

EQJW 141: Microprocessor-controlled heating controller

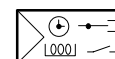
Used in conjunction with temperature detectors (Ni1000) and a through valve for heating control in district-heating networks with converter. Weather-compensated control of the secondary flow-temperature and limitation of the primary return. Suitable for all types of building.

Pre-set basic program for the initial commissioning. Limitation (dependent on outside temperature) of the primary return temperatures (fixed-value + schedule + fixed-value). Input for a contact that closes the valve when it is at its minimum position. Automatic change-over between summer and winter modes (heating limit function). Correction of room temperature via room detector or remote control. Automatic adaption of the heating curve is possible with a room detector. Outputs for motor drive, pumps and configurable functions. Frost-protection function. Digital weekly time-switch with holiday program or timer function. Summertime/wintertime change-over can be programmed up to a week in advance. Demand-led pump control with anti-jamming function.

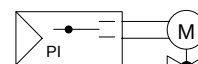
Housing 144 × 96 mm of flame-resistant, pure-white (RAL 9010) thermoplastic. Front plate with LCD display and sealable sliding switch (Hand/Automatic/Service). Keypad for adjusting the set values and selecting the operating mode (Automatic/Normal/Reduced/Off). For mounting on walls, in panels or on top-hat rails as per DIN/EN 50022. Plug-in baseplate of flame-resistant, black thermoplastic with screw terminals for cable of max. 2,5 mm².



T01980



Y01944



B02018

Type	Features	Voltage	Weight kg
EQJW 141 F001	with domestic-hot-water control ⁶⁾	230 V~	0,7
Control characteristic		Control parameters	
Flow temp. with motor drive	PI-control	P-band	10...99 K ²⁾
Configurable output	Three options ¹⁾	Reset time	1...15 min
Temperature measuring ranges		Limit for calc. of heating degree days	0...19 °C
Outside temp.	-50...50 °C	Limit for frost-protection function	-5...5 °C
Flow/boiler/return temp.	0...150 °C	Design temperature (heating)	-39...0 °C
Room temp. (separate sensor)	5...35 °C	Inputs	
Setting ranges		for temperature	Ni1000
Base point of heating curve	0...39,9 °C	for remote control	EGS 52/15
Slope of heating curve	0...4,99	for external time-switch	gold contacts
Heating limit (summer/winter)	0...39 °C	for auxiliary relay (valve stroke)	gold contacts
Holiday program (days or hours)	0...99	Outputs, switched potential-free ³⁾	
Min./max. limitation: sec. return	0...149 °C	for actuators (Open/Stop/Closed)	1 (0,5) A, 250~
Max. limitation: primary return temp.		for configurable output	2 (1) A, 250~
Lower value (fixed value)	0...99 °C	Outputs, switched live ⁴⁾	
Starting point (outside temp.sched.)	0...39 °C	Circulation pump	2 (1) A, 250~
Slope (outside temp. schedule)	0...4,99		
Upper value (fixed value)	0...149 °C	Domestic-hot-water (DHW) control:	
Reduced operation		Setpoint	0...99 °C
without room sensor, in steps	0...9	Switching difference	1...15 K
with room sensor, in °C	0...39,9 °C	Flow temp. during charge of DHW	0...99 °C
Digital quartz time-switch		Charge pump (or diverting valve) ³⁾	2 (1) A, 250~
Memory addresses	28	Plant configuration DHW priority operation	
Min. switching interval	1 min	Diverting valve or charge pump	0/1
Back-up power supply	> 15 h	Parallel operation (T _A)	2...39 ⁵⁾
Number of weekly programs	2		
Power supply 230 V~	± 15%, 50 Hz	Wiring diagram	A01526
Power consumption	approx. 5 VA	Dimension drawing	M368900
Permissible ambient temp.	0...40 °C	Fitting instructions	MV 505041
Deg. of protection (panel mounting)	IP 40 (EN 60529)	Operating instructions ⁶⁾	505034
Protection class	II (IEC 60730)	Abridged operating instructions	302857

Accessories

-EGS 52/15	Remote-control unit, see Sections 44
-EGT 333	Room-temperature detector with adjustment knob, see Sections 36
0228272 . . .	Operating instructions and abridged operating instructions: German 001, French 002, English 003
0369158 001	Fitting bracket, complete for fitting in boiler panel
0369161 000	Plug-in connector, terminal 1...10 for fitting in boiler panel
0369163 000	Plug-in connector, terminal 11...20 for fitting in boiler panel
0369746 001	Cover for front plate of transparent thermoplastic; sealable

¹⁾ Time channel to exterior; circulation-pump revolutionreduction; second charge pump.

²⁾ Applies to drives with a running time of two minutes. P-band decreases accordingly for faster drives.

³⁾ Start-up current max. 7 A (1 s), low voltage is not permissible

⁴⁾ Start-up current max. 7 A (1 s)

⁵⁾ Parallel operation (domestic-hot-water and heating) comes into effect when the outside temperature is lower than the set value.

⁶⁾ Operating instructions; since several languages are available, please order as an accessory.

Operation

The temperatures are measured at their measurement locations by the sensors (Ni1000) and fed via inputs 17...20 to the measuring bridges in the controller. Via multiplexer and A/D converter, the amplified bridge output signals reach the microprocessor, where they are processed further in digital form. The controller compares the actual values with the setpoints and calculates from the control deviation x_w the appropriate pulse duration for the switching amplifiers.

PI algorithm (for switched motorised drives; open/stop/close):

When the control deviation is zero, no pulses are emitted. This condition also remains when the control deviation is less than half of the operating range (X_{Sh}).

When the control deviation is larger, 'open' or 'close' pulses of appropriate length are emitted, depending on direction and size. Due to this integral phase, there is no remaining control deviation in the stationary condition. If a sizeable temperature change occurs during the prevailing sampling cycle, then an appropriate P-pulse is added to the I-pulse. Therefore, if the temperature increases, an 'open' pulse becomes shorter and a 'close' pulse longer. The proportional phase ensures a faster transient effect. The set P-band applies only for the typical running time (2 minutes). Where faster drives are used, the P-band must be enlarged accordingly.

Selector switch: Hand/Automatic/Service

- Hand: No control mode; the circulation pump is permanently on; the burner contacts are bridged (control via boiler thermostat); the drive is without power and can be moved by hand.
- Automatic: Control mode in accordance with the stipulated functions and set values.
- Service: Only this (sealable) position allows access to the service settings and relay test functions; control mode as in 'Automatic' position..

Configurable output

Using SERV 11, one of the following functions can be allocated to one of the outputs (ON/OFF):

- Time channel to exterior (time-switch function)
- Speed reduction of the heating circulation pump in reduced mode.
- Control of a second charge pump (domestic hot water)

Energy-saving functions

- The building setpoint can be reduced by a variable amount via a time-switch.
- The change-over from summer to winter mode or vice versa can be delayed: the average outside temperature must infringe the heating limit for at least 14 hours.

Safety functions

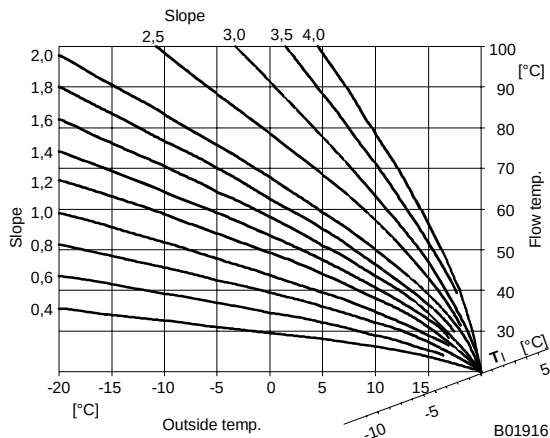
- Maximum limitation of the flow temperature.
- By circulating the water, the frost-protection function prevents parts of the installation from freezing up.

Engineering and fitting notes

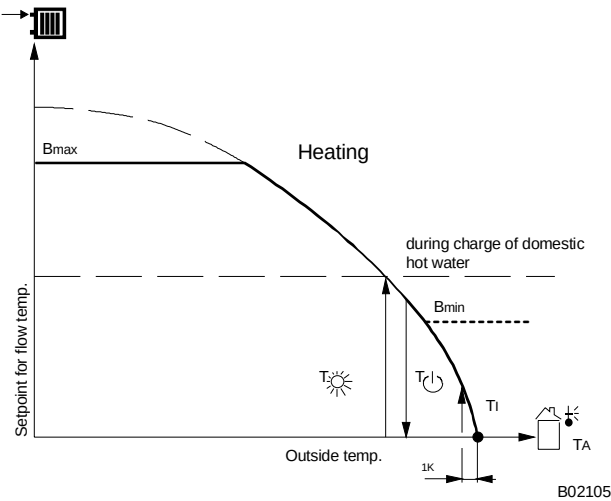
The *equitherm M50* controller should have power applied to it permanently.

Additional technical details

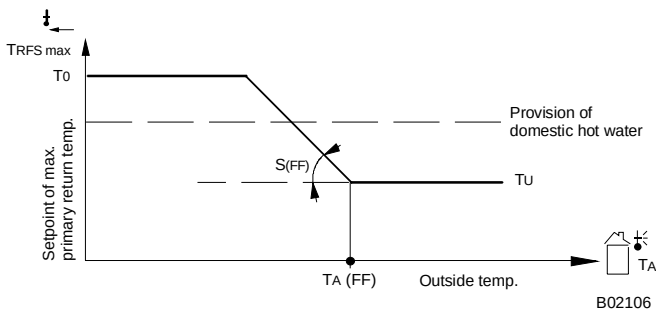
LCD display		
Weekday and time	d hh:mm	Mixed outside temperature
Outside temperature		Heating days (calculated) 0...9999
Actual value of flow temperature (secondary)		Heating degree days (calculated) 0...9999
Setpoint of flow temperature (secondary)		Actual value of domestic-hot-water temp.
Actual value of room temperature		Actual value of domestic-hot-water temp.
Actual value of return temperature (primary)		(Lower part of tank)
Return-temperature setpoint (primary)		Complies with:-
		Directive 2006/95/EC EN 60730-1/ EN 60730-2-9
		EMC directive 2004/108/EC EN 61000-6-3/ EN 61000-6-4



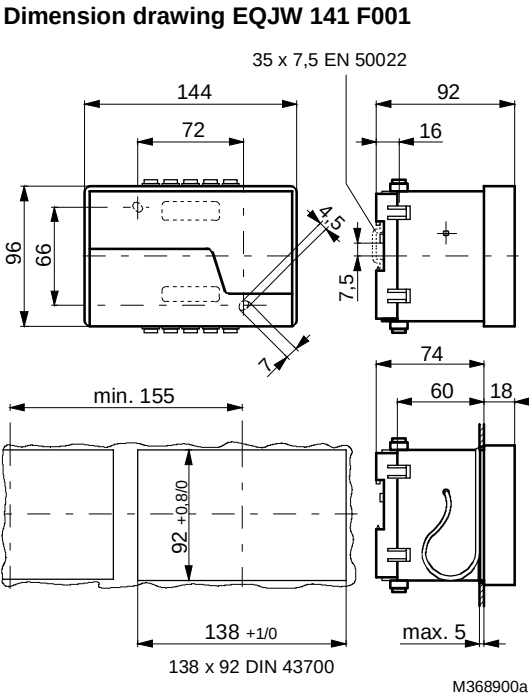
Heating curve for base point $T_I = 20\text{ °C}$ and curvature factor = 0,5



Curve for control of heating circuit

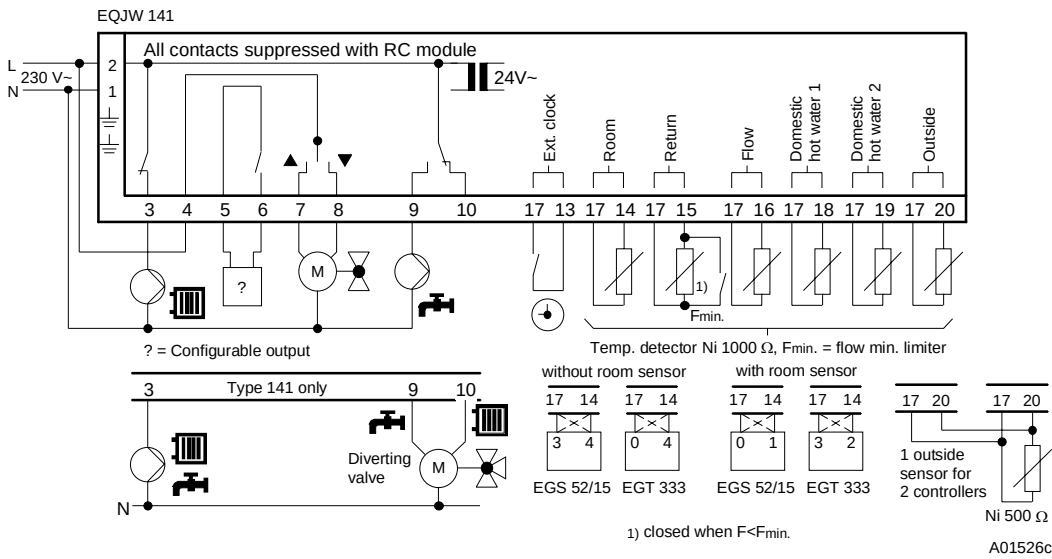


Primary return temp. fixed-value + schedule + fixed-value

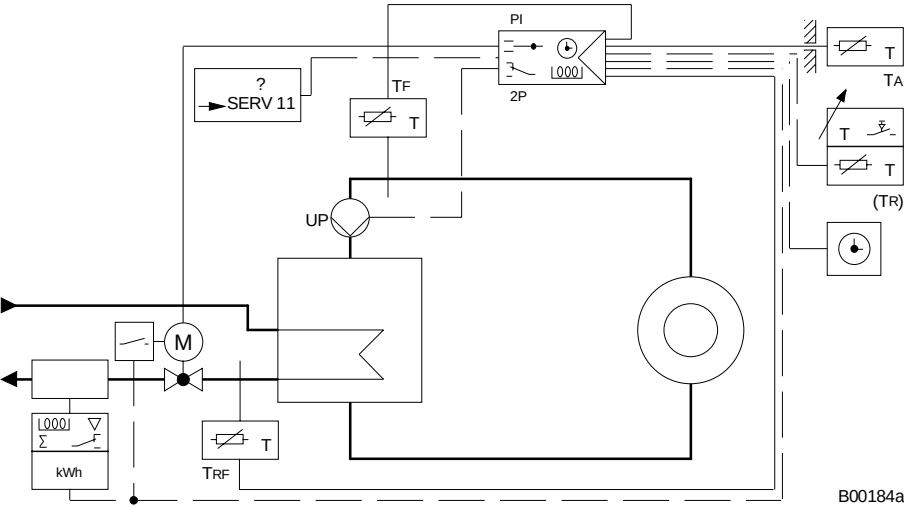


Key:			
B_{max}	max. limitation	T_O	upper limitation temperature
B_{min}	min. limitation	T_U	lower limitation temperature
T	heating limit summer/winter	$T_{RFS\ max}$	Limit of the max. permis. primary return temperature
$T_{\odot}$	heating limit winter/summer	$S_{(FF)}$	slope (fixed-value + schedule + fixed-value)
$T_{\odot}$	base point of heating curve	$T_{A\ (FF)}$	starting point (fixed-value + schedule + fixed-value)

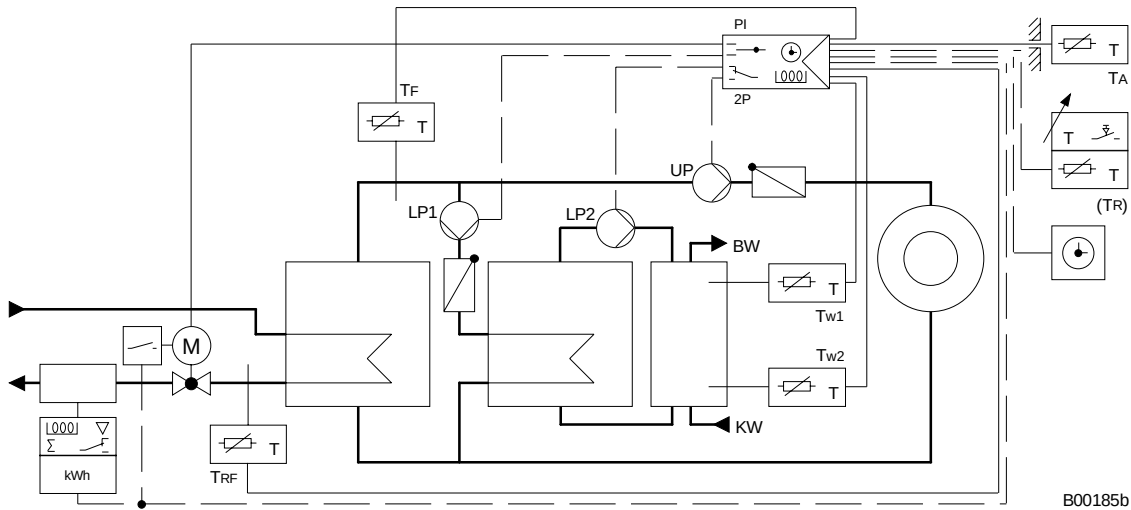
Connection diagram EQJW 141 F001



Examples of application



Weather-compensated flow-temperature control (secondary) in converter installations



Weather-compensated flow temperature (secondary) in converter installations with domestic-hot-water priority switching by means of 2 charge pumps via additional converters

Key::		T_A	outside temperature
BW	domestic hot water	T_F	flow temperature
KW	cold water	T_R	room temperature
LP	charge pump for domestic hot water	T_{RF}	return temperature
UP	circulation pump for heating	T_W	domestic-hot-water temperature