

## Multi-circuit trace-heating control and monitoring unit

The MoniTrace 200N-E unit is the central element of a multi-circuit electronic control and monitoring system for trace-heating used in process temperature maintenance and frost protection applications. The unit controls up to 130 trace-heating circuits in either surface sensing, ambient sensing, or PASC.

### PASC

The proportional ambient sensing control (PASC) mode uses a proprietary algorithm that measures ambient temperature and calculates the cycle time during which the trace-heating will be energised. On cold days, the heating cables are energised frequently. On warm days, they are energised less frequently, or not at all.

Using PASC, the MoniTrace 200N-E unit can be used to control groups of trace-heating circuits based solely on ambient temperature. Therefore, flow path design considerations can be eliminated, greatly reducing the number of circuits required, thus saving circuit breakers, panel space, wiring, and controllers. The result is a simpler, more reliable system.

### Control

Heating cable circuits are switched ON and OFF using up to 10 remote modules for control (RMCs) typically located in trace-heating power distribution panels. Each RMC unit can be configured for 2 to 32 relay outputs, which are wired directly to heating cable power contactors. RMCs are connected via a single, twisted pair RS-485 cable to the MoniTrace 200N-E.

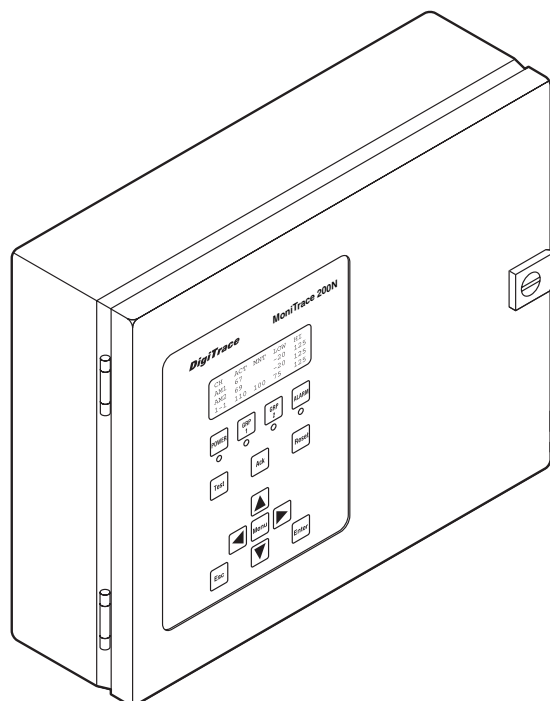
### Monitoring

The MoniTrace 200N-E monitors up to 16 remote monitoring modules (RMMs) that each have inputs for eight three wire Pt 100 temperature sensors. The RMMs are typically located as close as possible to the application in order to minimize the amount of RTD wires required. RMM2 units are connected to the MoniTrace 200N-E control unit using the same RS-485 network as being used by the RMC's and are connected by the same RS-485 cable to the MoniTrace 200N-E. Additional monitoring of the status of RCDs and contactors is provided through inputs in the MoniTrace 200N-E unit and in RMCs.

Based on temperature inputs from RMMs, the MoniTrace 200N-E determines which heating cable circuits are to be energised and sends this information to RMCs that then turn the heating cable power contactors ON or OFF. Because RMMs are local to temperature sensors and RMCs are local to contactors in distribution panels, wiring costs and complexity are reduced significantly.

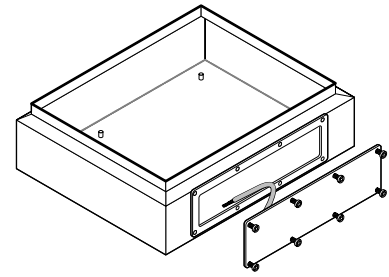
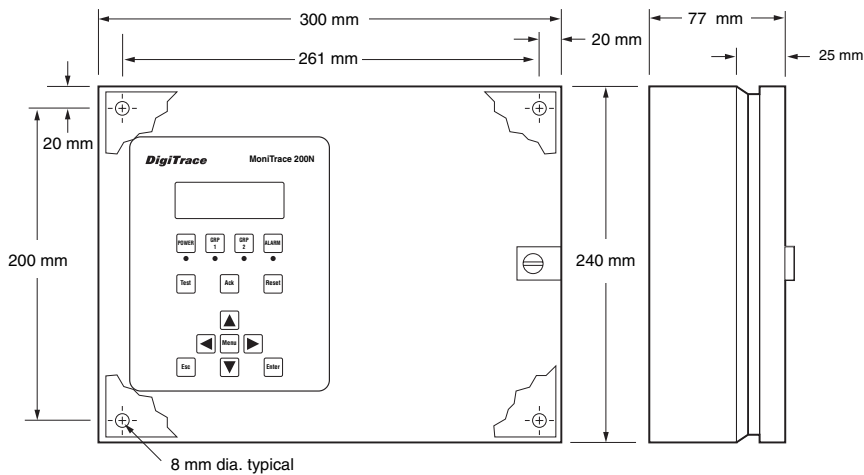
### User interface

Set-up parameters, system status, and alarm conditions are available locally at the MoniTrace 200N-E panel or remotely via an RS-232/RS-485 link to a host system supporting the Modbus protocol, such as a PC running Raychem's MoniTrace Supervisor software. For local use, the MoniTrace 200N-E features a function keypad and 4-line LCD display that make controller set-up and system status review simple.



MoniTrace 200N-E

**Dimensions (in mm)**



Removable gland plate on bottom of enclosure for entries.

**General**

Area of use	Ordinary area, indoors
Approvals	
Supply voltage (nominal)	100 / 120 V, 208 / 240 V +10% -10%, 50/60 Hz switch selectable
Internal power consumption	≤ 5 W

**Enclosure**

Protection	IP54
Base and lid	Material: steel, coating: powder painted, lid seal: neoprene
Lid fixing	1 flathead screw
Entries	None provided, space for 6 x M20 entries on removable gland plate
Power cable gland	1 x M20, 6-12 mm cable, IP54 min.
Control cable gland	1 x M20, 5-9 mm cable, IP54 min.
Sensor/network cable glands	3 x M16, 2-6 mm cable, IP54 min.
Ambient operating temperature range	0°C to +50°C
Ambient storage temperature range	-20°C to +60°C
Relative humidity	Max. 95%, noncondensing
Climate class	3K3, per EN 60 721

Also available as panel mount version suitable for custom panel applications (MONI-200N-PM)

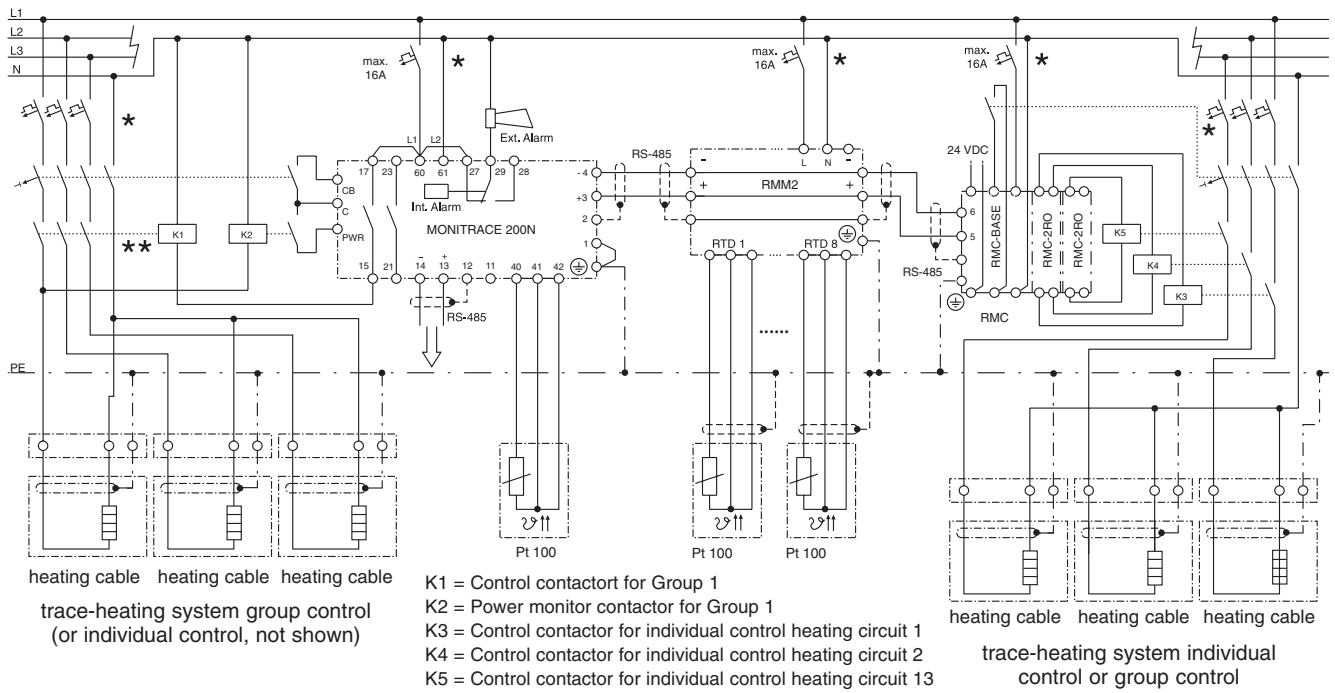
**Monitoring inputs**

Ambient or pipe temperatures	One or two Pt 100 sensors directly connected to MoniTrace 200N-E The sensor cable may be extended with a 3 (+PE)-wire signal cable adding 20 Ohms lead resistance maximum. When using 1.5 mm <sup>2</sup> cable this equals to ±150 m of cable. When the sensor cable is laid in cable ducts or in the vicinity of high voltage carrying cables the sensor extension cable should be shielded. The shield of the extension cable should be grounded at the controller end only. Up to 128 Pt 100 sensors connected via Remote Monitoring Modules (RMMs)
RCD trip alarm	2 digital inputs per MoniTrace 200N-E or optional one per circuit via MONI-RMC and MONI-RMC-2DI
Contactor actuation monitor	2 digital inputs per MoniTrace 200N-E or optional one per circuit via MONI-RMC and MONI-RMC-2DI

**Control outputs**

Number of output relays	Two independently switching control relays (internal) Up to 128 control relays connected via RMCs and MONI-RMC-2RO One alarm relay (internal)
Control relay	Double pole change over, NC. Rating: 5 A, 120 / 240 VAC, 24 VDC Closes to energise trace-heating
Alarm relay	Double pole change over. Rating: 5 A, 120 / 240 VAC, 24 VDC Normally energised; closes in alarm mode
Number of relay operations	5 x 10 <sup>4</sup> at rated current

Connection details



- \* Two- or four-pole electrical protection by circuit-breaker may be needed for local circumstances, standards and regulations.
- \*\* Depending on the application, one- or three-pole circuit-breakers or contactors may be used.

Network connections

Connection to RMMs and RMCs	RS-485 shielded twisted pair network cable, maximum length 1200 m (MONI-RS485-WIRE)
Number of RMM2s	Up to 16, individually addressable, each with up to 8, 3 wire Pt 100 inputs
Number of RMCs	Up to 10, individually addressable, each with 2 to 32 relay outputs.
Host communication connection	Serial port, RS-232 (default) or RS-485, max. 19200 baud rate
Host communication protocol	Modbus, RTU or ASCII

Programming and setting

Method	10 touch keys on front panel (Test, Reset, Ack, Menu, Esc, Enter, ←, →, ↑, ↓) Four-line, 20-character back-lit LCD display
Language	English, French, German
Stored parameters	Control settings, system settings, time- and date-stamped event log
Memory	Nonvolatile, restored after power loss
Set points	Pipe maintain temperature range: -7°C to +315°C Minimum ambient temperature range: -73°C to +52°C
Control modes	User-selectable for each circuit: Line (surface) sensing PASC (proportional ambient sensing) Ambient sensing ON/OFF Fixed duty cycle (0-100%)
Alarm conditions	High/low pipe or ambient temperature Sensor failure Communications failure RCD trip Contactor failure
Maintenance assistance	Daily power test (user-defined time of day) Contactor on/off cycle counter and alarm Heating cable hourly usage counter

Timed start up

With the timed start-up function the MONI-200N-E controller can be programmed such that the control circuits are switched ON one after another with in between a programmable delay. The function is integrated as 2 user definable timers " LoadShed Start" and "LoadShed Int". Using the LoadShed functions can avoid peak demands in electrical power when the system is started-up at low ambient temperature.

<b>Connection terminals</b>	
Supply	2 terminals for 0.2 mm <sup>2</sup> to 4 mm <sup>2</sup>
Internal earth	1 clamp for 0.2 mm <sup>2</sup> to 10 mm <sup>2</sup>
Pt 100 connections	2 x 3 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
Control relay connection	2 x 2 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
RCD alarm relay connection	2 x 2 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
Contact relay connection	2 x 2 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
Alarm relay connection	3 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
RS-485 connection to RMM and RMC	3 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
RS-485 connection to host computer	RS-485: 3 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup> RS-232: 6 terminals for 0.2 mm <sup>2</sup> to 2.5 mm <sup>2</sup>

<b>Electromagnetic compatibility</b>	
Immunity	Complies with EN 50 082-2 (heavy industrial)
Emissions	Complies with EN 50 081-1 (light industrial)

<b>Mounting method</b>	
	Surface mounting with 4 fixing holes on 261 mm x 200 mm centres Hole diameter: 8 mm

<b>Ordering details (Weight)</b>	<b>Part description</b>	<b>PN</b>	<b>Weight</b>
<b>MoniTrace 200N-E controller including supervisory software on CD</b>	MONI-200N-E	266429-000	3.9 kg
Panel mount version without enclosure	MONI-200N-PM	746245-000	3.2 kg
Pt 100 temperature sensor for Zone 1	MONI-PT100-EXE	967094-000	0.6 kg
Pt 100 temperature sensor for non-hazardous areas	MONI-PT100-NH	140910-000	0.2 kg
RS485 Communication cable	MONI-RS485-WIRE	549097-000	75 kg (300 m reel)

**note:** Easy to use windows based configuration software (MoniTrace Supervisor) included for comfortable configuration and supervision.