

# Control System Documentation

- Documentation that is typically generated for a control system installation are addressed.
- The purpose of each document is explained.
- Reference provided to ISA-5.4 standard for Instrument Loop Diagrams

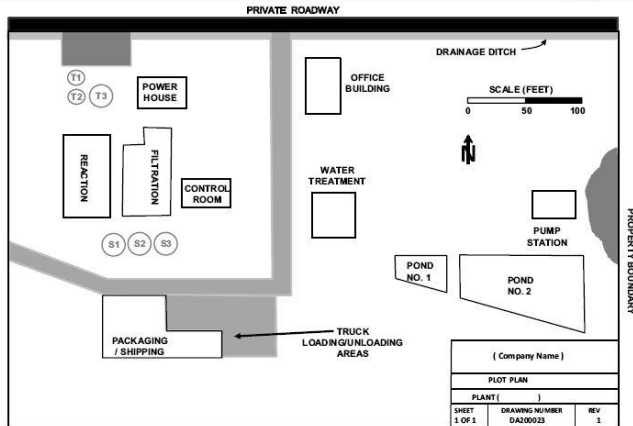


Figure 7-1. Plot Plan

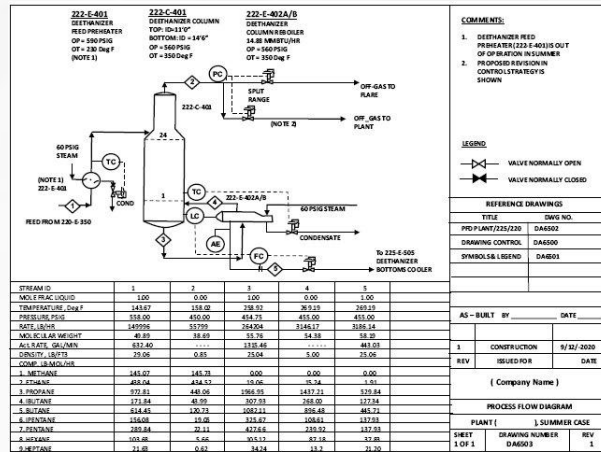


Figure 7-2. Process Flow Diagram

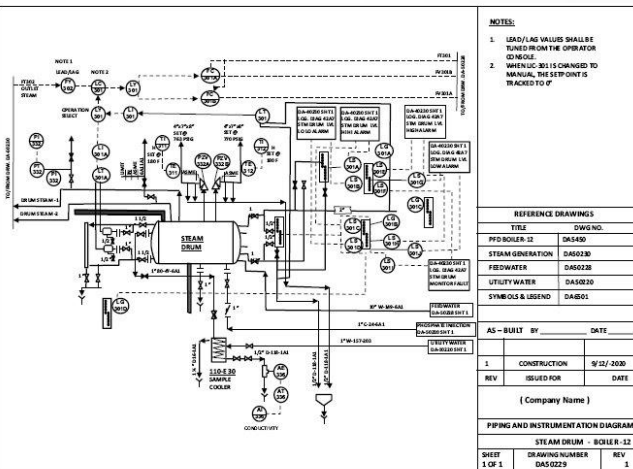


Figure 7-3. Piping and Instrumentation Diagram

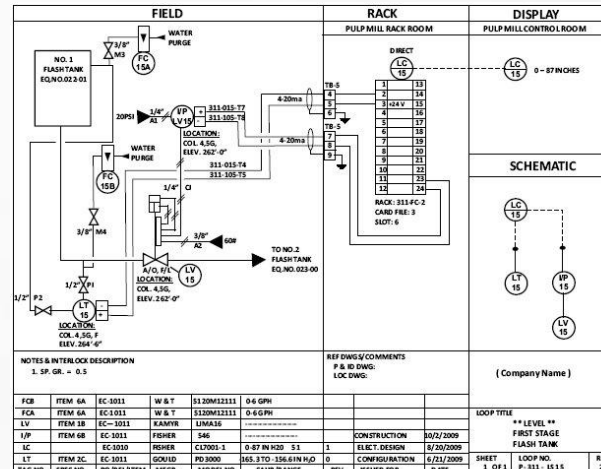


Figure 7-4. Example Loop Diagram—Level Control

# Tag Convention – ISA S5.1

## 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

## ISA S5.1 Tag Number Convention

	First Letters		Succeeding Letters		
	Measured/Initiating Variable	Variable Modifier	Readout/Passive Function	Output/Active Function	Function Modifier
<b>A</b>	Analysis		Alarm		
<b>B</b>	Burner, Combustion		User's Choice	User's Choice	User's Choice
<b>C</b>	User's Choice			Control	Close
<b>D</b>	User's Choice	Difference, Differential			Deviation
<b>E</b>	Voltage		Sensor, Primary Element		
<b>F</b>	Flow, Flow Rate	Ratio			
<b>G</b>	User's Choice		Glass, Gauge, Viewing Device		
<b>H</b>	Hand				High
<b>I</b>	Current		Indicate		
<b>J</b>	Power	Scan			
<b>K</b>	Time, Schedule	Time Rate of Change		Control Station	
<b>L</b>	Level		Light		Low
<b>M</b>	User's Choice				Middle, Intermediate
<b>N</b>	User's Choice		User's Choice	User's Choice	User's Choice
<b>O</b>	User's Choice		Orifice, Restriction		Open
<b>P</b>	Pressure		Point (Test Connection)		
<b>Q</b>	Quantity	Integrate, Totalize	Integrate, Totalize		
<b>R</b>	Radiation		Record		Run
<b>S</b>	Speed, Frequency	Safety		Switch	Stop
<b>T</b>	Temperature			Transmit	
<b>U</b>	Multivariable		Multifunction	Multifunction	
<b>V</b>	Vibration, Mechanical Analysis			Valve, Damper, Louver	
<b>W</b>	Weight, Force		Well, Probe		
<b>X</b>	Unclassified	X-axis	Accessory Devices, Unclassified	Unclassified	Unclassified
<b>Y</b>	Event, State, Presence	Y-axis		Auxiliary Devices,	
<b>Z</b>	Position, Dimension	Z-axis, Safety Instrumented System		Driver, Actuator, Unclassified final control element	

Figure 7-9. ISA-5.1 Identification Letters

# Representation of Signals and Instruments





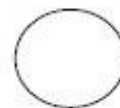
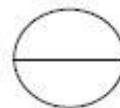
- Instrument supply or connection to process 
- Pneumatic Signal 
- Electric Variable or Binary 
- Communication Link 

Figure 7-10. Excerpt from ISA-5.1 Instrument Line Symbols

Discrete Instrument,  
field mounted



Discrete instrument,  
accessible to operator



Visible on video Display

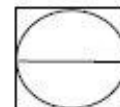


Figure 7-11. Excerpt from ISA-5.1 General Instrumentation or Symbol Function

# Symbols for Field devices and Elements

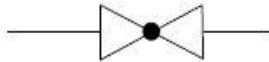
General Symbol



Ball Valve



Globe Valve



Damper

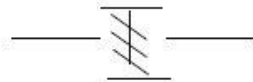


Figure 7-12. Excerpt from ISA-5.1 Valve Body and Damper Symbols

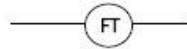
Restriction Orifice, With  
Flow Transmitter



Hand Valve



Inline Measurement



Measurement Element



Figure 7-14. Excerpt from ISA-5.1 Symbols for Other Devices

- Generic actuator, Spring-diaphragm
- Spring-diaphragm with positioner
- Linear piston actuator with positioner
- Rotary motor operated actuator
- Solenoid actuator for on-off valve



Figure 7-13. Excerpt from ISA-5.1 Actuator Symbols

# Process Symbols

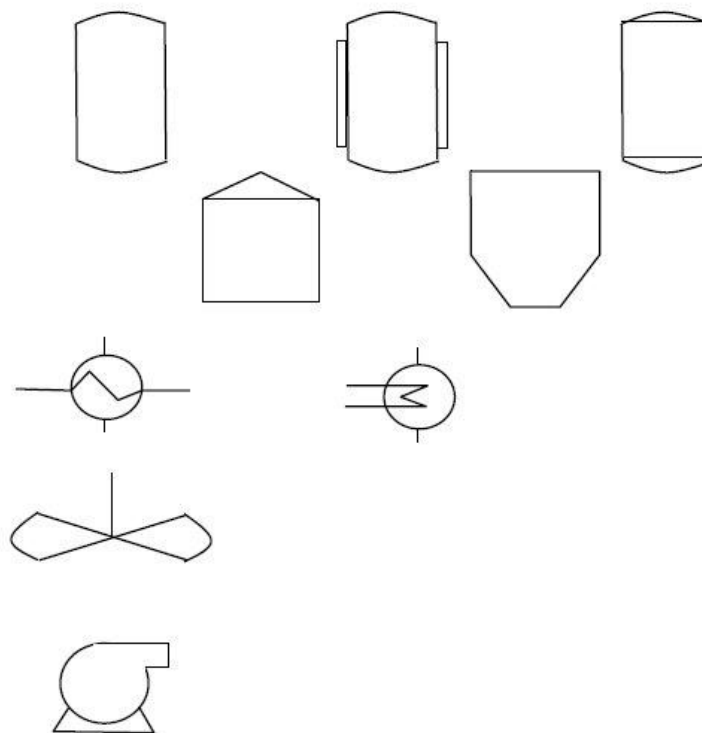
Vessel, Jacketed Vessel,  
Reactor

Atmospheric Tank, Storage

Heat Exchange

Agitator

Pump



**Figure 7-15. Examples of Process Equipment Symbols**



# Symbol Example – P&ID Drawing

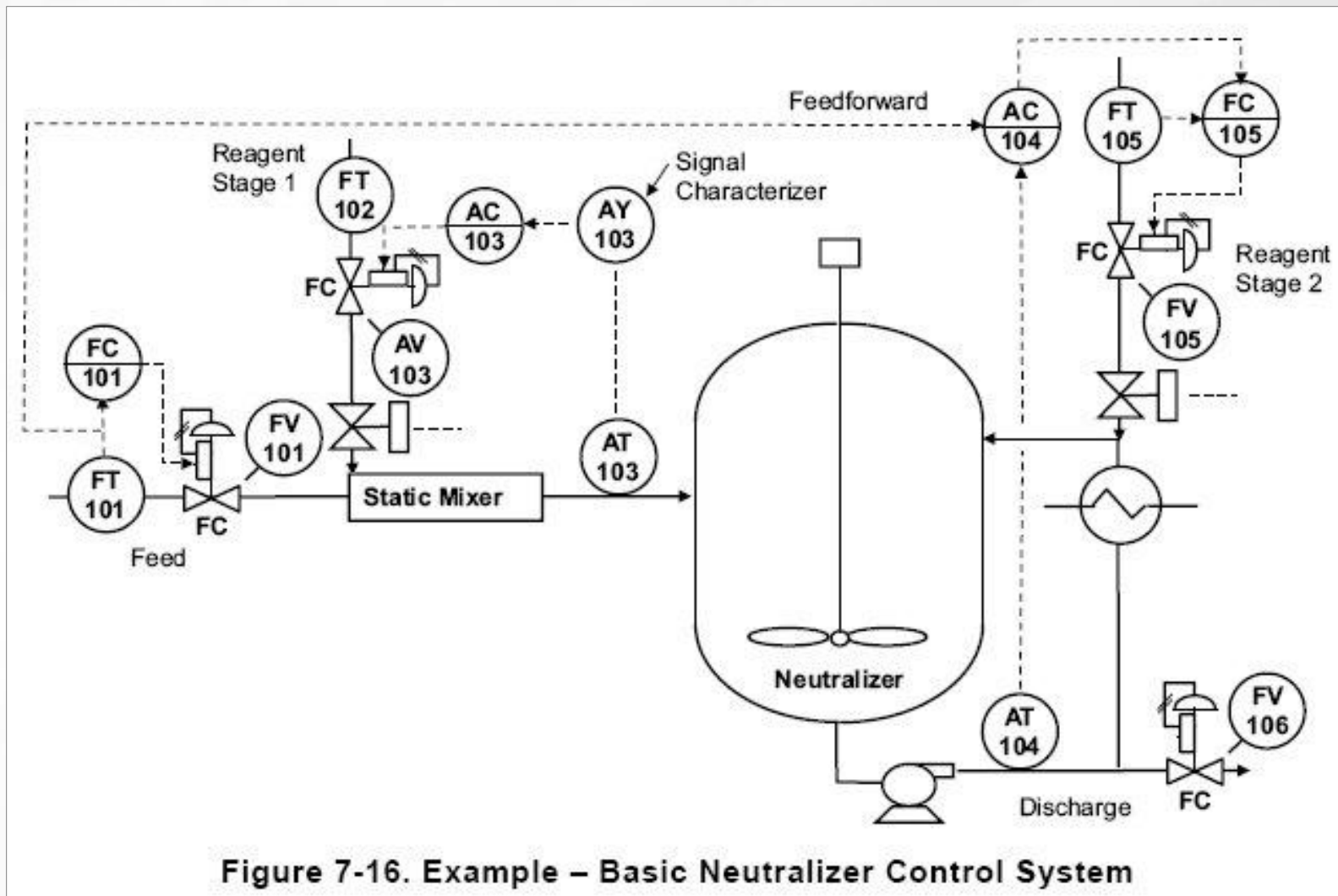


Figure 7-16. Example – Basic Neutralizer Control System

# Symbol Example(Cont.)

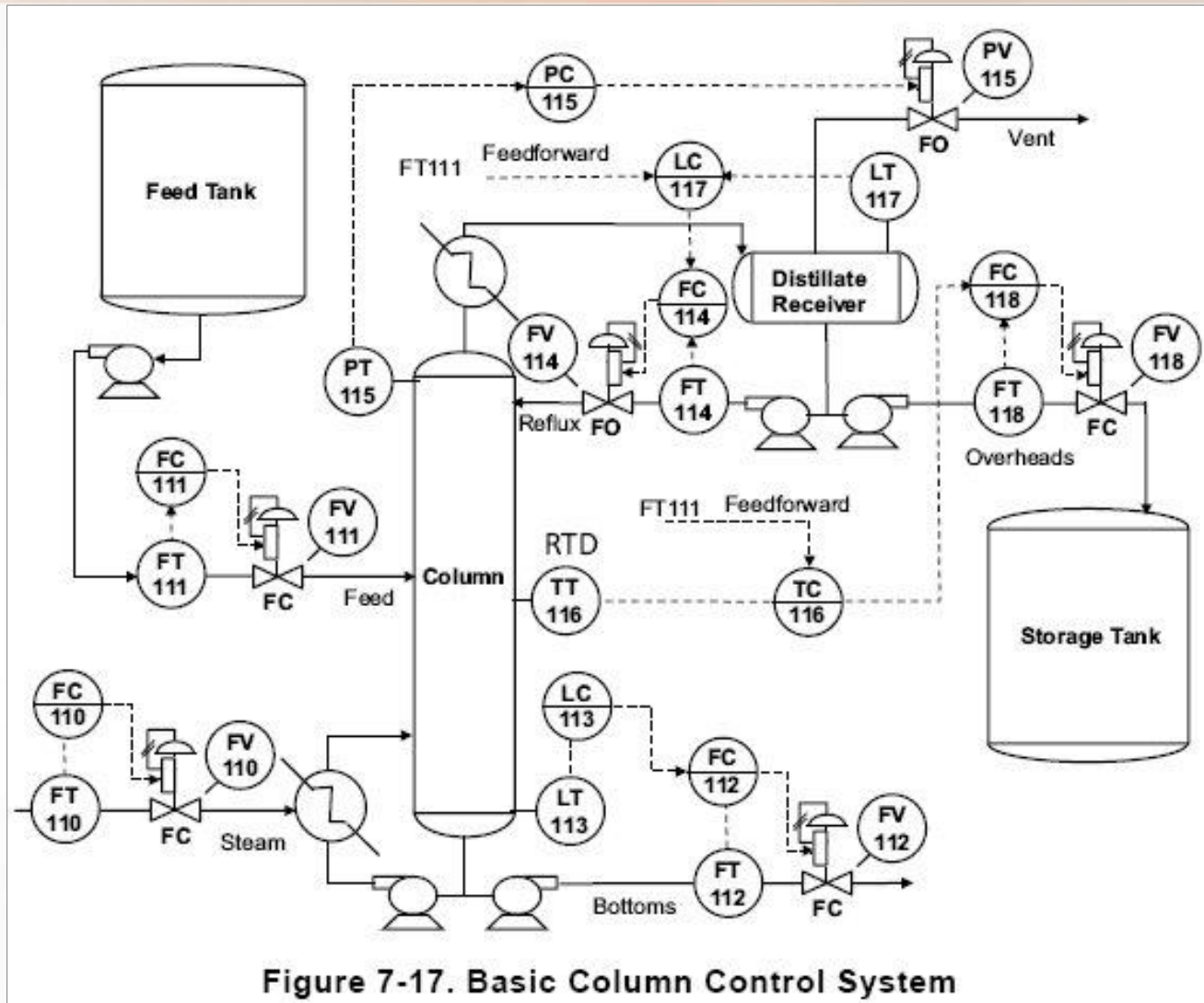


Figure 7-17. Basic Column Control System

# Symbol Example(Cont.)

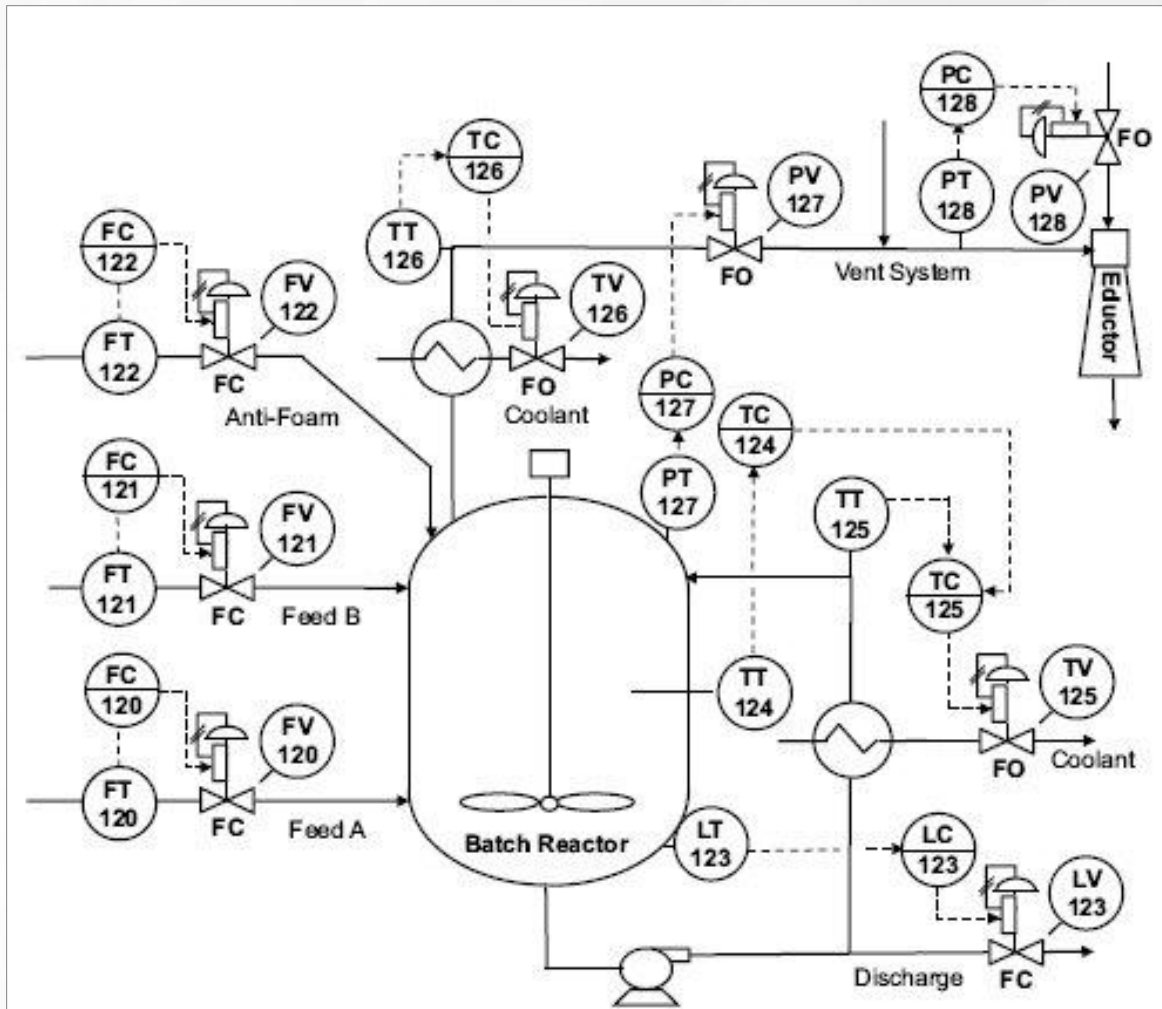


Figure 7-18. Example – Batch Reactor Control



