

GAS PRESSURE REGULATORS WITH RELIEF VALVE

Serie IR5 ... DN 32 ÷ 100



ITALPUMP



DESCRIPTION

Direct-operated gas pressure regulator with compensated obturator.

Pmax = 0,5 ÷ 5 bar

This devices are equipped with the following safety devices and accessories:

- **relief valve:**

it vents outside small quantity of gas in case there are downstream regulator overpressure. That exhaust it is convoyed outside in case of installation in environment with bad ventilation

- **outlet over pressure shut-off device (OPSO):** it stops the gas flow when the regulator outlet pressure goes up the device setting value

- **outlet under pressure shut-off device (UPSO):** it stops the gas flow when the regulator outlet pressure goes down the device setting value. It closes even if there is no inlet pressure.

- **outlet pressure test point.**

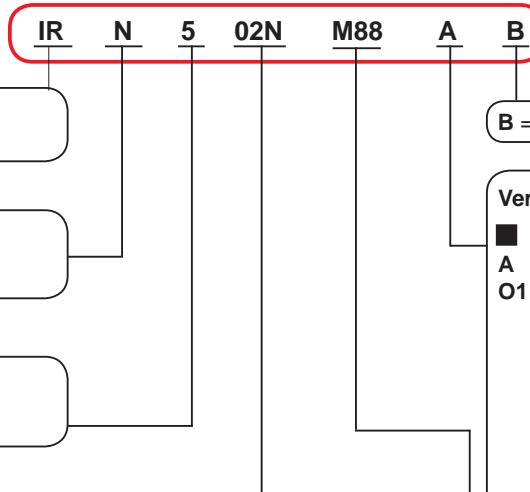
- EC certified according to EN 88-2 and EN 334

- In conformity with the 2009/142/EC Directive (Gas Directive)

- In conformity with the 97/23/EC Directive (PED Directive)

- In conformity with the 94/9/EC Directive (ATEX Directive)

IDENTIFICATION



Single stage gas pressure regulator with relief valve **series IR...**

Types

N = STANDARD version

Pmax

5 = Pmax 0,5 ÷ 5 bar

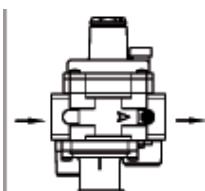
B = biogas

Versions

■ = without relief valve

A = with relief valve

O1 = with OPSO, UPSO and relief valve



Connections

Threaded				Flanged			
Code	GAS	Code NPT	NPT	Code	PN 16	Code ANSI	ANSI PN 16
05	DN 32 (G 1"1/4)	05N	DN 32 (NPT 1"1/4)	32	DN 32	32A	DN 32 ANSI
06	DN 40 (G 1"1/2)	06N	DN 40 (NPT 1"1/2)	40	DN 40	40A	DN 40 ANSI
07	DN 50 (G 2")	07N	DN 50 (NPT 2")	50	DN 50	50A	DN 50 ANSI
				08	DN 65	08A	DN 65 ANSI
				09	DN 80	09A	DN 80 ANSI
				10	DN 100	10A	DN 100 ANSI

Settings: see next page

M88 = setting spring (**mbar**)
(P2+diff. relief valve range)

M66 = setting spring (**mbar**)
(P2+OPSO+UPSO+diff. relief valve range)
.....

NOTE: not all combinations are possible
Please contact the technical department.

SETTINGS

Connections	P2 (mbar)	OPSO (mbar)	UPSO (mbar)	Differential relief valve range (mbar)	Code P. max 0,5 ÷ 5 bar
DN 32 - 40 - 50	10 ÷ 22	30 ÷ 90	7 ÷ 20	10 ÷ 20	M66
	15 ÷ 33	30 ÷ 90	7 ÷ 20	15 ÷ 40	M67
	32 ÷ 60	30 ÷ 90	10 ÷ 30	15 ÷ 40	M68
	50 ÷ 95	70 ÷ 140	10 ÷ 30	40 ÷ 80	M69
	85 ÷ 180	90 ÷ 260	30 ÷ 50	40 ÷ 80	M70
	150 ÷ 350*	200 ÷ 550	50 ÷ 110	50 ÷ 120	M71
	300 ÷ 500*	500 ÷ 1000	50 ÷ 110	50 ÷ 120	M72
	500 ÷ 800*	500 ÷ 1000	50 ÷ 110	50 ÷ 120	M77
	10 ÷ 22	-	-	10 ÷ 20	M88
	15 ÷ 33	-	-	15 ÷ 40	M89
	32 ÷ 60	-	-	15 ÷ 40	M90
	50 ÷ 95	-	-	40 ÷ 80	M91
	85 ÷ 180	-	-	40 ÷ 80	M92
	150 ÷ 350*	-	-	50 ÷ 120	M93
	300 ÷ 500*	-	-	50 ÷ 120	M94
	500 ÷ 800*	-	-	50 ÷ 120	M78
DN 65 - 80	13 ÷ 27	40 ÷ 110	7 ÷ 15	15 ÷ 50	M73
	22 ÷ 58	40 ÷ 110	15 ÷ 25	15 ÷ 50	M74
	50 ÷ 130	90 ÷ 210	25 ÷ 70	15 ÷ 50	M75
	110 ÷ 200	180 ÷ 350	70 ÷ 110	20 ÷ 100	M76
	13 ÷ 27	-	-	15 ÷ 50	M95
	22 ÷ 58	-	-	15 ÷ 50	M96
	50 ÷ 130	-	-	15 ÷ 50	M97
	110 ÷ 200	-	-	20 ÷ 100	M98
PILOTED REGULATOR					
	170 ÷ 400	-	-	40 ÷ 200	M85
	300 ÷ 530	-	-	40 ÷ 200	M86
	530 ÷ 1300	-	-	40 ÷ 200	M87
	800 ÷ 1500	-	-	40 ÷ 200	M99
DN 100	15 ÷ 27	40 ÷ 110	7 ÷ 15	15 ÷ 50	M73
	27 ÷ 55	40 ÷ 110	15 ÷ 25	15 ÷ 50	M74
	55 ÷ 130	90 ÷ 210	25 ÷ 70	15 ÷ 50	M75
	130 ÷ 200	180 ÷ 350	70 ÷ 110	20 ÷ 100	M76
	15 ÷ 27	-	-	15 ÷ 50	M95
	27 ÷ 55	-	-	15 ÷ 50	M96
	55 ÷ 130	-	-	15 ÷ 50	M97
	130 ÷ 200	-	-	20 ÷ 100	M98
PILOTED REGULATOR					
	170 ÷ 400	-	-	40 ÷ 200	M85
	300 ÷ 530	-	-	40 ÷ 200	M86
	530 ÷ 1300	-	-	40 ÷ 200	M87
	800 ÷ 1500	-	-	40 ÷ 200	M99

* = strengthen diaphragm

GENERAL DATA

TECHNICAL DATA

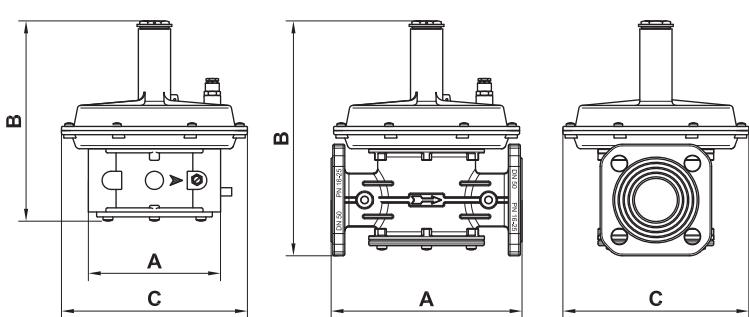
- Use: not aggressive gases of the 3 families (dry gases)
- Threaded connections Rp: (DN 32 ÷ DN 50) according to EN 10226
- Flanged connections PN 16: (DN 32 ÷ DN 100) according to ISO 7005
- On request ANSI 150 flanged connections
- Max. working pressure: 5 bar
- Environment temperature: -20 ÷ +60 °C
- Max superficial temperature: 60 °C
- P2 accuracy class (**AC**): 10
- Overpressure lockout accuracy group (**AG**): 10
- Closing pressure class (**SG**): 30
- Trip pressure range: see springs table
- Shut-off closure time: < 1 s
- Relief valve: tested according to EN 334
- Vent connection: G 1/4"
- Mechanical strength: Group 2 (according to EN 13611:2007)
- Safety factor: f=4 (5*4 = 20 bar) according to EN 88-2 point 7.2

MATERIALS

- Die-cast aluminium (UNI EN 1706)
- OT-58 brass (UNI EN 12164)
- 11S aluminium (UNI 9002-5)
- Stainless steel (UNI EN 10088)
- NBR rubber (UNI 7702)
- Nylon 30% glass fibre (UNI EN ISO 11667)

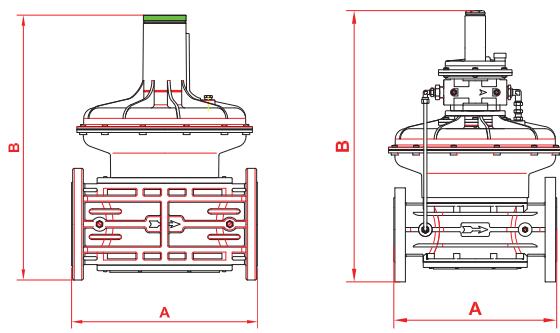
DIMENSIONS

DN 32 - DN 40 -DN 50

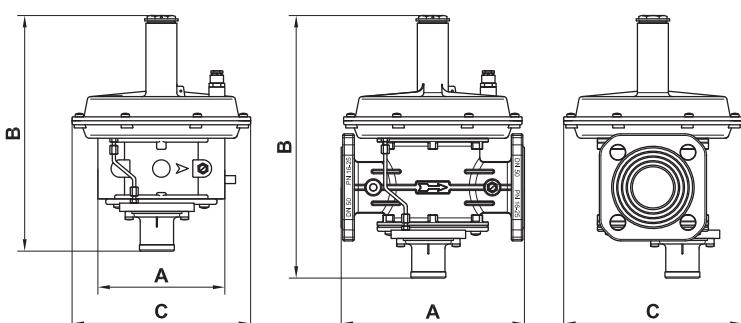


Connections	A	B	C
DN 32 ÷ 50 threaded	160	245	225
DN 32 ÷ 50 flanged	230	285	225

DN 65 - DN 80 - DN 100



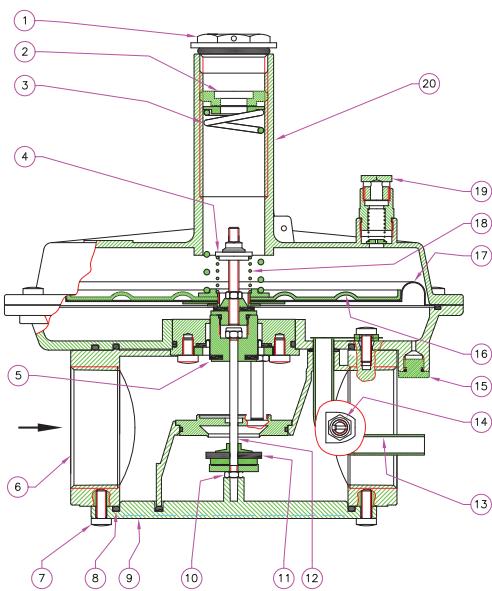
Connections	A	B
DN 65	290	471
DN 80	310	478
DN 100	350	504
IR ... O		
DN 65	290	528
DN 80	310	535
DN 100	350	561
PILOTED REGULATOR		
DN 65	290	518
DN 80	310	525
DN 100	350	551



Connections	A	B	C
DN 32 ÷ 50 threaded	160	297	225
DN 32 ÷ 50 flanged	230	330	225

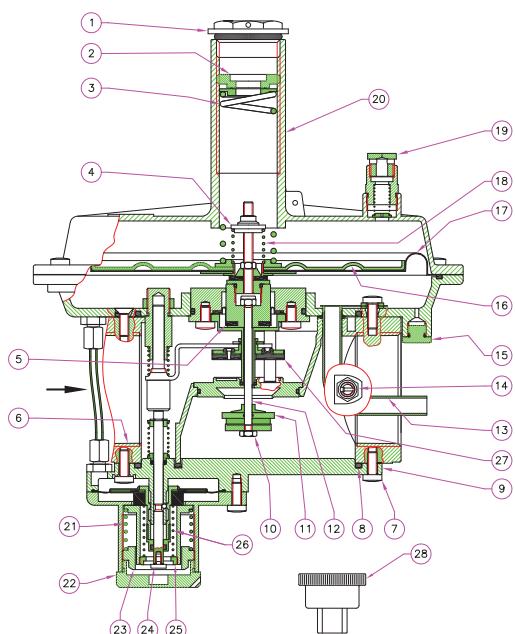
COMPONENTS

DN 32 - DN 40 -DN 50

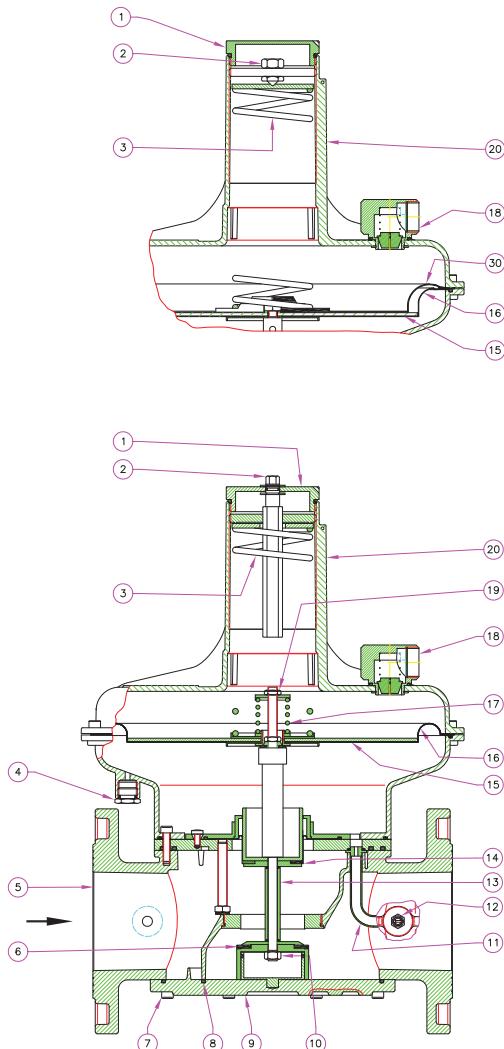


LEGEND

1. Closing cap
2. Outlet pressure calibration
3. P2 regulation spring
4. Relief valve calibration
5. Compensation diaphragm
6. Body
7. Bottom fixing screws
8. Seal O-Ring
9. Bottom
10. Fixing nut
11. Closure member
12. Central pin
13. Sensor tube
14. Outlet pressure test nipple
15. G 1/8" connection
16. Diaphragm disc
17. Working diaphragm
18. Relief valve spring
19. Antidust cap
20. Funnel
21. Maximum shut-off spring
22. Closing cap (shut-off)
23. Calibration of maximum pressure shut-off
24. Reset of shut-off device
25. Calibration of minimum pressure shut-off
26. Minimum shut-off spring
27. Closure member of shut-off
28. Special Key

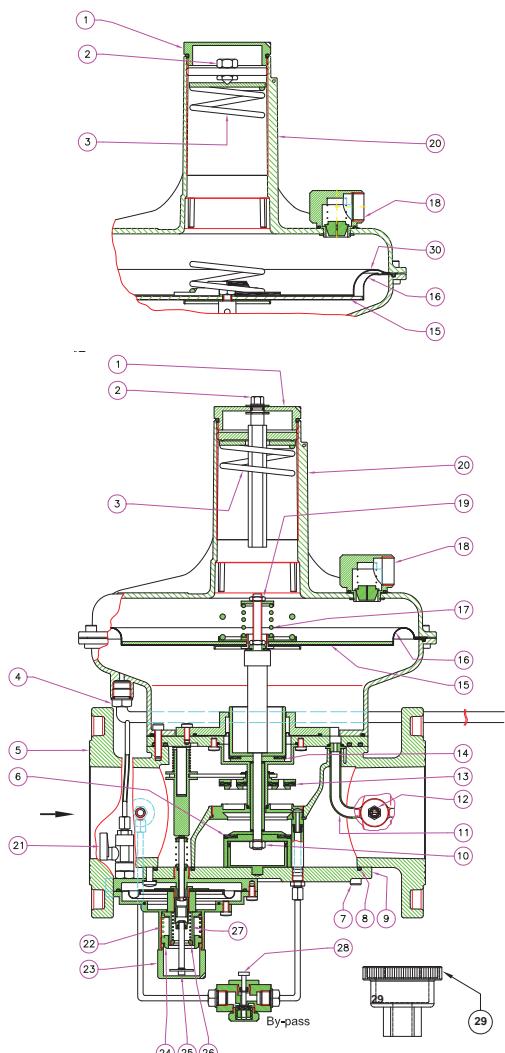


DN 65 - DN 80 - DN 100



LEGEND

1. Closing cap
2. Outlet pressure calibration
3. P2 regulation spring
4. External sensing line connection
5. Body
6. Closure member
7. Bottom fixing screws
8. Seal O-Ring
9. Bottom
10. Fixing nut
11. Seal seat
12. Outlet pressure test nipple
13. Central pin/Closure member
14. Compensation diaphragm
16. Diaphragm disc
17. Working diaphragm
18. Relief valve spring
19. Antidust cap/relief valve discharge
20. Relief valve calibration
21. Funnel
21. Tap
22. OPSO spring
23. Closing cap (shut-off)
24. OPSO calibration
25. Reset of shut-off device
26. UPSO calibration
27. UPSO spring
28. By-pass button
29. Special key
30. Safety diaphragm (no on piloted version)



SETTINGS SPRINGS

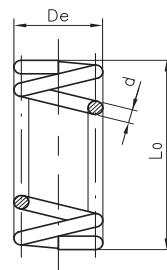
Connections	P2 (mbar)	Code and dimensions (d x De x Lo x it) (mm)	OPSO (mbar)	Code and dimensions (d x De x Lo x it) (mm)	UPSO (mbar)	Code and dimensions (d x De x Lo x it) (mm)	Differential relief valve range (mbar)	Code and dimensions (d x De x Lo x it) (mm)
DN 32 - DN 40 - DN 50	10 ÷ 22	M08 (2x29x140x16)	30 ÷ 90	M51 (2x35x20x4)	7 ÷ 20	M40 (0,8x17x40x6)	10 ÷ 20	M33 (1,3x17x40x6)
	15 ÷ 33	M09 (2,2x29x140x18)	30 ÷ 90	M51 (2x35x20x4)	7 ÷ 20	M40 (0,8x17x40x6)	15 ÷ 40	M34 (1,8x18,4x45x8,5)
	32 ÷ 60	M06 (2,5x29x155x16)	70 ÷ 140	M53 (2X35X37X4)	10 ÷ 30	M41 (0,9x17x45x7)	15 ÷ 40	M34 (1,8x18,4x45x8,5)
	50 ÷ 95	M10 (3x29x140x18)	70 ÷ 140	M53 (2X35X37X4)	10 ÷ 30	M41 (0,9x17x45x7)	40 ÷ 80	M35 (2x17x54x9)
	85 ÷ 180	M11 (3,5X29X125X14)	90 ÷ 260	M54 2X35,5X27X3)	30 ÷ 50	M44 (1x17x52x7)	40 ÷ 80	M35 (2x17x54x9)
	150 ÷ 350*	M12 (4X29X98X8)	200 ÷ 550	M55 (2,5x35x27x2,25)	50 ÷ 110	M43 (1,2x15x36x5)	50 ÷ 120	M36 (18x2,5x50x8)
	300 ÷ 500*	M29 (4,6x29,4x95x9)	500 ÷ 1000	M56 (3x35x33,5x3,5)	50 ÷ 110	M43 (1,2x15x36x5)	50 ÷ 120	M36 (18x2,5x50x8)
	500 ÷ 800*	M29 (4,6x29,4x95x9)	500 ÷ 1000	M56 (3x35x33,5x3,5)	50 ÷ 110	M43 (1,2x15x36x5)	50 ÷ 120	M36 (18x2,5x50x8)
DN 65 - DN 80	13 ÷ 27	M14 (4,5x70x200x14,5)	40 ÷ 110	M54 (2X35,5X27X3)	7 ÷ 15	M41 (0,9x17x45x7)	15 ÷ 50	M22 (3,5x29,8x64x9)
	22 ÷ 58	M15 (5x70x200x13,5)	40 ÷ 110	M54 (2X35,5X27X3)	15 ÷ 25	M42 (1x17x40x6)	15 ÷ 50	M22 (3,5x29,8x64x9)
	50 ÷ 130	M16 (6x70x200x10,5)	90 ÷ 210	M55 (2,5x35x27x2,25)	25 ÷ 70	M46 (1,3X17X40X6)	15 ÷ 50	M22 (3,5x29,8x64x9)
	110 ÷ 200	M80 (M16+M17) (6x70x200x10,5 + 5,5x54,5x195x12,5)	180 ÷ 350	M57	70 ÷ 110	M47 (1,8x18,4x45x8,5)	20 ÷ 100	M12 (4X29X98X8)
DN 100	15 ÷ 27	M14 (4,5x70x200x14,5)	40 ÷ 110	M54 (2X35,5X27X3)	7 ÷ 15	M41 (0,9x17x45x7)	15 ÷ 50	M22 (3,5x29,8x64x9)
	27 ÷ 55	M15 (5x70x200x13,5)	40 ÷ 110	M54 (2X35,5X27X3)	15 ÷ 25	M42 (1x17x40x6)	15 ÷ 50	M22 (3,5x29,8x64x9)
	55 ÷ 130	M16 (6x70x200x10,5)	90 ÷ 210	M55 (2,5x35x27x2,25)	25 ÷ 70	M46 (1,3X17X40X6)	15 ÷ 50	M22 (3,5x29,8x64x9)
	130 ÷ 200	M80 (M16+M17) (6x70x200x10,5 + 5,5x54,5x195x12,5)	180 ÷ 350	M57	70 ÷ 110	M47 (1,8x18,4x45x8,5)	20 ÷ 100	M12 (4X29X98X8)

PILOTED REGULATOR

DN 65 - 80 - 100	170 ÷ 400	M22 (3,5X29,8X64X9)	-	-	-	-	40 ÷ 200	M32 (2x17x29x6)
	300 ÷ 530	M07 (3,5x29,8x98x11,5)	-	-	-	-	40 ÷ 200	M32 (2x17x29x6)
	530 ÷ 1300	M12 (4X29X98X8)	-	-	-	-	40 ÷ 200	M32 (2x17x29x6)
	800 ÷ 1500	M29 (4,6x29,4x95x9)	-	-	-	-	40 ÷ 200	M32 (2x17x29x6)

Dimension Legend

d=diameter
 De = external diameter
 Lo= length
 it = total number of turns



PRESSURE CAPACITIES

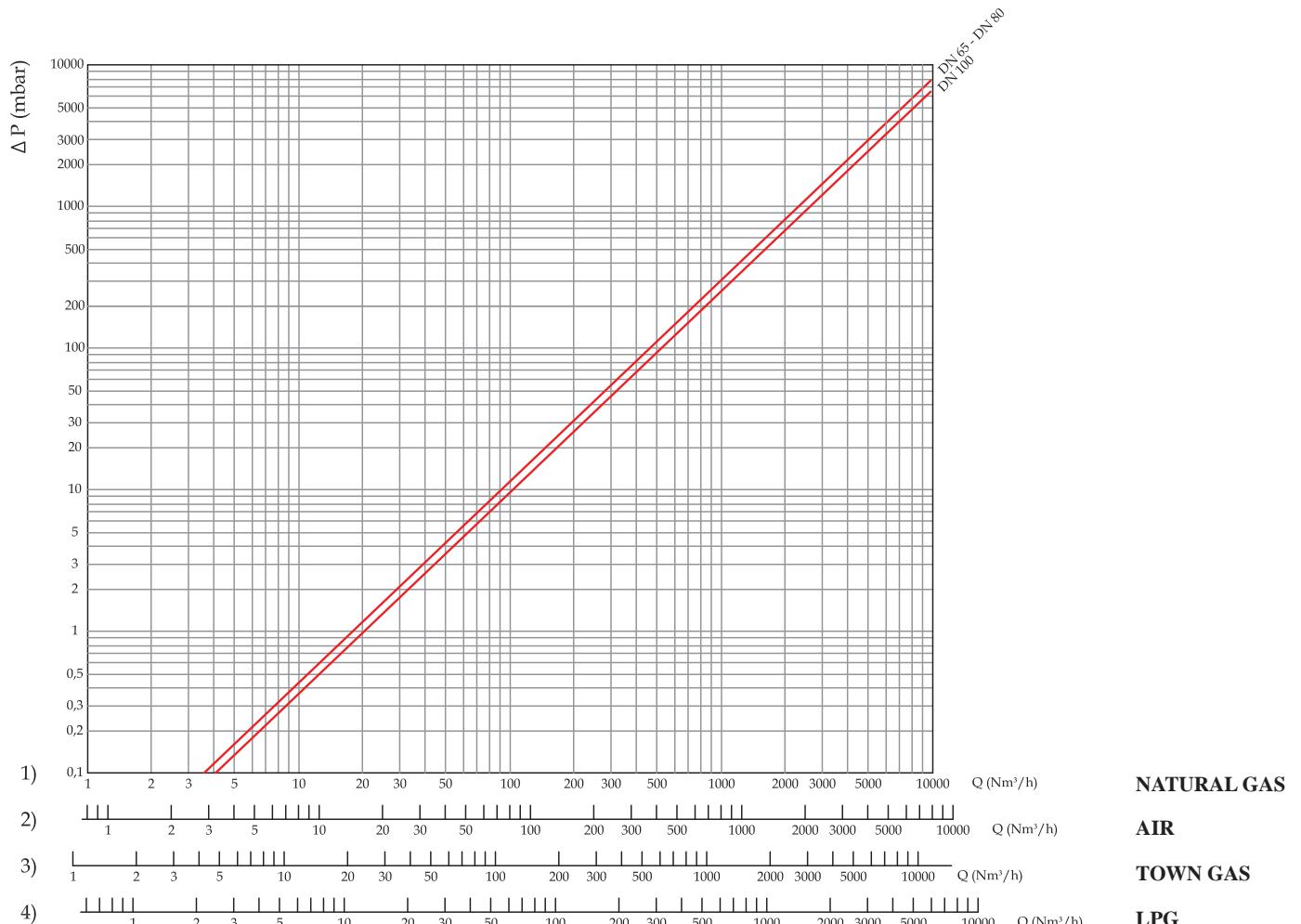
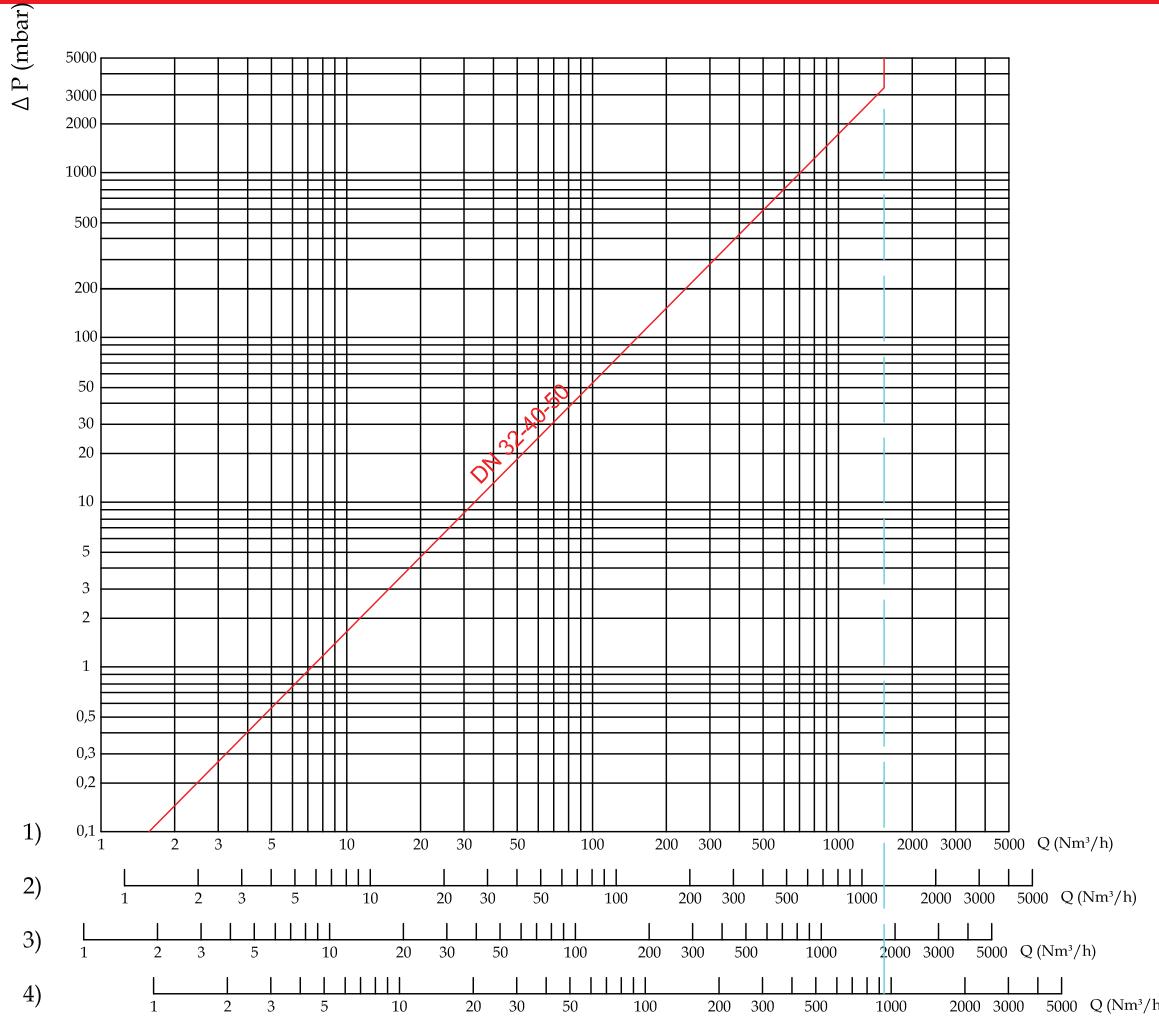
(Nm³/h) Natural Gas

Air	= 0,806
Natural Gas	= 1
Town gas	= 1.177
LPG	= 0,62

Connections	P2 (mbar)	Inlet Pressure					
		0,5 bar	1 bar	2 bar	3 bar	4 bar	5 bar
DN 32	20	185	350	470	470	470	470
	30	185	370	495	495	495	495
	50	198	370	540	740	740	740
	100	150	290	520	815	850	850
	200	100	220	495	790	960	960
	300	110	250	495	890	1100	1100
DN 40	20	220	400	740	960	990	990
	30	220	400	740	1090	1140	1140
	50	220	400	740	1090	1240	1240
	100	200	370	790	1090	1190	1190
	200	135	250	580	890	1340	1390
	300	135	290	590	940	1190	1200
DN 50	20	248	446	850	1230	1500	1500
	30	248	446	818	1280	1440	1500
	50	300	446	818	1230	1500	1500
	100	290	440	818	1240	1500	1500
	200	245	372	740	1140	1480	1490
	300	186	320	645	1100	1480	1480
DN 50 Outlet pipe DN 80	20	300	450	990	1290	1500	1500
	30	370	465	990	1350	1500	1500
	50	325	470	850	1265	1500	1500
	100	300	470	850	1265	1500	1500
	200	300	420	900	1380	1500	1500
	300	250	400	740	1100	1500	1500
Data obtained using the external sensor tube							

Connections	P2 (mbar)	Inlet Pressure					
		0,5 bar	1 bar	2 bar	3 bar	4 bar	5 bar
DN 65 - DN 80	20	904	1480	2100	2900	2900	2900
	100	1000	1600	2900	4400	4400	4400
Inlet pipe DN 80 - Outlet pipe DN 80 for 10 diameters then DN 100 pipe							
DN 100	20	1200	1800	2900	3400	3400	3400
	100	800	2200	3300	4000	4000	4000
Inlet pipe DN 100 - Outlet pipe DN 100 for 10 diameters then DN 150 pipe							

PRESSURE DROP DIAGRAM



INSTALLATION

The regulator is in conformity with the Directive 94/9/CE (said Directive ATEX 100 a) as device of group II, category 2G and as device of group II, category 2D; for this reason it is suitable to be installed in the zones 1 and 21 (besides in the zones 2 and 22) as classified in the attachment I to the Directive 99/92/EC.

The regulator is not suitable to be used in zones 0 and 20 as classified in the already said Directive 99/92/EC.

To determine the qualification and the extension of the dangerous zones, see the norm EN 60079-10.

The device, if installed and serviced respecting all the conditions and the technical instructions of this document, is not source of specific dangers: in particular, during the normal working, is forecast, by the regulator, the emission in the atmosphere of inflammable substance only occasionally.

The regulator can be dangerous as regards to the presence close to it of other devices when the integrated relief valve vents or in case of damage of the working diaphragm (**16/17**) and safety one (**30**). Only in this last case the regulator is a source of emission of the continue degree explosive atmosphere and, so, it can originate dangerous areas 0 as defined in the 99/92/EC Directive.

In conditions of particularly critic installation (places not protected, lack of servicing, lacking availability of ventilation) and, especially in presence, close to the regulator, of potential sources of primer and/or dangerous devices during the normal working because susceptible to origine electric arcs or sparks, it is necessary to value before the compatibility between the regulator and these devices.

In any case it is necessary to take any useful precaution to avoid that the regulator could be origin of areas 0: for example yearly periodical inspection of regular working, possibility to change the emission degree of the source or to attend on the exhaust outside the explosive material canalizing outside, for example, the relief valve discharge.



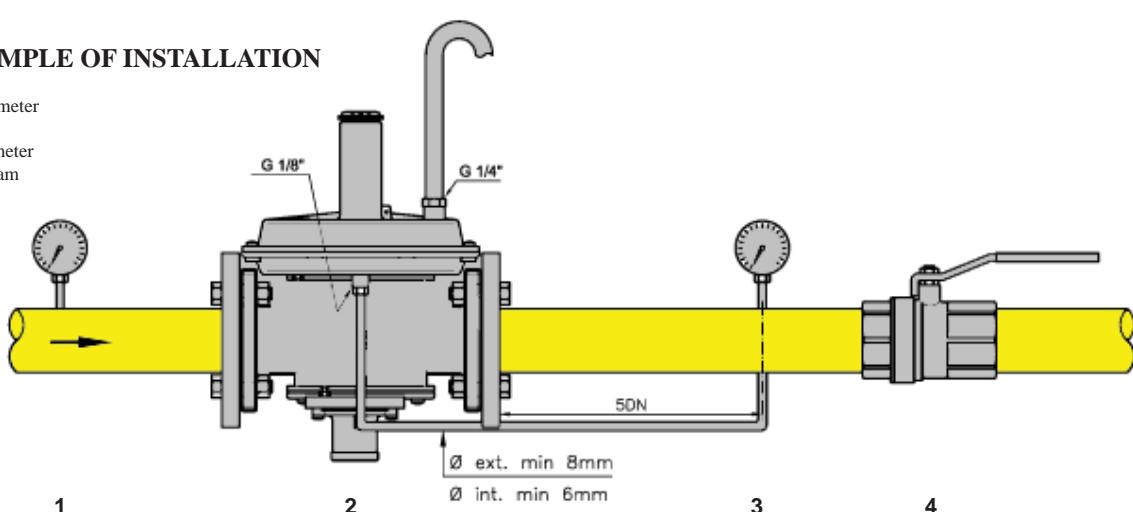
Installation must be in compliance with local law in force!

**WARNING: Read carefully the instruction sheet of each product before installing.
Installation and maintenance must be carried out by qualified personnel.**

- The gas supply must be shut-off before installation.
- Check that the line pressure **DOES NOT EXCEED** the maximum pressure stated on the product label.
- The regulator is normally installed before the user. It must be installed with the arrow on the body (**6/5**) towards the user.
- It can be installed in any position but it is preferable the installation with the spring in vertical position. Outside the regulator and downstream of it there is a checking pressure-tap (**14**) for the control of the regulation pressure.
- Connect the G1/8" connection pulse tap (**15/4**) to downstream regulator pipe. On versions IR..O connect together with the impulse grip the tap outlet (**21**).
- Canalize outside the relief valve discharge. Please see installation examples.
- If the device is threaded check that the pipeline thread is not too long; overlong threads may damage the body of the device when screwed into place.
- If the device is flanged check that the inlet and outlet counterflanges are perfectly parallel to avoid unnecessary mechanical stresses on the body of the device. Also calculate the space needed to fit the seal. If the gap left after the seal is fitted is too wide, do not try to close it by over-tightening the device's bolts.
- During installation take care not to allow debris or scraps of metal to enter the device.
- Do not use the spring casing for leverage when screwing into place; use the appropriate tool.
- Always check that the system is gas-tight after installation.

EXAMPLE OF INSTALLATION

1. high pressure manometer
2. regulator IR
3. low pressure manometer
4. ball valve downstream



MANUAL RESET (versions IR...O)

DN 32-40-50

1. Close the tap or ball valve downstream the regulator.
2. Unscrew the tap (22)
3. Slowly push the reset pin (24), wait a few moments to get the pressure balanced and then push till the end the reset pin (24).
4. Keeping pushed the reset pin (24), slowly open the tap upstream the regulator.
5. Subsequently screw again the cap (22) on its original position.

DN 65-80-100

In order to reset the shut-off device, you need to follow the instructions:

1. Close ball valve downstream of the regulator.
2. Close the shut-off tap (21)
3. Push the by-pass button (28).
4. Reset pushing the pin (25).
 - a. If RESETED, slowly open the ball valve downstream the regulator and open the shut-off tap (21).
 - b. If NOT RESETED, open the shut-off tap (21) and reset pushing the pin (25).
 - b1. If RESETED, slowly open the ball valve downstream of regulator.
 - b2. If NOT RESETED:
 - open the ball valve downstream of regulator
 - close the shut-off tap (21)
 - close the ball valve downstream of regulator
 - push the by-pass button (28)
 - reset pushing the pin (25)
 - once rearmed, slowly open the ball valve downstream of regulator
 - open the shut-off tap (21)

When the reset operation is completed, to avoid any contact with the internal reset pin, slowly pull down the reset pin (25).

CALIBRATION P2

Before starting the system, pay attention that the standard regulation spring is suitable with the needed regulation pressure.

Get a proper pressure gauge to check the regulator pressure.

On versions with relief valve, you must act directly on the adjustment regulation screw (2), on versions without relief valve you have to unscrew the cap (1).

When the regulator is set, rescrew the cap (1) in the original position.

SETTING

DN 32-40-50

Normally the devices are presetted according to the customer specification, where it is needed to set it, with the plant giving flow, you need:

- Get a spanner (hex with a pipe of 8 mm and a max. external Ø not over 12 mm) and a proper pressure gauge to check the regulator pressure.
- Unscrew the caps (1) and (22)
- In order to change the setting value of the outlet pressure P2, act on the regulation screw (2).
- Screw till the end the setting screws (4) and (23) and place at minimum, unscrewing it, the regulation screw (25).
- To modify the setting value of the minimum pressure shut-off tripping, act with the supplied key (28) on the regulation screw (25).
- To modify the setting value of overpressure shut-off tripping, act with the supplied screw (28) on the regulation screw (23).
- To modify the setting of the relief valve, act with a 8 mm spanner (not supplied) on the regulation screw (4).

DN 65-80-100

Where it is needed to set the devices, with the plant giving flow, you need:

- On versions with relief valve use an hex with a pipe type of 10 mm and a maximum external Ø not over than 15 mm.
- On versions of piloted regulator with relief valve use an hex with a pipe type of 8 mm and a maximum external Ø not over than 12 mm.
- Unscrew the cap (23).
- Unscrew and remove the final part of the pin (25).
- By the special key (29) screw completely the regulation screw (24) and put at minimum the regulation screw (26).
- In order to change the setting value of the outlet pressure P2, act on the regulation screw (2).
- Screw till the end the setting screws (4) and (23) and place at minimum, unscrewing it, the regulation screw (25).
- To modify the setting value of the minimum pressure shut-off tripping, act with the supplied key (29) on the regulation screw (26).
- To modify the setting value of overpressure shut-off tripping, act with the supplied screw (29) on the regulation screw (24).
- To modify the setting of the relief valve, act with a commercial spanner (not supplied) on the regulation screw (19).

FOR FURTHER INFORMATION PLEASE CONTACT OUR TECHNICAL OFFICE.