FLOWMATIC® Pressure Independent Control Valve (PICV)

145 series

Function

The pressure independent control valve is a device composed of an automatic flow rate regulator and a control valve with optional actuator. The device can adjust flow rate and keep it constant in the presence of changing differential pressure conditions of the circuit in which it is installed.

Flow rate is adjusted in two different ways:
-manually on the automatic flow rate regulator, to restrict the maximum value.
-automatically by the control valve in combination with a proportional (0–10 V) or ON/OFF actuator, in accordance with the thermal load requirements of the circuit to be controlled.

The pressure independent control valve (PICV) is supplied complete with pressure test ports for confirming pressure differential and flow rate.

Product range

145 Series pressure independent control valve (PICV), with PT ports:
sizes 1/2", 3/4", 1" NPT female, sweat, press

Technical characteristics

Materials:

Body: DZR corrosion-resistant brass CW602N
Headwork: DZR corrosion-resistant brass CW602N
Control stem and piston: stainless steel AISI 303
Seat:
- (G90): DZR corrosion-resistant CW602N
- (1G8, 3G5, 5G3): PTFE
- (7G9, 13G, 16G): stainless steel AISI 303

Springs: stainless steel AISI 302
Seals: peroxide-cured EPDM
Pre-adjustment indicator: PA6G30
Knob: PA6

Connections:

Main:
Actuators: 1/2", 3/4", 1"
M30 p.1.5
Pressure test ports: 1/4" F (ISO 228-1) with cap

Performance:

Medium: water, glycol solutions
Max. percentage of glycol: 50 %
Max. working pressure:
360 psi (25 bar) / 200 psi (14 bar) press
Max. differential pressure with actuator: 58 psi
Working temperature range: 4 – 248 °F (-20 - 120 °C)
Nominal Δp control range: 3.6 - 58 psi (0.2 - 4 bar)
Max flow rate regulation:
(G90): 0.09-0.90 gpm (0.34–3.4 l/min)
(1G8): 0.35-1.75 gpm (1.3–6.6 l/min)
(3G5): 0.35-3.5 gpm (1.3–13.2 l/min)
(5G3): 0.53-5.3 gpm (2.0–20 l/min)
(7G9): 0.79-7.9 gpm (3.0–30.3 l/min)
(13G): 1.3-13 gpm (5.0–50 l/min)
(16G): 1.6-16 gpm (6.25–62.5 l/min)

Accuracy: ± 5% of set-point
Leakage: 0.01% (class V)

SAFETY INSTRUCTION

This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warning.ca.gov.

CAUTION: All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of systems in accordance with all applicable codes ordinances.

CAUTION: Over-tightening and breakage can occur with the use of Teflon® pipe joint compounds. Teflon® provides lubricity so that care must be exercised not to over-tighten joints. Failure to follow these instructions could result in property damage and / or personal injury.

CAUTION: System fluids under pressure or temperature can be hazardous. Be sure the pressure has been reduced to zero and the system temperature is below 100□ (38□). Failure to follow these instructions could result in property damage and/or personal injury.

CAUTION: Clean the pipes of any debris, rust, incrustations, welding slag and any other contaminants. For optimal operation, air in the system must be removed.

CAUTION: If the 145 valve is not installed, commissioned and maintained properly, according to the instructions contained in this manual, it may not operate correctly and may endanger the user.

CAUTION: Make sure that all the connecting pipework is water tight.

Caleffi shall not be liable for damages resulting from stress corrosion, misapplication or misuse of its products..

CONSIGNE DE SÉCURITÉ

Ce symbole d'avertissement servira dans ce manuel à attirer l'attention sur la sécurité concernant instructions. Lorsqu'il est utilisé, ce symbole signifie. **ATTENTION! DEVENEZ ALERTE ! VOTRE SÉCURITÉ EST EN JEU ! NE PAS SUIVRE CES INSTRUCTIONS PEUT PROVOQUER UN RISQUE DE SECURITE.**

AVERTISSEMENT: Ce produit peut vous exposer à des produits chimiques comme le plomb, qui est connu dans l'État de Californie pour causer le cancer, dommages à la naissance ou autre. Pour plus d'informations rendez-vous www.P65Warnings.ca.gov.

AVERTISSEMENT: Tous les travaux doivent être effectués par du personnel qualifié formé à la bonne application, installation et maintenance des systèmes conformément aux codes et règlements locaux.

AVERTISSEMENT: Un serrage excessif et une rupture peuvent survenir avec l'utilisation de Teflon® composés de joint de tuyau. Le Teflon® offre un pouvoir lubrifiant de sorte que les soins doivent être exercé pour ne pas trop serrer les joints. Non-respect de ces instructions pourrait entraîner des dommages matériels et / ou des blessures corporelles.

AVERTISSEMENT: Les liquides du système sont sous pression ou de la température peivent être dangereux. Être sûr que la pression a été réduite à zéro et la température du système est inférieure à 100□ (38□). Le non-respect de ces instructions peut entrainer des dommages matériels et/ou des blessures.

AVERTISSEMENT: Nettoyer les tuyaux de tout debris, roille, incrustations, scories de soudure et d'autres contaminants.Pour un fonctionnement optimal, de l'air dans le system doit etre retire.

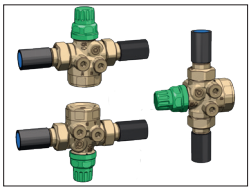
AVERTISSEMENT: Si le 145 vanne n'est pas installe, mis en service et Entretenu correctement, selon les instructions contenues dans ce manuel, il Peut ne pas fonctionner correctement et peut mettre en danger l'utilisateur.

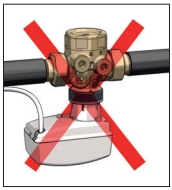
AVERTISSEMENT: S'assurer que tous les raccordements sont étanches.

Caleffi ne pourra etre tenue responsable des dommages resultant de la corrosion, d'une mauvaise utilisation ou une mauvaise utilisation des produits.

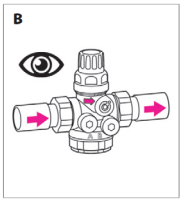
Installation:

- Assembly and disassembly of the valve should always be carried out while the system is cold and not under pressure.
- The valve without actuator can be installed in any position. When using an actuator the valve can be installed in any position except upside down.





- Indoor use only. When installed with actuator consult actuator instruction sheet for details on ambient temperature, humidity and fluid temperature restrictions.
- If installed with an actuator and inside an enclosure it is important to ensure that there is adequate ventilation inside the enclosure itself.
- When valve is installed, the direction of flow must be observed.

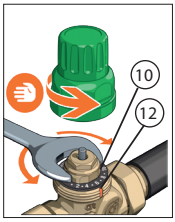


- Valve must be installed in a manner to allow easy access for inspection and maintenance.

Adjustment procedure:

Maximum flow rate adjustment

Unscrew the protective cap by hand to gain access to the maximum flow rate locking nut (10), which can be turned with a 19 mm wrench. Attached to the locking nut is a 10-position graduated scale. Refer to the “Flow rate adjustment table” below to determine the correct numerical position based on the design flow rate of the circuit being served. Turn the locking nut, lining up the desired numerical position with the notch on the valve (12).



Flow rate adjustment table

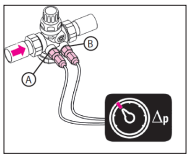
Code locking nut color	flow range G Δp min		Adjustment position									
			1	2	3	4	5	6	7	8	9	10
145... G90	0.34-3.40 (l/min)		0.34	0.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.40
	0.09-0.90 (GPM)		0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90
	Δp min	(kPa)	25	25	25	25	25	25	25,5	25,5	26	26
		(psi)	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.7	3.8	3.8
145... 1G8	1.30-6.60 (l/min)		–	1.30	2.00	2.67	3.33	4.00	4.67	5.33	6.00	6.60
	0.35-1.75 (GPM)		–	0.35	0.53	0.70	0.88	1.05	1.23	1.40	1.58	1.75
	Δp min	(kPa)	–	25	25,5	26	26	26,5	26,5	27	27	27
		(psi)	–	3.6	3.7	3.8	3.8	3,8	3.8	3.9	3.9	3.9
145... 3G5	1.30-13.2 (l/min)		1.30	2.67	4.00	5.33	6.67	8.00	9.33	10.67	12.00	13.20
	0.35-3.50 (GPM)		0.35	0.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50
	Δp min	(kPa)	25	25	25,5	26	26	27	27,5	28	28,5	29
		(psi)	3.6	3.6	3.7	3.8	3.8	3.9	4.0	4.1	4.1	4.2
145... 5G3	2.0-20.0 (l/min)		2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00
	0.53-5.30 (GPM)		0.53	1.06	1.59	2.12	2.65	3.18	3.71	4.24	4.77	5.30
	Δp min	(kPa)	25	25	25,5	26	26	26,5	26,5	27	27,5	28
		(psi)	3.6	3.6	3.7	3.8	3.8	3.8	3.8	3.9	4.0	4.1
145... 7G9	3.0-30.30 (l/min)		3.00	6.00	9.00	12.00	15.00	18.00	21.00	24.00	27.00	30.30
	0.79- 7.9 (GPM)		0.80	1.60	2.40	3.20	4.00	4.80	5.60	6.40	7.20	8.00
	Δp min	(kPa)	35	35	35	35	35	28	25	25	25	25
		(psi)	5.1	5.1	5.1	5.1	5.1	4.1	3.6	3.6	3.6	3.6
145... 13G	5.0-50.0 (l/min)		5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
	1.30-13 (GPM)		1.30	2.60	3.90	5.20	6.50	7.80	9.10	10.40	11.70	13.00
		(kPa)	35	35	35	35	35	35	35	35	35	35
		(psi)	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
145... 16G	6.25-62.50 (l/min)		6.25	12.33	18.5	24.67	30.83	37.00	43.17	49.33	55.50	62.50
	1.6-16 (GPM)		1.65	3.30	4.95	6.60	8.25	9.90	11.55	13.20	14.85	16.50
	Δp min	(kPa)	48	48	48	48	45	45	43	43	43	43
		(psi)	6.96	6.96	6.96	6.96	6.53	6.53	6.24	6.24	6.24	6.24

Minimum differential pressure required

For pump sizing, add the minimum pressure difference required by the served emitter to the fixed head losses of the most flow starved circuit. Use this value to find the Δp min shown in the above table to select the 145 series code

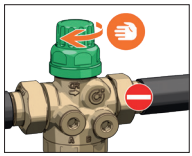
Flow rate confirmation

During operation the differential pressure across the valve is observed using a manometer connected to upstream (A) and downstream (B) test ports on the valve. If the differential pressure is greater than the minimum ΔP of the valve at the selected flow rate and less than the maximum ΔP, the valve is supplying the flow rate for which it has been set up. Refer to the “Flow rate adjustment table” to determine minimum ΔP. Maximum ΔP is 58 psi.



Shut-off

With the protective cap installed, manual shut-off is possible with the integrated knob. Turn clockwise to shut-off flow, turn counterclockwise to open.



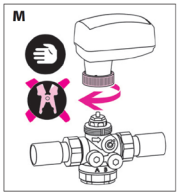
Optional Actuators:

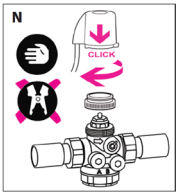
				
Code	**145018**	**145013**	**656524**	**656504**
Type	Proportional		Thermo-Electric	
Fail Position	Fail in place closed or open	Fail-in-place	Normally Closed	
Electic Supply	24V AC/DC			
Power Consumption	2.5 VA (AC) ; 1.5W (DC)		1.2 W	1 W
Control Signal	0(2)-10VDC or 0(4)-20mA	0(2)-10VDC or 0(4)-20mA	0-10 VDC	ON / OFF
Open & Close Time	~ 35 sec (*)		~200 sec	~ 240 sec
Protection class	NEMA 3 (IP54)			
Ambient temp range	32 - 120°F (0 50°C)		32 - 140°F (0 - 60°C)	
Feedback signal	0 - 10V		0 - 10V	---
Supply cable length	78 inches (2 m)		39 inches (1 m)	
Connection	M30 x 1.5		M30 x 1.5 (quick-coupling)	
Force	36 lbf (160 N)		28 lbf (125 N)	23 lbf (100 N)
Max. differential pressure	58 psid (4 bar)			
Starting current	1.54A		320mA	300mA

*auto stoke detection

Actuator installation:

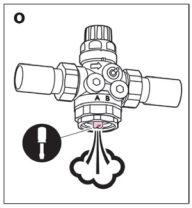
- Protective cap on valve must be removed before actuator installation.
- Do not supply power to the actuator until it is installed on the valve.
- For 6565 Series actuators, thread clip onto valve fully and fit actuator to clip (N).
- For 145 Series actuators, thread onto valve fully (M).
- Connect the actuator to external controls (BMS or similar) to operate actuator.
- Consult actuator instruction sheet for details on wiring and setup





Maintenance:

After final commissioning, release the air that has built up at the top of the valve body by using a screwdriver to loosen screw at bottom of valve, without fully removing. Re-tighten screw at the end of the procedure (O).



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