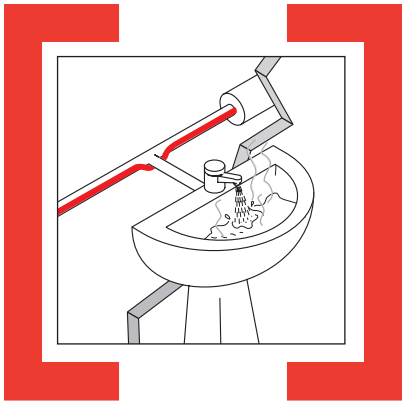


Raychem

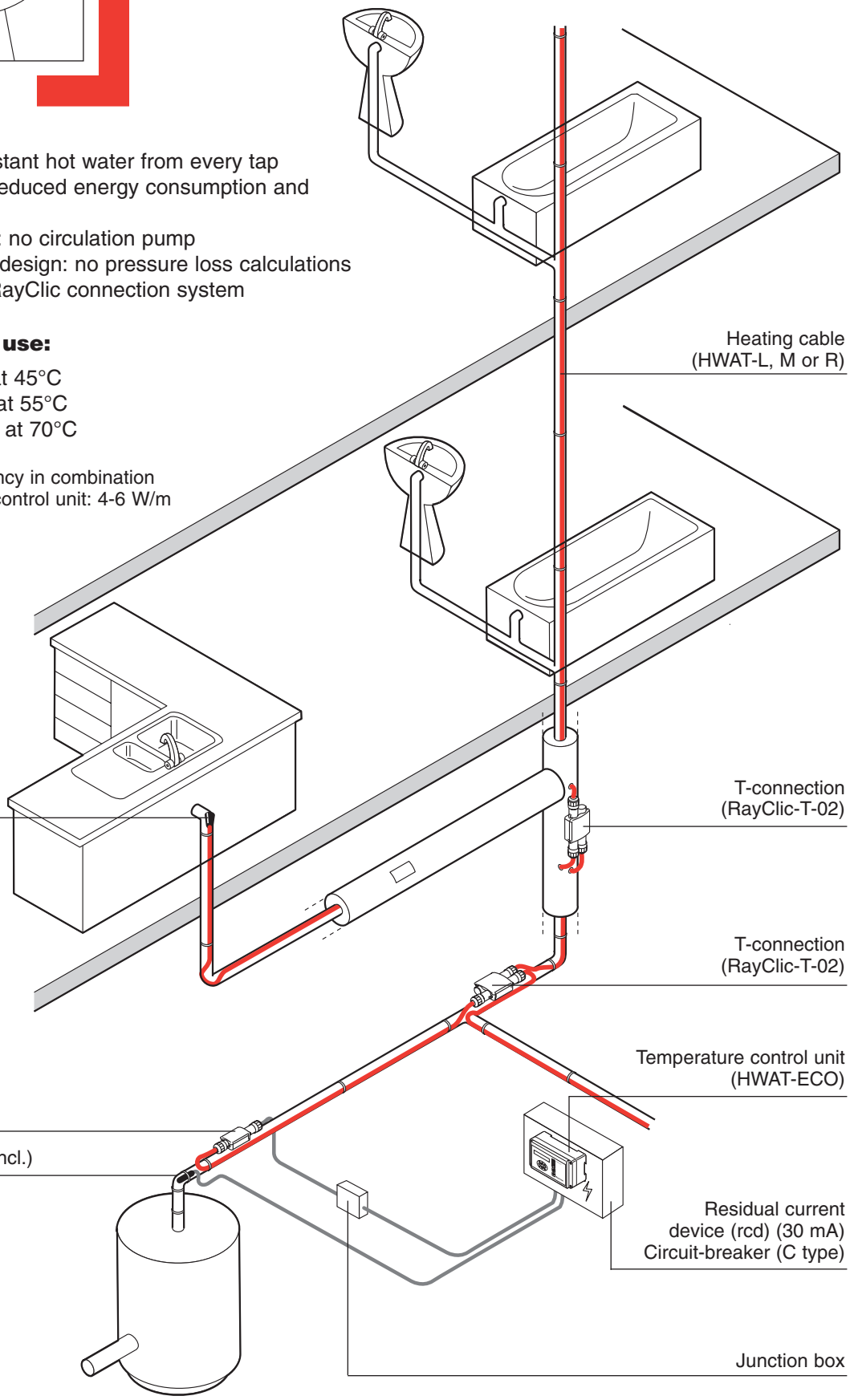
Hot water temperature maintenance

- High reliability: instant hot water from every tap
- No return pipes: reduced energy consumption and space-saving
- Maintenance-free: no circulation pump
- Easy and flexible design: no pressure loss calculations
- Easy assembly: RayClic connection system

Efficient energy use:

- HWAT-L: 7 W/m at 45°C
- HWAT-M: 9 W/m at 55°C
- HWAT-R: 12 W/m at 70°C

Further energy efficiency in combination with the HWAT-ECO control unit: 4-6 W/m (HWAT-R)



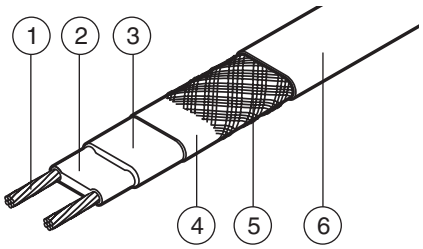
Design guide, control units and accessories

1. Application

Optimum water temperature maintenance for single family houses, flats, offices, hotels, hospitals, convalescent homes, sports centres, ...

Heating cable type	HWAT-L	HWAT-M	HWAT-R
Maintenance temperature	typically 45°C	typically 55°C	variable 50-70°C
Max. exposure temperature	65°C	65°C	80°C
Outer jacket colour	yellow	orange	red
Control unit HWAT-ECO	–	compatible	essential
Timer QWT-04	recommended	–	–
Legionella prevention			Possibility of thermal legionella prevention up to the drawoff points

2. Composition of the HWAT-L/R/M heating cable



1. Copper conductor (1.2 mm²)
2. Self-regulating heat element
3. Insulation made of modified polyolefin
4. Aluminium laminated wrap
5. Protective tinned copper braid
6. Protective jacket made of modified polyolefin

Technical data: see page 59

3. Heating cable length

- The heating cable is installed in a straight line on the pipework
- The heating cable can be traced right up to the drawoff points

Total length of pipe to be traced
+ approx. 0.3 m per connection
+ approx. 1.0 m per T-connection
+ approx. 1.2 m per 4-way connection
= required heating cable length

4. Insulation thicknesses

Pipe size (mm)	15	22	28	35	42	54
Insulation thickness (mm)	20	20	25	30	40	50

Ambient temperature: 18°C
Thermal conductivity λ = 0.035 W/(m.K)
For other thermal conductivity insulation materials, contact your Tyco Thermal Controls representative.

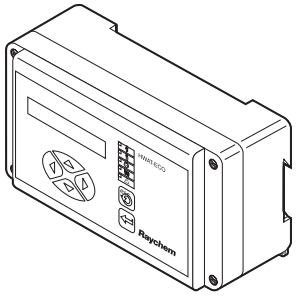
5. Electrical protection

- The total length of heating cable determines the number and size of the circuit breakers
- Residual current device (rcd): 30 mA required
- Power line for the heating cables according to local regulations
- The power connection must be carried out by an approved electrical installer

Circuit-breaker to BSEN 60898 (type C): the maximum length of the heating circuit is based on a minimum start-up temperature of +12°C, 230 VAC.

	HWAT-L	HWAT-M	HWAT-R
10 A	80 m	50 m	50 m
13 A	110 m	65 m	65 m
16 A	140 m	80 m	80 m
20 A	180 m	100 m	100 m

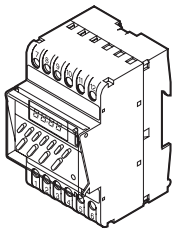
6. Control units



HWAT-ECO (Version 2)

Electronic temperature control unit with integrated clock
- Nine building-specific-programmes
- Boiler temperature monitoring
- Holiday button
- Password protection
- Easy user interface
- Compatible with HWAT-L/R/M heating cables
- BMS interface
- Alarm relay contacts

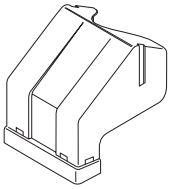
Technical data: see page 9



QWT-04

Pre-programmed, two-channel timer with 7-day programming.

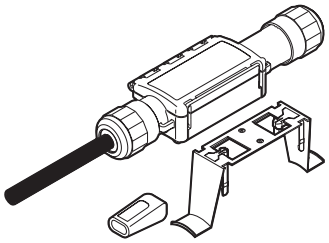
Technical data: see page 8



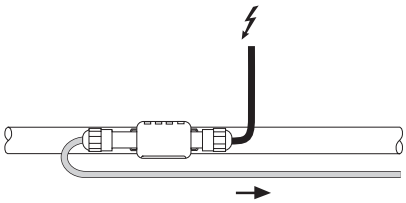
HARD-70

Terminal cover kit for QWT-04

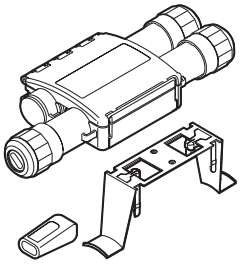
7. Accessories



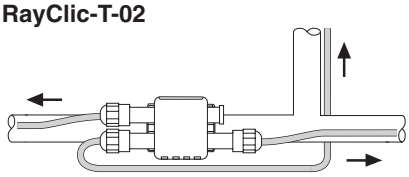
RayClic-CE-02



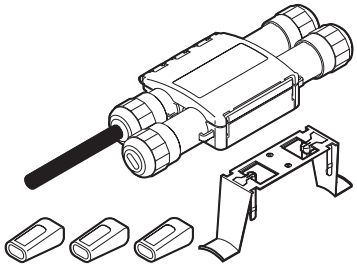
Power connection with 1.5 m power cable
- End seal and support bracket
- IP 68 weather protection



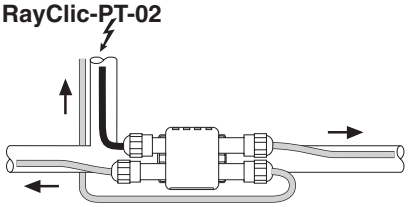
RayClic-T-02



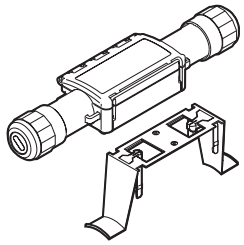
T-connection
- Connection for 3 cables
- End seal and support bracket
- IP 68 weather protection



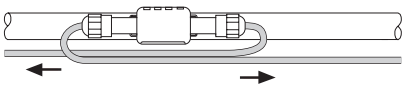
RayClic-PT-02



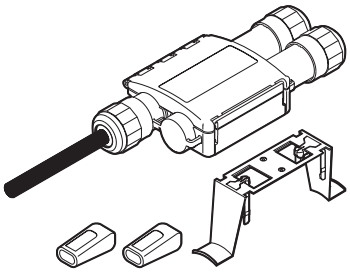
Power T-connection
- 3 connections with integral 1.5 m power cable
- 3 end seals and 1 support bracket
- IP 68 weather protection



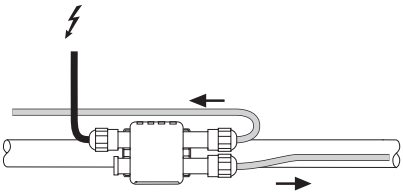
RayClic-S-02



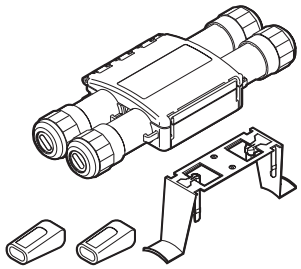
Splice for joining 2 lengths of heating cable
- Connection for 2 cables with 1 support bracket
- IP 68 weather protection



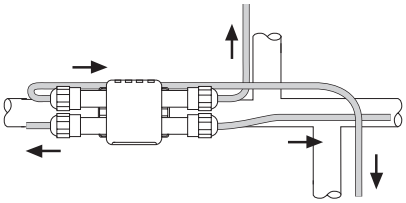
RayClic-PS-02



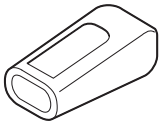
Powered splice
- Connection for 2 cables with integral 1.5 m power cable
- 2 end seals and 1 support bracket
- IP 68 weather protection



RayClic-X-02

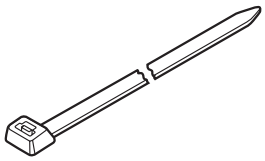


4-way connection
- Connection for 4 cables
- 2 end seals and 1 support bracket
- IP 68 weather protection



RayClic-E-02

Gel-filled end seal
- For system extensions (to be ordered separately)
- IP 68 weather protection



KBL-10

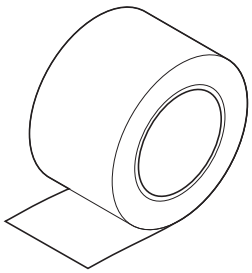
Cable ties
- One pack of 100 required for approx. 30 m of pipework
- Length: 370 mm
- Temperature and UV resistant

Use ATE-180 on plastic pipes

GT-66

Heat-resistant glass cloth tape
- Heat resistant up to 130°C
- 20 m roll for approx. 20 m of pipework

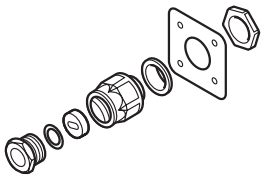
Use ATE-180 on plastic pipes



ATE-180

Aluminium adhesive tape
- Heat resistant up to 150°C
- 55 m roll for approx. 50 m of pipework

On plastic pipes: the heating cable must be covered with aluminium adhesive tape along its entire length



IEK-16-05

Insulation entry kit
- Insertion of heating cable in metal cladding
- Consists of: metal fasteners, PG 16 gland and joint seal

LAB-I-01	Electric traced label • To be placed at 5 m intervals on pipework surface

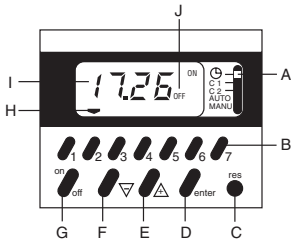
8. Supply voltage

The supply voltage lead to the heating circuits must be laid according to the local standards, codes and regulations.

MCBs to BS EN 60898 Type C or D, or equivalent	Min. power cable diameter (mm²)	Max. power cable length (m) HWAT-M	HWAT-R
10 A	3 x 1.5	200	80
16 A	3 x 1.5	100	50
20 A	3 x 2.5	130	70

QWT-04 timer

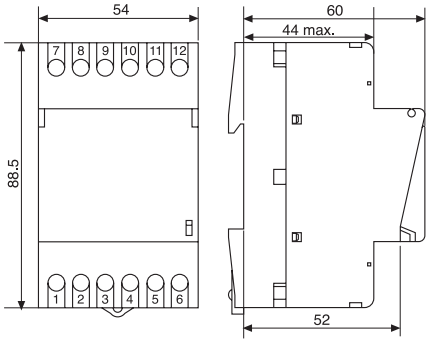
Module layout



A. Selection of the modes (sliding switch)
- 🕒 = Time setting
- **C1** = Programming channel 1
- **C2** = Programming channel 2
- **AUTO** = running mode
- **MANU** = permanent or timed manual overrides (1 hour to 27 days)

B. Day selection
C. Reset
D. Enter (confirm setting)
E. F. Scrolling hours and minutes
G. ON/OFF
H. Display of the days of the week
I. Time display
J. Status of channels 1 + 2
Channel 1 left
Channel 2 right

Technical data

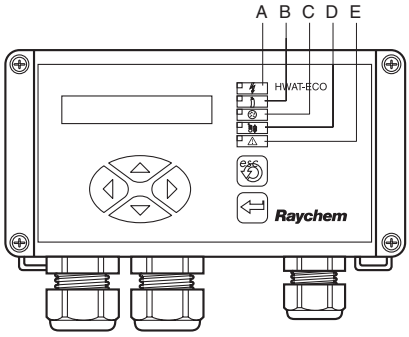


(Dimensions in mm)

Reference number	Timer	QWT-04
	Terminal cover kit	HARD-70
Operating voltage		110-240 VAC / +10% –15% / 50/60Hz
Programme		Day/week
Switching intervals		140 per week 20 set points to share between the two channels (one set point can be allocated to one or several days without using more capacity)
Minimum programming step		1 minute
Channels		2
Switch rating		1 potential-free selector per channel 16 A, 250 VAC
Battery back-up		> 3 years through lithium battery
Power consumption		< 1 VA
Accuracy		± 1 sec/day at 25°C
Operation and storage temperature		–10°C to +50°C
Material		ABS Cycolac and ABS PC Cicoloy
Ingress protection		IP 40
Weight		190 g
Mounting		Mounted on DIN rail
Terminals		Wire cross-section: 1 to 4 mm²

HWAT-ECO Temperature control unit (Version 2)

Module layout



A Power supply on (green LED)

B Power to heater on (green LED)

C Legionella prevention (green LED) - heating cable 100% powered - increased risk of scalding

D Maintain temperature lowered following boiler temperature decrease (green LED) - boiler temperature is lower than expected.

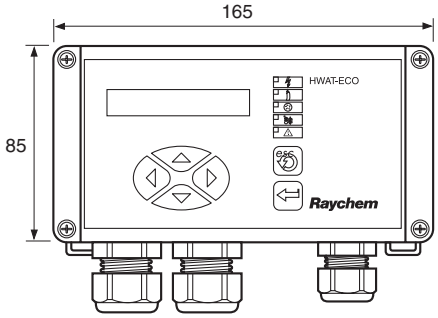
E Error (red LED)

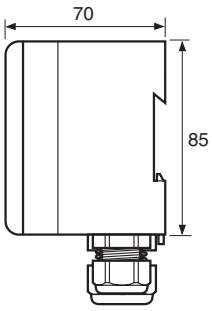
Change menu selection or position cursor

Escape, backspace or NO

Confirm selection, new value or YES

Technical data





(Dimensions in mm)

Product description	HWAT-ECO
Use	Only for HWAT-L/R/M heating cables
Selectable maintain temperature	41°C to 65°C in max. 48 timer blocs per day
Operating voltage	230 VAC (+10%, –10%), 50 Hz
Switching capacity	20 A / AC 230V
Internal power consumption	2,5 W
Circuit breaker	Max. 20 A, C-Characteristic
Power cable section entry	1.5 - 4 mm² for fixed wiring only
Auxiliary cable section entry	Up to 16 AWG (1.3 mm²)
Weight	880 g
Mounting options	Wall mount with 2 screws or DIN rail
Cable glands (entries)	2 x M20 and 1 x PG13.5 with 3 inputs for external wires of 3-5 mm
Protection level	IP 54
Ambient temperature	0°C to 40°C
Housing material	ABS
Internal temperature alarm	85°C
Master/slave cable	2-wire twisted pair, max. 1.3 mm² core and insulation of 500 V
Master/Slave	Master is selectable in the unit, up to 8 slaves can be connected
BMS interface	0 - 10 VDC
Alarm relay contacts	Max. 24VDC or 24 VAC, 1 A voltage free
Boiler temperature sensor	NTC
Power correction factor	60% to 140% (fine tuning of maintained temperature)
Clock back-up time	8 hours ±10%
Clock accuracy	±10 minutes per year
Real time clock	Automatic summer/winter time and leap year correction
Parameters stored in non-volatile memory	All parameters, except date and time
Approval	VDE according to EN 60730
EMC	According to EN 50081-1/2 for emission and EN 50082-1/2 for immunity

Raychem requires the use of a 30 mA residual current device and a C-Characteristic circuit breaker to provide maximum safety and protection from fire.

The unit complies with IEC1000-3-3 (flicker) if installed according to part 3 of VDE 0838. To avoid flicker install the unit in such a way that at the current value of the systems start-up temperature (max. 20 A per heating circuit) the voltage drop does not exceed 1% at the power supply of the lightning apparatus (normally subpanel).

Program

The HWAT-ECO has 9 different building specific time/temperature programs. These programs are based on our long experience for optimum comfort and energy saving. For user specific changes in the programming, the Edit timer program can be used.

Program name	Building type
Program 0	Constant temperature (±55°C)
Program 1	Apartment block
Program 2	Family home
Program 3	Prison / Barracks
Program 4	Hospital
Program 5	Nursing home
Program 6	Hotel
Program 7	Sports centre / Swimming pool
Program 8	Convalescent home

In addition user specific programs can be created

Temperature can vary in 1/2 h block to any desired temperature between: OFF, economic t°, maintain t° and legionella prevention (100% powered, increased risk for scalding)