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**Control technology –
Rules for the designation
of measuring instruments**



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Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned will transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of three years starting from 2005-06. The validity may be extended for a single three-year period, following which it shall be revised to become another type of normative document or shall be withdrawn.

INTRODUCTION

During the period from 1920 to 1960, there was a fundamental change in the comprehension and usage of physical quantities, which was particularly promoted by the works of Julius Wallot published between 1922 and 1953. In this process, the various systems of physical units and the usage of numerical equations were replaced by the SI units (see ISO 1000) and the usage of quantity equations, so the quantities were no longer linked to certain units.

This development culminated in the publishing of the first edition of the German standard DIN 1313 in 1931 and the resolutions of the 10th general conference of weights and measures in 1954. Since then, it has been considered incorrect to address a quantity by its unit.

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CONTROL TECHNOLOGY – RULES FOR THE DESIGNATION OF MEASURING INSTRUMENTS

1 Scope and object

This Publicly Available Specification (PAS) is applicable to measurement techniques. It defines rules for the unambiguous designation of different types of measuring instruments and of measuring instrument features.

The scope of this PAS is

- (a) the adaptation of the designations of measuring instruments and of measuring instrument features to the state of science;
- (b) the designation of measuring instruments and of measuring instrument features by the measuring quantity or by the measuring task instead of the unit;
- (c) the avoidance of other secondary components than “...measuring instrument” in compound names at least in the far future in the English language;
- (d) the avoidance of other secondary components than those corresponding to “measuring instrument” in compound names in languages other than English.

In view of this, measuring instruments should not be addressed by the unit of the measured quantity but only by the measured quantity or the measuring task itself.

In the compound names of measuring instruments, the use of secondary components (“...gauge”, “...meter”, “...indicator”) other than “...measuring instrument” is inconsistent with the objective of standardization (namely uniformity), especially since the meaning of these secondary components is no more descriptive than that of the standard component or their meaning is already contained in the first element of the compound name (for example, in the case of “water meter”).

Therefore, the use of secondary components other than “...measuring instrument” should be avoided in the English language at least in the far future.

In addition, the use of secondary components other than those corresponding to “...measuring instrument” should be avoided in languages other than English.

Finally, the ambiguous component “...sensor” should not be used. In its place, one of the secondary components “...detector”, “...transformer”, “...transducer”, “...measuring instrument” or “...measuring chain” should be used, depending on the task of the functional unit being named. The definitions for detector (detecting device), transformer, and transducer are given in IEC 60050-351.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-351, *International Electrotechnical Vocabulary – Part 351: Control technology*¹

ISO 31 (all parts), *Quantities and units*

¹ Edition 3 to be published.

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

DIN 1313, *Größen (Quantities)* (no corresponding international standard)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

measuring instrument

device intended to be used to make measurements, alone or in conjunction with supplementary devices

[IEV 311-03-01]

NOTE 1 Material measures are also measuring instruments.

NOTE 2 An instrument is also a measuring instrument if its output is transmitted, converted, processed or stored and cannot be perceived directly by the observer.

NOTE 3 The designation measuring instrument without any supplementary designation components should only be used as a generic term referring to all types of measuring instrument. In compound expressions, the term "measuring instrument" should only be used to signify a measuring instrument with direct output (see 3.6).

EXAMPLE The measuring instruments and measuring systems catalogue (also contains, for example, signal generators and measuring assemblies)

3.2

measuring device

entirety of all measuring instruments and supplementary devices used for obtaining a measurement result

3.3

measuring system

complete set of measuring instruments and other equipment assembled to carry out specific measurements

[IEV 311-03-06]

3.4

measuring chain

series of elements of a measuring instrument or system that constitutes the path of the measurement signal from the input to the output

NOTE Example: set of transducers and connecting elements between one or more measuring instruments placed between the sensor, which is the first element in the chain, and the last element of the chain; for example, the indicating, recording or storage device.

[IEV 311-03-07]

3.5

(measurement) standard

material measure, measuring instrument, reference material or measuring system intended to define, represent physically, conserve, or reproduce a unit of a quantity, or a multiple or sub-multiple thereof (for example, standard resistance), or a known value of a quantity (for example, standard cell), with a given uncertainty

[IEV 311-04-01]

NOTE 1 In a measuring chain, the measurement standard is a functional unit which provides a defined value of a measured quantity for measuring purposes.

NOTE 2 Several parameters may be required for the purposes of definition, for example, frequency and amplitude of a sinusoidal a.c. voltage.

NOTE 3 The value can be invariable, manually adjustable or programmable.

3.6

measuring instrument with direct output

functional unit which measures a quantity at an input and outputs an image of the measured quantity at the output such that it can be directly perceived by the observer

NOTE 1 Several parameters may be required to output the measured value, for example, power and energy when referring to the supply of electrical energy.

NOTE 2 The output measured value can refer directly to the measured quantity, or it can be derived from this using a processing method. The processing method can be invariable, manually adjustable or programmable.

3.7

transmitting measuring instrument

measuring instrument with indirect output

functional unit which measures a quantity at an input and outputs an image of the measured quantity at the output such that it cannot be directly perceived by the observer

NOTE 1 Several parameters may be required to output the measured value, e.g. power and energy when referring to the supply of electrical energy.

NOTE 2 The output measured value can refer directly to the measured quantity or it can be derived from this using a processing method. The processing method can be invariable, manually adjustable or programmable.

3.8

measuring assembly

functional unit for performing a complex measuring task which generally combines measuring instruments defined under 3.1 to 3.8 to form a compact unit with common control unit and measurement result output

NOTE The processing method can be fixed, manually adjustable or controlled by a computer.

4 Designation rules

4.1 General rules

There are no particular grammatical rules to be observed in the naming of instruments, apart from specifying that the resulting designation is clear and understandable. Hyphens should be used to avoid ambiguity, for example, “moving-coil galvanometer” and not “moving coil galvanometer”.

Names for physical quantities are given in the ISO 31 series. Names for their units are given in ISO 1000.

Abbreviated names (for example, “tension” instead of “mechanical tension” or “electric tension”) can be used if the quantity is clearly defined by the context.

4.2 Designation rules for measurement standards

Rules

To name a measurement standard the words “measurement standard” shall be combined with a word indicating the measured quantity and written as a compound noun (“...measurement standard”) or in dissolved style (“measurement standard for ...”).

NOTE Other names are used for complex measurement standards.

Examples

Compound noun:

length measurement standard
mass measurement standard
quartz-time measurement standard
caesium-time measurement standard

Dissolved form:

measurement standard for electrical voltage
measurement standard for electrical resistance

Context-related short form:

voltage measurement standard
resistance measurement standard

Complex measurement standard:

signal generator
triple-point cell

4.3 Designation rules for measuring instruments with direct output

Rules

To name a measuring instrument with direct output, the words “measuring instrument” shall be combined with a word indicating the measuring task or measured quantity and written as a compound noun (“...measuring instrument”) or in dissolved form (“measuring instrument for...”).

NOTE 1 A measuring instrument with direct output often has a measurement standard as an internal component or as an accessory. Examples are a balance with weights, or a measuring instrument for electrical voltage with integrated voltage measurement standard.

NOTE 2 Other names are used for complex measuring tasks.

Examples

Compound noun:

temperature measuring instrument
pressure measuring instrument
rotational speed measuring instrument
sound level measuring instrument

Dissolved form:

measuring instrument for electrical voltage
measuring instrument for a.c. voltage
measuring instrument for mechanical tension
measuring instrument for electrical power

Context-related short form:

voltage measuring instrument
a.c. voltage measuring instrument
tension measuring instrument
power measuring instrument

4.4 Designation rules for transmitting measuring instruments

Rules

To name a transmitting measuring instrument, the first component “measuring” shall be placed in front of a word which indicates the method of transmission or processing.

Examples

Compound noun

measuring amplifier
measuring rectifier
measuring demodulator
measuring bridge
measuring transformer
measuring transducer
measuring converter

To specify the precise type of measuring transducer, a word which indicates the measured quantity can be placed in front of “measuring transducer”.

NOTE 1 If the input quantity is electrical, the input and output quantities may not be of the same kind, for example, a voltage and a current.

NOTE 2 In certain instances, measuring transducers may also have a specific name in respect of their function (for example, amplifier, converter, transformer, frequency transducer, etc.).
[IEV 312-02-15]

4.5 Designation rules for measuring assemblies

Rules

To name a measuring assembly, the words “measuring assembly” shall be combined with a word indicating the measuring task and written as a compound noun (“...measuring assembly”) or in dissolved form (measuring assembly for ...).

Examples

Compound noun:

radiocommunication measuring assembly
frequency response measuring assembly
gas analysis measuring assembly
material constant measuring assembly

Dissolved form:

measuring assembly for GSM cellular radio units
measuring assembly for frequency response
determination
measuring assembly for CO and NO_x components
in vehicle exhaust gas

Context-related short form:

GSM radio measuring assembly
frequency response measuring assembly
(also: sweep measuring assembly)
exhaust gas measuring assembly

4.6 Examples of names of measuring instruments for complex measuring tasks

spectrum analyser
harmonics analyser
FFT analyser
measuring receiver
atmospheric pollutant analyser

Annex A (informative)

Examples of names to be avoided and corresponding recommended names

Name to be avoided

length meter
differential pressure meter
temperature meter
rotational speed transmitter
atomic clock
voltmeter
ammeter
ohmmeter
manometer²
thermometer³
sensor

Recommended name

length measuring instrument
differential pressure measuring instrument
temperature measuring instrument
rotational speed measuring instrument
atomic time measurement standard
voltage measuring instrument
current measuring instrument
resistance measuring instrument
pressure measuring instrument
temperature measuring instrument
see section Principles of this PAS

Exceptions

Rules

Names adopted for measuring instruments which clearly and unambiguously perform very specific measuring procedures can be retained.

Examples

interferometer
absorption spectrometer
psychrometer

² Manometer should not be used as the general name for pressure measuring instruments.

³ Thermometer should not be used as the general name for temperature measuring instruments.