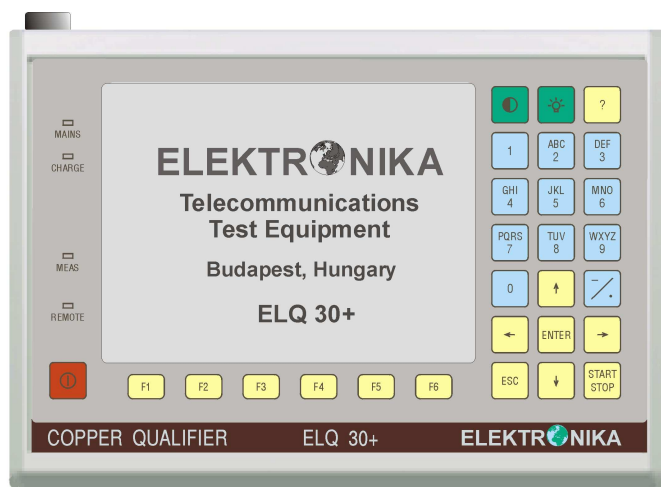


IS THIS PAIR SUITABLE FOR YOUR SYSTEM? IF NOT WHERE IS THE FAULT? ELQ 30+ GIVES THE ANSWER !



Five instruments in one

- **30 MHz test set** for ADSL, VDSL line qualification with pre-programmed templates and data transfer speed calculation
- **20Hz to 20 kHz test set** for the test of voice frequency circuits
- **Active AC-DC bridge** for accurate and comfortable fault location
- **DMM** functions
- **TDR** to find low impedance faults and splits causing cross talk between the pairs

APPLICATIONS

The **COPPER QUALIFIER ELQ 30+** is a hand held battery operated, multifunction measuring instrument, intended for pre-qualification, installation, fault location and maintenance of balanced copper pairs.

- **Pre-qualification in Master Slave mode**

Just one person, thanks to the communication between the two instruments, can perform such measurements. Operation is made extremely simple by means of pre-defined automatic test sequences. ELQ 30+ can be programmed as MASTER and SLAVE as well. ELQ 30 S + the simplified slave version of ELQ 30+ is also available.

- **Pre-programmed Tolerance Masks**

Tolerance masks of cable parameters as Loss, LCL, Return Loss, Impedance, and the principal system parameters are pre-programmed for several VDSL, ADSL and Voice frequency systems. User defined template sets can be created with the parameter editor of ELQ 30+ without PC.

- **Automatic Data Rate Calculation**
- **Immediate PASS/FAIL indication**

When the automatic test sequence is ready ELQ 30+ provides an immediate PASS/FAIL indication by comparing the test results with the tolerance masks and the required data rate with the calculated theoretically achievable rate.

- **Single Sided Measurement**

ELQ 30+ provides numerous single sided measuring modes like: Transmitter, Receiver, Spectrum Analyzer, Wide Band Noise, Impulsive Noise, Impedance, Return Loss, NEXT(Loss) Balance measurements.

ELQ 30+ provides several tools for the accurate location of DC/AC faults on the line:

Resistance Measurements

- Loop resistance
- Resistance difference
- Insulation resistance

Capacitance Measurements

- Cable capacitance
- Capacitive balance

DC Fault Location Methods

- Murray
- Küpfmüller
- Repeated Küpfmüller

AC Fault Location Methods

- Interruption
- Repeated Küpfmüller

TDR Measurements

- Single pair
- Long time
- XTALK
- Comparison to Memory

AC-DC Voltage measurements

The obtained test results can be stored in the internal memory of the instrument and transferred to PC.

ELQ 30+ has two USB ports for result transfer

- **USB B device-port for PC connection**
- **USB A host-port for USB stick**

The indirect transfer via USB stick is advantageous for the user who does not have administrative right to install a special driver to his PC.

SPECIFICATIONS

20 kHz to 30 MHz range

Transmitter

Frequency range 20 kHz to 30 MHz
 Resolution 4.3125 or 5 kHz
 Impedance 100, 120, 135 or 150 Ohm
 Transmitting modes:
 Generation of 1 single frequency
 Generation of 30 frequencies at the same time
 Output level
 In 1 frequency mode -10 to +10 dBm
 In 30 frequency mode -12 dBm/tone
 Accuracy at 0 dBm
 20 kHz to 100 kHz ±1 dB
 100 kHz to 5 MHz ±0.3 dB
 5 MHz to 30 MHz ±1 dB

Receiver

Frequency range 20 kHz to 30 MHz
 Resolution 4.3125 or 5 kHz
 Impedance 100, 120, 135, 150 Ohm
 Receiving modes:
 Receiving of 1 single frequency
 Receiving of 30 frequencies at the same time
 Measuring range +10 to -100 dBm
 Accuracy at 0 dBm
 20 kHz to 100 kHz ±1 dB
 100 kHz to 5 MHz ±0.3 dB
 5 MHz to 30 MHz ±1 dB

LCL Measurement

Frequency range 20 kHz to 30 MHz
 Display range 0 to 70 dB
 Accuracy at 35 dB
 20 kHz to 100 kHz ±2 dB
 100 kHz to 5 MHz ±1 dB
 5 MHz to 18 MHz ±2 dB

Impedance Measurement

Frequency range 20 kHz to 30 MHz
 Measuring range 50 Ohm to 400 Ohm
 Accuracy
 100 kHz to 30 MHz 5% ±5 Ohm

Return Loss Measurement

Frequency range 20 kHz to 30 MHz
 Impedance 100, 120, 135 or 150 Ohm
 Display range up to 40 dB
 Accuracy at 20 dB
 100 kHz to 5 MHz ±1 dB
 5 MHz to 18 MHz ±2 dB

NEXT, FEXT, Loss Measurement

Frequency range 20 kHz to 30 MHz
 Measuring range
 NEX, FEXT up to 80 dB
 LOSS up to 90 dB

Spectrum Analyzer

Frequency range 20 kHz to 30 MHz
 Display range down to -130 dBm/Hz
 Impedance 100, 120, 135, 150 Ohm or
 5kOhm // 5pF with high impedance probe

Range MHz	Bandwidth / frequency step kHz					
	100/100	50/50	20/20	10/10	5/5	5/2.5
30						
18	60/60	20/20	10/10	5/5	5/2.5	
12	40/40	20/20	10/10	5/5	5/2.5	
9	30/30	15/15	10/10	5/5	5/2.5	
3	10/10	5/5	5/2.5			
1.5	5/5	5/2.5				

Number of Displayed frequencies 300
 Saving of result the actual content of display
 Evaluation Normal, Peak, Average
 Units dBm, dBm/Hz

Noise Measurement

Frequency range 20 kHz to 30 MHz
 Impedance 100, 120, 135, 150 Ohm
 Filters for noise measurement ADSL, ADSL 2+
 VDSL, VDSL2-8, VDSL2-17, VDSL2-30,
 NO FILTER
 Measurement times 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12, 24, 48 hours

Evaluation
 For 1 sec to 1 min Quasi analog
 For 5 min to 48 hour Histogram

Impulse Noise Measurement

Impedance 100, 120, 135, 150 Ohm
 Pulse width >500 ns
 Interval size 10 ms
 Threshold range 0 to -60 dBm
 Maximum count 65000
 Measurement times 1, 5, 10, 30 sec
 1, 5, 10, 30 min
 1, 2, 4, 8, 12, 24, 48 hours

Evaluation
 For 1 to 30 sec Numeric
 For 1 min to 48 hour Histogram

High Impedance Active Probe (option)

Frequency range 20 kHz to 30 MHz
 Attenuation 10 dB
 Input Impedance: 5 kOhm // 5pF
 Accuracy
 20 kHz to 5 MHz ±0.3 dB
 12 MHz to 30 MHz ±1dB

AC-DC FAULT LOCATOR BRIDGE

DMM MEASUREMENTS

Voltage

DC voltage..... up to 400 V
 AC voltage..... up to 250 V eff
 Accuracy..... $\pm 3\% \pm 1$ V
 Frequency range 15 to 300 Hz
 Input resistance..... >1 MOhm

Current

DC current..... 1 μ A to 0,1 A
 AC current 10 μ A to 0,1 A
 Accuracy..... $\pm 3\% \pm 0,5$ μ A
 Frequency range 15 to 300 Hz

Loop Resistance

Measuring range up to 10 kOhm
 Accuracy..... $\pm 0.3\% \pm 0.1$ Ohm

Insulation Resistance

Measuring range 10 kOhm to 5 000 MOhm
 Measuring voltage 100 V
 Accuracy
 10 kOhm to 300 MOhm..... ± 2 to $5\% \pm 1$ kOhm
 300 MOhm to 5 000 MOhm..... ± 20 %

Capacitance

Measuring range 1 nF to 2 μ F
 Measuring voltage 11 Hz, 100 V
 Accuracy..... $\pm 2\% \pm 0.2$ nF

CABLE FAULT LOCATION

DC Fault Location

Test Methods Murray, K pfm ller
 Loop resistance range..... 1 Ohm to 10 kOhm
 Fault resistance range..... up to 100 MOhm
 Measuring voltage 100 V
 Accuracy
 Fault resistance < 5 MOhm..... ± 0.3 %
 Fault resistance 5 MOhm to 25 MOhm ± 0.5 %
 Fault resistance 25 MOhm to 100 MOhm ± 2 %

AC Fault Location Interruption

Range..... up to 20 km (Depends on cable typ)
 Accuracy..... $\pm 2\% \pm 0.2$ nF

Resistance Difference

Loop resistance range..... up to 5000 Ohm
 Accuracy..... $\pm 0.2\%$ of RI ± 0.2 Ohm

Capacitive Balance

Measuring range 1 nF to 2 μ F
 Measuring voltage 11 Hz, 100 V
 Accuracy of Lx/L value ± 0.2 %

REPEATED PREE MEASUREMENTS

Disturbing Voltage

Measuring range
 DC voltage..... up to 400 V
 AC voltage up to 250 V eff

Loop Resistance

Measuring range up to 10 kOhm
 Accuracy ± 0.5 % ± 0.2 Ohm

Insulation Resistance

Measuring range 10 kOhm to 300 MOhm
 Measuring time ~ 3 sec
 Measuring voltage 100 V

AUTOMATIC QUICK TEST

Disturbing Voltage

Measuring range Up to 400 V DC, 250 V AC
 Test results Vab, VaE and VbE

Insulation

Measuring range up to 300 MOhm
 Measuring time $\sim 3 \times 20$ sec

Capacitance

Measuring range up to 2000 nF

Capacitive Balance

Test result Unbalance %
 Measuring voltage 11 Hz, 100 V

AUTOMATIC QUALITY TEST

Insulation

Measuring range up to 5 000 MOhm
 Measuring time $\sim 3 \times 35$ sec

Capacitance

Measuring range up to 2000 nF

Capacitive Balance

Test result Unbalance %
 Resolution 1/1000

Loop Resistance

Measuring range up to 10kOhm
 Accuracy $\pm 0.3\% \pm 0.1$ Ohm

Resistance Difference

Loop resistance range up to 5 kOhm
 Resolution 1/1000

LOOP CLOSING DEVICE (OPTION)

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 K pfm ller method). The device is remote controlled by (ELQ 30+) over the tested pair

Power Supply

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

Mechanical Data

Dimensions 110 x 60 x 25 mm

GENERAL SPECIFICATIONS

Power supply

Internal rechargeable NIMH battery pack
 Operation time.....approx. 8 hours
 (Without backlight)

Charging

(Without taking the battery pack out)
 From 80 to 230V mains..... with mains adapter
 From 12V car battery with car adapter
 Fast charging time..... less than 3 hours

Display.....320 x 240 LCD with backlight

Connectors

For mains or 12V car adapter .. 2.1/5.5 mm coaxial
 Power supply for active probe..... Mini-din-4P
 For L1 and L2 line 4 mm banana sockets
 Ground connector 4 mm banana socket
 USB A..... USB 1.1 host port for USB stick
 USB B.....USB 1.1 device port to connect PC

Line Protection

Between a and b or ground 500V DC
 Longitudinal voltage60V 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/m³)
 Limits of operation-5 to +45°C
 Rel. humidity 5% to 95% *(<29g/m³)
 Storage and transport-40 to +70°C
 Rel. humidity 95% at +45°C *(<35g/m³)

*without condensation

Mechanical Data

Dimensions 224 x 160 x 60 mm
 Weight..... approx. 1.8 kg

ORDERING INFORMATION

COPPER QUALIFIER

ELQ 30+428-000-000E

Including:

Operating Manual OM 428-000-000E
 Short form operation instructionsML 428-000-000E
 Calibration CertificateCC 428-000-000 E
 CD (xxx version) containing: . CD 428-000-000 EE
 Operating Manual for ELQ 30
 Upgrade program
 Demo program
 PC program (option)
 Operating manual for PC program (option)
 Ground connecting cable (2 m)..... Y 107-420
 2 Special Balanced Measuring Cables .. Y 107-420
 2-wire test lead (red/black)..... Y 107-426
 2- wire test lead (blue/yellow)..... Y 107-427
 USB cable Y 107-420
 Mains adapter Y 107-017
 Carrying case Y 147-014

OPTIONS

Sw Options

Result transfer.....SW 428-510-000
 Parameter set edition with PCSW 428-520-000
 Interruption measurementSW 428-550-000
 Spectrum as ReferenceSW 428-560-000

Voice Frequ. Sw Options

Event counters
 (O.95, O.61, O.71)SW-404-580-000
 Group delay distortion
 (O.81 app. I).....SW-404-590-000
 Phase jitter and fr. error
 (O.91).....SW-404-600-000

Sw. Package(Instrument & PC Sw)

SpectrogramSW 428-570-000

Hardware Options

ELQ 30S Slave unit426-000-000
 ELC 30 Loop Closing Device.....421-000-000
 High Impedance Probe410-000-000

