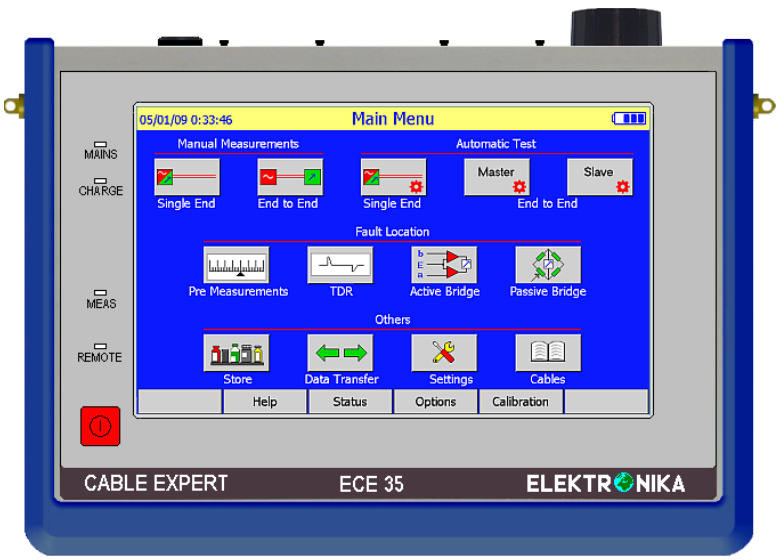
IS THIS PAIR SUITABLE FOR YOUR SYSTEM? IF NOT WHERE IS THE FAULT?

ECE 35 GIVES THE ANSWER!



ECE 35 is an advanced hand-held instrument providing powerful tools for qualification and fault location of copper pairs used for various xDSL and voice frequency telecommunication services.

TWO INSTRUMENTS IN ONE

- Sophisticated Line Qualifier
- Precision Cable Fault Locator

TOOLS for LINE QUALIFICATION

- 35 MHz Transmitter
- 35 MHz Receiver
- Spectrum Analyzer
- Z, Return Loss, LCL measurements
- Phone Simulator

TOOLS for CABLE FAULT LOCATION

- Active Bridge & DMM
- Passive Wheatstone Bridge
- Graaf Fault Locator
- TDR

LINE QUALIFICATION

MANUAL MEASUREMENTS

For the test of principal characteristics on xDSL and voice frequency lines

Single Sided Measurements

Impedance, Return Loss, LCL, NEXT, WB Noise, Impulse Noise, Spectrum Analyzer, Loss estimation for xDSL lines ad Echo for VF lines

End to End Measurements

Loss, Interruption, Group Delay, Noise with Tone, Jitter and Frequ.-error, Simultaneous Event Counter

AUTOMATIC MASTER SLAVE TEST

Tolerance masks of cable parameters as Loss, LCL, Return Loss, Impedance, and the principal system parameters are pre-programmed for VDSL, ADSL, SHDSL, HDSL, ISDN , VF systems
In that mode ECE 35 provides:

Automatic Data Rate Calculation
Immediate PASS/FAIL indication

SPECIAL ADVANCED SW OPTIONS

Spectrogram

In that mode ECE 35 performs repeated spectrum measurements in every second and the obtained results are display up to 72 hours in the form of “water-fall” diagram. That method is an excellent tool to discover disturbers appearing in unpredictable times and frequency ranges.

Non disturbing test beside vectored groups

The operation of vectored group can be interrupted i the alien noise exceeds a certain limit therefore the traditional test methods are not applicable. ECE 35 provides non disturbing special test methods for the measurement beside vectored lines

CABLE FAULT LOCATION

ACTIVE BRIDGE MEASUREMENTS

For accurate location of faults where the level of disturbing voltages are low.

DC Fault Location Methods

Murray, 3 Point, Küpfmüller, Repeated Küpfmüller and Resistance Difference

AC Fault Location Methods

Interruption, Repeated Küpfmüller, C Balance

PASSIVE BRIDGE MEASUREMENTS

For accurate location of faults where the level of disturbing voltages are high.

DC Fault Location Methods

Murray, 3 Point, Küpfmüller, R Difference

AC Fault Location Methods

Küpfmüller, C Balance

GRAAF FAULT LOCATION

For fault location on totally water-soaked cable if the disturbing voltages are high and intermittent.

TDR MEASUREMENTS

To find low impedance faults and splits causing cross talk between the pairs.

Single Pair Modes

Short Time L1 or L2, Long Time L1 or L2

Double Pair Modes

XTALK, L1 & L2 or L1-L2

Memory Modes

Memory & L1 or Memory - L1

Automatic Configuration

For L1 and XTALK measurements

DMM MEASUREMENTS

Loop and Insulation resistance, Capacitance, AC/DC Voltage, DC Current
Automatic Cable State Survey

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BASIC MEASURING MODES FOR LINE QUALIFICATION

Manual Measuring Modes

- Transmitting
- Selective Receiver
- Wideband Receiver
- NEXT
- LCL Balance
- Impedance
- Return loss
- Wideband Noise
- Impulse Noise
- Spectrum Analyzer

Automatic Master/Slave xDSL Line Test (DELT)

- Templates for SVDSL, VDSL2, ADSL2+, ADSL2, ADSL, READSL, SHDSL HDSL and ISDN systems
- Loss, Noise, Impedance, Return Loss, Balance, NEXT and FEXT measurements
- Bit load & Achievable bit rate calculation

Automatic Master/Slave VF Line Test (DELT)

- Templates for Active, Passive and Switched voice frequency lines
- Loss, Noise, Total Distortion, Impedance, Return Loss, Balance, NEXT and FEXT measurements

SW OPTIONS FOR LINE QUALIFICATION

Spectral Trace as Reference

- Stored spectrum as reference and
- System dependent PSD as reference

Spectrogram

- Repeated spectrum measurements in every second up to 72 hours

Test Beside Vectored Groups

- Non-disturbing test beside VDSL2 groups.
- Non-disturbing test beside SVDSL groups

Interruption Analysis

Automatic Single Ended xDSL Line Test (SELT)

- Single End Loss, Noise estimation,
- Bit load & Achievable bit rate estimation
- Impedance, Return Loss, Balance, NEXT

Voice frequency SW package

- Noise with tone measurement
- Group delay distortion measurement
- Phase jitter and Frequ. error measurement
- Simultaneous Event counters
- Echo test

ACTIVE BRIDGE FOR CABLE FAULT LOCATION (HW Option)

DC Fault Location

- Loop Resistance
- Resistance Difference
- Insulation Resistance
- Murray,
- 3 Point,
- Küpfmüller
- Repeated Küpfmüller

AC Fault Location

- Capacitance
- Capacitive Balance
- Interruption
- Repeated Küpfmüller

Telephone Simulator

TDR

- Single Pair
- Double Pair
- Comparison to Memory

DMM

- AC DC Voltage
- DC Current
- Resistance
- Insulation Resistance
- Capacitance

Automatic Test Sequences

- Quick Test
- Quality Test
- Pair Condition Survey

EXTENSIONS FOR ACTIVE BRIDGE

PASSIVE BRIDGE (HW Option)

DC Fault Location

- Loop Resistance
- Resistance Difference
- Insulation Resistance
- Murray, 3 Point, Küpfmüller, Synchronous Graaf Method

AC Fault Location

- Capacitive Balance, Küpfmüller

TEST OF LOADED CABLES (SW Option)

TEST OF MULTI SECTION CABLES (SW Option)

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SPECIFICATIONS OF LINE QUALIFIER FUNCTIONS

Transmitter

Outputs (Balanced)
- 10 kHz to 35 MHz ..... 100, 135, 150 Ω
- 200 Hz to 10 kHz ..... 600 Ω

Frequency
- Frequency Range ..... 200 Hz to 35 MHz
- Frequency resolution ..... 1 Hz
- Frequency accuracy ..... $2x10^{-6}$ ±1 Hz

Transmitting modes ..... One frequency/MTTS/Sweep

Output level
- 10 kHz to 35 MHz ..... +10 to –40 dBm
- 200 Hz to 10 kHz ..... +4 to –45 dBm
- Level Resolution ..... 0.1 dB

Accuracy at 0 dBm
- 200 Hz to 10 kHz ..... ±0,5 dB
- 10 kHz to 6 MHz ..... ±0.3 dB
- 6 MHz to 35 MHz ..... ±1 dB

Receiver

Inputs (Balanced)
- 10 kHz to 35 MHz ..... 100, 135, 150 Ω or High
- 200 Hz to 10 kHz ..... 600 Ω or High

Selective Level Measurement

Frequency
- Frequency Range ..... 200 Hz to 35 MHz
- Frequency resolution ..... 1 Hz
- Frequency accuracy ..... $2x10^{-6}$ ±1 Hz

Receiving modes ..... One frequency/MTTS/Sweep

Band width
- 200 Hz to 10 kHz ..... 20 Hz
- 10 kHz to 6 MHz .... 20, 200 Hz, 1.74, 1.95, 3.1 kHz
- 6 MHz to 18 MHz ..... 200 Hz, 1.74, 1.95, 3.1 kHz
- 18 MHz to 35 MHz ..... 1.74, 1.95, 3.1 kHz

Measuring Range
- 10 kHz to 35 MHz ..... -120 to +10 dBm
- 200 Hz to 10 kHz ..... -120 to +4 dBm
- Level Resolution ..... 0.1 dB

Accuracy at 0 dBm
- 200 Hz to 10 kHz ..... ±0,5 dB
- 10 kHz to 6 MHz ..... ±0.3 dB
- 6 MHz to 30 MHz ..... ±1.5 dB

Wideband Level Measurement

Frequency Range ..... 200 Hz to 35 MHz

Measuring Range
- 10 kHz to 35 MHz..... -50 to +10 dBm
- 200 Hz to 10 kHz..... -50 to +4 dBm
- Level Resolution..... 0.1 dB

Accuracy at 0 dBm
- 200 Hz to 10 kHz..... ±0,5 dB
- 10 kHz to 6 MHz..... ±0.3 dB
- 6 MHz to 35 MHz ..... ±1.5 dB

Spectrum Analyzer

Frequency range ..... 200 Hz to 35 MHz

Line impedances
- 10 kHz to 30 MHz..... 100, 135, 150 Ω or High
- 200 Hz to 10 kHz..... 600 Ω or High

Display range ..... down to -140 dBm/Hz

Maximum input level
- 200 Hz to 10 kHz ..... +4 dBm
- 10 kHz to 35 MHz ..... +10 dBm

With high impedance active probe..... +20 dBm

Bandwidth and frequency step

Frequency Range	Bandwidth & Freq. Step
35 MHz	500 Hz to 120 kHz
18 MHz	500 Hz to 60 kHz
12 MHz	500 Hz to 40 kHz
9 MHz	500 Hz to 30 kHz
3 MHz	500 Hz to 10 kHz
1.5 MHz	500 Hz to 5 kHz
600 kHz	500 Hz to 2 kHz
300 kHz	500 Hz to 1 kHz
20 kHz	50 Hz to 100 Hz
4 kHz	10 Hz to 20 Hz
0.3 kHz	1 Hz

Number of displayed frequencies 300
Saving of result ..... the actual content of display
Evaluation ..... NORM, PEAK, AVG, SAVG
Units ..... dBm, dBm/Hz

LCL Measurement

Frequency Range..... 200 Hz to 35 MHz

Display range ..... 0 to 70 dB

Accuracy for all impedances at 35 dB
- 200Hz to 100 kHz..... ±2 dB
- 100 kHz to 5 MHz ..... ±1 dB

Accuracy for 100 Ohm at 35 dB
- 5 MHz to 30 MHz ..... ±2,5 dB

Impedance Measurement

Measuring range
- 10 kHz to 35 MHz ..... 50 to 400 Ohm
- 200 Hz to 10 kHz ..... 300 to 1600 Ohm

Accuracy
- 200 Hz to 10 kHz ..... ± 10% ± 5 Ohm
- 10 kHz to 18 MHz ..... ±5% ± 5 Ohm
- 18 MHz to 30 MHz ..... ±10% ± 5 Ohm

Return Loss Measurement

Impedance
- 10 kHz to 35 MHz ..... 100, 135, 150 Ω
- 200 Hz to 10 kHz ..... 600 Ω

Display range ..... 0 to 40 dB

Accuracy at 20 dB
- 200 Hz to 18 MHz ..... ±2 dB

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Next Measurement

Frequency range ..... 200 Hz to 35 MHz
Impedances
10 kHz to 35 MHz ..... 100, 135, 150 Ω Balanced
200 Hz to 10 kHz ..... 600 Ω Balanced
Measuring modes ..... One frequency, Sweep
Measuring range ..... up to 80 dB

Wideband Noise Measurement

Frequency range ..... 200 Hz to 35 MHz
Filters ..... None, Psophometric, 3,1 kHz Flat, ADSL, ADSL 2+, VDSL 1, VDSL 2-8, VDSL 2-12,VDSL 2-17, SVDSL-35
Measuring time ..... selectable 1sec to 72 hours
Evaluation
For 1 sec to 1 min ..... Quasi analogue
Over 1 min ..... Histogram with 60 time slots

Impulse Noise Measurement

Pulse width ..... >500 ns
Interval size ..... >10 ms
Threshold range ..... 1 to 500 mV
Maximum count 65000
Measuring time ..... selectable 1sec to 72 hours
Evaluation
For 1 sec to 30 s ..... Quasi analogue
Over 30 s ..... Histogram with 60 time slots

Interruption Analysis

Test signal ..... 1020 Hz, 0 to –30 dBm
Impedance ..... 600 Ω
Threshold below the normal level .... 3, 6, 10, 20 dB
Accuracy of Threshold
For 3, 6, 10 dB ..... ± 1 dB
For 20 dB ..... ± 2 dB
Measuring time ..... selectable 4min to 72 hours
Interruption Categories 0.6 ms to >1 min
Evaluation ..... Relative duration, Errored sec Count & time distribution / category

Single-End Insertion Loss Measurement

Frequency ranges ..... 1.5, 3, 9, 12, 18, 35 MHz
Line length range ..... 100 m to 6 km
Direct measurement ..... 100 kHz to 6 MHz or up to 45 dB cable loss
Extrapolation ..... Over 6 MHz or Over 45 dB cable loss
Vertical scale ..... 0 to 80 dB
Accuracy ..... 2 to 4 dB
(The accuracy and the maximum length depends on the cable conditions)

Echo Test

Measuring range ..... up to 2500 ms
Resolution ..... 5 ms
Display range ..... 0 to -90 dB

Telephone Simulator

Dialing ..... Pulse & Tone
Storage of phone numbers ..... Provided
Indications
Line voltage ..... up to 100V
Line current ..... up to 100 mA
Ringing voltage ..... up to 100V p-p

Simultaneous Event Counting

Transmitter
Test signal ..... 1020 Hz
Test signal level ..... 0 dBm
Receiver
Level range ..... 0 to –30 dBm
Measurement times ..... 5, 15, 30, 60 min
Maximum counts for each counter 65000
Amplitude Hit Counter (O.95)
Threshold range ..... 2 to 9 dB
Guard interval ..... 4 ms
Dead time ..... 125 ±25 ms
Dead time after interruption (>10 dB drop) ..... 1 s
Phase Hit Counter (O.95)
Threshold range ..... 5 to 45 °
Guard interval ..... 4 ms
Dead time ..... 125± 25 ms
Interruption Counter (O.61)
Threshold ..... 6, 10 dB
Guard interval ..... 2 ms
Dead time ..... 3 ±1 ms
Impulsive Noise Counter (O.71)
Filter ..... 1020 Hz Notch
Guard interval ..... 20 µs
Dead time ..... 125 ±25 ms
Threshold range ..... 0 to –50 dBm

Group Delay Distortion (O.81 app. I)

Transmitter
Test signal ..... 36MTT, 200 to 3700 Hz
Resolution ..... 100 Hz
Output level ..... -20 dBm/tone (3dBm peak)
Receiver
Input level range ..... -50 to –10 dB/tone
Group delay distortion range ..... 0 to 5 ms
Resolution ..... 1 µs
Reference .... smallest, 800 Hz, 1000 Hz, 1800 Hz

Phase Jitter & Frequ. Error Measurement

Transmitter
Test signal ..... 1020 Hz
Test signal level ..... 0 dBm
Receiver
Test signal level ..... 0 to –30 dBm
Phase Jitter measurement (O.91)
Measuring Range ..... 0.2 to 30.0 degrees p-p
Filter ..... 4 to 300 Hz
Frequ. Error Measurement (O.91)
Measuring Range ..... ± 30 Hz
Resolution ..... 0.1 Hz

Noise with Tone Measurement

Transmitter
Test signal ..... 1020 Hz
Test signal level ..... 0 dBm
Receiver
Measuring range ..... 0 to –80 dBm
Filters ..... Psophometric (O.41)
1020 Hz Notch (O.132)

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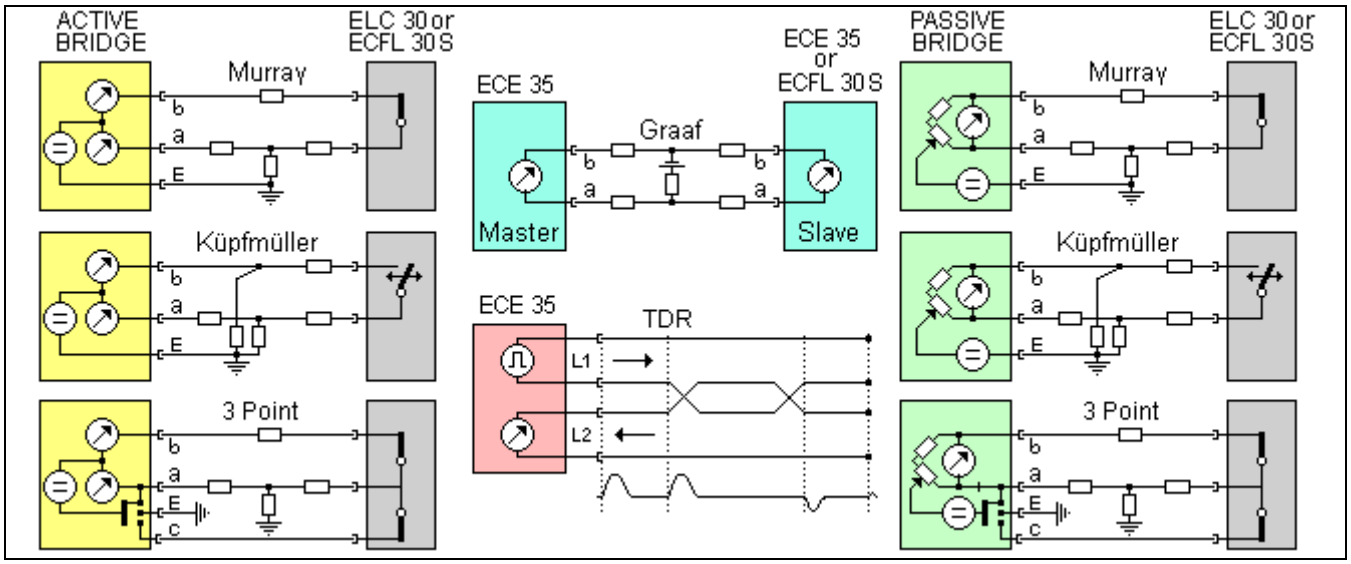
FAULT LOCATOR MODES



SPECIFICATIONS OF FAULT LOCATOR FUNCTIONS

TDR

Measuring Modes
- Single Pair: L1, L2, L1 long time, L2 long time, L1 with automatic configuration
- Double Pair: L1& L2, L1-L2, XTALK, XTALK with automatic configuration
- Memory Modes: L1& Memory, L1- Memory

Measuring Ranges
- For non loaded cable (at V/2=100): up to 32 km
- For loaded cable (at V/2=10): 6.4 to 32 km
- The maximum range depends on cable condition

Evaluation of Results
- With Cursor and Marker: In meters
- Refreshing of waveform: ~4/sec
- Zoom: Maximum 16

Accuracy
- Fault location: 0.2% of range
- Resolution: 0.01 m

Propagation Velocity

For non loaded cables
- V/2: 45 to 149 m/µs
- VOP: 30 to 99 %

For loaded cables
- V/2: 1.2 to 30 m/µs
- VOP: 0.8 to 20 %

Pulse Characteristics
- Widths for non loaded cable: 4 ns to 6 µs
- Widths for loaded cable: 330 µs
- Amplitude: 1.3 to 12 Vpp in 120 Ω, Automatically changed with gain and width.

Line Connection
- Impedance: 120 Ω balanced
- Balance control: 50 to 270 Ω

Gain Control
- Range: 0 to 90 dB
- Steps: 6 dB/Step

Distance Dependent Amplitude Correction
- Number of steps: 10

ACTIVE BRIDGE

Voltage
- DC voltage: up to 400 V
- AC voltage: up to 250 V eff
- Accuracy: ±3% ±1 V
- Frequency range: 15 to 300 Hz
- Input resistance: 2 M Ω

Loop Resistance
- Measuring range: 1 Ω to 10 kΩ
- Accuracy: ±0.3% ±0.1 Ω

Resistance Difference
- Loop resistance range: 10 Ω to 5000 Ω
- Accuracy: ±0.2% of Rl ±0.2 Ω

Insulation Resistance
- Measuring range: 10 kΩ to 300 MΩ
- Measuring voltage: 100 / 250 V
- Accuracy: 5% ±1 kΩ

Capacitance
- Measuring range: 1 nF to 2 µF
- Measuring voltage: 11 Hz, 100 Vp
- Accuracy: ±2% ±0.2 nF

Capacitive Balance
- Measuring range: 1 nF to 2 µF
- Measuring voltage: 11 Hz, 100 Vp
- Accuracy of Lx/L value: ±0.2 %

DC Fault Location
- Test Methods: Murray, Küpfmüller, 3 Point
- Loop resistance range: 1 Ω to 10 kΩ
- Fault resistance range: up to 100 MΩ
- Measuring voltage: 100 V
- Accuracy (Rl=2 kΩ, Lx/L=0,1 to 1)
- Fault resistance < 1MΩ: ± 0.2 %
- Fault resistance 1 MΩ to 5 MΩ: ± 0.3 %
- Fault resistance 5 MΩ to 25 MΩ: ± 0.5 %
- Fault resistance 25 MΩ to 100 MΩ: ± 2 %

AC Fault Location Interruption
- Range: up to 20 km (Depends on cable typ)
- Accuracy: ±2% ±0.2 nF

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PASSIVE BRIDGE

Loop Resistance
Measuring range ..... 1 Ω to 10 kΩ
Accuracy ..... ±0.3% ±0.3 Ω

Insulation Resistance
Measuring ranges
Measuring ranges..... 10 kΩ to 300 MΩ
10 kΩ to 10 GΩ
Measuring voltage..... 100 V
Accuracy
100 kΩ to 50 MΩ ..... 5 %
50 MΩ to 100 MΩ ..... 10 %
100 MΩ to 5 000 MΩ ..... 20 %
5 000 MΩ to 10 000 MΩ ..... 30 %

Resistance Difference
Loop resistance range ..... 1 Ω to 5000 Ω
Accuracy ..... ±0.2% of Rl ±0.2 Ω
Resolution of Lx/L (Mk)-value
In range ΔR <10% 1/10000
In range ΔR >10% 1/1000

DC Fault Location
Test methods ..... Murray, Küpfmüller, 3 Point
Loop resistance range ..... 1 Ω to 10 kΩ
Fault resistance range ..... up to 100 MΩ
Measuring voltage..... 100 V
Accuracy (Rl=2 kΩ, Lx/L=0,1 to 1)
Fault resistance < 1 MΩ..... 0.2 %
Fault resistance 1 MΩ to 5 MΩ..... 0.3 %
Fault resistance 5 MΩ to 25 MΩ..... 0.5 %
Fault resistance 25 MΩ to 100 MΩ..... 2 %
Resolution of Lx/L (Mk) value 1/1000

AC Fault Location Küpfmüller Method
Loop resistance range ..... 1 Ω to 10 kΩ
Fault resistance range. ..... up to 25 MΩ
Measuring voltage..... 11 Hz, 100 Vp
Accuracy (Rl=2 kΩ, Lx/L=0,1 to 1)
Fault resistance < 1 MΩ..... ±0.3%
Fault resistance 1 MΩ to 5 MΩ ..... ±0.5%
Fault resistance 5 MΩ to 25 MΩ..... ±1.0%
Resolution of M value 1/1000

AC Capacitive Balance
Measuring range. ..... 10 nF to 2 µF
Accuracy of Lx/L value ..... ±0.2%
Measuring voltage..... 11 Hz, 100 Vp
Resolution of Lx/L value
In range Lx/L=0.9 to 1.1..... 1/10000
In range Lx/L<0.9 or Lx/L>1.1 ..... 1/1000

Fault Location Graaf Method
Loop resistance range ..... 10 Ω to 10 kΩ
DC current range. ..... 10 µA to 0.1A
Accuracy of current measurement..... ±0.3% ±2µA
Accuracy of Lx/L value (current >0.1mA) ..... ±3%
Accuracy of Lx/L value (current >1mA) ..... ±0.3%

PRE MEASUREMENTS

Disturbing Voltage
DC voltage. ..... up to 400 V
AC voltage..... up to 250 V eff
Accuracy ..... ±3 % ±.1 V
Frequency range ..... 15 to 300 Hz
Input resistance ..... 2 MΩ

Loop Resistance
Measuring range ..... 1 Ω to 10 kΩ
Accuracy ..... ±0.5 % ±0.2 Ω

Insulation Resistance
Measuring range. ..... 10 kΩ to 1 GΩ
Measuring voltage ..... 100 V
Accuracy (without disturbing DC voltage)
Up to 300 MΩ ..... 20 %

DC Current
Measuring range. ..... 10µA to 0.1A
Accuracy ..... ±0.3 % 2 µA

Capacitance
Measuring range ..... 10 nF to 2 µF
Measuring voltage ..... 11 Hz, 100 Vp
Accuracy ..... ±3% ±0.3 nF

AUTOMATIC QUICK TEST

Disturbing Voltage
Measuring range. ..... up to 400 V DC, 250 V AC
Test results ..... Vab, VaE and VbE

Insulation
Measuring range ..... 10 kΩ to 300 MΩ
Measuring voltage..... 100 V

Capacitance
Measuring range ..... 10 nF to 2 µF

Capacitive Balance
Test result ..... Unbalance %
Measuring voltage ..... 11 Hz, 100 Vp

AUTOMATIC QUALITY TEST

Insulation
Measuring range ..... 10 kΩ to 10 GΩ

Capacitance
Measuring range ..... 10 nF to 2 µF

Capacitive Balance
Test result ..... Unbalance %
Resolution 1/1000

Loop Resistance
Measuring range ..... 1 Ω to 10kΩ
Accuracy ..... ±0.3% ±0.1 Ω

Resistance Difference
Loop resistance range ..... 1 Ω to 5 kΩ
Resolution 1/1000

PAIR CONDITION SURVEY

The Survey of Pair Condition is extremely useful test sequence to find the best fault location method.

The consists of the following measurements:

- **Disturbing voltage**
- **Capacitance**
- **Loop and wire resistances**
- **Insulation resistances**

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DATA TRANSFER

Data transfer via USB port

The USB port provides:

- bidirectional transfer of test results
- bidirectional transfer of test setups
- transfer of print screen images to USB stick
- transfer of upgrade files to ECE 35

Data transfer via WiFi

The WiFi connection provides two ways of transferring test results, test setups and images to LAN network:

- ECE 35 initiates a connection to a FTP server
- ECE 35 acts as a HTTP server

LOOP CLOSING DEVICE ELC 30 (Accessory)

Functions

Opening or closing the far end of tested pair when just one person wants to perform a measurement during which the far endings should be opened or closed (e.g. Küpfmüller method).

The device is remote controlled over the tested pair by ECE 35

Specifications

Power supply

AA size alkaline battery cells ..... 3 pieces
Operation time ..... ca. 1000 hours
Auto power off..... 4 hours

Connectors ..... 4 mm banana plugs

Mechanical Data

Dimensions ..... 110 x 60 x 25 mm
Weight (Including battery pack) ..... ca. 0,2 kg

INTELLIGENT SLAVE ECFL 30S (Accessory)

Functions

Opening or closing the far end of tested pair when just one person wants to perform a measurement during which the far endings should be opened or closed (e.g. Küpfmüller method).

Current measurement at the far end of the tested pair when Graaf method is applied. In case of Graaf method the master ECE 35 and the remote controllable intelligent slave ECFL 30S measure the current at the two cable ends at the same time and communicate over the tested pair. The Master calculates the location of fault out of the rate of currents

Specifications

Power Supply

AA size alkaline battery cells .....4 pieces
Operation time ..... ca. 500 hours
Auto power off..... 4 hours

Connectors

A, B, C line connectors ..4 mm banana sockets
Ground connector ..... 4 mm banana socket

Mechanical Data

Dimensions ..... 210 x 100 x 40 mm
Weight (Including battery pack) ..... ca. 0,4 kg

Control

The device is remote controlled over the tested pair by ECE 35

HIGH IMPEDANCE PROBE ELQP 30 (Accessory)

Purpose

The ELQP 30 active probe is intended for PSD spectrum measurement on working lines when test instrument should be connected parallel with the operating modems and the regular measuring cables can not be used because the digital systems are extremely sensitive for the capacitive load

Specifications

Frequency range .....5 kHz to 30 MHz
Attenuation .....15 dB
Input Impedance ..... 5 kOhm II 5pF
Accuracy
5 kHz to 25 kHz.....±1dB
25 kHz to 5 MHz.....±0.3 dB
5 MHz to 30 MHz .....±1dB
Powered.....from ECE 35

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GENERAL SPECIFICATIONS

Power Supply
Internal rechargeable Lithium Ion battery pack
Operation time ..... approx. 8 hours
Charging (without taking the battery pack out)
From 100 to 240 V mains .....with mains adapter
From 12 V car battery ..... with car adapter
Charging time..... ~ 3 hours
Display ..... 800 x 480 color LCD TFT
Connector for mains adapter ..... 2.1/5.5 mm coax

Connectors for Bridge Measurements
Ground connector ..... 4 mm banana socket
Line connectors.....4 pcs of 4 mm banana sockets

Connectors for Line Qualification
Ground connector ..... 4 mm banana socket
Line connectors..... 2 pcs of 3 pol CF sockets

Connectors for Data Transfer
USB A .....USB host port for USB-Stick

Over Voltage Protection
Between a and b
Fault locator .....500 V DC, 350 V AC
Line qualifier .....200V DC 160V AC

Ambient temperature ranges
Reference..... 23±5°C
Rel. humidity 45% to 75%*
Normal operation.....0 to +40°C
Rel. humidity 30% to 75% *(<25g/m^3)
Limits of operation.....-5 to +45°C
Rel. humidity 5% to 95% *(< 29 g/m^3)
Storage and transport .....–40 to +70°C
Rel. humidity 95% at +45°C *(<35g/m^3)
Protection .....IP 54

Dimensions
Without bridge ..... 224 x 160 x 65 mm
With bridge ..... 224 x 160 x 75 mm

Weight
Without bridge ..... ca. 1.5 kg
With bridge ..... ca. 1.8 kg

* Without condensation

ORDERING INFORMATIONS

CABLE EXPERT ECE 35..... 460-000-000

Including:
Operating manual set & Calibration Certificate
Ground connecting cable
2 Balanced Measuring Cables
USB stick
Mains adapter
Carrying case

HW options
Active bridge, DMM, and TDR 460-400-000
2-wire test lead (red/black)
2- wire test lead (blue/yellow)
Test lead (green)
Passive bridge.....460-460-000
(Extension for Active Bridge)

Accessories
High Impedance Probe ELQ P30 410-000-000
Loop closing device ELC 30 421-000-000
Intelligent Slave ECFL 30S 425-000-000
Car lighter power adapter EAA 20 462-000-000

SW options for xDSL line qualification
Single End Line Test. .....SW 460-640-000
Single-End loss estimation and
Automatic line test with data rate estimation
Test Beside Vectored Groups. SW-460-910-000
Non-disturbing test beside VDSL groups.
Non-disturbing test beside SVDSL groups.
Spectrogram Measurement.....SW 460-570-000
Spectral Trace as Reference.....SW 460-950-000
Stored spectrum as reference and
System dependent PSD as reference
Interruption Analysis.....SW 460-530-000

SW option for voice frequency measurements
Voice frequency SW package.....SW 460-940-000
Group delay, Jitter & Frequ Difference,
Noise with tone measurements,
Event counter, Echo Test

SW options for bridge measurement
Test of loaded cables SW-460-650-000
Test of multi section cables..... SW-460-660-000

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