



Actuator controls

AUMATIC AC 01.1/ACExC 01.1

Profibus DP-V1

DTM (Device Type Manager)

for FDT (Field Device Tool)



Reference documents:

- Manual (operation and setting) AUMATIC AC 01.1/ACExC 01.1 with Profibus DP.
Can be downloaded from the Internet (www.auma.com) or ordered directly from AUMA (addresses see page 26).

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1. Introduction

Process data DP-V0 Extended functions DP-V1

The field devices used in the industrial process automation today have, aside from the compulsory main functions, a variety of more detailed application functions to adapt their performance optimally to the process requirements. In addition to this, most field devices have even more functions and methods to diagnose their own field device status. When using open, internationally standardised fieldbus systems such as Profibus DP-V1, access to these device-specific application and diagnosis functions is made through the same fieldbus cables which are also used for the process data exchange between field device and control system. Beside the cyclic process data exchange via Profibus DP-V0, an additional acyclic communication via Profibus DP-V1 can hereby be established, without additional wiring. It serves for adapting parameters of the application functions or reading out status and diagnostics data during operation.

By means of the optional acyclic Profibus DP-V1 services, the actuator controls AUMATIC offers access to

- User function parameters for adapting to process requirements
- Data within the electronic name plate for detailed device identification
- Operational data for preventive maintenance

Furthermore, the current device status may be communicated for diagnosis purpose.

Access via FDT interface

The device access for all connected field devices is thereby made through a central operation and monitoring station, located e.g. in the control room. A standardised software interface enables uniform integration of various field devices into the operation and monitoring software.

The details of this software interface were laid down and published in the FDT interface specification (FDT = Field Device Tool, refer to www.profibus.com or www.fdt-group.org).

FDT frame application

Typical examples for operation and monitoring software with FDT interface are PACTware (www.pactware.com) or Fieldcare (by Endress&Hauser). These tools are also called FDT frame applications, as they contain the various DTMs for all field devices of a plant.

Device integration via DTM

A DTM (Device Type Manager) is an instrument-specific software component required to integrate a field device of a certain manufacturer into the operation and monitoring software (FDT frame application) or into a control system with FDT interface.

The **AUMATIC DTM** for the actuator controls AUMATIC is available for free download on the Internet, at **www.auma.com**.

The AUMATIC DTM frees the user from having to worry about the details regarding the Profibus DP-V1 communication, but allows to use the device-specific application and diagnosis functions immediately after having installed and assigned the device address.

The present document describes the handling of the AUMATIC DTM on the basis of the PACTware FDT frame application; the instructions apply accordingly to other FDT applications.

1.1. AUMA scope of delivery

AUMATIC DTM installation package, available on the Internet at www.auma.com, with the following contents:

- Installation file (setup.exe) for AUMATIC DTM
- Manual device integration with AUMATIC DTM (pdf file)

1.2. Summary of AUMATIC DTM functions

The AUMATIC DTM provides the following features:

- Reading and writing of AUMATIC parameters.
- Reading and writing of the electronic name plate for detailed identification of the AUMATIC.
- Reading and clearing the operating data for diagnosis and preventive maintenance.
- Tool tips with short descriptions for each parameter.
- Offline and online operation mode
- Online diagnosis regarding the current AUMATIC status.
- Trend functions with logging and storing features of the current torque, the actual position, the setpoint, as well as the current operation status.
- Includes the GSD file, the documentation of the AUMATIC with Profibus DP, short instructions for AUMATIC DTM, as well as Online Help.
- Profibus DP-V0 communication channel (e.g. for integration into ABB systems).

AUMATIC DTM conforms to FDT specification 1.2 including addendum.

1.3. Prerequisites for the device integration with AUMATIC DTM

Actuator controls AUMATIC:

The following software versions/functions must be installed:

- AUMATIC logic software Z031.922/10-xx or later, refer to AUMATIC display, diagnosis indication D6: LOGIC SW-VERSION.
If the AUMATIC DTM is operated in combination with an AUMATIC equipped with an older logic software version (e.g. Z031.922/05-04 or later, or Z031.922/08-xx), the available functionality is somewhat restricted (no online transfer of status or diagnosis information, no trend function).
- AUMATIC Profibus DP-V1 software Z031.320/02-00 or later, refer to AUMATIC display, diagnosis indication DD: DP1 SW-VERSION (for Profibus DP redundancy additionally DH: DP2 SW-VERSION).
- The Profibus DP-V1 function has to be activated within the AUMATIC, refer to AUMATIC display, menu indication M4009: MAIN MENU > CONFIGURATION > SPECIAL FUNCTIONS > VIEW > DP-V1 SERVICES = FUNCTION ACTIVE.

Computer:

The following programs/hardware must be installed:

- FDT frame application (operation and monitoring software), with FDT specification 1.2 support, e.g. PACTware (www.pactware.com)
- CommDTM (communication DTM) for Profibus DP-V1 interface e.g. PCMCIA board with PROFIdtm DPV1 by Softing AG (www.softing.com).

2. Installing AUMATIC DTM software

1. Exit all running programs.
2. Start setup.exe.
3. Follow the instructions of the setup program.

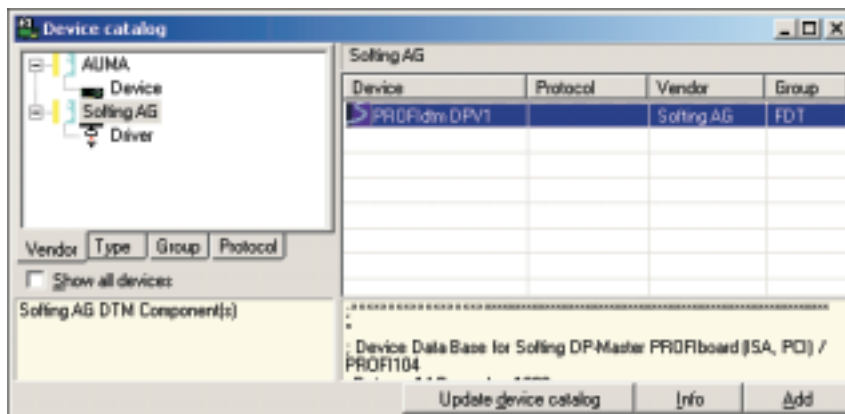
3. Setup of AUMATIC in FDT frame application

This chapter describes the setup with the example of the FDT frame application PACTware. Please refer to the PACTware Online help for a complete program description.

When using a different FDT frame application, the procedure to be followed is basically the same way as described hereunder.

Starting FDT frame application

1. Start PACTware
2. Display the device catalogue selecting **View > Device catalog**
The device catalogue shows all DTMs installed on the computer, sorted by manufacturer.

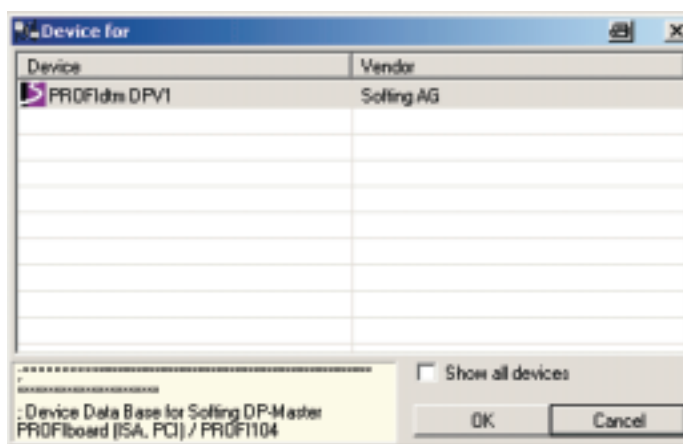


3. Click **Update device catalog** to display all DTMs available within the system.

Adding CommDTM

A CommDTM (communication DTM) is a software component which must be available for each project. The AUMATIC DTM and all other DTMs for other field devices are then assigned to the CommDTM.

4. Click **HOST PC** with the right mouse button and select **Add device**.
The **Device for** window shows the available CommDTMs.

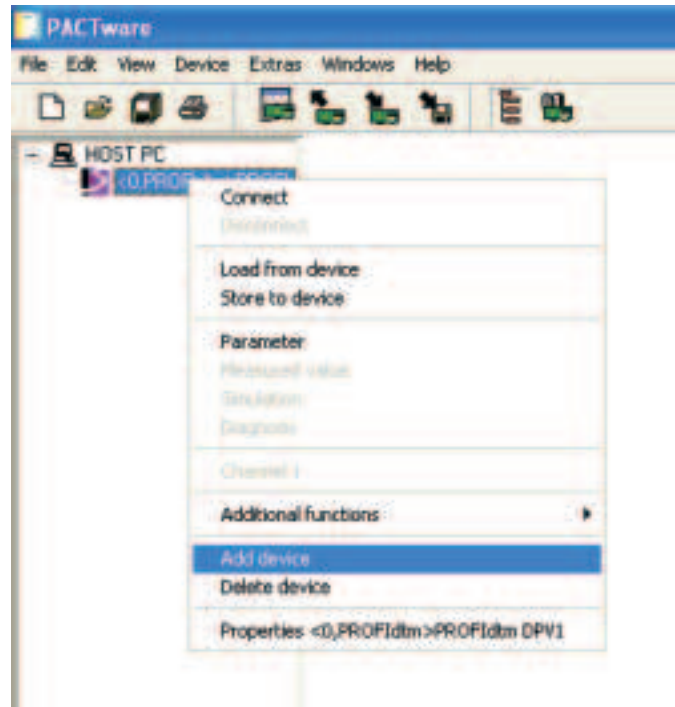


5. Select **CommDTM (Device Data Base for Softing DP Master)** and confirm by clicking **OK**.

Adding the AUMATIC

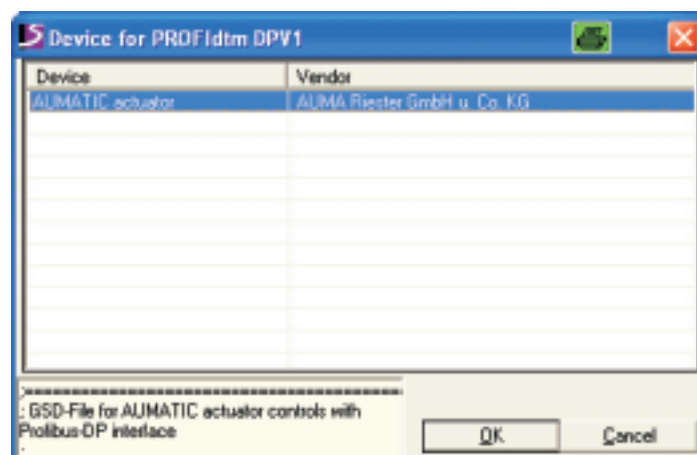
6. Click CommDTM (here: <0.PROFIdtm>PROFIDTM V1>) using right mouse button.

The following dialogue window opens:



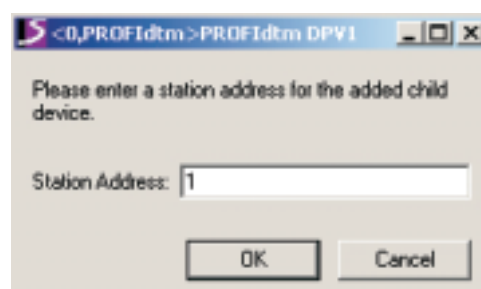
7. Click **Add device** command

The **Device for PROFIdtm DPV1** window shows the available devices:



8. Select **Device** (AUMATIC actuator) and confirm with **OK**.

The dialogue window for entering the station address opens:



9. Enter **Station Address** (Profibus DP device address of the AUMATIC) and click **OK**.

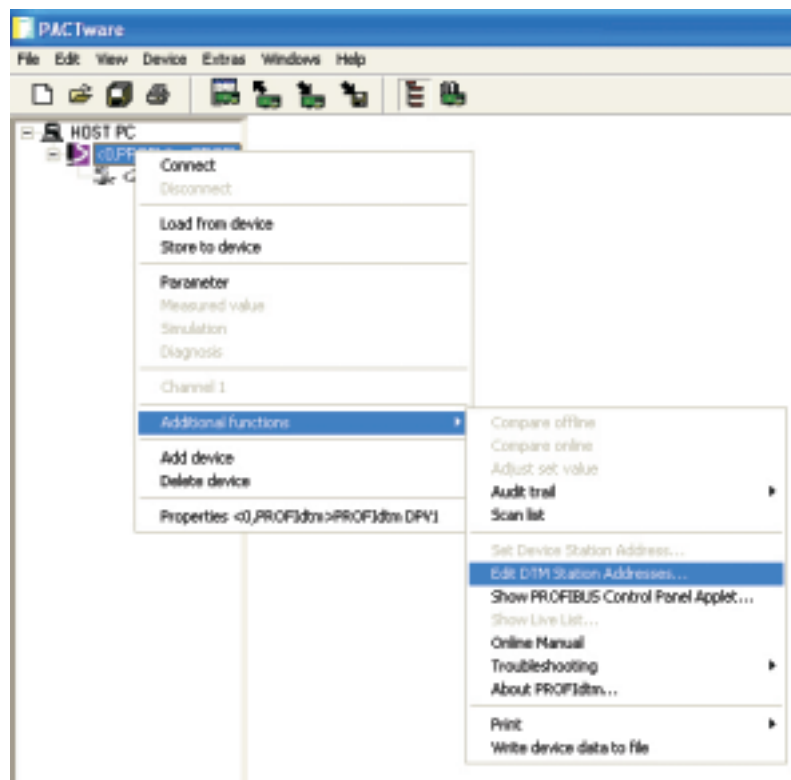
Note The station address entered must be identical to the device address of the AUMATIC connected!

You may request the device address at the AUMATIC local controls display as follows:

MAIN MENU (M0)
SETTINGS (M1)
PROFIBUS DP1 (M1B)
SLAVE ADDRESS (M1B00)

Subsequently updating the device address

1. Click CommDTM (here: <0.PROFIdtm>PROFIDTM V1>) using right mouse button and select **Additional functions**.
The dialogue window indicates:



2. Click **Edit DTM Station Addresses**.
The device address may be modified within the window opening now.

4. General information regarding the AUMATIC DTM operation

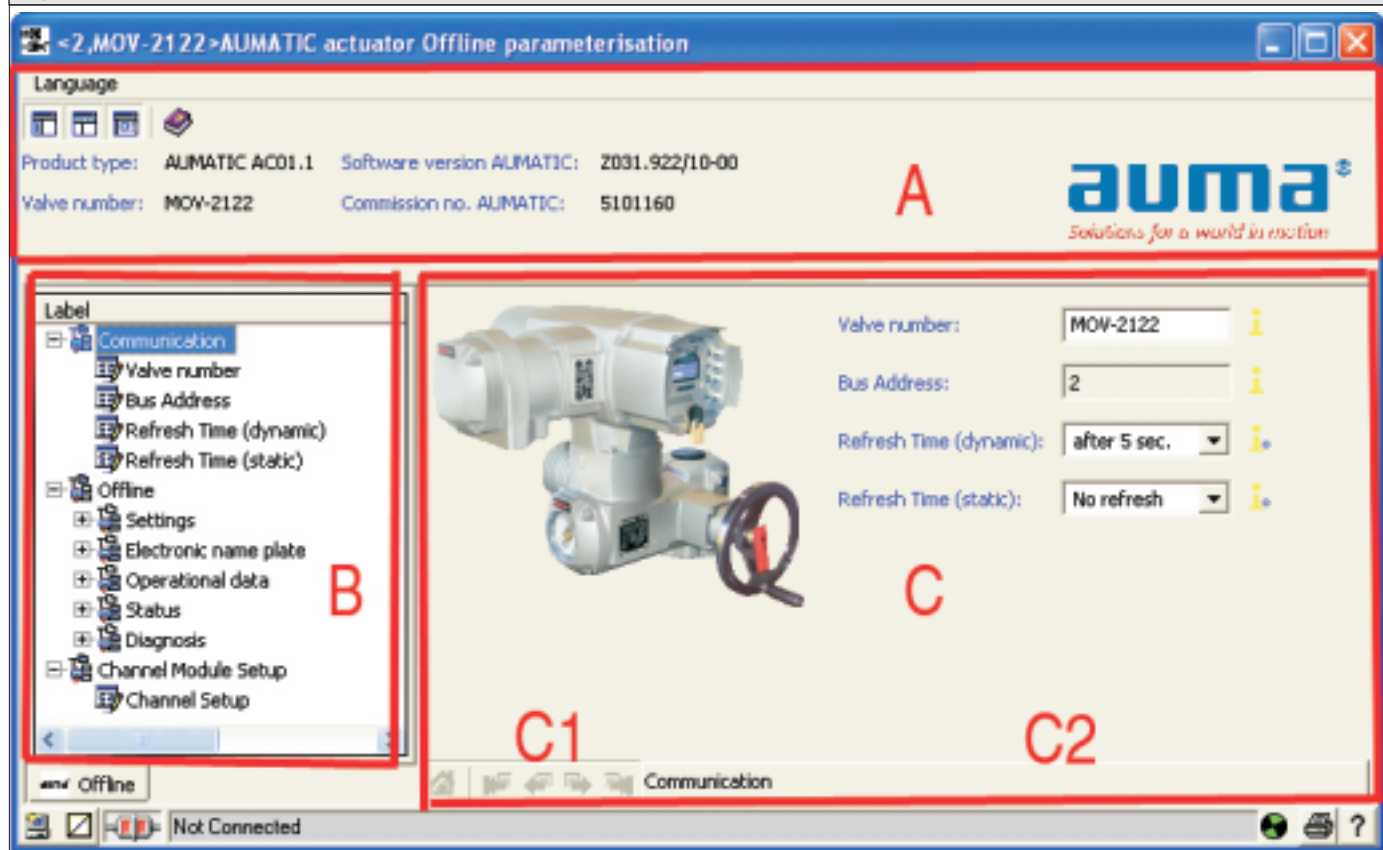
4.1. Starting the AUMATIC DTM

When using PACTware, double-click the AUMATIC projected within the project tree to start the AUMATIC DTM.



4.2. Main window

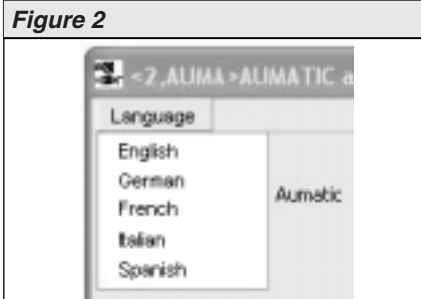
Figure 1



- Area mark A** The area mark A describes the AUMATIC DTM **Header**. This area shows typical device features and serves the purpose to identify, at a glance, the AUMATIC used. The figures shows the AUMATIC in offline mode.
- Area mark B** The area mark B describes the **Tree view** of the AUMATIC DTM. The tree structure is used to quickly toggle between the various parameters. Pull the tree structure to an expanded view to display values and units.
- Area mark C** Area mark C describes the **Parameter main view**, the so-called display. The navigation arrows (mark C) allow to navigate between the individual displays. It is possible to divide a menu with several parameters into several displays to logically group the parameters. If only one display containing all parameters is defined for a menu, the navigation arrows are inactive and shown in grey. The mark C2 shows the menu names of the currently displayed items.

4.3. Selecting the AUMATIC DTM language

The AUMATIC DTM supports six languages altogether, which can be selected independently of the FDT frame application language setting using the **Language** button:



4.4. AUMATIC DTM views

The three icons below the Language button are used to display the available AUMATIC DTM views,

- a) with or without tree structure
- b) with or without header display
- c) with or without displaying the AUMATIC photo



4.5. Printing device data



Printing device data

For example, the data saved in the device memory may be printed to dispose of all parameter conditions in the event of failure for any possible subsequent troubleshooting required. The selection criteria can be:

- Offline parameter
- Online parameter
- Measured value

Attention

The printing of online parameters may take several minutes and depends on the number of instrument parameters to be read.

4.6. AUMATIC DTM Online help

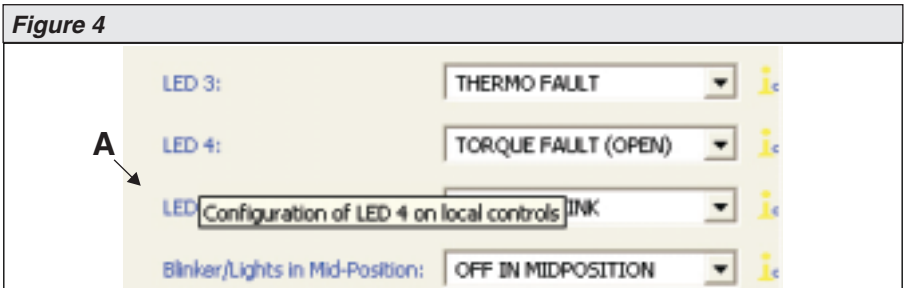


Selecting online help

Provides detailed information on AUMATIC parameters.

If the menu pointer points to a parameter, the pertaining tool tip is displayed for explanation.

Furthermore, the operation instructions are selected when clicking the parameter names (mark A)



5. Functions for data communication with AUMATIC DTM

5.1. Connecting/disconnecting the communication to the AUMATIC

Before reading data from or writing data into the AUMATIC, you have to establish a connection to the device.

→ Click the AUMATIC icon with the right mouse button and select **Connect** or **Disconnect**.

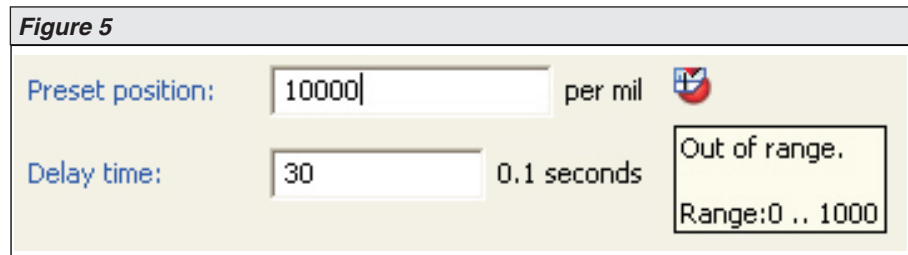
5.2. Reading data from/writing data into the AUMATIC

This function allows reading/writing of AUMATIC parameters from/into the AUMATIC DTM. It is possible to display and/or set the parameters in the offline parameter display. They are stored in the frame application data base.

→ Click the AUMATIC icon with the right mouse button and select **Load from device** or **Store to device**.

Note These functions are only available if an online connection to the device is established.

Parameter values must be within the permissible minimum and maximum limits. When transmitting invalid values, the reference “Out of range” is displayed together with the permissible value range for the parameter concerned:



Some parameters of the AUMATIC actuator controls are combined with optional functions and features; changing these parameters will only have an effect if these functions are available in the AUMATIC actuator controls (e.g. parameters of a possibly available redundant Profibus DP or parallel standard interface).

FDT user groups

FDT frame applications distinguish between five different user groups with different access authorisations.

An **observer** of the AUMATIC DTM may only read the AUMATIC actuator controls information.

Offline parameterisation and trend function are not available.

All other user groups have the right to read the information stored within the AUMATIC like the **observer** and write most parameters. Offline parameterisation and the trend function are available.

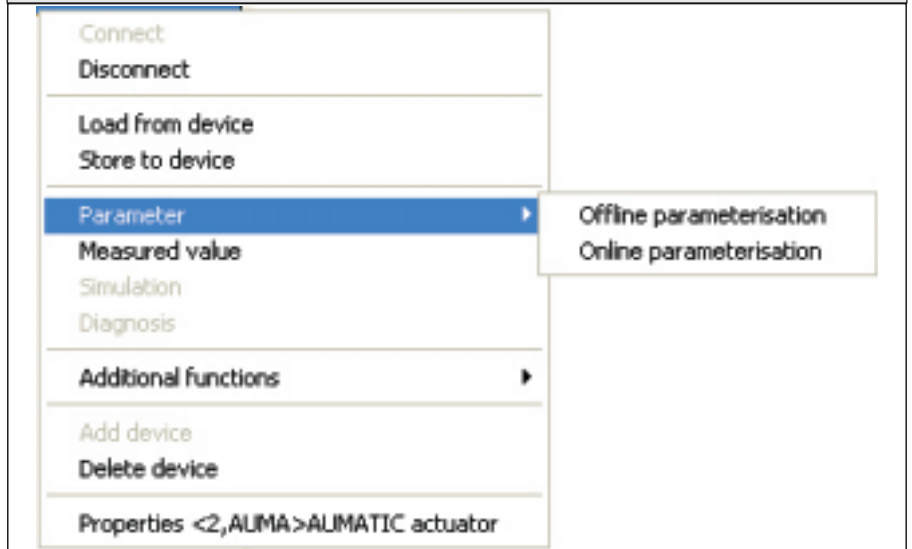
5.3. Parameter setting

Parameters may be set in online or offline mode.

Online/offline parameterisation

→ Click the AUMATIC icon with the right mouse button and select offline or online parameterisation.

Figure 6



Note Online parameterisation is only available if an online connection to the device is established.

5.3.1 Offline parameterisation

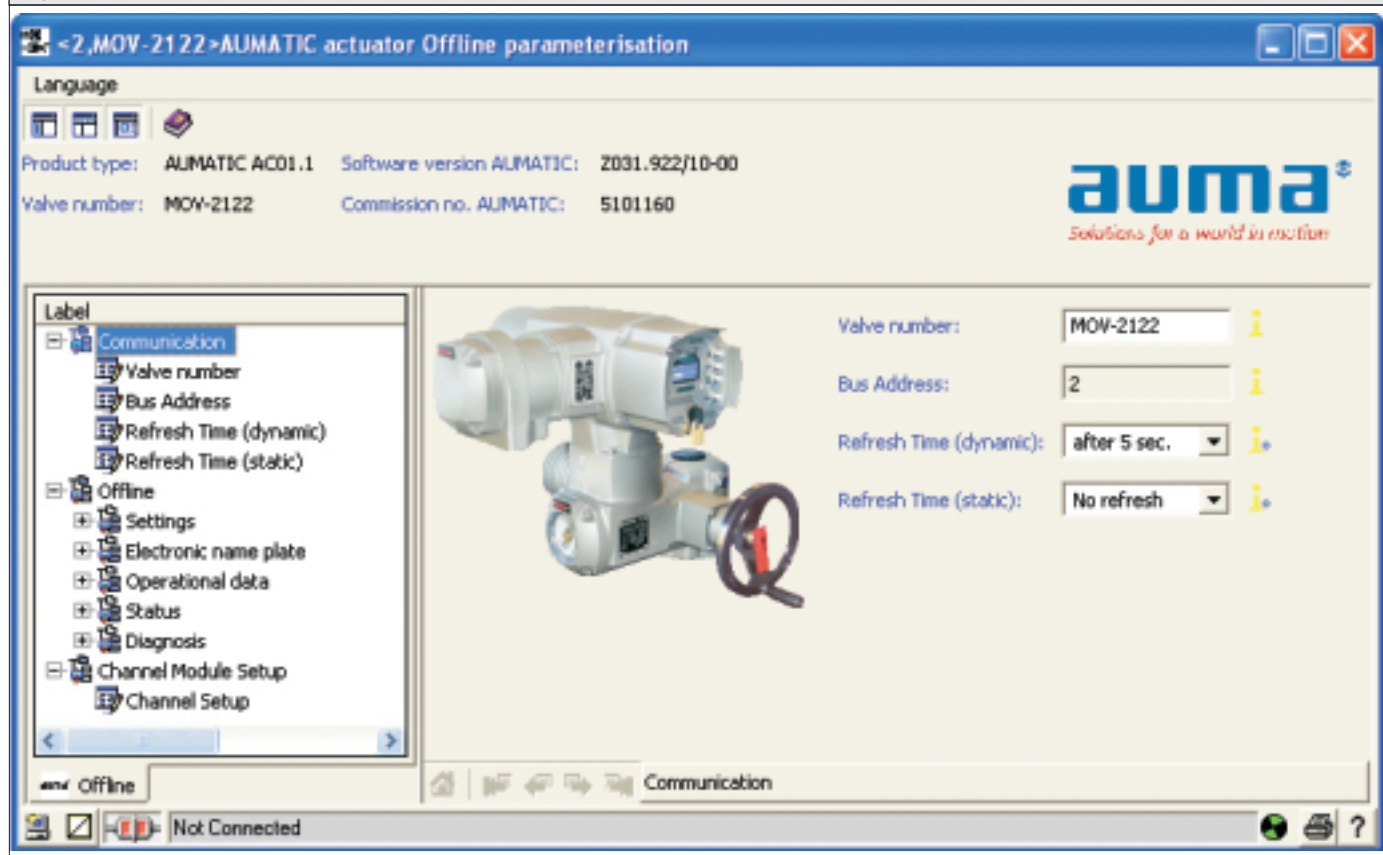
In case of absence of communication, the DTM is first started in offline mode.

During offline parameterisation, the parameters displayed in the DTM are not synchronised with those modified simultaneously online within the AUMATIC.

Attention First load the data from the AUMATIC, then specifically modify individual parameters using the AUMATIC DTM. The complete parameter record should only be rewritten to the AUMATIC after this procedure. This is the only way to ensure that the AUMATIC DTM values match the values currently available in the AUMATIC.

The following view allows to display and modify the offline parameters of the device. The offline parameters may be stored in the FDT frame application data base.

Figure 2



Changing parameters

→ Click in the entry field to modify the desired values.

Note Parameters which cannot be modified are shaded in grey.



Value unchanged (with blue circle)

The displayed value corresponds to the AUMATIC DTM standard value.



Value has been changed, modification has not yet been saved (red asterisk)

To save changes, press return key.

The changes are lost unless you press the return key.



Value has been modified but not yet set (white asterisk)

Does not correspond to the standard value.



Reset all parameters to the standard AUMATIC DTM values

Consequently, all changes within the AUMATIC DTM are lost.

Sending data to the AUMATIC

→ Click **Store to device** function.

Once the data is successfully stored to the device, the blue asterisks are removed; this shows that the displayed value matches the value within the device.



Value has not been stored to AUMATIC

Further information regarding the error can be gathered when clicking this icon.


5.3.2 DTM Communication behaviour

In the “Offline parameterisation” view, the DTM time behaviour during “Online parameterisation” may be influenced.

Communication > parameter


Refresh Time (dynamic)

This parameter is used to determine the time during which the dynamic device parameters are automatically updated.

Dynamic parameters are marked with the  icon.

Refresh Time (static)

This parameter is used to determine the time during which the static device parameters are automatically updated.

Static parameters are marked with the  icon.

A higher value or a longer refresh time leads to a reduced, acyclic Profibus DP-V1 data exchange (this can be particularly useful in order not to completely occupy the available Profibus DP-V1 communication bandwidth when several field devices are connected).

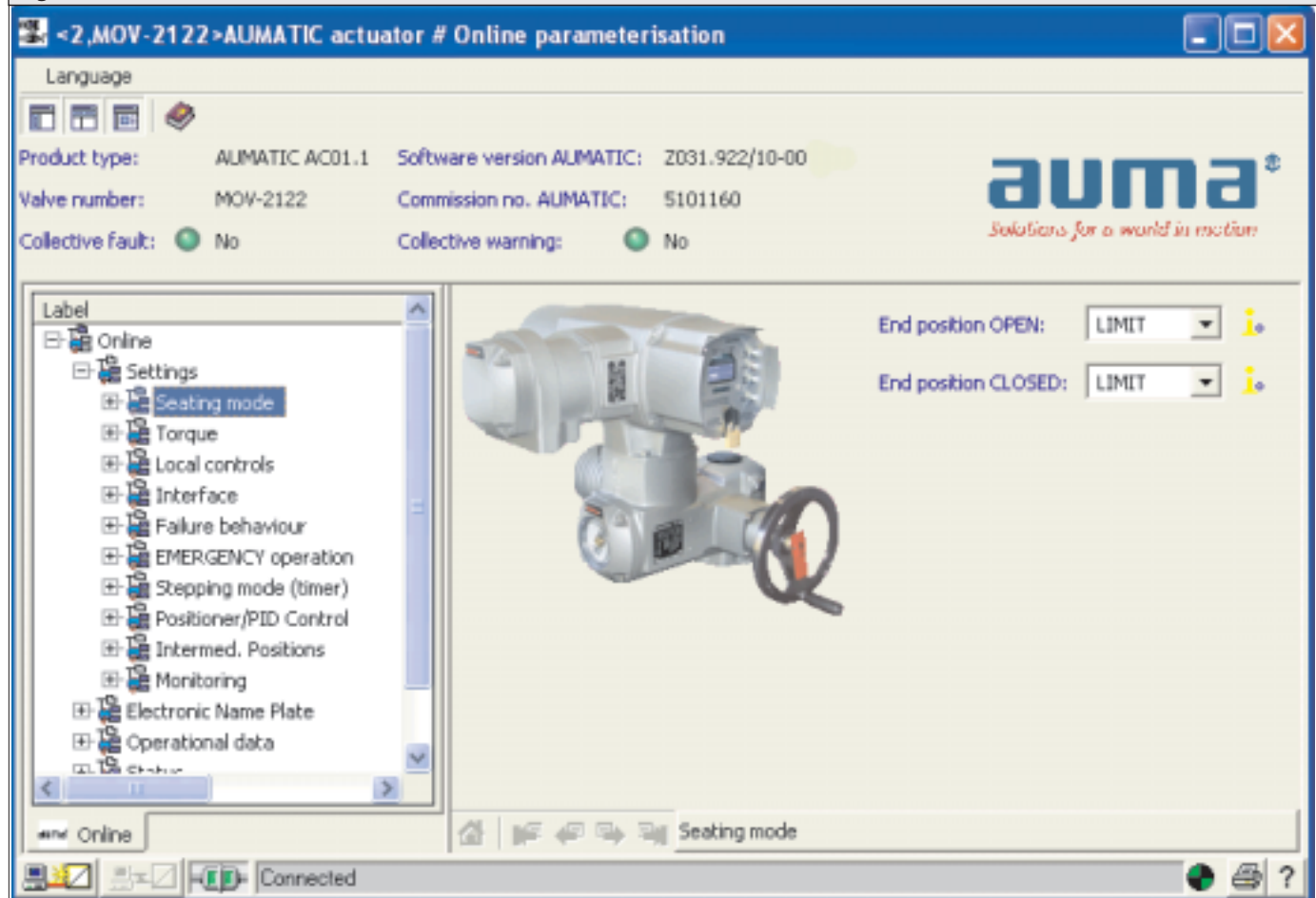
The cycle times set via the “Refresh Time” parameters define the reading cycle times which are not fallen short of. The actual cycle times may be higher; this depends on the Profibus DP baud rate, the number of Profibus DP devices, the configuration of the Profibus DP communication, as well as on the number of any simultaneously available Profibus DP-V1 connections to other field devices.

5.3.3 Online parameterisation

Note This function is only available if an online connection to the device is established.

Opening the menus may take more time than in offline mode because the data has to be loaded from the device. The loading time depends on the number of parameters to be loaded.

Figure 3



Like for the offline parameterisation, the parameters can be written or modified. The difference is that the modified value is stored to the device immediately after entry confirmation. Thus, the displayed values match the device values.



Dynamic value

This data is cyclically loaded from the device and displayed. Typically, this includes measured values, the cycle time depends on the "Refresh Time (dynamic)" parameter.



Static value

This data may also cyclically loaded from the device. These values normally remain unchanged.



Value has not been stored to AUMATIC

Further information regarding the error can be gathered when clicking this icon.

Attention

The parameter data may not be modified directly at the device or using a different tool if the AUMATIC DTM is in the online parameterisation mode. This can lead to an inconsistent status in the DTM. Therefore, go offline first; then the user can modify the parameters before allowing to read again the data in online mode.

5.4. Measured value

Note This function is only available if an online connection to the device is established.

This function opens the AUMATIC DTM Observe view. An overview of the dynamic values of the AUMATIC devices is displayed here (e.g. torque values, setpoint, actual position, and information on the operation status).

Figure 4



The current actuator torque is simultaneously shown in three different units

- Torque E6 as percentage of nominal torque
- Torque E6 as absolute value in Nm
- Torque E6 as absolute value in Lbs.Ft.

Notes Negative values correspond to a torque in direction CLOSE, positive values correspond to a torque in direction OPEN. Only those torque values are displayed in the AUMATIC DTM which exceed a certain actuator-specific basic load (typically approx. 40 – 50 % of the nominal actuator torque).

The actual position E2 and the setpoint E1 (when controlling via a setpoint) are displayed in per mil values.

The status information contains binary data on the current operation status:

Table 1	
Value	Signification
1	Actuator runs in direction OPEN
2	Actuator runs in direction CLOSE
3	Actuator is in end position OPEN
4	Actuator is in end position CLOSED
5	Actuator is at desired setpoint E1

The dynamic data transfer is a cyclic communication using the Profibus DP-V1 services. The cycle time may vary depending on the configuration of the Profibus DP-V0 communication and the workload of the available bandwidth for the Profibus DP-V1 communication.

The cycle time set via the “Refresh Time (dynamic)” parameter defines the reading cycle time which is not fallen short of. The actual cycle time may be higher; this depends on the Profibus DP baud rate, the number of Profibus DP devices, the configuration of the Profibus DP communication, as well as on the number of any simultaneously available Profibus DP-V1 connections to other field devices.

5.5. Special features of the programming

Parameters for setting the tripping torques

The setting of the tripping torques in direction OPEN or direction CLOSE is only available in combination with non-intrusive actuators (parameters Tripping torque OPEN or Tripping torque CLOSE).



The permissible minimum values of both parameters depend on the actuator type.

A typical AUMA actuator of the type range SA 07.1 has a tripping torque of 10 – 30 Nm (see details on the name plate), the minimum permissible tripping torque is in this case 33 %.

Make sure that the permissible minimum values for the tripping torques are not fallen short of; otherwise the writing process is rejected and the parameter is shown with an exclamation mark.

Figure 7



Parameters for setting the torque indication

The Local controls > Torque indication parameter only has an effect for non-Intrusive actuators equipped with the AUMATIC logic software version Z031.922/05 or later.

Figure 6



5.6. Additional functions

The "Additional functions" option allows to access to further AUMATIC DTM functions.

5.6.1 Trend

Note This function is only available if an online connection to the device is established.

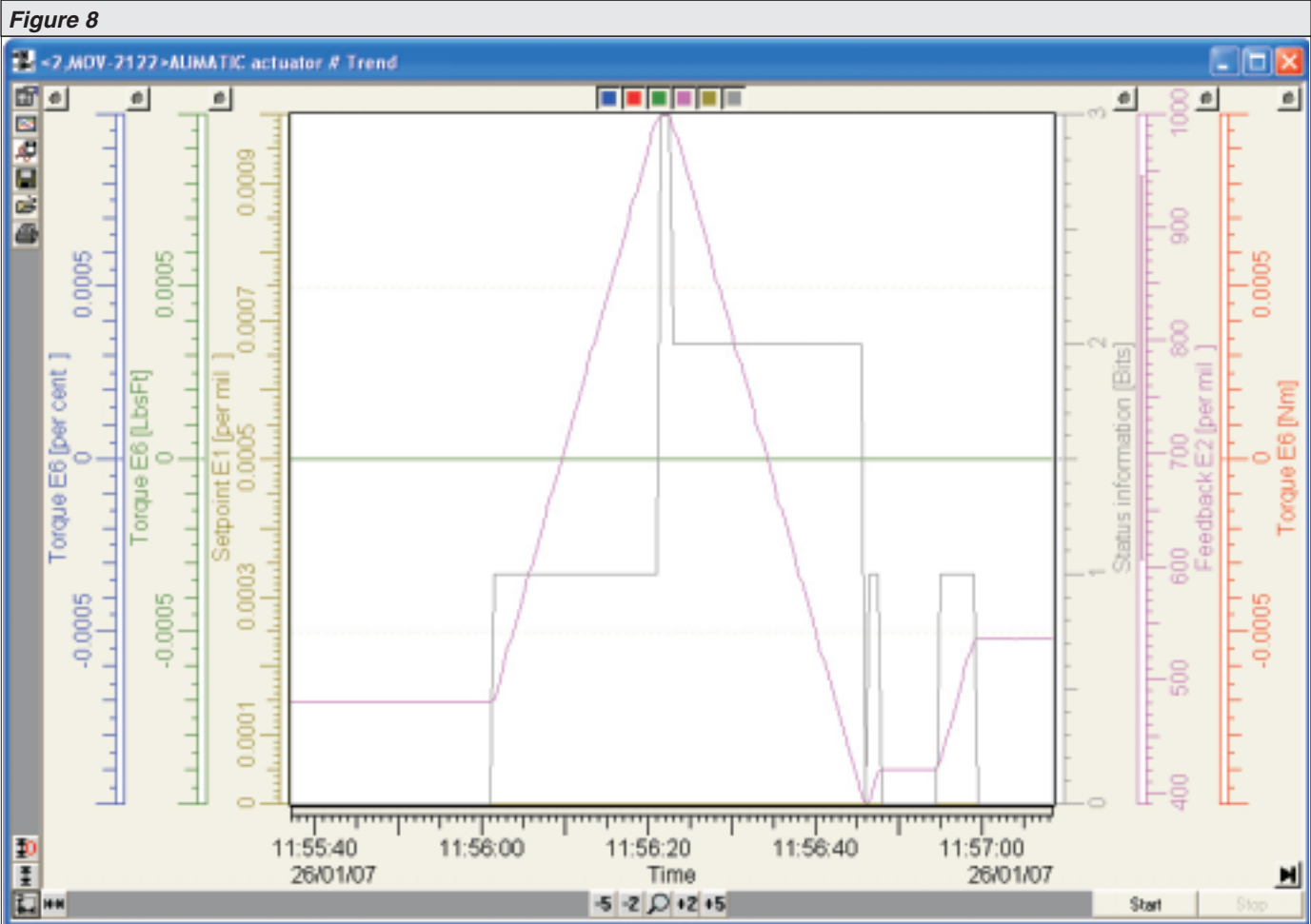
This function (Additional functions > Trend) opens the trend view of the dynamic device values. The following data can be logged as trend:

- 1) Torque E6 as percentage of the nominal torque
- 2) Torque E6 as absolute value in Nm
- 3) Torque E6 as absolute value in Lbs.Ft.
- 4) Actual position E2 in per mil
- 5) Setpoint E1 in per mil
- 6) Status information on the operation status as binary value.

Further notes Negative torque values correspond to a torque in direction CLOSE, positive values correspond to a torque in direction OPEN. Only those torque values are displayed in the AUMATIC DTM which exceed a certain actuator-specific basic load (typically approx. 40 – 50 % of the nominal actuator torque).

The status information contains binary data on the current operation status:

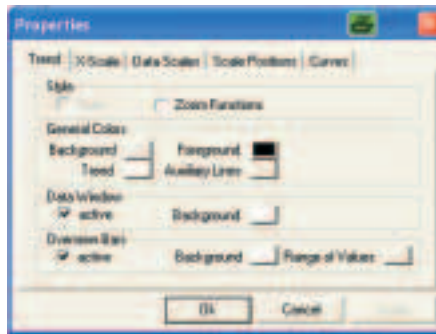
Table 2	
Value	Signification
1	Actuator runs in direction OPEN
2	Actuator runs in direction CLOSED
3	Actuator is in end position OPEN
4	Actuator is in end position CLOSED
5	Actuator is at desired setpoint E1





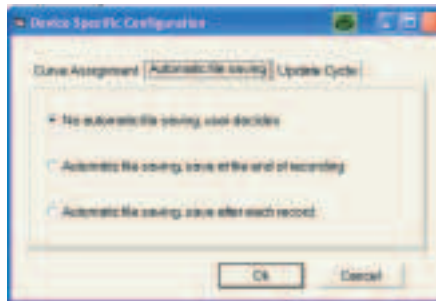
Configuring the trend function

Scaling of axes, graph representations, ... etc..



Device specific configuration:

Setting the graph assignment, the automatic file backup, as well as the refresh time of the trend function.



Note regarding the refresh time:

The cycle time set by this parameter defines the reading cycle time for the trend data which is always observed. The actual cycle time might be longer, depending on the Profibus DP baud rate, the number of connected Profibus DP devices, the configuration of the Profibus DP communication, as well as the number of simultaneously available Profibus DP-V1 connections to other field devices.



Save recorded trend data as *.bmp file



Save recorded trend data as *.csv file



Load recorded trend data in *.csv format



Print trend data



This button can be used to shift the respective data series using the mouse from the Y axis to the X axis. Besides the time-dependent presentation, this feature allows a presentation of the X-Y graph of the trend data.



Adapt current view of recorded trend data

 **Start recording the trend function**

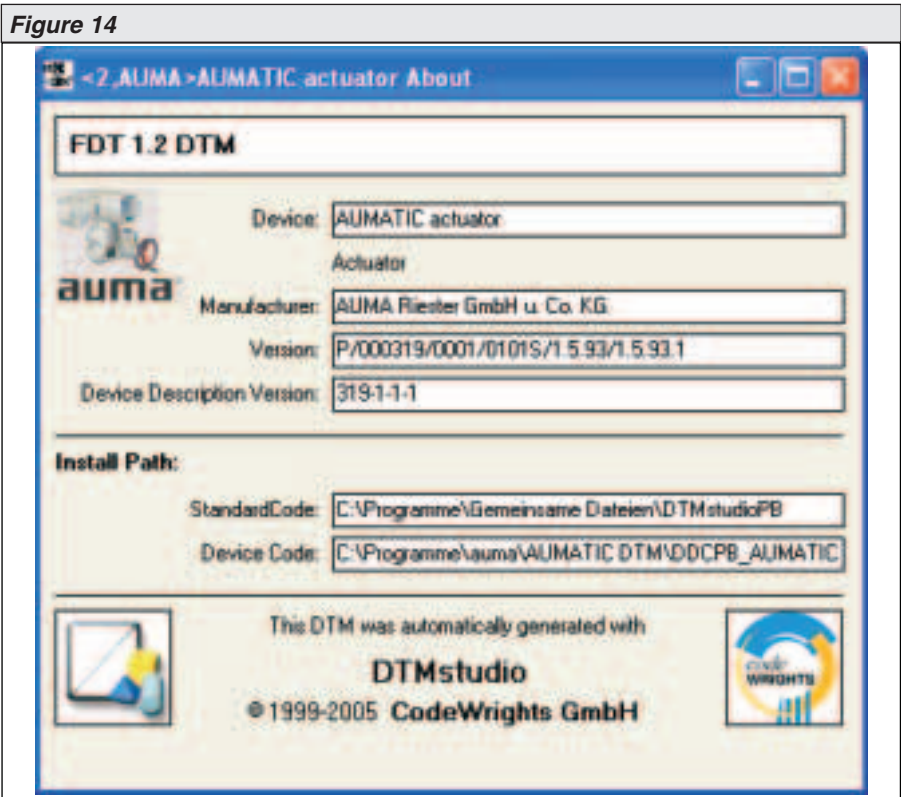
 **Stop recording the trend function**



Activate the screen refresh feature
This button is used to activate or deactivate the refresh feature for the trend graphs on the screen. The trend data can be recorded in the background if the refresh feature is deactivated.

5.6.2 About

This function opens a window indicating important information on the AUMATIC DTM.



6. Profibus DP-V0 communication channel

The AUMATIC DTM supports various configurations for the cyclic data exchange via Profibus DP (e.g. in combination with ABB control systems). Depending on the configuration selected, the number of communication channels varies. You may select the following options:

4 byte input, 4 byte output, consistent
8 byte input, 4 byte output, consistent
12 byte input, 4 byte output, consistent
16 byte input, 8 byte output, consistent
20 byte input, 8 byte output, consistent
6 byte input, 2 byte output, consistent

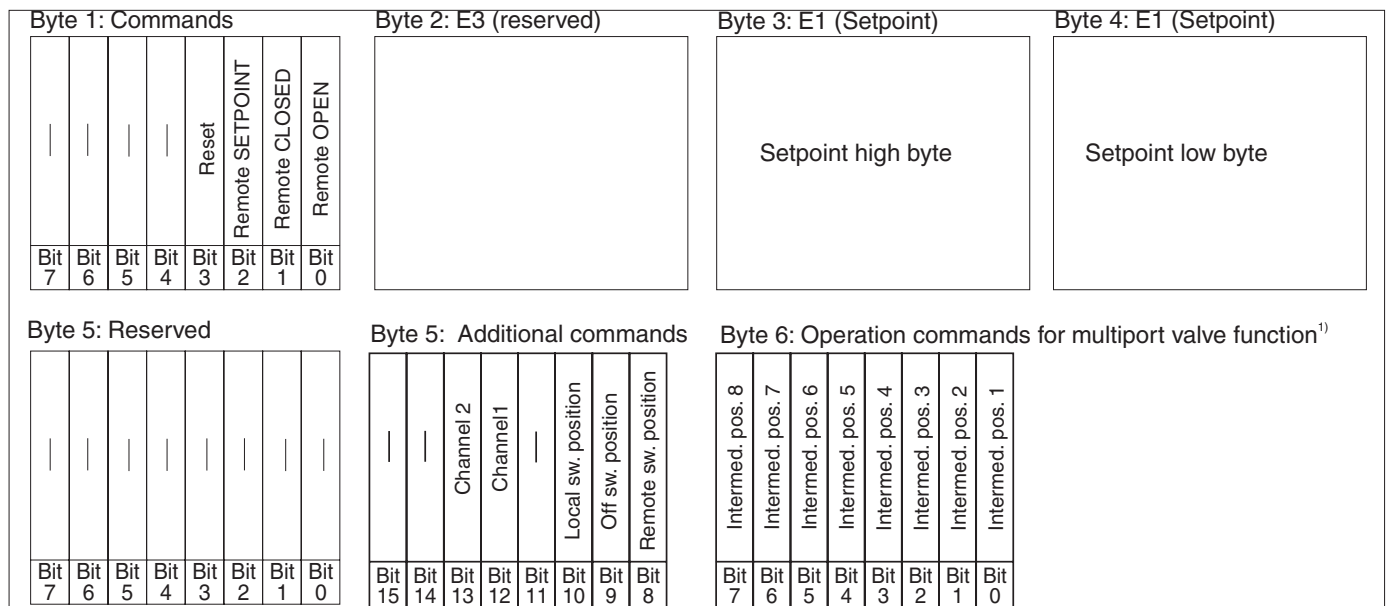
Use the Channel Module Setup > Channel Setup parameter in the Offline parameterisation to set the communication channel.

All configurations refer to process representation input arrangement 1, see the following figures:

Figure 15



<div>Byte1: Logical signals</div> <table><tr><td>Fault ind.</td><td>Warning ind.</td><td>Running CLOSE</td><td>Running OPEN</td><td>Not ready ind.</td><td>Setpoint reached</td><td>Closed position</td><td>Open position</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Fault ind.	Warning ind.	Running CLOSE	Running OPEN	Not ready ind.	Setpoint reached	Closed position	Open position	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 2: Actuator signals</div> <table><tr><td>TSC (DSR)</td><td>TSO (DOEL)</td><td>LSC (WSR)</td><td>LSO (WOEL)</td><td>Local sw. position</td><td>Remote sw. position</td><td>Loss of phase</td><td>Thermal fault</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	TSC (DSR)	TSO (DOEL)	LSC (WSR)	LSO (WOEL)	Local sw. position	Remote sw. position	Loss of phase	Thermal fault	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 3: E2 (Actual position)</div> <table><tr><td colspan="8">Actual position high byte (positioner)</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Actual position high byte (positioner)								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 4: E2 (Actual position)</div> <table><tr><td colspan="8">Actual position low byte (positioner)</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Actual position low byte (positioner)								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Fault ind.	Warning ind.	Running CLOSE	Running OPEN	Not ready ind.	Setpoint reached	Closed position	Open position																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
TSC (DSR)	TSO (DOEL)	LSC (WSR)	LSO (WOEL)	Local sw. position	Remote sw. position	Loss of phase	Thermal fault																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
Actual position high byte (positioner)																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
Actual position low byte (positioner)																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
<div>Byte 5: Configurable byte 1</div> <table><tr><td>(Fault 3)</td><td>(Not ready ind.)</td><td>(Loss of phase)</td><td>(Torque fault (OPEN))</td><td>(Torque fault (CLOSE))</td><td>(Remote sw. position)</td><td>(Open position)</td><td>(Closed position)</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	(Fault 3)	(Not ready ind.)	(Loss of phase)	(Torque fault (OPEN))	(Torque fault (CLOSE))	(Remote sw. position)	(Open position)	(Closed position)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 6: Physical operation (configurable byte 2)</div> <table><tr><td>(Runs fom Local)</td><td>(Runs from REMOTE)</td><td>(Runs via handwheel)</td><td>(Actuator moving)</td><td>-</td><td>(Start stepping mode)</td><td>Reserved</td><td>(Operation pause)</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	(Runs fom Local)	(Runs from REMOTE)	(Runs via handwheel)	(Actuator moving)	-	(Start stepping mode)	Reserved	(Operation pause)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 7: Options part 1 (configurable byte 3)</div> <table><tr><td>(DP1 dig. input 4)</td><td>(DP1 dig. input 3)</td><td>(DP1 dig. input 2)</td><td>(DP1 dig. input 1)</td><td>(Intermed. pos. 4)</td><td>(Intermed. pos. 3)</td><td>(Intermed. pos. 2)</td><td>(Intermed. pos. 1)</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	(DP1 dig. input 4)	(DP1 dig. input 3)	(DP1 dig. input 2)	(DP1 dig. input 1)	(Intermed. pos. 4)	(Intermed. pos. 3)	(Intermed. pos. 2)	(Intermed. pos. 1)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 8: Options part 2 (configurable byte 4)</div> <table><tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	:	:	:	:	:	:	:	:	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
(Fault 3)	(Not ready ind.)	(Loss of phase)	(Torque fault (OPEN))	(Torque fault (CLOSE))	(Remote sw. position)	(Open position)	(Closed position)																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
(Runs fom Local)	(Runs from REMOTE)	(Runs via handwheel)	(Actuator moving)	-	(Start stepping mode)	Reserved	(Operation pause)																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
(DP1 dig. input 4)	(DP1 dig. input 3)	(DP1 dig. input 2)	(DP1 dig. input 1)	(Intermed. pos. 4)	(Intermed. pos. 3)	(Intermed. pos. 2)	(Intermed. pos. 1)																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
:	:	:	:	:	:	:	:																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
<div>Byte 9: DP1 An1</div> <table><tr><td colspan="8">DP1 Analogue input high byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	DP1 Analogue input high byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 10: DP1 An1</div> <table><tr><td colspan="8">DP1 Analogue input low byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	DP1 Analogue input low byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 11: E4 (Torque)</div> <table><tr><td colspan="8">Torque high byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Torque high byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte12: E4 (Torque)</div> <table><tr><td colspan="8">Torque low byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Torque low byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DP1 Analogue input high byte																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
DP1 Analogue input low byte																																																																			
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Torque high byte																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
Torque low byte																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
<div>Byte13: Not ready ind.</div> <table><tr><td>External operation</td><td>Clear state</td><td>Emergency mode</td><td>Emcy stop active</td><td>-</td><td>Actuator locked</td><td>Selector not remote</td><td>Wrong command</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	External operation	Clear state	Emergency mode	Emcy stop active	-	Actuator locked	Selector not remote	Wrong command	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte14: Fault signals</div> <table><tr><td>-</td><td>Internal fault</td><td>Torque fault (CLOSED)</td><td>Torque fault (OPEN)</td><td>Loss of phase</td><td>Thermal fault</td><td>-</td><td>Config. fault</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	-	Internal fault	Torque fault (CLOSED)	Torque fault (OPEN)	Loss of phase	Thermal fault	-	Config. fault	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte15: Warning signals part 1</div> <table><tr><td>Operation time</td><td>Starts/run</td><td>Internal feedback</td><td>Internal warning</td><td>I/O1 Analog In2 loss</td><td>I/O1 Analog In1 loss</td><td>-</td><td>-</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Operation time	Starts/run	Internal feedback	Internal warning	I/O1 Analog In2 loss	I/O1 Analog In1 loss	-	-	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte16: Warning signals part 2</div> <table><tr><td>Analog In1 DP1 loss</td><td>Analog In2 DP2 loss</td><td>-</td><td>-</td><td>Setpoint E1 loss</td><td>Feedback E2 loss</td><td>-</td><td>Torque E4 loss</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Analog In1 DP1 loss	Analog In2 DP2 loss	-	-	Setpoint E1 loss	Feedback E2 loss	-	Torque E4 loss	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
External operation	Clear state	Emergency mode	Emcy stop active	-	Actuator locked	Selector not remote	Wrong command																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
-	Internal fault	Torque fault (CLOSED)	Torque fault (OPEN)	Loss of phase	Thermal fault	-	Config. fault																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
Operation time	Starts/run	Internal feedback	Internal warning	I/O1 Analog In2 loss	I/O1 Analog In1 loss	-	-																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
Analog In1 DP1 loss	Analog In2 DP2 loss	-	-	Setpoint E1 loss	Feedback E2 loss	-	Torque E4 loss																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
<div>Byte 17: DP1 An2</div> <table><tr><td colspan="8">DP1 Analogue input 2 high byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	DP1 Analogue input 2 high byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 18: DP1 An2</div> <table><tr><td colspan="8">DP1 Analogue input 2 low byte</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	DP1 Analogue input 2 low byte								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 19: Reserved</div> <table><tr><td colspan="8">Reserved for future extensions</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Reserved for future extensions								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 20: Reserved</div> <table><tr><td colspan="8">Reserved for future extensions</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Reserved for future extensions								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DP1 Analogue input 2 high byte																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
DP1 Analogue input 2 low byte																																																																			
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Reserved for future extensions																																																																			
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
<div>Byte 21: Reserved</div> <table><tr><td colspan="8">Reserved for future extensions</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Reserved for future extensions								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 22: Reserved</div> <table><tr><td colspan="8">Reserved for future extensions</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Reserved for future extensions								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 23: Additional data</div> <table><tr><td>In intermed. position</td><td>-</td><td>-</td><td>-</td><td>Intermed. pos. 8</td><td>Intermed. pos. 7</td><td>Intermed. pos. 6</td><td>Intermed. pos. 5</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	In intermed. position	-	-	-	Intermed. pos. 8	Intermed. pos. 7	Intermed. pos. 6	Intermed. pos. 5	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	<div>Byte 24: Reserved</div> <table><tr><td colspan="8">Reserved for future extensions</td></tr><tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr></table>	Reserved for future extensions								Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
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In intermed. position	-	-	-	Intermed. pos. 8	Intermed. pos. 7	Intermed. pos. 6	Intermed. pos. 5																																																												
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												
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Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																												





























¹⁾ The multiport valve function is available as an option (refer to short instructions AUMATIC with multiport valve function)

7. Appendix A: Literature

- FDT Interface Specification; specification for Profibus Device Description and Device Integration, Release 5/2001, Version: 1.2 Order No.2.162, www.profibus.com
- Field Device Tool FDT; Die universelle Feldgeäteintegration [the universal field device integration], Oldenburg Verlag [publisher] ISBN 3-486-27044-3
- FDT Joint Interest Group www.fdt-group.org
- Operation instructions Actuator controls AUMATIC AC 01.1 Profibus DP, www.auma.com

8. Overview on AUMATIC DTM icons

Table 3	
	Static value, display
	Static value: Indicates that this value is a default value.
	Invalid dynamic value: This value has not been read from the device.
	Dynamic value display: Blue and red arrows toggle each time the value is read from the device.
	Modification indication: Indicates that the value has been modified and not yet saved to the device. This icon disappears after saving the value to the device.
	This value is currently being edited and has not yet been confirmed via the Return key.
	Range violation. The entered value conflicts with this requirement.
	Error indicator: Indicates an error that occurred when reading this value from the device. Disappears when the value is read without error.
	Device status error: The device is in error state.
	Device status OK: The device is in OK state.
	Undefined parameter: The value has not yet been read from the device.
	System is working: Indicates that no feedback has been received from the system.
	Calculation indicator: Green turning wheel indicates that the DTM is performing calculations.
	Communication indicator: Yellow turning wheel indicates active communication with the device.
	Indicates a communication error.
	Connection indicator: The DTM is connected to the device.
	Offline indicator: The DTM is not connected to the device.
	Set default values: Sets all persistent parameters to their default value.
	Set all values to invalid. When opening a menu again, all parameters are read from the device.
	Status bar: Provides information on the current state of the DTM.
	Print: Prints the data of the current view.
	Tree view on/off. Activates and deactivates the tree view.
	Tree view on/off. Activates and deactivates the header view.
	Picture view on/off. Enables and disables the presentation of the photo.
	Opens the online help file of the device.
	Opens an online help file providing information on the AUMATIC parameters.

Notes

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2007-02-21



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