

## Product Description

The PO1112 module is part of the Ponto Series and has 8 isolated analog inputs for measuring voltage, current, RTD, thermocouples, mV and resistance. When measuring temperature the module automatically compensates for cold joint temperature, conversion and linearization of the values.

The module is designed to control or supervise machineries and processes.

The picture shows the product installed in a analog IO base with spring terminal blocks.

The module main features are:

- Universal isolated module, with independently configurable inputs for any transducer and range
- Local and remote diagnostic
- Measurement of voltage and current
- Measurement of thermocouples type J, K, B, E, T, R, S, N with linearization
- Measurement of RTDs type Pt100 and Pt100 accordingly to American and European standards
- Cold joint compensation for thermocouples measurement
- Verification of open thermocouple
- Hot swap with no interference on panel cabling
- Remote parameterization via software
- Galvanic isolation between analog inputs and logic circuits
- Field cabling connected to the base, thus eliminating intermediary terminal blocks for field signals
- Optional protection with fuse on IOs power supply and on 4-20mA signal
- Filters parameters configurable by software
- Automatic addressing
- Automatic verification of module type based on the bus head



## Ordering Information

### Included Items

The product packaging comes with:

- PO1112 Module
- Installation Guide

### Product Code

Please use following product code when ordering the product:

Code	Description
PO1112	8 Isolated Universal AI

## Related Products

Depending on your system requirements, the following products might be ordered along with the PO1112. Please check with your sales representative if you have any questions.

Code	Description
PO6001	Analog IO Base - Spring
PO6101	Analog IO Base – Spring with Fuse
PO8520	16 Fuses 3 A 250 VAC (1)
PO8521	16 Fuses 32 mA 250 VAC (1)
PO8510	10 Sheets with 14 labels of 16 tags for printer (2)
PO8523	Spring Terminal Block Tool (3)

PO8520 and PO8521 may work as 16 spare fuses for bases PO6101 and PO6151.

PO8510 are A4 sheets with labels where the tags may be printed using the MasterTool ProPonto Software - MT6000.

**PO8523** is an isolated tool to connect the cables into the spring bases PO6001 and PO6101.

## Features

### General Features

	PO1112
<b>Module type</b>	8 isolated analog inputs
<b>Input type</b>	Voltage, current, thermocouple, RTD, resistance
<b>Data format</b>	16 bits in 2 complement, justified to the left
<b>Converter resolution</b>	16 bits monotonicity guaranteed, no missing codes
<b>Terminal block configuration</b>	1 terminal block, power supply 24 VDC for 4-20 mA sensors ( P ) 1 terminal block voltage input ( + ) ( V ) 1 terminal block voltage input ( - ) ( L ) 1 terminal block current input ( I ) 1 terminal block for each IO return ( 0 VDC ), interconnected ( N ) 1 terminal block for shield cable ( G )
<b>Diagnostic indication</b>	Two multifunctional LEDs with indication of module Ok, missing external power supply, burned fuse, out of range signal and missing parameterization.
<b>Configurable parameters</b>	Signal type per input Measurement range per input Thermocouple and RTD per input Filters per input Temperature unit ( °F or °C ) per module
<b>Auto-test</b>	A/D converter and all the control logic
<b>Hot swap</b>	Yes
<b>Protections</b>	3A fuse in the sensor power cable and 32mA fuse in line with current signal when used with fused bases. Varistors for voltage inputs. Polarity inversion for power supplies.
<b>External power supply</b>	19.2 to 30 VDC including ripple consumption 100 mA @ 24 VDC.
<b>Scanning time</b>	25 or 100 ms
<b>Isolation</b>	
<b>Inputs to logic circuits</b>	1500 VAC for 1 minute
<b>Inputs to ground</b>	1500 VAC for 1 minute
<b>Power supply to logic circuits</b>	1500 VAC for 1 minute
<b>Among inputs</b>	No isolation
<b>Bus power consumption</b>	60 mA
<b>Power consumption</b>	2.5 W
<b>Maximum operating temperature</b>	60 °C
<b>Dimensions</b>	100 x 52 x 84 mm
<b>Norms</b>	- IEC 61131-2:2003, clauses 8 and 11  Please see Series' general features
<b>Compatible bases</b>	PO6001: Spring Analog IO base PO6051: Screw Analog IO base PO6101: Fuse and spring Analog IO base PO6151: Fuse and screw Analog IO base

**The scanning time** is the time the module takes to provide a new canal value to the GBL bus. This time may be configured for 25 ms or 100 ms for all the module. All the 8 canals are updated at the same time.

The scanning time is a function of the conversion time and the filter algorithm, where the cutting frequency is programmable by the user. The scanning time may be set to 25 or 100ms when measuring voltage and current. When measuring temperature via thermistors, thermocouples and resistance the scanning time must be set to 100ms.

**ATTENTION:**

If the scanning time is set to 25ms: it is not possible to configure measurement for thermocouples, RTDs and resistance; also filtering times of 100ms, 1s and 10s are not available.

If scanning time is set to 25ms and the modes and filtering times set to values described above, then the module will get into an canal configuration error status.

**Power supply interruptions:** Interruptions in power port are supported if not longer than 10 ms and if the module is powered with it's nominal 24 Vdc voltage or greater. Longer interruptions or in voltages lower than the nominal may cause modules reset.

**Voltage Mode Features**

PO1112 – Voltage Mode			
Precision	$\pm 0.1\%$ full range@ 25 °C $\pm 0.005\%$ / °C full range		
Resolution	16 bits Monotonicity guaranteed with no missing codes		
Input impedance	1,1 M $\Omega$		
Maximum voltage without damage	$\pm 30$ V		
Filtering	Time constant configurable: 0.2 ms, 1.3 ms, 100 ms, 1 s or 10 s		
Crosstalk DC to 100 Hz	- 30dB mim		
Scanning time	25 or 100ms		
Ranges	Range	Counting	Resolution
	-100 to +100 mV	-30,000 to 30,000	3,33 $\mu$ V
	0 to 1 V	0 to 30,000	33,3 $\mu$ V
	0 to 5 V	0 to 30,000	166,6 $\mu$ V
	0 to 10 V	0 to 30,000	333 $\mu$ V
	-1 to +1 V	-30,000 to 30,000	33,3 $\mu$ V
	-5 to +5 V	-30,000 to 30,000	166,6 $\mu$ V
	-10 to +10 V	-30,000 to 30,000	333 $\mu$ V
Range slack	$\pm 5\%$		
Over-range indication	When 5% over or under measurement range		

**Current Mode Features**

PO1112 – Current Mode			
Precision	$\pm 0.1\%$ full range @ 25 °C $\pm 0.005\%$ / °C full range		
Resolution	16 bits Monotonicity guaranteed with no missing codes		
Input impedance	50 $\Omega$ no fuse (PO6001 or PO6051 base) 340 $\Omega$ with fuse 32 mA (PO6101 or PO6151 base)		
Maximum continuous current without damaging	40 mA		
Filtering	Time constant configurable: 0.2 ms, 1.3 ms, 100 ms, 1 s or 10 s		
Crosstalk @ 100hz	- 30dB mim		
Scanning time	25 or 100ms		
Ranges	Range	Counting	Resolution
	-1 to +1 mA	-30,000 to 30,000	0.033 $\mu$ A
	0 to 20 mA	0 to 30,000	0.666 $\mu$ A
	4 to 20 mA	0 to 30,000	0.533 $\mu$ A
	-20 to +20 mA	-30,000 to 30,000	0.667 $\mu$ A
Range slack	$\pm 5\%$		
Over-range indication	When 5% over or under measurement range		

**Thermocouple Mode Features**

PO1112 – Thermocouple Mode				
Precision	$\pm 0.1\%$ full range @ 25 °C $\pm 0.001\%$ /°C full range			
Resolution	16 bits Monotonicity guaranteed with no missing codes			
Measurement unit	Configurable: °C or °F			
Input impedance	10 M $\Omega$			
Maximum continuous voltage without damage	$\pm 30$ VDC			
Filtering	Time constant configurable: 1.3 ms, 100 ms, 1 s or 10 s			
Maximum common mode voltage	$\pm 1500$ mV			
Common mode rejection	120 dB @ 60hz			
Crosstalk among canals @ 100hz	- 30 dB mim			
Open thermocouple detection	Indicated at the diagnostic			
Cold joint compensation	Usage of two temperature sensors integrated into the base Compensation range from 0 to 80 °C Precision $\pm 1$ °C from 0 to 80 °C			
Scanning time	100 ms			
Thermocouple Mode °C Curve ITS-90	Model	Temperature	Counting	Resolution
	J	0 to 1140 °C	0 to 11400	0.1 °C
	K	-200 to 1250 °C	-2000 to 12500	0.1 °C
	B	485 to 1700 °C	4850 to 17000	0.1 °C
	E	-200 to 900 °C	-2000 to 9000	0.1 °C
	T	-200 to 350 °C	-2000 to 3500	0.1 °C
	R	0 to 1450 °C	0 to 14500	0.1 °C
	S	0 to 1450 °C	0 to 14500	0.1 °C
	N	-200 to 1300 °C	-2000 to 13000	0.1 °C
Thermocouple Mode °F Curve ITS-90	Model	Temperature	Counting	Resolution
	J	32 to 2084 °F	320 to 20840	0.2 °F
	K	-328 to 2282 °F	-3280 to 22820	0.2 °F
	B	905 to 3092 °F	9050 to 30920	0.2 °F
	E	-328 to 1652 °F	-3280 to 16520	0.2 °F
	T	-328 to 662 °F	-3280 to 6620	0.2 °F
	R	32 to 2642 °F	320 to 26420	0.2 °F
	S	-32 to 2642 °F	-320 to 26420	0.2 °F
	N	-328 to 2372 °F	-3280 to 23720	0.2 °F
Range slack	$\pm 5\%$			
Over-range indication	When 5% over or under measurement range			

**RTD Mode Features**

	<b>PO1112 –RTD Mode</b>			
<b>Precision</b>	$\pm 0.1\%$ full range @ 25 °C $\pm 0.006\%$ / °C full range			
<b>Resolution</b>	16 bits Monotonicity guaranteed with no missing codes			
<b>Measurement unit</b>	Configurable: °C or °F			
<b>Input impedance</b>	1.1 M $\Omega$			
<b>Excitation current</b>	452 $\mu$ A			
<b>Measurement technique</b>	3 wires			
<b>Maximum continuous voltage with no damage</b>	$\pm 30$ VDC			
<b>Filtering</b>	Time constant configurable: 1.3 ms, 100 ms, 1 s or 10 s			
<b>Crosstalk among canals @ 100hz</b>	- 30dB mim			
<b>Detection of open RTD</b>	Indication at the diagnoses			
<b>Scanning time</b>	100 ms			
<b>RTD Mode Measurement °C European Curve (DIN 43760) <math>\alpha=0,00385</math></b>	Model	Temperature	Counting	Resolution
	Pt100	-200 to +850 °C	-2000 to 8500	0.1 °C
	Pt1000	-200 to +850 °C	-2000 to 8500	0.1 °C
<b>RTD Mode Measurement °C American Curve <math>\alpha=0,00392</math></b>	Model	Temperature	Counting	Resolution
	Pt100	-100 to +457 °C	-1000 to 4570	0.1 °C
	Pt1000	-100 to +457 °C	-1000 to 4570	0.1 °C
<b>RTD Mode Measurement °F European Curve (DIN 43760) <math>\alpha=0,00385</math></b>	Model	Temperature	Counting	Resolution
	Pt100	-328 to 1562 °F	-3280 to 15620	0.2 °F
	Pt1000	-328 to 1562 °F	-3280 to 15620	0.2 °F
<b>RTD Mode Measurement °F American Curve <math>\alpha=0,00392</math></b>	Model	Temperature	Counting	Resolution
	Pt100	-148 to 854.6 °F	-1480 to 8546	0.2 °F
	Pt1000	-148 to 854.6 °F	-1480 to 8546	0.2 °F
<b>Range slack</b>	$\pm 5\%$			
<b>Sensor cable</b>	3-wires, maximum resistance per wire = 20 $\Omega$			
<b>Over-range indication</b>	When 5% over or under measurement range			

## Resistance Mode Features

PO1112 – Resistance Mode			
Precision	$\pm 0.1\%$ full range @ 25 °C $\pm 0.006\%$ / °C full range		
Resolution	16 bits Monotonicity guaranteed with no missing codes		
Input impedance	1.1 M $\Omega$		
Excitation current	452 $\mu$ A		
Measurement technique	2 or 3 wires		
Filtering	Time constant configurable: 1.3 ms, 100 ms, 1 s or 10 s		
Crosstalk among canals @ 100hz	- 30dB mim		
Detection of open resistance	Indicated at the diagnoses		
Ranges	Range	Counting	Resolution
	0 to 400 $\Omega$	0 to 30,000	13,3 m $\Omega$
	0 to 4000 $\Omega$	0 to 30,000	133 m $\Omega$
Scanning time	100 ms		
Range slack	$\pm 5\%$		
Sensor cable	3-wires, maximum resistance per wire = 20 $\Omega$		
Over-range indication	When 5% over or under measurement range		

## Installation

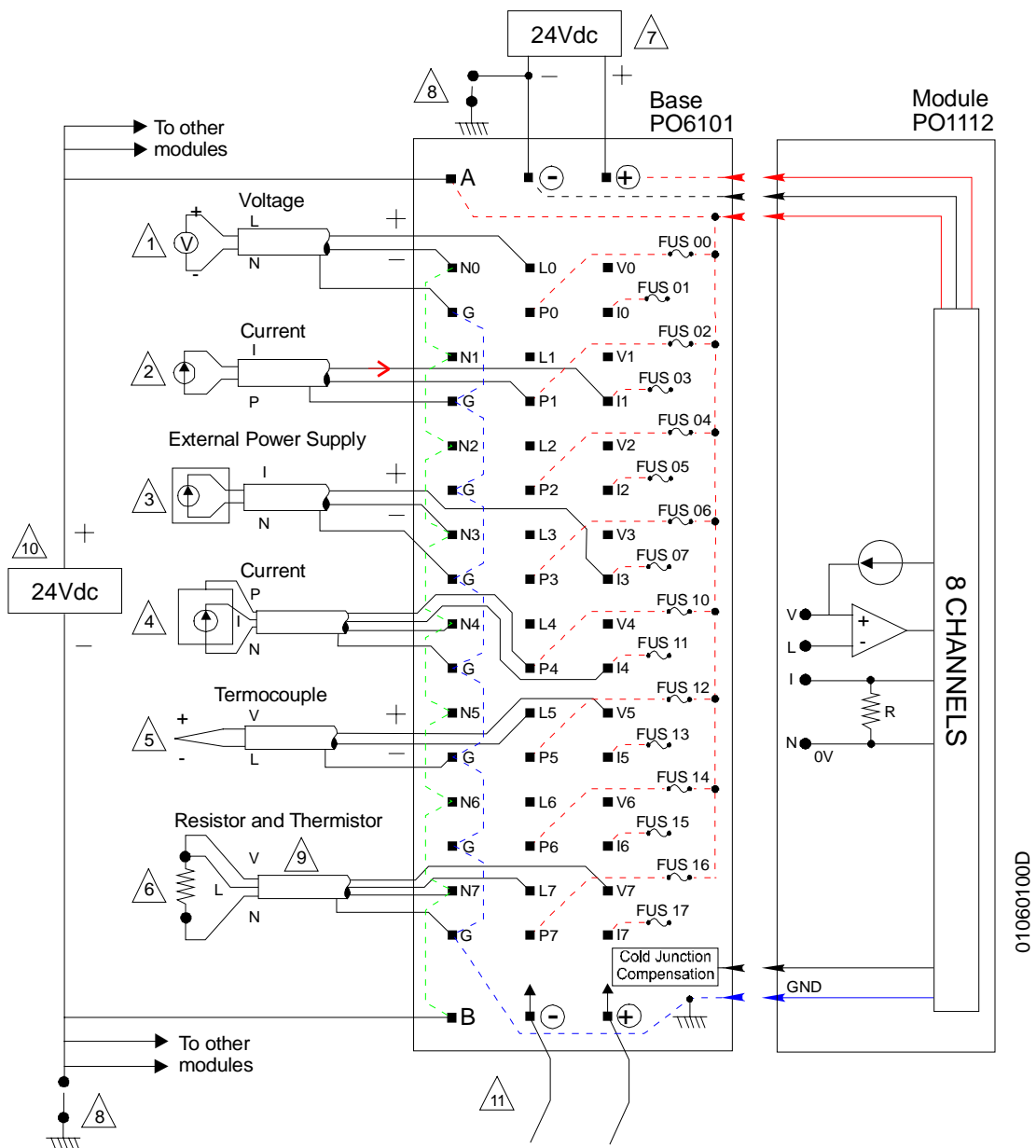


### ATTENTION:

ESD (Electro Static Discharge) sensitive device. Always touch a grounded metallic object before handling the device.

## Electrical Installation

You may install the PO1112 module in the two available bases, with or without fuses. When installing non fused PO6001 use the following details ignoring the fuses.





## Diagram notes:

- 1- Please connect the positive terminal to the L block and the negative terminal to the N common when measuring voltage.
- 2- The current signal is considered positive when its used type two wires sensor. The current input is protected by a 32mA fuse per canal, identified by the odd numbering by the fuse case. The power supplier is feeder by borne P.
- 3- Current Sensors that require external power, type four wire sensors: the input signal enter by the borne I and return to sensor by the borne N.
- 4- Sensor that needs 24 VDC Power Supplier can use the borne P. These borne is internal connected with the Power Supplier (10) and it is protected by a 3 A fuse with even numbering in the base.
- 5- The thermocouples measurement should be made by the positive terminal connected to V block and the negative to the L block. The environment temperature compensation (cold joint) is automatically done through integrated sensors in the base – below the terminal blocks.
- 6- For measuring Resistors or Thermistors you should use shielded cable with 3 wires of the same size and shield as the one connected to G block. The V and L cables must connect directly on the component to be measured, without intermediary connectors.
- 7- The electric installation is done by feeding the base with a 24VDC power supply on the terminal block extremities – blocks marked by + and -. This connection is mandatory.
- 8- The common point for the power supply (6) and the sensors (9) may be connected to the panel ground. This connection is not mandatory, but it is recommended in order to reduce electric noise in automation systems.
- 9- All the signals must be connected by shielded cables with the shield grounded preferably at the G block or by the sensor. It should not be grounded at both shield ends.
- 10- This power supply may provide 24VDC to feed the sensors. This power supply is protected by 3A fuses identified by even numbering.
- 11- The next module may be fed through the points (+) and (-) on this base. The maximum number of bases that may be connected in this way is 10. No other device can be connected to this terminal blocks.

## Module power supply:

The PO1112 module utilizes a 24VDC regulated power supply (terminal blocks + and -). This power supply may be used also to feed the field sensors. We recommend to use separate power supplies for larger systems.

## Field cabling:

When installing the module please follow procedures described below in order to avoid electromagnetic interference:

- Avoid sharing the same conduit for high voltage or current cables (for instance motors power supply) and sensor cables.
- Identify and eliminate other noise sources, such as faulty or unprotected contactors and sparks produced by wear down motors' brushes.
- Utilize shielded cables for carrying input signals and having one of the shield ends grounded.

ATTENTION:: should be use the recommendations from standard IEEE 518-1977 Guide for the Installation of Electrical Equipment to Minimize Electrical Noise Input to Controllers from External Sources.

## Fuses:

The PO6101 and PO6151 bases have protection fuses for the sensors power supply or against current surges on the current inputs.

The fuses identification follow direct relation to the IOs as shows below:

Module IO	00	01	02	03	04	05	06	07
3A Power Supply Fuse	F00	F02	F04	F06	F10	F12	F14	F16
32mA Current Input Fuse	F01	F03	F05	F07	F11	F13	F15	F17

The fuse casing is of the bayonet type. When replacing the fuse, please shut down the power supply and use a plastic screw driver with 5mm width. Please consult the Ponto Series Utilization Manual for complete fuse replacement procedures.

ATTENTION: because the special characteristics, when necessary to replace the Fuses, its necessary the use only of original spare part PO8521.

## Measurement of Environment Temperature:

In order to measure the environment temperature please short circuit the terminal blocks V and L for any analog input available. Then such input should be configured for any thermocouple that includes the environment temperature range (any thermocouple except type B). The temperature value measured by such point will be the environment temperature.

**ATTENTION:**

Atmospheric discharges (lightning) may cause damages to the modules although it's protections.

Additional protections should be used if module's power comes from a power supply located outside the cabinet where the module is installed, because it could be vulnerable to this kind of discharges.

If the field wiring of the input points is susceptible to this kind of discharge, surge suppressors should be used.

**ATTENTION:**

This is an analog module and it's installation near radio-frequency emitter devices may interfere in the precision of the inputs. Avoid installing it near radio equipment, antennas and similar devices.

Field wiring should be shielded because radio-frequency coupling may happen in field signals.

Module has been tested with electromagnetic fields of intensities up to 10 V/m. In those conditions, observed precision was at least 0,5%. This field intensity corresponds to the maximum values considered by international standards to industrial environment. Stronger fields can cause greater performance depreciation.

Tests with portable radio transmitters (walkie-talkies) near the module (1 meter) caused no alteration in nominal precision.

### **Mechanical Assembly**

The mechanical assembly is described in the Ponto Series Utilization Manual.

Please adjust the mechanical code on the assembly base to 12 (1 on switch A and 2 on switch B).

## Parameterization

The CPU or field network head defines via software the PO1112 module parameterization. The parameterization sets the measurement modes as well as the filtering. Such parameterization may be set by the MasterTool when using Altus CPUs or by the software that configures the field bus master. For further information please consult Ponto Series Utilization Manual, MasterTool Utilization Manual and Manuals for the Interfaces and Field Network Heads. The parameterization is set through user friendly menus. For reference purposes, following are the binary codes.

### Parameters Bytes

The module parameterization is defined by ten bytes. The first two bytes set the generic module aspects and the remaining eight set the parameterization of each analog input.

The bytes should be defined as follow.

Byte	Parameters
0	Module generics
1	Module generics
2	Canal 0
3	Canal 1
4	Canal 2
5	Canal 3
6	Canal 4
7	Canal 5
8	Canal 6
9	Canal 7

### Bits

Description of the parameterization bits for each byte:

Byte 0 - Module generics								Description
7	6	5	4	3	2	1	0	
				1	0	1	0	Number of parameters bytes
0	0	0	0					Not used

This byte carries always the OAH value, with no options.

Byte 1 - Generics								Description
7	6	5	4	3	2	1	0	
							0	Temperature unit in °C
							1	Temperature unit in °F
						0		Not used ( always zero)
					0			RTD Curve American standard
					1			RTD Curve European standard
				0				Scanning time = 100 ms
				1				Scanning time = 25 ms
0	0	0	0					Not used ( always zero)

**Scanning time :** if Scanning time is set to 25 ms then it is not possible to configure any canal for measurement of thermocouples, RTDs and resistance. It will get into a parameterization error.

The bytes 2 to 9 define individually each analog input. The 3 most significant ones define the filter and the 5 least significant define the type of the analog variable.

Bytes 2 to 9								Description
7	6	5	4	3	2	1	0	
	0	0						Filter 0.2 ms – cut frequency of 780 Hz when configured in Byte 1 with scanning time of 25 ms.
								Filter 1.3 ms - cut frequency of 122 Hz when configured in Byte 1 with scanning time of 100 ms.
	0	1						Filter 100 ms - cut frequency of 1.6 Hz
	1	0						Filter 1 s - cut frequency of 0.16 Hz
	1	1						Filter 10 s - cut frequency of 0.016 Hz
			0	0	0	0	0	Deactivated canal
			0	0	0	0	1	Voltage -100 to 100mV
			0	0	0	1	0	Voltage 0 to 1 V
			0	0	0	1	1	Voltage 0 to 5 V
			0	0	1	0	0	Voltage 0 to 10 V
			0	0	1	0	1	Voltage -1 to +1 V
			0	0	1	1	0	Voltage -5 to + 5 V
			0	0	1	1	1	Voltage -10 to +10 V
			0	1	0	0	0	Current -1 to +1 mA
			0	1	0	0	1	Current: 0 to 20 mA
			0	1	0	1	0	Current 4 to 20 mA
			0	1	0	1	1	Current -20 to +20 mA
			1	0	0	0	0	Thermocouple type J
			1	0	0	0	1	Thermocouple type K
			1	0	0	1	0	Thermocouple type B
			1	0	0	1	1	Thermocouple type E
			1	0	1	0	0	Thermocouple type T
			1	0	1	0	1	Thermocouple type R
			1	0	1	1	0	Thermocouple type S
			1	0	1	1	1	Thermocouple type N
			1	1	0	0	0	RTD PT100
			1	1	0	0	1	RTD PT1000
			1	1	0	1	1	Resistance of 0 to 400 $\Omega$
			1	1	1	0	0	Resistance of 0 to 4000 $\Omega$
0								Not used ( always zero)

**Deactivated canal:** module will always provide zero for such input.

**Filters:** the 100ms, 1s and 10s are available just for scanning time set to 100ms in the Byte 1.

**Example**

Byte	Parameters	7	6	5	4	3	2	1	0	Hex Value	Description
0	Module generics	0	0	0	0	1	0	1	0	0A	Fixed value
1	Module generics	0	0	0	0	0	1	0	1	05	°F /European Curve/ scanning in 100 ms
2	Canal 0	0	1	0	1	0	0	0	0	50	Filter 1s / Thermocouple type J
3	Canal 1	0	0	1	0	0	1	1	1	27	Filter 100 ms / Voltage -10 to 10 V
4	Canal 2	0	0	0	0	1	0	1	0	0A	Filter 25 ms / Current 4 to 20 mA
5	Canal 3	0	1	1	1	1	0	0	0	78	Filter 10 s / RTD PT100
6	Canal 4	0	0	1	1	1	0	1	1	3B	Filter 100 ms / Resistance 0 to 400 Ω
7	Canal 5	0	1	1	1	1	0	1	1	7B	Filter 10 s / Resistance 0 to 400 Ω
8	Canal 6	0	1	0	0	0	0	1	0	42	Filter 1 s / Voltage 0 to 1 V
9	Canal 7	0	0	0	0	0	0	0	0	00	Deactivated canal

**Diagnosis**

The PO1112 module provides ten bytes for operating diagnosis including information about the connected sensors. The first two bytes indicate the generic aspects related to the module operation.

Byte	Diagnosis
0	Module generics
1	Module generics
2	Canal 0
3	Canal 1
4	Canal 2
5	Canal 3
6	Canal 4
7	Canal 5
8	Canal 6
9	Canal 7

Byte 0									
7	6	5	4	3	2	1	0	Description	
					0	0	0	Always zero	
				0				Normal operation	
				1				Non parameterized module	
			0					Normal temperature	
			1					Temperature over 65°C (1)	
	0	0						Always zero	
0								Normal fuses	
1								One or more burned 3A fuses	

- (1) The module uses the cold joint temperature sensor in order to monitor the environment temperature. This indication will occur when the temperature surpasses 65 °C.

Byte 1								
7	6	5	4	3	2	1	0	Description
0	0	0	0	0	0	0	0	Always zero

Bytes 2 to 10								Description
7	6	5	4	3	2	1	0	
							0	Normal operation
							1	Canal wrongly configured
						0		Normal RTD sensor
						1		Short circuited RTD sensor
					0			Normal sensor (thermocouples, RTDs ) or cable (Current)
					1			Open sensor (thermocouples, RTDs ) or cable (Current)
				0				Measurement within range
				1				Over-range
0	0	0	0					Always zero

The diagnosis LED indicates the following situations:

LED DG	Meaning	Causes
On	Normal operation	
Blinking 1X	Head is not accessing module or logic fault at module	<ul style="list-style-type: none"> <li>- Wrong module type for the position</li> <li>- Non declared module</li> <li>- Damaged module</li> </ul>
Blinking 2X	Burned fuse	- one or more 3 A fuses are burnt
Blinking 3X	Under voltage on external power supply	- The external power supply is under 19 VDC
Blinking 4X ( the fault identification is done through CPU diagnosis word)	Missing continuity for signal of thermocouple, RTD and resistance	- Field cable open
	Missing continuity for signal current 4 – 20 mA	- Field cable open

LED 17	Meaning	Cause
On	Normal operation	
Blinking 1X	Parameterization error	Parameterization is not valid.
Off	Non parameterization	Parameterization missing

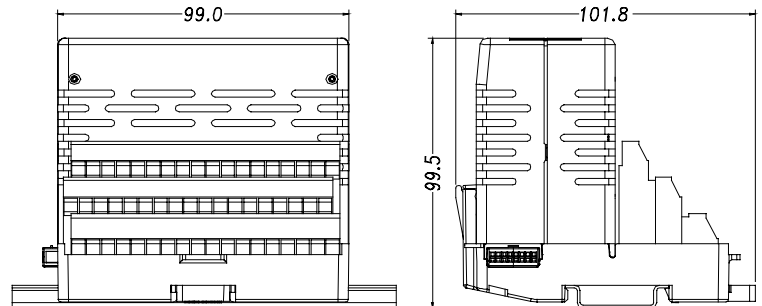
If you get any signalization different from described above please ship module to Altus Support.

## Physical Dimensions

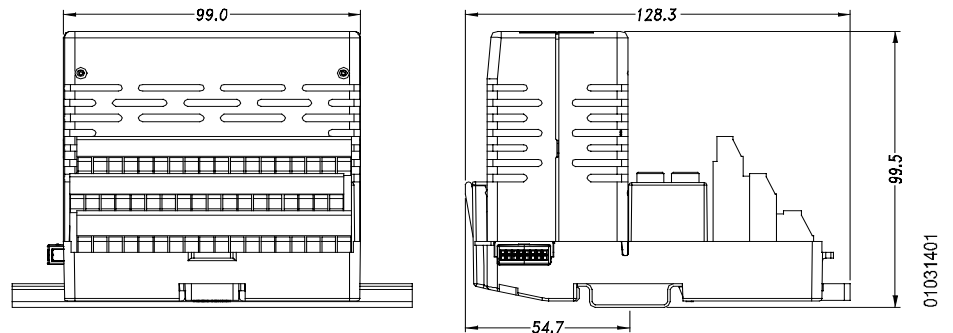
Dimensions in mm.

The electrical panel dimensions should take into consideration the module base sizes. Please consult the Ponto Series Utilization Manual IP20 - MU209000.

Here is the PO1112 module assembled in a PO6001 base in DIN TS35 rails.



Here is the PO1112 module assembled in a fused base PO6101 base in DIN TS35 rails.



## Maintenance

The hot swap procedure is described in the Ponto Series Utilization Manual.

When calibrating the module please use instrumentation like Beta Calibrator or similar for voltage, current and thermocouples; and use precision resistors for RTDs and resistance.

All the module adjusts are set through software by Altus.

## Manuals

For further technical details, configuration, installation and programming of Ponto Series products please consult following documents:

Document Code	Description
CT109000	Ponto Series General Characteristics
MU209000	Ponto Series Utilization Manual - IP20
MU203600	Utilization Manual , MT6000- MasterTool ProPonto
MU209100	Utilization Manual PO3045- UPC
MAN/MT4100	Utilization Manual MasterTool MT4100

Also please consult the utilization manuals for the field network heads and compatible CPUs.