



## PRESSURE REDUCERS

# PISTON COMPENSATED PRESSURE REDUCERS

## FUNCTION AND USAGE

The pressure reduction valve for Fluids or Liquids, defined as the "PRESSURE REDUCER", is a device that allows the automatic reduction of a high, variable upstream pressure to a stable and lower pressure downstream by means of a mechanical control mechanism. For this reason the pressure reducer is a device that keeps outgoing fluid at a pre-established and constant pressure and value.

Such pressure can be regulated within the indicated limits, by adjusting the calibration device on the valve body.

GNALI reducers are produced in a range from 3/8" to 2" and are available in different models and for different usages. They are all with compensated action.

The "metallic piston" construction system ensures that the outgoing pressure is not influenced by variations in pressure that may occur in the circuit upstream from the reducer.

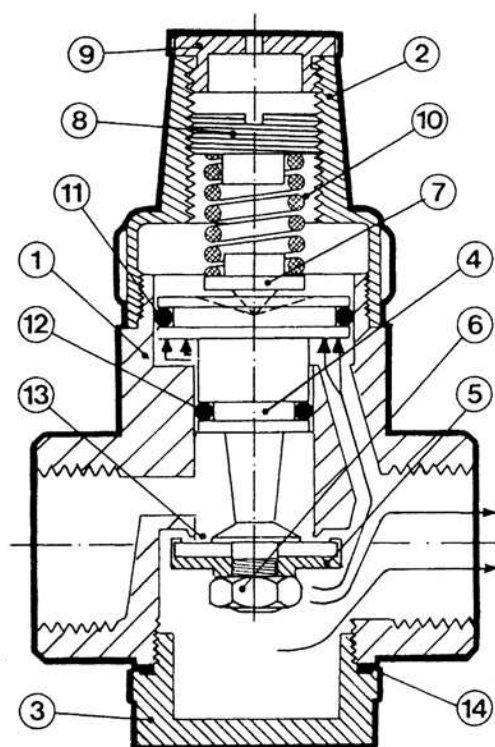


## FUNCTIONING

Unlike most reducers, GNALI reducers operate by means of a "piston" pressure reduction system. The constructional design shown in fig. 1 explains the functioning principle. The shutter (5), built into the control piston (4) follows the movements, caused by two prevailing contrasting forces, on one hand, the thrust of the spring (10), and on the other, the pressure of the incoming fluid. The shutter, fitted with a seal, keeps its position until the outgoing pressure reaches the calibration value (shutter open).

FIG.1

- 1) Housing
- 2) Cap
- 3) Plug
- 4) Plunger
- 5) Cylinder
- 6) Nut
- 7) Tip
- 8) Calibration collar
- 9) Hood
- 10) Calibration spring
- 11) Big toric packing -OR-
- 12) Small toric packing -OR-
- 13) Cylinder Packing



The section of the compensation piston (4) is identical to the opposed section of the seal housing. In this way, by creating a counterbalance, the thrust exercised by the pressure of the incoming liquid is counterbalanced and prevents influences on the calibration of the reduced pressure as the upstream pressure changes.

The control system, without the traditional diaphragm, makes the reduction system extremely strong and reliable. The seals on the piston (11-12) and the disk (13) guarantee an adequate range of usage and require less maintenance than the "diaphragm" systems.

It is very simple to replace seals and this can be done without removing the reducer from the pipes.

## USAGE

The pressure reducer can be used in a wide range of applications. Naturally, it is most frequently used in water distribution plants for sanitary systems.

Even if the most common application of the reducer is to reduce pressure in water mains, it can also be used with air, hydrocarbons, gas, etc.; obviously the characteristics of these fluids and gases (inert) must be compatible with the constructional characteristics of our reducers, which in adequate construction combinations, envisage the use of materials suitable for numerous fluids and gases with temperatures of up to 140° including aggressive fluids such as sea water or particularly aggressive waters.

The adoption of special UNI EN 12165 CW602N (DZR) brass, in suitable models, allows these reducers to be used on water systems in conditions where it is necessary to resist the corrosive action of water on the soluble metals contained **in the alloy**.

The use of the DZR alloy is particularly necessary on those plants that require a high organoleptic quality of water since this alloy has a very small content of water-soluble metals. (Pb-Zn). However, on request, if necessary special models can be produced that are compatible with fluids or gases.

## SELECTION

The model and the size of the reducer to be used must be selected taking into consideration the various characteristics of the Reducers we produce; diagrams 1 and 2 show how to select the right size according to the capacities and type of fluid (water or air). Diagram 1 indicates the capacities corresponding to the speed in the pipes; selection is usually made so that the speed in the pipes does not exceed 2.0 m/sec (water) and 20 m/sec (air). The maximum recommended capacities (water) for the various pipe diameters, corresponding to a speed of 2 m/sec are as follows:

DN 3/8"	QMAX 600 l/h
DN 1/2"	QMAX 1200 l/h
DN 3/4"	QMAX 2300 l/h
DN 1"	QMAX 3600 l/h
DN 1" 1/4	QMAX 6000 l/h
DN 1" 1/2	QMAX 9600 l/h
DN 2"	QMAX 14500 l/h

Designing the size of the plant according to the required capacities and making sure that the maximum levels are not exceeded will prevent the production of annoying resonance noises in the fluid running inside the pipes (the speed of the flow in the reducer housing is in fact about three times higher than that existing in the pipe). Moreover, it ensures that the reduction mechanism works correctly and lasts for a long time.

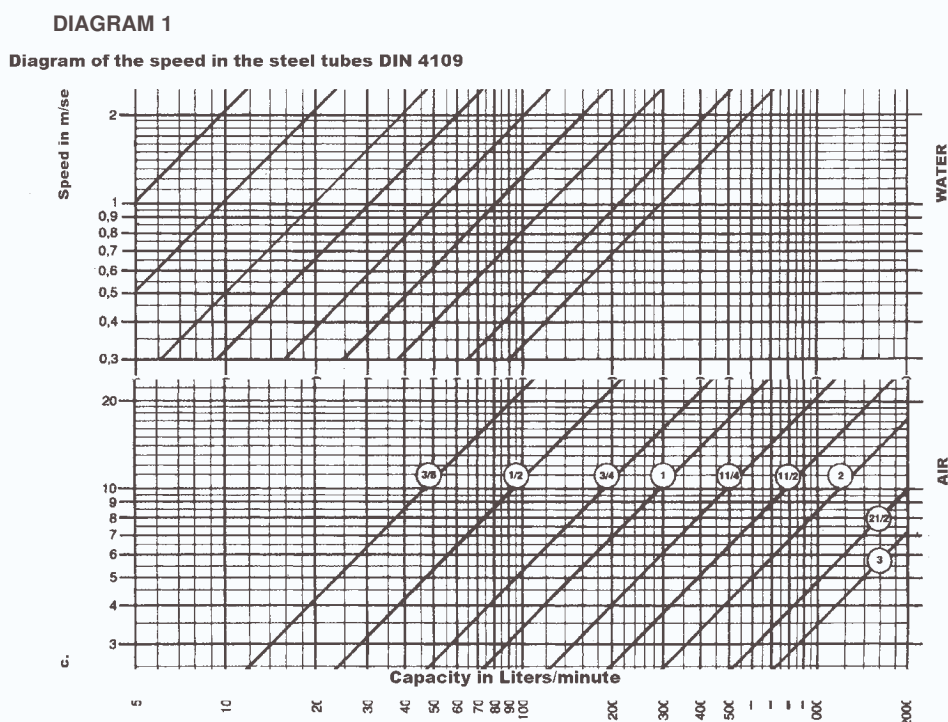


Diagram 2 indicates the flow resistance values of our reducers; this, therefore, is the loss of pressure, in the various models, as the fluid flows (values relating to water). The flow resistance remains more or less constant as the calibration pressure varies. You are recommended to size the plant so that the flow resistance does not exceed 1.2 bars.



## INSTALLATION

- GNALL reducers can be fitted in any position; the direction of flow indicated by the arrow stamped on the body must be respected.
- During the initial running phase, it is advisable to open all the supply taps in order to expel the air contained in the plant.
- A filter upstream of the reducer is always advisable.
- The reducers are supplied with pressure regulated at 2 bars. Proceed as follows to change this calibration: remove the cap (9) and turn the ring nut (8) in a clockwise direction to increase the output pressure and in an anticlockwise direction to decrease it. The new regulation can always be checked when there is no fluid passing through the reducer (no drawing) via a manometer.

- Special versions can be made on request (different calibration range, usage with particular fluids, etc.).
- Maintenance is carried out by replacing the seal on the housing and the O-Rings (fig.2)



Fig.2

## SCALING EXAMPLE

Scaling of a GNALL reducer in a water system with the following characteristics (fig. 3)

- pressure reduced downstream from reducer ( $Q=0$ ):  $P_0 = 4.0$  bars
- maximum required capacity:  $Q = 150$  l/min.
- hydrostatic height:  $P_1 = 17.5$  (1.75 bars)
- minimum pressure requested upstream of the less advantageous supply tap:  $P_2 = 0.6$  bar
- flow resistance in pipes in conditions of maximum capacity contemporaneity (from the reducer to the least advantageous supply tap);  $\Delta P = 0.65$  bar

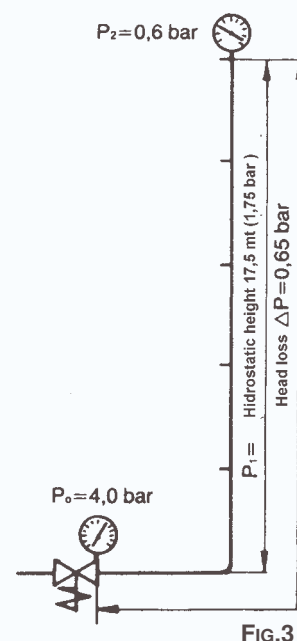


Fig.3

The designer is always aware of the data indicated above.

Therefore, downstream from the reducer a minimum pressure of:  $P_{min} = P_1 + P_2 + \Delta P = 3.0$  bar must be

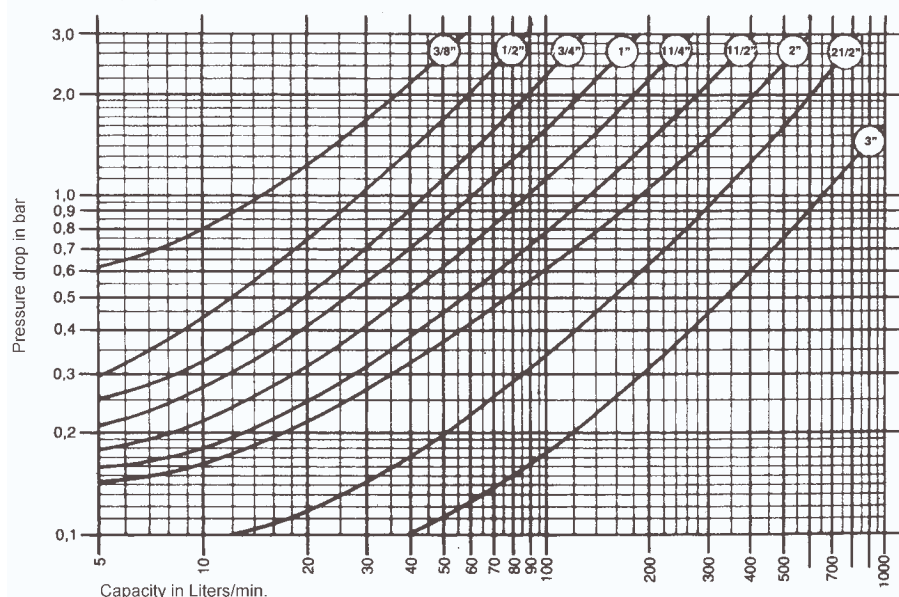
guaranteed with a capacity of 150 l/min. Since the reducer is regulated for a pressure of  $P_0 = 4.0$  bar ( $Q=0$ ), selection must be made so that the flow resistance through the reducer does not exceed the value of 1.0 bar.

In diagram 2 it can be seen that flow resistances in reducers DN 1"1/2 and DN 2" are close to the requested values: **DN 1"1/2: 1.10 bars - DN 2": 0.84 bar**. By selecting the DN 2" model, the minimum pressure guaranteed in the plant will be:  $P_{min} = 4.00 - 0.84 = 3.16$  bars a higher value than the previously calculated minimum required (3.0 bars).

On the other hand, on diagram 1 it will be possible to check that the speed of 2.0 m/sec is not exceeded in the envisaged reducer model. Selection must therefore take into account the characteristics of the circuit and, in some special cases, it may also be made with a flow speed in the pipes of less than 1 m/sec.

DIAGRAM 2

Load drop of pressure, reducers DN 3/8" - 2"

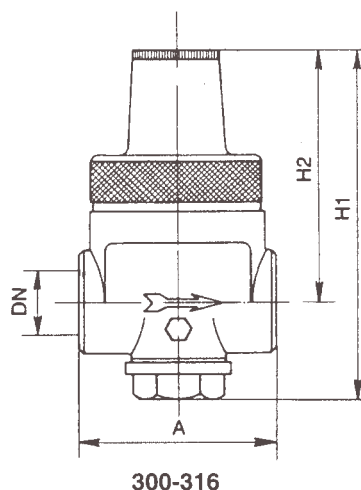


## PRESSURE REDUCERS STANDARD SERIES

The STANDARD series, with appropriate weights and measurements **for a substantial usage** of the reduction function, is based on a piston and compensation chamber mechanism. Suitable for use in circuits for small and moderate-sized civil or domestic plants such as multi-family apartment blocks, small houses or villas, or on industrial plants with pressures below 30 bars and good capacities. The values and excellent functioning balance are ensured by the high quality machining of the internal parts and by a sufficiently sturdy central structure. The nickel-plated version can be adapted for "exposed" installation.



STANDARD Series				
DN	A	H1	H2	Size
3/8"	52	90	67,5	590
1/2"	65	95	71,5	720
3/4"	74	98	79,5	750
1"	79	131	94	1510
1 1/4"	87	144	99	2150
1 1/2"	106	170	125	3650
2"	122	192	131	5310



300-316

### CONSTRUCTIONAL FEATURES

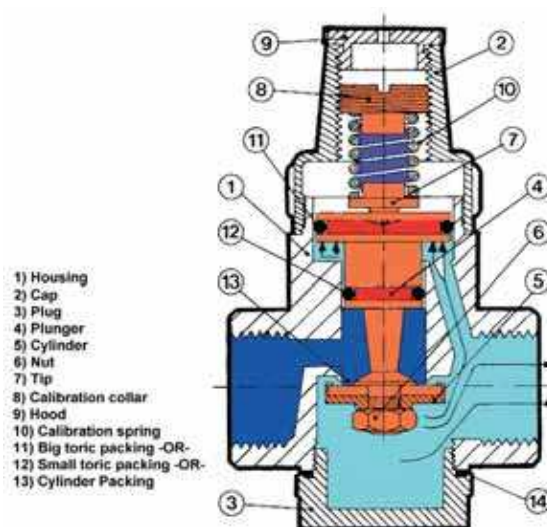
- Rated plant pressure PN 25
- Compensated action with housing and body in EN 12165 - CW 617N (3/8" ÷ 2")
- Sandblasted or nickel-plated version on request
- Calibration spring in special steel
- Maximum reduction ratio: 1:10
- Maximum pressure upstream: 30 bars
- Calibration range: 1.0 - 4.5 bars (H.D. version 2.0 - 9.0 bars)
- Seals: EPDM
- Maximum temperature of fluid (water) 80°C (in version with VITON seals 130°)
- Threaded sockets ISO 228/1
- Sockets for output pressure reading manometer, sealed with plastic threaded plug-ring nut F 1/4" ISO 228/1
- Tests and inspections: EN 1567

All the reducers in the STANDARD series are inspected and calibrated at an output pressure of 2 bars.

## PRESSURE REDUCERS SUPER SERIES

The SUPER series is suitable **for a very frequent usage** of the reduction function and is based on an oversized piston and compensation chamber mechanism, with chemical Nickel hardening treatment of the runner housings and greater wear on the piston. Suitable for use in circuits for large civil and industrial plants with frequent sudden changes in pressure and accurate reduction values or on industrial plants with constant usage pressures up to 30 bars and high capacity volumes. The values and balanced functionalities are ensured by the high quality machining of the internal parts and by a proportionally sturdy central structure. The nickel-plated version can be adapted for "exposed" installation.

SUPER Series					
Code	a	A	H1	H2	Size
310	3/8"	52	90	67,5	590
311	1/2"	65	95	71,5	732
312	3/4"	74	107	79,5	1183
313	1"	79	131	94	1510
314	1 1/4"	87	144	99	2158
315	1 1/2"	106	170	125	3652
316	2"	122	192	131	5349



### CONSTRUCTIONAL FEATURES

- Rated input pressure PN 25
- Compensated action with forged and machined housing and body in Brass EN 12165 -CW 617N (3/8" ÷ 2")
- Chemical Nickel hardened piston housing
- External surface treatment: nickel-plated
- Calibration spring in special steel
- Maximum reduction ratio: 1:10
- Maximum pressure upstream: 30 bars
- Calibration range: 1.0 – 4.5 bar (H.D. version 2.0 – 9.0 bar)
- Seals: EPDM
- Maximum temperature of fluid (water) 80°(in version with Viton seals Viton 130°)
- Threaded sockets ISO 228/1
- F 1/4" ISO 228/1 manometer-holder sockets are installed for reading output pressure, sealed with a threaded ring nut-plug in plastic
- Tests and inspections: EN 1567

All the reducers in the SUPER series are inspected and calibrated at an output pressure of 2 bars.

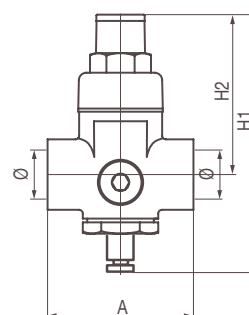
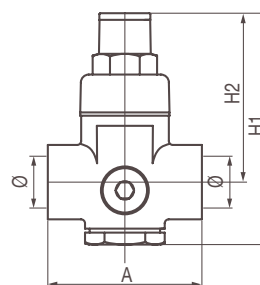
## PRESSURE REDUCERS

### MIGNON SERIES

The MIGNON series is characterised by a piston and compensation chamber mechanism. The pressure reducers in this series are light and small. **Suitable to be used in circuits for small civil or domestic plants** such as: mono-family apartments, small houses or villas, or on industrial plants with pressures below 25 bars and small capacities. The values and excellent functioning balance are ensured by the high quality machining of internal parts. The nickel-plated version is suitable for exposed installation.

MIGNON Series					
Code	a	A	H1	H2	Size
320	3/8"	57	87	65	400
321	1/2"	57	87	65	400
322	3/4"	70	87	65	450

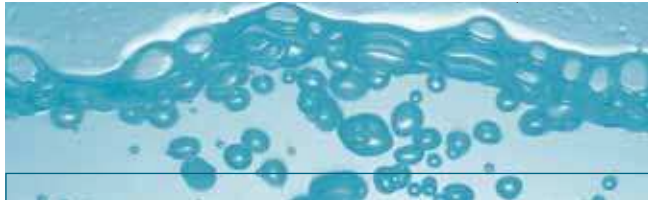
MIGNON-P Series					
Code	a	A	H1	H2	Size
320/P	3/8"	57	103	65	400
321/P	1/2"	57	103	65	400
322/P	3/4"	70	103	65	450



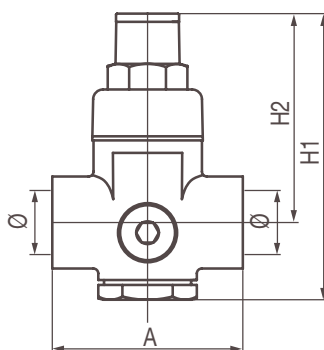
#### CONSTRUCTIONAL FEATURES

- Rated plant pressure PN 25
- Compensated action with forged and machined housing and body in EN 1 21 65 - CW 61 7N (3/8" ÷ 3/4")
- External surface treatment: sandblasted or nickel-plated
- Calibration spring in special steel
- Maximum reduction ratio: 1:8
- Maximum pressure upstream: 25 bars
- Calibration range: 1.0 – 4.5 bars
- Seals: EPDM
- Maximum temperature of fluid (water) 80° (in version with Viton seals Viton 130°)
- Threaded sockets ISO 228/1
- Except for mod. 321 (Mignon), 1/4" ISO 228/1 manometer-holder sockets are installed for reading output pressure, sealed with plastic threaded plug-ring nut
- Tests and inspections: EN 1567

All the reducers in the MIGNON and MIGNON-P series are inspected and calibrated at an output pressure of 2 bars.



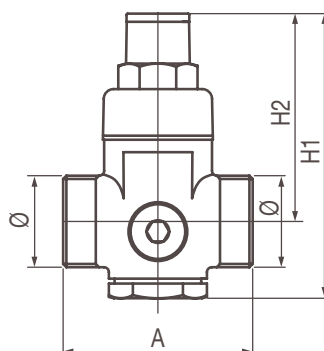
## MIGNON SERIES SOCKET F/F



Pressure reducer compensated by a piston mechanism, suitable for light plumbing systems. Body and housing in CW617N brass. FF. PN 25 reduction from 1:8.

Code	a	A	H1	H2	Size
320	3/8"	57	87	65	400
321	1/2"	57	87	65	400
322	3/4"	70	87	65	450

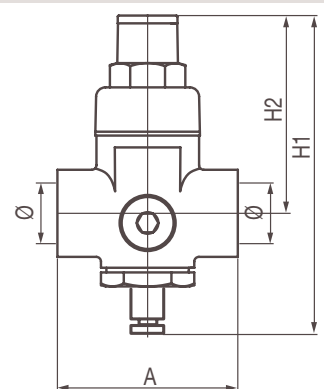
## MIGNON SERIES SOCKET M/M



Pressure reducer compensated by a piston mechanism, suitable for light plumbing systems. Body and housing in CW617N brass. MM. PN 25 reduction from 1:8.

Code	a	A	H1	H2	Size
325	1/2"	57	87	65	400
323	3/4"	70	87	65	450

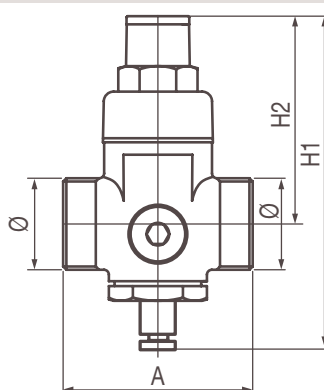
## MIGNON SERIES SOCKET F/F WITH MANOMETER HOLDER



Pressure reducer compensated by a piston mechanism, suitable for light plumbing systems. Body and housing in CW617N brass. FF. PN 25 reduction from 1:8.

Code	a	A	H1	H2	Size
320/P	3/8"	57	103	65	400
321/P	1/2"	57	103	65	400
322/P	3/4"	70	103	65	450

## MIGNON SERIES SOCKET M/M WITH MANOMETER HOLDER

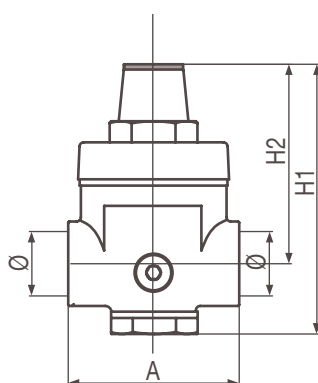


Pressure reducer compensated by a piston mechanism, suitable for light plumbing systems. Body and housing in CW617N brass. MM. PN 16 reduction from 1:8.

Code	a	A	H1	H2	Size
325/P	1/2"	57	103	65	400
323/P	3/4"	70	103	65	450



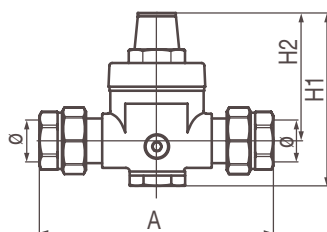
## STANDARD SERIES



Pressure reducer compensated by a piston mechanism, suitable for light plumbing systems. Body and housing in CW617N brass. FF-MM connections with manometer holder socket. PN 30 reduction 1:4 bar.

Code	a	A	H1	H2	Size
300	3/8"	52	90	67,5	590
301	1/2"	65	95	71,5	732
302	3/4"	74	107	79,5	1183
303	1"	79	131	94	1510
304	1 1/4"	87	144	99	2158
305	1 1/2"	106	170	125	3652
306	2"	122	192	131	5349

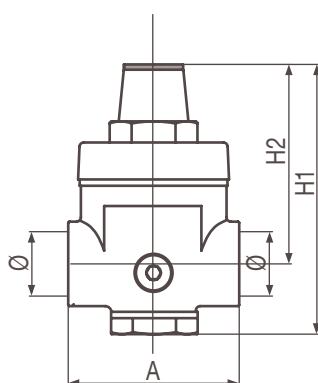
## STANDARD SERIES WITH PIPE UNIONS



Pressure reducer compensated by a piston mechanism, suitable for light and industrial plumbing systems. Body and housing in CW617N brass. FF pipe union connections also available nickel-plated. FF connections with manometer holder socket. PN 30 reduction 1:4 bar.

Code	a	A	H1	H2	Size
301/BF	1/2"	133	95	71,5	932
302/BF	3/4"	154	107	79,5	1487
303/BF	1"	173	131	94	2010

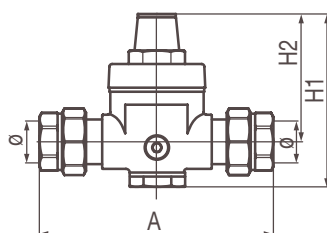
## SUPER SERIES



Pressure reducer compensated by a piston mechanism, suitable for light and industrial plumbing systems. Body in CW617N brass and housing in chemically nickel plated brass for high resistance to wear and tear. FF connection also available nickel-plated. With manometer holder socket. PN 30 reduction 1:4 bar.

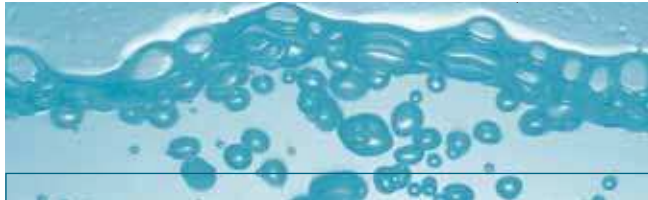
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310	3/8"	52	90	67,5	590
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312	3/4"	74	107	79,5	1183
313	1"	79	131	94	1510
314	1 1/4"	87	144	99	2158
315	1 1/2"	106	170	125	3652
316	2"	122	192	131	5349

## SUPER SERIES WITH PIPE UNION



Pressure reducer compensated by a piston mechanism, suitable for light and industrial plumbing systems. Body in CW617N brass and housing in chemically nickel-plated brass for high resistance to wear and tear. FF pipe union connections also available nickel-plated. With manometer holder socket. PN 30, reduction 1:4 bar.

Code	a	A	H1	H2	Size
311/BF	1/2"	133	95	71,5	932
312/BF	3/4"	154	107	79,5	1487
313/BF	1"	173	131	94	2010



## AUTOMATIC FILLING UNIT

The axial-flow, automatic filling valve is fitted in all installations equipped with both closed and open expansion tank in order to obtain automatic and constant feeding so as to be able to switch the water supply on and off manually and to adjust the circuit pressure. For closed circuit plants, recommended for feeding heating or chilling circuits. It is usually produced in the Nickel-plated version for "exposed" mounting and is also available in the sandblasted brass version, with combined function of:

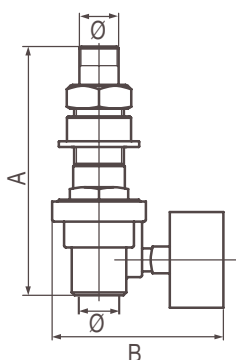
- pressure reduction,
- check,
- on/ off,
- filter
- recording reduced pressure.



### CONSTRUCTIONAL CHARACTERISTICS

- Body in CW617N Brass, stainless steel spring and washers Ethylene-propylene diaphragm
- Nickel finishing
- Maximum operating pressure: 10 bars
- Calibration range: 0.5 - 4.0 bars
- Calibration pressure (in the factory): 1.0 bars
- Threaded sockets Gas MF with nut and sleeve: 1 / 2"
- Threaded pressure gauge F 1 / 4" ISO 228/ 1

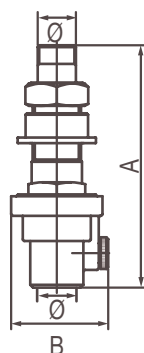
## AUTOMATIC FILLING UNITS AND MANOMETERS



Axial-flow automatic filling valve, suitable for closed circuit systems with combined functions. Body in CW617N nickel-plated brass. FM connections with pipe union.  
With manometer, campo di taratura 0,5÷4,0 bar.  
Manometro incluso non assemblato.

Code	a	A	B	H2	Size
705/M	1/2"	128	78		478

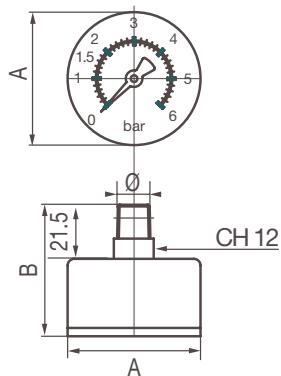
## AUTOMATIC FILLING UNITS AND MANOMETERS



Axial-flow automatic filling valve, suitable for closed circuit systems with combined functions. Body in CW617N nickel-plated brass. FM connections with pipe union.  
With manometer, campo di taratura 0,5÷4,0 bar.  
Manometro incluso non assemblato.

Code	a	A	B	H2	Size
705	1/2"	128	49		478

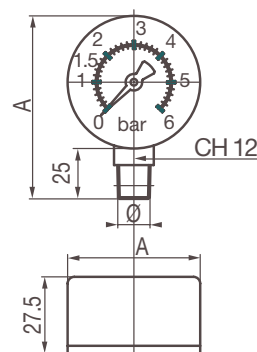
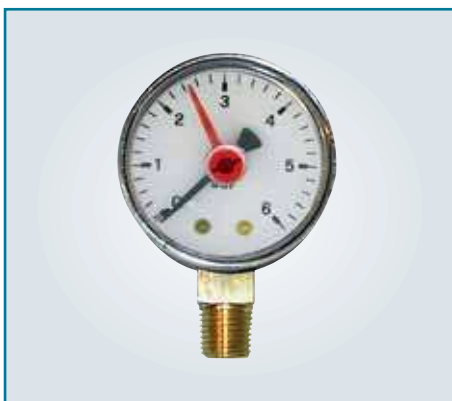
## MANOMETERS FOR PRESSURE REDUCERS



Manometer with rear socket for GB reducers, body in plastic, dial diameter 50 mm.

Code	a	A	B	Scale
701/6	1/4"	50	49	0-6
701/10	1/4"	50	49	0-10

## MANOMETERS FOR PRESSURE REDUCERS



Manometer with lateral socket for GB reducers, body in plastic, dial diameter 50 mm.

Code	a	A	B	Scale
702/6	1/4"	50	75	0-6
702/10	1/4"	50	75	0-10
702/25	1/4"	50	75	0-25