Device Type Manager (DTM)
Basic HART

Contents:

1 Features / Application 2
1.1 General 2
2 Description of the Basic HART Function Blocks 3
2.1 Configuration 3
2.2 Parameterisation 6
2.3 Display of Measurements 7
2.4 Simulation 7
2.5 Diagnostics 8

1 Features / Application

- Able to run in any FDT server environment
- Supports all HART devices
- Universal commands and common practice commands are supported
- Communication with the HART devices independently of system and fieldbus
- Complete system integration into Symphony

1.1 General

With the Basic HART component we offer you a convenient and user-friendly method for the diagnosis and parameterisation of intelligent field devices via HART protocol communication.

The Basic HART component communicates with all HART-capable devices available on the market using the universal and common practice HART commands. It is used for parameter display, configuration and diagnosis of HART-capable field and service devices.

The Basic HART component is a device type manager (DTM), and only operates within a field device tool environment.

The application can be called by means of the function blocks listed below:

- Configuration
- Parameterisation
- Diagnostics
- Display of measurements
- Simulation

The character of a DTM, its function blocks, and the FDT server environment are described in the "FDT" specification.

The Basic-HART component consists of the following functions:

- Display of the general device data from the database
- Parameterisation of the general device parameters in the data base
- Loading the parameters from the data base into the device
- Reading back the present configuration from the device
- Online commands for setting limits to measuring ranges
- Online commands to reset the device and to burn EEPROM data
- Online measurement display
- Simulation of the analogue value
- Diagnosis for the detection of changes in field device status

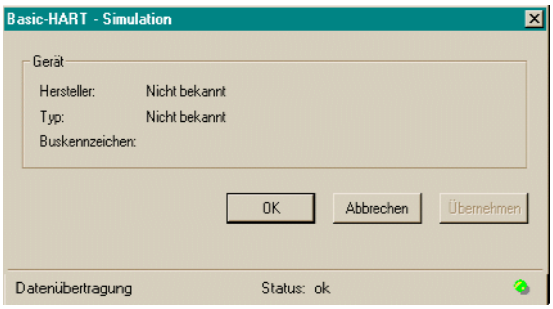
To integrate the functions mentioned above, the Basic HART component supports the following HART commands:

- Universal commands
- 0, 1, 2, 3, 6, 11, 12, 13, 14, 15, 16, 17, 18
- Common practice commands:
- 34, 35, 37, 39, 40, 41, 42, 44

These commands are described in the HART protocol, COMMAND SUMMARY INFORMATION, Revision 7.0. If commands are not supported by the devices, the associated functions can not be executed.

2 Description of the Basic HART Function Blocks

The function blocks for configuration, parameterisation, measurement display, simulation and diagnosis are displayed in consistent windows.



At the top of the window, the function block that has been called and the name of the component are displayed.

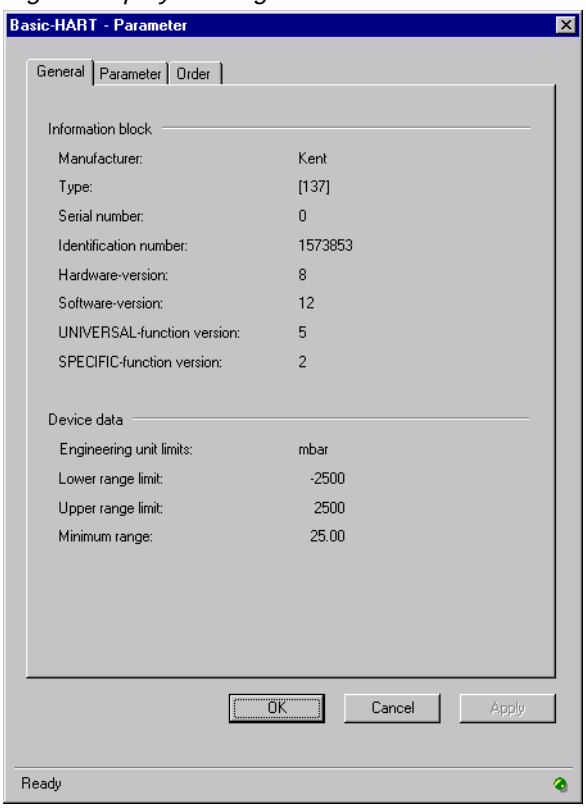
Within the window, general information about the device is first displayed (manufacturer of the device, e.g. Hartmann & Braun, type of the device, e.g. AF800). All further information depends on the function block.

The individual components of the Basic HART are described below.

2.1 Configuration

The configuration consists of 2 different file cards, one for display of the general device data and one which is the configuration file card.

Fig. 1: Display of the general device data:

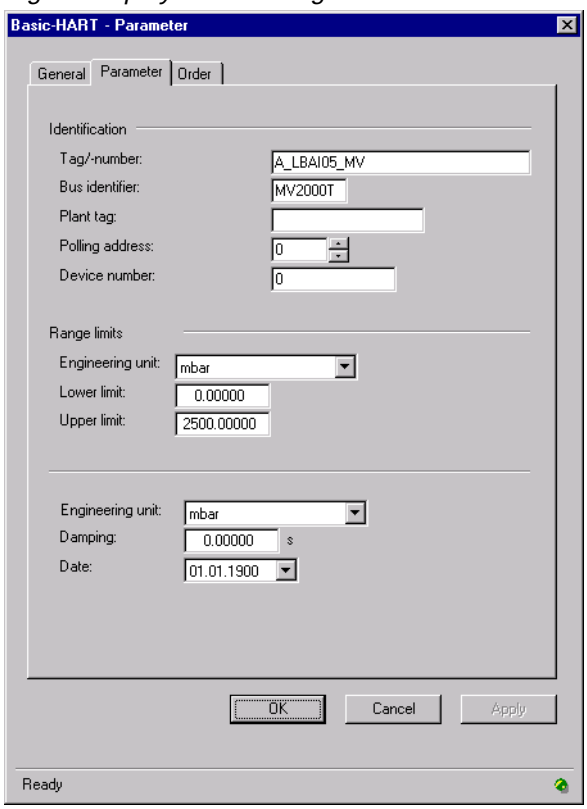


The general device data is read from the device, and can not be edited. The read is made at the time the selection is made. The data that is read is automatically stored in the data base.

Meaning of the displayed information:

Manufacturer	Display of the device manufacturer from Table 8 of the HART - Smart Communications Protocol common tables, Rev. 5.0
Type	Device type
Serial number	Serial number of the device
Identification number	Identification number of the device
Hardware version	Hardware version of the device
Software version	Software version of the device
Version of the UNIVERSAL functions	Revision number of the specification for the Universal Commands used as the basis
Version of the SPECIFIC functions	Revision number of the specification for the device-specific document used as the basis
Unit of the measuring range limits	Unit of the measuring range limits from Table 2 of the HART - Smart Communications Protocol common tables, Rev. 5.0
Lower measuring range limit	Value of the lower measuring range limit
Upper measuring range limit	Value of the upper measuring range limit
Minimum span	Minimum span of the device

Fig. 2: Display of the configuration file card



The data that must be written into the device when required can be entered into the configuration file card. In order to obtain the current data from the device, it is possible to initiate a read of all the parameters through the engineering system. The data that is read can then be stored in the data base. This data is then displayed on the configuration file card, and can be edited if required.

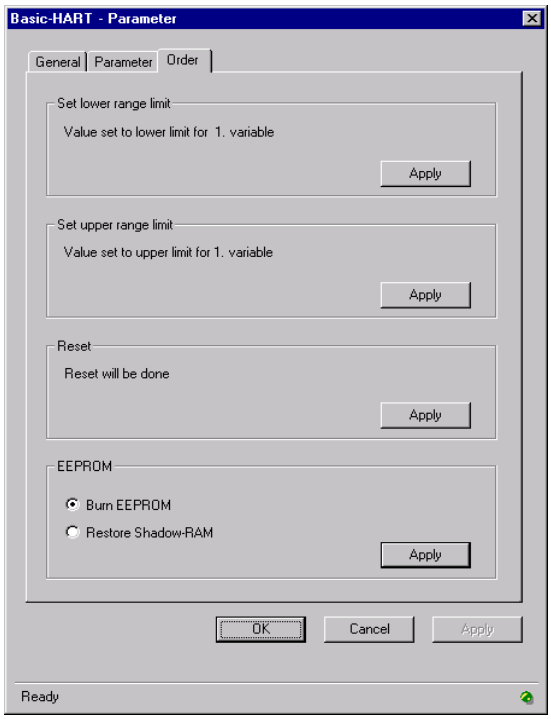
Measuring point identification	Field for entry of the measuring point identifier with a maximum of 32 characters. Acceptable characters are upper case letters, numbers and other signs in accordance with the HART specification.
Bus identifier	The bus identifier is entered here using a maximum of 8 characters. Acceptable characters are upper case letters, numbers and other signs in accordance with the HART specification.
Plant identifier	The plant identifier can be entered using a maximum of 16 characters. Acceptable characters are upper case letters, numbers and other signs in accordance with the HART specification.
Polling address	The polling address is needed if the device is operated on a bus (Multidrop). An address between 0 and 15 is possible. 0=single device, 1-15=bus operation (current is set to minimum and can not be changed, polling address 0 cancels the current limit)
Device number	Serial number of the device
Unit of the measuring range limits	Unit from Table 2 of the HART - Smart Communications Protocol common tables, Rev. 5.0
Upper limit	Value of the lower measuring range limit for the first measured value
Lower limit	Value of the upper measuring range limit for the first measured value
Unit (free process variable)	Select the unit for the free process variable. The unit set does not affect the analogue output current! The unit is part of Table 2 of the HART - Smart Communications Protocol common tables, Rev. 5.0
Damping	The output signal from the transmitter can be damped by this function. This can be very helpful if the input is fluctuating.
Date	Optional date that can be entered for the last change.

2.2 Parameterisation

The parameterisation consists of 3 different file cards: the file card with the general data (see configuration), the parameter file card (see configuration) and the commands file card.

The difference from function block configuration is that the entered data is written immediately into the device. The data base is only saved if the data is accepted by the device.

Fig. 3: The command file card



The commands file card consists of 4 command switches.

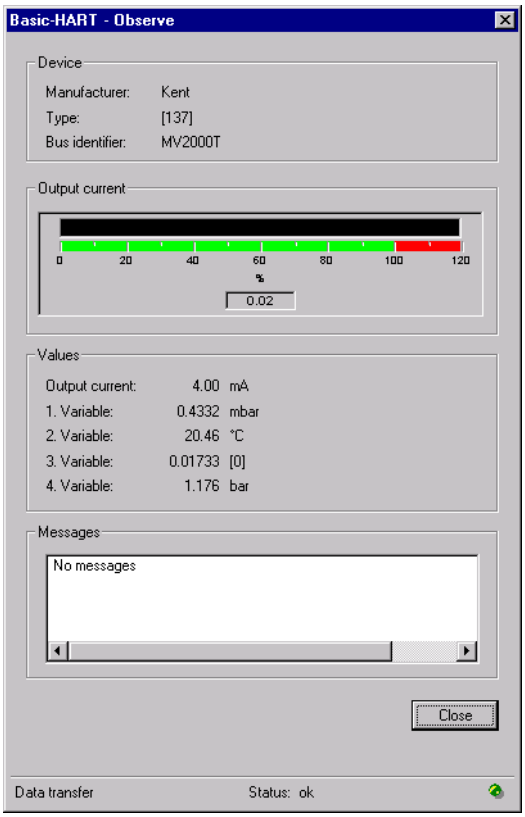
Set the upper measuring range limit	The current process magnitude is set as the upper measuring range limit for the first variable (see Measurement Display). The command is sent to the device immediately, and is irreversible. It is not possible to set the upper measuring range limit to a value lower than the lower measuring range limit.
Set the lower measuring range limit	The current process magnitude is set as the lower measuring range limit for the first variable (see Display of Measurements). The command is sent to the device immediately, and is irreversible. It is not possible to set the lower measuring range limit to a value higher than the upper measuring range limit.
Reset command	This command resets all the software in the device, which is automatically started again. During the time in which the full reset has been executed it is not possible to communicate with the device, which is out of operation for that time. How the device behaves during the reset phase is not, in general, predictable, and depends on the particular device (see device description). The reset process can take some time (device dependent).
EEPROM commands	The EEPROM commands are used either to burn the device's EEPROM with the current device data, or to reset the current data using the data saved in the EEPROM (restore shadow RAM). You can select between these two functions by means of the toggle function.

2.3 Display of Measurements

This function can only be executed when it is possible to establish communication with the field device.

In the window area for the output current, the instantaneous output current (which is identical with the analogue output current) is given as a percentage.

The values measured for the output current are displayed in milliamps. Up to 4 other measured values with their associated units are also displayed if these are supported by the device.



2.4 Simulation

This function can only be carried out when it is possible to establish communication with the field device.

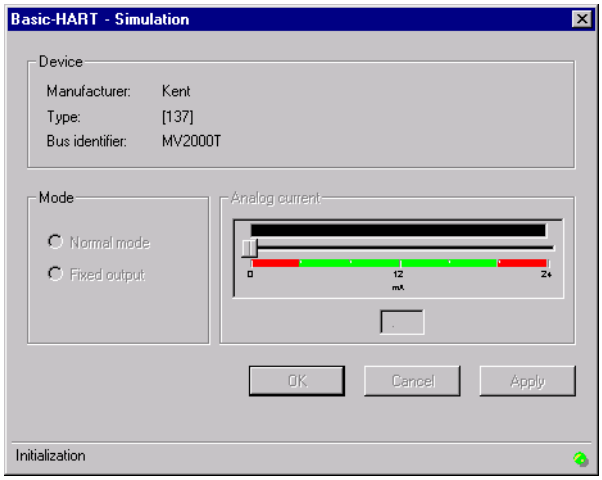
Simulation, setting a constant output current at the device, is used to test the signal lines, for example.

The desired simulation current is entered either by the slider in the bar display or in the numerical input box.

The mode toggle function allows switching between normal operation and constant current operation. The bar display shows the current that was read at selection.

The "Accept" button takes over the functions from the device, and the window is not closed.

After clicking the "OK" button, the changes are transmitted to the device and the window is closed. If the window is closed while simulation is active, a dialogue box opens with the appropriate reminder that the device is still in constant current operation.



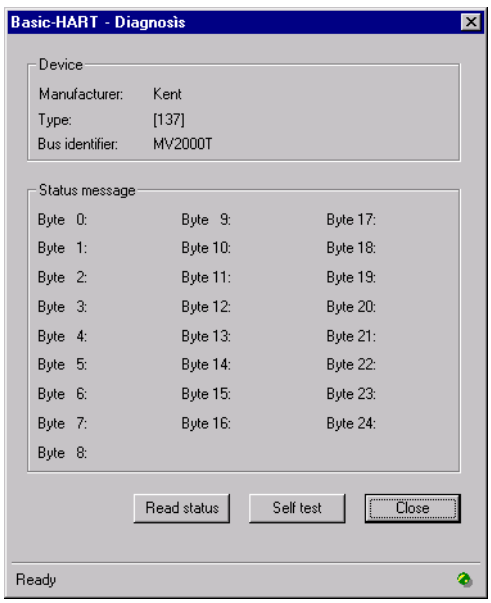
2.5 Diagnostics

This function can only be executed when it is possible to establish communication with the field device.

Diagnostics generate a display of the instantaneous device state by reading the status information. The interpretation of the diagnostic data read is device-dependent. For this reason the status information is displayed as bytes. To obtain more precise information about the data that is read it is necessary to refer to the technical information for the device concerned.

The data is read by clicking the "Read status" button.

The "Self test" button triggers a complete self-monitoring cycle, and returns the appropriate status messages.



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