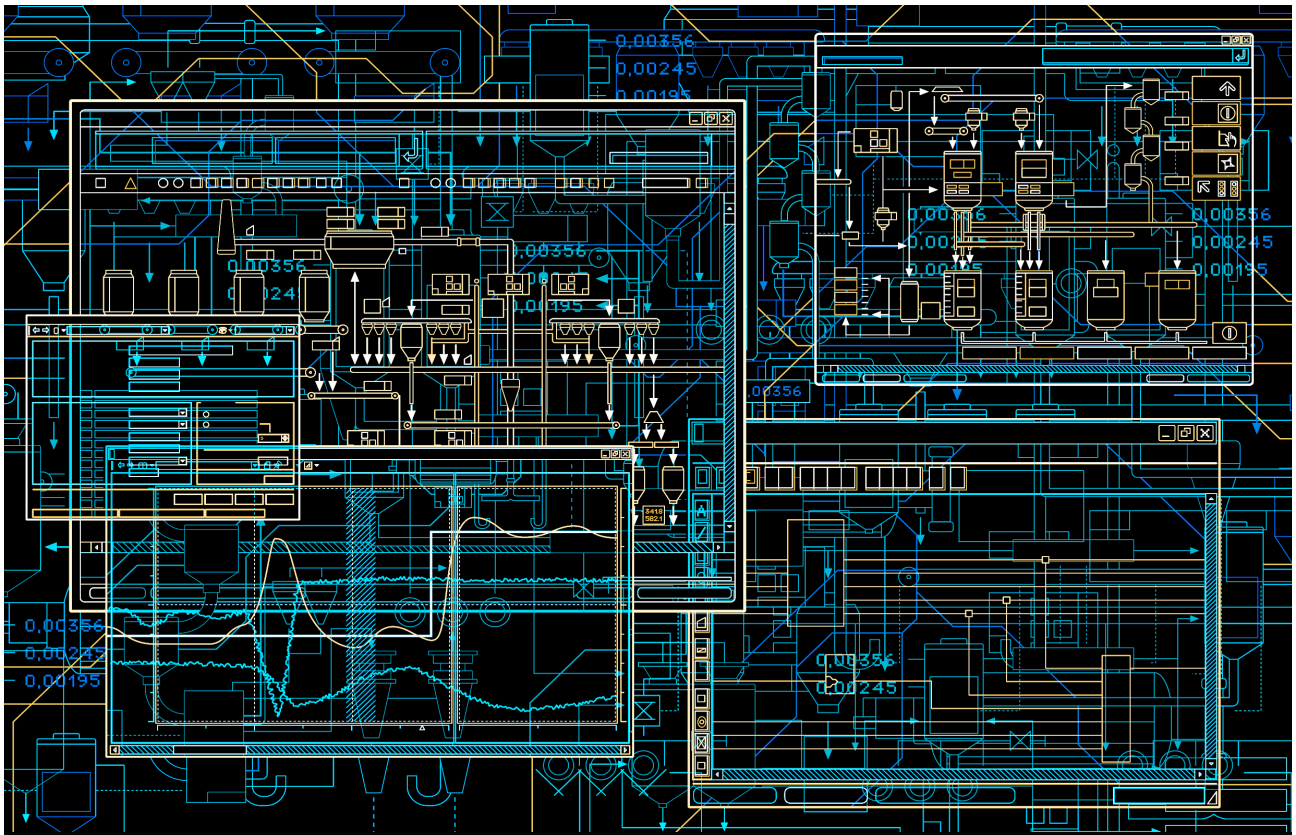

Device Management

HART DTM Builder 6.0

System Version 6.0

Power and productivity
for a better world™

Device Management

HART DTM Builder 6.0

System Version 6.0

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Release: April 2016
Document number: 3BDD011946-600 A

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About This User Manual

General

Any security measures described in this document, for example, for user access, password security, network security, firewalls, virus protection, etc., represent possible steps that a user of an 800xA 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 800xA System.

This User Manual contains a detailed description of how to use the *HART DTM Builder*. The *HART DTM Builder* is an enhancement of the Basic HART DTM, which is described in Basic HART DTM, Configuration manual.

For the latest information, refer to the corresponding Release Notes.

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

Feature Pack functionality in an existing figure is indicated using callouts.

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 the *System 800xA, System Guide, Functional Description (3BSE038018*)*. The listing includes terms and definitions as they 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 instruction may be included here as part of this document.

The following is a list of terms associated with the Basic HART DTM that the user should be familiar with. The list contains terms and abbreviations that are unique to ABB or have a usage or definition that is different from standard industry usage.

Term/Acronym	Description
Basic HART DTM	DTM for HART devices, additionally serving as a runtime environment (since version V3.1) for device specific DTMs, that have been build with the HART DTM Builder
HART DTM Builder	Software product consisting of a command editor, an application editor and a diagnostic text editor to define device specific DTMs, to be executed by the Basic HART DTM. This software product is not released and is only for ABB internal use.
Device Type Manager (DTM)	Software component (device driver) for configuring, diagnosing, forcing, displaying the measured variables, and so on of a field device. It is familiar with the way the device works and supplies device-specific documentation.
Device Description Language (DDL)	Interpretable language for the formal description of device parameters
Frame Application (FA)	Frame application (run-time environment) in accordance with the FDT specification for operating DTMs

Term/Acronym	Description
Field Device Tool (FDT)	The FDT concept describes the interface between a frame application and the device-specific software (DTM = Device Type Manager) of the device manufacturer. It enables devices produced by different manufacturers and different fieldbuses to be integrated in a single system. Currently supporting fieldbus protocols for PROFIBUS and HART.
Highway Addressable Remote Transducer (HART)	Digital communication protocol developed for applications in industrial process metrology
GUI	Graphical User Interface
OLE for Process Control (OPC)	Interface specification for data exchange based on the Microsoft COM/DCOM technology
System Application	A software package that provides functionality in the System 800xA. System applications cooperate according to rules defined by the System 800xA architecture, using mechanism provided by the Process Portal A. They are normally bundled into System Products. To participate in Aspect Object operations, and thus be an integrated part of an System 800xA, a system application must present itself as an aspect system. When there is no risk for confusion with user application, the term application may be used instead of system application.

Related Documentation

A complete list of all documents applicable to the *System 800xA Extended Automation System is provided in Released User Documents, 3BUA000263**. This document lists applicable Release Notes and User Instructions. It is provided in PDF format and is included on the Release Notes/Documentation media provided with your system. Released User Documents are updated with each release and a new file is provided that contains all user documents applicable for that release with their applicable document number. Whenever a reference to a specific instruction is made, the instruction number is included in the reference.

The table below contains a list of relevant documentation.

Category	Title	Description
DTM	Basic HART DTM, Installation (3BDD011942*)	The document describes how to install the Basic HART DTM with HART DTM Builder expansion.
	Device Management, HART DTM, (3BDD011939*)	The document describes the basic features and operation of the DTM applications.
	Basic HART DTM, Release Notes (3BDD011944*)	This document provides a brief overview on functionality and enumerates known problems encountered in the final testing of this product release.

Section 1 Introduction

Product Overview

The Field Device Tool (FDT) concept describes the interface between a frame application and the device-specific software, **D**evice **T**ype **M**anager, of the device manufacturer. It enables devices produced by different manufacturers and different fieldbuses to be integrated in a single system.

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

ABB provides a basic DTM called the Basic HART DTM for HART field devices which do not have a dedicated DTM. Furthermore, with the expansion of the Basic HART DTM to the HART DTM Builder, dedicated DTMs can be developed using the Basic HART DTM supported applications.

The Basic HART DTM with HART DTM Builder expansion enables the field devices to be operated in a frame application conforming to FDT 1.2.

Product Scope

The Basic HART DTM with HART DTM Builder expansion is suitable for executing various tasks, also referred to as applications. Most applications have a graphical user interface for data visualization and data entry. This documentation describes the HART DTM Builder extensions only. The Basic HART DTM functionality is described in the manual *Device Management, HART DTM, (3BDD011939*).*

The application can be called up through a menu offered by the DTM or the frame application.

The following DTM applications are available for the HART DTM Builder extension:

- **Registration**
  Allows to extend the Basic HART DTM to the HART DTM Builder.
- **User Applications (via HART DTM Builder templates)**
  The DTM menu will be extended with additional applications, which are created by using the Application Editor.
- **Command Editor**
  The Command Editor allows to extend the universal and common practice commands delivered by the Basic HART DTM with additional private HART commands.
- **Application Editor**
  The Application Editor allows to create new user-defined DTM applications to execute the private HART commands using graphical user interface.
- **Diagnosis Editor**
  The Diagnosis Editor allows to create clear text messages for specific device types.

Installation

The installation as well as the system requirements of the Basic HART DTM with HART DTM Builder expansion is described in the manual *Basic HART DTM, Installation (3BDD011906*).*

Registration

A separate license key is required for the HART DTM Builder. This is associated with the one workstation computer on which the software is to be installed and operated.

To order and register the license key, follow the steps as described below:

1. Install the software on the workstation computer on which it will be used.
2. Start the Basic HART DTM in a FDT 1.2 frame application and open the *Registration* dialog box.

3. Copy the hardware identifier indicated for the workstation computer in a mail and send it with request description to DE-Automation Supportline de.automation.supportline@de.abb.com

Note that the HART DTM Builder is for ABB internal use only. A license request will be surveyed, if the requirements are met.

It is strictly prohibited to give the HART DTM Builder functionality to external customers. For the HART DTM Builder functionality, only a limited internal support is offered.

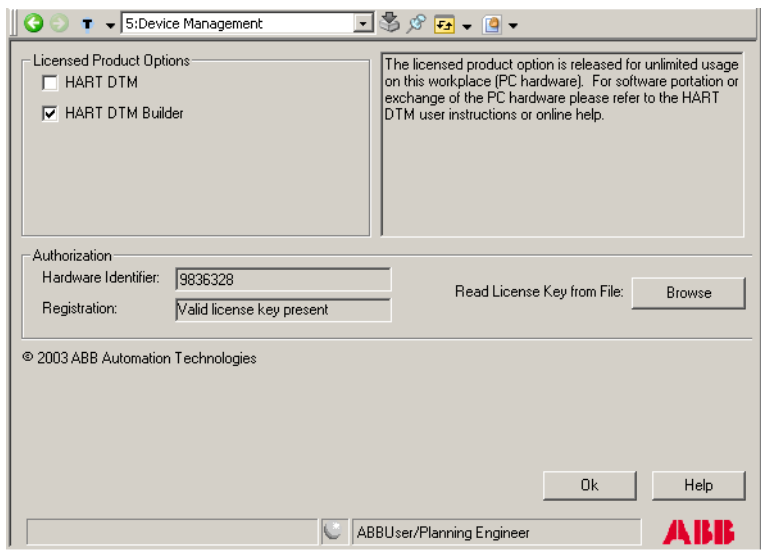


Figure 1. Registering the license key

If a license key file has been provided, follow the procedure described below:

1. Start the Basic HART DTM in a FDT 1.2 frame application and open the *Registration* dialog box.
2. Click on the [**Browse**] button to import the license key into the *Registration* dialog box. Once the file has been read in and the data verified as correct, the message "Valid license key present" appears. The product and all its functions can now be accessed on this workstation without a time limit.

If the message "Invalid license key present" appears, check whether the license key is:

– for a different product

– for a different workstation or

– for a workstation with different hardware resources, for example, Ethernet interface card.

Intended User

This configuration guide is designed for application engineers and commissioning engineers. It explains how to build device-specific DTMs using the HART DTM Builder.

The users using this manual should be familiar with the basics of the HART protocol.

Section 2 HART DTM Builder

General

The HART Command Editor, Application Editor, and Diagnosis Editor can be used to develop a device-specific DTM based on the Basic HART DTM. Additional applications with e.g. *private commands* can then be added to standard applications, which work with *universal commands* and some *common practice commands*. The HART DTM Builder also features error message output in plain text from the extended device status.

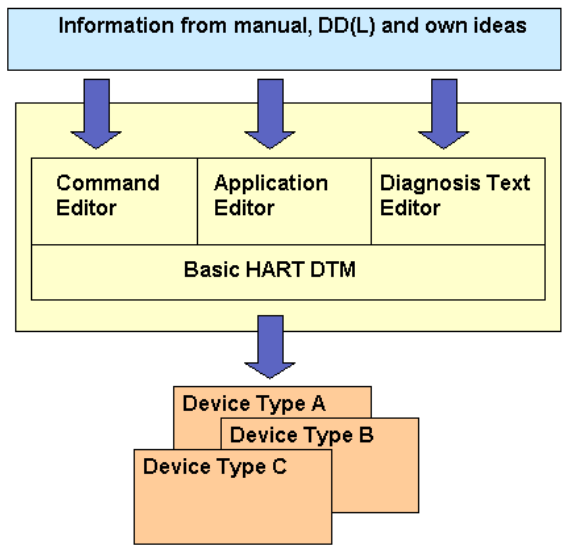


Figure 2. DTM Builder Overview

Load, Save, Import

The editors are used to define commands, layouts, or diagnosis texts directly. However, it is also possible to work on the basis of an existing type-specific file created with an editor and adapt this to meet the requirements of the new device type.

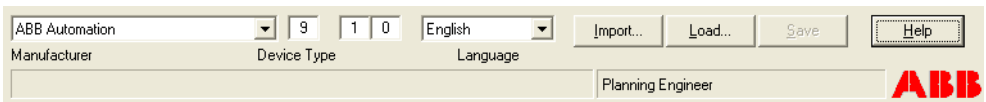


Figure 3. Application Editor: Load, Save, Import

Also, it is possible to load a default file in the Command Editor containing a complete description of all *universal* and *common practice commands*.

Click **[Load]** to load a file.

Loading a file

Existing type-specific file

Path <Project-specific path>\DTM\HART\<FileName.xml>

The file name comprises of the manufacturer code, the device type code, the device version, the language ID, and the short description of the editor used.

Example: 22_8_1_9_app.xml

22 = ABB Automation Products
8 = TH02
1 = Device version 1
9 = Language ID (9: "English", 7: "German")
app = Application Editor

Interpretation of the manufacturer code and device type code is in accordance with the HART Common Tables.

Default file

Description of *universal commands* and *common practice commands.*

Path <System drive>:\Program Files(x86)\ABB Industrial IT\EngineerIT\DTM\Basic HART DTM\xml_DefaultHartCommands.xml

Attribute: Read-only

The file's write protection feature must never be violated. Modifying the commands written in the file may cause the applications to malfunction.

Check that the file name is correct before saving the file. The manufacturer code, the device type code, the version number, and the editor abbreviation are important as they create the reference to the planned and installed device type during the definition phase (offline) and subsequently during operation (online).

Saving a file

Click **[Save]** to save a file. On saving, the XML file name reflects the version information.

[Save] always saves the file to the project related path for users who are granted the access rights.

Versioning a file

Each saved file contains two version information:

- A major version, which offers the possibility to create different XML files for the same device type (manufacturer ID and device ID).
- A minor version, which includes a version information in the existing XML file. Only the internal XML version information is changed.

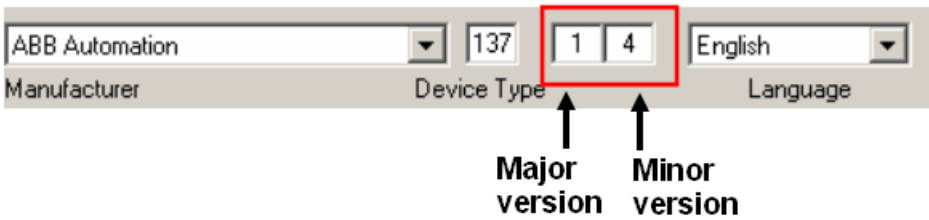


Figure 4. Major/Minor version box

Major Version

Changing the major version results in a new XML file of the specific device type. Change the major version, if new functionality is available for a device type with the same manufacturer and device ID.

Example:
The newly device type is based on a new DD revision with additional supported features.

The new created XML file is represented in a new Sub-DTM of the Basic HART DTM. Assignment of this DTM to a device type has to be done manually.

If a new XML file version is created, a refresh of the DTM catalog in the FDT frame application is recommended. Both, the new and the old DTM version are included in the DTM catalog.

The previous version of the DTM must not be changed to the new version. The previous version is still valid.

Minor Version

The minor version saves the version information in the existing XML file. The minor version helps to have an internal versioning, if changes to the XML file have been performed.

The minor version cannot be modified by the user. A configuration change results in a new minor version inside the XML file.

Importing a file

The Import function can be used to combine data from two files. These files must have been created with the same editor.

- Command file (_cmd.xml):
  The Commands/parameters from the imported file are added to the file that is to be loaded. Existing commands are not overwritten with those from the import file.
- Layout file (_app.xml):
  All the applications from the import file are added to the file that is to be loaded. If an import application has the same name as an existing application, then the Application Editor changes the name of the import application.
- Diagnosis text file (_dgn.xml):
  In this file, data convergence is determined by byte interpretation. Only if the interpretations are identical for bit, integer, and so on, the diagnosis texts for unused bits, integer values, and so on are taken from the import file and added to the loaded file.

User Roles

The HART DTM Builder checks the user rights when an editor starts up. Certain users may even be barred from using some editors.

Table 1. User Roles

Editors	User Roles			
	Observer	Operator	Maintenance	Planning Engineer
Application Editor	-/-	-/-	-/-	*R/W*
Command Editor	-/-	-/-	-/-	*R/W*
Diagnosis Text Editor	-/-	-/-	-/-	*R/W*

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

R = Data output only (read)

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

HART Command Editor

The HART Command Editor provides all the functions required for defining device-specific and manufacturer-specific *private commands*. The new commands and the read/write parameters they contain can be accessed through appropriate user interfaces or through OPC.
By default, the Command Editor features a list containing all *universal commands* and all *common practice commands*. The list contains the complete command definition for the *request*, *response* or activation of a special function in the field device.

Click at the headline to sort the rows alphabetically or numerically.

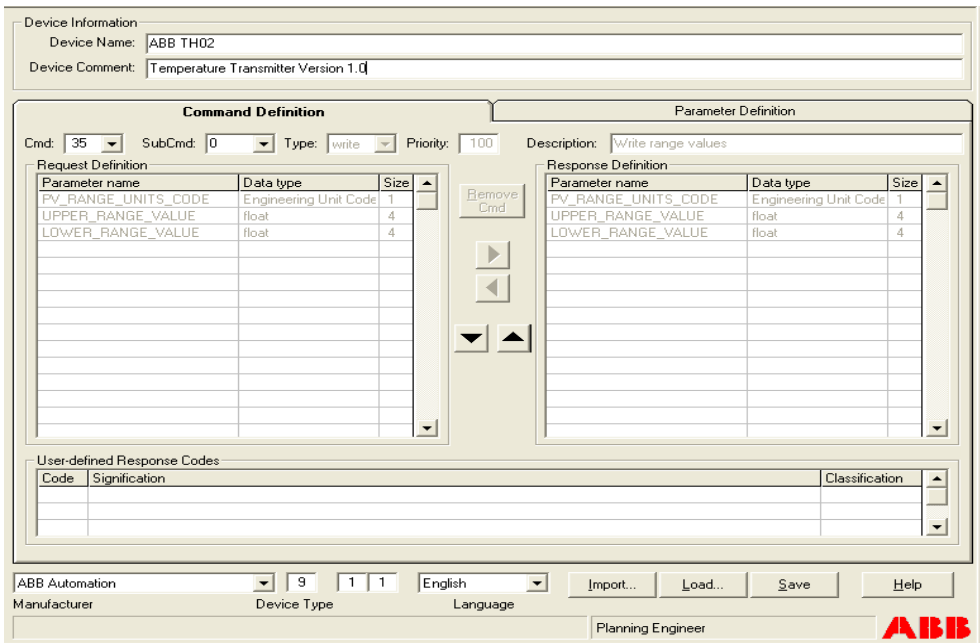


Figure 5. Command Editor

Parameter Definition

When working with the HART Command Editor, the necessary parameters must be defined first. The **Parameter Definition** tab is used for this purpose.
Enter the name, data format, and length of each parameter in this table. The check boxes OPC and Per are optional. But, saving the parameter value as persistent (Per) is the standard option so that it is saved permanently in the data record.

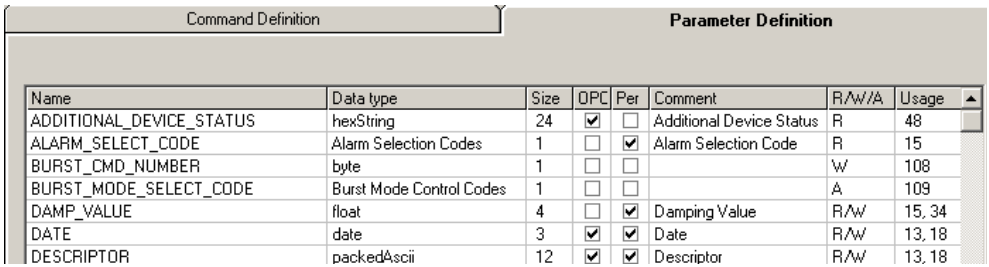


Figure 6. Parameter definition

Table 2. Parameter definition

Field	Description
Name	The parameter name in accordance with the HART name convention. Lower case letters are automatically converted to upper case letters.
Data type	Select via pull-down menu. It is entered in accordance with the *HART Common Tables*, universal data formats (byte, float, etc.) and special types (unit codes, material codes, etc.).
Size	The Editor automatically adds the number of bytes to each data format. With the exception of byte (1) and float (4), the number for all formats can be modified manually.
OPC	The parameter is made available for OPC access. In accordance with its identifier (R/W), it can be read or written by the OPC Server.

Table 2. Parameter definition (Continued)

Field	Description
Per	The parameter value is saved permanently in the instance data record of the field device and thereby made available to the OPC Server.
Comment	Additional information about the command defined
R/W/A	The Editor assigns additional information (Read/Write/Action) using the selection made during command definition.
Usage	Command (number) in which the parameter is used. The Editor adds this information independently. A parameter may be used in a number of commands.

The length of a user-defined parameter with data type *HexString* will not be checked. The user can enter a value of any length. Note:

- Maximal length of an hexstring parameter is twice the declared length in size column of the parameter (e.g. hexstring size = 12, allowed a parameter input up to 24 characters.
- Only input values from data type hexadecimal can be entered.

If parameters and their attributes are changed, for example, persistence or OPC behavior, the applied changes will not be updated in the Offline List View, if this window is open in parallel. The changes will be reflected only when a next DTM is instantiated.

Command Definition

Once parameter definition is complete, switch to the **Command Definition** tab.

Now, enter the required command number or select an existing command. Once the access method has been selected and the load priority entered, the parameter that was defined previously is transferred manually from the Request Definition panel to the Response Definition panel. To do this, select the parameter name in the pull-down menu and click on the [>] button to transfer it to the table.

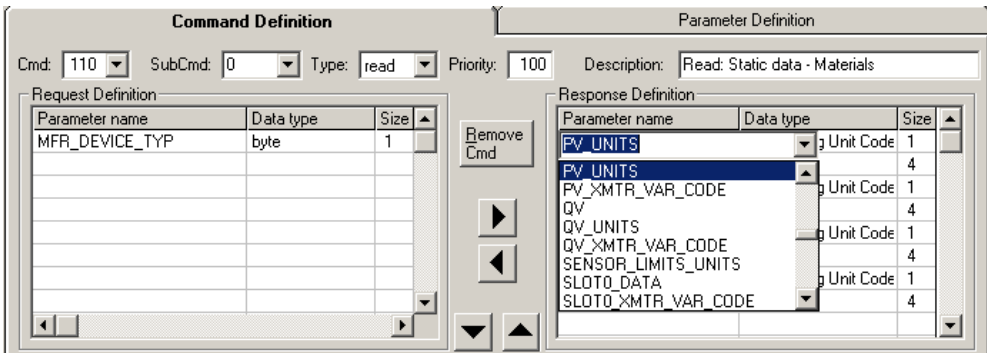


Figure 7. Command Definition

Table 3. Command Definition

Field	Description
Command (Cmd)	Selection of an existing command (number) via a pull-down menu or entry of a new number. Range = 0 to 254 (decimal)
Sub-command (SubCmd)	A subcommand is a derivation of a HART command with differences in some settings.
Type	Defines whether the command is a read command, write command or an action. Action commands are used to perform special tasks like "Perform Device Reset" except upload/download purposes. (read/write/action)
Priority	Loads the priority of commands in sequences. 0 = low, 254 = high, default = 100
Description	Description of the function of the HART command. This field must be configured, if a new command is defined.
Parameter name	Selection of the parameter names via a pull-down menu differentiated by *request* and *response*.
Data type	Taken from parameter list (cannot be edited here)
Size	Taken from parameter list (cannot be edited here)

Five buttons with the following control functions appear in the middle of the two tables.

Table 4. Control Functions

Button	Meaning
	Scroll down command list
	Scroll up command list
	Overwrites the content of the right-hand table with the entire content of the left-hand table (not relevant for write-protected commands)
	Overwrites the content of the right-hand table with the entire content of the left-hand table (not relevant for write-protected commands)
	Deletes a command along with the content of the right-hand and left-hand table (not relevant for write-protected commands)

To delete a parameter from Parameter Definition:

1. Open the **Command Definition** tab.
2. Select the Cmd number of the corresponding parameter.
3. Click on the [**Remove Cmd]** button.
4. Switch to the **Parameter Definition** tab.
5. Select the parameter which should be deleted.
6. Click on the **[Del]** button in the keyboard.

Write-protected commands

The following *universal commands* and *common practice commands* are write-protected. The parameters cannot be deleted, added or changed, including their properties.

Table 5. Write-protected HART commands

Universal commands	Common practice commands
0 - 3 12-19 20, 22 (HART 6)	34 - 42 44 47 - 49

User-Defined Response Codes

Private HART commands usually include one or more *response codes* with a separate meaning. The associated message text and classification can be defined using the Command Editor.

The message text and classification appear later in online mode in the status line if the field device, for example, cannot execute the command correctly and enters a *response code* in the general device status (2 bytes).

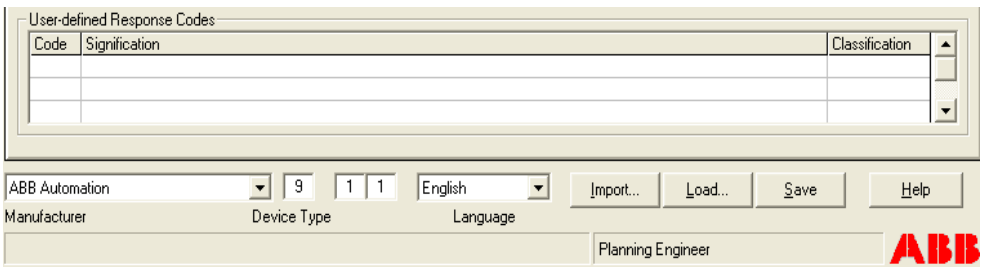


Figure 8. User-defined response codes

Table 6. User-Defined Response Codes

Field	Description
Code	ID (*response code)* Range = Integer (0 .. 127)
Signification	Entry for associated message text Data format = ASCII
Classification	Meaning in relation to the general device status Classes = OK, warning, error

The *User-defined response codes* should only be redefined if the corresponding value is not appropriate as a default value or differs from the default value.

Application Editor

The Application Editor provides all the essential functions and tools for creating graphical user interfaces (GUIs). An interface is the part of the application through which the operations are performed. It is therefore managed by the Application Editor under the name of the application. The Editor can be used to create one or more interfaces for each device type.
No programming knowledge is required for working with the Editor. The basic graphical elements can be arranged on a worksheet (Application Layout) using drag & drop functionality. The properties of the elements are then defined and the HART parameters and HART commands defined previously that are appropriate for the task are assigned.

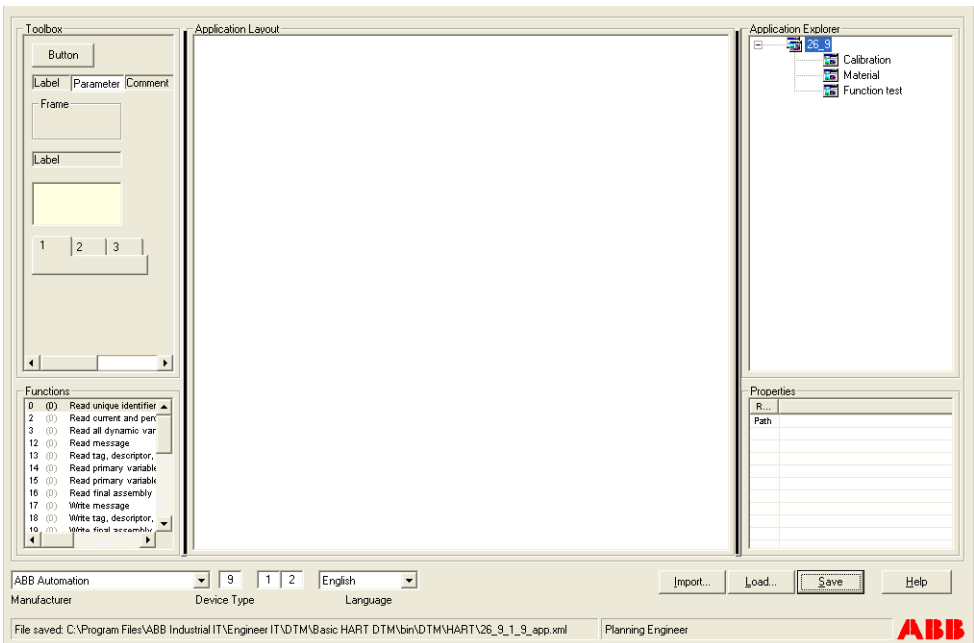


Figure 9. Application Editor

Toolbox

The Toolbox contains the graphical elements, similar to the elements available in the Windows applications for creating user interfaces. By using a small number of elements with a small number of properties, it is possible to standardize the appearance of GUIs and the way in which they are handled.

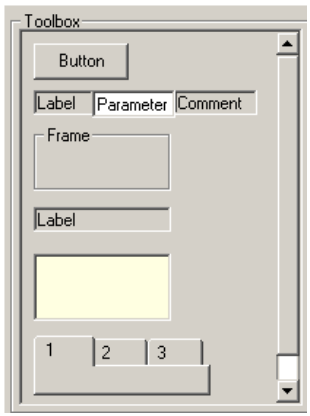


Figure 10. Toolbox

A detailed description of the graphical elements available in the Toolbox is given below.

Button

Button for executing one or more HART commands.

Properties:

The "Functions" section describes how to activate the button for operation, that is to assign one or more "HART commands".

Table 7. Button

Field	Description
Name	Name under which the Explorer manages the graphical element and also the descriptive name on the user interface

Parameter

HART parameter for input or output of device data. **Label** and **Comment** are optional.

Properties:

Table 8. Parameter

Field	Description
Name	Freely selectable name under which the Explorer manages the graphical element
Variable	Reference to the HART parameter (variable) according to the Command Editor parameter list
Label	Descriptive name of the parameter on the user interface
Comment	Comment (e.g. engineering unit as constant)

Example:

Figure 11. Parameter with unit (constant)

Label, Variable, and Comment combine to create a graphical element, which can be positioned very easily on the Application Layout.

Example:

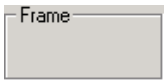
Figure 12. Parameter with unit (variable)

The "Comment" in the "Properties" section has been deleted for the first element that is to display the parameter value. The second element is used to read the associated physical unit. The label and comment are therefore superfluous.

The application reads the current unit and value from the field device in online mode.

Frame

Frame for grouping elements that belong to a group in terms of their function. It is used primarily to group parameters and buttons.



Properties:

Table 9. Frame

Field	Description
Name	Name under which the Explorer manages the graphical element and also the descriptive name on the user interface
Border	True = with border; False = without border

Example:

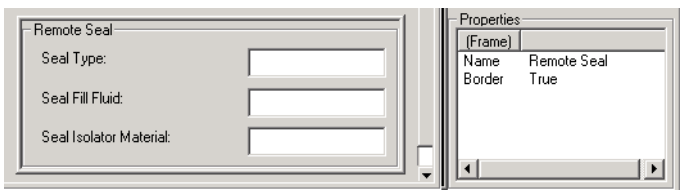


Figure 13. Frame

Label

Descriptive text, which can be assigned to the other graphical elements, if required.

Properties:

Table 10. Label

Field	Description
Name	Name under which the Explorer manages the graphical element and also the descriptive name on the user interface

Example:

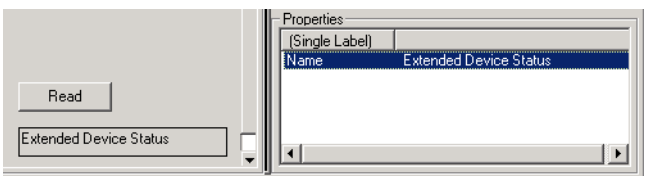


Figure 14. Label

Picture

Image (file) in JPEG format, which can either be used as background or as foreground in the same level with parameters or other elements

Properties:

Table 11. Picture

Field	Description
Name	Name under which the Explorer manages the graphical element
Path	The Editor saves the path and the image in the _app.xml file. When an import/export is carried out, this means that the image is transferred to the other computer or storage medium and appears there.

Example:

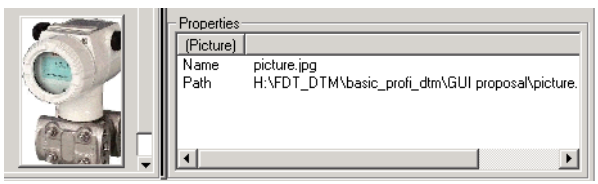


Figure 15. Picture

Tab card

Tabs for dividing an application into a number of sub-functions.

Properties:

Table 12. Tab card

Field	Description
Name	Name under which the Explorer manages the tab card and also the descriptive name on the user interface
Number	The number indicates the position of the tab card. Up to three tabs can be used in one application.

Example:

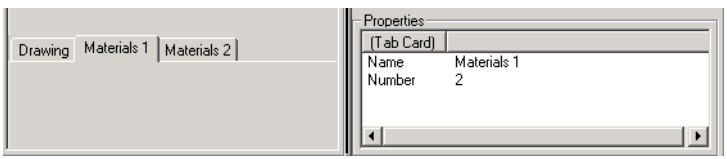


Figure 16. Tab card

Application Layout

The user can arrange the required graphical elements for the new user interface on this viewport according to the users requirements.

The layout of the elements in the definition phase (offline) is exactly the same as that in operation (online). Set up the GUI with the same screen configuration (e.g. 1024 x 768) as is set for subsequent operation on the designated workstation computer.

Changes to the layout are transferred immediately to the Explorer object tree.

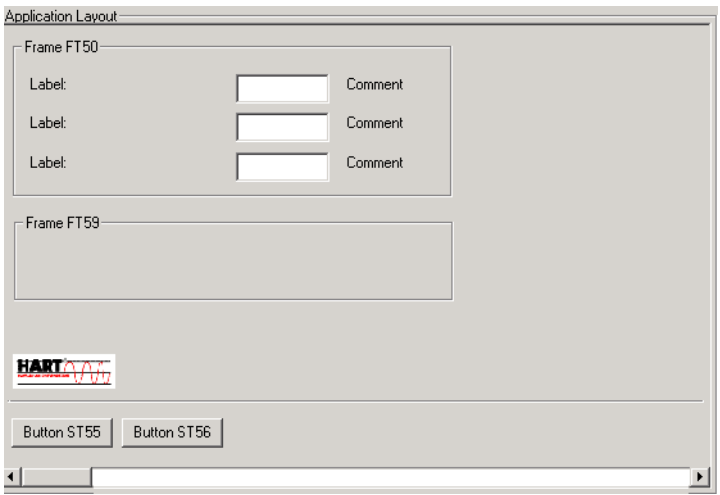


Figure 17. Application Layout

It is recommend that the parameters for an application are grouped according to function using frames. Frames are permitted within a frame.

The elements in the toolbox can be copied to the Application Layout using drag & drop functionality:

1. Place the mouse pointer over the required element and wait until the tooltip appears.
2. Click and hold down the left mouse button and use the mouse to drag the small icon that is now visible to the required position on the Application Layout.

3. The element will reappear once the mouse button is released. Select the element again and move it in order to get it into exactly the correct position.

Once an element has been selected, it can be positioned very precisely using the cursor keys.

Application Explorer

The Explorer shows the hierarchical structure of the graphical elements and functions. When creating a new GUI, first add a new object to the Application Explorer bearing the name of the application:

1. Click with the mouse to select the root node in the object tree.
2. Click the right mouse button to activate the "Add Application" button.
3. Click the button to add a new application object.

Example: Another application is to be added to the existing applications (Materials, Calibration).

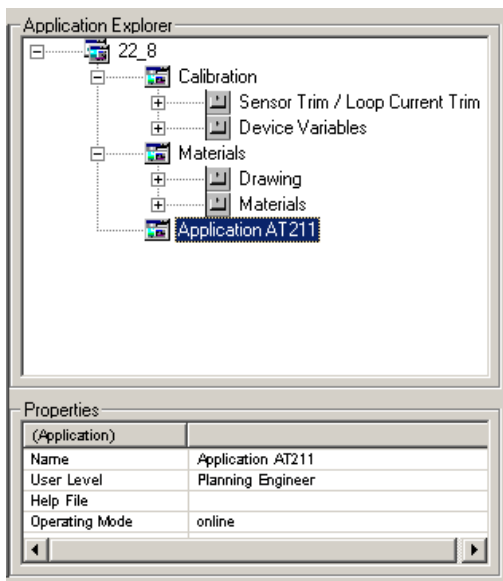


Figure 18. Application Explorer

The application object now requires the following entries to be made (see Properties) to complete the description.

1. Change the default name, that is enter the actual name of the application.
2. Select the appropriate user role for the application.
3. If available, enter the path to a Help file.
4. Select the operating mode.

It is easier to carry out actions affecting a number of graphical elements (copying, moving, deleting, etc.) in the Explorer than in the Application Layout. Changes to the object layout in the tree are automatically applied to the layout and vice versa.

Functions

It selects the HART command designated/defined for the required application from the list. This command is then assigned to the button used for its execution in the Application Explorer using the drag and drop functionality.

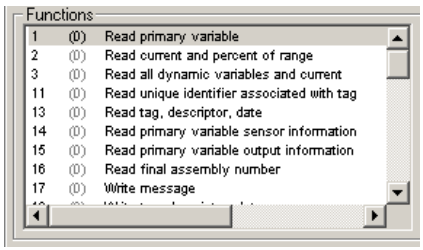


Figure 19. HART commands as per command file (...cmd.xml)

Properties:

Table 13. Functions

Field	Description
Number	Number of the HART command, taken from the Application Explorer (cannot be edited)
Index	Index of the sub-command derived from the HART command, taken from the Application Explorer (cannot be edited) Example: "54 (4)" indicates that subcommand no. 4 derived from HART command 54 is being used here, as defined in the Command Editor.
Comment	Descriptive text for the HART command, taken from the command list (cannot be edited)
Parameter (optional)	Selection of the parameter (acc. to parameter list) to which a constant value is to be assigned
Value (optional)	Entry for the constant value for the parameter selected above

Table 13. Functions (Continued)

Field	Description
Parameter (optional)	Next parameter
Value (optional)	Next constant

Button with more than one command

One button may represent a number of commands. During operation, the application executes all commands in accordance with their definition. The associated parameters are read/written.

Example:

When the button is clicked, commands 34 and 47, which write the "Transfer Function Code" and "Damping Value" entered through the GUI to the field device, are executed.

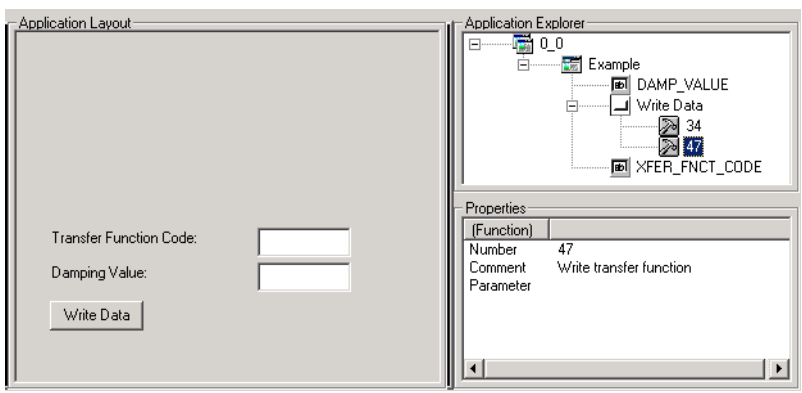


Figure 20. Button with two commands

There are also commands without transfer parameters. They are usually used to allow the field device to perform a special sub-function.

Parameter with constant value

A constant value can be assigned to each of one or more parameters in the Function Properties.

In the parameter list, only select the parameters that belong to the command entered in the Properties.

Example:

As required by the device manufacturer, the parameter MFR_DEVICE_TYP is sent to the field device with the value 6 in the request to read the material data.

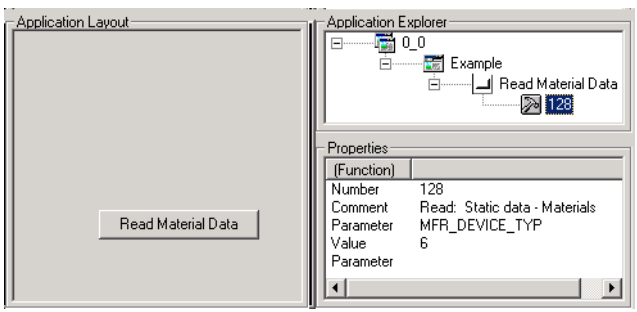


Figure 21. Parameter with constant value

If two identical names are detected during execution, the constant parameter value has priority over a parameter value from an input field and this parameter value has priority over the corresponding parameter from the device instance data record.

Status Bar

The Application Editor automatically adds the status bar shown below to the layout created. The status bar is identical to that featured in standard applications.

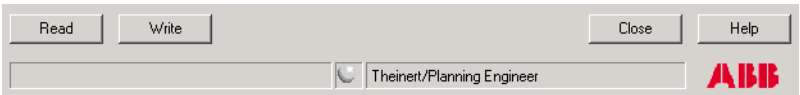


Figure 22. Status bar for new applications

Properties:

Table 14. Status Bar

Field	Description
Read	Click this button to read in all parameters as new
Write	Click this button to write all parameters to the device

Diagnosis Text Editor

This editor can be used to inform the DTM diagnosis application of the interpretation of different bytes used for the extended device status. The bits and bytes are used for referring the associated message texts. In extended status, some device types also send count values, internal measured values or other information.

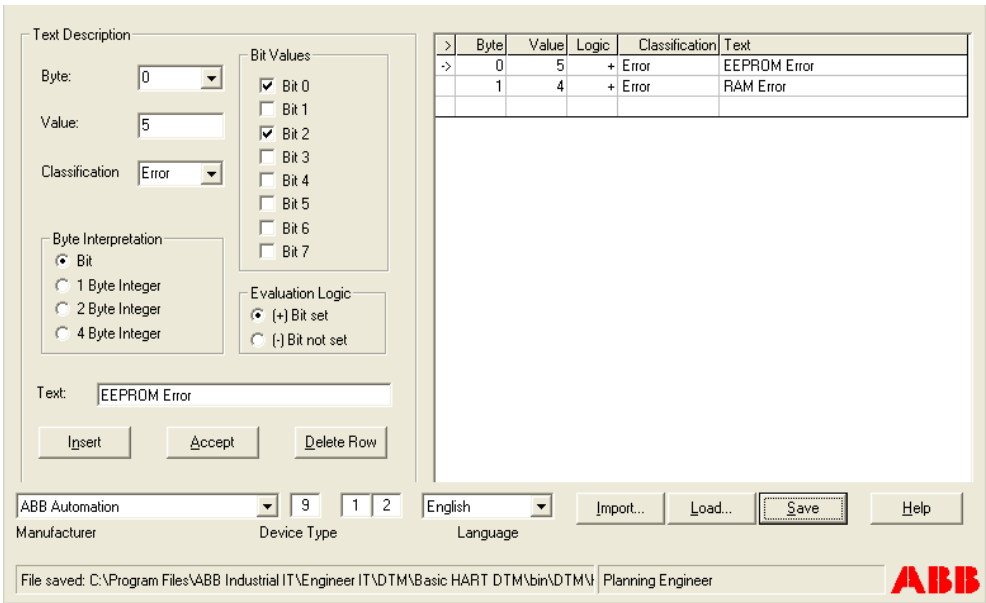


Figure 23. Diagnosis Text Editor

If additional messages are present, the field device will set a bit reserved for these messages in the general device status (more status available). The extended device status can then be read using the "Diagnosis" online application. The application uses *common practice* command 48 to read the messages.

Table 15. Diagnosis Text Editor

Field	Description
Byte	Entry for byte number or selection of the byte number using the list Integer = 0 to 24
Value	Input field for the decimal value of the byte for bit interpretation. Automatic conversion to corresponding bit pattern. Integer = 0 to 255
Classification	Defines the diagnosis message class Class = [Error | Warning | Info]
Byte Interpretation	Indicates how the individual byte/group of bytes are to be interpreted. Selection of access method using the radio button. Bit, N byte integer (N = 1, 2 or 4)
Text	Input field for a diagnosis text for the extended device status ASCII format
Evaluation Logic	Only if byte interpretation = Bit (-) = Message bits not set are evaluated (negative logic) (+)= Only set message bits are evaluated (positive logic)
Bit Values	Selection of an individual bit/bit combination. Automatic conversion to corresponding decimal value. Selection through a check box.

Table 16. Diagnosis Text Editor buttons

Button	Meaning
Insert	Add the diagnosis text, byte number, and value to the table
Accept	Accept a subsequent change to the text, byte number or value. To do this, select any row in the sequence and click the button.
Delete Row	Delete a row (diagnosis text definition) in the table. To do this, select any row in the sequence and click the button.

Bit(s) Definition

Once the byte to be interpreted (0 to 24) has been selected and the interpretation method entered, the user can assign a dedicated message text to the individual bits for each bit combination. It would also be possible to interpret a variant, e.g. 4 individual bits and 4 bits as a combination, using the Editor.

Description of individual bits

The field device can send up to of 8 messages in parallel in one message cycle and one byte.

In the example below, bit 2 of byte 1 has been assigned to the message text "RAM error". All user-defined messages appear in the list on the right-hand side.

The steps to follow are:

1. Enter or select from the list the number of the byte to be interpreted.
2. In the Bit Interpretation, select the required bit by clicking the option button next to it. Else, it can be done by entering the value in the Value text box.

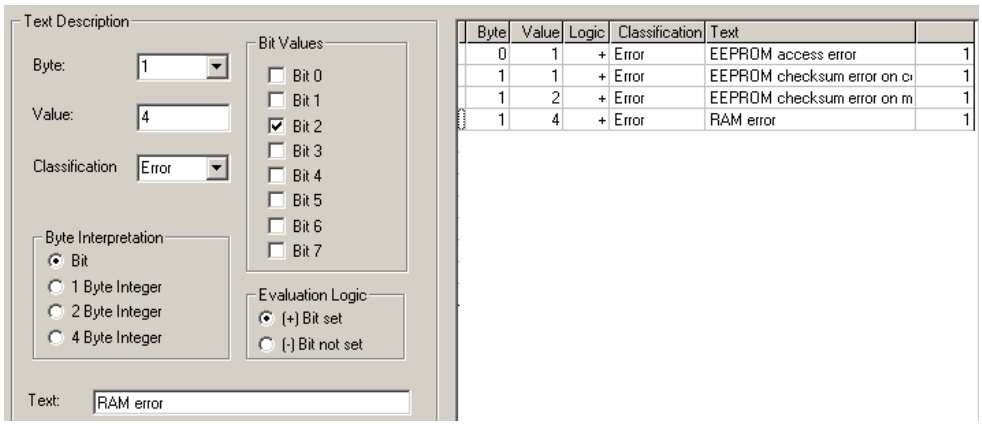


Figure 24. Defining individual bits in the Diagnosis Text Editor

3. Select the required evaluation logic from the Evaluation Logic.
4. Enter the corresponding message text in the text box and click **Insert** to add it to the table.

New or modified diagnosis text definitions can be sorted by byte or value by clicking on the "Byte" or "Value" column headers.

Bit combination

The field device can only send up to 255 possible messages in one message cycle and with one byte.

Example:

Figure 25 shows the definition of a message text as a bit combination (Bit 0 & Bit 1 & Bit 3 & Bit 5) or as an equivalent decimal value of 43 for byte 22.

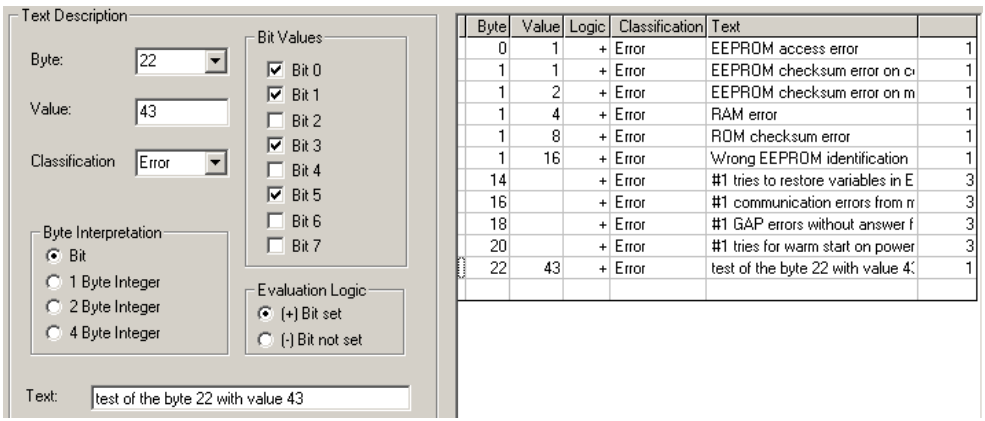


Figure 25. Defining a bit combination in the Diagnosis Text Editor

The steps to follow are:

1. Enter or select from the list the number of the byte to be interpreted.
2. In the Bit Interpretation, select the required bit by clicking the option button next to it. Else, it can be done by entering the value in the Value text box.
3. Select the required evaluation logic from the Evaluation Logic.
4. Enter the corresponding message text in the Text text box and click **[Insert]** to add it to the table.

Byte(s) Definition

Bytes can always be defined whenever the field device is transferring count values, internal measured values or other type-specific information in extended status. Bytes are defined using one byte or a number of consecutive bytes in the data stream, which can be a maximum length of 25 bytes.

The 1, 2 or 4 bytes can be assigned a message text and a marker "#1" for the integer value transferred in the bytes. The content of the bytes is always interpreted as an unsigned integer value and added to the message text at the point marked with "#1".

On the basis of the definitions made in the example below, following the execution of command 48, the diagnosis application would add the value "123" to the message text defined and displays the message "123 EEPROM Write Cycles".

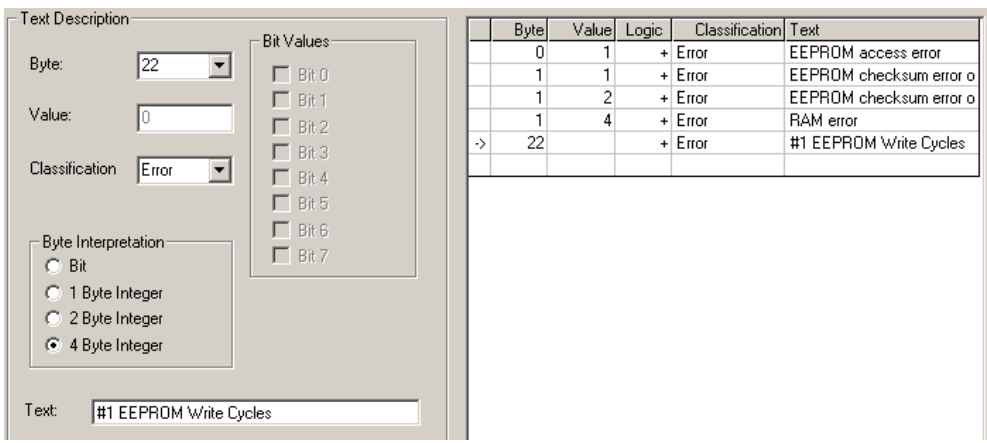


Figure 26. Defining a byte in the Diagnosis Text Editor

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