ibaPDA-Interface-LANDSCAN

Data Interface for LAND Temperature Scanners

Manual

Issue 3.0

Measurement Systems for Industry and Energy

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3.0	08-2024	New version ibaPDA v8	nm	8.7.0

Contents

1 About this documentation

This documentation describes the function and application of the software

ibaPDA-Interface-LANDSCAN.

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.

This documentation in particular addresses persons, who are concerned with the configuration, test, commissioning or maintenance of Programmable Logic Controllers of the supported products. For the handling *ibaPDA-Interface-LANDSCAN* the following basic knowledge is required and/or useful:

- Windows operating system
- Basic knowledge of *ibaPDA*
- Knowledge of configuration and operation of the relevant measuring device/system

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 LANDSCAN data interface:

- *ibaPDA* v8.0.0 or higher
- License for *ibaPDA-Interface-LANDSCAN*
  (supports up to 2 scanners, i.e. 2 connections)

  If you need more than 2 connections, you will require additional *one-step-up-Interface-LANDSCAN* licenses for each additional 2 connections. A total of up to 16 connections are possible.

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

Note

The 2D top view is particularly suitable for displaying the measured values. This display is possible with live data, but only with the trend graph and HD trend graph objects of the *ibaQPanel* software. It is therefore recommended to purchase additional licenses for *ibaQPanel* and/or *ibaHD-Server*.

The 2D top view is included as standard in the offline analysis with *ibaAnalyzer*.

License information

Order no.	Product name	Description
31.001011	ibaPDA-Interface-LAND-SCAN	*ibaPDA* data interface for connecting up to 2 LAND (Ametek) temperature line scanners
31.101011	one-step-up-Interface-LANDSCAN	Extension license for 2 more LANDSCAN - connections; a maximum of 7 permissible
30.670040	ibaQPanel-V7-Add-On	Additional package for an *ibaPDA* client to display process/quality data in an HMI image

3 LANDSCAN interface

The LANDSCAN interface can be used to measure data from LAND (Ametek) temperature line scanners. Up to 2 devices or connections are supported with an interface license. In total, a maximum of 8 licenses (=16 devices) can be used. The scanners generate 1000 samples per line and they can scan at up to 150 lines per second. The scanners can send their data in ASCII or binary mode. Both modes are supported by *ibaPDA*, while the binary mode is more efficient and is therefore recommended if the scanner supports it. Older versions of the scanners only support ASCII mode. Furthermore *ibaPDA* supports the dynamic correction of changing distances between scanner and material as well as the control of the emissivity of the scanner via an analog signal.

3.1 System topologies

The connections between the devices and *ibaPDA* can be established via the computer's standard Ethernet interfaces.

No further software is necessary for operation.

Note

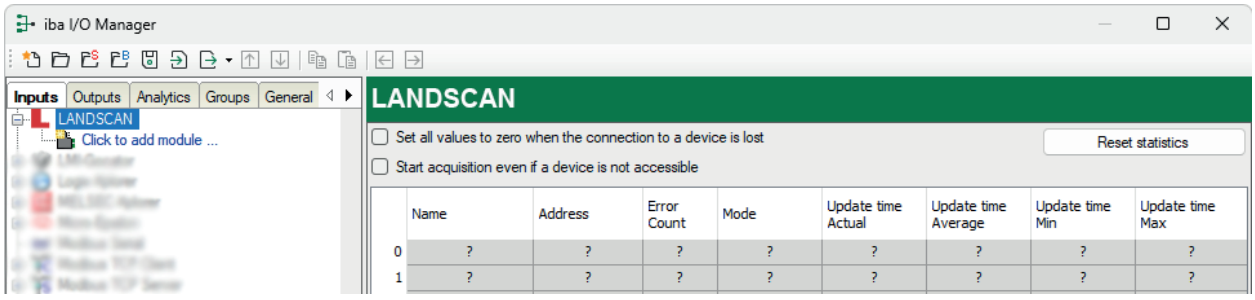
It is recommended carrying out the TCP/IP communication on a separate network segment to exclude a mutual influence by other network components.

3.2 Configuration and engineering ibaPDA

The engineering for *ibaPDA* is described in the following. If all system requirements are fulfilled, *ibaPDA* displays the the *LANDSCAN* interface in the interface 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 enabled, all measured values of the 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 in memory at the time the connection was lost.

Start acquisition even if an device is not accessible
If this option is enabled, the acquisition will start even if the device is not accessible. 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.

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

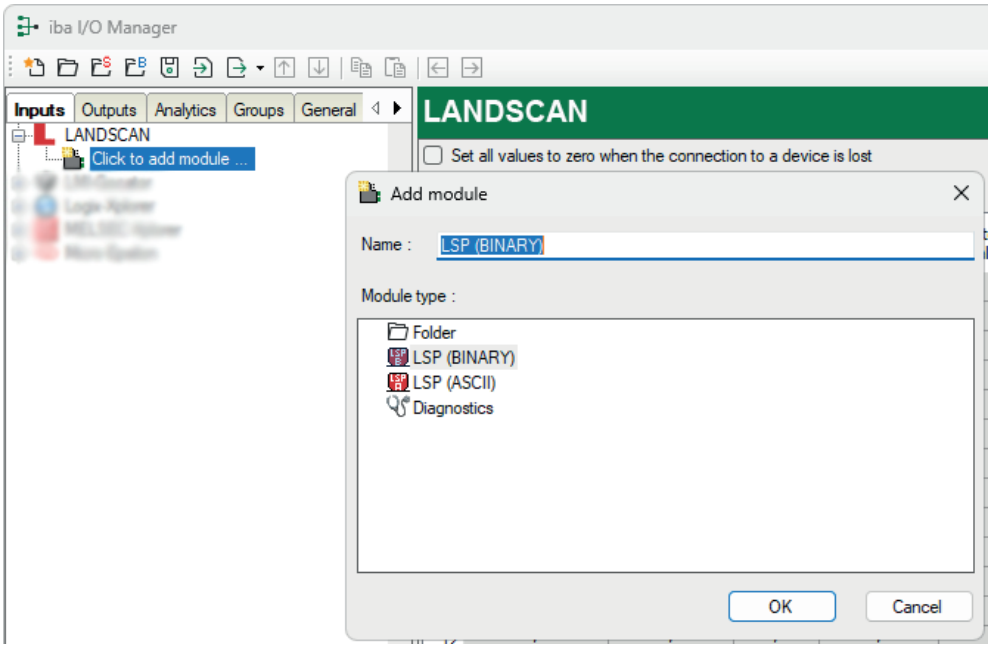
Connection table
For each connection, the table shows the connection status, the current values for the update time (actual value, average, min. and max.) as well as the data size. In addition, there is an error counter for the individual connections during the acquisition.

See ↗ *Connection table*, page 18

3.2.2 Adding a module

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>.



Module types

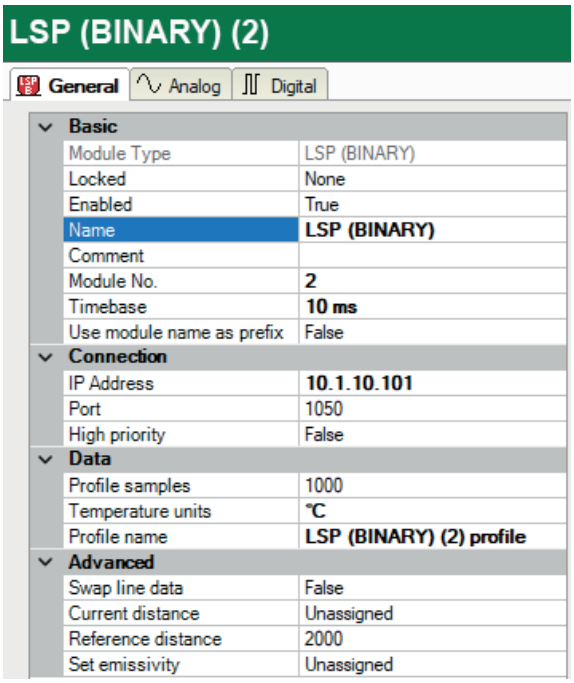
For each device you need one module. *ibaPDA* supports 2 module types:

- LSP (BINARY) for binary mode
  This module supports polling (SBD) and streaming (SLD) mode.
- LSP (ASCII) for ASCII mode
  This module supports polling (SND) mode

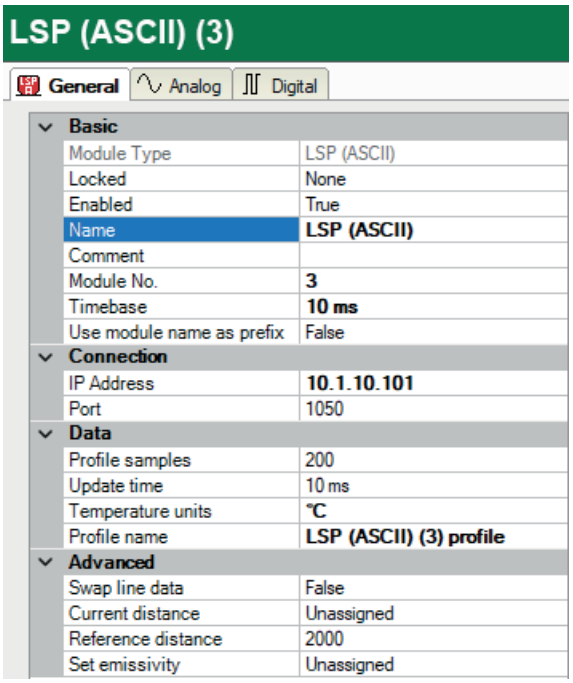
3.2.3 General module settings

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

All modules have the following setting options.



LSP (BINARY)



LSP(ASCII)

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.

Connection

IP Address
Enter the IP address of the LANDSCAN device.

Port
Enter the port number of the LANDSCAN device *ibaPDA* should connect to. The default value is 1050. The port number can also be changed if necessary.

High priority (BINARY type only)
In binary mode the data is streamed. This means that the scanner will send the data by itself as soon as it is finished with a line. A scanner supports up to 4 connections, i.e. up to 4 clients. There is 1 connection that can have the highest priority. This connection will get the full speed of up to 150Hz. If you want this to be the *ibaPDA* connection then set the *High priority* property to “True”.

Data

Profile samples
The scanner always sends 1000 samples per line in binary mode. You can reduce the number of samples via the *Profile samples* property. If you set the Profile samples to 200 then *ibaPDA* will take every 5th sample. There is no aggregation done.

In ASCII mode you can configure how many samples per line the scanner sends. You have to configure this in the scanner itself via the LANDSCAN configuration software. You must enter the same value here under *Profile samples*.

Update time (ASCII type only)
In ASCII mode the data is polled. By setting the *Update time*, you determine how often *ibaPDA* should read the data from the scanner.

Temperature units
Select the appropriate temperature unit, °C or °F.Profile name

Profile name
For each LANDSCAN module *ibaPDA* generates a vector for the measured line data. The vector signal can be found in the *Groups* section of the I/O Manager.

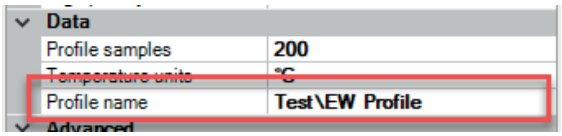
You can determine the name of this vector signal by entering it into the *Profile name* field. You can use the '\' character to put the vector signal in a subgroup.

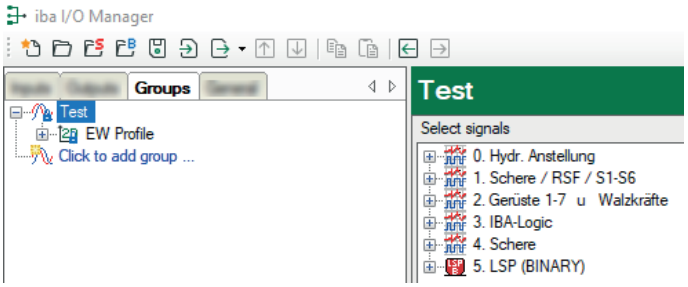
Tip

The vector is easy to use for 2D top view of the temperature profile either in *ibaQPanel* and/or *ibaAnalyzer*.

Note

Entering "Test\EW profile" as profile name will result in a subgroup named "Test" with a vector named "EW profile" as group member.





Advanced

Swap line data

Reversing the measuring point sequence in the scan line. Measuring point 1 becomes measuring point 1000 and vice versa. In relation to the measured material, this corresponds to swapping the left and right side.

Current distance, Reference distance

In case the distance between the scanner and the material is not fix then *ibaPDA* can scale the received data to a reference distance so that the material width will stay constant. To be able to do this, a signal that determines the current distance between scanner and material must be provided. You can freely choose the unit of the reference distance and current distance as long as you use the same unit for both.

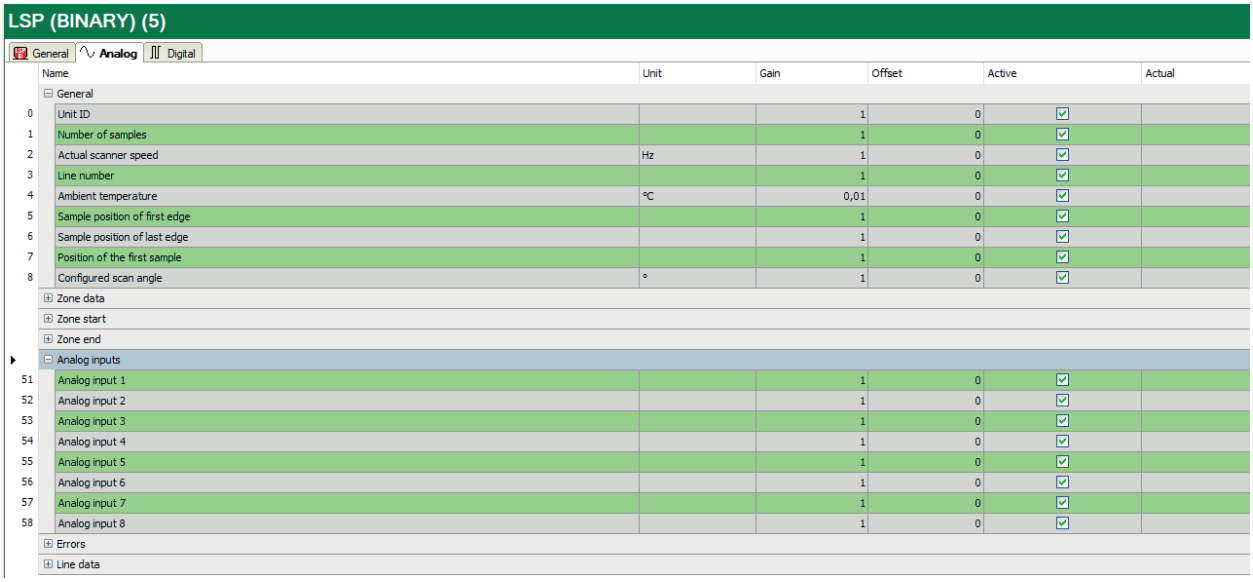
Set emissivity

The emissivity of the scanner can be changed by *ibaPDA* via this signal. The valid emissivity range is between 0.01 and 1.00. This feature can be used when different materials are being processed that require a different emissivity.

3.2.4 Signal configuration

Configure all signals to be measured in the *Analog* and *Digital* tabs. The module contains all analog and digital signals that the scanner sends. The complete set of signals of a LANDSCAN device is automatically created with every module.

They are grouped by functionality in the signal table. There is no need to select any other signals. However, you may disable/enable the signals individually if you want.



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.

Active
Activation or deactivation of the respective signal

Actual
Display of the current actual value of the signal

Other documentation

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

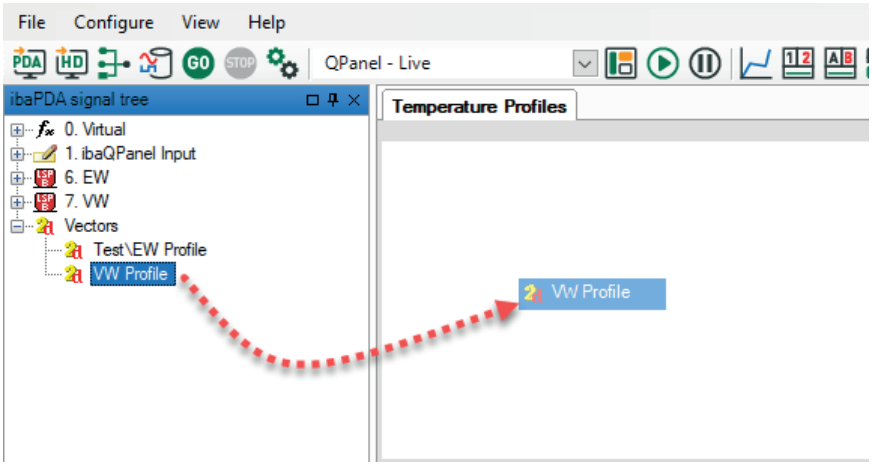
3.2.5 Visualization

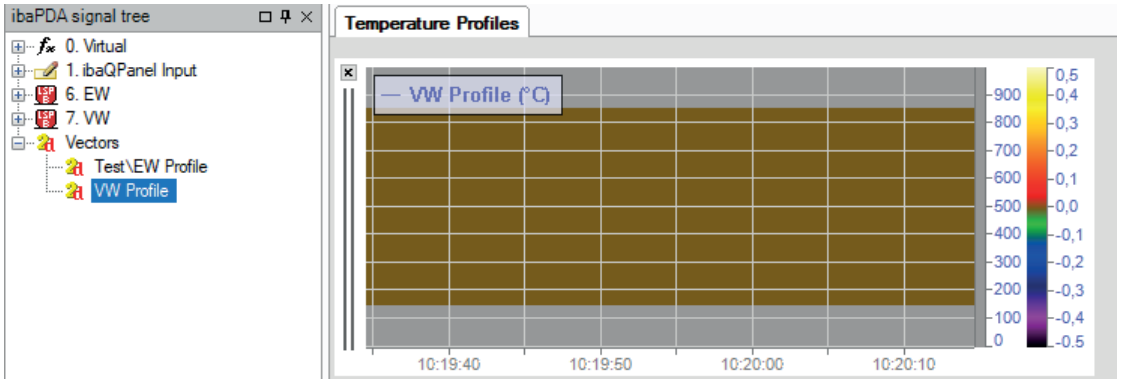
For the visualization of temperature profiles, the 2D false color display has proven successful.

In *ibaPDA*, you can implement this form of representation with the element *Trend graph* in *ibaQPanel.*

To do this, create a trend graph in a QPanel view and then exit the design mode.

Now simply drag the corresponding profile vector, which was automatically created with the configuration of the module, from the signal tree into the trend display (drag & drop). The vectors can usually be found at the very bottom of the signal tree, under the *Vectors* node.



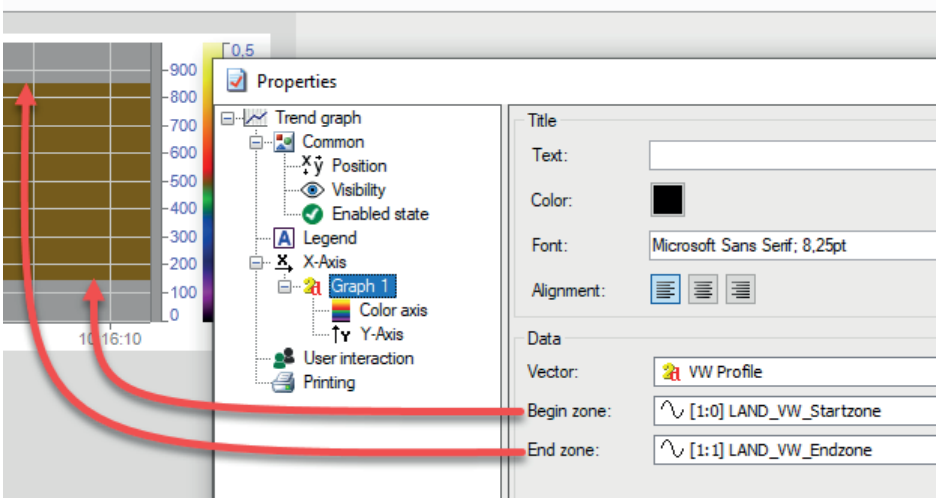


In this view, the Y-axis corresponds to the measuring point number from the line data 1 to max. 1000. The temperature is displayed using the colors.

Further settings can be defined in the properties dialog of the trend view.

For example, in addition to the usual settings for the X and Y axes, you can also change the color assignment for the temperatures.

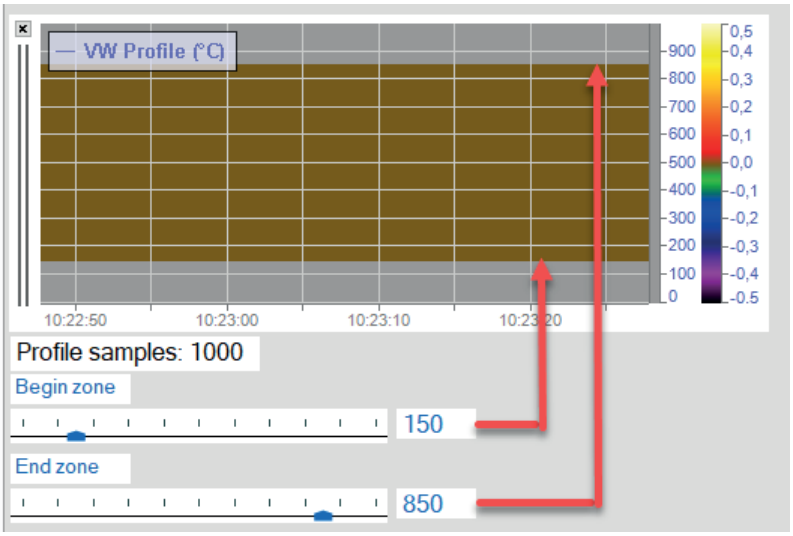
With the parameters *Begin zone* and *End zone* you can hide areas at the edges that are not relevant. Select in each case a signal that provides the corresponding value. This can be a static virtual signal, a calculated virtual signal or an input signal from a PLC.



The value for begin and end zone is the number of the measuring point within a line.

Example

The following picture shows the result of a setting with a number of profile samples of 1000, begin zone 150 and end zone 850. Thus the first 149 measuring points and the last 150 measuring points (851 to 1000) are hidden.

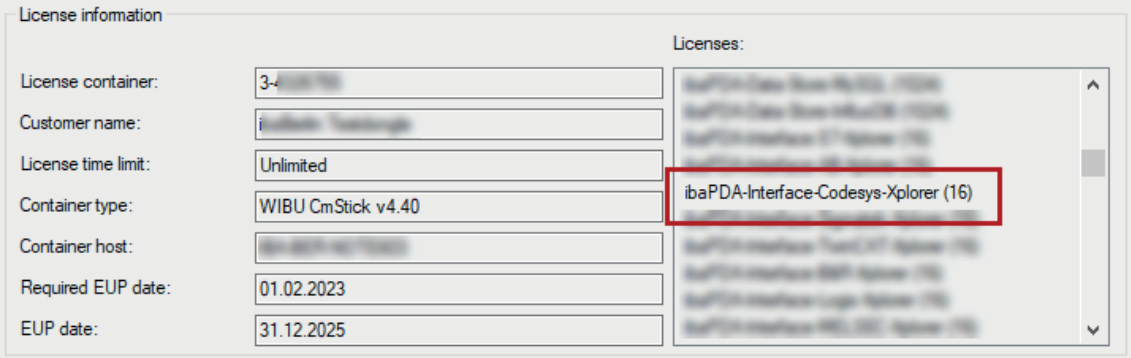


4 Diagnostics

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-LANDSCAN* 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.

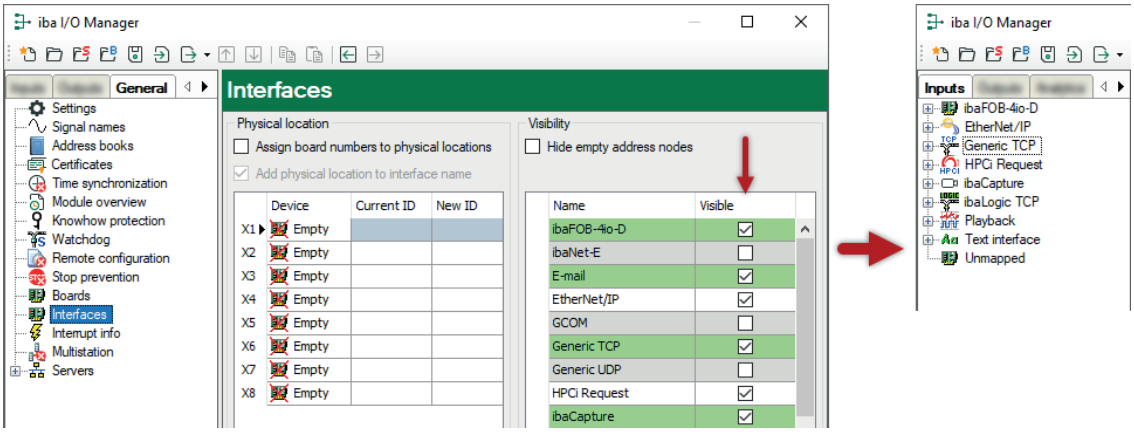
Visibility

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)

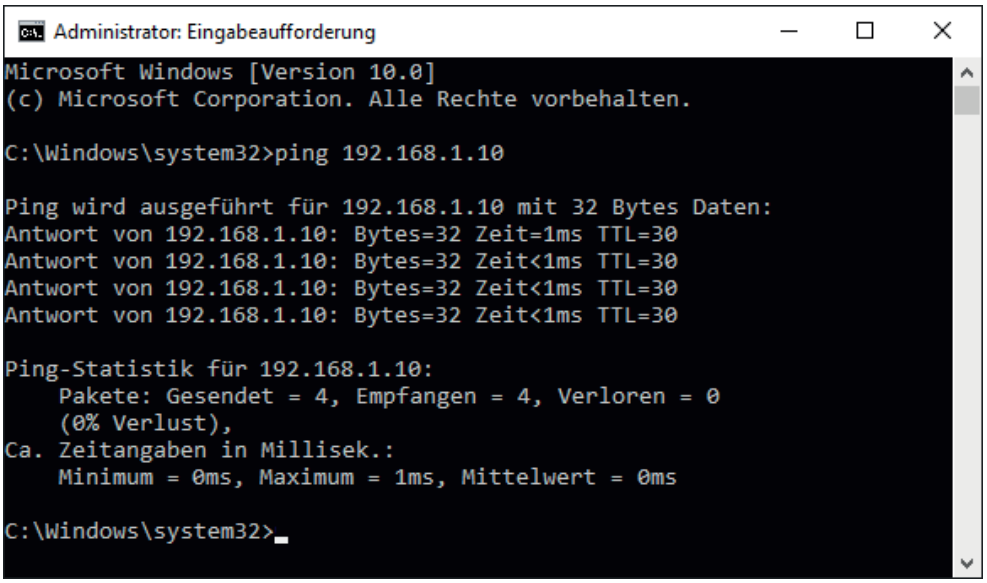
4.4 Connection diagnostics with PING

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

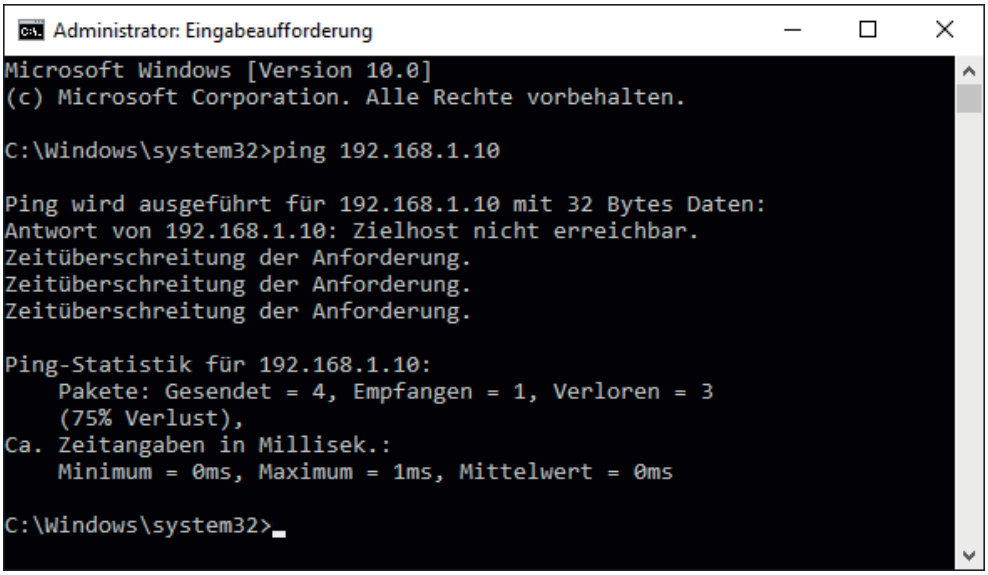
1. Open a Windows command prompt.

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.

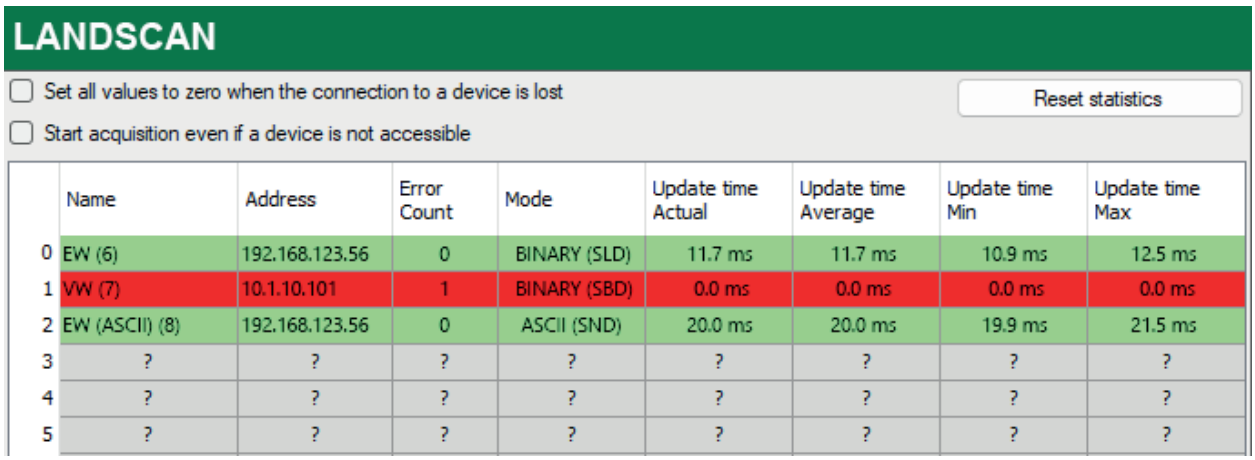


→ With no existing connection you receive error messages.



4.5 Connection table

The LANDSCAN interface shows all connections in a table. There is one row per connection to a scanner.



	Name	Address	Error Count	Mode	Update time Actual	Update time Average	Update time Min	Update time Max
0	EW (6)	192.168.123.56	0	BINARY (SLD)	11.7 ms	11.7 ms	10.9 ms	12.5 ms
1	VW (7)	10.1.10.101	1	BINARY (SBD)	0.0 ms	0.0 ms	0.0 ms	0.0 ms
2	EW (ASCII) (8)	192.168.123.56	0	ASCII (SND)	20.0 ms	20.0 ms	19.9 ms	21.5 ms
3	?	?	?	?	?	?	?	?
4	?	?	?	?	?	?	?	?
5	?	?	?	?	?	?	?	?

The table columns and their meaning:

- Name: Name of the module
- Address: IP address of the scanner
- Error counter: The number of communication errors that occurred
- Mode: Display of how the data is transferred from the scanner to the *ibaPDA* system. The possible values are:
  - BINARY (SBD): Streaming binary data
  - BINARY (SLD): Polling binary data
  - ASCII (SND): Polling ASCII data

  Current update time, average, minimum, maximum:
  The update time is the time between consecutive data messages. It should be the same as the configured scan speed in the scanner when using binary mode. It should be the same as the Update time property in ASCII mode.

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 has failed or was interrupted
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.

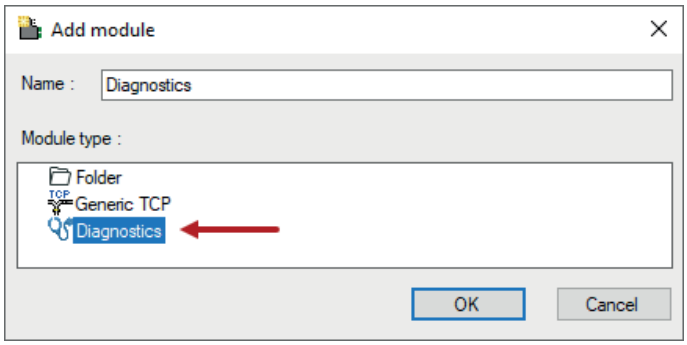
A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module, you can record and analyze the diagnostic information continuously in the *ibaPDA* system.

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:

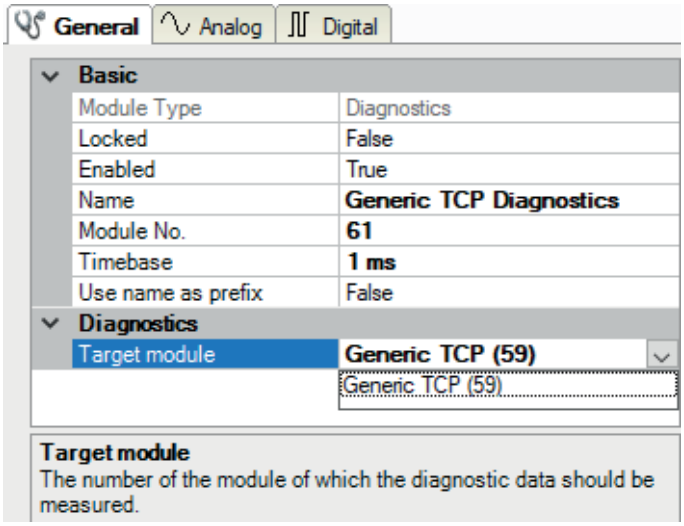
- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized 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

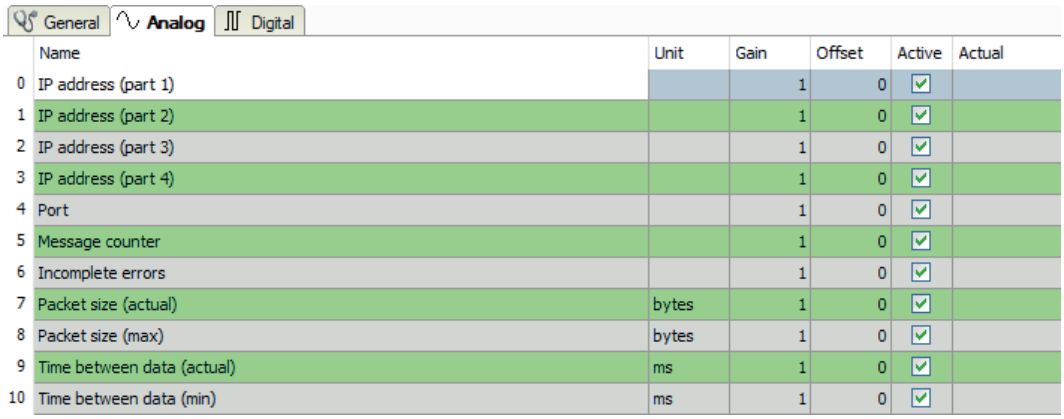
For a diagnostic module, you can make the following settings (example: Generic TCP):



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

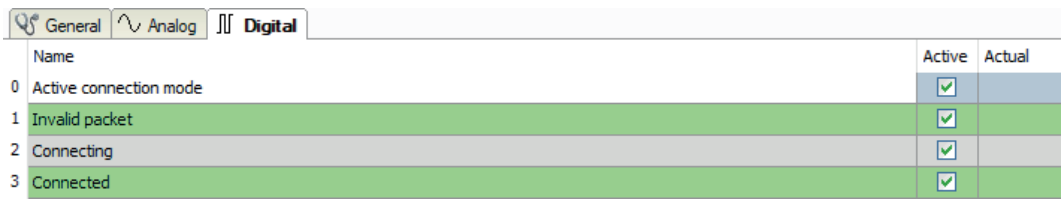
There is only one setting which is specific for the diagnostic module: the target module.

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.



	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.



	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 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 (actual) 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 Support and contact

Support

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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.

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