

TECHNICAL INFORMATION

Automatic flow balancing valve

CIM 790

Description

Balancing valves **Cim 790** are designed for automatic balancing of heating and cooling installations, regardless pressure fluctuations under service, which might occur due to flow rate changes in the installation. Automatic balancing is achieved by means of cartridges that provide constant flow within a fixed range of differential pressures.

The selection of cartridges is able to match every flow requirement from a minimum of 0,007 l/s up to a maximum of 3,154 l/s.



Picture 1

Automatic balancing function is performed with innovative and patented cartridges with incorporated fixed orifice. These cartridges are available in two pressure classes:

- Low pressure up to 350 KPa in “CR” brass;
- High pressure up to 600 KPa in nickel plated “CR” brass.

The automatic function of **Cim 790** eliminates the manual balancing of the system, allowing possible inspection by contractor. The cartridge can be easily removed from its seat even with installed valve, allowing easy flushing of the installation and possible flow modification required after first installation.

The use of automatic balancing valve on terminal units of the system avoids the need of other balancing valves on the main circuit or on system branches.

Balancing valve **Cim 790** is made of “CR” brass and is available in sizes from DN ½” up to DN 2”.

Working temperature range of the valve is between -20°C ÷ 120°C, with maximum operating pressure PN 25.

The main features of **Cim 790** are the following:

- The cartridge is removable from the valve body and can be changed, inspected and cleaned without breaking the main piping. No special tool is requested for removal of cartridge;
- System balancing is assured automatically, even under fluctuating pressure conditions;
- More compact installation with automatic balancing valves not requiring straight pipe to obtain linear flow at valve inlet and outlet;
- Cartridge performance is not affected by debris. The self-cleaning cartridge design makes very difficult for any particles to accumulate and compromise the accuracy of the valve;
- Energy saving due to elimination of excessive flow;
- Increased comfort thanks to more accurate flow distribution with better performance of system regulating valves.

Installation procedure

Before installation of **CIM 790**, check that inside the valve and the pipes there are no foreign matters which might damage the tightness of the valve.

Burr pipe connections after having threaded them and distribute the sealing material on pipe threads only and not on valve threads.

It is advisable to install a filter and an intercepting valve on the feed line.

Before installation of **Cim 790**, check that cartridge flow rate is properly matching the project requirements and that pump is able to assure the minimum differential pressure (Δp min) stated in the tables of following pages (section "Tables").

Valves may be installed either on horizontal or vertical pipelines, following the arrow direction casted on the valve body, which shall be the same as the flow one.

For assembly purposes, use a spanner, not a pipe wrench, by applying necessary working torque only on the valve end nearest the pipe. This helps get a firmer grip and avoids potential damages to valve body. Make sure that pipe threading length is not longer than valve threads.

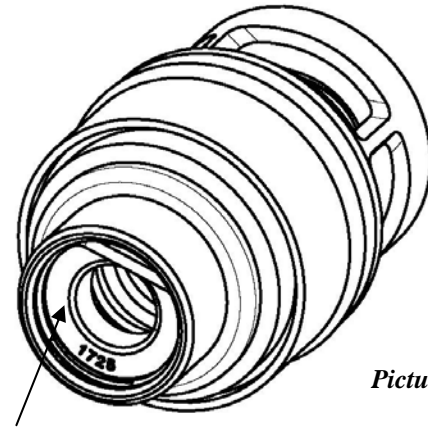
It is advisable to flush the installation before service. To this purpose, remove all cartridges of the installed valves, following the instructions detailed in "Maintenance" part of the present brochure.

Balancing

Flow rate balancing is achieved automatically by **Cim 790**, regardless pressure fluctuations. The flow rate of each cartridge depends on the fixed orifice installed therein. Each fixed orifice has a four digit code number, corresponding to the last four digits of Cimberio cartridge code.

Once the cartridge is identified by Cimberio code, the relevant flow rates and minimum Δp can be read in the tables shown in "Tables" section of this brochure.

Using the electronic differential manometer **Cim 726**, check that the differential pressure is higher or the same as the minimum value shown in said tables. The differential manometer interfaces with the balancing valve through two sensors inserted in the binder points of the valve.



Picture 2

Calibrated
orifice

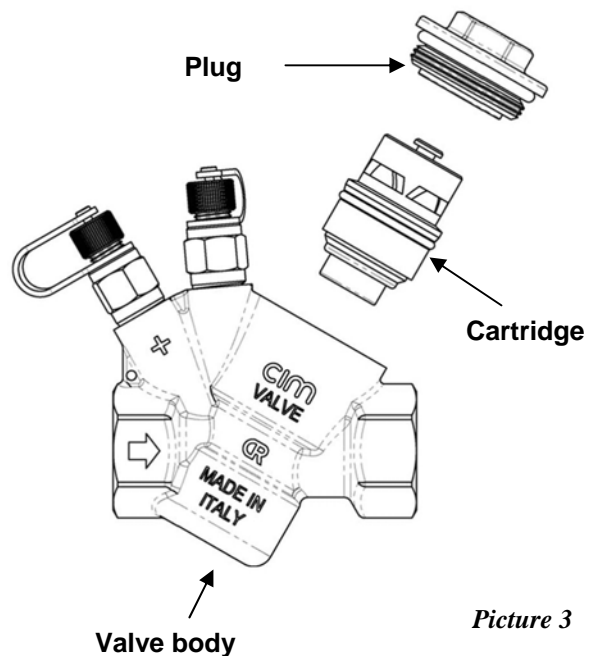
Maintenance

As a rule, the balancing valve does not need any maintenance. In case of replacement or need of disassembling of some components of the valve, make sure that the installation is not under service or pressure.

When flushing the installation, follow these instructions:

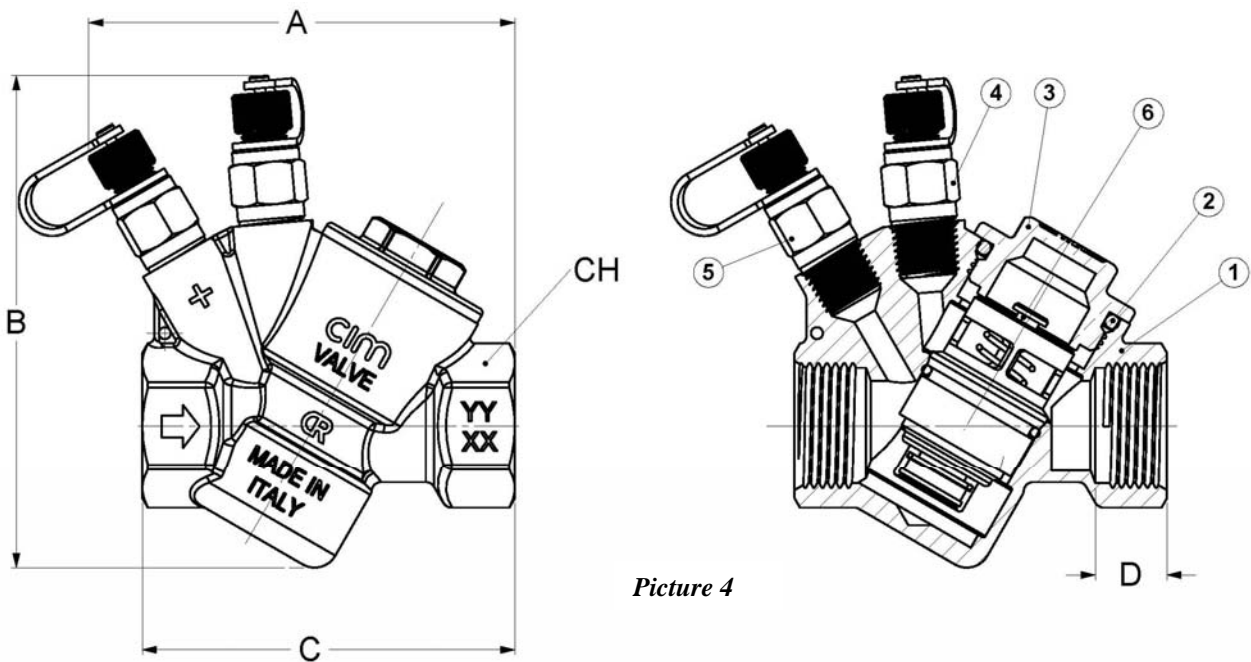
- unscrew the plug (see picture 3);
- take off the cartridge from the valve body using a common grab acting on the pin placed at the end of the cartridge;
- close the valve with the plug and let flow the water to flush the installation;
- remove the plug, insert the cartridge and then reassemble the plug.

If flow rate has to be changed, proceed as above by replacing the installed cartridge with the one corresponding to the required flow rate. The features of different types of cartridge are available in the following chapter "Tables".



Picture 3

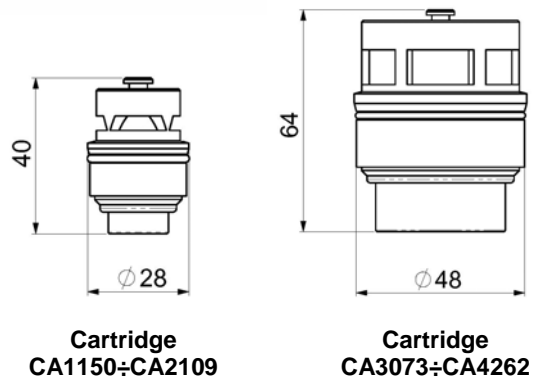
The below table shows the dimensions of all **Cim 790** series.



Picture 4

Legenda:

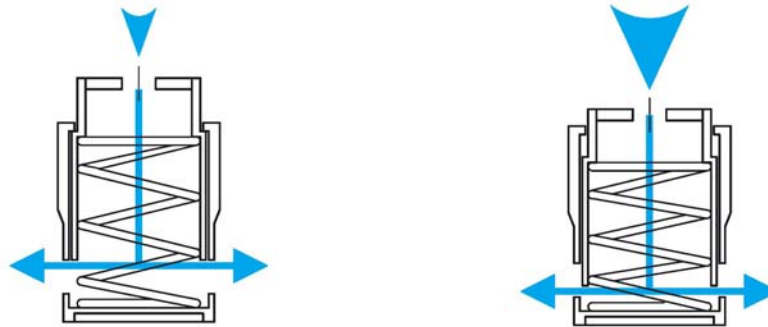
1. Valve body;
2. ORing;
3. Plug;
4. Binder point;
5. Binder point;
6. Cartridge.



DN	A	B	C	D	CH
15	89	103	78	11,5	25
20	89	103	78	12,5	31
25	93	103	85	14,5	38
25L	125	141	123	14,5	40
32	125	141	123	16,8	46
40	125	141	123	16,8	52
50	130	141	132	21,1	64

Cartridge operations

When the pressure increases, the spring is compressed and the piston reduces outlet windows, in order to maintain the same flow rate; when Δp decreases the windows start to open again (see picture on the right).



Picture 5

Constant flow is obtained through the valve, despite pressure fluctuations.

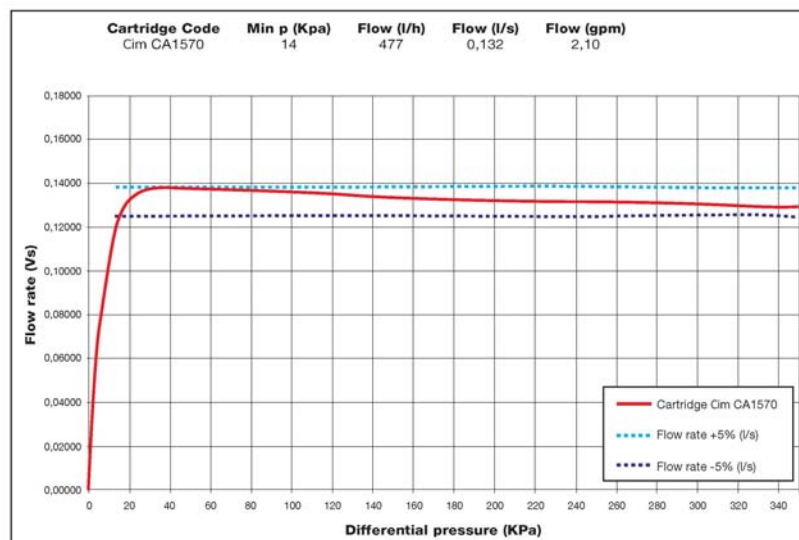
By simply measuring differential pressure across the valve, the flow through the cartridge is obtained as follows:

- If measured differential pressure is above minimum Δp , the flow rate is the same as the one stated on the cartridge table;
- If measured differential pressure is below minimum Δp stated on cartridge table, flow rate is calculated with one of the following formula.

$$Q = Kvs \times \sqrt{\Delta p} \quad \text{where} \quad Q = \text{m}^3/\text{h}; \Delta p = \text{bar}$$

$$Q = 100 \times Kvs \times \sqrt{\Delta p} \quad \text{where} \quad Q = \text{l/h}; \Delta p = \text{KPa}$$

$$Q = \frac{1}{36} \times Kvs \times \sqrt{\Delta p} \quad \text{where} \quad Q = \text{l/s}; \Delta p = \text{KPa}$$



Picture 6

Tables

CIM 790 - DN 15, DN 20, DN 25

Flow rates and minimum Δp for all cartridges available

Cartridge Code (max 350KPa)	Cartridge Corde (max 600KPa)	Flow rate (l/s)	Flow rate (l/h)	Flow rate (gpm)	Min Δp (KPa)	Kvs
Cim CA1150		0,007	25	0,11	7	0,09
Cim CA1170		0,01	35	0,15	7	0,14
Cim CA1190		0,012	46	0,20	7	0,16
Cim CA1210	Cim CA1210H	0,015	55	0,24	7	0,21
Cim CA1230	Cim CA1230H	0,021	75	0,33	8	0,27
Cim CA1260	Cim CA1260H	0,023	84	0,37	9	0,28
Cim CA1290	Cim CA1290H	0,029	104	0,46	10	0,33
Cim CA1300	Cim CA1300H	0,032	114	0,50	10	0,36
Cim CA1320	Cim CA1320H	0,036	129	0,57	11	0,39
Cim CA1350	Cim CA1350H	0,043	154	0,68	11	0,46
Cim CA1370	Cim CA1370H	0,049	175	0,77	12	0,51
Cim CA1400	Cim CA1400H	0,057	204	0,90	12	0,59
Cim CA1430	Cim CA1430H	0,067	241	1,06	12	0,70
Cim CA1460	Cim CA1460H	0,078	279	1,23	12	0,81
Cim CA1490	Cim CA1490H	0,089	320	1,41	13	0,89
Cim CA1510	Cim CA1510H	0,097	350	1,54	13	0,97
Cim CA1540	Cim CA1540H	0,111	400	1,76	13	1,11
Cim CA1570	Cim CA1570H	0,132	477	2,10	14	1,27
Cim CA1620	Cim CA1620H	0,151	545	2,40	14	1,46
Cim CA1725	Cim CA1725H	0,171	615	2,71	14	1,64
Cim CA1730	Cim CA1730H	0,186	670	2,95	14	1,79
Cim CA1735	Cim CA1735H	0,204	736	3,24	14	1,97
Cim CA1740	Cim CA1740H	0,222	799	3,52	16	2,00
Cim CA1745	Cim CA1745H	0,242	870	3,83	19	2,00
Cim CA1750	Cim CA1750H	0,260	936	4,12	21	2,01
Cim CA2070	Cim CA2070H	0,283	1020	4,49	22	2,17
Cim CA2074	Cim CA2074H	0,300	1081	4,76	22	2,30
Cim CA2077	Cim CA2077H	0,332	1195	5,26	22	2,55
Cim CA2082	Cim CA2082H	0,371	1335	5,88	23	2,78
Cim CA2086	Cim CA2086H	0,412	1483	6,53	23	3,09
Cim CA2088	Cim CA2088H	0,439	1581	6,96	23	3,30
Cim CA2092	Cim CA2092H	0,493	1774	7,81	24	3,62
Cim CA2094	Cim CA2094H	0,509	1833	8,07	24	3,74
Cim CA2099	Cim CA2099H	0,578	2080	9,16	25	4,16
Cim CA2103	Cim CA2103H	0,625	2251	9,91	26	4,41
Cim CA2106	Cim CA2106H	0,644	2319	10,21	27	4,46
Cim CA2109	Cim CA2109H	0,680	2448	10,78	28	4,63

The "gpm" values are corresponding to US gallon per minute.

CIM 790 - DN 25L, DN 32, DN 40 e DN 50
Flow rates and minimum Δp for all cartridges available

Cartridge Code (max 350KPa)	Cartridge Code (max 600KPa)	Flow rate (l/s)	Flow rate (l/h)	Flow rate (gpm)	Min Δp (KPa)	Kvs
Cim CA3073	Cim CA3073H	0,187	674	2,97	12	1,95
Cim CA3082	Cim CA3082H	0,239	861	3,79	12	2,49
Cim CA3089	Cim CA3089H	0,283	1020	4,49	12	2,94
Cim CA3094	Cim CA3094H	0,315	1136	5,00	12	3,28
Cim CA3096	Cim CA3096H	0,331	1190	5,24	12	3,44
Cim CA3098	Cim CA3098H	0,353	1272	5,60	13	3,53
Cim CA3102	Cim CA3102H	0,375	1349	5,94	13	3,74
Cim CA3107	Cim CA3107H	0,413	1485	6,54	13	4,12
Cim CA3111	Cim CA3111H	0,435	1567	6,90	14	4,19
Cim CA3112	Cim CA3112H	0,453	1631	7,18	14	4,36
Cim CA3118	Cim CA3118H	0,504	1815	7,99	14	4,85
Cim CA3124	Cim CA3124H	0,556	2001	8,81	15	5,17
Cim CA3125	Cim CA3125H	0,568	2044	9,00	16	5,11
Cim CA3129	Cim CA3129H	0,603	2171	9,56	16	5,43
Cim CA3132	Cim CA3132H	0,631	2271	10,00	17	5,51
Cim CA3135	Cim CA3135H	0,661	2380	10,48	17	5,77
Cim CA3138	Cim CA3138H	0,694	2498	11,00	18	5,89
Cim CA3142	Cim CA3142H	0,733	2639	11,62	18	6,22
Cim CA3148	Cim CA3148H	0,797	2871	12,64	19	6,59
Cim CA3156	Cim CA3156H	0,886	3191	14,05	21	6,96
Cim CA3161	Cim CA3161H	0,946	3407	15,00	22	7,26
Cim CA3163	Cim CA3163H	0,968	3486	15,35	22	7,43
Cim CA4148	Cim CA4148H	1,009	3635	16,00	20	8,13
Cim CA4152	Cim CA4152H	1,023	3681	16,00	21	8,03
Cim CA4156	Cim CA4156H	1,136	4090	18,00	21	8,92
Cim CA4164	Cim CA4164H	1,199	4315	19,00	21	9,42
Cim CA4168	Cim CA4168H	1,262	4540	20,00	22	9,68
Cim CA4173	Cim CA4173H	1,325	4770	21,00	22	10,17
Cim CA4176	Cim CA4176H	1,388	4995	22,00	23	10,42
Cim CA4182	Cim CA4182H	1,514	5450	24,00	24	11,12
Cim CA4191	Cim CA4191H	1,640	5905	26,00	25	11,81
Cim CA4194	Cim CA4194H	1,816	6539	29,00	26	12,82
Cim CA4200	Cim CA4200H	1,893	6815	30,00	27	13,11
Cim CA4205	Cim CA4205H	2,019	7265	32,00	28	13,73
Cim CA4211	Cim CA4211H	2,145	7720	34,00	30	14,10
Cim CA4217	Cim CA4217H	2,271	8175	36,00	31	14,68
Cim CA4222	Cim CA4222H	2,397	8630	38,00	33	15,02
Cim CA4229	Cim CA4229H	2,523	9085	40,00	34	15,58
Cim CA4235	Cim CA4235H	2,650	9540	42,00	36	15,90
Cim CA4241	Cim CA4241H	2,776	9990	44,00	38	16,21
Cim CA4248	Cim CA4248H	2,902	10445	46,00	40	16,51
Cim CA4250	Cim CA4250H	3,028	10900	48,00	42	16,82
Cim CA4262	Cim CA4262H	3,154	11355	50,00	44	17,12

The "gpm" values are corresponding to US gallon per minute.