"Cocon 2TZ" Regulating valves
"eco" and "classic" measuring technique

Tender specification:

Oventrop regulating valves "Cocon 2TZ" with proportional presetting with memory lock. With draining, filling and isolating facility, pressure test points for flow measurement and linear characteristic line of the regulating insert for k_{vs} values 0.45 and 1.0. Body made of unplated brass (DN 15) or bronze (DN 20), valve disc made of EPDM or PTFE, O-rings made of EPDM, stem of the regulating insert made of stainless steel.

Connection thread M 30 x 1.5.

Complete valve insert of the size DN 15 replaceable by use of the "Demo-Bloc" without draining the system.

Connection for threaded pipes, copper, plastic, stainless steel or precision steel pipes as well as the Oventrop composition pipe "Copipe".

Technical data:

Max. operating temperature t_S:	+ 120 °C
Min. operating temperature t_S:	−10 °C
Max. operating pressure p_S:	10 bar (PN 10)
Max. differential pressure Δp_V:	1 bar

The regulating valves "Cocon 2TZ" are designed for four ranges of mass flow:

Models:

Inlet port: R ½ coupling, outlet port: Rp ½ female thread:

Size	k_V value of integrated measuring orifice	Marking on gland and protection cap		Item no.	
				"eco"	"classic"
DN 15	0.46	P 1	$k_{vs} = 0.45$	1145004	1145074
DN 15	1.16	P 2	$k_{vs} = 1.0$	1145104	1145174
DN 15	3.00	P 3	$k_{vs} = 1.8$	1145204	1145274

Inlet and outlet port: G ¾ male thread with taper:
With insert, item no. 1661100, suitable for flat sealing tailpipes.

Size	k_V value of integrated measuring orifice	Marking on gland and protection cap		Item no.	
				"eco"	"classic"
DN 15	0.46	P 1	$k_{vs} = 0.45$	1145361	1145371
DN 15	1.16	P 2	$k_{vs} = 1.0$	1145362	1145372
DN 15	3.00	P 3	$k_{vs} = 1.8$	1145363	1145373

Inlet and outlet port: G 1 male thread with taper:
With insert, item no. 1650793, suitable for flat sealing tailpipes.

Size	k_V value of integrated measuring orifice		Item no.	
			"eco"	"classic"
DN 20 (G¾)	5.50	$k_{vs} = 4.5$	1145465	1145475

Application:
Closed systems like cooling systems, fan coil units and central heating systems.

Function:
Oventrop regulating valves "Cocon 2TZ" control the room temperature by varying the flow rate with the help of actuators. The valves are installed in the return pipe of chilled ceiling modules for instance. To carry out hydronic balancing of the chilled ceiling system, a presetting for the modification of the flow resistance can be carried out. The set value can be reproduced. The required values can be obtained from the flow charts.

Regulation of the installation can be carried out via the pressure test points with the help of the Oventrop flow-meter "OV-DMC 2". Filling and draining of the chilled ceiling modules is carried out by using the service tool (filling and draining tool), item no. 1090551 or the fill and drain tool item no. 1061791 for "Cocon 2TZ" valves with measuring technique "eco".

"Cocon 2TZ"

Advantages:
– easy installation and operation
– only one valve for 6 functions
　　regulating
　　presetting
　　measuring
　　isolating
　　filling
　　draining/bleeding
– exact hydronic balancing of the installation
– infinitely adjustable presetting
– exact control of the flow rate via the pressure test points
– regulating of insert DN 15 replaceable without draining the system
– linear flow characteristic lines for k_{vs} 0.45 and 1.0

Accessories:
– Tailpipe sets
– Compression fittings "Ofix"
– Filling and draining tools
– Measuring device (measuring technique "eco")
– Measuring needles

Actuators:
The regulating valves "Cocon 2TZ" can be combined with the following Oventrop actuators (M 30 x 1.5):

| Actuator	Voltage	Regulation behaviour		
		2 point	3 point	Proportional
Electro-thermal	24V	1012816/26 1012916/26		1012951 (0-10V)
	230V	1012815/25/17 1012915/25		
Electro-motive	24V		1012701	1012700/05 (0-10V)
	230V	1012710	1012703	
	EIB			1156065/66
	LON			1157065

The regulating valves "Cocon 2TZ" can also be combined with the Oventrop temperature controllers.

Presetting:

1. Unscrew protection cap.

2. Close the valve disc by turning a 4 mm spanner clockwise.

3. Then preset the valve disc by turning the 4 mm spanner anti-clockwise according to the number of turns selected from the flow chart (illustr. 1).

4. Finally, using a screwdriver, turn the lock nut clockwise until stop (illustr. 2).

Important: In case of subsequent modification of the presetting, the lock nut should first be unscrewed by turning a screwdriver (illustr. 2) slightly anticlockwise. Afterwards the presetting can be changed with the help of the 4 mm spanner.

Note: The chosen presetting will not be changed by draining or isolating the chilled ceiling module.
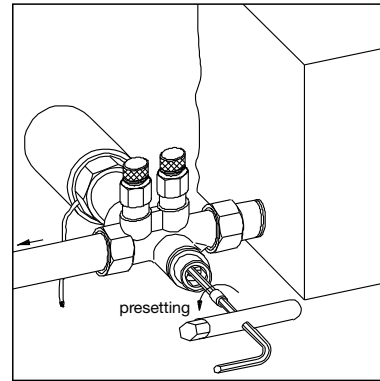
Isolating:

1. Unscrew protection cap.

2. Close the valve disc by turning a 4 mm spanner clockwise.
   Attention: Do not twist the lock nut, otherwise the chosen presetting will no longer be given when opening the valve.

Draining/bleeding:

1. Close the valve in the supply pipe of the chilled ceiling module (only for draining operation).

2. Isolate the valve as described under point 2 (only for draining operation).

3. Loosen the valve insert by turning a 10 mm spanner anti-clockwise (max. ¼ thread) (illustr. 3).

   Attention: The lock nut has to be screwed in sufficiently so that the 10 mm spanner can be inserted up to 4 mm at least.

4. Fit the service tool to the valve and connect a ½" hose (illustr. 4).
   Attention: Tighten the 19 mm compression nut closely (max. 10 Nm).

5. Fit the 10 mm spanner to the service tool and drain or bleed the chilled ceiling module by turning anticlockwise (illustr. 4).
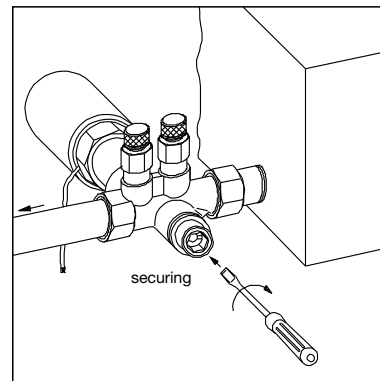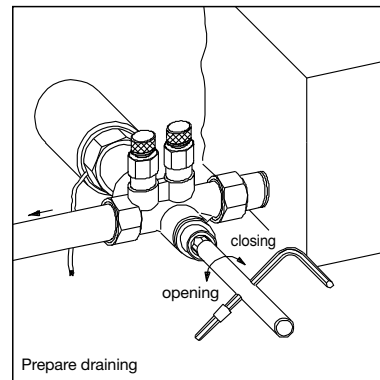
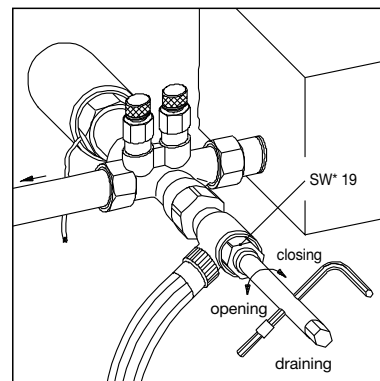**Filling:**

via the service tool:

1. If the chilled ceiling module was drained via the service tool, no modification to the tool or the valve are required. The chilled ceiling module can now be filled through the connected ½" hose.

2. After having completed the filling operation, fit the 10 mm spanner to the service tool again and close the insert by turning it clockwise (illustr. 4).

3. Remove the service tool and tighten insert using the 10 mm spanner (illustr. 3).

via the system:

4. Close the valve by turning the insert clockwise with a 10 mm spanner and tighten it (max. 10 Nm) (illustr. 3).

5. Open the valve disc by turning a 4 mm spanner anticlockwise.

6. Replace protection cap.

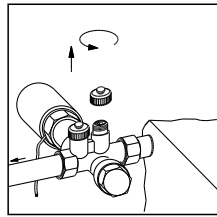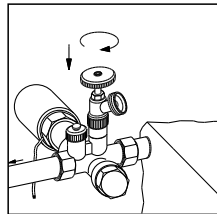7. The chilled ceiling module has to be bled.

Illustr. 1

Illustr. 2

Illustr. 3

Illustr. 4

*SW = spanner size

Filling/draining/bleeding by use of the fill and drain tool, item no. 1061799.
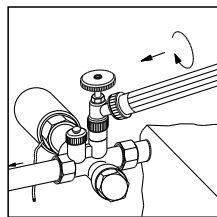
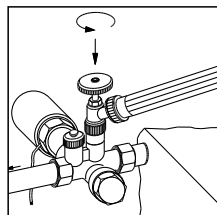**Important: Only for "Cocon 2TZ" valves with measuring technique "eco"**
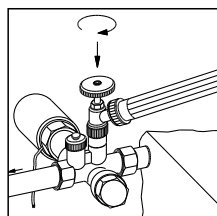
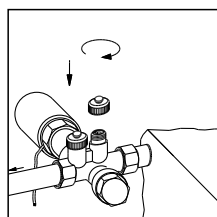1. Unscrew protection cap.

2. Fit fill and drain tool.

3. Connect hose.

4. Press handwheel downwards while turning it anticlockwise. Note: First the stem engages, then the valve opens for draining or filling.

5. For isolation, press handwheel downwards while turning it clockwise.

6. After having completed the operation, unscrew hose and fill and drain tool and remount protection cap.

Determination of the presetting valve for hydronic balancing of the installation

The flow rates and flow resistances of the individual chilled ceiling modules result from the design calculation for a chilled ceiling installation. Accordingly, the flow rate q_m and the pressure loss Δp for each ceiling module have to be set exactly at the regulating valve "Cocon 2TZ" to guarantee an even supply of coolant to all modules.

To do so, the design point is searched for in the charts 3, 5, 7 or 9 (depending on the chosen k_{vs} value) with the help of the values Δp and q_m. The required number of turns is taken from the chart and the valve disc is opened accordingly at the presetting of the regulating valve (procedure see chapter "Presetting").

Control of the hydronic balance within the chilled ceiling installation

Should a control of the flow values in the chilled ceiling modules become necessary, this can be done by using the pressure test points integrated in the regulating valves. The measuring needles of the Oventrop flow-meter "OV-DMC 2" may be inserted into these pressure test points.

Behaviour during low demand periods

For the regulation of the chilled ceiling installation during low demand periods, the regulating valves "Cocon 2TZ" have to be equipped with actuators (see chapter "Function") operating the valve inserts which vary the flow rates of the coolant within the chilled ceiling modules. Charts 4, 6, 8 and 10 illustrate the operating range of the regulating valves depending on the piston stroke for the four valve inserts ($k_{vs} = 0.45$, $k_{vs} = 1.0$, $k_{vs} = 1.8$ and $k_{vs} = 4.5$). It must be observed that these values including the noise characteristic lines 25 dB(A) and 30 dB(A) are only valid for the presetting being fully open. This is why the charts only give information on the operating range of the regulating valves with maximum flow rates.

Correction factors for mixtures of water and glycol

1. Calculation with given flow rate

When antifreeze liquids are added to the coolant, the pressure loss obtained from the chart must be multiplied by the correction factor f (charts 1/2).

$$\Delta p_{mixture} = \Delta p_{chart} \cdot f$$

2. Calculation with given or measured pressure loss
When antifreeze liquids are added to the coolant, the measured pressure loss must be divided by the correction factor f.

$$\Delta p_{chart} = \Delta p_{mixture} : f$$

The flow rate can be read off chart 10 with the help of the calculated Δp_{chart}.

3. Calculation with measured flow rate
($q_{m\ measured}$) with "OV-DMC 2"

$$q_{m\ mixture} = q_{m\ measured} : \sqrt{f}$$
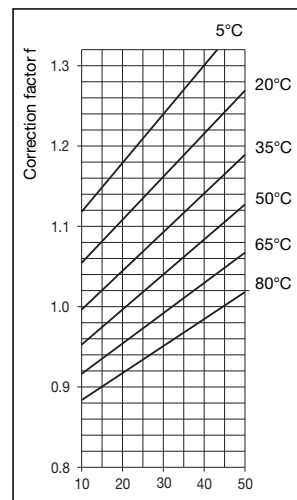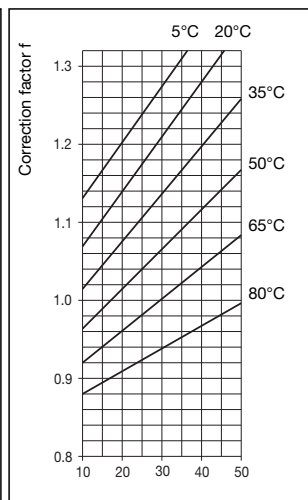
Chart 1:

Chart 2:

Weight proportion of ethylene glycol [%]   Weight proportion of propylene glycol [%]

When using the flow-meter "OV-DMC 2", only the percentage of the glycol mixture has to be entered. The conversion is carried out by the computer.

Flow rate depending on the pressure loss (Δp) and the presetting of the valve (charts 3, 5 and 7)

Item no. 1145004, 1145361, 1145074 and 1145371, k_{vs} = 0.45
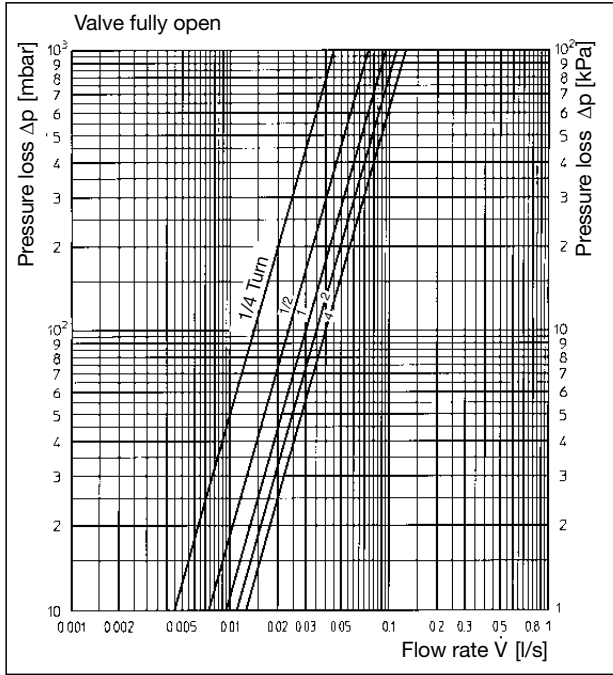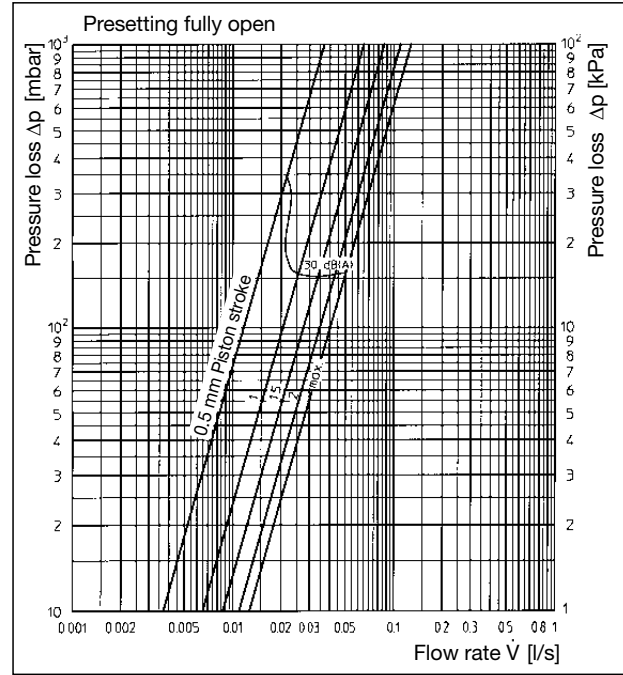**Chart 3**   **Chart 4**
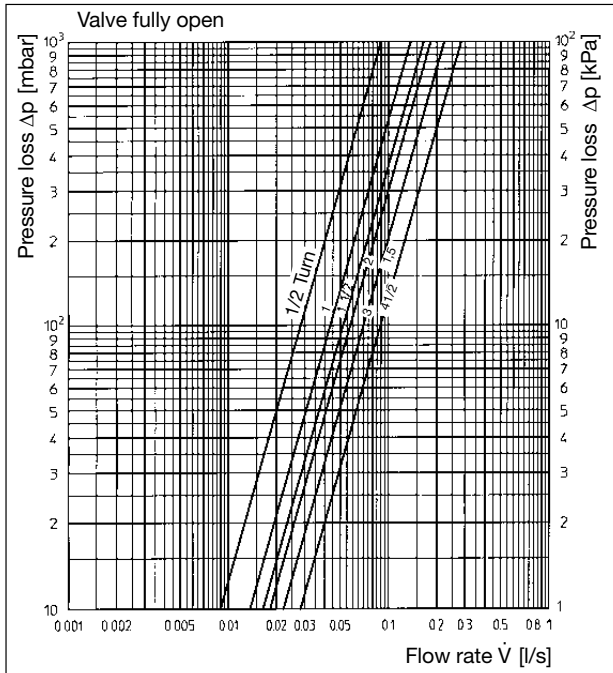

Item no. 1145104, 1145362, 1145174, 1145372, k_{vs} = 1.0
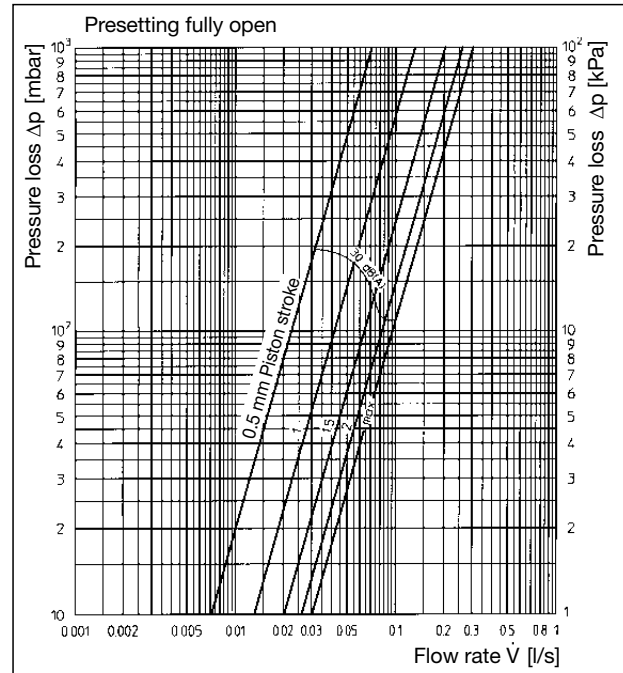**Chart 5**   **Chart 6**

Performance data (all models) when used in combination with thermostats
(e.g. "Uni XH", "Uni LH")
Presetting fully open

Size	k_{vs}-value	k_v at P-deviation			
		1 K	2 K	3 K	4 K
DN 15	0.45	0.05	0.10	0.15	0.20
DN 15	1.0	0.095	0.17	0.25	0.33
DN 15	1.8	0.5	1.0	1.3	1.5
DN 20	4.5	0.6	1.2	1.75	2.1

Item no. 1145204, 1145363, 1145274, 1145373, k_{vs} = 1.8
Chart 7

Valve fully open

Pressure loss Δp [mbar] / Pressure loss Δp [kPa] vs Flow rate $\dot{V}$ [l/s]

1/2 Turn, 1, 2, 4, 3, 7

Diagramm 8

Presetting fully open

Pressure loss Δp [mbar] / Pressure loss Δp [kPa] vs Flow rate $\dot{V}$ [l/s]

0.3 mm Piston stroke, 0.5, 1, max., 25 dB(A)
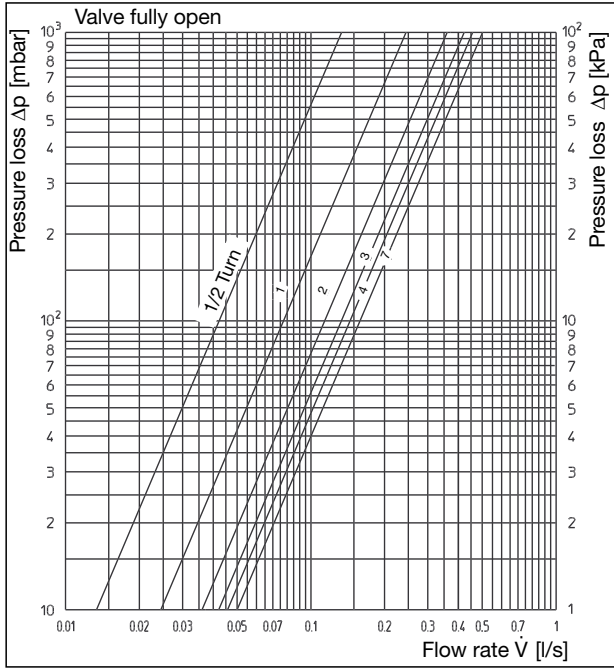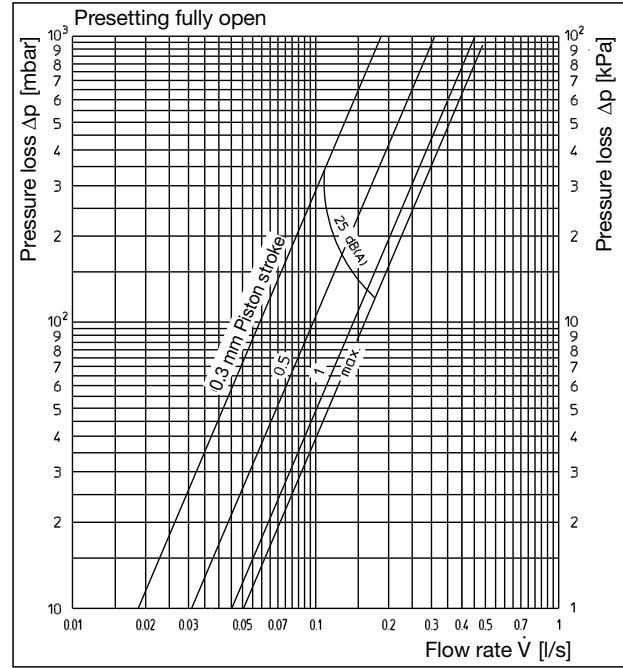
Item no. 1145465, 1145475, k_{vs} = 4.5
Chart 9

Valve fully open

Pressure loss Δp [mbar] / Pressure loss Δp [kPa] vs Flow rate $\dot{V}$ [l/s]

3/4 Turn, 0.5, 1, 1.5, 2.5, max., 25 dB(A), 30 dB(A)

Chart 10

Presetting fully open

Pressure loss Δp [mbar] / Pressure loss Δp [kPa] vs Flow rate $\dot{V}$ [l/s]
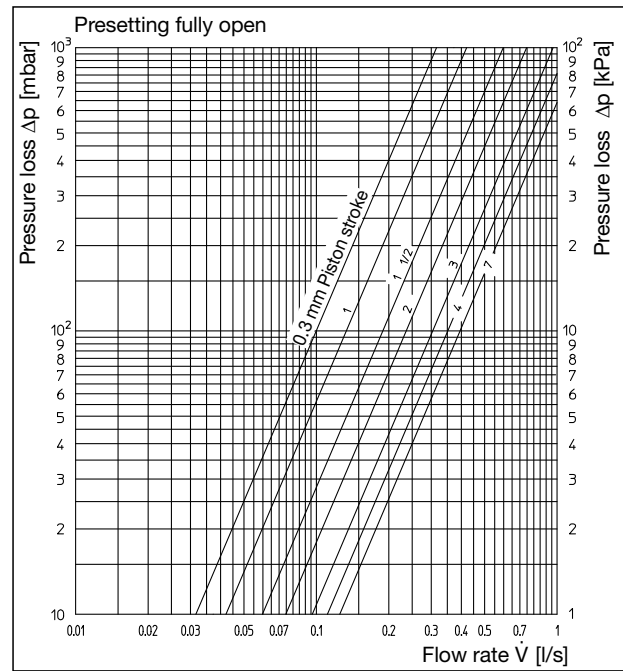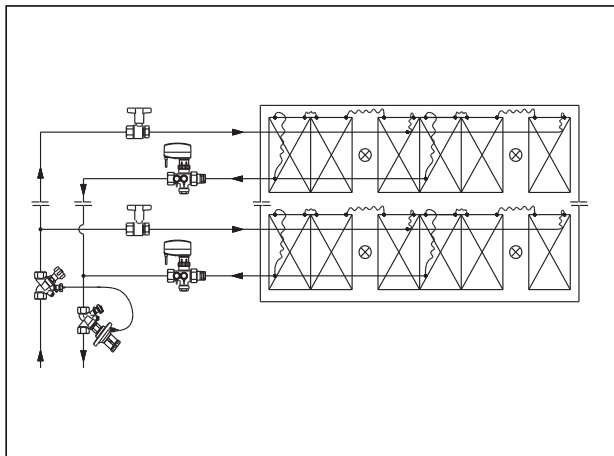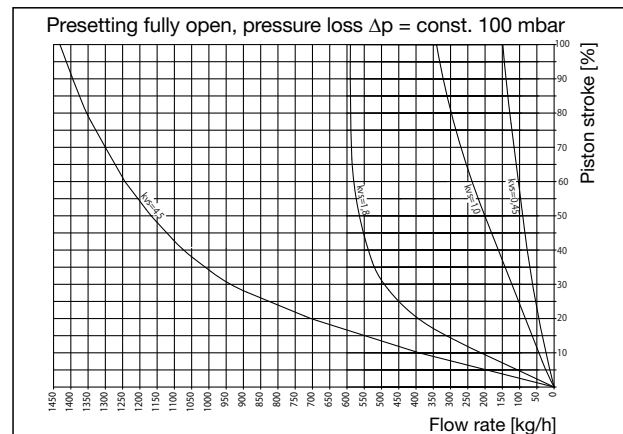
0.3 mm Piston stroke, 1, 2, 1 1/2, 4, 3, 7
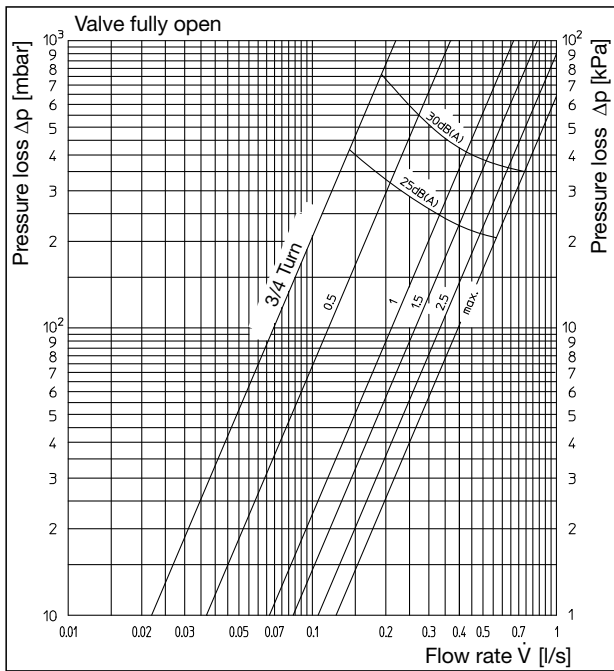
System illustration chilled ceiling installation (example):

Flow rate depending on the piston stroke, linear course of characteristic line for valves with k_{vs} value 0.45/1.0, chart 11:

Presetting fully open, pressure loss Δp = const. 100 mbar

Piston stroke [%] vs Flow rate [kg/h]

$k_{vs}=1.8$, $k_{vs}=1.0$, $k_{vs}=0.45$

Control with the help of the pressure loss chart

When measuring the differential pressure by use of the flow-meter "OV-DMC 2" (item no. 1069170), the valve insert must be fully open as the valve seat acts as measuring orifice. The measured pressure loss $\Delta p_{orifice}$ is entered into chart 12 and where this intersects the characteristic line of the corresponding valve insert, determines the actual flow rate. After that, the actual flow rate can be read off.

The flow rate can also be directly read off the flow-meter "OV-DMC 2". The characteristic lines are stored in the flow-meter.

Illustr. 5:

Flow rate depending on the pressure loss (Δp orifice) via the pressure test points (see illustr. 5):

Chart 12:
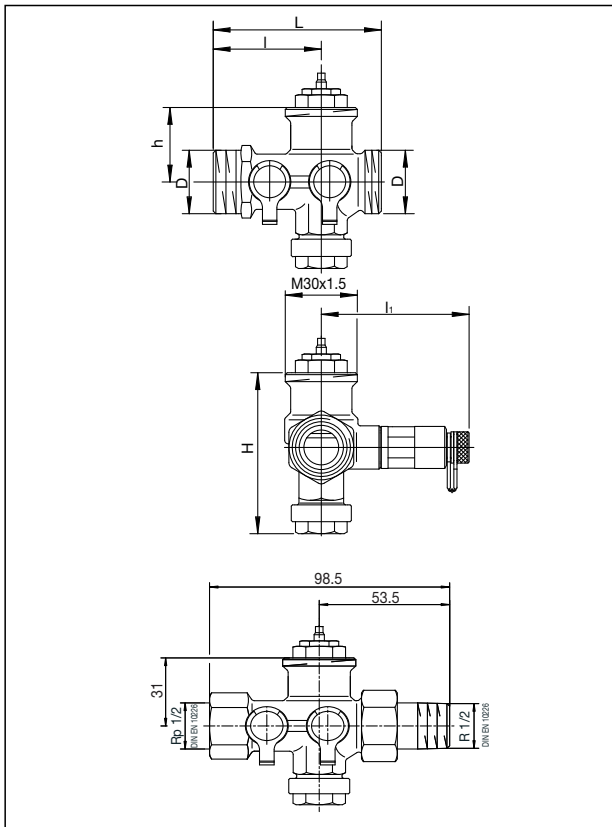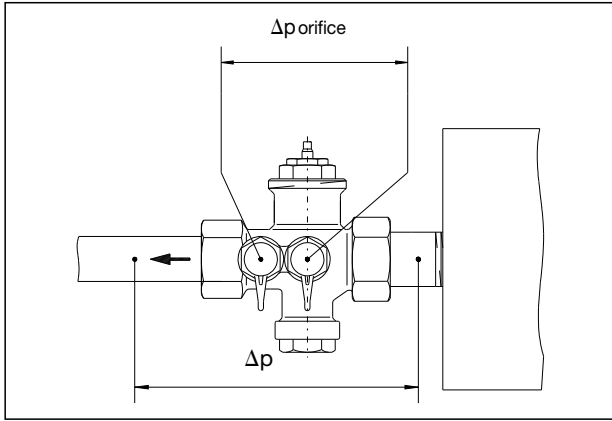
Item no.	D	L	l	l_1	H	h
1145371	G¾	70	45	61.5	67	31
1145372	G¾	70	45	61.5	67	31
1145373	G¾	70	45	61.5	70	31
1145475	G1	80	42	65.5	91	45

Dimensions measuring technique "classic"
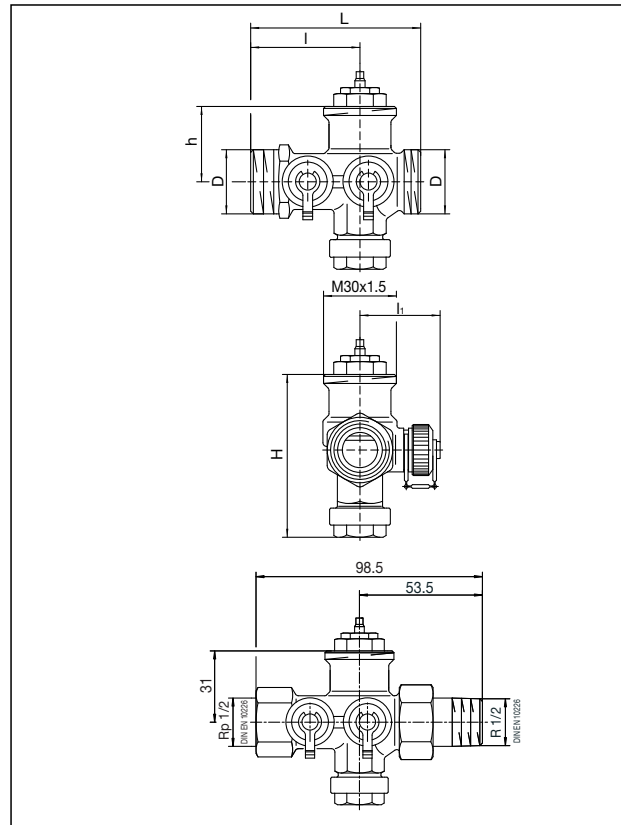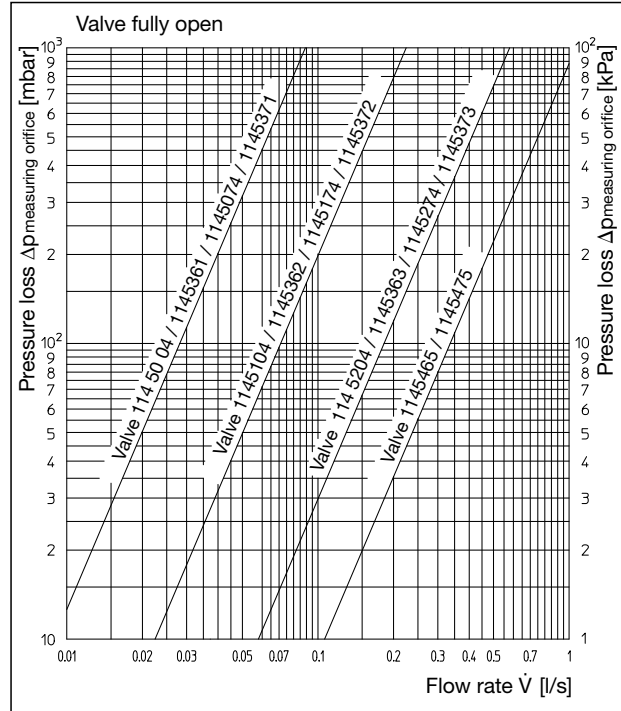
Item no.	D	L	l	l_1	H	h
1145361	G¾	70	45	33	67	31
1145362	G¾	70	45	33	67	31
1145363	G¾	70	45	33	70	31
1145465	G1	80	42	37	91	45

Dimensions measuring technique "eco"