Process & Instrumentation Diagram (P&ID)


**Purpose**
1. To show the instruments or control devices attached to the process.
2. To show the control system architecture associated with the process.

**How it is done?**
Standard symbols and notations representing instruments or control devices are placed to the pipings and vessels. Standard symbols and notations are available from ISA-5.1(1984) standard.

**Methodology?**

**Process piping and sub-piping**

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A thick straight line represent main process piping

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A thin straight line represent process sub-piping either to instruments or by-pass process line.
Methodology?

*Instruments / control devices:*

- A circle representing locally mounted instrument.
- A circle with horizontal line representing control room panel mounted instrument.
- A circle with horizontal line inside a square representing its function in DCS.

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**Function devices**

- √ Square root extractor
- ∫ Integrator
- < Low selector
- I/P Current to Pneumatic Converter

**Signals**

- Electrical signal (low current or low voltage e.g. 4-20 mA). Straight dashed line
- Pneumatic signal e.g. 3-15 psig or 0-60 psig. Straight line with //
**Naming rule**

Instruments or devices are noted by 2 to 4 letters.

1st 2nd 3rd 4th

Measurement Control device Device/ Condition Condition

Common measurement:
P = Pressure
T = Temperature
L = Level
F = Flow

Common control devices:
I = Indicator
C = Controller
R = Recorder
T = Transmitter
A = Alarm
S = Switch
G = Gauge

Common condition:
H = High
L = Low

Examples

See Smith & Corripio (2006) as in Appendix A, Table A-1

Level transmitter no. 120 installed to vessel
Level transmitter no. 120 panel mounted, control room.
Level controller no. 120 in DCS, control room.

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Examples

thin process line

thick process line

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Process control loop

- Process
  - Sensor
    - Transmitter
      - Controller
        - Transducer
          - Control valve

FLOW

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**Final control elements**

Control valves

Manual valve

Manual valve

Solenoid valve

Not darkened → Always open

Darkened → Always closed

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