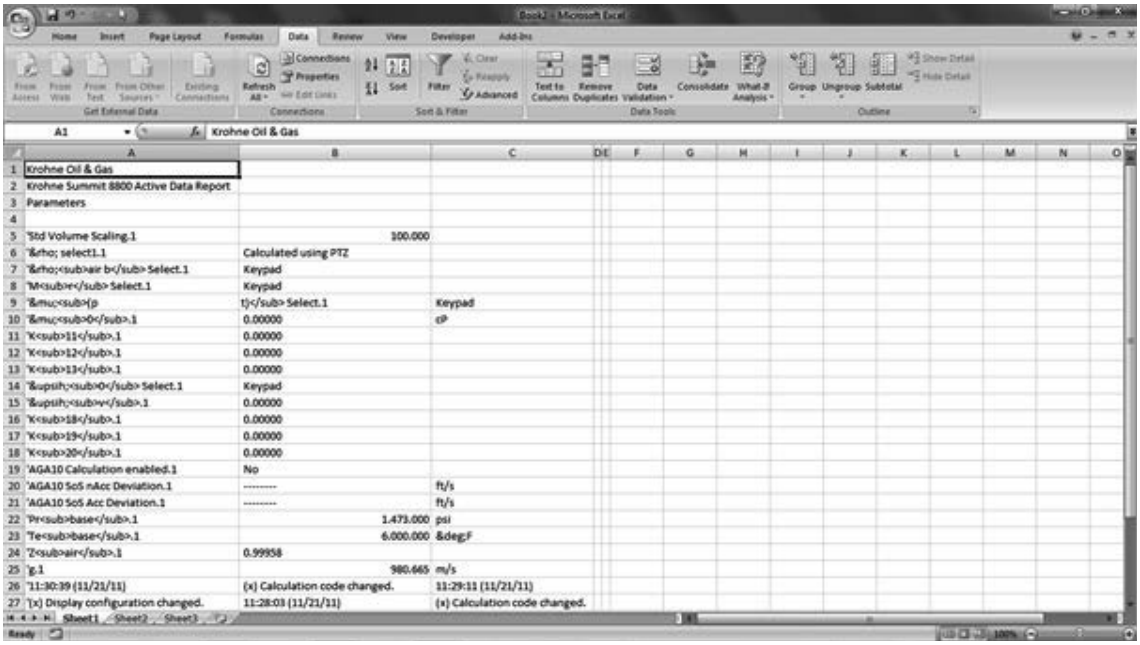


Figure 105 Finishing the wizard in Excel

10.1 Introduction

The SUMMIT 8800 configuration software is Windows based software which has two major functions:

- It allows the user to create a configuration, specific to his application.
- It also allows communication with a Summit 8800 to transfer configuration and setup data and for downloading of results, tables and report data.

In this volume of the handbook, the second function will be described. In volume 2 and 3 the actual configuration will be described.

The functionality of this Windows software is closely related to the firmware installed in the Summit 8800. It is therefor imperative to have a software version which at least matches the Summit firmware, see also chapter Firmware. As the software is upwards compatible, a higher configuration software version can also be used.

The software is part of the SUMMIT 8800 package and is normally provided on CD-ROM. Newer versions with additional functionality become available at regular intervals and can be requested free of charge.

For an installation instruction of the Configurator, see Appendix: Install the Configurator.

10.1.1 Start the configurator

To start the configurator press the following Summit 8800 Config icon:

Figure 106 Configurator desktop icon

If the icon cannot be found, please find the software under:
>Start menu> All Programs> KROHNE> SUMMIT 8800 Configuration> SUMMIT 8800 Configuration

When starting the Configurator, provide the correct user name and password.

After 3 failed login attempts the software will exit.

Figure 107 User login screen

The main menu of the configurator will appear:

Figure 108 Menu Configurator software

10.1.2 Select the preferred engineering units

Normally, the default engineering units will be Metric. However it is possible to set the default units for the configurator to USC.

Start the configurator, then:

Select settings and tab “Users”:

Figure 109 Appearance

Select the default engineering units (metric or USC) and press OK.

10.1.3 Install an additional user

Multiple users can be given access to the configuration software, each with their own name and password and each with their specific access levels.

On top of this, it will be possible to restrict the access to running software modules by configuration. See Volume 3, General Information: Security Configuration.

To install a new user, start the configurator (the configuration software).

Select settings and tab Users to add users.

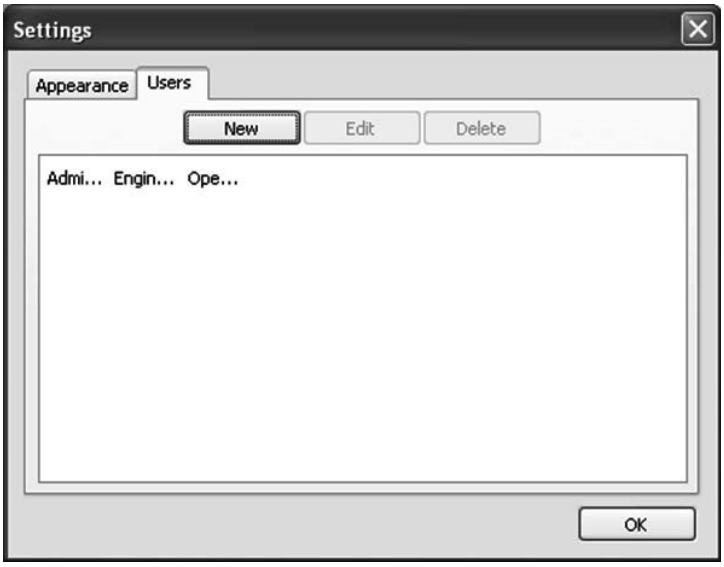


Figure 110 User creation screen

Figure 111 User access level

Create an Operator user, e.g.:
- User name : Operator
- Password: Operator

and make any other users with relevant access and permission levels.

10.2 USB Driver installation

For communication between the Configurator and the Summit via the USB port, a driver must be installed. Here the standard procedure to do so:
Power on the SUMMIT 8800 flow computer – by supplying the 24VDC to the PSU input connector

Figure 112 24V input power

Ensure that the current user has Windows administrator privileges and has Windows permissions to install drivers.
Connect an A to B USB cable between the SUMMIT 8800 flow computer and the PC or laptop.

Figure 113 USB port

When connecting the Summit to a PC loaded with a configurator, the correct USB Driver should automatically be loaded, resulting in a message shown in Figure 105. Now the configurator can be used to communicate with connected SUMMIT 8800.

Figure 114 Driver recognition message

If the driver is not automatically found, it can be loaded manually from :
C:\Krohne\Summit 8800 Configuration\USB Driver

10.3 Main functions of the configurator

Start the configurator (the configuration software) with an administrator account to get full access to all settings.

Figure 115 Menu Configurator software

Edit Offline
This function allows the user to create a new configuration without actually being connected to the flow computer. This function will be described in detail in volume 2 and 3 of this handbook.

Connect
With this option the configurator can connect to a running flow computer to do on-line functions:
- Uploaded and download software and to change configuration
- Access data from the computer

For details, see next section.

Load Set-up
This function allows the user to read a configuration from a disk of the PC.

Read Data from SD Card
This allows the user to read data from a SD card configured for use with the flow computer. The card can be inserted into a card reader connected to a PC running the configuration software and having administration rights.
Alternatively it is possible to read the SD card installed in the SUMMIT 8800 when connected to it.

Settings
Change the font of the configurator software, select the engineering units (USC or Metric) for a user, create new users and configure user access levels. See previous section.

Help
Comprehensive help menu

About

Details of versions and releases

Exit
Exits the software.

10.4 Connect to a Summit

There are two different ways to connect to a Summit:
- Using the connect button
- Using the download button

Since both functions are the same we describe only the first.

When the connect button is selected, the software, will open a discovering window where it will search all Summits connected to USB and/or Ethernet. When have been found they will be displayed similar to:

Figure 116 Connection list

For the Ethernet ports, the IP address is shown to identify the different Summits.

It is possible that the Configurator version is not compatible to the Summit firmware version. In that case the remark "(Unable to connect)" is added. To be able to connect anyway, update the configurator software to a newer version.

The software uses a broadcast message on the Ethernet. It is possible that this message is blocked by Ethernet equipment, such as routers. It is then possible to add an IP address manually. For this, right click in the menu and select "new Ethernet" to have the manual connection menu:

Figure 117 Manual connection list

After adding a new Summit, the connection menu will be updated.

From the connection menu, the operator can select the Summit of choice and click OK or double click on the line to connect to it. The configuration software will then read the Summit set-up:

Figure 118 Reading setup

To poll the basic configuration and serial number displaying the details in the top title bar of the Configuration Menu Page.

Figure 119 Connection menu

For details on this menu, see chapter Configuration Software: Connect to a SUMMIT.

10.5 Working with configuration set-up's

The configurator can be used in off-line and on-line mode (not connected or connected to a Summit).

- In off-line mode, a configuration can be edited (newly created one or an existing one), the configuration can be saved on disk and can be loaded from disk.
- In on-line mode it is also possible to upload and download configurations to and from a Summit.

10.5.1 Security

It is important to know that flow computers require high security. Not everybody may change information, certainly not if the Summit is in normal operation. This is specifically true in custody transfer or fiscal applications where often certificates are needed to change settings. Therefore several measures are available to prevent unauthorized use.

10.5.1.1 User passwords

To be able to use the configurator, a user name and password must be given.

10.5.1.2 Configurator users

Restrictions can be set by giving access levels to certain users. When such users use the configurator, specific actions may be disabled, such as Edit offline or connecting to flow computers..

10.5.1.3 Configuration restrictions

Any of the menu's in the configurator may be disabled for on-line use. This means that the Configurator can be blocked for any fiscal relevant changes, but can still be used for non-fiscal configuration changes.
For details, see Volume 3, General Information: Security Configuration.

10.5.1.4 Security switches

The Summit is equipped with hardware security switches which can be set to open, partial and full:

OPEN	The SUMMIT 8800 is fully open and changes can be made without restrictions, However, user passwords are required.
PARTIAL	In this mode the front panel Edit mode can be accessed with the proper user password, but calibration data cannot be changed. New application information cannot be uploaded or downloaded. The existing configuration can be downloaded, changed and uploaded again. The type of changes allowed can be defined using the configurator Software and will typically be non-critical configuration data, parameters and values
FULL	Connection is possible and applications can be uploaded, but cannot be downloaded to from the SUMMIT 8800 as it is in Read only mode. Change in parameters, values or any other data is not possible. Configuration data cannot be changed with the GUI software. Edit menu cannot be accessed. Calibration data cannot be changed. Alarms and audit data cannot be cleared.

By setting the Summit to full, it is therefore not possible to download any configuration, and an error message will be displayed:

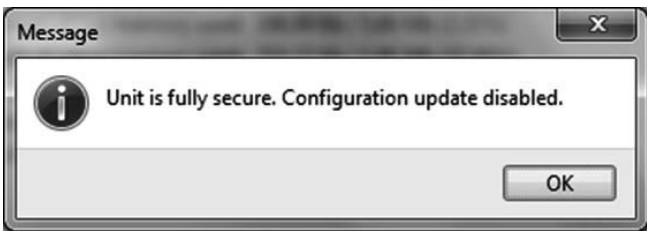


Figure 120 Fully secure error message

Figure 121 Operating dipswitch settings

The security dip-witched must then be changed to download the configuration.

10.5.2 New configuration

In the main menu of the configurator (see chapter Configuration Software: Main Functions of the Configurator) select edit offline to start a new configuration and select the correct version matching the target hardware.

Figure 122 Select version

Then select the machine type and make the basic stream (run) configuration:

Figure 123 Select Run type

Select the configuration type
- Prover/Master Meter
- Standard Run.

Select the relevant meter application;
- Gas Turbine/DP
- Gas Ultrasonic
- Gas DP
- Gas Coriolis
- Liquid Turbine
- Liquid Ultrasonic
- Liquid Coriolis
- Steam Ultrasonic

Then the configuration can be edited.

10.5.3 Load a configuration

To load a existing configuration from disk, use: "Load Set-up" from the main menu (see chapter Configuration Software: Main Functions of the Configurator)
Select an .exi file from the memory of the PC, for loading into the configuration software.

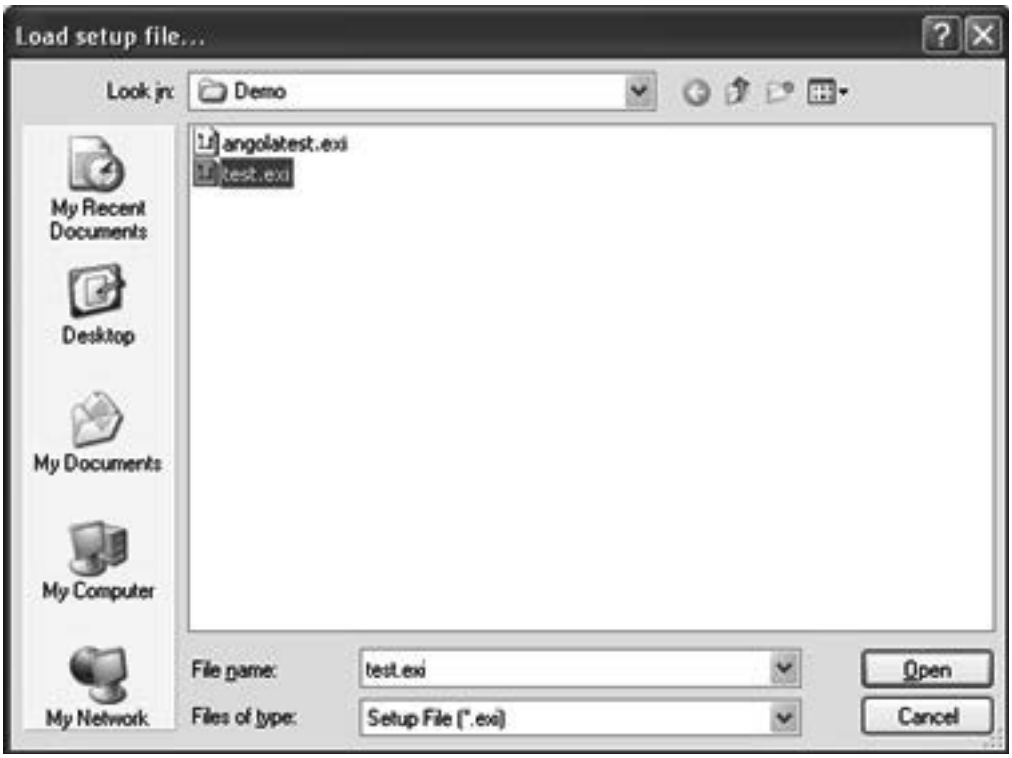


Figure 124 Load configuration file

Press "Open" and set the correct version for your hardware revision.

Then the configuration can be edited.

10.5.3.1 Convert a configuration

It might be that the old set-up is for a different software version that actually used. For that reasons an automatic conversion can be done as the configurator is upwards compatible. In this case the configuration on disk was for version 0.32.1 while we like to convert to e.g. version 0.34:

Figure 125 Load set-up configuration

So change the selection to 0.34 and press OK to start the conversion. When loaded refer to edit off-line for further details.

Please note that some features may not be supported in older versions.

Then the configuration can be edited.

10.5.4 Save a configuration

To save the configuration select the 'Save' icon.

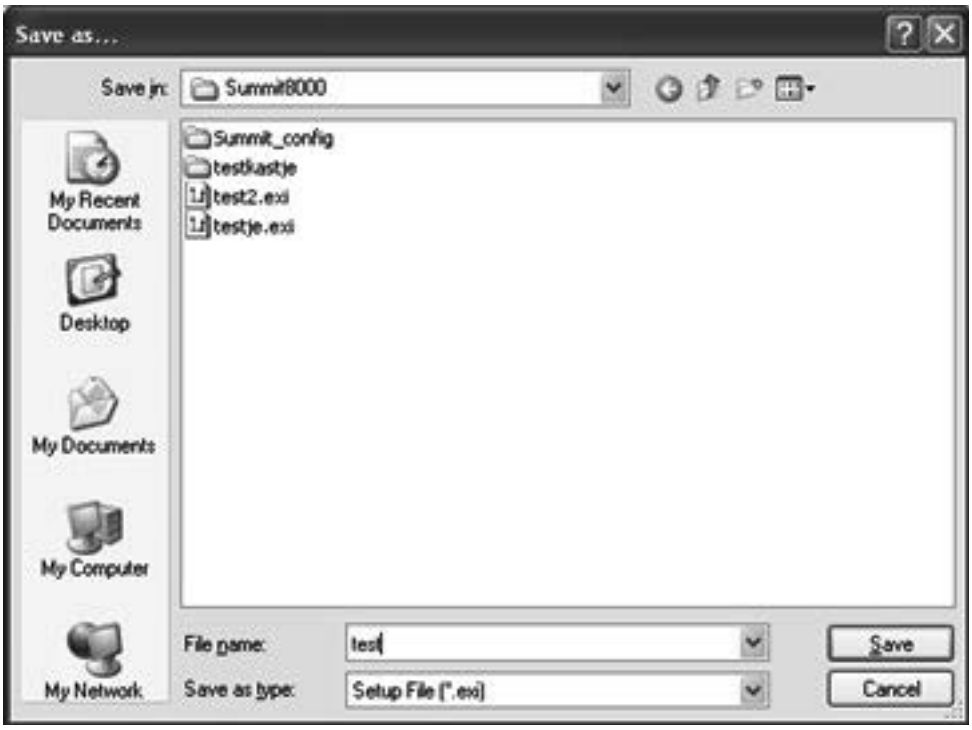


Figure 126 Save configuration

Give the application a name and select the save button.

Then the configuration can be edited.

10.5.5 Upload a configuration

Connect to the desired Summit flow computer and press "Read setup".
The configuration will be automatically uploaded into the configurator and the edit online main window will be displayed with the configuration loaded into the relevant parameters.

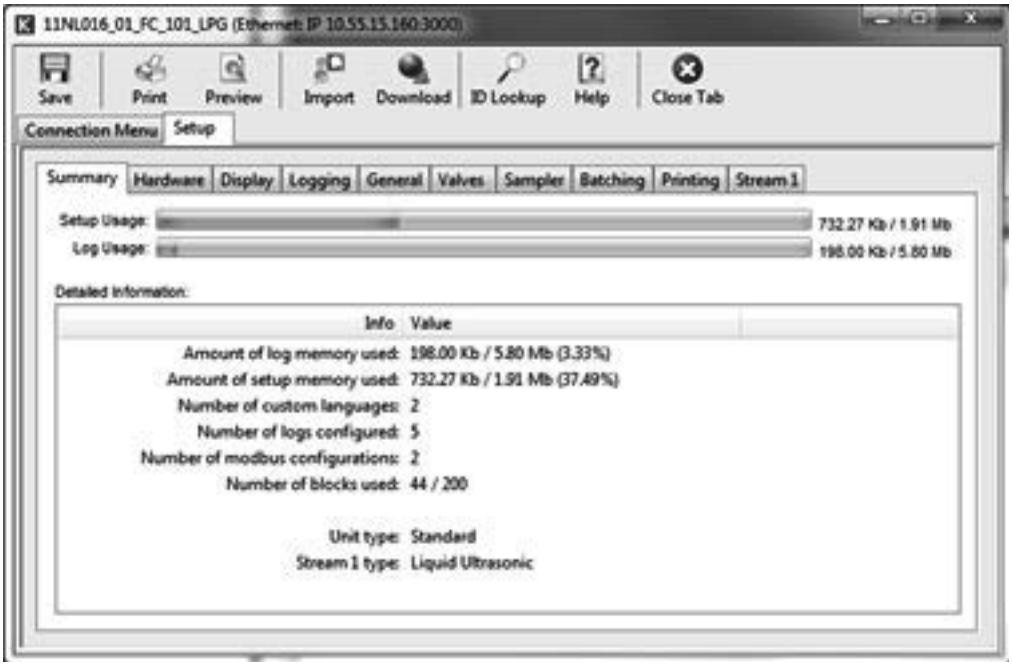


Figure 127 Edit online window

The title bar will display the unique name of the flow computer application and how it is connected, either by USB or Ethernet with the IP address.

10.5.6 Download a configuration

After loading the software, the typical maintenance action will be to download the software to the Summit 8800. For this use the “download” button in the edit menu:

Figure 128 Edit off-line menu

The connection list window will be displayed with only the flow computers with the correct firmware revision in the list.

Figure 129 Connection list

Select the desired flow computer and press OK (or double click). The download will then start.

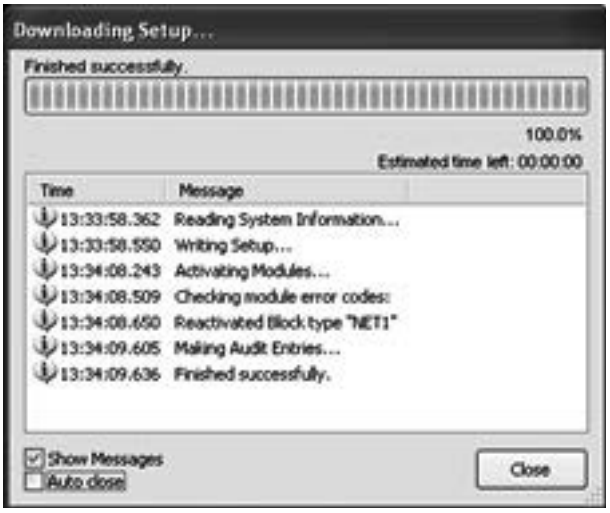


Figure 130 Download configuration process

In this case the download was successfully completed, however it might also be that there are errors indicated. Typically these are related to missing hardware, where the software assumes a certain board at a certain slot, but where the hardware is different. Therefore always check the list.

10.6 Edit menu

The edit menu can be reached in three ways:
- Starting a new configuration (off-line mode)
- Loading a configuration (off-line mode)
- Uploading a configuration (on-line mode)

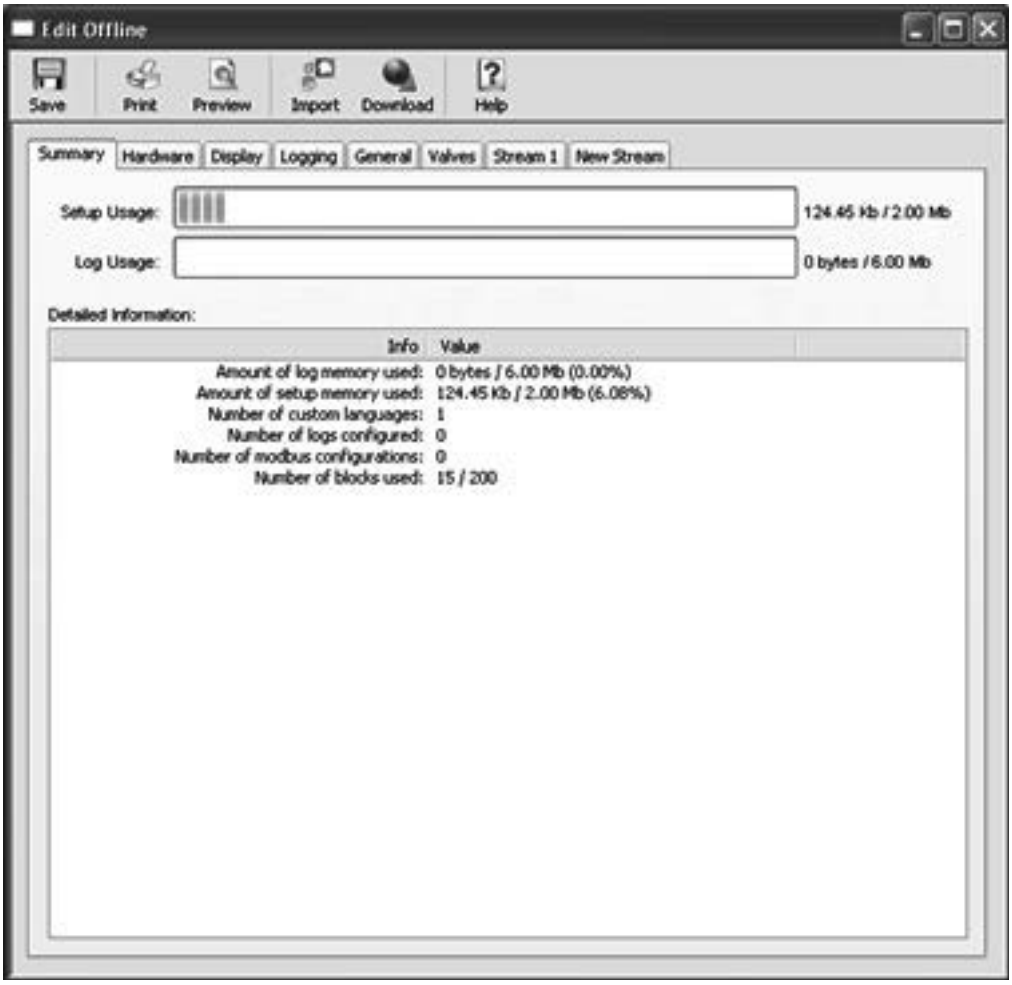


Figure 131 Edit offline

Six icons are displayed in the Edit Offline Window

Save
Allows the operator to save the current selected setup files to the computer memory, the user is prompted to enter a file name, browse for a location and a file type. The normal file extension for set-up is .exi, using this extension the file can be uploaded into the configurator software. Other possible file types are .pdf, .html, .rtf, .txt, .xls or .csv.

Print
Allows the operator to print a copy of either the complete setup file, or a selected page of the set up file from any printer currently available on the PC.

Preview
Gives a print preview of the selected setup file.

Import
Allows a previously saved set up file saved in the .exi format to be uploaded into the software. Individual items from the configuration can be individually selected to be downloaded.
For example a display page or a Modbus set up can be individually selected from the previously saved file and imported into the set up to be downloaded.
Select the import button and chose a file to import from the left-hand table, which will show the available items to copy across, select the required item or items to copy or drag and drop to the appropriate tree structure position on the right hand of the window.

When the operation is complete select OK.

Download
Downloads the modified or new setup file into the selected connected flow computer.

Help
Displays the help menu.

Tabs
The offline configuration is now setup and consists of the following tabs;

- Summary
- Hardware (see Volume 2)
- Display (see Volume 3)
- Logging (see Volume 3)
- General (see Volume 3)
- Valves (see Volume 2)
- Sampler (see Volume 2)
- Batching (see Volume 2)
- Printer (see Volume 3)
- Prover (if selected) (see Volume 2)
- Stream 1- n (see Volume 2)

Summary
Displays a summary of the current memory used. This page contains no user controls.

10.7 On-line (connection) menu

This menu will be reached after a connect is done to a Summit (see chapter Configuration Software: Connect to a SUMMIT)
The connections menu is as follows:

Figure 132 Connection menu

When the options are selected, as default, a new tab is created on the same screen. The user has the option to undock which removes the new tab created and creates a separate window for the data required.
Redock is the reverse of undock and will add the window and its data back into the main screen as a separate tab

10.7.1 Read Setup

Reads the current setup from the connected SUMMIT 8800 (see chapter Configuration Software: Upload a Configuration).

10.7.2 Read Alarms

Reads the current alarms from the connected SUMMIT 8800.

Each alarm is displayed with an alarm number, on time and date, off time and date, alarm type, alarm group and description.

Alarms are colour coded:

- Blue Non Accountable
- Red Accountable
- Orange Warning
- Bold Text Active Alarm
- Light Text Cleared Alarm

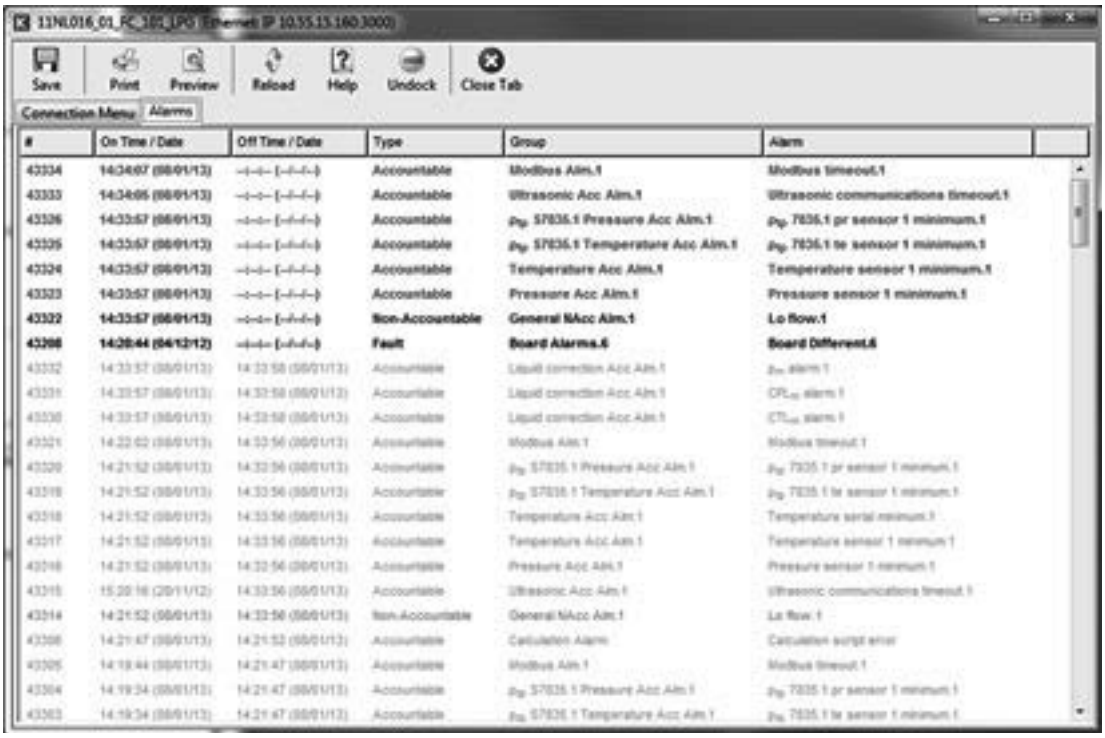


Figure 133 Alarm window

10.7.3 Read Log Data

Reads the current logged Data from the connected SUMMIT 8800. If more than one Log record type is configured, the user is prompted to select which Log Record to display.

Figure 134 Data log selection

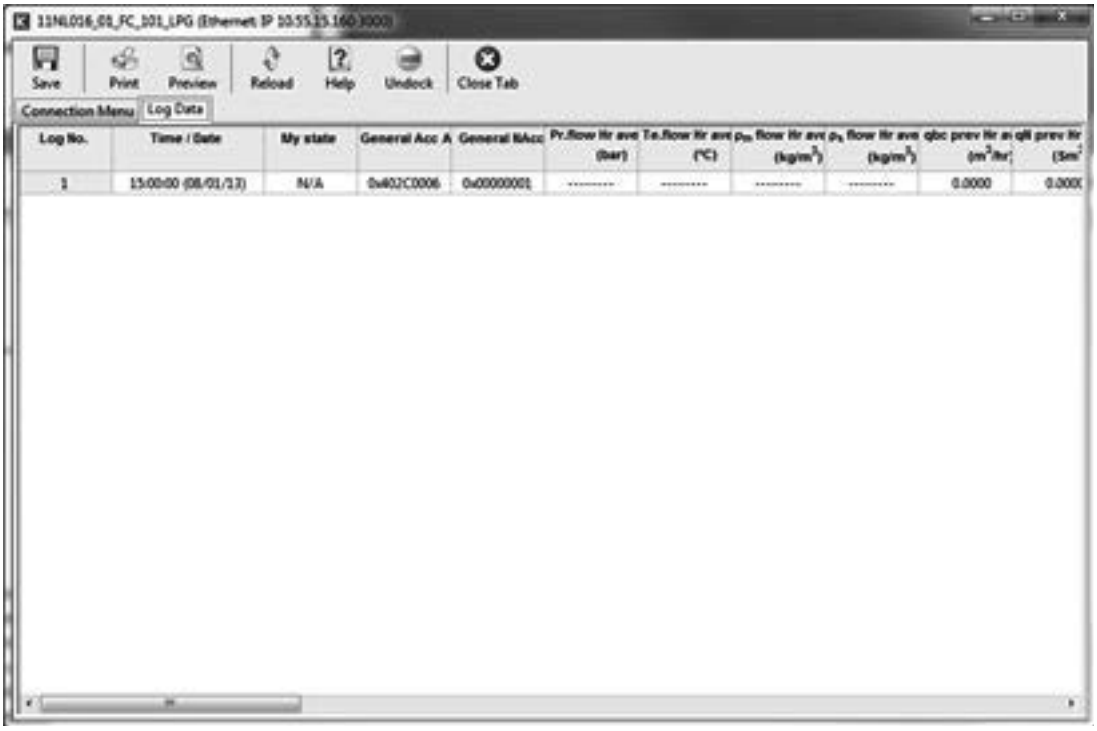


Figure 135 Data log window

The selected log data, will be displayed in Vertical columns in descending time and date order together with the Log record number, time and data of the record and the data logs.

10.7.4 Read Data Reports

Reads any available ID reports that have been configured. If more than one data report has been set up, the user will be prompted to select which data report to display.

Data can be auto reloaded based on a user defined time in seconds, by selecting the Auto reload icon.

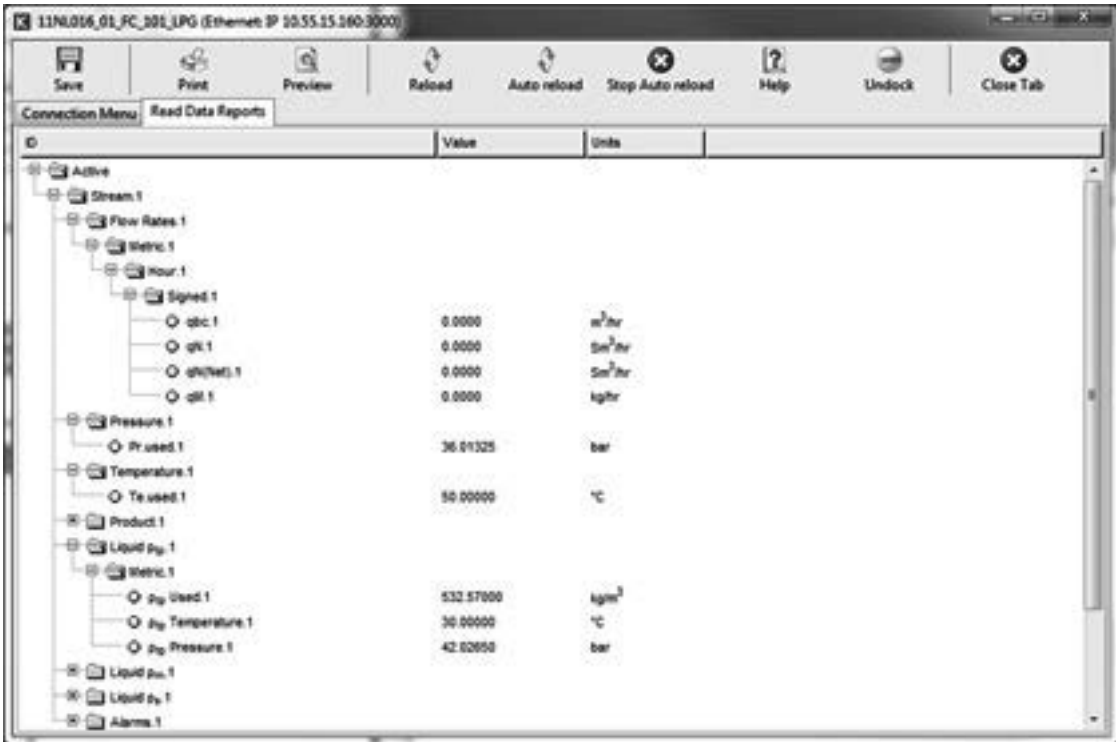


Figure 136 Data report window

10.7.5 Read Audit Log

Reads the current audit log Data from the SUMMIT 8800. The user will be prompted to display the Audit log from internal memory Data Flash, or from the optional memory card SD Card.

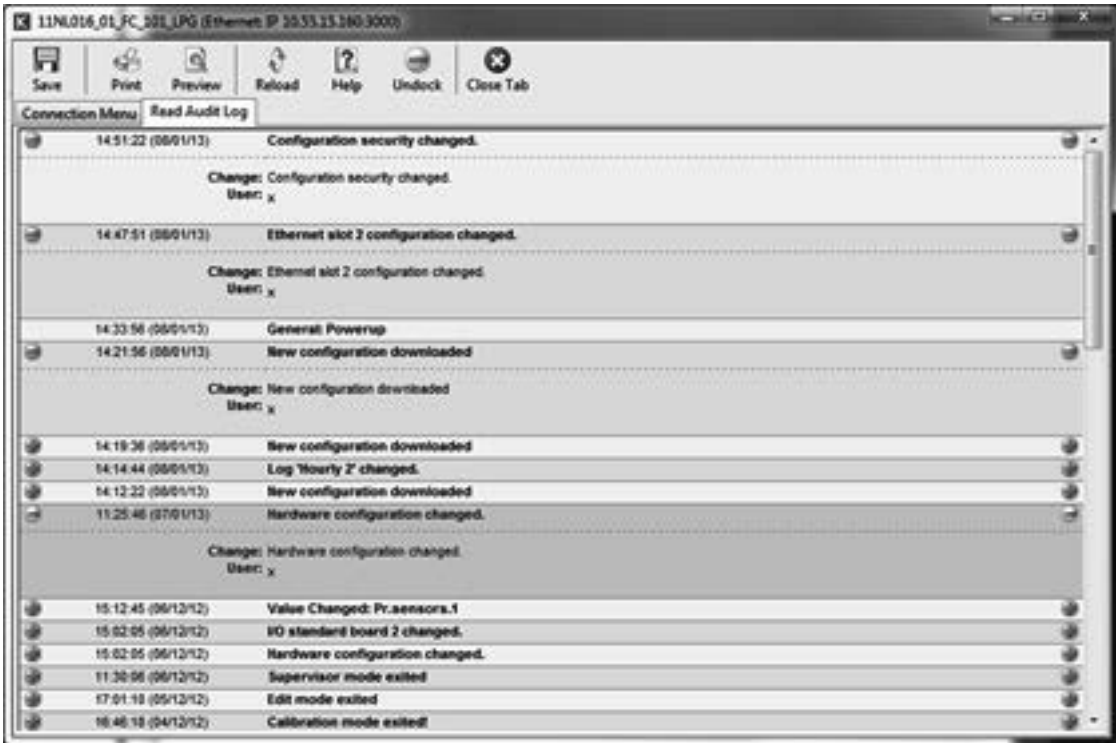


Figure 137 Audit log window

The selected Audit Log Data will be displayed in Vertical columns in descending time and date order.
Each Record can be expanded, where such data exists, to display additional data from each audit.

10.7.6 Clear Data

Allows the user to clear any stored, Audit, Alarm or Logged Data. The user is prompted to select the logged data item to be cleared, from a list of possible items. Once the item has been cleared, this is confirmed by a message window.

10.7.7 Battery Status

Gives an indication of the current backup battery condition

Figure 138 Configurator good battery status

If the power level was low, or if a battery was not in place, a warning window with a Battery status is BAD will be indicated.

10.7.8 Script Debug

Helps the user to debug a LUA script. (Specialists only)

10.7.9 Process Monitor

Shows all the software modules running in the Summit and their timing (Specialist only)

10.7.10 Check Threads

Shows all the software modules running in the Summit and their memory stack used (Specialist only)

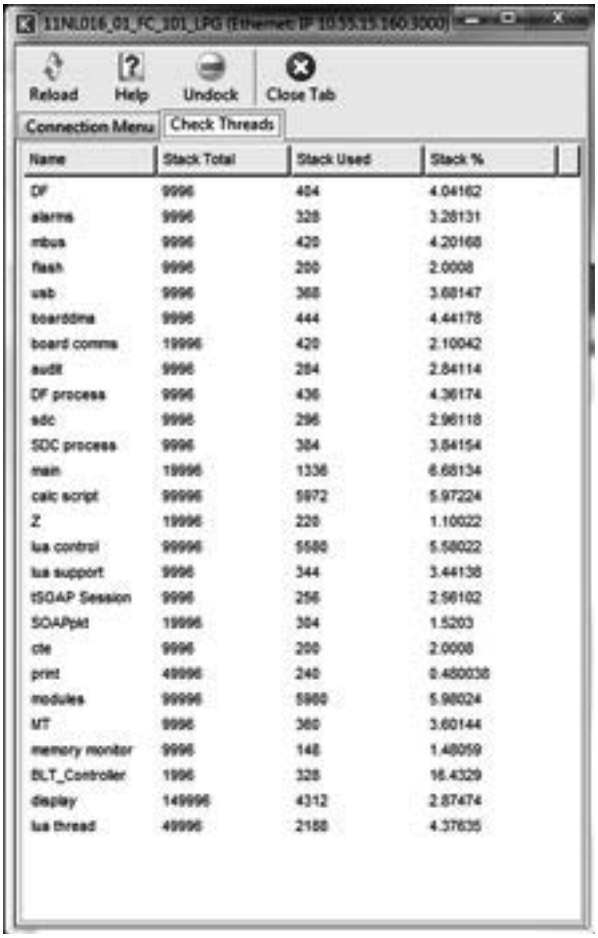


Figure 139 Check threads display

10.7.11 Check Memory Pool

Displays memory allocation with details such as available memory, used and reaming.

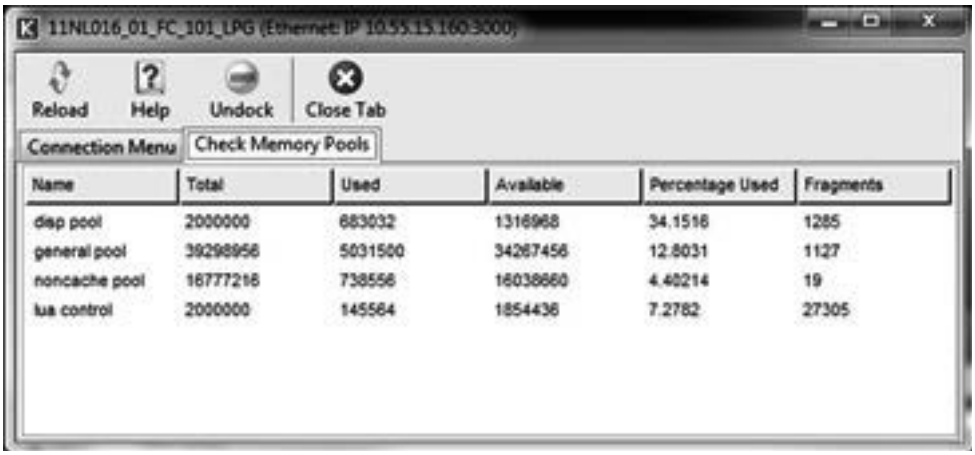


Figure 140 Check memory pool display

10.7.12 Read Unit Information

Saves a text file with hardware, software and firmware serial numbers including detailed technical information on the configuration setup.

10.7.13 Log off and close

Logs off from the main connection menu, closes the window and returns the operator to the main configuration menu.

11.1 Introduction

The firmware wizard is required when updates for one of the boards, the back panel or the summit computer board is required.

The Summit 8800 firmware consists of eight main programs as listed below, each of these programs are individual items that is created, stored, compiled and transmitted to the flow computer separately.
The "Boot " program as listed is only used when the Main program is being loaded into the device and as such are non-operational when the Boot Run Mode switch is set to the Run mode.

For ease of control and maintenance the source code software of each of the 8 program types consists of many hundreds of individual software modules and functions. Each of which contains a CRC 32 checksum to ensure integrity.
The software that is downloaded into the Summit 8800 is identified with the file extension .s19 and is created using a specialist compiler for each Microprocessor type used.
The Compiler will compile all the files that make up each individual program in a single .s19 file for each type as listed. At compile time the Version Number and unique checksum of the version are embedded in the .s19 file.
The individual programs and different Versions are then subject to standard Quality Control techniques, such that only controlled copies can be used in manufacturing etc.
When the programs have been loaded into the Summit 8800 all Version numbers and unique checksums are shown on the System Information page of the Summit 8800. As part of the approval apparatus, particular Versions have been subjected to the approval procedures and the identification of these Versions has been recorded and can therefore be checked against the identification of software in the Summit 8800.

11.1.1 Firmware description

The Various software Versions and checksums can be viewed on the Display of the Summit 8800 as follows:

- Select the Main Menu button on the display of the Summit 8800
- Scroll down the Main Menu items until the System Information Page is found
- Select that item.
- The Page displayed will show details of the Summit 8800 software and under the headings Boot Program and Main Program will show FW Version numbers and FW Checksum
- These items are the Firmware Version number and Firmware Checksum for the Display Board Software as detailed in paragraph 5.0 of this manual.
- Select the Board Information button on this display page to show similar pages for each of the Board types in the Summit 8800. For each board fitted the Board type and position in the Unit will be shown at the top of the page.
- Select the Board button to display the Version and Checksum information for each fitted Board.

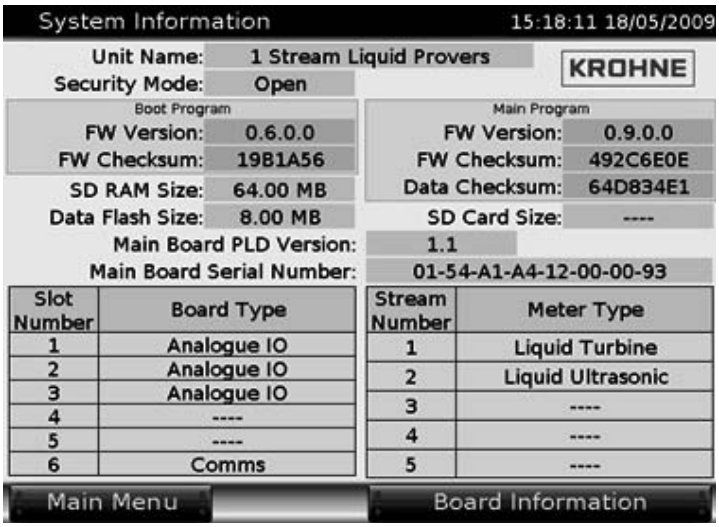


Figure 141 Firmware illustration

11.1.2 Firmware Versions

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 which includes minor bug fixes revision 1

11.2 Installation

11.3 Use of the wizard

The flow computer engineering team are constantly working hard to add new function and features based on application, systems, projects, and customer requirements including improving the current functionalities and operation of the SUMMIT 8800.

With these added features, new firmware is created every 4 months which the user upon request can receive and upload into their SUMMIT 8800 whilst the field.

With every update, a set of firmware and PLD (programmable logic device) files are created. The upgrading of the SUMMIT 8800 flow computer is easy in these few simple steps.

NOTE: It is advisable the PLD updates are only performed by specialist and in extreme cases. Please contact KROHNE Oil & Gas for further instructions.

IMPORTANT: Prior to any upgrades, it is advisable to download the flow computer configuration (hard copy print in addition) and to note all totaliser values.

11.3.1 Upgrading firmware boot/main version

With the firmware update, two files are presented – main and boot. These are the two files that will be uploaded into the CPU of the flow computer to successfully upgrade it to the latest revision. I/O boards may also require updating depending on the functions added. The procedure of CPU and I/O boards updates are identical and outlined below.

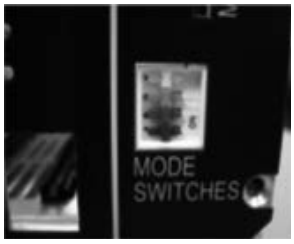
	On the rear panel of the flow computer set the brown mode switch to the off position "1"

Figure 142 Upgrade mode switch

	Connect the flow computer to the PC device making sure you have installed the SUMMIT configuration installer with the USB driver.

Figure 143 USB cable port

	Apply power to the flow computer by connecting the 24V input connector

Figure 144 Input power

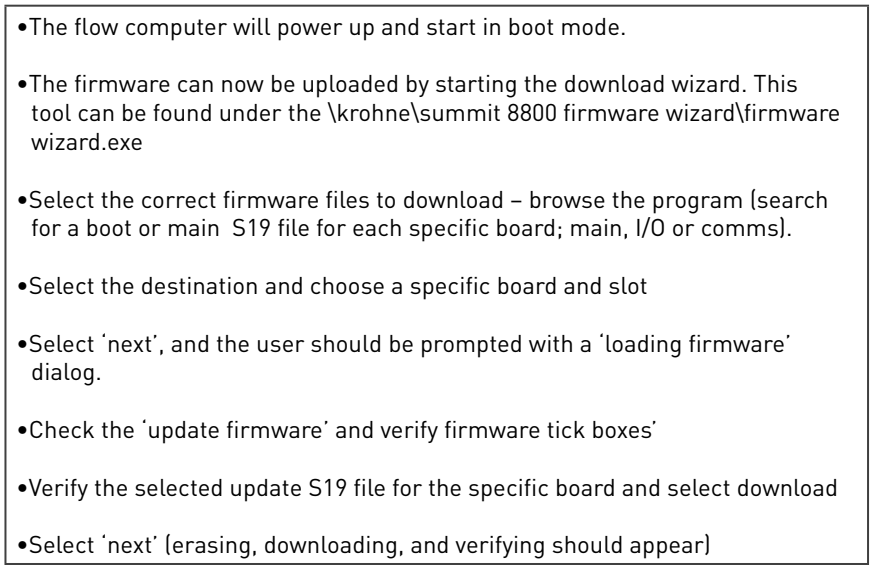


Figure 145 Update wizard windows

- Repeat steps 6 to 12 for main and boot files, if necessary and provided with instructions the I/O boards and communication boards.
- When completed, select finish.
- Power down the flow computer by removing the input connector
- Disconnect the flow computer from the PC device by removing the USB cable
- Select the brown mode switch to the on position '0'

Apply power to the flow computer and verify the update by confirming firmware in system information.

The display monitor is software to be installed on a Windows PC.

The Display monitor software is used for two purposes:
- Make a screen shot of the Summit display
- Use a PC to display the Summit screen, e.g. when using a beamer.

The flow computer will be forwarded to a laptop once a second

13.1 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 which includes minor bug fixes revision 1

13.2 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.

13.2.1 Latest version 0.35.0.0

Type Board	Version	Date	Checksum
Summit8800_Main	0.35.0.0	2013-03-01	0x14B3F2C1
Summit8800_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.

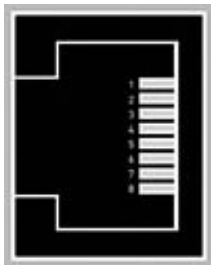
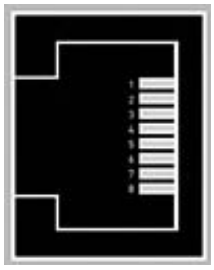
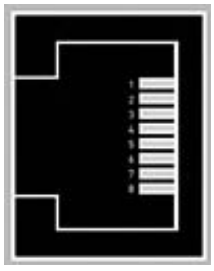
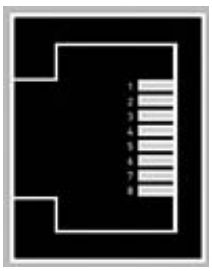
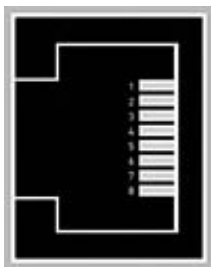
13.2.2 Approved version MID2.4.0.0

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

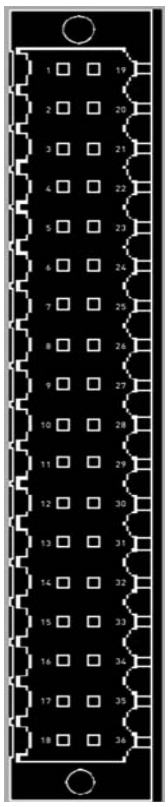
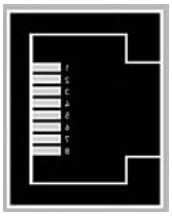
Type Board	Version	Date	Checksum
Summit8800_Main	2.4.0.0	2012-07-27	0x13BE3F70
Summit8800_Boot	0.26.0.0	2011-07-25	0x01AAC8CC
AIOboard_Main	2.4.0.0	2012-07-27	0x004C29FA
DIOboard_Main	2.4.0.0	2012-07-27	0x004C0DE0

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.

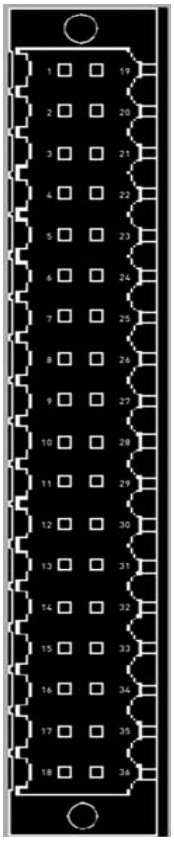
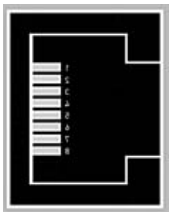
14.1 Example

Slot number: 6				
Input	Input type	Signal type		Purpose
Port 1	RS232	X		Ticket printer
	RS485			
Port 2	RS232	X		Gas Chromatograph
	RS485			
Port 3	RS232			V12 Ultrasonic meter
	RS485	5		
IP Address				
Net 1	10.10.2.1			Web Browser
Net 2	10.10.3.2			XML reports FTP printing DSC modbus slave

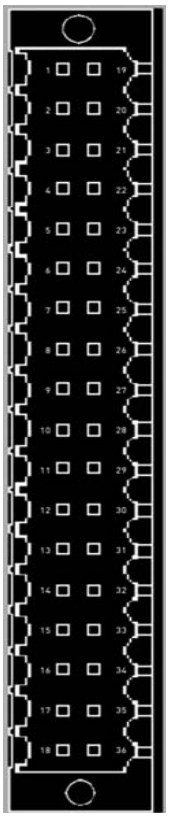
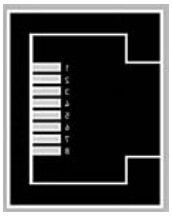
14.1.1 Digital /O Board 1 Terminal Connections

Slot number:				
Input	Input type	Signal type		Purpose
1/19	Digital input 1			
2/20	Digital input 2			
3/21	Digital input 3			
4/22	Digital input 4			
5/23	Digital input 5			
6/24	Digital output 1			
7/25	Digital output 2			
8/26	Digital output 3			
9/27	Digital output 4			
10/28	Digital output 5			
11/29	Not Used			
12/30	HART input 1			
13/31	HART input 2			
14/32	PRT RTD			
15/33	PRT RTD			
16/34	Analog output 1			
17/35	Analog output 2			
18/36	Not Used			
	RS232			
	RS485			

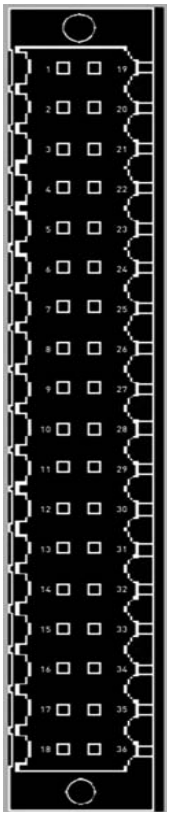
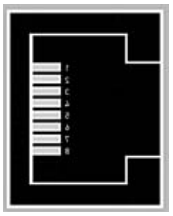
14.1.2 Digital /O Board 2 Terminal Connections

Slot number:				
Input	Input type	Signal type		Purpose
1/19	Digital input 1			
2/20	Digital input 2			
3/21	Digital input 3			
4/22	Digital input 4			
5/23	Digital output 6			
6/24	Digital output 1			
7/25	Digital output 2			
8/26	Digital output 3			
9/27	Digital output 4			
10/28	Digital output 5			
11/29	Not Used			
12/30	HART input 1			
13/31	HART input 2			
14/32	Analog output 3			
15/33	Analog output 4			
16/34	Analog output 1			
17/35	Analog output 2			
18/36	not used			
Port 1	RS232			
	RS485			

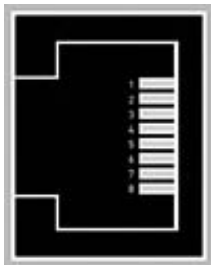
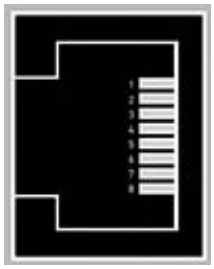
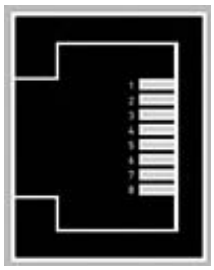
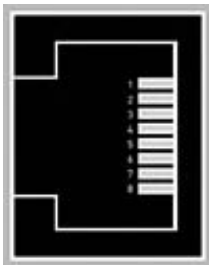
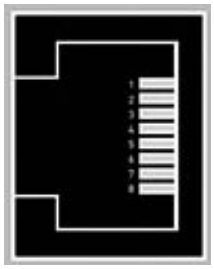
14.1.3 Analog /O Board Terminal Connections

Slot number:				
Input	Input type	Signal type		
1/19	Digital input 1			
2/20	Digital input 2			
3/21	Digital input 3			
4/22	Digital input 4			
5/23	Digital input 5			
6/24	Digital output 1			
7/25	Digital output 2			
8/26	Digital output 3			
9/27	Digital output 4 Analog input 4			
10/28	Digital output 5 Analog output 3			
11/29	Analog input 2			
12/30	HART input 1			
13/31	HART input 2			
14/32	PRT RTD			
15/33	PRT RTD			
16/34	Analog output 1			
17/35	Analog output 2			
18/36	Analog input 3			
Port 1	RS232			
	RS485			

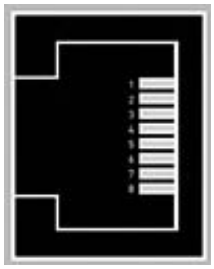
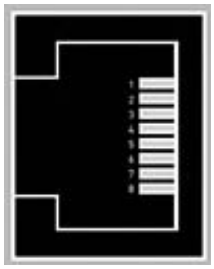
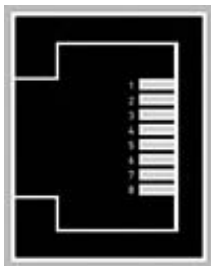
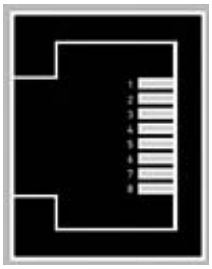
14.1.4 Switch Board Terminal Connections

Slot number:				
Input	Input type	Signal type		
1/19	Digital input 1			
2/20	Digital input 2			
3/21	Digital input 3			
4/22	Digital input 4			
5/23	Digital input 5			
6/24	Digital input 6			
7/25	Digital output 1			
8/26	Digital output 2			
9/27	Digital output 3			
10/28	Digital output 4			
11/29	Digital output 5			
12/30	Digital output 6			
13/31	Digital in 1 Digital out 1			
14/32	Digital in 2 Digital out 2			
15/33	Digital in 3 Digital out 3			
16/34	Digital in 4 Digital out 4			
17/35	Digital in 5 Digital out 5			
18/36	Digital in 6 Digital out 6			
Port 1	RS232			
	RS485			

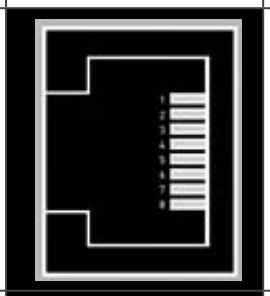
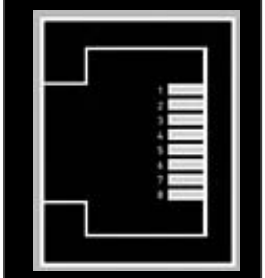
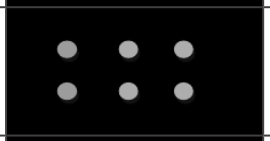
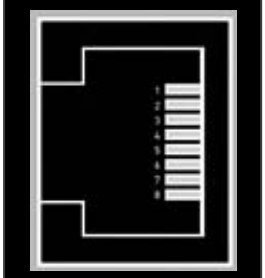
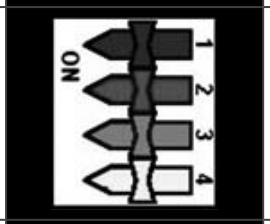
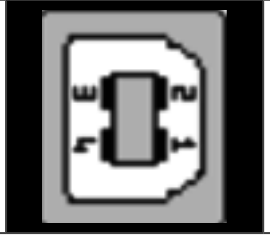
14.1.5 Dual Ethernet Board Terminal Connections

Slot number: 6				
Input	Input type	Signal type		Purpose
Port 1	RS232			
	RS485			
Port 2	RS232			
	RS485			
Port 3	RS232			
	RS485			
IP Address				
Net 1				
Net 2				

14.1.6 Single Ethernet Board Terminal Connections

Slot number: 6				
Input	Input type	Signal type		Purpose
Port 1	RS232			
	RS485			
Port 2	RS232			
	RS485			
Port 3	RS232			
	RS485			
IP Address				
Net 1				

14.1.7 DSfG Board Terminal Connections

Slot number: 6				
Input	Input type	Signal type		Purpose
PL1	RS232			
PL1	RS232			Flow computer
				
PL3	DSfG			
SW	RS485			DSfG Bus
USB-B				Configuration Data retrieval

15.1 General

Environmental	Intended for Indoor use only	Optional IP20
	Maximum Altitude	2000 meters
	Operating Temperature	0 to 50°C
	Storage Temperature	-25 to 70°C
	Maximum Relative Humidity	80% non condensing
	Pollution Degree	2
Dimensions	Height	130 mm
	Width	210 mm
	Depth	240 mm
Weight	All slots occupied	2.5 kg
	1 I/P Board and 1 comms Board	2.0 kg
Packed Weight	All slots occupied	3.1 kg
	1 I/P Board and 1 comms Board	2.6 kg
Packaging	Type	Cardboard, Foam Internal
	Dimensions	340 x330 x 230 mm
External Connections	Input /Output Type	Mating part Weidemüller 36 Way Part No. 1748640000
	Communication RS232/RS485	RJ45 8C8P
	Network	RJ45 8C8P
	Power Input	Mating part Weidemüller 3 Way Part No. 1606650000
	Power Output	Mating part Weidemüller 6 Way Part No. 1727560000
	Front Panel USB	Standard B USB connector
Internal Battery	Type	BR/CR 2032
	Voltage	Nominal 3V
	Capacity	200/220mAh
Memory Card	Type Standard SD	Standard SD
	Capacity	Up to 4 G Byte

15.2 Inputs

Pulse	Type	Isolated Opto coupler Input
	Frequency Range	DC to 5KHz
	Maximum Input Current	25mA
	Maximum Input Voltage LK8, 10, 12 OFF	+24V DC
	Maximum Input Voltage LK8, 10, 12 ON	+1.2V
Switch	Type	Isolated Opto coupler Input
	Minimum closure time	1 second
	Maximum Input Current	25mA
	Maximum Input Voltage LK14, 16 OFF	+24V DC

	Maximum Input Voltage LK14, 16 ON	+1.2V
Analog	Type	Current Input
	Input range	4 to 20 mA
	Input resistance	100 ohm
Analog	Type	4 wire Direct RTD
	Nominal Input Range	-20°C to +100°C
	RTD type	100 ohm @ 0°C
	Energising current	3mA
Analog	Type	HART current Loop
	Maximum No. transmitters/ loop	3
	Maximum Loop Current	12mA
	Input Resistance	510 ohm

15.3 Outputs

Pulse	Type	Open collector Darlington Transistor
	Maximum applied Voltage	+30V dc
	Maximum Load current	20mA dc
	Maximum Power in output Transistor	100mW
	Frequency Ranges	50, 25, 10, 5, 2 Hz at 50% Duty Cycle
	Output Invert	On or Off
Prover corrected Bus	Pulse Output 1 Only	
Switch	Type	Open collector Darlington Transistor
	Maximum applied Voltage	+30V dc
	Maximum Load current	20mA dc
	Maximum Power in output Transistor	100mW
	Output Invert	On or Off
Analog	Type	Current source loop
	Current ranges	4 to 20 mA or 0-20mA
	Maximum Loop Resistance	750
	Maximum Output current	26mA

15.3.1 Communication

I/O Board Communication		
Serial Communication	Physical Layer	RS232 or RS485
	Max Baud Rate	38400 Baud
	Handshake	None
	Isolation	None
Comms Board		

Serial Communication	Physical Layer	RS232 or RS485
	Max Baud Rate	38400 baud
	Handshake	RTS/CTS on Port PL3 None on Port PL4 or PL5
	Isolation	Galvanically isolated
Network communication	Ethernet	IEEE 802.3
	Speed	10/100

15.3.2 Power Supply

Power Input	Voltage Range	+24VDC +/- 10%
Power Consumption	All slots occupied	30W at Input voltage +24V nominal
	1 I/P Board and 1 comms Board	8.5W
Fuse	F1 Internal	3.15A 20mm
	F2 External Rear Panel	1.6A 20mm
Power Output	Rear Aux Connector	+24V DC nominal at I max = 200mA

15.4 Data sheet

SUMMIT 8800 Flow Computer Specifications.

Overview		
Number of runs	Up to 5 runs plus a prover/master meter	
Calculation cycle	0.25, 0.5 or ¼ second	
Communication	Single or dual ethernet to SCADA, serial ports to meters, DCS, PLC, GC and analysers	
Audit trail/ logging	Full audit trail with defined user name, logging/ trending e.g. lifetime data, recorded 7 times per minute on 4 GB flash memory card	
Products	Oil, liquids, water, gas, wet gas, steam, LPG, LNG, industrial gases, CO2 emission, etc.	
Hardware		
Chassis	Half width 3U high 19" construction Panel or chassis mounted Dimensions 130 x 210 x 240 mm (h x w x d) Accommodates up to 6 plug-in cards IP20 Ingress protection index level IP52 in a panel with open doors IP 65 in an appropriately closed panel	
Power supply	Supply voltage 22 to 28 V DC 8.5 W (15 W with 6 boards fitted) Protection 3.15A internal fuse Protection 1.6A external fuse Auxiliary outputs 24 VDC/ 200 mA	
Operating	Operating temperature	-10 to 55 °C analog inputs (15 to 130 °F) -25 to 55 °C HART inputs (-15 to 130°F)
	Storage temperature	-20 to 70 °C (0 to 160 °F)
	Operating humidity	30% to 90% non-condensing
	Weight approximately	2.0 kg / 4.5 lbs (2.5 kg / 5 lbs with 6 boards fitted)
Rear Panel		

Field connections	PSU connections and fuse Six slots for option boards I/O and Communication Connections
Switch Panel	Access to security mode switches Access to Memory Card
Front Panel Display	
Display	5.7" Colour graphics screen Touch panel 360° rotary facilitating menu navigation dial Local language support 5 x high brightness indicator LED's Front panel USB connection
Various	
Configuration	Menu-based configuration program Optional "flow computer" language interpreter Local data downloading via USB Local diagnostics and re-programming
Connectors	
	RS232/485 RJ45 Ethernet 10/100 Mbs RJ45 Connector kit to rail mounted screw terminal I/O board Weidmüller non-screw type 36-way (part no 1748640000) Power in Weidmüller connector (part no 1727570000) Power out Weidmüller connector (part no 1597370000)
Meters and Standards	
Meter technology	Pulse: e.g. Turbine, PD, Prover, DP: e.g. Orifice, Venturi Serial: e.g. Ultrasonic, Coriolis
Connectivity	Meters: Turbine, Coriolis, PD, Ultrasonic, Orifice, Venturi, Nozzle, etc. Ultrasonic meters: KROHNE, Daniel, Elster, GE, Sick, etc. Chromatographs: ABB, Daniel, Elster, Siemens, etc. Density/ specific gravity: frequencies Solartron 781x, 783x, Sarasota ID900 Provers: Bi-directional, 2 / 4 detector inputs, piston prover, master provers Control: up to 18 valves, Prover, PID
Approvals	Compliant with all international approvals, including - MID European approval - CSA C22.2, CB, CCSAus - UL 61010-1, IEC 61000-4, IEC 61010-1, EN G1326-1 - OIML R117
Standards	Compliant with international standards, including ISO 5167 (2003 , 1997, 1991), ISO 6976, PTZ, NX19, NX19 G9, SGERG (all types), User defined Z-factor Tables, Fixed AGA3, 5, 7, 8, 9-support, 10, 11 API chapters 11.1, 11.2 and 21.112.2.5.1 and 2, chapters 12.2.5.3 Table 54 and 54A ASTM D1250 IP200 OIML R 022 GPA 2172 GOST NX19
Processing	Calibration up to 20 points linear (positive and/or negative), meter factor or K-curve, 5 products Pulse handling: API5.5 level A, B, C, D, E, dual chronometry, pulse interpolation Counters: Unhaltable, Normal, Period, Error, Maintenance, Positive and negative, Prover Averages: Time weighted, Flow weighted

Redundancy					
Master/Slave computer	Health based switching Full redundancy between two flow computers Duty-standby system based on health indicator Healthiest computer duty Other flow computer Hot standby Two independent heartbeat/ healthy channels				
I/O Boards	Type board:	Digital 1	Digital 2	Analog	Switch
HART transmitter loop	Up to 3 transmitters (if multi-dropped) Up to 4 variables per transmitter For temperature, (differential) pressure, meters	2	2	1	-
Direct RTD Input	4 wire PT100 temperature input -20°C ... +100°C (10 ... 210°F), 1 mA energise	1	-	1	-
Analog Inputs	4-20 mA, 100 ohm, 20 bit resolution, accuracy 0.01 % FS @ 20 °C Selectable: either 1x 4-20 mA output or 1x Digital Output	-	-	3/4*	-
Digital Inputs for Switch / Valve / Status 3 of which can be:	Optically isolated, 24 Vdc, 25 mA	5	6	5 / 4*	6
Pulse Counting/ Frequency Inputs	DC to 15 kHz, optically isolated ISO 6551 or API Chapter 5.5 Level A Turbine, density, status or detector switch max, Input voltage + 24 Vdc or 1.2 Vdc	(3)	(3)	(3)	(3)
Digital / Switch / Valve / Alarm / Pulse Outputs	Open Collector, 30 V max, 20 mA, 100 mW Frequency 0, 2, 5, 10, 25, 50 Hz @ 50% duty cycle	5	6	5 / 4*	6
Analog Outputs	4-20 mA, loop max. 750 W, 26 mA 16 bit max error 0.15% For telemetry and PID control	2	4	2 / 3*	-
Selectable Digital Input or Output	Can be individually selected to be input or output Same specifications as above	-	-	-	6
Serial Communication Connection	RS232/RS485 Speeds up to 38400 baud, software handshake Modbus Master/Slave communication For meters (ultrasonic, Coriolis), GC and analysers	1	1	1	1

Communications Boards			
	Type Board:	Single	Dual
Serial Communication Connection	RS232/ RS485 Galvanically isolated, Port 1: hardware handshake (RTS/CTS); Port 2/3 Software handshake Speeds up to 38400 baud RJ45 Connector Fully user configurable Modbus ASCII or RTU	3	3
Ethernet Port	10/100 RJ45 port with indicators IEEE 802.3 Fully use configurable and programmable - Applications e.g. Modbus master and slave over TCP - Remote diagnostics and configuration - Web Server functions- Network Time Protocol - Printing	1	2
Capabilities	SOAP communication protocol	yes	yes

* 1 input and 1 output selectable to be digital or analog

15.4.1 Ordering Options

Up to 6 slots with free choice of:

				A: Analog I/O board						
				H: Digital I/O board 1						
				K: Digital I/O board 2						
				S: Switch board						
				E: Communication board: single Ethernet						
				D: Communication board: dual Ethernet						
								0: Standard card		
								P: Polymer-coated to withstand moisture and salty mist, complies to OIML D11		
									0: No cables	
									C: Cable assembly (2.5 m) for each I/O board	
										0-No training
										1: 1 day operator training at KOG
										2: 2 days engineering training at KOG
VN90	-	#	#	#	#	#	#	-	#	#	#

15.4.2 Replacement Parts

The following user replacement parts are available for service/maintenance:

Part No.	Item	Description
8800-300	Display and MPU board	Main display, MPU, memory & USB Interface.
8800-301	Cage incl. PSU and Aux	Housing, display, power supply and aux board
8800-302	PSU Board	Power supply for complete Unit.
8800-303	Aux. Board	Mode switch, SD Card and battery backup.
8800-304	Digital I/O board 1	Board without mA analog inputs
8800-305	Single Ethernet board	Board with 3x serial ports and 1x ethernet port.
8800-306	Analogue I/O board	Board including analog inputs
8800-307	Switch I/O board	Board with only digital I/O e.g. for valve switching
8800-308	Dual Ethernet board	Board with 3x serial ports and 2x ethernet port.
8800-309	Digital I/O board 2	Board without mA and RTD analog inputs
8800-995	DSfG boards	DSfG to Modbus board. 8800-308D needed
8800-308G	Dual Ethernet DSfG board	As 8800-308 with one serial port internal for DSfG.
	USB A-B cable	USB A-B Cable
	Replacement battery	CR/BR2032

Optional Polymer coating for each of the electronics: Special coating to withstand moisture and salty mist as need to comply with OIML D11 class H2

When boards are replaced it may be necessary to change the customised link and jumper settings, further details on the position and function of all links and jumper settings are described in section 3.3

Before installation commences ensure that the current Windows user has administrator privileges. In a Windows Vista, Windows 7 and windows 8 environment follow below instructions. Click on the Windows start button. In search field, type explorer. Navigate to the Summit 8800 CD-ROM. Search for your target executable. Right mouse button click the executable and select START AS AN ADMINISTRATOR.

To install the configurator software run:

X:\ SUMMIT 8800\Software\Version X.XX SUMMIT 8800 vXX \Configuration Installer.exe.

Where X:\ is your CD-ROM drive.

Click Next in the "SUMMIT 8800 CONFIGURATION wizard

Figure 146 Configurator Wizard screen

Easiest is not change the installation destination and click Next

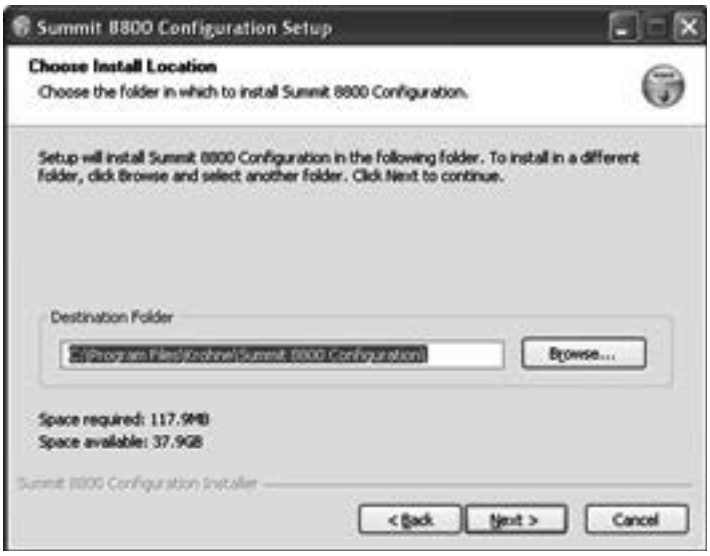


Figure 147 Configurator file location

Click Next when the system opens the "Choose start menu folder"

Figure 148 Configurator program location

Select Typical for setup type and click Install;
(double check USB driver is selected)

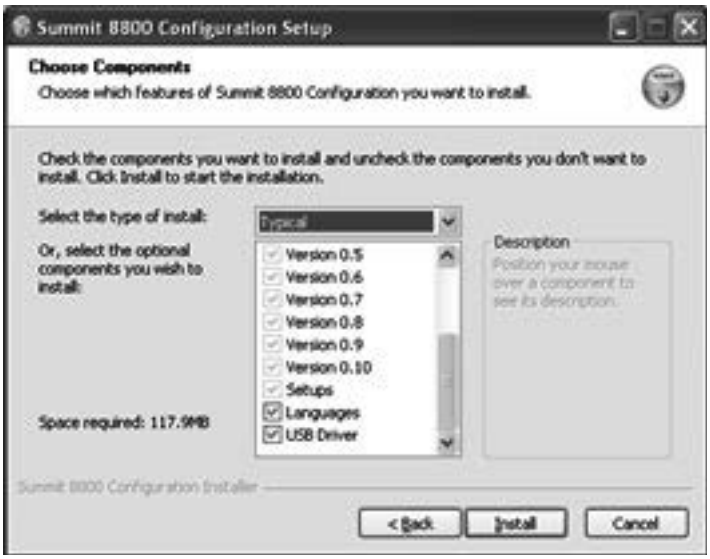


Figure 149 Configurator install features

The Summit 8800 can have many different versions which are upwards compatible. When a new software version of the configurator is installed, it is important to indicate which old versions should be supported so the software can install a version specific file. Only then this old version can be loaded and a possible upgrade to a new version will be possible.

Installing configuration files

Figure 150 Software installation process

Click Finish to complete the setup

Figure 151 Completion window

Remove the CD and login to access the configuration tool.
A windows appears with “No users exists”. Select OK.

Figure 152 Add user window

At this stage it a super user or administrator will be created who has FULL rights and open permission. At a later stage additional users can be added. Choose a name and password e.g..

User name: Administrator
Password: Administrator

Figure 153 Edit user window

The KROHNE configuration software is now installed

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