

# Spirit<sup>IT</sup> Flow-Xpress

## Flow computer configuration software

### Spirit<sup>IT</sup> Flow-Xpress 2.1 (March 2018)

Spirit<sup>IT</sup> Flow-Xpress 2.1 was released in March of 2018. Besides the features and changes mentioned below, this release also contains about 10 minor improvements and bug fixes. For a complete list of changes, please contact ABB.

#### New Features/Changes

##### New calculation functions

Flow-Xpress 2.1.0 contains a number of new calculation functions that support the following standards:

- ISO 6976: 2016
- AGA-8 Part 1 : 2017
- AGA-8 Part 2 : 2017 (GERG)
- AGA-3: 2012
- GOST-30319: 2015 (SGERG)
- GPA-2172: 2009 and 2004 with tables GPA-2145: 2006
- OIML R22: 1975 International Alcoholometric tables

### Spirit<sup>IT</sup> Flow-Xpress 2.0 (December 2017)

Spirit<sup>IT</sup> Flow-Xpress 2.0 was released in December of 2017. Besides the features and changes mentioned below, this release also contains over 500 minor improvements and bug fixes. For a complete list of changes, please contact ABB.

#### New Features/Changes

##### New hardware platforms

With Spirit<sup>IT</sup> Flow-Xpress 2.0 ABB introduces support for a new line of Spirit<sup>IT</sup> Flow-X hardware. The Flow-X/M and Flow-X/P line of flow computers have received a major hardware update, and a minor change in appearance. With this update even larger applications with more intensive flow calculations can be supported. For example, next to the existing support for the GERG2008 Gas calculation it is now possible to make use of the GERG2008 Flash calculation on the flow computer. The new models are fully compatible with existing Spirit<sup>IT</sup> Flow-X applications and can be used as drop-in replacements.

Next to the familiar Flow-X/M and Flow-X/P line of flow computer hardware a new member of the Spirit<sup>IT</sup> Flow-X family is introduced, the Flow-X/C:

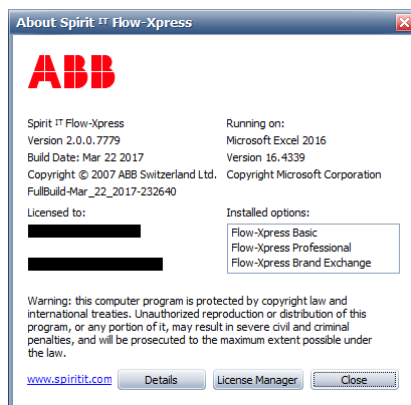
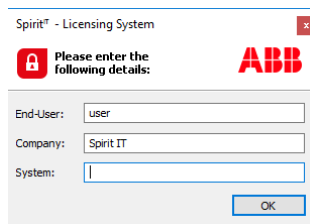


The Flow-X/C combines a single stream Flow-X/M with the intuitive graphical touch-screen interface offered by the Flow-X/P range of flow computers.

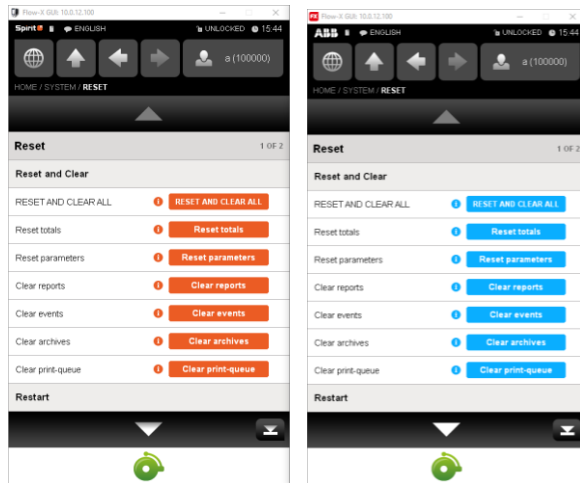
### Changes to Branding

Because Spirit IT has become a member of the ABB group, logo's, colors, icons, etc. have been updated to ABB branding.

- The ABB logo replaces the Spirit IT logo in various places:



- Various places in the user interface that used orange now use a blue tint instead:

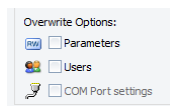


- New icons for Flow-Xpress and related utilities:

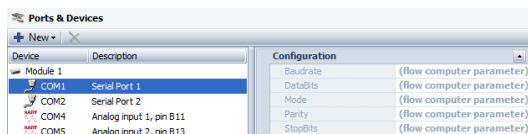


## Firmware

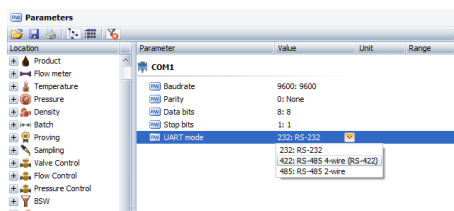
- Modbus communications can now be switched between RTU and ASCII transmission modes at runtime.
- The IP address of the remote Modbus Server for the Modbus Client Protocol can now be configured at runtime.
- A Modbus proxy can now be configured forwarding Modbus message from an Ethernet server to serial master connection.
- COM port settings can now be configured as parameters:
  - The COM Port settings check box on the Upload to Device dialogue is disabled:



- COM port settings on the Ports & Devices tab are disabled:



- COM port settings are now configurable from the Parameters tab:



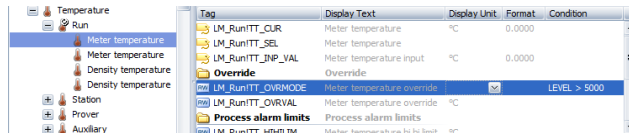
This change streamlines the configuration of COM port settings by making it no different from configuring other settings on the flow computer. In particular, it is now possible to make configuration changes to the COM port settings at run time simply by changing a tag value. I.e. remote configuration of COM

port settings is now possible using the Flow-X HTTP interface, or by adding the relevant tags to a Flow-X Communications sheet to enable configuration over e.g. Modbus

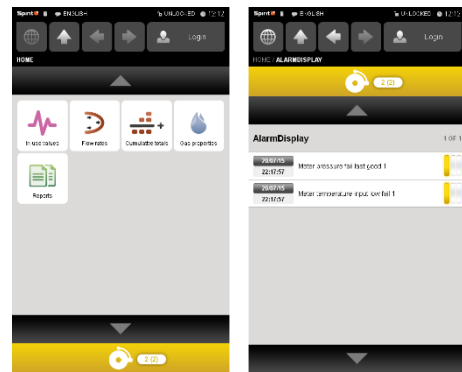
#### NOTE:

Before updating to this new version of Spirit<sup>IT</sup> Flow-Xpress, please take note of the current COM port settings for your application. You will need to adjust the COM port parameter settings to match with these settings manually, before writing the application to a device. Writing the application to a device without updating these parameters will cause serial communications to use default settings (i.e. 9600 bauds, no parity, 8 data bits, 1 stop bit), even if no parameters are overwritten.

- It is now possible to conditionally show or hide individual tags on tag displays:



- A new type of Alarm has been introduced: a “warning”. This allows for the distinction between critical and non-critical conditions. Where an alarm is typically an abnormal condition that requires (immediate) action by the operator, a warning is a condition that the operator needs to be aware of but which does not require immediate action. An example use of the warning alarm type is a self-diagnostic notification from a measurement device. An operator needs to be aware of this, but no immediate action may be required as the measurement device is still operating within acceptable parameters.



#### Functions

- A new function `fxGasViscosity_2004(..)` is added which calculates gas viscosity according to an equation published in the International Journal of Thermophysics in 2004.
- Gas compressibility calculations are added that are in accordance with MR113 and GOST 30319 standards.
- The `fxISO15377` function is extended with support for ISO/TR 15377 Quarter Circle and Conical Entrance tappings.
- The `fxISO6976_1995` function is extended with user-definable components.
- (new models only) A new function `fxGERG2008_Flash(..)` is added which can calculate the compressibility and density of a gas/liquid mixture in accordance with the GERG2008 standard.

#### Supported versions of Microsoft Windows & Office

- Starting with Spirit<sup>IT</sup> Flow-Xpress 2.0, ABB no longer supports the use of Spirit<sup>IT</sup> Flow-Xpress on Windows XP or Windows Vista. Flow-Xpress 2.0 is supported on the following windows versions:
  - Windows 7
  - Windows 8 and Windows 8.1
  - Windows 10
  - Windows Server 2008 R2
  - Windows Server 2012
  - Windows Server 2012 R2
  - Windows Server 2016

ABB recommends that you keep your Windows installation up-to-date with the latest Service Packs and Updates.

- Starting with Flow-Xpress 2.0, ABB no longer supports the use of Spirit<sup>IT</sup> Flow-Xpress on Microsoft Office 2003 and Microsoft Office 2007 prior to Service Pack 2. Flow-Xpress 2.0 is supported on the following versions of Microsoft Office:

- Microsoft Office 2007 (Minimum Service Pack 2)
  - Microsoft Office 2010
  - Microsoft Office 2013
  - Microsoft Office 2016
  - Microsoft Office 365 (up to and including the versions based on 2016)
- Spirit<sup>IT</sup> Flow-Xpress 2.0 now fully supports both 32-bit and 64-bit installations of Microsoft Office. With this addition, it is now possible to support more and larger applications than ever before.

## Spirit<sup>IT</sup> Flow-Xpress 1.7 (July 2014)

Spirit<sup>IT</sup> Flow-Xpress 1.7 was released in July of 2014. Besides the features and changes mentioned below, this release also contains 25 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

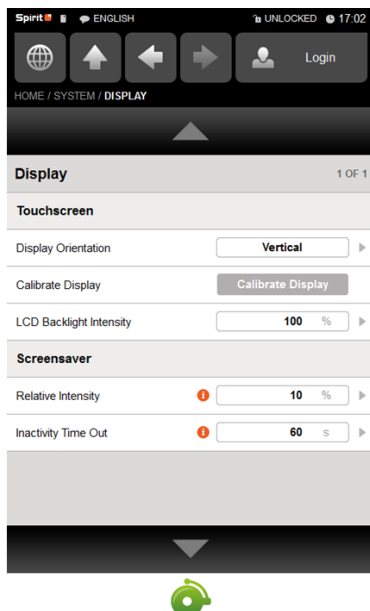
## New Features/Changes

### Functions

- The GERG2008 Wide-Range Equation of State for Natural Gases and Other Mixtures is now available for use on the Spirit<sup>IT</sup> Flow-X range of flow computers.  
fxGERG2008\_Gas ( .. )
- The MR113 calculation for humidity of gas is now available for use on the Spirit<sup>IT</sup> Flow-X range of flow computers.  
fxMR113 ( .. )

### Flow-X/P Touch Screen

The touch screen of the Flow-X/P flow computer can now automatically be dimmed after a configurable amount of time. This reduces the power consumption and amount of heat generated by Flow-X/P series flow computers.



### Firmware

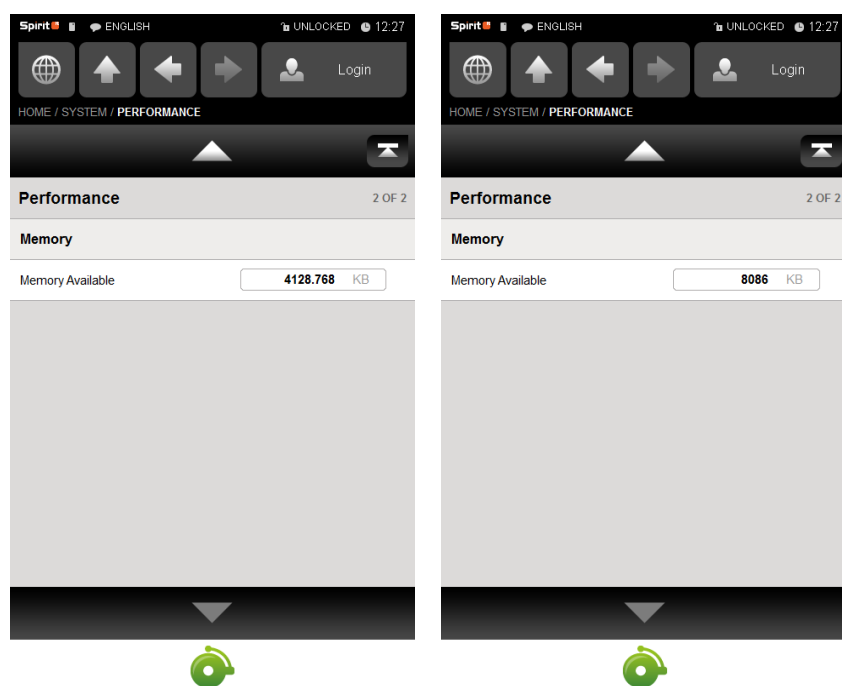
- **Important Notice**  
This notice only applies to:
  - FPGA version 6557-700-52-13 (shipped between Nov 2013 and Nov 2014).
  - Flow meters with a dual-pulse output for which pulse fidelity level A is enabled.

If one of the above conditions does not apply, the below statement is not applicable and no further action is required.

The FPGA is a digital signal processor in the Spirit<sup>IT</sup> Flow-X module with its own embedded software. For FPGA version 13 the pulse fidelity checking algorithm may occasionally reject correct meter pulses resulting in a lower flow rate than expected. Spirit<sup>IT</sup> Flow-Xpress version 1.7.3 therefore disables the correction of flow pulses for FPGA version 13, which effectively results in pulse fidelity level B (no correction, error detection only). For other FPGA versions, level A functionality remains in-use.

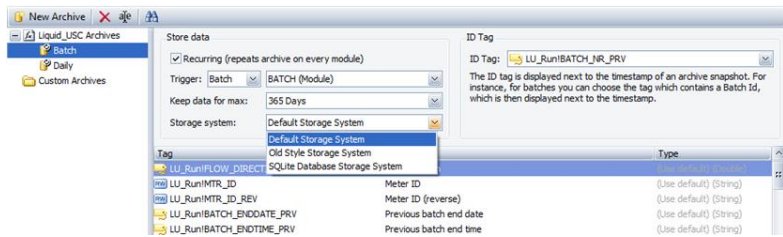
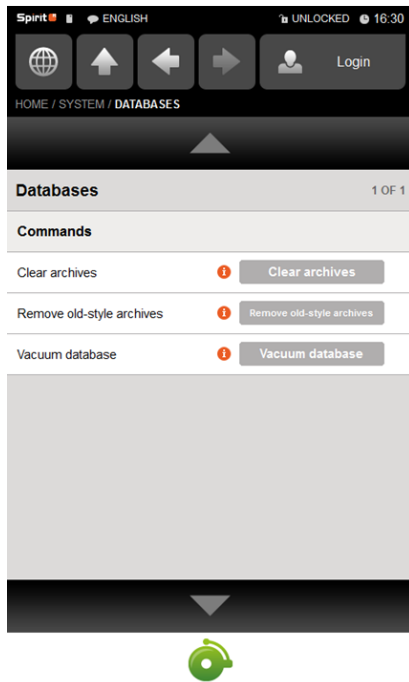
The actual FPGA version can be checked on the display 'System/Versions', item 'FPGA product number', where the last number indicates the FPGA version. In case a Spirit<sup>IT</sup> Flow-Xpress upgrade is not desired, it is advised to change to 'Pulse fidelity level B' (refer to display 'IO/Module <x>/Configuration/Pulse input'), item 'Dual pulse fidelity level'). When 'Pulse fidelity level A' is required, it is advised to downgrade the FPGA version. Please contact Technical Support at ABB for more information.

- A new memory manager has been implemented for the Spirit<sup>IT</sup> Flow-X series flow computer. This allows for the flow computer to run larger applications with more runs. The below screenshots shows the difference in memory available for the "Liquid USC Master 2.1.0" standard application. The left screenshot shows the memory usage with Spirit<sup>IT</sup> Flow-X firmware 1.6, the right screenshot shows the memory usage with Spirit<sup>IT</sup> Flow-X firmware 1.7.



### Historical Archives

A new system has been implemented for the on-device storage of Historical Archives. With this system it is possible to store an increased number of snapshots. It is possible for existing archives to be upgraded the new format. You can read more about the new storage system in the manual.



## Reports & Printers

The end-of-page behavior of serial text printers has been changed to match that of network text printers. In previous versions of Spirit<sup>IT</sup> Flow-Xpress a serial text printer would always send the next-page character(s) at the end of a page, even for the last page in a print job. This has been changed so that the next-page character(s) is only send to the printer between pages. The result is that e.g. printed reports will no longer include an empty page at the end. The end-of-page handling can be restored to the previous behavior by including the end-of-page character in the end-of-report characters.

## Microsoft Office / Excel

- The Spirit<sup>IT</sup> Flow-Xpress 1.7 release includes preliminary support for 64-bit installations of Microsoft Office 2010 and Microsoft Office 2013. Please note that while Spirit<sup>IT</sup> Flow-Xpress 1.7 can now be used with 64-bit versions of Microsoft Excel, we kindly ask you to report any issues you may encounter to ABB.
- 64-bit versions of Microsoft Excel are only supported under Windows 7.

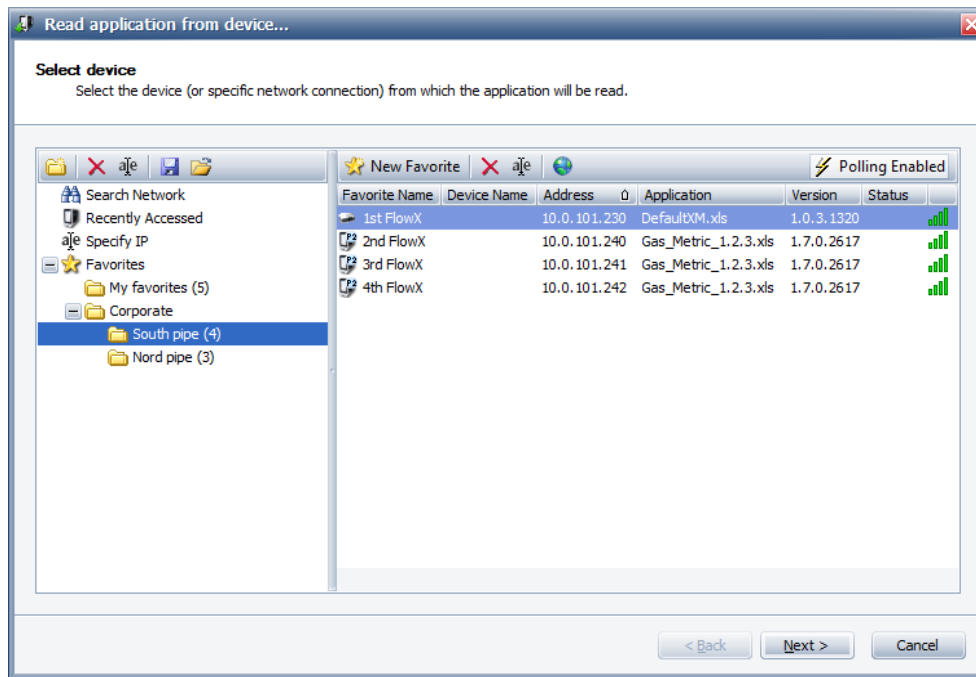
# Flow-Xpress 1.6 (April 2013)

Flow-Xpress 1.6 was released in April 2013. Besides the features and changes mentioned below, this release also contains more than 70 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

## New Features/Changes

### Favorites

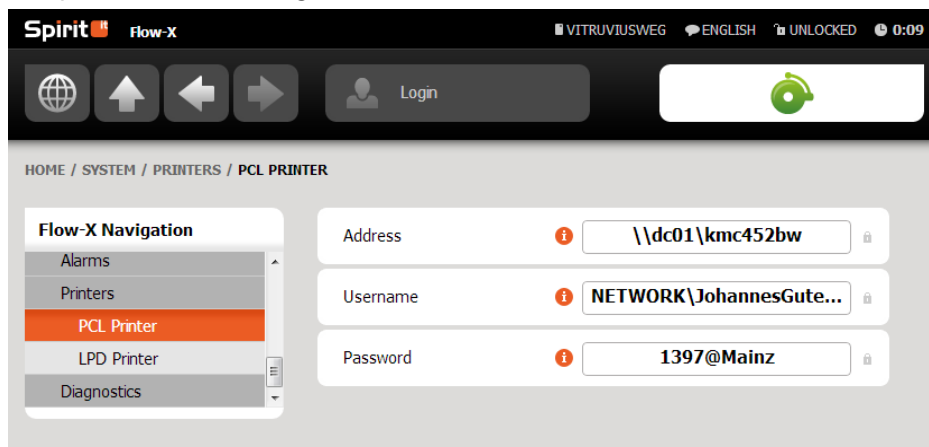
- Large lists of favorite flow computers can be split into groups and subgroups.



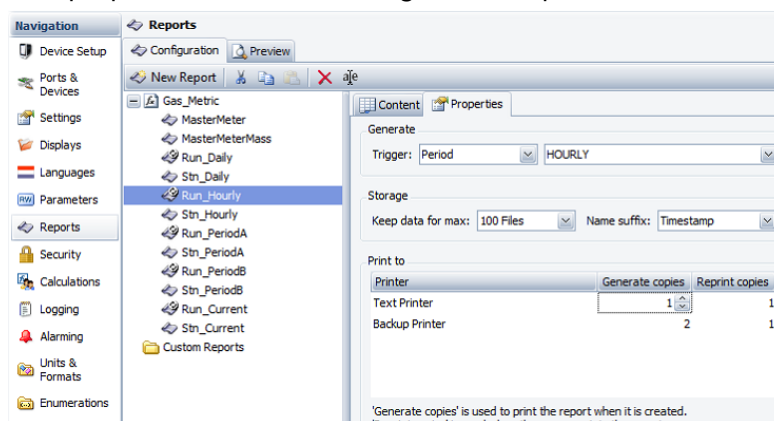
- It is possible to disable polling the status of flow computers to save the network bandwidth.
- Lists of flow computers can be imported and exported.

## Reports & Printers

- Some settings of network printers (e.g. network address, password) can now be changed on the flow computer without having to restart it.



- Multiple printers can now be assigned to a report.



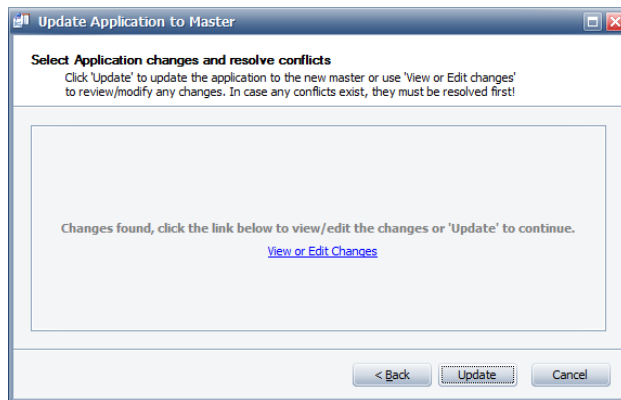
- The number of print-copies can be freely configured.



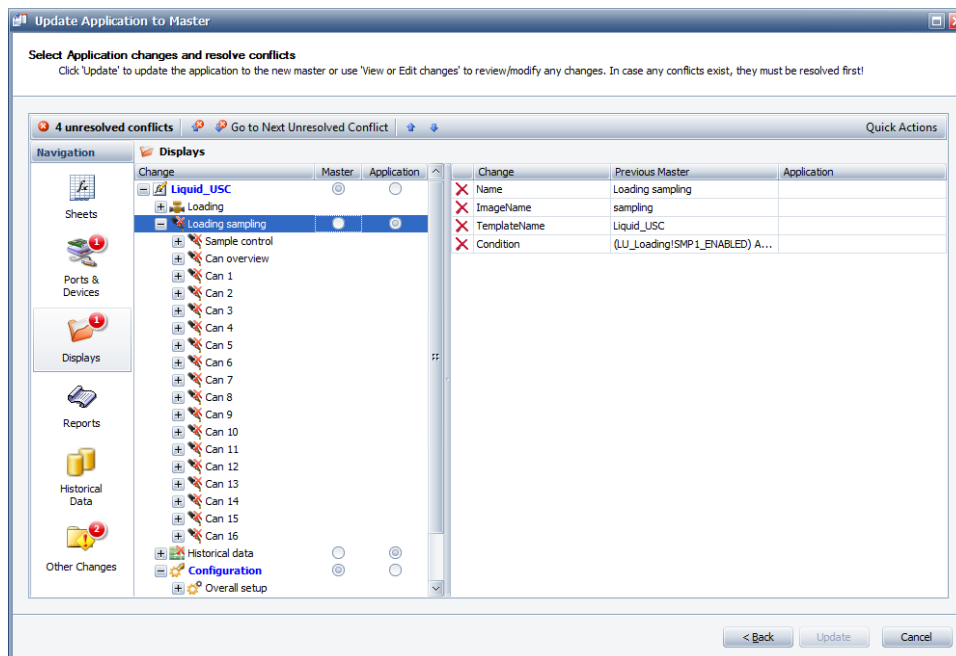
- Support for ‘Excel-based’ report-sheets has been dropped. Flow-Xpress 1.4 or 1.5 can be used to convert the old-style reports to the new format, after which they can be loaded in 1.6 or higher.

### Update to Master

- The Update to Master wizard has been re-designed to easier view/edit changes and resolve conflicts.
- In normal circumstances you can optionally view the changes or just click ‘Update’ to proceed:



- When viewing or editing changes, conflicts that must be resolved are clearly highlighted:



### Firmware

- Reduced memory usage so larger applications can be loaded (released in 1.5.1)
- Added new ‘syslog’ for enhanced diagnostic capabilities.
- Various improvements & fixed to redundancy support.

### Flow-X GUI (formerly known as stand-alone GUI)

- Now available for these platforms: x86 (Windows XP/Vista/7/CE6), ARM (CE5/CE6).
- Fully configurable through both registry & command-line.
- Support for physical keyboard input.
- Auto-login and auto-restart support.
- Size and position are configurable.

# Flow-Xpress 1.5 (August 2012)

Flow-Xpress 1.5 was released in August 2012. Besides the features and changes mentioned below, this release also contains more than 60 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

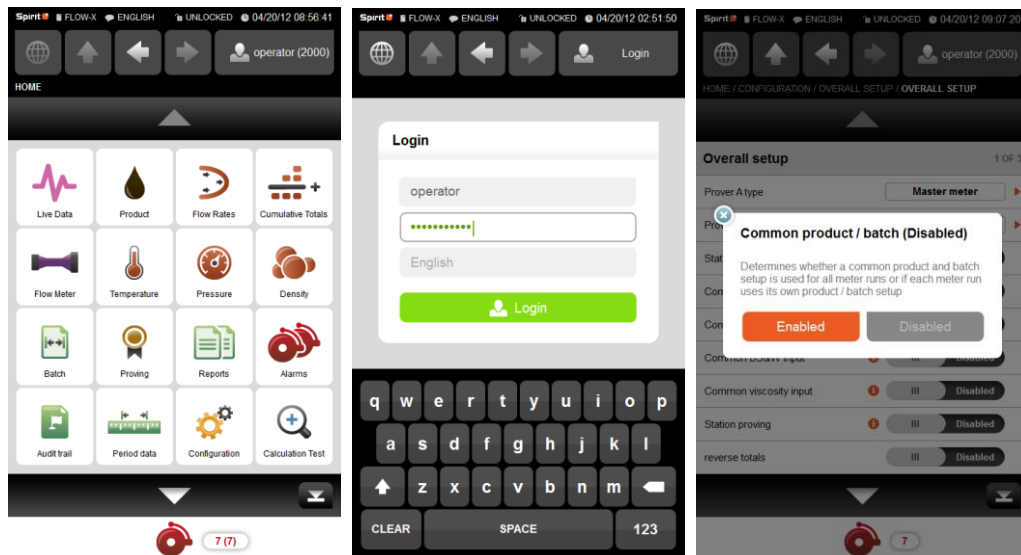
## New Features/Changes

### Functions

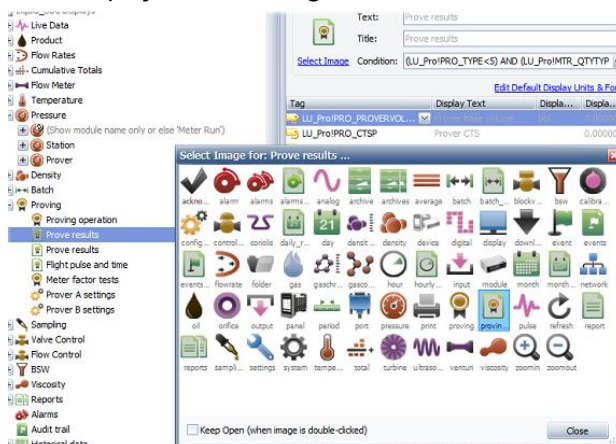
- New ASTM (Butadiene) functions:  
fxASTM\_D1550\_RD60 (..),  
fxASTM\_D1550\_Ctl (..)
- New Ethylene functions:  
fxEthylene\_NIST1045 (..)  
fxAPI\_MPMS\_11\_3\_2\_1(..)
- Added '2009' edition to the fxGPA2172\_96\_C(..) compressibility function.

### New User Interface

- The Flow-X User Interface has been completely re-imagined and contains a beautiful new theme!



- Each display can be configured with its own distinct image.



- The alarm indicator shows number of active & unacknowledged alarms.



- Location-bar shows full path of current display.

HOME / TEMPERATURE / RUN 1 / METER TEMP. OVERRIDE

- Reports can be viewed in Full screen.

**DAILY REPORT**

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Liquid\_USC\_1.1.0\_Enterprise\_Master.xls

Start date / time      04/19/12      20:48:44  
End date / time      04/20/12      00:00:00

Meter ID      ---  
Batch number (at day end)      1  
Batch ID (at day end)  
API table version (at day end)      5/6 (1980)

Day totals		Forward	R
Indicated volume	bbl	0	0
Gross volume	bbl	0	0
Mass	klbm	0.000	0
Gross standard volume	bbl	0	0
Net standard volume	bbl	0	0
Good pulses	pls	0	0
Error pulses	pls	0	0
Sampler pulses	pls	0	0

Day end totals

Forward		R
Indicated volume	bbl	0
Gross volume	bbl	0
Mass	klbm	0.000
Gross standard volume	bbl	0
Net standard volume	bbl	0
Good pulses	pls	0
Error pulses	pls	0

Time weighted averages

Forward		R
Indicated volume	bbl/h	0
Gross volume	bbl/h	0
Mass	klbm/h	0.000
Gross std volume	bbl/h	0
Net std volume	bbl/h	0

Flow weighted averages

Forward		R
Meter temp.	deg F	0.00
Meter error	deg F	0.00

- Added acknowledgement of single alarms.
- Sliders are shown for certain kind of tags

Meter pres. input units      gauge      III

Meter pres. override      III      Disabled

**Common product / batch (Disabled)**

Determines whether a common product and batch setup is used for all meter runs or if each meter run uses its own product / batch setup.

Enabled      Disabled

- The Web-UI has been redesigned from the ground up and uses the latest HTML techniques to provide the best performance and maximize compatibility with modern browsers and tablets. Needless to say, it is ready for the future!

**Flow-X navigation**

- Cumulative Totals
- Flow Meter
- Temperature
- Pressure
- Density
- Batch
- Proving
- Reports
- Alarms
- Audit trail
- Period data
- Configuration
- Calculation Test
- System

**Flow-X**

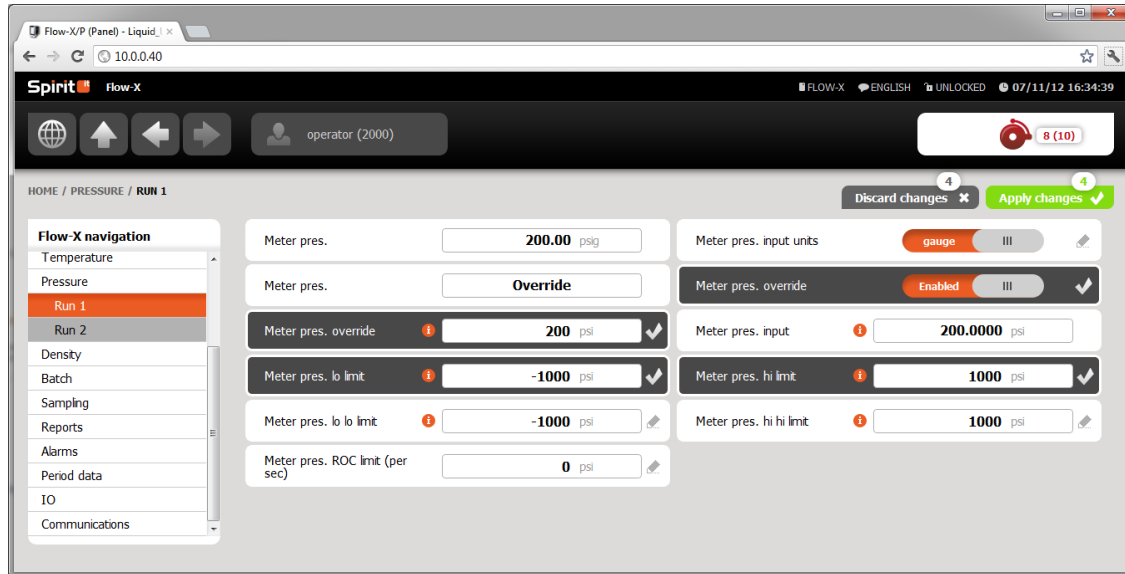
Live Data      Product      Flow Rates      Cumulative Totals      Flow Meter

Temperature      Pressure      Density      Batch      Proving

Reports      Alarms      Audit trail      Period data      Configuration

Calculation Test      System      IO      Communication

- Multiple values can be edited in a single operation.



### New File Formats

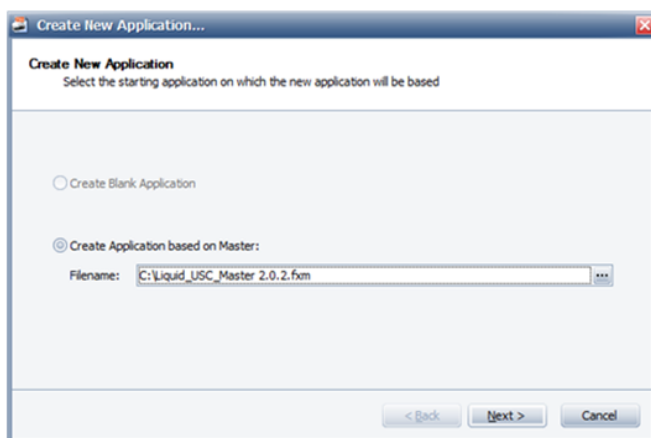
- Two new file formats are now supported:
  - .FXA (Flow-Xpress Application)
  - .FXM (Flow-Xpress Master)
- The new formats are a replacement for the .XLS file-format (which remains supported) and add the following benefits:
  - Reduced file-size.
  - Proprietary format (not viewable/editable without Flow-Xpress).
  - Support for upgrading applications to a new version of the Master.
  - Improved compatibility.
  - Can be opened directly from the Windows Explorer.

### Masters & Upgrading

Whenever Spirit IT added new functionality to a Master (formerly known as Standard application), it was not easy for customers to migrate their changes onto that Master. To tackle this problem, the new .FXA and .FXM file formats were introduced. The .FXA file-format makes it possible to track changes made by the customer, and to migrate these onto a new Master. This process is called 'Upgrading'.

### Creating an upgradable application

- Obtain Master from Spirit IT website (or use Professional Mode to create your own).



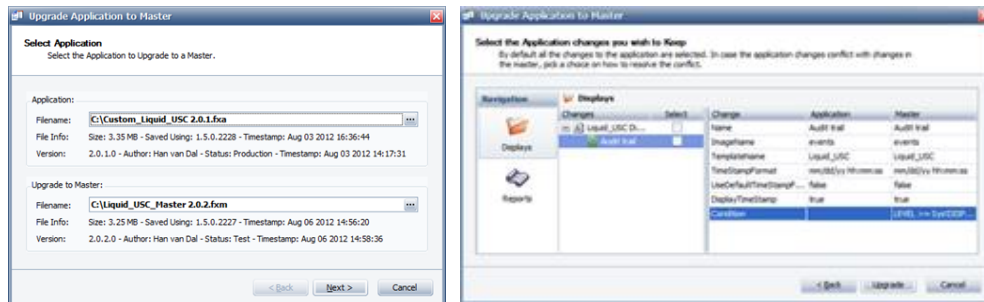
- Create an Application based on that Master.

## Making changes to an application

- The following properties can be modified and are eligible for upgrade (other types will be added in future versions):  
Calculation Sheets, Communication Sheets (e.g. Modbus Lists), Ports & Devices, Languages, Displays, Reports, Historical Data, Calculations & Revision History.
- When modifying sheets (calculation or communication), create a copy and modify that rather than modifying the original. During the upgrade only new sheets are eligible for upgrade.

## Upgrading an application

- Obtain newer (or older) version of the Master.
- Open the Application you wish to upgrade.
- Choose 'Upgrade to Master' and select the Master.



- All the changes made by the customer are shown and selected by default.
- If the changes conflict with the Master, the user is given the choice to keep or discard the change.

# Flow-Xpress 1.4 (February 2012)

Flow-Xpress 1.4 was released in February 2012. Besides the features and changes mentioned below, this release also contains more than 30 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

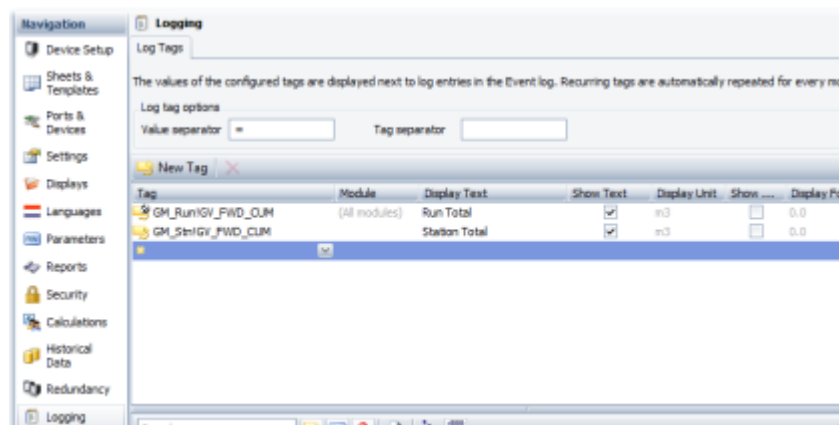
## New Features/Changes

### Functions

- New ASTM (Asphalt) functions:  
fxASTM\_D4311M\_09\_C (.),  
fxASTM\_D4311M\_09\_M (.)

### Event Logging

Added support for logging tag values (e.g. totalizers) with every message in the event-log.



Event log			11
08/02/12 11:55:51	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:27	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:25	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:25	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:25	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:25	User autologin (Touchscreen) has logged in	Run Total 1 = 0.0 Run Total 2 = 0.0 Station Total = 0.0	
08/02/12 11:55:23	Local module 1 comms fail changed from Normal to Alarm		
08/02/12 11:55:23	Local module 2 comms fail changed from Normal to Alarm		
08/02/12 11:55:23	Analog input 1 forced 1 changed from Normal to Alarm		
08/02/12 11:55:23	Analog input 2 forced 1 changed from Normal to Alarm		

## Units

Added new unit 'Pressure' in order to differentiate between 'Pressure' and 'Differential Pressure' in application development.

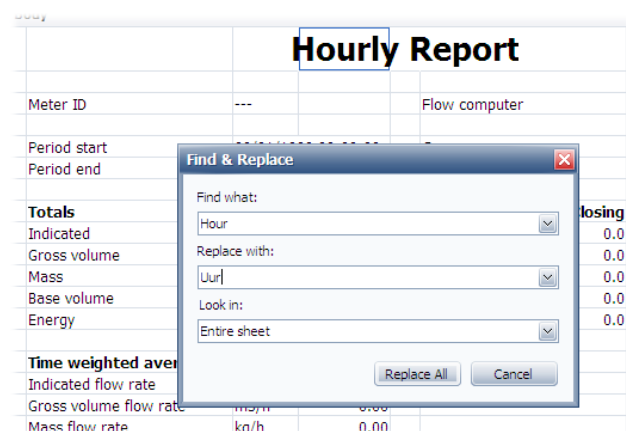
## Diagnostics

Added 'Read debug info from Device' option to Flow-Xpress. This option allows you to extract diagnostic information from a flow computer, which can then be submitted to Spirit IT for analysis.



## Reporting

Added Find & Replace to the report editor.



## Performance

- Reduced memory usage, especially when working with large Modbus lists.
- Reduced CPU usage, especially for station functionality and the touchscreen-UI.

# Flow-Xpress 1.3 (October 2011)

Flow-Xpress 1.3 was released in October 2011. Besides the features and changes mentioned below, this release also contains more than 60 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

## New Features/Changes

### Functions

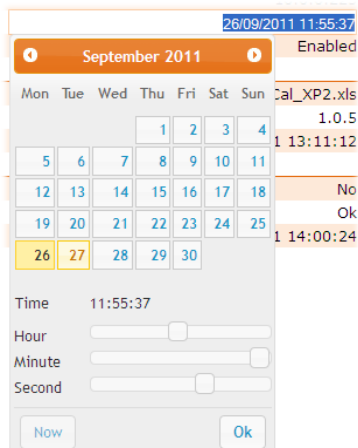
- New NIST (Ethylene) functions:  
fxNIST\_Ethylene\_Visc\_C(..),  
fxNIST\_Ethylene\_Visc\_M(..)
- Extended IUPAC (Ethylene) functions with new outputs: Isobaric heat capacity, Isochoric heat capacity, Specific heats ratio & Speed of sound.
- Added option to 'AGA10ex\_M(..)' to perform Fast calculations (without critical flow factor).

### Communication Drivers

- Added support for Modbus Master RS485 listen-mode. (this item was released in version 1.2.5)
- Added 'xto\_ForceWrite' item option to tags used for communication drivers. This option always causes the item to be written to the remote device when triggered using a 'fxSetOn..()' function. (this item was released in version 1.2.5)

### Displays

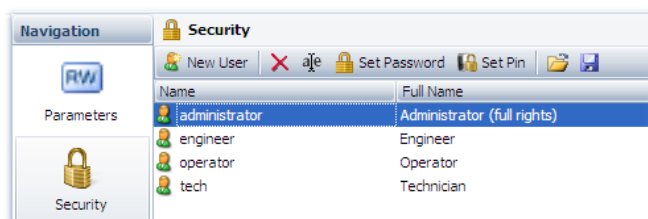
- Added Calendar to Web-UI.



- Improved support for Android devices.
- Improvements in various areas, including: Navigation, Feedback, Performance and Memory Usage.

### Security

Added support for loading and saving security configurations to and from files:



### Redundancy

Added support for explicitly selecting the Duty/Standby flow computer. This can be done through display 'System\Redundancy\Redundancy Selection' or through tag 'SYSGLOBAL!REDUNDANCY\_DUTY'.

## Tags

- Added support for entering parameter-values in Flow-Xpress using scientific notation (e.g. '1.0e12').
- Added system-tags for Virtual Devices. These tags are called 'SYSGLOBAL!VIRTUALDEVICE1..n'.

## Reporting

Improved performance when scrolling through lots of reports on the Touchscreen UI and the Web-UI.

## Web Server

Added default filter option 'writable' to '/tags' web-service and added ability to specify custom filters.

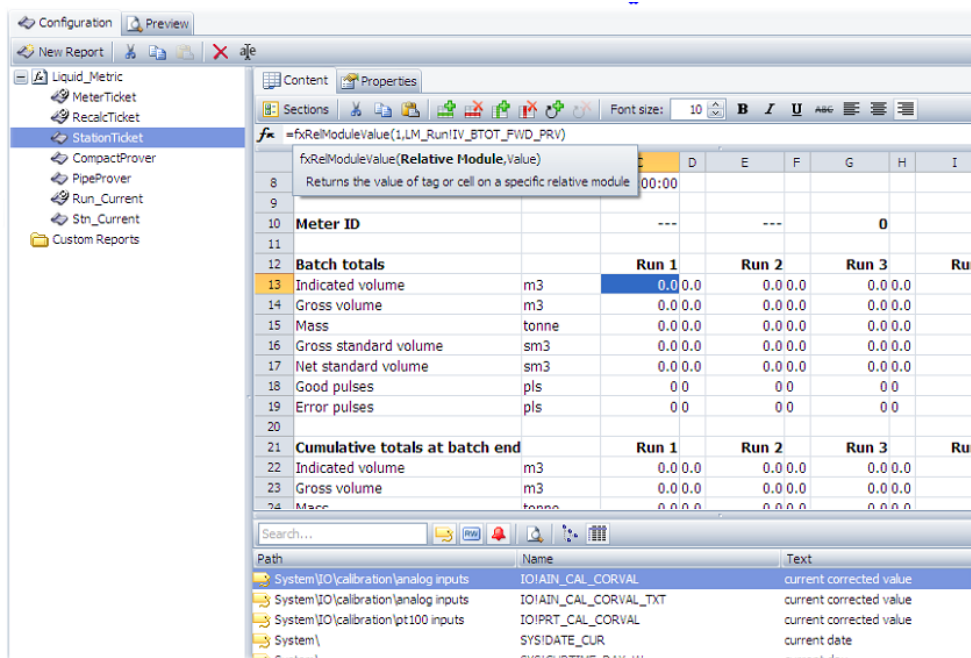
# Flow-Xpress 1.2 (June 2011)

Flow-Xpress 1.2 was released on June 1 2011. Besides the features and changes mentioned below, this release also contains more than 100 minor improvements and bug-fixes. For a complete list of changes please contact ABB.

## New Features/Changes

### Reporting

- New Report Editor which is accessible from Basic Mode:



The New Report Editor replaces the report worksheets ("Report\_"-prefix) that previously required Professional Mode to be configured. The New Report Editor makes it a lot easier to create your own reports or customize existing ones. Reports can contain anything from static texts, formulas, tag-references to event-log sections. Through the Properties-tab you can link a report to a certain trigger, such as a period, batch-end or tag.

- Report-names on the flow computer are now displayed in a new clean form (without date/time and such in the name).

### Documentation

The help files are now included in the Flow-Xpress setup and directly accessible from within Flow-Xpress.

### Online Mode

It is now possible to edit the users of multiple flow computers using Online Mode.

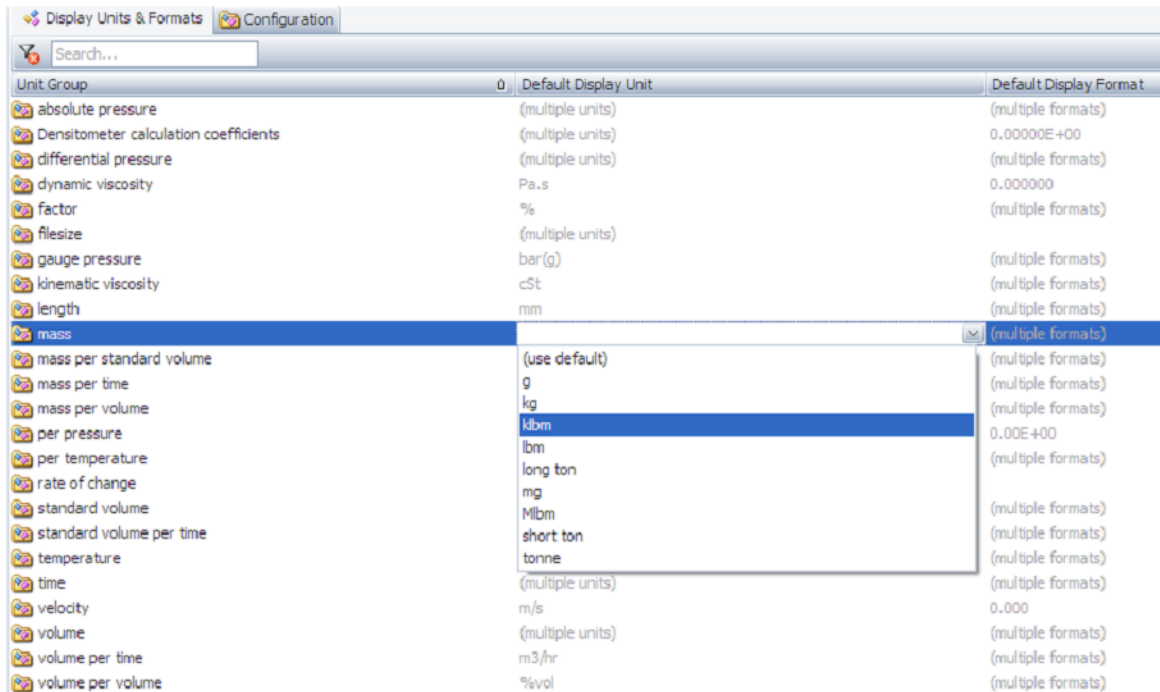


## Debug Offline/Online

- Debug Offline now uses the same Parameters as configured in the application. When a parameter is changed in Debug Offline, it is automatically updated in the application.
- Debug Online now shows the contents of all sheets, instead of only the module that it was connected to.

## Displays

- Ability to configure the default Display Units & Formats for Displays:



The default units and formats can now be configured at one place. These default units are used for display purposes only and don't affect internal processing. This makes it very easy to change all the mass-related tags on the displays to for instance 'kg'. Apart from the default display units and format, it is still possible to change the unit or format of each tag individually.

- Add option 'Show All Displays' which disables all display-conditions for testing purposes.
- The touchscreen GUI now displays group-headers on tag-displays.
- All the texts on the Module LCD are now translatable.

## Tags

Added 2 new system-tags which indicate the last started- and shutdown time of the device. These tags are called 'SYSTEM!STARTEDTIME' and 'SYSTEM!SHUTDOWNTIME'. These tags are visible in the 'System\Performance' display.

## Web Server

- Added support for HTTPS (SSL). The use of HTTPS is optional and HTTP is still supported and enabled. The flow computer generates a self-signed Certificate, which can then be added to the Web Browser. HTTPS reduces the security risk by encrypting all data through a very strong key.
- Added ability to '/writetags' web-service to write tags by their name (instead of only their ID).

## Functions

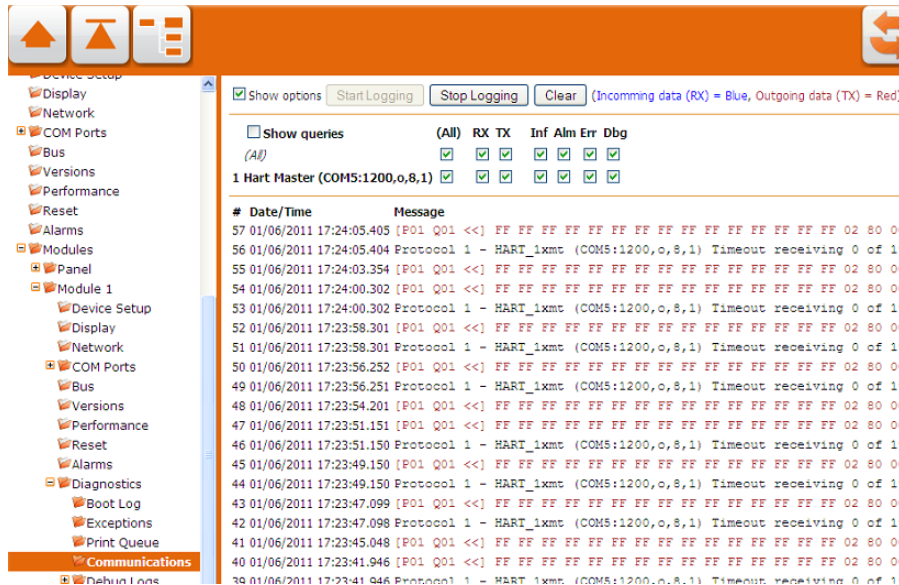
- New API functions:  
fxAPI\_Table53\_1952(..),  
fxAPI\_Table54\_1952(..)  
fxAPI\_Dens15C\_1952(..)
- New GOST8 functions:  
fxGOST8\_586\_2005\_EdgeRadius(..)

fxGOST8\_586\_2005\_SteelExpansionFactor(..)  
fxGOST8\_586\_2005\_MassFlowRate(..)

- fxSetOnCondition(..) is now volatile and copies the source-value to the target for every cycle that the 'condition' is set to True. Previously, the source-value was only copied to the target when any of the inputs was changed.

## Communication Drivers

- Updated Communication Drivers diagnostics logging web-service ('/comm') and added it to the Web-UI:



- Added new datatype 'xd\_RevDouble' (reverse double).
- Added constants for communication driver query options (e.g. 'xqo\_BlockWrites').
- Added 'xqo\_WriteAll' query option to Modbus drivers. This option always causes the whole query to be written even when only a few items have changed.
- Added integrated communication protocol for use by the 'FlowXClient' protocol in eXLERate.