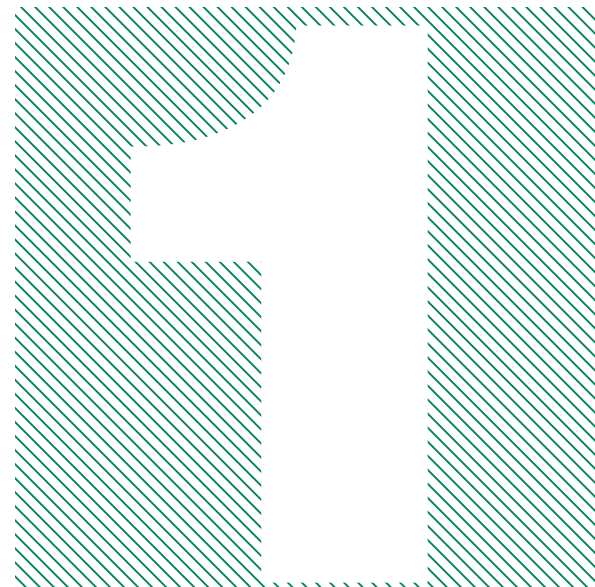




**TORMENE
GROUP**

www.tormenegroup.com



TA-956 DFO

Fail open diaphragm type pressure regulator



Engineering eXcellence In Measurement Packages

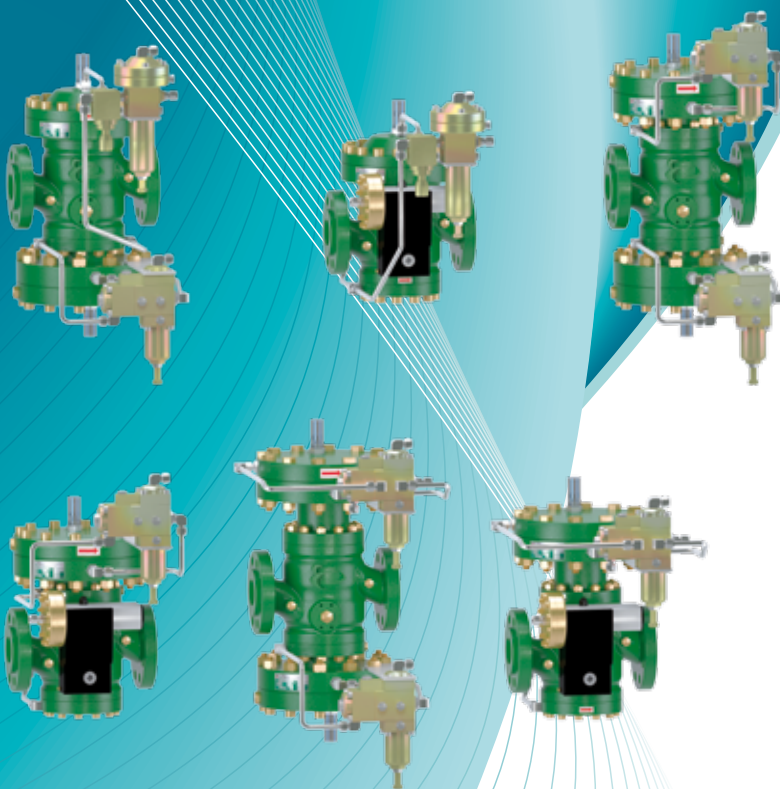
www.eximpmeasurement.com

SINGLE FUNCTION

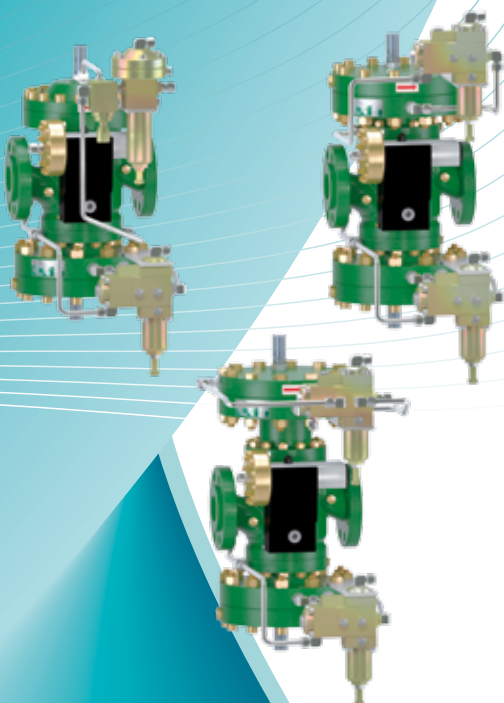


TA-956 DFO

DOUBLE FUNCTION



TRIPLE FUNCTION



Products range

INDEX

TA-956 FAMILY	... 4
APPLICATION	... 5
TECHNICAL SPECIFICATIONS TA-956 DFO	... 6
TA-956 DFO OPERATING PRINCIPLE	... 8
DIMENSIONS	... 10
FEATURES	... 12
INSTALLATION SCHEMATICS	... 13
SIZING	... 16
TA-956 DFO PART NUMBERING FOR ASSEMBLED UNITS	... 18

TA-956 FAMILY

The TA956 family of pressure regulators and SSV comprises single function units, double function and triple function units.

The modular design in which a single body is capable of accepting up to three separate functions with separate sensing lines, pilots actuators, internal control valves and seats is a peculiar characteristic of TA956 family.

This feature (of three optional integrated independent functions in one body) allows the best possible use of space due to an exceptionally compact configuration.

The modular design allows any installed units, to be updated or upgraded during the entire lifetime of the regulator as the operating requirements or any changes in customers specifications are modified.

TA956 pressure regulators are top entry design, this allow for ease and cost effective maintenance without dismantling regulator body from the line.



APPLICATION

The modular design allows a wide variety of configurations to suit the most demanding applications in gas transmission, gas supply to industrial power plant, city gates, distribution utility systems, industrial installations, etc.

TA956 pressure regulators and SSV are designed to be used with non corrosive and filtered natural gas.

Upon request other gases and different process conditions may be acceptable with specific choice of materials.

TA956DFO is a pilot operated single function Fail to Open gas pressure regulator suitable for high, medium, and low pressure applications.

This pressure regulator will go to fully open position in case of rupture of one of the following parts:

- Main regulator diaphragm;
- Pilot diaphragm;
- Pilot impulse connection pipework;
- Pilot motorizing connection pipework.

TA956DFO pressure regulator is CE marked in accordance with the following standards:

- Pressure Equipment Directive (PED) 2014/68/EU
- DIN EN 334 (01 .07.2009)
- DIN EN 14382 (01.07.2009)

Product Identification Number: CE-0085CO0164



TA-956 FC & SSV DN200 ANSI 600
Customer: Bembo Project in Marib, Yemen

TECHNICAL SPECIFICATIONS TA-956 DFO

Max. inlet pressure pumax	100 bar			
Outlet pressure range Wd	0.005 to 60 bar			
Pressure difference between inlet and outlet	Δp_{min} = 0.85 bar; Δp_{max} = 100 bar			
Nominal diameter and CG value	1" (DN 25)	CG=550		
	2" (DN 50)	CG=1912		
	3" (DN 80)	CG=3825		
	4" (DN 100)	CG=6375		
	6" (DN 150)	CG=12675		
	8" (DN 200)	CG=20300		
	10" (DN 250)	CG=32900		
	12" (DN 300)	CG=47300		
Type of connection	Flanges ANSI 150, ANSI 300, ANSI 600 (PN 16,25,40,100 on request)			
Accuracy class and closing pressure category	with Pilot	Outlet pressure range Wd	Accuracy class	Closing pressure category
	TA-983 FO	7 ... 60 bar	AC 1 %	SG 5%
	TA-984 FO	0.8 ... 9.5 bar	AC up to 1%	SG 2.5%
	TA-985 FO	0.1 ... 1.2 bar	AC up to 10%	SG 2.5%
	TA-986 FO	0.005 ... 0.1 bar	AC 20 %	SG 2.5%
Lock Up pressure category	SZ 2.5 %			
Operational temperature range	-20 °C to +60 °C (-40°C to +60°C available on request)			
Operation and strength according to	EN 334, EN 14382, PED 2014/68/EU, ANSI B16.5, ANSI B16.34			
CE mark according to PED	CE 0085			
EAC mark	EurAsian Conformity EAC			
EX protection	Since the device is not fitted with potential ignition sources of its own, it is not subject to ATEX 95 regulations (all used electronic accessories meet ATEX requirements)			
Pilots accessories	Pneumatic remote set point			

MATERIALS

Body	ASTM A216 WCB, (ASTM A352 LCC on request)
Diaphragm housing	ASTM A105, SAE1020, ASTM A216 WCB, (ASTM A352LCC or LF2 on request)
Covers	ASTM A105; SAE1020 (ASTM A352 LCC or LF2 on request)
Diaphragms	Nitrile rubber with nylon fabric
Seals	Nitrile (NBR) or flouroelastomer (FKM)
Pilot	Aluminium 6082 T6
SSV device	Steel, Brass, Aluminium

PILOTS 980 SPRING TABLE

PILOT	Pilot Spring			Pressure	
	Nr	Code	Color	Min. [bar]	Max. [bar]
TA-986FO	1521	000000000431	Pink	0.005	0.013
TA-986FO	1522	000000000432	Brown	0.012	0.030
TA-986FO	1523	000000000433	Aluminium	0.028	0.055
TA-986FO	1524	000000000434	Orange	0.040	0.085
TA-986FO	1501	000000000403	White	0.069	0.100
TA-985FO	1501	000000000403	White	0.100	0.310
TA-985FO	1502	000000000404	Green	0.280	0.650
TA-985FO	1525	000000000435	Lilac	0.640	1.040
TA-985FO	1504	000000000406	L.Blue	0.800	1.200
TA-984FO	1508	000000000418	White	0.800	1.300
TA-984FO	1509	000000000419	Green	1.200	2.100
TA-984FO	1510	000000000420	Yellow	2.000	3.300
TA-984FO	1511	000000000421	L.Blue	3.000	4.800
TA-984FO	1512	000000000422	Blue	4.500	7.000
TA-984FO	1513	000000000423	Red	6.000	9.500
TA-983FO	1511	000000000421	L.Blue	7.000	12.000
TA-983FO	1512	000000000422	Blue	10.000	17.000
TA-983FO	1513	000000000423	Red	15.000	25.000
TA-983FO	1514	000000000424	Black	20.000	35.000
TA-983FO	1515	000000000425	Pink	30.000	45.000
TA-983FO	1516	000000000426	Brown	40.000	60.000



TA-956 FC and MFO DN150 ANSI 600
Customer: Ivalsa Project in Sipco Bangkok, Thailand

TA-956 DFO OPERATING PRINCIPLE

The Tormene TA 956 DFO is a Fail Open type pressure regulator, this means that the main valve will move to the fully open position in the event of a diaphragm rupture of the main valve, rupture of pilot diaphragm or supply pressure to pilot is not available.

This pressure regulator is based on a special diaphragm that acts as the control medium/valve itself.

Inlet pressure is taken to the diaphragm / valve grid area and the position of the diaphragm is controlled by the pressure on its top side. The diaphragm is also held by a spring against the valve grid plate for increased tightness and thus reduced regulator “lock up”. This solution reduces dramatically the number of parts in the valve and makes maintenance far easier thus reducing time and associated costs on site –reducing parts for maintenance again reducing costs. This type of configuration is not recommended where fine dust of submicron size is expected in the gas stream.

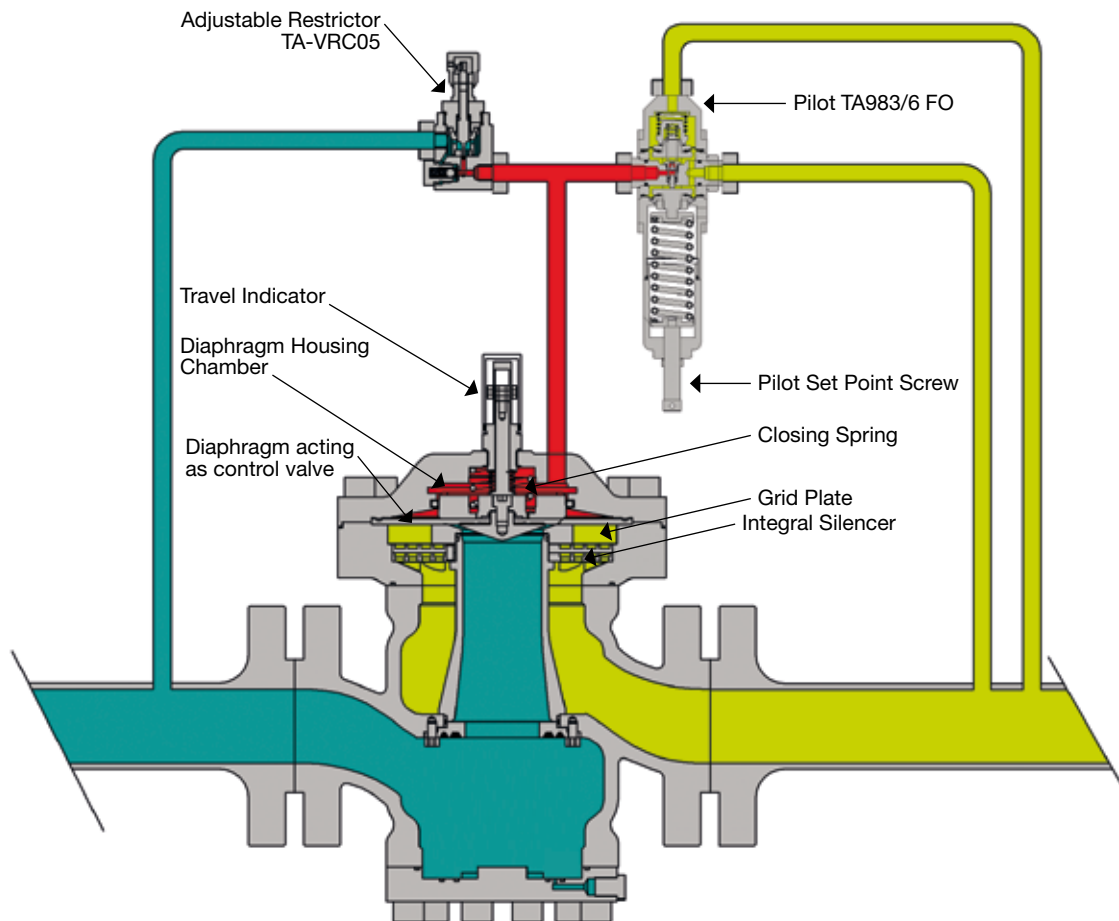
The piloting system for this valve is made of a combination of flow restrictor TA-VRC05_A and a model FO pilot.

The adjustable throttle needle valve (flow restrictor TA-VRC05) supplies pressure to the pilot and to the upper chamber of the main valve diaphragm housing. The position of the restrictor in the throttle valve is adjustable and this allows it to adjusted to dedicate the speed

of response of the TA 956 regulator to the specific installation application. It provides pressure to the upper chamber of the main valve diaphragm that may become equal to upstream inlet pressure when the required outlet pressure is reached and the pilot closes shutting off bleed downstream. The pilot takes its gas supply from after flow restrictor TA-VRC05 and from the upper diaphragm chamber.

When the outlet pressure after the regulator increases due to a reduction in flow rate, the pilot moves slightly to the closed position, therefore reducing the flow through the pilot valve and so increasing the pressure in the main valve upper diaphragm chamber. This increased pressure forces the main diaphragm to move downwards therefore reducing the flow passing through the valve grip plate and re-establishing control of the outlet pressure to the required set value.

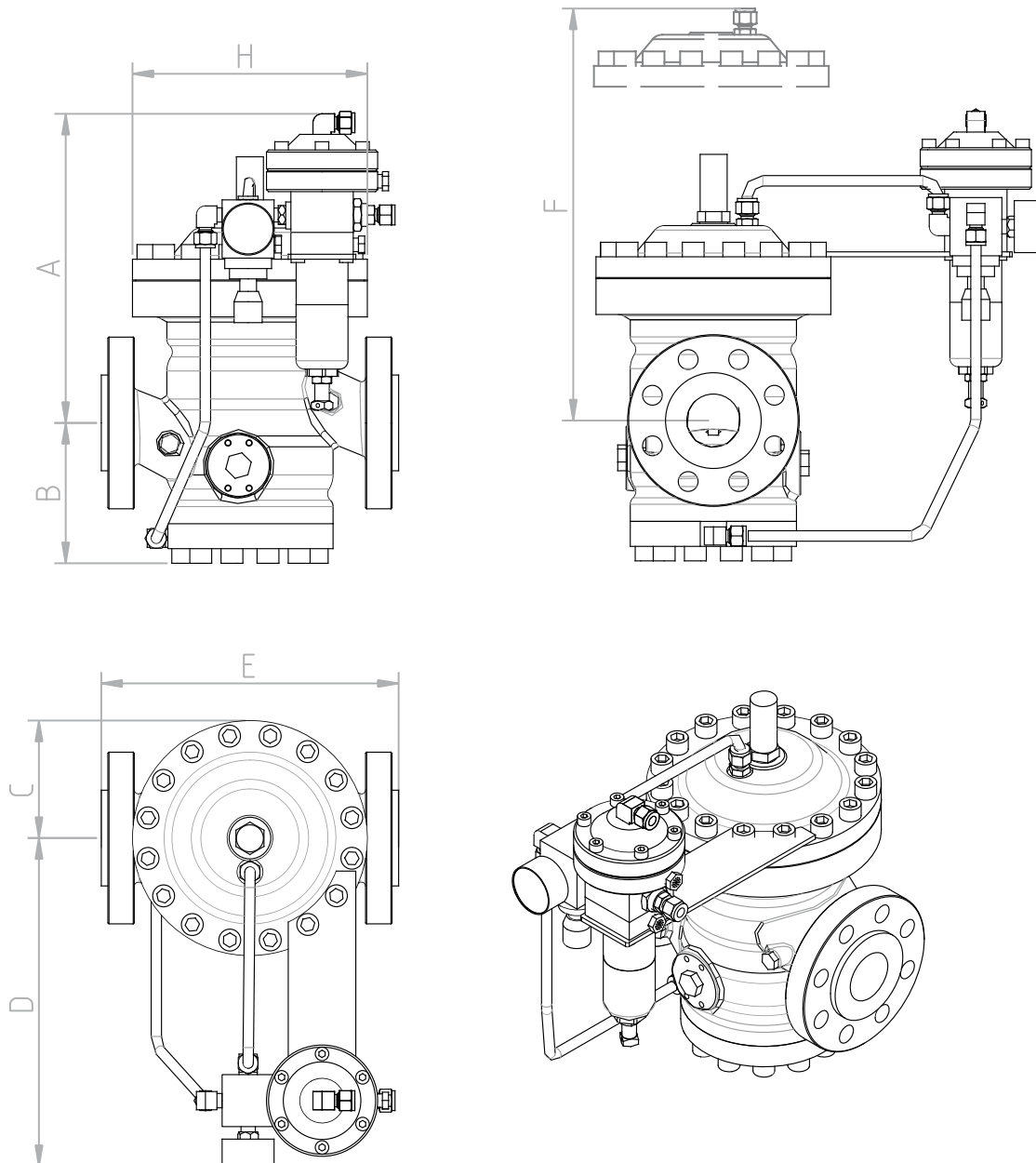
When downstream pressure decreases because of a increased demand, the pilot senses this and tends to open and therefore causes the pressure on the upper chamber of the main valve diaphragm to reduce. This allows the diaphragm to start to open allowing a higher flow to pass through the regulator and re-establishing the controlled pressure to the set value.



Pressure legend

■ Inlet ■ Controlled ■ Motorisation

DIMENSIONS



Note: Picture shows the configuration with flow from left to right (Right), opposite configuration (Left) available on request.

WEIGHTS [kg] TA-956 DFO

Class	DN25	DN50	DN80	DN100	DN150	DN200	DN250
#150	25	43	64	90	223	453	865
#300	36	56	89	112	291	566	915
#600	37	58	90	117	307	604	944

DIMENSIONS [mm] TA-956 DFO

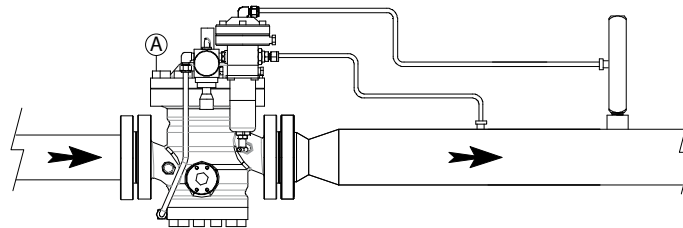
DN	Class	A	B	C	D	H	E	F	
25 (1")	#150	270	110	90	330	180	184	310	
	#300				310		197		
	#600						210		
50 (2")	#150	300	140	115	330	225	254	350	
	#300				320		267		
	#600						286		
80 (3")	#150	335	170	135	440	270	298	400	
	#300				350		318		
	#600						337		
100 (4")	#150	370	200	160	350	315	352	480	
	#300								368
	#600								394
150 (6")	#150	485	280	205	430	405	451	650	
	#300								473
	#600								508
200 (8")	#150	605	360	260	490	520	543	900	
	#300								568
	#600								610
250 (10")	#150	700	450	315	500	625	673	980	
	#300								708
	#600								752

FEATURES

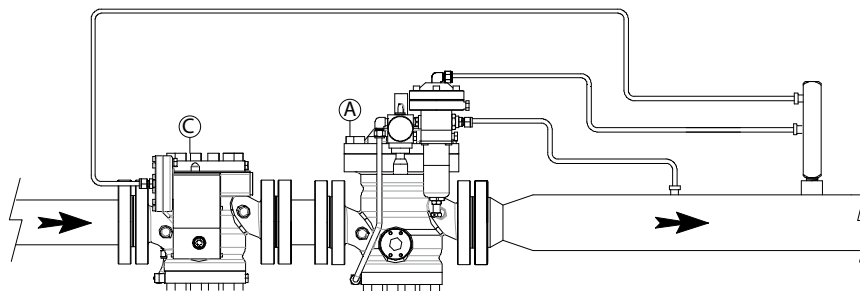
- Body specifically designed for high capacity with low noise generation;
- Completely self operated using the inlet gas pressure energy to operate regulators;
- Extremely high rangeability ;
- Suitable for high pressure reduction applications;
- Local position indicator with magnetic drive, no possibility of leakage to atmosphere;
- Available with internal silencer;
- Available with different valve sizes. The regulator can dedicated to best suit specific duties by utilising different capacity limitation designs;
- Available with Open/Close limit switch suitable for classified area installation;
- Available with 4-20 mA position transmitter with magnetic drive suitable for classified area installation;
- Available in double and triple function configurations with built in monitor and/or SSV.



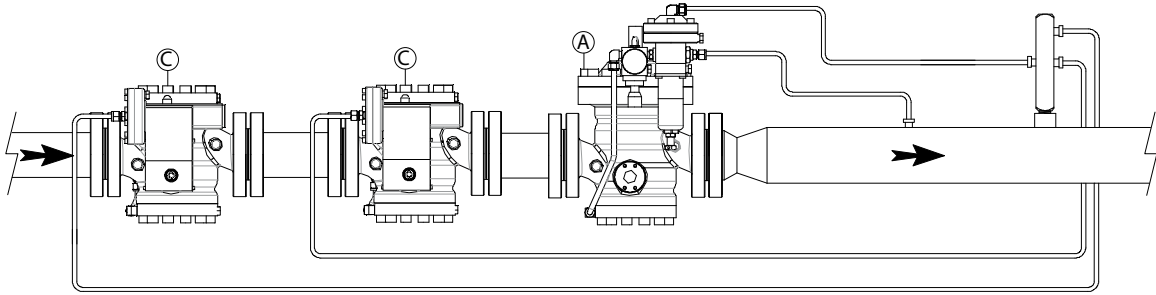
INSTALLATION SCHEMATICS



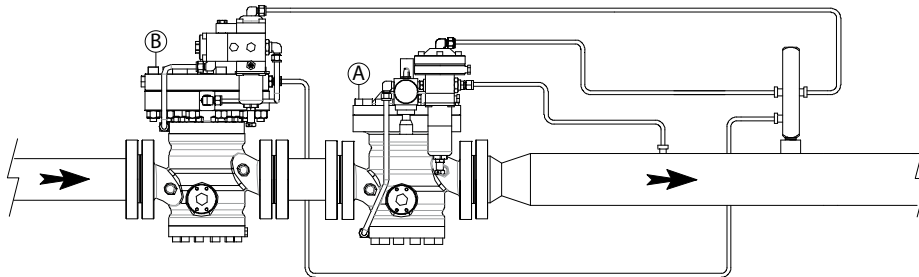
A - TA-956 DFO PRESSURE REGULATOR



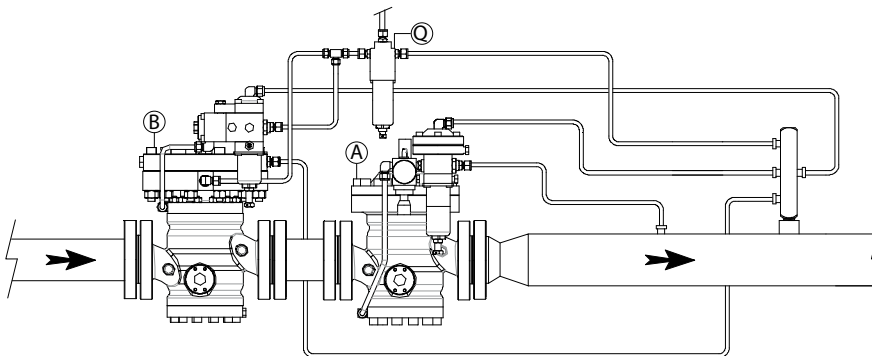
A - TA-956 DFO ACTIVE
C - TA-956 SSV SAFETY SHUTOFF VALVE



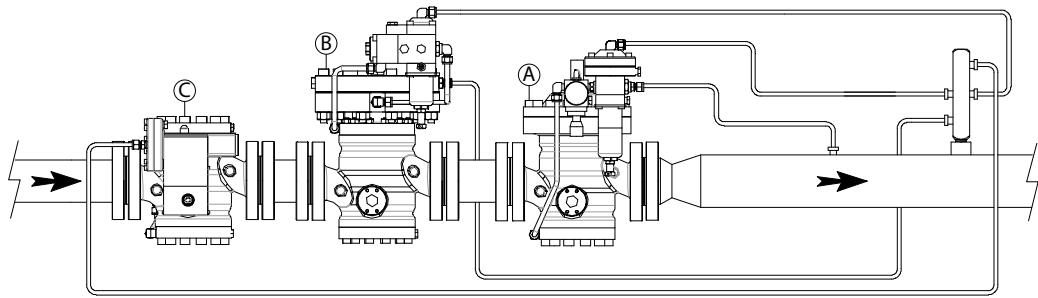
A - TA-956 DFO PRESSURE REGULATOR
C - TA-956 SSV SAFETY SHUTOFF VALVE



A - TA-956 DFO ACTIVE REGULATOR
B - TA-956 FC MONITOR



A - TA-956 DFO ACTIVE REGULATOR
B - TA-956 FC MONITOR
Q - QUICK EXHAUST VALVE



A - TA-956 DFO ACTIVE REGULATOR
 B - TA-956 FC MONITOR
 C - TA-956 SSV SAFETY SHUTOFF VALVE



TA-956 DFO+FC+SSV DN50 ANSI 300
 Customer: Ecogas Project in Cordoba, Argentina

SIZING

Sizing of gas pressure regulator involves establishing if the installed C_g is higher than the required C_g and if the outlet velocity of gas at regulator outlet flange is within the required limits.

The following units shall be used in the below formulas:

- Q = Flow Rate [Sm^3/h] (Reference conditions $T=15^\circ\text{C}$, $P=1$ barg)
- P_u = Upstream Pressure [bar g]
- P_d = Downstream (Controlled) Pressure [bar g]
- P_b = Atmospheric Pressure [bar]
- d = Gas Density Relative to Air
- t_u = Upstream Temperature [$^\circ\text{C}$]
- DN = Regulator Outlet Nominal Diameter [mm]
- v = Gas Velocity at Outlet Flange [m/s]

According to the ratio of inlet to outlet pressure there are two cases using different formulas.

a) Sub Critical Flow Conditions

$$(P_u - P_d) \leq 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{Q}{13.57} \sqrt{\frac{d(t_u + 273)}{(P_d + P_b)(P_u - P_d)}}$$

b) Critical Flow Conditions

$$(P_u - P_d) > 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{2Q}{13.57 (P_u + P_b)} \sqrt{d(t_u + 273)}$$

CG TA-956 DFO

Class	DN25	DN50	DN80	DN100	DN150	DN200	DN250	DN300
Cg	550	1912	3825	6375	12675	20300	32900	47300

In case of gases different from d=0.61 Natural Gas a correction factor F shall be used in the value of the Flow Rate Q used in the above formulas.

The Flow Rate to be used shall be $Q' = Q/F$.

F is taken from the following table.

Gas conversion table

Gas	Relative Density [d]	Coefficient [F]
Air	1	0.78
City Gas	0.44	1.17
Butane	2.01	0.55
Propane	1.53	0.63
Nitrogen	0.97	0.79
Carbon Dioxide	1.52	0.63
Hydrogen	0.07	3

Velocity of gas at regulator outlet flange shall be calculated using the following formula:

$$v = \frac{345.92 Q (1 - 0.002 P_d)}{DN^2(P_d + P_b)}$$

Allowable velocity

Downstream Pressure Pd [bar g]	Maximum Allowable Velocity v [m/s]
1	250
3	230
5	200
10 and higher	150

Interpolation may be used for intermediate values.

TA-956 DFO PART NUMBERING FOR

FIXED			MODEL	CLASS/ FLANGES	SIZE	MATERIALS	SILENCER	PILOT (upper unit)	Continue
1	2	3	4	5	6	7	8	9	...
9	5	6	D						...

0	NONE
1	ANSI 150 RF
2	ANSI 300 RF
3	ANSI 400 RF
4	ANSI 600 RF
5	ANSI 900 RF
7	PN 16
8	PN 25
9	PN 40
A	PN 64
B	PN 100
D	ANSI 150 RTJ
E	ANSI 300 RTJ
F	ANSI 400 RTJ
G	ANSI 600 RTJ
H	ANSI 900 RTJ

	INLET x OUTLET
1	25x25
3	50x50
4	80x80
5	100x100
6	150x150
7	200x200
8	250x250
9	300x300
A	400x400
B	500x500

0	NONE
1	100% Cg internal
2	70% Cg internal
3	50% Cg internal
4	30% Cg internal
5	100% Cg internal + Expander
6	70% Cg internal + Expander
7	50% Cg internal + Expander
8	30% Cg internal + Expander

1	Standard Temperature Range -20/+60°C
2	Low Temperature Steel Survival -40/+60°C
3	Low Temperature Steel Survival -40/+60°C
4	Standard Temperature Range -20/+60°C - High Aromatics
5	Low Temperature Steel Survival -40/+60°C - High Aromatics

0	NONE
4	TA983FO
5	TA984FO
6	TA985FO
7	TA986FO

ASSEMBLED UNITS

Continue	PILOT (lower unit)	SSV HEAD	QEV	ACCESSORY REGULATOR	ACCESSORY PILOTS	ACCESSORY SSV	FLOW ORIENTATION		
...	10	11	12	13	14	15	16	17	18
...	0	0	0			0		0	0

0	NONE
1	PNEUMATIC REMOTE S.P.
2	ELECTRIC REMOTE S.P.

000	NO SPECIAL REQUESTS
001	SPECIAL REQUESTS

0	NO SPECIAL REQUESTS
R	LEFT TO RIGHT (STANDARD)
L	RIGHT TO LEFT

0	NONE
1	OPEN/CLOSE MICROSWITCH
2	POSITION TRANSM. MAGDRIVE

EMEA - ASEA



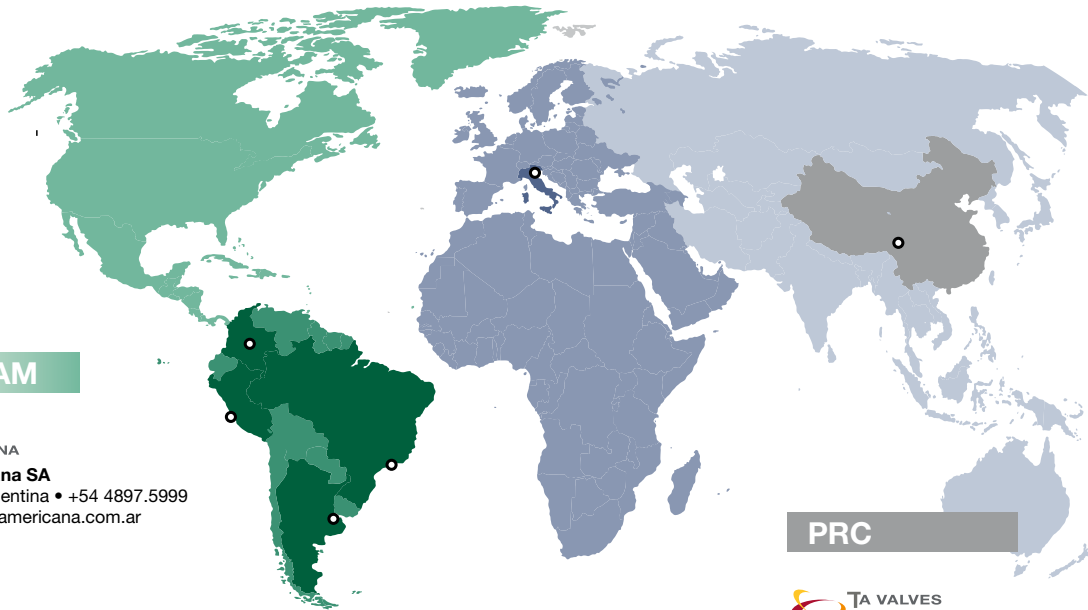
Tormene Industriale srl
Padua - Italy • +39 049 9004107
info@tormeneindustriale.com



Euromag International srl
Padua - Italy • +39 049 9005064
euromag@euromag.com



Light Engineering + Design srl
Padua - Italy • +39 049 0980809
info@lightengineering.net



NA - LATAM



Tormene Americana SA
Buenos Aires - Argentina • +54 4897.5999
tormene@tormeneamericana.com.ar



Tormene Americana do Brasil
Rio de Janeiro - Brazil • +55 21 2510.6155
consulta@tormenebrasil.com.br



Tormene Americana Colombia
Bogotá - Colombia • +571 45709464
gerencia@tormene.com.co



Tormene Andina SAC
Lima - Peru • +511 628.1595/596
tandina@tormeneandina.com.pe



Euromag Andina
Lima - Peru • +5116371844
euromag@euromag.com

PRC



TA Valves & Regulators Company
Sichuan - China • +86 813 5536 058
sales@tavrc.com

www.tormenegroup.com



Eximp Measurement Private Limited

Corporate Office Greater Kailash, New Delhi
Sales Office Nigdi, Pune
Projects Office Vadodara, Gujarat

Contact +91 020 27654694
E-Mail empl@eximpmeasurement.com

www.eximpmeasurement.com

