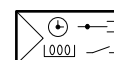


NRT 114: Electronic heating controller, equiflex



NRT114F0**



How energy efficiency is improved

Comfortable, integrated weekly and calendar timer for programming the system with the option of 3 temperature levels, for which the setpoint temperatures can be individually set in order to select the back-up mode

Areas of use

Weather-dependent flow-temperature control and room-temperature control in individual rooms with additional fixed-value control, e.g. for drinking water.

Features

- P/PI control with 3-point output signal
- Choice of 3 basis control models for various applications
- Measurement of room temperature by either integrated or external temperature sensor
- Inputs for outside, supply and room temperatures or for room operating unit
- Programmable input for e.g. presence/absence detector, window contacts and fault indication
- Outputs for control units, pump and pilot timer
- Easy to use with frontal keys and large LCD
- Weekly and calendar switching programmes with 3 temperature levels
- Automatic summertime/wintertime change-over
- Min./max. limitation for supply and return temperatures
- Frost-protection and anti-overheating functions, anti-jamming function for pumps and valves
- Function heating (floor-drying function)
- Electronics in attachable housing

Technical data

Power supply		
Power supply		24 V~/110...230 V~
Tolerance in power supply		±15%, 50/60 Hz
Power consumption		< 1.5 VA
Parameters		
	Setting range for temperature	8...40 °C
	Control characteristics	PI, P+PI
	Operating modes	Reduced/normal/comfort
	Factory setting	17 °C/20 °C/21 °C
	Frost-protection temperature	3 °C outside, 8 °C in room
PI controller	Running time of valve	30...300 s
	P band X_p	2...100 K
	Integral action time	$t_n = 15...6000$ s
P controller	P band X_p	1...20 K
Temperature fixed-value control	Setting range	0...130 °C
	Factory setting	60 °C
Temperature sensor, internal	Time constant	22 min
Ambient conditions		
	Admissible ambient temperature	0...50 °C
	Admissible ambient humidity	5...95% rh, no condensation
	Storage and transport temperature	-25...65 °C
Inputs/Outputs		
	Number of outputs	1 relay, 2 triacs
	Number of inputs	1 digital, 3 analogue
	Digital input	Switching current approx. 1 mA
	Analogue inputs ¹⁾	2 Ni1000, 1 Ni1000 or 0...10 V

¹⁾ 0...10 V equates to a temperature range of -50...50 °C



Function		
Timer	Back-up power supply	> 6 h (super cap, 20 °C, after 1 h of charging)
	Accuracy	±1 s/d at 20 °C
Weekly switching programme	Number of switching commands	Max. 42
	Min. switching interval	10 min
Calendar switching programme	Number of switching commands	Max. 6
	Min. switching interval	1 d

Construction		
Weight		0.28 kg
Housing material		Fire-retardant thermoplastic
Housing		Pure white (RAL 9010)
Fitting		Wall fitting/recessed junction box
Cable feed		At rear
Screw terminals		For wire of up to 2.5 mm ²

Standards and directives		
CE conformity according to	Type of protection	IP 30 (EN 60730-1)
	Protection class	II (EN 60730-1)
	Software class A	EN 60529
	EMC directive 2004/108/EC	EN 61000-6-1, EN 61000-6-2 EN 61000-6-3, EN 61000-6-4
	Low-voltage directive 2006/95/EC	EN 60730-1

Overview of types				
Type	Voltage	Load on Triac	Min. load on Triac	Relay load
NRT114F031	110...230 V~	230 V~, 0.3 (0.5) A	10 mA	230 V~, 5 (2) A
NRT114F041	24 V~	24 V~, 0.3 (0.5) A	40 mA	≤ 50 V~/~, 5 (2) A

☼ *Triac (0.5) A: if internal room-temperature sensor is not active*

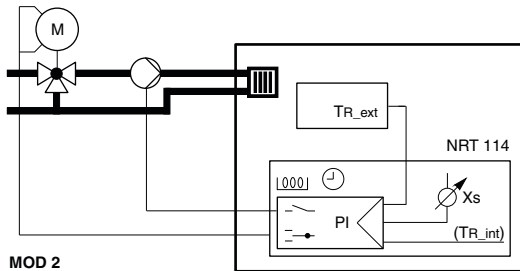
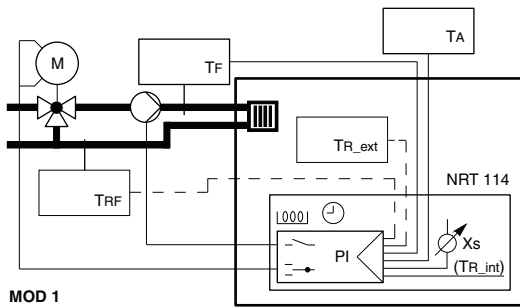
Accessories	
Type	Description
AVF***	Motorised valve actuator (see product data sheet)
AVM***	Motorised valve actuator (see product data sheet)
AXM***	Motorised valve actuator (see product data sheet)
EGS 52/15	Room operating unit (see product data sheet)
EGT***	External temperature sensor Ni1000 (see product data sheet)
0386273001	Plug-in power unit, input 230 V~, output 21 V~ (0.34 A), length of cable 1.8 m, IP 30
0313346001	Module 0...10 V for Ni1000; R > 5 kΩ; 24 V~, ±20%; IP 00 (IP 42 when fitted in housing), 4 temp. ranges: -50...0 °C; -50...50 °C; 0...50 °C; 0...100 °C
0303124000	Recessed junction box
7000974001	Operating manual, German
7000974002	Operating manual, French
7000974003	Operating manual, English

Description of operation

The temperatures are measured with precision temperature sensors and compared with the current setpoint. Depending on the control offset and the control characteristic, the relay contacts and the Triacs are switched. As a result, the heating in the room is increased or reduced. In this way, the required room temperature is kept constant.

The adjustable weekly switching programme is used to select an individual temperature profile for each day to provide the optimal comfort level with the minimum energy consumption.

For different temperature requirements, the temporary, time-limited and time-unlimited operating modes are available for using the absence and party functions. Energy savings can be made during longer absences such as holidays by using the calendar programme in advance. The operating status of the system is shown on the display (LCD) with visual symbols and a numerical field.



Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product documents must also be adhered to. Changing or converting the product is not admissible.

Control models

Control model 1: PI,

- supply-temperature control based on outside temperature

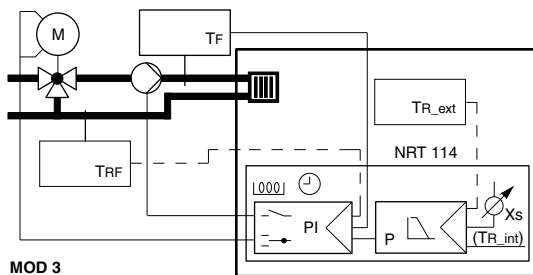
Control model 2: PI,

- room temperature control

Control model 3: P+PI,

- supply-temperature control based on room temperature (cascade controller)

Engineering and fitting notes



The device must be supplied with power all year round due to the integrated timer, frost-protection and pump and valve anti-jamming functions! Place of installation approx. 1.5 metres above the ground. When the room-temperature connection is active, the unit should be fitted so that it is protected from direct sunlight, draughts and sources of heat and cold.

Abbreviations

T_A	= outside temperature	T_I	= initial point (foot point)
T_F	= supply temperature	T_R	= room temperature
T_{Rmin}	= minimum limitation setting range T_R	T_{Rmax}	= maximum limitation setting range T_R
T_{RF}	= return temperature	X_p	= proportional band
T_n	= reset time	X_{sh}	= neutral zone
T_y	= running time of valve	F_{lim}	= limitation of throughflow
UP	= heating pump	V	= valve
MOD	= control model	S	= slope of heating characteristic
⊖	= factory setting	T_0	= temperature level 0 (stand-by heating)

T ₁	= temperature level 1 (reduced)	T ₂	= temperature level 2 (normal)
T ₃	= temperature level 3 (comfort)	T ₄	= temperature level 4 (fixed value)

Indexes:		Example:	
X _s	= setpoint	T _{Rs}	= room-temperature setpoint
X _i	= actual value	T _{Fi}	= actual value of the supply temperature
X _{ged}	= damped value	T _{Aged}	= damped outside temperature
max	= maximum	T _{Fsmax}	= maximum supply setpoint
min	= minimum	T _{Rsmin}	= minimum room setpoint

Parameter

General information	
Heating characteristic for MOD1	Curved, without influence of extraneous heat (see page 10)
Damping of outside temperature	Adjustable through 10 levels from undamped to damping 24 hours
Summer/winter heating limit	ON corresponds to summer → winter; OFF corresponds to winter → summer MOD 1: ON for T _{Aged} ≤ T _{Rs} ; OFF for T _{Aged} ≥ T _{Rs} + 1K MOD 2: ON for T _{Ri} ≤ T _{Rs} + ½ X _p ; OFF for T _{Ri} ≥ T _{Rs} + ½ X _p + 1K MOD 3: ON for T _{Ri} ≤ T _{Rs} ; OFF for T _{Ri} ≥ T _{Rs} + 1K
Binary input (PROG)	Binary input PROG can be programmed in SERVICE mode for various input signals. If the voltage between the input and GND is less than 0.4 V, the contact is interpreted as closed. If the voltage is greater than 0.6 V, the contact is interpreted as open. The current across the contacts is approx. 1 mA. Table 1 shows the possible temperature levels and the influence options for the temperature control when the input is active. If the contact is not active, the controller operates based on the switching programme.

Special functions

Room-temperature connection	With control model 1, the room-temperature connection corrects differences between the actual value of the room temperature and the room-temperature setpoint. Both positive and negative differences can be compensated by increasing or decreasing the supply temperature. Can be (de)activated in the SERVICE mode. Factory setting is not active. Effect of room-temperature connection: $\Delta T_F = 3 \cdot (S+1) \cdot (T_{Rs} - T_{Ri})$, whereby (T _{Rs} - T _{Ri}) is only considered up to ± 3 K.
Switching programmes	A weekly switching programme with a maximum of 42 switching commands and a calendar switching programme with a maximum of 6 switching commands are available. A lower temperature level from the weekly and calendar switching programmes has priority. An "empty" switching programme is interpreted as automatic mode with temperature level T3. On the LCD, the clock symbol is displayed without index 1 or 2. The calendar switching programme can be (de)activated in the SERVICE mode. In the factory setting, the calendar switching programme is not active.
Summer-/wintertime changeover	Automatic with the calendar programme. The changeover is performed on the programmed date, as long as it is a Sunday. Otherwise on the following Sunday. The time of the changeover is 2.00 a.m. or 3.00 a.m. Can be (de)activated in the SERVICE mode. Factory setting: active with changeover dates 25 October and 25 March.
Frost-protection facility	The frost-protection function becomes active if the controller is in automatic mode and the heating is on stand-by (corresponds to temperature level T ₀) or the heating is switched off. Additionally, the temperature must be below the anti-frost limit. The anti-frost limit is 3 °C for the (damped) outside temperature with control model 1 and 8 °C for the room temperature with control models 2, 3. The frost-protection function is disabled again when the (damped) outside temperature rises above 4 °C or the room temperature rises above 9 °C. When the frost-protection function becomes active, the valve is opened 30% with MOD2 and the heating pump is switched on. With MOD1 and MOD3, T _F is checked. If T _F < 5 °C, the valve is opened 30% and the heating pump is switched on. If T _F > 20 °C, the valve is closed and the heating pump is switched off. The frost-protection function can be (de)activated in the SERVICE mode. The factory setting is active.
Anti-jamming function for pump and valve	If the heating pump or valve has a downtime greater than 168 h, the outputs are activated sequentially on the following Sunday at midnight. Can be (de)activated in the SERVICE mode; factory setting not active.
Reset	The controller is reset by pressing the reset button. After this, the time and date must be entered again. The parameters set in the SERVICE mode and the switching programme remain unchanged.
Fixed-value control	With control model 1 and 3, fixed-value control can be performed using binary input PROG (see table 1). The supply temperature is regulated to a fixed value. This value can be changed in SERVICE mode. The fixed-value control has priority over the control of the supply temperature according to the switching programme.

Limitation of supply temperature	The maximum and minimum values for the supply temperature are limited for control models 1, 3. The values for the upper and lower limits can be changed. If a setpoint is calculated for the supply temperature that is outside these limits, the relevant limit temperature is regulated. In summer mode or if the heating is operating in stand-by mode (corresponds to temperature level T ₀) or the heating is switched off, the limitation of the supply temperature is not active.
Limitation of return temperature	With control model 1 and 3, a limitation of the return temperature can be defined. The limit value for the return temperature and the level of intervention for the supply temperature are defined in SERVICE mode. If the limit value is exceeded, the level of intervention changes the value for the supply-temperature setpoint according to the value defined. If there is an infringement of the maximum or minimum limit for the return temperature, the setpoint for the supply temperature is reduced. In summer mode or if the heating is operating in stand-by mode (corresponds to temperature level T ₀) or the heating is switched off, the limitation of the return temperature is not active.
Manual mode	In manual mode, the pump and the valve can be activated separately. The settings are performed in a menu if manual mode has been enabled. Manual mode is enabled in the SERVICE mode. In the factory setting, manual mode is "not enabled".
Pilot timer	The relay output can be configured as a pilot timer signal. Temperature levels T ₀ (stand-by heating) and T ₁ (reduced temperature) cause the relay contact to be closed. T ₂ (normal temperature) and T ₃ (comfort temperature) cause the contact to be open. The configuration is performed in the SERVICE mode. In the SERVICE mode, the influence of a time-(un)limited temperature change and the binary input on the pilot timer signal can also be defined. The factory setting for the relay output is used to activate a heating pump.
Floor-drying function	Section 4 of EN 1264 describes how cement screeds must be treated with operational heating before putting down floor coverings. Initially, a supply temperature of 25 °C must be maintained for 3 days. After this, the maximum supply temperature must be maintained for a further 4 days. This function has been implemented in the NRT 114. The function is called up in the SERVICE mode.

Table 1: Functions for an active binary input (PROG)
















Function PROG – input	Value of SERV Parameter	Changes in the temperature levels In automatic mode ²⁾	Possible influence	Symbol
Absence, ext. clock	0	T ₂ → T ₁ , T ₃ → T ₁	+ or - ³⁾ ;  ⁴⁾	
Presence	1	T ₀ → T ₂ , T ₁ → T ₂	+ or -; 	
Window contact	2	T ₂ → T ₁ , T ₃ → T ₁	+ or -; 	
Remote switching	3	T ₁ → T ₀ , T ₂ → T ₀ , T ₃ → T ₀	+ or -; 	
Fault indication	4	–	+ or -; 	
Keys locked	5	–	+ or -;	
Fixed-value control	6	T ₀ → T ₄ , T ₁ → T ₄ , T ₂ → T ₄ , T ₃ → T ₄	 (only OFF)	

Table 2: List of SERVICE parameters

Num- ber		Description	Range	Step size
P01	0Y.xx	Software version • Y = 1: series version, xx = sequential number		
P02	0	Current device status • 0 = OK; for error codes, see operating instructions 7000974	0...8191	1
P03	0	No meaning	0...1	1
P04	0	Software reset • 0 = function not active • 1 = reset SERV parameters (SAUTER or OEM factory setting) • 2 = reset switching programmes (SAUTER factory setting) • 3 = reset SERV parameters (SAUTER or OEM factory setting) and reset switching programmes (SAUTER factory setting) Afterwards, the parameter is reset to 0	0...3	1
P05	0	Manual mode menu • 0 = manual mode not enabled • 5...100 manual mode enabled with a maximum valve opening of 5% ... 100 %	0...100	5

²⁾ When the contact is not active, all the temperature levels are controlled according to the switching programme

³⁾ + or – causes temporary temperature change until the next switching time

⁴⁾  Causes a time-(un)limited temperature change

Number		Description	Range	Step size
P06	0	Control model MOD <ul style="list-style-type: none"> • 0 = control not active (contacts open) • 1 = outside temperature-based PI-supply-temperature controller • 2 = PI-room-temperature controller • 3 = room temperature-based P+PI-supply-temperature controller (cascade) 	0...3	1
P07	0	Language <ul style="list-style-type: none"> • 0 = German • 1 = French • 2 = English • 3 = Italian • 4 = Spanish • 5 = Czech • 6 = 1...7 	0...6	1
P08	0	Unit of the displayed temperature <ul style="list-style-type: none"> • 0 = °C • 1 = °F 	0...1	1
P09	0	Temperature display of actual value in automatic mode <ul style="list-style-type: none"> • 0 = room temperature • 1 = outside temperature undamped with MOD1 (see P06) • 2 = supply temperature with MOD1, 3 (see P06) • 3 = return temperature with MOD1, 3 (see P06) if corresponding sensor type was parameterised (P12:3) 	0...3	1
P10	8	Minimum limitation setting range for room-temperature setpoint T_{Rmin}	8...36 °C	1 K
P11	38	Maximum limitation setting range for room-temperature setpoint T_{Rmax} <ul style="list-style-type: none"> • 10...40 °C with data capture via NTC sensor • 10...70 °C with data capture via Ni1000 sensor (P12:1) 	10...40 (70) °C	1 K
P12	0	Room- and return-temperature measurement: <ul style="list-style-type: none"> • 0 = room-temperature measurement via internal NTC sensor • 1 = room-temperature measurement via external Ni1000 sensor • 2 = internal NTC and external Ni1000 room-temperature measurement with averaging • 3 = return-temperature measurement via external Ni1000 sensor for maximum limitation of the return temperature, possibly also with binary input F_{Lim} for minimum throughflow limitation • 4 = return-temperature limitation via external Ni1000 sensor for minimum limitation of the return temperature to protect a boiler • 5 = return-temperature limitation via external Ni1000 sensor for minimum limitation of the return temperature to protect a heating surface • 6 = connection of remote-control unit EGS 52/15 or EGT333 	0...3	1
P13	0.0	Influence of wall in room-temperature measurement with internal NTC sensor	-6.0 K...6.0 K	0.1 K
P14	0.0	Influence of wall in room-temperature measurement with external Ni1000 sensor	-6.0 K...6.0 K	0.1 K
P15	0	Outside temperature measurement with MOD1 (see P06) <ul style="list-style-type: none"> • 0 = Ni1000 • 1 = 0...10 V requires additional change of jumper connection! (see MV 505760 or MV 505761) 	0...1	1
P16	3	Levels for setting the damping of the outside temperature (MOD 1) <ul style="list-style-type: none"> • Level 0 = undamped to level 10 = damped with time constants of 24 hours • 	0...10	1

Number	☉	Description	Range	Step size
P17	0	Function of input PROG (see also table 1) <ul style="list-style-type: none"> • 0 = absence • 1 = presence • 2 = window contacts • 3 = remote switching • 4 = fault indication • 5 = keys locked • 6 = fixed-value control 	0...6	1
P18	0	Direction of operation of input PROG <ul style="list-style-type: none"> • 0 = active, closed • 1 = active, open 	0...1	1
P19	2.0	2 K proportional band for P-controller with MOD3 (see P06)	1.0...20.0 K	0.1 K
P20	40	40 K proportional band for PI-controller	2...100 K	1 K
P21	240	240 seconds reset time for PI-controller	15... 6000 s	5 s
P22	120	120 seconds running time of valve	30... 300 s	5 s
P23	0	0 °C minimum limitation for supply temperature with MOD1, 3 (see P06)	0...100 °C	1 K
P24	75	75 °C maximum limitation for supply temperature with MOD1, 3 (see P06)	20...130 °C	1 K
P25	90	90 °C limitation for return temperature with MOD1, 3 (see P06)	0...90 °C	5 K
P26	2	2 K/K level of intervention when return temperature limit reached with MOD 1, 3 (see P06, P12)	0 K/K ... 10 K/K	1 K/K
P27	60	60 °C supply setpoint for T4 (fixed-value control) with MOD1, 3 (see P06, P17)	0...130 °C	1K
P28	0	Room-temperature connection with MOD 1 (see P06, P12) <ul style="list-style-type: none"> • 0 = not active • 1 = active if $T_{Ri} > T_{Rs}$ • 2 = active if $T_{Ri} < T_{Rs}$ • 3 = active if $T_{Ri} < > T_{Rs}$ 	0...3	1
P29	1.4	1.4 slope of heating characteristic with MOD1	0.0...5.0	0.1
P30	1	Frost-protection facility <ul style="list-style-type: none"> • 0 = not active • 1 = active 	0...1	1
P31	1	Function of the relay output (abbreviations: pilot timer: PU; pump: UP) <ul style="list-style-type: none"> • 0 = relay has no function • 1 = UP for heating • 2 = UP for fixed-value control • 3 = PU controlled by weekly and calendar switching programmes • 4 = same as 3 with additional consideration of input PROG • 5 = same as 4 with additional consideration of time-(un)limited temperature change 	0...5	1
P32	0	Valve and pump anti-jamming functions <ul style="list-style-type: none"> • 0 = not active • 1 = active at Triac outputs (valve) • 2 = active at relay output (pump) • 3 = active at relay and Triac outputs (pump and valve) 	0...3	1
P33	120	120 min timeout for pump at start of temperature reduction with MOD1 Prerequisite: <ul style="list-style-type: none"> • room-temperature connection not active (P28:0) 	0...900 min	10 min
P34	0	Display / [10 hours] total duration of closed relay contacts (cannot be deleted)	0...9999	1
P35	0	Calendar switching programme <ul style="list-style-type: none"> • 0 = not active • 1 = active • 2 = active, switching commands are deleted after execution • 3 = active, switching commands are taken over for next year after execution 	0...3	1
P36	10.25	25 October summer-/wintertime changeover	00.01...12.31	00.01
P37	3.25	25 March winter-/summertime changeover; if P36 = P37: no summer-/wintertime or winter-/summertime changeover	00.01...12.31	00.01

Number	☉	Description	Range	Step size
P38	66.3	Display of actual value of supply temperature, e.g. 66.3 °C for MOD1, 3 (see P06)	-1.0...140.5 °C	0.1 K
P39	69.7	Display of setpoint of supply temperature, e.g. 69.7 °C for MOD1, 3 (see P06)	-1.0...140.5 °C	0.1 K
P40	16.0	Display of damped outside temperature, e.g. -16.0 °C for MOD1 (see P06)	-49.9...49.9 °C	0.1 K
P41	33.4	Display of actual value of return temperature, e.g. 33.4 °C for MOD1, 3 (see P06, P12)	-1.0...140.5 °C	0.1 K
P60	0	Floor-drying function <ul style="list-style-type: none"> • 0 = not active • 1 = active • 9 (only read) = completed successfully 		

Additional technical data

Temporary temperature change	Change in automatic mode. Valid until next switching time, but for at least 2 hours. Termination of change possible.
Time-(un)limited temperature change	Change in automatic mode. Change of 3 hours to 19 days possible. The display shows the remaining time for the change. Termination of change possible.
Room-temperature measurement	Internal NTC and/or external Ni1000 sensor
Zero-point correction, influence of wall	Up to ±6 K possible
Outside temperature measurement	Range -50...50 °C. A jumper can be used to select between input signal Ni1000 and 0...10 V. Input impedance for 0...10 V: 100 kΩ
Input for remaining temperature sensors	Ni1000
Measuring accuracy	±0.2 K at 20 °C and a Triac current < 0.3 A
Setpoint range for room temperature	8...40 °C for room-temperature measurement via internal NTC sensor, 8...70 °C for room-temperature measurement via external Ni1000 sensor
Granularity of setpoint for room temperature	0.5 K
Time constant for processing of measured values	< 10 s for Ni1000 sensor; < 25 s for NTC sensor
Setting limit of the room-temperature setpoint	The SERvice level can be used to limit/extend minimum and maximum setpoints (TRsmin, TRsmax) for the room temperature. Factory setting 8...38 °C. 8...40 °C setting range limitation for room-temperature measurement via internal sensor, 8...70 °C setting range limitation for room-temperature measurement via external sensor
Keys locked	Locked and unlocked using defined key sequence; locking shown in display.
Valve outputs	Triac (with indication of switching status)
Pump output	Relay (with indication of switching status)
Switching frequency, mechanical	> 5 million switching cycles
Mode of operation	According to EN 60730: Type 1C
Hours-run meter	Counts when relay contacts closed; can be queried in SERvice mode but not deleted.
Pump follow-on time	During the transition from fixed-value control to supply-temperature control based on a switching programme, the pump follows on for the defined running time of the valve plus an additional 2 seconds.
Limitation of throughflow	When binary contact FLIM is closed, the valve is closed. The valve is opened again when TFi < TFs -5 °C. After the valve is opened, the binary contact is not considered for 3 times the running time of the valve.
Maximum valve opening	Opening time of valve = 1.5 × running time of the valve
Neutral zone with MOD 1 and 3	±1.5 K
Neutral zone with MOD 2	±0.20 K
Pump downtime	Time for which the pump is switched off after the room-temperature setpoint is reduced, if the room temperature is not measured. The time can be defined in SERvice mode. The factory setting is 120 min.
Cycle time	1/10 Ty

Error

ERR	If errors occur, they are indicated in the display with "ERR". In SERVICE mode, the device status can be queried. Errors are coded in the device status. For a detailed description, see operating instructions 7 000974.
U U U	The temperature sensor used to detect the variable shown in the display has an interruption
C C C	The temperature sensor used to detect the variable shown in the display has a short circuit
--- (line in the middle)	Parameter not required or measured value not yet calculated (line in the middle)
--- (line at the top)	The measured value from the sensor used to detect the variable shown in the display is too high (measured value is in range 2 - see table 3)
--- (line at the bottom)	The measured value from the sensor used to detect the variable shown in the display is too low (measured value is in range 2 - see table 3)

Depending on the range in which the recorded temperature measurements lie, action is carried out with regard to the valve and pump control. A distinction is made between the following ranges: The relevant measures are carried out.

Range 1

- Control mode, no additional measures with regard to pump and valve control

Range 2

- Control mode based on the last recorded value in range 1

Range 3

- Valve is closed taking 1.7 times the running time of the valve into account; pump is switched off after 1.7 times the running time of the valve.

Table 3 lists the individual ranges of the different types of sensor.

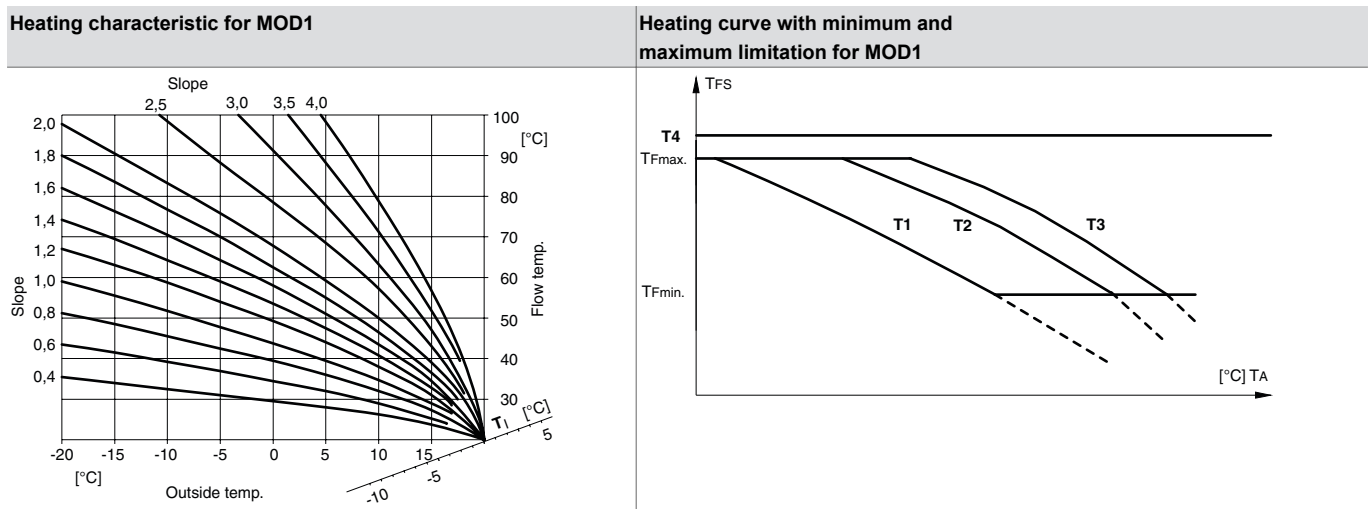
Table 3: Ranges of measured temperatures

Sensor (Ni1000)	Range 1	Range 2	Range 3
Supply temperature	-1.0...140.5 °C	-100.0...-1.0 °C; 140.5...200.0 °C	< -100.0 °C; > 200.0 °C
Outside temperature	-50.0...50.0 °C	-100.0...-50.0 °C; 50.0...200.0 °C	< -50.0°C; > 200.0 °C
External room temperature	-5.0...140.5 °C	-100.0...-5.0 °C; 140.5...200.0 °C	< -100.0 °C; > 200.0 °C
Internal room temperature	-5.0...45.0 °C	< -5.0 °C, > 45.0 °C	Not defined
Return temperature	-1.0...140.5 °C	-100.0...-1 °C; 140.5...200 °C	> 200.0 °C; (< -100.0 °C ≙ Flim)

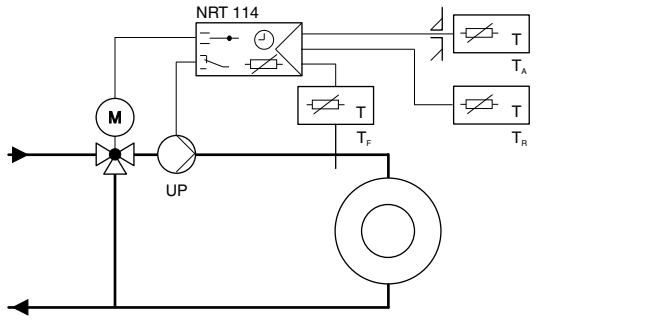
Disposal

When disposing of the product, observe the currently applicable local laws.

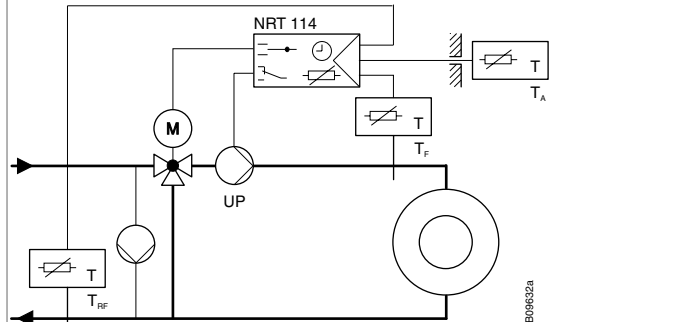
More information on materials can be found in the Declaration on materials and the environment for this product.



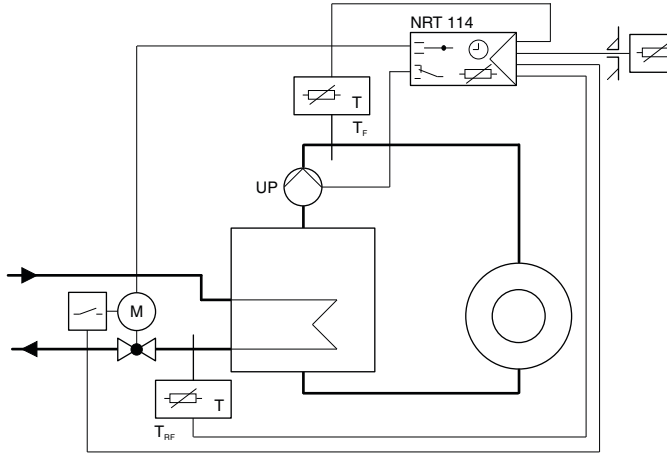
Example applications



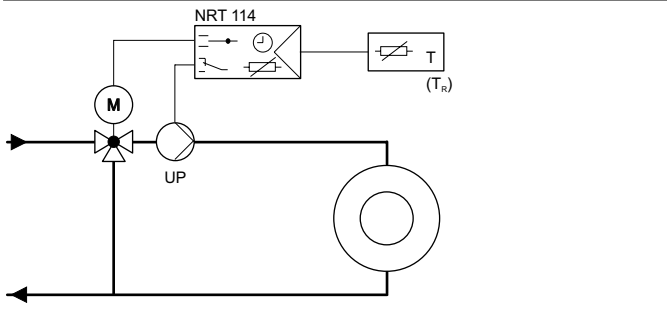
MOD1; weather-dependent supply-temperature control with internal/external room-temperature sensor



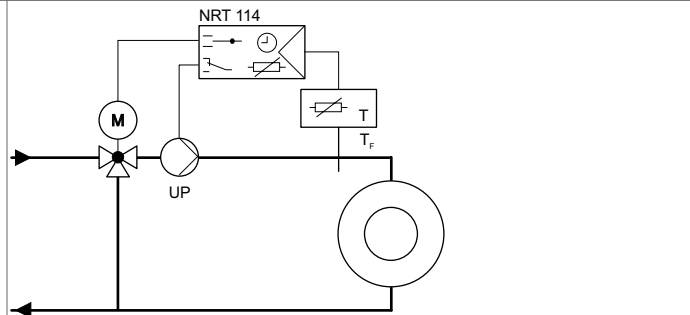
MOD1; weather-dependent supply-temperature control with limitation of the return temperature (min)



MOD1; weather-dependent supply-temperature control with limitation of the primary-return temperature (max)

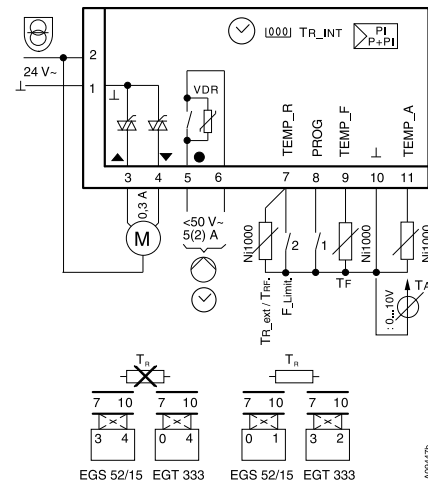
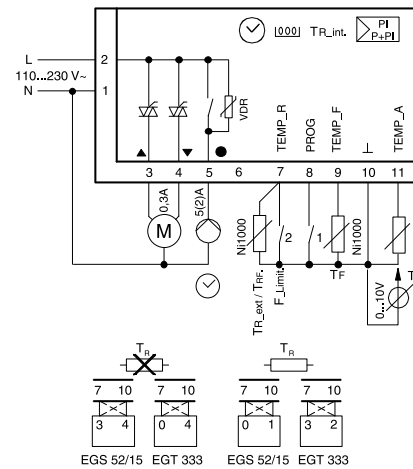


MOD2; room-temperature control with internal/external temperature sensor



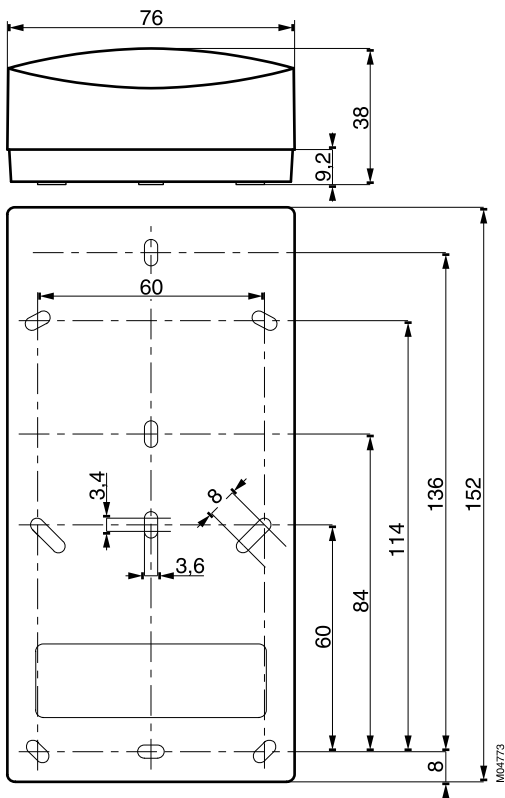
MOD3; room-temperature-dependent supply-temperature control

Connection diagram



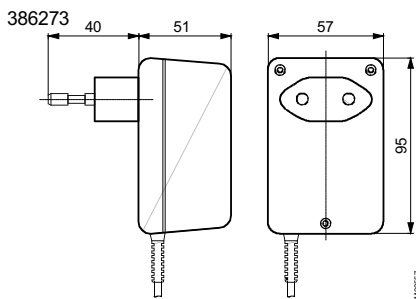
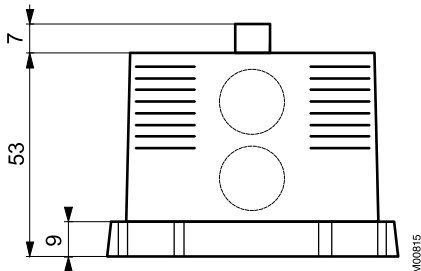
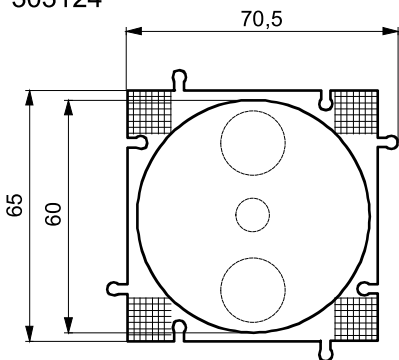
Note: The electronic ground is connected to pin 3,4

Dimension drawing



Accessories

303124



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