I/O expansions for pCO

Contents:

pCOB, pCO2, pCO1 and pCOC I/O expansions

Introduction

The term “I/O expansion” refers to a programmable controller used, in the simplest case, to increase the number of inputs/outputs available. If necessary, the I/O expansions can also be loaded with suitable software.

In general, an I/O expansion for pCO* may be any controller that satisfies the following requirements:

1) it communicates via the Carel RS485 supervisor protocol;
2) it communicates at a speed of 19200 baud;
3) it sends/receives the status of the inputs/outputs using the coding illustrated in Table 1 below.

There can be a maximum number of 5 expansion boards for each pCO* board.
The following programmable controllers can be used as I/O expansions, that is, “Slaves”:

- pCO^B standard (any model);
- pCO^B expansion (code PCOBCP0A21);
- pCO^2 (any model): only if the pCO^2 master was manufactured after December 2001;
- pCO^1/pCO^C(any model): only if the pCO^2 master was manufactured after December 2001;

The pCO^2 application software must be suitably configured in order to use the I/O expansion boards.

The pCO^2 and the expansions communicate via the Carel RS485 supervisor protocol.

Initially, the pCO^2 and the expansion were able to send/receive:

- maximum 8 analogue inputs;
- maximum 18 digital inputs;
- maximum 2 analogue outputs;
- maximum 18 digital outputs;
- maximum 40 general integer variables, called “configuration variables”. These can be used by the expansion software to modify the operation of the software itself (the expansion software must be designed to able to do this).

Starting from Bios version 3.33, the maximum number of analogue inputs/outputs managed was increased to:

- maximum 10 analogue inputs;
- maximum 6 analogue outputs;

corresponding to the number of inputs/outputs on a pCO^2 large board.
The following sections refer to these maximum values.

Connections

The following are the possible connection alternatives for the I/O expansions:

- from pCO^2 (LARGE) connector J23 to pCO^2 connector J10/J11 (display/pLAN connector);
- from pCO^2 (LARGE) connector J23 to pCO^2 via RS485 serial card;
- from pCO^2 (LARGE) connector J23 to pCO^B connector J11/J19 (display/pLAN connector);
- from pCO^2 (LARGE) connector J23 to pCO^B via RS485 serial card;
- from pCO^2 (LARGE) connector J23 to pCO^1/pCO^C connector J10/J11 (display/pLAN connector);
- from pCO^2 (LARGE) connector J23 to pCO^1/pCO^C via RS485 serial card;
- for the pCO^2 Master, connector J10/J11 (display/pLAN connector) can be used as an alternative to connector J23.
  In this case, the pLAN and the external terminal cannot be used.
  The pCO^2 must obviously have the built-in display.
- If using connector J10/J11, the following I/O expansions can be used:
  - pCO^B, pCO^B expansion, if the version of the BIOS of the pCO^2 is 2.34 or lower;
  - pCO^B, pCO^B expansion, pCO^2, pCO^1/pCO^C if the version of the BIOS of the pCO^2 is higher than 2.34.
- If using connector J23, the following I/O expansions can be used:
  - pCO^B, pCO^B expansion, if the production date of the pCO^2 is before December 2001;
  - pCO, pCO expansion, pCO^2, pCO^1 if the production date of the pCO^2 is after December 2001.

Even if not economically convenient, a pCO^2 LARGE can be used at the same time as both an expansion for another pCO^2 Master and a master for other expansions.

Features of the application SW on the pCO² Master

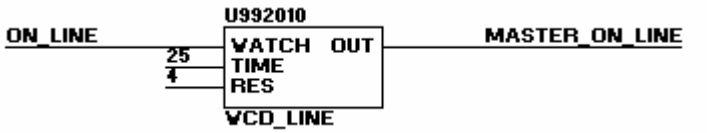
The following features are required for the software on the Master controller:

- Read/write the inputs/outputs on the expansions using the atoms **Ain**/ **Din**/ **Aout**/ **Dout**.
  The value of *Ch* to be used for the above atoms is: *Ch* = Channel no. + 100 * Expansion no.
  Example: to read digital input no.2 on expansion no.5, use a **Din** atom with *Ch* = 2 + 100 * 5 = 502.
- Send the configuration variables using **Aout** atoms with a value of *Ch* between (11 + 100 * Expansion no.) and (50 + 100 * Expansion no.).
- Select the protocol for the serial output.
  If using connector J10/11 (display/pLAN connector), the variable SERIAL0_PROTOCOL must be set to 7 (expansion protocol). Using connector J23 no special configuration is required.
- The application knows if the expansions are "online" using the system variables EXP_BOARD_TYPE1,…, EXP_BOARD_TYPE5.
  - EXP_BOARD_TYPEn=0 → expansion number n is not online
  - EXP_BOARD_TYPEn=149 → expansion number n is online. The expansion is a standard pCO^B controller.
  - EXP_BOARD_TYPEn=150 → expansion number n is online. The expansion is a pCO^B expansion.
  - EXP_BOARD_TYPEn=249 → expansion number n is online. The expansion is a pCO² or pCO^1/pCO^C controller.
- The version of the Bios must be 2.32 or higher.
- The version of EasyTools (WinMask and WinCad) must be November 2001 or later.

Features of the application SW on the expansion

The I/O expansion communicates with the pCO² Master via the supervisor protocol, and therefore the pCO² Master in considered as a supervisor to all effects; consequently, the expansion, which acts as a Slave, can only be queried by the Master. A precise relationship has been established between the value of the *Ch* pin for the atoms **Ain**/ **Din**/ **Aout**/ **Dout** on the pCO² Master and the value of the *Ind* pin for the atoms **Rain**/ **Rdin**/ **Raout**/ **Rdout** on the Slave expansion.
The software features are yet to be implemented in the application on the Slave expansions:

- The application on the expansion knows whether the pCO² Master is connected using the system variable ON_LINE, which must be managed by the application, for example as shown in the figure:



- The address of the expansion is defined by the system variable IDENT.
  Given that normally an expansion does not have a display, IDENT must be defined in another way, for example:
  - by reading the status of some digital inputs (e.g. ID1 closed → IDENT = 1, ID2 closed → IDENT = 2, etc.);
  - by reading the value of a special analogue input (e.g. 0°C ≤ B1 < 20°C → IDENT = 1, 20°C ≤ B1 < 40°C → IDENT = 2, etc.);

- by assigning IDENT a constant value (in this way, however, each expansion requires different software);
- by reading the value of the dipswitches using the system variable NET_ADDRESS and assigning this value to IDENT. Note: the address set using the dipswitches for the expansions is not a pLAN address, but simply an identifier of the expansion number.

- If the expansion is a pCO^2, a pCO^1 or a pCO^C and connector J10/J11 is used, the variable SERIAL0_PROTOCOL must be set to 1 (supervisor protocol for Slave expansion).
  In this case, for the pCO^2, pCO^1 and pCO^C expansions, the system variable IDENT is automatically assigned the number set using the dipswitches (pCO^2) or the terminal (pCO^1 and pCO^C), while the system variable INI_BAUD_SPV, which defines the communication speed, is automatically set to 4, corresponding to 19200 baud.
- The expansion sends/receives the status of the inputs/outputs to the pCO² Master, according to the following coding:

Application installed on the pCO² Master controller		Application installed on the I/O expansion	
Atom	I/O channel (*Ch* pin) (*)	Atom	Index (*Ind* pin)
Ain	X01	**Raout**	1
Ain	X02	**Raout**	2
Ain	X03	**Raout**	3
Ain	X04	**Raout**	4
Ain	X05	**Raout**	5
……..	…….	…….	……
……..	…….	…….	……
Ain	X10	**Raout**	10
Aout	X01	**Rainnm**, **Raout**	13
Aout	X02	**Rainnm**, **Raout**	14
Aout	X03	**Rainnm**, **Raout**	15
Aout	X04	**Rainnm**, **Raout**	16
Aout	X05	**Rainnm**, **Raout**	17
Aout	X06	**Rainnm**, **Raout**	18
Din	X01	**Rdout**	1
Din	X02	**Rdout**	2
Din	X03	**Rdout**	3
Din	X04	**Rdout**	4
Din	X05	**Rdout**	5
……..	…….	…….	……
……..	…….	…….	……
Din	X18	**Rdout**	18
Dout	X01	**Rdinnm**, **Rdout**	21
Dout	X02	**Rdinnm**, **Rdout**	22
Dout	X03	**Rdinnm**, **Rdout**	23
Dout	X04	**Rdinnm**, **Rdout**	24
Dout	X05	**Rdinnm**, **Rdout**	25
Dout	X06	**Rdinnm**, **Rdout**	26
……..	…….	…….	……
……..	…….	…….	……
Dout	X18	**Rdinnm**, **Rdout**	38

Aout	X11	**Riinnm**, **Riout**	1
Aout	X12	**Riinnm**, **Riout**	2
Aout	X13	**Riinnm**, **Riout**	3
Aout	X14	**Riinnm**, **Riout**	4
Aout	X15	**Riinnm**, **Riout**	5
……..	…….	…….	……
……..	…….	…….	……
Aout	X50	**Riinnm**, **Riout**	40

Table 1. Coding of the inputs and outputs.

(*): "X"= expansion number, from 1 to 5.

Example:
to control relay number 2 on expansion number 5, the software on the pCO² Master must include a **Dout** atom with *Ch* = 502, while the software on the expansion controller must include an **Rdinnm** atom with *Ind* = 22. The output of this **Rdinnm** atom is connected to the input of a **Dout** atom with *Ch* = 2.

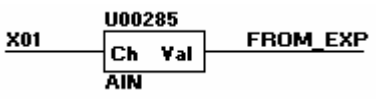
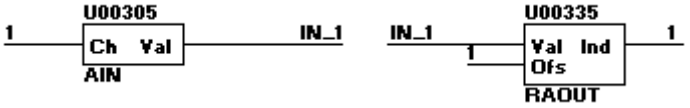
- The **R*innm** atoms must be accompanied by an **R*out** atom having the same inputs/outputs.
- When a controller works as an expansion, the following functions cannot be used:
  - supervisor (given that the **R*in**/ **R*out** atoms are used to communicate with the expansions);
  - pLAN, if the display/pLAN connector J11/J19 (pCO) or J10/J11 (pCO^2, pCO^1, pCO^C) is used.

NOTE: If the expansion is a pCO², in order to correctly manage the analogue inputs, the pCO² Master must inform the expansion of the type of probe (*Type* pin in the **Ainpco2** atom). This value must be a constant or alternatively can be sent by the pCO² to the expansion as a configuration variable.

Examples

Analogue input expansion

The figure shows an example of the software to be configured on the Master and on the Expansion:

MASTER	EXPANSION
	

Master

Use the **Ain** atom to read the value sent by the expansion, setting the value $Ch_{AinMaster}$ = X * 100 + $Ch_{AinExpansion}$ for the *Ch* pin, where X = number of the expansion that the analogue input is read from (range: 1 to 5).

NOTE: the **Ainpco2** atom cannot be used.

Expansion

Use the **Ain** or **Ainpco2** atom (depending on the hardware) to read the input.

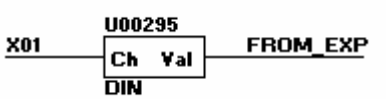
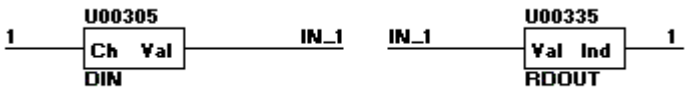
Use the **Raout** atom to send the value to the master, setting the *Ind* pin to the same value used for *Ch* in the **Ain** atom (or **Ainpco2**, depending on the hardware) used on the expansion to read the input:

Ch_{Ain} = number of the analogue input;

Ind_{Raout} = address of the variable sent to the master (range: 1 to 10).

Digital input expansion

The figure shows an example of the software to be configured on the Master and on the Expansion:

MASTER	EXPANSION
	

Master

Use the **Din** atom to read the value sent by the expansion, setting the value $Ch_{DinMaster}$ = X * 100 + $Ch_{DinExpansion}$ for the *Ch* pin, where X = number of the expansion that the digital input is read from (range: 1 to 5).

Expansion

Use the **Din** atom to read the digital input.

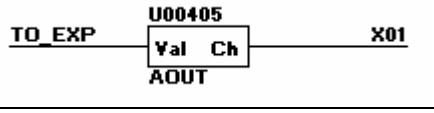
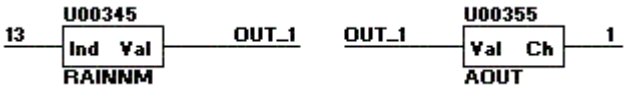
Use the **Rdout** atom to send the value to the master, setting the *Ind* pin to the same value used for *Ch* in the **Din** atom on the expansion used to read the input:

Ch_{Din} = number of the digital input;

Ind_{Rdout} = address of the variable sent to the master (range: 1 to 18).

Analogue output expansion

The figure shows an example of the software to be configured on the Master and on the Expansion:

MASTER	EXPANSION
	

Master

Use the **Aout** atom to send the value to the expansion, setting the *Ch* pin to the value $Ch_{AoutMaster}$ = X * 100 + $Ch_{AoutExpansion}$, where X = number of the expansion that the analogue output is sent to (range: 1 to 5).

Expansion

Use the **Aout** atom to set the analogue output.

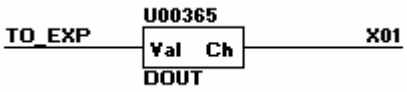
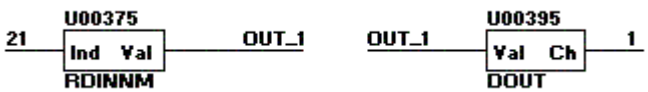
Use the **Rainnm** atom to receive the value from the master, setting the *Ind* pin to the same value used for the *Ch* pin in the **Aout** atom on the expansion used to set the output, plus the offset 12:

Ch_{Aout} = number of the analogue output (range: 1 to 6)

Ind_{Rainnm} = $Ch_{AoutExpansion}$ + 12

Digital output expansion

The figure shows an example of the software to be configured on the Master and on the Expansion:

MASTER	EXPANSION
	

Master

Use the **Dout** atom to send the value to the expansion, setting the *Ch* pin to the value $Ch_{DoutMaster}$ = X * 100 + $Ch_{DoutExpansion}$, where X = number of the expansion that the digital output is sent to (range: 1 to 5).

Expansion

Use the **Dout** atom to set the digital output.

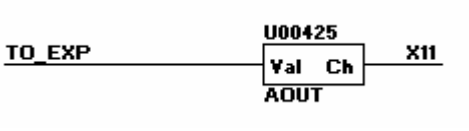
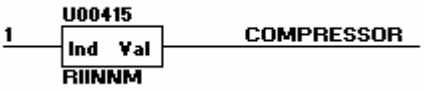
Use the **Rdinnm** atom to receive the value from the master, setting the *Ind* pin to the same value used for the *Ch* pin in the **Dout** atom on the expansion used to set the output, plus the offset 20:

Ch_{Dout} = address of the analogue output (range: 1 to 18)

Ind_{Rdinnm} = $Ch_{DoutExpansion}$ +20

Configuration variables

The figure shows an example of the software to be configured on the Master and on the Expansion:

MASTER	EXPANSION
	

Master

Use the **Aout** atom to send the value to the expansion, setting the *Ch* pin to the value $Ch_{AoutMaster}$ = X * 100 + Y, where X = number of the expansion that the configuration variable is sent to (range: 1 to 5), Y = index of the configuration variable (range: 11 to 50).

Expansion

Use the **Riinnm** atom, setting the *Ind* pin to the value:
$Ind_{Riinnm} = (Ch_{Aout} – X*100) – 10$.

Note

The expansion may have response times that vary significantly, according to the size of the software resident in the expansion, the number and type of variables that are send by the expansion to the master, and the processes being run at that moment by the Master.
The variables are sent from the master to an expansion practically instantly.
It is not recommended to connect inputs defined as “critical” to the expansion, such as thermal overloads or high pressure switches.
The same is also valid for the outputs that must observe strict times, such as a part-winding or the modulating relay for the Bitter screw compressors.

pCOE RS485 and tLAN I/O expansions

Introduction

The pCOE expansions do not require software onboard, as they communicate according to a predefined table.

tLAN expansions

The tLAN expansions can be connected directly to a pCOxs or pCO1 tLAN using the serial connection card (code PCO100TLN0).
A maximum of 5 expansions can be connected.

The tLAN must be configured with the following system variables:

- SERIAL2_PROTOCOL set to 20
- INI_BAUD_SPV_2 (0-4) set to 4 (19200).

In addition, the system variable SLAVE_CONFIGURATION must be used to define which expansions should be queried. Not setting this variable is the same as checking all 5 addresses available for the expansions. It is in any case recommended to configure the exact number of expansions connected, so as to significantly reduce the response times.
In this variable, the bits from 1 to 5 indicate the respective expansions to be queried.
For example, setting bit 1 of this variable and leaving the others at 0 means only the expansion address 1 will be queried.

RS485 expansions

The RS485 expansions must be connected to terminal J23 on a pCO2 large with production date after December 2001.
They can also be connected to the serial port reserved for the pLAN or the shared terminal, by setting the system variable SERIAL0_PROTOCOL to 7.
These decisions are mutually exclusive (only one of the two is possible).
In the first case, no variable needs to be set.
A maximum of 5 expansions can be connected, however, unlike the tLAN, there is no variable that indicates which ones to query. The pCO2 will always query all 5 addresses.

General information

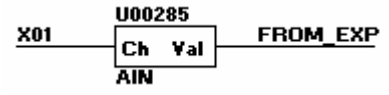
(See the configuration on page 3)
To check if an expansion is online, simply check the corresponding read-only system variable EXP_BOARD_TYPE1..2..3..4..5 (where 1, 2, 3, 4, 5 identify the addresses of the expansions).
If one of these variables is 0, the corresponding expansion is off-line.

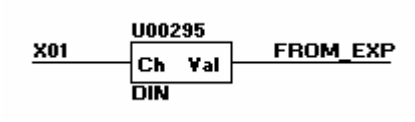
Both the expansions have the following I/O available:

- 4 digital inputs
- 4 digital outputs
- 4 analogue inputs
- 1 analogue output

How to read a variable from the expansion

The digital/analogue variables are read in the same way from a RS485 and tLAN expansion.
To read a variable, simply use the AIN atom (in the case of analogue or integer variables) and the DIN atom (in the case of digital variables), as for the expansions using pCOX controllers.



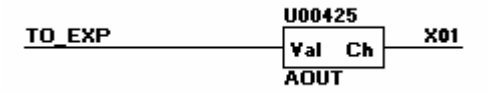


The output value Val will be the variable read from the expansion.
The number set for Ch will be set in a similar way as described for expansions with pCOX boards.

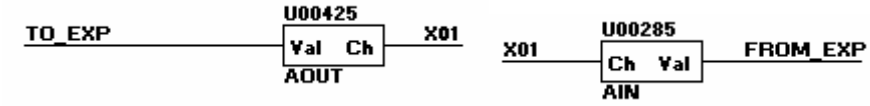
How to send a variable to the expansion

The variables are sent to the expansion in a different way for the RS485 and tLAN.
The addresses of the variables (obviously only with write access) are also different. In addition, the configuration of a variable on an RS485 expansion will only involve them being sent using the DOUT or AOUT atoms, while on a tLAN expansion they are sent with DOUT or AOUT and received as confirmation with DIN or AIN at the same address.

In the example below, an analogue variable is sent to a RS485 and tLAN expansion respectively.



In this case, the operation is similar to that with pCOX expansions.



In this case, however, a check is performed that the data written to the expansion was successfully received.
Both the write/read atoms with the same address need to be used for correct communication.

Integer configuration variables

Le variabili di configurazione permettono di impostare dei parametri all'interno della espansione come il tipo di sonda analogica utilizzata (NTC, 0-5 V, 4-20 mA).
Le variabili di configurazione possono non essere usate dall'applicativo; in questo caso l'espansione pCOe utilizza i valori di default .
Se l'applicativo utilizza le variabili di configurazione bisognerà accertarsi che queste rientrino nel range valido.

Descrizione	**R/W**	**Indirizzo RS485**	**Indirizzo tLAN**	**Range**	**Default**
Costante di tempo per filtraggio sonda 1	R/W	AOUT x11	AOUT x50 / AIN x50	0÷15	8
Costante di tempo per filtraggio sonda 2	R/W	AOUT x12	AOUT x51 / AIN x51	0÷15	8
Costante di tempo per filtraggio sonda 3	R/W	AOUT x13	AOUT x52 / AIN x52	0÷15	8
Costante di tempo per filtraggio sonda 4	R/W	AOUT x14	AOUT x53 / AIN x53	0÷15	8
Type of analog inputs 1 e 2	R/W	AOUT x15	AOUT x54 / AIN x54	0-2-4-6 See table	0
Type of analog inputs 3 e 4	R/W	AOUT x16	AOUT x55 / AIN x55	0-2-4-6 See table	0
Matrice d'inibizione delle uscite digitali in funzione degli ingressi digitali	R/W	AOUT x17	AOUT x56 / AIN x56	-32767÷ 32767	0
Matrice d'inibizione delle uscite digitali in funzione dell'ingresso analogico selezionato	R/W	AOUT x18	AOUT x57 / AIN x57	0÷15	0
Ritardo attivazione matrice d'inibizione da ingressi digitali (s)	R/W	AOUT x19	AOUT x58 / AIN x58	0÷65535	0
Ritardo attivazione matrice d'inibizione da ingresso analogico (s)	R/W	AOUT x20	AOUT x59 / AIN x59	0÷65535	0
Selezione analogica interessata all'attivazione della matrice	R/W	AOUT x21	AOUT x60 / AIN x60	1-2-3-4	1
Pattern dell'uscita analogica e delle 4 uscite digitali in caso di mancanza comunicazione per oltre 30 secondi	R/W	AOUT x22	AOUT x61 / AIN x61	0÷255 v. tabella	144

Where x represents the number of the expansion to be communicated with, from 1 to 5.

Type of analogue inputs
This selection is similar to the “Ain_pco2” atom when configuring an analogue probe for a pCO.

The possible values are:

0	NTC probe
2	0-1V probe
4	0-20mA probe
6	0-5V probe

Pattern dell'uscita analogica e delle 4 uscite digitali
Permette di stabilire lo stato delle uscite in assenza di comunicazione per oltre 30 secondi.

Bit	7	6	5	4	3	2	1	0
Significato	*Enable aout*	Pattern Aout 1	Pattern Aout 0	*Enable Relè*	Relè 4	Relè 3	Relè 2	Relè 1

L'abilitazione del pattern per le uscite digitali è il bit “4”:

0 = pattern non abilitato

1 = pattern abilitato

Il pattern per le uscite digitali prevede la configurazione dei bit da “0” a “3” secondo i seguenti significati:

0 = relè spento

1 = relè acceso

L'abilitazione del pattern per l' uscita analogica è il bit “7”:

0 = pattern non abilitato

1 = pattern abilitato

Il pattern per l’uscita analogica prevede la configurazione dei bit “5” e “6” come da seguente tabella:

Bit 6	**Bit 5**	**Valore uscita analogica**
0	0	**0v**
1	1	
0	1	**5v**
1	0	**10v**

Digital variables

Description	R/W	RS485 address	TLAN address
Status of input 1	R	DIN x01	DIN x01
Status of input 2	R	DIN x02	DIN x02
Status of input 3	R	DIN x03	DIN x03
Status of input 4	R	DIN x04	DIN x04
Status of output (relay) 1	R	DIN x05	DIN x05
Status of output (relay) 2	R	DIN x06	DIN x06
Status of output (relay) 3	R	DIN x07	DIN x07
Status of output (relay) 4	R	DIN x08	DIN x08
I/O mismatch alarm (no confirmation of output pattern for 10 s)	R	DIN x09	DIN x09
Control output (relay) 1	R/W	DOUT x01	DOUT x10 / DIN x10
Control output (relay) 2	R/W	DOUT x02	DOUT x11 / DIN x11
Control output (relay) 3	R/W	DOUT x03	DOUT x12 / DIN x12
Control output (relay) 4	R/W	DOUT x04	DOUT x13 / DIN x13
Abilitazione della matrice su fronte apertura (“0”) o chiusura (“1”) degli ingressi digitali	R/W	DOUT x05	DOUT x14 / DIN x14
Abilitazione della matrice analogica sopra (“0”) o sotto (“1”) la soglia impostata	R/W	DOUT x06	DOUT x15 / DIN x15

Where x represents the number of the expansion to be communicated with, from 1 to 5.

Analogue variables

Description	R/W	RS485 address	TLAN address
Value of analogue probe 1	R	AIN x01	AIN x01
Value of analogue probe 2	R	AIN x02	AIN x02
Value of analogue probe 3	R	AIN x03	AIN x03
Value of analogue probe 4	R	AIN x04	AIN x04
Set analogue output value	R/W	AOUT x01	AOUT x05 / AIN x05
Pattern activation threshold	R/W	AOUT x01	AOUT x06 / AIN x06

Where x represents the number of the expansion to be communicated with, from 1 to 5.

Using the disabling patterns

Le matrici di inibizione permettono di forzare al valore “0” una o più uscite digitali. Gli effetti delle due matrici di inibizione si sovrappongono.
Se, a matrici attive, subentra l'allarme di OFF-LINE, l'eventuale pattern di allarme delle uscite digitali è prioritario rispetto alle matrici di inibizione.

Pattern according to of the digital inputs.

This function is used to set one or more digital outputs to “0” according to the status of the predefined digital inputs on the expansion.

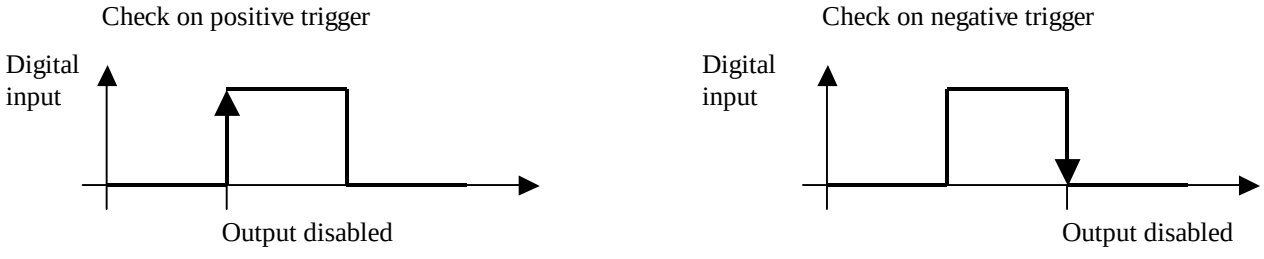
1) First of all, the inputs to be checked for each output need to be set, configuring the variable “Pattern for disabling the digital outputs according to the digital inputs” (integer).
This is a 16-bit variable in which each bit is used to check the status of a digital input so as to disable a determined output.
Bit “0” to bit “3” are used to control input 4, bit “4” to bit “7” input 3, and so on.

Nella tabella sono visualizzati per ciascun bit (da “0” a “15”) i rispettivi ingressi/uscite digitali:

Bit	*15*	*14*	*13*	*12*	*11*	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	*0*
Ing. Dig.	**1**				**2**				**3**				**4**			
Relè	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

La variabile si compone secondo quanto segue:
0 = relè non considerato
1 = relè spento

2) The configure the variable “Enable the pattern on opening (“0”) or closing (“1”) the digital inputs” (digital).
The value “0” means the check is performed on a positive trigger (that is, when the selected inputs switch from logical status “0” to “1”), while the value “1” means the check is performed on a negative trigger (that is, when the selected inputs switch from logical status “1” to “0”).



3) Finally, the time must be set for the “Delay in the activation of the disabling pattern from digital inputs (s)” (integer).

Pattern according to the analogue inputs.

This function is used to set one or more digital outputs to "0" according to the status of the predefined analogue input on the expansion.

1) First of all "Select the analogue input for the activation of the pattern" (integer).

The table below shows the possible values for this variable:

1	Set probe 1
2	Set probe 2
3	Set probe 3
4	Set probe 4

2) Then select the digital outputs to be affected by the pattern, setting the bits (from "0" to "3") of the variable "Pattern for disabling the digital outputs according to the analogue input selected" (integer).

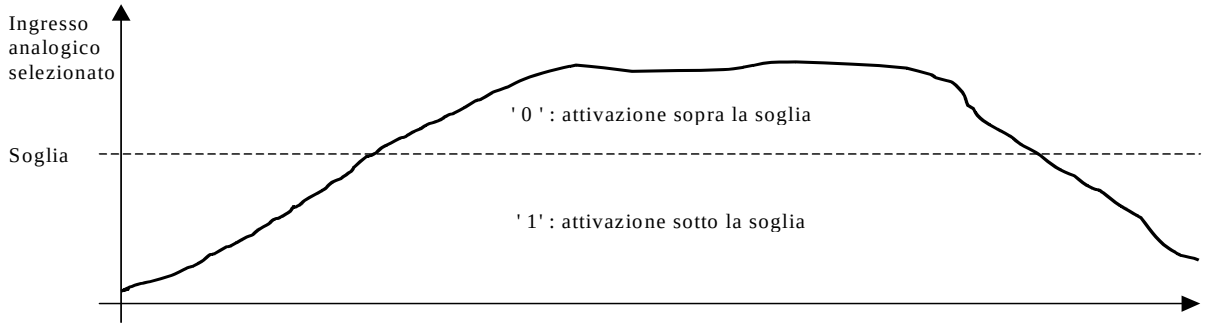
Nella tabella sono visualizzati per ciascun bit (da "0" a "3") i rispettivi ingressi/uscite digitali:

Bit	**3**	**2**	**1**	**0**
Relè spento	**Relè 4**	**Relè 3**	**Relè 2**	**Relè 1**

La variabile si compone secondo quanto segue:
0 = relè non considerato
1 = relè spento

3) Once having selected the probe to be checked and the outputs that the pattern will act on, set the "Pattern activation threshold" (analogue).

4) The variable "Enable the pattern when crossing the threshold from low to high (0) or vice-versa (1)" (digital) defines whether the pattern is activated when the value of analogue input selected exceeds ("0") or falls below the threshold ("1").



5) Finally, set the time for the "Delay in the activation of the disabling pattern from analogue input (s)" (integer).

Significato dei LED di segnalazione

I significati dei LED esposti nella tabella seguente sono

LED rosso	LED giallo	LED verde	significato
-	-	acceso	comunicazione attiva.
-	acceso	-	errore sonde.
acceso	-	-	errore di "I/O mismatch" da più di 10 sec., causato dalle matrici di inibizione.
lampeggiante	-	-	mancanza di comunicazione da più di 30 secondi (prioritario rispetto a errore di "I/O mismatch")
-	-	-	attesa di inizializzazione da parte del master.