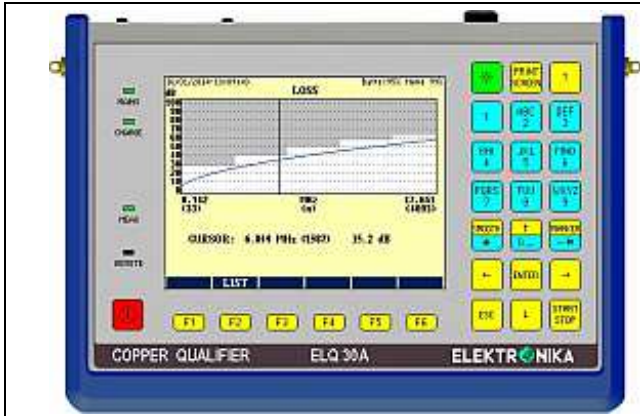


IS THIS PAIR SUITABLE FOR YOUR SYSTEM? IF NOT WHERE IS THE FAULT?



ELQ 30A+ COPPER QUALIFIER GIVES THE ANSWER!



FIVE INSTRUMENTS IN ONE

- **200 Hz to 35 MHz Transmitter**  
Generating Sinus and MTTs test signals.
- **200 Hz to 35 MHz Receiver**  
For selective and wideband measurements.
- **Spectrum Analyzer**  
For disturbing noise and PSD measurement
- **High Resolution TDR**  
For the location of bridged taps, splits etc.
- **Active AC-DC Fault Locator Bridge**  
For the location of resistive and capacitive faults.

MAIN FEATURES

**ELQ 30A+** is a hand held battery operated instrument intended for the pre-qualification, installation, fault location and maintenance of balanced copper pairs.

- **Single Sided Measurements**  
ELQ 30A+ provides numerous single sided measuring modes like: Transmitter, Selective and Wide band Receiver, Spectrum Analyzer, Wide Band Noise, Impulsive Noise, Impedance, Return Loss, Balance and NEXT (Loss) measurements.
- **Automatic Single Ended Test Sequences <sup>a</sup>**  
ELQ 30A+ provides single sided test sequences to estimate the data transfer capacity of the tested lines used for different xDSL systems without the aid of far end device or a second operator.
- **Automatic Master Slave Measurements**  
ELQ 30A+ provides pre-defined easy to use automatic Master-Slave test sequences. ELQ 30A+ can be programmed as MASTER and SLAVE as well.
- **Pre-programmed Tolerance Masks**  
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 and VF lines
- **Automatic Data Rate Calculation**
- **Immediate PASS/FAIL indication**  
When the automatic test sequence is ready an immediate PASS/FAIL indication is provided by comparing the test results with the tolerance masks and the required data rate with the calculated achievable rate.
- **TDR Measurements <sup>a</sup>**  
For the location of cable faults causing impairment of xDSL services. Manual and auto modes are provided.
- **Active AC-DC Fault Locator Bridge <sup>b</sup>**  
For the location of resistive and capacitive cable faults. Manual and auto modes are provided

- **New !! 35 MHz Frequency Range**  
ELQ 30A+ provides the qualification of cables used for the new VDSL2+ systems
- **New !! Test beside Vectored Groups <sup>a</sup>**  
ELQ 30A+ provides special non-disturbing Master-Slave test for Cables Containing Vectored Groups.
- **New !! DPBO and UPBO Dependent Templates <sup>a</sup>**  
ELQ 30A+ provides ESEL, MUS dependent templates and achievable rate calculation for the local subscriber lines when the local DSLAM is working with reduced transmit power and qualification of VDSL2 lines when the modems are working with distance dependent reduced transmit power.
- **PC Supported Spectrogram <sup>a</sup>**  
The purpose of Spectrogram PC program is to discover the disturbers causing considerable service impairment to communication systems. In this mode ELQ 30A+ performs spectrum measurements in every second for a long time up to 72 hours. The PC displays the results on "water-fall" diagram.
- **Micro Interruption Analysis <sup>a</sup>**  
ELQ 30A+ detects the micro interruptions according to ITU O.62 and provides detailed information about the number and relative duration of interruptions
- **Long Time Impulse Noise Measurement**  
ELQ 30A+ displays the counted impulses in histogram form with 60 time slots providing information about the time distribution.
- **Simultaneous Event Counting <sup>a</sup>**  
Providing simultaneous phase hit, gain hit, impulse noise, and interruption counting
- **Group Delay Distortion Measurement <sup>a</sup>**  
ELQ 30A+ applies the multi tone test method given in the rec. ITU-T O.81 Appendix I
- **PC Control Program**  
Provided for result transfer, setup transfer and parameter edition.

Notices: **a.** SW Option **b.** With AC-DC Bridge HW Option

LINE QUALIFICATION

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <p><b>MANUAL MEASUREMENTS</b></p> <ul style="list-style-type: none"> <li>• <b>Transmitting</b><br/>One Frequency Test Signal<br/>30 / 36 Frequency MTTs Test Signal</li> <li>• <b>Receiving</b><br/>One Frequency<br/>30 / 36 Frequency MTTs Signal ,Wideband</li> <li>• <b>NEXT</b><br/>One Frequency / Sweep</li> <li>• <b>Double-End Insertion Loss</b><br/>One Frequency<br/>30 / 36 Frequency MTTs Signal</li> <li>• <b>LCL Balance</b><br/>One Frequency / Sweep</li> <li>• <b>Impedance</b><br/>One Frequency / Sweep</li> <li>• <b>Return loss</b><br/>One Frequency / Sweep</li> <li>• <b>Noise</b><br/>Wideband / Weighted / Psophometric</li> <li>• <b>Impulse Noise</b><br/>Short Time,<br/>Long Time with Histogram up to 72 hours</li> <li>• <b>Spectrum Analyzer</b><br/>With Spectral Trace as Reference</li> <li>• <b>Spectrogram</b> <sup>a.</sup><br/>Water fall diagram up to 72 hours</li> <li>• <b>Telephone Simulator</b> <sup>b.</sup><br/>With Bridge HW option</li> <li>• <b>Micro Interruption Analysis</b> <sup>a.</sup><br/>With one or two ELQ 30A+(s)<br/>List and 240 Point Histogram</li> </ul> <p><b>VOICE FREQUENCY LINE QUALIFICATION</b> <sup>a.</sup></p> <p><b>SW package containing:</b></p> <ul style="list-style-type: none"> <li>• <b>Noise with tone measurement</b><br/>With 1020 Hz Notch Filter</li> <li>• <b>Group delay distortion measurement</b><br/>With 36 Frequency MTT Test Signal</li> <li>• <b>Phase jitter and Frequ. error measurement</b><br/>With 1020 Hz Test Signal</li> <li>• <b>Simultaneous Event counters</b><br/>Simultaneously counting amplitude &amp; phase hits<br/>Interruptions and noise impulses</li> <li>• <b>Echo test</b><br/>With 1020 Hz signal packets</li> </ul> | <p><b>AUTOMATIC MASTER SLAVE xDSL LINE TEST</b></p> <ul style="list-style-type: none"> <li>• <b>Loss</b><br/>With ~300 Frequencies</li> <li>• <b>Noise spectrum</b><br/>With ~300 Frequencies</li> <li>• <b>Bit load &amp; Achievable bit rate calculation</b><br/>Both Directions</li> <li>• <b>LCL Balance</b><br/>Both Ends</li> <li>• <b>Impedance &amp; Return Loss</b><br/>Both Ends</li> <li>• <b>NEXT &amp; FEXT</b><br/>Both Ends</li> <li>• <b>DPBO, UPBO Dependent Templates</b> <sup>a.</sup><br/>ESEL Measurement up to 120 dB.<br/>ESEL and KLo dependent data rate calculation.</li> </ul> <p><b>SINGLE END xDSL LINE TEST (SELT)</b> <sup>a.</sup></p> <ul style="list-style-type: none"> <li>• <b>Single End Loss estimation</b><br/>With ~300 Frequencies</li> <li>• <b>Noise spectrum</b><br/>Measurement at near end<br/>Estimation at far end</li> <li>• <b>Bit load &amp; Achievable bit rate estimation</b><br/>Both Directions</li> <li>• <b>LCL Balance</b><br/>Near End</li> <li>• <b>Impedance &amp; Return Loss</b><br/>Near End</li> <li>• <b>NEXT</b></li> </ul> <p><b>AUTOMATIC MASTER SLAVE VF LINE TEST</b></p> <ul style="list-style-type: none"> <li>• <b>Double End Loss</b><br/>36 Frequency Sweep</li> <li>• <b>Noise spectrum</b><br/>Both Ends</li> <li>• <b>Total distortion</b><br/>For PCM or Lines with Amplifiers</li> <li>• <b>Impedance &amp; Return Loss</b><br/>Both Ends</li> <li>• <b>LCL Balance Measurement</b><br/>Both Ends</li> <li>• <b>Group delay distortion</b><br/>With 36 Frequency MTTs</li> <li>• <b>Phase jitter and Frequency error</b><br/>With 1020 Hz Test Signal</li> <li>• <b>Event counters</b></li> </ul> |
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Notices: **a.** SW Option  
**b.** With AC-DC Bridge HW Option

**PRE-PROGRAMMED STANDARD PARAMETER SETS**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p><b>STANDARD VDSL SYSTEMS</b></p> <p><b>VDSL 2 (ITU-T G.993.2) 35 MHz</b><br/>                 998-E35-M2x-A<br/>                 998-ADE35-M2x-A<br/>                 998-ADE35-M2x-M<br/>                 998-ADE35-M2x-B<br/>                 998-ADE35-M2x-BV (Beside vectored groups)</p> <p><b>VDSL 2 (ITU-T G.993.2) Over ISDN</b><br/>                 998-M2x-B-8<br/>                 998-M1x-B<br/>                 998-M2x-B<br/>                 998-M2x-B-17<br/>                 998-M2x-B-17V (Beside vectored groups)</p> <p><b>VDSL 2 (ITU-T G.993.2) without US0</b><br/>                 998-M1x-NUS0<br/>                 998-M2x-NUS0<br/>                 998-E17-M2x-NUS0</p> <p><b>VDSL 2 (ITU-T G.993.2) Over POTS</b><br/>                 997-M1c-A-7<br/>                 997-M2x-A<br/>                 998-M1x-A<br/>                 998-M2x-A</p> <p><b>VDSL 2 (ITU-T G.993.2) Over POTS, extended US0</b><br/>                 998-M2x-M-8<br/>                 997-M1x-M-8<br/>                 997-M2x-M-8<br/>                 997-M1x-M<br/>                 997-M2x-M<br/>                 998-M2x-M<br/>                 998-M2x-M-17<br/>                 998-M2x-M-17V (Beside vectored groups)</p> | <p><b>STANDARD ADSL SYSTEMS</b></p> <p><b>ADSL2+ (ITU-T G.992.5 Annex A, B, I, J, M)</b><br/>                 Spectrum: FDD/EC, ADLU selectable 32 to 64</p> <p><b>ADSL2 (ITU-T G.992.3 Annex A, B, I, J, M)</b><br/>                 Spectrum: FDD/EC, ADLU selectable 32 to 64</p> <p><b>ADSL (ITU-T G.992.1 Annex A, B)</b><br/>                 Spectrum: FDD/EC</p> <p><b>ADSL G.LITE2 (ITU-T G.992.4 Annex A, I)</b><br/>                 Spectrum: FDD/EC</p> <p><b>READSL2 (ITU-T G.992.3 Annex L)</b><br/>                 Spectrum: FDD/EC Up band: wide/narrow</p> <p><b>STANDARD SHDSL SYSTEMS</b></p> <p><b>SHDSL 2W (ITU-T G.991.2 Annex B)</b><br/>                 16 TC PAM<br/>                 32 TC PAM</p> <p><b>SHDSL 4W (ITU-T G.991.2 Annex B)</b><br/>                 16 TC PAM<br/>                 32 TC PAM</p> <p><b>STANDARD HDDSL SYSTEMS</b></p> <p><b>HDDSL (ITU-T G.991.1)</b><br/>                 2B1Q, CAP</p> <p><b>STANDARD ISDN SYSTEMS</b></p> <p><b>ISDN ITU-T G.962</b><br/>                 Basic/Primary Rate</p> <p><b>STANDARD VOICE FREQUENCY SYSTEMS</b></p> <p><b>ITU-T M.1020, ITU-T M.1025, ITU-T M.1040</b><br/>                 Active / Passive, Leased circuit test<br/>                 Switched circuit test <sup>b.</sup></p> |
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**SYSTEM INDEPENDENT TEST SEQUENCES**

ELQ 30A+ provides system independent test sequences to measure selected cable parameters:

- Over pre-programmed frequency ranges (10 selectable ranges are available)
- With a user defined fix frequency
- ESEL measurement up to 120 dB

**LONG TIME SPECTROGRAM MEASUREMENT <sup>a</sup>**

The **Spectrogram PC Program** is an excellent tool of ELQ 30A+ to discover the disturbers causing considerable service impairment to communication systems. The trouble shooting is usually very difficult because:

- **The disturbing signals appear in unpredictable times**
- **They appear in unpredictable frequency ranges**



In this mode ELQ 30A+ performs spectrum measurements in every second. The results are directly transferred to PC via USB port or indirectly by means of a memory stick when the measurement is completed.

Utilizing the large memory capacity and large display of PC the spectrogram program shows the results in form of "Waterfall" diagram in which:

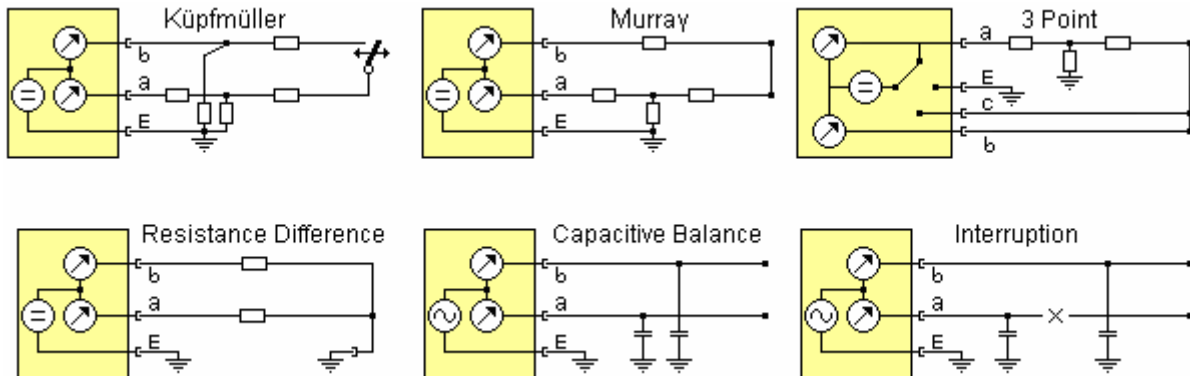
- **The time is displayed on the vertical axis**
- **The frequency is displayed on the horizontal axis**
- **The level is interpreted in form of colors**

Notices: **a.** SW Option  
**b.** With AC-DC Bridge HW Option

**FAULT LOCATION with BRIDGE MEASUREMENTS (HW Option)**

The bridge of ELQ 30A+ provides numerous tools for cable fault location:

- Cable parameter measurements
- DC AC fault location methods
- Automatic test sequences making the work quicker and more effective



**CABLE PARAMETER MEASUREMENTS**

- **AC DC Voltage measurement**  
Between the two wires  
Between wires and the ground
- **Resistance measurement**  
2 Wire (Loop resistance)  
2 Wire and ground
- **Insulation Resistance measurement**  
Physical and 2 Pole
- **Capacitance measurement**  
Physical, 2 Pole and  
With short circuit (Rec. EN 50289-1-5: 2001)  
DC capacitance measurement

**DC FAULT LOCATION**

- **Resistance Difference Measurement**  
In sensitive / protected modes
- **Murray Method**  
In sensitive / protected modes
- **Küpfmüller Method**  
In sensitive / protected modes
- **3 Point Method**  
In sensitive / protected modes
- **Repeated Küpfmüller Method (DC)**  
With histogram

**AUTOMATIC TEST SEQUENCES**

- **Quick Test**  
To get a quick information about an unknown pair without going to the other end of the tested cable (AC DC Voltage, Insulation, Capacitive balance)
- **Quality Test**  
To help the user to produce detailed acceptance protocol for a known good pair with the remote controlled loop closing device ELC 30 on the far end (Insulation, Capacitance, Capacitive balance R loop Resistance difference)
- **Pair Condition Survey**  
To help for the user to find the proper method to locate the fault of a faulty pair

**AC FAULT LOCATION**

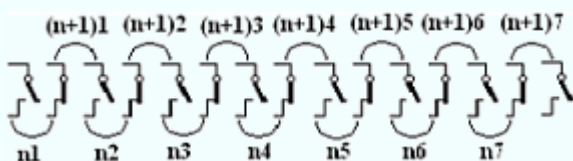
- **Capacitive Balance Measurement**  
In sensitive / protected modes
- **Interruption Measurement**  
In sensitive / protected modes
- **Repeated Küpfmüller Method (AC)**  
With histogram

**REPEATED KÜPFMÜLLER METHOD**

That method is a sequence of Küpfmüller measurements consisting of 15 part measurements alternating :

- 8 measurements with open loop
- 7 measurements with closed loop

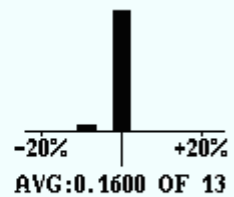
The alternating measurements provide 14 Lx/L values



The obtained Lx/L results of the test sequence are displayed in two columns and a histogram

**Lx/L VALUE**

| n:n    | n:n+1    |
|--------|----------|
| 0.1600 | 0.1600   |
| 0.1600 | 0.1600   |
| 0.1600 | 0.1600   |
| 0.1600 | 0.1500 # |
| 0.1600 | 0.1600   |
| 0.1600 | 0.1600   |
| 0.1600 | 0.1600   |



MIN: 0.1500  
MAX: 0.1600

RI = 238.0 Ω  
Rx = 19.04 Ω  
2Rx = 38.08 Ω

**SPECIFICATIONS**

**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.....  $2 \times 10^{-6} \pm 1$  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 5 MHz .....±0.3 dB  
 5 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.....  $2 \times 10^{-6} \pm 1$  Hz

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

Band width  
 200 Hz to 10 kHz .....20 Hz  
 10 kHz to 5 MHz 20, 200 Hz, 1.74, 1.95, 3.1 kHz  
 5 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 5 MHz .....±0.3 dB  
 5 MHz to 35 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 5 MHz .....±0.3 dB  
 5 MHz to 30 MHz .....±1.5 dB

**Spectrum Analyzer**

Frequency range .....200 Hz to 35 MHz  
 Line impedances  
 10 kHz to 35 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      |
| 30 MHz          | 500 Hz to 100 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**

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

Display range ..... 0 to 70 dB

Accuracy at 35 dB  
 200 Hz to 100 kHz ..... ±2 dB  
 100 kHz to 5 MHz ..... ±1 dB  
 5 MHz to 30 MHz ..... ±2,5 dB

**Impedance Measurement**

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

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

**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

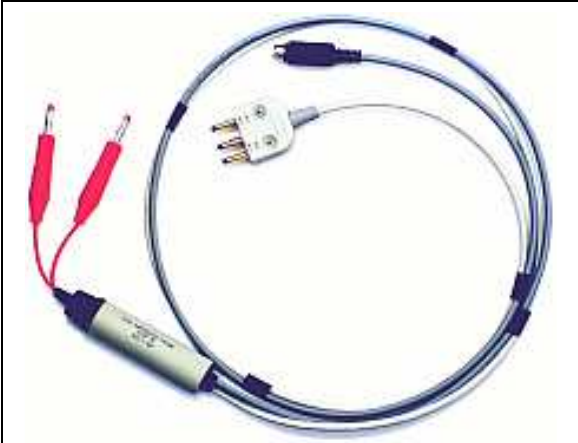
Accuracy at 20 dB  
 200 Hz to 18 MHz ..... ±2 dB



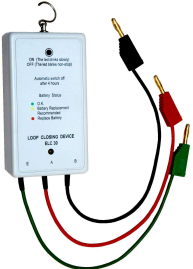
**SPECIFICATIONS OF AC-DC BRIDGE (HW Option)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>MEASUREMENTS</b></p> <p><b>Voltage</b><br/>                 DC voltage.....up to 400 V<br/>                 AC voltage.....up to 250 V eff<br/>                 Accuracy .....±3% ±1 V<br/>                 Frequency range.....15 to 300 Hz<br/>                 Input resistance.....1 or 2 M Ω</p> <p><b>Loop Resistance</b><br/>                 Measuring range .....1 Ω to 10 kΩ<br/>                 Accuracy .....±0.3% ±0.1 Ω</p> <p><b>Resistance Difference</b><br/>                 Loop resistance range.....10 Ω to 5 k Ω<br/>                 Accuracy.....±0.3% of RI ±0.2 Ω</p> <p><b>Insulation Resistance</b><br/>                 Measuring range .....10 kΩ to 1000 MΩ<br/>                 Measuring voltage.....100/250 V<br/>                 Accuracy<br/>                 10 kΩ to 300 MΩ ..... 10% ±1 kΩ<br/>                 Over 300 MΩ ..... 20% ±1 MΩ</p> <p><b>Capacitance</b><br/>                 Measuring range .....10 nF to 2 μF<br/>                 Measuring voltage.....11 Hz, 5 V<br/>                 Accuracy .....±2% ±0.2 nF</p> <p><b>Capacitive Balance</b><br/>                 Measuring range .....1 nF to 2 μF<br/>                 Measuring voltage.....11 Hz, 5 V<br/>                 Accuracy of Lx/L value .....±0.2 % ± 0.2 nF</p> <p><b>DC Fault Location</b><br/>                 Test Methods..... Murray, Küpfmüller, 3Point<br/>                 Loop resistance range.....1 Ω to 10 kΩ<br/>                 Fault resistance range..... up to 100 MΩ<br/>                 Measuring voltage.....100 V<br/>                 Accuracy (RI=2 kΩ, Lx/L=0,1 to 1)<br/>                 Fault resistance &lt; 1MΩ ..... ± 0.2 %<br/>                 Fault resistance 1 MΩ to 5 MΩ ..... ± 0.3 %<br/>                 Fault resistance 5 MΩ to 25 MΩ ..... ± 0.5 %<br/>                 Fault resistance 25 MΩ to 100 MΩ ..... ± 2 %</p> <p><b>AC Fault Location Interruption</b><br/>                 Range..... up to 20 km (Depends on cable type)<br/>                 Accuracy.....±2% ±0.2 nF</p> | <p><b>REPEATED TWO POLE DMM MEASUREMENTS</b></p> <p><b>Disturbing Voltage</b><br/>                 DC voltage..... up to 400 V<br/>                 AC voltage ..... up to 250 V eff<br/>                 Accuracy ..... ±3 % ±.1 V<br/>                 Frequency range..... 15 to 300 Hz<br/>                 Input resistance ..... 2 MΩ</p> <p><b>Loop Resistance</b><br/>                 Measuring range .....1 Ω to 10 kΩ<br/>                 Accuracy ..... ±0.5 % ±0.2 Ω</p> <p><b>Insulation Resistance</b><br/>                 Measuring range.....10 kΩ to 1000 MΩ<br/>                 Measuring voltage.....100 V<br/>                 Accuracy (without disturbing voltages)<br/>                 in % of test result up to 300 MΩ.....20 %</p> <p><b>DC Current</b><br/>                 Measuring range.....5 μA to 0,1A<br/>                 Accuracy ..... ±3 % 0.1 μA</p> <p><b>Capacitance</b><br/>                 Measuring range ..... 10 nF to 2 μF<br/>                 Measuring voltage ..... 11 Hz, 5 V<br/>                 Accuracy .....±3% ±0.3 nF</p> <p><b>AUTOMATIC TEST SEQUENCES</b></p> <p><b>Quick Test</b><br/>                 Purpose .....to get a quick information<br/>                 about an <u>unknown pair</u></p> <p><b>Quality Test</b><br/>                 Purpose .....help for the user to produce<br/>                 detailed acceptance protocol<br/>                 for a <u>known good pair</u></p> <p><b>Pair Condition Survey</b><br/>                 Purpose ..... help for the user to find the<br/>                 proper method to locate the<br/>                 fault of a <u>faulty pair</u></p> |
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**HIGH IMPEDANCE PROBE ELQP 30 (HW Option)**

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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|  | <p><b>Purpose</b><br/>                 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</p> <p><b>Specifications</b><br/>                 Frequency range.....10 kHz to 35 MHz<br/>                 Attenuation.....15 dB<br/>                 Input Impedance ..... 5 kOhm    5pF<br/>                 Accuracy<br/>                 10 kHz to 25 kHz .....±1dB<br/>                 25 kHz to 5 MHz .....±0.3 dB<br/>                 5 MHz to 35 MHz .....±1.5dB<br/>                 Powered ..... from ELQ 30A+</p> |
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LOOP CLOSING DEVICE ELC 30 (HW Option)

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| <p><b>Functions</b></p> <p>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. Kűpfműller method).</p> <p>The device is remote controlled over the tested pair by ELQ 30A+</p> |  | <p><b>Specifications</b></p> <p>Connectors ..... 4 mm banana plugs</p> <p>Power supply<br/>AA size alkaline battery cells ..... 3 pieces</p> <p>Operation time ..... ca. 1000 hours</p> <p>Auto power off ..... 4 hours</p> <p>Dimensions ..... 110 x 60 x 25 mm</p> <p>Weight (Including battery pack) ..... ca. 0,2 kg</p> |
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GENERAL SPECIFICATIONS

ORDERING INFORMATION

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| <p><b>Power supply</b></p> <p>Internal rechargeable NIMH battery pack</p> <p>Operation time ..... approx. 8 hours<br/>(Without backlight)</p> <p><b>Charging</b></p> <p>(Without taking the battery pack out)</p> <p>From 230V mains ..... with mains adapter</p> <p>From 12V car battery ..... with car adapter</p> <p>Fast charging time ..... less than 3 hours</p> <p><b>Display</b> ..... 320 x 240 Color LCD -TFT</p> <p><b>Connectors</b></p> <p>For mains or 12V car adapter ..... 2.1/5.5 mm coaxial</p> <p>Power supply for active probe ..... Mini-din-4P</p> <p>Line connectors ..... 4 mm banana sockets</p> <p>USB A ..... USB host port for USB stick<br/>(FAT16, FAT32 file system supported)</p> <p>USB B ..... USB device port to connect PC</p> <p><b>Over voltage protection</b></p> <p>Between a and b or ground ..... 200V DC</p> <p>Longitudinal voltage ..... 60V AC</p> <p><b>Ambient temperature ranges</b></p> <p>Reference ..... 23±5°C<br/>Rel. humidity 45% to 75%</p> <p>Normal operation ..... 0 to +40°C<br/>Rel. humidity 30% to 75% *(<math>&lt;25g/m^3</math>)</p> <p>Limits of operation ..... -5 to +45°C<br/>Rel. humidity 5% to 95% *(<math>&lt;29g/m^3</math>)</p> <p>Storage and transport ..... -40 to +70°C<br/>Rel. humidity 95% at +45°C *(<math>&lt;35g/m^3</math>)</p> <p>* without condensation</p> <p><b>Dimensions</b> ..... 224 x 160 x 65 mm</p> <p><b>Weight</b> ..... approx. 1.5 kg</p> | <p><b>COPPER QUALIFIER ELQ 30A+ ..... 433-000-000P</b></p> <p><b>Including:</b></p> <ul style="list-style-type: none"> <li>Operating manual &amp; Calibration Certificate</li> <li>2 Measuring cables (yellow &amp; green)</li> <li>2 Balanced Measuring Cables</li> <li>USB cable and USB stick</li> <li>Mains adapter</li> <li>Carrying case</li> </ul> <p><b>HW options</b></p> <ul style="list-style-type: none"> <li>High Impedance Probe ELQ P30 ..... 410-000-000</li> <li>Built in AC-DC Bridge &amp; DMM ..... 442-300-000 B</li> <li>Loop closing device ELC 30 ..... 421-000-000</li> <li>Car lighter power adapter EAA 10 ..... 367-000-000</li> </ul> <p><b>SW options for xDSL line qualification</b></p> <ul style="list-style-type: none"> <li>DPBO, UPBO Dependent Templates . SW 433-920-000</li> <li>ESEL Measurement up to 120 dB.</li> <li>ESEL and KLo dependent data rate calculation.</li> <li>Single End Line Test. .... SW 433-640-000</li> <li>Single-End loss estimation and Automatic line test with data rate estimation</li> <li>Test Beside Vectored Groups. .... SW-433-910-000</li> <li>Non-disturbing test beside VDSL2 groups.</li> <li>Non-disturbing test beside 35 MHz Vplus groups.</li> <li>Spectrogram Measurement ..... SW 433-570-000</li> <li>PC program and instrument SW</li> <li>Spectral Trace as Reference ..... SW 433-950-000</li> <li>Stored spectrum as reference and System dependent PSD as reference</li> <li>Parameter Editor ..... SW 433-930-000</li> <li>PC program and instrument SW</li> <li>TDR measurement ..... SW 433-960-000</li> </ul> <p><b>SW options for voice frequency measurement</b></p> <ul style="list-style-type: none"> <li>VF Line qualification ..... SW 433-940-000</li> <li>Group delay, Jitter &amp; Frequ Difference, Echo Noise with tone measurements, Event counter</li> <li>Micro Interruption Analysis ..... SW 433-530-000</li> <li>Time distribution of interruptions in 240 time slots</li> </ul> <p><b>SW options for bridge measurement</b></p> <ul style="list-style-type: none"> <li>Test of loaded cables ..... SW-433-650-000</li> <li>Test of multi section cables ..... SW-433-660-000</li> </ul> |
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