

Operating Instructions

RM-Loop

***Loop Resistance
Measuring Module
for the Rail-Module-Bus***



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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

Loop resistance

Measurement range	0 .. 9.99 K Ω , fault: ± 3 % of measured value, ± 50 Ω
Resolution	10 Ω
Measuring voltage	24 V DC
Supply voltage	by RM-Basic module
Power consumption	max. 4 W
Measurement input	
Impulse stability 1.2/50 μ s	1000 V
Operating temperature	-20 °C .. +65 °C
Storing temperature	-40 °C .. +70 °C
Admissible ambient humidity	0 .. 95 % rel. humidity, non-condensing
Display	Monochrome LC-Display by RM-Basic module
Signal LEDs	
2 x green / red:	<i>red</i> : alarm loop <i>flashing</i> : acknowledged alarm loop, <i>green</i> : display loop resistance
1 x blue:	display operation
Signal outputs	2 dry change-over contacts for: alarm loop 1, alarm loop 2
Max. switchable voltage	100 V DC
Max. switchable current	0.1 A DC
Dimensions RM-Loop (W x H x D)	72 x 89 x 65 mm

Ordering Data

Measuring module RM-Loop **Order-No. 074008.000**

Accessories

Basic module RM-Basic

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

Bus expansion RM-Bus-Extender

with connection cable **Order-No. 074002.000**

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-Loop measuring module is intended for the measurement of loop resistances and is used to monitor remote switches, such as float switches, door contacts. Two loops can be monitored per module.

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.

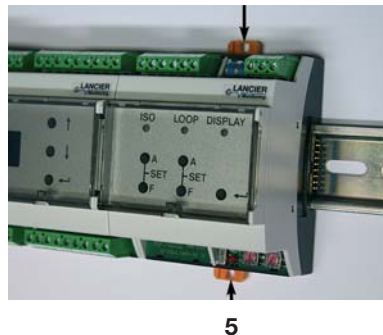
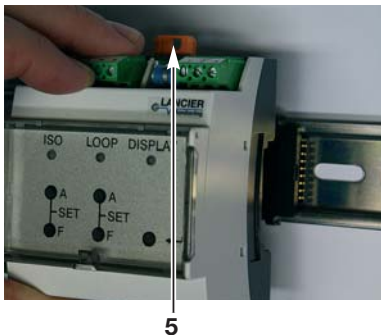
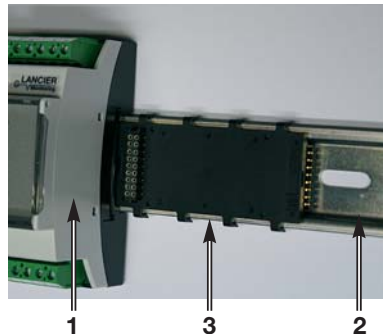
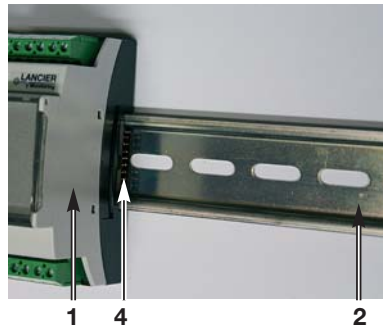
Installation

Mounting

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

Each measuring module (1) has a bus connecting plate (3) that plugs into the interfaces (4) of the existing neighbouring module and subsequently clips into the DIN rail (2).

The measuring module 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.



Electrical connection



Accident prevention!

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



WARNING,

Adhere to EMC directives!

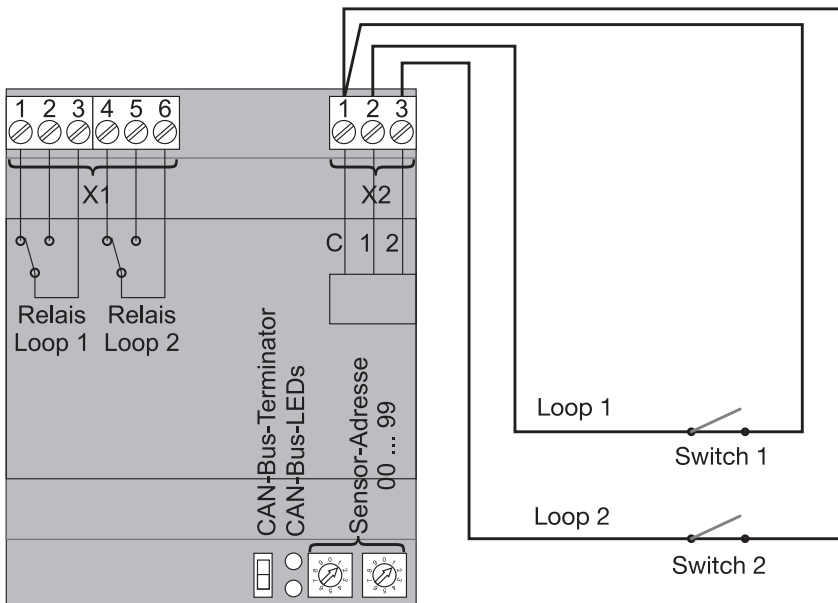
RM-Loop measuring modules are connected to each other using a bus connecting plate (3). Communication between modules is carried out by a CAN bus.

Measurement loops are connected directly to each module.

Terminal assignment

Module

X1.1 to 3	Signal contact Loop 1
X1.4 to 6	Signal contact Loop 2
X2.1	Common connection Loop 1 and loop 2 (Common)
X2.2	Second connection Loop 1
X2.3	Second connection Loop 2



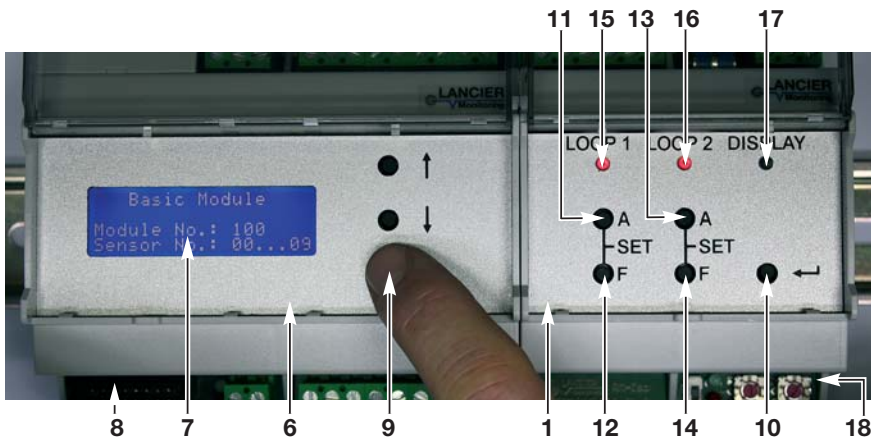
CAN bus terminator

The last participant on the RM CAN bus (as seen from the basic module) must be equipped with a terminating resistor. Next, flip the "CAN-Bus-Terminator" switch down.

Entering the measuring module address

Each RM-Basic module (6) can hold a maximum of 10 measuring modules (1). The measuring modules are connected to the basic module (6) on a DIN rail using a bus connecting plate or using an interface cable with the connecting plug (8).

To assign unique measurement values, the measuring modules (1) must be addressed.



1. Determining the basic module number

Press and hold the “Enter” button (9) on the basic module for 5 s until “Module No.” appears on the display (7).

2. Reading the module No.

For the

- basic module No. 100 measuring module addresses 01 to 09 are acceptable,
- basic module No. 101 measuring module addresses 10 to 19 are acceptable, etc., until
- basic module No. 109 measuring module addresses 90 to 99 are acceptable

The basic module automatically returns to the normal display mode after a preset amount of time.

3. Entering measuring module addresses

Using a small screwdriver, enter the module number on the address rotary switch (18) (left switch in the 10th position, right switch in the 1st position).

For technical reasons the measuring module address 00 is not allowed.



10th, 1st pos.

Example: Module address 01

The measuring module address remains identical when connected to another CAN or module bus.



IMPORTANT!

After entering the measurement module addresses, the basic module should be reset by switching the power supply off and then on again.

Function/Start-up

The RM-Loop module is a measuring and monitoring device for loop resistance in the LANCIER monitoring RM bus. It detects the status (closed/open) of more remote switches, such as float switches, door contacts. Two switches can be monitored per module.

Several measuring modules are mounted to a DIN rail and, by means of integrated plug-in contacts, are directly connected to one another. The power supply, measurement value reporting and display, as well as their transmission to remote measuring stations, are carried out through the RM-Basic module.

Communication between the modules is carried out by a CAN bus.

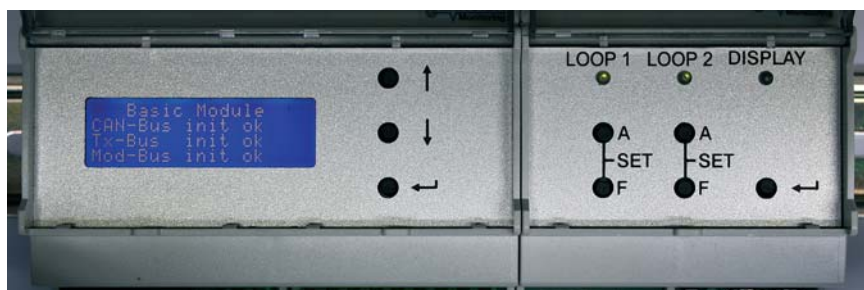
Every monitored switch interrupts or closes a measuring loop, which is measured continuously by the RM-Loop module. The alarm threshold for the measured values can be programmed with no restriction using an integrated keypad and the basic module's display. All settings are saved in an internal EEPROM memory to prevent losses.

For remote alarms, the RM-Loop has an integrated potential-free output contact.

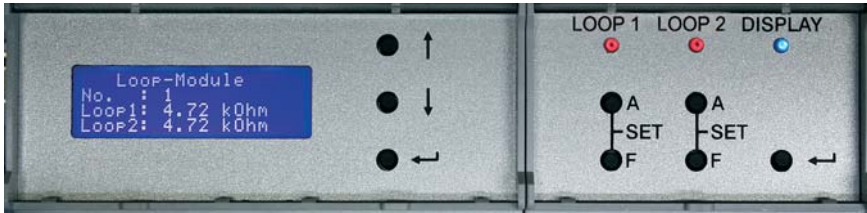
Basic functions of the measuring module RM-Loop

1. System start/Self test

- When the power supply is switched on, the system carries out a self test, which is indicated by the display (7) on the basic module (6).

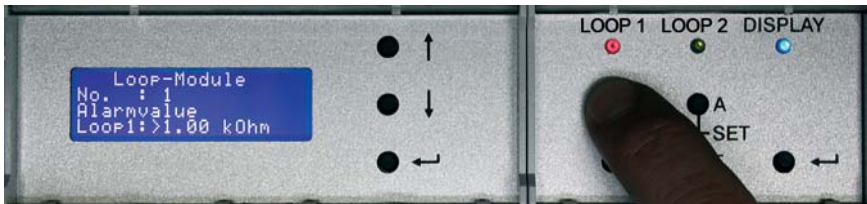


2. Measured value display



- Press the “Enter” button (10) on the measuring module (1) to show the current loop measurement values in the display (7) on the basic module (6).
- The blue “Display” LED (17) glows on the measuring module.

3. Loop 1 threshold / Entering the threshold



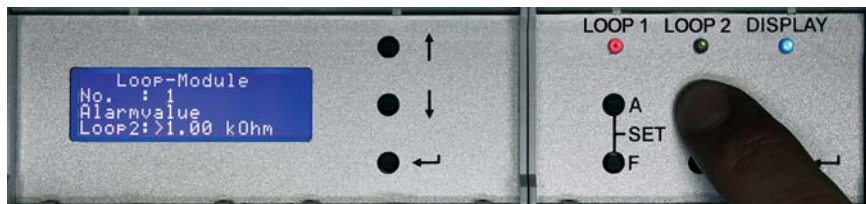
- Press the “Loop1 A” button (11) on the measuring module (1) to display the stored Loop1 threshold on the display (7) of the basic module (6).

Increasing the threshold

- Press and hold the “Loop1 A” button (11) on the measuring module (1) and also press the “Loop1 F” button (12) on the measuring module (1) until the desired value (0 bis 9,99 kOhm) is reached. The longer the “Loop1 F” button (12) is pressed, the quicker the threshold increases. After the maximum value of 9.99 the display returns to the minimum value of 0.0.

The new value entered is saved automatically.

4. Loop 2 threshold / Entering the threshold



- Press the “Loop2 A” button (**13**) on the measuring module (**1**) to display the stored Loop2 threshold on the display (**7**) of the basic module (**6**).

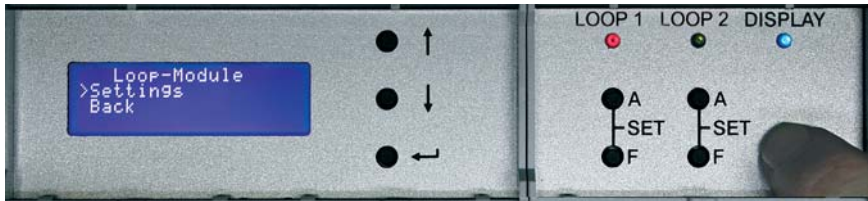
Increasing the threshold

- Press and hold the “Loop2 A” button (**13**) on the measuring module (**1**) and also press the “Loop2 F” button (**14**) on the measuring module (**1**) until the desired value (0 bis 9,99 kOhm) is reached. The longer the “Loop2 F” button (**14**) is pressed, the quicker the threshold increases. After the maximum value of 9.99 the display returns to the minimum value of 0.0.

The new value entered is saved automatically.

Measuring module RM-Loop settings

1. Opening the service menu



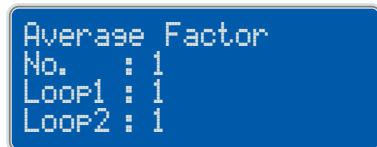
- Press and hold the “Enter” button (10) on the measuring module (1) for 5 s to call up the measuring module’s service menu on the display (7) of the basic module (6).
- Every short press of the “Enter” button (10) on the measuring module (1) moves the selection cursor down one menu item.
- The blue “Display” LED glows on the active measuring module.

2. Displaying and changing the settings of the measuring module

- The cursor must be in front of the “Settings” menu item.
- Press and hold the “Enter” button (10) on the measuring module (1) for 2 s to call up the settings display on the display (7) of the basic module (6).
The “No.” item always shows the number of the active measuring module.
- Every short press of the “Enter” button (10) on the measuring module (1) calls up the following settings in succession:

1. „Average Factor”

Strongly fluctuating measurement values, which occur on the line due to interference voltages, can be steadied by forming an average of 2 to 16 measurements for display. The mean value is adjusted separately for the insulation and loop resistance measurement.



To change the number of measurements for the mean Loop1 value formation:

- Keep the “Loop1 A” key (11) pressed, while
- Pressing the “Loop1 F” key (12) repeatedly until the desired value (1 to 16) has been reached. Once the maximum value of 16 has been reached, the value on the display will return to 1.

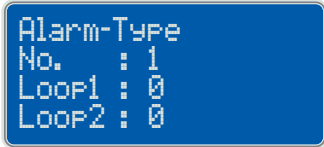
To change the number of measurements for the mean Loop2 value formation:

- Keep the “Loop2 A” key (13) pressed, while
- Pressing the “Loop2 F” key (14) repeatedly until the desired value (1 to 16) has been reached. Once the maximum value of 16 has been reached, the value on the display will return to 1.

The new, reset value is saved automatically.

2. „Alarm-Type”

- 0 = measured value > set alarm value,
In the event of an alarm,
the relay is energised
- 1 = measured value < set alarm value,
In the event of an alarm,
the relay is energised
- 2 = measured value > set alarm value,
In the event of an alarm, the relay is de-energised
- 3 = measured value < set alarm value,
In the event of an alarm, the relay is de-energised



```
Alarm-Type
No.      : 1
Loop1    : 0
Loop2    : 0
```

To change the alarm type for the Loop1 measurement:

- Keep the „Loop1 A” (11) key (11) pressed, while
- pressing the „Loop1 F” (12) repeatedly until the desired value (0 to 3) has been reached. Once the maximum value of 3 has been reached, the value on the display will return to 0.

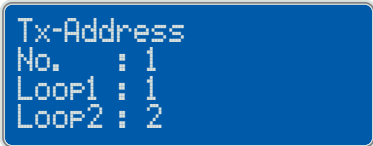
To change the alarm type for the Loop2 measurement:

- Keep the „Loop2 A” (13) key (11) pressed, while
- pressing the „Loop2 F” (14) repeatedly until the desired value (0 to 3) has been reached. Once the maximum value of 3 has been reached, the value on the display will return to 0.

The new, reset value is saved automatically.

3. „Tx-Address”

- Loop 1 = preset Tx bus address
for Loop1 measurement
- Loop 2 = preset Tx bus address
for Loop2 measurement



```
Tx-Address
No.      : 1
Loop1    : 1
Loop2    : 2
```

Changing the Tx bus address:

- The Tx bus addresses are always given in direct succession. The lower valued addresses are always valid for Loop1 measurement, the higher ones are valid for Loop2 measurement,
e.g. Loop 1 = 1, Loop 2 = 2 until Loop 1 = 126, Loop 2 = 127



IMPORTANT!

Make sure that the measuring module is coded with a unique address on the assigned Tx-bus to avoid data collision.

Increasing the address value:

- Press and hold the “Loop1 A” button (11), and simultaneously
- Press the “Loop1 F” button (12) as often as required until the desired value (0 to 127) is reached. After the maximum value of 127 the display returns to a value of 1.

Decreasing the address value:

- Press and hold the “Loop2 A” button (13), and simultaneously

- Press the “Loop2 F” button (14) as often as required until the desired value (127 to 0) is reached. After the minimum value of 0 the display returns to a value of 127.

Address value 00:

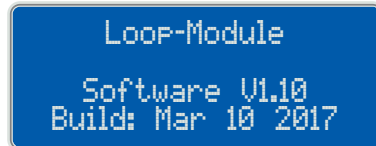
- The address value 00 deactivates communication by the measuring module through the Tx bus.

The new value entered is saved automatically.

4. „Software”

Version and production date of the internal software (firmware).

These values cannot be changed.



The module automatically returns to normal service once the service time has expired.

The LANCIER Tx bus

A maximum of 127 sensors can be connected to a monitoring pair in the LANCIER Tx bus, whereby care must be taken that the RM-Loop monitors two parameters that are read in a total of two time frames in succession, i.e., the RM-Loop counts as two sensors in the Tx bus.

The transmission of measurement values to all sensors connected to the Tx bus happens at separate times. Therefore the sensors must be encoded before installation (see page 13) with a unique address.

Tx bus performance test

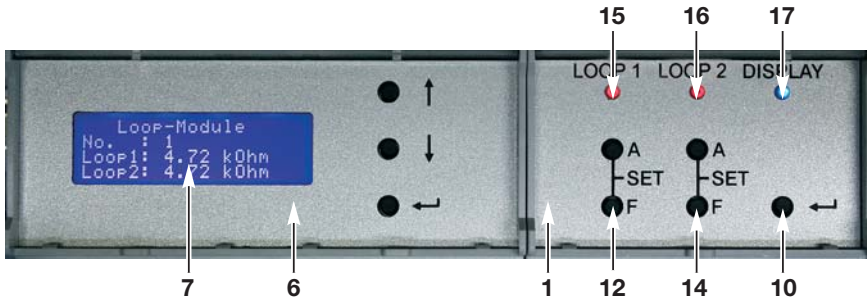
All addressable sensors must be tested for proper functioning and coding with the LANCIER Testbox (Order No. 050833.100). The necessary steps for this are described in the Testbox's operating instructions.



Warning!

To prevent later malfunctions, never start up untested sensors!

Signification of the LEDs



15 LED „Loop 1“

- glows **green** if the Loop1 resistance value is within the target range.
- glows **red** if the Loop1 resistance value is in alarm condition.
- Alternately flashes **red** and **green** if the “Loop1” signal contact is acknowledged by pressing the “Loop1 F” button (12) but the Loop1 resistance value is still in alarm condition.

16 LED „Loop 2“

- glows green if the Loop2 resistance value is within the target range.
- glows red if the Loop2 resistance value is in alarm condition.
- Alternately flashes red and green if the “Loop2” signal contact is acknowledged by pressing the “Loop2 F” button (14) but the Loop2 resistance value is still in alarm condition.

17 LED „Display“

- glows if the “Enter” button (10) on the measuring module (1) is pressed in order to display the measurement value on the display (7) of the basic module (6).

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EC Declaration of Conformity

We declare under our sole responsibility, that the product

Make: LANCIER Monitoring
Type: Measuring module RM-Loop

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

2014/30/EU 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, 10.03.2017


Research and Development


Managing Director