



Medium - Low Pressure Gas Regulator





Pietro Fiorentini USA Inc.

606 Park Drive | Weirton, WV 26062, United States of America | +1 304 232 9115 fio.westvirginia@fiorentini.com

Pietro Fiorentini S.p.A.

Via E.Fermi, 8/10 | 36057 Arcugnano, Italy | +39 0444 968 511 sales@fiorentini.com

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cirval_technicalbrochure_USA_revA

www.fiorentini.com



Who we are

We are a global organization that specializes in designing and manufacturing technologically advanced solutions for natural gas treatment, transmission and distribution systems.

We are the ideal partner for operators in the Oil & Gas sector, with a business solutions that span the whole natural gas chain.

We are constantly evolving to meet our customers' highest expectations in terms of quality and reliability.

Our aim is to be a step ahead of the competition, with customized technologies and an after-sale service program undertaken with the highest level of professionalism.



Pietro Fiorentini advantages



Localized technical support

Experience since 1940

Operating in over 100 countries

Area of Application







Figure 1 Area of Application Map

Introduction

The **Cirval** is a **lever-operated gas pressure regulator** controlled by a diaphragm and setting spring which controls the valve.

Mainly used for medium and low pressure natural gas distribution networks, as well as commercial and industrial applications.

It should to be used with previously filtered non-corrosive gases.

According to the European Standard EN 334, it is classified as Fail Open.

The Cirval is Hydrogen Ready for NG-H2 blending.





Inlet pressure

Outlet pressure

Figure 2 Cirval



Features and Calibration ranges

The Cirval is a lever-operated device for medium and low pressure with a unique dynamic balancing cartridge system which ensures an **outstanding turndown ratio** combined with an extremely **accurate outlet pressure control.**

A balanced pressure regulator is a pressure regulator where the delivery pressure accuracy is not affected by the fluctuation of the inlet pressure and flow during its operation. Therefore, a balance pressure regulator can have a single orifice for all pressure and flow operating conditions.

The Cirval is available in two sizes: the Cirval 200 and the Cirval 300

This regulator should be used with previously filtered, non-corrosive gases in distribution networks as well as commercial and industrial applications.

It is a **truly top entry design** which allows an **easy maintenance** of parts directly in the field **without** removing the body from the pipework.

The modular design of the Cirval pressure regulators allows for retrofitting either a slam shut valve, Integral Full Monitor (IFM) or Independent Monitoring Device (IMD).





Figure 4 Cirval 300 with LA slam shut valve

Figure 3 Cirval 300



Cirval competitive advantages



Compact and simple design

High accuracy

FAIL

Fail Open plug and seat regulator



Balanced type



Token IRV

Features

Features	Values
Design pressure* (PS ¹ / DP ²)	up to 860 kPa up to 125 psig
Ambient temperature* (TS1)	from -29 °C to +65 °C from -20 °F to +150 °F
Inlet gas temperature*	from -20 °C to +60 °C from -4 °F to +140 °F
Inlet pressure (MAOP / p_{umax}^{1})	from 13.8 kPa to 517 kPa from 2 psig to 75 psig
Range of downstream pressure (Wd1)	from 1.7 kPa to 82 kPa from 7" w.c. to 12 psig
Available accessories	LA Slam shut, IMD (Independent Monitoring Device), IFM (Integral Full Monitor), built-in strainer
Minimum operating differential pressure (Δp_{min}^{-1})	12 kPa 1.75 psig
Accuracy class (AC ¹)	up to 10
Lock-up pressure class (SG ¹)	up to 20
Nominal size (DN ^{1,2})	DN 32 1-1/4"; DN 40 1-1/2"; DN 50 2"
Orifice	Cirval 200: 3/4" Cirval 300: 1-1/2"
Connections	Cirval 200: 1-1/4", 1-1/2" and 2" NPT according to ANSI B1.20.1, Cirval 300: 2" NPT according to ANSI B1.20.1, 2" S.125FF according to ANSI B16.5 and Sliding 2" S.150RF for AU version

Top entry

H, Ø

Easy maintenance

Built-in accessories

Biomethane compatible and

20% Hydrogen blending compatible.

Higher blending available on request

(1) according to EN334 standard

(²) according to ISO 23555-1 standard

(^{')} NOTE: Different functional features and/or extended temperature ranges may be available on request. Stated inlet gas temperature range is the maximum for which the equipment's full performance, including accuracy is guaranteed. Product may have a different pressure or temperature ranges according to the version and/or installed accessories.

Table 1 Features



Materials and Approvals

Part	Material					
Body	Ductile iron GS 400-18 ISO 1083					
Cover	Die cast aluminum					
Seat	Brass					
Diaphragm	Nitrile rubber					
Sealing ring	Nitrile					
NOTE: The metaviole indicated above refer to the standard models. Different metaviole can be provided according to encode						

Table 2 Materials

Construction Standards and Approvals

The **Cirval** regulator is designed according to ANSI B109.4 and CSA 6.18 standards. The regulator reacts in opening (Fail Open) according to EN 334.

Leakage class: bubble tight, better than class VIII according to ANSI/FCI 70-3.



Design pressure by version

Design pressure (PS according to EN334)

Vortion	Bo	dy	Slam shut			
Version	MPa	psig	MPa	psig		
all versions	0.86	125	2.00	290		

Table 3 Design pressure for body and slam shut

Design pressure (PS according to EN334)												
		Control head										
Parts	200)BP	300)BP	200	MP	300	MP	200)TR	300)TR
	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig
Covers	0.86	125	0.86	125	0.86	125	0.86	125	0.86	125	0.86	125
Diaphgragm	0.03	4.3	0.03	4.3	0.07	10.8	0.10	14	0.17	24	0.17	24
Max Diaphgragm Δp	0.02	2.9	0.02	2.9	0.05	7.2	0.07	10.1	0.11	15	0.11	15

 Table 4 Design pressure for regulator's parts

Maximum allowable operating pressure

MAOP Ma	MAOP Maximum Allowable Operating Pressure (p _{umax} according to EN334)							
		Control head						
Version		200BP 200	MP 200TR	300BP 300MP 300TR				
		MPa	psig	MPa	psig			
WITHOUT CE MARKING	all versions	0.52	75	0.52	75			

Table 5 MAOP Maximum Allowable Operating Pressure without CE marking



Springs ranges and control heads

Control heads pressure ranges								
	Control head BP	Control head MP	Control head TR	Spring Table web link				
Model	kPa psig	kPa psig	kPa psig					
Cirval 200	1.6 - 10.3 0.2 - 1.5	9.6 - 36.5 1.4 - 5.3	35.8 - 82.7 5.2 - 12	<u>TT 1817</u>				
Cirval 300	1.6 - 8.3 0.2 - 1.2	8 - 50.3 1.2 - 7.3	50 - 82.7 7.2 - 12	<u>TT 1818</u>				

Table 6 Settings table

CIRVAL 200BP VERSION							
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (" w.c.)	
						Min.	Max.
4	US64470068GI	Yellow	2	110	34	6.4	10.0
I	US64470024BI*	White	1.3	45	15	0.4	10.0
2	US64470139NE	Black	2.2	115	34	9.2	16
	US64470024BI*	White	1.3	45	15		10
2	US64470140MA	Brown	2.7	106	34	12.6	26
5	US64470024BI*	White	1.3	45	15	13.0	20
Poo	Spring itom codo	Spring color	d			Spring range (psig)	
F05.	Spring item code	Spring Color	u	LU	De	Min.	Max.
4	US64470071GR	Grey	2.8	115	34	0.90	1.50
4	US64470031RO*	Red	1.7	40	15	0.69	1.50
d = Wire (*) NOTE	Diameter (mm) Lo = Spring Length (mm) : Internal relief valve spring for regulator set-c	De = External Diar	neter (mr e Sprina	n) range co	olumn		

Table 7 TT 1817 - Cirval 200BP version setting springs

CIRVAL 200MP VERSION							
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (psig)	
						Min.	Max.
4	US64470141VE	Green	3.2	120	34	1.46	2.39
I	US64470031RO*	Red	1.7	40	15		
0	US64470338BL	Blue	3.8	110	34	0.40	5.00
2	US64470031RO*	Red	1.7	40	15	2.40	0.29
d = Wire (*) NOTE	d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm) (*) NOTE: Internal relief valve spring for regulator set-point as stated in the Spring range column						

Table 8 TT 1817 - Cirval 200MP version setting springs

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	2	2	2	2	2
		-			
		2		2	2
	Ξ.	1	Ξ.	2	2
		2		2	2
- 2	Ξ.	Ξ.	Ξ.	Ξ.	Ξ.
- 2	2	2	2	2	2
- 2	Ξ.	2	Ξ.	2	2
	Ξ.	2	Ξ.	2	а.
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		÷.		÷.	÷.

CIRVAL 200TR VERSION							
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (psig)	
1 00.						Min.	Max.
-	US64470144VI	Violet	5	100	34	F 00	10
I	US64470031RO*	Red	1.7	40	15	5.22	12
d = Wire	d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm) (*) NOTE: Internal relief value spring for regulator set-point as stated in the Spring range column						

Table 9 TT 1817 - Cirval 200TR version setting springs

CIRVAL 300BP VERSION								
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (" w.c.)		
						Min.	Max.	
4	US64470382NE	Black	2.5	160	39	6.4	11.0	
I	US2700525*	Orange	2	40	22	0.4	11.0	
0	US64470301GI	Yellow	2.8	145	39	10.8	16.8	
2	US2700645*	Red	2.3	40	22	10.6		
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (psig)		
						Min.	Max.	
0	US64470302VI	Violet	3.8	140	39	0.50	1.00	
3	US2700999*	Grey	3	37	22	0.59	1.20	
d = Wire (*) NOTE	$\mathbf{d} = \text{Wire Diameter (mm)} \mathbf{Lo} = \text{Spring Length (mm)} \mathbf{De} = \text{External Diameter (mm)}$							

Table 10 TT 1818 - Cirval 300BP version setting springs

CIRVAL 300MP VERSION							
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (psig)	
						Min.	Max.
-	US64470262AR	Orange	4.5	140	39	1.16	2.20
	US2700999*	Grey	3	37	22		2.39
0	US64470398AZ	Light Blue	5	140	39	0.40	4.00
2	US2700999*	Grey	3	37	22	2.40	4.20
2	US64470408RO	Red	5.5	140	40	4.00	7.00
3	US2700999*	Grey	3	37	22	4.22	1.29
d = Wire (*) NOTE	Diameter (mm) Lo = Spring Length (mm) : Internal relief valve spring for regulator set-p	De = External Dian point as stated in the	neter (mr 9 Spring	m) range co	olumn		

Table 11 TT 1818 - Cirval 300MP version setting springs



CIRVAL 300TR VERSION									
Pos.	Spring item code	Spring color	d	Lo	De	Spring range (psig)			
103.						Min.	Max.		
-	US64470408RO	Red	5.5	140	40	7.05	10		
I	US2700999*	Grey	3	37	22	7.25	12		
 d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm) (*) NOTE: Internal relief valve spring for regulator set-point as stated in the Spring range column 									

Table 12 TT 1818 - Cirval 300TR version setting springs

General link to the calibration tables: **PRESS HERE** or use the QR code:



Accessories

For the pressure regulators:

- Integral Full Monitor (IFM)
- Slam shut valve
- Independent Monitoring Device (IMD)

Integral Full Monitor (IFM)

IFM is an overpressure protection device, which will take over a failing worker regulator. In this configuration the gas flows through the monitor first and then through the worker (or active) regulator.

The monitor regulator outlet pressure set-point shall be set higher than the worker to allow the monitor regulator to be in a wide open position during normal operation.

With the Integral Full Monitor, the Cg valve coefficient is 5% lower than the corresponding version without.

When the outlet pipe increases more than 1 diameter, installing an external sensing line is recommended to guarantee optimal performances.







Slam Shut LA

The Cirval pressure regulator offers the possibility of installing an incorporated LA slam shut valve and this can be done either during the manufacturing process or be retrofited in the field. Retrofitting the LA can be done without modifying the pressure regulator body assembly.

With the built-in slam shut, the Cg valve coefficient is 5% lower than the corresponding version without.

The main characteristics of this device are:



Overpressure shut-off



Underpressure shut-off



Internal by-pass

Optional push button for tripping test



Compact dimensions



Easy maintenance



Remote tripping option



Limit switch option







Figure 6 Cirval with LA

- 22		
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	_	

Pressure switch types and ranges									
		Operation -	Rang	Spring Table					
SSV Type	Model		kPa	psig	web link				
	BP	OPSO	3 - 18	0.43 - 2.61	<u>TT 00214</u>				
LA		UPSO	0.6 - 6	0.09 - 0.9					
	MD	OPSO	14 - 45	2 - 6.5	TT 00014				
LA	IVIE	UPSO	1 - 24	0.14 - 3.4	- <u>11.00214</u>				
1.0	TR -	OPSO	25 - 550	3.6 - 79	<u>TT 00214</u>				
LA		UPSO	10 - 350	1.45 - 50					

Table 13 Settings table

Shut-off device model LA performance							
Worker set point	Minimum suggested set-point						
1.7 kPa	3.7 kPa						
7"w.c.	15"w.c.						
13.7 kPa	20.6 kPa						
2 psig	3 psig						
34.4 kPa	48.2 kPa						
5 psig	7 psig						
68.9 kPa	89.6 kPa						
10 psig	13 psig						
Please see PF monitor and accesory setting sheet for precise settings.							

Table 14 Recommended slam shut settings



LA/BP "OPSO"								
Pos.	Soring part number	Spring color	d	Lo	De	Spring ra	nge (psig)	
			d Lo			Min.	Max.	
1	US64470112RO	Red	2.2	44	34	0.43	0.71	
2	US64470115GR	Grey	2.8	42	34	0.72	2.61	
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)								

Table 15 TT 002014 - LA/BP "OPSO" setting springs

LA/BP "UPSO"									
Pos.	Soring part number	Spring color	d	Lo	o De	Spring range (psig)			
						Min.	Max.		
12	US64470024BI	White	1.3	45	15	0.08 0.87			
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)									

Table 16 TT 002014 - LA/BP "UPSO" setting springs

LA/MP "OPSO"								
Pos.	Soring part number	Spring color	ing color d Lo De					
			u			Min.	Max.	
3	US64470115GR	Grey	2.8	42	34	2.03	2.59	
4	US64470116GI	Yellow	3.2	40	34	2.61	4.04	
5	US64470051BI	White	3.2	50	34	4.06	6.52	
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)								

Table 17 TT 002014 - LA/MP "OPSO" setting springs

LA/MP "UPSO"								
Pos.	Spring part number	Spring color	d	Lo	De	Spring ra	nge (psig)	
						Min.	Max.	
13	US64470024BI	White	1.3	45	15	0.14	0.85	
14	US64470038GI	Yellow	2	40	15	0.87	3.48	
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)								

 Table 18 TT 002014 - LA/MP "UPSO" setting springs

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LA/TR "OPSO"									
Pos.	Spring part number	Spring color	d	Lo	De	Spring ra	nge (psig)		
			ũ		De	Min.	Max.		
6	64470116GI	Yellow	3.2	40	34	3.62	7.96		
7	64470051BI	White	3.2	50	34	7.97	12.31		
8	64470057BL	Blue	3.5	50	34	12.32	20.29		
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)									

Table 19 TT 002014 - LA/TR "OPSO" setting springs

LA/TR "UPSO"								
Pos.	Spring part number	Spring color	d	Lo	De	Spring rai	nge (psig)	
			ing color a			Min.	Max.	
15	US64470038GI	Yellow	2	40	15	1.45	7.23	
16	US64470045MA	Brown	2.4	41	15.3	7.25	14.48	
d = Wire Diameter (mm) Lo = Spring Length (mm) De = External Diameter (mm)								

Table 20 TT 002014 - LA/TR "UPSO"

General link to the calibration tables: **PRESS HERE** or use the QR code:



Independent Monitoring Device (IMD)

The IMD is a rough cut monitor control overpressure protection safety device (OPP), which is designed to limit downstream pressure build-up in case of regulator failure. Example are lock-up failure, cut diaphragm or lever disconnect which can cause a catastrophic failure.

When a failure occurs, the IMD operates on the inlet side of the orifice to limit the downstream pressure. Since the IMD is a separate an independent monitoring device from the main regulator, it will function in the event of worker regulator's failure.

With the Independent Monitoring Device, the Cg valve coefficients is 10% lower than the corresponding version without, except for IMD-1 which has a maximum flow limitation (see table 21).

When the IMD is in operation or in lock-up, a small amount of gas will bleed continuously to the atmosphere through a small port in the IMD (less than 1 scfh). This generates an alert of regulator's abnormal condition.

Token relief valve is always disabled when using the IMD.



Figure 7 Cirval IMD

IMD performance								
IMD version	Maximum IMD peak activation pressure	IMD pressure control range*	IMD lock-up pressure	IMD activated vent flow rate	Cg reduction/ maximum flow			
IMD-1	6.2 kPa 0.9 psig	3.4 - 4.8 kPa 0.5 - 0.7 psig	6.2 kPa 0.9 psig	< 0.028 m³/h < 1 cfh	10%; max flow 457 m ³ /h 16000 scfh			
IMD-2	12.4 kPa 1.8 psig	8.2 - 11.7 kPa 1.2 - 1.7 psig	12.4 kPa 1.8 psig	< 0.028 m³/h < 1 cfh	10 %			
IMD-5	26.8 kPa 3.9 psig	16.5 - 25.5 kpa 2.4 - 3.7 psig	26.8 kPa 3.9 psig	< 0.028 m³/h < 1 cfh	10 %			
IMD-7	47.5 kPa 6.9 psig	37.9 - 44.8 kPa 5.5 - 6.5 psig	47.5 kPa 6.9 psig	< 0.028 m³/h < 1 cfh	10 %			
	ance IMD version IMD-1 IMD-2 IMD-5 IMD-7	IMD versionMaximum IMD peak activation pressureIMD-16.2 kPa 0.9 psigIMD-212.4 kPa 1.8 psigIMD-526.8 kPa 3.9 psigIMD-747.5 kPa 6.9 psig	IMD versionMaximum IMD peak activation pressureIMD pressure control range*IMD-16.2 kPa 0.9 psig3.4 - 4.8 kPa 0.5 - 0.7 psigIMD-112.4 kPa 1.8 psig3.4 - 1.7 kPa 1.2 - 1.7 psigIMD-526.8 kPa 3.9 psig16.5 - 25.5 kpa 2.4 - 3.7 psigIMD-747.5 kPa 6.9 psig37.9 - 44.8 kPa 5.5 - 6.5 psig	IMD versionMaximum IMD peak activation pressureIMD pressure control range*IMD lock-up pressureIMD-16.2 kPa 0.9 psig3.4 - 4.8 kPa 0.5 - 0.7 psig6.2 kPa 0.9 psigIMD-212.4 kPa 1.8 psig8.2 - 11.7 kPa 1.2 - 1.7 psig12.4 kPa 1.8 psigIMD-526.8 kPa 3.9 psig16.5 - 25.5 kpa 2.4 - 3.7 psig26.8 kPa 3.9 psigIMD-747.5 kPa 6.9 psig37.9 - 44.8 kPa 5.5 - 6.5 psig47.5 kPa 6.9 psig	IMD versionMaximum IMD peak activation pressureIMD pressure control range*IMD lock-up pressureIMD activated vent flow rateIMD-16.2 kPa 0.9 psig3.4 - 4.8 kPa 0.5 - 0.7 psig6.2 kPa 0.9 psig< 0.028 m³/h < 1 cfh			



In-line monitor

In-line monitor is an emergency pressure regulator that is usually upstream from the worker regulator, in an abnormal event, when the worker regulator is unable to maintain downstream pressure from exceeding the set point, the monitor will take over the worker regulator at a set point slightly higher.

An external sensing line is required in upstream monitor configurations, and the internal sensing line will be plugged.





Balanced valve design (Fig. 8 - Item 1)

The Cirval is a spring loaded, lever-operated regulator that incorporates a balanced cartridge design. The balancing piston allows an opposite force equal to the inlet pressure to be applied on the back side of the orifice's seat disk. This feature improves the accuracy of the outlet pressure setting as inlet pressure fluctuates and provides high turndown ratio across a wide flow range.

Integral strainer (Fig. 8 - Item 2)

The Cirval is equipped with a removable internal 300 micron (50 U.S. mesh) strainer to prevent foreign particles, such as weld slag or PE shavings, to get stuck between the orifice and seat/disk thus preventing lockup. The purpose of the strainer is to provide protection to the Cirval and its optional accessories thus protecting the customers downstream piping system. The strainer can be easily accessed to be cleaned or replaced without removing the regulator body from the piping.

Token relief valve (Fig. 8 - Item 3)

The Cirval has an optional token relief valve that discharges a small amount of gas into the atmosphere when the regulator exceeds the relief valve set point. Token relief valve cannot be used as overpressure protection device. However it can be activated or deactivated in the field, if necessary.

During no-flow conditions, thermal expansion of the gas can cause downstream static pressure to build up. The token relief valve will prevent downstream pressure from rising, and if equipped, can prevent nuisance tripping of the slam shut valve.

Outlet pressure sensing (Fig. 8 - Item 4)

The Cirval can sense downstream pressure internally (4a) or externally (4b). Internal sensing lines are fully independent between accessories to provide Independent control.

External sensing can be connected without plugging the internal sensing and use a secondary external sense line connected to the lower diaphragm case. For external sensing line only, it is recommended to use the inline monitor version.



Figure 9 Cirval components location

Safety limitation

In case of a single regulator supplied without built-in overpressure protection device (SSV, IMD or IFM), the regulator shall be protected with a secondary means of overpressure protection per the DOT §192.740 and NFPA 54 5.9.3.1 standard.

The overpressure protection must be provided per code capable of limiting the downstream pressure to the system.



Weights and Dimensions

The Cirval





Figure 10 Cirval dimensions

Weights and Dimension	Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)									
Model	Cirva	al 200	Cirva	ıl 300	Cirval 300 AU					
	[mm]	inches	[mm]	inches	[mm]	inches				
A	167.7	6.6"	193	7.6"	193	7.6"				
A1	-	-	254	10.0"	267*	10,5"*				
В	259	10.2"	391.2	15.4"	391.2	15.4"				
С	66	2.6"	99.1	3.9"	99.1	3.9"				
D	185.4	7.3"	279.4	11.0"	279.4	11.0"				
F	177.8	7.0"	256.5	10.1"	256.5	10.1"				
Μ	3/4"	NPT	3/4"	NPT	3/4" NPT					
Inlet	1-1/4"; 1-1	/2"; 2" NPT	2" NPT; 2	" S125FF	2" S150RF					
Outlet	1-1/4"; 1-1	/2"; 2" NPT	2" NPT; 2	" S125FF	2" S1	50RF				
Tubing Connections			1/4" NPT x 3/	'8" O.D. Tubing						
Weight	Kg	lbs	Kg	lbs	Kg	lbs				
NPT	5.4	11.9	11.8	26	-	-				
FF/RF	-	-	16	35.3	18	39.6				
*sliding flanges with boo	dy connectors dual s	ealing guaranteed wi	ith o-ring and high int	egrity sealing compo	bund.					

 Table 22
 Weights and dimensions



Cirval with IFM



Figure 11 Cirval with IFM dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)										
Model	Cirva	al 200	Cirva	I 300	Cirval	300 AU				
	[mm]	inches	[mm]	inches	[mm]	inches				
A	167.7	6.6"	193	7.6"	193	7.6"				
A1	-	-	254	10.0"	267*	10,5"*				
В	259	10.2"	391.2	15.4"	391.2	15.4"				
С	259	10.2"	391.2	15.4"	391.2	15.4"				
D	185.4	7.3"	279.4	11.0"	279.4	11.0"				
F	177.8	7.0"	256.5	10.1"	256.5	10.1"				
М	3/4"	NPT	3/4"	NPT	3/4"	NPT				
Inlet	1-1/4"; 1-1	/2"; 2" NPT	2" NPT; 2	" S125FF	2" S150RF					
Outlet	1-1/4"; 1-1	/2"; 2" NPT	2" NPT; 2	" S125FF	2" S150RF					
Tubing Connections			1/4" NPT x 3/	8" O.D. Tubing						
Weight	Kg	lbs	Kg	lbs	Kg	lbs				
NPT	7.1	13.6	16.8	37.3	-	-				
FF/RF	-	-	21	46.3	23	50.7				
*sliding flanges with bo	dy connectors dual s	ealing guaranteed w	ith o-ring and high int	egrity sealing compo	bund.					

Table 23 Weights and dimensions



Cirval with LA



Figure 12 Cirval with LA dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)									
Model	Cirva	l 200	Cirva	al 300	Cirval	300 AU			
	[mm]	inches	[mm]	inches	[mm]	inches			
A	167.7	6.6"	193	7.6"	193	7.6"			
A1	-	-	254	10.0"	267*	10,5"*			
В	259	10.2"	391.2	15.4"	391.2	15.4"			
С	208.3	8.2"	241.3	9.5"	241.3	9.5"			
D	185.4	7.3"	279.4	11.0"	279.4	11.0"			
E	165.1	6.5"	185.4	7.3"	185.4	7.3"			
F	177.8	7.0"	256.5	10.1"	256.5	10.1"			
Μ	3/4"	NPT	3/4"	NPT	3/4"	NPT			
Ν	1/4"	NPT	1/4" NPT		1/4" NPT				
Inlet	1-1/4"; 1-1/	(2"; 2" NPT	2" NPT; 2" S125FF		2" S150RF				
Outlet	1-1/4"; 1-1/	(2"; 2" NPT	2" NPT; 2	2" S125FF 2" S150RF					
Tubing Connections			1/4" NPT x 3/	/8" O.D. Tubing					
Weight	Kg	lbs	Kg	lbs	Kg	lbs			
NPT	6.4	14.1	12.8	28.2	-	-			
FF/RF	-	-	17	37.5	19	42			
*sliding flanges with boo	dy connectors dual sea	ling guaranteed with c	-ring and high integrity	v sealing compound.					

 Table 24 Weights and dimensions



Cirval with IMD



Figure 13 Cirval with IMD dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)										
Model	Cirva	l 200	Cirva	il 300	Cirval 300 AU					
	[mm]	inches	[mm]	inches	[mm]	inches				
A	167.7	6.6"	193	7.6"	193	7.6"				
A1	-	-	254	10.0"	267*	10,5"*				
В	259	10.2"	391.2	15.4"	391.2	15.4"				
С	165	6.5"	213	8.4"	213	8.4"				
D	185.4	7.3"	279	11.0"	279	11.0"				
F	177.8	7.0"	256.5	10.1"	256.5	10.1"				
Μ	3/4"	NPT	3/4"	NPT	3/4"	NPT				
Ν	1/4"	NPT	1/4" NPT		1/4" NPT					
Inlet	1-1/4"; 1-1,	/2"; 2" NPT	2" NPT; 2" S125FF		2" S150RF					
Outlet	1-1/4"; 1-1,	/2"; 2" NPT	2" NPT; 2	" S125FF	2" S1	50RF				
Tubing Connections			1/4" NPT x 3/	'8" O.D. Tubing						
Weight	Kg	lbs	Kg	lbs	Kg	lbs				
NPT	6.6	14.6	13	28.7	-	-				
FF/RF	-	-	17.2	37.9	19	42				
*slicting flanges with body connectors dual sealing guaranteed with o-ring and high integrity sealing compound										

Table 25 Weights and dimensions



Sizing and Cg

In general, the choice of a regulator is made based on the calculation of the flow rate determined by using the flow rate coefficients (Cg) and the form factor (K1) as indicated by the EN 334 standard. Sizing is available through the on-line Pietro Fiorentini sizing program.

Flow rate coefficient									
Model	Cirval 200	Cirval 300							
Cg	200	759							
K1	89	96							

Table 26 Flow rate coefficient

For sizing **PRESS HERE** or use the QR code:



Note: In case you do not have the proper credentials to access, feel free to contact your closest Pietro Fiorentini representative.

In general the on-line sizing considers multiple variables as the regulator is installed in a system, enabling a better and multiperspective approach to the sizing.

For different gases, and for natural gas with a different relative density other than 0.61 (compared to air), the correction coefficients from the following formula shall be applied.

$$F_{c} = \sqrt{\frac{175.8}{S \times (273.16 + T)}} \qquad F_{c} = \sqrt{\frac{316.44}{S \times (459.67 + T)}}$$

S = relative density (refer to Table 27) T = gas temperature ($^{\circ}C$) S = relative density (refer to Table 27) T = gas temperature ($^{\circ}F$)

		_			
				Ξ.	
		-		-	
- 2	Ξ.	Ξ.	Ξ.	Ξ.	Ξ.
		-		-	
- 7	Ξ.	-	Ξ.		Ξ.
		_			
		-			

Correction Factor Fc

Gas Type	Relative Density S	Correction Factor Fc						
Air	1.00	0.78						
Propane	1.53	0.63						
Butane	2.00	0.55						
Nitrogen	0.97	0.79						
Oxygen	1.14	0.73						
Carbon Dioxide	1.52	0.63						

Note: the table shows the Fc correction factors valid for Gas, calculated at a temperature of 15°C | 59 °F and at the declared relative density.

Table 27 Correction Factor Fc

Flow rate conversion

Stm³/h x 0.94795 = Nm³/h

Nm³/h reference conditions T= 0 °C; P= 1 barg | T= 32 °F; P= 14.5 psig Stm³/h reference conditions T= 15 °C; P= 1 barg | T= 59 °F; P= 14.5 psig

Table 28 Flow rate conversion

CAUTION:

In order to get optimal performance, to avoid premature wear on the regulators components, and to limit noise emissions, it is recommended to check the gas speed and its compliance with local practice and regulations. The gas speed at the outlet flange of the regulator which may be calculated by the following formula:

$$V = 345.92 \text{ x} - \frac{Q}{DN^2} \text{ x} - \frac{1 - 0.002 \text{ x Pd}}{1 + Pd}$$
$$V = 0.0498 \text{ x} - \frac{Q}{DN^2} \text{ x} - \frac{14.504 - 0.002 \text{ x Pd}}{14.504 + Pd}$$

V = gas speed in m/s Q = gas flow rate in Stm³/h DN = nominal size of regular in mm Pd = outlet pressure in barg V = gas speed in ft/s Q = gas flow rate in Scfh DN = nominal size of regular in inches Pd = outlet pressure in psi



Cirval 200 - DN 1-1/4"

from 1.74 kPa | 7" w.c. up to 68.9 kPa | 10 psig flow capacity table

Cirval flow rate (according to ANSI B 109.4)										
		Outlet pressure								
Inlet pr	essure	droop +2	2/-1"w.c.	droop	±2"w.c.	droop ±	1% ABS	droop ±1% ABS		
		1.74 kPa	7" w.c.	3.5 kPa 14" w.c.		6.9 kPa 1 psig		34.5 kPa 5 psig		
kPa	psig	Stm³/h	Scfh	Stm ³ /h	Scfh	Stm³/h	Scfh	Stm³/h	Scfh	
13.8	2	59	2100	59	2100	-	-	-	-	
34.5	5	71	2500	71	2500	71	2500	-	-	
48.3	7	79	2800	79	2800	99	3500	-	-	
68.9	10	99	3500	99	3500	122	4300	61	2150	
103.4	15	156	5500	156	5500	170	6000	80	2825	
172.4	25	198	7000	198	7000	234	8250	109	3850	
275.8	40	241	8500	241	8500	297	10500	194	6850	
413.7	60	198	7000	198	7000	297	10500	269	9500	
499.9	72.5	198	7000	198	7000	297	10500	347	12250	
CG = 200	K1= 89									

Table 29 Cirval flow rate with outlet pressure from 1.74 kPa | 7" w.c. up to 34.5 kPa | 5 psig

Cirval flow rate										
	Outlet pressure									
Inlet pi	ressure	droop ±10	0% Gauge	droop ±10	0% Gauge					
		34.5 kPa	34.5 kPa 5 psig 68.9 kPa							
kPa	psig	Stm ³ /h	Scfh	Stm³/h	Scfh					
13.8	2	-	-	-	-					
34.5	5	-	-	-	-					
48.3	7	-	-	-	-					
68.9	10	140	4950	-	-					
103.4	15	184	6500	-	-					
172.4	25	283	10000	184	6500					
275.8	40	382	13500	297	10500					
413.7	60	382	13500	382	13500					
499.9	72.5	382	13500	425	15000					
CG = 200	K1= 89									

 Table 30 Cirval flow rate with outlet pressure from 34.5 kPa | 5 psig up to 68.9 kPa | 10 psig

Cirval 200 - DN 1-1/2"

from 1.74 kPa | 7" w.c. up to 68.9 kPa | 10 psig flow capacity table

Cirval flow rate (according to ANSI B 109.4)										
	Outlet pressure									
Inlet pr	ressure	droop +2	2/-1"w.c.	droop	±2"w.c.	droop ±1% ABS		droop ±1% ABS		
		1.74 kPa	ı 7" w.c.	3.5 kPa 14" w.c.		6.9 kPa 1 psig		34.5 kPa 5 psig		
kPa	psig	Stm ³ /h	Scfh	Stm³/h	Scfh	Stm³/h	Scfh	Stm ³ /h	Scfh	
13.8	2	68	2400	68	2400	-	-	-	-	
34.5	5	79	2800	79	2800	79	2800	-	-	
48.3	7	99	3500	99	3500	105	3700	-	-	
68.9	10	119	4200	119	4200	127	4500	69	2450	
103.4	15	184	6500	184	6500	184	6500	95	3350	
172.4	25	241	8500	241	8500	269	9500	130	4600	
275.8	40	241	8500	241	8500	340	12000	251	8850	
413.7	60	198	7000	198	7000	340	12000	326	11500	
499.9	72.5	198	7000	198	7000	340	12000	396	14000	
CG = 200	K1= 89									

Table 31 Cirval flow rate with outlet pressure from 1.74 kPa | 7" w.c. up to kPa | 5 psig

Cirval flow rate											
	Outlet pressure										
Inlet pi	ressure	droop ±10% Gauge droop ±10% Gaug									
		34.5 kPa	a 5 psig	68.9 kPa	10 psig						
kPa	psig	Stm ³ /h	Scfh	Stm³/h	Scfh						
13.8	2	-	-	-	-						
34.5	5	-	-	-	-						
48.3	7	-	-	-	-						
68.9	10	144	5100	-	-						
103.4	15	198	7000	-	-						
172.4	25	311	11000	198	7000						
275.8	40	425	15000	311	11000						
413.7	60	425	15000	425	15000						
499.9	72.5	425	15000	481	17000						
CG = 200	K1= 89										

Table 32 Cirval flow rate with outlet pressure from 34.5 kPa | 5 psig up to 68.9 kPa | 10 psig



Cirval 200 - DN 2"

from 1.74 kPa | 7" w.c. up to 68.9 kPa | 10 psig flow capacity table

Cirval flow rate (according to ANSI B 109.4)										
		Outlet pressure								
Inlet pi	ressure	droop +2	2/-1"w.c.	droop	±2"w.c.	droop ±	1% ABS	droop ±1% ABS		
		1.74 kPa	a 7" w.c.	3.5 kPa 14" w.c.		6.9 kPa 1 psig		34.5 kPa 5 psig		
kPa	psig	Stm ³ /h	Scfh	Stm ³ /h	Scfh	Stm³/h	Scfh	Stm³/h	Scfh	
13.8	2	71	2500	71	2500	-	-	-	-	
34.5	5	85	3000	85	3000	85	3000	-	-	
48.3	7	105	3700	109	3850	109	3850	-	-	
68.9	10	130	4600	142	5000	142	5000	69	2450	
103.4	15	184	6500	184	6500	184	6500	105	3700	
172.4	25	255	9000	283	10000	297	10500	163	5750	
275.8	40	255	9000	283	10000	368	13000	269	9500	
413.7	60	227	8000	249	8800	368	13000	340	12000	
499.9	72.5	227	8000	249	8800	368	13000	453	16000	
CG = 200	K1= 89									

 Table 33 Cirval flow rate with outlet pressure from 1.74 kPa | 7" w.c. up to kPa | 5 psig

Cirval flow rate									
Outlet pressure									
Inlet pressure		droop ±10% Gauge droop ±10% Gaug							
		34.5 kPa	a 5 psig	68.9 kPa	10 psig				
kPa	psig	Stm ³ /h	Scfh	Stm ³ /h	Scfh				
13.8	2	-	-	-	-				
34.5	5	-	-	-	-				
48.3	7	-	-	-	-				
68.9	10	150	5300	-	-				
103.4	15	205	7250	-	-				
172.4	25	326	11500	204	7200				
275.8	40	467	16500	326	11500				
413.7	60	467	16500	439	15500				
499.9	72.5	467	16500	496	17500				
CG = 200	K1= 89								

Table 34 Cirval flow rate with outlet pressure from 34.5 kPa | 5 psig up to 68.9 kPa | 10 psig

Cirval 300 - DN 2"

from 1.74 kPa | 7" w.c. up to 68.9 kPa | 10 psig flow capacity table

Cirval flow rate (according to ANSI B 109.4)												
		Outlet pressure										
Inlet pressure		droop +2/-1"w.c.		droop ±2"w.c.		droop ±1% ABS		droop ±1% ABS				
		1.74 kPa 7" w.c.		3.5 kPa 14" w.c.		6.9 kPa 1 psig		34.5 kPa 5 psig				
kPa	psig	Stm³/h	Scfh	Stm ³ /h	Scfh	Stm³/h	Scfh	Stm³/h	Scfh			
13.8	2	198	7000	198	7000	-	-	-	-			
34.5	5	241	8500	255	9000	255	9000	-	-			
48.3	7	269	9500	283	10000	297	10500	-	-			
68.9	10	354	12500	368	13000	368	13000	300	10600			
103.4	15	425	15000	439	15500	481	17000	421	14850			
172.4	25	481	17000	552	19500	609	21500	630	22250			
275.8	40	538	19000	651	23000	772	27250	665	23500			
413.7	60	708	25000	651	23000	772	27250	772	27250			
499.9	72.5	708	25000	651	23000	772	27250	772	27250			
CG = 759	K1= 96											

Table 35 Cirval flow rate with outlet pressure from 1.74 kPa | 7" w.c. up to kPa | 5 psig

Cirval flow rate												
		Outlet pressure										
Inlet pi	ressure	droop ±10	0% Gauge	droop ±10% Gauge								
		34.5 kPa	a 5 psig	68.9 kPa 10 psig								
kPa	psig	Stm³/h	Scfh	Stm³/h	Scfh							
13.8	2	-	-	-	-							
34.5	5	-	-	-	-							
48.3	7	-	-	-	-							
68.9	10	496	17500	-	-							
103.4	15	708	25000	-	-							
172.4	25	850	30000	204	7200							
275.8	40	850	30000	326	11500							
413.7	60	850	30000	439	15500							
499.9	72.5	850	30000	496	17500							
CG = 759	K1= 96											

Table 36 Cirval flow rate with outlet pressure from 34.5 kPa | 5 psig up to 68.9 kPa | 10 psig



Customer Centricity

Customer centricity is a way of running your business — implementing a perfect customer experience at each stage of the pipeline. Pietro Fiorentini is one of the main Italian international company with high focus on product and service quality.

The main strategy is to create a stable, long-term relationship, putting the customer's needs first. Lean management and customer centricity are used to improve and maintain the highest level of customer experience.



Support

Pietro Fiorentini's top priority is to provide support to the client in all phases of project development, during installation, start up and operation. Pietro Fiorentini has developed a highly standardized Intervention-Management-System (IMS), which helps to facilitate the entire process and putting the customer at the forefront of every decision in our process while manufacturing or developing a product to help improve the product and service. With our IMS business model many services are available remotely, avoiding long waiting times, improving service, and avoiding unnecessary expenses.



Training

Pietro Fiorentini offers training services available for both experienced operators and new customers. The training is offered for all levels of our customers which can include one or all of the following: sizing of equipment, application, installation, operation, maintenance and is prepared according to the level of use and the customer's need.



Customer Relation Management (CRM)

The service and care of our customers are one of the main missions and vision of Pietro Fiorentini. For this reason, Pietro Fiorentini has enhanced the customer relation management system. This enables us to track every opportunity and request from our customers into one single information point and allows us to coordinate information allowing us to give the customer improved service.

Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technology and solutions that can shape a more sustainable future. That is why respect for people, society and the environment form the cornerstones of our strategy.



Our commitment to the world of tomorrow

While in the past we limited ourselves to providing products, systems and services for the oil & gas sector, today we want to broaden our horizons and create technologies and solutions for a digital and sustainable world. We have a particular focus on renewable energy projects to help make the most of our planet's resources and create a future in which the younger generations can grow and prosper.

The time has come to understand how and why we operate now.









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