LANCIER Monitoring

Operating Instructions

RM-Basic

Basic Module with ethernet connector for the Rail-Module-Bus

BA 074085.120/09.15

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Important!
It is imperative to read and observe all safety instructions prior to initial operation!

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Technical Data

Supply voltage	21 .. 72 V DC
Output voltage	12 V/1.25 A 5 V/1.6 A
Display	Graphic display, blue back-lit
LEDs	12 V, 5 V, 3,3 V, Link, Traffic
Interfaces	Ethernet 10/100 Mbit/s LANCIER Monitoring Tx-Bus RS232 RS485 CAN-Bus
Local User Interface	by push-button
Operating temperature	-20 °C .. +65 °C
Storage temperature	-40 °C .. +70 °C
Admissible humidity	0 .. 95 % rel. humidity, non-condensing
Dimensions RM-Module (W x D x H)	108 x 62.2 x 89.7 mm

Ordering Data

Basic module RM-Basic Ethernet
Power supply and display module for the RM-Bus — **Order-No. 074001.100**

Accessories

Measuring module RM-Iso
for insulation and loop resistance monitoring — **Order-No. 074003.100**

Measuring module RM-TH
for temperature and humidity monitoring — **Order-No. 074004.000**

Measuring module RM-Tx
for the reading of Tx-bus sensors — **Order-No. 074005.000**

Measuring module RM-Ax
for the reading of Ax-bus sensors — **Order-No. 074006.000**

Measuring module RM-Loop
for remote switch monitor — **Order-No. 074008.000**

Bus expansion RM-Bus-Extender
with connection cable — **Order-No. 074002.000**

RM-Power
voltage converter 110 .. 230 V AC / 24 V DC — **Order-No. 074009.000**

General Information

These operating instructions should make it easier for you to become acquainted with the product. They contain important information to ensure safe, appropriate and cost-effective use of the equipment.

The operating instructions endorse the directives of national regulations for the prevention of accidents and the protection of the environment.

These operating instructions shall be read and adopted by anyone assigned to work with/on the equipment, e. g. during operation to include setting-up, maintenance trouble-shooting.

In addition to the operating instructions and the mandatory regulations for the prevention of accidents, applicable in the operator's country and at the place of use, the recognized technical regulations for safe and professional operation shall also be observed.

Designated Use

The RM-Basic module is designed as a power supply for measuring modules in the RM-Bus by LANCIER Monitoring. In addition, it controls the display function for measurement readings and internal parameters of the connected measuring modules as well as communication with superordinate control systems.

Any other use is considered improper. The manufacturer is not liable for any resulting damage; the user alone bears the risk!

Safety Instructions

Important!
Read and observe safety instructions prior to initial operation!

- Keep the operating instructions ready to hand!

Accident prevention!
All circuit lines must be dead before the opening of its housing!

- The unit should only be operated in technically-sound condition, for its designated use, with safety and risk awareness in mind, taking into account the operating instructions. In particular, operational faults, which can compromise safety, should be rectified immediately!
- Do not make any modifications to the equipment!
- Mounting, maintenance and repair work should only be performed by trained personnel!
- Only use original LANCIER Monitoring replacement parts!

Important!
Obey handling instructions. Electrostatic discharge (ESD) damage.

WARNING!
The place of installation of the RM module should have a complete lightning protection plan that covers power supply cables as well as data and telecommunications cables.

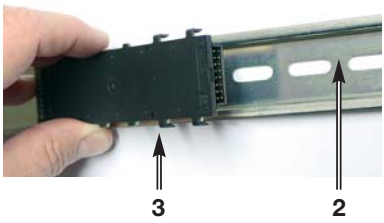
Installation

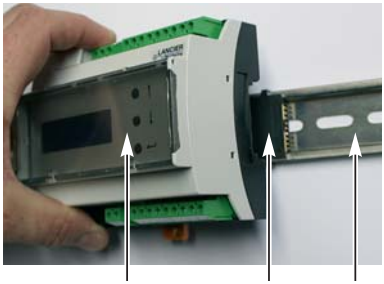
Mounting

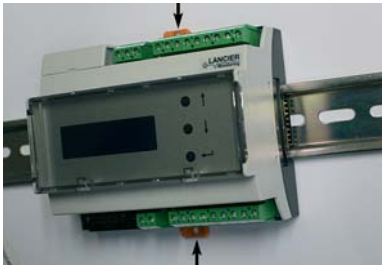
The Rail-Module-Bus-System is composed of a basic module (**1**) and various measuring modules (**6**), which are clipped on a DIN rail (**2**). When mounting the DIN rail (**2**) make sure that the spacing of the mounting screws matches the spacing of the ports on the back of the bus connecting plates (**3**).

The basic module (**1**) has a bus connecting plate (**3**) that must be clipped on to the DIN rail (**2**).

The basic module (**1**) can now be attached to the bus connecting plate (**3**) using opened connecting clips (**5**). The connecting clips (**5**) must be pushed in until they lock into place to secure them.



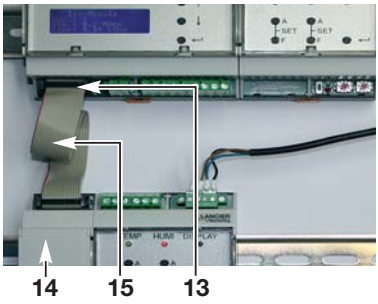




Generally, there is not enough space on the DIN rails for 10 measuring modules.

In this case, further measuring modules must be connected to additional DIN rails, which are mounted below the first one.

Connection is made at the basic module's module interface using the RM bus extender (**14**) with its ribbon cable (**15**).



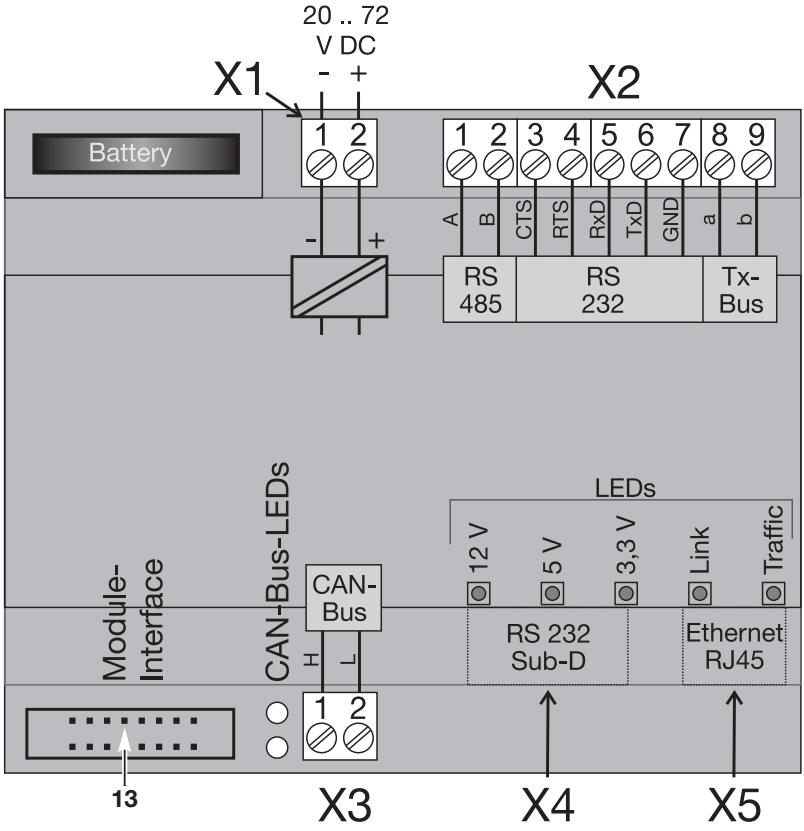
Electrical connection

Accident prevention!
Before working on the bus system the supply voltage MUST be switched off!

The RM-Basic module is connected to terminals X1.1 and X1.2 with a 20...72 VC power supply.

Terminal assignment

X1.1 to 2	Power supply
X2.1 to 9	Communications interface
X3.1 to 2	CAN bus
X4	RS232 Sub-D
X5	Ethernet RJ45



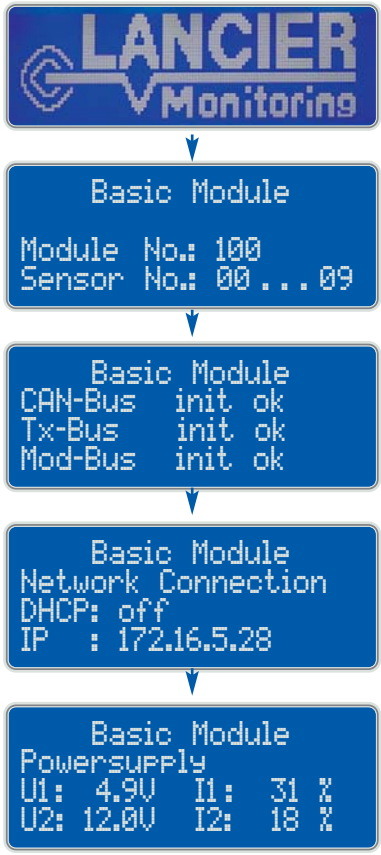
Function/Start-up

The RM-Basic module is the core of the Rail-Module-Bus by LANCIER Monitoring. It supplies power for the sensor module, displays measurements and parameters, and transmits the readings to superordinate control systems via one of the integrated interfaces. Communication between the modules is carried out by a CAN bus.

The RM-DC basic module's display is also used to set the threshold values of the connected sensors.

Start-up

Once the power supply has been turned on the module is initialised and a self-test is carried out.



After pressing the "Enter" button (**9**) on the basic module, information on the internal voltage and power consumption is displayed:

U1 = 5 V rated voltage

U2 = 12 V rated voltage

I1 = Capacity utilisation U1

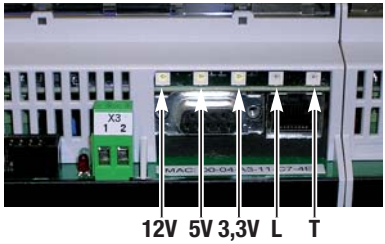
I2 = Capacity utilisation U2

Power consumption must not exceed 100% at either I1 or I2. If necessary, further basic modules should be used.

LEDs of the RM-Basic module

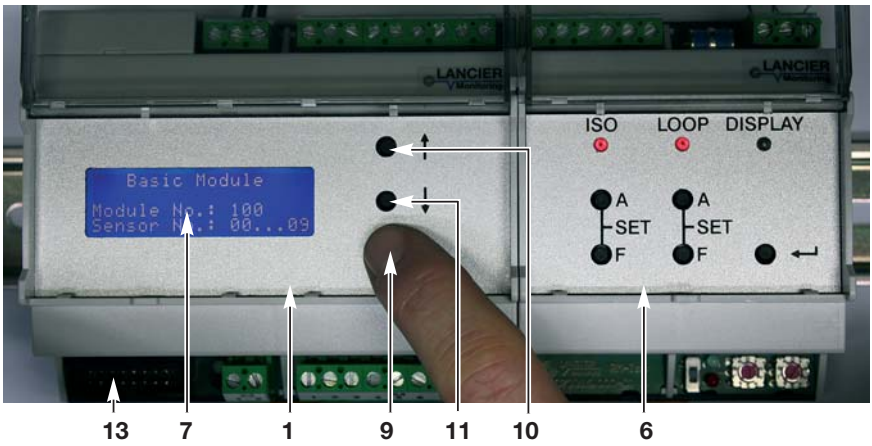
There are 5 LEDs directly above the RS232 and the Ethernet interface, that show the operating condition:

- 3 green LEDs „12 V“, „5 V” and „3,3 V“ illuminate promptly when the operating voltage is switched on.
- The green LED „Link“ illuminates when an Ethernet connection is present.
- The green LED „Traffic“ flashes during data exchange by the Ethernet.



Configuration and operation of the RM-Basic module

The RM-Basic module (**1**) can be configurated and operated by the integrated push-buttons (**9-11**) or by the Ethernet (see pages 15 ff.)

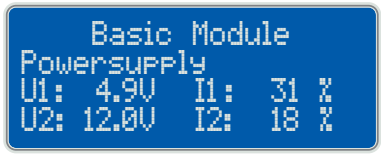


1 RM-Basic module
6 Measuring module
7 Display
9 „Enter” push-button
10 „up” push-button
11 „down” push-button
13 Module interface for further basic modules

Show display contents

All display contents are shown consecutively by pressing the „Enter" button (**9**) of the RM-Basic module:

1. **Standard display = System display**
   Shows internal voltage and power consumption.

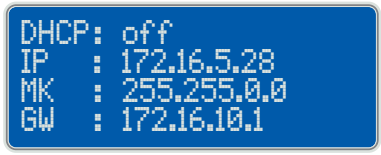


   Pressing the „Enter" (**9**) button shows:

2. **Measurement readings**
   Shows a list of the attached RM measuring modules with the Tx-bus frequency values corresponding to their readings and Tx-bus addresses.

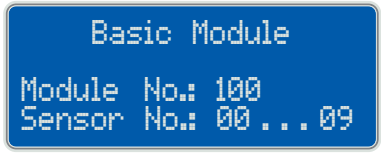
   Pressing the „Enter" (**9**) button shows:

3. **Network settings**
   Shows the current network settings.



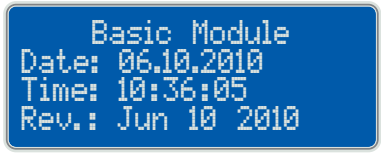
   Pressing the „Enter" (**9**) button shows:

4. **Basic module settings**
   Shows the basic module number and the assigned measuring modules.



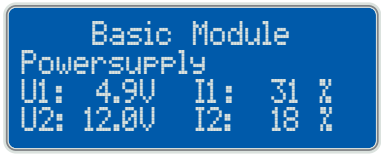
   Pressing the „Enter" (**9**) button shows:

5. **Time and software settings**
   Shows date and time of the internal clock and the release status of the software.



   Pressing the „Enter" (**9**) button leads back to:

1. **Standard display**
   Shows internal voltage and power consumption

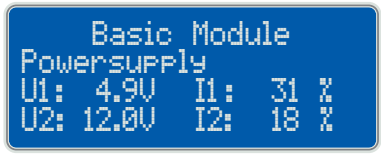


Explanation of display contents / Configuration

1. System display

Internal voltage and power consumption indication:

U1 = 5 V rated voltage
U2 = 12 V rated voltage
I1 = Capacity utilisation U1
I2 = Capacity utilisation U2



Power consumption must not exceed 100% at I1 or I2. If necessary, further basic modules should be used.

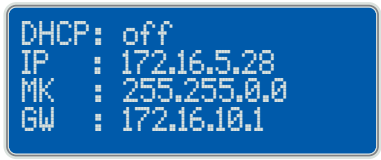
2. Measurement readings

The RM-Basic module can forward the readings of the attached RM measuring modules to a remote monitoring station via the LANCIER Tx-bus. This list shows the Tx-bus address (to be set in the RM measuring modules), the frequencies to be transmitted (corresponding to readings) and the number of the RM measuring module. The last column indicates the value of the sensor of modules having several relevant measurement tasks:
e.g. RM-Iso:
VAL 01 = Iso measurement value,
VAL 02 = Loop measurement value).

- By pressing the “up” (**10**) and “down” (**11**) buttons, the list can be scrolled through to see further values.

3. Network settings

Shows the current network settings:



DHCP: The **Dynamic Host Configuration Protocol** (DHCP) allows for an automatically issued network configuration of the RM-Basic module by the server. The factory setting is „off”.
Fix IP addresses should be used because of security reasons.

IP: **IP address of the RM-Basic module**. This address is arbitrary. The IP address must be unique and must not overlap with any other address in the network.

MK: **Subnet Mask.** The subnet masks of a subnetwork are identical for all hosts of the specific subnet.

GW: **IP address of the gateway to the network**.

Changing network settings

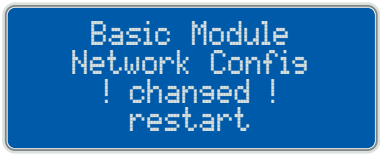
Attention!
Changing network settings should happen in close collaboration with network administrators only, to avoid network failure.

a. Changing DHCP settings

Display „Network settings", then press the „Enter" (**9**) button for 5 sec. until a „*" appears at the DHCP setting in the display (**7**) .

DHCP settings can be changed now:
- pressing the button „up" (**10**) or „down" (**11**) alternates the setting between „on" and „off".

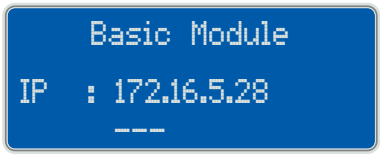
The new setting must be acknowledged by pressing the „Enter" button (9) once again.
If setting „DHCP: on" is chosen, the module restarts because no further network settings are necessary. The module gets them automatically from the DHCP server.



If setting „DHCP: off" is chosen, the display moves forward to:

b. Changing IP address

The first 3 digit block of the IP address is underlined and can be changed:
- pressing the button „up" (**10**) raises the value of the digit block.
- pressing the button „down" (**11**) lowers the value of the digit block.



The change of the digit block must be acknowledged by pressing the „Enter" button (**9**). Afterwards the curser forwards to the next digit block, which is set in the same way.

After setting the last digit block and acknowledging the new setting by pressing the „Enter" button (**9**) the display moves forward to:

c. Changing subnet mask address

The setting of the subnet mask address is carried out as described before at item b.

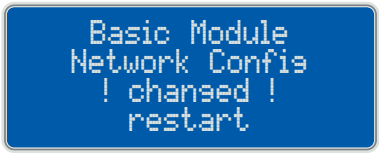
After setting the last digit block and acknowledging the new setting by pressing the „Enter" button (**9**) the display moves forward to:

d. Changing gateway address

The setting of the gateway address is carried out as described before at item b and c.

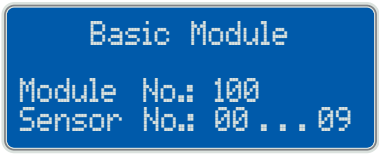
After setting the last digit block and acknowledging the new settings by pressing the „Enter" button (9) the module restarts.

If no value was changed, the module display returns to the screen „Network settings" without restart.



4. Basic module settings

Shows the basic module number and the assigned measuring modules.



Changing the basic module number

Important!
Entering this number is only necessary when,
- more than 1 basic module is in use or
- the addresses of available measuring modules require it.

When only one basic module is in use the factory setting of 100 can be applied without problem.

Basic module number and measuring module addresses are linked as follows:
- Basic module no. 100 ◄► Measuring module addresses 01 to 09,
- Basic module no. 101 ◄► Measuring module addresses 10 to 19,

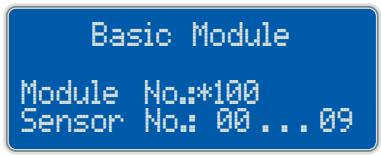
etc., until
- Basic module no. 109 ◄► Measuring module addresses 90 to 99

Every RM-Basic module (**1**) can hold a maximum of 10 measuring modules (**6**). The measuring modules are connected to the basic module (**1**) on a DIN rail using a bus connecting plate or an interface cable with the connecting plug (**12**).

If several basic modules (**1**) are available in a measuring bus, each one must have a unique basic module number.

Changing the basic module number

Display „Basic module settings", then press the „Enter" (**9**) button for 5 sec. until a "*" appears in front of the digits of the module number on the display (**7**).



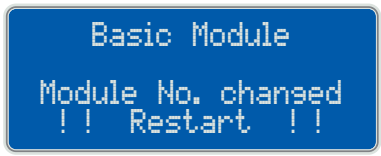
The basic module number can now be changed:

- Pressing the "up" button (**10**) raises the module number
- Pressing the "down" button (**11**) lowers the module number

The module number range is 100 to 109. After the maximum value of 109, the display jumps back to 100

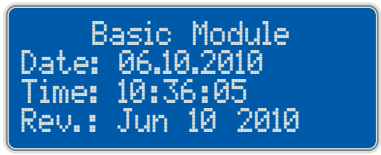
The range of acceptable measuring module/sensor addresses is adjusted automatically when the module number is changed.

The changing of the basic module number must be confirmed by pressing the "Enter" button (9) again.
Subsequently, the module automatically restarts.



5. Time and software settings

Shows date and time of the internal clock and the release status of the software.
Date format: DD.MM.YYYY
Time format: HH:MM:SS



Changing time and software settings

Display „time and software settings" then press the „Enter" (**9**) button for 5 sec. until the right-hand shown display appears (**7**).

The day value of the date is underlined and can be changed :

- Pressing the "up" button (**10**) raises the day value.
- Pressing the "down" button (**11**) lowers the day value.

The change of the day value must be acknowledged by pressing the „Enter" button (**9**). Afterwards the curser forwards to the next (month) value, which is set in the same way. Year and time values are set in the same way.

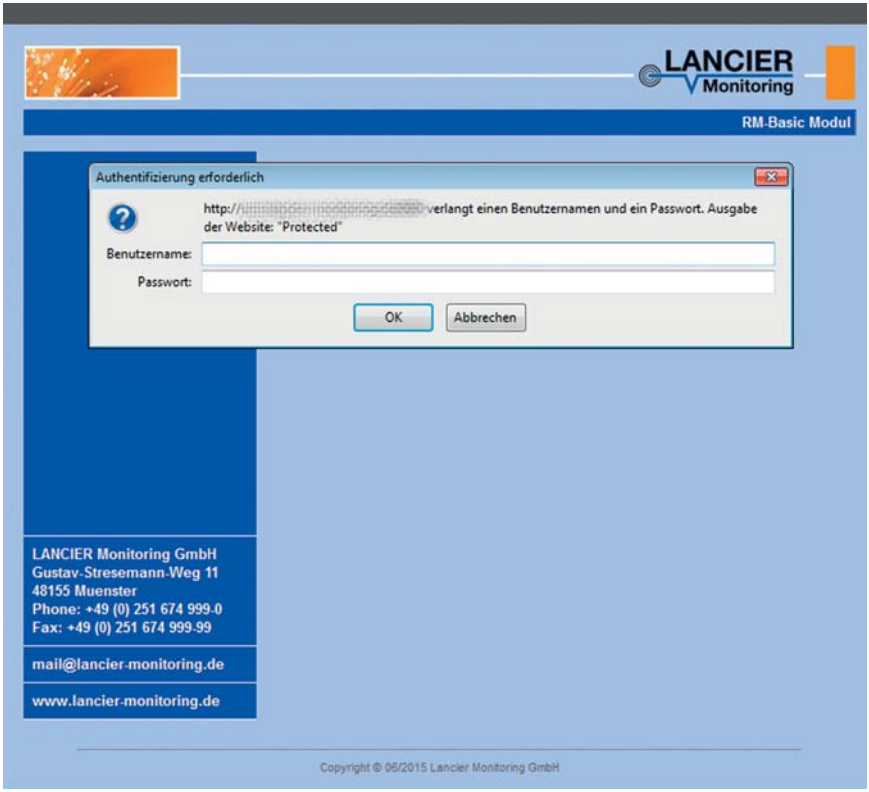
After setting the last value and acknowledging the new settings by pressing the „Enter" button (9) the module restarts.

Configuration by Ethernet

The RM-Basic module can be configurated by Ethernet also using a web browser. The IP address must be known for this.

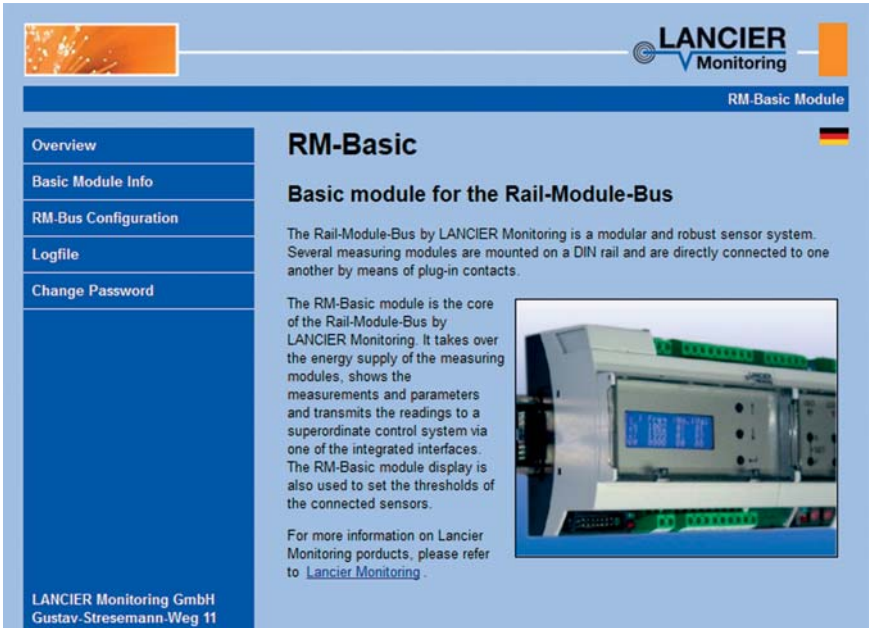
The connection to the module will be established after entering the IP address into the browser's address field.

Access to the RM basic module's configuration is password protected.
Factory settings: **User name:** http
Password: http



1. Overview/menu

Once the correct password has been entered the **Homepage/Overview** screen will appear:



In the left menu bar the following menu will appear:

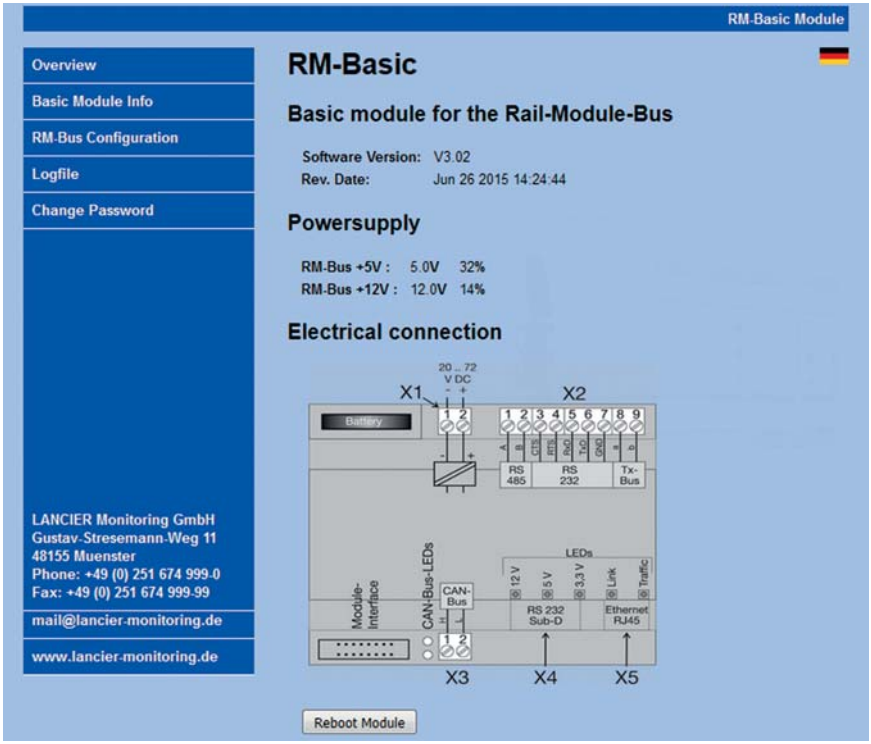
- **Overview:** General information about the rail module bus.
- **Basic module information:** Displays the software version including revision status and the system display including internal voltage and load levels as well as the circuit diagram for connection cables and the reset option for the basic module.
- **RM bus configuration:** **Displays** all current measurement data.
  Configuration platform for
  - the basic module,
  - all connected measuring modules.
- **Log file:** **Displays** or **downloads** log files (list of all measurement data, approximately 20,000 data sets) in CSV format.
- Change password: Changes the **login password** to this configuration platform.

On the top right you have the option to switch languages, i.e. between German and English and vice versa, by clicking on the corresponding country flag.

2. RM-Basic Module

1. Page title: **RM Basic**
   Describes the **basic module** used.
2. **Basic module for the rail module bus**
   Displays the **software version** including revision status.
3. **Voltage supply**
   System display including internal voltages and their respective loads:
   RM-Bus +5V : 4.9V 35% (nominal voltage/load)
   RM-Bus +12V : 12.0V 17% (nominal voltage/load)

   Both at + 5V and at + 12V loads must not exceed the 100% mark.
   If necessary, more basic modules must be used.
4. **Electrical connection**
   Circuit diagram for connection cables.
5. **“Reboot Modul” button**
   Restarts the basic module and rebuilds the connections to the measuring modules. All settings and values remain unchanged.



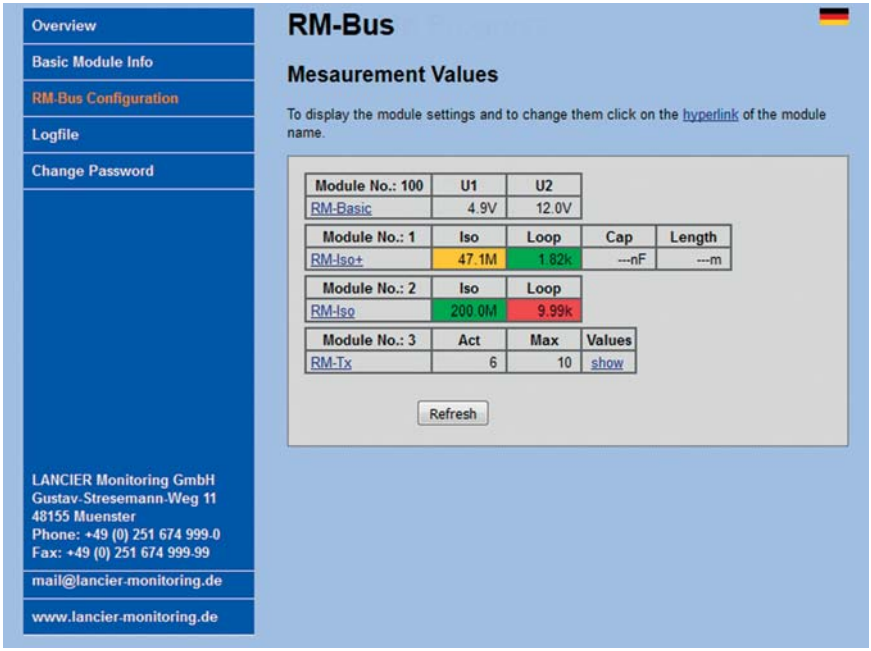
3. RM-Bus Configuration

1. Displays current measured values of all modules at a glance

Readings **within the thresholds** are highlighted in **green**.

Measured values, which have **exceeded the alarm limits**, are highlighted in **red**.

Acknowledged alarms are highlighted in **orange**.



2. Configuration of all modules

By clicking on the module names (1st column, underlined in blue), the corresponding configuration window will open.

Changed values must be saved by clicking on the "Save" button.

2.1 Configuration of the basic module

General

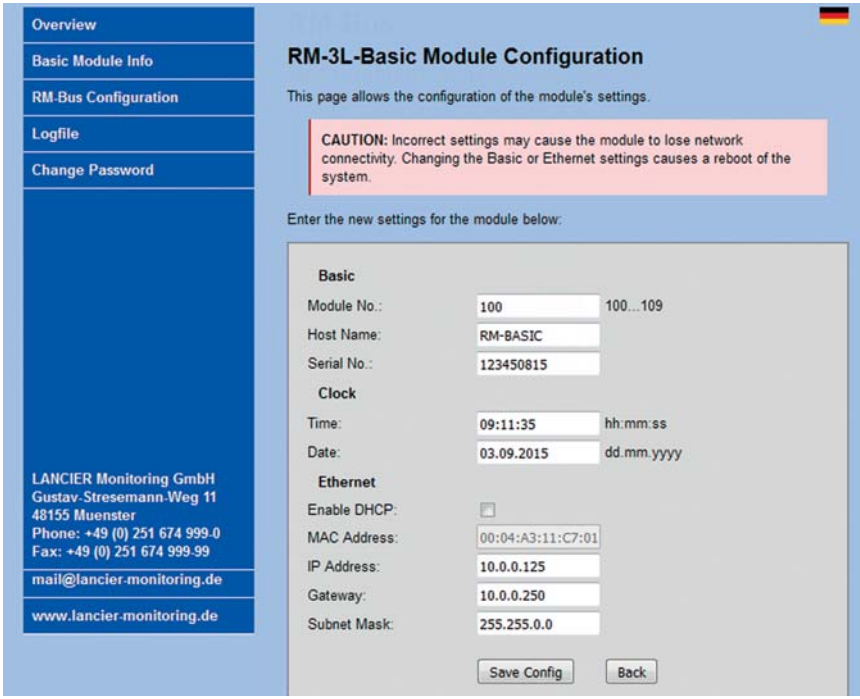
- Module number:

  If multiple basic modules (**1**) exist in a measurement bus, they must each be assigned a unique basic module number. Possible module numbers are 100 to 109. An error message will appear when other values are entered.

  Changes to the module number will automatically change the range of acceptable measuring module/sensor addresses.

WARNING!
Changes to the basic module number will cause previously assigned modules to be lost and these will no longer be displayed here.
Entering the original basic module number makes it possible to "find" these modules again.

- Host Name: Freely editable **name for the basic module** in the network.
- Serial No. Entry of serial no. (refer to name plate).
  This entry is compulsory for the registration of the RM-Basic module at the UMS server.



Clock

Settings of the internal clock (date and time) can be changed here.

Date format: `DD.MM.YYYY`
Time format: `HH:MM:SS`

Ethernet

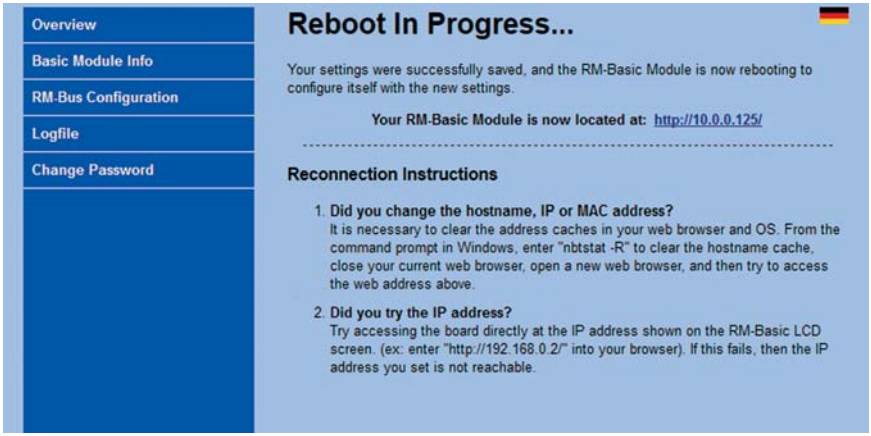
Network settings can be changed here.

Attention!
Changing network settings should happen in close collaboration with network administrators only, to avoid network failure.

Description

- Checkbox „Enable DHCP”: The **Dynamic Host Configuration Protocol** (DHCP) allows for an automatically issued network configuration of the RM-Basic module by the server. The factory setting is „off”. Fix IP addresses should be used because of security reasons.
  If the checkbox is activated (ticked) no further network settings are necessary. The input fields of the other values are greyed out.
- MAC Address: The **MAC address** (unique hardware label) of the RM-Basic module is not editable.
- IP Address: Freely editable **IP address for the basic module** in the network.
  The IP address must be unique and must not overlap with any other address in the network.
- Gateway: Freely editable **IP address of the gateway to the network**.
- Subnet Mask: The **subnet masks** of a subnetwork are identical for all hosts of the specific subnet.
  Freely editable **subnet mask for the basic module** in the network.

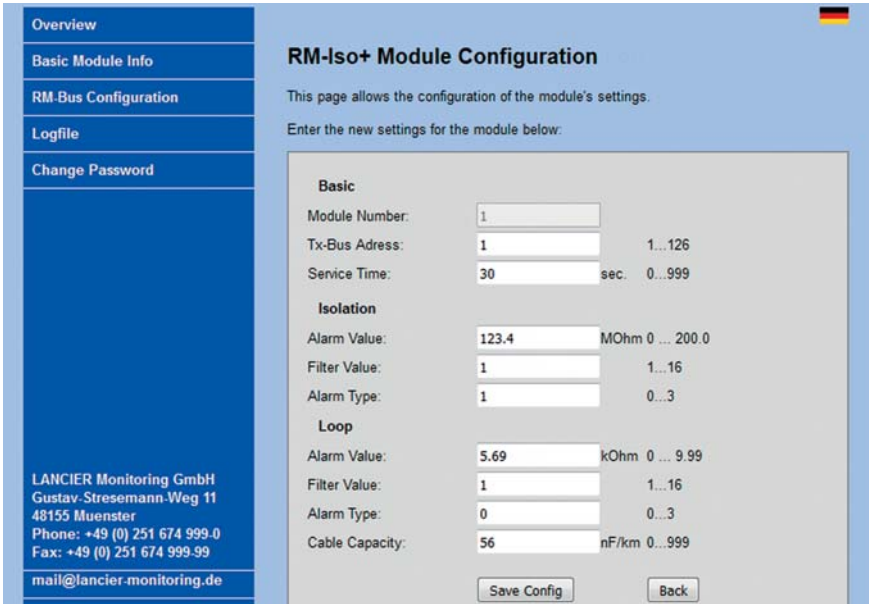
Changed settings must be acknowledged by clicking the button „**Save Config**”.
Click on the "**Back**" button to leave the page without saving your changes.



Once the page has saved, it will be reloaded and display the changed values.

2.2 Configuration of the measuring modules

- Module number: The number of each measuring module is mechanically set at the module itself and the display cannot be changed here.
- All other settings: Please consult the respective measuring module's operating instructions for a description of the other settings, their meaning as well as acceptable values.



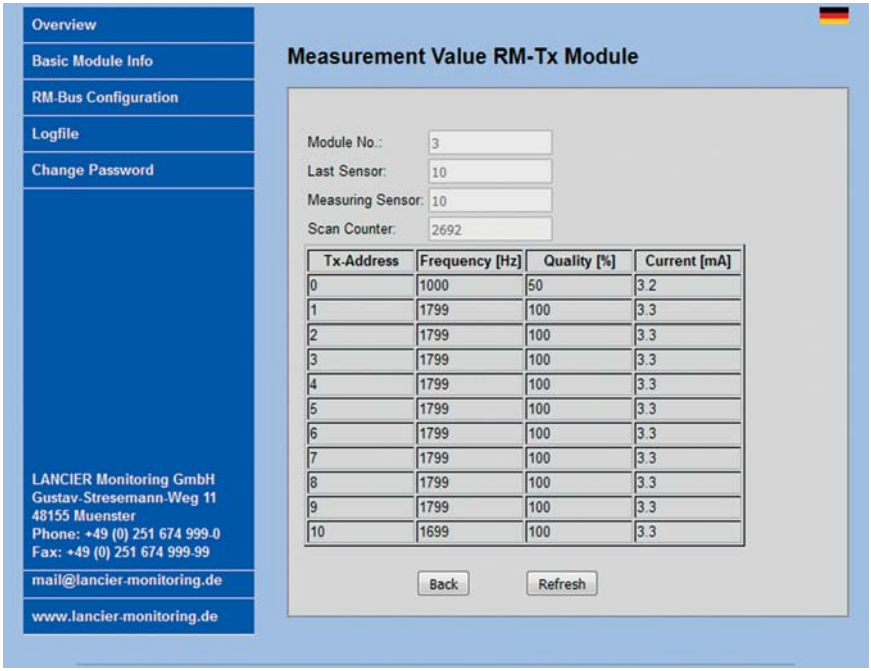
Changed settings must be acknowledged by clicking the button „**Save Config**”.

Click on the "**Back**" button to leave the page without saving your changes.

Once the page has saved, it will be reloaded and display the changed values.

3. Information and values (only TX measuring modules)

By clicking on the "Show" link (underlined in blue) in the last, "Values" column, the corresponding display window will open.



The module name and number as well as information about the Tx-bus will be displayed.

By clicking on the "**Refresh**" button, the module's latest values will be read out.

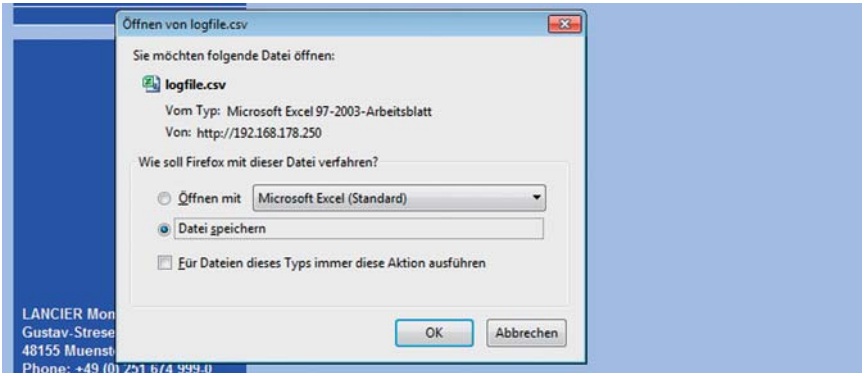
Click on the "**Back**" button to leave the page without saving your changes.

4. Logfile

Here all saved measured values can be downloaded onto the local PC/laptop as a log file in CSV format.

Download log file

- By clicking on the "Download log file" button, the browser's communication window will open.
- Depending on the used PC's/laptop's specifications an option to open/save the file will be displayed.



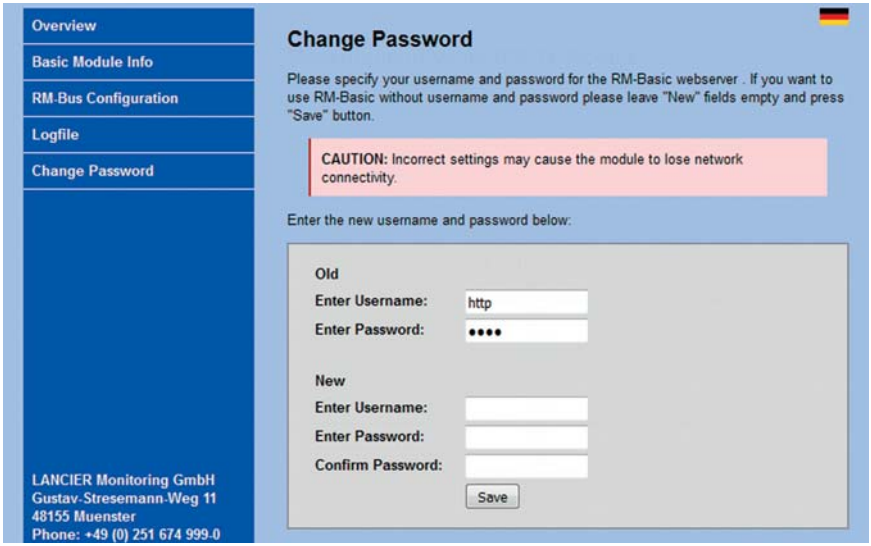
Log file evaluation

The following values are represented in the log file**:**

Date	The date the measured value was saved (from the module's real time clock)
Time	The time the measured value was saved (from the module's real time clock)
Message type	Entry type: 0 = system message, e.g. "Reboot" (restart occurs) 1 = alarm message 2 = status message, e.g. as "value measured"
Modules	Measuring module type
No.	Measuring module number
Value 1	Measured value of the 1st measuring channel
State 1	Alarm state of the 1st measuring channel
Value 2	Measured value of the 2nd measuring channel
State 2	Alarm state of the 2nd measuring channel The following applies for all alarm states: 0 = within the thresholds 1 = alarm 2 = acknowledged alarm
Message	Content of the system messages, e.g. "Reboot" (restart occurs)

5. Change password

Here the user name and password can be changed.



- Enter the previous **user name** and previous **password** in the appropriate fields at the top and
- the new **user name** and new **password** (twice) in the appropriate lower fields and click on the "Save" button.
  The new password will be valid immediately.
- A login using the new access data will then follow.

Alternatively **disable password protection**.

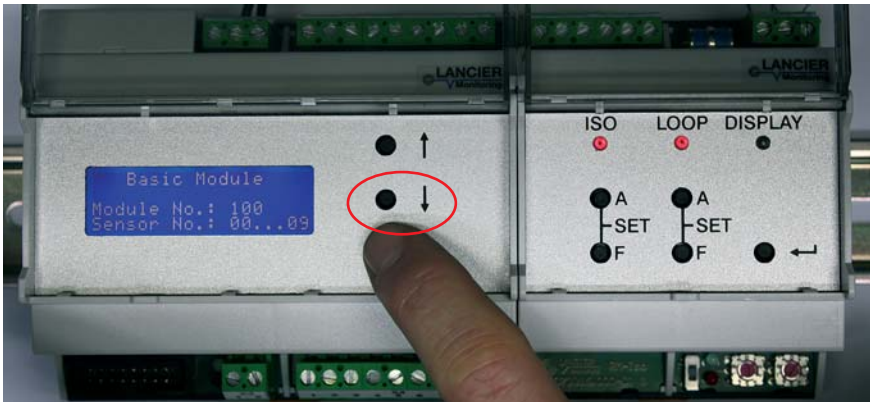
- To disable password protection leave the **user name** and **password** fields blank (twice) and click on the "Save" button.
  Access to the RM basic module's configuration will now no longer be protected by a password request.
- A login using the new blank login data will then follow.

6. Help if the password is lost

If the password has been changed and is no longer known, this can only be remedied directly on the basic module.

More information:

1. Switch off the basic module/disconnect from the power supply.
2. Keep the middle arrow button ↓ pressed and turn on the basic module/reconnect to the power supply.



3. Keep the middle arrow button ↓ pressed until the display shows "Factory reset".
   The basic module has now been reset to factory settings:
   - The network settings and password have been deleted.
   - The module number, date and time are retained.
4. You can now login using the original factory-set login data:
   User name: http
   Password: http

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CE

EC Declaration of Conformity

We declare under our sole responsibility, that the product

Make:	**LANCIER Monitoring**
Type:	**Basic Module RM-Basic**

to which this declaration refers, meets the relevant health and safety requirements of the following EC directives:

2004/108/EG	**Electromagnetic compatibility**
2011/65/EU	**RoHS-II**

For proper implementation of the health and safety requirements named in the EC directives the following standard(s) and/or technical specification(s) have been consulted:

EN 61326-1	**Electrical equipment for measurement, control and laboratory use - EMC requirements (class B)**

Münster, 28.03.2014

Research and Development

Managing Director