# Engineering Standard

SAES-J-004 30 June, 2002

Instrumentation Symbols and Identification



## Saudi Aramco DeskTop Standards

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## 1 Scope

The ANSI/ISA-5.1-1984 (R1992) *Instrumentation Symbols and Identification* shall be used as basis for this standard, unless otherwise specified in paragraph 4.

This standard establishes a uniform means of designating instruments and instrumentation systems used, in Saudi Aramco, for measurement and control. The identification is also used as equipment tag (mark) numbers on equipment and for material requisitions, specification sheets, instrument installation schedules, records and forms.

## 2 Conflicts and Deviations

2.1 Any conflicts between this standard and other applicable Saudi Aramco Engineering Standards (SAESs), Materials System Specifications (SAMSSs), or industry standards, codes, and forms shall be resolved in writing by the Company or Buyer Representative through the Manager, Process & Control Systems Department of Saudi Aramco, Dhahran

2.2 Direct all requests to deviate from this standard in writing to the Company or Buyer Representative, who shall follow internal company procedure SAEP-302 and forward such requests to the Manager, Process & Control Systems Department, of Saudi Aramco, Dhahran.

## 3 References

The latest edition or revisions of the following documents are part of this standard.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

| | |
|---|---|
| *SAEP-302* | *Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement* |

Saudi Aramco Engineering Standard

| | |
|---|---|
| *SAES-J-904* | *FOUNDATION Fieldbus (FF) Systems* |

3.2 Industry Codes and Standards

American National Standard Institute

| | |
|---|---|
| *ANSI/ISA-5.1 - 1984 (R1992)* | *Instrumentation Symbols and Identification* |

## 4 Exceptions to ANSI/ISA-5.1, Instrumentation Symbols and Identification

The following paragraph numbers refer to ANSI/ISA-5.1 - 1984 (R1992), reaffirmed July 13, 1992, which is the basis of this standard. However, the following paragraphs are an addition, exception, modification, or deletion to ANSI/ISA-5.1 as noted. Paragraph numbers not appearing in ANSI/ISA-5.1 are new paragraphs to be inserted.

4.1.4 (New Paragraph) All instruments shall be identified with a tag (mark) number.

4.3.2 (Modification, Exception) Loop numbering shall be parallel. Parallel numbering involves starting a numerical sequence for each new first-letter, *e.g., TIC-101, FRC-101, LIC-101, AI-101, etc.*

4.3.2.1 (New Paragraph) When identification numbers are required for new plants, existing plant expansions or modifications, a block of identification numbers shall be requested from the Engineering Drawing Services Division, Saudi Aramco, Dhahran.

4.3.2.2 (New Paragraph) Instrument identification (tag/mark numbers) for parallel process trains, i.e., duplicated process trains within the same facility, shall use the same tag numbers. The identical instrument tag numbers, between trains, shall be differentiated by the plant number prefix. The parallel train instrument tag numbering shall be reviewed and approved in writing by the Proponent Organization and the Supervisor Drawing Standards Compliance Unit, Engineering Drawing Services Division, Saudi Aramco.

4.3.2.3 (New Paragraph) If the instrument tagging convention for an existing plant is different from what is specified in this standard - then the existing tagging convention may be used for an expansion to that plant. The use of the existing instrument tagging convention shall be reviewed and approved in writing by the Proponent Organization and the Supervisor Drawing Standards Compliance Unit, Engineering Drawing Services Division, Saudi Aramco, Dhahran.

5.1 Notes for Table-1 in ANSI/ISA-5.1

(2) (Modification Exception) Delete 'X' and replace with 'N'.

(6) (Delete complete paragraph).

(8) (Modification Exception) Delete 'PSV' and 'PSE', replace with 'PZV' and 'PZE', respectively.

(10) (Additional Paragraph) For shared display/shared control symbols (i.e., Geometry: Square with inscribed circle) the Modifier "I" can be left out. (e.g., instead of FIC, TIC, and PIC you may use FC, TC and PC).

(11) (Modification Exception) Delete 'X' and replace with 'N'.

5.2 Exceptions to Table 1 in ANSI/ISA-5.1

**Table 1 – Identification Letters**

| | First-Letter (4) | | Succeeding-Letters (3) | | |
|---|---|---|---|---|---|
| | **Measured or Initiating Variable** | **Modifier** | **Readout or Passive Function** | **Output Function** | **Modifier** |
| C | Conductivity | | | Control (13) | |
| D | Density, Specific Gravity | Differential (4) | | | |
| N | Unclassified (2) | | Unclassified (2) | Unclassified (2) | Unclassified (2) |
| U | Logic Function | | Multifunction (12) | Multifunction (12) | Multifunction (12) |
| X | Position, Dimension | X Axis | Unclassified (2) | Unclassified (2) | Unclassified (2) |
| Z | Safety | Safety (8) | | Driver, Actuator, Unclassified Final Control Element | |

**Note:** Numbers in parentheses refer to specific explanatory notes in Section 5.1 of ANSI/ISA-5.1 (Reaffirmed 13 July 1992).

5.3 (Additions to Table 2 in ANSI/ISA-5.1)

5.3.1 Saudi Aramco Specific Combinations:

MOV Electric Motor Operated Valve (exception to ISA 'Typical Letter Combinations')

ML Motor Running Pilot Light (the letter *M* does not represent the word "motor," but for a monitored state)

UC Logic System (Non ESD)

XS Valve Position Switch

XL Pilot Light (do not use for motor running light)

ZC Emergency Shutdown (ESD) Logic System

ZV Valve used in ESD System

5.3.2 (Addition) Alternate for tagging 'open' and 'closed' limit switches. To use this alternate tagging convention you must first get written approval from the Proponent Organization.

5.3.2.1 (Addition) The alternate identification (tagging) is as follows:

- First letter is the 'measured or initiating variable'.
- Second letter is "L" for 'limit' (not per ISA standard).
- Third letter is "S" for 'switch'.

- Loop number
- Suffix "O" for 'open' or "C" for closed.

**Example 'Alternate' Tagging for Limit Switches**

| | **Standard** | **Standard** | **Alternate** | **Alternate** |
|---|---|---|---|---|
| Valve Tag | Open Limit Switch Tag | Closed Limit Switch Tag | Open Limit Switch Tag | Closed Limit Switch Tag |
| LV-101 | XSH-101 | XSL-101 | LLS-101O | LLS-101C |
| MOV-101 | XSH-101 | XSL-101 | MLS-101O | MLS-101C |
| ZV-101 | XSH-101 | XSL-101 | ZLS-101O | ZLS-101C |

*Commentary Note:*

*The term "high" and "low", when applied to positions of valves and other open-close devices, are defined as follows: "high" denotes that the valve is in or approaching the fully open position, and "low" denotes that the valve is in or approaching the fully closed position e.g., XSH – valve is open, XSL – valve is closed, reference 'Standard' tagging for limit switches in table above.*

6.2 (Addition to 'Note' to Instrument Line Symbols in ANSI/ISA-5.1)

The line symbology, as defined in ANSI/ISA-5.1, shall be used for all 'grass root' projects. For an existing plant or an expansion to an existing plant, the line symbology being used for that plant shall be used. An existing plant may use ANSI/ISA-5.1 line symbology, with concurrence of the Proponent and Supervisor Drawing Standards Compliance Unit, Engineering Drawing Services Division, Saudi Aramco, Dhahran.

6.4 (Addition to 'Note' to Control valve body symbols, damper symbols in ANSI/ISA-5.1)

TSO = Tight Shut-Off (FCI- 70-2 Class IV minimum)

7.0 Foundation Fieldbus

(New Paragraph) Foundation Fieldbus instrumentation symbols, line symbology and identification shall be per Section 10 in SAES-J-904 *FOUNDATION Fieldbus (FF) Systems.*

**Revision Summary**

30 June, 2002 Major revision.