

Quick Choice of Temperature Controls

Sizing of Valves and Actuators



Clorius
Controls A/S

- ensures reliable
control of heating, cooling
and ventilation systems.

Quick Choice of Temperature Controls

Ever since 1902 we have produced reliable temperature controls for nearly all forms of water, oil and steam systems. The experience thereby gained has formed the basis of the present control and valve programme, which makes it possible to determine the optimal combination of valve and actuator.

Control types

Self-acting Temperature Controllers

- Work on the liquid expansion principle without any auxiliary energy
- P-controls
- Reliable under all conditions
- Secured against over-temperature

Electronic Temperature Controllers

- Low energy consumption
- PID-controls
- Adjustable PID-values
- Many adjustment possibilities

Control Valves

All of our control valves fulfil the demands for seat leakage as per VDI/VDE 2174, i.e. the flow through the closed valve is less than the percentage of full flow (by same Δp_v) indicated in this table:

| Type of valve | Max. seat leakage |
|-------------------------|-------------------|
| Single seated | 0,05% |
| Single seated, balanced | 0,05% |
| Double seated | 0,5% |
| 3-way | 0,5% |

Regarding the control characteristics and general characteristics of the valves, please refer to the corresponding data sheets. We can deliver the valves with certificates from the maritime classification companies.

Control valves larger than 80 mm should be installed in horizontal pipe lines and be mounted with a vertical spindle. This limits wear and tear and prolongs the lifetime. At high temperatures, a cooling unit should be used (see diagram 3.)

Sizing of Controls

General points

The diagrams have been worked out to obtain the optimal combination of valve and thermostat etc.

In order to secure stability in the control circuit the following points should be observed:

The valve is to be sized according to load and pressure – over sizing (too big valve) corresponding to a large proportional band (PB) may cause unstable control.

In case of thermostat control with large load variations a small proportional band should be avoided. The proportional band (PB) is calculated as the rated travel (mm) of the valve divided by the amplification of the thermostat (mm/°C) = the two last figures of the type description of the V-thermostat. It is strongly recommended to calculate the PB.

Example: 20 M1F valve (rated travel 6.5 mm) with V4.05 thermostat:

$$PB = 6,5/0,5 = 13^\circ C$$

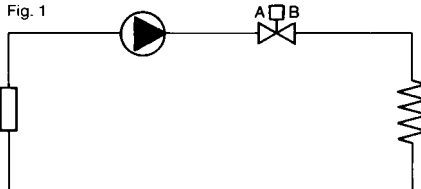
Experience shows that a PB-value in the green field, 8-13°C, is often to be preferred:

| Load variation | Proportional band (PB) | Colour |
|----------------|------------------------|--------|
| Small | 4-8 °C | Red |
| Medium | 8-13 °C | Green |
| Large | Above 13 °C | Yellow |

To avoid noise as well as wear and tear the sizing pressure drop Δp_v across control valves for water should not exceed 1 bar in domestic premises. Otherwise the control should be distributed on more valves.

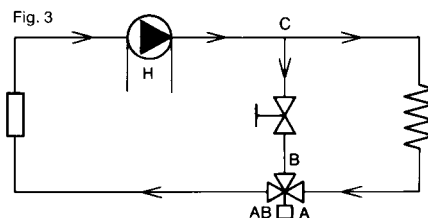
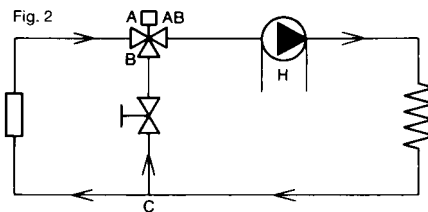
Δp_v must be at least 10% of the total pressure drop of the control circuit.

Control circuits with 2-way valves should be sized so that the pressure drop across the valve $\Delta p_{A \rightarrow B}$ is 30-50% of the total pressure drop of the control circuit ($\Delta p_{A \rightarrow B} + \Delta p_{B \rightarrow A}$), fig. 1.



Control circuits with 3-way valves should be sized so that the following rules are observed:

1. The pressure drop across the valve port A and AB ($\Delta p_{A \rightarrow AB}$) is more than 50% of the pressure drop across the section C-A ($\Delta p_{C \rightarrow A}$), fig. 2 and 3.
2. The pressure drop across the section C-A ($\Delta p_{C \rightarrow A}$) should be less than 25% of the pump pressure H, fig. 2 and 3.
3. The pressure drop across the section C-A ($\Delta p_{C \rightarrow A}$) should be equal to the pressure drop across the section C-B ($\Delta p_{C \rightarrow B}$), fig. 2 and 3.



Control Systems for Water

Necessary sizing values:

1. Max. water flow: G m³/h (e.g. G = 3,0 m³/h)
2. Pressure drop Δp_v in bar across valve at G m³/h (e.g. $\Delta p_v = 0,1$ bar).
3. Pressure drop Δp_L in bar across closed valve (e.g. $\Delta p_L = 5,0$ bar)
4. The working pressure of the system p bar (e.g. p = 5 bar)
5. The working temperature of the system T °C (e.g. T = 90°C)
6. Load variation of the system (e.g. medium = green field)

In diagram 1 the correct valve size is determined by the intersection between the lines for the water flow G and the pressure drop Δp_v (e.g. 32 mm valve).

The required proportional band (green field) and the max pressure Δp_L , against which the controller is to close, is decisive for the choice of thermostat etc. which can be found from the table – e.g. 32 mm single seated valve + V8.09 thermostat ($\Delta p_L = 6,8$ bar) or 32 mm M3F valve + V4.10 thermostat ($\Delta p_L = 12$ bar).

When controlling cooling systems with V-thermostat and 2-way valve, reverse acting valves type L2SR, M2FR, G2FR or H2FR should always be used. See data sheet.

Control Systems for Steam

Only 2-way valves should be used for steam.

Necessary sizing values:

1. Max. steam flow: G ton/h (e.g. G = 1,5 ton/h)
2. Inlet pressure (saturated steam) p_1 bar absolute (e.g. $p_1 = 10$ bar)
3. Steam temperature T at p_1 bar (e.g. T = 179°C)
4. Variation of load in the system (e.g. medium = green field)

In diagram 2 the vertical line for the actual inlet pressure p_1 should be followed to the intersection with the line for $\delta = 0,42$ (or below if a smaller δ is specified). The intersection between the horizontal line from this point and the line for steam flow G lies in the field for the optimal valve size (e.g. 40 mm valve).

The required proportional band (green field) and the max pressure Δp_L , against which the controller is to close, is decisive for the choice of thermostat etc. which can be found from the table – e.g. 40 mm single seated balanced M1FB valve + V8.09 thermostat ($\Delta p_L = 11$ bar).

Valve Material

The necessary valve material is determined by diagram 3 at the intersection for the actual temperature and pressure lines.

Control Systems for Other Media

Oil systems with viscosity v_k in:

If actual cSt < $35 \cdot \sqrt{G} \cdot \sqrt{\Delta p}$ should be sized as water systems. The flow G measured in m³/h. If measured in kg/h, G will have to be divided by the density of the oil (in kg/m³) before entering diagrams. When sizing other oil systems – or systems for other media – please contact our company.

Ordering of Controls

Control Valves

When ordering control valves, valve size and type should be indicated:

| | | | | | |
|--|----------|---|---|---|---|
| Example: | 25 | M | 1 | F | B |
| Valve size | 4 (15/4) | | | | |
| L = Gunmetal valve M = Cast iron valve G = Nodular cast iron H = Cast steel valve | | | | | |
| 1 = Single seated 2 = Double seated 3 = 3-way | | | | | |
| S = Threaded ends F = Flanged ends | | | | | |
| B = Balanced R = Reverse-acting | | | | | |

V-Thermostats

When ordering thermostats the following data should be stated:

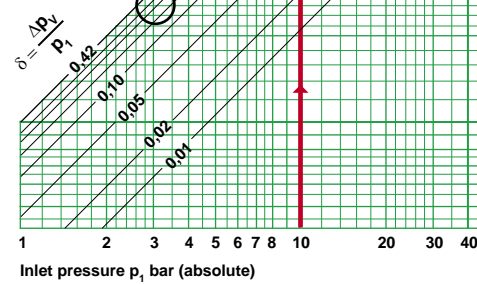
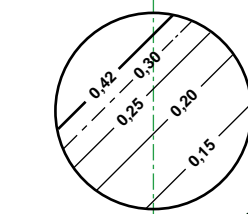
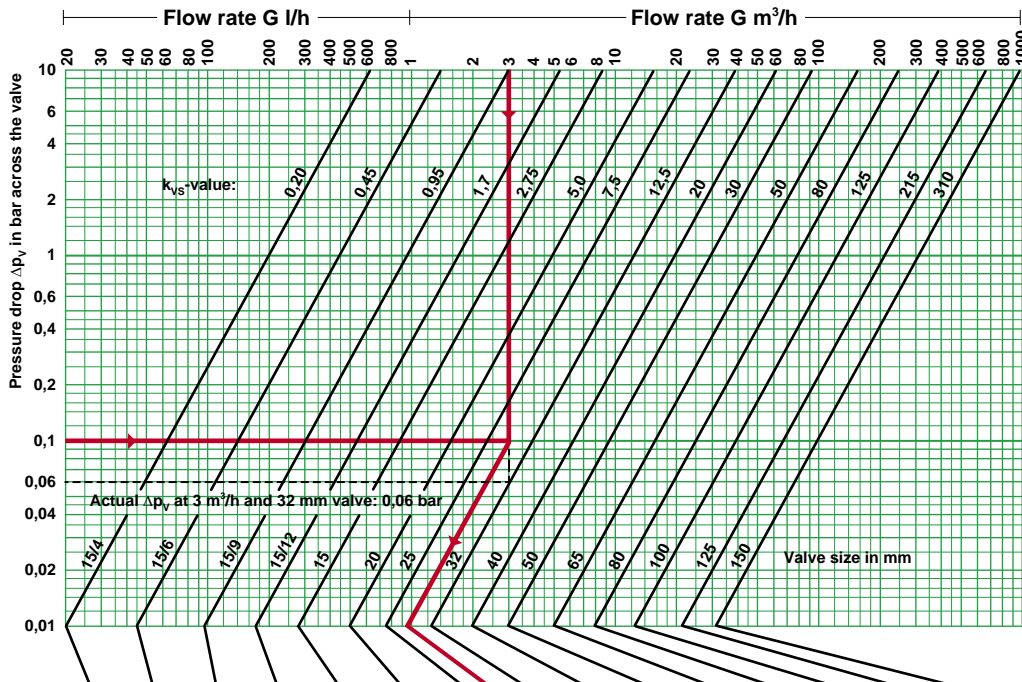
- Type of thermostat (e.g. V4.05)
- Temperature range (e.g. 0-120 °C)
- Length of capillary tube (e.g. 3 m)
- Material of capillary (e.g. copper)
- Type of sensor (e.g. bulb sensor)
- Sensor material (e.g. copper)

See also the data sheets:

- 3.4.xx V-thermostats
- 3.9.xx Pressure differential controls
- 4.6.xx Electronic controllers
- 4.8.xx Valve motors.

Sizing for Water

Diagram 1



| Max. pressure in bar (Δp_1), against which the control can close 1) | | | | | | | | | | | Valve size in mm | | | | | | | | |
|---|------|------|-------|-----|-----|-----|-----|-----|-----|-----|------------------|-----|-----|-----|------------------|---------------------|---------------------------------|---------------|--------------|
| 15/4 | 15/6 | 15/9 | 15/12 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | Type of valve 3) | Actuator | | | |
| | 16 | 16 | 11 | 6,7 | 3,8 | 2,2 | | | | | | | | | L1S | single seated | Type V2.05 | | |
| | 21 | 21 | 13 | 10 | 6,1 | 2,8 | 1,8 | 0,9 | | | | | | | M1F, G1F, H1F | | | | |
| | | | | | 16 | 13 | 7,8 | 3,5 | 2,5 | | | | | | L2S | double seated | | | |
| | | | | | 16 | 14 | 7,9 | 4,3 | 3,3 | | | | | | M2F, G2F, H2F | | | | |
| | | | | | 5,4 | 5,4 | | | | | | | | | 4) L3S | 3-way | (200 N) | | |
| | | | | | 2,2 | 1,9 | | | | | | | | | 5) L3S | | | | |
| | 16 | 16 | 16 | 16 | 9,8 | 6,2 | | | | | | | | | L1S | single seated | Type V4.05, TD-58, TD-66-4 | | |
| | 40 | 40 | 38 | 25 | 16 | 7,6 | 5 | 2,8 | 1,8 | 1,4 | | | | | M1F, G1F, H1F | | | | |
| | | | | | | | 15 | 12 | 8,8 | 6,5 | | | | | M/G/H1FB | single seated, bal. | | | |
| | | | | | | | 40 | 40 | 25 | 21 | 14 | 9,2 | 7,3 | 5,7 | 3,8 | | | 2,7 | L2S, M/G/H2F |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | 3-way | (400 N) |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 4) M3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (400 N) |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | 16 | 16 | 16 | 16 | 9,8 | 6,2 | | | | | | | | | L1S | single seated | Type V4.10, TD-58, TD-66-4 | | |
| | 40 | 40 | 38 | 25 | 16 | 7,6 | 5 | 2,8 | 1,8 | 1,4 | | | | | M1F, G1F, H1F | | | | |
| | | | | | | | 15 | 12 | 8,8 | 6,5 | | | | | M/G/H1FB | single seated, bal. | | | |
| | | | | | | | 40 | 40 | 25 | 21 | 14 | 9,2 | 7,3 | 5,7 | 3,8 | | | 2,7 | L2S, M/G/H2F |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | 3-way | (400 N) |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 4) M3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (400 N) |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | 16 | 16 | 16 | 16 | 9,8 | 6,2 | | | | | | | | | L1S | single seated | Type V8.09 and type TD-66-8 | | |
| | 40 | 40 | 38 | 25 | 16 | 7,6 | 5 | 2,8 | 1,8 | 1,4 | | | | | M1F, G1F, H1F | | | | |
| | | | | | | | 15 | 12 | 8,8 | 6,5 | | | | | M/G/H1FB | single seated, bal. | | | |
| | | | | | | | 40 | 40 | 25 | 21 | 14 | 9,2 | 7,3 | 5,7 | 3,8 | | | 2,7 | L2S, M/G/H2F |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | 3-way | (800 N) |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 4) M3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (800 N) |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | 16 | 16 | 16 | 16 | 9,8 | 6,2 | | | | | | | | | L1S | single seated | Type V8.18 and type TD-66-8 | | |
| | 40 | 40 | 38 | 25 | 16 | 7,6 | 5 | 2,8 | 1,8 | 1,4 | | | | | M1F, G1F, H1F | | | | |
| | | | | | | | 15 | 12 | 8,8 | 6,5 | | | | | M/G/H1FB | single seated, bal. | | | |
| | | | | | | | 40 | 40 | 25 | 21 | 14 | 9,2 | 7,3 | 5,7 | 3,8 | | | 2,7 | L2S, M/G/H2F |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | 3-way | (800 N) |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 4) M3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (800 N) |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | 16 | 16 | 16 | 16 | 16 | 10 | | | | | | | | | L1UP, L1IP | single seated | Valve motor type MT40/A (450 N) | | |
| | 16 | 16 | 16 | 16 | 16 | 10 | | | | | | | | | L1S | single seated | Valve motor type VB, VBA | | |
| | 40 | 40 | 40 | 40 | 26 | 12 | 8 | 4,8 | | | | | | | M1F, G1F, H1F | | | | |
| | | | | | | | | | | | | | | | M/G/H1FB | single seated, bal. | | | |
| | | | | | | | | | | | | | | | | | | | L2S, M/G/H2F |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | 3-way | (600 N) |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 4) M3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (1200 N) |
| | | | | | | | | | | | | | | | | | 4) G3F, H3F | | |
| | 40 | 40 | 40 | 40 | 40 | 27 | 18 | 10 | 6,8 | 5,3 | | | | | L1S, M/G/H1F | single seated | Valve motor type V, AV | | |
| | | | | | | | | | | | | | | | | | | | M/G/H1FB |
| | | | | | | | | | | | | | | | | | L2S, M/G/H2F | double seated | |
| | | | | | | | | | | | | | | | | | 4) L3S, L3F | | |
| | | | | | | | | | | | | | | | | | 5) L3S, L3F | 3-way | |
| | | | | | | | | | | | | | | | | | 4) M3F, G3F, H3F | | |
| | | | | | | | | | | | | | | | | | 5) M3F, G3F, H3F | 3-way | (1200 N) |
| | | | | | | | | | | | | | | | | | 4) M3F, G3F, H3F | | |

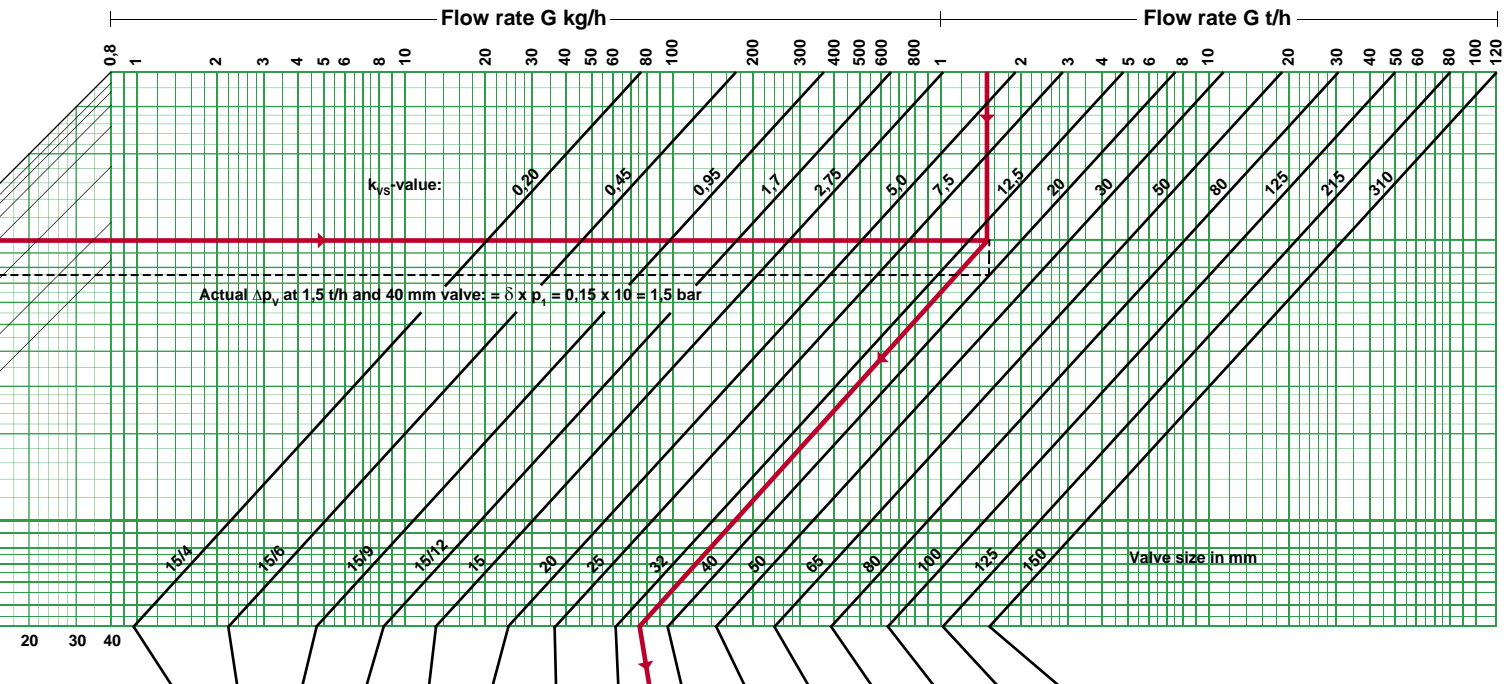
1 bar = 100 kPa = 10,2 mV = 0,99 Atm. = 1,02 kp/cm²

1 cSt = 0,01 St = 10⁻⁶ m²/sec.

°E into cSt: $v_k \cong 7,6 \times °E \cdot (1-1/°E)$

Sizing for Steam

Diagram 2



| Max. pressure in bar (Δp_1), against which the control can close 1) | | | | | | | | | | | Valve size in mm | | Type of valve 2) | | Actuator | | |
|---|------|------|-------|-----|------|-----|-----|-----|-----|-------|------------------|------|------------------|-----|---------------|---------------------|---------------------------------|
| 15/4 | 15/6 | 15/9 | 15/12 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | LIS | | Type V2.05 |
| 16 | 16 | 10 | 6 | 2,9 | 1,3 | | | | | | | | | | M1F, G1F, H1F | single seated | (200 N) |
| 20 | 20 | 13 | 9,3 | 5,3 | 1,9 | 0,9 | | | | | | | | | M2F, G2F, H2F | double seated | |
| | | | | 15 | 13 | 7,3 | 3,8 | 2,7 | | | | | | | LIS | | Type V4.05 |
| 16 | 16 | 16 | 16 | 9 | 5,3 | | | | | | | | | | M1F, G1F, H1F | single seated | |
| 40 | 40 | 38 | 24 | 15 | 6,7 | 4,1 | 1,9 | 0,8 | 0,4 | | | | | | M/G/H1FB | single seated, bal. | (400 N) |
| | | | | 40 | 40 | 24 | 20 | 17 | 8,4 | 6,5 | 4,9 | 2,9 | 1,8 | | M2F, G2F, H2F | double seated | |
| | | | | 40 | 40 | 24 | 20 | 17 | 8,4 | 6,5 | 4,9 | 2,9 | 1,8 | | LIS | | Type V4.10 |
| 16 | 16 | 16 | 16 | 9 | 5,3 | | | | | | | | | | M1F, G1F, H1F | single seated | |
| 40 | 40 | 38 | 24 | 15 | 6,7 | 4,1 | 1,9 | 0,8 | 0,4 | | | | | | M/G/H1FB | single seated, bal. | (400 N) |
| | | | | 40 | 40 | 24 | 20 | 17 | 8,4 | 6,5 | 4,9 | 2,9 | 1,8 | | M2F, G2F, H2F | double seated | |
| | | | | 40 | 40 | 24 | 20 | 17 | 8,4 | 6,5 | 4,9 | 2,9 | 1,8 | | LIS | | Type V8.09 |
| 16 | 16 | 16 | 16 | 16 | 13 | | | | | | | | | | M1F, G1F, H1F | single seated | |
| 40 | 40 | 40 | 40 | 35 | 16 | 10 | 5,8 | 3,3 | 2,3 | | | | | | M/G/H1FB | single seated, bal. | (800 N) |
| | | | | 40 | 40 | 40 | 40 | 24 | 19 | 16 | 10 | 8,4 | | | M2F, G2F, H2F | double seated | |
| | | | | 40 | 40 | 40 | 40 | 24 | 19 | 16 | 10 | 8,4 | | | LIS | | Type V8.18 |
| 16 | 16 | 16 | 16 | 16 | 13 | | | | | | | | | | M1F, G1F, H1F | single seated | |
| 40 | 40 | 40 | 40 | 35 | 16 | 10 | 5,8 | 3,3 | 2,3 | | | | | | M/G/H1FB | single seated, bal. | (800 N) |
| | | | | 40 | 40 | 40 | 40 | 24 | 19 | 16 | 10 | 8,4 | | | M2F, G2F, H2F | double seated | |
| | | | | 16 | 10,4 | | | | | | | | | | L1UP, L1IP | single seated | Valve motor type MT40/A (450 N) |
| | 16 | 16 | 16 | 16 | 16 | | | | | | | | | | LIS | | Valve motor type V, AV |
| 40 | 40 | 40 | 40 | 40 | 26 | 17 | 9,8 | 5,8 | 4,3 | | | | | | M1F, G1F, H1F | single seated | |
| | | | | 40 | 40 | 40 | 40 | 40 | 25 | 25/16 | 25/13 | 19/6 | 15/4,4 | | M/G/H1FB | single seated, bal. | (1200 N) |
| | | | | 40 | 40 | 40 | 40 | 40 | 25 | 25/16 | 25/13 | 19/6 | 15/4,4 | | M2F, G2F, H2F | double seated | |

1) As Δp_1 is normally decreasing by increasing inlet pressure p_1 , all Δp_1 values for water are calculated for $p_1 = \Delta p_1$ - and for steam as max allowable inlet pressure (pos. pressure) on the basis of vacuum behind the valve. For 15/4 and 15/6 mm valves where Δp_v is increasing by increasing inlet pressure (p_1 is minimum by $\Delta p_v = 0$) Δp_1 is, however, in both cases calculated as the max. allowable inlet pressure p_1 by $\Delta p_v = 0$.

2) Colour code (PB) is only valid for thermostats. The other type designations apply to pressure differential controls - with the same tabular values.

3) Tabular values preceded by a slanted stroke (e.g. 4,9/0,5) apply for motors with spring return - in cases where Δp_1 is reduced.

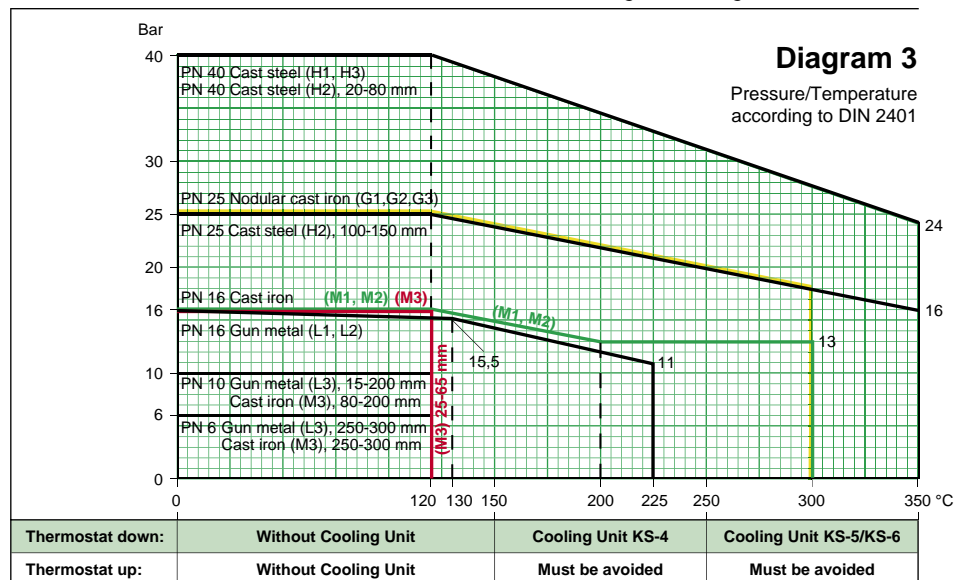
4) Tabular values valid for mixing valves by closing port A(2) - and for diverting valves by opening port B(3). See also: 5).

5) For mixing valves by closing port B(3) and for diverting valves by opening port A(2) - Δp_1 is independent of actuator.

The sizing chart for steam is based on saturated steam. For superheated steam increase the required flow rate by the percentage shown in this table before entering the chart:

| | |
|-----------|------------------|
| Superheat | Increase flow by |
| 10°C | 1% |
| 50°C | 5% |
| 100°C | 9% |

We reserve the right of changes without notice.



Dimensions and Weights of Valves

All flange connections according to EN standard.
All actuator connections shown downwards.

| Type | Valve Size | mm | | | | | | | | | | | | |
|---------------------|----------------|----------|----------|----------|-----------|-----------|----------|----------|----------|----------|-----------|-----------|------------------------|--|
| | | 15 ½" | 20 ¾" | 25 1" | 32 1¼" | 40 1½" | 50 2" | 15 ½" | 20 ¾" | 25 1" | 32 1¼" | 40 1½" | 50 2" | |
| L1S L1UP L1IP | L | 85 | 95 | 99 | | | 85 | 95 | | | | | | |
| | H | 65 | 67 | 67 | | | 220 | 225 | | | | | L1UP/MT40 L1IP/MT40 | |
| | H ₁ | 20 | 23 | 25 | | | 20 | 23 | | | | | | |
| | L ₁ | | | | | | 122 | 122 | | | | | | |
| | B | | | | | | 92 | 92 | | | | | | |
| kg | 0,7 | 0,8 | 1,1 | | | 0,7 | 0,8 | | | | | | | |

| Type | Valve Size | mm | | | | | | | | | | | | |
|-------------|----------------|----------|----------|----------|-----------|-----------|----------|----|----|-----|-----|-----|-----|--|
| | | 15 ½" | 20 ¾" | 25 1" | 32 1¼" | 40 1½" | 50 2" | 65 | 80 | 100 | 125 | 150 | | |
| L2S L2SR | L | | 90 | 100 | 113 | 129 | 153 | 75 | 87 | 99 | 113 | 129 | 153 | |
| | H | | 82 | 80 | 82 | 118 | 122 | 43 | 45 | 50 | 55 | 65 | 70 | |
| | H ₁ | | 48 | 53 | 58 | 68 | 71 | 80 | 80 | 80 | 80 | 90 | 94 | |
| | L | | | | | | | 1 | 1 | 1 | 1,5 | 3 | 4 | |
| | kg | | 1 | 1 | 1,6 | 2,9 | 3,8 | 1 | 1 | 1 | 1,5 | 3 | 4 | |

| Type | Valve Size | mm | | | | | | | | | | | |
|------|----------------|----------|----------|----------|-----------|-----------|----------|----|----|-----|-----|-----|--|
| | | 15 ½" | 20 ¾" | 25 1" | 32 1¼" | 40 1½" | 50 2" | 65 | 80 | 100 | 125 | 150 | |
| L3S | L | 110 | 110 | 140 | 140 | 185 | 185 | | | | | | |
| | L ₁ | | | 140 | 140 | 185 | 185 | | | | | | |
| | H | 60 | 60 | 145 | 145 | 150 | 150 | | | | | | |
| | H ₁ | 55 | 55 | 80 | 80 | 105 | 105 | | | | | | |
| | kg | 1 | 1 | 4,4 | 4,4 | 8,3 | 7,7 | | | | | | |

| | | | | | | | | | | | | | |
|-------------------|----------------|-----|-----|-----|------|------|------|--|--|--|--|--|--|
| M1F G1F H1F | L | 130 | 150 | 160 | 180 | 200 | 230 | | | | | | |
| | H | 80 | 85 | 95 | 105 | 110 | 125 | | | | | | |
| | H ₁ | 60 | 65 | 70 | 75 | 85 | 95 | | | | | | |
| | M1F | 3,1 | 4,2 | 5,5 | 8,1 | 9,7 | 14,7 | | | | | | |
| | G1F | 3,1 | 4,2 | 5,5 | 8,1 | 9,7 | 14 | | | | | | |
| H1F | 3,4 | 4,6 | 6,1 | 9 | 10,8 | 15,5 | | | | | | | |

| | | | | | | | | | | | | | |
|------------------------------------|----------------|---|-----|-----|-----|-----|-----|-----|--|--|--|--|--|
| M1FB G1FB H1FB (25-50 mm) | L | | 160 | 180 | 200 | 230 | 290 | 310 | | | | | |
| | H | | 180 | 195 | 205 | 225 | 260 | 275 | | | | | |
| | H ₁ | | 70 | 75 | 85 | 95 | 110 | 115 | | | | | |
| | M1FB | | 6 | 9 | 13 | 16 | 23 | 38 | | | | | |
| | G1FB | | 6 | 9 | 13 | 16 | 23 | 38 | | | | | |
| H1FB | | 6 | 9 | 13 | 16 | 23 | 38 | | | | | | |

| | | | | | | | | | | | | |
|---------------------------------------|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| M2F G2F (20-50, 100-150 mm) H2F | L | 150 | 160 | 180 | 200 | 230 | 290 | 310 | 350 | 400 | 400 | |
| | H | 85 | 95 | 105 | 110 | 125 | 135 | 145 | 185 | 205 | 240 | |
| | H ₁ | 70 | 77 | 82 | 92 | 102 | 120 | 165 | 209 | 224 | 244 | |
| | M2F | 5 | 6,5 | 9 | 11 | 16 | 21 | 26 | 37 | 73 | 76 | |
| | G2F | 5 | 6,5 | 9 | 11 | 16 | 21 | 26 | 37 | 73 | 76 | |
| H2F | 5 | 6,5 | 9 | 11 | 16 | 21 | 35 | 38 | 73 | 76 | | |

| | | | | | | | | | | | | |
|--|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| M2FR G2FR (20-50, 100-150 mm) H2FR | L | 150 | 160 | 180 | 200 | 230 | 290 | 310 | 350 | 400 | 400 | |
| | H | 63 | 70 | 75 | 85 | 95 | 110 | 155 | 145 | 160 | 180 | |
| | H ₁ | 112 | 117 | 151 | 155 | 169 | 180 | 195 | 240 | 260 | 293 | |
| | M2FR | 5 | 6,5 | 9 | 11 | 16 | 21 | 35 | 39 | 75 | 77 | |
| | G2FR | 5 | 6,5 | 9 | 11 | 16 | 21 | 35 | 39 | 75 | 77 | |
| H2FR | 5 | 6,5 | 9 | 11 | 16 | 21 | 35 | 44 | 80 | 83 | | |

| | | | | | | | | | | | | |
|-----|----------------|--|------|-----|-----|-----|-----|--|--|--|--|--|
| L3F | L | | 240 | 260 | 350 | 400 | 400 | | | | | |
| | L ₁ | | 120 | 130 | 175 | 240 | 240 | | | | | |
| | H | | 175 | 185 | 195 | 245 | 245 | | | | | |
| | H ₁ | | 120 | 125 | 145 | 180 | 180 | | | | | |
| | kg | | 22,5 | 30 | 55 | 91 | 95 | | | | | |

| | | | | | | | | | | | | |
|-------------------------------|----------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| M3F G3F, H3F (25-50 mm) | L | | 160 | 180 | 200 | 230 | 290 | 310 | 350 | 400 | 480 | |
| | L ₁ | | 130 | 150 | 160 | 190 | 220 | 155 | 175 | 240 | 270 | |
| | H | | 70 | 75 | 85 | 95 | 110 | 127 | 141 | 171 | 189 | |
| | H ₁ | | 7 | 10 | 14 | 18 | 26 | 35 | 49 | 79 | 111 | |
| | kg | | 7 | 10 | 14 | 18 | 26 | 35 | 49 | 79 | 111 | |

| 3-way valves for MT90 M motor | | Type | M3FM (80-300), G3FM (100-300) | | | | | | L3FM | | | | |
|-------------------------------|----------------|------|-------------------------------|-----|-----|-----|-----|-----|------|-----|-----|-----|----|
| | | Size | 80 | 100 | 125 | 150 | 200 | 250 | 300 | 200 | 250 | 300 | mm |
| | L | | 310 | 350 | 400 | 480 | 600 | 850 | 850 | 550 | 850 | 850 | |
| | L ₁ | | 155 | 175 | 240 | 270 | 325 | 450 | 450 | 300 | 450 | 450 | |
| | H | | 117 | 132 | 181 | 216 | 238 | 305 | 305 | 235 | 305 | 305 | |
| | H ₁ | | 127 | 141 | 171 | 189 | 238 | 305 | 305 | 235 | 305 | 305 | |
| | kg | | 35 | 49 | 79 | 111 | 160 | 300 | 300 | 179 | 450 | 460 | |

Dimensions and Weights of Thermostats

Dimensions G and H are Pipe threads according to ISO 7/1.
Other dimensions are mm. Weight: net.

| C = Sensor of copper S = Sensor of high alloy stainless steel | Type V2.05 | | Type V4.05 | | Type V4.10 | | Type V8.09 | | Type V8.18 | | | |
|--|---|-----|-------------------------|-----|-----------------|-----|-------------------------|-----|-----------------|---|-------------------------|--|
| | C | S | C | S | C | S | C | S | C | S | | |
| Adjusting cylinder | A | 305 | 305 | 385 | 385 | 385 | 385 | 560 | 560 | | 560 | |
| | B | 405 | 405 | 525 | 525 | 525 | 525 | 740 | 740 | | 740 | |
| Weights: see below | Setting range for standard thermostats °C | | 0-60 30-90 60-120 | | 0-120 40-160 | | 0-60 30-90 60-120 | | 0-120 40-160 | | 0-60 30-90 60-120 | |
| | Setting ranges from -30 to +280 °C | | | | | | | | | | | |

| | | | | | | | | | | | | |
|--|--|--|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Sensor with conn. according to ISO 7/1 | | C | 210 | 190 | 390 | 380 | 490 | 515 | 710 | 745 | 800 |
| | | | D | 235 | 170 | 235 | 250 | 325 | 325 | 425 | 435 | 810 |
| | | | E | 22 | 22 | 22 | 22 | 28 | 25 | 28 | 25 | 34 |
| | | | F | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | | | G | R ¾ | R ¾ | R 1 | R 1 | R 1 | R 1 | R 2 | R 2 | R 2 |
| | | | H | R 2 | R 2 | R 2 | R 2 | R 2 | R 2 | R 2 | R 2 | R 2 |
| | | | kg | 1,8 | 1,8 | 2,6 | 2,6 | 3,3 | 3,3 | 6,3 | 6,3 | 7,3 |
| | | | kg | 2,3 | 2,3 | 3,1 | 3,1 | 3,8 | 3,8 | 6,3 | 6,3 | 7,3 |
| | | | kg | | | | | | | | | |
| | | | kg | | | | | | | | | |

| | | | | | |
|-----------------------------|----|-----|-----|-----|-----|
| Sensor with air duct flange | F | 49 | 49 | 49 | 49 |
| | I | 420 | 420 | 420 | 420 |
| | L | 60 | 60 | 60 | 60 |
| | M | 95 | 95 | 95 | 95 |
| | kg | 1,8 | 2,6 | 3,3 | 5,8 |

Other sensors and connections can be supplied.
Subject to changes without notice.

Capillary tube is supplied in Copper: 3 - 6 - 9 - 12 - 15 - 18 and 21 m
Stainless steel: 3 - 4,5 - 6 - 7,5 - 9 - 10,5 - 12-13,5-15-16,5 and 18 m

Complete control systems

Clorius Controls offers a complete range of tested and reliable equipment for control of heating, cooling and ventilation systems, all with the purpose of achieving the highest reliability and saving energy.



Controllers

Clorius Controls offers a wide range of electronic controllers for heating, cooling and ventilation systems. The controllers are available for systems in the maritime industry, general industry, institutions and residences. Clorius Controls offer controllers for simple stand-alone solutions or for larger BMS-plants.

Control valves

Clorius valves are simple and reliable for regulation of temperature and pressure differences in heating, cooling and ventilation systems for maritime industry, general industry, institutions and residences.



Motors

Clorius Controls offers a large program of conventional regulation motors and analogue motors. This includes special motors for maritime use, which are designed to withstand vibrations.

Balancing valves

With Ballorex balancing valves the amount of water in the individual heating circuits can be balanced and regulated.



Thermostats

Self-acting thermostats from Clorius Controls function directly and are available with sensors for air or liquids. They are also available as safety thermostats for the protection of secondary pipe installations.

Pressure differential controllers

The controllers from Clorius Controls lower large and variable pump pressure to stabilize the flow in the plant.



Service

Clorius Controls has an international network of service engineers who perform commissioning and trouble shooting in heating and ventilation plants. We are available 24 hours a day, 365 days a year. We offer service contracts including preventive maintenance for all brands of regulating equipment. We are also ready to help in case of urgent problems.



Clorius Controls' products can also be found on Tribon.com.



on Tribon.com

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