LANCIER Monitoring

Operating Instructions

RM-X2

Measuring Module
for the evaluation of sensors
for physical parameters
with a standardised current and
voltage interface
for the Rail-Module-Bus

Contents

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

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Technical Data

Current signals	0 mA … 20 mA
according to DIN IEC 60381-1	4 mA … 20 mA
	Fault ±1.5 % of measured value, ±1 % of end value
Internal shunt resistor	500 Ω
	Measuring range configured ex works
	according to order specification
	Potential separation 200 V DC
Voltage signals	0 V … 5 V DC
according to DIN IEC 60381-2	0 V … 10 V DC
	Fault ±1.5 % of measured value, ±1 % of end value
further	0 V … 1 V DC
	0 V … 100 V DC
	Fault ±1.5 % of measured value, ±1 % of end value
	Measuring range configured ex works
	according to order specification
	Potential separation 200 V DC
Ratiometric voltage signal	10 … 90 % (0.5 V … 4.5 V)
Supply voltage	12 V / 5 V DC by RM-Basic module
	Max. 4 RM-X2 modules per Basic module
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	
green / red:	*red*: alarm S1 resp. S2
	flashing: acknowledged alarm S1 resp. S2
	green: display S1 resp. S2
1 x blue:	display operation
Signal outputs	2 dry change-over contacts for S1, S2
Max. switchable voltage	250 V AC
Max. switchable current	1.5 A AC
Dimensions RM-X2 (W x H x D)	72 x 89 x 65 mm

Ordering Data

Measuring module RM-X2

for voltage and current	**Order-No. 074708.100**

Accessories
  Basic module RM-Basic

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

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 measuring module RM-X2 is designed for the evaluation of sensors for physical parameters with a standardised current and voltage interface.

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.
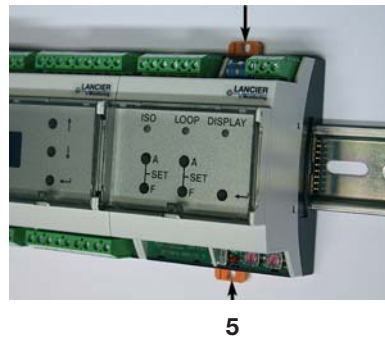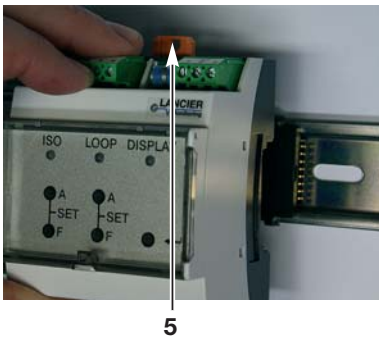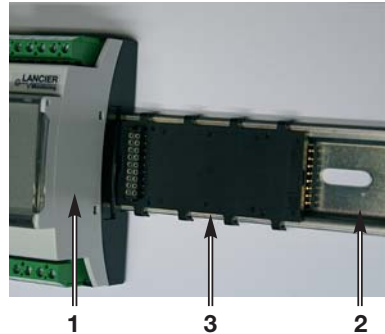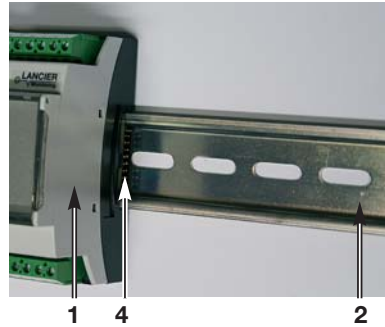
Electrical connection

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

> **WARNING,**
> **Adhere to EMC directives!**

RM-X2 measuring modules are connected to each other using a bus connecting plate (**3**). Communication between modules is carried out by a CAN bus.

> **WARNING,**
> **Due to the power consumption, a maximum of 4 RM-X2 modules may be connected to one Basic module.**

The sensor is connected directly to each module.

Terminal assignment

Module

|	
X1.1 to 1.3	Signal contact S1
X1.4 to 1.6	Signal contact S2
X2.1	Signal input Sensor 1 (+)
X2.2	Ground Sensor 1 (-)
X3.1	Signal input Sensor 2 (+)
X3.2	Ground Sensor 2 (-)
J1 and J2	Jumper for configuration of current/voltage measurement (pre-configured ex works)
SW1	Switch for CAN Bus terminator
SW2 to 5	Switches for configuration of measuring ranges (pre-configured ex works)
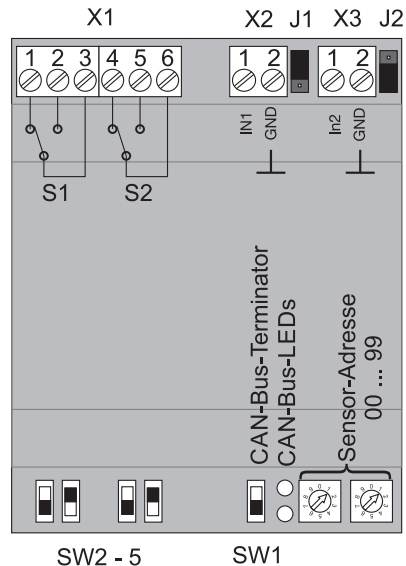
> **CAN bus terminator**
> **The last participant on the RM CAN bus (as seen from the basic module) must be equipped with a terminating resistor.**
> **Next, flip the "CAN-Bus-Terminator" switch down.**

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.
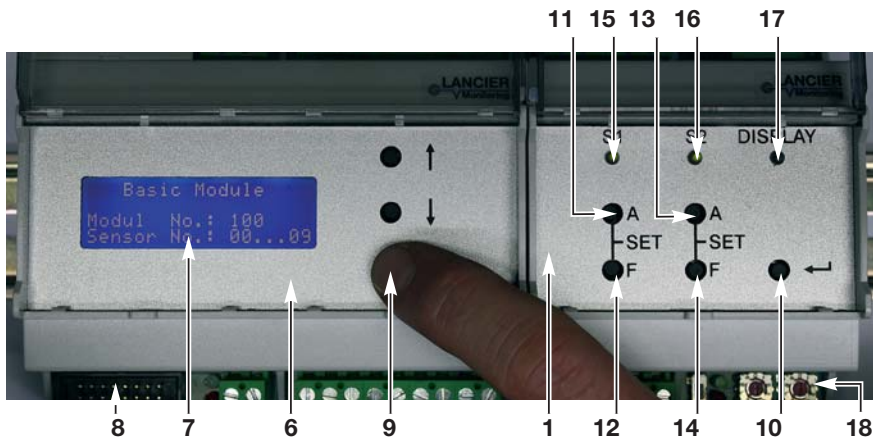
1. **Determining the basic module number**
   Press and hold the "Enter" button (**9**) on the basic module for 5 s until "Module No." appears on the display (**7**).

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-X2 module is a measuring and monitoring device for the evaluation of sensors for physical parameters with a standardised current and voltage interface in the LANCIER monitoring RM bus. The basic module's display shows the values measured by the sensors along with their physical units, e.g. current [mA, A], pressure [mbar, bar] etc.

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.

External sensors are continuously measured by the RM-X2 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.

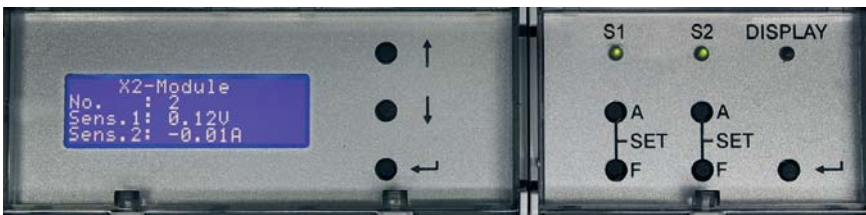For remote alarms, the RM-X2 has an integrated potential-free output contact.

Basic functions of the measuring module RM-X2

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**).
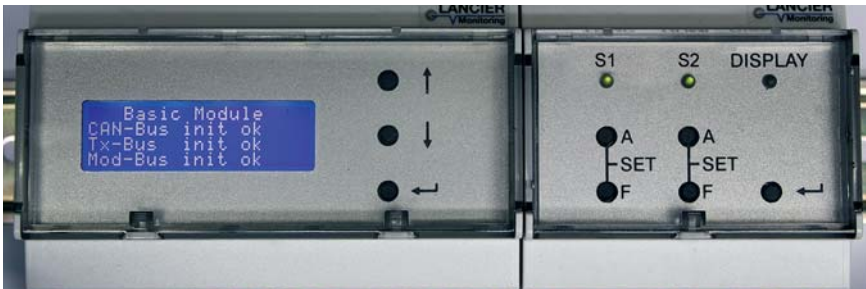

2. **Measured value display**

• Press the "Enter" button (**10**) on the measuring module (**1**) to show the present voltage and current values in the display (**7**) on the basic module (**6**).
• *The blue "Display" LED (**17**) glows on the measuring module.*

- The measuring channels are factory configured, i.e. the current or voltage signals used as well as the measuring ranges and units to be displayed are preset.
- The alarm values can be set freely within the measuring ranges.
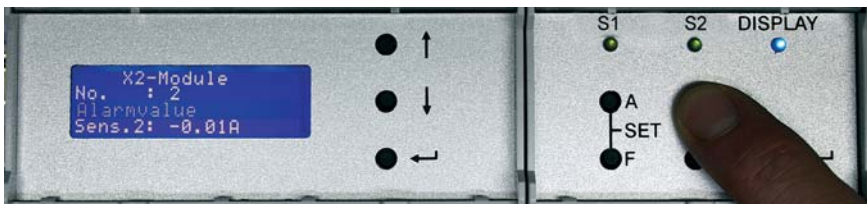
3. S1 display/Entering threshold
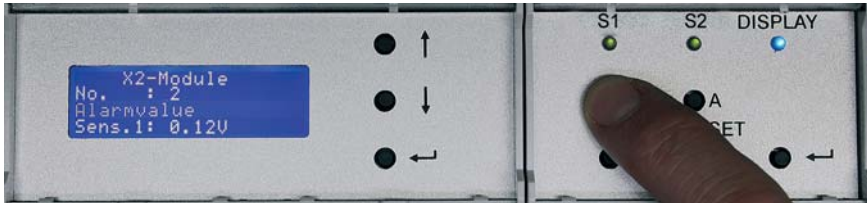
- Press the "S1 A" button (**11**) on the measuring module (**1**) to display the stored S1 threshold on the display (**7**) of the basic module (**6**).

Increasing the threshold

- Press and hold the "S1 A" button (**11**) on the measuring module (**1**) and also press the "S1 F" button (**12**) on the measuring module (**1**) until the desired value is reached. The longer the "S1 F" button (**12**) is pressed, the quicker the threshold increases. After the maximum value the display returns to the minimum value.

The new value entered is saved automatically.

4. S2 display/Entering the threshold

- Press the "S2 A" button (**13**) on the measuring module (**1**) to show the stored S2 threshold on the display (**7**) on the basic module (**6**).

Increasing the threshold

- Press and hold the "S2 A" button (**11**) on the measuring module (**1**) and also press the "S2 F" button (**12**) on the measuring module (**1**) until the desired value is reached. The longer the "S2 F" button (**12**) is pressed, the quicker the threshold increases. After the maximum value the display returns to the minimum value.

The new value entered is saved automatically.

Measuring module RM-X2 settings

1. Opening the service menu
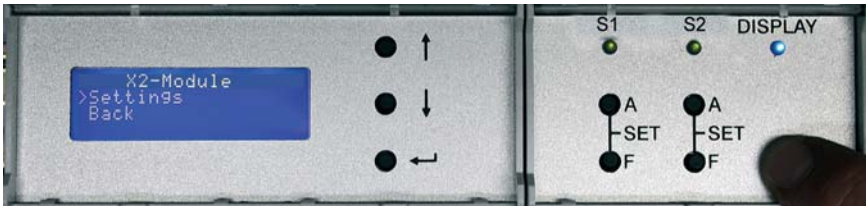
- Press and hold the "Enter" button (**10**) on the measuring module (**1**) for 5 s to call up the measuring module's service menu on the display (**7**) of the basic module (**6**).
- Every short press of the "Enter" button (**10**) on the measuring module (**1**) moves the selection cursor down one 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. „Alarm-Type"

   0 = Measurement value > preset threshold, relay is activated during the alarm

   1 = Measurement value < preset threshold, relay is activated during the alarm

   2 = Measurement value > preset alarm value, relay is deactivated during alarm

   3 = Measurement value < preset alarm value, relay is deactivated during alarm
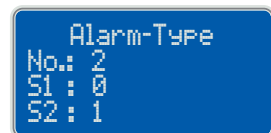
   Changing the alarm type for S1 measurement:
   - Press and hold the "S1 A" button (**11**), and simultaneously
   - Press the "S1 F" (**12**) as often as required until the desired value (0 to 3) is reached.
     After the maximum value of 3 the display returns to a value of 0.

   Changing the alarm type for S2 measurement:
   - Press and hold the "S2 A" button (**13**), and simultaneously
   - press the "S2 F" button (**14**) as often as required until the desired value (0 to 3) is reached.
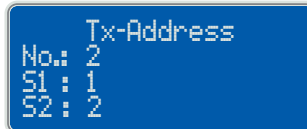   After the maximum value of 3 the display returns to a value of 0.

   The new value entered is saved automatically.

**The "Tx address" settings
are relevant only for users of the LANCIER Tx bus.**

2. „Tx-Address"
S1 = preset Tx bus address
        for sensor S1
S2= preset Tx bus address
        for sensor S2

```
       Tx-Address
No.: 2
S1: 1
S2: 2
```

Changing the Tx bus address:
- The Tx bus addresses are always given in direct succession. The lower valued addresses are always valid for S1 measurement, the higher ones are valid for S2 measurement,
  e.g., S1 = 1, S2 = 2 until maximum SX = 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 "S1 A" button (**11**), and simultaneously
- Press the "S1 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 "S2 A" button (**13**), and simultaneously
- Press the "S2 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.
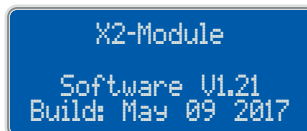
Address value 00:
- The address value 00 deactivates communication by the measuring module through the Tx bus.

The new value entered is saved automatically.

3. „Software"
Version and production date of the internal software (firmware).

These values cannot be changed.

```
       X2-Module

     Software V1.21
   Build: May 09 2017
```

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-X2 monitors two parameters that are read in a total of two time frames in succession, i.e., the RM-X2 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 12) with a unique address.
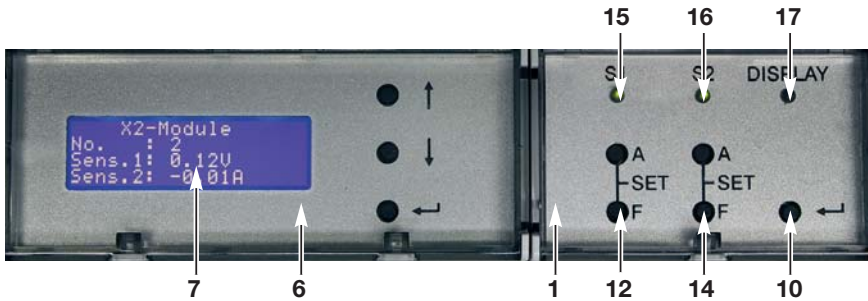
Tx bus performance test

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 instructionsn.

> ⚠ **Warning!**
> **To prevent later malfunctions, never start up untested sensors!**

Signification of the LEDs

15 LED „S1"

- glows **green** if the S1 value is within the target range.
- glows **red** if the S1 value is in alarm condition.
- Alternately flashes **red** and **green** if the "S1" signal contact is acknowledged by pressing the "S1 F" button (**12**) but the S1 value is still in alarm condition.

16 LED „S2"

- glows **green** if the S2 value is within the target range.
- glows **red** if the S2 value is in alarm condition.
- Alternately flashes **red** and **green** if the "S2" signal contact is acknowledged by pressing the "S2 F" button (**14**) but the S2 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-X2**

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

2014/35/EU	**Low voltage directive**
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 measure-
                        ment, control and laboratory use -
                        EMC requirements (class B)**

Münster, 02.10.2020

Research and Development   Managing Director