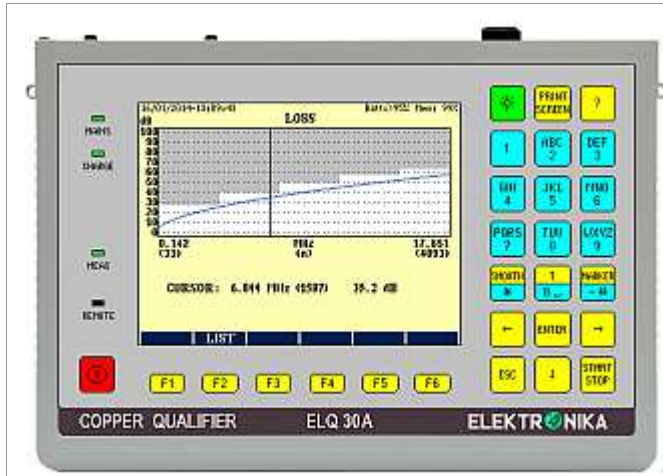


IS THIS PAIR SUITABLE FOR YOUR SYSTEM? IF NOT WHERE IS THE FAULT?



ELQ 30A COPPER QUALIFIER GIVES THE ANSWER!



FIVE INSTRUMENTS IN ONE

- **200 Hz to 30 MHz Transmitter**
Generating Sinus, Multi-ton, White-noise signals.
- **200 Hz to 30 MHz Receiver**
For selective, wideband and MTTTS measurements
- **Spectrum Analyzer**
For disturbing noise and PSD measurement
- **High Resolution TDR**
For the location of cable faults like Break, Short, Loose contact, Bridged taps XTALK etc.
- **Active AC-DC Fault Locator Bridge**
For AC-DC fault location with Murray, Kűpfműller, 3 Point, Repeated Kűpfműller and other methods.

APPLICATIONS

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

MAIN FEATURES

• **Single Sided Measurements**

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

• **Automatic Single Ended Test Sequences**

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**

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 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 VDSL2, VDSL1, ADSL2+, ADSL, ADSL G LITE READSL2, ADSL G LITE, ADSL G.LITE2, SHDSL, HDSL, ISDN and Voice Frequency systems.

• **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 theoretically achievable rate. The test results can be stored in memory and transferred to PC.

• **USB Ports for Data Transfer**

• **Long Time Interruption Measurement**

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**

Providing simultaneous phase hit, gain hit, impulse noise, and interruption counting

• **Group Delay Distortion Measurement**

ELQ 30A applies the multi tone test method given in the rec. ITU-T O.81 Appendix I

• **PC Supported Spectrogram**

Spectrum measurements are performed in every second and the obtained results are transferred to PC to display them up to 72 hours in the form of "water-fall" diagram.

• **High Impedance Active Test Probe**

For PSD spectrum measurement on xDSL lines without disturbing the operation

• **ESEL Measurement up to 120 dB**

The Exchange Side Electrical Length (ESEL) measurement is a useful tool for the programming of local DSLAM-s when power shaping is required.

• **ESEL Dependent Templates**

For data rate calculation of local subscriber lines where the local DSLAM is working with reduced transmit power (DPBO). Pre-programmed ESEL dependent templates are provided for all ADSL 2+ systems.

LINE QUALIFICATION

MANUAL MEASUREMENTS WITH ONE ELQ 30A

- **Transmitting**
One Frequency Test Signal
30 / 36 Frequency MTTTS Test Signal
- **Receiving**
One Frequency
30 / 36 Frequency MTTTS Signal
Wideband
- **Single-End Insertion Loss**
FDR/TDR Combination
- **NEXT**
One Frequency / Sweep
- **LCL Balance**
One Frequency / Sweep
- **Impedance**
One Frequency / Sweep
- **Return loss**
One Frequency / Sweep
- **Noise**
Wideband
Weighted
Psophometric
- **Impulse Noise**
Short Time
Long Time with Histogram up to 72 hours
- **Spectrum Analyzer**
With Spectral Trace as Reference
- **Spectrogram**
Water fall diagram up to 72 hours
- **Echo test**
With 1020 Hz signal packets
- **Telephone Simulator**

MANUAL MEASUREMENTS WITH TWO ELQ 30A

- **Double-End Insertion Loss**
One Frequency
30 / 36 Frequency MTTTS Signal
- **Micro Interruption**
List and 240 Point Histogram
- **Noise with tone**
With 1020 Hz Notch Filter
- **Phase jitter and Frequency error**
With 1020 Hz Test Signal
- **Simultaneous Event counters**
Simultaneously counting amplitude & phase hits
Interruptions and noise impulses
- **Group delay distortion measurement**
With 36 Frequency MTT Test Signal

AUTOMATIC MASTER SLAVE TEST SEQUENCES

Selectable Measurements for xDSL systems

- **Double End Loss**
With ~300 Frequencies
- **Noise spectrum**
With ~300 Frequencies
- **Bit load calculation**
Both Directions
- **Achievable bit rate calculation**
Both Directions
- **LCL Balance**
Both Ends
- **Return loss Measurement**
Both Ends
- **Impedance**
Both Ends
- **NEXT**
Both Ends
- **FEXT**
Both Ends
- **ESEL Measurement**
Up to 120 dB for ADSL 2+
- **RSEL Calculation**
ESEL Depended Templates for ADSL 2+

Selectable Measurements for Voice Fr. systems

- **Double End Loss**
36 Frequency Sweep
- **Noise spectrum Measurement**
Both Ends
- **Total distortion Measurement**
For PCM or Lines with Amplifiers
- **Return loss Measurement**
Both Ends
- **Impedance Measurement**
Both Ends
- **LCL Balance Measurement**
Both Ends
- **Group delay distortion**
With 36 Frequency MTTTS
- **Phase jitter and Frequency error**
With 1020 Hz Test Signal
- **Event counters**
simultaneously counting:
Amplitude hits
Phase hits
Interruptions
Impulsive noises

PRE-PROGRAMMED STANDARD PARAMETER SETS

<p>VDSL 2 (ITU-T G.993.2) Over ISDN 998-M2x-B8 Data rate: 25000 to 50000 kbps 998-M1x-B Data rate: 34000 to 68000 kbps 998-M2x-B Data rate: 34000 to 68000 kbps 998-M2x-B-17 Data rate: 50000 to 100000 kbps</p> <p>VDSL 2 (ITU-T G.993.2) Over ISDN without US0 998-M1x-NUS0 Data rate: 34000 to 68000 kbps 998-M2x-NUS0 Data rate: 34000 to 68000 kbps</p> <p>VDSL 2 (ITU-T G.993.2) Over POTS 997-M1c-A7 Data rate: 25000 to 50000 kbps 997-M2x-A Data rate: 25000 to 50000 kbps 998-M1x-A Data rate: 34000 to 68000 kbps 998-M2x-A Data rate: 34000 to 68000 kbps</p> <p>VDSL 2 (ITU-T G.993.2) Over POTS, extended US0 998-M2x-M8 Data rate: 25000 to 50000 kbps 997-M1x-M8 Data rate: 25000 to 50000 kbps 997-M2x-M8 Data rate: 25000 to 50000 kbps 997-M1x-M Data rate: 25000 to 50000 kbps 997-M2x-M Data rate: 25000 to 50000 kbps 998-M2x-M Data rate: 34000 to 68000 kbps 998-M2x-M-17 Data rate: 50000 to 100000 kbps</p> <p>VDSL 1 (ITU-T G.993.1) 997-P1.M2 Data rate: 20000 to 40000 kbps 998-P1.M2 Data rate: 20000 to 40000 kbps 997-P2.M2 Data rate: 20000 to 40000 kbps 998-P2.M2 Data rate: 20000 to 40000 kbps</p> <p>ADSL2+ (ITU-T G.992.5 Annex A, B, I, J, M) Spectrum: FDD/EC, ADLU selectable 32 to 64 Data rate: 448 to 17696 kbps</p>	<p>ADSL2 (ITU-T G.992.3 Annex A, B, I, J, M) Spectrum: FDD/EC, ADLU selectable 32 to 64 Data rate: 448 to 6656 kbps</p> <p>ADSL (ITU-T G.992.1 Annex A, B) Spectrum: FDD/EC Data rate: 448 to 6656 kbps</p> <p>ADSL G.LITE2 (ITU-T G.992.4 Annex A, I) Spectrum: FDD/EC Data rate: 448 to 2304 kbps</p> <p>READSL2 (ITU-T G.992.3 Annex L) Spectrum: FDD/EC Up band: wide/narrow Data rate: 448 to 2304 kbps</p> <p>HDSL (ITU-T G.991.1) 2B1Q, CAP</p> <p>SHDSL (ITU-T G.991.2 Annex B) 16 TC PAM Data rate: 256 to 2304 kbps</p> <p>SHDSL (ETSI TS 101 524 v 1.3.1 Annex E) 16 UC PAM Data rate: 512 to 3848 kbps 32 UC PAM Data rate: 768 to 5696 kbps</p> <p>ISDN ETSI ETR080 Primary Rate</p> <p>ISDN ITU-T G.962 Basic Rate</p> <p>VOICE FREQUENCY ITU-T M.1020, ITU-T M.1025, ITU-T M.1040 Active / Passive, Leased/Switched</p>
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SYSTEM INDEPENDENT TEST SEQUENCES

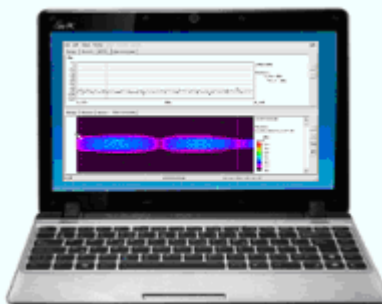
ELQ 30A provides system independent test sequences to measure selected cable parameters:

- Over pre-programmed frequency ranges (10 selectable ranges are available)
- With a user defined fix frequency

LONG TIME SPECTROGRAM MEASUREMENT (Option)

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 **Spectrogram** 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.

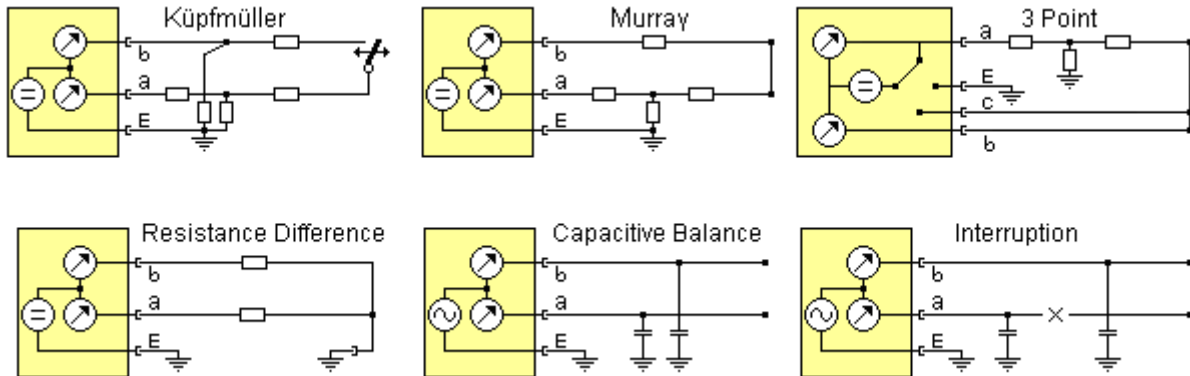
Utilizing the large memory capacity and large display of PC the spectrogram program shows the results in form of "Waterfall" diagram in which:

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

FAULT LOCATION with BRIDGE MEASUREMENTS

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 FAULT LOCATION

- **Resistance Difference Measurement**
In sensitive / protected modes
- **Murray Method**
In sensitive / protected modes
- **Kűpfműller Method**
In sensitive / protected modes
- **3 Point Method**
In sensitive / protected modes
- **Repeated Kűpfműller 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

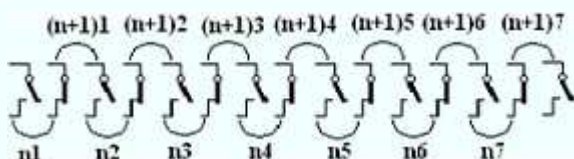
- **Capacitive Balance Measurement**
In sensitive / protected modes
- **Interruption Measurement**
In sensitive / protected modes
- **Repeated Kűpfműller Method (AC)**
With histogram

REPEATED KűPFMűLLER METHOD

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

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

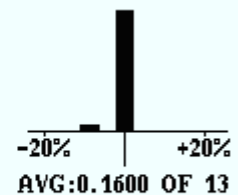
The alternating measurements provide 14 Lx/L values



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

AVG: 0.1600 OF 13
RI = 238.0 Ω
Rx = 19.04 Ω
2Rx = 38.08 Ω

SPECIFICATIONS

Transmitter

Outputs (Balanced)
 10 kHz to 30 MHz 100, 135, 150 Ω
 200 Hz to 10 kHz 600 Ω

Frequency
 Frequency Range 200 Hz to 30 MHz
 Frequency resolution 1 Hz
 Frequency accuracy..... $2 \times 10^{-6} \pm 1$ Hz

Transmitting modesOne frequency/MTTS/Sweep

Output level
 10 kHz to 30 MHz+10 to -40 dBm
 200 Hz to 10 kHz+4 to -45 dBm
 Level Resolution0.1 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 dB

Receiver

Inputs (Balanced)
 10 kHz to 30 MHz 100, 135, 150 Ω or High
 200 Hz to 10 kHz600 Ω or High

Selective Level Measurement

Frequency
 Frequency Range 200 Hz to 30 MHz
 Frequency resolution 1 Hz
 Frequency accuracy..... $2 \times 10^{-6} \pm 1$ Hz

Receiving modesOne frequency/MTTS/Sweep

Band width
 200 Hz to 10 kHz20 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 30 MHz 1.74, 1.95, 3.1 kHz

Measuring Range (with 20 Hz band width)
 10 kHz to 30 MHz -120 to +10 dBm
 200 Hz to 10 kHz -120 to +4 dBm
 Level Resolution0.1 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 dB

Wideband Level Measurement

Frequency Range 200 Hz to 30 MHz

Measuring Range
 10 kHz to 30 MHz -50 to +10 dBm
 200 Hz to 10 kHz -50 to +4 dBm
 Level Resolution0.1 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 dB

Spectrum Analyzer

Frequency range200 Hz to 30 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
 With high impedance active probe +20 dBm
 Without high impedance probe
 200 Hz to 10 kHz +4 dBm
 10 kHz to 30 MHz +10 dBm

Bandwidth and frequency step

Frequency Range	Bandwidth & Freq. Step
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 30 MHz 100, 135, 150 Ω
 200 Hz to 10 kHz 600 Ω

Display range 0 to 70 dB

Accuracy at 35 dB with special balanced cable
 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 30 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 30 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

Single-End Insertion Loss Measurement

Frequency ranges 1.5, 3, 9, 12, 18, 30 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
 depend on the cable conditions)

Next / Loss Measurement

Frequency range 200 Hz to 30 MHz
 Impedances
 10 kHz to 30 MHz 100, 135, 150 Ω Balanced
 200 Hz to 10 kHz 600 Ω Balanced
 Measuring modes One frequency, Sweep
 Measuring range
 NEXT up to 80 dB
 LOSS up to 90 dB

Wideband Noise Measurement

Frequency range 200 Hz to 30 MHz
 Filters for noise Measurements Psophometric
 3,1 kHz Flat, 1020 Hz Notch
 ADSL, ADSL 2+, VDSL 1
 VDSL 2-8, VDSL 2-12,
 VDSL 2-17 VDSL 2-30
 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 0 to -60 dBm
 Maximum count 65000
 Measuring time selectable 1sec to 72 hours
 Evaluation For 1 to 30 sec numeric
 Over 30 sec Histogram with 60 time slots

Micro Interruption Measurement

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 3 ms
 3 ms to 30 ms
 30 ms to 300 ms
 300 ms to 1 min
 >1 min
 Evaluation Relative duration, Errored sec
 Count & time distribution / category

Phase Jitter & Frequ. Error Measurement (O.91)

Test signal 1020 Hz, 0 to -30 dBm
 Range 0.2 to 30.0 degrees p-p
 Filter 4 to 300 Hz

Simultaneous Event Counting

Measurement times 5, 15, 30, 60 min
 Test signal 1020 Hz, 0 to -30 dBm
 Maximum counts for each counter 65000
Amplitude Hit Counter (O.95)
 Threshold range 2 to 9 dB
 Guard interval 4 ms
 Dead time 125 \pm 25 ms
 Dead time after interruption (>10 dB drop) 1 s
Phase Hit Counter (O.95)
 Threshold range 5 to 45 $^{\circ}$
 Guard interval 4 ms
 Dead time 125 \pm 25 ms
Interruption Counter (O.61)
 Threshold 6, 10 dB
 Guard interval 2 ms
 Dead time 3 \pm 1 ms
Impulsive Noise Counter (O.71)
 Filter 1020 Hz Notch
 Guard interval 20 μ s
 Dead time 125 \pm 25 ms
 Threshold range 0 to -50 dBm

Group Delay Distortion (O.81 app. I)

Test signal 36MTT, 200 to 3700 Hz
 Output level -20 dBm/tone (3dBm peak)
 Input level range -50 to -10 dB/tone
 Group delay distortion range 0 to 5 ms
 Resolution 1 μ s

TDR Measurements

Measuring Modes
 Single pair short time L1
 Single pair long time L1LT
 Comparison to memory L1 & M, L1-M
 XALK point location Tx on L2, Rx on L1
 Impedance 100 Ω
 Measuring ranges 16m to 32 km
 Zoom 1 to 5
 Gain range 0 to 90 dB
 Pulse Amplitude ~ 3 V
 Pulse width 6 ns to 6 μ s
 Propagation velocity
 V 90 to 299m/ μ s
 V/2 45 to 150 m/ μ s
 PVF 0.3 to 0.999
 Accuracy $\pm 0.5\%$ ± 1 m

Telephone Simulator

Dialling 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

Echo Test

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

SPECIFICATIONS OF AC-DC BRIDGE

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 or 2 M Ω

Loop Resistance

Measuring range 1 Ω to 10 k Ω
 Accuracy $\pm 0.3\% \pm 0.1 \Omega$

Resistance Difference

Loop resistance range 5 Ω to 5000 Ω
 Accuracy $\pm 0.2\%$ of RI $\pm 0.2 \Omega$

Insulation Resistance

Measuring range 10 k Ω to 1000 M Ω
 Measuring voltage 100 V
 Accuracy
 10 k Ω to 300 M Ω 2 to 5% $\pm 1 k\Omega$
 Over 300 M Ω 10% $\pm 1 M\Omega$

Capacitance

Measuring range 1 nF to 2 (10) μF
 Measuring voltage 11 Hz, 5 V
 Accuracy $\pm 2\% \pm 0.2 nF$

Capacitive Balance

Measuring range 1 nF to 2000 nF
 Measuring voltage 11 Hz, 5 V
 Accuracy of Lx/L value $\pm 0.2\% \pm 0.2 nF$

DC Fault Location

Test Methods Murray, K pfm ller, 3Point
 Loop resistance range 1 Ω to 10 k Ω
 Fault resistance range up to 100 M Ω
 Measuring voltage 100 V
 Accuracy (RI=2 k Ω , Lx/L=0,1 to 1)
 Fault resistance < 1M Ω $\pm 0.2\%$
 Fault resistance 1 M Ω to 5 M Ω $\pm 0.3\%$
 Fault resistance 5 M Ω to 25 M Ω $\pm 0.5\%$
 Fault resistance 25 M Ω to 100 M Ω $\pm 2\%$

AC Fault Location Interruption

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

REPEATED TWO POLE DMM MEASUREMENTS

Disturbing 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 2 M Ω

Loop Resistance

Measuring range 1 Ω to 10 k Ω
 Accuracy $\pm 0.5\% \pm 0.2 \Omega$

Insulation Resistance

Measuring range 10 k Ω to 300 M Ω
 Measuring time ~ 3 sec
 Measuring voltage 100 V
 Accuracy (without disturbing voltages)
 in % of test result 20 %

DC Current

Measuring range 5 μA to 0,1A
 Accuracy $\pm 3\% \pm 0.1 \mu A$

Capacitance

Measuring range 10 nF to 2 μF
 Measuring voltage 11 Hz, 5 V
 Accuracy $\pm 3\% \pm 0.3 nF$

AUTOMATIC TEST SEQUENCES

Quick Test

Purposeto get a quick information about an unknown pair

Quality Test

Purposehelp for the user to produce detailed acceptance protocol for a known good pair

Pair Condition Survey

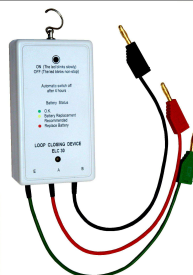
Purposehelp for the user to find the proper method to locate the fault of a faulty pair

LOOP CLOSING DEVICE ELC 30 (HW 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).

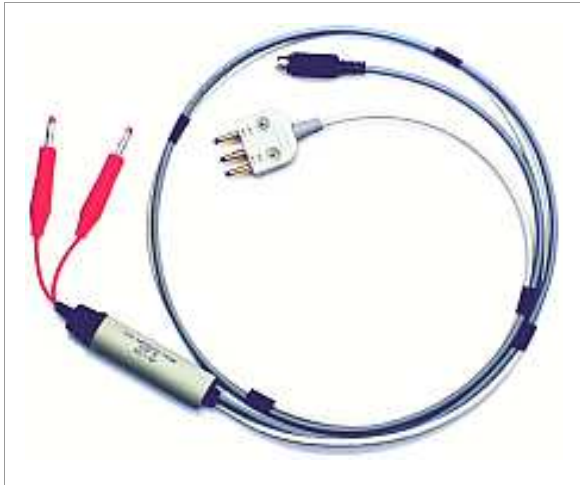
The device is remote controlled over the tested pair by ELQ 30A



Specifications

Connectors 4 mm banana plugs
 Power supply
 AA size alkaline battery cells 3 pieces
 Operation time ca. 1000 hours
 Auto power off 4 hours
 Dimensions 110 x 60 x 25 mm
 Weight (Including battery pack) ca. 0,2 kg

HIGH IMPEDANCE PROBE ELQP 30 (HW option)



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 || 5pF
 Accuracy
 5 kHz to 25 kHz ±1dB
 25 kHz to 5 MHz ±0.3 dB
 5 MHz to 30 MHz ±1dB
 Powered..... from ELQ 30A

GENERAL SPECIFICATIONS

Power supply

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

Charging

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

Display320 x 240 Color LCD -TFT

Connectors

For mains or 12V car adapter2.1/5.5 mm coaxial
 Power supply for active probeMini-din-4P
 Line connectors.....4 mm banana sockets
 USB A USB 1.1 host port for USB stick
 USB B USB 1.1 device port to connect PC

Over voltage protection

Between a and b or ground 200V DC
 Longitudinal voltage.....60V AC

Ambient temperature ranges

Reference 23±5°C
 Rel. humidity 45% to 75%
 Normal operation 0 to +40°C
 Rel. humidity 30% to 75% *($<25\text{g/m}^3$)
 Limits of operation-5 to +45°C
 Rel. humidity 5% to 95% *($<29\text{g/m}^3$)
 Storage and transport-40 to +70°C
 Rel. humidity 95% at +45°C *($<35\text{g/m}^3$)
 * without condensation

Dimensions..... 224 x 160 x 65 mm

Weightapprox. 1.5 kg

ORDERING INFORMATION

COPPER QUALIFIER ELQ 30A 433-000-000E

Including:

- Operating manual
- Calibration Certificate
- CD (xxx version)
- 2 Measuring cables (yellow & green)
- 2 Special Balanced Measuring Cables (L1, L2)
- USB cable and USB stick
- Mains adapter
- 6 Alligator clips
- Carrying case

HW Options

- High Impedance Probe ELQ P30..... 410-000-000
- TDR measuring unit (built in) 409-210-000
- Loop closing device ELC 30 421-000-000
- Car lighter power adapter EAA 10 367-000-000

SW Options

- VF Group delay meas.SW 433-620-000
- VF Jitter & fr. Difference meas.SW 433-560-000
- VF Echo meas..... SW-433-630-000
- VF Event counterSW 433-540-000
- VF Micro interruption meas.....SW 433-530-000
- Single ended loss meas.....SW 433-640-000
- ESEL measurement..... SW-433-600-000
- ESEL Dependent Templates SW-433-610-000
- Spectral Trace as Reference. SW-433-550-000
- Spectrogram (PC+ Instrument)..... SW-433-570-000
- SW for result transfer.....SW 433-510-000
- Loaded cable..... SW-433-650-000
- Multi section cable SW-433-660-000

Others

Calibration Report for ELQ 30A ...CR 433-000-000 E