PROCESS AUTOMATION

Freelance 2019

Introduction
New Features History

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Table of Contents

3 - New features in Freelance 2013 SP1

Section 2 - New features in Freelance 2013

3 - New features in V9.2 SP2

4 - New features in V9.2 SP1

5 - New features in V9.2

6 - New features in V9.1 RU1a

7 - New features in V8.2

8 - New Features in V8.1 SP1

9 - New features in V8.1

10 - New features in V7.2 SP1

11 - New features in V7.2

12 - New features in V7.1 SP3

13 - New features in V7.1 SP2a

14 - New features in V7.1 SP2

15 - New features in V7.1 SP1

16 - New features in V7.1

17 - New features in V6.2

18 - New features in V6.1

19 - New features in V5.2

20 - New features in V5.1

21 - New features in V4.1

22 - New features in V3.3

23 - New features in V3.1 and V3.2

Index

About this book

Use of warning, caution, information, and tip icons

This publication includes **Warning**, **Caution**, and **Information** where appropriate to point out safety related or other important information. It also includes **Tip** to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

Electrical warning icon indicates the presence of a hazard which could result in *electrical shock.*

Warning icon indicates the presence of a hazard which could result in *personal injury.*

Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in *corruption of software or damage to equipment/property.*

Information icon alerts the reader to pertinent facts and conditions.

Tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Terminology

The Glossary contains terms and abbreviations that are unique to ABB or have a usage or definition that is different from standard industry usage. Please make yourself familiar to that.

You will find the glossary at the end of this manual.

Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press **ESC, E, C** indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
  - The following convention is used for menu operations: MenuName > MenuItem > CascadedMenuItem. For example: select **File** > **New** > **Type**.
  - The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.

- System prompts/messages are shown in the Courier font, and user responses/input are in the boldfaced Courier font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be 0 to 30.
  ```

  You may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure:

  TIC132

  Variables are shown using lowercase letters.

  sequence name

1 New features in Freelance 2016 SP1

1.1 New Microsoft Windows Operating System

Starting with this Freelance version, the Freelance software also runs under Microsoft Windows 10.

All components of Freelance 2016 SP1 can be used with the following versions of the Microsoft Windows operating system:

- Windows 7 Professional SP1 32 bit
- Windows 7 Professional SP1 64 bit
- Windows 7 Enterprise SP1 32 bit
- Windows 7 Enterprise SP1 64 bit
- Windows 10 Pro 32 bit
- Windows 10 Pro 64 bit
- Windows 10 Enterprise 32 bit
- Windows 10 Enterprise 64 bit

The Freelance OPC Server can also be used with the following versions of the Windows operating system (for integration with 800xAOperations):

- Windows 2008 Server R1 SP2 32 bit
- Windows 2008 Server R2 SP1 64 bit
- Windows Server 2012 R2

The operating systems above can be used in English or German version.

Microsoft Edge is not supported.

1.2 UAC for all Freelance components under Windows 7 and Windows 10

With this Freelance version, the Windows User Account Control is supported. User Account Control (UAC) helps prevent malware from damaging a computer. With UAC, software always runs in the security context of a non-administrator account unless an administrator specifically authorizes administrator-level access to the system. UAC can block the automatic installation of unauthorized software and prevents inadvertent changes to system settings.

The UAC default setting should be:

- Notify me only when programs try to make changes to my computer.

During Freelance installation, the user will be asked to enable UAC or not..

1.3 New Microsoft Office version

Starting with this Freelance version, the Microsoft Office version 2016 32bit is supported.

1.4 New Freelance OPC Tunnel

A new Freelance OPC Tunnel with improved configuration and Windows 10 support is now available in Freelance 2016 SP1.

1.5 Freelance as successor for DigiVis500

Freelance 2016 or higher will succeed current supervision software DigiVis 500 for AC500 PLC. Freelance 2016or higher should replace DigiVis 500 for all new AC500 applications.

1.5.1 System limits

- Max. 10 Freelance Operator stations
- Max. 10 OPC Servers can be used.
- Each OPC Server can be connected to 30 AC500 Controllers

In case of an AC500 high availability controller, each OPC Server can be connected to 15 AC500 HA pairs.

1.5.2 AC500 Tag Type Library

A new version of the Tag Type Library for AC500 is released with this Freelance version.

2 New features in Freelance 2016

2.1 New Product Naming

Starting with this Freelance version some Freelance software components are renamed:

Previous Name	New Name
Control Builder F (CBF)	**Freelance Engineering**
DigiVis	**Freelance Operations**
CBF Viewer	**Control Aspect**
DigiBrowse	**Archive Browser**
Configure	**Settings**
Trend-Server	**Freelance Trend Server**
OPC-Server 800F Trace	**OPC Server Trace**

2.2 New Process Station AC 900F Lite

Starting with this Freelance version the new process station AC 900F Lite with optimized price-performance ratio is supported. Like the previously supported process stations, the AC 900F Lite will be configured with Freelance Engineering and can be used together with the other Freelance controllers.

Details can be found in the two new manuals
Mounting & Installation Instructions AC 900F and
Engineering Manual Process Stations.

The AC 900F Lite process station is designed for smaller lines:

- the number of possible I/O signals is limited to 400,
- there are only three instead of four Ethernet interfaces available,
- the available memory capacity and the CPU performance are lower than with the standard version.

2.3 New in AC 900F

2.3.1 New CAN Communication Interface Module CI 910F

With this Freelance version the new CAN module CI 910F is released.
With this new module the AC 900F / AC 900F Lite now allows connectivity to Freelance Rack I/Os based on CAN bus.

2.3.2 Control Net Redundancy

Optionally, to increase the availability, the communication between AC 900F / AC 900F Lite controllers and operator or gateway stations and lateral communication between AC 900F / AC 900F Lite controllers is possible using a Control Net in a redundant configuration.

Communication between the operator stations and gateway stations (horizontal communication) is only possible via the configured Ethernet line. Redundancy is not supported in this case. Communication between AC 900F controllers (lateral communication) and with operator or gateway stations (vertical communication) is done via the active Control Net line. In the event of a failure of the active line, a redundancy toggle to the redundant line occurs within a configurable changeover time.

2.3.3 Extended Temperature Range

The AC 900F and AC 900F Lite controllers are released for operation in an ambient temperature between -20 °C to +70°C.

2.4 New in AC 700F and AC 900F

2.4.1 Increased Security with Controller Lock

The AC 700F and both AC 900F controllers come with a feature for locking the controller via the display. When locked, dedicated engineering changes, downloads or firmware updates are disabled, while typical operator access is still possible. Furthermore, no commands like “Warm start”, “Cold start” or “Initialize” are possible from Freelance Engineering.

New security options

- Telnet
  The controller Telnet interface can be protected against unauthorized access in Freelance Engineering.
- Web Interface
  The controller web interface can be protected against unauthorized access in Freelance Engineering.
- Loading
  The controller can be protected against subsequent program changes.
- The Run/Stop switch on the controller can be disabled in Freelance Engineering.
- The AC 900F standard, as well as the new AC 900F Lite, are released for temperatures from -20 to 70 degrees

SD card monitoring

With activated card monitoring, a system message is released in Freelance Operations when the SD card is removed.

2.4.2 Diagnostic interface (Radio clock)

The diagnostic interface of the AC 700F and AC 900F controller supports now transmission rates of 9.6 kBit/s and 19.2 kBit/s, default value is 19.2 kBit/s.

When connecting a radio clock, ensure that the transfer rate of radio clock and controller match.

2.5 Freelance Engineering

2.5.1 Engineering Efficiency

- Improved graphical representation in the hardware structure
- Better support and easier configuration of Panel 800
- Graphics Editor improvements to support different screen resolutions and ratio.
- Improved GSD file handling

2.5.2 Database Compression

To ensure a secure project work for very large Freelance projects, the Freelance project database can be compressed.

2.6 Freelance Operations

With this Freelance version Freelance Operations is now optimized for widescreen displays (16:10 and 16:9).

The Freelance Operations software supports both the conventional screen formats 4:3 / 5:4 and the widescreen formats 16:9 / 16:10. For the 5:4 screen format a monitor screen resolution of 1280 * 1024 pixels is recommended, for the 16:9 widescreen format a resolution of 1920 * 1080 pixels should be used.

2.6.1 Freelance Operations Lite

The new lite version of Freelance Operations also provides for enhanced scalability of the system. In contrast to the standard version of Freelance Operations, the lite

version is very attractively priced. It offers an unlimited number of standard displays and only limits the number of graphic displays to five. It is mainly suitable for smaller plants or the usage of Panel PCs in cabinet doors.

2.7 Virtualization of Freelance PCs in ESX-Server

As from this release it is possible to run all Freelance software components (Engineering, Operations, OPC, …) on an ESX server.

3 New features in Freelance 2013 SP1

3.1 Hardware

3.1.1 Color scheme

With the release of the next major version of the Freelance software, the hardware of the process stations is delivered with a more suitable gray color for industrial use. The first steps in this direction have already been implemented with this version. In addition to the components of the process station AC 900F (CPU module, display unit and empty housing) also the new versions of Profibus modules are already available from this version in the new color.

Existing white components can be used together with the new gray components.

3.1.2 New Profibus module CI 773F

With this Freelance version the new Profibus module CI 773F is released. It can be used with the process stations AC 700F and AC 900F.
The Profibus module CI 773F is only available with the new gray housing.

3.1.3 New version of Profibus module CI 930F

Freelance version 2013 SP1 a new version of the Profibus module CI 930F is released. The Profibus module CI 930F can be used in a simple and also in a redundant process station AC 900F. This module contains two SUB-D connectors for connecting the redundant Profibus lines A and B. The terminal block TU 951F for connection of Profibus line B is no longer needed with this new hardware version.
The Profibus module CI 930F is available as version R5 with the new gray housing.

3.2 Control Builder F

3.2.1 Hardware structure

The hardware structure has been extended to support the new Profibus modules.

The graphic views in the hardware structure are adapted to the new color of the Freelance hardware. The housing color white and gray of the Profibus modules CI 930F and CI 773F are not distinguished, these Profibus modules are always shown with the new gray color.

3.2.2 Profibus line redundancy with module CI 930F

Master configuration for line redundancy

The configuration of the Profibus master PROFI_M_930 was enhanced. If this module is used with line redundancy, additionally it can be configured whether a fault should lead to a system message. Therefore the dialog for the master configuration is enhanced with the checkbox “Enable alarms line redundancy”.

3.2.3Modbus coupling

Modbus TCP for AC 800F

Additionally to the serial Modbus coupling of process station AC 800F now also Modbus communication (Master and Slave) via a TCP/IP connection is supported.)

Modbus TCP protocol is supported **only for the process stations AC 900F, AC 800F and AC 700F, but not with the rack based station**.

3.3 Upgrade of a project

3.3.1 Using Profibus modules in AC 700F controllers

Engineering tool does not longer support CI 930F in AC 700F

From this version on, the usage of the Profibus modules in the engineering tool has been modified. Only these combinations are supported from now on:

- **Process station AC 700F: Profibus modules CM 772F, CI 773F**
- **Process station AC 900F: Profibus modules CM 772F, CI 930F, CI 773F**
- **Process station AC 900FR: Profibus modules CI 930F and CI 773F**

With version Freelance 2013 another combination was allowed which is now not supported anymore: AC 700F with CI 930F
To upgrade a project with this not longer supported combination perform the following steps in Control Builder F:

1. Import the Freelance 2013 project into Freelance version 2013 SP1.
   or
   Open the Freelance 2013 project with Control Builder F of version 2013 SP1 and confirm the Update Information dialog with **Update.**
2. Open the hardware structure and select the Profibus master of the not supported combination in the hardware tree; CI 930F in an AC 700F.
3. Export the Profibus master with all associated Profibus slaves of the CI 930F module. Alternatively, you can **cut (not copy)** this part of the hardware structure and paste it in the template tree.
4. Delete the module CI 930F module of the AC 700F controller from the hardware tree.
5. Insert in the hardware tree a new Profibus module CI 773F in the AC 700F controller.
6. Import the exported data from step 3 to the new CI 773F module or cut (not copy) this part of the template tree and paste it to the new CI 773F module.

Changing the hardware of the Profibus module is not necessary; the CI 930F module in AC 700F controller now behaves like a CI 773F module and is also

recognized by the Control Builder F as an CI 773F module. After the plausibility check of the project, the process stations can be loaded. The CI 930F module is still working with an AC 700F controller now.

Section 2 New features in Freelance 2013

2.1 New Process station type AC 900F

Starting with this Freelance version the new controller AC 900F with more power, speed and functionality is supported. Like the previous supported controller types the AC 900F will be configured with Control Builder F and can be used together with the other Freelance controllers.

For more details, refer to manuals ***Mounting & Installation instructions AC 900F*** and ***Engineering manual, Process station - AC 900F***.

2.1.1 AC 900F interfaces

The new process station type AC 900F supports more interfaces than the previous existent controllers:

- Four (4) built-in Ethernet ports supporting Modbus TCP/IP or 60870-5-104 transmission protocol.
- Two (2) serial ports supporting Modbus RTU/ASCII or IEC 60870-5-101
- Pluggable Profibus master modules (up to two) providing integrated line redundancy
- Direct connection of up to 10 I/O modules

2.1.2 Display for AC 900F

The new optional display for AC 900F allows to restore an earlier created backup of an application into the controller or to update the controller firmware without the need of a connection to the system network.

2.1.3 Hot plug feature for communication modules of AC 900F

Hot plug feature is available for the communication modules of a AC 900F controller. For details, refer to the manual ***Mounting and Installation Instructions AC 900F***.

2.1.4 New in AC 700F and AC 900F

SD card support

An SD card reader/writer allows to backup and restore the application or to run the firmware update. Any SD and SDHC card of good quality is supported. Also micro SD cards with an adapter can be used.

In opposite to the description in the manuals, not only SD cards up to 2 GByte are supported. The following SD cards have been used successfully during the tests:

Vender	Memory size	Standard	HC (High capacity)
AGFAPHOTO	1 GByte	x	
EXTREMEMORY	2 GByte	x	
KINGSTON	4 GByte		x
SAMSUNG	4 GByte		x
KINGSTON	8 GByte		x
SAMSUNG	16 GByte		x

2.1.5 New Profibus module CI 930F

With this Freelance version the new Profibus module CI 930F is released. Both, the existent Profibus module CM 722F and the new module CI 930F, can be used in the process stations AC 700F and AC 900F.

With the new Profibus module CI 930F line redundancy for the Profibus can be realized.

2.1.6 New protocols

Modbus TCP

Additionally to the serial Modbus coupling now Modbus communication (Master and Slave) via a TCP/IP connection is supported.

Modbus TCP protocol is supported only for the process stations AC 900F and AC 700F, but not with AC 800F and the rack based station.

Telecontrol protocol

Starting with this Freelance version the serial Telecontrol protocol IEC 60870-5-101 is released for all controller types.

Additionally to the serial Telecontrol communication starting from this version, the Telecontrol coupling via TCP/IP connection (IEC 60870-5-104) is supported. The use of this protocol on a rack based controller is intended for internal testing and presentation only.

2.1.7 Differences between AC 900F and AC 700F/AC 800F/DCP

The architecture of the new process station AC 900F is similar to the AC 700F, but different to the process stations AC 800F and racked based station. Therefore AC 900F and AC 700F may have a different behavior in some cases.

Integer Arithmetic

The AC 900F like the AC 700F does not support correction of Integer values. In case of an Integer overflow or underflow the AC 800F uses the max and min values (32767 or -32678); in the AC 900F and AC 700F the overflow value MAX_LONG is converted to -1.

While within function blocks the values are checked and limited like in the AC 800F, in user application the behavior described above is valid. An application may be adapted if it is used at another controller type.

Interim results, e.g. within a FBD program, are calculated with INT32 for Integer values. If this result is assigned to an INT16 variable, within the commissioning the

value for the global variable may be shown as 32767, the value of the local variable will get the value -1.

System variables

For each resource in the project tree system variables are created. Like for the AC 800F and AC 700F also for an AC 900F no data are provided for the variables <res>.IOBootT_y_z, <res>.IOBoard_y_z and <rs>.IOForce_y_z. These system variables are used only for the rack-based process stations.

Similar the system variables for redundancy for each resource are created, but there are usable only for redundant process stations.

2.2 Control Builder F

ABB introduces new technologies in the Freelance engineering tool Control Builder F to optimize the workflow. Freelance leverages the familiar Microsoft® environment to allow easy navigation. For instance, different function block diagrams can be displayed and copied, and tag or variable list can be sorted and filtered similar to Excel spreadsheets. Both lists can be easily exported to or imported from a Microsoft® Excel® spreadsheet.

For details, refer to the manual ***Engineering Manual, System Configuration***.

3 New features in V9.2 SP2

3.1 Operating System

3.1.1 Windows 7 64 bit

Freelance V9.2 SP2 has been released for use with the 64 bit version of the Windows 7 operating system.

3.1.2 Windows XP and Windows 7

All components of Freelance V9.2 SP2 can be used with the following versions of the Microsoft Windows operating system:

- Windows 7 Professional SP1 32 bit
- Windows 7 Professional SP1 64 bit
- Windows 7 Enterprise SP1 32 bit
- Windows 7 Enterprise SP1 64 bit
- Windows XP Professional SP3 32 bit

3.1.3 Windows 2003 Server and Windows 2008 Server

The Freelance OPC Server and Trend Server can also be used with the following versions of the Windows operating system:

- Windows 2003 Server SP2
- Windows 2008 Server R1 SP2 32 bit
- Windows 2008 Server R2 SP1 64 bit

This feature is intended for integration with 800xA operation.

3.2 Installation

3.2.1 Supported Windows Operating Systems

Mixed systems with Windows XP and Windows 7

It is possible to use PCs with Windows XP and Windows 7 operating systems in the same Freelance system. This allows you to gradually update your Freelance system computers from Windows XP to Windows 7 in a step-by-step manner.

When using a mixed Freelance system with both Windows XP and Windows 7, however, make sure that the same Windows version is run on the PC of the Extended Diagnostic DigiVis Station and the PC with the Control Builder F software.

The reason for this is the usage of different versions of 3rd party software, e.g DTMs. (#21503 - RN_V921_021)

Adaption to the used Windows operating system

Depending on the Windows version installed on the PC where the Freelance setup is executed, different Windows settings are necessary and different versions of the compatible software packages must be used together with the Freelance software. The Freelance setup program is capable of recognizing the operating system version on the PC and will adapt the software installation accordingly.

3.2.2New default install path

For installing Freelance components in production and demo mode the same default install path is used. According to the current Windows operating system these default paths are used: (#22078-RN_V922_004):

Windows XP and Windows 7, 32 bit:

C:\Program Files\ABB Industrial IT\Freelance

Windows 7 64 bit:

C:\Program Files (x86)\ABB Industrial IT\Freelance

3.3 Microsoft Office

Usage of the Bulk Data Manager and Excel Reports functionality requires that Microsoft Office, especially Microsoft Excel is installed on the PC.

Windows 7

With the Windows 7 operating system the following Microsoft Office/Excel versions can be used:

- Office 2007 SP3 32 bit
- Office 2010 SP1 32 bit

Windows XP

With the Windows XP operating system the following Microsoft Office/Excel version can be used:

- Office 2007 SP3 32 bit

3.4 AC 700F

New hardware revisions of CPU module PM 783F supported Freelance V9.2 SP2 supports hardware revisions Rev.A and Rev.B of the AC 700F controller's CPU module PM 783F. (#21763).

3.5 Control Builder F

More than 18 operator stations per project

In a single Control Builder F project now more than 18 operator stations with DigiVis software can be engineered. (#21747)

Redundancy toggle in big PROFIBUS installations

In projects with a very big number of PROFIBUS devices the manual redundancy toggle of the controller occasionally may cause a controller restart. For technical details please refer to Product Bulletin 3BDD011838D0282. (#21811)

Control Builder F crashes during plausibility check

During the plausibility check for a Profibus slave a crash of Control Builder F could occur. The reason were many large diagnose data defined in a GSD file and internally fixed memory space. This behavior was observed with a Lenze GSD file. (#21897, RN_922_005)

Control Builder F on a secondary monitor

If the Control Builder F is used in full screen mode on a secondary monitor of a PC, starting the printing function (hardcopy) will either freeze the display or terminate the Control Builder F. (#21796)

3.6 DigiVis under Windows 7

ALT+TAB shortcut not disabled

The ALT+TAB was not fully disabled. As a result, it was possible to access the Windows desktop or operating system from the DigiVis system. (#21729)

Windows task bar not hidden

Under certain conditions the Windows task bar was shown in DigiVis. As a result, it was possible to access the operating system in some cases. (#21730)

Icon of the DigiVis “Overview Display” too big

When using a wide screen monitor for DigiVis, the icons in the Overview Display were oversized and overlapped the text in the next line. (#21770)

DigiVis system security

When starting DigiVis under Windows XP, the error message “DigiVis system security corrupt” erroneously appears. (#21789)

3.7 DigiVis

Switch of process graphic displays takes long time

When switching between process graphics a delay up to several seconds could occur for presenting the selected display. The delay time was related to the complexity of the graphic display. (#22027, RN_V922_007).

Wrong value in faceplate for function block DOS

In the value field S (Shut-off value) of the faceplate (new DigiVis design) for the function block DOS the value of CA (Counter actual value) was shown instead of the value of S (Shut-off value). (#22017, RN_V922_006).

Faceplate for function block FPX

In the faceplate (new DigiVis design) of the function block FPX the values of the internal recipe parameters were displayed, which are not updated in operating mode Program. Now the faceplate shows the values of the according outputs of the function block, thus in all operating modes the active recipe values can be observed in the faceplate. (#21945, RN_V922_008)

3.8 OPC and Trend Server

OPC Server items cannot be read

If only the OPC Server or Trend Server and no other Freelance component is installed on a PC, the server can be successfully loaded from a Control Builder F project, but it is not possible to read OPC Server or Trend Server data from DigiVis or browse the data via the browser interface. (#21777)

No communication after redundancy toggle

After a redundancy toggle of an AC 800F controller a connected OPC Server may, under certain conditions, no longer transmit any data. (#21798)

3.8.1 Performance Monitor for OPC Server under Windows 7

Within the OPC Server manual the handling of the Performance monitor is described for usage at Windows XP. The handling for Windows 7 is different and is described below (#22433, RN_V922_010).

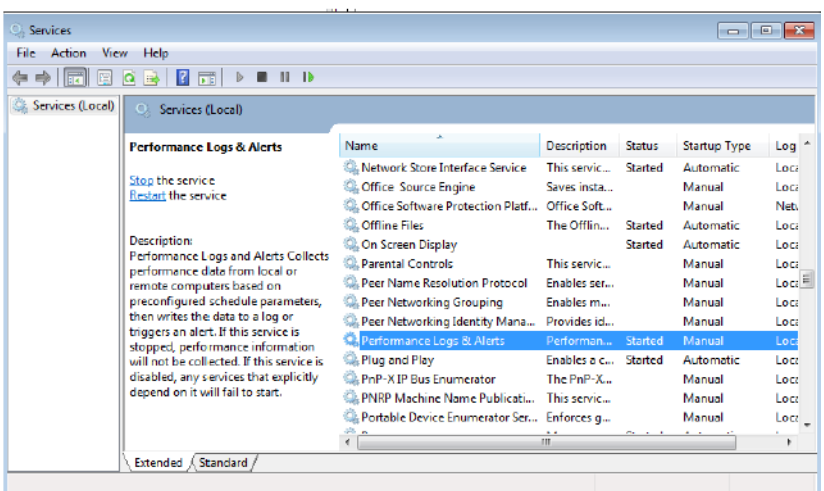
Prepare Windows operating system

Make sure that the Freelance OPC server is running. Start the Windows services.

Control Panel > Administrative Tools > Services

or

type `services.msc` in the search field of the Windows start menu.



PerfMon1_us.png

Select **Performance Logs & Alerts** and start this service.

Start the Performance Monitor at Windows 7 32 bit

Control Panel > Administrative Tools > Performance Monitor

or

type `perfmon.exe` in the search field of the Windows start menu.

Start the Performance Monitor at Windows 7 64 bit

Type `c:\windows\syswow64\perfmon.exe` in the search field of the Windows start menu.

Configure the Performance Monitor

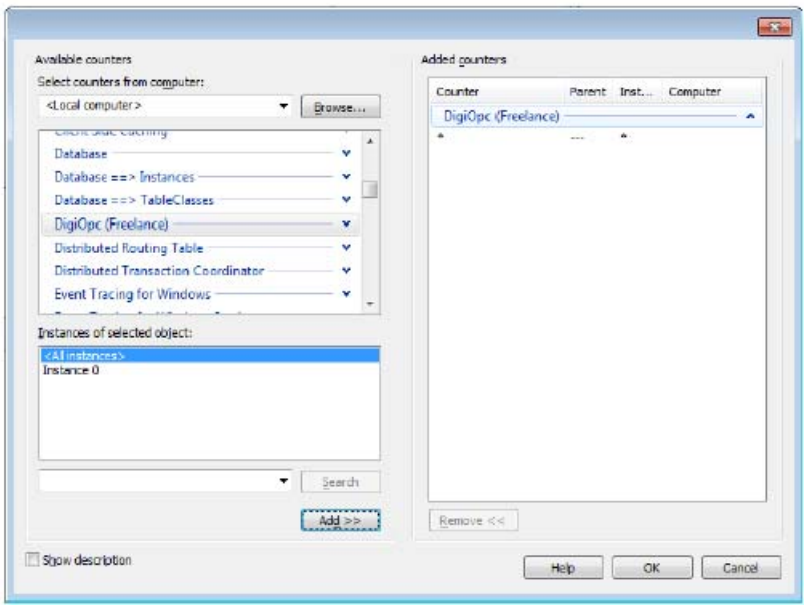
Select in tree in the left part of the dialog: **Performance / Monitoring Tools /**

Performance Monitor.

In the right part of the dialog a diagram is shown. The operation is mainly done with the buttons in the tool bar:

Select the symbol Change graph type from the tool bar to select another view for the collected data.

Select the green + sign from the tool bar to add counters to be observed. In the next dialog, browse the computer for available counters. Select first the Freelance component, e.g. **DigiOPC (Freelance)**. In any cases select **<All instances>** and press the button **Add >>** to select the counters.



PerfMon5_us.png

If required, process counters supplied by Windows can be added. When the counter specification is complete, close the dialog with button **OK**.

The display parameters can be set via the dialog **Performance Monitor Properties**. For the meaning of the variables, please refer to manual ***OPC Server, System Monitor*** for OPC.

3.9 CBF Viewer

Display of I/O pins of user-defined function blocks. The new version of the CBF Viewer correctly displays the input and output pins of the user-defined function blocks in function block diagrams (FBD).

3.10 User manuals

For detailed description of the installation, especially for the usage of Windows 7 operating system with the Freelance software, please refer to the manual "***Getting started***".

4 New features in V9.2 SP1

4.1 Operating System

4.1.1Windows 7

Starting with this version V9.2 SP1 Freelance software has been released for use with the operating system Windows 7 Professional, Enterprise and Ultimate in addition to Windows XP Professional SP3.

The usage of Freelance V9.2 SP1 under Windows 7 is restricted due to missing experiences in Beta projects. The restrictions are handled by a Managed Release for this version. Until further notice a TSA (Temporary Sales Approval) is needed for using Freelance V9.2SP1 under Windows 7 operating system.

4.1.2Windows XP Professional

Freelance Version 9.2 SP1 has been released for use with the operating system Windows XP Professional SP3.

4.1.3Windows 2003 Server , Windows 2008 Server and Windows 7 Professional

Freelance OPC-Server F and Trend Server can also be run under the Windows operating systems 2003 Server , 2008 Server and Windows 7 Professional. This feature is provided specifically for the connection to 800xA Operations.

4.1.4Windows 32 Bit Version

The Freelance software has been tested with the 32bit version of the Windows operating system; the usage of the 64bit versions of the Windows operating system is not released for Freelance software.

4.2 Installation

4.2.1 Supported Windows Operating Systems

Mixed systems with Windows XP and Windows 7

It is possible to combine PCs with Windows XP and PCs with Windows 7 operating system in a Freelance system. With this, an update from Windows XP to Windows 7 can be done step-wise.

If using mixed systems with Windows XP and Windows 7 operating systems for a Freelance system, make sure that the same Windows operating system is used for the PC of the Extended Diagnostic DigiVis station and the PC with the Control Builder F.The reason for this is the usage of different versions of the 3rd party software, e.g DTMs. (#21503 - RN_V921_021)

Adaption to the used Windows operating system

Depending on the Windows operating system on the PC where the Freelance setup is executed, different Windows settings are necessary and different versions of the compatible software packages must be used together with the Freelance software. Freelance setup program detects the operating system on the PC and adapted the software installation.

User manual

For detailed description of the installation, especially for the usage of Windows 7 operating system with the Freelance software, please refer to the manual "***Getting started***".

4.3 Control Builder F

4.3.1 Hardware Manager

Boot parameters for AC 800F controller

When changing the AC 800F controller type from PM 803F to PM 802F or vice versa, a warning message is shown that the boot parameters will be changed accordingly. Closing the message with OK will do the modification; closing the dialog with Cancel will undo the type changing. (#21473- RN_V921_020)

5 New features in V9.2

5.1 Operating System

5.1.1 Windows XP Professional

Freelance Version 9.2 has been released for use with the operating system Windows XP Professional SP3.

5.1.2 Windows 2003 Server and Windows 2008 Server

Freelance OPC-Server F and Trend Server can also be run under the Windows operating systems 2003 Server and 2008 Server. This feature is provided specifically for the connection to 800xA Operations.

5.1.3 Windows 32 Bit Version

The Freelance software has been tested with the 32bit version of the Windows operating system; the usage of the 64 bit versions of the Windows operating system is not released for Freelance software.

5.2 Installation

5.2.1 ABB OPC Tunnel

Connecting OPC servers

The Freelance setup program contains the new component “ABB OPC Tunnel”. This component must be installed on all PCs with an OPC server to be connected to the Freelance system. The OPC Tunnel replaces the Windows DCOM configuration

and makes its complicated settings unnecessary. Also the entries in the Configure tool “Remote Settings” for OPC and Trend server are not needed any longer.

If only one OPC server is used, the name of the OPC server and a port number must be configured in the OPC tunnel tool “Configurator”. For using more than one OPC server on one PC, the configuration is done with the help of “Advanced Configurator Tool”.

These configuration tools can be reached via the start menu:

Start > Programs > ABB Industrial IT > Freelance > OPC Tunnel > Configurator
or
Advanced Configurator

After the OPC Tunnel configuration has changed, the tunnel must be restarted:

Start > Program > ABB Industrial IT > Freelance > OPC Tunnel > System Tray

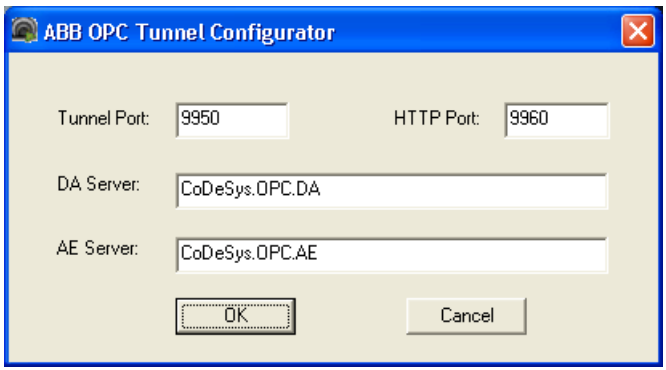
Select tunnel icon from the task bar, call context menu and select
Restart Server

For details please refer to ***Getting Started*** Manual of V9.2.

Example 1:
Installation of an AC500 OPC server for connection to a Freelance system

First install an AC500 OPC Server on a PC. Then start the Freelance setup program to install the ABB OPC tunnel software. Chose “custom” installation and select “Freelance-Software / Servers and Gateways / ABB OPC Tunnel”.

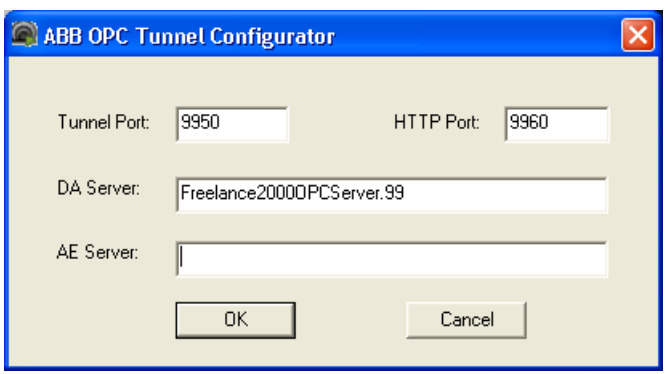
After this, call up the OPC tunnel “Configurator” tool from the start menu. Specify “CoDeSys.OPC.DA” for the DataAccess server (DA server) and “CoDeSys.OPC.AE” for the Alarms&Events server (AE server).



Example 2:
Installation of a Freelance OPC Server and a Trend Server on one PC

Use the Freelance setup program to install Freelance OPC server and trend server at the PC. Additionally the software package “ABB OPC tunnel” is needed. Use the Freelance “Configure” tool to create an instance for the OPC server and the trend server. In this example the Freelance OPC server is created with resource ID 123 and the trend server with resource ID 99.

Now call “Configurator” of the ABB OPC tunnel from the start menu and enter for the DataAccess server (DA Server) the name of the Trend server; empty the name field for the Alarms&Events servers (AE Server). Close the dialog with the **OK** button.

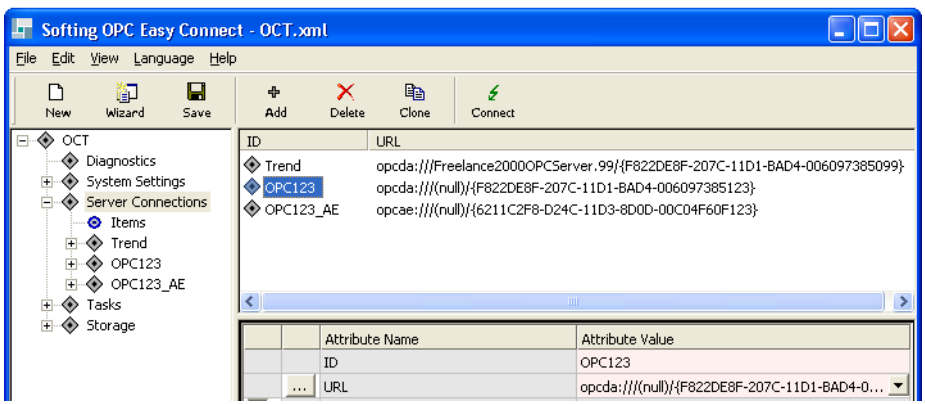


After this call the “Advanced Configurator” of the OPC tunnel from the start menu. Close the first dialog with the **Cancel** button.

Within the next dialog “Softing OPC Easy Connect” select “Server Connections” in the tree and select “Add” from the context menu. At the right part of the dialog click the “...” button in front of the “URL” entry. In the next dialog all available OPC server for DataAccess and Alarms&Events can be selected via “Local” and “Remote”.

For this example select “Local”, “Data Access” and then the entry “Freelance 2000 OPCServer 123”. For configuration of the Alarms&Events interface of this OPC server, add a new connection in the tree structure and select “Freelance 2000 OPCAEServer 123” for the URL.

“Easy Connect” dialog after configuration of Trend server 99 and Freelance OPC server 123 at a local PC:



5.2.2 Installation of 3rd party components

Starting with version V9.2 the Freelance setup provide 3rd party components which can be installed together with the Freelance software in one step. For details please refer to “***Getting Started”*** manual.

5.2.3Configuration support

With installation of an Engineering or Combi station the following macros and templates with a description file are installed at the PC in the Freelance installation directory <Install Dir>:

<Install Dir>/export/S700_Template_US.hwm
GSD based templates for easy integration of S700 modules in the Freelance hardware configuration.
For these templates only an US user interface is available. (24106)

<Install Dir>/macros/3D_Macro.bol
Library with dynamic graphic macros in 3D look for support the creation of free graphic displays

<Install Dir>/export/S800_UFB
User defined function blocks for easy integration of S800 modules in Freelance programs

<Install Dir>/export/S900_UFB
User defined function blocks for easy integration of S900 modules in Freelance programs

<Install Dir>/export/ACS800_Drives_UFBs
User defined function blocks for easy integration of ACS800 drives via Modbus RTU in Freelance programs

<Install Dir>/export/FreelanceSampleTagTypeLib_V1.0.prt
Example of OPC function block classes for Freelance function blocks for connecting a Freelance project via the new PLC integration functionality.

<Install Dir>/export/AC500 Standard TagTypeLibrary V1.0.prtt
Example of OPC function block classes for AC500 function blocks for connecting a AC500 project into a Freelance system via the new PLC integration functionality.

5.2.4 Configure Tool

Dialog Load Boot-EPROM

The “Load Boot EPROM” dialog for loading the Controller software is enhanced by a check box “Update boot software”. With the default settings the checkbox is selected and must be used in this way for most cases.

Especially the AC 700F controller may be destroyed permanently if the power is interrupted during the load and installation process of the boot software. For this reason loading of the boot software can be activated and deactivated explicitly.

Upgrading a project from V9.1 to V9.2 needs an upgrade of the boot software in all AC 700F controllers. Also AC 700F controller, which have been manufactured earlier, need to be loaded with the new boot software if they shall be used with Freelance V9.2.

Using newer versions of the AC 700F controllers this checkbox should be deselected.

For the other process station types this checkbox must be always selected

5.3 AC 700F hardware

5.3.1 New I/O modules for AC 700F

Starting with this version, 4 new IO module types are supported as direct I/O with AC 700F:

- DX 731F - 230/120VAC input + relay output (8 in and 4 out)
- DX 722F - 24V input + relay output (8 in and 8 out)
- AO 723F - analog output (16 out)
- AI 731F - analog in incl. THC thermocouple (8 in)

For details of these modules please refer to the manuals ***Mounting and Installation AC 700F*** and ***Engineering manual, Process station - AC 700F*** of version 9.2.

5.3.2AC 700F CPU Module

New hardware revision necessary for Profibus

To make use of the Profibus feature in the AC 700F, the hardware revision of the CPU module needs to be A3 or higher. If a Profibus module is plugged with an older CPU revision, the Profibus module is shown in Control Builder F as “not existent”.

Symbol FBP at PM 783F

The symbol FBP at the front panel of PM 783F was not used until now. Starting with version 9.2 this symbol is used for visualizing the Profibus status.

Three different states are displayed:

- Fault (flashing rectangle): CM 772F Module not available or not configured.
- Offline (flashing triangle): No Slave in state data exchange.
- Online (static triangle): At least one Slave in state data exchange

5.3.3Profibus Module

Error LED “Err” at CM 772F

The red Error LED “Err” at the front panel of a CM 772F signals an error of the Profibus communication - NOT an error of the module itself.

Typical errors are

- a slave is not connected
- the configured bus address does not match with the existing address of a slave

5.4 Profibus with AC 700F

Starting with Freelance version 9.2 the Profibus communication with the controller type AC 700F is supported. Configuration and commissioning is similar to the known procedure for AC 800F. Due to the used hardware there are some differences to the known solution with AC 800F. The most important changes are described here.

5.4.1 General information about Profibus

The PROFIBUS-DP protocol defines a Master Class 1, usually the central controller which exchanges information with the slaves in a defined cycle (DPV0), and a Master Class 2, responsible for configuration and commissioning of the PROFIBUS-DP system (DPV1). The original DP protocol was extended by the DP V1 and DP V2 services.

The I/O data of a PROFIBUS-DP slave communicated in cyclic data exchange is defined by the slave module set. In addition the slave configuration consists of standard parameters and additional user parameters. The Profibus Master Module in Freelance typically takes over both parts.

Beside the cyclic data exchange a slave can notify diagnostic data to the master.

Master and slave pass defined states Offline, Stop, Clear, Operate when initiating cyclic data communication.

5.4.2 General Freelance Profibus DP Master Capabilities

The Freelance master implementation supports master class 1 and master class 2 including class 2 DP V1 service.

Slaves can be configured using GSD based configuration or DTM based configuration.

Master Class 1 features

- Initiation of cyclic data exchange with slaves
- Set Parameter to set the standard and user parameter together
- Diagnostic communication and slave specific decoding

Master Class 2 features

- Bus scan
- Set address
- Query configuration
- Read and write DP V1 parameters

5.4.3Differences of the Profibus solutions in AC 700F and in AC 800F

Not all functions and parameters that are know from AC 800F Profibus implementation are supported

Based on the firmware of the Profibus module the following constraints exist compared to the Profibus solution with AC 800F controller:

Minimal bus cycle configuration

For Optimization of the performance of a AC 700F controller the bus cycle of the Profibus can be limited. In the configuration dialog “Master configuration” of the PROFI_M_722 object the check box “Limit bus cycle” must be activated and a value for “Minimal bus cycle” must be given.

Changing the Profibus configuration

The firmware of the AC 700F Profibus module does not support bumpless configuration changes. Each configuration change of the Profibus, including adding and deleting of slaves, needs a reset of the Profibus communication. The cyclic I/O data communication must be stopped; all I/O data of the effected link will be reset. During the load operation the cyclic communication must be stopped, all slave devices change into status “offline” with their configured or specific behavior.

A message dialog is shown to the user with the information that the communication will be stopped for loading the changes.

Cyclic communication

Enabling/Disabling of function “cyclic communication” in the parameter dialog of a Profibus slave PROFI_S_DEV cannot be used due to missing support of bumpless configuration changes (see Changing the Profibus configuration on page 57), if the Profibus slave is connected to an AC 700F.

Writing of User Parameters

User Parameters cannot be written or corrected during commissioning mode. Attempting a write or correct operation will lead to the error message “An error occurred while writing a variable” or “Error during correction”. Also write attempts from other clients like OPC will be rejected.

For changing slave parameters the configuration must be changed and loaded into the slave device. As described above this leads to an interrupt of the cyclic Profibus communication. “Hot configuration in run” functionality is not supported.

Less memory for I/O data

With the CM 722F module there only 7 KByte memory available for input and output data; with AC 800F controller in total 60 KByte is available. This limits the number of Profibus slaves and the flexibility to mix slaves with small and large I/O data size.

Limited diagnosis messages

One diagnosis message per slave can be processed within the Profibus module CM 772F at each time only with a maximum length of 100 bytes. Profibus DP diagnosis messages can carry up to 244 bytes of data. Such a message will be truncated by CM 722F module to 100 bytes. If a new message is received from a slave and the currently stored message is not already requested by the host Profibus stack overwrites the stored message.
An additional system message is generated for a shortened diagnosis.

No support of redundant Profibus slaves

Redundant Profibus slaves are not supported at AC 700F Profibus connection. Line redundancy for the Profibus can be realized via RLM 01 components.

5.4.4 S700-Profibus-Slave

A Profibus slave S700 can be built up with the S700 I/O modules together with the interface module DC 705F. Using the available templates, (see Configuration support on page 53), a quick and easy configuration in a Freelance project is possible.

For building up this cost-saving ABB Remote-IO more I/O module types can be used than for the direct I/O of the AC 700F. These I/O modules can be used for a S700 slave:

- AX 721F - 24 V DC Analog Input + Output (4 in + 4 out)
- AX 722F - 24 V DC Analog Input + Output (8 in + 8 out)
- AC 722F - 24 VDC Analog Input or Output (8 configurable)
- AI 723F - 24 V DC Analog Input (16 in)
- AI 731F - 24 V DC Analog Input incl. Thermo element (8 in)
- AO 723F - 24 V DC Analog Output (16 out)
- DX 722F - 24 V DC Digital Input + Relay Output (8 in + 8 out)
- DX 731F - 230/120 VAC Input + Relay Output (8 in + 4 out)
- DC 722F - 24 V DC Digital Input or Output (16 configurable)
- DC 723F - 24 V DC Digital Input or Output (24 configurable)
- DC 732F - 24 VDC Digital Input + Output (16 in + 16 out)
- DI 724F - 24 V DC Digital Input (32 in)
- CD 722F - 24 V DC Frequency Input/Output (8 configurable)
- DA 701F - 24 V DC Digital/Analog Input/Output

Details ar described in the new user manual "***Engineering Manual, S700 Modules***".

5.5 Control Builder F

5.5.1 Profibus with AC 700F controller

Configure Profibus for process station AC 700F

Control Builder F was enhanced for Profibus configuration for AC 700F. Insert a AC 700F Profibus module CM 722F into the slot left from AC 700F CPU module. The following configuration of a Profibus line is identical to the Profibus configuration for a AC 800F station.

After a Profibus master has been configured for an AC 700F station, a Profibus slave configuration from a AC 800F Profibus master can be moved via Drag and Drop to the AC 700F Profibus master. A complete move of the Profibus configuration including the master configuration is not possible.

5.5.2 Integration of a PLC system

Overview

Enhancements are integrated in Control Builder F to integrate a PLC system in a comfortable way into a Freelance system. If a connection is established between Control Builder F and the OPC server of another system, the configuration of the OPC server can be read via the browser interface. The read OPC items are displayed in a list view. OPC items can used to define a new function block type (OPC function block class). A faceplate can be configured for each function block class. In a 2nd step tag instances based on the classes can be created from the OPC item list. With the defined faceplates a quick and easy visualization on a DigiVis station is available.

New nodes in the p-tree

These new node types exist in the project tree:

OPC_FB-LIB	Usage below CONF,
OPC_FB-CLASS	Element of OPC_FB-LIB
REPORT	Object for DigiVis stations

Library for OPC function block classes OPC_FB-LIB

Below the project tree node CONF any nodes of type OPC_FB-LIB (Library for OPC function block classes) can be configured. The OPC_FB-LIB nodes are used to structure OPC function block classes in a logical way, e.g. all classes which are used by an external OPC server.

OPC function block class OPC_FB-CLASS

An OPC function block class OPC_FB-CLASS is similar to an User function block class. In opposite to the user FB classes the OPC FB classes do not have any functional code. Each OPC_FB-CLASS is defined by its interface and a faceplate.

The interface is created via the class definition in the OPC item list, but can be defined also manually directly with the editor “OPC_FB class components”.

The definition of the interfaces of an OPC_FB class is similar to the interface definition of a user FB class. The instances are available only via the OPC server, thus only the storage types VAR, VAR-VIS and ALARM are available.

The definition of the faceplate for an OPC_FB class is identical to the faceplate creation for a user function block.

OPC server in the project tree

To configure an external OPC server in the project tree the IP address of the PC and a port number is needed.

For easy and comfortable connection of external OPC servers naming conventions and alarm mapping can be defined in new dialogs.

Configure Name Pattern

This dialog defines naming conventions for the items found via the browser interface of the OPC server. For connection to a Freelance OPC server or a AC500 OPC server predefined templates for the naming conventions can be used. For connecting OPC servers from other systems, the naming for DataAccess as well Alarms&Events items can be specified by using the “Prefix”, “Tag”, “Selector” and “Postfix” fields in the dialog.

Alarm Mapping

This dialog maps the alarms generated by the OPC server or PLC to corresponding Freelance messages. In the upper part of the dialog the OPC severity is mapped to the message priorities of the Freelance system. In the other part the mapping of the attributes is specified; e.g. it is configured whether “Condition” or “Sub-Condition” shall be used as message type in Freelance.

Browser interface of external OPC Server

The connection of external OPC server into a Freelance system has been enhanced. The configuration of an OPC servers can now be called directly in the project tree via the browser interface.
Within the “System” menu of the project tree the entry “OPC item list” can be selected. All items of the connected OPC servers which can be reached via the browser interface are listed. After selecting one or more of these items from the list, a new function block class OPC_FB-CLASS or a new instance to an already existing OPC_FB-CLASS can be created. A single items can be instantiated as a variable in the Freelance project.

For details refer to the user manuals “***Engineering manual, System configuration***” and “***Engineering manual, IEC-61131-3 Programming***”.

5.5.3Enhancements in the Project tree

Excel report REPORT

Below an Operator station Excel reports can be created in the project tree.

For details refer to the user manual “***Engineering manual, System configuration***”.

5.5.4 Hardware Manager

Default values for Process Station

The default values of the boot parameter of an AC 800F or AC 800FR station in the hardware structure are now adapted to the newer process station type PM 803F.

If you insert a new AC 800F controller in your project and select PM 802F for the CPU type, the default boot parameter needs to be adjusted.
The configured values cannot be checked completely by Control Builder F during the plausibility check. A download with invalid boot configuration will be rejected by the controller.

5.6 DigiVis

Close all Faceplates

All Faceplates or all pinned faceplates can be closed with one action via the menu items “Close all faceplates” or “Close all unpinned faceplates”. These functions can be called also via keyboard with “Ctrl+Z” or “Ctrl+Y”.

5.7 New Freelance application

Bulk Data Manager for Freelance

The Freelance Bulk Data Manager (BDM) is a self-contained offline tool that simplifies engineering for small and large applications. High amount of data from Control Build F can be manipulated with Microsoft Excel during configuration phase. Tags, variables and elements of the project tree can be exported, manipulated in Excel and imported again. Hardware objects are not supported.

Parameterization of Function blocks is made easier by means of excel templates available for standard function blocks. User can customize the parameters that will appear in the excel sheet for each type of Function block according to parameterization needs or retain the default template settings.

Initially the BDM tool is available as a bonus component and can be used on own risk, free of charge. In later versions this component will be available as licensed version with associated cost.

The BDM is released for usage with Microsoft Excel 2003 and 2007 version.

Details are described in the new user manual "***Engineering Manual, Bulk Data Manager***".

5.8 Manuals

The existing manuals are updated and now available for version 9.2.

Bulk Data Manager

The new tool "Bulk Data Manager" is described in the new manual "***Engineering Manual, Bulk Data Manager***".

S700 Profibus Slave

Installation and configuration of the new Profibus slave device S700 are described in the new user manual "***Engineering Manual, S700 Modules***".

6 New features in V9.1 RU1a

6.1 Operating System

6.1.1 Windows XP Professional

Freelance 800F Version 9.1 has been released for use with the operating system Windows XP Professional SP2 and SP3.

6.1.2 Windows 2003 Server

Freelance OPC-Server F and Trend Server can also be run under the Windows operating system 2003 Server. This feature is provided specifically for the coupling with 800xA.

6.2 Process Station type AC 700F

Starting with this Freelance 800F version the new process station type AC 700F is supported. Like the previous supported controller AC 800F and rack-based process station the AC 700F will be configured with Control Builder F and can be used together with the other Freelance controller.

The AC 700F controller should not be used without a charged battery and without an adjusted clock. Otherwise a power fail may lead to a fatal error of the controller. (22645)

Details can be found in the new manuals "***Mounting & Installation, AC 700F***" and "***Engineering Manual, Process-Station - AC 700F***".

The following functions are not released for the usage with the new station type AC 700F:

- Tele Control Library

- Ethernet Send and Receive function blocks
- Sartorius Scale Coupling
- Protronic Coupling

These function blocks can be used within the configuration. The plausibility check reports an error if telecontrol, send and receive or Sartorius scale functions are used for AC 700F.

The Protronic function blocks can be configured and checked for AC 700F without an error message.

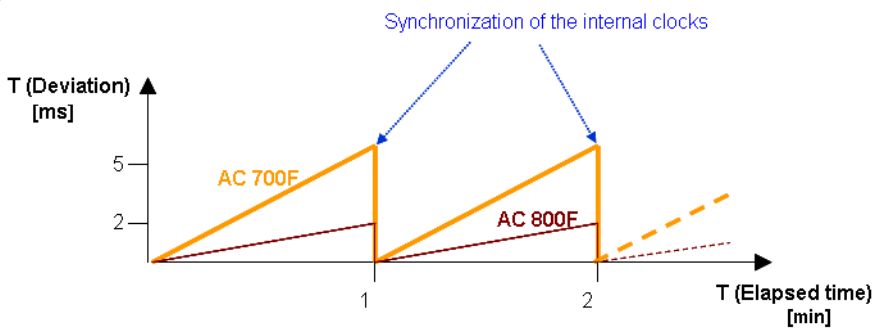
The Protronic function blocks must not be loaded to AC 700F; loading these function blocks leads to a crash of the AC 700F controller.

6.2.1 Differences between AC 700F and AC 800F/DCP

The new process station AC 700F is based on a different processor architecture than the other process stations. Therefore the AC 700F may have a different behavior.

Real-time clock in the controller

As in AC 800F the internal clock of an AC 700F is synchronized internally each minute by an quartz oscillator. Due to tolerances of the hardware components the CPU clock of a AC 700F may be bit imprecise. With each synchronization the clock may be corrected by a higher amount. Internal time calculations may be a little more imprecise than in an AC 800F. (22087)



Inaccuracy of the Real Time clocks

CPUClock01us.bmp

For mixed systems with different controller types it is recommended to avoid that an AC 700F is used as time master by configuring the AC 700F controllers with higher resource IDs.

Integer Arithmetic

The AC 700F does not support correction of Integer values. In case of an Integer overflow or underflow the AC 800F uses the max and min values (32767 or -32678); in the AC 700F the overflow value MAX_LONG is converted to -1. While within function blocks the values are checked and limited like in the AC 800F, in user application the behavior described above is valid. An application may be adapted if it is used at another controller type. (22126, 22551)

Interim results, e.g. within a FBD program, are calculated with INT32 for Integer values. If this result is assigned to an INT16 variable, within the commissioning the value for the global variable may be shown as 32767, the value of the local variable will get the value -1. (22517)

REAL to STRING Conversion

The conversion of a Real value to a String data type may lead to different results at different process station types (22103):

Real value	Result for AC 800F/DCP	Result for AC 700F
-0.00001	########	-1.0e-05
1.0E-6	10.0E-07	1.0E-06
-1.0E-03	-0.001	-1.0E-03
-9.99880791E-04	########	-1.0E-03

System variables

For each resource in the project tree system variables are created. Like for an AC 800F the variables <res>.IOBootT_y_z, <res>.IOBoard_y_z and

<rs>.IOForce_y_z are created, but not provided with data. These system variables can be used only for the rack based controller. (22322).

The same applies to the system variables for redundancy. They are used only for redundant process stations. (22467)

Power Fail behavior

After a very short power fail at an AC 800F or a DCP controller the application will be continued. At an AC 700F short power fails up to 300ms (depending on the plugged modules) are bridged by the power supply, after this the CPU will be informed and perform a warm start.

6.3 Control Builder F

6.3.1 Configuration of Process station AC 700F

Control Builder F were enhanced for the configuration of AC 700F. The configuration of the software part for an AC 700F is identical to the software configuration for the known AC 800F and rack based controller with Control Builder F.

The configuration of the hardware part for an AC 700F is similar to the hardware configuration of a rack based process station with I/O modules. The description of the new I/O modules can be found in the manual "***Engineering Manual, Process Station - AC 700F***".

6.3.2 Graphics Editor

New Action type "Write list of variables"

Within the configuration of a graphics display the new action type "Write list of variables" is available. Unlimited global variables can be selected for the list. The variables are configured similar to the configuration for writing a single variable: Name, Unit, Value, Input range, continuos or discrete operation are specified.
For the whole list it must be configured whether fixed values or operated values will be written out of the graphic display at DigiVis.
For operated values, the DigiVis user must specify the values one by one, similar to

the operation for a structured variable. After this all values are sent together with one command to the process station.

This kind of operation is necessary for writing HART parameters. Within the HART devices one write command will always write the complete list with all parameters.

If the new action type “Write list of variables” is used for writing HART parameter out of a graphic display, the configuration must take care that all HART parameters are specified for the list. Writing an incomplete list of HART parameters may lead to an unspecific behavior of the device.

6.4 DigiVis - Online Help

New DigiVis Online Help

The DigiVis Online Help is based on a new help system. The user interface is modernized.

6.5 Installation

New Installation program

The installation of the Freelance 800F system is now done with a new Setup program. This simplifies the installation process to a large extent. For details refer the manual “***Getting Started, Installation***”.

6.6 PG Information Manager 800F

With PGIM 800F a new Information Manager is available for Freelance V9.1. For details please refer the documents and separate Release Note in the ABB Library at Control Systems/Freelance 800F/Information Management/Power Generation Information Manager/PGIM 800F 5.0

7 New features in V8.2

7.1 Operating System

7.1.1 Windows XP Professional SP2

Freelance 800F Version 8.2 has been released for use with the operating system Windows XP Professional SP2.

7.1.2 Windows 2003 Server

Freelance OPC-Server F and Trend Server can also be run under the Windows operating system 2003 Server. This feature is provided specifically for the coupling with 800xA.

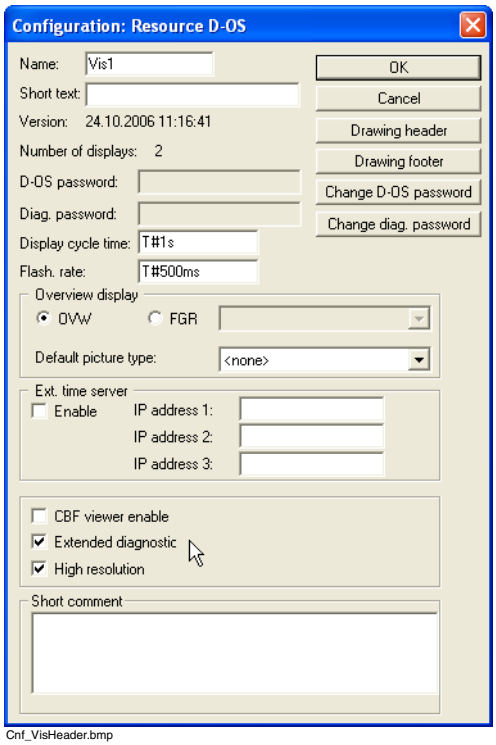
7.2 Control Builder F

Extended Diagnostic

Configuring a DigiVis Station for "Extended Diagnostic" Mode

Exactly one DigiVis resource in the project can be configured for extended diagnostic mode. If the required license is available on this DigiVis station, you can display and – with the required user privileges – modify the parameters of the FF blocks. For Profibus applications, you can call up DTMs on this DigiVis station and – with the required access rights – use these DTMS in “Visualize”, “Operate” and “Maintain” mode.

The functionality of the "Extended diagnostic" mode is configured in the DigiVis station's header parameters (Resource D-OS).

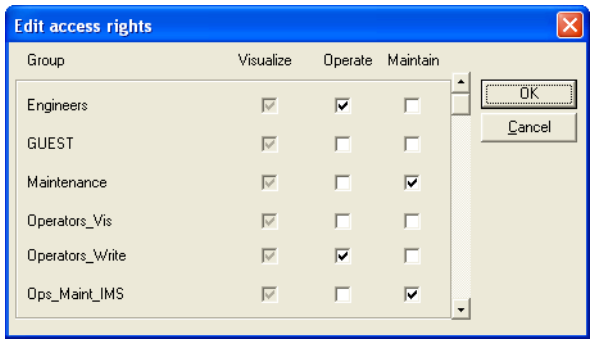


Cnf_VisHeader.bmp

Configuring Access Rights

The appropriate access rights for the extended diagnostic mode are configured in the hardware structure under **Operate / Access Rights**. The access rights configured here refer exclusively to the extended diagnostic mode in the System Display. The right to ***Visualize*** cannot be unselected.

With SecurityLock you can define the access rights of each user group individually. Without SecurityLock these rights are always valid on the DigiVis station with extended diagnostic. This configuration has no effect on DigiVis stations without extended diagnostic mode.



FDT_AccRights.bmp

7.2.1 FOUNDATION Fieldbus

Limits for FF applications with Control Builder F

Configuration and commissioning of FF applications in Control Builder F has been reworked. With this version the following limits are valid:

Communication limits of a FI 840 module:

- 600 signals (Pub/Sub)
- 64 sessions (Pub/Sub) or
- 70 sessions (Clt/Srv + Pub/Sub) or
- 80 sessions for all services in total (Pub/Sub + Clt/Srv + CBF + Vis +OPC)

Depending on the configured cycle times and the load of the FI 840 module these maximum values may not be reached. See also FF Load Display **on page 86**

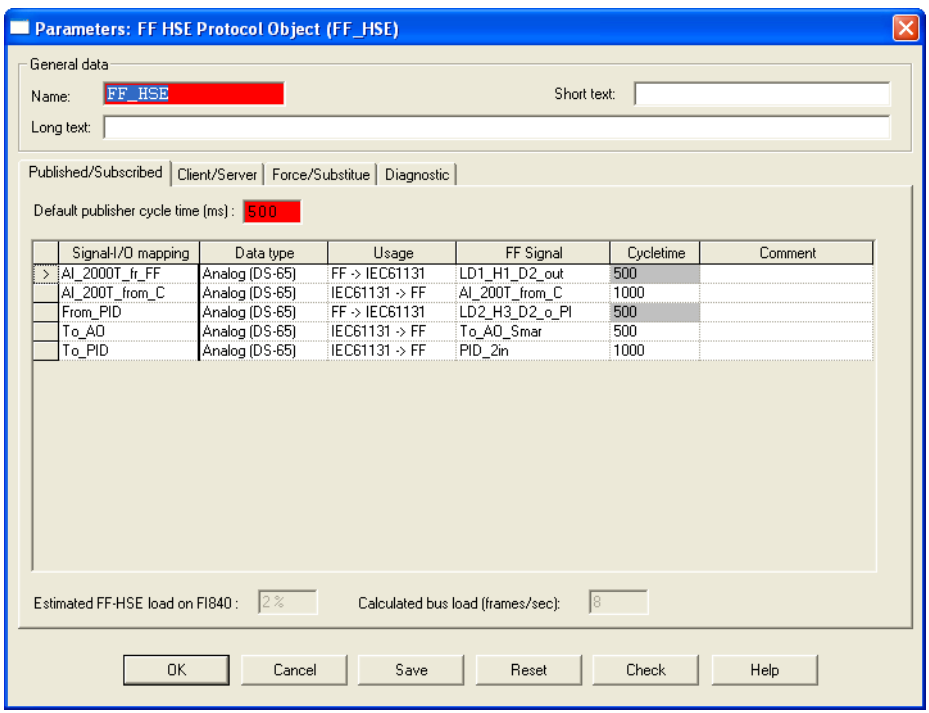
Communication resources of LD 800HSE:

Refer to the documentation of LD 800HSE.

FF HSE Protocol object, Tab Publish/Subscribe

Additional to the I/O description the calculated bus load is displayed.

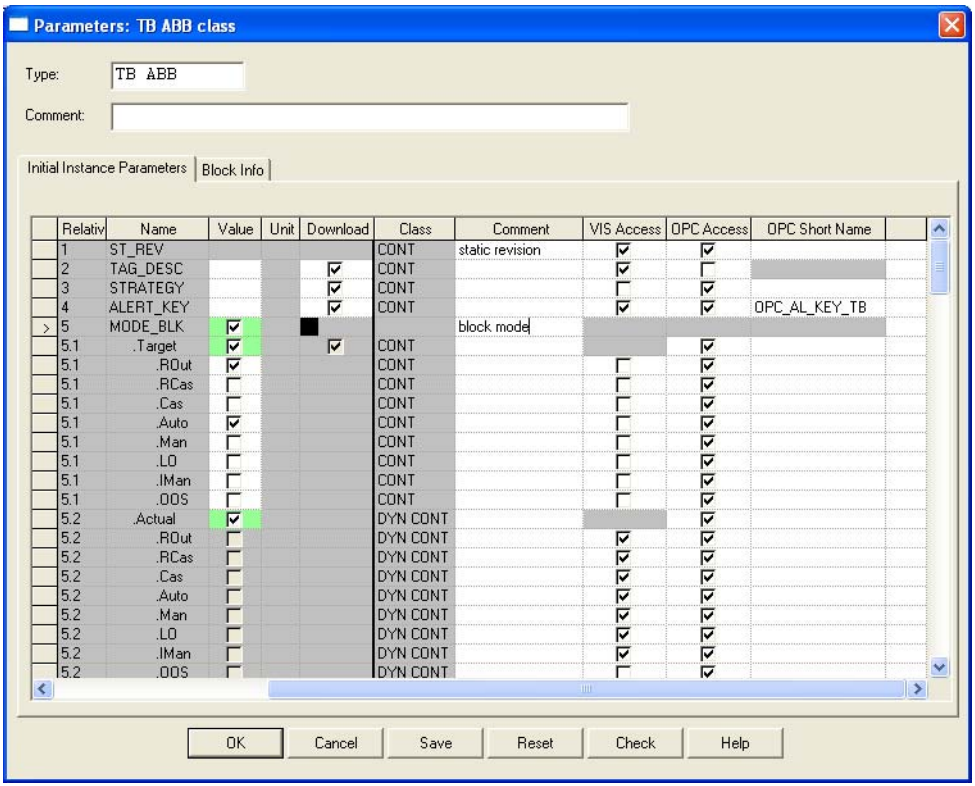
For estimation of the FF HSE load considers only the cyclic communication of the FF signals. Because of other occurrences the actual load of the FI 840 module may be clearly higher. Please control the actual load during commissioning. Refer also FF HSE Protocol Object on page 91



ff095us.bmp

Configuring the Parameters of FF Blocks for DigiVis Access

Each parameter, input or output of an FF block can be enabled for access from DigiVis. The DigiVis access configuration is made in the class definition of the FF block in the block library and is, thus, effective for all instances of the block class.



Cnf_VisAccFF.bmp

The DigiVis access requires additional client/server services on the H1 link which may affect the data throughput. For this reason, only some parameters are enabled for DigiVis access by default:

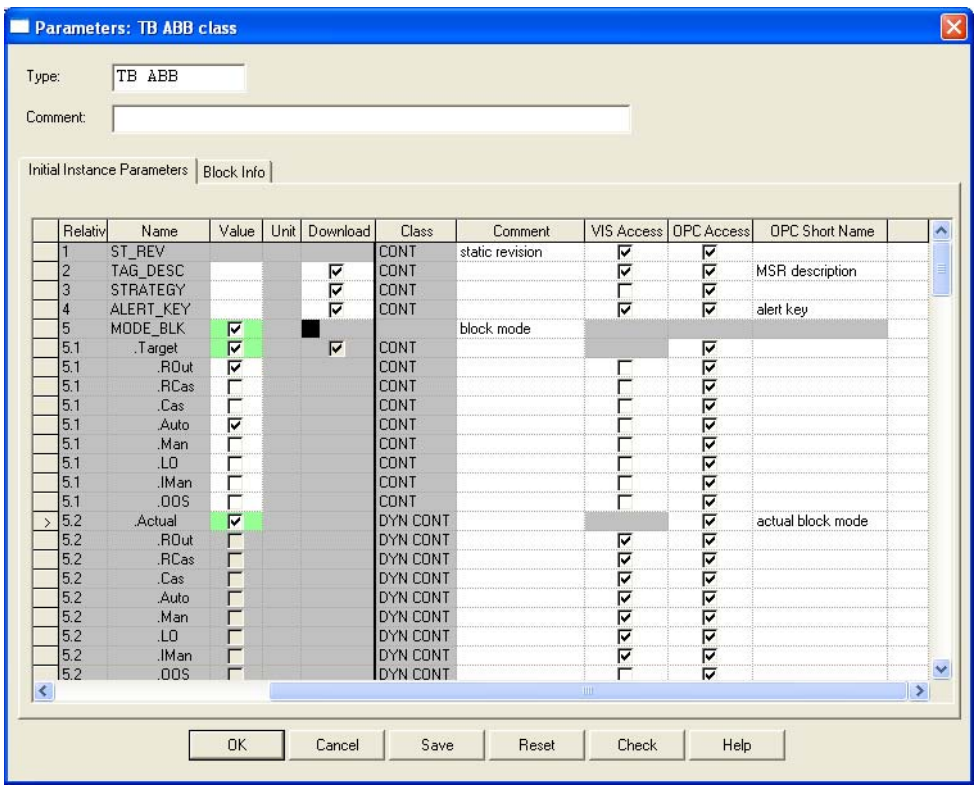
- ST_REV
- TAG_DESC
- MODE_BLK
- BLOCK_ERR

More parameters can be enabled for access from DigiVis via the block class. However, the limited data rate of an H1 link must be observed. The configured DigiVis access flags are displayed in the parameter dialogs of the block instances, but cannot be modified there.

Configuring the Parameters of FF Blocks for OPC Access

Each parameter, input or output of an FF block can be enabled for access from an OPC server F. The OPC access configuration is made in the class definition of the FF block in the block library and is, thus, effective for all instances of the block class.

An OPC client can then read an enabled parameter from an FF device or write data into an FF device via the OPC-Server F by using the address **<Tag Name>/<Component Name>**. Additionally, a short name for OPC access can be assigned which will then be used for addressing instead of the tag name and component name.



Cnf_OPCAccFF.bmp

The OPC access requires additional client/server services on the H1 link which may affect the data throughput. In the default setting, no parameters are enabled in the system for OPC access. The parameters can be enabled for OPC access via the

block class. However, the limited data rate of an H1 link must be observed. The configured OPC access flags are displayed in the parameter dialogs of the block instances, but cannot be modified there.

Incremental Download for FF Devices

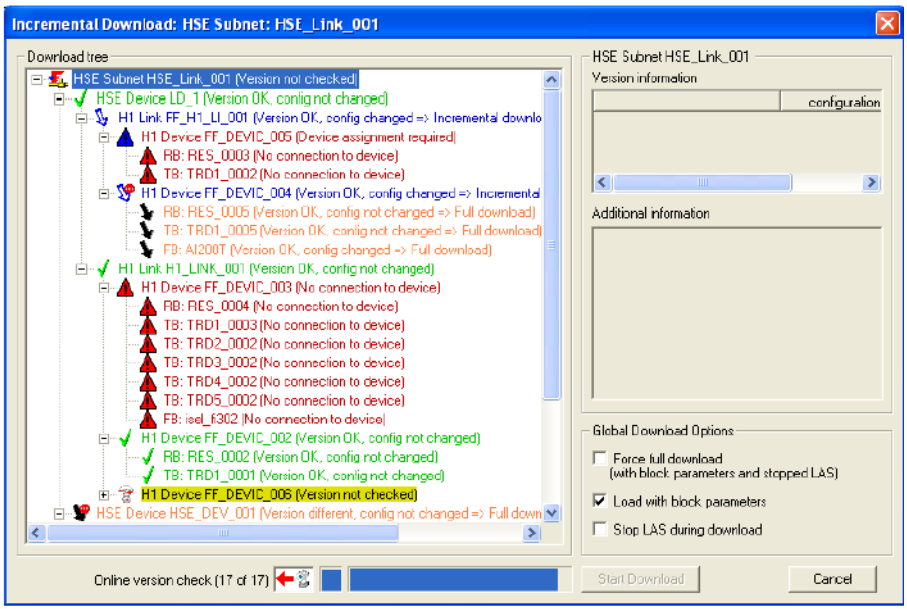
From this software revision on, it is possible to download FF applications not only completely, but also incrementally into the FF Devices. This functionality allows you to take over the configuration changes seamless into your process. Compared to previous versions, the download speed is increased and possible download errors are minimized.

New Download Dialog for FF Devices

The download dialog for the object classes

- FF_HSE_LINK FF (HSE link object),
- FF_HSE_DEV (HSE linking device),
- FF_H1_LINK (H1 link) and
- FF_DEVICE (H1 device)

has been enhanced. You can call up this dialog from the context menu or via **Object > Load….**



Load_HSELink.bmp

Once this dialog has been opened, the online version check is executed. During this check, the stored configuration is compared with the configuration in the actual device by reading the version information from all devices.

An activity indicator and two progress bars under the tree view inform you about the current state of the version check. The vertical bar on the left hand side indicates the progress of the respective device, whereas the horizontal bar to the right of it indicates the progress for the entire version check of the entire tree.

When the version check is finished, the current commissioning state and the online version check result are indicated. The tree view indicates for each structural element whether the object still has to be downloaded or not.

The following list details the individual symbols in the download tree view and their meaning:


No version check has been executed for this object.


The object will not be loaded. The downloaded configuration is up to date.

If a compressed branch is connected to this object, none of the objects in this compressed branch is downloaded. The downloaded configuration for all these objects is up to date.


A download is required for at least one object in the compressed branch.

You can display details for all objects in the compressed branch by expanding the branch.


Only the modified configuration is downloaded into the object (incremental download).


Only the modified configuration is downloaded into the object (incremental download).

For an H1 link: The Link Active Scheduler (LAS) is stopped while the download is in progress, i.e. the application is interrupted.

For an H1 device: The resource block is stopped. As a result, all function blocks in that device change over to OutOfService mode.


The object is downloaded with all configuration data (full download).


The object is downloaded with all configuration data (full download).

For an H1 link: The Link Active Scheduler (LAS) is stopped while the download is in progress, i.e. the application is interrupted.

For an H1 device: The resource block is stopped. As a result, all blocks in that device changeover to OutOfService mode.


Although the block configuration (i.e. the block parameters) has changed, the block parameters are not downloaded, since the global download option "Load with block parameters" has not been ticked.


The actual device on the bus cannot be reached.


A device assignment is required for the object. Refer to the text displayed in the download tree for details.

In the bottom right part of the dialog box, the user can select global download options.

- Force full download
- Load with block parameters
- Stop LAS during download

In the default setting, none of these download options is ticked. This setting is intended for downloading the changes incrementally, i.e. without stopping the LAS and without modifying the parameter settings in the devices. If, however, the made configuration changes have a major effect on the link and the function block applications, a short-time interruption of the application may be required to be able to execute the download. The necessary interruptions are detailed in the table above.

We strongly recommend to retain the global download options' default settings. The options are provided only for users with sound FF knowledge who are able to assess the effects of the individual download options in dependence of the respective application state.

Peculiarity:

When this symbol is indicated in the tree view, check if the “Load with block parameters” option must be ticked.

Explanation of the Version Check Results

Two states are indicated after a version check: a version number discrepancy and a configuration change.

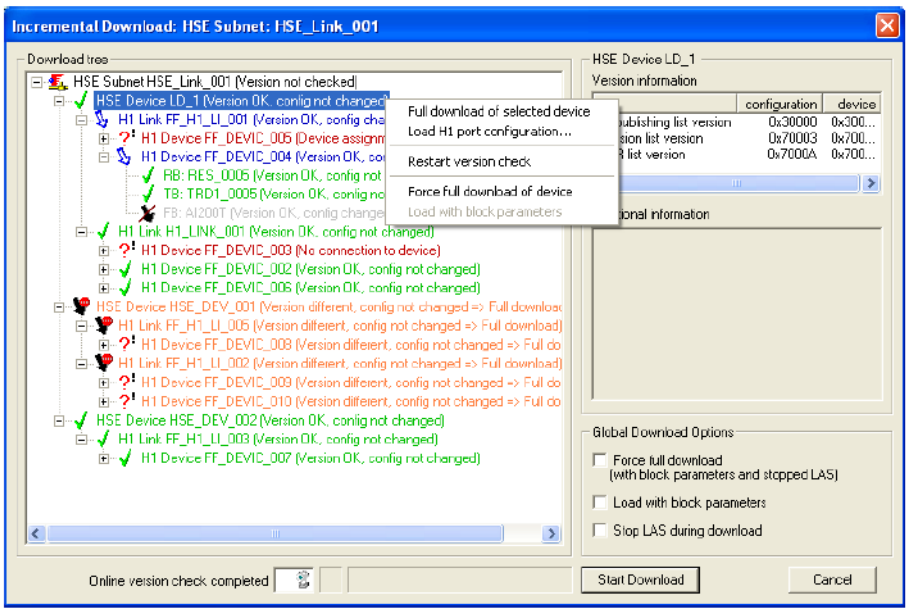
A **Version number discrepancy** indicates that a static parameter has been changed in the device "without notifying Control Builder F ". In the FF specification, a distinction is made between static (i.e. configured) and dynamic (i.e. configurable) parameters. Dynamic parameters can be changed (or are changed automatically by the device) without incrementing the StaticRevision number. Static parameters are stored in the device's Flash memory. Any changes (made via the OPC server or a handheld terminal) should increment the revision number. However – depending on the vendor – some FF devices have some static parameters with a "dynamic" behavior.

When writing data from a parameter mask to a static parameter, the respective parameter setting is changed in the device and the revision number is incremented automatically. Control Builder F then reads the new revision number from the device and stores it. No load arrow or revision discrepancy is indicated (similar to the controller in the P-tree). A discrepancy between the configured and the actual value is indicated by highlighting the value yellow in the parameter mask. It is possible to change the configuration of an FF device – unlike a controller configuration – by using an external tool (e.g. DigiVis, OPC server, FF configurator). This external configuration change is indicated in the version check by “Version different”.

The message "Config changed / Config not changed " is displayed only to indicate whether the internal Control Builder F configuration has been changed and must be downloaded. There is no comparison with the parameters in the device.

Context Menu in the Download Dialog

The context menu allows you to select object-specific download actions and download options for the objects in the tree view of the download dialog.



Load_ContextMenu.bmp

The following menu options can be available in the context menu, depending on the selected object:

Full download of selected device

HSE device and H1_device

The complete configuration including the block parameters is downloaded into the device. The loading operation is started immediately upon selection of this menu option. Once the loading operation is finished, a new version check is performed.

Load H1 port configuration

HSE device

The configuration of the H1 links in the linking device is loaded.

Restart version check

HSE segment, HSE device, H1 link, H1 device and Block
A new version check is started for the selected part of the FF structure.

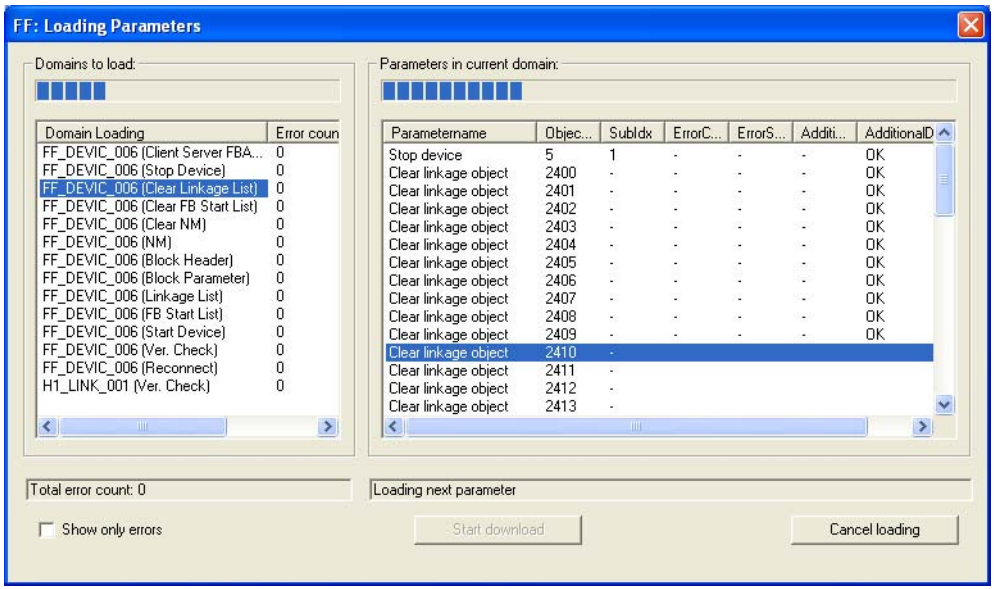
Force full download of device

HSE device and H1 device
The entire configuration is downloaded into the device, independently of the version check results. This option corresponds to the global download option "Force full download", but has an effect on the selected object, only. Note that you have to click the **Start** button to start the download.

Load with block parameters

H1 device
Any changed parameters of the function blocks, resource blocks or transducer blocks are downloaded into the device as well, independently of the version check results. This download option corresponds to the global download option "Load with block parameters", but has an effect on the selected object, only.

Note that you have click the ***Start*** button to start the download. The loading progress and possible errors or warnings (see figure below) are displayed in a new dialog. All configuration data are downloaded into the H1 devices and the linking devices. If the loading operation is successful, the following text is displayed: **Total error count 0; Download finished"**.



Load_Parameters.bmp

If errors occur during the download, not all configuration parts are downloaded. In this case, each line shown in the right window pane that does not end with "OK" indicates and error. The error causes can be determined via the error classes and sub-classes seen here.

Registry Entry for Enabling Download Warnings

Detailed warnings can be displayed for special critical errors when executing an incremental software download.

- Downloading configuration changes into H1 devices or linking devices will interrupt the communication or the execution of a function block.

  Examples:
  - The global download option "Stop LAS during download" has been selected.
  - The global download option "Load with block parameters" has been selected.
  - The object-specific download option "Load with block parameters" has been selected for some objects via the context menu.

- A user-selected download will lead to an incomplete application and may affect safe process control.

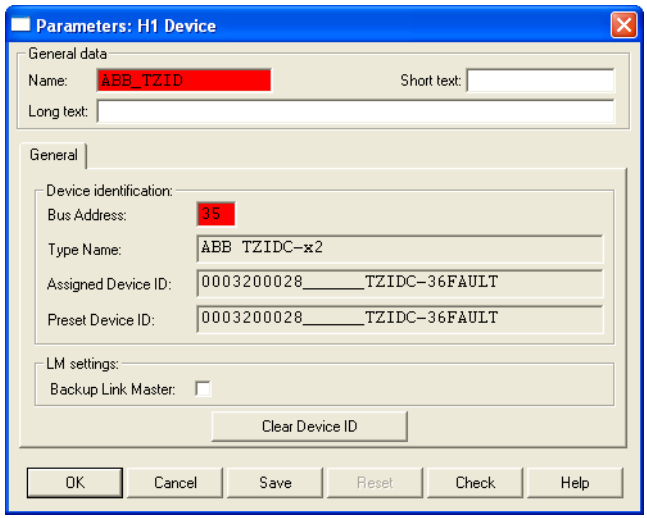
  Examples:
  - The download dialog has been opened only for a tree section under the HSE segment (of the FF_HSE_LINK object).
  - The global download option "Load with block parameters" has been unselected.
  - The object-specific download option "Load with block parameters" has been unselected for some objects via the context menu.
- The device into which the data is to be downloaded is not connected to the bus.
- A full download may be required for some devices.

The display of these warnings is disabled by default. If a project requires that these download warnings are output, please contact your local ABB service department.

Automatic Device Assignment with Preset Device ID

In a project with FF applications, the configured H1 devices must be assigned to the physical devices. So far, this assignment had to be made manually upon each project export and import. With software revision V8.2 and higher the device assignment is saved with the project. As a result, an automatic assignment is possible upon a project import.

In the context menu of the objects **FF_HSE_LINK (HSE segment), FF_HSE_DEV (linking device)** and **FF_H1_LINK** you can select the function **Assign devices automatically**. The device IDs of physical devices are read and compared with the project data. The device assignment is made automatically for all recognized configured devices. Note that this applies to the respective tree section, only.

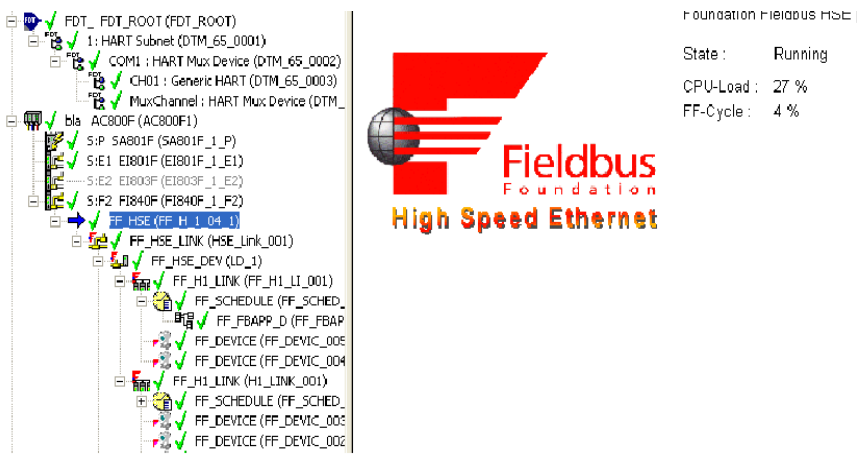


DevInst_Para.bmp

The configured device ID is provided by the device assignment. The user cannot enter an ID. The **Clear Device ID** button is used to delete all device ID entries. Subsequently, a new device assignment can be made.

FF Load Display

In order to facilitate the commissioning phase, the current CPU load and FF network load are displayed together with the HSE protocol object.



Ssy_HSEObj.bmp

CPU load indicates the complete load of the HSE FI840F module. The value of **FF load** indicates the load of the configured cycle for the Publisher/Subscriber services. In normal operating mode the cyclic FF load must not exceed 70%, otherwise the system behavior in extreme situation will be unpredictable. In case of overload this value can be greater than 100%. This will cause a system message in DigiVis.

Processing client/server services the CPU load may increase by leaps and bounds. If FF values are read via an OPC server, make sure, that both load values are clearly below 100%. Otherwise values cannot be read securely. (21852, 21894)

FIO-100 No Longer Supported

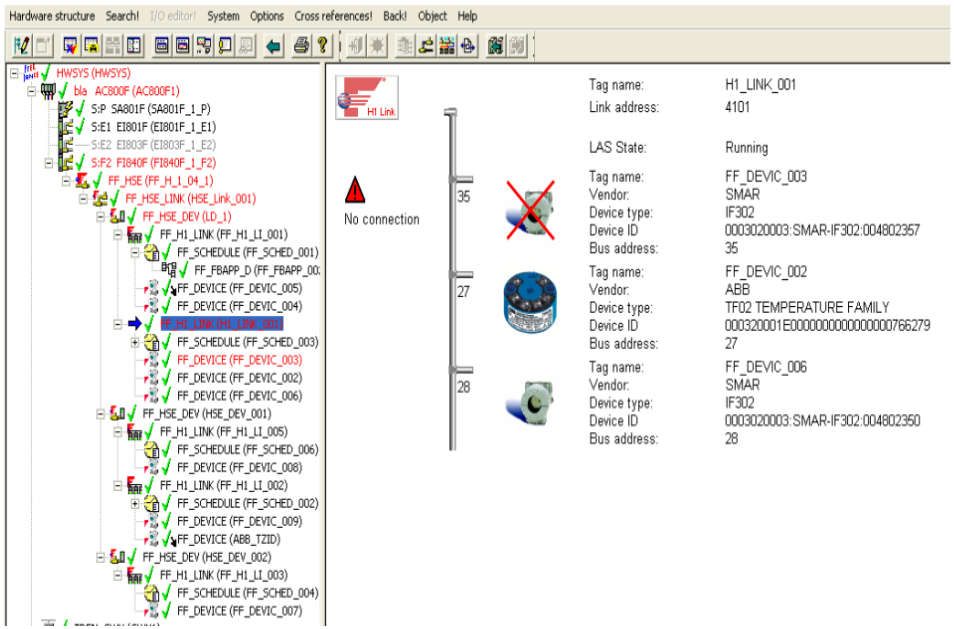
With software revision 8.2 and higher, the FIO-100 linking device is no longer supported. If a project created with a previous Freelance version is imported where FIO-100 is used, a message is displayed notifying that a least one used class has not been installed. The affected hardware part is handled as “not activated”. As a result, no plausibility check messages are generated.

In order to be able to commission this plant part, you have to transfer the configuration to an LD 800HSE linking device.

7.2.2 State Display in the Hardware

Error Display and Propagation in the Hardware Structure Tree View

In commissioning mode, an error in a fieldbus device or module is indicated by displaying the node in red. Additionally, all superordinate nodes in the tree up to the **process station node** are shown in red. This means, errors are also indicated in compressed displays.



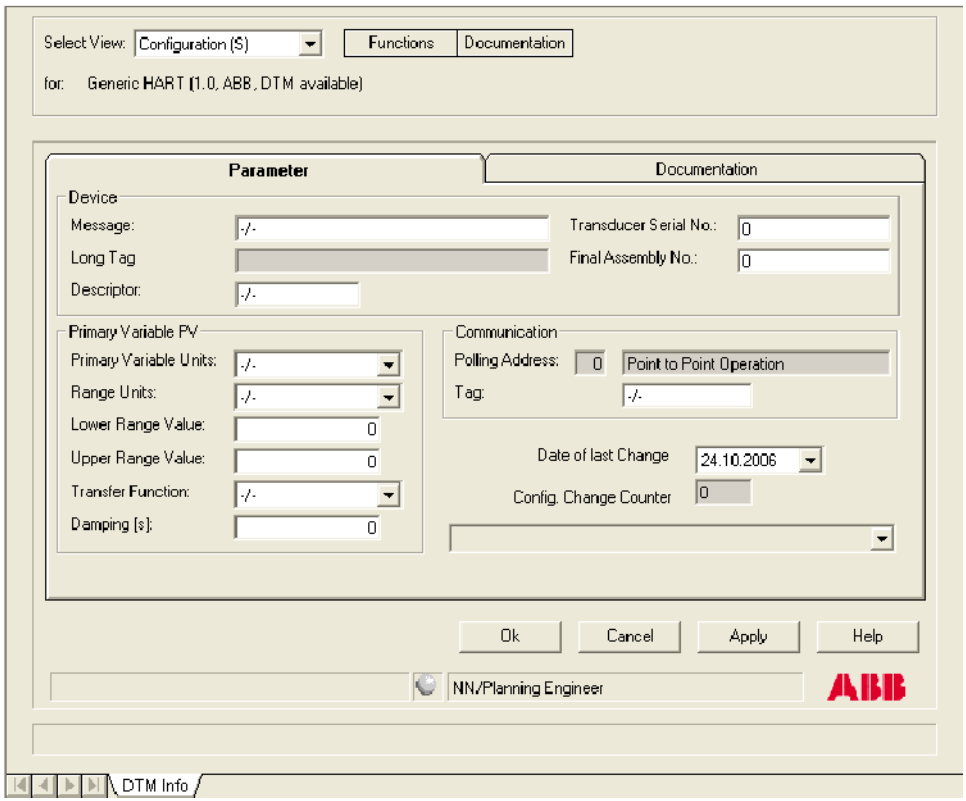
HwTree_Err.bmp

7.2.3Working with DTMs

Changes of the DTM User Interface

Like with previous Control Builder F versions, the graphical user interface of a DTM can be selected from a list box under **Select View**. A new feature of this version is that both the functions without the graphical user interface and the documentation functions are available in the DTM view.

The list of available user interfaces, functions and documentation types may be different in configuration mode and commissioning mode.



DTM_View.bmp

7.3 DigiVis

7.3.1System Display

DigiVis Station with "Extended Diagnostic" Mode

The ***Extended Diagnostic*** mode requires an **Extended Diagnostic** license.The DigiVis station must be configured for this operating mode (Control Builder F, DigiVis header parameters).

If Security Lock has been installed, the ***"Ext.diag"*** privilege must have been assigned to the current user.

In DigiVis, you can reach the "Extended Diagnostic" mode in the System Display under "Operate - Enter diagnostic mode". If Security Lock has not been installed, you will need a diagnostic password (Control Builder F, DigiVis header parameters). Under "Operate - Leave diagnostic mode" you can exit this mode again.

If Security Lock has not been installed, this operating mode is automatically left when you leave the System Display. With SecurityLock, you can exit this operating mode only via the corresponding menu item or by logging out or logging in another user.

Using DTMs or observing and writing FF block parameters is only possible in "Extended Diagnostic" mode.

Maintenance and Diagnostic Information for FF Devices in DigiVis

The parameters of an FF block can be displayed and – if the required license is available and the required user privileges have been defined – can also be modified.

DTMs in DigiVis

Exactly one of the operator stations in a Freelance project can be configured for extended diagnostics. If the required license is available on this DigiVis station, more detailed information about the connected field devices (Profibus, FF, HART, …) is available in the System Display in diagnostic mode than on the other DigiVis stations.

In extended diagnostic mode, the DTMs can be started with the accordingly configured "Visualize", "Operate" or "Maintain" privilege.

DTM User Interface

In DigiVis, a DTM's graphical user interfaces are available in the **Select View** list box. Additionally, the same functions and documentation functions as in Control Builder F are provided.

The list of available user interfaces, functions and documentation types may be different for the individual configured access rights. Which user interfaces and functions a DTM provides for each access right is determined by the DTM.

Error Display and Propagation in the System Display

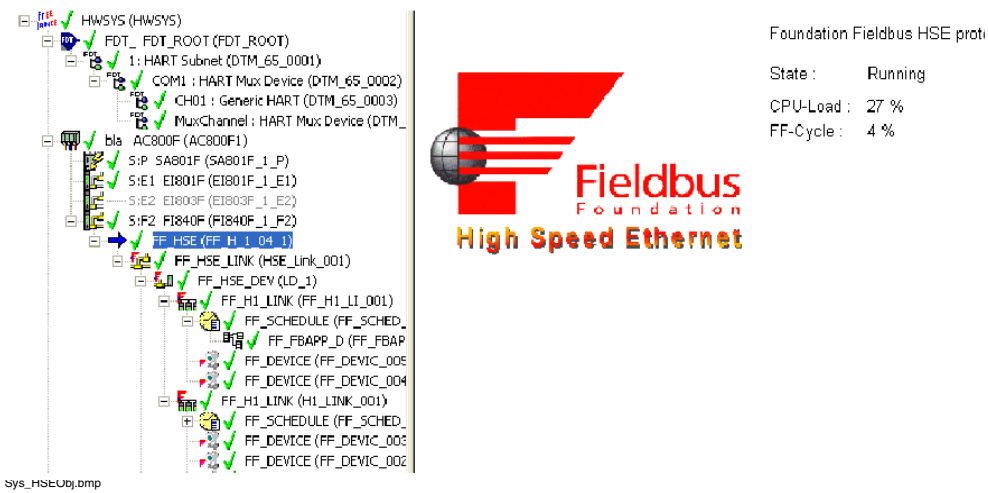
An error in a fieldbus device or module is indicated in the System Display hardware tree by displaying the node in red. Additionally, all superordinate nodes in the tree up to the **process station node** are shown in red. This means, errors are also indicated in compressed displays.

View of FF device status in System Display

Within the system display in DigiVis the state of the FF devices is shown in the same way like in Control Builder F. Following some examples for the different FF object types are listed.

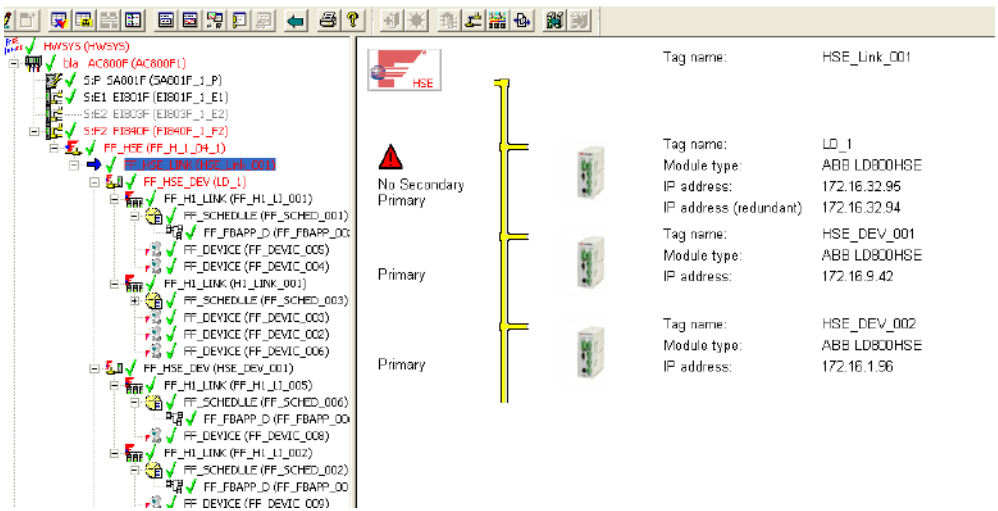
FF HSE Protocol Object

In the DigiVis System Display, the FF HSE protocol object is indicated in the same way as in commissioning mode in Control Builder F. The module view shows the status information and load data.



FF HSE Link Object

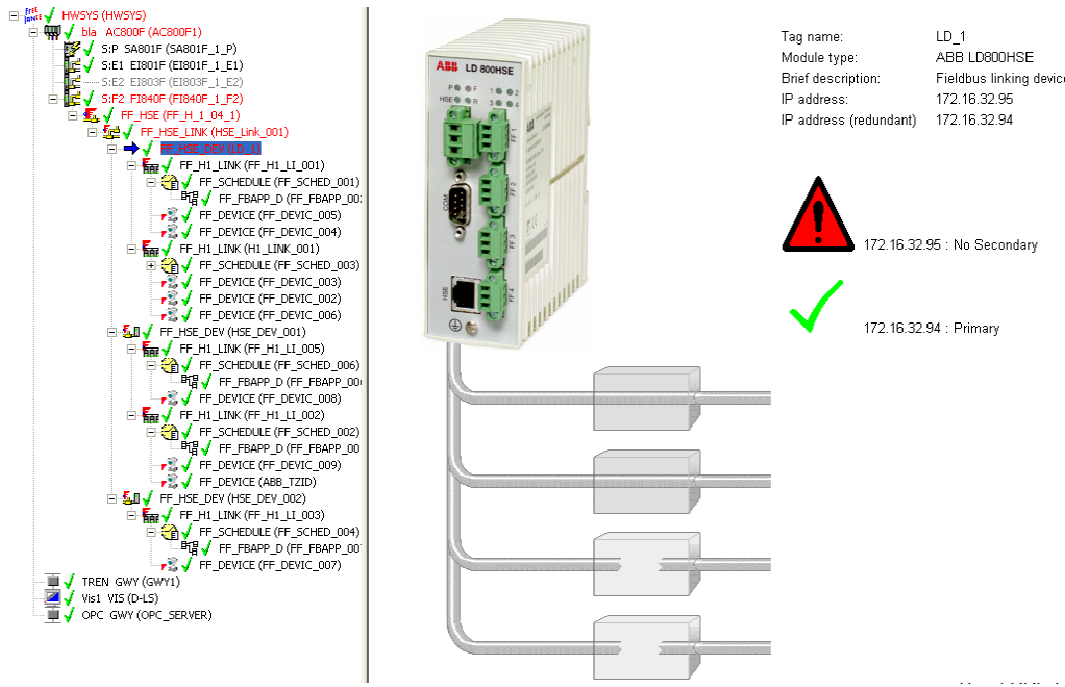
The module view of the FF HSE link object contains the status information and configuration data for the HSE devices on this HSE segment.



Sys_LinkObj.bmp

FF HSE Device Instance Object

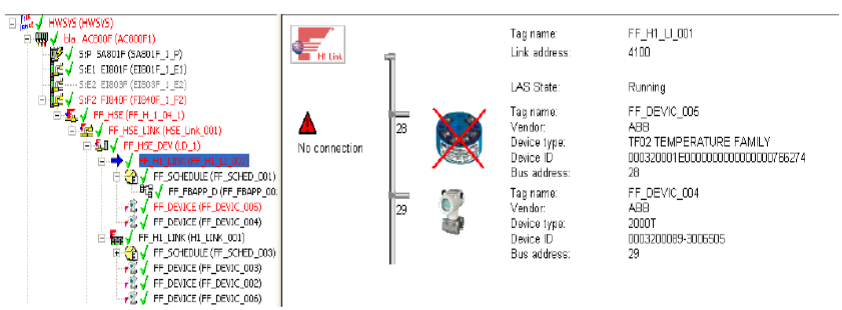
The module view of the FF HSE device instance object shows the status information and configuration data for both the HSE device and the H1 segments (channels of the HSE device).



Sys_LDObj.bmp

FF H1 Link Object

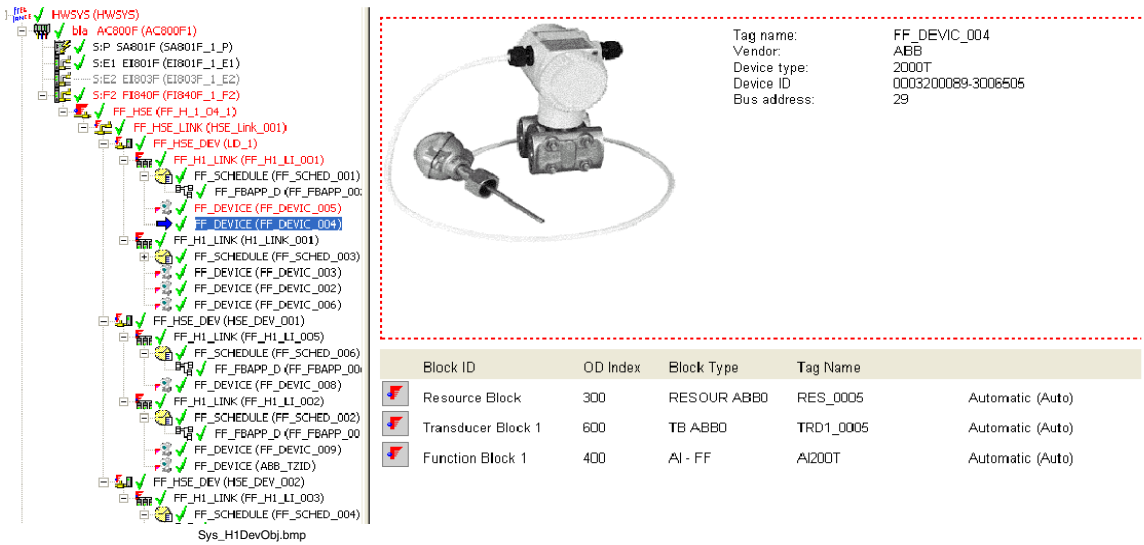
The module view of the FF H1 link object contains the status information and configuration data for the H1 segment (channel of the linking device) and for the field devices on this segment.



Sys_H1LinkObj.bmp

FF H1 Device Instance Object

The module view of the FF H1 device instance object contains status information and configuration data for the field device. Additionally, the current operating mode of the resource, transducer and function blocks are indicated.



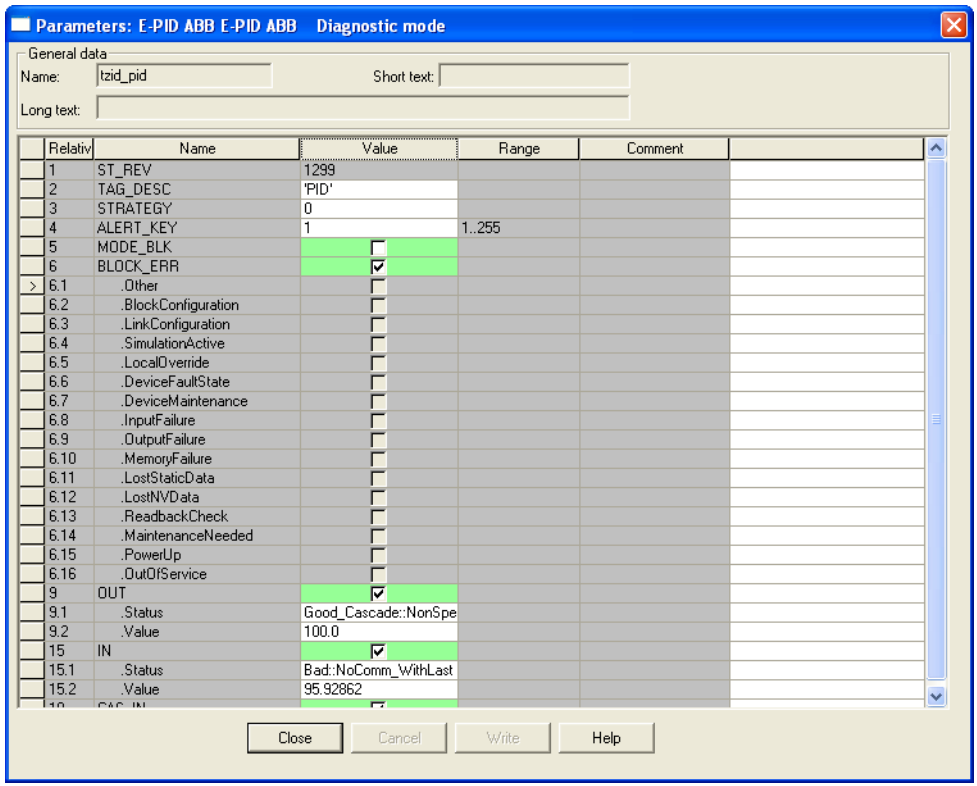
Sys_H1DevObj.bmp

Displaying the FF Function Block Parameters

It is only possible to display the FF function block parameters in DigiVis if

- the DigiVis station has been configured to support the "Extended Diagnostic" mode.
- the DigiVis license “Extended diagnosis” is available.
- the "Extended Diagnostic" mode has been activated.

Double-clicking the function block in the module view of an H1 device opens the parameter dialog of the FF function block. Only those parameters are displayed to which DigiVis access has been enabled in the function block class. The dialog shows for these parameters the **Relative index**, the **Name**, the **Value**, the **Range** and the **Comment**. DigiVis reads the value from the H1 device via an additional client/server communication service.



Vis_H1Paras.bmp

Writing FF Block Parameters

If the logged-in user has the **Operate** privilege, he/she can edit the value of the respective parameter in the **Value** column and then write the value into the field device by clicking the **Write** button.

If the **SecurityLock** software package has not been installed, only the configured default access rights are evaluated (access rights can be configured on the HWSYS node in the hardware tree).

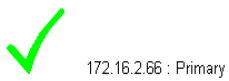
Logging User Actions

The write operations on the parameters of a FF function block are recorded in the signal sequence log as user actions and saved accordingly. As a result, these data are available for AuditTrail applications.

The format corresponds to an entry when operating faceplates.

7.3.2State Displays

State Displays of an HSE Device



Normal state. There is a connection to the HSE device. The device appears in the Live List.

There is no communication link to the HSE device with the given IP address, tag name and device ID.

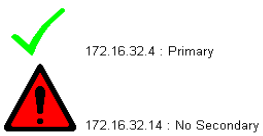
If there is no communication link to the HSE device with the given IP address, tag name and device ID.

Reason	Remedy
• The actual HSE device is not connected to the HSE segment.	Connect the actual HSE device to the HSE segment.
• There is no connection between the DigiVis station and the AC800F controller which is linked to the HSE segment via an FI840 module.	Establish a connection to the AC800F controller.
• The FI840 module is not connected to the HSE segment.	Establish a connection between the FI840 module and the HSE segment.
• The FI840 module is switched off.	Switch on the FI840 module.

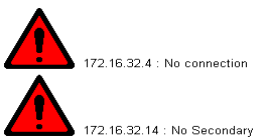
Reason	Remedy
• The configuration data have not been downloaded into the AC800F controller.	Download the configuration data into the AC800F controller.
• The current configuration data have not been downloaded into the DigiVis station.	Download the configuration data into the DigiVis station.
• At least one of the configured parameters, i.e. the IP address, the tag name or the device ID, in the database does not match the current value of the actual device.	If required, change the IP address in the configuration and/or actual device and make a new device assignment.

State Displays of a Redundant HSE Device

Normal state. There is a connection between the primary and secondary HSE device. Both devices appear in the Live List



There is no communication link to the secondary HSE device. Only the primary HSE device appears in the Live List



There is no communication link to any of the two redundant HSE devices. No HSE device appears in the Live List.

If there is no communication link to the secondary HSE device and only the primary HSE device appears in the Live List:

Reason	Remedy
• The secondary device is in an error state. It is not ready to take over the role as a primary linking device.	Replace the defective HSE device. Follow the instructions for replacing a defective linking device in a redundant linking device setup.

Reason	Remedy
• The actual HSE device is not connected to the HSE segment.	Connect the actual HSE device to the HSE segment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.
• The configured IP address in the database does not match the current IP address of the actual device.	If required, change the IP address in the configuration data and/or in the actual device. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.

If there is no communication link to any of the two redundant HSE devices and no HSE device appears in the Live List:

Reason	Remedy
• None of the actual HSE devices of this redundancy pair is connected to the HSE segment.	Connect the actual HSE devices to the HSE segment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.
• There is no connection between the DigiVis station and the AC800F controller which is linked to the HSE segment via an FI840 module.	Establish a connection to the AC800F controller.
• The FI840 is not connected to the HSE segment.	Establish a connection between the FI840 module and the HSE segment.
• The FI840 module is switched off.	Switch on the FI840 module.
• The configuration data have not been downloaded into the AC800F controller.	Download the configuration data into the AC800F controller.

Reason	Remedy
• The current configuration data have not been downloaded into the DigiVis station.	Download the configuration data into the DigiVis station.
• The configured IP address in the database does not match the current IP addresses of the actual devices.	If required, change the IP addresses in the configuration and/or actual devices and make a new device assignment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.

State Displays of an FF H1 Link Object

There is no connection to the linking device's H1 channel.

If there is no connection to the linking device's H1 channel:

Reason	Remedy
• There is no connection to the HSE device (FF linking device) that contains the H1 channel. Refer to the “HSE Device State” tables for possible reasons.	See the “HSE Device State” tables.
• The H1 channel in the HSE device (FF linking device) assigned to this H1 segment has not been activated.	Activate the H1 channel and commission the linking device (load the H1 port configuration).

State Displays of an FF H1 Device Instance Object

There is no communication link to the H1 device with the given bus address, tag name and device ID.

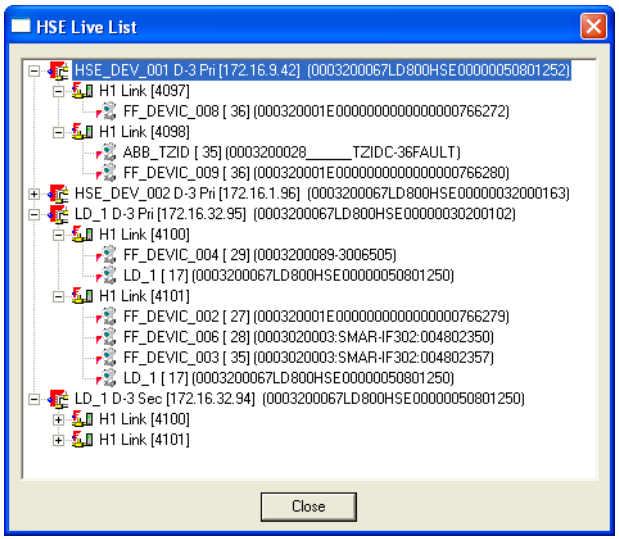
If there is no communication link to the H1 device with the given bus address, tag name and device ID:

Reason	Remedy
• There is no connection to the H1 channel of the HSE device (FF linking device). Refer to the “H1 Link State” tables for possible reasons.	See the “H1 Link State” tables.
• The physical H1 device is not connected to the H1 link.	Connect the actual H1 device to the H1 link.
• At least one of the configured parameters, i.e. the bus address, the tag name or the device ID in the database does not match the current value of the actual device.	Make a device assignment for this H1 device.

Displaying Subscribers in an HSE Segment

The HSE Live List can be called up via the **FF_HSE_LINK** and **FF_HSE_DEV** objects.

The HSE Live List is a diagnosis tool. It shows a hierarchical view of all actual HSE and FF devices that are currently present in the HSE segment. Additionally, any devices of other projects that may be present are displayed.



Vis_HSELiveList.bmp

Tag name Tag name of the respective device. During the device assignment, the configured tag name has been written into the actual device.

Redundancy mode
For an HSE device, the redundancy mode (Pri, Sec) is displayed to the right of the tag name. Non-redundant devices are marked "Pri".

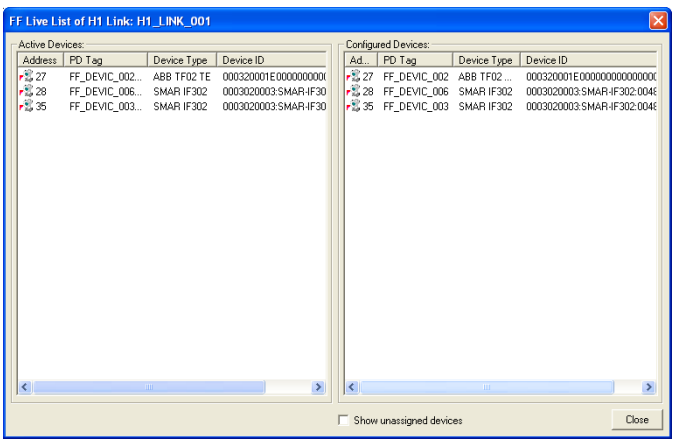
Address The device address.
For an HSE device the HSE device's IP address.
For an H1 device the bus address on the H1 segment.
During the device assignment, the configured bus address has been written into the actual device.
For an H1 link the H1 segment's segment address.

Device ID Unique identification number of the device. A unique device ID is assigned to each device by the vendor. The device ID will not change. During the device assignment, the device ID is read from the device and entered into the database.

Displaying Subscribers in an H1 Segment

The H1 Live List can be called up via the FF_H1_LINK object.

The H1 Live List is a diagnosis tool. It shows all actual devices on the H1 segment and the configured devices.



Vis_H1LiveList.bmp

Address The bus address of the device. During the device assignment, the configured bus address has been written into the actual device.

Tag name Tag name of the device. During the device assignment, the configured tag name has been written into the actual device.

Device ID Unique identification number of the device. A unique device ID is assigned to each device by the vendor. The device ID will not change. During the device assignment, the device ID is read from the device and entered into the database.

Device type The device type from the device description.

Show unassigned devices

In order to reduce the number of displayed devices, a filter can be activated.

If this filter has been set, only the unassigned devices are shown in the window. Among these are:

– configured devices without a device ID,

– active devices on temporary addresses (248...251)

– active devices on permanent addresses (20...247) that have not been entered into the configuration data.

7.3.3 General

New System Alarm

When a project is subject to a plausibility check, the required network buffers are calculated. In very few cases, e.g. in case of an improperly installed network, these configured limits in the controller software are not adhered to. A warm start can solve this problem. A system alarm indicates the problem and recommends a warm start.

"Network buffer low, warm start recommended" or

"Network buffer error, warm start recommended"

(21372)

CBF Viewer

A new version (V8.2) of the stand-alone program **CBF Viewer** integrated in DigiVis is now available. This version supports long plant area names. Additionally, special characters can be used for steps and transition names.

Please note that Unicode characters (Japanese, Chinese, Russian) are not supported.

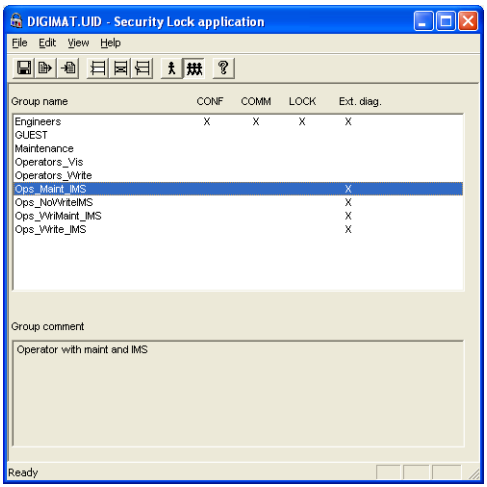
7.4 Security Lock

Group Rights for "Extended Diagnostic" Mode

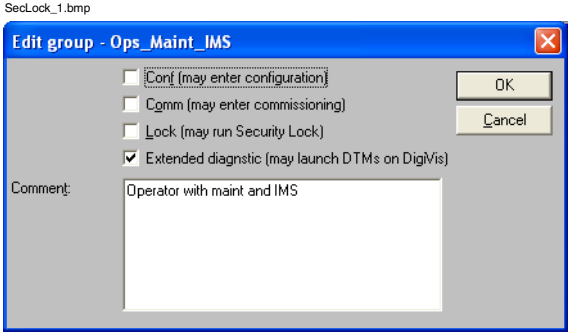
In SecurityLock, the access rights for the extended diagnostic mode can be configured.

Besides the already known user privileges **CONF**, **COMM** and **LOCK,** the **Ext.diag.** privilege (extended diagnostic) can now be configured for each group.

Without this privilege, it is not possible to run DigiVis in Extended Diagnostic mode.



SecLock_1.bmp



SecLock_2.bmp

7.5 Using DTMs and FF Devices in DigiVis

In the hardware structure, you can assign the “Visualize” “Operate” and “Maintain” privilege. This defines for the DTMs, in which mode the DTM is started and, thus, which actions can be performed. FOUNDATION Fieldbus does not make a distinction between the privilege for **Operation** and **Maintenance**. In both cases writing FF parameters is permissible.

7.6 OPC-Server F

The Freelance OPC Server FF provides access to data from FOUNDATION Fieldbus devices (OPC data access)

External diagnostic tools (e.g. ValveView) are supported through access to data from FOUNDATION Fieldbus devices.

7.7 Upgrading previous Versions to V8.2

7.7.1FF Standard Dictionary

A new version of the FF dictionary (FF Standard Dictionary standard.dct) is delivered with version V8.2. Please note that the new dictionary is not taken over automatically when importing a project from a previous Freelance version. The update must be initiated by the user.

> Hardware structure > HW library > FF-HSE or FF-H1 device library > Parameters... > Update standard dictionary

If plausibility check errors have occurred prior to the dictionary update, it may be necessary to update the affected FF block class. (21423)

> Hardware structure > HW library > FF block library > Select block class > Object > Reread DD

7.7.2FDT 0.98

In Version 8.2, FDT 0.98 is no longer supported. If a project with FDT 0.98 components is imported, the components are marked as “not installed” in the hardware tree. In the graphic view, these components are not displayed. The affected components must be deleted from the project and replaced with FDT1.2 configurations. (21267)

7.7.3Using Resource IDs

In previous Freelance versions, the Control Builder F ID was not considered when the resource IDs were checked. From this version on, a plausibility check error is reported when a project contains a gateway or operator station with the same resource ID as Control Builder F. (21794)

7.7.4Graphic Macros

In previous versions, a software error may have caused faulty parameter assignments that were stored in a graphic macro. Due to this software error, one instance value was assigned to two parameter values, whereas another instance value was ignored. This error is now recognized during the data import, and a plausibility check error is reported. The graphic macro must by corrected by changing the parameter assignment in the macro definition. (21526)

8 New Features in V8.1 SP1

8.1 Control Builder F

8.1.1 FOUNDATION Fieldbus

Limits for FF applications with Control Builder F

Configuration and commissioning of FF applications in Control Builder F has been reworked. With this version the following limits are valid:

Communication limits of a FI 840 module:

- 600 signals (Pub/Sub)
- 64 sessions (Pub/Sub) or
- 70 sessions (Pub/Sub + Clt/Srv) or
- 80 sessions for all services in total (Pub/Sub + Clt/Srv + CBF + VIS)

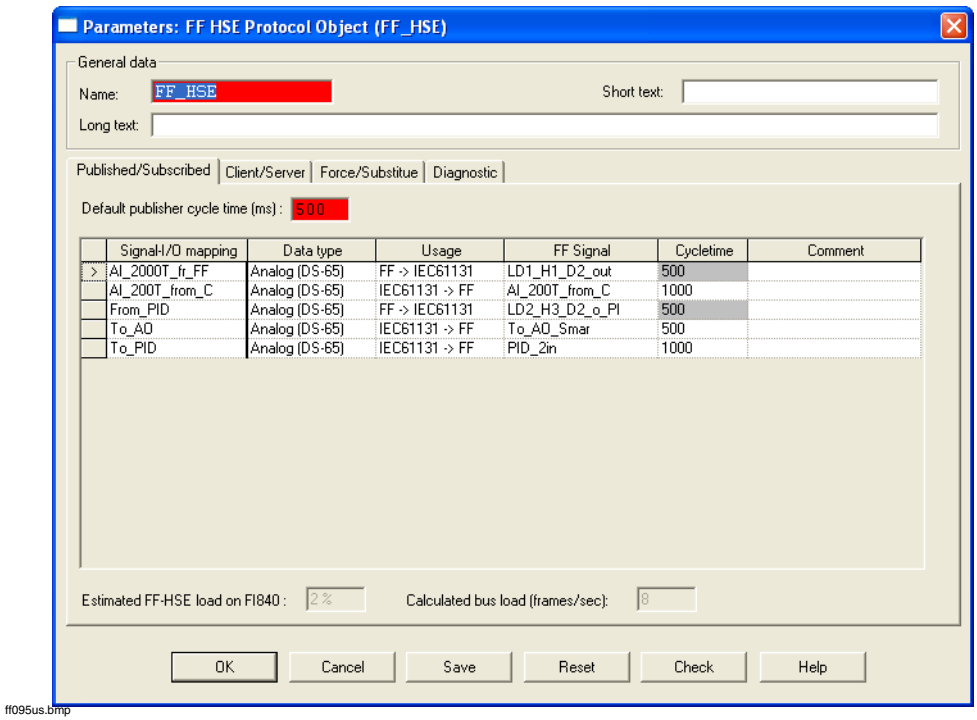
Depending on the configured cycle times and the load of the FI 840 module these maximum values may not be reached. See also FF Load Display **on page 115**

Communication resources of LD 800HSE:
refer to the documentation of LD 800HSE.

FF HSE Protocol object, Tab Publish/Subscribe

Additional to the I/O description the calculated bus load is displayed.

For estimation of the FF HSE load considers only the cyclic communication of the FF signals. Because of other occurrences the actual load of the FI 840 module may be clearly higher. Please control the actual load during commissioning. Refer also FF HSE Protocol Object on page 120



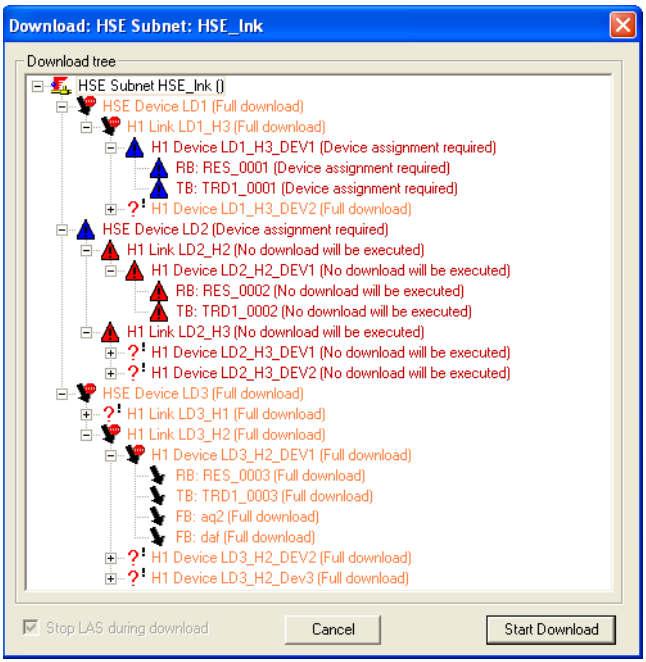
ff095us.bmp

New Download Dialog for FF Devices

The download dialog for the object classes

- FF_HSE_LINK FF (HSE link object),
- FF_HSE_DEV (HSE linking device),
- FF_H1_LINK (H1 link) and
- FF_DEVICE (H1 device)

has been enhanced. You can call up this dialog from the context menu or via **Object > Load….**



Load_HSELink.bmp

The tree view indicates for each structural element whether the object will be loaded or not. An element will not be loaded if a device assignment is required. In that case a blue triangle will be shown at the corresponding device.

The check box “Stop LAS during download“ is located below the tree view. Depending on the element, the download dialog has been opened for, this option is either changeable or disabled. If the download dialog has been opened for a single FF device stopping the LAS can be avoided by unchecking this check box. For all other FF elements this option cannot be changed and consequently the LAS will be stopped during download.

The following list details the individual symbols in the download tree view and their meaning:

A device assignment or a download is required for at least one object in the compressed branch.

You can display details for all objects in the compressed branch by expanding the branch.

The object is downloaded with all configuration data (full download).

The object is downloaded with all configuration data (full download).

For an H1 link: The Link Active Scheduler (LAS) is stopped while the download is in progress, i.e. the application is interrupted.

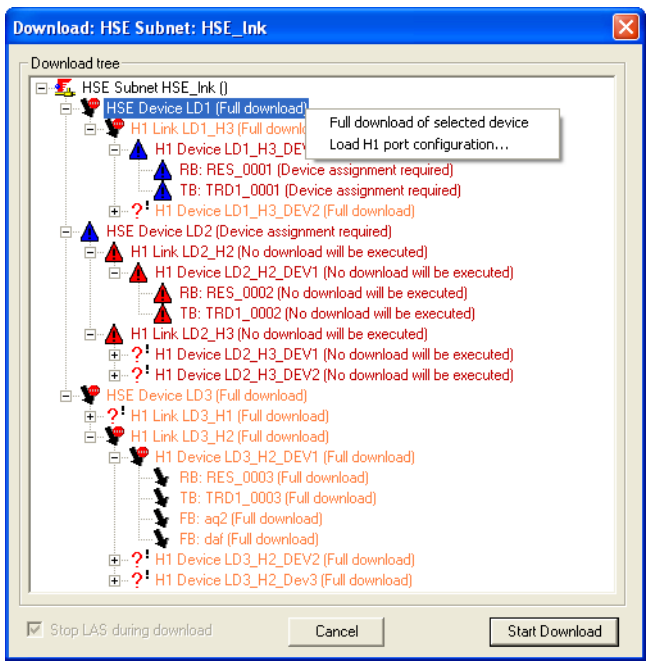
For an H1 device: The resource block is stopped. As a result, all blocks in that device changeover to OutOfService mode.

The object will not be loaded, because a superordinate object requires a device assignment.

A device assignment is required for the object.

Context Menu in the Download Dialog

The context menu allows you to select object-specific download actions and download options for the objects in the tree view of the download dialog.



Load_ContextMenu.bmp

The following menu options can be available in the context menu, depending on the selected object:

Full download of selected device

HSE device and H1_device

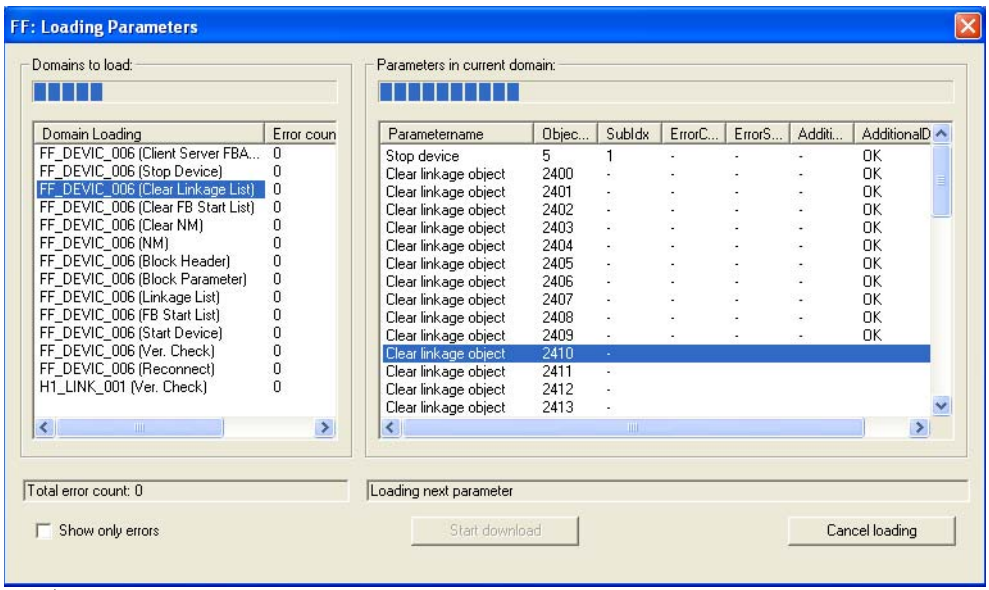
The complete configuration including the block parameters is downloaded into the device. The loading operation is started immediately upon selection of this menu option.

Load H1 port configuration

HSE device

The configuration of the H1 links in the linking device is loaded.

Note that you have click the ***Start*** button to start the download. The loading progress and possible errors or warnings (see figure below) are displayed in a new dialog. All configuration data are downloaded into the H1 devices and the linking devices. If the loading operation is successful, the following text is displayed: “**Total error count 0; Download finished"**.



Load_Parameters.bmp

If errors occur during the download, not all configuration parts are downloaded. In this case, each line shown in the right window pane that does not end with "OK" indicates and error. The error causes can be determined via the error classes and sub-classes seen here.

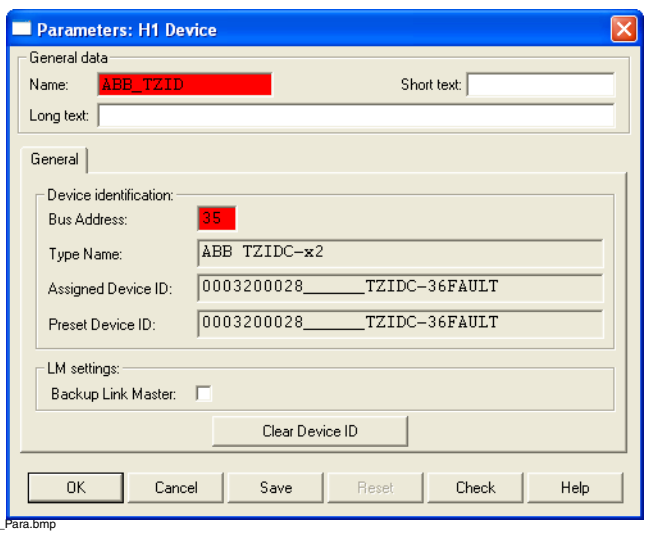
In V8.1 SP1 the download of a single H1 port of a HSE device is no longer supported. The download can be carried out by calling the context menu entry “Full download of selected device“ of the HSE device. Furthermore the appropriate H1 link can be downloaded with all H1 devices.

Automatic Device Assignment with Preset Device ID.

In a project with FF applications, the configured H1 devices must be assigned to the physical devices. So far, this assignment had to be made manually upon each project export and import. With software revision V8.1 SP1 and higher the device

assignment is saved with the project. As a result, an automatic assignment is possible upon a project import.

In the context menu of the objects **FF_HSE_LINK (HSE segment), FF_HSE_DEV (linking device)** and **FF_H1_LINK** you can select the function **Assign devices automatically**. The device IDs of physical devices are read and compared with the project data. The device assignment is made automatically for all recognized configured devices. Note that this applies to the respective tree section, only.



DevInst_Para.bmp

The configured device ID is provided by the device assignment. The user cannot enter an ID. The **Clear Device ID** button is used to delete all device ID entries. Subsequently, a new device assignment can be made.

FF Load Display

In order to facilitate the commissioning phase, the current CPU load and FF network load are displayed together with the HSE protocol object.

Sys_HSEObj.bmp

CPU load indicates the complete load of the HSE FI840F module. The value of **FF Cycle** indicates the load of the configured cycle for the Publisher/Subscriber services. In normal operating mode the cyclic FF load must not exceed 70%, otherwise the system behavior in extreme situation will be unpredictable. In case of overload this value can be greater than 100%. This will cause a system message in DigiVis.

FIO-100 No Longer Supported

With software revision 8.1 SP1 and higher, the FIO-100 linking device is no longer supported. If a project created with a previous Freelance version is imported where FIO-100 is used, a message is displayed notifying that a least one used class has not been installed. The affected hardware part is handled as “not activated”. As a result, no plausibility check messages are generated.

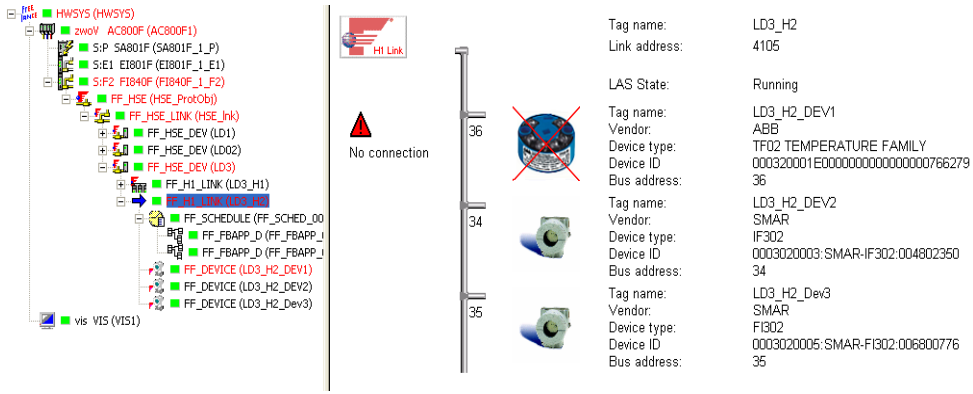
In order to be able to commission this plant part, you have to transfer the configuration to an LD 800HSE linking device.

8.1.2State Display in the Hardware

Error Display and Propagation in the Hardware Structure Tree View

In commissioning mode, an error in a fieldbus device or module is indicated by displaying the node in red. Additionally, all superordinate nodes in the tree up to the

process station node are shown in red. This means, errors are also indicated in collapsed tree displays.



HwTree_Err.bmp

8.1.3 Working with Telecontrol blocks

Extended data format for certain blocks

The Telecontrol blocks “FWK_S_ZWERT” and “FWK_S_ZWR” have been upgraded. In addition to the existing functions

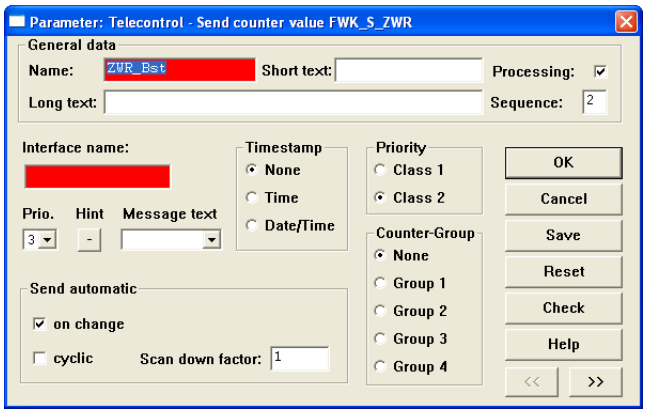
<15> (Integrated totals: M_IT_NA_1) and

<16> (Integrated totals with time tag: M_IT_TA_1)

the function

<37> (Integrated totals with time tag CP56Time2a: M_IT_TB_1)

is available now. The desired format type can be selected by choosing one of the timestamp options “None”, “Time” and “Date/Time” in the parameter dialog of the block.



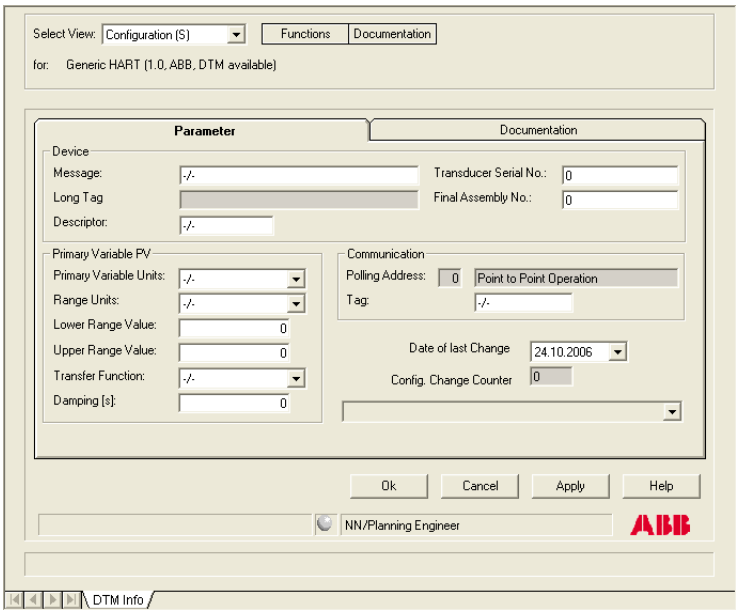
HwTree_Err.bmp

8.1.4 Working with DTMs

Changes of the DTM User Interface

Like with previous Control Builder F versions, the graphical user interface of a DTM can be selected from a list box under **Select View**. A new feature of this version is that both the functions without the graphical user interface and the documentation functions are available in the DTM view.

The list of available user interfaces, functions and documentation types may be different in configuration mode and commissioning mode.



DTM_View.bmp

8.2 DigiVis

8.2.1System Display

Error Display and Propagation in the System Display

An error in a fieldbus device or module is indicated in the System Display hardware tree by displaying the node in red. Additionally, all superordinate nodes in the tree up to the **process station node** are shown in red. This means, errors are also indicated in collapsed tree displays.

View of FF device status in System Display

Within the system display in DigiVis the state of the FF devices is shown in the same way like in Control Builder F. Following some examples for the different FF object types are listed.

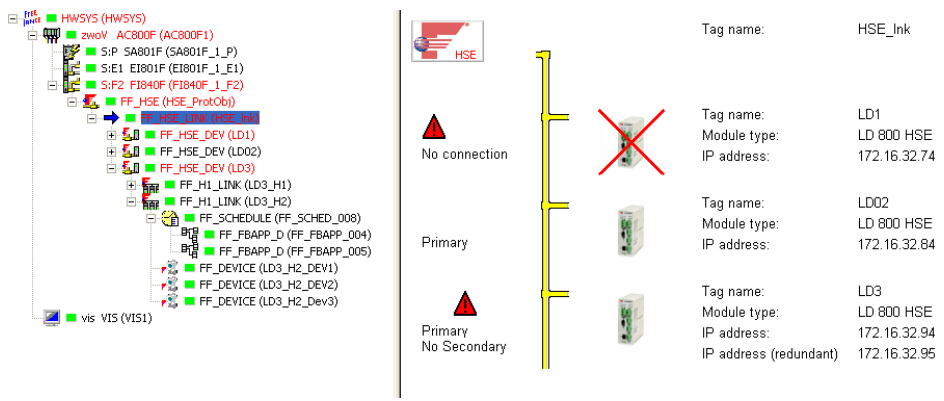
FF HSE Protocol Object

In the DigiVis System Display, the FF HSE protocol object is indicated in the same way as in commissioning mode in Control Builder F. The module view shows the status information and load data.

Sys_HSEObj.bmp

FF HSE Link Object

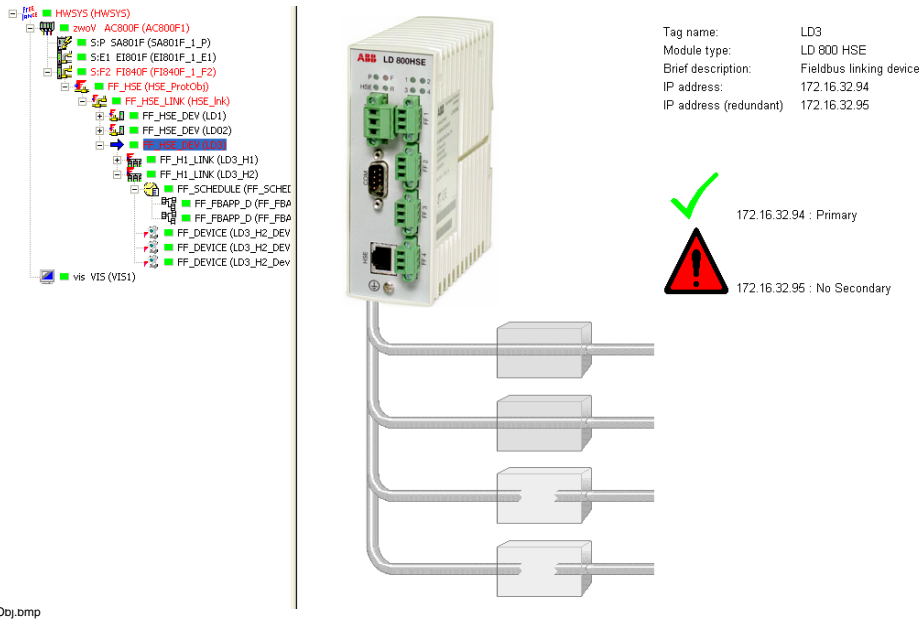
The module view of the FF HSE link object contains the status information and configuration data for the HSE devices on this HSE segment.



Sys_LinkObj.bmp

FF HSE Device Instance Object

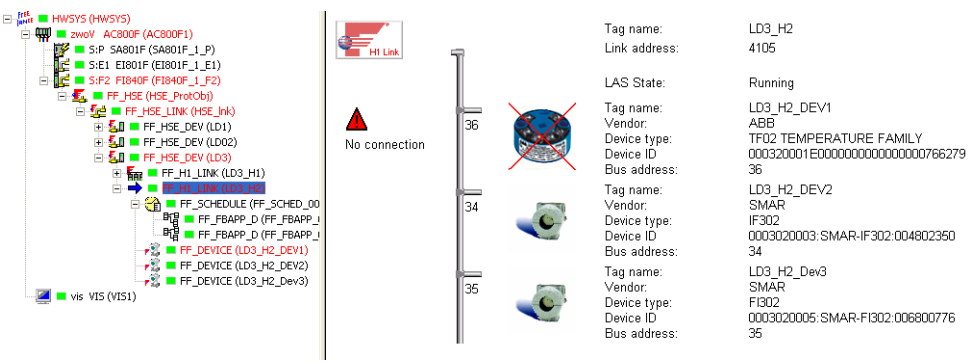
The module view of the FF HSE device instance object shows the status information and configuration data for both the HSE device and the H1 segments (channels of the HSE device).



Sys_LDObj.bmp

FF H1 Link Object

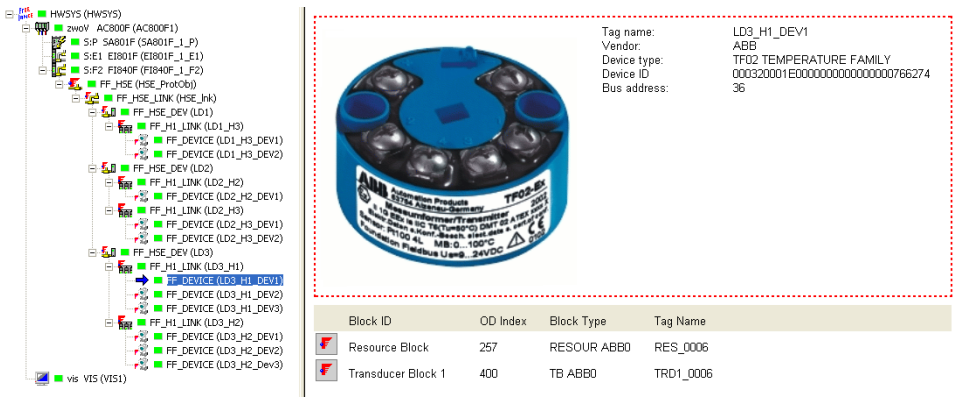
The module view of the FF H1 link object contains the status information and configuration data for the H1 segment (channel of the linking device) and for the field devices on this segment.



Sys_H1LinkObj.bmp

FF H1 Device Instance Object

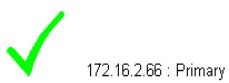
The module view of the FF H1 device instance object contains status information and configuration data for the field device. In contrast to Control Builder F the current operating mode of the resource, transducer and function blocks are not indicated.



Sys_H1DevObj.bmp

8.2.2State Displays

State Displays of an HSE Device



Normal state. There is a connection to the HSE device. The device appears in the Live List.

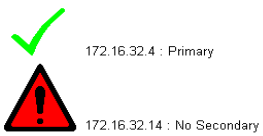
There is no communication link to the HSE device with the given IP address, tag name and device ID.

If there is no communication link to the HSE device with the given IP address, tag name and device ID.

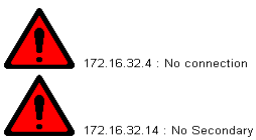
Reason	Remedy
• The actual HSE device is not connected to the HSE segment.	Connect the actual HSE device to the HSE segment.
• There is no connection between the DigiVis station and the AC800F controller which is linked to the HSE segment via an FI840 module.	Establish a connection to the AC800F controller.
• The FI840 module is not connected to the HSE segment.	Establish a connection between the FI840 module and the HSE segment.
• The FI840 module is switched off.	Switch on the FI840 module.
• The configuration data have not been downloaded into the AC800F controller.	Download the configuration data into the AC800F controller.
• The current configuration data have not been downloaded into the DigiVis station.	Download the configuration data into the DigiVis station.
• At least one of the configured parameters, i.e. the IP address, the tag name or the device ID, in the database does not match the current value of the actual device.	If required, change the IP address in the configuration and/or actual device and make a new device assignment.

State Displays of a Redundant HSE Device

Normal state. There is a connection between the primary and secondary HSE device. Both devices appear in the Live List



There is no communication link to the secondary HSE device. Only the primary HSE device appears in the Live List



There is no communication link to any of the two redundant HSE devices. No HSE device appears in the Live List.

If there is no communication link to the secondary HSE device and only the primary HSE device appears in the Live List:

Reason	Remedy
• The secondary device is in an error state. It is not ready to take over the role as a primary linking device.	Replace the defective HSE device. Follow the instructions for replacing a defective linking device in a redundant linking device setup.

Reason	Remedy
• The actual HSE device is not connected to the HSE segment.	Connect the actual HSE device to the HSE segment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.
• The configured IP address in the database does not match the current IP address of the actual device.	If required, change the IP address in the configuration data and/or in the actual device. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.

If there is no communication link to any of the two redundant HSE devices and no HSE device appears in the Live List:

Reason	Remedy
• None of the actual HSE devices of this redundancy pair is connected to the HSE segment.	Connect the actual HSE devices to the HSE segment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.
• There is no connection between the DigiVis station and the AC800F controller which is linked to the HSE segment via an FI840 module.	Establish a connection to the AC800F controller.
• The FI840 is not connected to the HSE segment.	Establish a connection between the FI840 module and the HSE segment.
• The FI840 module is switched off.	Switch on the FI840 module.
• The configuration data have not been downloaded into the AC 800F controller.	Download the configuration data into the AC 800F controller.
• The current configuration data have not been downloaded into the DigiVis station.	Download the configuration data into the DigiVis station.
• The configured IP address in the database does not match the current IP addresses of the actual devices.	If required, change the IP addresses in the configuration and/or actual devices and make a new device assignment. Follow the instructions for commissioning a redundant linking device in the FF linking device's user documentation.

State Displays of an FF H1 Link Object

There is no connection to the linking device's H1 channel.

If there is no connection to the linking device's H1 channel:

Reason	Remedy
• There is no connection to the HSE device (FF linking device) that contains the H1 channel. Refer to the “HSE Device State” tables for possible reasons.	See the “HSE Device State” tables.
• The H1 channel in the HSE device (FF linking device) assigned to this H1 segment has not been activated.	Activate the H1 channel and commission the linking device (load the H1 port configuration).

State Displays of an FF H1 Device Instance Object

There is no communication link to the H1 device with the given bus address, tag name and device ID.

If there is no communication link to the H1 device with the given bus address, tag name and device ID:

Reason	Remedy
• There is no connection to the H1 channel of the HSE device (FF linking device). Refer to the “H1 Link State” tables for possible reasons.	See the “H1 Link State” tables.
• The physical H1 device is not connected to the H1 link.	Connect the actual H1 device to the H1 link.
• At least one of the configured parameters, i.e. the bus address, the tag name or the device ID does not match the current value of the actual device.	Make a device assignment for this H1 device.

8.2.3 General

New System Alarm

During plausibility check of a project, the required network buffers are calculated. In very few cases, e.g. in case of an improperly installed network, these calculated resources are not sufficient. A warm start can solve this problem. A system alarm indicates the problem and recommends a warm start.

"Network buffer low, warm start recommended" or

"Network buffer error, warm start recommended"

(21372)

8.3 CBF Viewer

A new version (V8.1 SP1) of the stand-alone program **CBF Viewer** integrated in DigiVis is now available. This version supports long plant area names. Additionally, special characters can be used for steps and transition names.

Please note that Unicode characters (Japanese, Chinese, Russian) are not supported.

8.4 Upgrading previous Versions to V8.1 SP1

8.4.1 FF Standard Dictionary

A new version of the FF dictionary (FF Standard Dictionary standard.dct) is delivered with version V8.1 SP1. Please note that the new dictionary is not taken over automatically when importing a project from a previous Freelance version. The update must be initiated by the user.

> Hardware structure > HW library > FF-HSE or FF-H1 device library > Parameters... > Update standard dictionary

If plausibility check errors have occurred prior to the dictionary update, it may be necessary to update the affected FF block class. (21423)

> Hardware structure > HW library > FF block library > Select block class > Object > Reread DD

8.4.2 Using Resource IDs

In previous Freelance versions, the Control Builder F ID was not considered when the resource IDs were checked. From this version on, a plausibility check error is reported when a project contains a gateway or operator station with the same resource ID as Control Builder F. (21794)

8.4.3 Graphic Macros

In previous versions, a software error may have caused faulty parameter assignments that were stored in a graphic macro. Due to this software error, one instance value was assigned to two parameter values, whereas another instance value was ignored. This error is now recognized during the data import, and a

plausibility check error is reported. The graphic macro must by corrected by changing the parameter assignment in the macro definition.(21526)

9 New features in V8.1

9.1 Operating System

9.1.1 Windows XP Professional SP2

Freelance 800F Version 8.1 has been released for use with the operating system Windows XP Professional SP2. The use under Windows 2000 is no longer supported.

9.1.2 Windows 2003 Server

Freelance OPC Server F and Trend Server can also be run under the Windows operating system 2003 Server. This feature is intended specifically for coupling with 800xA.

9.2 DigiVis

9.2.1 Advanced User Interface

The operator station's graphical user interface (GUI) has been completely redesigned and modernized. All DigiVis functions known from previous versions are still available, but can be accessed more easily and intuitively.

9.2.2 Screen Resolution

The new GUI provides more details than the one known from previous versions. After start-up, DigiVis first checks the current screen resolution of your PC and then appears with either the conventional low-resolution GUI or the newly designed high-resolution GUI.

The new GUI has a standard resolution of 1280 x 1024 pixels. With all screen resolutions providing at least 1024 pixels in vertical direction DigiVis will start with the new GUI.

9.2.3Operating Philosophy

An essential feature of the new operating concept is the new context menu which you can call by right-clicking with the mouse. It replaces the display selection dialog used so far. Now all operations can be initiated by either entering commands into input masks or invoking context menus.

Operations can be triggered not only by selecting menu items but also by clicking the respective toolbar buttons.

At many points you can display tooltips providing user assistance or details.

9.2.4CBF Viewer

The separate **CBF Viewer** software package has been integrated in DigiVis. The context menu has been extended by the item **Control Aspect**.

This new feature allows you to open the commissioning view of a step or transition program known from Control Builder F. Simply click the respective step or transition in the SFC display and select the **Control Aspect** option from the context menu. Additionally, you can call the Control Aspect for each tag via the context menu. The Control Aspect is an animated graphic representing the program in which the tag has been configured in Control Builder F, similar to the program display in the Control Builder F commissioning mode.

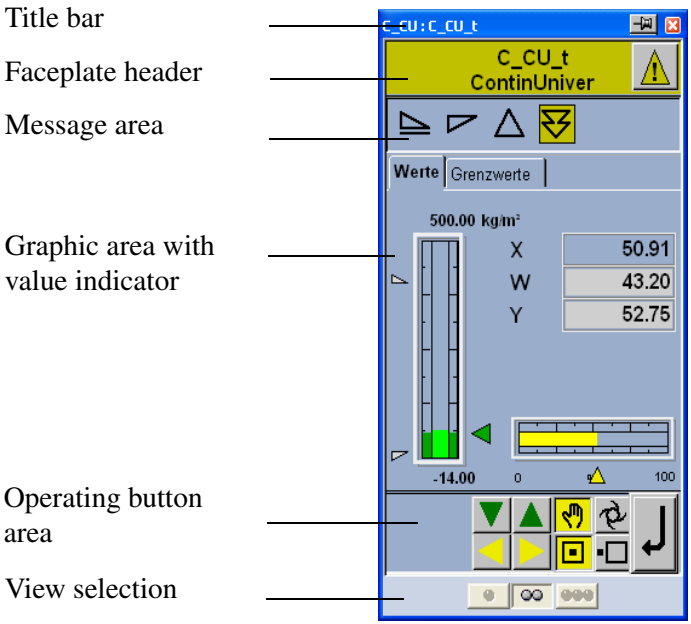
The optional Control Aspect application must be available on each DigiVis operator station in order to allow for the use of this function. (See the price list for V8.1.)

9.2.5New Faceplates for Standard Function Blocks

Revised faceplates fitting well with the new DigiVis GUI are available for the standard function blocks. The faceplates have been adapted to the faceplate layout used by the ABB 800xA system. This feature considerably simplifies the

simultaneous use of Freelance 800F operator stations and 800xA system operator consoles.

New faceplate layout



New buttons with colored (yellow and green) arrows have been added to the operating button area. These buttons allow for incremental adjustment of the process values. Clicking on one them increments or decrements the associated process value by a calculated difference within its own scaling. The new value is directly downloaded to the process station without requiring confirmation and is indicated in a data tip field at the current cursor position. You can repeat this operation as often as required by continuously clicking the corresponding arrow button (holding the left mouse button down for a longer time). With this, a constant change of the process value is achieved instead of a stepwise change normally resulting from typing in a new process value.

Additionally, you can increase or decrease the controller setpoint and output value by moving the slider (colored triangle) to the right of or under the bargraph.

9.2.6 Opening Several Faceplates in Parallel

With software revision level V8.1 and higher, you can open several faceplates at the same time on the same DigiVis station. When running DigiVis with the new GUI on a high-resolution screen, you can open up to five faceplates in parallel. With a conventional low-resolution screen up to three faceplates are possible.

When calling up another faceplate although the maximum number of faceplates are already open, the faceplate which has not been activated for the longest time is automatically closed.

If you want to prevent a specific faceplate from being closed down automatically by this function, you can 'pin' it to your screen by clicking the **Pin** button in the faceplate title bar. A pinned faceplate can be moved freely within the display area, but will not be closed automatically. A maximum of four (high-resolution screen) or two (low-resolution screen) faceplates can be pinned down in this way. You will, thus, always be able to open a new tag.

A special DigiVis function allows you to define how several faceplates shall be arranged in the current display area: either cascaded or tiled.

Cascade (left) and **Tile** (right) toolbar buttons

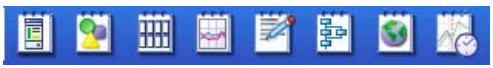
Cascade A newly opened faceplate overlaps the previously active one, but is slightly displaced towards the bottom right corner as compared to the top left corner of the last active faceplate. If this newly calculated position does not allow for a full view of the new faceplate in the display area, the faceplate is moved up and to the left hand side until it appears fully on the screen.

Tile As far as this is possible, the faceplates are tiled. Every new tag is placed alongside the previously active one without overlapping it.

If several faceplates are shown on a DigiVis station, they can be arranged, as required, by using the **Cascade** and **Tile** toolbar buttons.

9.2.7Standard Displays

In the new DigiVis version the standard displays have been modernized and adapted to the new operating philosophy by omitting the dialogs. Now you can use the icons in the icon bar for selecting a display.



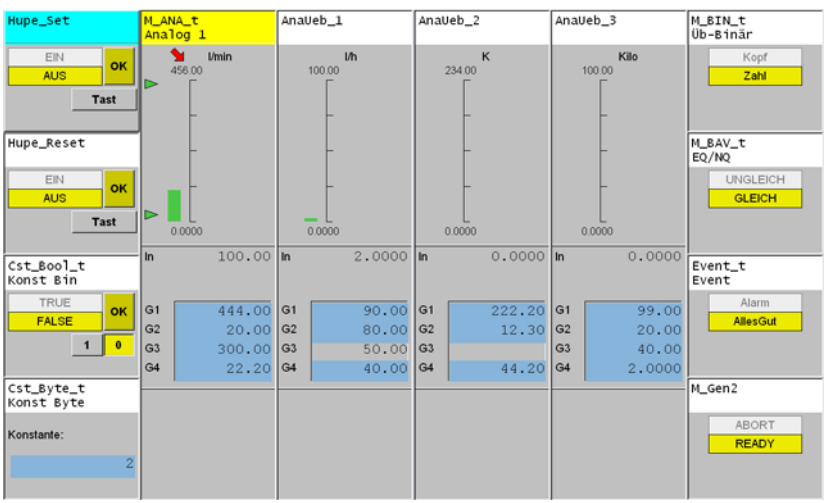
With this, all standard displays and tags available on the operator station are shown in a tree structure with the corresponding icon.

New Group Display

A layout corresponding to the 800xA System faceplates has been chosen for the new faceplates. As a result, the group display arrangement has also been changed. The conventional faceplates allow you to display only six tags per group display. The group display height is equivalent to the height of one standard faceplate or of four small faceplates one on top of the other.

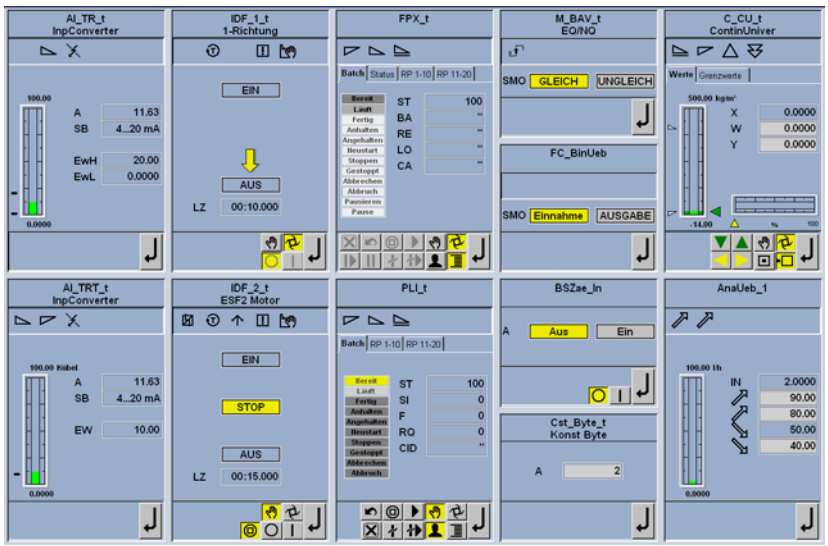
With the new layout, you can display five tags side by side and two stacked standard faceplates. Two small faceplates one on top of the other have the same size as one standard faceplate.

Conventional group display



Grp_Old.bmp

New group display



Grp_new.bmp

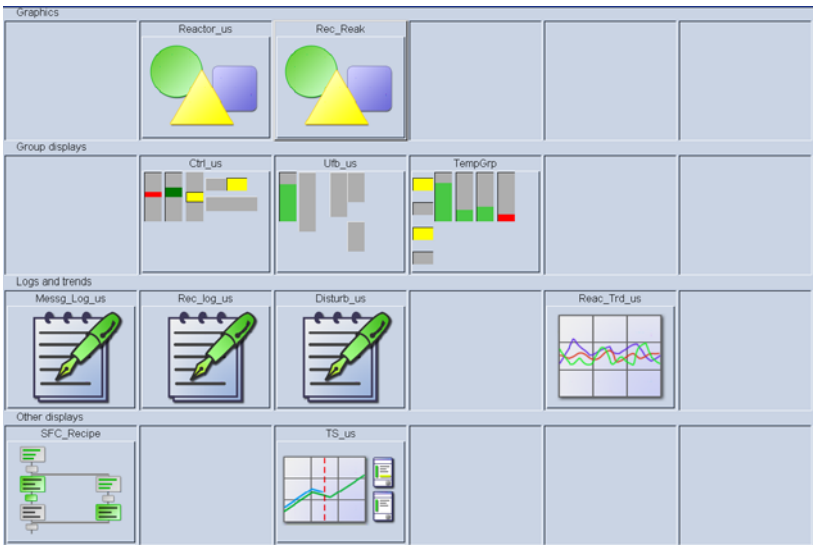
When importing projects from previous versions, Control Builder F attempts to convert the group definition to the new grid. For example, the faceplate at position six of the conventional group display migrates to the second row of the first column in the new group display.

When calling up a group display under DigiVis that does not match the current screen resolution, some faceplates may be “outside” the viewable area. You can display these faceplates by scrolling up/down or left/right.

New Overview Display

Due to the new group display layout, there are new group display icons in the overview display. Additionally, new standard display icons are used.

New overview display

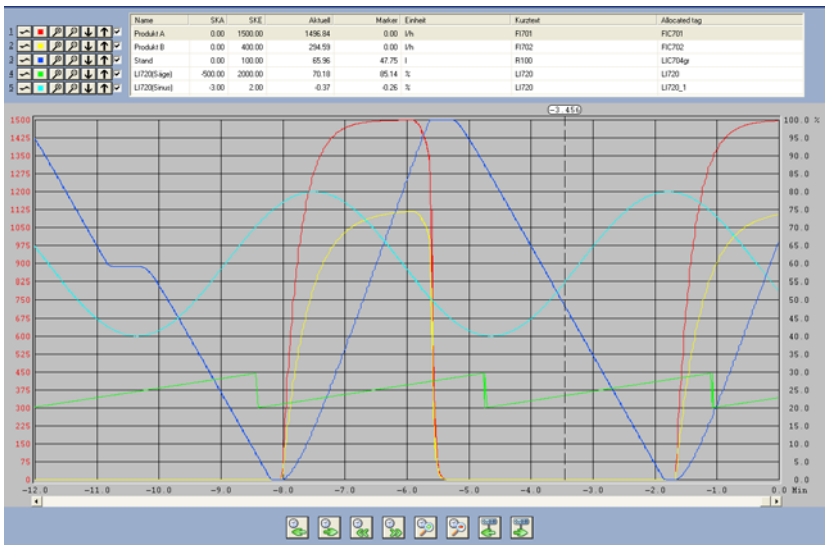


Overview.bmp

New Trend Display

Instead of using a central operation dialog you can now operate the individual trends directly in the new trend display by clicking dedicated buttons. Functions related to the entire trend display, like zooming in/out or shifting the time axis, can be performed by clicking the appropriate buttons under the trend curves.

New trend display

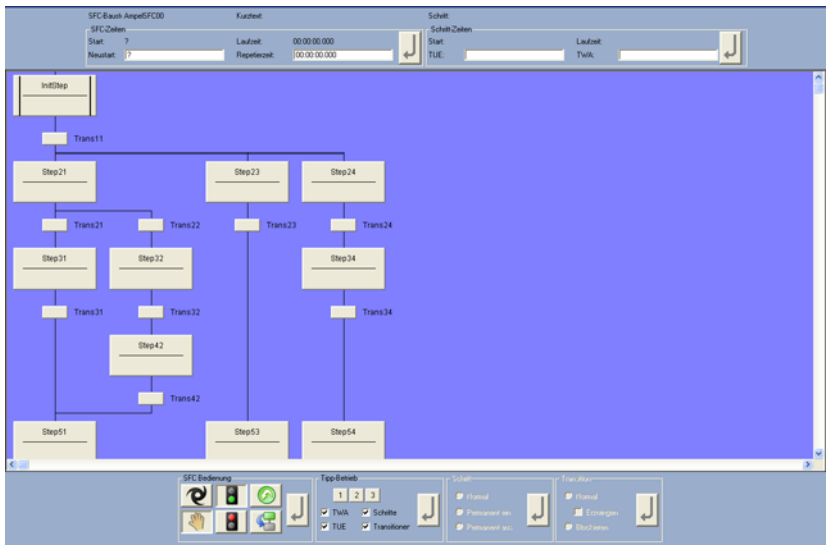


Trnd_new.bmp

New SFC Display

The visualization of the sequential function chart has changed for both GUI versions. The operation of the new GUI version has also been updated. However, the functionality has not changed from the previous version.

New SFC display



SFC_New.bmp

If the **CBF Viewer** program is installed on the DigiVis PC, the context menu of a step or transition also contains the **Control Aspect** menu option. After selection of this item, the associated configured program with the current process values is displayed.

9.2.8Message Line

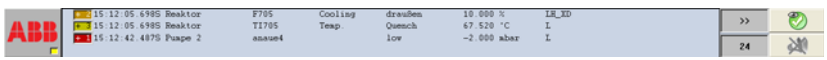
The new GUI for high-resolution screens allows you to see more information in the message line. Three different display modes can be selected:

Toolbar buttons for switching between the message line displays (Standard/Area/List)

- Standard view:
  Individual tags with tag names and related tag information.
  This display mode corresponds to the message displays of previous versions. However, more tags can be displayed at the same time with this version.
  Double-clicking the message calls up the associated faceplate.

- Area view:
  A dedicated position of the message line is assigned to each area. The number of associated active messages is indicated for each area. The area is highlighted in the priority color of the most important message of this area. The tooltip details the most important message. Clicking an area button opens a specific message list for this area.

- List view:
  The four most important messages are shown in the same format as on the message page. Double-clicking the message calls up the associated faceplate.



You can switch between displays using either the menu or the assigned toolbar buttons.

Menu: **View > Standard view / Area view / List view of message line**

9.2.9External Aspect

The new Freelance version allows you to configure a link to any Windows program and add it to the context menu as a special item. With this feature, you can link, for example, MS Word documents or MS Excel spreadsheets to a tag.

Caution: When using this function, there is a potential risk that the operator may freely access the operating system from DigiVis.

9.2.10Control Aspect

If the optional **CBF Viewer** is installed on the DigiVis PC, each tag's context menu also contains the **Control Aspect** menu option. After selection of this menu item, the associated configured program with the current process value is displayed.

9.2.11Security Lock and DigiVis

If the optional Security Lock program for DigiVis is installed, an open or closed padlock icon is shown in each display, indicating whether the logged-on user has the right to operate this display or not.

Padlock icon:
Open padlock = operation enabled
Closed padlock = operation disabled

9.2.12PC Relay Card for the Horn

No longer supported. Drivers for this hardware cannot be run under Windows XP.

9.3 Control Builder F

9.3.1Long Area Names

With Freelance version V8.1 and higher, a 16-character name can be assigned to the areas. If no specific name is assigned, the areas are called "Area A" to "Area O" by default. In the tag list, the areas are always represented by their long names. When selecting filters in the Control Builder F, the short names "A" to "O" are displayed together with the long names.

The new DigiVis GUI always displays the long names of the used areas. In the conventional GUI, the short names of the areas are still used, due to confined spaces.

9.3.2Check project

Checking the Sequential Function Chart (SFC)

No plausibility check message is generated, if no SFC display has been configured for a sequential function chart.

Checking the Time Scheduler

No plausibility check message is generated, if no time scheduler display has been configured for a time scheduler block.

Checking the Trend Acquisition

When using a trend acquisition block without an associated trend display, a plausibility check message is generated only if at least one DigiVis station has been configured in the project.

Checking the Disturbance Course Log

When using a disturbance course log block without an associated disturbance course log, a plausibility check message is generated only if at least one DigiVis station has been configured in the project.

9.3.3More Space for Free Graphic Displays

As the operation dialog is no longer needed, there is more space available for graphic displays. The maximum height of a graphic display has been increased. A graphic display from a previous Freelance version can be adapted to the new maximum size. By selecting:

Options > Resize display

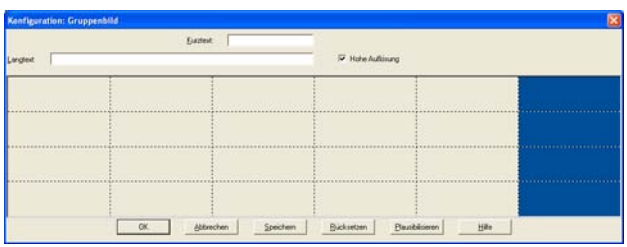
you can change the internal graphic size of 10240 x 6184 virtual pixels to 10240 x 6728 pixels.

The content of the graphic display remains unchanged. Only the background is increased accordingly, i.e. it becomes higher.

9.3.4Group Display Configuration

As the standard group display has changed in the new GUI, you must define in the group display configuration if the group display intended for a DigiVis station with high or low resolution. 6 x 1 or 5 x 2 standard faceplates can be arranged in a group display, depending on the selection made here.

Configuring a group display for a high-resolution DigiVis station



GrpCnf_High.bmp

Configuring a group display for a low-resolution DigiVis station

GrpCnf_High.bmp

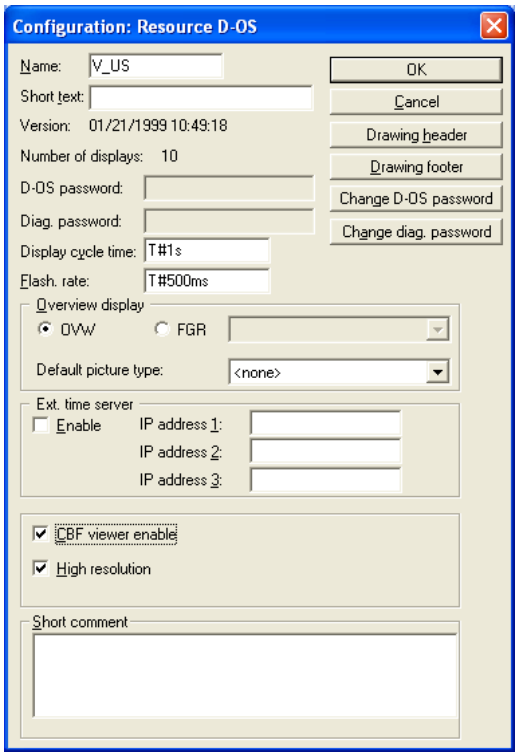
You cannot place a faceplate in the blue area seen in the right section of this dialog box. However, if you import a project from a previous Freelance version, faceplates may nevertheless reside in this area, due to the different formats. In this case, you should find another place for the faceplates in the blue area, either within the same group display or by creating a new group display. This is often the case when a classical group of 24 binary faceplates are imported into version V8.1, as a maximum of 20 binary faceplates can be placed here.

9.3.5Optimizing the Plausibility Checking Time

The interdependence between configuration changes and other project data has been optimized. As a result, the time required for plausibility checking upon such a change in an already plausible project has been considerably decreased. (20691)

9.3.6Integrating the CBF Viewer

If you want to use the CBF Viewer for displaying the Control Aspect of a tag or the step or transition programs in a sequential function chart, you can accordingly configure the resource header of each DigiVis station.



GrpCnf_High.bmp

Beside the OPC Server (or Trend Server) the CBF viewer requires the project's current CSV file. Control Builder F generates the current CSV file in the background when the plausibility check is initiated from the first level project node.

In larger projects, the time required for generating the CSV file may assume a large value, and cannot be neglected. As a result, the generation of the CSV file has been linked with the project node plausibility check. If you select, for example, the CONF node and initiate the plausibility check from there, the CSV file is not generated.

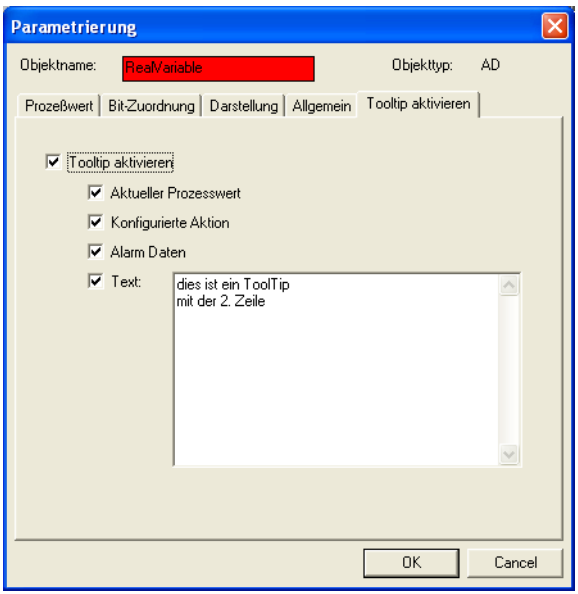
In the commissioning phase, it may be reasonable to initiate the plausibility check from the CONF node, or even from a subnode, and only sometimes directly from the project node, at least once at the end of this procedure.

When downloading data to the DigiVis station, the generated CSV file is written to the DigiVis PC.

9.3.7Graphic Editor

Configuring Tooltips

A tooltip can be configured for each dynamic object. For this purpose, a new tab card called **Tooltip** is available in the objects' configuration dialog windows.



Cnf_ToolTip.bmp

Enable tooltip

When selecting the Enable tooltip check box, the check boxes below it are selected as well. If several tooltip variants are configured, these are listed in DigiVis together in one tooltip.

Current process value

The name of the display variable and the current process value are displayed in DigiVis:

`Value(<name>): <current value>`

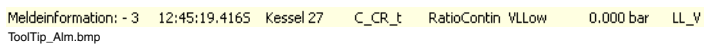
Configured action

The action initiated by clicking on the object is displayed as a tooltip.

`Load display <name>`

```
Open faceplate <name>
Write variable <name>
Quit message
Confirm operation
Cancel operation
```

Message data The alarm information representing the object is displayed as a tooltip, for example:



ToolTip_Alm.bmp

Text In the Text input field you can enter any multi-line text intended to be indicated in the same format in the tooltip.

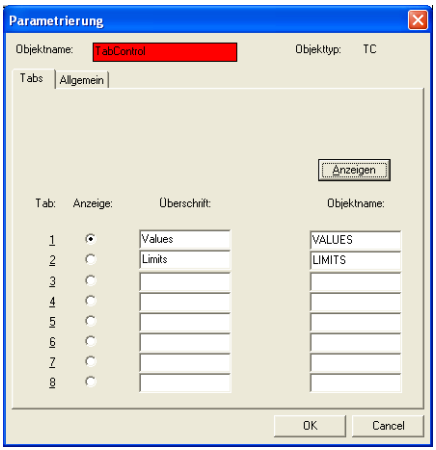
New Function: Alignment

After having selected several graphic objects (with SHIFT + mouse click), you can align them with each other. For this purpose, the new **Align** menu item has been implemented in the **Edit** menu. In the respective submenu, the functions **Left sides**, **Left/right centers**, **Right sides**, **Tops**, **Top/bottom centers**, **Bottoms**, and **Distribute horizontally** and **Distribute vertically** are available.

The last selected object is highlighted by a selection frame. This object will be used as the reference object for aligning the top, bottom, left and right sides

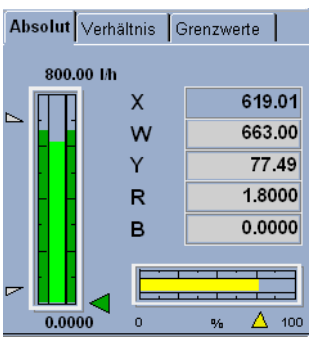
Tab Control

Tab Control is a new dynamic object. Up to eight tabs can be handled using this element. You can assign a group of static and/or dynamic graphic elements to each tab.



TabContr_2.bmp

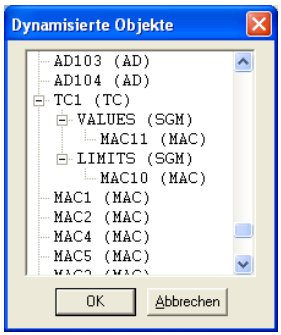
When selecting one of these tabs in DigiVis, the assigned graphic area appears in the foreground.



TabContr_1.bmp

Re-editing Dynamic Objects

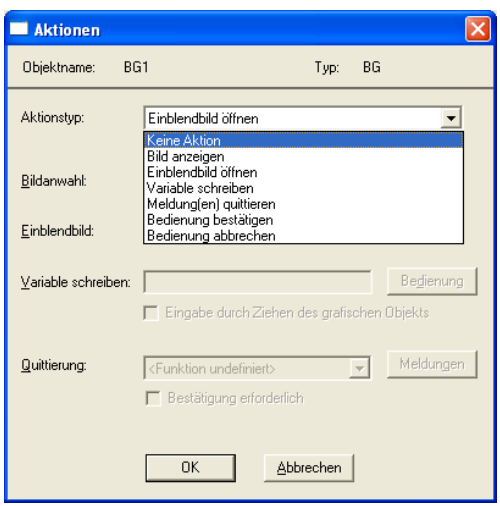
In software version V8.1 and higher, the dynamic objects of a graphic display are listed in a tree view. This allows for easy and direct selection for re-editing – even of nested objects.



GED_ReEdit.bmp

Configuring Actions

The **Actions** configuration dialog window has been re-designed.



GED_Aktionen.bmp

The other input fields are enabled or disabled, depending on the selected action type. The following actions are possible:

- No action
- Show display
  You can enter a display name in the **Show display** field - either directly or via the **F2** key. The corresponding display will then be invoked by selection of the object in DigiVis.

- Show faceplate
  Enter a tag name in the **Show faceplate** field - either directly or via the **F2** key. The corresponding faceplate will then be invoked by selection of the respective object in DigiVis.
- Write variable
  Enter a variable name in the **Write variable** field - either directly or via the **F2** key. A new value for this variable will then be written into the process station. The **Operation** key is activated for configuring the write action. If this action is configured for a graphic icon, the **Input by drag&drop of the graphic object** is activated. You can find a detailed description later in this document.
- Acknowledge message(s)
  In the **Acknowledge** field you can choose a function for message selection. The **Message** button and the **Operation needs to be confirmed** check box are activated. See *Execute confirmed operation*.
- Execute confirmed operation
  You can configure rules for writing variables and acknowledging messages, stating that the write command will be set only when a second button corresponding to OK or ENTER is pressed once a value has been changed. When selecting **Execute confirmed operation** the graphic object will act like an ENTER key.
- Cancel confirmed operation;
  This action can cancel an operation, but requires confirmation using the OK or ENTER button. The remaining actions are also cancelled.
  When selecting **Cancel confirmed operation** the graphic object will act like an ESC key.

Writing a Variable by Moving an Object

You can write the value of a variable by simply moving a graphic object in the display with the mouse, e.g. a slider on a bargraph. For this purpose, you create a graphic symbol with the **Move continuously** option. After selection of the **Write variable** action the **Input by sliding symbol** check box is activated. When this check box is selected, you can move the object within the configured display range using the mouse. To allow for this action, an object must always be configured in the graphic display with the **Execute confirmed operation** action.

9.3.8Standard Function Block

Adapting the PLI Block for the 800xA Batch

The PLI function block has been enhanced in such a way that it can be used for linkage with both DigiBatch and the 800xA Batch program. The check box **Compatibility mode / 800xA Batch compatible** in the second parameter mask can be used for configuring this new function.

9.4 Process Handling

9.4.164 kBytes Memory Space for Variables

The PM 803F CPU provides more memory in the process station, which is used in the standard program setting. When configuring resources in the project tree you can toggle the memory space to be used for variables between 32 kByte and 64 kByte. Using the 64 kByte variable range is only possible in conjunction with the PM 803F CPU. Assigning another CPU type to this resource will result in a plausibility check error.

9.4.2New FF Linking Device Firmware Version

Release 8.1 of the Freelance 800F Software is ready for the new Linking Device LD800HSE Firmware version. For details please refer to the document *3BDS009980, Compatibility Matrix 8.1* within the ABB library under *Control Systems/ Freelance 800F/ System / Freelance 8.1 /....*

9.4.3New Versions of the FDT 1.2 Components

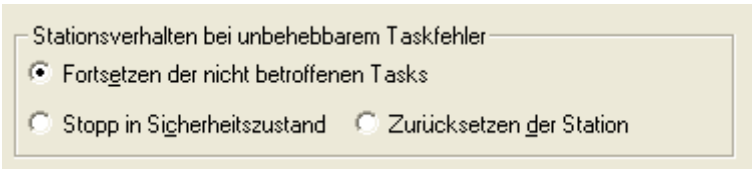
Release 8.1 of the Freelance 800F Software is ready for the new versions of the FDT 1.2 components Base Container and Shared Components. For details please refer to the document PacketAssembling_US.pdf.

9.4.4Modified Reaction on Task Errors

In the previous Freelance versions, the affected user task stopped in case of an internal error, whereas all other tasks and the I/O communication continued. This ensured a high availability. For some applications, however, a safety state is much

more important than a high availability. In case of a task error, the process station should stop, and all outputs of the process station should assume their configured safety values.

In order to allow for this behavior, the item **Resource behavior on unrecoverable task error** has been added to the process station configuration dialog window:



Cnf_TaskError.bmp

Resource behavior on unrecoverable task error

Here you can define how the process station shall behave if an unrecoverable error occurs (e.g. division by zero without the error correction function being switched on) while an application is being executed.

Continue with not affected tasks

Only the task containing the application program with the error is set to the "not executable" state. All unaffected tasks continue working. This behavior is compatible with the task behavior of previous Freelance versions. This selection is the default setting.

Stop in safety state

The station is set to its safety state in order to avoid that unaffected tasks output inconsistent data to the process. The CPU module stops working, and the I/O modules assume their configured safety values (this applies to both rack modules and field modules). For redundant process stations a redundancy toggle is performed. To restart a stopped station a manual reset is required.

Reset resource

The station is set to the safety state. For a redundant process station a redundancy toggle is performed. The station where the error has occurred is reset and automatically restarts after 10 seconds. Depending on the type of error, the station either performs a cold restart or is initialized.

Restart behavior

Upon a manual or automatic reset, the station first tries to perform a cold start. If this is not possible, e.g. due to a corrupted configuration, the station deletes the entire configuration and waits in its initialization state for the configuration to be loaded. If "Stop in safety state" has been configured, the behavior upon a reset can be read from the LEDs.

State	Failure LED	Run/Stop LED
Fatal error	Red blinking	Off
Safety > Cold start	Red blinking	Green blinking
Safety > Initialize	Red blinking	Red blinking

9.5 Upgrading Previous Software Versions to V8.1

9.5.1 Group Display Conversion Depending on the DigiVis Screen Resolution

When importing a Freelance project created with a previous Freelance version, you are asked if you want to import the group displays for the high-resolution DigiVis version. This option is preselected by default and adapts the faceplates in the group display to the new grid. If, for example, a group display contains six blocks for which standard-size faceplates are available, these faceplates were displayed side by side in the previous versions. The "High resolution" import option shifts the sixth faceplate from the last position in the first row to the first position in the second row. If this import option is disabled, the faceplate arrangement remains unchanged. Due to the new faceplate format only five tags can be displayed together. The sixth tag can be reached by scrolling, only.

If you like to use DigiVis with the conventional view (less than 1024 pixel in vertical direction) the question should be answered with “No”. In this case group displays with 6 faceplates width stay unchanged.

9.5.2 Long Standard Names for Areas

With DigiVis Version 8.1 and higher the areas are always indicated with their long names. When importing project from a previous version, the default standard names

"Area A" to "Area O" are assigned, just like in new projects created with this version.

9.5.3Graphic Displays

With the new DigiVis GUI the operation dialog has been omitted. Any inputs, for example writing a process variable, are made directly on the graphic object. This new function is automatically available and does not require any configuration changes.

Due to the omission of the operation dialog, the new DigiVis GUI provides more space for the graphic displays than the previous GUI. For displays imported from previous versions, the graphic editor indicates a size of 10240 x 6184 virtual pixels in the tool box. By selecting **Options > Update display size** you can adapt the display background to the new size of 10240 x 6728 pixels. The display content remains unchanged.

9.5.4 I/O Count Tool

With version V8.1 and higher, the I/O Count Tool is no longer available as a separate program, but is an integral part of Control Builder F. In order to be able to determine the number of I/Os in a project, you have to load the project into the Control Builder F, and it must pass the plausibility check without errors. This means, for example, that the used DTM must have been installed without any errors as well.
The number of used I/Os can only be determined for a project that has passed the plausibility check without any errors (20742).

9.5.5 PC Relay Card for the Horn

No longer supported. Drivers for this hardware cannot be run under Windows XP.

9.6 Installing the OPC Server F and Trend Server

9.6.1 OPC Server F and Trend Server

The software for the OPC-Server F and the Trend Server can also be installed under the Windows 2003 Server operating system. For this purpose, the installation procedure for these two components has been revised completely.

10 New features in V7.2 SP1

10.1 FF Communication

10.1.1 Client/Server connection

The software of the FI 840F module has been enhanced to support additional diagnostic information from the linking device LD800HSE.

The linking device parameters are accessible as I/O components of the HSE protocol object. All necessary information is configured in the Control Builder F. With this feature it is possible for the AC 800F controller to get access to internal parameters of the ABB FF linking device LD800HSE such as redundancy state or the H1 LAS states.

10.1.2 Configuration of Client/Server access

Access to the additional diagnostic information is provided by client/server communication. A new tab *Client/Server* is available in the configuration dialog of the HSE protocol object. For the components defined in this dialog a name, data type and relation to a parameter of a linking device is configured.

The name of the component is configured in the I/O editor to build the connection to IEC 61131 world. For each parameter of the LD800HSE the data type **RedStateType** or **LasStateType** must be selected.

The entry *Parameter Name* is used to specify the linking device parameter. Press F2 key in this field and navigate to the device. After either the parameter RED_STATE has been selected from a linking device or the parameter LAS_STATE from an H1 link, the entries for Block/H1-Port-Tag, Device Tag and Parameter Index are set by the system.

The cycle time must be configured as a multiple of 1000 ms.

Redundancy State

Insert a new component in the *Client/Server* tab.

Specify the *name* of the new component, e.g. **RedState1**.

For redundancy state the *data type* **RedStateType** must be selected.

Press F2 key in the field *Parameter Name*, select the according linking device from the tree, select parameter RED_STATE.

If applicable change the default value 1000 ms for the cycle time.

LAS State

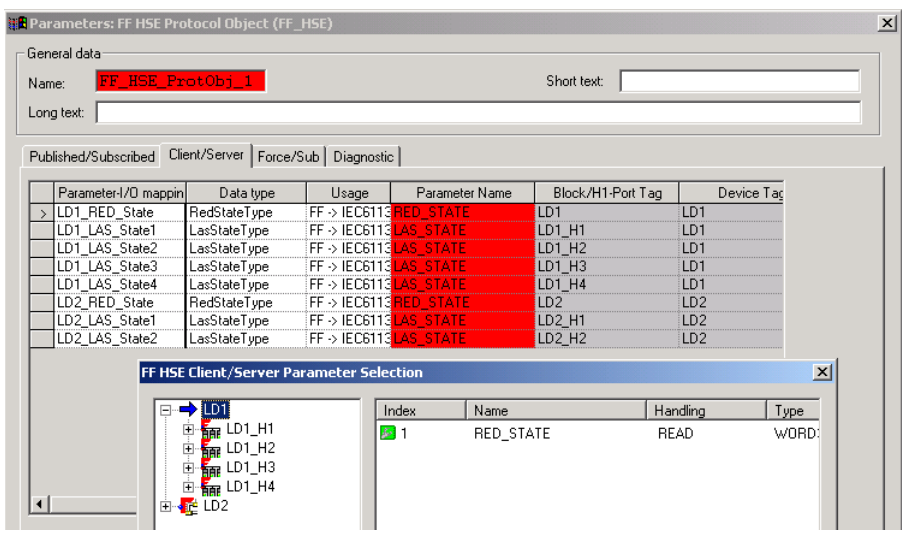
Insert a new component in the *Client/Server* tab.

Specify the *name* of the new component, e.g. **LasState1**.

For redundancy state the *data type* **LasStateType** must be selected.

Press F2 key in the field *Parameter Name*, select the according H1 link from the tree, select parameter LAS_STATE.

If applicable change the default value 1000 ms for the cycle time.



CS_001.bmp

Values of parameter RED_STATE

The bits of the parameter RED_STATE must be interpreted as follows:

Table 1. RED_STATE

Bit	Short name	Value	Description
Bit 0	IP1 present	TRUE	The LD with the IpAddress IP1 is visible in the Live list
		FALSE	not visible
Bit 1	IP1IsPrimary	TRUE	The LD with the IpAddress IP1 is primary (Live list info)
		FALSE	not primary
Bit 2	IP2 present	TRUE	The LD with the IpAddress IP2 is visible in the Live list
		FALSE	not visible
Bit 3	IP2IsPrimary	TRUE	The LD with the IpAddress IP2 is primary (Live list info)
		FALSE	not primary
Bit 4	HasConnection	TRUE	The controller has connection to LD800HSE. **Bits 5-7 are valid**
		FALSE	no connection. **Bits5-7 not valid**
Bit 5	RedStatePrimary	TRUE	Primary with backup functionality available. (info from LD800HSE Diag data)
		FALSE	primary, no backup
Bit 6	OpStatePrimary	TRUE	Primary is operational (info from LD800HSE Diag data)
		FALSE	primary is not operational
Bit 7	OpStateRemote	TRUE	Secondary is operational (info from LDHSE Diag data)
		FALSE	Secondary is not operational

The Bits 0 - 3 represent information gained from the HSE Live List which is sent cyclically by all HSE devices as a broadcast. The FI 840F will receive this information without being connected via TCP to the LD800HSE.

The Bit 4 indicates the TCP connection state between FI 840F and LD800HSE. Only if this Bit is set, the following Bits 5-7 are valid and can be interpreted correctly.

Values of parameter LAS_STATE

The value of the parameter LAS_STATE can be enumerated with the following meanings:

Table 2. values of LAS_STATE

Value	Description
1	stopped
2	running
3	not loaded
4	invalid LAS
5	unknown (not configured in LD800HSE)
0xFFFF	not connected to LD800HSE

Hold last value and Substitute value

The functions 'Hold last value' and 'substitute value' are not applicable and therefore not supported for both parameters RED_STATE and LAS_STATE.

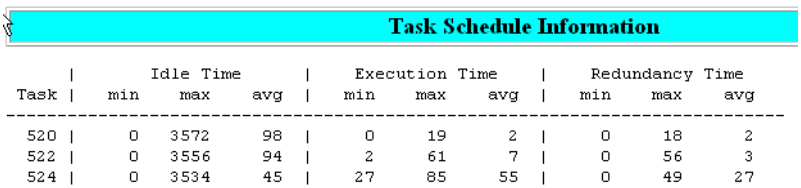
10.2 Communication of redundancy data

Inside the Ethernet interfaces of the Controller a certain transceiver chip is used. Under certain conditions some of these chips drop a complete Ethernet frame due to an internal hardware problem. Generally this can be handled by the communication software but if too many frames are lost, communication slows down and the redundancy synchronization times out. In this case the secondary controller is dropped and rebooted.

The chip manufacturers did not intend to fix the hardware problem, so the redundancy communication layer had to be changed to cope with frequently lost packets. (20583)

10.3 Enhancement of the WebServer

Starting with version V7.2 SP1 some more internal information can be seen via the built-in WebServer. (Call-up of the WebServers: Enter IP address of the process station in the Internet Explorer and select button 'Diagnosis').Within the table 'Task Schedule Information' all user tasks are listed. Minimum (min), Maximum (max) and Average (avg) are reported for each user task.



Task Schedule Information

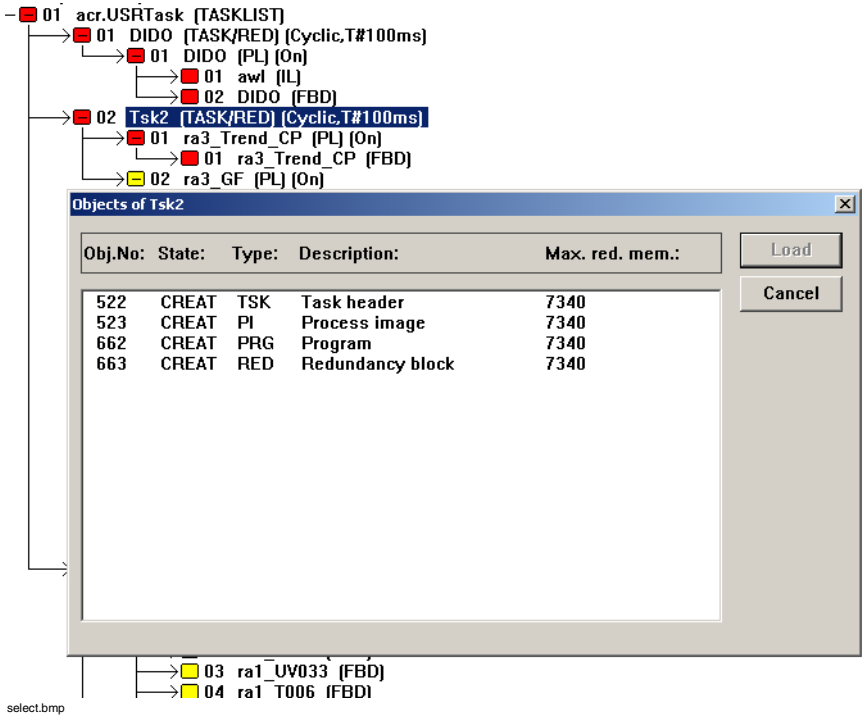
Task	Idle Time min	Idle Time max	Idle Time avg	Execution Time min	Execution Time max	Execution Time avg	Redundancy Time min	Redundancy Time max	Redundancy Time avg
520	0	3572	98	0	19	2	0	18	2
522	0	3556	94	2	61	7	0	56	3
524	0	3534	45	27	85	55	0	49	27

taskstat.bmp

with

Task	Object number of the task; the task names are not available within the process station. (1)
Idle Time	Time between two calculation cycles where the task sleeps
Execution Time	Time needed for task execution; incl. Redundancy Time
Redundancy Time	Time needed for redundancy synchronization
avg	The floating average value of the last 16 measures values is calculated

(1) The name of the referenced task can be found in this way:
Select a User task in the project tree of Control Builder F (configuration or commissioning); select from menu
> System > Show selected objects...



select.bmp

All values are given in milliseconds.

After a download or stopping and starting the controller in general the min and max values are extremely low or high and cannot be used for a qualified statement about the task behavior. Using the item 'Clear Task Statistic' in the WebServer dialog all values are cleared and calculated new. The new displayed values can be used to analyze the task performance.

Task Schedule Information

Task	Idle Time min	Idle Time max	Idle Time avg	Execution Time min	Execution Time max	Execution Time avg	Redundancy Time min	Redundancy Time max	Redundancy Time avg
520	87	97	91	3	9	6	2	9	5
522	87	94	93	6	11	7	3	6	4
524	39	46	45	54	61	55	23	29	26

tasksta2.bmp

Adding 'Idle Time' and 'Execution Time' of a task should result in the configured task cycle time. If there is a high different, select 'Clear Task Statistic' to get new calculated values.

Example for an analysis of the displayed values

Estimation of the control quality with a PID control loop:

A PID function block shall be calculated within a user task with a cycle time of 100 ms; Tcyc = 100ms. For Freelance PID control function blocks it is recommended that the relation Tcyc / Tcalc should not be lower that 5 (Tcalc means the execution time of the PID control loop), otherwise oscillations may occur.

With the help of the WebServer Enhancements the calculation time of the PID control loop can be seen in the task schedule table. Tcalc = 'Average Execution Time'

In the example above (see picture tasksta2.bmp above, 3rd list entry, Task no = 524) the calculation time of 55 ms is too high; Tcyc / Tcalc = 100ms / 55ms = 1,8. To solve this problem the following actions can be done:

- Change of task priorities
  If the task with the PID control loop works with the same or lower priority as the other user tasks, raising up the priority may shorten the calculation time of this task at the expense of the other tasks.
- Move of application parts
  Those parts of the application which have no directly dependency to the PICD will be moved into other tasks. This will shorten the execution time for the PID control loop task.
- Increase task cycle time
  Increase the task cycle time to 250 ms if the process dynamics do allow this.

Analyze of the calculated task times

Two critical points can be identified:

- 'Redundancy Time' has a value in the range of the cycle time of another redundant task

  The big task spends a lot of time synchronizing the data with the secondary controller of the redundant pair. The synchronization process cannot be interrupted by another task. A task with a fast task cycle will have to wait for the synchronization part of a big task to finish, before it can synchronize its own data. This may result in the fast task being not able to keep its cycle,

though the CPU load could be low.
Consider breaking up the big task into more than one task thus breaking up one big chunk of redundancy data into two or more smaller chunks. This will give the fast task the opportunity to synchronize its own data in between those other chunks.
Also consider to break up a big task into a redundant and a non-redundant task thereby reducing the data to be synchronized. Please note that the non-redundant task will start with initial values in case of a redundancy fail over. Perhaps it already helps to reduce the amount of variables within the process image of the big task if they do not have to be redundant.

- Very low 'Idle Time' in relation to the 'Execution Time' of a task

  In this situation the risk of an overload is given. An overload alarm message may be generated.
  For a redundant station a critical situation may arise in case of a failover. While the old secondary takes over and becomes the new primary, the old primary will re-boot and try become the new secondary. During that process the new secondary will initially load all the configuration data and current working data from the active primary. Because of the low idle time this may not be successful. In that case the station will issue a redundancy error and redundancy will no longer be available.
  Try to break up the big task into two or more smaller tasks. This will help only, if other tasks do not have the same problem. Otherwise the CPU load is to high and you should consider using an additional process station.

11 New features in V7.2

11.1 Freelance 800F

Within the evaluation at ABB from products to systems the system name Industrial IT Control System Freelance 800F, short name Freelance 800F, has been launched for the combination of Freelance 2000 and AC 800F. The names of the individual components like Control Builder F or DigiVis have not been changed.

11.2 Installation

The setup procedure has been revised. After installation of an OPC server F package on a PC, further instances can be created using the Configure tool, without running the OPC server F setup procedure again. Also OPC servers F instances can be removed from the PC with the Configure tool.
Additionally the redundant coupling to 800xA Operations via OPC server F is prepared. For standard usage the check box 'Configure separate Alias ID' must not be selected.

For an installed trend server the resource ID can be changed with the Configure tool.

De-installation of these the packages is further on only possible with all other Freelance 800F software.

11.3 Hardware

11.3.116 MByte CPU Module PM 803F Step 2

The hardware of the 16 MByte CPU module PM 803F is now available in an improved version (Step2). Compared to step1 the new version step2 supports battery backup functionality.

Step2 can be identified by the article number and the hardware index at the type tag:

Article number:	3BDH000530R1
Hardware Index:	02.00 or higher

11.3.2PM 803F with battery backup functionality

Compared to the existing Field Controller and AC 800F the behavior of the battery backup has changed with PM 803F.

The 16 MByte controller PM 803F needs a higher backup current during power down than the 4MByte Controllers. Therefore it was necessary to provide new Ethernet modules and a new battery module (EI 811F, EI 812F, EI 813F and AM 811F). A battery backup of PM 803F is possible only with these new modules. These new modules can be identified by their hardware index, which must be 2.00 or higher.

The high backup current requires a different battery check during runtime. The remaining battery capacity has to be tested under backup load conditions. This functionality is provided with this software version.

On startup or battery replacement the battery is tested under backup conditions. The battery LED is orange during this time. This first test may take up to 5 minutes, because old batteries sometimes got passive and need some time to recover. If the battery is not ok after this time, the LED switches to red and a battery alarm is generated. If the battery is good the LED becomes green. Now every 24 hours the battery is tested again under load conditions for a short while. This prevents the battery from getting passive again. If this load test fails for the first time (battery alarm) the remaining capacity will provide a backup time of 5-10 hours.

The PM 803F Step1 does not support battery backup

For battery backup the hardware revision of the Ethernet or Battery module must be 2.00 or greater.

11.3.3Light emitting diodes EI 81x and AM 811

The new modules EI 81x and AM 811 can be used with a PM 802F controller and with a PM 803F controller. The LEDs behave differently in these controllers:

PM 802F mode (LEDs set by hardware)

Battery good	LED off
Battery power below level value	LED orange

PM 803F mode (LEDs set by software)

Battery good	LED green
Battery test running, no defined state	LED orange (steady)
Battery empty	LED red

11.3.4Buffer times EI 81x and AM 811

The new modules EI 81x and AM 811 can be used with a PM 802F controller and with a PM 803F controller. Because of different power consumption the buffer times differ depending on the used controller type:

Usage with PM 802F controller

Buffer time with new battery (950 mAH)	1.5 years
Buffer time with battery rest capacity of 2%	10 days
Battery lifetime during operation with 1 hour buffer mode per week (longer buffer times will reduce the battery lifetime)	5 years

Usage with PM 803F controller

Buffer time with new battery (950 mAH)	10 days

Buffer time with battery rest capacity of 2%	5 hours
Battery lifetime during operation with 1 hour buffer mode per week (longer buffer times will reduce the battery lifetime)	2 years

11.4 Control Builder F

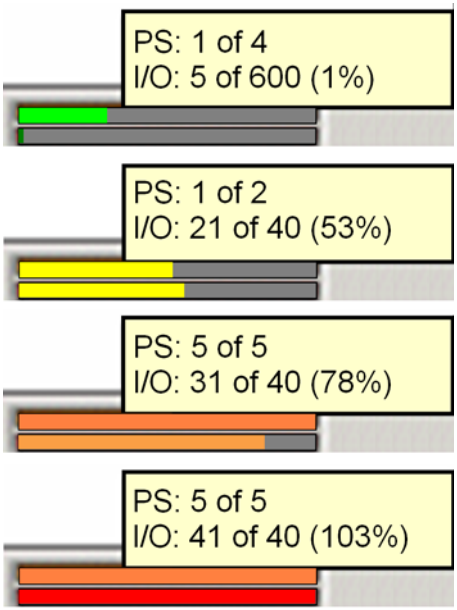
11.4.1I/O Counter

Starting with version 7.1 all used I/O components within a project can be counted with the help of the IO Count Tool. During configuration the number of used I/Os can be shown in the hardware manager.

Starting with version 7.2 this information is displayed permanently in the status line of Control Builder F with two horizontal bar graphs:
The upper bar graph indicates the relationship between the number of licensed and the process stations configured in the project.
The lower bar graph indicates the relationship between the number of licensed and the points of I/O configured in the project.

Additionally to the size of the bar graph resources consumption is recognizable from the color. The color changes from a dark green (0%) over yellow (50%) to orange (100%). All percentages over 100% are displayed in red.

The exact numbers are displayed in a ToolTip.



IOCount01.bmp

11.4.2Monitoring of database problems

The database is monitored during working with Control Builder F. If a problem is detected, the user is requested to close the project immediately. In that way there is a high probability that all content can be restored, with the exception of the very last changes.

11.4.3FDT 1.2 Addendum

The FDT specification version 1.2 was extended by an Addendum. The interfaces in the Control Builder F were extended to support DTMs that are based on these new specifications.

11.4.4FDT DTM Caching

With the use of the new BaseContainer software a cache is available for working with DTMs. Several DTMs are stored during working with the Control Builder F in this memory. Each DTM which is needed during configuration or commissioning, is

loaded into the cache. If more DTMs are needed than within the cache can be stored, those DTMs which are no longer needed are closed to free space in this memory.

11.4.5FDT DTM Data Caching

The interaction between Control Builder F and DTMs has been improved. If a DTM has been loaded and opened for configuration, all current instance data are read and stored by the Control Builder F before closing the DTM. So, during working with one project the Control Builder F has a local copy of the DTM data. For checking the project all DTMs which have been used during configuration must not be loaded and opened again.

The time performance in the Control Builder F was improved substantially when working with DTMs.

11.4.6HART Communication with CBF / S800

Description see HART Communication with CBF / S800 on Page 174 of chapter News in Version 7.1 SP3.

11.4.7Foundation Fieldbus

Using multicast addresses with FF configurations allows a maximum of 32 groups now.

11.4.8Configuration changes with impacts to the process image

With this version the impact of configuration changes to the process image has been reworked. Up to now all I/O components are getting new addresses within the process image after changing one component of a function block. For this reason all related programs have to be loaded into the controller.

Starting with this software version all components which are not effected directly by a configuration change keep their variable description. Only programs that are directly effected by this change must be loaded.

11.4.9Telecontrol function blocks

The selection of the interface objects via the F2 key is supported. From now on the selection list can be used with unsymmetrical transmission functions also.

Online help for function blocks of the telecontrol library is now available.

11.4.10OPC Server Configuration for Profibus data

A new check functionality is implemented; within a Profibus device all OPC items must be unique.

11.4.11FPX and PLI function block

Within a project with FPX and PLI function blocks relevant changes of assigned SFCs are checked.

11.5 DigiVis

11.5.1Dual monitor support

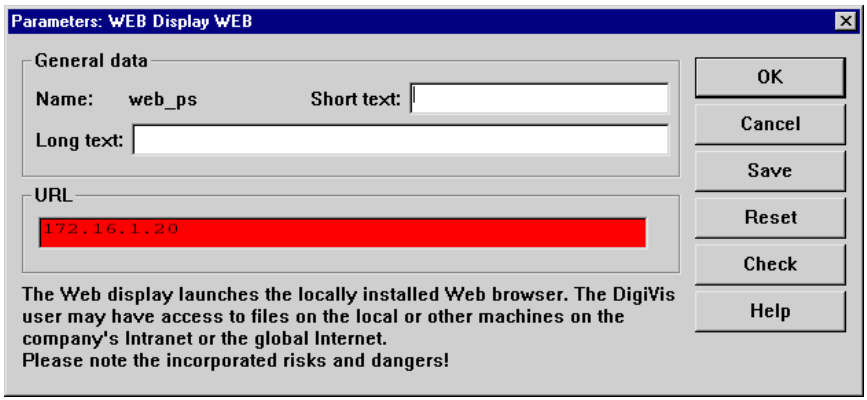
With using an appropriate graphic board two monitors can be connected to one DigiVis station.Thus two Vis displays for operation and observation can be displayed at the same time.

Software version V7.2 has been tested successfully with the graphic board Matrox G-550.

11.5.2WEB Display

A new display type WEB Display is available for configure the operator station. A URL must be configured.

Calling up a WEB Display in DigiVis will call up the local Internet Explorer. The link to the configured URL will be activated.



web100.bmp

11.6 OPC Server F

11.6.1 Alarms

If an alarm goes to state inactive before it has been acknowledged, the OPC server F has overwritten its the internal time stamp. Depending on the functionality of the OPC client it may happen that for this reason an acknowledge request was rejected.

This problem is solved with this version.

11.6.2 Setup

The setup of the OPC server F has been enhanced. Additional to the resource ID which is used for communication within the Freelance project additional a second different resource ID for DCOM connection to an OPC client can be configured. With the default setting the Freelance resource ID is also used for the DCOM connection.

Two different resource IDs are necessary for a redundant OPC connection to Operate IT Process Portal A.

11.7 Trend Server

11.7.1Installation and DCOM configuration

Within the manual of the Trend Server installation and DCOM settings are described. Contrary to the sequence in the manual first the Trend Server must be installed and afterwards the DCOM settings can be done.

If two PCs are used for Trend Server and DigiVis, both PCs - as described - must be configured with the same user, e.g. 'Freelancer' with identical password and power user rights. A hint is missing, that this user must be logged in at least once at each PC. The first Login is necessary to generate the complete user profile in the Windows operating system.

After this the Trend Server PC can be used without a logged in user.

Additional it is necessary that both PCs can reach each other e.g. via a net browser. This means, both PCs should be within the same domain or workgroup. A simple physical TCPIP connection is not sufficient.

11.8 Connect Software to PPB

11.8.1DCOM Configuration

Within the manual the setting "launching user" is recommended for the DCOM configuration. in most cases the OPC server is used from different user accounts, e.g. RTDS of PPB and Control Builder F. Therefore it is recommended to configure a fixed user.

For coupling to PPB the setting "This user" should be selected with the local PPB Servic3e Account.

12 New features in V7.1 SP3

12.1 16 MByte Controller

12.1.1 Battery backup for PM 803F

Compared to the existing FieldController and AC 800F the behavior of the battery has changed with PM 803F.

The 16 MByte controller PM 803F needs a higher backup current during power down than the 4MByte Controllers. Therefore it was necessary to provide new Ethernet modules and a new battery module (EI 811F, EI 812F, EI 813F and AM 811F). A battery backup of PM 803F is possible only with these modules.

The high backup current requires a different battery check during runtime. The battery has to be tested under backup load conditions. This functionality is provided by Hotfix 2 for V7.1 SP2a and also available with this version.

On startup or battery replacement the battery is tested under backup conditions. The battery LED is orange during this time. This first test may take up to 5 minutes, because old batteries sometimes got passive and need some time to recover. If the battery is not ok after this time, the LED switches to red and a battery alarm is generated. If the battery is good the LED becomes green. Now every 24 hours the battery is tested again under load conditions for a short while. This prevents the battery from getting passive again. If this load test fails for the first time (battery alarm) the remaining capacity will provide a backup time of 5-10 hours.

The PM 803F Step1 does not support battery backup.

For battery backup of a PM 803F controller Ethernet or Battery modules with hardware revision 2.00 or greater must be used.

12.2 S800-HART-Communication

12.2.1 HART Communication with CBF / S800

Control Builder F has been enhanced to communicate with HART devices via S800 I/O modules AI895 and AO895. The general concept is based on the way HART commands are configured via PROFBUS/DPV1 parameter masks in Control Builder F via S900 (refer to Control IT AC 800F Engineering Reference Manual 'Communication and Fieldbusses')

The reason why the HART templates that are available for S900 HART communication could not be used with S800 is the different addressing mechanism.

To communicate with S800 HART devices the DPV1 parameter dialog needs an additional command to obtain the so-called 'long address' of the HART device.

Creating a new HART template

After inserting a HART I/O within the hardware structure all HART commands and parameters must be configured in the DPV1 parameter mask.

The following 3 lines must occur in every S800 HART DPV1 parameter mask with identical values except the addressing information:

DPV1 | DeviceInfo | PV | Sensor Info | Output Info | Config. Info | Set Sensor | Set Range | Out

	Name	Value	Type	Byte	Bit	Length	Slot
>	V1_Addr	☐	Slot/Idx	0	0	2	0
	M1C1 CMD0	☐	HartCmd0_S800	0	0	20	V1_Addr
	M1C1 HC0	☐	HartCmd0_895	0	0	32	V1_Addr

HART001.bmp

V1_Addr is used to define position an offset; all following HART commands refer to this variable. the following both entries **M1C1 CMD0** and **M1C1 HC0** contain the S800 specific address commands.

V1_Addr is a variable structure with the entries Slot and IndexOffset that is used by all following HART commands.

V1_Addr Slot has to be changed because it indicates the slot number of the I/O-device (such as AI895 or AO895). Slot 1 is the first slot of CI840 module bus.

V1_Addr IndexOffset has a **fixed value of 48** for S800 / CI840.

	Name	Value	Type	Byte	Bit	Length	Slot
>	V1_Addr	☑	Slot/Idx	0	0	2	0
	V1_Addr Slot	1	BYTE	0	0	8	0
	V1_Addr IndexOffset	48	BYTE	1	0	8	0
	M1C1 CMD0	☐	HartCmd0_S800	0	0	20	V1_Addr

HART003.bmp

CMD0 (Type HartCmd_S800) is the HART command 0 with predefined entries: **Req Start** has value **2** and **Req ShortAddr** is **0x80**.

Within the Slot edit control the variable **V1_Addr** has to be entered. No further changes are necessary.

	Name	Value	Type	Byte	Bit	Length	Slot
	V1_Addr	☐	Slot/Idx	0	0	2	0
>	M1C1 CMD0	☑	HartCmd0_S800	0	0	20	V1_Addr
	M1C1 CMD0 Req Start	16#2	BYTE	0	0	8	V1_Addr
	M1C1 CMD0 Req ShortAdd	16#80	BYTE	1	0	8	V1_Addr
	M1C1 CMD0 Req Cmd	16#0	BYTE	2	0	8	V1_Addr
	M1C1 CMD0 Req Len	16#0	BYTE	3	0	8	V1_Addr

HART002.bmp

The next entry is a CMD0 HART command of the type **HartCmd0_895** that is important to get the so-called ‘long address’ of the HART device. All entries are preset.

	Name	Value	Type	Byte	Bit	Length	Slot
	V1_Addr	☐	Slot/Idx	0	0	2	0
	M1C1 CMD0	☐	HartCmd0_S800	0	0	20	V1_Addr
>	M1C1 HC0	☑	HartCmd0_895	0	0	32	V1_Addr
	M1C1 HC0 Req ModuleStart	16#82	BYTE	0	0	8	V1_Addr
	M1C1 HC0 Req ModuleLongA	0x 00 00 00	Hart895Addr	1	0	5	V1_Addr
	M1C1 HC0 Req ModuleCmd	155	BYTE	6	0	8	V1_Addr
	M1C1 HC0 Req ModuleLen	6	BYTE	7	0	8	V1_Addr
	M1C1 HC0 Req Channel	0	BYTE	8	0	8	V1_Addr
	M1C1 HC0 Req Start	16#2	BYTE	9	0	8	V1_Addr

HART004.bmp

Within the Slot edit control the variable **V1_Addr** has to be entered.

The channel entry to which the HART device is connected at the AI895 or AO895 must be entered. (Channel number is a value from 0 to 7 using these S800 I/O-devices). No further changes are necessary.

Modifying an existent S900 template to work with S800

Instead of creating a new template for S800 with HART devices an existing S900 template can be modified.

Change **V1_Addr** index Offset to **48**

Enter the used Slot number to the AI895/AO895 slot number in S800 module bus.

Change data type of HC0 from HartCmd0 to **HartCmd0_S800**.

Insert a new component, select type **HartCmd0_895** and set Slot edit control to **V1_Addr**.

Set the channel number of your attached HART devices.

Do not change the Name of the CMD0 line because the other entries of the dialog editor are referring to this name.

Known problems

With the current version of the AI895/AO895 firmware - Software version 2 is displayed in HART Command 0 - a HART communication error between S800 and I/O-module may occur. In this case all HART commands were responded with a communication status 32 (means ‘device is busy’).

It is possible to recover from this state by resetting the AI895/AO895.

The described implementation has been tested successfully with CI840 Firmware version 2.0 and a GSD file of version 1.1.
Using CI840 firmware version 3 and a newer GSD file the HART commands did not work correctly for all channels.

12.3 General

12.3.1 Online help for Telecontrol Function blocks

Online help for function blocks of the telecontrol library is now available.

12.3.2 New version of FDT BaseContainers

The installation CD contains a service pack of FDT BaseContainer. For using FDT1.2 this version must be installed.

12.3.3 FDT DTM Data Caching

The interaction between Control Builder F and DTMs has been improved. If a DTM has been loaded and opened for configuration, all current instance data are read and

stored by the Control Builder F before closing the DTM. So, during working with one project the Control Builder F has a local copy of the DTM data. For checking the project all DTMs which have been used during configuration must not be loaded and opened again.

The time performance in the Control Builder F was improved substantially when working with DTMs.

12.3.4DCOM configuration for Connect software to PPB

Within the manual the setting “launching user” is recommended for the DCOM configuration. in most cases the OPC server is used from different user accounts, e.g. RTDS of PPB and Control Builder F. Therefore it is recommended to configure a fixed user.

For coupling to PPB the setting “This user” should be selected with the local PPB Service Account. (20559)

13 New features in V7.1 SP2a

13.1 Foundation Fieldbus

13.1.1 Support of FF-Signal Groups

Up to version 7.1 SP2 of Control Builder F all FF/HSE signals are published with the same network address. This simplifies the configuration of FF/HSE networks but every device on this network will receive all transmitted signals. Some devices (e.g. LD 800HSE) may run into performance problems if a large number of signals is configured. So for high load configurations (especially with more than 1-2 Linking Devices) the received signals must be filtered to prevent an overload of the devices.

Therefore from version 7.1 SP2a on, a grouping of HSE signals is possible. All signals within one group will use the same network address. If the signals are assigned to different groups properly, every device will be able to filter only the

configured signals without loss of performance. The group assignment is configured within the parameter dialog of the FF_HSE_Link objects. See Figure 1 and Figure 2

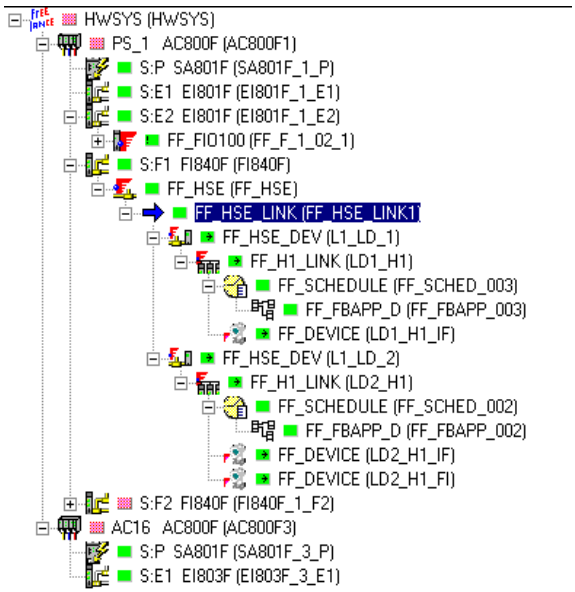


Figure 1. FF_HSE_Link object

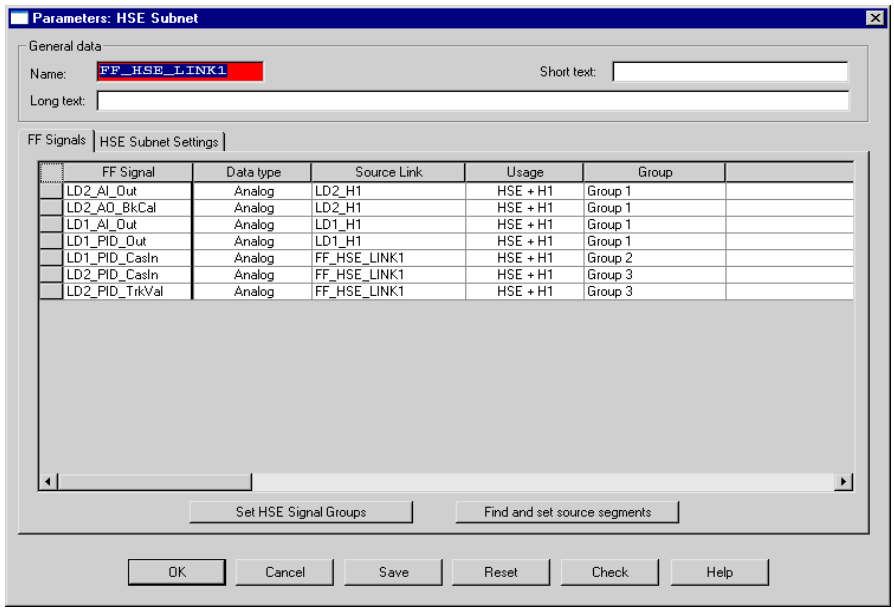


Figure 2. Configuration of FF/HSE groups

With the button 'Set HSE Signal Groups' an automatic assignment can be done. Nevertheless, for special configurations the assignment can be changed manually afterwards.

Please note, that it is important to group signals with the same destination.

In the example above, an HSE segment is configured with two Linking Devices. All signals received by the FI 840F are in Group1, regardless which Linking Device is the source. The signals published by the FI 840F are split into two groups, depending on which Linking Device is the sink.

A maximum of 32 FF/HSE groups can be handled.

This limit is not regarded by the check function. Using more than 32 HSE groups may lead to a crash of the FI 840F module.

Maximum of Pub/Sub messages per second in LD 800HSE

With using software version V7.1 SP2 and the ABB HSE linking devices LD 800HSE a maximum communication of 80 Publisher/Subscriber messages per second is allowed. With overload the linking device left the livelist cyclically and cannot communicate with Control Builder F.
Starting with software version V7.1 SP2a and using firmware version V1.20.00.0 or higher for the ABB-HSE Linking Device LD 800HSE up to 400 Publisher/Subscriber messages per second can be used. Nevertheless one Linking Device LD 800HSE cannot handle more than 80 signals per second.

14 New features in V7.1 SP2

14.1 16 MByte Controller

14.1.116 MB CPU modules AC 800F

The following hardware modules are released later for use with Version 7.1 service pack 2, Build index 2706:

- PM 803F - Base unit with 8 MByte flash EPROM and 16 MByte RAM
- SA 811F - Power supply module,115 ... 230 V AC for PM 803F
- EI 811F - Ethernet module 10Base2 (Cheapernet) for coax cable of type ThinCoax for PM 803F
- EI 812F - Ethernet module AUI to connect transceiver for 10Base5, 10Base2, 10BaseT, 10BaseFL or star coupler units for PM 803F
- EI 813F - Ethernet module 10BaseT for connections with Shielded Twisted Pair for PM 803F

Please notice the current restrictions when using the module PM 803F:

Please note that the performance of PM 803F is slightly lower than the performance of the PM 802F. For typical projects we have measured a difference of 5%. This means that you have to multiply the CPU load measured on a PM 802F by 1.05 to estimate the CPU load for a PM 803F.

Example: An application runs on a PM 802F with 60% CPU load. The same application is estimated to run on a PM 803F with 63% CPU load.

Please note that the module PM 803F (with current hardware index) does not have a battery backup functionality implemented.
Using an Ethernet module or a battery backup module with a battery the memory content will not be saved in case of a power down.

We recommend using an un-interruptible power supply (UPS) with this CPU module.

Without a UPS in case of power loss for more then 20 ms all memory content will be lost. You will have to re-download the configuration after power has been restored. The process station will execute a cold start and the outputs will be set to initial values.

14.2 Foundation Fieldbus

14.2.1 FF/HSE connection

FI 840F - FF/HSE module 100BaseTX

The FF/HSE module can be used with this software version.

FF_HSE - FF HSE protocol object.

Therefore especially the following functionality is available:

- Coupling the FF subsystem via a FF/HSE module 100BaseTX (FI 840F) in the AC 800F to the IEC 61131 Controller.
- Cyclical data exchange between the FF-subnet and the AC 800F using the HSE protocol.
- Configuration and commissioning of FF Linking Devices of the device classes 42a, 42b and 42c.
- Cyclical communication between field devices at different H1 links of the same linking device or of different linking devices using HSE republishing.

Please notice the current restrictions when using the module FI 840F:

Please note that this module may NOT be removed or plugged in under power.

Failing to follow this warning may result in destroying the CPU or the module or both.

15 New features in V7.1 SP1

15.1 Process Portal B

15.1.1 Coupling to Process Portal B1.1

With the Software package **ConnFB11** the coupling of AC 800F/Freelance 2000 to Software **Operate IT Process Portal B1.1/1 Build 3.03.143** is possible.

15.2 FBD Programs

15.2.1 Comment block in FBD programs

Starting with version 7.1 SP1 comment blocks can be inserted into FBD programs. With menu selection *FBD elements / Comment* a block is selected and can be positioned in the FBD page. With double clicking or selecting *Edit / Parameters* any text can be inserted. Comments do not have influence to the program calculation in the process station; there are used only in Control Builder F to describe or comment the program.

16 New features in V7.1

16.1 General

16.1.1Installation

The setup procedure was revised. The most important components of the AC 800F / Freelance 2000-software can be installed now in a single work procedure. The direct installation of individual packages remains possible.

16.1.2Software Components for tests and presentations

The Setup CD contains **software packages (Controller Emulator, Converter for AutoCad files, Audit Trail),** which may be used for test and presentation only**.** It is not allowed to use these packages in production environment.

Therefore the packages *Converter for AutoCad files* and *Audit Trail a*re only available within the Demo mode. For **test purposes the package *Controller Emulator*** can be used together with a licensed Control Builder F software.

16.1.3I/O-Count Tool

The I/O-Count Tool adds up and displays all I/O components used in a project. CSV files from any Control Builder F or DigiTool version may be imported. Used I/Os are displayed per process station, independent from the control software license types **Basic** and **Advanced**.

If the number of I/Os used in a project exceeds the number of licensed I/Os the project will not become plausible after a plausibility check. Therefor the configuration can not be downloaded to the process stations.

The display of all used I/O components (CAN, Profibus and/or Foundation Fieldbus) does not take into account the Modbus registers (integer) and coils (binary). Anyhow the Modbus signals must be licensed. Therefor it is necessary to evaluate these manually. Registers and coils count as one I/O component. The number of used registers and coils is displayed in the Modbus function blocks Read Coil, Write Coil, Read Register and Write Register.

All used I/Os in an open project can be displayed in the hardware manager:

Hardware structure > Show all used I/Os

16.1.4FDT 1.2

FDT (Field Device Tool) FDT specifies the software interface for integrating intelligent field devices as a DTM (Device Type Manager) in an automation system. Control Builder F now supports both FDT specifications FDT 0.98 and FDT 1.2.

16.1.5AC 800F with 16 MByte

New basic unit with 16 MByte SDRAM for project data and 8 MByte flash EPROM.

The following new modules are available to make full use of the new PM 803F functions.

Power supply modules

SA 811F: Input voltages from 115 ... 230 V AC for PM 803F

SD 812F: Redundant DC voltage 24 V DC for PM 803F

Ethernet modules

EI 811F: 10Base2 module (Cheapernet) for ThinCoax type coax. cable for PM 803F

EI 812F: AUI module for connecting transceivers for 10Base5, 10Base2, 10BaseT, 10BaseFL or star coupler units for PM 803F

EI 813F: 10BaseT module for Shielded Twisted Pair cables for PM 803F

Battery module

AM 811F: Battery module for redundant battery back-up for PM 803F

16.1.6FI 840F

Field bus Ethernet module of the AC 800F Controller. The module has a 100BaseT Ethernet interface which can be occupied by the FOUNDATION field bus HSE protocol and TCP/IP send and receive communication (sub-protocol UDP). The module itself can be installed in slots F1 to F4.

16.2 Control Builder F

16.2.1Structured Text

Structured text is a text-oriented program language of IEC 61131-3.

Unlike the function block diagram (FBD), the functional scope of the structured text is extended by conditional statements and loop statements that are called up by corresponding keywords.

Structured Text programs may be used in the project tree as well as in user-defined function blocks.

16.2.2Debugger

The debugger is a source text debugger for programming languages to IEC 61131-3. At present only the debugging of structured text programs is supported. The debugger supports all available types of process station.

The debugger supports breakpoints and provides a dedicated watch window.

16.2.3Calculating of XOR

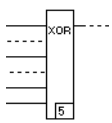
XOR is a binary operator with the following output:

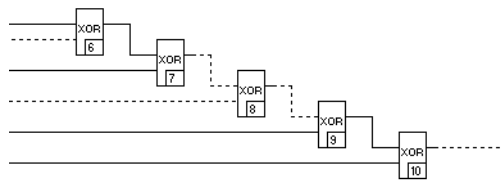
IN1	IN2	OUT
0	0	0
0	1	1

IN1	IN2	OUT
1	0	1
1	1	0

The XOR function in the Control Builder F combines up 10 input signals. Using more than 2 inputs the output signal is calculated depending on the quantity of 1-level inputs. An even number of 1-signal inputs will produce an 0-level output, an odd number of 1-level inputs will produce an 1-level output.

16.2.4This result is identically to a sequence of single binary XOR operators. The following XOR function with 6 inputs leads to the same result as a sequence of 5 binary functions.





16.2.5Auto routing

With the graphic configuration of function diagrams and programs an auto routing function is available. Using the editor function block diagram FBD or ladder diagram KOP as well as the function block application diagram for FF configuration FBAD lines and connections can be drawn automatically by the system. Also shifting of blocks while maintaining existing connections is possible.

16.2.6Hostname support

The stations and resources in a project can be addressed both via IP addresses and via host names.

16.2.7Online-help

The online-help was completely reworked and is now based on Microsoft HTML help. It provides strongly improved navigation and search capabilities.

16.3 Communications

16.3.1FF - Foundation Fieldbus

The FF subsystem is interfaced to the IEC 61131 controller using a FF/HSE module 100BaseTX in the AC 800F. For cyclical data exchange between the FF subnet and the AC 800F the HSE protocol is used.

The Control Builder F enables the configuration and commissioning of FF linking devices of device classes 42a, 42b and 42c. By using HSE republishing, it is possible to configure cyclical communication between field devices on different H1 segments and devices on the HSE segment

The Control Builder F supports managing several parameter value sets for a block type. These are fixed value sets integrated in the Control Builder F, default or example value sets from the capabilities file or user-defined value sets which the user may modify.

In order to define parameters for FF function blocks more easily, the dialog editor allows a specific parameter input dialog to be created for the FF function block class object.

By automatic import of the specific H1 device “FF STD FBs”, the standard function blocks specified by the Fieldbus Foundation are made available in the FF function block library. Standard function blocks and enhanced function blocks are presented in a hierarchical library structure.

16.3.2Profibus

Configuration of redundant Profibus devices is now supported.

For all User and DPV1 parameters of a Profibus device an OPC access can be configured.

16.3.3Send and receive blocks

The TCP/IP send and receive blocks support the TCP subprotocol.

16.3.4OPC server for Profibus and Profibus HART

For the DPV1 and User parameters of the Profibus and Profibus HART devices in a AC 800F/Freelance 2000 project an OPC access can be configured. Thus defines, which data from a project are available via an OPC server F for other systems.

16.4 DigiVis

16.4.1User-defined trend displays

The DigiVis user can configure trend displays. All variables, which are available over a trend server on the DigiVis station, can be used in the user-defined trend displays.

16.4.2Trend displays and logs

The number of trend displays and logs in one DigiVis operator station is not longer limited by the software. Take care of the capability of the used PC.
The amount of trend acquisition blocks per process station is still limited to 42.

16.4.3Converting archive files

Archive files from former software versions must be converted for the current version. The archive converter can be called up from start menu as well as via the command line:
<Installation directory>/exe/V2TOV3.EXE

17 New features in V6.2

17.1 Industrial^{IT} for AC 800F and the effects on the Freelance 2000 Controllers

AC 800F is a part of the **Industrial^{IT}** Controller family. From this result some changes regarding the Freelance 2000 System licensing and naming conventions. The licensing models for the ABB Industrial^{IT} Controller series AC 800M, AC 800C and AC 800F have been standardized.

The options of all **Freelance 2000** controllers have been grouped in kits that are scalable through the number of I/Os. As a result, the licenses of each controller can be adapted to the customer's needs. These changes also have an effect on the licenses for the rack-based Freelance 2000 controllers.

DigiTool is replaced with **Control Builder F**, a programming tool from the **Engineer^{IT}** suite. Control Builder F can be used for configuring both the AC 800F and the Freelance 2000 System. The AC 800F hardware and software belong to the **Control^{IT}** suite.

The changes stated above will be effective with Version 6.2 and higher. Freelance 2000 projects created with Version 6.1 and lower can be upgraded to Version 6.2 using the project import function, as usual.

Engineer^{IT} – Control Builder F

Control Builder F is the programming tool for AC 800F and the known Freelance 2000 controllers like DCP 02, DCP 10, DFC 01 (Freelance Select) and DFC02 (FieldController).

The following Control Builder F versions are available:

- Control Builder F Select

- Control Builder F Standard
- Control Builder F Professional

All Control Builder F versions support the following functions:

- Configuration and commissioning of user programs
- Tree view of the programs for convenient program overview and selection
- IEC 61131-3 programming (FBD, IL, LD, SFC)
- Graphical hardware configuration
- Integral fieldbus configuration for Profibus and Foundation Fieldbus
- IEC 61131-3 data types and user-defined (structured) data types
- Project-wide variables and function block lists
- Online cross-reference
- Efficient plausibility check
- Extensive online help

Additionally, online test functions (debugging functions) and a consistent graphical documentation of the entire user program are supported.

Besides the programs, all hardware components are displayed in graphical form and are submitted to a plausibility check together with the allocated software.

Contrary to DigiTool, Control Builder F cannot be used for creating programs, since function block licenses are not included in its scope of delivery. Special controller software licenses have to be ordered for this purpose.

Control Builder F Select – the starter kit

Control Builder F Select can only be ordered together with a Freelance Select kit. With Version 6.2 and higher, the Freelance Select kit includes a control software Basic license for 500 I/Os. Compared to the Control Builder F Standard, the Control Builder F Select kit has the following limitations:

- A maximum of 1 link with a local DigiVis Select operator station
- A maximum of 1 Controller Select

- A maximum of 1 gateway
- A maximum of 2 user tasks
- A maximum of 8 control loops
- A maximum of 20 trend data recorders
- Tag names of max. 12 characters

Control Builder F Standard

Control Builder F Standard supports:

- Any number of programs
- A maximum of 100 clients like operator stations or gateways (DDE, OPC)
- A maximum of 10 links between a controller and clients like local operator stations and/or gateways.
- A maximum of 100 controllers
- A maximum of 9 user tasks per controller
- Tag names of max. 16 characters (so far special DigiTool option)

Control Builder F Professional

Control Builder F Professional supports all functions of Control Builder F Standard and additionally provides the following features:

- Access protection (lock function)
- User-defined function blocks (engineering license)
- DTM/FDT support

Control^{IT} for AC 800F and Freelance 2000

With V6.2 and higher a control software license is needed for every process station. Control IT offers two license types. They are different in terms of their functionality and of the number of supported I/Os. The license types are:

- Basic control software license

- Advanced software license

The license functionality can be adapted to the customer's needs for every controller, and the number of I/Os can be extended in steps of 100.

Note that all controllers/process stations within a system must use the same control software license. Mixing basic and advanced control software licenses within one system is not permissible.

A Version 6.2 control software license allows you to:

- enable specific function block libraries for a controller
- enable in Control Builder F a specific number of I/O signals (I/O components) which may be used in the controller/process station configuration.

Basic control software license

The Basic control software license includes the following function block libraries:

- IEC 61131-3, digital and analog value processing
- controllers (without self-tuning)
- integration of fieldbuses (Profibus, Foundation Fieldbus)
- DigiVis support

Options for the Basic control software license

The standard Basic control software license can be extended with the following options:

- Serial Package (Modbus Master, Modbus Slave, Sartorius balance interface, Protronic coupling)
- Tune (PID self-tuning)
- Sequence of Events (with Rack I/O)
- Batch Function Block Package (PLI, FPX)
- Interbus
- Telecontrol Library (IEC 60870-5)

- DMS-API
- Maestro-UX Coupling

Advanced control software license

The Advanced control software license provides Operate IT B support (Operate IT A Support if available). It includes the function block libraries of the Basic license and additionally contains the following function block libraries and functionality:

- Serial Package (Modbus Master, Modbus Slave, Sartorius balance interface, Protronic coupling)
- Tune (PID self-tuning)
- Sequence of Events
- Maestro-UX Coupling

When you are extending your Basic license to an Advanced one at a later time, you can continue to use the existing options for the Basic license. Additionally, all options of the Advanced license are available.

Options for the Advanced control software license

The Advanced license already includes the majority of the Basic license options. Additionally, the following options are provided:

- Batch Function Block Package (PLI, FPX)
- Interbus
- Telecontrol Library (IEC 60870-5)
- DMS-API

Additional control software options

The following control software options are available for Basic and Advanced licenses

- Open Communication Package (DDE, OPC)
- Trend server

17.2 License Model

17.2.1 Changes to the license model

Besides the Control Builder F engineering program both the used controllers/process stations with the respective number of I/Os and the options must be licensed. The number of licensed controllers/process stations and the number of I/Os and options licensed for a controller/process station are counted.

Counting the I/Os

The number of I/Os relevant for licensing is determined by counting only those I/Os that are in use, i. e.:

- the input / output variables used in a program that is running on a controller, or
- the input / output variables provided via a gateway (OPC, trend server, RTDS...)

The input/output variable definition depends on the respective bus/fieldbus:

- Rack I/O (CAN bus):
  Every channel used is considered as an I/O
- Profibus:
  All input or output components agreed and used on the controller are considered as I/Os.
- Foundation Fieldbus:
  Every variable transferred between the linking device and the controller/process station is considered as an I/O.
- Modbus:
  All Boolean data (coils) or registers used by the transmit and receive function blocks are considered as an I/O.
- Transmit/Receive function blocks (Ethernet):
  Not considered as I/O.

The following data are not considered as I/Os:

- diagnostic data (DP, PA)
- alarms (FF)

- parameters (PA, FF)
- global variables

Only those controllers/process stations provided with an Advanced control software license can communicate I/Os to Operate IT.

17.2.2Upgrading previous software versions

From Version 6.2 on there is no longer a difference between updating and upgrading the software. It is then possible to change from Version 5.1 to 6.2 or from Version 6.2 to 6.3 or 7.1.

- The change-over from Versions V3.x, V4.x and V5.x to Version 6.2 is handled as an upgrade. Additionally, the 1-year subscription offer from the software management program is included in this upgrade.
- The change from Version 6.1 to Version 6.2 is handled as a subscription.

When upgrading to Version 6.2, the customer decides which Control Builder F license, which control software licenses and how many I/Os he needs.

An upgrade requires a control software license for every existing process station license.

If DigitTool was licensed for five process stations, one Control Builder F license and five control software licenses have to be ordered for upgrading the system. If, for example, DigiTool was used with the user-defined function blocks, a Control Builder F Professional license is required.

The appropriate control software license is needed for all controllers/process stations. If Operate IT is to be used on the operator level, then the Advanced control software is required for the controllers/process stations.!

When upgrading your system to Version 6.2, always indicate the number of the existing hard key when ordering the software upgrade.

Software management program

The software management program allows you to subscribe in order to keep your installation always up to date and benefit from new features and improvement

directly and without any delay. You will automatically receive the latest software versions. No need to send an additional order.

Maximum productivity through continuous software upgrades:

With every new order or upgrade the customer is entitled to receive free upgrades for one year. After one year the software management program can be renewed for one year for 15% of the list price.

17.3 DigiVis

17.4 Operating the logs

Log operation by keyboard entries is much easier now. When the keyboard focus is in the main display, you can directly jump from the file view to the file list by actuating ESC.

17.5 Criteria windows

The criteria windows of an SFC display can be resized as required.

17.5.1 Date display

The date is displayed in the DigiVis status bar in the format specified in your Windows system setup.

17.6 Control Builder F

17.6.1 Hardware structure

When you are configuring the hardware structure, the system automatically checks the computer for sufficient memory. If not enough memory is available, an alarm is generated, and you are prompted to save your project data.

Like in the tree view, the nodes of the hardware tree are marked through colored rectangles to indicate their plausibility state.

17.6.2Tag list

The filter functions of the tag list have been enhanced. The function 'Only tags with faceplate' has been added.

17.6.3Plausibility check

The dialog window for displaying the messages of the plausibility check can be resized as required

17.6.4Configuring the messages

WAV files

When you are installing Control Builder F, the directory **freelance/wave** is automatically created for your WAV files. A reference pointing to this directory is entered in your Registry file under the name HKEY_LOCAL_MACHINE /DigiTool/ SETUP/ WAVFileDir. When you are configuring message items, a selection list with all WAV files available in the said directory is displayed.

17.6.5Graphic editor

Graphic macros

All graphic macros of a project are displayed and can be edited in the project tree under a special node called **MakroPool P-MA.** New macros can be created under this node, or can be loaded into the project using the library function. The structuring element **STRUKT** is available for grouping the macros.

Like in the previous software versions, all macro functions can be called directly from the graphic display.

Fill areas

Besides the polygons available so far, ellipses, rectangles and circle segments can now also be used for creating fill areas.

Scalable text

The texts in the graphic display can now be resized using the cursor. The text displayed in the resized field is then automatically scaled to fit in.

17.7 Operate^{IT} B Integration

17.7.1 Loading data into the ConfigServer

Data configured in the Freelance system can be loaded directly from the tree view into the configuration database of an Operate IT B system. The functions **Load whole station, Load changed objects** and **Load selected objects** already known from loading data from the process, gateway or operator stations are now also available for this purpose.

The data is loaded asynchronously into the configuration server of the Operate IT B system without requiring the Control Builder F program. The progress of the loading procedure on the configuration server is recorded in a log file and can be checked at any time.

17.7.2 Gateway redundancy

Two OPC gateway stations can be configured in the Freelance project for realizing a redundant RTDS (RealTimeDataServer) from Operate IT B. The configurations of the two gateways are then matched with each other in the dialog of the RTDS node. The redundant RTDS is notified of both OPC servers and then activates / deactivates the appropriate one.

17.8 Foundation Fieldbus

Like Profibus we now offer the complete configuration and commissioning of FF fully integrated in the Control Builder F. This also includes programming of the function block to run in the FF devices. This FF integration is based on the FF linking device FIO-100.

18 New features in V6.1

18.1 General

18.1.1FieldController Redundancy

The ABB FieldController 800 can now be operated in redundancy.

It is possible to set up the following redundancies:

- Master redundancy
- Profibus Line redundancy (a new hardware module, the **Redundancy Link Module RLM 01** is available for setting up this redundancy)
- Component redundancy

18.1.2Module Templates

For modular slaves (Remote I/O), templates are available at the **module level**.

Templates can now also be compiled by the re-using of template parts, with Export/Import.

18.1.3Hart Support

HART protocol-capable devices can now be linked to the FieldController through Profibus.

The HART parameters are made available through the DPV1 parameters.

18.1.4FDT / DTM-Support (Field Device Tool / Device Type Manager)

Devices which provide the FDT Interface can be linked to the FieldController.

18.1.5Maestro NT Coupling

There is vnow a freely configurable interface available under Windows, as an operation and observation interface. The coupling of the Process Stations and the FieldController (real-time process values) is done through an OPC Gateway.

The operation and observation is furthermore possible with DigiVis.

18.1.6Flexible System Limits

The number of the stations in a system is no longer restricted to the previous limits.

The only restriction is that up to 10 communications, that is 10 **active stations** can be linked to **one** process station.

The configuration of the connections is done in the CONF nodes of the project tree.

By combining local operator stations (operator stations only for selected process stations) and central operator stations, a many-sided operation and observation concept is possible.

18.1.7Batch

In addition to the previous batch package ”DigiBatch” a new batch package, can also be installed. This is fully integrated into Maestro NT and offers additional functions such as

- Batch recording
- A sequence scheduler for the individual compiling of operations
- Materials management
- Batch server redundancy
- Trends and history acquisition
- Interface to Enterprise Systems (EPR)

Coupling to Maestro NT is done through a coupling module in **PhaseX** (similar to the PLI module of DigiBatch)**.**

18.1.8Trend Server

Previously, the number of Trends per operator station was restricted to 42.

These limits are no longer valid. As many variables as desired can be acquired, all from the Variables List, and also variables from external sources. The trend acquisition module is necessary for these options. The data transfer is done through a Trend Gateway. This is configured in DigiTool as a node and also integrated in the hardware structure as a gateway.

The determination as to whether this should be transferred by trend acquisition module or gateway is done in the parameter mask of the trend display. The variables can also be given a time stamp.

18.1.9True Color and Screen Resolution

Work can now be done with the True Color setting. The screen resolution can be set to1600 x 1200 pixels.

These settings are done in the system control. The screen resolution is no longer asked for when setting up DigiTool and DigiVis.

18.2 DigiTool

18.2.1Scalable Window Size in DigiTool

Previously, it was only possible to operate DigiTool in a full window.

Now the size of the window can adjusted and therefore viewed in parallel with other applications. The setting is done with the Windows minimize button and then re-sizing or positioning.

18.2.2Moveable Toolbars

In DigiTool, the toolbars can be moved from the top group-wise and can be arranged on the screen as desired.

The toolbars for selecting *configuration* and *start-up* are now by default in the first position in the toolbar strip. As a result a quick changeover is possible.

18.2.3Loading of Selected Objects

When loading selected objects, an additional box appears with a safety prompt.

This additional prompt gives you the opportunity to reconsider the procedure and/or to undo an incorrect selection.

18.2.4Display of the Redundancy Memory

By selecting objects in the project tree, it is possible to see the amount of the redundancy memory that is in use.

System → *Display all objects* or

System → *Display selected objects*

18.2.5Greater Number of Log files

The records can now be archived in 400 files rather than the 100 previously.

The memory required should be noted.

18.2.6Variables and Tag Lists

The configuration within the lists is now also possible with a context menu.

A quick selection of a Variable or Tag list can be done with *Search* → *Type ahead*, then entering the first letters of the name.

Up to 10 pre-defined search criteria can be stored and be later recalled, e.g. with the Toolbars 1 to 10. It is also possible to select multiple search criteria (AND operations).

18.2.7Gateway Write Permission

The write permission for a configured gateway is entered by default.

18.2.8Project tree

In the Project tree, the desired program can be quickly selected with *Search* and entry of one or more characters.

Side effects caused by re-configuration are also visible when the project tree is not expanded, since they are passed upwards.

18.2.9Boot Parameters

The configuration of the boot parameters for the resources was taken over into the hardware structure. In order to do this, the resource node is selected.

18.2.10Graphics

In the graphics editor, it is possible to automatically adjust the size of graphic displays from previous software versions to the new drawing area.

For complete display of a graphical image, it is possible to call up an overview image. In this, elements which lie outside of the editing area can be seen again.

If you are working with lower resolution, a ruler shows the area visible later.

18.3 DigiVis

18.3.1Acknowledgement

The acknowledgement of sounds can be done **for all operator stations** together in the horn module.

18.3.2Selection in the Graphic Display

If an operator display of a measuring point (e.g. overlay image) is activated, and then a graphic display in which this is configured is called up, the activated measuring point is shown as selected in the display.

18.4 DigiBrowse

18.4.1Print

Trends and logs can now be printed from within DigiBrowse.

18.4.2Command Line for Batch Files

A command line interface is available for the creation of batch files. It is therefore possible to have incoming trend or log files automatically converted in the

background. The configuration of the interface is done through the Windows input prompt.

19 New features in V5.2

19.1 General

19.1.1 Length of tag names

It is possible to use tag names that are 16 characters in length (KKS) rather than 12-character names. The standard tag name length is 12 characters; a special order must be placed in order to use 16-character tag names.

19.1.2 Profibus

Additional configuration and commissioning facilities have been provided for Profibus objects.

For DPV1 parameters, data structures from the PROFIBUS-PA Profile for Process Control Devices can be used directly.

The design of the combo boxes for creating the individual dialogs has been enhanced.

The bus address and identification number of all slaves connected to the master can be read.

The configuration data of the slaves can be displayed and read from the device.

All configured DPV1 parameters can be read from the device and transferred to the project database.

The system message for diagnostic values can be deactivated.

19.1.3 Sequence of Event Message

Selected binary signals can be logged with a time stamp in the correct chronological order.

For this purpose, the 'Time stamp' function is activated in module DDI 01. When this function is activated, an extra binary value and a time value are made available at the output of this hardware block in addition to the 'normal' 32 binary outputs. For each channel, when there is an edge change to the binary value on these outputs the current value and associated time (resolution = update cycle of module) are stored.

A sequence of events monitoring block M_SOE is configured in an FBD program. This block can be used to transfer binary values with time stamps to a DDI 01 in a signal sequence log. For this purpose, when parameters are defined for this block a DDI 01 module is allocated and the channels that are to be monitored are defined.

With each cycle of the user task the binary values and time stamps of the DDI 01 module are read. When the stored binary values and their time stamps are read, the time stamp function is re-activated in the DDI 01 module, i.e. the next edge change of this binary value can be detected and stored.

Each time the function block M_SOE detects a value change on a monitored channel, a sequence of event message is generated with the binary value and associated time stamp; this sequence of event message can be processed further in the signal sequence logs.

Sequence of event messages are not shown on the DigiVis message line or message page.

19.1.4Function block diagram

The editor for function block diagram programs has been provided with a new interface.

The draw area is now 10 x 10 pages. The lines for linking variables are no longer used. Instead, the editor now contains a freely-positionable element variable, as used already in the ladder diagram editor.

FBD programs from earlier versions of Freelance 2000 are converted automatically.

19.2 Freelance Select

Freelance Select with the FieldController Select is a fieldbus starter kit aimed at providing customers with an initial entry into fieldbus technology. For an attractive entry-level price one receives a fully-functional FieldController with a Profibus

module. The entire software package is also provided, thus enabling a Profibus line to be operated with a master and slaves.

19.2.1Starter kit

The FieldController is equipped with a power supply (115/230 V AC), a 10Base2 Ethernet module and a Profibus module; the starter kit also includes a DigiTool license and a DigiVis license.

It also includes two hard keys and the appropriate authorization code for DigiTool Select and DigiVis Select. All the documentation is provided in the form of a CD.

Entry is made easier for the first-time user by a pre-prepared project which can be used to gain an understanding of the first steps in configuring a project.

19.2.2Freelance *Select* functional capabilities

The FieldController Select has the same external design, but is identified by the system as FieldController Select. In its standard form the FieldController *Select* is provided with one Profibus Select module, and can be upgraded with both a CAN-3 and a SERIAL fieldbus module. The Profibus Select module can only be used in a FieldController Select.

In total, DigiTool Select supports the following:

- 1 operator station (DigiVis) and 1 gateway (DDE, OPC, Maestro)
- 2 user tasks
- 8 control circuits
- 20 trend data acquisition blocks

All other functions are the same as for a standard DigiTool license.

19.2.3Freelance *Select* upgrade

Freelance Select can be upgraded to a full system, naturally using the FieldController Select, which remains in the existing system.

If, for example, the process stations, gateways and/or operator stations are upgraded, then both DigiTool Select and DigiVis Select must also be upgraded. When you order an upgrade, your license will also be upgraded.

19.2.4Function Blocks

Monitoring blocks

The new sequence of event monitoring block **M_SOE** processes sequence of event signals (sequence of events).

TCP/IP send and receive blocks

The TCP/IP interface is configured under Hardware Structure. New statistics blocks are provided for processing statistical data further in user programs.

Telecontrol blocks

The functionality of the telecontrol editor (export/import of the telecontrol list) has been transferred to the interface blocks.

20 New features in V5.1

20.1 General

20.1.1FieldController

Version V5.1 provides a FieldController for interfacing field buses to Freelance 2000.

The FieldController operates like a conventional Freelance 2000 process station via DigiNet S (Ethernet). The Freelance 2000 I/O modules can be used via a CAN module. Remote I/Os can be connected using an open field bus standard such as Profibus DP. A combined total of up to 10 process stations and FieldControllers may be operated in a Freelance 2000 system.

The FieldController has a modular case that enables it to be operated without ventilation at temperatures between 0 and 60 °C. The power supply (115/230 V AC or 24 V DC) is a plug-in unit that is integrated in the case. The Ethernet interface is supplied by plug-in modules (10BASE2 or AUI). Up to 4 field bus modules can be connected per FieldController. There are modules available for Freelance 2000 CAN bus, Profibus DP and serial protocols (e.g. Modbus).

The FieldController complies with the following standards: CE mark, NAMUR-EMC, IEC950, IEC1010, IEC1131-2, CSA, CSA-NRTL.

20.1.2Profibus

Freelance 2000 supports Profibus in the form of PROFIBUS-DP Master Class 1. Any kind of Profibus slave can be connected to Freelance 2000 and configured via a Profibus slave object. The Profibus slave object enables DigiTool to define parameters for any field device that can in principle be configured via Profibus.

Configuration and parameterization are based on the device master data (GSD file) that is imported when a new Profibus slave object is imported. The data for the

Profibus devices are treated exactly like I/O components. Custom parameter masks can be set up for the Profibus devices as for user-defined blocks.

Existing device configurations can be reused with the aid of a template manager.

20.1.3Modules

Digital input module DDI 05

This module enables up to a maximum of 32 binary signals in a voltage range up to 120 V AC / 230 V AC to be linked.

20.2 DigiVis

20.2.1Movable faceplates

All the faceplates can be moved to moved to any position within the display area.

20.2.2Messages with sound files

There are three options for processing sound files in the operator station:

- priority-controlled, oldest message,
- priority-controlled, most recent message,
- time order.

20.3 DigiTool

20.3.1Toolbars and context-sensitive menus

Toolbars and context-sensitive menus (right mouse button) are now available in all areas of DigiTool.

20.3.2FBD and LAD editor

A context menu entry in the FBD and LAT editor enables the operator to switch into the mode "Draw lines".

20.3.3Sequential function chart

A tag can be allocated to each criterion in the criteria windows. In the SFC display, the faceplate for the assigned measuring point can be called up directly.

20.3.4Variable list

Leading numbers

Variable names are now also allowed to begin with numbers. However, the variable name must contain at least one letter.

Channel assignment

The assignment of variables to I/O channels can now also be edited in the variable list.

20.3.5Hardware structure

Templates

Sections of the configured hardware structure can be stored in a template manager for reuse. Templates can be reused in the same project as well as in other projects.

Direct use of I/O components

I/O data from field devices can also be used directly in programs.

Objects

The hardware structure organizes the 20 most recently called objects in a cache. It is possible to move in both directions (forwards and backwards) within the cache.

Graphic views

Graphic views for the field bus configuration have been added to the hardware structure.

20.3.6Commissioning

When the variables or pins of a function or function block are overrun with the cursor in FBD and LAD programs, then the current values are displayed directly.

20.3.7Documentation

Hardware documentation

The hardware can also be documented selectively. This means that only the selected sections can be documented in the hardware structure.

Cross references

Cross references in FBD programs are no longer documented. The documentation of cross references is performed through the cross reference list.

20.3.8PLC export

An external tool (DELTAPLC) is available for PLC export; this determines the difference between two PLC files, and saves it in PLC format. In this way, just the changes in the configuration can be transferred to other systems (e.g. Maestro UX).

20.3.9Display access

To a certain extent, display access configuration can be specified automatically by the system. This serves to reduce the effort for manual configuration.

When display access is called up, and when a plausibility check is carried out on an operator station, the tags, displays and logs contained in the configuration database are checked. For each tag, usage is established in the instances of all display types and log types.

When usage of a tag is discovered, the display or log is indicated as an entry for the display access. If no usage and no cross reference is found, this is indicated by the entry "<undefined>".

20.3.10 Function Blocks

Several different sound files (WAV files) can be entered for each message for the purpose of sound output. The separate sound files are separated by a '+'. The input field remains the same length as before, i.e. 100 characters. Any number of sound files may be entered as long as they fit within the space available.

21 New features in V4.1

21.1 General

21.1.1 User-defined function blocks

The user-defined function blocks (UFB for short) provide the option of creating custom function blocks. Function blocks can thus be created that are tailored to the specific requirements of the field.

A distinction is made between classes and instances for working with UFBs.

The functionality and visual appearance of a UFB is determined by the user-defined function block class. This contains the entire program set up by the user with its functions, function blocks and variables, the faceplate, the parameter mask and the help text. UFBs can be locked by the user with a password.

To use a UFB class, instances of the class are formed. Each user-defined function block instance has one.

The user-defined function block faceplate is produced in the faceplate editor. The faceplate editor provides all the same functions as the graphic editor.

21.1.2 Modules

Communication module DCO 01

Changes have been made to the EPROM of the DCO 01 which have made it incompatible. When changing from older versions, the EPROM of V4.1 must be used.

21.1.3 DigiNet P

New terminating resistors for the CAN bus (100 Ω in place of 120 Ω).

21.2 DigiVis

21.2.1 System display

The system display features the same appearance as the hardware structure in DigiTool. The dialogs are made up of tabbed dialogs.

21.2.2 Quick-select dialog

The quick-select dialog makes it possible to rapidly access favorite displays, trend displays, logs etc. The quick-select dialog can be called up as an additional window on the screen. This window contains a set of buttons. Each function can also be called via keyboard operation rather than using the buttons.

21.2.3 Display Buffer

DigiVis organizes the 5 most recently called displays in a display buffer.

It is now possible to move in both directions (forwards and backwards) within the display buffer.

This buffer can also be implemented in the form of ring memory.

21.2.4 Freelance 2000 logo

The Freelance 2000 logo is displayed in the message line.

21.3 DigiTool

21.3.1 Update

Names for variables and tags

From version V4.1 variables and tags are no longer allowed to share the same names. When importing from earlier versions, any variable names that are the same as tag names are suffixed with ”_var”.

Statistics blocks

Interface blocks for serial communications are configured in the hardware structure in versions from V4.1. The statistical information is made available to the programs via pin-compatible statistics blocks. When importing from older versions, the interface blocks are automatically replaced by the corresponding statistics blocks.

21.3.2 Project tree

External time server

Up to 3 external stations can be time-synchronized via an operator station or gateway station.

A DCP gateway can time-synchronize other DCP gateways or Maestro UX stations.

Cross references

As well as branching to the points where a cross reference is used, it is now also possible to switch to the point at which a cross reference is defined.

Plausibility check

If a sequential function chart (SFC), a trend acquisition block (TREND), a disturbance course log acquisition block (DISLOG) or a time scheduler (TS) has no corresponding display, this will cause a plausibility warning to be generated.

21.3.3 Hardware structure

Tree view and graphic view

The hardware structure now has two views (tree view and graphic view) in which the hardware is configured.

Toolbar and context menu

A toolbar and context menus (right mouse button) have been added to the hardware structure.

I/O editor

The new I/O editor replaces the previous channel assignment.

All channels defined in the I/O editor can be used directly in the programs with <Tag name>.<Channel name>.

Standard names

Each object is assigned a standard name when it is added to the hardware structure.

Station type

A new station type for redundant process stations has been added. The redundant connection is now added automatically.

21.3.4 Commissioning

Load changed objects has been optimized to give shorter load times.

21.3.5 Graphic editor

Increased flexibility of graphic objects

Bar graph, fill level and graphic symbol can also be scaled by means of variables.

A reference line has been introduced for bargraph and fill level.

Configured message texts can be displayed with the alphanumeric display.

All actions can now be performed with any graphic object (other than trend window).

Operator actions

The following operator actions can be performed: display selection, tag selection, writing of variables and acknowledgment of messages.

Any value can now be entered in DigiVis when writing to variables.

Message visualization

The state of one or more messages can now be displayed instead of the bit variables. The messages can be displayed in the Freelance 2000 message colors.

Message type symbol

The graphic object message type symbol has been introduced for displaying the message types.

Macros

The management of the macro libraries has been overhauled.

In addition to the previous static macros, dynamic macros can now also be created. Macros are created in macro mode in the graphic editor. All graphic objects can be used in macros. All attributes of the graphic objects can be defined as parameters for animating the macros.

Text

Text for user faceplates can be selected from a text list.

21.3.6 Trend

The description length for each trend has been increased to 16 characters.

21.4 Function blocks

21.4.1 Message block M_GEN

The message block is used to create messages with a predefinable message value. This block can also generate messages from external devices. For this purpose, an external time stamp can be attached. The acknowledge status of the message (coming and going) is available at outputs.

21.4.2 Interfacing Protronic / Freelance 100

The integration of Protronic process controllers in Freelance 2000 is in the form of standard function blocks. It is implemented with the following blocks:

Blocks for describing the communication interface.

Block for describing the process controller as a communication subscriber.

Block for describing the controller-specific functionality of a channel on the process controller with specific parameter masks in DigiTool and a dedicated faceplate in DigiVis.

The Protronic range comprises the process controllers Protronic 100/Freelance 100, Protronic 500 and Protronic 550. The process controllers can be operated as stand-alone instruments in the process environment, but also in an interconnected system with other Protronic controllers or interconnected with overlaid systems.

21.4.3 Interbus function blocks

The function of the Interbus blocks is to transfer I/O data to an Interbus link module. The transmission medium used by the blocks is DigiNet S (Ethernet). The Interbus link module is a complete Interbus master. All data types and data structures from Freelance 2000 can be transferred.

21.4.4 Description of the block parameters

A description of the parameters has been added to manual DigiTool (2).

22 New features in V3.3

22.1 General

22.1.1 Process stations

Under version 3.3 up to 10 process stations can be used (previously 5) with up to 5 racks (previously 3). A process station thus consists of one central unit and up to 4 I/O units.

The **D-GS resource** (gateway) has been reworked and is now also available as a redundant gateway.

Frequency input module DFI 04

Processing of frequencies and pulses in the operating modes: Dosing circuit, event counting, frequency measurement, period duration measurement, pulse width measurement.

22.1.2 OPC

The **OPC server** has been newly implemented. It enables data to be made available to a third-party OPC client.

OPC client functionality has been added to DigiVis. Data from a third-party OPC server can thus be processed in DigiVis.

Variables that are to be routed to the Freelance 2000 system via an OPC server are declared to the system using this function. These variables are not assigned to any process station, but remain assigned to the resource of type OPC server.

22.1.3Licensing - Safety mode

With a software update/upgrade or a license upgrade you receive a new authorization code that can be loaded into the Freelance 2000 system.

If a hard key is defective, the software goes into a safety mode (emergency mode). As with demo mode, Freelance 2000 can be used in this mode for 100 days. Within these 100 days the hard key can be replaced without affecting license rights.

If the hard key is removed after startup, then the software will likewise go into safety mode.

22.2 DigiVis

22.2.1Messages

Messages with sound files in wave format

For each process message, a separate sound file can be configured and played back over the sound system on the DigiVis PC.

Switch off horn

The control room horn can be switched off in the message line by means of the HORN button. The configuration determines whether the field horn is switched off along with the control room horn, or whether it is controlled via a configured binary signal.

System error messages

System error messages have been added and updated.

22.2.2Overview display

It is now possible to configure a free graphic as an overview display instead of the standard overview display. The display has been adjusted to conform with the new system limits.

22.3 DigiTool

22.3.1Tags and Variables

Loadable libraries

When the project is opened, block versions are brought in line with one another. Only the classes of block used in a project are loaded onto the process station. This results in a greater amount of memory remaining available on the process station for the user programs. Classes of block required later can be post-loaded.

Variable list

The block of selected variables in the variable list is calculated via a task's process image.

Tag list

The tags exported from a tag list can be re-imported.

22.3.2Project tree

Adjustments for time zone / daylight saving changes

The time zone and daylight-saving time are set for the entire project in the project tree, project element Configuration (CONF). This is now structured in the same way as the equivalent setting in Windows NT.

Redundancy memory

Redundancy memory has been added to the boot parameters of a redundant process station. This is the area of memory that is reserved for the transfer of redundancy data.

Structuring of the operator station

The "structure node" has been added to the operator station level. This project element allows the displays and logs on the operator station to be organized more clearly.

When importing tags it is also possible to import into the tag list files created using external applications (e.g. Microsoft Excel).

22.3.3Commissioning

Loading I/O module EPROMs

In order to avoid the extremely time-consuming replacement of EPROMs on the I/O modules and a shutdown of the plant, EPROMs can be programmed with the system up and running and without involving any changes to the I/O modules' outputs. However, this is only possible with relatively new I/O modules that are already equipped with flash EPROMs.

22.3.4Graphic editor

Storing the graphic as a bitmap

A complete graphic can be stored as a bitmap, as can the separate objects that make up a graphic.

Self-animated object

In version 3.3 and later a new dynamic graphic object is available.

Up to 8 static graphic objects are displayed cyclically in quick succession. Binary process variables can be used to switch the alternating display on and off, to alter the speed of the display and to make the display invisible.

Enhanced buttons

Any button, be it a separate button or part of a button field, can be 'labeled' with any static graphic element in addition to text.

Color map

The colors available for graphic displays have been changed from version V3.3 onwards. This means that color sequences are now available, e.g. for 3D displays.

When older projects are imported, the colors available previously are translated as effectively as possible to the new color values. However, it is also an option to continue using the existing color values. The color map can be selected before a project is imported.

23 New features in V3.1 and V3.2

23.1 General

The compact control system known until now as Digimatik will be marketed internationally under the new name **Freelance 2000** from software version 3 onwards.

23.1.1 Windows NT operating system

Windows NT 4.0, as a system platform for the future, forms a foundation for a high degree of operational security and performance.

In the process of porting it to Windows NT 4.0, the software engineers also adapted the Freelance 2000 software for the use of unicode. Only the Windows applications in Freelance 2000 are affected by the conversion to unicode; the operating system in the process stations has not changed as a result.

23.1.2 Modules

CPU module DCP 10 for redundancy

The new CPU module DCP 10 for redundancy is now available, enabling CPU redundancy to be configured.

Digital input module DDI 04

This module enables inputs to be connected directly for NAMUR initiators, 3- or 4-wire initiators or contact interrogation (make, break or changeover contacts).

Rack DRA 02

In a type DRA 02 rack the redundant CPU modules can be installed in slots 0 and 1 in the main rack and slot 0 in the supplementary rack.

Redundancy

Version 3 offers the ability to increase the availability of the Freelance 2000 system by means of CPU redundancy.

The CPU redundancy has been implemented in such a way that users both of DigiTool and DigiVis see only one process station. The fact that a redundant process station has two CPU modules only needs to be taken into account initially during configuration and later when evaluating the state during the commissioning/servicing process. In all other situations a redundant process station behaves like a non-redundant process station with only one CPU module (single-machine model).

In order to upgrade V3 with redundant operation, the I/O EPROMs of all I/O modules in the process station must be changed.

For V3 projects that are to be operated with no redundancy, non-redundant operation is possible with V2 I/O modules.

23.2 DigiVis

23.2.1 Number of operator stations

10 operator stations can be connected in a Freelance 2000 system.

23.2.2 Plant areas

Each point of measurement can be assigned to one plant area from a maximum of 15 (A...O). The plant areas are shown in the **message page** and the **signal sequence log**.

23.2.3 Diagnostic password

The system display contains information that is more important to some users than to others. Thus, certain items of data are provided in the system display which are of

interest only to staff who have received specialized training in diagnostics. In order to avoid diagnostic data from being accessed by staff other than maintenance engineers, this data is protected by an access right - the diagnostics right.

23.2.4Customizing alarm colors

To enable specific country-specific or company-specific requirements to be met, the facility is provided to change the display colors for the various message priorities.

Since a modification of this nature has an effect on the entire visual appearance of DigiVis and also includes aspects with relevance to safety, the person responsible for commissioning or the service technician must be involved in implementing it. The Freelance 2000 documentation always refers to the standard color settings.

23.2.5Trend display

The window that is displayed can be positioned at a predetermined point in time on the curve.

Changes made by the operator in DigiVis are stored. These settings are used to show the trend display the next time it is called. The display can be reset to the configured values.

23.2.6Display of the number of hard copies

To provide the DigiVis operator with information on the status of hard-copy print jobs, a display has been incorporated in the DigiVis status line.

23.2.7Logs

The output format for signal sequence logs (80-character display) has been changed.

If the remainder of the line is not long enough to output the old and new value of an operator action, then the output will wrap round over one or more new lines. The new value is displayed in line with the old value.

23.2.8Headers and footers in logs

Headers and footers in logs can be configured freely. Fixed text, field references and variables can be used in header and footer text.

23.2.9 Reserving space for archives

After the software is downloaded onto the D-OS, the maximum disk space that could be required by the archives is set up straight away and permanently reserved.

23.2.10 Input formats of data types

Additional input formats of data types have been provided.

Strings may now been entered without enclosing them in quotation marks. A date (**DT**)can now be entered without a leading **DT#** and time (**TIME**) without a leading **T#**. REAL numbers can now also be entered without a decimal point.

23.2.11 Improved tag selection

The selection dialog for tags has been changed over to a combo-box with "type-ahead" functionality. The requisite tags can now be found and selected more quickly by entering a search string.

23.2.12 Grouping of system error messages

All system error messages have been classified into so-called system message groups.

23.3 DigiTool

23.3.1 Project tree

New or changed project elements

(CONF)	Configuration	The numbers of operator stations and gateways should be specified here (default 5 D-OS and 0 D-GS).
(D-PS/RED)	Process station	A redundant process station is defined by two equipped CPU modules of type DCP 10.
(TASKLIST)	Task list	New object for separating the system tasks and user tasks.
(TASK/RED)	Redundant task	All subsidiary program lists and sequential function charts within this task are implemented with redundancy.

The resource needs to be initialized if boot parameters such as the number of objects, PRAM, I/O protocol etc. are changed in the resource header.

Separating the user tasks from the system tasks

Additional structural elements have been introduced to make the project tree clearer.

USRTask User tasks can be set up under this node.

SYSTask Used for recording predefined system tasks. No other user-defined tasks can be set up under this node.

Renaming display names globally

When a display name is changed in the project tree and confirmed by the user, that name is replaced throughout the project.

23.3.2FBD program

Signalling other objects

When FBD objects are positioned above or below the visible portion of the screen, arrows pointing up and/or down appear on the scroll bar.

23.3.3Ladder Diagram

The new programming language, Ladder Diagram, has been introduced.Ladder Diagram is a graphically-oriented programming language complying with IEC 1131-3.

The LD language comes from the field of electromagnetic relay systems and describes the flow of current though the individual networks of the program organization units (POU) of a PLC.

23.3.4Tag list

Configuring the plant areas

In column **A** of the tag list a plant area can be assigned to each tag. A maximum of 15 plant areas (A...O) can be allocated.

Unused points of measurement displayed in red

Unused points of measurement are now displayed in **red** in the tag list (corresponding to unused variables in the variable list). Unused points of measurement can be selected and then deleted.

23.3.5Variable list

In the **search filter** for the variable list, the unused variable names and the system variables can be shown and hidden.

The variable list can be **sorted by slot/channel**.

New system variables for redundant process stations.

23.3.6Hardware structure

Preserving the allocation of resources and hardware

The resource allocation of a process variable is retained when the I/O channel allocation is deleted or changed.

Transmission rate on the station bus does not depend on rack ID

From version 3 onwards the rack ID is no longer displayed in hardware structure to the left of the unit (previously rack ID).

Slot for the DCP10 in rack DRA 01 and 02

In a type DRA 02 rack the redundant CPU modules may be installed in slots 0 and 1 in the main rack, and in slot 0 in the supplementary racks.

A rack DRA 01 with a hardware index of 04 or above is capable of redundant operation, but with this rack the redundant CPU modules must be installed in slot 0 in the central unit and slot 0 in the supplementary racks.

Defining parameters for the link module DLM and the CPU module

In V3, parameters must be defined for the link modules. The label facilitates error diagnosis since the label and the associated short and long texts can be reported.

State information of the I/O modules

State information has been added in the I/O channel allocation for the link module and also for the CPU module; it should be evaluated using variables.

23.3.7Commissioning

Uploading the current block parameters

The current working data from blocks can be modified using write utilities from commissioning, from DigiVis or via a gateway (e.g. DDE server). More than one item of working data can be saved using the Upload parameter function.

Rapid switch from commissioning to configuration mode

It is possible to switch rapidly from commissioning to configuration mode from an FBD program, IL program or SFC program, or from the hardware structure (system structure and station view), variable list and tag list.

New resource states

The transitions of the resource from **stopped** to **running** and vice versa are now represented by the states **starting** and **stopping**. These states are only visible when the processing of a task takes a considerable length of time.

Error handling at task level

The error message "Execution_abort_error" is sent if the task takes longer than 10 s to calculate the programs in this task once.

State display of tasks in the project tree

Partially running has been added to the states displayed for a resource or task. The state 'running' is only adopted if all assigned program modules are being processed.

Trend window and value window

The procedure for configuring the trend and value window has been improved for the user by storing configurations, a simplified way of deleting an entire configuration, and the retention of values when changes are made.

Long-term error buffer on the process station

Each occurrence of an error on a process station is logged, which means that it is possible to analyze the cause of the error.

The content of the compiled error list is transferred to an ASCII file on the operator station (DigiVis PC). The error log is automatically read by DigiVis and written to an ASCII file when either of the following two alarms occurs: 'DPS boot: Self monitoring' or 'DPS boot: Fatal error'.

23.3.8Trend

The color selection for the foreground, background and windows of the trend display (3 colors) and for each curve can be configured.

It is also possible to choose whether max. 3 or all trends in the value region of the trend display are shown.

23.3.9Logs

A file run time > 24.8 days can now be configured in operation logs.

The plant areas in the **signal sequence log** can be shown and hidden.

23.3.10Graphic editor

Bitmap

Import of bitmaps for excellent graphic displays on the operator station.

Improved zooming in the graphic editor

The portion for display can be selected immediately after choosing *Zoom level ...* from the menu.

Selection of the current section can also be initiated using the right mouse button if the graphic editor is in "selection mode" (this does not apply in parameter definition masks).

Mandatory parameters in the graphic editor

The mandatory parameters in the masks of the graphic editor are now displayed in **red**, as per the general convention.

23.3.11General improvements

Selection of cross references from editors

Cross references can now be selected direct from each editor (apart from the graphic editor).

Switching to error locations after the plausibility check

You can switch directly from the plausibility list to the point at which an error has been detected.

Classes of plausibility errors

Hints have been added to complement the plausibility check messages (errors and warnings).

Storing the latest editing position

Many editors now store the latest editing position.

Return to project tree, expanding branches automatically

If a program is quit via **Exit**, then the edited program is selected in the project tree. If the edited program is in a "contracted" tree structure, the project tree is "expanded" accordingly. This facilitates navigation in the project tree.

Global cancel/exit from nested parameter input dialogs

A parameter input operation that extends over more than one dialog mask can now be cancelled completely with **Cancel** or completed fully with **Ok**. Scrolling in such masks can only still be performed using the >>/<< buttons.

Improved tag selection

The tag selection dialog has been improved. The requisite tags can now be found and selected more quickly by entering a search string.

Global renaming of tags

When a tag name is changed in the tag list and confirmed by the user, all instances of that tag name are replaced.

23.4 Function blocks

23.4.1Send/receive blocks

Send and receive blocks enable communication to take place with any other TCP/IP subscriber on an external computer, as well as communication between Freelance 2000 systems.These blocks use DigiNet S (Ethernet) as the transmission medium, and the protocol used is the TCP/IP sub-protocol UDP or, as an alternative option, UDP Broadcast.

All data types and data structures from Freelance can be transferred.

23.4.2Analog blocks

Counter with analog input CT_ANA

The basic value can only still be configured and used within the measuring range. In order to achieve greater precision the counter works internally with 64-bit REAL resolution.

Set point controller C_ANA

The manual value is checked in conjunction with the weighting adjustment parameter.

The bias can only be configured and operated within the range [-scale range .. +scale range].

In automatic operating mode the manual value is not allowed to be written.

Analog input converter AI_TR

The plausibility check only still checks the default values (pins **DVL** and **DVH**) where these have been input in the parameters mask.

Analog input converter with transient evaluation AI_TRT

The plausibility check only still checks the default value (pin **DV**) where this has been input in the parameters mask.

Transient monitoring (ON/OFF) can only still be changed by modifying the configuration.

Time scheduler TS

At each coincidence point with a run time ≥ task cycle time, a coincidence point value within the scale range must be entered.

At each coincidence point with a coincidence point value, a valid run time must also be entered.

When the error output **ERR** is set, the values on state output **STA** are redefined.

Time analog filter TFILT

The function of this new block is to filter analog signals with high resolution. It implements the functions dead time, mean time value, minimum time value and maximum time value.

23.4.3Binary blocks

Operating time counter CT_LT

To enable the counter to produce a 'genuine' count of operating hours, the facility has been provided for configuring a time resolution (second;minute;hour). In each different time resolution the counter operates with a precision to the nearest millisecond.

Frequency analog converter FAC_D

The minimum frequency configured is observed in all cases at the block output.

23.4.4Controller blocks

All controllers

Set point ramps and correction value ramps can be activated in configuration either only in automatic mode or in both manual and automatic modes. Previously they were always active both in manual and automatic mode.

The set point limits are supplied dynamically with the values of the measuring range limits while a controller is being configured. However, these can be overwritten with valid values at any time. If the measuring range limits are reduced, then the set point limits follow suit.

Empty fields are no longer accepted as parameter entries for set point limits and correction value limits, unless they are interconnected.

The effectiveness of the output limits with continuous controllers and point controllers has been overhauled.

Universal controllers and ratio controllers

The disturbance variable feedforward range for a DTB input has been expanded to -100.00.0% ... 100 .0%.

New parameter, "Disturbance variable monitoring", for specifying whether disturbance variables should be taken into account when displaying and checking the limit values of X, XD.

The disturbance variable processing for X has been corrected so that when the time function is configured to X (D-action and/or P-action effective to X) and disturbance variable DTB to X, a changed response may result.

Step controller C_SS, C_SU, C_SR

The maximum task cycle time, in which the controllers concerned can be calculated, may not exceed 24 h.

The allowable ranges for motor positioning time, minimum pulse length, minimum pause length and dead time external feedback are restricted.

End position tracking (0%, 100%) even when no external feedback is available. Tracking of whichever values are of interest with internal feedback configured and external feedback available. State output STR is only still dependent on the value of the TRC input.

Secure control of end positions in automatic mode with external feedback. The continuous output variable has hitherto been limited to 0%..100% to make it impossible to completely reach end positions subject to min. pulse duration and motor positioning time. Steps have now been taken to ensure that the controller

outputs remain set for as long as the target output variable required is ≥ 100% or ≤ 0%.

The control functions **Hold value**, **Disable direction OPEN**, **Disable direction CLOSED** are now also available with internal feedback.

Parameter for external feedback (mask 2) can now also be written in commissioning, with the result that it is possible to switch between internal and external feedback in commissioning.

Three-position controller C_OS, C_OU, C_PU

The maximum task cycle time, in which the controllers concerned can be calculated, may not exceed 24 h.

23.4.5 Acquisition blocks

Disturbance course log acquisition block DISLOG

When the error output **ERR** is set, the values on state output **STA** are redefined.

Trend acquisition block TREND

When the error output **ERR** is set, the values on state output **STA** are redefined.

23.4.6 Monitoring blocks

Connection monitoring M_CONN

The station type is no longer required for connection monitoring.

It is not possible to monitor the connections to other process stations.

23.4.7Open loop control blocks

Individual drive function for unidirectional drives IDF_1

End position monitoring is carried out irrespective of whether or not runtime monitoring is activated. The state local ignores any end position errors that may occur and resets them.

End position monitoring can be switched on and off.

The buttons for the correction command in the faceplate and in the operator line indicate the state at the block's output rather than the state of the input as before.

Individual drive function for bidirectional drives IDF_2

End position monitoring is carried out irrespective of whether or not runtime monitoring is activated. The state local ignores any end position errors that may occur and resets them.

End position monitoring can be switched on and off.

A new response has been implemented for motors that are to be controlled. The type of device to be connected can be configured. In the faceplate, run direction STOP is signified by the STOP indicator flashing.

A dead time can be configured for the feedback inputs **FB1** and **FB0**.

The buttons for the correction command in the faceplate and in the operator line indicate the state at the block's output.

Individual drive function for servodrives IDF_A

End position monitoring is carried out irrespective of whether or not runtime monitoring is activated. The state local ignores any end position errors that may occur and resets them.

End position monitoring can be switched on and off.

A dead time can be configured for the feedback inputs.

The buttons for the correction command in the faceplate and in the operator line indicate the state at the block's output.

Analog dosing circuit DOS_A

In order to achieve greater precision the counter now works internally with 64-bit REAL resolution.

Extended dosing circuit DOS_E

In order to achieve greater precision the counter now works internally with 64-bit REAL resolution.

23.4.8DigiBatch blocks

PLI function block

Enhanced PLI function block (Phase Logic Interface) for interfacing to DigiBatch.

23.4.9Telecontrol function blocks

The blocks in the remote control library enable Freelance 2000 to be coupled with external systems. Interfacing is carried out over the serial interface of the CPU module (only DCP 10). The remote control protocol used is that conforming to IEC 870-5.

23.4.10Sartorius scale block

For standard interfacing of Sartorius balances (not balance controllers), a block is provided with its own faceplate. The balance is linked by means of the communications module DCO01.

Index

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