LANCIER Monitoring

Operating Instructions

Monitoringstation MUX 101-IMS

BA 073593.020/09.07

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Technical Data

Operating voltage:	35 .. 72 V DC or 21 .. 36 V DC
Power consumption:	typ. 10 VA DC
LED:	U_1, U_2 (function control)) ISO (insulation resistance measurement is active) LOOP (loop resistance measurement is active) SYM A (of no significance) SYM B (of no significance) DCD (of no significance) LINE (of no significance)
Measuring channels:	10, for insulation and loop resistance measurement each
Measuring ranges	
Insulation resistance measurement:	0.01 ... 500 MΩ
Loop resistance measurement:	50 ... 20.000 Ω
Resolution	
Insulation resistance measurement:	0.01 ... 9.99 MΩ = 0.01 MΩ 10 ... 99,9 MΩ = 0.10 MΩ 100 ... 500 MΩ = 1.00 MΩ
Loop resistance measurement:	50 ... 9,999 Ω = 1 Ω 10 ... 20 kΩ = 100 Ω
Measuring voltage:	30 V or 90 V
Global protection of measuring channels: (to be provided by customer)	Over-voltage protection 150 V to ground
Alarm outputs	
No. of output contacts:	13
Sort of output contacts:	Dry contacts
Switching voltage/current	max. 100 V/0.5 A
Switching power:	30 VA
Interface for terminal operation:	RS232, 9600 Baud, 8N1
Connector:	Female 9-pin, SUB-D
Operating temperature range:	0 .. +40 °C
Storing temperature range:	-5 .. +60 °C
Admissible humidity:	0 .. 95 % rel. humidity, non-condensing
Dimensions (H x W x D):	237 x 355 x 150 mm
Weight:	approx. 3.2 kg

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

Technical Data

CPU-Card

Embedded Controller:	SC13 (SC186/40 MHz)
RAM:	512 Kb
Flash:	512 Kb
Compact Flash Card:	16 MB to 2 GB
Interfaces	
Ethernet:	10/100Mbit BaseT
Connector:	RJ45
RS232:	9600 Baud, 8N1
Connector:	Female 9-pin, SUB-D
LED:	12V, 5V, BR, SI, CF, LINK, TRAFFIC

Software

Operating system:	RTOS

Ordering Data

Monitoring station MUX 101-IMS
with pre-assembled ethernet cable

48 V DC, Measuring voltage 30 V	**Order-no. 073187.000**
24 V DC, Measuring voltage 30 V	**Order-no. 073187.024**
48 V DC, Measuring voltage 90 V	**Order-no. 073187.100**
24 V DC, Measuring voltage 90 V	**Order-no. 073187.124**

Spare parts

CPU-board MUX 101-CPU	**Order-no. 072653.000**
Basis circuit board MUX 101-IMS	
48 V DC, Measuring voltage 30 V	**Order-no. 061432.000**
24 V DC, Measuring voltage 30 V	**Order-no. 061711.000**
48 V DC, Measuring voltage 90 V	**Order-no. 061432.100**
24 V DC, Measuring voltage 90 V	**Order-no. 061711.100**
Compact Flash-Card	**Order-no. 072747.000**
Ethernetcable, 2.5 m long with PG connector	**Order-no. 072782.000**
Fast-acting fuse, 5 x 20 mm, 1,00 A FL	**Order-no. 032279.000**

General Information

These operating instructions contain important instructions to ensure safe, appropriate and cost-effective operation of the equipment, to reduce repair costs and downtimes, as well as to raise the equipment's reliability and operational lifetime.

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

These operating instructions should always be available at the installation site.

These operating instructions shall be read and adopted by anyone assigned to work with/on the equipment, e.g. during maintenance, inspection and repair

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 MUX 101-IMS monitoring station was developed for logging and evaluating measurement readings of insulation and loop resistance in a LANCIER Monitoring System.

Proper intended use includes adherence to all prescribed operating, service and repair conditions.

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

Any non-compliant use excludes the manufacturer from liability for any damages. The operator carries the risk!

Safety Instructions

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

- Keep the operating instructions ready to hand!

Risk of damage to property!
Disconnect the power supply before working on the equipment!

Danger to life!
Disconnect the power supply before working on the equipment!

- The equipment 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.
- Malfunctions deleteriously affecting safety in particular must be remedied immediately!
- The monitoring station MUX 101-IMS may only be serviced and operated by persons familiar with it who have been informed of the possible risks.
- Do not modify the equipment in any way.

Risk of damage to property!

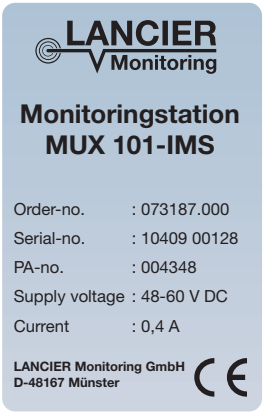
- Maintenance and repair work should only be performed by trained personnel!
- Only use original LANCIER Monitoring replacement parts!

Items supplied

- 1 MUX 101-IMS
- 1 Ethernet cable RJ45, 2.5 m long, pre-assembled with PG connector
- 1 Screw/rawlplug set for wall fixing
- 2 Dejamming ferrites
- 1 Set of Operating Instructions

The monitoring station is clearly identified by the nameplate with technical data and particulars of the manufacturer. The nameplate is located on the outside of the housing to the right.

Compliance with the directives in force is confirmed by the attached EC declaration of conformity (see back of these operating instructions).



Conditions of use

Temperatures

- Permissible ambient temperature: 0 °C to + 40 °C
  The monitoring station is guaranteed to function perfectly in this temperature range.
- Outside this range its operating mode cannot be guaranteed.

Ambient conditions

- Ambient media, particularly those of a chemically aggressive nature, may attack seals, wire and plastic.

Installation conditions

- The monitoring station should be set up in a dry, dust-free and frost-free area, with due regard for the general guidelines relating to workplaces.

Storage

General storage information

- If the monitoring station is not installed and operated straightaway it must be kept under appropriate storage conditions in dry, dust-free and frost-free premises away from the sunlight.
- for storage purposes it should be plastic or foil wrapped.

Description of the product

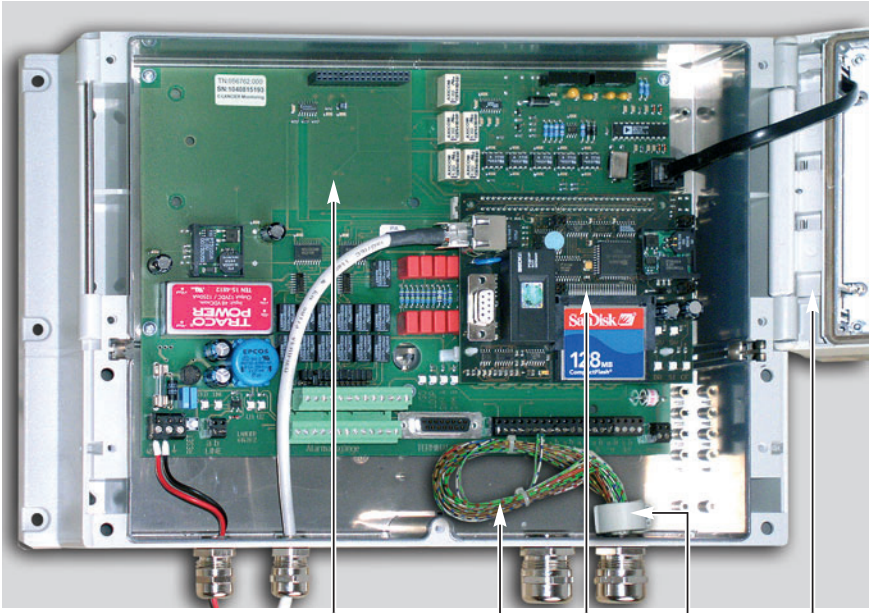
1. Housing

2. Components and connections

Risk of damage to property!
Disconnect the power supply before working on the equipment!

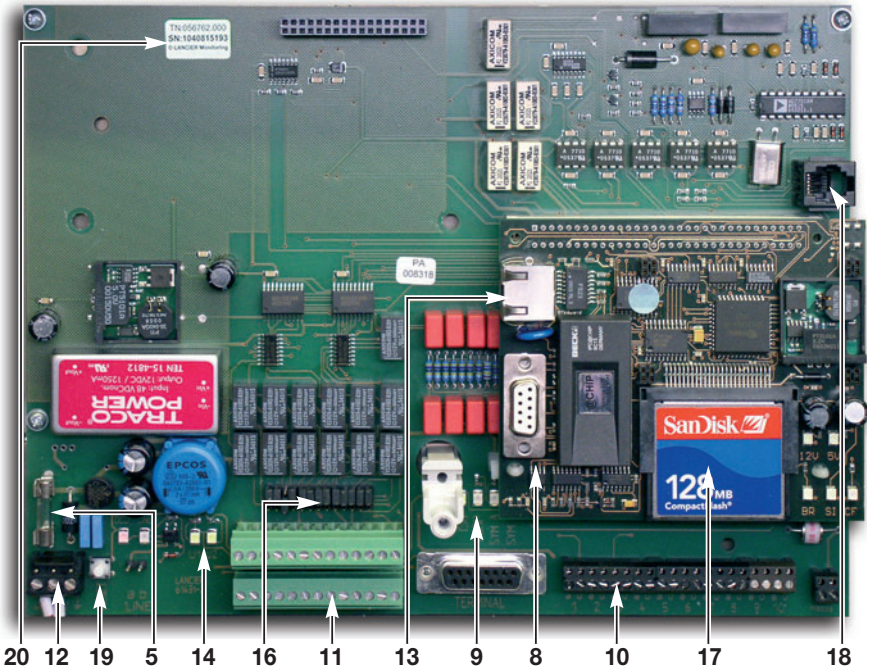
Danger to life!
Disconnect the power supply before working on the equipment!

- Open the MUX 101-IMS by unbolting the top cover on the left (orange arrow) and folding it over to the right.
- Remove cover after loosening the four screws marked with blue arrows.



3. Basic printed circuit board

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



20 Order no. and serial no.
12 Connection for supply voltage
19 Reset button
5 Fast-acting fuse 5 x 20 mm, 1,00 A FL
14 LEDs U_1 and U_2 (function control)
16 Jumpers to configure dry contacts as make or break
11 Connectors for alarm outputs
13 Connecting socket for ethernet cable
9 LEDs ISO, LOOP (ignite during measurement)
SYM A und SYM B (of no significance)
8 CPU card
10 Connectors for measuring channels 1 to 10
17 Compact Flash card
18 Connecting socket for LC-Display in housing cover

Installation

Wall fixing

The MUX 101-IMS monitoring station is designed for wall installation. 4 of the 6 drill holes (**1**) on the side of the housing are provided for the purpose.

The point of installation should be dry and swept clean.

Minimum distance from neighbouring walls and equipment = 100 mm

- Drill 4 holes (diam. 6 mm) in a sustaining wall:
  horizontal clearance: 340 mm
  vertical clearance: 210 mm
- Use the fixing materials supplied (rawlplug and screws) to install.
- Using the 4 drill holes (**1**), screw the monitoring station flush to the wall

Cable connection

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

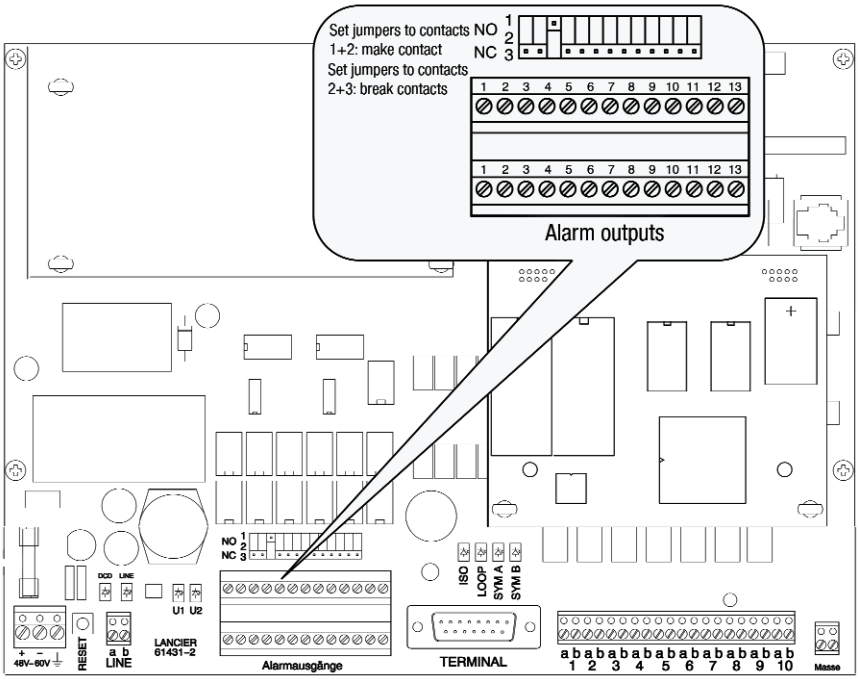
NOTE: It is important to abide by the terms of the EMC Directive!
- **Screening (aluminium screen) of the connected cable must also be earthed at the other end of the cable.**
- **The earthing clamp on the power (12) plug must be connected to earth.**

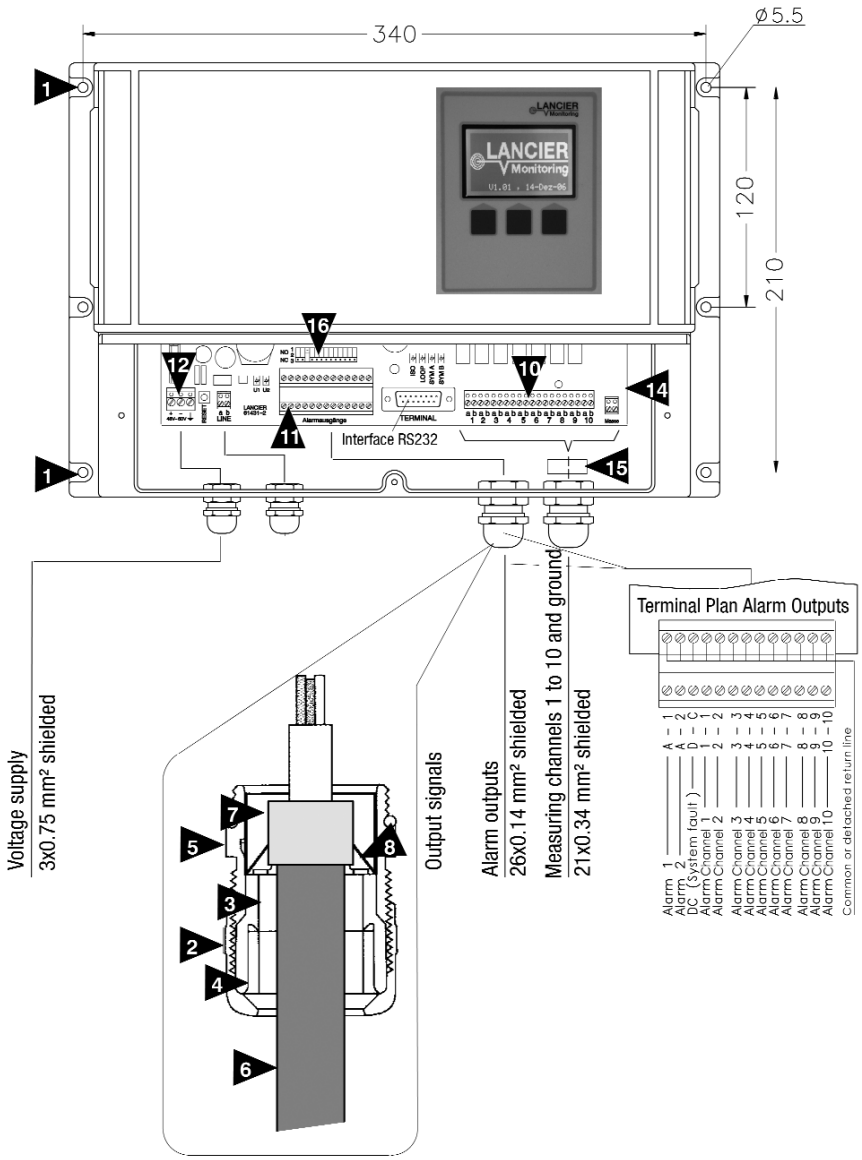
Unscrew cap nut (**2**) with rubber nozzle (**3**) and plastic ring (**4**) from the PG screw connection (**5**) and push over the end of the cable.

- Move cable sheath (**6**) **without** aluminium screen 220 mm away.
- Move aluminium screen up to 10 mm away from the wire and fold back (**7**) over the cable sheath.
- Push cable firmly into the screw connection until there is contact between the aluminium screen and the jaws of the clamp (**8**).
- Place plastic ring (**4**) with rubber nozzle (**3**) into the PG screw connection (**5**), rotating the ring so that the 4 lead ribs on the outside diameter of the plastic ring can be fed into the corresponding slot in the PG screw connection.
- Using a 17 mm combination wrench, tighten PG screw connection cap nut such that there is no strain on the cable.
- Run measuring channel leads through the ferrite nucleus provided (**9**) and clip on to connections „a“ and „b“ of the respective measuring channel inputs 1 to 16 (**10**) on the basic printed circuit board (**11**).
- Run the voltage feed wire direct to the terminal „voltage feed“ clamp (**12**) and clip on. Using a 13 mm combination wrench, tighten PG screw connection such that there is no strain on the wire.

- Push ethernet cable, including screw connections through an unused housing aperture. Using a 17 mm combination wrench, tighten PG screw connection in the housing such that there is no strain on the cable.
  Connect ethernet cable to the CPU card and join the other end of the ethernet cable to the LAN.

- Mount second ferrite nucleus (**9**) around voltage feed wire and ethernet cable.

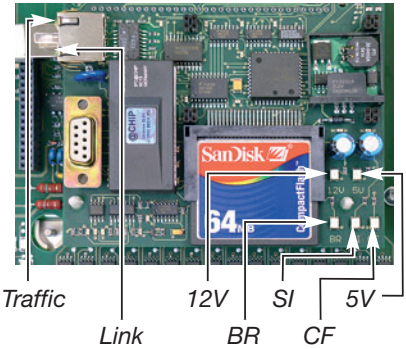



340
Ø5.5
120
210
LANCIER Monitoring
V1.01 , 14-Dez-06
Interface RS232
TERMINAL
Alarmeingänge
Voltage supply
3x0.75 mm² shielded
Output signals
Alarm outputs
26x0.14 mm² shielded
Measuring channels 1 to 10 and ground
21x0.34 mm² shielded
Terminal Plan Alarm Outputs
Alarm 1 — A – 1
Alarm 2 — A – 2
DC (System fault) — D – C
Alarm Channel 1 — 1 – 1
Alarm Channel 2 — 2 – 2
Alarm Channel 3 — 3 – 3
Alarm Channel 4 — 4 – 4
Alarm Channel 5 — 5 – 5
Alarm Channel 6 — 6 – 6
Alarm Channel 7 — 7 – 7
Alarm Channel 8 — 8 – 8
Alarm Channel 9 — 9 – 9
Alarm Channel 10 — 10 – 10
Common or detached return line

Initial operation

Switch on power

- Switch on mains and observe CPU card LEDs:
  - *the green „12V“ and „5V“ LEDS light up straightaway.*
  - *the green „BR“ (boot ready) LED lights up after a few seconds if the application is started correctly.*
  - *the red „CF“ LED flashes on contact with the compact-flash card (application loading).*
  - *Green „SI“ LED lights up if the server is initialised.*



- The RJ45 plug contains other LEDS with the following functions:
  - *the green „Link“ LED lights up and signals the LAN connection.*
  - *the yellow „Traffic“LED flashes in the presence of data traffic.*
- Configure as described in the following pages and lock the housing.

CPU card configuration

Connection

Configure the CPU card via the integrated RS232 interface (9-pole SUB-D, cable not crossed) (may be unnecessary if already installed at LANCIER Monitoring GmbH's factory).

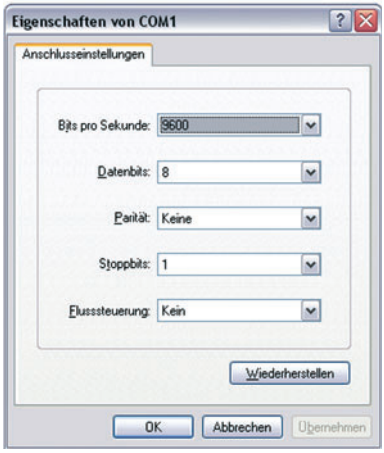
- Connect the laptop or other PC to the CPU card via the RS232 interface
- Start up terminal program, adjust connection features and proceed with connection (illustrated below, using the Windows „Hyperterminal“ Program as an example).

- Run the „Hyperterminal“ software, i.e. under Windows „Start“ -> „(All) Programs“ -> „Accessories“ -> „Communication“ -> „Hyperterminal“
- Enter any name (example: MUX-config) in the „New connection“ window and confirm „OK“ by clicking on the button.

- Select the COM interface used from the pull-down menu in the „Connect with“ window.

- Insert the following values in the „COMX features“ window:
  - ***9.600*** bps
  - ***8*** databytes
  - ***no*** parity
  - ***1*** stop bit
  - ***no*** flow control

The CPU connection is configured.



Configure

Enter „Setup“ in the „Hyperterminal“ window to call up the configuration menu. Alterations can now be made without the need for a password.

The main MUX 101-IMS menu appears:

```
MUX-RTU Menu
====================
<f> FTP-Password
<h> HTTP-Password
<i> IP-Setup
<n> Serial-No.
<t> Telnet-Password
<q> Quit Program
```

For menu control enter the prefixed letters in pointed brackets (example: <f> for FTP password).

Similarly, for submenu control enter the prefixed figures.

The desired adjustments can be made in the input masks appearing

Factory setting

FTP-Password:

User:	ftp
Password:	ftp

HTTP-Password:

User:	http
Password:	http

Telnet-Password:

User:	tel
Password:	tel

IP:	172.16.11.110
Netmask:	255.255.0.0
Gateway:	172.16.10.1

Important!
Reset all passwords for safety reasons!

Set FTP-Password

Enter „f“

FTP menu appears:

```
FTP-Password Config
=======================
<0> Exit
<1> User     : ftp
<2> Password : ftp
```

Set „User“

Enter „1“

FTP-User menu appears:

```
Old User : ftp
New User :
```

Previously valid user is displayed. In order to keep it, re-enter the previous entry, otherwise new user name will be recorded. Confirm entry by pressing „Return“ key or „Enter“ key.

Set „Password“

Enter „2“

FTP-Password menu appears:

```
Old Password : ftp
New Password :
```

Previously valid password is displayed. In order to keep it, re-enter the previous entry, otherwise new password will be recorded. Confirm entry by pressing „Return“ key or „Enter“ key.

To exit user configuration

Enter „0“

Return to main menu (see page 16)

Set HTTP-Password

HTTP password is altered in the same way as FTP password.
The HTTP menu is accessed by entering „h“.

Set Telnet-Password

Telnet password is altered in the same way as FTP password.
The Telnet menu is accessed by entering „t“.

Set Serial-No.

Serial number is altered in the same way as FTP password.
Serial number menu is accessed by entering „n“.

- serial number should match nameplate serial number.

Set TCP/IP configuration

Enter „i“

TCP/IP menu appears:

```
Current   TCP/IP-Config
========================
IP      = 172.16.11.110
Netmask = 255.255.0.0
Gateway = 172.16.10.1
MAC     = 00:30:56:80:04:AD

TCP/IP Config Menu
==================
<1> IP-Address
<2> Netmask
<3> Gateway
<0> Exit Menu
```

Set IP-Address

Enter „1“

IP-Address menu appears:

```
Old IP : 172.16.11.110
New IP :
```

The previously valid IP address is displayed. To keep it, re-enter the previous entry, otherwise the new IP address will be entered. Confirm entry by pressing the „Return“ key or the „Enter“ key.
The TCP/IP main menu appears (see above)

Set „Netmask“

The netmask address is altered in the same way as Card-IP address.
The netmask menu is accessed by entering „2“.

Set „Gateway“

The gateway address is altered in the same way as Card-IP address.
The gateway menu is accessed by entering „3“.

Set „MAC“

The MAC address is a one-time identification address firmly incorporated in the hardware and cannot be altered.

Exit TCP/IP configuration

Enter „0“

Return to main menu (see page 16)

Exit MUX configuration

Enter „q“ `Good Bye.. Program Exit`

End connection

- Click on „Off“ button on the „Hyperterminal“ software menu bar.
- Close the „Hyperterminal“ software.

Important!
The CPU card must be rebooted after configuration. Press the reset key at the main board (see page 10).

Operating the monitoring station

Log-in

Following configuration, MUX101-IMS values can, for test purposes, be read in a web environment by an internet browser. Since actual values are on the server, limit values cannot be set.

- The MUX101-IMS must be connected to the LAN.
- The IP address must be known.
- The internet browser must be installed and started.

Connection is established once the IP address is entered in the browser address field. The start page appears.

A log-in is required:

- Enter user and password, as already established at the time of CPU configuration **(<h> HTTP-Password)**, and confirm by clicking the „Submit“ button.
- After 10 minutes service break or log-off, a new log-in is required.

Attention!
Only one user at a time can work on the system. Other users cannot log in before the first user has logged out.

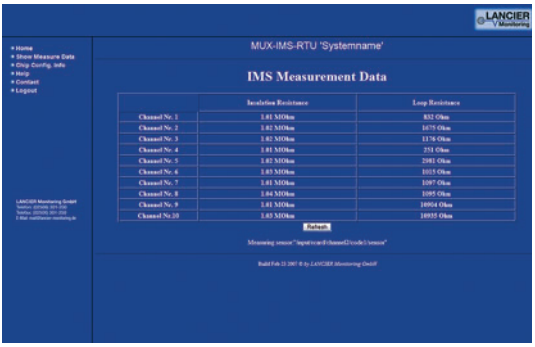
Menu

The following appears on the left-hand menu bar:

- **Home:** back to start page
- **Show Measure Data:** shows last sensor readings
- **Chip Config. Info:** shows processor data
- **Help:** service assistance
- **Contact:** contact data of LANCIER Monitoring GmbH
- **Logout:** log off

Read values

- Click on the „Show Measure Data“ menu point.
- A table indicating all 10 measuring channels with their related values for insulation and loop resistance appears.
- The display refreshes all 5 seconds automatically.

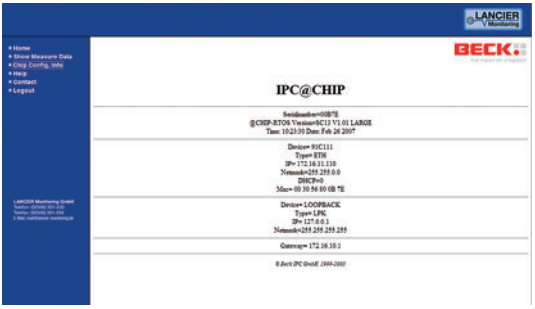


Interpretation of values

Values may lie in the range of 0 to 500 MΩ (insulation resistance) respectively 0 to 20 kΩ (loop resistance) and are entered in the table by means of a continuous signal.

Configuration

- Click on the „Configuration“ menu point.
- Processor data are displayed.



Log-out

- Click on the „Logout“ menu point.
- The monitoring station connection is terminated.

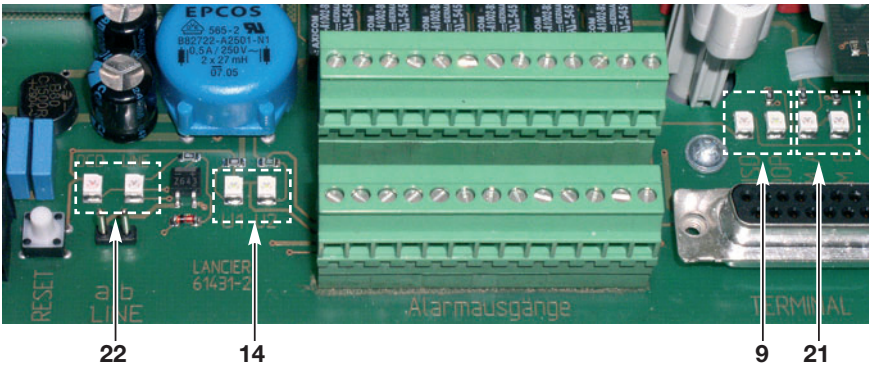
Operation of the monitoring station

The MUX 101-IMS monitoring station can now operate independently.

Remote reading and evaluation are normally conducted via the UMS server.

Meaning of the LEDs

While the MUX 101-IMS monitoring station is in operation, various LEDs on the base plate (items 9, 14, 21, 22) indicate differential operating status and may point to faults, directly after installation, for example.



U_1, U_2 (function control)

LEDs U_1 and U_2 (**14**) are for function control and indicate internal voltages:

U_1: 5 V (digital)
U_2: 12 V (relay)

Measuring channel indication ISO, LOOP, SYM A, SYM B

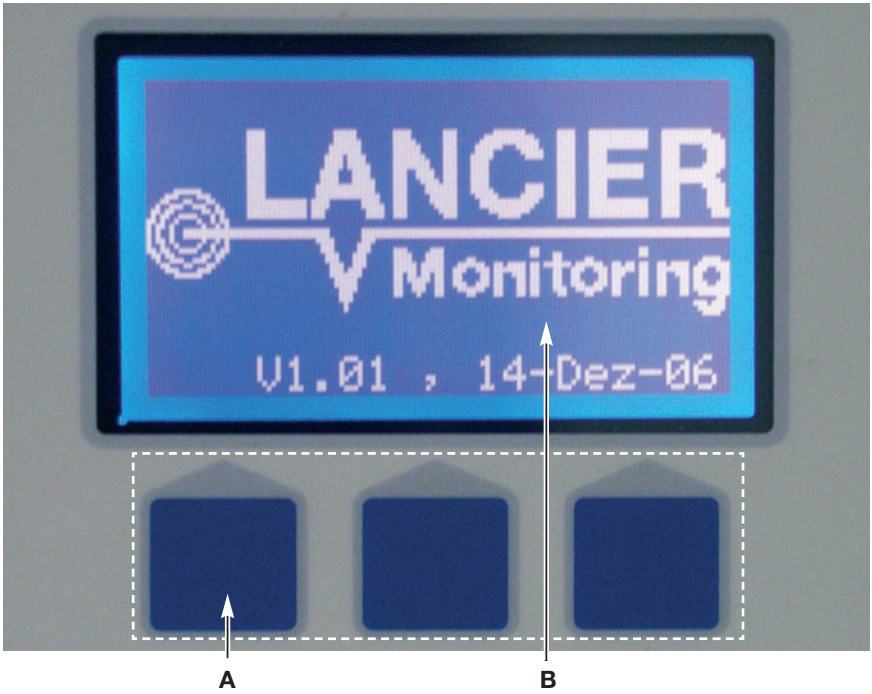
LEDs ISO and LOOP (**9**) indicate which measuring channel is currently active and read out (e. g. LOOP lights up when loop resistance measurement is in process).

LEDs SYM A and SYM B (**21**) are of no significance.

DCD, LINE

- LEDs DCD and LINE (**22**) are of no significance.

Operation of LC-Display



The MUX 101-IMS is operated by menu prompt. Options are selected by soft-keys (**A**) with different modes of operation according to the displayed menu.

Active menue items are highlighted.

The marker can be moved down and up line by line with the softkeys „Next“ und „Back“.

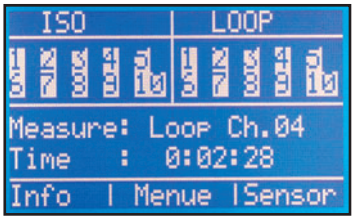
Menu items are selected by pressing the softkey „Select“.

Return to the overview display by pressing the softkey „Exit“.

Display „Overview“

The standard display shows up.

It indicates which measuring channels are in alarm condition (channel no. is highlighted, in the shown example all channels are in alarm condition).

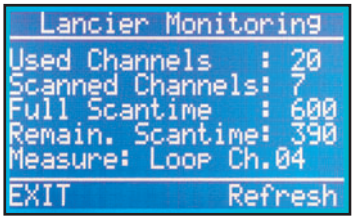


ISO:	Indicates which insulation resistance measuring channels are installed. Measuring channels in alarm condition are highlighted.
LOOP:	Indicates which loop resistance measuring channels are installed. Measuring channels in alarm condition are highlighted.
Measure:	Indicates which measuring channel is currently active (Loop Ch.04 = measuring channel 4 reads loop resistance values right now).
Time:	Indicates the system’s internal time.
Softkeys	
- Info:	Selects display „Info“ (described in the following).
- Menue:	Selects the submenue (described in the following).
- Sensor:	Selects display „Sensor information“ (described in the following).

Display „Info“

Selected by softkey **„Info“** in the overview display.

The following values are indicated:



Used Channels:	Number of active measuring channels.
Scanned Channels:	Number of completed measurements of the actual measuring cycle.
Full Scantime:	Duration of a complete measuring cycle (seconds).
Remain. Scantime :	Remaining time until the actual measuring cycle is completed.
Measure:	Indicates which measuring channel is currently active (Loop Ch.04 = measuring channel 4 reads loop resistance values right now).
Softkeys	
- EXIT:	Returns to the overview display.
- Refresh:	Refreshes the displayed values.

Display „Menue“

Selected by softkey **„Menue“** in the overview display.

The submenue shows up:
The active item is highlighted.

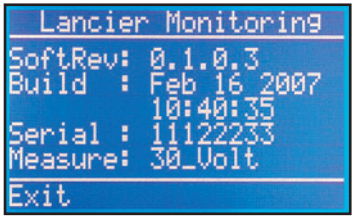
The marker can be moved down and up line by line with the softkeys „Next“ und „Back“.

Menu items are selected by pressing the soft-key „Select“.

Display „Software Info“

Selected by highlighting menue item **„Software Info“** and pressing softkey **„Select“** in the menue display.

The following values are indicated:



SoftRev:	Revision status of the implemented software.
Build:	Time stamp of the revision status.
Serial:	Serial number of the monitoring station.
Measure:	Sensor measuring voltage of the monitoring station (factory preset).

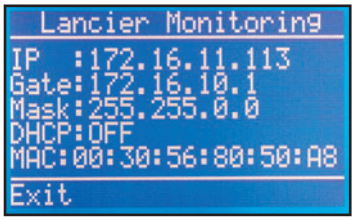
Softkey

- EXIT:	Returns to the overview display.

Display „TCP/IP Info“

Selected by highlighting menue item **„TCP/IP Info“** and pressing softkey **„Select“** in the menue display.

The following values are indicated:



IP:	IP-address of the MUX 101-IMS.
Gate:	Preset standard gateway.
Mask:	Preset sub net mask.
DHCP:	State of the DHCP-Server (on or off).
MAC:	MAC hardware key of the MUX 101-IMS (unique device code).

Softkey

- EXIT:	Returns to the overview display.

Display „Relay Info“

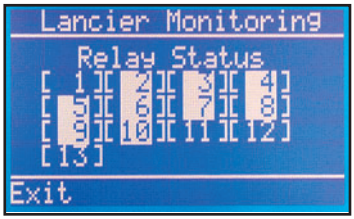
Selected by highlighting menue item **„Relay Info“** and pressing softkey **„Select“** in the menue display.

Indicates the switching state of the output relays.

Signalling relays are highlighted.

Softkey

- EXIT: Returns to the overview display



Display „Brightness“

Selected by highlighting menue item **„Brightness“** and pressing softkey **„Select“** in the menue display.

Display brightness can be adjusted gradually from 1 (dark) to 20 (light).

Softkeys

- EXIT: Returns to the overview display.
- Minus: Shades the display gradually.
- Plus: Brightens the display gradually.

Display „Sensor“

Selected by softkey **„Sensor“** in the overview display.

The following values are indicated:

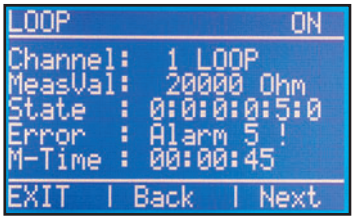
Channel: Measuring channel’s number and task (LOOP or ISO)

MeasVal: Last measurement reading Ohm/MOhm

State: Current alarm priorities.

Error: Indicates the error with the highest alarm priority.

M-Time: Indicates the time stamp of the sensor reading.



Softkeys

- EXIT: Returns to the overview display.
- Back: Indicates the values of the preceding sensor.
- Next: Indicates the values of the subsequent sensor.

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Declaration of Conformity

in accordance with EC directives 98/37/EC

We declare under our sole responsibility that the product

Make:	**LANCIER Monitoring**
Type:	**Monitoring Station MUX 101-IMS**

to which this declaration refers, meets the relevant health and safety requirements of the EC directive 98/37/EC,as well as the requirements of other relevant EC directives.

73/23/EWG	**Low voltage directive**
89/336/EWG	**Electromagnetic compatibility**

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 61000-6-3/4	**Emitted interference**
EN 61000-6-1/2	**Interference resistance (fault-free operation)**

Münster, 26 February 2007

Research and Development

Managing Director

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