



Installation & Operating Manual



ART 20C Pressure Independent Control Valve (PICV)

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1. Introduction

- Albion Valves (UK) Ltd ART 20C is a Pressure Independent Control Valve (PICV) which can be used to regulate the pressure differential in a circuit and to control the amount of fluid flowing through it.
- Thanks to their unique design, PICV's can perform flow regulation, differential pressure control and modulation for comfort control.

Flow Regulation

When an electric actuator is not present or the plastic cap has been removed, the valve is normally open. But if the plastic cap is screwed on, or an electric actuator is installed, the spring forces the valve to close. The inlet water passes through a modulating control component whose geometry can be modified by turning the pre-setting dial to obtain the required flow rate for the branch of the system where the valve is installed.

Differential Pressure Control

PICV maintains steady flow rate even when there are pressure fluctuations. The DPC bonnet has two different pressures. The first one is in the passage connecting the valve inlet to the upper section of the valve (see hydraulic diagram); the second one is at the valve outlet near the "pa" flow rate selecting device. In order to maintain these pressure differences, the DPC bonnet obturator restricts the bore of the water outlet to achieve the pre-set flow rate, even if the pressures in the system fluctuate.

Modulation

Full authority" flow rate modulation for room temperature control; The actuator performs the modulating function changing the section of flow passage.

When continuous modulation is carried out, the temperature is kept under control. ART 20C keeps the same obturator stroke, regardless of the presetting dial position. With continuous modulation, control is excellent even with small flow openings and this eliminates the on/off effect.

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 Δp min (start-up pressure), the flow rate is the same as the one stated on the valve table (function) of the pre-set;

If measured differential pressure is below minimum Δp min stated on valve table, flow rate is calculated using the following formula:

$$Q = Kvs \frac{\sqrt{\Delta p}}{r}$$

Where:

Q is the flow rate in m³/h, r is the relative density, Δp is the pressure drop across the valve;
Kvs - Kv across the valve when it is fully open

- The ART 20C has been classified in accordance with PED 2014/68/EU.

2. Technical Data

Valve Type	Size Range	Connection Type	Temperature Rating	Pressure Rating (Max)
ART 20C PN25	DN 15 – DN 25	ISO 228/1	-10°C – 120°C	25 bar

Size	10LF	10HF	15LF	15HF	20HF	25HF
Δp Range KPa	16-400	16.5-400	16.5-400	19.5-400	26-400	37-400
Flow Range (l/s)	0.012-0.042	0.024-0.097	0.024-0.097	0.027-0.134	0.042-0.250	0.076-0.447
Kvs	0.37	0.86	0.86	1.09	1.77	2.65

Albion Valves (UK) Ltd recommend that any ART 20C PICV are sized prior to installation to ensure the correct valve selection.

3. Valve Features

- The ART 20C PICV can be used in conjunction with multiple actuators to open, close and modulate the valve.
- Motorised Actuators
 - o C21V 24V AC 3 position control
 - o C22V 230V 3 position control
 - o C23E 24V AC 0-10V DC control



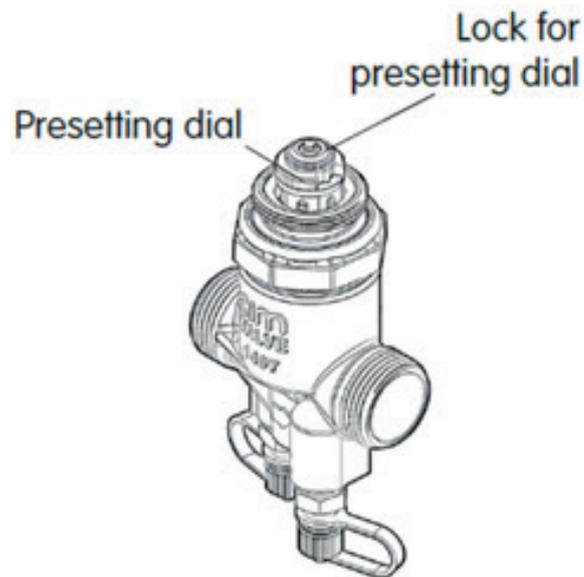
Model	C23E	C21V	C22V
Technical Code	ADPI20C23EN	ADPI20C21VN	ADPI20C22VN
Voltage	24 V AC	24 V AC	230V Ac
Control Signal	0-10Vdc/4-20mA	3 position	3 position
Frequency	50Hz	50Hz	50Hz
Power	5 VA	5 VA	5 VA
Open / Close Time	18.5 sec/mm	18.5 sec/mm	18.5 sec/mm
IP Rating	IP54	IP54	IP54
Actuator Stroke	6.5 mm	6.5 mm	6.5 mm
Actuator Force	200 N	200 N	200 N
Cable Length	1m	1m	1m
Connection	M30x1.5	M30x1.5	M30x1.5

4. Valve Installation

- The valve should be sited to ensure ease of access.
- It is the responsibility of the installer to ensure the valve is suitable for service conditions e.g., temperature, pressure, and service media.
- It is the responsibility of the installer to ensure that the required flow rate is within the valves operating range.
- Where fitted, remove flange protectors / dust caps and all other packaging material.
- Care should be taken to ensure the surface finish of the valve is protected during installation.
- The valves may be installed in horizontal or vertical pipework, but the actuator must never be sited underneath the valve.
- The valve is uni-directional and should only be used for flow in the direction shown on the valve.
- Suitable gaskets / sealing material should be used during installation.
- When setting the valve, the valve can be set by rotating the adjustment knob which sits underneath the cap.

5. Balancing

- Remove the plastic cap from the top of the valve. Turn the pre-set dial (see picture) so that the mark on the rotating part matches the value indicated on the fixed part of the device (1,2,3,etc.) which corresponds to the required flow rate. Do not exceed the set operating range (1-5).



- The relation between the setting dial, and flow rates can be found in the tables below.
- Using a differential manometer, check that the differential pressure is higher or the same as the minimum value reported in the tables. The differential manometer interfaces with the balancing valve through the two binder points of the valve. When balancing is achieved, lock the pre-setting dial by screwing it down completely, preventing it from being unintentionally rotated.



ART 20C LF - 1/2" DN10 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	l/h	43	47	55	63	72	79
	l/s	0.012	0.013	0.015	0.018	0.020	0.022
	GPM	0.19	0.21	0.24	0.28	0.32	0.35
Min Δp kPa		15	15	15	15	15	15
Kvs		0.11	0.12	0.14	0.16	0.18	0.20

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	l/h	79	85	90	93	96	99
	l/s	0.022	0.024	0.025	0.026	0.027	0.027
	GPM	0.35	0.37	0.40	0.41	0.42	0.43
Min Δp kPa		15	15	15	15	15	16
Kvs		0.20	0.22	0.23	0.24	0.24	0.25

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	l/h	99	101	104	108	113	119
	l/s	0.027	0.028	0.029	0.030	0.031	0.033
	GPM	0.43	0.45	0.46	0.48	0.50	0.52
Min Δp kPa		16	16	16	16	16	16
Kvs		0.25	0.25	0.26	0.27	0.28	0.30

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	l/h	119	126	133	140	146	150
	l/s	0.033	0.035	0.037	0.039	0.040	0.042
	GPM	0.52	0.55	0.59	0.62	0.64	0.66
Min Δp kPa		16	16	16	16	16	16
Kvs		0.30	0.31	0.33	0.35	0.36	0.37



ART 20C HF - 1/2" DN10 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	l/h	86	102	122	143	172	194
	l/s	0.024	0.028	0.034	0.040	0.048	0.054
	GPM	0.38	0.45	0.54	0.63	0.76	0.85
Min Δp kPa		13	13	13.5	13.5	14	14
Kvs		0.24	0.28	0.33	0.39	0.46	0.52

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	l/h	194	217	232	238	254	259
	l/s	0.054	0.060	0.064	0.066	0.071	0.072
	GPM	0.85	0.96	1.02	1.05	1.12	1.14
Min Δp kPa		14	14	14	14.5	14.5	14.5
Kvs		0.52	0.58	0.62	0.62	0.67	0.68

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	l/h	259	266	280	281	288	294
	l/s	0.072	0.074	0.078	0.078	0.080	0.082
	GPM	1.14	1.17	1.23	1.24	1.27	1.29
Min Δp kPa		14.5	14.5	15	15	15	15
Kvs		0.68	0.70	0.72	0.73	0.74	0.76

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	l/h	294	298	300	304	314	347
	l/s	0.082	0.083	0.083	0.084	0.087	0.097
	GPM	1.29	1.31	1.32	1.34	1.38	1.53
Min Δp kPa		15	15.5	15.5	15.5	16	16.5
Kvs		0.76	0.76	0.76	0.77	0.78	0.86



ART 20C LF - 3/4" DN15 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	l/h	86	102	122	143	172	194
	l/s	0.024	0.028	0.034	0.040	0.048	0.054
	GPM	0.38	0.45	0.54	0.63	0.76	0.85
Min Δp kPa		13	13	13.5	13.5	14	14
Kvs		0.24	0.28	0.33	0.39	0.46	0.52

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	l/h	194	217	232	238	254	259
	l/s	0.054	0.060	0.064	0.066	0.071	0.072
	GPM	0.85	0.96	1.02	1.05	1.12	1.14
Min Δp kPa		14	14	14	14.5	14.5	14.5
Kvs		0.52	0.58	0.62	0.62	0.67	0.68

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	l/h	259	266	280	281	288	294
	l/s	0.072	0.074	0.078	0.078	0.080	0.082
	GPM	1.14	1.17	1.23	1.24	1.27	1.29
Min Δp kPa		14.5	14.5	15	15	15	15
Kvs		0.68	0.70	0.72	0.73	0.74	0.76

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	l/h	294	298	300	304	314	347
	l/s	0.082	0.083	0.083	0.084	0.087	0.097
	GPM	1.29	1.31	1.32	1.34	1.38	1.53
Min Δp kPa		15	15.5	15.5	15.5	16	16.5
Kvs		0.76	0.76	0.76	0.77	0.78	0.86



ART 20C HF - 3/4" DN15 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	l/h	96	112	135	155	179	192
	l/s	0.027	0.031	0.037	0.043	0.050	0.053
	GPM	0.42	0.49	0.59	0.68	0.79	0.85
Min Δp kPa		12.5	12.5	12.5	13	13	13
Kvs		0.27	0.32	0.38	0.43	0.50	0.53

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	l/h	192	210	234	235	260	261
	l/s	0.053	0.058	0.065	0.065	0.072	0.072
	GPM	0.85	0.92	1.03	1.03	1.14	1.15
Min Δp kPa		13	13	13.5	13.5	14	14
Kvs		0.53	0.58	0.64	0.64	0.69	0.70

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	l/h	261	262	271	284	318	343
	l/s	0.072	0.073	0.075	0.079	0.088	0.095
	GPM	1.15	1.15	1.19	1.25	1.40	1.51
Min Δp kPa		14	14	15	16	17	17.5
Kvs		0.70	0.70	0.70	0.71	0.77	0.82

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	l/h	343	409	440	456	476	483
	l/s	0.095	0.114	0.122	0.127	0.132	0.134
	GPM	1.51	1.80	1.94	2.01	2.10	2.13
Min Δp kPa		17.5	18	18.5	19	19.5	19.5
Kvs		0.82	0.96	1.02	1.05	1.08	1.09



ART 20C HF - 1" DN20 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	l/h	150	200	244	259	273	315
	l/s	0.042	0.056	0.068	0.072	0.076	0.088
	GPM	0.66	0.88	1.07	1.14	1.20	1.39
Min Δp kPa		18	18	18.5	18.5	19	19
Kvs		0.35	0.47	0.57	0.60	0.63	0.72

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	l/h	315	350	370	380	390	425
	l/s	0.088	0.097	0.103	0.106	0.108	0.118
	GPM	1.39	1.54	1.63	1.67	1.72	1.87
Min Δp kPa		19	19	19	19	19	19
Kvs		0.72	0.80	0.85	0.87	0.89	0.98

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	l/h	425	456	475	502	545	590
	l/s	0.118	0.127	0.132	0.139	0.151	0.164
	GPM	1.87	2.01	2.09	2.21	2.40	2.62
Min Δp kPa		19	20	20	21	21	23
Kvs		0.98	1.02	1.06	1.10	1.19	1.23

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	l/h	590	610	690	812	885	900
	l/s	0.164	0.169	0.192	0.226	0.246	0.250
	GPM	2.62	2.69	3.04	3.58	3.90	3.96
Min Δp kPa		23	23	24	25	26	26
Kvs		1.23	1.27	1.41	1.62	1.74	1.77



ART 20C HF - 1 1/4" DN25 – Pre-set Values

Pre-Set		1.0	1.2	1.4	1.6	1.8	2.0
Flow Rate	I/h	272	352	400	428	490	592
	I/s	0.076	0.098	0.111	0.119	0.136	0.164
	GPM	1.20	1.55	1.76	1.88	2.16	2.61
Min Δp kPa		18	18	19	19	20	20
Kvs		0.64	0.83	0.92	0.98	1.10	1.32

Pre-Set		2.0	2.2	2.4	2.6	2.8	3.0
Flow Rate	I/h	592	645	700	740	770	882
	I/s	0.164	0.179	0.194	0.206	0.214	0.245
	GPM	2.61	2.84	3.08	3.26	3.39	3.88
Min Δp kPa		20	21	22	23	24	25
Kvs		1.32	1.41	1.49	1.54	1.57	1.76

Pre-Set		3.0	3.2	3.4	3.6	3.8	4.0
Flow Rate	I/h	882	920	950	1046	1160	1200
	I/s	0.245	0.256	0.264	0.291	0.322	0.333
	GPM	3.88	4.05	4.18	4.61	5.11	5.28
Min Δp kPa		25	25	26	26	27	27
Kvs		1.76	1.84	1.86	2.05	2.23	2.31

Pre-Set		4.0	4.2	4.4	4.6	4.8	5.0
Flow Rate	I/h	1200	1260	1345	1400	1540	1610
	I/s	0.333	0.350	0.374	0.389	0.428	0.447
	GPM	5.28	5.55	5.92	6.16	6.78	7.09
Min Δp kPa		27	28	31	32	35	37
Kvs		2.31	2.38	2.42	2.47	2.60	2.65



6. Approvals Classification

- The valve is classified in accordance with PED 2014/68/EU as Sound Engineering Practice (SEP).

7. Troubleshooting

- If any maintenance is to be undertaken on the valve it is the responsibility of the installer to ensure the system is adequately drained and depressurized.
- A full risk assessment should be undertaken prior to any works taking place.

8. Warranty

- For further details of Albion Valves (UK) Ltd warranty period, please refer to Albion Valves (UK) Ltd 'Conditions of Sale' available on our website.



About Albion Valves (UK) Ltd

Albion has been supplying valves and fittings to the building services and industrial markets for the past 40 years.

Albion was created with the sole purpose of providing quality products at an affordable price. With a growing reputation for quality and reliability, Albion is now an established brand providing the industry with a trusted alternative to premium-priced products.

Our commitment to setting the highest standards in all areas of our business means, if you're looking for quality, service, delivery and choice — you'll find it's all at Albion.

Quality

Whatever you need, you can rest assured that if it comes from Albion it has been designed and manufactured to deliver optimum performance and is accredited with the necessary approvals. Our in-house quality department are always on hand too!

Service

We pride ourselves on our customer service – we have even won awards for it! Our cradle to grave approach means you will never be on your own!

Delivery

We know that time is money, and when a priority project depends on a part you can trust Albion to deliver – next day for all orders placed before 4:00PM.

Choice

We may have started out with a single brass ball valve, but our range has grown substantially since and we now consider ourselves to be a 'One Stop Shop' with our comprehensive range. It is becoming more and more apparent to the industry, that it really is all at Albion.