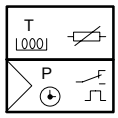
NRT 101: Electronic room-temperature controller with time program


T06121

For individual control of rooms, homes and zones with programmable times and temperatures. Suitable for residential and commercial premises. For activating (2-point or pulse-pause) an electric heating system, a burner, a pump or a thermal drive. Can also be used as a 2-point controller for cooling equipment.

Housing of flame-retardant, pure-white thermoplastic (RAL 9010). The front has a modern design comprising a simple keypad and liquid crystal display with figures and symbols (e.g. time, switching times, temperatures and current relative energy consumption). Time-switch with weekly and annual program. Automatic change-over between summer- and wintertime. Three programmable temperature levels: reduced/normal/comfort. Anti-frost or anti-overheat facility. Programmable input function. Relay output with potential-free contacts. Hours-run counter. Suitable for mounting on walls or in a recessed junction box. Electrical connection in baseplate with screw terminals for wire of up to 2,5 mm². Cable inlet at rear. Electronics unit in the snap-on housing.

Type	Control behaviour	Pilot timer	Voltage	Weight kg
NRT 101 F002	P, 2-pt.	no	2 × 1,5 V	0,25
NRT 101 F012	P, 2-pt.	no	110...230 V~	0,27
NRT 101 F111	P, 2-pt.	yes	110...230 V~	0,28



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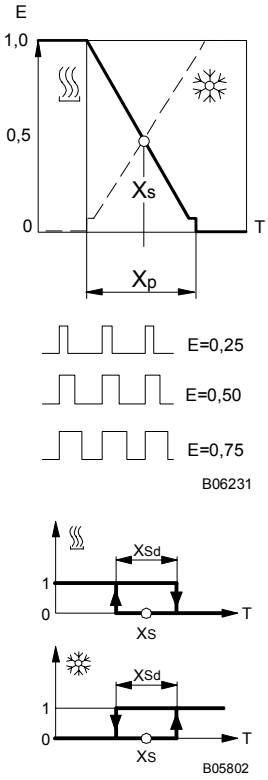
Time-switch:

1 weekly program	max. 42 switching commands	Accuracy	± 1 s/d at 20 °C
Min. switching interval	10 minutes	Back-up power supply	> 6 h (super cap, 20 °C after 10 hrs' charging)
1 calendar program	max. 6 switching commands		
Min. switching interval	1d	When batteries are being changed	> 5 min
		Parameters	non-volatile

Power supply F002	Two 1.5 V LR6 batteries [1]	Perm. ambient temp.	0...50 °C
F012, F111	± 15%, 50...60 Hz	Perm. ambient humidity	5...80 %rh non-condensing
Power consumption	< 1 VA		
Setting range °C	8...38	Degree of protection	IP 30 (EN 60529)
Switching rating	5(2) A, 24...250V~	Protection class	II (IEC 60730)
F111	5(2) A, not pot.-free		
Switch rating of timer F111	5(2) A, 24...250V~	Conformity	EN 12098 and CE
when low voltage	0,2 A, < 60 V	EMC immunity	EN 61000-6-1, 2
As 2-point controller	switching diff. X_{Sd} = 0,4...8 K	EMC irradiation	EN 61000-6-3, 4
With P-behaviour	switching period 4...30 min	Safety	EN 60730-1
P-band X_p	1...20 K, min. pulse 30 s	Quality	ISO 9001
Control factor E	shown in 10 levels		
Direction of operation	heating or cooling	Wiring diagram	
Temperature levels	reduced/normal/comfort	F002	A05259
Frost-protection temp.	8 °C (when heating is off)	F012	A05260
Overheating protection	38 °C (when cooling is off)	F111	A08464
Time constant	22 min	Dimension drawing	M04773
Dead time	2 min	Fitting instructions	
		F002	MV 505409
		F012	MV 505412
		F111	MV 505644
		Operating instructions [2]	
		F002	BA 505601
		F012, F111	BA 505602



Accessories

-**AXT . . .** Thermal valve drive; see Section 55

-**EGT . . .** External temperature sensor Ni1000 (for F012 and F111); see Section 36

0303124 000* Recessed junction box

*) Dimension drawing or wiring diagram are available under the same number

1) Two alkali-manganese batteries: type LR6, AA, AM3 or Mignon (not included)

2) Supplied with each controller; in 5 languages (Ger., Fre., Eng., Ital., Span)

Operation

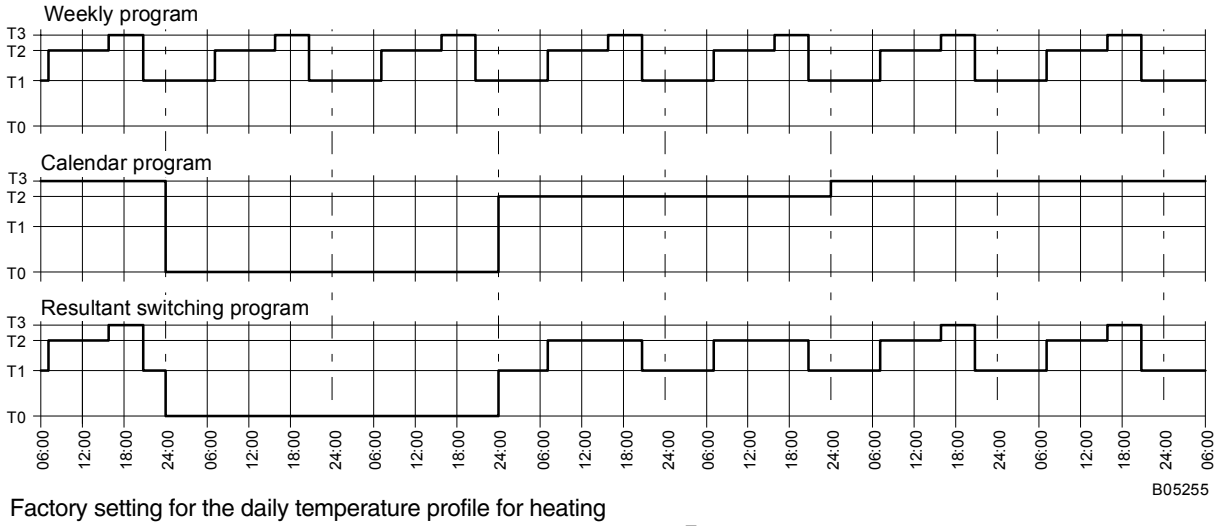
The room temperature is measured by a precision temperature sensor and compared to the current setpoint. Depending on the control offset and control characteristic, the relay contacts are switched, thereby heating the room up or cooling it down in order to keep the desired room temperature constant. The optimum of comfort with the minimum of energy consumption is achieved by selecting your own individual temperature profile for each day in the weekly switching program. Should you require other temperature settings, use the temporary, the time-limited and the unlimited modes to obtain the absence or party functions. Longer periods of non-occupation (such as holidays etc.) can be entered in the calendar program in advance.

The plant's operating status is shown on the LCD by means of pictograms and the numeric field. To enter one's own individual temperature profile, use the programming mode; to match the controller to the plant, use the service mode. It is possible to parameterise control behaviour, pump anti-jamming function, setpoint limitation etc.

Engineering and fitting notes

Because of the clock, the frost-protection function and the pump's anti-jamming function, the mains version should be permanently connected to the power supply.

The controller should be fitted at approx. 1,5 metres height and away from direct insolation, draughts and sources of heat or cold.



Factory setting for the daily temperature profile for heating

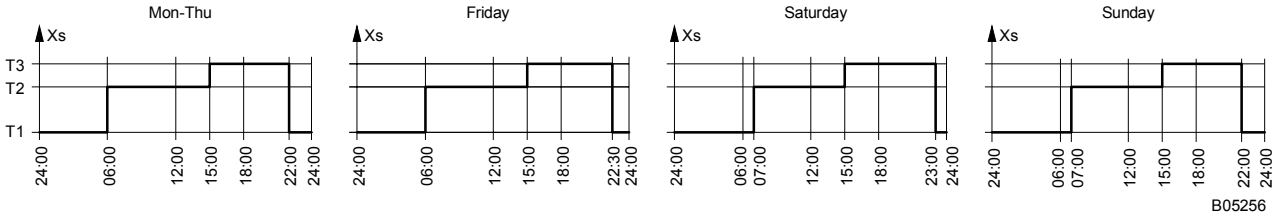
F002, F012, F111

T0 Off (possibly frost protection or overheating protection)
T1 Temperature level 1 (reduced); factory setting 17 °C
T2 Temperature level 2 (normal); factory setting 20 °C
T3 Temperature level 3 (comfort); factory setting 21 °C

T0 ≤ Tmin ≤ T1 ≤ T2 ≤ T3 ≤ Tmax ≤ T0

F111

T0 or T1 = Pilot-timer relay ON (contacts closed)
T2 or T3 = Pilot-timer relay OFF (contacts open)
The pilot-timer function is not recommended for cooling!



Correspondance on cooling mode:

T0 Overheating protection
T1 Temperature 1 (comfort, high cooling request)
T2 Temperature 2 (normal)
T3 Temperature 3 (reduced coding request)

Additional technical data

Time-switch:	
Calendar program	has higher priority than the weekly switching program; not programmed (inactive)
Summer-/wintertime change-over	automatically via calendar; function can be disabled via SERV; factory setting 'enabled'
Time-limited temperature change	from 2 hours to 5 days; remaining time is shown
Temporary temperature changes	valid till next switching time
Temperature measured by	NTC sensor (intern)
Input for ext. temperature sensor	Ni1000 (F012 and F11 only); selectable internally/externally
Zero-point correction, e.g. wall effect	± 6 K
Meas. range: heating, cooling	8...38 °C
Graduation for setpoint entry	0,5 K
Graduation for display of actual value	0,1 K
Error	0,3 K at 20 °C
Setting limitation: setpoint	minimum and maximum setting values (Tmin, Tmax) can be restricted via SERV; factory setting not restricted

Universal contact-input PROG	for external, potential-free, gold-plated contacts. Up to 20 controllers can be activated in parallel from one set of contacts if the diameter of the (copper) cable is ≥ 0,5 mm² and the distance from the contacts to the controller is ≤ 100 m. Suitable for one of the following functions:-
Absence	energy-saving mode with 'reduced' temperature level
Presence	normal temperature/comfort
Window contacts	'reduced' temperature level
Remote operation	stand-by: automatic mode
Fault (e.g. burner malfunction)	indicated by symbol
Keys disabled (key-operated switch)	indicated by symbol
Anti-jamming function for pump/valve	After one week, the relay output is activated for 0....15 minutes on Wednesday at 10 hrs.
Frost & overheating protection	can be de-activated via SERV
Childproof function	enabled/disabled by special key sequence; indicated by symbol
Mains version	4-wire connection
Battery version	2-wire connection
Life expectancy of batteries	> 2 years (alkali-manganese) when SERV parameters are at factory setting
Warning of flat battery	optically, approx. 3 months before probable expiry
SERV parameters	EEPROM non-captive

Relay output (with indication of switching condition):

Method of operation as per EN 60730:	type 1C,
Hours-run counter	when contacts closed; 0...9990 h can be called up via SERV; not erasable
Mechanical switching operations	> 5 million
Switching condition of relay in the event of a power failure	F002: any F012: off (4...5 = open) F111: off (1...3 = open)

SERV parameters, factory setting (range):

P01:000	Language	0 = German	1 = French	2 = English	
		3 = Italian	4 = Spanish	5 = Czech	6 = 1...7
P02:000	Type of sensor:	0 = NTC (intern) 1 = Ni1000 (extern)			
P03:000	Effect of wall	NTC (–60...+60 = ± 6 K)			
P04:000	Effect of wall	Ni1000 (–60...+60 = ± 6 K)			
P05:000	Control behaviour	0 = quasi-continuous (P), 1 = 2-point (2pt)			
P06:006	0.6 K switching difference	2-pt. controller (004...080)			
P07:020	2 K P-band	P-controller (10...200)			
P08:018	18 min. period	P-controller (4...30)			
P09:000	Heating	(0 = heating, 1 = cooling)			
P10:000	Contact-input function PROG: see table below				
P11:000	Frost & overheat'g protection	(0 = active ♨: 8 °C / ❄: 38 °C, 1 = inactive)			
P12:001	Calendar program	(0 = active, 1= inactive)			
P13:010	Su-Wi time-change, October*)	(001...012)			
P14:003	Wi-Su time-change March*) (if P13 = P14, there is no Su-Wi time-change)	(001...012)			
P15:000	Anti-jamming function for pump/valve (0 = inactive, 1...15 = active minutes)				
P16:008	Minimum limitation of setting range for temperature setpoint; Tmin (008...036)				
P17:035	Maximum limitation of setting range for temperature setpoint; Tmax (010...038)				
P18:000	Hours-run counter; works when relay contacts are closed; unit = 10 hrs; not erasable				
P19:10×	Software version				

*) On the last Sunday of the month at 02:00 or, respectively, 03:00 hrs.

Universal input functions

P10:	Function of universal input	1)	♨ ⟋ ❄	Possible operating mode when contacts are closed						Activated by:	Display when contacts closed
						Temporary	TIME	TEMP	PROG		
000	Absence	⌄	T1 T3		✓	✓	✓	✓	✓	Absence detector	
001	Presence	⌄	⌄T2, T3 ⌄T1, T2	(✓)	✓	✓	✓	✓	✓	Occupancy detector	
002	Window contacts	⌄	T1 T3		✓	✓	✓	✓	✓	Window contacts	
003	Remote operation	⌄	(T0) (T0)		✓	✓	✓	✓	✓	Telephone	
004	Fault indication	⌄	⌄	✓	✓	✓	✓	✓	✓	Fault contacts	
005	Keys disabled	⌄	⌄	✓	2) (✓)	2) (✓)				Switch	
				⌄	✋						

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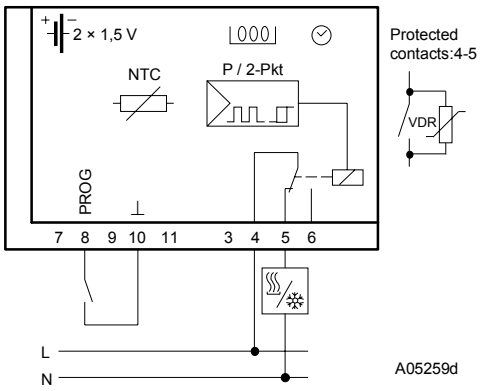
1) Has no effect on the current operating mode

2) If this operating mode was active before the contacts closed; normally, however, of limited duration only.

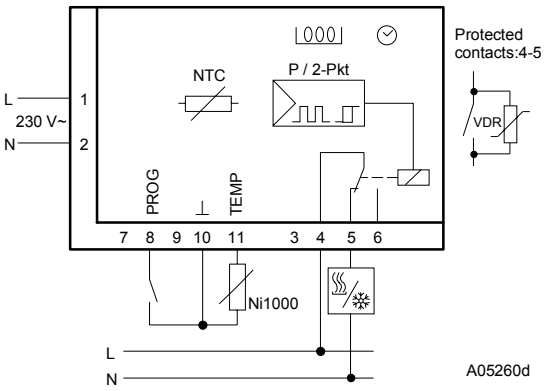
Storage and transport temp. –25...+65 °C

Dimension drawing

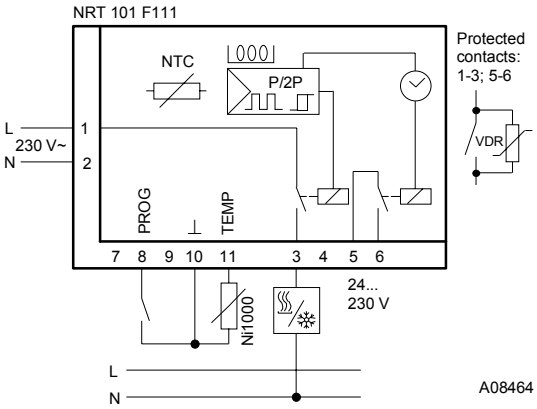
NRT 101 F002



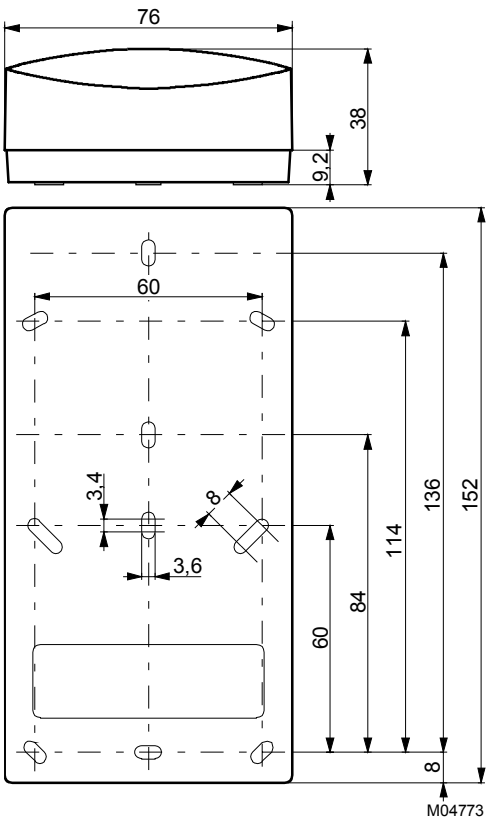
NRT 101 F012



NRT 101 F111



Wiring diagrams



Accessories

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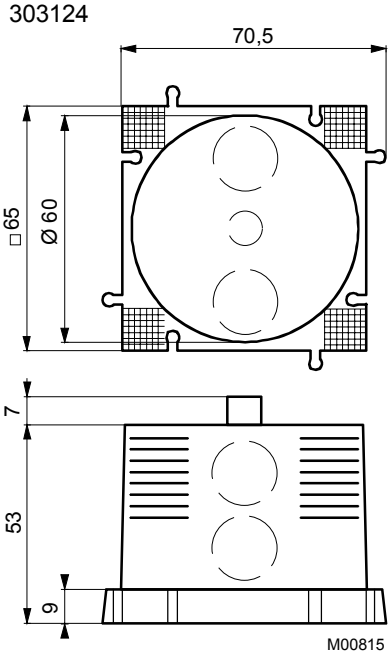
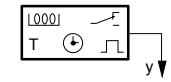


Examples of application

NRT 101 F002, F012



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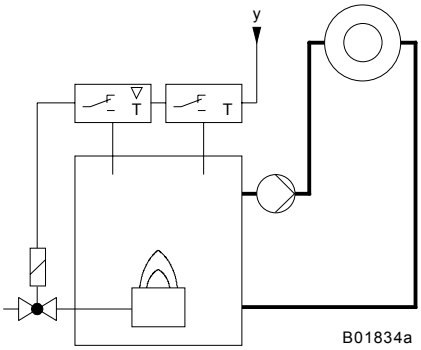

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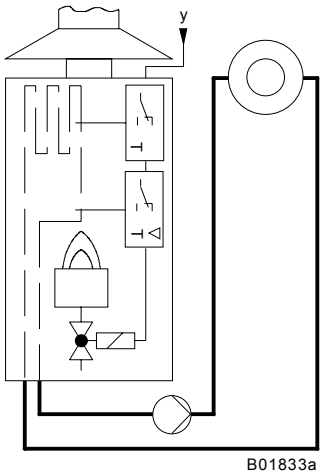
Gas-fired boiler with atmospheric burner



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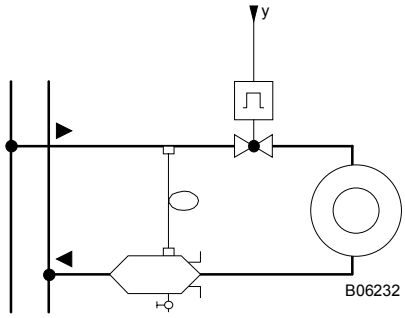
Flow heater



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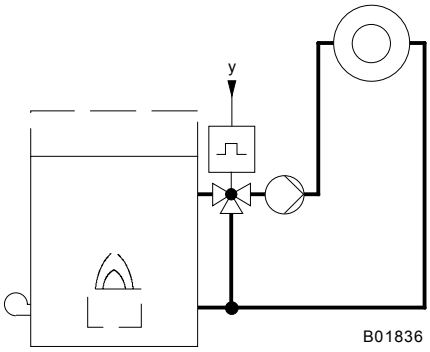
Heating or district heating with limitation of flow and differential pressure



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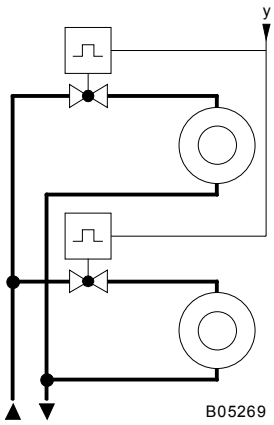
Control valve with thermal valve drive



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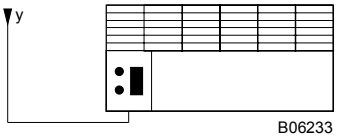
Radiator valve with thermal drive



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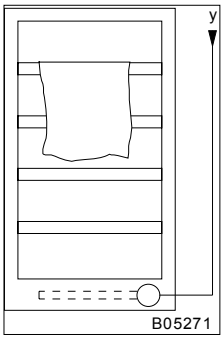
Room cooling with chiller



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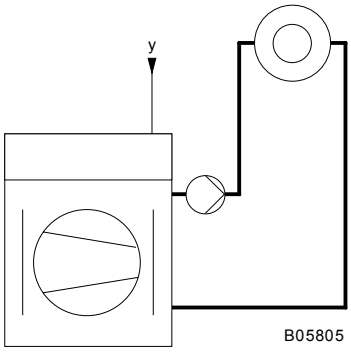
Electric heating in bathroom



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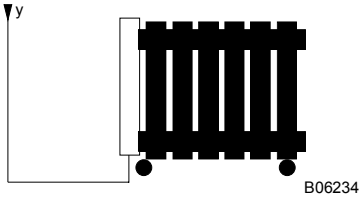
Heating pump



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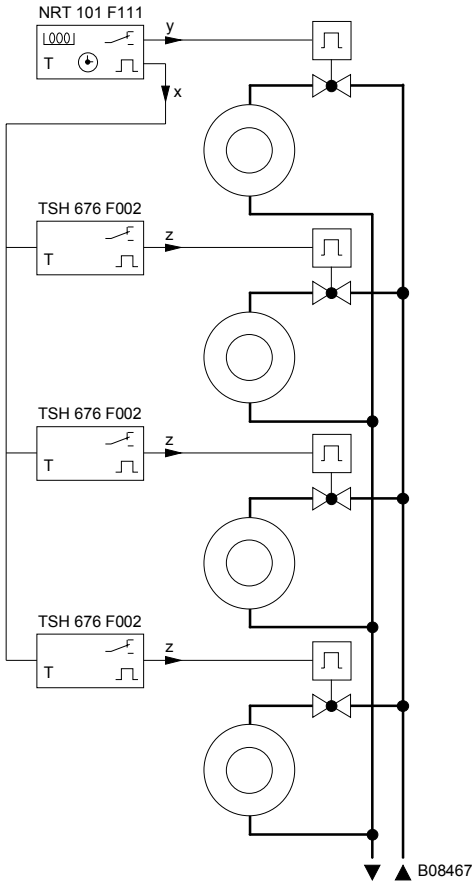
Electric resistor heating



Individual-room control with radiator valves and thermal drives

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