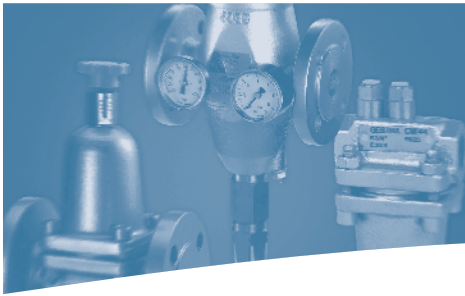


GESTRA

Return-Temperature Control Valves

For the Economical Utilization of Cooling Water and Pressurized Hot Water





GESTRA Temperature Control Valves

Introduction

GESTRA temperature control valves ensure optimum utilization of cooling water and hot water of thermal oil. For cooling applications the cooling-water control valves (GESTRAMAT®) type CW are available, for hot-water or thermal-oil heating systems the return-temperature control valves (Calorimat) type BW are used. In many cases these self-acting valves produce the same result as far more expensive temperature control systems.

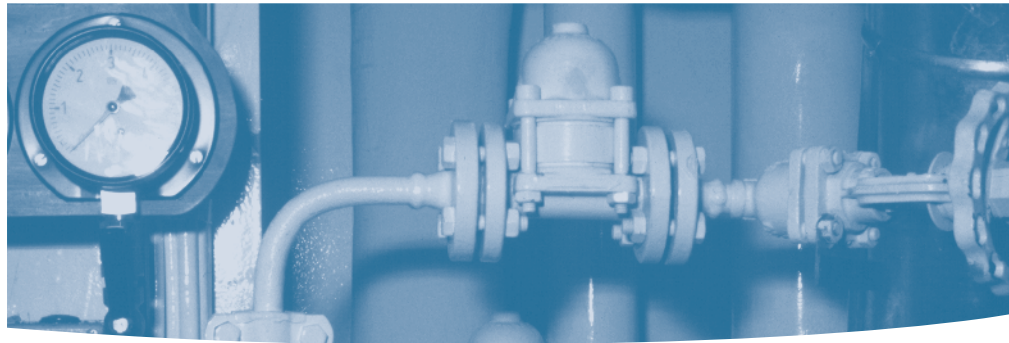
Cooling-water control valves type CW reduce the cooling-water consumption by ensuring that full use is made of cooling capacity of the water. They maintain steady cooling-water discharge temperatures, prevent short-circuiting and automatically balance large systems.

Return-temperature control valves type BW ensure the uniform distribution of the hot water or thermal oil throughout the system by automatically adapting their pressure drops to the temperature requirements of the heat exchangers and thereby balancing the system.

GESTRA cooling-water control valves type CW and return-temperature control valves type BW are self-acting valves which are virtually maintenance-free. They have proven themselves for many decades in hundreds of plants. (Examples of application see pages 4 and 7.)

Contents

Cut the cost of water and power with GESTRA cooling-water control valves type CW	3–5
Available designs, technical data, examples of application	4
Design and operation of GESTRA cooling-water control valves CW 41	5
Optimum utilization of heat energy with GESTRA return-temperature control valves type BW	6–7
Available designs, technical data, examples of application	7



Cooling-Water Control Valves GESTRAMAT CW

Purpose

GESTRA cooling-water control valves are self-acting proportional controllers requiring virtually no maintenance. They regulate the cooling-water flow as a function of the discharge temperature, and reduce the cooling-water consumption to a minimum. The discharge temperature can be individually adjusted with the setting key. A detailed description of the operation of the CW 41 is given on page 5.

Advantages

The cooling-water control valves keep the discharge temperature of the cooling-water at the max. permissible value. The discharge temperature is sensed by the integral thermostat, the valves do not open unless the preset discharge temperature is reached. Cooling is effected with minimum water consumption. The following advantages result:

- ▶ Savings in water costs
- ▶ Reduced pumping costs
- ▶ Reduced costs for water treatment
- ▶ Smaller pumps, pipelines, valves and fittings
- ▶ Extension of existing systems without increasing pump and cooling tower capacity

Besides savings in operating costs, investment and maintenance costs are also reduced.

GESTRA cooling-water control valves automatically balance the system by adapting their flowrates to the process requirements. Short-circuiting is prevented.

Example of savings obtained with a CW

Heat capacity of a cooler $Q = 2 \cdot 10^5 \text{ J/s}$.

Cooling-water inlet temperature $t_1 = 10 \text{ }^\circ\text{C}$, outlet temperature $t_2 = 15 \text{ }^\circ\text{C}$.

Water consumption

$$m_1 = \frac{Q}{c_p (t_2 - t_1)} = \frac{2 \cdot 10^5 \cdot 3600}{4187 (15 - 10)} = 34392 \text{ kg/h} = 34.4 \text{ m}^3/\text{h}$$

(where $c_p = \text{specific heat of water} = 4187 \text{ J/kg K}$)

After fitting a CW set to discharge at a temperature of $t_{02} = 28 \text{ }^\circ\text{C}$ the flow rate is reduced to

$$m_2 = \frac{2 \cdot 10^5 \cdot 3600}{4187 (28 - 10)} = 9553 \text{ kg/h} = 9.5 \text{ m}^3/\text{h}$$

The savings are 72.4%!

In addition to the water savings, pumping costs are also reduced. In the above example the power consumption of the pump before installation of a CW was 6.5 kW, after installation of a CW only 3.5 kW.

This means 46.2% of savings in pump energy.

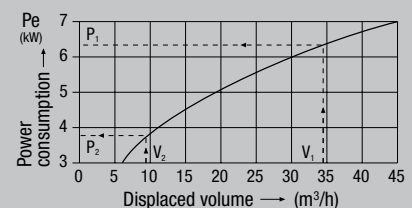
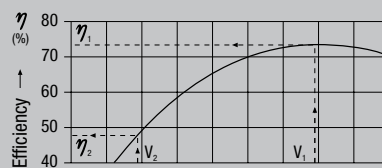
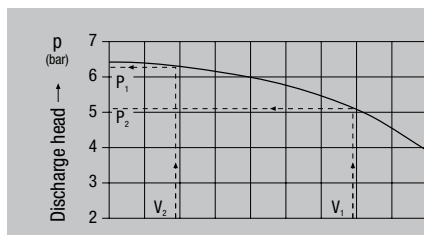
The valves pay for themselves in a very short period, lying between a few days and three months.



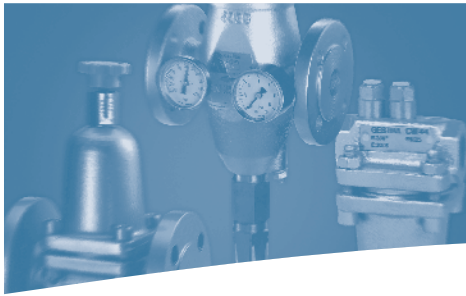
Cooling-water control valve GESTRAMAT CW 44, PN 25, DN 3/8", 1/2", 3/4", 1"



Cooling-water control valve GESTRAMAT CW 41, PN 16, DN 25, 40, 50, 80, 100 mm (1", 1 1/2", 2", 3", 4")



Savings in cooling water and pump energy by increasing the cooling-water discharge temperature.

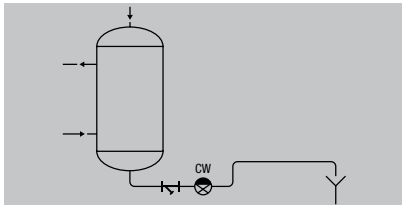


Cut the Cost of Water and Power

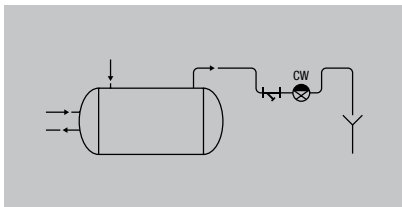
Cooling-Water Control Valves GESTRAMAT CW

Examples of Application

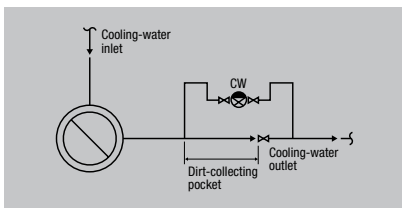
GESTRA cooling-water control valves are used downstream of any cooling surface, such as condensers, air and oil coolers, coils in induction furnaces, chemical baths, compressors and cold-storage houses. For brine circuits down to -37°C special designs are available (code letter "k").



Application downstream of a counter-flow cooler



Application downstream of oil cooler



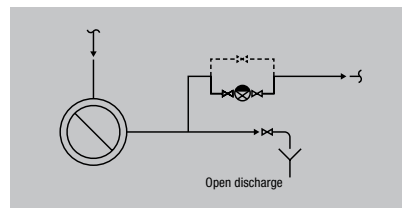
Installation in a bypass, closed system

Available Designs, Technical Data

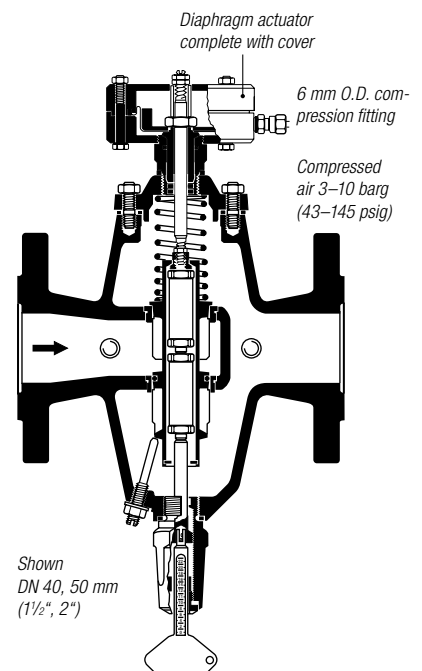
Cooling-water control valves	CW 44	CW 44 k	CW 41		
Nominal sizes (DN)	$\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" BSP		25 (1")	40, 50 (1 1/2", 2")	80, 100 (3", 4")
Nominal pressure (PN)	25	25	16	16	16
Max. pressure barg (psig)	25 (360)	25 (360)	16 (230)	16 (230)	16 (230)
Max. diff. pressure bar (psi)	16 (230)	16 (230)	6 (85)	6 (85)	6 (85)
Adjustable outlet temperature	-2°C to $+106^{\circ}\text{C}$	-37°C to $+71^{\circ}\text{C}$	depending on thermostat / cone combination 20 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$ 3 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$ -32°C to 74 $^{\circ}\text{C}$		

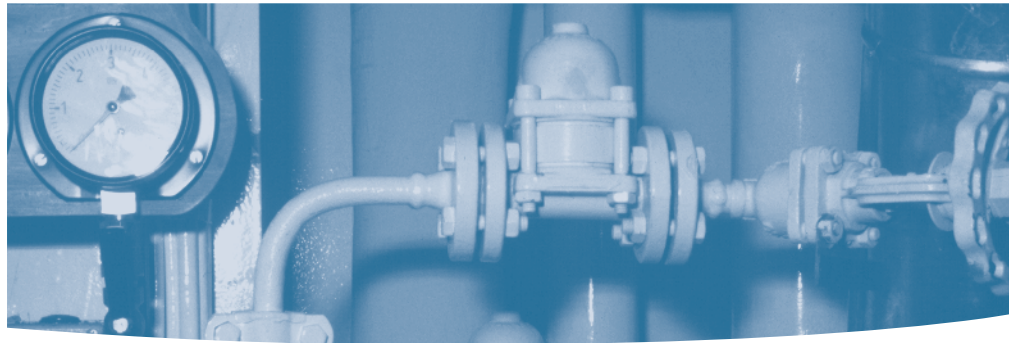
Cooling-water control valve MCW 41 with diaphragm actuator for dirt-charged cooling systems

All cooling-water control valves can be retrofitted with a diaphragm actuator (MCW 41). The MCW 41 ensures trouble-free operation also with untreated cooling water, e.g. river water. All dirt accumulations are purged by actuated opening of the valve. The operation of the pneumatic actuator can, for example, be effected from a control room.



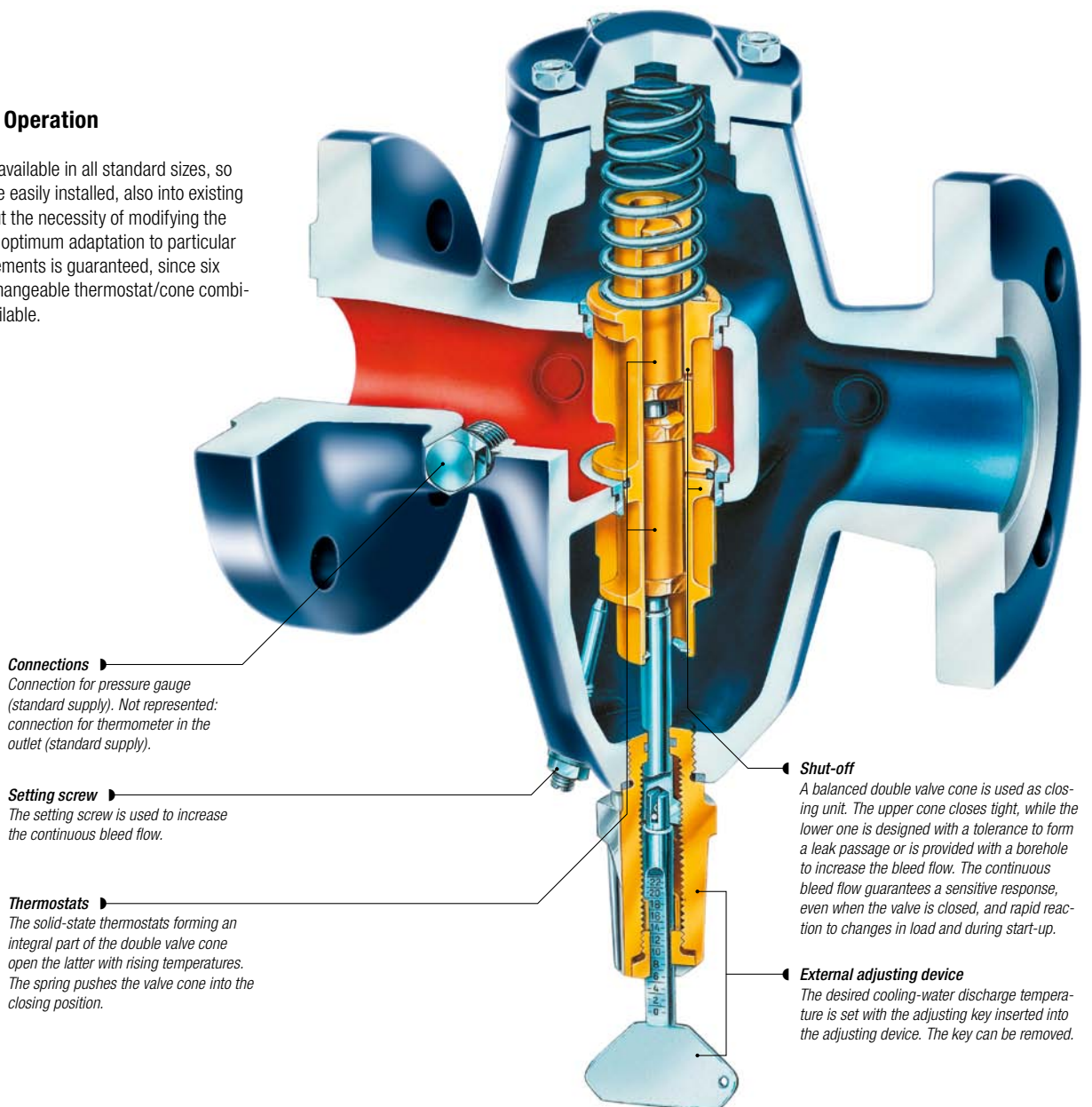
Installation in a bypass, open discharge





Design and Operation

The valves are available in all standard sizes, so that they can be easily installed, also into existing systems without the necessity of modifying the pipe layout. An optimum adaptation to particular process requirements is guaranteed, since six different interchangeable thermostat/cone combinations are available.





Optimum Utilization of Heat Energy

GESTRA Return-Temperature Control Valves BW

Purpose

Economic operation of a heating system depends to a large extent on an optimum flowrate through each heater and an efficient utilization of the heat content of the heating fluid. GESTRA return-temperature control valves were specially developed for this purpose in hot-water and thermal-oil heating systems. These self-acting control valves, requiring no maintenance, maintain constant return temperatures within their proportional range. The valves are set at our works to the desired closing temperature. On request an external adjusting device with graduated scale can be supplied.

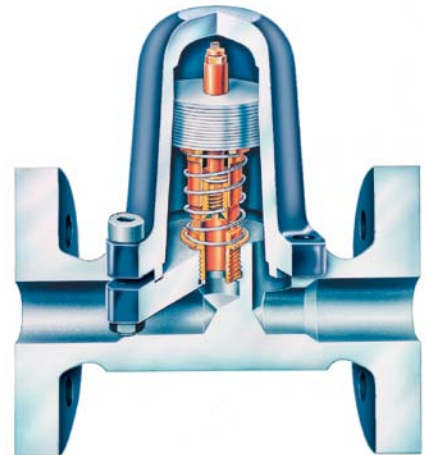
The integral thermostat of the valve senses the temperature of the heating fluid and moves the valve sleeve to regulate the flow, i.e. with rising temperatures the sleeve is moved towards the closed position (reduced cross-sectional area), with falling temperatures towards the open position (enlarged cross-sectional area).

The different pressure drops across each heat exchanger are balanced by the BW, so that pressure, quantity and temperature are always properly distributed throughout the system. System-balancing is superfluous. A uniform distribution of the heating fluid is guaranteed, insufficient heating or overheating of heat exchangers at the end of the system are prevented, as is short-circuiting.

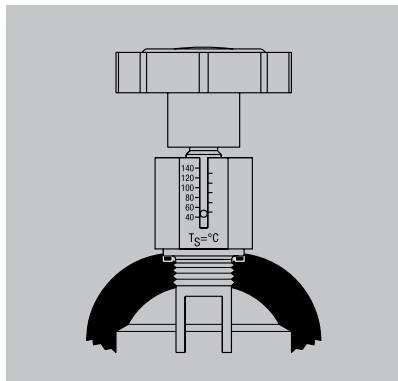
Advantages

Heat exchangers are quite frequently oversized. New systems equipped with return-temperature control valves can be sized smaller, so that operating costs are considerably reduced. But also in existing systems savings can be obtained by equipping the heat exchangers with BW. The resulting optimum flow distribution, the prevention of short-circuits and the reduction in pumping energy ensure that the valves pay for themselves within a short period. Existing systems can often be extended without increasing the pump size or modifying the piping system.

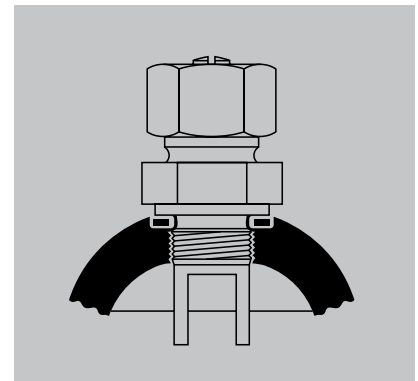
The installation of the return-temperature control valves is very easy. The valves are supplied in standardized overall lengths to DIN.



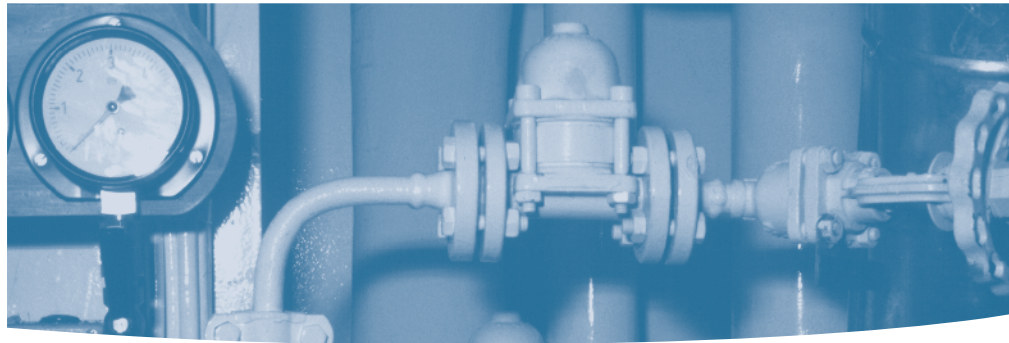
Return-temperature control valve CALORIMAT BW 31, BW 31a, PN 25, DN 15, 20, 25 mm (1/2", 3/4", 1")



External adjusting device for BW 31, DN 15–40 mm (1/2–1 1/2")



External adjusting device for BW 31a, DN 15–40 mm (1/2–1 1/2")

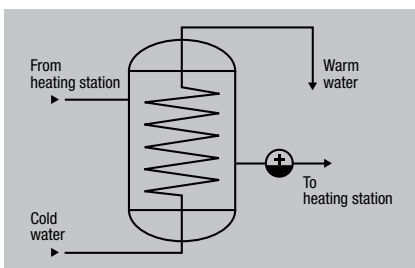


Examples of Application

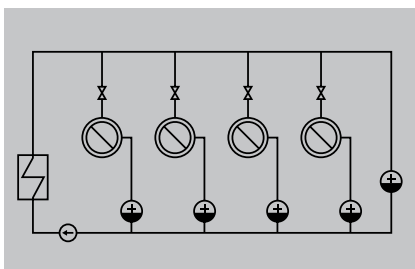
GESTRA return-temperature control valves are used in hot-water or thermal-oil heating systems, in particular heating systems of large factories, for tracing systems, etc. Further applications: air heaters, any heat exchanger heated with hot-water or thermal oil, such as washing baths, chemical or galvanic baths, hot-water vessels, etc. One particular application: temperature control of thermal-oil heated moulds for forced drying of precast concrete parts.

Available Designs, Technical Data

<i>Return-temperature control valves</i>	<i>BW 31</i>	<i>BW 31 a</i>
Nominal sizes (DN)	15–40 mm (1/2–1 1/2")	15–40 mm (1/2–1 1/2")
Nominal pressure (PN)	25	25
Max. pressure barg (psig)	22 (230)	17
Max. differential pressure bar (psi)	6 (85)	6 (85)
Max. temperature of feed circuit	180 °C	320 °C
Adjustable closing temperatures (according to size)	40 °C to 130 °C	100 °C to 280 °C with adjusting device: 70 °C to 270 °C
Heating fluid	Hot water	Thermal oil



Installation in the outlet line of water heater



Installation in a system with parallel heat exchangers



BW installed downstream of an air heater (space heating)



Tank-heating system equipped with BW on an ore carrier



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