

valve  
**cimberio**<sup>®</sup>  
technological solutions



**Automatic flow  
balancing valves**



## Cim 790 Threaded automatic flow balancing valves

Balancing valve **Cim 790** is designed for automatic balancing of heating and cooling installations.

Automatic balancing is achieved by means of cartridges that provide constant flow. The wide selection of cartridges is able to match every flow requirement from a minimum of 0,007 l/s (7 KPa min.  $\Delta p$ ) up to a maximum of 3,154 l/s (44 KPa min.  $\Delta p$ ).

**Cim 790** can be used either in constant flow or variable flow system, assuring that specified flow would not be exceeded.

Automatic balancing function is performed with innovative and patented cartridges with incorporated fixed orifice.

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 1/2" up to DN 2"

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

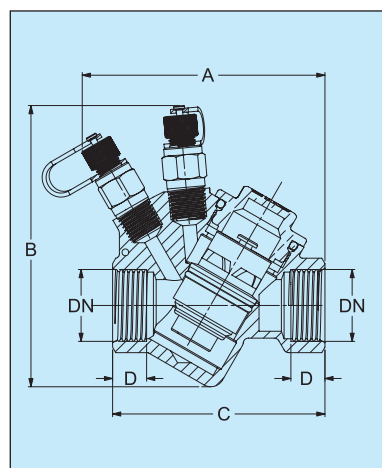


The main features of **Cim 790** are as follows:

- 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;
- Decrease of installation costs, due to energy saving and cut off cost related to system balancing.
- 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.

## cim 790

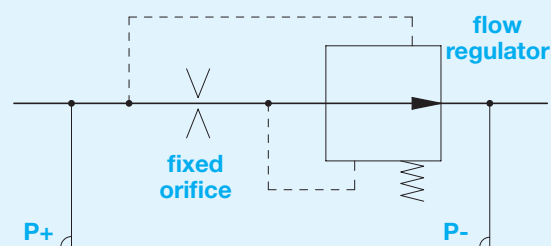
### THREADED AUTOMATIC FLOW BALANCING VALVES



		Cim 790					
DN	Grms.	A	B	C	D	Flow rate range (l/h)	
15	510	89	103	78	11,5	25 ÷ 2448	
20	530	89	103	78	12,5	25 ÷ 2448	
25	615	93	103	85	14,5	25 ÷ 2448	
25L	1505	125	141	123	14,5	674 ÷ 11355	
32	1530	125	141	123	16,8	674 ÷ 11355	
40	1590	125	141	123	16,8	674 ÷ 11355	
50	1710	130	141	132	21,1	674 ÷ 11355	

## Installation notes

- Before installation check that cartridge flow rate is properly matching the project requirements;
- Valves may be installed either on horizontal or vertical pipelines;
- At valve inlet and outlet no minimum straight-piping is required.



## Cartridge - Technical data

Cartridges are available in two pressure classes:

- Low pressure up to 350Kpa in "CR" brass (f.i. Cim CA1210);
- High pressure up to 600Kpa in nickel plated "CR" brass (f.i. Cim CA 1210H).

**Working temperature:** -20°C to 120°C

### CARTRIDGE FOR VALVES FROM DN 15 TO DN 25 (0,007 l/s ÷ 0,680 l/s)

cod. (max 350KPa)	cod. (max 600KPa)	Flow (l/s)	Flow (l/h)	Flow (gpm)	Min Δp (KPa)	Kv
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 CA1210 H	0,015	55	0,24	7	0,21
Cim CA1230	Cim CA1230 H	0,021	75	0,33	8	0,27
Cim CA1260	Cim CA1260 H	0,023	84	0,37	9	0,28
Cim CA1290	Cim CA1290 H	0,029	104	0,46	10	0,33
Cim CA1300	Cim CA1300 H	0,032	114	0,50	10	0,36
Cim CA1320	Cim CA1320 H	0,036	129	0,57	11	0,39
Cim CA1350	Cim CA1350 H	0,043	154	0,68	11	0,46
Cim CA1370	Cim CA1370 H	0,049	175	0,77	12	0,51
Cim CA1400	Cim CA1400 H	0,057	204	0,90	12	0,59
Cim CA1430	Cim CA1430 H	0,067	241	1,06	12	0,70
Cim CA1460	Cim CA1460 H	0,078	279	1,23	12	0,81
Cim CA1490	Cim CA1490 H	0,089	320	1,41	13	0,89
Cim CA1510	Cim CA1510 H	0,097	350	1,54	13	0,97
Cim CA1540	Cim CA1540 H	0,111	400	1,76	13	1,11
Cim CA1570	Cim CA1570 H	0,132	477	2,10	14	1,27
Cim CA1620	Cim CA1620 H	0,151	545	2,40	14	1,46
Cim CA1725	Cim CA1725 H	0,171	615	2,71	14	1,64
Cim CA1730	Cim CA1730 H	0,186	670	2,95	14	1,79
Cim CA1735	Cim CA1735 H	0,204	736	3,24	14	1,97
Cim CA1740	Cim CA1740 H	0,222	799	3,52	16	2,00
Cim CA1745	Cim CA1745 H	0,242	870	3,83	19	2,00
Cim CA1750	Cim CA1750 H	0,260	936	4,12	21	2,01
Cim CA2070	Cim CA2070 H	0,283	1020	4,49	22	2,17
Cim CA2074	Cim CA2074 H	0,300	1081	4,76	22	2,30
Cim CA2077	Cim CA2077 H	0,332	1195	5,26	22	2,55
Cim CA2082	Cim CA2082 H	0,371	1335	5,88	23	2,78
Cim CA2086	Cim CA2086 H	0,412	1483	6,53	23	3,09
Cim CA2088	Cim CA2088 H	0,439	1581	6,96	23	3,30
Cim CA2092	Cim CA2092 H	0,493	1774	7,81	24	3,62
Cim CA2094	Cim CA2094 H	0,509	1833	8,07	24	3,74
Cim CA2099	Cim CA2099 H	0,578	2080	9,16	25	4,16
Cim CA2103	Cim CA2103 H	0,625	2251	9,91	26	4,41
Cim CA2106	Cim CA2106 H	0,644	2319	10,21	27	4,46
Cim CA2109	Cim CA2109 H	0,680	2448	10,78	28	4,63



### CARTRIDGE FOR VALVES FROM DN 25L TO DN 50 (0,187 l/s ÷ 3,154 l/s)

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

## 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  $\Delta p$  decreases the windows start to open again (see picture on the right).

Constant flow rate 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  $\Delta p$ , the flow rate is the same as the one stated on the cartridge table.
- if measured differential pressure is below minimum  $\Delta p$  stated on cartridge table, flow rate is calculated with one of the following formula.

$$Q = K_v * \sqrt{\Delta p}$$

$$Q = m^3/h$$

$$\Delta p = \text{bar}$$

$$Q = 100 * K_v * \sqrt{\Delta p}$$

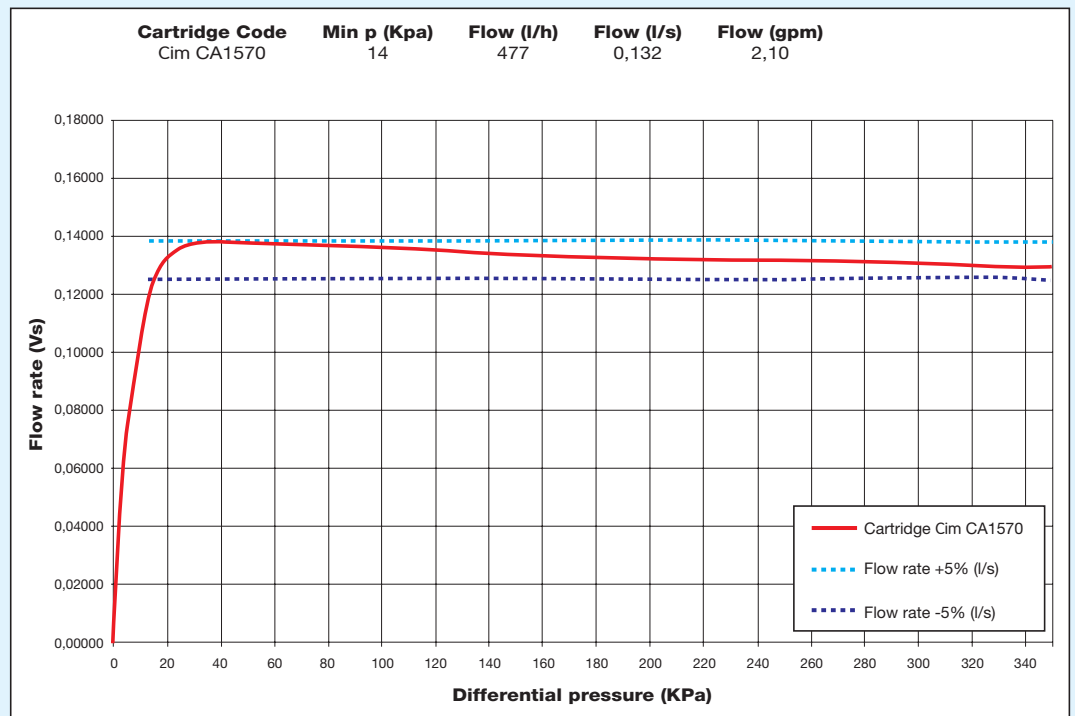
$$Q = l/h$$

$$\Delta p = \text{KPa}$$

$$Q = 1/36 * K_v * \sqrt{\Delta p}$$

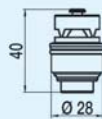
$$Q = l/s$$

$$\Delta p = \text{KPa}$$



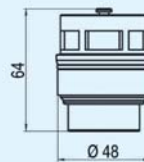
**Cim 790**  
DN 15 - 20 - 25

**CARTRIDGES**  
from 0.007 l/s to 0.680 l/s  
25 l/h - 2448 l/h



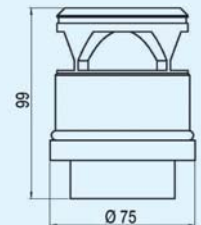
**Cim 790**  
DN 25L - 32 - 40 - 50

**CARTRIDGES**  
from 0.188 l/s to 3.154 l/s  
674 l/h - 11355 l/h



**Cim 3790**  
DN 50 - DN 800

**CARTRIDGES**  
from 1.0061 l/s to 12.5 l/s  
3820 l/h - 45000 l/h



## Orifice plate marking

On the orifice plate is engraved a four digit code number, corresponding to the last four digits of Cimperio cartridge code.

Cartridges can be identified by above mentioned four digits numbers; the corresponding flow rate and minimum  $\Delta p$  can be read on specific tables.

cod. (max 350KPa)	cod. (max 600KPa)	Flow (l/s)	Flow (l/h)	Flow (gpm)	Min $\Delta p$ (KPa)
Cim CA1620	Cim CA1620 H	0,151	545	2,40	14
Cim CA1725	Cim CA1725 H	0,171	615	2,71	14
Cim CA1730	Cim CA1730 H	0,186	670	2,95	14



## Cim 3790 Flanged automatic flow balancing valve

Wafer style automatic flow balancing valves **Cim 3790** are particularly designed for cooling and heating systems. The special cartridge assures system balancing even under fluctuating pressure conditions.

The available cartridge range can meet flow rate requirements ranging from a minimum of 1,061 l/s up to 12,500 l/s. Since inside the body valve quantity of cartridges may change according to the project flow rate, **Cim 3790** valves are able to meet flow rate requirements ranging from a minimum of 3.820 l/h up to a maximum of 3.825.000 l/h. If a full flow capacity is not required, but rather only a portion of it, blind caps can be fitted instead of cartridges.

Automatic balancing function is performed with innovative and patented cartridges with incorporated fixed orifice.

**Cim 3790** valves are made of ductile iron GGG40 with flanges according to EN/ANSI standards. Wafer style automatic flow balancing valves **Cim 3790** are available in sizes from DN50 up to DN 800. Working temperature range is from -20°C up to 110°C, with a maximum working pressure of PN 16.

Wafer style automatic flow balancing valves **Cim 3790** are supplied with 100mm length binder points. From DN 100 the valves are supplied with a threaded hook to be screwed on the body.

These valves work properly within a range of differential pressures included between a minimum value (specified in the table hereafter reported) and a maximum value of 600KPa. Minimum differential pressure can be measured out with the binder points on the valve body.

The main features of **Cim 3790** are the followings:

- System balancing 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 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.

**cim3790**





## cim 3790



### Cartridge - Technical data

Cartridges are available in two materials having same high pressure class up to 600Kpa:

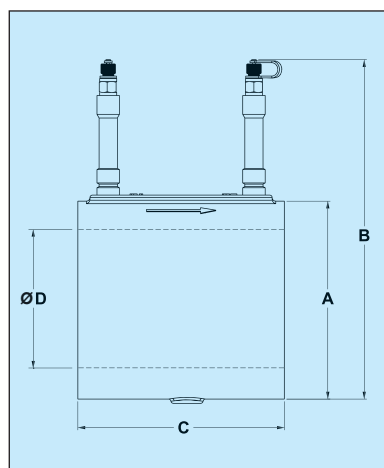
- AISI 304 (f.i. Cim CA5179H);
- AISI 316 for high resistance to corrosion (f.i. Cim CA5179HR).

**Working temperature:** -20°C to 120°C



## cim 3790

### FLANGED AUTOMATIC FLOW BALANCING VALVE



Cim 3790 DN	Weight (gr.)	Ø A (mm)	B (mm)	C (mm)	Ø D (mm)	Max n. of cartridges	Flow rate range (l/h)
50	3410	100	218	170	80	1	3820÷45000
65	4910	119	237	170	80	1	3820÷45000
80	4790	131	249	170	80	1	3820÷45000
100	6900	163	281	170	100	2	3820÷90000
125	9000	193	311	170	125	3	3820÷135000
150	11730	216	334	170	150	4	3820÷180000
200	18750	271	389	170	200	7	3820÷315000
250	23440	326	440	170	260	12	3820÷540000
300	33410	383	501	170	315	15	3820÷675000
350	44210	443	561	170	355	19	3820÷855000
400	51630	496	614	170	405	26	3820÷1170000
450	57470	545	663	170	455	33	3820÷1485000
500	67750	601	719	170	508	40	3820÷1800000
600	88900	715	833	170	610	56	3820÷2520000
800	127300	880	998	170	760	85	3820÷3825000



### CARTRIDGE FOR VALVES FROM DN 50 TO DN 800 (1,061 l/s ÷ 12,500 l/s)

cod. (max 600KPa)	cod. (max 600KPa)	Flow (l/s)	Flow (l/h)	Flow (gpm)	Min Δp (KPa)	Kv
Cim CA5179 H	Cim CA5179 HR	1,061	3820	16,82	13	10,6
Cim CA5184 H	Cim CA5184 HR	1,092	3931	17,31	13	10,9
Cim CA5189 H	Cim CA5189 HR	1,125	4049	17,83	13	11,2
Cim CA5194 H	Cim CA5194 HR	1,166	4199	18,49	13	11,7
Cim CA5200 H	Cim CA5200 HR	1,222	4399	19,37	13	12,2
Cim CA5206 H	Cim CA5206 HR	1,289	4640	20,43	14	12,4
Cim CA5213 H	Cim CA5213 HR	1,375	4951	21,80	14	13,2
Cim CA5220 H	Cim CA5220 HR	1,475	5310	23,38	14	14,2
Cim CA5227 H	Cim CA5227 HR	1,583	5700	25,10	14	15,2
Cim CA5235 H	Cim CA5235 HR	1,725	6209	27,34	14	16,6
Cim CA5243 H	Cim CA5243 HR	1,809	6511	28,67	14	17,4
Cim CA5251 H	Cim CA5251 HR	1,967	7081	31,18	14	18,9
Cim CA5260 H	Cim CA5260 HR	2,195	7901	34,79	15	20,4
Cim CA5269 H	Cim CA5269 HR	2,472	8900	39,19	16	22,3
Cim CA5279 H	Cim CA5279 HR	2,889	10399	45,79	19	23,9
Cim CA5287 H	Cim CA5287 HR	3,154	11355	50,00	21	24,2
Cim CA5292 H	Cim CA5292 HR	3,470	12491	55,00	23	26,1
Cim CA5298 H	Cim CA5298 HR	3,722	13399	59,00	24	27,4
Cim CA5303 H	Cim CA5303 HR	4,100	14762	65,00	27	28,4
Cim CA5308 H	Cim CA5308 HR	4,444	15999	70,45	29	29,7
Cim CA6285 H	Cim CA6285 HR	4,733	17037	75,02	34	29,2
Cim CA6292 H	Cim CA6292 HR	5,041	18148	79,91	34	31,1
Cim CA6301 H	Cim CA6301 HR	5,221	18797	82,77	35	31,8
Cim CA6305 H	Cim CA6305 HR	5,408	19467	85,72	35	32,9
Cim CA6312 H	Cim CA6312 HR	5,684	20464	90,11	35	34,6
Cim CA6319 H	Cim CA6319 HR	5,980	21527	94,79	36	35,9
Cim CA6326 H	Cim CA6326 HR	6,236	22449	98,85	36	37,4
Cim CA6332 H	Cim CA6332 HR	6,523	23482	103,40	36	39,1
Cim CA6338 H	Cim CA6338 HR	6,814	24531	108,02	37	40,3
Cim CA6344 H	Cim CA6344 HR	7,117	25621	112,82	38	41,6
Cim CA6349 H	Cim CA6349 HR	7,369	26528	116,81	38	43,0
Cim CA6356 H	Cim CA6356 HR	7,690	27686	121,91	38	44,9
Cim CA6362 H	Cim CA6362 HR	8,099	29157	128,39	38	47,3
Cim CA6367 H	Cim CA6367 HR	8,321	29954	131,90	39	48,0
Cim CA6373 H	Cim CA6373 HR	8,605	30976	136,40	39	49,6
Cim CA6379 H	Cim CA6379 HR	8,961	32260	142,05	40	51,0
Cim CA6385 H	Cim CA6385 HR	9,324	33565	147,80	40	53,0
Cim CA6391 H	Cim CA6391 HR	9,709	34953	153,91	40	55,3
Cim CA6393 H	Cim CA6393 HR	10,093	36336	160,00	42	56,1
Cim CA6398 H	Cim CA6398 HR	10,468	37685	165,94	43	57,5
Cim CA6400 H	Cim CA6400 HR	10,724	38607	170,00	44	58,2
Cim CA6407 H	Cim CA6407 HR	11,381	40971	180,41	46	60,4
Cim CA6407 HH	Cim CA6407H HR	12,500	45000	198,00	49	64,3

cav. uff.   
**GIACOMO CIMBERIO**  
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