ibaPDA-Interface-LMI-Gocator
Data Interface for LMI-Gocator sensors

Manual
Issue 1.3
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The current version is available for download on our web site www.iba-ag.com.

Version    Date       Revision - Chapter / Page            Author  Version SW
1.3        07-2020    ibaQPanel license                  rm       7.0.6

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# About this Manual

This document describes the function and application of the software interface ibaPDA-Interface-LMI-Gocator.

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 the standard regulations.

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

- Windows operating system
- Basic knowledge of ibaPDA
- Knowledge of configuration and operation of the relevant LMI-Gocator sensors

## 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 LMI-Gocator data interface:

■ **ibaPDA** v6.38.0 or more recent
■ License for **ibaPDA-Interface-LMI-Gocator** (supports up to 2 sensors, i.e. 2 connections)
■ If you need more than 2 connections, you will require additional one-step-up-Interface-LMI-Gocator licenses for each additional 2 connections. The total limit is 16 connections.

Also Gocator sensors used in a buddy mode setup require a license.

A minimum firmware version "Gocator Release 4.6 SR1" (v4.6.7.17) is required. Sensors of older series available only with firmware versions < v4.6 are not supported (e.g. Gocator 1100, 2000 series).

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. Therefore it is recommended to purchase additional licenses for **ibaQPanel** and/or **ibaHD server**.

In the offline analysis with **ibaAnalyzer**, the 2D top view is included as standard.

---

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Product name description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001012</td>
<td>ibaPDA-Interface-LMI-Gocator</td>
<td>ibaPDA data interface for connecting up to 2 Gocator sensors</td>
</tr>
<tr>
<td>31.101012</td>
<td>one-step-up-Interface-LMI-Gocator</td>
<td>Extension license for 2 more Gocator sensor connections; a maximum of 7 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 LMI-Gocator interface licenses
3 LMI-Gocator interface

3.1 General information

The LMI-Gocator interface can be used to measure profile data from Gocator® sensors (LMI Technologies Inc.). Data from several, adjacent sensors can be collected and merged into a single profile.

3.2 System topologies

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

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.

3.3 Configuration and engineering ibaPDA

Open the I/O manager, e.g. from the toolbar 📊.

![LMI-Gocator interface in the I/O manager](image)

If all system requirements are met (see above), the LMI-Gocator interface will be displayed in the signal tree.

3.3.1 Interface settings

The interface itself has the following functions and configuration options:

![LMI-Gocator interface settings](image)
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 data 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 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 the device.

Connection table  
The table shows the cycle times and error counters for the individual connections during data measurement. Each table row corresponds to a configured Gocator module. To reset the calculated times and error counters, simply click on the <Reset counters> button. See "Connection table," page 18.

3.3.2 Adding a module  
Add a module by clicking below the interface. Select the desired module type and click <OK>.

Fig. 3: Adding LMI-Gocator module

One Gocator module corresponds to a full profile, which is typically, but not necessarily, the composit of the profiles of several adjacent Gocator sensors.
3.3.3 General module settings

In the General tab the following module settings can be configured:

![General settings of a LMI-Gocator module](image)

**Basic settings**

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

**Locked**
A module can be locked to avoid unintentional or unauthorized changing of the module settings.

**Enabled**
Disabled modules are excluded from 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.

**Gocator settings**
One Gocator module corresponds to a full profile which is typically (but not necessarily) the composition of the profiles of several, adjacent Gocator sensors. Apart from the standard options, the following specific settings can be configured:
Sample time
This determines how fast profile data is generated by the Gocator sensors. Although in theory, it is possible to set the sample time as low as 1 ms, in practice it might be limited by the sensors.

Resolution
This determines the distance in microns between two neighbouring profile samples. Allowed values are 100 µm, 200 µm, 250 µm, 500 µm and 1000 µm. When changing the resolution, ibaPDA will automatically adjust the number of analog signals.

Sensor width
The sensor width determines the width of the measured profile on the X-axis (as defined in the Gocator documentation).

Maximum data delay
Maximum allowed difference (in ms) between the requested timestamp and the actual timestamp of the (reconstructed) profile.
Change this parameter only after consulting the iba support.

Data timeout
The number of sample times ibaPDA can wait without receiving a new (reconstructed) profile.
Change this parameter only after consulting the iba support.

3.3.4 Configuration of sensors
In the Connection tab you can configure the sensors associated with a module.

Sensors can be added and removed manually by using the button and button respectively. In addition the discovery functionality ( ) will list all available sensors in the network. Dis-
covered sensors which are not necessary for the configuration can be removed from the table. For sensors in a buddy mode group the master of the group is discovered and listed.

For each sensor, the following settings can be configured:

**Name**
This is an identifier used internally in *ibaPDA* and is not related to any setting in the sensor. The default value when discovering a new sensor is the serial number.

**IP Address**
The IP address at which a sensor can be reached for communication.

**X offset**
The offset of a sensor in mm along the axis of the sensor's laser line. The "X offset" value is retrieved from and stored in the sensor. This parameter is required when constructing a profile based on the data of multiple sensors. It can be measured manually or using *ibaPDA* when acquiring a test profile of all sensors (see below).

**Note**
The "X offset" value must be a multiple of the Gocator module's resolution. For example, if the resolution is set to 500 µm, a value of 10.486 mm will be automatically set to 10.500 mm.

**Z offset**
The offset of a sensor in the height direction. This value is retrieved from and stored in the sensor. Typically this parameter is obtained by using the calibration function of the sensor (see below).

**Angle**
The angle between the object to be measured and the sensor plane. This value is retrieved from and stored in the sensor. Typically this parameter is obtained by using the calibration function of the sensor (see below).

**Bank**
This is the number of a bank, the sensor is assigned to. A bank is a subgroup of sensors that can generate the laser line and measure the profile simultaneously without interfering with each other. The following figure illustrates an array of 6 sensors measuring a slab:
In the ideal case when the sensors can be positioned precisely next to one another, there will be no overlap of laser lines. However for high features in the slab, the projected width of the laser line of the sensor is smaller than for low features. Thus if an entire slab with relatively high and low features should be covered, the sensors must be positioned with some overlap between the laser lines.

In case all sensors would be generating the laser line and measuring the profile at the same time, the laser line from sensor 1 would interfere with the one from sensor 0 and would affect the measurement data. Note that sensor 1 would also interfere with sensor 2. To prevent this unwanted behavior, it is possible to time multiplex the exposure.

**Example:**
Assuming you would like to obtain a full profile every millisecond (i.e. you can divide a continuous measurement in time slots of 1 ms) and the exposure time (i.e. the time required to get a good measurement of the profile) of one sensor is 400 µs. In each time slot, sensor 0 could generate the laser line and measure the profile from 0 µs to 400 µs and sensor 1 could do so from 400 µs to 800 µs, thus still leaving a margin of 200 µs. There is no longer any interference, since the sensors that normally overlap now generate their laser lines at different points in time.

Since sensor 1 and sensor 2 also overlap, they should also time multiplex the exposure. However, since sensor 0 and sensor 2 do not overlap, they can generate the laser line simultaneously.

In the figure above this implies that sensor 0, 2 and 4 can generate the laser line at the same time (e.g. in the subslot from 0 µs to 400 µs) and 1, 3 and 5 can generate the laser line at another time (e.g. in the subslot from 400 µs to 800 µs). Sensors 0, 2 and 4 form the first bank; sensors 1, 3 and 5 constitute the second bank.

Since the Gocator sensors operate independently and are unaware of each other, this setting is not saved in the sensor.
Exposure time
The required time in microseconds to generate a valid profile for this sensor. This value is retrieved from and stored in the sensor. Typically it is obtained by configuring the sensor in its web interface (by checking the live image).

Checking a sensor’s status and connection
To check whether a connection to a sensor can be created or to obtain some basic diagnostic information, select the sensor in question and click the button to test the connection to the sensor. You may click on the button to test the connection to all listed sensors.

Select the Status tab below the list. Testing the connection will display the current status, model, firmware version and serial number of the sensor.

Calibrating a sensor
Before using the sensors in a measurement the “Z offset” and “Angle” need to be configured properly. To do so, place a flat surface below the sensors (i.e. where the measurement object will eventually be placed) and click the button to calibrate the selected sensor or the button to calibrate all sensors. The “Z offset” and “Angle” will be updated automatically.

Though the “X offset” will also be set by calibrating the sensors, this will not be the correct value: the “X offset” is the distance of one sensor to another reference sensor. Since sensors are unaware of each other, there is no way to determine this automatically. However the following method can make it easier to get a relatively precise value for this “X offset”: by clicking the button (for a single sensor) or the button (for all sensors), the current profile is retrieved and displayed in the Calibration tab.

In the graph above, the profile for two calibrated sensors is displayed; the "X offset" however is not yet set correctly. Since the sensors overlap, part of their profiles should match. In this example, the red circled region should overlap with the blue circled region. Using markers in the graph you can measure the distance between these two regions and use those value as the "X
offset" of one of the sensors. When you enter this value in the sensor table and acquire the profiles again, you get the following result:

![Fig. 7: "X offset" sensor value](image)

Now the profiles overlap as they should and apparently the correct value for the "X offset" has been found.

Once the "X offset" has been adjusted, the number of signals needs to be updated. This can be done by clicking the button. Based on the module’s resolution and "X offset" parameters of all sensors, ibaPDA will generate the required number of signals with each signal corresponding to a single data point of the entire profile.
3.3.5 "Analog" tab

In the Analog tab, no further changes need to be made (apart from changing the signal names "Gain" and "Offset", if desired).

3.3.6 Vector signal

For each LMI-Gocator module ibaPDA generates automatically a vector signal with the measured line data. The vector signal can be found in the "Groups" section of the I/O manager. The name consists of the module name, module number and the suffix “profile”.

Tip

The vector signal can be used directly in the 2D color-coded display of the surface profile in ibaQPanel and/or ibaAnalyzer.
4 Diagnostics

4.1 License

If the "LMI-Gocator" interface is not displayed in the signal tree, you can either check in ibaPDA under General - Settings - License info in the I/O manager or in the ibaPDA service status application, whether your license "Interface LMI-Gocator" has been properly recognised. The number of licensed connections is indicated in brackets.

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

Fig. 10: License display in the ibaPDA 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. 11: PING successful](image1)

With no existing connection you receive error messages.

![Fig. 12: PING unsuccessful](image2)
4.3 Connection table

The LMI-Gocator interface shows a table of the configured LMI-Gocator modules. Each line in the table corresponds to a configured LMI-Gocator module and connection respectively.

![LMI-Gocator connection table](image)

Fig. 13: LMI-Gocator connection table

The columns in the table and their meaning:

- **Name**: Name of the module
- **Received Messages**: Number of messages coming from configured/used sensors
- **Error Count**: Number of communication errors that occurred
- **Unknown Sensor**: Number of messages coming from sensors which are not configured or used. This number should be "0" during normal operation.
- **Update time Actual, Average, Min, Max**: The update time indicates the time between 2 read operations.

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.</td>
</tr>
<tr>
<td>Grey</td>
<td>No connection configured.</td>
</tr>
</tbody>
</table>

Table 2: Meaning of background colors
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.

![Image of diagnostic module settings](image)

Fig. 14: 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. 17: 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 or the license number.

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