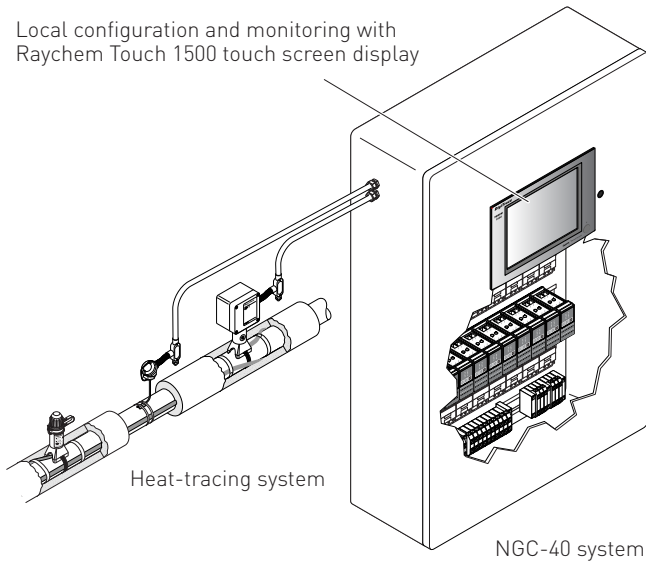# Raychem NGC-40

PANEL MOUNTED ADVANCED MODULAR HEAT-TRACING CONTROL SYSTEM

Local configuration and monitoring with Raychem Touch 1500 touch screen display
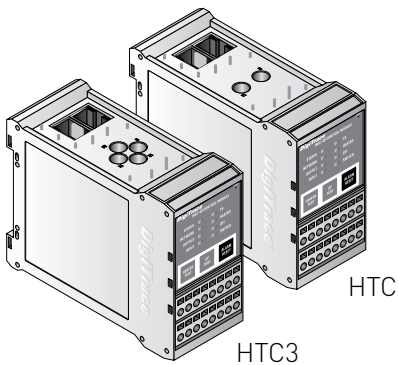
Heat-tracing system

NGC-40 system

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.

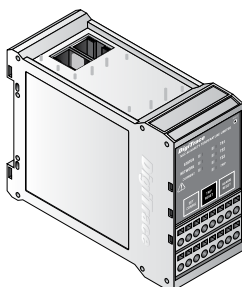### CONTROL MODULES: NGC-40-HTC & NGC-40-HTC3

HTC

HTC3

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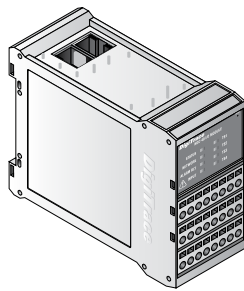
The digital input is programmable and may be used for various functions such as forcing outputs on and off or generating alarms, making the system more flexible to match each customer's specific needs.

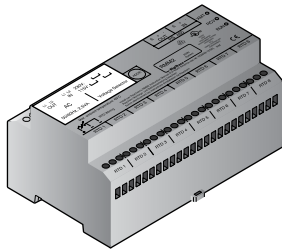### SIL2 SAFETY TEMPERATURE LIMITER: NGC-40-SLIM

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 heat-tracing 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.
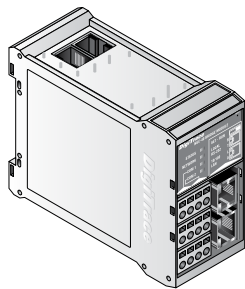
IO MODULE: NGC-40-IO

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.
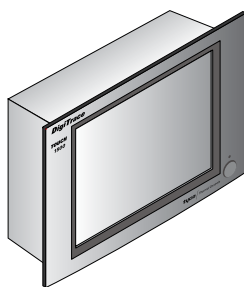
RMM2

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.

COMMUNICATION MODULE: NGC-40-BRIDGE

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.

RAYCHEM TOUCH 1500

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RAYCHEM SUPERVISOR SOFTWARE

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.

GENERAL RAYCHEM NGC-40 CONTROLLER MODULES

Application type	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 ETL not for NGC-40-SLIM module

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	–40ºC to 65ºC (–40ºF to 149ºF)
Ambient storage temperature	–40ºC to 75ºC (–40ºF to 167ºF)
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

Type	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 HOUSING

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,α = 0.00385 ohms/ohm/ºC 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	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, α = 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-IO

Temperature Sensors	Type 100 Ω platinum RTD, 3-wire, α = 0.00385 ohms/ohm/ºC 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-IO 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, COM2

Type	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

Type	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

Type	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 mm² (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.

TOUCH 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-40 three phase heat trace control module	10730-004
NGC-40-SLIM	NGC-40 Safety Temperature Limiter	1244-010700
NGC-40-IO	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