

Designations for signals and connections

The European Standard EN 61175 : 1993 has the status of a
British Standard

Désignations des signaux et connexions

Bezeichnungen für Signale und Verbindungen

UDC 621.3 : 001.4

Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the national committees of the following countries:

Austria	Italy
Belgium	Luxembourg
Denmark	Netherlands
Finland	Norway
France	Portugal
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom

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National foreword

This British Standard has been prepared under the direction of the General Electrotechnical Standards Policy Committee and is the English language version of EN 61175 : 1993 *Designations for signals and connections*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 1175 : 1993 published by the International Electrotechnical Commission (IEC).

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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Designations for signals and connections

(IEC 1175 : 1993)

Désignations des signaux et connexions
(CEI 1175 : 1993)

Bezeichnungen für Signale und Verbindungen
(IEC 1175 : 1993)

This European Standard was approved by CENELEC on 1993-03-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 3B(CO)48, as prepared by Sub-Committee 3B: Documentation, of IEC Technical Committee 3, Documentation and graphical symbols, was submitted to the IEC-CENELEC parallel vote in March 1992.

The reference document was approved by CENELEC as EN 61175 on 9 March 1993.

The following dates were fixed:

- latest date of publication
of an identical national
standard (dop) 1994-07-01
- latest date of withdrawal
of conflicting national
standards (dow) 1994-07-01

Annexes designated 'normative' are part of the body of the standard. Annexes designated 'informative' are given only for information. In this standard, annex A is informative and annex ZA is normative.

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Designations for signals and connections

1 Scope

This standard establishes rules for the composition of designations and names that identify signals and connections in electrotechnical and related fields.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 27,	<i>Letter symbols to be used in electrical technology</i>
IEC 445: 1988,	<i>Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system</i>
IEC 617-12: 1991,	<i>Graphical symbols for diagrams - Part 12: Binary logic elements</i>
IEC 747,	<i>Semiconductor devices. Discrete devices.</i>
IEC 750: 1983,	<i>Item designation in electrotechnology</i>
ISO 31-1: 1978,	<i>Quantities and units of space and time</i>
ISO 31-5: 1979,	<i>Quantities and units of electricity and magnetism</i>
ISO/IEC 646: 1991,	<i>Information technology ISO 7-bit coded character set for information processing interchange</i>
ISO 3511-1: 1977,	<i>Process measurement control functions and instrumentation - Symbolic representation - Part 1: Basic requirements</i>
ISO/IEC 4873: 1991,	<i>Information technology ISO 8-bit code for information interchange - Structure and rules for implementation</i>
ISO 8859-1: 1987,	<i>Information processing - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1</i>

3 General

A signal designation shall identify uniquely a simple functional or electrical connection among a set of points (for example terminals, junctions) within a collection of items, assemblies, equipments, plants, installations, or other systems being documented.

For the purposes of this standard, the term “*signal designation*” includes designations for power and other constant-level connections.

3.1 Structure of a signal designation

A signal designation contains a *signal name* and, if necessary, a preceding *item designation*. The signal name, in turn, contains a *basic signal name* followed, if necessary, by a *signal version identifier*. For binary logic signals on circuit diagrams using direct logic polarity indication, the signal name also contains a *signal level indication* following the remainder of the signal name.

These parts of the signal designation are shown as follows:

$\boxed{i} ; \boxed{b} : \boxed{v} (\boxed{l})$

where

$\boxed{i}$	is the item designation (see clause 4)
;	is the item designation separator
$\boxed{b}$	is the basic signal name (see 5.2)
:	is the signal version separator
$\boxed{v}$	is the signal version identifier (see 5.3)
()	is the signal level separator (only one method shown, see 5.4)
$\boxed{l}$	is the signal level indication (see 5.4)

Parts *b* through *l* together form the signal name.

Examples of signal designations:

=A1A2;CNTEN1:A(H)

START(H)

ON

=T1;230V_L1

3.2 Recommended characters

Signal designations should be composed from standard character sets, excluding lowercase letters. Different mnemonics, abbreviations, identifiers, suffixes, etc., within a signal name may be separated by a single space or by an underline () to increase readability. To maintain compatibility with computer processing, character sets should be restricted to those characters in the ISO/IEC 646 7-bit character set, basic code table, excluding control characters and national replacement characters¹. If the computer and communication systems that are to be used are restricted to those that can process 8-bit character sets, ISO 8859-1 is recommended for supplementary characters.

¹ National replacement characters are character codes to which individual National Committees may assign graphic characters other than those tentatively assigned in ISO/IEC 646.

The recommended characters include the following :

- capital letters A through Z;
- digits 0 through 9;
- negation characters: macron (¯)^{1,2} , logic negation (¬)^{1,2} , or, where 7-bit characters must be used, tilde (~)³. (For negation methods, see 5.2.3.1.);
- spacing characters: underline (_) or space;
- item designation separator: semicolon (;);
- signal version separator: colon (:);
- algebraic operators: hyphen/minus (-), plus (+);
- Boolean operators: raised dot (^)¹;
- special characters: ! " % & ' () * , . / < = > ?

3.3 Length

Computer processing and space requirements in documentation usually place practical limits on the length of signal designations. This should be taken into account when composing these designations.

The signal name portion of the signal designation (see clause 5) should be restricted to 24 characters or fewer.

4 Application of item designation

A signal designation may begin with an item designation. This shall be separated by a semicolon (;) from the remainder of the signal designation, i.e., the signal name.

The item designation portion of the signal designation is used to identify a particular item, assembly, equipment, plant, or installation in a collection of items, etc., within which the signal name portion of the signal designation becomes unique. For example, see figure 1.

Item designations shall be constructed according to the rules of IEC 750.

NOTE - When a signal designation is shown on a document, the item designation part of the signal designation may be abbreviated, if no confusion is likely, by omitting the part of the item designation that is applicable to the whole document or to

¹ Included in ISO 8859-1. Not part of ISO/IEC 646.

² May occupy the same position as tilde (~) in some character sets.

³ National replacement character in ISO/IEC 646.

the document page (for example, a common part shown in the title block).¹

Likewise, the item designation part of the signal designation may be abbreviated by omitting the part that is common to all items shown within a boundary frame in a diagram or within a section in a signal list. See figure 1.

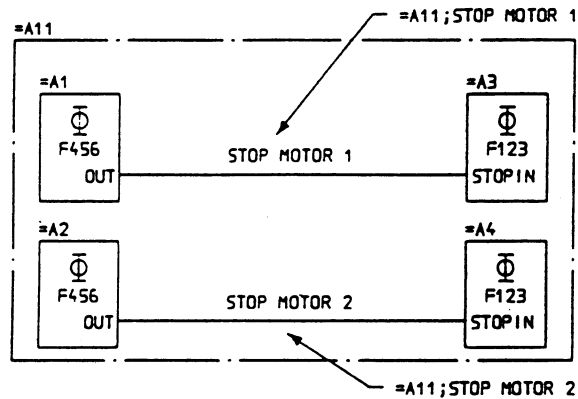


Figure 1a

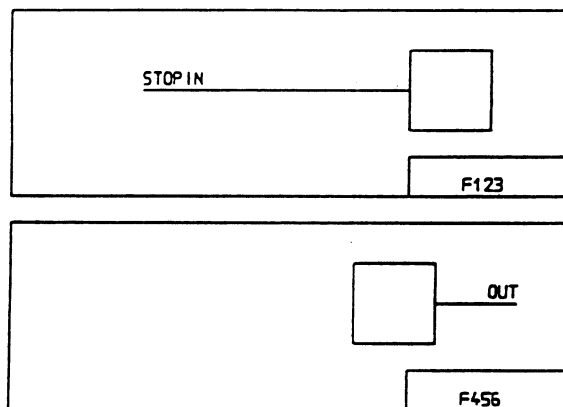


Figure 1b

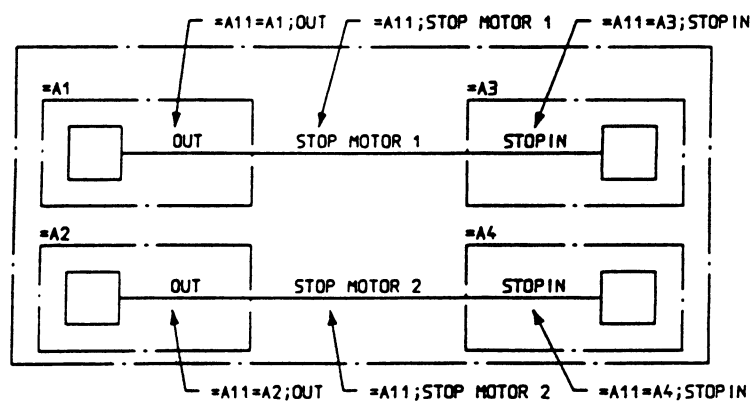


Figure 1c

Figure 1 - Signal designations in a hierarchy

Figure 1a shows a portion of a diagram that uses two instances each of two pre-engineered circuits (F123 and F456). Figure 1b shows, in part, the diagrams for F123 and F456. Figure 1c shows a more detailed ("exploded") form of figure 1a. Each signal can be uniquely identified by any of the three complete signal designations shown.

¹ Detailed guidance on this subject is under consideration in the context of IEC 1082 and the revision of IEC 750.

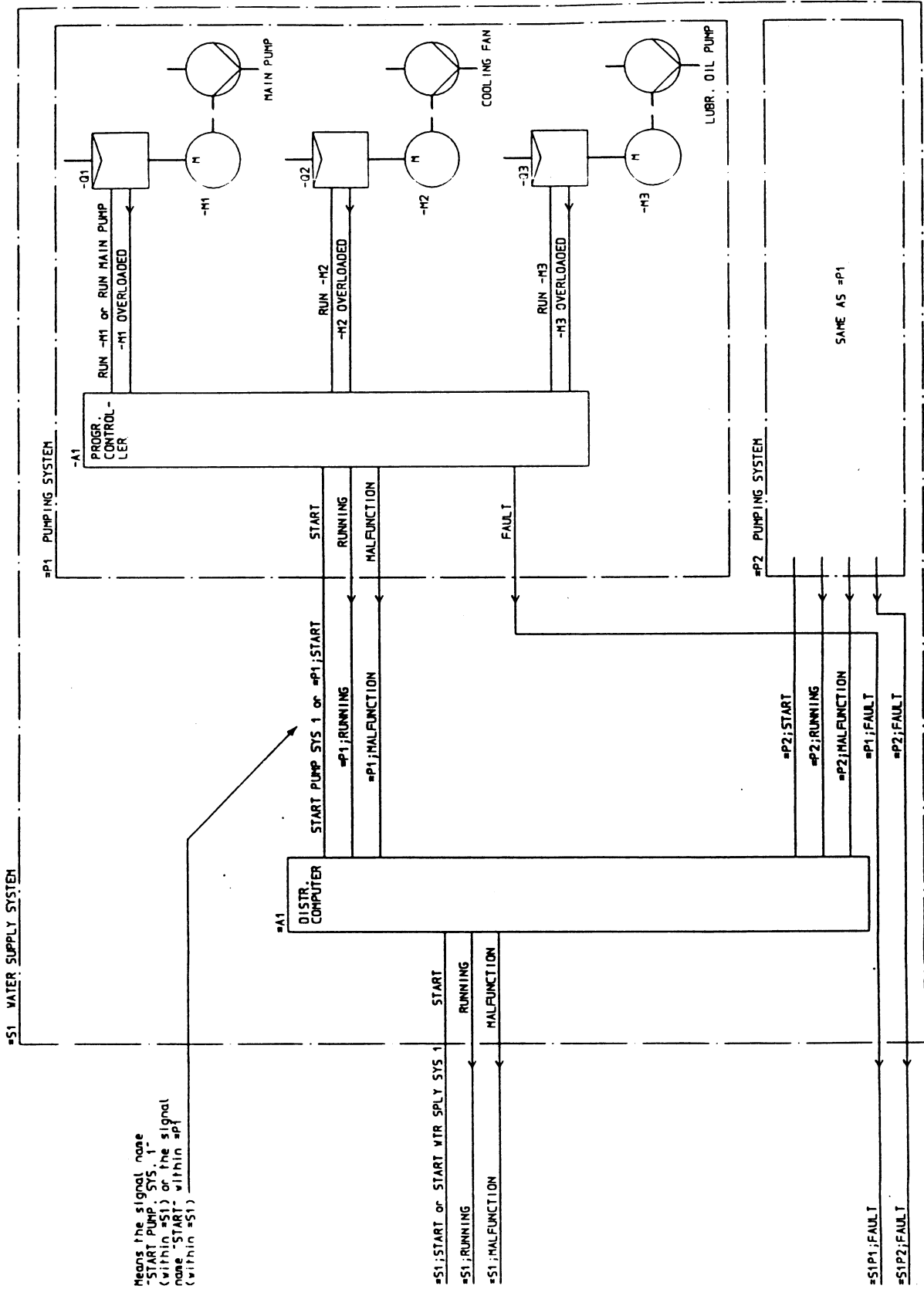


Figure 2 - Item designations used to denote the item within which the signal name is defined versus those used to denote the source, destination or target item of the signal

Figure 2 shows the difference between signal designations (such as =P1;FAULT) containing item designations that indicate the item within which the signal name portion of the signal designation is defined, and signal designations (such as RUN-M1) that include in the signal name portion the item designation of a source, destination, or target item for the signal.

5 Signal name

5.1 General

A signal name shall identify uniquely a simple functional or electrical connection among a set of points (for example, terminals, junctions) within the boundaries of one item, assembly, equipment, plant, installation, or other system being documented.

A signal name contains a *basic signal name* (see 5.2) and may contain a *signal version identifier* (see 5.3) and/or a *signal level indication* (see 5.4).

Identical signal names shall not be applied to different signals no matter how similar the functions. The following rules apply:

- a) Similar signals in similar circuits shall have different signal names. Suitable suffixes may be added to the basic signal name (see 5.2) to distinguish the different circuits. For example, in figure 3 two motor-control circuits each have a signal that stops their respective motors. These different signals are named STOP1 and STOP2.

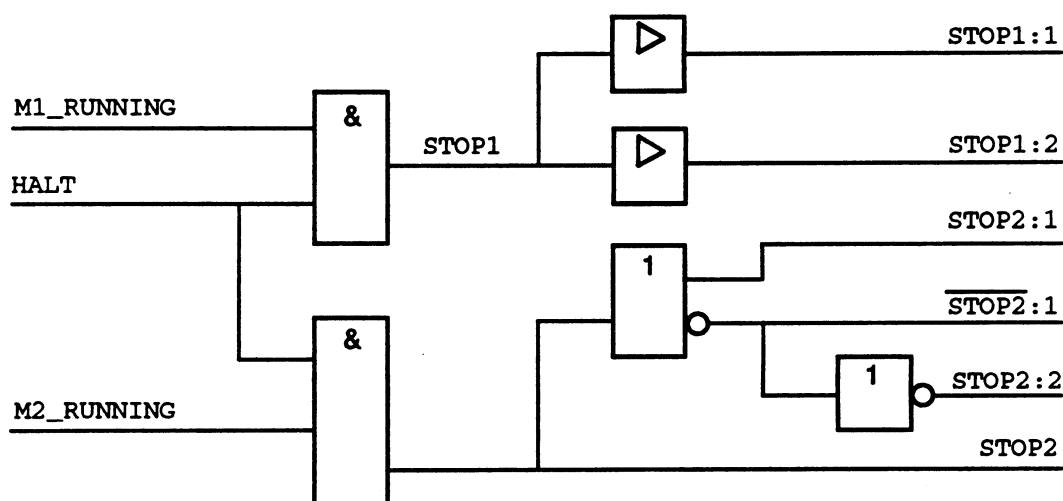


Figure 3 - Similar signals (STOP1 and STOP2) and signal versions

- b) A signal name shall be altered whenever a signal is amplified, inverted, gated with another signal, delayed, chopped, stored, or changed in any way. This change may take the form of a change in the basic signal name (see 5.2) or of the addition of a signal version identifier to the basic signal name (see 5.3).

- c) If the same signal is generated more than once, amplified, level shifted, or passed through a conductive device, each occurrence of the basic signal should have the same basic signal name, but with different signal version identifiers (see 5.3). For example, in figure 3 the signal STOP1 drives two amplifiers. The outputs of those amplifiers are named STOP1:1 and STOP1:2.
- d) If a binary logic signal (see 5.2.3) is merely negated or inverted, the basic signal name shall remain unchanged except for the addition (or deletion) of a negation indication. If direct logic polarity indication is used, the signal level indication (see 5.4) may be changed instead. If a signal is inverted more than once, different version identifiers shall be used (see 5.3) to distinguish different inverted or noninverted versions of a signal. For example, see figure 3, signals STOP2:1, $\overline{\text{STOP2}}:1$, and STOP2:2.

5.2 Basic signal name

The basic signal name in a signal designation identifies *a single piece of information* that may be transmitted through *several different physical signals within a circuit*. The unique name for each such physical signal should be formed using the same basic signal name that describes the common piece of information.

A basic signal name shall indicate the information carried by the signal or the function performed.

Signals of a *reporting nature*, such as status signals, should be named based on the information they convey. For example, a signal reporting whether or not motor M2 is running might be named M2_RUNNING.

Signals of a *commanding or controlling nature* should be named based on the function they perform, rather than on the signals or functions used to generate them. For example, if a signal RUN_EN is gated with another signal CLK6 to produce a signal that sets a bistable element named RUN, the function is obvious if the output signal is named SET_RUN. However, if the output signal is named RUN_EN_CLK6, its function is open to speculation.

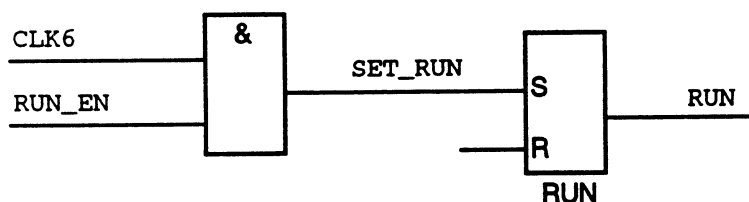


Figure 4 - Example of names for controlling signals

Every effort should be made to use mnemonic names, standard abbreviations, and standard letter symbols. Mnemonics, abbreviations, and letter symbols shall be explained in the document in which the signal name appears or in supporting documentation, or a reference shall be made to the International Standard(s) where they are explained.

If space permits, easy-to-understand mnemonics should be used instead of over-short abbreviations. For example, SELDEV1 better conveys the meaning "select device 1" than does SD1.

NOTE - Mnemonics, abbreviations, and letter symbols that are internationally standardised are considered to be language-independent and suitable for use in any language. Other mnemonics and abbreviations may be language-dependent. If used in languages other than the original, their mnemonic property may be lost.

5.2.1 Power and other constant-level connections

The principles for naming power-supply and other constant-level connections are the same as for analogue and binary-logic signals.

Each designation shall apply to *only one supply* in an installation or equipment.

Constant-level connections should be named according to the characteristics of the constant-level physical quantity they carry. This can be either a numerical value with a unit of measure or a commonly understood abbreviation that implies a nominal numerical value and may also imply a tolerance or other additional properties. For example, a ground connection may be named 0V or GND. A TTL supply voltage connection may be named +5V or VCC. A power main connection may be named 50HZ 230V L1.

Mnemonics and abbreviations should be derived from letter symbols given in IEC 747 or IEC 445, if applicable. For convenience, IEC 445 conductor markings are included in annex A, table A.4.

Figure 5 is an example of signal designations in an a.c. power supply system.

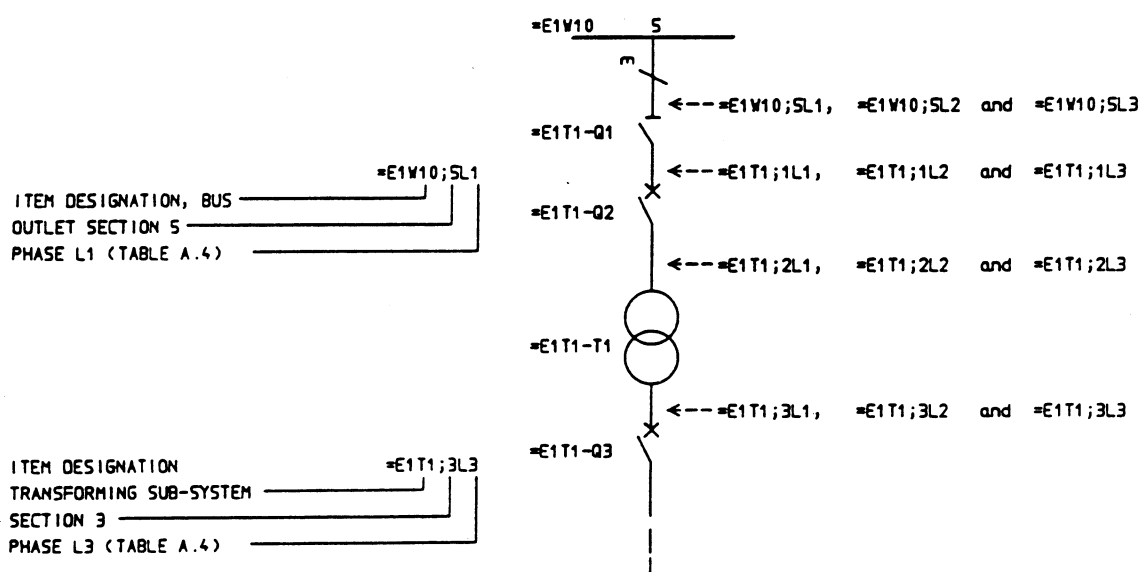


Figure 5 - Example of signal designations in an a.c. power supply system