4 Current AO with HART Module PO2134

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Product Description

The PO2134 module is part of Ponto Series and has 4 isolated analog outputs for current. This module is applied for control and supervision of machines, automation processes and where it is required remote parameterization of transmitters through an asset management tool that uses HART technology over PROFIBUS.

The picture shows the product installed on an analog I/O spring-clamp terminal base.

The module main features are:

- Analog output module
- Two current scales: 0-20 mA and 4-20 mA
- HART protocol (4-20 mA)
- Isolation for internal logic as for external power supply
- Open current loop diagnosis
- Local and remote diagnosis
- Over-range for all modes
- Hot swap with no interference on panel cabling
- Remote parameterization via software
- Remote parameterization of transmitters through asset management tools
- Field cabling connected to the terminal base, therefore eliminating intermediary terminal blocks for field signals
- Automatic addressing

ATTENTION:
This product is only compatible with PROFIBUS head PO5064 and PO5065.

Ordering Information

Included Items

The product packaging contains the following items:

- PO2134 module
- Installation guide

Product Code

The following code should be used to purchase the product:

Code	Description
PO2134	4 Current AO with HART Module

Related Products

The following products must be purchased separately when necessary:

Code	Description
PO6001	Analog I/O spring-clamp terminal base
PO8510	10 Sheets with 14 labels of 16 tags for printer
PO8523	Spring Terminal Block Tool

Notes

PO8510: this product consists of A4 sheets with labels where the tags may be printed, in the case the user wishes so, using MasterTool ProPonto Software - MT6000.

PO8523: this product is an isolated tool to connect the cables into the spring-clamp terminal bases PO6001 and PO6101.

Product Features

General Features

	PO2134
Module type	4 analog outputs
Output Type	Current
Data format	12 bits in 2 complement, aligned to the left
Converter resolution	12 bits monotonicity guaranteed, no missing codes
Terminal block configuration	1 terminal for current output (I) 1 terminal for each IO return (0 Vdc), interconnected (N) 1 terminal for shield cable (G)
Diagnostic indication	Two multifunctional LEDs with indication of module OK status, open current loop and missing of parameterization
Configurable parameters	Output range per output point Enabling of HART protocol
Hot swap	Yes
External power supply	19 to 30 Vdc including ripple Maximum input current – 100 mA @ 24 Vdc
Initialization time	5 s (maximum)
Isolation	
Outputs to logic circuits	1500 Vac up to 1 minute
Outputs to ground	1500 Vac up to 1 minute
Power supply to logic circuits	1500 Vac up to 1 minute
Power supply to outputs	1500 Vac up to 1 minute
Among outputs	No isolation
Bus power consumption	30 mA
Power consumption	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
Dimensions	100 x 52 x 84 mm
Environment conditions	Consult general features of Ponto Series (CT109000)
Compatible bases	PO6001: Spring-clamp analog I/O terminal base

Notes

Power supply interruptions: power supply interruptions, during at least 10 ms may be supported, since the module is operating in its nominal voltage of 24 Vdc or greater. Longer interruptions or in voltages lower than its nominal one may cause module reset.

Analog Outputs

	PO2134 – Current Mode		
Precision	± 0.1 % full range @ 25 °C ± 0.005% / °C full range		
Load maximum impedance	600 Ω		
Scanning time	Maximum 100 ms		
Stabilization time	6 ms		
Ranges	Range	Counting	Resolution
	0 to 20 mA	0 to 30000	5.7 µA
	4 to 20 mA	0 to 30000	5.7 µA
	4 to 20 mA with HART	0 a 30000	5.7 µA
Range slack	Minimum 4%		
Open loop indication	Output voltage fault		

Notes

Scanning time: maximum time between receiving the values from the bus until the output update (worst case– 4 channels). The PO2134 module receives the 4 channels in 5 scanning polls from the Ponto bus (4 channels + 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 Ω load.

Open loop indication: activated when output voltage is higher than 13,5 V. It happens when the output cable breaks.

Resolution: indicates the minimum possible variation on the outputs, considering the number of bits of the DA converter and the internal reference voltage source.

HART

	PO2134
Operation mode	Monodrop
Allows secondary master	Yes

Compatibility With Other Products

The following table describes the main Altus products compatible with PO2134.

	Compatible version
ProPonto MT6000	1.59 or upper
MasterTool MT8000	5.42 or upper

Installation

ATTENTION:
This device is sensible to electrostatic discharge (ESD). Always touch a grounded metallic surface before handling this device.

Electrical Installation

PO2134 module installation must be done on a PO6001 base.. The internal circuit is plotted in doted lines.

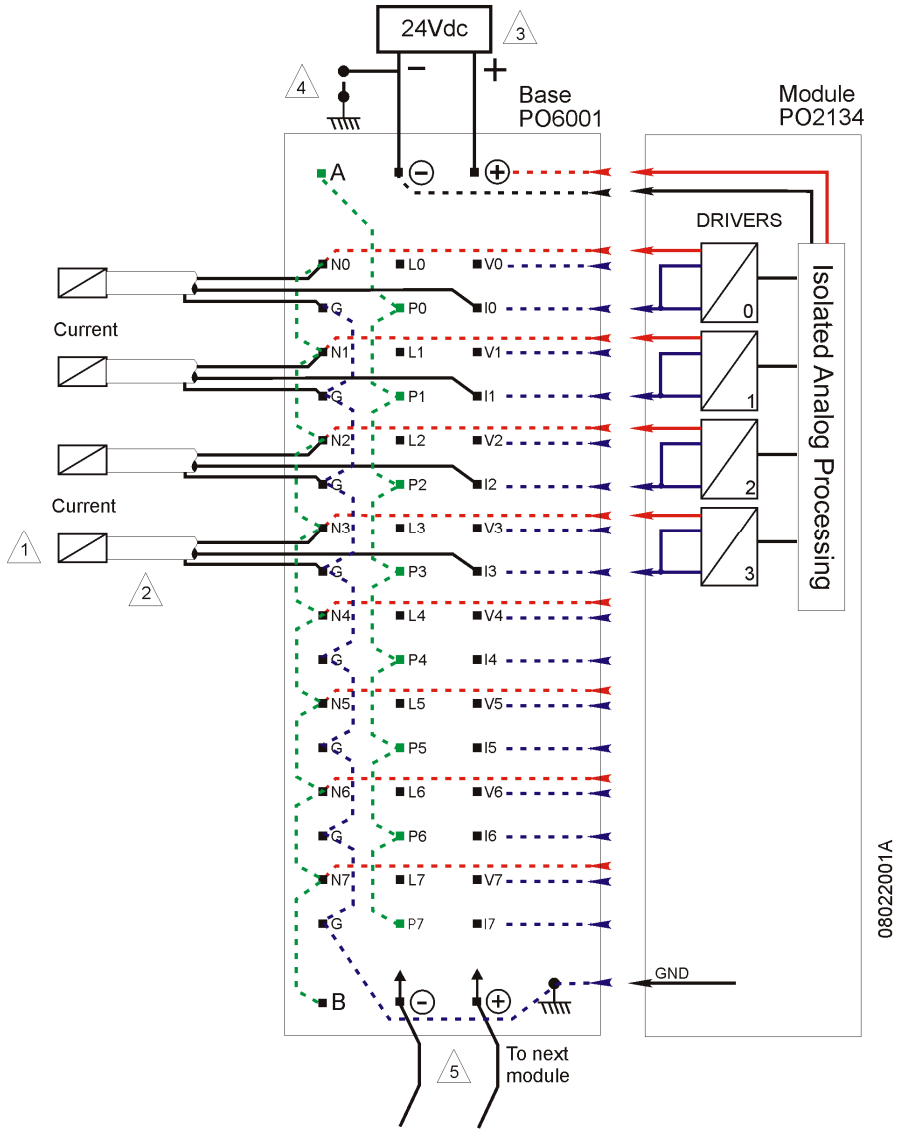


Diagram Notes:

1- IO, I1, I2, I3 are the four current analog output.

2- All signals must be connected through shielded cables with the shield grounded to the G terminal block. Both ends should not be grounded simultaneously.

3-Electrical installation is done by feeding the module base with a 24 Vdc power supply. This connection is done via terminals marked by (+) and (-). This connection is mandatory, because it is the only way to supply power to the module.

4- The common point for the power supply (3) 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.

5- The next module may be fed through the points (+) and (-) on this module base. The maximum number of module bases that may be connected in this way is 10. No other device can be connected to these terminal strips.

Module Power Supply:

The PO2134 module uses a 24 Vdc regulated power supply – terminals (+) and (-).

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 the wearing down of motors' brushes.
- Use shielded cables for carrying input signals and ground only one of the shielding ends.

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 I/O	0	1	2	3
Terminal block for current output	I0	I1	I2	I3
Common terminal block	N0	N1	N2	N3
Grounding terminal block	G	G	G	G

ATTENTION:

Atmospheric discharges (lightnings) may cause damages to the modules although their 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 this makes it vulnerable to this kind of discharges.

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

ATTENTION:

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

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

The module has been tested with electromagnetic fields of intensities up to 10 V/m. In those conditions, observed precision was at least 0.5% full range. 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 m) caused no alteration in nominal precision.

Mechanical Assembly

The mechanical assembly is described in the Ponto Series Utilization Manual (MU209000). There are no special requirements in mechanical assembly of this module.

Please adjust the module base mechanical code, when assembly this module on its base, to 34 (3 on switch A and 4 on switch B).

Parameterization

The CPU or field network head defines via software the PO2134 module parameterization. The software which configures the field bus master sets the parameterization. For further information, please consult Ponto Series Utilization Manual and Manuals for the Interfaces and Field Network Heads. The parameterization is set through user-friendly menus. For reference purposes, the binary codes are shown as follows.

Parameters Bytes

The module parameterization is defined by six bytes. The first two bytes set the general module aspects and the remaining four bytes set the parameterization of each analog output.

The bytes are defined as the following.

Byte	Parameters
0	Module (General)
1	Module (General)
2	Channel 0
3	Channel 1
4	Channel 2
5	Channel 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 configure each analog channel.

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
					1	0	0	Current: 4 a 20 mA with HART
1	0	0	0	0	x	x	x	Disables output
	0	0	0	0				Always zero

Notes

Disables output: if all channels are disabled, the outputs will be turned off and an configuration error diagnostic byte will be returned on byte 0 (LED 17 blinks 1x).

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	1	0	0	04	Current 4 to 20 mA with HART
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	1	0	0	04	Current 4 to 20 mA with HART

Diagnosis

Diagnosis Bytes

The PO2134 module provides six bytes for operating diagnosis including status of each output.

The first two bytes indicate the general aspects related to the module operation.

Byte	Parameters
0	Module (General)
1	Module (General)
2	Channel 0
3	Channel 1
4	Channel 2
5	Channel 3

In the case when the module is part of a PROFIBUS remote, the diagnostic informations are provided to the CPU that implements the PROFIBUS Master Network Interface only in case when there are any failures. In this case the error codes are sent in decimal form.

Byte 0 – Module (General)								PROFIBUS message code	Description
7	6	5	4	3	2	1	0		
					0	0	0	-	Always zero
				0				-	Functioning Normaly
				1				31	Module not parameterized. Error with parameterization
		0	0					-	Always zero
	0							-	Normal External voltage
	1							02	External volage below 19 Vdc
0								-	Always zero

Byte 1 – Module (General)								PROFIBUS Message Code	Description
7	6	5	4	3	2	1	0		
0	0	0	0	0	0	0	0	-	Always zero

Bytes 2 to 5, individually diagnoses

Bytes 2-5 – Channel Diagnosis								PROFIBUS Message Code	Description
7	6	5	4	3	2	1	0		
							0	-	Functioning Normaly
							1	16	Wrong configuration for canal
						0		-	Always zero
					0			-	Normal current output
					1			18	Open current output
0	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	Wrong module type for the position Non declared module Damaged module
Blinking 3X	External power supply	Missing external power supply
Blinking 4X (the failure identification is done through the diagnosis byte)	No continuity on the current output	Open field cable

LED 17	Meaning	Causes
Off	No parameterization	Parameterization missing
On	Normal operation	
Blinking 1X	Parameterization error	Parameterization is not valid All channels are disabled

Notes

LED 17: any diagnosis infiormation different from the ones listed above indicates that the module must be forwarded to Altus Support service.

LED 17:the diagnosis priority is from the higher number of blinking times to the lower.

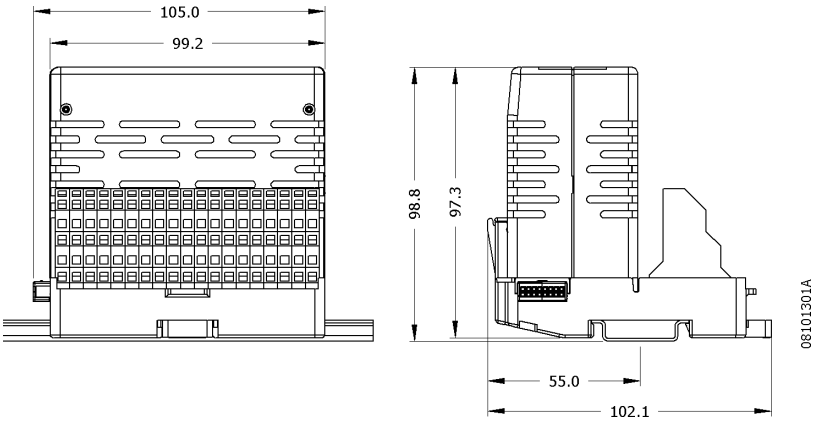
Physical Dimensions

Dimensions in mm.

The electrical panel dimensions should take into consideration the module terminal base sizes.

Ponto Series Utilization Manual IP20 (MU209000) must be consulted for panel general dimensioning.

Beside, there's a PO2134 module assembled on a PO6001 terminal base on DIN TS35 rail.



Maintenance

Hot-swapping procedures are described in the Ponto Series Utilization Manual (MU209000).

All the module adjusts are set via software in Altus industrial area.

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
MU299040	User Manual MT6000 – MasterTool ProPonto
MU209503	User Manual PO5064 and PO5065 - PROFIBUS Head
MU299604	User Manual MasterTool MT8000
MU203026	User Manual ProfiTool - AL-3865

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