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About This User Manual

Any security measures described in this User Manual, for example, for user access, password security, network security, firewalls, virus protection, etc., represent possible steps that a user of a control system may want to consider based on a risk assessment for a particular application and installation. This risk assessment, as well as the proper implementation, configuration, installation, operation, administration, and maintenance of all relevant security related equipment, software, and procedures, are the responsibility of the user of the control system.

This User manual provides a description of the S800 I/O DTM product which includes DTMs for the S800 I/O (see Product Overview on page 13). It provides instructions for installation and for operation of the DTMs.

User Manual Conventions

Microsoft Windows conventions are normally used for the standard presentation of material when entering text, key sequences, prompts, messages, menu items, screen elements, etc.

Feature Pack

The Feature Pack content (including text, tables, and figures) included in this User Manual is distinguished from the existing content using the following two separators:

Feature Pack Functionality

<Feature Pack Content>
Feature Pack functionality included in an existing table is indicated using a table footnote (*):

* Feature Pack Functionality

Unless noted, all other information in this User Manual applies to 800xA Systems with or without a Feature Pack installed.

**Warning, Caution, Information, and Tip Icons**

This User Manual 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 that could result in *electrical shock*.

- **Warning icon** indicates the presence of a hazard that 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 that 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, fully comply with all Warning and Caution notices.

**Terminology**

A complete and comprehensive list of terms is included in *System 800xA System Guide Functional Description (3BSE038018*)*. The listing includes terms and definitions that apply to the 800xA System where the usage is different from
commonly accepted industry standard definitions and definitions given in standard dictionaries such as Webster’s Dictionary of Computer Terms.

Terms that uniquely apply to this User Manual are listed in the following table.

<table>
<thead>
<tr>
<th>Term</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Type Manager</td>
<td>DTM</td>
<td>Software components (device drivers) for configuring, diagnosing, simulating, displaying the measured values, etc. of a field device.</td>
</tr>
<tr>
<td>Fieldbus Communication Interface</td>
<td>FCI</td>
<td>The Fieldbus Communication Interface (FCI) device contains the interface to the fieldbus, ModuleBus interface and power regulators. The FCI module can manage 24 I/O devices (up to 12 directly and the others in 1 to 7 I/O clusters).</td>
</tr>
<tr>
<td>Frame Application</td>
<td>FA</td>
<td>Frame application (run time environment) in accordance with the FDT specification for operating DTMs.</td>
</tr>
<tr>
<td>Field Device Tool</td>
<td>FDT</td>
<td>Interfaces for integrating device-specific components into a frame application.</td>
</tr>
<tr>
<td>Graphical User Interface</td>
<td>GUI</td>
<td>Graphical user interface.</td>
</tr>
<tr>
<td>Highway Addressable Remote Transducer</td>
<td>HART</td>
<td>Digital communication protocol developed for applications in industrial process metrology.</td>
</tr>
<tr>
<td>I/O module</td>
<td>-</td>
<td>In this user manual the term I/O module is related to a S800 I/O module.</td>
</tr>
<tr>
<td>Instrument</td>
<td>-</td>
<td>In this user manual the term instrument is related to a HART instrument.</td>
</tr>
<tr>
<td>Intrinsic Safety</td>
<td>I.S.</td>
<td>Intrinsic Safety is a protection technique to prevent explosion in hazardous areas of a process plant.</td>
</tr>
<tr>
<td>Outputs Set as Predetermined</td>
<td>OSP</td>
<td>A user configurable action on an output module when communications is lost to the FCI or Controller.</td>
</tr>
</tbody>
</table>
Applicable Specifications

This product conforms to applicable parts of the requirements specified in FDT version 1.2 and addendum.

Released User Manuals and Release Notes

A complete list of all User Manuals and Release Notes applicable to System 800xA is provided in System 800xA Released User Manuals (3BUA000263*).

System 800xA Released User Manuals (3BUA000263*) is updated each time a document is updated or a new document is released. It is in pdf format and is provided in the following ways:

- Included on the documentation media provided with the system and published to ABB SolutionsBank when released as part of a major or minor release, Service Pack, Feature Pack, or System Revision.
- Published to ABB SolutionsBank when a User Manual or Release Note is updated in between any of the release cycles listed in the first bullet.

A product bulletin is published each time System 800xA Released User Manuals (3BUA000263*) is updated and published to ABB SolutionsBank.

<table>
<thead>
<tr>
<th>Term</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Asynchronous Receiver and Transmitter</td>
<td>UART</td>
<td>A microchip used to exchange data with modems and other serial devices.</td>
</tr>
<tr>
<td>Sequence of Events</td>
<td>SOE</td>
<td>A feature to realize the time stamp for events from digital input signals.</td>
</tr>
</tbody>
</table>
Section 1  Introduction

FDT/DTM - General
The FDT concept describes the interface between a frame application and the DTMs (DTM = Device Type Manager) from the device manufacturer. It enables devices from different manufacturers and different fieldbuses to be integrated in a single system.

Product Overview
The DTM is a software component, which is usually supplied by the manufacturer together with the intelligent field device or I/O component. The DTM is familiar with the way the field device works (plausibility), offers graphical user dialogs, manages device configuration and diagnosis, and supplies the device-specific documentation.

The product S800 I/O DTM covers the following S800 I/O modules:

Table 1. S800 I/O Units

<table>
<thead>
<tr>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI801</td>
<td>Remote PROFIBUS DPV1 Communication Interface</td>
</tr>
<tr>
<td>CI840</td>
<td>Remote PROFIBUS DPV1 Communication Interface for redundant applications</td>
</tr>
<tr>
<td>AI801</td>
<td>Analog Input 1*8 channels, 0...20 mA, 4...20 mA</td>
</tr>
<tr>
<td>AI810</td>
<td>Analog Input, 1*8 channels, 0..20 mA, 4..20mA, 0...10 V, 2...10 V</td>
</tr>
</tbody>
</table>
### Table 1. S800 I/O Units (Continued)

<table>
<thead>
<tr>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI815</td>
<td>Analog Input, 1*8 channels, 0..20 mA, 4..20 mA, 0..5V, 1..5 V, HART Interface, Extended Diagnosis</td>
</tr>
<tr>
<td>AI820</td>
<td>Analog Input differential, 1*4 channels, -20..20 mA, 0..20 mA, 4..20 mA, -5..5 V, 0..5 V, 1..5 V, -10..10 V, 0..10 V, 2..10 V</td>
</tr>
<tr>
<td>AI825</td>
<td>Analog Input 4*1 channels for applications requiring galvanic isolated channels, -20...20 mA, 0(4)...20 mA, -10...10 V, 0(2)...10 V</td>
</tr>
<tr>
<td>AI830</td>
<td>Analog Input, 1*8 channels, Resistance Temperature Detector (RTD)</td>
</tr>
<tr>
<td>AI835</td>
<td>Analog Input, 1*8 channels, Thermocouples (TC)</td>
</tr>
<tr>
<td>AI835A</td>
<td>Analog Input, 1*8 channels, Thermocouples (TC) with remote Cold junction compensation</td>
</tr>
<tr>
<td>AI843</td>
<td>Analog Input, 1*8 channels, Thermocouples (TC)</td>
</tr>
<tr>
<td>AI845</td>
<td>Analog Input, 1*8 channels, 0..20 mA, 4..20 mA, 0..5V, 1..5 V, HART Interface, Extended Diagnosis, Redundant Applications</td>
</tr>
<tr>
<td>AI880</td>
<td>High Integrity Analog Input 1*8 channels, 0...20 mA, 4...20 mA</td>
</tr>
<tr>
<td>AI890</td>
<td>Analog Input, 1*8 channels, 0..20 mA, 4..20 mA, I.S. Interface</td>
</tr>
<tr>
<td>AI893</td>
<td>Analog Input, 1*8 channels, RTD and Thermocouple, I.S Interface</td>
</tr>
</tbody>
</table>
### Table 1. S800 I/O Units (Continued)

<table>
<thead>
<tr>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI895</td>
<td>Analog Input, 1*8 channels, 4..20 mA, I.S. and HART Interface</td>
</tr>
<tr>
<td>AO801</td>
<td>Analog Output, 1*8 channels, 0...20 mA, 4...20 mA</td>
</tr>
<tr>
<td>AO810</td>
<td>Analog Output, 1*8 channels, 0..20 mA, 4..20 mA</td>
</tr>
<tr>
<td>AO815</td>
<td>Analog Output, 1*8 channels, 4..20 mA, HART Interface, Extended Diagnosis</td>
</tr>
<tr>
<td>AO820</td>
<td>Analog Output, 4*1 channels, -20..20 mA, 0..20 mA, 4..20 mA, -10..10 V, 0..10 V, 2..10 V, individually isolated</td>
</tr>
<tr>
<td>AO845</td>
<td>Analog Output, 1*8 channels, 4..20 mA, HART Interface, Extended Diagnosis, Redundant Applications</td>
</tr>
<tr>
<td>AO890</td>
<td>Analog Output, 1*8 channels, 0..20 mA, 4..20 mA, I.S Interface</td>
</tr>
<tr>
<td>AO895</td>
<td>Analog Output, 1*8 channels, 4..20 mA, I.S. and HART Interface</td>
</tr>
<tr>
<td>DI801</td>
<td>Digital Input 24 V d.c., 1*16 channels$^{(1)}$</td>
</tr>
<tr>
<td>DI802</td>
<td>Digital Input 120 V a.c., 110 V d.c., 8*1 channels</td>
</tr>
<tr>
<td>DI803</td>
<td>Digital Input 230 V a.c., 220 V d.c., 8*1 channels</td>
</tr>
<tr>
<td>DI810</td>
<td>Digital Input 24 V d.c., 2*8 channels$^{(2)}$, current sinking</td>
</tr>
<tr>
<td>DI811</td>
<td>Digital Input 48 V d.c, 2*8 channels current sinking</td>
</tr>
</tbody>
</table>
**Table 1. S800 I/O Units (Continued)**

<table>
<thead>
<tr>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI814</td>
<td>Digital Input 24 V d.c., 2*8 channels, current source</td>
</tr>
<tr>
<td>DI818</td>
<td>Digital Input 24 V d.c., 32 channels</td>
</tr>
<tr>
<td>DI820</td>
<td>Digital Input 120 V a.c., 110 V d.c., 8*1 channels</td>
</tr>
<tr>
<td>DI821</td>
<td>Digital Input 230 V a.c., 220 V d.c., 8*1 channels</td>
</tr>
<tr>
<td>DI825</td>
<td>Digital Input 125V d.c, 1*8 channels, SOE (Sequence of Events)</td>
</tr>
<tr>
<td>DI828</td>
<td>Digital Input 120 V a.c., 16 channels</td>
</tr>
<tr>
<td>DI830</td>
<td>Digital Input 24V d.c, 1*16 channels, current sinking, SOE (Sequence of Events)</td>
</tr>
<tr>
<td>DI831</td>
<td>Digital Input 48V d.c, 1*16 channels, current sinking, SOE (Sequence of Events)</td>
</tr>
<tr>
<td>DI840</td>
<td>Digital Input 24 V d.c. 1*16 channels(^{(1)}), Extended Diagnosis, Redundant Applications</td>
</tr>
<tr>
<td>DI885</td>
<td>Digital Input 24V/48V d.c, 1*8 channels, current sinking, SOE (Sequence of Events)</td>
</tr>
<tr>
<td>DI890</td>
<td>Digital Input, I.S. Interface, 8*1 channels, Galvanic isolation between channels</td>
</tr>
<tr>
<td>DO801</td>
<td>Digital Output 24 V d.c., 0.5 A short circuit proof, 1*16 channels(^{(1)})</td>
</tr>
<tr>
<td>DO802</td>
<td>Digital Output Relay 1*8 channels, 24-230 V a.c./110 V d.c. 2 A cos (\varphi) &gt; 0.4 d.c. &lt; 60 W</td>
</tr>
<tr>
<td>DO810</td>
<td>Digital Output 24 V d.c. 0.5 A short circuit proof, 2*8 channels</td>
</tr>
<tr>
<td>DO814</td>
<td>Digital Output 24 V d.c. 0.5 A short circuit proof, 2*8 channels, current sink</td>
</tr>
</tbody>
</table>
All DTMs are used to operate the S800 I/O modules in a frame application conforming to applicable parts of FDT version 1.2 and addendum.

### ABB Standard Drive Integration

ABB Standard drives can be connected to the S800 I/O system. The FCI works as a communication link between the fieldbus master and the drives. No application software concerning this functionality is stored in the FCI. Check the available support for each FCI type.
The following drives are considered to be standard drives:

- ACS600 with standard application
- ACS800 with standard application
- ACS600 with crane application
- ACS800 with crane application
- ACS600 with pump and fan application (PFC)
- ACS800 with pump and fan application (PFC)
- ACS400 with standard drive
- DCS400 with standard drive
- DCS500 with standard drive
- DCS600 with crane application

**Product Scope**

The S800 I/O DTM version 6.0 is suitable for executing various tasks, also referred to as applications in the following description. The applications have a graphical user interface. The product also contains DTMs that has HART tool routing functionality. Tool routing describes a mechanism to enable sub connected DTMs, such as the Basic HART DTM to communicate through a S800 I/O DTM to HART instruments connected to a S800 I/O module. For this function no graphical user interface is required.

The following are examples of available applications:

- About DTM
- Identification
- Diagnosis
- Configuration
- Observe
- Parameterization
- Service
Prerequisites and Requirements

The S800 I/O DTM conforms to applicable parts of FDT 1.2 and addendum and requires a frame application conforming to FDT 1.2.

For details about the supported operating systems and FDTs, see System Prerequisites on page 21.

Intended User

This manual is designed specifically for application engineers, commissioning engineers and maintenance personnel. It provides for easy installation and operation of the S800 I/O DTM.

Those using this document should be familiar with the basic method of operation of computers and software installation.
Section 2  Installation

System Prerequisites

The following are the prerequisites to install and operate S800 IO DTM version 6.0:

• Operating System (any of the following):
  – Windows server operating system
  – Windows client operating system

Refer to 3BUA000500 for more information.

• ABB FDT Shared Components:
  – Version 14.0.0.x

• ABB FDT Base Container:
  – Version 14.0.0.x

For remote I/O, a PROFIBUS master DTM is required (for example AC800F DTM).

To use the HART functionality together with the DTM s AI815, AI845, AI880, AI895, AO815, AO845 and AO895, a HART DTM has to be installed (for example Basic HART DTM).

The S800 I/O DTM version 1.0/0 and higher will not run in frame applications conforming to version 0.98 of the FDT specification. The FDT versions differ in the expanded number of interfaces, their meaning and data management.
Installation Directory

The S800 I/O DTM files are stored in the following path and directories:

![Folders]

Figure 1. Installed DTMs
Language Setting

S800 I/O DTM supports English.

Backup

It is recommended to use a standard software to create a backup of the memory medium (CD). This backup helps to save the data if the medium is damaged, or in the event of a fatal error on the computer.

Ensure that the backup is clearly marked and carefully maintained.

Initial Installation

Sequence

The S800 I/O DTM consists of a single program to install all DTMs. The installation process is the same for all components and is therefore described only once.

Installation Procedure

This procedure describes the manual installation, and needs to be referred only if the automatic installation of S800 IO DTM is not performed along with the Control System installation.

To install the S800 I/O DTM component through command prompt, do the following steps:

1. Run the command prompt (administrator login) and change it to the drive where the builds are copied, for example D drive would be D:/

2. Enter `cd <space> Path`.

Enter the folder path where the build is available.
3. Enter `msiexec <space> i <space>"MSIname"` and press enter. The system prepares for installation.

![Windows Installer](image)

*Figure 2. Windows Installer*

4. Follow the instructions on the screen and accordingly click **Next**.

![InstallShield Wizard](image)

*Figure 3. InstallShield Wizard*
5. Enter the **User Name** and the **Company Name**.

![Customer Information Screen](image)

*Figure 4. Customer Information Screen*
6. Click Install to start the installation process.

Figure 5. Installation start-up
7. Click **Finish** to complete the installation process.

![Image of installation complete](image)

*Figure 6. Installation complete*

This completes the installation of S800 DTM.
Section 3  Run-time Operation

Introduction

This section describes how to operate the DTM with the applications in a frame application, for example Fieldbus Builder.

After the DTMs are installed, start the frame application and locate the S800 I/O DTM. See appropriate documentation for handling of the frame application.

This section is also available as Online Help.

Data Storage

The data (parameters) is only available temporarily in the DTM for processing. When a user interface is closed or data is buffered, the DTM saves the data permanently.

In off-line mode, data is saved in Frame Application. In on-line mode, data is saved first to the I/O module and then to the database. However, the DTM will only update the data in the database if the I/O module has accepted the data.
User Interfaces

Most DTM applications have a graphical user interface for display variables, input/output parameter values or executing commands. Only two applications (download/upload) do not have a graphical user interface. They are controlled exclusively by the frame application (the DTM works in the background).

The user interface comprises a header, which is provided by the frame application. If possible, the header should contain the process point, the device name and the active application.

The DTM adds the application-specific area in the middle and two footer lines. The footer contains the standard buttons and status bar.

DTM user interfaces may be different for different Frame Applications. For example, some DTM GUI may not be offered in 800xA Control System compared to Melody or Freelance Control System.

Frame Application

The DTM informs the frame application about the possible applications. The frame application usually provides a drop-down menu for selecting an application or similar. Depending on the user’s rights or the operating state (on-line/off-line), some applications may not be available for selection.

The title bar and tool bar shown in the examples should be made available by a frame application. They provide assistance when working with several DTMs or applications in parallel.

More detailed information about the selection and presentation of the DTM can be found in the instruction manual for the frame application.
System Structure

The figure below is an example of a system structure for the hardware hierarchy and the corresponding DTMs were the S800 I/O is used.

![System Structure Diagram]

Figure 7. Example of System Structure
User Roles

The DTM checks the user rights when an application starts up. Certain users may even be prohibited from using some applications. If access to an application is permitted, a distinction is made between restricted access (read-only) and full access (read and write) to its functions.

The user roles are FDT specific. They can have different names in different Frame Applications.

Table 2. User Roles

<table>
<thead>
<tr>
<th>Applications</th>
<th>Observer</th>
<th>Operator</th>
<th>Maintenance</th>
<th>Planning Engineer</th>
</tr>
</thead>
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<td>R/W</td>
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<td>-/-</td>
<td>-/-</td>
<td>R/W</td>
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<td>R/W</td>
<td>R/W</td>
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<td>-/-</td>
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<td>R</td>
<td>R/W</td>
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<tr>
<td>Upload</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>R/W</td>
</tr>
</tbody>
</table>

-/- = The user interface is not available for selection

R = Data output only (read)

R/W = Data input (write) and output (read)

If, in addition to the roles above, you have administrators or OEM service rights, the role of an observer will grant you unrestricted access to all applications.
**Buttons**

The following buttons are not application-specific and always have the same function:

Press the **Ok** button if you want to save all data and close the graphical interface. The DTM will then save the data for that application to the database and/or device.

![Ok Button](image)

If **Cancel** is pressed, the DTM will reject all data input (since the last time data was saved/applied) and close the interface.

![Cancel Button](image)

Press the **Apply** button to apply the number or text input and menu selections made. The DTM will save all modifications made since the last time data was applied. The interface remains open.

![Apply Button](image)

Press the **Help** button to access the Online Help for an application.

![Help Button](image)
Input/Output Boxes

The input/output boxes are used to display and input data (parameter values). Depending on the meaning of the parameter, numerical values or character strings can be entered. In some cases, these values must be selected from a list containing a fixed number of default entries.

Input and output boxes are identified by means of the background brightness. The DTM highlights the fields containing modified data. Pressing the Apply, Ok or Cancel buttons and performing a save prompts the DTM to remove the highlighting.

When data is entered into an input box, the DTM checks the data format, value ranges, etc. The data plausibility check can only be carried out once all data has been entered. The DTM carries out the plausibility check once the Apply or Ok button has been pressed. Entries that conflict with other entries on these user interfaces are identified accordingly in the appropriate fields. They must be corrected before the data can be applied.
Status Bar

The status bar at the bottom of the user interface comprises a total of three fields. The status bar provides the following information:

The left-hand field provides information about the on-going transactions within the application. It will tell when the communication is progressing and when it is finished. If any error occurs then a description will be displayed here.

<table>
<thead>
<tr>
<th>Reading Diagnosis...</th>
</tr>
</thead>
</table>

The middle field provides information about the user name and the user role. For more information about user roles, see User Roles on page 32.

<table>
<thead>
<tr>
<th>UserName/Observer</th>
</tr>
</thead>
</table>

The right-hand field is currently not used for information.

|         |         |         |
Applications

Following applications are currently available for the S800 I/O DTM:

- **About DTM**
  Displays version information.

- **Identification**
  Displays information about the hardware.

- **Diagnosis**
  Displays diagnosis for the unit.

- **Observe**
  Displays the cyclic data.

- **Configuration**
  Used to set user parameters.

- **Parameterization**
  Used to set HART parameters.

- **Service**
  Used for sending special functions (commands).

*Table 3. Applications available for the S800 I/O DTM*

<table>
<thead>
<tr>
<th>Module</th>
<th>About DTM</th>
<th>Identification</th>
<th>Diagnosis</th>
<th>Observe</th>
<th>Configuration-on</th>
<th>Parameter-ization</th>
<th>Service</th>
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</table>
Table 3. Applications available for the S800 I/O DTM (Continued)

<table>
<thead>
<tr>
<th>Module</th>
<th>About DTM</th>
<th>Identification</th>
<th>Diagnosis</th>
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### Table 3. Applications available for the S800 I/O DTM (Continued)

<table>
<thead>
<tr>
<th>Module</th>
<th>About DTM</th>
<th>Identification</th>
<th>Diagnosis</th>
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</table>
Table 3. Applications available for the S800 I/O DTM (Continued)

<table>
<thead>
<tr>
<th>Module</th>
<th>About DTM</th>
<th>Identification</th>
<th>Diagnosis</th>
<th>Observe</th>
<th>Configuration</th>
<th>Parameterization</th>
<th>Service</th>
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<tbody>
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<td>ABB Standard Drive</td>
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<td></td>
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<td>X</td>
</tr>
</tbody>
</table>

(1) HART Parameterization only.
(2) The module supports SOE (Sequence Of Events), but this feature can only be used in a frame application that also supports SOE.

### About DTM

For general information, directly related to the S800 I/O DTM, select the “About DTM” menu item. It will show the DTM version information.

![Figure 8. About DTM](image-url)
Identification

The identification control is used for displaying information about the hardware. It shows the type of module, which functionality it has and the device revision. Furthermore it has a picture of the module and a comment box.

Figure 9. Identification, this example shows DI810

Module area

- **Module type**
  Shows the S800 I/O module type.

- **Vendor name**
  Shows the vendor name.
Section 3  Run-time Operation

Diagnosis

- **Position**
  Shows the address information of the module. This number correspond to the actual hardware position of the module including cluster address.

  If the Identification window is open and the position of the module is changed in the Control Builder, the new position is not updated in the window. Close and open the Identification window to view the updated position.

**Function area**

Describes hardware specific data for the module.

See the S800 I/O manuals for more detailed information about the functions of the module.

**Revisions area**

- **Hardware revision**
  This revision will be read from the module and displayed in the text field in online mode.

  This function is not supported in all I/O modules.

**Diagnosis**

The diagnosis control shows the status of the module. It displays information like Module missing, Wrong module type and Internal channel error. The available diagnosis can differ depending on the module type.
Station specific diagnosis is displayed in Diagnosis control for the CI801 or CI840 DTM. AI895 and AO895 have also specific HART diagnosis, see Diagnosis section for respective unit.

Figure 10. Diagnosis for I/O modules not supporting Diagnostic History
Figure 11. Diagnosis for AI815, AO815, AI830, AI835, AI835A, AI843, AI845 and AO845

Channel Status area
Displays the channel status reported by the module in cyclic data.

Module Diagnosis area
Reports diagnostic that affects the entire I/O module i.e. Wrong module type.

Channel Diagnosis area
Reports errors on separate channels.
Read Diagnostic History

Shows a list of diagnostic events that have been changed since the list was last read. When clicking this button the history on the I/O module will be erased.

Observe

The Observe control displays the dynamic data and channel status for a module in online mode. It is possible to update the value once or to read it cyclic with an interval of 30 s by checking the corresponding check box. To stop the cyclic reading, press the Cancel button.
**Observe Analog modules**

Displays the dynamic data, both in digits, percent and as a gauge bar and the chosen signal range.

*Figure 12. Observe, Analog modules, this example shows AI895 for AC800F and AC870P*
The Observe window can also be used to analyze overflow or underflow in the signals at each channel. For underflow, no value is shown in the gauge bar. For overflow, a percentage value (above 100%) is shown in the gauge bar. If AC 800M is used as the controller, the underflow/overflow information can also be read under the Unit Status tab of the module editor, in the Control Builder.
**Observe Digital modules**

Displays the dynamic data and the channel status.

*Figure 14. Observe, Digital modules, this example shows DO810*
CI801

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See CI801 Dynamic values on page 149.

Diagnosis

Diagnosis control shows the status of the CI801 and node specific errors and warnings. Module specific diagnosis are displayed in the Diagnosis control for each I/O module.
General tab

![CI801 Diagnosis General Tab](image)

*Figure 15. CI801 - Diagnosis - General Tab*

**Device state area**

This text field shows the actual state of the FCI. Either the state is *Operational* or the text field is left blank.

**Device diagnostics area**

The device specific errors that are detected for the CI801 are:

- **Station warning**
  At least one error is detected within the entire CI801 station (including I/O modules etc.).

- **Redundant power A failure**
  Power fail on the optical modem.
• **Redundant power B failure**
  Power fail on the optical modem

**Station address warning**
There is a mismatch between the actual address on the CI801 and the one configured in the system or if the address is set above 62. The warning will be cleared when the system is restarted with the right configuration or if the switch on the CI801 is changed back to the configured address.

**Configuration**

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.

*Figure 16. CI801 - Configuration for AC870P*
Section 3 Run-time Operation

**Figure 17. CI801 - Configuration for AC800F**

- **Power supervision of opto extension**
  Mark the check box if the voltage supply to the cluster shall be supervised. Only if redundant power supply.

- **Extended HART mode**
  Normal mode shall always be used if HART data is \( \leq 56 \) bytes. Mark the check box if the HART data is \( \geq 56 \) bytes but \( < 215 \) bytes. If Extended HART mode is chosen less I/O modules can be used. See *S800 I/O Manuals* for more details.

- **HCIR Enable**
  Hot Configuration In Run active

- **HCIR Factor**
  Hot Configuration In Run Factor

- **HCIR Watchdog**
  Hot configuration In Run Worst Case Bus Cycle Base
CI840

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See CI840 Dynamic values on page 150.

Diagnosis

Diagnosis control shows the status of the CI840 and node specific errors and warnings. Module specific diagnosis are displayed in the Diagnosis control for each I/O module.
General tab

Figure 18. CI840 - Diagnosis - General Tab

Device state area

This text field shows the actual state of the FCI. Either the state is **Operational** or the text field is left blank.

Device diagnostics area

The device specific errors that are detected for the CI840 are:

- **Station warning**
  At least one error is detected within the entire CI840 station (including I/O modules etc.).

- **Redundancy warning**
  Decreased availability due to error on redundant part in the entire CI840 station.
  In system with only single CI840 this warning could be raised if the system is not correctly configured for single mode.
• **Redundant power A failure**  
  For the CI840 or an optical modem.

• **Redundant power B failure**  
  For the CI840 or an optical modem.

• **CI840 in position A is primary**  
  CI840 in position A is primary in a redundant pair also set if used as single.

• **CI840 in position B is primary**  
  CI840 in position B is primary in a redundant pair.

• **CI840 error on unit in position A**  
  CI840 in position A is erroneous.

• **CI840 error on unit in position B**  
  CI840 in position B is erroneous.

• **Redundant cable A failed**  
  The Profibus cable to CI840 in position A is unconnected or broken.

• **Redundant cable B failed**  
  The Profibus cable to CI840 in position B is unconnected or broken.

**Station address warning**  
There is a mismatch between the actual address on the CI840 and the one configured in the system or if the address is set above 62. The warning will be cleared when the system is restarted with the right configuration or if the switch on the CI840 is changed back to the configured address.

**Configuration**

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item. It shows the user parameters for the FCI e.g. Output Hold Time.
Figure 19. CI840 - Configuration for AC870P

**Sequence of Events**

The **Sequence of Events** checkbox determines the status of the SOE feature in the supported I/O modules:

- If this checkbox is checked, the SOE drop-down menu in the Channel Parameters tab of the supported I/O modules is activated. The user can then select the SOE status for each channel.
- If this checkbox is unchecked, the SOE is disabled for the supported modules, and the SOE drop-down menu in the Channel Parameters tab of the supported modules are not activated.

SOE is supported in DI825, DI830, DI831, and DI885 modules.
Figure 20. CI840 - Configuration for AC800F

- **Power supervision of FCI**
  Mark the check box if the voltage supply to the FCI shall be supervised. Only if redundant power supply.

- **Power supervision of opto extension**
  Mark the check box if the voltage supply to the cluster shall be supervised. Only if redundant power supply.

- **Redundancy**
  Mark the check box if the CI840 shall be configured as a redundant module.

- **Extended HART mode**
  Normal mode shall always be used if HART data is \( \leq 56 \) bytes. Mark the check box if the HART data is \( \geq 56 \) bytes but \( \leq 215 \) bytes. If Extended HART mode is chosen less I/O modules can be used. See Memory Maps for more details.

- **Output hold time**
  After a fail over, a timer is started in the new primary CI840. This CI840 requires configuration and data from the Profibus Master within the output hold time, which is defined in the **Output hold time** text field. If no data is received
within the defined time, the channels on the output modules are set to the predefined value (OSP value).

- **HCIR Enable**
  Hot Configuration In Run active

- **HCIR Factor**
  Hot Configuration In Run Factor

- **HCIR Watchdog**
  Hot configuration In Run Worst Case Bus Cycle Base

### Configuration Control of DI825/DI830/DI831/DI885 with CI840 for SOE

To use the modules DI825/DI830/DI831/DI885 for SOE, open the `ServiceEntries.xml` file, and set the value of the ‘EnableSOE’ attribute to 1.

The location of `ServiceEntries.xml` is `<ProgramData>`\ABB\800xA\S800DTM. The ProgramData folder is hidden, by default.

**Table 4** describes the different configuration control options for the SOE supported modules DI825, DI830/DI831 and DI885, used with CI840 for AC870P. It is assumed that the **EnableSOE** attribute is set to 1 globally.

**Table 4. Configuration control of SOE supported modules used with CI840, for AC870P**

<table>
<thead>
<tr>
<th>Status of ‘Sequence of Events’ checkbox in CI840 Configuration Control</th>
<th>Displayed status in the ‘SOE’ drop-down menu in DI825/DI830/DI835/DI885 Configuration Control</th>
<th>Whether the displayed SOE status in DI8xx can be changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchecked, by default, after inserting the CI840 for the first time</td>
<td>SOE disable</td>
<td>No</td>
</tr>
<tr>
<td>Checked after an unchecked status</td>
<td>SOE disable</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 4. Configuration control of SOE supported modules used with CI840, for AC870P

<table>
<thead>
<tr>
<th>Status of ‘Sequence of Events’ checkbox in CI840 Configuration Control</th>
<th>Displayed status in the ‘SOE’ drop-down menu in DI825/DI830/DI835/DI885 Configuration Control</th>
<th>Whether the displayed SOE status in DI8xx can be changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checked, after inserting the CI840 for the first time</td>
<td>SOE enable</td>
<td>Yes</td>
</tr>
<tr>
<td>Unchecked after a checked status</td>
<td>SOE disable</td>
<td>No</td>
</tr>
</tbody>
</table>
Service

The service control is used for reading acyclic data.

---

**Service functions area**

Click the **Execute** button to perform a switch over between unit A and unit B.

**Status area**

In the **Status** area you can see which unit that is primary. By clicking the **Update** button you update the status for which of the units that are the primary.

---

*Figure 21. CI840 - Service*
AI801/AI810/AI820/AI825

About DTM
See About DTM on page 39.

Identification
See Identification on page 40.

Dynamic Data
See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151, and AI820/AI825 Dynamic values on page 152.

Diagnosis
See Diagnosis on page 41.

Observe
See Observe on page 44.

Configuration
This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item. It shows the user parameters for the module i.e. Filter time, Signal range and Linearization.
**Channel parameters tab**

The control looks the same for all modules but for the number of channels.

![Channel Parameters 1-8](image)

*Figure 22. AI801/AI810/AI820/AI825 - Configuration*

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Filter time**, **Signal range** and **Linearization** drop-down menus.
**AI815/AI845**

**About DTM**

See About DTM on page 39.

**Identification**

See Identification on page 40.

**Dynamic Data**

See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151.

**Diagnosis**

See Diagnosis on page 41.

**Observe**

See Observe on page 44.

**Configuration**

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional. For configuration of the module, select the “Configuration” menu item.
Module parameters tab

Figure 23. AI815 - Configuration - Module Parameters Tab
Mark the Redundancy check box if the unit shall be set for redundant operation. This check box is only applicable for AI845 when configured via CI840.

Mark the External power supervision check box if supervision of the power supply to the transducer shall be enabled. If an error occurs the status of the unit is updated and the channel status bits will be set.

In the Shunt mode drop-down menu you can choose between ‘Internal shunt’ or ‘External shunt’. External shunt shall always be set together with MTU TU844 or TU845, and at voltage signal together with other MTUs.

Figure 24. AI845 - Configuration - Module Parameters Tab
Channel parameters tab

The Channel parameters tab shows the user parameters of the module. It shows Filter time, Linearization function and Signal range.

Figure 25. AI815 and AI845 - Configuration - Channel Parameters Tab

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Filter time, Signal range and Linearization drop-down menus.
Service

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840. The service control is only applicable for AI845.

Redundancy Tab

![Redundancy Tab Image]

*Figure 26. AI845 - Service - Redundancy Tab*

The Redundancy Tab is only shown in Commissioning mode.

*Module status area*
In the **Module status** area you can see which I/O module that is treated as primary by CI840. By clicking the **Update** button you update the status for which of the I/O module that are the primary.

The HART Primary unit does not have to be identical with the Primary unit described in this control. The HART Primary unit is set in the Service Control in Engineering mode.
HART Primary Tab

The HART Primary Tab is only shown in Engineering mode. Here you select through which unit HART communication should happen.

The HART Primary unit can be, but does not have to be, identical with the unit treated as primary by CI840 seen in Service Control in Commissioning mode. If the HART Primary module fails, HART communication does not switch over automatically to the other unit. The user must manually do the switchover.

Figure 27. AI845 - Service - HART Primary Tab
AI830

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for the channels, i.e. Filter time and Signal range.
Module parameters tab

Figure 28. AI830 - Configuration - Module Parameters Tab

**Grid frequency area**

Make the required choice in the Grid frequency drop-down menu.
Channel parameters tab

<table>
<thead>
<tr>
<th>Module parameters</th>
<th>Channel Parameters 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 1</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 2</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 3</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 4</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 5</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 6</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 7</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
<tr>
<td>Channel 8</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Filter time</td>
<td>Filter off</td>
</tr>
<tr>
<td>Signal range</td>
<td>PM100 - 200, 050°C, 751 - 80</td>
</tr>
</tbody>
</table>

Figure 29. AI830 - Configuration - Channel Parameters Tab

Channel area

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Filter time** and **Signal range** drop-down menus.
AI835/AI835A

The difference between the AI835 and AI835A modules is that AI835A has some supplementary features. AI835A supports the same thermocouple types as AI835 and additionally TC types D, L and U. AI835A has also a possibility to use remote cold junction compensation. It is possible to insert an AI835A in a configuration as replacement for AI835, but not the other way around.

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151, and AI835A Dynamic Values on page 152.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for the channels, i.e. Signal range and Filter time.
Module parameters tab

Grid Frequency area

Make the required choice in the Grid frequency drop-down menu.

Fix Junction Temperature area

Type the required value in the Fix junction temperature text field.
Channel parameters tab

Figure 31. AI835/AI835A - Configuration - Channel parameters Tab

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Filter time**, **Signal range** and **Cold junction temperature** drop-down menus.
AI843

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See AI843 Dynamic values on page 153

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module parameters tab

Figure 32. AI843 - Configuration - Module Parameters Tab

**Redundancy area**

Mark the **Redundancy** check box if the unit shall be set for redundant operation. This check box is only applicable for AI843 when configured via a CI840.

**Grid Frequency area**

Make the required choice in the **Grid frequency** drop-down menu.

**Deactivate CJ channel area**

Mark the **Deactivate CJ channel** check box if the Cold Junction channel shall not be used and the supervision disabled.

**Fix Junction Temperature area**

Type the required value in the **Fix Junction Temperature** text field.
Channel parameters tab

The Channel parameters tab shows the user parameters of the module. It shows Filter time, Signal range and Cold junction temperature.

Figure 33. AI843 - Configuration -Channel Parameters Tab

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Filter time, Signal range and Cold junction temperature drop-down menus.
Service

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840.

Figure 34. AI843 - Service - Redundancy Tab

Redundancy Tab

The Redundancy Tab is only shown in Commissioning mode.

Module status area
In the Module status area you can see which I/O module that is addressed by CI840. By clicking the Update button you update the status for which of the I/O module that are the primary. The module has to be configured via a CI840.

**AI880**

This module is only supported as direct I/O connected to AC800M.

If the AI880A are used in Safety applications there are restrictions on how to access data and the HART parameter are recommended to be set to Read only.

Device specific HART commands are not predefined and can be implemented as both read or write commands. If device specific commands are to be used the parameter has to be set to Full mode.

**Note:** If the HART routing functionality of AI880A is not restricted by the modules configuration settings (Read only or Disabled), the operation procedures must include restrictions for use of this function.

If a write command is sent when the AI880A is in Read only mode the module will return an error which is reported back to the AI880 DTM. The AI880 DTM will display an error message “No connection” in the Fieldbus Builder (FBB) view stating which command that has failed. The AI880 DTM will also send an error report back to the HART DTM and it is up to this DTM to decide how to act on the error.

**About DTM**

See About DTM on page 39.

**Identification**

See Identification on page 40.
AI890

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Channel parameters tab

Channel parameters tab shows the user parameters of the module. It shows Filter time, Linearization and Signal range.

Figure 35. AI890 - Configuration - Channel Parameters Tab

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Filter time, Signal range and Linearization drop-down menus.
AI893

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
AI893 in RTD mode

Channel parameters tab

Figure 36. AI893 - Configuration in RTD mode

Mark the Deactivate check box if the channel shall not be used.
Make the required choices in the Filter time and Signal range drop-down menus.
**AI893 in TC mode**

*Module parameters tab*

![Module Parameters Tab](image)

**Figure 37. AI893 - Configuration in TC mode- Module Parameters Tab**

- **Fix Junction Temperature area**
  Type the required value in the **Fix Junction Temperature** text field.
Channel parameters tab

Channel parameters tab shows the user parameters of the module. It shows Filter time, Signal range and Cold junction temperature.

Figure 38. AI893 - Configuration in TC mode - Channel Parameters Tab

- Channel area
  Mark the Deactivate check box if the channel shall not be used.

  Make the required choices in the Filter time, Signal range and Cold junction temperature drop-down menus.
AI895

About DTM
See About DTM on page 39.

Identification
See Identification on page 40.

Dynamic Data
See AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values on page 151.

Diagnosis

Module diagnosis tab
The module tab in the diagnosis window is used for reading diagnosis about the module itself. See Diagnosis on page 41.
HART device tab

The HART tab in the Diagnosis window is used for reading diagnosis about the HART part of the module.

![Module parameters - Channel Parameters 1-8](image)

*Figure 39. AI895 - Diagnosis - HART device tab*

**Device Status area**

- **Operations in progress**
  
  Shows an indication if one of the following operations is currently performed:
  
  - Reset: Reset of the HART functionality.
  - Rebuild: Collecting information about HART instruments (HART command 0 performed).
  - Scan_enabled: Normal operation if scanning is enabled.
  - Self test: A check sum verification on HART non-volatile parameters is performed.
• **Hardware faults**

  Shows one of the following faults for the module:
  
  – Channel fault (of any HART channels)
  – ROM fault
  – EEPROM fault

• **Instruments communication error**

  Shows the summary of the communication error bits for the instruments. According to the HART protocol specification.

• **Instruments status**

  Shows the summary of the status bits for the instruments. According to the HART protocol specification.

**Channel status area**

• **Channel 1 - 8**

  Shows the instruments scan faults and status. Following status can be shown, Scan enabled, Searching, Disappeared, Appeared, Mismatched. See Scan enabled for more information on different status.

  An empty box means that no instrument was found and have not been present on this channel before.

**General status area**

The status can be of three different types, either it is a communication error, command response or field device status. Note that if it is a communication error, the other statuses will then be empty. These status bytes are defined by the HART protocol specification. See appropriate HART documentation for more detailed information.

Communication errors are mostly those which will be detected by a UART, like parity, overrun and framing errors. The field device reports RX (receive buffer for HART messages) overflow and check sum error.

Command response codes are categorized as either errors or warnings, which could have a single meaning or multiple meaning. The codes listed below are those which could be applicable to all transactions. There could also be private defined meanings for some numbers.
Field device status includes both fault conditions and abnormal operation modes or conditions and does not necessarily mean a faulty device.

- **Communication Error**
  Case Communication error can be of the following types:
  - Parity error
  - Overrun error
  - Framing error
  - Check sum error
  - RX buffer overflow
  - Undefined

- **Command response**
  Case Command response can show the following:
  - No command-specific error
  - Invalid selection
  - Passed parameter too large
  - Passed parameter too small
  - Too few data bytes received
  - Device-specific command error
  - In write-protect mode
  - Access restricted
  - Device is busy
  - Command not implemented

- **Field device status**
  Case Field device status can show the following:
  - Field device malfunction
  - Configuration changed
  - Cold start
– More status available
– Analogue output current fixed
– Analogue output saturated
– Non-primary variable out of limits
– Primary variable out of limits

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
**Channel parameters tab**

Channel parameters tab shows the user parameters of the module. It shows Filter time, Signal range and Linearization.

![Channel parameters tab](image)

*Figure 40. AI895 - Configuration - Channel Parameters Tab*

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Filter time**, **Signal range** and **Linearization** drop-down menus.

**Parameterization**

The parameterization control is used for sending parameters to the module. This is for the HART part of the module.
## HART parameters tab

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of retries (busy response)</td>
<td>2 (0..10)</td>
</tr>
<tr>
<td>Number of retries (other error)</td>
<td>2 (0..10)</td>
</tr>
</tbody>
</table>

**Figure 41. AI895 - Parameterization**
**General area**

- **Number of retries (busy response)**
  Writes the selected number of retries to the module. This affects the communication between the module and the HART instrument. Valid numbers are 0 - 10. This applies for a busy response.

  If the communication with the HART instrument fails when the default value is used, increase the value to ensure a better performance.

- **Number of retries (other error)**
  Writes the selected number of retries to the module. This affects the communication between the module and the HART instrument. Valid numbers are 0 - 10. This applies for other error.

**Service**

The service control is used for sending special functions (commands) to the HART part of the I/O module.
HART

Module

| Manufacturer ID code: | 73 |
| Manufacturer device type code: | 236 |
| Device specific command rev: | 1 |
| Software rev: | 2 |
| Hardware rev: | 14 |
| Long address: | 73, 236, 3, 13, 65 |

Status

| Operations in progress: |
| Hardware faults: |
| Instruments scan faults and status: |
| Instruments communication error bits: |
| Instruments status bits: |

Service functions

Execute

Gateway parameters

| Number of instruments in list: | Delayed response, number of retries for busy response: |
| Number of instruments scanned: | Scan enabled: Number of retries for error response: |

Close  Help

Figure 42. AI895 - Service

Module area

- **Manufacturer ID code**
  Shows the number code for the manufacturer.

- **Manufacturer device type code**
  Shows the number code for the type of module.

- **Device specific command rev**
  Shows the number of the command revision. Each HART instrument implements HART universal commands, HART common practice commands
and HART specific commands. This number identifies the revision of this set of commands.

- **Software rev**
  Shows the software revision of the firmware.

- **Hardware rev**
  Shows the hardware revision.

- **Long address**
  These text fields will show the long address, also known as extended address, which is defined by the HART protocol and consists of the "manufacturer identification code", "manufacturer's device type code" and three bytes called identification number.

**Service functions area**

- **Reset configuration changed identification**
  This function resets this change identification in the module. This configuration changed flag is part of the general status and this status will be read when the function "Read additional device status" and "Read gateway parameters" are executed. This flag is set every time a HART change is made for the configuration parameters.

- **Perform device self-test**
  This self-test is related to the HART part of the module. A check sum verification of the HART non volatile parameters is performed.

- **Perform master reset**
  This function will reset the HART functionality of the module. The HART activity and all HART variables are reset. Then the HART functionality is restarted and a rebuild of its internal HART structure will be done, i.e. it collects information about HART instruments on the channels (HART command 0 performed).

If new devices are connected to an AI895 module, or if the devices are changed at specific channels of the module, executing the **Perform master reset** option ensures that the devices are detected, see **Connecting a HART instrument** on page 147

- **Read additional device status**
  This function will read additional status for the module. These are:
– Operations in progress
– Hardware faults
– Instruments scan faults and status
– Instruments communication error bits
– Instruments status bits

See I/O Module Status area for more information.

• **Flush completed delayed response**
  This function will delete the response that is stored in the buffer. If the DTM is in a lock situation when the I/O module always response busy then this function can be used to flush the HART response buffer.

• **Read gateway parameters**
  This function will read gateway parameters for the module. These are:
  – Number of instruments in list
  – Number of instruments scanned
  – Delayed response, primary master
  – Scan enabled
  – Number of retries for busy response
  – Number of retries for error response

• **Enable scan status**
  This function turns on the scanning.

  The scanning function is implemented to monitor the presence of field instruments. When the scanning is enabled, all instruments of the instrument lists are scanned with HART command 1. A different channel every 5s. If an instrument does not reply the DISAPPEARED and SEARCHING bits related to that instrument are set, else the SCAN_ENABLED will be set.

  For the instrument that is not replying the module begins to scan that instrument with HART command 0. If there is a reply to command 0, the module verifies if it comes from the original instrument:
– If it does, the APPEARED bit is set, the DISAPPEARED and SEARCHING bits are cleared and the module restarts the normal scanning activity.
– If it does not, the MISMATCHED bit is set, the DISAPPEARED bit is cleared and the module keeps on searching the instrument with command 0.

• **Disable scan status**
  This function turns off the scanning.

**Gateway parameters**

• **Number of instruments in list**
  Shows the number of instruments that the module has found on its channels. If an instrument is added in run-time then the module has to be reset to find the new instrument and add it to its instrument list. This can be done by using the service function "Perform master reset". The maximum of instruments are one per channel which means eight total on the module.

• **Number of instruments scanned**
  If the scan option is enabled the module will try to scan all elements that are in the instrument list. See **Enable scan status** for more information about the scanning.

• **Delayed response, primary master**
  Shows if there are any responses in use for the primary master. Can be flushed with using the service function "Flush completed delayed response".

• **Number of retries for busy response**
  Shows the configured number of retries for a busy response from the instrument to the module.
  Default number of retries is 2.

• **Number of retries for error response**
  Shows the configured number of retries for an error response between the instrument and the module.
  The following is determined for an error response:
– Instrument time-out: when the maximum amount of time that an I/O module will wait before deciding that the instrument has failed is elapsed. The value is fixed to 33 character times (305 ms)

– Outgoing communication error: when bit 7 is set in the reply status first byte

– Incoming communication error:
  - byte count error (received data byte number differs from byte count field)
  - command number error (received command number differs from transmitted one)
  - received address error
  - check sum error
  - character error (parity, overrun, framing error)

Default number of retries is 2.

- **Scan enabled**
  The scanning function is implemented to monitor the presence of field instruments.

When the scanning is enabled or if diagnosis is read all instruments of the instruments list are scanned (a different channel every 5 s).

If an instrument does not reply the DISAPPEARED and SEARCHING bits related to that instrument are set. Then the module begins to scan that instrument with HART command 0.

If there is a reply to command 0, the module verifies if it comes from the original instrument:

– if it does, the APPEARED bit is set, the DISAPPEARED and SEARCHING bits are cleared and the module restarts the normal scanning activity;

– if it does not, the MISMATCHED bit is set, the DISAPPEARED bit is cleared and the module keeps on searching the instrument with command 0.
With a new diagnosis scan, the DISAPPEARED and APPEARED bits are cleared.

**AO801/AO810/AO820**

**About DTM**

See About DTM on page 39.

**Identification**

See Identification on page 40.

**Dynamic Data**


**Diagnosis**

See Diagnosis on page 41.

**Observe**

See Observe on page 44.

**Configuration**

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item. It shows the user parameters of the module, i.e. Signal range, OSP Value.
Channel parameters tab

The control looks the same for all modules but for the number of channels.

![Channel Parameters Tab](image)

Figure 43. AO801/AO810/AO820 - Configuration - Channel Parameters Tab

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Signal range and OSP control drop-down menus.

If the alternative “Set OSP value” is chosen, you can type your own value (0-100%) in the OSP value text field.
AO815/AO845

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data


Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module parameters tab (only applicable for AO845)

Figure 44. AO845 - Configuration - Module Parameters Tab

- **Redundancy**
  Mark the Redundancy check box if the unit shall be set for redundant operation.

**Channel parameters tab**

The Channel parameters tab shows the user parameters of the module. It shows Signal range, OSP control, OSP value and Output filter.
**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Signal range** and the **OSP control** drop-down menus.

If the alternative “Set OSP value” is chosen, you can type your own value (0-100%) in the **OSP value** text field.

Mark the **Output filter** check box if it shall be used. Should be set when using HART.
Service

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840. The service control is only applicable for AO845.

Redundancy Tab

The Redundancy Tab is only shown in Commissioning mode.

![Redundancy Tab](image)

*Figure 46. AO845 - Service - Redundancy Tab*

*Module status area*
In the **Module status** area you can see which I/O module that is treated as primary by CI840. By clicking the **Update** button you update the status for which of the I/O module that are the primary.

The HART Primary unit does not have to be identical with the Primary unit described in this control. The HART Primary unit is set in the Service Control in Engineering mode.

**HART Primary Tab**

The HART Primary Tab is only shown in Engineering mode. Here you select through which unit HART communication should happen.

![HART Primary Tab](image)

*Figure 47. AO845 - Service - HART Primary Tab*

The HART Primary unit can be, but does not have to be, identical with the unit treated as primary by CI840 seen in Service Control in Commissioning mode. If the
HART Primary module fails, HART communication does not switch over automatically to the other unit. The user must manually do the switchover.

AO890

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data


Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Channel parameters tab

The channel parameters tab shows the user parameters of the module. It shows Signal range, OSP control and OSP value.

![Channel parameters tab image](image)

**Figure 48. AO890 - Configuration - Channel Parameters Tab**

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Signal range and the OSP control drop-down menus.

If the alternative “Set OSP value” is chosen, you can type your own value (0-100%) in the OSP value text field.
AO895

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data


Diagnosis

Module diagnosis tab

The module tab in the diagnosis window is used for reading diagnosis about the module itself. See Diagnosis on page 41.
HART device tab

The HART tab in the Diagnosis window is used for reading diagnosis about the HART part of the module.

![HART device tab](image)

*Figure 49. AO895 - Diagnosis*

See HART device tab on page 87

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Channel parameters tab
The channel parameters tab (see Figure 40) shows the user parameters of the module. It shows Signal range, OSP control and OSP value.

Channel area
Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the Signal range and the OSP control drop-down menus.

If the alternative “Set OSP value” is chosen, you can type your own value (0-100%) in the OSP value text field.

Parameterization
The parameterization control is used for sending parameters to the module. This is for the HART part of the module as shown in Figure 41.

General area
- **Number of retries (busy response)**
  Writes the selected number of retries to the module. This affects the communication between the module and the HART instrument. Valid numbers are 0 - 10. This applies for a busy response.

  If the communication with the HART instrument fails when the default value is used, increase the value to ensure a better performance.

- **Number of retries (other error)**
  Writes the selected number of retries to the module. This affects the communication between the module and the HART instrument. Valid numbers are 0 - 10. This applies for other error.

Service
The service control is used for sending special functions (commands) to the HART part of the I/O module. The Service tab is as shown in Figure 42.

Module area
- **Manufacturer ID code**
  Shows the number code for the manufacturer.
• **Manufacturer device type code**
  Shows the number code for the type of module.

• **Device specific command rev**
  Shows the number of the command revision. Each HART instrument
  implements HART universal commands, HART common practice commands
  and HART specific commands. This number identifies the revision of this set
  of commands.

• **Software rev**
  Shows the software revision of the firmware.

• **Hardware rev**
  Shows the hardware revision.

• **Long address**
  These text fields will show the long address, also known as extended address,
  which is defined by the HART protocol and consists of the "manufacturer
  identification code", "manufacturer's device type code" and three bytes called
  identification number.

*Service functions area*

• **Reset configuration changed identification**
  This function resets this change identification in the module. This
  configuration changed flag is part of the general status and this status will be
  read when the function "Read additional device status" and "Read gateway
  parameters" are executed. This flag is set every time a HART change is made
  for the configuration parameters.

• **Perform device self-test**
  This self-test is related to the HART part of the module. A check sum
  verification of the HART non volatile parameters is performed.

• **Perform master reset**
  This function will reset the HART functionality of the module. The HART
  activity and all HART variables are reset. Then the HART functionality is
  restarted and a rebuild of its internal HART structure will be done, i.e. it
collects information about HART instruments on the channels (HART command 0 performed).

If new devices are connected to an AO895 module, or if the devices are changed at specific channels of the module, executing the **Perform master reset** option ensures that the devices are detected, see Connecting a HART instrument on page 147.

- **Read additional device status**
  This function will read additional status for the module. These are:
  - Operations in progress
  - Hardware faults
  - Instruments scan faults and status
  - Instruments communication error bits
  - Instruments status bits
  See I/O Module Status area for more information.

- **Flush completed delayed response**
  This function will delete the response that is stored in the buffer. If the DTM is in a lock situation when the I/O module always response busy then this function can be used to flush the HART response buffer.

- **Read gateway parameters**
  This function will read gateway parameters for the module. These are:
  - Number of instruments in list
  - Number of instruments scanned
  - Delayed response, primary master
  - Scan enabled
  - Number of retries for busy response
  - Number of retries for error response
**Enable scan status**

This function turns on the scanning.

The scanning function is implemented to monitor the presence of field instruments. When the scanning is enabled, all the instruments of the instruments list are scanned with HART command 1. A different channel every 5s. If an instrument does not reply the DISAPPEARED and SEARCHING bits related to that instrument are set, else the SCAN_ENABLED will be set. For the instrument that is not replying the module begins to scan that instrument with HART command 0. If there is a reply to command 0, the module verifies if it comes from the original instrument:

- If it does, the APPEARED bit is set, the DISAPPEARED and SEARCHING bits are cleared and the module restarts the normal scanning activity.

- If it does not, the MISMATCHED bit is set, the DISAPPEARED bit is cleared and the module keeps on searching the instrument with command 0.

**Disable scan status**

This function turns off the scanning.

**Gateway parameters**

**Number of instruments in list**

Shows the number of instruments that the module has found on its channels. If an instrument is added in run-time then the module has to be reset to find the new instrument and add it to its instrument list. This can be done by using the service function "Perform master reset". The maximum of instruments are one per channel which means eight total on the module.

**Number of instruments scanned**

If the scan option is enabled the module will try to scan all elements that are in the instrument list. See **Enable scan status** for more information about the scanning.

**Delayed response, primary master**
Shows if there are any responses in use for the primary master. Can be flushed with using the service function "Flush completed delayed response".

- **Number of retries for busy response**
  Shows the configured number of retries for a busy response from the instrument to the module.
  Default number of retries is 2.

- **Number of retries for error response**
  Shows the configured number of retries for an error response between the instrument and the module.
  The following is determined for an error response:
  - Instrument time-out: when the maximum amount of time that an I/O module will wait before deciding that the instrument has failed is elapsed. The value is fixed to 33 character times (305 ms)
  - Outgoing communication error: when bit 7 is set in the reply status first byte
  - Incoming communication error:
    - byte count error (received data byte number differs from byte count field)
    - command number error (received command number differs from transmitted one)
    - received address error
    - check sum error
    - character error (parity, overrun, framing error)
  Default number of retries is 2.

- **Scan enabled**
  The scanning function is implemented to monitor the presence of field instruments.
  When the scanning is enabled or if diagnosis is read all instruments of the instruments list are scanned (a different channel every 5 s).
If an instrument does not reply the DISAPPEARED and SEARCHING bits related to that instrument are set. Then the module begins to scan that instrument with HART command 0.

If there is a reply to command 0, the module verifies if it comes from the original instrument:

– if it does, the APPEARED bit is set, the DISAPPEARED and SEARCHING bits are cleared and the module restarts the normal scanning activity;

– if it does not, the MISMATCHED bit is set, the DISAPPEARED bit is cleared and the module keeps on searching the instrument with command 0.

With a new diagnosis scan, the DISAPPEARED and APPEARED bits are cleared.

**DI801/DI802/DI803/DI810/DI811/DI814/DI818/DI820/DI821/ DI828/DI890**

**About DTM**

See About DTM on page 39.

**Identification**

See Identification on page 40.

**Dynamic Data**


**Diagnosis**

See Diagnosis on page 41.
Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for separate channels.

Module parameters tab

The control looks the same for all modules but for the number of channels.

Power supervision area

Make the required choice in the Power supervision drop-down menu.
**Filter time channel area**

Make the required choice in the **Filter time channel** drop-down menu.

**Channel parameters tab**

The control looks the same for all modules but for the number of channels.

![Channel parameters module](image)

**Figure 51. DI801/DI802/DI803/DI810/DI811/DI814/DI818/DI820/DI821/DI828 - Configuration - Channel Parameters Tab**

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.
Channel area

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choice in the **Channel supervision** drop-down menu.

**DI825**

This module requires CI840 and supports the SOE feature only with AC870P/Composer. Contact ABB Local Supplier for the Composer version.

**About DTM**

See **About DTM** on page 39.

**Identification**

See **Identification** on page 40.
Dynamic Data

See DI825 Dynamic Values on page 160.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module Parameters Tab

![Module Parameters Tab](image)

**Figure 53. DI825 - Configuration - Module Parameters Tab**

**Power Supervision group 1 area**

Make the required choice in the **Power Supervision group 1** drop-down menu, for supervising channels 2-4.

**Power Supervision group 2 area**

Make the required choice in the **Power Supervision group 2** drop-down menu, for supervising channels 5-7.
**Channel Parameters Tab**

![Channel Parameters Tab Diagram](image)

**Figure 54. DI825 - Configuration - Channel Parameters Tab**

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choice in the **SOE** drop-down menu. For SOE configuration options when using this module with CI840, see Configuration Control of DI825/DI830/DI831/DI885 with CI840 for SOE on page 57.

Make the required choice in the **Filter time** drop-down menu.

Make the required choice in the **Normal position** drop-down menu.
This module requires CI840 and supports the SOE feature only with AC870P/Composer. Contact ABB Local Supplier for the Composer version.

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DI830/DI831 Dynamic Values on page 161.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module Parameters Tab

Power Supervision group 1 area
Make the required choice in the **Power Supervision group 1** drop-down menu, for supervising channels 2-4.

Power Supervision group 2 area
Make the required choice in the **Power Supervision group 2** drop-down menu, for supervising channels 5-7.
### Channel Parameters Tab

![Channel Parameters Tab](image)

**Figure 56. DI830/DI831 - Configuration - Channel Parameters Tab**

#### Channel area

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choice in the **SOE** drop-down menu. For SOE configuration options when using this module with CI840, see Configuration Control of DI825/DI830/DI831/DI885 with CI840 for SOE on page 57.

Make the required choice in the **Filter time** drop-down menu.

Make the required choice in the **Normal position** drop-down menu.
DI840

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DI801/DI810/DI811/DI814/DI828/DI840 Dynamic values on page 156.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module parameters tab

![Module parameters tab](image)

*Figure 57. DI840 - Configuration - Module Parameters Tab*

**Redundancy area**

Mark the **Redundancy** check box if the unit shall be set for redundant operation. This check box is only applicable when configured via CI840.

**Channel supervision area**

Make the required choice the **Sensor power supervision** drop-down menu.

Make the required choice the **Channel supervision** drop-down menu.
**Channel parameters tab**

It shows the user parameters of the module.

![Channel parameters tab](image)

**Figure 58. DI840 - Configuration - Channel Parameters Tab**

**Channel area**

Mark the **Deactivate** check box shows if the channel shall not be used.

Make the required choice in the **Filter time** drop-down menu.

**Service**

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840. The Service redundancy tab is as shown in **Figure 34**.
Module status area

In the Module status area you can see which I/O module that is primary. By clicking the Update button you update the status for which of the I/O module that are the primary.

DI885

This module requires CI840 and supports the SOE feature only with AC870P/Composer. Contact ABB Local Supplier for the Composer version.

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DI885 Dynamic Values on page 162.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module Parameters Tab

Figure 59. DI885 - Configuration - Module Parameters Tab

**Power supervision area**
Make the required choice in the **Power supervision** drop-down menu.

**Channel supervision area**
Make the required choice in the **Channel supervision** drop-down menu.

**Sensor type area**
Make the required choice in the **Sensor type** drop-down menu.

**Sensor power supply area**
Make the required choice in the **Sensor power supply** drop-down menu.
Channel Parameters Tab

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choice in the **SOE** drop-down menu. For SOE configuration options when using this module with CI840, see [Configuration Control of DI825/DI830/DI831/DI885 with CI840 for SOE](#) on page 57.

Make the required choice in the **Filter time** drop-down menu.

Make the required choice in the **Normal position** drop-down menu.
**DO801/DO802/DO810/DO814/DO815/DO818/DO820/DO821/DO828**

**About DTM**

See About DTM on page 39.

**Identification**

See Identification on page 40.

**Dynamic Data**

See DO801/DO810/DO814/DO828/DO840 Dynamic values on page 163, DO818 Dynamic values on page 164 and DO802/DO815/DO820/DO821 Dynamic values on page 165.

**Diagnosis**

See Diagnosis on page 41.

**Observe**

See Observe on page 44.

**Configuration**

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for separate channels.

---

* Feature Pack Functionality
Module parameters tab

The control looks the same for all modules but for the number of channels.

![Module parameters tab](image)

Figure 61. DO802/DO810/DO814/DO815/DO818 /DO820/DO821/DO828 - Configuration - Module Parameters Tab

Power supervision area

Make the required choice in the **Power supervision** drop-down menu.

The Power supervision is not available for DO801.
Channel parameters tab

The control looks the same for all modules but for the number of channels.

![Channel parameters tab](image)

Figure 62. DO801/DO802/DO810/DO814/DO815/DO818/DO820/DO821/DO828 - Configuration - Channel Parameters Tab

Channel area

Mark the Deactivate check box if the channel shall not be used.

Make the required choices in the OSP control and OSP value drop-down menus.

DO840

About DTM

See About DTM on page 39.
Identification

See Identification on page 40.

Dynamic Data

See DO801/DO810/DO814/DO828/DO840 Dynamic values on page 163.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

For configuration of the module, select the “Configuration” menu item.
Module parameters tab

Figure 63. DO840 - Configuration - Module Parameters Tab

Redundancy area

Mark the **Redundancy** check box if the unit shall be set for redundant operation. This check box is only applicable when configured via CI840.

Supervision area

Mark the **External power supervision** check box if supervision of the power supply to the output channels shall be enabled. If an error occurs the status of the unit is updated and the channel status bits will be set.
Channel parameters tab

Figure 64. DO840 - Configuration - Channel Parameters Tab

Channel area

Check the Deactivate check box shows if the channel shall not be used.
Make the required choices in the OSP control and OSP value drop-down menus.

Pulse test area

DO840 has two groups (Group 1 = channel 1-8 and Group 2 = channel 9-16), each with 8 channels. The pulse test checks if the process connection is OK by inverting all output for the group for <1 ms in intervals of 100 ms.

Internal channel error area

Make the required choice, Deactivated enabled or disabled, in the Deactivated drop-down menu.
Service

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840. The Service redundancy tab is as shown in Figure 34.

Module status area

In the Module status area you can see which I/O module that is primary. By clicking the Update button you update the status for which of the I/O module that are the primary.

DO890

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DO890 Dynamic values on page 166.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.
Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for separate channels.

**Module parameters tab**

![Module parameters tab](image)

*Figure 65. DO890 - Configuration - Module Parameters Tab*

**Power supervision area**

Make the required choice in the **Power supervision** drop-down menu.
Channel parameters tab

Figure 66. DO890 - Configuration - Channel Parameters Tab

**Channel area**

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **OSP control**, **OSP value** and **Channel supervision** drop-down menus.
DP820

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DP820 Dynamic values on page 167.

Diagnosis

See Diagnosis on page 41.

Observe

The Observe control displays the dynamic for a module in online mode. It is possible to update the value once or to read it cyclic with an interval of 30 s by checking the corresponding check box. To stop the cyclic reading, press the Cancel button.
Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for separate channels.
Channel parameters tab

![Channel parameters tab](image)

Figure 68. DP820 - Configuration - Channel Parameters Tabs

Make the required choices in the channel parameter drop-down menus.
DP840

About DTM

See About DTM on page 39.

Identification

See Identification on page 40.

Dynamic Data

See DP840 Dynamic values on page 171.

Diagnosis

See Diagnosis on page 41.

Observe

See Observe on page 44.

Configuration

This control is not available if the unit is used towards AC 800M. The configuration data is then set via Control Builder Professional.

Configuration consists of two tabs. The Module parameters tab shows the user parameters for the module and the Channel parameters tab shows parameters for separate channels.
Module parameters tab

![Module parameters tab](image)

**Figure 69. DP840 - Configuration - Module Parameters Tab**

**Redundancy area**
Mark the **Redundancy** check box if the unit shall be set for redundant operation. This check box is only applicable when configured via CI840.

**Channel supervision area**
Make the required choice in the **Channel supervision** drop-down menu.

**Signal range area**
Make the required choice in the **Signal range** drop-down menu.

**Shunt mode area**
Make the required choice in the **Shunt mode** drop-down menu.
Channel parameters tab

Figure 70. DP840 - Configuration - Channel Parameters Tab

Channel area

Mark the **Deactivate** check box if the channel shall not be used.

Make the required choices in the **Filter time**, **Pulse count/Freq measure** and **Interval Timer** drop-down menus.

Service

The service control is used for reading acyclic data and is only visible if the module is configured via a CI840. The Service redundancy tab is as shown in Figure 34.

Module status area

In the **Module status** area you can see which I/O module that is primary. By clicking the **Update** button you update the status for which of the I/O module that are the primary.
ABB Standard Drive

About DTM
See About DTM on page 39.

Identification
See Identification on page 40.

Dynamic Data
See Appendix B, Dynamic Data.

Diagnosis
See Diagnosis on page 41.
Appendix A  Operating with HART DTMs

Introduction

The AI815/AO815, AI845/AO845, AI880 and the AI895/AO895 DTMs support to have HART DTMs connected to their channels. All seven DTMs have 8 channels reflecting their hardware channels. It is possible to connect one HART DTM to any of the channels of the parent AI815/AO815 DTM, AI845/AO845 DTM, AI880 DTM or AI895/AO895 DTM.

Connecting a HART instrument

A HART instrument can be connected on any of the channels of an AI815, AO815, AI845, AO845, AI880, AI895 or AO895, module. If the instrument is connected at run-time to an AI895 or AO895, for example when the module is operational, then the module will not discover the new HART instrument automatically.
The DTM for the AI895 and AO895 have a Service application with different functions for the module (For AI895, see Service on page 93; and for AO895, see Service on page 110). The service function *Perform master reset* will reset the HART functionality in the module and a new scan for HART instruments on every channel will be done.

**Supervision of HART instrument**

The AI895 or AO895 module has an supervision option (see Scan enabled). This option can be turned on or off from the DTM, Service application with the service functions “Enable scan” and “Disable scan”.

This option only applies for HART instrument that already has been confirmed by the module. This option will not discover any newly added HART instruments. It only supervises the ones in an internal list.
Appendix B  Dynamic Data

The dynamic data is predefined for all units in S800 I/O DTM. Each connection, or variable, is specified and explained in the tables below.

This appendix is not applicable when using S800I/O DTM towards AC800M.

CI801 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Bit 07</th>
<th>Bit 06</th>
<th>Bit 05</th>
<th>Bit 04</th>
<th>Bit 03</th>
<th>Bit 02</th>
<th>Bit 01</th>
<th>Bit 00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input</td>
<td>Byte</td>
<td>SW</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>RPB</td>
<td>RPA</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>Station warning. Set if any error exists in the FCI station including modules.</td>
</tr>
<tr>
<td>RPB</td>
<td>Redundant power B failure (opto extension).</td>
</tr>
<tr>
<td>RPA</td>
<td>Redundant power A failure (opto extension).</td>
</tr>
</tbody>
</table>
## CI840 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Bit 07</th>
<th>Bit 06</th>
<th>Bit 05</th>
<th>Bit 04</th>
<th>Bit 03</th>
<th>Bit 02</th>
<th>Bit 01</th>
<th>Bit 00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input</td>
<td>Byte</td>
<td>SW</td>
<td>RW</td>
<td>0</td>
<td>FPR</td>
<td>RPB</td>
<td>RPA</td>
<td>FEB</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>Station warning. Set if any error exists in the FCI station including modules.</td>
</tr>
<tr>
<td>RW</td>
<td>Redundancy warning.</td>
</tr>
<tr>
<td>FPR</td>
<td>If = 0, FCI in position A is Primary or only FCI</td>
</tr>
<tr>
<td></td>
<td>If = 1, FCI in position B is Primary or only FCI</td>
</tr>
<tr>
<td>RPB</td>
<td>Redundant power B failure (opto extension).</td>
</tr>
<tr>
<td>RPA</td>
<td>Redundant power A failure (opto extension).</td>
</tr>
<tr>
<td>FEB</td>
<td>FCI error on FCI B (to the right).</td>
</tr>
<tr>
<td>FEA</td>
<td>FCI error on FCI A (to the left).</td>
</tr>
</tbody>
</table>
## AI801/AI810/AI815/AI830/AI835/AI845/AI890/AI893/AI895 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input</td>
<td>Analog value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input</td>
<td>Analog value channel 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input</td>
<td>Analog value channel 3</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input</td>
<td>Analog value channel 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Analog value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input</td>
<td>Analog value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input</td>
<td>Analog value channel 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input</td>
<td>Analog value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input</td>
<td>Byte</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 7 S8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 6 S7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 5 S6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 4 S5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 3 S4</td>
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<tr>
<td></td>
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<td>Bit 2 S3</td>
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<td></td>
<td>Bit 1 S2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 0 S1</td>
</tr>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>S#</td>
<td>Channel status #</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
</tbody>
</table>
## AI820/AI825 Dynamic values

### Signal type | Data type | Description
--- | --- | ---
Connection 1 | Input | Analog value channel 1
Connection 2 | Input | Analog value channel 2
Connection 3 | Input | Analog value channel 3
Connection 4 | Input | Analog value channel 4
Connection 5 | Input | Analog value channel 5
Connection 6 | Input | Analog value channel 6

### Abbreviation | Name | Values
--- | --- | ---
S# | Channel status # | 0 = channel OK
1 = channel error

## AI835A Dynamic Values

### Signal type | Data type | Description
--- | --- | ---
Connection 1 | Input | Analog value channel 1
Connection 2 | Input | Analog value channel 2
Connection 3 | Input | Analog value channel 3
Connection 4 | Input | Analog value channel 4
Connection 5 | Input | Analog value channel 5
Connection 6 | Input | Analog value channel 6
### AI843 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 7</td>
<td>Input Integer</td>
<td>Analog value channel 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input Integer</td>
<td>Analog value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input Byte Bit 7, Bit 6, Bit 5, Bit 4, Bit 3, Bit 2, Bit 1, Bit 0</td>
<td>Application controlled CJT</td>
</tr>
</tbody>
</table>

### AI843 Dynamic values

<table>
<thead>
<tr>
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<th>Data type</th>
<th>Description</th>
</tr>
</thead>
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<td>Connection 1</td>
<td>Input Integer</td>
<td>Analog value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input Integer</td>
<td>Analog value channel 2</td>
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<tr>
<td>Connection 3</td>
<td>Input Integer</td>
<td>Analog value channel 3</td>
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<tr>
<td>Connection 4</td>
<td>Input Integer</td>
<td>Analog value channel 4</td>
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<tr>
<td>Connection 5</td>
<td>Input Integer</td>
<td>Analog value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input Integer</td>
<td>Analog value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input Integer</td>
<td>Analog value channel 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input Integer</td>
<td>Analog value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input Integer</td>
<td>Analog value CJT input</td>
</tr>
<tr>
<td>Connection 10</td>
<td>Input Byte Bit 7, Bit 6, Bit 5, Bit 4, Bit 3, Bit 2, Bit 1, Bit 0</td>
<td>Application controlled CJT</td>
</tr>
<tr>
<td>Signal type</td>
<td>Data type</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Connection 11</td>
<td>Input Byte</td>
<td>Not used</td>
</tr>
<tr>
<td>Connection 12</td>
<td>Input Integer</td>
<td>Application controlled CJT</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>S#</td>
<td>Channel status #</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
<tr>
<td>CJ ch</td>
<td>Channel status for CJT channel</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
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</table>

**AO801/AO810/AO815/AO845/AO890/AO895 Dynamic values**

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Connection 1</td>
<td>Output Integer</td>
<td>Analog value channel 1</td>
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<tr>
<td>Connection 2</td>
<td>Output Integer</td>
<td>Analog value channel 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Output Integer</td>
<td>Analog value channel 3</td>
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<tr>
<td>Connection 4</td>
<td>Output Integer</td>
<td>Analog value channel 4</td>
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<tr>
<td>Connection 5</td>
<td>Output Integer</td>
<td>Analog value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Output Integer</td>
<td>Analog value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Output Integer</td>
<td>Analog value channel 7</td>
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### AO820 Dynamic values

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<th>Description</th>
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<tr>
<td>Connection 2</td>
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<tr>
<td>Connection 3</td>
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<td>Connection 4</td>
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<td>Integer</td>
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<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Byte</td>
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</table>

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
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</thead>
<tbody>
<tr>
<td>S8</td>
<td>S7</td>
<td>S6</td>
<td>S5</td>
<td>S4</td>
<td>S3</td>
<td>S2</td>
<td>S1</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>S#</td>
<td>Channel status #</td>
<td>0 = channel OK</td>
</tr>
</tbody>
</table>

0 = channel OK
1 = channel error
## DI801/DI810/DI811/DI814/DI828/DI840 Dynamic values

<table>
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<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
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<td>Connection 1</td>
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<tr>
<td>Connection 2</td>
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<tr>
<td>Connection 3</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 4</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 6</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 7</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 8</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 9</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 10</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 11</td>
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<td>Bool</td>
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<tr>
<td>Connection 12</td>
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<td>Bool</td>
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<tr>
<td>Connection 13</td>
<td>Input</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 14</td>
<td>Input</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 15</td>
<td>Input</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 16</td>
<td>Input</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 17</td>
<td>Input</td>
<td>Integer</td>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 .... Bit15=ch 16</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
</tbody>
</table>
## DI818 Dynamic values

<table>
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<th>Data type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
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<td>Input</td>
<td>Bool</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 3</td>
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<td>4</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 4</td>
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<tr>
<td>5</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 5</td>
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<td>6</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 6</td>
</tr>
<tr>
<td>7</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 7</td>
</tr>
<tr>
<td>8</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 8</td>
</tr>
<tr>
<td>9</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 9</td>
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<td>10</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 10</td>
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<td>12</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 12</td>
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<td>13</td>
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<td>Bool</td>
<td>Digital value channel 13</td>
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<td>14</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 14</td>
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<td>15</td>
<td>Input</td>
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<td>Digital value channel 15</td>
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<td>Input</td>
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<td>Digital value channel 16</td>
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<td>Input</td>
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<td>Digital value channel 17</td>
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<td>Digital value channel 18</td>
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<td>19</td>
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<td>Description</td>
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<td>Connection 23</td>
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<td>Bool</td>
<td>Digital value channel 23</td>
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<td>Input</td>
<td>Bool</td>
<td>Digital value channel 27</td>
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<tr>
<td>Connection 28</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 28</td>
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<td>Connection 29</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 29</td>
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<tr>
<td>Connection 30</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 30</td>
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<tr>
<td>Connection 31</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 31</td>
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<td>Connection 32</td>
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<td>Bool</td>
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</tr>
<tr>
<td>Connection 33</td>
<td>Input</td>
<td>Integer</td>
<td>Channel status #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 .... Bit31=ch 32</td>
<td>0 = channel OK 1 = channel error</td>
</tr>
</tbody>
</table>
## DI802/DI803/DI820/DI821/DI890 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input/Bin</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input/Bin</td>
<td>Digital value channel 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input/Bin</td>
<td>Digital value channel 3</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input/Bin</td>
<td>Digital value channel 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input/Bin</td>
<td>Digital value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input/Bin</td>
<td>Digital value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input/Bin</td>
<td>Digital value channel 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input/Bin</td>
<td>Digital value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input/Byte</td>
<td>Channel status #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 .. Bit7=ch 8</td>
<td>0 = channel OK 1 = channel error</td>
</tr>
</tbody>
</table>
## DI825 Dynamic Values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
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<td>Input</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input</td>
<td>Digital value channel 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input</td>
<td>Digital value channel 3</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input</td>
<td>Digital value channel 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Digital value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input</td>
<td>Digital value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input</td>
<td>Digital value channel 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input</td>
<td>Digital value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input</td>
<td>Channel status #</td>
</tr>
<tr>
<td></td>
<td>Byte</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 …. Bit7=ch 8</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
</tbody>
</table>
## DI830/DI831 Dynamic Values

<table>
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<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>Input</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input</td>
<td>Digital value channel 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input</td>
<td>Digital value channel 3</td>
</tr>
<tr>
<td>Connection 4</td>
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</tr>
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<td>Connection 5</td>
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<td>Digital value channel 5</td>
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<tr>
<td>Connection 6</td>
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<td>Digital value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input</td>
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<tr>
<td>Connection 8</td>
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<td>Digital value channel 8</td>
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<td>Connection 9</td>
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<td>Connection 10</td>
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<td>Connection 11</td>
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<td>Digital value channel 11</td>
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<tr>
<td>Connection 12</td>
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<tr>
<td>Connection 13</td>
<td>Input</td>
<td>Digital value channel 13</td>
</tr>
<tr>
<td>Connection 14</td>
<td>Input</td>
<td>Digital value channel 14</td>
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<tr>
<td>Connection 15</td>
<td>Input</td>
<td>Digital value channel 15</td>
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<tr>
<td>Connection 16</td>
<td>Input</td>
<td>Digital value channel 16</td>
</tr>
<tr>
<td>Connection 17</td>
<td>Input Integer</td>
<td>Channel status #</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 9…. Bit7=ch 16</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td>Bit8=ch 1…….Bit15=ch 8</td>
<td>1 = channel error</td>
</tr>
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</table>
## DI885 Dynamic Values

<table>
<thead>
<tr>
<th>Signal type</th>
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<th>Description</th>
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<tbody>
<tr>
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<td>Bool</td>
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<tr>
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<td>Bool</td>
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<td>Connection 4</td>
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<td>Connection 5</td>
<td>Input</td>
<td>Bool</td>
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<tr>
<td>Connection 6</td>
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<td>Connection 7</td>
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<td>Connection 8</td>
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<td>Bool</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input</td>
<td>Byte</td>
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### Abbreviation

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
</table>
| Channel status # | Bit0=ch 1 …. Bit7=ch 8 | 0 = channel OK  
|               |                               | 1 = channel error      |
### DO801/DO810/DO814/DO828/DO840 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
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<tr>
<td>Connection 4</td>
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<td>Connection 5</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Output</td>
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<tr>
<td>Connection 7</td>
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<tr>
<td>Connection 8</td>
<td>Output</td>
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<td>Connection 9</td>
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</tr>
<tr>
<td>Connection 10</td>
<td>Output</td>
<td>Bool</td>
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<tr>
<td>Connection 11</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 12</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 13</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 14</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 15</td>
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<tr>
<td>Connection 16</td>
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<td>Bool</td>
</tr>
<tr>
<td>Connection 17</td>
<td>Input</td>
<td>Integer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 …. Bit15=ch 16</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
</tbody>
</table>
## DO818 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
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<td>Bool</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Output</td>
<td>Bool</td>
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<tr>
<td>Connection 3</td>
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<td>Connection 4</td>
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<td>Connection 5</td>
<td>Output</td>
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<td>Connection 6</td>
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<tr>
<td>Connection 7</td>
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<td>Connection 10</td>
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<tr>
<td>Connection 11</td>
<td>Output</td>
<td>Bool</td>
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<td>Connection 14</td>
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<tr>
<td>Connection 15</td>
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<tr>
<td>Connection 16</td>
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<td>Connection 17</td>
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<td>Connection 18</td>
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<tr>
<td>Connection 19</td>
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<tr>
<td>Connection 20</td>
<td>Output</td>
<td>Bool</td>
</tr>
<tr>
<td>Connection 21</td>
<td>Output</td>
<td>Bool</td>
</tr>
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</table>

Digital value channel 1
Digital value channel 2
Digital value channel 3
Digital value channel 4
Digital value channel 5
Digital value channel 6
Digital value channel 7
Digital value channel 8
Digital value channel 9
Digital value channel 10
Digital value channel 11
Digital value channel 12
Digital value channel 13
Digital value channel 14
Digital value channel 15
Digital value channel 16
Digital value channel 17
Digital value channel 18
Digital value channel 19
Digital value channel 20
Digital value channel 21
### DO802/DO815/DO820/DO821 Dynamic values

#### Connection Summary

<table>
<thead>
<tr>
<th>Connection</th>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 22</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 22</td>
</tr>
<tr>
<td>Connection 23</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 23</td>
</tr>
<tr>
<td>Connection 24</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 24</td>
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<tr>
<td>Connection 25</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 25</td>
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<tr>
<td>Connection 26</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 26</td>
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<td>Connection 27</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 27</td>
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<td>Connection 28</td>
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<td>Digital value channel 28</td>
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<td>Connection 29</td>
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<td>Connection 30</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 30</td>
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<tr>
<td>Connection 31</td>
<td>Output</td>
<td>Bool</td>
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<td>Connection 32</td>
<td>Output</td>
<td>Bool</td>
<td>Digital value channel 32</td>
</tr>
<tr>
<td>Connection 33</td>
<td>Input</td>
<td>Integer</td>
<td>Channel status #</td>
</tr>
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</table>

#### Abbreviation Table

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
</table>
| Channel status # | Bit0=ch 1 .... Bit31=ch 32 | 0 = channel OK  
                             | 1 = channel error  |

---

### DO802/DO815/DO820/DO821 Dynamic values

#### Signal Type Summary

<table>
<thead>
<tr>
<th>Connection</th>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Input</td>
<td>Bool</td>
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</tr>
<tr>
<td>Connection 2</td>
<td>Input</td>
<td>Bool</td>
<td>Digital value channel 2</td>
</tr>
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</table>
### DO890 Dynamic values

<table>
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<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 3</td>
<td>Input</td>
<td>Digital value channel 3</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input</td>
<td>Digital value channel 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Digital value channel 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input</td>
<td>Digital value channel 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input</td>
<td>Digital value channel 7</td>
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<tr>
<td>Connection 8</td>
<td>Input</td>
<td>Digital value channel 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Output</td>
<td>Channel status #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 .... Bit7=ch 8</td>
<td>0 = channel OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
</tr>
</tbody>
</table>

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### DO890 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Connection 1</td>
<td>Output</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>Connection 2</td>
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<td>Connection 3</td>
<td>Output</td>
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<td>Connection 4</td>
<td>Output</td>
<td>Digital value channel 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input</td>
<td>Not used</td>
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<table>
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<tr>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
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<tr>
<td>S4</td>
<td>S3</td>
<td>S2</td>
<td>S1</td>
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### Abbreviation Name Values

<table>
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<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 …. Bit3=ch 4</td>
<td>0 = channel OK 1 = channel error</td>
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</tbody>
</table>

### DP820 Dynamic values

<table>
<thead>
<tr>
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<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input Integer</td>
<td>Pulse counter value 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input Byte Bit 7 li_sp1 Bit 6 tp1 Bit 5 coin1 Bit 4 sync1 Bit 3 li_ps1 Bit 2 owf1 Bit 1 up1 Bit 0 DI1</td>
<td></td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input Real</td>
<td>Measured frequency value 1</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input Integer</td>
<td>Pulse counter value 2</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input Byte Bit 7 li_sp2 Bit 6 tp2 Bit 5 coin2 Bit 4 sync2 Bit 3 li_ps2 Bit 2 owf2 Bit 1 up2 Bit 0 DI2</td>
<td></td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input Real</td>
<td>Measured frequency value 2</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Output Integer</td>
<td>Coincidence comparison value1</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Output Byte Bit 7 r_lip1 Bit 6 r_of1 Bit 5 r_sy1 Bit 4 r_co1 Bit 3 r_sp1 Bit 2 DO1 Bit 1 r_lis1 Bit 0 LED1</td>
<td></td>
</tr>
<tr>
<td>Connection 9</td>
<td>Output Byte Bit 7 pcy1 Bit 3..6 Sync condition1</td>
<td>Bit 0..2 pxlc1</td>
</tr>
<tr>
<td>Connection 10</td>
<td>Output Byte Bit 6..7 splc2 Bit 4..5 splc1 Bit 3 frzps2 Bit 2 frzsp2 Bit 1 frzps1 Bit 0 frzsp1</td>
<td></td>
</tr>
<tr>
<td>Connection 11</td>
<td>Output Integer</td>
<td>Coincidence comparison value2</td>
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### Abbreviation Name Values

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>li_ps#</td>
<td>Latch inhibit, pulse counter</td>
<td>0 = Latch not inhibit 1 = Latch inhibit</td>
</tr>
<tr>
<td>owf#</td>
<td>Pulse counter overflow</td>
<td>0 = No overflow 1 = Overflow</td>
</tr>
<tr>
<td>up#</td>
<td>Counting direction</td>
<td>0 = Counting direction is down 1 = Counting direction is up</td>
</tr>
<tr>
<td>li_sp#</td>
<td>Latch inhibit, frequency</td>
<td>0 = Latch not inhibit 1 = Latch inhibit</td>
</tr>
<tr>
<td>tp#</td>
<td>Transducer power OK</td>
<td>0 = False 1 = True</td>
</tr>
<tr>
<td>coin#</td>
<td>Coincidence has occurred</td>
<td>0 = False 1 = True</td>
</tr>
<tr>
<td>sync#</td>
<td>Pulse counter has been synchronized</td>
<td>0 = False 1 = True</td>
</tr>
<tr>
<td>DI#</td>
<td>Reflects the input signal</td>
<td>0 or 1</td>
</tr>
<tr>
<td>coen#</td>
<td>Enable coincidence</td>
<td>0 = Disable 1 = Enable</td>
</tr>
<tr>
<td>r_lip#</td>
<td>Reset latch inhibit, pulse counter</td>
<td></td>
</tr>
<tr>
<td>r_of#</td>
<td>Reset pulse counter overflow</td>
<td></td>
</tr>
<tr>
<td>r_sy#</td>
<td>Reset sync.</td>
<td></td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Name</td>
<td>Values</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>r_co#</td>
<td>Reset coincidence</td>
<td></td>
</tr>
<tr>
<td>DO#</td>
<td>Activate DO</td>
<td></td>
</tr>
<tr>
<td>LED#</td>
<td>Activate used LED</td>
<td></td>
</tr>
<tr>
<td>pcsy#</td>
<td>Sync. (i.e. reset) of pulse counter</td>
<td></td>
</tr>
<tr>
<td>Sync condition#</td>
<td>Synchronization condition</td>
<td>0 = Synchronization inhibit&lt;br&gt;1 = Sync. if pcsy=1&lt;br&gt;2 = Sync. if count.dir=up and input&lt;br&gt;ST=active&lt;br&gt;3 = Sync. if count.dir=down and input&lt;br&gt;ST=active&lt;br&gt;4 = Sync. if count.dir=up and input&lt;br&gt;DI=pos. edge&lt;br&gt;5 = Sync. if count.dir=down and input&lt;br&gt;DI=pos. edge&lt;br&gt;6 = Sync. if count.dir=up and input&lt;br&gt;DI=neg. edge&lt;br&gt;7 = Sync. if count.dir=down and input&lt;br&gt;DI=neg. edge&lt;br&gt;8 = Sync. if count.dir=up and input&lt;br&gt;ST=active and DI=pos. edge&lt;br&gt;9 = Sync. if count.dir=down and input&lt;br&gt;ST=active and DI=pos. edge&lt;br&gt;10 = Sync. if count.dir=up and input&lt;br&gt;ST=active and DI=neg. edge&lt;br&gt;11 = Sync. if count.dir=down and input&lt;br&gt;ST=active and DI=neg. edge&lt;br&gt;12 = Sync. if coincidence on &quot;own&quot; channel&lt;br&gt;13 = Sync. if coincidence on &quot;other&quot; channel&lt;br&gt;14 and 15 = Not used</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Name</td>
<td>Values</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| pxic#        | Pulse counter value, freeze condition | 0 = Latch inhibit on DI+. "Freeze" PSXL-value on pos. edge of DI signal.  
1 = Latch inhibit on DI-. "Freeze" PSXL-value on neg. edge of DI signal.  
2 = Latch inhibit on coincidence.  
3 = Latch inhibit on sw freeze, bit frzps x in the Dynamic values.  
4 = Latch inhibit on coincidence on the "other" channel. |
| r_lis        | Reset frequency value | 1 = Reset of bit lisp #  
0 = - |
| splc#        | Frequency value freeze condition (Speed Latch Inhibit Condition) | 0 = Latch inhibit on DI+.  
1 = Latch inhibit on DI-.  
2 = Latch inhibit on coin on "own" channel.  
3 = Latch inhibit on sw freeze, bit frzsp x in the Dynamic values. |
| frzps#       | Freeze pulse counter value channel # | 0 = -  
1 = freeze |
| frzsp#       | Freeze frequency value channel # | 0 = -  
1 = freeze |
## DP840 Dynamic values

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection 1</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 1</td>
</tr>
<tr>
<td>Connection 2</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 2</td>
</tr>
<tr>
<td>Connection 3</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 3</td>
</tr>
<tr>
<td>Connection 4</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 4</td>
</tr>
<tr>
<td>Connection 5</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 5</td>
</tr>
<tr>
<td>Connection 6</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 6</td>
</tr>
<tr>
<td>Connection 7</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 7</td>
</tr>
<tr>
<td>Connection 8</td>
<td>Input UINT16 / Real</td>
<td>Pulse counter value / Frequency value ch 8</td>
</tr>
<tr>
<td>Connection 9</td>
<td>Input Bool</td>
<td>Digital value channel 1</td>
</tr>
<tr>
<td>Connection 10</td>
<td>Input Bool</td>
<td>Digital value channel 2</td>
</tr>
<tr>
<td>Connection 11</td>
<td>Input Bool</td>
<td>Digital value channel 3</td>
</tr>
<tr>
<td>Connection 12</td>
<td>Input Bool</td>
<td>Digital value channel 4</td>
</tr>
<tr>
<td>Connection 13</td>
<td>Input Bool</td>
<td>Digital value channel 5</td>
</tr>
<tr>
<td>Connection 14</td>
<td>Input Bool</td>
<td>Digital value channel 6</td>
</tr>
<tr>
<td>Connection 15</td>
<td>Input Bool</td>
<td>Digital value channel 7</td>
</tr>
<tr>
<td>Connection 16</td>
<td>Input Bool</td>
<td>Digital value channel 8</td>
</tr>
<tr>
<td>Connection 17</td>
<td>Input Byte</td>
<td>Channel status #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Values</th>
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</thead>
<tbody>
<tr>
<td>Channel status #</td>
<td>Bit0=ch 1 …. Bit7=ch 8</td>
<td>0 = channel OK</td>
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<tr>
<td></td>
<td></td>
<td>1 = channel error</td>
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Revision History

The following table lists the revision history of this User Manual.

The revision index of this User Manual is not related to the 800xA 6.0 System Revision.

<table>
<thead>
<tr>
<th>Revision Index</th>
<th>Description</th>
<th>Date</th>
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<tr>
<td>A</td>
<td>Published for 800xA System Version 6.0.</td>
<td>December 2014</td>
</tr>
<tr>
<td>B</td>
<td>Published for 800xA System Version 6.0.3</td>
<td>September 2016</td>
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Updates in Revision Index B

The following table shows the updates made in this Release for 800xA 6.0.3.

<table>
<thead>
<tr>
<th>Updated Section/Sub-section</th>
<th>Description of Update</th>
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<tr>
<td>Section 2 Installation</td>
<td>Changed “Windows 8.1” to “Windows client operating system”.</td>
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<td></td>
<td>Added a note, on Page 21.</td>
</tr>
</tbody>
</table>
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