smar

Improving Your Process and Profitability



# Product Portfolio

# LD300 Series

## Pressure, Level and Flow Transmitters




The LD300 Series is a complete line of smart transmitters for differential, absolute, gauge, high static differential pressure and flow measurement as well as models for level, remote seal and sanitary applications. The LD300 Series is a robust and highly reliable solution for your process. For flow measurement, the transmitter offers user selectable square root function making it suitable for commonly used flow sensors. The large acceptance of the LD300 line is due to the use of a capacitive cell as pressure sensor, which keeps the digital signal from the pressure reading up to the transmitter output, increasing the device accuracy and stability. For applications requiring the highest accuracy, the LD300 series offer the model L1, with 0.04% accuracy. Three options of communications protocols for configuration, monitoring and diagnostic are available: HART®, FOUNDATION™ fieldbus and PROFIBUS PA.

- ± 0.075% accuracy for standard models;
- ± 0.040% accuracy for L1 models (high performance);
- ± 0.2% of URL stability - Guarantee for 12 years;
- Wide range of pressures, up to 40 MPa (5800 psi);
- 120:1 rangeability;
- 100 ms total response time;
- PID control capability;
- Advanced diagnostics;
- Bi-directional flow measurement;
- Support for DD, EDDL and FDT/DTM;
- Built-in transient suppression;
- Low Total Probable Error;
- Multifunction rotary display;
- Simple (zero and span) and complete local adjustment;
- Weather proof, explosion proof and intrinsically safe.

# MANIFOLD

## Manifold Valves for Pressure Transmitters



Smar manifolds have needle valves for high pressure with a non-rotating shutter, with great tightness in the process, avoiding leaks typically found in valves with rotary shutter. Provided in AISI 316 and others metals. Gaskets in PTFE and screws in Carbon Steel, also with the option in Stainless Steel. Also available for vacuum, corrosive fluids and for use with oxygen. Produced by certified quality system according to ISO9000-2000.

- 6,000 psi nominal pressure (414 bar);
- Temperature from -50 ºC to 200 ºC (PTFE seal);
- “T” shape handle for easy use;
- Internal metal-metal seat, which extends the lifetime of gaskets;
- 0.21” internal passage (5.4 mm);
- Stainless Steel, Carbon Steel * Monel *, Hastelloy *, Super Duplex * materials.

  * item by inquire;

# LD400 HART® SIS

## Pressure, Level and Flow Transmitters



The LD400 Series is a complete line of smart transmitters for differential, absolute, gauge, high static differential pressure and flow measurement as well as models for level, remote seal and sanitary applications. LD400 offers the best solution for all field applications demanding the highest performance. It is a robust and highly reliable solution for pressure, level and flow measurement.
It has high flexibility in applications due to use of a capacitive cell as pressure sensor, which keeps the digital signal from the pressure reading up to the transmitter output, increasing the device accuracy and stability. All the processing is made by the HT3012, a powerful mathematical co-processor and a 16-bit CPU that ensures a fast response time and high performance for the transmitter. The LD400 is SIL 2 and SIL 3 certified by TUV in compliance with the IEC 61508-2000 for using in Safety Instrumented Systems. LD400 is the best choice to increase productivity and ensure process reliability and safety.

- ± 0.045% accuracy;
- ± 0.2% of URL Stability - Guarantee for 12 years;
- 200:1 rangeability;
- 35 ms total response time;
- PID control capability;
- Advanced diagnostics;
- Bi-directional flow measurement;
- Support for DD, EDDL and FDT/DTM;
- Non-polarity power supply input;
- Built-in transient suppression;
- Low Total Probable Error;
- HART® Protocol;
- Multifunction rotary display;
- Simple (zero and span) and complete local adjustment;
- Suitable for installations requiring SIL2 and SIL3.

# LD400 WirelessHART®

## Pressure, Level and Flow Transmitters



The LD400WH Series is a complete line of smart transmitters for differential, absolute, gauge, high static differential pressure and flow measurement as well as models for level, remote seal and sanitary applications. LD400WH offers the best solution for all field applications demanding data wireless transition and highest performance. It is a robust and highly reliable solution for pressure, level and flow measurement.
It works in mesh network that is self-organizing, has low power consumption and has long battery power.

- ± 0.045% accuracy;
- ± 0.2% of URL Stability - Guarantee for 12 years;
- 200:1 rangeability;
- Advanced diagnostics;
- Support for DD, EDDL and FDT/DTM;
- Local adjustment (zero and span calibration) and complete;
- Low Total Probable Error;
- Repeater/router function in mesh network;
- “Burst Mode” for sending periodics statements;
- Battery operation for long duration;
- WirelessHART® Protocol;

# LD290 Series
## Gage Pressure Transmitter and Level



The LD290M models are an economical alternative for gauge pressure and level transmitters. It is based on a field-proven capacitive sensor that provides reliable, safe operation and high performance. As there is no A/D conversion on pressure reading, errors and drifts during conversions are eliminated. A temperature sensor provides temperature compensations, which combined with the sensor precision, results in high accuracy and stability for the LD290 Series. This lightweight design can eliminate the need for mounting brackets. In many applications they can be attached directly to the process without the use of impulse lines. The coupling of remote seals and sanitary connections are also available for all of the LD290 Series.

**4-20 mA** HART FOUNDATION PROFIBUS



The LD290L models were designed to be a low cost alternative for level measurement in non-pressurized tanks. The process connection is a slip-on flange in Plated Cabon Steel, 304 SST or 316 SST. The LD290L (4-20 mA), LD291L (4-20 mA + HART®), LD292L (FOUNDATION™ fieldbus) and LD293L (PROFIBUS PA) versions are available.

**4-20 mA** HART FOUNDATION PROFIBUS

The LD290I models are gauge pressure transmitter with an extended probe for level measurement in non-pressurized tanks. A probe, in several lengths, with a sensor in its ends, is immersed in the process fluid, providing the level of the liquid in the tank. Several process connections options are available.



The LD290 Series have the following characteristics:

- ± 0.075% accuracy;
- Wide range of pressures, up to 25 MPa (3600 psi);
- Totally digital, including sensor, electronics and communication;
- Several options for process connections;
- 100 ms total response time;
- Simple (zero and span) and complete local adjustment;
- MTBF (Mean Time Between Failures) of 239 years;
- 40:1 rangeability;
- Configuration and remote diagnostics by HPC401, CONF401, DDCON 100 and FDT/DTM;
- Multifunction rotary display;
- Digital communication via HART®, FOUNDATION™ Fieldbus, and PROFIBUS-PA protocols;
- Weather proof, explosion proof and intrinsically safe;
- Built-in transient suppression.

**4-20 mA** HART FOUNDATION PROFIBUS

# LD1.0
## Economic Capacitive Pressure Transmitter



The Smar LD1.0 is an Economic Capacitive Pressure Transmitter and was designed for liquid, gas and steam gauge pressure measurement in several industrial applications such as, industrial process measurement, pneumatic and hydraulic systems, pumps and compressors, machine and machining tools.

This low price transmitter is the only one in its market category to use the capacitive sensor technology for pressure reading in a completely digital way, which provides excellent precision, repeatability and linearity for the measurement. The LD1.0 design features provide resistance to vibration, shock, great temperature variations, immunity to electromagnetic interference and other extreme environmental conditions that are typical in industrial applications. The LD1.0 is the transmitter in its class that offers the best cost/benefit.

- ± 0.2% accuracy;
- 4-20 mA output signal according to NAMUR NE43;
- HART® Communication Protocol;
- Several Process Connections Options;
- DIN 43650 Electric Connection - Without Polarity;
- Wide range of pressures, up to 150 bar;
- 50:1 Rangeability;
- Operation Temperature: - 40 to 85 ºC;
- Response time 200 ms;
- Zero and Span Local Adjustment;
- Configuration Protection with Password;
- Housing Material in 17-4PH / AISI316L;
- Diaphragm Material in Hastelloy C276;
- Fill fluid in Silicone;
- Configuration via the HPC401 and CONF401;
- Support for DD, EDDL and FDT/DTM;
- IP65 environmental protection.

# SR301 Series
## Remote Seals



The SR301 series is a complete Remote Seal line, which is coupled on the pressure transmitters to meet different applications such as very high or very low temperatures, areas of difficult access or with too much vibration.

- SR301T: Flanged remote seal for general applications. The flush connection is optional.
- SR301E: Flanged remote seal with extension for general applications and it is very used when the tank wall is coated.
- SR301P: Pancake type remote seal especially used in applications with limited installation area. It may be supplied optionally with flush connection.
- SR301Q: Pancake remote seal with extension.
- SR301R: Threaded remote seal for general applications with a wide variety of threaded connections. Optionally it may be supplied with flush connection.
- SR301S: Sanitary remote seal especially designed for use in food industries and other applications where sanitary connections are required.

# Level

## RD400
## Guided Wave Level Transmitter



The RD400 uses TDR (Time Domain Reflectometry) principle for direct measurement of levels in industrial processes. By using a RF frequency generator, RD400 emits waves of low frequency which are guided through a probe in contact with the process. With a dedicated software, the RD400 continuously calculates the time difference between reflected waves and the actual process fluid level.

- Measurement is not affected by density and/or temperature variations;
- Not affected by viscosity, gravity, steam, gases or turbulence over the process;
- Medium accuracy of ±5 mm*;
- Configuration via local adjustment or HART® remote configuration tool;
- Volume calculation for non-standard tanks or irregular shaped tanks.

* The accuracy depends on the probe type, the area of contact between the product and the probe, and the process dielectric constant. Outside the dead zones, the RD400 can reach up to ±7 mm. For further information, consult our representatives.

# Position

## FY300 Series
## Smart Control Valve Positioner



The FY300 Series converts the input signals to pressure values, for the valve actuator to move its stem to the more appropriate and accurate openings, in order to carry out adequately the process control strategies. The FY300 Series is available in 4-20 mA or HART®, FOUNDATION™ Fieldbus, and PROFIBUS-PA technologies.

The valve position is measured by a magnetic sensor, without physical contact. The FY300 series presents a local magnetic sensor assembly, or remote mounting up to 20 m cable length for applications involving severe vibration, high temperatures or difficult access.

Appropriate for linear or rotary valve displacement, and for single action or double action valves. Automatic setup takes less than 3 minutes. Local adjustment without need to open the circuit housing. Universal mounting brackets for rotary or linear valves.

Customized mounting brackets are available for different brands and models of control valves. Consult www.smar.com for available brackets models and sizes.

Connectivity with asset management and FDT/DTM (Field Device Tool/Device Type Manager) applications. The FY300 HART® can also be configured using third-party configuration tools, and also partially configured through local adjustment using the Smar magnetic tool.

Provide important data for valve and actuator diagnostics, aimed at preventive and predictive actions.

Smar offers PST (Partial Stroke Test) for free for the FY303.

- Travel: Linear Motion: 3 - 100 mm;
  Rotary Motion: 30° - 120°;
- Air pressure supply: 1.4 - 7 bar (20 - 100 psi);

- Flow Characterization: Linear, Equal Percentage, Quick Opening or configurable;
- Aluminum or 316 SST;
- Indicator with 4½ - numerical digit and 5-character alphanumerical;
- Certifications for Hazardous Areas: explosion-proof and intrinsically safe.

## BFY-CL
## Coupling Device



BFY-CL is a coupling device for the FY family of Smar positioners, for final elements of control and with strokes longer that 100 mm. The operation principle of BFY-CL is based on the oblique split rule, reducing an original long stroke to a short one, orthogonal to the original travel.

Designed for ISO 6431 series cylinders - SAE1020 carbon and stainless steel materials. The BFY-CL is used with the FY300 Series and FY400 Smar positioners - presented in three technology options: HART®, FOUNDATION™ fieldbus, and PROFIBUS PA.

- For use in ISO 6431 series cylinders;
- 100 mm to 1000 mm cylinder and ruler strokes;
- 63 mm to 160 mm cylinders diameters;
- Carbon and stainless steel materials.

## FY400 Series
## Smart Valve Positioner



The FY400 Series is a device that converts an input electrical signal in position for control valve or other final control element with pneumatic actuator that receives signals in 4-20 mA current or in HART® protocol.

Local configuration with magnetic tool, without need to open the housing, makes it suitable for applications in hazardous areas. The portable configurators based on the HART® protocol, such as the HPC401 HART® Configurator, enables full access to the configuration parameters. Interface with the CONF401 and DDCON 100 application software on desktop or laptop.

The FY400 uses a non-contact position sensor. Optionally, the FY400 can be supplied with remote position sensor, available with up to 20 m cable length.

The FY400 has advanced diagnostics for control valves, fully configurable. Settings can be made by application programs based on FDT/DTM standard or by AssetView (Smar Asset Management system).

- Auto-tuning of the PID parameters;
- Partial Stroke test;
- Linear and rotary applications;
- Non-polarity power supply input;
- Travel: Linear Motion: 3 to 100 mm;
  Rotary Motion: 30° to 120°;
- Pressure Supply: 1.4 - 7 bar (20 - 100 psi);
- Flow Characterization: Linear, Equal Percentage, Quick Opening or configurable;
- Aluminum or 316 SST;
- Indicator with 4½ - numerical digits and 5-alphanumeric characters;
- Certifications for Hazardous Areas: explosion-proof and intrinsically safe;
- More than 100 types of configurable parameters for diagnostic of control valve.

# ACP300 Series
## Pneumatic Cylindric Actuator



ACP Rotary

ACP300 Series actuators are devices that receive an electrical signal and position their stem in accordance with the received signal.

Available in the 4-20 mA, HART®, FOUNDATION™ fieldbus, and PROFIBUS PA technology options for FY301, FY302, FY303 and FY400.

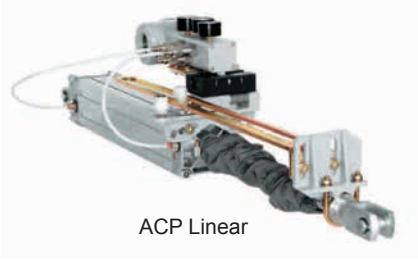
Available in the linear version, for 100 to 1000 mm displacements, or the rotary version.

The ACP300 cylinders are in compliance with the ISO 6431 standard, are self-lubricating, guide linkage, with magnetic piston for the purpose of using magnetic limit switches and double action with dampening.

The configurations can be made locally or remotely, facilitated by different FY options, without need to open the electronic housing.

Additionally, the ACP300 has the option for remote position sensor, suitable for applications in high temperature, excessive vibration or even difficult local access.

- 20 to 100 psi pressure;
- Operation temperature: -20º to 80 ºC;
- Stroke available: 100, 200, 400, 500, 800 and 1000 mm;
- Auto Setup;
- Bracket Material in Carbon Steel;
- Cylindrical material in cast aluminum with low copper percentage.



ACP Linear

# TP300 Series
## Smart Position Transmitter



4-20 mA

The TP300 Series produces an output signal proportional to the displacement length of mechanical equipment.

The TP300 Series is available in 4-20 mA, HART®, FOUNDATION™ fieldbus, and PROFIBUS-PA technology options. Additionally, the TP290 is available in 4-20 mA technology option. The TP300 can be used to measure linear or rotary displacements.

The position sensor used in the TP300 family is based on the Hall Effect, without mechanical contact. Additionally, the TP300 has the option for remote sensor position with extension cables up to 20 m. Suitable for applications in high temperature, excessive vibration or difficult local access.

The TP300 Position Transmitter can be configured locally with the Smar magnetic tool, without the need to open the electronic housing. Suitable for applications in hazardous area. In addition to local configuration, the TP300 Position Transmitter can be configured via HPC401 HART® Configurator manual or by any other manufacturer complying with HART® Foundation standards.

It is also possible to configure and operate the Position Transmitter with applications based on desktops for HART®, FOUNDATION™ fieldbus and PROFIBUS-PA technology.

- Output signals: two-wire, 4-20 mA, HART®, FOUNDATION™ fieldbus or PROFIBUS-PA technology options;

# Position

- Linear stroke: 3 to 100 mm;
- Rotary stroke: 30º to 120º;
- Indication: Rotary display, with 4½-numerical digits and 5-alphanumeric liquid crystal characters;
- Material: Aluminum or 316 SST;
- Temperature Limits: Ambient: -40 to 85 ºC (-40 to 185 ºF);
  Process: -40 to 100 ºC (-40 to 212 ºF);
- Humidity Limits: 0 to 100 % RH;
- Certification for Hazardous Area: explosion-proof, weather-proof and intrinsically safe.

# Temperature

## TT300 Series

### Smart Temperature Transmitters




The TT300 temperature transmitter line is a fully digital, accurate, and compact solution for temperature measurements. The TT300 transmitters accept different types of sensors with large measurement range, with 2, 3 and 4-wire connections. TT300 Series have several features that reduce the installation, operation and maintenance costs. They are suitable for direct field installation and are weather and explosion proof, and intrinsically safe for use in hazardous areas.

- ± 0.02% accuracy;
- Built-in thermocouples and RTD's linearization;
- True non-interactive zero and span;
- Remote configuration via the Hand-Held Terminal or the PC;
- Small and lightweight;
- Explosion proof and weather proof housing;
- EMC (Electromagnetic Compatibility) according to IEC standards;
- Write protection function;
- Intrinsically safe;
- Three technology options: HART®, FOUNDATION™ fieldbus, and PROFIBUS PA;
- Support for DD/EDDL and FDT/DTM.

# TT400 HART® SIS
## Smart Temperature Transmitter



Safety Instrumented Systems are designed and used to prevent hazardous events, to protect people, the environment or prevent damage to process equipments. The SIS project is based on the damage that a failure can cause. The Smar TT400 HART® SIS is a transmitter mainly intended for temperature measuring using RTDs or thermocouples, and for SIL2 and SIL3 (redundancy) levels. This device can operate even with two sensors and in the following conditions:

- Simple measurement, only one sensor, providing a current output or via communication;
- Differential measurement, two sensors (same type), providing a current output or via communication;
- Backup measurement, two sensors (same type), providing a current output or via communication;
- Maximum, minimum or average measurement, two sensors (same type), providing a current output (only HART®).

- 0.02% accuracy;
- Single unit and several options for sensors and connections;
- Input signal isolation;
- Advanced diagnostics;
- Support for DD/EDDL and FDT/DTM;
- Sensor backup;
- Safety Certified to IEC 61508 by TÜV.

# TT400 WirelessHART®
## Smart Wireless Temperature Transmitter



TT400WH is used in all field applications demanding data wireless transition.
Smar TT400 WH is a transmitter mainly intended for temperature measuring using RTDs or thermocouples.
This device can operate even with two sensors and in the following conditions:

- Simple measurement, by using only one sensor, providing a current output or via communication;
- Differential measurement, with two sensors (same type), providing a current output or via communication;
- Backup measurement, with two sensors (same type), providing a current output or via communication;
- Maximum, minimum or average measurement, two sensors (same type), providing a current output (only with HART® technology).

- 0.02% accuracy;
- Single unit and several options for sensors and connections;
- Advanced diagnostics;
- Support for DD/EDDL and FDT/DTM;
- Sensor back-up.

# TT383
## Eight Channels Temperature Transmitter



TT383 has independent channels to measure up to 8 (eight) different points. The temperature information is provided by the PROFIBUS-PA communication protocol and the measurement can be done via Thermocouples or RTD sensors. Some TT383 features:

- 8 (eight) temperature channels for several types of sensors;
- ± 0,03% accuracy;
- 2 or 3 wires sensor connections;
- Input signal isolation;
- DD/EDDL and FDT/DTM technologies based;
- Differential measurement,
- Sensor backup measurement;

# TT411
## Panel Mount 4 to 20 mA + HART® Smart Temperature Transmitter




The TT411 is a panel mount temperature transmitter, compatible with the HART® protocol. It works with several types of sensors and is an excellent cost/benefit solution. Lightweight, compact and extremely robust, it has an internal PID block that allows it operate as a controller. In addition, this equipment uses algorithms that ensure that the output signal works in linearity with the temperature.

- 0.02% accuracy;
- Input: a single input accepts signals from thermocouples, RTDs, differential RTDs, mV signals from radiation pyrometers, load cells, ohm signals from position indicators, etc;
- Ambient temperature limit: -40 to 75 ºC (-40 to 167 ºF);
- Measurement types: single sensor: 2, 3, or 4-wires; 2-wire double sensor; Differential, Average, Maximum and Minimum;
- Configuration: via HART® configuration tool;
- Mounting: DIN rail type 'T' on panel installation.

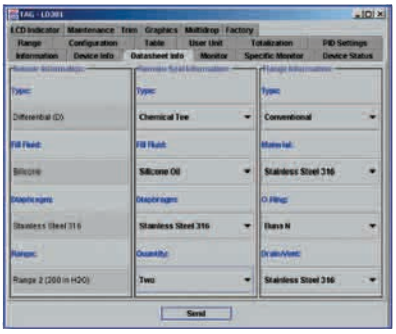
# TT421
## 4 to 20 mA + HART® Head Mount Smart Temperature Transmitter




The TT421 is a temperature transmitter for head mounting, compatible with the HART® protocol. It works with several sensor types and represents an excellent cost/benefit solution. Lightweight, compact and extremely robust, it has an internal PID block that allows it operate as a controller. In addition, this equipment uses algorithms that ensure that the output signal works in linearity with the temperature.

- 0.02% accuracy;
- Input: a single input accepts signals from thermocouples, RTD's, differential RTD's, mV signals from radiation pyrometers, load cells, Ohm signals from position indicators, etc;
- Ambient temperature limit: -40 to 75 ºC (-40 to 167 ºF);
- Measurement types: Single Sensor: 2, 3, or 4 wires; Differential, Average; Maximum and Minimum;
- Configuration: via HART® configuration tool;
- Mounting: easy integration with industry-standard DIN Form B package, in pit and head.

# CONF401
## HART® Network Configuration Software



The CONF401 is powerful and user-friendly. It provides easy configuration and monitoring of field instruments plus the ability to analyze data and modify instrument performance.

- Turns your personal computer into a fast configuration platform for HART® devices;
- Fully compatible with Microsoft Windows '95, '98, 2000 and XP; Microsoft NT, and UNIX;
- Provides full support for HART® instruments;
- Configurations can be made off-line and stored for later use;
- Upgradeable to support additional devices;
- Supported Devices
    - Smar: LD301/291, TT301, FY301, TP301, DT301(Version 2.00 and above), HCC301, TT411, TT421 and RD401;
    - Rosemount: 3051C, 3144, and 3244MV;
    - Yokogawa: EJA Series;
    - Spirax Sarco Italy: SP301.

# HI311/HI321
## HART® Serial/USB Interface



The HI311 (RS-232) and HI312 (USB) HART® Serial Interfaces are designed to provide a full physical link between a HART® field instruments and personal computers. They are fully self contained, and require no direct power supply.
The HI311/HI321 are designed for use with Smar Research's CONF401 HART® Configuration Software and are compatible with HART® communication environments.

- Fully compatible with HART® products manufactured by SMAR and others;
- System powered: no need for external power supply;
- Tested isolation of 1500 Vdc between field instrument and EIA-RS232C adaptor pins;
- Very low leakage current to the process network (Max 10 uA @35 Vdc);
- Standard USB or DB9 serial port connector.

# DDCON 100
## HART® Network Configurator with DDL Technology



DDCON 100 is a comprehensive communication and configuration tool package that is compatible with all HART® devices. Based on the recently ratified Device Description Language (DDL), DDCON 100 has the ability to work with any HART® device that has a manufacturer created Device Description (DD) file.

- Turns your PC or laptop into a universal HART® device configuration platform;
- Intuitive, easy to use graphical interface;
- Supports over 100 HART® devices out of the box;
- New devices can be downloaded via www.smarresearch.com and then easily added or removed directly within the software;
- Supports multidrop operations and off-line configurations that can be saved for later use;
- Bus monitoring via the integrated HART® serial monitor software.

# HPC401 Plus
## HART® Configurator



The HPC401 Plus HART® Configurator turns the included Palm into a fast configuration and diagnostic platform for HART® instruments.

- Provides full support for HART® instruments based upon the manufacturers device description files (DDL);
- New device files can be downloaded and added from the Smar Research website;
- Faster and easier to use than other hand held alternatives;
- Support Multidrop operation for all 15 nodes allowed by the HART® protocol;
- Preinstalled software allows easy out-of-the-box operation;
- Data logging application allows logging of device variables over time for exporting to a PC.

# DT300 Series
## Intelligent Density Transmitters



The DT300 intelligent density transmitters line was designed for the continuous measurement of liquid density and concentration in industrial processes. The complete line is available in the 4-20 mA + HART®, FOUNDATION™ fieldbus, and PROFIBUS-PA technology options. These transmitters use an exclusive and patented technology to calculate the density, where a probe immersed in the process, with two pressure sensors and one temperature sensor, is connected to a capacitive sensor which calculates the ΔP between the pressure sensors. With the ΔP and temperature, a dedicated software calculates the density and concentration of the process fluid. This density/concentration may be expressed in g/cm³, kg/m³, lb/ft³, relative density, Brix degree, Bé degree, INPM degree, GL degree, API degree, Solids%, Concentration%, etc. The DT300 may be installed in a pipe or directly in the process tank. The DT300 Series may be applied in Sugar an Ethanol Plants, Food Industry, Beverage Industry, Chemical and Petrochemical Industries, Pulp and Paper Industries, Oil and Gas Industries, Mining, etc.

- Accuracy ± 0.0004 g/cm³;
- Range 0.5 - 5 g/cm³;
- Standard industrial and sanitary (3A) process connection;
- Multifunction rotary display;
- Two-wire loop powered;
- Several different wetted materials;
- Single integrated unit, without moving parts;
- Factory calibration and self-calibration;
- In-field re-calibration:
    - No standard reference required;
    - No lab calibration required;
    - No process shutdown.
- Continuous/self diagnostics;
- Weather proof, explosion proof and intrinsically safe;
- Totally digital; including sensor, electronics and communication;
- Configurable via local adjustment (FOUNDATION™ fieldbus and PROFIBUS-PA);
- Easy firmware upgrade (via Flash Memory Interface) for FOUNDATION™ fieldbus and PROFIBUS-PA.

# PD3
## Didactic Pilot Plant



Smar Didactic Pilot Plant, trainings and technical update in control loops for industrial automation processes, 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 reproduces 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.

- Available for the most modern technologies: HART®, FOUNDATION™ fieldbus and PROFIBUS protocols;
- Easy to install, operate and execute maintenance;
- The most flexible, modern and robust 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.

Smar understands the importance of being as close as possible to a real industrial plant during the learning process for technicians, engineers and Instrumentation students. Smar has a dedicated division for the interface between educational institutions and the company. In addition, Smar provides optional didactic kits, instruments, support and specialized training for schools and training centers.

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.

# DIDACTICAL KITS

The new Smar didactical kits are available on FOUNDATION™ fieldbus, PROFIBUS-DP and PROFIBUS-PA technologies (with possibility of PROFIBUS-DP+PA on the same kit), AS-i, DeviceNet, HART® and WirelessHART. One of their major differentials is the possibility of communication between the different technologies.

The new didactical kits work as Mini-Didactical Plants. Teachers and instructor get a powerful tool on the tuition of industrial automation and industrial networks, since with they provide practical classes of most subjects included in the grid of the best professional formation courses on the sector.

Get to know them by asking a visit from our sales team.

Smar Didática.
Spreading Industrial Automation knowledge.







# HI302 N/I/O

## HART® / FOUNDATION™ fieldbus Interface




The HI302 is an innovative product that can be integrated in any FOUNDATION™ fieldbus host. Its main function is to serve as interface between HART® devices and FOUNDATION™ fieldbus systems, allowing the user to perform maintenance, calibration, and monitor sensor status and general device status, among other information.

- Interoperable with fieldbus systems from different manufacturers;
- Suitable for asset management systems, totally integrated to AssetView;
- Protects investment on HART® devices maintenance;
- Complete built-in configuration of Smar devices in the HI302 module;
- Allows that configuration of third-party devices also be embedded in the flash memory or added through FOUNDATION™ fieldbus function blocks;
- It has eight non-multiplexed and independent HART® master channels;
- One FOUNDATION™ fieldbus H1 channel;
- Supports up to eight peer-to-peer HART® devices;
- It has 4-20 mA input circuits on the HI302-I model (current to FOUNDATION™ fieldbus conversion);
- It has 4-20 mA output circuits on the HI302-O model (FOUNDATION™ fieldbus to current conversion).

# HCC301

## HART® to Current Converter




The HCC301 is a HART® Current Converter that transforms a digital variable obtained via HART® communication into an analog current signal, allowing this variable to be monitored or controlled.

- Two-wire, 4 to 20 mA output signal, in compliance with NAMUR NE43 specification, with super-imposed digital HART® Protocol communication;
- 1500 Vdc insulation;
- Power supply 12-45 Vdc;
- 0.04% Accuracy;
- 120 ms response time;
- HART® network primary master;
- Allows access to a secondary master.

# FP300 Series
## Fieldbus Converter for Pressure




The FP300 Series pressure converters are designed as an interface for a FOUNDATION™ fieldbus or PROFIBUS-PA system, with a pneumatic actuator or a valve positioner. The FP300 series provides a pneumatic output signal proportional to an input received from a network FOUNDATION™ fieldbus or PROFIBUS-PA. The technology used in the FP300 Series allows easy interfacing between the field and the control room, and it has several interesting features that considerably reduce the installation, operation and maintenance costs. The function blocks concept has been introduced to make programming easier to users, who can now build and visualize complex control strategies. Present additional advantage in flexibility, once allow changing the control strategy without changing the wiring or any hardware. They can be locally configured using a magnetic tool, without having to open the device, eliminating the need for a configurator in many basic applications.

The FP300 series is suitable for output pressures ranging from 3 psi to 15 psi or 3 psi to 30 psi extended range version. Besides the local settings, the FP300 Series can be configured remotely via the applications that meet the FOUNDATION™ fieldbus or PROFIBUS-PA standards. Smar makes available to its customers applications for both communication protocols, for where pneumatic actuators are indispensable or in plants that are still migrating from pneumatic to digital technology.
The FP300 Series was designed to meet IP66 weather-proof requirements and has been submitted and approved for explosion-proof or intrinsically safe areas.

- Input: Digital only. FOUNDATION™ fieldbus or PROFIBUS-PA with bus power;
- Output: 3-15 psi (0.2-1.0 kg/cm²) or 3-30 psi (0.2-2.1 kg/cm²);
- Output capacity: 6.7 Nm³/h (4 scfm);
- Accuracy: 0.4 % of span;
- Bus powered: 9-32 Vdc;
- Quiescent current consumption: 12 mA.

# FRI300
## Fieldbus/Profibus Relay and Digital Input




The FRI300 Series makes it easier to integrate fieldbus and conventional signals, as solenoids, pumps, motors, alarm generation, etc.
With two discrete inputs and two discrete outputs, the series can be mounted in the field without the need to extend the conventional cable to the control room.

By using FOUNDATION™ fieldbus and PROFIBUS-PA Functional Blocks, these inputs and outputs are easily integrated to the control loops.

- Discrete outputs and inputs connected directly to the fieldbus world;
- Input: Digital only. FOUNDATION™ fieldbus or PROFIBUS-PA powered through bus;
- Instantiable Functional Blocks for FOUNDATION™ fieldbus on Field regulatory and discrete control in the Field;
- DI and DO Functional Blocks on PROFIBUS-PA;
- Permits fieldbus connection to conventional discrete equipment;
- Reduces wiring costs;
- Backup master capability on the FOUNDATION™ fieldbus network;
- Supports EDDL, FDT/DTM.

# IF300 Series
## Triple Channel Current to Fieldbus Converters




The IF300 Series is a special group of devices for the transition of systems that still have conventional instrumentation with analog 4-20 mA or 0-20 mA signals. It allows up to 3 analog signals to be converted into fieldbus signals through fieldbus analog input function blocks. They are available in FOUNDATION™ fieldbus or PROFIBUS-PA technologies.

- H1 bus power supply: 12 mA @ 9 to 32 Vdc;
- Analog input signal accepts any values between 0-20 mA;
- Three 0/4-20 mA current inputs with external power supply;
- Accuracy: ±0.03%;
- Material: Aluminum with low copper content or 316 SST;
- Configuration through an engineering station or magnetic tool;
- Hazardous Area Certification: explosion proof, weather proof and intrinsically safe;
- Functions Blocks:
    - Up to 20 dynamically instantiable function blocks for the IF302 with backup master capacity (H1 network LAS);
    - 1 Physical (PHY), 3 Transducers (TRD), 3 Analog Input (AI) and 3 Totalizers (TOT) for IF303;
    - Fail safe functions.

# FI300 Series
## Triple Channel Fieldbus to Current Converters




The FI300 Series is a special group of devices for the transition of systems that still have conventional instrumentation with analog 4-20 mA signals. It allows up to 3 fieldbus control signals to be converted into 4-20 mA output current. They are available in FOUNDATION™ fieldbus or PROFIBUS-PA technologies.

The converted signals can be used for speed control in frequency converters, valve positioners, electric actuators and other 4-20 mA inputs devices.

- H1 bus power supply: 12 mA @ 9 to 32 Vdc;
- Digital input signal:
    - FOUNDATION™ fieldbus (FI302);
    - PROFIBUS-PA (FI303);
- Three 4-20 mA current outputs with external power supply;
- Accuracy: ±0.1%;
- Material: Aluminum with low copper content or 316 SST;
- Configuration through an engineering station or magnetic tool;
- Hazardous Area Certification: explosion proof, weather proof and intrinsically safe;
- Functions Blocks:
    - Up to 20 dynamically instantiable function blocks for the FI302 with backup master capacity (H1 network LAS);
    - 1 Physical (PHY), 3 Transducers (TRD), 3 Analog outputs (AO) for FI303;
    - Fail-safe functions.

# DFI302

## Process Automation and Control Platform



DFI302 is a key element for the Smar SYSTEM302 control system. Its flexible and innovative platform has a modern and economic design for automation architectures and process control of any size to meet the demands of all phases of plant life cycle. Whether in the design phase, commissioning, qualification and training, operation, maintenance or future expansion, the DFI302 maximizes the return on investment for companies of different market segments, since:

- Reduces the engineering costs through its multi-protocol, multiprocessor, and multi-user platform that allows an optimized, modular and scalable configuration, application-oriented and automation network based on high-speed Ethernet;
- Reduces the time between changes through tasks management and centralized database, besides online changes with the system in operation;
- Allows the use of the most modern and reliable technology of digital networks: FOUNDATION™ fieldbus, PROFIBUS-DP, PROFIBUS-PA, AS-i, DeviceNet, SNMP, OPC, DNP3, MODBUS, and other IEC standards;
- It is easy to integrate with safety systems and provides high availability through redundancy at all levels of enterprise automation;
- Client/Server distributed architecture and the state-of-the-art SCADA/supervisory system;
- OPC server (DA, HDA, A&E, SNMP) and time stamp records, synchronized via Ethernet network.
- Integrates all plant information, as well as constantly checks the device conditions;
- Totally integrated to the Smar asset management system, AssetView, based on predictive and proactive maintenance;
- Support for work on hazardous areas;
- Supports up to 32 redundant controllers per subsystem;
- It can work as a remote Ethernet I/O to other systems;

General controller technical characteristics:

- Up to 2 integral High Speed Ethernet channels for redundant communication on HSE and/or MODBUS TCP;
- 1 integral EIA232 channel;
- MODBUS (RTU and TCP) gateway;
- Up to 250 FOUNDATION™ fieldbus function blocks instantiation;
- Up to 2000 IEC61131-3 function blocks;
- 1 exclusive channel for Hot Standby redundancy;
- Independent interlocking processing (Ladder Logic Execution) of up to 10 ms;
- Internal bus to access up to 64 I/O modules, such as:
    - Analog Inputs and Outputs:
        - 4-20 mA, 0-20 mA, HART® 0-5V, 1-5V, 0-10V and -10V -10V;
        - Up to 8 isolated inputs or 4 isolated outputs per module;
    - Discrete Inputs:
        - 30 Vdc, 60 Vdc, 75 Vdc 140 Vdc, 120 Vac, 240 Vac and 264 Vac;
        - Up to 16 points per module;
    - Discrete Outputs:
        - Sink or Source transistor, Triac and NO/NC Relays;
    - Universal Temperature Inputs:
        - RTD, TC (B,E,J,K,N,R,S,T,L and U (DIN)), -50 to 500 mV Voltage,0-2000Ω Resistor;

    - High Frequency Pulse Inputs:
        - AC and DC;
        - Up to 100 µs.
- Support for dynamic instantiation of standard, advanced and flexible (FFB) FOUNDATION™ fieldbus function blocks;
- Support for IEC 61131-3 programming language;
- Integrated webserver for diagnostics, devices' Live List, and parameterization;
- Access channels to the various protocols on the market, depending on the model selected:

    - DF62 - HSE Controller and FOUNDATION™ fieldbus Bridge
        - 4 H1 channels (IEC 61158) of 31.25 kbps;
        - It supports up to 64 devices.

    - DF63 - HSE Controller and FOUNDATION™ fieldbus Bridge
        - 4 H1 channels (IEC 61158) of 31.25 kbps;
        - It supports up to 64 devices.

    - DF73 - HSE Controller and PROFIBUS-DP Gateway
        - 1 PROFIBUS-DP V1 channel supporting up to 12 Mbps;
        - Class 1 master for cyclic communication;
        - Class 2 master for acyclic communication;
        - It supports up to 124 DP slaves;
        - 2048 PROFIBUS discrete points;
        - 512 PROFIBUS analog points.

    - DF75 or DF89 - HSE Controllers
        - Up to 10 ms of Ladder minimum execution time;
        - Up to 1024 I/O points.

    - DF79 - HSE Controller and DeviceNet Gateway
        - 1 DeviceNet channel supporting up to 500 kbps;
        - It supports up to 63 devices.

    - DF81 - HSE Controller and AS-i Gateway
        - 2 AS-i channels of 167 kbps - 2.1 version;
        - Up to 124 AS-i discrete nodes.

    - DF95 or DF97 - HSE Controller and PROFIBUS 1DP/2PA or 1DP/4PA Gateway
        - 1 PROFIBUS-DP V1 channel supporting up to 12 Mbps;
        - 2 or 4 built-in PA channels (IEC 61158) of 31.25 kbps;
        - Class 1 master for cyclic communication;
        - Class 2 master for acyclic communication;
        - It supports up to 124 slaves (DP and/or PA);
        - 2048 PROFIBUS discrete points;
        - 512 PROFIBUS analog points.

    - DF100 - HSE Controller and WirelessHART Gateway
        - 1 WirelessHART (HART® 7 Specification);
        - Up to 100 WirelessHART field devices;
        - IP66 Protection Degree;
        - Operational temperature: -40 ºC + 85 ºC range.

# DC300
## Fieldbus/Profibus Remote Input and Output



Enables easy integration between discrete devices like pressure switches, button panels, On/Off valves, pumps and conveyors and the FOUNDATION™ fieldbus and PROFIBUS-PA systems via H1 bus. It is a compact module with power supply, control and I/O integrated on a single equipment, making it easy to use and mount in comparison to other solutions in the market. The DC303 is integrated to the Smar SYSTEM302 and can also be easily integrated to third-party systems.

- Signals: 16 isolated inputs and 8 isolated outputs;
- Consumption: 150 mA and external power supply of 18-30Vcc;
- Supports up to 20 FOUNDATION™ fieldbus functional blocks to implement control strategies on the field device;
- Supports the FOUNDATION™ fieldbus flexible logic block with 100 ms of independent cycle time on the H1 network macrocycle;
- Supports the PROFIBUS-PA flexible logic block with 60 ms of scan time;
- Backup master capability on the FOUNDATION™ fieldbus network;
- Supports EDDL, FDT/DTM.
- DIN rain mounting.



# CD600Plus
## Multi-Loop Digital Controller



The CD600Plus is a versatile and reliable single module process controller. It is capable of simultaneously controlling up to 4 loops with up to 8 PIDs and sophisticated strategies with function blocks. It has a powerful multiple I/O channel hardware platform. In a single station, this high-end controller replaces as many as eight traditional controllers, numerous signal and wiring conditioning modules. The high reliability of the CD600 has earned a great reputation from a wide range of high-end users.

- Up to four independent control loops with up to eight PID functions;
- 8 analog inputs, 8 analog outputs, 8 discrete inputs and 8 discrete outputs;
- Built-in 24Vdc 200 mA power supply for up to 8 field devices;
- More than 120 function blocks are available for user programming;
- Adjustment of control options through the front panel;
- OPC server serial and/or Ethernet for HMI;
- Configuration tools available for download at no cost: CONF600PLUS, TAGLIST;
- Works with the ENET-710 for CDBUS/TCP communication.

# LC700
## Programmable Controller



The LC700 Programmable Logic Controller is a powerful Universal Hybrid Controller that can be used as a standalone or fully integrated with the Smar SYSTEM302. Smar's excellence in design was consistently applied on the LC700 to make it safer and dependable even in the most demanding industrial environments and applications. As a Universal Hybrid Controller, the LC700 was designed from the begining with traditional discrete manufacturing automation tasks, continuous regulatory process control, and batch control.

- True Industrial Universal Hybrid Controller;
- Fault tolerant for high availability and many redundancy levels;
- Remote I/O for distributed and long distance data transfer;
- Ethernet and/or Serial OPC server for HMI clients;
- Configuration tools available for download at no cost: CONF700, TAGLIST;
- Works with the ENET-710 for MODBUS/TCP communication.

# MB700
## MODBUS RTU and TCP/IP Processor



The MB700 is a powerful multifunction module that can be used isolated or integrated to the Smar SYSTEM302. The module can perform multifunction in MODBUS protocol such as MODBUS TCP/IP and MODBUS RTU gateway, MODBUS data concentrator and peer-to-peer communication between MODBUS slave devices.

- Integration with intelligent devices and software from multiple manufacturers due to use of open standards as the OPC Server and the MODBUS TCP/IP and RTU;
- Totally integrated unit having the following functions: interface, gateway, linking device, bridge and MODBUS data concentrator;
- As MODBUS gateway, the MB700 can work in both directions: as TCP/IP to serial or serial to TCP gateway;
- As data concentrator the module can concentrate the data from the slaves in the serial and provide the data to TCP/IP via OPC or MODBUS TCP/IP;
- As peer-to-peer can exchange MODBUS data between slaves connected in the TCP/IP, serial or both media;
- Full redundancy and failure isolation for high safety and uninterrupted operation.

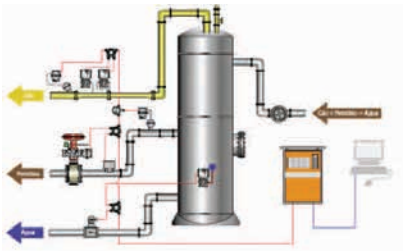
# AuditFlow
## Flow Measurement System



Compliant with up to date international standards for custody transfer applications and flow measurement systems, AuditFlow provides a comprehensive solution for Electronic Flow Measurement. AuditFlow includes real time flow correction calculation, data security, audit trail and support to measuring activities in order to fulfill every requirement for configuration, parameterization and field network inspection. The HFC302 module is the AuditFlow flow computer. It is fully configurable and designed with leading edge hardware and software concepts for measuring, controlling and correcting liquid and gas flow rates. The HFCView software complements this solution with a complete human-machine interface.

- Custody transfer and fiscal measurement;
- Reduced uncertainty with the use of FOUNDATION™ fieldbus digital architecture, thus eliminating the A/D and D/A conversions of conventional systems;
- Compliance with ASME, OIML, GPA, ISO, AGA and API Standards;
- Supported flow meters: differential pressure, turbine, ultrasonic, positive displacement, Coriolis, VCone, Wafer Cone;
- Suitable liquids: crude oil, refined products, lubricating oil, LPG, water and ethanol;
- Suitable gases: natural gas, steam, humid steam, argon, oxygen, nitrogen, carbon dioxide and ammonia;
- Prover types supported: Piston, Ball, Tank and Master Meter;
- Configurable in user-friendly languages as Block Diagrams and Ladder;
- Modular and expansible I/O system;
- Based on international digital communication standards: FOUNDATION™ fieldbus (H1 and HSE), OPC, MODBUS RTU, MODBUS TCP/IP, Ethernet TCP/IP and HART®;
- Report storage in databases;
- Remote SCADA architecture via radio or GSM/GPR;
- Outstanding applications on exploration and production, well test, allocation measurement, transportation and distribution of gas or liquids.

# AuditTank
## Tank Measurement System



The TM302 and TMView Measurement System was designed for International Standards focusing applications like inventory control, custody transfer, well test using tank and leak detection. Based on AuditFlow - Flow Measurement System where the application is the fiscal measurement and custody transfer, Smar innovates by incorporating the audit trail characteristic to the Tank Measurement System. Due to its hardware modular configuration, as well the FOUNDATION™ fieldbus, MODBUS RTU and TCP/IP protocols as a built-in feature in the TM302 module, many options of architecture and connectivity are available to the user.

- Complete auditable measurement in tank, test separator & tank farm;
- HTG and HIMS measurement models;
- Enhanced remote field device diagnostics;
- Reduced uncertainty in measurement through digital communication with FOUNDATION™ fieldbus field devices, eliminating the A/D and D/A converters;
- Standards: API, GPA, ISO, OIML and NBR;
- Tank types supported: vertical cylindrical (with or without floating roof), horizontal pressurized cylindrical and pressurized spherical;
- Product types supported: crude oil, refined products (gasoline, diesel, JP4, aviation kerosene), MTBE, lubricating oil, GLP/ natural gasoline and ethanol;
- Language: Function Blocks Diagram;
- Predictive & proactive maintenance, reducing maintenance and field visits due to the possibility of remote access to diagnostics and process information;
- Well test solution implementation.

# Solution Provider

## Solution Provider
### Fieldbus device development kit

A complete package to incorporate fieldbus technology into automation equipment including:

- Function blocks that perform the basic automation functions. They process input parameters according to a specified algorithm and an internal set of control parameters;
- Fieldbus device development kit;
- Communication Stack;
- Custom-made projects.

# Power Supply

## DF52/DF60
### FOUNDATION™ fieldbus H1 & PROFIBUS-PA Power Supply



These modules were specially designed to power the fieldbus networks. These power supplies are non-intrinsically safe devices with a 24 Vdc output, isolated, with short-circuit and overcurrent protection, besides failure indication.

- Input: 127 to 135 Vdc or 90 to 264 Vac (DF52), 20 to 30 Vdc (DF60);
- Output (Voltage): 24 Vdc ±1%;
- Current: 1.5 A (DF52), 850 mA (DF60);
- Output for failure indication: 1 A, 30 Vdc SPST (Closed contact).

## DF50/DF56
### Power Supply for Backplane



These redundant power supplies work independently or together with another redundant power supply module to ensure constant power supply to the DFI302 Smar control and process automation platform. When two redundant power supplies are used, in the failure condition, the backup will assume automatically the operation. A relay is provided to indicate failure on each power supply, indicating to the user when necessary to replace the faulty one.

- Input: 127 to 135 Vdc or 90 to 264 Vac (DF50), 20 to 30 Vdc (DF56);
- Outputs: 5 Vdc @ 3A: distributed by the internal bus through the DFI302 racks, to power the DF Modules circuits;
  24 Vdc @ 300 mA: for external use via terminals;
- Power consumption: 72 VA (DF50), 42 W (DF56).

# Safety Barrier

## DF47-12 / DF47-17

### Intrinsic Safety Barrier with FOUNDATION™ Fieldbus & PROFIBUS PA repeaters (1.2 W/1.7 W)



The Intrinsically Safe (I.S) technology incorporated in the DF47-12 and DF47-17 totally isolates the control network from the hazardous area. The I.S. values of the power supply are designed for fieldbus devices, which are in compliance with the FISCO model.

The incorporation of a fieldbus repeater, in compliance with IEC 61158-2, 31.25 kbps, essentially filters and boosts the incoming communication signal, transmitting it to the hazardous environment. The networks of the hazardous and safe sides of the DF47-12 and DF47-17 are completely independent from one another.

- Certified for IEC, FM & CENELEC intrinsic safety standards;
- In compliance with IEC 60079-27, FISCO and FNICO for power supplies;
- Dual marking in compliance with IEC 60079-11 and IEC 60079-27;
- Bus terminator on the hazardous side.

# Impedance for Power Supply

## DF49/53

### Impedance for FOUNDATION™ fieldbus Power Supply



These modules were specially designed to provide appropriate impedance for H1 fieldbus networks in compliance with the IEC61158-2 standard in non-hazardous areas. The DF49 model has 2 ports and the DF53 has 4 ports.

They have selectable bus terminators and control the network impedance in an active and non-isolated way for a broad frequency range.

- Input: 24 to 32 Vdc +/- 10%;
- Output: 340 mA;
- Ambient Temperature Limits: 0 to 60 ºC (32 to 140 ºF).

## BT302

### FOUNDATION™ fieldbus & PROFIBUS-PA Terminator




The BT302 is a fieldbus bus terminator specifically designed for industrial plant applications. This device has been developed to comply with the requirements of IEC 61158-2 standard, and it can be used in safe or hazardous areas, to meet the intrinsic safety standards requirements. The BT302 device can be installed in panel or in distribution boxes.

- Maximum operational voltage: 35 Vdc;
- Input impedance: 100 Ω ± 2% @ 7.8 - 39 KHz;
- Intrinsic safety: FM, CEPEL, DMT, and CE.

## JM1/JM400

### Junction Box for FOUNDATION™ fieldbus, PROFIBUS-PA, and 4-20 mA + HART® devices



Smar junction boxes were especially designed to facilitate fieldbus (FOUNDATION™ fieldbus and PROFIBUS-PA), HART® and conventional instrumentation (4-20 mA) connections.

The IP66/68 rated enclosure combined with appropriate cable glands, protects the wire connections from dust, water, oil, and moisture.

They may be used indoors or outdoors, and can withstand the most severe environments. Its design allows easy access to the terminals, without the use of special tools. The terminals are twin type at the four ends. They can be used as bus input and output according to the application convenience, keeping apart the wires that should be disconnected in case of device maintenance. This arrangement makes possible the disconnection of a single device keeping the continuity of the bus.

## IS400P

### Power Distributor and Isolator




The Power Distributor and Isolator IS400P can be used in two ways: as power supply for two-wire transmitters, providing isolation between inputs and outputs, or to isolate 4-20 mA or 1-5 Vdc signals between inputs and outputs.

- Input: 4-20 mA using the integral power supply for two-wire transmitters, 4-20 mA, 1-5 Vdc;
- Output (A/B): 4-20 mA / 4-20 mA, 1-5 Vdc / 4-20 mA, 1-5 Vdc / 1-5 Vdc;
- Accuracy: 0.15%;
- Power supply: 24 Vdc ± 10%;
- Power consumption: 120 mA (maximum);
- Ambient temperature limits: 0 to 60 ºC (32 to 140 ºF).

# SYSTEM302
## Process Control System




Designed in an innovative way and focused on results, the SYSTEM302 provides unparalleled, safe competitive advantages with operational excellence. Its main features are:

- Business solution allowing the integration among control, information and corporate systems;
- Scalability and flexibility in the architecture expansion to meet new production demands;
- Provides compact, robust, safe and fully integrated projects;
- Asset management which, through digital communications, facilitates the collection of plant information, storing them in a single database, making them available in any company site at any time;
- Total connectivity with open and global-standard automation technologies. Its infrastructure based on HSE (High Speed Ethernet) network allows connectivity with several protocols: FOUNDATION™ fieldbus, HART®, AS-i, DeviceNet, MODBUS, PROFIBUS-DP/PA, OPC, DNP3, and others;
- Real-time data analysis allows making business decisions faster and focused on the best results.

The SYSTEM302 has a complete applications platform for configuration, operation, maintenance and analysis of control systems. Here are its components.

### AssetView & AssetView STANDALONE
Industrial Assets Online Management System

Asset management systems enable real-time access of valuable functions through digital communication technologies, such as diagnostics and statistics for automatic operation and identification of equipment. The stand-alone version allows their use on third-party control systems.

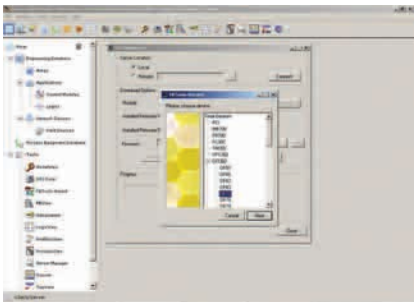
Some of these products features are;

- Remote configuration and reconciliation of data stored in the equipment itself or in a data base;
- Management of orders of service and asset records without self-diagnostics, as for motors and other devices;
- Costs reduction focused on predictive and proactive maintenance;
- Technologies supported: FOUNDATION™ fieldbus, PROFIBUS, HART®, OPC, FDT/DTM, SNMP and data bases as SQL and Oracle;

- Equipment calibration and configuration;
- Plant condition monitoring;
- Equipment monitoring and information storage;
- Internet equipment management;
- Increase of repair reliability, availability and speed.

## FBTools

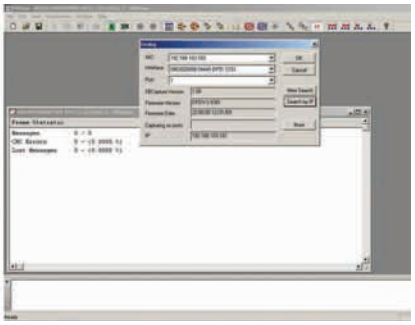
### Tool for Firmware Upgrade



FBTools is an application which allows the firmware upgrade of any Smar field device - FOUNDATION™ fieldbus and PROFIBUS PA, PCI302 cards, DFI302 controllers and communication gateways such as the FB700, MB700, and HI302. This tool also allows configuring TCP/IP properties of those modules network interfaces.

## FBView

### Fieldbus Network Analyzer

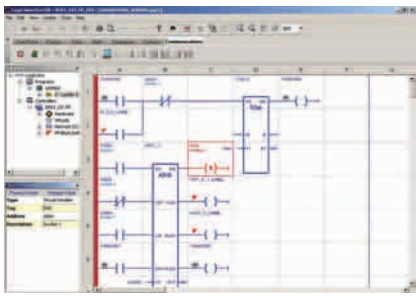


A powerful tool for those who want to work with fieldbus devices, the FBView enables the user to view the messages that pass through the fieldbus buses.
The FBView captures the messages and sends them to the computer through the DFI302. It is thus possible to analyze and decode the messages, showing all information. The information reports the message type, the address of the device that sent the message, and the address of the receiver. Compatible with Windows 2000 and XP.

- Captures messages from any fieldbus bus (ISP, FOUNDATION™ fieldbus, HSE and PROFIBUS).
- Decodes FOUNDATION™ fieldbus messages.
- The messages can also be displayed in hexadecimal format or in FOUNDATION™ fieldbus commands.
- Messages filtering capability. It means that it captures only the desired messages.
- Search tools. This tool is useful to find a pattern for captured messages.

## LogicView for FFB

### Ladder Logic Configurator, IEC 61131-3 standard, for the DFI302 controller line

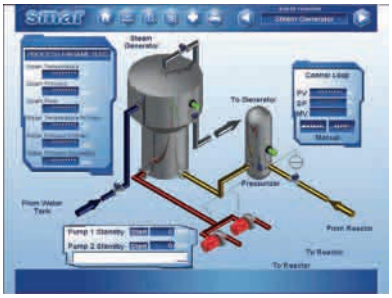


LogicView for FFB is the IEC-61131-3 standard tool to implement logic networks and interlocking for process control, dedicated to DFI302 controller line.
The control strategy is achieved with logic networks in Ladder style which supports integration with a rich library of built-in function blocks, and also FOUNDATION™ fieldbus and flexible function blocks (FFB). The network manager supports enabling, disabling and changing of the logics (nets) execution order.

- It can handle manufacturing and process control applications;
- Ladder Logic language IEC 61131-3;
- A large function block library with almost a hundred functions (PID, Math, Status, Alarm, etc);
- Checks the consistency of the configuration against the hardware;
- Built-in simulator;
- User-friendly interface;
- Many features that makes easier ladder diagram editing and construction;
- Creation of templates for control strategies.

## ProcessView

### HMI and SCADA modular solutions suite enabled for Internet



Advanced component for process visualization, data acquisition, alarm, trend analysis, batch control and much more. The ProcessView is the standard option for workstation operation package of the SYSTEM302. It is modular and offered with 3 basic packages: GraphWorkX, AlarmWorkX, and TrendWorkX for process visualization, acquisition and management of alarms; trending acquisition and management, respectively.

- Ease of configuration, visualization and maintenance, including support for Alarm & Events OPC server;
- Compatible with multiprocessor workstations and multimedia resources for PDAs and SmartPhones;
- Data mining advanced functions;
- Feature of historical and trend video replay;
- Possibility of local setting of the client station language, regardless of the server language;
- Optimized module for recipe management;
- SNMP connector and time stamp through field device or local time server;
- Support to SQL Express 2005 SP2.

## ProfibusView

### Profibus PA Device Parameterization Software



ProfibusView is a tool to parameterize PROFIBUS PA field devices. This software can use DF73 module as router for acyclic configuration information or USB PBI interface (PROFIBUS Interface) to communicate with the plant equipment with the following features:

- Calibration;
- Monitoring;
- Online and offline parameterization;
- On-line equipment diagnostics;
- Reconciliation of information from calibration and parameterization backups.

## PBI-PLUS

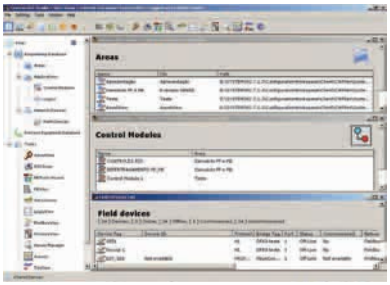
### Advanced PROFIBUS PA Interface



PBI-PLUS is a USB communication interface used to connect PROFIBUS-PA devices with any maintenance or asset management system based on FDT/DTM technology, like AssetView STANDALONE. The dedicated application ProfibusView is ready to be used with PBI-PLUS.
The installation driver creates a virtual serial port that allows local or remote configuration in the PROFIBUS PA network. Thus, this powerful interface offers great advantages as the possibility of workbench application, where no extra power supply or coupler DP/PA are needed, or alternatively, it creates a seamless connection to the operational PROFIBUS-PA channel without interruptions.

## Studio302

### SYSTEM302 applicative management system



The Studio302 is the SYSTEM302 initial tool. It is easy to use and integrates all applications included in the Smar automation system. The Studio302 has extended functionalities such as managing the single system database.

- Automatic summary of the system topology;
- Automatic device detection;
- Audit reports;
- System alteration tracking;

- System inventory performing;
- Uses Windows Security for access control;
- Link diagnostics;
- Automatic creation of shortcuts for areas, control modules and ladder diagrams.

## Smar OPC Servers

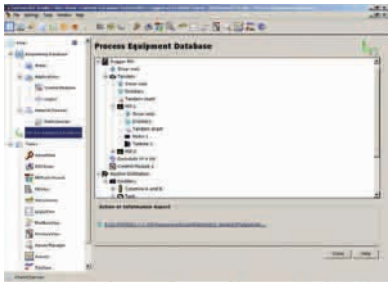


The use of OPC servers through open standards allows any OPC client to access data from all of the system networks, through a supervisory.
The supervision can be done by local (COM) or remote (DCOM) access, and because it uses the same technology, the fieldbus configuration can also be done the same way and with multiple users. To the SE (Smar Ethernet) network Smar provides the DFI OPC Server, and to the HSE (High Speed Ethernet) network provides the HSE OPC Server. They are in compliance with the OPC DA standard for supervision. Besides, Smar also offers the OPC A&E for alarms and events, the HDA server for standardized access to historical data, and the SNMP OPC server for controller diagnostics.
The servers are tested and validated by the OPC Foundation through self-test tools and also in interoperability events, thus demonstrating robustness and compliance with the OPC standard.

- All fieldbus interfaces supplied by Smar include their respective OLE Servers, which provide connections with one or more HMI simultaneously;
- These servers also provide fieldbus network configuration using OLE interfaces, so that all the supervision and configuration steps can be done across a network environment by using the Microsoft DCOM;
- This open architecture provides flexibility for systems of all sizes.

## Process Equipment Database

Plant Information Management software

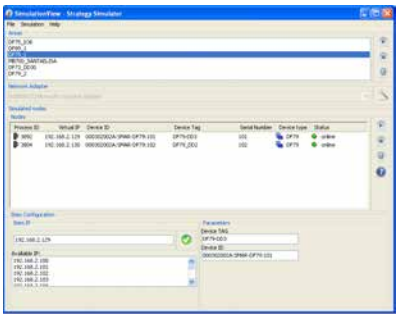


With this tool, the user is able to organize and explore all system information, centralizing them into a single local database. It also allows:

- The creation of information nodes, gathering the device specific attributes, common links and attributes inherited by the node;
- The device specific attributes are: links to documentation files, device images and pictures, web pages, process supervision screens and executable files.

## SimulationView

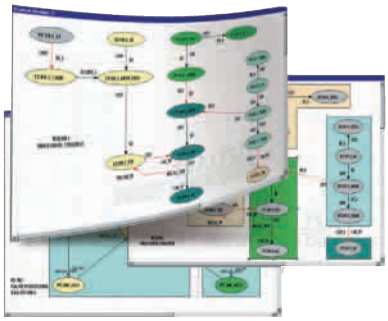
Strategy Simulator



It is a strategy simulator, totally integrated to the SYSTEM302, developed specifically to simulate control strategies with FOUNDATION™ fieldbus function blocks and ladder logic IEC 61131-3 standard.

- Accesses data directly from the SYSTEM302 database;
- The SYSTEM302 application tools use the simulation automatically and transparently;
- The simulated data are visible through the SYSTEM302 OPC™ Server;
- Any supervisory software and SCADA based on OPCTM can benefit from the simulation;
- Very useful for operators training. It can be used in an academic environment for teaching control and automation, application testing, help in the development and improvement of industrial processes.

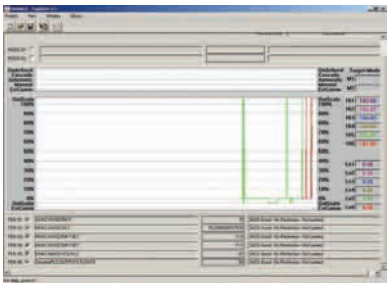
## Syscon
System Configurator



The Smar System Configurator is the software tool that configures, maintains and operates the FOUNDATION™ fieldbus, PROFIBUS, DeviceNet, AS-i and MODBUS products line, through a personal computer with a field interface. With a friendly HMI, the Syscon provides a productive and efficient interaction with the user, without prior knowledge of the software.

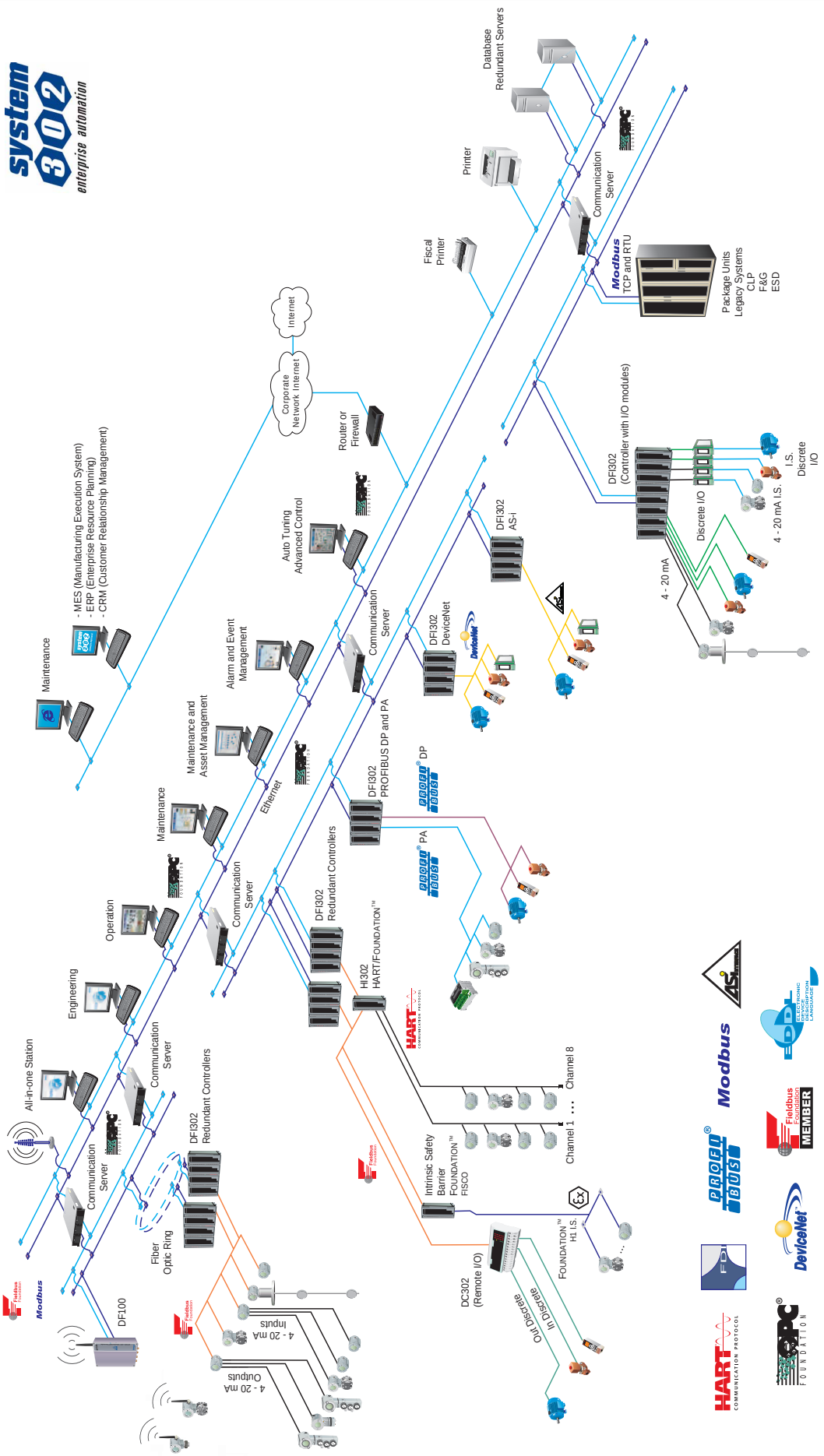
- Automatic export and creation of OPC tags;
- Local or remote OPC access;
- Offline and online configuration and Live List;
- Reusable templates for devices, bridges, controllers and control strategies;
- Automatic calculation of macrocycle;
- Several levels of downloads: plant total, partial or incremental.

## TagView
OPC Client Application



An integral part of SYSTEM302, the TagView is an OPC client that allows connection with any OPC DA 2.05a server on the market. It provides, through its browsing features, the entire addressing available, allowing the items displayed to be added to the supervision. The OPC items can also be added by importing them from a list of tags. Through the history window, the trending chart with previously selected items can be shown in real time. When using the monitoring window, the optimized supervision by exception is enabled, i.e., the OPC server notifies the TagView only when the variable is changed. Thus, it hastens the test phases of the control loop project and allows the independence of the supervisory systems.

# SYSTEM302 Architecture



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# Engineering and Project

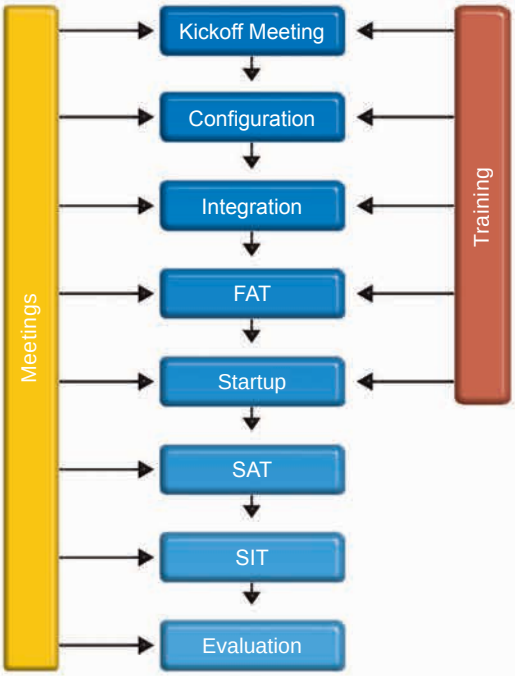
Most customers prefer a complete SMAR solution when acquiring their initial SYSTEM302. However, SMAR also partners with integrators in various regions throughout the world who can engineer and support SYSTEM302 installations on a local basis. In most cases, the best approach is to let SMAR's experienced team oversee the initial project and commissioning, while the customer handles system installation and maintenance.
A SMAR project group can supervise the entire job, starting from the basic system engineering.

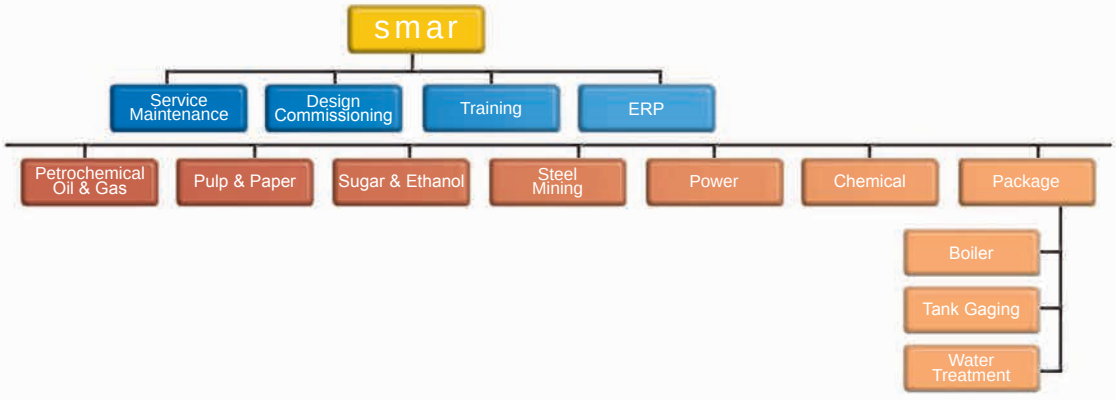
Preparation and configuration of operator workstations and the Factory Acceptance Test (FAT) can be done at a SMAR facility under the user's supervision. System Acceptance Tests (SAT) and Field Integration Tests with all the field devices are also available options.

## Our systems

SMAR can develop program applications executing measurement, control, logic sequencing and functionality according to instructions provided in user documents. These may include flowcharts, logic diagrams, cause and effect tables, and other descriptive operational papers.

The projects managed by our company are supplied with the complete system documentation, including programs and configurations, connection schemes, cross-reference and manuals.



SMAR has several groups of specialized professionals offering valuable contributions to various types of process control. Our company, with its dual role as system provider and device manufacturer, has comprehensive knowledge about control system selection and installation. Our project teams also specialized in other aspects of systems engineering, such as computers, network infrastructure and wireless devices.

## Building your own system

In some cases, users prefer to develop their own automation system and keep their process secret. The high degree of openness and easy of use with SYSTEM302 enables the user to implement the system on their own with SMAR support.

Under this scenario, the user acquires the confidence needed to carry out maintenance and future updates. They can also realize initial savings that may be expanded from time to time. Consequently, the user is better positioned to solve possible difficulties, always counting on SMAR's recognized technical assistance on a periodic basis.



# Assembly of control cabinets, commissioning and start-up

Today, there is a growing trend in the process industries to shorten the period required for executing projects and starting up plants. Experience shows that in the commissioning stage, it is common practice to involve several primary suppliers in discussions regarding project scope and responsibilities. Many times, however, the delivery, acceptance and approval of an automation system is impaired by the lack of definition of responsibilities.

The choice of an automation provider capable of supervising most of the project stages avoids potential disagreements that may endanger the success of the undertaking.

To avoid these difficulties, SMAR offers expert Applications and Project Engineering Departments, as well as an Assembly Department that can design and build control cabinets on its own or based on the client's project. We provide complete documentation, including manuals, inspection procedures and checklist, with a view to the acceptance FAT, SAT and SIT tests, compliant to the IEC 62381 standard.

Customer benefits are even greater when you take into account the services provided by our Technical Assistance Department, such as electrical and mechanical installation for field equipment, communication networks, etc.

The high quality and reliability of SMAR products are demonstrated in our cabinet solutions. Our broad experience can be seen in thousands of cabinets in operation worldwide. Let us make your startup and maintenance faster, safer and more reliable.



# Training and Support

SYSTEM302, based on the Microsoft Windows platform, provides applications and interoperability with the main digital protocols available in the Industrial Automation market.

Configuration manuals for software, hardware, installation and system maintenance, together with SMAR training modules, enable the user to develop new projects in a clear and dynamic way.

SMAR provides complete packages to meet all your needs, including training, services, maintenance and technical support. Through our worldwide network of business and engineering offices, technical services, system integrators and sales representatives, we are able to provide industry-leading technical services both in the field and via the Internet. This ensures a fast and secure transfer of files and information helping to finalize projects and services without delay.

## Training

Training modules cover the basic and advanced aspects of our products, as well as the protocols and technologies applied to the project.

Specific training on maintenance or other activities may be conducted at our training centers in Brazil and the United States, or at the customer's own facility.

As a qualified provider of industrial automation products and services, SMAR offers trainings to meet different customer requirements:

- Specification and configuration of automation systems and workstations;
- Installation, configuration, operation and maintenance of field devices;
- Basic instrumentation for process control;
- Automatic process control;
- Utilities control;
- Digital technologies and protocols.



# Services and Support

SMAR offers customers first-class technical support and services with a highly specialized, experienced team. We guarantee the maintenance of your system by supplying quality spare parts and services rapidly, in all stages of the project and plant maintenance.

## Online Support

We provide information and technical support via the Internet at http://www.smar.com/liveperson.asp, where customers can find detailed information about SMAR products and services. Registered users may submit technical questions and visit the Most Frequent Asked Questions section. Responses are quick, usually in less than 24 hours, via chat, e-mail or telephone (except on weekends and holidays). Our support team is made up of qualified engineers and technicians who provide basic consultation and assistance for initial configurations and engineering.

## Technical Assistance

SMAR provides a technical assistance group on 24/7 basis. Requests can be submitted by telephone: (+ 55 16 3513-1722).

The Technical Assistance and Support Departments provide the following services:

- Electrical installations and instrumentation projects;
- Execution or supervision of instrumentation and electrical installations;
- Certifications for installation of analog or digital instrumentation;
- Pre-commissioning and commissioning of systems;
- Plant start-up follow-up and support;
- Assistance to the project operation;
- Support during plant outages for corrective, preventive and predictive maintenance;
- Emergency device support and repairs;

They also offer preventive maintenance contracts for systems and field devices.

In order to better support the market, Smar policy is to maintain very close contact to customers and representatives. Our products are marketed worldwide by a network of Smar subsidiaries and representatives. Smar subsidiaries provide technical and commercial support to representatives, and keep stock of transmitters and spares for urgent requirements and service.

Smar has subsidiaries in all regions of the world and representatives in more than 80 countries.



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**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

PRODUCT SCE

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