Documentation of Plant Control and Instrumentation
**Typical Documentation**

- **Plot Plan** – Physical layout of plant
- **Process Flow Diagram** – Major pieces of equipment in a process area and design operating condition
- **P&ID** – Shows the piping and instrumentation that will be installed
- **Loop Sheet** – Details field wiring and instrumentation details.
Example – Process Flow Diagram
Example – P&ID

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Process Control
Documentation of Plant
Example – Loop Sheet
Example - Loop Sheet
Example – Loop Sheet
Example – Loop Sheet
Example – Loop Sheet
**ISA S5.1 Tag Number Convention**

**TYPICAL TAG NUMBER**

- **TIC 103** - Instrument Identification or Tag Number
- **T 103** - Loop Identifier
- **103** - Loop Number
- **TIC** - Function Identification
- **T** - First-letter
- **IC** - Succeeding-Letters

**EXPANDED TAG NUMBER**

- **10-PAH-5A** - Tag Number
- **10** - Optional Prefix
- **A** - Optional Suffix

Note: Hyphens are optional as separators.
### ISA S5.1 IDENTIFICATION LETTERS

<table>
<thead>
<tr>
<th>First-letter</th>
<th>Succeeding- Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured or Initiating variable</td>
<td>Modifier</td>
</tr>
<tr>
<td>A</td>
<td>Analysis</td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Flow Rate</td>
</tr>
<tr>
<td>H</td>
<td>Hand</td>
</tr>
<tr>
<td>I</td>
<td>Current</td>
</tr>
<tr>
<td>L</td>
<td>Level</td>
</tr>
<tr>
<td>P</td>
<td>Pressure, vacuum</td>
</tr>
<tr>
<td>Q</td>
<td>Quantity</td>
</tr>
<tr>
<td>S</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Temperature</td>
</tr>
<tr>
<td>V</td>
<td>Vibration</td>
</tr>
<tr>
<td>Z</td>
<td>Position</td>
</tr>
</tbody>
</table>
Examples – Typical Letter Combination

- AIC, AI, AT, AY
- FRC, FIC, FC, FY, FE, FQI
- II, IIC, IT
- LIC, LI, LT, LE,
- PIC, PC, PCV, PI, PSH, PIT, PSL
- TIC, TCV, TI, TSH, TE, TY
- ZC, ZSH, ZSL, ZT
ISA S5.1 Instrument Line Symbols

- Instrument supply or connection to process
- Pneumatic Signal
- Electric Signal
- Internal System Link
ISA S5.1 General Instrument or Function Symbol

Discrete Instrument, field mounted

Discrete instrument, accessible to operator

Shared display, shared control
**ISA S5.1 Valve Body, Damper Symbols**

- **General Symbol**
- **Rotary Valve**
- **Globe Valve**
- **Damper**
ISA S5.1 Actuator Symbols

- Diaphragm, spring-opposed
- Rotary Motor
- Digital

Valve Actuator with Electro-pneumatic converter
ISA S5.1 Symbols for Other Devices

Restricting Orifice, With Flow Transmitter

Hand Valve

Inline Measurement

Measurement Element
ISA 5.5 Process Symbols

Vessel, Jacketed Vessel, Reactor

Atmospheric Tank, Storage

Heat Exchange

Agitator

Pump
Example – Basic Neutralizer Control System

*1 - Isolation valve closes when control valve closes

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Basic Column Control System
Example – Batch Reactor Control System

Batch Reactor 1

Feed A

Feed B

Anti-Foam

Coolant

Discharge

Vent System

Process Control Documentation of Plant

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Continuous Feed and Recycle Tanks

Diagram showing the process flow for Continuous Feed and Recycle Tanks, including Feed Tank, Recycle Tank, and Reactors 1 and 2 with various control instruments such as PC, FT, FC, LC, LT, and RSP.