



Brüel & Kjær Vibro

Encyclopedia

L

LAN

Abbr. for **local area network**

Local PC network for exchange of data within a geographically limited area (e.g. office building or company facility). The data is transferred in serial fashion.

Larger vibration displacement

The characteristic quantity “largest vibration displacement sppm” with non-contacting measurement of shaft vibration measurement is defined as the larger value of determined vibration displacement in the two measurement directions 1 and 2

S_{pp1} and S_{pp2} :

$$S_{ppm} = (S_{pp1}, S_{pp2})_{max}$$

Note: This characteristic quantity corresponds with API 670, but does not correspond with VDI 2059 sheets 1 to 5 [88; ..., 92]. In general no direct comparison between both characteristic quantities is possible.

Last transition duration of a pulse

The duration between two points in time during which the momentary values of the impulse assume preassigned values for the last time; for example, 10% or 90% of the impulse amplitude, as long as the form of the impulse does not force a different finding.

Note: The term that has been customary until now was duration of decrease.



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LC element

A four-pole network formed from an inductive element, e.g. a coil L, and its condenser C. LC elements are used in circuits similar to RC elements, e.g. in filter chains.

LCD display; liquid crystal display

An indicator arrangement of liquid crystal cells. By a suitable geometrical organization of the transparent electrodes, complicated indicator figures can be represented at will. Also the function mode of the principle of the flat screen is based on L.

LED

Abbr.for <light emitting diode>

Light-diode

Level (of a time-variable quantity)

The average or otherwise-weighted value of a time-dependent variable, like power or some other field variable, evaluated according to a kind of default during the determined time interval.

Note: The L. of a variable can be expressed in logarithmic units, e.g. dB, in relation to a reference value.



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Level; Signal level

- 1) A characteristic number, which is determined from the logarithm of the relationship of the value of a variable to that of a base factor. For example, the level a for a voltage is

$$a = 20 \log\left(\frac{U_2}{U_1}\right)$$

For U_1 larger than U_2 the level is negative. The reference value for electrical L. is the voltage 0.775 V. The utilizable level is the L. of a transferred signal. The maximum utilizable level at a measuring point (under adherence to certain distortion conditions) is the nominal level. The voltage level at a measuring point, if no utilizable level is present, is called the interference level. This L. corresponds, if it concerns a voltage, to the interference voltage. The RMS value of the interference level, measured with a frequency-dependent display within the transmission range of the transmission system, is the foreign level. Over the relationship between interference level and utilizable level → breakdown band.

- 2) Logical L. (logic levels), the allocation of binary values to the logical statements "true" or "false" and/or the binary values 1 or 0. In the international use one assigns also the identification letters H (abbr. for <high>) and L (abbr. for <low>) to logical L. Thereby in the binary system H corresponds to the binary 1 and L corresponds to the binary 0.

Level conversion

The adjustment of the levels of two electronic building groups by an interface circuit, so that these can be connected together. If a building group has e.g. the logic levels High = 12 V and Low = - 12 V and this is to be connected with the input of another building group, then the Low level must be converted from - 12 V to 0 V and the High level from +12 V to 5 V.



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LF

Abbr. for **Low frequency**.

LF technique

The sub-section of information electrics, which covers the procedures and devices for producing, strengthening and transferring electrical vibrations in the frequency range from some Hertz to approximately 20 kHz (range of the audible frequencies, audio-frequency spectrum). The LF in particular is applied during the sound transformation, reinforcement and conservation (electro-acoustic), studio technology, consumer goods electronics), in telephone and telegraphy transmission in original frequency situation (LF-transmission technique, telecommunication technology) as well as in vibration measuring technology. Circuits of the LF are characterized by large capacitance and inductance values and usually small quality factors. The employment of electronic elements does not cause difficulties regarding the upper critical frequency. Problems arise, if very low frequencies, as they frequently occur particularly in vibration measuring technology, must be processed. Direct galvanic couplings are often ruled out for stability reasons. In these cases appropriately a conversion takes place on higher frequencies by means of choppers.

LIFO

Abbr. for **<last in first out>**

Characteristic of a shift register, with which the information (bit) fed in last, appears first at the output. This principle makes the structure of stack memories possible, which function practically like a card-deck function, where the upper (thus last presented) card is always taken first. This is employed in computer technology for the temporary protection of significant data.



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Light-emitting diode

Abbr: LED

Crystal diode, which emits light when a current passes through it. Increasingly replaces small indicator. L. supply red, yellow, green or blue light depending upon the execution. There are also two and three-coloured versions which change colour depending upon the voltage.

Limit-relay blocking circuit;

With machine monitoring devices the self-monitoring circuit does not improve the protection from false alarms, since it only announces disturbed signals, but does not prevent the processing of falsified signals. This is achieved by the L. This prevents signalling in the measuring channels which is recognized as self-monitoring disturbances. L. is used only during the monitoring of vibrations. During the monitoring of the axial shaft displacement, a real displacement of the shaft and a wrongly adjusted or defective displacement sensor cannot be differentiated. For this reason usually two sensors per measuring point with a logical "AND" connection of the limit value messages, or even three sensors with a "two-of-three" connection, are used. In this way false alarms from damaged sensors are excluded.

Linearity

L. of a measuring instrument is present, if the transmission coefficient is independent of the amount of input.

- 1) The functional dependence between two quantities, which is described in a right-angled coordinate system by the straight line equation $y = mx + n$ (linear function, function of 1st degree).
- 2) A differential equation is called linear, if the function and its derivatives arise only in the 1st power.



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- 3) A network is called linear, if it consists exclusively of linear elements.
- 4) An element is called linear, if between the two quantities of current $i(t)$ and tension $u(t)$ a linear equation or a linear differential equation exists.

The converse is non-linearity.

Linearity deviation

L. is the difference between the indicated measured value and the associated value on the reference straight line, which leads from the zero point through the measured value for the reference input.

Linearity range

L. is the range, within which the amount of the linearity error does not exceed a given value. L. is also called the disqualification range.

Line spectrum

Spectrum, which exhibits different values of zero only with certain discrete frequencies or in the proximity of these frequencies.

Example: The consequence of the coefficients of the Fourier series, which represents a periodic signal or noise.

A spectrum represented in line form, i.e. each component of the spectrum is represented as a single straight line at the associated frequency.



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Lissajous figure

A curve, which develops on the screen of an oscilloscope, if two alternating voltages are supplied to the x -deflecting plates and y -deflecting plates, with frequencies in a certain relationship to each other. For the production of L. the tension with (e.g. an unknown) frequency is supplied to one plate pair of an oscilloscope, and at the other plate pair a tension with the other (e.g. known) frequency. The displayed figure depends on the frequency relationship and on the phase position of the component vibrations to each other. If the vibration event contains harmonics, then a modified figure results. L. are consulted with the aid of oscilloscopes during the frequency and phase measurement.

Load

Usually the performance at the output of an electronic element or circuit. For these L. the thermal maximum stress sets limits. This is given e.g. by thermal effects (heating up) or break-through effects and depends on the size and the construction of the element including its environment (cooling).

Load zone

- 1) The region at the outside perimeter of a rolling-element bearing at which the effect of the force from the shaft is the greatest.
- 2) The direction of force of the static load at all bearings, including sleeve bearings. The "normal" load is due to the force of gravity (valid for horizontal machines), tooth contact forces, gap excitation, etc.

Low-noise amplifier

See Amplifier, low-noise



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Logic

Short description for the totality of the logical circuits in electronic equipment.

Logic analyser

A piece of test equipment used for the statement and display of logical conditions in complicated circuits.

Logic, mathematical

The science of (logical) structure (compound) statements. With the help of a mathematical, formal representation, general statements about it are achieved, under which conditions one can decide on the validity of certain statements (consequences) from the validity of other statements (conditions).

Longitudinal waves

Longitudinal waves, i.e. waves with oscillations in the reproduction direction (e.g. flexible shock waves).

Loose contact

Workshop term for a contact with irregular, usually only intermittently occurring interruption.



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Low-frequency

Abbr.:LF

Electrical oscillations with a frequency up to 20,000 cycles per second; covers the range of the audible tones.

Low-level

The low current or voltage level in a digital circuit for binary signals. The low level is assigned e.g. the logical "0".

The converse is the high-level.

Low-noise amplifier

Amplifier at the input end of a chain of amplifiers, so laid out that its internal noise (noise) at a given amplification factor is as low as possible in order to attain the maximum possible signal-to-noise ratio at the output.

Lowpass filter

A filter with a bandwidth range from 0 (or from the lower boundary of the sensor or measurement apparatus) to a final upper frequency limit (at which the amplitude is attenuated by 3 decibels (dB)).

Lowpass filtration

The filtering of oscillations by means of a lowpass filter.