ibaPDA-Interface-Micro-Epsilon
Data interface for Micro-Epsilon laser profile scanner

Manual
Issue 1.0

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1 About this Manual

This document describes the function and application of the software interface
ibaPDA-Interface-Micro-Epsilon

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 addresses qualified professionals, who are familiar with handling electrical
and electronic modules as well as communication and measurement technology. A person is
regarded as a professional if he/she is capable of assessing the work assigned to him/her and
recognizing possible risks on the basis of his/her specialist training, knowledge and experience
and knowledge of standard regulations.

This documentation in particular addresses persons, who are concerned with the configura-
tion, test, commissioning or maintenance of Programmable Logic Controllers of the supported
products. For the handling of ibaPDA-Interface-Micro-Epsilon 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:

<table>
<thead>
<tr>
<th>Action</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu command</td>
<td>Menu Logic diagram</td>
</tr>
<tr>
<td>Calling the menu command</td>
<td>Step 1 – Step 2 – Step 3 – Step x</td>
</tr>
<tr>
<td></td>
<td>Example: Select the menu Logic diagram - Add - New function block.</td>
</tr>
<tr>
<td>Keys</td>
<td>&lt;Key name&gt;</td>
</tr>
<tr>
<td></td>
<td>Example: &lt;Alt&gt;; &lt;F1&gt;</td>
</tr>
<tr>
<td>Press the keys simultaneously</td>
<td>&lt;Key name&gt; + &lt;Key name&gt;</td>
</tr>
<tr>
<td></td>
<td>Example: &lt;Alt&gt; + &lt;Ctrl&gt;</td>
</tr>
<tr>
<td>Buttons</td>
<td>&lt;Key name&gt;</td>
</tr>
<tr>
<td></td>
<td>Example: &lt;OK&gt;; &lt;Cancel&gt;</td>
</tr>
<tr>
<td>File names, paths</td>
<td>&quot;Filename&quot;, &quot;Path&quot;</td>
</tr>
<tr>
<td></td>
<td>Example: &quot;Test.doc&quot;</td>
</tr>
</tbody>
</table>
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 Micro-Epsilon data interface:

- *ibaPDA* v7.1.0 or higher
- License for *ibaPDA-Interface-Micro-Epsilon* (supports up to 2 devices or 2 connections)
- For more than 2 connections, you need additional *one-step-up-Interface-Micro-Epsilon* licenses for each additional 2 connections. The total limit is 16 connections.

For further requirements for the used computer hardware and the supported operating systems, please 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**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Product name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001016</td>
<td>ibaPDA-Interface-Micro-Epsilon</td>
<td>ibaPDA data interface for connecting up to 2 laser scanners of the Micro-Epsilon scanCONTROL family.</td>
</tr>
<tr>
<td>31.101016</td>
<td>one-step-up-Interface-Micro-Epsilon</td>
<td>Extension license for 2 more Micro-Epsilon connections (maximum of 7 licenses permissible)</td>
</tr>
<tr>
<td>30.670040</td>
<td>ibaQPanel-V7-Add-On</td>
<td>Additional package for an ibaPDA client to display process/quality data in an HMI image</td>
</tr>
</tbody>
</table>

Table 1: Available Micro-Epsilon interface licenses
3    Micro-Epsilon interface

3.1    General Information
The Micro-Epsilon interface is suitable for measurement data acquisition of laser profile scanners of the Micro-Epsilon scanCONTROL family. Up to 2 devices or connections are supported with an interface license. In total, a maximum of 8 licenses (=16 devices) can be used.

3.2    System topologies
The connections to the devices can be established via the computer's standard Ethernet interfaces.
No further software is necessary for operation.

Note
It is recommended to use a direct connection with 1 GBit/s for communication from the ibaPDA PC to the device. The device may cause a high network load during operation.

3.3    Configuration and engineering ibaPDA
Open the I/O Manager, e.g., from the toolbar.
If all system requirements are met (see above), the "Micro-Epsilon" interface will be displayed in the signal tree.

Fig. 1: Micro-Epsilon interface in I/O Manager
3.3.1 Interface settings

The interface itself 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 scanCONTROL 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 a device is not accessible**
If this option is enabled, the acquisition will start even if the scanCONTROL device is not accessible. In case of 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.

**Connection table**
The table shows the cycle times and error counters of the individual connections during data measurement. See chapter **Connection table**, page 17.

To reset the calculated times and error counters to zero, simply click on the <Reset counters> button.

3.3.2 Add module

For each device you need one module of the scanCONTROL type.

Add a module by clicking below the interface. Select the desired module type and click <OK>.
3.3.3 General module settings

All modules have the following common settings.

Basic settings

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

Locked
A module can be locked in order to prevent change of module settings by accident or unauthorized users.

Enabled
Disabled modules are excluded from the signal acquisition.

Name
The plain text name should be entered here as the module designation.

Module no.
Internal reference number of the module. This number determines the order of the modules in the signal tree of ibaPDA client and ibaAnalyzer.

Time base
All signals of the module will be sampled on this time base.

Use name as prefix
Puts the module name in front of the signal names.
Data

Profile name
For each scanCONTROL module, ibaPDA generates a vector signal with 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. If the name contains “/" characters, then subgroups are generated. Leave the name empty if you do not want to create any vectors.

Note
The vector is easy to use for 2D top view of the profile in ibaQPanel.

Example
Entering "Test\scanCONTROL (1) Profile" as profile name will result in a subgroup named "Test" with a vector named "scanCONTROL (1) Profile" as group member.

Profile name setting in the general module settings
3.3.4 Connection settings

In the Connection tab, you configure the settings for the connection setup.

Fig. 5: scanCONTROL connection settings

"Connection" area

Scanner address
Enter the IP address of the scanCONTROL device here

Scanner type
Here, you can select the scanner type.

Resolution
Select the resolution used here. The list of available resolutions changes according to the selected scanner type.

Connection timeout
The maximum time (in s) between two profile updates, before the connection is considered interrupted.

Sample time
The time (in µs) between two profile recordings by the scanner.

Exposure time
The exposure time can be set here. The exposure time depends on the laser power and the scanned material and must be smaller than the selected sample time. Please refer to the device manual for more information.
**Automatic exposure time regulation**
If you enable this option, the scanCONTROL device starts with the configured exposure time and then automatically sets the exposure time to optimal results.

**Record extended dataset**
The acquisition of the X and Z vectors is sufficient for normal operation. For diagnostic reasons, additional vectors can also be recorded with the used threshold, the reflection width and the reflection maximum. The additional vectors are only visible in the Analog tab after applying the IO configuration once.

**Flip distance**
The Z vector contains the distance between the scanned material and the scanner. These values are usually inverse to the material height. To use the values, it can be easier to invert the distance value.

**Flip position**
Due to the scanner position, it may happen that the value alignment from left to right from the scanner view does not match the material position. The alignment will be inverted if this option is enabled.

**Note**
Without resampling, this only affects the values in the X vector. The sequence of the values remains unchanged.

**“Sampling” area**
These values must always be configured in *ibaPDA*, since they are defined for the device per acquisition session and affect the available size of the vector for further processing.

**First sample**
The first data sample that is sent to *ibaPDA*. Also changes the first sample number in the resulting vectors.

**Number of samples**
Number of samples that are sent to *ibaPDA*. This changes the number of values in the resulting vectors.

**Note**
The sum of the first sample and the number of samples must be less than the selected resolution.

**Resampling**
You can convert the vector to equidistant values. You can select the desired spacing of values in the dropdown menu.

This is important for the further processing in *ibaAnalyzer*, since *ibaAnalyzer* only supports equidistant values. For further information, please refer to the device manual.
**Median filter / average filter**
You can apply smoothing filters to Z values and set a window width for the filters here. For further information, please refer to the device manual.

**"Scan field" area**
The scan field defines the area of the device sensor used for data acquisition. This is important for data acquisition with short sample times. The scan field can be set independently of the “First Sample” / “Number of Samples” values, but values outside the scan field are set to 0. For further information, please refer to the device manual.

**Set scan field range**
If this option is enabled, the scan field settings are used as defined here.

**Start X / End X / Start Z / End Z**
Define the area of the device sensor, which is used for the data acquisition. Specification in percent of the entire sensor.

**Threshold**
The threshold is used to remove noise resulting from external light reflection or high dispersion due to surface textures. For further information, please refer to the device manual.

**Set threshold settings**
If this option is enabled, the threshold settings are used as defined here.

**Threshold value**
Set the threshold here above which a measured response is valid.

**Enable automatic threshold**
If this option is enabled, the threshold is calculated by the sensor to better adapt to different materials. The current threshold can be checked by recording the extended dataset.

**“Laser power” area**
You can set the laser power used for the measurement here. For further information, please refer to the device manual.

**Set laser power**
If this option is enabled, the laser power settings are used as defined here.

**Laser power**
Choose from the drop-down menu: full, reduced, off

**Pulsed mode**
If this option is enabled, the laser pulses correspond to the sample time.
3.3.5 Signal configuration

The module contains all signals that the scanner sends. The complete set of signals of a scanCONTROL device is automatically created for each module.

The signals are grouped in the signal tables by functionality. It is not necessary to add additional signals. If necessary, you can enable/disable individual signals.

![Fig. 6: “Analog” signal table](image)

The Analog tab of a scanCONTROL module shows the available values. When the recording is running, the current values are shown in the “Actual” column.

**Note**

The number of line data signals is always smaller than is configured for ‘Number of samples.’ The last data fields are always overwritten in the scanCONTROL interface with time data information, which is excluded from the recording in ibaPDA. For further information, please refer to the device manual.
4 Diagnostics

4.1 License

If the "Micro-Epsilon" interface is not displayed in the signal tree, you can either check in ibaPDA under General - Settings - License in the I/O Manager or in the ibaPDA service status application to see whether your license "Interface Micro-Epsilon" has been properly recognized. The number of licensed connections is indicated in brackets.

![License display in the I/O Manager](image)

Fig. 7: License display in the I/O Manager
4.2  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.

Open a Windows command prompt.

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

With an existing connection you receive several replies.

![Fig. 8: PING successful](image)

With no existing connection you receive error messages.

![Fig. 9: PING unsuccessful](image)
4.3 Connection table

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

![Micro-Epsilon connection table](image)

**Fig. 10: Micro-Epsilon connection table**

The columns in the table and their meaning:

- **Name**: Name of the module
- **Address**: IP address of the scanner
- **Device name**: Name of the scanCONTROL device
- **Profile count**: is incremented with each update sent by the device, which contains an internal profile number.
- **Lost profiles**: reflect lost updates according to the internal profile number
- **Error count**: The number of communication errors that occurred
- **Update time actual, average, minimum, maximum**: The update time is the time between two consecutive telegrams.

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

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>The connection is OK and the data is read.</td>
</tr>
<tr>
<td>Red</td>
<td>The connection has failed or been interrupted.</td>
</tr>
<tr>
<td>Gray</td>
<td>No connection configured.</td>
</tr>
</tbody>
</table>

Table 2: Meaning of background colors of the connection table

For the Micro-Epsilon devices, a diagnostic module can be configured, which records the values available in the connection table for the Micro-Epsilon interface.
4.4 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, since 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.

![Add diagnostic module, example Generic TCP](image)

Fig. 11: Add diagnostic module, example Generic TCP

Module settings diagnostic module

For a diagnostic module, you can make the following settings:
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.

For example, the IP (v4-) address of a TCP Generic 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.
Fig. 14: Example: Digital values of a diagnostic module for a TCP Generic module
5 Support and contact

Support

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Note

If you require support, indicate the serial number (iba-S/N) of the product and the license number.

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