

GESTRA Steam Systems

Product Range A4

Instructions for Installation and Maintenance

Cooling-Water Control Valves Gestramat

CW 41, CW 41/4

PN 16, DN 25 – 100 mm (1 – 4")

CW 41

CW 41/4

Description

The cooling-water control valves type CW are direct-acting proportional controllers for installation in cooling water or brine return lines. They ensure that the cooling-water outlet temperature is maintained at a preset value, calculated for the process requirements.

When using cooling-water control valves, higher temperatures are possible than with an uncontrolled process. As a result of the larger heat absorption by the cooling-water or brine, cooling-agent and energy consumption are reduced.

The regulator of the CW 41 consists of one, two or three thermostats **3** (depending on the valve size) mounted in series within a double-seat valve cone **2**. The upper cone closes tight whilst the lower one is designed with a tolerance to form a leak passage ("s" cone), or the leak passage is formed by a borehole in the cone ("r" cone).

The thermostats **3** contain an elastomer thermal expansion material ("n" and "k" thermostats) or wax ("w" thermostat). Under the influence of heat the volume of the thermostats increases, projecting a pin which is included in the thermostat body.

The lift of the thermostats is transmitted to the valve cone via the pin of setting device **6**, supporting the thermostats. With rising cooling-water outlet temperature, the valve cone is moved in the opening direction against the force of the spring. When the temperature drops again the valve cone is moved by the spring **7.1** in the closing direction.

With the aid of setting key **11** that can be removed and fits all valve sizes, the position of the setting pin can be varied to obtain higher or lower cooling-water outlet temperatures (see "Temperature Adjustment").

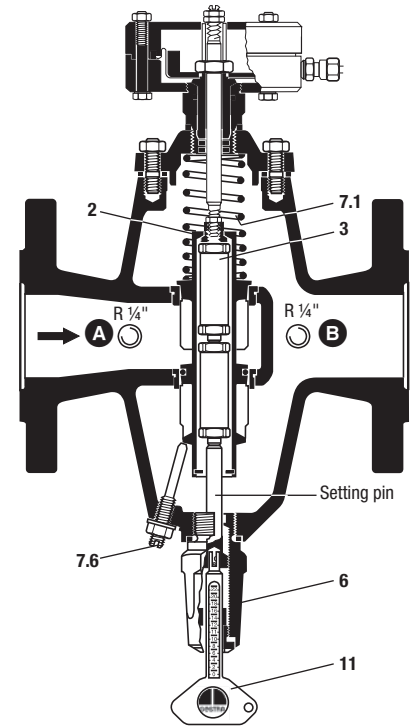
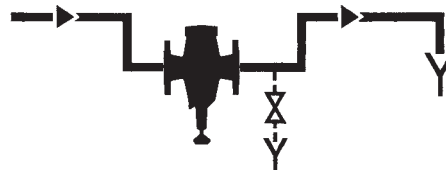
Even if the valve is closed, a continuous bleed flow ensures a sensitive response. The bleed flow can be increased by screwing setting screw **7.6** to the right (e.g. in the case of a long line between heat exchanger and CW).

Installation

1. Screw pressure gauge (item 15) into the inlet (point A in figure opposite) and thermometer (item 16) into the outlet (point B in figure opposite). To avoid damaging these instruments tighten them only at the hexagon using a spanner (A.F. 14 and 19 mm).
2. Always install CW 41 in the cooling-water return line as close as possible to the heat exchanger. Flow is in the direction of arrow. Recommended position: in horizontal lines, setting device **6** pointing downwards.

With free drainage the CW should be installed so that it will not run empty, so as to prevent the formation of deposits. If there is the danger of freezing it might be useful to provide a drain valve in the water pocket (see schematic diagram below). If necessary, the valve can be emptied by unscrewing setting device **6**.

Note: When the CW valve is closed, the cooling zone is under full pump pressure.



- A** = Connection for pressure gauge
- B** = Connection for thermometer

CW 41 DN 40, 50

Pressure / Temperature Rating

Max. service pressure	16 barg (230 psig)
Max. differential pressure	6 bar (85 psi)

Temperature ratings see "Adjustment Table", page 4.

Differential pressure = **inlet** pressure minus **outlet** pressure.

Maintenance

The CW 41 does not require any particular maintenance. If there is the danger of freezing, the valve should be emptied.

Parts List CW 41

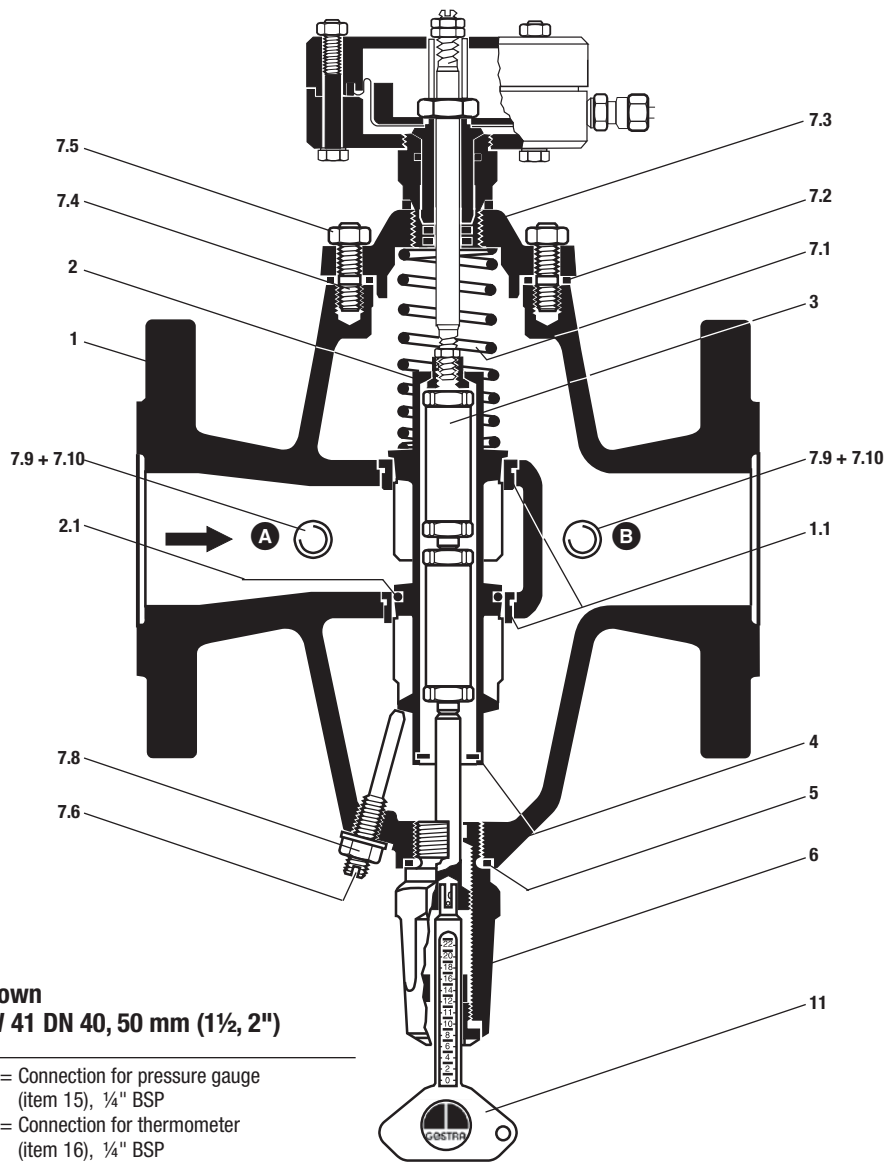
Item No.	Description	Stock code	Number	Material	Hints	
1	Body	–	1	S.G. iron GGG-40.3 (0.7043)	no spare part	
1.1	Seat	–	2	S.S. (1.4122 / 1.4401)	no spare part, interference-fit	
2	Valve cone:					
	“r” cone complete	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184283 184288 184292	1	Cast brass (2.0290)	
	“s” cone	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	004940 004980 030000	1	Cast brass (2.0290)	
2.1	O-ring	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	030092 030093 031787	1	EPDM	for “r” cone only
3	Thermostat complete:					
	“w” thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	004941	1 2 3	Body: Brass (2.0380) Pin: Austenitic stainless steel (1.4571)	
	“n” thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	030040	1 2 3		
	“k” thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	030042	1 2 3		
4	Retaining ring		010332	1	S.S. (1.4034) DIN 472	21.1 x 1
5	Gasket		010333	1	DIN 7603 Steel	A 26 x 31 mm
6	Setting device complete ¹⁾ Threaded bush Gasket		004953 031837 010501	1 1 1	Brass (2.0380) / S.S. Steel (1.0356) DIN 7603 Steel	A 40 x 47 { only for DN 80, 100 mm (3, 4")
7.1	Spring	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	004950 004981 030001	1 1 1	Austenitic stainless steel (1.4571)	
7.2 *)	Gasket	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184372 184373 184374	1 1 1	Graphite/CrNi	45.5 x 75 x 1.0 55.5 x 90 x 1.0 92.5 x 136 x 1.0
7.3	Cover		–	1	S.G. iron (0.7043)	no spare part
7.4	Stud bolt	DN 25-50 mm (1-2") DN 80, 100 mm (3, 4")	010135 010140	4 6	DIN 939 – 5.6 DIN 939 – 5.8	M 8 x 22 M 10 x 25
7.5	Nut	DN 25-50 mm (1-2") DN 80, 100 mm (3, 4")	010514 013123	4 6	DIN 934 – 5 DIN 934 – Steel (1.7258)	M 8 M 10
7.6	Setting screw		004965	1	S.S. (1.4122)	
7.8	“Seal-lock” nut		004800	1	8.8	M 8
7.9 *)	Gasket		000992	4	DIN 7603 – S.S. (1.4301 N)	A 14 x 18
7.10	Plug		085289	4	Steel (1.0501)	¼" BSP
11	Adjusting key		004962	1	Brass (2.0401)	
15	Pressure gauge ¹⁾		004704	1		Measuring range: 0 – 6 barg (0 – 85 psig)
16	Thermometer ¹⁾		184596	1		Measuring range: –30 °C to 100 °C

¹⁾ With “k” thermostat use:

- Setting device complete with extension (stock code 031135)
- Pressure gauge with extension (stock code 031154) and
- Thermometer with extension (stock code 184598)

*) Parts subject to wear (stock keeping recommended)

Note: CW 41 for usual industrial cooling water.
CW 41/4 for salt water, ammoniacal water and chlorinated hydrocarbons.



**Shown
CW 41 DN 40, 50 mm (1½, 2")**

- A** = Connection for pressure gauge (item 15), ¼" BSP
- B** = Connection for thermometer (item 16), ¼" BSP

Dismantling

Exchange of Valve Cone / Thermostat

1. Isolate the valve from pressure. Shut off feed line and in the case of back pressure also return line.
2. Remove nuts **7.5**.
Attention: Spring **7.1** is under tension! Reduce tension by turning adjusting key **11** to the left. Be careful when loosening nuts. Remove cover **7.3**, and take out spring **7.1**.
3. Turn adjusting key **11** to the right until a resistance is felt to push valve cone **2** upwards.
4. Take out valve cone **2** from above.
To exchange thermostats **3** remove retaining ring **4**.
(Number of thermostats:
DN 25 mm (1") = 1 off;
DN 40, 50 mm (1½, 2") = 2 off;
DN 80, 100 mm (3, 4") = 3 off.)

The setting device **6** is provided with a righthand thread. Normally, the setting device need not be dismantled.

Reassembly in reverse order.

Take care that sealing surfaces are clean, replace gasket **7.2**. Valves with "r" cone: Ensure that O-ring **2.1** is undamaged, replace if necessary.

Torques required for tightening nuts **7.5** at room temperature

DN 25, 40, 50 mm (1, 1½, 2")	15 Nm
DN 80, 100 mm (3, 4")	25 Nm

Tools Required

Spanners for items

7.5	DN 25, 40, 50 mm (1, 1½, 2")	A.F. 13 mm
	DN 80, 100 mm (3, 4")	A.F. 17 mm
6		A.F. 32 mm
15		A.F. 14 mm
16		A.F. 19 mm

Parts List CW 41/4 (for parts differing from those of CW 41)

Item No.	Description	Stock code	Number	Material	Hints	
2	Valve cone:					
	"r" cone complete	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184348 184351 184352	1	Satinless steel (1.4312)	For "r" cone only: O-ring of FKM (Item No. 2.1) DN 25 mm (1") No. 031151 DN 40, 50 mm (1½, 2") No. 031152 DN 80, 100 mm (3, 4") No. 031788
	"s" cone	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	030984 030987 030990	1	Satinless steel (1.4312)	
3	Thermostat complete:					
	"w" thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184427	1 2 3	Body and Pin: Austenitic satinless steel (1.4571)	
	"n" thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184428	1 2 3		
	"k" thermostat	DN 25 mm (1") DN 40, 50 mm (1½, 2") DN 80, 100 mm (3, 4")	184429	1 2 3		
6	Setting device complete with extension	031135	1	S.S. (1.4305 / 1.4104)		
15 15.1	Pressure gauge with extension Pressure gauge, water-proof	031154 033779	1 1	Extension: S.S. (1.4104)	Measuring range: 0 – 6 barg (0 – 85 psig)	
16 16.1	Thermometer with extension Thermometer 105 mm long	184598 184597	1 1	Extension: S.S. (1.4104)	Measuring range: –30 °C to 100 °C	

Cooling-Water Control Valves

Gestramat

CW 41, CW 41/4

PN 16, DN 25 – 100 mm (1 – 4")

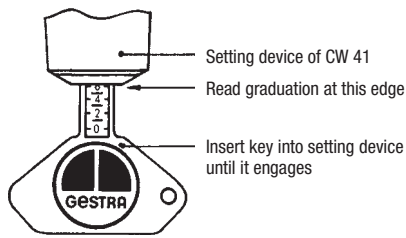
Temperature Adjustment

GESTRA cooling-water control valves CW 41... – exact designation see name plate – can be preset with the adjusting key to the desired cooling-water outlet temperature. The graduations on the key correspond to the temperatures indicated in the adjustment table.

The required outlet temperature is adjusted after start-up. Turn adjusting key $\frac{1}{4}$ to $\frac{1}{2}$ turn at a time. (Remember that one key can be used for all CWs).

The outlet temperature is indicated by the thermometer.

Note that the reaction period of the plant to an adjusted temperature might be 10 to 50 minutes.



Increase in Bleed Flow

When supplied, setting screw 7.6 is set so that it does not touch valve cone 2. To adjust an additional bleed flow with screw 6 proceed as follows:

1. Turn adjusting key 11 to the left to bring valve cone 2 into closed position. The pressure gauge 15 will then indicate the full service pressure.
2. Turn setting screw 7.6 to the right until the pressure gauge indicates a pressure drop which signifies that the opening point of the valve is reached.
3. Adjust additional bleed flow. Normally, $\frac{1}{4}$ to $\frac{1}{2}$ turn will suffice. One complete turn to the right corresponds to a valve lift of approx. 1.2 mm.

Adjustment table for CW 41 wr, ws, nr, ns, kr, ks

Desired outlet temperature in °C									Corresponding graduations on adjusting key
DN 25 mm (1")			DN 40, 50 mm (1½, 2")			DN 80, 100 mm (3, 4")			
wr ws	nr ns	kr ks	wr ws	nr ns	kr ks	wr ws	nr ns	kr ks	
						63	109	74	—
						57	104	69	— 22 —
						54	100	65	—
						51	95	60	— 20 —
						49	90	55	—
			68	114	79	47	86	51	— 18 —
			60	107	72	45	81	48	—
			54	100	65	43	77	42	— 16 —
			50	93	58	41	72	37	—
			47	86	51	39	67	32	— 14 —
			44	79	44	37	63	27	—
68	114	79	41	72	37	36	58	23	— 12 —
54	100	65	38	65	30	34	53	18	—
47	82	51	36	58	23	33	49	14	— 10 —
41	72	37	33	51	16	31	44	9	—
36	58	23	31	44	9	30	39	4	— 8 —
31	44	9	28	37	2	27	35	0	—
25	30	- 5	25	30	- 5	25	30	- 5	— 6 —
18	16	-19	20	23	-12	20	25	-10	—
	3	-32		16	-19		21	-14	— 4 —
				9	-26		16	-19	—
				3	-32		11	-24	— 2 —
							7	-28	—
							3	-32	— 0 —

Malfunction

Reasons and Remedies

1. Discontinuous operation, intermittent opening and closing of valve cone, unstable control position

The reason may be that the cooling-water control valve is installed at quite a long distance from the heat exchanger.

Remedy: Install the CW directly downstream of the heat exchanger or, if this is not possible, increase the bleed flow.

2. Setting device hard to turn or blocked

This may be caused by foreign bodies, dirt or calcium deposits in the valve body.

Remedy: Clean cooling-water control valve and mount a strainer upstream of valve. Calcium deposits can only be avoided by water softening or possibly a lower discharge temperature adjustment might help.

3. Cooling-water outlet temperature too high

Possible reasons may be wrong temperature adjustment, deposits in valve body which affect valve lift or water admission.

Remedy: Check water supply. Check whether valve cone moves freely by operating setting device of cooling-water control valve (see also point 2). Check correct temperature adjustment in accordance with adjustment table above.

4. Cooling-water outlet temperature too low

This may be caused by wrong temperature adjustment, deposits in valve body which impair valve lift or too large a bleed flow.

Remedy: Check whether valve cone moves freely by operating setting device several times (see also point 2).

Readjust cooling-water outlet temperature in accordance with adjustment table above.

Check whether bleed flow is not too large. If necessary, turn setting screw back to reduce bleed flow.

GESTRA AG

P. O. Box 10 54 60, D-28054 Bremen
Münchener Str. 77, D-28215 Bremen

Telephone +49 (0) 421 35 03 - 0, Fax +49 (0) 421 35 03-393

E-Mail gestra.ag@flowserve.com, Internet www.gestra.de



GESTRA