Pre-commissioning and commissioning

Connection and regulation kit for HVAC terminal units 149 series

CALEFFI
Hydronic Solutions

**Pre-commissioning recommended activities and checklist**

• Check the correct positioning of the unit (no upside-down if an actuator is installed).

• Check the correct flow direction of the valve.

• Make sure the cap is in open position.

• In case of modulating actuator, do not supply electrical energy before installing it on the valve (clearly indicated on the specific tag).

• The system has to be properly flushed (better if according to BSRIA BG29/2012).

• The system must be fully filled and the air completely vented.

• Refer to Caleffi instruction sheet H0003683 (included in the package) for additional informations.
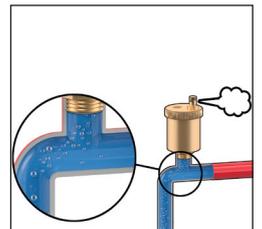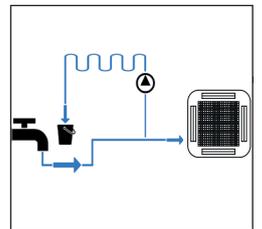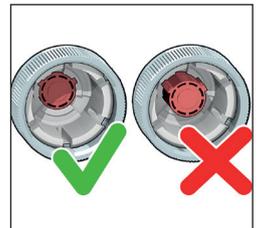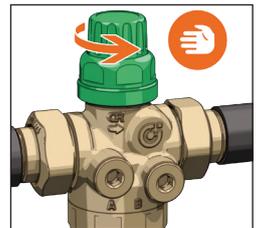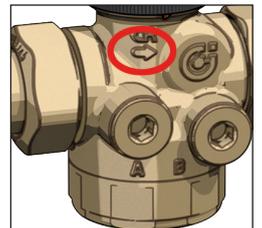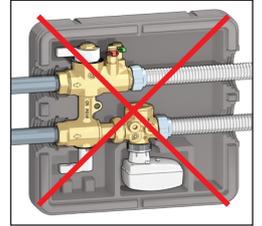
SCHEME

Commissioning according to CIBSE Commissioning Code W:2010

Connection and regulation kits with included pressure independent control valves (PICVs) are typically installed on branches serving terminal units. For the system shown, the regulating procedure should be as follows.

Symbol	Description		Symbol	Description		Symbol	Description		Symbol	Description		Symbol	Description
⋈	Shut-off valve			Strainer		Y	Drain cock			Pressure test port			PICV
	Balancing valve with flow meter			Flow meter			Flow rate regulator			Thermostat			
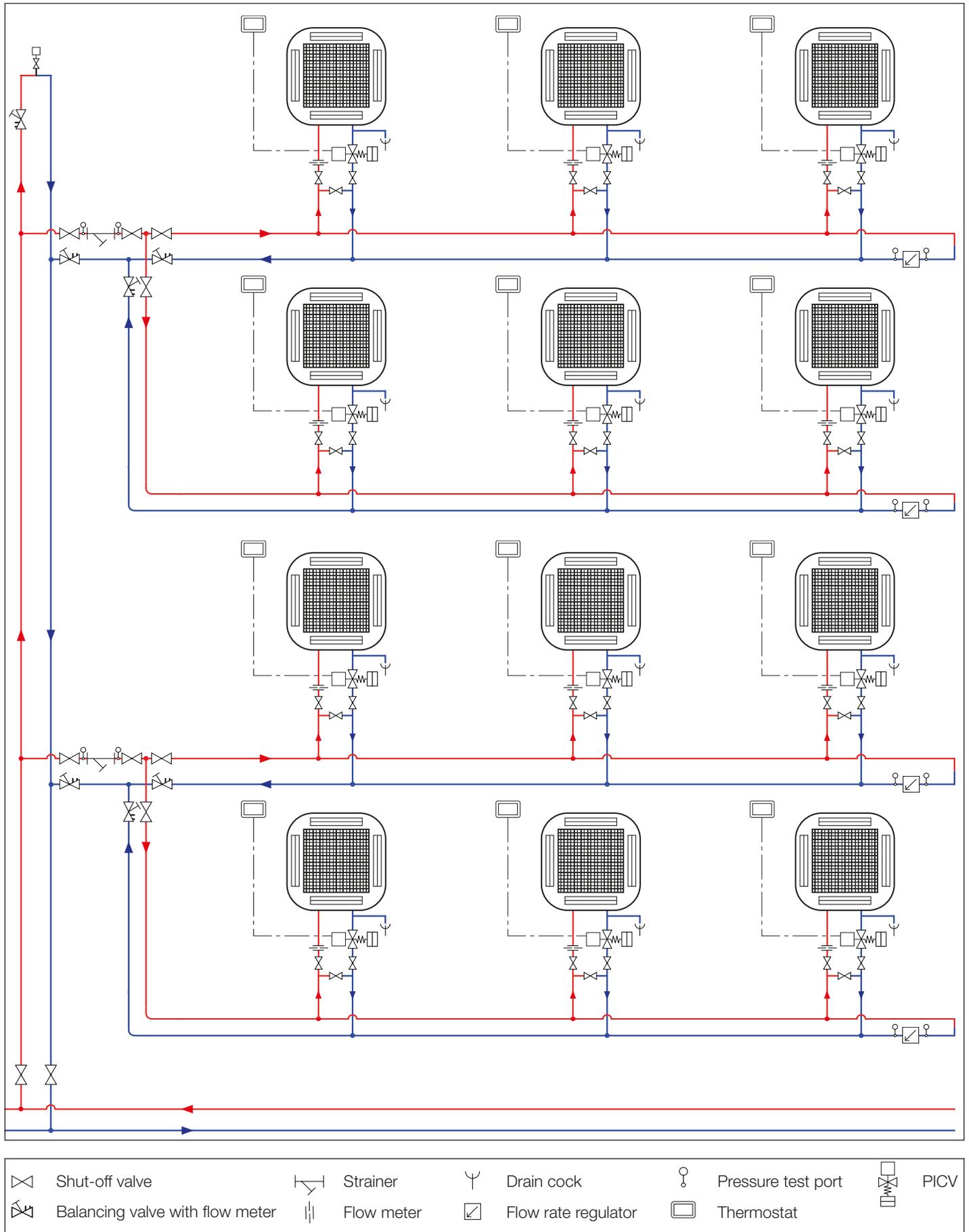
1. Set both 3-way valves in each kit to **"Open" position**.
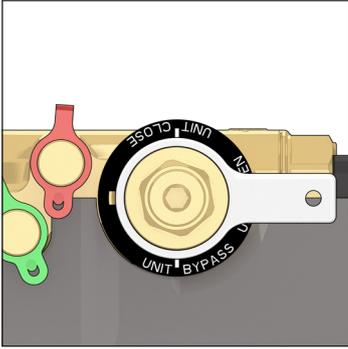
UNIT OPEN
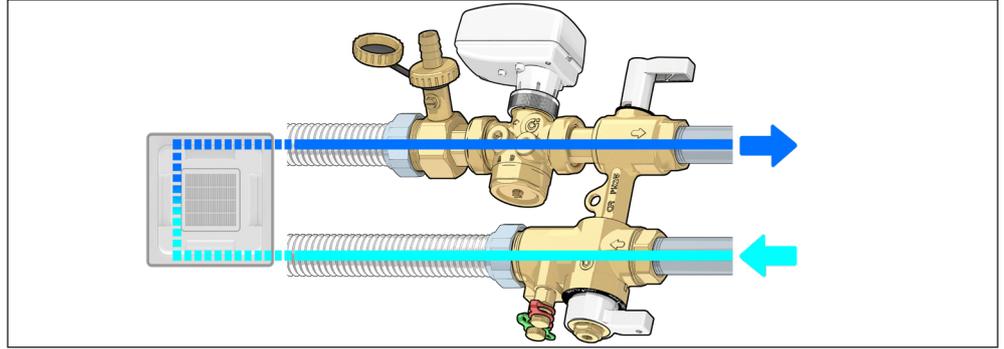
2. For each PlCV, **adjust the flow to the specified design value** and record the setting.
   Refer to Flow Rate adjustment table reported in Caleffi instruction sheet H0003683.

Adjustment position	$Gmax_x$	G (m³/h)
10	$Gmax_{10}$	
8	$Gmax_8$	
6	$Gmax_6$	
1	$Gmax_1$	

25 kPa   30 kPa   400 kPa Δp (kPa)

Δp minimum
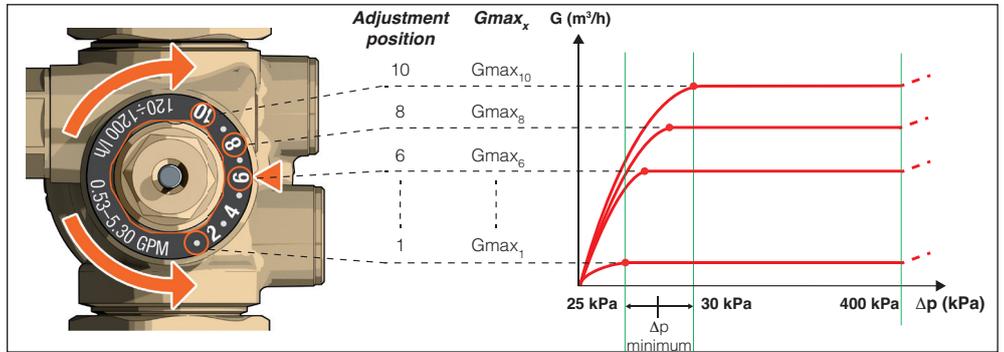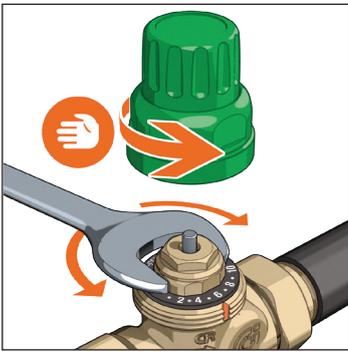
3. Using the built-in pressure ports (if installed), **measure the pressure differential across the PICV** in the index terminal branch. The index branch is usually either the branch furthest from the pump or the one with the highest resistance terminal unit. If built-in pressure ports are not installed, skip point 3 and 4.
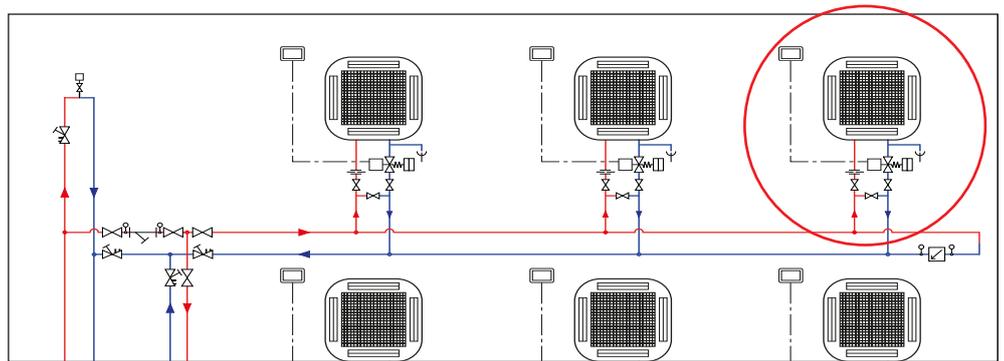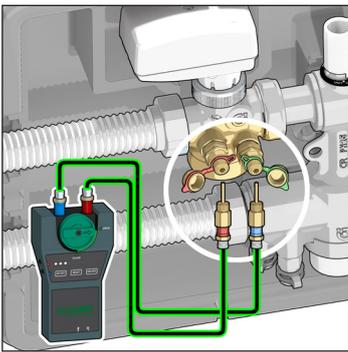
4. Check that **the value (or values) measured is (are) within the manufacturer's stated pressure differential operating range for the PICV**. If not, change the pump speed or close valves elsewhere in the system until the measured pressure differential is within the stated operating range. Refer to Flow Rate adjustment table reported in Caleffi instruction sheet H0003683 (reported below).

|	DN		1	2	3	4	5	6	7	8	9	10
149410 H20 0,02-0,20 m³/h	15	0,02-0,2 (m³/h)	0,02	0,04	0,06	0,08	0,1	0,12	0,14	0,16	0,18	0,2
		Δp min PICV (kPa)	25	25	25	25	25	25	25,5	25,5	26	26
		Δp by-pass kit (kPa)	*	*	*	*	*	*	*	*	*	*
149410 H40 0,08-0,40 m³/h	15	0,08-0,4 (m³/h)	-	0,08	0,12	0,16	0,2	0,24	0,28	0,32	0,36	0,40
		Δp min PICV (kPa)	-	25	25,5	26	26	26,5	26,5	27	27	27
		Δp by-pass kit (kPa)	-	*	*	*	*	*	*	*	*	0,5
149410 H80 0,08-0,80 m³/h	15	0,08-0,8 (m³/h)	0,08	0,16	0,24	0,32	0,40	0,48	0,56	0,64	0,72	0,8
		Δp min PICV (kPa)	25	25	25,5	26	26	27	27,5	28	28,5	29
		Δp by-pass kit (kPa)	*	*	*	*	0,5	0,8	1	1,4	1,7	2,1
149510 H20 0,02-0,20 m³/h	20	0,02-0,2 (m³/h)	0,02	0,04	0,06	0,08	0,1	0,12	0,14	0,16	0,18	0,2
		Δp min PICV (kPa)	25	25	25	25	25	25	25,5	25,5	26	26
		Δp by-pass kit (kPa)	*	*	*	*	*	*	*	*	*	*
149510 H40 0,08-0,40 m³/h	20	0,08-0,4 (m³/h)	-	0,08	0,12	0,16	0,2	*0,24*	0,28	0,32	0,36	0,40
		Δp min PICV (kPa)	-	25	25,5	26	26	26,5	26,5	27	27	27
		Δp by-pass kit (kPa)	-	*	*	*	*	*	*	*	*	*
149510 H80 0,08-0,80 m³/h	20	0,08-0,16 (m³/h)	0,08	0,16	0,24	0,32	0,40	0,48	0,56	0,64	0,72	0,8
		Δp min PICV (kPa)	25	25	25,5	26	26	27	27,5	28	28,5	29
		Δp by-pass kit (kPa)	*	*	*	*	*	*	0,5	0,6	0,8	1
149510 1H2 0,12-1,20 m³/h	20	0,12-1,2 (m³/h)	0,12	0,24	0,36	0,48	0,6	0,72	0,84	0,96	1,08	1,2
		Δp min PICV (kPa)	25	25	25,5	26	26	26,5	26,5	27	27,5	28
		Δp by-pass kit (kPa)	*	*	*	*	0,5	0,8	1,1	1,4	1,8	2,2
149610 1H8 0,18-1,80 m³/h	25	0,18-1,8 (m³/h)	0,18	0,36	0,54	0,72	0,9	1,08	1,26	1,44	1,62	1,8
		Δp min PICV (kPa)	35	35	35	35	35	28	25	25	25	25
		Δp by-pass kit (kPa)	*	*	*	0,6	0,9	1,3	1,7	2,3	2,8	3,5
149610 3H0 0,3-3,00 m³/h	25	0,3-3 (m³/h)	0,3	0,6	0,9	1,2	1,5	1,8	2,1	2,4	2,7	3
		Δp min PICV (kPa)	35	35	35	35	35	35	35	35	35	35
		Δp by-pass kit (kPa)	*	*	*	1,6	2,4	3,5	4,8	6,3	7,9	9,8
149610 3H7 0,37-3,70 m³/h	25	0,37-3,70 (m³/h)	0,37	0,74	1,11	1,48	1,85	2,22	2,59	2,96	3,33	3,70
		Δp min PICV (kPa)	48	48	48	48	45	45	43	43	43	43
		Δp by-pass kit (kPa)	0,2	0,6	1,4	2,4	3,7	5,4	7,3	9,5	12,0	14,9

5. If the installed kits also have Venturi type flow measurement devices installed or if each single terminal unit branch is equipped with a dedicated flow metering device, **measure the Flow Rates** at each of these points to confirm that the set design Flow Rate for each terminal is being achieved within the required tolerance limits.

5.1 Measure the **differential pressure** across the Venturi device.
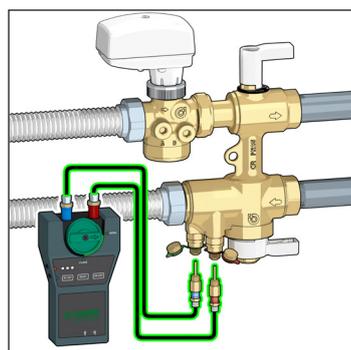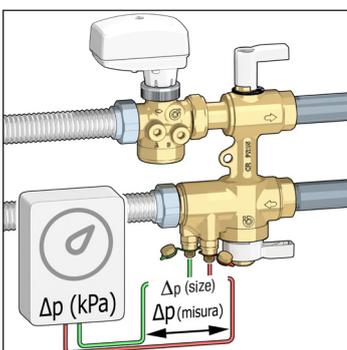
5.2 Use the following table to retrieve $Kv_{Venturi}$ value.

	H10	H20	H40	H80	1H2-1H8	3H0-3H7
Kv Venturi (m³/h)	0,25	0,5	1,1	2,35	5,0	9,6

5.3 Use the following formula to do the **Flow Rate calculation.**

$$G = Kv_{Venturi} \times \sqrt{\Delta p_{Venturi}} \times 0,1$$

G [m³/h]
Δp [kPa]

5.4 **Example**

Reading a $\Delta p_{Venturi}$ of 4,5 kPa (red line) on a H80 valve, the Venturi chart can be used to estimate a Flow Rate of 0,5 m³/h (blue line).
Alternatively, the Flow Rate can be calculated using the formula given at point 5.3 (bearing in mind that the $Kv_{Venturi}$ of the H80 valve is equal to 2,35) leads to the calculation of the Flow Rate.

$$G = 2,35 \times \sqrt{4,5} \times 0,1 = 0,5 \text{ m}^3/h$$
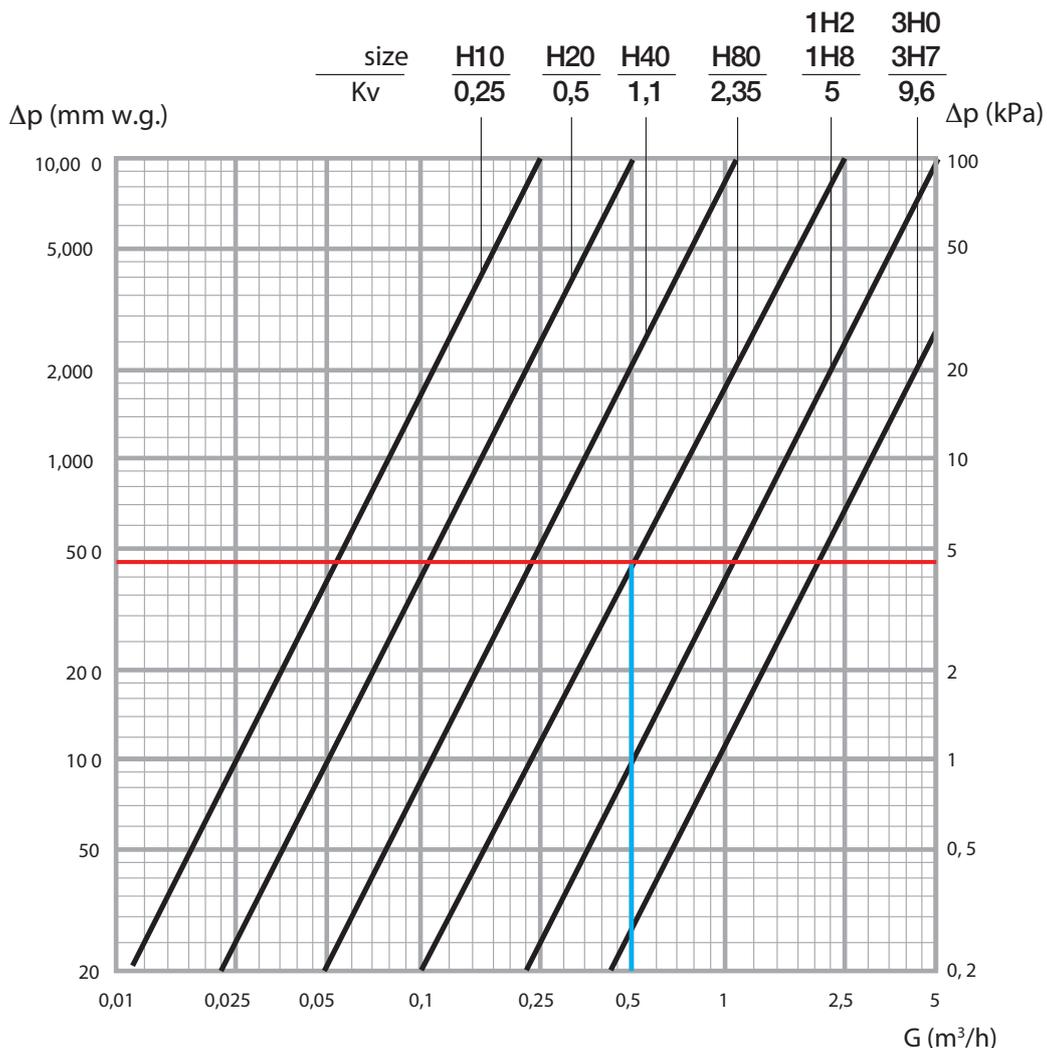
6. If the kits do not have flow measurement devices installed, **measure the total Flow Rate in the main branch**.Isolate each terminal branch in turn, each time recording the flow difference through the main branch. Confirm that in each case, the flow difference is equal to the set design Flow Rate through the isolated branch.
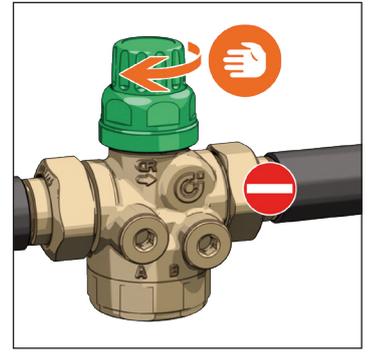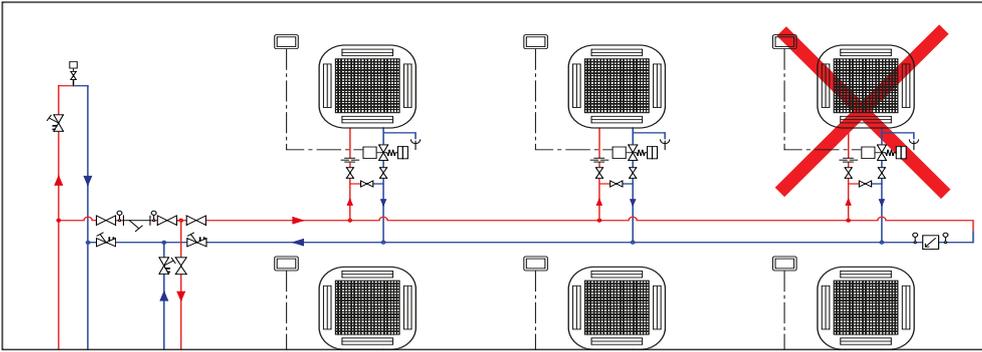
7. Confirm that **the Flow Rate measured at the main branch is equal to the sum of downstream PICV settings**. If this is not the case, investigate the cause and, if necessary, report to the designer.

8. Report the data obtained on the tag included in the package.

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149 series

REF: _____
DESIGN FLOW: _____
PRESET: _____
Min ΔP: _____

Commissioning

KV (Venturi) if present:

☐ ☐ ☐ ☐ ☐ ☐ ☐
NO 0,25 0,5 1,1 2,35 5 9,6

SIGNAL (Venturi): _____
FLOW (Venturi): _____
ΔP (PICV): _____
DATE: _____
NAME: _____

Notes

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