



PD3 Series

301-302-303

DIDACTIC PILOT PLANT

**TRAININGS AND TECHNICAL UPDATE
IN CONTROL LOOPS FOR INDUSTRIAL
AUTOMATION PROCESSES**



- Available for the most modern technologies: HART®, FOUNDATION™ fieldbus and PROFIBUS protocols
- Easy to install, operate and execute maintenance
- The most flexible, modern and resistant in the market
- Distinct mechanical characteristics
- Compact lightweight structure in Aluminum
- Easy to move and transport, no need to disassembly any element
- Device configuration flexibility
- Simulate a real industrial plant using the state-of-the-art technology
- Configure and control the main measuring variables of a real plant
- Control loops previously provided by Smar
- Create custom control loop strategies
- Designed for students and professionals in the Control and Automation Area
- Wheels at the base of the structure facilitate transportation
- Tanks and tubes built in Stainless Steel
- Command and Operation Front Panel
- Monitored and operated by one or several remote supervision workstations

HART
COMMUNICATION PROTOCOL

Fieldbus
FOUNDATION

PROFIBUS

Modbus

EDDL
ELECTRONIC
DESIGN
DEVELOPMENT
LIMITED

FD

OPC
FOUNDATION
LIMITED

smar

Smar Didactic Pilot Plant reproduces in a simple and objective manner, the operation of several control loops that can be implemented for an industrial plant, using the same field instruments and software tools that configure and operate large scale applications. The Smar Didactic Pilot Plant compact structure represents all of the components of an automation control, which can be manipulated and monitored by instructors and learners.

Control loops in the Smar Didactic Pilot Plant simulates the same characteristics found in an industrial plant by field instrumentation experts, which means learners, as well as their instructor, are provided with the state-of-the-art technology available in the market, on their own Learning and Practice Center.

The Didactic Pilot Plant incorporates previously configured control loops, but the flexibility to configure the devices allows new control loops to be created with no need to restructure the physical location of the devices, therefore adapting the Didactic Pilot Plant performance and integration to any teaching methodology.

Smar noticed the importance for new technicians and engineers of being closer to a real industrial plant during the learning process, and the Didactic Pilot Plant provides control and supervision processes in a compact system but consistent to the Industrial Automation environment.

Common Characteristics for the Didactic Pilot Plants

Smar Didactic Pilot Plant presents distinct mechanical characteristics. The lightweight structure is built in aluminum, which makes it light enough to be easily handled by two people, in a flat floor. There is no need to remove or disassembly any of its elements to transport the Didactic Pilot Plant, for long or short distances, and the wheels at the base of the structure facilitate the transportation.

All tanks and tubes are built in Stainless Steel to prevent corrosion and assure the quality along time.

- Lightweight structure in aluminum;
- Wheels at the base of the structure to facilitate transportation;
- Tubes and tanks in stainless steel;
- Control and operation front panel;
- Ten 1" Tri-Piece Ball Valves;
- Twelve 3/4" Tri-Piece Ball Valves.

The controller's front panel is located near the switches and LEDs to facilitate the access to control and electrical elements. Boards indicate plant and user information, and the main related control strategies.

The Smar Didactic Pilot Plant is configured, operated and supervised by a workstation, which means software tools developed by Smar and specific for each stage of the industrial process are installed in the microcomputer. SYSTEM302 Enterprise Automation System integrates configuration and operation software tools to edit parameters from instruments, modifying internal values from valves and transmitters, and also altering the operation mode for the control loops.

ProcessView Supervisory System, also integrated to SYSTEM302, acquires data from the instruments and displays control loop information through animated graphical screens. Using ProcessView, you can monitor and modify the system during its normal operation. Instructors and students can edit custom graphical screens and operation charts, acknowledge alarms and generate reports.

The supervision workstation can be configured in a remote computer, networked to the workstation that is connected to the Didactic Pilot Plant, and therefore several users can simultaneously access and view the process, from two or more remote supervision workstations.

Smar Didactic Pilot Plant uses analog or digital technology to execute temperature, flow and level control. Five specific models for each technology are available:

- **Didactic Pilot Plant - PD3-C:** Analog 4 to 20 mA & HART® Technology, with CD600Plus Multi-Loop Controller;
- **Didactic Pilot Plant - PD3-H:** Analog 4 to 20 mA & HART® Technology, with DF75 Controller;
- **Didactic Pilot Plant - PD3-F:** Digital FOUNDATION™ fieldbus Technology, with DF63 Controller;
- **Didactic Pilot Plant - PD3-P:** Digital PROFIBUS Technology, with DF95 Controller;
- **Didactic Pilot Plant - PD3-A:** HART®, FOUNDATION™ fieldbus and PROFIBUS Technologies.

The Didactic Pilot Plant is design with instruments and controllers manufactured by Smar, for HART®, FOUNDATION™ fieldbus, and PROFIBUS technologies. All Didactic Pilot Plant models include pressure transmitters, temperature transmitters and valve positioners. These instruments are installed in the Didactic Pilot Plant according to the implemented technology, and they are described below.

Pressure Transmitter - LD301, LD302, LD303

Differential pressure transmitters measure the upper tank level in the Didactic Pilot Plant. The gage pressure transmitter measures the air pressure at the upper tank.

LD301, the pressure transmitter for the HART® communication protocol, is configured and programmed using CONF401 software together with Smar HI321 Interface, or using the HPC401 HART® Configurator.

LD302 is Smar's pressure transmitter for the FOUNDATION™ fieldbus protocol. Use SYSTEM302 Enterprise Automation System, which integrates several software tool, to configure, operate and execute maintenance for the transmitters. LD303, the pressure transmitter for the PROFIBUS communication protocol, is also configured using SYSTEM302 tools.



Temperature Transmitter - TT301, TT302, TT303

Smar temperature transmitters are smart, powerful and extremely versatile. The digital technology used in the temperature transmitters enables a single device to accept different types of sensors available in the market, such as thermocouple and RTD, including load cells and resistance position indicators.

TT301, the temperature transmitter for the HART® communication protocol, is configured and programmed using CONF401 software together with Smar HI321 Interface, or using the HPC401 HART® Configurator.

TT302, Smar's temperature transmitter for the FOUNDATION™ fieldbus protocol, and TT303, the temperature transmitter for the PROFIBUS protocol, are configured and programmed using SYSTEM302 Enterprise Automation System.



Valve Positioners - FY301, FY302, FY303

Smar valve positioners execute fast and accurate positioning for diaphragm or cylinder actuators. FY300 Series positioners provide a pressure output as required to position a control valve according to an input received from the controller.

FY301, based on the HART® communication protocol, is configured using CONF401 software together with Smar HI321 Interface, or using the HPC401 HART® Configurator.

FY302, based on the FOUNDATION™ fieldbus protocol, and FY303, based on the PROFIBUS protocol, are configured and programmed using SYSTEM302 Enterprise Automation System.



According to the technology implemented in the Didactic Pilot Plant, other specific instruments developed by Smar can be installed.

FOUNDATION™ fieldbus to Current Converter - FI302

FI302 converts the information from the FOUNDATION™ fieldbus protocol and provides a 4-20 mA signal. FI302 has three independent output channels. The control loop sends the signal to the converter using one of the channels. Use SYSTEM302 Enterprise Automation System to configure and operate FI302.



PROFIBUS to Current Converter - FI303

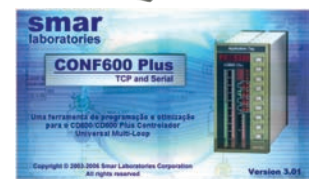
FI303 converts the information from the PROFIBUS protocol and provides a 4-20 mA signal. FI303 has three independent output channels. The control loop sends the signal to the converter using one of the channels. Use SYSTEM302 Enterprise Automation System to configure and operate FI303.



CD600Plus Multi-Loop Digital Controller

The CD600Plus is a powerful stand-alone single station process controller. It is capable of simultaneously controlling up to 4 independent control loops. The Digital Controller implements sophisticated control strategies using an extensive function block library. CD600Plus has an 8-digit alphanumeric display on the front panel to facilitate control loop tuning and alarm acknowledgment.

CONF600Plus is the user-friendly configuration tool for CD600Plus. Use CONF600Plus to create, edit, optimize and download control strategies to CD600Plus. You can also calibrate inputs and outputs, monitor function blocks during control loop operation, configure block parameters, add notes and print the documentation.



DF75 HSE Controller

DF75 is the second generation of Smar Logic Controllers. DF75 is part of the DFI302 Process Control and Automation Platform, and it is fully configured and operated using SYSTEM302 Enterprise Automation System tools.

DFI302 is a key-interfacing element in distributed field control systems. It combines powerful communication features with direct I/O access and advanced control for discrete and continuous applications. Due to its modular structure, DFI302 can be placed in the control room panels or in sealed boxes in field. This highly expandable platform is targeted from small standalone systems to large and complex plants.

DF75 is indicated for applications with high performance. DF75 executes discrete control via Ladder logic accessing I/O cards, and supports the highest limit of function blocks and ladder points among the DFI302 Controllers.

As a Modbus slave, DF75 maps ladder and I/O points as Modbus points, making it easier to integrate other instruments.



DFI302 Platform for Process Control and Automation

DFI302 is a modular, multifunctional device, combining powerful communication features with direct I/O access and advanced control for discrete and continuous applications. DFI302 modules are designed for complete distributed control solutions, including configuration tools, network analysis, parameterization, and device's data acquisition.

DF63 is a multifunctional controller with gateway capabilities among independent H1 networks and HSE networks, in addition to Modbus communication. DF63 supports flexible function block instantiation and discrete control configuration through Ladder language.

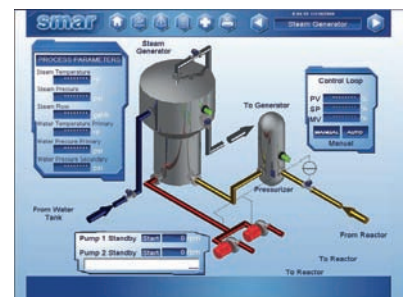
DF75 is the HSE controller whose main purpose is to associate the discrete control with continuous control using FOUNDATION™ fieldbus function blocks. Through I/O cards, it is possible to execute the discrete control via Ladder Logic, communication among field devices, in addition to Modbus communication.

DF95 is the multifunctional controller with PROFIBUS - High Speed Ethernet gateway capability. This controller executes function blocks and Ladder logics. DF95 extended functionalities allow communication between PROFIBUS DP and PA field devices, besides Modbus communication.



Process Visualization and Operation Software - ProcessView

Use SYSTEM302 ProcessView to create graphical interfaces that can be freely configured by the user in order to meet specific plant operating requirements. Smar Didactic Pilot Plant has pre-configure hierarchical screens that present a general, group and detail view for the process, as well as other common screens, such as synoptic, real-time history files, alarm and event history etc. ProcessView collects data from the instruments in the Didactic Pilot Plant and display the information on the workstation. In addition, ProcessView database can be easily configured.



Other Equipments Developed by Smar

CODE	DESCRIPTION
DF61	Ethernet Switch Module
DF54	Standard Cable
IS400P	Power Distributor and Isolator
PS-AC-R	Power Supply Module
ENET-710	Modbus Processor
PS302P	Power Supply
BT302	Fieldbus Bus Terminator
DF50	Power Supply for Backplane
DF52	Power Supply for Fieldbus
DF53	Power Supply Impedance for Fieldbus with 4 ports



Other Equipments

Smar Didactic Pilot Plant also includes other third-party equipments:

Frequency Inverter	Electronic device to convert constant DC power (voltage and frequency) to variable AC power. The frequency variation allows control of the speed of electric engines. This equipment is used in the Didactic Pilot Plant to control the pump rotation in the mixing tank.
Hydraulic Pumps	For water recirculation through the pipes and within the tanks of the Didactic Pilot Plant, two high performance hydraulic pumps are easily operated and maintained. They are compact and silent.
Control Valves	Two Globe Control Valves control the water flow through the Didactic Pilot Plant.
Rotameter	Two rotameters in the Didactic Pilot Plant indicate in real time the value of the water flow in each related circuit.
Temperature Sensor with RTD	A PT100-IEC temperature sensor measures water temperature in the hot water tank.
Temperature Sensor with Thermocouple	A temperature sensor with Thermocouple measures water temperature in the mixing tank.
Level Transmitter	Detects low hot water level in tank and sends a command to the control panel, inhibiting through the static converter the electric power being transferred to the electrical resistances inside the tank, this way preventing them from being burned out.
Immersion Resistance	Both resistances are submerged into the tank to heat the water.
Static Converter	It is used to feed the electrical resistances, heating the water.
Thermostat	The thermostat is located in the hot water tank and sends a signal that inhibits the static converter when the temperature reaches a high limit.

Accessories and Related Equipments

- Magnetic tool for local adjustment;
- Integral Orifice for Flow Measurement;
- Immersion Resistance;
- Pipes, connections, nuts and bolts;
- Brackets, flanges and accessories;
- Aluminum Table;
- Heating tank;
- Mixing tank;
- Feed Tank;
- Balance Tank;
- Compensation cable;
- Front panel with switches, signal LEDs, terminals, relays and protections.



PD3-C Didactic Pilot Plant

Analog 4 to 20 mA & HART® Technology, with CD600Plus Multi-Loop Controller

Devices	3 Differential Pressure Transmitters LD301D; 2 Temperature Transmitters TT301; 2 Valve Positioners FY301; 2 BFY Positioner Mounting Brackets.
Hardware	1 CD600 Multi-Loop Controller; 1 SW-700 Ethernet Switch Module; 1 ENET-710 Modbus/CDBus TCP 10/100Base-T Ethernet Module; 1 DF54 Twisted Pair Cable; 2 IS400P Signal Distributor; 1 HI321 HART® Interface for USB port; 1 Diode matrix interface with 12 lamps for tests; 1 Handheld with HPC401 HART® Communication Interface.
Software	1 CONF401 HART® Configurator; 1 CD-ROM with software tools for CD600Plus.
Other Equipments and Accessories for Industrial Usage	2 SD Magnetic Tool; 1 PT-100-IEC RDT; 1 Sensor Element Type J Thermocouple - NBS; 2 1" Integral Orifice; 2 Globe Control Valves with Pneumatic Actuator; 1 Conductive Level Switch; 2 Conductive Level Sensors; 1 Thermostat; 2 Rotameters; 1 220 Vca to 24 Vdc / 3 A Power Supply; 1 Compensation Cable - NBS Type J Thermocouple 1,5 m; 2 220 V Water Pumps; 1 Frequency Inverter with HMI for the front panel; 1 Static Converter; 2 2000 Watts Immersion Resistances; 1 Aluminum Table; 1 Heating Tank; 1 Mixing Tank; 1 Feed Tank; 2 Balance Tanks; 2 Wheel sets without brakes; 2 Wheel sets with brakes; 10 1" Tri-Piece Ball Valves; 12 3/4" Tri-Piece Ball Valves; Pipes, connections, nuts and bolts; Brackets, flanges and accessories; Electrical Materials (Front Panel, terminals, wires, flexible conduits, relays, signal LEDs, switches, buttons).

PD3-H Didactic Pilot Plant

Analog 4 to 20 mA & HART® Technology, with DF75 Controller

Devices	3 Differential Pressure Transmitters LD301D; 2 Temperature Transmitters TT301; 2 Valve Positioners FY301; 2 BFY Positioner Mounting Brackets.
Hardware	2 DF93 - Rack with 4 Slots – With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF75 - DFI Module - Logic Processor; 1 DF15.S0 - DFI Module - 2 Groups of 8 Digital Inputs 24 Vdc (Insulated); 1 DF28.S0 - DFI Module - 2 Groups of 8 NO Relay Outputs (double insulation and RC Protection); 1 DF3.S0 - Flat Cable to connect two racks - length 6,5 cm; 1 DF2.S0 - Rack Terminator; 1 DF44.S0 - DFI Module - 8 Current/Voltage Inputs - with 250 Ohms Resistors; 1 DF46.S0 - DFI Module - 1 Group of 4 Analog Outputs; 2 DF54 Twisted Pair Cables; 1 PS302P Power Supply; 1 ENET-710 Modbus/CDBus TCP 10/100 Base-T Ethernet Module; 1 IS400P Signal Distributor; 1 HI321 HART® Interface for USB port; 1 Diode matrix interface with 12 lamps for tests; 1 Handheld with HPC401 HART® Communication Interface.
Software	1 CONF401 HART® Configurator; 1 SYSTEM302.AC/V3 - SYSTEM302-7 CD-ROM - Studio; 1 STATIONKEY44100005.V3: DFI OPC Sever License for 128 Function Blocks / 1500 tags; Syscon Software Licence for 128 Function Blocks / 1500 tags; Ladder Logic Configuration Software for FFB.
Other Equipments and Accessories for Industrial Usage	2 SD Magnetic Tool; 1 PT-100-IEC RDT; 1 NBS Type J Thermocouple; 2 1" Integral Orifice; 2 Globe Control Valves with Pneumatic Actuator; 1 Conductive Level Switch; 2 Conductive Level Sensors; 1 Thermostat; 2 Rotameters; 1 220 Vca to 24 Vdc / 3 A Power Supply; 1 Compensation Cable - NBS Type J Thermocouple 1,5 m; 2 220 V Water Pumps; 1 Frequency Inverter with HMI for the front panel; 1 Static Converter; 2 2000 Watts Immersion Resistances; 1 Aluminum Table; 1 Heating Tank; 1 Mixing Tank; 1 Feed Tank; 2 Balance Tanks; 2 Wheel sets without brakes; 2 Wheel sets with brakes; 10 1" Tri-Piece Ball Valves; 12 3/4" Tri-Piece Ball Valves; Pipes, connections, nuts and bolts; Brackets, flanges and accessories; Electrical Materials (Front Panel, terminals, wires, flexible conduits, relays, signal LEDs, switches, buttons).

PD3-F Didactic Pilot Plant

Digital FOUNDATION™ fieldbus Technology, with DF63 Controller

Devices	3 Differential Pressure Transmitters LD302-D; 2 Temperature Transmitters TT302; 2 Valve Positioners FY302; 2 BFY Positioner Mounting Brackets; 1 FI302 Fieldbus to Current Converter; 1 BT302 Bus Terminator.
Hardware	FOUNDATION™ fieldbus Bridge Module 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF63 - DFI302 Module - 2 x 10/100MBPS, 4 x H1 Channels; 1 DF52.S0 - Power Supply for Fieldbus; 1 DF53.S0 - Power Supply Impedance for Fieldbus with 4 channels; 1 DF2.S0 - Rack Terminator. Logical Processor Module 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF75 - DFI Module - Logic Processor; 1 DF15.S0 - DFI Module - 2 Groups of 8 Inputs 24 Vdc (Insulated); 1 DF28.S0 - DFI Module - 2 Groups of 8 NO Relay Outputs (double insulation and RC Protection); 1 DF2.S0 - Rack Terminator.
Software	1 SYSTEM302-7 DVD-ROM; 1 Syscon License for 128 Function Blocks; 1 DFI OPC Sever License for 128 Function Blocks; 1 CD-ROM with ProcessView Supervision Software.
Other Equipments and Accessories for Industrial Usage	2 SD Magnetic Tool; 1 PT-100-IEC RDT; 1 NBS Type J Thermocouple; 2 1" Integral Orifice; 2 Globe Control Valves with Pneumatic Actuator; 1 Conductive Level Switch; 2 Conductive Level Sensors; 1 Thermostat; 2 Rotameters; 1 220 Vca to 24 Vdc / 3 A Power Supply; 1 Compensation Cable - NBS Type J Thermocouple 1,5 m; 2 220 V Water Pumps; 1 Frequency Inverter with HMI for the front panel; 1 Static Converter; 2 2000 Watts Immersion Resistances; 1 Aluminum Table; 1 Heating Tank; 1 Mixing Tank; 1 Feed Tank; 2 Balance Tanks; 2 Wheel sets without brakes; 2 Wheel sets with brakes; 10 1" Tri-Piece Ball Valves; 12 3/4" Tri-Piece Ball Valves; Pipes, connections, nuts and bolts; Brackets, flanges and accessories; Electrical Materials (Front Panel, terminals, wires, flexible conduits, relays, signal LEDs, switches, buttons).

PD3-P Didactic Pilot Plant

Digital PROFIBUS Technology, with DF95 Controller

Devices	3 Differential Pressure Transmitters LD303-D; 2 Temperature Transmitters TT303; 2 Valve Positioners FY303; 2 BFY Positioner Mounting Brackets; 1 FI303 PROFIBUS to Current Converter; 1 BT302 Bus Terminator.
Hardware	PROFIBUS PA Module 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF95 - HSE/PROFIBUS Controller with 2 Ethernet ports, 1 x DP (M12) and 2 x PA; 1 DF52.S0 - Power Supply for Fieldbus; 1 DF53.S0 - Power Supply Impedance for Fieldbus with 4 channels; 1 DF2.S0 - Rack Terminator. Logical Processor Module 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF75 - DFI Module - Logic Processor; 1 DF15.S0 - DFI Module - 2 Groups of 8 Inputs 24 Vdc (Insulated); 1 DF28.S0 - DFI Module - 2 Groups of 8 NO Relay Outputs (double insulation and RC Protection); 1 DF2.S0 - Rack Terminator.
Software	1 SYSTEM302-7 DVD-ROM 1 Syscon License for 128 Function Blocks; 1 DFI OPC Sever License for 128 Function Blocks; 1 CD-ROM with ProcessView Supervision Software.
Other Equipments and Accessories for Industrial Usage	2 SD Magnetic Tool; 1 PT-100-IEC RDT; 1 NBS Type J Thermocouple; 2 1" Integral Orifice; 2 Globe Control Valves with Pneumatic Actuator; 1 Conductive Level Switch; 2 Conductive Level Sensors; 1 Thermostat; 2 Rotameters; 1 220 Vca to 24 Vdc / 3 A Power Supply; 1 Compensation Cable - NBS Type J Thermocouple 1,5 m; 2 220 V Water Pumps; 1 Frequency Inverter with HMI for the front panel; 1 Static Converter; 2 2000 Watts Immersion Resistances; 1 Aluminum Table; 1 Heating Tank; 1 Mixing Tank; 1 Feed Tank; 2 Balance Tanks; 2 Wheel sets without brakes; 2 Wheel sets with brakes; 10 1" Tri-Piece Ball Valves; 12 3/4" Tri-Piece Ball Valves; Pipes, connections, nuts and bolts; Brackets, flanges and accessories; Electrical Materials (Front Panel, terminals, wires, flexible conduits, relays, signal LEDs, switches, buttons).

PD3-A Didactic Pilot Plant

HART®, FOUNDATION™ fieldbus and PROFIBUS Technologies

Devices	3 Differential Pressure Transmitters LD302-D; 2 Temperature Transmitters TT302; 2 Valve Positioners FY302; 2 BFY Positioner Mounting Brackets; 1 FI302 Fieldbus to Current Converter; 1 BT302 Bus Terminator; 1 FDI302 - Interface for FOUNDATION™ fieldbus & PROFIBUS PA field devices; 3 GLL1071 Main Boards - LD301; 2 GLL1307 and GLL1308 Sets - TT301; 2 GLL1011 Main Boards - FY301.
Hardware	<p>HART® Module</p> 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 2 DF75 - DFI Module - Logic Processor; 1 DF44.S0 - DFI Module - 8 Current/Voltage Inputs - with 250 Ohms Resistors; 1 DF46.S0 - DFI Module - 1 Group of 4 Analog Outputs; 1 DF2.S0 - Rack Terminator. <p>FOUNDATION™ fieldbus Module</p> 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 1 DF63 - DFI302 Module - 2 x 10/100MBPS, 4 x H1 Channels; 1 DF52.S0 - Power Supply for Fieldbus; 1 DF53.S0 - Power Supply Impedance for Fieldbus with 4 channels; 1 DF2.S0 - Rack Terminator. 1 DF28.S0 - DFI Module - 2 Groups of 8 NO Relay Outputs (double insulation and RC Protection); 1 DF3.S0 - Flat Cable to connect two racks - length 6,5 cm; 1 DF54 Twisted Pair Cables; 1 DF78 - DFI302 Module - With 4 Slots - Hot Swap Processor; 1 DF11 - Discrete Input Module with 16 x 24 Vdc Inputs. <p>PROFIBUS PA Module</p> 1 DF93 - Rack with 4 Slots - With Diagnostic; 1 DF84 - IMB Soft Starter; 1 DF50.S0 - Backplane Power Supply for DFI302; 2 DF95 - HSE/PROFIBUS Controller with 2 Ethernet ports, 1 x DP (M12) and 2 x PA; 1 DF52.S0 - Power Supply for Fieldbus; 1 DF53.S0 - Power Supply Impedance for Fieldbus with 4 channels; 1 DF2.S0 - Rack Terminator.
Software	1 SYSTEM302-7 DVD-ROM 1 Syscon License for 128 Function Blocks; 1 DFI OPC Sever License for 128 Function Blocks; 1 CD-ROM with ProcessView Supervision Software.
Other Equipments and Accessories for Industrial Usage	2 Ethernet Switch; 2 SD Magnetic Tool; 1 PT-100-IEC RDT; 1 NBS Type J Thermocouple; 2 1" Integral Orifice; 2 Globe Control Valves with Pneumatic Actuator; 1 Conductive Level Switch; 2 Conductive Level Sensors; 1 Thermostat; 2 Rotameters; 1 220 Vca to 24 Vdc / 3 A Power Supply;

PD3-A Didactic Pilot Plant

HART®, FOUNDATION™ fieldbus and PROFIBUS Technologies

**Other Equipments
and Accessories
for Industrial
Usage**

1 Compensation Cable - NBS Type J Thermocouple 1,5 m;
 2 220 V Water Pumps;
 1 Frequency Inverter with HMI for the front panel;
 1 Static Converter;
 2 2000 Watts Immersion Resistances;
 1 Aluminum Table;
 1 Heating Tank;
 1 Mixing Tank;
 1 Feed Tank;
 2 Balance Tanks;
 2 Wheel sets without brakes;
 2 Wheel sets with brakes;
 10 1" Tri-Piece Ball Valves;
 12 3/4" Tri-Piece Ball Valves;
 Pipes, connections, nuts and bolts;
 Brackets, flanges and accessories;
 Electrical Materials (Front Panel, terminals, wires, flexible conduits, relays, signal LEDs, switches, buttons).

Instructors and learners can easily implement several control loops using SYSTEM302 Enterprise Automation System and Smar Didactic Pilot Plant.

Smar also supplies control modules that are installed and configured in the Didactic Pilot Plant.

Feed Forward Control

Feed forward control strategies measure the disturbance and calculates, based on a Set Point value for the monitored variable, the most appropriate value for the measured variable in order to prevent changes on the process variable.

Feedback Control

Feedback control consists of three basic functions. The monitored variable is measured, the value is then compared to the Set Point and difference is the error signal. Finally, the process variable is adjusted or manipulated to decrease or zero in the error signal.

Cascade Control

The cascade control is a simple method involving two controllers connected in series. The cascade control is defined as a configuration where the output signal from one controller is the Set Point of at least another controller.

Technical Characteristics

Computer and Peripherals

The Didactic Pilot Plants PD3-H, PD3-F, PD3-P and PD3-A require a workstation to execute configuration, operation and monitoring.

Only the PD3-C model does not require a workstation.

The workstation (microcomputer, monitor and printer) is not part of the Didactic Pilot Plant set supplied by Smar.

Some minimum requirements when purchasing the workstation for the Didactic Pilot Plant must be fulfilled to install and run the SYSTEM302 Enterprise Automation System. The system performance will improve according to the processing capacity of the microprocessor and memory usage from the workstation.

- **Processor:** Pentium IV 2.0 GHz;
- **Operational System:** Windows XP Service Pack 3 (or previous version) or Windows Server 2003 Service Pack 1 or Windows Server 2003 Service Pack 2;
- 2 USB ports;
- SVGA Monitor (256 colors);
- DVD-ROM.

The board shows the minimum requirements for executing SYSTEM302 Version 7.2 and operating the Didactic Pilot Plant.

Facility Infrastructure

The infrastructure of the facility where a Didactic Pilot Plant is installed requires:

- Power Supply: 220 Vca, 60 Hz;
- Consumption: 5 KW;
- Air supply for valve positioners: 20-100 psi;
- Valve actuators: 24 psi;
- Water tap installation;
- Compressed air installation;
- Water drain.

The Configuration (for software and hardware), Installation and Maintenance Manuals included in the Smar Didactic Pilot Plant, along with training courses offered by Smar, enable instructors to alter and improve the system.

Physical Specifications

Material	Structure built in Aluminum; Tanks and Tubes built in 304 Stainless Steel.	
Equipment Dimensions	Assembled Equipment: Width 2300 mm x Depth 1000 mm x Height 2030 mm.	
Equipment Weight	Approximate weight, packaging with no water in the tanks:	800 Kg.
	Approximate weight, after installation, no packaging (80 to 100 kg) and tank filled with water (maximum of 120 liters):	820 to 850 Kg.

Start-up Assistance

Smar provides assistance during installation, verification and start-up:

- Electrical Installations;
- Mechanical Installations;
- Electrical Installation Projects;
- Mechanical Installation Projects;
- System Tools Configuration;
- Technical Support.

Training

The Smar Learning Center provides specific courses covering aspects from the initial project phase to the final phases such as the operation, supervision and maintenance of process control modules, and these courses can be adapted to fit the purposes of your training requirements.

Workshops and trainings are held at Universities, Technical Institutes and Companies facilities or at the Smar Learning Center located in Houston, Texas.

For further information, consult our website:
<http://www.smar.com/learningcenter/index.asp>.



smar learning center

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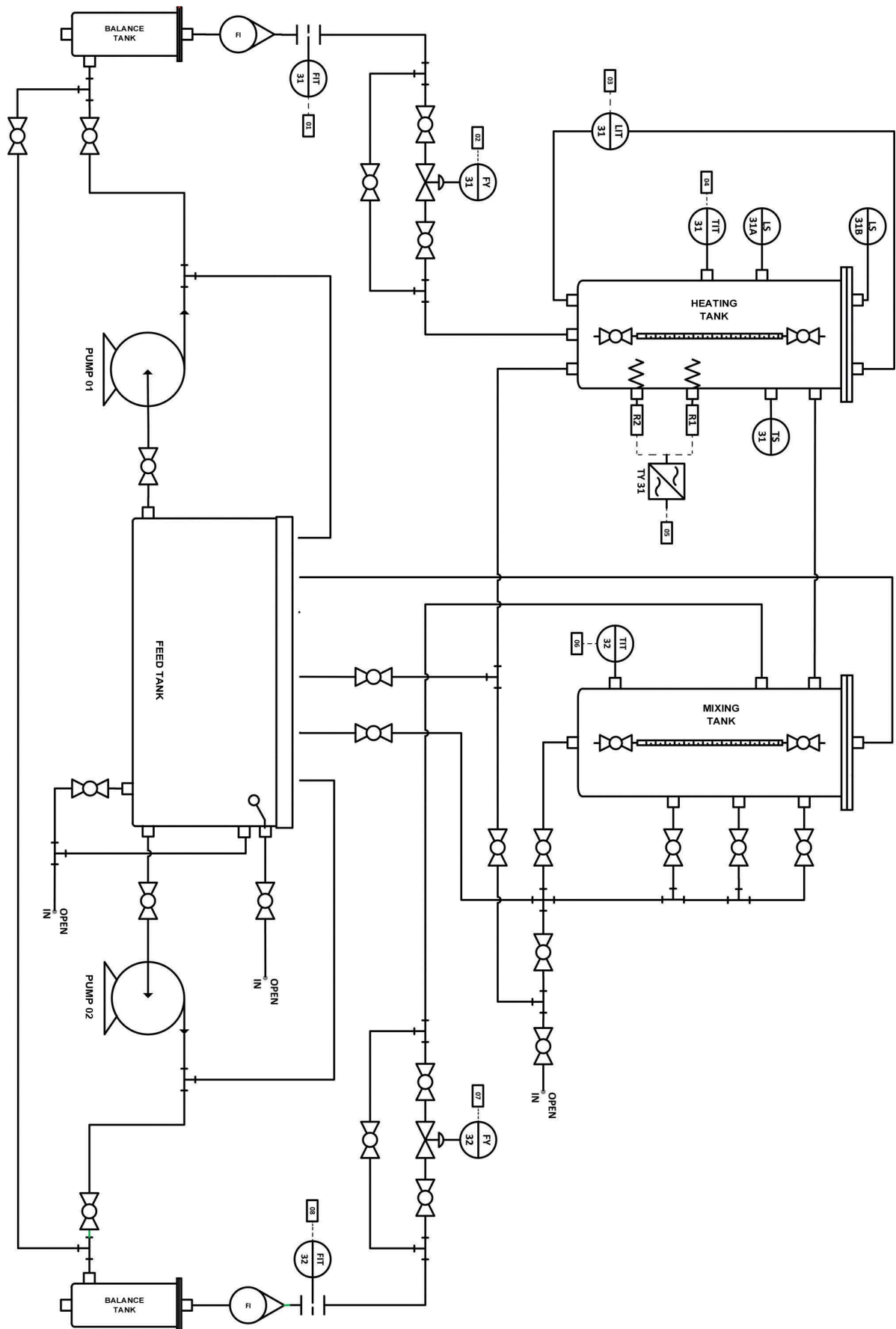
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Ordering Codes

MODEL	DIDACTIC PILOT PLANT
PD3-C	HART® with CD600P;
PD3-H	HART® with DF75;
PD3-F	FOUNDATION™ fieldbus;
PD3-P	PROFIBUS;
PD3-A	HART®, FOUNDATION™ fieldbus and PROFIBUS Technologies.

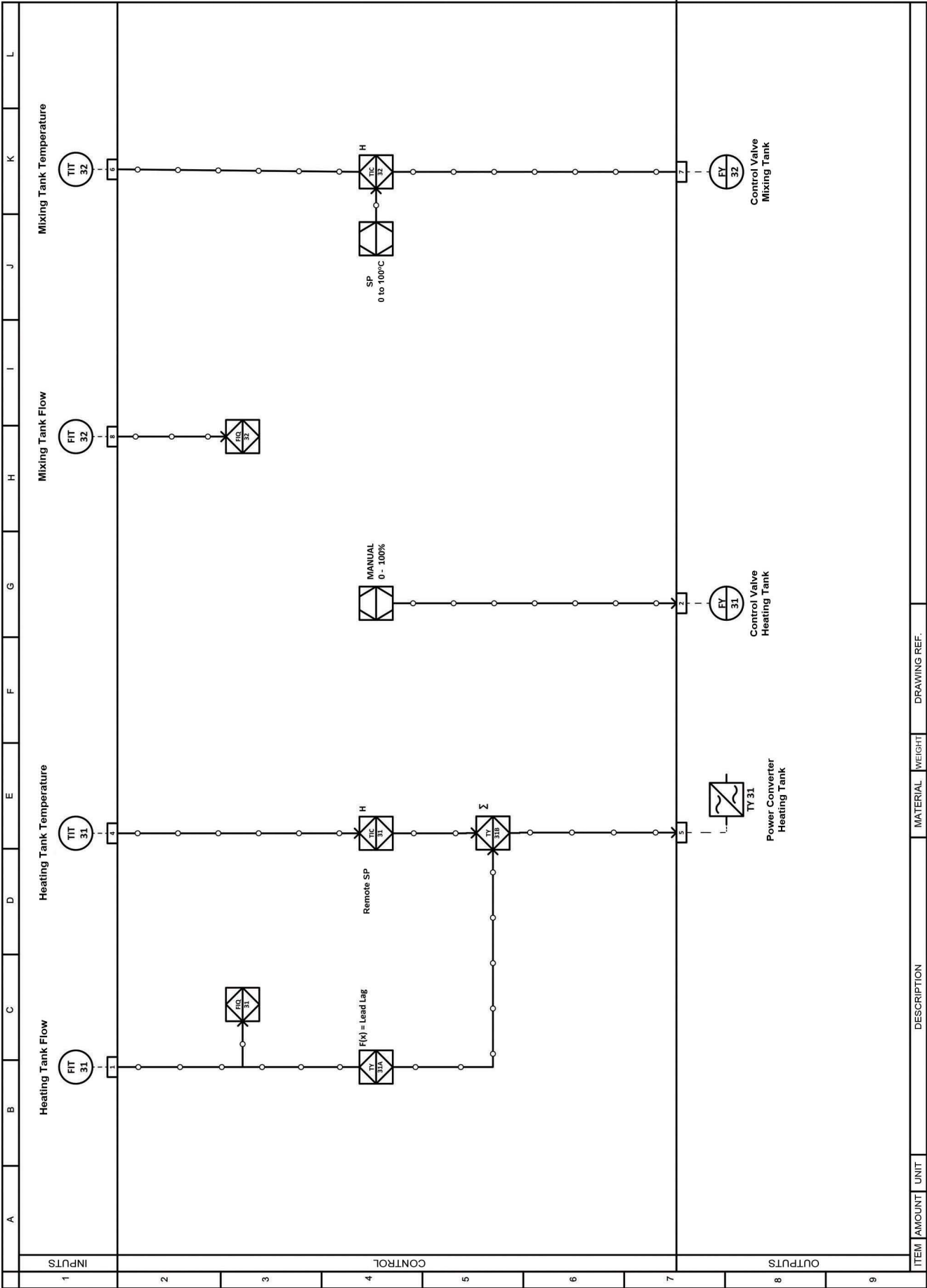
P&I Diagram



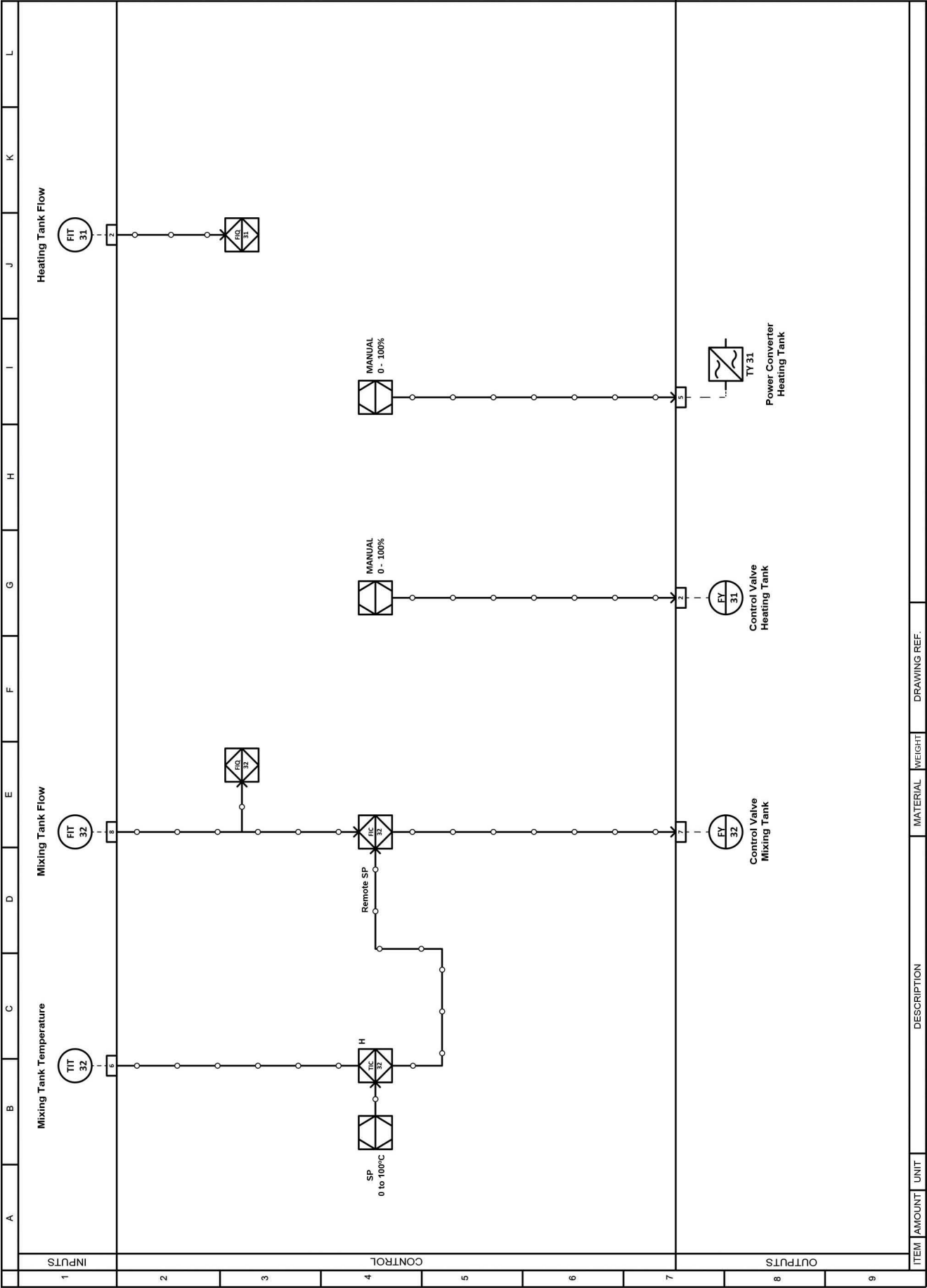
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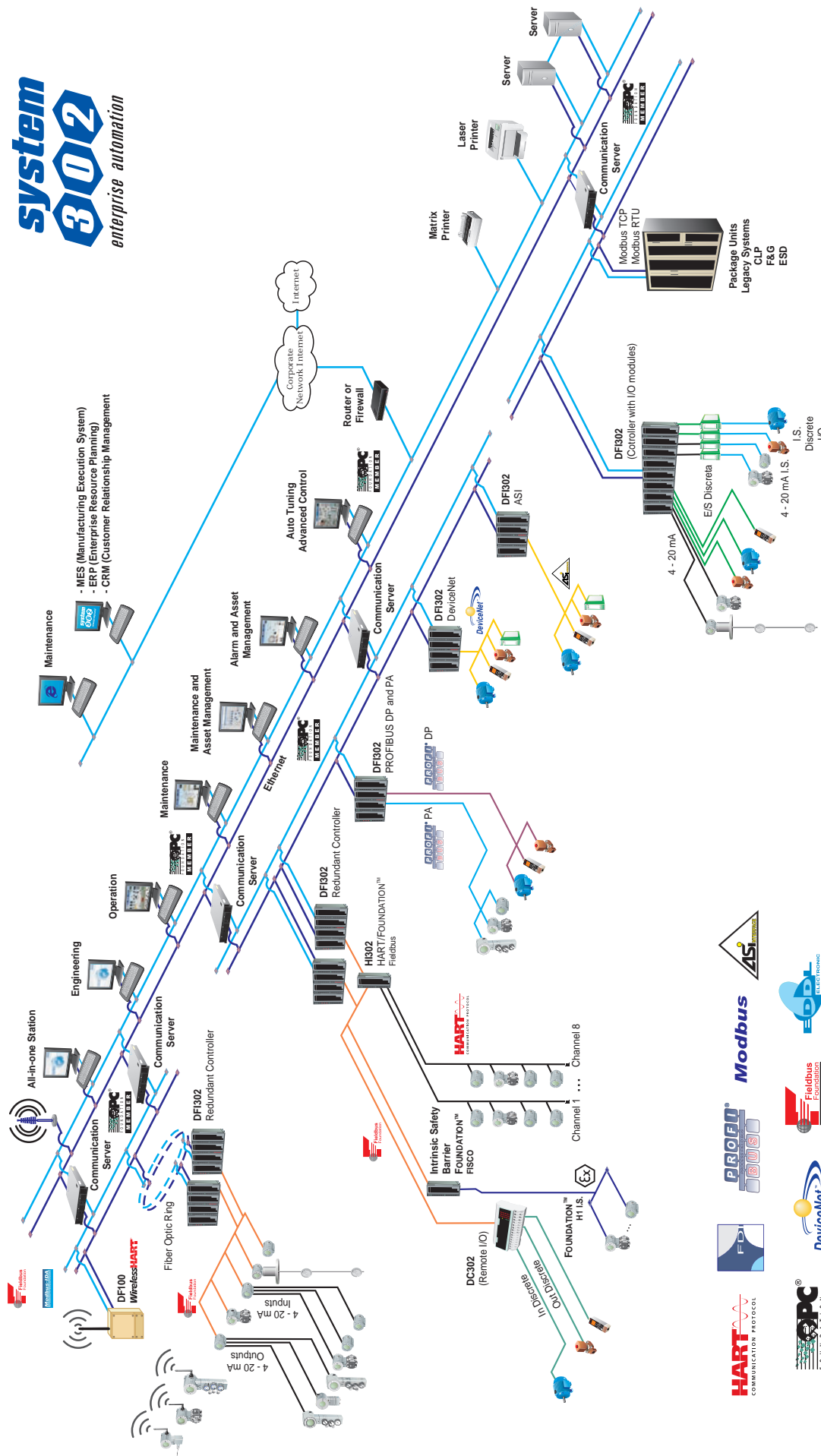
It is necessary to wear proper Personal Protective Equipments (PPEs) to execute maintenance in the Didactic Pilot Plant, according to Safety Standards.

Feed Forward Control



Cascade Control





Front View



Back View



Upper View



smar
www.smar.com

Specifications and information are subject to change without notice.
Up-to-date address information is available on our website.

web: www.smar.com/contactus.asp

