

Network Analyzing Handheld NA 02-13 for measuring grid-bound disturbance voltage in the low voltage range, according to EN 55011 - EN 55022 in the range 150KHz – 500KHz and the new Norm CEI – 0-21 for the lower frequency range from 1 KHz to 500KHz

Since 2012 in Italis exists a new norm: CEI-0-21.



As first member of the EU Italy asks for stricter criteria for the supply grid's quality in the lower frequency range from 3 kHz – 95 kHz.

N O R M A I T A L I A N A C E I

Norma Italiana Data Pubblicazione

Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica

Reference technical rules for the connection of active and passive users to the LV electrical Utilities

Sommario

La presente seconda edizione riporta le modifiche necessarie per rispettare quanto previsto nella delibera 84/2012/R/EEL, pubblicata in data 8 marzo 2012, che fissa alcuni criteri per garantire la sicurezza del sistema elettrico nazionale.

L'articolo 12 della presente Norma riporta le modifiche al fine di razionalizzare la misura dell'energia elettrica degli utenti connessi alle reti delle società di distribuzione dell'energia elettrica in BT.

Al fine di semplificare la lettura da parte degli utenti interessati, si è preferito pubblicare una seconda edizione della Norma CEI 0-21 invece che una Variante. Inoltre, sempre con lo scopo di rendere agevole l'utilizzo del presente documento, tutte le modifiche introdotte nella presente edizione sono state evidenziate con una doppia barra a destra del testo della stessa.

La Norma in oggetto sostituisce completamente la Norma CEI 0-21:2011-12 che rimane applicabile fino al 30-06-2012.

Short translation:

Su questo aspetto si ricorda che le norme europee (CEI EN 50065-1) definiscono in maniera chiara la banda di frequenza assegnata ad uso esclusivo dei Distributori, per la trasmissione dei segnali sulla rete BT (3 kHz - 95 kHz).

At this point it is to consider that the European standard norm (IEC 50065-1) is defined in a way that all those low-voltage-supply-grid users are involved who have influence in the frequency range from 3 kHz – 95 kHz.

Since 1996 Bajog points in many professional articles on the importance of this norm adaption. Italy was one of the first countries which already used smart meter in a number of millions 5 years ago.

This strict norm is the requirement for a faultless functionality of smart meters and other electronic consumers in the supply grid. For that it was of highest necessity that this norm got valid as quick as possible!

If other countries learn from Italy, than it is to expect that in the next months more and more EU – countries will follow that norm. Please have also a look at this report:

<http://www.bajog.de/en/technical-report/required-adjustment-to-the-standard.html>

Bajog electronic developed a Line Impedance Stabilization Network, which is required for the frequency range 1 kHz – 30 MHz And Bajog electronic developed the first disturbance voltage measurement device worldwide.

The technical and economic requirement of our customers for this device have been:

- the measurement has to be geared to existing norms and not to undefined, imaginary measurement values.
- the device has to scan the disturbance voltage in the lower frequency range (< 1KHz – >500 KHz)
- the device has to fulfill the basic functions of an analyzer and show the same measurement results.
- the handling has to be easy without any danger of a faulty interpretation.
- the device should have a moderate pricing.

These requirements above have been brought to Bajog electronic by:

- Building biologists worldwide
- Professional electronic engineers
- Electronical specialist companies
- Industrial electricians , energy and bulding technique
- Electrical guild (HK)
- Industrial system technicians
- Electronic engineers for machines and drive engineering
- Ecologically aware inhabitants

The special about this analyzing device is:

- The small dimensions (handheld)
- Direct measurement at the smart grid
- the accuracy of the measuring results (disturbance voltage) according to EN 55011..22 in the lower frequency range, and clear-sighted according to expectable norms in the future
- the simple handling
- the flexible use as alternative for network analyzer and test receiver

Operation Purpose:

Frequency converter (IGBT), thyristor circuits, phase cut controls, protection and switches etc. clocking and switching into the own or public supply grids at a high energy level from sometimes up to 10KV/μs. This leads to performance failures and device destructions.

Analyzer and test receiver usually start scanning at 10kHz to >30MHz. Network analyzers and network writers can determine cos phi, portion of harmonics, network interruptions and voltage changes according to, but they are not able to show the real network quality and disturbing influences (according to EN 55011) in the lower frequency range <10kHz.

So the sources of the disturbances cannot be analyzed.
 But exactly these measurements bring a clear evaluation of the supply grid character and of possible destructive disturbances in the supply grid

Frequenzspektren von Störquellen

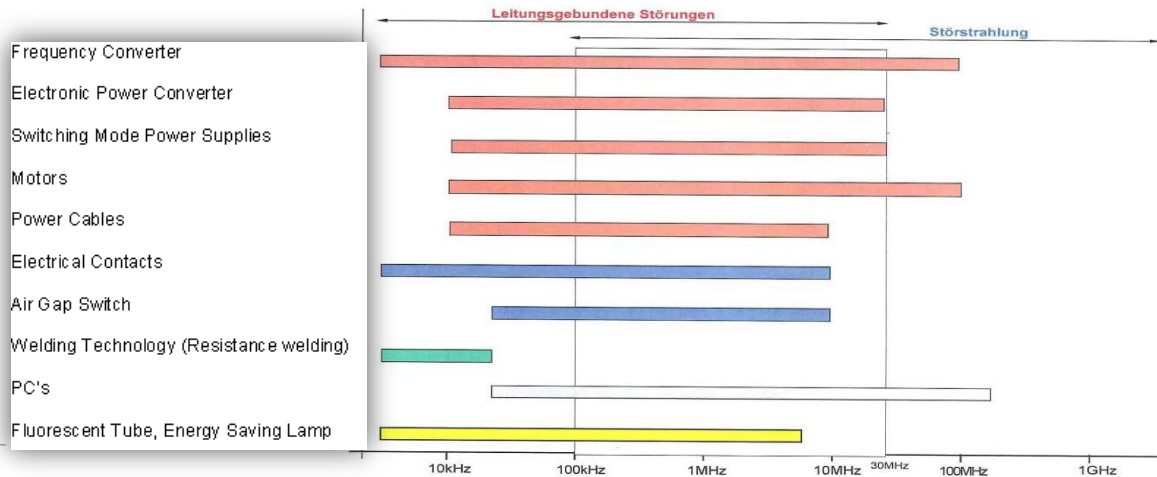


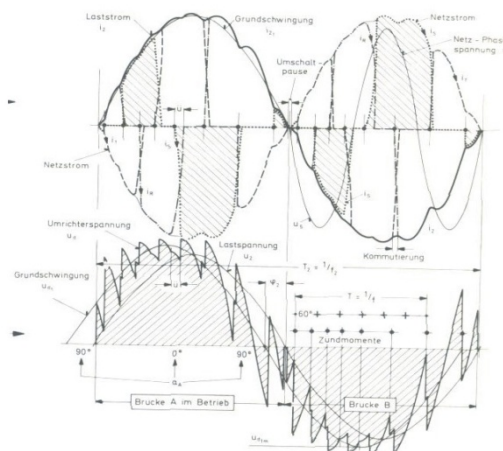
Chart 1

Chart 1 shows the different clock frequencies, which pulse with high energy nonstop into the supply grid.

This causes massive portions of harmonics and narrow-band spikes and transients, which are able to generate destructions in network-parallel devices (capacitors, controls, PCs). This can occur also via long network range

Please read this report for more information:

<http://www.bajog.de/en/technical-report/reason-for-x2-and-y2-demolition.html>



The picture on the left shows the effects on the network quality in the lower frequency range by a single 6-pulse transformer rectifier.

Chart 2

For those described EN-conform EMC measurement of disturbance voltage in a laboratory, you need a normed LISN according to CISPR 16 / EN 55016-1-2 and a spectral analyzer or a test receiver. Those tabletops are regularly very complicated to use and also very expensive. Furthermore these tabletops are very shock-sensitive and not always suitable for permanent transport and the conditions at site with big temperature changes (summer/ winter)

The new developed Network Analyzing Handheld NA 02-13 is the optimal addition to the regular tabletops and is unique in the frequency range from 1 KHz – 500 KHz (analyzer and test receiver)

The development of the NA 02-13 was focused on measurement and detection of portions of disturbance voltage in the lower frequency range and thus it builds a bridge between the possibilities of network recording devices according to EN 61000 ff (harmonics, fluctuation of load voltage) and the valid norms EN 55011...22 for measurement of disturbance voltage in the range 150 kHz – 30 MHz (grid bound).

This special measurement device – Handheld NA 02-13 – is not available from regular retailers and worldwide unique.

Legal protection of industrial design has been applied!

Eine zusätzliche SD – Speicherkarte ermöglicht die Übertragung von Messergebnissen auf einen PC oder Systemrechner. The basic principle and the technical construction of the new handheld NA 02-13 generally consists of a special entrance-decoupling-filter device (novelty) with amplifier coupled to low-pass-combination with software-part (additional software) and an A/D-converter for issuance of real disturbance voltage values in dB μ V. An additional SD – chip enables the data transfer to a pc or system controller.

Fazit 1:

Of course it is clear that the Handheld NA 02-13 is not a compensation for a fully working, expensive analyzer or test receiver worth >€ 50.000. But therefore the Handheld was not meant, because the economic viability of an EN-conform measuring device is reached, when the basic functions of an analyzer with different cutoff frequencies is used. Hereby the cutoff frequencies with a bigger band are detected and analyzed.

So it is possible (from <1KHz to >500KHz) to illustrate all known sources of interference voltage and thus detect analyzer / test receiver comparable values in the lower frequency range.

Fazit 2:

Disturbances in the upper MHz-range do not have the energy to affect destructive on devices on the power supply grid and are often detected as interference radiators. Therefore it makes no sense (and is economic not justifiable) to include these frequencies (MHz) into the analysis

The handheld NA 02-13 exclusively detects the described power range of all illustrated sources of disturbances and displays it EN-conform in the current and upcoming measurement range.

So disturbing sources in the lower frequency range can be detected and measured easily. Also in the household area disturbance sources can be detected by switching all fuses off and then step by step every fuse is switched on again. The Handheld analyzer shows the disturbance voltages in every fuse intersection. So the disturbance source can be easily and straight been detected.

Smart Meter and other electronic consumers can only work without disturbances at the power supply, if this frequency range has the necessary quality basics. To check these pre-conditions the NA 02-13 is particularly suitable.

The NA 02-13 gives affected users not only the possibility to detect the disturbance source, but also the chance (with help of the federal network agency) to advise the disturbance initiator of the qualitative pre-conditions and helps to implement by guarantee or norm basic principles.

Additional Information

Bajog electronic developed additionally a network decoupling unit for analyzer and test receiver according to CISP 16 EN 55016 -1-2 for measurement of disturbance voltage under load (at site and only for professional electricians). To this decoupling unit (ASK 06) the described handheld and regular analyzers and test receivers can be attached via BNC-connector at 50 Ohm.

ASK06 (for professional electricians)

This unit replaces a LISN and transfers the disturbance voltage noise at 50Ohm under full load to the analyzer/ test receiver and removes the 50/60Hz network frequency.

Ask us, it will pay out. Let yourself be well advised by our EMC-specialists.