
ELEKTRONIKA

ECMS 32

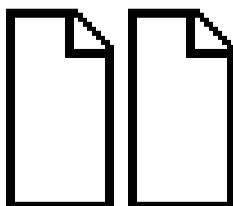
CABLE MONITORING SYSTEM

472-000-000

Manual for Control Program

OM472-000-002 E

Double sided view recommended



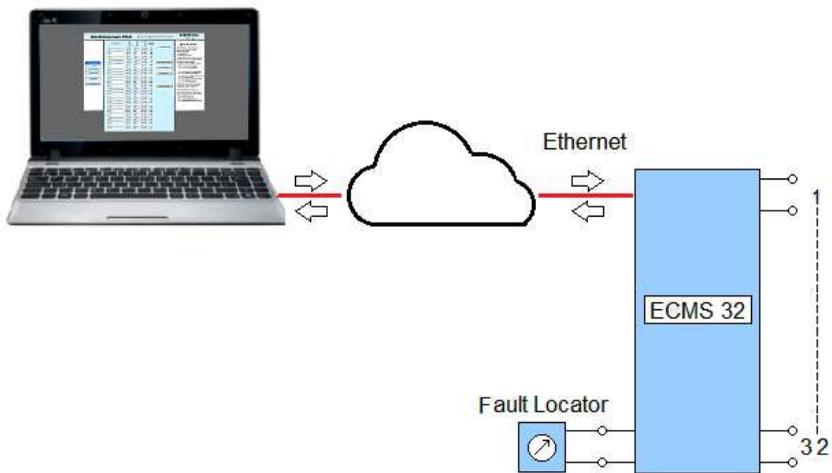
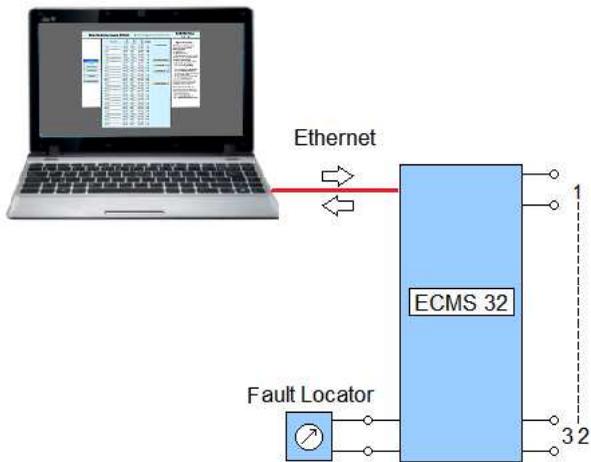
2022.05.14

CONTENTS

1	INTRODUCTION	3
2	START UP	5
3	ACCOUNT MANAGEMENT	7
4	DYNAMIC IP	9
5	STATIC IP.....	11
6	SMPT SETTINGS.....	13
7	PROGRAMMING.....	15
7.1	Change of Cable Data.....	15
7.2	Cable Activation.....	15
7.3	Submit Changes.....	15
8	TEST RESULTS.....	17
9	RESULT HISTORY	19
10	FAULT LOCATION	21
10.1	Start Fault Location:	21
10.2	Finish Fault Location	21
11	TIME DOMAIN REFLECTOMETER (TDR).....	23
11.1	Principles of Operation	23
11.2	New Test	25
11.3	New Test & Saved Result	27
11.4	Saved Result	27
12	STATUS.....	29
13	ALARM	31
13.1	Alarm in case of cable fault detection	31
13.2	Alarm in case of power failure	31

2022.03.28.

Copyright:Elektronika – Budapest, 2021



1 INTRODUCTION

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 are should be 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 limits can be set separately for each cable because their features may be different.

The violation of limits is indicated on display and activates a potential-free relay contacts for remote transmission of alarm warning.

To make a troubleshooting action easier ECM 32 provides access to the faulty cable for:

- a built in TDR unit or
- a fault locator (e.g. ECFL 30) connected to the sockets on the front plate.

The results of the last 250 monitoring cycles are stored.

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 useful tools for the operator to:

- Activate cables and deactivate the currently not used ones.
- Preset the limit values.
- Enter the name (identifier) of cables.
- Get detailed information about the current state of cables
- Get detailed information about the last 250 monitoring cycles
- Interconnect the faulty cable and the built in TDR unit
- Interconnect the faulty cable and an external fault locator

The content of this manual describe the details of that actions.

<p>MENU</p> <p>Programming</p> <p>Results</p> <p>Result History</p> <p>Fault Location</p> <p>IP Settings</p> <p>SMTP Settings</p> <p>Account Management</p> <p>Status</p>	<p style="text-align: center;">Login page</p> <p>Username: <input type="text"/></p> <p>Password: <input type="password"/></p> <p style="text-align: center;"><input type="button" value="Login"/></p>
---	--

<p>MENU</p> <p>Programming</p> <p>Results</p> <p>Result History</p> <p>Fault Location</p> <p>IP Settings</p> <p>SMTP Settings</p> <p>Account Management</p> <p>Status</p>	<p style="text-align: center;">Welcome!</p>
---	--

2 START UP

Establish a connection with ECMS 32 using the following URL in your browser: `http:// 192.168.0.1` (Factory default)

- Enter the **Username**
- Enter the **Password**
- Click the **Login** button

Doing so the welcome page appears indicating that the connection with ECMS 32 has been established.

Notice:

The factory defaults:

- Username: Ecms32
- Password: Ecms32

It is strongly recommended that you change the factory default username and password of this device.

All users who try to access this device's web-based utility will be prompted for this device's user name and password.

To change the defaults:

- Click the **Account Management** button of **MENU**

Account Management

Old Username:

Old Password:

New Username:

New Password:

Confirm New Password:

3 ACCOUNT MANAGEMENT

The factory defaults:

- Username: Ecms32
- Password: Ecms32

To change the factory defaults:

- Enter the **new Username**
- Enter the **new Password** twice to confirm it.
- Click the **Save** button when finished.

To Sign out from ECMS32

- Click the **Logout** button

Note:

The new user name and password must not exceed 20 characters in length and must not include any spaces.

Connection type

Static IP **Dynamic IP**

IP Address:

Subnet Mask:

Default Gateway:

Primary DNS:

Secondary DNS: (Optional)

Host Name:

4 DYNAMIC IP

- Click the **IP Settings** button of **MENU**
- Select the Dynamic IP option if your system administrator is running a DHCP server.

The server dynamically assigns:

- IP Address
- Subnet Mask
- Default Gateway
- Primary DNS
- Secondary DNS

To get new IP parameters from the server

- Click the **Renew** button.

Host Name

This option specifies the Host Name of instrument.

When you finish the change of setting:

- Click the **Save** button

Connection type

Static IP **Dynamic IP**

IP Address:

Subnet Mask:

Default Gateway:

Primary DNS:

Secondary DNS: (Optional)

Hostname:

5 STATIC IP

- Click the **IP Settings** button of **MENU**
- Select the **Static IP** option if your system administrator provides a static or fixed IP Address, Subnet Mask, Gateway and DNS setting.

IP Address

Enter the IP address in dotted-decimal notation provided by your system administrator.

Subnet Mask

Enter the subnet Mask in dotted-decimal notation provided by your system administrator.

Default Gateway

Enter the default gateway in dotted-decimal notation provided by your system administrator.

Primary DNS

Enter the DNS IP address in dotted-decimal notation provided by your system administrator.

Secondary DNS

Enter another DNS IP address in dotted-decimal notation provided by your system administrator.

Hostname

This option specifies the Host Name of the instrument.

When you finish the change of setting:

- Click the **Save** button.

SMTP Settings

Server name:

Port:

Username:

Password:

Destination address:

Email in case of alarm:

To use send Email for Gmail to port 465 (SSL), less secure app option should be enabled:
<https://myaccount.google.com/lesssecureapps?pli=1>

For yahoo mail, log in to your yahoo mail in web browser and generate app password by go to
<https://login.yahoo.com/account/security/app-passwords/add/confirm?src=noSrc>
and use the app password as password with your yahoo mail account to login.

The google app password signin is also available:
<https://support.google.com/mail/answer/185833?hl=en>

6 SMTP SETTINGS

Ecms32 can send an e-mail if the results violate the preset limits.

An SMTP (Simple Mail Transfer Protocol) server is an application that's primary purpose is to send, receive, and/or relay outgoing mail between email senders and receivers.

Server name

A few example server names:

- smtp.gmail.com for Gmail.
- smtp.office365.com for Outlook.
- smtp.mail.yahoo.com for Yahoo.

Port

A server's operating system uses ports to make sure data is received by the right process.

The default is 587.

Username

Your full Email address.

Password

Your account's password.

Destination address

The recipient's email address.

To send an Email in case of alarm

- Click the corresponding checkbox.

When you finish the change of settings

- Click the **Save** button.

Channel Name	Iso Min. [MΩ]	R loop Min. [Ω]	R loop Max. [Ω]	Channel Activation
1 Ch1	1 100	1 10	1 1000	1 <input checked="" type="checkbox"/>
2 Ch2	2 100	2 10	2 1000	2 <input checked="" type="checkbox"/>
3 Ch3	3 100	3 10	3 1000	3 <input checked="" type="checkbox"/>
4 Ch4	4 100	4 10	4 1000	4 <input checked="" type="checkbox"/>
5 Ch5	5 100	5 10	5 1000	5 <input checked="" type="checkbox"/>
6 Ch6	6 100	6 10	6 1000	6 <input checked="" type="checkbox"/>
7 Ch7	7 100	7 10	7 1000	7 <input checked="" type="checkbox"/>
8 Ch8	8 100	8 10	8 1000	8 <input checked="" type="checkbox"/>
9 Ch9	9 100	9 10	9 1000	9 <input checked="" type="checkbox"/>
10 Ch10	10 100	10 10	10 1000	10 <input checked="" type="checkbox"/>
11 Ch11	11 100	11 10	11 1000	11 <input checked="" type="checkbox"/>
12 Ch12	12 100	12 10	12 1000	12 <input checked="" type="checkbox"/>
13 Ch13	13 100	13 10	13 1000	13 <input checked="" type="checkbox"/>
14 Ch14	14 100	14 10	14 1000	14 <input checked="" type="checkbox"/>
15 Ch15	15 100	15 10	15 1000	15 <input checked="" type="checkbox"/>
16 Ch16	16 100	16 10	16 1000	16 <input checked="" type="checkbox"/>
17 Ch17	17 100	17 10	17 1000	17 <input checked="" type="checkbox"/>
18 Ch18	18 100	18 10	18 1000	18 <input checked="" type="checkbox"/>
19 Ch19	19 100	19 10	19 1000	19 <input checked="" type="checkbox"/>
20 Ch20	20 100	20 10	20 1000	20 <input checked="" type="checkbox"/>
21 Ch21	21 100	21 10	21 1000	21 <input checked="" type="checkbox"/>
22 Ch22	22 100	22 10	22 1000	22 <input checked="" type="checkbox"/>
23 Ch23	23 100	23 10	23 1000	23 <input checked="" type="checkbox"/>
24 Ch24	24 100	24 10	24 1000	24 <input checked="" type="checkbox"/>
25 Ch25	25 100	25 10	25 1000	25 <input checked="" type="checkbox"/>
26 Ch26	26 100	26 10	26 1000	26 <input checked="" type="checkbox"/>
27 Ch27	27 100	27 10	27 1000	27 <input checked="" type="checkbox"/>
28 Ch28	28 100	28 10	28 1000	28 <input checked="" type="checkbox"/>
29 Ch29	29 100	29 10	29 1000	29 <input checked="" type="checkbox"/>
30 Ch30	30 100	30 10	30 1000	30 <input checked="" type="checkbox"/>
31 Ch31	31 100	31 10	31 1000	31 <input checked="" type="checkbox"/>
32 Ch32	32 100	32 10	32 1000	32 <input checked="" type="checkbox"/>

Programming

7 PROGRAMMING

The features of monitored cables may be different therefore the limit parameters can be set for each one separately.

Default Limit Values:

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

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

7.1 Change of Cable Data

- Click the Programming button of MENU
- Type in the names (identifiers) of cables.
- Modify the limit values if necessary.

7.2 Cable Activation

Three activation modes are provided:

- Manual activation.
Click the corresponding **Checkboxes** to activate the cables.
- Automatic Activation.
Click the **Automatic Activation** button. In this mode, the ECMS 32 performs quick resistance measurements on each cable one by one. A cable is considered to be active when the measured resistance is less than 1000 Ω .

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

- Activation of all the 32 cables without any test.
Click the **Activate all** button. This mode can be applied if you are sure that the connections and the shorts on the far end are perfect.

7.3 Submit Changes

To continue monitoring with modified data

- Click the **Submit Changes** button

Note:

In case of connecting problem:

- Click the **Deactivate all** button and
- Start the **Automatic Activation** program

Channel Name	min.	Iso	min.	Rs	max.	Results	Alarm Stop
	[MΩ]	[MΩ]	[Ω]	[Ω]	[Ω]	<input type="button" value="Refresh"/>	<input type="button" value="All"/>
1 Ch1	100	>1G	10	240	1000	07/03/2022 08:02	<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
2 Ch2	100	520	10	220	1000	04/03/2022 14:16	<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
3 Ch3	100	12	10	100	1000	04/03/2022 14:23	<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
4 Ch4	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
5 Ch5	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
6 Ch6	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
7 Ch7	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
8 Ch8	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
9 Ch9	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
10 Ch10	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
11 Ch11	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
12 Ch12	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
13 Ch13	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
14 Ch14	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
15 Ch15	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
16 Ch16	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
17 Ch17	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
18 Ch18	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
19 Ch19	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
20 Ch20	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
21 Ch21	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
22 Ch22	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
23 Ch23	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
24 Ch24	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
25 Ch25	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
26 Ch26	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
27 Ch27	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
28 Ch28	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
29 Ch29	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
30 Ch30	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
31 Ch31	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>
32 Ch32	100		10		1000		<input type="button" value="Stop"/> <input type="button" value="Meas. again"/>

8 TEST RESULTS

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

- Click the **Results** button of **MENU**

The appearing result table shows all the results obtained during **the last monitoring cycle** and the preset limit values.

The limit values can be set separately for each cable because their features may be different.

Default Limit Values :

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

Later the content of result table can be actualized by

- Clicking on the **Refresh** key

The results are qualified by colors:

- Results fulfilling the requirements are marked with **green**
- Results violating the preset limits are marked with **red**
- The presence of high disturbing voltage are marked with **yellow**

To perform an extraordinary measurement on a cable:

- Click the corresponding **Meas. again** button.

Any violation of limits activate a relay contact for remote transmission of alarm signal

To clear the alarm warning of a selected channel:

- Click the corresponding **Stop** button.
(The alarm for other channels remain active)

To clear the alarm warning of all channels:

- Click the **All** button.

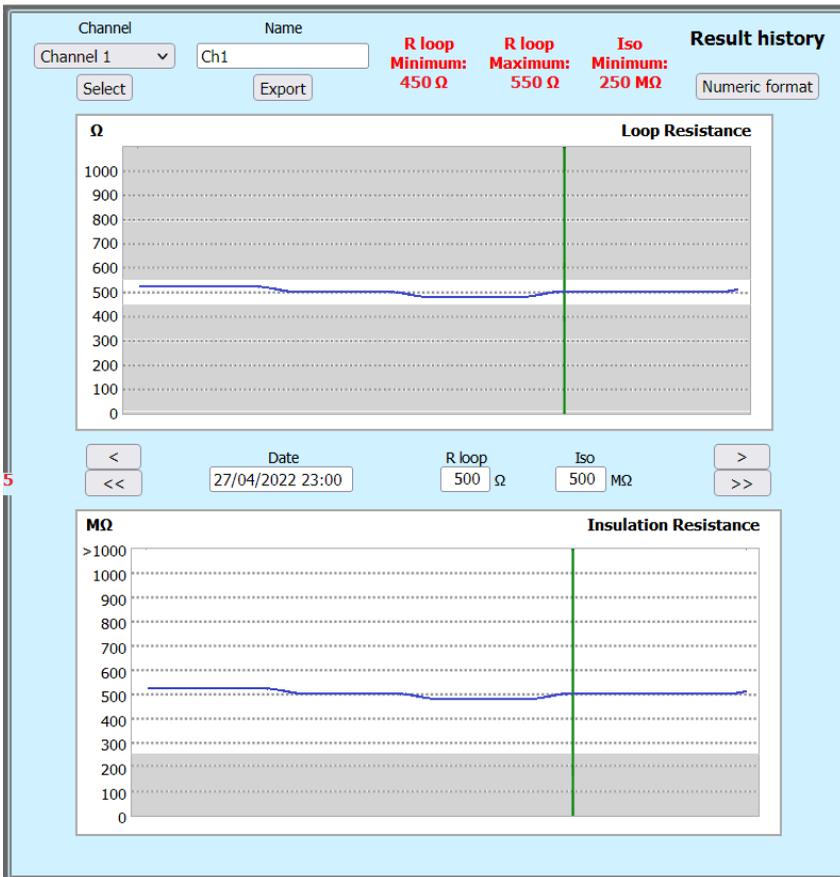
ECMS 32 stores the results of the last 250 monitoring cycles.

To study them:

- Click the **Result History** button of **MENU**.

Notice:

The knowledge of "History" is a good tool to recognize the tendency in time if a result is near to the limit.



9 RESULT HISTORY

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

The results are compared to preset limits. As the features of monitored cables are usually different the limits are separately defined for each cable.

ECMS 32 stores the results of the last 250 monitoring cycles

The Result History page shows the **results** and the preset **limits** belonging to the selected cable in graphic form.

To study them

- Click the **Result History** button of **MENU**
- Click a **Cable** and
- Click the **Select** button.

When the diagrams appear:

- Move the cursor with the cursor keys to a result or
- Place the pointer there and click the left button of mouse.

Doing so, the measured values and the date are displayed between the diagrams.

To study the results in numeric format:

- Click the **Numeric format** key

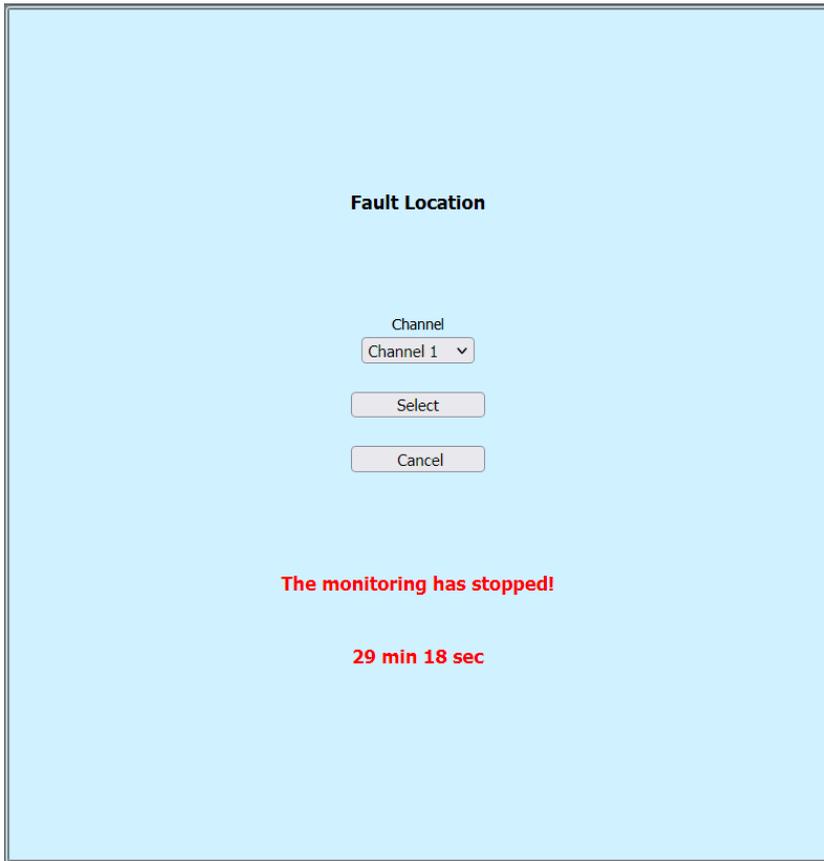
On the numeric format page the results violating the preset limits are marked with red color.

To return to graphic format:

- Click the **Graphic format** key

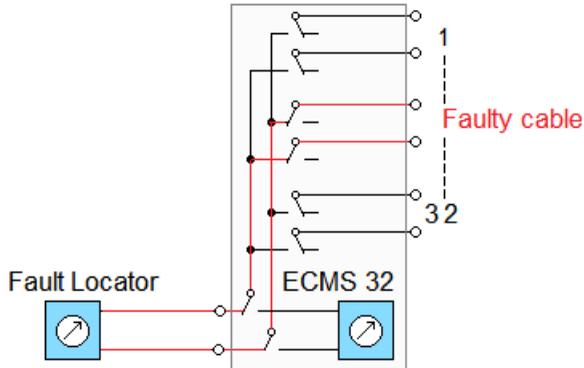
In case of faultless cables the repeated monitoring cycles provide similar results (Usually far from the limits).

It is a bad sign if the results are strongly changing. Detecting the bad tendency in time we may prevent a serious cable fault.



10 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.



10.1 Start Fault Location:

- Click the **Name** of the faulty cable.
- Click the **Select** button

Doing so, the monitoring is interrupted for 30 minutes and after 30 minutes automatically restarted.

The appearing time counter shows the time left.

10.2 Finish Fault Location

If 30 minutes is not enough:

The available time can be extended by clicking on the select button again before the 30 minutes have elapsed. Then the countdown will start again.

If you want to start monitoring earlier:

- Click on the **Cancel** key.

Then the monitoring is immediately restarted.

Channel
None ▾
Select

Channel
Channel 3 ▾
None ▲
Channel 1
Channel 2
Channel 3
Channel 4

Channel
Channel 3 ▾
Select

Channel
Channel 3 ▾
Select

Mode
New Test
New Test & Saved Result
Saved Result

Channel
Channel 3 ▾
Select

Mode
New Test
New Test & Saved Result
Saved Result

Channel
Channel 3 ▾
Select

Mode
New Test
New Test & Saved Result
Saved Result

11 TIME DOMAIN REFLECTOMETER (TDR)

11.1 Principles of Operation

To make a troubleshooting action easier ECMS 32 provides access to the faulty cable for a built in TDR. The results of TDR measurements can be saved (one result per cable).

If an earlier saved result is available the saved and actually obtained result can be displayed together (New Test & Saved Result mode).

Cable Selection:

- Click on the Channel key
- Click on the number of faulty cable.
- Click on the **Select** key.

Doing so, the monitoring is interrupted for 30 minutes. After 30 minutes, monitoring automatically restarts. The appearing time counter shows the time left.

If 30 minutes is not enough:

The available time can be extended by clicking on **Select** key again. Then the countdown will start again.

If you want to start monitoring earlier:

- Click on the **Cancel** key.
Then the monitoring is immediately restarted.

Selectable Modes

New Test

That mode is intended to display the waveform of a selected (supposedly faultless) cable. The obtained test result can be saved.

New Test & Saved Result

This mode is intended to compare the current and previous condition of a selected cable. The earlier saved and the actually obtained waveforms are displayed together

Saved Result

This mode is intended show the earlier saved waveform and the date of saving.

Fault Location with TDR

Channel
Channel 3 v

Berlin 2314

Select

Mode

New Test

New Test & Saved Result

Saved Result

Save

Export

0
Ready
3276

2239

Cursor

< >

<< >>

2239

Cursor-Marker

0

Marker

< >

<< >>

Saved

^

v

V/2 [m/us] 102.7

Range [m] 3200 v

Gain [dB] 66 v

Pulse [ns] 300 v

Smooth 4 v

Start/Stop

Edit

The monitoring has stopped!

29 min 7 sec

Cancel

2239

Cursor

< >

<< >>

2239

Cursor-Marker

0

Marker

< >

<< >>

V/2 [m/us] 102.7

Range [m] 3200 v

Gain [dB] 66 v

Pulse [ns] 300 v

Smooth 4 v

Esc

Enter

Enter the known V/2 or

Enter

Enter the known distance to cursor

11.2 New Test

Principles of Operation

The ECMS 32 in this mode applies the radar principle. A measuring pulse is transmitted down the cable. When that pulse reaches the end of the cable or a fault along the cable, a certain part or all the pulse energy is reflected back to the instrument.

The ECMS 32 measures the **time** taken by the pulse to travel down the cable, see the problem, and reflect back. Then converts this time to distance and displays the information as a waveform.

The displayed waveform shows all impedance discontinuities along the cable. The amplitude of any reflection is determined by the degree of the impedance change.

For the evaluation of waveform in meter we have to know:

- The V/2 propagation velocity of electromagnetic waves in cable or
- The length of the selected cable

To start a measurement:

- Click on the **Range** key and select the measuring range that definitely covers the cable length. The other test parameters recommended for the selected length are set automatically. (The default value of $V/2=100$ m/ μ s).
- Click on the **Start/Stop** key.
The TDR measurement is running repeatedly until a following Start/Stop key-stroke

Reading Distance to Fault:

Move the cursor with the cursor keys to the start point of the reflected pulse or place the mouse pointer there and click the left button.

The displayed value of cursor shows the distance to fault.

To change the V/2 value:

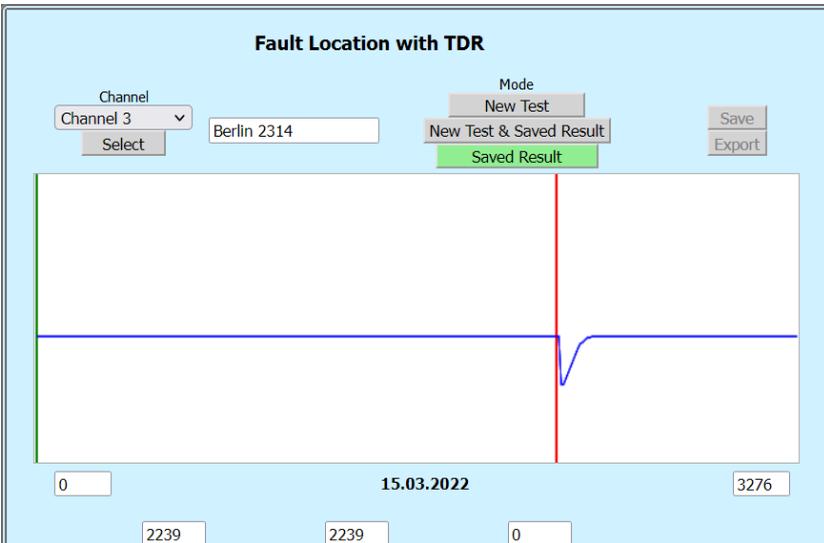
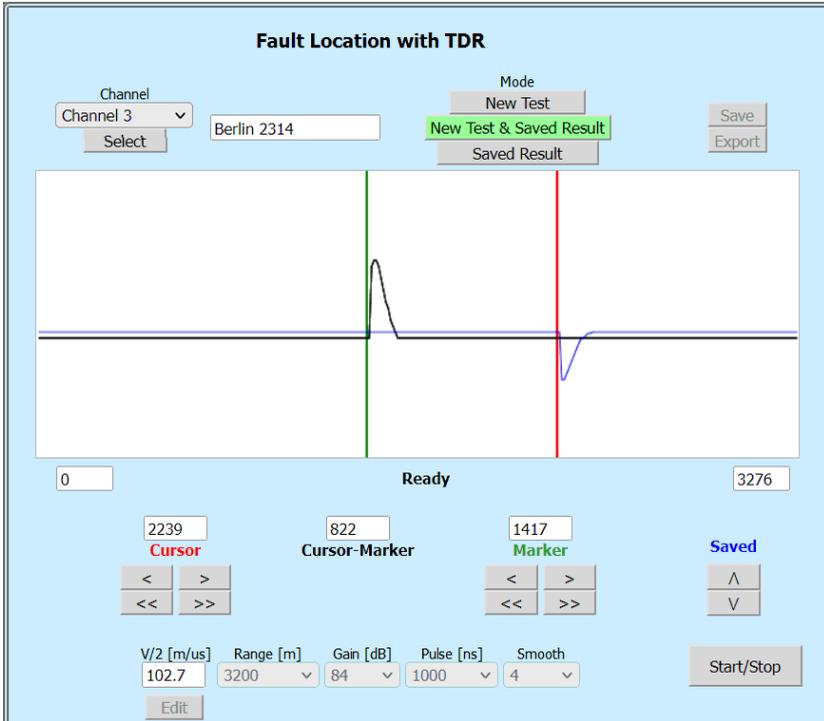
- Click on the **Edit** key.
- Enter the new V/2 value.

To change of V/2 value based on the known cable length:

- Move the cursor with the cursor keys to end of cable.
- Click on the **Edit** key.
- Enter the known length of cable.

To save the result:

- Click on the **Save** key
Doing so, the result and the current date are attached to the data of the selected cable. Since only one result can be attached to the selected cable, the previously saved result will be overwritten.



The “Smooth” Function

Because of the attenuation losses, the reflection from a fault long way down the cable may be much smaller than a regular reflection from a nearby discontinuity. The amplitude display of near reflections can be reduced by the smooth function. The smoothing factor is automatically changed with measuring range.

To obtain a better reading it can be modified as follows:

- Press the **SMOOTH** key
- Click on the required value.

(The smoothing factor can be adjusted between 0 to10)

11.3 New Test & Saved Result

This mode is intended to compare the current and previous condition of selected cable. The earlier saved and the actually obtained waveforms are displayed together (the saved waveform is blue).

The vertical position of the saved waveform can be shifted with the vertical arrow keys.

The saved waveform and the recently obtained waveform can only be compared if the main parameters are the same.

As the V/2, Range, Gain, Pulse and Smooth parameters are saved together with the waveform, the actual measurement must be performed with the saved settings.

Accordingly, in this mode, the controls of the above mentioned parameters are disabled.

The illustration shows a case where a cable that was faultless at the date indicated has been interrupted in the meantime.

11.4 Saved Result

This mode is intended to show the saved waveform attached to the selected cable without the actually obtained waveform.

The date of the saved measurement is shown below the waveform

Status

Name: ECMS32
Serial number: serialnumber
CPU card number: cpucardnumber
PIC card number: piccardnumber
PIC boot version: 1
PIC version: 0.01
CPU version: 1.2
Calibration date: 13/09/2021

12 STATUS

To get the most information about Ecms32:

- Click the **Status** button of **MENU**

The status page shows the:

- Name
- Serial number
- CPU card number
- PIC card number
- Pic boot version
- CPU version
- Calibration date

Channel Name	min.	Iso	min.	R loop	max.	Alarm	Results
	[MΩ]	[MΩ]	[Ω]	[Ω]	[Ω]	Reset All	Refresh
1 Ch1	100	>1G	10	100	1000	Reset	
2 Ch2	100	520	10	140	1000	Reset	
3 Ch3	100	12	10	120	1000	Reset	
4 Ch4	100		10		1000	Reset	
5 Ch5	100		10		1000	Reset	
6 Ch6	100		10		1000	Reset	
7 Ch7	100		10		1000	Reset	
8 Ch8	100		10		1000	Reset	
9 Ch9	100		10		1000	Reset	
10 Ch10	100		10		1000	Reset	
11 Ch11	100		10		1000	Reset	
12 Ch12	100		10		1000	Reset	
13 Ch13	100		10		1000	Reset	
14 Ch14	100		10		1000	Reset	
15 Ch15	100		10		1000	Reset	
16 Ch16	100		10		1000	Reset	
17 Ch17	100		10		1000	Reset	
18 Ch18	100		10		1000	Reset	
19 Ch19	100		10		1000	Reset	
20 Ch20	100		10		1000	Reset	
21 Ch21	100		10		1000	Reset	
22 Ch22	100		10		1000	Reset	
23 Ch23	100		10		1000	Reset	
24 Ch24	100		10		1000	Reset	
25 Ch25	100		10		1000	Reset	
26 Ch26	100		10		1000	Reset	
27 Ch27	100		10		1000	Reset	
28 Ch28	100		10		1000	Reset	
29 Ch29	100		10		1000	Reset	
30 Ch30	100		10		1000	Reset	
31 Ch31	100		10		1000	Reset	
32 Ch32	100		10		1000	Reset	

13 ALARM

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

- 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

13.1 Alarm in case of cable fault detection

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 with **red** color and activates the corresponding alarm relay.

For making a troubleshooting action easier ECMS 32 provides access to the faulty cable for a fault locator instrument (e.g. ECFL30) connected to the sockets on the front plate.

To clear the alarm warning of a selected channel:

- Click the corresponding **Reset** button.
(The alarm for other channels remain active)

To clear the alarm warning of all channels:

- Click the **Reset All** button.

To start a troubleshooting action with fault locator:

- Click the **Fault Location** option of **MENU**

13.2 Alarm in case of power failure

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.