

ELEKTRONIKA

CABLE MONITORING SYSTEM ECMS 32

472-000-000

Operating Manual

OM 472-000-001 E

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1 INTRODUCTION

1.1 Principles of Operation

The ECMS 32 Cable Monitoring System is a 60 V battery-operated instrument built in a 19" rack for monitoring maximum 32 telecom cables. The far ends of the tested pairs should be short-circuited.

The bridge-unit of the instrument performs continuously repeated loop resistance and insulation resistance measurements between the wires and the ground on each connected pair.

ECMS 32 compares the measured insulation and loop resistances to the preset limit values. The violation of limits is indicated on display and activates a potential-free relay contact for remote transmission the alarm signal.

Default Limit Values:

- Iso min=100 M Ω
- R loop minimum=10 Ω
- R loop maximum=1000 Ω

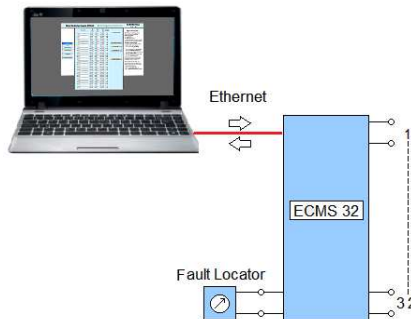
If required different limit values can be given for each cable separately through the Ethernet interface

1.2 Ethernet Interface

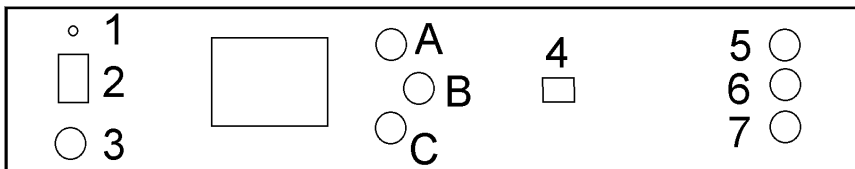
ECMS 32 has an Ethernet interface to connect a PC or establish connection to a remote operator. ECMS 32 acts as a HTTP server

The Ethernet connection provides additional tools for the operator:

- Adding names (identifiers) to the tested cables.
- Presetting different limit values for each cable separately
- Getting detailed information about the last 250 monitoring cycles
- Sending an e-mail if the results violate the preset limits.
- Interconnect the faulty cable and a fault locator.
- Upgrade the software.



2 ARRANGEMENT OF FRONT PANEL



2.1 LED indicator

1	Switch on indicator
---	---------------------

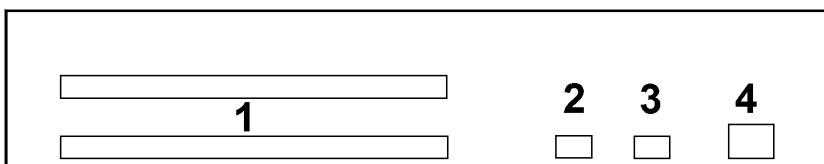
2.2 Controls

2	Switches the instrument on and off.
A	This keys can be used: to select measuring mode, to scroll tested cable, to change the state of cables
B	
C	
3	Fuse

2.3 Connectors

4	Ethernet interface to connect a PC or establish connection to a remote operator
5	
6	These sockets are intended to connect a fault locator.
7	

3 ARRANGEMENT OF BACK PANEL

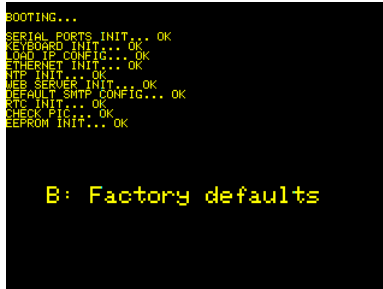


1	32 pieces of two pole connectors to connect the tested cables.
2	3 pole connector to connect the cable fault alarm relay.
3	3 pole connector to connect the power failure alarm relay.
4	3 pole connector to connect the 60V power and earth

4 START UP

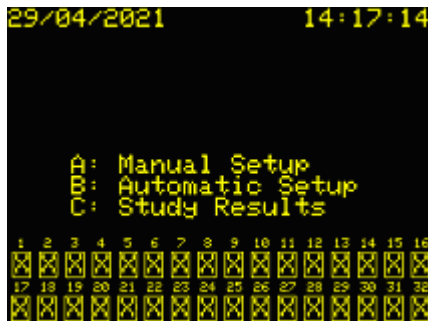
- Connect the cables at the sockets on the back panel.
- Switch the instrument on

Having the instrument switched on a temporary display appears for five seconds providing a software action to reconfigure the actual server setup to factory default.



- If you want to start reconfiguration press the **B** key. (The details of reconfiguration can be found in chapter 10.3)
- If you don't want to start any sw. actions wait for five seconds.

After five seconds the main display appears



The next step is to activate the newly connected cables.

5 ACTIVATION

32 cable connectors are provided, but usually not all the 32 is used. The used connectors should be activated for monitoring.

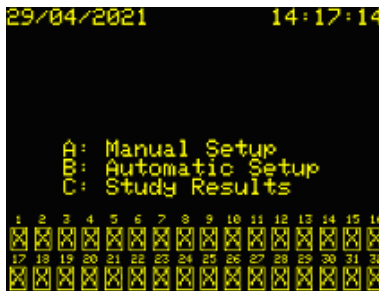
Two activation modes are provided:

- Manual
- Automatic

Note:

The automatic activation is a useful tool to check the proper connections and the shorts on the far end of cables.

5.1 Manual Activation



- Press the **A** key of main display



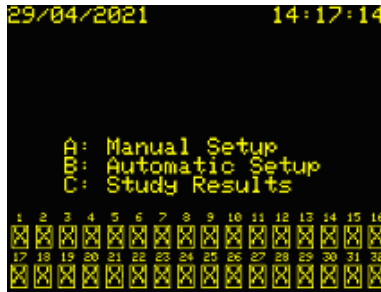
The appearing display shows the actual state of cables



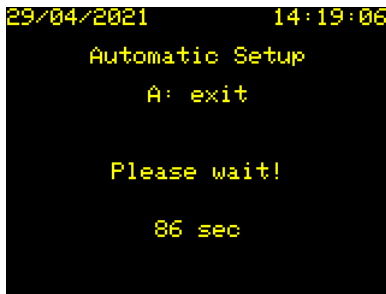
To change the actual state of a cable:

- Move on the wanted cable number by repeated pressing of **B** key.
- Press the **C** key

5.2 Automatic Activation



- Press the **B** key of main display



Doing so the test sequence is automatically started

ECMS 32 performs quick resistance measurements on each cable one by one. A cable is considered to be used when the measured resistance is less than 1000 Ω.

When the test sequence is completed the detected states of cables are displayed:



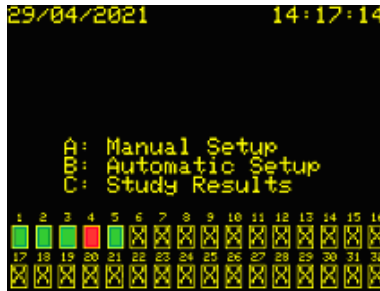
6 TEST RESULTS

6.1 Overview

ECMS 32 performs continuously repeated loop resistance and insulation resistance measurements on each activated cables.

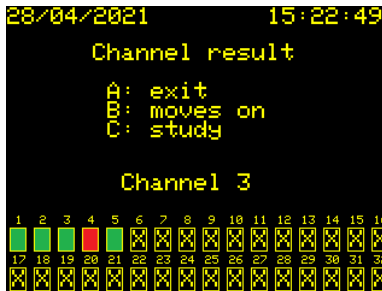
The main display shows the results qualified by colors:

- Results fulfilling the requirements are marked with **green**
- Results violating the preset limits are marked with **red**



To study the results:

- press the **C** key of main display



To return without any action:

- Press the **A** key.

If you want to study the details:

- Move on the wanted number by repeated pressing of **B** key.
- Press the **C** key.

6.2 When the selected channel fulfills the requirements

When the selected channel fulfills the requirements the following display appears:

```
27/09/2021      08:11:05
      Channel result
      A: exit
      B: fault location
      C: channel measuring

      R1(Ohm) Iso(MOhm)
Ch 1:      60      >1G
min:      10      100
max:     1000
```

To return without any action:

- Press the **A** key.

If you want to repeat the measurement by means of an external fault locator (e.g. ECFL 30):

- Press the **B** key. (Details in section 7)

If you want to repeat the measurement by means of ECMS 32:

- Press the **C** key. (Details in section 8)

6.3 When the selected channel violates the requirements

When the selected channel violates the alarm display appears:

```
27/09/2021      09:56:55
!!! ALARM !!!
A: exit
B: fault location
C: alarm off

          R1(Ohm) Iso(MOhm)
Ch 2:    >10k    >1G
min:      10     100
max:     1000
```

To return without any action:

- Press the **A** key.

If you want to repeat the measurement by means of an external fault locator (e.g. ECFL 30):

- Press the **B** key. (Details in section 7)

If you want to reset the alarm indication of the selected channel:

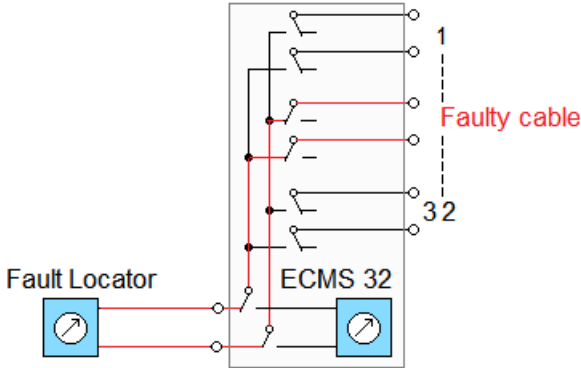
- Press the **C** key.
(The alarm indication of other channels remains active)

```
27/09/2021      10:33:58
Channel result
A: exit
B: fault location
C: channel measuring

          R1(Ohm) Iso(MOhm)
Ch 2:    >10k    >1G
min:      10     100
max:     1000
```

7 FAULT LOCATION

To make a troubleshooting action easier ECM 32 provides access to the faulty cable for a fault locator (e.g. ECFL 30) connected to the sockets on the front plate.



In this case the monitoring is interrupted for 30 minutes and after 30 minutes automatically restarted.

When the fault location option is selected the following display appears:

```

27/09/2021      08:11:50
  Fault location
    Channel 1
      34 sec
    A: exit
    
```

The time counter shows the time left.

If you want to restart monitoring earlier:

- Press the **A** key

8 REPEATED MEASUREMENT

ECMS 32 provides the possibility to repeat the measurement of a selected channel.

The monitoring is temporary stopped for the time of repeated measurement.

When the repeated measurement is completed the normal monitoring sequence is started again where it was stopped.

When the repeated measurement option is selected the following display appears:

```
27/09/2021      08:12:42
Channel measuring

Channel 1

197 sec
```

The appearing time counter shows the time left

When the repeated measurement is completed the following display appears:

```
27/09/2021      08:11:05
Channel result
A: exit
B: fault location
C: channel measuring

Ch 1:      R1(Ohm) Iso(MOhm)
min:      60 >1G
max:      10 100
```

(The results of repeated measurement are not saved)

9 ALARM

ECMS 32 has two relays for remote transmission of alarm signals.

- One for cable fault indication
- One for power failure indication

Both relays has potential-free relay contacts connected to two 3 pole sockets on the back panel

9.1 Cable fault indication

The far ends of the tested pairs are short-circuited.

The bridge-unit of the instrument performs continuously repeated loop resistance and insulation resistance measurements on each activated cables between the wires and the ground.

ECMS 32 compares the measured insulation and loop resistances to the preset limit values. The violation of limits is indicated on display and activates the corresponding alarm relay.

9.2 Power failure indication

The power failure indicator relay is activated during the normal operation of ECMS 32 and released:

- In case of power failure or
- The instrument is switched off.

10 ETHERNET CONNECTION

ECMS 32 has an Ethernet interface to connect a PC or establish connection to a remote operator. ECMS 32 acts as a HTTP server.

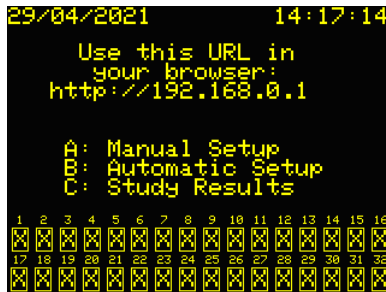
Factory default setup of Ethernet interface:

- IP-address: 192.168.0.1
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.0.1

Later the setup can be modified.
(Details in the Control Program Manual)

10.1 Initialization of Connection

- Interconnect ECMS 32 and your PC with the provided Ethernet cable. Sensing the connection, the current IP address appears on the display of ECMS 32 by means of which you can access the instrument.



- Initialize the connection with ECMS 32 using the displayed IP address in your browser.

When the Elektronika html page appears:

- Enter the **Username** (Factory default: ECMS32)
- Enter the **Password** (Factory default: ECMS32)
- Click the **Login** button

Later the Username and the Password can be modified.
(Details in the Control Program Manual)

After successful login:

- On the display of PC the welcome page appears indicating that the connection with ECMS 32 has been established.
- On the display of ECMS 32 a temporary display appears for 5 seconds providing two software actions.

```
BOOTING...
SERIAL PORTS INIT... OK
KEYBOARD INIT... OK
LOAD IP_CONFIG... OK
ETHERNET INIT... OK
HTTP INIT... OK
WEB SERVER INIT... OK
DEFAULT SMTP CONFIG... OK
RTC INIT... OK
CHECK FIC... OK
EEPROM INIT... OK

A: Upgrade mode
B: Factory defaults
```

- If you want to upgrade the sw. of ECMS 32 press the **A** key (The details of upgrade can be found in chapter 10.2)
- If you want to start reconfiguration press the **B** key. (The details of reconfiguration can be found in chapter 10.3)
- If you don't want to start any sw. action, wait for five seconds.

After five seconds the main display appears

```
29/04/2021 14:17:14
Use this URL in
your browser:
http://192.168.0.1

A: Manual Setup
B: Automatic Setup
C: Study Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒
```

Now ECMS 32 is ready to use.

10.2 SW Upgrade

When the upgrade mode is selected the following display appears:

```
Upgrade mode

Use this URL:
192.168.1.51

A: exit
```

When the upgrade display appears:

- Start the **ECMS32u.exe** upgrade program on the PC and follow the instructions.

During the upgrade process the instrument is restarted several times.

- Wait until the following picture appears

```
29/04/2021 14:17:14

Use this URL in
your browser:
http://192.168.0.1

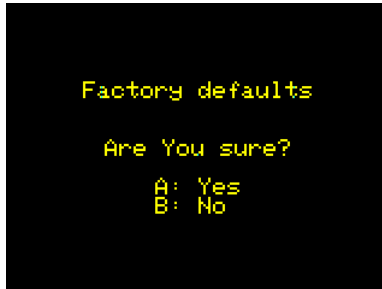
A: Manual Setup
B: Automatic Setup
C: Study Results

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒
```

Now ECMS 32 is ready to use

10.3 Reset to Factory Default

When the reset mode is selected the following display appears:



To modify the actual Server-Setup to factory defaults:

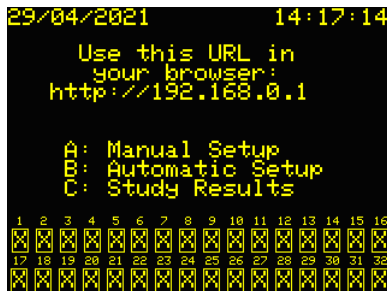
- Press the **A** key.

Very important to know when the factory default is started:

- **All results will be cleared**
- **All setups will be cleared**

The duration of the process is ~1 minute

- Wait until the following picture appears



Now ECMS 32 is ready to use:

11 SPECIFICATIONS

11.1 General Specifications

Power supply:

Voltage..... 60V DC
 Display..... 320 x 240 dot color TFT LCD

Connectors:

For power supply and GND 3 pole connector
 For tested cables 32 pieces of 2 pole connectors
 For alarm..... 2 pieces of 3 pole connectors
 For fault location 3 pieces of 4 mm banana sockets
 For data transfer..... Ethernet socket

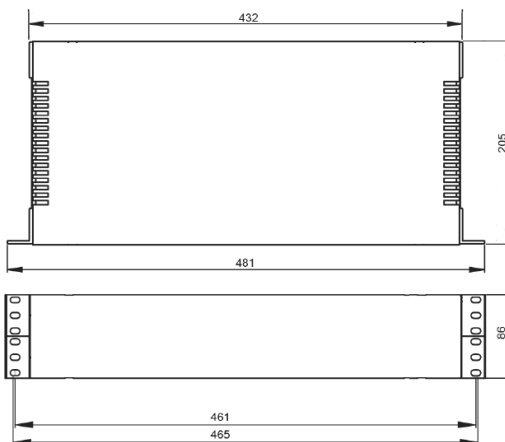
Ambient temperature ranges

Reference +23 ±5°C,
 Rel. humidity 45% to 75% *
 Normal operation 0 to +40°C
 Rel. humidity 30% to 75% *(<25g/m³)
 Limits of operation -5 to +45°C
 Rel. humidity 5% to 95% *(< 29 g/m³)
 Storage and transport..... -40 to +70°C
 Rel. humidity 95% at +45°C *(<35g/m³)

Weight ~2 kg

* Without condensation

Sizes



11.2 Loop Resistance Measurement

Measuring range.....	10 Ω to 1 kΩ
Measuring time	< 20 sec
Accuracy.....	±1 % ±0.5 Ω

11.3 Insulation resistance measurement

Measuring voltage.....	100 V
Measuring range	1 MΩ to 1 GΩ
Measuring time	< 40 sec
Accuracy	
1 MΩ to 50 MΩ.....	5%
50 MΩ to 300 MΩ	10%

11.4 Time Domain Reflectometer

Measuring ranges	640 m to 16000 m
Pulse width.....	30ns to 3μs
Pulse amplitude:	max 10Vpp to open circuit
Gain control.....	0 to 90 dB in 6 dB/steps
Propagation velocity (V/2)	50 to 150 m/μs
Resolution	1 m
Accuracy	0.2% of range
Measuring modes	New Test New Test & Saved Result Saved Result
Input protection	600V RMS 50 Hz

ORDERING INFORMATIONS

CABLE MONITORING SYSTEM ECMS 32 472-000-000

Including:

Operating Manual	OM 472-000-001
Manual for Control Program	OM 472-000-002

Connector set consisting of:

- 32 pieces of 2 pole sockets (for tested cables)
- pieces of 3 pole sockets (for alarm)
- 3 pole socket (for power supply and ground)