

Snow melting for ramps, access ways, and footpaths

Ice and snow on paths, loading bays, driveways, ramps, stairs and other access ways, can present a major problem causing accidents and delays. To help prevent this liability, Raychem provides a complete range of ground heating solutions to prevent snow and ice formation.

The Raychem range of products has been specifically designed to meet the requirements of commercial, industrial, and residential applications. Whether in concrete, sand, or asphalt, a Raychem system exists to provide a fast, reliable, and easy-to-install solution.

Each Raychem heating solution is complete with a Smart control and monitoring unit, providing useful user data and excellent energy efficient performance. The multi-sensor control and monitoring device (VIA-DU-20) is compatible with all ramp snow melting solutions.

Application in concrete

Ambient temperature sensor*
VIA-DU-A10 (incl.)

Temperature and moisture sensor
VIA-DU-S20

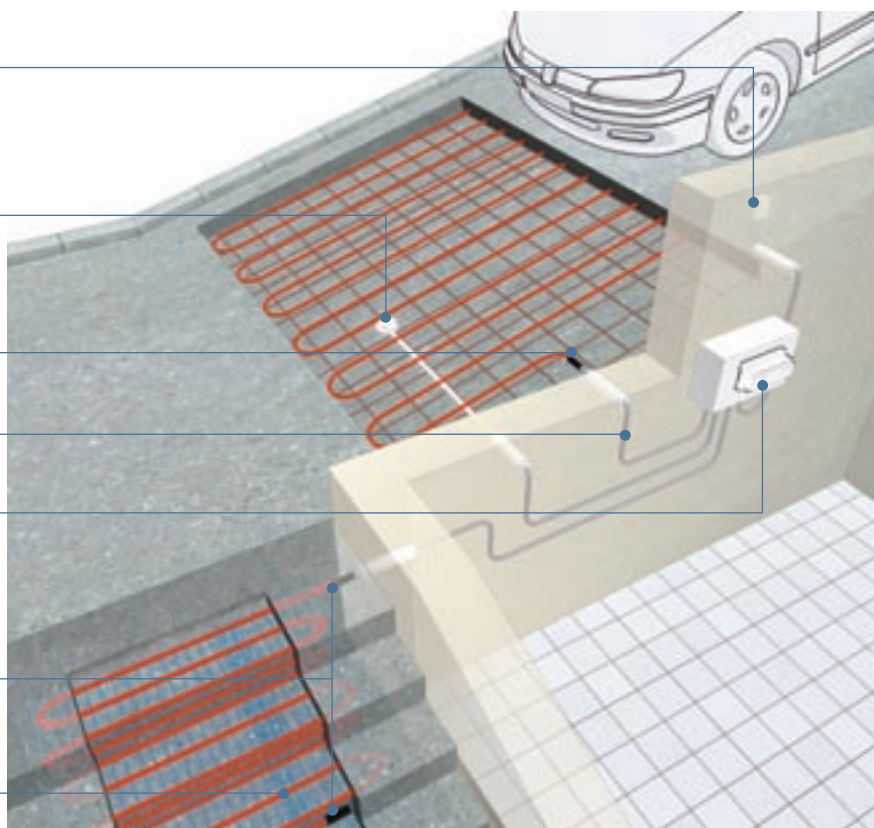
Connection and end seal kit
(VIA-CE1)

Connection cable (VIA-L1)

Control unit
(VIA-DU-20)

Connection and end seal kit
(VIA-CE1)

Self-regulating heating cable (EM2-XR) or
constant power heating cable (EM4-CW)



* Optional, only needed when "local detection" is selected.

Raychem Solutions for concrete

	Product	Description
Reinforced concrete ramp	EM2-XR	Self-Regulating heating cable for reinforced concrete ramps
Domestic/private garage-track heating	EM2-CM	Pre-terminated constant wattage heating mat for ramp, pavement and track heating
Stairs; wheelchair access ramps	EM4-CW	400V Pre-terminated constant wattage heating cable solution for larger concrete areas and stairs

Snow melting for ramps, access ways, and footpaths

Application in asphalt

Ambient temperature sensor*
VIA-DU-A 10 (incl.)

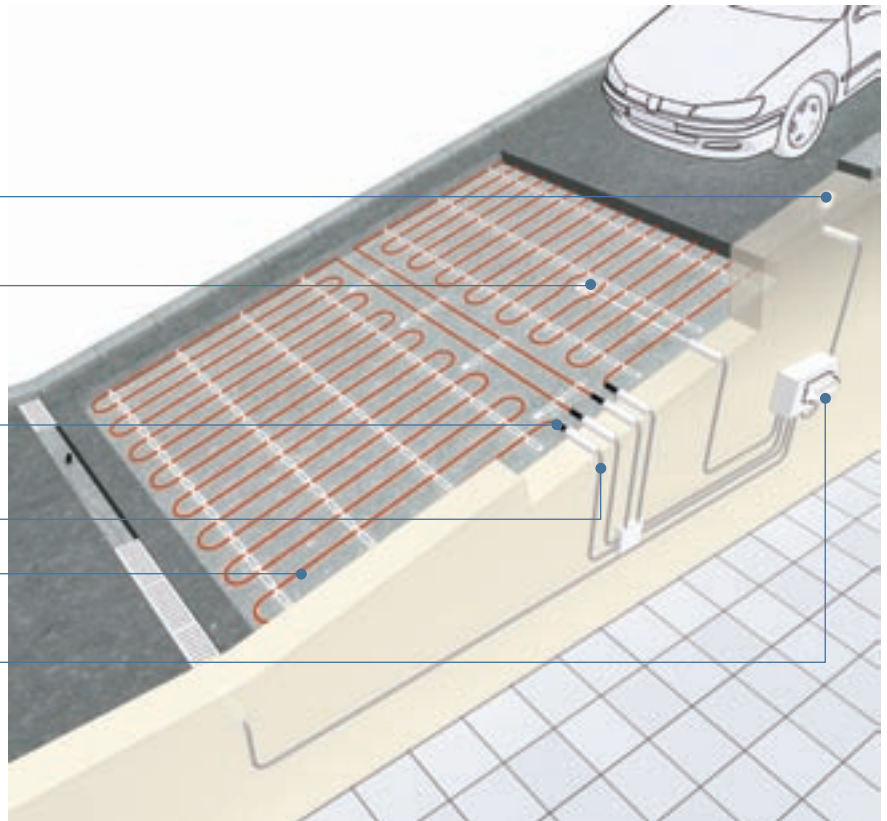
Temperature and moisture sensor
VIA-DU-S20

Connection between heater cable and
cold lead (Pre-engineered)

Mineral-Insulated
heating cable (EM2-MI)

Pre-engineered cold lead

Control unit
(VIA-DU-20)



* Optional, only needed when "local detection" is selected.





Snowmelting of ramps,
steps and footpaths

Raychem Solutions for asphalt

	Product	Description
Loading bay and asphalt layer	EM2-MI	Mineral insulated, high temperature resistant heating cable for asphalt ramps

Raychem Ramp heating systems:

Product Features & Selection Guide:

Product Features	EM2-XR 	EM2-MI 	EM2-CM 	EM4-CW 
Product Description	Self-regulating heating cable	Mineral Insulated constant power heating cable	Constant power polymeric pre-terminated ramp heating mat system	Constant power polymeric pre-terminated heating cable system
Features	Extremely robust self-regulating heating cable for flexible installation under severe site conditions.	Pre-terminated heating cable with exceptional resistance to high temperature asphalt surfaces.	Pre-terminated ramp, walkway, and track heating (Roll-out) mat for fast and simple installation.	Pre-terminated constant power heating cable for larger areas & 400 V power supplies.
Voltage Rating	230 Vac	230 Vac	230 Vac	400 Vac
Nominal power output	90 W/m @ 0°C.	25-30 W/m	300 W/m ²	25 W/m
Maximum circuit length	85 m	136 m	12.6 m ² (Mat size = 21 m x 0,60 m)	250 m
Maximum exposure temperature	100°C	250°C	65°C	65°C
Connections & termination	Cut-to-length system for flexible field termination (using Raychem heat-shrink components). Pre-terminated cable lengths (fixed or configured) available. Contact us.	Factory pre-terminated	Factory pre-terminated	Factory pre-terminated
Compatible control unit	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20
Approvals	VDE / CE	VDE / CE	VDE / CE	VDE / CE
Suitable for installation on reinforcement bar	★★★ Highly recommended	★★ Recommended		★★ Recommended
Suitable for installation in direct contact with hot poured asphalt		★★★ Highly recommended		
Suitable for embedding in sand sub-level	★★ Recommended	★★ Recommended	★★★ Highly recommended	★★★ Highly recommended
Cold lead included	Not as standard. Contact Tyco Thermal Controls for information on Configured EM2-XR heating elements.	3 m (at each end of heater cable)	4 m	4 m
Dual Wire / Single Wire construction	Dual	Single	Dual	Dual

General installation instructions

Checklist for problem-free installation and safe operation

Typical installation schedule for hot water temperature maintenance

General order of events

- The system is designed and the installation planned
- The pipework is pressure tested or otherwise checked for leaks
- The HWAT-L/M/R cable is tested and then installed on the designated pipes
- The components are installed and each circuit is tested
- The correct thermal insulation is applied, without delay, labelled and the system test repeated
- The supply voltage cables and circuit breakers are installed to each circuit
- The system is commissioned (see "System start-up" below)

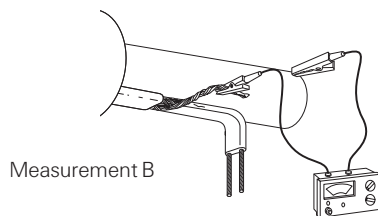
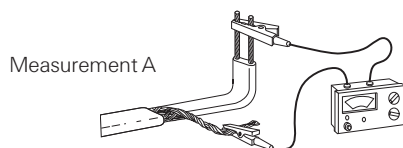
Circuit protection, testing and operation for all systems

Circuit protection

- Supply voltage 230 VAC, 50 Hz
- The required protective measures of the relevant regulations must be complied with.
- C type circuit breaker (anti-surge fuse)
- Residual current device (rcd 30 mA) required. Maximum approx. 500 m of self-regulating heating cable can be monitored per rcd

Testing

- Visual inspection for damage and fault-free installation of the accessories
- Proper installation of the system
- Heating cable affixed to all necessary pipes
- No mechanical damage to heating cable (e.g. cuts, cracks, etc.)
- No thermal damage
- Proper connection of all components including power supplies
- Insulation resistance measurement when heating cable is received and before and after installation of the thermal insulation. The test voltage should be 2500 VAC, but it must not be lower than 500 VAC. The insulation resistance, irrespective of the cable length, must not be less than 100 Mohms.
If the resistance falls below this value, the source of the fault must be investigated, eliminated, and re-tested.
 - Measurement A: Phase and neutral to the braid
 - Measurement B: Braid to the pipework
- After switching on, the cable ends must be warm after 5 to 10 minutes



Instructions for the placing of the heat insulation

- For problem-free operation of the self-regulating heating cables, the material quality and thickness of the thermal insulation should be in accordance with the design parameters, and this insulation must be installed correctly
- All parts of the pipework, including valves, wall transit points, etc. must be fully insulated

Operation / System start-up

- 1) For small installations, turn on the circuit breakers and preferably leave the system overnight for the water to warm up and stabilise
- 2) For bigger installations or for a faster start-up, first turn on the main water heater and open the outlet/tap at the end of the pipework run until the water feels warm and then turn on the circuit breakers
If the piping system is closed, such as by pressure-reducing valves or isolation valves, you must provide some method of pressure relief to allow for thermal expansion of the water during heat-up
- Under normal operating conditions, the heating cables are maintenance-free. Tyco Thermal Controls recommend that the insulation resistance should be checked periodically and compared with the original values. If the reading falls below the minimum value (100 Mohms) determine the cause and rectify before re-use
- The specified maximum ambient and operating temperatures should not be exceeded
- In the event of repair to the pipework, the heating cable must be protected against damage. Correct function of the electrical protection system should be maintained. To prevent shock or personal injury, turn off the power at the circuit breaker before testing or working on the heating cable or piping

- Following the completion of the repair work, the circuit should once again be tested (see above)
- All the important parts of the controls, thermostats, etc. must be checked for correct operation once a year, normally in the autumn

Only for hot water temperature maintenance

Newly installed heating cables have lower power at start-up of the installation. The nominal power will be reached after approximately 4 weeks of continuous operation

- The maintenance temperature should be 5°C to 10°C below the hot water temperature in the boiler

Standard assembly times

The actual assembly times achieved may deviate according to the conditions on site.

Pipework

Assembly of heating cable on pipes including fastening,
standard installation: 25 m/hour

Connection system

(electrical connection)

RayClic-CE-02	2 min/pc.
RayClic-S-02/RayClic-PS-02	4 min/pc.
RayClic-T-02/RayClic-PT-02	6 min/pc.
RayClic-X-02	8 min/pc.
RayClic-E-02	1 min/pc.

Heat-shrink connection system

(electrical connection)

C25-21	15 min/pc.
E-06	5 min/pc.
CE20-01	20 min/pc.

Other

Testing, visual inspection, insulation resistance measurement (2x)	10 min/heating circuit
Connecting the heating circuit in the switch box	10 min/heating circuit

General installation instructions

Trouble shooting guide

Fault	Possible causes	Measures
Circuit-breaker trips:	Circuit breaker wrong type: e.g. type B instead of C:	Change to C Type
	Circuit breaker undersized	If the power supply cable permits, install a larger circuit breaker
	Circuit too long	Split the circuit on 2 circuit breakers
	Short-circuit/earth fault	Eliminate short-circuit/earth fault (cable ends should not be twisted)
	Circuit breaker faulty	Replace faulty circuit breaker
	No end seal	Install end seal
	Conductor (or cable) twisted	Untwist and install end seal
	RCD residual current device trips:	More than 500 m of frost protection heating cable installed per rcd
Earth fault at connection or in end seal		Rectify earth fault
Cable damaged		Repair cable where damaged
Moisture in the junction box		Eliminate moisture
Pipeline does not become warm - Heating cable cold:	Circuit-breaker has tripped	See section circuit breaker
	Residual current device has tripped	See section residual current device
	No mains voltage	Switch on
	Cable or cold lead not connected	Connect cable or cold lead
	Cable not inserted correctly in connection system or end seal	Insert cable according to installation instructions (fully insert cable)
Water temperature is not maintained but the cable gives high output:	No insulation	Insulation according to tables in design guides
	Insulation thickness insufficient	Insulation according to tables in design guides
	Insulation wet	Dry insulation
	Cold water is running from the boiler	Test boiler temperature
	Cold water is pumping through mixer tap into the hot water pipe.	Test the mixer tap
	Insulation according to tables in design guides.	

Technical data

Choice of accessoires

Cable type	Hot water temperature maintenance				Frost protection for pipes				Frost protection for gutters and downpipes				Snow melting for ramps, access ways, and footpaths												
	HWAT-L	HWAT-M	HWAT-R	FS-A-2X	FS-B-2X	FS-C-2X	GM-2X	8BTV-2-CT	EM2-XR	EM2-MI	EM2-CM	EM4-CW	HWAT-L	HWAT-M	HWAT-R	FS-A-2X	FS-B-2X	FS-C-2X	GM-2X	8BTV-2-CT	EM2-XR	EM2-MI	EM2-CM	EM4-CW	
Colour																									
Nominal voltage	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	230 VAC	400 VAC
Nominal power output (*on insulated metal pipes)	7 W/m at 45°C	9 W/m at 55°C	12 W/m at 70°C	10 W/m at 5°C	26 W/m at 5°C	31 W/m at 5°C 22 W/m at 40°C	36 W/m in ice and 18 W/m in air at 0°C	18 W/m in air at 0°C 36 W/m in ice at 0°C	90 W/m at 0°C	30 W/m	300 W/m ²	25 W/m	7 W/m at 45°C	9 W/m at 55°C	12 W/m at 70°C	10 W/m at 5°C	26 W/m at 5°C	31 W/m at 5°C 22 W/m at 40°C	36 W/m in ice and 18 W/m in air at 0°C	18 W/m in air at 0°C 36 W/m in ice at 0°C	90 W/m at 0°C	30 W/m	300 W/m ²	25 W/m	7 W/m at 45°C
C-type circuit-breaker according to selected kit	max. 20 A	max. 20 A	max. 20 A	max. 16 A	max. 16 A	max. 16 A	max. 20 A	max. 20 A	max. 16 A	max. 16 A	max. 16 A	max. 20 A	max. 20 A	max. 20 A	max. 16 A	max. 16 A	max. 16 A	max. 20 A	max. 20 A	max. 50 A	max. 20 A	max. 20 A	max. 20 A	max. 20 A	
Max. circuit length	180 m 20 A	100 m 20 A	100 m 20 A	150 m 16 A	105 m 16 A	90 m 16 A	80 m 20 A	80 m 20 A	85 m 50 A	136 m	21 m (12.6 m ²)	250 m	180 m 20 A	100 m 20 A	105 m 16 A	105 m 16 A	90 m 16 A	80 m 20 A	80 m 20 A	85 m 50 A	136 m	21 m (12.6 m ²)	250 m	180 m 20 A	
Min. bending radius	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	12.7 mm (at 20°C)	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm	30 mm	
Max. continuous exposure temperature	65°C	65°C	80°C	65°C	65°C	95°C	65°C	65°C	65°C	65°C	95°C	65°C	65°C	65°C	65°C	65°C	95°C	65°C	65°C	100°C	250°C	65°C	65°C	65°C	
Max. exposure temperature (power-on condition – 800 h. cumulative)	85°C	85°C	90°C	85°C	85°C	95°C	85°C	85°C	85°C	85°C	95°C	85°C	85°C	85°C	85°C	85°C	95°C	85°C	85°C	110°C	250°C	65°C	65°C	65°C	
Max. dimensions in mm (W x H)	13.8 x 6.8	13.7 x 7.6	16.1 x 6.7	13.7 x 6.2	13.7 x 6.2	12.7 x 5.3	13.7 x 6.2	13.7 x 6.2	13.7 x 6.2	13.7 x 6.2	12.7 x 5.3	13.7 x 6.2	16.1 x 6.2	18.9 x 9.5	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	5.0 x 7.0	
Weight	0.12 kg/m	0.12 kg/m	0.14 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.13 kg/m	0.27 kg/m	–	–	–	–	–	–	–	–	–	–	–
Approvals	BS / ÖVE / VDE / SEV / CSTB / SVGW / DVGW / CE / VDE																								
Control units	QWT-04	HWAT-ECO	HWAT-ECO	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL RAYSTAT-ECO	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL RAYSTAT-ECO	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL	EMDR-10 HTS-D	–	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20	–	VIA-DU-20	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL RAYSTAT-ECO	AT-TS-13 AT-TS-14 RAYSTAT-CONTROL	–	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20	VIA-DU-20
Connection system	BS / ÖVE / VDE / ERFA / CE																								
Junction box	–	–	–	–	–	JB 16-02	–	–	VIA-JB-2	VIA-JB-2	VIA-JB-2	VIA-JB-2	JB 16-02	VIA-JB2	–	–	–	–	VIA-JB2	VIA-JB2	VIA-JB-2	VIA-JB-2	VIA-JB-2	VIA-JB-2	VIA-JB-2
Connection kit	RayClick	RayClick	RayClick	RayClick	RayClick	CE20-01	RayClick	RayClick	RayClick	RayClick	CE20-01	RayClick	CE25-21 E-06	VIA-CE1	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed	Pre-installed
Support bracket	included in the kit	included in the kit	included in the kit	included in the kit	included in the kit	JB-SB-08	included in the kit	included in the kit	included in the kit	included in the kit	JB-SB-08	included in the kit	JB-SB-08	–	–	–	–	–	–	–	–	–	–	–	–

Approvals: BS/ÖVE/ERFA/CE