NRT 101: Electronic room-temperature controller with time programme, equiflex

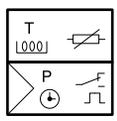
NRT101F***

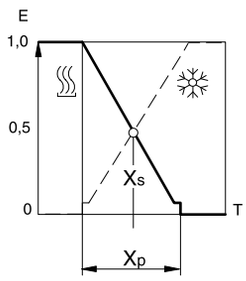
How energy efficiency is improved

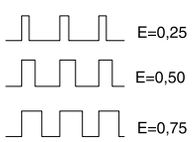
ECO Meter for displaying the current energy consumption and integrated timer for the individual programming of the presence and absence times

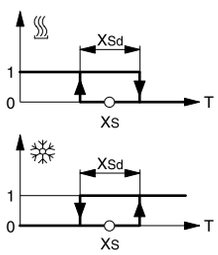
Features

- Individual single room, apartment and zone control for activating a thermal actuator, an electric heating system, a cooling unit, or for enabling a burner
- Measurement of room temperature by either integrated or external temperature sensor
- Large LCD and simple operation using keys make it easy to program the times and the temperatures
- Weekly and calendar switching programmes with 3 temperature levels
- Automatic summertime/wintertime changeover
- Model with pilot clock output
- Hours-run meter
- Electronics in attachable housing









Technical data

Power supply		
	Power supply	2 × 1.5 V/110...230 V~
	Power consumption	< 1 VA
Parameters		
	Operating modes	Reduced/normal/comfort
	Direction of operation	Heating/cooling (settable on service level)
	Setting range	8...38 °C
	Control characteristics	2-point, pulse-pause / P
	On/off controllers	Switching difference X_{sd} = 0.4...8 K
	Control factor	Indicated in ten levels
	Frost-protection temperature	8 °C (when heating OFF)
	Thermal overload temperature	38 °C (when cooling OFF)
P-controller	Proportional action	Switching period 4...30 min
	Proportional band	1...20 K
	Min. pulse	30 s
Temperature sensor, internal	Time constant	22 min
	Dead time	2 min
Ambient conditions		
	Admissible ambient temperature	0...50 °C
	Admissible ambient humidity	5...80% rh, no condensation
Function		
Timer	Accuracy	±1 s/d at 20 °C
	Back-up power supply	> 6 h (super cap, 20 °C, after 10 h of charging)
	Back-up power supply when battery changed	> 5 min
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		
	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 mm²

Standards and directives		
	Type of protection	IP 30 (EN 60529)
	Protection class	II (IEC 60730)
	Software class A	EN 60730
CE conformity according to	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	Power supply	Load (heating/cooling)	Load on pilot timer	Weight
NRT101F002	2 batteries: LR6 1.5 V	5 (2) A, 24...250 V~	–	0.25 kg
NRT101F012	110...230 V~, ±15%, 50...60 Hz	5 (2) A, 24...250 V~	–	0.27 kg
NRT101F111	100...230 V~, ±15%, 50...60 Hz	5(2) A not potential-free	5 (2) A, 24...250 V~; with extra-low voltage 0.2 A, < 60 V	0.28 kg

NRT101F002: Two alkaline manganese batteries, type LR6, AA, AM3 or Mignon (not included)

Accessories

Type	Description
AXT2**	Thermal valve actuators (see product data sheet)
EGT***	External temperature sensor Ni1000 (see product data sheet)
0303124000	Recessed junction box

*EGT***: does not apply to NRT101F002*

Description of operation

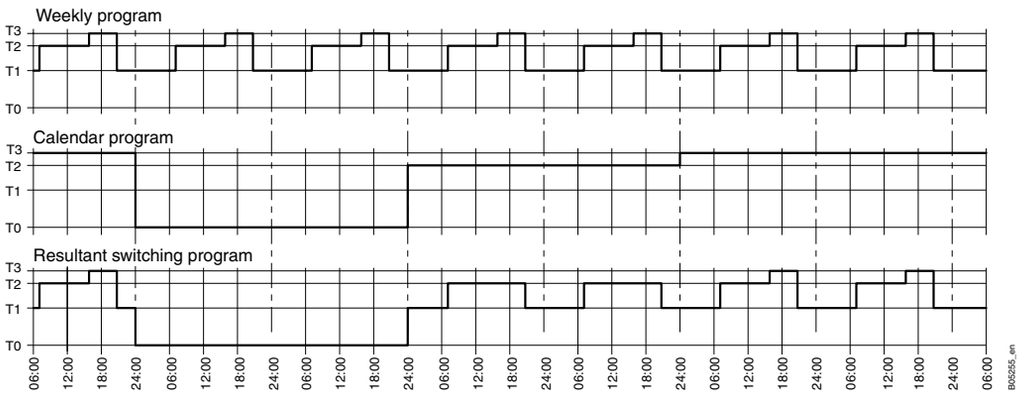
The room temperature is measured by a precision temperature sensor and compared with the current setpoint. Depending on the control offset and the control characteristic, the relay contact is regulated, thus increasing or decreasing the heating/cooling in the room and keeping the required room temperature constant. Using the weekly programme to select an individual temperature profile for each day ensures the optimal comfort level with minimal 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. The programming mode is used to enter an individual temperature profile for the switching programme that differs from the factory setting; the service mode is used to adjust the device to the system, etc. The control behaviour, anti-jamming function, setpoint limiting, etc., can be parameterised.

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.

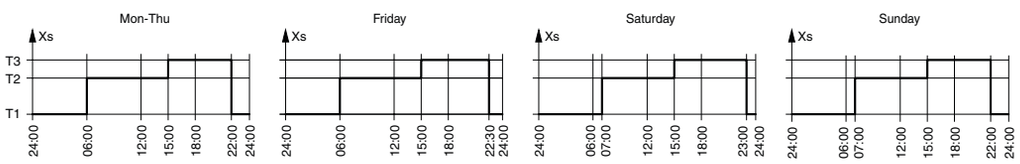
Engineering and fitting notes

The mains power version must be supplied with power all year round due to the clock and the frost-protection and anti-jamming functions!
The unit should be fitted approx. 1.5 m above the floor, and protected from direct sunlight, draughts and sources of heat and cold.



Factory setting of the daily temperature profiles for heating

F002, F012, F111	F111
T0: Off (possible frost-protection or anti-overheating functions)	T0 or T1 = pilot timer relay ON (contact closed)
T1: Temperature level 1 (reduced) factory setting 17 °C	T2 or T3 = pilot timer relay OFF (contact open)
T2: Temperature level 2 (normal) factory setting 20 °C	The pilot timer function is not recommended for the cooling mode!
T3: Temperature level 3 (comfort) factory setting 21 °C	
T0 ♨ ≤ Tmin ≤ T1 ≤ T2 ≤ T3 ≤ Tmax ≤ T0 ❄	



In cooling mode:

T0: Anti-overheating function

T1: Temperature level 1 (comfort, high cooling energy requirement)

T2: Temperature level 2 (normal)

T3: Temperature level 3 (reduced energy requirement)

Additional technical data

Timer

Calendar switching programme has a higher priority than the weekly switching programme - not programmed (inactive)

Summer-/wintertime changeover automatically with calendar programme, function can be blocked via SERV, factory setting “enabled”

Time-limited temperature change 2 hours to 5 days, with the remaining time displayed

Temporary temperature changes until the next switching time

Temperature measurement: NTC sensor (internal)

Input for ext. temperature sensor Ni1000 (only F012 and F111); optionally internal/external

Zero-point correction, e.g. influence of wall ±6 K

Measuring range for heating/cooling 8...38 °C

Granularity for setpoints 0.5 K

Granularity for display of actual value 0.1 K

Measuring accuracy 0.3 K at 20 °C

Setting limit for setpoint via SERV, limitable minimum and maximum setting values (Tmin, Tmax), factory setting not limited

Universal contacts input PROG		For external potential-free gold-plated contacts. Multiple controllers can be connected in parallel to one contact, but connecting more than 20 is not recommended. Cross-section of cable ≥ 0.5 mm^2 Cu and distance for contact controller ≤ 100 m.
Suitable for one of the following functions:		
	Absence	Energy-saving operation with “reduced” temperature level
	Presence	Normal temperature/comfort

	Window contact	“Reduced” temperature level
	Remote control	Stand-by/automatic mode
	Malfunction (e.g. burner malfunction)	Display with symbol
	Keyboard locking (key switch)	Display with symbol

Anti-jamming function for pump and valve	After one week, on the following Wednesday at 10 a.m., the relay output is activated for 0...15 minutes. (Adjustable).
Frost-protection facility, anti-overheating function	Can be deactivated via SERV
Child protection	Locked and unlocked using key sequence; display with symbol
Mains power version	4-wire connection
Battery version	2-wire connection
Serviceable life of batteries	> 2 years (alkali-manganese) with factory settings of SERV parameters
Warning for end of battery life	Visual, approx. 3 months before the switching function is no longer guaranteed
SERV parameters	Non-volatile EEPROM

Relay output (with indication of switching status):		
Mode of operation in accordance with EN 60730	Type 1C	
Hours-run meter	When contact closed; can be queried via SERV 0...9990 h; non-deletable	
Switching frequency, mechanical	> 5 million.	
Switching status of relay in the event of a power failure	F002: any F012: OFF (4...5 = open) F111: OFF (1...3 = open)	
SERV parameter factory settings (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 (internal) 1 = Ni1000 (external)
P03:000	Influence of wall	NTC (-60...+60 = ± 6 K)
P04:000	Influence of wall	Ni1000 (-60...+60 = ± 6 K)
P05:000	Control characteristics	0= quasi-continuously (P), 1 = 2-point (2pt)
P06:006	0.6 K switching difference	2-point controller (004...080)
P07:020	2 K proportional 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-protection/anti-overheating functions	(0 = active ⟅⟅:. 8 °C / ❄ : 38 °C, 1 = inactive)
P12:001	Calendar switching programme	(0 = active, 1= inactive)
P13:010	Su/Wi-time switching, month of October [1] (001...012)	
P14:003	Wi/Su-time switching, month of March [2] (001...012) if P13 = P14 no Su/Wi-time switching	
P15:000	Anti-jamming function for valve and pump (0 = inactive, 1...15 = active minutes)	
P16:008	Minimum limitation setting range for temperature setpoint Tmin (008...036)	
P17:035	Maximum limitation setting range for temperature setpoint Tmax (010...038)	
P18:000	Hours-run meter for closed relay contacts in units of 10 hours. Non-deletable	
P19:10×	Software version	

[1] *On the last Sunday of the month at 2.00 a.m. and 3.00 a.m. respectively*

[2] *On the last Sunday of the month at 2.00 a.m. and 3.00 a.m. respectively*

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 7000986.
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)

Universal input functions:

P10:	Function of universal input	1)	T1	T3	Possible operating mode when contacts are closed						Activated by:	Display when contacts closed
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	
					⌄	☜	Temporary	TIME	TEMP	PROG		

Key to graphic:

1) No effect on the current operating mode

2) If this operating mode was active before the contact was closed, but normally only for a limited period.

Storage and transport temp. -25...65 °C

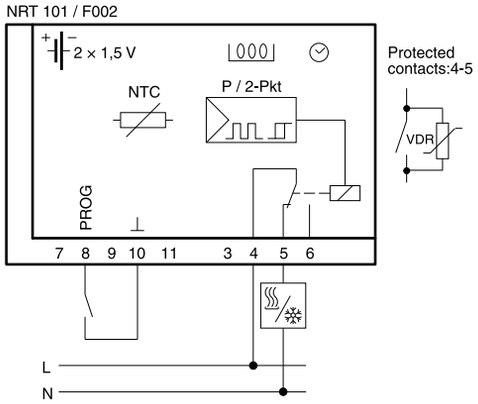
Disposal

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

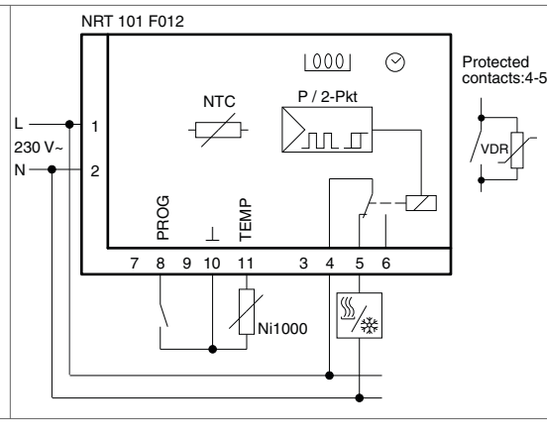
More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagram

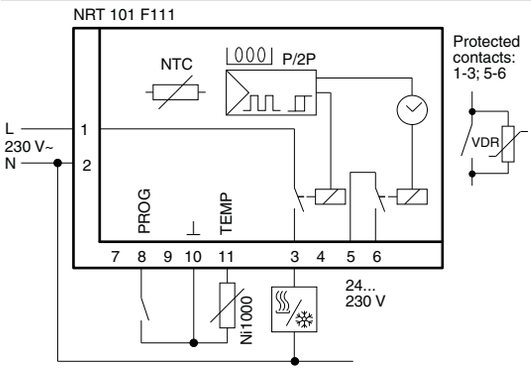
NRT 101 / F002



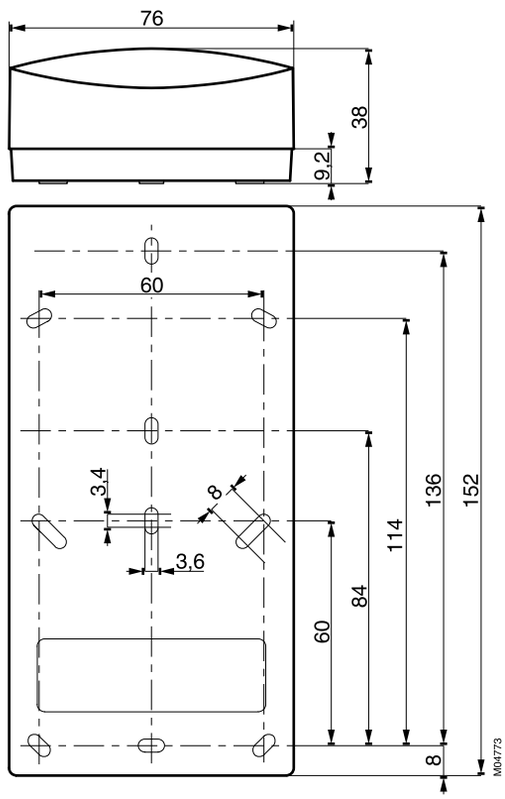
NRT 101 F012



NRT 101 F111



Dimension drawing



Accessories

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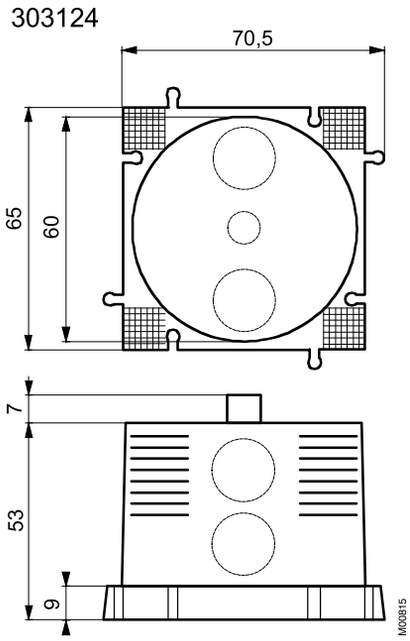
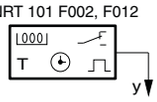
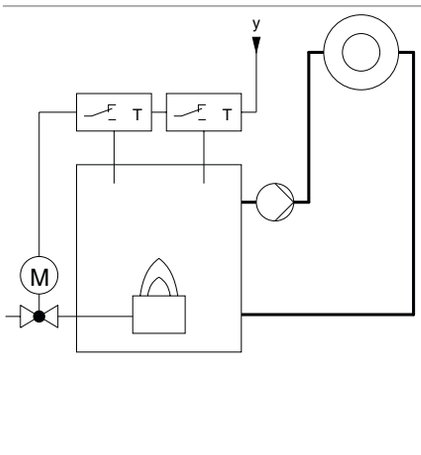


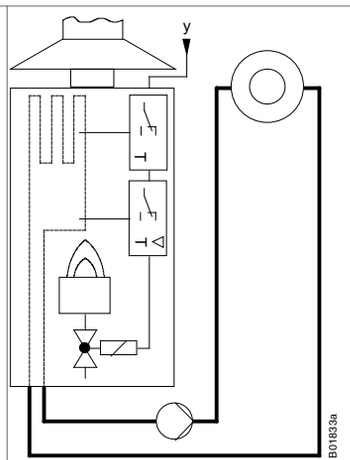
Example applications

NRT 101 F002, F012

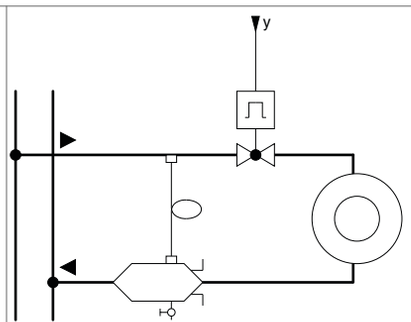




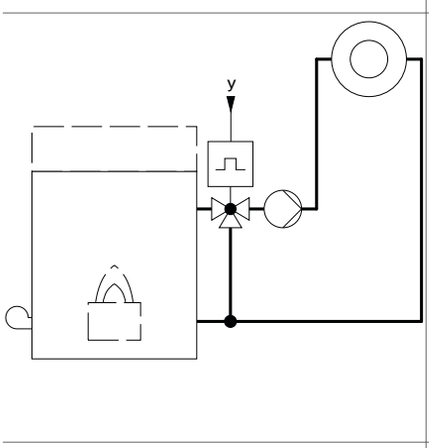
Gas-fired boiler with atmospheric burner



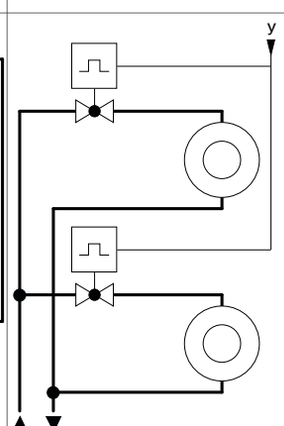
Wall gas heater



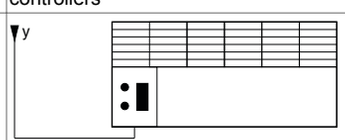
Heating or district heating with flow rate and differential pressure controllers



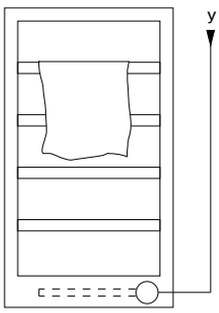
Room cooling with chiller



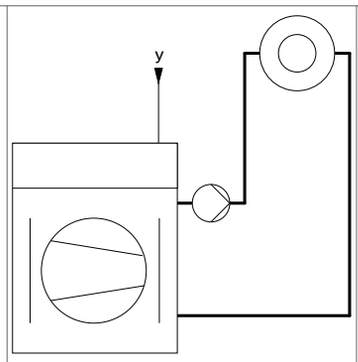
Room cooling with chiller



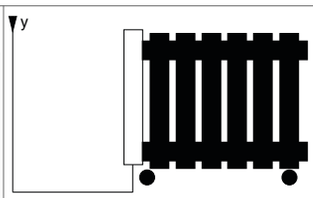
Room cooling with chiller



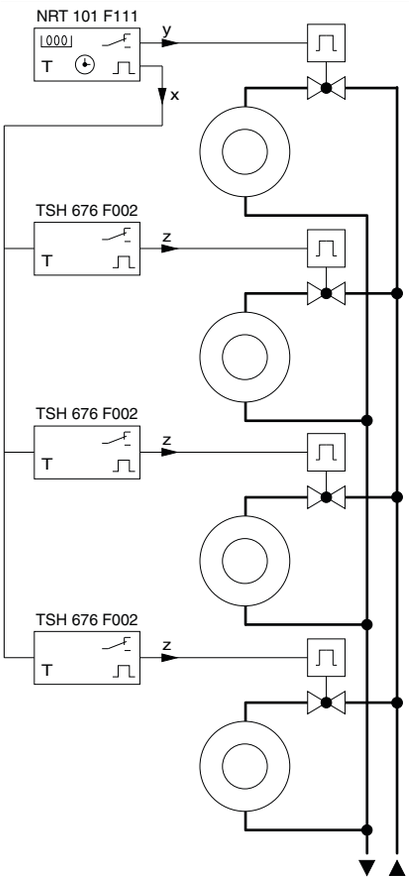
Electric heating in bathroom



Heat pump



Electric resistance heating



Single-room control with radiator valves with thermal actuators

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