

Serie Ponto®

The Serie Ponto offers the best solution for distributed control systems with remote I/O. It is based on flexible architecture that offers a wide variety of fieldbus protocols.

The I/O and fieldbus head modules work with either Altus or third parties CPUs.

Terminal blocks and fuses are integrated into the electronic module bases. This feature simplifies a lot the design, assembling and commissioning of control panels.

The Serie Ponto offers extensive diagnostic and hot-swap features that drastically reduce maintenance costs.

The high capacity CPUs allow Internet access through browsers. This brings unprecedented functionality to the supervision, control and diagnosis of control equipment's.

This document is an introduction to the general characteristics of the product, for further information please refer to the specific manual or technical characteristic of each product. The following 6 chapters are a configuration guide to Serie Ponto:

- List of Modules
- Architecture
- Dimensions
- Features of the Series
- Network Interfaces
- Software
- I/O System
- Environmental conditions



Module List

Following is the complete list of modules. Please contact your Altus sales representative to check availability and lead times. For further information please refer to the Technical Characteristics documentation of each module.

CPUs – Central Processor Units

- PO3042 : CPU 128K Flash, 16 I/O modules, 2 Serial Interfaces
- PO3142 : CPU 256K Flash, 30 I/O modules, 3 Serial Interfaces with MODBUS
- PO3242 : CPU 256K Flash, 30 I/O modules, 2 Serial Interfaces, Ethernet, PROFIBUS
- PO3342 : CPU 256K Flash, 30 I/O modules, 2 Serial Interfaces, Ethernet with WebServer, PROFIBUS

- PO1001 : 110 Vac 16 DI Sinking Opto Module
- PO1002 : 220 Vac 16 DI Sinking Opto Module
- PO1003 : 48 Vdc 16 DI Sinking Opto Module
- PO1004 : 125 Vdc 16 DI Sinking Opto Module
- PO1010 : 24 Vdc 32 DI Sinking Opto Module
- PO1112 : 8 Universal AI Isolated Module
- PO1113 : 8 Voltage Current AI Isolated Module
- PO1114 : 4 Fast Voltage Currente AI Isolated Module

Fieldbus Interfaces

- PO4050 : MODBUS Interface
- PO4053 : PROFIBUS-DP Interface
- PO4054 : DEVICENET Interface
- PO4056 : AS-I Interface

Output Modules

- PO2020 : 24 Vdc 16 DO Transistor Opto Module
- PO2021 : 110/220 Vac Triac Opto Module
- PO2022 : Dry Contact 16 DO Relay Module
- PO2023 : 48 Vdc 16 DO Transistor Opto Module
- PO2024 : 125 Vdc 16 DO Transistor Opto Module
- PO2132 : 4 Universal AO Isolated Module

Fieldbus Heads

- PO5060 : MODBUS Head
- PO5061 : Ethernet Head
- PO5063 : PROFIBUS-DP Head
- PO5063V4: PROFIBUS-DP Head with Redundancy
- PO5064 : DEVICENET Head

Special Modules

- PO7078 : Bus Expansion Module
- PO7079 : High Speed Counter Module
- PO7091 : Ethernet Industrial Interface

Input Modules

- PO1000 : 24 Vdc 16 DI Sinking Opto Module

Power Supply

- PO8085 : Power Supply 5 Vdc

Bases

- PO6000 : Spring-style Digital I/O Base
- PO6001 : Spring-style Analog I/O Base
- PO6002 : Spring-style Digital I/O Base Single Power Line
- PO6003 : Vac Spring-style Digital I/O Base
- PO6050 : Barrier-style Digital I/O Base
- PO6051 : Barrier-style Analog I/O Base
- PO6052 : Barrier-style Digital I/O Base Single Power Line
- PO6053 : Vac Barrier-style Digital I/O Base
- PO6100 : Spring-style Digital I/O Base with Fuse
- PO6101 : Spring-style Analog I/O Base with Fuse
- PO6102 : Barrier-style Digital I/O Base Single Power Line with Fuse
- PO6103 : Vac Spring-style Digital I/O Base with Fuse
- PO6150 : Barrier-style Digital I/O Base with Fuse
- PO6151 : Barrier-style Analog I/O Base with Fuse
- PO6152 : Barrier-style Digital I/O Base Single Power Line with Fuse
- PO6153 : Vac Barrier-style Digital I/O Base with Fuse
- PO6302 : CPU PO3x42 Base
- PO6400 : PROFIBUS Interface Base
- PO6401 : Ethernet Industrial Interface Base
- PO6402 : DEVICENET Interface Base
- PO6404 : AS-I Interface Base
- PO6500 : MODBUS, PROFIBUS Head Base
- PO6501 : Ethernet Head Base
- PO6502 : DEVICENET Head Base
- PO6800 : Power Supply Base

Man Machine Interfaces

- FOTON 1: HMI LCD 2x20, 4 keys keyboard
- FOTON 3: HMI LCD 2x20, 20 keys keyboard
- FOTON 5: Operation Terminal LCD 2x16, 35 keys keyboard
- FOTON 10: Operation Terminal LCD 4x20, 35 keys keyboard
- FOTON 30: Data Acquisition Terminal, LCD 2x16, 16 keys keyboard
- FOTON 31: Data Acquisition Terminal with optic reader
- FOTON 32: Data Acquisition Terminal with optic reader and printer
- AL-1419: RS-485 Isolator with Intrinsically Safe Barrier
- FOTON 50: Touch screen LCD Industrial Terminal
- FOTON 51: Touch screen Graphic Industrial Terminal
- FOTON 52: Touch screen Color Graphic LCD Industrial Terminal
- FOTON 55: LCD Industrial Terminal with Keyboard

Cables

- PO8500 : 0.4m Expansion Cable
- PO8501 : 1.0m Expansion Cable

Accessories

- PO8510 : 10 Sheets with 16 Labels of 16 tags, for printer
- PO8511 : 10 Sheets with, 16 Labels of 32 tags, for printer
- PO8520 : 16 Fuse 3 A - Spare Parts
- PO8521 : 16 Fuse 32 mA - Spare Parts
- PO8522 : End Bracket for Rail
- PO8523 : Spring Terminal Tool
- PO8524 : Bus Terminal - Spare Parts
- PO8530 : Battery -Spare Parts

Software

- MT6000 : MasterTool ProPonto Configuration License
- MT4100 : MasterTool Programming, for all Altus CPUs, Windows™ version.



Architecture

The Serie Ponto architecture is extremely versatile, it allows the interconnection of I/O modules and other complex modules like fieldbus interfaces and coprocessors.

The wide variety of supported fieldbus protocols and no need of intermediary terminals blocks make the Serie Ponto an ideal solution for control of machinery and systems of any size.

The flexible and functional architecture drastically reduces materials and labor on system installation. There are huge savings on cabling, cabinet size and future maintenance costs.

Other major advantages are: high-speed data communication, compact and economic solutions and interconnection with third party CPUs.

Following a brief description of main architecture components:

Rail

The Serie Ponto is mounted on TS35 DIN standard rails. Rails should be grounded to the panel.

CPU

The CPU performs the control functions. Among other functions, the CPU runs the basic control cycles composed by: reading inputs, running application algorithm, writing outputs, and communicating with the supervision system.

Power Supply

The CPU supplies 12 I/Os modules. When additional I/Os modules are necessary, extra Power Supply PO8085 are added for bus segments extra current.

Bus

One typical system consists of a Local Bus (CPU and its I/Os) and Remote Buses (sets of Fieldbus Heads and I/Os).

Every Local Bus or Remote Bus can handle up to 30 modules, each Bus divided in up to 4 Bus Segments, and each Bus Segment composed by up to 10 modules.

Bases

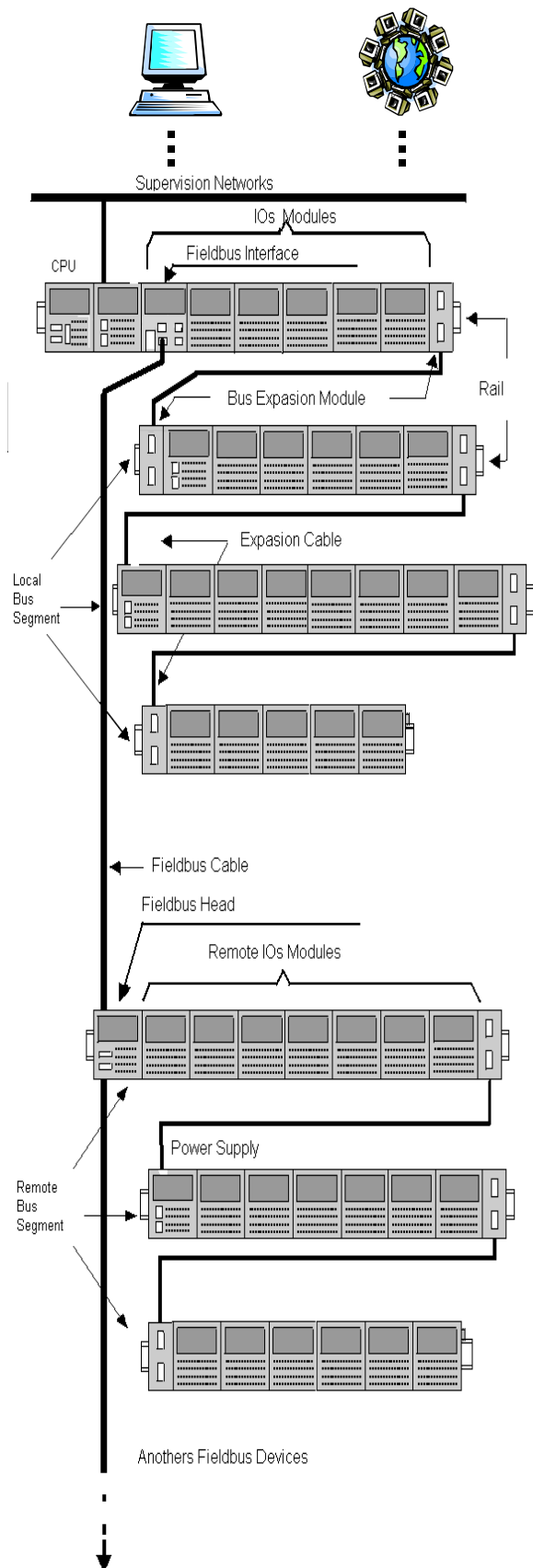
The bases are modular elements that gather buses. They are plugged into TS35 rails and act as interconnection agents for power, bus and I/O signals for all modules. The bases have terminals – spring or screw style - for field wiring interconnection, and optionally fuses for protection. The base selection depends upon the kind of module to be used. Please refer to the Technical Characteristics of each module to define available bases options.

I/O Modules

The I/O modules plugged into the bases act as adapters for different types of field signals, and also for sending the signals to the CPU or Fieldbus Head. The Serie Ponto supports a wide variety of I/O types and operational ranges, thus covering all the typical needs for an automation system.

The modules are hot swappable, meaning they can be unplugged without turning the system power off.

The field power supplies must be supplied externally to the modules.



Cód. Doc.:CE109000

Bus Expansions

Bus expansions interconnect the bus segments, thus bridging communication and power lines between them.

The bus expander that begins a bus segment can be replaced by a power supply if needed. If so, more current will be available for the I/O modules that follow.

Expansion Cables

Expansion cables interconnect the expander modules, thus creating the bus segments. They allow more flexibility when putting together different system configurations in control panels.

Fieldbus Head

The fieldbus heads connect the Serie Ponto modules to different field networks. They can communicate with CPUs from different vendors, supporting several protocols like Profibus, Modbus and DeviceNet.

The fieldbus heads have integrated power supply that feeds the modules connected to them. When required, another power supply can be connected at the beginning of a bus segment.

Fieldbus Interface

Fieldbus interfaces are fieldbus master nodes and allow the access to remote modules or other equipment based on Profibus, Modbus, DeviceNet and AS-I protocols.

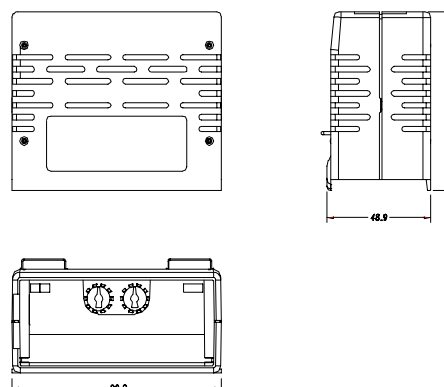
The fieldbus interfaces are plugged into local buses, and use one I/O module slot.

Dimensions

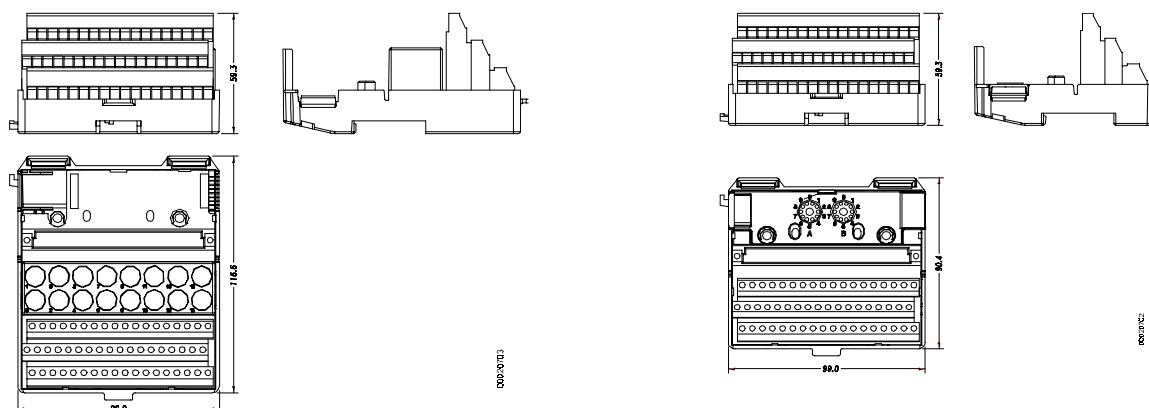
The main dimensions of the modules, in millimeters, are the following:

Modules

All the I/O, power supplies, CPUs and heads have the same dimensions.



Bases for I/Os

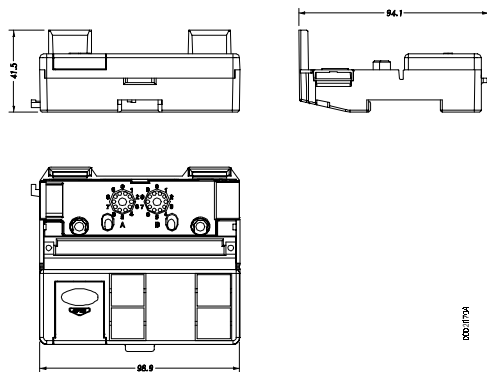


Base with fuses

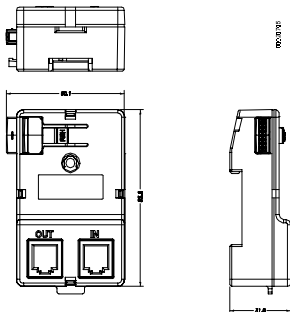
Base without fuses

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Bases for Power Supplies, CPUs, Fieldbus Interfaces and Fieldbus Heads

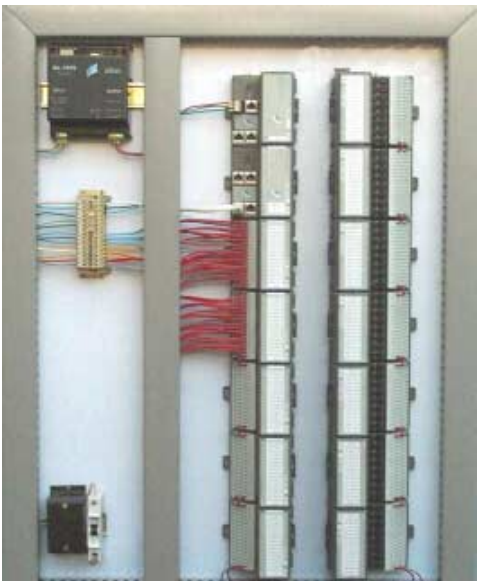
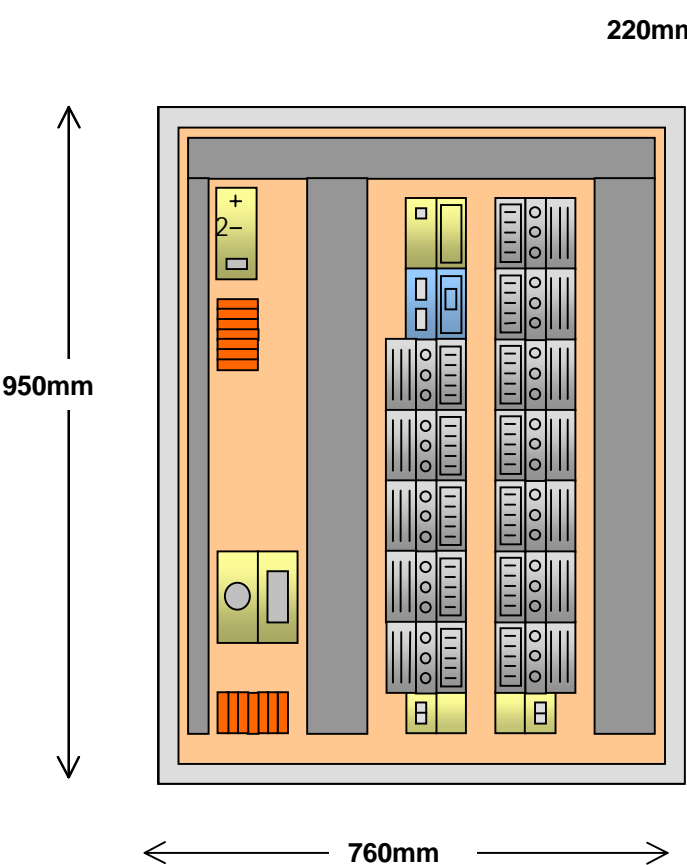


Bus Expansion



Example for control panel dimensions

The picture shows the basic physical dimensions for a panel with a local bus configuration. This system have a CPU with 192 I/O points, all of them with fuses using modules of 16 points. The use of 32 point modules would further increase system density.

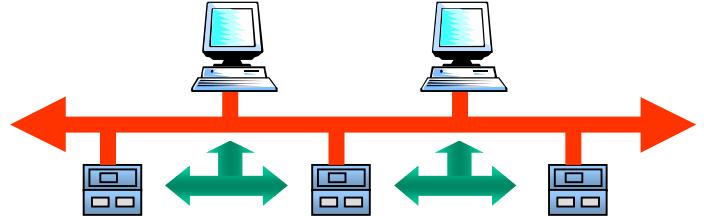


Series Features

CPUs

The CPUs have highly integrated functions, online programming, high memory capacity and many integrated serial channels.

The PO3142 version has three serial interfaces for programming, local HMI and Modbus network. The PO3342 version support the Industrial Ethernet Interface that allows the integration with control and supervision TCP/IP networks. Its software has a web server providing HTML pages that can be seen in conventional browsers.



Modules



The modules carry high density I/Os; there are configurations with 16 to 32 I/Os per module. Every I/O has a monitoring LED. There is one LED for multifunctional diagnosis, and that information is also accessible remotely by the CPU, fieldbus head or by the MasterTool ProPonto configuration tool.

The I/O modules have labels where the user can identify the field tags. These tags are conveniently located by the I/O LEDs, thus facilitating I/O identification.

Terminal Blocks Integrated to the Base

The Serie Ponto has direct connection to the field wiring, thus reducing installation costs with less wiring and terminals. In order to remove modules it is not necessary to move any field wiring.

Address System

The GBL communication bus implements the address system. It is a brand new technology developed and patented by Altus.

The modules have automatic addressing that eliminates the need for addressing keys or jumpers.

The address is defined by the module position, thus avoiding accidental addressing or undue field signals activation.

Hot-Swap Modules

The hot-swap feature allows modules replacement with no need to shut the system power off. The CPU keeps controlling the whole process, and the modules can be replaced whenever needed.

The modules can be replaced individually, and there is no need to disconnect any cabling once they are unplugged. When a module is unplugged all its I/Os values are stored and set inactive by the CPU.

Fuses

Optionally, there are fuses for the protection of outputs and field wiring. The 4-20 mA analog signals are also protected in this way. Therefore there is a gain in operational safety and an economy, eliminating additional wiring for blocks with fuses.

Keyswitch

The bases have a keyswitch system which prohibits the placement of a module different from the one previously thought and adjusted to the base. This key has a code defined by the last digits in the modules name. For example: module PO2021 must have its base adjusted by the user with the code 21.



Automatic Identification

This is a built-in system which allows the master of the bus (CPU or head) to identify its type, avoiding mistakes in the system assembling or after module replacement. This is an additional protection and allows checking of the configuration previously made, during the project phase of the system.

High Speed Bus

The communication between the CPU or head is based on a high speed bus , implemented with a single ASIC chip, achieving in this way unsurpassed acquisition and parameterization speed. The main features of this bus are:

- Automatic addressing and identification of the modules
- Hot-swapping
- 12 Mbaud serial bus, 0,5 acquisition time for 480 points
- Interconnection of 30 modules X 16 = 480 points
- Single chip hardware solution

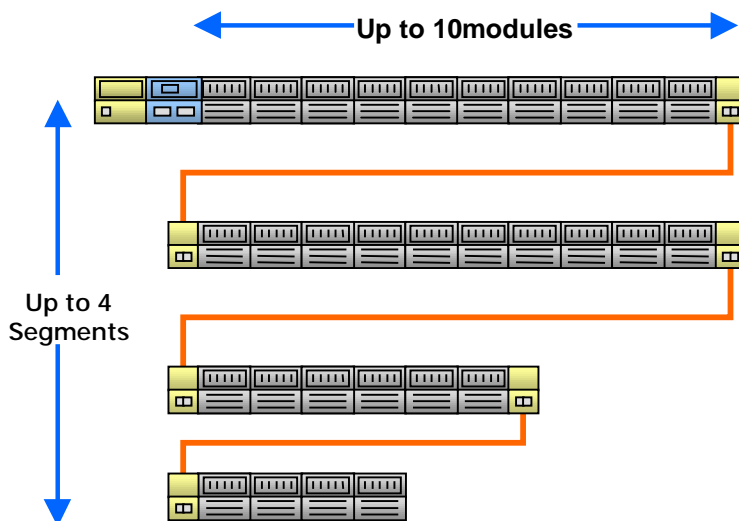


Diagnostics

CPUs, heads and I/O modules have various diagnostics available. Each module has a multifunctional diagnostic LED. The diagnostics are available in the CPU, fieldbus heads and can be consulted via configuration software - MasterTool ProPonto. Some examples are:

- Wrong module for the position
- Missing field power supply
- Short circuit in load

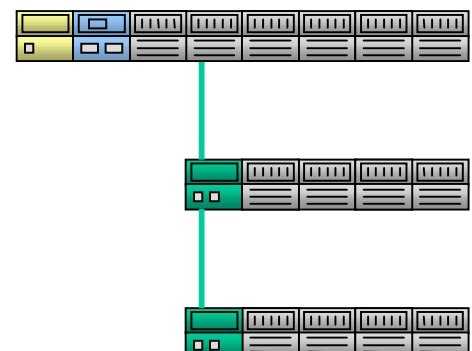
Capacities



Each bus can handle up to 30 I/O modules.
Each bus can be divided in up to 4 bus segments, and each bus segment composed by up to 10 modules.
A great amount of flexibility is achieved in this way.

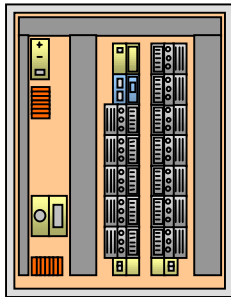
Remote I/O Points – Remote Bus

In this type of configuration the modules are far from the CPU and are linked via a fieldbus interface. In a PROFIBUS remote bus, the head of the fieldbus can contain up to 20 I/O modules configured in the same manner described previously. It is possible to add a power supply if needed in a segment expansion .

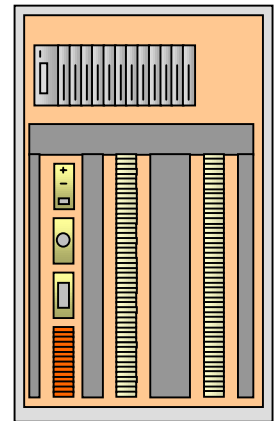


Panel Assembly Advantages

Following are the advantages on building a panel using Serie Ponto against a panel with the same configuration built on a conventional system.

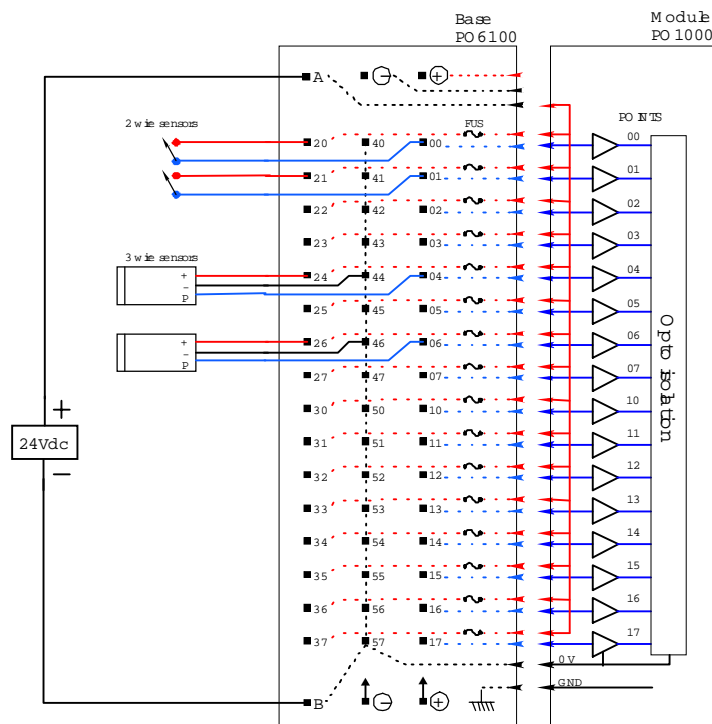
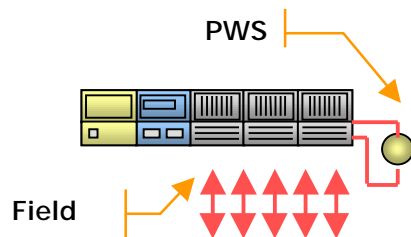


- Reduction of 47% on total panel depth
- Reduction of 20% on total panel area
- Reduction of 50% on total panel volume
- Serie Ponto reduces intermediary terminal blocks, wiring, identifiers and rails.
- Serie Ponto eliminates fused blocks

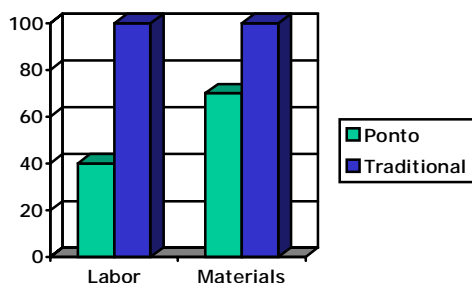


Control Panel Wiring Reduction

The diagram shows the wiring for a PO1000 module (24 Vdc 16 DI input) , installed on a PO6100 base. The field power supply is connected to the base that distributes the power to the field sensors. The sensors can have a 2 or 3 wire configuration, protected or not with individual fuses.



Cost Reduction



The assembling of a control panel using Serie Ponto reduces drastically the total cost of the system. The reduction of design time, assembling labor and materials are the crucial factors for this reduction.

The total cost reduction is about 30% in a typical panel

Network Interfaces

The Serie Ponto works with the following fieldbuses:

- PROFIBUS
- MODBUS
- Ethernet
- DEVICENET
- AS-I



The CPU PO3345 has three serial interfaces with the following configurations:

- Com 1 - RS232 : for programming and local monitoring.
- Com 2 – Isolated RS485: for MODBUS protocol. Other protocols are available.
- Com 3 - RS232 : for remote connections by modem or HMI. Other protocols are available.

When is together PO7091 module interface, it's available the Ethernet connection with TCP-IP for supervision systems or Internet.

Software

MT6000 – MasterTool ProPonto Configuration Tool

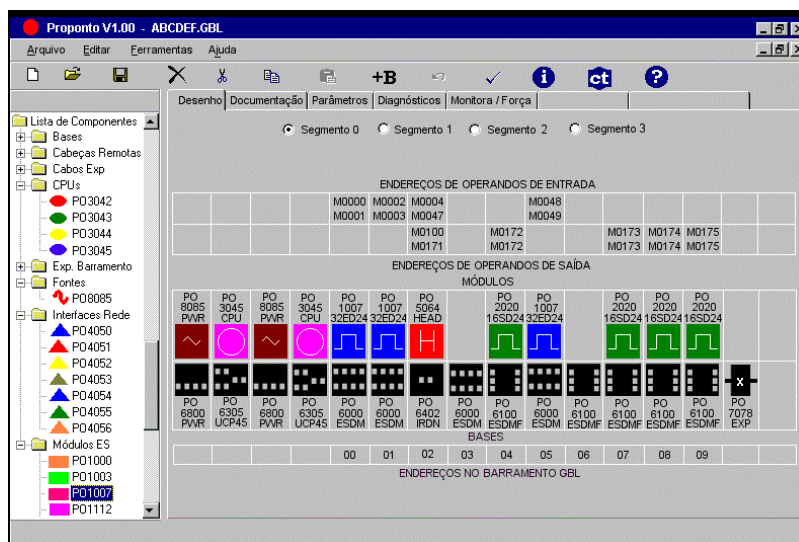
The MT6000 configures the Serie Ponto modules.

The ProPonto allows the definition of modules to be installed in every bus, thus facilitating the system design. Main functions are:

- Graphical design of buses
- Configuration validation: it checks items like power consumption, compatible bases and design limits.
- Tags definition. Generation of labels for module identification.
- Modules parameterization; for example, configuring the type of analog signal for an input or output.
- List of materials generation

The ProPonto creates the files for storage inside CPUs and fieldbus heads. Based on those files the CPUs and fieldbus heads will check physical connection of modules.

The software runs in Windows 32 bits.



MT4100 - MasterTool Programming

Software tool for CPU programming and buses configuration.

The MT4100 is one of the most efficient tools available in the market for ladder programming. It has the flexibility and power of using special functions for different applications.

I/O System

The list of I/O modules for the Serie Ponto is showed in the beginning of this document, as well a brief description of each one of them.

The following criteria should be considered when selecting the I/O modules:

- Working voltage
- Type of output element: transistor or relay
- Need for isolation on digital I/Os
- Need for isolation on analog I/Os
- Maximum currents (per I/O or per module)
- Timing of filters for inputs
- Needed protection level for I/Os
- Type of needed terminals: spring or screw style

Due to the system modularity, the user must specify separately each Serie Ponto component: modules and bases. They are available separately in order to rationalize the reposicion costs. Upon each bus design the ProPonto software generates its list of materials, thus facilitating this selection.

In order to be sure the system will perform its designing functions all the technical characteristics of modules must be rechecked.

Environment Conditions

The Serie Ponto IO modules comply with the following specifications:

Storage Temperature	-25 a 70°C
Operational Temperature	0 a 60°C
Relative Humidity	5 to 95% noncondensing
Noise Immunity	IEC 61131