

Product Description

The PO7079 module makes part of the Ponto Series. It presents 4 high speed programmable counters with 32 bits resolution each. It allows pulse counting with frequency up to 1 Mhz and quadruple of 250 KHz. It is the ideal solution to measure linear or rotative position transducers.

The picture shows the module mounted on the spring terminal base.

Each counter has the following main features:

- Two pulse inputs (A and B) that can count on up/down or quadruple mode.
- One digital input (I) configurable as instantaneous reading, reset or enable.
- One transistor output (T) that indicates up limit, low limit or no limit.
- Configurable range for counting (-2.147.483.648 to +2.147.483.647 / 32 bits with signal).
- Measurement mode to allow period and frequency measurement.
- Inputs and outputs (A, B, I, T) isolated from bus.
- Hot swap without interference on panel wiring.
- Local and remote diagnostic.
- Field wiring connected to the base, allowing direct connection of all field signals without intermediary terminals.
- Remote parameterization via software.
- Automatic addressing.
- Automatic module type identification by CPU or fieldbus head



This module is suitable for following main applications:

- Control positioning.
- Flow metering.
- Speed control and gas flow metering.
- Dosage plants.

ATTENTION

This product is compatible with Altus PROFIBUS head PO5063v1 and redundant PROFIBUS head PO5063v5. It must be used with CPUs that allows processing with 32 bits operands, as Altus AL-2004 CPU, or another manufactures with PROFIBUS interface.

Ordering Information

Included Items

The product packing comes with:

- PO7079 Module.
- Installation guide.

Product Code

Use the following codes when ordering the product:

Code	Description
PO7079	High Speed Counter Module

Related Products

Depending on your system requirements, the following products might be ordered separately.

Code	Description
PO6000	Base E/S Digital Mola
PO8523	Spring Terminal Tool

Characteristics

General Characteristics

	PO7079
Module	4 High speed counters – 32 bits.
Measurement Modes	Mode 0: Counter. Mode 1: Frequency. Mode 2: Period.
Counting Modes	Mode 0: A = up, B = down. Mode 1: A = direction, B = up / down. Mode 2: A / B quadruple, 4 counts / period. Mode 3: A / B quadruple, 2 counts / period.
Data	32 Bit integer with signal
Operation Limits	Counter: -2.147.483.648 to +2.147.483.647. Frequency measurement: 1 Hz to 1 MHz, 1 Hz resolution. Period measurement: 1 μ s to 40.000.000 μ s, 1 μ s resolution.
Status Indication	3 LEDs for active input (A, B and I). 1 LED for active output.
Common Terminals	24 Vdc and 0 Vdc.
Diagnostic Indication	LED (DG) multifunctional to indicate module OK, module not accessed, output overload.
Configurable Parameters	Measurement mode. Counter mode. Input function (I). Output function (O). Comparison registers. Input filters.
Hot Swap	Yes.
External Power Supply	19 to 30 Vdc, including ripple.
Protections	Power supply polarity inversion. Short circuit on output points.
Isolation	
Inputs – Ground / Power Supply	1500 Vac / 1 minute, 250 Vac continuos.
Inputs – Logic	1500 Vac / 1 minute, 250 Vac continuos.
Input – Input	500 Vac / 1 minute.
Logic – GBL Bus	1500 Vac / 1 minute, 250 Vac continuos.
Logic – Outputs	No isolation.
Logic – Power Supply	No isolation.
Bus Current Consumption	24 mA.
Power Consumption	5 W with all inputs active.
Operating Temperature	0 °C to 60 °C.
Dimensions	(99 x 49 x 81) mm.
Standards	IEC 61131
Compatible Base	PO6000

Digital Inputs

	PO7079
Input voltage	24 Vdc nominal. 15 to 30 Vdc, Status on (1). 0 to 5 Vdc, Status off (0).
Input current	10 mA with nominal voltage.
Input type	Type 1, sink, source or differential.
Input impedance	2,4 k Ω .
Maximum frequency	1 MHz.

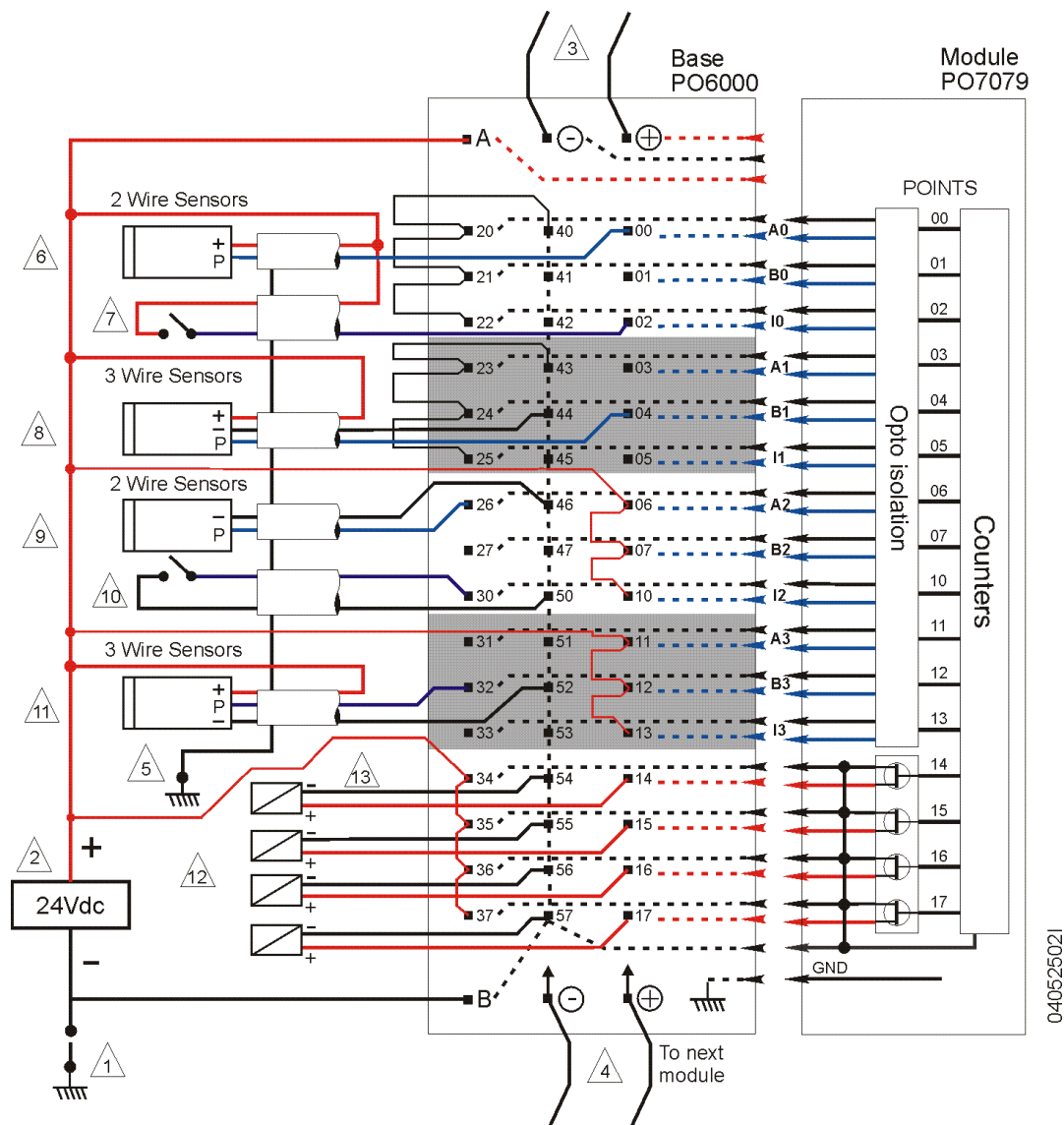
Digital Outputs

	PO7079
Maximum current / point	500 mA @ 25 °C.
Operation voltage	19 to 30 Vdc.
Output type	Transistor, source type.
Protection	4 A @ 25 °C (total current).
Commutation period	250 μ s.
Maximum frequency for switching with load	2 kHz.

Installation

Electrical Installation

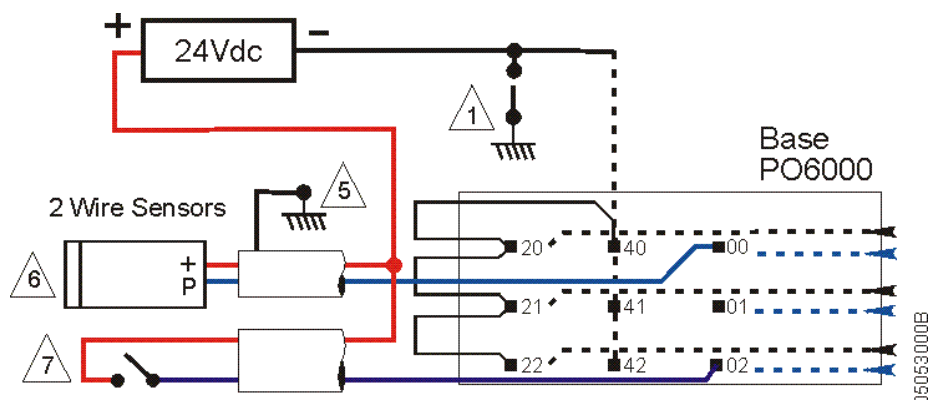
The following picture shows the connection for sensors with 2 and 3 wires, sink and source type. The PO7091 is mounted over the PO6000 base.



Notes:

- 1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.
- 2 – Power supply for field sensors. The power supply must be connected on terminal A (+24 Vdc) and B (0 Vdc). The power supply must guarantee a signal according module specification. The power supply must be direct current and regulated.
- 3 – Terminal + and - can be used to supply energy to other modules installed on bus. The PO7091 do not use this connection, because it doesn't use external power supply.
- 4 – The next module must be fed through terminals + and -. The maximum number of bases that may connected in such way is 10 and the current limit is 2 A for each terminal.
- 5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground only in one point.

The following picture shows details about the connection of a sensor type P with 2 wires to sink input.



Notes:

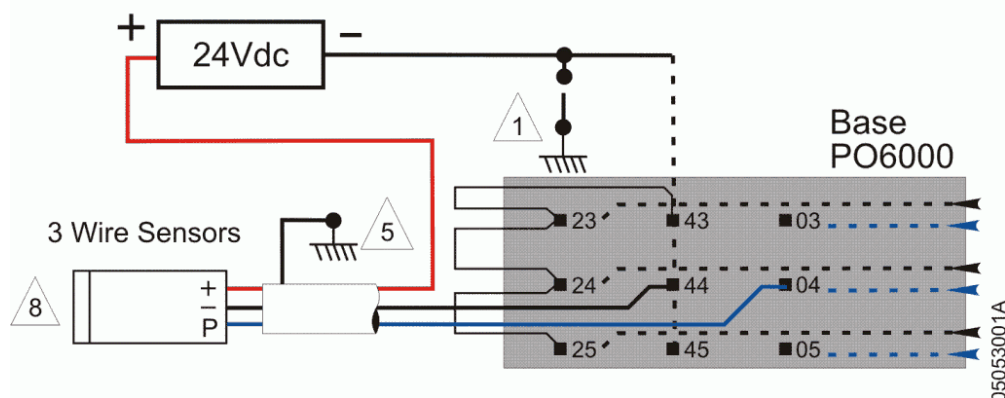
1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

6 - Two wire sensors (type P) are connected to the terminals identify as 00, 01, 03, 04, 06, 07, 11, 12 and its supply to positive pole (+) of the power supply. The terminals 20 to 27 and 30 to 33 must be short circuited and connected to negative pole (-) of the power supply.

7 – Two wire sensors and contacts must be connected to special inputs identify as 02, 05, 10, 13 and its supply to positive pole (+). The terminals 20 to 27 and 30 to 33 must be short circuited and connected to negative pole (-) of the power supply.

The following picture shows details about the connection of a sensor type P with 3 wires to sink input.



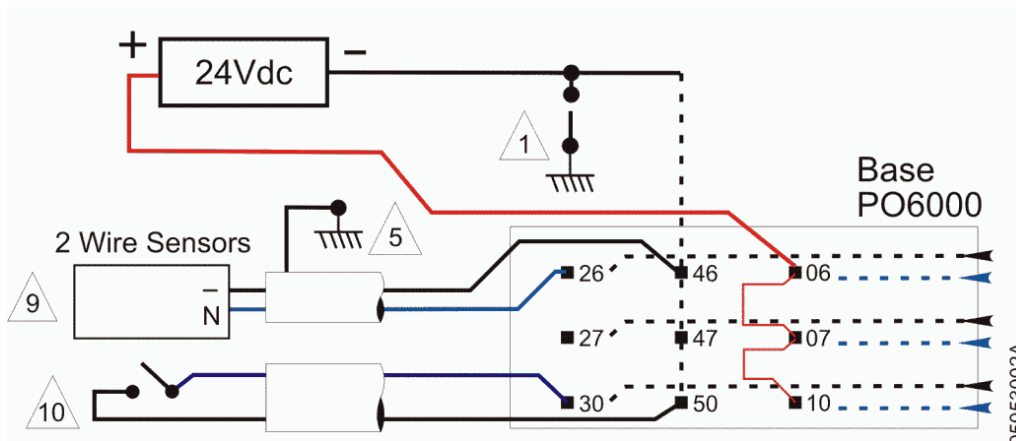
Notes:

1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

8 – Three wire sensors (type P) are connected to the terminals identify as 00, 01, 03, 04, 06, 07, 11, 12 and its supply to positive pole (+) and zero pole (-) of the power supply. The terminals 40 to 47 and 50 to 53 can be an alternative for zero volt connection. The terminals 20 to 27 and 30 to 33 must be short circuited and connected to negative pole (-) of the power supply.

The following picture shows details about the connection of a sensor type N with 2 wires to source input.



Notes:

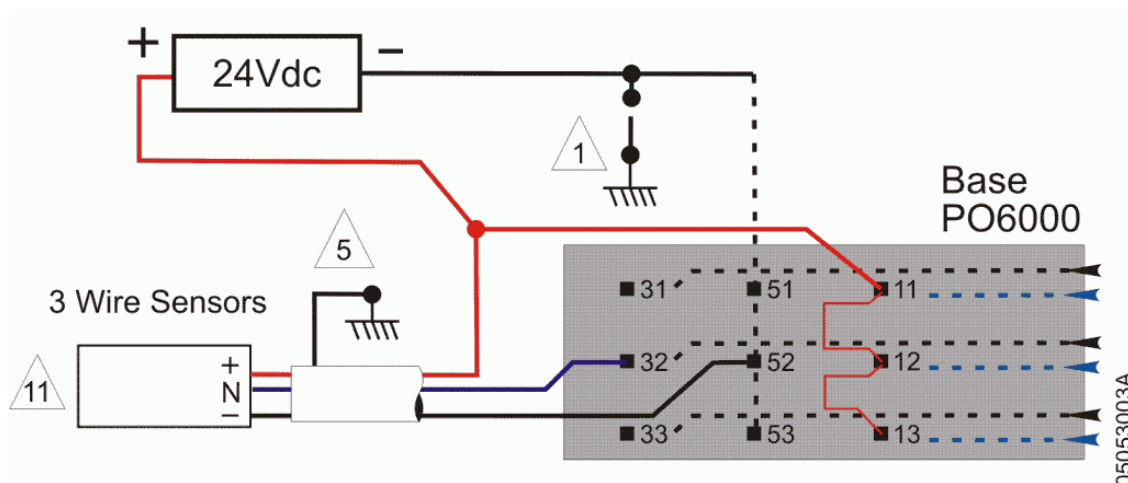
1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

9 – Two wire sensors (type N) are connected to the terminals identify as 20, 21, 23, 24, 26, 27, 31, 32 and its supply to negative pole (-) of the power supply. The terminals 00 to 07 and 10 to 13 must be short circuited and connected to positive pole (+) of the power supply.

10 – Two wire sensors and contacts must be connected to special inputs identify as 02, 05, 10, 13 and its supply to negative pole (-) of the power supply. The terminals 00 to 07 and 10 to 13 must be short circuited and connected to negative terminal (-) of the power supply.

The following picture shows details about the connection of a sensor type N with 3 wires to source input.



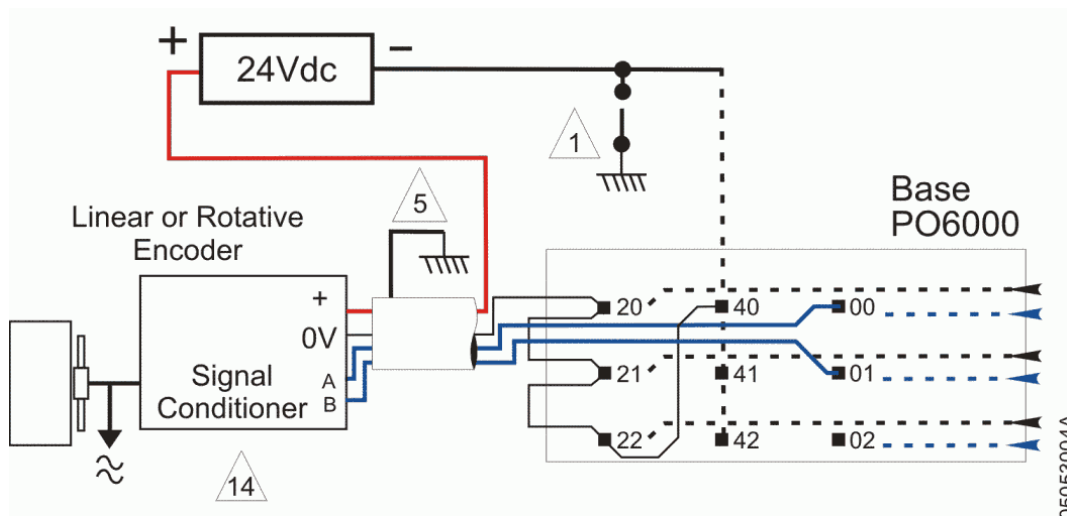
Notes:

1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

8 – Three wire sensors (type N) are connected to the terminals identify as 00, 01, 03, 04, 06, 07, 11, 12 and its supply to positive pole (+) and zero pole (-) of the power supply. The terminals 20 to 27 and 30 to 33 can be an alternative for zero volts connection. The terminals 20 to 27 and 30 to 33 must be short circuited and connected to negative pole (-) of the power supply.

The following picture shows details about the connection of a linear or rotative encoder to sink input.



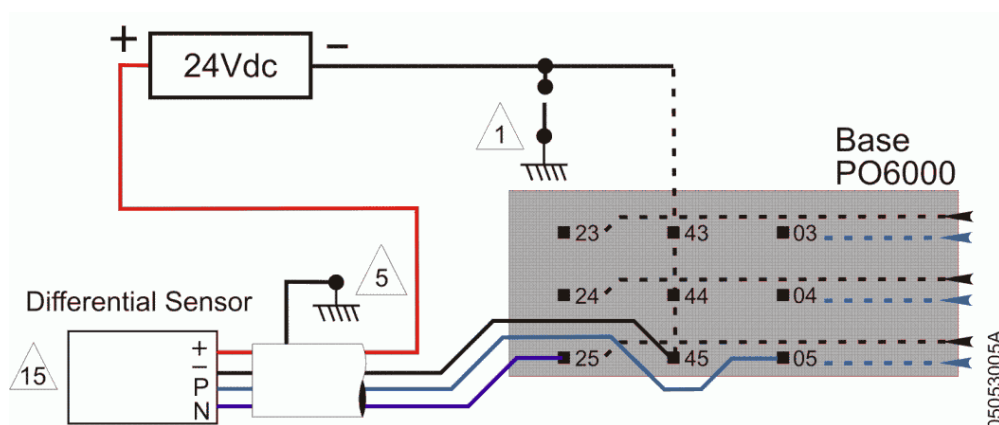
Notes:

1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

14 – The A output must be connected to terminals 00, 03, 06 and 11 (according each encoder). The B output must be connected to terminals 01, 04, 07 and 12. The terminals 20 to 27 and 30 to 33 must be connected to negative pole (-) of the power supply. Inverting A and B connection the counting sequence is inverted. The supply for sensor must be connected directly to power supply. The terminals 40 to 47 and 50 to 53 can be an alternative for zero volt connection. The index signal can be connected to terminal I on terminals 02, 05, 10 and 11.

The following picture shows details about the connection of a differential sensor type N with 3 wires to a source input.



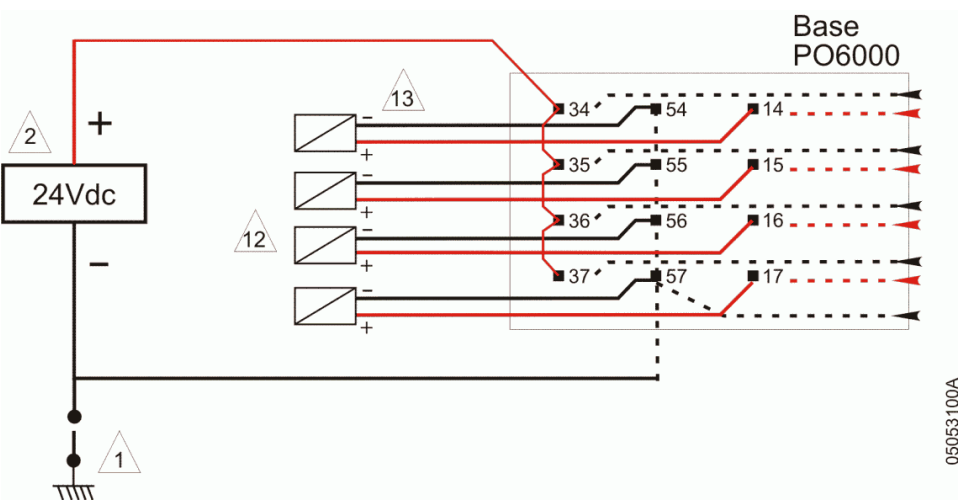
Notes:

1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.

5 – It is recommended the use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground in order to minimize electrical noise on system automations.

8 – Positive output (P) must be connect to the terminals identify as 00 to 07 and 10 to 13. The negative output (N) must be connect to the terminals identify as 20 to 27 and 30 to 33 and its supply to negative pole (-) of the power supply. The terminals 40 to 47 and 50 to 53 can be an alternative for zero volt connection.

The following diagram shows details about the load connections.



Notes:

- 1 – The common point between power supply and field sensors (0 V) can be connected to electrical panel grounding. This connection is not mandatory but it is recommended in order to reduce electrical noise in automation systems.
- 12 – The positive pole (+) from loads must be connected to terminals 14, 15, 16 and 17. The negative pole (-) is connected to terminals 54, 55, 56 and 57. It is recommended the connection of power supply on terminals 34, 35, 36 and 37. These terminals are short circuited to terminal A on the base (internal connection), the external connection it is recommended to have a better distribution of the current from the external power supply.

ATTENTION

In order of minimize electrical noise on inputs it is highly recommended:

- The use of shielded cables to connect the sensors on input terminals. The shield must be connected to the ground only in one point (extremity).
- Correct parameterization of input filters, according the measure signal.

Terminal Connections

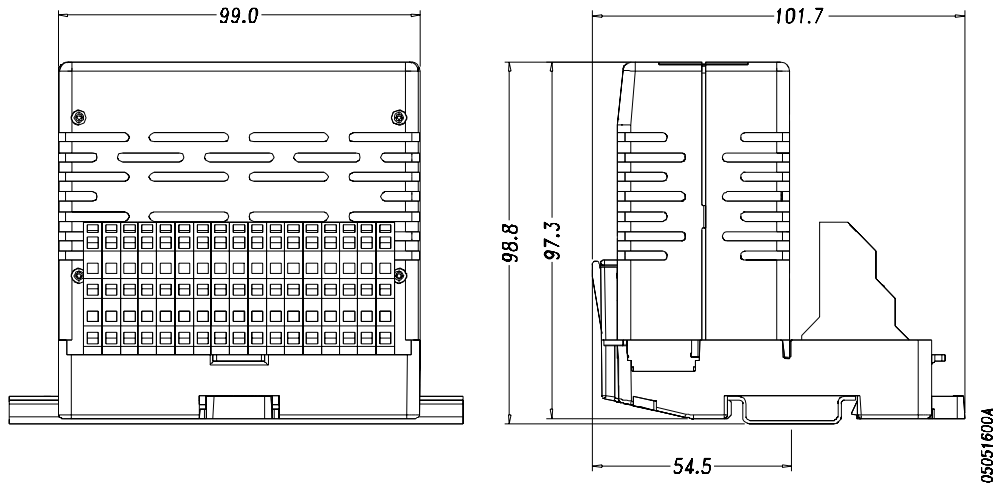
The terminal connections are described according PO6000 Base. Another base models may use the same positions and descriptions.

Module Point	A0	B0	I0	A1	B1	I1	A2	B2	I2	A3	B3	I3	T0	T1	T2	T3
Positive Input / Output Terminal	00	01	02	03	04	05	06	07	10	11	12	13	14	15	16	17
Negative Input Terminal	20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37
Common Terminal	40	41	42	43	44	45	46	47	50	51	52	53	54	55	56	57

- Digital inputs: Sink: 00, 01, 02, 03, 04, 05, 06, 07, 10, 11, 12, 13
Source : 20, 21, 22, 23, 24, 25, 26, 27, 30, 31, 32, 33
- Digital outputs: Source Transistor: 14, 15, 16, 17
- Power supply +24 Vdc: A
0 Vdc: B
- Common terminals with terminal B: 40, 41, 42, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 56, 57

Physical Dimensions

The Ponto Series Utilization Manual must be consulted to complete electrical panel project.
mm dimensions.



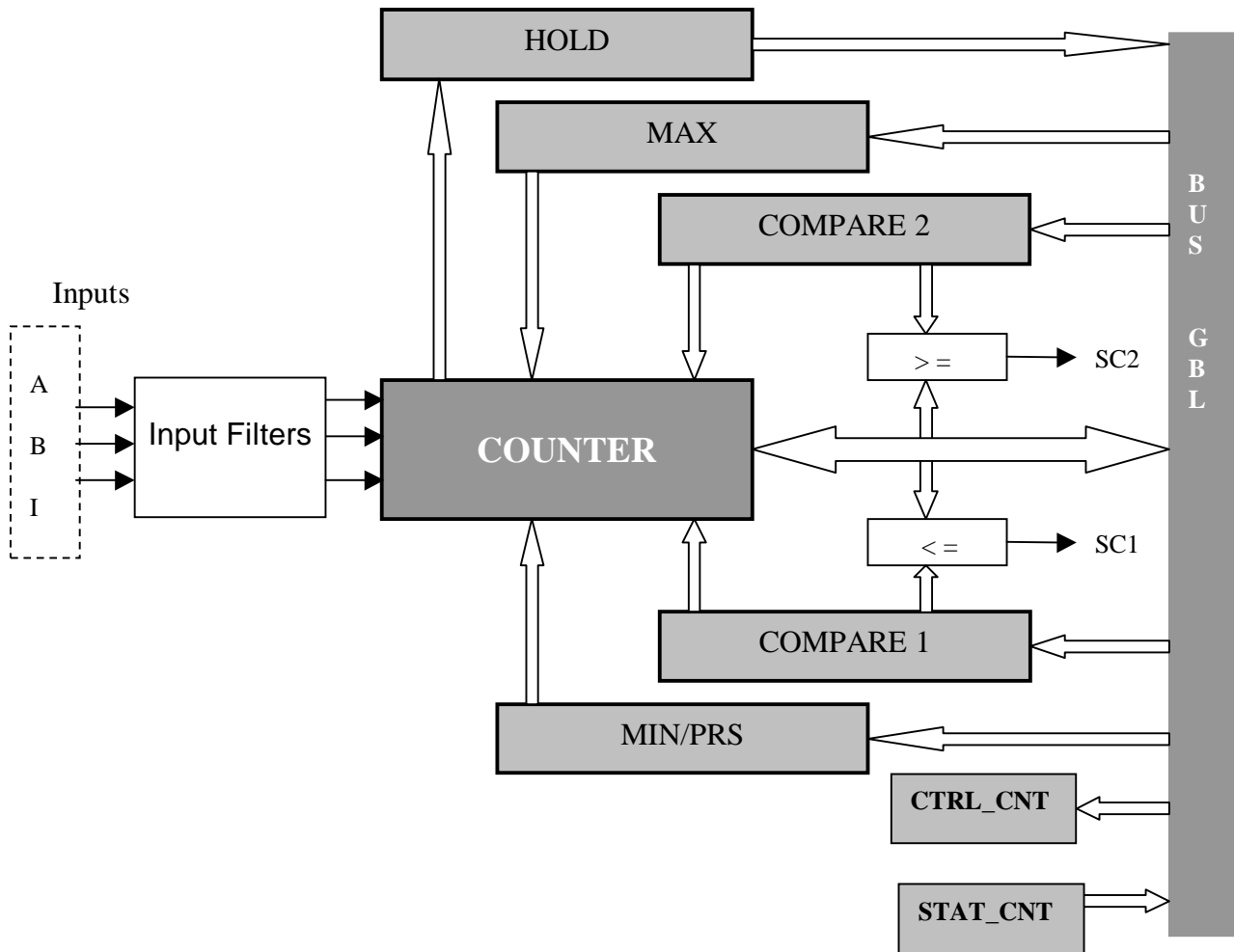
Maintenance

The hot swap procedure is described on Ponto Series Utilization Manual.

Counter Function

Functional Description

The PO7091 module can work with 4 binary counters / 32 bits, Counter 0, Counter 1, Counter 2 and Counter 3. Three inputs, one counter register, two limit registers and two compare registers form each counter. The architecture is described according following diagram.



Counter Components

- **COUNTER**
COUNTER is the binary counter / 32 bits with signal. Full range of integer numbers -2.147.483.648 to +2.147.483.647.
- **MIN/PRS**
This register defines the low limit. When the counter cross the limit established by MIN/PRS, it will assumes the value zero or the value registered on MAX register (according parameterization).
The value on MIN/PRS is copied to COUNTER every time that PRESET command is enable. This command can be enable by I input (when configured) or the register CTRL_CNT.
- **MAX**
This register defines the top limit. When the counter cross the limit established by MAX, it will assumes the value zero or the value registered on MIN register (according parameterization).
- **COMPARE 1 and COMPARE 2**
These registers establish the reference for comparison with the value on COUNTER. It informs if COUNTER is less or equal than COMPARE 1 or bigger and equal than COMPARE 2
- **HOLD**
It saves the COUNTER value when the freeze command is received by input I (according parameterization).

- **STAT_CNT**
It saves the counter status, zero crossing, counting overflow, I input, negative value, comparators result.
- **CTRL_CNT**
It controls the counter operation including counter enable, output enable, reset and preset.
- **A / B Counting inputs**
The counting is executed through electrical signals present on A / B inputs. These signals are interpreted by counting processor according to mode operation, determine the number of pulses and direction, up or down.
- **I Input**
I is a multifunctional input that can be configured according to the following tasks:
 - Zero function (reset).
 - MIN/PRS load function.
 - Freeze function (hold).

Register initialization and exemption behavior

When the module is initialized, the registers assume values according to the following table. The values can only be changed by CPU command.

Situations when communication failure or hot swap operation occurs will keep the parameterization values. The register values will not change. In these cases only the outputs will be disabled.

	Register values on initialization
COUNTER	0 (Zero)
HOLD	0 (Zero)
MIN/PRS	-2.147.483.648
MAX	+2.147.483.647
COMPARE 1	0 (Zero)
COMPARE 2	0 (Zero)

ATTENTION

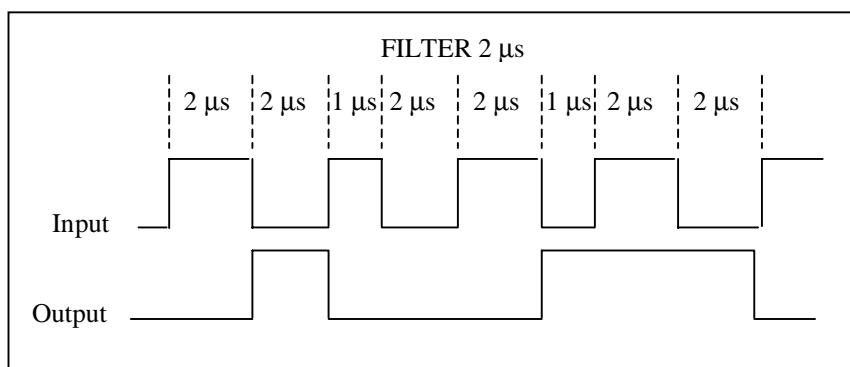
When a hot swap occurs, the module is reparameterized, but the data in registers MIN/PRS, MAX, COMPARE 1 and COMPARE 2 is still the same.

Input filters

Each counter presents a parameterized digital filter for its inputs (A, B and I). These filters work as RC analog filters / first class. The configured period sets the minimum period that the signal must be on (or off) to guarantee consistence of the values. Input signals that present pulse wide less than 2/3 of configured period are ignored. For signals between 2/3 and configured value on filter is considered undetermined.

Parameter [5 4]	Filter Period	Maximum Frequency
00	0,5 μ s	1 MHz
01	2 μ s	250 KHz
10	20 μ s	25 KHz
11	200 μ s	2,5 KHz

The following graph shows the comportment of the input filters (filter time = 2 μ s).



ATTENTION

The indicative LEDs (A0~A3, B0~B3, I0~I3) and bit 2 from status word will be active after the input filter..

Counting Modes

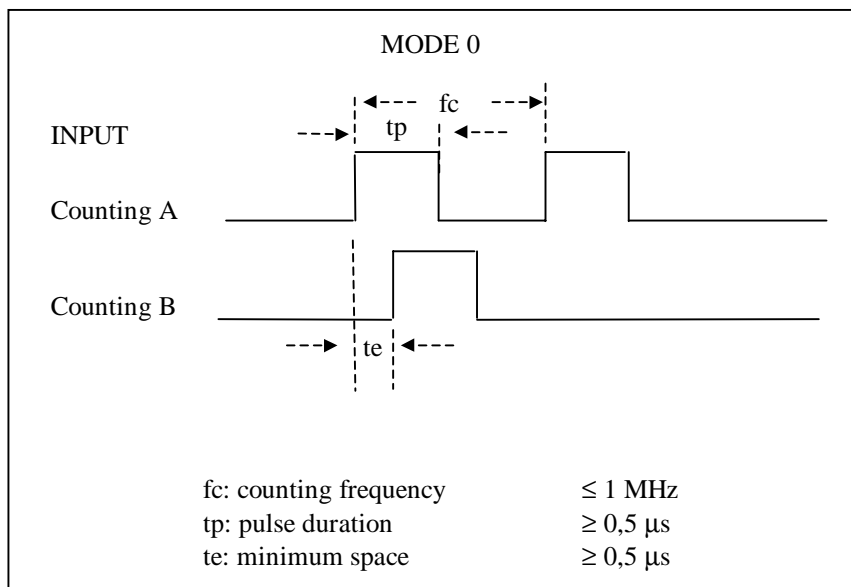
The processor unit can operate in 4 different modes. The programming of the modes is set according parameterization via software AL-3865 ProfiTool or PROFIBUS configuration tool according master of the net.

- Mode 0

The positive pulse is applied in channel A that increment the value on counter (one step). The channel B produces one decrement on counter.

If it is necessary only unidirectional counter one channel must be use and the other one must be opened or grounded.

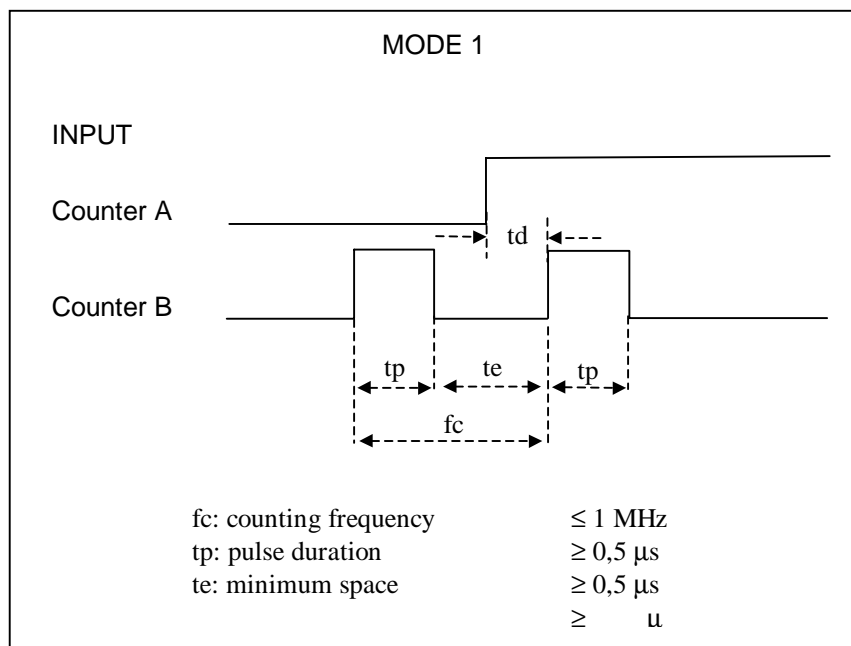
The following graph shows the frequency limits (considering filters disable).



- Mode 1

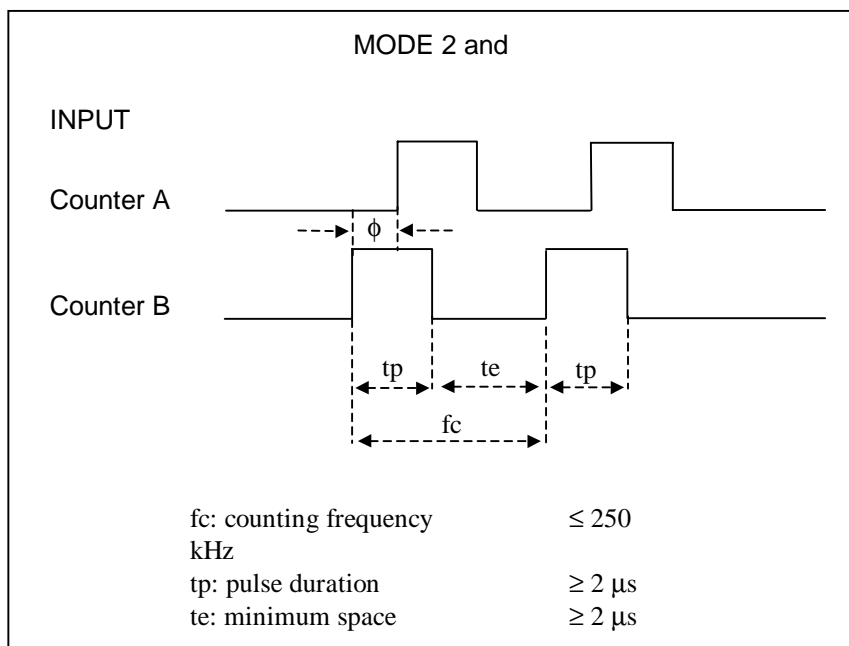
The count pulse must be applied on channel B and direction is applied on channel A. Logic level 1 indicates increase and level 0 indicates decrease.

The following graph shows the frequency limits (considering filters disable).



- Mode 2 and 3

These modes identify quadruple input signals according standards that are usually used by optical position transducers. The direction of counting is obtained according the phase relation between inputs and the counting pulses are related to transitions. Mode 2 generates 4 pulses per period from input signal (x 4). Mode 3 generates 2 pulses per period from input signal (x 2). The following graph shows the frequency limits (considering filters disable).



Outputs

The high speed counter module has 4 transistor outputs (source type) T0, T1, T2 and T3.

The output can be associated to counter according parameterization, respecting the following conditions.

- T0 output is associated to Counter 0 or Counter 1.
- T1 output is associated to Counter 0 or Counter 1.
- T2 output is associated to Counter 2 or Counter 3.
- T3 output is associated to Counter 2 or Counter 3.

Also it is possible to define the output behavior (parameterization). The output can assume the following functionality.

- Output active when COUNTER > COMPARE 1
- Output active when COUNTER < COMPARE 2
- Output active when COMPARE 1 < COUNTER < COMPARE 2
- 2 ms pulse when COUNTER = COMPARE 1

Note:

The outputs must be active to promptly work. It is necessary to activate bit 6 from control operand to enable the outputs. If this bit stay in logic level 0 the outputs will remain disable.

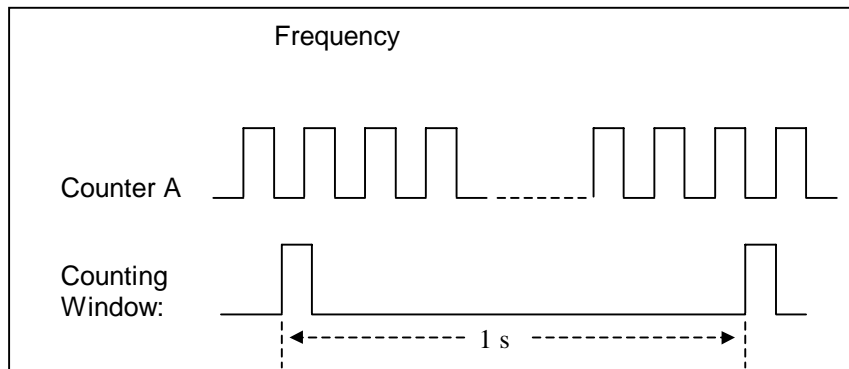
Frequency Measurement Mode

On frequency measurement mode the signal input will work according the other modes describe previously. The difference will be the no consideration of counting direction (up or down).

This mode will open a window with 1s and during this time will sum the received pulses. When the window is finished the value is copied to HOLD register and a new cycle is started. The result of the frequency measurement will be saved in HOLD register (Hz units) and it will be actualized each second.

The minimum frequency counting is 1 Hz. Eventually the frequency signal with less than 1 Hz can produce 1 unit (count).

It is recommend the period measurement mode to count low frequency signals (range of 10Hz).



Period Measurement Mode

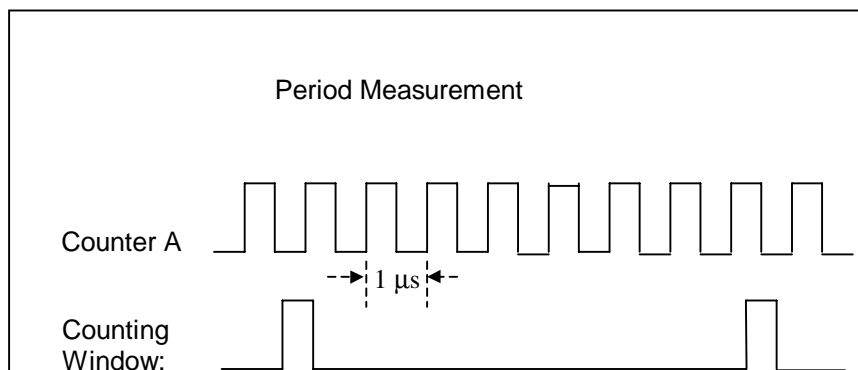
On period measurement mode the signal input will work according the other modes describe previously. The difference will be the no consideration of counting direction (up or down).

This mode uses a base with $1\mu\text{s}$. When the counter receives the pulse it started a counting window and the time increment is started. When the second pulse is received the counting is finished and the value will be copy to HOLD register.

The period value is presented in HOLD register directly in microseconds.

The measurement can present a variation with 1 unit when the input signal is neat to $1\mu\text{s}$. Signals between 700 ns and 900 ns (out of range values) can cause bas lectures in measurement.

Each 4s the period measurement is started. This situation will limit the measurement value.



Counting Modes and Measurement Modes

The frequency and period measurement mode use the signals processed by the counting modes. This operation allows the measurement of optical encoder or other devices

It is important to consider the measure signal and the counting mode, because the obtained result can be different from the expected result.

Important considerations:

- The direction on frequency and period mode is not considered. The change of direction can provoke different measurement. It is highly recommend the use of mode 0 or mode 1. The B counter must be use only for counting.
- The counting modes 2 and 3 generate 4 and 2 pulses each quadruple signal cycle. This operation will decrease 4 or 2 times the period measure and the frequency measure too.
- The duty cycle on counting modes 2 and 3 can change the measure value.

Parameterization

The PO7091 module is configure via software through CPU or fieldbus head. MasterTool software (Altus CPUs) or the software that configures the master of the bus makes the parameterization. For further details see Ponto Series Utilization Manual, MasterTool User's Manual and Interfaces and Fieldbus Head Manuals. The parameterization most of case present a user friendly interface. The following tables show the binary codes just for reference.

ATTENTION

The PO7091 module is supported by MasterTool version V3.70 or greater.

Parameters Bytes

The module parameterization is defined in 10 bytes. The first two bytes defines general options of the modules, the last ones define characteristics of each counter.

Byte	Parameters
0	General
1	General
2	Counter 0
3	Counter 0
4	Counter 1
5	Counter 1
6	Counter 2
7	Counter 2
8	Counter 3
9	Counter 3

Byte 0 – General								Description
7	6	5	4	3	2	1	0	
				1	0	1	0	Number of parameter bytes (always 10).
0	0	0	1					Reserved (always 0001).

Byte 1 – General								Description
7	6	5	4	3	2	1	0	
							1	Reserved (always one).
				0	0	0		Reserved (always zero).
			0					Output T0 active by counter 0.
			1					Output T0 active by counter 1.
		0						Output T1 active by counter 0.
		1						Output T1 active by counter 1.
	0							Output T2 active by counter 2.
	1							Output T2 active by counter 3.
0								Output T3 active by counter 2.
1								Output T3 active by counter 3.

Byte 2 – Counter 0								Description
7	6	5	4	3	2	1	0	
						0	0	Pulses count mode.
						0	1	Frequency measurement mode.
						1	0	Period measurement mode.
						1	1	Reserved.
				0	0			Mode 0: A = count up, B = count down.
				0	1			Mode 1: A = up/down, B = select up/down.
				1	0			Mode 2: A / B quadruple, 4 counts / period.
				1	1			Mode 3: A / B quadruple, 2 counts / period.
		0	0					No filter on inputs.
		0	1					Input filter 2 μ s.
		1	0					Input filter 20 μ s.
		1	1					Input filter 200 μ s.
	0							After maximum count (MAX), COUNTER is set zero.
	1							After maximum count (MAX), COUNTER is set as MIN/PRS.
0								After minimum count (MIN/PRS), COUNTER is set zero.
1								After minimum count (MIN/PRS), COUNTER is set as MAX.

Byte 3 – Input 0 / Output 0								Description
7	6	5	4	3	2	1	0	
							0	Input I0 active on zero or falling edge
							1	Input I0 active on level 1 or edge
				0	0	0		Input I0 not enable
				0	0	1		Stop counting on active edge I0
				0	1	0		Reset counting on active edge I0
				0	1	1		Load value MIN/PRS on active edge I0
				1	0	0		Counting value saved on HOLD when active edge I0
				1	0	1		Counting value saved on HOLD and load counter with MIN/PRS when active edge I0
				1	1	0		Counting value saved on HOLD and load counter with MIN/PRS when active edge I0. Stop counting meanwhile I0 is active
				1	1	1		Reserved
			0					Reserved
0	0	0						Output disable
0	0	1						Output active when COUNTER > COMPARE 1
0	1	0						Output active when COUNTER < COMPARE 2
0	1	1						Output active when COMPARE 1 < COUNTER < COMPARE 2
1	0	0						2ms Pulse when COUNTER = COMPARE 1
1	0	1						Reserved
1	1	0						Reserved
1	1	1						Reserved

Programming

The PO7091 block data uses 24 words, 12 words transmitted to the module and 12 words received from module.

Word	Description
Word 0 / 1	Operand %I, data read from Counter 0
Word 2 / 3	Operand %I, data read from Counter 1
Word 4/5	Operand %I, data read from Counter 2
Word 6 / 7	Operand %I, data read from Counter 3
Word 8 / 9	Operand %I, data write on Counter 0
Word 10/11	Operand %I, data write on Counter 1
Word 12 / 13	Operand %I, data write on Counter 2
Word 14 / 15	Operand %I, data write on Counter 3
Word 16	Counter 0 Status
Word 17	Counter 1 Status
Word 18	Counter 2 Status
Word 19	Counter 3 Status
Word 20	Counter 0 Control
Word 21	Counter 1 Control
Word 22	Counter 2 Control
Word 23	Counter 3 Control

The 32 bits data transport values, instead status/control word that transfer information of module STATUS/CONTROL and identifies 32 bits data.

Write Operation in Counter Registers

The write operation occurs with values stored on write operands (words 8 to 15) and it is controlled by the respective control operand.

This operation must follow the following steps.

- Load the value to operand %I.
- Set the corresponding bit on control operand, according the desired register.
- Wait the operand write confirmation or error on operation (bit 15 from Status).
- Turn off the bit to write controlling.

ATTENTION

If the counter outputs are disable from communication menu from MasterTool the counting will be interrupt.

Control Word																Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
																Counter control byte
															0	No action
															1	Confirms information from reset
															0	No action
															1	Confirms Overflow / Underflow
															0	No action
															1	Confirms information from input I action
															0	No action
															1	No action
															0	No action
															1	Reset COUNTER
															0	No action
															1	Load MIN/PRS in COUNTER
															0	Output disable
															1	Output enable
															0	Count disable
															1	Count enable
																32 Bits data specification byte
															0	No action.
															1	Instantaneous value from counter.
															0	No action.
															1	Freeze value from counter.
															0	No action.
															1	Operand %I with value to write in MIN/PRS.
															0	No action
															1	Operand %I with value to write in MAX.
															0	No action.
															1	Operand %I with value to write in COUNTER.
															0	No action.
															1	Operand %I with value to write in COMPARE 1.
															0	No action.
															1	Operand %I with value to write in COMPARE 2.
															0	No action.
															1	No action.

Notes:

- If both register are selected or no one is select for reading operation the returned values will be COUNTER register.
- If more than one register is selected to write operation an error is presented on STATUS register and the operation is not concluded.
- The reset operations (bit 4 = 1) present priority over MIN/PRS load operation (bit 5 = 1) and write operations (bit 12 = 1).
- The MIN/PRS load operation (bit 5 = 1) presents priority over write operations (bit 12 = 1).

Status Word																Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
																Counter status
															0	COUNTER value different from zero.
															1	COUNTER value zero or cross zero.
															0	No Overflow / underflow.
															1	Overflow / underflow in COUNTER.
															0	No action.
															1	Active edge input I.
															0	COUNTER value positive.
															1	COUNTER value negative.
															0	COUNTER value bigger than COMPARE 1.
															1	COUNTER value COMPARE 1.
															0	COUNTER value less than COMPARE 2.
															1	COUNTER value equal or bigger tha COMPARE 2.
															0	T Output level 0.
															1	T Output level 1.
															0	I Input level 0.
															1	I Input level 1.
																32 Bits data specification byte
															0	No action.
															1	Operand %I with COUNTER value.
															0	No action.
															1	Operand %I with HOLD value.
															0	No action.
															1	Operand %I with value to write in MIN/PRS.
															0	No action
															1	Operand %I with value to write in MAX.
															0	No action.
															1	Operand %I with value to write in COUNTER.
															0	No action.
															1	Operand %I with value to write in COMPARE 1.
															0	No action.
															1	Operand %I with value to write in COMPARE 2.
0																Well succeed write operation.
1																Write operation error.

Diagnostic

Diagnostic Byte

The PO7079 present one byte for diagnostic. The first byte indicates genral aspects about the module and the other indicates parameterization failure.

The diagnostics bits are described according the following table.

Byte	Diagnostic
0	General

Byte 0 – General								PROFIBUS Message Code	Description
7	6	5	4	3	2	1	0		
					0	0	0	-	Always zero
				0				-	Correct parameterization
				1				31	No parameterized module. Counter value out of range.
			0					-	Always zero.
		0						-	Normal outputs.
		1						01	Outputs short-circuited.
	0							-	Normal external voltage.
	1							02	External voltage under 19 Vdc.
0								-	Always zero

Diagnostic LED

The diagnostic LEDs indicates the following situations.

LED DG	Description	Causes
Off	Module without power supply.	Power supply not connected Damage module.
On	Normal operation.	
Blinking 1X	Module not accessed or logic failure.	Misplace module. Module not declared. Damage module.
Blinking 2X	Outputs short-circuited.	Outputs short-circuited.
Blinking 3X	Low external power supply.	External voltage under 19 Vdc.
Blinking 4X	Module without parameterization or counter out of range.	Damage module. Noise level exceeds specification. Misplace module. Wrong parameterization. Counting value out of range (defined by MIN and MAX).

ATTENTION

In case of power supply missing the PO7079 can not communicate to CPU or fieldbus head. Also can not signalize by LED DG.

Installations that use different power supplies for CPU/fieldbus head and the PO7079 module can generate problems when the consistence start is enable.

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
MU299040	MT6000 Utilization Manual - MasterTool ProPonto
MU209503	PO5063 Utilization Manual – PROFIBUS Head
MU299601	MasterTool Programming User's Manual