ibaPDA-Interface-CAN

Data Interface for CAN bus

Manual

Issue 1.0

Measurement Systems for Industry and Energy

www.iba-ag.com

Manufacturer

iba AG

Koenigswarterstrasse 44

90762 Fuerth

Germany

Contacts

Main office	+49 911 97282-0
Support	+49 911 97282-14
Engineering	+49 911 97282-13
E-mail	iba@iba-ag.com
Web	www.iba-ag.com

Version	Date	Revision	Author	Version SW
1.0	10-2025	First edition	nm	8.12.0

Contents

1 About this documentation

This documentation describes the function and application of the software interface *ibaPDA-Interface-CAN*.

Other documentation

This documentation is a supplement to the *ibaPDA* manual. Information about all the other characteristics and functions of *ibaPDA* can be found in the *ibaPDA* manual or in the online help.

1.1 Target group and previous knowledge

This documentation is aimed at qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as professional if he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

For the handling of *ibaPDA-Interface-CAN* the following basic knowledge is required and/or useful:

- Basic knowledge of *ibaPDA*
- Knowledge of configuration and operation of the relevant measuring devices/measuring systems

1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu *Logic diagram*
Calling the menu command	*Step 1 – Step 2 – Step 3 – Step x* Example: Select the menu *Logic diagram – Add – New function block*.
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
Filenames, paths	`Filename`, `Path` Example: `Test.docx`

1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:

Danger!

The non-observance of this safety information may result in an imminent risk of death or severe injury:

- Observe the specified measures.

Warning!

The non-observance of this safety information may result in a potential risk of death or severe injury!

- Observe the specified measures.

Caution!

The non-observance of this safety information may result in a potential risk of injury or material damage!

- Observe the specified measures

Note

A note specifies special requirements or actions to be observed.

Tip

Tip or example as a helpful note or insider tip to make the work a little bit easier.

Other documentation

Reference to additional documentation or further reading.

2 System requirements

The following system requirements are necessary for the use of the CAN data interface:

Software

- *ibaPDA* v8.12.0 or higher
- License for *ibaPDA-Interface-CAN*
  for up to 2 connections to Ethernet/CAN gateways

  If you need more than 2 connections, you will require additional *one-step-up-Interface-CAN* licenses for each additional 2 connections. A total of up to 256 connections are possible.

For further requirements for the used computer hardware and the supported operating systems, refer to the *ibaPDA* documentation.

Hardware

The following Ethernet/CAN gateways are currently supported:

- CAN-Ethernet gateway (2 channels) from iba (art. no. 19.000040)
- Ethernet/CAN Gateway EtherCAN CI-ARM9/RMD-IBA of EMS Thomas Wünsche
  (art. no. 12-20-383-20)

  Ethernet/CAN interface with 32-bit microcontroller (ARM9 core) and two internal CAN controllers, preconfigured for iba AG

License information

Order no.	Product name	Description
31.001027	ibaPDA-Interface-CAN	*ibaPDA* data interface for connecting CAN gateways, up to 2 connections possible
31.101027	one-step-up-Interface-CAN	Extension license for 2 additional connections Maximum 256 connections possible

3 CAN interface

The CAN interface is suitable for data acquisition from a CAN bus (Controller Area Network) as a data source. The interface was developed as a successor to the *ibaBM-CAN* device and replaces it.

The following devices are currently supported:

- CAN Ethernet gateway (2-channel) from iba (art. no. 19.000040)
- Ethernet/CAN-Gateway EtherCAN CI-ARM9/RMD-IBA of the manufacturer EMS Thomas Wünsche (art. no. 12-20-383-20)

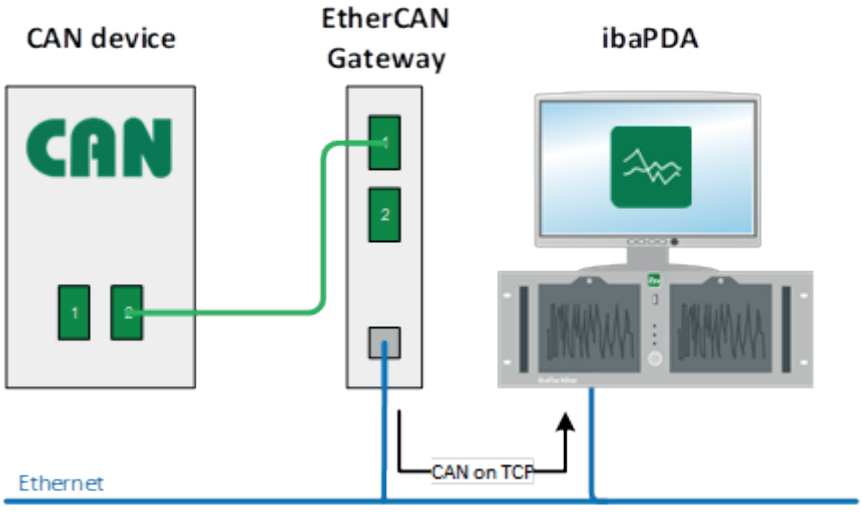
  Ethernet/CAN interface with 32-bit microcontroller (ARM9 core) and two internal CAN controllers, preconfigured for iba AG

Other documentation

Further information can be found on the manufacturer's website:
https://www.ems-wuensche.com

3.1 System topologies

A CAN-Ethernet gateway is used to establish the connection between the CAN bus and *ibaPDA*. This means that the Ethernet network interface can simply be used on the *ibaPDA* side.



The device has two CAN bus connections so that communication with two CAN bus networks is possible with one device. The interface license allows up to two connections.

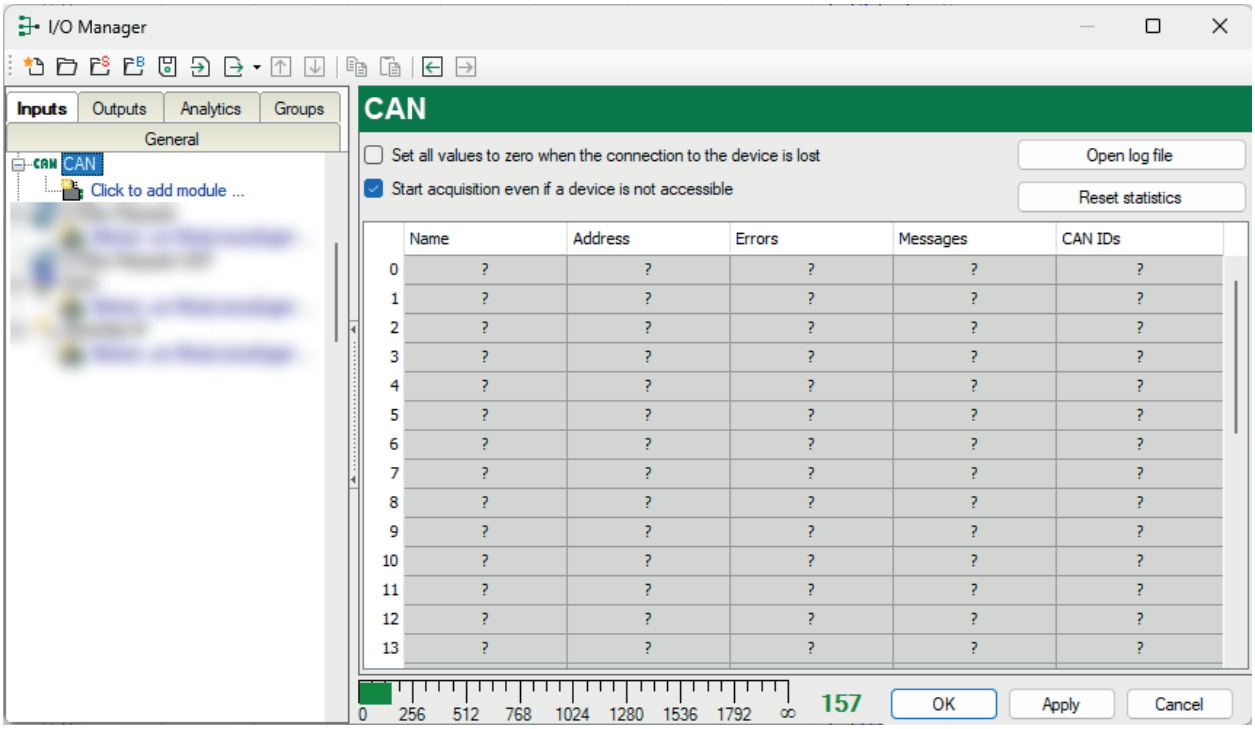
For easier configuration of the measurement data, the interface offers automatic detection of active CAN bus devices.

3.2 Configuration and engineering ibaPDA

The engineering for *ibaPDA* is described in the following. If all system requirements are fulfilled, *ibaPDA* displays the *CAN* interface in the signal tree of the I/O Manager.

3.2.1 Interface settings

The interface has the following functions and configuration options:



Set all values to zero when the connection to a device is lost
If this option is enabled, all measured values of a device are set to zero as soon as the connection is lost. If this option is disabled, *ibaPDA* will keep the last valid measured value at the time the connection was lost in the memory.

Start acquisition even if a device is not accessible
If this option is enabled, the acquisition will start even if *ibaPDA* was not able to establish a connection to a device or if there is an error in the configuration. In case of a an error, a warning is indicated in the validation dialog. If the system has been started without a connection to the device, *ibaPDA* will periodically try to connect to the device.

<Open log file>
Messages relating to the interface are written to a separate log file. To open the current log file, click on <Open log file>.

<Reset statistics>
Click this button to reset the calculated times and error counters in the table to 0.

Connection table
For each connection, the table shows the connection status, the current values for the update time (actual value, average, min. and max.) as well as the data size. In addition, there is an error counter for the individual connections during the acquisition.

Connection table
For each connection, the table shows the connection status, the number of messages received and an error counter for the individual connections during the measurement.

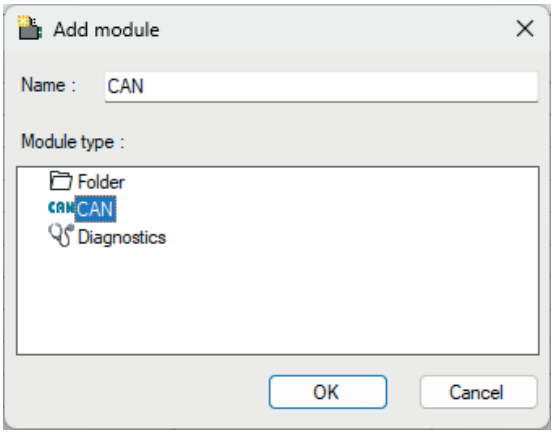
For more information on the connection table, see ↗ *Connection table*, page 17.

3.2.2 Adding a module

Add a *CAN* module for each CAN connection.

Procedure

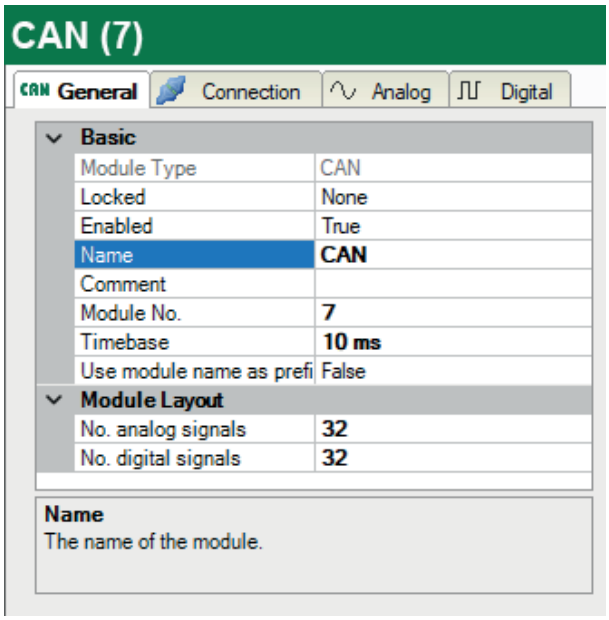
1. Click on the blue link *Click to add module* located under each data interface in the *Inputs* or *Outputs* tab.
2. Select the desired module type in the dialog box and assign a name via the input field if required.
3. Confirm the selection with <OK>.



3.2.3 General module settings

To configure a module, select it in the tree structure.

All modules have the following setting options.



Basic settings

Module Type (information only)
Indicates the type of the current module.

Locked
You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled
Enable the module to record signals.

Name
You can enter a name for the module here.

Comment
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Module No.
This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Timebase
All signals of the module are sampled on this timebase.

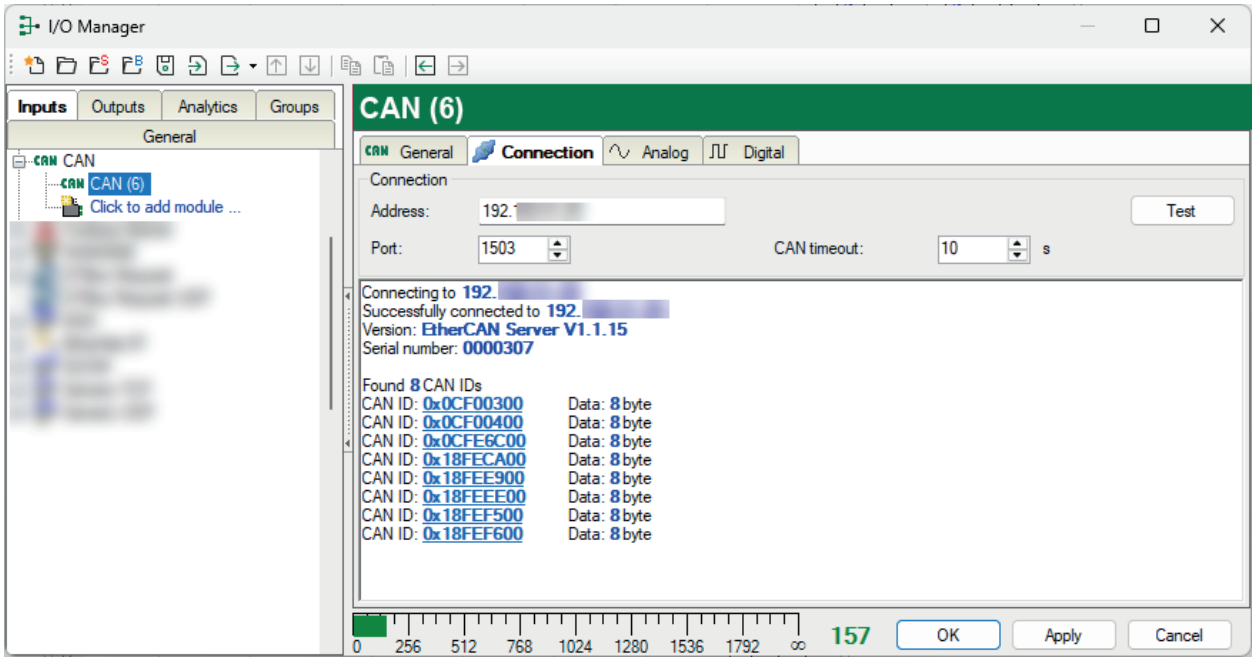
Use module name as prefix
This option puts the module name in front of the signal names.

Module Layout

No. analog signals/No. digital signals
Define the number of configurable analog and digital signals in the signal tables. The default value is 32 for each. The maximum value is 1000. The signal tables are adjusted accordingly.

3.2.4 Connection settings

Configure and test the connection to the respective CAN gateway in the *Connection* tab.



Connection

Address
Enter the IP address or the host name of the CAN gateway.

Port
Port via which *ibaPDA* is to receive data

CAN timeout
Here you can specify a value for the timeout in seconds for establishing the connection and for read accesses. If the time set here is exceeded, *ibaPDA* declares the device unavailable.

<Test>
If you click on this button, the connection to the specified IP address is tested. *ibaPDA* also attempts to open the specified ports and read some information from the device.

ibaPDA scans the bus for 3 seconds and displays the CAN IDs found. *ibaPDA* asks if you want to add analog signals for the CAN ID data when you click on one of the CAN IDs.

For further information see ↗ *Signal configuration*, page 12.

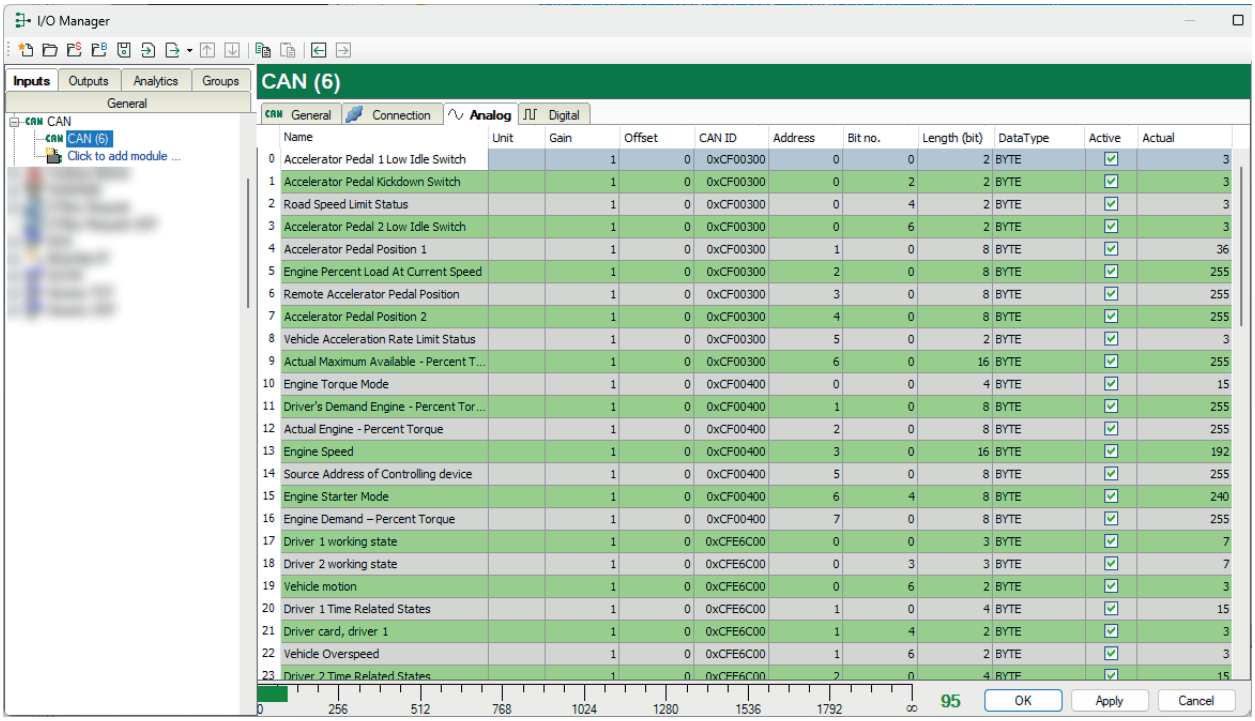
3.2.5 Signal configuration

In the *Analog* and *Digital* tabs, you can configure the signals for the CAN gateways

Other documentation

Detailed descriptions of the columns and how to fill in the signal tables can be found in the documentation for *ibaPDA*.

Analog and Digital tab



Name
Enter a meaningful plain text name for the signal.

Unit (analog signals only)
Assignment of a physical unit for the signal

You can enter a maximum of 11 characters, the field is only considered a comment field. The unit is always displayed in conjunction with a numerical display of the values.

Gain, Offset (analog signals only)
Specification of gain and offset for scaling the incoming values

The values describe a linear characteristic curve for scaling. If incoming values are specified in physical units, you can ignore this function, i.e. Gain = 1 and Offset = 0.

CAN ID
ID of the associated CAN message

Address
Byte address within the 8 data bytes of a CAN message

Length (bit) (analog signals only)
Length of the message in bits

If you change the data type, this length changes automatically if it was equal to the bit length of the data type. It can be used to use only a few bits of a byte.

Data type (analog signals only)
Selection of the data type of the signal

The data type determines the address of the next signal.

Active
Activation or deactivation of the respective signal

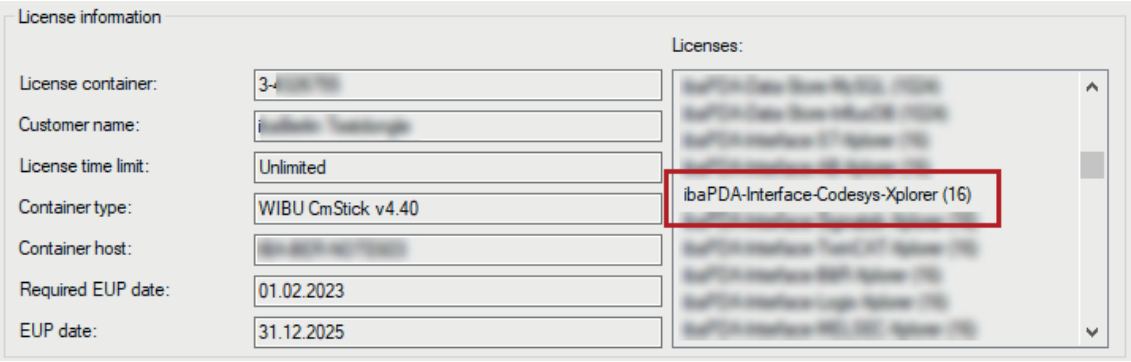
Actual
Display of the current actual value of the signal

4 Diagnostics

4.1 License

If the interface is not displayed in the signal tree, you can either check in *ibaPDA* in the I/O Manager under *General – Settings* or in the *ibaPDA* service status application whether your license for the interface *ibaPDA-Interface-CAN* has been properly recognized. The number of licensed connections is shown in brackets.

The figure below shows the license for the *Codesys Xplorer* interface as an example.



4.2 Visibility of the interface

If the interface is not visible despite a valid license, it may be hidden.

Check the settings in the *General* tab in the *Interfaces* node.

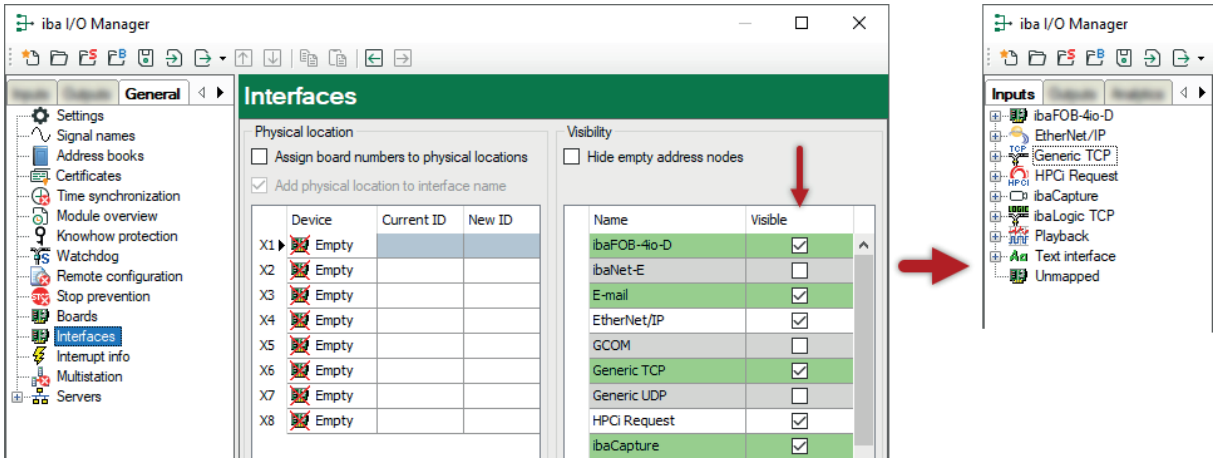
Visibility

The table *Visibility* lists all the interfaces that are available either through licenses or installed cards. These interfaces can also be viewed in the interface tree.

You can hide or display the interfaces not required in the interface tree by using the checkbox in the *Visible* column.

Interfaces with configured modules are highlighted in green and cannot be hidden.

Selected interfaces are visible, the others are hidden:



4.3 Log files

If connections to target platforms or clients have been established, all connection-specific actions are logged in a text file. You can open this (current) file and, e.g., scan it for indications of possible connection problems.

You can open the log file via the button <Open log file>. The button is available in the I/O Manager:

- for many interfaces in the respective interface overview
- for integrated servers (e.g. OPC UA server) in the *Diagnostics* tab.

In the file system on the hard drive, you can find the log files of the *ibaPDA* server (…\ProgramData\iba\ibaPDA\Log). The file names of the log files include the name or abbreviation of the interface type.

Files named `interface.txt` are always the current log files. Files named `Interface_yyyy_mm_dd_hh_mm_ss.txt` are archived log files.

Examples:

- `ethernetipLog.txt` (log of EtherNet/IP connections)
- `AbEthLog.txt` (log of Allen-Bradley Ethernet connections)
- `OpcUAServerLog.txt` (log of OPC UA server connections)

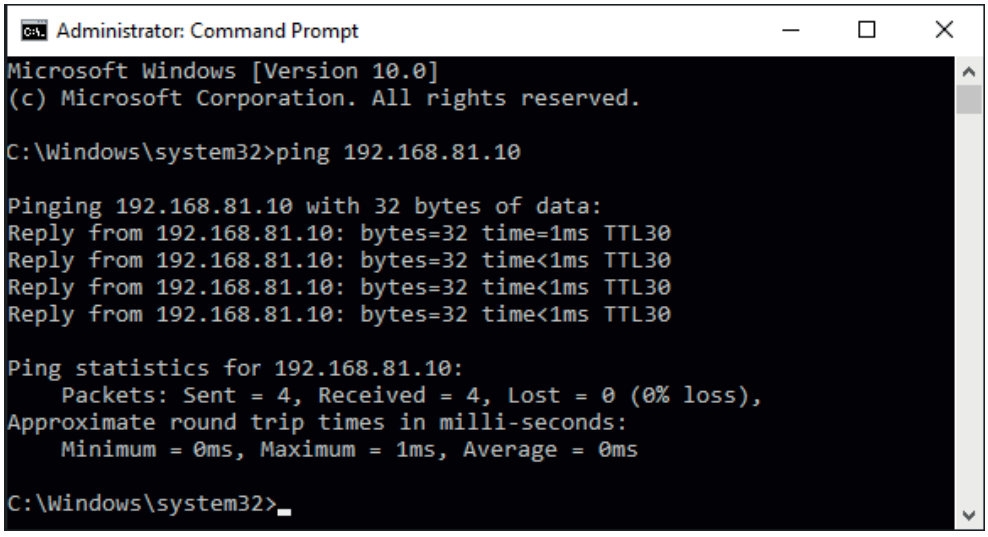
4.4 Connection diagnostics with PING

PING is a system command with which you can check if a certain communication partner can be reached in an IP network.

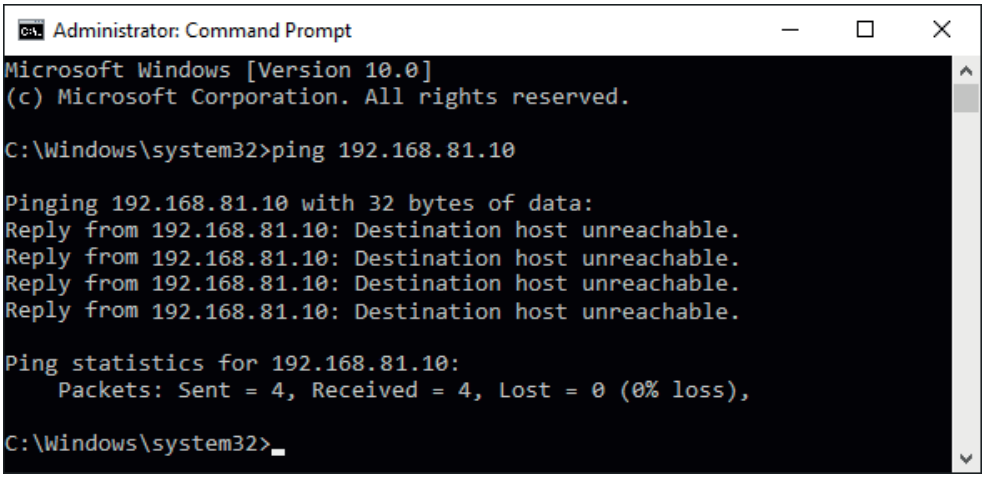
1. Open a Windows command prompt.

2. Enter the command "ping" followed by the IP address of the communication partner and press <ENTER>.

→ With an existing connection you receive several replies.

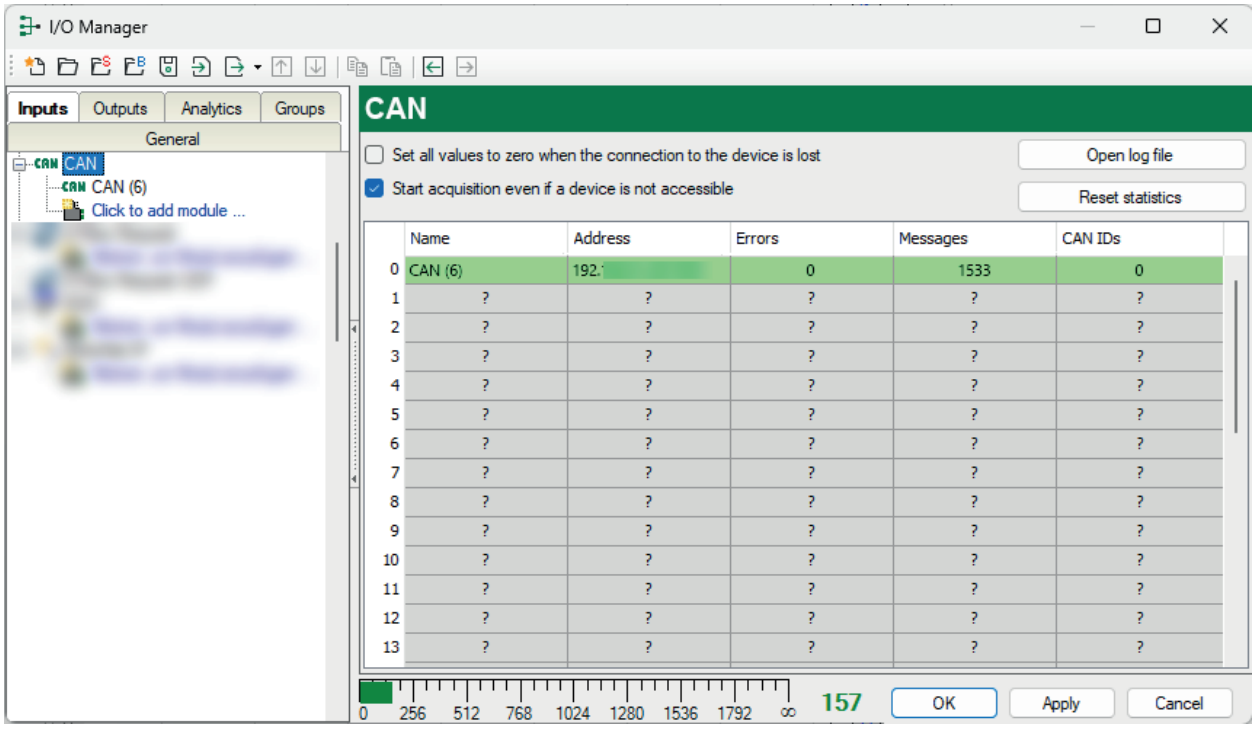


→ With no existing connection you receive error messages.



4.5 Connection table

The CAN interface shows all configured connections to CAN gateways in a table. There is one row per connection to a gateway.



The table columns and their meaning:

- Name: Name of the module
- Address: IP Address or Host Name of the Gateways
- Error: Number of communication errors that occurred

  Counts up if the connection attempt to a gateway fails or the gateway reports an error to the CAN bus.
- Messages: Number of the received messages
- CAN IDs Number of different CAN ID messages received

Additional information is provided by the background color of the table rows:

Color	Meaning
Green	The connection is OK and the data is read.
Red	The connection is not active.
Gray	No connection configured.

4.6 Diagnostic modules

Diagnostic modules are available for most Ethernet based interfaces and Xplorer interfaces. Using a diagnostic module, information from the diagnostic displays (e.g. diagnostic tabs and connection tables of an interface) can be acquired as signals.

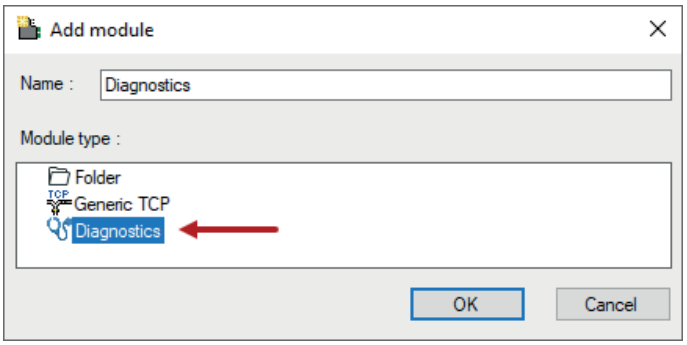
A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module, you can record and analyze the diagnostic information continuously in the *ibaPDA* system.

Diagnostic modules do not consume any license connections because they do not establish their own connection but refer to another module.

Example for the use of diagnostic modules:

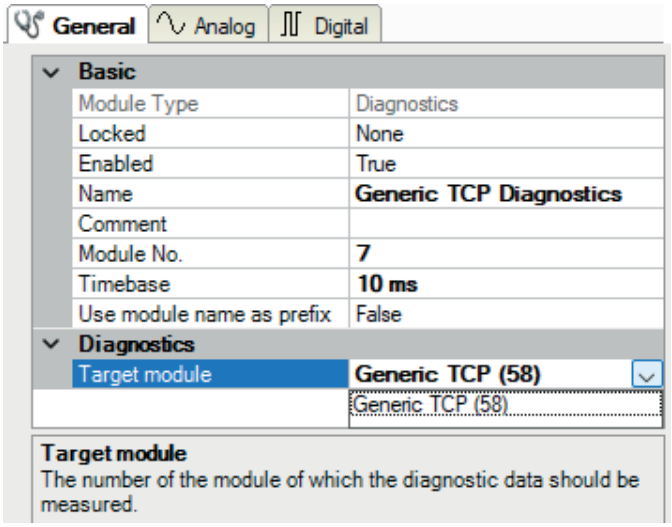
- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized in *ibaQPanel*.
- You can forward diagnostic information via the SNMP server integrated in *ibaPDA* or via OPC DA/UA server to superordinate monitoring systems like network management tools.

In case the diagnostic module is available for an interface, a "Diagnostics" module type is shown in the *Add module* dialog (example: Generic TCP).



Module settings diagnostic module

For a diagnostic module, you can make the following settings (example: Generic TCP):



The basic settings of a diagnostic module equal those of other modules.

There is only one setting which is specific for the diagnostic module: the target module.

By selecting the target module, you assign the diagnostic module to the module on which you want to acquire information about the connection. You can select the supported modules of this interface in the drop-down list of the setting. You can assign exactly one data acquisition module to each diagnostic module. When having selected a module, the available diagnostic signals are immediately added to the *Analog* and *Digital* tabs. It depends on the type of interface, which signals exactly are added. The following example lists the analog values of a diagnostic module for a Generic TCP module.

General | Analog | Digital

	Name	Unit	Gain	Offset	Active	Actual
0	IP address (part 1)		1	0	☑	
1	IP address (part 2)		1	0	☑	
2	IP address (part 3)		1	0	☑	
3	IP address (part 4)		1	0	☑	
4	Port		1	0	☑	
5	Message counter		1	0	☑	
6	Incomplete errors		1	0	☑	
7	Packet size (actual)	bytes	1	0	☑	
8	Packet size (max)	bytes	1	0	☑	
9	Time between data (actual)	ms	1	0	☑	
10	Time between data (min)	ms	1	0	☑	

For example, the IP (v4) address of a Generic TCP module (see fig. above) will always be split into 4 parts derived from the dot-decimal notation, for better reading. Also other values are being determined, as there are port number, counters for telegrams and errors, data sizes and telegram cycle times. The following example lists the digital values of a diagnostic module for a Generic TCP module.

General | Analog | Digital

	Name	Active	Actual
0	Active connection mode	☑	
1	Invalid packet	☑	
2	Connecting	☑	
3	Connected	☑	

Diagnostic signals

Depending on the interface type, the following signals are available:

Signal name	Description
Active	Only relevant for redundant connections. Active means that the connection is used to measure data, i.e. for redundant standby connections the value is 0. For normal/non-redundant connections, the value is always 1.
Buffer file size (actual/avg/max)	Size of the file for buffering statements
Buffer memory size (actual/avg/max)	Size of the memory used by buffered statements
Buffered statements	Number of unprocessed statements in the buffer
Buffered statements lost	Number of buffered but unprocessed and lost statements
Connected	Connection is established
Connected (in)	A valid data connection for the reception (in) is available
Connected (out)	A valid data connection for sending (out) is available
Connecting	Connection being established
Connection attempts (in)	Number of attempts to establish the receive connection (in)
Connection attempts (out)	Number of attempts to establish the send connection (out)
Connection ID O->T	ID of the connection for output data (from the target system to *ibaPDA*). Corresponds to the assembly instance number
Connection ID T->O	ID of the connection for input data (from *ibaPDA* to target system). Corresponds to the assembly instance number
Connection phase (in)	Status of the ibaNet-E data connection for reception (in)
Connection phase (out)	Status of the ibaNet-E data connection for sending (out)
Connections established (in)	Number of currently valid data connections for reception (in)
Connections established (out)	Number of currently valid data connections for sending (out)
Data length	Length of the data message in bytes
Data length O->T	Size of the output message in byte
Data length T->O	Size of the input message in byte
Destination IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to *ibaPDA*)
Destination IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from *ibaPDA* to target system)
Disconnects (in)	Number of currently interrupted data connections for reception (in)
Disconnects (out)	Number of currently interrupted data connections for sending (out)
Error counter	Communication error counter
Exchange ID	ID of the data exchange
Incomplete errors	Number of incomplete messages

Signal name	Description
Incorrect message type	Number of received messages with wrong message type
Input data length	Length of data messages with input signals in bytes (*ibaPDA* receives)
Invalid data points	Number of received data points with missing configuration
Invalid packet	Invalid data packet detected
IP address (part 1-4)	4 octets of the IP address of the target system
Keepalive counter	Number of Keepalive messages received by the OPC UA Server
Lost images	Number of lost images (in) that were not received even after a retransmission
Lost Profiles	Number of incomplete/incorrect profiles
Message counter	Number of messages received
Messages per cycle	Number of messages in the cycle of the update time
Messages received since configuration	Number of received data telegrams (in) since start of acquisition
Messages received since connection start	Number of received data telegrams (in) since the start of the last connection setup. Reset with each connection loss.
Messages sent since configuration	Number of sent data telegrams (out) since start of acquisition
Messages sent since connection start	Number of sent data telegrams (out) since the start of the last connection setup. Reset with each connection loss.
Multicast join error	Number of multicast login errors
Number of request commands	Counter for request messages from *ibaPDA* to the PLC/CPU
Output data length	Length of the data messages with output signals in bytes (*ibaPDA* sends)
Packet size (actual)	Size of the currently received message
Packet size (max)	Size of the largest received message
Ping time (actual)	Response time for a ping telegram
Port	Port number for communication
Producer ID (part 1-4)	Producer ID as 4-byte unsigned integer
Profile Count	Number of completely recorded profiles
Read counter	Number of read accesses/data requests
Receive counter	Number of messages received
Response time (actual/average/max/min)	Response time is the time between measured value request from *ibaPDA* and response from the PLC or reception of the data. Actual: current value Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.
Retransmission requests	Number of data messages requested again if lost or delayed

Signal name	Description
Rows (last)	Number of resulting rows by the last SQL query (within the configured range of result rows)
Rows (maximum)	Maximum number of resulting rows by any SQL query since the last start of acquisition (possible maximum equals the configured number of result rows)
Send counter	Number of send messages
Sequence errors	Number of sequence errors
Source IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to *ibaPDA*)
Source IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from *ibaPDA* to target system)
Statements processed	Number of executed statements since last start of acquisition
Synchronization	Device is synchronized for isochronous acquisition
Time between data (actual/ max/min)	Time between two correctly received messages Actual: between the last two messages Max/min: statistical values since start of acquisition or reset of counters
Time offset (actual)	Measured time difference of synchronicity between *ibaPDA* and the ibaNet-E device
Topics Defined	Number of defined topics
Topics Updated	Number of updated topics
Unknown sensor	Number of unknown sensors
Update time (actual/average/ configured/max/min)	Specifies the update time in which the data is to be retrieved from the PLC, the CPU or from the server (configured). Default is equal to the parameter "Timebase". During the measurement, the real actual update time can be higher than the set value if the PLC needs more time to transfer the data. How fast the data is really updated, you can check in the connection table. The minimum achievable update time is influenced by the number of signals. The more signals are acquired, the greater the update time becomes. Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.
Write counter	Number of successful write accesses
Write lost counter	Number of failed write accesses

5 Appendix

5.1 Configuration of the CAN gateway

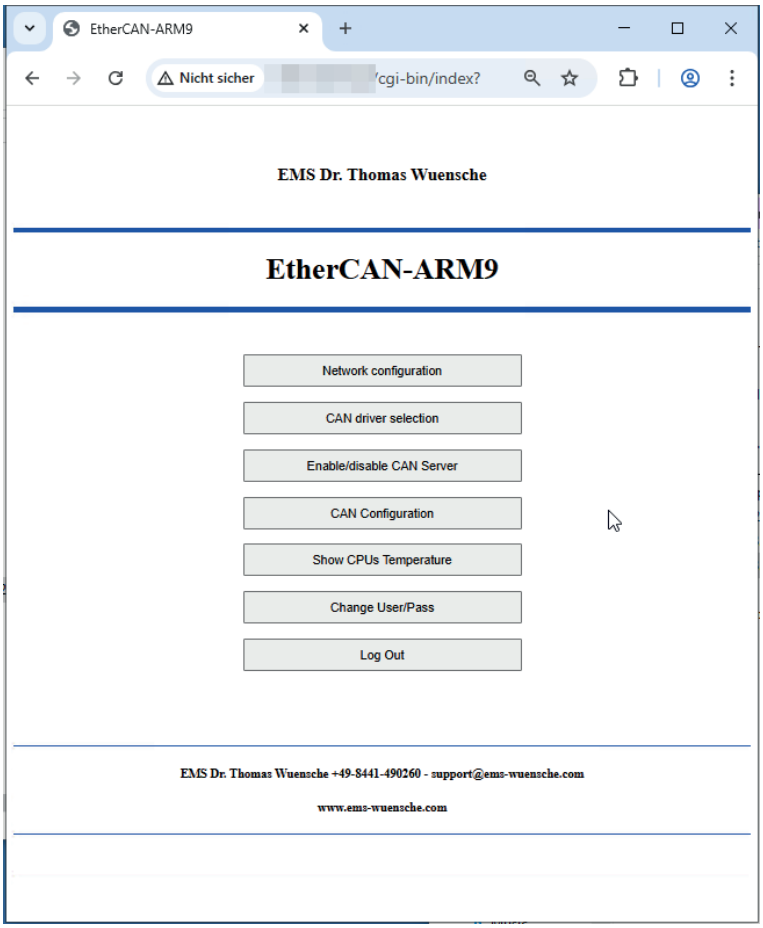
All relevant CAN gateway settings can be accessed via a web server on the device. Information on opening the web server can be found in the manufacturer's documentation.

1. Log in with the initial access data:
   - User: admin
   - Password: admin

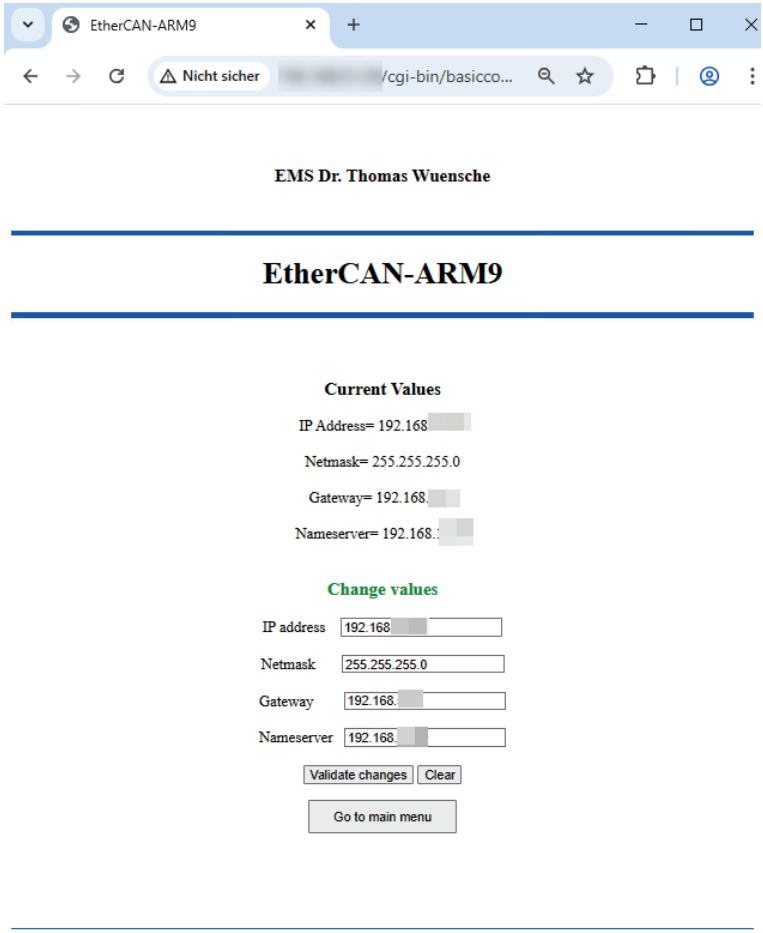
Note

For security reasons, iba strongly recommends to change your password immediately. This change will take effect with the next login attempt.

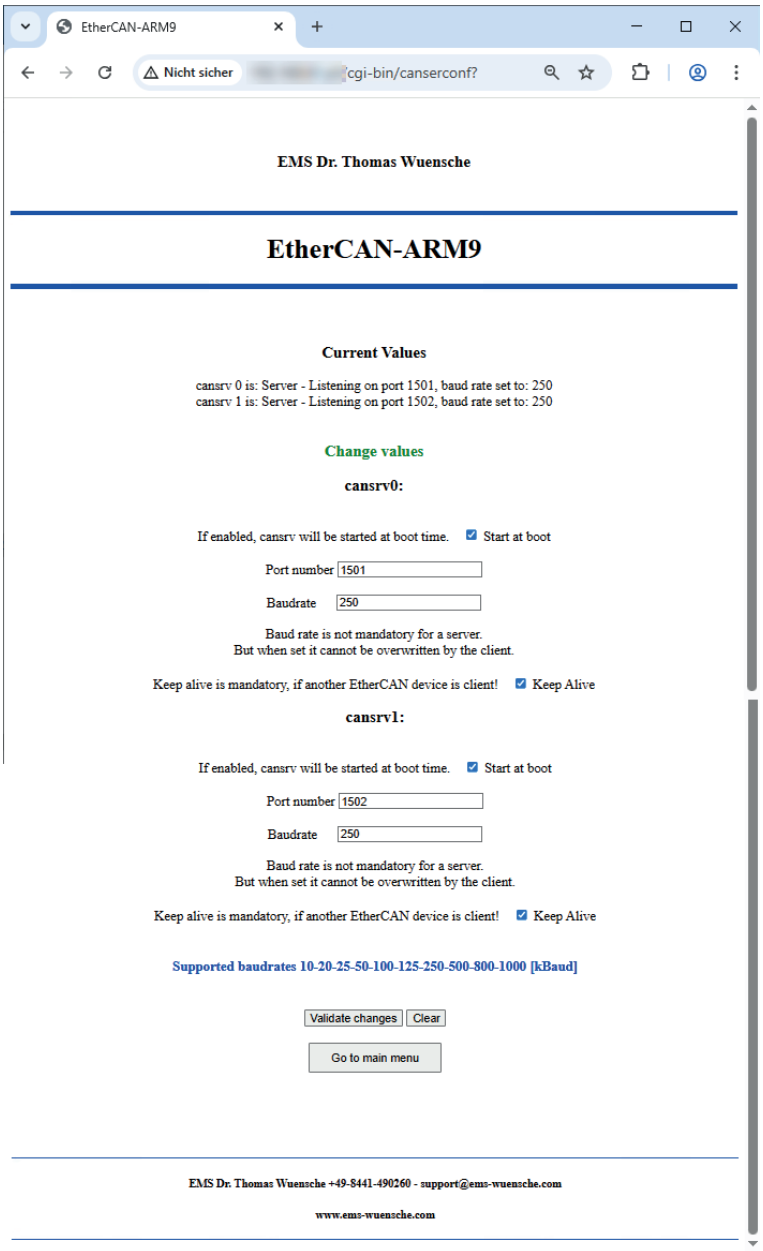
→ The following window appears:



2. Open *Network configuration – Validate – IP settings* and make the following settings:



3. Open *CAN Configuration – CAN bus Baudrate* and make the following settings:



4. Save the changes and restart the device.

   It is not usually necessary to adjust the other parameters.

Default configuration

The default delivery of EtherCAN CI has the following parameters set:

IP address	192.168.1.15
Netmask	255.255.255.0
Gateway	none
Nameserver	none

CAN driver selection	EMS driver
CAN 1	Server Port: 1501 Start at boot: enabled Keep alive: enabled Baudrate: 250 kBaud
CAN 2	Server Port: 1502 Start at boot: enabled Keep alive: enabled Baudrate: 250 kBaud

6 Support and contact

Support

Phone: +49 911 97282-14

Email: support@iba-ag.com

Note

If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

Contact

Headquarters

iba AG
Koenigswarterstrasse 44
90762 Fuerth
Germany

Phone: +49 911 97282-0

Email: iba@iba-ag.com

Mailing address

iba AG
Postbox 1828
D-90708 Fuerth, Germany

Delivery address

iba AG
Gebhardtstrasse 10
90762 Fuerth, Germany

Regional and Worldwide

For contact data of your regional iba office or representative
please refer to our web site:

www.iba-ag.com