Operation and maintenance instructions for Series PRE Electronic proportional regulator – IO-Link version

CE	*Made in Italy*

The products are designed and manufactured in conformity with the following directives:

- 2014/30/UE "Electromagnetic compatibility"

They also comply partially or totally with regard to the applicable parts of the following standards:

- EN 61000-6-2:2005 Electromagnetic compatibility (EMC) — Part 6-2:
  Generic standards - Immunity for industrial environments
- EN 61000-6-4:2007 Electromagnetic compatibility (EMC) — Part 6-4: Generic standards - Emissions for industrial environments
- UL 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements and the following technical standards

and to the following technical standards:

- EN ISO 4414:2010 Pneumatics - General rules and safety requirements for systems and their components.

For more information regarding the declarations of conformity, see the Certifications section

on the website **http://catalogue.camozzi.com.**

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	Operation and maintenance instructions	5000030186
CAMOZZI Automation	**Series PRE proportional pressure regulator**	
	IO-Link version	Ver. 06

1. Product identification

	Conversion table for the production date.	86-1400-0001 Rev. D
CAMOZZI		Leaf 02 / 02

Position 1 and 2: n° of the week.

01	14	27	40
02	15	28	41
03	16	29	42
04	17	30	43
05	18	31	44
06	19	32	45
07	20	33	46
08	21	34	47
09	22	35	48
10	23	36	49
11	24	37	50
12	25	38	51
13	26	39	52

Position 3: One letter for the present Year.

A		1996	2021	2046
B		1997	2022	2047
C		1998	2023	2048
D		1999	2024	2049
E		2000	2025	2050
F		2001	2026	2051
G		2002	2027	2052
H		2003	2028	2053
I		2004	2029	2054
K		2005	2030	2055
L		2006	2031	2056
M		2007	2032	2057
N		2008	2033	2058
O		2009	2034	2059
P		2010	2035	2060
Q		2011	2036	2061
R		2012	2037	2062
S	1988	2013	2038	2063
T	1989	2014	2039	2064
U	1990	2015	2040	2065
V	1991	2016	2041	2066
W	1992	2017	2042	2067
X	1993	2018	2043	2068
Y	1994	2019	2044	2069
Z	1995	2020	2045	2070

Example of composition.

03P

Description:

03	Week n° 03
P	Year 2010

Managing authority: **Industrial Engineering**	Date: **9 April 2010**	Created by: **Marco Bontempi**	Approved by: **Bruno Ghizzardi**

2. Introduction

This manual illustrates how to properly use the **Series PRE electronic pressure regulator in its version with IO-Link interface**.

This version of the Controller is identified with code 0120 xx xx xxx x xxxxx, where 0120 indicates the IO-Link version and is followed by year, week, machine, station and serial number.

For more information, refer to the manual dedicated to the Camozzi UVIX supervision software (Universal Visual Interface X).

3. General recommendations

The recommendations regarding safe use in this document should be observed at all times.

- Some hazards can only be associated with the product after it has been installed on the machine/equipment. It is the task of the final user to identify these hazards and reduced the associated risks accordingly.
- The products dealt with in this manual may be used in circuits that must comply with the standard EN ISO 13849-1.
- For information regarding component reliability, contact Camozzi.
- Before proceeding with use of the product, carefully read all information in this document.
- The instructions in this manual must be observed together with the instructions and additional information regarding the product in this manual, available from the following reference links:
    - o web site http://www.camozzi.com
    - o Camozzi general catalogue
    - o Technical assistance service
- Assembly and start-up operations must be performed exclusively by qualified and authorized personnel on the basis of these instructions.
- It is the responsibility of the system/machine designer to ensure the correct selection of the most suitable pneumatic component according to the intended application.
- For all situations not contemplated in this manual and in situations in which there is the risk of potential damage to objects, or injury to persons or animals, contact Camozzi for advice.
- Never make unauthorized modifications to the product. In this case, any damage or injury to objects, persons or animals will be the responsibility of the user.
- All relevant product safety standards must be observed at all times.
- Never intervene on the machine/system before verifying that all working conditions are safe.
- Before installation and maintenance, ensure that the specific envisaged safety locks are active, and then disconnect the electrical mains (if necessary) and system pressure supply, discharging all residual compressed air from the circuit and deactivating residual energy stored in springs, condensers, recipients and gravity.

- To reduce the noise levels caused by the discharge of air from the component, envisage the use of silencers or convey the fluid to a zone where no personnel are envisaged during normal operation.
- Avoid covering the equipment with paint or other substances that may reduce heat dissipation.
- Avoid cleaning with aggressive agents such as to dull the plastics and make it difficult to read the screen
- **In the event of an electrical power failure and pneumatic supply at the port connection 1, the regulated pressure on port connection 2 will not be maintained and can be discharged.**

4. Product description:

The Series PRE electronic pressure regulator is composed of:
- M12 4 pin connector (1): provides connection to power supply and communication with IO-Link master (for more details refer to the paragraph "Installation and Commissioning").
- General diagnostic LED bar (3): provides a quick indication of the general status of the device (for more details, refer to the "Use" paragraph).
- Micro USB connector (5) and wireless communication LED (4) to connect to the UVIX: the device can be connected to the UVIX supervision software via wireless (if present) or USB that allows to configure and monitor the device.
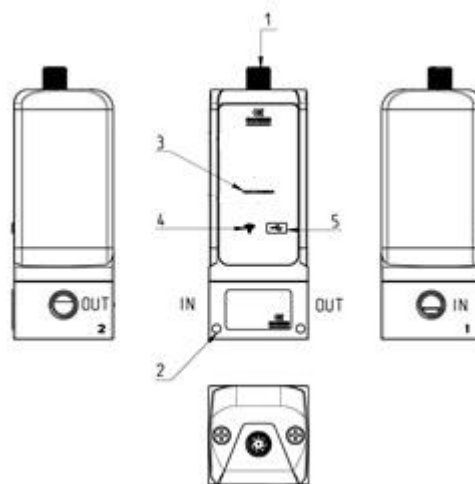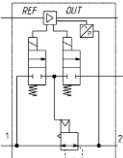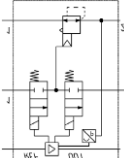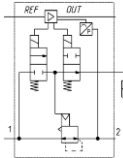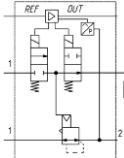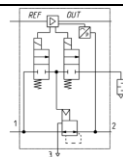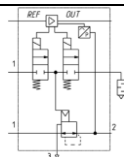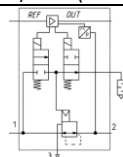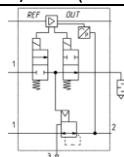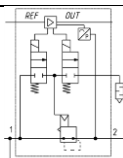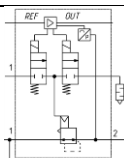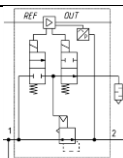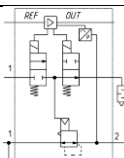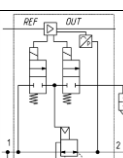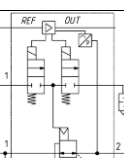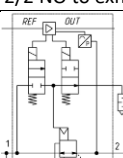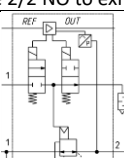

The configuration of some features of the Series PRE electronic pressure regulator is done through the UVIX supervision software.
Two operating modes have been implemented:
- Automatic: the pressure target is set via the analog input. At startup the Regulator is in this mode.
- Manual: the pressure target is set using the function keys or through a special command of the UVIX supervision software. The regulator must be set in this mode during the configuration phase in order to avoid unwanted pressure adjustments.
- In addition, using the NFCamApp app it is possible to configure the parameters of WiFi communication (only for models that provide for WiFi communication) and view some features of the PRE series electronic pressure regulator.

5. Pneumatic symbol:

SIZE 1 AND 2			
Version with internal servo-pilot supply, two pilot valves 2/2 NC.	Version with external servo-pilot supply, two pilot valves 2/2 NC.	Version with internal servopilot supply and two pilot valves; one 2/2 NC and one 2/2 NO (exhaust).	Version with external servopilot supply and two pilot valves; one 2/2 NC and one 2/2 NO (exhaust).
Version with internal servo-pilot supply and two pilot valves 2/2 NC, exhaust conveyable.	Version with external servopilot supply and two pilot valves 2/2 NC, exhaust conveyable.	Version with internal servopilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust, exhaust conveyable.	Version with external servopilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust, exhaust conveyable.

SIZE 1 AND 2 MANIFOLD			
Manifold version with internal servo-pilot supply and two pilot valves 2/2 NC.	Manifold version with external servo-pilot supply and two pilot valves 2/2 NC.	Manifold version with internal servo-pilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust.	Manifold version with external servo-pilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust
Manifold version with internal servo-pilot supply and two pilot valves 2/2 NC and exhaust conveyable.	Manifold version with external servo-pilot supply and two pilot valves 2/2 NC and exhaust conveyable	Manifold version with internal servo-pilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust, exhaust conveyable.	Manifold version with external servo-pilot supply and two pilot valves; one 2/2 NC and one 2/2 NO to exhaust, exhaust conveyable.

6. General characteristics and conditions of use

General characteristics and conditions of use		
	PRE1	**PRE2**
Reference standards	CE; RoHs	
Materials	Body: Aluminum Cover: Technopolymer Seal:NBR and FKM	
Assembly position	Any	
Overall dimensions	L = 50 mm; W = 50 mm; H = 140 mm	L = 50 mm; W = 50 mm; H = 185 mm
Weight	350gr circa	630gr circa
Medium and its quality	Filtered and non-lubricated compressed air of class 7.4.4 according to ISO 8573.1. Inert gases and oxygen only for OX1 versions.	
Maximum free flow rate (Pin 10 bar) **Measured at ±5% of Preg**	Pout 6 bar: 1.100 l/min ANR (PRE104) Pout 4 bar: 1.200 l/min ANR (PRE104)	Pout 6 bar: 4.500 l/min ANR (PRE238) Pout 4 bar: 5.200 l/min ANR (PRE238)
Maximum leakage rate	20 cc/min	10 cc/min
Maximun inlet pressure (refer to coding table)	2 bar (B) 5 bar (E)	11 bar (D); (G) and (F)
Regulated pressure range	0 - 1 bar (0-14,5 PSI)(B) 0,05 - 10,3 bar (0,72-150 PSI)(D) 0,05 - 6 bar (0,72-87 PSI)(F) 0,03 - 4 bar (0,43-58 PSI) (E) 0,05 - 7 bar (0,72-101,5 PSI) (G)	
Number of ways	3	
Ambient temperature	0 ÷ 50 °C	
Protection class	IP65 (according to EN 60529) Open-type (according to UL 61010)	
Pneumatic ports	Standard version: G1/4; G1/8; 1/4 NPTF Manifold version: G1/4; G1/8; 1/4 NPTF	Standard version: G1/4, G3/8 Manifold version: G1/4
Vibrations sine **According to EN 60068 part 2-6:2009-11 (table B.1)**	Frequency range: 10-500Hz Displacement 0-peak: 0,75mm or 100 m/s^2 Number of cycle: 10	
Continuous shock **According to DIN EN 60068-2-27:2010-02 (table A.1)**	Peak acceleration: 150 m/s^2 Duration: 11ms Pulse shape: half sine	
Electric port	M12 4 Pin Male A-key	
Input signal setpoint	IO-Link	
Electrical power supply	24Vdc ±10%	

Current consumption	Max 0,250A (refer to the table below for more details)	
Hysteresis (*)	0,5% FS	0,7% FS
Repeatability (*)	0,4% FS	0,4% FS
Linearity (*)	0,3% FS	0,3% FS
Resolution (*)	0,3% FS	0,6% FS
Overpressure discharge	With relieving	
Modularity	With Series MD	

(*) measured with Inlet pressure = Maximum regulated pressure + 1bar and a volume connected to the outlet without any loss.

WIFI module	Integrated exaust valve	Code	Maximum current consumption
NO	NO	PRExxx-Ex5xxx-xx PRExxx-Ex7xxx-xx	0,105 A
YES	NO	PRExxx-Ex5xxx-xxxW PRExxx-Ex7xxx-xxxW	0,145 A
NO	YES	PRExxx-Ex6xxx-xx PRExxx-Ex8xxx-xx	0,190 A
YES	YES	PRExxx-Ex6xxx-xxxW PRExxx-Ex8xxx-xxxW	0,230 A

- Efficiency curve

Efficiency curve 10,33 bar

$$y = 0{,}1033x$$

Regulated pressure [bar] vs Electrical control signal [%]

Efficiency curve 4 bar

$$y = 0{,}04x$$

Regulated pressure [bar] vs Electrical control signal [%]
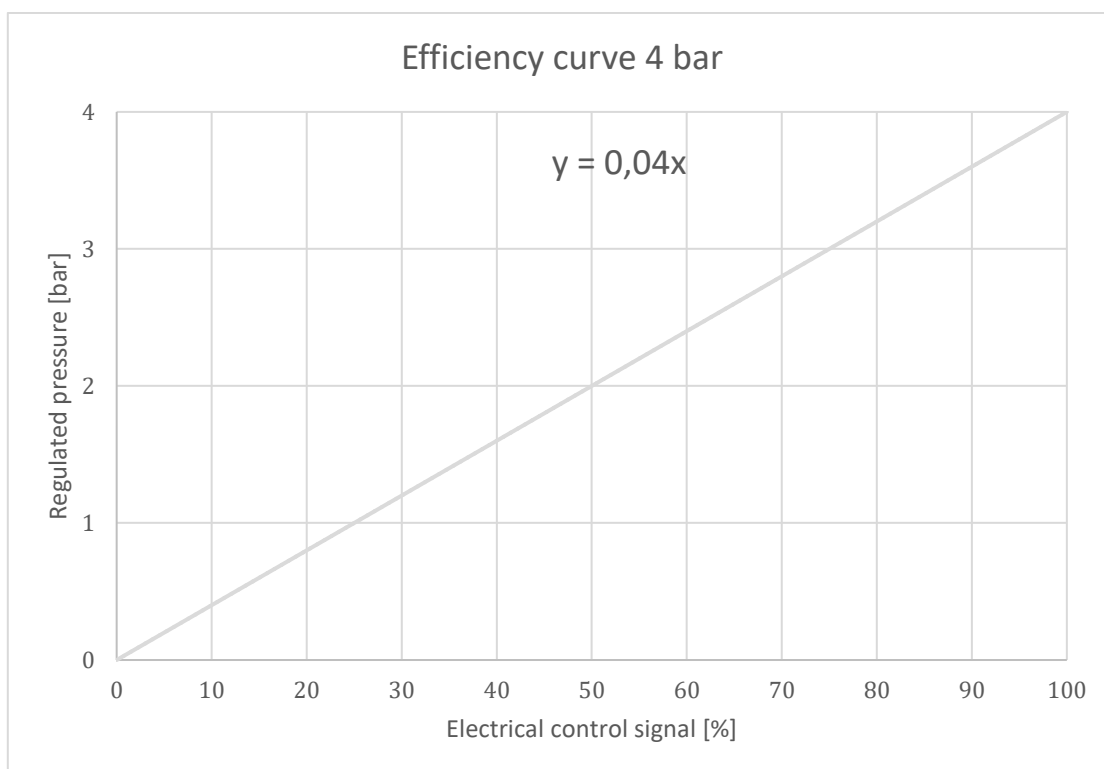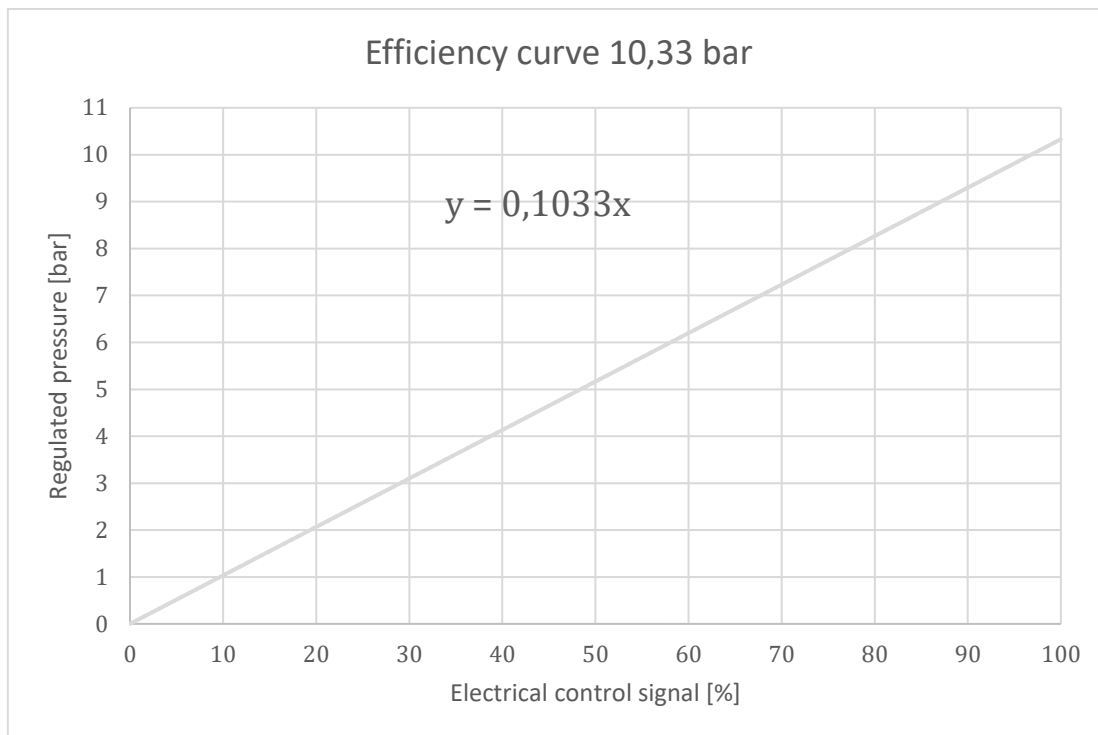
- FLOW CHARTS SIZE 1 - Standard version (1/4G)

Typical curve for version PRE104-xB…
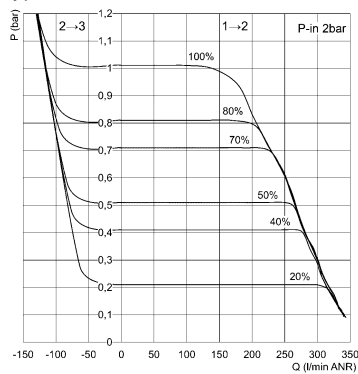
P = Regulated outlet pressure and exhaust pressure

Q = Flow

% = Percentage of the command signal

Typical curve for version PRE104-xE…
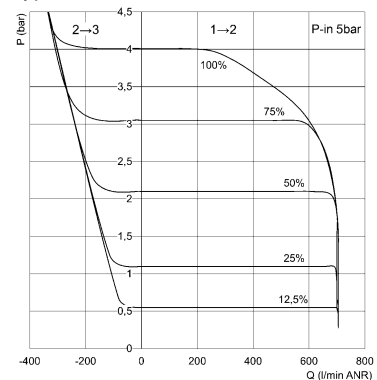
P = Regulated outlet pressure and exhaust pressure

Q = Flow

% = Percentage of the command signal

Typical curve for version PRE104-xF…

P = Regulated outlet pressure and exhaust pressure

Q = Flow

% = Percentage of the command signal

Typical curve for version PRE104-xG…

P = Regulated outlet pressure and exhaust pressure

Q = Flow

% = Percentage of the command signal

Typical curve for version PRE104-xD…

P = Regulated outlet pressure and exhaust pressure

Q = Flow

% = Percentage of the command signal

- FLOW CHARTS SIZE 1 – Manifold version (1/4G)

Typical curve for version PRE1M4-xB…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE1M4-xE…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE1M4-xF…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE1M4-xG…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE1M4-xD…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

DECAY FACTOR FOR MANIFOLD REGULATOR SIZE 1
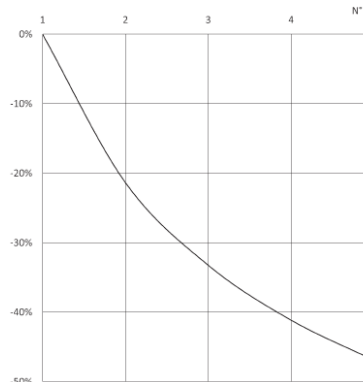
N° = number of regulators in manifold configuration
% = relative percentage decay of the maximum flow rate
Note: the air inlet is only from one side, in case it should be on the
right and on the left, only consider the positions as from 1 ÷ 3..

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- FLOW CHARTS SIZE 2 - Standard version (1/4G)

Typical curve for version PRE204-xB…

P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE204-xE…
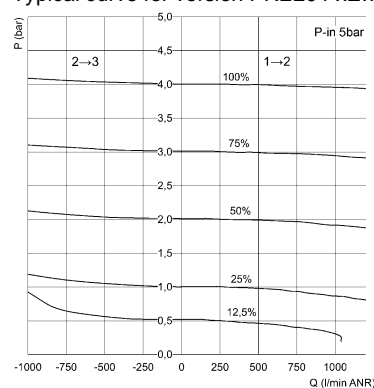
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE204-xF…
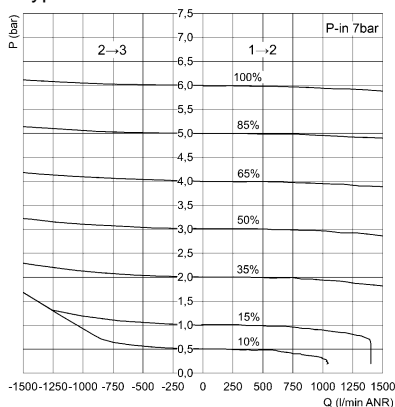
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE204-xG…
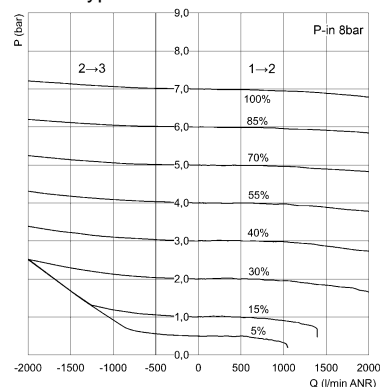
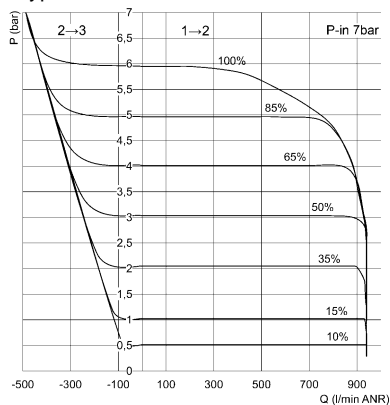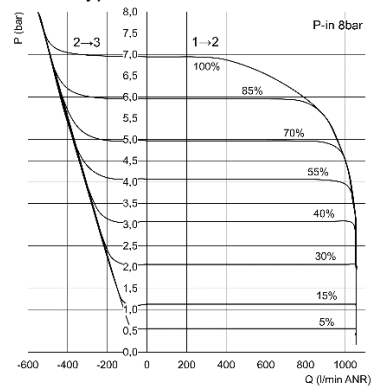
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE204-xD…
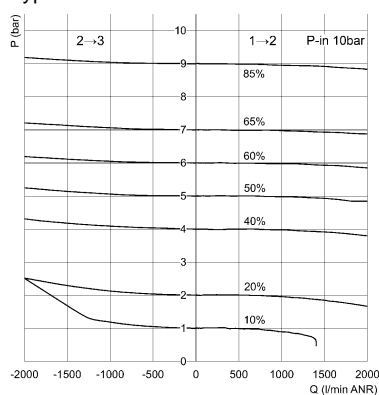
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

- FLOW CHARTS SIZE 2 - Standard version (3/8G)
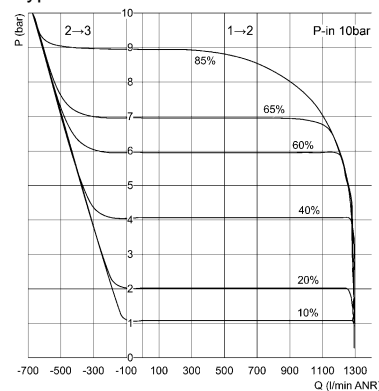
Typical curve for version PRE238-xB…
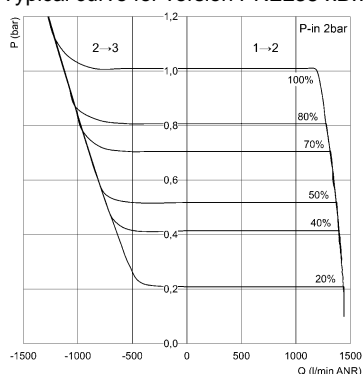
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE238-xE…
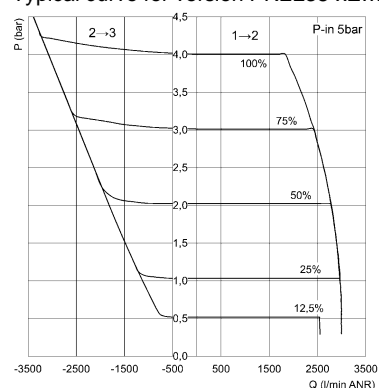
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE238-xF…
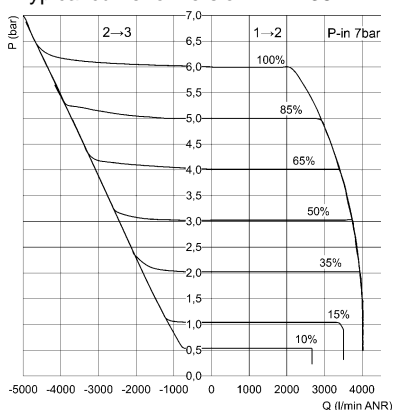
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE238-xG…
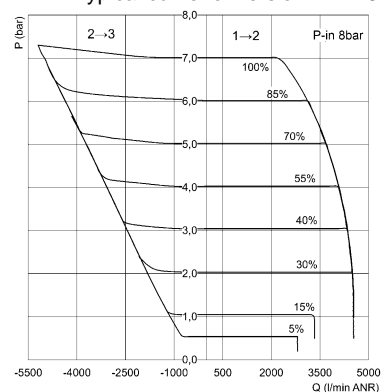
P = Regulated outlet pressure and exhaust pressure
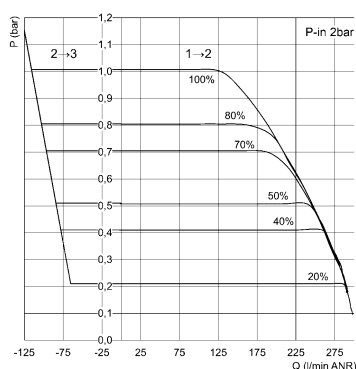Q = Flow
% = Percentage of the command signal

Typical curve for version PRE238-xD…
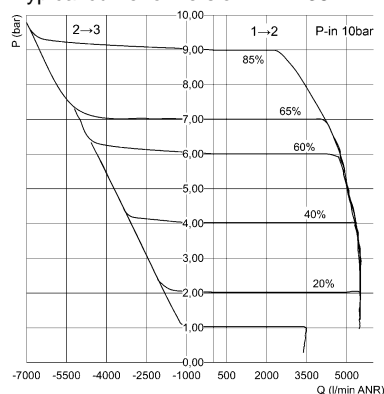
P = Regulated outlet pressure and exhaust pressure
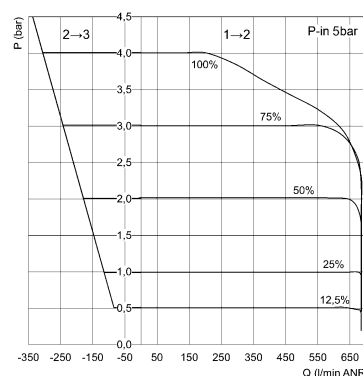Q = Flow
% = Percentage of the command signal

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- FLOW CHARTS SIZE 2 – Manifold version (1/4G)
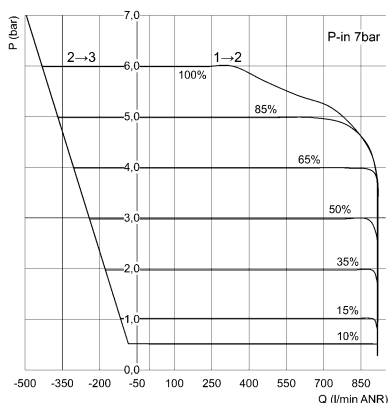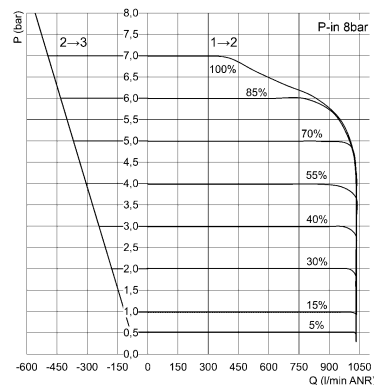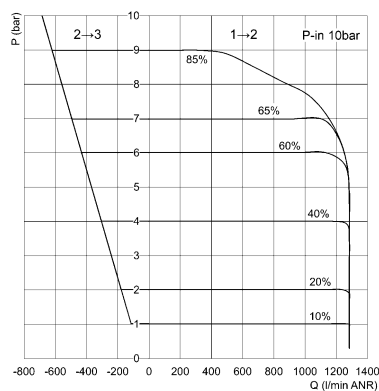
Typical curve for version PRE2M4-xF…
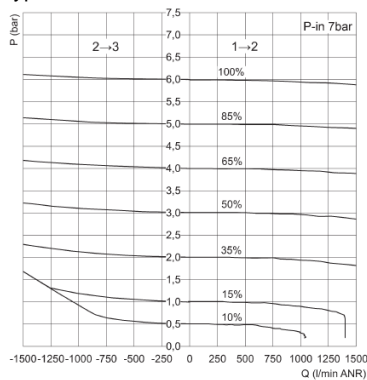
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE2M4-xG…
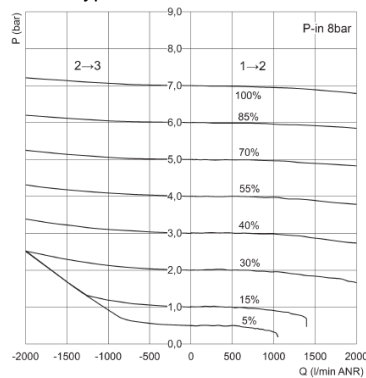
P = Regulated outlet pressure and exhaust pressure
Q = Flow
% = Percentage of the command signal

Typical curve for version PRE2M4-xD…
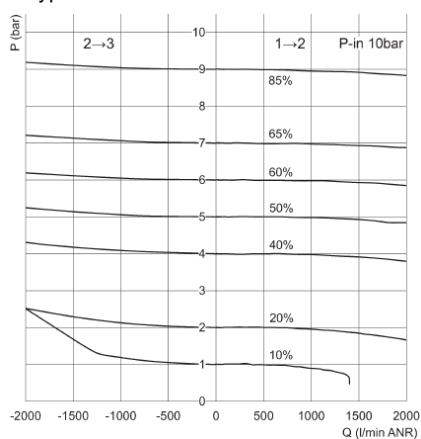
P = Regulated outlet pressure and exhaust pressure
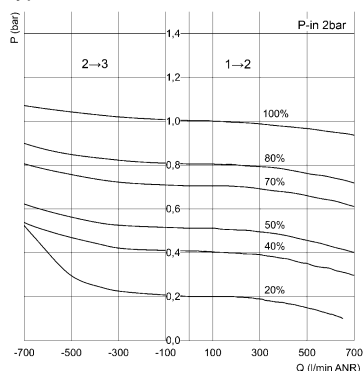Q = Flow
% = Percentage of the command signal

DECAY FACTOR FOR MANIFOLD REGULATOR SIZE 2

N° = number of regulators in manifold configuration
% = relative percentage decay of the maximum flow rate
Note: the air inlet is only from one side, in case it should be on the right and on the left, only consider the positions as from 1 ÷ 3..

- Step response (Values determined according to ISO 10094-1)

PRE-104				
Type of Dynamic tests	Dynamic Characteristics	No tank	Volume 0,4L	Volume 2L
Step 0% to 100%	Shifting Time [ms]	36	82	175
	Response Time [ms]	260	372	1.261
	Settling Time [ms]	179	247	934
Step 100% to 0%	Shifting Time [ms]	39	64	177
	Response Time [ms]	678	957	4.152
	Settling Time [ms]	470	708	3.170
PRE-238				
Type of Dynamic tests	Dynamic Characteristics	No tank	Volume 0,4L	Volume 2L
Step 0% to 100%	Shifting Time [ms]	60	60	95
	Response Time [ms]	350	465	850
	Settling Time [ms]	250	325	650
Step 100% to 0%	Shifting Time [ms]	60	60	80
	Response Time [ms]	850	860	870
	Settling Time [ms]	600	590	565

7. Electrical/Pneumatic circuit
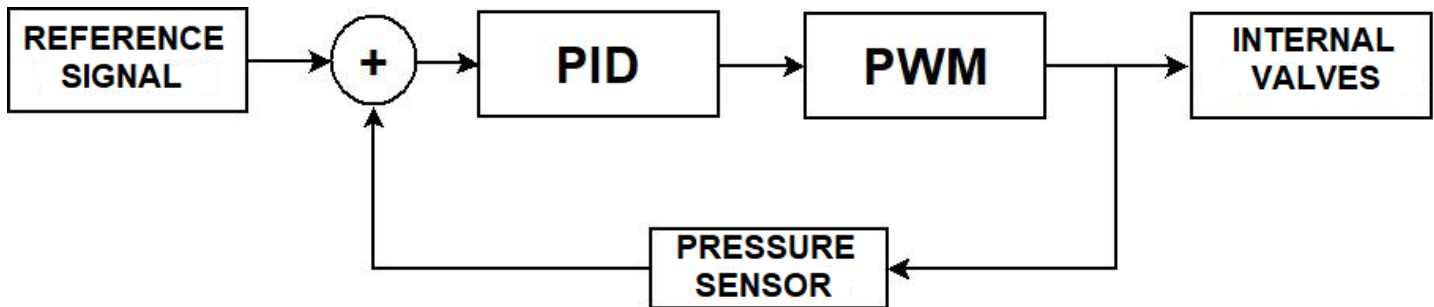
8. Product storage and transport

- Adopt all measures possible to avoid accidental damage to the product during transport, and when available use the original packaging.
- Observe the specified storage temperature range of -20 ÷ 50 °C.

9. Installation and start-up

- During unpacking, take great care not to damage the product.
- Check whether there are any faults caused by product transport or storage.
- Separate all packaging material to enable the recovery or disposal in accordance with current standards in the country of use.
- Where possible avoid the risk of repeated pressure surges on the circuit where the component is installed.
- The components must be fixed correctly using, where possible, the specific brackets and ensuring that the fixture remains efficient even when the actuator is repeatedly used at a high frequency and in the presence of strong vibrations.
- Once the component is installed, ensure that all air ways are securely connected to the respective couplings.
- If the power supply is turned off, residual pressure may remain on the secondary side of the regulators. The manufacturer must provide for additional exhaust components.
Recommended pneumatic circuit
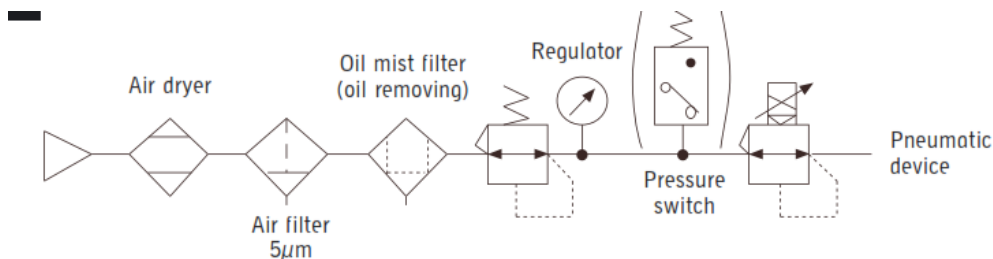
- Keep the protective cap of the M12 connector until the regulator is completely installed

- PRE series electronic regulator can be connected to DIN rails using the relative elements PCF-E520 fitted on the rear of the body using two M4 threaded holes.
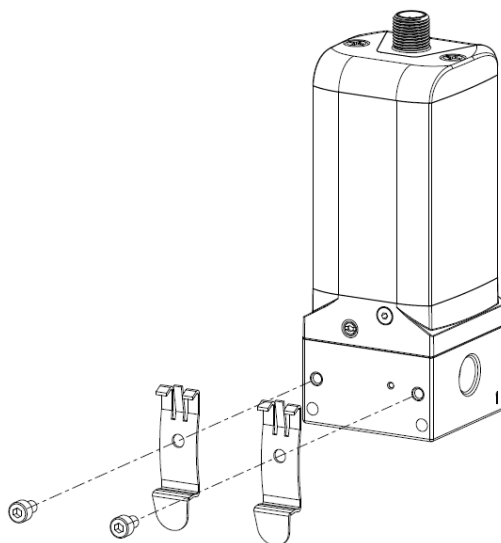
- The Series PRE electronic regulator can be directly fixed to a support using the 2 through holes with diameter 4mm present on the body (not available in the PRE1 manifold version).
- The PRE1 electronic regulator can be fixed to the wall with the optional bracket code MD1-ST/1 (if the two through holes in the body have a 34 mm center distance) or with the optional bracket code PRE-ST (if the two through holes in the body have a 42 mm center distance); the PRE2 electronic regulator can be fixed to the wall with the optional bracket code PRE-ST:

  1. Fix the bracket to the wall with suitable screws
  2. Connect the fittings G1/4; G3/8 or NPTF according to the PRE regulator size
  3. Connect the regulator to the bracket with the two M4 x 55 screws supplied
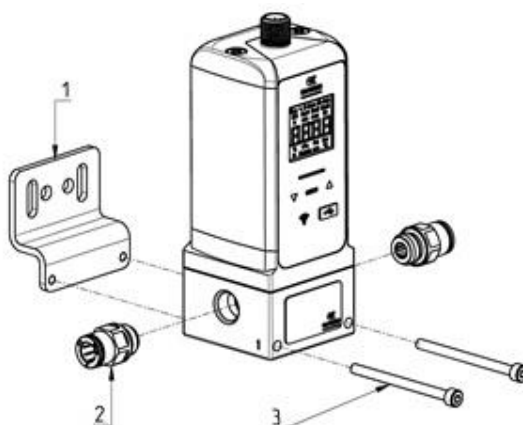
- Make sure that the bracket is completely resting on the wall
- Connection of Manifold regulators with related Kit PRE-M-Pin-1-2

  1. Insert the pins (1) in the seats on the regulator body
  2. Insert the O-ring seal (3) into the special seat on the side face of the body
  3. Bring the two modules sideways up until contact
  4. Tighten the four grub screws (2) until they are locked (Tightening torque: 2,5 ± 0,5 Nm)

	Operation and maintenance instructions	5000030186
CAMOZZI Automation	Series PRE proportional pressure regulator IO-Link version	Ver. 06
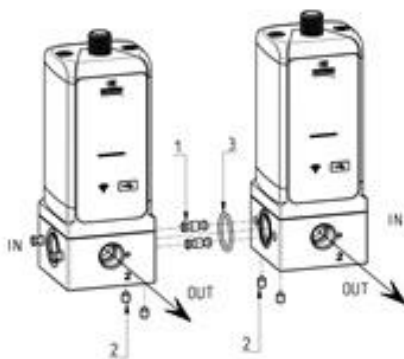
- There are 2 additional pneumatic ports on the PRE series electronic regulator:
  - M5 to discharge the exhaust valve to the outside. It is important to keep this port free and clean to ensure that air is discharged without obstructions that could limit the flow. If necessary, only for version with conveyable port, remove the pre-assembled filter, connect a suitable coupling and use a hose to convey discharged air to a suitable area.
  - M5 for external servo-pilot supply. The regulator is supplied with a preassembled cap for the versions with internal servo-pilot supply and with the fitting 6625 3-M5 for the versions with external servo-pilot supply.
- In order to connect the regulator with MD series, use the PRE-1/4-C kit for regulator with G1/4 pneumatic port or use the PRE-3/8-C kit for regulator with G3/8 pneumatic port.
- The board implements a protection against inversion of polarity on the power supply voltage.
- The board is also fitted with a resettable 1A fuse to limit the maximum current absorption of the servovalve. Use a power supply unit able to deliver a current of at least 0,5A (recommended 1.0A).
- If UL/CSA standard compliance is required, the unit shall be supplied by an isolated power source which fulfils at least one of the following the requirements of:
  - Limited-Energy Circuit in accordance with UL/CSA 61010-1/ UL/CSA 61010-2-201
  - Limited Power Source (LPS) in accordance with UL/CSA 60950-1
  - a Class 2 supply source which complies with the National Electrical Code (NEC), NFPA 70, Clause 725.121 and Canadian Electrical Code (CEC), Part I, C22.1. (typical examples are a Class 2 transformer or a Class 2 power sources in compliance with, UL 5085-3/ CSA-C22.2 No. 66.3 or UL 1310/CSA-C22.2 No. 223). In order to respect the UL/CSA 61010 requirements, install the regulator inside a box, not in external environment.
  If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The power supply voltage must be within the range of 24V±10%.
- The board implements a protection against overload of the reference signal.
- The M12 4 pin male connector has the following pinout. The port is configured as port A:

PIN	NAME	DESCRIPTION
1	L+	Power supply: Connect to the positive pole (24VDC) of the power supply.
2	N.C	Not connected.
3	L-	Power supply : Connect to the negative pole (GND) of the power supply.
4	C/Q	IO-Link communication

- For the electrical connection the following cable types are available:

CODE	DESCRIPTION
CS-LF05HB-D200	co-moulded connector M12 5 pole, female, straight with 2-metre cable shielded
CS-LF05HB-D500	co-moulded connector M12 5 pole, female, straight with 5-metre cable shielded
CS-LF05HB-C200	co-moulded connector M12 5 pole, female, straight with 2-metre cable unshielded
CS-LF05HB-C500	co-moulded connector M12 5 pole, female, straight with 5-metre cable unshielded
CS-LR05HB-D200	co-moulded connector M12 5 pole, female, bend with 2-metre cable shielded
CS-LR05HB-D500	co-moulded connector M12 5 pole, female, bend with 5-metre cable shielded
CS-LR05HB-C200	co-moulded connector M12 5 pole, female, bend with 2-metre cable unshielded
CS-LR05HB-C200	co-moulded connector M12 5 pole, female, bend with 5-metre cable unshielded
G11W-G12W-2	Micro USB cable (it may be used during the configuration phase)
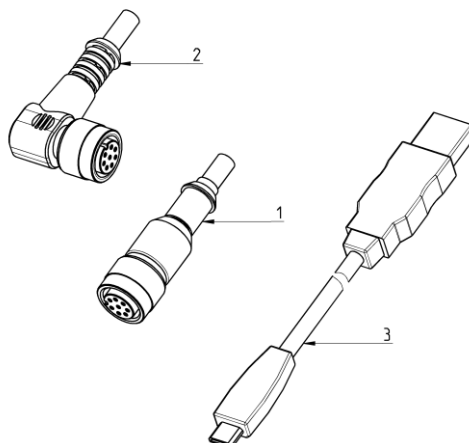
10. CoilVision

With the integrated CoilVision technology the proportional regulator is able to constantly monitor the operation of the coils inside it and prevent any malfunctions.

Depending on the model chosen, the proportional regulator can have three different levels of diagnostics:

- Without diagnostics: the CoilVision technology isn't implemented.
- Basic diagnostics: CoilVision technology is active and will advise the user when the coils are nearing the end of their life cycle
- CoilVision diagnostics: CoilVision technology is active and, in addition to advice the user when the coils are nearing the end of their life cycle, constantly sends information about their current health status to the UVIX environment.

11. NFCamApp

NFCamApp is a configuration application that can be installed on android mobile device and available on Play Store.
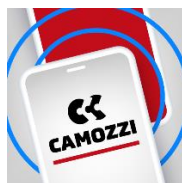
NFCamApp communicates with the Series PRE electronic pressure regulator via NFC connection and is able view some device parameters and modify, if present, the parameters of the wi-fi card. The NFC antenna is located under the front label in the lower left corner.

For installation and use of the NFCamApp, please refer to the dedicated manual.
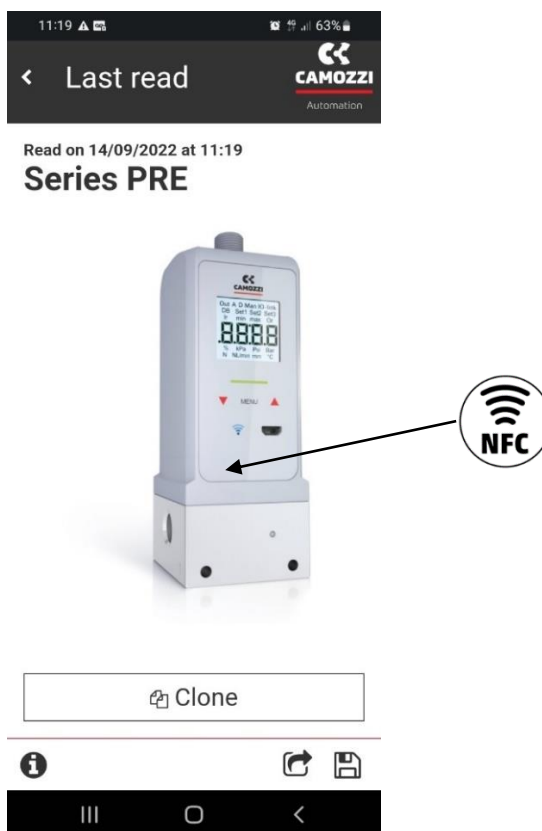
11.1. Information

This section (🛈) displays the information about selected device.

- *Type*: description of device type.

- *Subtype*: description of device sub-type.

- *Firmware*: firmware version.

- *WiFi connection*: indicates if the WiFi connection is present

- *Fieldbus connection*: indicates the fieldbus connection available

- *Serial number*: univocal serial number device assigned by producer.

- *Setup version*: internal memory mapping version.

12. Universal visual interface X (UVIX)

UVIX is a supervisor software that can be installed on PC or on server that is part of the company network and accessible from other PCs.
UVIX communicates with the Series PRE electronic pressure regulator via wireless connection (if present) or via USB cable and is able to monitor and configure the device.
Following the monitoring and configurator of the Series PRE electronic pressure regulator is described in detail. For installation and use of the UVIX, please refer to the dedicated manual.

12.1. Monitoring

Once the device is selected, the work page will be displayed. This page is divided into two parts;

- Status information
- Details

12.1.1. Status information

This section displays the following fields related to the selected device. This information is the same for all devices manageable by UVIX.
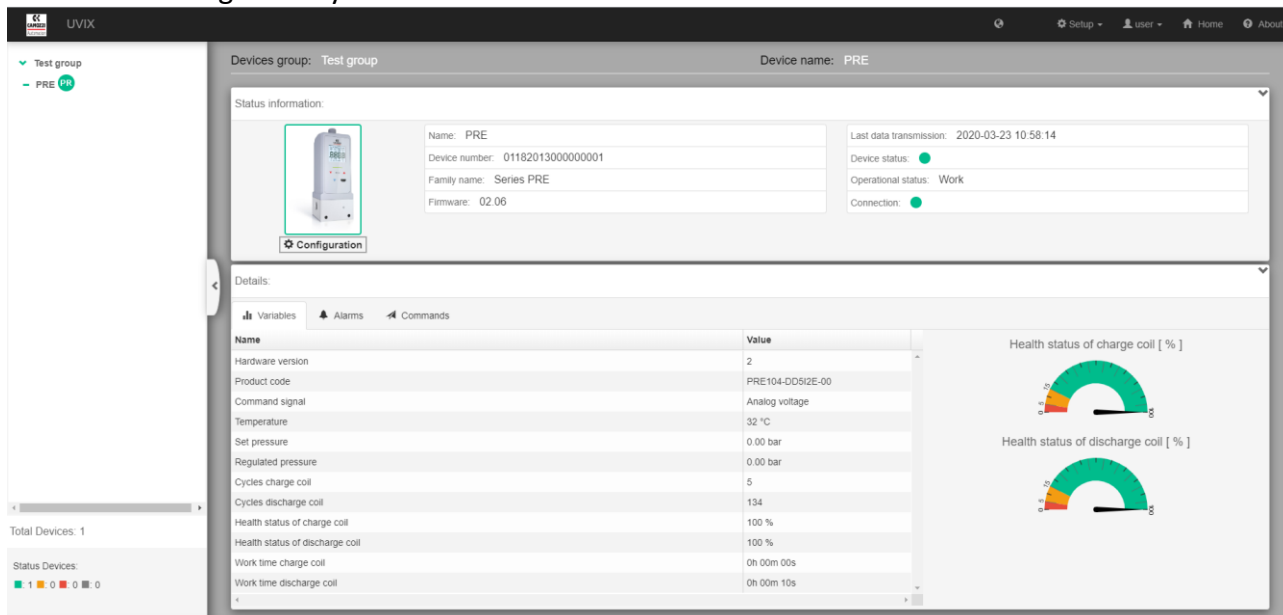
o A picture of the device with a coloured frame based on its global state (green if status is ok, yellow/orange if a warning occurs, red if an error occurs)

o Name: name given by the user

o Device number: univocal serial number device assigned by producer.

o Family name: description of device type

o Firmware: firmware version

o Last transmission: date and time of last data received

o Device status: global state of device

o Operational status: operational status of device that can either be "work" if the target pressure is received by the command signal (analog input or digital inputs) or "manual" if the target pressure is received by UVIX.

o Connection: indicates if the device is transmitting or, more precisely, if the UVIX is receiving data from it. The indication is given by the color of the dot that turns green if the device is connected or red if it is not connected.

o Under the device picture the "Configuration" command is located. Via this command it is possible to open the configuration window of the selected device

12.1.2. Details

This section is divided into 3 sub-sections and lists specific information about selected device.

VARIABLES

This sub-section lists all variables sent from the device to UVIX, including those related to Coil Vision if the device is equipped with advanced diagnostics.

- Hardware Version: device hardware version.
- Product Code: commercial code of the device.
- Command signal: reference signal used by the device.
- Temperature: device temperature value.
- Target Pressure: target pressure.
- Regulated Pressure: regulated pressure value.
- Charge coil cycles: number of cycle of charge coil.
- Exhaust coil cycles: number of cycles of exhaust coil.
- Charge coil health status: health status of charge coil.
- Exhaust coil health status: health status of exhaust coil.
- Charge coil work time: total working time for charge coil.
- Exhaust coil work time: total working time for exhaust coil.

ALARM

This section lists all the possible warnings and alarms, for each of them the status is specified and, if active, the date on which the error occurred.
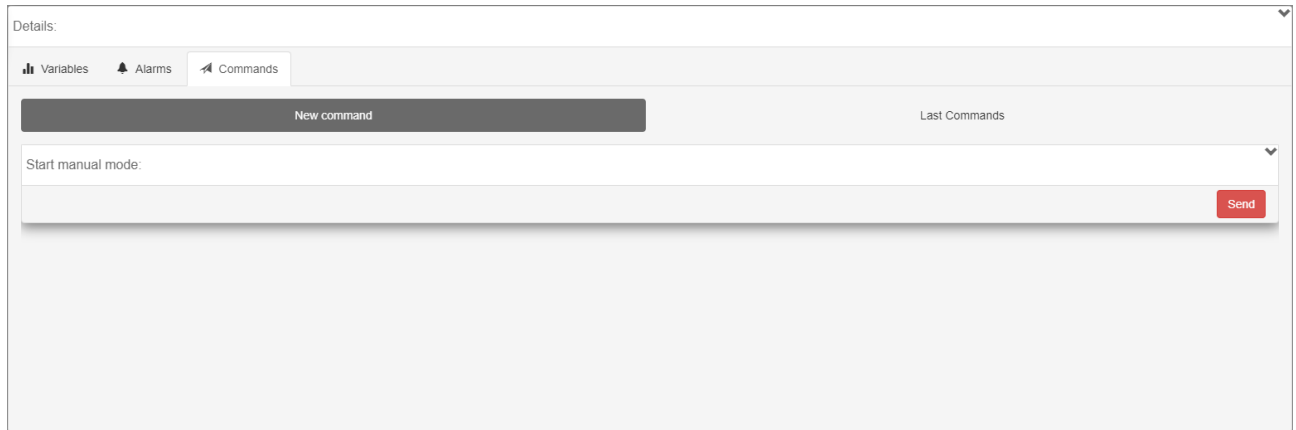
For more details and for the complete list of errors and warnings, refer to the paragraph "Troubleshooting and/or exceptional circumstances ".

COMMANDS

In this section it is possible to send a new command to the device or to check the history of the commands sent.

If the device is in the Automatic operating mode, the only command that can be sent is "Start manual mode" which allows the activation of the Manual operating status.

If the Manual operating mode is activated on the device, it is possible to send the following commands:

- End manual mode: which allows to activate the Automatic operating mode.
- Set Pressure: the target pressure is set via this command.

12.2. Configurator

By clicking on the button below the image of the device (⚙ Configuration) it is possible to open the configurator. It is not possible to modify the parameters present in the configurator: with the IO-Link version, parameters can be modified only through the IO-Link master.

The parameters are divided into groups and can only be modified by the user with the necessary permissions, furthermore, based on the version of the regulator, only some parameters will be visible.

12.2.1. User setup

Parameters visible only for versions with wireless connection:

- SSID: network name to connect.
- Password: password of network name to connect.
- IP address: IP address of data destination. This is the IP address of PC or gateway where UVIX used by device is installed.
- Host port: port number used to send and receive data with the UVIX component designated for this task

Parameters visible in all versions:

- Fail safe signal: displays the behavior of the pressure regulator if the cyclic data are no longer valid. Based on the value of this parameter, the pressure regulator can maintain the last valid target received (Maintenance) or discharge the regulated pressure (Discharge).
- Unit of measurement (regulator): serves to set the unit of measurement of the device. Possible values are: psi, bar or kPa.
- Pressure regulation check mode: shows the event type, warning or alarm, in case the regulated pressure doesn't reach the target value. Refer to the "Pressure regulation check timeout" parameter
- Pressure regulation check timeout: shows if the control of the regulated pressure is enabled. This control is similar to the "window" function of the digital output (for more details regarding this function, refer to paragraph "Digital output"): the regulator checks if the regulated pressure reaches the pressure target within a certain settable time (Pressure regulation timeout). This control uses the values " Lower limit window control " and " Upper limit window control " to determine the tolerance range on the regulated pressure.
- Pressure regulation timeout: shows the timeout value for the pressure regulation check. Refer to the "Pressure regulation check timeout" parameter.
- Lower limit window control: shows the lower threshold to define the control window. Refer to the "Pressure regulation check timeout" parameter.
- Upper limit window control: shows the upper threshold to define the control window. Refer to the "Pressure regulation check timeout" parameter.
- Protection Timeout: shows the inactivity time of the regulator when the target pressure is not reached before the expiration of the Pressure regulation timeout. During the period of inactivity, the regulator maintains the current pressure without trying to reach the target pressure. After this inactivity time has expired, the regulator will try again to reach the target pressure

- Dead band: available only with FW version 3.01 or higher. When this parameter is set to a value higher than 0, the regulator will not make any adjustment as long as the absolute error of the regulated pressure (difference between the regulated pressure and the target pressure) remains lower than the set dead band value (red line).

  On the other hand, when the absolute error of the regulated pressure exceeds the value of the set dead band, the regulator returns to carry out normal regulation (green line).

  This operating mode makes it possible to avoid continuous adjustments by the regulator, increasing its life cycle. On the other hand, the achievement of the target pressure according to the declared performance is not guaranteed: the adjusted pressure error will depend directly on the dead band value set.

- Hysteresis value: available only with FW version 3.01 or higher and if the dead band value is greater than 0. When the absolute error of the adjusted pressure (difference between the adjusted pressure and the target pressure) remains below the dead band value set for a sufficient time, the regulated pressure is considered stable and the hysteresis operating mode (A) is activated. If, on the other hand, the absolute error of the regulated pressure remains lower than the dead band value set for a NOT sufficient time, the regulated pressure is deemed NOT stable and the hysteresis operating mode (B) is NOT activated.

  When the hysteresis operating mode is active, the regulator will not make any adjustment as long as the absolute error of the regulated pressure remains less than the value of the sum of the dead band and hysteresis values set (C).

  When the absolute error of the regulated pressure exceeds the value of the sum of the dead band and hysteresis values set, the hysteresis operating mode is deactivated (D) and therefore the regulator will not carry out any regulation only if the absolute error of the regulated pressure becomes lower than the set dead band value (E). To reactivate the hysteresis operating mode, the absolute error of the regulated pressure must remain below the dead band value set for a sufficient time.

  This operating mode allows to reach the target pressure with sufficient precision, according to the dead band value set, and to define a wider range, defined by the set hysteresis value, in which the regulator will not perform any regulation.

  Compatibly with the application carried out by the regulator, it is recommended to set:

- o the dead band value as small as possible, in order to obtain a good regulation precision of the regulated pressure
- o the hysteresis value as large as possible, generally greater than the dead band value, in order to limit the number of actuations of the regulator.

- Internal sensor filter cutoff: available only with FW version 3.01 or higher, this parameter shows the cutoff frequency [Hz] of the digital filter applied to the internal sensor signal. Use this parameter to eliminate noise in the regulated pressure signal. A big value of this parameters increases the time response of the regulator. If the value of this parameter is 0, the filter is disabled.
- Pid mode: if the "Custom PID enable" command is disabled, it sets the PID gain based on the volume used. The possible values are: SET1 (SLOW, suitable for small volumes), SET2 (MEDIUM, suitable for medium volumes), SET3 (FAST, suitable for large volumes). If the "Custom PID enable" command is enabled, it displays the selection of the SET4 (CUSTOM) value.
- Custom PID enable: it allows you to select the SET4 (CUSTOM) value for the "Pid mode" parameter. When this parameter is enabled, it is possible to indicate the values of the PID gains. For details, refer to the "Custom PID parameters" paragraph.

12.2.1.1. Custom PID parameters

This group is available only if Pid Mode SET4 (CUSTOM) is selected and contains the parameters in order to set the PID.

ATTENTION: the system could be instable if you use values too high. Increase carefully the K parameters values. Do not create a system instability. The mechanical and electronic internal components could be damage. Avoid continuously oscillations of regulator (you hear an hammered noise). In this case decrease the K parameters values in order to eliminate the oscillations.

- KpUpCustom: proportional gain for upload coil
- KiUpCustom: integral gain for upload coil
- KdUpCustom: derivative gain for upload coil
- KpDownCustom: proportional gain for download coil
- KiDownCustom: integral gain for download coil
- KdDownCustom: derivative gain for download coil

12.3. Digital output setup

This group contains the parameters to set the "pressure switch" and "pressure window" function. For more details regarding this function, refer to the related paragraph.

- Lower limit switch control: sets the lower threshold for the pressure switch mode.
- Upper limit switch control: sets the upper threshold for the pressure switch mode.
- Lower limit window control: sets the lower differential for the pressure window mode.
- Upper limit windows control: sets the higher differential for the pressure window mode.

12.4. Pressure sensor setup

The parameters of the pressure sensor are contained in this group: these parameters cannot be modified by the user.

- Pressure sensor unit: displays the unit of measurement of the internal pressure sensor.
- Pressure sensor minimum pressure: displays the minimum value of the pressure sensor range. Value expressed in "Pressure sensor unit".
- Pressure sensor maximum pressure: displays the maximum value of the pressure sensor range. Value expressed in "Pressure sensor unit".

13.Use

- Ensure that the pressure in the compressed air supply system and all other operating conditions remain within the admissible values.
- Use with liquids or gas is not permitted according to the intended use
- The LED bar on the regulator provides information regarding the status of the product, please refer to the table below.

SYMBOL	LED STATUS	DESCRIPTION
⬤	LED OFF	LED is OFF.
◯	LED ON	LED is fixed ON.
☀	BLINKING	LED is blinking according to a specific sequence associated to the different diagnostic state: @XX [ms/Hz] per YY [s] ▪ XX is the ON/OFF time duration of a blink. ▪ YY is the repetition time of blinking sequence. **Example 1**: 1 blink @100 ms every 2 s
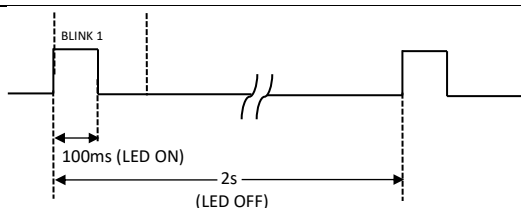
Example 2: 2 blinks @100 ms every 2 s
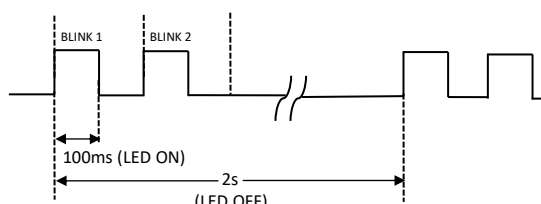
DEVICE STATUS	LED STATUS	MEANING
Normal operation.	GREEN ON	Regulator is working with no errors or warnings.
The regulator has registered an **ERROR**. Pressure regulation is interrupted.	1 RED blink @200 ms every 3 s	ALARM_INTERNAL: an internal component of regulator don't work properly.
	2 RED blinks @200 ms every 3 s	ALARM_PRESSURE: the regulator is not able to reach the target pressure.
	4 RED blinks @200 ms every 3 s	ALARM_COIL: generic error during pilot valve power on, probably caused by interrupted or short-circuited coil.
The regulator has registered a **WARNING**. Pressure regulation is not interrupted.	1 YELLOW/ORANGE blink @200 ms every 3 s	WARNING_INTERNAL: an internal component of regulator don't work properly
	2 YELLOW/ORANGE blinks @200 ms every 3 s	WARNING _PRESSURE: the regulator is not able to reach the target pressure.

	☀️ 3 YELLOW/ORANGE blinks @200 ms every 3 s	WARNING_IOLINK_SIGNAL: the target is out of range.
	☀️ 4 YELLOW/ORANGE blinks @200 ms every 3 s	WARNING_UNDERVOLTAGE: power supply is below the minimum value
	☀️ 5 YELLOW/ORANGE blinks @200 ms every 3 s	(Signalling available only if the device is equipped with the coil vision function) WARNING_COIL: a coil is near the end of its life cycle.
During startup operation, the LED bar is red fixed.		

WIRELESS LED STATUS	MEANING
🔵 BLUE ON	Wireless board is available and the regulator is connected to the supervisor software UVIX
☀️ Blinking BLUE 1Hz	Wireless board is available but the regulator is not connected to the supervisor software UVIX
⚪ OFF	Wireless board is not available

14. IO-Link

This chapter describes the implementation of the SDCI (single-drop digital communication interface) protocol, more commonly known as IO-Link, for the Camozzi proportional pressure regulator.

Port type	Class A
Protocol version	V1.1
Device ID	1
Vendor ID	805
ISDU	Supported
Block parameter	
Data Storage	
SIO	Not supported
Local Parametrization	
Bit rate	COM2 (38.4 kbps)
Minimum cycle time	2400 μs
Process data IN (PRE → Master)	2 byte
Process data OUT (Master → PRE)	2 byte

In according to the standard protocol, three different data exchange device-master type are supported:

- Process data: cyclic data exchange.
- On-request data: on request data exchange, usually configuration parameter.
- Events: events generated by the device, usually diagnostic parameters.

14.1. Cyclic data

In case of the Regulator, there are two types of Process Data:

- Target Pressure: input data with a size of 2 bytes is sent by the master and indicates the output pressure of the regulator.
- Read Pressure: output data with a size of 2 bytes is sent by the Regulator and indicates the pressure read by its internal sensor.

The Pressure Regulator supports three units of measurement: psi/10, mbar and kPa.

The pressure target resolution based on the units is:

- 0,1 psi/bit
- 1 mbar/bit
- 1 kPa/bit

In the case of psi, having a resolution of 0.1 psi/bit, the pressure target has to be multiplied by a factor of 10, i.e. if a target of 50 psi is desired, the pressure target sent by the master must contain the value 500.

14.2.   Acyclic data

The data exchanged on request are all useful parameters to know the status of the pressure regulator and to parameterize it.

The protocol provides a set of predefined parameters, some are mandatory, others are optional, and manufacturers can to define others.

The parameters can be divided as follows:

▪ Device identification parameters

Address	Parameter	Access (RO, WO o RW)	Dimension (byte)	Description
0x0010 (16)	Vendor Name			Manufacturer name
0x0011 (17)	Vendor Text			Additional information of manufacturer
0x0012 (18)	Product Name			Product name
0x0013 (19)	Product ID			Product ID
0x0014 (20)	Product Text	RO	Max 64	Product description
0x0015 (21)	Serial Number			Device serial number
0x0016 (22)	Hardware Version			Device hardware version
0x0017 (23)	Firmware Version			Device firmware version
0x0018 (24)	Application Specific Tag	RW	Da 16 a 32	Parameter available to the user

- Device parametrization parameters

Address	Parameter	Access (RO, WO o RW)	Dimension (byte)	Description
0x103 (259)	Unit of measurement (regulator)	RW	1	Unit of measurement of the regulator
0x104 (260)	Minimum target pressure	RO	2	Minimum target pressure accepted by the regulator
0x105 (261)	Maximum target pressure	RO	2	Maximum target pressure accepted by the regulator
0x106 (262)	Pressure switch control	RW	1	Enables the pressure switch control function
0x107 (263)	Pressure window control	RW	1	Enables the pressure window control function
0x108 (264)	Lower limit switch control	RW	2	Lower threshold of the pressure switch control function
0x109 (265)	Upper limit switch control	RW	2	Upper threshold of the pressure switch control function
0x10A (266)	Lower limit window control	RW	2	Lower threshold of the window control function
0x10B (267)	Upper limit window control	RW	2	Upper threshold of the window control function
0x10C (268)	Pressure regulation check mode	RW	1	Sets the generated error type in case the pressure falls out of the target value
0x10D (269)	Pid mode	RW	1	Sets the PID gains of the regulator
0x10E (270)	Pressure regulation check	RW	1	Allows to check the regulated pressure
0x10F (271)	Pressure regulation check timeout	RW	2	Sets the time to achieve the regulated pressure

0x117 (279)	Protection timeout	RW	1	Sets the inactivity time when a PRESSURE OUT OF RANGE warning occours.
0x118 (280)	Pressure failsafe	RW	1	Set the regulator behavior if the communication with master is interrupted.
0x119 (281)	FilterCutOff	RW	1	Cutoff frequency of digital filter applied to the internal sensor signal
0x11A (282)	Hysteresis value	RW	2	Hysteresis value parameter for regulated pressure
0x11B (283)	DeadBand value	RW	2	Dead band value parameter for regulated pressure
0x11C (284)	Kp UP value	RW	4	Proportional gain value for upload valve (effective if Pid mode = 3)
0x11D (285)	Kp DOWN value	RW	4	Proportional gain value for download valve (effective if Pid mode = 3)
0x11E (286)	Ki UP value	RW	4	Integral gain value for upload valve (effective if Pid mode = 3)
0x11F (287)	Ki DOWN value	RW	4	Integral gain value for download valve (effective if Pid mode = 3)
0x120 (288)	Kd UP value	RW	4	Derivative gain value for upload valve (effective if Pid mode = 3)
0x121 (289)	Kd DOWN value	RW	4	Derivative gain value for download valve (effective if Pid mode = 3)

- ▪ Device diagnostic parameters

Address	Parameter	Access (RO, WO o RW)	Dimension (byte)	Description
0x110 (272)	Health status charge coil	RO	1	Health status as a percentage of the charge coil

0x111 (273)	Health status exhaust coil	RO	1	Health status as a percentage of the exhaust coil
0x112 (274)	Cycles charge coil	RO	4	Indicates the number of cycles performed by the charge coil
0x113 (275)	Cycles exhaust coil	RO	4	Indicates the number of cycles performed by the exhaust coil
0x114 (276)	Total work time charge coil	RO	4	Total time that the charge coil has been on
0x115 (277)	Total work time exhaust coil	RO	4	Total time that the exhaust coil has been on
0x116 (278)	Temperature	RO	2	Indicates the internal temperature of the regulator
0x0024 (36)	Device status	RO	1	Indicates the device status
0x0025 (37)	Detailed Device Status	RO	192 (list of 64 elements, 3 byte every element)	For every element, first byte indicate the eventQualifier and the others two bytes indicate the event code (refer to the dedicated chapter)

The various parameters are described in detail below

14.2.1.   Unit of measurement (pressure sensor)

Set the unit of measurement of the device, all pressure values present in the master configurator will be expressed in this unit of measurement. Possible values are:

0 = psi/10.

1 = mbar.

2 = kPa.

14.2.2.   Minimum target pressure

Sets the minimum target pressure accepted by the Regulator, in case the value should be lower than the value stated in this parameter, the Regulator will give a warning without making any adjustment.

14.2.3.   Maximum target pressure

Sets the maximum target pressure accepted by the Regulator, in case the value should be higher than the value stated in this parameter, the Regulator will give a warning without making any adjustment.

14.2.4.   Pressure switch control

Enables the "Pressure Switch" control on the pressure reading and can be

0 = Disable or 1 = Enable.

This control allows to define a lower and an upper threshold, in case the regulated pressure falls out of the range established by these two thresholds, the Regulator will give a warning, but will not interrupt the regulation.

In this case the diagnostic led will not change its state.

This is a useful way to verify if the regulated pressure lies within the pre-established range or not.

14.2.5. Pressure window control

Enables the "Pressure Window" control on the reading of the regulated pressure and can be

0 = Disable or 1 = Enable.

This control allows to define a lower and an upper threshold that establish a pressure range with respect to the target pressure.

If the regulated pressure at some point falls out of the range (depends on the target pressure at that moment) established by the two thresholds, the Regulator will give a warning, but will not interrupt the regulation and the diagnostic led will not change its state.

This is a useful way to verify if the regulated pressure lies within the pre-established pressure range or not.

14.2.6. Lower limit switch control

Sets the lower threshold of the pressure switch control in the unit of measurement of the Regulator. This must be a positive value and be less than the "upper limit switch control" parameter.

14.2.7. Upper limit switch control

Sets the upper threshold of the pressure switch control in the unit of measurement of the Regulator, its value must be higher than the "Lower limit switch control" parameter and must not exceed the "Maximum target pressure".

14.2.8. Lower limit window control

Sets the lower threshold of the pressure window control in the unit of measurement of the Regulator, its value must be positive and must not be higher than one tenth of the "Maximum target pressure".

14.2.9. Upper limit window control

Sets the upper threshold of the pressure window control in the unit of measurement of the Regulator, its value must be positive and must not be higher than one tenth of the "Maximum target pressure".

14.2.10. Pressure regulation check mode

Sets the type of event triggered by the "pressure regulation check", 129 = warning or 10 = error.

This check uses the same window as the window control with the difference that the pressure reading must remain outside the window for a time defined by the "Pressure regulation timeout" parameter.

14.2.11. Pid mode

- Set the PID gains, the values it can take are:
- 0 = slow: for small-sized volumes;
- 1 = medium: for medium-sized volumes;
- 2 = fast: for large-sized volumes;
- 3 = custom.

With the value 3 (custom), the values of the parameters "Kp UP", "Kp DOWN", "Ki UP", "Ki DOWN", "Kd UP" and "Kd DOWN" will be used for regulation; instead, with the values 0 (slow), 1 (medium) and 2 (fast), these parameters are ignored and the controller will use preset values.

14.2.12. K parameters

Set the values for the following parameters:

- Kp UP: proportional gain for upload valve
- Kp DOWN: proportional gain for download valve
- Ki UP: integral gain for upload valve
- Ki DOWN: integral gain for download valve
- Kd UP: derivative gain for upload valve
- Kd DOWN: derivative gain for download valve

The values of the parameters listed above are used for regulation only if Pid mode is set to 3 (custom), otherwise they will be ignored and the regulation will use preset values for these parameters.

ATTENTION: the system could be instable if you use values too high. Increase carefully the K parameters values. Do not create a system instability. The mechanical and electronic internal components could be damage. Avoid continuously oscillations of regulator (you hear an hammered noise). In this case decrease the K parameters values in order to eliminate the oscillations.

14.2.13.   Pressure regulation check timeout

Enables to control the regulated pressure. This control is similar to the "window" function of the digital output (for more details regarding this function, refer to paragraph "Digital output"): the regulator checks if the regulated pressure reaches the pressure target within a certain settable time (Pressure regulation timeout). This control uses the values "Lower limit window control" and "Upper limit window control" to determine the tolerance range on the regulated pressure.

14.2.14.   Pressure regulation timeout

Sets the time to achieve the regulated pressure, its value is expressed in milliseconds from 0 to 60000 (1 minute).

14.2.15.   Protection Timeout

Sets the inactivity time of the regulator when the target pressure is not reached before the expiration of the Pressure regulation timeout. During the period of inactivity, the regulator maintains the current pressure without trying to reach the target pressure. After this inactivity time has expired, the regulator will try again to reach the target pressure

14.2.16.   Pressure failsafe

Sets the behavior of the pressure regulator if the cyclic data are no longer valid. Based on the value of this parameter, the pressure regulator can maintain the last valid target received (Maintenance) or discharge the regulated pressure (Discharge).

14.2.17.   Filter cutoff

Available only with FW version 3.01 or higher, this parameter sets the cutoff frequency [Hz] of the digital filter applied to the internal sensor signal. Use this parameter to eliminate noise in the regulated pressure signal. A big value of this parameters increases the time response of the regulator. If the value of this parameter is 0, the filter is disabled.

14.2.18.   Hysteresis value

Available only with FW version 3.01 or higher and if the dead band value is greater than 0. When the absolute error of the adjusted pressure (difference between the adjusted pressure and the target pressure) remains below the dead band value set for a sufficient time, the regulated pressure is considered stable and the hysteresis operating mode (A) is activated. If, on the other hand, the absolute error of the regulated pressure remains lower than the dead band value set for a NOT

sufficient time, the regulated pressure is deemed NOT stable and the hysteresis operating mode (B) is NOT activated.

When the hysteresis operating mode is active, the regulator will not make any adjustment as long as the absolute error of the regulated pressure remains less than the value of the sum of the dead band and hysteresis values set (C).

When the absolute error of the regulated pressure exceeds the value of the sum of the dead band and hysteresis values set, the hysteresis operating mode is deactivated (D) and therefore the regulator will not carry out any regulation only if the absolute error of the regulated pressure becomes lower than the set dead band value (E). To reactivate the hysteresis operating mode, the absolute error of the regulated pressure must remain below the dead band value set for a sufficient time.

This operating mode allows to reach the target pressure with sufficient precision, according to the dead band value set, and to define a wider range, defined by the set hysteresis value, in which the regulator will not perform any regulation.

Compatibly with the application carried out by the regulator, it is recommended to set:
- o the dead band value as small as possible, in order to obtain a good regulation precision of the regulated pressure
- o the hysteresis value as large as possible, generally greater than the dead band value, in order to limit the number of actuations of the regulator.

14.2.19.   Dead band:

Available only with FW version 3.01 or higher. When this parameter is set to a value higher than 0, the regulator will not make any adjustment as long as the absolute error of the regulated pressure (difference between the regulated pressure and the target pressure) remains lower than the set dead band value (red line).

On the other hand, when the absolute error of the regulated pressure exceeds the value of the set dead band, the regulator returns to carry out normal regulation (green line).

This operating mode makes it possible to avoid continuous adjustments by the regulator, increasing its life cycle. On the other hand, the achievement of the target pressure according to the declared

performance is not guaranteed: the adjusted pressure error will depend directly on the dead band value set.

14.2.20. Health status charge coil

Indicates the health status as a percentage of the charge coil, is either visible or not according to the diagnostics level of the Regulator.

14.2.21. Health status discharge coil

Indicates the health status as a percentage of the exhaust coil, is either visible or not according to the diagnostics level of the Regulator.

14.2.22. Cycles charge coil

Indicates the number of commands of the charge coil, is either visible or not according to the diagnostics level of the Regulator.

14.2.23. Cycles discharge coil

Indicates the number of commands of the exhaust coil, is either visible or not according to the diagnostics level of the Regulator.

14.2.24. Total work time charge coil

Indicates the total work time of the charge coil expressed in ms, is either visible or not according to the diagnostics level of the Regulator.

14.2.25. Total work time discharge coil

Indicates the total work time of the exhaust coil expressed in ms, is either visible or not according to the diagnostics level of the Regulator.

14.2.26. Temperature

Indicates the internal temperature of the regulator

14.2.27. Device Status

Indicates the status of the device:

- 0: the device is working properly.
- 1: Maintenance requested, the health indicator of a coil is low.
- 2: Out of specification, the device has at least one warning.

- 4: Failure, the device has at least one error and is unable to work (in this case the cyclic data are no longer valid).

14.2.27.1.   Detailed device status

The Detailed Device Status parameter is a list of 64 elements: the first bite of every elements indicate a data called EventQualifier, the others two bytes indicates the event code (the complete list of codes are available in the dedicated chapter).
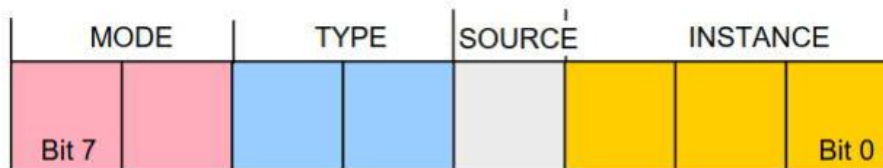

Figure A.24 – Structure of the EventQualifier

- Instance (bit da 0 a 2): indicates the cause of the event, in this case it will always have value 4.
- Source (bit 3): indicates which device generates the event, in this case it will always have value 0.
- Type (bit 4 e 5): indicates the event type, in this case it can assume the value 2 in case of warning or 3 in case of error.
- Mode (bit 6 e 7): indicates the mode, if it appears or disappears, in this case only the events present appear in the list and therefore will always have the value 3.

14.2.28.   Protection timeout

Sets the behavior of the pressure regulator in case it fails to reach the pressure target, to have an effect the control on the regulated pressure must be active.

When the error occurs, the pressure regulator will try again to reach the target after a time equal to the value indicated by this parameter (expressed in seconds).

If this parameter is null, the pressure regulator will not attempt any new regulation.

14.2.29.   Pressure failsafe

Sets the behavior of the pressure regulator in case the cyclic data is no longer valid.

Based on the value of this parameter, the pressure regulator can maintain the last valid target received (Maintenance) or regulate zero pressure (Discharge).

15. Block Parameters

This function allows the master to indicate the start and end of the transmission of a block of parameters.

In general, when you want to write a new parameter value, the master sends the new value and the device, upon receiving the data, checks its validity. In case it is valid, it is immediately effective.

In case of several parameters connected among each other, the change of the parameter without changing the others connected to it, may cause a malfunction of the device.

This could for example happen when you modify the unit of measurement of the regulator, without adjusting the other correlated parameters.

For this reason the parameter block has been introduced that consists in sending the following commands by the master: Start of transfer with parameter block; transfer of parameters; end of block.

Only upon receipt of the "End of block" command, the Regulator checks the validity of all parameters.

According to the master used, it is possible that the transfer of parameters takes place exclusively with the parameter block or according to the user's choice.

To help the user changing the unit of measurement, the Regulator implements an automatic conversion system of all the values that refer to it, regardless of the parameter block. This means that in the event there has been a change, the Regulator is able to detect which other parameters have not been changed and therefore need to be converted into the new unit of measurement.

16. Data Storage

The Data Storage is a function of the IO-Link protocol, enabling the master to store the parameterization of the device.

Each time it is turn on, the master compares the parameterization of the device with the one that has been saved and checks if there is a request from the device to save a new configuration.

The main situations that could occur are:

- The device was parameterized before commissioning: at the time of connection with the master, the device prompts it to save its parameterization.
- The device must be replaced: when connecting with the master, the latter realizes that the parameterization of the new device is different from the one that has been saved, so it proceeds with a new parameterization.

Depending on the master used, there may be additional functions, for an overview of all the functions and how to perform them refer to the manual of the IO-Link master.

17.IO Device description (IODD)

IODD is a mandatory file for every device that contains all necessary information to establish the communication and manage parameters and events of a specific device. The IODD of the Regulator is available on Camozzi's site at http://catalogue.camozzi.com/Downloads.aspx?cat=182

18. Troubleshooting and/or exceptional circumstances

The following table collects all the possible faults in the Pressure Regulator, it is possible to identify them by the color change of the diagnostic LED (yellow if warning or red if error) and by sending the event containing the code to the IO-Link master generated it.

UVIX Code	Name	Description	IO-Link code	
			EXE	DEC
ERROR = The control operations are interrupted				
E001	Alarm sensor	Communication error regarding pressure sensor, the sensor doesn't communicate in the right way or a diagnostic error is present	1800	6144
E002				
E005	Alarm EEprom	Memory writing, reading or accessing error of information that is essential to the process.	1802	6146
E006				
E007				
E009	Pressure out of range	The regulator is not able to reach the target pressure.	1804	6148
E010	Fault up coil	Generic error during pilot valve power on, probably caused by interrupted or short-circuited coil.	180D	6157
E011	Fault down coil	Generic error during pilot valve power off, probably caused by interrupted or short-circuited coil.	180E	6158
WARNING = The control operations are not interrupted but performance is not guaranteed				
A129	Undervoltage Power	Power supply is below the minimum value.	180C	6156
A130	Pressure out of range	The regulator is not able to reach the target pressure.	1805	6149
A131	No activation valve	No activation valve error	1803	6147
A132	Data process not valid	The connection with master is interrupted	180F	6159
A133	Warning EEprom	Memory writing, reading or accessing error of information that is not essential to the process.	1806	6150
A134				
A136				
A141	IO-Link target out of range	Target not valid	1807	6151
A139	Pressure switch Function	Active when the regulated pressure exceeds one of the thresholds set. Inactive when the regulated pressure lies within the thresholds set.	1808	6152

A140	Pressure window Function	Active when the regulated pressure exceeds the window set. Inactive when the regulated pressure lies within the window set.	1809	6153

If the device is equipped with the coil vision function, the following signals are also available:

UVIX Code	Name	Description	IO-Link code	
			EXE	DEC
WARNING = The control operations are not interrupted but performance is not guaranteed				
A137	Warning charge coil	The charge coil is near the end of its life cycle.	180A	6154
A138	Warning exhaust coil	The exhaust coil is near the end of its life cycle.	180C	6156

19. Limitations on use

- Never exceed the technical specifications stated in the paragraph "General characteristics" and the Camozzi general catalogue.
- Except for specific intended applications, do not use the product in environments with a risk of direct contact with corrosive gas, chemical products, salt water, water or steam.
- If possible, do not install the device:
  - in closed and small spaces
  - exposed to direct sunlight (if necessary provide a shield)
  - near heat sources or in areas subject to sudden changes in temperature
  - near power on parts with no proper insulation
  - near conductors or electrical devices with high alternate or impulsive currents (danger of parasitic currents);
  - near sources of high intensity electromagnetic waves (antennas) (danger of parasitic currents and / or arcing of electric arcs).
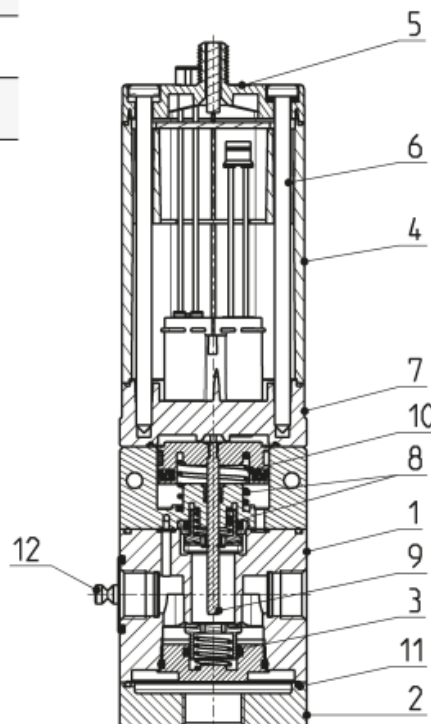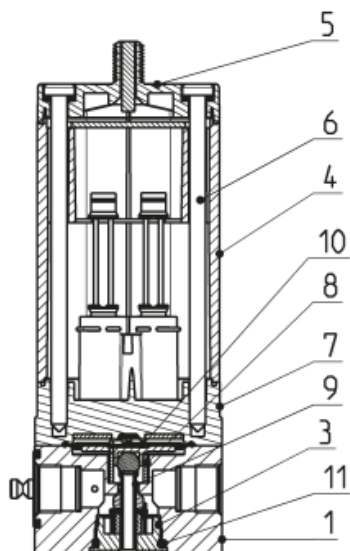
20. Maintenance

- Check all conditions to prevent the inadvertent release of parts, and disconnect the power supply to enable the discharge of residual pressure from the system before performing work.
- Discharge all pressure from the system and the actuator itself.
- Check whether it is possible to have the product serviced at a technical assistance centre.
- Never disassemble units when pressurized.
- Shut off all pneumatic, hydraulic and electric supplies before maintenance.

21. Environmental notes

- At the end of the product's life cycle, separate the relative materials to enable recycling.

- Observe all current standards in the country of use governing waste disposal.
- The product and relative parts all comply with the standards ROHS and REACH.

Parts		Materials
1	= body	Anodised aluminium
2	= end cover	Anodised aluminium
3	= plug	brass
4	= cover	PA6 CM 30%
5	= cap	PA6 CM 30%
6	= screws	stainless steel
7	= valve body	PARA GF50%
8	= springs	stainless steel
9	= piston rod	stainless steel
10	= piston seal	NBR
11	= seals and O-Ring	NBR standard version FKM oxygen version
12	= pin for manifold version	stainless steel only for manifold version

22.Contacts

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