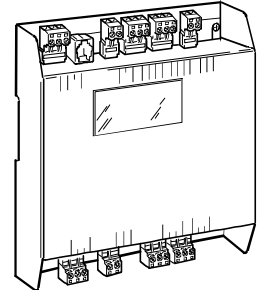DESIGO 30

Heating controller   RCH1

for one heating zone, with time switch

Pre-programmed digital P (PI)-heating controller
- **For control of one heating zone in accordance with heating curve**
- **For Ni1000 / T1 temperature sensors**
- **Communicates via LON® bus and BACnet™ protocol**
- **Operating voltage AC 24 V**
- **One proportional output, for DC 0...10 V / DC 2...10 V / DC 4...8 V as required**
- **Three on/off outputs, AC 230 V / 5(2) A**

Use

Communicating, pre-programmed digital heating controller for the control of one weather-compensated outside-temperature dependent heating zone with a boiler enable signal The RCH1 is defined with P (PI) control parameters.

In networked systems the controller can be operated remotely by operator terminal from a central location via the operator terminals.

The proportional output can be used for direct control of magnetic valves or for indirect control of motorised or thermic valves.

The three on/off relay outputs may be used for direct on/off control of the heat pump, boiler enable signal etc.

Functions

Signal inputs

The controller is suitable for the connection of passive Ni1000 / T1 sensors, passive setpoint adjusters (e.g. BSG-... or BSGN-...) and digital contacts.

The inputs are as follows:
Outside temperature TO**, Flow temperature TF *
Room temperature sensor TRO *, Return temperature sensor TRT *, External setpoint transmitter W *

* The sensor inputs are suitable for multiple use, i.e. one sensor may be wired to several inputs or controllers, or

** the signal can be transmitted via the bus.

Signal outputs

The controller has one proportional sequence Y, and three relay outputs:
PU (heating pump), BE (boiler enable signal), YCL (time-switch output)

Heating zone control

The flow temperature of the heating zone or variable temperature circuit is controlled on the basis of the outside temperature and the pre-defined heating curve. Other influences are the type of building, the measured room temperature and room setpoint, and the time programme.

Heating zone   Variable temp. circuit
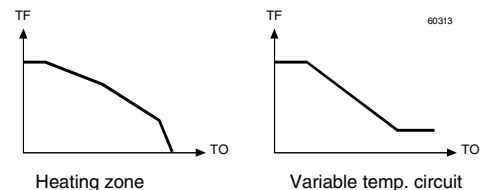
The controller can be operated with or without a room sensor. The influence of the room sensor on the flow temperature can be adjusted.

Low return water temperature protection

Requires a sensor installed in the return. If the temperature falls below the pre-set value, the valves are modulated closed, to prevent oxidation in the boiler ("back-end protection").

Optimum Start Control	The optimum start time is determined on the basis of the outside temperature and the room temperature. OSC can also operate without a room sensor, however, in which case the start-time is calculated on the basis of the outside temperature, type of building and time taken for the building to cool down. A higher setpoint can be selected for the boost period.

TRO
60285
06:00
t

Boiler enable signal	The RCH1 controller transmits a signal via relay to enable the boiler when required.
7-day / date programme	In the 7-day programme, up to 28 switch times can be distributed as required over the seven days. The date programme allows six time periods to be defined (twelve switch times) during which the plant will be switched off.

Day
Stand-by
Night
60315

With the programme override function, the plant status (Night / Stand-by / Day) can be overridden at any time from the operator terminals via the bus.
The daylight savings time changes automatically on the date programmed.

Disabling the controller	The controller can be disabled externally by short-circuiting input W.
Time switch output	This relay output determines the status of the controller. The output is active when: – the heating zone is operating in Day or Stand-by mode – the VETO function is active
Remote control of plant	Functions available with the BCE remote operator terminal: – Outside temperature display – Room setpoint display and adjustment – Plant mode control (Auto, Day, Night, VETO) – LED indication of plant status and common alarms

VETO function: The Day operating mode can be extended by a pre-defined period of time by pressing a key on the BCE or BCM operator terminal. A pulse transmitted to input TRO has the same effect.

Functions available with the BCM and BCO operator terminals: The required functions can be selected and collated with the APED 30 service software.

Defining the room temperature setpoint

The room temperature setpoint can be set in a variety of ways:
– BCS service terminal	Absolute value (w) via bus
– BCO or BCM remote op. terminals	Absolute value (w) via bus
– BCE remote operator terminal	Reset value in relation to w, via bus
– BSG...-TC setpoint potentiometer	Absolute value (w) via input w
– BSG...-U1 setpoint adjuster or PBA or QAA27 room unit	Reset value in relation to w, via input w

Summer /winter mode change-over	The system switches automatically to Winter mode when the average outside temperature is below the predefined relative heating limit. The system switches automatically to Summer mode when the average outside temperature is above the predefined relative heating limit. The change-over occurs either immediately or after a three-day delay. Frost protection is active even in summer, and the pump is operated each day for approximately one minute at 1500 hours, and the valve is opened and closed.
Frost protection	The heating switches on when the outside temperature drops to below 5 °C.
Sensor monitoring and alarm	All connected sensors are continuously monitored for short circuits and open circuits. If a fault is detected, an alarm is transmitted over the network and displayed on the operator terminal.
Communication	Via LON® bus and BACnet™ protocol. This provides access to all parameters, and peer-to-peer communication of outside temperature, plant status and energy demand.

Ordering

When ordering, please specify the quantity, product name and type code.

Example: **2 Heating controllers   RCH1**

Field devices	Ni1000 / T1 temperature sensors can be connected. Other compatible devices are the BSG...-T... and BSGN-… setpoint adjusters, the BSG...-U1 setpoint reset unit and the PBA and QAA27 room units.

Input side

Output side

The proportional output can be used to drive magnetic valves directly and other valves and actuators indirectly.
The heating pump, boiler enable signal or other equipment with the appropriate power rating can be connected to the three on/off outputs.

Mechanical design

Metal housing incorporating all electronic components and plug-in screw terminals.
To reduce the possibility of incorrect wiring, the field device terminals are separated from other terminals (inputs at the top and outputs at the bottom) and distinguished by colour.

LEDs and operator controls

- The LEDs (Power / Service / Battery, YV, PU, BE) can be seen without opening the controller.
- The DIL switches used for Ni1000 / T1 selection and to programme the input signals and bus termination are under a transparent cover.
- All other settings require the use of the BCS service terminal or a PC with APED 30 service software.

Operator and service terminals

BCE	Control panel or surface-mounted unit for operation of one system via the LON bus.
BCO	Control panel unit for operation of several systems via the LON bus.
BCM	Hand-held terminal for operation of several systems via the LON bus.
BCW	Microsoft® Windows compatible PC software for operation of several systems via the LON bus.
BCS	Service terminal
APED 30	PC service software

Mounting / Commissioning

The following mounting instructions must be observed:
– The controller connection terminals must be freely accessible.
– Ensure adequate air circulation to dissipate the heat generated during operation.
– Local installation regulations must be observed.

⚠ **Caution**   **Always disconnect the power supply before mounting or removing controllers.**
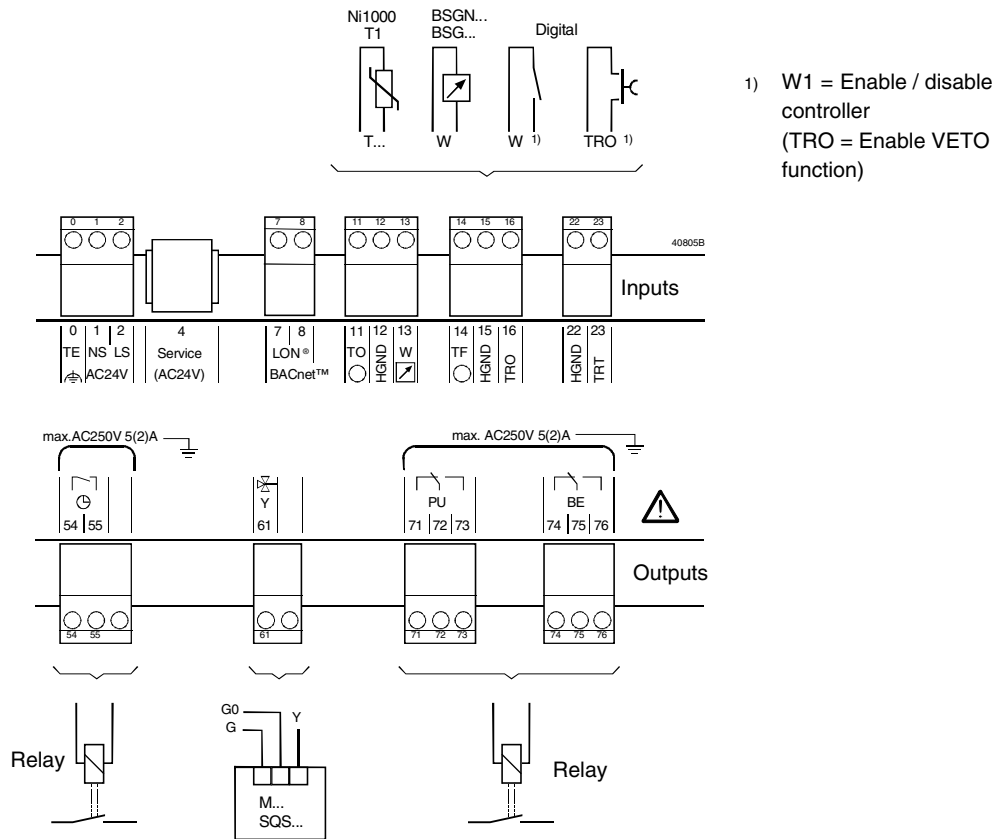
Full instructions for mounting and commissioning will be found in the technical manual, R21. In addition to detailed information on parameter-setting, this manual also includes the relevant check-list.

Technical data

Power supply

Supply voltage	Low voltage (SELV)
Nominal voltage	AC 24 V, 50/60 Hz
– Admissible voltage tolerance	+15/–10 %
Power consumption	4 VA (excluding output peripheral devices)

Signal inputs

TO, TF, TRO, TRT	Set with DIL switch: Ni1000 or T1 sensor
W	Set with DIL switch: Ni1000 or T1 setpoint adjuster
– Use as control input	Short-circuit to disable controller (volt-free contact)

Signal outputs

Proportional output Y	Defined in software
– Universal	DC 0 ...10 V ⎤
– Universal	DC 2 ...10 V ⎬ max. 2 mA (current source), short-circuit-proof
– Magnetic valve	DC 4 ... 8 V ⎦
– Motorised valve	via UA3 or
	via NKOK terminal module and NTIOS module carrier
– Thermic valve	via NKOD terminal module and NTIOS module carrier
On/off outputs	
PU, BE	Volt-free change-over contacts
Time switch	Volt-free change-over contact
– Contact rating	Max. AC 250 V
	Max. 5 A resistive, max. 2 A inductive, $\cos \varphi \geq 0.4$
	Min. admissible load 10 mA at DC 5 V
– Max. voltage to earth	Max. AC 250 V

Communication	LON bus with BACnet protocol	2-wire; without power supply, connected via screw terminals
	– Max. cable length	1100 m (unscreened) for serial topology
		500 m for other topologies
	– Bus termination	Internal, selected by switch
	– Service socket	RJ45 (bus connection including power supply) for
		BCE, BCM and BCO operator terminals, BCS service terminal
		or PC with APED 30 software
General	Connection terminals	Plug-in screw terminals, 2 x 1.5 mm^2
	Weight excluding packaging	0.75 kg
	Dimensions (W x H x D)	162 x 176 x 52 mm
	Mounting	Snap-mounted on DIN rail (EN50022-35 x 7.5) or
		screwed to a flat surface
General ambient conditions	Conditions of use	For indoor use, inside control panel
	Temperature ranges	
	– Operation	5 ... 45 °C
	– Storage	– 25 ... 70 °C
	Ambient humidity	10 ... 90 %rh, non-condensing
Safety	Product safety	EN 61010-1
	– Overvoltage category	II ; with transient overvoltages up to 2500 V
	– Contamination level	2 ; normal non-conductive contamination
	Electrical safety	SELV-E (PELV to IEC 364-4-41)
	Conformity	Meets the requirements for **CE** marking

Connection terminals

1) W1 = Enable / disable controller
(TRO = Enable VETO function)

Bus connection (Terminals 7, 8) :
– Bus length max. 1100 m (twisted-pair cable) for serial topology. Max. 500 m for all other topologies
– Do not use screened cable, this reduces the maximum permissible bus length. See manual R21-04.

Wiring diagrams

For wiring diagrams showing various applications and connections to the field devices, refer to the technical manual, R21 Section 04.

Dimensions

Dimension diagrams will be found in the technical manual, R21 Section 04.

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