

Raychem NGC-20-C-E AND NGC-20-CL-E FIELD-MOUNTED ELECTRONIC HEAT-TRACING CONTROL UNIT (E)



COMMUNICATIONS AND NETWORKING

PRODUCT OVERVIEW

The Raychem NGC-20 is an electronic heat-tracing control unit featuring the benefits of local control and the capability for central monitoring. Raychem NGC-20 control unit can be used for single phase circuits up to 25 A and is approved for use in hazardous areas. The Raychem NGC-20 can provide tight temperature control and is available with an IEC 61508-SIL 2 classified safety temperature limiter on board (NGC-20-CL-E). It measures the temperature with up to two RTD(s) connected to the unit. The Safety temperature limiter has a dedicated temperature input.

CONTROL, MONITORING AND ALARM CAPABILITIES

The Raychem NGC-20 offers several different control algorithms including PASC for an optimised electrical heat-tracing control. The Raychem NGC-20 offers alarms for high and low temperature, high and low current, groundfault current and voltage. The trip and warning level of the ground-fault current is user configurable and can be used as a warning and to isolate circuits. The Raychem NGC-20 control unit provides a dry contact relay for alarm annunciation.

AUTOMATED HEAT-TRACING SYSTEM CHECK

To ensure system integrity the Raychem NGC-20 control unit can be configured to periodically check dormant heating cables for faults. As a consequence maintenance is systematically informed about the status of the heat-tracing system and unexpected and usually expensive downtime of important pipelines can be reduced.

The Raychem NGC-20 control unit is equipped with a RS-485 interface. Through this interface up to 247 Raychem NGC-20 units can be networked to a single Raychem NGC-UIT or to one serial port of standard PC running Pentair' Raychem Supervisor software.

The Raychem NGC-20 control unit can as well be monitored and/or configured via the Raychem NGC-CMA wireless handheld device. This device is available for hazardous and non-hazardous areas.

INSTALLATION

The Raychem NGC-20 control unit can be installed in the field near the heating application. The Raychem NGC-20 enclosures are manufactured from high impact-resistant, UV stabilized glass-filled polyester suitable for installation indoors or outdoors. One heating cable can be directly connected to the unit. The units can be mounted on the heated surface via an appropriate support bracket.

CONFIGURATION AND COMMISSIONING

The Raychem NGC-20 control unit can be commissioned locally by means of a handheld programming device (Raychem NGC-CMA) or from a central location using the Raychem NGC-UIT or Raychem Supervisor Software. After programming, all settings are permanently stored in the non-volatile memory of the Raychem NGC-20 control unit, avoiding loss of data in the event of power failure or after a long term power shutdown. The Raychem NGC-20 control unit allows the heating and power cable to be connected directly to the unit.

DIMENSIONS (IN MM)



Sample shown is Raychem NGC-20-CL-E Gland included in scoop of delivery - 1 x M25 x 1,5

GENERAL

Temperat	ure Class T5 T	emperature Class T4	
	T*: The switching capacity depends on the hazard (T-Class) and the maximum expected use tem	The switching capacity depends on the hazardous area temperature classification T-Class) and the maximum expected use temperature. Ratings as shown in table belov	
	Baseefa08ATEX0184X	(Russia, Kazakhstan, Belarus) For other countries contact your local Pentair representative.	
APPROVALS			
Application type	Raychem NGC-20-C(L)-E units are appr or Zone 2 (Gas) or Zone 21 or Zone 22 (D	oved for use in Hazardous area Zone 1 Just) and non hazardous areas	

Maximum Ambient Temperature	Maximum Switching Current	Maximum Ambient Temperature	Maximum Switching Current
+50°C	25 A		
+54°C	20 A	Up to 56°C	25 A
+56°C	16 A		

All values as per hazardous area certification.

Current ratings are given for a supply voltage of 254 V +/-10%, 50/60 Hz and resistive loads only.

FUNCTIONAL SAFETY APPROVAL

	Baseefa08SR0134 SIL2 IEC 61508-1:1998 & IEC 61508-2:2000
Conditions of Safe Use	Refer to Hazardous Area Certificate or installation instructions

ENVIRONMENTAL		
Temperature range control unit	From -80°C to +700°C in steps of 1K	
Temperature range limiter	From -60°C to +599°C in steps of 1K (NGC-20-CL-E only)	
Ambient operating temperature	From -40°C to +56°C	
Storage temperature	From -55°C to +80°C	
ENCLOSURE		
	Raychem I support br exceeded. holes in th	NGC-20-C(L)-E units can be installed directly on the pipe via an appropriate acket as long as the maximum permitted ambient temperature is not Alternatively, units can be mounted on any stable structure via the moulded e enclosure.
Protection	IP 66 per l	EC-60529
Material	Glass fibre	reinforced enclosure with internal earth plate on the bottom
Entries	3 x M25	1 x M25 gland Ø 8 – 17 mm: power IN/heating cable out 1 x M25 stopping plug: daisy chaining of power 1 x M25 rain plug: daisy chaining of power
	3 x M20	Digital communication IN/OUT and alarm (all with stopping plugs)
	2 X M16	Temperature sensor(s) 1 with stopping plug one with rain plug
Mounting & installation	Installation temperatu install the	n on an appropriate support bracket directly on the heated surface up to res of 230°C. When the temperature of the heated surface is above 230°C, control unit to a stable structure nearby the application.
Installation position	Any position allowed, typical use with glands facing down	

1 EC-61508 Safety related information is published in the NGC-20 installation instructions INSTALL-130. A copy of the INSTALL-130 can be downloaded from the literature section on salesthermaluk@pentair.com or can be obtained via your local Pentair representative.

ELECTRICAL DATA

Power supply & own power consumption	100 Vac to 254 Vac +/-10 % 50/60 Hz 20 VA max.
Connection terminals	Spring-type
L, N and PE terminals	9 pc (cables with diameter ranging from 0.2 to 6 mm²)
Alarm output terminals	3 pc (cables with diameter ranging from 0.2 to 2.5 mm²)
Pt 100 (RTD) terminals	12 pc (cables with diameter ranging from 0.2 to 1.5 mm²)
RS-485 communication	7 pc (0.2 to 1.5 mm²)
Internal Earth stud for RTD shield	1 pc (Cable diameter max 6 mm²)
Contact lifetime main switch	500k operations at 25 A/250 Vac (resistive load)
Alarm output relay	Contact rated 250 Vac/3 A
	Relay output is software programmable to open, close or to toggle in case of alarm
Electromagnetic compatibility	EN 61000-6-2:2005 (Gen. Immunity standard for industrial environments) EN 61000-6-3:2007 (Gen. Emission standard for residential, commercial and light industrial) EN 61000-3-2-2006 (Limits for harmonic current emissions) EN 61000-3-3:1995+A1:2001+A2:2005 (limitation of voltage fluctuations and flicker)
Electrical safety	EN 61010-1, Category III, Pollution degree 2
Vibration & Shock	Shock to EN 60068-2-27: 1/2 sine wave of 11 ms duration, 15 g Vibration to EN 60068-2-6/sine wave 10 to 150 Hz (p-p), 2 g
TEMPERATURE SENSORS	
Compatible types	100 Ω platinum, 3-wire, a = 0.00385 Ω /°C. Can be extended with a three core shielded or braided cable of maximum 20 Ω lead resistance per conductor.
Quantity	Two RTD inputs for the control unit plus one independent temperature input for the safety limiter. All temperature sensors are permanently monitored for "sensor short", "sensor break".

NGC-20-C-E AND NGC-20-CL-E

COMMUNICATIONS	
Physical network	RS-485 and Bluetooth Class 1
Protocol/topology	Modbus RTU or ASCII. Multi drop/Daisy chain
Cable and maximum length	Shielded twisted pair cable, 0.5 mm ² (AWG 24) or larger
	maximum cable length between should be no more than 1200 m
Maximum quantity of control units in one network	Max. of 247 units per Raychem NGC-UIT or per serial communication port
(Modbus) Network address	Software programmable via Raychem NGC-CMA-NH, Raychem NGC-CMA-EX or Raychem Supervisor

PROGRAMMING AND SETTING

Method	Through handheld programming device Raychem NGC-CMA-NH, NGC-CMA-EX (hazardous area) and a wireless Bluetooth connection or via RS485 interface and Raychem Supervisor software or Raychem User Interface Terminal (NGC-UIT2-ORD) and Raychem software.
Units of measure	°C or °F, software selectable
Memory	Non-volatile, no loss of parameters after the event of power outage or long term shut down, data holding time ~10 years.
LED indicators	Status LEDS are available for:
NGC-20-C-E	Heater, Alarm, RS-485 communication, Bluetooth communication
NGC-20-CL-E	Heater, Alarm, Limiter Tripped, RS-485 communication and Bluetooth

MEASURING RANGES

Temperature range control unit	From -80°C to +700°C in steps of 1K
Temperature range limiter	From -60°C to +599°C in steps of 1K (NGC-20-CL-E only)
Voltage	From 50 Vac to 305 Vac
Load Current	From 0.3 A to 30 A
Ground-fault current	From 10 mA to 250 mA (RCD/ELCB required due to IEC and/or local regulations)
Heater time alarm	From 1 to 1 x 10 ⁶ hours
Relay cycle alarm	From 0 to 2 x 10 ⁶ cycl

Ordering information

RAYCHEM NGC-20 CONTROL	UNITS
Product name	NGC-20-C-E (Hazardous area approved control unit without safety temperature limiter)
Part number & (weight)	1244-007035 (2.2 kg)
Product name	NGC-20-CL-E (Hazardous area approved control unit with integrated safety temperature limiter)
Part number & (weight)	1244-007036 (2.3 kg)
Raychem NGC-20 accessories	
TEMPERATURE SENSORS	
Product name	MONI-PT100-260/2 or MONI-PT100-EXE-SENSOR
SUPPORT BRACKET FOR INS	TALLATION ON PIPE
Product name	SB-125
Part number & (weight)	1244-06603 (0.5 kg)
BLUETOOTH ENABLED HAND	HELD PROGRAMMING DEVICE WITH CUSTOMIZED RAYCHEM SOFTWARE
Product name	NGC-CMA-EX 🐵 (Hazardous area approved device for use in Zone 1, 2, 21, 22)
Part number & (weight)	1244-006605 (1.2 kg)
Product name	NGC-CMA-NH (Industrial grade, not approved for use in hazardous area)
Part number & (weight)	1244-006606 (0.8 kg)

CONNECTION DIAGRAM (TYPICAL)





Raychem NGC-30 PANEL MOUNTED ELECTRONIC MULTI-CIRCUIT HEAT-TRACING CONTROL, MONITORING AND POWER DISTRIBUTION SYSTEM



PRODUCT OVERVIEW

The Raychem NGC-30 is a multi circuit electronic control, monitoring and power distribution system for heat-tracing used in process temperature maintenance and freeze protection applications. The system consists of multiple components covering a broad range of requirements from simple temperature monitoring to ground fault, voltage and current measurement, bringing valuable information about the status and health of the heat-tracing circuits from the field into a central location. The Raychem NGC-30 system can minimise routine checks by transforming field data into valuable information for maintenance and operations.

RAYCHEM NGC-30 PANEL

The NGC-30 is available as a complete distribution panel ²⁰⁰⁰ mm system. Typical characteristics for these panels are easy access, pre-wired and all wiring landed on easy accessible terminals. The enclosure is based on industrial standards while the wiring is optimised for maintenance purposes. The panels are equipped with earth leakage circuit breakers and a main circuit breaker. In addition to these standard features the customer can select additional options based upon the heat-tracing monitoring and control requirements. For example the options include types of contactors (solid state or mechanical), number of circuits plus spare required, voltage monitoring, alarm light indications, panel size, cable entry location and other parameters. A Raychem NGC-30 panel system can consist of multiple cabinets which are interlinked via a dedicated communication link. In general the master panel contains the User Interface Terminal (UIT), typically built into the door.

RAYCHEM NGC-30 COMPONENTS

Customers who wish to integrate the Raychem NGC-30 system into their own control panels can obtain the individual components separately. The Raychem NGC-30 system is configurable in different ways depending upon the requirements of the customer. The user interface for the Raychem NGC-30 is the User Interface Terminal (UIT). As soon as ground-fault measurement, line current measurements or distributed control requirements become important, the components Card Rack (CR), Card Rack Modules for mechanical relays (CRM) and/or solid state relays (CRMS), Current Transformer Modules (CTM) and Voltage Module (CVM) should be chosen. Users who want to build on the known and proven technology used in the MoniTrace 200N-E can continue using the fully compatible components; Remote Monitoring Modules (RMM) and Remote Modules for Control (RMC).

The powerful Raychem Supervisor (DTS) heat-tracing controller configuration and monitoring PC-software package completes the system. The Client - Server application enables the user to access all information from anywhere in the world, making Raychem Supervisor a strong management tool for the entire Heat Management System.



Examples of various Raychem NGC-30 configurations The following section gives an overview of the different components used in the Raychem NGC-30 system.

RAYCHEM USER INTERFACE TERMINAL (UIT)



The Raychem User Interface Terminal (UIT) is the central part of the Raychem NGC-30 communication. The UIT can be used as well with the Raychem NGC-20 (for more information see the Raychem NGC-20 datasheet). It covers heattracing monitoring, configuration and maintenance purposes. The Raychem User Interface Terminal (UIT) consists of a 8.4" LCD colour display using touch screen technology. This provides an easy user interface for programming without the need for keyboards or cryptic labels. The Raychem UIT communicates via RS-485 to the field and via RS-232/RS-485/Ethernet (selectable) to the Raychem Supervisory Software package as well as the plant process control system. The user interface terminal is available in two different models; the Raychem NGC-UIT2-ORD, ideal for indoor applications, is for direct mounting on the Raychem NGC-30 panel door. The Remote User Interface Terminal (NGC-UIT2-ORD-R) is a panel mounted display (NGC-UIT2-EX) for use with the Raychem NGC-30 panel that allows for the user interface to be mounted remotely. For detailed description see installation instruction NGC-UIT2-EX: INSTALL-168.

CARD RACK MODULE (CRM/CRMS)



The Raychem Card Rack Module controls up to 5 heat-tracing circuits. The Card Rack Modules are available in two versions, the Raychem NGC-30 CRM (for mechanical relays) and the Raychem NGC-30 CRMS (for solid state relays). Up to four of these Card Rack Modules can be installed in a panel mounted Card Rack. RTD's are either directly connected to the Raychem CRM(S) or alternatively collected via RMM's locally or centralized in the field (distributed architecture). The CRM/CRMS solution can control up to 260 individual heat-tracing circuits and monitor up to 388 temperature inputs (including 128 temperature inputs via RMMs).

CURRENT TRANSFORMER (CTM)



Raychem Current Transformers are an important part of the Raychem NGC-30 system. Raychem CRM in combination with current transformers offer the capability of monitoring and alarming on ground-fault and operating currents. Circuits can be tripped by the controller on high ground-fault currents.

VOLTAGE MODULE (CVM)



Raychem Voltage modules (CVM), used in combination with a Raychem CRM(S) offer the option to monitor the voltage in the panel. The Raychem CVM module uses one channel on one Raychem CRM board in a panel.

REMOTE MODULES FOR CONTROL (RMC)



The Raychem NGC-30 system also includes integrated control functionality. Multiple relay outputs to operate contactors of each heat-tracing circuit will be provided by Remote Modules for Control (RMC). Temperature inputs will be provided by Remote Monitoring Modules (RMM) while the control is executed by the UIT.

Raychem RMC units are modular and may be configured with 2 to 40 relay outputs. Each RMC unit also includes two digital inputs (DI) to monitor the status of circuit breakers or power contactors. A single UIT control unit can communicate with up to 10 RMC modules via a single, twisted pair RS-485 cable to provide distributed control of up to 250 heating cable circuits with a maximum of 128 temperature inputs (see Raychem RMM below). For more information refer to the datasheet of Raychem MONI-RMC. Circuits controlled via RMCs, can't be combined with the current transformers (CTM).

The Raychem NGC-30 system also supports building mixed systems of relay outputs via CRM(S) and RMCs, individual circuits can therefore be configured in the most appropriate way.

REMOTE MONITORING MODULES (RMM)



Remote Monitoring Modules (RMM) provide temperature monitoring capability for the Raychem NGC-30 system.

The RMM accepts inputs up to eight Pt 100 temperature sensors that measure pipe or ambient temperatures in a heat-tracing system. Up to 16 RMMs for a total monitoring capacity of 128 temperatures can be connected to the NGC-30 system. There are two versions available. The RMM2-E is without an enclosure. The RMM2-EX-E is build into a Hazardous approved enclosure. For more details see the RMM2-E/RMM2-EX-E datasheet in Technical Databook.

RAYCHEM SUPERVISORY SOFTWARE



The Raychem NGC-30 system integrates seamless with the Raychem Supervisor (DTS) heat-tracing controller configuration and monitoring software. It provides a graphical user interface for Raychem communication and heat-tracing controller products. The software supports the latest Raychem control systems via ModBus® protocol. Raychem Supervisor is a powerful client-server software package that gives the possibility to configure and monitor controllers from almost anywhere in the world, using the latest connectivity technologies. In addition to this functionality Raychem Supervisor includes the following functions:

- Logging & trending,
- Configuration of alarms
- Batch & recipe processing,
- Scheduled events,
- Group displays for monitoring multiple controllers at the same time
- Virtual Private Network (VPN) functionality for monitoring possibility on global basis
- Plant Reference Model for structuring controller on a logical way
- Support of plant documentation reports like plant group, location, line/ equipment number, breaker panel, controller panel, user and roles are included.

For more detailed information see Raychem Supervisor datasheet.

COMPATIBILITY WITH MONITRACE 200N-E

The Raychem NGC-30 is an upgrade of Pentair very successful MoniTrace-200N-E system. It provides a state-of-the-art user interface and an opportunity for existing 200N-E installations to benefit from the new features of the Raychem Supervisor software.

Using the new Raychem NGC-30 UIT2, circuits in existing MoniTrace 200 installations can now be upgraded to include monitoring functionality of ground fault and operating current and many other features as described in this document.

Technical Details

APPLICATION		
Туре	Surface Sensing/Ambient Sensing/PASC (Proportional Ambient Sensing Control)	
Area of use	Non-hazardous area indoors or outdoors typically panel mounted	
APPROVAL CERTIFICATION		
NGC-UIT2-EX	CE All components for ordinary areas.	
	(Russia, Kazakhstan, Belarus) For other countries contact your local Pentair representative.	
ELECTROMAGNETIC COMPATIBILITY		
Immunity	All components tested for heavy industrial environments	
Emissions	All components tested for residential/commercial/light industrial environments	
Vibration	Raychem NGC-30 UIT: meets requirements of IEC-60068-2-6	
Shock	Raychem NGC-30 UIT: meets requirements of IEC-60068-2-27	
ENCLOSURE		
Protection	UIT: IP 65 (NEMA 4) when mounted in a panel door.	
Ambient operating temperature range	UIT: -30°C to 60°C CRM(S): -40°C to 60°C, storage temp -40°C to 75°C	

ELECTRICAL PROPERTIES

Connection terminals	UIT and CRM both are equipped with 2.5 mm ² Phoenix style connectors with retaining
	screws.
Power supply	The NGC-UIT2-EX requires supply voltage of 9-30 V DC, 3.6-1.2 A. The CRM's powered by 12 V DC @ 400 mA per board. For more information about RMC and RMM see datasheets of individual components
Power consumption	UIT: 36 W max, CRM/CRMS: 5 W max.
Power output	CRM and CTM are calibrated for a maximum load of 60 A
Control output	Wired directly to contactor or SSR CRM: SPST 3 A @ 277 V AC max 50/60 Hz CRMS: 12 V DC @ 30 mA max per output

Communications

HARDWARE (UIT)	
Local port/ remote port;	Isolated RS232/RS-485, selectable. Ports may be used to communicate with
Communication port 1 UIT	(Raychem Supervisor Software) or DCS.
	The local RS-232 is a non-isolated, 9 pin D sub male;
	Remote RS-485 #2 is 2-wire isolated, 9 pin D sub male;
	Data rate is 9600 to 57600 baud;
	Maximum cable length for RS-485 not to exceed 1200 m (4000 ft).
	Cable to be shielded twisted pair.
	Max number of devices 247, Fail safe design with optional termination resistors
	Max length 1200 m, Data rate to 9600 baud.
Field port; communication port 2 UIT	RS485, used to communicate with external devices like RMM, RMC and NGC-30. typical
	max. cable length 1200 m, cable to be shielded twisted pair.
	Fail safe design with optional termination resistors
LAN UIT	10/100 Base-T Ethernet port with link and activity status LEDs. Protocol Modbus via
	TCP/IP; can be used to communicate to Raychem Supervisor
USB Port UIT	USB 2.0 Host port type A receptable

COMMUNICATIONS

Temperature (UIT)				
	Low alarm range	–73°C to 482°C or off		
	High Alarm range	-73°C to 482°C or off		
Ground fault monitoring (UIT, CRM	, CT)			
	Alarm range	10 mA to 200 mA		
	Trip range	10 mA to 200 mA or off		
Operating current (UIT, CRM, CT)				
	Low alarm range	1 A to 60 A or off		
	High alarm range	1 A to 60 A or off		
Voltage (CRM, CVM; optional)	Displays supply voltage to heat-tracing (Note: requires one operating current input)			
Autocycle	Each loop can be programmed	Each loop can be programmed from 1 to 1000 or off		
Temperature sensor inputs	One input standard per control point on CRM, optional temperature inputs via max. 16 RMMs (8 RTDs per RMM)			
COMMUNICATIONS				
Control modes	EMR: line sensing on/off, ambient on/off, PASC (proportional ambient sensing control)			
	SSR: line sensing on/off, ambie	SSR: line sensing on/off, ambient on/off,		
	PASC (proportional ambient sensing control),			
	Proportional (includes sof	t start for all SSR control modes)		
Units	°C or °F			
Deadband	1°C to 10°C			

ALARM OUTPUTS

	UIT: 3 [3 open collector outputs, to be combined with external relays]	
CONTROL OUTPUTS		
Number of output relays	CRM: 3-pole mechanical	
	CRMS: 1, 2 or 3 pole solid state, normally open (NO)	
Current maximum, used in	SSR: 60 A at 40°C	
combination with CRM(S) and CTM	EMR: 60 A at 40°C	
NETWORK CONNECTION		
Number of RMM's	Up to 16, individually addressable, each with up to 8, 3 wire Pt 100 inputs	
Number of CRM/CTM's	Up to 52 NGC-30-CRM may be connected to one NGC-30-UIT in combination with repeaters. 1 CRM has 5 circuits. In total 260 circuits per NGC-30 system.	
DISPLAY		
Туре	LCD is a XGA, colour TFT transflective device with integral LED backlight	
Screen size	175 mm x 132 mm	
Touchscreen	5-wire resistive touch screen interface for user entry, usable with gloved fingers	
PROGRAMMING AND SETTINGS		
Method	Via touch screen or Raychem Supervisor 2.1 or higher	
Language(s)	English, Russian, French, German, Spanish, Czech, Chinese	
Memory	Non-volatile, restores after power loss	

ORDERING NGC-30 CONTROL SYSTEM

The NGC-30 is offered as a complete solution, where the control system is already integrated into fully engineered control and power distribution panels. Using standard industrial enclosures, specific care has been taken to design the systems to highest safety standards by enabling optimum access for easy maintenance, as well a clear layout of the functional blocks and terminals. Customers desiring to build their own systems, can use the individual components of the Raychem NGC-30 and integrate them into their own power distribution panels. Below both options are described how to order the NGC-30 system.

ORDERING DETAILS INDIVIDUAL COMPONENTS

Product name	Description	Part Number (Weight)
NGC-UIT2-EX	User Interface Terminal	10332-032 (1.78 kg)
NGC-UIT2-ORD-R	User Interface Terminal with enclosure	10332-016 (8.86 kg)
NGC-30-CRM-E	Card Rack Module (EMR)	10720-008 (0.68 kg)
NGC-30-CRMS-E	Card Rack Module (SSR)	10720-009 (0.50 kg)
NGC-30-CTM-E	Current Transformer Module	10720-010 (0.36 kg)
NGC-30-CVM-E	Voltage Monitoring Module (CVM)	10720-011 (0.20 kg)
NGC-30-CR-E	Card Rack	10720-012 (3.66 kg)
PS12	Transformer 12 V DC	1244-001505 (0.18 kg)



Raychem NGC-40 PANEL MOUNTED ADVANCED MODULAR HEAT-TRACING CONTROL SYSTEM



CONTROL MODULES: NGC-40-HTC & NGC-40-HTC3

PRODUCT OVERVIEW

The Raychem NGC-40 is a multipoint electronic control, monitoring and power distribution system with a unique single-point controller architecture providing the most reliable central control and monitoring solution for your Heat Management System.

By taking advantage of innovative modular packaging techniques, the Raychem NGC-40 system provides configuration and component flexibility so that it may be optimised for a customer's project specific needs.



The Raychem NGC-40 uses a single controller module per heat-tracing circuit for maximum reliability. The Raychem NGC-40 control system can be powered between 100 to 240 Vac, while mechanical contactors (EMRs) or solid-state relays (SSRs) allow circuit switching up to 60 A at 600 Vac.

There are dedicated control modules available for single phase (NGC-40-HTC) and three-phase (NGC-40-HTC3) heat-tracing circuits. The Raychem NGC-40 control modules include ground-fault detection and protection. The control modules guarantee precise single phase and three-phase line current measurements. Up to eight (8) temperature sensors (RTDs) can be used for each heat-tracing circuit allowing a variety of temperature control, monitoring, and alarming configurations. The Raychem NGC-40 provides alarm outputs and digital inputs. The alarm output can be used to control an external annunciator.

The digital input is programmable and may be used for various functions such as forcing outputs on and off or generating alarms, making the system more flexible to match each customer's specific needs.

SIL2 SAFETY TEMPERATURE LIMITER: NGC-40-SLIM



The Raychem NGC-40 has a SIL2 certified safety temperature limiter module. The module can be used with up to 3 temperature inputs for three phase heattracing circuits. The limiter can be associated with a Raychem NGC-40 controller and use current information for latching the trip functionality. The front panel of the limiter module has LED indicators for various status conditions. The front panel also provides a button to confirm new set trip point, a reset trip button and a reset alarm button. The module has one output for the contactor and one output for external alarm annunciation. The safety temperature limiter can be reset via the digital input, the user interface Touch 1500 and Raychem Supervisor.

IO MODULE: NGC-40-IO



In addition to hardwiring an RTD directly into a Heat Trace Control module, RTDs can be wired to Input/output modules (NGC-40-IO) within the panel and assigned to heat-tracing circuits through software. This means that a Raychem NGC-40 system can be optimised for the specific application needs. Each IO module accepts up to four additional RTD inputs.

RMM2



The Raychem NGC-40 works with the MONI-RMM2 module. Each RMM2 module installed in the field can accept up to 8 RTDs. 16 RMM2 Modules can be daisy chained together via RS-485 for a total of 128 temperature inputs. Since multiple RMM2s can be networked over a single cable to the Raychem NGC-40, the cost of RTD field wiring will be significantly reduced.

The Raychem NGC-40 system supports multiple communications ports, allowing serial interfaces (RS-485 and RS-232) and network connections (Ethernet) to be used with external devices. All communications with the NGC-40 panel are accomplished through the NGC-40-BRIDGE module which acts as the central router for the system, connecting the panel's control modules, IO modules, safety

COMMUNICATION MODULE: NGC-40-BRIDGE



RAYCHEM TOUCH 1500



RAYCHEM SUPERVISOR SOFTWARE



limiter modules, RMM2 Modules, as well as upstream devices such as Raychem Touch 1500 touch screen, Raychem Supervisor (DTS) and Distributed Control System (DCS). Communications to devices external to the NGC-40 panel are done via Modbus® protocol over Ethernet, RS-485 or RS-232. The Raychem NGC-40 system supports multiple communications ports, allowing serial interfaces (RS-485 and RS-232) and network connections (Ethernet) to be used with external devices. All communications with the NGC-40 panel are

accomplished through the NGC-40-BRIDGE module which acts as the central router for the system, connecting the panel's control modules, IO modules, safety limiter modules, RMM2 Modules, as well as upstream devices such as Raychem Touch 1500 touch screen, Raychem Supervisor (DTS) and Distributed Control System (DCS). Communications to devices external to the NGC-40 panel are done via Modbus® protocol over Ethernet, RS-485 or RS-232.

The Raychem Supervisor (DTS) software package provides a remote, graphic interface for the Raychem NGC-40. The software allows the user to configure and monitor various NGC systems from a central location. It also provides an audible alarm tone, acknowledges and clears alarms; and contains advanced features such as data logging, trending, implement changes in batches, and other useful functions. Users can access all information from anywhere in the world, making Raychem Supervisor a powerful management tool for the entire Heat Management System.

NGC-40

GENERAL RAYCHEM NGC-40 CONTROLLER MODULES

Application type	The Raychem NGC-40 Hazardous area appro heat-tracing circuits i	The Raychem NGC-40 units shall be installed in non-hazardous areas. Hazardous area approved sensors shall be used when the system is applied to heat-tracing circuits in hazardous areas.	
Approval certification	CE	(Russia, Kazakhstan, Belarus) For other countries contact your	



ETL not for NGC-40-SLIM module

local Pentair representative.

ELECTROMAGNETIC COMPATIBILITY		
Emissions	EN 61000-6-3	
Immunity	EN 61000-6-2	
Supply voltage	24 Vdc +- 10%	
Internal power consumption	< 2.4 W per module	
Ambient operating temperature	-40°C to 65°C (-40°F to 149°F)	
Ambient storage temperature	-40°C to 75°C (-40°F to 167°F)	
Environment	PD2, CAT III	
Maximum altitude	2,000 m (6,562 ft)	
Humidity	5 – 90% non-condensing	
Mounting	Din Rail – 35 mm	
CAN NETWORKING PORT		
Туре	2-wire isolated CAN-based peer to peer network. Isolated to 24 Vdc – verified by 500 Vrms dielectric withstand test	
Connection	Two 8-pin RJ-45 connectors (both may be used for Input or Output connections) Protocol Proprietary NGC-40	
Topology	Daisy chain	
Cable length	10 m (33 ft) maximum	
Quantity	Up to 80 HTC/HTC3 and IO modules per network segment	
Address	Unique, factory assigned	
CONNECTION TERMINALS AND HOU	SING	
Wiring terminals	Spring-type, 0.5 to 2.5 mm ² (24 to 12 AWG)	
Housing Size	45.1 mm (1.78 in) wide x 87 mm (3.43 in) high x 106.4 mm (4.2 in) deep	
Module specific information		
NGC-40-HTC/NGC-40-HTC3		
Temperature Sensors	Type 100 Ω platinum RTD, 3-wire, a = 0.00385 ohms/ohm/°C Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor 100 Ω , Ni-Fe, 2-wire. Can be extended with a 2-wire shielded cable of 20 Ω maximum per conductor	
Quantity Temperature sensors	One per NGC-40-HTC/HTC3 module	
Measuring range	Temperature range from -80°C to +700°C (-112°F to 1292°F)	
Current measurement	Internal to the module	
Current measurement NGC-40-HTC	1 for single-phase line current measurements, 60A, +/- 2% of range	
Current measurement NGC-40-HTC3	3 for three-phase line current measurements, 60A, +/- 2% of range	
Ground-fault	1 for ground-fault measurements, 10-250 mA, +/- 2% of range	
Alarm Relay	Dry contact relay (voltage free). Relay contact rated 250 V/3 A 50/60 Hz (EC) and 277 V/3 A 50/60 Hz (cCSAus). Alarm relay is programmable. N0 and NC contacts available.	
Contactor Output Relay	Relay contact rated 250 V/3 A 50/60 Hz (EC) and 277 V/3 A 50/60 Hz (cCSAus).	
SSR Output	12 Vdc @ 45 mA max per output	
Digital Input	Multi-purpose input Multi-purpose input for connection to external dry (voltage-free) contact or DC voltage. May be user programmable for: not used/force off/force on functions. It can be configured to be active open or active closed.	

NGC-40-SLIM

Functional Safety Approval	Baseefa Functional safety according to Baseefa10SR0109 SIL 2 IEC 61508-1-1998 & IEC 61508-2-2000		
Conditions of use	See installation instructions		
Measuring range	Temperature range limiter from +50°C to +500°C (-22°F to 932°F)		
Temperature Sensor	Type: 100 Ω platinum RTD, 3-wire, a = 0.00385 ohms/ohm/°C. Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor. Quantity: 3 per NGC-40-SLIM module.		
Digital Input	Used for resetting the safety temperature limiter remotely. The Digital Input will be for connection to external dry (voltage free) contactor or DC voltage. The input shall be 5 – 24 VDC/1mA max with 100 ohms of loop resistance and configured as active low.		
NGC-40-10			
Temperature Sensors	Type 100 Ω platinum RTD, 3-wire,a = 0.00385 ohms/ohm/°C Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor 100 Ω , Ni-Fe, 2-wire. Can be extended with a 2-wire shielded cable of 20 Ω maximum per conductor.		
Quantity Temperature sensors	Up to four wired directly to each NGC-40-10 module		
Alarm Relay	Dry contact relay (voltage free). Relay contact rated 250 V/3 A 50/60 Hz (EC) and 277 V/3 A 50/60 Hz (cCSAus). Alarm relay is programmable. N0 and NC contacts available.		
Digital Input	Multi-purpose input Multi-purpose input for connection to external dry (voltage-free) contact or DC voltage. May be user programmable for: not used/force off/force on functions. It can be configured to be active open or active closed.		

NGC-40-BRIDGE

Communications COM1, COM	2
Туре	2-wire RS-485
Cable	One shielded twisted pair
Length	1,200 m (4,000 ft) maximum
Quantity	Up to 255 devices per port
Data rate	9600, 19.2K, 38.4K, 57.6K, 115.2K baud
Data bits	7 or 8
Parity	None, even, odd
Stop bits	0, 1, 2
Tx delay	0 – 5 sec.
Protocol	Modbus RTU or ASCII
Connection terminals	Spring-type terminals

COMMUNICATIONS COM3

Туре	RS-232
Cable	Custom TTC# 10332-005
Length	15 m (50 ft) maximum
Data rate	9600, 19.2K, 38.4K, 57.6K, 115.2K baud
Data bits	7 or 8
Parity	None, even, odd
Stop bits	0, 1, 2
Tx delay	0 – 5 sec.
Protocol	Modbus RTU or ASCII
Connection terminals	RJ-11

ETHERNET

Туре	10/100 BaseT Ethernet network
Length	100 m (328 ft)
Data rates	10 or 100 MB/s
Protocol	Connection terminals
Connection terminals	Shielded 8-pin RJ-45 connector on front of module

NGC-40-PTM		
Connection terminals	Spring-type, 0.5 to 2.5 mm ² (24 to 18 AWG). As the current to the modules require up to 2.05 A @ 24Vdc (20 modules - see CAN Bus connection diagrams) the minimum wire size to the module shall be 1.0 mm2 (AWG18)	
CAN networking and module Power	 Two RJ-45 connectors, one each IN and OUT. Provides CAN bus signals and 24 Vdc power. 	
ТОИСН 1500		
General		
Area of use	Nonhazardous, Indoors (IP65, NEMA 4)	
Supply voltage	10 - 30 Vdc	
Amperage rating	Steady state 1.8 A	
Surge current	16 A	
Operating temperature	0°C to 50°C (32°F to 122°F) w/o space heater, –30°C to 50°C (–22°F to 122°F) using space heater and screen cover	
Storage temperature	-20°C to 60°C (-4°F to 140°F)	
Dimensions	449.9 mm (W) X 315.6 mm (H) X 141.7 mm (D)	
Relay outputs	One Form C relay rated at 12 A @ 250 Vac. Relay is used as a common alarm. To be ordered separately	
Display	LCD is a 15-in XGA, color TFT transflective device with integral CCFL backlight Touch Screen 4-wire resistive touch screen interface for user entry	
NETWORK CONNECTION		
Local/Remote Port	RS-232/RS-485 ports may be used to communicate with host (Raychem Supervisor Software) or DCS 9 pin D sub male	
Remote RS-485	2-wire isolated, 9 pin D sub male Data rate 9600 to 57600 baud Maximum cable length not to exceed 1200 m (4000 ft). Cable length to be shielded, twisted pair.	
Field Port	RS-485, 2-wire isolated, used for communication with external devices, such as Raychem NGC-40-BRIDGE and Raychem NGC-20. Maximum cable length not to exceed 1200 m (4000 ft). Cable to be shielded twisted pair. Signals 2-wire isolated, 9 pin D sub male Data rate to 9600 baud	
LAN	10/100 Base-T Ethernet port with Link and Activity Status LEDs (X2)	
USB Ports	USB 2.0 Host port Type A receptacle (X4)	
PART NUMBERS		
Product name	Description	Part Number
NGC-40-HTC	NGC-40 single phase heat trace control module	10730-003
NGC-40-HTC3	NGC-/() three phase heat trace control module	10730-00/

NGC-40-HTC	NGC-40 single phase heat trace control module	10730-003
NGC-40-HTC3	NGC-40 three phase heat trace control module	10730-004
NGC-40-SLIM	NGC-40 Safety Temperature Limiter	1244-010700
NGC-40-10	NGC-40 Input - Output Module	10730-001
NGC-40-BRIDGE	NGC-40 Communication Bridge Module	10730-002
NGC-40-PTM	NGC-40 Power Termination Module	10730-005
TOUCH1500	TOUCH1500 display kit– 15" Touch screen and Relay Output Module	10332-009
TOUCH1500R	Touch 1500 in enclosure for remote mounting on wall	10332-020
RELAY OUTPUT - TOUCH	Relay Output Module /w Modbus for Touch 1500	10332-017
NGC-40-CAN05	NGC-40 CAN Cable Length 5"	20578011-005
NGC-40-CAN48	NGC-40 CAN Cable Length 48"	20578011-048
NGC-40-TB	CANbus termination plug	10392-043
PS-24	24 Vdc Power supply	972049-000