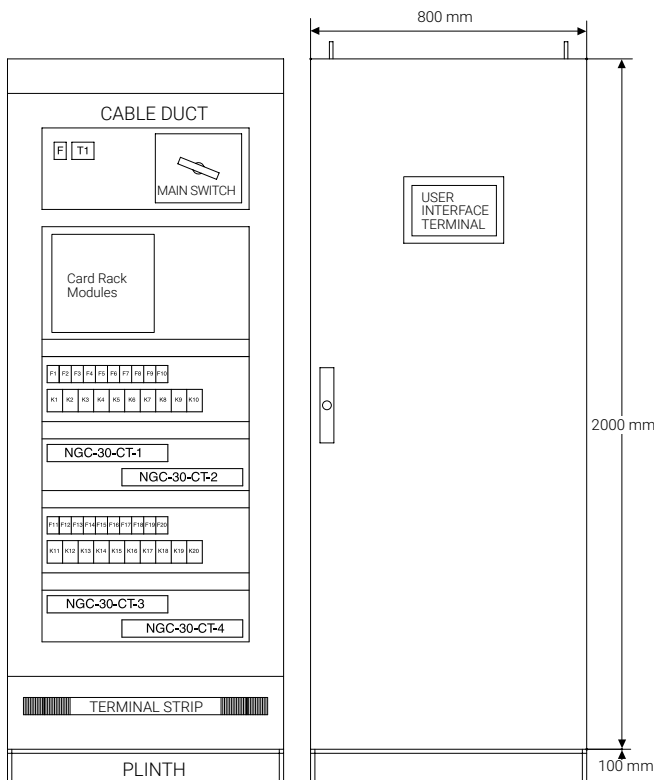# NGC-30

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

PRODUCT OVERVIEW

The nVent 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 nVent RAYCHEM NGC-30 system can minimise routine checks by transforming field data into valuable information for maintenance and operations.
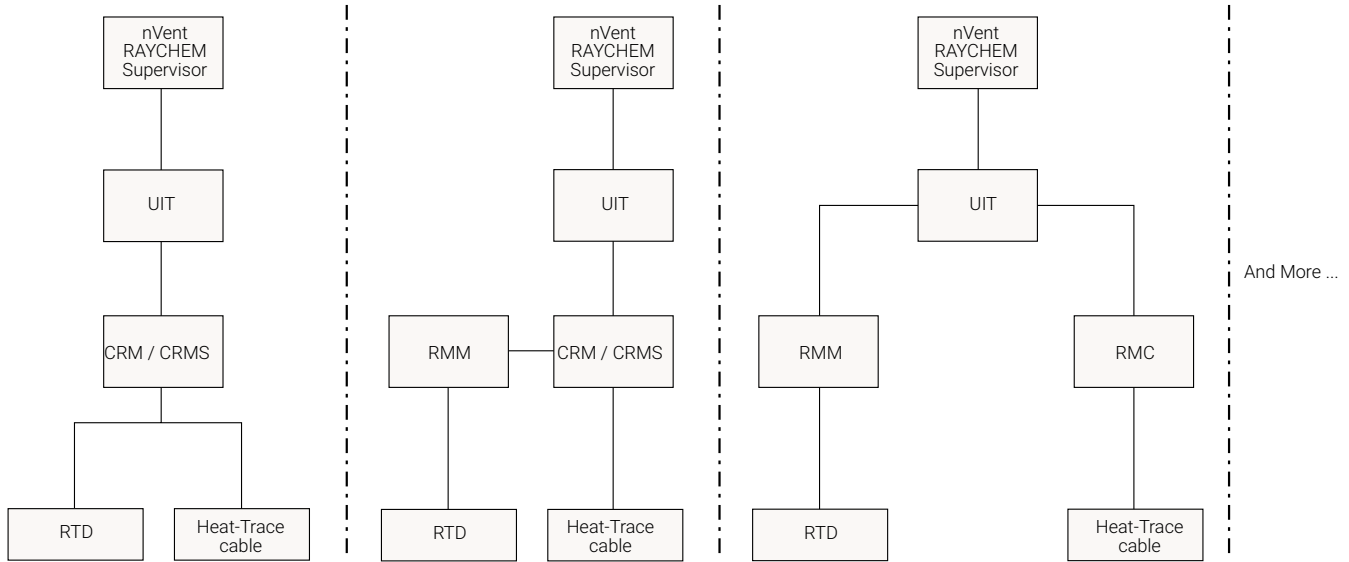
NVENT RAYCHEM NGC-30 PANEL

The nVent RAYCHEM NGC-30 is available as a complete distribution panel 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 nVent 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.

NVENT RAYCHEM NGC-30 COMPONENTS

Customers who wish to integrate the nVent RAYCHEM NGC-30 system into their own control panels can obtain the individual components separately. The nVent RAYCHEM NGC-30 system is configurable in different ways depending upon the requirements of the customer. The user interface for the nVent RAYCHEM NGC-30 is the User Interface Terminal (NGC-UIT2-EX). 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. The nVent RAYCHEM NGC-30 system has two Remote Measurement Modules available. These modules are the RMM2 for temperature measurement and the RMM-DI for digital inputs. 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 Module (RMM2) and Remote Modules for Control (RMC).

The powerful nVent nVent RAYCHEM Supervisor 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 nVent RAYCHEM Supervisor a strong management tool for the entire Heat Management System.

Examples of various nVent RAYCHEM NGC-30 configurations

The following section gives an overview of the different components used in the nVent RAYCHEM NGC-30 system.

NVENT RAYCHEM USER INTERFACE TERMINAL (UIT)
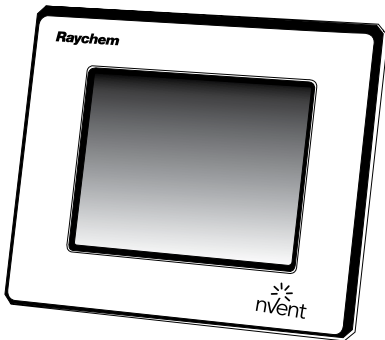
The nVent RAYCHEM User Interface Terminal (NGC-UIT2-EX) is the central part of the nVent RAYCHEM NGC-30 communication. The UIT can be used as well with the nVent RAYCHEM NGC-20 (for more information see the nVent RAYCHEM NGC-20 datasheet). It covers heat-tracing monitoring, configuration and maintenance purposes.

The nVent RAYCHEM User Interface Terminal (NGC-UIT2-EX) 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 nVent RAYCHEM UIT communicates via RS-485 to the field and via RS-232/RS-485/Ethernet (selectable) to the nVent RAYCHEM Supervisory Software package as well as the plant process control system. The user interface terminal is available in two different models; the nVent RAYCHEM NGC-UIT2-ORD, ideal for indoor applications,

is for direct mounting on the nVent 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 nVent 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)
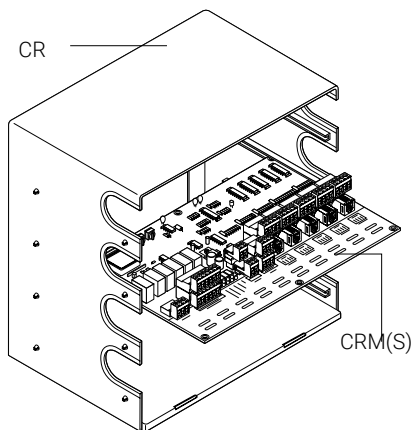
The nVent RAYCHEM Card Rack Module controls up to 5 heat-tracing circuits. The Card Rack Modules are available in two versions, the nVent RAYCHEM NGC-30 CRM (for mechanical relays) and the nVent RAYCHEM NGC-30 CRMS (for solid state relays). Up to four of these Card Rack Modules can be installed in a panel mounted Card Rack. RTD's are either directly connected to the nVent 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)
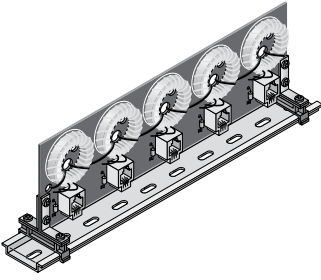
nVent RAYCHEM Current Transformers are an important part of the nVent RAYCHEM NGC-30 system. nVent RAYCHEM CRM in combination with current transformers offer the capability of monitoring and alarming on ground-fault and operating currents. Circuits can be tripped by the controller on high ground-fault currents.

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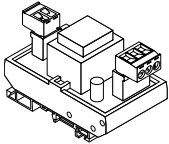
nVent RAYCHEM Voltage modules (CVM), used in combination with a nVent RAYCHEM CRM(S) offer the option to monitor the voltage in the panel. The nVent RAYCHEM CVM module uses one channel on one nVent RAYCHEM CRM board in a panel.

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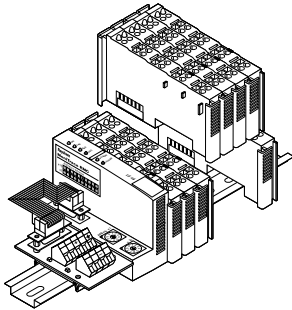
The nVent RAYCHEM NGC-30 system also includes integrated control functionality. Multiple relay outputs to operate contactors of each heat-tracing circuit will be provided by Remote Modules for Control (RMC). Temperature inputs will be provided by Remote Monitoring Modules (RMM) while the control is executed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

nVent 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 nVent RAYCHEM RMM below). For more information refer to the datasheet of nVent RAYCHEM MONI-RMC. Circuits controlled via RMCs, can't be combined with the current transformers (CTM).

The nVent 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.

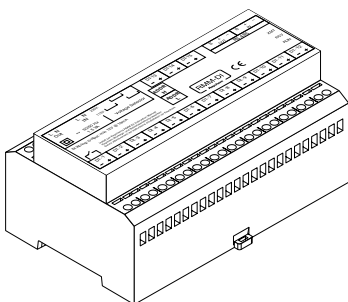## REMOTE MONITORING MODULES (RMM2) FOR TEMPERATURE MEASUREMENT
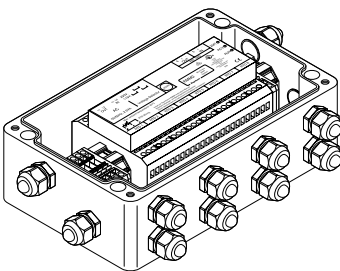
Remote Monitoring Modules (RMM2) provide temperature monitoring capability for the nVent RAYCHEM NGC-30 system.

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.

REMOTE MONITORING MODULES (RMM-DI) FOR DIGITAL INPUT

Remote Monitoring Module for Digital Inputs (RMM-DI) provides digital input monitoring capability for the nVent RAYCHEM NGC-30 system. The RMM-DI accepts inputs up to 15 digital inputs per module. Up to 247 RMM-DI modules can be connected to the nVent RAYCHEM NGC-30 system. The RMM-DI module can currently only be installed in safe area. For more details see the RMM-DI datasheet.

NVENT RAYCHEM SUPERVISORY SOFTWARE
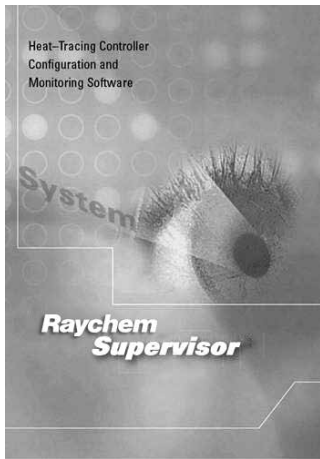
The nVent RAYCHEM NGC-30 system integrates seamless with the nVent RAYCHEM Supervisor heat-tracing controller configuration and monitoring software. It provides a graphical user interface for nVent RAYCHEM communication and heat-tracing controller products. The software supports the latest nVent RAYCHEM control systems via ModBus® protocol. nVent 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 nVent 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 nVent RAYCHEM Supervisor datasheet.

COMPATIBILITY WITH MONITRACE 200N-E

The nVent RAYCHEM NGC-30 is an upgrade of nVent RAYCHEM's 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 nVent RAYCHEM Supervisor software.

Using the new nVent 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

Type	Surface Sensing/Ambient Sensing/PASC (Proportional Ambient Sensing Control)
Area of use	Non-hazardous area indoors or outdoors typically panel mounted

APPROVAL CERTIFICATION

NGC-30	CE All components for ordinary areas.
	EAC (Russia, Kazakhstan, Belarus) For other countries contact your local nVent representative.
NGC-UIT2-EX	EAC Ex RU C-BE.ИМ43.В.01764 ООО "ТехИмпорт" 2Ex nA IIC T5 Gc IP54 Ta -40°C...+60°C Made in US

ELECTROMAGNETIC COMPATIBILITY

Immunity	All components tested for heavy industrial environments
Emissions	All components tested for residential/commercial/light industrial environments
Vibration	nVent RAYCHEM NGC-30 UIT: meets requirements of IEC-60068-2-6
Shock	nVent 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 mm² 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; Communication port 1 UIT	Isolated RS232/RS-485, selectable. Ports may be used to communicate with (nVent 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 nVent 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 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, ambient on/off,
	    PASC (proportional ambient sensing control),
	    Proportional (includes soft 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 combination with CRM(S) and CTM	SSR: 60 A at 40°C 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

Type	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 nVent 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 nVent 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)

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nVent.com   CADDY   ERICO   HOFFMAN   RAYCHEM   SCHROFF   TRACER