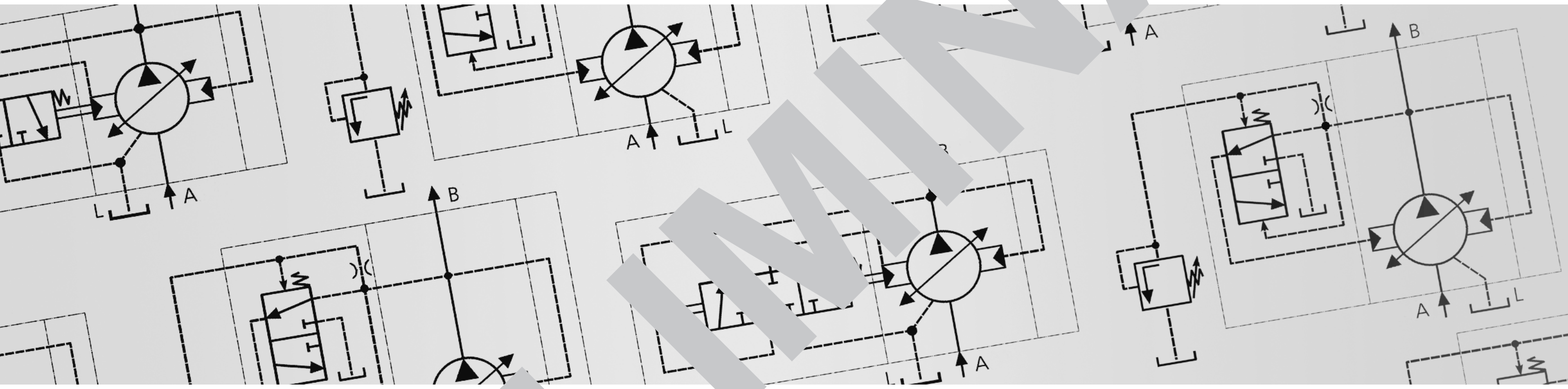
Manual

Configuration Software for Hydraulic Servo Valves and Radial Piston Pumps with CAN Bus Interface



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For your notes

1 Installing the program

1.1 Requirements

Requirements

The program can be installed on a PC that meets the following minimum requirements:

- IBM compatible computer, 133 MHz
- Windows 95/98/ME, Windows NT/2000/XP
- 64MB RAM
- 5 MB of free hard drive space
- Monitor 640X480 pixel resolution
- Keyboard, mouse

Recommended requirements:

- IBM compatible, 300 MHz
- Windows NT/2000/XP

The following additional equipment is required to operate the program in the online mode:

- A free PCI or PCMCIA slot or a USB connector[1]
- A CAN interface card from Ixxat (PCI or PCMCIA or USB) or from National Instruments (PCI or PCMCIA)
- A 24V AC / 2A power pack
- Device connection cable with counter plug for the 6+PE-pole or 11+PE-pole external plug
- CAN cable with counter plug for the 5-pole CAN external plug and 9-pole D-Sub plug (female).

1.2 Installing the CAN Interface Card

CAN Interface card

A CAN interface card and the associated driver are not included with delivery of the program. A CAN interface card is required in case the program should be used in online mode.

! The program supports CAN interface cards from the vendors Ixxat and National Instruments. When installing the CAN interface card, please observe the notes in the operating manual that is included with the CAN interface card.

In case of problems during installation of the CAN interface card, the associated driver software, or the configuration of the computer in general, please contact the reseller of the CAN interface card or computer.
The CAN interface card in the PC must work flawlessly in order to use the program in online mode. To make sure that this card is working properly, the

[1] The usage of a CAN interface-card with USB interface requires Windows 2000/XP or higher.

test and diagnosis software that is included with the CAN interface card should be used to check for proper functionality beforehand of the operation of the program in online mode.

1.3 Installing the program

Start the setup program and follow the instructions. It is strongly recommended to remove older program versions before performing a new installation. To remove a program, go to the Windows "Control Panel", click on "Software" and then start the respective "Uninstall" program.

An installed CAN interface card from National Instrumentsmust be initially configured before the program can be used in online mode. The port that is being used (port 1 or port 2) must be set to the interface name "CAN0" or "CAN1" in the CAN driver settings. Observe all of the notes contained in the operating manual included with the CAN interface card.

2 Safety instructions

The following safety guidelines must be observed when operating one or several devices with the Moog Valve Configurator:

2.1 Initial start-up

⚠ Operating in the non-pressurized condition is strongly recommended while becoming familiar with the program and the device functions and also during the initial start-up procedure!

⚠ Activation of the device through the program is permissible only when doing so cannot result in a dangerous condition in the machine and its surroundings.

2.2 Operation through the CAN bus

Important notes

It is not permissible to operate the program on a CAN bus on which there is already data traffic.

The device and the program must communicate via a direct (point-to-point) connection.

To establish a direct connection between the CAN interface card and a device, remove the bus cable from the device and connect the device directly to the CAN interface card on the PC.

If a safe operation of the device by the program cannot be ensured , the device must first be put into a non-pressurized condition.

Before operation of the program in a CAN network, the following points must be noticed:

❗ The exchange of data with the device can be disturbed if another CAN bus participant (e.g. a controller) attempts to access the device at the same time.

❗ Node-guarding may be activated only when no other CAN bus node is monitoring the device via this service.

❗ CAN message frames can also be received from other CAN bus nodes. This may trigger unforeseeable events!

❗ The program may not, for reasons of safety, be used within a machine facility for visualization purposes or as an operating terminal.

3 Using the program

Using the program

The program can be used to control, to configure and to parameterize hydraulic servo valves and radial piston pumps that have integrated CANopen interfaces.

! The program is intended exclusively for commissioning Moog hydraulic servo valves and radial piston pumps with integrated CANopen interfaces.

The program can be used to transfer configuration and parameter data from the computer to the device or to transfer the device's current settings to the computer where they can be displayed or saved.

The computer can be connected via the installed CAN interface card to a CAN bus with up to 127 nodes. However, the program can communicate with only one device in the bus system at a time. The device to which a connection shall be established is selected by means of the node ID, which explicitly identifies a CANopen device on the bus.

Using the program, the following tasks can be performed:

- Become familiar with the device functions
- Bring a servo valve or a radial piston pump into operation
- Perform a diagnosis
- Operate and control a servo valve or radial piston pump
- Save the device's configuration and parameter data on a PC
- Transfer configuration data from a PC to the device
- Configure a device's CANopen node ID
- Configure a device's CAN bit rate

4 Communication between program and device

4.1 CAN bus and CANopen

CAN bus and CANopen interface

The device and the program will communicate over the CAN bus using standardized protocols according to the CANopen communication standard.
The CAN bus is a differential two-wire bus developed for fast and fault-free networking. Its versatile capabilities and high reliability make it equally suitable for applications within machine facilities. For these reasons, the CAN bus has become a widely used standard.

Communications profile

CANopen is a standardized communications profile that makes it easy to connect CANopen devices from a variety of manufacturers to a single CAN bus.

The communications profile complies with the standard DS 301, version 4.0 and can be obtained from the CiA.

The node ID and the bit rate are set over the CAN bus by means of the Layer Setting Services (LSS) in accordance with the CiA standard DSP 305, version 1.0.

4.2 Device profile

Device profiles are defined in order to facilitate the connection of various classes of devices, such as hydraulic and electric drives, PLCs, and angle transmitters.

CiA standard DSP 408 device profile

The functionality of a Moog servo valve or a radial piston pump equipped with a CANopen interface corresponds with the device profile "Fluid Power Technology" in compliance with the CiA standard DSP 408.

4.3 Data exchange

A machine controller or other bus nodes can exchange data with the device in real time over the CAN bus. This data includes especially set points and actual values as well as control and condition messages. In addition to this real-time transmission, the PLC and the device can also exchange configuration data, parameters, and diagnosis data at any time.

The PLC or other bus nodes transfer set points, device commands, and configuration data/parameters over the CAN bus to the device.

The PLC or other bus nodes can read from the device actual values, condition information, diagnosis data, and the current configuration/parameters.

5 Program functions

5.1 Modes

Offline and online modes

The program can be operated in two different modes: offline and online. The current mode can be determined by the appearance of the program's window title. In addition, the ticker text will be activated in the lower right in the status bar when in the online mode. The default mode at program start is the offline mode.
The program can be brought into the online mode only when one of the program-supported CAN interface cards is installed on your PC.

5.1.1 Offline Mode

In the offline mode, there is no exchange of data with the device.

When parameters are changed, only the values of a locally existing memory map of a virtual device will be modified. Then these values can be saved in a file, for example.

This mode provides access to information about the program itself and about the existing device parameters, thereby enabling the user - within a limited scope - to learn something about the device's functionality.

CAN interface card not installed

When the CAN interface card is not installed, the program can be operated only in the offline mode.

5.1.2 Online Mode

CAN interface card initialized

The program can be operated in the online mode after the CAN interface card has been installed and successfully initialized . This makes the PC an active bus node.
Operating the program in the online mode requires an operationally-ready servo valve/radial piston pump that is connected to the PC's CAN interface card by means of properly-installed cabling. Another requirement of data exchange between the program and a device is proper configuration of the bit rate and the node ID (see chapter 6.5).
In online mode, the program will receive all messages that are present on the CAN bus. The program then filters out from all of the sent messages only those messages necessary for the communication between the program and the device addressed over the node ID.
As soon as the program establishes a connection with a device, the program itself will also send messages via the CAN bus.

! If it is not possible to communicate with the device even when the CAN interface card is installed, there may be problems with the cabling or the wrong bit rate may be set. In this case, neither sending nor receiving of messages will be possible (communication error).
Another possible problem is that a device is set to a node ID that is different from the program setting. In this case, an attempt to establish communication will be acknowledged by a time-out (no bus node replies).

5.2 User levels

User levels

The device has a number of functions and parameters that can be used only by authorized personnel. These parameters are protected by a password. The program employs user levels to display only those parameters that are accessible with proper authorization.

ℹ The following instructions describe the functions that are available in the standard user level. Higher user levels are not included in these instructions.

5.2.1 Standard user levels

Standard user levels

The standard user level is the default level when the program is started. Included in this level are all functions for operating the device within the machine facility.

5.2.2 Other user levels

Other user levels

Additional functions are available in other user levels. They are used for calibration, diagnosis, control optimization of the servo valve / radial piston pump, and for test procedures. These user levels are reserved exclusively for properly authorized persons. A password is required to activate these levels.

5.3 Main and additional windows

The main window provides the user interfaces for configuring the bus and devices.

Depending on the view that is open and the current user level, other windows, tool- and menu bars will be available for certain tasks in addition to the main window. Additional windows can be opened by selecting the respective menu entries or clicking on the icons in the toolbar. Refer to the respective chapters for descriptions of these windows.

5.4 Configuration views

Views

The program's main window has two fundamentally different views, depending on which task the user wants to perform.

The default view after program start is the bus configuration view.

After a connection has been established to a device or after loading a standard template in the offline mode, the device configuration view will open.

The device configuration view can be left at any time so that the bus configuration view will be loaded again.

5.4.1 Bus configuration view

Bus configuration view

This view permits setting of the communication parameters that are necessary for the communication between the program and the device.

The program functions are accessible through the menu entries and the toolbar within the program window.

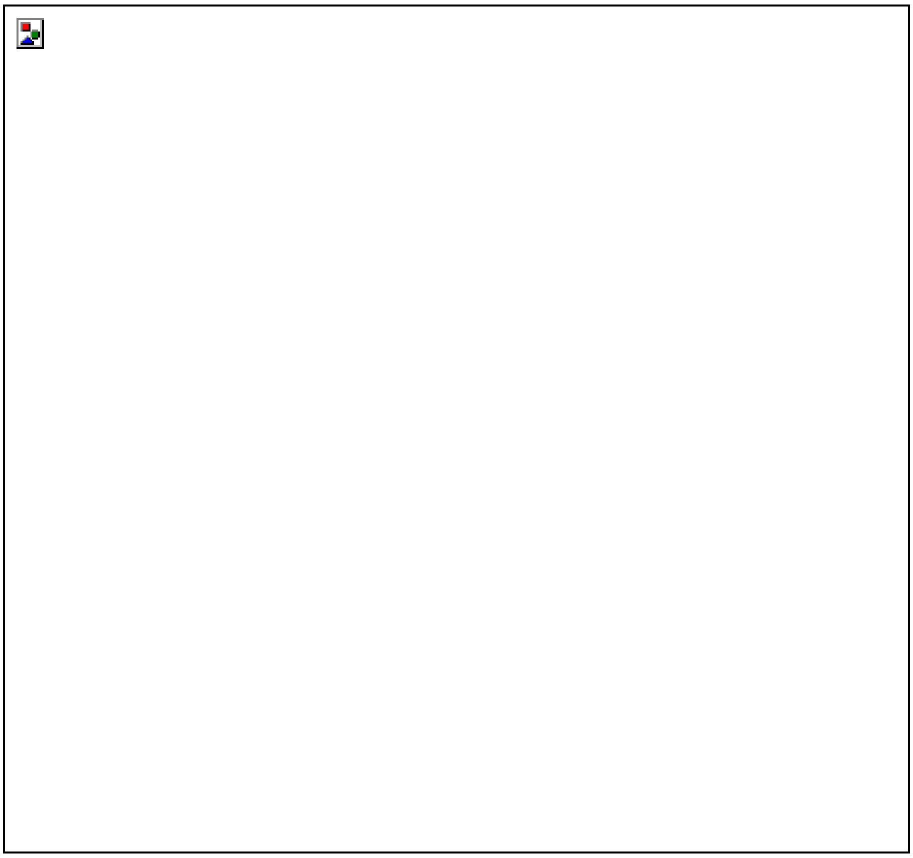


Fig. 1: Bus configuration view

5.4.1.1 Messages

At the lower margin of the program window are boxes that display messages with a variety of meanings:

Event display

The event display shows bus activities that are related to the exchange of data between the device and the program.

Warnings display

The warnings display shows bus activities that require the user's attention. These activities may include, among others, cancellation of data transmission (communication abort or communication time out), as well as global bus messages (like the boot-up message).

Error display

The error display shows error messages sent by the device as well as data transmission errors (protocol errors).

5.4.1.2 Bus configuration menu

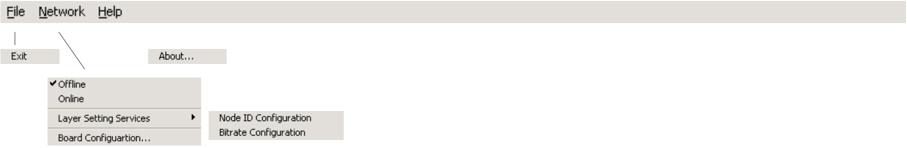


Fig. 2: Menu in the bus configuration view

In the bus configuration view, the following commands are available through the menu:

Menu entry	Description
File→Exit	Exits the program
Network→Offline	Switches to the offline mode (deactivation of the CAN interface card)
Network→Online	Switches to the online mode (activation of the CAN interface card)
Network→Layer Setting Services→Node ID Configuration	Starts the assistant for modifying the device's CAN node ID
Network→Layer Setting Services→Bitrate Configuration	Starts the assistant for modifying the device's CAN bit rate
Help→About	Opens the program information window

5.4.1.3 Bus configuration toolbar

Toolbar

The toolbar provides direct access to functions contained in the menus.

To see a brief description of a function, place the mouse pointer over the icons in the toolbar.

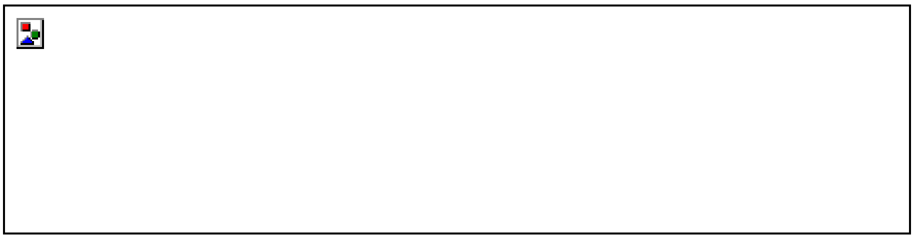


Fig. 3: Toolbar in the bus configuration view

Icon	Description
STOP	Switches to the offline mode (deactivation of the CAN interface card)
GO	Switches to the online mode (activation of the CAN interface card)
?	Opens the program information window

5.4.2 Device configuration view

Device configuration view

This view permits setting or viewing of the device parameters.

The program functions are accessible through the menu entries and the toolbar shown in the program window. The device's parameters are represented by data fields and selection and display elements on the tabs.

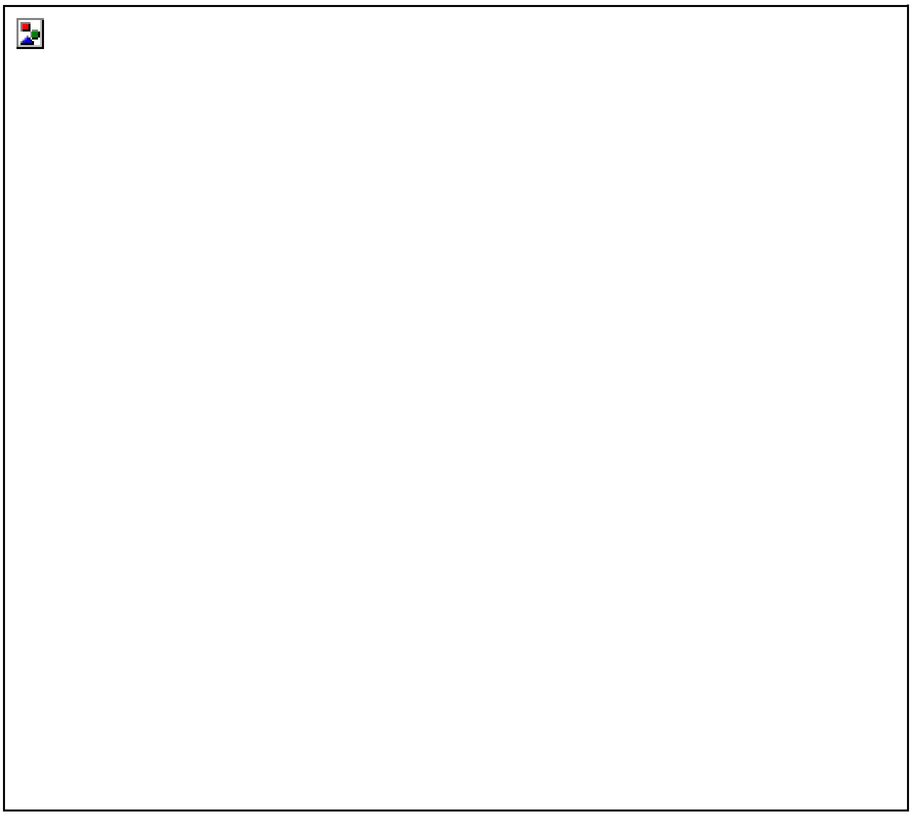


Fig. 4: Device configuration view

Messages with a variety of meanings are displayed in the message displays at the lower margin of the program window, see chapter 5.4.1.1.

5.4.2.1 Device configuration menu

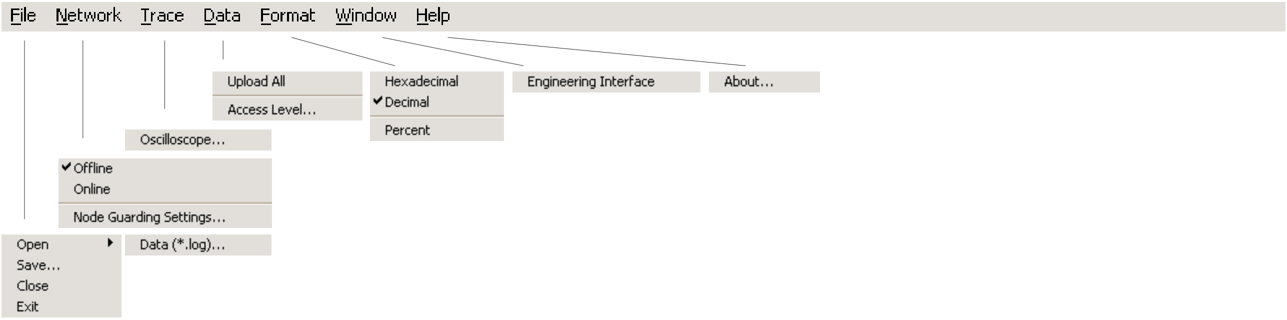


Fig. 5: Menu of the device configuration view

The following commands are available in the menu of the device configuration view:

Menu entry	Description
File→Open→Data (*. log)	Opens a dialog for loading a file, which contains the device's parameter data.

File→Save ...	Opens a dialog for saving the device's parameter data
File→Close	Closes the device configuration view and returns to the bus configuration view
File→Exit	Exits the program
Network→Offline	Switches to the offline mode (deactivation of the CAN interface card)
Network→Online	Switches to the online mode (activation of the CAN interface card)
Network→Layer Setting Services→Node ID Configuration	Starts the assistant for modifying the device's CAN node ID
Network→Layer Setting Services→Bitrate Configuration	Starts the assistant for modifying the device's CAN bit rate
Trace→Oscilloscope ...	Opens the oscilloscope window
Data→Upload All	Loads all of the device's data into the program via the CAN bus
Data→Access Level ...	Opens a dialog for entering a password. This must be done in order to switch to a higher user level
Format→Hexadecimal	Converts the data fields to the hexadecimal format. Data fields without number representation or those that are in the percent format are excepted from the conversion
Format→Decimal	Converts the data fields to the percent format. Data fields without number representation or those that are in the percent format are excepted from the conversion
Format→Percent	Converts the data fields to the percent format. Only those data fields that permit depiction of percentages will be affected
Window→Engineering Interface	Opens the engineering interface window
Window→Data Logger	Opens the data logger window
Help→About	Opens the program information window

5.4.2.2 Toolbar in the device configuration view

Toolbar

The program's most important functions can be reached by clicking on the icons in the toolbar. To see a brief description of a function, place the mouse pointer over the icons in the toolbar.

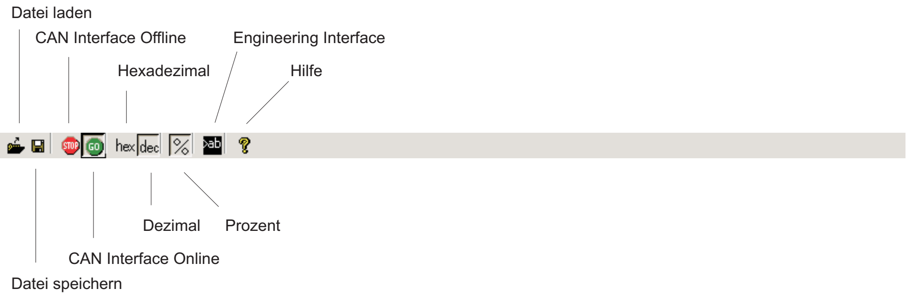


Fig. 6: Toolbar of the device configuration view

Icon	Description
📂	Opens a dialog for loading a file, which contains the device's parameter data.
💾	Opens a dialog for saving the device's parameter data
STOP	Switches to the offline mode (deactivation of the CAN interface card)
GO	Switches to the online mode (activation of the CAN interface card)
hex	Converts the data fields to the hexadecimal format. Data fields without number representation or those that are in the percent format are excepted from the conversion
dec	Converts the data fields to the percent format. Data fields without number representation or those that are in the percent format are excepted from the conversion
%	Converts the data fields to the percent format. Only those data fields that permit depiction of percentages will be affected
>ab	Opens the engineering interface window
	Opens the data logger window
?	Opens the program information window

5.5 Operating elements

5.5.1 Tabs

Tabs

In the device configuration view, data fields are arranged on individual tabs. Each tab contains one or several device functions. The tabs are arranged hierarchically according to function. A list of functional groups can be found in Table 1 on page 26.

5.5.2 Data fields

Data fields

The data fields are accessible within the windows or tabs. Individual parameters with numbers or text as contents are shown in data fields or can be edited there. A brief description next to or above the data field or a group of data fields provides information about the parameters shown there. For the exact name of a parameter, move your mouse over the data field and a text balloon will appear.

Access rights

Data fields can be read-only or readable and writable.

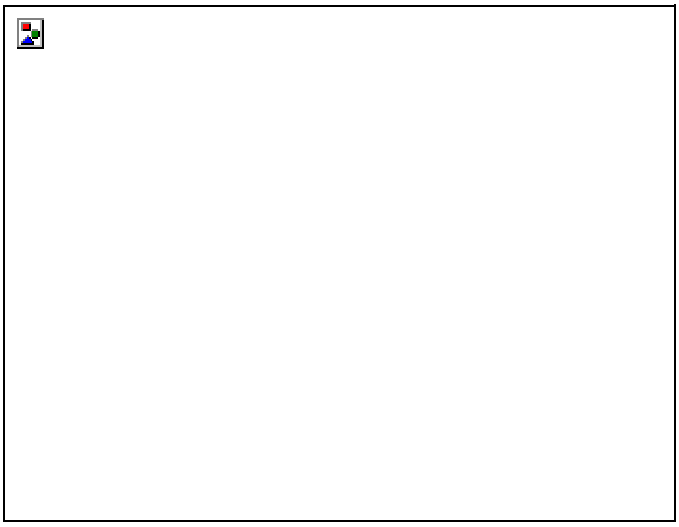


Fig. 7: Read-only and readable/writable data fields

Read-only data fields

Read-only data fields have a colored text or icon background. Users cannot modify these fields by making entries. The fields are updated when the respective data is loaded from a device.

Readable and writable data fields

Readable and writable data fields have a white text or icon background. Users can make entries in these fields, thereby changing the data represented by the field. The fields are updated when the associated data is loaded from the device or a file.

Editing data fields

To edit a data field, just click on it to place the cursor in the field or keep hitting the Tab key on the keyboard until the desired field is selected and then enter the new value through the keyboard. When you hit the Return key, the value will be overtaken; if in the online mode, the data will additionally be transferred to the device. If you do not hit the Return key after making an entry but instead just move to another field (by clicking on the field or by using the Tab key), the value you entered will still be overtaken and transferred to the device.

You can also use the "up arrow" and "down arrow" keys to raise or lower the value one step at a time.

⚠ When in online mode, the updated values in a parameter control will be transferred immediately to the device. Even incorrectly entered values are applied immediately. Therefore, failure to observe the safety regulations could result in dangers to persons and/or damages to the machines.

Text fields

Text fields can display the ASCII characters 'a' - 'z', 'A' - 'Z', '0' - '9' and all other special printable characters. In the case of writable text parameters, these characters can be entered into the text field.

Numerical data fields

Numerical data fields can be shown in decimal, hexadecimal, or percentage format. The percentage format is available only for those data fields that have a reference to a 100% condition (such as a spool position).

Example: A decimal value of 16384 for the spool position set point corresponds to a spool position set point of 100%.

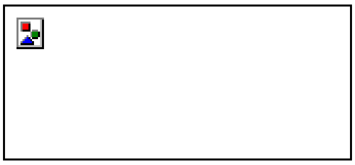


Fig. 8: Numerical data fields and their number formats

You can centrally set a format for all data fields by choosing the Format menu entry or by clicking on the toolbar. You can switch between the formats at any time. When you convert to a format, all data fields will be converted to the new format.

The label in front of the data field tells you which number format is represented:

d stands for decimal format

x stand for hexadecimal format

No icon in front of a number field means percent format.

Selection lists and slider

Parameters with selection options can be shown by means of a selection list or a slider.

The selection list pops up when you click on the arrow or hit the space key. To select and transfer the value, click on the desired value in the pop up list, use the up/down arrow keys to highlight the value, or enter the name that is displayed and then hit the Return key.

The list entries or the slide bar positions can also be selected directly with the up/down arrow keys. A selection list need not to be popped up to accomplish this.

To adjust the slide bar, use the mouse to drag the button to the desired value or simply click on desired position directly on the slide bar path.

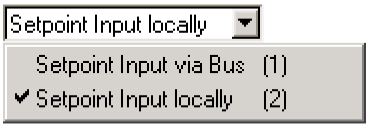


Fig. 9: list control

Button controls

The stored value will be written to the parameter when you click on a button control or press the Return or space key on a selected button control.

state machine controls

Buttons for controlling and visualizing state machines are simultaneously linked with the readable/writable control parameter and the read-only status parameter. In this case, the current status is indicated by color-coding of the button while the activated control command is indicated by bold print.

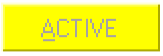


Fig. 10: Color-coding of a status

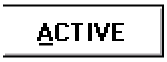


Fig. 11: Bold print of a control command

Function Graphs

Function Graphs are used to visualize a function, which could depend on several parameters. The function's input values are shown on the X-axis; the output values are shown on the Y-axis.

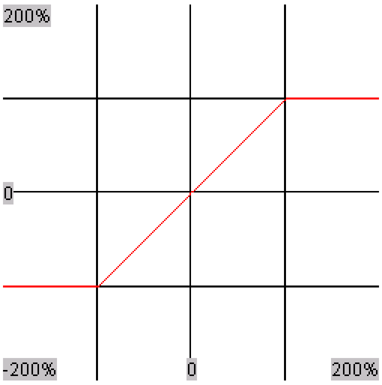


Fig. 12: Function Graph

5.5.3 Display of data consistency

In the online mode, data consistency is depicted by the color of the parameter of a data field.

up-to-date values

If the value of a device parameter has been updated since the connection was established (read or written at least once), then the text or the number will be shown in black on a white or gray background.

Some device data may have changed since the most recent data calibration without the program detecting this. This data includes especially the device control values and status information. Data that the device itself has modified is not automatically transferred to the program!

Not updated values

If the value of a device parameter has not been updated since the connection was established, the text/number will be shown in gray. This may happen if, for example, the data transfer between device and the program was canceled.
When parameters are shown in gray, this indicates that the parameter values may differ between the device and the program and that a data transfer is required.

Data transfer error or cancellation

If an error occurs during data transfer or if the transfer of data from the device is canceled due to invalid data or other reasons, then the text/number of the affected parameter will be shown in red.

5.5.4 Pop-up menu

Pop-up menu

Right-clicking on one of the data fields will open a pop-up menu to display information about the data linked to the field as well as possible reading and writing actions.

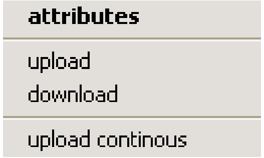
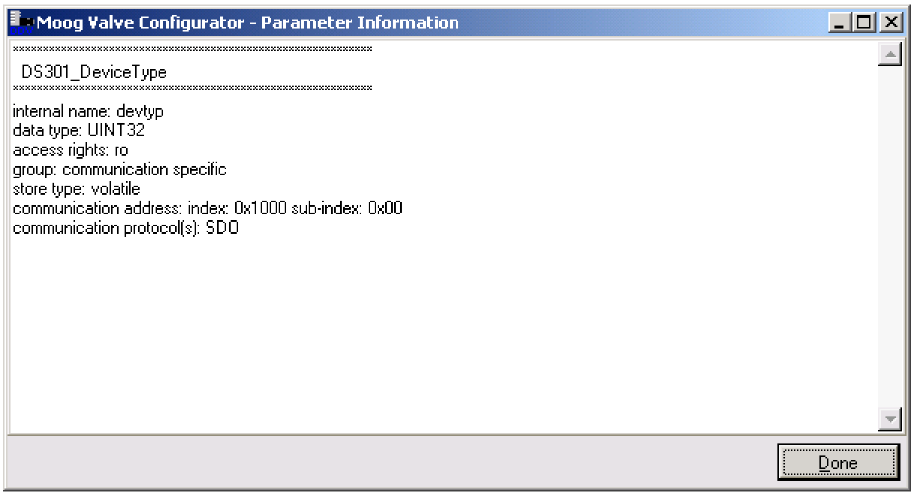


Fig. 13: Pop-up menu

Attributes

Select the /attributes/ menu entry to open a window that provides detailed information about the linked parameter(s) (see Fig. 9).



```
************************************************************
 DS301_DeviceType
************************************************************
internal name: devtyp
data type: UINT32
access rights: ro
group: communication specific
store type: volatile
communication address: index: 0x1000 sub-index: 0x00
communication protocol(s): SDO
```

Fig. 14: Parameter attributes window

Upload

The menu entry /upload/ can be selected only in online mode and permits loading of data for the linked parameter(s) from the device into the program.

Download

The menu entry /download/ can be selected only in the online mode; in addition, the linked parameter(s) must be writable.

This function enables writing (from the program to the device) of the data linked to this data field. This option has the same effect as manually writing a value into a data field, except the set value must not be re-entered.

Upload continuous

The menu entry /upload continuous/ can be selected only in online mode and permits continuous loading of data for the linked parameter(s) from the device into the program.

6 Working with the program

6.1 Starting the program

Automatically initializing the CAN interface card

The first time the program starts, a dialog will appear by which the initialization of a CAN interface card installed in the PC can be started. If no CAN interface card is installed, cancel the initialization. If the program was started without initialization or if an initialization has failed, then it will be possible to use the program in offline mode only.

Once the program successfully initializes the CAN interface card, at next program start the card will be initialized automatically without requesting the program again.

The CAN interface card can be initialized at any time by choosing the appropriate menu entry.

Manually initializing the CAN interface card

Select the menu entry /Network→Board Configuration/ and select the desired CAN interface card.

ℹ If no CAN card is installed or if the installation of the driver for the CAN interface card has errors, an error message will appear.

6.2 Changing between Offline and Online mode

Changing mode

Changing from one mode to the other can be done at any time.
To do this, select the menu entry /Network→Offline/ or /Network→Online/ or click on Stop (to go offline) or Go (to go online) in the toolbar.

6.3 Bus configuration

Immediately after the program starts, the bus configuration view opens (refer to chapter 5.4.1). The parameters necessary for communication between the program and the device can be configured here.

6.3.1 Configuring the CAN interface card

CAN interface driver and version

If the initialization of the CAN interface card was successful, the driver that is used and its version will be shown in the pictogram with the figure of the CAN interface cards. If the CAN interface card was not initialized, this field will be empty or a message will be shown there.

CAN port

The CAN interface cards can have one or several separated ports. The interface number can therefore be changed if the CAN cable is attached to an interface other than the specified interface.

Bit rate

The bit rate that is applied for the CAN interface card can be set here. The selected bit rate must comply with the one configured in the device. Otherwise, communication will not be possible. The factory setting for Moog servo valves / radial piston pumps with a CANopen interface is 500Kbit/sec.

! Setting the bit rate in the bus configuration view will not initiate a change in the device (there is still no communication); only the connection parameters of the CAN interface card will change.

6.3.2 Selecting CAN bus nodes

Node ID

Within the pictogram with the figure of a Moog servo valve, a data field that permits setting of the CAN node ID is located. Enter here the node ID of the bus node with which you want to establish a connection. The factory setting for Moog servo valves / radial piston pumps with a CANopen interface is node ID 127.

! Setting the node ID in the bus configuration view will not initiate a change in the device (there is still no communication); this only sets the connection parameters.

6.3.3 Connecting to the device

Connecting to the device

The button /Connect/ is used to start a connection to the bus node addressed by the node ID. Note, that in offline mode, a standard template saved in the PC will be loaded without any CAN communication taking place.

If the bus node addressed over the node ID is not a supported device or if there is no node with the selected node ID attached to the bus, the connection will be canceled.

Because of the following reasons, a successful connection to the device will be avoided.

- The CAN interface card was not yet installed or initialized. See chapter 1 (Installing the program) and chapter 6.1 (Starting the program).
- The CAN bus cabling was not done correctly. See chapter 9.2 (CAN bus cabling).
- An incorrect bit rate or node ID was selected. See chapter 6.3 (Bus configuration) and chapter 6.5 (Setting the CAN node ID and bit rate).

6.4 Device configuration

6.4.1 Setting the device's parameters

Tab controls

Each tab provides access to a certain group of functions. By a click on a tab it will pop up to the foreground. The following table shows an overview of the available tabs and device functions:

Tab	Description
Device control	Device control (see chapter 8.1)
Spool position	Spool position (see chapter 8.1.4)
Pressure	Pressure (see chapter 8.1.2)
Communication	Communication (see chapter 8.2)
CANopen	CANopen
Network Management	Network management (see chapter 0)
Receive PDO's	Receive PDO (see chapter 8.2.2)
Transmit PDO's	Send PDO (see chapter 8.2.3)
Application	Application (see chapter 8.3)
Spool position	Spool position
Limit	Limit (see chapter 8.3.1.1)
Scale	Scaling (see chapter 8.3.1.2)
Ramp	Ramp (see chapter 8.3.1.3)
Direction	Directional dependent gain (see chapter 8.3.1.4)
Characteristic	Characteristic compensation (see chapter 8.3.1.5)
Deadband	Deadband compensation (see chapter 8.3.1.6)
Zero	Zero point correction (see chapter 8.3.1.7)
Pressure	Pressure
Limit	Limit (see chapter 8.3.1.1)
Scale	Scaling (see chapter 8.3.1.2)
Ramp	Ramp (see chapter 8.3.1.3)
Characteristic	Characteristic compensation (see chapter 8.3.1.5)
Controller	Controller (see chapter 8.4)
Spool position	Spool position (see chapter 8.4.2)
Monitoring	Control monitoring (see chapter 8.4.1)
Pressure	Pressure (see chapter 8.4.3)
Transducer	Pressure transducer (see chapter 8.4.3.1)
Parameters	Control parameter (see chapter 8.4.3.2)
Monitoring	Control monitoring (see chapter 8.4.1)
Diagnosis	Diagnose (see chapter 8.5)
Store / Restore	Save / load (see chapter 8.6)
Information	Information (see chapter 8.7)

Table 1: Device functions and tabs

6.4.2 Reading the value of a parameter from the device

After connection has been established with the device and the device configuration view has been loaded, the current device data will be loaded automatically over the CAN bus into the program.

Upload

Individual parameters can be updated manually over the pop-up menu entry /Upload/. To open the pop-up menu, right-click on the data field. See chapter 5.5.4.

Upload continuous

A data object can be read continuously over the menu entry /upload continuous/ in the pop-up menu. This permits tracking of the continually changing values (such as the actual values). See chapter 5.5.4.

Data→Upload All

All device data can be updated over the menu entry /Data→Upload All/. See chapter 5.4.2.1.

Read errors

A failed reading operation will be indicated by a message in the warnings display at the lower margin of the program window. The affected data field(s) change their color to red.

Data objects can be read only when the program is in the online mode.

6.4.3 Writing the value of a parameter to a device

Only data with the respective write access can be written.

Editing data fields

When a data field is edited, the value will be transferred immediately to the device.

Download

To transfer a set value to the device once again, just click on the pop-up menu entry /download/. Open the pop-up menu by right-clicking on the data field.

Read errors

A failed writing operation will be indicated by a message in the warnings display at the lower margin of the program window. The affected data field(s) change their color to red.

Data objects can be written into the device only when the program is in online mode.

6.5 Setting the CAN node ID and bit rate

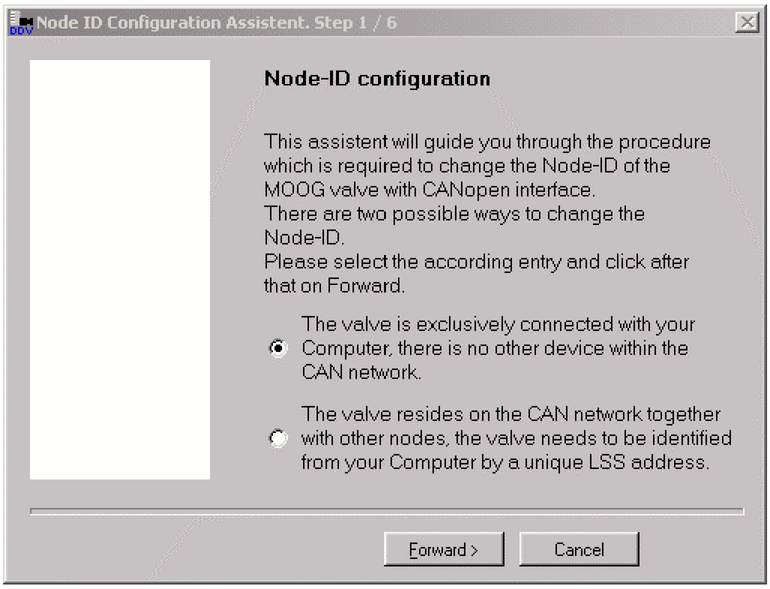
6.5.1 Setting the node ID

A unique node ID must be assigned to each CANopen bus node.

To assign a new node ID to a device, proceed as follows:

Open the menu /Network→Layer Setting Services (LSS) → Node ID Configuration/. A window with a settings assistant will open. Follow the assistant's instructions.

6.5.1.1 Node ID configuration, step 1



Node-ID configuration

This assistent will guide you through the procedure which is required to change the Node-ID of the MOOG valve with CANopen interface.
There are two possible ways to change the Node-ID.
Please select the according entry and click after that on Forward.

● The valve is exclusively connected with your Computer, there is no other device within the CAN network.

○ The valve resides on the CAN network together with other nodes, the valve needs to be identified from your Computer by a unique LSS address.

Fig. 15: Node ID settings assistant

Select the method with which the device should be switched into the node ID configuration mode.

Direct connection, program - device

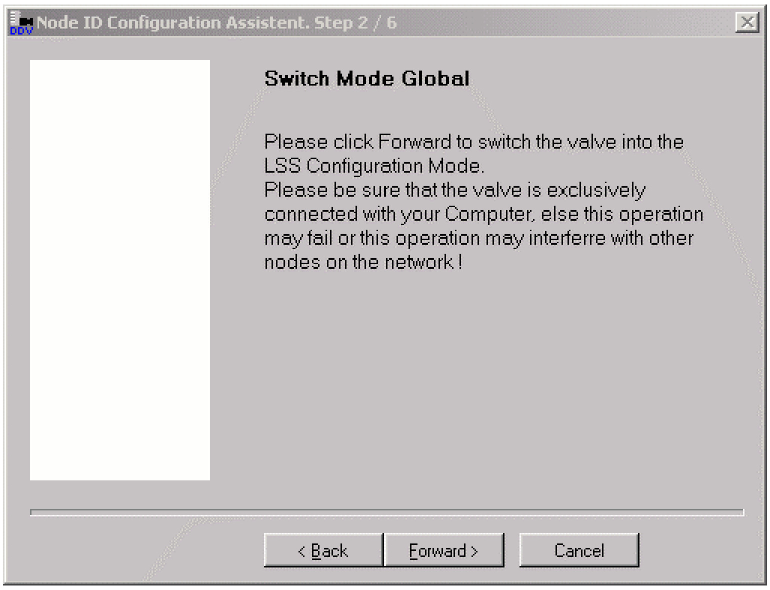
If the device is connected directly with the CAN interface card (a point-to-point connection), then the device can be switched directly into the configuration mode. To do this, select the upper radio button and click on "Forward".

Connection to a device on the bus

If the device is not connected directly with the CAN interface card (in other words: the device must be configured via a bus with several attached devices), then the device can only be switched into the configuration mode by entering a unique LSS address. To do this, select the lower radio button and click on "Forward".

6.5.1.2 Node ID configuration, step 2

If a direct connection was selected, the entry form below will appear. In this form, click on "Forward", to put the device in the configuration mode.



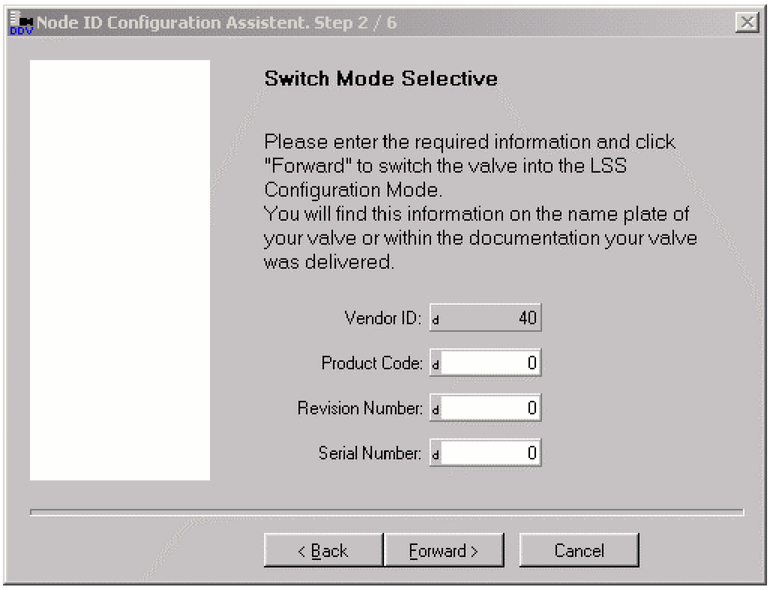
Switch Mode Global

Please click Forward to switch the valve into the LSS Configuration Mode.
Please be sure that the valve is exclusively connected with your Computer, else this operation may fail or this operation may interferre with other nodes on the network !

Fig. 16: Switching the device into the configuration mode directly

If a connection to a device on the bus was selected, the form shown below will appear.

Enter the data into the fields. To do this, the product key, the revision number, and the serial number of the device is required. This information can be found either on the device's type plate or in the included documentation.



Switch Mode Selective

Please enter the required information and click "Forward" to switch the valve into the LSS Configuration Mode.
You will find this information on the name plate of your valve or within the documentation your valve was delivered.

Vendor ID: d 40

Product Code: d 0

Revision Number: d 0

Serial Number: d 0

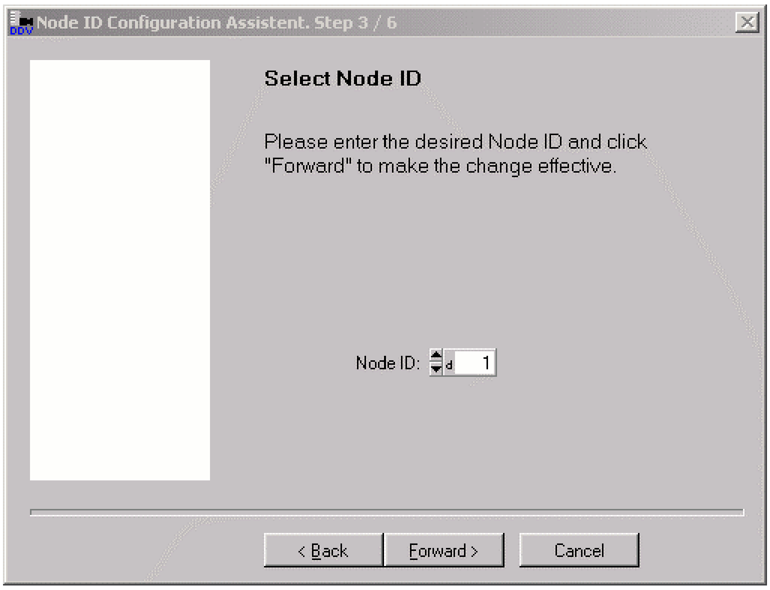
Fig. 17: Switching the device into the configuration mode by using the unique LSS address

Click on "Forward", so that the LSS address will be transferred to the device. If the transferred LSS address is not correct, an error message will appear.

6.5.1.3 Node ID configuration, step 3

Assigning a node ID

Enter into this entry form the node ID to which the device should be configured to.



Select Node ID

Please enter the desired Node ID and click "Forward" to make the change effective.

Node ID: d 1

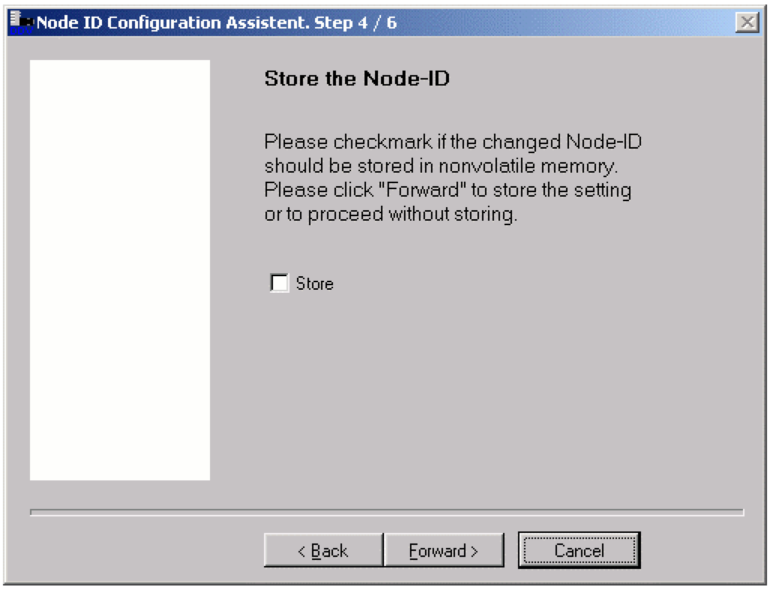
Fig. 18: Assigning a node ID

Click on "Forward", so that the selected node ID will be transferred to the device.

6.5.1.4 Node ID configuration, step 4

Saving a node ID

To permanently store the device's previously set node ID, select the "Store" check box.



Store the Node-ID

Please checkmark if the changed Node-ID should be stored in nonvolatile memory. Please click "Forward" to store the setting or to proceed without storing.

☐ Store

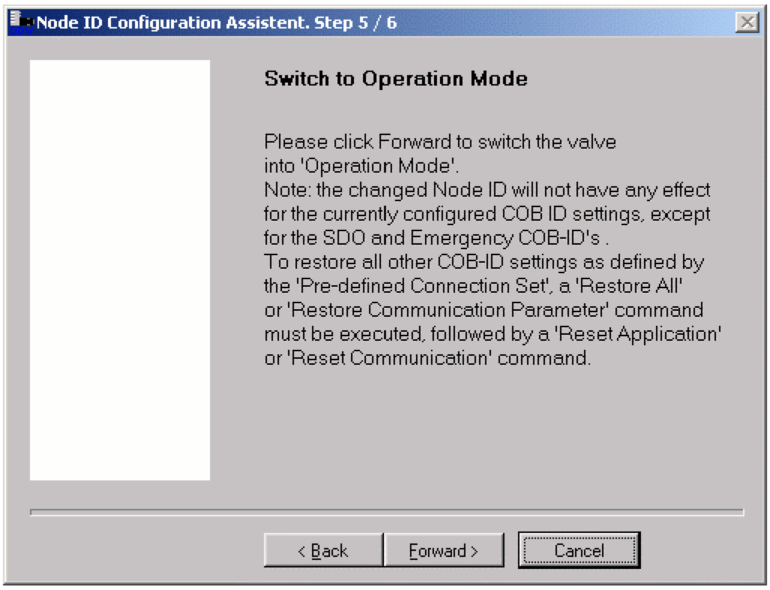
Fig. 19: Saving the node ID

Click on "Forward" to execute or skip the save procedure, respectively.

6.5.1.5 Node ID configuration, step 5

Leaving the configuration mode

In this entry form, click on "Forward" to leave the device's configuration mode.



Node ID Configuration Assistent. Step 5 / 6

Switch to Operation Mode

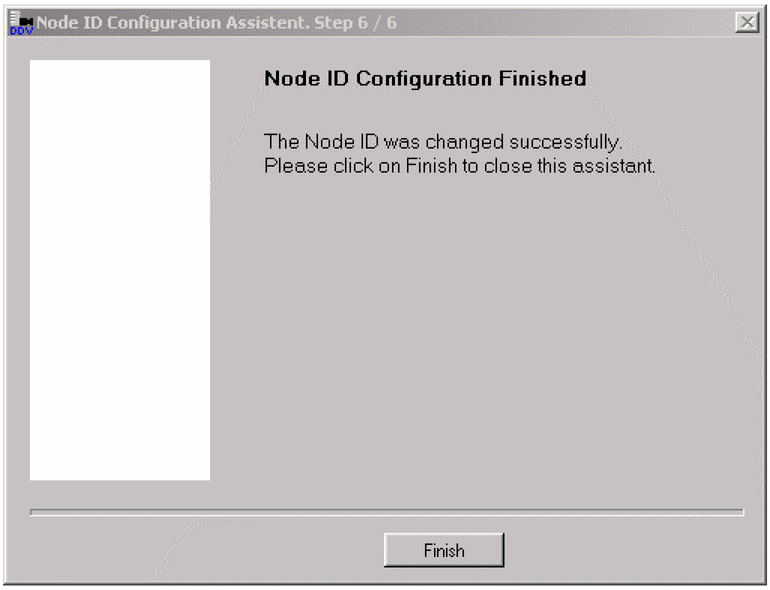
Please click Forward to switch the valve
into 'Operation Mode'.
Note: the changed Node ID will not have any effect
for the currently configured COB ID settings, except
for the SDO and Emergency COB-ID's .
To restore all other COB-ID settings as defined by
the 'Pre-defined Connection Set', a 'Restore All'
or 'Restore Communication Parameter' command
must be executed, followed by a 'Reset Application'
or 'Reset Communication' command.

Fig. 20: Leaving the configuration mode

6.5.1.6 Node ID configuration, step 6

Leaving the configuration assistant

In this entry form, click on the button "Finish" in order to leave the configuration assistant.



Node ID Configuration Assistent. Step 6 / 6

Node ID Configuration Finished

The Node ID was changed successfully.
Please click on Finish to close this assistant.

Fig. 21: Exiting the node ID configuration assistant

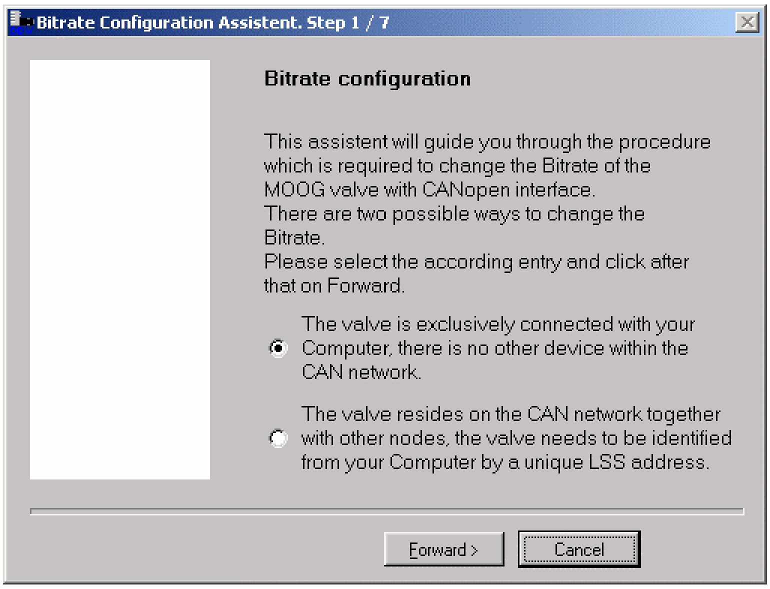
6.5.2 Setting the bit rate

Every CAN bus node must be set to the same bit rate.

If a device is set to another bit rate, proceed as follows:

Open the menu /Network→Layer Setting Services→Bitrate Configuration/. A window with the settings assistant will open. Follow the assistant's instructions.

6.5.2.1 Configuration of the bit rate, step 1


Bitrate Configuration Assistent. Step 1 / 7

Bitrate configuration

This assistent will guide you through the procedure which is required to change the Bitrate of the MOOG valve with CANopen interface.
There are two possible ways to change the Bitrate.
Please select the according entry and click after that on Forward.

● The valve is exclusively connected with your Computer, there is no other device within the CAN network.

○ The valve resides on the CAN network together with other nodes, the valve needs to be identified from your Computer by a unique LSS address.

Fig. 22: Bit rate settings assistant

Select the method with which the device should be switched into the bit rate configuration mode.

Direct connection, program - device

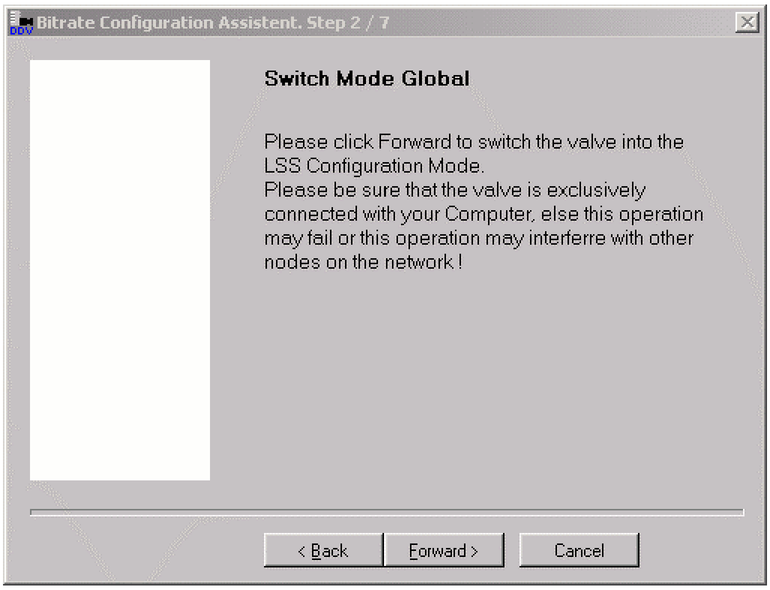
If all bus nodes will be set to a new bit rate or if the device is connected directly with the CAN interface card (a point-to-point connection), then the attached bus node can be switched directly into the configuration mode. To do this, select the upper radio button and click on "Forward".

Connection to a device on the bus

If the device is not connected directly with the CAN interface card (in other words: the device must be configured via a bus with several attached devices), then the device can only be switched into the configuration mode by entering a unique LSS address. To do this, select the lower radio button and click on "Forward".

6.5.2.2 Configuration of the bit rate, step 2

If a direct connection was selected, the entry form below will appear. In this form, click on "Forward", to put the device in the configuration mode.


Bitrate Configuration Assistent. Step 2 / 7

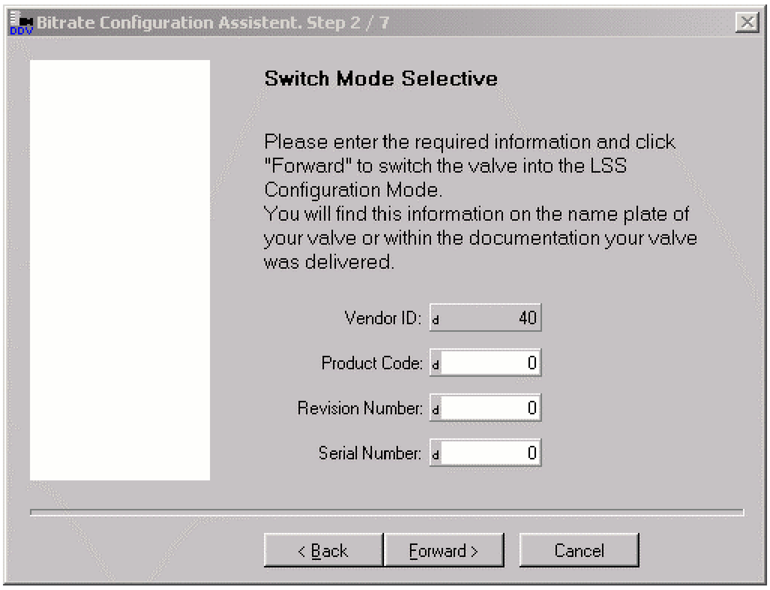
Switch Mode Global

Please click Forward to switch the valve into the LSS Configuration Mode.
Please be sure that the valve is exclusively connected with your Computer, else this operation may fail or this operation may interferre with other nodes on the network !

Fig. 23: Switching the device into the configuration mode directly.

If connection to a device on the bus was selected, the form shown below will appear.

Enter the data into the fields. To do this, the product key, the revision number, and the serial number is required. This information can be found either on the device's type plate or in the included documentation.


Bitrate Configuration Assistent. Step 2 / 7

Switch Mode Selective

Please enter the required information and click "Forward" to switch the valve into the LSS Configuration Mode.
You will find this information on the name plate of your valve or within the documentation your valve was delivered.

Vendor ID: d 40
Product Code: d 0
Revision Number: d 0
Serial Number: d 0

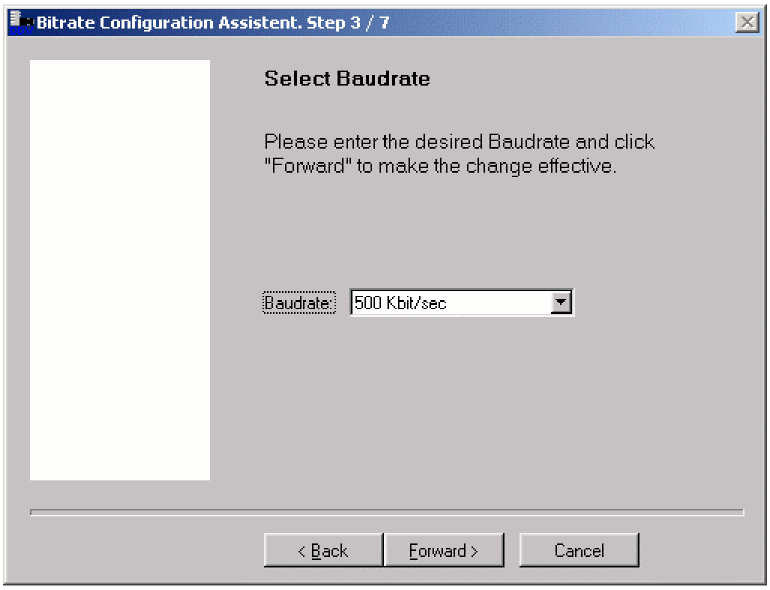
Fig. 24: Switching the device into the configuration mode through the unique LSS address

Click on "Forward", so that the LSS address will be transferred to the device. If the transferred LSS address is not correct, an error message will appear.

6.5.2.3 Configuration of the bit rate, step 3

Assigning a bit rate

In the "Baudrate" field, select the CAN bit rate to which the device should be configured to.



Bitrate Configuration Assistent. Step 3 / 7

Select Baudrate

Please enter the desired Baudrate and click "Forward" to make the change effective.

Baudrate: 500 Kbit/sec

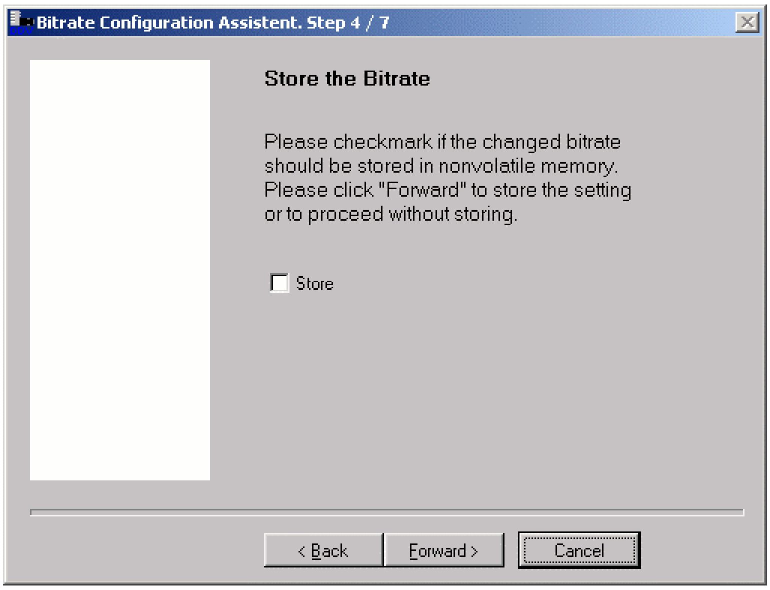
Fig. 25: Assigning bit rate

Click on "Forward", so that the selected bit rate will be transferred to the device.

6.5.2.4 Configuration of the bit rate, step 4

Saving the bit rate

To permanently store the device's previously set bit rate, select the "Store" check box.



Bitrate Configuration Assistent. Step 4 / 7

Store the Bitrate

Please checkmark if the changed bitrate should be stored in nonvolatile memory. Please click "Forward" to store the setting or to proceed without storing.

□ Store

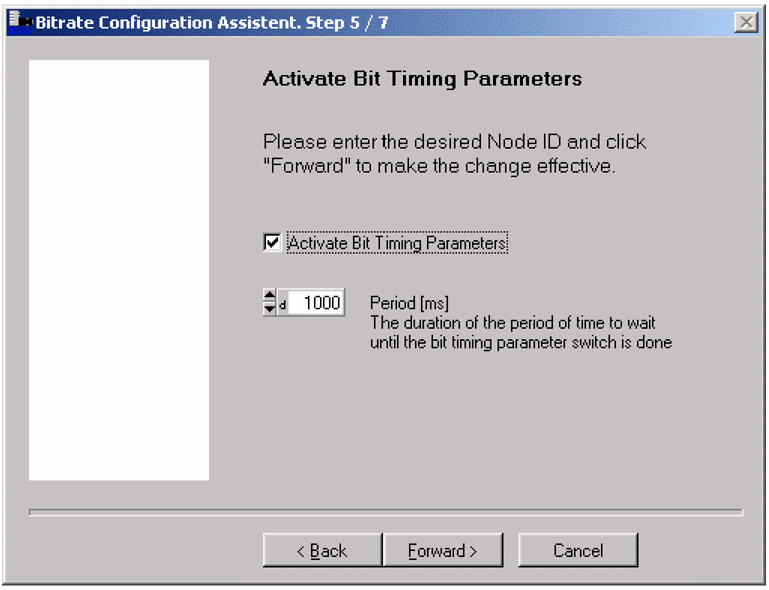
Fig. 26: Saving bit rate

Click on "Forward" to execute or skip the save procedure, respectively.

6.5.2.5 Configuration of the bit rate, step 5

Activating bit rate

In this form, select the 'Activate Bit Timing Parameter' check box if the bit rate should be activated immediately after elapsing of the wait time specified in the field "Period".



Bitrate Configuration Assistent. Step 5 / 7

Activate Bit Timing Parameters

Please enter the desired Node ID and click "Forward" to make the change effective.

☑ Activate Bit Timing Parameters

1000 Period [ms]
The duration of the period of time to wait until the bit timing parameter switch is done

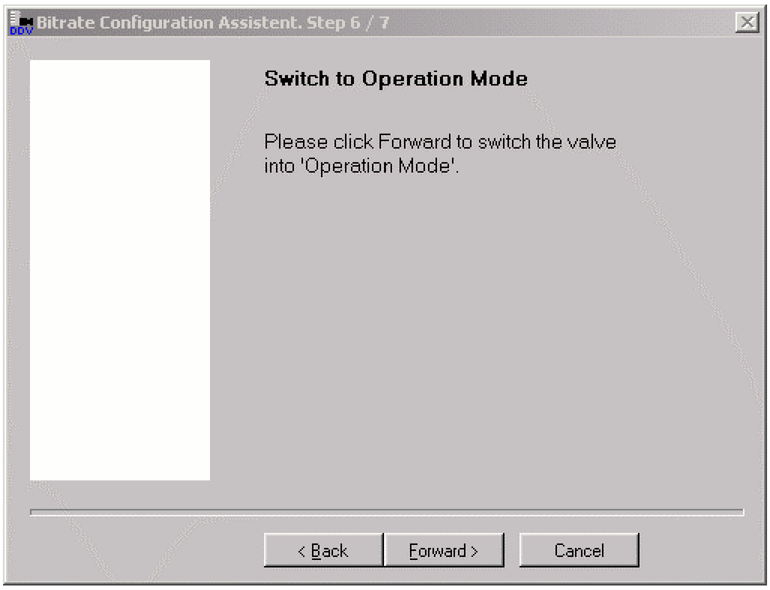
Fig. 27: Activate bit rate

Click on "Forward" to execute or skip the change-over procedure, respectively.

6.5.2.6 Configuration of the bit rate, step 6

Leaving the configuration mode

In this entry form, click on "Forward" to leave the device's configuration mode.



Bitrate Configuration Assistent. Step 6 / 7

Switch to Operation Mode

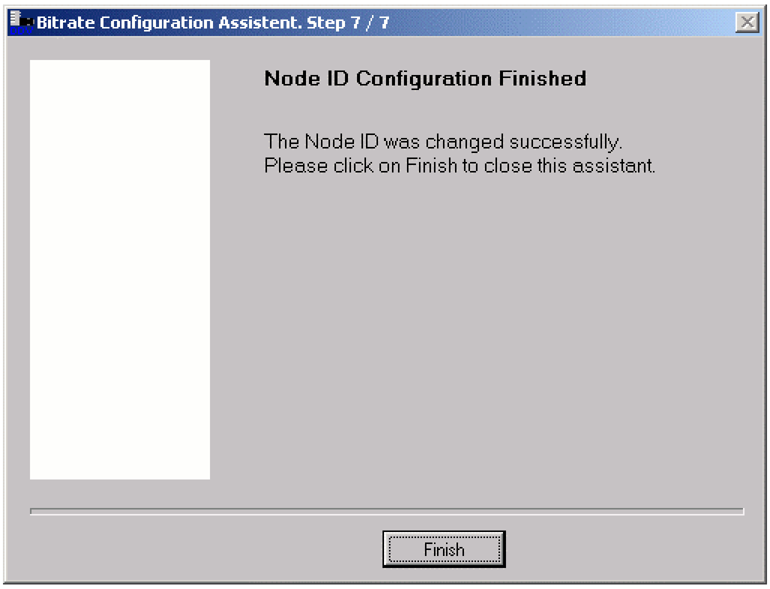
Please click Forward to switch the valve into 'Operation Mode'.

Fig. 28: Leaving the configuration mode.

6.5.2.7 Configuration of the bit rate, step 7

Leaving the configuration assistant

In this entry form, click on the button "Finish" in order to leave the configuration assistant.



Bitrate Configuration Assistent. Step 7 / 7

Node ID Configuration Finished

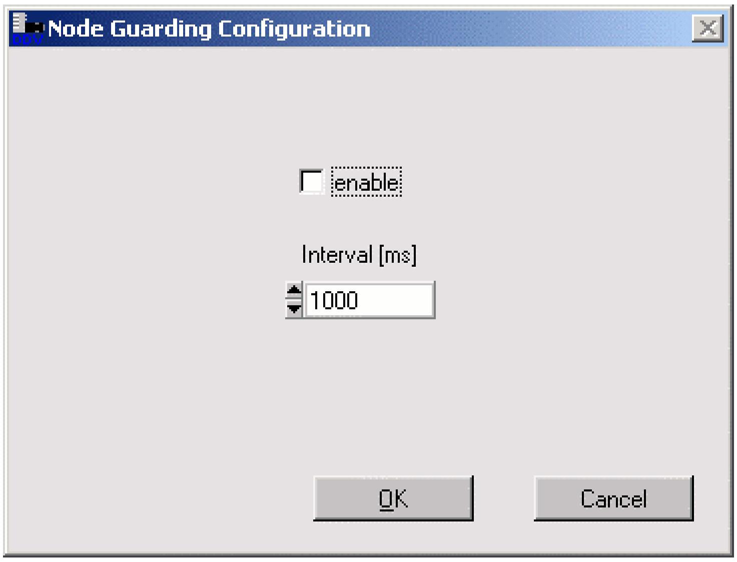
The Node ID was changed successfully.
Please click on Finish to close this assistant.

Fig. 29: Leaving the configuration assistant

6.6 Activating the node guarding function

Device monitoring

The CANopen node-guarding protocol can be activated in order to monitor the device. Activation of this function is useful when the data in an application will be transferred to the device only at long intervals and it should be certain that the connection between the device and the program exists during the entire time period. Call up the menu entry /Network→Node Guarding Settings. .. /. In the "Node Guarding Configuration" window, click on the box "Enable" and select there the desired time interval. Acknowledge the new settings with "OK".



Node Guarding Configuration

□ enable

Interval [ms]

1000

Fig. 30: Node-guarding configuration dialog

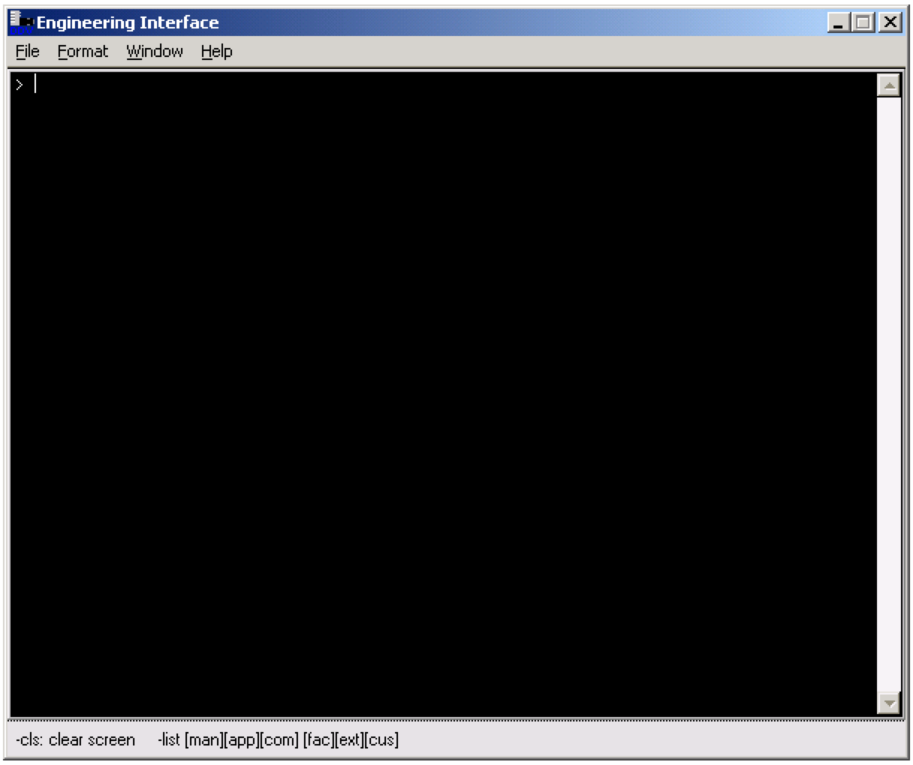
7 Engineering interface

Engineering interface

The Engineering Interface can be used to display the current values of a parameter or enter new values. This gives experienced users the ability to enter parameters through the keyboard or to read parameters without requiring them to switch to the respective tabs and data fields.

The data fields dependent on the respective parameters will be automatically updated during every read or write operation through the engineering interface.

Opening the engineering interface
To open the engineering interface, click on the respective icon in the toolbar or choose the /Window→Engineering Interface/ entry in the menu (see chapter 5.4.2).



```
> |
```

Fig. 31: Engineering interface

7.1 Internal parameter name

Internal parameter name

Every parameter managed by the program is identified by an internal name. The internal name of a parameter can be obtained by means of the attribute window, which can be opened via the pop-up menu entry /attributes (right click into the control).

Scalar parameters

Scalar parameters are addressed directly over the internal name without the addition of a suffix.

Example: *splset* addresses the spool position set point <**Sp**oo**l** Position **Set** Point>.

Array parameter

An array is addressed as a complete object (consisting of several array elements) by employing the internal name without the specification of a suffix.

Example: *splchrtbl* addresses the entire spool position characteristic table <**Sp**oo**l** Position **Ch**a**r**acteristic **T**a**bl**e>.

array elements
An individual element in an array is addressed by means of the array name followed by a suffix.

The suffix is comprised of the sequence:

- Opening bracket ([ )
- Element number
- Closing bracket ( ])

Example: *splchrtbl[0]* addresses the first element of the table.

Strings

String parameters are addressed directly by means of the internal name without the specification of a suffix.

7.2 Number formats

Decimal and hexadecimal display

Numerical values can always be entered in decimal and hexadecimal format. Exceptions are the data objects of the "float" type, in which the values can only be entered in floating point format. Hexadecimal values have the prefix "0x", floating point values have a decimal point.

Percentage depiction

When data objects can be displayed as a percentage, the value will be shown as a floating point value. The value 1.0 corresponds to a value of 100%. The relationship between values shown as percentages is defined in the Reference Manual that describes the device's functions.
Example: a decimal value of 16384 for the spool position set point <Spool Position Setpoint> corresponds to a value of 100%, the floating point value is 1.0.

7.3 Reading parameter values

At the engineering interface prompt, enter the internal name of the parameter that should be read and confirm with the Return key.
If the program is in the online mode, the identified parameter will first be read from the device over the CAN bus. In the offline mode, the value will be read from the memory's image of a virtual device. The value then appears indented in a new line.
In the case of arrays, the internal parameter name (with suffix) will appear in front of the value of the individual element.

Syntax: > InternalName [Suffix]

7.4 Writing parameter values

At the engineering interface prompt, enter the internal name of the parameter that should be written. Then enter a space followed by the numerical value or text that should be written and confirm with the Return key.
Numerical values can be entered as decimals or hexadecimals with the exception of data objects of the "float" type, in which case the value must be entered as a floating point value. Hexadecimal values must be preceded with "0x".
Percentage values must be entered with a decimal point.

Syntax: > InternalName [Suffix] ,_, value

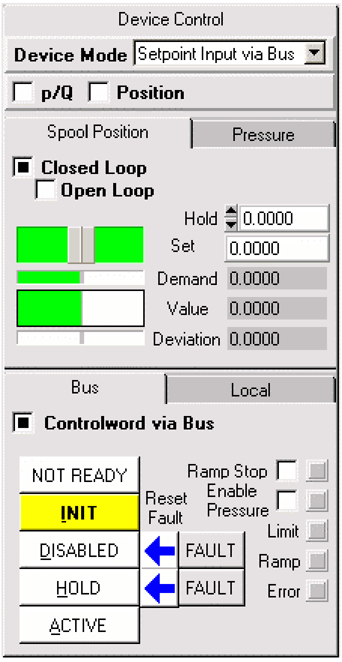
ℹ Arrays cannot be written in their entirety.

8 Description of the parameters

The following chapter gives a brief overview of the most commonly used parameters that are found in all devices. For complete descriptions of the parameters and functions, refer to the Reference Manual that describes the device's functions.

8.1 Controlling the device

The following functions and parameters apply to all types of control (for information on control modes, see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**).



Device Control

Device Mode: Setpoint Input via Bus

☐ p/Q ☐ Position

☒ Closed Loop

☐ Open Loop

Hold 0.0000

Set 0.0000

Demand 0.0000

Value 0.0000

Deviation 0.0000

☒ Controlword via Bus

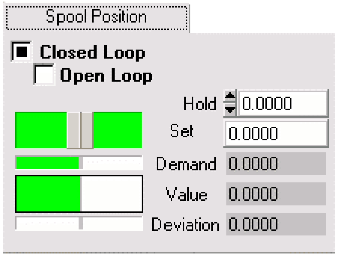
Ramp Stop ☐

Enable Pressure ☐

Fig. 32: Device control tab

8.1.1 Spool position

In the control modes "spool position closed loop" or "spool position open loop" as well as the "p/Q closed loop", the following parameters are effective:



☒ Closed Loop

☐ Open Loop

Hold 0.0000

Set 0.0000

Demand 0.0000

Value 0.0000

Deviation 0.0000

Fig. 33: Spool position tab

8.1.1.1 ValvePositionControl_Setpoint

<Setpoint>

The spool position set point is the set point that is transferred via the bus for the control modes "spool position control closed loop" or "spool position control open loop" , respectively. This setpoint will only take effect in case the device is in the device state ACTIVE.

The device mode <DeviceMode> must be set to {Setpoint Input via Bus} in order to make this parameter effective.

Specification: see CiA DS408

The device mode, the control mode, and the device state influence whether this parameter will affect the control.

8.1.1.2 ValvePositionControl_DemandValueGenerator_HoldSetPoint

<HoldSetPoint>

The spool position hold setpoint is the setpoint that is transferred via the bus for the control modes "spool position control closed loop" or "spool position control open loop" , respectively. This setpoint will only take effect in case the device is in the device state HOLD.

Specification: see CiA DS408

The control mode and the device state influence whether this parameter will affect the control.

8.1.1.3 ValvePositionControl_DemandValueGenerator_DemandValue

<DemandValue>

The spool position demand value is the value calculated by the demand value generator and is provided to the spool position controller.

Specification: see CiA DS408

8.1.1.4 ValvePositionControl_ActualValue

<ActualValue>

The spool position actual value is the actual position value returned from the spool position transducer to the controller.

Specification: see CiA DS408

8.1.1.5 ValvePositionControl_ControlDeviation

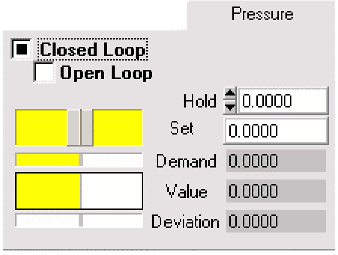
<SpoolPositionControl Deviation>

The control deviation of the spool position controller is the difference between the spool position demand value and the spool position actual value.

Specification: see CiA DS408

8.1.2 Pressure

In the control modes "pressure control closed loop" or "pressure open loop" as well as the "p/Q closed loop", the following parameters are effective:



Pressure

☒ Closed Loop
□ Open Loop

Hold 0.0000
Set 0.0000
Demand 0.0000
Value 0.0000
Deviation 0.0000

Fig. 34: Pressure tab

8.1.2.1 ValvePressureControl_Setpoint

<Setpoint>

The pressure set point is the set point that is transferred via the bus for the control modes "pressure control closed loop" or "pressure control open loop" as well as for "p/Q control closed loop" respectively. This setpoint will only take effect in case the device is in the device state ACTIVE.

The device mode <DeviceMode> must be set to {Setpoint Input via Bus} so that this parameter will be effective.

ℹ The device mode, the control mode, and the device status influence whether this parameter will affect the control.

Specification: see CiA DS408

8.1.2.2 ValvePressureControl_DemandValueGenerator_HoldSetPoint

<HoldSetPoint>

The pressure hold setpoint is the setpoint that is transferred via the bus for the control modes "pressure control closed loop" or "spool position control open loop" as well as for "p/Q control closed loop" , respectively. This setpoint will only take effect in case the device is in the device state HOLD.

ℹ The control mode and the device state influence whether this parameter will affect the control.

Specification: see CiA DS408

8.1.2.3 ValvePressureControl_DemandValueGenerator_Demand

<Demand>

The pressure demand value is the value calculated by the demand value generator and is provided to the pressure controller.

Specification: see CiA DS408

8.1.2.4 ValvePressureControl_ActualValue

<ActualValue>

The actual pressure value is the actual pressure value (of the medium in the connection port A of the servo valve) feed from the integrated pressure transducer to the controller. The maximum pressure specified on the type plate corresponds to 100%.

Specification: see CiA DS408

8.1.2.5 ValvePressureControl_ControlDeviation

<ControlDeviation>

The pressure controller's control deviation is the difference between the pressure demand value and the actual pressure value.

Specification: see CiA DS408

8.1.3 Device modes

8.1.3.1 Device_DeviceMode

<DeviceMode>

With the parameter <DeviceMode> the input which will be used for the set point can be set. It can be chosen between the modes {Setpoint Input via Bus} and {Setpoint Input locally}.

Specification: see CiA DS408

Set point input via bus

{Setpoint Inputvia Bus}

In this mode, the set points <SpoolPositionSetpoint> and <PressureSetpoint> that are transferred over the CAN bus will take effect as set points.

Set point input local

{Setpoint Input locally}

In this mode, a signal source configured on the device will take effect to provide the set points. Depending on the versions and variations, these can be analog inputs or other sources.

8.1.4 Control modes

8.1.4.1 Device_ControlMode

<ControlMode>

The parameter <ControlMode> allows to select between following control modes: spool position control, pressure control, or p/Q control (depending on variant).

ℹ Since all devices, depending on model and variant, are set by default and optimized to a particular type of control, it is not always possible to freely choose the control mode. The available control modes can be retrieved via the <Capability> parameter; see chapter 8.7.1.9.

Specification: see CiA DS408

Spool position control (volume flow control)

{Spool Position Closed Loop}

In this control mode, the position of the spool positionspool position will be controlled. The specified set point corresponds to a certain spool position. The spool position is proportional to the demand signal.

A constant volume flow will be established depending on the pressure drop Δp on the individual control edges and the control edge opening, which results from the spool position.

Pressure closed loop

{Pressure Closed Loop}

In this control mode, the pressure will be controlled in connection port A. The specified set point corresponds to a certain pressure in the connection port.

Pressure and volume flow control (p/Q function)

{p/Q}

This control mode is a combination of the pressure and volume-flow functions.

Spool position open loop / pressure open loop

{Open Loop}

With the option {Open Loop} in the "spool position" or "pressure control closed loop" control mode, the control loops are opened; in this case, the spool position will be moved only under control. These modes are suitable only for test operation.

8.1.5 Device status

Device status

The device status is controlled by one of the control words <Device_Controlword> or <Device_LocalControlWord> and displayed by means of the status word <Device_StatusWord>.

8.1.5.1 Device_ControlWord

<Controlword>

The control word will be written as soon as one of the buttons {INIT}, {DISABLED}, {HOLD}, {ACTIVE} or one of the blue arrows {Reset Fault} or one of the check boxes {Ramp Stop} or {Enable Pressure} is clicked on.

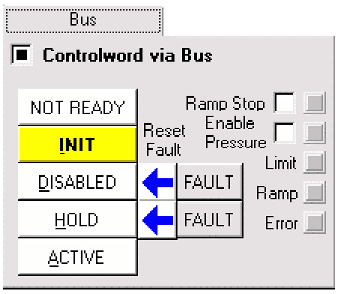


Fig. 35: Bus tab

After the device is switched on, the control word is always set to INIT, the ramp function is not stopped, and the pressure controller is not enabled (relevant only for the p/Q control mode).

Specification: see CiA DS408

INIT

{INIT}

Switches the device to the initialization status. The device function is deactivated.

DISABLED

{DISABLED}

Switches the device to the deactivation status. The driver stage for the motor is deactivated.

HOLD

{HOLD}

Switches the device to the hold status. The device controls to achieve the hold set point (depending on control mode, to achieve the set point <ValvePositionControl_DemandValueGenerator_HoldSetPoint> or <ValvePressureControl_DemandValueGenerator_HoldSetPoint>).

ACTIVE

{ACTIVE}

Switches the device to the active status. The device controls to achieve the specified set point (depending on the control mode, to the set point ValvePositionControl_DemandValueGenerator_SetPoint> or <ValvePressureControl_DemandValueGenerator_SetPoint>, or in the device mode <Device_DeviceMode> set point over the bus {Setpoint Input locally} to achieve a locally specified set point, such as over an analog input).

{Reset Fault}

Reset Fault

Switches the device from a fault status back to the status of DISABLED or HOLD

{Ramp Stop}

Ramp Stop

Actuating this switch stops the ramp function of the demand value generator. The device status remains unchanged. See chapter 8.3.1.3.

{Enable Pressure}

Enable Pressure

Actuating this switch enables the pressure controller to enter the p/Q control mode. The device status remains unchanged.

! The device status will change by changing the control word parameter <Device_Controlword> only if the parameter <Local> is not set to {Controlword local}.

! The device will adopt the states of HOLD and ACTIVE only when an electrical "enable" signal is pending at the device plug.

8.1.5.2 Device_LocalControlWord

<LocalControlword>

The local control word will be written as soon as one of the buttons {INIT}, {DISABLED}, {HOLD}, {ACTIVE} or one of the blue arrows {Reset Fault} or one of the check boxes {Ramp Stop} or {Enable Pressure} is clicked on.

The local control word is a manufacturer-defined parameter and is differentiated from the standardized control word only with regards to the switch-on value and the bus address (index / sub-index).

After the device is switched on, the local control word is always set to {ACTIVE}, the ramp function is not stopped, and the pressure controller is not enabled (relevant only for the p/Q control mode).

For a function description, see chapter 8.1.5.1.

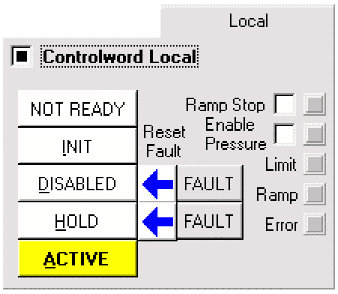


Fig. 36: Local tab.

! The device status will change by changing the local control word parameter <Device_LocalControlWord> only if the parameter <Device_Local> is not set to {Controlword via Bus}.

> ❗ The device will reach the states of HOLD and ACTIVE only when an electrical release signal is pending at the device plug.

Specification: manufacturer-defined

8.1.5.3 Device_Local

<Local>

With the local switch, one of the two controlwords can be selected, by which the device state machine shall be controlled. Click in the corresponding check box in order to set one of the options {Controlword via Bus} or {Controlword Local}. See Fig. 35 and Fig. 36.

Specification: see CiA DS408

Controlword via Bus

{Controlword via Bus}

The device status is controlled by the standardized control word <Device_Controlword>.

Controlword Local

{Controlword Local}

The device status is controlled by the manufacturer-defined local control word <Device_LocalControlWord>.

8.1.5.4 Device_StatusWord

<Statusword>

The status word indicates the device's status by marking one of the fields {INIT, DISABLED, HOLD, or ACTIVE} with a color. Other bit states within the status word are indicated over the signal fields {Limit}, {Ramp}, {Error} and {Ramp Stop} and {Enable Pressure}.

Specification: see CiA DS408

Limit

{Limit}

This field will be activated when the set-point generator's limit function indicates that the adjusted limit has been exceeded. See chapter 8.3.1.1.

Ramp

{Ramp}

This field will be activated when the set-point generator's ramping function has not yet reached the end value. See chapter 8.3.1.3.

Error

{Error}

This field will be activated when the control monitor signalizes a controller fault. See chapter 8.4.1.

Ramp Stop

{Ramp Stop}

This field will be activated when the set-point generator's ramp function has been stopped and the ramp has not yet reached the end value.

Enable Pressure

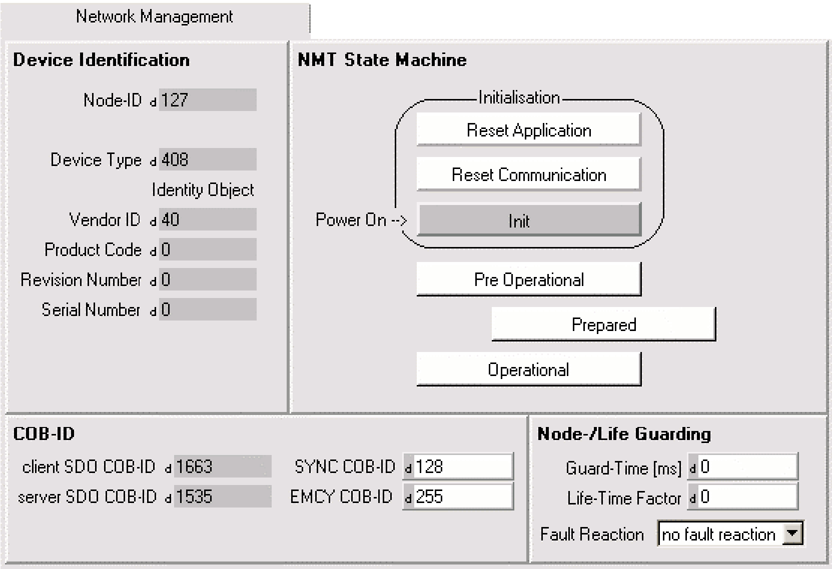
{Enable Pressure}

This field will be activated when the pressure controller is activated in the p/Q control mode.

8.2 Communication

Communication → CANopen

All settings that affect the device's CANopen communication parameters can be set in the Communication → CANopen tab control.



Network Management

Device Identification

Node-ID d 127

Device Type d 408

Identity Object

Vendor ID d 40

Product Code d 0

Revision Number d 0

Serial Number d 0

NMT State Machine

COB-ID

client SDO COB-ID d 1663

server SDO COB-ID d 1535

SYNC COB-ID d 128

EMCY COB-ID d 255

Node-/Life Guarding

Guard-Time [ms] d 0

Life-Time Factor d 0

Fault Reaction: no fault reaction

Fig. 37: Network management tab

8.2.1 Network management

Network management

Unless otherwise specified, all parameters and functions that appear in the tab Communication → CANopen → Network Management are defined in CANopen Standard and are known under the names listed below.

8.2.1.1 Device Identification

NodeID

<NodeID>

Device addresses that are unique on the entire CAN bus

Specification: CiA DS301

DeviceType

<DeviceType>

The device type:The number 408 designates the device profile DS408 (Fluid Power Technology).

Specification: CiA DS301

IdentityObject

<IdentityObject>

Worldwide unique device identification via the following parameters:

<IdentityObject_VendorID> - manufacturer number, 0x28 reserved for Moog

<IdentityObject_ProductCode> - product number

<IdentityObject_RevisionNumber> - revision number

<IdentityObject_SerialNumber> - serial number

Specification: CiA DS301

8.2.1.2 NMT state machine

NMT state machine

Status changes in the NMT State Machine when the operator clicks on one of the buttons {Operational, Prepared, Pre-Operational, Reset Application, Reset Communication}.

Specification: CiA DS301

Operational

{Operational}

Sends the command *start_remote_node* – Change to the status *Operational* (transmission of PDO's is enabled).

Prepared

{Prepared}

Sends the command *stop_remote_node* – Change to the status *Prepared*. (transmission of SDO's and PDO's is disabled).

Pre-Operational

{Pre-Operational}

Sends the command *enter_pre_operational_state* – Change to the status *Pre-Operational*. (transmission of PDO's is disabled).

Reset Application

{Reset Application}

Sends the command *reset_node* – Change to the status *Pre-Operational,* whereby the states *Reset Application* and *Reset Communication* will be executed.

Reset Communication

{Reset Communication}

Sends the command *reset_communication* – Change to the status *Pre-Operational,* whereby the status *Reset Communication* will be executed.

8.2.1.3 COB ID

COB ID

The CAN identifiers for the following CANopen protocols are located in this area.

ServerSdoParameter_CobIdClientServer / ServerSdoParameter_CobIdServerClient

<CobIdClientServer> / <CobIdServerClient>

The CAN identifiers that the device is using for the SDO protocol handling.

Specification: CiA DS301

CobIdSyncMessage

<CobIdSyncMessage>

The CAN identifier that the device is using to receive the synchronization message (SYNC).

Specification: CiA DS301

CobIdEmergencyMessage

<CobIdEmergencyMessage>

The CAN identifier that the device is using to send error messages (EMCY).

Specification: CiA DS301

8.2.1.4 Node/Life Guarding

The Node/Life Guarding protocol serves to monitor the device and the master PLC.

GuardTime

<GuardTime>

This parameter establishes the protocol's cycle time with which the device shall be monitored.

Specification: CiA DS301

LifeTimeFactor

<LifeTimeFactor>

This parameter establishes the number of incomplete node guarding cycles, after that a fault reaction (*Life-Guarding Event*) will be triggered.

Specification: CiA DS301

FaultReaction_NodeGuardFaultReaction

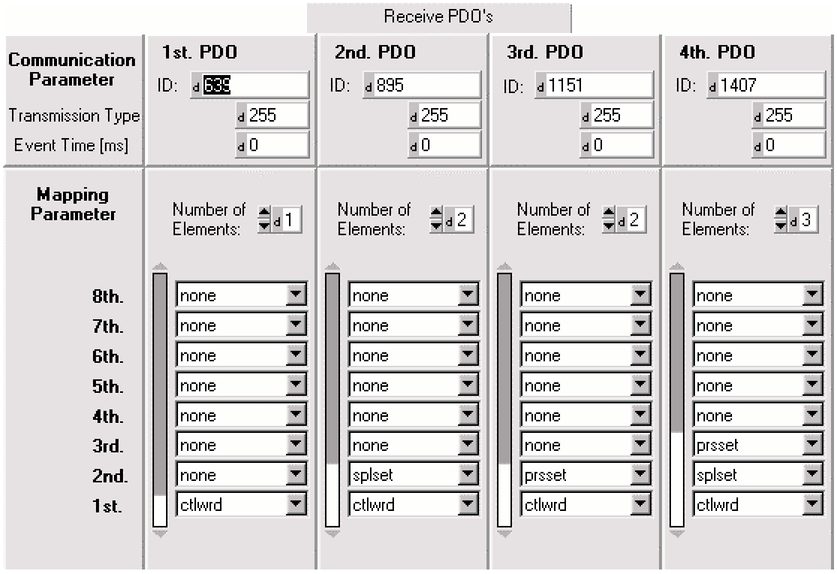
<NodeGuardFaultReaction>

This parameter is used to configure the fault reaction to a *Life Guarding Event*.

Specification: manufacturer-defined

8.2.2 Receive PDO`s

The four PDO channels for receiving process data can be configured in the tab Communication → CANopen → Receive PDO’s.



Receive PDO's

Communication Parameter	1st. PDO	2nd. PDO	3rd. PDO	4th. PDO
ID:	639	895	1151	1407
Transmission Type	255	255	255	255
Event Time [ms]	0	0	0	0

Mapping Parameter				
Number of Elements:	1	2	2	3
8th.	none	none	none	none
7th.	none	none	none	none
6th.	none	none	none	none
5th.	none	none	none	none
4th.	none	none	none	none
3rd.	none	none	none	prsset
2nd.	none	splset	prsset	splset
1st.	ctlwrd	ctlwrd	ctlwrd	ctlwrd

Fig. 38: Tab Receive PDO’s

8.2.2.1 ReceivePdoCommunicationParameter_NthReceivePdo_CobIdUsedByPdo

<CobIdUsedByPdo>

The CAN identifier that the device is using to receive the incoming process data message (RPDO).

Specification: CiA DS301

8.2.2.2 ReceivePdoCommunicationParameter_NthReceivePdo_TransmissionType

The RPDO's transmission type.

<TransmissionType>

Specification: CiA DS301

8.2.2.3 ReceivePdoCommunicationParameter_NthReceivePdo_EventTimer

Expiry time of the process data

<EventTimer>

Specification: CiA DS301

8.2.2.4 ReceivePdoMappingParameter_NthReceivePdoMapping_ NumberOfMappedApplicationObjectsInPdo

Number of mapping parameters within the RPDO.

<NumberOfMappedApplicationObjectsInPDO>

Set this value to NULL before determining the mapping parameters for the RPDO. After completion of the parameter mapping, the desired number can finally be configured.

Specification: CiA DS301

8.2.2.5 ReceivePdoMappingParameter_nthReceivePdoMapping PdoMappingForTheNthApplicationObjectToBeMapped

Mapping parameters 1 through 8 for the RPDO.

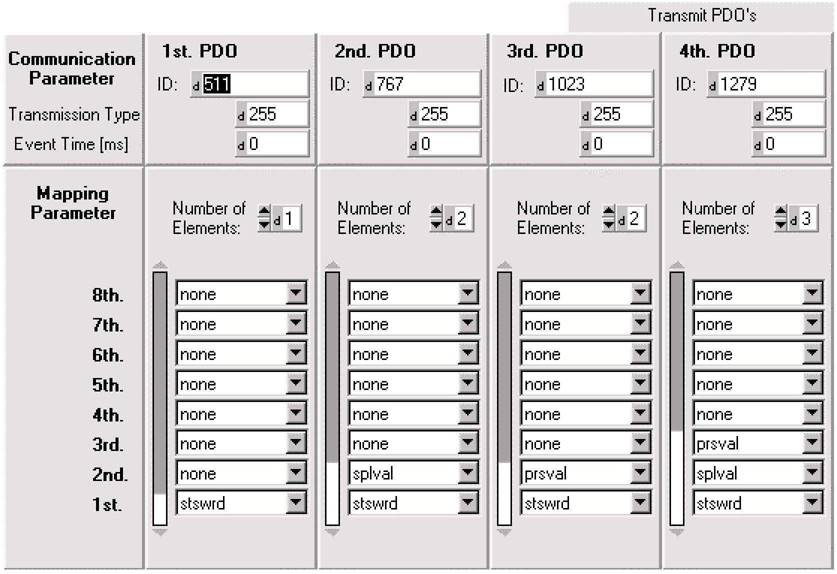
<PDOMapping ForTheNthApplication ObjectToBeMapped>

Specification: CiA DS301

8.2.3 Transmit PDO`s

The four PDO channels for transmitting process data can be configured in the tab Communication → CANopen → Transmit PDO’s.

All parameters and functions that appear in this tab are defined in the CANopen standard and are known under the names listed below. Refer to the CANopen standard (CANopen DS 301, version 4.0 for more detailed information.



Transmit PDO's

Communication Parameter	1st. PDO	2nd. PDO	3rd. PDO	4th. PDO
ID:	d 511	d 767	d 1023	d 1279
Transmission Type	d 255	d 255	d 255	d 255
Event Time [ms]	d 0	d 0	d 0	d 0
Mapping Parameter				
Number of Elements:	d 1	d 2	d 2	d 3
8th.	none	none	none	none
7th.	none	none	none	none
6th.	none	none	none	none
5th.	none	none	none	none
4th.	none	none	none	none
3rd.	none	none	none	prsval
2nd.	none	splval	prsval	splval
1st.	stswrd	stswrd	stswrd	stswrd

Fig. 39: Tab Transmit PDO’s

8.2.3.1 TransmitPdoCommunicationParameter_NthTransmitPdo_CobIdUsedByPdo

<CobIdUsedByPdo>

The CAN identifier that the device is using to send the outgoing process data message (TPDO).

Specification: CiA DS301

8.2.3.2 TransmitPdoCommunicationParameter_NthTransmitPdo_TransmissionType

<TransmissionType>

The TPDO's transmission type.

Specification: CiA DS301

8.2.3.3 TransmitPdoCommunicationParameter_NthTransmitPdo_EventTimer

<EventTimer>

Cycle time of the process data

Specification: CiA DS301

8.2.3.4 TransmitPdoMappingParameter_NthTransmitPdoMapping_ NumberOfMappedApplicationObjectsInPdo

<NumberOfMappedApplicationObjectsInPDO>

Number of mapping parameters within the TPDO.

ℹ Set this value to NULL before determining the mapping parameters for the TPDO. After completion of the parameter mapping, the desired number can finally be configured.

Specification: CiA DS301

8.2.3.5 TransmitPdoMappingParameter_NthTransmitPdoMapping_ PdoMappingForTheNthApplicationObjectToBeMapped

<PDOMappingForTheNthApplicationObjectToBeMapped>

Mapping parameters 1 through 8 for the TPDO.

Specification: CiA DS301

8.3 Application

8.3.1 Demand-value generator

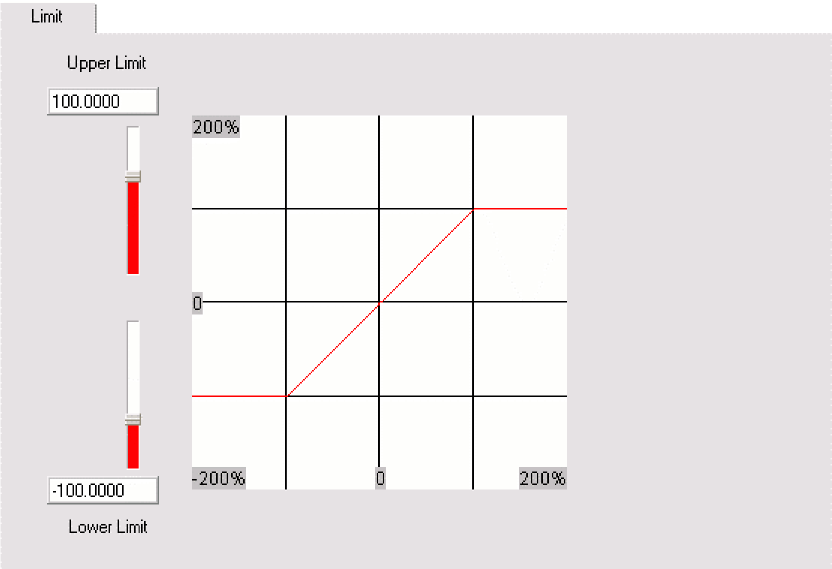
The following functions and parameters are available for calculating the demand values of the spool position and pressure controller closed loop.

Unless otherwise specified, all parameters and functions that appear in the following tabs are defined in the device profile and are known under the names listed below. Refer to the device profile Fluid Power Technology (CANopen DS 408, Version 1.5) for more detailed information.

8.3.1.1 Limitation

The limitation function is used to limit the set point.

ℹ This function exists both for the spool position demand value generator (ValvePositionControl_DemandValueGenerator) and for the pressure demand-value generator (ValvePressureControl_DemandValueGenerator).



Upper Limit

100.0000

-100.0000

Lower Limit

Fig. 40: Limit tab

…_DemandValueGenerator_Limit_UpperLimit

The upper limit value for the set point of the spool position or the pressure. **<UpperLimit>**

Specification: CiA DS408

…_DemandValueGenerator_Limit_LowerLimit

The lower limit value for the set point of the spool position or the pressure. **<LowerLimit>**

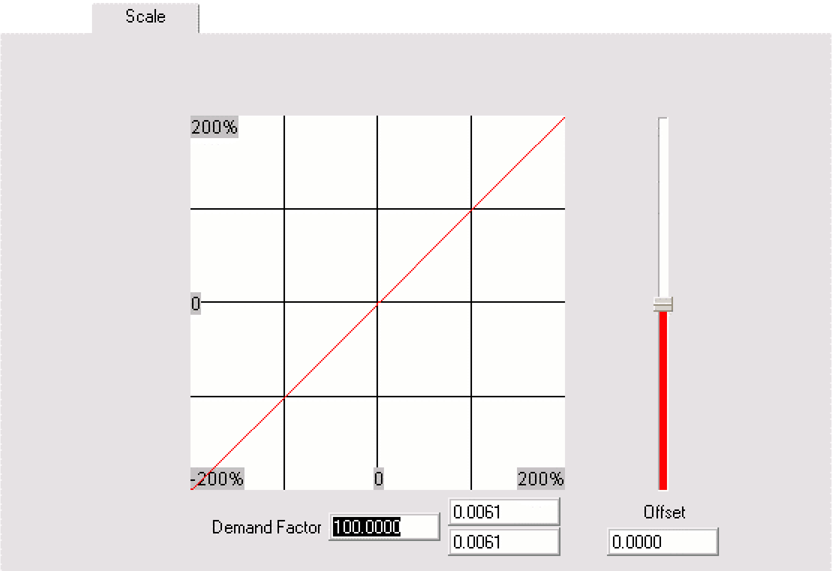
Specification: CiA DS408

8.3.1.2 Scaling function

The scaling function is used to scale the set point. The scaling is made according to the function:

Output = Input x <Factor> + <Offset>

ℹ This function exists both for the spool position demand value generator (ValvePositionControl_DemandValueGenerator) and for the pressure demand-value generator (ValvePressureControl_DemandValueGenerator).



Demand Factor 100.0000 0.0061 0.0061

Offset 0.0000

Fig. 41: Scale tab

…_DemandValueGenerator_Scaling_Factor

<Factor>

The factor by which the input is multiplied. This parameter contains a numerator and a denominator from which the factor is formed. The quotient can be entered directly into the left field; enter the numerator in the upper field and the denominator in the lower field.

Specification: CiA DS408

…_DemandValueGenerator_Scaling_Offset

<Offset>

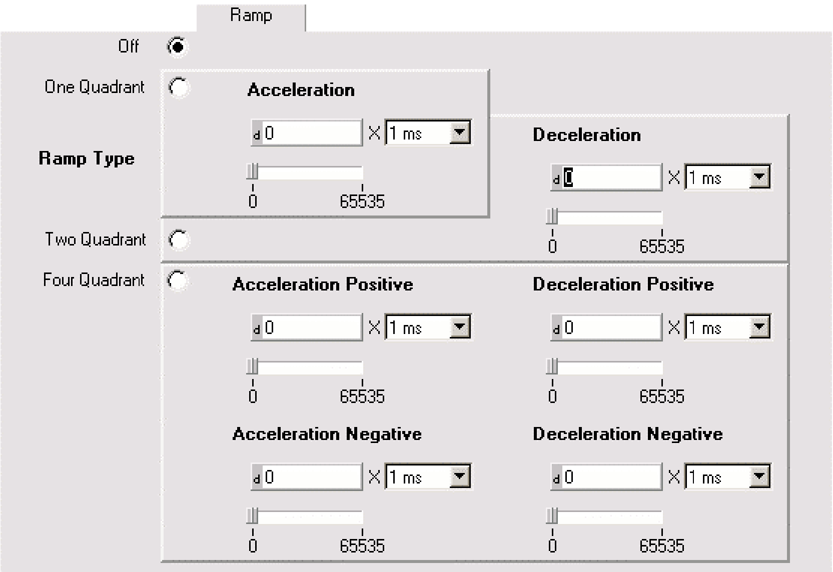
The offset that is added to the multiplied input.

Specification: CiA DS408

8.3.1.3 Ramping function

The ramping function is used to limit the signal's slew rate to a predefined ramping time.

ℹ This function exists both for the spool position demand value generator (ValvePositionControl_DemandValueGenerator) and for the pressure demand-value generator (ValvePressureControl_DemandValueGenerator).



Ramp Type: ● Off ○ One Quadrant ○ Two Quadrant ○ Four Quadrant

Acceleration: 0 × 1 ms

Deceleration: 0 × 1 ms

Acceleration Positive: 0 × 1 ms

Deceleration Positive: 0 × 1 ms

Acceleration Negative: 0 × 1 ms

Deceleration Negative: 0 × 1 ms

Fig. 42: Ramp tab

…_DemandValueGenerator_Ramp_Type

The ramp type activates a one-quadrant, two-quadrant, or four-quadrant ramp. Select the desired function by choosing one of the radio buttons {Off}, {One Quadrant}, {Two Quadrant} or {Four Quadrant}.

<Type>

Specification: CiA DS408

…_DemandValueGenerator_Ramp_…_Unit

The ramping time unit is specified to be 'seconds'.

<Unit>

Specification: CiA DS408

…_DemandValueGenerator_Ramp_…_Prefix

The ramping times can be specified in the gradations of 10^{-3}, 10^{-2}, 10^{-1}, and 10^{0} (corresponds to {1 sec, 100ms, 10ms, 1ms}). The desired resolution of time can be selected by the corresponding fields.

<Prefix>

Specification: CiA DS408

…_DemandValueGenerator_Ramp_AccelerationTime_Value

One-quadrant ramp: ramping time during the acceleration phase or deceleration phase for positive or negative movement directions.

<AccelerationTime>

Two-quadrant ramp: ramping time during the acceleration phase for positive or negative movement directions.

Specification: CiA DS408

…_DemandValueGenerator_Ramp_DecelerationTime_Value

Ramping time in the deceleration phase for positive or negative movement directions, effective in the two-quadrant ramp.

<DecelerationTime>

Specification: CiA DS408

…_DemandValueGenerator_Ramp_AccelerationTimePositive_Value

<AccelerationTime-Positive>

Ramping time in the acceleration phase for positive movement direction, effective in the four-quadrant ramp.

Specification: CiA DS408

…_DemandValueGenerator_Ramp_AccelerationTimeNegative_ Value

<AccelerationTimeNegative>

Ramping time in the acceleration phase for negative movement direction, effective in the four-quadrant ramp.

Specification: CiA DS408

…_DemandValueGenerator_Ramp_DecelerationTimePositive_Value

<DecelerationTime-Positive>

Ramping time in the deceleration phase for positive movement direction, effective in the four-quadrant ramp.

Specification: CiA DS408

…_DemandValueGenerator_Ramp_DecelerationTimeNegative_ Value

<DecelerationTimeNegative>

Ramping time in the deceleration phase for negative movement direction, effective in the four-quadrant ramp.

Specification: CiA DS408

ℹ The ramping time corresponds to the time that the output signal needs for a change of 0 to 100%.

8.3.1.4 Directional-dependent gain

With the directional-dependent gain, the signal will be reduced by a factor depending on the direction of movement.

ℹ This function exists only for the spool position demand value generator (ValvePositionControl_DemandValueGenerator).

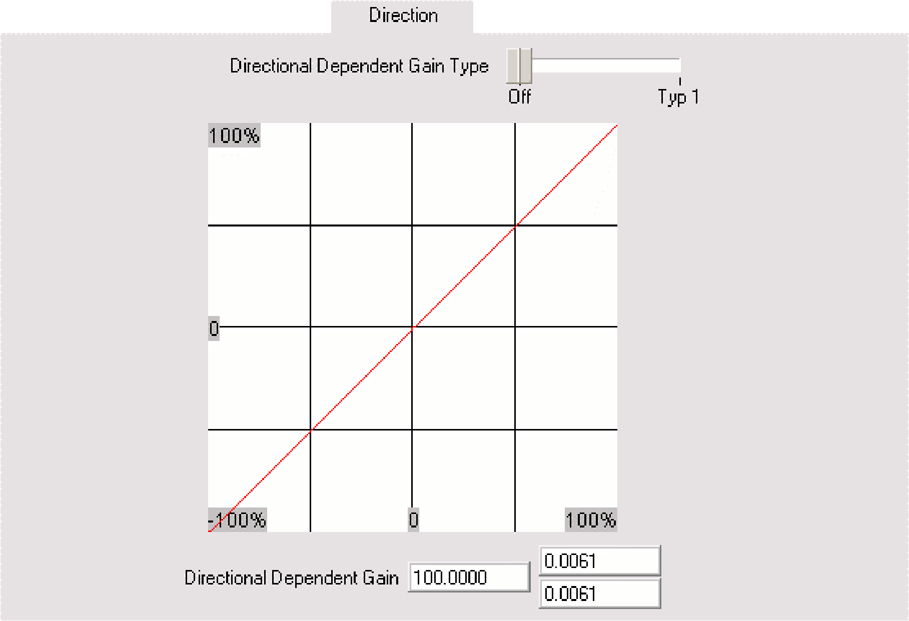


Fig. 43: Direction tab

…_DemandValueGenerator_DirectionalDependentGain_Type

<Type>

The type of directional-dependent gain function, either activated or deactivated. One of the options {Off} or {Type 1} can be selected by either clicking or dragging the slider.

Specification: CiA DS408

…_DemandValueGenerator_DirectionalDependentGain_Factor

<Factor>

The factor by which one side of the input will be multiplied or divided. The calculation is performed in dependence of the factor's ratio to the number one.

This parameter contains a numerator and a denominator from which the factor is formed. The factor can be entered directly as a quotient into the left field; the numerator can be entered in the upper field and the denominator in the lower field.

Specification: CiA DS408

8.3.1.5 Characteristic

With the characteristic function, the input can be manipulated with a desired characteristic.

ℹ This function exists only for the spool position demand value generator (ValvePositionControl_DemandValueGenerator).

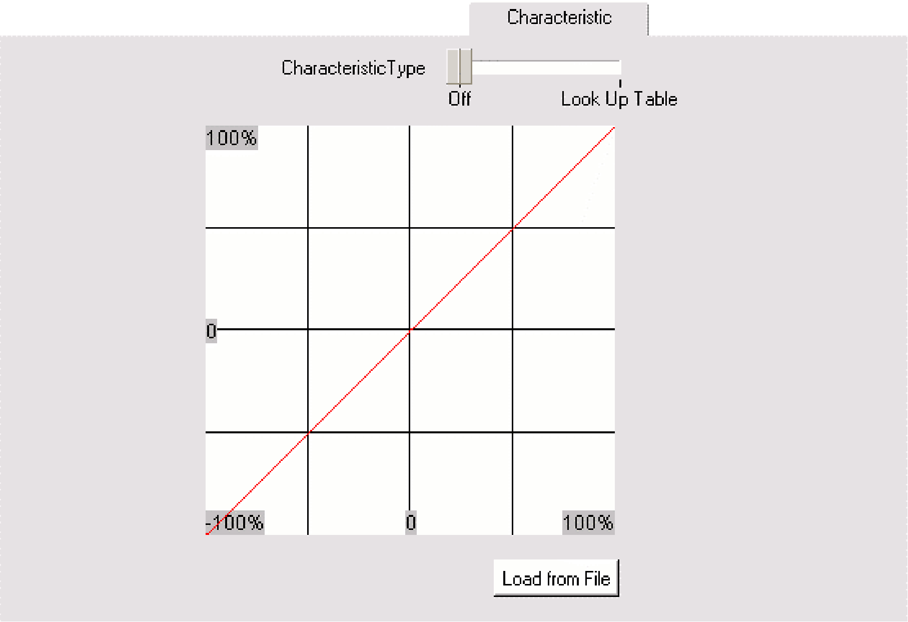


Fig. 44: Characteristic tab

…_DemandValueGenerator_CharacteristicCompensation_Type

<Type>

The characteristic function type is either manufacturer-defined or deactivated. One of the options {Off} or {Look Up Table} can be selected by either clicking or dragging the slider.

Specification: CiA DS408

…_DemandValueGenerator_CharacteristicCompensation_ LookUpTable

<LookUpTable>

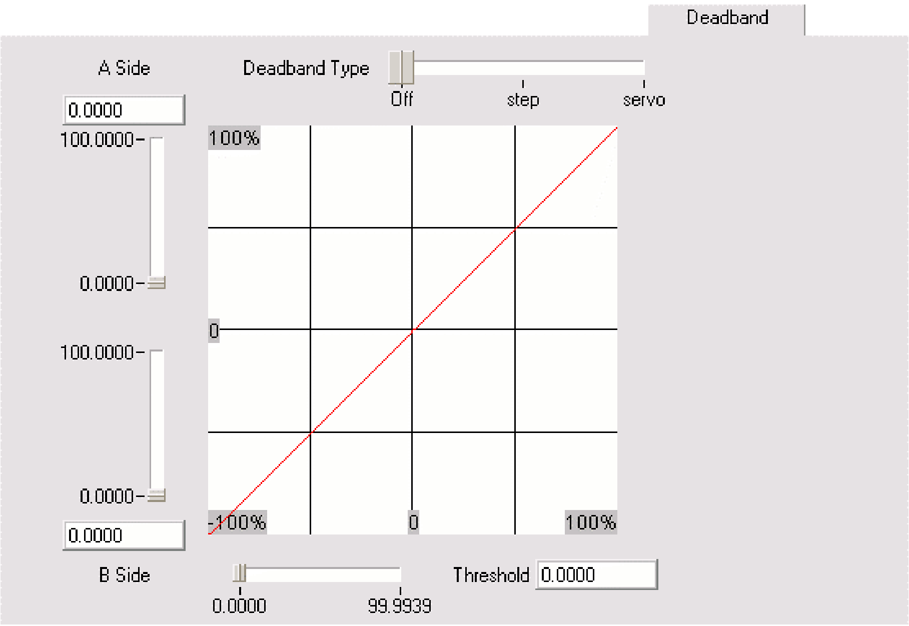
The characteristic by means of a look-up table. The look-up table can be loaded from a file by clicking onto the button 'Load From File'.

Specification: manufacturer-defined

8.3.1.6 Dead band compensation

The dead band compensation can be used to configure the dead band characteristic of the spool position.

This function exists only for the spool position demand value generator (ValvePositionControl_DemandValueGenerator).



Deadband

A Side 0.0000

Deadband Type: Off

B Side 0.0000

Threshold 0.0000

Fig. 45: Deadband tab

…_DeadbandCompensation_Type

<Type>

The dead band compensation can be activated with this parameter. One of the options {Off}, {step} or {servo} can be selected by either clicking or dragging the slider.

Specification: CiA DS408

…_DeadbandCompensation_ASide

<ASide>

The jump height for the positive direction of movement.

Specification: CiA DS408

…_DeadbandCompensation_BSide

<BSide>

The jump height for the negative direction of movement.

Specification: CiA DS408

…_DeadbandCompensation_Threshold

<Threshold>

Step dead band compensation: in this input-signal value range the output is defined as null.

Servo dead band compensation: in this input-signal value range the output is interpolated between null and the respective jump height.

Specification: CiA DS408

8.3.1.7 Zero correction

The zero correction function can be used to shift the demand value up or down by any desired amount.

This function exists only for the spool position demand value generator (ValvePositionControl_DemandValueGenerator).

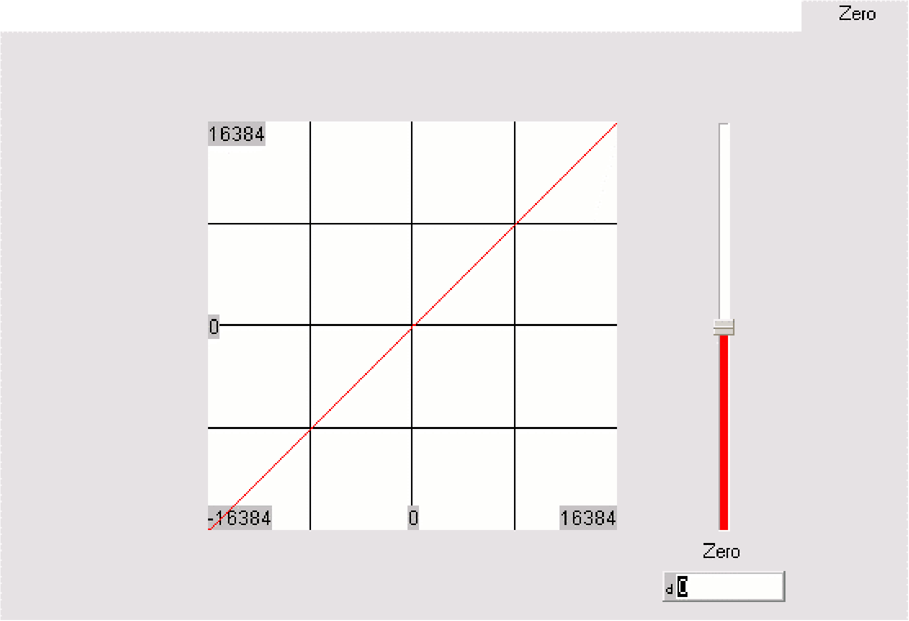


Fig. 46: Zero correction function

…_ ZeroCorrection_Offset

<Offset> This is the value that is added to the input.

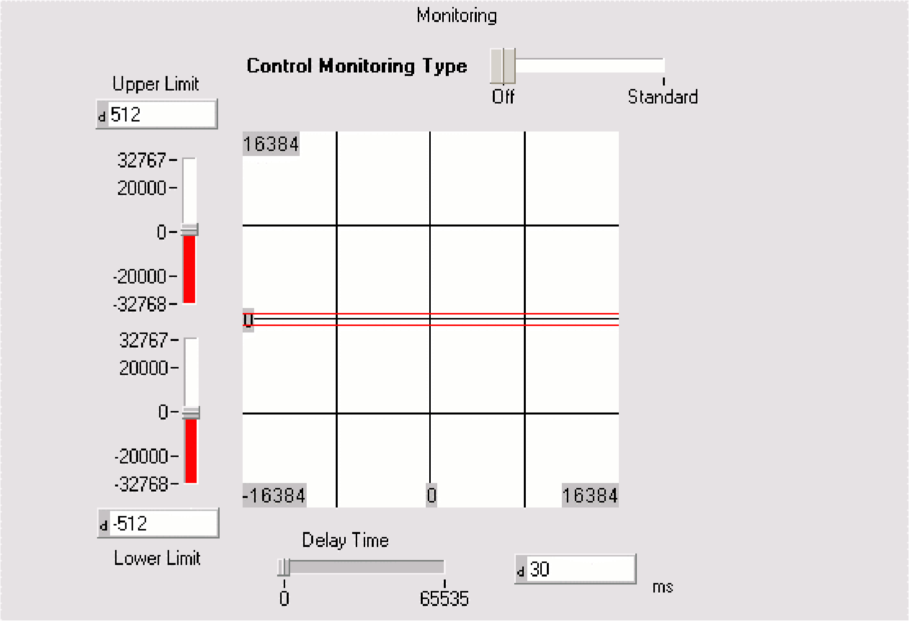
Specification: CiA DS408

8.4 Controller

8.4.1 Control monitoring

The control monitoring recognizes malfunctions in the control of the spool position and the pressure.

This function exists both for the spool position closed loop (ValvePositionControl) and for the pressure control closed loop (ValvePressureControl).



Monitoring

Control Monitoring Type: Off

Upper Limit: 512

Lower Limit: -512

Delay Time: 30 ms

Fig. 47: Monitoring tab

…_ControlMonitoring_Type

<Type>

Function type of the control monitoring, either deactivated or standard control monitoring.

One of the options {Off} or {Standard} can be selected by either clicking or dragging the slider.

Specification: CiA DS408

…_ControlMonitoring_UpperThreshold

<UpperThreshold>

Upper limit value of the control deviation. When this limit value is exceeded and after expiry of the delay time, the error bit in the status word <Device_StatusWord> will be set.

Specification: CiA DS408

…_ControlMonitoring_LowerThreshold

<LowerThreshold>

Lower limit value of the control deviation. When this limit value is under-run and after expiry of the delay time, the error bit in the status word <Device_StatusWord> will be set.

Specification: CiA DS408

…_ControlMonitoring_DelayTime

<DelayTime>

Delay time in milliseconds.

Specification: CiA DS408

8.4.2 Spool position controller

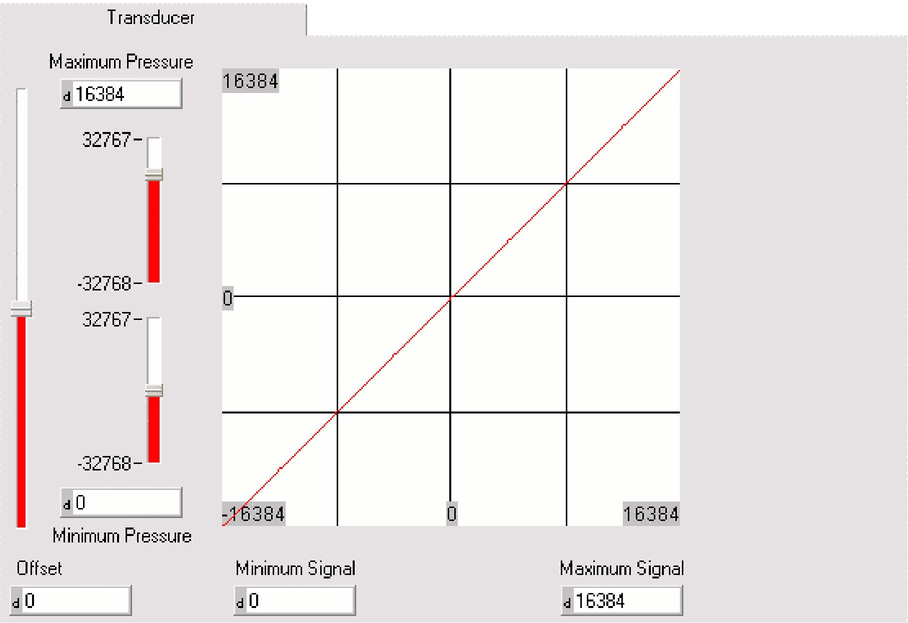
The control parameters of the spool position controller are available only in a higher access level.

8.4.3 Pressure controller

8.4.3.1 Pressure transducer calibration

The characteristic of an integrated pressure transducer can be corrected using the pressure transducer calibration function. Integrated pressure transducers are already calibrated at the factory. Therefore, in its original delivery condition the pressure transducer will have the value "zero" for atmospheric pressure and the value 16384 for the device's specified nominal pressure.

ℹ Integrated pressure transducersare calibrated at the factory, so manual adjustments are initially not required. However, the effects of aging may make corrections necessary.



Maximum Pressure: 16384

Minimum Pressure: 0

Offset: 0

Minimum Signal: 0

Maximum Signal: 16384

Fig. 48: Transducer tab

Valve_ActualValueConditioning_MaximumPressure

<MaximumPressure> Upper level of measured pressure, related to the parameter <MaximumTransducerSignal>. The value is provided in relation to the nominal pressure and is based on the internal resolution iR.

Specification: CiA DS408

Valve_ActualValueConditioning_MinimumPressure

<MinimumPressure> Lower level of measured pressure, related to the parameter <MinimumTransducerSignal>. The value is provided in relation to the nominal pressure and is based on the internal resolution iR.

Specification: CiA DS408

Valve_ActualValueConditioning_MaximumTransducerSignal

<MaximumTransducer-Signal> Transducer signal at the upper measured pressure level. The signal is based to the internal resolution iR.

ℹ In its original delivery condition, the resulting pressure signal at nominal pressure is 100%, which corresponds to the value 16384 based on the internal resolution iR.

Specification: CiA DS408

Valve_ActualValueConditioning_MinimumTransducerSignal

<MinimumTransducer-Signal>

Transducer signal at the smallest measured pressure level. The signal is related to the internal resolution iR

ℹ In its original delivery condition, the resulting pressure signal at atmospheric pressure is 0%, which corresponds to zero based on the internal resolution iR.

Specification: CiA DS408

Valve_ActualValueConditioning_PressureOffset

<PressureOffset>

Correctional value that is added to the transducer signal.

Specification: CiA DS408

8.4.3.2 Pressure control parameters

The pressure controller output signal is fed to the subordinated controller (servo valve: spool position controller, radial piston pump: stroke ring controller) as a demand value. The controller structure corresponds to a PIDT1 controller; however, unlike a PIDT1 controller, the DT1 partition is derived not from the control deviation but from the actual pressure value. This modification of PIDT1 structure typically leads to a better damping behavior in hydraulic drives.

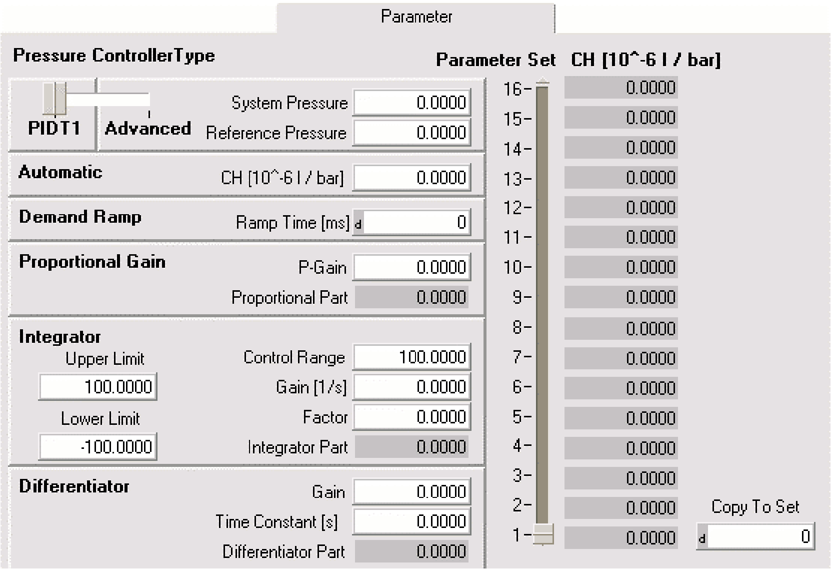
The integrator works within a freely adjustable control window with the specified integrator gain. Outside of this control window, the integrator can be operated with a deviating gain that is derived from a factor and the adjusted integrator gain. The integrator is equipped with an anti-wind-up mechanism that prevents the drifting of the integration value when the pressure level cannot be achieved.

The demand value can be limited via a ramp to a defined rate in order to reduce over-shoots of the pressure in case of commanded pressure jumps.

By means of a control parameter estimation, the proportional-, integrator-, and the differentiation gain as well as the maximum pressure demand rate can automatically be set by adjusting just one parameter. This parameter corresponds to the hydraulic capacity C_H (liters/bar) of the volume to be controlled and can be easily estimated or evaluated.

Switching to a PIDT1 controller with additional gain compensation for altered working and system pressure can, in many cases, improve the control quality.

Sixteen pressure controller parameter sets are available, selectable by just one parameter. Thereby a simple and fast change over to various controller settings in real-time is possible..



Parameter

Pressure ControllerType

PIDT1 | Advanced

System Pressure 0.0000

Reference Pressure 0.0000

Automatic

CH [10^-6 l / bar] 0.0000

Demand Ramp

Ramp Time [ms] 0

Proportional Gain

P-Gain 0.0000

Proportional Part 0.0000

Integrator

Upper Limit 100.0000

Lower Limit -100.0000

Control Range 100.0000

Gain [1/s] 0.0000

Factor 0.0000

Integrator Part 0.0000

Differentiator

Gain 0.0000

Time Constant [s] 0.0000

Differentiator Part 0.0000

Parameter Set	CH [10^-6 l / bar]
16	0.0000
15	0.0000
14	0.0000
13	0.0000
12	0.0000
11	0.0000
10	0.0000
9	0.0000
8	0.0000
7	0.0000
6	0.0000
5	0.0000
4	0.0000
3	0.0000
2	0.0000
1	0.0000

Copy To Set 0

Fig. 49: Parameter tab

ValvePressureControl_PressureControllerType

<PressureController-Type>

The pressure controller type selects between a standard PIDT1 controller structure to a PIDT1 controller structure with additional gain compensation for altered working and system pressure.

One of the options {PIDT1} or {Advanced}.can be selected by either clicking or dragging the slider.

PIDT1

{PIDT1}

The pressure controller works as a PIDT1 controller.

Specification: manufacturer-defined

Advanced

{Advanced}

The pressure controller works as a PIDT1 controller with gain compensation for altered working and system pressure.

Specification: manufacturer-defined

ValvePressureControl_SystemPressure

<SystemPressure>

The system pressure must be known in order for the pressure controller to function properly in the mode {Advanced}.

Specification: manufacturer-defined

ValvePressureControl_ReferencePressure

<ReferencePressure>

The working pressure must be known in order for the pressure controller to function properly in the mode {Advanced}. The working pressure corresponds to the mean pressure level for which the PIDT1 controller was optimized.

Specification: manufacturer-defined

ValvePressureControl_HydraulicCapacity

<HydraulicCapacity>

The hydraulic capacity C_H (liters/bar) of the volume to be controlled serves to automatically set the proportional-, integration-, and differentiation gain or time constant, respectively, as well as the pressure demand rate.

ValvePressureControl_RampSlope

<RampSlope>

The maximum pressure rate of the commanded pressure demand is limited by means of a ramp. The value of this parameter corresponds to the ramp time in milliseconds.

> The ramping time corresponds to the time that the output signal needs for a change of 0 to 100%.

ValvePressureControl_ProportionalGain

<ProportionalGain>

The proportional gain of the pressure controller.

Specification: manufacturer-defined

ValvePressureControl_ProportionalPart

<ProportionalPart>

The proportional part of the pressure controller's proportional controller unit. This parameter can be used to observe the behavior of the proportional part.

Specification: manufacturer-defined

ValvePressureControl_IntegratorControlRange

<IntegratorControlRange>

The control range of the pressure controller's integrator. If the pressure control deviation is within this range, then the integrator is working with the adjusted integrator gain <ValvePressureControl_IntegratorGain>; if the pressure control deviation is out of this range, then there is a gain effective that is calculated from the factor <ValvePressureControl_IntegratorFactor> and the adjusted integrator gain.

Specification: manufacturer-defined

ValvePressureControl_IntegratorGain

<IntegratorGain>

The pressure controller's integrator gain in 1/millisecond.

Specification: manufacturer-defined

ValvePressureControl_IntegratorFactor

<IntegratorFactor>

The pressure controller's integrator gain factor weights the integrator gain <ValvePressureControl_IntegratorGain> in case the pressure control deviation is out of the adjusted integrator control range <ValvePressureControl_IntegratorControlRange>.

Specification: manufacturer-defined

ValvePressureControl_IntegratorUpperLimit

<IntegratorUpperLimit>

The upper limit of the integrator part, that the pressure controller is allowed to reach.

Specification: manufacturer-defined

ValvePressureControl_IntegratorLowerLimit

<IntegratorLowerLimit> The lower limit of the integrator part, that the pressure controller is allowed to reach.

Specification: manufacturer-defined

ValvePressureControl_IntegratorPart

<IntegratorPart> The integral proportion of the pressure controller's integrator. This parameter can be used to observe the behavior of the integrator.

Specification: manufacturer-defined

ValvePressureControl_DifferentiatorGain

<DifferentiatorGain> The pressure controller's differentiator gain.

Specification: manufacturer-defined

ValvePressureControl_DifferentiatorT1

<DifferentiatorT1> The time constant of the pressure controller's differentiator in milliseconds.

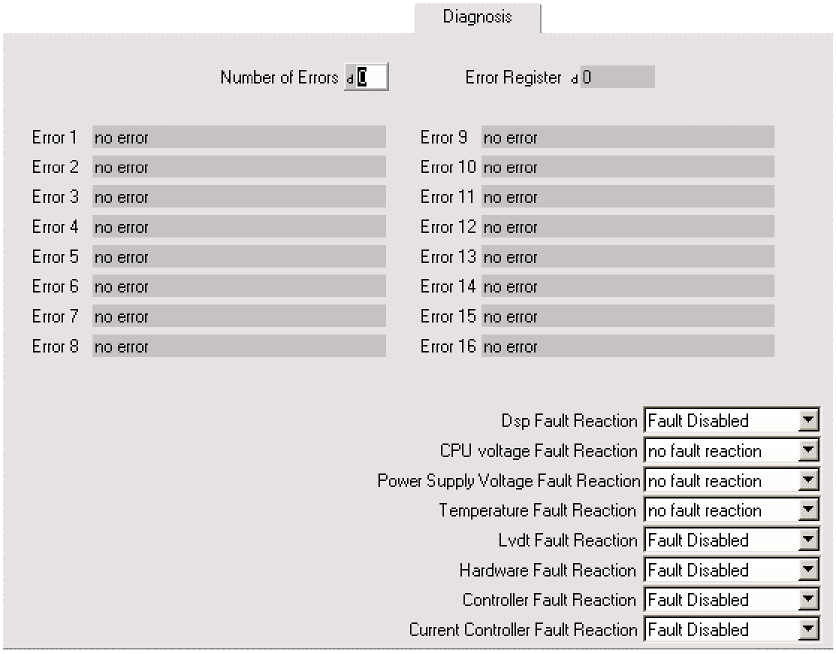
Specification: manufacturer-defined

<DifferentiatorPart> The differentiation part of the pressure controller differentiator. This parameter can be used to observe the behavior of the differentiator.

Specification: manufacturer-defined

8.5 Diagnosis

In the Diagnosis tab error-diagnostics parameters as well as parameters for configuring the fault reaction during certain types of faults can be found.



Diagnosis

Number of Errors d 0 Error Register d 0

Error 1	no error	Error 9	no error
Error 2	no error	Error 10	no error
Error 3	no error	Error 11	no error
Error 4	no error	Error 12	no error
Error 5	no error	Error 13	no error
Error 6	no error	Error 14	no error
Error 7	no error	Error 15	no error
Error 8	no error	Error 16	no error

Dsp Fault Reaction	Fault Disabled
CPU voltage Fault Reaction	no fault reaction
Power Supply Voltage Fault Reaction	no fault reaction
Temperature Fault Reaction	no fault reaction
Lvdt Fault Reaction	Fault Disabled
Hardware Fault Reaction	Fault Disabled
Controller Fault Reaction	Fault Disabled
Current Controller Fault Reaction	Fault Disabled

Fig. 50: Diagnosis tab

8.5.1 Error detection

8.5.1.1 Pre-defined Error Field

The errors are stored in a list with 16 entries. The error codes are defined in the DS408 device profile.

PreDefinedErrorField_NumberOfErrors

The number of saved errors in the *Pre-defined Error Field*. **<NumberOfErrors>**

Specification: DS301

PreDefinedErrorField_StandardErrorField

A list with 16 entries in which the error code for describing the cause of the error as well as manufacturer-defined information is stored. The most recently entered error is always in the first position of the list, thereby producing a chronological order. **<StandardErrorField>**

Specification: DS301

PreDefinedErrorField_ErrorRegister

An error register that permits classification of the most recently appearing error by means of bit coding. **<ErrorRegister>**

Specification: DS301

8.5.2 Handling faults

8.5.2.1 Fault reaction

The fault reactions {no fault reaction}, {Emergency Message}, {Fault Hold}, and {Fault Disabled} are available for selection.

No fault reaction

The fault is ignored and no fault reaction occurs. **{No fault reaction}**

Emergency Message

Send an emergency message, no other fault reaction. **{Emergency Message}**

Fault Hold

Send an emergency message, switch to the device status FAULT HOLD (see chapter 8.1.5). **{Fault Hold}**

Fault Disabled

Send an emergency message, switch to the status FAULT DISABLED (see chapter 8.1.5). **{Fault Disabled}**

8.5.2.2 Fault types

FaultReaction_DspErrorFaultReaction

Fault reaction when a fault appears in the digital signal processing. **<DspErrorFaultReaction>**

Specification: manufacturer-defined

FaultReaction_CpuSupplyFaultReaction

<CpuSupplyFaultReaction>

Fault reaction when the CPU's supply voltage is lower or greater than permitted.

Specification: manufacturer-defined

FaultReaction_PowerSupplyFaultReaction

<PowerSupplyFaultReaction>

Fault reaction when the device's supply voltage is lower or higher than permitted.

Specification: manufacturer-defined

FaultReaction_TemperatureFaultReaction

<TemperatureFaultReaction>

Fault reaction when the ambient temperature is lower or higher than permitted.

Specification: manufacturer-defined

FaultReaction_LvdtErrorFaultReaction

<LvdtErrorFaultReaction>

Fault reaction when there is a fault in the spool position transducer.

Specification: manufacturer-defined

FaultReaction_HardwareErrorFaultReaction

<HardwareErrorFaultReaction>

Fault reaction when there is a general fault in the electronics hardware.

Specification: manufacturer-defined

FaultReaction_ControlErrorFaultReaction

<ControlErrorFaultReaction>

Fault reaction when there is a controller fault in the spool controller or pressure controller.

Specification: manufacturer-defined

FaultReaction_CurrentControlErrorFaultReaction

<CurrentControlErrorFaultReaction>

Fault reaction when there is a controller fault in the current regulator.

Specification: manufacturer-defined

8.6 Saving and restoring

Parameters are saved and restored in accordance with the procedure described in the CANopen Standard DS301.

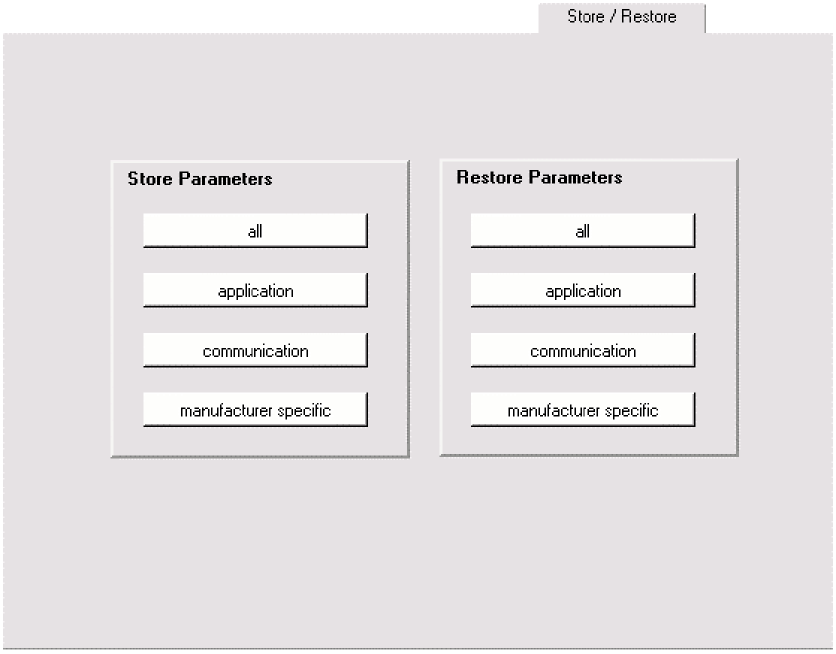


Fig. 51: Save/restore function

8.6.1 Saving parameters

Via the buttons {all}, {application}, {communication}, {manufacturer defined} on the left side of the tab, the parameters will be non-volatile saved in the device .

8.6.1.1 All

{All}

Saves all parameters in the device's non-volatile memory. After acknowledge of the dialog that opens, a signature will be written to the parameter <SaveAllParameters> so that the data will be saved in the device.

StoreParameters_SaveAllParameters

<SaveAllParameters>

Saves all parameters in the non-volatile memory.

Specification: DS301

8.6.1.2 Application

{Application}

Saves all application parameters in the device's non-volatile memory. After acknowledge of the dialog that opens, a signature will be written to the parameter <SaveApplicationParameters> so that the data will be saved in the device.

StoreParameters_SaveApplicationParameters

<SaveApplication-Parameters>

Saves all application parameters in the non-volatile memory. Application parameters include all parameters that are defined in the DS408 device profile.

Specification: DS301

8.6.1.3 Communication

{Communication}

Saves all communication parameters in the device's non-volatile memory. After acknowledge of the dialog that opens, a signature will be written to the parameter <SaveCommunicationParameters> so that the data will be saved in the device.

StoreParameters_SaveCommunicationParameters

<SaveCommunicationParameters>

Saves all communication parameters in the non-volatile memory. Communication parameters include all parameters that are defined in the CANopen Standard DS301.

Specification: DS301

8.6.1.4 Manufacturer defined

{Manufacturer defined}

Saves all manufacturer-defined parameters in the device's non-volatile memory. After acknowledge of the dialog that opens, a signature will be written to the parameter <SaveManufacturerDefinedParameters> so that the data will be saved in the device.

StoreParameters_SaveManufacturerDefinedParameters

<SaveManufacturerDefinedParameters>

Saves all manufacturer-defined parameters in the non-volatile memory.

Specification: DS301

8.6.2 Restoring parameters

Via one of the buttons {all}, {application}, {communication}, {manufacturer defined} on the right side of the tab, the factory parameter settings can be restored. Depending on the parameter group, it will then be necessary to reset the device by means of the *reset communication* or *reset application* services (see chapter 8.2.1.2) in order to finalize restoration of the parameters.

8.6.2.1 All

{All}

Restores the factory settings for all parameters in the device. After acknowledge of the dialog that opens, a signature will be written to the parameter <RestoreAllDefaultParameters> so that the device is prepared for restoration.

StoreParameters_RestoreAllDefaultParameters

<RestoreAllDefaultParameters>

Restores the factory settings for all parameters.

Specification: DS301

ℹ In order to restore the factory settings, after this parameter was written, a reset of the device needs to be performed by means of the NMT service *reset application*.

8.6.2.2 Application

{Application}

Restores the factory settings for application parameters in the device. After acknowledge of the dialog that opens, a signature will be written to the parameter <RestoreApplicationDefaultParameters> so that the device is prepared for restoration.

StoreParameters_RestoreApplicationDefaultParameters

<RestoreApplicationDefaultParameters>

Restores the factory settings for application parameters. Application parameters include all parameters that are defined in the DS408 device profile.

Specification: DS301

In order to restore the factory settings, after this parameter was written, a reset of the device needs to be performed by means of the NMT service *reset application*.

8.6.2.3 Communication

{Communication}

Restores the factory settings for communication parameters in the device. After acknowledge of the dialog that opens, a signature will be written to the parameter <RestoreCommunicationDefaultParameters> so that the device is prepared for restoration.

StoreParameters_RestoreCommunicationDefaultParameters

<RestoreCommunicationDefaultParameters>

Restores the factory settings for communication parameters. Communication parameters include all parameters that are defined in the CANopen Standard DS301.

Specification: DS301

In order to restore the factory settings, after this parameter was written, a reset of the device needs to be performed by means of the NMT service *reset application* or *reset communication* .

8.6.2.4 Manufacturer defined

{Manufacturer defined}

Restores the factory settings for manufacturer-defined parameters in the device. After acknowledge of the dialog that opens, a signature will be written to the parameter <RestoreManufacturerDefinedDefaultParameters> so that the device is prepared for restoration.

StoreParameters_RestoreManufacturerDefinedDefaultParameters

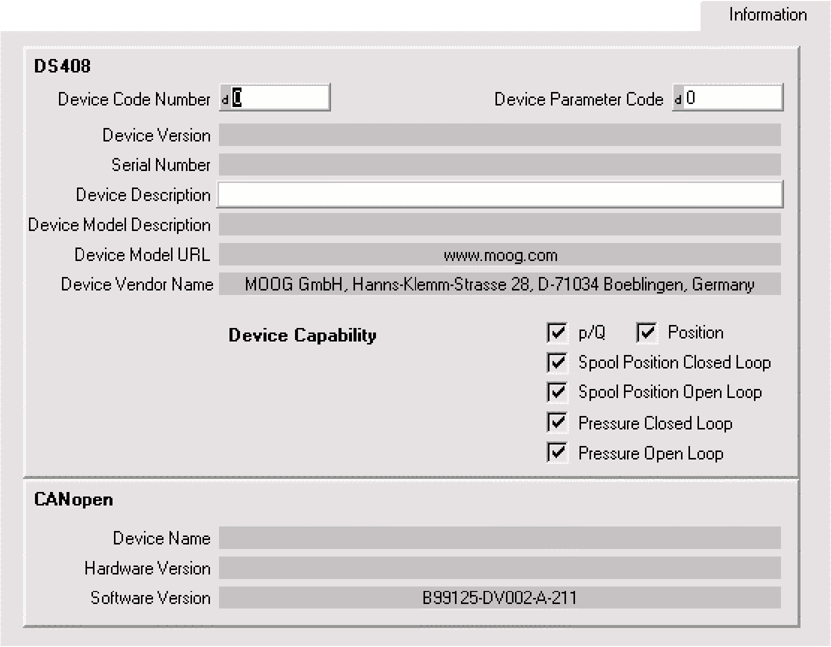
<RestoreManufacturerDefinedDefaultParameters>

Restores the factory settings for manufacturer-defined parameters.

Specification: DS301

In order to restore the factory settings, after this parameter was written, a reset of the device needs to be performed by means of the NMT service *reset application*.

8.7 Device information



DS408

Device Code Number d 0

Device Parameter Code d 0

Device Version

Serial Number

Device Description

Device Model Description

Device Model URL www.moog.com

Device Vendor Name MOOG GmbH, Hanns-Klemm-Strasse 28, D-71034 Boeblingen, Germany

Device Capability

☑ p/Q ☑ Position

☑ Spool Position Closed Loop

☑ Spool Position Open Loop

☑ Pressure Closed Loop

☑ Pressure Open Loop

CANopen

Device Name

Hardware Version

Software Version B99125-DV002-A-211

Fig. 52: Information tab

8.7.1 Device profile, informational parameters

8.7.1.1 Device_CodeNo

An individual code that will identify the device in the machinery can be entered here. **<CodeNo>**

Specification: DS408

8.7.1.2 Device_ParameterSetCode

An individual parameterization code can be entered here. As soon as the factory settings are restored, this code will be reset to null. **<ParameterSetCode>**

Specification: DS408

8.7.1.3 Device_DeviceVersion

Specifies the device version. **<DeviceVersion>**

Specification: DS408

8.7.1.4 Device_SerialNo

The device's serial number. **<SerialNo>**

Specification: DS408

8.7.1.5 Device_Description

An individual descriptive text that will identify the device in the machinery can be entered here. **<Description>**

Specification: DS408

8.7.1.6 Device_ModelDescription

The device's model description. **<ModelDescription>**

Specification: DS408

8.7.1.7 Device_ModelURL

An Internet address under which additional information is available about the device. **<ModelURL>**

Specification: DS408

8.7.1.8 Device_VendorName

The manufacturer's name. **<VendorName>**

Specification: DS408

8.7.1.9 Device_Capability

Description of functions that support the device. **<Capability>**

Specification: DS408

8.7.2 CANopen information parameter

8.7.2.1 Device_ManufacturerDeviceName

<ManufacturerDeviceName>

The device's manufacturer name.

Specification: DS301

8.7.2.2 Device_ManufacturerHardwareVersion

<ManufacturerHardwareVersion>

The device's hardware version.

Specification: DS301

8.7.2.3 Device_ManufacturerSoftwareVersion

<ManufacturerSoftwareVersion>

The device's software version.

Specification: DS301

For your notes

9 What to do in case of problems?

9.1 CAN interface card

Outdated or incompatible driver version

Outdated or incompatible driver versions can lead to problems when operating the program with a CAN interface card. The actual driver version can be viewed in the bus configuration view.

Solution: Uninstall the outdated or incompatible driver and then install the driver version recommended for the CAN interface card.

CAN interface card not initialized

The CAN interface card was not yet initialized.

Solution: Perform an initialization, assuming that a CAN interface card is installed in the PC which the program supports.

9.2 CAN bus cabling

No CAN communication or faulty communication

If the CAN bus cabling is not installed properly, the CAN communication may be severely disturbed or it may not be possible to send or receive any messages at all (communication error).

Solution: Check the cabling (the plug's pin assignment) and make sure the CAN bus termination is correct. Compare the interface number of the CAN port attached to the CAN bus to the interface number set in the program.

9.3 Device's CAN bit rate is not known

No CAN communication

CAN communication will not be possible if the device's bit rate is unknown.

Solution: First connect the device directly to the PC's CAN interface card (there may be no other bus nodes attached to the CAN bus). Set the lowest bit rate and switch to the online mode. Then disconnect the device's voltage supply for a few seconds and then reconnect it. Look in the warnings display to see if a boot-up message appears. If no message appears, repeat this process with the next-highest bit rate until the boot-up message could be received.

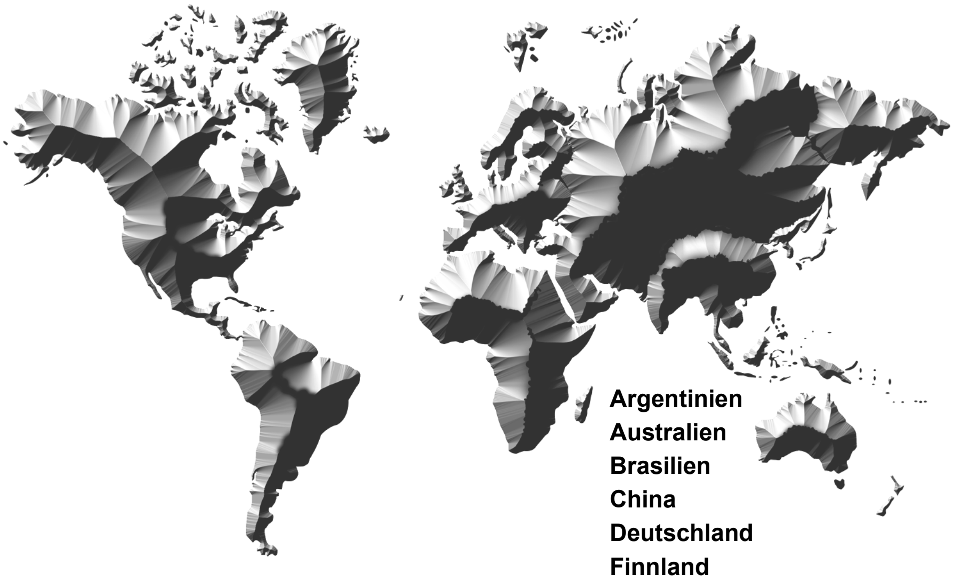
Attention: all bus nodes must be set to the same bit rate.

9.4 The device's node ID is not known

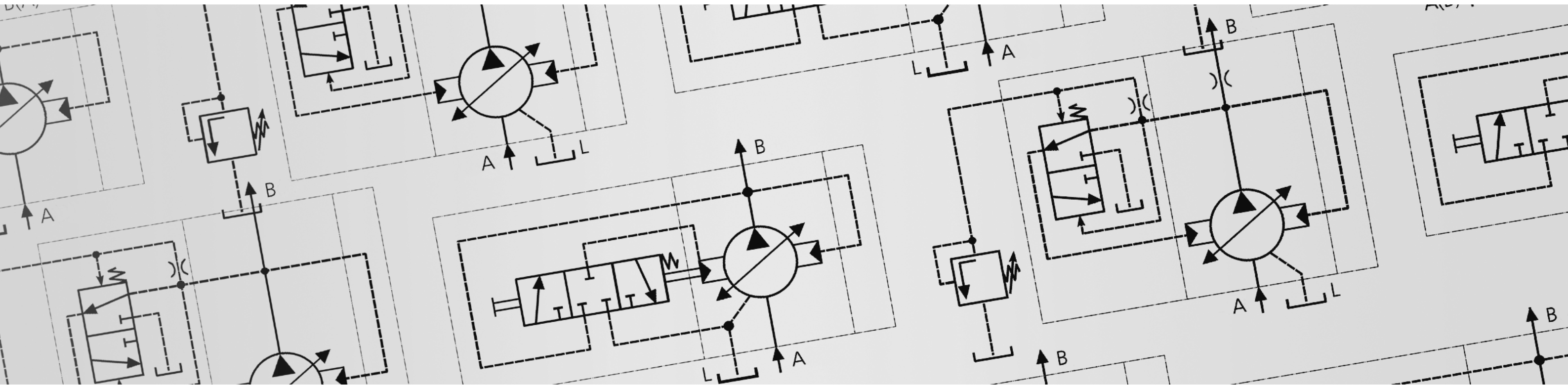
Connection not established

If the node ID set for the device is not known, it will not be possible to establish a connection to the attached bus nodes.

Solution: Switch to the online mode in the program's bus configuration view. Then disconnect the device's voltage supply for a few seconds and then reconnect it. A boot-up message from the device (with indication of the node ID) will appear in the warnings display.



Argentinien
Australien
Brasilien
China
Deutschland
Finnland
Frankreich
Großbritannien
Indien
Irland



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