

## Product Description

The PO2132 module is part of the Ponto Series and has 4 isolated analog outputs for voltage or current.

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 outputs
- Isolation among analog outputs, logic circuits and external power supply
- Open current loop diagnostic
- Local and remote diagnostic
- Over-range for all modes
- Hot swap with no interference on panel cabling
- Remote parameterization via software
- Field cabling connected to the base, thus eliminating intermediary terminal blocks for field signals
- Automatic addressing



## Ordering Information

### Product Packaging

The product packaging comes with:

- PO2132 Module
- Installation Guide

### Product Code

Please use following product code when ordering the product:

Code	Description
PO2132	4 Isolated Universal AO

## 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
PO6051	Analog IO Base – Screw
PO8510	10 Sheets with 14 labels of 16 tags for printer
PO8523	Spring Terminal Block Tool

**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

	PO2132
<b>Module type</b>	4 isolated analog outputs
<b>Output Type</b>	Voltage, current
<b>Data format</b>	12 bits in 2 complement, justified to the left
<b>Converter resolution</b>	12 bits monotonicity guaranteed, no missing codes
<b>Terminal block configuration</b>	1 terminal block voltage output ( + ) ( V ) 1 terminal block current output ( 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 Open current loop and low external power supply Parameterization status LED
<b>Configurable parameters</b>	Type for each output Range per output
<b>Hot swap</b>	Yes
<b>External power supply</b>	19 to 30 VDC (ripple included) consumption 100 mA
<b>Isolation</b>	
<b>Inputs to logic circuits</b>	1500 VAC for 1 minute
<b>Outputs to ground</b>	1500 VAC for 1 minute
<b>Power supply to logic circuits</b>	1500 VAC for 1 minute
<b>Power supply to outputs</b>	1500 VAC for 1 minute
<b>Among outputs</b>	No isolation
<b>Bus power consumption</b>	95 mA
<b>Power consumption</b>	2.4 W with all outputs on and current outputs short circuited to the ground 1.2 W with all outputs off, range 4-20 mA
<b>Maximum operating temperature</b>	60 °C
<b>Dimensions</b>	99 x 49 x 81 mm
<b>Norms</b>	IEC 61131 CE Please see Series' general features ( CT 109000 )
<b>Compatible bases</b>	PO6001: Spring Analog IO base PO6051: Screw Analog IO base

## Voltage Mode Features

PO2132 – Voltage Mode			
Precision	$\pm 0.1\%$ full range@ 25 °C $\pm 0.005\%$ / °C full range		
Resolution	12 bits Monotonicity guaranteed with no missing codes		
Minimum load impedance	1 K $\Omega$		
Short circuit protection	For limited time, just one output		
Scanning time	1 ms		
Stabilization time	3 ms		
Ranges	Range	Counting	Resolution
	-10 to +10 V	-30,000 to 30,000	5.12 mV
	0 to +10 V	0 to 30,000	5.12 mV
Range slack	Minimum 4%		

**Scanning time:** maximum time between receiving the values from the bus until the output update (worst case– 4 canals). The PO2132 module receives the 4 canals in 5 scanning polls from the Ponto bus (4 canals + 1 parameter). Please see bus head manual for further details on the scanning time.

**Stabilization time:** time for the output to reach the programmed value with 1% precision

**Range slack:** the range slack allows the module to reach voltages out of the range in order to compensate possible offset errors from devices to be controlled. The 0 to +10V range only has range slack at the high end.

## Current Mode Features

PO2132 – Current Mode			
Precision	$\pm 0.1\%$ full range @ 25 °C $\pm 0.005\%$ / °C full range		
Resolution	12 bits Monotonicity guaranteed with no missing codes		
Load maximum impedance	600 $\Omega$		
Scanning time	1 ms		
Stabilization time	6 ms		
Ranges	Range	Counting	Resolution
	0 to 20 mA	0 to 30,000	5.18 $\mu$ A
	4 to 20 mA	0 to 30,000	5.18 $\mu$ A
Range slack	Minimum 4%		
Open loop indication	Output voltage over 13VDC		

**Scanning time:** maximum time between receiving the values from the bus until the output update (worst case– 4 canals). The PO2132 module receives the 4 canals in 5 scanning polls from the Ponto bus (4 canals + 1 parameter). Please see bus head manual for further details on the scanning time.

**Stabilization time:** time for the output to reach the programmed value with 1% precision

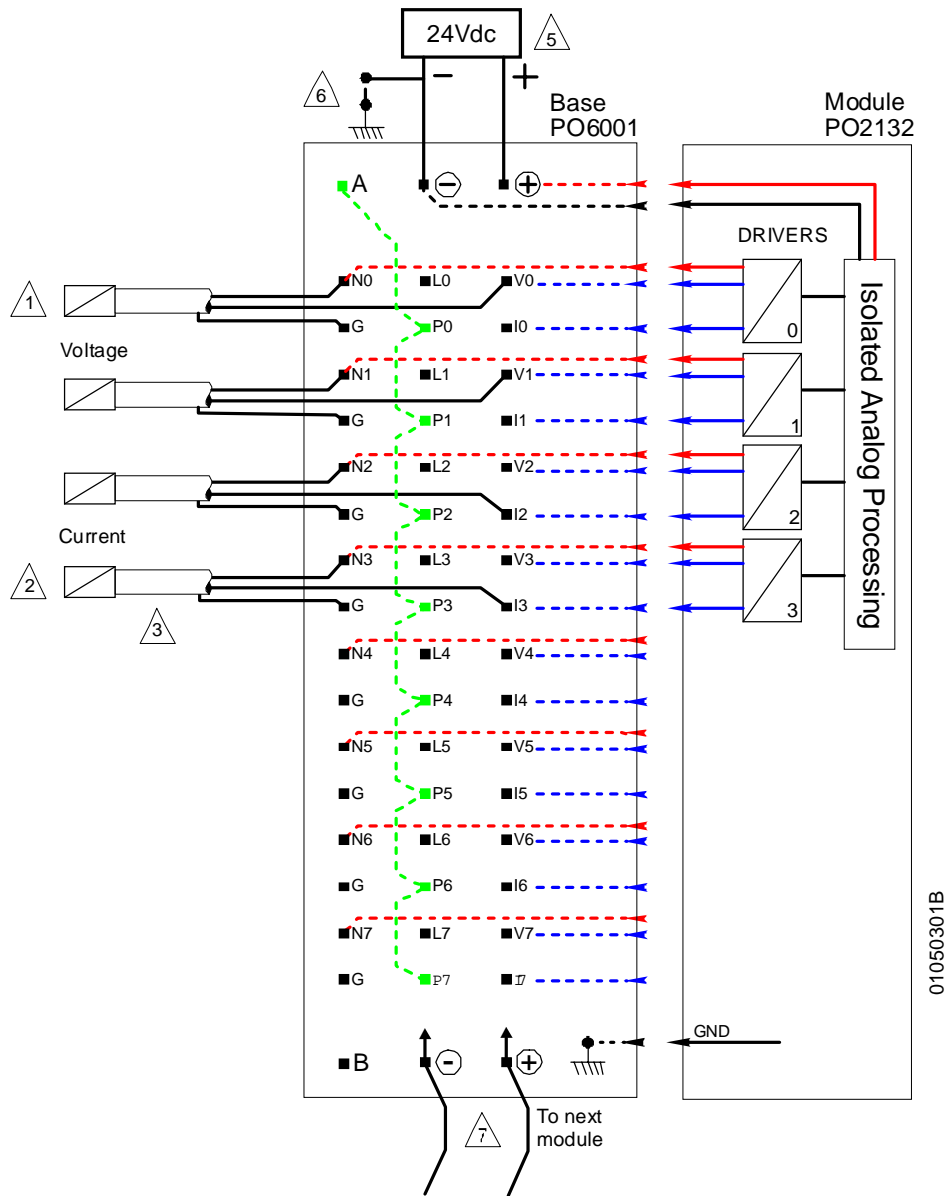
**Range slack:** the range slack allows the module to reach voltages out of the range in order to compensate possible offset errors from devices to be controlled. The range slack is specified for a 500  $\Omega$  load.

**Open loop indication:** activated when output voltage surpasses 13 VDC. It happens when the output cable ruptures.

## Installation

Following are the instructions for installing the PO2132. The installation for spring and screw terminal blocks are similar.

The following diagram shows the cabling for voltage loads (canals 0 and 1) and for current loads (canals 2 and 3) for the PO2132 module installed on a PO6001 base. The internal circuit is plotted in dotted lines with the purpose to clarify the signals distribution.



### Diagram notes:

- 1- The voltage output has a positive pole connected to the V terminal block and the negative to the N.
- 2- The current signal gets out of the I terminal block and returns to the N.
- 3- All signals must be connected through shielded cables with the shield grounded to the G terminal block. Both ends should not be grounded simultaneously.
- 5- 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.

6- The common point for the power supply (5) 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.

7- 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 PO2132 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. Greater shielding is achieved through the use of double shield cables, the outer shield should be grounded at both ends while the inner shield should be grounded just at one end.

The field elements should be connected to the base as shown on diagram. The terminal blocks identification have direct correlation with the module IOs as follow:

Module IO	0	1	2	3
Terminal block for voltage output	V0	V1	V2	V3
Terminal block for current output	I0	I1	I2	I3
Common terminal block	N0	N1	N2	N3
Grounding terminal block	G	G	G	G

## Mechanical Assembly

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

Please adjust the mechanical code on the assembly base to 32 (3 on switch A and 2 on switch B).

## Parameterization

The CPU or field network head defines via software the PO2132 module parameterization. The parameterization sets the output modes. 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 six bytes. The first two bytes set the generic module aspects and the remaining four set the parameterization of each analog output.

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

Byte 0 - Module generics								Description
7	6	5	4	3	2	1	0	
				0	1	1	0	Number of parameters bytes ( always 6 )
0	0	0	0					Always zero

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

The bytes 2 to 5 individually configures each analog canal.

Bytes 2 to 5								Description
7	6	5	4	3	2	1	0	
					0	0	0	Current: 4 to 20 mA
					0	0	1	Current 0 to 20 mA
					0	1	0	Voltage 0 to 10 V
					0	1	1	Voltage -10 to +10 V
0	0	0	0	0				Always zero

## Example

Byte	Parameters	7	6	5	4	3	2	1	0	Value in Hex	Description
0	Module generics	0	0	0	0	0	1	1	0	06	Fixed value
1	Module generics	0	0	0	0	0	0	0	0	00	Fixed value
2	Canal 0	0	0	0	0	0	0	0	0	00	Current 4 to 20 mA
3	Canal 1	0	0	0	0	0	0	1	1	03	Voltage -10 to +10 VDC
4	Canal 2	0	0	0	0	0	0	0	1	01	Current 0 to 20 mA
5	Canal 3	0	0	0	0	0	0	1	0	02	Voltage 0 to +10 VDC

## Diagnosis

### Diagnosis Bytes

The PO2132 module provides six bytes for operating diagnosis and also status of each output. 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

The diagnosis bits for each byte are described as follow:

Byte 0 - Module generics								Description
7	6	5	4	3	2	1	0	
					0	0	0	Always zero
				0				Normal operation
				1				Non parameterized module
		0	0					Always zero
	0							Normal external voltage
	1							External voltage under 19 VDC
0								Always zero

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

The bytes 2 to 5 individually diagnoses each analog canal

Bytes 2-5 - Module generics								Description
7	6	5	4	3	2	1	0	
							0	Normal operation
							1	Canal wrongly configured
						0		Always zero
					0			Current output: normal
					1			Current output: open
0	0	0	0	0				Always zero

## Diagnosis LED

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 3X	No external power supply	<ul style="list-style-type: none"> <li>- Missing external power supply</li> </ul>
Blinking 4X (the failure identification is done through the diagnosis byte)	No continuity on the current output	<ul style="list-style-type: none"> <li>- Open field cable</li> </ul>

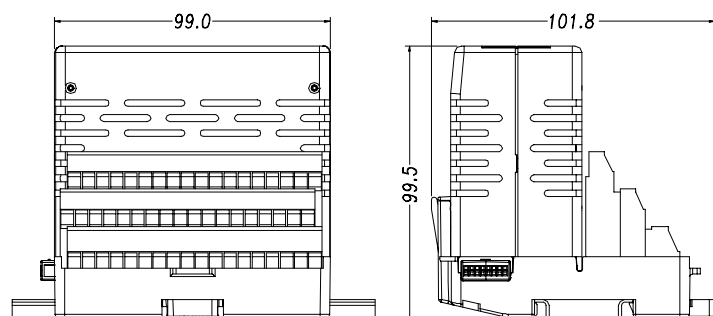
LED 17	Meaning	Causes
Off	No parameterization	<ul style="list-style-type: none"> <li>- Parameterization missing</li> </ul>
On	Normal operation	
Blinking 1X	Parameterization error	<ul style="list-style-type: none"> <li>- Parameterization is not valid.</li> </ul>

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

## Physical Dimensions

Dimensions ins mm.

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





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## Maintenance

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

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## 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
MU209012	Configuration Manual for the Profibus Remote
MAN/MT4100	Utilization Manual MasterTool MT4100

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