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O

Octave

Interval between two frequencies in the relationship 2 to 1. An O. higher as seen from a certain frequency. Means the double frequency of an O. lower than the half frequency.

Offline

Describing circumstances where one functional unit works independently of another functional unit or is prepared for it, whereby the other functional unit is super-ordinate it in the case of co-operation.

Off-line means that between instruments and a central plant, which are normally connected with one another, no direct connection exists. Data from measuring instruments will be saved intermediately and can only arrive later into the central system. In the central plant only historical data and no current data can be processed.

Offset

The shift of a variable in relation to a reference value. In analogue circuits e.g. the shift of a voltage in relation to an offset voltage.

Offset values; compensation values

The alignment values during alignment - mostly on the basis of a dial indicator - that are to compensate for the effects of temperature-induced growth. In the cold condition, the machines are set up "falsely" so that under operational conditions they are set up correctly (necessary with steam turbines and pumps for hot or very cold fluids). These values have to be provided by the manufacturer of the machine or they have to be determined metrologically. Differentiation is made in:

- Coupling guidelines (default values dependent on coupling) and
- Base guidelines (default values dependent on the machine bases)



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Ohm

Abbr.: Ω (the Greek letter omega)

Unit of measure for electrical resistance.

Ohm's law

A law of electricity: With certain cables the current I of the laid down voltage U is proportional. Such cables are called Ohmic cables. Its resistance $R = U/I$ is constant.

Oil whip

A self-excited bending vibration that can occur in bearings, seals and sometimes also in other cylindrical machine components. Oil whips occur when oil impacts reach a natural frequency (often the first critical bending frequency). The oscillation occurs in the direction of rotation and with a circular or elliptical wave path (orbit) with almost constant frequency, independent of the shaft's rotational speed. The amplitude under conditions of resonance is usually very high.

Omega (ω ; Ω)

A letter from the Greek alphabet.

- 1) ω ; Formula character, for rotational frequency and angular velocity.
- 2) Ω ; Unit character for \rightarrow Ohm (electrical resistance)



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Online

Describing circumstances that a functional unit with a superordinate functional unit co-operates or is ready for co-operation with their.

On-line one means that from equipment a direct connection to the central system exists. Measured data can be transferred immediately to the central system; data or instructions issued by the central system can be directly displayed or implemented at the instrument.

The converse is → offline.

Open-loop voltage

The voltage which one measures between two points of a network with a high resistance. This describes the spare supply source in two-pole theory. With reference to an electrical constructional element, the O. is the voltage which occurs at the output terminals of the unloaded constructional element. If the element is a galvanic cell, one speaks of the open-circuit voltage.

Operating period

Sum of the intervals of an examined application period in which the required function is fulfilled.

Operating system

The program of a digital computing system, which together with the characteristics of the computer forms the basis of the possible modes of operation of the digital computing system and in particular controls and supervises the execution of programs (S. also DIN 19226).

Widespread O. are e.g. DOS, Windows, Windows NT, Windows XP, OS/2 and UNIX. The O. provides the requirements for the operation of the user-software.



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Operating temperature range

The temperature range specified by the manufacturer for a component or instrument in which fault-free operation can be guaranteed. As a rule a limited function is still possible within known limits outside of the O.

Operation at overload

Operation of a unit at a stress ratio greater than one.

Operation, sequential

See Operation, serial

Operation, serial; Operation, sequential

A mode of operation for a functional unit of completing orders in such a way that they are completed one after another.

Operational limit values

With some machines it is usual practice to specify the operation of vibration limit values. These limits are designated the ALARM and SHUTDOWN limits.

- **ALARM**

This is the warning that a pre-determined vibration limit value has been reached or a clear change has occurred, an investigation should be initiated and corrective measures carried out if necessary. If an ALARM situation occurs, the operation may be generally continued until the reasons for the change in vibration condition are determined and remedied.



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- **SHUTDOWN**

This is the vibration limit value above which continued operation of the machine may result in serious damage to the machine. When the SHUTDOWN limit value is exceeded measures should be immediately initiated to reduce the vibration level or the machine should be shut down.

Differences in the dynamic loads and bearing rigidities can be cause to specify different limit values at different measuring points and in different measuring devices for the operation.

Operational measurement technique, industrial measurement technique

The area of measuring technology which employs the acquisition of information for the purposes of processing, operational quality control, accounting and balancing, documentation, safety engineering and environmental protection in the operation (manufacturing, storage, transport or other) employ, as far as measuring instruments are used. When one is dealing only with tasks of process guidance, one speaks of a Process Measurement Technique, especially in continuous production methods. In areas with discontinuous production (manufacturing) the description Manufacturing Measurement Technique is used. A sharp distinction to laboratory measurement techniques is not possible, (e.g. discontinuous measurements for quality monitoring). For most methods the O. is the characteristic continuous or periodic quasi-continuous operational method. (Occasionally this is regarded as the sole decisive criterion). Instruments and equipment must be adequate for the requirements of the BMSR technique.

Operational pause

Interval during the application period during which the user does not require fulfillment of the required function.

Operational voltage

The voltage supplied to an electronic circuit as the supply voltage.



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Operator guidance

The object of the O. is to lead the user through the program, simplify the orientation and show the selection possibilities. Corresponding hints for answering standard questions are offered at the start of the program on pages provided for the purpose and according to the need.

Optical cable

A cable consisting of one or more fibre optics in a common sheath. Glass (in glass-fibre cable) and plastic serve as the materials. There is O. with unregulated single fibres, which serve only for light transmission for lighting purposes, e.g. for instrument illumination or lighting cable in places with accessibility difficulties, and O. with regulatory single fibers. The latter make the optical transmission of pictures possible. The resolution of the pictures depends on the number of individual light conductors in the cable.

Optical cable transmission technique

A cable-bound transmission technique using fiber optics. Because of the high frequency of light waves (about 10^{15} cycles per second) it is possible to transfer, by means of light as a storage medium, very large data sets over time (e.g. some 10,000 telephone calls simultaneously over a cable).

Optical wave cable; light cable

A cable through which a light wave can be passed. One differentiates between fibre-light cables and lens-light cables. Glass fibres have the greatest technical importance with fibre-light cables. By means of O. large data sets can be transferred over long distances. The advantage of O. as opposed to copper-conductor cable is also in the fact that it is insensitive in relation to electromagnetic disturbances and differences of potential between the participating elements.



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Opto-electronic coupler; Optron; light-coupler

An opto-electronic arrangement for optical coupling (opto-electronic coupling), i.e. for electrical-optical-electrical signal conversion. O. consists of a light emitter, usually a luminescence diode or a diode laser, a transmitting medium for the light (i.e. if necessary a light conductor) and a photo detector as light receptors. There are O also integrated, e.g. for the separation of different circuit parts, in integrated solid-state circuits. The most important characteristics of O. are the absence of interaction or, as the case may be, high tension isolation with spatial separation between input and output, low value, high operating speed and high reliability.

OR function

The logical OR operation of two binary variable, which then have the value (= 1), if one of the two variables (or both) possess the value 1. A written description of the OR function is

$$f = a \vee b$$

a	b	f
1	1	1
0	1	1
1	0	1
0	0	0

Table of the OR function

Orbit

See Kinetic shaft orbit



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Order analysis

Order analysis is a special case of frequency analysis. With the O. the oscillation components that are synchronous to a reference system (generally the rotor) are determined according to amount and phase. The reference system must be fixed by a reference signal (generally an impulse per revolution of a phase angle reference sensor). Important oscillation components for the evaluation of the condition of machines are the dominant mode (rotational frequency) and the 1st and 2nd harmonic. In these components e.g. unbalance, alignment error and shaft cracks express themselves.

Order number; of modal vibrations

Quantity of integer numbers, with whose assistance the natural modes of a system are assigned according to frequency.

Oscillator; Oscillator circuit

An active circuit for creation of a periodic variable whose fundamental frequency is determined by the characteristics of the circuit.

Electronic circuit or construction unit for the production of electrical oscillations usually with a sinusoidal potential gradient. For other electrical tension processes (e.g. square, saw tooth, impulses) the term "generator" is common.

The O. is a component of a non-contacting displacement measuring chain for shaft vibration measurement according to the eddy-current measurement principle. It sends a high frequency carrier signal to the sensor, demodulates and linearizes the sensor output signal and transforms it into a DC voltage (proportional the static sensor distance to the measurement surface) with an overlaid alternating voltage (proportional to the fast motion of the measurement surface).



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Oscillation quartz; Quartz resonator

Abbr.: Quartz

A plate consisting of quartz crystal which, under the influence of a high frequency alternating electrical Field, can be excited into intensive elastic deforming vibrations if the excited frequency coincides with the natural frequency of the quartz plate. The action of the O as an electro-mechanical transducer and as an object that is able to oscillate is based on the piezoelectric effect.

Oscillogram

Illustration or recording of fast, variable events with the help of an oscillograph.

Oscillograph

Oscillation driver, equipment for recording fast, variable electrical and mechanical vibration events. The oscilloscope serves for the pure visualization of the signals, in contrast to the O.

Oscilloscope

A highly sensitive measuring instrument for measurement and visualization of electrical variables, such as voltage, mode of motion, modulation grade, etc. Thereby an electron-beam is diverted according to the bias voltage it is subjected to and displays on the screen of the O. the progress of the variable which is measured.

Output

Output; Output information; Output variable; Output data.

The converse is Input.



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Output resistance

Internal resistance effective at the output terminals of an electronic element or a circuit. O. depends upon the currents and voltages at the input.

Overall mass

See vibration sensor, total mass

Over-sampling

The scanning of a signal with a higher scanning rate than is prescribed in the sampling theorem. The information acquired thereby with the sampling can be used during signal processing, in order to operate e.g. with same quality of signal processing (noise, resolving power) at lower cost.

Overtone-frequency vibration

The name for vibrations, whose frequencies are integral multiples of the frequency (number of revolutions) of the fundamental vibration. Because the fundamental vibration is counted as the first component, the n th vibration component is the $(n - 1)$ component of O.

Overwriting

The storage of information in previously occupied memory. In the process, the old content is lost and is "overwritten".