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1 Subject of specification

This specification used in conjunction with other technical specifications of the LOTOS Group establishes the minimum requirements ion order to standardize the system of identification of media, vessels, equipment and their nipples, machinery, pipelines and instruments as used in the technical documentation.

2 Scope of validity

This specification applies to the preparation of tender documents, inquiries and contracts concerning new investments and modernization projects planned by LOTOS Group.

It shall also be a basis for preparing both detailed specifications and inquiries for individual or package supplies.

2.1 Deviations

Any deviations from this specification and relevant specifications, standards and documents, including the bidder's proposals indicating a more economic design or solution, shall be submitted in writing for checking and approval by LOTOS Group S.A. No deviation or modification shall be permitted unless confirmed in writing by LOTOS Group S.A.

The bidder shall present in written form any ambiguity in this standard or any other LOTOS Group S.A standards as well as conflict with referenced documents/standards, and shall receive LOTOS Group's written explanation.

3 Definitions and identifications

Isolating barriers – Electronic systems for dividing – isolating two different zones, for instance a spark-safe circuit zone from a non-spark-safe one. Isolating barriers can also protect against electromagnetic interference, separate voltage potentials, or they can be a protection against overvoltage.

Sensor, detector – an element of an automation system changing the measured physical quantity to an electric signal transmitted on to a transducer or directly to the DCS, ESD system. A sensor can, but does not need to be physically integrated with the signal transducer. A sensor with a transducer is used when it is necessary to transmit the value of the measured quantity to other electronic systems by means of a standard signal.

Local instrument sensor – an element used only for local monitoring of the measured quantity. As different from a transducer sensor, it forms a functional whole. Examples are bimetallic or pressure-spring thermometers and manometers. Local instruments usually do not operate without additional energy from outside.

DCS – Distributed Computer Control System

ESD – Safety interlocking system

Converter – a device receiving a signal in a certain form of an electric signal and converting it to another form.

MOV – a valve with an electric actuator.

Installation – an installation means a part created by an area and sub-area of the plant in accordance with Documentation Numbering Procedure No. 90-10-00001. It is marked by digits e.g. 110.

Locally – means a location in the direct vicinity of the measuring and final control elements, as different from a location e.g. in the central control room.

Transducer – an electric and/or electronic and/or programmable element of the automation systems, changing a signal from an electric sensor to a predefined output signal e.g. 4-20 mA. It can contain a local indicator of the measured quantity.

Converting device – a general concept for a device which receives one or several signals, modifies them and makes one output signal. Depending on the application program a converting device can be a transducer, a relay, a converter or another device.

SIF – a safety function with a defined SIL level (for more information see standard 3650).

Plant – this concept means an aggregate of several sub-installations connected or not connected functionally. It is marked by letters, e.g. PZH.

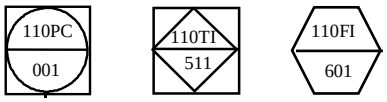
Accessible – By accessibility is meant accessibility for the control system operator(s). The concept of accessibility is used both for all actions in control systems and for instrumentation devices, and so:

access to system functions means that:

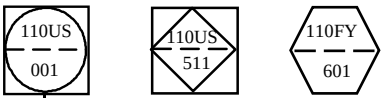
the functions of an automation element and operations on them are accessible for the system operator through the są HMI system. Accessibility for an indicator means the monitoring of the measured quantity, for a regulator it means the modification of its parameters. Operation is e.g. switching the device on – off, modification of the value preset for the regulator. Accessibility is connected with the range of the system operator's functions. We can say that if something is in the operator's scope of competence, it should be accessible.

A single line in a function symbol means a location in the central control room, if it is a continuous line it additionally means accessibility for the operator. A single continuous line in the graphical function symbol of a DCS or PLC or the process computer system means accessibility to the function.

Example:



Inaccessibility for the operator is represented by a dashed line in the function block of the DCS or PLC or the process computer.
Example:



Access to a device means that:

The operator is able to exercise control by means of the device. The device is located separately or on a control panel. The device location can be in the installation (field location) or in the central control room. It is important that physical access to the device is not hampered, i.e. that it is not installed inside a cubicle and access does not require using any tools or time.

Example 1:

A push button located on a local panel for interlock reset:



Example 2:

A device that intermediates between a local element and the control system (adjusting a frequency signal from a transducer to a 4-20mA signal acceptable by the control system).



ESD – Safety interlocking system

HMI - Human Machine Interface **An integrated system for visualization and communication with the user** – A computer system which through implemented graphical or text applications enables communication between the user – operator and the integrated control system.

Process computer – a high-efficiency computer for complex process calculations. It can be capable of data visualizing, regulating and recording. It is usually a specialized computer for a specific use e.g. flow measurement with multiparameter compensation. Frequently connected with other control systems by means of a communications link.

Inaccessible – means the lack of accessibility features (see the concept „Accessible").

DCS Distributed Control System – **A distributed Computer Control System** – A control system used to exercise control and visualization of equipment distributed locally, via a remote visualization and intervention system (HMI). This concept does not include the electronic system of interlocking and safety sequence and other independent dedicated PLC controllers.

PLC (controller) – for the purpose of this document it is an electronic programmable system, independent from the distributed system, usually without a visualization feature. It can be:

- A safety interlocking system – ESD. It is connected with other systems via digital communications or by means of I/O cards.
- A dedicated system, specialized for one specific piece of equipment or equipment group. The operator has access only to all parameters and control features needed by him, although he does not necessarily have access to all parameters and control features (he does not need them or he does not understand them). It is connected with other systems via digital communication or by means of I/O cards.

4 The terminology of vessels, equipment and machines and their subassemblies

4.1 General description

The names of vessels, equipment and machines and their subassemblies include the following elements:

- The symbol of the installation
- The identification of the functional group of equipment
- The identification of the machine subassembly
- The serial number within the equipment functional group for the given installation
- An additional letter (if required)
- The symbol of the nozzle
- The consecutive number in the name of the nozzles of vessels

where:

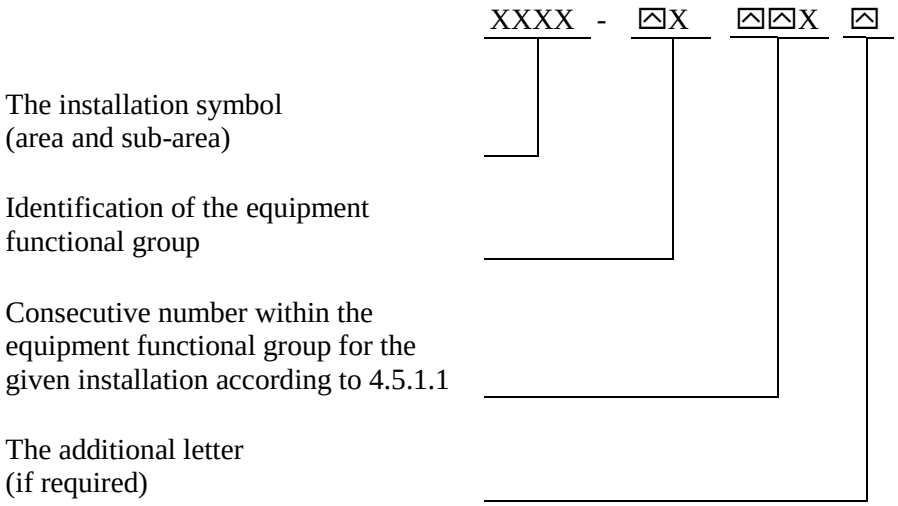
- The symbol of the installation shall be understood as a combination of numbers denoting the Area and Sub-area for the given installation, according to the Documentation Numbering Procedure – Specification No. 6110. (consists of 4 digits with the leading zero, if required).
- The identifications of the functional groups of vessels used to construct the names of vessels, equipment and machines as well as the names of their parts are shown in table 1 in this chapter. They can consist of one or two letters.
- The name of a vessel, equipment or machine shall be adopted in accordance with table 2 in this chapter.
- The consecutive number within the vessel functional group of the given installation can consist of one, two or three digits without preceding zeros, and the numbering should comply with the rules presented in 4.5.1.1
- The additional letter in the names of vessels, equipment or machines and also in the names of their subassemblies is used in cases where there are several identical vessels or pieces of equipment and they are not given separate numbers. In other cases this letter should be omitted.
- The nozzles shall be denoted by a letter according to the nozzle description in table 3.
- A consecutive number (without a leading zero) in the name of vessel nozzles is used if there are two identical nozzles. In other cases this number shall be omitted.
- All identification elements shall be written without spaces.

Note:
A general and overriding rule is that the number of a vessel or equipment is connected with the number of the process installation to which it belongs, and not with the number of the document. In justified cases it may be necessary to use other identifications of the designed vessels and equipment, that would follow from the accepted document identification. Each such deviation shall be approved by LOTOS Group or result from a request by LG.

Additional requirements for the identification of vessels and equipment are given in LOTOS Group specification No. 2030.

4.1.1 Identification of vessels, equipment and machinery

The names of vessels, equipment and machines are created in the following way:



EXAMPLE:

2080-P5A

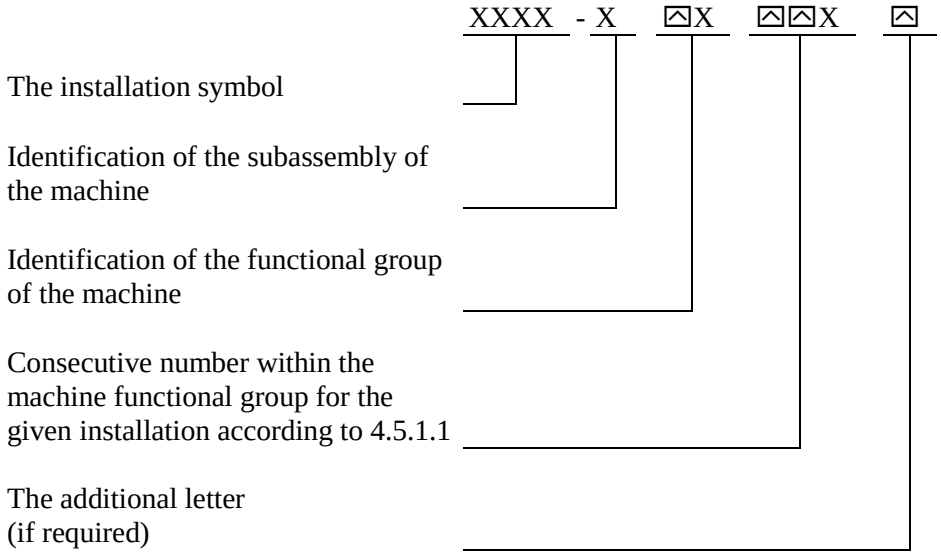
where: **2080** - the installation symbol (area=20, sub-area=80)

P - identification of the functional group (P - pump)

5A - consecutive number and a letter identification

4.1.2 Identification of the subassemblies of vessels, equipment and machinery

The names of the subassemblies of vessels, equipment and machines are created in the following way:



EXAMPLE:

0150-MP5A

where: **0150** - the installation symbol (area 01, sub-area 50)

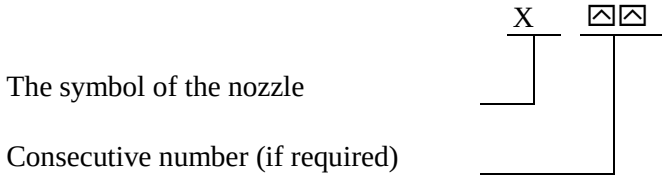
M - identification of the machine subassembly (M – el. motor)

P - identification of the functional group (P - pump)

5A - consecutive number and a letter identification

4.1.3 Identification of vessel nozzles and connections

In order to facilitate the identification of vessel nozzles and connections, the following numbering method has been established:



EXAMPLE:

G2

where: **G** - the nozzle symbol

2 - consecutive number

4.2 Tables with identifications

Tab. 1. Identification of functional groups of vessels, equipment and machines

Item	Funct. group id.	Description
1	B (*)	Boilers, steam generators
2	C	Rectifying, absorption or distillation columns
3	CF	Centrifuges
4	D	Batchers, meters
5	E	Heat exchangers
6	EA	Air coolers
7	F	Fired heaters
8	G	Breakers, sieves, mills
9	H	Dryers, electric heaters
10	J	Injectors
11	K	Blowers, compressors
12	LA	Tanker, barrel, container filling equipment
13	M	Mixers
14	ME (*)	Flares
15	N	Separators, cyclones
16	P	Pumps
17	R	Reactors
18	S	Atmospheric pressure storage tanks

Item	Funct. group id.	Description
19	T	Lifts, conveyors, trucks
20	U	Filters
21	W	Fans
22	V	Vessels
23	X	Other equipment

(*) Identifications marked in table 1 may occur in earlier LOTOS Group's documentation for existing installations and then their description is respectively:

B - Blowers,
ME - Filters,
It is not recommended to use so interpreted identifications in new documentation.

Tab. 2. Identification of subassemblies of vessels, equipment and machines

Item	Subassembly identification	Subassembly
1	X	Agitators (mixer arms)
2	B	Oil and gas feeders
3	C	Couplings
4	G	Gears
5	M	Electric motors
6	P	Steam engines
7	S	Internal combustion engines
8	T	Steam, gas and liquid turbines

Tab. 3. Nozzle identification

Item	Nozzle identif.	Nozzle description
1	A	The main inlet of the process stream
2	B	The main outlet of the process stream
3	C	Condensate inlet\outlet
4	D	Drain
5	E	Auxiliary connection
6	F	Vent
7	G	Level measurement
8	H	Overflow
9	J	Auxiliary inlet of the process stream
10	K	Auxiliary outlet of the process stream
11	L	Liquid-level indicator
12	M	Manhole
13	P	Pressure indicator
14	R	Reserve (stand-by)
15	S	Safety valve, safety head (blow-out disk)
16	T	Temperature indicator
17	V	Steam inlet/outlet
18	W	Water inlet/outlet
19	X	Service opening
20	Y	Ventilating opening

4.3 Pipeline terminology

4.3.1 General description

Names of pipelines include the following elements:

- Nominal pipe size
- Installation identification
- Medium code
- Sequence number within medium group of installation
- Modification sign (if required)
- Identification of material class code

where:

- In the name of a pipeline, the nominal pipe size appears without the metric unit identification, but where its value is given in inches, it must end with the unit sign (").
- Identification of an installation shall be understood as the combination of the number describing the area and the first digit of the sub-area for the given installation, according to the Documentation Numbering Procedure – Specification No. 6110 (consists of 3 digits with a leading zero, if required).
- Medium code shall be compatible with the description in table 1.
- In the name of a pipeline, the sequence number within medium group of installation shall be identified by a one-, two- or three-digit symbol (without the leading zero).
- The modification character shall be the letter M if an existing pipeline has been modernized without changing its name. In other cases this character shall be omitted.
- The name of a material class shall be comprised of 3 to 6 characters. The way how to create it is presented in 4.3.3.
- All identification elements shall be written without spaces.

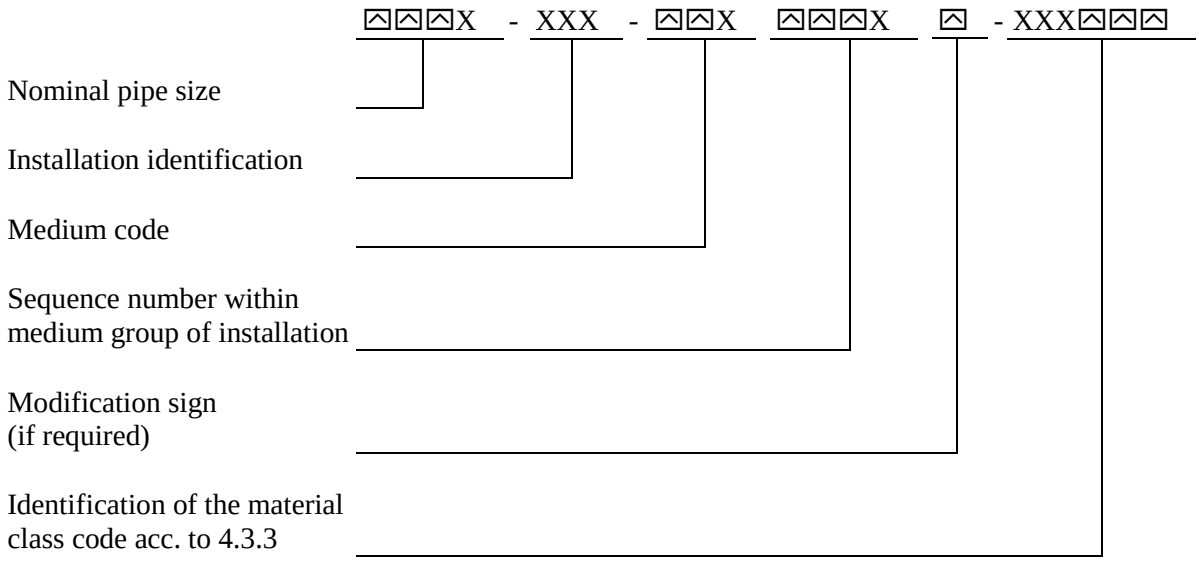
Tab. 1. Media identification

Item	Medium code	Medium description
1	A	Service air
2	IA	Instrumentation air Instrumential air
3	BD	Blow down (vapour)
4	BS	Slops (liquid) Blow down (liquid)
5	CH	Chemicals
6	HC	High pressure condensate
7	MC	Medium pressure condensate
8	LC	Low pressure condensate
9	FO	Fuel oil
10	FG	Fuel gas
11	FL	Foaming agent
12	FLW	Water ~~solution of a~~ foaming agent
13	H	Hydrogen
14	N	Nitrogen
15	IN	Inert gas (for instruments) Instrumental nitrogen
16	O	Oxygen

Item	Medium code	Medium description
17	P	Process medium
18	PP	Flushing oil
19	RL	Liquid refrigerant
20	RG	Gaseous refrigerant
21	HS	High pressure steam
22	MS	Medium pressure steam
23	LS	Low pressure steam
24	W	Drinking water
25	BW	Boiler feed water
26	CW	Cooling water
27	DW	Decarbonated water
28	FW	Fire water
29	SW	Service water
30	TW	Tempered water
31	Y	Sewage
32	NY	Non-oily sewage
33	OY	Oily sewage
34	PY	Process sewage, slops

4.3.2 Identification of pipelines

The name of a pipeline shall be created as follows:



EXAMPLES:

100-015-P11-HAB1E

where: **100** - nominal pipe size (mm)

015 - the installation identification (area 01, sub-area 50)

P - the medium code (P – process medium)

11 - sequence number

HAB1E - material class code

3"-200-P1158M-HAB1E

where: **3"** - nominal pipe size (inches)

200 - the installation identification (area 20, sub-area 00)

P - the medium code (P – process medium)

1156 - sequence number

M - modification sign

HAB1E - material class code

4.3.3 Generating the names of material classes

The name of a material class is comprised of 3 to 6 characters and it shall be created in the following way:

- the first character is used to code the intended use of the material class,
- the second character is used to code the rated pressure,
- the third character is used to code the basic material of the pipeline,
- the fourth, fifth and sixth letters are optional modifiers:

Description of specific characters:

- the first character (the intended use of the class) shall be adopted as below:

- C = Process (excluding hydrocarbons),
- H = Hydrocarbons (without hydrogen content),
- U = Utilities,
- W = Hydrocarbons with high hydrogen content and hydrogen.

- the second character (rated pressure) shall be selected as below:

- A = Class 150#,
- B = Class 125#,
- C = Class 300#,
- D = Class 600#,
- F = Class 900#,

- H = Class 1500#,
- J = Class 2500#,
- K = For underground pipelines,
- L = Class 125# or other low rated pressure,
- N = Class 150# (for utilities),
- R = Class 300# (for utilities),
- S = Class 600# (for utilities),
- T = Class 900# (for utilities),
- U = Class 1500# (for utilities),
- V = Class 2500# (for utilities).

▪ the third sign (basic material) shall be adopted as below:

- A = carbon steel / low-temperature carbon steel,
- B = 1-1/4 Cr or 2-1/4 Cr,
- C = 5 Cr,
- D = 9 Cr,
- E = other with Cr,
- F = austenitic acid-resistant steels,
- G = ferritic acid-resistant steels,
- H = high-alloy heat-resisting steels,
- J = other stainless,
- K = Monel,
- L = Alloy 20,
- M = Inconel/Incoloy,
- N = Hastelloys,
- P = Titanium,
- Q = Aluminum,
- R = cast iron,
- S = other,
- T = lined pipe,
- U = non-metallic,
- V = other,
- W = DUPLEX steels
- Z = Zirconium.

- the optional fourth digit in the name of a material class (a modifier for the adopted corrosion allowance) may assume the following values:

- 0 = the basic case, corrosion allowance 0.03 inch (0.8mm),
- 1 = the basic case, corrosion allowance 0.062 inch (1.6mm),
- 2 = corrosion allowance 0.125 inch (3.2mm),
- 3 = corrosion allowance 0.187 inch (4.8mm),
- 4 = corrosion allowance 0.237 inch (6.02mm)
- 5 = corrosion allowance 0

- the optional fifth letter in the name of a material class (a modifier for a specific material) shall be adopted in accordance with table 2.

Tab. 2 Selection of the specific material depending on the adopted basic material

The third character in the name of the material class	The attributed material	The fifth character in the name of the material class	The attributed material
A	Carbon steel/ low-temperature carbon steel	A	P235T1 (R35)
		B	P265 (K18)
		C	API 5L gr. B
		D	A333 Gr. 1
		E	A53 + galvanized
		F	A106 + galvanized
		G	X12 + galvanized
		H	A 106B
B, C, D	Steels with Cr content of up to 9%.	A	13CrMo4-5 (15HM)
		B	16Mo3 (16M)
		C	10CrMo9-10 (10H2M)
		D	A335 gr. P1
		E	A335 gr. P5
		F	A335 gr. P9
		G	A335 gr. P11
F, G	Acid-resistant steels	A	X6CrNiTi18-10 (1H18N9T)
		B	X6CrNiMoTi17-12-2 (H18N10MT)
		C	X6CrNiMoTi17-12-2 (H17N13M2T)
		D	TP304L
		E	TP321
		F	TP316
		G	TP316L

- J = Jacket heating,
- L = Low-temperature steel,
- S = For work in acid environment (sour service),

- V = For work in vacuum environment (vacuum service).

▪ the optional sixth letter in the name of a material class (a modifier related to additional material requirements) can have a symbol as below:

- H = HIC (hydrogen induced cracking)
- N = NACE (work in acid environment)
- T = PWHT (post-weld heat treatment)
- M = NACE + HIC
- P = NACE + PWHT
- R = NACE + HIC + PWHT

Note:
Other steels may be used after approval or on demand by LOTOS Group.

Table 3 in this chapter shows examples of pipeline material class identifications, which are typical, and the most frequently used in LOTOS Group's installations. Identifications of pipeline classes of parameters and requirements going beyond the given examples shall be generated in agreement with LOTOS Group.

Typical pipeline material classes

Pipeline classes	Medium	Design parameters		Basic material	Corrosion allowance (mm)	Pressure class	Gaskets	The main connections of pipelines
		Temperature (°C)	Pressure (MPa)					
PROCESS MEDIA								
CAA1	non-corrosive process media (with the exclusion of hydrocarbons), dumps, slops	from -29 to 300	as per ANSI B16.5	carbon steel	1.6	150RF face roughness 3.2 ÷ 6.3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
CCA1	non-corrosive process media (with the exclusion of hydrocarbons)	from -29 to 427	as per ANSI B16.5	carbon steel	1.6	300RF face roughness 3.2 ÷ 6.3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
CCA4HR	acid water	from -29 to 371	as per ANSI B16.5	killed carbon steel (NACE + HIC + PWHT)	6.0	300RF face roughness 3.2 ÷ 6.3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
CCA1HR	amine	from -29 to 371	as per ANSI B16.5	killed carbon steel (NACE + HIC + PWHT)	1.6	150RF face roughness 3.2 ÷ 6.3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	

Pipeline classes	Medium	Design parameters		Basic material	Corrosion allowance (mm)	Pressure class	Gaskets	The main connections of pipelines
		Temperature (°C)	Pressure (MPa)					
HYDROCARBONS								
HAA1	hydrocarbons (without hydrogen)	from -29 to 371	as per ANSI B16.5	carbon steel	1,6	150RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
HCA1	hydrocarbons (without hydrogen)	from -29 to 427	as per ANSI B16.5	carbon steel	1,6	300RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
WAA1	hydrocarbons with high hydrogen content, hydrogen	from -29 to 371	as per ANSI B16.5	killed carbon steel	1,6	150RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
WCA1HM	hydrocarbons with high hydrogen content, hydrogen	from -29 to 427	as per ANSI B16.5	killed carbon steel (NACE + HIC)	1,6	300RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	

Pipeline classes	Medium	Design parameters		Basic material	Corrosion allowance (mm)	Pressure class	Gaskets	The main connections of pipelines
		Temperature (ºC)	Pressure (MPa)					
UTILITIES								
UNAG	instrumentation air, potable water, fire water	from -29 to 66	do 1.92	carbon steel, two-sided galvanizing	0	150RF face roughness 12,5 µm	flat, from pressed non-asbestos plates as per ANSI B16.21	threaded NPT
UNA, UNF	steam tracing elements	from -29 to 300	acc. to steam used	carbon steel –steam tracing elements of a diameter of ≥ ½”, acid-resistant steel-steam tracing elements of a diameter of < ½”	0	-	-	
UNA1	service air, nitrogen, cooling water, industrial water, decarbonized water, low-pressure steam and condensate	from -29 to 300	as per ANSI B16.5	carbon steel	1.6	150RF face roughness 3,2 ÷ 6,3 µm	flat, from pressed non-asbestos plates as per ANSI B16.21	

Pipeline classes	Medium	Design parameters		Basic material	Corrosion allowance (mm)	Pressure class	Gaskets	The main connections of pipelines
		Temperature (°C)	Pressure (MPa)					
URA1	medium-pressure steam and condensate, demineralized water	from -29 to 427	as per ANSI B16.5	carbon steel	1.6	300RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	
USA1	high-pressure steam and condensate	from -29 to 427	as per ANSI B16.5	carbon steel	1.6	600RF face roughness 3,2 ÷ 6,3 µm	spiral – acid-resistant steel with graphite separators and an external centering ring as per ANSI B16.20	

4.4 Terminology of corrosion test points

4.4.1 General

The name of a corrosion test point is comprised of the following elements:

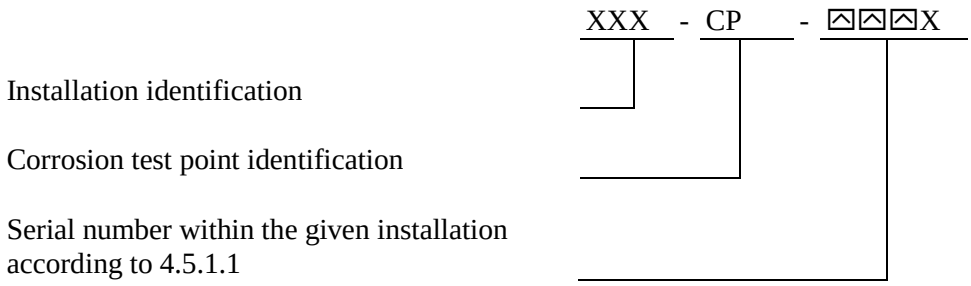
- Identification of the installation
- Identification „CP"
- Serial number within the given installation

where:

- Identification of the installation shall be understood as the combination of a number describing the Area and the first digit of the sub-area for the given installation, according to the Documentation Numbering Procedure – Specification No.. 6110 (consists of 3 digits with a leading zero, if required).
- The serial number of the corrosion test point within the given installation shall be identified by a one-, two- or three digit symbol (without the leading zero).

4.4.2 Identification of corrosion test points:

The identification of corrosion test points shall be created as follows:



EXAMPLE:

031-CP-1

where: **031** - installation identification (area 03, sub-area 10)

CP - corrosion test point

1 - serial number

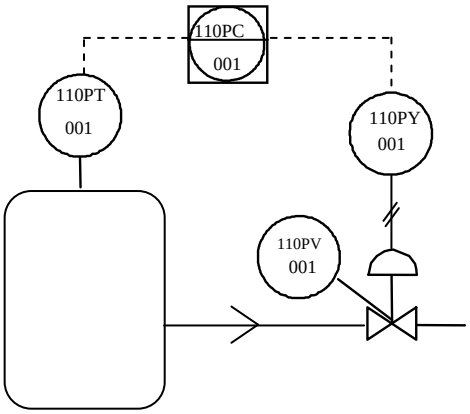
4.5 Identification of instrumentation equipment

This chapter provides general guidelines for the identification of the measuring and executing elements of instrumentation and for the identification of their functions within control systems. Requirements concerning the identification of instrumentation equipment such as junction boxes, control panels, supporting structures, air distributors, control rooms, control cabinets, cables and terminal strips are given in point 4.7.

4.5.1 The structure of the identification of instrumentation loop elements

An instrumentation loop, is formed by instrumentation equipment. Every loop has its identification. For instance, a pressure regulation loop in a tank may contain a pressure controller implemented in a

DCS system, which controls the valve letting the medium out of the tank. The regulator receives the measurement signal from the pressure transmitter (sensor) installed in the tank. This situation is illustrated in the figure below.

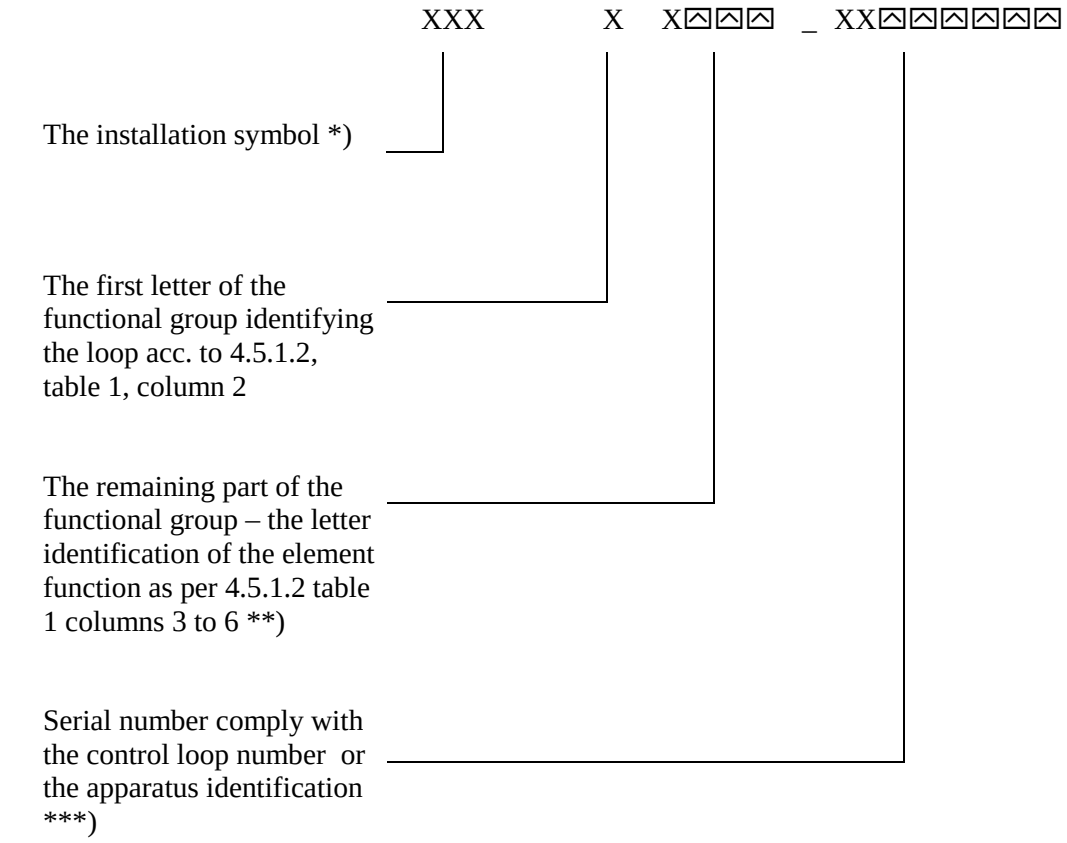


Loop identification 110P_001

Loop elements:

- transmitter 110PT_001
- the controller in the DCS system 110PC_001
- the valve positioner 110PY_001
- the executing element - valve 110PV_001

The structure of the identification of a loop element has been presented below:



where: ⍁ optional identification X required identification

NOTES:

*) The three digits of the installation symbol (for the area and the first digit of the sub-area) shall be used in accordance with Documentation Numbering Procedure No. 90-10-00001 .

**) There can be maximum six characters of the function group, where the last character must be the underline character ("_"). For new installations and installations where the control system is being completely modernized, the identification of a functional group shall be generated according to ANSI/SA-S5.1.-1984 - "Instrumentation Symbols and Identification". For other existing installations the letter L (low) or H (high) shall be the first letter of the functional group identification (if required).

***)

- Serial number - max. 8 characters: digits according to the rules presented in 4.5.1.1 and letters (if they appear, they do only on the last places).

  or

- The identification of a apparatus within the identifications of functions connected with an interface with the electrical discipline – see 4.5.1.7.

Examples:

110LLPS_120ABC (existing installation)

where: **110** - symbol of the installation (area = 11, sub-area = 00)

LLPS - functional group identification

12345ABC - serial number

015PSLL_001A (new installation)

where: **015** - symbol of the installation (area = 01, sub-area = 50)

PSLL - functional group identification

001A - serial number

4.5.1.1 Division of the range of ordinal numbers

Within each installation the range of ordinal numbers (001-999) shall be divided into sub-ranges for individual package contractors so that each of them can use its range without fear that its identification will duplicate the identification of another contractor. In case of complex installations LG may extend the range of serial numbers to a four-digit range.

The selected division of the range of numbers refers not only to measuring and final-executing elements but also to instrumentation equipment (junction boxes, control panels, control cabinets and other – see 4.7). It must also include apparatus, machines, equipment and their subassemblies.

Example for 5 contractors on installation 110 :

Main contractor - range 001-400

Subcontractor 1 - range 401-600

Subcontractor 2 - range 601-800

Subcontractor 3 - range 801-900

Subcontractor 4 - range 901-999

The division of the numerical range should be done by a process engineer on the basis of the expected numbers of instruments on the installation.

Care should be taken to ensure that numbers for manual valves (type HV) with limit switches for position signaling are generated by the instrumentation discipline.

4.5.1.2 The meaning of the letter parts of the identification:

Most identifications comply with the recommendations of ISA-S5.1, however a certain part has been modified or provided with details as below:

Table 1

1	2	3	4	5	6
	The first letter		**Next letters**		
	Measured or initiating value	**Modifying letter**	**Read function**	**Output function**	**Modifying letter**
A	Analysis-analyzer		Alarm		
B	Burner		Unused	Unused	Unused
C	Unused			Regulator	
D	Unused	Difference			
E	Voltage		Sensor		
F	Flow	Ratio, proportion			
G	Unused		Glass indicator, or other indicating device		
H	Manual				High state
I	Current (electric)		Indication		
J	Power	Scanning			
K	Time	Change with time		Manual signal adjuster	
L	Level		Lamp		Low state
M	Valve with an electric actuator	Momentary action, pulse			Intermediate, transient state,
N	Interface with the electrical discipline: control and signaling of drive, apparatus etc. states		Unused	Unused	Unused
O	Unused		Reducing pipe		
P	Pressure, vacuum		Control point connection		
Q	Quantity	Integration, counting			
R	Radiation		Backing up		
S	Velocity, frequency	Safety		Connector	
T	Temperature			Transmitter	
U	Multivariable		Multivariable	Multivariable	Multivariable
V	Vibrations, mechanical analysis			Valve, gate valve, shutter	
W	Weight, force		Instrument well		
X	Other feature provided with details by the loop description	Axis X	Other function but not an alarm, provided with details by the loop description	Shut down valve	Unused
Y	Event, Current status	Axis Y		Relay, recalculation, valve positioner	
Z	Position, dimension	Axis Z		Actuator, final executing element, driver	

- The first letter of the functional group (identification) shall comply with the process function of the loop and not with the design of the measuring or executing element, see table 1– column 1. Therefore a differential pressure transmitter with measuring orifice, used to measure flow, shall be marked FT and not PT.
- When identifying a loop, the requirements of the standards ISA S-5.1, ISA S-5.3 shall be followed.
- When identifying alarm levels, try to use maximum two-letter identifications, i.e..

One letter, e.g. L, means signaling an exceeded threshold value without any automatic action.

Two letters, e.g. LL mean the performance of a preprogrammed automatic action confirmed by signaling.

The value of the threshold LL is lower than that of L, that is first there is signaling in the alarm state system and then, if no adequate reaction to that state could be made, an automatic reaction takes place.

- The number of the identification letters shall be minimum, but sufficient to understand the meaning of the function.
- Letter „A" shall be used for identifying gas detector loops.
- Letter „I" for identifying an analog indication in the control system does not need to be used if there is a regulator in the system, i.e. e.g. 110PC_001 and not 110PIC_001.
- Letter „R" should not be used to identify measurement recording since as a rule all measurements referred to DCS must be recorded.

4.5.1.3 Distinguishing control loop elements performing the same function

If there are several elements performing the same function in one control loop e.g. one regulator and two valves, they shall be distinguished by adding a letter suffix at the end.

Example

Valve first 110FV_001A

Valve second 110FV_001B

Similarly for transmitters:

Example:

Transmitter first 110PT_001A

Transmitter second 110PT_001B

4.5.1.4 Parallel process lines

For parallel process lines comprised of similar instrumentation elements and performing the same function, for instance, stand-by lines or lines for controlling the capacity by activating subsequent parts, letter suffixes shall be used at the end of the identification for each line. The lines shall be identified by the subsequent letters of the alphabet, e.g. if there is one compressor on each line, they shall be marked e.g. 0150-K5**A**, 0150-K5**B**, 0150-K5**C.** Instrumentation elements shall be identified according to a similar method, e.g. temperature at inlet from the compressor on line „A" has identification e.g. 015T_001A, on line „B"- 015T_001B and so on.

4.5.1.5 Valves with pneumatic or hydraulic actuators

The following identification shall apply to valves:

- FV flow control valve
- HV manual valve
- LV level control valve
- MOV - motor operated valve
- PV pressure control valve
- XV shut down valve
- TV temperature control valve
- UV valve for sequence control
- ZV position control valve
- other – an identification constructed according to the above rules

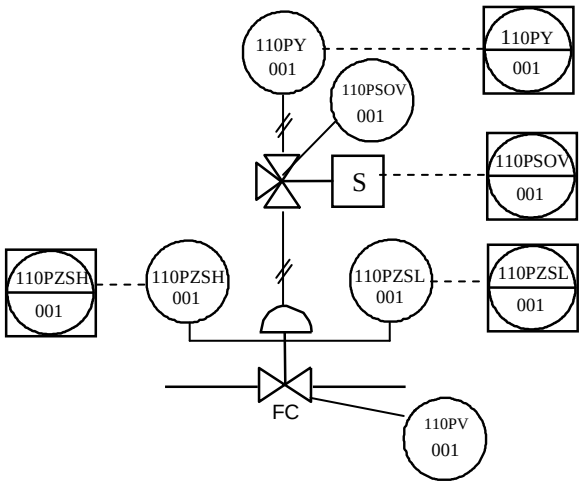
and for direct action valves

- FCV self-actuated flow control valve
- LCV self-actuated level control valve
- PCV self-actuated pressure control valve
- TCV self-actuated temperature control valve
- other identification constructed according to the above rules

The positioner on a valve shall be identified by letter „**Y"** and a solenoid valve by letters „**SOV**". Limit switches on a valve shall be identified by letters: **ZSH** (opening signaling) and **ZSL** (closing signaling). Valve identifications are shown in the figure below.

Note:

For shut down valves and ones for sequence control (identified by letters UV and XV) shall have different numbers.



If there are two solenoid valves on a valve, they shall be identified by letters A,B... in the identification suffix.

Example 1 :

110P_001	loop identification
110PSOV_001A	solenoid valve first
110PSOV_001B	solenoid valve second

Example 2:

110P_001A	loop identification (e.g. a loop on 1 line from among several parallel lines – the line identified by suffix „A)
110PSOV_001AA	solenoid valve first
110PSOV_001AB	solenoid valve second

4.5.1.6 ON-OF valves with electric actuators

A ON-OF valve with an electric actuator is identified by letters „MOV" and the valve loop identification is – 110M_001.

The identification is built of the following parts:

- parts identifying the valve loop, e.g. 110M_001
- parts identifying the instrumentation function.

The way of ranking those parts are shown by the following example.

Identification example:

110MOV_001 a valve with an electric actuator (a local element)

110MSH_001 opening of the valve

110MHSH_001 manual pushbutton – opening of the valve (can be local or in the system)

110MSL_001 closing of the valve

110MHSL_001 manual pushbutton – closing of the valve (can be local or in the system)

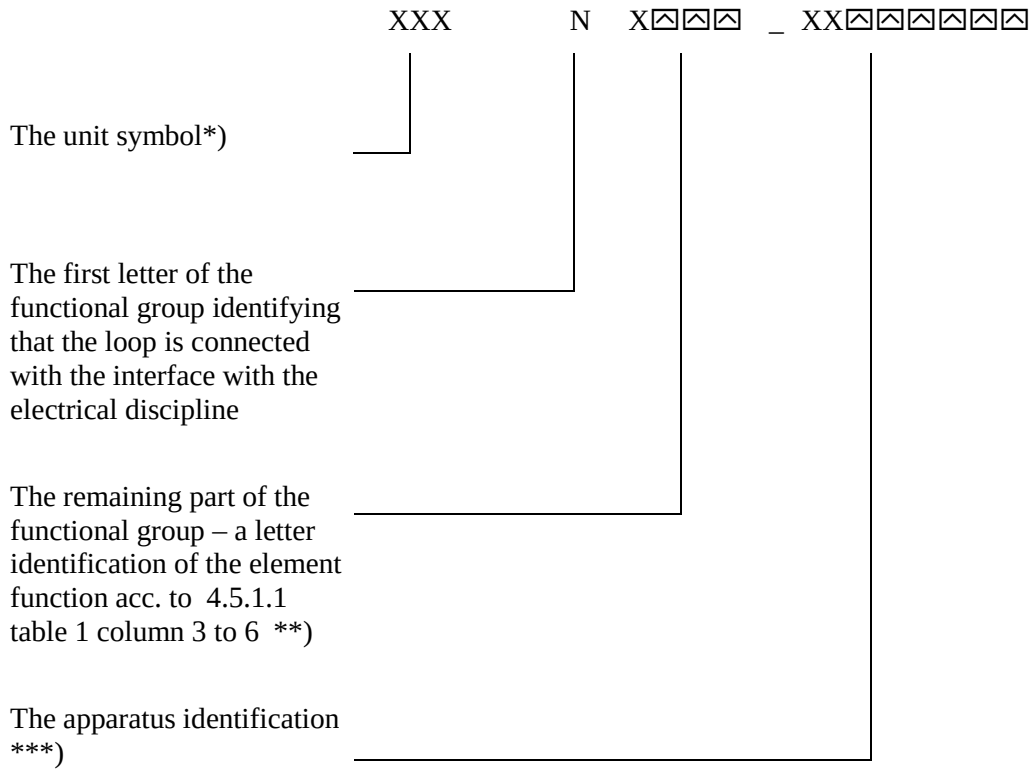
110MX_001 signaling of the valve operation

110MA_001 signaling of the valve failure

110MLR_001 signaling of the valve switch-over to local control

4.5.1.7 Identifications of instrumentation signals relating to the interface with the electrical discipline.

The way of identification is shown below.



where: ⍓ optional identifications X required identifications

NOTES:

*) Three digits of the installation symbol (area and the first digit of the sub-area) shall be applied according to Documentation Numbering Procedure – specification GL 6110.

**) There may be maximum six characters of the functional group, where the last character must be the underline character.

***) apparatus identification e.g. MP5A

Identification example 1: For the electric motor of pump 0150-MP5A:

015N**SH**_MP5A	switching the device on
015N**HSH**_MP5A	manual pushbutton / switch for switching the device on (it can be local or in the system)
0015N**SL**_ MP5A	switching the device off
015N**HSL**_ MP5A	manual pushbutton / switch for switching the device off (it can be local or in the system)
015N**X**_ MP5A	signaling of the device operation
015N**A**_ MP5A	signaling of the device failure
015N**LR**_ MP5A	signaling of the position of the „remote/local control" switch

Identification example 2: For electrical heater 0150-E1:

015N**X**_E1	signaling of the device operation
015N**A**_E1	signaling of the device failure.

4.5.1.8 Other identifications

For atypical instrumentation elements or exchange with other systems for which it is difficult to select a letter from the table in 6.4, letter „X" shall be used to identify a control loop.

Identification example:

110X_001	identification of a loop connected with power section diagnostics
110XA_001	power system failure
110XX_001	proper operation of the power system.

4.5.1.9 Identification of loops concerning many installations or parts of the plant

It is often necessary to identify a loop not connected with one specific installation, e.g. the identification of the control room air conditioning signaling loop, or of the voltage in the system power cabinet. In this case, the identification of the central control room associated with this loop shall be used in place of the area / sub-area code.

Identification example:

CR1_X_001	e.g. Identification of the control room No. 1 air-conditioning operation signaling loop in the room TIR2 for system cabinets
CR1_XA_001	air-conditioning system failure
CR1_XX_001	air-conditioning system operation.

For a signal not connected with a specific control room but with a part of the plant, in place of the area / sub-area code the identification of the plant part shall be used.

Identification example:

PZH_X_001 e.g. Identification of the signaling loop in the central fire control room on a part of PZH plant from the fire switchboard

PZH_XA_001 fire in a part of PZH plant

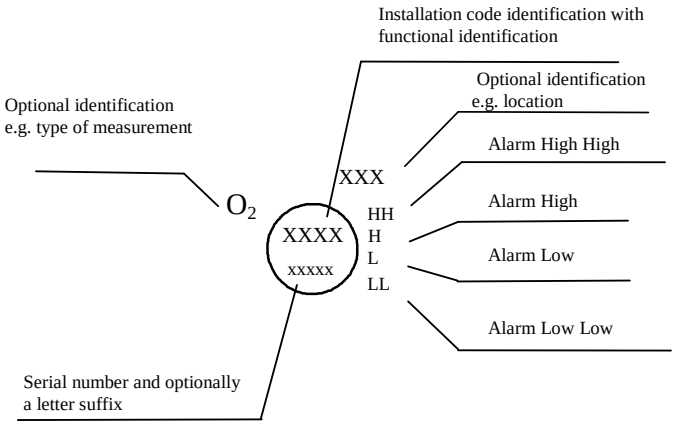
PZH_XX_001 no fire in a part of PZH plant

4.6 Presentation of instrumentation elements in P&I diagrams

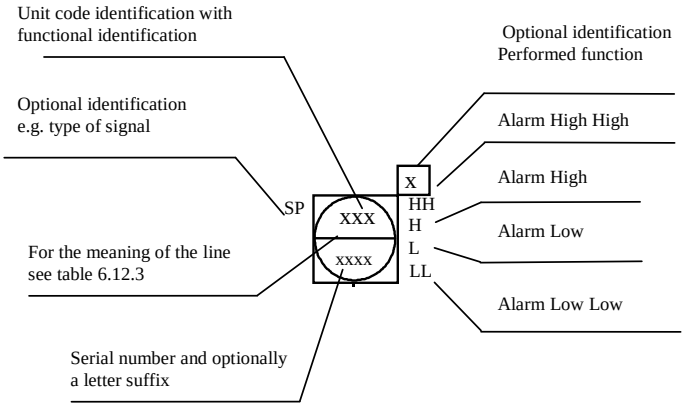
4.6.1 General requirements

- The identification method shall be based on the requirements of ISA S-5.1, ISA S-5.3 standards.
- Between the blocks of instrumentation elements there shall be a line appropriate for the transmitted signal.
- Arrows on signal lines shall be used if required to understand the way of information flow.
- Effort should be made to present if possible all digital communication connections between different control systems, considering the P&ID diagram transparency.

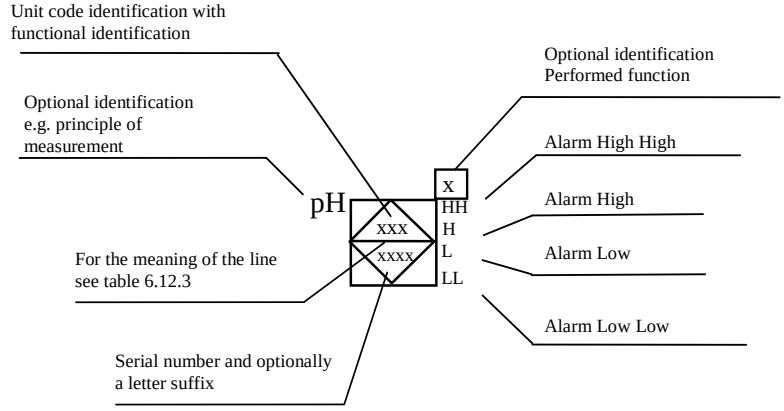
Identification of elements located in the installation.



Identification of the functional blocks of the DCS system



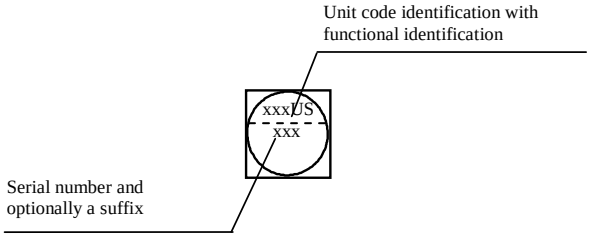
Identification of functional blocks in the PLC system



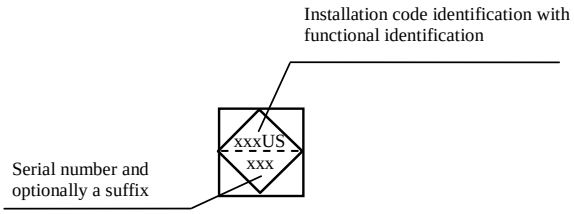
4.6.2 Identification of interlocks in control systems

The shut down and sequence identification system is based on principles analogous to the identifications of loop elements (see 6.2) with functional element „US".

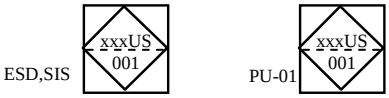
Shut down identification in the DCS system



Identification of shut downs in the PLC system



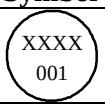
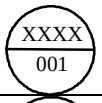
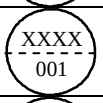
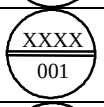
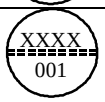
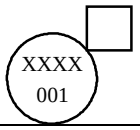
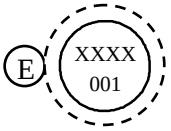
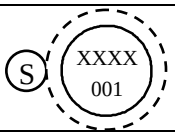
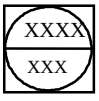
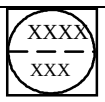
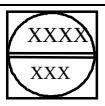
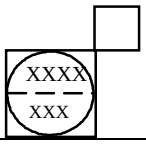
If the identification of the PLC systems of different subcontractors by means of the range of serial number is not sufficient, then additionally a system should be identified at the graphical symbol.
Example :
Distinguishing an ESD,SIS system from among other PLC controllers, when distinguishing by a serial number is not possible:

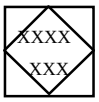
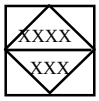
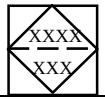
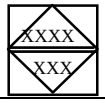
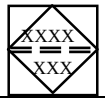
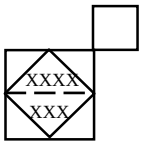
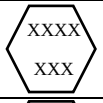
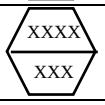
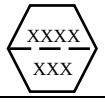
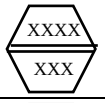


4.6.3 Types of signal lines

No.	**Description**	**Symbol**
1	Process line	
2	Pneumatic signal line	
3	Electric signal line	lub
4	Digital communication link MODBUS, PROFIBUS DP/ ETHERNET	
5	Digital communication link of field equipment (FIELDBUS) e.g. PROFIBUS PA	
6	Capillary	
7	Signals not lead via a cable (radiation, sound, light etc.)	

4.6.4 Identification of the functions of elements, their location and accessibility for the operator

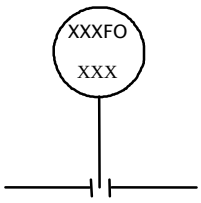
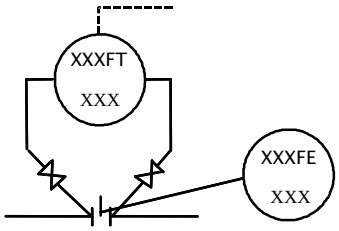
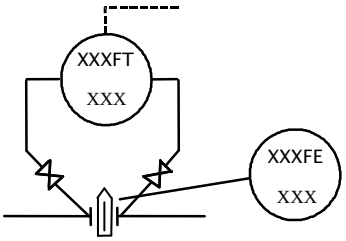
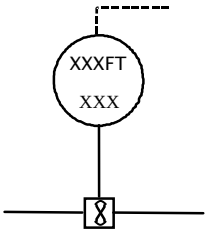
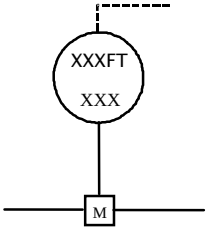
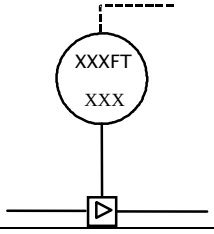
No.	Description	Symbol
1	Field-located instruments – locally	
2	Instruments located in the central control room, accessible for the operator	
3	Instruments located in the central control room, inaccessible for the operator	
4	Instruments located on a local panel, accessible for the operator	
5	Instruments located on a local panel, normally inaccessible for the operator, e.g. a panel in a cabinet in a service room. It can be a separate regulator.	
6	Field-located instruments with identification of the perfomed function according to 4.6.5	
7	Electrically heated instruments located on the installation.	
8	Steam-heated instruments located on the installation.	
9	An element of DCS, located on the installation, without access for the operator or An element of DCS, without a concrete location, e.g. a communicat-ions link, without access for the operator	
10	An element of DCS, in the central control room, with access for the operator	
11	An element of DCS, in the central control room, without access for the operator	
12	An element of DCS, location on a local panel, with access for the operator (can be an operator's station)	
13	An element of DCS, in the central control room, without access for the operator, with identification of the performed function acc. to 4.6.5	

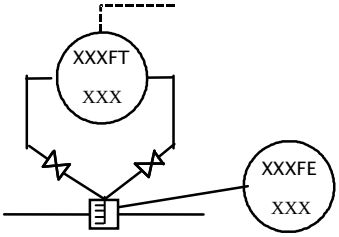
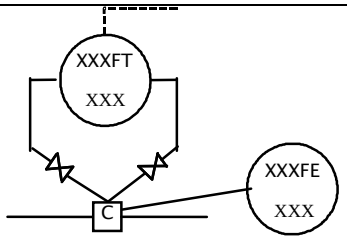
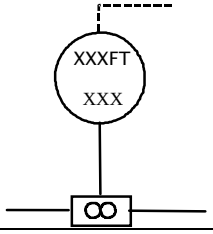
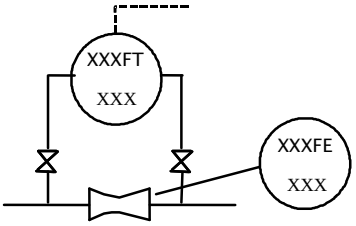
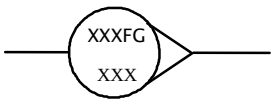
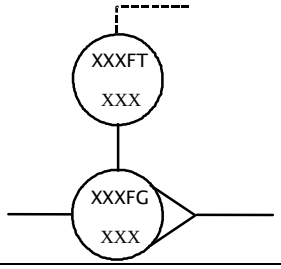
14	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, located on the installation, without access for the operator	
15	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, located in the central control room, with access for the operator	
16	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, located in the central control room, without access for the operator	
17	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, located on a local panel, with access for the operator	
18	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, located on a local panel, without access for the operator	
	Element – a function in the programmable logical controller (PLC) – it can also be a controller functioning as an ESD,SIS systems, without access for the operator, with identification of the performed function acc. to 4.6.5	
19	Element – a function in the process computer, located on the installation, without access for the operator	
20	Element – a function in the process computer, located in the central control room, with access for the operator	
21	Element – a function in the process computer, located in the central control room, without access for the operator	
22	Element – a function in the process computer, located on a panel, with access for the operator	
23	Element – a function in the process computer, located on a panel, without access for the operator	

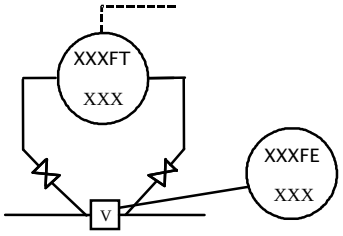
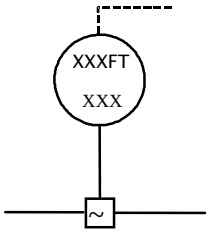
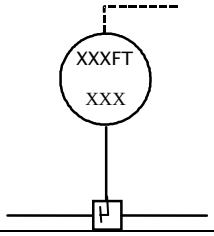
4.6.5 Functional identifiers

No.	Description	Symbol	Nr	Description	Symbol
1	SUM		8	SELECTION OF THE BIGGER SIGNAL	
2	SUBTRACTION		9	SELECTION OF THE SMALLER SIGNAL	
3	MULTIPLICATION		10	UPPER BOUND	
4	DIVISION		11	LOWER BOUND	
5	SQUARE ROOT		12	INTEGRATION	
6	FUNCTION		13	DIFFERENTIATION	
7	DEVIATION, SHIFT		14	CHANGE OF SIGNAL FORM- TYPE Where „* ” means: E- voltage, I-current, P- pneumatics, A- analogue, B- binary, H- hydraulics, O electromagnetic signal, R- resistance, D- digital	

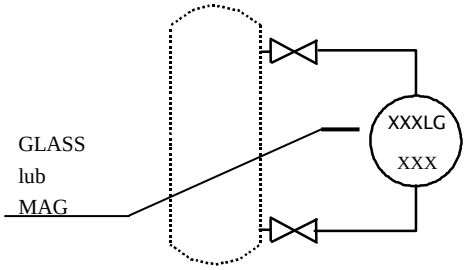
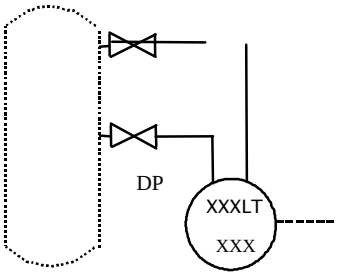
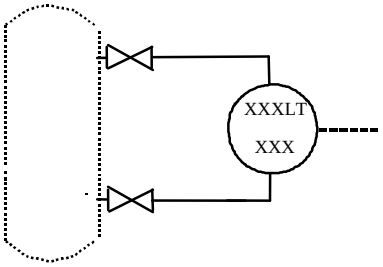
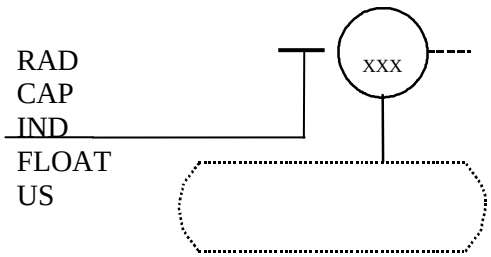
4.6.6 Functional blocks – flow

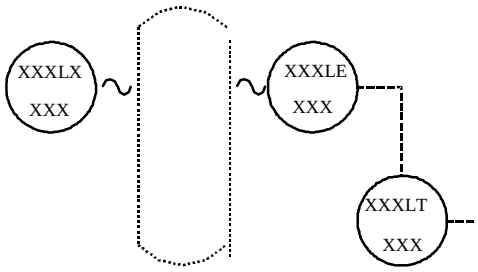
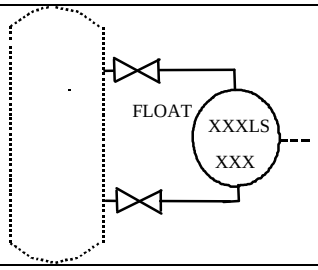
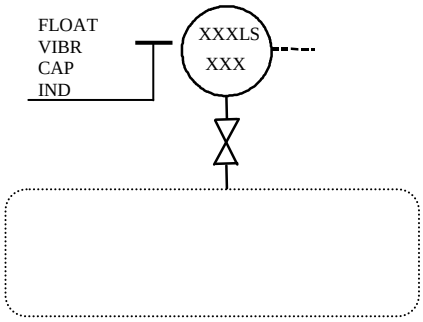
No.	Description	Symbol
1	Restriction orifice	
2	Measuring orifice	
3	Measuring orifice removable under pressure	
4	Turbine flowmeter	
5	Magnetic flowmeter	
6	Vortex type flowmeter	

No.	Description	Symbol
7	Pitot tube	
8	Mass flowmeter	
9	Displacement flowmeter	
10	Venturi tube	
11	Rotameter	
12	Rotameter with a transmitter	

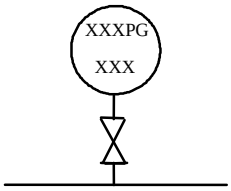
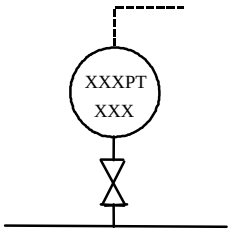
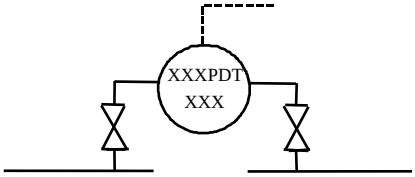
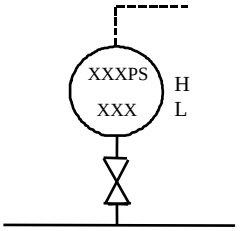
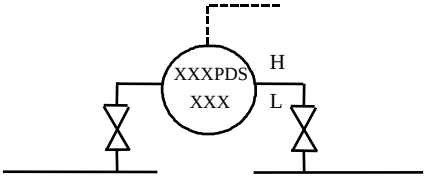
No.	Description	Symbol
13	V-cone orifice	
14	Ultrasonic flowmeter	
15	Target meter	

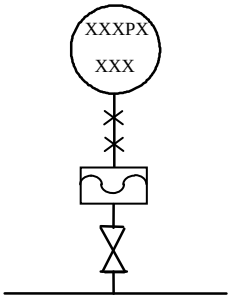
4.6.7 Functional blocks – level

No.	Description	Symbol
1	Local level indicator Glass – ident. GLASS Magnetic – ident. MAG	
2	Level measurement by the differential pressure method	
3	Displacement level transmitter	
4	Level measurement: ▪ Radar- ident. RAD ▪ Capacitance- ident. CAP ▪ Induction- ident. IND ▪ Float- ident. FLOAT ▪ Ultrasonic- ident. US	

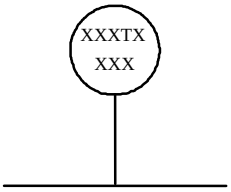
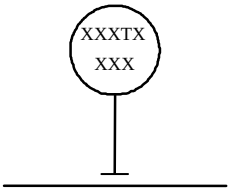
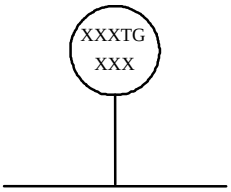
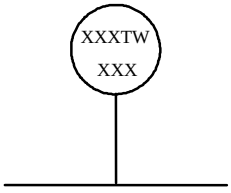
No.	Description	Symbol
5	Nuclear level transmitter	
6	Float level switch	
7	Level switch (installed on the upper surface)	

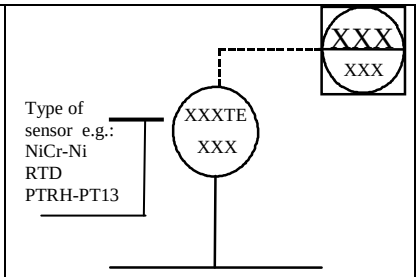
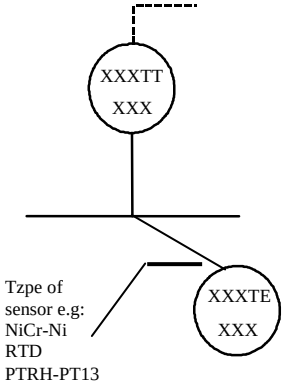
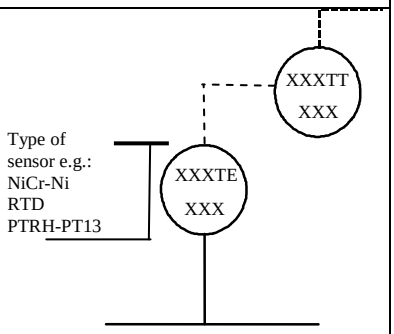
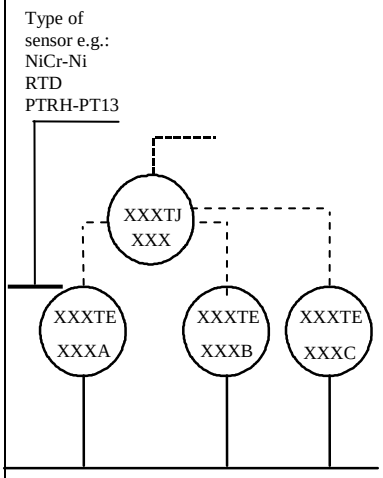
4.6.8 Functional blocks – pressure / differential pressure

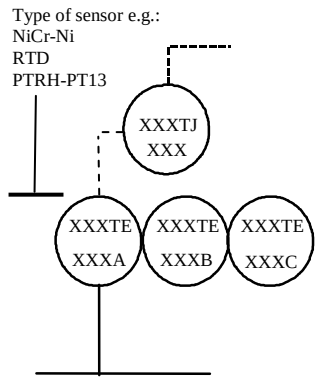
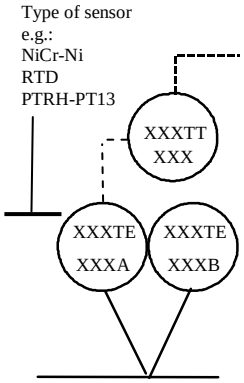
No.	Description	Symbols
1	Pressure gauge – manometer – local indication	
2	Pressure transmitter	
3	Differential pressure transmitter	
4	Pressure switch – here for signaling high and low pressure.	
5	Differential pressure switch	

6	Measurement using a separating diaphragm and a capillary (for use in the previous types of measurements)	

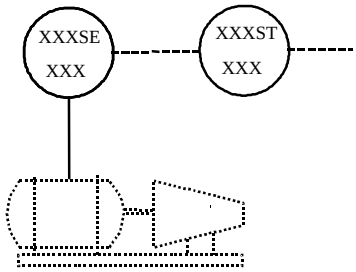
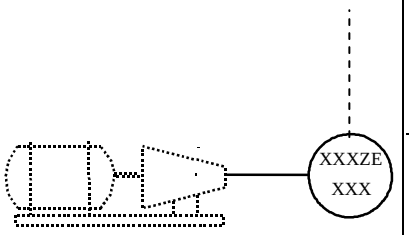
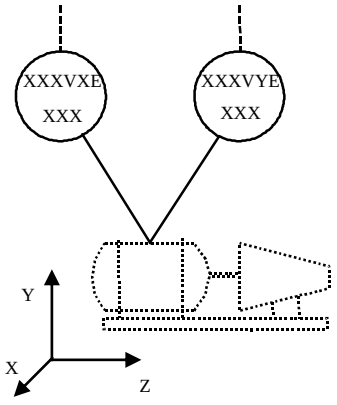
4.6.9 Functional blocks – temperature

No.	**Description**	**Symbols**
1	A general symbol for use in the following types for temperature measurements – insertion temperature measurements	
2	A general symbol for use in the following types for temperature measurements – surface temperature measurement.	
3	Local thermometer	
4	Thermowell (the identification appears when the well exists independently)	

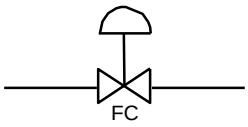
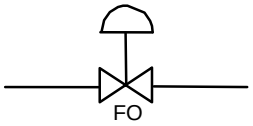
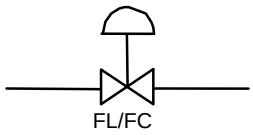
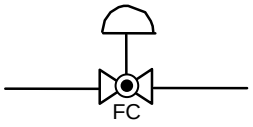
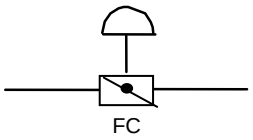
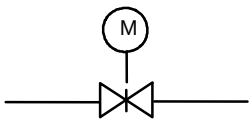
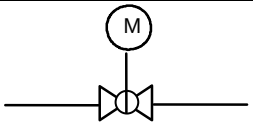
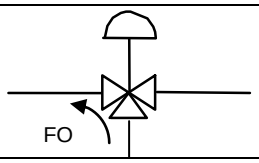
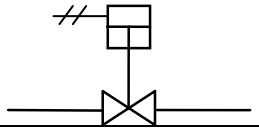
5	Temperature measurement with reference to the DCS system without a transmitter agency	
6	Temperature measurement with reference to the DCS system with the transmitter integrated with the sensor	
7	Temperature measurement with the transmitter that is not integrated with the sensor	
8	Several sensors located in different places and connected directly to a multiplexer. (Letter suffixes A,B,C... for consecutive measurements appear in the identification).	

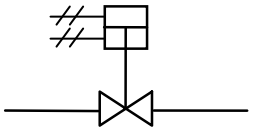
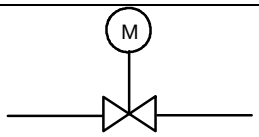
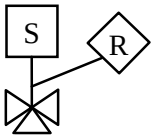
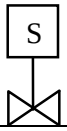
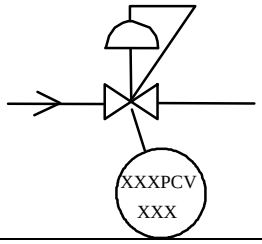
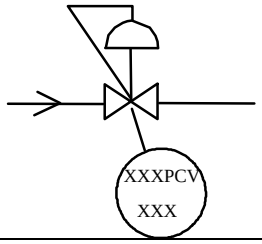
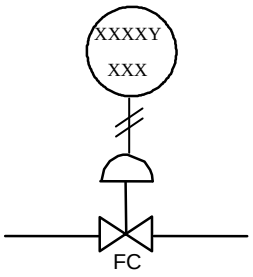
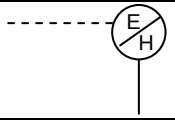
9	Several sensors located in one thermowell and connected directly to a multiplexer. (Letter suffixes A,B,C... for consecutive measurements appear in the identification).	
10	Two sensors in one thermowell. One of the sensors is connected with a transmitter, the other one is a spare.	

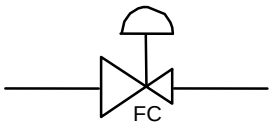
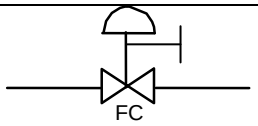
4.6.10 Velocity, vibrations and axial displacements

No.	Description	Symbols
1	Velocity or frequency measurement with a probe and a transmitter	
2	Axial displacement measurement	
3	Vibration analysis in two planes (X, Y)	

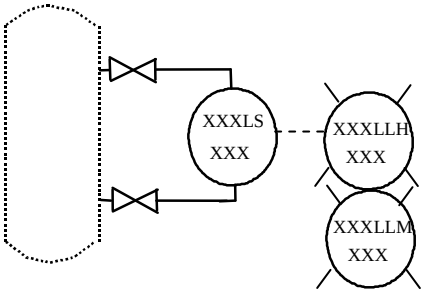
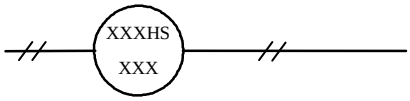
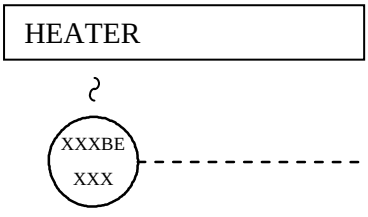
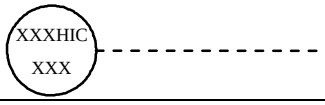
4.6.11 Valve identifications

No.	Description	Symbols
1	A valve with a membrane pneumatic actuator, FC means a valve without energy i.e. without air and/or without electric energy aims at closing	
2	A valve with a membrane pneumatic actuator, FO means a valve without energy i.e. without air and/or without electric energy aims at opening	
3	A valve with a membrane pneumatic actuator, FL/FC means a valve without energy i.e. without air and/or without electric energy aims at closing but is blocked in the position in which it is at the moment	
4	A ball valve with a membrane pneumatic actuator	
5	Butterfly valve with a membrane pneumatic actuator	
6	Gate valve with an electric actuator	
7	Plug valve (cock) with an electric actuator	
8	A three-way control valve with a membrane pneumatic actuator with indication of the open way when energy fails	
9	A single action pneumatic valve with a piston actuator	

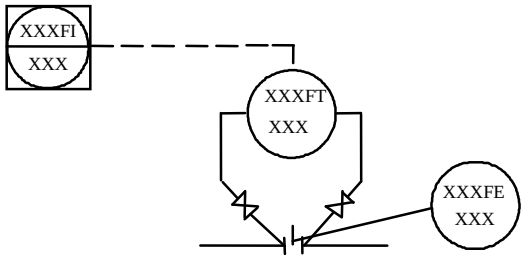
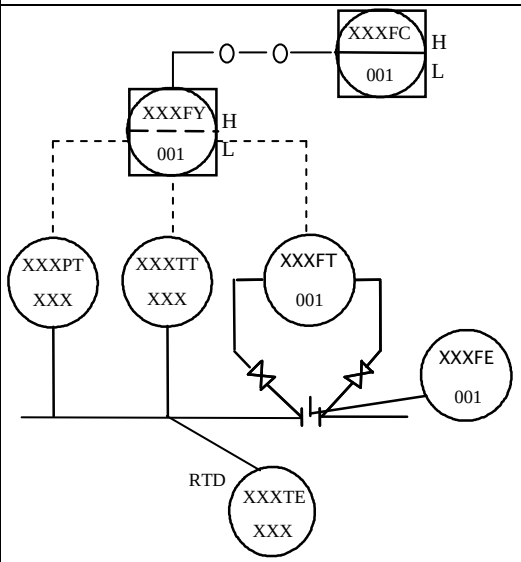
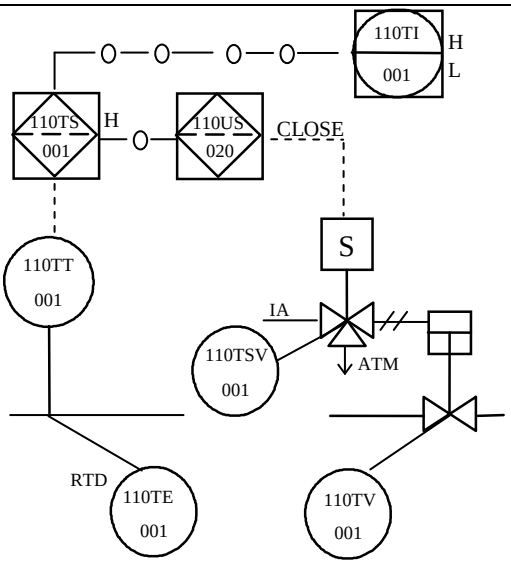
No.	Description	Symbols
10	A double action pneumatic valve with a piston actuator	
11	Electrically operated valve	
12	Three-way solenoid valve with a possibility of manual return to the initial positions	
13	Two-way solenoid valve	
14	Self-actuated valve	
15	Self-actuated valve	
16	A valve with a positioner	
17	Electric to hydraulic signal converting device	

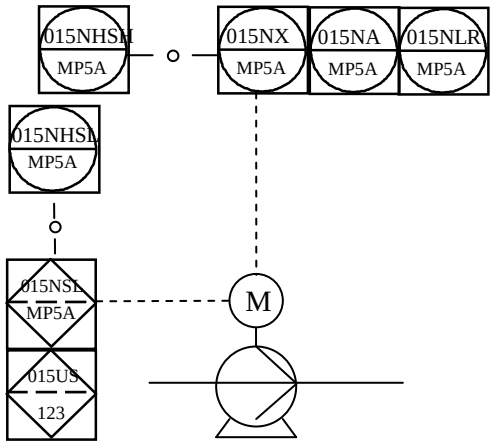
No.	Description	Symbols
18	A different diameters of valve inlet and outlet connections	
19	A valve with a manual control wheel	

4.6.12 Miscellaneous

No.	Description	Identification
1	Level switch with a lamp signaling high state H and a lamp signaling „medium” state	
2	Manual close/open switch on an instrumentation air line	
3	Flame detector	
4	Signal adjuster	

4.6.13 Examples

No.	Description	Identification
1	Flow transmitter (FT) - flow indication (FI) in DCS	
2	Flow measurement with compensation from pressure and temperature in DCS	
3	Closing of valve 110TV_001 from interlock 110US_020. Indication in DCS of the value of temperature 110TI_001 and signaling of alarms generated in ESD or SIS.	

4	Control and signaling of the states of pump motor 0150-MP5A. Failure signaling -015NA_5MP5A Operation signaling -015NX_5MP5A Position of „remote/local" switch -015NLR_MP5A Switching-on of a pump: - from DCS manually - 015NHSH_MP5A . Switching-off of a pump: by controlling output ESD,SIS-015NSL_MP5A - from DCS manually- 015NHSL_MP5A - from ESD,SIS by interlock 015US123	

4.7 Identification of instrumentation devices and equipment

This chapter provides guidelines concerning identifications and numbering of instrumentation system elements such as junction boxes, control panels, supporting structures, air distributors, control-room rooms, control cabinets, cables and terminal strips.

4.7.1 The meaning of the identification prefix

Identification prefix can mean:

- Plant, e.g. **PZH**
- Control room, e.g. **CR1**
- Installation, e.g. **110.**

Instrumentation elements shall receive a prefix appropriate for their function and location, and the procedure shall be as follows:

If the installation suffix cannot be assigned to the element, the code of the central control room shall be used. In the function of the element is connected with many control rooms, the code of the plant shall be used.

Example:

110MA_001- MOV valve failure

CR1_XA_001- cabinet power supply failure e.g. CD_001 in the central control room CR_1

PZH_XA_001- PZH plant fire-fighting system failure

4.7.2 Length and meaning of the identification suffix

The length of the suffix depends on the associated facility:

In the identification of the rooms of the control room the length of the suffix is one, e.g. CR_**1,** ER_**1,**TIR_**1**.

In the identification of terminal strips and cables the length of the suffix is two, e.g. X**01**, 110PT001K**01**.

For measuring and executing elements, boxes, panels, cabinets and other elements which can be assigned to different subcontractors – it is three (see the paragraph below).

In exceptional cases, where there is a very large number of instrumentation elements LOTOS Group may introduce a four-digit suffix.

Example:

110PY_002 valve positioner

110JIA_002 junction box

OS_001 operator's station

CD_001 DCS system cabinet

CR_1- room of the central control room

4.7.3 The use of the underline character (_)

The character „underline (_)" separating the identification of the functional group and the serial number is used in the identifications of all instrumentation elements and associated elements such as junction boxes, panels, cabinets, system cabinets, rooms and buildings except for the identifications of cables and terminal strips (due to the limitation of the notation on the identifiers).

For the identification of a loop not connected with one specific installation, e.g. the identification of the control room air-conditioning signaling loop, in place of the area / sub-area code the identification of the central control room associated with this loop shall be used and the underline character shall be used to separate the parts signifying the control room and the function group.

Identification example:

CR1_XA_001 CR_1 control room air conditioning system failure

For a signal not connected with a specific control room but with a plant, in place of the area/sub-are code use the plant identification together with the underline character.

Identification example:

PZH_XA_001 fire in PZH plant

Note that due to the legibility of the notation, in the prefix describing the central control room the underline character does not appear, it is CR1, not CR_1.

The underline character shall be used after prefixes denoting the central control room and the plant.

Example:

110PT_001

CR1_XA_001

PZH_XA_001

4.7.4 Junction boxes

Applies to junction boxes to which cables from measuring or final-executing elements or from another box enter, and from which one or more multi-cored cables to the control room or to the next junction box is (are) lead out. For terminal strips see point: „Terminal strips".

Identification example: **110JIA_001** a junction box located on installation No. 110, intrinsically-safe analogue loops, number of the box on the installation 001

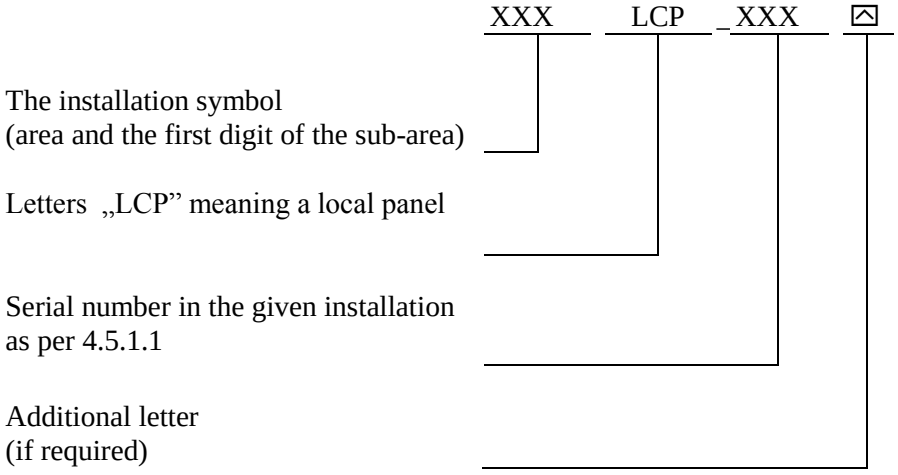
Instal-lation No.	First letter of identification	Second letter of identification	Third letter of identification	Box No. on installation acc. to rules in 4.5.1.1	Identification description -execution-
XXX				**XXX**	
	J				Junction box
		I			Intrinsically-safe
		D			Flame-proof
		N			Other than intrinsically-safe for use in explosive conditions
		E			Non-explosive conditions
		S			Special, not mentioned above, e.g. a box contains loops for explosive and non-explosive conditions
			A		Analogue loops
			B		Binary loops
			D		Digital transmission loops (e.g. Profibus)
			G		Gas detector loops or associated with the detection of explosive factors
			M		Monitoring of machines
			P		Feed loops
			R		Signals running directly (not converted by a transmitter to an analogue signal) from resistance sensors
			T		Signals running directly (not converted by a transmitter to an analogue signal) from thermocouple sensors
			X		Other loops

⍓ - optional identification X – required identification

4.7.5 Identification of local control panels

By local panels shall be understood elements located “locally” which, as opposed to junction boxes, allow to perform control actions. This can be for instance a compressor panel containing pushbuttons for controlling the machine, lamps signaling the states of the subassemblies, and terminal strips. The panel can contain various types of loops (considering the type of the signal [analogue, binary] and the type of the explosion protection) located in separate segments. That is why these types are not distinguished in the identification of panels.

The structure of the identification:



⍓ - optional identification X – required identification

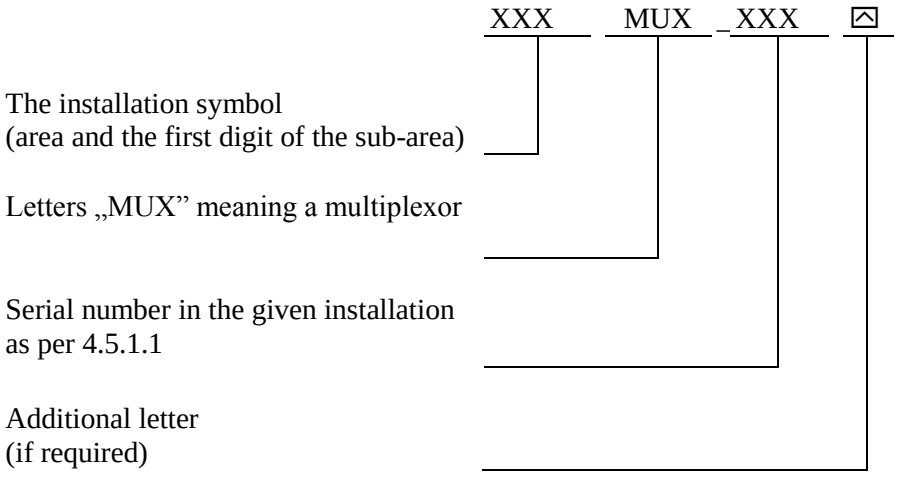
Identification example: **110LCP_001** where LCP means a local panel (PNL means a panel in a building)

For terminal strips see „Terminal strips". See also specification GL 3630 – Local panels.

4.7.6 Multiplexers

A device for multiplexing signals from sensors, e.g. temperature sensors, for the needs of process parameter visualization.

The structure of the identification:



⍓ - optional identification X – required identification

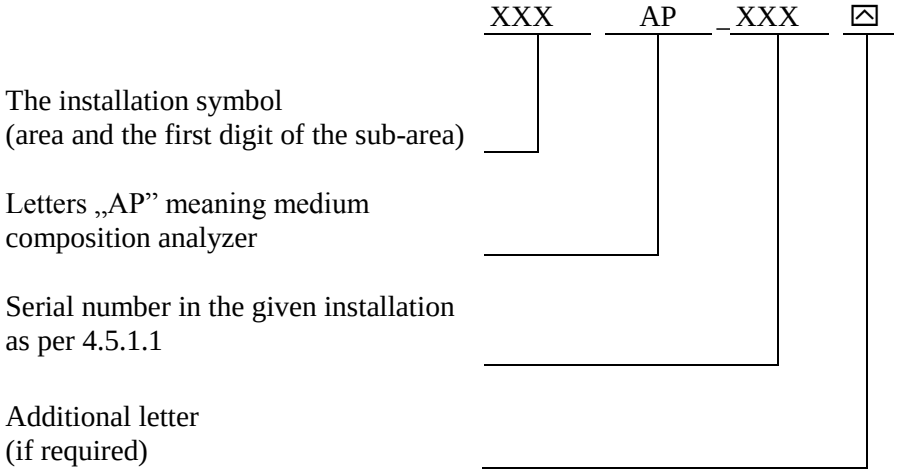
Identification example: **110MUX_001** where MUX abbr. from MUltipleXer

4.7.7 Sampling cabinets (sampler cabinets)

A sampling cabinet shall mean an assembly preparing a sample for measuring its physical and chemical parameters, connected to test nozzles located on the installation.

For medium composition analyzers identification **AP** shall be used (identification suggested by ISA-S5.1)

The structure of the identification:



⍓ - optional identification X – required identification

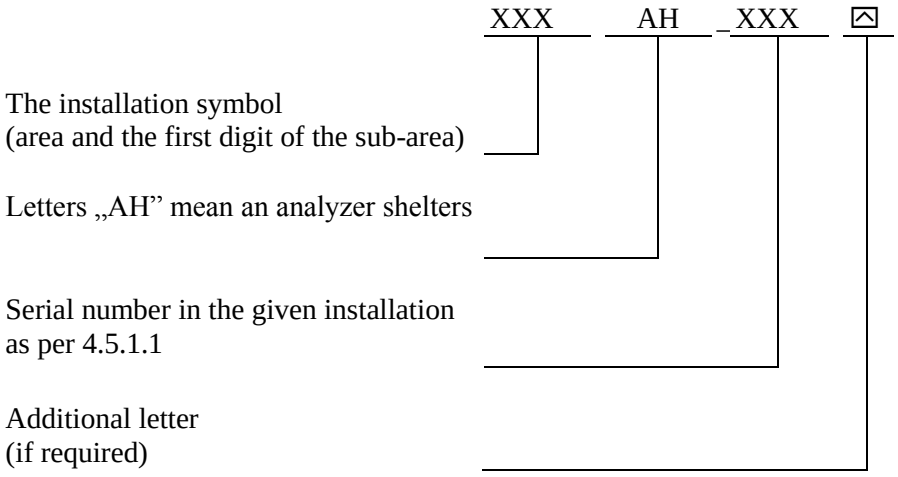
Identification example: **110AP_001** sampling cabinet on installation 110 having the number 001 for analyzing the medium compositions.

See also specifications GL 3530 and 3510.

4.7.8 Analyzer Shelters

Container-type buildings housing equipment for sampling and sample analyzing together with the necessary equipment for connecting with control and shut down visualization systems.

The structure of the identification:



⍓ - optional identification X – required identification

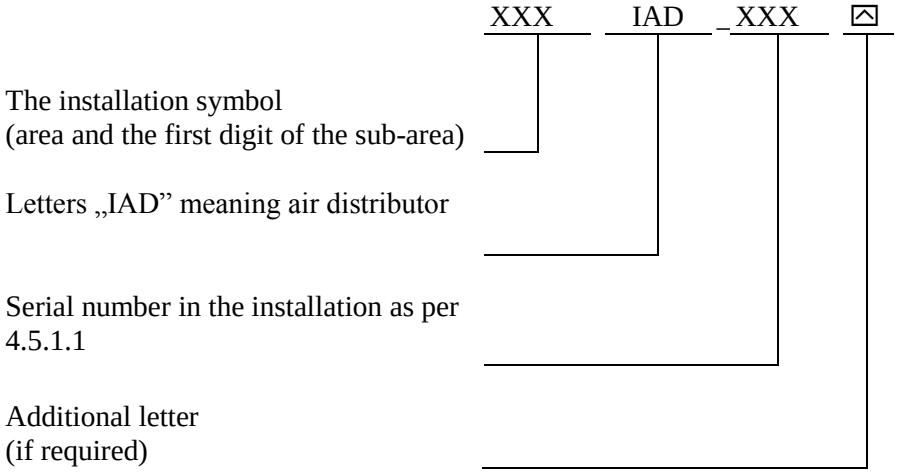
Identification example: **110AH_001** abbr. from **A**nalyzer Shelter

See also specifications GL 3530 and 3510.

4.7.9 Air distributors

Instrumentation air distribution elements. Usually created for valves supply.

The structure of the identification:



☒ - optional identification X – required identification

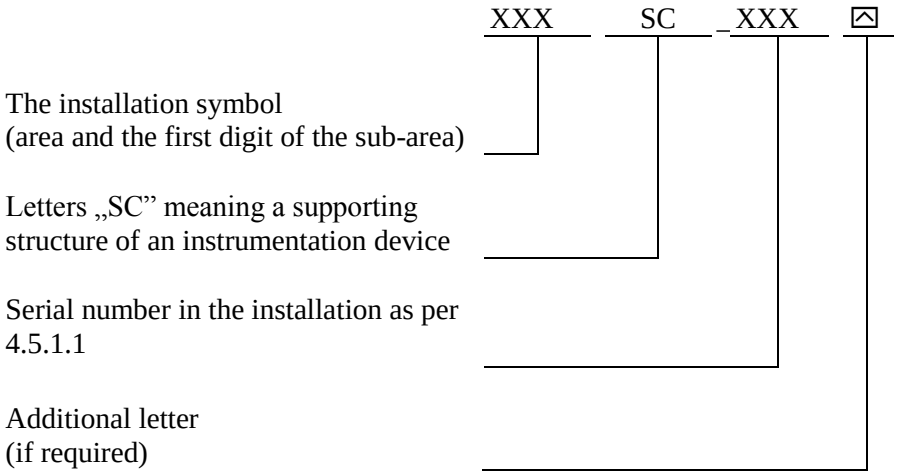
Identification example: **110IAD_001- I**nstrument **A**ir **D**istributor

See also specification GL 3140.

4.7.10 Supports for junction boxes, transmitter cabinets and air distributors.

A structure in the form of a rack for installing junction boxes and/or transmitter cabinets and/or air distributors.

The structure of the identification:



☒ - optional identification X – required identification

Identification example: **110SC_001 - S**tanchion **C**onstruction

See also specification GL 3020.

4.7.11 Protecting boxes of transmitter

A box for a transmitter, usually heated to keep the transmitter in adequate temperature. It is assumed that only one instrument may be in the box, though other solutions are acceptable after approval by GL.

The structure of the identification:

The identification identical with the identification of the element mounted in the box.

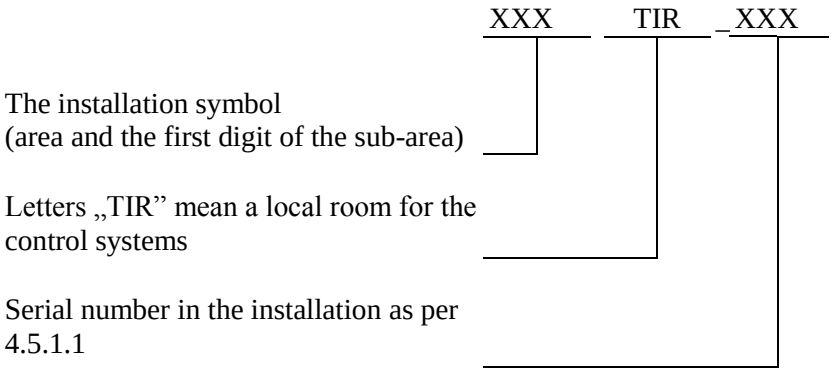
Identification example: **110PT_001-** the identification of the protective box of transmitter 110PT_001.

See also specification GL 3020.

4.7.12 Local rooms for control systems

Field-located container-type or other buildings containing the system cabinets. They have letters **TIR** in the identification. Please note, that the room located next to the central control room – where the system cabinets are located – also has a „TIR" part in its identification (see the title: The rooms of the central control room).

The structure of the identification:



X – required identification

Identification example: **110TIR_001** abbr. Technical Instrumentation Room

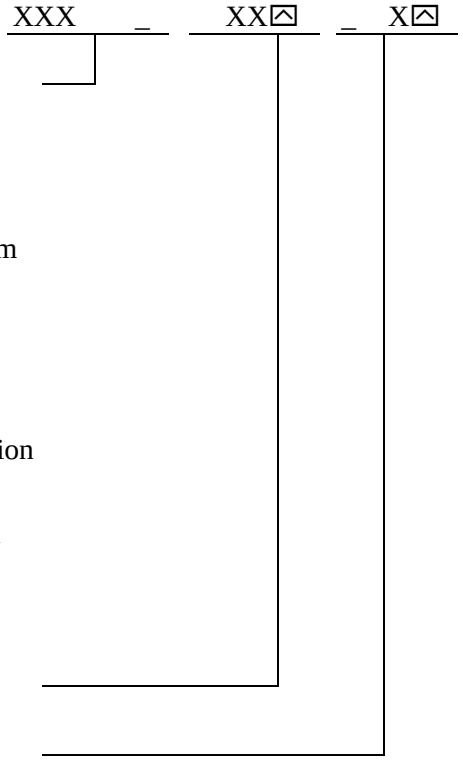
4.7.13 The rooms of the control room

The central control room can consist of several functionally separated rooms. The room, where operator's stations are located is called the Central Control Room.

The room, where engineering stations are located is called the Engineering Room.

The room, where the system cabinets are located is called the Technical Instrumentation Room.

The structure of the identification:



⍁ - optional identification X – required identification

Identification example:

CR_1 – operator's stations room.

Or **PZH_CR_1** – if it is necessary to differentiate rooms within various plants the full identification is used.

Note that local rooms like "TIR" are assigned to one installation, e.g. 110TIR_001, and auxiliary rooms at the central control room are assigned to the plant e.g. PZH_TIR_1.

4.7.14 Indoor cabinets/cabinets and associated equipment.

The structure of the identification:

as per 4.7.12 / as p. 4.7. 13 _ XX☒ _ XXX

Identification of the room wherein the element is located
This part of identification is optional. It is used when it is necessary to distinguish between cabinets (equipment) in different rooms

The following letters are possible, meaning respectively:

- **PNL** control panel (PaNeL)
- **OS** Operator Station
- **ES** Engineering Station
- **VD** Video Display
- **KB** keyboard (KeyBoard)
- **PR** PrinteR
- **CD** DCS cabinet (Cabinet and DCS)
- **CE** ESD cabinet (Cabinet and ESD)
- **CP** PLC cabinet (Cabinet and PLC)
- **CG** chemical alarm and hazardous gas detection system cabinet (Cabinet and Gas)
- **CF** fire detection system cabine (Cabinet and Fire)
- **CM** marshalling cabinet – (Cabinet and Marshalling)
- **CO** overvoltage protection cabinet (Cabinet and Overvoltage)
- **CB** cabinet with separators (Cabinet and Barriers)
- **CA** auxiliary – additional cabinet (Cabinet and Auxiliary)
- **CS** supply cabinet (Cabinet and Supply)
- **CI** cabinet for exchanging signals with other systems e.g. connection with electric systems (drive service), gas alarm detection and other (Cabinet and Interface)

Serial number within the given control room, consistent with the numbering described in 4.5.1.1

☒ - optional identification X – required identification

Example :

CD_001 DCS system cabinet number 001

If it is necessary to distinguish cabinets in technical documents at the level of different rooms, then identification containing a part informing about the room in which the given cabinet is located shall be used:

Example:

PZH_TIR1_CD_001

See also specification GL 3030.

4.7.15 Cabinets and associated equipment in the local rooms of the system (TIR)

The identifications are constructed according to the rules presented in „Cabinets and associated equipment in the central control room".

If it is necessary to distinguish cabinets in technical documents at the level of different rooms, then identification containing a part informing about the room in which the given cabinet is located shall be used:

Example:

110TIR1_CD_001

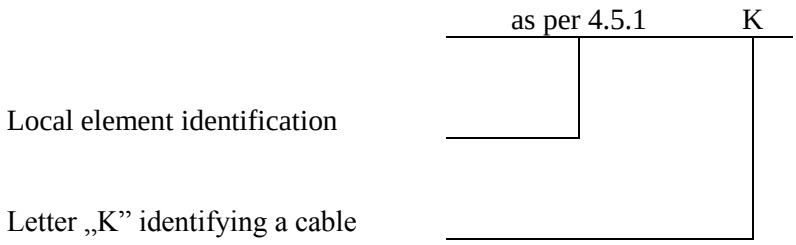
4.7.16 Identification of instrumentation cables

A cable identification consists of two parts: the first contains the identification of the element from which the signal comes out (if identification of this direction is possible) and the second part contains identification „K" which identifies a cable.

The character „_" shall not be used in cable identification due to the limited length of cable identifier.

4.7.16.1 A cable from a local element with one output cable

The structure of the identification:



Identification example 1:

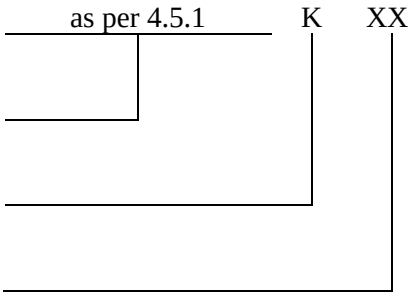
110PT001K cable from transmitter 110PT_001

Identification example 2:

110JIA001K cable from junction box 110JIA001

4.7.16.2 A cable from a local element which has more than one output cable

The structure of the identification:



Local element identification

Letter „K" identifying a cable

Cable serial number for the given element

X – required identification

Identification example 1:

110PT001K01 cable from transmitter 110PT_001, number 01 (e.g. signal)

110PT001K02 cable from transmitter 110PT_001, number 02 (e.g. power supply)

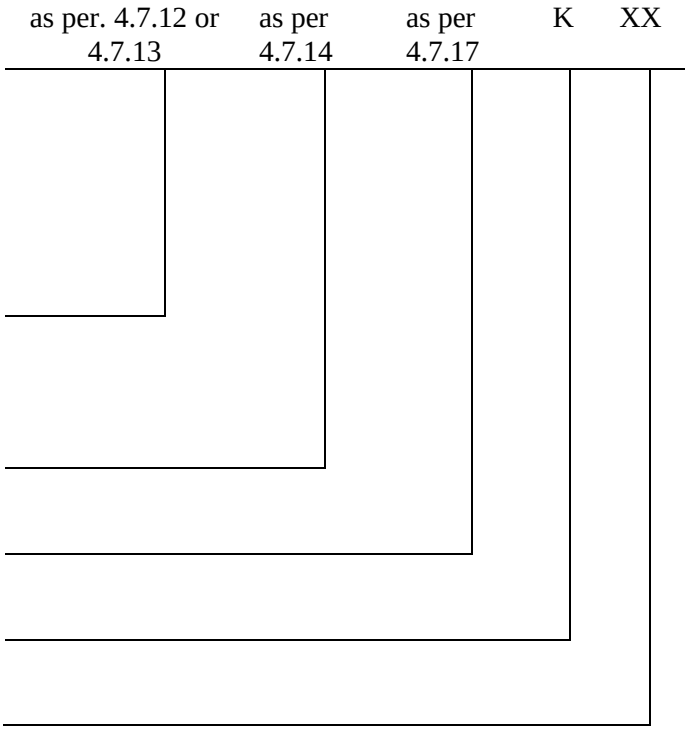
Identification example 2:

110JIA001K01 the first cable from box 110JIA001

110JIA001K02 the second cable from box 110JIA001

4.7.16.3 A cable from an indoor element

The structure of the identification:



Room identification without the character „_"

This part of the identification is required only when the cable goes out of the room

Identification of an associated indoor cabinet or device without the character „_" and the part identifying the room

Terminal strip identification as per 4.7.17

Letter „K" identifying a cable

Cable serial number on the terminal strip

⍁ - optional identification X – required identification

Identification example 1:

CD001X01K01 a cable between instrumentation cabinets located in the same room

Identification example 2:

PZHCR1CD001X01K01 a cable between instrumentation cabinets located in different rooms

This is the full and longest possible cable identification. The full identification of a cable shall be used in the cable list and other documents where the identifications of cables from different installations are collected.

The shortest possible identification but sufficient for correct identification shall appear on the cable identifier.

Identification example 3:

For a cable from a control panel located in a local technical room TIR the identification takes the following form:

110TIR001PNL001K01 a cable coming out of technical building 110_TIR001 on installation 110, panel PNL001, cable serial number 01

For panels containing numerous terminal strips the rules described for system cabinets shall be used (an additional identification of the terminal strip in the identification).

4.7.16.4 Identification of cable strands

Each strand of a cable shall be identified by the number of the terminal of the strip to which it is connected.

In marshalling cabinets, the identifier of a single-pair cable strand of a transmitter connected without an intermediate box shall identify the strand signal polarization (identification „+” , „-”).

4.7.17 Terminal strips

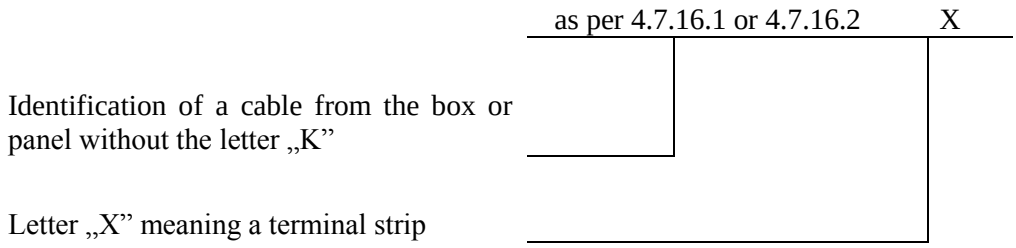
Terminal strips for multi-pair cables from junction boxes and local panels to system cabinets are semantically assigned to cables, which means that the strip in the junction cabinet for cable 110JIA001K has identification **110JIA001X**. Thus the identification is formed by changing the letter „**K**” meaning a cable to „**X**” meaning a terminal strip.

Identifications of terminals in a marshalling cabinet should be consistent with the identifications of terminals in the junction box/local panel, each of the cable strands being connected to terminals having the same number on both sides.

As for cables, due to limitations on the length of identifiers, the character „_” shall not be used.

4.7.17.1 Identification of strips in system cabinets for cables from junction boxes and panels which have one output cable

The structure of the identification:



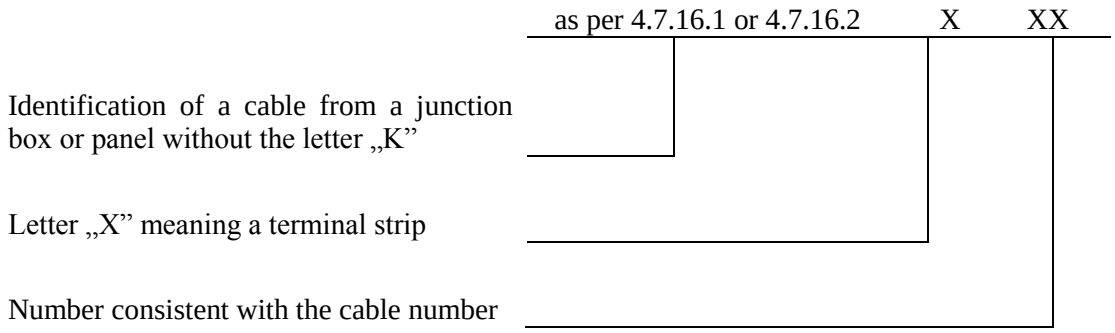
X – required identification

Identification example 1:

110JNA001X a strip in a cabinet for cable 110JNA001K

4.7.17.2 Identification of terminal strips in system cabinets for cables from junction boxes and panels which have several output cables.

The structure of the identification:



X – required identification

Identification example:

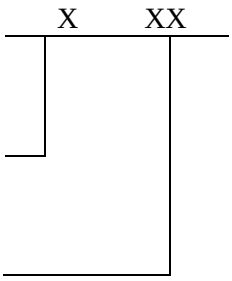
110LCP001X01 a strip in the cabinet for cable 110LCP001K01

110LCP001X02 a strip in the cabinet for cable 110LCP001K02

4.7.17.3 Strips for cables from measuring and final-executing elements and for cables between system cabinets

For instrumentation elements which are not connected through junction boxes or panels, for instance cables connecting directly a transmitter with a cabinet or for cables between cabinets, terminal strips for particular types of signals shall be made.

The structure of the identification:



Letter „X" meaning a terminal strip

Strip number selected from the range of numbers for the given type of loop – see the table below

Example:

X01 a terminal strip for analogue intrinsically safe loops (see the table below)

Within a cabinet, terminal strips shall be divided as shown below in order to ensure adequate voltage separation and to protect against electromagnetic interference. When dividing the strips, not only division into intrinsically safe and non- intrinsically safe loops should be taken into consideration, but also a division within each of these groups due to the type of signal. Thus a intrinsically safe strip with analogue signals should be separated from a non- intrinsically safe one with analogue signals. It should be remembered that each strand of a cable should have an individual terminal. The range of the numbers of the strips for particular types of signals is shown in the table below.

Classification of terminal strips	**Range of numbers within one cabinet for the given type of loop**
Intrinsically safe analogue loops	01÷10
Intrinsically safe binary loops	11÷20
Intrinsically safe other loops	21÷30
Non intrinsically safe analogue loops	31÷40
Non intrinsically safe binary loops	41÷50
Non intrinsically safe other loops	51÷60
Signal running directly (not converted by a converter to an analogue signal) from resistance sensors	61÷70
Signal running directly (not converted by a converter to an analogue signal) from thermocouple sensors	71÷80
Digital transmission loops	81÷90
Power supply circuits	91÷99

4.7.17.4 The colors of the terminals on terminals strips:

Intrinsically safe loops – BLUE unless it is a safety function loop with a defined SIL level – then YELLOW

Non-intrinsically safe loops – GRAY unless it is a safety function loop with a defined SIL level – then YELLOW

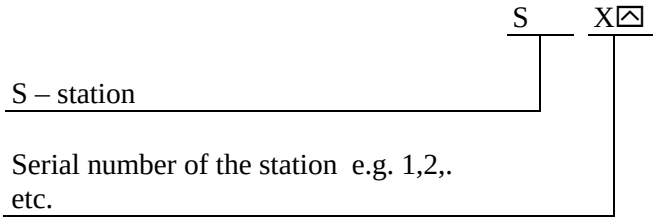
Feed circuits – DC „+" gray „-" gray

Feed circuits – AC „L" gray or black „N" gray or black „PE" yellow-green

4.8 Electric equipment identification system.

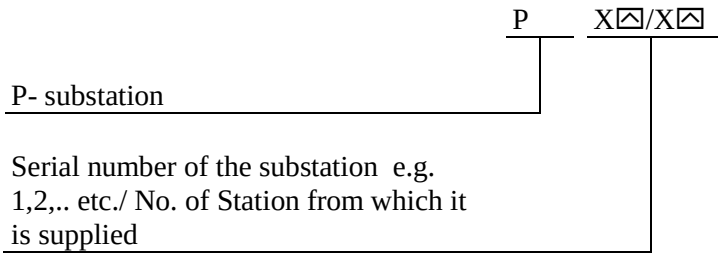
4.8.1 Identification of stations and substations

- GPZ – the main feed point
- S- stations, e.g. S1, S2 etc.



⍁ - optional identification X – required identification

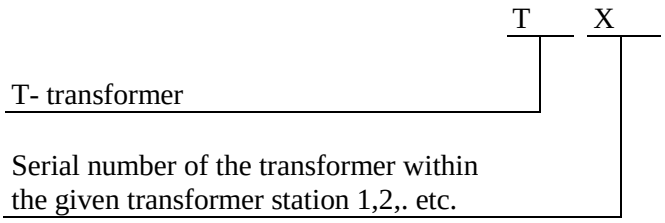
- P – substations, e.g. P1/6, P2/6 etc.



4.8.2 Transformer identification

Transformers shall be identified by letter **T** completed with the serial numbers of the transformers in the given transformer station, e.g. **T1**, **T2** etc.

T – transformers, e.g. T1, T2 etc.



- Write on the door of the transformer chamber:

  T number; transformer rated power; transformer voltage ratio
  e.g. **T1; 1600 kVA; 6/0,4 kV**

- Describe outgoings in the switchgear:

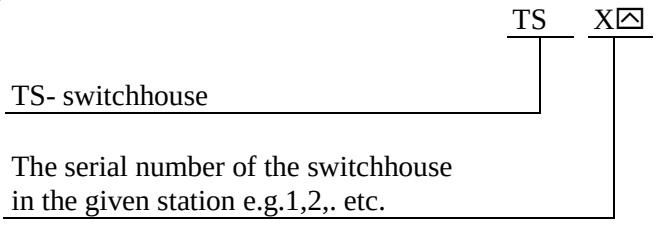
  T number; transformer rated power

  e.g. **T1; 1600 kVA**

4.8.3 MCC's identifications

MCC's shall be identified by letters **TS** completed with the number of the MCC in the given electrical station, e.g. **TS1**, **TS2** etc.

TS – MCC, e.g. TS1, TS2 of Station S1 etc.

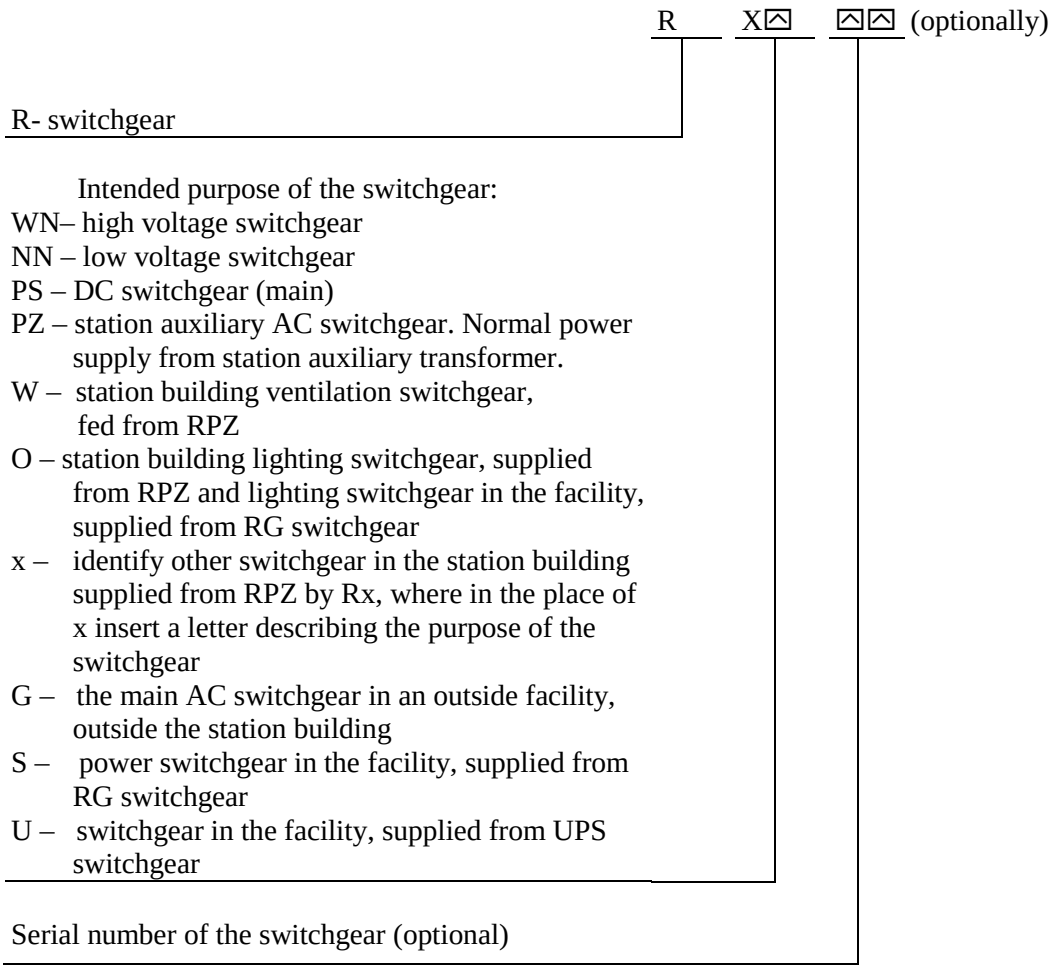


☒ - optional identification X – required identification

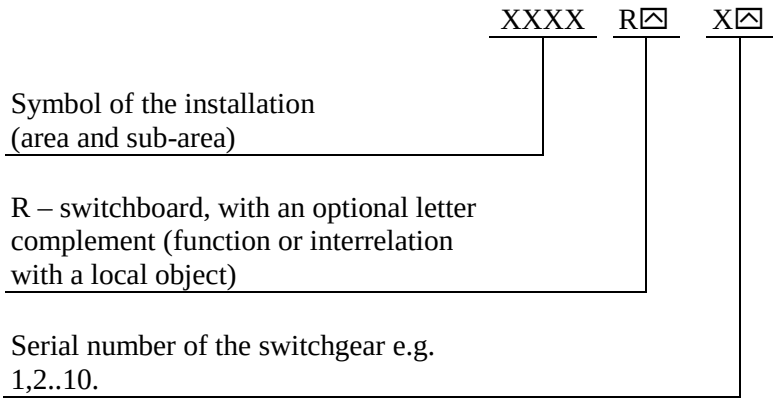
In the descriptions of drawings, after slash additionally state the number of the station e.g. **TS1/12**, **TS2/12*.**

* /12 – means the No. of the Station in which the MCC is located

4.8.4 Identification of switchgear and switchboards



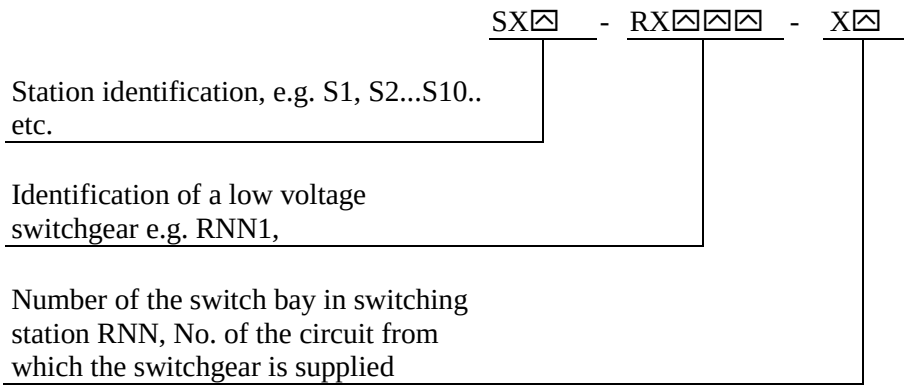
- **TL** – Meter board. If there are several boards, the identification shall be completed with serial numbers e.g. TL1, TL2.
- **... R...** – Field switchgear



EXAMPLE: **0500 R12**

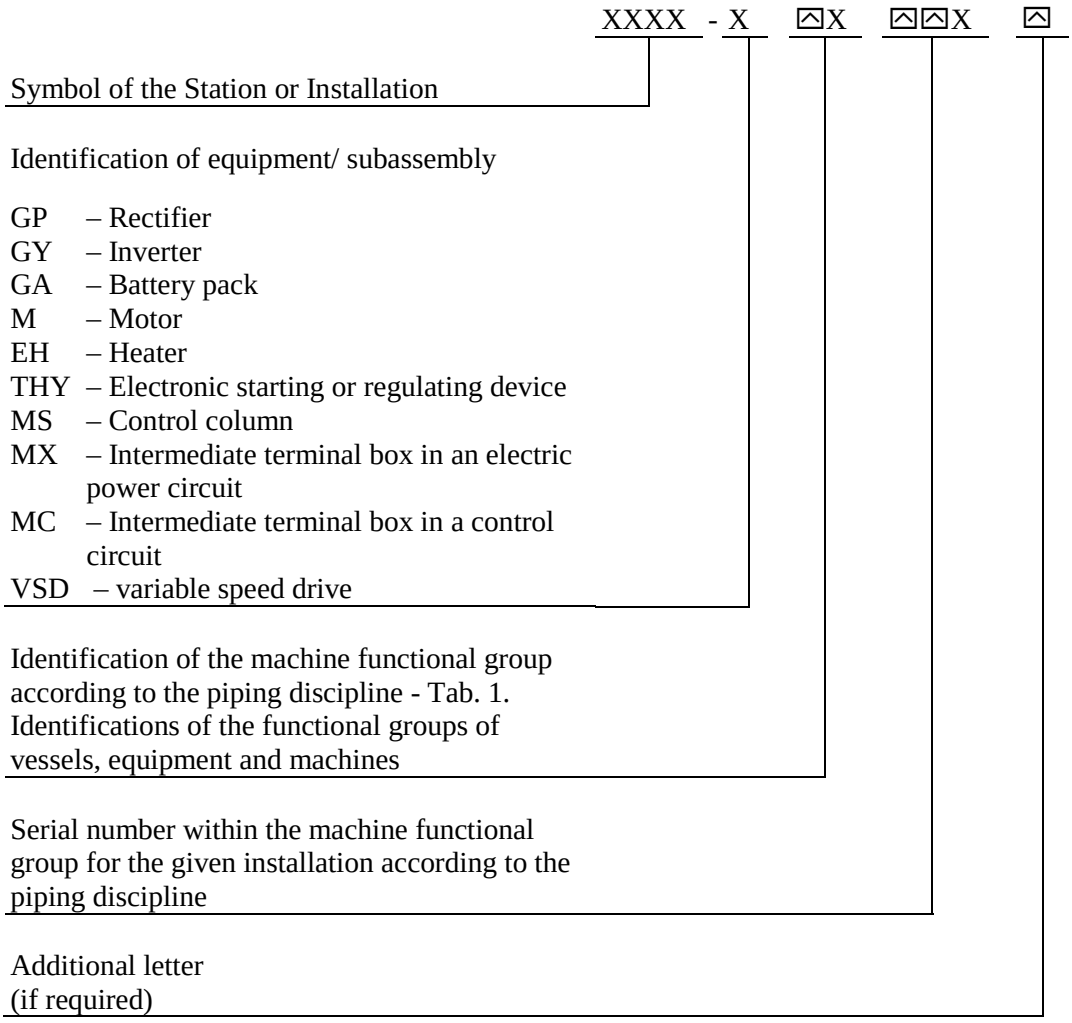
NOTE:

The source of supply shall be described on every switchgear:



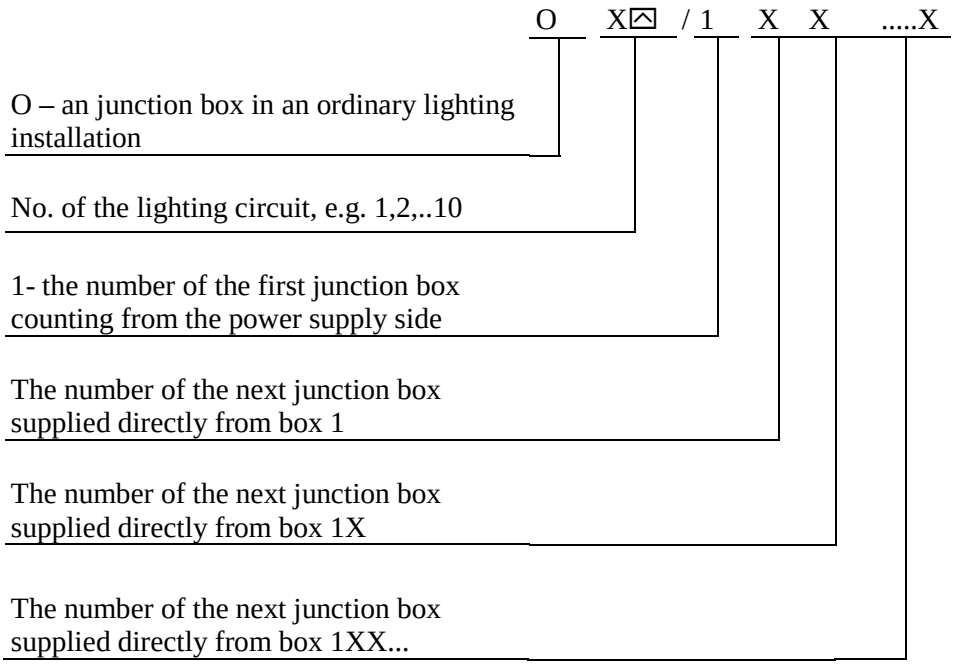
☒ - optional identification X – required identification

4.8.5 Identification of electrical power equipment



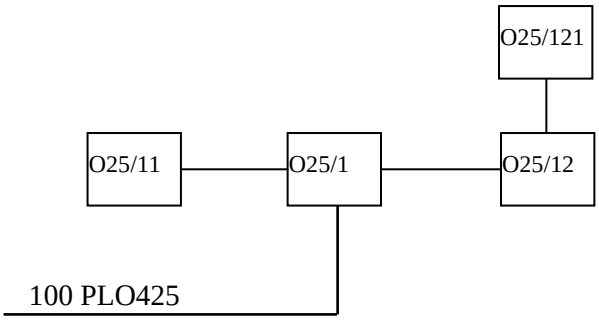
4.8.6 Junction boxes in a lighting installation

- **O.... / ... –** A junction box in an ordinary lighting installation

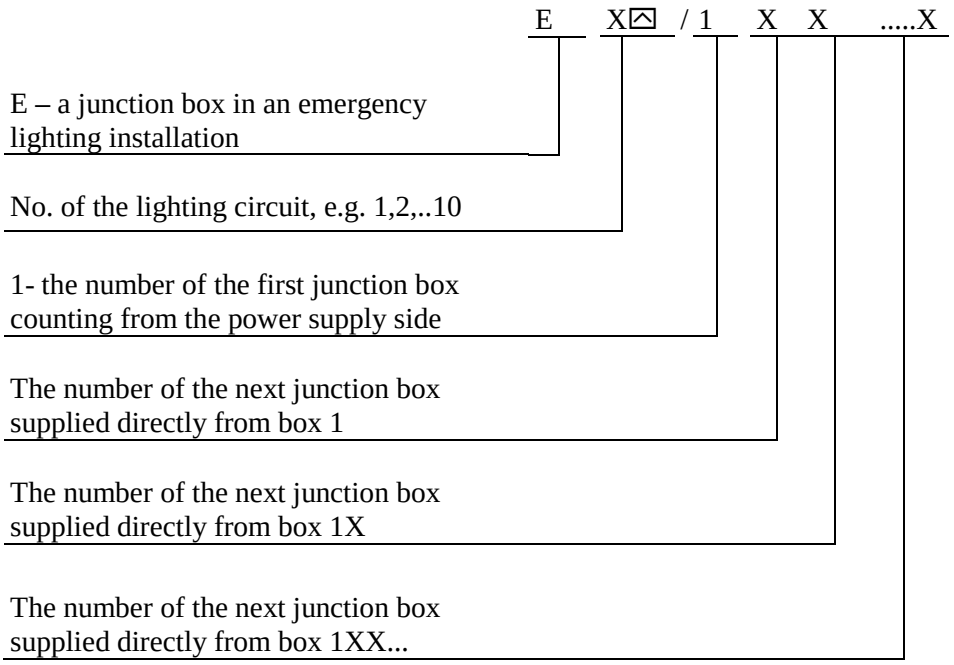


where: ⍓ - optional identifications X - required identifications

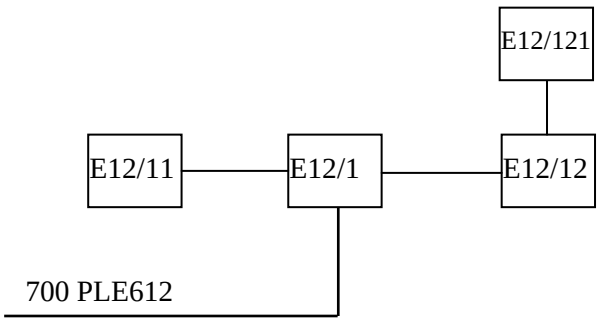
EXAMPLE:



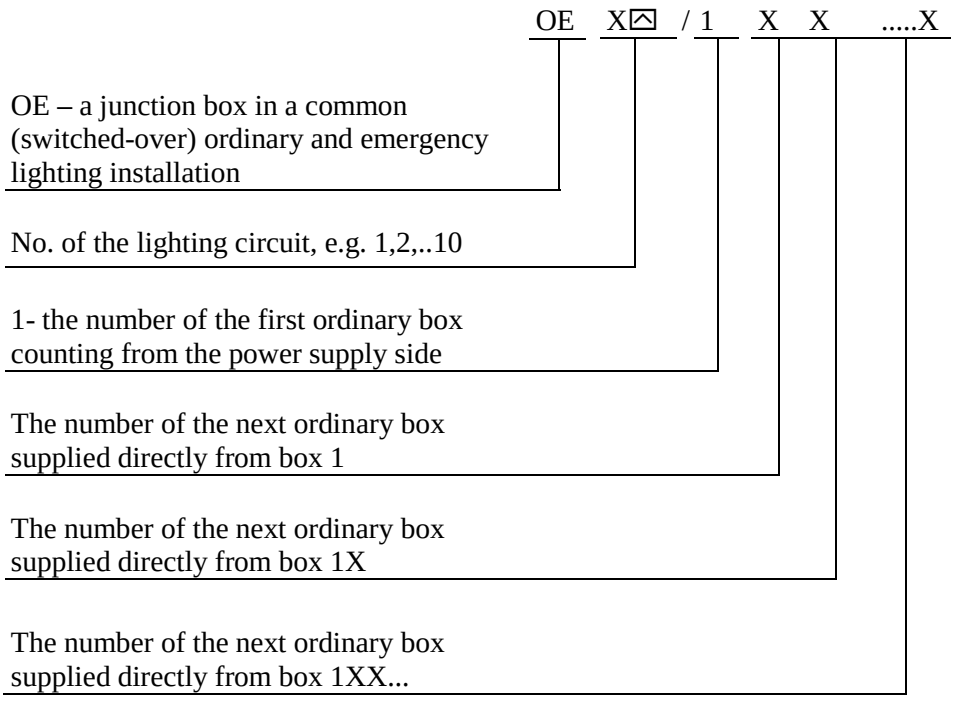
- **E.... / ...** – A junction box in an emergency lighting installation



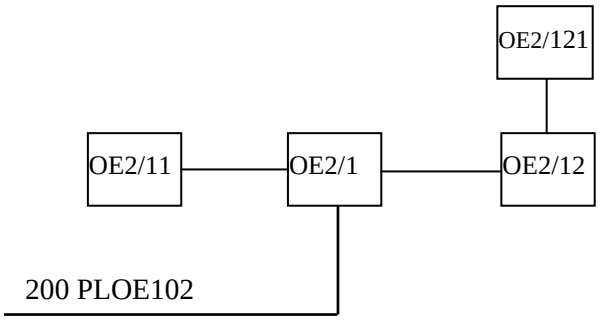
EXAMPLE:



- **OE.... / ...** – a junction box in a common (switched-over) ordinary and emergency lighting installation

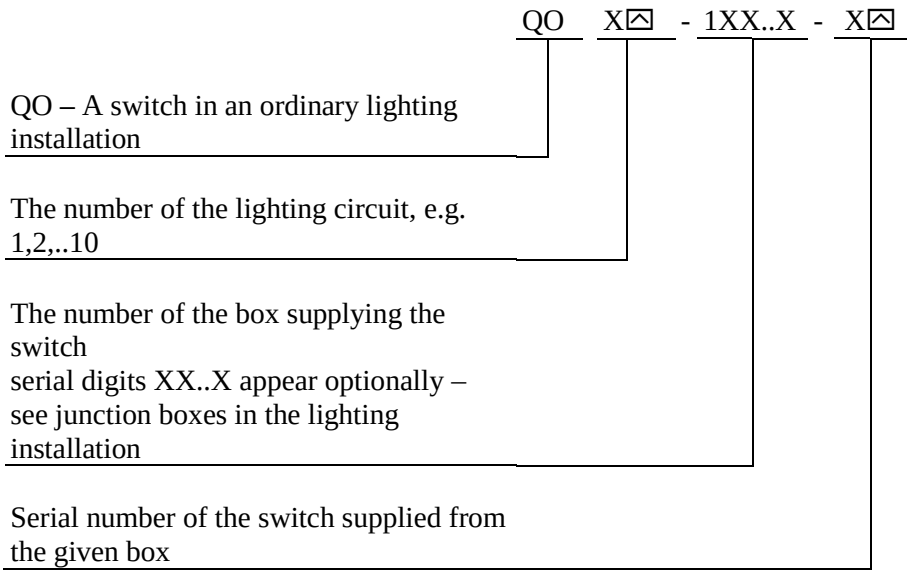


EXAMPLE:



4.8.7 Switches in a lighting installation

- **QO...-....-....** – A switch in a ordinary lighting installation

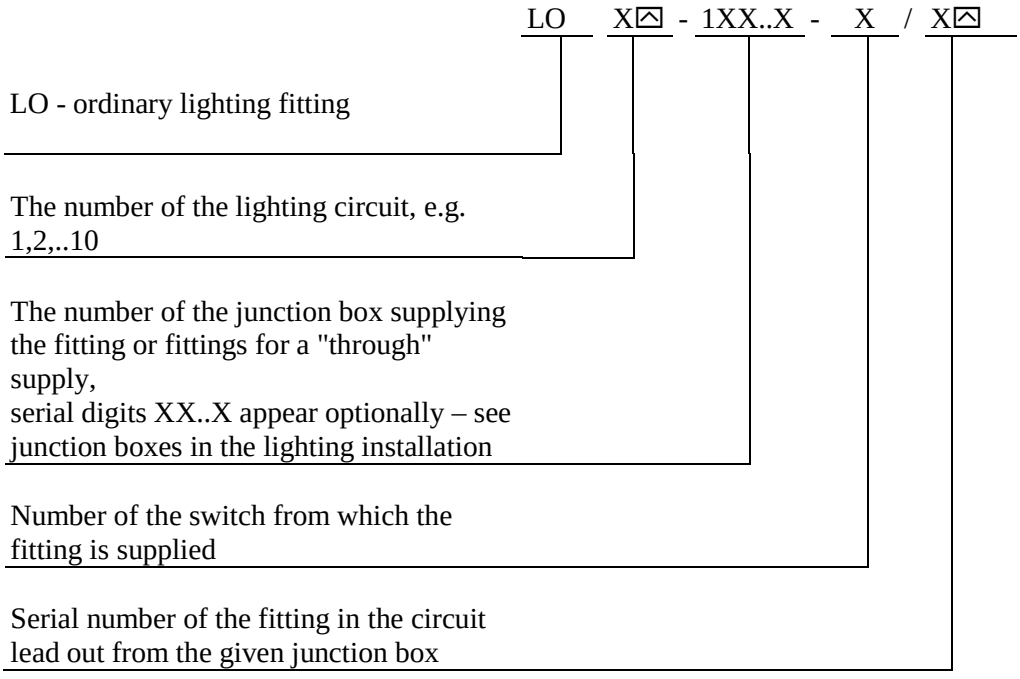


EXAMPLE:

QO2-12-1 – a switch of an ordinary lighting system (QO), circuit No. 2, supply from junction box No. O2/12, switch No.1 (supplied from this junction box)

4.8.8 Lighting fittings

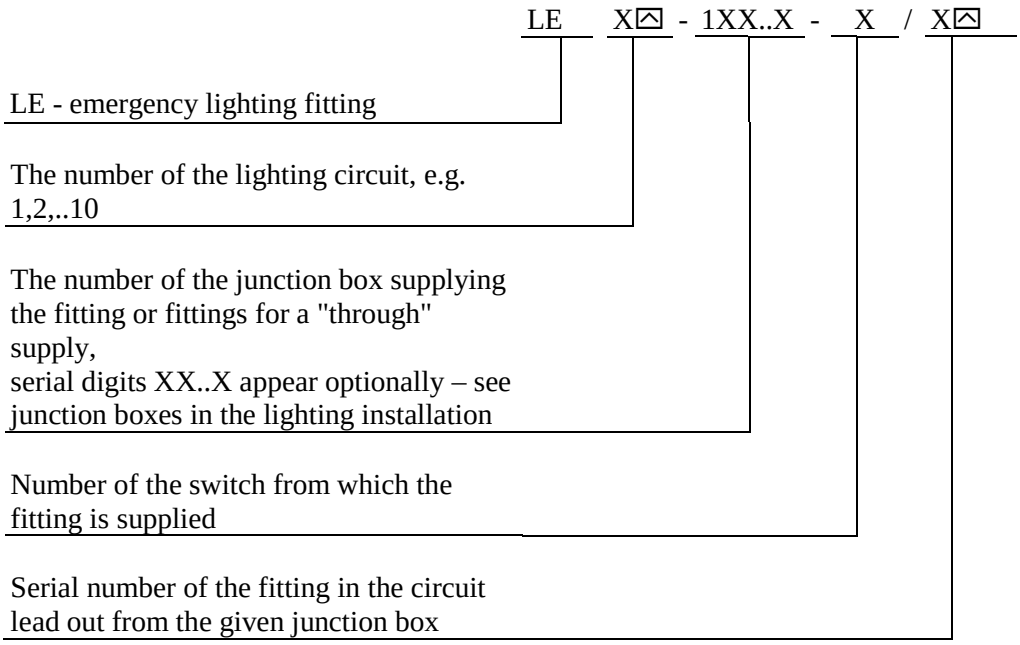
- **LO...-....-..../....** – Ordinary lighting fitting



EXAMPLE:

LO2-12-1/1 – ordinary lighting fitting (**LO**), lighting circuit No. **2**, supply from junction box No. O2/**12**, supplied from switch No. **1**, fitting No. **1**

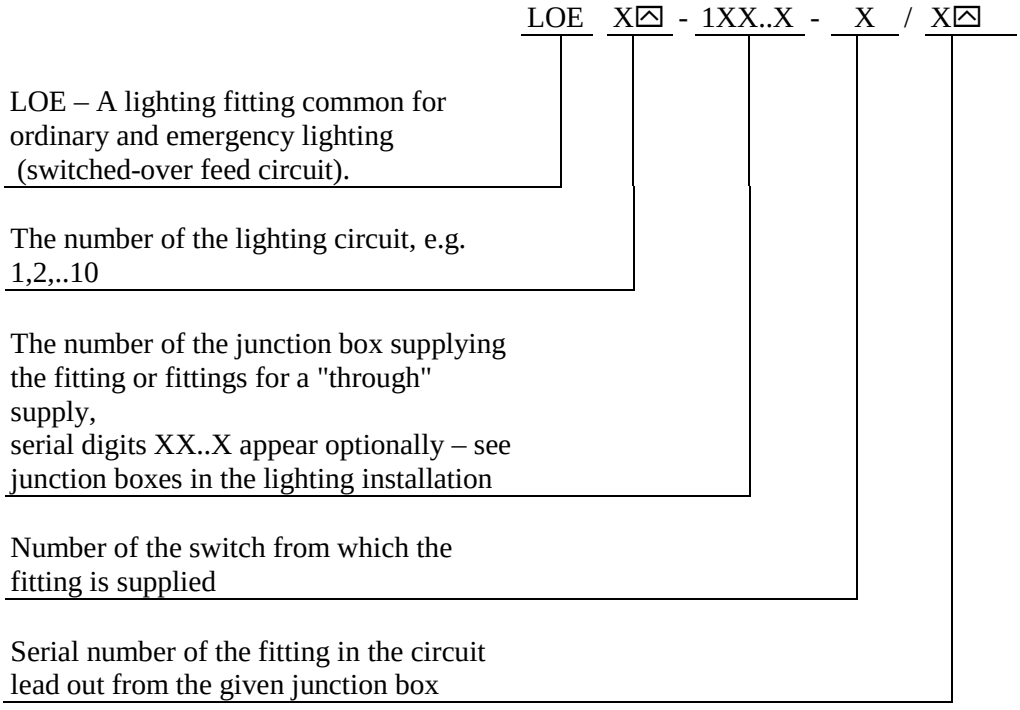
- **LE...-....-..../....** – Emergency lighting fitting



EXAMPLE:

LE2-12-1/1 – emergency lighting fitting (**LE**), lighting circuit No. **2**, supply from junction box No.O2/**12**, supplied from switch No. **1**, fitting No. **1**

- **LOE...-....-..../....** – Lighting fitting common for ordinary and emergency lighting (switched-over feed circuit).



EXAMPLE:

LOE2-12-1/1 – ordinary and emergency lighting fitting (**LOE**), lighting circuit No. **2**, supply from junction box No. O2/**12**, supplied from switch No. **1**, fitting No. **1**

4.8.9 Cable identification

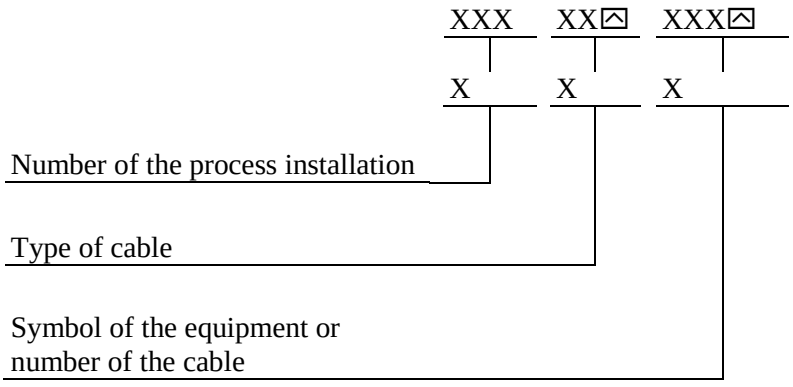
- **Table No. 1.** Cable type identification.

Identi-fication	**Description**
PH	HV feeder cable
PL	LV feeder cable
PLO	Working lighting circuit cable
PLE	Emergency lighting circuit cable
PLOE	Common ordinary and emergency lighting circuit cable
PC	Common cable – feeder and control (for small LV drives)
C(CA)	Control cable – identification CA shall be used if there is a measuring current circuit in the cable
CK	Control (signal) cable for connection from the terminal strips of outgoing feeders to the collective strips of signals for instrumentation
CTA	Control (signal) cable for connection from the collective terminal strips or from the terminal strips of outgoing feeders to the instrumentation control room
CP	Cable to measuring sensors. Station – a consumer on the installation, e.g. temperature sensors

Cable identification shall be completed with serial numbers or the numbers (symbols) of the installation and process equipment and additional identification as per tables 2, 3.

Table 2. Cable branching identification

XXX – Cable identification as per Table 3



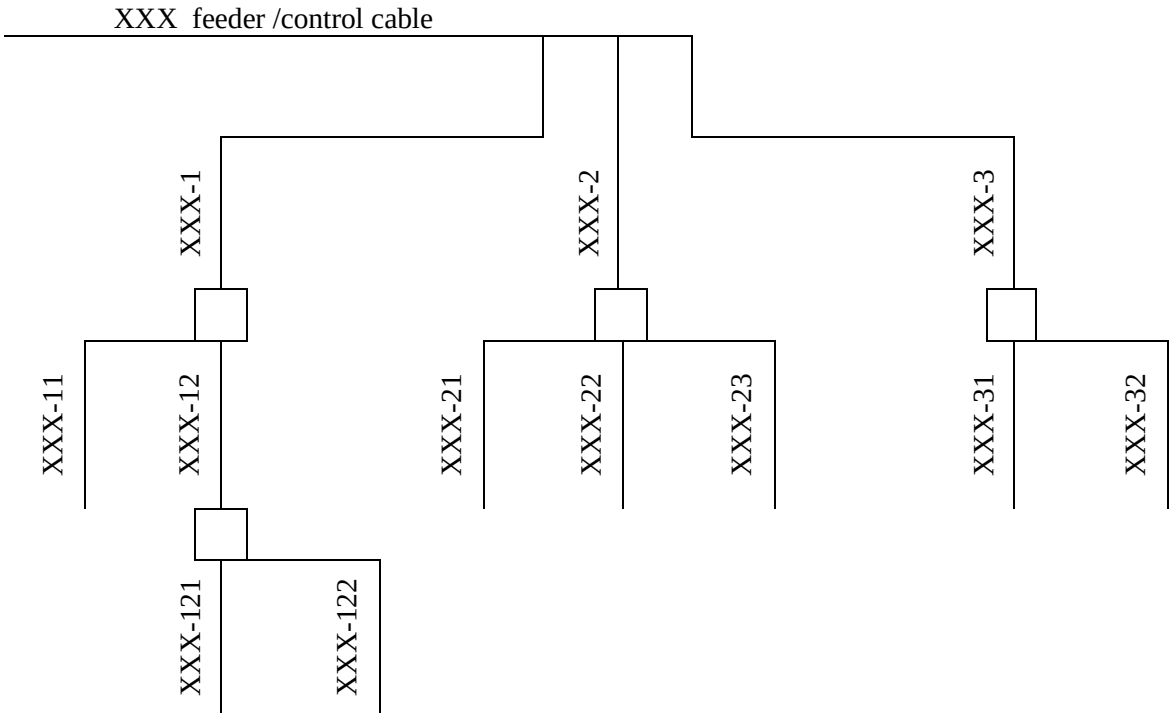


Table 3. Generation of cable identifications

	Number of the process installation	Type of cable	Symbol of the equip-ment or No. of the cable	Additional identi-fication
ADDITIONAL IDENTIFICATIONS: - small letters a,b,c... in parenthesis if there is more than one cable to the given piece of equipment, e.g. star-delta starting, cross-section increase etc.				
or				
- digital identifications for cable branching				
CABLE NUMBER: - for cables not connected with process equipment (in every case shall be agreed with LOTOS Group)				
or				
PROCESS EQUIPMENT SYMBOLS: - generated according to Specification No. 6120 „Process Identification System”				
TYPE OF CABLE – according to Table 1				
NO. OF THE PROCESS INSTALLATION - according to Specification No. 6120 „Process Identification System”				
	1	2	3	4

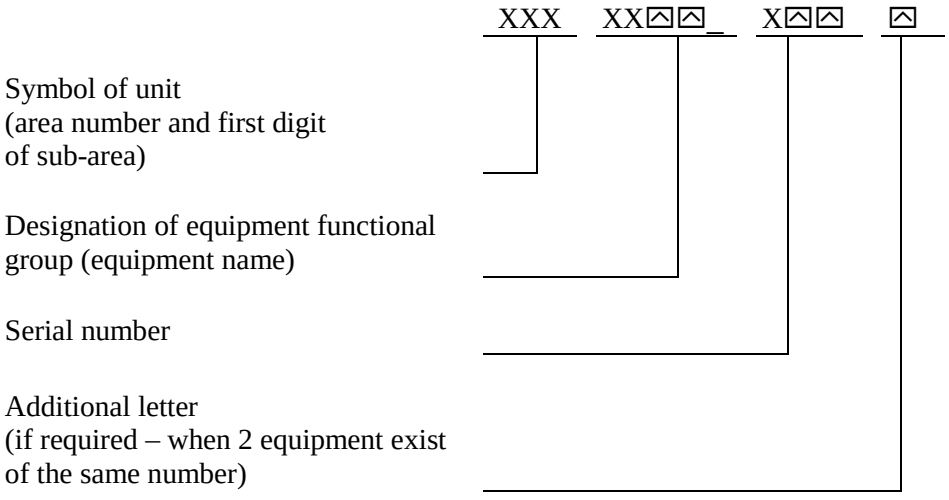
EXAMPLES				
Cables connected with process equipment	700	PL	P3A	
	700	C	P3A	
	700	CK	P3A	
	500	PH	P12A	(a)
	500	PL	P12A	(b)
	500	CP	P12A	
Lighting cables for process installations, e.g. installation 500 (working lighting)	500	PLO	335	
	500	PLO	336	-1
	500	PLO	336	-11
	500	PLO	336	-12
Cables not connected with process equipment		PL	511	
		CTA	510	
		PH	101	
		C	305	
		PL	234	(a)
		PL	234	(b)
		PLO	621	
		CA	0006	

4.9 Identification system of telecommunication equipment

4.9.1 General system of apparatuses and equipment nomenclature

The name of apparatuses, equipment and machines is created in the following way:

a) for equipment assigned to single unit



where: ☒ - optional designations X - required designations

Only capital letters are allowed!

EXAMPLE:

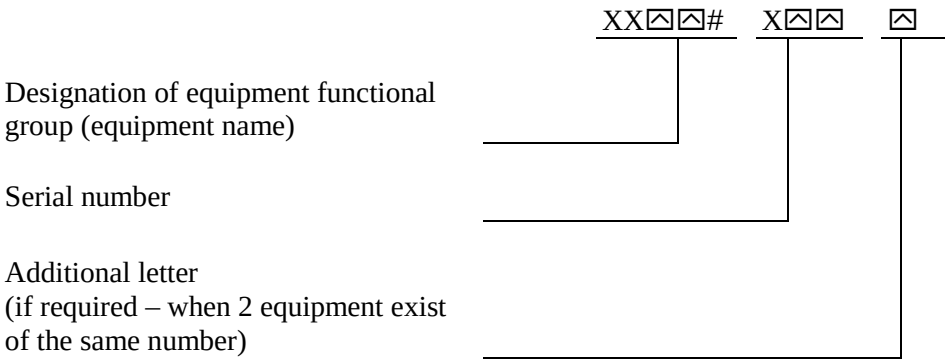
208 ROP_151

where: **208** - unit symbol (area=20, sub-area=80)

ROP - designation of manual fire signalling device

151 - serial number

b) for equipment not assigned to single unit (e.g. in buildings)



where: ☒ - optional designations X - required designations

EXAMPLE:

MDF#50

where: **MDF** - designation of computer main cabinet

50 – serial number

The following subparagraphs show detailed method of telecommunication engineering equipment and cables designation and numbering

4.9.2 Recesses, cabinets, boxes, cable boxes, apparatuses

4.9.2.1 Telephone Recesses (distribution frames) on objects:

PT#X☒☒

where:
PT – distribution frame
X☒ – object number on general plan of GL S.A.
☒ – optional, when more than one distribution frame exists on the object

EXAMPLE:
PT#15A – telephone distribution frame in pumping station 18 (object number 15A)

4.9.2.2 Computer main cabinets:

MDF#X⍰⍰

where:
MDF – computer main cabinet (external fibre optics are led to it)
X⍰ – object number on general plan of GL S.A.

EXAMPLE:
MDF#15A – computer cabinet in pumping station 18 (object number 15A)

4.9.2.3 Computer local cabinets:

SDF#X⍰⍰

where:
SDF – computer local cabinet (fibre optics from MDF are led to it)
X⍰ – object number on general plan of GL S.A.

EXAMPLE:
SDF#15A – computer local cabinet in pumping station 18 (object number 15A)

4.9.2.4 Radio recesses (distribution frames) on objects:

PR#X⍰⍰

where:
PR – radio distribution frame
X⍰⍰ – object number on general plan of GL S.A.

EXAMPLE:
PR#15A – radio distribution frame in pumping station 18 (object number 15A)

4.9.2.5 Boxes, cable boxes, apparatuses on production units and outside buildings – assigned to single unit

XXX XX⍰⍰_ X⍰⍰ ⍰

Designations – refer to p. 4.9.1a

where XX⍰⍰_ designation of equipment functional group (name of equipment)
B – box or cable box
the second module depicts branch:
POŻ – fire
TEL – telephony
GŁ – loudspeaker
DAN – data transmission

lack of „B" letter on the beginning means, that end device is being depicted (e.g. telephone set, fire pushbutton, loudspeaker)
the second module identifies a device:
ROP – manual fire signalling device
CIR – flame IR sensor

CUV – flame UV sensor
CKC – heat cable sensor
TEL – telephone set
GŁ – loudspeaker

EXAMPLE:
090 BGŁ_01 – first loudspeaker cable box on unit 900
090 TEL_7456 – telephone set on unit 900, with 7456 number
208 ROP_151 – manual fire signalling device on unit 2080 and monitoring line number 151
015 CIR_07 – 7 IR sensor on unit 150

4.9.2.6 Equipment installed in buildings

Designations of devices (line element of fire signalling system) installed in building, is located under graphical symbol of specific device on block diagram of wiring, according to the following scheme:



where: X – required designations

EXAMPLE:
53/02/(01) – N° 120 of zone/ N° 21 of element in zone/ (N° 1 of element in line, loop)

4.9.2.7 Stock boxes of fibre optic cables

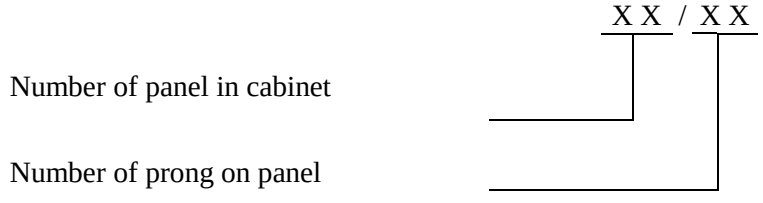
XX⏢_X

where:

XX⏢ – 2-digit and possibly 1-letter object number on general plan of GL S.A.
X – a letter corresponding to serial number of fibre optic cables stock box

EXAMPLE:
5Aa – first stock box in pumping station 18 (object number 15A)

4.9.3 Structural (generic) cabling system (SCS) – sockets



where: X – required designations

EXAMPLE:
01/12 – 12 RJ45 socket in first RJ45 panel of MDF cabinet

4.9.4 Cables

4.9.4.1 Fibre optic cables

NN(N)_MM(M)x

where:

NN(N) – first 2 or 3 significant digits of object number on general plan of GL S.A. The object closer to main ring of network
MM(M) – first 2 or 3 significant digits and letters of object number on general plan of GL S.A.
x – a letter corresponding to serial number of cable outgoing from object closer to main ring of network

EXAMPLE:
38w15Aa – twenty third (w - 23rd letter of alphabet) cable from Central Control Room (object number 38) to pumping station 18 (object number 15A), from which this cable is the first one

4.9.4.2 Telephone cables

KTX_NN(NN).MMKK_MMLLx

where:

KTX – first 3 letters depicting type of cable:
KTM – arterial cable
KTS – inter-cabinet cable
KTR – distribution cable
KTO – inter-object cable

NNN(N) – designation of object closer to main distribution frame, from which the cable is outgoing
KK – cross number on main distribution frame
SKxx – number of cable cabinet
xx – first 2 or 3 significant digits of object number on general plan of GL S.A.
MM – 2 digits corresponding to number of telephone head
KK – 2 digits corresponding to first pair of cable
LL – 2 digits corresponding to the last pair of cable
x – a letter corresponding to serial number of cable, for cables of less than 10 pairs

EXAMPLE:

KTM_01.0700_0799 – 100 –pair arterial cable from 7th head 1st PG cross
KTS_SK01.0700_0799 – 100-pair inter-cabinet cable from 7th head of SK1 cabinet
KTR_SK02.0780_0799 – 20-pair distribution cable from 7th head of SK2 cabinet, pairs from 80 up to 99
KTO_33E.0100_0709 – 10-pair inter-object cable from first P3 head, pairs from 00 up to 09

4.9.4.3 Radio cables

KRX_NN(NN).MMKK_MMLLx

where:

	KRX	– first 3 letters, designating cable type:
	KRM	– arterial cable
	KRS	– inter-cabinet cable
	KRR	– distribution cable
	KRO	– inter-object cable
NNN(N)		designation of object closer to main wire broadcasting node, from which the cable goes out KK – number of terminals on radio main distribution frame SKxx – number of cable cabinet – first 2 or 3 significant digits and letters of object number on GL S.A. general plan
MM		– 2 digits corresponding to terminals' number
x		– a letter corresponding to serial number of cable, for cables of less than 10-pair

EXAMPLE:
KRM_01.10_11 – arterial cable going from terminals 10 and 11 of radio main distribution frame

4.9.4.4 Telecommunication cables on units

NN(N)_M(M)KK(K)_LL

where:

NN(N)		– first 2 or 3 significant digits of GL S.A. production unit number
M(M)		– one or two letters depicting type of cable:
	KM	– arterial cable (e.g. from control room to cable box on unit)
	KR	– distribution cable (e.g. from cable box on unit to telephone set)
KK(K)		– 2 or 3 letters designating branch of unit being described:
	TEL	– telephony
	GL	– loudspeaker
	POŻ	– fire
LL		– serial number of device

EXAMPLE: *090_KMTEL_01 –the first telephone arterial cable on unit 900*
010_KRPOŻ_02 – the second distribution fire cable on unit 100

5 Relevant documents

The following LOTOS Group S.A. specifications:

- 6110 – Documentation Numbering Procedure
- 2030 – Vessel and Equipment Identifications

6 Standards and regulations

Design, manufacture and erection shall comply with the latest editions of the standards and regulations listed below.

- ASME/ANSI B 16.5 – Pipe Flanges and Flanged Fittings NPS 1/2 ÷ NPS 24.
- ASME/ANSI B 16.20 - Metallic Gaskets for Pipe Flanges Ring-Joint, Spiral-Wound and Jacketed.
- ASME/ANSI B 16.21 – Nonmetallic Gaskets for Pipe Flanges.
- Instrumentation symbols and identification ISA-S5.1
- Graphic symbols for Distributed Control/Shared Display Instrumentation, Logic and Computer Systems ISA-S5.3
- ISA-S5.1 Instrumentation Symbols and Identification
- IEC61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
- IEC61511 Functional safety- Safety instrumented systems for the process industry sector

7 Record of changes

No.	Date	Description	Introduced by
0		This specification entirely replaces the former LOTOS Group S.A. standard No. PR 07 612 with the same title.	T. Wróbel
1	18.01.07.	In point 4.3.3. added symbol “W” for DUPLEX steels.	B. Kowalewski
-	31-08-2015	Page layout corrections, no contents changes.	T. Wróbel