equitherm©

EQJW 95: Heating controller with analogue operation

How energy efficiency is improved
Adjustable summer/winter heating limit for seasonal changeover of system, and digital input for switching the system off remotely.

Areas of application
Weather-compensated flow temperature control in all types of building.

Properties
- Easy to operate thanks to analogue user interface
- LED display
- Room temperature input by means of room temperaturesensor or room user panel
- Automatic changeover to summer or heating mode
- Manual mode
- Versions available with weekly or daily time switch

Technical description
- Housing 144 x 96 mm made of flame-retardant, pure white thermoplastic (RAL 9010)
- Inputs for Ni200 and Ni1000 sensors
- PI control
- Relay outputs for activation of final control elements and pumps
- SERVice level with adjustable control parameters
- Min./max. limitation of flow temperature
- Frost protection and pump anti-jamming function
- Room temperature switching
- Automatic switch-off to save energy
- Suitable for fitting on walls, in panels and on top-hat rails
- Electrical connection in base with screw terminals for wires up to 2.5 mm²

T10429

T10254

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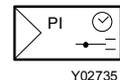
Type	Features	Power	Weight kg
EQJW 95 D F001	PI supply-temperature control, daily time-switch	230 V~	0,7
EQJW 95 W F001	PI supply-temperature control, weekly time-switch	230 V~	0,7

Power supply 230 V~	+10/–15%, 50…60 Hz	Analogue quartz daily or weekly time-switch	
Power consumption	≤ 5 VA	Min. switching period (week)	2 hours
Outputs	3 relays	Min. switching period (day)	15 minutes
Switch rating		Running capacity	> 72 h
Relay: pump [1]	4 A, 250 V~, cos φ > 0,5	Accuracy	–1,5...+2,5 s/week
Relay: drive [2]	0,5 A, 250 V~, cos φ > 0,5		
Inputs	3 analogue, 2 binary	Ambient temperature	0...+50 °C
Binary inputs	switching current approx. 1 mA	Storage temperature	–25 ... +65 °C
Analogue inputs	1 Ni1000 or	Ambient humidity	5...95 %rh
	remote control		without condensation
	2 Ni200 or Ni1000	Degree of protection	
Control parameters		(when fitted in panels)	IP 40 (EN 60529)
Proportional band [3]	10 ... 90 K	Protection class	II (IEC 60730 - 1)
Integral action time	2 min	Conformity	EN 12098; CE
Setting parameters		EMC immunity	EN 61000-6-1, 2
Nominal room temp.	14...26 °C	EMC irradiation	EN 61000-6-3, 4
Temperature set-back		Safety	EN 60730 - 1
for reduced operation	0...–16 K		
Max. limitation, supply	+30...+130 °C	**Documentation**	
Slope	0,2...3,0	Wiring diagram	A10173
Heating limit	+5...+25 °C	Dimension drawing	M10174
Proportional band	10...90 K	Fitting instructions	MV 505869
Cycle time	< 10 s	Operating instructions [4]	BA 505871
Frost-protection temp.	+3 °C	Declaration on materials	MD 44.410

Accessories
-EGS 52/15	Remote control see Section 44
-EGT . . .	Temperature sensors see Section 36
-AV…, AXM	Motorised valve drive (3-point) see Section 51, 55
0220074 001	Adaptor for EQJW; type 41 C
0220074 002	Adaptor for EQJW; type 41 D

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[1] Start-up current max. 7 A, (1 s)
[2] Low voltage not permissible
[3] Applies to drives with a running time of 2 min. If faster drives are employed, increase the P-band accordingly!
[4] Supplied with every controller, in 4 languages (Ger., Eng., Fre., Ital.)

Sauter Components

General description of operation

The outside temperature, flow temperature and (where applicable) the room temperature are measured by precision sensors.

The microprocessor employed in the controller uses these temperatures to calculate the signals for the outputs. Using the control model stored in the controller, the setpoints, the current control offset and the set control parameters – along with the actual values – are taken into account when the output signals are worked out. These signals are processed further by circuit amplifiers; the on/off commands of the relay outputs for the drive and the pump are derived from here.

The necessary heat is fed into the room and the room temperature is kept constant at the setpoint. The heating controller automatically detects whether a room-temperature sensor is connected.

The switching programme, which can be set up by the user to meet his particular requirements, ensures a minimum of energy consumption while providing optimum room conditions. The setpoint for the room temperature is infinitely variable. The operating mode can be chosen easily using the rotary switch provided. For instance, the heating can be switched off for long periods, yet the installation is protected against freezing thanks to the anti-frost function.

The prevailing operating condition is indicated to the user by LEDs. The heating controller's operating mode can be changed via binary inputs. This makes it possible to control the controller from a central workstation or to switch it on/off via a remote telephone line.

Engineering note

Because of the integrated time-switch, the anti-frost function and the anti-jamming function for the pump, the EQJW95 controller should be connected to the power supply all year round.

Abbreviations and symbols

T_A	= outside temperature	T_I	= initial point (foot point)
T_F	= flow temperature	T_R	= room temperature
$T_{S/W}$	= value for summer/winter heating limit	X_p	= proportional band
☾	= reduced mode	☼	= nominal mode
⏻	= OFF mode	S	= slope of heating characteristic
☽	= mode as per switching programme		

Indices:

X_s	= setpoint	T_{Rs}	= room-temperature setpoint
X_i	= actual value	T_{Fi}	= actual value of flow temperature
X_{ged}	= attenuated value	T_{Aged}	= attenuated outside temperature
max	= maximum	T_{Fsmax}	= maximum flow setpoint
min	= minimum		

Example:

Additional technical data

Measuring accuracy	Better than $\pm$ 0,5 K @ 25 °C
Time constant: data processing	Approx. 12 min for T_R, < 30 sec. for T_F and T_A
Neutral zone	$\pm$ 0,9 K
Min. limitation of flow	+ 5 °C
Minimum pulse duration	1 sec
Integral action time for PI controller	2 min
Valve's running time	2 min
Integral action time for pump	4 min
Binary input	If the voltage between the input and GND is less than 2 V, the contacts are interpreted as being closed. If it is greater than 3.5 V, the contacts are interpreted as being open. The current across the contacts is approx. 1 mA; the open-circuit voltage is approx. 12 V d.c.
Heating characteristic	Curved, uninfluenced by extraneous heat (see page 4)
Attenuation of outside temperature	Time constant approx. 21 hours
Summer/winter heating limit	ON equals summer → winter; OFF equals winter → summer ON bei T_{Aged} + 0,5K < $T_{S/W}$; OFF bei T_{Aged} > $T_{S/W}$ + 0,5K
Running capacity	72 hours (the controller should have been connected to the mains for at least 120 hours.)

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Special functions

Room-temperature connection	The room-temperature connection is activated automatically if a room-temperature sensor is connected. Any deviation between T_{Rs} and T_{Ri} will be corrected. Both positive and negative deviation can be compensated for by raising or lowering T_F. Influence of room-temperature connection: $\Delta T_F = 1{,}87 \cdot (S+1) \cdot (T_{Rs} - T_{Ri})$
Frost protection	Anti-frost function cuts in if the controller is in OFF mode and the anti-frost limit has been undercut. This limit is 3 °C for the outside temperature. The anti-frost function is de-activated whenever the outside temperature is higher than 4 °C. When the anti-frost function cuts in, the flow temperature is in force, which, according to the heating characteristic, equates to a room temperature of 5 °C. Any room sensor that is connected will be ignored.
Anti-jamming function for pump	Each time the controller changes from normal mode to reduced mode, the pump is switched on for 15 seconds if it hasn't been in operation at any time in the previous 20 hours. The function is active in all operating modes except manual mode.
Maximum limitation of the flow temperature	The maximum setpoint for the flow-temperature is limited. If the calculation for the setpoint for the flow-temperature is outside of the limit, then the limit temperature is in force. The limit value can be changed by using the potentiometer on the front of the heating controller.
Manual mode	In manual mode, both outputs for the drive are dead, so the drive can be adjusted by hand. The output for the circulation pump is switched on. The power supply is at the relevant terminal.
Automatic cut-off	With the automatic cut-off facility, the heating controller saves energy without any loss of comfort levels, wherever possible. There are the following ways of switching off the heating controller:- a) Operating mode ⏻ b) Summer/winter heating limit OFF c) $T_A \geq T_{Rs}$ (when $T_A \leq T_{Rs} - 1K$, controller switches back on) d) $T_{Fs} < T_{Rs}$ (when $T_{Fs} \geq T_{Rs} + 1K$, controller switches back on)
Mode selection via binary inputs	If the mode selector switch is in a position with the ⊘ symbol, i.e. in automatic mode, the operating mode can be changed using both binary inputs. If the contacts are closed between terminals 23 and 34, the controller runs in reduced mode. If the contacts are closed between terminals 23 and 35, the controller is in back-up mode. Similarly, the controller is in back-up mode if both contacts are closed.
Switching programmes	The switching programme can be set to meet the user's own requirements. The minimum switching interval on the daily time-switch is 15 minutes, and on the weekly time-switch 2 hours. The switching programme can be set using the pins that are provided on the time-switch. If these are positioned on the inside, the controller works in normal mode; when they are on the outside, it works in reduced or back-up mode.

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Heating-characteristic diagram with ☼, ☾ mode and heating ⏻ (OFF with frost protection)


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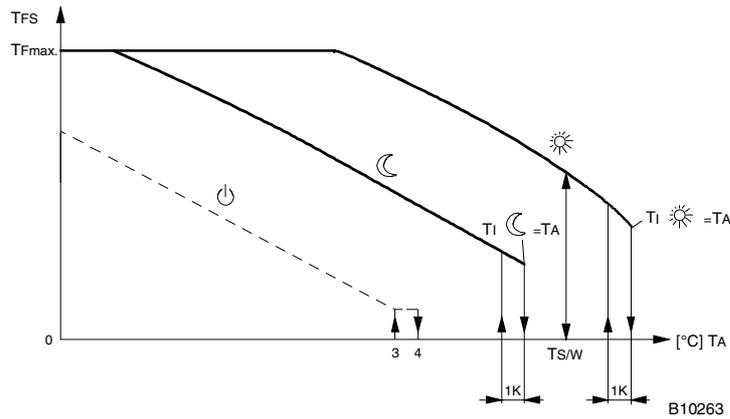
T_I ☼ = foot point of the heating characteristic ☼(= nominal room temperature) or room-temperature setpoint ☼

T_I ☾ = foot point of the heating characteristic ☾(= reduced temp.) or room-temperature setpoint ☾

The heating is switched off automatically whenever T_A exceeds the foot point of the heating characteristic (☼ ☾ mode) or whenever the summer/winter heating limit $T_{S/W}$ is exceeded.
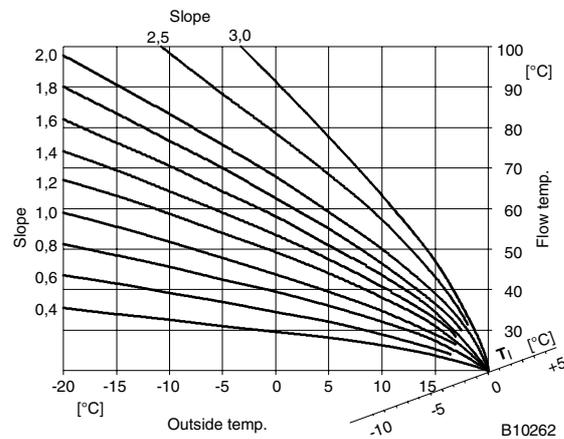
Example of application

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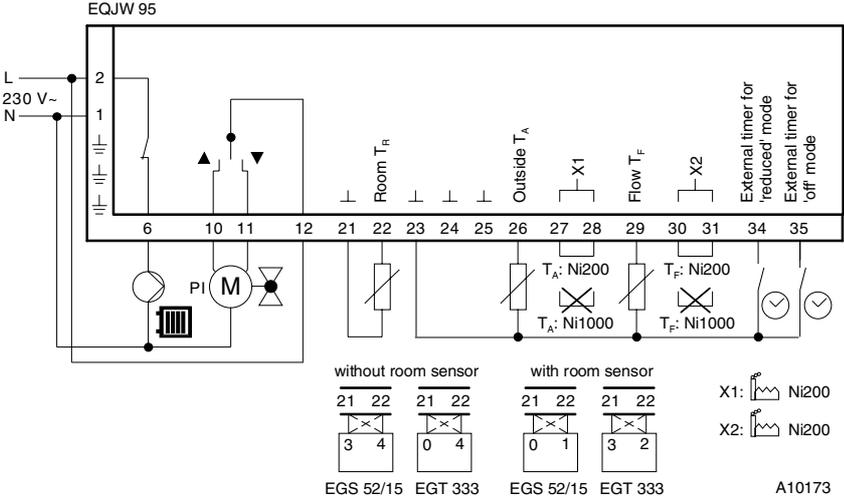Weather compensating flow-temperature control:
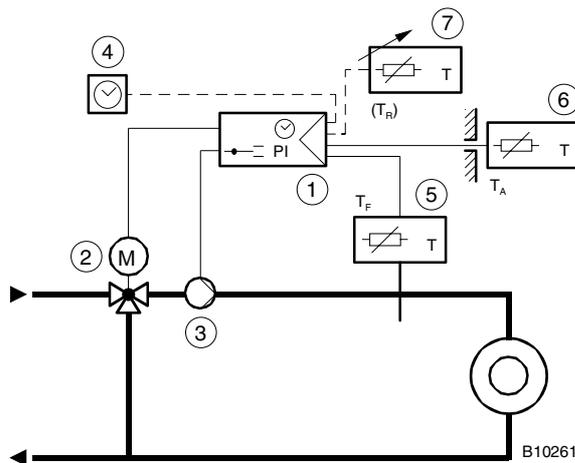
1. EQJW 95 heating controller
2. Control unit with 3-pt. motorised drive
3. Circulation pump
4. External time-switch
5. Flow-temperature sensor
6. Outside-temperature sensor
7. Room-temperature sensor and/or remote-control unit (where applicable)

Heating characteristic

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Wiring diagram

EQJW 95

without room sensor | with room sensor

21 22	21 22	21 22	21 22
3 4	0 4	0 1	3 2
EGS 52/15	EGT 333	EGS 52/15	EGT 333

X1: Ni200
X2: Ni200

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Dimension drawing

138 × 92 DIN 43700

M10174

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