

CONNECT AND PROTECT

Industrial Heat Tracing Products & Services

IEC / ATEX


nvent

RAYCHEM

BUILDING A MORE— SUSTAINABLE AND ELECTRIFIED WORLD



Our nVent RAYCHEM solutions work to connect and protect a more sustainable and electrified world with products and services that increase **energy efficiency**, enhance **customer productivity**, extend the **lifespan of systems** and improve **end-user safety**.

nVent.com/RAYCHEM

BUILDING A MORE SUSTAINABLE AND ELECTRIFIED WORLD

We provide freeze protection and heat management solutions to a wide range of industrial markets: oil & gas, (petro) chemical, pharmaceutical, manufacturing, power, mining...

Our solutions also support the energy transition, with applications in LNG, Clean Fuels, Hydrogen, Carbon Capture & Storage.



Energy Efficiency

Our solutions improve energy efficiency for our customers.



Customer Productivity

Our solutions reduce labor cost in design and installation, improve utilization and reduce total cost of ownership.



Safety

Our solutions improve end-user safety and help our customers enhance the safety of their operations.



Resiliency and Protection

Our solutions add resiliency to critical systems by helping keep them safe from natural and manmade disruptions.



Lifespan and Serviceability

Our solutions extend the lifespan of our customers' systems, reducing waste and lowering cost.



Eco-Friendly

We support customers sustainability goals by developing environmentally friendly products and solutions.

BEFORE YOU BUY, WEIGH THE FACTS....



TIME-TESTED QUALITY

QUALITY

We are the **inventor** of self-regulating heating technology. Our cables are designed & manufactured in the USA since 1972.

We offer **complete systems**

20+ year design life

10-year product warranty

High Power Retention (HPR) technology



200+ EXPERT DESIGNERS
6000+ INSTALLERS

EXPERTISE

We offer **turnkey project solutions**, delivering seamless project management, efficient system designs, on-time delivery, schedule compression & power distribution savings

200+ expert designers

300+ trained field personnel

600,000+ optimized EHT circuits

Engineering automation



600,000KM INSTALLED
= 15X AROUND THE GLOBE

RELIABLE

Our systems provide maximum performance with 600,000 km of cable installed in 100+ countries since 1972.

Proven to perform in the **world's most remote and harshest environments**

Advanced **control & monitoring**

Wide temperature ranges from **-200°C to +1000°C**

Highest **QUALITY** Products

+










































EXPERTISE Optimal System Design & Installation

=

RELIABLE Performance & Lower Cost of Ownership



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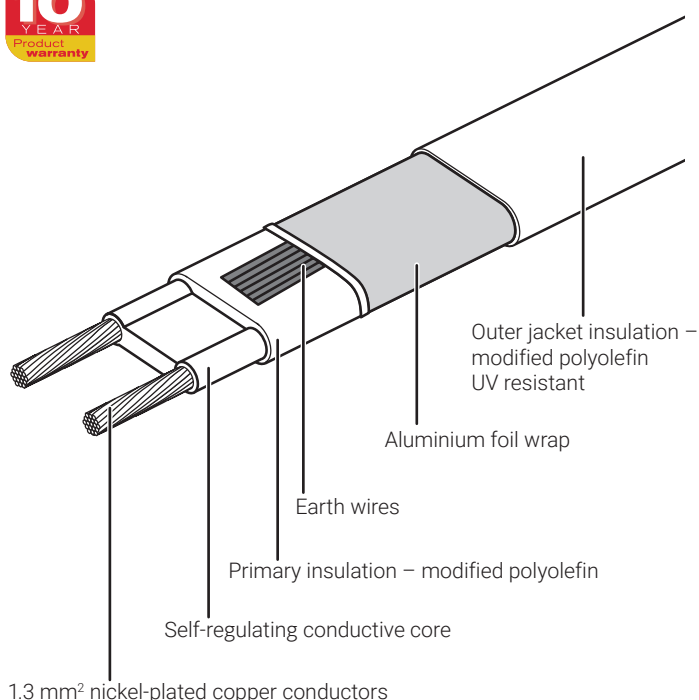
Max continuous exposure, or max continuous operating temperature (°C)												Product	Technology	
50	100	150	200	250	300	350	400	450	500	550	600			
65													BTV	Parallel self-regulating Field-terminated
	110												QTVR	Parallel self-regulating Field-terminated
		150											XTVR	Parallel self-regulating Field-terminated
			205										HTV	Parallel self-regulating Field-terminated
				260									VPL	Parallel power-limiting Field-terminated
			200										FMT	Parallel Constant Wattage Zone Field-terminated
				260									FHT	Parallel Constant Wattage Zone Field-terminated
	90												XPI-F	Polymer Insulated (PI) Series Constant Wattage, Field-terminated
				260									XPI	Polymer Insulated (PI) Series Constant Wattage, Field-terminated
				260									XPI-S	Polymer Insulated (PI) Series Constant Wattage, Field-terminated
	80												HCHR/HCCR (LSZH)	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
			200										HCH/HCC	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
							400						HDF/HDC	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
											600		HSQ	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
										550			HAX	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
												600	HIQ	Mineral Insulated (MI) Series Constant Wattage, Factory-terminated
			250										STS/STS-HV	Skin effect Tracing System (STS) Engineered Product

For exact data per cable type, go to datasheet.

Max. intermittent exposure temperature (°C) ◆Continuous power off	Temperature classification		Preferred control method				Typical pipe length range (m)
	T-class unconditional (product approach)	T-class per design (system approach)	No control	Ambient sensing	Broad temperature range (+/-10°C)	Tight temperature control (+/-3°C)	
85	T6	-					0 - 400
110	T4	T5-T6					0 - 400
250	T3	T4-T6					0 - 400
260	T2/T3	T3-T6					0 - 400
260◆	-	T1-T6					0 - 600
200◆	-	T2-T6					0 - 400
260◆	-	T2-T6					0 - 600
100◆	-	T2-T6					Up to 3000
300◆	-	T2-T6					Up to 5000
300◆	-	T2-T6					Up to 5000
80◆	-	T2-T6					Up to 5000
200◆	-	T2-T6					Up to 5000
400◆	-	T1-T6					Up to 2500
700◆	-	T1-T6					Up to 500
700◆	-	T1-T6					Up to 5000
1000◆	-	T1-T6					Up to 500
250◆	-	T2-T6					Up to 50,000

Self-Regulating Heating Cable

PRODUCT OVERVIEW



The nVent RAYCHEM BSA self-regulating heating cable is designed for industrial pipe freeze protection without steam cleaning and moderate process temperature requirements. It can be used for indoor and outdoor installation in ordinary (non-hazardous) area applications.

The foil wrap/drain-wire construction provides a highly flexible cable, that is easy to install around complex or small pipe networks.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal Plastic
Chemical resistance	Mild inorganic solutions

Supply voltage

230 Vac

PRODUCT SPECIFICATIONS

Product dimensions (nominal) and weight

	3BSA2-DR	7BSA2-DR
Thickness (mm)	5.7	5.7
Width (mm)	13.0	13.0
Weight (g/m)	100	100

Technical details

Maximum maintain or continuous exposure temperature (power on/off) 65°C

Maximum intermittent exposure temperature (power on/off) 85°C
Maximum cumulative exposure 1000 hours

Minimum installation temperature -60°C

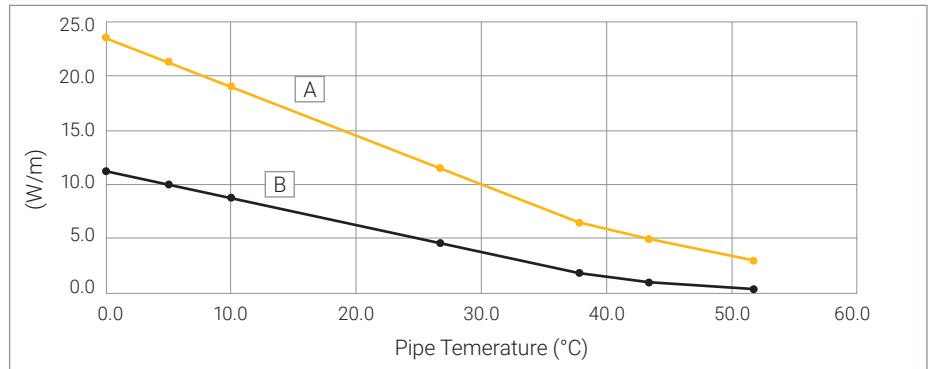
Minimum bend radius at 20°C: 10 mm
at -60°C: 35 mm

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

A 7BSA2-DR

B 3BSA2-DR



	3BSA2-DR	7BSA2-DR
Nominal power output (W/m at 10°C)	9W/m	19W/m

Maximum circuit length based on Type 'C' circuit breakers according to EN 60898

Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m)	
16 A	-20°C	126	70
	+10°C	150	120
20 A	-20°C	150	87
	+10°C	150	120
25 A	-20°C	150	109
	+10°C	150	120

The above numbers are for circuit length estimation only. For more detailed information please use nVent RAYCHEM TraceCalc software or contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary area.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	3BSA2-DR	7BSA2-DR
Part No.	P000002271	P000002272

Components

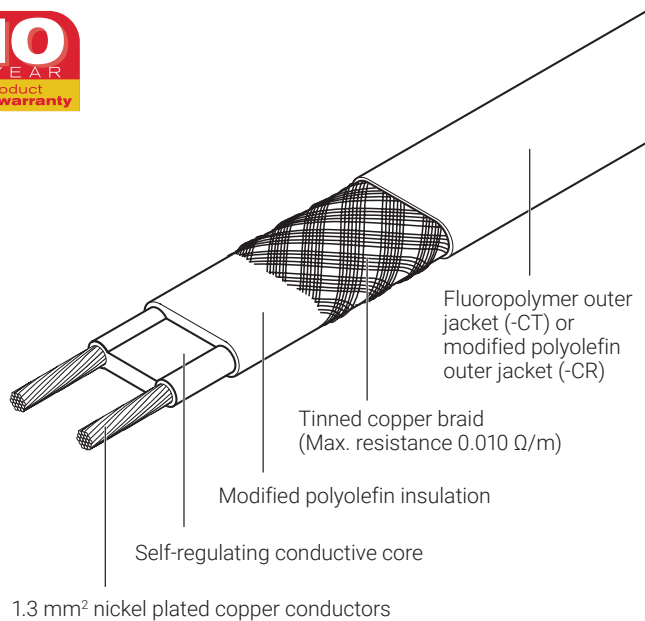
nVent offers a full range of components for power connections, splices and end seals. As a minimum a connection kit and end seal must be used from the below list to ensure proper functioning of the product and compliance with electrical requirements.

Name	Part number	Description
JB-82	535679-000	Junction box , polycarbonate, 4 entries, non-hazardous
JB-NH2	1244-020910	Junction box , engineered polymer, 2 entries, non-hazardous
JB-NH4	1244-020911	Junction box , engineered polymer, 4 entries, non-hazardous
SB-110	707366-000	Support bracket (other brackets possible SB-100, SB-101, SB-130)
C25-01	1244-020909	Hot applied connection kit to the Junction Box, non hazardous
IEK-25-04	332523-000	Insulation entry kit
IEK-25-pipe	1244-001050	Insulation entry kit for pipe mounting
E-02-AL	1244-020913	Cold applied end seal kit, non hazardous
CSE-05-DR	1244-021440	Cold lead/splice connection and end seal kit, non hazardous



Self-regulating Heating Cable

PRODUCT OVERVIEW



Electrical heat-tracing for frost protection without steam cleaning. The nVent RAYCHEM BTV-family of self-regulating, parallel circuit heating cables is used for frost protection of pipes and vessels. It can also be used for process temperature maintenance up to 65°C.

Application

Traced surface type	Carbon steel Stainless steel Plastic Painted or unpainted metal
Chemical resistance	For organic corrosives: use -CT (fluoropolymer outer jacket) For mild inorganic solutions: use -CR (modified polyolefin outer jacket) For aggressive organics and corrosives consult your local nVent representative

Supply voltage

230 Vac (Contact your local nVent representative for data on other voltages)

PRODUCT SPECIFICATIONS

Product dimensions and weight

	3BTV2-CR 3BTV2-CT	5BTV2-CR 5BTV2-CT	8BTV-2-CR 8BTV-2-CT	10BTV2-CR 10BTV2-CT
Width x Thickness (nominal) mm	10.5 x 5.5		13.2 x 5.5	
Weight (g/m)	110		150	

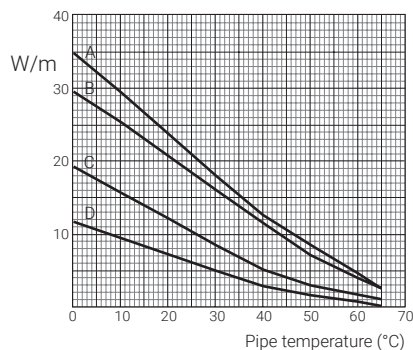
Technical details

Maximum maintain or continuous exposure temperature (power on/off)	65°C
Maximum intermittent exposure temperature (power on/off)	85°C Maximum cumulative exposure 1000 hours
Minimum installation temperature	-60°C
Minimum bend radius	-60°C ≤ T < -20°C: 35 mm -20°C ≤ T < -10°C: 30 mm -10°C ≤ T < 0°C: 25 mm 0°C ≤ T < +10°C: 20 mm T ≥ +10°C: 12 mm

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

- A 10BTV2-CT**
10BTV2-CR
- B 8BTV2-CT**
8BTV2-CR
- C 5BTV2-CT**
5BTV2-CR
- D 3BTV2-CT**
3BTV2-CR



	3BTV2-CR 3BTV2-CT	5BTV2-CR 5BTV2-CT	8BTV2-CR 8BTV2-CT	10BTV2-CR 10BTV2-CT
Nominal power output (W/m at 10°C)	9	16	25	29

Maximum circuit length based on type 'C' circuit breakers according to EN 60898

Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m)			
16 A	-20°C	155	110	70	45
	+10°C	200	160	110	65
20 A	-20°C	195	140	90	55
	+10°C	200	160	125	85
25 A	-20°C	200	160	110	70
	+10°C	200	160	125	105
32 A	-20°C	200	160	125	90
	+10°C	200	160	125	110

The above numbers are for circuit length estimation only. For more detailed information please use the nVent RAYCHEM TraceCalc software or Contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use ordinary area and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust).

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Part description	3BTV2-CR	5BTV2-CR	8BTV-2-CR	10BTV2-CR
Part No. (*)	914279-000	414809-000	479821-000	677245-000
Part description	3BTV2-CT	5BTV2-CT	8BTV-2-CT	10BTV2-CT
Part No. (*)	469145-000	487509-000	008633-000	567513-000

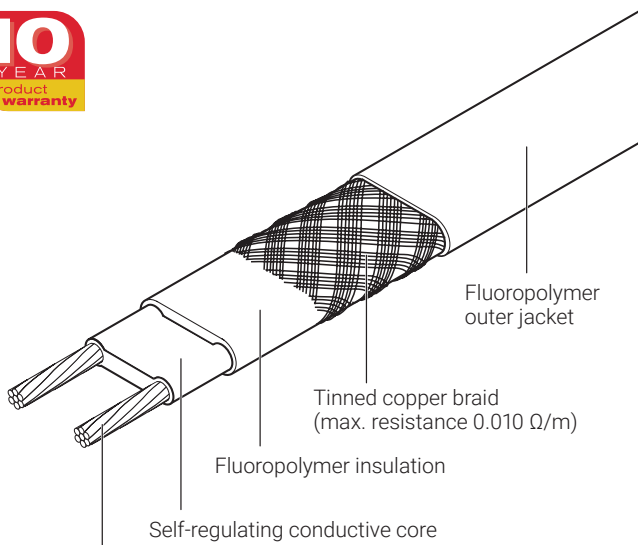
Components

nVent offers a full range of components for power connections, splices and end seals. These components must be used to ensure proper functioning of the product and compliance with electrical requirements.

(*) Localized versions may exist with limited approvals and different part numbers. Contact your local sales representative

Self-regulating heating cable

PRODUCT OVERVIEW



1.4 mm² nickel plated copper conductors (10 and 15QTVR2-CT)
 2.3 mm² nickel plated copper conductors (20QTVR2-CT)

Electrical heat-tracing for process temperature maintenance applications up to 110°C which are not subject to steam cleaning.

The nVent RAYCHEM QTVR family of self-regulating, parallel circuit heating cables is used for process temperature maintenance of pipes and vessels.

It can also be used for frost protection of large pipes and for applications requiring medium temperature exposure capability.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative

Supply voltage

230 Vac (Contact your local nVent representative for data on other voltages)

Heating Cables

PRODUCT SPECIFICATIONS

Product dimensions and weight

	10QTVR2-CT	15QTVR2-CT	20QTVR2-CT
Width x Thickness (nominal) mm	11.8 x 4.5		14.0 x 5.1
Weight (g/m)	126		180

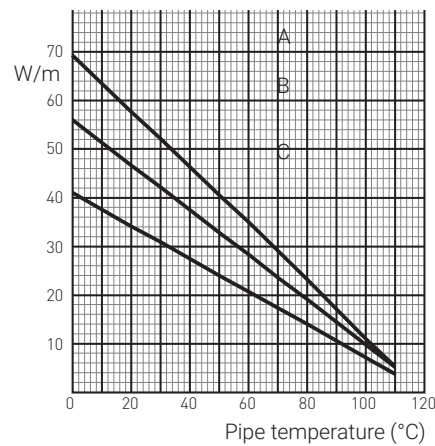
Technical details

Maximum maintain or continuous exposure temperature (power on/off)	110°C
Maximum intermittent exposure temperature (power on/off)	110°C
Minimum installation temperature	-60°C
Minimum bend radius	-60°C ≤ T < -20°C: 35 mm -20°C ≤ T < -10°C: 30 mm -10°C ≤ T < 0°C: 25 mm 0°C ≤ T < +10°C: 20 mm T ≥ +10°C: 12 mm

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

A 20QTVR2-CT
B 15QTVR2-CT
C 10QTVR2-CT



	10QTVR2-CT	15QTVR2-CT	20QTVR2-CT
Nominal power output (W/m at 10°C)	38	51	64

Maximum circuit length based on type 'C' circuit breakers according to EN 60898

Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m)		
		10QTVR2-CT	15QTVR2-CT	20QTVR2-CT
16 A	-20°C	65	63	47
	+10°C	80	63	47
25 A	-20°C	95	75	60
	+10°C	115	95	75
32 A	-20°C	115	100	75
	+10°C	115	100	95
40 A	-20°C	115	100	95
	+10°C	115	100	115

The above numbers are for circuit length estimation only. For more detailed information please use the nVent RAYCHEM TraceCalc software or contact your local nVent representative.

nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T4 (unconditional)

T6...T5 Possible using stabilized design

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Part description	10QTVR2-CT	15QTVR2-CT	20QTVR2-CT
Part No.	391991-000	040615-000	988967-000

Components

nVent offers a full range of components for power connections, splices and end seals.

These components must be used to ensure proper functioning of the product and compliance with electrical requirements.

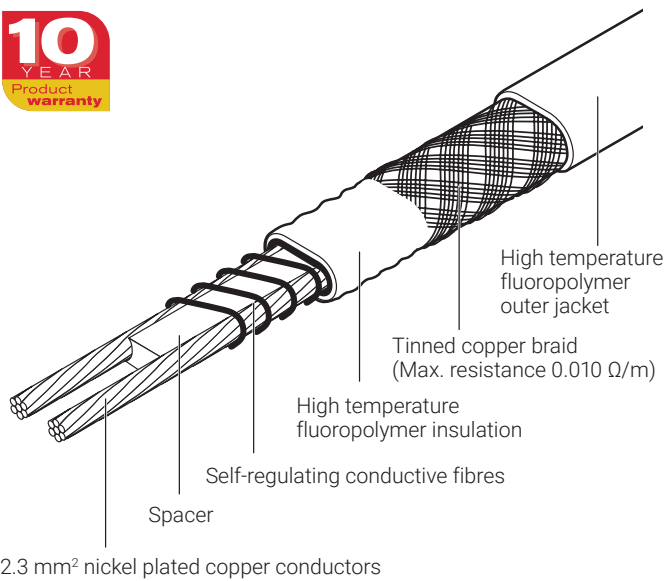


Heating Cables



Self-regulating heating cable

PRODUCT OVERVIEW



Electrical heat-tracing for process temperature maintenance applications up to 121°C which may be subject to steam cleaning.

The nVent RAYCHEM XTV family of self-regulating, parallel circuit heating cables is used for process temperature maintenance of pipes and vessels.

It can also be used for frost protection of large pipes and for applications requiring high temperature exposure capability.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative



PRODUCT SPECIFICATIONS

Product dimensions (mm)

Width x Thickness (nominal) mm 10.8 x 7.2

Technical details

Maximum maintain or continuous exposure temperature (power on) 121°C

Maximum intermittent exposure temperature (power on/off) 250°C (*)
Maximum cumulative exposure 1000 hours
(*) The 250°C rating applies to all products printed "MAX INTERMITTENT EXPOSURE 250°C"

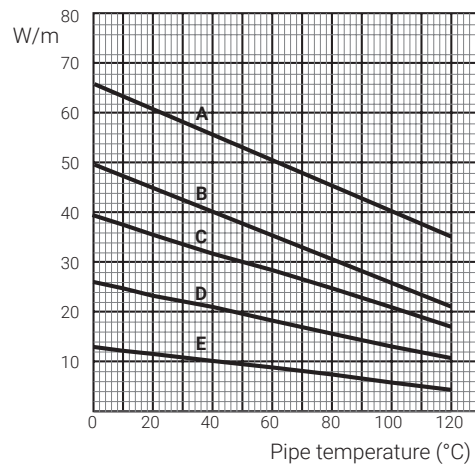
Minimum installation temperature -60°C

Minimum bend radius
-60°C ≤ T < -20°C: 51 mm
-20°C ≤ T < -10°C: 35 mm
-10°C ≤ T < 0°C: 25 mm
0°C ≤ T < +10°C: 20 mm
T ≥ +10°C: 12 mm

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

- A 20XTV2-CT-T2**
- B 15XTV2-CT-T3**
- C 12XTV2-CT-T3**
- D 8XTV2-CT-T3**
- E 4XTV2-CT-T3**



	4XTV2-CT-T3	8XTV2-CT-T3	12XTV2-CT-T3	15XTV2-CT-T3	20XTV2-CT-T2
Nominal power output (W/m at 10°C)	12	25	38	47	63

Maximum circuit length based on type 'C' circuit breakers according to EN 60898

Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m)				
		16 A	-20°C	145	90	65
	+10°C	170	105	75	60	45
25 A	-20°C	225	145	105	85	65
	+10°C	245	165	120	95	70
32 A	-20°C	245	175	135	105	80
	+10°C	245	175	140	125	90
40 A	-20°C	245	175	140	135	110
	+10°C	245	175	140	135	110

The above numbers are for circuit length estimation only. For more detailed information please use the nVent TraceCalc software or Contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS (*)

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification:

T3: unconditional (except 20XTV2-CT: T2)

T6 ...T4 using stabilized design (except 20-XTV2-CT: T6 ... T3 using stabilized design)

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design (as per system classification approach). Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Part description	4XTV2-CT-T3	8XTV2-CT-T3	12XTV2-CT-T3	15XTV2-CT-T3	20XTV2-CT-T2
Part No. (**)	P000001667	P000001670	P000001673	P000001675	P000001677
Weight (g/m)	170	170	170	170	170

Components

nVent offers a full range of components for power connections, splices and end seals.

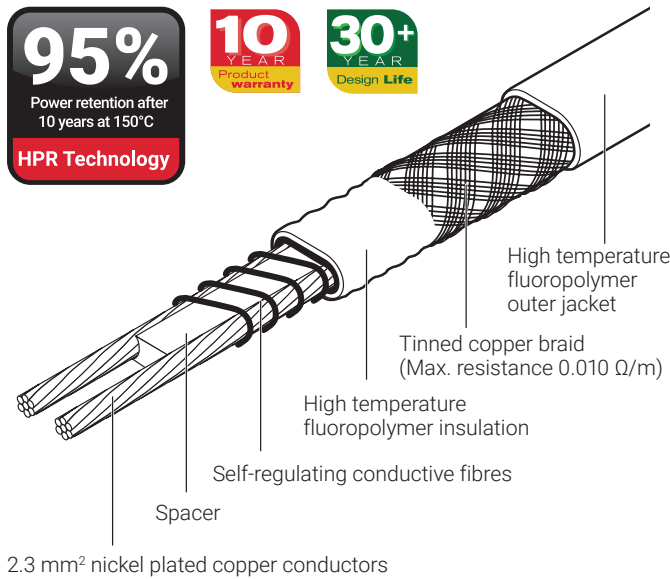
These components must be used to ensure proper functioning of the product and compliance with electrical requirements.

(**) Localized versions may exist with limited approvals and different part numbers. Contact your local sales representative.



Self-regulating heating cable

PRODUCT OVERVIEW



The nVent RAYCHEM XTVR self-regulating heating cable is designed for freeze protection or process temperature maintenance of pipes and vessels requiring high power output and exposure temperatures.

The XTVR heating cables can withstand temperatures up to 250°C and provide process temperature maintenance to 150°C (which may be subject to steam cleaning). The XTVR heating cable incorporates a high power retention (HPR) heating core. This innovative heating core technology and product design results in:

- Highly reliable power output for long operational life
- Ease of stripping, flexible and installation
- Seven wattage levels (at 230 Vac) for efficient heat trace designs and lower installation costs

Power retention: Minimum 95% after 10 years at maximum operating temperature of 150°C.

Certified for use in hazardous and ordinary areas and comes with a 10 year product warranty.

Design life: 30+ years of design life, depending on application.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative

Supply Voltage

230 Vac (contact nVent for data on the other voltages 190 - 277 Vac)

PRODUCT SPECIFICATIONS

Product dimensions (mm)

Width x Thickness (nominal) mm	10.8 x 7.2
Weight (nominal)	164 g/m

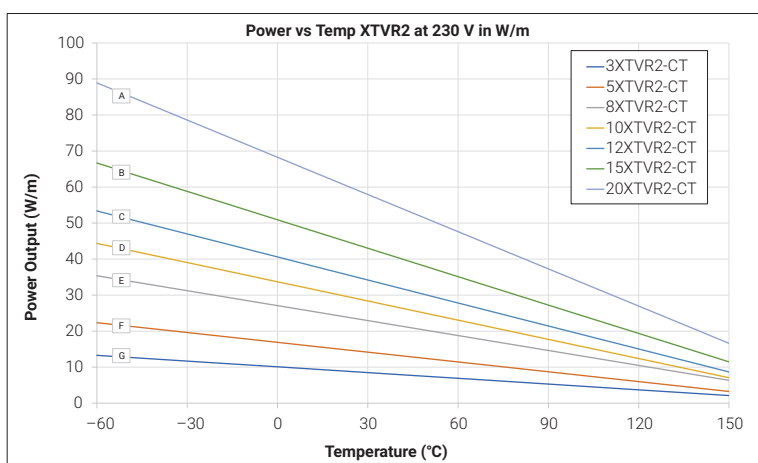
Technical details

Maximum continuous operating temperature (energized)	150°C
Maximum intermittent exposure temperature (energized/de-energized)	250°C Maximum cumulative exposure 2000 hours
Minimum installation temperature	-60°C
Minimum bend radius	-60°C ≤ T < -20°C: 51 mm -20°C ≤ T < -10°C: 35 mm -10°C ≤ T < 0°C: 25 mm 0°C ≤ T < +10°C: 20 mm T ≥ +10°C: 12 mm
Design life	30 years or more depending on application (contact nVent for more details)
Power retention	Minimum 95% after 10 years of maximum operating temperature of 150°C

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

Part Description	"Nominal power output (W/m at 10°C)"	See chart
20XTVR2-CT	64	A
15XTVR2-CT	48	B
12XTVR2-CT	38	C
10XTVR2-CT	32	D
8XTVR2-CT	25	E
5XTVR2-CT	16	F
3XTVR2-CT	9	G



Maximum circuit length based on type 'C' circuit breakers according to EN 60898

	Start-up Temp.	Electrical protection sizing / Maximum heating cable length per circuit (m)				
		16 A	20 A	25 A	32 A	40 A
3XTVR2-CT	10°C	193	241	290	290	290
	0°C	182	228	285	290	290
	-20	165	206	258	290	290
	-40	151	188	235	290	290
5XTVR2-CT	10	144	180	221	221	221
	0	136	170	213	221	221
	-20	123	154	192	221	221
	-40	112	140	175	221	221
8XTVR2-CT	10	104	130	162	171	171
	0	99	123	154	171	171
	-20	89	112	140	171	171
	-40	82	102	128	164	171
10XTVR2-CT	10	89	111	139	151	151
	0	84	105	131	151	151
	-20	76	95	119	151	151
	-40	69	87	108	139	151
12XTVR2-CT	10	77	96	120	135	135
	0	73	91	113	135	135
	-20	66	82	103	131	135
	-40	60	75	94	120	135

	Start-up Temp.	Electrical protection sizing / Maximum heating cable length per circuit (m)				
		16 A	20 A	25 A	32 A	40 A
15XTVR2-CT	10	57	72	90	115	120
	0	54	68	85	109	120
	-20	49	62	77	99	120
	-40	45	56	70	90	113
20XTVR2-CT	10	45	57	71	91	101
	0	43	54	67	86	96
	-20	39	49	61	78	88
	-40	36	45	56	72	83

The above numbers are for circuit length estimation only. For more detailed information please use the nVent TraceCalc software or Contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T3: unconditional (20XTVR2-CT up to Max 240 VAC)

T6 ...T4: nVent RAYCHEM XTVR is approved for the listed temperature classifications by using the principles of stabilized design or controlled limited design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Part No.	Description	Part No.	Description
2000003070	XTV-3XTVR2-CT	2000003076	XTV-12XTVR2-CT
2000003072	XTV-5XTVR2-CT	2000003078	XTV-15XTVR2-CT
2000003073	XTV-8XTVR2-CT	2000003080	XTV-20XTVR2-CT
2000003075	XTV-10XTVR2-CT		

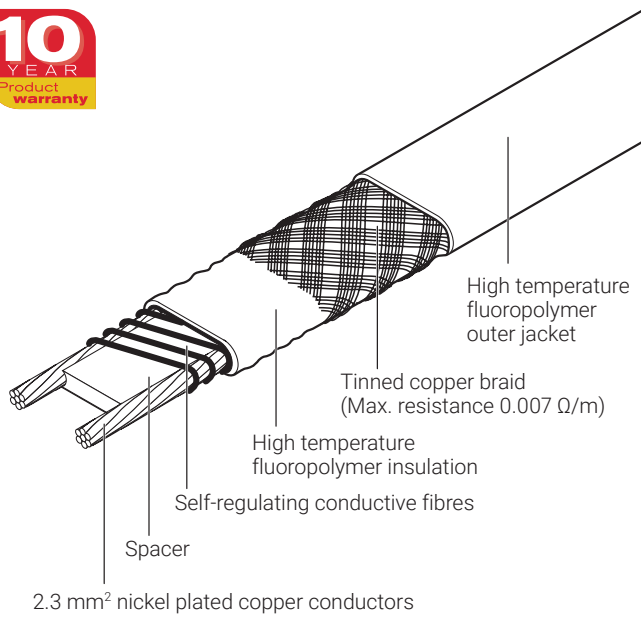
Components

nVent offers a full range of components for power connections, splices and end seals.

These components must be used to ensure proper functioning of the product and compliance with electrical requirements.

Self-regulating heating cable

PRODUCT OVERVIEW



Electrical heat-tracing for process temperature maintenance applications up to 150°C which may be subject to steam cleaning.

The nVent RAYCHEM KTV family of self-regulating, parallel circuit heating cables is used for process temperature maintenance of pipes and vessels.

It can also be used for frost protection of large pipes and for applications requiring high temperature exposure capability.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative

Supply voltage

230 Vac (Contact your local nVent representative for data on other voltages)

PRODUCT SPECIFICATIONS

Product dimensions and weight

Width x Thickness (nominal) mm	14.0 x 7.6
Weight (g/m)	250

Heating Cables

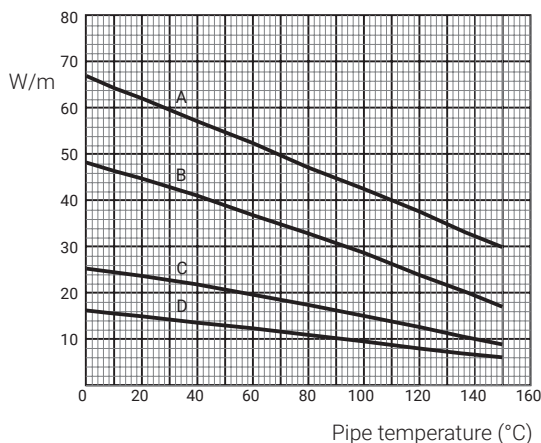
Technical details

Maximum maintain or continuous exposure temperature (power on)	150°C
Maximum intermittent exposure temperature (power on/off)	250°C (*) Maximum cumulative exposure 1000 hours (*) The 250°C rating applies to all products printed "MAX INTERMITTENT EXPOSURE 250°C".
Minimum installation temperature	-60°C
Minimum bend radius	-60°C ≤ T < -20°C: 26 mm -20°C ≤ T < -10°C: 20 mm -10°C ≤ T < 0°C: 15 mm 0°C ≤ T < +10°C: 15 mm T ≥ +10°C: 12 mm

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

- A 20KTV2-CT**
- B 15KTV2-CT**
- C 8KTV2-CT**
- D 5KTV2-CT**



	5KTV2-CT	8KTV2-CT	15KTV2-CT	20KTV2-CT
Nominal power output (W/m at 10°C)	16	25	47	66

Maximum circuit length based on type 'C' circuit breakers according to EN 60898

Electrical Protection Sizing	Start-up Temperature	Maximum Heating Cable Length Per Circuit (m)			
16 A	-20°C	130	95	60	40
	+10°C	145	105	65	45
25 A	-20°C	205	150	90	65
	+10°C	230	165	100	75
32 A	-20°C	230	180	115	85
	+10°C	230	180	130	95
40 A	-20°C	230	180	130	105
	+10°C	230	180	130	110

The above numbers are for circuit length estimation only. For more detailed information please use the nVent RAYCHEM TraceCalc software or contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T2: 5KTV2-CT, 8KTV2-CT, 15KTV2-CT, 20KTV2-CT (unconditional)

T6...T3: 5KTV2-CT, 8KTV2-CT, 15KTV2-CT, 20KTV2-CT (using stabilized design)

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design (as per system classification approach). Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	5KTV2-CT	8KTV2-CT	15KTV2-CT	20KTV2-CT
Part No.	P000001679	P000001681	P000001683	P000001685

Components

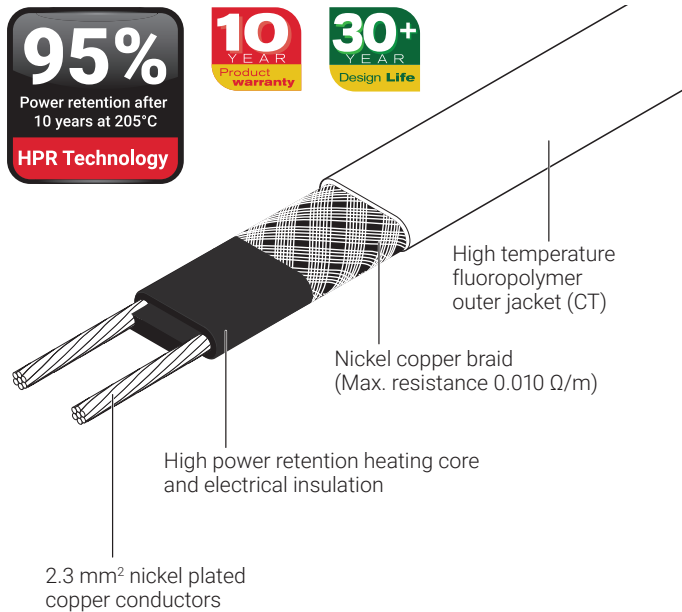
nVent RAYCHEM offers a full range of components for power connections, splices and end seals.

These components must be used to ensure proper functioning of the product and compliance with electrical requirements.



Self-regulating heating cable

PRODUCT OVERVIEW



The nVent RAYCHEM HTV self-regulating heating cable is designed for freeze protection or process temperature maintenance of pipes and vessels with very high continuous operating temperatures (205°C).

Maximum exposure temperature is 260°C.

The HTV cable has a solid construction with a high power retention (HPR) heating core and pressure extruded electrical insulation. It is then integrated with a robust metallic braid and a chemically resistant fluoropolymer outer jacket.

The innovative heating core technology and design result in:

- Superior thermal conductivity
- Highly stable power output for long operational life
- Ease of stripping, flexing and installation
- Long circuit lengths for minimized total installation cost

Power retention: At least 95% after 10 years of simulated product life at maximum continuous operating temperature (205°C).

Certified for use in hazardous and ordinary areas and comes with a 10 year product warranty programme.

Design life: 30 years or more depending on application.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics aqueous inorganic chemicals and corrosives

Supply voltage

230 Vac (Contact nVent for data on other voltages 190-277 Vac)

Heating Cables

PRODUCT SPECIFICATIONS

Product dimensions (mm)

Heating cable dimensions	10.9 x 7.1 mm
Weight (nominal)	170 g/m

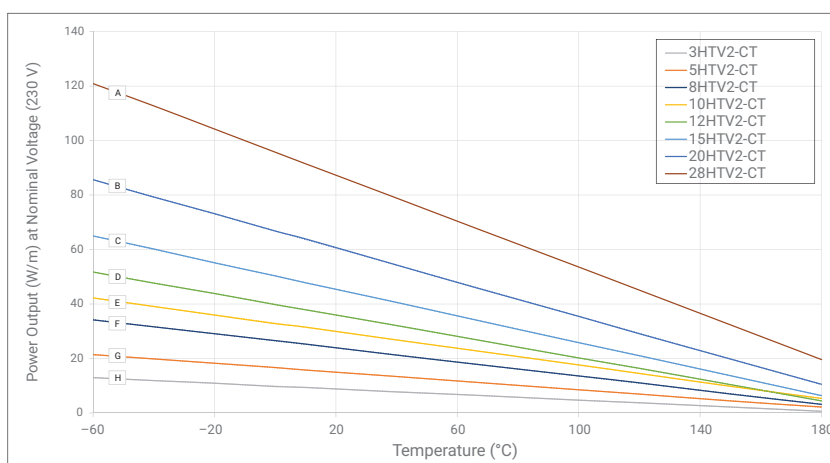
Technical details

Maximum continuous operating temperature (energized)	205°C
Maximum continuous exposure temperature (de-energized)	205°C
Maximum intermittent exposure temperature (energized/de-energized)	260°C Maximum cumulative exposure 2000 hours (*) (*) Longer periods allowed between 205-260°C. Contact nVent.
Minimum installation temperature	-60°C
Bus wire size	2.3 mm ²
Minimum bend radius	25 mm at -60°C ≤ T < -20°C 20 mm at -20°C ≤ T < -10°C 15 mm at -10°C ≤ T < +10°C 13 mm at T ≥ +10°C
Design life	30 years or more depending on application
Power retention	At least 95% after 10 years of simulated product life at maximum continuous operating temperature (205°C).

Thermal output rating

Nominal power output at 230 Vac on insulated steel pipes

Part description	Nominal power output (W/m at 10°C)	See chart
28HTV2-CT	88	A
20HTV2-CT	64	B
15HTV2-CT	48	C
12HTV2-CT	38	D
10HTV2-CT	32	E
8HTV2-CT	25	F
5HTV2-CT	16	G
3HTV2-CT	9	H



Maximum circuit length based on type 'C' circuit breakers according to EN 60898

	Start-up Temp.	Electrical protection sizing / Maximum heating cable length per circuit (m)				
		16 A	20 A	25 A	32 A	40 A
3HTV2-CT	10°C	197	246	293	293	293
	0°C	189	237	293	293	293
	-20°C	168	210	262	293	293
	-40°C	155	193	241	293	293
5HTV2-CT	10°C	146	183	224	224	224
	0°C	138	172	215	224	224
	-20°C	126	158	197	224	224
	-40°C	116	145	181	224	224
8HTV2-CT	10°C	106	132	165	173	173
	0°C	100	125	157	173	173
	-20°C	92	115	143	173	173
	-40°C	84	105	132	169	173
10HTV2-CT	10°C	90	112	140	152	152
	0°C	86	108	135	152	152
	-20°C	79	99	123	152	152
	-40°C	72	91	113	145	152
12HTV2-CT	10°C	78	97	121	138	138
	0°C	74	93	116	138	138
	-20°C	67	84	105	134	138
	-40°C	62	77	97	124	138
15HTV2-CT	10°C	61	76	95	119	119
	0°C	58	72	90	115	119
	-20°C	53	66	82	105	119
	-40°C	48	60	75	96	113
20HTV2-CT	10°C	46	58	72	92	99
	0°C	44	55	69	88	95
	-20°C	40	50	63	81	88
	-40°C	37	46	58	74	82
28HTV2-CT	10°C	27	35	47	67	68
	0°C	27	34	45	65	65
	-20°C	25	32	42	59	60
	-40°C	24	30	40	54	57

The above numbers are for circuit length estimation only. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. For more detailed information please use the nVent TraceCalc design software or contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification:

T3 : unconditional (T2: 20HTV2-CT, 28HTV2-CT)

T6...T4 (T3 20HTV2-CT, 28HTV2-CT) using stabilized design

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification:



More details about product certification, approvals and conditions of safe use are available in the installation manual for Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM.

* pending for 28HTV2-CT

ORDERING INFORMATION

Part description	Part number
3HTV2-CT	P000004319
5HTV2-CT	P000004320
8HTV2-CT	P000004321
10HTV2-CT	P000004322
12HTV2-CT	P000004323
15HTV2-CT	P000004324
20HTV2-CT	P000004325
28HTV2-CT	2000003152

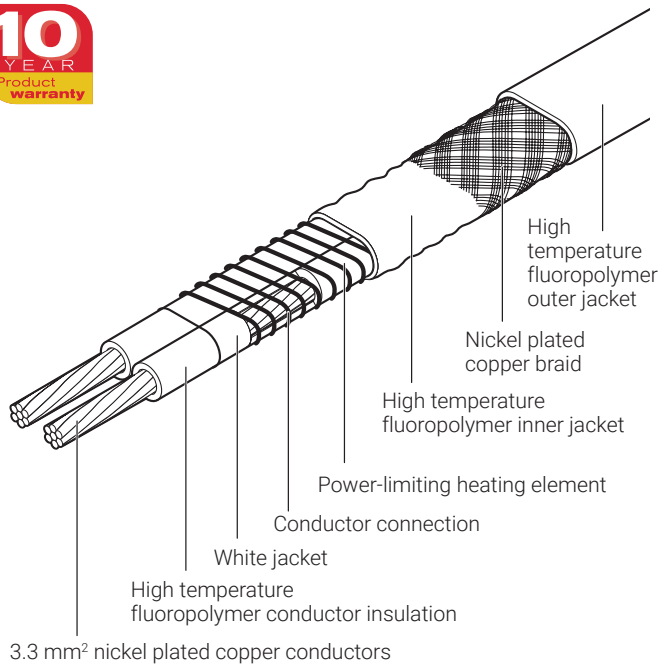
Components

nVent offers a full range of components for power connections, splices and end seals. These components must be used to ensure proper functioning of the product and compliance with electrical requirements.



High-temperature power-limiting heating cable

PRODUCT OVERVIEW



nVent RAYCHEM VPL is a family of power limiting heating cables designed for pipe and equipment heat-tracing in industrial applications.

VPL can be used for frost protection and process temperature maintenance requiring high power output and/or high temperature exposure. VPL can provide process temperature maintenance up to 235°C (depending on cable type) and can withstand routine steam purges and temperature exposure to 260°C with power off.

Power-limiting cables are parallel heaters formed by a coiled resistor alloy heating element wrapped around two parallel conductors. The distance between conductor contact points forms the heating zone length. This parallel construction allows it to be cut-to-length and terminated on-site. The power output of VPL heating cables decreases with increasing temperature. VPL heating cables can be overlapped once. The relatively flat power temperature curve of VPL ensures a low start-up current and high output at elevated temperatures. VPL cables are approved for use in hazardous areas. Approvals are listed below.

Application

Traced surface type	Carbon steel Stainless steel Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative

Supply voltage

VPL2: 208-277 Vac
VPL4: 400-480 Vac

PRODUCT SPECIFICATIONS

Dimensions (mm)

	5VPLx-CT	10VPLx-CT	15VPLx-CT	20VPLx-CT
Thickness (mm)	8.2	8.2	8.2	8.2
Width (nominal) mm	11.6	11.6	11.6	11.6



Technical details

	Cable	208 V	230 V	254 V	277 V	400 V	480 V
Maximum maintain or continuous exposure temperature (power on)	5VPL2-CT	235°C	230°C	225°C	225°C	–	–
	10VPL2-CT	220°C	210°C	200°C	195°C	–	–
	15VPL2-CT	200°C	180°C	145°C	105°C	–	–
	20VPL2-CT	150°C	150°C	–	–	–	–
	5VPL4-CT	–	–	–	–	230°C	230°C
	10VPL4-CT	–	–	–	–	215°C	205°C
	15VPL4-CT	–	–	–	–	195°C	160°C
	20VPL4-CT	–	–	–	–	150°C	150°C
Maximum continuous exposure temperature (power off)	260°C						
Temperature classification T*	To be established using the principles of stabilized design or the use of a temperature limiting device. Use TraceCalc design software or contact nVent for assistance.						
Minimum installation temperature	–60°C						
Minimum bend radius	–60°C ≤ T < –20°C: 19 mm –20°C ≤ T < +10°C: 15 mm T ≥ +10°C: 12 mm						
Minimum clearance	15 mm						

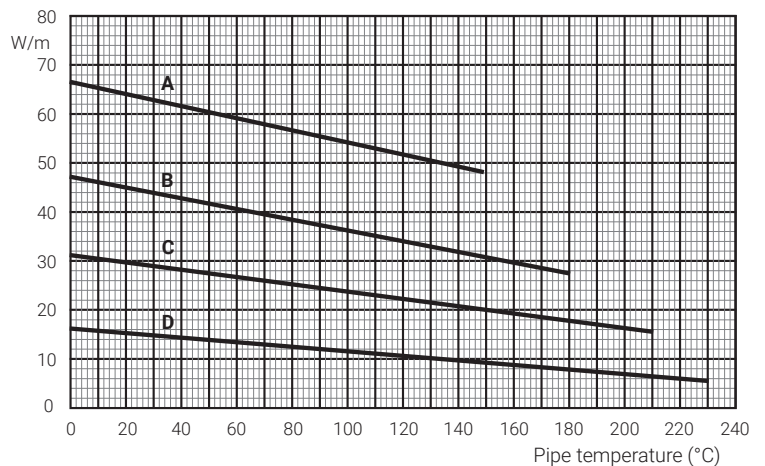
	5VPLx-CT	10VPLx-CT	15VPLx-CT	20VPLx-CT
Nominal cold lead/ heating zone length (m)	1.2 (VPL2)	0.9 (VPL2)	0.6 (VPL2)	0.5 (VPL2)
	2.4 (VPL4)	1.7 (VPL4)	1.3 (VPL4)	1.1 (VPL4)

Thermal output rating

Nominal power output rating on insulated steel pipes at 240 V and 480 V (power output of VPL4 at 400 V will be lower)

To choose the correct heating cable for your application use the TraceCalc design software.

- A 20VPL-CT**
- B 15VPL-CT**
- C 10VPL-CT**
- D 5VPL-CT**



Nominal power output (W/m at 10°C)	5VPLx-CT	10VPLx-CT	15VPLx-CT	20VPLx-CT
VPL2 at 230 V	15	30	45	61
VPL2 at 240 V/VPL4 at 480 V	16	33	49	65
VPL4 at 400 V	12	24	36	49

Adjustment factors

		5VPL2-CT	10VPL2-CT	15VPL2-CT	20VPL2-CT
254 V	Power output	1.2	1.19	1.19	Not allowed
	Circuit length	1.05	1.04	1.04	Not allowed
277 V	Power output	1.3	1.28	1.26	Not allowed
	Circuit length	1.13	1.11	1.09	Not allowed
400 V	Power output	0.72	0.73	0.74	0.75
	Circuit length	0.86	0.87	0.89	0.9

Maximum circuit length based on type 'C' circuit breakers according to EN 60898

VPL2 at 230 V		5VPL2-CT	10VPL2-CT	15VPL2-CT	20VPL2-CT
Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m)			
16 A	-20°C	195	100	70	50
	+10°C	215	110	75	55
25 A	-20°C	220*	155*	105	80
	+10°C	220*	155*	115	85
32 A	-20°C	220*	155*	130*	100
	+10°C	220*	155*	130*	110*
40 A	-20°C	220*	155*	130*	110*
	+10°C	220*	155*	130*	110*

VPL4 at 480 V and 400 V		5VPL4-CT	10VPL4-CT	15VPL4-CT	20VPL4-CT
Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit (m) at 480 Vac and (at 400 Vac)			
16 A	-20°C	390 (335)	195 (170)	130 (115)	100 (90)
	+10°C	425 (365)	210 (185)	140 (125)	105 (95)
25 A	-20°C	450* (450)	310 (265)	205 (185)	155 (140)
	+10°C	450* (450)	320* (290)	220 (195)	165 (150)
32 A	-20°C	450* (450)	320* (320)	260* (235)	200 (180)
	+10°C	450* (450)	320* (320)	260* (250)	210 (190)
40 A	-20°C	450* (450)	320* (320)	260* (260)	225* (225)
	+10°C	450* (450)	320* (320)	260* (260)	225* (225)

*The maximum heating cable length must not exceed these values, even when voltage adjustment factors are used.

The above numbers are for circuit length estimation only. For more detailed information please use the nVent RAYCHEM TraceCalc software or contact your local nVent representative.

nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6...T2 using stabilized design

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Constant Wattage Parallel Circuit Heating Cable Systems at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Part description	5VPL2-CT	10VPL2-CT	15VPL2-CT	20VPL2-CT
Part No.	451828-000	892652-000	068380-000	589252-000
Part description	5VPL4-CT	10VPL4-CT	15VPL4-CT	20VPL4-CT
Part No.	P000000678	P000000679	P000000680	P000000681
Weight (g/m)	200	200	200	200

Components

nVent offers a full range of components for power connections, splices and end seals.

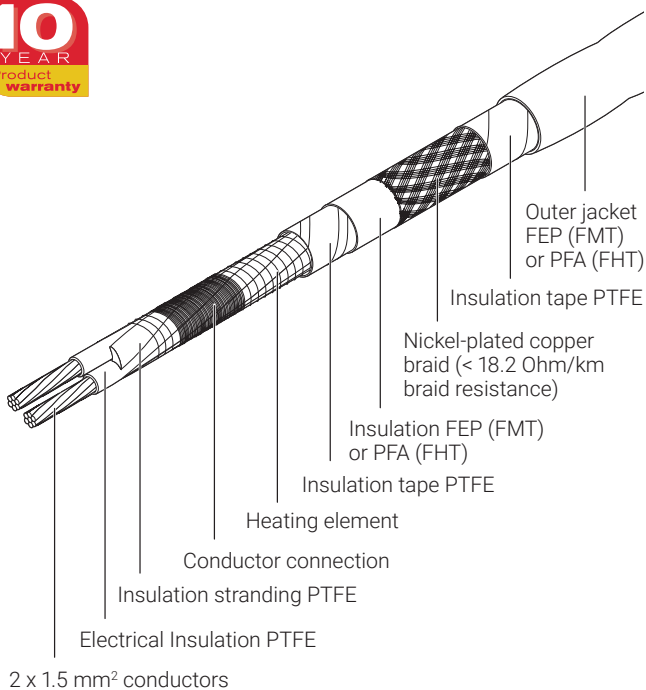
These components must be used to ensure proper functioning of the product and compliance with electrical requirements.

FMT and FHT

CONNECT AND PROTECT

Constant wattage parallel circuit heating cable

PRODUCT OVERVIEW



nVent RAYCHEM FMT and FHT are constant wattage parallel circuit heating cables designed for pipe and equipment heat-tracing in industrial applications. This family offers an economical alternative to our self-regulating heating cables but requires more skill for installation and also requires more advanced control and monitoring systems. Its unique round geometry provides excellent flexibility during installation as it allows for bending in every direction. The heating element which is the most fragile part of any constant wattage parallel circuit heating cable is protected by a PTFE insulation tape that eliminates shear stresses during flexing and also acts as a shock absorber, thereby providing a high level of protection. The heating cables can be used for frost protection and process temperature maintenance requiring high power output. The heating cables are zone parallel heaters constructed from a heating element wrapped around two parallel conductors. The distance between conductor contact points forms the heating zone length. The parallel construction allows it to be cut-to-length and terminated in the field.

FMT heating cables can withstand routine steam purges and temperature exposure to 200°C power off. They can be used to maintain temperatures up to 150°C (depending on cable type) and are only available in a 230 Vac version.

FHT heating cables can withstand routine steam purges and temperature exposure to 260°C power off. They can be used to maintain temperatures up to 230°C (depending on cable type) and are available for 230 Vac and 400 Vac supplies. The 400 Vac version offers a further advantage of long circuit lengths reducing the cost of the electrical installation.

Application

Traced surface type	Carbon steel, Stainless steel, Painted or unpainted metal
Chemical resistance	Organics and corrosives For aggressive organics and corrosives consult your local nVent representative

PRODUCT SPECIFICATIONS

Dimensions (mm)

	FMT2	FHT2	FHT4
Size	Ø 7.5	Ø 7.5	Ø 7.5



Technical details

	FMT2	FHT2	FHT4
Supply voltage	190 - 277 Vac	190 - 277 Vac	385 - 415 Vac
Maximum continuous exposure temperature (power off)	200°C	260°C	260°C
Cold lead/heating zone length	1.5 m	1.5 m	2.5 m
Minimum installation temperature	-40°C	-60°C	-60°C
Minimum bending radius	-60°C ≤ T < -20°C: 25 mm -20°C ≤ T < -10°C: 20 mm -10°C ≤ T < +10°C: 15 mm T ≥ +10°C: 12 mm		
Minimum clearance	50 mm	50 mm	50 mm
Colour	White	Green	Violet

Maximum circuit length based on type 'C' circuit breakers according EN 60898

Voltage	Heating cable (nominal power: W/m)						
	10FMT2/ 10FHT2	20FMT2/ 20FHT2	30FMT2/ 30FHT2	40FHT2	10FHT4	20FHT4	30FHT4
230 Vac	200 m	150 m	120 m	85 m	–	–	–
400 Vac	–	–	–	–	330 m	235 m	190 m

The above numbers are for circuit length estimation only. For more detailed information please use the nVent RAYCHEM TraceCalc software or Contact your local nVent representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Maximum maintain or continuous exposure temperature °C (power on)

Heating cable	Nominal power output (W/m)	230 V a.c.	254 V a.c.	277 V a.c.
10FMT2-CT	10	153	153	144
20FMT2-CT	20	129	116	97
30FMT2-CT	30	94	71	36
10FHT2-CT	10	229	225	219
20FHT2-CT	20	209	199	187
30FHT2-CT	30	184	168	143
40FHT2-CT	40	154	130	87
		385 V a.c.	400 V a.c.	415 V a.c.
10FHT4-CT	10	250	250	249
20FHT4-CT	20	224	221	218
30FHT4-CT	30	212	208	205

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

FHT: T6...T2

FMT: T6...T3

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for the Self-regulating and Power limiting heating cable systems at www.nVent.com/RAYCHEM.

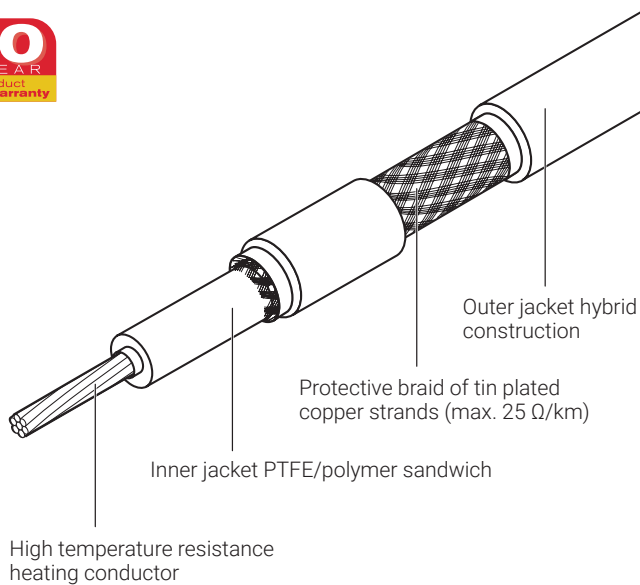
ORDERING INFORMATION

Part description & part no.	Part description & part no.	Part description & part no.
10FMT2-CT: 1244-006057	10FHT2-CT: 1244-006060	10FHT4-CT: 1244-006064
20FMT2-CT: 1244-006058	20FHT2-CT: 1244-006061	20FHT4-CT: 1244-006065
30FMT2-CT: 1244-006059	30FHT2-CT: 1244-006062	30FHT4-CT: 1244-006066
	40FHT2-CT: 1244-006063	



Polymer insulated (PI) series resistance heating cable

PRODUCT OVERVIEW



nVent RAYCHEM XPI-F is a polymer insulated (PI) series heating cable, suitable for use in ordinary and hazardous areas. It has been designed for freeze protection and low temperature maintenance applications on pipes, tanks and other equipment.

XPI-F offers an economical solution for a wide variety of heat-tracing applications, in particular for pipe lengths beyond the maximum circuit lengths of parallel heating cables.

The inner insulation is a sandwich construction of PTFE and PE, the outer insulation is a hybrid PE construction. The use of PTFE in the construction makes it very easy to terminate, provides flexibility, eliminates internal mechanical and thermal stress and makes XPI-F a very safe and reliable product. The PE provides a good chemical withstand and excellent mechanical strength.

XPI-F heating cables can be used for temperatures up to 90°C (continuous) and 100°C (intermittent short-term exposure), making it an ideal PI heating cable for transfer lines and large tanks with limited temperature requirements.

XPI-F is easy to install and has printed meter-marks. nVent offers XPI-F heating cables in a wide range of resistances, starting from 1.8 Ω/km up to 200 Ω/km as well as a complete range of components for connection and splicing.

Application

Chemical resistance Organic corrosives

PRODUCT SPECIFICATIONS

Technical details

Max. exposure temperature	90°C (power off, continuous), 100°C (power off, intermittent for max 1000 h)
Min. installation temperature	-60°C
Min. bending radius at -55°C	7.5 x cable diameter
Max. power output	20 W/m (typical value, depending on application)
Nominal voltage	Up to 300/500 Vac (U0/U)
Min. impact resistance	4 Joule (as per EN 60079-30-1)
Min. clearance	20 mm between heating cables



APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6 ... T2

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual for Polymer Insulated (PI) Series Constant Wattage Heating Cable Systems at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

XPI-F heating cable references

Order reference	Nominal resistance [Ω/km @ 20°C]	Temp. coefficient [x 10 ⁻³ /K]	Outer diameter [mm nom.]	Nom. weight (kg/km)	Part number PN
XPI-F-1.8	1.8	4.3	9.5	208	1244-018798
XPI-F-2.9	2.9	4.3	7.8	143	1244-018799
XPI-F-4.4	4.4	4.3	7.2	112	1244-018800
XPI-F-7	7	4.3	6.6	83	1244-018801
XPI-F-10	10	4.3	6.5	76	1244-018802
XPI-F-11.7	11.7	4.3	6.4	65	1244-018803
XPI-F-15	15	4.3	6.1	61	1244-018804
XPI-F-17.8	17.8	4.3	6	57	1244-018805
XPI-F-25	25	3	6	57	1244-018806
XPI-F-31.5	31.5	1.3	6.4	67	1244-018807
XPI-F-50	50	1.3	6	57	1244-018808
XPI-F-65	65	1.3	5.7	53	1244-018809
XPI-F-80	80	0.7	6.1	61	1244-018810
XPI-F-100	100	1.3	5.4	67	1244-018811
XPI-F-150	150	0.4	5.9	48	1244-018812
XPI-F-200	200	0.4	5.6	53	1244-018814

Resistance tolerance: +10/-5%. In particular for cables < 31.5 Ω/km the resistance of the conductor materials is a function of temperature and the change must be considered for design purposes.

Recommended cold lead cables for XPI-F (Cold lead cables from XPI can be used alternatively)

Order reference	Nominal resistance [Ω/km @ 20°C]	Temperature coefficient [x 10 ⁻³ /K]	Outer diameter [mm nom.]	Nom. cross section [mm ²]	Current rating [A]	Part number PN
XPI-F-7	7	4.3	6.6	2.5	32	1244-018801
XPI-F-4.4	4.4	4.3	7.2	4	42	1244-018800
XPI-F-2.9	2.9	4.3	7.8	6	54	1244-018799
XPI-F-1.8	1.8	4.3	9.5	10	73	1244-018798

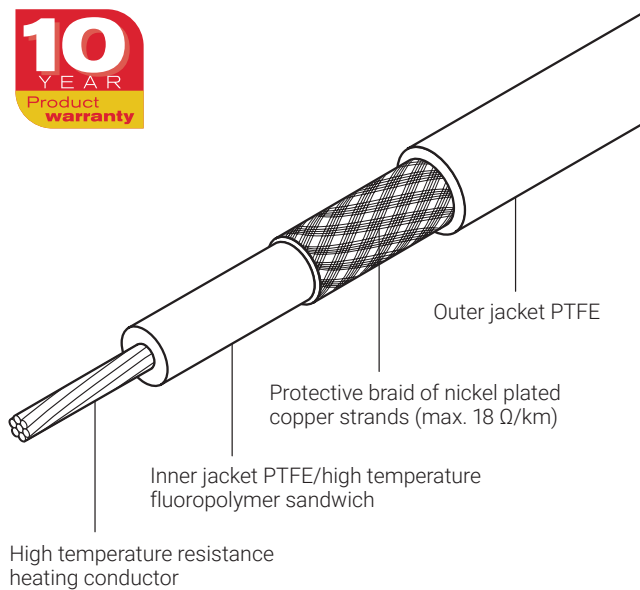
Notes: Delivery length depends on type of resistance and is limited by max. weight of 120 kg/spool, respectively 1000 m/run. To ensure practical and safe on-site handling, it is strongly recommended to limit spool lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.



Polymer insulated (PI) series resistance heating cable

PRODUCT OVERVIEW



nVent RAYCHEM XPI is a polymer insulated (PI) series heating cable, suitable for use in hazardous areas. It has been designed for use in freeze protection and temperature maintenance applications of pipes, tanks and other equipment. XPI offers an economical solution for a wide variety of heat-tracing applications, in particular for pipe lengths beyond the maximum circuit lengths of parallel heating cables.

The inner insulation is a sandwich construction of high temperature fluoropolymer and PTFE, the outer insulation is made of PTFE. This unique construction is very easy to terminate, highly flexible and makes XPI a very safe and reliable product. It provides highest chemical withstand and excellent mechanical strength, in particular at elevated temperatures.

XPI heating cables can be used for temperatures up to 260°C (continuous) and 300°C (intermittent short-term exposure). XPI is easy to install and has printed meter-marks. nVent RAYCHEM offers XPI heating cables in a very wide range of resistances, starting from 0.8 Ω/km up to 8000 Ω/km as well as a complete range of components for connection and splicing of the cables.

Application

Chemical resistance Organic and inorganic corrosives

PRODUCT SPECIFICATIONS

Technical details

Max. exposure temperature	260°C (power off, continuous), 300°C (power off, intermittent for max 1000 h)
Min. installation temperature	-70°C
Min. bending radius at -70°C	2.5 x cable diameter for cable diameter ≤ 6 mm 6 x cable diameter for cable diameter > 6 mm
Max. power output	35 W/m (typical value, depending on application)
Nominal voltage	Up to 450/750 Vac (U0/U)
Min. impact resistance	4 Joule (as per EN 60079-30-1)
Min. clearance	20 mm between heating cables

Heating Cables

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6...T2 using stabilized design

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the Polymer insulated series constant wattage heating system installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	Nominal resistance [Ω/km @ 20°C]	Temp. coefficient [x 10 ⁻³ / K]	Outer diameter [mm nom.]	Nom. weight (kg/km)	Part number PN
XPI-0.8	0.8	4.3	11.9	404	1244-000189
XPI-1.1	1.1	4.3	10.1	306	1244-000201
XPI-1.8	1.8	4.3	8.6	208	1244-000182
XPI-2.9	2.9	4.3	6.9	143	1244-000202
XPI-4.4	4.4	4.3	6.1	112	1244-000190
XPI-7	7	4.3	5.5	83	1244-000203
XPI-10	10	4.3	5.4	76	1244-000204
XPI-11.7	11.7	4.3	5.2	65	1244-000183
XPI-15	15	4.3	5.1	61	1244-000191
XPI-17.8	17.8	4.3	4.9	57	1244-000178
XPI-25	25	3	4.9	57	1244-000192
XPI-31.5	31.5	1.3	5.3	67	1244-000205
XPI-50	50	1.3	4.9	57	1244-000184
XPI-65	65	1.3	4.8	53	1244-000206
XPI-80	80	0.7	5.1	61	1244-000193
XPI-100	100	0.4	5.2	67	1244-000207
XPI-150	150	0.4	4.9	57	1244-000185
XPI-200	200	0.4	4.8	53	1244-000195
XPI-320	320	0.18	4.9	56	1244-000653
XPI-380	380	0.18	4.8	53	1244-000180
XPI-480	480	0.18	4.7	51	1244-000208
XPI-600	600	0.18	4.5	48	1244-000196
XPI-700	700	0.18	4.5	46	1244-000186
XPI-810	810	0.04	4.6	50	1244-000209
XPI-1000	1000	0.04	4.5	48	1244-000197
XPI-1440	1440	0.04	4.4	45	1244-000211
XPI-1750	1750	0.04	4.3	43	1244-000198
XPI-2000	2000	0.35	4.6	49	1244-000187
XPI-3000	3000	0.35	4.4	45	1244-000212
XPI-4000	4000	0.35	4.2	42	1244-000199
XPI-4400	4400	0.1	4.3	43	1244-000181
XPI-5160	5160	0.1	4.3	42	1244-000654
XPI-5600	5600	0.1	4.2	41	1244-000188
XPI-7000	7000	0.1	4.2	40	1244-000213
XPI-8000	8000	0.1	4.1	40	1244-000200

Resistance tolerance: +10/-5%. In particular for cables < 31.5 Ω/km the resistance of the conductor materials is a function of temperature and the change must be considered for design purposes.

Recommended cold lead cables for XPI (cold lead cables from XPI-S can be used alternatively)

Nom. cross section [mm ²]	Current rating [A]	Outer diameter [mm nom.]	Nominal resistance [Ω /km @ 20°C]	Temperature coefficient [$\times 10^{-3}$ /K]	Order reference	Part number PN
2.5	32	5.5	7	4.3	XPI-7	1244-000203
4	42	6.1	4.4	4.3	XPI-4.4	1244-000190
6	54	6.9	2.9	4.3	XPI-2.9	1244-000202
10	73	8.6	1.8	4.3	XPI-1.8	1244-000182
16	98	10.1	1.1	4.3	XPI-1.1	1244-000201
25	129	11.9	0.8	4.3	XPI-0.8	1244-000189

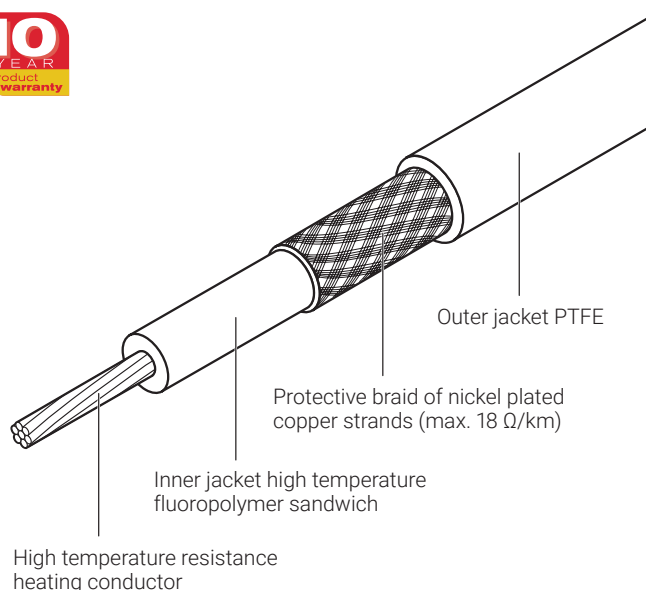
Notes: Delivery length depends on type of resistance and is limited by max. weight of 120 kg/spool, respectively 1000 m/run. To ensure practical and safe on-site handling, it is strongly recommended to limit spool lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Heating Cables

Polymer insulated (PI) series resistance heating cable

PRODUCT OVERVIEW



nVent RAYCHEM XPI-S is a polymer insulated (PI) series heating cable, suitable for use in hazardous areas. It has been designed for use in freeze protection and temperature maintenance applications of pipes, tanks and other equipment. XPI-S is a re-reinforced version of XPI, particularly suitable for areas with high demands on mechanical abuse of the heating cable. XPI-S offers an economical solution for a wide variety of heat-tracing applications, in particular for pipe lengths beyond the maximum circuit lengths of parallel heating cables (e.g. 250 m).

The inner insulation is a sandwich construction of high temperature fluoropolymer and PTFE, the outer insulation is made of PTFE. This unique construction is very easy to terminate, highly flexible and makes XPI a very safe and reliable product. It provides highest chemical withstand and most excellent mechanical strength, in particular at elevated temperatures.

XPI-S heating cables can be used for temperatures up to 260°C (continuous) and 300°C (intermittent short-term exposure). XPI-S is easy to install and has printed meter-marks. nVent RAYCHEM offers XPI-S heating cables in a very wide range of resistances, starting from 0.8 Ω/km up to 8000 Ω/km as well as a complete range of components for connection and splicing of the cables.

Application

Chemical resistance Organic and inorganic corrosives

PRODUCT SPECIFICATIONS

Technical details

Max. exposure temperature	260°C (power off, continuous), 300°C (power off, intermittent for max 1000 h)
Min. installation temperature	-70°C
Min. bending radius at -70°C	2.5 x cable diameter for cable diameter ≤ 6 mm 6 x cable diameter for cable diameter > 6 mm
Max. power output	35 W/m (typical value, depending on application)
Nominal voltage	Up to 450/750 Vac (U0/U)
Min. impact resistance	7 Joule (as per EN 60079-30-1)
Min. clearance	20 mm between heating cables

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6...T2: using stabilized design

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the Polymer insulated series constant wattage heating system installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	Nominal Resistance [Ω/km @ 20°C]	Temp. Coefficient [$\times 10^{-3}/K$]	Outer Diameter [mm nom.]	Nom. Weight (kg/km)	Part Number PN
XPI-S-0.8	0.8	4.3	11.9	405	1244-003047
XPI-S-1.1	1.1	4.3	10.1	307	1244-003048
XPI-S-1.8	1.8	4.3	8.6	209	1244-003049
XPI-S-2.9	2.9	4.3	7.1	149	1244-003050
XPI-S-4.4	4.4	4.3	6.5	116	1244-003051
XPI-S-7	7	4.3	5.9	88	1244-003052
XPI-S-10	10	4.3	5.8	84	1244-003053
XPI-S-11.7	11.7	4.3	5.6	76	1244-003054
XPI-S-15	15	4.3	5.5	71	1244-003055
XPI-S-17.8	17.8	4.3	5.3	68	1244-003056
XPI-S-25	25	3	5.5	72	1244-003057
XPI-S-31.5	31.5	1.3	5.9	82	1244-003058
XPI-S-50	50	1.3	5.5	72	1244-003059
XPI-S-65	65	1.3	5.4	66	1244-003060
XPI-S-80	80	0.7	5.7	75	1244-003061
XPI-S-100	100	0.4	5.8	79	1244-003062
XPI-S-150	150	0.4	5.8	78	1244-003063
XPI-S-200	200	0.4	5.7	72	1244-003065
XPI-S-320	320	0.18	5.8	76	1244-003066
XPI-S-380	380	0.18	5.7	73	1244-003067
XPI-S-480	480	0.18	5.6	70	1244-003068
XPI-S-600	600	0.18	5.4	67	1244-003069
XPI-S-700	700	0.18	5.4	65	1244-003070
XPI-S-810	810	0.04	5.5	69	1244-003071
XPI-S-1000	1000	0.04	5.4	67	1244-003072
XPI-S-1440	1440	0.04	5.6	69	1244-003073
XPI-S-1750	1750	0.04	5.5	67	1244-003074
XPI-S-2000	2000	0.35	5.8	74	1244-003075
XPI-S-3000	3000	0.35	5.6	69	1244-003076
XPI-S-4000	4000	0.35	5.4	65	1244-003077
XPI-S-4400	4400	0.1	5.5	66	1244-003078
XPI-S-5160	5160	0.1	5.5	66	1244-003079
XPI-S-5600	5600	0.1	5.4	63	1244-003080
XPI-S-7000	7000	0.1	5.4	61	1244-003081
XPI-S-8000	8000	0.1	5.3	60	1244-003082

Resistance tolerance: +10/-5%. In particular for cables < 31.5 Ω/km the resistance of the conductor materials is a function of temperature and the change must be considered for design purposes.

Recommended cold lead cables for XPI-S

Nom. Cross Section [mm ²]	Current Rating [A]	Outer Diameter [mm nom.]	Nominal Resistance [Ω /km @ 20°C]	Temperature Coefficient [$\times 10^{-3}$ /K]	Order Reference	Part Number PN
2.5	32	5.9	7	4.3	XPI-S-7	1244-003052
4	42	6.5	4.4	4.3	XPI-S-4.4	1244-003051
6	54	7.1	2.9	4.3	XPI-S-2.9	1244-003050
10	73	8.6	1.8	4.3	XPI-S-1.8	1244-003049
16	98	10.1	1.1	4.3	XPI-S-1.1	1244-003048
25	129	11.9	0.8	4.3	XPI-S-0.8	1244-003047

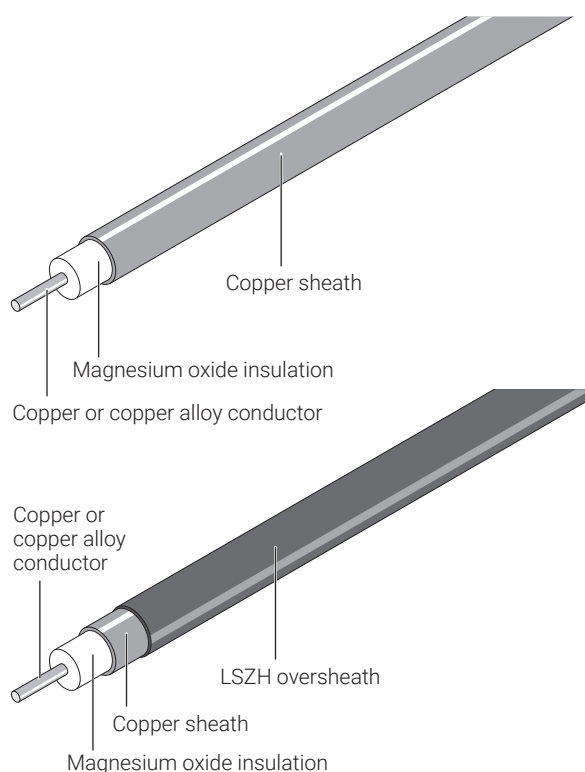
Notes: Delivery length depends on type of resistance and is limited by max. weight of 120 kg/spool, respectively 1000 m/run. To ensure practical and safe on-site handling, it is strongly recommended to limit spool lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time.

nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Mineral insulated (MI) copper sheathed heating cable

PRODUCT OVERVIEW



nVent RAYCHEM HCH/HCC mineral insulated (MI) Copper series heating cables are suited for use in hazardous areas. They are extensively used in a wide variety of industrial heat-tracing applications, such as long line heating or condensation prevention at low temperatures, and domestic applications, such as under floor or road and ramp heating applications. The copper heating cables with copper conductors (HCC) are available in very low resistances to allow for long line applications with a limited amount of supply points when the maximum operating sheath temperature does not exceed 200°C. The typical maximum power output goes up to 50 W/m. Cables are available with an optional LSZH (Low Smoke Zero Halogen) over-sheath for enhanced corrosion protection up to 80°C, usually applied when buried in concrete. The heating cables are offered as bulk cable as well as factory-terminated heating units to ensure optimum quality of the connections. The offering is completed with a full range of components for installation, connection and splicing of the heating cables.

PRODUCT SPECIFICATIONS

Technical details

Cable sheath material	Copper	
Conductor material	Copper (HCC) or Copper Alloy (HCH)	
Max. exposure temperature	200°C**	
Min. installation temperature	-60°C	
Min. bending radius	6 x outer diameter at -60°C	
Max. supply voltage and power	Voltage (U0/U) 300/500 Vac	Max. power output* 50 W/m *typical value, depending on application
Earth leakage	3 mA/100 m (nominal at 20°C, 230 Vac, 50 - 60Hz)	
Min. cable spacing	25 mm for hazardous areas	

**** Note:** Cables available with optional additional oversheath for corrosion protection:
 - LSZH (Max Sheath temp 80°C) - add R to the ref. (HCHR...)
 For LSZH add 1.8 mm to cable OD.

MI series heating cables HCH/HCC

Order Reference	Nominal resistance (Ω/km @ 20°C)	Outer diameter (mm)	Temp. coefficient (x 10 ⁻³ /K)	Max. coil length [m]	Nom. weight (kg/km)
HCH1L2000 ⁽¹⁾	2000	2.8	0.4	1200	31
HCH1L1250 ⁽¹⁾	1250	2.8	0.4	1200	32
HCH1M800	800	3.5	0.4	900	50
HCH1M630	630	4	0.4	1100	65
HCH1M450	450	4	0.4	1000	67
HCH1M315	315	4.3	0.4	1000	77
HCH1M220	220	4.5	0.4	1000	85
HCH1M140	140	4.9	0.4	1000	102
HCH1M100	100	5.2	0.4	800	125
HCC1M63	63	3.2	3.9	2000	41
HCC1M40	40	3.4	3.9	2000	46
HCC1M25	25	3.7	3.9	1600	56
HCC1M17	17	4.6	3.9	500	85
HCC1M11	11	4.9	3.9	500	98
HCC1M7	7	5.3	3.9	400	118
HCC1M4	4	5.9	3.9	800	150
HCC1M2.87	2.87	6.4	3.9	650	170
HCC1M1.72	1.72	7.3	3.9	500	235
HCC1M1.08	1.08	8.3	3.9	400	326

(1) Not approved for hazardous areas, maximum 300 Vac.

Recommended cold leads for HCH/HCC MI series heating cables

Cold Lead Code	Sheath Material	Current Rating (A)	Voltage Rating (Vac)	No of Conductors	Design*	Cable O.D. (mm)	Pigtail Size (mm ²)	Gland Size
C31A	Copper	31	600	1	B	5.8	2.1	M25
C41A	Copper	41	600	1	B	7	3.3	M25
C54A	Copper	54	600	1	B	6.2	5.3	M25
C70A	Copper	70	600	1	B	7.6	8.4	M25
C94A	Copper	94	600	1	B	8.6	13.3	M25
C127A	Copper	127	600	1	B	10.2	21.1	M25

* For details on the different heating unit designs, refer to chapter MI heating Systems - MI heating Cables in the Databook (reference DOC-2210)

Nickel plated brass glands are standard on all copper sheathed heating units. Other materials are possible, contact nVent for more information. If a cold lead has an LSZH oversheath, the C in the order reference becomes an R. (example : C31A becomes R31A)

Delivery length of bulk cable on coil depends on type of resistance and is limited by max. coil length as indicated in the table on top. Factory terminated elements are limited by a max. weight of 50 kg, however to ensure practical and safe on-site handling, it is strongly recommended to limit element lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock.

Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Also refer to the components section for more details on heating units, accessories and nomenclatures.



Chemical resistance

Sheath Material	Maximum Cable Sheath Temp (°C)	Description	Sulphuric Acid	Hydro-chloric Acid	Hydro-fluoric Acid	Alkalis	Phosphoric Acid	Sea Water	Nitric Acid	Chloride	Organic Acid
Copper-LSZH	80	Copper with Low Smoke Zero Halogen oversheath	GE	GE	A	A	A	NR	A	A	
Copper	200	Copper	NR	NR	A	A	NR	A	A	NR	X

Note: NR Not recommended, A acceptable, GE Good to excellent, X Check for specific data.
Corrosion resistance data is dependent on temperature and concentration.

APPROVALS

For use in ordinary and hazardous* area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

*Cable types HCH1L2000 and HCH1L1250 can only be used in ordinary areas

Temperature classification

T6...T2

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



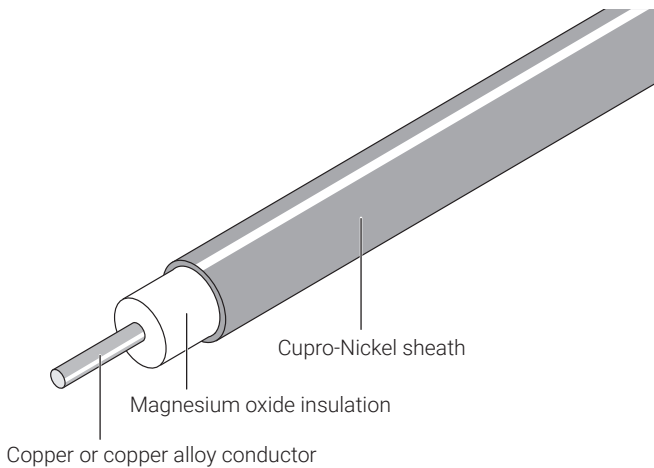
More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

- Due to the sensitivity & craftsmanship required to assemble an MI heating unit, they are usually purchased as factory terminated units. Refer to the "MI Heating Systems Nomenclature" datasheet for more information on the ordering references for complete units or contact your local nVent representative.
It is strongly recommended to use nVent design software such as TraceCalc Pro to validate the design and ordering string.
- To purchase MI heating cables in bulk, refer to the tables with the cable references on p. 2 of this document.

Mineral insulated Cupro-Nickel sheathed heating cable

PRODUCT OVERVIEW



nVent RAYCHEM HDC/HDF mineral insulated (MI) Cupro-Nickel series heating cables are suited for use in hazardous areas. They are extensively used for a wide variety of industries, such as oil and gas, chemical and petrochemical, power generation, gas storage and many other industrial applications. Cupro-Nickel heating cables with copper conductors (HDC) are available in very low resistances to allow for long line applications with a limited amount of supply points, in particular for applications exceeding the capabilities of Polymer Insulated (PI) series heating cables. The heating cables can be used for exposure temperatures up to 400°C and a typical power output up to 70 W/m. The heating cables are offered as bulk cable as well as factory-terminated heating units to ensure optimum quality of the connections. The offering is completed with a full range of components for installation, connection and splicing of the heating cables.

PRODUCT SPECIFICATIONS

Cable sheath material	70/30 Cupro-Nickel	
Conductor material	Copper (HDC) or Copper Alloy (HDF)	
Max. exposure temperature	400°C	
Min. installation temperature	-60°C	
Min. bending radius	6 x outer diameter at -60°C	
Max. supply voltage and power	Voltage (U ₀ /U)	Max. power output*
	300/500 Vac	70 W/m
	*typical value, depending on application	
Earth leakage	3 mA/100 m (nominal at 20°C, 230 Vac, 50 - 60 Hz)	
Min. cable spacing	25 mm for hazardous areas	

Heating Cables



MI series heating cables HDF/HDC

Order reference	Nominal resistance (Ω/km @ 20°C)	Outer diameter (mm)	Temp. coefficient (x 10 ⁻³ /K)	Max. coil length [m]	Nom. weight (kg/km)
HDF1M1600	1600	3.2	0.04	625	40
HDF1M1000	1000	3.4	0.04	550	45
HDF1M630	630	3.7	0.04	465	55
HDF1M400	400	4	0.04	400	67
HDF1M250	250	4.4	0.04	330	84
HDF1M160	160	4.9	0.04	265	108
HDC1M63	63	3.2	3.9	620	39
HDC1M40	40	3.4	3.9	550	44
HDC1M25	25	3.7	3.9	440	55
HDC1M17	17	4.6	3.9	300	84
HDC1M11	11	4.9	3.9	265	98
HDC1M7	7	5.3	3.9	225	119
HDC1M4	4	5.9	3.9	180	155

Recommended cold leads for HDF/HDC MI series heating cables

Cold lead code	Sheath material	Current rating (A)	Voltage rating (Vac)	No of conductors	Design*	Cable O.D. (mm)	Pigtail size (mm ²)	Gland size
S33A	Alloy 825	33	600	1	B	5.5	3.3	M25
S55A	Alloy 825	55	600	1	B	6.4	8.4	M25
S76A	Alloy 825	76	600	1	B	8.1	13.3	M25
S123A	Alloy 825	123	600	1	B	10.2	21.1	M25

* For details on the different heating unit designs, refer to chapter MI heating Systems - MI heating Cables in the Databook (reference DOC2210)

Nickel plated brass glands are standard on all heating units. Other materials are possible, contact nVent for more information. Cold leads attached to cupro nickel sheathed heating cables are provided with an Alloy 825 outer sheath. As the cold lead is an exposed component, not protected by insulation, it can be subject to extremely variable corrosive environments. The Alloy 825 sheath provides enhanced life expectancy with a superior level of corrosion protection against a wide range of exposure conditions.

By default, all cold leads are supplied with M25 glands intended for use with a standardized range of nVent RAYCHEM MI junction boxes which include an integral earth plate.

Delivery length of bulk cable on coil depends on type of resistance and is limited by max. coil length as indicated in the table on top. Factory terminated elements are limited by a max. weight of 50 kg, however to ensure practical and safe on-site handling, it is strongly recommended to limit element lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Also refer to the components section for more details on heating units, accessories and nomenclatures.

Chemical resistance

Sheath material	Maximum cable sheath temp (°C)	Description	Sulphuric acid	Hydrochloric acid	Hydrofluoric acid	Phosphoric acid	Nitric acid	Organic acid	Alkalis	Sea water	Chloride
Cupro-Nickel	400	Cupro-Nickel alloy 70% copper 30% nickel	NR	X	X	X	X	X	X	GE	GE

Note: NR Not recommended, A acceptable, GE Good to excellent, X Check for specific data
Corrosion resistance data is dependent on temperature and concentration.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6 ... T1

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



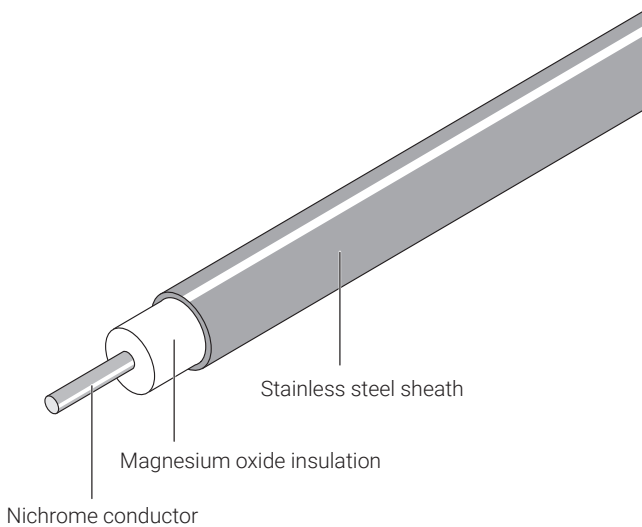
More details about product certification, approvals and conditions of safe use are available in the installation manual for Mineral Insulated (MI) series heating systems at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

- Due to the sensitivity & required craftsmanship to assemble an MI heating unit, they are usually purchased as factory terminated units. Refer to the "MI Heating Systems Nomenclature" datasheet for more information on the ordering references for complete units or contact your local nVent representative.
It is strongly recommended to use nVent design software such as TraceCalc Pro to validate the design and ordering string.
- To purchase MI heating cables in bulk, refer to the tables with the cable references on page 2 of this document.

Mineral insulated (MI) stainless steel sheathed heating cable

PRODUCT OVERVIEW



nVent RAYCHEM HSQ mineral insulated (MI) Stainless steel series heating cables are suited for use in hazardous areas. The Stainless steel sheath offers excellent corrosive properties against a wide range of organic acids and alkalis in combination with a high temperature withstand capability. HSQ cables are typically used in bitumen plants, gas plants, oil refineries, reactors and vessels, sodium loops and a wide variety of other heat-tracing applications where temperature resistance, power output and durability are paramount. The heating cables can be used for exposure temperatures up to 680°C and a typical power output up to 150 W/m. Higher temperatures and power outputs can be achieved, contact nVent for assistance. The heating cables are offered as bulk cables as well as factory-terminated heating units employing brazing or laser welding techniques to ensure optimum quality of the connections. The offering is completed with a full range of components for installation, connection and splicing of the heating cables.

PRODUCT SPECIFICATIONS

Technical details

Cable sheath material	321 Stainless steel	
Conductor material	Nichrome	
Max. exposure temperature	550°C (brazed heating units) 680°C* (laser welded heating units) *Higher temperatures can be realized, contact nVent	
Min. installation temperature	-60°C	
Min. bending radius	6 x outer diameter at -60°C	
Max. supply voltage and power	Voltage (Uo/U) 300/500 Vac 460/600 Vac (laser welded heating units)	Max. power output* 150 W/m *typical value, depending on application
Earth leakage	3 mA/100 m (nominal at 20°C, 230 Vac, 50 - 60 Hz)	
Min. cable spacing	25 mm for hazardous areas	

MI series heating cables HSQ

Order Reference	Nominal Resistance (Ω/km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient (x 10 ⁻³ /K)	Max. Coil Length [m]	Nom. Weight (kg/km)
HSQ1M10K	10000	3.2	0.09	740	39
HSQ1M6300	6300	3.2	0.09	741	39
HSQ1M4000	4000	3.2	0.09	743	39
HSQ1M2500	2500	3.4	0.09	660	46
HSQ1M1600	1600	3.6	0.09	591	52
HSQ1M1000	1000	3.9	0.09	506	62
HSQ1M630	630	4.3	0.09	419	78
HSQ1M400	400	4.7	0.09	354	96
HSQ1M250	250	5.3	0.09	280	127
HSQ1M160	160	6.5	0.09	187	191

Recommended cold leads for HSQ MI series heating cables

Cold Lead Code	Sheath Material	Current Rating (A)	Voltage Rating (Vac)	No. of Conductors	Design*	Cable O.D. (mm)	Pigtail Size (mm ²)	Gland Size
S33A	Alloy 825	33	600	1	B	5.5	3.3	M25
S55A	Alloy 825	55	600	1	B	6.4	8.4	M25
SC33A	Stainless steel	33	600	1	B	5.5	3.3	M25
SC55A	Stainless steel	55	600	1	B	6.4	8.4	M25

* For details on the different heating unit designs, refer to chapter MI heating Systems - MI heating Cables in the Databook (reference DOC2210)

Nickle plated brass glands are standard on all heating units. Other materials are possible, contact nVent for more information.

Cold leads attached to HSQ heating cables are provided with an Alloy 825 outer sheath when the joint connection method is brazed or SS321 sheath when the connection method is laser welded. As the cold lead is an exposed component, not protected by insulation, it can be subject to extremely variable corrosive environments. The Alloy 825 sheath provides enhanced life expectancy with a superior level of corrosion protection against a wide range of exposure conditions.

By default, all cold leads are supplied with M25 glands intended for use with a standardized range of nVent RAYCHEM MI junction boxes which include an integral earth plate. Delivery length of bulk cable on coil depends on type of resistance and is limited by max. coil length as indicated in the table on top. Factory terminated elements are limited by a max. weight of 50 kg, however to ensure practical and safe on-site handling, it is strongly recommended to limit element lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Also refer to the components section for more details on heating units, accessories and nomenclatures.

Table 3 Chemical resistance

Sheath Material	Description	Sulphuric Acid	Hydrochloric Acid	Hydrofluoric Acid	Phosphoric Acid	Nitric Acid	Organic Acid	Alkalies	Sea Water	Chloride
Stainless Steel 321 DIN 1.4541	18/8 austenitic stainless steel with added titanium	NR	NR	NR	NR	X	GE	A	NR	NR

Note: NR - Not recommended, A - Acceptable, GE - Good to excellent, X - Check for specific data
Temperature limitation based on construction of heating element.

Corrosion resistance data is dependent on temperature and concentration.



APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature Classification

T6 ... T1

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

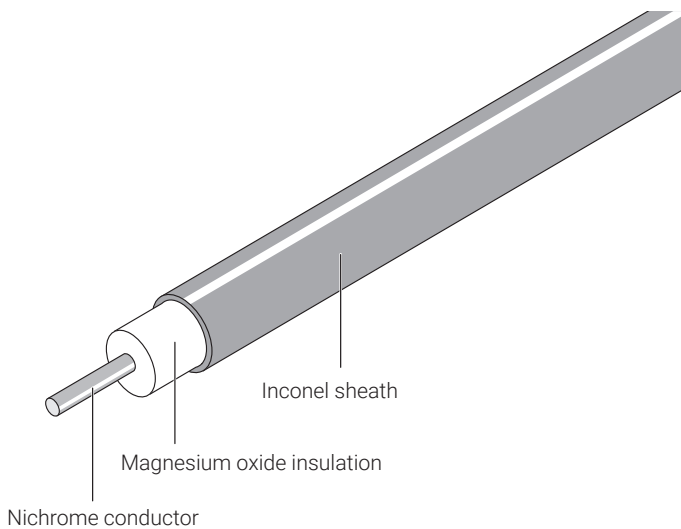
ORDERING INFORMATION

- Due to the sensitivity & craftsmanship required to assemble an MI heating unit, they are usually purchased as factory terminated units. Refer to the "MI Heating Systems Nomenclature" datasheet for more information on the ordering references for complete units or contact your local nVent representative.
It is strongly recommended to use nVent design software such as TraceCalc Pro to validate the design and ordering string.
- To purchase MI heating cables in bulk, refer to the tables with the cable references on page 2 in this document.



Mineral insulated (MI) Inconel sheathed heating cable

PRODUCT OVERVIEW



nVent RAYCHEM HIQ mineral insulated (MI) Inconel 600 series heating cables are suited for use in hazardous areas. The Inconel 600 sheath offers excellent corrosive properties against a wide range of organic acids and alkalis, as well as chloride stress-corrosion cracking, in combination with a high temperature withstand capability. HIQ cables are typically used in bitumen plants, gas plants, oil refineries, reactors and vessels, sodium loops and a wide variety of other heat-tracing applications where temperature resistance, power output and durability are required and exceed the limitations of stainless steel sheathed MI heating cables. The heating cables can be used for exposure temperatures up to 680°C and a typical power output up to 300 W/m. Higher temperatures and power outputs can be achieved, contact nVent for assistance. The heating cables are offered as bulk cables as well as factory-terminated heating units employing brazing or laser welding techniques to ensure optimum quality of the connections. The offering is completed with a full range of components for installation, connection and splicing of the heating cables.

PRODUCT SPECIFICATIONS

Technical details

Cable sheath material	Inconel 600	
Conductor material	Nichrome	
Max. exposure temperature	550°C (brazed heating units) 680°C* (laser welded heating units) *Higher temperatures can be realized, contact nVent	
Min. installation temperature	-60°C	
Min. bending radius	6 x outer diameter at -60°C	
Max. supply voltage and power	Voltage (U0/U) 300/500 Vac 460/600 Vac (laser welded heating units)	Max. power output* 300 W/m *typical value, depending on application
Earth leakage	3 mA/100 m (nominal at 20°C)	
Min. cable spacing	25 mm for hazardous areas	

MI series heating cables HIQ

Order Reference	Nominal Resistance (Ω/Km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient (x 10 ⁻³ /K)	Max. Coil Length [m]	Nom. Weight (kg/km)
HIQ1M10K	10000	3.2	0.09	772	39
HIQ1M6300	6300	3.2	0.09	774	39
HIQ1M4000	4000	3.2	0.09	776	39
HIQ1M2500	2500	3.4	0.09	689	46
HIQ1M1600	1600	3.6	0.09	617	52
HIQ1M1000	1000	3.9	0.09	528	62
HIQ1M630	630	4.3	0.09	437	78
HIQ1M400	400	4.7	0.09	368	96
HIQ1M250	250	5.3	0.09	292	127
HIQ1M160	160	6.5	0.09	194	191

Recommended cold leads for HIQ MI series heating cables

Cold Lead Code	Sheath Material	Current Rating (A)	Voltage Rating (Vac)	No of Conductors	Design*	Cable O.D. (mm)	Pigtail Size (mm ²)	Gland Size
S33A	Alloy 825	33	600	1	B	5.5	3.3	M25
S55A	Alloy 825	55	600	1	B	6.4	8.4	M25

* For details on the different heating unit designs, refer to chapter MI heating Systems - MI heating Cables in the Databook (reference DOC2210)

Nickel plated brass glands are standard on all heating units. Other materials are possible, contact nVent for more information.

Delivery length of bulk cable on coil depends on type of resistance and is limited by max. coil length as indicated in the table on top. Factory terminated elements are limited by a max. weight of 50 kg, however to ensure practical and safe on-site handling, it is strongly recommended to limit element lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Also refer to the components section for more details on heating units, accessories and nomenclatures.

MI heating cable sheath corrosion resistance and temperature data

Sheath Material	Description	Sulphuric Acid	Hydrochloric Acid	Hydrofluoric Acid	Phosphoric Acid	Nitric Acid	Organic Acid	Alkalis	Sea Water	Chloride
Inconel 600 DIN 2.4816	High nickel, high chromium content inconel alloy 600	X	X	A	X	X	GE	GE	A	GE

Note: NR - Not recommended, A - Acceptable, GE - Good to excellent, X - Check for specific data

Temperature limitation based on construction of heating element.

Corrosion resistance data is dependent on temperature and concentration.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6 ... T1

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the Mineral Insulated (MI) series heating systems installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

- Due to the sensitivity & craftsmanship required to assemble an MI heating unit, they are usually purchased as factory terminated units. Refer to the "MI Heating Systems Nomenclature" datasheet for more information on the ordering references for complete units or contact your local nVent representative.
It is strongly recommended to use nVent design software such as TraceCalc Pro to validate the design and ordering string.
- To purchase MI heating cables in bulk, refer to the tables with the cable references on page 52 in this document.

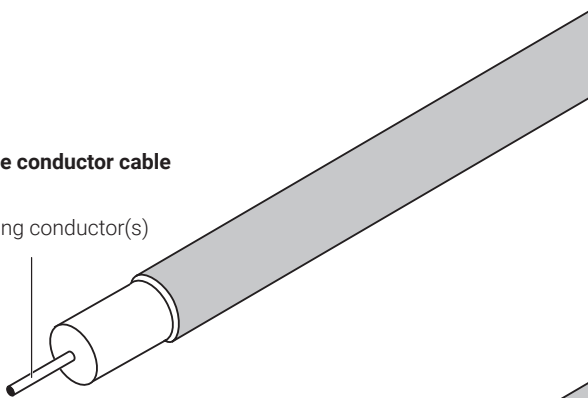


Mineral insulated (MI) Alloy 825 heating cable

PRODUCT OVERVIEW

Single conductor cable

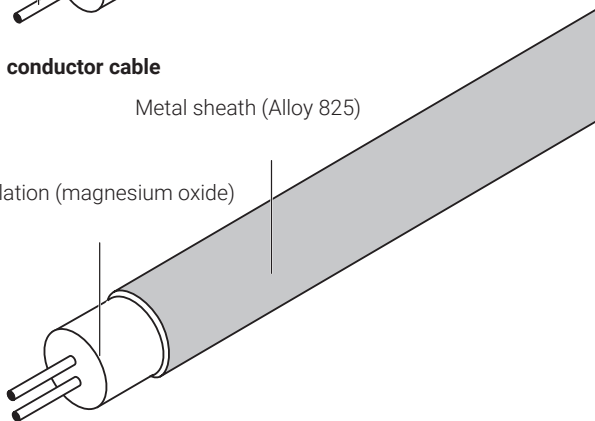
Heating conductor(s)



Dual conductor cable

Metal sheath (Alloy 825)

Insulation (magnesium oxide)



nVent RAYCHEM HAX mineral insulated (MI) Alloy 825 series heating cables are suitable for use in hazardous areas. They have been designed for use in freeze protection and temperature maintenance applications of pipes, tanks and other equipment.

MI heating cables of the HAX-series offer an ideal combination of ruggedness, high temperature withstand capability and corrosion resistance and can therefore be used for a wide variety of heat-tracing applications, in particular for applications with high power requirements and for temperatures exceeding the capabilities of polymer insulated (PI) series heating cables.

The heating cables can be used for exposure temperatures of up to 600°C and a typical power output of up to 270 W/m. Higher temperatures and power outputs can be achieved, contact nVent for assistance.

HAX mineral insulated (MI) heating cables are available as single and dual conductor construction and in a very wide range of resistances. The use of dual conductor heating cables can significantly reduce total installed cost and simplifies installation, in particular for small pipes and instrument tubing.

The heating cables are offered as bulk cable as well as factory terminated heating units employing brazing and laser welding technology. The offering is completed with a full range of components for installation, connection and splicing of the heating cables.

PRODUCT SPECIFICATIONS

Technical Details

Cable sheath material	Alloy 825		
Conductor material	Various alloys and copper		
Max. exposure temperature	550°C (brazed heating units) 600°C* (laser welded heating units) *Higher temperatures can be realized, contact nVent		
Min. installation temperature	-60°C		
Min. bending radius	6 x OD (cable diameter) at -60°C		
Max. supply voltage and power	Voltage (U ₀ /U)	Max. power output*	Heating cable type
	600/600 Vac	210 W/m	HAX1N Single conductor cable, 600 V
	300/300 Vac	200 W/m	HAX2M Dual conductor cable, 300 V
	600/600 Vac	270 W/m	HAX2N Dual conductor cable, 600 V
	*typical value, depending on application		
Earth leakage	3 mA /100 m (nominal at 20°C, 230 Vac, 50 - 60 Hz)		
Min. cable spacing	25 mm for hazardous areas		

Table 1 MI series heating cables HAX2M (Dual conductor cable, 300 V)

Order Reference	Nominal Resistance (Ω/km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient (x 10 ⁻³ /K)	Max. Coil Length [m]	Nom. Weight (kg/km)	Part Number PN
HAF2M59K	59000	4.4	0.09	387	73	32SF1180
HAF2M36K	36000	4	0.09	483	60	32SF1110
HAF2M29.5K	29500	4.1	0.09	459	63	32SF2900
HAF2M24.5K	24500	4	0.09	477	61	32SF2750
HAA2M19.7K	19700	4.1	0.09	459	63	32SA2600
HAA2M13.2K	13200	3.7	0.09	554	54	32SA2400
HAA2M10.4K	10400	4.4	0.09	389	74	32SA2318
HAA2M9000	9000	3.9	0.09	505	60	32SA2275
HAA2M6600	6600	4.3	0.09	414	73	32SA2200
HAA2M5600	5600	4.2	0.09	425	72	32SA2170
HAB2M3750	3750	4.4	0.04	390	76	32SB2114
HAB2M3000	3000	4.1	0.04	451	67	32SB3914
HAB2M2300	2300	4.3	0.04	411	74	32SB3700
HAQ2M1560	1560	4.5	0.5	376	78	32SQ3472
HAQ2M1240	1240	4.6	0.5	352	82	32SQ3374
HAQ2M965	965	4.5	0.5	368	79	32SQ3293
HAQ2M660	660	4.1	0.5	457	66	32SQ3200
HAQ2M495	495	4.3	0.5	420	73	32SQ3150
HAQ2M330	330	4.7	0.5	348	89	32SQ3100
HAP2M240	240	4.4	1.3	391	78	32SP4734
HAP2M190	190	4.5	1.3	375	82	32SP4583
HAP2M150	150	4.8	1.3	337	62	32SP4458
HAC2M105	105	4.7	3.9	349	85	32SC4324

Table 2 MI series heating cables HAX2N (Dual conductor cable, 600 V)

Order Reference	Nominal Resistance (Ω/km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient (x 10 ⁻³ /K)	Max. Coil Length [m]	Nom. Weight (kg/km)	Part Number PN
HAF2N36K	36000	4.9	0.09	312	91	62SF1110
HAF2N29.5K	29500	4.9	0.09	312	91	62SF2900
HAF2N24.5K	24500	5.2	0.09	279	103	62SF2750
HAF2N19.7K	19700	5.8	0.09	222	128	62SF2600
HAA2N13.6K	13600	6.1	0.09	204	140	62SA2414
HAA2N9000	9000	5.7	0.09	232	125	62SA2275
HAF2N6600	6600	6.2	0.09	196	149	62SF2200
HAA2N5600	5600	6.1	0.09	205	143	62SA2170
HAT2N3750	3750	5.5	0.18	254	113	62ST2115
HAB2N3000	3000	5.9	0.04	219	132	62SB3914
HAB2N2300	2300	6.7	0.04	168	174	62SB3700
HAT2N1670	1670	5.5	0.18	255	115	62ST3505
HAQ2N1240	1240	5.5	0.5	254	113	62SQ3374
HAQ2N940	940	5.6	0.5	239	121	62SQ3286
HAQ2N660	660	5.8	0.5	229	128	62SQ3200
HAQ2N495	495	5.8	0.5	229	128	62SQ3150
HAQ2N330	330	6.5	0.5	179	165	62SQ3100
HAP2N255	255	6.4	1.3	188	155	62SP4775
HAP2N185	185	6.7	1.3	171	173	62SP4561
HAP2N130	130	7	1.3	154	194	62SP4402
HAP2N92	92	7.4	1.3	139	219	62SP4281
HAC2N66	66	7.2	3.9	145	201	62SC4200



Order Reference	Nominal Resistance (Ω/km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient ($\times 10^{-3}/\text{K}$)	Max. Coil Length [m]	Nom. Weight (kg/km)	Part Number PN
HAC2N43	43	7.7	3.9	128	233	62SC4130
HAC2N27	27	8.4	3.9	100	279	62SC5818
HAC2N17	17	9.2	3.9	90	343	62SC5516
HAC2N10.5	10.5	10.2	3.9	74	432	62SC5324
HAC2N6.6	6.6	12.6	3.9	48	653	62SC5204
HAC2N4.3	4.3	13.8	3.9	143	769	62SC5128

Table 3 MI series heating cables HAX1N (Single conductor cable, 600 V)

Order Reference	Nominal Resistance (Ω/km @ 20°C)	Outer Diameter (mm)	Temp. Coefficient ($\times 10^{-3}/\text{K}$)	Max. Coil Length [m]	Nom. Weight (kg/km)	Part Number PN
HAA1N6565	6565	4.3	0.085	406	75	61SA2200
HAA1N5250	5250	4.1	0.085	443	66	61SA2160
HAA1N4300	4300	4.1	0.085	460	63	61SA2130
HAA1N3300	3300	4.1	0.085	460	64	61SA2100
HAA1N2800	2800	4.3	0.085	408	72	61SA3850
HAA1N2300	2300	4.1	0.085	462	64	61SA3700
HAA1N1640	1640	4.3	0.085	410	73	61SA3500
HAT1N920	920	4.3	0.18	408	72	61ST3280
HAB1N660	660	4.6	0.04	365	82	61SB3200
HAB1N500	500	4.3	0.04	412	76	61SB3150
HAQ1N390	390	4.4	0.5	384	75	61SQ3118
HAQ1N240	240	4.3	0.5	410	72	61SQ4732
HAQ1N190	190	4.4	0.5	399	75	61SQ4581
HAP1N155	155	4.3	1.3	408	72	61SP4467
HAP1N120	120	4.4	1.3	394	75	61SP4366
HAP1N95	95	4.5	1.3	377	79	61SP4290
HAP1N76	76	4.4	1.3	391	78	61SP4231
HAP1N60	60	4.3	1.3	411	75	61SP4183
HAP1N48	48	4.3	1.3	412	76	61SP4145
HAP1N37	37	4.7	1.3	345	91	61SP4113
HAC1N21.3	21.3	4.7	3.9	338	89	61SC5651
HAC1N13.5	13.5	4.9	3.9	326	95	61SC5409
HAC1N8.5	8.5	5.5	3.9	259	124	61SC5258
HAC1N5.3	5.3	6.8	3.9	166	192	61SC5162
HAC1N3.3	3.3	6.4	3.9	171	185	61SC5102
HAC1N2	2	8.1	3.9	119	294	61SC6640

Table 4 Recommended cold lead cables for HAX MI series heating cables

Cold Lead Code	Sheath Material	Current Rating (A)	Voltage Rating (Vac)	No of Conductors	Design*	Cable O.D. (mm)	Pigtail Size (mm ²)	Gland Size
S33A	Alloy 825	33	600	1	B	5.5	3.3	M25
S55A	Alloy 825	55	600	1	B	6.4	8.4	M25
S76A	Alloy 825	76	600	1	B	8.1	13.3	M25
S123A	Alloy 825	123	600	1	B	10.2	21.1	M25
LS28A	Alloy 825	28	300	2	D or E	8.1	2.1	M25
S28A	Alloy 825	28	600	2	D or E	9	2.1	M25
S41A	Alloy 825	41	600	2	D or E	10.2	5.3	M25
S57A	Alloy 825	57	600	2	D or E	12.6	8.4	M25
S77A	Alloy 825	77	600	2	D or E	13.8	13.3	M25

* For details on the different heating unit designs, refer to the chapter MI Heating Systems - MI Heating Cables in the Databook.

Cold leads attached to HAX heating cables are provided with an Alloy 825 outer sheath. As the cold lead is an exposed component, not protected by insulation, it can be subject to extremely variable corrosive environments. The Alloy 825 sheath provides enhanced life expectancy with a superior level of corrosion protection against a wide range of exposure conditions.

By default, all cold leads are supplied with nickel plated brass M25 glands intended for use with a standardized range of nVent RAYCHEM MI junction boxes which include an integral earth plate. Other gland materials are possible, contact nVent for more information. Delivery length of bulk cable on coil depends on type of resistance and is limited by max. coil length as indicated in the table on top. Factory terminated elements are limited by a max. weight of 50 kg, however to ensure practical and safe on-site handling, it is strongly recommended to limit element lengths to 25 - 30 kg. Not all resistances are standard items and as such may not be in stock. Contact nVent to confirm lead time. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire.

Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

Table 5 Chemical resistance

Alloy	Maximum Cable Sheath Temp (°C)	Description	Nominal chemical composition, % (major elements)				High temperature resistance (+540°C)		Corrosion resistance									
			Nickel (+Cobalt)	Iron	Chromium	Other	Oxidation	Carburization	Sulfuric acid	Hydrochloric acid	Hydrofluoric acid	Phosphoric acid	Nitric acid	Organic acid	Alkalis	Salts	Seawater	Chloride cracking
INCOLOY Alloy 825 nickel-iron-chromium	550°C*	Excellent resistance to a wide variety of corrosives. Resists pitting and intergranular type corrosion, reducing acids and oxidizing chemicals	42	30	21.5	Mo 3.0 Cu 2.2	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E	G-E

From Huntington Alloys Publication 78-348-2

Note: NR - Not recommended, A - Acceptable, GE - Good to excellent, X - Check for specific data

* Temperature limitation based on construction of heating element.
Corrosion resistance data is dependent on temperature and concentration.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6 ... T1

nVent RAYCHEM heat-tracing products are approved for the listed temperature classifications by using the principles of stabilized design. Use TraceCalc design software or contact nVent.

Product certification



More details about product certification, approvals and conditions of safe use are available in the Mineral Insulated (MI) series heating systems installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

- Due to the sensitivity & craftsmanship required to assemble an MI heating unit, they are usually purchased as factory terminated units. Refer to the "MI Heating Systems Nomenclature" Datasheet for more information on the ordering references for complete units or contact your local nVent representative.

It is strongly recommended to use nVent design software such as TraceCalc Pro to validate the design and ordering string.

- To purchase MI heating cables in bulk, refer to the tables with the cable references on page 2-3 in this document.

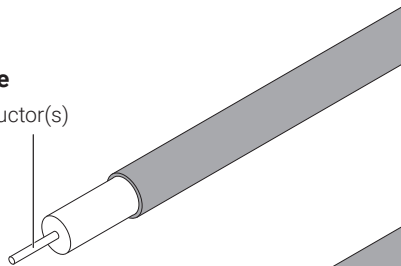


MI heating cables

PRODUCT OVERVIEW

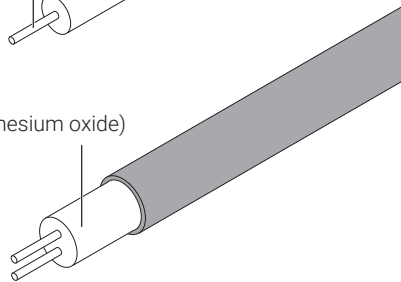
Single conductor cable

Heating conductor(s)



Dual conductor cable

Insulation (magnesium oxide)



nVent RAYCHEM MI heating cables are available for a wide range of applications.

For more details about the different MI heating cable types, also refer to the product datasheets.

Various constructions of the MI bulk heating cables are available:

HCC/HCH:	Copper sheathed MI heating cables
HDF/HDC:	Cupro-nickel sheathed MI heating cables
HSQ:	Stainless steel sheathed MI heating cables
HAX:	Alloy 825 sheathed MI heating cables
HIQ:	Inconel sheathed MI heating cables

MI bulk heating cables are supplied in a range of different constructions, the product references use the following nomenclature:

Example: HCHR1L2000-RD

H	H denotes a heating cable	H =Heating Cable
C	Sheath material	C =Copper D =Cupro-Nickel S =Stainless steel A =Alloy 825 I =Inconel 600
H	Conductor material (examples)	C =Copper H =Copper Alloy and a variety of other metal alloys
R	Oversheath material (optional for copper cables only, oversheath colour is red)	R =LSZH
1	Number of conductors	1 or 2
L	Normal operating voltages	Refer to datasheets of individual heating cables
2000	Conductor resistance	in Ω/km - i.e. 2000=2000 Ω/km

PRODUCT SPECIFICATIONS

MI heating units

MI heating units consist of a heating cable, the hot-cold joint as well as the cold lead cables with an appropriate seal and gland. The connection and sealing of an MI heating unit is critical for a safe and reliable operation.

nVent strongly recommends the use of factory-terminated heating units, which guarantee a consistently high level of quality.

The stainless steel (HSQ), Inconel 600 (HIQ) and Alloy 825 (HAX) can be delivered with either brazed joints and/or end caps or laser welded joints and/or end caps. We recommend the use of laser welded joints and/or end caps if the load or exposure temperatures cause element temperatures above 550°C.

Lower temperatures can be fulfilled with brazed connections. (Alloy 825 heating cables or cold leads should not be used at temperatures between 650°C and 750°C).

When brazed connections are used, nVent offers heating units with Alloy 825 cold leads regardless of the sheath material used to obtain maximum corrosion resistance on the exposed parts. (except copper heating cables which are offered with a copper cold lead) Brazed heating units also come with an additional strain relief for bending protection on the heating cable side.

When laser welded connections are used, we offer either stainless steel cold leads when stainless steel heating cables have been selected or Alloy 825 cold leads if Inconel or Alloy 825 heating cables are the choice.

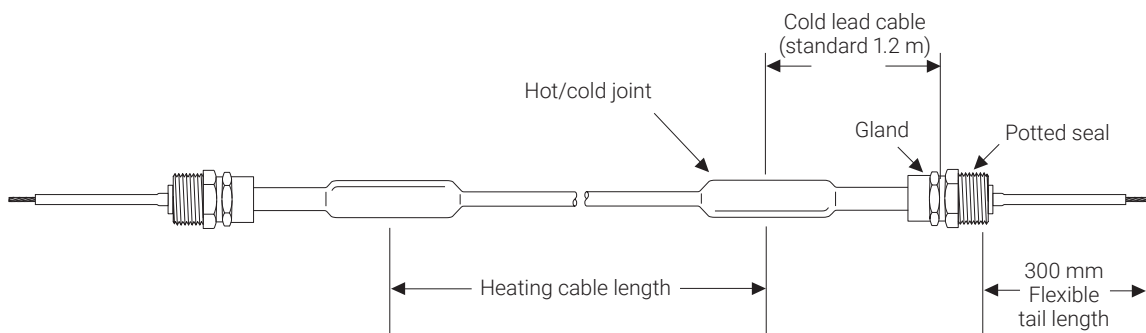
The standard gland material is nickel plated brass but they are also available in stainless steel. The gland size is M25 for all cold lead sizes.

Appropriate earthing of the heating units is realized through the glands and use of junction boxes with integral earth plate or metallic junction boxes. Consult our product literature for more information on our junction box offering with integral earth plates.

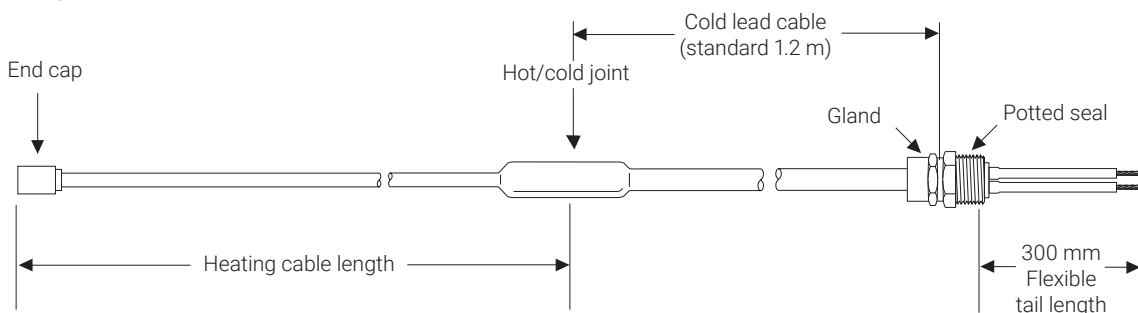
For use in hazardous areas, MI heating units need to be assembled by nVent or an authorized installer.

MI heating units are available in different configurations (unit types)

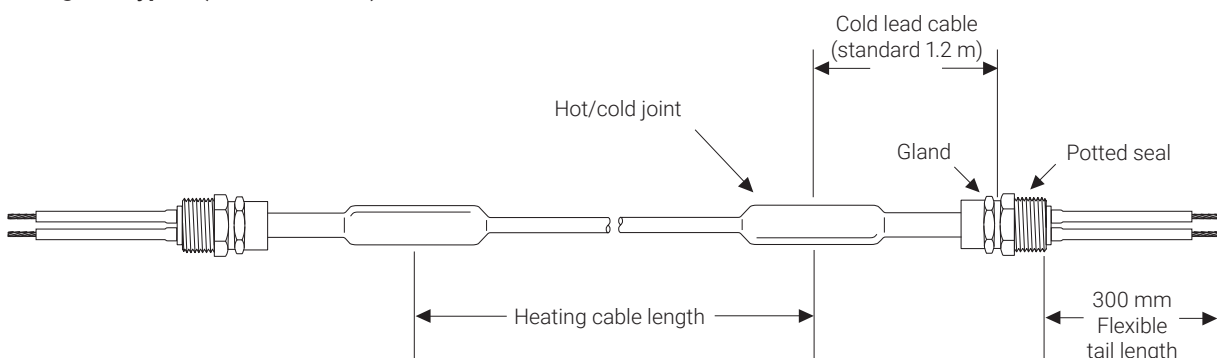
MI heating unit type B (single conductor)



MI heating unit type D (dual conductor)



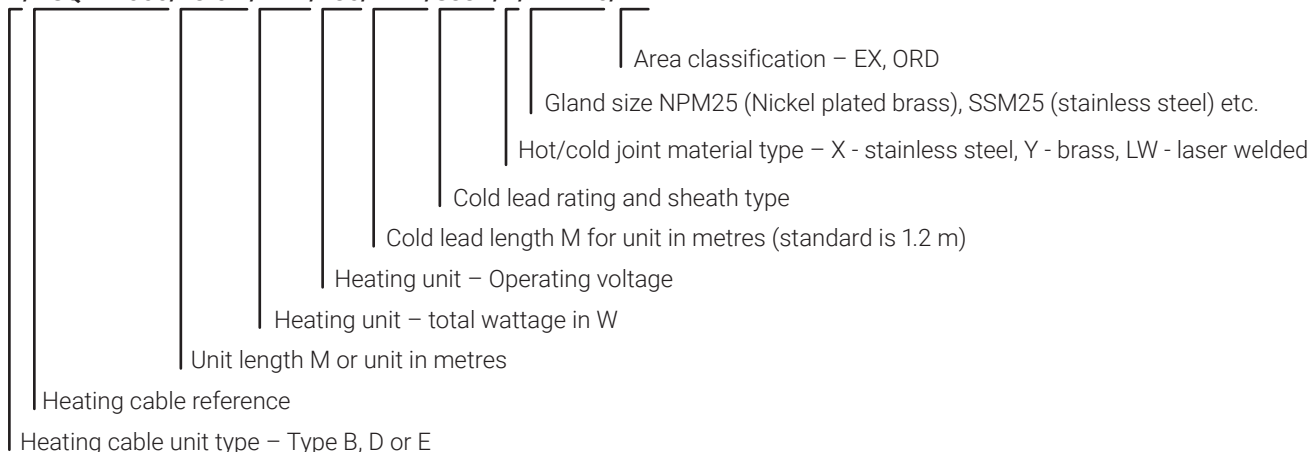
MI heating unit type E (dual conductor)



The cold lead length includes 300 mm long flexible tails. Glands are fitted with washers and locknuts. Other configurations available on request.

The order reference of MI heating units uses the following nomenclature

B/HSQ1M1000/43.0M/1217/230/1.2M/S33A/X/NPM25/EX



When ordering, the complete order reference of the MI heating unit needs to be provided. For hazardous areas, information must also be provided about the T-rating and temperature data relevant to the application (max. sheath temperature data) to enable the correct representation of data on hazardous area tags attached to the completed heating unit in the factory.

Any missing detail may lead to potential delays in order processing.

Selection of MI cold leads

Standard cold leads consist of 1.2 m of mineral insulated cold lead cable and 300 mm of stranded flex tails. The glands are always M25 and the standard gland material nickel plated brass.

Earthing of the units is realized through the glands and use of junction boxes with earth plate or metallic junction boxes. The cold leads do not have an integrated earth wire. (alternatively earth lugs can also be used if the junction boxes are in plastic without earth plate – contact nVent for more information) Optionally stainless steel glands or different cold lead lengths are also available but will increase lead time. Contact nVent for more information for a specific request.

The reference of a cold lead always consists of one or 2 letters indicating the sheath material and a number followed by 'A' indicating the maximum continuous current rating.

And example : **S 33A**

- S**: Cold lead sheathed material Alloy 825
- 33A**: Cold lead rated up to 33A continuous

nVent RAYCHEM MI cold lead cables are available in different sheath materials:

- S...A : Alloy 825 sheathed cold lead
- SC...A : Stainless steel sheathed cold lead
- C...A : Copper sheathed cold lead

For selection of the MI cold lead, the environmental exposure (chemicals etc...), as well as the current rating need to be considered:

- nVent typically recommends using the same or superior sheath materials for the cold lead as used for the heating cable. When a unit is brazed, nVent default cold lead is in Alloy 825 to offer maximum corrosion protection on the most exposed part. (except for copper heating units for which the cold leads are also copper sheathed or overjacketed) When a unit is laser welded (available for stainless steel, Alloy 825 and Inconel sheathed cables), nVent will offer an Alloy 825 cold lead on both Inconel and Alloy 825 heating units and a stainless steel cold lead on a stainless steel unit.
- Cold leads are normally selected based on the operating current of the heating unit at maintain temperature. For higher maintain temperatures, the current can be significantly higher during the transitional start-up phase. If the application involves more frequent heat-up from lower temperatures, we recommend selecting the cold lead size based on the start-up

The option for laser welded units is not available for MI heating cables with a copper or cupro-nickel sheath.

Cold lead selection table

Number Of Conductors	Cross Section of Pigtail (mm ²)	Cold Lead Order Reference	Current Rating (A)	Connection Method (Lw: Laser Welded / B: Brazed)	Outer Diameter (mm)	Sheath Material	Gland Size
1	3.3	C33A SC33A S33A	33	B LW B or LW	5.5	Copper Stainless steel Alloy 825	M25
	8.4	C55A SC55A S55A	55	B LW B or LW	6.4	Copper Stainless steel Alloy 825	
	13.3	C76A S76A	76	B B or LW	8.1	Copper Alloy 825	
	21.2	C123A S123A	123	B B	10.2	Copper Alloy 825	
2	2.1	LS28A** S28A	28	B or LW B or LW	8.1 9	Alloy 825	M25
	5.3	S41A	41	B	10.2	Alloy 825	
	8.4	S57A	57	B	12.6	Alloy 825	
	13.3	S77A	77	B	13.8	Alloy 825	

** Cold lead is limited up to 300 Vac

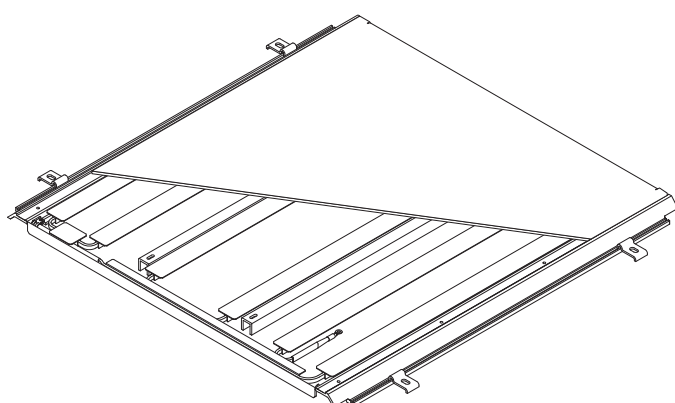
For over jacketed cables (copper sheathed only), add 2 mm to the outer diameter

Nickel plated brass glands are standard on all heating units. Optionally glands in stainless steel are also available.



Anti-icing system for offshore walkways and deck surfaces

PRODUCT OVERVIEW



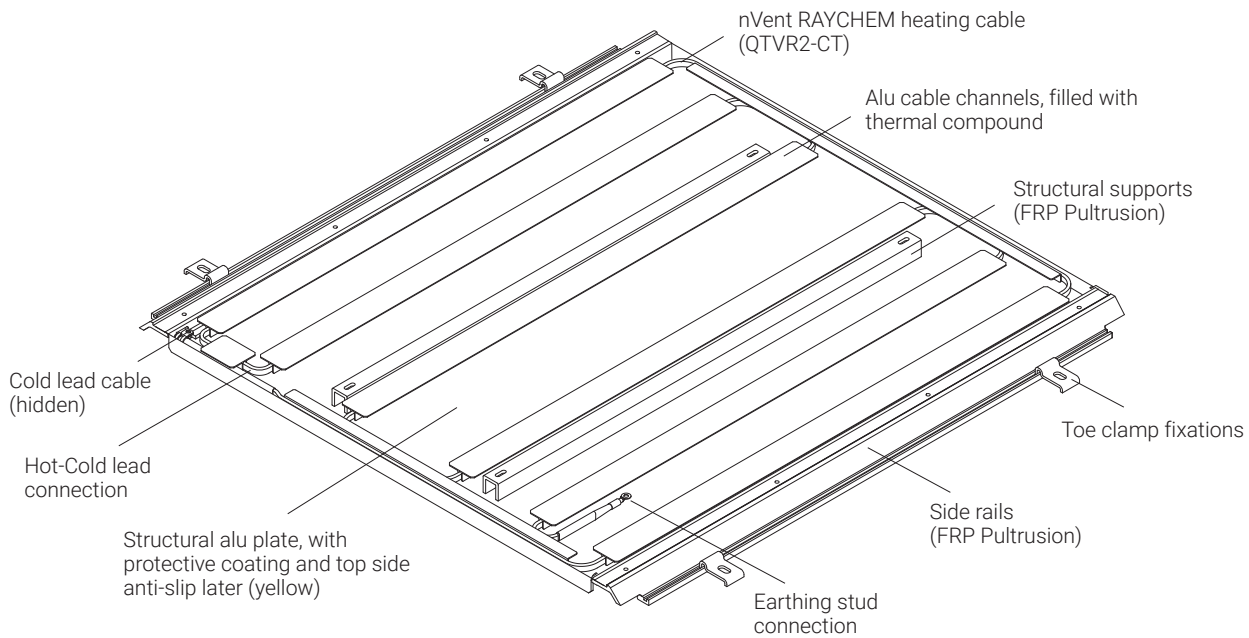
The nVent RAYCHEM ArcticStep is a modular panel system for anti-icing or de-icing of walkways and deck surfaces on offshore platforms and vessels. It is designed for use in hazardous area installations in oil & gas and marine industries.

The system consists of a robust metallic top plate, an embedded nVent RAYCHEM self-regulating heating cable, fiber reinforced polymer supports, protective anti-slip coating, and adjustable fixations.

This hybrid light weight construction allows for fast and easy installation, minimizes heat loss and energy consumption, provides galvanic and thermal insulation from the deck surface, and ensures long life operation in harsh corrosive environments. Integrated cable channels protect the power supply cables from any mechanical damage.

PRODUCT SPECIFICATIONS

Surface type	Offshore and onshore structures, on top of steel decks, grating (special fasteners and wind barrier are required), painted or unpainted.
Chemical resistance	Designed to withstand salt and corrosive atmosphere, sea water, cleaning solvents, oil. Protective Primer coating (black) + top layer antislip coating (yellow, RAL 1021)
Supply voltage	230 Vac
Impact load	250 kg/m ²
Materials of construction	Top plate: Aluminium (4 mm) Pultrusions + supports: fiber reinforced polymer (FRP)
Cold lead connection	Power cable in oil resistant TPE/PUR, size 1.5 mm ² , standard length: 10 m. Approved for electrical installation in offshore and marine



Dimensions (*)

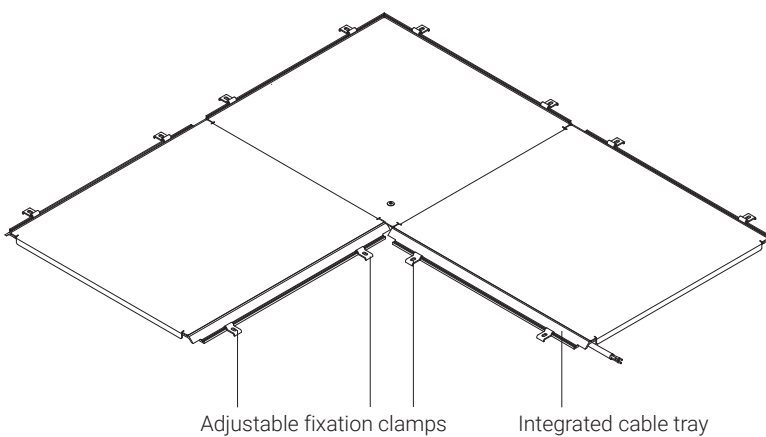
3 Types	Straight	Straight long	Corner
Size (m)	1.0 * 1.0	2.0 * 1.0	1.0 * 1.0
Height (mm)	35	35	35
Weight (kg)	<20	<40	<20

Thermal output rating (*)

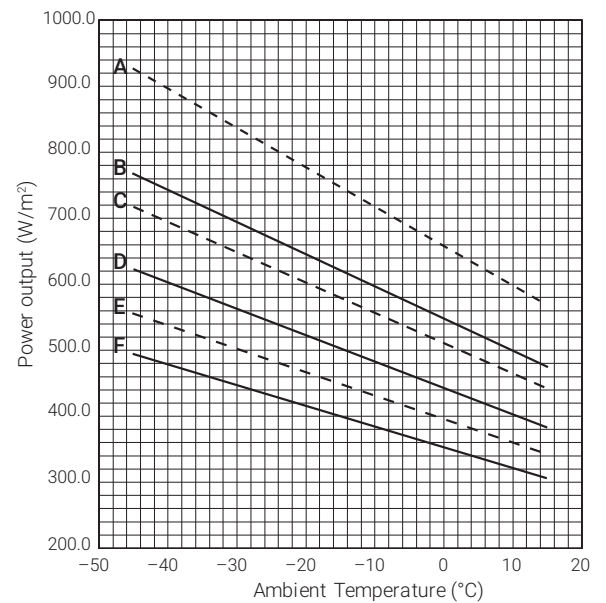
3 Versions	RAS-350	RAS-500	RAS-650
Minimum power output @ -20°C (W/m²)	350	500	650

(*) Customized sizes and power outputs available, up to 1800 W/m². Contact your nVent sales representative.

Size customization possible



nVent RAYCHEM ArcticStep nominal power output at 230 Vac (W/m²)



- A = RAS 650 - Light wind
- B = RAS 650 - No wind
- C = RAS 500 - Light wind
- D = RAS 500 - No wind
- E = RAS 350 - Light wind
- F = RAS 350 - No wind

Installation instruction

Complete panel wiring information and schematics are provided with the product. All electrical installations must be carried out by an approved electrician in compliance with local electrical requirements and norms.

Maximum installed surface area (in m²) per circuit based on type 'C' circuit breakers

Electrical protection sizing	Start-up temperature	RAS-350	RAS-500	RAS-650
16 A	-20°C	7	5	3
	-10°C	8	5	3
	+5°C	9	6	4
25 A	-20°C	12	8	6
	-10°C	12	9	6
	+5°C	14	11	7
32 A	-20°C	15	11	8
	-10°C	16	12	8
	+5°C	18	14	10

The above numbers are for estimation only. For more information contact your local nVent sales representative. nVent requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where design results in higher leakage current, the preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the trace heater supplier or alternatively, the next common available trip level for non-adjustable devices, with a maximum of 300 mA. All safety aspects need to be proven.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T4

Product certification

ArcticStep:



BTV and QTVR heating system:



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

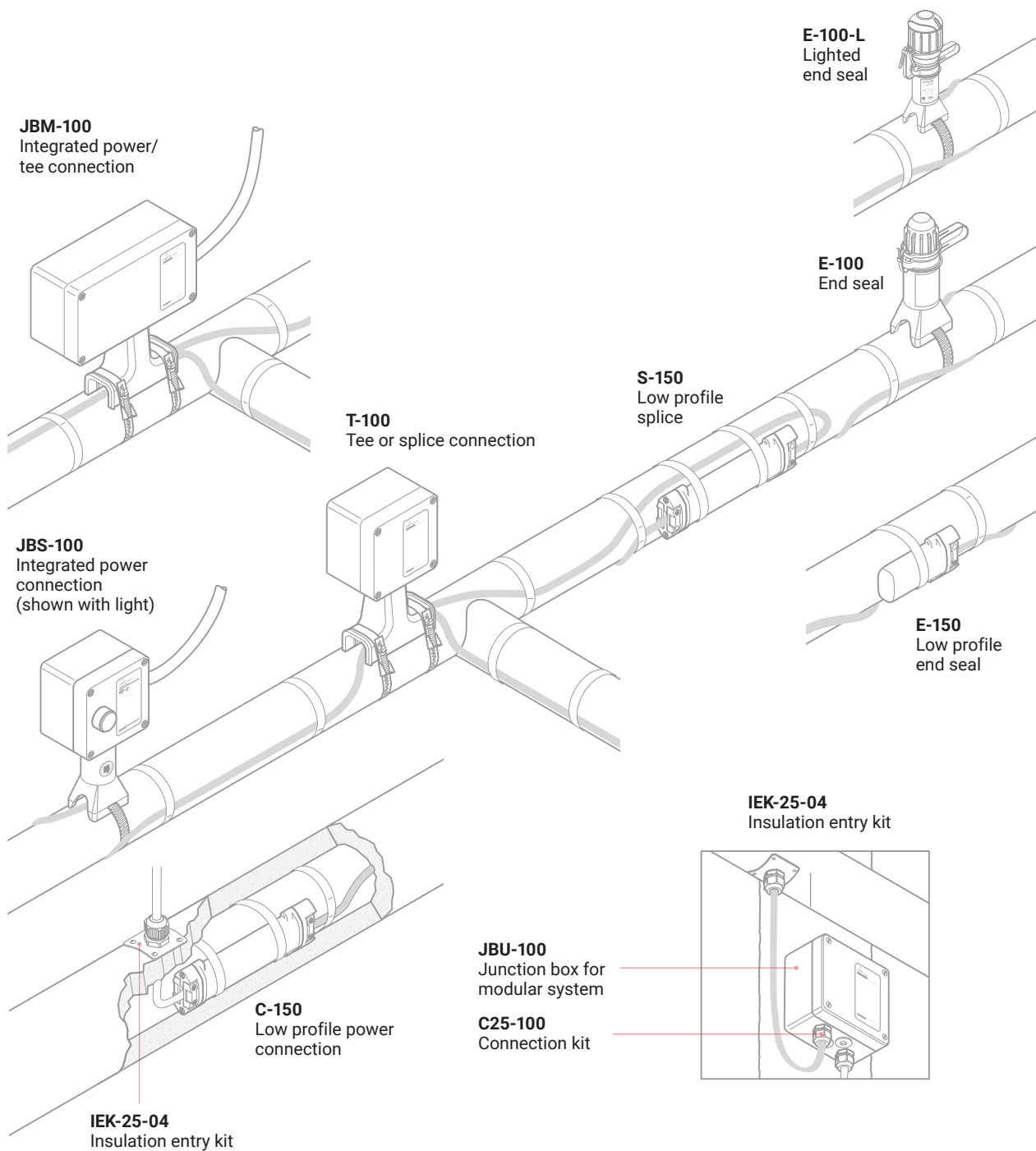
Name	Description	PN code
RAS-350-S-1.0-10	ArcticStep, 350 W/m ² , Straight, 1 m long	RAS-00001
RAS-350-S-2.0-10	ArcticStep, 350 W/m ² , Straight, 2 m long	RAS-00002
RAS-350-C-1.0-10	ArcticStep, 350 W/m ² , Corner, 1 m long	RAS-00003
RAS-500-S-1.0-10	ArcticStep, 500 W/m ² , Straight, 1 m long	RAS-00004
RAS-500-S-2.0-10	ArcticStep, 500 W/m ² , Straight, 2 m long	RAS-00005
RAS-500-C-1.0-10	ArcticStep, 500 W/m ² , Corner, 1 m long	RAS-00006
RAS-650-S-1.0-10	ArcticStep, 650 W/m ² , Straight, 1 m long	RAS-00007
RAS-650-S-2.0-10	ArcticStep, 650 W/m ² , Straight, 2 m long	RAS-00008
RAS-650-C-1.0-10	ArcticStep, 650 W/m ² , Corner, 1 m long	RAS-00009

RAS-xxx-Y-x.yy: RAS = RAYCHEM ArcticStep / xxx = Power W/m² / Y: S = straight, C = corner / x.x.yy = length panel-length cold lead cable

Accessories

Name	PN code
RAS-TOE.CLAMP-15PC	RAS-ACC0001
RAS-CABLE.COVER-2M	RAS-ACC0002
RAS-GRAT.MAT-10M	RAS-ACC0003

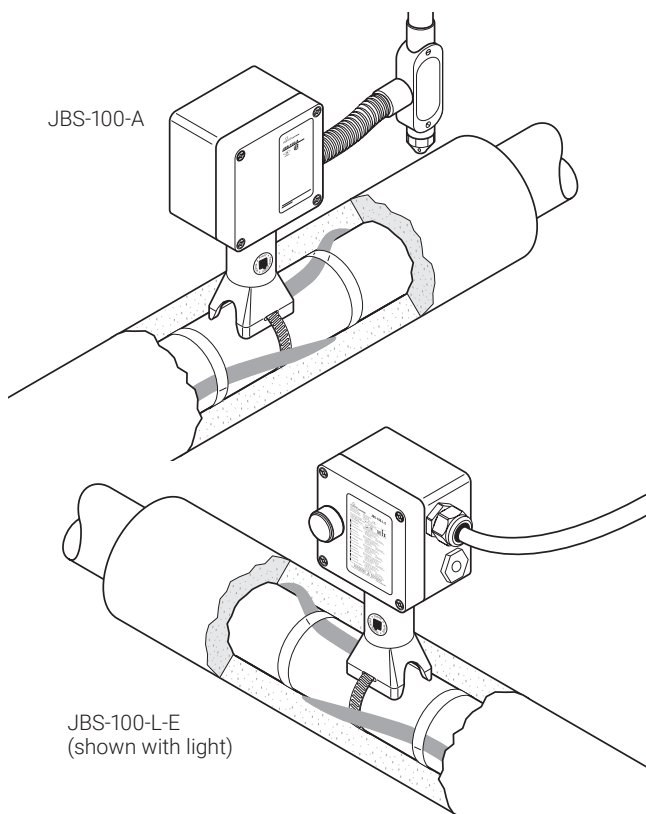
Component overview of self-regulating and power-limiting heating cable system



Note: S-150, E-150 & C-150 Not available for VPL

Single-Entry power connection with junction box

PRODUCT OVERVIEW



The nVent RAYCHEM JBS-100 kit is designed to connect power to a single nVent RAYCHEM BTV, QTVR, XTVR, HTV or VPL industrial parallel heating cable.

The JBS-100 integrates the functions of both connection kits and insulation entries. The rugged stand protects the heating cable and allows for up to 100 mm (4") of thermal insulation.

The core sealing boot does not require a heat gun or torch for the installation (no hot work permit necessary). The non-curing sealant (silicone free) in the boot allows easy installation and facilitates maintenance.

Spring-type terminals provide fast installation and safe, reliable, maintenance-free operation. This connection kit significantly reduces installation time. The kit is offered in three basic versions, customised for local installation practices. All kits are also available as a lighted version. These include a unique light module with a superbright LED that simply plugs into the terminals, and a lens in the lid. This provides indication that power is available in the box. There is also a connection kit with drain plug available.

Description

JBS-100-A JBS-100-L-A	JBS-100-E JBS-100-L-E JBS-100-D-E	JBS-100-EP JBS-100-L-EP
This connection system is certified for use in North America and has one through-hole for use with 3/4" conduit.	This connection system is certified for use in IEC regions and provides two M25 threaded entries, one stopping plug, and one plastic power cable gland.	This connection system is certified for use in IEC regions and provides two M25 threaded entries, an earthing plate, and an external earthing stud. It is designed for use with armoured cables.

Kit contents

JBS-100-A JBS-100-L-A	JBS-100-E JBS-100-L-E JBS-100-D-E	JBS-100-EP JBS-100-L-EP
1 junction box with terminals	1 junction box with terminals	1 junction box with terminals, earth plate, and stud
1 light module (for -L only)	1 light module (for -L only)	1 light module (for -L only)
1 stand	1 stand	1 stand
1 core sealer	1 core sealer	1 core sealer
1 green/yellow earthing sleeve	1 green/yellow earthing sleeve	1 green/yellow earthing sleeve
1 polywater sachet	1 M25 gland for power cable 8-15 mm in diameter (temperature range -55°C / 70°C)	1 M25 stopping plug
1 cable tie	1 M25 stopping plug	1 polywater sachet
	1 polywater sachet	1 cable tie
	1 cable tie	
	1 ATEX/IECEx Certified drainplug (for JBS-100-D-E only)	

PRODUCT SPECIFICATIONS

Dimensions (nominal)

	JBS-100-A JBS-100-L-A	JBS-100-E JBS-100-L-E JBS-100-D-E	JBS-100-EP JBS-100-L-EP

Technical details

	JBS-100-A JBS-100-L-A	JBS-100-E JBS-100-L-E JBS-100-D-E	JBS-100-EP JBS-100-L-EP
Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT, HTV-CT, VPL-CT		
Ingress protection	IP66	IP66	IP66
Entries	1 x ¾"	2 x M25	2 x M25
Ambient temperature range	-55°C to +56°C (JBS-100-A) -40°C to +40°C (JBS-100-L-A)	-55°C to +56°C* (JBS-100-E and JBS-100-D-E) -40°C to +40°C (JBS-100-L-E)	-55°C to +56°C* (JBS-100-EP) -40°C to +40°C (JBS-100-L-EP)
	* Extra conditions for safe use apply at ambient temperatures >40°C. Temperature resistant power cable and metal glands must be used. Please refer to the certificate or installation instructions for full details.		
Max. pipe temperature	Refer to heating cable specification		
Terminals	Spring-type terminals 2 line, 1 ground	Spring-type terminals 1 phase, 1 neutral, 1 earth	Spring-type terminals 1 phase, 1 neutral, 1 earth
Max. conductor size	8 AWG stranded	10 mm ² stranded, 10 mm ² solid	10 mm ² stranded, 10 mm ² solid
Max. operating voltage	480 Vac*	480 Vac*	480 Vac*
	* JBS-100-L-E, JBS-100-L-EP and JBS-100-L-A are limited to 277 Vac. Extra conditions for safe use apply for voltages higher than 277 Vac. Please refer to the certificate or installation instructions for full details.		
Max. continuous operating current (***)	53 A	53 A	53 A

(***) For pipe temperature >150°C and <260°C and XTVR or HTV heating cables, the maximum operating current shall be reduced to maximum 20 A.

Materials of construction

Enclosure, lid, and stand	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black
Lid screws	Stainless steel	Stainless steel	Stainless steel
Lid gasket	Silicone rubber	Silicone rubber	Silicone rubber
Earth continuity plate	N/A	N/A	Steel, zinc plated, and blue chromated

Optional LED indicator light

Colour	Red	Green	Green
Voltage rating	100-277 Vac	100-277 Vac	100-277 Vac
Power consumption	< 1 W	< 1 W	< 1 W

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) (and Class I Div 2).

Temperature classification

Temperature classification is defined by the complete system.

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION**

Power connection

Part Description	JBS-100-A	JBS-100-E	JBS-100-EP
PN (Weight)	085947-000 (2.5 lb)	829939-000 (1.2 kg)	158251-000 (1.3 kg)

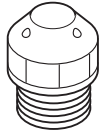
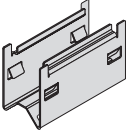
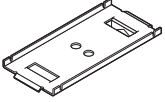
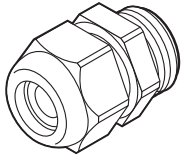
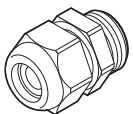
Power connection with light

Part Description	JBS-100-L-A	JBS-100-L-E	JBS-100-L-EP
PN (Weight)	944699-000 (3.5 lb)	054363-000 (1.6 kg)	075249-000 (1.7 kg)

Power connection with drain plug

Part Description		JBS-100-D-E	
PN (Weight)		1244-021057 (1.4 kg)	

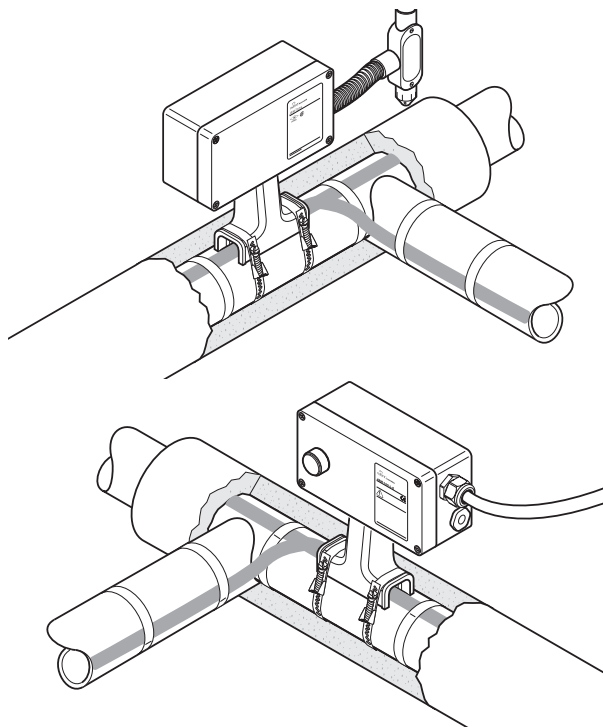
Accessories

Conduit Drain ¾"	Prevents condensate from collecting in the box	
Catalog number	JB-DRAIN-PLUG-3/4IN	
Part Number	278621-000	
Weight	0.074 lb / 36 g	
Junction box standoff	For insulation thickness >100 mm & ≤150 mm *	
Catalog number	JBM-100-STANDOFF	
Part Number	P000003408	
Weight	0.279 lb / 135 g	
* Consider extra pipe strap length 6-9" (150-225 mm) for attachment		
Small pipe adapter	Required for stand on pipes ≤ 1"	
Catalog number	JBM-SPA	
Part Number	E90515-000	
Weight	0.408 lb / 185 g (Bag of 5 adaptors)	
Glands for power cables	Hazardous area approved gland for cables 8-15 mm (temperature range -55°C/70°C)	
Catalog number	GL-55-M25	
Part Number	1244-019083	
Weight	0.016 kg	
Glands for power cables	Hazardous area approved gland for cables 8-17.5 mm (temperature range -20°C/70°C)	
Catalog number	GL-36-M25	
Part Number	1244-019082	
Weight	0.016 kg	

(**) Localized versions may exist with limited approvals and different part numbers. Contact your local sales representative.

Multiple-Entry Power/Tee Connection with Junction Box

PRODUCT OVERVIEW



The nVent RAYCHEM JBM-100 kit is designed to connect power to up to three nVent RAYCHEM BTV, QTVR, XTVR, HTV, or VPL industrial parallel heating cables.

The JBM-100 integrates the functions of both connection kits and insulation entries. The rugged stand protects the heating cable and allows for up to 100 mm (4") of thermal insulation.

The core sealing boot does not require a heat gun or torch for the installation (no hot work permit necessary). The non-curing sealant (silicone free) in the boot allows easy installation and facilitates maintenance.

Spring-type terminals provide fast installation and safe, reliable, maintenance-free operation. This connection kit significantly reduces installation time.

The kit is offered in three basic versions, customised for local installation practices. All kits are also available as a lighted version. These include a unique light module with a superbright LED that simply plugs into the terminals, and a lens in the lid. This provides indication that power is available in the box. There is also a connection kit with drain plug available.

Description

JBM-100-A JBM-100-L-A	JBM-100-E JBM-100-L-E JBM-100-D-E	JBM-100-EP JBM-100-L-EP
This connection system is certified for use in North America and has one 3/4" through holes for use with 3/4" conduit. One stopping plug is supplied in the kit.	This connection system is certified for use in IEC regions and provides two M25 threaded entries, one stopping plug, and one plastic power cable gland.	This connection system is certified for use in IEC regions and provides two M25 threaded entries, an earthing plate, and an external earthing stud. It is designed for use with armoured cables.

Kit contents

<ul style="list-style-type: none"> 1 junction box with terminals 1 light module (for -L only) 1 stand 3 core sealers 3 green/yellow earthing sleeve 1 3/4" stopping plug 1 polywater sachet 1 spanner 1 strain relief assembly 2 grommet plugs 	<ul style="list-style-type: none"> 1 junction box with terminals 1 light module (for -L only) 1 stand 3 core sealers 3 green/yellow earthing sleeve 1 M25 gland for power cable 8-15 mm (temperature range -55°C to +70°C) in diameter 1 M25 stopping plug 1 polywater sachet 1 spanner 1 strain relief assembly 2 grommet plugs 1 ATEX/IECEx Certified drainplug (for JBM-100-D-E only) 	<ul style="list-style-type: none"> 1 junction box with terminals, earth continuity plate, and stud 1 light module (for -L only) 1 stand 3 core sealers 3 green/yellow earthing sleeve 2 M25 stopping plugs 1 polywater sachet 1 spanner 1 strain relief assembly 2 grommet plugs
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Components

PRODUCT SPECIFICATIONS

Dimensions (nominal)

	JBM-100-A JBM-100-L-A	JBM-100-E JBM-100-L-E JBM-100-D-E	JBM-100-EP JBM-100-L-EP

Technical details

Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT, HTV-CT, VPL-CT		
Ingress protection	IP66	IP66	IP66
Entries	1 x 3/4"	2 x M25	2 x M25
Ambient temperature range	-55°C to +56°C (JBM-100-A) -40°C to +40°C (JBM-100-L-A)	-55°C to +56°C* (JBM-100-E and JBM-100-D-E) -40°C to +40°C (JBM-100-L-E)	-55°C to +56°C* (JBM-100-EP) -40°C to +40°C (JBM-100-L-EP)
	*Extra conditions for safe use apply at ambient temperatures >40°C. Temperature resistant power cable and metal glands must be used. Please refer to the certificate or installation instructions for full details.		
Max. pipe temperature	Refer to heating cable specification		
Terminals	Spring-type terminals 4 line, 2 ground	Spring-type terminals 2 phase, 2 neutral, 2 earth	Spring-type terminals 2 phase, 2 neutral, 2 earth
Max. conductor size	8 AWG stranded	10 mm ² stranded, 10 mm ² solid	10 mm ² stranded, 10 mm ² solid
Max. operating voltage	480 Vac*	480 Vac*	480 Vac*
	*JBM-100-L-E, JBM-100-L-EP and JBM-100-L-A are limited to 277 Vac. Extra conditions for safe use apply for voltages higher than 277 Vac. Please refer to the certificate or installation instructions for full details.		
Max. continuous operating current (***)	53 A	53 A	53 A

(***) For pipe temperature > 150°C and <260°C and XTVR or HTV heating cables, the maximum operating current shall be reduced to maximum 20 A.

Materials of construction

Enclosure, lid, and stand	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black
Lid screws	Stainless steel	Stainless steel	Stainless steel
Lid gasket	Silicone rubber	Silicone rubber	Silicone rubber
Earth continuity plate	N/A	N/A	Steel, zinc plated, and blue chromated

Optional LED indicator light

	JBM-100-A JBM-100-L-A	JBM-100-E JBM-100-L-E JBM-100-D-E	JBM-100-EP JBM-100-L-EP
Colour	Red	Green	Green
Voltage rating	100-277 Vac	100-277 Vac	100-277 Vac
Power consumption	< 1 W	< 1 W	< 1 W

Ordering details (**)

APPROVALS (**)

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) and Class I Div 1 & 2

Temperature classification

Temperature classification is defined by the complete system.

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual. More details about product certification, approvals and conditions of safe use are available in the installation manual www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Power connection

Part Description (**)	JBM-100-A	JBM-100-E	JBM-100-EP
PN (Weight)	179935-000 (4.3 lb)	831519-000 (1.9 kg)	986415-000 (2.1 kg)

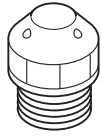
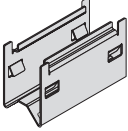
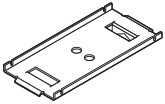
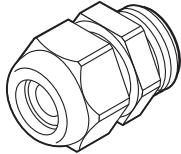
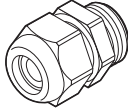
Power connection with light

Part Description	JBM-100-L-A	JBM-100-L-E	JBM-100-L-EP
PN (Weight)	656081-000 (5.3 lb)	395855-000 (2.3 kg)	300273-000 (2.5 kg)

Power connection with drain plug

Part Description		JBM-100-D-E	
PN (Weight)		1244-021056 (2.1 kg)	

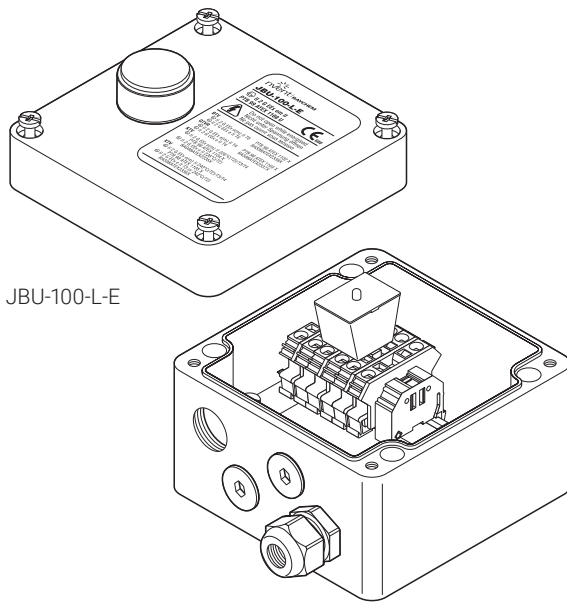
Accessories

Conduit Drain ¾"	Prevents condensate from collecting in the box	
Catalog number	JB-DRAIN-PLUG-3/4IN	
Part Number	278621-000	
Weight	0.074 lb / 36 g	
Junction box standoff	For insulation thickness >100mm & ≤150mm *	
Catalog number	JBM-100-STANDOFF	
Part Number	P000003624	
Weight	0.599 lb / 272 g	
* Consider extra pipe strap length 6-9" (150-225 mm) for attachment		
Small pipe adapter	Required for stand on pipes ≤ 1"	
Catalog number	JBM-SPA	
Part Number	D55673-000	
Weight	0.930 lb / 422 g (Bag of 5 adaptors)	
Glands for power cables	Hazardous area approved gland for cables 8-15 mm (temperature range -55°C/70°C)	
Catalog number	GL-55-M25	
Part Number	1244-019083	
Weight	0.016 kg	
Glands for power cables	Hazardous area approved gland for cables 8-17.5 mm (temperature range -20°C/70°C)	
Catalog number	GL-36-M25	
Part Number	1244-019082	
Weight	0.016 kg	

(**) Localized versions may exist with limited approvals and different part numbers. Contact your local sales representative.

Junction box for modular system

PRODUCT OVERVIEW



JBU-100-L-E

The nVent JBU-100 kit is designed to connect power to up to three nVent RAYCHEM BTV, QTVR, XTVR, HTV or VPL industrial parallel heating cables.

Innovative Spring-type terminals provide fast installation and safe, reliable, maintenance-free operation.

The box is part of the modular component system, it allows for maximum flexibility and can be either wall or pipe mounted.

Connection kits (M25) and insulation entry kits have to be ordered separately. The box is offered in two basic versions customised to local installation practices.

All kits are also available as a lighted version (-L). These include a unique light module with a superbright green LED that simply plugs into the terminals, and a lens in the lid. This provides indication that power is available in the box.

Description

JBU-100-E JBU-100-L-E	JBU-100-EP JBU-100-L-EP
This box is certified for use in IEC regions and provides four M25 threaded entries, stopping plugs and one plastic power cable gland.	This box is certified for use in IEC regions and provides four M25 threaded entries, an earthing plate and an external earth stud. It is designed for use with armoured power cables.

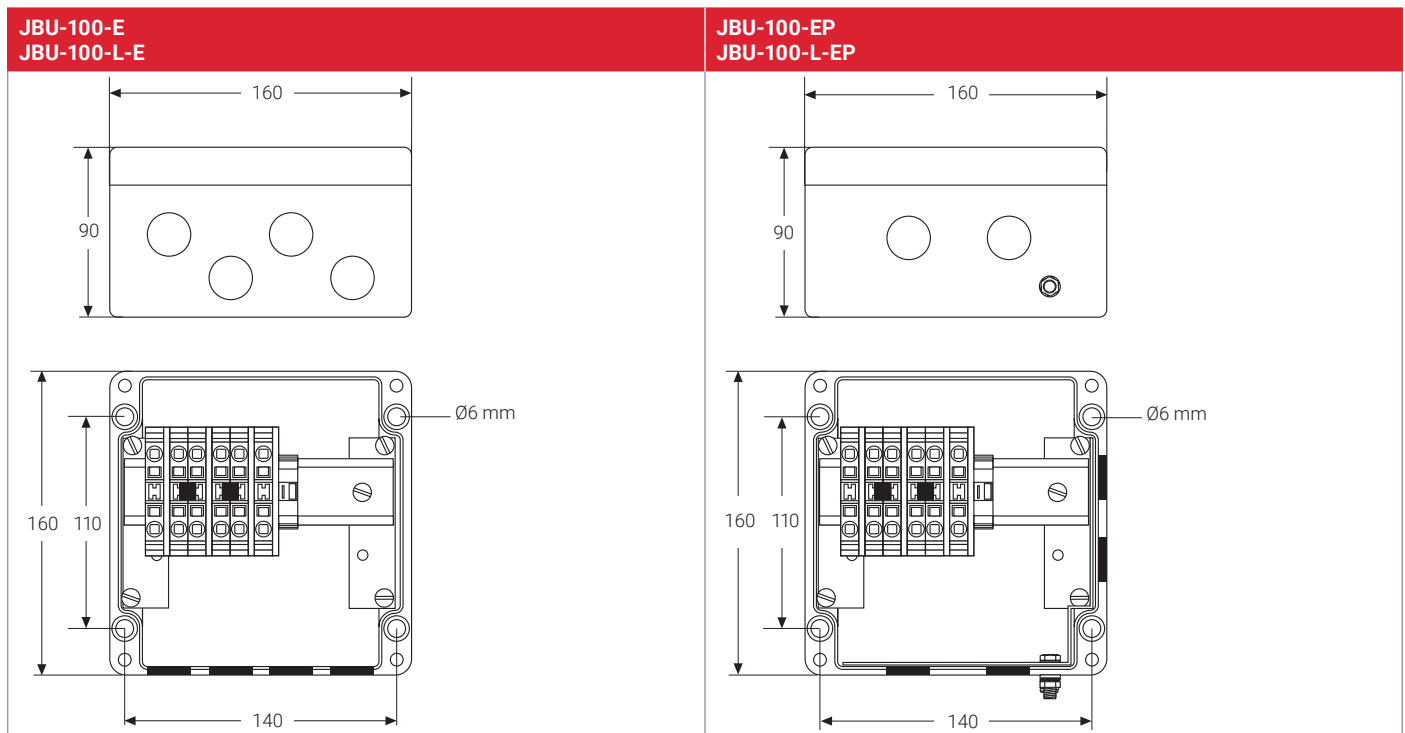
Kit contents

1 junction box with terminals	1 junction box with terminals with earth plate and external earth stud
1 light module (for -L only)	1 light module (for -L only)
1 M25 gland for power cable 8-15 mm in diameter (temperature range -55°C to +70°C)	2 M25 stopping plugs
2 M25 stopping plugs	



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Technical details

	JBU-100-E JBU-100-L-E	JBU-100-EP JBU-100-L-EP
Ingress protection	IP66	IP66
Entries	4 x M25	4 x M25
Ambient temperature range	-55°C to +56°C ⁽¹⁾ (JBU-100-E) -40°C to +40°C (JBU-100-L-E)	-55°C to +56°C ⁽¹⁾ (JBU-100-EP) -40°C to +40°C (JBU-100-L-EP)
Terminals	Spring-type terminals 2 phase, 2 neutral, 2 protective earth	Spring-type terminals 2 phase, 2 neutral, 2 protective earth
Max. conductor size	10 mm ² stranded, 10 mm ² solid	10 mm ² stranded, 10 mm ² solid
Max. operation voltage	480* Vac	480* Vac
	* JBU-100-L-E and JBU-100-L-EP are limited to 277 Vac. Extra conditions for safe use apply for voltages higher than 277 Vac. Please refer to the certificate or installation instructions for full details.	
Max. current rating ⁽²⁾	53 A	53 A

⁽¹⁾ Extra conditions for safe use apply for ambient temperatures above +40°C. Temperature resistant power cable and metal glands must be used. Please refer to the certificate or installation instructions for full details.

⁽²⁾ For pipe temperature > 150°C and < 260°C and XTVR or HTV heating cables, the maximum operating current shall be reduced to maximum 20 A. Refer to heating cable specification for the maximum pipe temperature.

Materials of construction

Enclosure, lid	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black
Lid screws	Stainless steel	Stainless steel
Lid gasket	Silicone rubber	Silicone rubber
Earth continuity plate	N/A	Steel, zinc plated, and blue chromated

Optional LED indicator light

Colour	Green	Green
Voltage rating	100-277 Vac	100-277 Vac
Power consumption	< 1 W	< 1 W

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) and Class I Zone 1

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Junction box

Part Description (**)	JBU-100-E	JBU-100-EP
PN (Weight)	051976-000 (1.7 kg)	243948-000 (1.8 kg)

Junction box with light

Part Description	JBU-100-L-E	JBU-100-L-EP
PN (Weight)	069262-000 (2.1 kg)	113974-000 (2.2 kg)

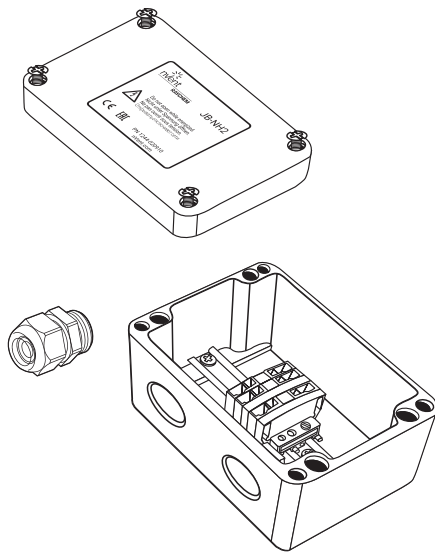
Accessories

Heating cable connection kits	C25-100, C25-21, CCON25-100	C25-100, C25-21, CCON25-100, C25-100-METAL, C25-100-METAL-NP (Nickel plated brass), C25-100-METAL-SS (stainless steel)
Insulation entry kit	IEK-25-04 or IEK-25-PIPE	IEK-25-04 or IEK-25-PIPE
Power cable gland	GL-55-M25 hazardous area approved gland for cables 8-15 mm (temperature range -55°C to +70°C) GL-36-M25 hazardous area approved gland for cables 8-17.5 mm (temperature range -20°C to +70°C)	GL-38-M25-METAL (optional)
Junction box support bracket (optional)	SB-100, SB-101	SB-100, SB-101

(**) Localized versions may exist with limited approvals and different part numbers. Contact your local sales representative.

Junction box for modular system

PRODUCT OVERVIEW



The nVent RAYCHEM JB-NH2 is a non-hazardous junction box for use with various heating cable types with M25 connection kits.

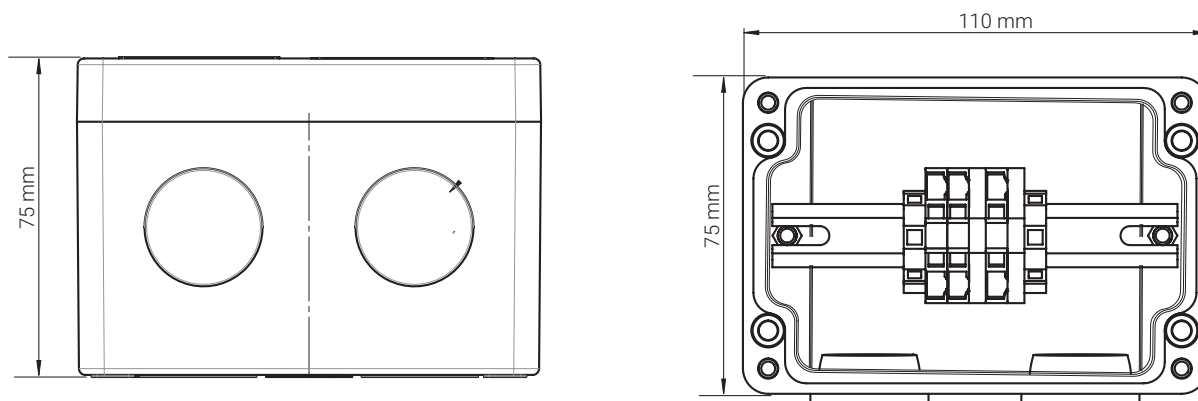
It can be used to make a power connection, splice, or end seal. For use with nVent RAYCHEM industrial parallel self-regulating heating cables.

Through the two entries a heating cable and a power cable, or two heating cables can be accommodated and connected to the DIN-rail mounted terminals. A power cable (M25) gland is included.

The box can be wall mounted via the four holes moulded in the back of the box. For pipe mounting, it is recommended that this box is used with a nVent RAYCHEM support bracket.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Enclosure

Area of use	Ordinary (non-hazardous)
Protection	IP66
Entries	2 x M25
Exposure temperature	-40°C to +90°C
Base	Grey glass filled polymer
Lid	Grey glass filled polymer



Terminals

MSB 2.5	Din rail mounted, spring-type terminals
Voltage rating	800 Vac
Max. conductor size	Stranded: 2.5 mm ² Solid: 4 mm ²
Current rating	Nominal 24 A - Maximum 30 A with 4 mm ² conductor cross section
Quantity	2 phase and 1 PE

APPROVALS

For use in ordinary (non-hazardous) area

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

ORDERING INFORMATION

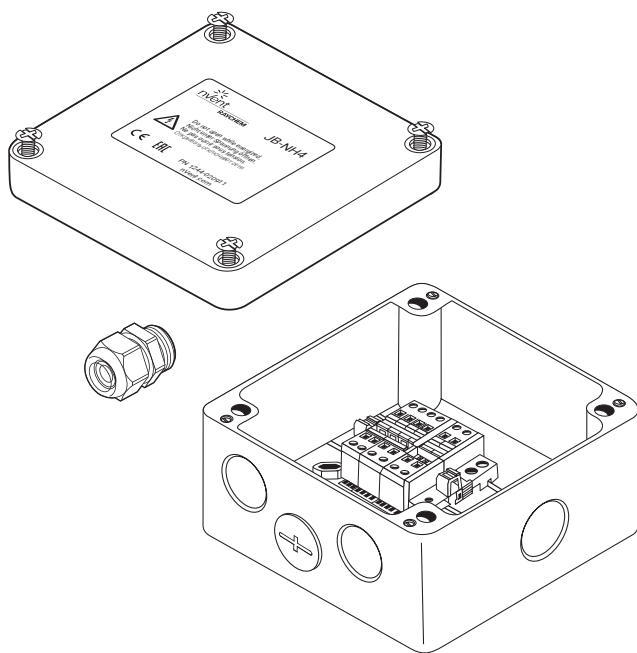
Part description	JB-NH2
PN (Weight)	1244-020910 (0.34 kg)

Accessories

PN	Name	Description
192932-000	SB-100	Support Bracket with Hollow Profile for Cable, Stainless Steel, Vertical
990944-000	SB-101	Support Bracket, Double-Leg, Stainless Steel, Horizontal
707366-000	SB-110	Support Bracket, Single-Leg, Stainless Steel, Vertical
579796-000	SB-111	Support Bracket, Stainless Steel, Vertical

Junction box for modular system

PRODUCT OVERVIEW



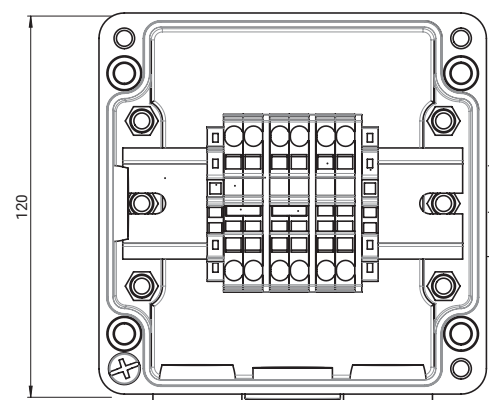
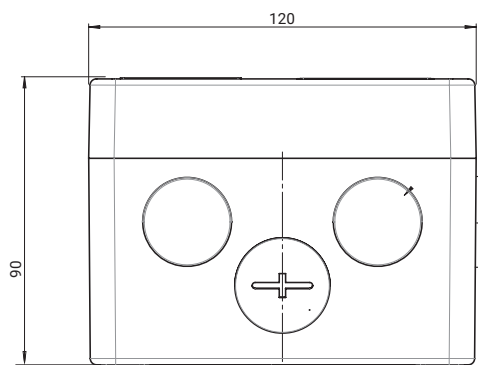
The nVent RAYCHEM JB-NH4 is a junction box for use with various heating cable types with M25 connection kits and suitable for use in ordinary (non-hazardous) areas. It can be used to make a power connection, splice, or end seal. For use with nVent RAYCHEM industrial parallel heating cables.

Up to four heating cables or three heating cables and the appropriate size power cable can be accommodated through the four entries and connected to the DIN-rail mounted terminals. A power cable gland (M25) included.

The box can be wall mounted via the four holes moulded in the back of the box. For pipe mounting, it is recommended that this box is used with a nVent RAYCHEM support bracket.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Enclosure

Area of use	Ordinary (non-hazardous)
Protection	IP66
Entries	4 x M25
Exposure temperature	-40°C to +90°C
Base	Grey glass filled polymer
Lid	Grey glass filled polymer

Terminals

ST-4	Din rail mounted, spring-type terminals
Voltage rating	Max. 800 Vac
Max. conductor size	Stranded: 4 mm ² Solid: 6 mm ²
Current rating	Nominal 32 A - Maximum 40 A with 6 mm ² conductor cross section
Quantity	4 phase terminals, bridged per 2 and 2 PE terminals

APPROVALS

For use in ordinary (non-hazardous) area

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	JB-NH4
PN (Weight)	1244-020911 (0.47 kg)

Accessories (to be ordered separately)

PN	Name	Description
192932-000	SB-100	Support Bracket with Hollow Profile for Cable, Stainless Steel, Vertical
990944-000	SB-101	Support Bracket, Double-Leg, Stainless Steel, Horizontal
707366-000	SB-110	Support Bracket, Single-Leg, Stainless Steel, Vertical
579796-000	SB-111	Support Bracket, Stainless Steel, Vertical



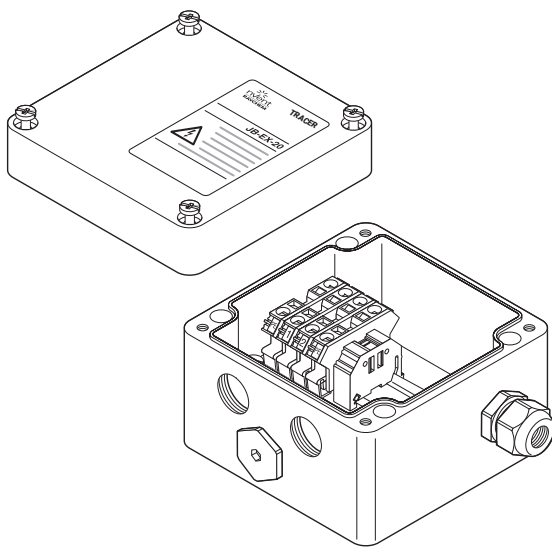
Components

JB-EX-20 and JB-EX-20-EP

CONNECT AND PROTECT

Multi purpose junction box

PRODUCT OVERVIEW



Industrial junction box for use in hazardous areas with nVent RAYCHEM FMT, FHT and PI heating cables. This box can be used to make connections between power cables, heating cables and cold lead cables. Depending on the configuration of the system, the box can accommodate heating cables, cold leads and a power cable. nVent RAYCHEM M20 connection kits have to be ordered separately depending on the type of heating cable being used.

Cable connection is via DIN rail mounted Spring-type terminals to provide fast installation and safe, reliable, maintenance-free operation.

The box can be either wall or pipe mounted via the four holes moulded in the base of the box. For pipe mounting, use one of the standard support brackets.

Typical use

JB-EX-20	JB-EX-20-EP
Power supply box for series heating cables (PI) and constant wattage parallel heating cables (FMT & FHT) or end box (star) for series heating cables (PI), when using M20 connection kits	

Entries

3 x M20	3 x M20
1 x M25	1 x M25

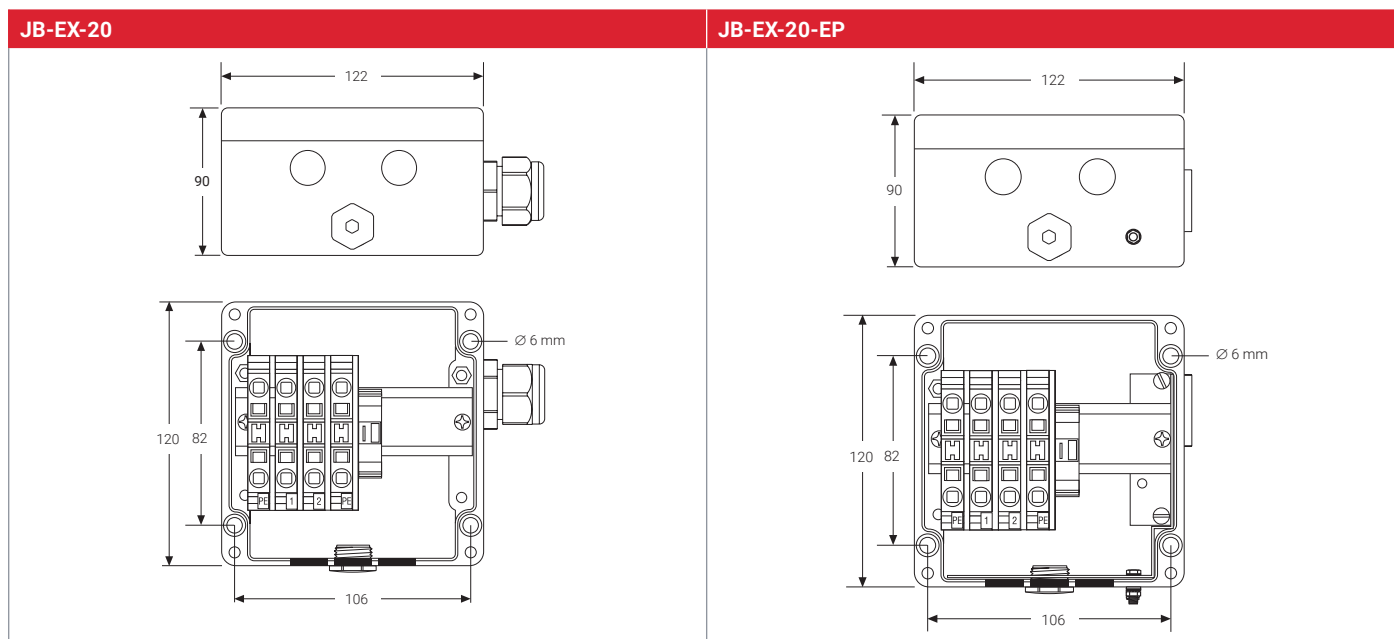
Kit contents

Junction box with spring-type terminals on DIN rail	Junction box with spring-type terminals on DIN rail, earthing plate and an external earth stud
1 x M20 stopping plug	1 x M20 stopping plug
2 x M20 rain plugs (temporary)	2 x M20 rain plugs (temporary)
1 x M25 Hazardous area approved cable gland for power cables with \varnothing of 8-15 mm	1 x M25 rain plug (temporary)
1 x terminal jumper allowing various wiring configurations (remove terminal plate)	



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Materials of construction

	JB-EX-20	JB-EX-20-EP
Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber	Silicone rubber
Lid fixing screws	Stainless steel (captive)	Stainless steel (captive)
Earthing plate	N.A.	Steel, zinc plated and blue chromated

Technical details

Ingress protection	IP66	IP66
Ambient temperature range	-55°C to +55°C	-55°C to +55°C

Terminals

Quantity	4 pcs, spring-type	4 pcs, spring-type
Labeling	1, 2 + 2 x PE	1, 2 + 2 x PE
Maximum conductor size	10 mm ² (solid & stranded)	10 mm ² (solid & stranded)
Maximum operating voltage	590 Vac	590 Vac
Maximum operating current	53 A	53 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	JB-EX-20	JB-EX-20-EP
Part number (Weight)	1244-000590 (0.9 kg)	1244-006384 (1 kg)

Accessories (to be ordered separately)

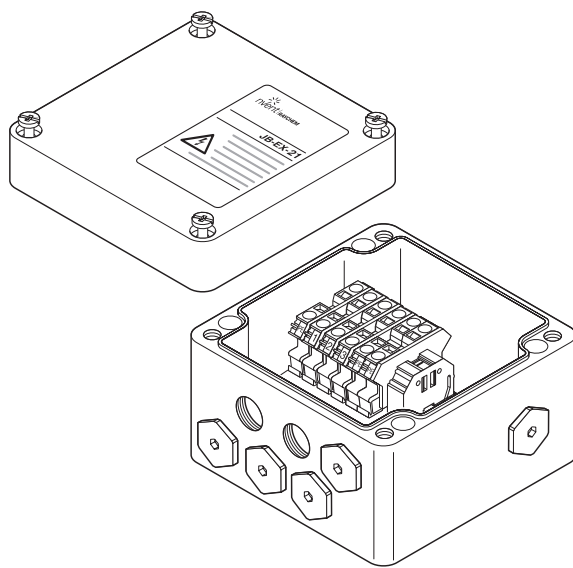
	JB-EX-20	JB-EX-20-EP
Support bracket	SB-100, SB-101, SB-110, SB-111	SB-100, SB-101, SB-110, SB-111
Power cable gland	GL-55-M25 (included) up to -55°C, 8-15 mm	GL-38-M25-METAL (optional) up to -60°C, inner diam. 10-13.5 mm, outer diam. 13.5-21 mm
Loose terminals (*)	Phase/neutral terminal: HWA-WAGO-PHASE Earth terminal: HWA-WAGO-EARTH End plate: HWA-WAGO-ENDPLATE Terminal jumper: HWA-WAGO-JUMPER	
Connection kit for FMT and FHT heating cables	C20-01-F hot applied connection kit with plastic gland	C20-02-F cold applied connection kit with metal gland
Insulation entry kit for FMT and FHT heating cables	IEK-25-04 or IEK-25-PIPE	IEK-25-04 or IEK-25-PIPE
Gland for PI cold leads	C20-PI-PA-KIT Hazardous area approved gland, PA, up to -40°C	C20-PI-M0-KIT Hazardous area approved gland, Ni plated brass, up to -55°C (to be used with boxes with integral earth plate or with earth lug)
Insulation entry kit for PI cold leads	IEK-20-PI	IEK-20-PI
Gland for MI cold leads	Contact nVent or refer to DOC-606	Contact nVent or refer to DOC-606
Stopping plug	HWA-PLUG-M20-EXE-PLASTIC	HWA-PLUG-M20-EXE-PLASTIC

(*) in total no more than 6 terminals of this type should be installed.



Multi purpose junction box

PRODUCT OVERVIEW



Industrial polyester junction box for use in hazardous areas. This box can be used to make connections between power cables, heating cables and cold lead cables using M20 connection kits. Depending on the configuration of the system, the box can accommodate six heating cables/cold leads and a power cable. M20 connection kits have to be ordered separately depending on the type of heating cable being used. Cable connection is accomplished via DIN rail mounted spring-type terminals.

The box can be either wall or pipe mounted via the four holes moulded in the base of the box. For pipe mounting use one of the standard support bracket.

Typical use

Power supply box, end-box, splice box (3-phase and loop), marshalling box.

Entries

6 x M20

1 x M32

Kit contents

1 x junction box with terminals on DIN rail

4 x M20 stopping plugs

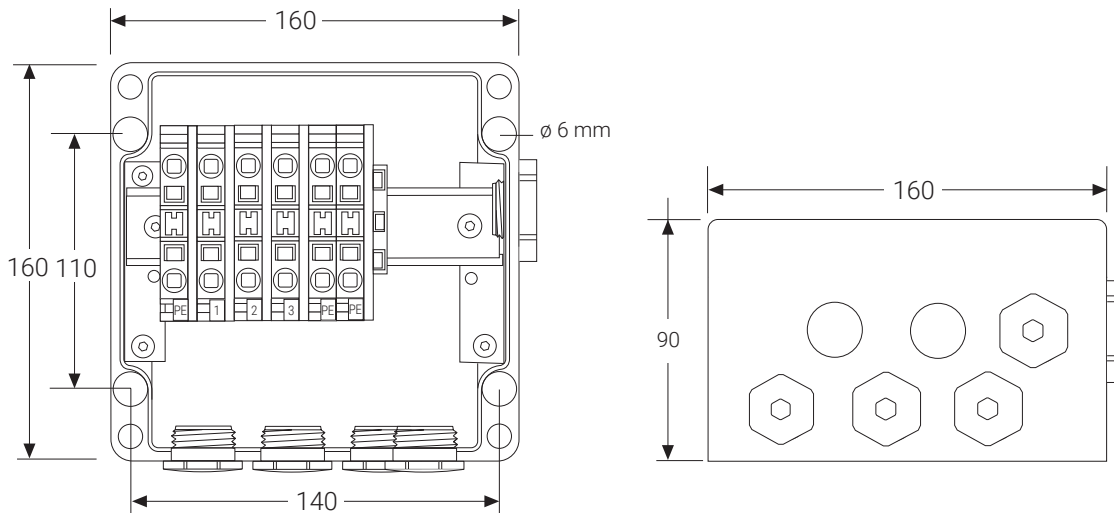
2 x M20 rain plug (temporary)

1 x M32 stopping plug

1 x terminal jumper allowing various wiring configurations (remove terminal plate)

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Materials of construction

Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber
Lid fixing screws	Stainless steel (captive)

Technical details

Ingress protection	IP66
Ambient temperature range	-55°C to +55°C

Terminals

Quantity	6 pc.
Type	Spring-type
Labeling	1, 2, 3, 3 x PE
Maximum conductor size	10 mm ² (solid & stranded)
Maximum operating voltage	550 Vac
Maximum operating current	53 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference nVent RAYCHEM JB-EX-21

Part number (Weight) 1244-000579 (1.2 kg)

Accessories (to be ordered separately)

	JB-EX-20	JB-EX-21
Support Bracket	SB-100, SB-101, SB-110, SB-111	SB-100, SB-101
Power cable gland	GL-55-M25 (included) up to -55°C, 8-15 mm	GL-45-M32 hazardous area approved gland for cables Ø 14-21 mm, up to -55°C
Loose terminals (*)	Phase/neutral terminal: HWA-WAGO-PHASE Earth terminal: HWA-WAGO-EARTH End plate: HWA-WAGO-ENDPLATE Terminal jumper: HWA-WAGO-JUMPER	
Connection kit for FMT and FHT heating cables	C20-01-F hot applied connection kit with plastic gland	C20-02-F cold applied connection
Insulation entry kit for FMT and FHT heating cables	IEK-25-04 or IEK-25-PIPE	IEK-25-04 or IEK-25-PIPE
Gland for PI cold leads	C20-PI-PA-KIT Hazardous area approved gland, PA, up to -40°C	C20-PI-M0-KIT Hazardous area approved gland, Ni plated brass, up to -55°C (to be used with boxes with integral earth plate or with earth lug)
Insulation entry kit for PI cold leads	IEK-20-PI	IEK-20-PI
Stopping plug	HWA-PLUG-M20-EXE-PLASTIC	HWA-PLUG-M20-EXE-PLASTIC

(*) in total no more than 10 terminals should be installed.



Components

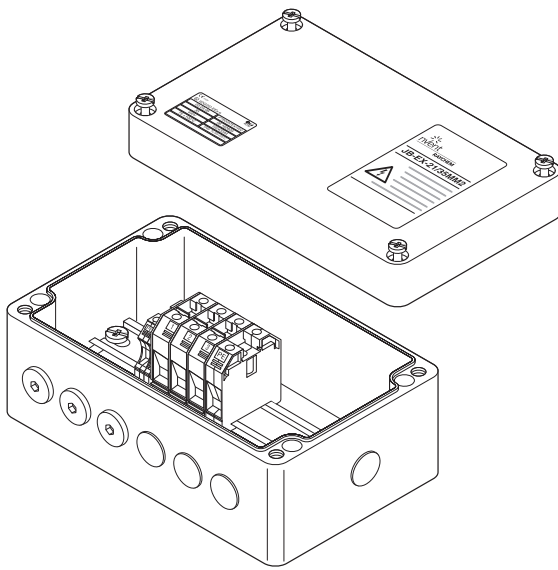


JB-EX-21/35MM2

CONNECT AND PROTECT

Multi purpose junction box

PRODUCT OVERVIEW



Industrial junction box for use in hazardous areas with PI and MI heating cables when large terminal sizes are required. This box can be used to make connections between power cables, heating cables and cold lead cables. Depending on the configuration of the system, the box can accommodate multiple heating cables/cold leads and a power cable.

The M20 connection kits have to be ordered separately depending on the type of heating cable being used.

Cable connection is accomplished via DIN rail mounted screw terminals from Weidmuller to provide safe, reliable and maintenance-free operation.

The box can be wall mounted via the four holes moulded in the base of the box.

Typical use

Power supply box, end-box, splice box for series heating cables (PI), when using M20 connection kits.
Marshalling box for power cables.

Entries

6 x M20
1 x M40

Kit contents

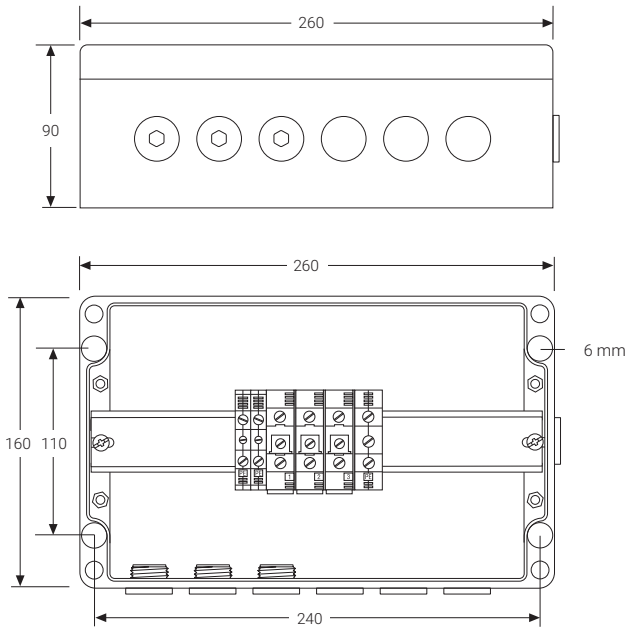
1 x Junction box with screw terminals on DIN rail
3 x M20 stopping plugs
3 x M20 rain plugs (temporary)
1 x M40 stopping plug



Components

PRODUCT SPECIFICATION

Dimensions (in mm)



Materials of construction

Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber
Lid fixing screws	Stainless steel (captive)

Technical details

Ingress protection	IP66
Ambient temperature range	-55°C to +55°C

Terminals

Quantity & type	3 pcs WDU35 screw terminals 2 pcs WPE10 earth terminals for heating cable earth leads 1 pc WPE35 earth terminal for power cable Junction box can accommodate up to 6 fully loaded phase/neutral terminals (maximum 10 terminals in total)
Labelling	1, 2, 3 + 3 x PE
Minimum conductor size	2.5 mm ² stranded & solid
Maximum conductor size	35 mm ² stranded & 16 mm ² solid
Maximum operating voltage	690 Vac
Maximum operating current	100 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	nVent RAYCHEM JB-EX-21/35MM2
Part number (Weight)	1244-006653 (1.9 kg)

Accessories (to be ordered separately)

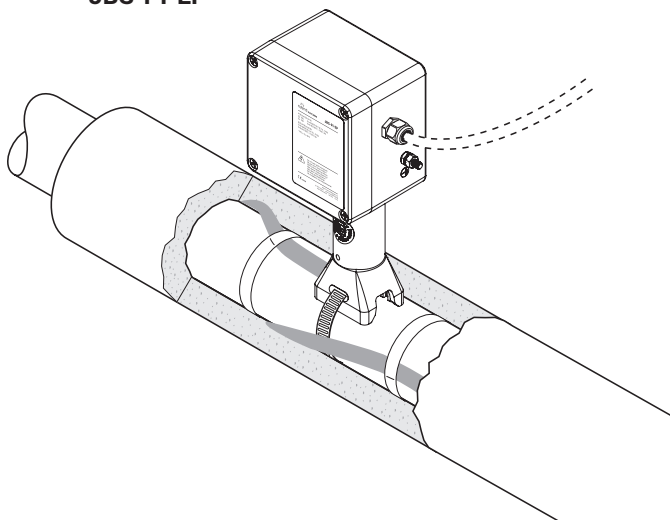
Glands for power cables	GL-51-M40 hazardous area approved gland for cables \varnothing 19-28 mm, up to -55°C GL-45-M32 hazardous area approved gland for cables \varnothing 14-21 mm, up to -55°C
Reducer	REDUCER-M40/32-EEXE hazardous area M40 male to M32 female reducer
Loose terminals	35 mm ² phase/neutral terminal: HWA-WDM-PHASE-35 10 mm ² earth terminal: HWA-WDM-EARTH-10 35 mm ² earth terminal: HWA-WDM-EARTH-35 Endplate: HWA-WDM-PLATE Terminal jumper (2): HWA-WDM-JUMPER-35-2 Terminal jumper (3): HWA-WDM-JUMPER-35-3
Gland for PI cold leads	C20-PI-PA-KIT Hazardous area approved gland, PA, up to -40°C C20-PI-M0-KIT Hazardous area approved gland, Ni plated brass, up to -55°C (to be used with boxes with integral earth plate or with earth lug)
Insulation entry kit for PI cold leads	IEK-20-PI



Integrated junction box for direct connection of XPI heaters

PRODUCT OVERVIEW

JBS-PI-EP



The nVent RAYCHEM JBS-PI-EP kit is designed to connect nVent RAYCHEM XPI industrial series heating cables directly to a power supply without the use of cold leads and with certain power and current restrictions.

The system is approved for hazardous areas and integrates the function of connection kits, cold leads and insulation entry kits. This simplifies the Bill of Materials and actual installation by eliminating the need for special tools or craft sensitive connections.

The XPI heating cables are directly connected into spring-type terminals to provide a fast, reliable and maintenance free operation. This connection system significantly reduces installation time.

The kit is equipped with an earth plate & earth stud to allow for maximum flexibility on the power connection side (metal or polymeric glands).

The design validation depends on cable type, power and temperature and is captured in our design software packages such as TraceCalc Pro.

Application

This kit provides one M25 threaded entry for the power cable. It is also equipped with an integrated earth plate in case metallic power cable glands are used.

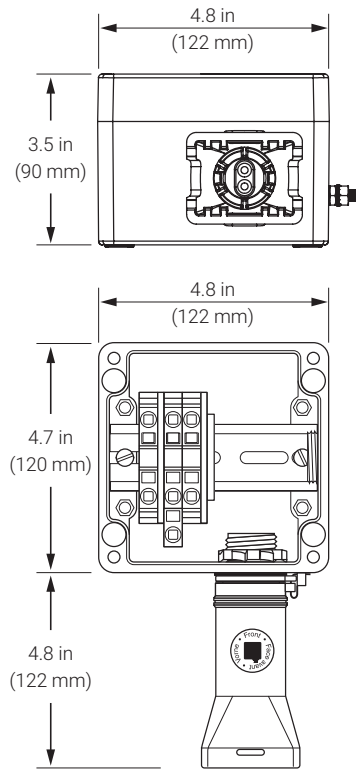
The kit can be used with nVent RAYCHEM XPI series heating cables type XPI-(S)-8000 up to XPI-(S)-50 to realize a monophasic power connection or a loop end box.

Kit contents

- 1 junction box with spring-type terminals
- 1 stand assembly
- 2 green/yellow earthing sleeves
- 1 skip jumper
- 1 grommet (premounted)
- 1 polywater sachet
- 1 cable tie

PRODUCT SPECIFICATIONS

Dimensions (Nominal)



Technical details

Heating cables	XPI-8000 up to XPI-50 XPI-S-8000 up to XPI-S-50 (XPI-F not allowed)
Ingress protection	IP66
Entries	1 x M25
Ambient temperature range	-55°C up to +56°C
Minimum installation temperature	-55°C
Max continuous pipe temperature	160°C*
Terminals	16 mm ² Spring-type terminals (terminal configuration & types cannot be altered w/o consulting nVent)
Max conductor size	16 mm ² stranded and solid
Max operating voltage	550 Vac
Max continuous operating current	45 A*
Max start-up current	70 A*
Power cable gland	minimum required rating 90°C (not included)

* Different current and power restrictions apply for different ambient temperatures, pipe temperatures and cable types. Use nVent design software packages to validate the usage for your application.

Materials of construction and weight

Enclosure, lid and stand	Electrostatic charge resistant glass-filled engineered polymer (Black)
Lid screws	Stainless steel (captive screws)
Lid gasket	Silicone rubber
Earth continuity plate	Steel, zinc plated and blue chromated
Weight	1.3 kg

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust).

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING DETAILS

Part description	JBS-PI-EP
PN	P000004428

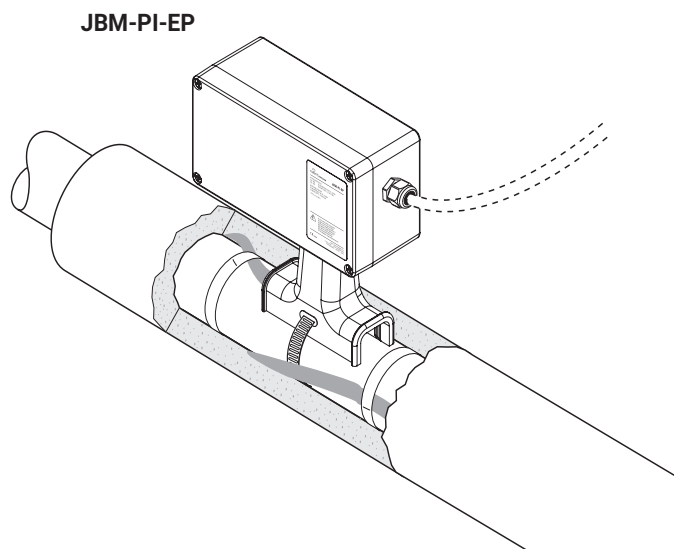
Accessories

Small pipe adaptor	JBS-SPA, required for pipes ≤ 1 " (DN 25) (bag of 5 adaptors)
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Integrated junction box for direct connection of XPI heaters

PRODUCT OVERVIEW



The nVent RAYCHEM JBM-PI-EP kit is designed to connect nVent RAYCHEM XPI industrial series heating cables directly to a power supply without the use of cold leads and with certain power and current restrictions.

The system is approved for hazardous areas and integrates the function of connection kits, cold leads and insulation entry kits. This simplifies the Bill of Materials and actual installation by eliminating the need for special tools or craft sensitive connections.

The XPI heating cables are directly connected into spring-type terminals to provide a fast, reliable and maintenance free operation. This connection system significantly reduces installation time.

The kit is equipped with an earth plate & earth stud to allow for maximum flexibility on the power connection side (metal or polymeric glands).

The design validation depends on cable type, power and temperature and is captured in our design software packages such as TraceCalc Pro.

Application

This kit provides one M32 threaded entry for the power cable. It is also equipped with an integrated earth plate in case metallic power cable glands are used.

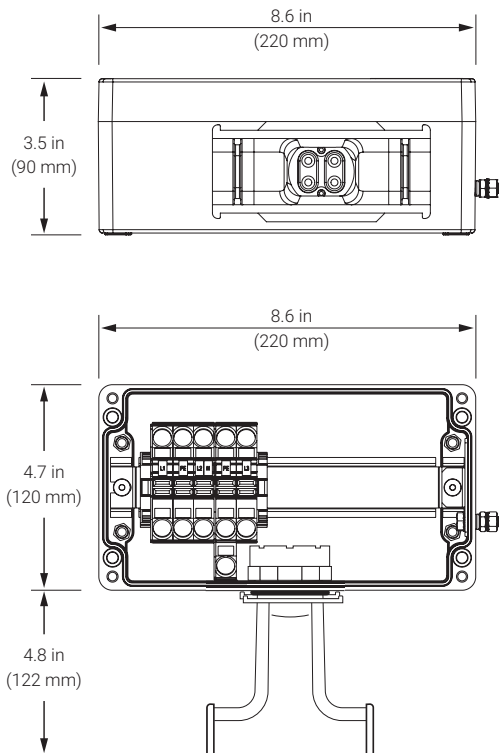
The kit can be used with nVent RAYCHEM XPI series heating cables type XPI-(S)1000 up to XPI-(S)1.8 to realize a monophase / triphase (star) power connection or a loop / triphase (star) end box.

Kit contents

- 1 junction box with spring-type terminals
- 1 stand assembly
- 3 green/yellow earthing sleeves
- 1 skip jumper
- 2 sealing pins
- 2 grommets (1 premounted for small cables, 1 for large cables)
- 1 stand wrench
- 1 strain relief assembly
- 1 polywater sachet

PRODUCT SPECIFICATIONS

Dimensions (Nominal)



Technical details

Heating cables	XPI-1000 up to XPI-1.8 XPI-S-1000 up to XPI-S-1.8 (XPI-F not allowed)
Ingress protection	IP66
Entries	1 x M32
Ambient temperature range	-55°C up to +56°C
Minimum installation temperature	-55°C
Max continuous pipe temperature	160°C*
Terminals	16 mm ² Spring-type terminals (terminal configuration & types cannot be altered w/o consulting nVent)
Max conductor size	16 mm ² stranded and solid
Max operating voltage	550 Vac
Max continuous operating current	45 A*
Max start-up current	70 A*
Power cable gland	minimum required rating 90°C (not included)

* Different current and power restrictions apply for different ambient temperatures, pipe temperatures and cable types. Use nVent design software packages to validate the usage for your application.

Materials of construction and weight

Enclosure, lid and stand	Electrostatic charge resistant glass-filled engineered polymer (Black)
Lid screws	Stainless steel (captive screws)
Lid gasket	Silicone rubber
Earth continuity plate	Steel, zinc plated and blue chromated
Weight	1.5 kg

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust).

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING DETAILS

Part description	JBM-PI-EP
PN	P000004429

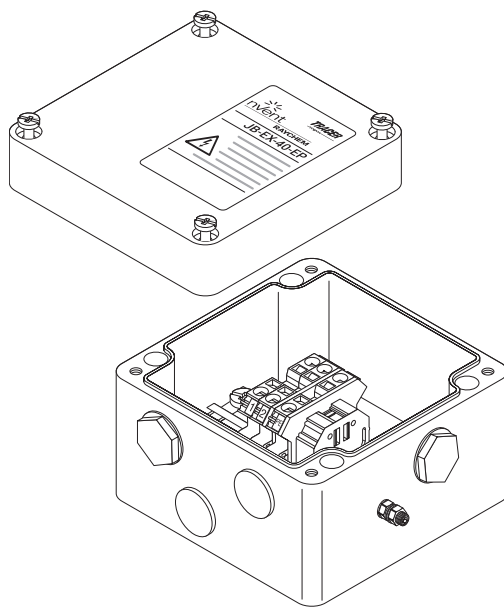
Accessories

Small pipe adaptor	JBM-SPA
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Multi purpose junction box

PRODUCT OVERVIEW



Industrial polyester junction box with earth plate for use in hazardous areas. This box can be used to make connections between power cables, heating cables and cold lead cables using M25 metallic connection kits or glands. Earthing of the connections is realized via the earth plate

Depending on the configuration of the system, the box can accommodate 3 cold lead entries and/or a power cable.

M25 connection kits have to be ordered separately or are integrated in the heating unit (eg MI heating units), depending on the type of heating cable being used. Cable connection is accomplished via DIN rail mounted spring-type terminals.

The box can be either wall or pipe mounted via the four holes moulded in the base of the box. For pipe mounting use one of the standard support bracket.

Typical use

Power supply box, end-box (3-Phase), marshalling box.

Entries

3 x M25

1 x M25

Kit contents

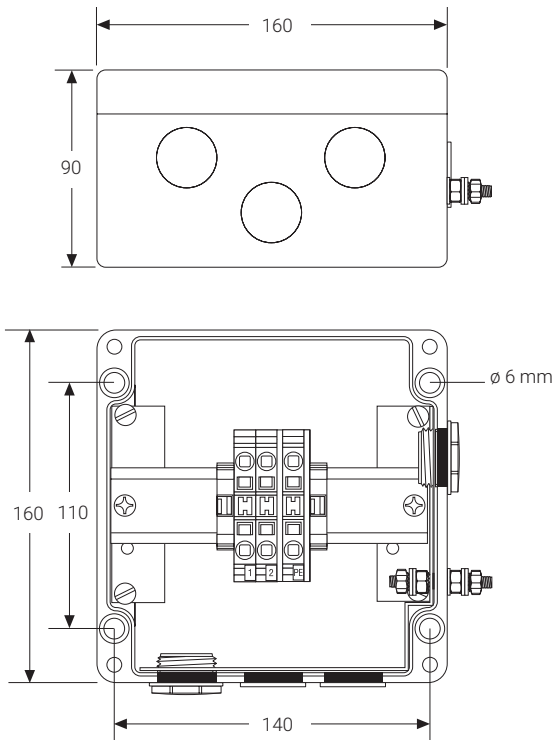
1 x junction box with terminals on DIN rail

2 x M25 stopping plugs

2 x M25 rain plug (temporary)

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Materials of construction

Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber
Lid fixing screws	Stainless steel (captive)

Technical details

Ingress protection	IP66
Ambient temperature range	-55°C to +55°C

Terminals

Quantity	3 pc
Type	Spring-type
Labeling	1, 2, PE
Maximum conductor size	10 mm ² (solid & stranded)
Maximum operating voltage	550 Vac
Maximum operating current	53 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification

Present logos of available certificates



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	JB-EX-40-EP
PN (Weight)	1244-020505 (1.6 kg)

Accessories (to be ordered separately)

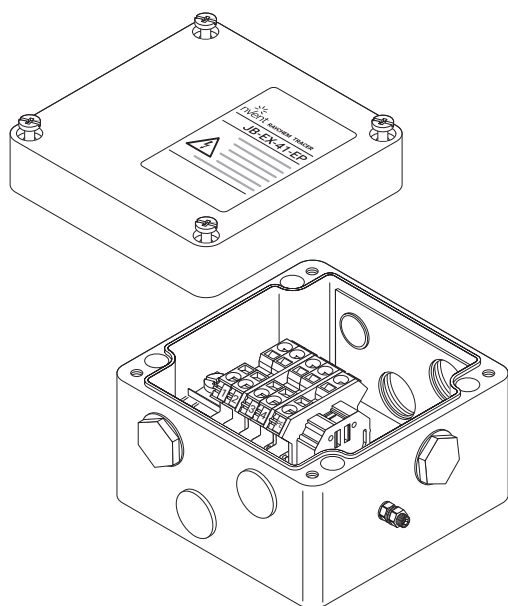
Support bracket	SB-100, SB-101, SB-130 (for fixation to cable tray)
Gland for MI cold leads	Integrated in MI heating unit or contact Thermal management for more information
Gland for power cable	GL-55-M25 (Polyamide) up to -55°C, 8-15 mm GL-38-M25-METAL (Ni plated brass) up to -60°C, inner diam. 10-13.5 mm, outer diam. 13.5-21 mm
Loose terminals (*)	Phase/neutral terminal: HWA-WAGO-PHASE Earth terminal: HWA-WAGO-EARTH End plate: HWA-WAGO-ENDPLATE Terminal jumper: HWA-WAGO-JUMPER

(*) in total no more than 7 terminals should be installed.



Multi purpose junction box

PRODUCT OVERVIEW



Industrial polyester junction box with earth plate for use in hazardous areas. This box can be used to make connections between power cables, heating cables and cold lead cables using M25 metallic connection kits or glands. Earthing of the connections is realized via the earth plate

Depending on the configuration of the system, the box can accommodate 6 cold lead entries and/or a power cable.

M25 connection kits have to be ordered separately or are integrated in the heating unit (eg MI heating units), depending on the type of heating cable being used. Cable connection is accomplished via DIN rail mounted spring-type terminals.

The box can be either wall or pipe mounted via the four holes moulded in the base of the box. For pipe mounting use one of the standard support bracket.

Typical use

Power supply box, (power) splice box, (power) tee box, marshalling box.

Entries

6 x M25

1 x M25

Kit contents

1 x junction box with terminals on DIN rail

3 x M25 stopping plugs

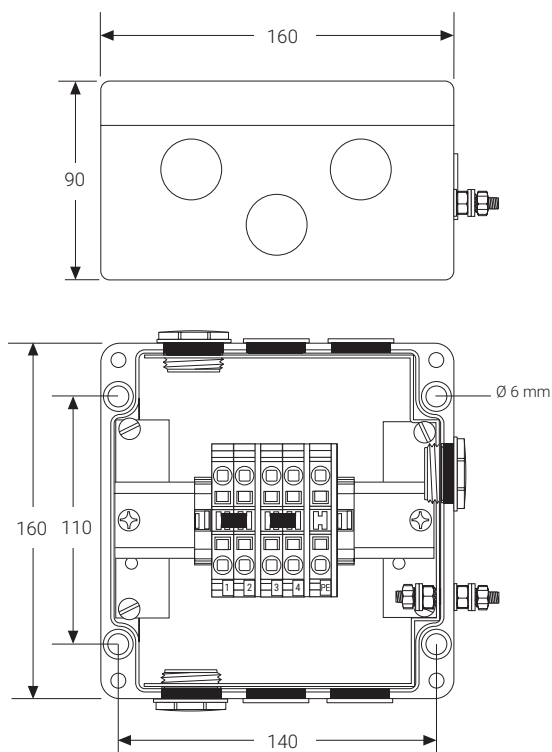
4 x M25 rain plug (temporary)



Components

PRODUCT SPECIFICATION

Dimensions (in mm)



Materials of construction

Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber
Lid fixing screws	Stainless steel (captive)

Technical details

Ingress protection	IP66
Ambient temperature range	-55°C to +55°C

Terminals

Quantity	5 pcs, bridged per 2
Type	Spring-type
Labeling	1, 2, 3, 4, PE
Maximum conductor size	10 mm ² (solid & stranded)
Maximum operating voltage	550 Vac
Maximum operating current	53 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification

Present logos of available certificates



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	JB-EX-41-EP
Part number (Weight)	1244-020506 (1.9 kg)

(* in total no more than 7 terminals should be installed.

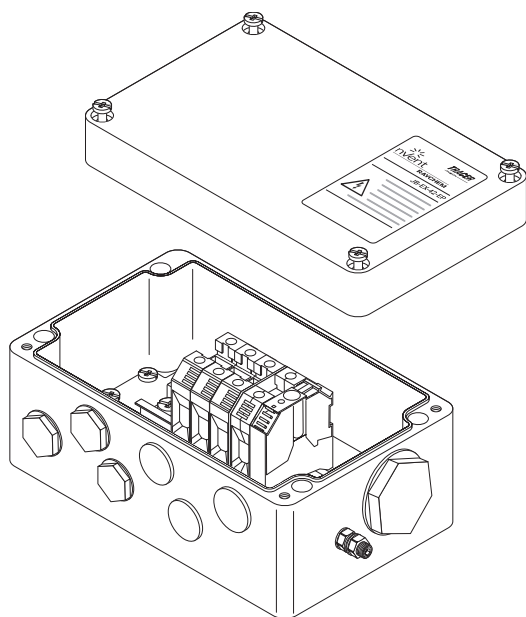
Accessories (to be ordered separately)

Support bracket	SB-100, SB-101, SB-130 (for fixation to cable tray)
Gland for MI cold leads	Integrated in MI heating unit or contact nVent for more information
Gland for power cable	GL-55-M25 (Polyamide) up to -55°C, 8-15 mm GL-38-M25-METAL (Ni plated brass) up to -60°C, inner diam. 10-13.5 mm, outer diam. 13.5-21 mm
Loose terminals (*)	Phase/neutral terminal: HWA-WAGO-PHASE Earth terminal: HWA-WAGO-EARTH End plate: HWA-WAGO-ENDPLATE Terminal jumper: HWA-WAGO-JUMPER



Multi purpose junction box

PRODUCT OVERVIEW



Industrial polyester junction box with earth plate for use in hazardous areas. This box can be used to make connections between power cables, heating cables and cold lead cables using M25 metallic connection kits or glands. Earthing of the connections is realized via the earth plate

Depending on the configuration of the system, the box can accommodate 6 cold lead entries and/or a power cable.

M25 connection kits have to be ordered separately or are integrated in the heating unit (eg MI heating units), depending on the type of heating cable being used. Cable connection is accomplished via DIN rail mounted spring-type terminals.

The box can be either wall or pipe mounted via the four holes moulded in the base of the box. For pipe mounting use one of the standard support bracket.

Typical use

Power supply box, end-box (3-Phase), (power) splice box, (power) tee box, marshalling box.

Entries

6 x M25

1 x M40

Kit contents

1 x junction box with terminals on DIN rail

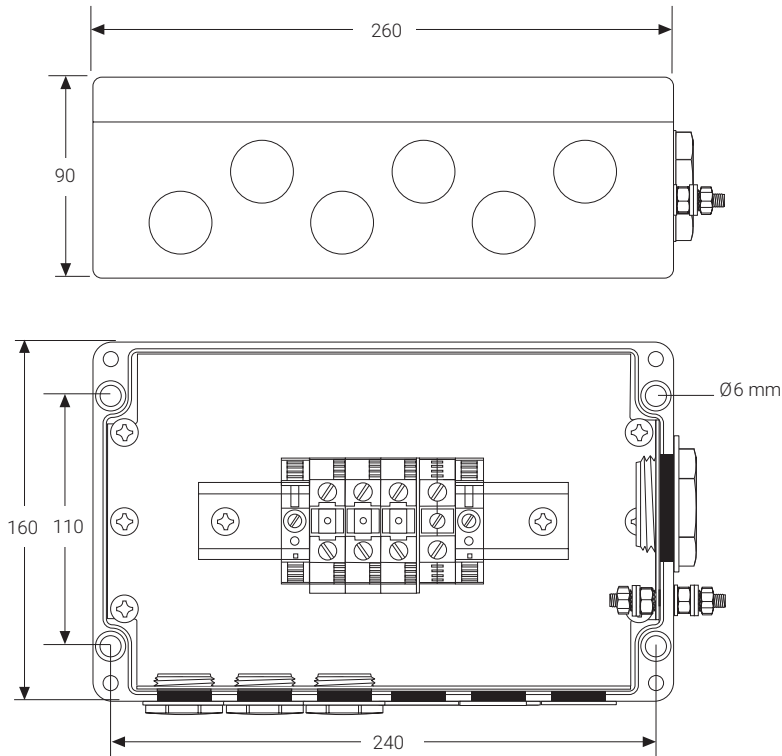
3 x M25 stopping plugs

3 x M25 rain plug (temporary)

1 x M40 stopping plug

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Materials of construction

Box & lid	Electrostatic charge-resistant glass-filled engineered polymer, black
Sealing gasket	Silicone rubber
Lid fixing screws	Stainless steel (captive)

Technical details

Ingress protection	IP66
Ambient temperature range	-55°C to +55°C
Terminals	
Quantity and Type	3 pcs WDU35 screw terminals 1 pc WPE35 earth terminal for power cable
	Junction box can accommodate up to 6 fully loaded phase/neutral terminals (maximum 8 terminals in total)
Labeling	1, 2, 3 + PE
Minimum conductor size	2.5 mm ² (solid & stranded)
Maximum conductor size	35 mm ² (solid & stranded)
Maximum operating voltage	690 Vac
Maximum operating current	100 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification

Present logos of available certificates



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

ORDERING INFORMATION

Order reference JB-EX-42-EP

PN (Weight) 1244-020507 (2 kg)

Accessories (to be ordered separately)

Support bracket 2 x SB-111

Gland for MI cold leads Integrated in MI heating unit or contact nVent for more information

Gland for power cable GL-51-M40 (Polyamide)
up to -55°C, 17-28 mm

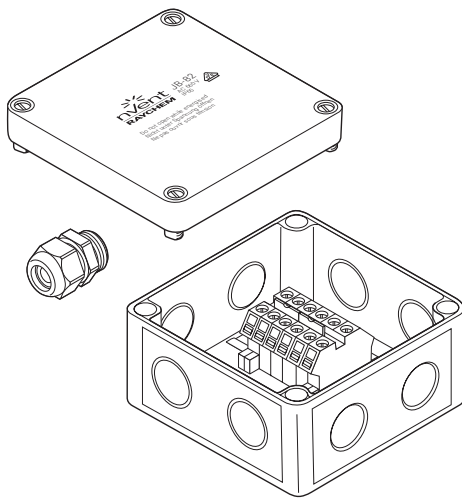
Loose terminals (*)	35 mm ² phase/neutral terminal:	HWA-WDM-PHASE-35
	35 mm ² earth terminal:	HWA-WDM-EARTH-35
	Endplate:	HWA-WDM-PLATE
	Terminal jumper (2):	HWA-WDM-JUMPER-35-2
	Terminal jumper (3):	HWA-WDM-JUMPER-35-3

Gland for MI cold leads In case of factory terminated units, already present.

(*) in total no more than 8 terminals should be installed.

Junction box

PRODUCT OVERVIEW



The nVent RAYCHEM JB-82 is a standard, non-hazardous polycarbonate junction box.

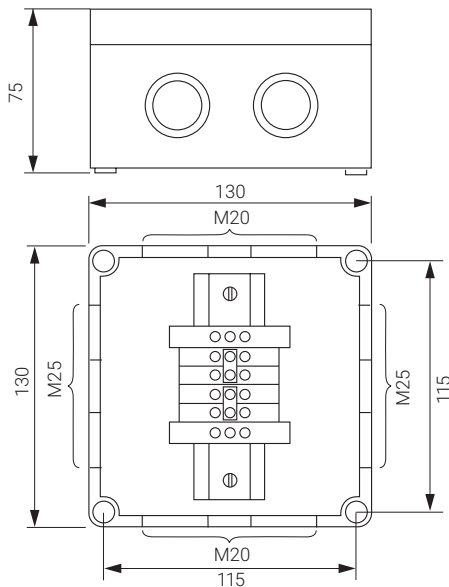
It may be used to make a power connection, splice, powered splice, powered tee or simple tee, for use with nVent RAYCHEM industrial parallel heating cables.

Up to four heating cables or three heating cables and the appropriate size power cable can be accommodated through the four entries and connected to the rail mounted terminals.

For pipe mounting, it is recommended that this box is used with a nVent RAYCHEM support bracket.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Enclosure

Protection	IP66
Entries	4 x M20 and 4 x M25
Exposure temperature	-35°C to +115°C
Base	Grey glass filled polycarbonate
Lid	Grey polycarbonate
Lid gasket	Foamed polyurethane

Phase terminals

Conta-Clip RK6-10	Din rail mounted
Voltage rating	750 Vac
Max. conductor size	0.5-10 mm ² (solid and stranded)
Current rating	61 A
Quantity	Two cross-connected groups of two

Earth terminals

2 Conta-Clip SL10/35

Mounting

Through holes moulded in the base of the junction box

Centres	115 x 115 mm
Size	5 mm diameter
Cable gland	Polyamide with locknut for cable diameters from 9 to 16 mm

APPROVALS

For use in ordinary areas; in- and outdoors

Product certification



ORDERING INFORMATION

Part description	JB-82
PN (Weight)	535679-000 (0.47 kg)

Accessories

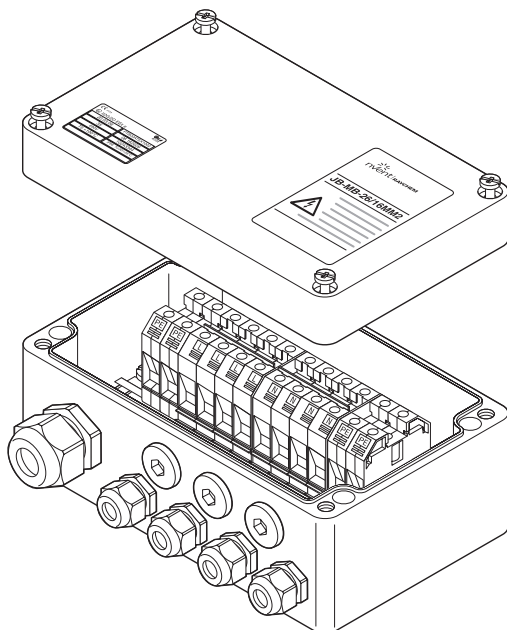
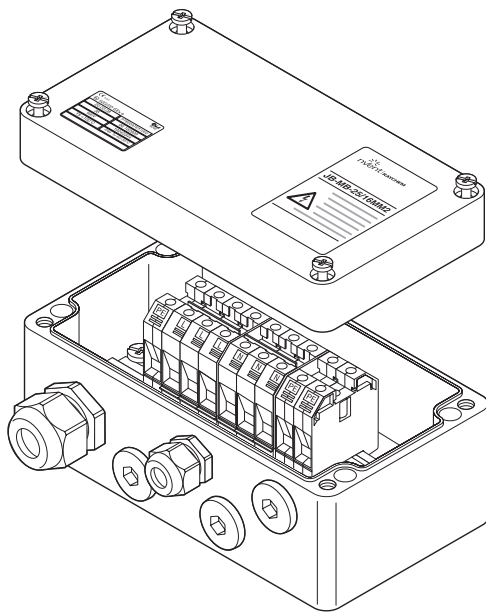
Junction box support bracket	SB-100, SB-101, SB-110, SB-111
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JB-MB-25/16MM2 and JB-MB-26/16MM2

CONNECT AND PROTECT

Marshalling box

PRODUCT OVERVIEW



Both connection boxes are ATEX approved polyester marshalling boxes that can be used in hazardous areas.

The nVent RAYCHEM JB-MB-25/16MM2 is intended to split a power cable into a maximum of four subsequent heat-tracing feeders, while the JB-MB-26/16MM2 allows the connection of maximum seven subsequent heat-tracing feeders. They are particularly suited for powering multiple short heat-tracing circuits from a single supply point, typically in instrumentation areas or where the power infrastructure is limited.

Cable connection is accomplished via DIN rail mounted screw terminals that allow the connection of a wide range of cable cross sections. The terminals are already equipped with the necessary terminal jumpers to minimize installation time.

Both boxes can be wall mounted via the four holes moulded in base of each box.

The JB-MB-25/16MM2 can also be pipe mounted with a standard support bracket.

Typical use

JB-MB-25/16MM2	JB-MB-26/16MM2
Marshalling box	Marshalling box

Entries

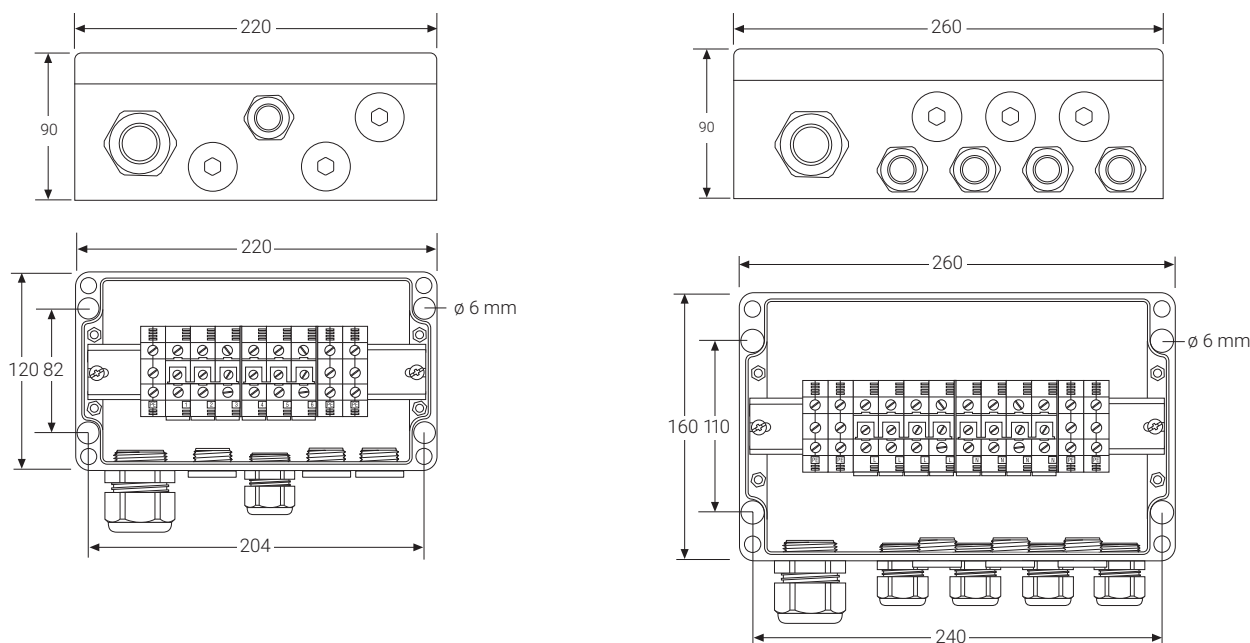
1 x M32	1 x M32
4 x M25	7 x M25

Kit contents

1 junction box with Weidmüller screw terminals on DIN rail, two sets bridged per three and three earth terminals,	1 junction box with Weidmüller screw terminals on DIN rail, two sets bridged per four and four earth terminals,
1 M32 Hazardous area approved cable gland for power cables with \varnothing of 14 to 21 mm,	1 M32 Hazardous area approved cable gland for power cables with \varnothing of 14 to 21 mm,
1 M25 Hazardous area approved cable gland for power cables with \varnothing of 8 to 15 mm,	4 M25 Hazardous area approved cable glands for power cables with \varnothing of 8 to 15 mm,
3 M25 stopping plugs	3 M25 stopping plugs

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Materials of construction

	JB-MB-25/16MM2	JB-MB-26/16MM2
Box & lid	Glass filled polyester	Glass filled polyester
Sealing gasket	Silicone rubber	Silicone rubber
Lid fixing screws	Stainless steel (captive)	Stainless steel (captive)

Technical details

	JB-MB-25/16MM2	JB-MB-26/16MM2
Ingress protection	IP66	IP66
Ambient temperature range	-55°C to +55°C	-55°C to +55°C
Terminals		
Quantity & type	9 pcs Weidmüller screw terminals, bridged per 3, 6 x WDU16, 3 x WPE16, Max. 8 fully loaded phase/neutral terminals; max. 12 terminals in total	12 pcs Weidmüller screw terminals, bridged per 4, 8 x WDU16 and 4 x WPE16, Max. 10 fully loaded phase/neutral terminals; max. 15 terminals in total
Labelling	1, 2, 3, 4, 5, 6 and PE	L, N and P.E.
Minimum conductor size	1.5 mm ² stranded & solid	1.5 mm ² stranded & solid
Maximum conductor size	25 mm ² stranded, 16 mm ² solid	25 mm ² stranded, 16 mm ² solid
Maximum operating voltage	550 Vac	550 Vac
Maximum operating current	50 A	50 A

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

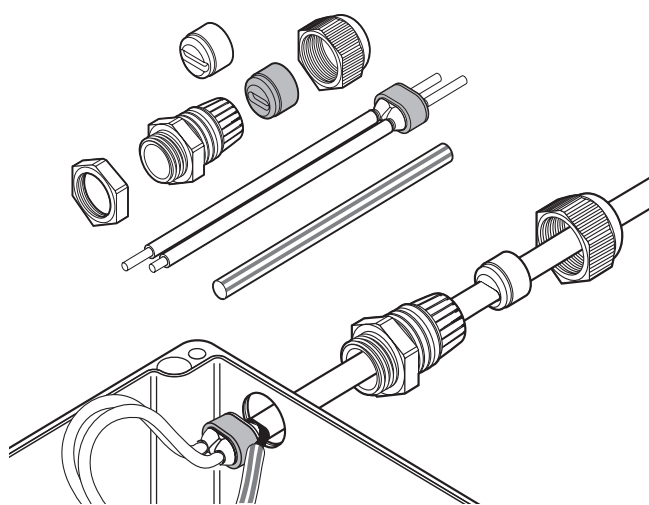
Order reference	JB-MB-25/16MM2	JB-MB-26/16MM2
Part number (Weight)	1244-006656 (0.9 kg)	1244-006657 (1.9 kg)

Accessories (to be ordered separately)

Support bracket PN	SB-125 165886-000	N.A. (wall mounting)
M25 Power cable gland PN	GL-55-M25 (1 included) 1244-019083	GL-55-M25 (4 included) 1244-019083
M32 Power cable gland PN	GL-45-M32 (included) 1244-000847	GL-45-M32 (included) 1244-000847
M25 Stopping plug PN	HWA-PLUG-M25-PLASTIC (3 included) 434994-000	HWA-PLUG-M25-PLASTIC (3 included) 434994-000
16 mm ² Phase terminal PN	HWA-WDM-PHASE-16 (6 included) 1244-006992	HWA-WDM-PHASE-16 (8 included) 1244-006992
16 mm ² Earth terminal PN	HWA-WDM-EARTH-16 (3 included) 1244-006993	HWA-WDM-EARTH-16 (4 included) 1244-006993
Terminal jumper for bridging 2 terminals PN	HWA-WDM-JUMPER-16-2 1244-006997	HWA-WDM-JUMPER-16-2 1244-006997
Terminal jumper for bridging 3 terminals PN	HWA-WDM-JUMPER-16-3 (2 included) 1244-006998	HWA-WDM-JUMPER-16-3 1244-006998
Terminal jumper for bridging 4 terminals PN	HWA-WDM-JUMPER-16-4 1244-006999	HWA-WDM-JUMPER-16-4 (2 included) 1244-006999
Endplate PN	HWA-WDM-PLATE 124-007004	HWA-WDM-PLATE 1244-007004

Cold applied connection kit

PRODUCT OVERVIEW



This connection kit is designed for terminating all nVent RAYCHEM BTV, QTVR, XTV, KTV, HTV and VPL industrial parallel heating cables to a junction box, whilst maintaining electrical insulation of the heating cable conductors and core. It is approved for use in hazardous areas.

The core sealing boot does not require a heat gun or torch for the installation (no hot work permit necessary). The non-curing sealant (silicone free) allows easy installation and facilitates maintenance purposes.

Two grommets supplied in this kit enable the gland to maintain optimum sealing under various ambient conditions. An additional locknut is provided for unthreaded entries.

Application

Connection kit for BTV, QTVR, XTV, KTV, HTV and VPL parallel heating cables.

Kit contents

1 gland, 2 grommets, 1 locknut, 1 core sealer, 1 green/yellow tube, 1 installation instruction (multilingual)

PRODUCT SPECIFICATION

Type	Cold applied
Thread size	M25 x 1.5
Min. ambient temperature	-55°C
Max. exposure temperature (gland)	110°C

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

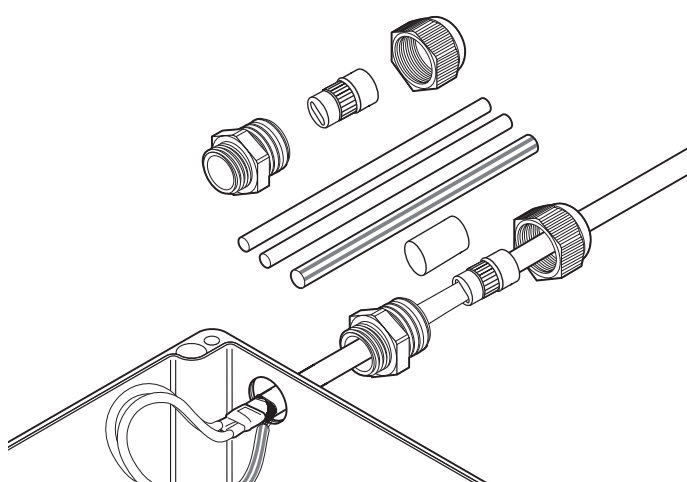
ORDERING INFORMATION

Part description	C25-100
PN (Weight)	263012-000 (0.07 kg)



Heat-shrink connection kit

PRODUCT OVERVIEW



This connection kit is designed for connecting all nVent RAYCHEM BSA and BTV-CR industrial parallel heating cables to a junction box in ordinary (non-hazardous) area applications, whilst maintaining electrical insulation of the heating cable conductors and core.

The sealing of the heating cable core is provided by heat-shrinkable sleeves. The grommet supplied in this kit enables the gland to maintain optimum sealing under various ambient conditions.

Application

Connection kit for BSA and BTV-CR parallel heating cables in ordinary (non-hazardous) area

Kit contents

- 1 gland with grommet
- 1 green/yellow tube and heat-shrinkable sleeves for core sealing
- 1 installation instruction (multilingual)

PRODUCT SPECIFICATIONS

Type	Heat-shrinkable
Thread size	M25 x 1.5
Min. ambient temperature	-20°C
Max. exposure temperature (gland)	100°C
IP ingress protection rating	IP66

APPROVALS

For use in ordinary (non-hazardous) area

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at nVent.com/RAYCHEM

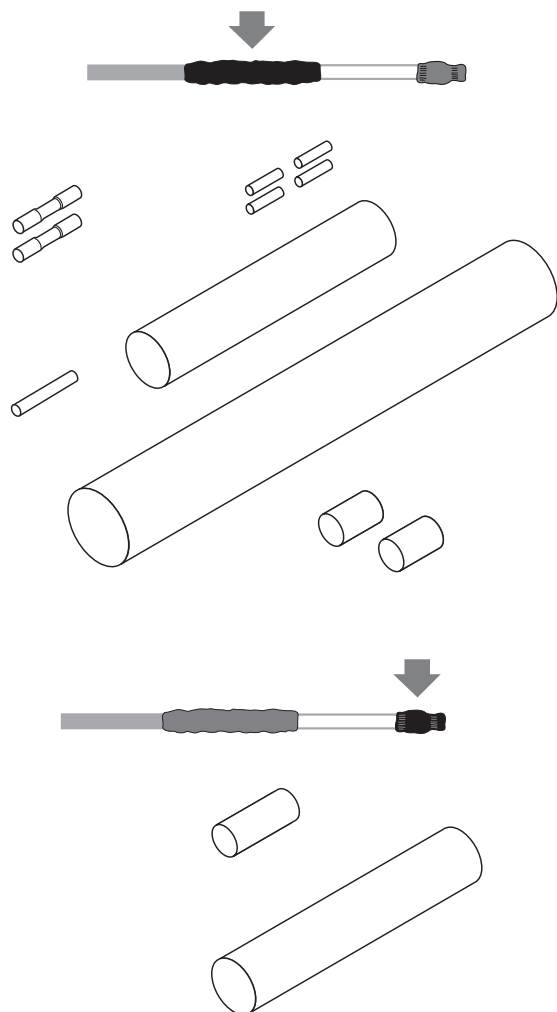
ORDERING INFORMATION

Part description	C25-01
PN (Weight)	1244-020909 (0.06 kg)



Cold lead/splice connection and end seal kit

PRODUCT OVERVIEW



The nVent RAYCHEM CSE-05-DR kit combines the following: in-line connection of a BSA heating cable to a flexible power cable, or in-line joining of 2 BSA heating cables, and end termination of the BSA heating cable.

This kit is designed for use in ordinary area (non hazardous).

It employs easy to use heat-shrinkable tubing with an adhesive, that when heated forms a semi-flexible moisture proof encapsulation.

Electrical continuation is maintained via crimps for the conductors and another crimp connection for the drainwire of the heating cable.

Due to its low profile design the finished power or splice connection and end seal can be installed under the insulation, directly on the pipe.

Application

In-line cold lead/splice connection and end seal kit for BSA heating cable in ordinary area

Kit contents

Heat-shrinkable adhesive coated sleeves, insulation sleeves, crimps and installation instruction

**Components**

PRODUCT SPECIFICATIONS

Technical details

Max. exposure temperature during operation	85°C
Maximum current rating	32 A
Dielectric strength	1.3 – 3.5 MV/m
Volume resistivity	10 ¹² Ω cm
Final dimensions	length approx. 200 mm
Minimum Installation Temperature	-10°C

Installation details

Heat shrinkable tubing	125°C
Gas torch or equivalent	min. 1460 W hot air gun

APPROVALS

For use in ordinary (non-hazardous) area

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	CSE-05-DR
PN (Weight)	1244-021440 (0.05 kg)

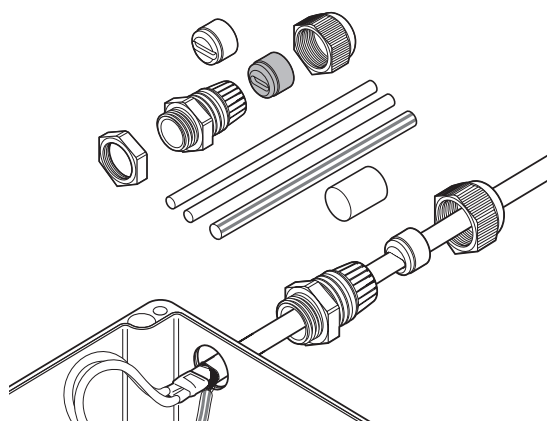


Components



Heat-shrink connection kit

PRODUCT OVERVIEW



This connection kit is designed for terminating all nVent RAYCHEM BTV, QTVR, XTV, KTV and VPL industrial parallel heating cables to a junction box, whilst maintaining electrical insulation of the heating cable conductors and core.

The sealing of the heating cable core is provided by nVent RAYCHEM heat-shrinkable sleeves. Two grommets supplied in this kit enable the gland to maintain optimum sealing under various ambient conditions.

An additional locknut is provided for unthreaded entries.

Application

Connection kit for BTV, QTVR, XTV, KTV and VPL parallel heating cables

Kit contents

- 1 gland
- 2 grommets
- 1 locknut
- 1 green/yellow tube, heat-shrinkable sleeves for core sealing
- 1 installation instruction (multilingual)

PRODUCT SPECIFICATION

Technical details

Type	Heat-shrinkable
Thread size	M25 x 1.5
Min. ambient temperature	-55°C
Max. exposure temperature (gland)	110°C
IP ingress protection rating	IP66



APPROVALS

The kit is certified as part of the system approval of the various heating cables.
For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	nVent RAYCHEM C25-21
PN (Weight)	311147-000 (0.06 kg)



C25-100-METAL and C3/4-100-METAL

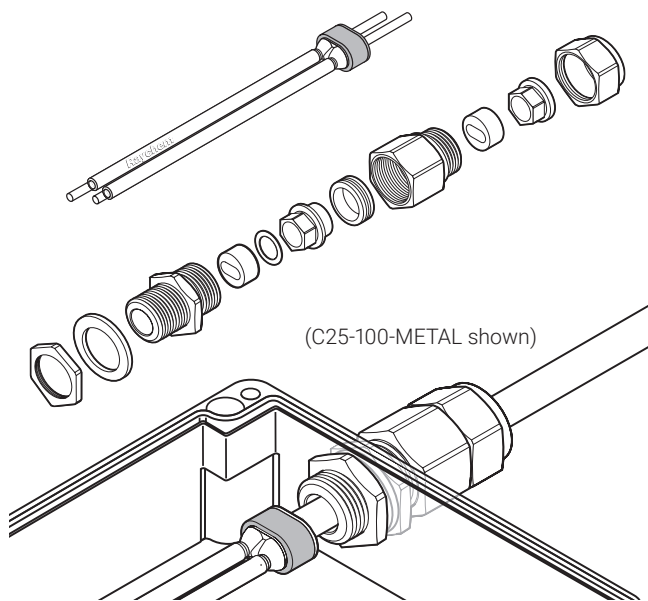


RAYCHEM

CONNECT AND PROTECT

Cold applied metal connection kit

PRODUCT OVERVIEW



These connection kits are designed for terminating all nVent RAYCHEM BTV, QTVR, XTV, KTV, HTV and VPL industrial parallel heating cables to a junction box, whilst maintaining electrical insulation of the heating cable conductors and core.

The braid is directly connected to the metal gland body. The connection kits can be used with metal boxes or plastic boxes with internal earthing plate. They are approved for use in hazardous areas.

The core sealing boot does not require a heat gun or torch for the installation (no hot work permit necessary). The non-curing sealant allows easy installation and facilitates maintenance purposes.

The C25-100-METAL kit is designed for use with M25 entries, the C3/4-100-METAL for 3/4" NPT entries.

A metal locknut is included.

Application

Connection kit for BTV, QTVR, XTV, KTV, HTV and VPL parallel heating cables

Kit contents

- 1 gland,
- 2 grommets,
- 1 locknut and sealing washer (only M25),
- 1 core sealer,
- 1 installation instruction (multilingual).



Components

PRODUCT SPECIFICATION

Technical Details

	C25-100-METAL	C3/4-100-METAL
Thread size	M25 x 1.5	3/4" NPT
Gland material	Brass	Brass
Min. ambient temperature	-60°C	-60°C
Max. exposure temperature	180°C	180°C

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



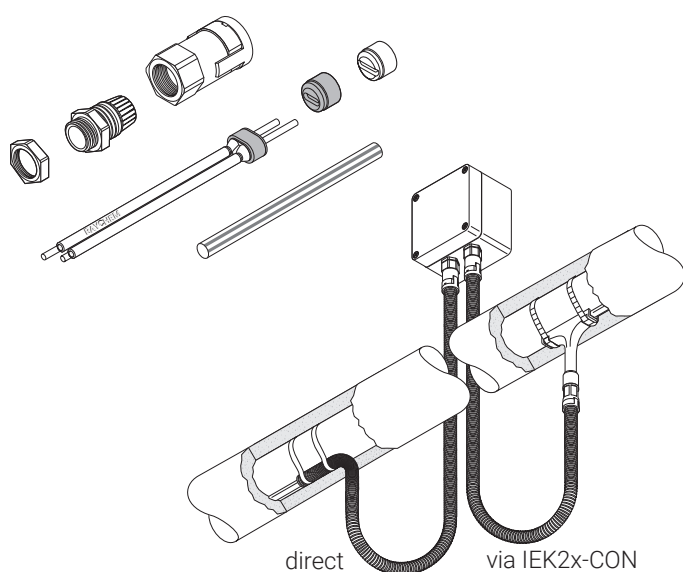
More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	C25-100-METAL	C3/4-100-METAL
PN (Weight)	875016-000 (0.31 kg)	440588-000 (0.3 kg)
Gland material	Brass	Brass
Part description	C25-100-METAL-NP	C3/4-100-METAL-NP
PN (Weight)	1244-002296 (0.31 kg)	1244-001350 (0.3 kg)
Gland material	Nickel Plated Brass	Nickel Plated Brass
Part description	C25-100-METAL-SS	
PN (Weight)	1244-017869 (0.3 kg)	
Gland material	Stainless Steel	

Cold applied conduit connection kit

PRODUCT OVERVIEW



This connection kit is designed for terminating all nVent RAYCHEM BTV, QTVR, XTV, KTV and VPL parallel industrial heating cables to a junction box, whilst maintaining electrical insulation of the heating cable conductors and core as well as providing a reliable and sealed connection to a conduit system. It is approved for use in hazardous locations.

The conduit system will provide supplementary mechanical protection of the heating cable between a junction box and the entry into the insulation. The conduit connection is fast and reliable and allows simple installation whilst maintaining an IP66 seal. The kit can be used with various types of conduits which can be cut-to-length as required in the field. The core sealing boot for the heating cable does not require a heat gun or torch for the installation (no need for a hot work permit). The non-curing sealant (silicone free) allows easy installation and facilitates maintenance purposes.

The conduit and eventually required insulation entry kit needs to be purchased separately.

Application

Connection kit with conduit adaptor for BTV, QTVR, XTV, KTV and VPL parallel industrial heating cables

Kit contents

- 1 gland body,
- 1 conduit adaptor including safety retention clip,
- 2 grommets,
- 1 locknut,
- 1 core sealer,
- 1 green/yellow tube,
- 1 installation instruction (multilingual)

PRODUCT SPECIFICATION

Technical details

Thread size	M25 x 1.5
Conduit compatibility	ND 23 mm, nVent RAYCHEM conduits type CCON25-C...
Ambient temperature	-55°C to +40°C
IP ingress protection rating	IP66
Surface resistance	< 1GΩ according to the requirements of EN 60079-0 and EN 61241-0 for use in hazardous areas



APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description nVent RAYCHEM CCON25-100

PN (weight) 1244-003272 (0.075 kg)

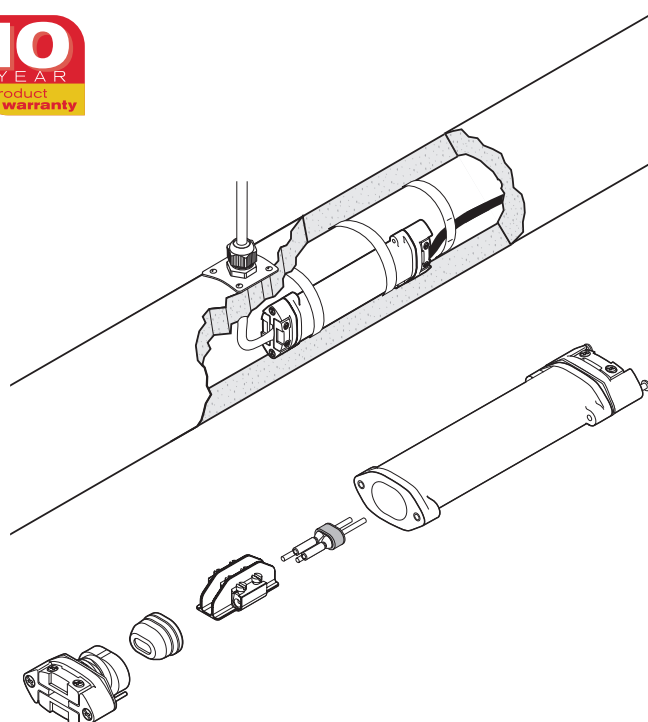
Accessories

For suitable conduits and insulation entry kits refer to the datasheet for CCON2x-C...



Cold applied low profile power connection

PRODUCT OVERVIEW



The nVent RAYCHEM C-150-E is a cold applied low profile power connection. The kit enables in line connection of nVent RAYCHEM industrial heating cables, BTV, QTVR and XTVR, to a flexible power cable. It can be used in applications with temperature ratings from -55°C to 200°C . It is approved for use in hazardous areas.

A nVent RAYCHEM supplied power cable such as C-150-PC may be used or any suitable standard industrial power cable type $3 \times 1.5 \text{ mm}^2$ or $3 \times 2.5 \text{ mm}^2$ with stranded copper conductors and an outer insulation jacket. The power cable is connected by means of screw terminals to the conductors and the braid of the heating cable.

C-150-E is used as connector:

- where connection to a junction box is difficult e.g. because of space limitation
- on instrument lines or loading arms
- where installation of "under insulation" components is preferred
- as a cost effective solution for short heat-tracing lines as an alternative for JBS-100.

Application

Cold applied low profile splice for connection of BTV, QTVR and XTVR heating cables to a power cable

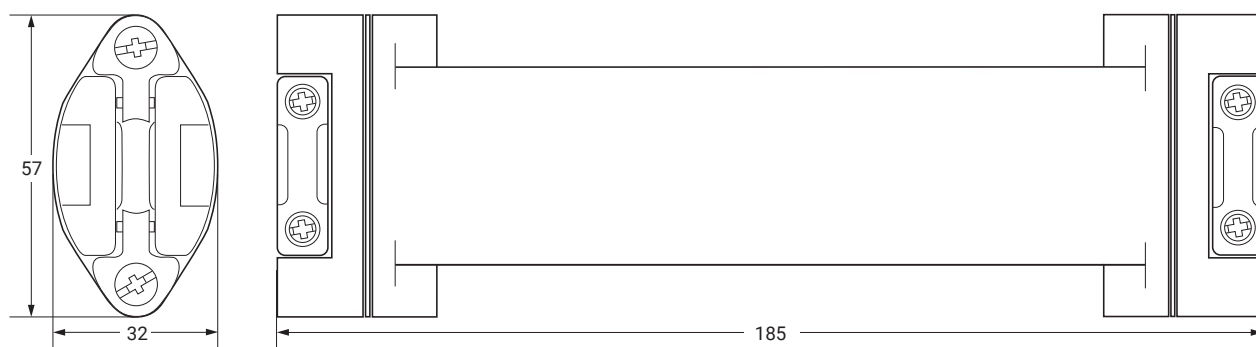
Kit contents

- 1 splice housing assembly including
 - 1 sealing grommet assembly for heater
 - 1 pressure plate/strain relief assembly
- 1 core sealer for heater
- 1 spacer including screw terminal
- 1 sealing grommet assembly for the power cable
- 1 pressure plate/strain relief assembly for the power cable
- 1 identification label
- 1 installation instruction



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Technical details

Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT
Power cable capability	For use with nVent RAYCHEM's high temperature power cable C-150-PC or for use with other flexible cable such as: H07RN-F, Silicone insulated cables. Minimum and maximum installation and operating temperatures, given by cable manufacturer, have to be considered by designer and installer.
Power cable dimension	-> outer diameter range 6.8 mm - 12.6 mm -> 3 stranded copper conductors (3 x 2.5 mm ² or 3 x 1.5 mm ²) -> temperature range depending on the application
Maximum power cable length	Depending on power cable voltage drop and maximum current for nVent RAYCHEM power cable C-150-PC (3 x 2.5 mm ²): CB 16 A 40 m CB 20 A 32 m CB 25 A 25 m
Ingress protection	IP66
Minimum installation temperature	-55°C
Maximum pipe temperature	Refer to heating cable specification
Maximum operating voltage	277 Vac
Maximum current rating	Depending on power cable and 40 A maximum

Construction materials

Housing, end plate, shim and spacer	Engineering polymers, black
Sealing grommets	Silicone rubber
Screws, compression spring	Stainless steel

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) Class I Zone 1

Temperature classification

Temperature classification is defined by the complete system.

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	C-150-E
PN (Weight)	073704-000 (0.4 kg/0.8 lb)
Pack size	1 bag

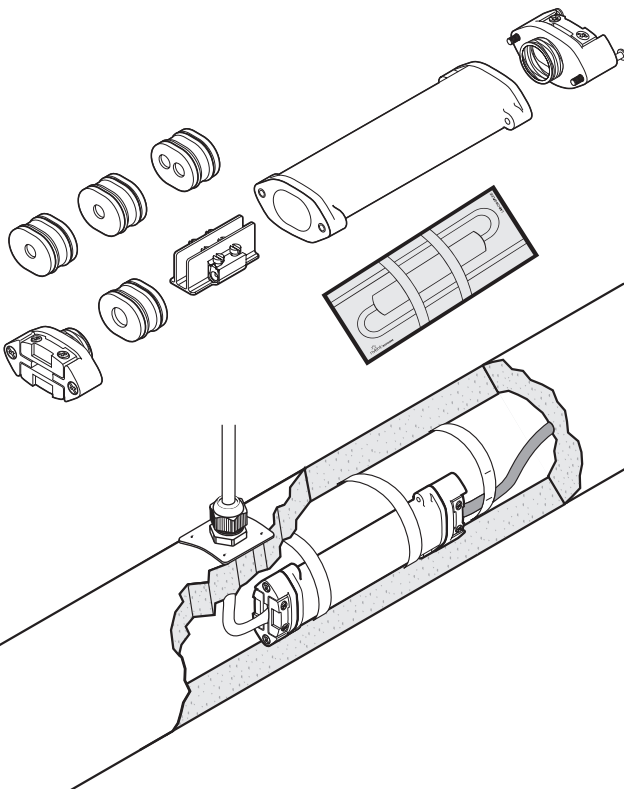
Accessories

Power cable	C-150-PC 3-core flexible power cable for connection to C-150-E, 3 x 2.5 mm ² , silicone insulation, temperature range: -40°C to +180°C, short term: 215°C
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Cold applied low profile power connection

PRODUCT OVERVIEW



The nVent RAYCHEM CS-150-UNI-PI is a universal low profile heating cable connector for the direct connection of single conductor Polymer Insulated (PI) series heating cables. It can be used in different configurations: for the connection of a cold lead to a heating cable (Variant C), as an under insulation connecting system for the connection of a three core power cable to a heating cable loop (Variant L), as well as for splicing two heating cables (Variant S).

The connector is certified for use in hazardous areas and doesn't require a hot work permit. The electrical connection is realized by means of screw terminals, so no special crimp tools are required. If used as a connection kit, an additional gland needs to be ordered separately.

Application

"Cold" applied connection/splice for a single conductor polymer insulated (PI) series heating cables with an external diameter between 3.2 and 6.4 mm. In hazardous area use only with ATEX approved heating cable.

The CS-150-UNI-PI can be used in different configurations:

- Connection of a heating cable to a cold lead cable 1 x 2.5 mm² or 1 x 4 mm² (Variant C)
- Connection of a heating cable to a power cable 3 x 2.5 mm² (Variant L)
- Splice of two heating cables (Variant S)

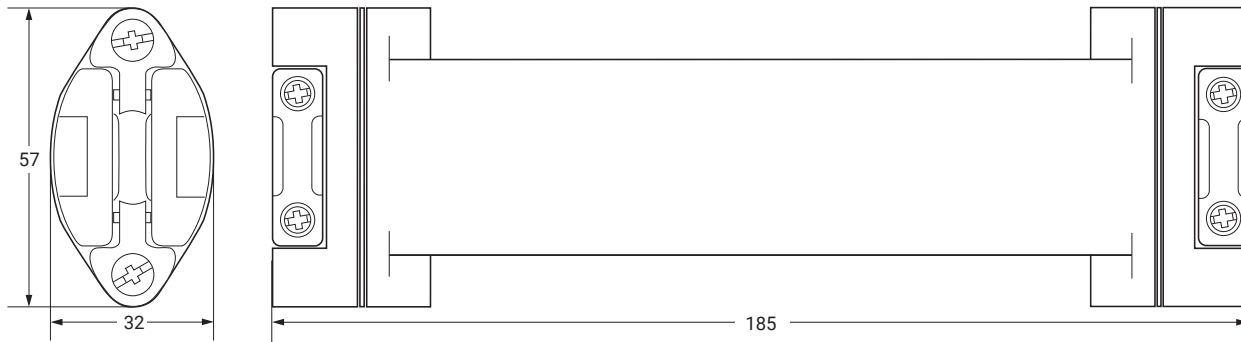
Kit contents

- 1 x temperature resistant and impact proof body
- 1 x screw terminal block
- 4 x rubber seals (to be used according to application)
- 2 x strain relieve clamps with screws
- 1 x identification label
- 1 x tube of lubricant
- 1 x installation instruction



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Heating cable types

Heating cable capability	XPI-F, XPI and XPI-S polymer insulated (PI) series resistance cable, for other types contact nVent.
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Materials of construction

Housing, connection	Glass fibre reinforced temperature resistant engineering plastic
Support ring, spacer, screws and spring	Stainless steel
Cable seals	Silicon rubber

Technical Details

Maximum operating temperature (*)	Power on: 180°C (may be limited by the temperature resistance of the supply cable) Power off: 200°C (using variant L, dependent on the type of supply cable e.g. 200°C for silicon cables, unless the power cable connection is bent sufficiently far away from the heated surface).
Minimum installation temperature	-50°C
Max. operating voltage	Variant C and S = 750 Vac Variant L = 420 Vac
Max. allowed wattage	The max. allowed cable output is limited depending on the application. Refer to the installation instruction for details.
Max. permitted nominal current (*)	Variant S: 32 A Variant C with 1 x 2.5 mm ² supply cable: 25 A Variant C with 1 x 4 mm ² supply cable: 32 A Variant L with 3 x 2.5 mm ² supply cable up to 150°C: 25 A Variant L with 3 x 2.5 mm ² supply cable 151°C to 180°C: 20 A

Supply cable dimensions

- Multi-stranded copper conductors 3 x 2.5 mm², Ø 6.8–12.6 mm
- Single conductor cold lead, max. 1 x 4 mm², Ø 3.2–6.4 mm

Supply cable requirements

The maximum permissible voltage drop is to be taken into consideration when selecting the cross-section of the power cable. The maximum working temperature of the CS-150-UNI-PI can be reduced through the maximum permitted continuous use temperature of the supply cable, unless the supply cable is laid (at a sufficient distance from the heated surface) so that the maximum permitted continuous use temperature will not be exceeded. A suitable power cable is the silicon insulated cable type C-150-PC.

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Particular measures to maintain the T-classification of polymer insulated heating cables are to be taken in accordance with the appropriate EC - Type examination certificate (also refer to installation instructions).

Type examination certification applies for the use of ATEX certified polymer insulated (PI) series heating cables.

The temperature class will depend on the system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference CS-150-UNI-PI

Part number (Weight) A45371-000 (0.4 kg)

(* For the full range of technical design details of the CS-150-UNI-PI refer to the installation instructions (INSTALL-064)

Accessories

Cable gland GL-55-M25 hazardous area approved gland for, 8–15 mm, up to –55°C

Glands for PI heaters C20-PI-PA-KIT Hazardous area approved gland, PA, up to –40°C

C20-PI-M0-KIT Hazardous area approved gland, Ni plated brass, up to –55°C
(to be used with boxes with integral earth plate or with earth lug)



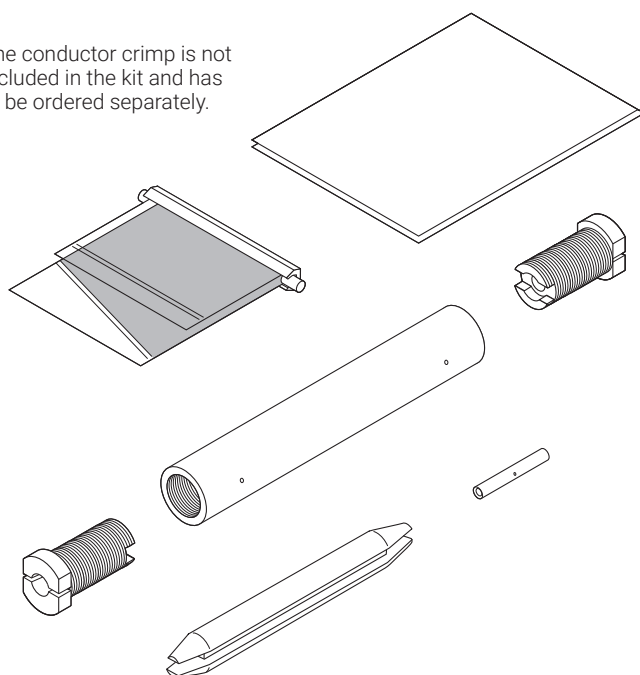
Components



Cold applied connection and splice kit with silicone sealing for Polymer Insulated (PI) heating cables

PRODUCT OVERVIEW

The conductor crimp is not included in the kit and has to be ordered separately.



The kits nVent RAYCHEM CS-150-xx-PI are designed to connect a PI cold lead cable to a polymer insulated (PI) series heating cable as well as to splice two PI heating cables. The kit employs a two component silicone compound to provide durable and flexible moisture proof encapsulation.

Electrical continuation is maintained via specially engineered crimps that provide a highly reliable electrical connection.

It is very important that the electrical crimp connections are performed with the correct crimp tool (PI-TOOL-xx).

Due to its low profile design, the connection can be easily installed under the insulation directly on the pipe. If used as a connection kit, a cable gland, an insulation entry kit as well as a crimp for the connection between the cold lead and the heating cable, need to be ordered separately. If used as a splice kit, just the heating cable conductor crimp is needed additionally.

For simplified installation- and maintenance work, we offer a crimp toolbox that contains the suitable installation tool, crimping dies and a variety of crimps exactly matching common cable types. For all details concerning the crimping system, refer to the datasheet of the electrical connection system for PI heating cables (PI-TOOL-SET-xx).

Application

Cold applied silicone sealed connection/splice for PI heating cables.

Kit contents

- 1 x PTFE body
- 2 or 3 x PTFE plugs (depending on kit)
- 1 x PTFE crimp separator
- 1 x two component silicone compound in plastic bag (shelf life is 12 months)
- 2 x braided crimps
- 1 x identification label
- 1 x multilingual installation instruction

PRODUCT SPECIFICATIONS

Dimensions (in mm)

CS-150-2.5-PI: Overall length ~120 mm, Ø ~17 mm

CS-150-6-PI: Overall length ~120 mm, Ø ~26 mm

CS-150-25-PI: Overall length ~135 mm, Ø ~35 mm

Technical details

	CS-150-2.5-PI	CS-150-6-PI	CS-150-25-PI
Max. operating temperature	200°C continuous, (260°C intermittent)		
Min. installation temperature	-50°C		
Max. operating voltage (U0/U)	450/750 Vac nominal		
Max. operating current	Only limited by heating cable used		
Cable/Cold leads	Up to 2.5 mm ²	4 to 6 mm ²	10 to 25 mm ²

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

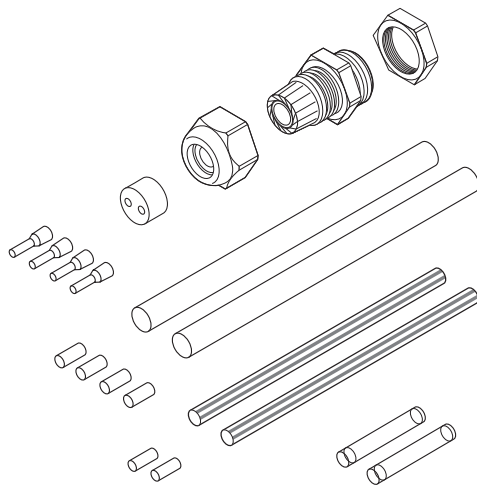
Order reference	CS-150-2.5-PI	CS-150-6-PI	CS-150-25-PI
Part number (Weight)	1244-000586 (0.1 kg)	1244-000588 (0.2 kg)	1244-000587 (0.3 kg)

Accessories

Cable gland for PI connection kit (one per piece of cold lead connection; to be ordered separately)	C20-PI-PA-KIT Hazardous area approved gland, PA, up to -40°C
	C20-PI-M0-KIT Hazardous area approved gland, Ni plated brass, up to -55°C (to be used with boxes with integral earth plate or with earth lug)

Heat-shrink connection or splice kit for PI heating cables

PRODUCT OVERVIEW



The nVent RAYCHEM CS20-2.5-PI-NH kit is designed for terminating polymer insulated (PI) series resistance heating cables.

The CS20-2.5-PI-NH may be used in non-hazardous areas only. The kit contains components required for the installation of either: a connection of (2) cold leads- to a heating cable or for (2) splices between two heating cables. The splice kit employs easy to use heat shrinkable tubing that after installation forms a semi-flexible moisture proof encapsulation. Electrical continuation is maintained via crimps for both conductor and braid. Thanks to its low profile design the finished connection can be easily installed under the insulation directly on the pipe. The kit is designed for use with junction boxes with M20 entries.

Each CS20-2.5-PI-NH kit contains 2 connection sets. The crimps must be installed using an appropriate crimp tool (CW-CT-KIT or equivalent).

Application

Heat shrink based connection/splice kit for single core polymer series resistance heating cable. Only use with PTFE sheathed cables (XPI and XPI-S).

Kit contents

- 4 x heat shrinkable tubes (PTFE/FEP)
- 2 x green/yellow tube for the braid
- 6 x crimp connectors (crimp for conductor and braid)
- 1 x polyamide gland with dual hole sealing grommet M20 threaded, suitable for cables ranging from 4.8 to 7 mm diameter
- 1 x installation instruction

PRODUCT SPECIFICATIONS

Dimensions

Overall length ~130 mm, \varnothing ~10 mm

Technical data

Max. cold lead size	2,5 mm ²
Max. operating temperature	205°C
Min. installation temperature	-50°C
Max. operating voltage	750 Vac
Max. operating current	25 A



APPROVALS

For use in ordinary area only.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Order reference	CS20-2.5-PI-NH
Part number (Weight)	1244-000585 (0.1 kg)

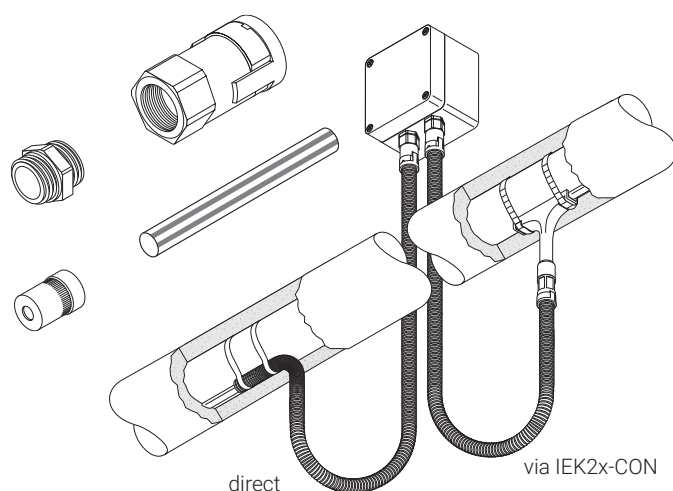


Components



Cold applied conduit connection kit

PRODUCT OVERVIEW



This connection kit is designed for terminating the full range of nVent RAYCHEM XPI polymer insulated series heating cables and cold leads in to a junction box, as well as providing a reliable and sealed connection to a conduit system.

It is approved for use in hazardous locations. The conduit system will provide supplementary mechanical protection of the heating cable or cold lead between a junction box and the entry into the insulation. The conduit connection is fast and reliable and allows simple installation whilst maintaining at all time an IP66 seal.

The kit can be used with various types of conduits which can be cut-to-length as required in the field. The kit exists in three different versions, depending on the outer diameter of the heating cable or cold lead to protect. The conduit and possibly required insulation entry kit need to be purchased separately.

Application

Connection kit with conduit adaptors for 2 PI series heating cables or cold lead cables

Kit contents

- 2 metal gland bodies,
- 2 conduit adaptors including safety retention clip,
- 2 grommets,
- 2 green/yellow tubes for braid,
- 1 installation instruction (multilingual)

PRODUCT SPECIFICATIONS

Dimensions

	CCON20-100-PI-A	CCON20-100-PI-B	CCON20-100-PI-C
PI cable diameter range	4.0 – 6.5 mm	6.5 – 9.5 mm	9.5 – 13 mm

Technical details

Thread size	M20 x 1.5
Conduit compatibility	ND 17 mm, nVent RAYCHEM conduits type CCON20-C.....
Ambient temperature	-55°C to +40°C
IP ingress protection rating	IP66
Surface resistance	< 1 GΩ according to the requirements of EN 60079-0 and EN 61241-0 for use in hazardous areas

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	CCON20-100-PI-A	CCON20-100-PI-B	CCON20-100-PI-C
PN (Weight)	1244-003274 (0.1 kg)	1244-003276 (0.1 kg)	1244-003278 (0.1 kg)

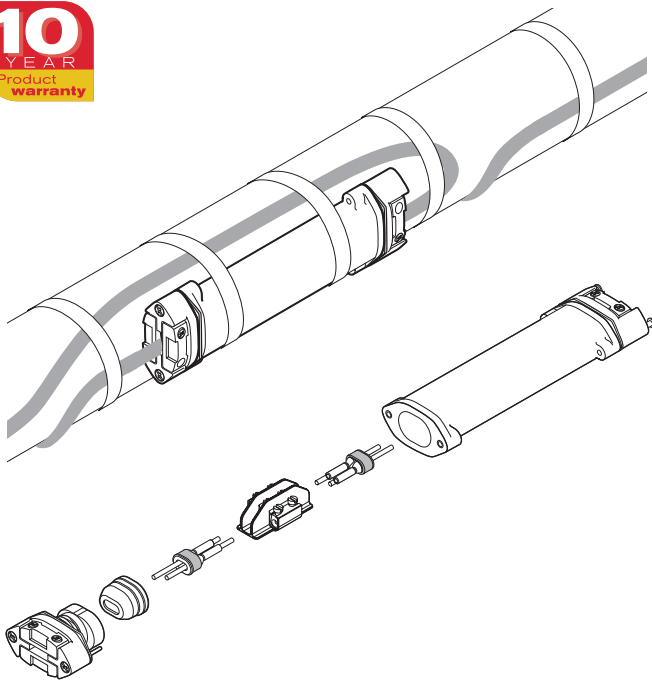
Accessories

For suitable conduits and insulation entry kits refer to the datasheet for CCON2x-C...



Cold applied under insulation low profile splice

PRODUCT OVERVIEW



The nVent RAYCHEM S-150 is a cold applied low profile splice for in-line connection. This universal kit fits with all nVent RAYCHEM industrial heating cables, BTV, QTVR and XTVR, meaning simplified product selection and reduced inventory to stock. It can be used in applications with temperatures ranging from -55°C to 200°C . It is approved for use in hazardous areas.

The unique design of the S-150 suits the demanding requirements of the industrial environment. The low profile housing can be installed on pipes and other surfaces. Spring loaded grommets make a first seal to maintain a water tight connection while the non-curing sealant (silicone free) used in nVent RAYCHEM's core sealer adds a second seal, providing additional protection. The rugged construction of the splice makes it resistant to impact and suitable for high temperature variations and aggressive chemical exposure. The connection is made using screw terminals. The splice is re-enterable. The S-150 is a safe under the insulation in-line splice that can be relied upon over time.

The splice requires no heat source for installation, making maintenance work fast and easy. Each kit contains all the necessary materials to do one in-line splice connection.

Description

Cold-applied in-line splice kit for use with BTV, QTVR and XTVR heating cables.

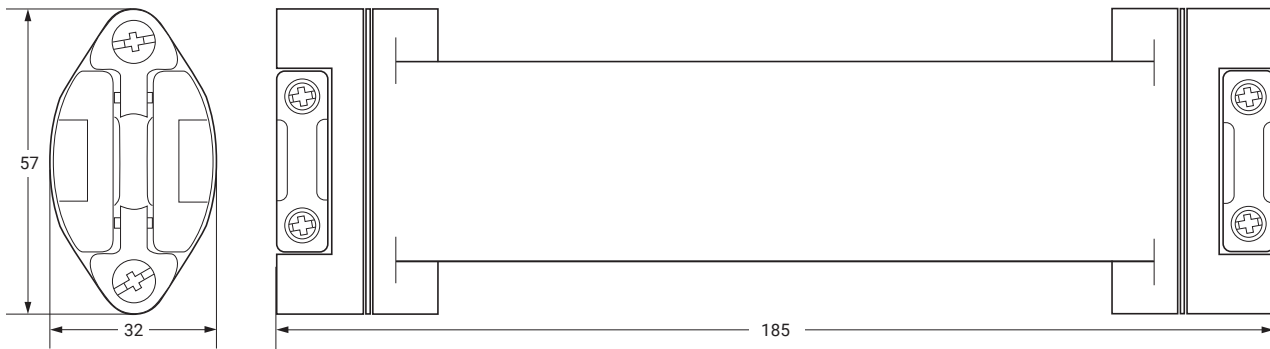
Kit contents

- 1 splice housing
- 2 sealing grommets
- 2 core sealers
- 1 spacer including screw terminals
- 1 identification label



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Technical details

Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT
Ingress protection	IP66
Minimum installation temperature	-55°C
Maximum pipe temperature	150°C POWER ON and 200°C POWER OFF
Connection method	Screw terminals
Maximum operating voltage	277 Vac
Maximum current rating	40 A heating cable circuit

Materials of construction

Housing, end plate, shim and spacer	Engineering polymers, black
Sealing grommets	Silicone rubber
Screws, compression spring	Stainless steel

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust).
Class I Div 2 and Class II, Div 2

Temperature classification

Temperature classification is defined by the complete system

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

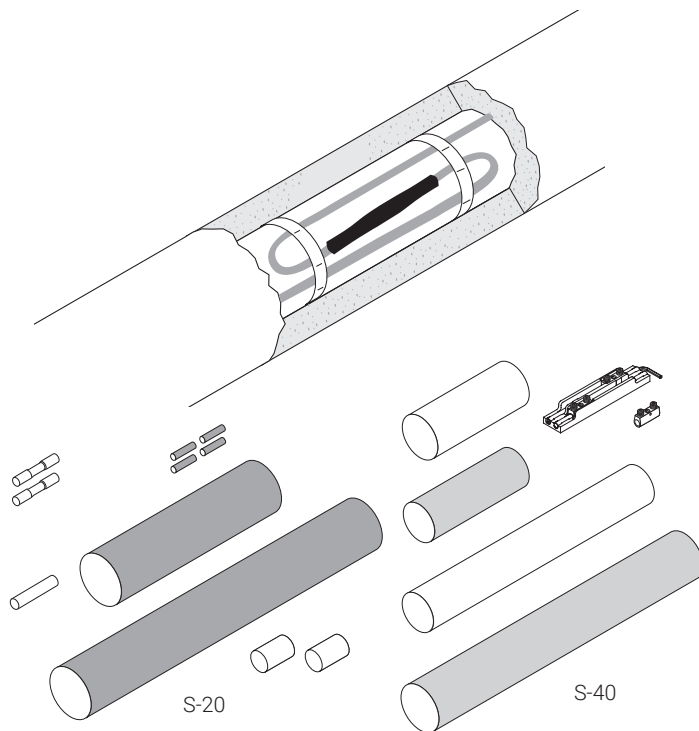
Splice connection	S-150
PN (Weight)	497537-000 (0.4 kg/0.8 lb.)

S-20 and S-40

CONNECT AND PROTECT

Heat-shrink under insulation in-line splice kit

PRODUCT OVERVIEW



These splice kits are designed for the in-line joining of nVent RAYCHEM BTV, QTVR, XTVR, HTV and VPL self-regulating heating cables.

The nVent RAYCHEM S-20 kit is designed for use with BTV and QTVR heating cables and the S-40 kit is for use with XTVR, HTV and VPL heating cables.

All kits are approved for use in hazardous areas.

The splice kits employ easy to use heat-shrinkable tubing with an adhesive, that when heated, forms a semi-flexible moisture proof encapsulation. The S-40 kit is supplied with a removable caddy to make the installation quick and easy.

The S-20 kit uses crimp electrical connections, while the S-40 kit utilizes screw terminals.

Due to their low profile designs, the finished splices can be installed under the insulation, directly on the pipe.

Application

	S-20	S-40
	In-line splice kit for BTV and QTVR heating cables	In-line splice kit for XTVR, HTV and VPL heating cables

Kit contents

	Heat shrinkable sleeves Crimp splice connectors	Heat shrinkable sleeves, with installation aid, screw terminals and an allen (hex) wrench
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PRODUCT SPECIFICATIONS

Technical details

	S-20	S-40
Maximum exposure temperature	110°C (230°F)	260°C (500°F)
Maximum current rating	35 A (with QTVR cables)	
Final dimensions	Length approximately 180 mm (7 inches) Diameter approximately 20 mm (0.8 inches)	Length approximately 300 mm (11.8 inches) Diameter approximately 20 mm (0.8 inches)
Minimum ambient temperature	-60°C (-76°F)	-60°C (-76°F)

Installation details

Gas torch or equivalent	Minimum 1460 W hot air gun	Minimum 3000 W hot air gun
Minimum installation temperature	-20°C (-4°F)	-60°C (-76°F)

APPROVALS

For use in ordinary and hazardous area Zone 1 (Gas), Zone 21 (Dust) and Div 2

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

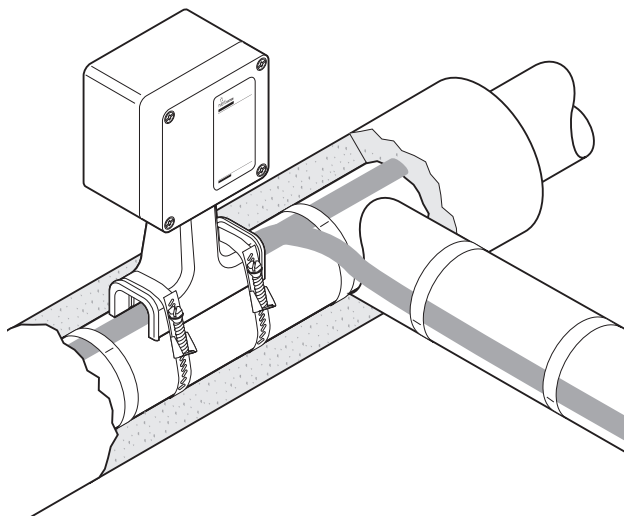
Part description	S-20	S-40
PN (Weight)	1244-022490 (0.05 kg)	1244-022492 (0.11 kg)

The installation of the S-40 requires a high power heat gun and an experienced installer.



Splice or tee connection kit

PRODUCT OVERVIEW



The nVent RAYCHEM T-100 is an above-insulation splice or tee kit, designed for use with up to three nVent RAYCHEM BTV, QTVR, XTVR, HTV or VPL industrial parallel heating cables. It is approved for use in hazardous locations.

The rugged stand protects the heating cable and allows for up to 100 mm (4") of thermal insulation.

The core sealing boot does not require a heat gun or torch for the installation (no hot work permit necessary).

The non-curing sealant (silicone free) in the boot allows easy installation and facilitates maintenance.

The T-100 significantly reduces installation and maintenance time and effort.

Description

This kit is an above-insulation splice/tee, appropriate for use worldwide with no requirements for local customization.

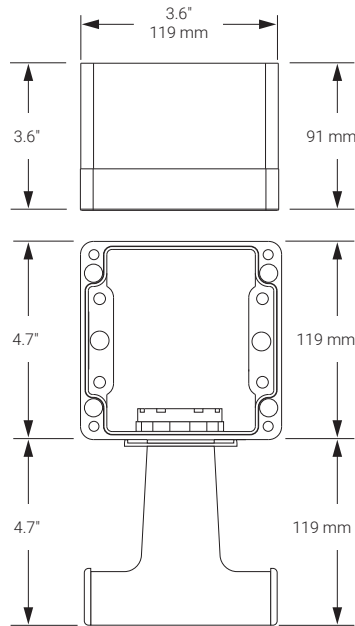
Kit contents

- 1 splice/tee enclosure and lid
- 1 stand assembly
- 3 core sealers
- 3 green/yellow earthing sleeve
- 3 compression crimps
- 3 crimping insulating tubes
- 1 polywater sachet
- 1 spanner
- 1 strain relief assembly
- 2 grommet plugs
- 1 installation instruction



PRODUCT SPECIFICATIONS

Dimensions (nominal)



Technical details

Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT, HTV-CT, VPL
Ingress protection	NEMA Type 4X IP66
Min. installation temperature	-55°C
Max. pipe temperature	Refer to heating cable specification
Ambient temperature range:	-55°C to +56°C
Max. operating voltage	277 Vac for FM, CSA, 480 Vac for PTB
Max. continuous operating current	50 A heating cable circuit for NEC/CEC as approved by CSA and FM 40 A heating cable circuit for IEC as approved by PTB

Materials of construction

Enclosure, lid, and stand	Electrostatic charge-resistant glass-filled engineered polymer, black
Lid screws	Stainless steel
Lid gasket	Silicone rubber

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) and Class I Div 2 (Groups A, B, C, D), Class II Div 1 (Groups E, F, G) and Class III

Temperature classification

Temperature classification is defined by the complete system.

Product certification



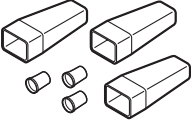
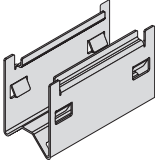
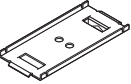
For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	T-100
PN (Weight)	447379-000 (2.5 lb /1.2 kg)

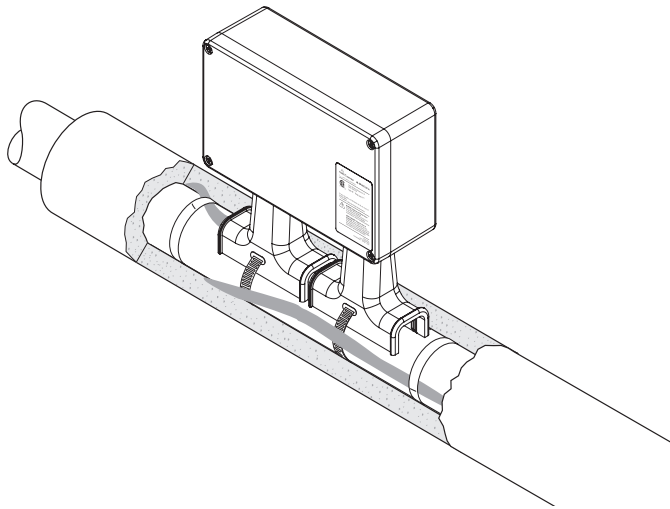
Accessories

Crimp tool	T-100-CT (not included in the kit, equivalent to Panduit: CT-1570)	
	PN	954799-000
		T-100-CRIMP-KIT (spare part only)
Spare crimps and insulating tubes 	T-100-CRIMP-KIT (spare part only)	
	PN	577853-000
Junction box standoff 	For insulation thickness >100 mm & ≤150 mm *	
	Catalog number	JBM-100-STANDOFF
	Part number	P000003624
	Weight	0.599 lb / 272 g
	* Consider extra pipe strap length 6-9" (150-225 mm) for attachment	
Small pipe adapter 	Required for stand on pipes ≤1"	
	Catalog number	JBM-SPA
	Part number	D55673-000
	Weight	0.930 lb / 422 g (Bag of 5 adaptors)

Integrated junction box for direct connection of XPI heaters

PRODUCT OVERVIEW

JB-SPLICE-PI-E



The nVent RAYCHEM JB-SPLICE-PI-E kit is designed to splice nVent RAYCHEM XPI industrial series heating cables directly without the use of cold leads and with certain power and current restrictions.

The system is approved for hazardous areas and integrates the function of connection kits, cold leads and insulation entry kits. This simplifies the Bill of Materials and actual installation by eliminating the need for special tools or craft sensitive connections.

The XPI heating cables are directly connected into spring-type terminals to provide a fast, reliable and maintenance free operation. This connection system significantly reduces installation time.

The design validation depends on cable type, power and temperature and is captured in our design software packages such as TraceCalc Pro.

Application

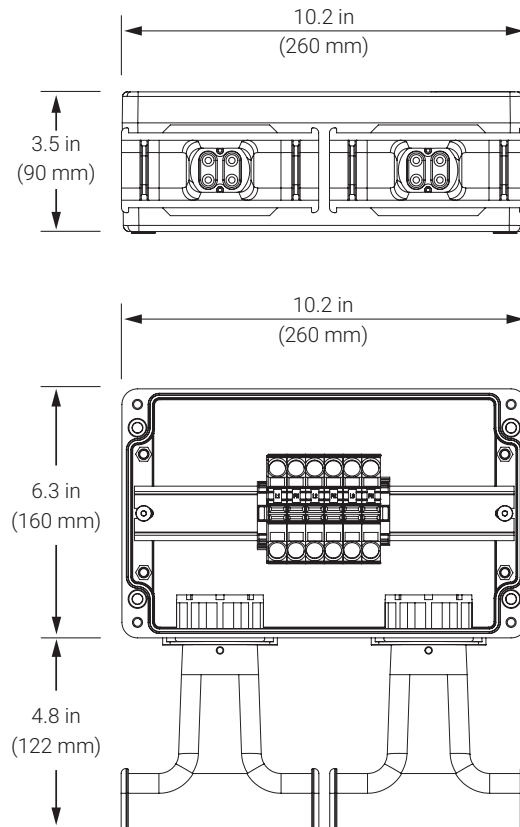
This kit is for use in regions adhering to the IEC standards and allows the splicing of both monophasic or triphasic circuits with nVent RAYCHEM XPI series cables of type XPI-(S-)1000 up to XPI-(S-)1.8 without the use of cold leads.

Kit contents

- 1 junction box with spring-type terminals
- 2 stand assemblies
- 6 green/yellow earthing sleeves
- 4 sealing pins
- 4 grommets (2 premounted for small cables, 2 for large cables)
- 1 stand wrench
- 2 strain relief assemblies
- 1 polywater sachet

PRODUCT SPECIFICATIONS

Dimensions (Nominal)



Technical details

Heating cables	XPI-1000 up to XPI-1.8 XPI-S-1000 up to XPI-S-1.8 (XPI-F not allowed)
Ingress protection	IP66
Ambient temperature range	-55°C up to +56°C
Minimum installation temperature	-55°C
Max continuous pipe temperature	160°C*
Terminals	16 mm ² Spring-type terminals (terminal configuration & types cannot be altered w/o consulting nVent)
Max conductor size	16 mm ² stranded and solid
Max operating voltage	550 Vac
Max continuous operating current	45 A*
Max start-up current	70 A*

* Different current and power restrictions apply for different ambient temperatures, pipe temperatures and cable types. Use nVent design software packages to validate the usage for your application.

Materials of construction and weight

Enclosure, lid and stand	Electrostatic charge resistant glass-filled engineered polymer (Black)
Lid screws	Stainless steel (captive screws)
Lid gasket	Silicone rubber
Weight	2.7 kg

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust).

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING DETAILS

Part description	JB-SPLICE-PI-E
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PN	P000004430
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Accessories

Small pipe adaptor	JBM-SPA, required for pipes ≤ 1 " (DN 25) (bag of 5 adaptors). Requires 2 pieces per junction box
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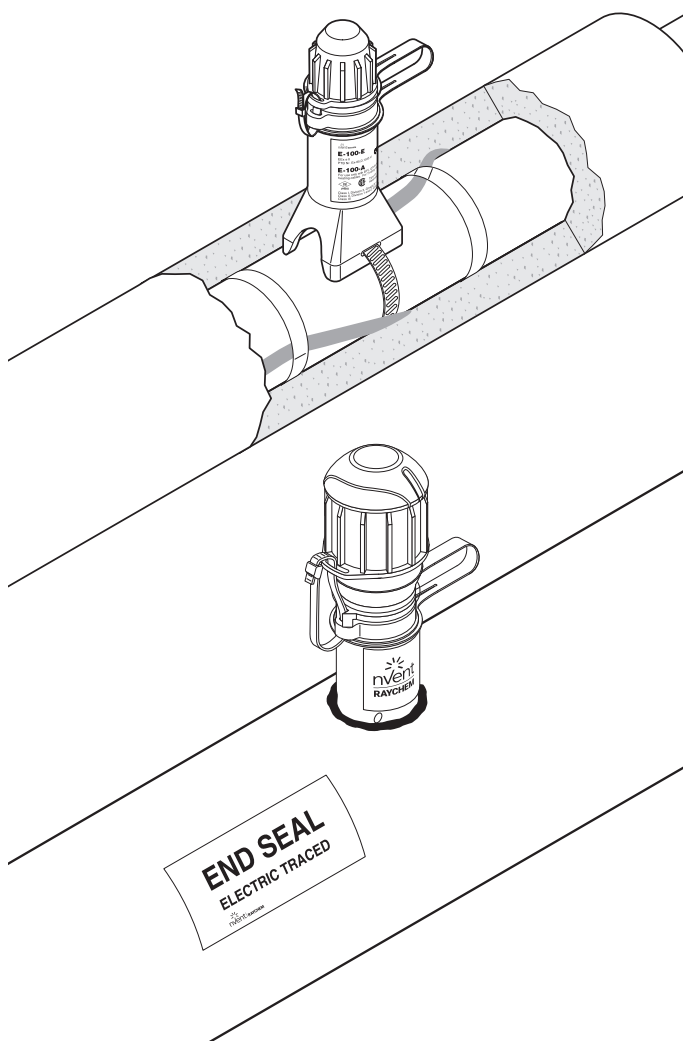


E-100-E and E-100-L-E

CONNECT AND PROTECT

End seal and lighted end seal

PRODUCT OVERVIEW



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTVR, HTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

Kit contents

	E-100-E	E-100-L-E
	1 end seal 1 cable tie 1 polywater sachet 1 installation instruction	1 end seal with indicator light 1 cable tie 1 polywater sachet 2 insulated parallel crimps 1 core sealer 1 installation instruction



PRODUCT SPECIFICATIONS

Technical details

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	277 V* (480 V VPL4 only)	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	-55°C to +56°C*	-40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the certificate or installation instructions for full details.	
Min. installation temperature	-55°C	-40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

Light source

	E-100-E	E-100-L-E
Type		Green LEDs
Voltage rating range		110-277 Vac, 50/60 Hz
Power consumption		< 2 W
Electromagnetic immunity/emissions		Complies with IEC61000-6 and IEC61000-4

Installation data

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers
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APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust) Class I Div 2, Class II Div 1 and 2, and Class III

Temperature classification

Temperature classification is defined by the complete system.

Product certification

Present logos of available certificates



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

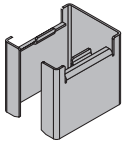
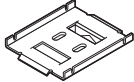
More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

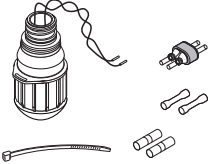
End seal

Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied)

Accessories

	For insulation thickness >100 mm & ≤150 mm *	
	Catalog number	JBS-100-STANDOFF
	Part number	P000003408
	Weight	0.297 lb / 135 g
	* Consider extra pipe strap length 6-9" (150-225 mm) for attachment	
	Required for stand on pipes ≤1"	
	Catalog number	JBS-SPA
	Part number	E90515-000
	Weight	0.408 lb / 185 g (Bag of 5 adaptors)

Spare part

	Part description	E-100-BOOT-5-PACK
	PN (Weight)	281053-000 (140 g)
	Pack size	5 sealant filled boots and 5 cable ties
	Part description	E-100-LR-E
	PN (Weight)	P000001586 (450 g)

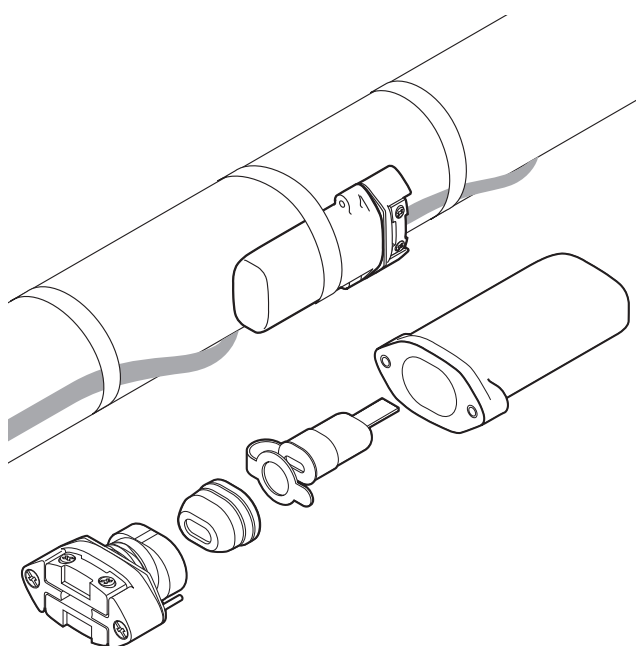


E-150

CONNECT AND PROTECT

Low profile end seal-cold applied

PRODUCT OVERVIEW



The nVent RAYCHEM E-150 is a cold applied low profile end seal. This universal end seal is designed to fit with all nVent RAYCHEM industrial self-regulating heating cables; BTV, QTVR and XTVR meaning simplified product selection and reduced inventory to stock. It can be used in applications with temperatures ranging from -55°C to $+200^{\circ}\text{C}$. It is approved for use in hazardous areas.

The unique design of the E-150 suits the demanding requirements of the industrial environment. The low profile housing can be installed on pipes and other surfaces. A spring loaded grommet makes a first seal to maintain a water tight connection while the non-curing sealant (silicone free) used in nVent RAYCHEM's core sealing boot adds a second seal, providing additional protection. The rugged construction of the end seal makes it resistant to impact and suitable for high temperature variations and aggressive chemical exposure. The end seal is re-enterable. The E-150 design provides a safe under the insulation end seal that can be relied upon over time.

The end seal requires no heat source for installation, making maintenance fast and easy. Each kit contains all the necessary materials to do one end termination.

Description

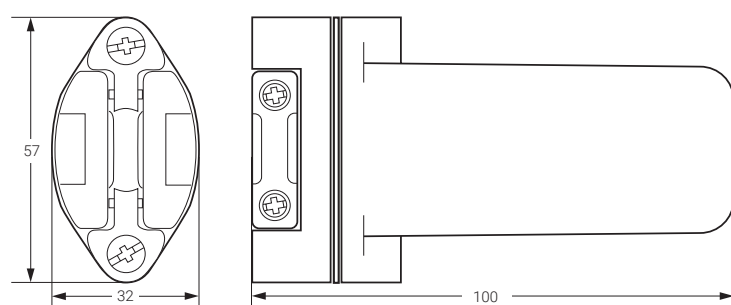
Cold applied end seal for use with BTV, QTVR and XTVR heating cables.

Kit contents

- 1 end seal enclosure housing
- 1 sealing grommet assembly
- 1 core sealing boot
- 1 identification label
- 1 installation instruction

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Technical details

Heating cable capability	BTV-CR, BTV-CT, QTVR-CT, XTVR-CT
Ingress protection	IP66
Minimum installation temperature	-55°C
Maximum pipe temperature	150°C POWER ON and 200°C POWER OFF
Operating voltage	277 V

Materials of construction

Enclosure, end plate, and shim	Engineering polymers, black
Sealing grommet and core sealer	Silicone rubber
Screws, compression spring, reinforcement plate	Stainless steel

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)
Class I Div 2, Class II Div 2, Class III

Temperature classification

Temperature classification is defined by the complete system.

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

End seal	E-150
PN (Weight)	979099-000 (0.3 kg/0.6 lb.)

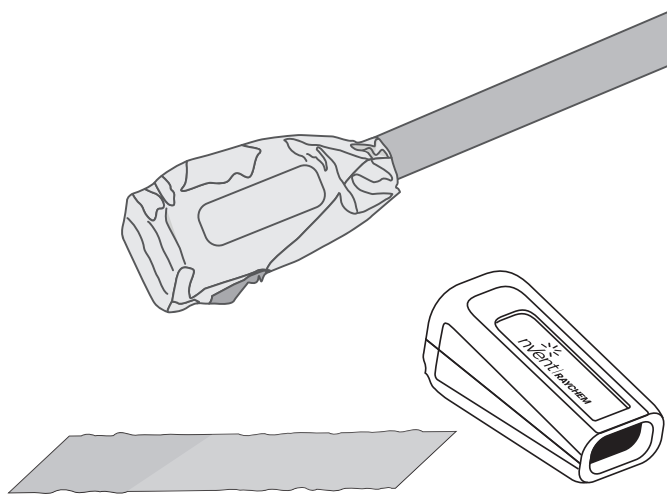


E-02-AL

CONNECT AND PROTECT

Cold applied end seal kit

PRODUCT OVERVIEW



nVent RAYCHEM End Seal E-02-AL is a cold applied end seal kit for termination of nVent RAYCHEM BSA heating cables in ordinary (non-hazardous) area.

This kit is quick and easy to install without the need of a heat gun.

Kit content

- 1 x end seal with gel filling
- 1 x protective aluminium tape

PRODUCT SPECIFICATIONS

Rated voltage	230 Vac
Ingress protection	IP68
Min installation Temp	-20°C
Max maintain or continuous exposure T (power on)	65°C
Max exposure T (power off)	85°C
Material	Grey polymer

APPROVALS

For use in ordinary area

Product certification



ORDER INFORMATION

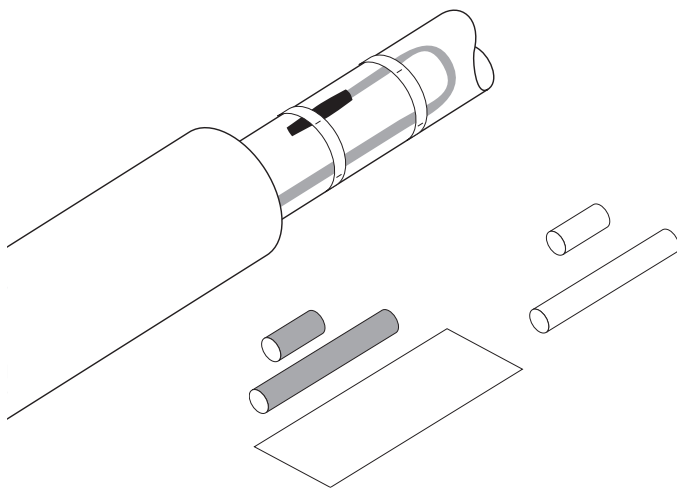
Part description	E-02-AL
Part number (weight)	1244-020913 (0.03 kg)

E-20 and E-40

CONNECT AND PROTECT

Heat-shrink under insulation end seal kits

PRODUCT OVERVIEW



These end seal kits are designed for the termination of nVent RAYCHEM BTV, QTVR, XTVR, HTV and VPL self-regulating heating cables.

The nVent RAYCHEM E-20 is designed for use with BTV and QTVR heating cables and the nVent RAYCHEM E-40 is designed for use with XTVR, HTV and VPL heating cables. All kits are approved for use in hazardous areas.

The end seal kit E-20 employs easy to use heat-shrinkable tubing with an adhesive, that when heated forms a semi-flexible moisture proof encapsulation. The end seal kit E-40 employs high temperature heat-shrinkable tubing with a plastic melt liner that when heated forms a semi-flexible moisture proof encapsulation. Due to the low profile design, the finished termination can be installed directly on the pipe.

One end seal kit is required for each termination.

Application

	E-20	E-40
	End seal for BTV and QTVR self-regulating heating cables	End seal for XTVR and HTV self-regulating and VPL power-limiting heating cables

Kit contents

	Heat-shrinkable adhesive coated sleeves Installation instruction Aluminum tape	Heat-shrinkable sleeves Installation instruction
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PRODUCT SPECIFICATIONS

Technical details

	E-20	E-40
Maximum exposure temperature	110°C (230°F)	260°C (500°F)
Final dimensions	Length approximately 120 mm Diameter approximately 20 mm	Length approximately 120 mm Diameter approximately 20 mm
Minimum ambient temperature	-60°C (-76°F)	-60°C (-76°F)

Installation details

Gas torch or equivalent	Minimum 1460 W hot air gun	Minimum 3000 W hot air gun
Minimum installation temperature	-20°C (-4°F)	-60°C (-76°F)

APPROVALS

For use in ordinary and hazardous area Zone 1 (Gas), Zone 21 (Dust) and Div 2

Temperature classification

Temperature classification is defined by the complete system.

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

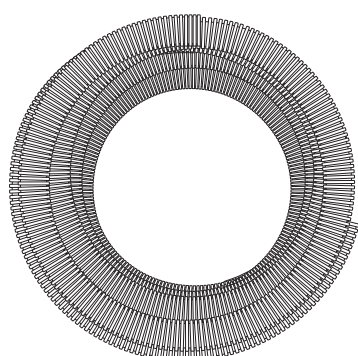
Part description	E-20	E-40
PN (Weight)	1244-022489 (0.03 kg)	1244-022491 (0.06 kg)

The installation of the E-40 requires a high power heat gun and an experienced installer.

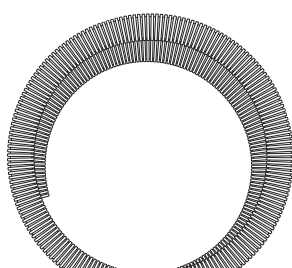


Conduit for protection of heating cables

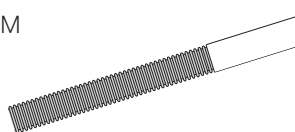
PRODUCT OVERVIEW



CCON2x-CxT-25M



CCON2x-CMT/HT



These conduits have been designed for use in combination with the conduit connection kits nVent RAYCHEM CCON2x-100-... They provide supplementary mechanical protection of the heating cable or cold lead between a junction box and the entry into the insulation. The conduit materials have been selected to meet the requirements for use in hazardous locations.

The resistance of the conduits to fuels, mineral oils, fats, alkalis, acids and bases is excellent.

The conduits can be cut-to-length as required in the field and can either be entered in the insulation directly or by use of an insulation entry kit.

Application

Conduit for protection of heating cables

Kit content

	M20	M25
	CCON20-CHT-...	CCON25-CHT-...
Pipe stands	2	1
Conduit connectors	2	1
Pipe straps	Pipe straps need to be ordered separately	Pipe straps need to be ordered separately

PRODUCT SPECIFICATIONS

Technical details

	M20	M25
	CCON20-CHT-...	CCON25-CHT-...
Medium temperature conduit (150°C)		
Conduit size	ND 17 mm	ND 23 mm
Outer diameter (nominal)	21.2 mm	28.5 mm
Bending radius (static)	40 mm	45 mm
Weight (kg/100 m)	5.7	9.9
Material	Modified polyamide	
Temperature range (continuous)	-40°C to +135°C (compatible with surface temperature of all heating cables)	
Exposure temperature	150°C (3000 h intermittent, cumulative)	
Impact strength	Minimum 6 J @ -40°C (empty conduit), min. 7 J with all heating cables	
Flame class	HB as per UL 94	

	M20	M25
	CCON20-CHT-...	CCON25-CHT-...
High temperature conduit (260°C)		
Conduit size	ND 17 mm	ND 23 mm
Outer	21.1 mm	28.8 mm
Bending radius (static)	15 mm	26 mm
Weight (kg/100 m)	8.3	14.8
Material	PFA	
Temperature range	-200°C to +260°C	
Impact strength	Minimum 2.5 J (empty conduit), min. 7 J with all heating cables	
Flame class	V0 as per UL 94	

Combined medium and high temperature conduit

	Ideal for direct entry into cladding for high pipe temperatures.	1.67 m length of medium temperature conduit for connection to the junction box connected to 33 cm of high temperature conduit for connection to the hot surface.
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APPROVALS

For use in ordinary and hazardous area Zone 1 / Zone 21 and Zone 2 / Zone 22 (Gas and Dust)

Temperature classification

Temperature classification is defined by the complete system

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Conduit size	ND 17 mm	ND 23 mm
Pack of 2 m of medium temperature conduit	CCON20-CMT-2M (PN: 1244-003286/Weight: 0.12 kg)	CCON25-CMT-2M (PN: 1244-003281/Weight: 0.20 kg)
Pack of 25 m of medium temperature conduit	CCON20-CMT-25M (PN: 1244-003285/Weight: 1.44 kg)	CCON25-CMT-25M (PN: 1244-003280/Weight: 2.25 kg)
Pack of 2 m of high temperature conduit	CCON20-CHT-2M (PN: 1244-003289/Weight: 0.16 kg)	CCON25-CHT-2M (PN: 1244-003284/Weight: 0.28 kg)
Pack of 25 m of high temperature conduit	CCON20-CHT-25M (PN: 124-003288/Weight: 2.24 kg)	CCON25-CHT-25M (PN: 1244-003283/Weight: 3.90 kg)
1 pc of combination med./high temperature conduit (1.67 m medium temperature with 0.33 m high temperature)	CCON20-CMT/HT-1.67/0.33M (PN: 1244-003475/Weight: 0.135 kg)	CCON25-CMT/HT-1.67/0.33M (PN: 1244-003474/Weight: 0.24 kg)

Accessories

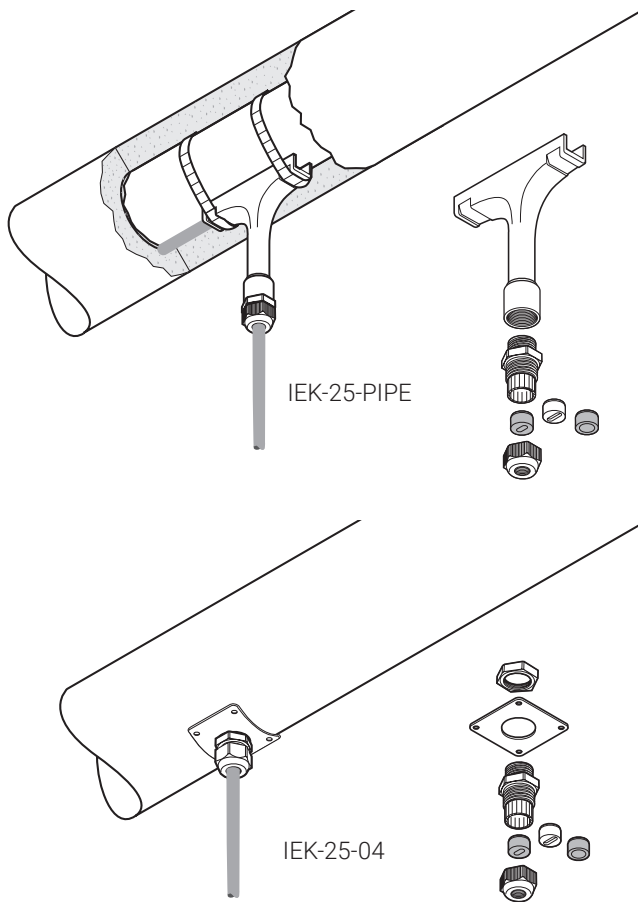
Insulation entry kit comprising of pipe stand with conduit connection system	IEK20-CON (PN: 1244-003291)	IEK25-CON (PN: 1244-003290)
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IEK-25-PIPE and IEK-25-04

CONNECT AND PROTECT

Insulation entry kit

PRODUCT OVERVIEW



Insulation entry kits are designed to protect cables when passing through the thermal insulation cladding. The IEK's are suitable for all type of parallel heating cables as well as power cables. Insulation entry kits may be used in hazardous and non hazardous areas.

The gland and the grommet provided in the kit provide strain relief and environmental sealing to avoid water ingress in the insulation.

The nVent RAYCHEM IEK-25-PIPE contains a protective guiding tube which is fixed to the pipe and allows the heat-tracing installation to be completed independently from the insulation work. The nVent RAYCHEM IEK-25-04 contains a stainless steel plate which can be screwed to the cladding.

Insulation entry kits can be used for installations on pipes, tanks and vessels etc.

Application

IEK-25-PIPE	IEK-25-04
Insulation entry kit for pipe mounting for heating- and power cables with an outside diameter in the range of 8 to 17 mm. Kit contains 1 pc.	Insulation entry kit for pipes, tanks and vessels. Usable for all types of polymer heating cables and power cables with an outside diameter in the range of 8 to 17 mm. Kit contains 1 pc.

Kit contents

1 x polymer "T" Tube 1 x plastic gland (M25) with round hole grommet for power cables 1 x bag with 2 silicon grommets for heating cables	1 x stainless steel fixing plate 1 x plastic gland (M25) with round hole grommet for power cables 1 x bag with 2 silicon grommets for heating cables 1 x locknut
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PRODUCT SPECIFICATIONS

Dimensions

Height	135 mm
Width	120 mm
Plate	60 x 60 mm (22SWG)

Technical details

	IEK-25-PIPE	IEK-25-04
Max. exposure temp.		
gland	110°C	110°C
tube	260°C	–

APPROVALS

For use in ordinary area

Product certification



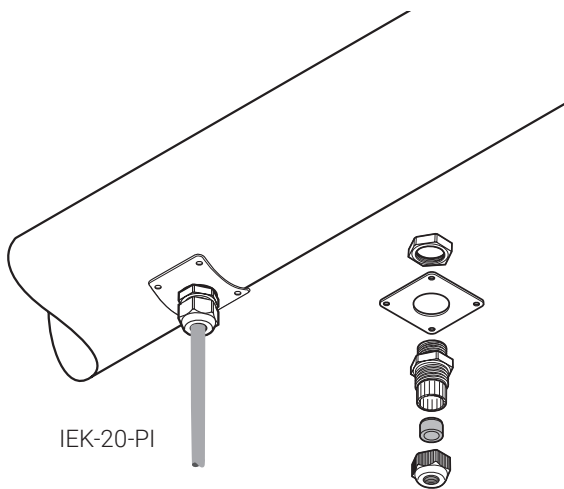
ORDERING INFORMATION

Part number (Weight)	1244-001050 (0.13 kg)	332523-000 (0.06 kg)
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Insulation entry kit

PRODUCT OVERVIEW



Insulation entry kits are designed to protect cables when passing through the thermal insulation cladding.

The nVent RAYCHEM IEK-20-PI is suited for PI heating cables as well as for power cables.

Insulation entry kits may be used in hazardous and non hazardous areas.

The gland and the grommet included in the kit provide strain relief and environmental sealing to avoid water ingress in the insulation. They contain a stainless steel plate which can be screwed to the cladding. Insulation entry kits can be used for installations on pipes, tanks and vessels etc.

Application

Two-pack insulation entry kit for pipes, tanks and vessels. Usable for all types of PI cold leads as well as all other round cables with an outer diameter in the range of 5 to 13 mm. Kit contains 2 pc.

Kit contents

- 2 x stainless steel fixing plates
- 2 x plastic glands (M20) with round hole grommet for power- or cold lead cables
- 2 x locknuts

PRODUCT SPECIFICATIONS

Dimensions

Plate 60 x 60 mm (22 SWG)

Technical Details

Max. exposure temp. gland 80°C

APPROVALS

For use in ordinary area

Product certification



ORDERING INFORMATION

Part number (Weight) 1244-000689 (0.08 kg)

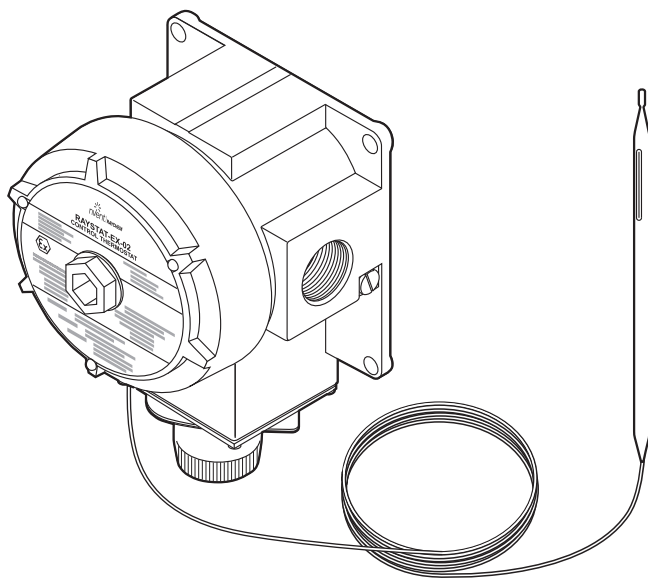


RAYSTAT-EX-02

CONNECT AND PROTECT

Surface sensing mechanical thermostat

PRODUCT OVERVIEW



This EEx d approved surface sensing thermostat provides temperature control for all nVent RAYCHEM BTV, QTVR, VPL and XTVR heating cables in hazardous areas. The switching temperature range is -4°C to $+163^{\circ}\text{C}$ and is adjustable externally to the Ex enclosure by a dial mounted under a bolted-on cover and seal.

The switching current capacity is 22 A. It has a single pole change-over switch with volt-free contacts.

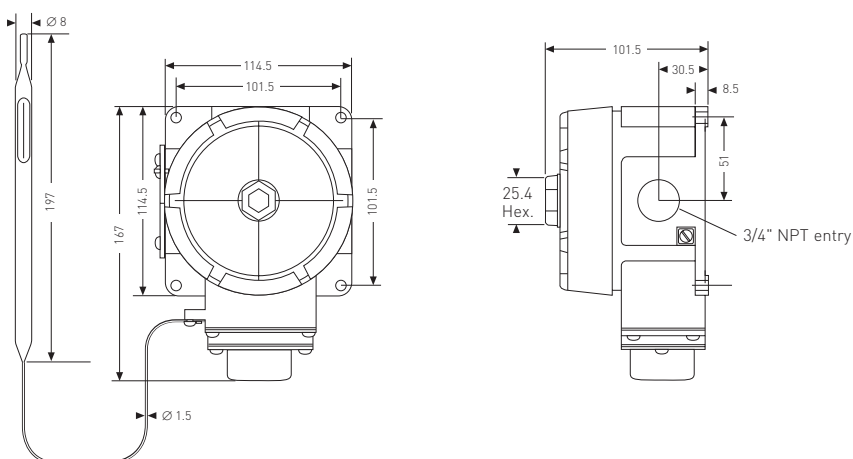
Cable entry is through a single 3/4" NPT thread entry. nVent RAYCHEM cable glands are available to suit non-armoured and armoured cable.

The 3 m long stainless steel fluid filled bulb and capillary give freedom to locate the enclosure remote from the bulb. The bulb exposure range is -50°C to $+215^{\circ}\text{C}$.

The cast aluminium construction with stainless steel fittings gives a lightweight unit which can be pipe mounted using nVent RAYCHEM support brackets or surface mounted.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Enclosure

Body and lid	Lacquer coated cast aluminium with stainless steel fittings and nitrile rubber internal lid seal
Protection	IP 65 if installed with nVent RAYCHEM cable glands GL-33 or GL-34
Lid fixing	Screw thread lid locked in place by a 2 mm hexagonal key grub screw
Entry	1 x 3/4" NPT
Ambient operating temperature	-40°C to $+60^{\circ}\text{C}$



Control & Monitoring

Temperature sensing

Type	Fluid filled bulb and capillary
Dimensions	Capillary 3 m long, bulb 197 mm x 8 mm
Material	Stainless steel (Type SS316)
Exposure temperature	-50°C to +215°C
Minimum bend radius	Do not bend bulb, 15 mm for capillary

Switching

Type	Single pole change over volt free contacts (SPDT)
Rating	22 A at 480 Vac, switching (100.000 cycles)

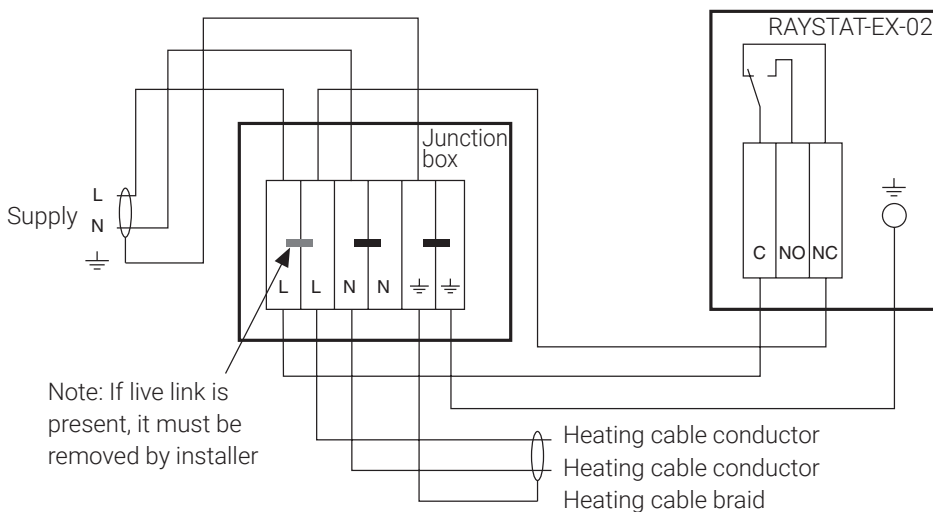
Setting

Range	-4°C to +163°C
Repeatability	±1.7 K
Differential	5 K
Accuracy (switch on)	±4.5°C at 21°C ambient and 50°C sensor temperature
Method	External knob and dial

Connection terminals

Supply	3 terminals for 1 to 4 mm ² conductors
Internal earth	Single bolt for 1 to 4 mm ² conductors
External earth	Single bolt and clamp for 1 to 4 mm ² conductors

Connection details and thermostat control system



Maximum recommended heating cable lengths (230 V supply)

The maximum recommended heating cable length is restricted by the electrical protection sizing or the switching capacity of the RAYSTAT-EX-02.

For circuits and electrical protection rated up to and including 20 A

Use the maximum recommended heating cable lengths, mentioned in the cable datasheet.

For circuits and electrical protection rated above 20 A but less than or equal to 22 A

Use the shorter length of the values given in the cable datasheet and those given for your switching temperature in the table below.

For circuits and electrical protection rated above 22 A, RAYSTAT-EX-02 must NOT be connected for direct switching.

Heating- cable reference

	3BTV2-CT/-CR	5BTV2-CT/-CR	8BTV2-CT/-CR	10BTV2-CT/-CR	10QTVR2-CT	15QTVR2-CT	20QTVR2-CT	4XTV2-CT-T3	8XTV2-CT-T3	12XTV2-CT-T3	15XTV2-CT-T3	20XTV2-CT-T2	5KTV2-CT	8KTV2-CT	15KTV2-CT	20KTV2-CT	5VPL2	10VPL2	15 VPL2	20VPL2
Switching temp. (°C)	L max. (m) - Maximum recommended heating cable length																			
5	200	165	120	105	110	85	65	230	145	105	85	65	200	145	90	65	220	145	95	70
10	200	165	120	105	110	90	65	235	150	110	85	65	205	145	90	65	220	150	95	70
15	200	165	120	105	115	90	70	245	155	110	85	65	210	150	95	65	220	150	95	70
20	200	165	120	105	115	95	75	250	160	115	90	65	215	155	95	70	220	150	100	70
25	200	165	120	105	115	95	75	250	165	120	90	70	220	160	100	70	220	155	100	75
30	200	165	120	105	115	95	80	250	170	125	95	70	225	160	100	70	220	155	100	75
35	200	165	120	105	115	95	85	250	180	130	95	75	225	165	105	75	220	155	100	75
40	200	165	120	105	115	95	90	250	180	135	100	75	225	170	105	75	220	155	105	75
45	200	165	120	105	115	95	95	250	180	140	100	75	225	175	110	80	220	155	105	75
50	200	165	120	105	115	95	105	250	180	145	105	80	225	180	115	80	220	155	105	75
55	200	165	120	105	115	95	110	250	180	145	110	80	225	180	115	85	220	155	105	80
60	200	165	120	105	115	95	110	250	180	145	110	85	225	180	120	85	220	155	110	80
65	200	165	120	105	115	95	110	250	180	145	115	85	225	180	125	90	220	155	110	80
70	-	-	-	-	115	95	110	250	180	145	120	90	225	180	130	95	220	155	110	80
75	-	-	-	-	115	95	110	250	180	145	120	90	225	180	130	95	220	155	115	80
80	-	-	-	-	115	95	110	250	180	145	125	95	225	180	130	100	220	155	115	85
85	-	-	-	-	115	95	110	250	180	145	130	100	225	180	130	105	220	155	115	85
90	-	-	-	-	115	95	110	250	180	145	130	100	225	180	130	110	220	155	120	85
95	-	-	-	-	115	95	110	250	180	145	130	105	225	180	130	110	220	155	120	85
100 to 110	-	-	-	-	115	95	110	250	180	145	130	110	225	180	130	110	220	155	120	85
115 to 120	-	-	-	-	-	-	-	250	180	145	130	110	225	180	130	110	220	155	125	90
125 to 150	-	-	-	-	-	-	-	-	-	-	-	-	225	180	130	110	220	155	125	95

Mounting method

nVent RAYCHEM support bracket nVent RAYCHEM SB-100, SB-101, SB-110, SB-111, SB-125 or surface mounting with 4 fixing holes (M6) on 101.5 x 101.5 mm centres

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

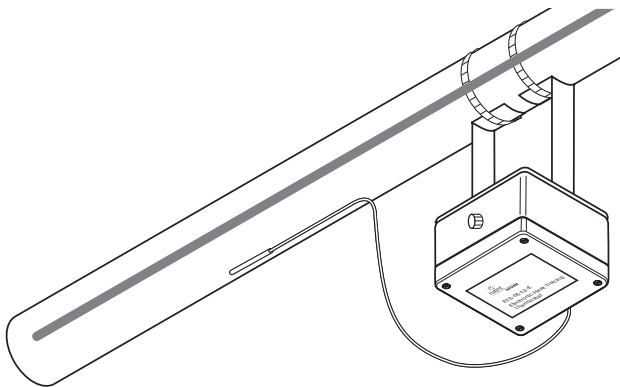
Part description	RAYSTAT-EX-02
PN (Weight)	404385-000 (1.77 kg)

Accessories

Power cable gland for armoured cable	GL-33	493217-000
Power cable gland for non-armoured cable (to be ordered separately)	GL-34	931945-000

Surface and ambient sensing electronic thermostat

PRODUCT OVERVIEW



nVent RAYCHEM ETS-05 electronic surface and ambient sensing thermostat provides accurate temperature control for heating cables.

The ETS-05 is available in many versions. The ETS-05-L2-E is for temperatures up to 199°C, while the ETS-05-H2-E can be used for temperatures up to 499°C. The ETS-05-A2-E is an ambient sensing thermostat with a temperature setpoint in the range of 0°C to +49°C.

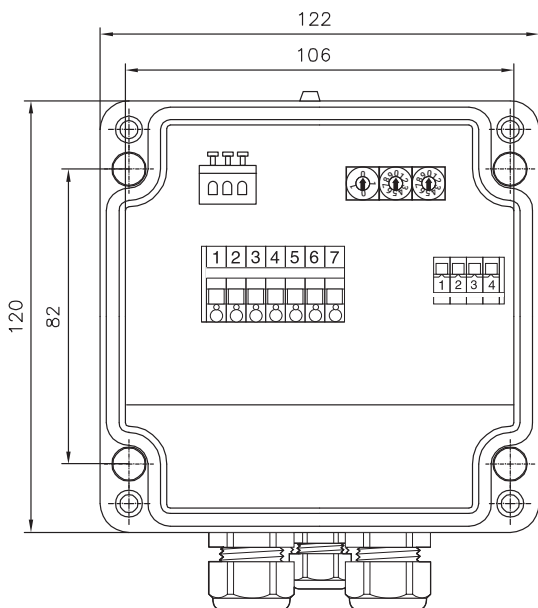
The maximum nominal load is 32 A for the thermostats. Temperature setting is accurate via digital rotary switches inside the enclosure.

The ETS-05 is available with an alarm relay for remote monitoring.

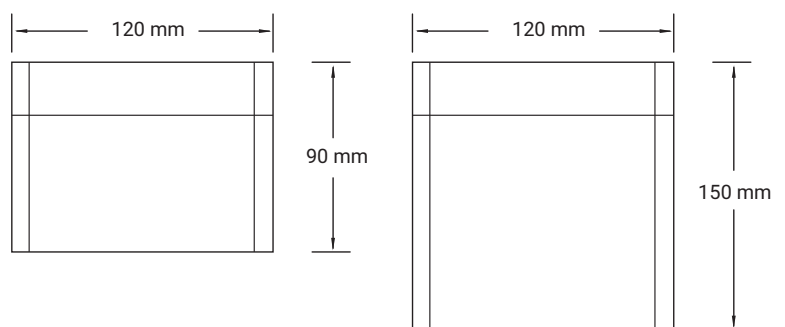
The ETS-05 has a LED indicator which indicates the status of the thermostat (powered on/off), the status of the heat-tracing cable (powered on/off) and the status of the sensor. In case of sensor failure, the thermostat can switch to an on or off state, depending upon the user's requirement.

Dimensions (in mm)

Top view



Side view



ETS-05 versions without alarming, without extended voltage range

ETS-05 versions with extended voltage range and/or alarm relay



PRODUCT SPECIFICATIONS

The following table shows the general information applicable for all versions of the ETS-05.

Maximum sensor lead resistance	20 Ohm
Ingress protection	IP66
Switching accuracy	±1 K at 5°C, 2 K at 499°C
Switching differential (Hysteresis)	≈ 3°C
Output relay	Single pole change over type (SPST)
Switching capacity	32 A resistive load
Ambient temperature range	-40°C to +60°C (ATEX / IECEx) -60°C to +60°C (EAC Ex)
Internal power consumption	3 VA
Terminal size	max. 6 mm ²
Cable gland entries	2 x M25: 1 x M25 gland for power cable in 1 x M25 rain plug for heating cable out 1 x M20 gland for alarm wire (when alarm relay is available in unit)
Sensor	The ETS-05 for ATEX/IECEx countries includes a sensor. The ETS-05 for EAC countries does not include a sensor. The sensor needs to be ordered separately.
Alarm light	Green: ETS-05 powered on, heat-tracing cable off Yellow: ETS-05 powered on, heat-tracing cable on Red flashing: Sensor failure, controller in fail-safe mode
Fail safe	Fail safe "On" and Fail Safe "Off" configurable
Weight	ETS-05 with Alarm Relay 2.38 kg Other versions: 1.64 kg

Versions

The ETS-05 is available in different versions. These are:

ETS-05-AB-CD-E

Letters ABCDE described in table below

Type description ETS-05		
"A":	Setpoint range	Temperature measurement range
A: Ambient Sensing	0°C to +49°C	-65°C to +260°C
L: Line Sensing, Low Temp.	0°C to +199°C	-65°C to +260°C
H: Line Sensing, High Temp.	0°C to +499°C	-65°C to +585°C
"B"	Voltage range	
1: 110 Vac	99-121 Vac	
1R: 110 Vac	99-132 Vac	
2: 230 Vac	195-230 Vac +10%	
2R: 277 Vac	195-277 Vac +3%	
"C"		
E: ATEX / IECEx approved (IEC countries)		
J: ATEX / IECEx approved (for Japan)		
"D"		
P: Earth Plate		
"E"		
A: Alarm Relay	NO and NC contacts	275 Vac, 3 A resistive load max
(EAC) in the product name indicates that the product has a Russian language label on it for Eurasian Customs Union countries.		
Examples:		
ETS-05-L2-EP: ETS-05 thermostat, setpoint range 0-199°C, 195-230 Vac, ATEX/IECEx approved, Earth Plate		
ETS-05-H2R-EP-A: ETS-05 thermostat, setpoint range 0-499°C, 195-277 Vac, ATEX/IECEx, Earth Plate, Alarm Relay		

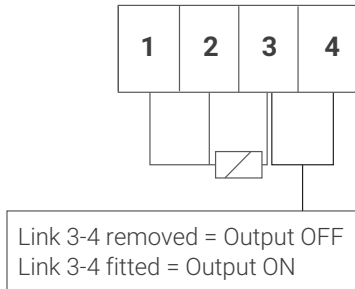
Terminals

Power terminals

1	2	3	4	5	6	7
Line Out	Neutral Out	Neutral Supply	230 V Supply	Earth	Earth	Earth

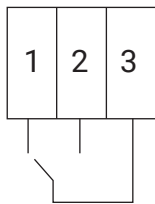
Terminals 2 and 3 are joined electrically
 Terminals 5, 6 and 7 are joined electrically

Sensor/Failure mode select terminals



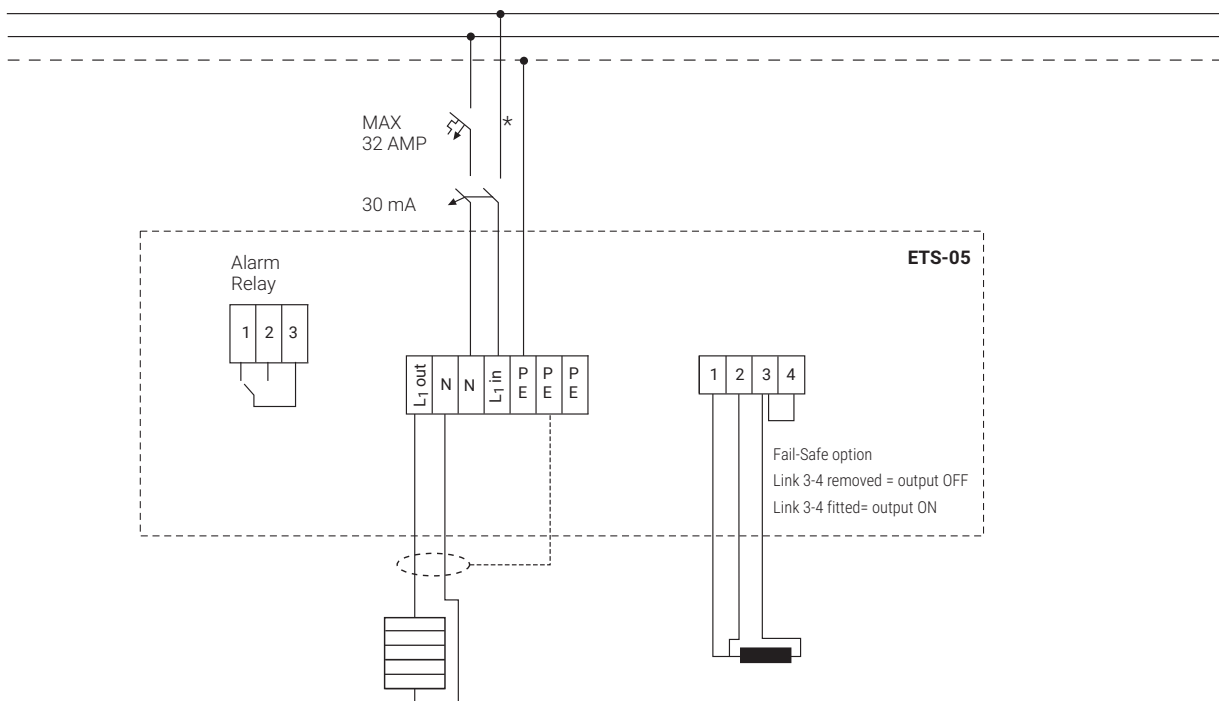
Terminals 1 to 3 allow for the connection of a three wire PT100 sensor.
 Terminals 3 to 4 allow the user to select the default heating status on sensor error. Without a link fitted the heating will turn OFF if a sensor error is detected (default). With a link fitted the heating will turn ON if a sensor error is detected

Alarm relay



Healthy situation: 1-3 is closed, 2-3 is open
 Alarm situation: 1-3 is open, 2-3 is closed

Typical wiring diagram for direct switching



* Circuit breaker configuration may vary according to local standards / requirements

Mounting method

Support bracket SB-100, SB-101, SB-110, SB-111, SB-130 or surface mounting with 4 fixing holes on 106 x 82 mm centers

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T5

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING DETAILS

Product Name	Part Number	Product Name	Part Number
ETS-05-L2-E	1244-014367	ETS-05-L2-E (EAC)	1244-022701
ETS-05-H2-E	1244-014368	ETS-05-H2-E (EAC)	1244-022702
ETS-05-A2-E	1244-022311	ETS-05-A2-E (EAC)	1244-022700
ETS-05-L2-EP	1244-017508	ETS-05-L2-EP (EAC)	1244-022703
ETS-05-H2-EP	1244-017509	ETS-05-H2-EP (EAC)	1244-022704
ETS-05-A2-E-A	1244-022663	ETS-05-A2-E-A (EAC)	1244-022710
ETS-05-L2-EP-A	1244-022669	ETS-05-L2-EP-A (EAC)	1244-022713
ETS-05-H2-EP-A	1244-022670	ETS-05-H2-EP-A (EAC)	1244-022714
ETS-05-H2R-EP-A	1244-022680	ETS-05-H2R-EP-A (EAC)	1244-022719

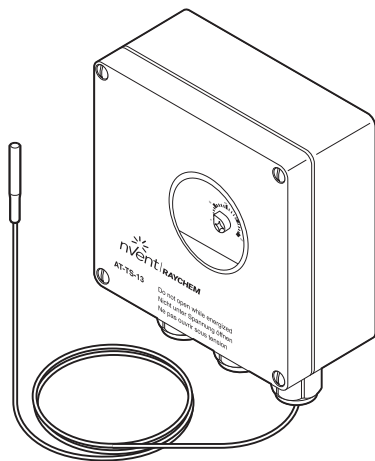
(EAC) in the product name indicates that the product has a Russian language label on it for Eurasian Customs Union countries.

AT-TS-13 and AT-TS-14

CONNECT AND PROTECT

Surface sensing thermostat, electronic

PRODUCT OVERVIEW

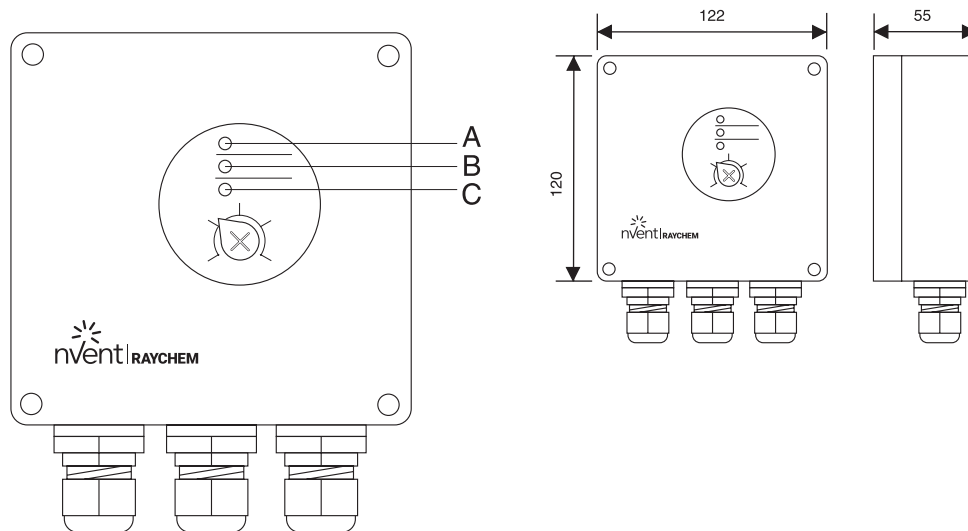


nVent RAYCHEM AT-TS thermostats provide temperature control in safe area. The temperature set point can be checked through a window in the lid. LED's are providing an indication when cables are energized (Heating ON) or when the temperature sensor is defect (sensor break or sensor short-circuit).

The temperature sensor has a length of 3 meter and can be shortened for ambient sensing operating. Direct connection of the heating cable is possible. Connection kits need to be ordered separately. The thermostat is available in 2 temperature ranges.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



- A Green LED Heating cable on
- B Red LED Sensor break
- C Red LED Sensor short-circuit



Technical details

	nVent RAYCHEM AT-TS-13	nVent RAYCHEM AT-TS-14
Supply voltage	230 Vac +10% -15% 50/60 Hz	230 Vac +10% -15% 50/60 Hz
Max. switching current	16 A, 250 Vac	16 A, 250 Vac
Max. conductor size	2.5 mm ²	2.5 mm ²
Switching differential	0.6 K to 1 K	0.6 K to 1 K
Switching accuracy	± 1 K at 5°C (calibration point)	2 K at 60°C (calibration point)
Switch type	SPST (normally open)	SPST (normally open)
Adjustable temperature range	-5°C to +15°C	0°C to +120°C

Housing

Temperature setting	inside	inside
Exposure temperature	-20°C to +50°C	-20°C to +50°C
Ingress protection	IP65 according to EN 60529	IP65 according to EN 60529
Entries	1 x M20 for supply cable (Ø 8-13 mm) 1 x M25 for heating element (Ø11-17 mm) 1 x M16 for the sensor	1 x M20 for supply cable (Ø 8-13 mm) 1 x M25 for heating element (Ø 11-17 mm) 1 x M16 for the sensor
Material	ABS	ABS
Lid fixing	nickel-plated quick release screws	nickel-plated quick release screws
Mounting	SB-110 and SB-111 or surface mount	SB-110 and SB-111 or surface mount

Temperature sensor

	AT-TS-13	AT-TS-14
Type	PTC KTY 83-110	PTC KTY 83-110
Length sensor cable	3 m	3 m
Diameter sensor cable	5.5 mm	5.5 mm
Diameter sensor head	6.5 mm	6.5 mm
Sensor material	PVC	Silicone
Max. exposure temperature sensor cable	80°C	160°C

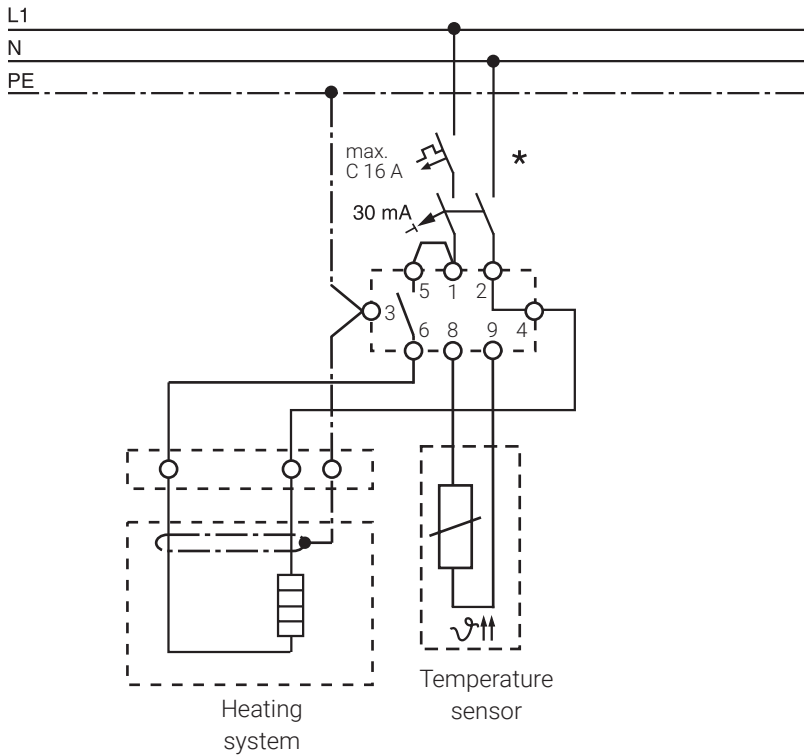
The sensor cable may be extended to a maximum of 100 m using a 2-conductor wire with a cross-section of 1.5 mm². The sensor cable should be shielded if it is laid in cable ducts or in the vicinity of high-voltage carrying cables. The shield of the extension cable should be grounded at the controller end only.

Output parameters

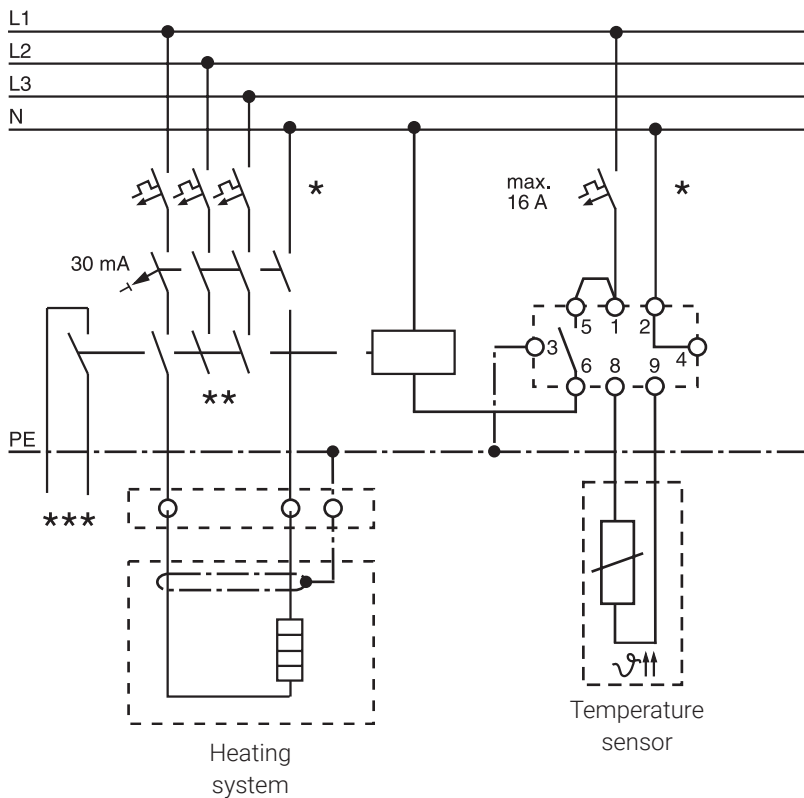
Alarm on LED	Green LED: Heating Cable ON Red LED: Sensor break Red Led: Sensor short-circuit	Green LED: Heating Cable ON Red LED: Sensor break Red Led: Sensor short-circuit
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Wiring diagram for thermostat

AT-TS-13 or AT-TS-14



AT-TS-13/14 with contactor



* 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

*** Optional: Potential-free circuit-breaker for connection to the BMS



APPROVALS

For use in ordinary area (indoors & outdoors)

Product certification



ORDERING INFORMATION

Part description	AT-TS-13	AT-TS-14
PN (Weight)	728129-000 (0.44 kg)	648945-000 (0.44 kg)

Accessories

PA Reducer	Reducer M25 (M)/M20 (F)	Reducer M25 (M)/M20 (F)
PN	184856-000	184856-000
Spare temperature sensor (AT-TS-13 and AT-TS-14)	HARD-69 (Max. exposure temperature 160°C)	HARD-69
PN (Weight)	133571-000 (180 g)	133571-000 (180 g)



Electronic controller for pipe freeze protection and temperature maintenance systems

PRODUCT OVERVIEW



The nVent RAYCHEM RAYSTAT V5 controller is designed for operation with the nVent RAYCHEM self-regulating heating cables.

Features

- Easy set-up and programming of the unit
- Flexible temperature control of pipe freeze protection and temperature maintenance systems
- Line sensing and/or ambient sensing
- Proportional Ambient Sensing Control (PASC) algorithm for enhanced energy savings in ambient sensing mode
- Alarm relay with change over contact to signal power, temperature or communication problems
- Pipe temperature monitoring with high and low temperature alarm
- Offsite configurable – can be set up prior to final installation
- On wall mountable for outdoor location

GENERAL

Area of use Non-hazardous locations; for nVent RAYCHEM heating cables

ELECTRICAL PROPERTIES

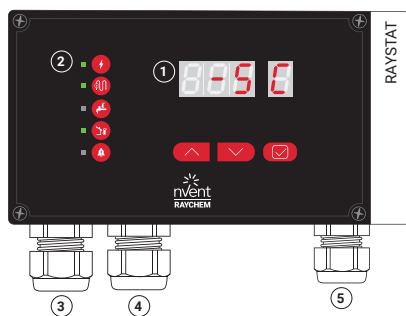
Supply voltage	180 – 253 VAC 50/60 Hz
Operating temperature	-40°C to +40°C ambient
Power consumption	Max. 3.5 VA
Switching capacity output relay	25 A 230 VAC
Size power supply terminals	3 x 6 mm ² max.
Size heating cable terminals	3 x 6 mm ² max.
Size alarm terminals	3 x 1.5 mm ² max.
Size pipe sensor terminals	2 x 1.5 mm ² max.
Alarm relay	Single pole double throw relay, volt-free; Max. switching capacity (resistive load only) 1 A/30 VDC 0.5 A/125 VAC, Max.: 60 VDC/125 VAC
Keylock	Password protection for parameter settings
USB port	For pre-setup in power off mode; for firmware upgrades



ENCLOSURE

Dimensions	210 mm x 110 mm x 85 mm
Ingress protection class	IP65
Enclosure material	Polycarbonate
Mounting option	On wall; mountable DIN rail 35 mm (included in the package)
Cable entries	2 x M25 and 1 x M20; 2 x M20 pre-punched
Storage temperature	-40°C to +50°C
Flammability class	DIN EN 60730/VDE 0631-1
Weight	990 g

MODULE LAYOUT



1. LED Display
2. LED Green:
 - a - Power to the unit
 - b - Power to the heating cable
 - c - Line sensor connected or
 - d - Ambient sensor connected
 - e - Alarm/Error info
3. M25 Gland: Power cable
4. M25 Gland: Heating cable
5. M20 Gland: Sensor/Sensor pipe/External alarm

PROGRAMMING

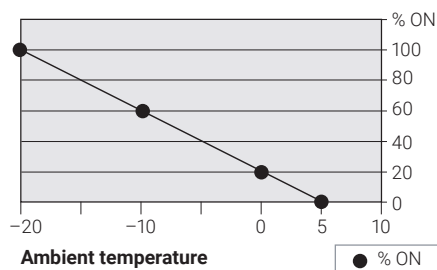
Selectable set temperatures	0°C to +90°C (line sensing) and 0°C to +30°C (ambient sensing); optional 0°C to +250°C (line sensing, when used with SM-PT100-1)
Parameter	Operation modes, high and low temperature alarm, hysteresis

ENERGY SAVING WITH PROPORTIONAL AMBIENT SENSING CONTROL (PASC)

Duty cycle (power to heater on) depends on the ambient temperature. For example:
 If minimum temperature= -20°C and if maintain temperature (set point)= +5°C

ambient t°	% ON	
-20	100	Min. Ambient
-10	60	
0	20	Set point
5	0	

Result: At ambient temperature of -5°C, 60% energy is saved



SENSOR

	Standard	With SM-PT100-1 Module	
	(included in box)	HARD-78	MONI-PT100-260/2
Temperature sensor type	NTC 2 KOhm / 25°C, 2-wire	PT100	PT100
Sensor tip dimensions	Ø 5 mm; length 20 mm	Ø 6 mm, length 50 mm	Ø 6 mm, length 50 mm
Sensor cable length	5 m	3 m	2 m
Cable extension	Up to 150 m, cross section extension cable: 2 x 1,5 mm ²	Up to 150 m, 3 x 1,5 mm ²	
Temperature range	-40°C to +90°C	-40°C to +150°C	-50°C to +260°C

MONITORING

Temperature alarm	High temperature alarm	Adjustable range: maintain temperature to +2°C to +250°C, OFF
	Low temperature alarm	Adjustable range: maintain temperature to -40°C to +245°C, OFF
Sensor alarm	Sensor open circuit Sensor short circuit	
Heating cable connection	Heating cable open circuit	

MEMORY

Parameters All parameters are stored in nonvolatile memory

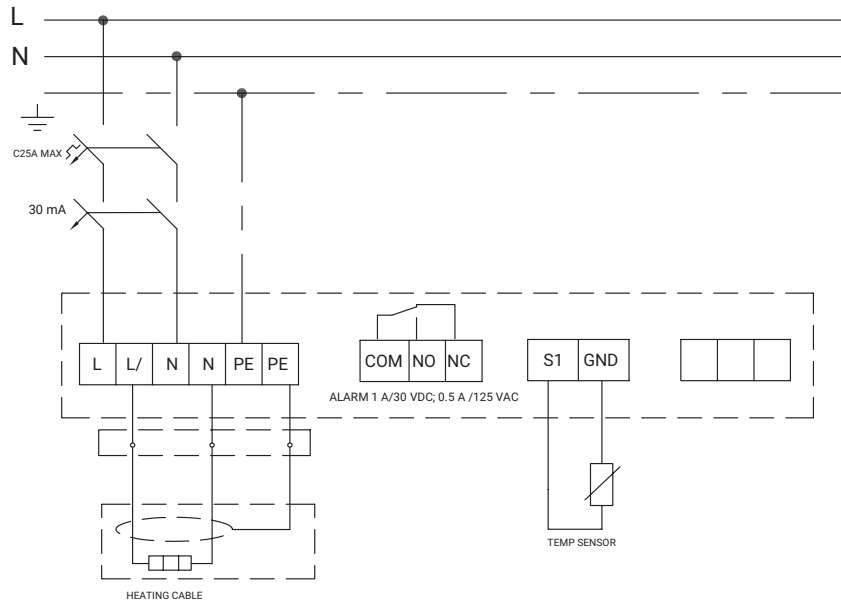
APPROVALS

Approvals CE, ROHS, WEEE

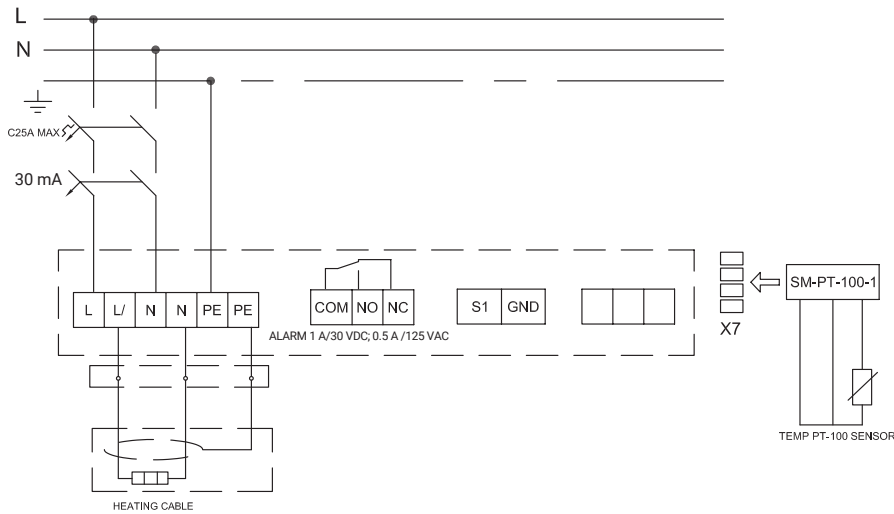
Electromagnetic Compatibility (EMC) EN 61000-6-1: 2007; EN 61000-6-3:2007 + A1:2011

ELECTRICAL SCHEME

Standard: NTC Sensor



Option: PT100 Sensor



ORDERING DETAILS

Catalog number	RAYSTAT V5
Part number	1244-022440
Weight	990 g
In package	Control unit, Din-rail, 1 Line sensor

ACCESSORY

Product description	PCN number
SENSOR-NTC-10M (-40°C ... +90°C)	1244-015847
Sensor Module for PT 100 (up to +250°C) SM-PT100-1	1244-022441
PT-100 Sensor HARD-78 (-40°C ... +150°C)	213430-000
PT-100-Sensor MONI-PT100-260/2 (-50°C ... +260°C)	1244-006615
GM-TA-AS NTC-Sensor / Ambient sensor in enclosure	1244-017965
nVent RAYCHEM PB-POWERBANK	1244-020365

Important: The nVent RAYCHEM RAYSTAT controller is for use with the nVent RAYCHEM heating cables only. The warranty and system listing will be invalidated if the RAYSTAT controller is used with other heating cables.

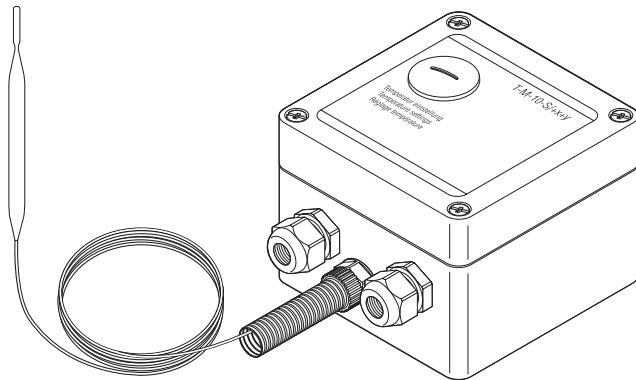


T-M-10-S/+x+y

CONNECT AND PROTECT

Surface sensing thermostat

PRODUCT OVERVIEW



A surface sensing thermostat providing temperature control in safe areas.

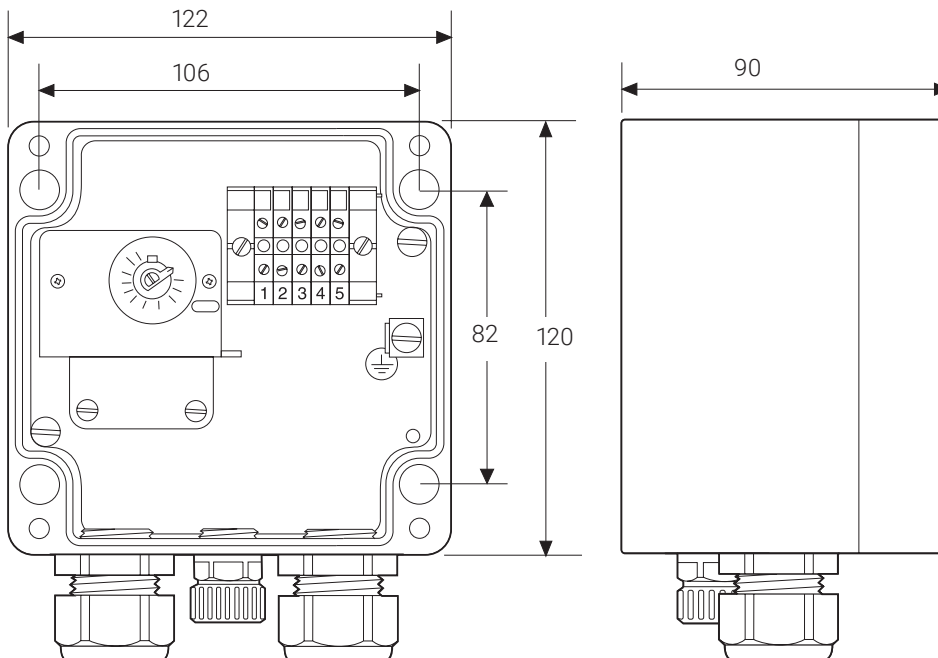
Temperature set point adjustment can be completed, without opening the enclosure, via a removable plug in the lid. The 2 meter long stainless steel capillary is protected at the enclosure by a flexible conduit.

Direct connection of the heating cable is possible.

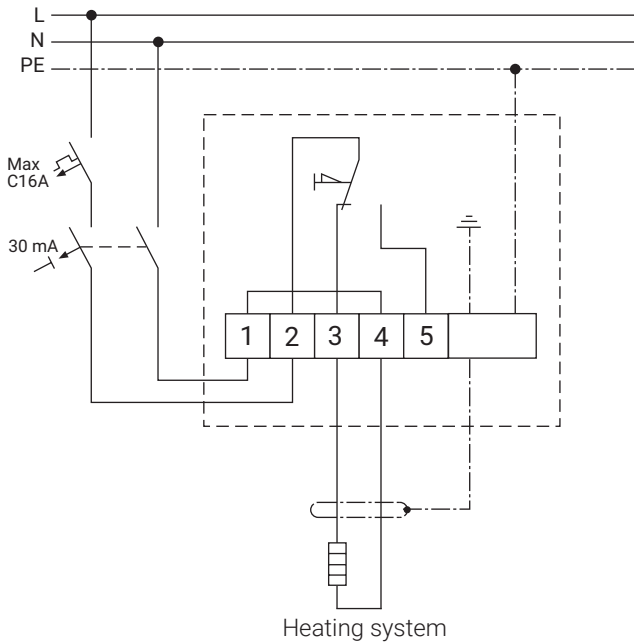
The thermostat is available in 3 temperature ranges: 0–50°C; 0–200°C; 50–300°C.

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Connection details



Technical details

	T-M-10-S/+0+50C	T-M-10-S/0+200C	T-M-10-S/+50+300C
Max rated voltage (nom)	230 Vac	230 Vac	230 Vac
Temperature setting	0°C to +50°C	0°C to +200°C	+50°C to +300°C
Switching type	Single pole change over (SPDT) 100,000 cycles at 16 A	Single pole change over (SPDT) 100,000 cycles at 16 A	Single pole change over (SPDT) 100,000 cycles at 16 A
Switching capacity	Max 16 A	Max 16 A	Max 16 A
Hysteresis/Differential	2.5% of temperature range	2.5% of temperature range	2.5% of temperature range
Accuracy	±1.5% of setpoint for temperature setting in upper third of range (measured at 22°C)		
Setting	Internal dial, through lid	Internal dial, through lid	Internal dial, through lid
Terminal size	4 mm ²	4 mm ²	4 mm ²
Ambient operating temp. range	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C

Output parameters

Control relay	Change-over switch	Change-over switch	Change-over switch
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Enclosure

Protection	IP65	IP65	IP65
Dimension	122 x 120 x 90 mm	122 x 120 x 90 mm	122 x 120 x 90 mm
Materials body and lid	Grey, polyester enclosure		
Lid fixing	4 captive screws, stainless steel		
Entries	2 entries: 1 x M25 reducer M25 (M)/M20 (F) incl. M20 gland (ø 8-13 mm) 1 x M20 gland (ø 8-13 mm)		

Temperature sensor

Type	Fluid filled capillary, 2 m long		
Dimensions	ø	8 mm	8 mm
	Length sensing element	166 mm	78 mm
Material	V4A Stainless Steel		
Exposure temperature	-40°C to +60°C	-20°C to +230°C	-20°C to +345°C
Minimum bending radius	10 mm for capillary, the sensor cannot be bent		

Mounting method

Support bracket	SB-110 or SB-111 or surface mount	SB-110 or SB-111 or surface mount	SB-110 or SB-111 or surface mount
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APPROVALS

For use in ordinary area.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Ordering references	Part Number (PN)	Weight
T-M-10-S/0+50C	105336-000	1 kg
T-M-10-S/0+200C	337388-000	1 kg
T-M-10-S/+50+300C	607672-000	1 kg

Meaning of reference: T-M-10-S/+x+y

T = thermostat

M = mechanical thermostat

10 = control thermostat

S = surface sensing

x = min temperature of control range

y = max temperature of control range

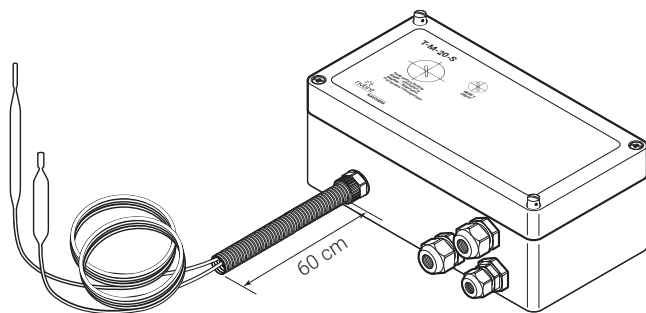


T-M-20-S/+X+Y

CONNECT AND PROTECT

Surface sensing thermostat with limiter

PRODUCT OVERVIEW



A surface sensing thermostat providing temperature control and temperature limiter in safe areas. The high limit cut-out prevents the heating system exceeding a preset maximum temperature should the control function fail to operate or an unsafe process temperature occur.

Temperature set point adjustment and limiter reset can be completed, without opening the enclosure, via removable plugs in the lid.

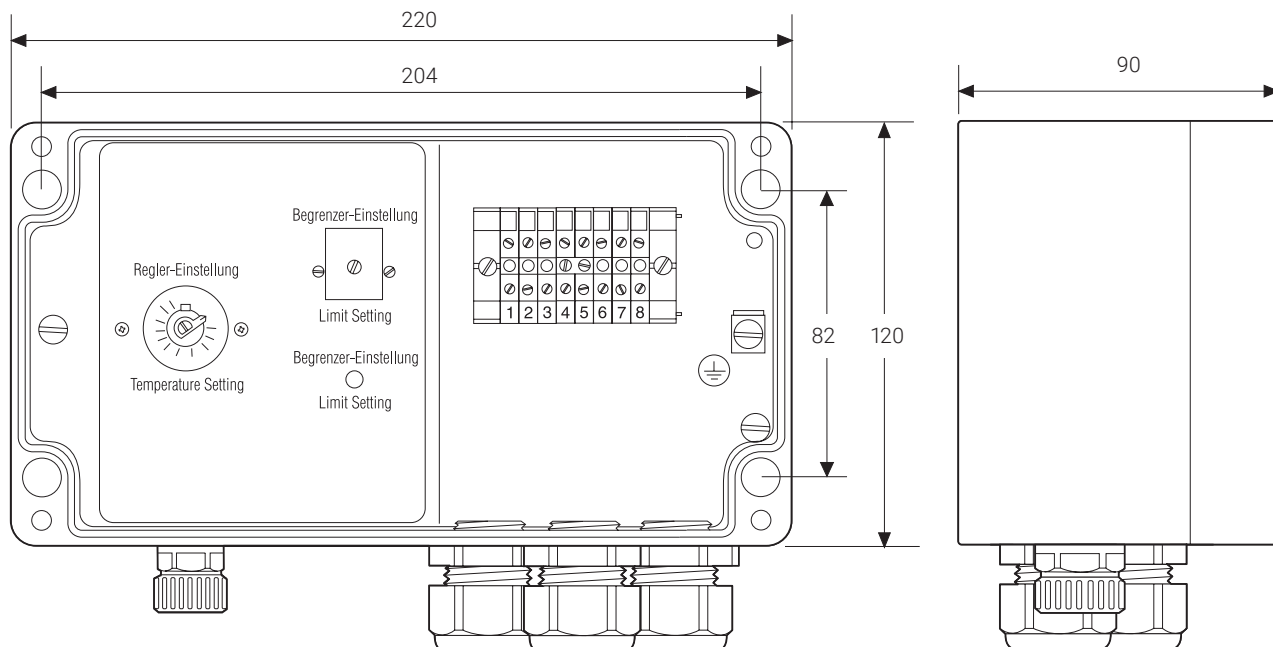
Both 2 meter long stainless steel fluid filled bulb and capillary are protected at the enclosure by a flexible conduit.

Direct connection of the heating cable is possible.

The thermostat is available in 3 temperature ranges. 0–100°C; 0–200°C; 50–300°C.

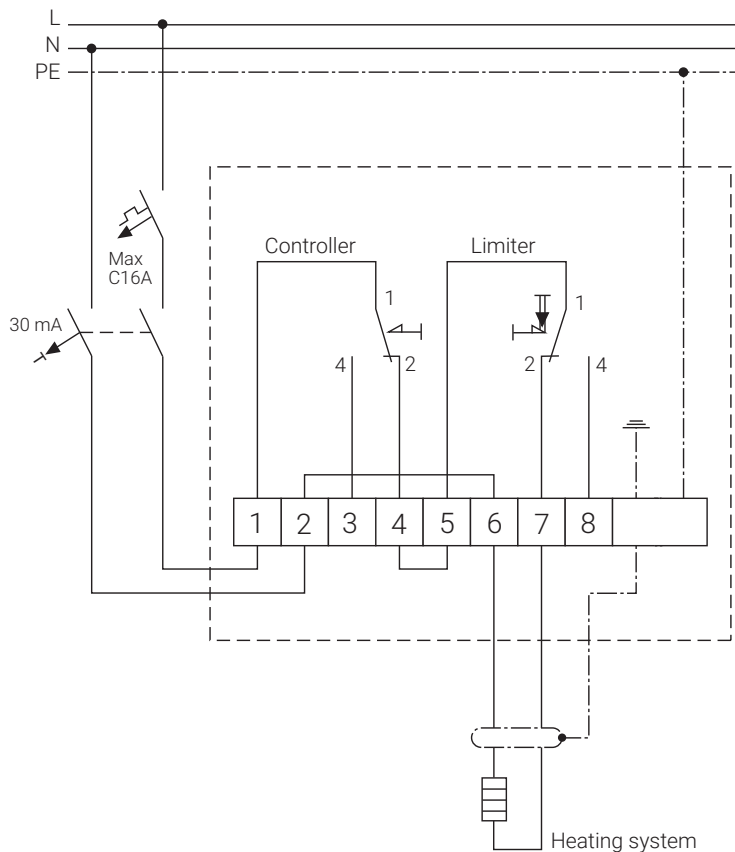
PRODUCT SPECIFICATIONS

Dimensions (in mm)



Control & Monitoring

Connection details



Technical details

		T-M-20-S/0+100C	T-M-20-S/0+200C	T-M-20-S/+50+300C
Max rated voltage (nom)		230 Vac	230 Vac	230 Vac
Temperature setting	Controller	0°C to +100°C	0°C to +200°C	+50°C to +300°C
	Limiter	+50°C to +150°C	+80°C to +200°C	+150°C to +350°C
Switching type		Single pole change over (SPDT) 100,000 cycles at 16 A (controller) 500 cycles at 10 A (limiter)		
Switching capacity	Controller	Max 16 A at 230 Vac	Max 16 A at 230 Vac	Max 16 A at 230 Vac
	Limiter	Max 16 A at 230 Vac	Max 16 A at 230 Vac	Max 16 A at 230 Vac
Hysteresis/Differential		2.5% of temperature range	2.5% of temperature range	2.5% of temperature range
Accuracy		±1.5% of setpoint in upper third of temperature range (at 22°C ambient)		
Setting		Internal dial, through lid	Internal dial, through lid	Internal dial, through lid
Terminal size		4 mm ²	4 mm ²	4 mm ²
Ambient operating temp. range		-20°C to +80°C	-20°C to +80°C	-20°C to +80°C

Output parameters

Control relay	Change-over switch (SPDT)
Limiter relay	Change-over switch with possibility for external alarm (SPDT)

Enclosure

	T-M-20-S/0+100C	T-M-20-S/0+200C	T-M-20-S/+50+300C
Protection	IP65	IP65	IP65
Dimension	222 x 120 x 90 mm	222 x 120 x 90 mm	222 x 120 x 90 mm
Materials body and lid	Grey, polyester enclosure	Grey, polyester enclosure	Grey, polyester enclosure
Lid fixing	4 captive screws, stainless steel		
Entries	3 entries: 1 x M25 Reducer M25 (M)/M20 (F) incl. M20 gland (Ø 8–13 mm) 1 x M20 gland (Ø 8–13 mm) 1 x M20 gland (Ø 8–13 mm)		

Temperature sensor

	T-M-20-S/0+100C	T-M-20-S/0+200C	T-M-20-S/+50+300C	
Type	Fluid filled capillary, 2 meter long			
Dimensions				
Controller	Ø	8 mm	8 mm	8 mm
	Length sensing element	90 mm	82 mm	60 mm
Limiter	Ø	6 mm	6 mm	6 mm
	Length sensing element	52 mm	57 mm	85 mm
Material	V4A Stainless Steel		V4A Stainless Steel	V4A Stainless Steel
Exposure temperature	Controller	+125°C	+230°C	+330°C
	Limiter	+175°C	+230°C	+365°C
Minimum bending radius	10 mm for capillary, the sensor cannot be bent			

Mounting method

Support bracket	SB-120 or surface mount
Storage temperature	-50°C to +50°C

APPROVALS

For use in ordinary area.

Product certification



ORDERING INFORMATION

Ordering References	Part Number (PN)	Weight
T-M-20-S/0+100C	1244-022642	1.9 kg
T-M-20-S/0+200C	1244-022643	1.9 kg
T-M-20-S/+50+300C	1244-022644	1.9 kg

Meaning of reference: nVent RAYCHEM T-M-20-S/+x+y

T = thermostat

M = mechanical thermostat

20 = control thermostat + limiter

S = surface sensing

x = min temperature of control range

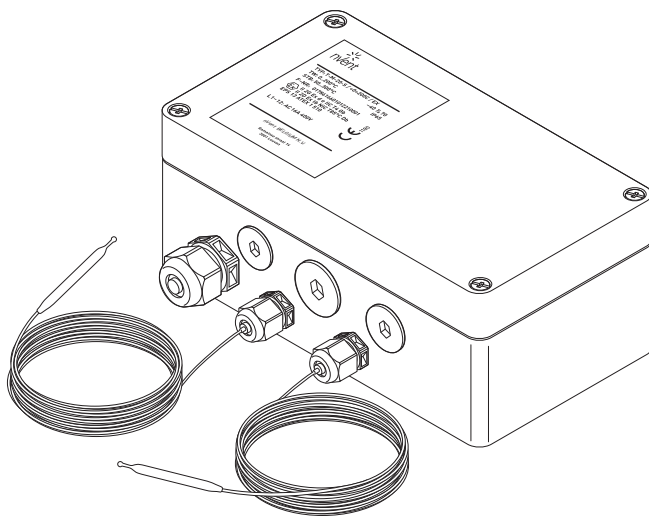
y = max temperature of control range

T-M-20-S/+X+Y/EX

CONNECT AND PROTECT

Surface sensing thermostat with safety limiter for hazardous area

PRODUCT OVERVIEW



A surface sensing thermostat providing temperature control and temperature limit in hazardous areas.

The safety limiter prevents the heating system exceeding a preset maximum temperature should the control function fail to operate or an unsafe process temperature occur. The maximum rated voltage is 400 VAC. The switching current capacity is 16 A maximum via independent Ex d single pole change over micro switches with volt-free contacts.

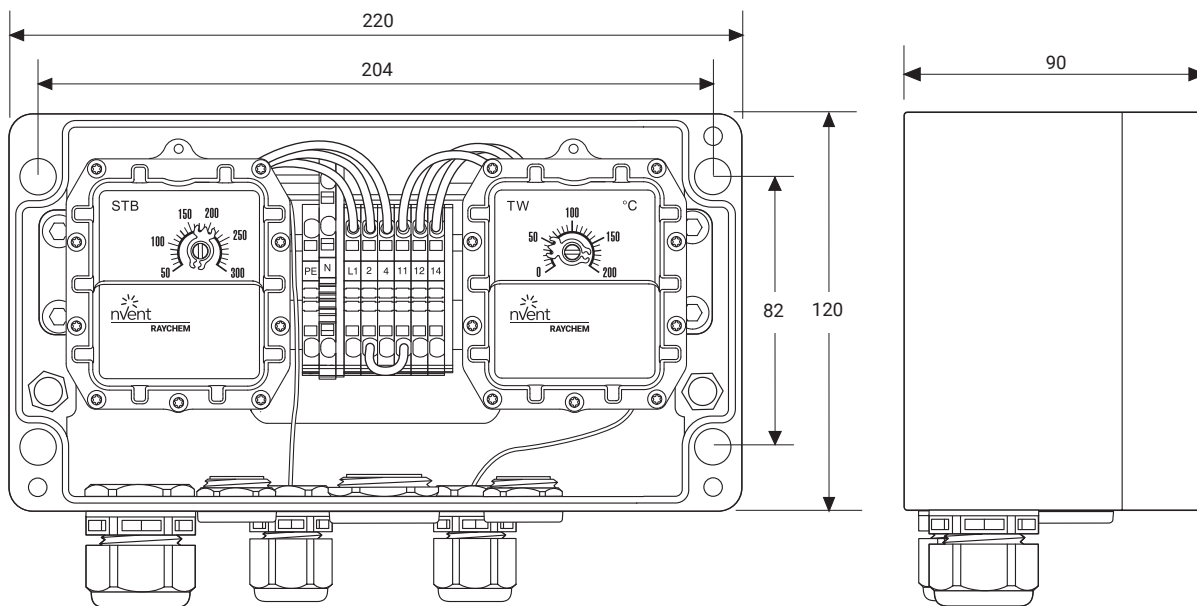
The switches are mounted within an Ex e enclosure together with a spring-type terminal block for fast easy connection. The sensors are 3 meter long stainless steel fluid filled bulb and capillary.

The thermostat is delivered with Ex approved power cable glands and plugs and the entries offer the possibility for a variety of connections such as connecting M25 and M20 glands for direct heating cable entry or alarm output.

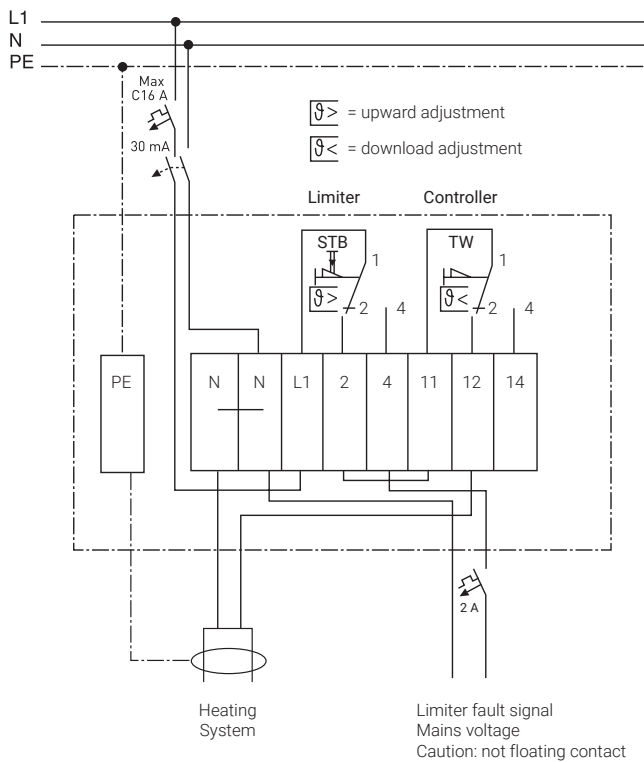
The thermostat with limiter is available in 3 temperature ranges: +0°C +120°C, +0°C +200°C and +50°C +300°C

PRODUCT SPECIFICATIONS

Dimensions (in mm)



Connection details



Technical details

		T-M-20-S/+0+120C/EX	T-M-20-S/+0+200C/EX	T-M-20-S/+50+300C/EX
Temperature setting	Controller	+0°C to +120°C	+0°C to +200°C	+50°C to +300°C
	Limiter	+0°C to +120°C	+50°C to +300°C	+50°C to +300°C
Switching type		Single pole change over (SPDT) >100.000 cycles at I nom	Single pole change over (SPDT) >100.000 cycles at I nom	Single pole change over (SPDT) >100.000 cycles at I nom
Switching capacity		Maximum 16 A at 400 Vac, resistive load	Maximum 16 A at 400 Vac, resistive load	Maximum 16 A at 400 Vac, resistive load
Hysteresis/Differential	Controller	max. 2.5% range, calibrated downwards	max. 2.5% range, calibrated downwards	max. 2.5% range, calibrated downwards
	Limiter	max 7% calibrated upwards	max. 7.5%, calibrated upwards	max. 7.5%, calibrated upwards
Setting		Inside enclosure	Inside enclosure	Inside enclosure
Reset limiter		Inside enclosure by means of a screwdriver		
Terminal size		4 mm ²	4 mm ²	4 mm ²
Terminal type		spring-type terminals	spring-type terminals	spring-type terminals
Ambient operating temp. range		-60°C to +70°C	-40°C to +70°C	-40°C to +70°C

Output parameters

Control relay	Change-over switch	Change-over switch	Change-over switch
Limiter relay	Change-over switch with possibility for external alarm Capillary leakage detection system		

Enclosure

	T-M-20-S/+0+120C/EX	T-M-20-S/+0+200C/EX	T-M-20-S/+50+300C/EX
Protection	IP65	IP65	IP65
Dimension	220 x 120 x 90 mm	220 x 120 x 90 mm	220 x 120 x 90 mm
Materials body and lid	Black, glass filled polyester enclosure	Black, glass filled polyester enclosure	Black, glass filled polyester enclosure
Lid fixing	4 captive screws, stainless steel	4 captive screws, stainless steel	4 captive screws, stainless steel
Entries	6 entries: 1 x M25 gland (Ø 8-17 mm): power supply 1 x M25 stopping plug: output to heating cables 2 x M20 stopping plug: output to heating cables (possibility to connect single conductor heating element) 2 x M20: capillary sensors		

Temperature sensor

Type		Fluid filled capillary, 3 m long	Fluid filled capillary, 2 m long	Fluid filled capillary, 2 m long
Dimensions	Controller	Ø 6 mm; length sensing element = 90 mm	Ø 6 mm; length sensing element = 72 mm	Ø 4 mm; length sensing element = 135 mm
	Limiter	Ø 6 mm; length sensing element = 58 mm	Ø 4 mm; length sensing element = 78 mm	Ø 4 mm; length sensing element = 78 mm
Material			stainless steel	stainless steel
Temperature exposure	Controller	-40°C +138°C	-40°C +230°C	-40°C +345°C
	Limiter	-40°C +138°C	-40°C +345°C	-40°C +345°C
Minimum bending radius		5 mm for capillary (not for sensor)	5 mm for capillary (not for sensor)	5 mm for capillary (not for sensor)

Mounting method

Support bracket	SB-120, SB-125 or surface mounting via 4 fixing holes at 204 x 82 centres		
PN		SB-120	165886-000
		SB-125	1244-00603

APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

T6...T4

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Ordering References:	PN Number	Weight
T-M-20-S/+0+200C/EX	1244-013410	2 kg
T-M-20-S/+50+300C/EX	1244-013411	2 kg
T-M-20-S/+0+120C/EX	1244-016536	2 kg

Meaning of reference: nVent RAYCHEM T-M-20-S/+x+y/Ex

T = thermostat

M = mechanical thermostat

20 = control thermostat + limiter

S = surface sensing

x = min temperature of control range

y = max temperature of control range

Ex = hazardous area



Elexant 5010i and Elexant 5010i-LIM

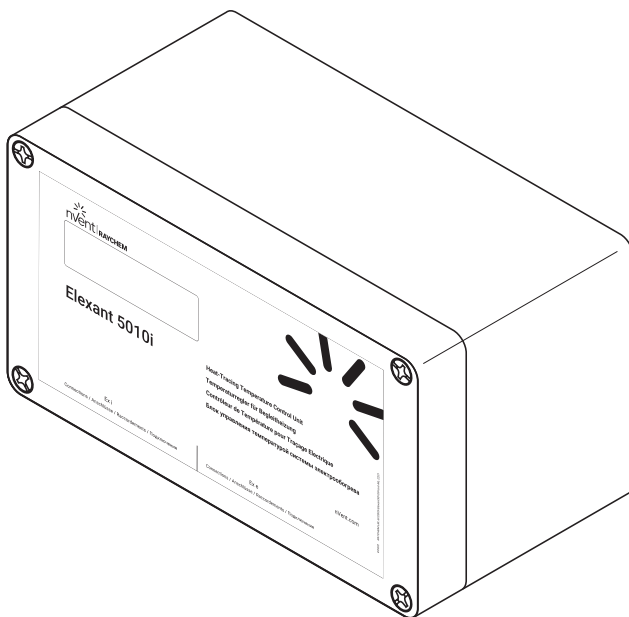


RAYCHEM

CONNECT AND PROTECT

Field-Mounted electronic heat-tracing control unit

PRODUCT OVERVIEW



The nVent RAYCHEM Elexant 5010i is an electronic heat-tracing control unit featuring the benefits of local control and the capability for central monitoring. Elexant 5010i control unit can be used for single phase circuits up to 25 A and is approved for use in hazardous areas. The Elexant 5010i can provide tight temperature control and is available with an IEC 61508-SIL 2 classified safety temperature limiter on board (Elexant 5010i-LIM). 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 Elexant 5010i offers several different control algorithms including PASC for an optimised electrical heat-tracing control. The Elexant 5010i offers alarms for high and low temperature, high and low current, high and low voltage and ground fault. 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 Elexant 5010i control unit provides a dry contact relay for alarm annunciation.

Automated heat-tracing system check

To ensure system integrity the Elexant 5010i control unit can be configured to periodically check dormant heating cables for faults. As a consequence maintenance personnel is systematically informed about the status of the heat-tracing system, and unexpected and usually expensive downtime of important pipelines can be reduced.

Communications and networking

The Elexant 5010i control unit is equipped with a RS-485 interface. Through this interface up to 247 Elexant 5010i units can be networked to a single nVent RAYCHEM NGC-UIT3-EX/TOUCH 1500 or to one serial port of a standard PC running nVent RAYCHEM Supervisor software.

The Elexant 5010i control unit can as well be monitored and/or configured via the wireless Tab-EX handheld device. This device is available for hazardous areas.

Installation

The Elexant 5010i control unit can be installed in the field near the heating application. The Elexant 5010i 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.

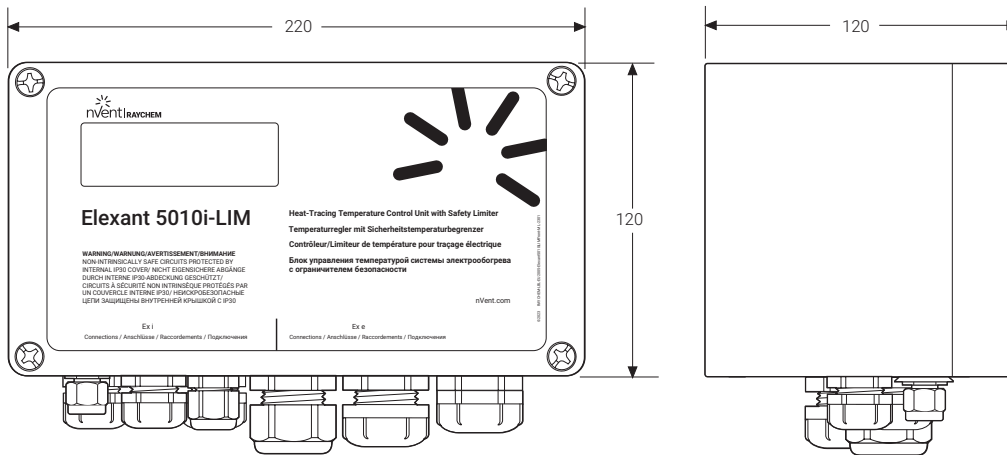
Configuration and commissioning

The Elexant 5010i control unit can be commissioned locally by means of a handheld programming device or from a central location using the nVent RAYCHEM NGC-UIT3-EX/TOUCH 1500 or nVent RAYCHEM Supervisor Software. After programming, all settings are permanently stored in the non-volatile memory of the Elexant 5010i control unit, avoiding loss of data in the event of power failure or after a long term power shutdown.



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Sample shown is Elexant 5010i-LIM. Gland included in scope of delivery - 1 x M25 x 1,5

Enclosure

Elexant 5010i(-LIM) units can be installed directly on the pipe via an appropriate support bracket as long as the maximum permitted ambient temperature is not exceeded. Alternatively, units can be mounted on any stable structure via the moulded holes in the enclosure.

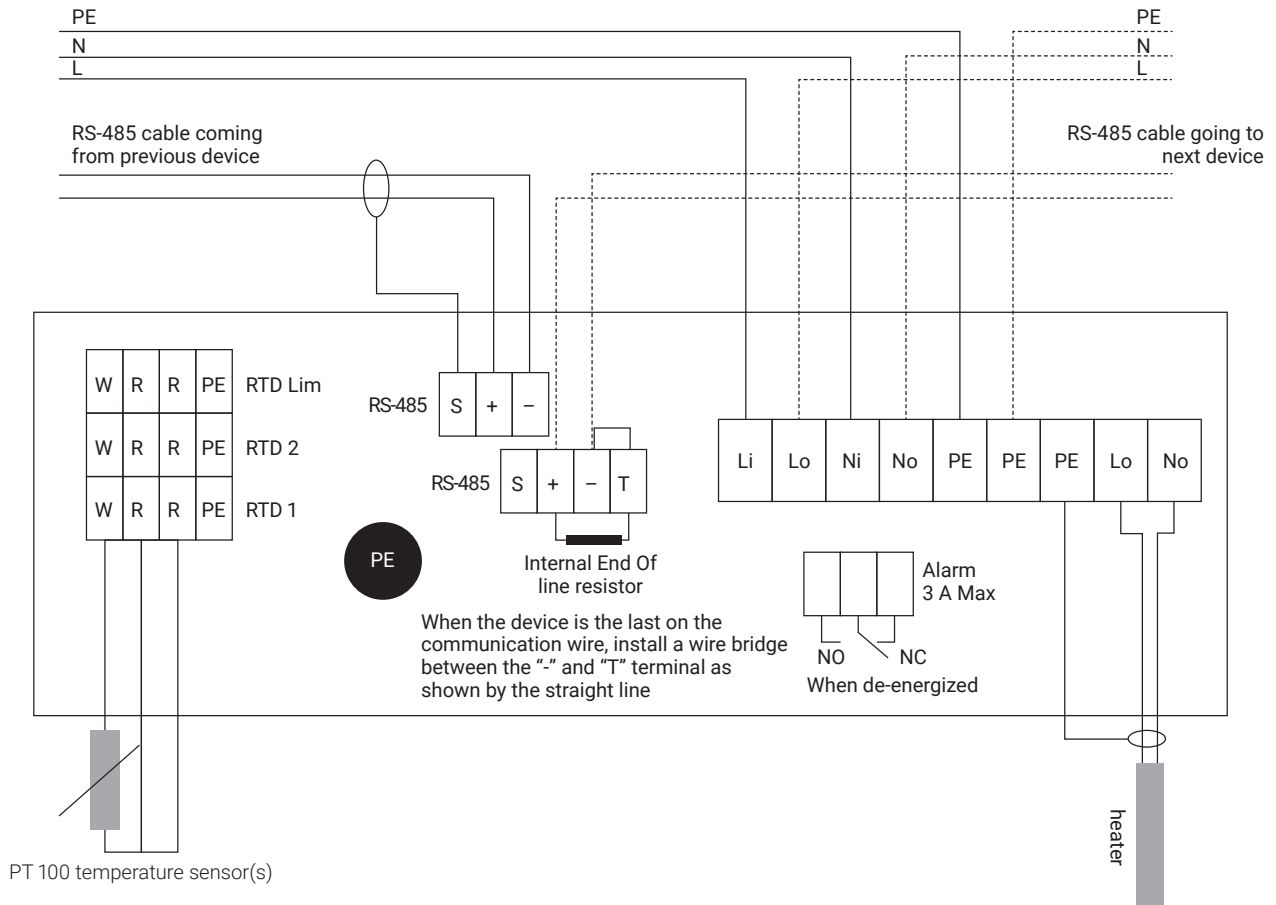
Protection	IP66 per IEC-60529
Material	Glass fibre reinforced enclosure with internal metallic earth plate on the bottom
Entries	<ul style="list-style-type: none"> 1 x M25 gland Ø 8 – 17 mm: power IN/heating cable out 3 x M25 <ul style="list-style-type: none"> 1 x M25 stopping plug: daisy chaining of power 1 x M25 rain plug: heating cable out 3 x M20 Digital communication IN/OUT and alarm (all with stopping plugs) 2 x M16 Temperature sensor(s): one with stopping plug, one with rain plug
Mounting & installation	Installation on an appropriate support bracket directly on the heated surface up to temperatures of 230°C. When the temperature of the heated surface is above 230°C, install the control unit to a stable structure nearby the application.
Installation position	Any position allowed, typical use with glands facing down

Electrical data

Power supply & own power consumption	100 Vac to 250 Vac +/-10% 50/60 Hz 20 VA max.
Connection terminals	Spring-type
L, N and PE terminals	9 pc (cables with cross section ranging from 0.2 to 6 mm ²)
Alarm output terminals	3 pc (cables with cross section ranging from 0.2 to 2.5 mm ²)
Pt 100 (RTD) terminals	8 pc Elexant 5010i, 12 pc Elexant 5010i-LIM (cables with cross section ranging from 0.2 to 1.5 mm ²)
RS-485 communication	7 pc (0.2 to 1.5 mm ²)
Internal Earth stud for RTD shield	1 pc (Cable cross section max 6 mm ²)
Alarm output relay	Contact rated 250 Vac/3 A Relay output is software programmable to open, close or to toggle in case of alarm
Electrical safety	EN 61010-1, Category III, Pollution degree 2



Connection diagram (typical)



Temperature sensors

Compatible types	100 Ω platinum, 3-wire, $\alpha = 0.00385 \Omega/^{\circ}\text{C}$. 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".

Communications

Physical network	RS-485 and Bluetooth
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 should be no more than 1200 m
Maximum quantity of control units	Max. of 247 units per nVent RAYCHEM NGC-UIT3-EX/TOUCH 1500 or per serial communication port in one network
Network User Interface	TOUCH 1500, NGC-UIT3-EX, Supervisor and Elexant Connect

Environmental

Ambient operating temperature	From -50°C to $+60^{\circ}\text{C}$ (ATEX, IECEx)
Storage temperature	From -55°C to $+80^{\circ}\text{C}$ (ATEX, IECEx)

Measuring ranges

Temperature range control unit	From -200°C to $+700^{\circ}\text{C}$ in steps of 1K
Temperature range limiter	From $+50^{\circ}\text{C}$ to $+599^{\circ}\text{C}$ in steps of 1K (Elexant 5010i-LIM only)
Voltage	From 90 Vac to 305 Vac
Load Current	From 0.1 A to 25 A
Ground-fault current	From 10 mA to 500 mA (RCD/ELCB required due to IEC and/or local regulations)
Heater time alarm	From 1 to 1×10^6 hours
Relay cycle alarm	From 0 to 2×10^6 cycle



Programming and setting

Method	Through handheld programming device and a wireless Bluetooth connection or via RS-485 interface and nVent RAYCHEM Supervisor software or nVent RAYCHEM User Interface
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: Heater, Alarm, RS-485 communication, Bluetooth communication Heater, Alarm, Limiter Tripped, RS-485 communication and Bluetooth

APPROVALS

For use in ordinary and hazardous area Zone 1 or Zone 2 (Gas) or Zone 21 or Zone 22 (Dust)

Temperature classification

T4

Product certification



* all in progress

More details about product certification, approvals and conditions of safe use are www.nVent.com/RAYCHEM.

Functional safety approval for limiter:

SIL2 IEC 61508

ORDERING INFORMATION

Elxant 5010i control units

Name	Description	Part Number	Weight
Elxant 5010i	Controller	2000002132	2.2 kg
Elxant 5010i-LIM	Controller + Limiter	2000002133	2.3 kg
Elxant 5010i (EAC pending)	Controller	2000002370	2.2 kg
Elxant 5010i-LIM (EAC pending)	Controller + Limiter	2000002369	2.3 kg

Temperature sensors

Name	Description	Part Number
MONI-PT100-260/2	Flexible sensor, maximum 260°C, 2 m length	1244-006615
MONI-PT100-260/5	Flexible sensor, maximum 260°C, 5 m length	1244-020817
MONI-PT100-260/10	Flexible sensor, maximum 260°C, 10 m length	1244-020816
MONI-PT100-EXE	Temperature Sensor with MI Cable and Junction Box	967094-000
MONI-PT100-EXE-SENSOR	Temperature Sensor with MI Cable	529022-000
MONI-PT100-EXE-AMB	Ambient Temperature Sensor with Junction box	1244-004451

Support bracket for installation on pipe

Product name	SB-125
Part number & (weight)	1244-06603 (0.5 kg)

Bluetooth enabled handheld programming device with customized nVent RAYCHEM software

Name	Description	Part Number
Tab-EX 02 DZ1	nVent RAYCHEM configuration & monitoring assistant Zone 1	1244-022745
Tab-EX 03 DZ2	nVent RAYCHEM configuration & monitoring assistant Zone 2	1244-022743

Single-point heat-tracing controller

PRODUCT OVERVIEW



Elexant 4010i-SSR-FW

The nVent RAYCHEM Elexant 4010i is a compact, full-featured, touch screen based, single-point heat-tracing controller. It provides control and monitoring of Electric Heat Tracing (EHT) circuits for both freeze protection and process temperature maintenance. This controller can monitor and alarm on high and low temperature, high and low current, ground-fault levels, voltage, and supports a host of additional features to offer the utmost in control and monitoring of EHT.

The Elexant 4010i controller is available in two output types: an electromechanical relay (EMR) for use in nonhazardous locations, and a solid-state relay (SSR) for use in nonhazardous and Class I Div. 2 / Zone 2 hazardous locations. The controller is protected by a Fiber reinforced plastic or Stainless steel enclosure, both with front window (-FW or -SW). Multiple communication ports allow flexible connectivity for remote monitoring, configuration, and ease of integration with nVent RAYCHEM Supervisor software or a Distributed Control System (DCS).

Control

The Elexant 4010i measures temperatures of up to three directly-connected temperature sensors. The controller also supports 4-20 mA inputs, allowing the use of external temperature sensor converters with thermocouples or other sensor types. The Elexant 4010i also features line sensing, ambient sensing, Proportional Ambient Sensing Control (PASC), and power limiting modes.

Monitoring

A complete set of parameters are measured, including ground fault, temperature, current and voltage to ensure system integrity. The controller can be set to periodically check the heating cable for faults, alerting maintenance personnel of a heat-tracing problem eliminating costly manual maintenance checks.

A programmable dry contact alarm relay is provided for local or remote alarm annunciation.

Installation



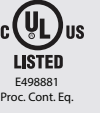
The Elexant 4010i comes ready to install, eliminating the need for custom panel design or field assembly. The IP6x rated FRP or stainless steel enclosures are approved for use in both indoor and outdoor locations. Wiring is as simple as connecting the incoming and outgoing power wiring (up to 277 Vac) and temperature sensors as needed for the application.

The Elexant 4010i provides an intuitive user interface that makes it easy to use and program. No additional programming devices are needed. Alarm conditions and programming settings are easy to read and interpret on the color touch screen. Settings are stored in non-volatile memory in the event of a power failure.

Communication

Elexant 4010i units come equipped with RS485 and Ethernet ports and can be readily connected to a distributed control system (DCS). The units support both the Modbus RTU and Modbus/TCP protocols. The controller may be networked to a host PC running Windows-based nVent RAYCHEM Supervisor software for central programming, status review, and alarm annunciation.

GENERAL

Area of Use	Nonhazardous locations (EMR versions) Nonhazardous and Class I, Division 2/Zone 2 hazardous locations (SSR versions)	
Approvals	Hazardous locations  Class I, Division 2, Group A,B,C,D T4 Type 4X Class I, Zone 2, AEx nA nC [ia Ga] IIC T4 Gc Ex ec nC [ia Ga] IIC T4 Gc IP64 (FW) IP66 (SW)  DEMKO 18 ATEX 2091 X IECEx UL 18 .0098X I13 (1)G Ex ec nC [ia Ga] IIC T4 Gc IP64 (FW) IP66 (SW)	Non-Hazardous locations  Enclosure Type 4X IP64 (FW) IP66 (SW)
	I.S Temperature Sensor Inputs (Optional) Um = 305VAC Associated Apparatus Uo = 5.4V Ca = 65uF Entity Parameters Io = 0.083A La = 2mH	
Electromagnetic Compatibility	IEC 61326-1:2012 / EN 61326-1:2013	
Supply voltage	100 Vac to 277 Vac, +/- 10%, 50-60 Hz	
Internal power consumption	< 24 W	

ENVIRONMENTAL

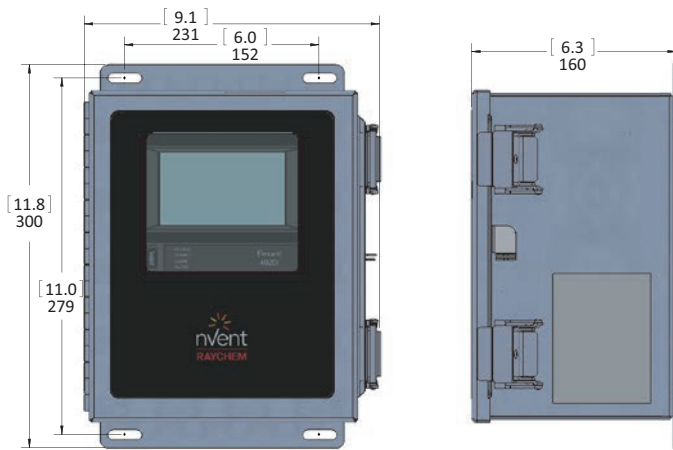
Protection	Type 4X, IP64 (FRP enclosure) Type 4X, IP66 (stainless steel enclosure)
Materials	Fiber-Reinforced Plastic (FRP) or stainless steel (SS304)
Ambient operating temperature	-40°C to 60°C (-40°F to 140°F)
Ambient storage temperature	-55°C to 85°C (-67°F to 185°F)
Relative humidity	0% to 90%, noncondensing
Environment	PD2, CAT III
Max altitude	2,000 m (6,562 ft)

CONTROL

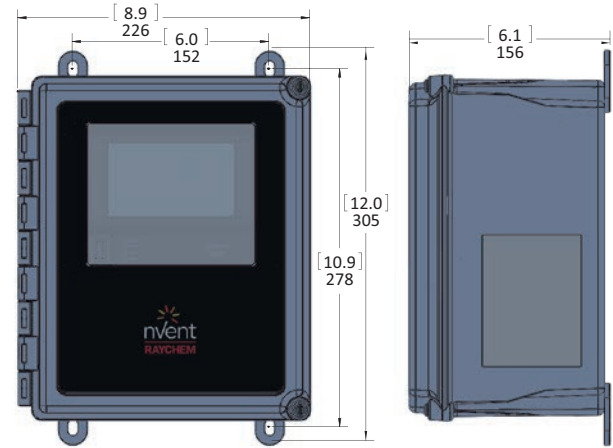
Relay Type	Double-pole, mechanical (EMR versions) Double-pole, solid-state (SSR versions)
Voltage, maximum	277 Vac nominal, 50/60 Hz
Current, maximum	32 A @ 40°C, de-rated to 24 A @ 50°C and further de-rated to 16 A @ 60°C (EMR) 32 A @ 40°C, de-rated to 24 A @ 50°C and further de-rated to 16 A @ 60°C (SSR)
Control algorithms	EMR: On/Off, PASC, always on, always off SSR: On/Off, proportional, PASC, always on, always off
Control Range	-200°C to 700°C (-328°F to 1292°F)

TYPICAL ENCLOSURE DIMENSIONS ([INCHES] MM)

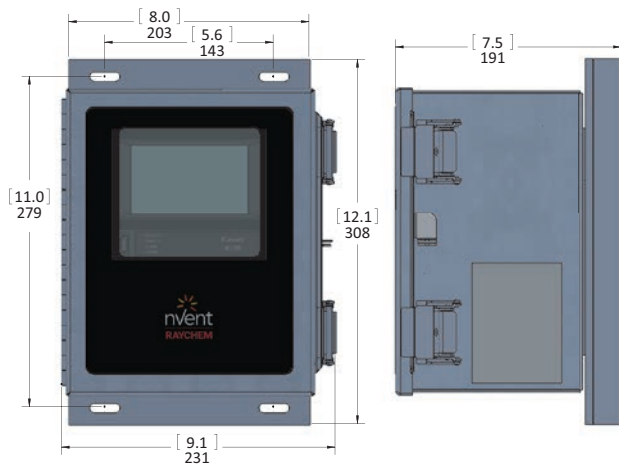
Elexant 4010i-EMR-SW



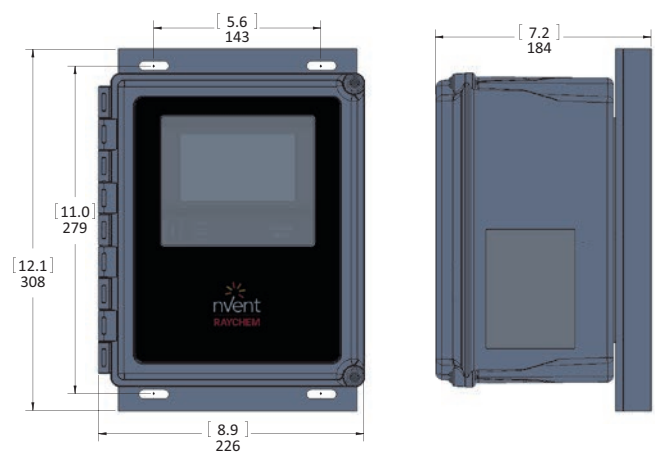
Elexant 4010i-EMR-FW



Elexant 4010i-SSR-SW



Elexant 4010i-SSR-FW



MOUNTING

FRP enclosure with EMR (EMR-FW)	Surface mounting with four holes on 152 mm x 278 mm (6.0 in x 10.9 in) centers Hole diameter: 8 mm (0.3 in)
FRP enclosure with SSR (SSR-FW)	Surface mounting with four holes on 143 mm x 279 mm (5.6 in x 11.0 in) centers Hole diameter: 8 mm (0.3 in)
SS enclosure with EMR (EMR-SW)	Surface mounting with four holes on 152 mm x 279 mm (6.0 in x 11.0 in) centers Hole diameter: 8 mm (0.3 in)
SS enclosure with SSR (SSR-SW)	Surface mounting with four holes on 143 mm x 279 mm (5.6 in x 11.0 in) centers Hole diameter: 8 mm (0.3 in)

MONITORING

Temperature	Low alarm range	-200°C to 700°C (-328°F to 1292°F) or OFF
	High alarm range	-200°C to 700°C (-328°F to 1292°F) or OFF
Ground fault	Alarm range	10 mA to 500 mA or OFF
	Trip range	10 mA to 500 mA or OFF
Current	Low alarm range	0.1 A to 100 A or OFF
	High alarm range	0.1 A to 100 A or OFF
	Power limit range	8 W to 30 kW
Voltage	Low alarm range	80 Vac to 300 Vac or OFF
	High alarm range	80 Vac to 300 Vac or OFF
Resistance	Low resistance range	1% to 100% of deviation from nominal
	High resistance range	1% to 250% of deviation from nominal
Autocycle	Diagnostic test interval	1 to 750 hours

TEMPERATURE SENSOR INPUTS

Quantity	3 Each can be individually set to one of the types below.
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Types

100Ω platinum RTD	3-wire, $\alpha=0.00385$ ohms/ohm/°C -200°C to 700°C (-328°F to 1292°F), $\pm 1^\circ\text{C}$ Can be extended with a 3-conductor shielded cable of 20Ω maximum per conductor
100Ω nickel iron RTD	2-wire, $\alpha=0.00599$ ohms/ohm/°C -73°C to 350°C (-99°F to 662°F), $\pm 1^\circ\text{C}$ Can be extended with a 2-conductor shielded cable of 20Ω maximum per conductor
100Ω nickel RTD	2-wire, $\alpha=0.00618$ ohms/ohm/°C -70°C to 250°C (-94°F to 482°F), $\pm 1^\circ\text{C}$ Can be extended with a 2-conductor shielded cable of 20Ω maximum per conductor
Thermocouple	Requires external 4-20 mA converter 4-20 mA current loop, ± 0.05 mA, 24 Vdc loop power

The Elexant 4010i-IS variants are equipped with intrinsic safety barriers at the RTD inputs.

RTD Intrinsic Safety Associated Apparatus Entity Parameters

Uo (Maximum Output Voltage): 5.4 V	La (Maximum External Inductance): 2 mH
Io (Maximum Output Current): 0.083 A	Ca (Maximum External Capacitance): 65 uF
Po (Maximum Output Power): 0.449 W	

DIGITAL INPUTS

Quantity	Two multi-purpose inputs for connection to external dry (voltage free) contact or DC voltage May be configured for Hand-Off-Auto (HOA) operation
Rating	100Ω max loop resistance or 5-24 Vdc @ 1 mA maximum

OUTPUTS

Alarm Relay	Form-C dry contact: 00 Vac to 277 Vac, 3 A 50/60 Hz
Auxiliary Output	24 Vdc, max load of 250 mA @ 40°C, de-rated to 165 mA @ 60°C

CONFIGURATION

Method	Touch screen display
Units	°F or °C
Idle display	Sensor temperature, control temperature, heater current, voltage, power, alarm status
LEDs	Status, heater on, alarm conditions, receive / transmit data
Memory	Nonvolatile, restored after power loss, checksum data checking
Stored usage parameters	Minimum and maximum process temperature, maximum ground-fault current, minimum and maximum voltage, maximum heater current, power accumulator, contactor cycle count, total time in use, heater on time
Alarm conditions	Low / high temperature, low / high current, low / high voltage, low / high resistance, ground-fault alarm / trip, RTD failure, loss of programmed values, EMR or SSR failure, equipment protection trip, attached device alarm, contactor lifetime exceeded
Alarm Modes	Normal (solid on), flash (on & off), toggle (re-ring new alarms)
Control Algorithms	EMR: On/Off, PASC, always on, always off SSR: On/Off, proportional, PASC, always on, always off
Equipment Protection	Ground fault trip, low / high temperature limit, Soft-Start features, (heat trace output limiting, SSR overcurrent protection, circuit breaker nuisance trip prevention)
Load Shedding	Up to 8 zones, with temperature failsafe and communication timeout (requires nVent RAYCHEM Supervisor)
Profiles	Built-in default setting profiles for common heat trace applications Up to two additional user configurations can be saved and reloaded. Saved configurations can be saved to, and loaded from, a USB thumb drive

Network	Automatic network configuration with DHCP, or static IP configuration
Firmware Updates	User updateable using a USB thumb drive
Multi-language Interface	English, French, German, Spanish, Russian
Other	Password protection, text tags / identifiers for controller and temperature sensors

CONNECTION TERMINALS

Power supply input	Screw terminals, 0.2 – 16.8 mm ² (24 – 5 AWG)
Heating cable output	Screw terminals, 0.2 – 16.8 mm ² (24 – 5 AWG)
Torque range for screw terminals	1.2 – 1.5 Nm
Ground (Earth)	Three box lugs, 2.0 – 33.6 mm ² (14 – 2 AWG)
Sensor / Other terminals	Cage clamp terminals, 0.08 – 3.3 mm ² (28 – 12 AWG)

CABLE ENTRIES

Fiberglass enclosure	3 x M16	for temperature sensors, 2 x stopping plugs and 1 x rain plug
	2 x M20	For communication and/or alarm relay, all with stopping plugs
	2 x M25	1 x gland (GL-55-M25), Ø 8-15 mm for power cable in 1 x rain plug for heat-tracing cable out
Stainless steel enclosure	3 x M16	for temperature sensors, 2 x stopping plugs and 1 x rain plug
	2 x M20	For communication and/or alarm relay, all with stopping plugs
	2 x M25	2 x rain plugs for power cable in and heat-tracing cable out

COMMUNICATIONS

RS-485

Type	2-wire RS-485
Cable	One shielded twisted pair
Length	1,200 m (4,000 ft.) maximum
Quantity	Up to 247 devices per port
Data Rate	9600, 19.2k, 38.4k, 57.6k baud
Parity	None, even, odd
Stop bits	0, 1, 2
Tx delay	0 – 5 seconds
Protocol	Modbus RTU

Ethernet

Type	10/100 Base-T
Length	100 m (328 ft) max
Data rates	10 or 100 MB/s
Protocol	Modbus/TCP, DHCP
Connection terminals	Shielded 8-pin RJ-45



ORDERING DETAILS

Description	Catalog number	Part number	Weight (kg/lbs)
Elxant 4010i controller in an 20 cm x 25 cm FRP enclosure with window. Controls a single circuit with a 2-pole electromechanical relay (32 A EMR). Includes intrinsically safe barriers on RTD inputs with power cable gland.	10380-009	4010i-EMR-IS-FW (EMEA)	4.6/10.2
(Approved for nonhazardous locations only. RTDs may be placed in Zone 0/Zone 1/Zone 2 locations)			
Elxant 4010i controller in an 20 cm x 25 cm stainless steel enclosure with window. Controls a single circuit with a 2-pole electromechanical relay (32 A EMR). Includes intrinsically safe barriers on RTD inputs with power cable gland.	10380-011	4010i-EMR-IS-SW (EMEA)	6.6/14.6
(Approved for nonhazardous locations only. RTDs may be placed in Zone 0/Zone 1/Zone 2 locations)			
Elxant 4010i controller in an 20 cm x 25 cm FRP enclosure with window. Controls a single circuit with a 2-pole solid-state relay (32 A SSR). Includes intrinsically safe barriers on RTD inputs with power cable gland.	10380-010	4010i-SSR-IS-FW (EMEA)	6.6/14.6
(Approved for Zone 2 hazardous locations. RTDs may be placed in Zone 0/Zone 1/Zone 2 locations)			
Elxant 4010i controller in an 20 cm x 25 cm stainless steel enclosure with window. Controls a single circuit with a 2-pole solid-state relay (32 A SSR). Includes intrinsically safe barriers on RTD inputs with power cable gland.	10380-012	4010i-SSR-IS-SW (EMEA)	8.6/19.0
(Approved for Zone 2 hazardous locations. RTDs may be placed in Zone 0/Zone 1/Zone 2 locations)			
RTD Sensors			
Temperature Sensor with 2 m flexible cable and M16 gland, Pt100	MONI-PT100-260/2	1244-006615	0.14/0.3
Temperature Sensor with 5 m flexible cable and M16 gland, Pt100	MONI-PT100-260/5	1244-020817	0.35/0.8
Temperature Sensor with 10 m flexible cable and M16 gland, Pt100	MONI-PT100-260/10	1244-020816	0.7/1.5
Temperature Sensor with 2 m MI Cable and Junction Box, Pt100, ATEX	MONI-PT100-EXE	967094-000	0.5/1.1
Temperature Sensor with 2 m MI Cable and M16 gland, Pt100, ATEX	MONI-PT100-EXE-SENSOR	529022-000	0.13/0.3
nVent RAYCHEM Supervisor Software	Available for download at www.nVent.com		



Control & Monitoring

Single-point heat-tracing control module

PRODUCT OVERVIEW



Elexant 4020i-Mod-3P-IS

The nVent RAYCHEM Elexant 4020i is a compact, full-featured, touch screen based, single-point heat-tracing controller. It provides control and monitoring of Electric Heat-Tracing (EHT) circuits for both freeze protection and process temperature maintenance. This controller can monitor and alarm on high and low temperature, high and low current, ground-fault levels, voltage, and supports a host of additional features to offer the utmost in control and monitoring of EHT.

The Elexant 4020i controller provides three output types: a line powered electromechanical relay (EMR) for driving contactors in nonhazardous locations; a DC output for driving solid-state relays (SSRs) in nonhazardous and Class I Div. 2 / Zone 2 hazardous locations; and a 0-10V analog output for driving variable output power modules. Multiple communication ports allow flexible connectivity for remote monitoring, configuration, and ease of integration with nVent RAYCHEM Supervisor software or a Distributed Control System (DCS).

Control

The Elexant 4020i measures temperatures for up to three directly-connected temperature sensors. The controller also supports 4-20 mA inputs, allowing the use of external temperature sensor converters with thermocouples or other sensor types. The Elexant 4020i also features line sensing, ambient sensing, Proportional Ambient Sensing Control (PASC), and power limiting modes.

Safety limiter

The Safety Limiter option provides a redundant, functionally safe, high temperature cutout mechanism. Its IEC61508 SIL2 certification makes it suitable for safety-critical applications.

Monitoring

A complete set of parameters are measured, including ground fault, temperature, current, and voltage to ensure system integrity. The system can be set to periodically check the heating cable for faults, alerting maintenance personnel of a heat-tracing problem eliminating costly manual maintenance checks.

A programmable dry contact alarm relay is provided for local or remote alarm annunciation. The dedicated Safety Limiter contactor output provides hardware redundancy for the Safety Limiter option.

Installation

The Elexant 4020i modules can be mounted on symmetric 35 mm DIN-rails into an enclosure appropriate for the intended environment. nVent offers standard multi-circuit panels suitable for indoor or outdoor locations, and custom configurations are available to provide the most flexible solution. Installing is as simple as connecting the incoming and outgoing power wiring and temperature sensors as needed for the application.

The Elexant 4020i provides an intuitive user interface that makes it easy to use and program. No additional programming devices are needed. Alarm conditions and programming settings are easy to read and interpret on the color touch screen. Settings are stored in non-volatile memory in the event of a power failure.



Communication

Elexant 4020i units come equipped with RS485 and Ethernet ports and can be readily connected to a distributed control system (DCS). The units support both the Modbus RTU and Modbus/TCP protocols, and an optional Profibus module is also available. The controller may be networked to a host PC running Windows-based nVent RAYCHEM Supervisor software for central programming, status review, and alarm annunciation.

PRODUCT SPECIFICATIONS

Typical enclosure dimensions

Elexant 4020i-Mod shown



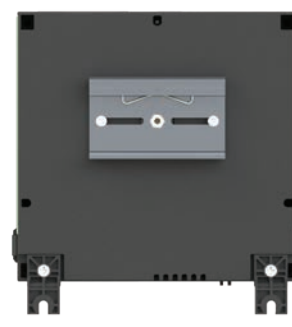
Front View



Side View



Bottom View

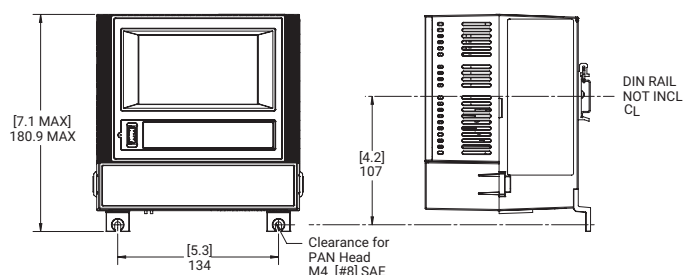


Rear View

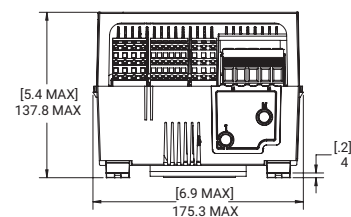
Mounting ([inches] mm)

Without IS barrier

Panel mounting on 35 mm DIN rails

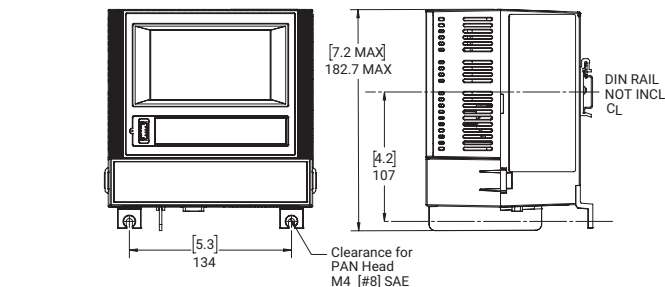


Single phase

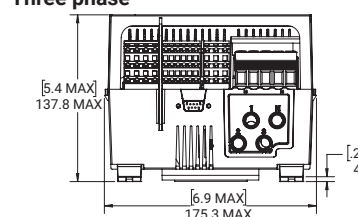


With IS barrier

Panel mounting on 35 mm DIN rails



Three phase



Technical details

Supply voltage	100 Vac to 277 Vac, +/-10%, 50-60 Hz	
Internal power consumption	< 24 W per 4020i module	
I.S temperature sensor inputs (Optional)	Um = 305 VAC	
Associated apparatus	Uo = 5.4 V	Ca = 65 uF
Entropy parameters	Io = 0.083 A	La = 2 mH

Functional safety

Standard	IEC 61508:2010
Safety integrity level	SIL 2
Systematic capability	SC 3
Available only with the Safety Limiter option. See Safety Limiter section of User Manual for detailed safety information.	

Environmental

Ambient operating temperature	-40°C to 70°C (-40°F to 158°F)
Ambient storage temperature	-55°C to 85°C (-67°F to 185°F)
Relative humidity	0% to 90%, noncondensing
Environment	PD2, CAT III
Max altitude	2,000 m (6,562 ft)

Elexant 4020i control modules are packaged in DIN rail mount housings for installation onto symmetric 35 mm DIN rails into enclosures suitable for the intended environment.

Control & load

Load voltage, maximum	690 Vac, 50/60 Hz
Load current, maximum	63 A continuous (limited by the rating of the output device)
Control algorithms	EMR Version: On/Off, PASC, always on, always off SSR Version: On/Off, proportional, PASC, always on, always off
Control range	-200°C to 700°C (-328°F to 1292°F)

Monitoring

Temperature	Low alarm range	-200°C to 700°C (-328°F to 1292°F) or OFF
	High alarm range	-200°C to 700°C (-328°F to 1292°F) or OFF
Ground fault	Alarm range	10 mA to 500 mA or OFF
	Trip range	10 mA to 500 mA or OFF
Current	Low alarm range	0.1 A to 100 A or OFF
	High alarm range	0.1 A to 100 A or OFF
	Power limit range	8 W to 30 kW
Voltage	Low alarm range	80 Vac to 300 Vac or OFF
	High alarm range	80 Vac to 300 Vac or OFF
Resistance	Low resistance range	1% to 100% of deviation from nominal
	High resistance range	1% to 250% of deviation from nominal
Autocycle	Diagnostic test interval	1 to 750 hours

Temperature sensor inputs

Standard

Quantity	3 Each can be individually set to one of the types below.
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Types

100 Ω platinum RTD	3-wire, $\alpha=0.00385$ ohms/ohm/°C -200°C to 700°C (-328°F to 1292°F), $\pm 1^\circ\text{C}$ Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor
100 Ω nickel iron RTD	2-wire, $\alpha=0.00599$ ohms/ohm/°C -73°C to 350°C (-99°F to 662°F), $\pm 1^\circ\text{C}$ Can be extended with a 2-conductor shielded cable of 20 Ω maximum per conductor
100 Ω nickel RTD	2-wire, $\alpha=0.00618$ ohms/ohm/°C -70°C to 250°C (-94°F to 482°F), $\pm 1^\circ\text{C}$ Can be extended with a 2-conductor shielded cable of 20 Ω maximum per conductor
Thermocouple	Requires external 4-20 mA converter 4-20 mA current loop, ± 0.05 mA, 24 Vdc loop power

The Elexant 4020i-IS variants are equipped with intrinsic safety barriers at the RTD inputs.

RTD Intrinsic Safe (IS) associated apparatus entity parameters

Uo (Maximum output voltage): 5.4 V	La (Maximum External Inductance): 2 mH
Io (Maximum output current): 0.083 A	Ca (Maximum External Capacitance): 65 μ F
Po (Maximum output power): 0.449 W	

Optional

Safety limiter	One dedicated temperature input
100 Ω platinum RTD	3-wire, $\alpha=0.00385$ ohms/ohm/ $^{\circ}$ C -200 $^{\circ}$ C to 700 $^{\circ}$ C (-328 $^{\circ}$ F to 1292 $^{\circ}$ F), $\pm 1^{\circ}$ C Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor

Digital inputs

Quantity	Two multi-purpose inputs for connection to external dry (voltage free) contact or DC voltage May be configured for Hand-Off-Auto (HOA) operation
Rating	100 Ω max loop resistance or 5-24 Vdc @ 1 mA maximum

Outputs

Control relay	Form-A wet contact:	100 Vac to 277 Vac, 3 A, 50/60 Hz
DC (SSR) control output	12 Vdc @ 215 mA max.	
Analog (linear phase control)	0-10 Vdc @ 215 mA max.	
Alarm relay	Form-C dry contact:	100 Vac to 277 Vac, 3 A, 50/60 Hz
Auxiliary output	24 Vdc, max load of 250 mA @ 40 $^{\circ}$ C, de-rated to 165 mA @ 60 $^{\circ}$ C	

Configuration

Method	Touch screen display	
Units	$^{\circ}$ F or $^{\circ}$ C	
Idle display	Sensor temperature, control temperature, heater current, voltage, power, alarm status	
LEDs	Status, heater on, alarm conditions, receive / transmit data	
Memory	Nonvolatile, restored after power loss, checksum data checking	
Stored usage parameters	Minimum and maximum process temperature, maximum ground-fault current, minimum and maximum voltage, maximum heater current, power accumulator, contactor cycle count, total time in use, heater on time	
Alarm conditions	Low / high temperature, low / high current, low / high voltage, low / high resistance, ground-fault alarm / trip, RTD failure, loss of programmed values, EMR or SSR failure, equipment protection trip, attached device alarm, Safety Limiter alarms, contactor lifetime exceeded	
Alarm modes	Normal (solid on), flash (on & off), toggle (re-ring new alarms)	
Control algorithms	EMR Version: On/Off, PASC, always on, always off SSR Version: On/Off, proportional, PASC, always on, always off	
Equipment protection	Ground fault trip, low / high temperature limit, Soft-Start features: (heat-trace output limiting, SSR overcurrent protection, circuit breaker nuisance trip prevention)	
Load shedding	Up to 8 zones, with temperature failsafe and communication timeout (requires nVent RAYCHEM Supervisor)	
Profiles	Built-in default setting profiles for common heat trace applications Up to two additional user configurations can be saved and reloaded. Saved configurations can be saved to, and loaded from, a USB thumb drive	
Network	Automatic network configuration with DHCP, or static IP configuration	
Firmware updates	User updateable using a USB thumb drive	
Multi-language interface	English, French, German, Spanish, Russian	
Other	Password protection, text tags / identifiers for controller and temperature sensors	

Connection terminals

Power supply input	Screw terminals, 0.2 – 16.8 mm ² (24 – 5 AWG)
Heating cable voltage sense input	Screw terminals, 0.2 – 16.8 mm ² (24 – 5 AWG)
Ground (Earth)	Screw terminal, 0.2 – 16.8 mm ² (24 – 5 AWG)
Torque range for screw terminals	1.2 – 1.5 Nm
Sensor / Other terminals	Cage clamp terminals, 0.08 – 3.3 mm ² (28 – 12 AWG)

Communications

RS485

Type	2-wire RS485
Cable	One shielded twisted pair
Length	1,200 m (4,000 ft) maximum
Quantity	Up to 247 devices per port
Data Rate	9600, 19.2 k, 38.4 k, 57.6 k baud
Parity	None, even, odd
Stop bits	0, 1, 2
Tx delay	0 – 5 seconds
Protocol	Modbus RTU

Ethernet

Type	10/100 BaseT
Length	100 m (328 ft) maximum
Data rates	10 or 100 MB/s
Protocol	Modbus/TCP, DHCP
Connection terminals	Shielded 8-pin RJ-45

APPROVALS

For use in ordinary area when using EMR contactors.

For use in ordinary and hazardous area Zone 2 (Gas) and Class I Div 2 for SSR or purged panel versions

Temperature classification

T4

Product certification



For certifications in other regions (FM, CSA, IEx, UL etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.



ORDERING INFORMATION

Description	Catalog Number	Part Number	Weight (kg/lbs.)
Elexant 4020i controller module with intrinsically safe barriers on RTD inputs. Single Phase loads. (Approved for Zone 2 locations. RTDs may be placed in Zone 0/ Zone 1/Zone 2 locations)	10380-021	4020i-Mod-IS	1.3/2.9
Elexant 4020i controller module with intrinsically safe barriers on RTD inputs and functional safety limiter. Single Phase loads. (Approved for Zone 2 locations. RTDs may be placed in Zone 0/ Zone 1/Zone 2 locations)	10380-022	4020i-Mod-IS-LIM	1.2/2.6
Elexant 4020i controller module with intrinsically safe barriers on RTD inputs. Three Phase loads. (Approved for Zone 2 locations. RTDs may be placed in Zone 0/ Zone 1/Zone 2 locations)	10380-024	4020i-Mod-3P-IS	1.3/2.9
RTD Sensors Temperature Sensor with 2 m flexible cable and M16 gland, PT100 Temperature Sensor with 5 m flexible cable and M16 gland, PT100 Temperature Sensor with 10 m flexible cable and M16 gland, PT100 Temperature Sensor with 2 m MI Cable and Junction Box, PT100, ATEX Temperature Sensor with 2 m MI Cable and M16 gland, PT100, ATEX	MONI-PT100-260/2 MONI-PT100-260/5 MONI-PT100-260/10 MONI-PT100-EXE MONI-PT100-EXE- SENSOR	1244-006615 1244-020817 1244-020816 967094-000 529022-000	0.14/0.3 0.35/0.8 0.7/1.5 0.5/1.1 0.13/0.3
nVent RAYCHEM – Supervisor Software	Available for download at www.nVent.com		

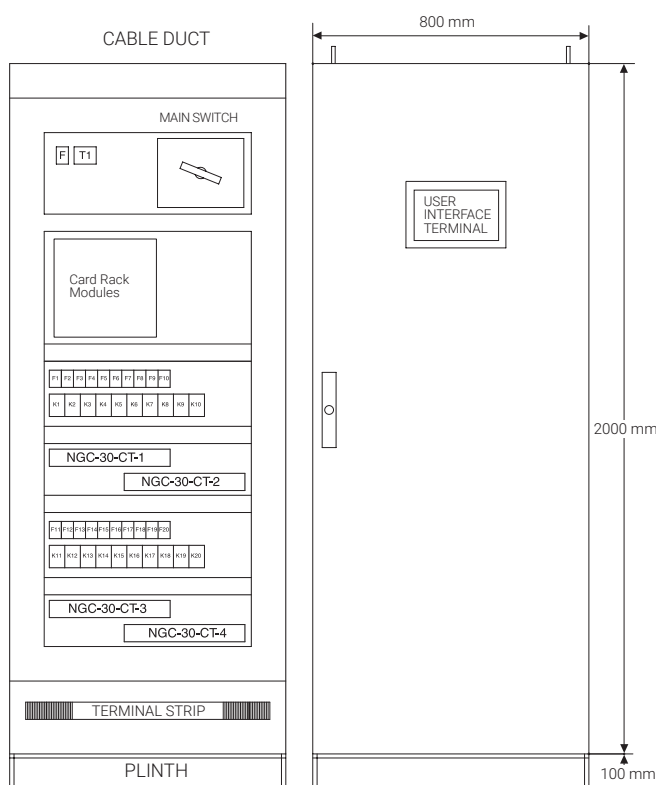


Control & Monitoring

CONNECT AND PROTECT

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

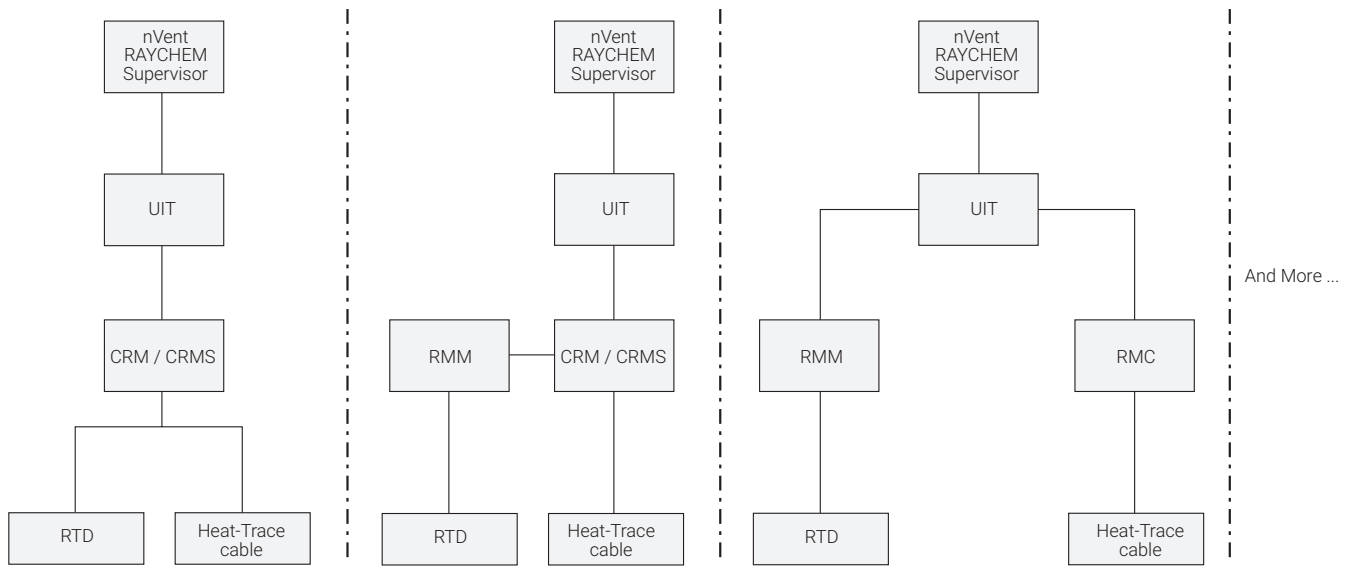
The nVent RAYCHEM NGC-30 is available as a complete distribution panel system. Typical characteristics for these panels are easy access, pre-wired and all wiring landed on easy accessible terminals. The enclosure is based on industrial standards while the wiring is optimised for maintenance purposes. 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-UIT3-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 RMM3 for temperature measurement and the RMM2-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 (RMM3) and Remote Modules for Control (RMC).

The powerful 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-UIT3-EX) is the central part of the nVent RAYCHEM NGC-30 communication. The UIT can be used as well with the nVent RAYCHEM Elexant 5010i and NGC-20 (for more information see the nVent RAYCHEM Elexant 5010i and NGC-20 datasheet).

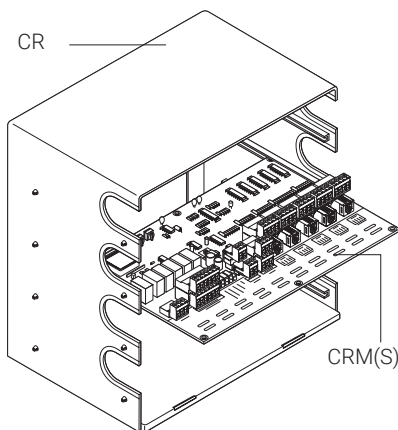
It covers heat-tracing monitoring, configuration and maintenance purposes.

The nVent RAYCHEM User Interface Terminal (NGC-UIT3-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-UIT3-EX is for direct mounting on the nVent RAYCHEM NGC-30 panel door. The Remote User Interface Terminal (NGC-UIT3-ORD-R) is a panel mounted display (NGC-UIT3-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 RAYCHEM-IM-H86181-NGCUI3EX.

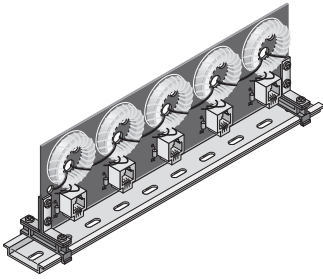
Card Rack Module (CRM/CRMS)



The nVent RAYCHEM Card Rack Module controls up to 5 heat-tracing circuits.

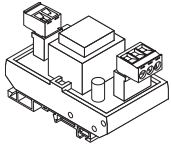
The Card Rack Modules are available in two versions, the nVent RAYCHEM NGC-30 CRM (for mechanical relays) and the nVent RAYCHEM NGC-30 CRMS (for solid state relays). Up to four of these Card Rack Modules can be installed in a panel mounted Card Rack. RTD's are either directly connected to the nVent RAYCHEM 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 Module (CTM)



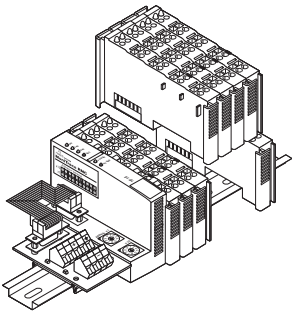
nVent RAYCHEM Current Transformers are an important part of the nVent RAYCHEM NGC-30 system. nVent RAYCHEM CRM in combination with current transformers offer the capability of monitoring and alarming on ground-fault and operating currents. Circuits can be tripped by the controller on high ground-fault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

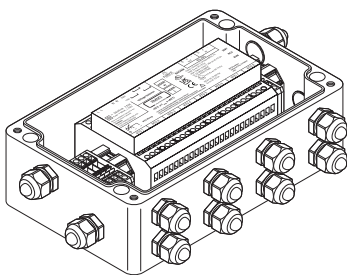


The nVent RAYCHEM NGC-30 system also includes integrated control functionality. Multiple relay outputs to operate contactors of each heat-tracing circuit will be provided by Remote Modules for Control (RMC). Temperature inputs will be provided by Remote Monitoring Modules (RMM) while the control is executed 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 (RMM3) for temperature measurement



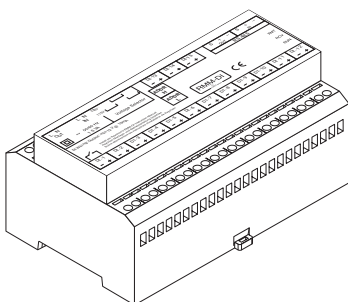
Remote Monitoring Modules (RMM3) provide temperature monitoring capability for the nVent RAYCHEM NGC-30 system.

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 RMM3 is without an enclosure.

The RMM3-EX-E is built into a Hazardous approved enclosure. For more details see the RMM3 datasheet.

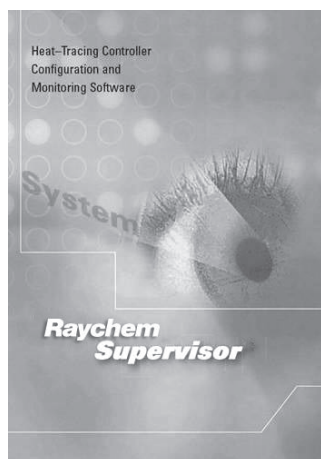
Remote Monitoring Modules (RMM2-DI) for digital input



Remote Monitoring Module for Digital Inputs (RMM2-DI) provides digital input monitoring capability for the nVent RAYCHEM NGC-30 system. The RMM2-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 RMM2-DI module can be installed in ATEX / UKEx / IECEx Zone 2 hazardous area. For more details see the RMM2-DI datasheet.



nVent RAYCHEM Supervisory Software



The nVent RAYCHEM NGC-30 system integrates seamlessly 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.

PRODUCT SPECIFICATIONS

Technical details

Type	Surface Sensing/Ambient Sensing/PASC (Proportional Ambient Sensing Control)
Display	
Type	LCD is a XGA, colour TFT transfective 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
Enclosure	
Protection	UIT: IP 65 (NEMA 4) when mounted in a panel door.
Ambient operating temperature range	UIT: -40°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-UIT3-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.
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

Configuration

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 hours or off	
Temperature sensor inputs	One input standard per control point on CRM, optional temperature inputs via max. 16 RMMs (8 RTDs per RMM)	
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.



APPROVALS

For use in ordinary area (indoors or outdoors) typically panel mounted

Temperature classification

T5

Product certification



For certifications in other regions (FM, CSA, IEx etc.), please refer to the installation manual.

More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

ORDERING INFORMATION

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.

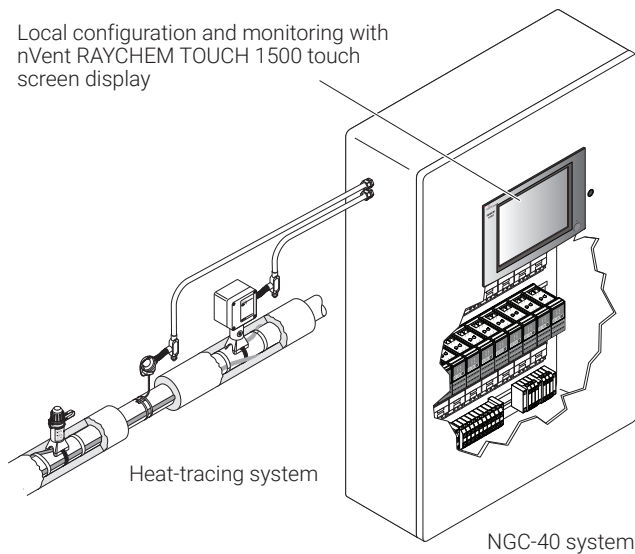
Individual components

Product Name	Description	Part Number (Weight)
RMM3	Eight RTD inputs, no enclosure RMM3	1244-022749 (0.7 kg)
RMM3-24VDC	Eight RTD inputs, no enclosure RMM3-24VDC	1244-022782 (0.7 kg)
NGC-UIT3-EX	User Interface Terminal	10332-034 (1.78 kg)
NGC-UIT3-ORD-R	User Interface Terminal with enclosure	10332-035 (8.86 kg)
NGC-30-CRM	Card Rack Module (EMR)	10720-001 (0.68 kg)
NGC-30-CRMS	Card Rack Module (SSR)	10720-004 (0.50 kg)
NGC-30-CTM	Current Transformer Module	10720-002 (0.36 kg)
NGC-30-CVM	Voltage Monitoring Module (CVM)	10720-005 (0.20 kg)
NGC-30-CR	Card Rack	10720-003 (3.66 kg)
PS12	Transformer 12 V DC	1244-001505 (0.18 kg)

Panel mounted advanced modular heat-tracing control system

PRODUCT OVERVIEW

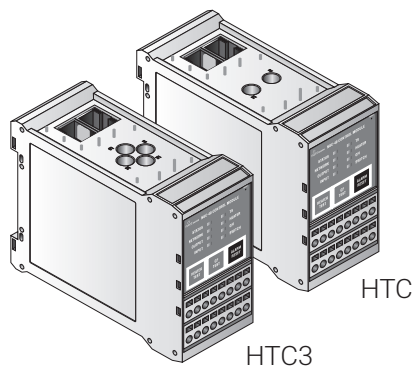
Local configuration and monitoring with nVent RAYCHEM TOUCH 1500 touch screen display



The nVent 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 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

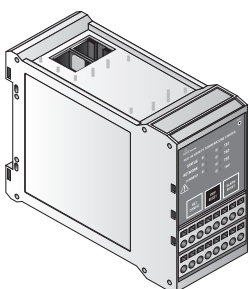


The NGC-40 uses a single controller module per heat-tracing circuit for maximum reliability. The NGC-40 control system can be powered between 100 to 240 Vac, while mechanical contactors (EMRs) or solid-state relays (SSRs) allow circuit switching up to 60 A at 600 Vac.

There are dedicated control modules available for single phase (NGC-40-HTC) and three-phase (NGC-40-HTC3) heat-tracing circuits. The 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 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.

Safety temperature limiter: NGC-40-SLIM

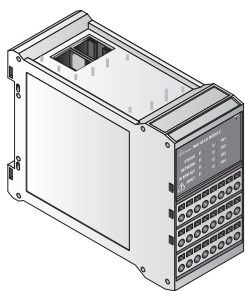


The NGC-40 has a certified safety temperature limiter module.

The module can be used with up to 3 temperature inputs for three phase heat-tracing circuits. The limiter can be associated with a 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 nVent RAYCHEM TOUCH 1500 and nVent RAYCHEM Supervisor.

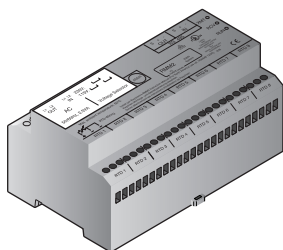


IO module: NGC-40-IO



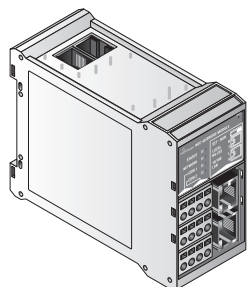
In addition to hardwiring an RTD directly into a Heat Trace Control module, RTDs can be wired to Input/output modules (NGC-40-IO) within the panel and assigned to heat-tracing circuits through software. This means that a NGC-40 system can be optimised for the specific application needs. Each IO module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

RMM2



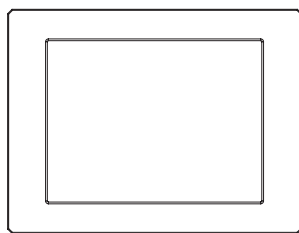
The NGC-40 works with the MONI-RMM2 module. Each RMM2 module installed in the field can accept up to 8 RTDs. 16 RMM2 Modules can be daisy chained together via RS-485 for a total of 128 temperature inputs. Since multiple RMM2s can be networked over a single cable to the NGC-40, the cost of RTD field wiring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

Communication module: NGC-40-BRIDGE



The 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 TOUCH 1500 touch screen, Supervisor 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.

nVent RAYCHEM TOUCH 1500



Front View

The nVent RAYCHEM TOUCH 1500 is a panel mounted display used in conjunction with NGC-20 and NGC-40 Control and Monitoring Systems devices. The TOUCH 1500 is rated IP 65 (NEMA 4) and can be mounted both indoors and outdoors. The TOUCH 1500 kit includes all hardware required for mounting in a suitable electrical panel. TOUCH 1500R, a remote version of TOUCH 1500, is also available as a standalone solution for applications in which the controllers are not in the same location as the user interface.

Make Your Systems Talk!

Now more than ever, open communication systems, data integration, easy configuration and real-time monitoring are critical components of running an industrial installation. With the latest TOUCH 1500 software, nVent offers the full data integration of its heat tracing systems with process control systems, allowing for the reduction of maintenance and energy costs and, consequently, increasing process productivity. TOUCH 1500 to DCS means "data a la carte." The heat tracing data you want, in your preferred format for your DCS system.

nVent RAYCHEM Supervisor software



The nVent RAYCHEM Supervisor software package provides a remote, graphic interface for the 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 Supervisor a powerful management tool for the entire Heat Management System.

PRODUCT SPECIFICATIONS

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

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

NGC-40-HTC/NGC-40-HTC3

Temperature sensors	Type 100 Ω platinum RTD, 3-wire, $\alpha = 0.00385$ 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, 60 A, +/- 2% of range
Current measurement NGC-40-HTC3	3 for three-phase line current measurements, 60 A, +/- 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. NO 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

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, $\alpha = 0.00385$ 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/1 mA max with 100 ohms of loop resistance and configured as active low.

NGC-40-IO

Temperature sensors	Type 100 Ω platinum RTD, 3-wire, $\alpha = 0.00385$ 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-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. NO and NC contacts available.
Digital 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	Communications COM3
Type	2-wire RS485	RS232
Cable	One shielded twisted pair	Custom TTC# 10332-005
Length	1,200 m (4,000 ft) maximum	15 m (50 ft) maximum
Quantity	Up to 255 devices per port	1
Data rate	9600, 19.2K, 38.4K, 57.6K, 115.2K baud	9600, 19.2K, 38.4K, 57.6K, 115.2K baud
Data bits	7 or 8	7 or 8
Parity	None, even, odd	None, even, odd
Stop bits	0, 1, 2	0, 1, 2
Tx delay	0 – 5 sec.	0 – 5 sec.
Protocol	Modbus RTU or ASCII	Modbus RTU or ASCII
Connection terminals	Spring-type 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 mm ² (24 to 18 AWG). As the current to the modules require up to 2.05 A @ 24 Vdc (20 modules - see CAN Bus connection diagrams) the minimum wire size to the module shall be 1.0 mm ² (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	Non-hazardous, 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 transfective device with integral CCFL backlight Touch Screen 4-wire resistive touch screen interface for user entry

Network connection

Local/Remote port	RS232/RS485 ports may be used to communicate with host (Supervisor Software) or DCS 9 pin D sub male
Remote RS485	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	RS485, 2-wire isolated, used for communication with external devices, such as RS485 NGC-40-BRIDGE and 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)

APPROVALS

For use in ordinary (non-hazardous) area

When system is applied to heat tracing circuits in hazardous areas, hazardous area approved sensors need to be used.

Temperature classification

T4

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.



ORDERING INFORMATION

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
TOUCH 1500-EX	TOUCH 1500 combined computer and 15" touch screen. Alarm output embedded in unit, ATEX / IECEx Zone 2 approved	10332-036
TOUCH 1500-EX-R	TOUCH 1500 in safe area enclosure for remote mounting on wall	10332-037
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
MONI-RMC-PS24	24 Vdc Power supply	972049-000



Single-circuit electronic controller with dual display

PRODUCT OVERVIEW



The nVent RAYCHEM TCONTROL-05 family of electronic controllers provide accurate temperature control and centralized monitoring for individual heat-tracing circuits.

The compact panel mount TCONTROL-05 has two displays for indicating the process value and the set point. During programming these displays provide user guidance and visual aid to simplify commissioning.

Alternatively, the optional and easy to use TCONTROL-05/CONFIG software can be used for computer aided configuration.

TCONTROL-05 units are factory configured for ON/OFF control and are suitable for most heat-tracing applications. Other types of control algorithms can be configured by the user.

Different hardware configurations are available: Units with a relay output for controlling electro-mechanical relays or solid state relays and TCONTROL-05/MA units with an analog output for driving other types of actuators like thyristors.

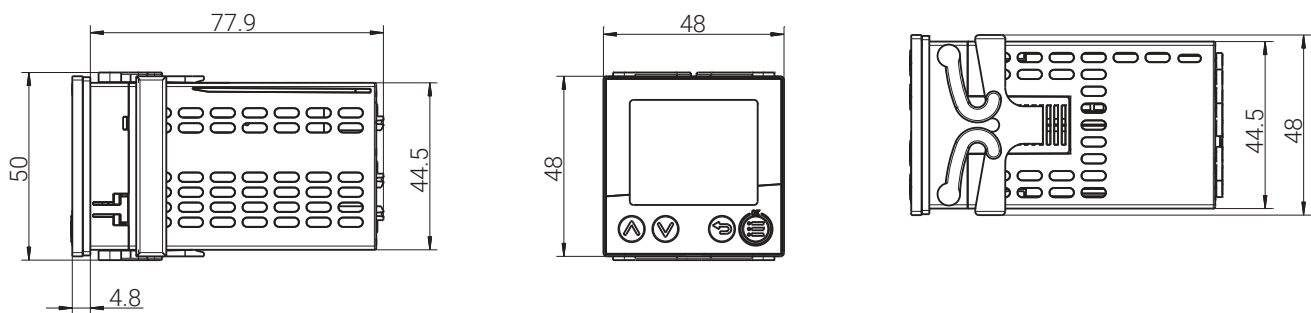
The health of the temperature input sensor is permanently monitored for failures. An alarm will appear in the event of sensor break or short circuit. In the event of a sensor failure the control output switches to a user defined state (ON or OFF)

Specific features:

- Time delayed controller activation after initial power up (this can be used to avoid peak demands during start-up)
- Service counter included in order to count and eventually alarm on the number of relay operations.

PRODUCT SPECIFICATIONS

Dimensions (mm)



Minimum spacing in between panel cut-outs	Horizontal spacing	Vertical spacing
TCONTROL-05 (all types)	> 15 mm	> 30 mm



Technical details

Application	nVent RAYCHEM TCONTROL-05 units are panel mount controllers and are typically used for providing tight temperature control of individual heat-tracing circuits.	
Memory data backup	EEPROM based non-volatile memory. No loss of configuration data after power outage or long term shut down.	
Display	2 piece 18 segment LCD displays	
Supported control modes	ON/OFF, P, PI, PD or PID with auto-tuning are user selectable	
Measuring accuracy	PT100 3-wire	error ≤ 0.1%,
	PT100 2-wire	error ≤ 0.1%
	Thermocouples (incl. cold junction)	error ≤ 0.25%
	Voltage and current inputs	error ≤ 0.1%

Electrical Properties

Supply voltage & own power consumption	110 Vac to 240 Vac -15/+10%, 48 to 63 Hz & ~4.1 VA
Electrical connections	Via screw terminals on the back of the unit. Terminals are suitable for wires ranging from 1 to maximum 1.3 mm ² solid core or 1 mm ² stranded with cable shoe. Terminal strips are pluggable.
Supported output types (depending on model)	TCONTROL-05: 3 relay outputs (SPST) + 1 logic output TCONTROL-05/MA: 2 relay outputs (SPST) + analog output TCONTROL-05/COM: 3 relay outputs (SPST) + 1 logic output + RS485 TCONTROL-05/COMA: 2 relay outputs (SPST) + analog output + RS485

Input options (all types)

Temperature sensor inputs	PT100, PT1000 RTD's in 2- and 3 wire connection, KTY11-6 sensors Thermocouple types: L, J, U, T, K, E, N, S
Electrical input signals	0/4 .. 20 mA or 0/2 .. 10 V (R _i = 100 Kohm)
Temperature control range	From -200°C to + 2400°C depending on the type of temperature sensor used

Output options and output ratings (depending on type)

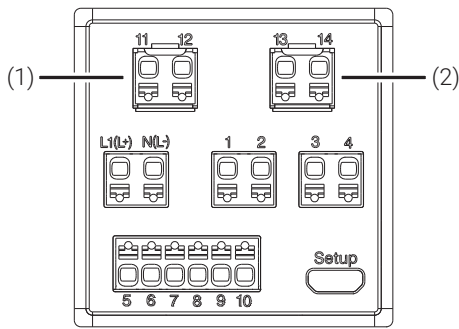
TCONTROL-05 TCONTROL-05/COM	Control and alarm relay contacts (SPST) are rated 3 A at 230 VAC. Expected lifetime: 350 k operations at rated current or ~900 K operations at 1 A Logic output 0 .. 12 V. Maximum current 20 mA
TCONTROL-05/MA TCONTROL-05/COMA	Control output, analog: 0/4 .. 20 mA R _{load} ≥ 500 Ohm Logic output 0 .. 12 V, maximum current 20 mA Alarm relay contacts (SPST) are rated 3 A at 230 VAC. Expected lifetime: 350 k operations at rated current. 900 k operations at 1 A
Communication options (*)	RS485, Modbus at 9600, 19200 or 38400 BPS. Maximum up to 32 devices per network. (*)
Alarm options	2 independently configurable alarm relay outputs are provided. TCONTROL-05 units automatically alarm in case of sensor break or sensor short. On top of the input sensor driven alarms up to 8 different temperature triggered alarm functions can be defined. (see installation instructions for details)

(*) supported on TCONTROL-05/COMx units only

Enclosure

Housing type	Plastic enclosure approved to IEC 61554 (ABS) Suitable for installation in electrical distribution panels
Environmental protection	Front IP65, rear IP20 to DIN EN60529
Max. operating temperature	-10°C to +55°C
Max. storage temperature	-30°C to +70°C
Relative humidity	90% maximum, no condensation
Installation position	All positions allowed

Connection diagram



Terminals	Connection	Terminals	Connection	Terminals	Connection
1, 2	Output 1 (relay)	8, 10	Input 2 (for potential-free contact)	13, 14	(2) = option 2: output 5 (relay, logic or analog output)
3, 4	Output 2 (relay)	9, 10	Input 1 (for potential-free contact) or output 3 (logic output)	L1(L+), N(L-)	Voltage supply
5-8	Analog input	11, 12	(1) = option 1: output 4 (relay, logic output) or RS485 interface	Setup (USB)	PC (setup program)

APPROVALS

For use in ordinary area (indoors, panel mount - through the panel)

Electrical Safety to DIN EN 61010-1 over voltage category II, pollution degree 2 EMC DIN EN 61326 -1, Class A to industrial requirements.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Wiring example

	Part Description	PN	Weight
Control units	TCONTROL-05	1244-022496	~ 0.125 kg
	TCONTROL-05/MA	1244-022497	
	TCONTROL-05/COM	1244-022499	
	TCONTROL-05/COMA	1244-022498	

Accessory selection table

Configuration and setup interface + software	TCONTROL-05/CONFIG	1244-022500	~ 0.120 kg
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Accessory selection table

Sensors for hazardous area	MONI-PT100-EXE (1), (2)	967094-000	
	MONI-PT100-4/20MA	704058-000	
Sensor for non-hazardous area	MONI-PT100-NH	140910-000	
Support bracket for temperature sensors	JB-SB-26	338265-000	

Note 1: Sensor can be extended with a 3-wire shielded cable of max 30 Ohms per conductor (max. 150 m with a 1.5 mm² cable). The sensor cable should be shielded if it is laid in cable ducts or in the vicinity of high-voltage carrying cables. The shield of the extension cable should be grounded at the controller end only.

Note 2: MONI-PT100-EXE temperature sensors can be directly connected to the TCONTROL-05 input terminals. There is no need to use current limiting devices such as zener barriers or isolators.

Note 3: Installed in ordinary area.

Elexant 450c / Elexant 450c-Modbus



RAYCHEM

CONNECT AND PROTECT

Electronic controller for pipe freeze protection and temperature maintenance systems

PRODUCT OVERVIEW



The nVent RAYCHEM Elexant 450c controller is designed for operation with the nVent RAYCHEM heating cables.

The Elexant 450c is available in 2 versions:

- **Elexant 450c** standard version
- **Elexant 450c-Modbus** version allowing flexible Modbus connectivity for remote monitoring, configuration, and ease of integration in a Building Management System (BMS).

FEATURES

- Intuitive set-up and programming of the unit with a 4,3" colour touch screen
- Flexible temperature control of pipe freeze protection and temperature maintenance systems
- Controls 2 independent heating circuits
- Pipe line sensing and/or ambient sensing
- Proportional Ambient Sensing Control (PASC) algorithm for enhanced energy savings in ambient sensing mode
- Alarm relay with change over contact to signal power, temperature or communication problems
- Pipe line temperature monitoring with high and low temperature alarm
- Offsite configurable - can be set up prior to final installation
- DIN rail panel mountable
- The Elexant 450c-Modbus is equipped with a RS485 port for Modbus communication to a BMS system which can be used for configuration, monitoring and alarm purposes.

GENERAL

Area of use	Non-hazardous locations; for nVent RAYCHEM heating cables
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ELECTRICAL PROPERTIES

Supply voltage	230 VAC –15/+10%; 50 Hz
Power consumption	4 VA
Output relay / contactor / heating cable	2 x 4 A / 230 VAC
Power supply terminals	3 x 1.5 mm ²
Heating cables terminals contactor	2 x 2 x 1.5 mm ²
Alarm terminals	3 x 1.5 mm ²
Sensor terminals	2 x 2 x 1.5 mm ²
Modbus terminals	3 x 1.5 mm ²
Alarm relay	Single pole double throw relay, voltage – free, rating 2 A/250 VAC
Real time clock	Automatic summer/winter time and leap year connection
Clock back up	3 years
Clock accuracy	+/- 10 minutes per year
Keylock	Password protection for parameter settings
USB Port	For preset-up in power off mode and firmware upgrade
Settings	All settings are stored in non-volatile memory
Exposure temperature	0°C to +40°C

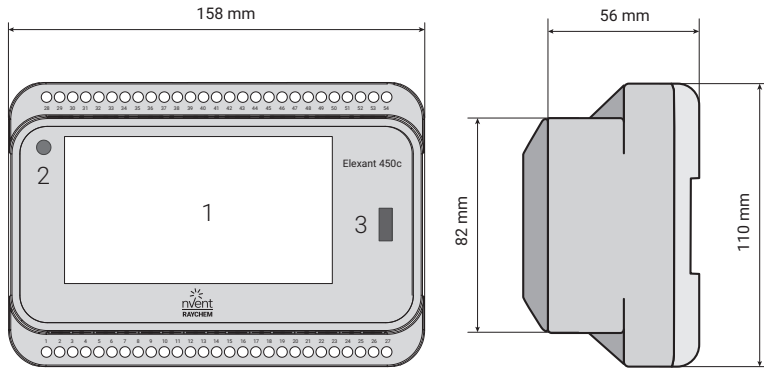


Control & Monitoring

ENCLOSURE

Dimensions	158 mm x 110 mm x 56 mm
Ingress protection class	IP20
Material	PPE
Mounting option	DIN-Rail mountable 35 mm, in panel
Storage temperature	-20°C to +50°C
Flammability class	D category (DIN EN60730/VDE0631-1)
Weight	550 g

TYPICAL ENCLOSURE DIMENSIONS AND MODULE LAYOUT



1. Touch screen, size 4.3"
2. LED: Flashes green in operation mode
3. USB port

PROGRAMMING

Selectable Temperature ranges	0°C to +80°C (when used with SM-PT100-2 up to +245°C)
Min and max temperature limit range	-40°C to +85°C (when used with SM-PT100-2 up to +250°C)
Operation modes	Pipe line sensing, Ambient sensing mode (P.A.S.C. Proportional Ambient Temperature Sensor Control); OFF

SENSOR

	Standard	With SM-PT100-2 Module	
	(included in box)	HARD-78	MONI-PT100-260/2
Temperature sensor type	NTC 2 KOhm / 25°C, 2-wire	PT100	PT100
Sensor tip dimensions	Ø5 mm, length 20 mm	Ø6 mm, length 50 mm	Ø6 mm, length 50 mm
Sensor cable length	5 m	3 m	2 m
Cable extension	Up to 150 m, cross section extension cable: 2 x 1,5 mm ²	Up to 150 m, 3 x 1,5 mm ²	Up to 150 m, 3 x 1,5 mm ²
Temperature range	-40°C to +90°C	-40°C to +150°C	-50°C to +260°C

MONITORING

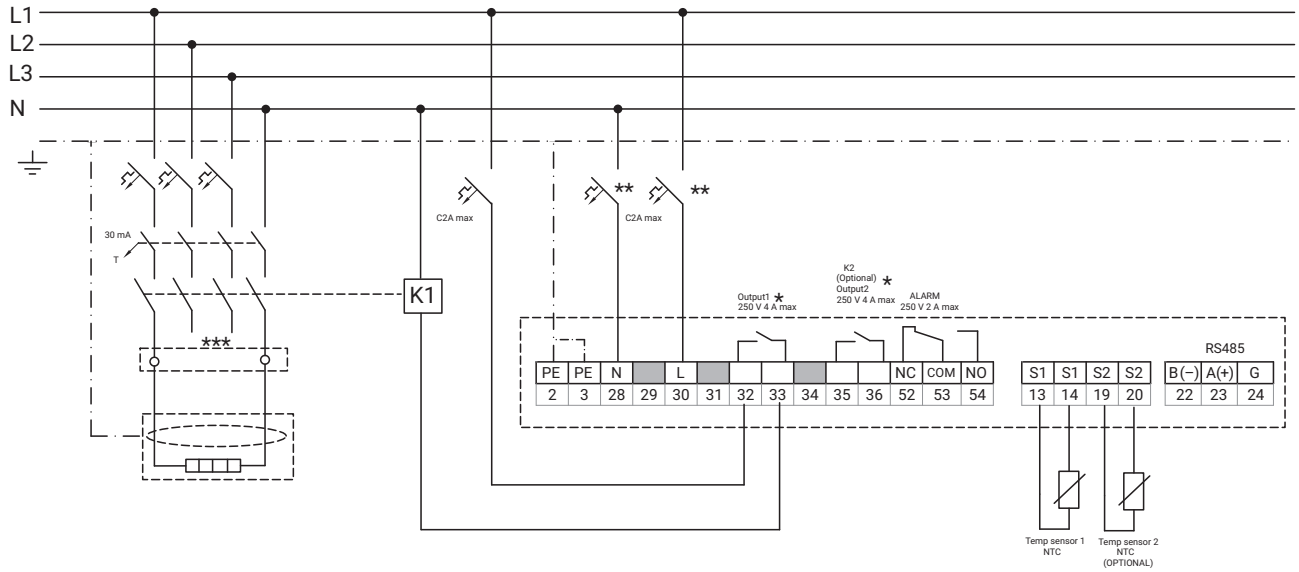
Pipe temperature alarm	High temperature alarm	Adjustable range set temperature to 250°C or OFF
	Low temperature alarm	Adjustable range -40°C to 245°C or OFF
Sensor alarm	Sensor open circuit	
	Sensor short circuit	
Parameter input	Each parameter input and event will be logged	

APPROVAL

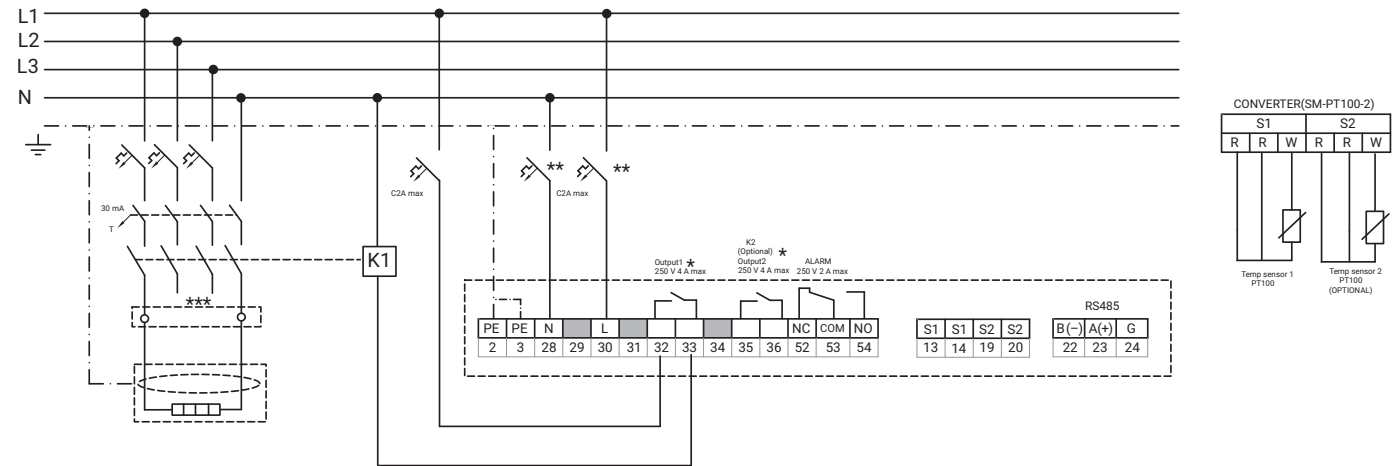
Approvals	CE, VDE (pending), ROHS, WEEE
Electromagnetic Compatibility (EMC)	Complies to EMC: EN 61000-6-3, EN 61000-6-2

ELECTRICAL SCHEME

Standard: NTC Sensor



Option: PT100 Sensor



- * Output1 and output 2 can be used separately.
- ** 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.

COMMUNICATION (Elexant 450c-Modbus)

Communication port	RS-485
Type	2-wire RS-485
Cable	One shielded twisted pair (not included)
Length	1,200 m (4,000 ft.) maximum
Quantity	Up to 247 devices per port
Data rate	2400, 4800, 9600, 19200 baud
Parity	None, even, odd
Stop bits	1, 2
Protocol	Modbus RTU

ORDERING DETAILS

Catalog description	ELEXANT 450c	ELEXANT 450c-Modbus
Part number	1244-021970	1244-022623
EAN code	5414506021356	5414506022667
Weight	550 g	550 g
In package	1 control unit Din rail, 1 line sensor 5 m	1 control unit DIN rail, 1 line sensor 5 m

Accessories

Product description	PCN number
SENSOR-NTC-10M (-40°C ... +90°C)	1244-015847
Sensor Module for PT 100 (up to +250°C) SM-PT100-2	1244-022442
PT-100 Sensor HARD-78 (-40°C ... +150°C)	213430-000
PT-100 Sensor MONI-PT100-260/2 (-50°C ... +260°C)	1244-006615
GM-TA-AS NTC-Sensor / Ambient sensor in enclosure	1244-017965
nVent RAYCHEM PB-POWERBANK	1244-020365

Important: The nVent RAYCHEM Elexant 450c / Elexant 450c-Modbus controller is for use with the nVent RAYCHEM heating cables only. The warranty and system listing will be invalidated if the Elexant 450c / Elexant 450c-Modbus controller is used with other heating cables.

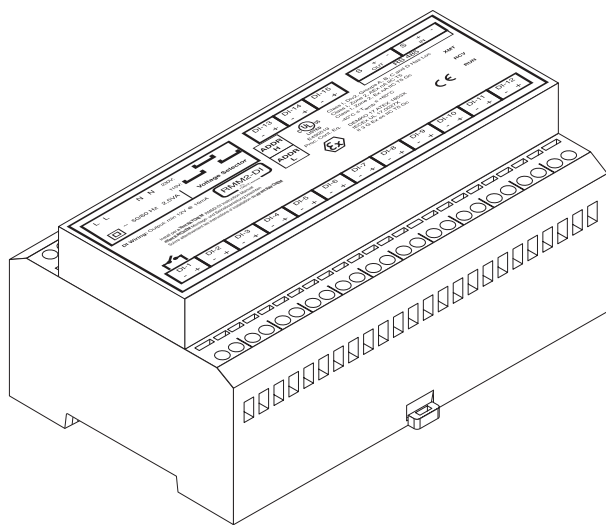


RMM2-DI

CONNECT AND PROTECT

Remote monitoring module for Digital Inputs

PRODUCT OVERVIEW



The Remote Monitoring Module for Digital Inputs (nVent RAYCHEM RMM2-DI) provides the capability for the nVent RAYCHEM NGC controller family to read the status of devices remotely and can link them back to the electrical heat-tracing circuits.

The RMM2-DI has in total 15 digital inputs. Multiple RMM2-DI units can communicate with a single User Interface providing centralized monitoring capabilities.

Control & Monitoring

Control and monitoring

A nVent RAYCHEM NGC network controls up to 260 heat-tracing circuits per system based on ambient or pipe temperatures. The RMM2-DI module can be used to collect circuit breaker status, contactor status or other digital information in the field. This information will be communicated back to a central location via one communication cable, reducing installation and wiring cost.

Circuit breaker trip alarms

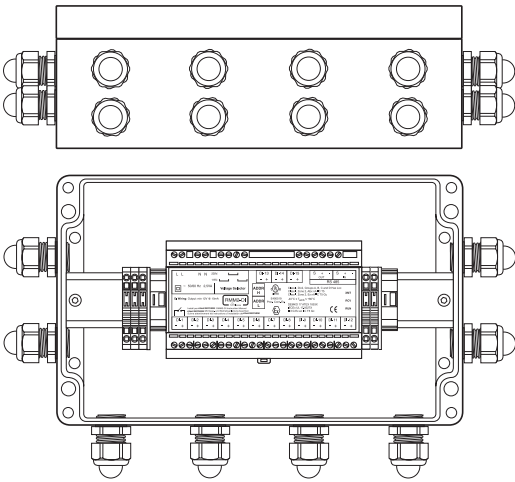
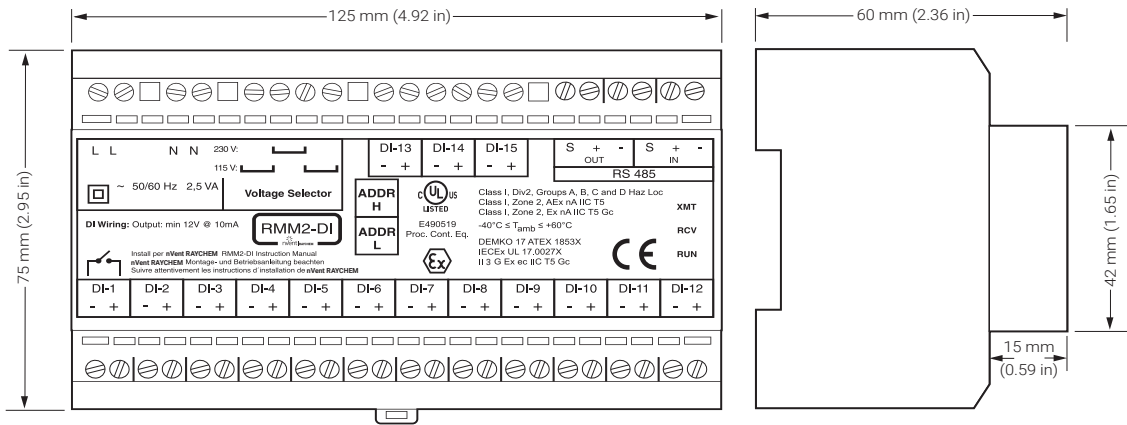
When monitoring the circuit breaker status with the RMM2-DI module, the information can be linked in the NGC control system to the associated electrical heat-tracing circuits. An alarm will be generated when a circuit breaker trips. As a result the User Interface will show in detail which circuit breaker tripped and the associated electrical heat-tracing circuit(s) effected. The alarms may be reported remotely through an alarm relay in the User Interface, via nVent RAYCHEM Supervisor and upstream to a Process Control system via a Modbus communication link.

Configurations

The RMM2-DI is an electronic device that clips to a DIN 35 rail. The complete kit for ordinary and hazardous areas (Zone 2) include an RMM2 mounted in a rugged polyester enclosure with appropriate terminals and cable glands. For other installation options, contact nVent.

PRODUCT SPECIFICATIONS

Dimensions (mm) and mounting



Dimensions	125 mm x 75 mm x 60 mm, see drawing
Mounting	DIN rail mountable

Technical details

Ambient operating temperature range	-40°C to +60°C
Ambient storage temperature range	-51°C to +60°C
Relative humidity	Max. 95%, noncondensing
Supply voltage	(nominal) 115/230 Vac +10% -10% 50/60 Hz (jumper selectable)

RMM2-DI-EX-E enclosure

RMM2-DI-8GL-EXE-E	RMM2-DI enclosure with 8 Glands for Digital input signals
Dimensions	260 mm x 160 mm x 91 mm
RMM2-DI-15GL-E	RMM2-DI enclosure with 15 Glands for Digital input signals
Dimensions	360 mm x 160 mm x 91 mm

Digital input

Type	2 wire digital input
Supplied power	Minimum power per DI connection supplied by RMM2-DI module 12 V 10 mA (Sink/source)
Number of signals	15 Digital inputs

Communication to nVent RAYCHEM NGC control system

Type	RS485
Protocol	Modbus RTU
Cable type	Shielded twisted pair
Length cable	1200 m max.
Address switch	Selectable on RMM2-DI, address range: 1-255

Connection terminals

Supply (in-out)	4 terminals for cables 0.2 mm ² to 4 mm ²
RS485 connection	2 x 3 terminals for cables 0.2 mm ² to 2.5 mm ²
DI connections	15 x 2 terminals for cables 0.2 mm ² to 2.5 mm ²

APPROVALS

RMM2-DI module

For use in ordinary area.
 For use in hazardous area (when mounted in Ex-d enclosure. RMM-DI panel mount, safe area)
 Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)
 Class 1 Div 2 and Class I Zone 2

RMM2-DI-8GL-EX-E and RMM2-DI-15GL-EX-E System

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas),

Temperature classification

T5

Product certification

RMM2-DI module:



RMM2-DI-8GL-EX-E and RMM2-DI-15GL-EX-E system



For certifications in other regions (FM, CSA, IEX, UL, etc.), please refer to the installation manual.

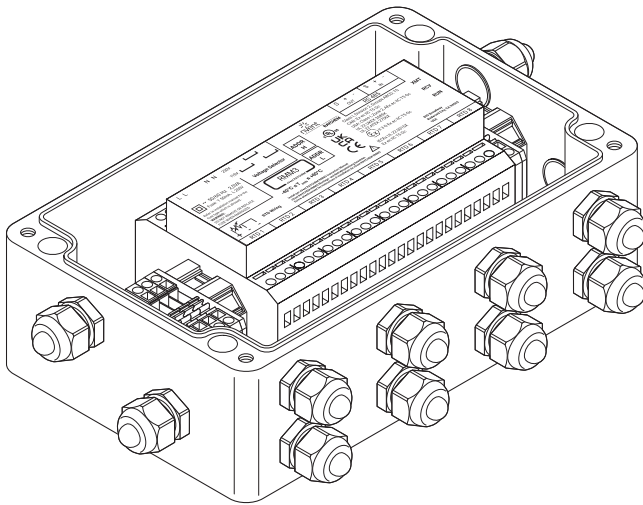
More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Additional Details	Part Description	Part Number	Weight	EAN Number
RMM2-DI, no enclosure	RMM2-DI	1244-018083	0.3 kg	5414506018479
With Zone 2 enclosure and 8 Glands for DI signals	RMM2-DI-8GL-EX-E	1244-018858	1.9 kg	7350027271611
With Zone 2 enclosure and 15 Glands for DI signals	RMM2-DI-15GL-EX-E	1244-018859	2.0 kg	7350027271628

Heat-tracing remote monitoring module

PRODUCT OVERVIEW



The Remote Monitoring Modules (RMM3) provide temperature monitoring capability for the nVent RAYCHEM Elexant and NGC controller family. The RMM3 accepts inputs from up to eight PT 100 temperature sensors that measure pipe or ambient temperatures in a heat-tracing system. Multiple RMM3 units communicate with a single nVent RAYCHEM User Interface providing centralised monitoring of temperatures.

A single, twisted pair RS-485 cable connects up to 247 RMM3 modules in the field.

Control and monitoring

A nVent RAYCHEM control network can consist of many heat-tracing circuits based on ambient and/or pipe temperatures. The RMM3 may be used to collect both ambient and pipe temperatures for control or for extensive monitoring of the heat-tracing system. The RMM3 units are placed near desired monitoring locations, even in hazardous areas (Zone 2). Multiple temperature sensor inputs are networked over a single cable, significantly reducing installation cost for temperature monitoring.

Alarms

Low and high temperature alarms may be set for sensors connected to the nVent RAYCHEM controllers via the RMM3. Alarm limits are set and alarm conditions are reported to the user. Additional alarms are triggered for failed temperature sensors and communication errors. Alarms may be reported remotely through the Modbus communication to the process control system, via an alarm relay in the User Interface or via nVent RAYCHEM Supervisor.

Configurations

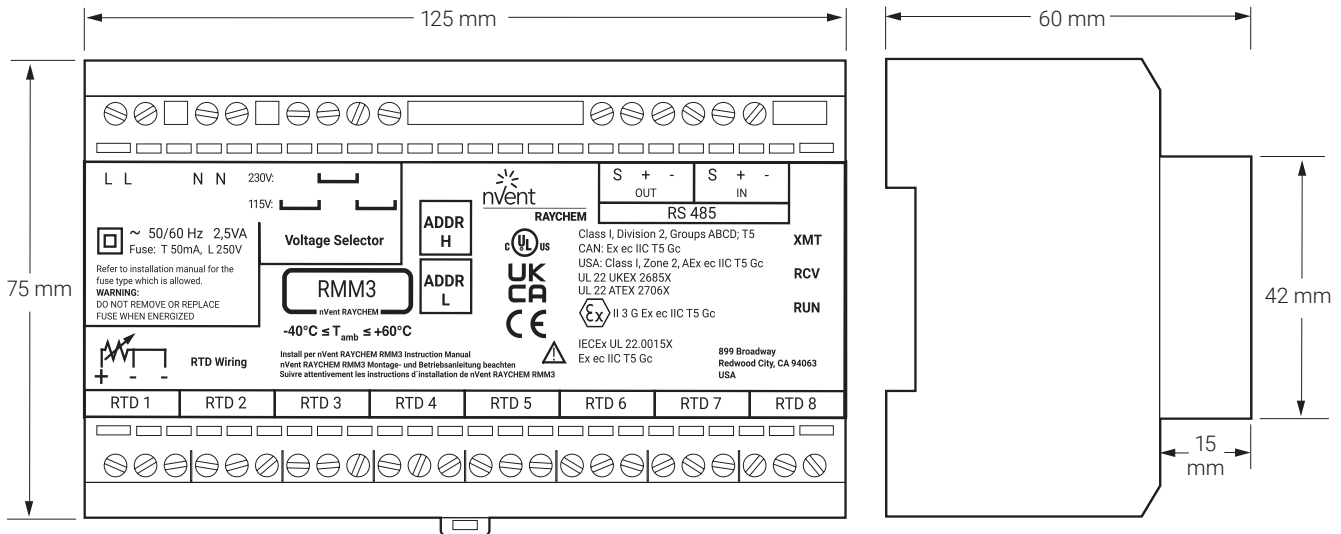
The RMM3 is an electronic device that clips to a DIN rail. The unit is available as 230/115 Vac version and 24 Vdc version. The complete kit for ordinary and hazardous areas (Zone 2) includes an RMM3 mounted in a rugged polyester enclosure with appropriate terminals and cable glands. For other installation options, contact nVent.



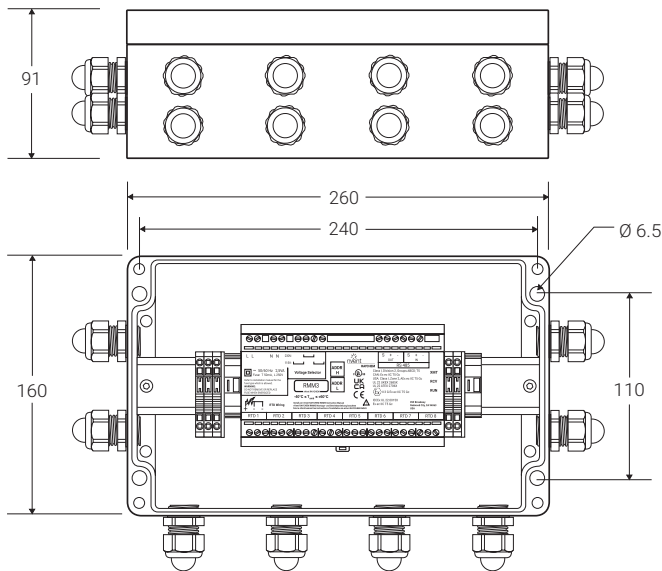
PRODUCT SPECIFICATIONS

Dimensions (in mm)

RMM3 module



Hazardous area enclosure



Technical details

Ambient operating temperature range	-40°C to +60°C
Ambient storage temperature range	-51°C to +60°C
Relative humidity	max. 95%, noncondensing
RMM3 supply voltage (nominal)	115/230 Vac +10% -10% 50/60 Hz (jumper selectable)
RMM3-24Vdc supply voltage (nominal)	24 Vdc (10-30 Vdc)
Internal power consumption	2.5 VA

RMM3 Hazardous Area Enclosure	nVent RAYCHEM RMM3-EX-E and RMM3-24VDC-EX-E
Protection	IP66
Base and lid	Material: glassfibre-reinforced polyester, lid seal: silicone
Colour	Black
Ambient temperature range	-40°C to +60°C
Lid fixing	4 x M6, cheese-head, captive, stainless steel
Entries	12 x M20 for cable diameters ranging from 6 to 12 mm
Glands provided (Ex e)	12 x M20 with integral stopping plugs
Mounting	Surface mounting with 4 fixing holes on 240 x 110 mm centres hole diameter: 5 mm

Temperature sensors

Type	3 wire PT 100, temperature coefficient per IEC 751-1983
Quantity to be connected	Up to 8 PT 100 per RMM3 The sensor cable may be extended with a 3 (+PE)-wire signal cable adding 20 Ohms lead resistance maximum. When using 1.5 mm ² 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 one end only.
Area of use	Use sensors with the appropriate approvals required for the area of use

Communication

Type	RS-485
Cable	1 shielded twisted pair
Length	1200 m max.
Quantity	By Modbus standards limited up to 247 units, maximum number of units defined by control network. See installation manual of control systems for more details.
Address	Switch-selectable on RMM3
Communication	Modbus RTU, modbus settings can be modified (baud rate, bits, parity, stop bits, tx delay)

Connection terminals

Supply (in-out)	4 terminals for cables 0.2 mm ² to 4 mm ²
Earth	10 terminals for cables up to 4 mm ² aside the RMM3 unit
PT 100 connections	8 x 3 terminals for cables 0.2 mm ² to 2.5 mm ²
RS-485 connection	2 x 3 terminals for cables 0.2 mm ² to 2.5 mm ²

Electromagnetic compatibility

Immunity	Complies with EN 50 082-2 (heavy industrial)
Emissions	Complies with EN 50 081-1 (light industrial)

APPROVALS

For use in ordinary and hazardous area Zone 2 (Gas)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at nVent.com/RAYCHEM.



ORDERING DETAILS

RMM3	Part Descriptions	Product Number	Weight
115 VAC/230 VAC No enclosure, internal electronics module only	RMM3	1244-022749	1.2 kg
115 VAC/230 VAC version with hazardous area enclosure	RMM3-EX-E	1244-022750	3.2 kg
24 VDC version, no enclosure, electronics module only	RMM3-24VDC	1244-022782	1.2 kg
24 VDC version with hazardous area enclosure	RMM3-24VDC-EX-E	1244-022783	3.2 kg

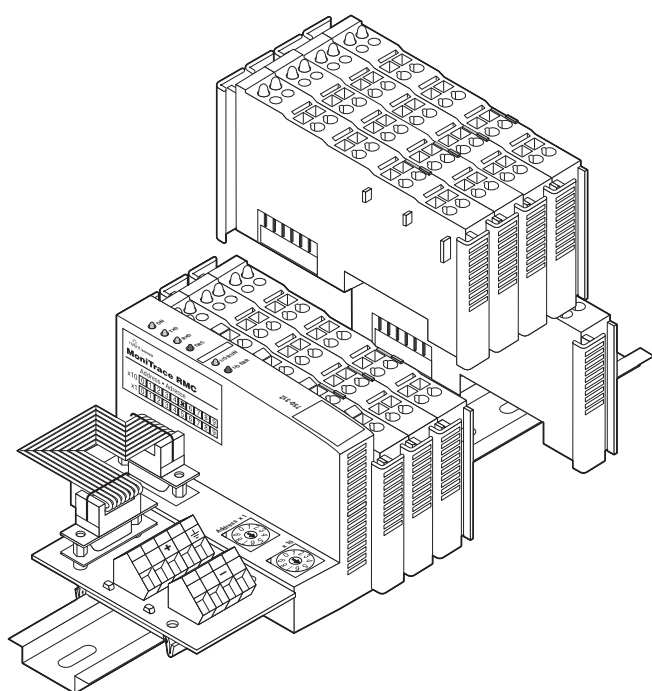
Pipe Temperature Sensors (PT 100)			
PT 100 temperature sensor for Zone 1	MONI-PT100-EXE	967094-000	0.6 kg
PT 100 temperature sensor for ordinary areas	MONI-PT100-NH	140910-000	0.2 kg



Control & Monitoring

Heat-tracing remote module for control

PRODUCT OVERVIEW



nVent RAYCHEM remote modules for control (RMC) provide multiple relay outputs for switching heating cable circuits controlled by the nVent RAYCHEM NGC User Interface Terminal (NGC-UIT). RMC units are modular and may be configured with 2 to 40 relay outputs. A single nVent RAYCHEM NGC-30-UIT can communicate with up to 10 RMC via a single, twisted pair RS-485 cable to provide distributed control of up to 260 heating cable circuits.

Control and monitoring

The nVent RAYCHEM NGC-30 controls and monitors multiple heat-tracing circuits based on pipe or ambient temperatures. These temperatures can be collected locally by nVent RAYCHEM remote monitoring modules (RMM2) connected on the same RS-485 network. Based on temperature inputs from the RMM2, the nVent RAYCHEM NGC-UIT determines which heating cable circuits are to be energized and sends this information to RMC, which then turn on or off the heating cable power contactors. Because temperature inputs and control outputs are located near equipment to be sensed or controlled, wiring costs are reduced significantly.

Alarm inputs

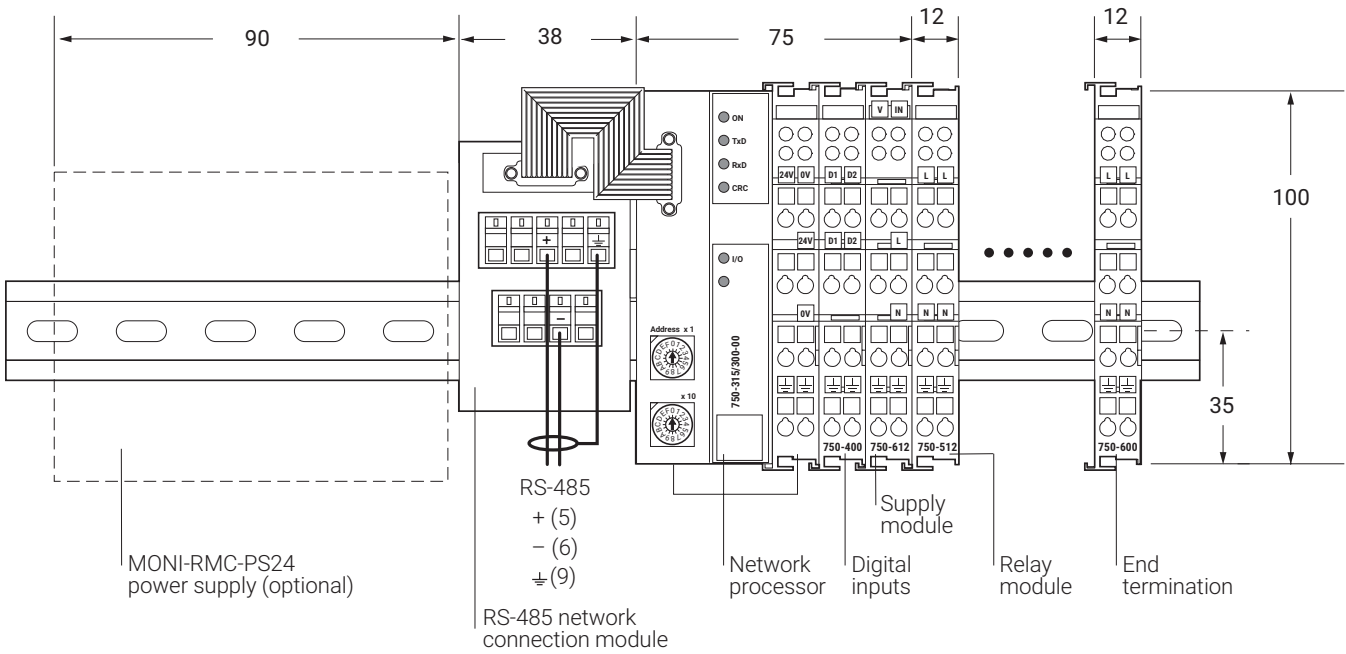
Each RMC unit includes two inputs to monitor the status of circuit breakers or power contactors. For example, one input may be used for a common circuit breaker trip alarm, providing an alarm indication at the nVent RAYCHEM NGC-UIT if any circuits fail due to earth fault or overcurrent events. Alarms may be reported remotely through an alarm relay in the nVent RAYCHEM NGC-UIT or through an RS-485 connection to nVent RAYCHEM Supervisor. Up to 20 MONI-RMC-2DI 2 channel digital input modules can be added if required.

Configurations

The RMC are modular, electronic devices that mount on a DIN 35 rail. RMC units must be installed in panels or enclosures suitable for the area classification and environment. For each RMC installation, purchase one MONI-RMC-BASE kit, which includes the network processor, digital inputs, and end terminator; one MONI-RMC-PS24 24-Vdc power supply; and up to 16 MONI-RMC-2RO 2-channel relay output modules, as required.

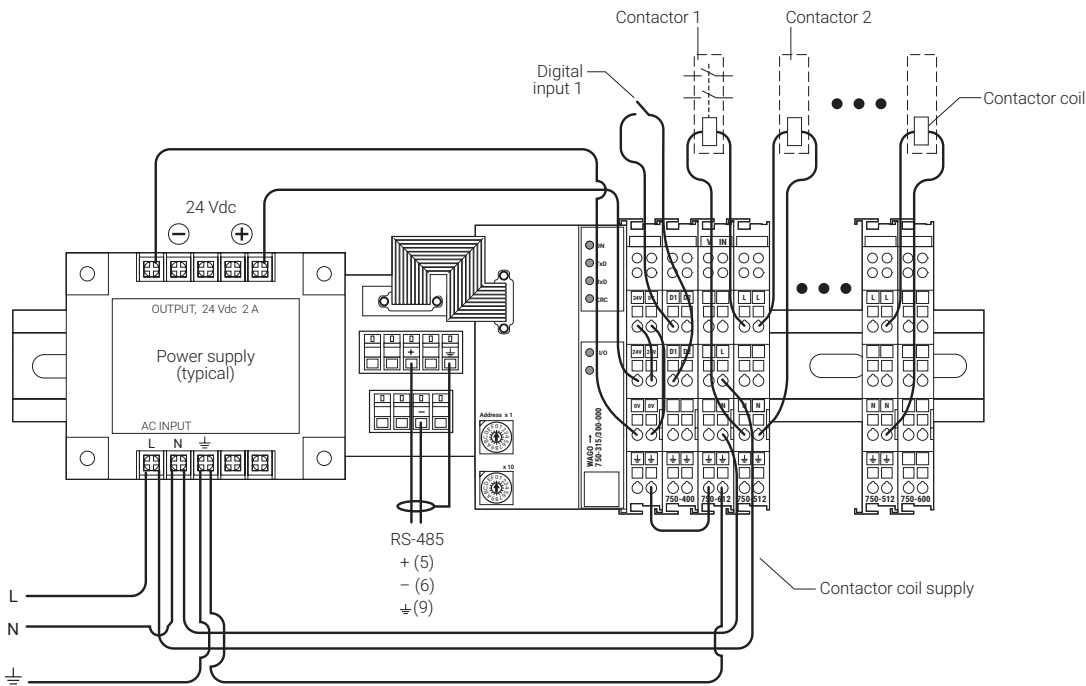


Connection details



PRODUCT SPECIFICATIONS

Dimensions (in mm)



Technical details

Ambient operating temperature range	0°C to 55°C
Ambient storage temperature range	-40°C to 70°C
Relative humidity	Max. 95%, noncondensing
Protection	IP2X per IEC 529
Supply voltage	24 Vdc
Supply current	< 2 A

Relay outputs

Quantity per RMC	1 to 20 two-channel modules (2 to 40 relay outputs)
Total relay outputs via RMCs	260
Type	Mechanical, normally open, non-floating
Voltage, maximum	250 Vac, 30 Vdc
Current, maximum	AC/DC 2 A
Maximum power	60 W/500 VA (resistive)
Isolation	4 kV
Life (operations)	1 x 10 ⁶ at 0.35 A to 0.2 x 10 ⁶ at 2 A
Connection terminals	0.08 mm ² –2.5 mm ² , Spring-type

Supply module

Voltage	230 Vac/dc
Current	10 A
Connection terminals	Spring-type for cables from 0.08 mm ² to 2.5 mm ²

Digital inputs

Quantity per RMC	Up to 20 two-channel modules (2 to 40 digital inputs)
Type	Solid-state, 24 Vdc source
Current consumption	5 mA
Isolation	500 V
Connection terminals	0.08 mm ² –2.5 mm ² (Spring-type)

Communication to nVent RAYCHEM NGC-UIT

Type	RS-485
Connection terminals	0.08 mm ² to 2.5 mm ² (Spring-type)
Cable	1 shielded twisted pair
Length	1200 m max.
Quantity	Up to 247 RMC may be connected to one nVent RAYCHEM NGC-UIT
Address	Switch-selectable on RMC, 10 addresses, 1-99

APPROVALS

For use in ordinary area.

Product certification



ORDERING INFORMATION

	Part Description	Product Number	Weight
Remote module for control (RMC)			
Base unit*	MONI-RMC-BASE	309735-000	0.5 kg
Two-channel relay output module**	MONI-RMC-2RO	920455-000	0.05 kg
Two-channel digital input module***	MONI-RMC-2DI	062367-000	0.05 kg
24 Vdc power supply	MONI-RMC-PS24	972049-000	0.7 kg

* Purchase one base for each RMC installation. Includes network processor, two digital inputs, end termination, and RS-485 connection module with ribbon cable.

** Purchase one module for each set of two relay outputs required. Minimum of one module (2 relay outputs), maximum of 20 (40 relay outputs) per RMC base.

*** Purchase one module for each set of two digital inputs required. Minimum of one module (2 digital inputs), maximum of 20 (40 digital inputs) per RMC base. Additional module for each pair of digital inputs required. One MONI-RMC-2DI module is included in each MONI-RMC-BASE unit



Ecom Tab-Ex 03

CONNECT AND PROTECT

Configuration and Monitoring Assistant

PRODUCT OVERVIEW



The Ecom Tab-Ex 03 is an easy-to-use wireless tablet for configuration and monitoring of nVent RAYCHEM NGC-20 and Elexant 5010i field controllers. The tablet has an intuitive user interface eliminating the need for extensive training. The tablet is available in two versions: For Zone 2 (Zone 22) use the Tab-EX 03 DZ2. For Zone 1 (Zone 21) use the Tab-Ex 03 DZ1.

Hardware design

The devices are designed for high productivity in an industrial environment. They are protected against humidity, dust, corrosion and extreme ambient temperatures. The tablet has an 8" TFT display.

Software

The application on the tablet is designed to provide full configuration and monitoring capabilities of the controllers. The tablets allow wireless connectivity via Bluetooth® to any nVent RAYCHEM NGC-20 and Elexant 5010i control unit within range. The devices are based on Samsung technology and are running Android operating system.

PRODUCT SPECIFICATIONS

General	Ecom Tab-EX 03 DZ2	Ecom Tab-EX 03 DZ1
Typical use	The tablets are used for the configuration and monitoring of nVent RAYCHEM NGC-20 and Elexant 5010i heat-tracing controllers	
Environmental protection	IP64 to EN/IEC 60079-0	IP64 according to EN/IEC 60079-0
Compatible control units	nVent RAYCHEM NGC-20-C-E, NGC-20-CL-E, Elexant 5010i and Elexant 5010i-LIM	
Operating temperature	-20°C to +55°C	-20°C to +53°C
Dimensions	126.8 x 213.8 x 9.9 mm (incl. protective case)	161.5 mm x 262.75 mm x 25.75 mm
Connectivity	Bluetooth, WiFi and USB connector	Bluetooth, WiFi and USB connector
Operating system	Android O.S. 11	Android O.S. 13
Processor	Exynos 9810 (Lhotse) Octa-Core 64-Bit; 4 x 2.7 GHz, 4 x 1.7 GHz	Octa-core, 4 x 2.7 GHz + 4 x 1.7 GHz Exynos 9810
Bluetooth interface	Bluetooth V5.0	Bluetooth 5.0
Memory	RAM 4 GB, ROM 64 GB with microSD up to 512 GB	RAM 4GB, ROM 64 GB with microSD up to 1024 GB, 512 GB installed
Wireless LNA	WiFi 802.11 a/b/g/n/ac/ax (2.4 GHz + 5 GHz)	802.11 a/b/g/n/AC/ax 2.4 G+5 GHz, HE80, MIMO, 1024 QAM
Display	8" TFT with 1920 x 1200 pixels	8" TFT with 1920 x 1200 (WUXGA)



General	Ecom Tab-EX 03 DZ2	Ecom Tab-EX 03 DZ1
Charger	EU compatible	EU compatible
Software (included)	General Android apps	General Android apps
Keyboards & buttons	Touchscreen, buttons on the side	Touchscreen, buttons on the side
Captive pen	Included	Included

APPROVALS

Ecom Tab-EX 03 DZ2

For use in ordinary and hazardous area
Zone 2 (Gas) and Zone 22 (Dust)

Ecom Tab-EX 03 DZ1

For use in ordinary and hazardous area
Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

ORDERING INFORMATION

	Ecom Tab-EX 03 DZ2	Ecom Tab-EX 03 DZ1
Part number	1244-022743	1244-022837
Weight	610 g	1100 g



Control & Monitoring

Heat-tracing controller configuration and monitoring software

PRODUCT OVERVIEW

The nVent RAYCHEM Supervisor heat-tracing controller configuration and monitoring software provides a graphical user interface for nVent RAYCHEM heat-tracing communication and controller products. Heat-trace system information can be accessed and managed from almost anywhere in the world, making Supervisor a powerful management tool for the entire Heat Management System (HMS).

Network and connectivity

By using the latest network technologies, costs can be reduced. Devices are no longer limited to simple hard-wired serial communications, but take advantage of existing network infrastructures including Ethernet LANs (Local Area Networks) and Internet-based WANs (Wide Area Networks).

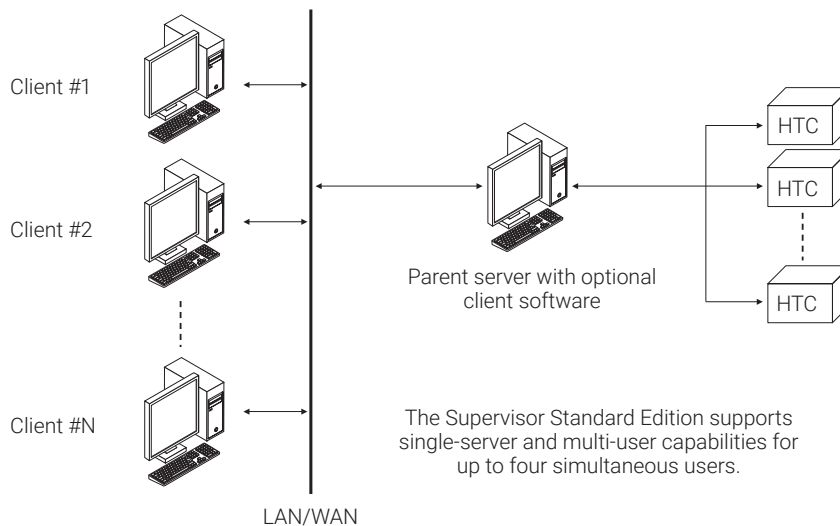
Scalability

nVent RAYCHEM Supervisor is available in two Editions – ‘Standard’ and ‘Enterprise’.

PRODUCT SPECIFICATIONS

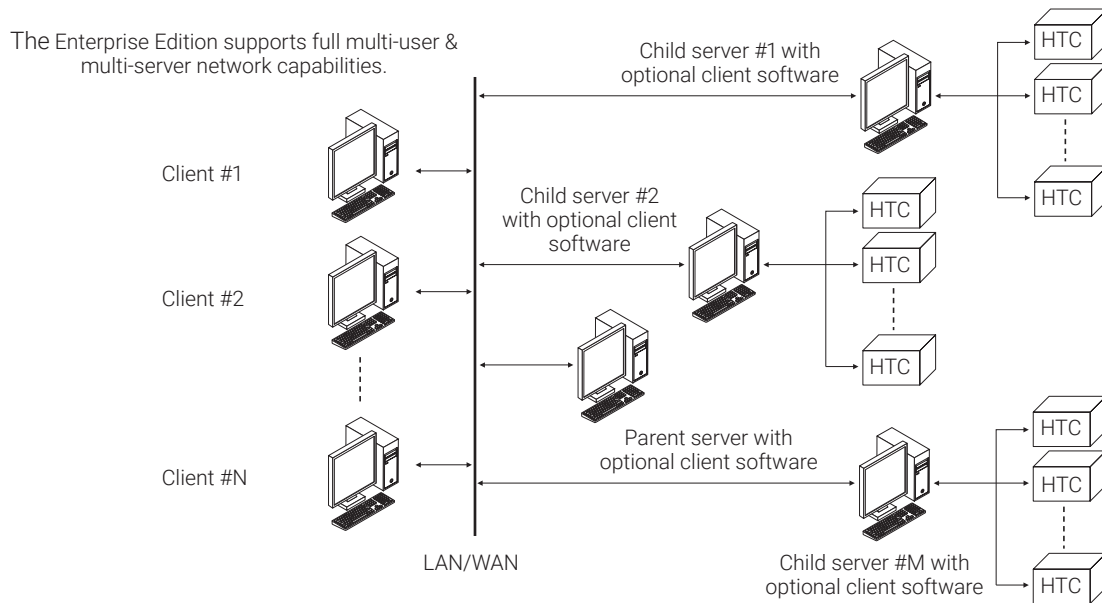
Supervisor STANDARD edition

The standard edition is a single-server multi-user version. It provides connectivity to several hundred control units in the field and can support up to four simultaneous users.



Supervisor ENTERPRISE edition

The 'Enterprise' edition offers unlimited multi-user, multi-server network capabilities, expanding on the capabilities of the 'Standard' edition. Enterprise level functionality requires the purchase of SQL server software and Microsoft Licensing.



Functionality

Device configuration	Individual devices can be configured in either offline or online mode. After confirmation, data will be uploaded into heat-tracing control devices.
Online monitoring	Monitoring online signals like temperature, ground-fault current, current, voltage of individual controllers or sets of controllers in user-defined groups.
Trending & historical data storage	User defined trending of heat-tracing data which can be stored into the database on a user-defined time interval and storage mechanism.
Alarm and events	Displayed in a separate pop-up banner where they can be individually acknowledged by the user. All alarms and events are stored in the database for post-event analyses.
Plant reference model	Organize Heat-tracing circuits via a model which represents the layout of the plant, simplifying the process of locating heat trace circuits for the entire system.
Enhanced documentation link to device configuration & monitoring utilities	Link heat-tracing circuits to design and construction documentation and makes it easily accessible to the user (examples: P&IDs, heat-tracing isometrics).
Data import & export	Export system devices and plant documentation, and save the data in an XML-format file which can also be imported.
Reports	Numerous pre-defined reports like device configurations, alarms and events (historical and current), user roles, etc.
Batch, recipes and event scheduler	Multiple pre-defined heat-trace setting changes can be executed at the same time by using the batch and recipe tool. Batches can be launched manually or automatic at a scheduled date and time or at regular intervals.
System wide data synchronisation	Synchronise continuously with the controllers in the field. Local changes in the controller will reflect in Supervisor and vice versa.
E-mail on alarm notification	Send email notifications to selected users when alarms occur.
Internal user messaging	Instantaneous communication between Supervisor clients connected to the same Supervisor network.
Multi level security and individual user defined preferences	Security is based on plant groups, users, and roles, which offers differentiation between each end-user responsibility, rights and preferences.
Languages	English, French, German, Russian, Chinese

Controller compatibility

Supervisor is compatible with any of the following nVent RAYCHEM communication and controller products that have the appropriate communications interface installed:

- Elexant 4000 series
- NGC-20
- Elexant 5010i
- NGC-30
- NGC-40 series
- HTC-900 series
- MoniTrace RMC
- NGC-UIT's
- Legacy devices (T2000 systems, GCC-9000/780, 720, 790, HTC-9000/9100/CAS HTC's)

System requirements

Parent server computer	<ul style="list-style-type: none">• A Quad core® – 2.0 GHz CPU For large systems, where multiple Child Servers are to be used, consider the use of higher speed CPU's with more processing cores and / or processing threads within the Parent Server computer for greater performance. Consult nVent Applications Engineering for guidance• 4 gigabytes of free disk space (HDD or SSD)• 8 gigabytes of RAM• Field Device connectivity, such as Ethernet or Serial RS-485 (type and quantity depend on device communication architecture)• A mouse or other compatible pointing device• A display with minimum 800x600 resolution• Standard configurations using Microsoft SQL Express: Windows 7, Windows 8 or Windows 10, either 32 or 64 bit.• Multi-User/Multi-Server Capable configurations using MS SQL Server: Microsoft Windows® Server 2012 through 2019, and Windows 7, 8, or 10 either 32 or 64 bit• Microsoft .NET® Framework version 4.0• Network connectivity
Child server computer(s) (optional)	<ul style="list-style-type: none">• A Quad core® – 2.0 GHz CPU• 4 gigabyte of free disk space (HDD or SSD)• 8 gigabytes of RAM• Field Device connectivity, such as Ethernet or Serial RS-485 (type and quantity depend on device communication architecture)• A mouse or other compatible pointing device• A display with a minimum 800x600 resolution• Microsoft Windows 7, 8 or 10• Microsoft .NET® Framework version 4.0• Network connectivity
Client computer(s)	<ul style="list-style-type: none">• A Quad core® – 2.0 GHz CPU• 2 gigabytes of free space (HDD or SSD)• 4 gigabytes of RAM• A mouse or other compatible pointing device• A display with a minimum 800x600 resolution• Windows 7, Windows 8 or Windows 10 either 32 or 64 bit• Microsoft .NET® Framework version 4.0• Network connectivity
nVent RAYCHEM Supervisor Database (Edition dependent)	<ul style="list-style-type: none">• Supervisor Standard edition runs on SQL Express• Supervisor Enterprise edition requires SQL Server

Registration

Supervisor will run in TRIAL mode for up to 14 days.

For more information about how to register within this period, see the Supervisor Installation and Operating Instructions or visit nVent.com.

Communication

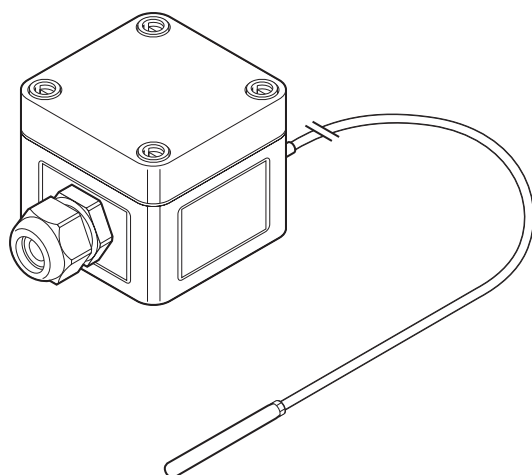
Modbus RTU protocol via:

- TCP/IP
- RS-232
- RS-485



Temperature sensor for ordinary area

PRODUCT OVERVIEW



2 wire nVent RAYCHEM PT 100 sensor with glass fiber reinforced polycarbonate junction box for installation in ordinary area.

PRODUCT SPECIFICATIONS

Sensor

Type	PT100 (2 wire) DIN IEC 751, Class B
Material	Tip: stainless steel Extension cable: silicone
Temperature measuring range	-50°C to +180°C
Temperature range extension cable	-50°C to +180°C (+215°C maximum 1000 hrs), max. exposure temp. tip: +400°C
Length	2 m
Diameter	Extension cable ca 4.6 mm, tip ca 6.0 mm
Minimum bending radius	Extension cable: 5 mm, the measuring tip should not be bent

Enclosure

Ingress protection	IP66
Material	Glass fiber reinforced polycarbonate (gray)
Dimensions	Width = 65 mm Height = 65 mm Depth = 57 mm
Cable gland	M20 (polyamide) suitable for cable diameters ranging from 10 mm to 14 mm
Operating temperature	-30°C to +80°C
Lid sealing gasket material	CFC-free Polyurethane
Cover screws	Plastic
Mounting	For pipe mount use JB-SB-26 wall mount surface mount via moulded holes at 50 x 50 mm



Installation and connection

Terminals	3 front entry spring-type terminals (terminals 2 and 3 are bridged)
Terminal sizing	Terminals suitable for cables from 0.15 mm to 2.5 mm ²

APPROVALS

For use in ordinary area

Product certification



ORDERING INFORMATION

Part Description	MONI-PT100-NH
PN (Weight)	140910-000 (0.22 kg)

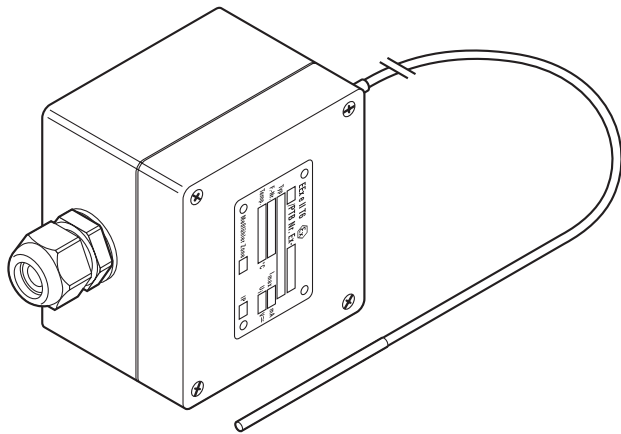


MONI-PT100-EXE

CONNECT AND PROTECT

Temperature sensor for hazardous areas

PRODUCT OVERVIEW



3 wire nVent RAYCHEM Pt 100 sensor connected to a black glass fiber reinforced polyester junction box with 4 front entry spring-type terminals.

Hazardous area cable gland, pre-installed (M20, black).

PRODUCT SPECIFICATIONS

Sensor

Type	Pt 100 (3 wire) DIN IEC 751, Class B.
Material	Extension cable and tip both stainless steel (MI)
Temperature measuring range	-100°C to +500°C
Maximum exposure temp. tip	+585°C
Length	2 m
Diameter	ca 3 mm
Minimum bending radius	Extension cable: 20 mm, the measuring tip should not be bent

Enclosure

Material	Glass fiber reinforced polyester (black)
Ingress protection	IP66
Dimensions	Width = 80 mm Height = 75 mm Depth = 55 mm
Cable entry	M20 gland suitable for cable diameters ranging from 10 mm to 14 mm
Operating temperature	-50°C to +60°C
Sealing gasket material	Tongue and groove system with silicone seal
Cover screws	Stainless steel M4 threaded
Mounting	For pipe mount use JB-SB-26 wall mount surface mount via moulded holes at 68 x 45 mm

Installation and connection

Terminals	4 front entry spring-type terminals
Terminal sizing	Suitable for cables from 0.5 mm ² to 2.5 mm ²



APPROVALS

For use in hazardous area Zone 1/ Zone 2 (Gas) and Zone 21 / Zone 22 (Dust)

Temperature classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

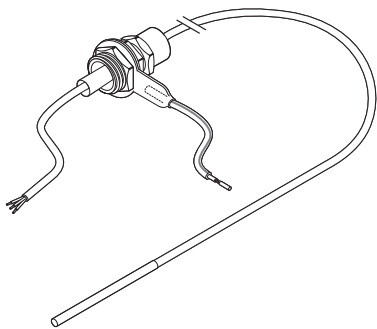
ORDERING INFORMATION

Part Description	nVent RAYCHEM MONI-PT100-EXE
PN (Weight)	967094-00 (0.44 kg)



Temperature sensor for hazardous area (without Junction box)

PRODUCT OVERVIEW



Mineral Insulated temperature sensor with M16 brass gland, installed on the sensor lead. Both are approved for use in hazardous area. (Sealing washer, locknut and earth tag are included)

PRODUCT SPECIFICATIONS

Sensor

Type	Pt 100 (3 wire)
	DIN IEC 751, Class B
Material	Stainless steel (MI)
Temperature measuring range	-100°C to +500°C
Maximum exposure temperature	+585°C
Length	2 m
Diameter	ca 3 mm
Minimum bending radius	Extension cable: 20 mm, the measuring tip should not be bent

Installation and Connection

M16 (Brass) compression gland pre-installed on the sensor.

Sealing washer, earth tag and locknut included.

Maximum operating temperature (for the gland) -50°C to +60°C

APPROVALS

For use in hazardous area

Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature Classification

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part Description	nVent RAYCHEM MONI-PT100-EXE-SENSOR
PN (Weight)	529022-000 (0.11 kg)

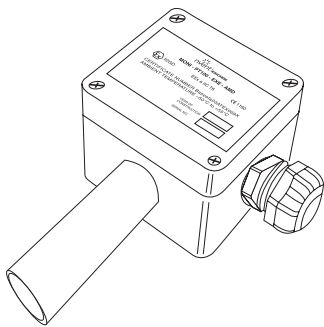


MONI-PT100-EXE-AMB

CONNECT AND PROTECT

Ambient sensing temperature sensor for hazardous area (PT100)

PRODUCT OVERVIEW



nVent RAYCHEM MONI-PT100-EXE-AMB is a PT100 temperature sensor connected to a glass fiber reinforced junction box, equipped with a preinstalled M20 gland. The unit is approved for hazardous areas.

The metal tube around the sensor gives mechanical protection and prevents the sensor for sudden temperature changes like by direct sunlight and/or wind.

PRODUCT SPECIFICATIONS

Sensor

Type	PT100 (3-Wire) acc. DIN IEC 751, Class B
Material	Sensor: stainless steel (MI) Protection tube: brass
Temperature measuring range	Assembly -50°C to $+60^{\circ}\text{C}$ (Sensor measuring range from -100°C to $+500^{\circ}\text{C}$)

Enclosure

Material	Glass fiber reinforced box (Black) M4 captive stainless steel cover screws.
Ingress protection	IP66
Dimensions	Box: Width = 80 mm Height = 75 mm Depth = 55 mm Installed: Width = ~ 110 mm Height = ~ 200 mm
Cable entry	M20 suitable for cable diameters ranging from 10 mm to 14 mm
Operating temperature	-50°C to $+60^{\circ}\text{C}$
Mounting	Surface mount via molded holes centered at 68 x 45 mm. Any installation position is allowed.

Installation and connection

Terminals	4 front entry cage clamp terminals suitable for cables from 0.5 to 2.5 mm ²
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APPROVALS

For use in ordinary and hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification:

T6

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM

ORDERING INFORMATION

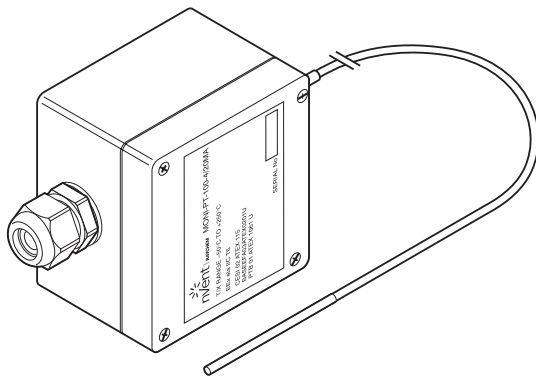
Part number	1244-004451
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MONI-PT100-4/20MA

CONNECT AND PROTECT

3 Wire PT 100 sensor with 4 to 20 mA transmitter for hazardous area

PRODUCT OVERVIEW



nVent RAYCHEM PT 100 sensor connected to a 4-20 mA transmitter built in a black glass fiber reinforced polyester junction box with M20 cable gland (Blue).

PRODUCT SPECIFICATIONS

Sensor

Type	PT 100 (3 wire) DIN IEC 751, Class B.
Material	Extension cable and tip both stainless steel (MI).
Temperature measuring range:	-50°C to +250°C (transmitter)
Maximum exposure temp. tip	+585°C
Length	2 m
Diameter	ca 3 mm
Minimum bending radius	Extension cable: 20 mm, the measuring tip should not be bent

Enclosure

Ingress protection	IP66
Material	Glass fiber reinforced polyester (black)
Dimensions	Width = 80 mm Height = 75 mm Depth = 55 mm
Cable gland	M20, blue (EEx e) suitable for cable diameters ranging from 10 mm to 14 mm
Operating temperature	-20°C to +55°C
Sealing gasket material	Tongue and groove system with silicone seal
Cover screws	Stainless steel M4 threaded
For pipe mounting use	JB-SB-26

Installation and connection

Terminals	2 screw terminals
Terminal sizing	Suitable for cables from 0.5 mm ² to 1.5 mm ²



APPROVALS

For use in hazardous area Zone 1 (Gas)

Temperature classification

T6...T4

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

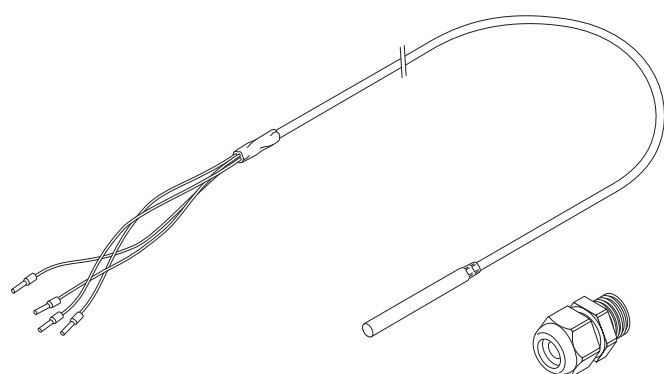
ORDERING INFORMATION

Part Description	MONI-PT100-4/20MA
PN (Weight)	704058-000 (0.46 kg)



Temperature sensor with M16 gland

PRODUCT OVERVIEW



nVent RAYCHEM MONI-PT100-260/2 temperature sensor is designed for providing accurate temperature measurements.

The MONI-PT100-260/2 sensor exhibits excellent mechanical, electrical and thermal properties what makes the sensor extremely useful for a broad range of applications. The sensor can be connected to the control device using 3-wire technology for providing highest accuracy and measuring stability.

PRODUCT SPECIFICATIONS

Sensor

Type	Pt 100 (3 wire) DIN IEC 751, Class B
Jacket/Sheath Material	Extension cable PTFE (Fluoropolymer) Measuring tip stainless steel (316 Ti)
Cable construction	Braided
Measuring range	-50°C to +260°C
Maximum exposure temp. tip	400°C
Length	Total sensor length 2 m (other lengths are available on request) Length of the measuring tip ca 50 mm
Nominal Diameter (OD)	Diameter of the sensor cable 4.8 mm Diameter of the tip 6 mm.
Conductors	4 x 0.5 mm ² (Red, Red, White and braid) PTFE insulated
Minimum bending radius	Sensor cable minimum 20 mm, the measuring tip should not be bent

Cable gland

Thread size (color)	M16 (Black)
Material	Polyamide (PA) Halogen-free
Temperature range	-40°C to +75°C
Cable acceptance size	Suitable for cables from 4 to 9 mm diameter



APPROVALS

For use in ordinary area.

For hazardous area only use in combination with Is barriers.

Cable gland: for use in ordinary and potentially hazardous area Zone 1 and Zone 2 (Gas), Zone 21 and Zone 22 (Dust)

Temperature classification

Temperature classification is defined by the complete system.

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Part description	Moni-PT100-260/2
PN	1244-006615

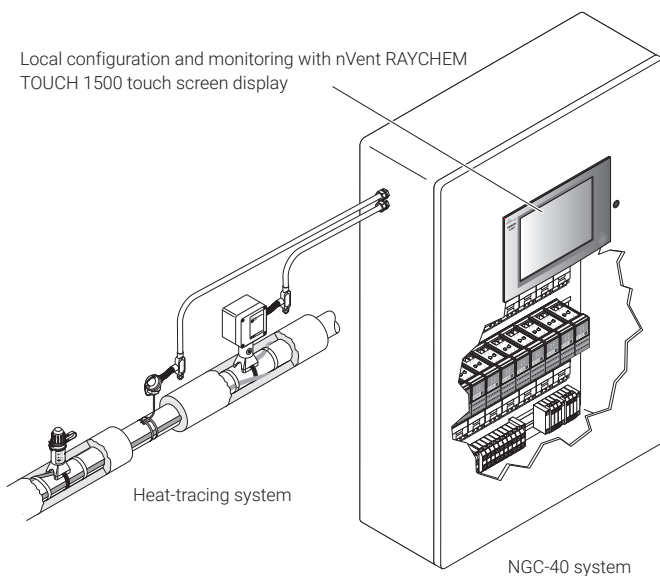


NGC-40 Safe Area Panels

CONNECT AND PROTECT

Control, monitoring and power distribution panels

PRODUCT OVERVIEW



nVent RAYCHEM distribution panels are specially designed to power, control and monitoring electrical heat tracing circuits. The system offers a complete standard set of configurations, serving most heat-tracing applications. The panels vary from power distribution panels up to systems with full control and monitoring capability. The panels are available with a combined incomer or with a separate incomer section.

The power distribution panels with control and monitoring functionality are equipped with the advanced nVent RAYCHEM control and monitoring systems like the nVent RAYCHEM NGC-40. Multiple panels can be combined and optionally supervised by means of the nVent RAYCHEM TOUCH 1500 interface.

Standard panel advantages

Standard control, monitoring and power distribution panels have the following advantages:

- No surprises or unpredictable cost increases
 - All dimensions and features known during quotation stage so full clarity at the moment of ordering
 - Proven design
- High Quality:
 - Design optimized for electrical heat-tracing and based on years of experience in the industry
 - Repeatedly build and pre-tested at the panel shop so no need for FAT
- Optimized scheduling:
 - No need to spend time on detailed panel design
 - Reduced time spend for the client leading to cost reduction
 - Short lead times

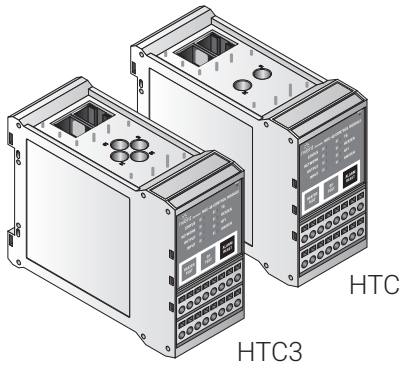
Panels are available as:

- Incomer sections: Power Supply System (PSS)
- Outgoing sections: Power Distribution System (PDS)
- Combination of incomer and outgoing in one panel enclosure



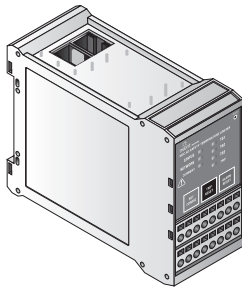
Control system power distribution panels: nVent RAYCHEM NGC-40

The NGC-40 is a multipoint electronic control and monitoring system with unique single-point controller architecture for heat-tracing used in process temperature maintenance and freeze protection applications. By taking advantage of innovative modular packaging techniques, the NGC-40 system provides configuration and component flexibility so that it may be optimized for specific applications needs. The NGC-40 system consists out of the following components:



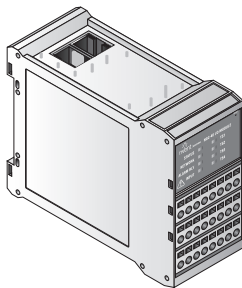
Control modules: NGC-40-HTC & NGC-40-HTC3

The NGC-40 system uses a single controller module per heat-tracing circuit for maximum reliability. There are dedicated control modules available for single phase (NGC-40-HTC) and three-phase (NGC-40-HTC3) heat-tracing circuits. The NGC-40 control modules include ground-fault detection and protection while guaranteeing 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 temperature sensors can be connected via the NGC-40-HTC and -HTC3, NGC-40-IO and the field mounted nVent RAYCHEM RMM2 module. The NGC-40 control modules provides digital inputs as well as alarm outputs that can be used to control an external annunciator. The digital input is programmable and may be used for various functions such as forcing heat-tracing outputs on or off or generating CB trip alarms, making the system more flexible to match each customer's specific needs.



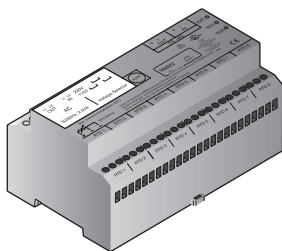
Safety temperature limiter: NGC-40-SLIM

The NGC-40 includes an optional 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 NGC-40 control module and use the heater current information to manage the trip functionality. The front panel of the limiter module has LED indicators, like the other modules, for various status conditions and provides buttons to confirm a new trip setpoint, and reset trip or alarm conditions. The module has one output for the contactor and one output for external alarm annunciation. The safety temperature limiter can also be reset via the digital input, the user interface TOUCH 1500 and Supervisor.



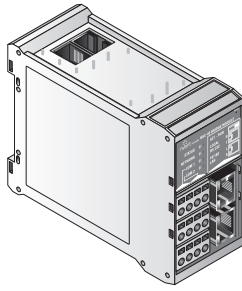
IO module: NGC-40-IO

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 NGC-40 system can be optimised for the specific application needs. Each IO module accepts up to four additional RTD 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 heat-tracing outputs on or off or generating CB trip alarms.



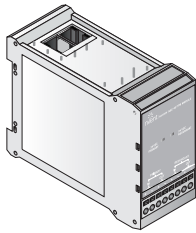
RMM2

The NGC-40 system works with the MONI-RMM2 module and each RMM2 can accept up to 8 RTDs. 16 RMM2 Modules can be daisy chained together via RS-485 for a total of 128 temperature inputs per NGC-40-BRIDGE. This will significantly reduce the cost of RTD field wiring.



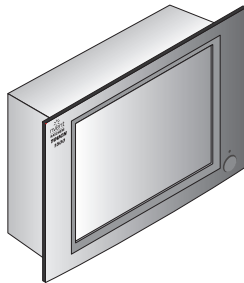
Communication module: NGC-40-BRIDGE

The 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 TOUCH 1500 touch screen, Supervisor and Distributed Control System (DCS). Communications to devices external to the NGC-40 panel use the Modbus protocol over Ethernet, RS-485 or RS-232.



Power termination module: NGC-40-PTM

The NGC-40-PTM distributes power to the NGC-40 modules. Each NGC-40-PTM can provide power to a maximum of 10 NGC-40 modules and supports redundant power supply connections.



nVent RAYCHEM TOUCH 1500

The TOUCH 1500 user interface has easy-to-navigate displays, with intuitive screens for use with the NGC-40 and nVent RAYCHEM NGC-20 control panels. The TOUCH 1500 is to be installed where the physical heat-tracing hardware is located to assist with system commissioning, setup, troubleshooting and on-site monitoring and control. The TOUCH 1500 has a 15-inch LCD color display with touch-screen technology, and provides an easy user interface for programming without using keyboards. It has RS485, RS232, and 10/100Base-T Ethernet communications ports that allow communication with the Bridge Module (NGC-40-BRIDGE). An USB interface is included for configuration and software upgrades.



nVent RAYCHEM Supervisor software

The Supervisor software package provides a remote, graphic interface for the NGC-family. 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, batched change management, and other useful functions. Users can access all information from anywhere in the world, making Supervisor a powerful management tool for the entire Heat Management System.

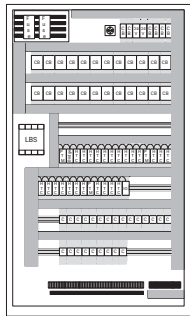
For more detailed specifications of the modules see the NGC-40 datasheet.

Technical details

- Colour: RAL 7035
- Protection degree: IP55
- Cable entry: bottom panel, split bottom plate
- Power: 3 Phase + Neutral
- Phase-to-phase: 400 V
- Incomer: 3P+N+PE
- Earthing: TN-S
- Short circuit protection: 10 kA / 25 kA depending upon panel selection
- Load break switch: 160 A, 250 A, 400 A depending upon panel selection
- Outgoing circuits:
 - ELCB 1-phase circuits: 16 A, 2P, 30 mA or 25 A, 2P, 30 mA depending upon panel selection
 - ELCB 3-phase circuits: 40 A, 4P, 30 mA
- Terminal size outgoing circuits: 10 mm²
- Panel dimensions: depending upon configuration. See section panel combinations

Standard panel combinations

The following table shows typical combinations of panels usable in different applications, followed by a list showing individual panels including their part number.

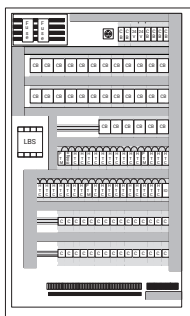


PSS-160A/10kA-PDS-40-24HTC/16A

- NGC-40 control & monitoring system
- Incomer: rated 160 A, 3P+N, 10 kA short circuit
- Outgoing circuits: 24 * 1-Phase controller, 2P EMR, ELCB 16 A (2P), 30 mA
- Size: 1200 (w) * 2200 (h) * 400 (d) including plinth

PSS-160A/10kA-PDS-40-24HTC/16A-T

- Including User Interface TOUCH 1500

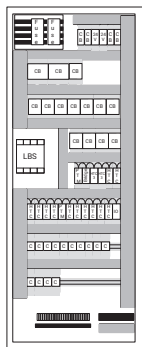


PSS-160A/10kA-PDS-40-30HTC/16A

- NGC-40 control & monitoring system
- Incomer: rated 160 A, 3P+N, 10 kA short circuit
- Outgoing circuits: 30 * 1-Phase controller, 2P EMR, ELCB 16 A (2P), 30 mA
- Size: 1200 (w) * 2200 (h) * 400 (d) including plinth

PSS-160A/10kA-PDS-40-30HTC/16A-T

- Including User Interface TOUCH 1500

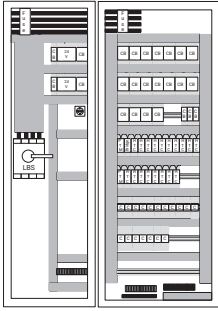


PSS-160A/10kA-PDS-40-12HTC/25A-2HTC3/40A

- NGC-40 control & monitoring system
- Incomer: rated 160 A, 3P+N, 10 kA short circuit
- Outgoing circuits:
 - 12 * 1-Phase controller, 2P EMR, ELCB 25 A (2P), 30 mA
 - 2 * 3-Phase controller, 4P EMR, ELCB 40 A (4P), 30 mA
- Size: 800 (w) * 2200 (h) * 400 (d) including plinth

PSS-160A/10kA-PDS-40-12HTC/25A-2HTC3/40A-T

- Including User Interface TOUCH 1500

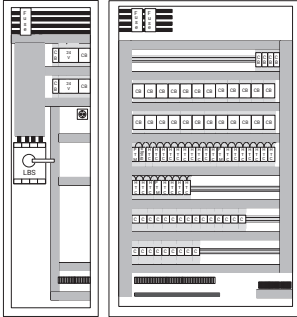


Incomer section: PSS-250A/25kA (-T)

- 250 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth
- Optional: User Interface TOUCH 1500

Outgoing section: PDS-40R-18HTC/25A

- 18 * 1-Phase controller, 2P EMR, ELCB 25 A (2P), 30 mA
- Size: 800 (w) * 2200 (h) * 400 (d) including plinth

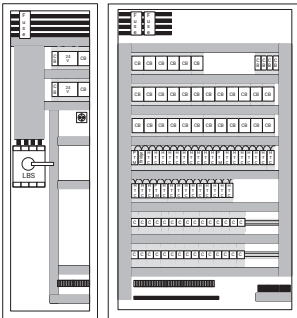


Incomer section: PSS-250A/25kA (-T)

- 250 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth
- Optional: User Interface TOUCH 1500

Outgoing section: PDS-40R-24HTC/25A

- 24 * 1-Phase controller, 2P EMR, ELCB 25 A (2P), 30 mA
- Size: 1200 (w) * 2200 (h) * 400 (d) including plinth

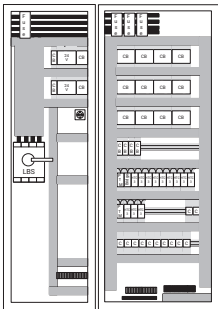


Incomer section: PSS-250A/25kA (-T)

- 250 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth
- Optional: User Interface TOUCH 1500

Outgoing section: PDS-40R-30HTC/25A

- 30 * 1-Phase controller, 2P EMR, ELCB 25 A (2P), 30 mA
- Size: 1200 (w) * 2200 (h) * 400 (d) including plinth



Incomer section: PSS-400A/25kA (-T)

- 400 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth
- Optional: User Interface TOUCH 1500

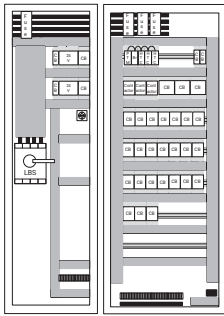
Outgoing section: PDS-40R-12HTC3/40A

- 12 * 3-Phase controller, 4P EMR, ELCB 40 A (4P), 30 mA
- Size: 800 (w) * 2200 (h) * 400 (d) including plinth



Outgoing section: PDS-40-12SLIM

- 12 * Safety Temperature Limiter, 40 A 4P EMR
- Up to 3 sensors per NGC-40-SLIM device
- To be combined with all other NGC-40 power distribution panels (PDS)
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth

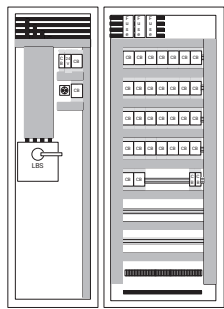


Incomer section: PSS-250A/25kA (-T)

- 250 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth
- Optional: User Interface TOUCH 1500

Outgoing section: PDS-40R-3PASC-24CB/25A

- 3 PASC controlled groups, 3 * EMR, 4P, 80 A
- CB: 24 * 25 A (1-Phase, 2P), 30 mA
- Size: 800 (w) * 2200 (h) * 400 (d) including plinth



Incomer section: PSS-250A/25kA

- 250 A, 3P+N, 25 kA short circuit
- Size: 600 (w) * 2200 (h) * 400 (d) including plinth

Outgoing section: PDS-R-30CB/25A

- ELCB 30 * 25 A (2P), 30 mA
- No controllers
- Auxiliary contacts CBs to terminals
- Size: 800 (w) * 2200 (h) * 400 (d) including plinth

For a more detailed description of the panels please ask your local representative.

APPROVALS

For use in ordinary area

Product certification

Complete panel



Controllers



ORDERING INFORMATION

Standard panel description

Product Name	Description	Part Number
PSS-160A/10kA-PDS-40-24HTC/16A-T	Incoming section 160 A, 10 kA, Outgoing section 24 * NGC-40-HTC 16A circuits with TOUCH 1500	1244-014348
PSS-160A/10kA-PDS-40-24HTC/16A	Incoming section 160 A, 10 kA, Outgoing section 24 * NGC-40-HTC 16A circuits. No TOUCH 1500	1244-014349
PSS-160A/10kA-PDS-40-30HTC/16A-T	Incoming section 160 A, 10 kA, Outgoing section 30 * NGC-40-HTC 16A circuits with TOUCH 1500	1244-014350
PSS-160A/10kA-PDS-40-30HTC/16A	Incoming section 160 A, 10 kA, Outgoing section 30 * NGC-40-HTC 16A circuits. No TOUCH 1500	1244-014351
PSS-160A/10kA-PDS-40-12HTC/25A-HTC3/40A-T	Incoming section 160 A, 10 kA, Outgoing section 12 * NGC-40-HTC 25A and 2 * NGC-40-HTC3 40A circuits with TOUCH 1500	1244-014352
PSS-160A/10kA-PDS-40-12HTC/25A-2HTC3/40A	Incoming section 160 A, 10 kA, Outgoing section 12 * NGC-40-HTC 25A and 2 * NGC-40-HTC3 40A circuits. No TOUCH 1500	1244-014353
PSS-250A/25kA-T	Incomer panel 250 A, 25 kA with TOUCH 1500 User Interface	1244-014354
PSS-250A/25kA	Incomer panel 250 A, 25 kA, No TOUCH 1500 User Interface	1244-014355
PSS-400A/25kA-T	Incomer panel 400 A, 25 kA with TOUCH 1500 User Interface	1244-014356
PSS-400A/25kA	Incomer panel 400 A, 25 kA, No TOUCH 1500 User Interface	1244-014357



Product Name	Description	Part Number
PDS-40L-18HTC/25A	NGC-40 Outgoing panel, 18 HTC circuits, 25A CB, positioned on left side of PSS panel.	1244-014358
PDS-40R-18HTC/25A	NGC-40 Outgoing panel, 18 HTC circuits, 25A CB, positioned on right side of PSS panel.	1244-014359
PDS-40L-24HTC/25A	NGC-40 Outgoing panel, 24 HTC circuits, 25A CB, positioned on left side of PSS panel.	1244-014360
PDS-40R-24HTC/25A	NGC-40 Outgoing panel, 24 HTC circuits, 25A CB, positioned on right side of PSS panel.	1244-014361
PDS-40L-30HTC/25A	NGC-40 Outgoing panel, 30 HTC circuits, 25A CB, positioned on left side of PSS panel.	1244-014362
PDS-40R-30HTC/25A	NGC-40 Outgoing panel, 30 HTC circuits, 25A CB, positioned on right side of PSS panel.	1244-014363
PDS-40L-12HTC3/40A	NGC-40 Outgoing panel, 12 HTC3 circuits, 40A CB, positioned on left side of PSS panel.	1244-014364
PDS-40R-12HTC3/40A	NGC-40 Outgoing panel, 12 HTC3 circuits, 40A CB, positioned on right side of PSS panel.	1244-014365
PDS-40-12SLIM	NGC-40 outgoing panel, 12 * Safety Temperature Limiter panel.	1244-014476
PDS-40L-3PASC-24CB/25A	NGC-40 outgoing panel, 3 PASC circuits feeding 24 outgoing Circuits, 25 A each, positioned on right side of PSS panel.	1244-014477
PDS-40R-3PASC-24CB/25A	NGC-40 outgoing panel, 3 PASC circuits feeding 24 outgoing Circuits, 25 A each, positioned on right side of PSS panel.	1244-014478
PDS-L-30CB/25A	Outgoing panel, 30 uncontrolled circuits, 25 A each, positioned on right side of PSS panel.	1244-014479
PDS-R-30CB/25A	Outgoing panel, 30 uncontrolled circuits, 25 A each, positioned on right side of PSS panel.	1244-014480

Product name definition

	PSS-***A/**kA-T
PSS	Power Supply System
***A	250: 250 A incomer switch 400: 400 A incomer switch
**kA	10: 10 kA short circuit protection 25: 25 kA short circuit protection
T	TOUCH 1500 (optional)

	PDS-40*-**HTC/*A-**HTC3/*A-*PASC-**CB/*A
	Power Distribution System
40*	40: Panel equipped with NGC-40 controllers. L: The panel is positioned on left side of PSS panel. R: The panel is positioned on right side of PSS panel.
**HTC/*A	**#: Number of NGC-40-HTC controllers *: CB rating of electrical heat tracing circuits
**HTC3/*A	**#: Number of NGC-40-HTC3 controllers *: CB rating of electrical heat tracing circuits (per phase)
*PASC	#: number of PASC controllers
**CB/*A	**#: Number on uncontrolled/PASC outgoing circuits *: CB rating of uncontrolled/PASC circuits.
	PSS-***A/**kA-PDS-40-**HTC/**A
	Panel including incoming and outgoing sections in one enclosure. For individual description of components see explanation text above.

Zone 2 Control & Monitoring Panels



RAYCHEM

CONNECT AND PROTECT

Zone 2 Control & Monitoring Panels

PRODUCT OVERVIEW



The nVent RAYCHEM Zone 2 Control and Monitoring panels are configurable Electric Heat-Tracing (EHT) panels that are ATEX and IECEx approved. The enclosure and all components are Zone 2 approved, including the nVent HOFFMAN Zonex enclosure, the nVent RAYCHEM NGC-30, NGC-40 and Elexant 4020i controllers as well as the Solid-State Relays used for switching the heat-tracing circuits. Ratings of up to 63 Amps at 690 Vac per circuit leads to the most flexible and optimized designs. The panels meet the IEC/EN 61439 and 60079 series standards and are designed, manufactured, tested & approved by a hazardous area approved nVent factory. The Zone 2 panels can be used in Arctic regions down to -55°C by using the patented heating solution included in the panel.



PRODUCT SPECIFICATIONS

Panel dimensions

Controller Type	Max # Circuits	Panel Size (H x W x D)	Panel Front View
Elexant 4020i	1	500 x 500 x 210 mm Wall mounted	
Elexant 4020i	2	750 x 500 x 210 mm Wall mounted	
NGC-30 NGC-40	5 6	600 x 600 x 300 mm Wall mounted	
NGC-30 NGC-40	20 18	1067 x 927 x 320 mm Wall mounted	
NGC-30 NGC-40	40 36	2100 x 927 x 600 mm Free standing	



Zone 2 panel

Ingress Protection	IP66
Ambient operating temperature range	-55°C to +60°C
Ambient storage temperature	-55°C to +70°C
Max. altitude	2000 m
Humidity	5 -90% non-condensing
Controller types	NGC-40: mix of NGC-40-HTC / HTC3 / IO / SLIM modules NGC-30: mix of NGC-30-CRMS, NGC-30-CTM / NGC-30-CVM boards Elexant 4020i: all version of the available Elexant 4020i controllers Other electronics upon request and validation
Gland entries	The Zone 2 panels can be delivered with predrilled holes and glands when specified during the ordering process. If holes need to be drilled onsite, special instructions of safe use shall be applied.

Panel configuration string

The configuration for the Zone 2 panel is represented by a configuration string, and the parameters in the string define the content of the panel. Any comments can be added to the string or discussed with the sales representative. The following table shows each parameter and presents examples:

Config string parameter	Values
Type of panel	NGC30: NGC-30 NGC40: NGC-40 E4020i: Elexant 4020i
Electrical standard	E: IEC
Area class	SAFE: Safe Area ZONE2: Zone 2
Panel size (# of circuits)	0-40
Enclosure	SS: Stainless Steel (IP66) SW: Stainless Steel with Window (IP66) AL: Aluminium
Control voltage (L-N)	230: 230 Vac 400: 400 Vac
Power distribution	PDY: Power distribution included PDN: No power distribution included
MCB/Load switch	LS80: Load Switch 80 Amp LS120: Load Switch 120 Amp LS250: Load Switch 250 Amp
Heated	HTN: Panel not heated HTY: Panel heated via patented heating system
CNTRL	CNTRL: Control PD: Power Distribution PD/CNTRL: Power Distribution and Control
Number of circuits	0-40
Circuit breaker type	RCBO/2P20C: circuit breaker with earth leakage protection, 2 Pole, 20 Amps, type C RCBO/2P25C: circuit breaker with earth leakage protection, 2 Pole, 25 Amps, type C RCBO/2P32C: circuit breaker with earth leakage protection, 2 Pole, 32 Amps, type C

Config string parameter	Values
Module type	4020iMOD: 4020i-Mod 4020iModIS: 4020i-Mod-IS 4020iModISLIM: 4020i-Mod-IS-LIM 4020iMod3P: 4020i-Mod-3P 4020iMod3PIS: 4020i-Mod-3P-IS 4020iModISPROF: 4020i-Mod-IS-PRF 4020iModISLIMPRF: 4020i-Mod-IS-LIM-PRF 4020iMod3PISPRF: 4020i-Mod-3P-IS-PRF NGC40HTC: NGC-40-HTC NGC40-HTC3: NGC-40-HTC3 NGC40-IO: NGC-40-IO (*1) NGC30CRM: NGC-30-CRM NGC30-CRMS: NGC-30-CRMS NGC20CE: NGC-20-C-E NGC-20CLE: NGC-20-CL-E
Additional module	NGC-40SLIM: NGC-40-SLIM NGC30CTM: NGC-30-CTM NGC30CVM: NGC-30-CVM
Poles	1, 2, 3
Phase selection	LN: L-N LL: L-L L1L2L3: L1-L2-L3 L1L2L3N: L1-L2-L3-N
Type of relay and rating	SS3EX: 32A 277 Vac, 6 mm ² cable SS3ZEX: 32A 277 Vac, 6 mm ² cable, Low Smoke Zero Halogen SS3LEX: 32A 277 Vac, 10 mm ² cable SS3LZEX: 32A 277 Vac, 10 mm ² cable, Low Smoke Zero Halogen SS3REX: 32A 277 Vac, high in-rush, 6 mm ² cable SS3RZEX: 32A 277 Vac, high in-rush, 6 mm ² cable, Low Smoke Zero Halogen SS3RLEX: 32A 277 Vac, high in-rush, 10 mm ² cable SS3RLZEX: 32A 277 Vac, high in-rush, 10 mm ² cable, Low Smoke Zero Halogen SSH3EX: 32A 690 Vac, 6 mm ² cable SSH3ZEX: 32A 690 Vac, 6 mm ² cable Low Smoke Zero Halogen SSH3LEX: 32A 690 Vac, 10 mm ² cable SSH3LZEX: 32A 690 Vac, 10 mm ² cable Low Smoke Zero Halogen SSH6LEX: 63A 690 Vac, 10 mm ² SSH6LZEX: 63A 690 Vac, 10 mm ² cable Low Smoke Zero Halogen 3SSR-SS3: Heated, 32A 277 Vac 3SSR-SS3R: Heated, 32A 277 Vac, High inrush 3SSR-SSH3: Heated, 32A 690 Vac
Skid	Yes No
Transformer	TransYes: Transformer included TransNo: No Transformer

Config string parameter	Values
General options	T1500: TOUCH 1500-EX UIT: NGC-UIT3-EX W800: Wireless 868 MHz W2400: Wireless 2.4 GHz Ant: Omni Antenna for wireless AL: Alarm Lights (power / control alarm) AR: Alarm Relay (power / control alarm) RMM2 RMM2DI
Comment box	Free format text

Examples:

NGC40-E-ZONE2-18-SS-230- PDN-HTN-CNTRL-18-NGC40HTC-1-LN-SS3REX-T1500-AR-AL

- NGC-40 panel, Zone 2, 18 circuits:
 - Stainless steel
 - Phase-Neutral = 230 Vac
 - No power distribution
 - Non heated
 - Circuit Configuration:
 - 18 circuits NGC-40-HTC, 1 pole switching Line-Neutral, Solid state relay 32 Amp switching high inrush
 - TOUCH 1500 user interface
 - Alarm relays
 - Alarm lights

NGC40-E-ZONE2-15-SS-230- PDN-HTN-CNTRL-12-NGC40HTC-1-LN-SS3REX-3-NGC40HTC3-2-LL-SS3REX-AR-AL

- NGC-40 panel, Zone 2, 15 circuits:
 - Stainless steel
 - Phase-Neutral = 230 Vac
 - No power distribution
 - Non heated
 - Circuit Configuration:
 - 12 circuits NGC-40-HTC, 1 pole switching Line-Neutral, Solid state relay 32 Amp switching high inrush
 - 3 circuits NGC-40-HTC3, 2 pole switching Line-Line, Solid state relay 32 Amp switching high inrush
 - Alarm relays
 - Alarm lights

NGC40-E-ZONE2-13-SS-230-PDN-HTY-CNTRL-10-NGC40HTC-1-LN-HSS3EX-3-NGC40HTC3-3-LLL-HSS3EX-W24-ANT-AL-AR

- NGC-40 panel, Zone 2, 13 circuits
 - Stainless steel
 - Phase-Neutral = 230 Vac
 - No power distribution
 - Heated
 - Circuit Configuration:
 - 10 circuits NGC-40-HTC, 1 pole switching Line-Neutral, Solid State relay 32 Amp switching
 - 3 circuits NGC-40-HTC3, 3 poles switching, L1-L2-L3, Solid State relay 32 Amp, Wireless radio 2.4 GHz, Alarm lights, Alarm relays, TOUCH 1500
 - Wireless radio 2.4 GHz
 - Antenna
 - Alarm Lights
 - Alarm Relays



1	#	2	#	3	#	4	#	5	#	6	#	7	#	8	#	9	#
Type of Panel		Electrical Standard		Area Class		Panel size (# of circuits)		Enclosure		Control Voltage (L-N)		Power Distribution		MCB/ Load Switch		Heated	



NGC-20	IEC	Safe Area	0..40	SS = Stainless Steel SW = Stainless Steel with Window FG = Fiber Glass	230	Yes	LS80	Yes
NGC-30		ZONE2			400	No	LS120	No
NGC-40							LS250	
Elexant-4020i								

To be repeated for each controller configuration

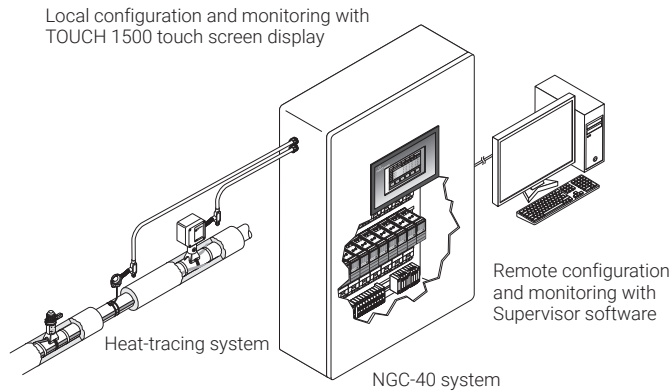
10	#	11	#	12	#	13	#	14	#	15	#	16	#	17	#	18	#	19	#	20	#	21	#
CNTRL		Number of Circuits		Circuit Breaker Type		Module Type		Ad-ditional Module		Poles		Phase Selec-tion		Type of Relay and Rating		Skid		Trans-former		General Options		Com-ment	



CNTRL: Control PD: Power Distribution PD/ CNTRL: Power Distribution and Control	0..40	RCBO/ 2P20C	Elexant-4020i-xxx	NGC30-xxx	1	L-N L-L	SS3 SS3Z	Yes	Trans-yes: Transformer included	T1500
		RCBO/ 2P25C	NGC40-xxx	NGC40-xxx	2			No	Trans-No: No Transformer	UIT
		RCBO/ 2P32C	NGC30-xxx NGC20-xxx		3					W800 W2400 ANT AL AR RMM2 RMM2-DI

Controller / main electronics selection

nVent RAYCHEM NGC-40



The nVent RAYCHEM NGC-40 is a multipoint electronic control system with a unique single point controller architecture for heat-tracing used in process temperature maintenance and freeze protection applications. By taking advantage of innovative modular packaging techniques, the NGC-40 control system provides configuration and component flexibility so that it may be optimized for a customer's specific needs.

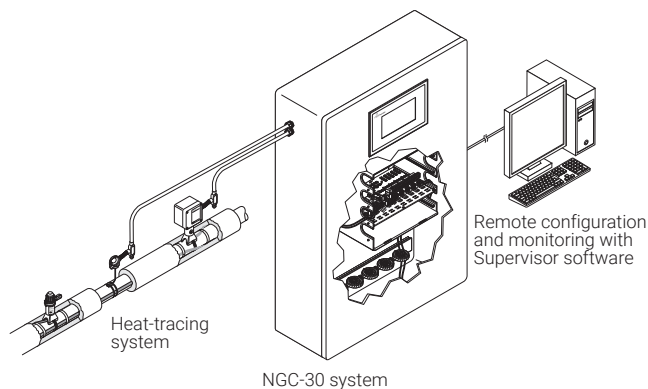
The NGC-40 uses a single controller module per heat-tracing circuit for maximum reliability. The NGC-40 control system in combination with the solid-state relays can be used for 1-phase and 3-phase heat-tracing circuits up to 63 Amp at 690 Vac. The NGC-40 control modules include ground-fault measurements and as well single-phase and three-phase line current measurements. The Safety Temperature limiter can be used in combination with hazardous area approved contactors for control limited designs in Zone 1 applications (with controller panel in Zone 2).

Temperature inputs: Each IO module accepts up to four additional RTD inputs. 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 (8x16) RTDs. Since multiple RMM2's can be networked over a single cable to the NGC-40, the cost of RTD field wiring will be significantly reduced.

Digital inputs: The NGC-40 control system can be extended with the Digital Input module RMM2-DI. This enables the capability monitoring of equipment in the field like circuit breakers, switches etc.

Communication: The NGC-40 support Industry 4.0 and the Internet of Things (IoT) by offering a flexible Modbus map creating a very easy way of integrating the TOUCH 1500 user interface with external control systems. The NGC-40 system supports multiple communications ports, allowing serial interfaces (RS-485 and RS-232) and Ethernet connections 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, TOUCH 1500 touch screen and Remote Monitoring Modules (RMM2), as well as upstream devices such as nVent RAYCHEM Supervisor and the TOUCH 1500 user interface.

nVent RAYCHEM NGC-30



The nVent RAYCHEM NGC-30 is a multi-circuit electronic control system for heat-tracing used in process-temperature maintenance and freeze-protection applications. The NGC-30 Controller can accommodate temperature inputs from a variety of sources: hard-wired to the panel mounted CRM(S) modules or from Remote Monitoring Modules (RMM2).

The NGC-30 for Zone 2 applications is equipped with the card rack module for solid-state-relays (CRMS), rated up to 63 Amp at 690 Vac.

Up to four PT100 sensor inputs for each heat-tracing circuit allow for a variety of combinations of temperature control, monitoring, and alarming. The ability to monitor and configure the controller is available both locally and remotely with the User Interface Unit (NGC-UIT3-EX) and the Supervisor software.

nVent RAYCHEM Elexant 4020i



The nVent RAYCHEM Elexant 4020i is a compact, full-featured, touch screen based, single-point heat-tracing controller. It provides control and monitoring of Electric Heat-Tracing (EHT) circuits for both freeze protection and process temperature maintenance. This controller can monitor and alarm on high and low temperature, high and low current, ground-fault levels, voltage, and supports a host of additional features to offer the utmost in control and monitoring of EHT. The Elexant 4020i controller provides three output types: a line powered relay for driving contactors, a DC output for driving solid-state relays (SSRs) and a 0-10 V analog output for driving variable output power modules. Multiple communication ports allow flexible connectivity for remote monitoring, configuration, and ease of integration with Supervisor software, TOUCH 1500-EX or a Process Control System.

Solid state relay modules

The Zone 2 approved solid state relay (SSRs) modules are available in various versions and may be used with any of the controller products outlined above. They are mounted on the side of the panel enabling good heat transfer to keep heat away from the inside of the panel. The heated SSR module always contains groups of three SSR modules mounted on one heat sink. The Type of SSR, including voltage, amperage, inrush current as well as the cable size and type of cable are specified at the panel configuration procedure.

The minimum ambient operating temperature of the heated SSRs is -55°C .

Elexant 9200i wireless radio

Each panel can be optionally equipped with the Elexant 9200i wireless radio modules. The radios enable wireless communications between the Zone 2 panels and the network User Interfaces such as the TOUCH 1500-EX, UIT3-EX, and/or Supervisor. The radios using 868 MHz and 2.4 GHz are available, and they support point-to-point, star, line, and Mesh network topologies. Security is ensured through use of the 128-bit Advanced Encryption Standard (EAES). Reliability is enhanced by network self-healing capabilities and auto-negotiation of alternate pathways in the event of lost communications. Antennas can be installed on the panel or when needed, antenna packages are available to allow remote installation for improved range. For more details see the specifications of the Elexant 9200i.

APPROVALS

Panel

For use in ordinary and hazardous area Zone 2 (Gas)

Temperature classification

Temperature classification depends on panel configuration

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

NGC-30 / NGC-40 / Elexant 4020i

For use in ordinary and hazardous area Zone 2 (Gas)

Temperature classification

NGC-40: T4

NGC-30: T5

Elexant 4020i: T4

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING INFORMATION

Optional components

The Zone 2 panels provide flexible configurations - the following items are optionally available:

Item	Can Be Used With
TOUCH 1500-EX	NGC-40, Elexant 4010i / 4020i, (field mounted) NGC-20
NGC-UIT3-EX	NGC-30, (field mounted) NGC-20
Alarm Lights	All controllers
Alarm Relay	All controllers
RMM2	Remote monitoring module for Temperature Inputs
RMM2-DI	Remote monitoring module for Digital Inputs



Wireless communications interface

PRODUCT OVERVIEW



The nVent RAYCHEM Elexant 9200i is a Wireless Communications Interface that provides an alternative solution to hardwired Remote Monitoring and Configuration of Electric Heat Tracing (EHT) systems. It integrates with nVent RAYCHEM Supervisor software and EHT controllers, helping reduce total cost of ownership of a project.

The Elexant 9200i product line consists of the following:

- Standalone enclosures
- A wireless communications option within a given Control Panel
- External antenna packages

A minimum of two radio transceivers are required to establish a network. Standalone enclosures can be configured in many ways, enabling the customer to choose from a range of options: enclosure material, radio frequency, and antenna type.

Installation

The Elexant 9200i comes ready to install, eliminating the need for custom modifications. Components are approved for both indoor and outdoor locations. Wiring is as simple as connecting the incoming power and communications wiring. If so chosen, the external antenna and associated coaxial cable, need be mounted and routed as per the requirements of the system.

Interfacing with and programming transceivers is accomplished through the specific transceiver Manufacturer's radio programming software and applicable interface cable.

Communication

Each Elexant 9200i comes equipped with an interface that allows connection to the nVent RAYCHEM Supervisor software and nVent EHT Controllers.

Supporting Information

Further information pertaining to transceiver hardware and software can be found within associated manufacturer's documentation.

Features

- **Available in three frequencies for global coverage:**
 - 868 MHz, 900 MHz, 2.4 GHz
- **Multiple network topologies & modes**
 - Point to Point / Star, Line / Mesh
 - I/O Data, Serial, PLC / Modbus RTU
- **Multiple Radio setup types**
 - Parent, Child, Repeater / Child
 - 128 bit Advanced Encryption Standard (AES)
- **Self-Healing**
 - Radios auto-negotiate alternate pathways in the event of a lost path
- **Long distance coverage**

PRODUCT SPECIFICATIONS

Technical details

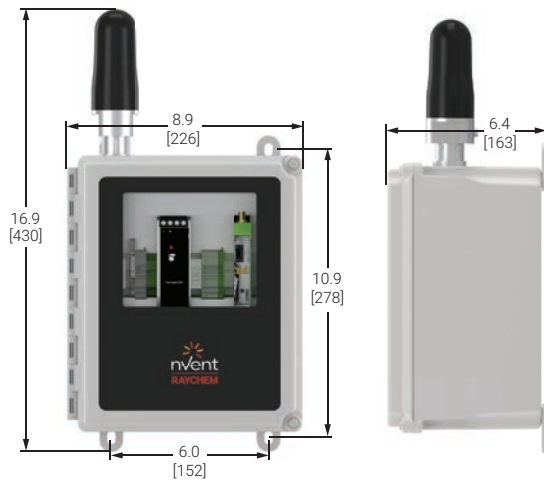
Electromagnetic Compatibility	Conformance with EMC Directive's 2004/108/EC and 2004/30/EU
Supply Voltage	100 – 240 VAC, 50-60 Hz
Internal power consumption	< 9 W (900 MHz), 2 W (868 MHz & 2.4 GHz)
Transmission power	< 1 W

Environmental

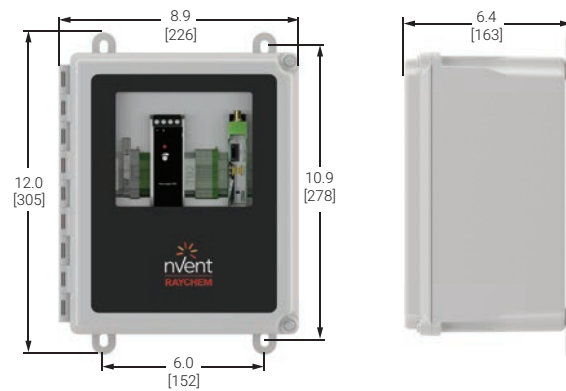
Protection	NEMA 4X, IP64 (FG enclosure), IP 66 (Stainless Steel Enclosure)
Materials	Fiberglass (FG) or Stainless Steel (SS304)
Ambient operating temperature	-40°C to 47°C (-40°F to 116°F) cULus variants -40°C to 52°C (-40°F to 125°F) IECEx/ATEX/UKEx variants
Ambient storage temperature	-40°C to 85°C (-67°F to 185°F)
Relative humidity	20% to 85% noncondensing
Environment	PD2, CAT III
Max. altitude	2,000 m (6,562 ft)

Typical enclosure dimensions (inches [mm])

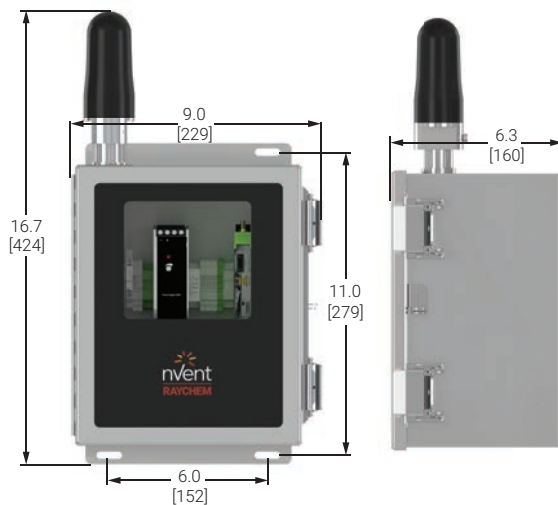
Elexant 9200i-X-PC-XXX-FW



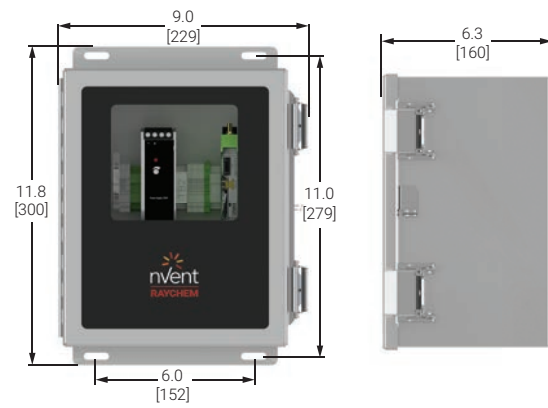
Elexant 9200i-X-PC-XXX-FW-EXT



Elexant 9200i-X-PC-XXX-SW



Elexant 9200i-X-PC-XXX-SW-EXT



Mounting

Fiberglass enclosure	Surface mount with four holes on 6.0 in. x 10.9 in. (152 mm x 278 mm) centers - hole diameter: 0.3 in (8 mm)
Stainless Steel enclosure	Surface mount with four holes on 6.0 in. x 11 in. (152 mm x 279 mm) centers - hole diameter: 0.3 in (8 mm)

Configuration

Refer to Manufacturers documentation for supporting information:

Method	Phoenix Contact: RAD-XXXX-IFS PSI-CONF	User Manual(s) Programming Software
Connection	Phoenix Contact: RAD-CABLE-USB	Radio Programming interface cable
Radio Parameters	Appropriate parameters are provided through Engineering Services	

Connection terminals

Power supply input	Fuse terminal, 26 – 10 AWG (0.14 – 6 mm ²), torque 0.6 – 0.8 Nm Neutral terminal, 20 – 10 AWG (0.5 – 6 mm ²), cage clamp Ground (Earth), 20 – 10 AWG (0.5 – 6 mm ²), cage clamp
RS-485 communications	Comm terminals, 22 – 12 AWG (0.25 – 4 mm ²), cage clamp Ground (Earth), 22 – 12 AWG (0.25 – 4 mm ²), cage clamp

Communications

Radio

Type	Phoenix Contact: 868 MHz, 900 MHz, and 2.4 GHz types available
Quantity	Phoenix Contact: Up to 250 transceivers per network (900 MHz & 2.4 GHz) Up to 99 transceivers per network (868 MHz)

RS-485

Type	RS-485, 2-wire
Cable	Shielded, Twisted pair
Length	4,000 ft. (1,200 m) maximum
Quantity	Up to 32 devices per serial port (Typical)

APPROVALS

For use in hazardous area Class I, Division 2 / Zone 2 (Gas) - applicable to Enclosures

Temperature classification

T4

Product certification



More details about product certification, approvals and conditions of safe use are available in the installation manual at www.nVent.com/RAYCHEM.

ORDERING DETAILS*

nVent RAYCHEM Elexant 9200i Wireless Enclosures

(See Notes 1 and 2)

Description	Catalog Number	Part Number	Weight (kg/lbs)
Elexant 9200i 868 MHz Phoenix Contact module in FG enclosure with window, antenna, and pre-drilled holes for power (M25) and communications (M20)	10392-100	9200i-E-PC-868-FW	3.9 / 8.6
Elexant 9200i 868 MHz Phoenix Contact module in FG enclosure with window, external antenna connection, and pre-drilled holes for power (M25) and communications (M20) - antenna & coax sold separately	10392-101	9200i-E-PC-868-FW-EXT	3.2 / 7.1
Elexant 9200i 868 MHz Phoenix Contact module in SS enclosure with window, antenna, and pre-drilled holes for power (M25) and communications (M20)	10392-102	9200i-E-PC-868-SW	6.7 / 14.7
Elexant 9200i 868 MHz Phoenix Contact module in SS enclosure with window, external antenna connection, and pre-drilled holes for power (M25) and communications (M20) - antenna & coax sold separately	10392-103	9200i-E-PC-868-SW-EXT	6.0 / 13.2
Elexant 9200i 900 MHz Phoenix Contact module in FG enclosure with window and antenna	10392-104	9200i-A-PC-900-FW	3.9 / 8.6
Elexant 9200i 900 MHz Phoenix Contact module in FG enclosure with window and external antenna connection - antenna & coax sold separately	10392-105	9200i-A-PC-900-FW-EXT	3.2 / 7.1
Elexant 9200i 900 MHz Phoenix Contact module in SS enclosure with window and antenna	10392-106	9200i-A-PC-900-SW	6.7 / 14.7
Elexant 9200i 900 MHz Phoenix Contact module in SS enclosure with window and external antenna connection - antenna & coax sold separately	10392-107	9200i-A-PC-900-SW-EXT	6.0 / 13.2
Elexant 9200i 2.4 GHz Phoenix Contact module in FG enclosure with window and antenna	10392-108	9200i-A-PC-024-FW	3.9 / 8.6
Elexant 9200i 2.4 GHz Phoenix Contact module in FG enclosure with window and external antenna connection - antenna & coax sold separately	10392-109	9200i-A-PC-024-FW-EXT	3.2 / 7.1
Elexant 9200i 2.4 GHz Phoenix Contact module in SS enclosure with window and antenna	10392-110	9200i-A-PC-024-SW	6.7 / 14.7
Elexant 9200i 2.4 GHz Phoenix Contact module in SS enclosure with window and external antenna connection - antenna & coax sold separately	10392-111	9200i-A-PC-024-SW-EXT	6.0 / 13.2
Elexant 9200i 2.4 GHz Phoenix Contact module in FG enclosure with window, antenna, and pre-drilled holes for power (M25) and communications (M20)	10392-112	9200i-E-PC-024-FW	3.9 / 8.6
Elexant 9200i 2.4 GHz Phoenix Contact module in FG enclosure with window, external antenna connection, and pre-drilled holes for power (M25) and communications (M20) - antenna & coax sold separately	10392-113	9200i-E-PC-024-FW-EXT	3.2 / 7.1
Elexant 9200i 2.4 GHz Phoenix Contact module in SS enclosure with window, antenna, and pre-drilled holes for power (M25) and communications (M20)	10392-114	9200i-E-PC-024-SW	6.7 / 14.7
Elexant 9200i 2.4 GHz Phoenix Contact module in SS enclosure with window, external antenna connection, and pre-drilled holes for power (M25) and communications (M20) - antenna & coax sold separately	10392-115	9200i-E-PC-024-SW-EXT	6.0 / 13.2

* Not all variants are available in all regions



nVent RAYCHEM Elexant 9200i Wireless Antenna Packages

All Antenna Packages listed are accessories to the Enclosures shown above, and are shown to assist the customer in product selection. However, they are not included in the approvals of the Enclosures. Each component of the antenna packages must have its own suitable certification for each use case. Refer to the section on 'SPECIFIC CONDITIONS OF SAFE USE' in the Installation Manual for further information. (See Notes 1 and 2)

Description	Catalog Number	Part Number	Weight (kg/lbs)
Elexant 9200i 868 MHz Antenna Package Accessory - OMNI 2 dBi antenna with 3 meter coaxial cable, antenna bracket, and gland	10392-151	9200i-E-PC-ANT-868-OM1-3	1.4 / 3.1
Elexant 9200i 868 - 900 MHz Antenna Package Accessory - OMNI 2 dBi antenna with 3 meter coaxial cable, antenna bracket, and gland	10392-152	9200i-A-PC-ANT-900-OM2-3	1.4 / 3.1
Elexant 9200i 2.4 GHz Antenna Package Accessory - 2 dBi antenna with 3 meter coaxial cable, antenna bracket, and gland	10392-153	9200i-C-PC-ANT-024-OM3-3	1.4 / 3.1
Elexant 9200i 868 - 900 MHz Antenna Package Accessory - OMNI 5 dBi YAGI antenna with 3 meter coaxial cable, antenna bracket, and gland	10392-154	9200i-C-PC-ANT-900-YA1-3	2.1 / 4.6
Customized Antenna Package Accessory	9200i-ANT-C	9200i-ANT-C	N/A

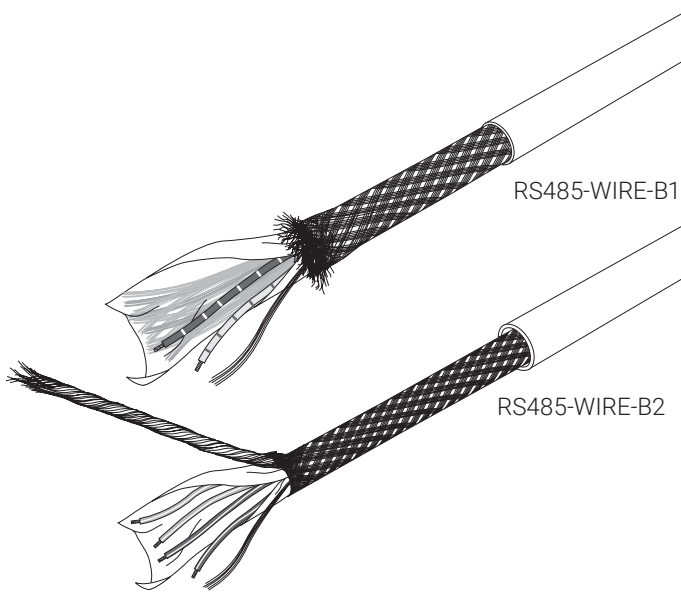
Notes:

- Many countries restrict the use of specific Radio Frequencies. In general, the following frequencies can be used accordingly:
 - 868 MHz – EMEAI
 - 900 MHz – North America
 - 2.4 GHz – Global
- Further information pertaining to specific regional information can be found within the manufacturer's documentation.



RS485 communication cables

PRODUCT OVERVIEW



nVent RAYCHEM RS485-WIRE are braided and shielded type cables suitable for RS485 data transmission. Screen continuity and polarity must be maintained throughout the entire communication network. Connections must be made at each panel in accordance with the details provided in the appropriate product manual. Do not share communication cables with other signals or power.

Zero Halogen (Low Smoke) cables of the same construction are available on request. (Flame retardant to IEC 60332-3C).

PRODUCT SPECIFICATIONS

Technical details

Type	RS485-WIRE-B1 (Single pair construction)	RS485-WIRE-B2 (Dual pair construction)
Conductors	Two tinned Copper conductors 24 AWG (7 x 0.20 mm)	Four tinned Copper conductors 24 AWG (7 x 0.20 mm)
Insulation	Polyethylene (PE)	Polyethylene (PE)
Pairing	One single twisted pair	Two twisted pairs
Identification	Blue/white + White/blue	Pair 1: Blue/white + White/blue Pair 2: White/orange + Orange/white
Screening	Aluminium polyester tape Tinned Copper Braid (90% coverage)	Aluminium polyester tape Tinned Copper Braid (90% coverage)
Jacket Type	RS485-WIRE-B1- and RS485-WIRE-B2 made of PVC (Polyvinylchloride) RS485-WIRE-ZHB1- and RS485-WIRE-ZHB2 made of LSOH	
Colour	All type Grey	



Electrical properties

Type	RS485-WIRE-B1 (Single pair construction)	RS485-WIRE-B2 (Dual Pair construction)
Max operating voltage	300 V RMS	300 V RMS
Capacitance	45 Pf/m (measured between conductors)	45 Pf/m (measured between conductors)
Conductor resistance	80 Ohm/km Ø 20°C	80 Ohm/km Ø 20°C
Nominal Impedance	120 Ohm	120 Ohm
Velocity of Propagation	66%	66%
Max allowed Current	2.10 A @ 25°C	2.10 A @ 25°C

Physical properties

Nominal Diameter (OD)	5.90 mm (±0.2 mm)	8.64 mm (±0.2 mm)
Temperature range	-30°C to +80°C	-30°C to +80°C
Minimum Bend radius	63 mm	89 mm
Max continuous length	1000 m	1000 m

APPROVALS

RS485 communications, In- and outdoors.

Product certification



ORDERING INFORMATION

Polyvinylchloride types	RS485-WIRE-B1	RS485-WIRE-B2
PN (Weight)	1244-006598 (55 kg/km)	1244-006599 (90 kg/km)
Zero Halogen types	RS485-WIRE-ZHB1	RS485-WIRE-ZHB2
PN (Weight)	1244-006600 (55 kg/km)	1244-006601 (90 kg/km)

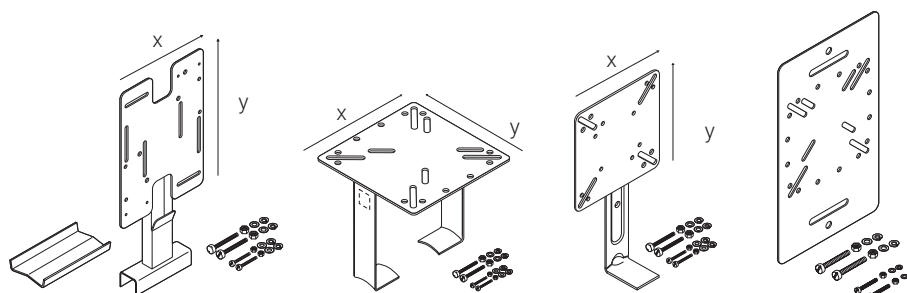
Accessories

SUPPORTS

Support brackets are used to fix equipment such as thermostats or junction boxes on pipes or cable trays. Support brackets require additional pipe straps which have to be ordered separately.

They include a set of M6 and/or M4 fixing screws, nuts, washers and spring lock washers for the fixation of one junction box or thermostat. They are fabricated in stainless steel (SS304, and passivation).

The table below outlines the typical compatibility of each bracket with relevant equipment, for other equipment please contact nVent representative.

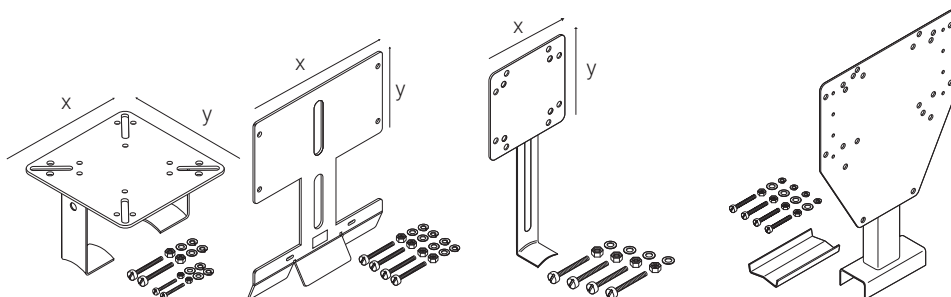


	SB-100 192932-000	SB-101 990944-000	SB-110 707366-000	SB-130** 1244-006602
AT-TS-13	X	X	X	X
AT-TS-14	X	X	X	X
JB-82	X	X	X	X
JB-NH2	X	X	X	
JB-NH4	X	X	X	
JB-EX-20(-EP)	X	X	X	X
JB-EX-21	X	X		X
JB-EX-21/35MM2				
JB-EX-25/35MM2				
JB-EX-32/35MM2				
JB-EX-42-EP				
JBU-100(-L)-E(P)	X	X		X
JB-EX-40-EP	X	X		X
JB-EX-41-EP	X	X		X
MONI-PT100-EXE		X		X
MONI-PT100-NH		X		X
MONI-PT100-4/20mA		X		X
RAYSTAT V5	X	X		X
RAYSTAT-EX-02	X	X	X	X
ETS-05	X	X	X	X
Elexant 5010i & Elexant 5010i-LIM				
T-M-10-S/+x+y	X	X	X	X
T-M-20-S/+x+y(/EX)			X	

**Support bracket for fixation to cable trays

Technical details

	SB-100 192932-000	SB-101 990944-000	SB-110 707366-000	SB-130** 1244-006602
Plate size (mm) X x Y	160 x 230	160 x 160	130 x 130	180 x 315
Distance pipe-plate (mm)	100	160	100	N.A.
Number of pipe straps required	2	2	1	2
Max. pipe temperature (°C)	230	230	230	N.A.
Weight (kg)	0.7	0.59	0.4	0.62



	SB-111 579796-000	SB-120 165886-000	JB-SB-26 338265-000	SB-125 1244-00603
AT-TS-13	x			
AT-TS-14	x			
JB-82	x			x
JB-NH2	x			
JB-NH4	x			
JB-EX-20(-EP)	x			
JB-EX-21				
JB-EX-21/35MM2	x*			
JB-EX-25/35MM2	x*			
JB-EX-32/35MM2	x*			
JB-EX-42-EP	x*			
JBU-100(-L)-E(P)				x
JB-EX-40-EP				x
JB-EX-41-EP				x
MONI-PT100-EXE	x		x	
MONI-PT100-NH	x		x	
MONI-PT100-4/20mA	x		x	
RAYSTAT V5				x
RAYSTAT-EX-02	x			x
ETS-05	x			
Elexant 5010i & Elexant 5010-LIM		x		x
T-M-10-S/+x+y	x			
T-M-20-S/+x+y/(EX)		x		x

* Use 2 brackets per junction box

Technical details

Plate size (mm) X x Y	130 x 130	220 x 120	80 x 80	220 x 232
Distance pipe-plate (mm)	100	120	100	100
Number of pipe straps required	2	2	1	2
Max. pipe temperature (°C)	230	230	230	230
Weight (kg)	0.48	0.66	0.2	0.9

LABELS AND TAGS

Warning labels

Warning labels indicate the presence of electrical heat-tracing under the insulation of the pipe or other equipment. (min. of 1 label per 5 m of heat-tracing line). Also suitable for stainless steel pipes.



Language	EHT label reference	Product number
Arabian	LAB-ETL-AR	036236-000
Bulgarian	LAB-ETL-BG	1244-002183
Czech	LAB-ETL-CZ	731605-000
Danish	LAB-ETL-DK	C97690-000
Dutch	LAB-ETL-NL	749153-000
English	LAB-I-01	938947-000
Estonian/English	LAB-ETL-EN/EE	1244-001415
Finnish/Swedish	LAB-ETL-SE/FI	756479-000
French	LAB-I-05	883061-000
German/French/Italian (230 V)	LAB-ETL-DE/FR/IT	148648-000
German	LAB-ETL-DE	597779-000
Hungarian	LAB-ETL-HU	623725-000
Italian	LAB-ETL-IT	C97688-000
Kazakh/Russian/English	LAB-ETL-KZ/RU/EN	1244-017393
Latvian	LAB-ETL-LV	841822-000
Lithuanian	LAB-ETL-LT	105300-000
Norwegian	LAB-ETL-NO	C97689-000
Norwegian/English	LAB-ETL-EN/NO	165899-000
Polish	LAB-ETL-PL	258203-000
Portuguese	LAB-ETL-PT	945960-000
Romanian	LAB-ETL-RO	902104-000
Russian	LAB-ETL-RU	574738-000
Russian/English	LAB-ETL-EN/RU	1244-001060
Russian/English/Azeri	LAB-ETL-AZ/RU/EN	1244-012283
Russian/English/Uzbek	LAB-ETL-UZ/RU/EN	1244-022143
Spanish	LAB-ETL-ES	C97686-000
Swedish	LAB-ETL-SE	691703-000
Turkish/English	LAB-ETL-EN/TR	1244-014860



Language	Component label reference	Product number
English	LAB-I-02	774499-000
Russian/English	LAB-I-02/E/R LAB-ENDSEAL	1244-001059 146909-000
English	ETL-END-SEAL LAB-SPLICE	103405-000 007063-000

Stabilized design labels

If compliance to the T-class or A.I.T. cannot be achieved by the unconditional T-rating of the heating cable, the hazardous area regulations require that cable sheath temperature is determined by the rules of stabilized design as per EN 60079-30 and the heating design information is appropriately documented. For series heating designs, the following labels are available for physical marking of circuits in the field (min. 1 label per heating circuit).

PI-LABEL-EX

Aluminum tag plate. To be installed when series polymer insulated XPI & XPI-S heating cables are used in hazardous areas.

PN: 1244-006940 Weight: 0.04 kg

PI-LABEL-NH

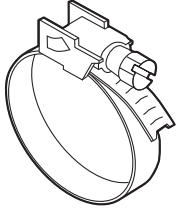
Aluminum tag plate. To be installed when series polymer insulated XPI & XPI-S heating cables are used non hazardous areas.

This label is not mandatory but highly recommended for future reference.

PN: 1244-006941 Weight: 0.04 kg

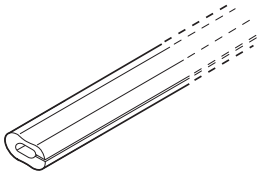
PIPE STRAPS

Metal straps for pipe mounting of integrated power connections, above the insulation tees and end seals as well as support brackets and the tubular insulation entry. Banding: stainless steel



Pipe outer diameter in mm	(inches)	Pipe strap	PN (Weight)
20 – 47	(½" – 1¼")	PSE-047	700333-000 (0.017 kg)
40 – 90	(1¼" – 3")	PSE-090	976935-000 (0.024 kg)
60 – 288	(2" – 10")	PSE-280	664775-000 (0.052 kg)
60 – 540	(2" – 20")	PSE-540	364489-000 (0.052 kg)

PROTECTIVE GROMMET



G-02

Silicone grommet that protects the heating cable at sharp edges such as endplates of insulation cladding, flanges etc. It can be cut-to-length and resists temperatures up to 215°C.

Sold in pieces of 1 m.

PN: 412549-000 Weight: 0.37 kg/m

FIXING MATERIALS

Self-adhesive tape for fixing the heating cables on pipes or other equipment.



GT-66

Glass cloth tape for attaching heating cable to pipe.

Not for stainless steel pipes or for installation temperatures below 5°C.

20 m per roll, 12 mm width.

PN: C77220-000 Weight: 0.053 kg

GS-54

Glass cloth tape for attaching heating cable to pipe.

For stainless steel pipes or for any installation below 5°C.

16.5 m per roll, 12 mm width.

PN: C77221-000 Weight: 0.048 kg

ATE-180

Aluminium tape* for attaching heating cables and thermostat sensors to pipes and tanks. Minimum installation temperature: 0°C. Also suitable for stainless steel pipes.

55 m per roll, 63.5 mm width.

PN: 846243-000 Weight: 0.84 kg

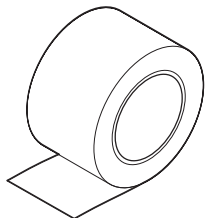
*Power output of selfregulating heating cables might increase when installed with aluminium tape or other heat transfer aids. Please use TraceCalc or contact nVent representative for further details.

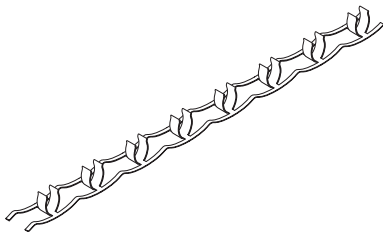
HWA-METAL-MESH-SS-50MM-10M

Stainless steel mesh for fixation of heating cables on valves, pumps or other odd-shaped surfaces. This mesh provides optimum contact and heat transfer between heating cables and heated equipment and can be used for exposure temperatures up to 400°C.

10 m per roll, 50 mm width.

PN: 1244-005772 Weight: 0.36 kg





HWA-PI-FIX- SS-xMM-10M

Stainless steel clip band to attach Polymer Insulated series heating cables to pipes. Clips at regular distances to allow for even heater spacing. Band available in two sizes for different diameter ranges.

10 m per roll.

For diameters up to 5 mm, HWA-PI-FIX-SS-5MM-10M

PN: 1244-007768 Weight: 0.32 kg

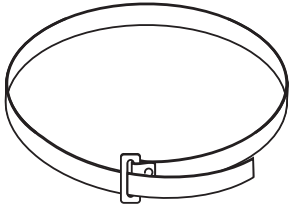
For diameters up to 8 mm, HWA-PI-FIX-SS-8MM-10M

PN: 1244-007769 Weight: 0.52 kg

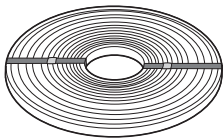
Available Pipe Straps

Stainless steel pipe straps for holding MI cable onto pipe. Tighten with pliers.

Allow one strap per 30 cm of pipe



Part No.	Pipe Diameter	Packing Qty
PB 125	to 1 ¼" (32 mm)	50 pc
PB 300	1 ½" to 3" (38 – 75 mm)	35 pc
PB 600	3 ½" to 6" (89 – 150 mm)	25 pc
PB 1000	6" to 10" (150 – 250 mm)	1 pc
PB 1200	to 12" (300 mm)	1 pc
PB 2400	to 24" (600 mm)	1 pc
PB 3600	to 36" (900 mm)	1 pc



SNLS

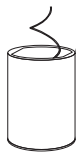
Plain stainless steel banding/strip for holding MI cables in place on pipes.

30 m roll. Secured with buckles.



SNLK

Stainless steel buckles for use with metal banding strip type SNLS.



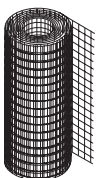
RMI-TW

Tie wire for fastening steel heating cables on pipes. Especially suitable for irregular shaped objects such as pumps, valves, flanges. Supplied in 50 m reels.

Do not use with copper or cupro nickel sheathed heating cables; use straps wherever possible.

Allowances for tie wire and banding on pipes.

Pipe Size (mm)	25	40	50	100	150	200	250	300	350	400	450	500	600	750	900	1200
Required length (m) per m of pipe	0.8	1.1	1.2	1.6	2.1	2.8	3.5	4.2	4.6	5.2	5.9	6.5	7.9	9.8	11.8	15.7



FT-19/FT-20

Zinc-plated metal mesh (FT-19) or stainless steel metal mesh (FT-20) for holding MI heating cables in place on pipes, tanks or other equipment.

Supplied in 25 m rolls (approx. width 1 m).

HARD-SPACER-SS-25MM-25M

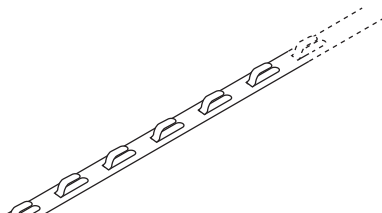
Stainless steel spacer for fixing the heating cable on walls, tanks and vessels, etc.

Width spacer: 12.5 mm.

Fixing distance for cables: each 25 mm.

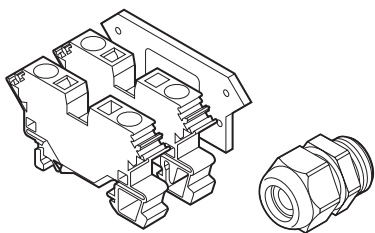
25 m per roll.

PN: 107826-000 Weight: 1.10 kg



The following terminals, glands, plugs, adaptors and reducers are all hazardous area approved (ATEX & EAC EX)
For approvals for other countries, contact your local nVent representative.

TERMINALS



HWA-WAGO-TSTAT-KIT

Thermostat kit with supplementary terminals to connect thermostats of type RAYSTAT-EX-02 to the junction boxes JBS, JBM and JBU.

The kit includes 2 terminals Spring-type terminals (1 x L, 1 x PE), 1 power cable gland GL-36-M25, 1 end plate and 1 installation instruction.

PN: 966659-000 Weight: 0.073 kg

HWA-WAGO-PHASE

Phase/neutral terminal (Ex e), spare part for various junction boxes, max. 10 mm² solid/stranded.

PN: 633476-000 Weight: 0.019 kg

HWA-WAGO-EARTH

Earth terminal (Ex e), spare part for various junction boxes, max. 10 mm² solid/stranded.

PN: 911505-000 Weight: 0.027 kg

HWA-WAGO-ENDPLATE

End plate for HWA-WAGO-..., 10 mm² terminals, spare part.

PN: 983674-000 Weight: 0.003 kg

HWA-WAGO-JUMPER

Jumper to bridge HWA-WAGO-..., 10 mm² terminals, spare part.

PN: 550942-000 Weight: 0.0004 kg

HWA-WDM-PHASE-35

Phase/neutral screw terminal (Ex e), spare part for JB-EX-xx/35MM2 junction boxes, max. 35 mm² solid/stranded.

PN: 1244-006990 Weight: 0.052 kg

HWA-WDM-EARTH-35

Earth screw terminal (Ex e), spare part for JB-EX-xx/35MM2 junction boxes, max. 35 mm² solid/stranded.

PN: 1244-006992 Weight: 0.077 kg

HWA-WDM-EARTH-10

Earth screw terminal (Ex e), spare part for JB-EX-xx/35MM2 junction boxes, max. 10 mm² solid/stranded.

PN: 1244-006994 Weight: 0.030 kg

HWA-WDM-JUMPER-35-2

Jumper to bridge two HWA-WDM... 35 mm² terminals, spare part

PN: 1244-006995 Weight: 0.013 kg

HWA-WDM-JUMPER-35-3

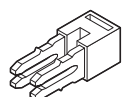
Jumper to bridge three HWA-WDM... 35 mm² terminals, spare part

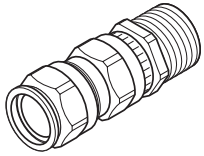
PN: 1244-006996 Weight: 0.020 kg

HWA-WDM-PLATE

End plate for HWA-WDM... 35 mm² terminals, spare part

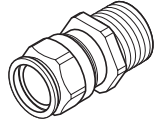
PN: 1244-007004 Weight: 0.005 kg





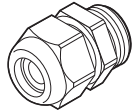
GL-33

¾" NPT power cable gland for RAYSTAT-EX-02 (Ex II2GD / Ex db IIC / Ex eb IIC / Ex tb IIIC)
 Nickel plated brass, silicone grommet.
 For use with armoured power cables with outer sheath diameter of 13.5 – 21 mm and inner sheath diameter of 10 – 15.5 mm.
 PN: 1244-017517 Weight: 0.14 kg



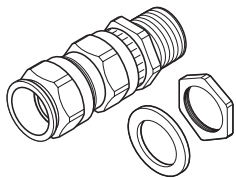
GL-34

¾" NPT power cable gland for RAYSTAT-EX-02 (Ex II2GD / Ex db IIC / Ex eb IIC / Ex tb IIIC)
 Nickel plated brass, silicone grommet.
 For use with non-armoured power cables with outer sheath diameter of 10 – 15.5 mm.
 PN: 1244-017518 Weight: 0.08 kg



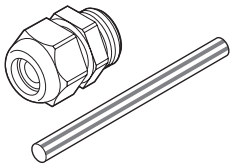
GL-36-M25

M25 power cable gland (Ex II 2 GD Ex eb IIC Gb / Ex tb IIIC Db) Polyamide.
 For use with non-armoured power cables with outer diameter range 8-17,5 mm.
 Temperature range: –20°C/+70°C.
 Spare part for JBS-100, JBM-100 and JBU-100.
 PN: 1244-019082 Weight: 0.016 kg



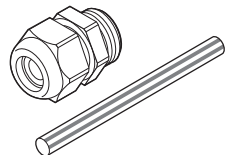
GL-38-M25-METAL

M25 power cable gland (Ex II 2 GD / Ex db IIC / Ex tb IIIC) for use with junction boxes with internal earth plate (-EP) or metal boxes.
 Nickel plated brass, silicone grommet.
 For use with armoured power cables with sheath diameter of 13.5 – 21 mm and inner sheath diameter 10 – 15.5 mm.
 PN: 056622-000 Weight: 0.15 kg



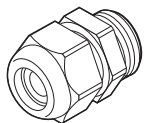
C20-PI-PA-KIT

Cable gland (Ex eb), polyamide for use with PI cables with a diameter range of 4-13 mm, up to –40°C. With green/yellow sleeve.
 PN: 1244-019669 Weight: 0.02 kg



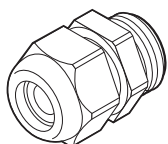
C20-PI-M0-KIT

Cable gland (Ex eb), Ni plated brass for use with PI cables with a diameter range of 5-14 mm in conjunction with junction boxes with earth plate or with polymer junction boxes and an earth lug, up to –55°C. With green/yellow sleeve.
 PN: 1244-019670 Weight: 0.71 kg



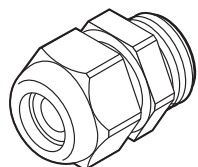
GL-45-M32

M32 cable gland (Ex eb), polyamide for use with power cables with a diameter range of 12 – 21 mm.
 PN: 1244-000 847 Weight: 0.028 kg



GL-51-M40

M40 cable gland (Ex eb), polyamide for use with power cables with a diameter range of 17 – 28 mm.
 PN: 1244-007003 Weight: 0.045 kg



GL-55-M25

M25 power cable gland (Ex eb) Polyamide.
 For use with non-armoured power cables with outer diameter range 8 – 15 mm.
 Temperature range: –55°C/+70°C
 Spare part for JBS-100, JBM-100, JBU-100, JB-EX-20(-EP), JB-EX-40-EP, JB-EX-41-EP, JB-MB-25/16MM2 and JB-MB-26/16MM2
 PN 1244-019083 Weight: 0.016 kg

PLUGS



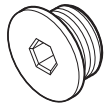
HWA-PLUG-M20-EXE-PLASTIC

M20 stopping plug Ex eb, up to -55°C.

Polyamide.

Spare parts for various junction boxes.

PN: 1244-000 845 Weight: 0.003 kg



HWA-PLUG-M25-EXE-PLASTIC

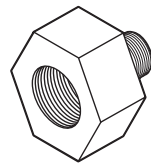
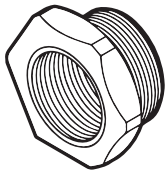
M25 stopping plug Ex eb, up to -55°C.

Polyamide.

Spare parts for various junction boxes.

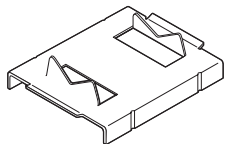
PN: 434994-000 Weight: 0.007 kg

ADAPTORS/REDUCERS



Prod description	Male	Female	Hazardous area approved	Material	Extra accessories	Product number (Weight)
REDUCER-M25/M20-EEXE	M25	M20	Ex eb	Polyamide	None	1244-002089 (0.021 kg)
REDUCER-M32/M25-EEXE	M32	M25	Ex eb	Polyamide	None	1244-000859 (0.009 kg)
REDUCER-M40/M32	M40	M32	Ex eb	Polyamide	O-ring	1244-007007 (0.016 kg)
ADPT-PG16-M25-EEXE	M25	PG16	Ex eb	Polyamide	O-ring	541892-000 (0.020 kg)
REDUCER-M25/20-EEXD	M25	M20	Ex db / eb	Brass	O-ring	404287-000 (0.07 kg)
REDUCER-M25/20	M25	M20	Ex db / eb	Brass	Locknut, Fibre washer, O-ring	630617-000 (0.07 kg)
REDUCER-M25/M20-EEXD-SS	M25	M20	Ex db / eb	Stainless steel	O-ring	1244-002090 (0.028 kg)
REDUCER-1NPT/PG16-EEXD	1" NPT	PG16	Ex db / eb	Stainless steel	None	414478-000 (0.10 kg)
REDUCER-1NPT/M25	1" NPT	M25	Ex db / eb	Stainless steel	None	1244-000953 (0.55 kg)
REDUCER-M25/PG16-EEXE	PG16	M25	Ex eb	Polyamide	O-ring	953780-000 (0.03 kg)
ADAPTOR-M20/25	M20	M25	Ex d	Brass	Locknut and O-ring	492799-000 (0.092 kg)
ADPT-M20/25-EEXD	M20	M25	Ex db / eb	Brass	O-ring	684953-000 (0.09 kg)

SMALL PIPE ADAPTORS



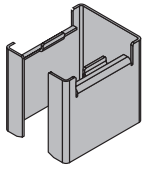
JBS-SPA

Small pipe adaptor required for pipes ≤ 1" (DN25), applicable for JBS-100, E-100, E-100-L
E90515-000 (bag of 5 adaptors) Weight: 0.14 kg

JBM-SPA

Small pipe adaptor required for pipes ≤ 1" (DN25), applicable for JBM-100, T-100
D55673-000 (bag of 5 adaptors) Weight: 0.40 kg

STANDOFFS



JBS-100-STAND-OFF

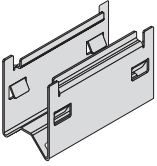
Junction box stand off

P000003408

For insulation ≥ 120 mm & ≤ 180 mm*

Weight (net) = 135 g

*Consider extra pipe strap length 6-9" (150-225 mm) for attachment.



JBM-100-STAND-OFF

Junction box stand off

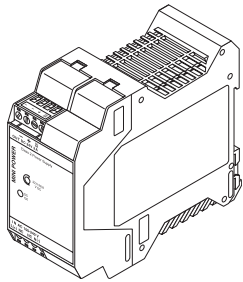
P000003624

For insulation ≥ 120 mm & ≤ 180 mm*

Weight (net) = 272 g

*Consider extra pipe strap length 6-9" (150-225 mm) for attachment.

POWER SUPPLY



MONI-RMC-PS24

24 Vdc stabilized power supply

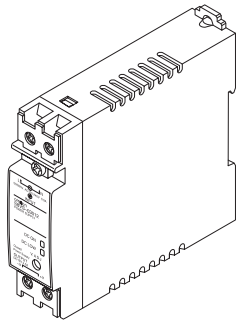
Wide range input (100 – 240 Vac) power supply to provide.

24 Vdc input for MONI- RMC-BASE.

Surface or DIN 35 rail mounted.

PN: 972049-000

Weight: 0.28 kg



MONI-PS12

12 Vdc stabilized power supply

Wide range input (100 – 240 Vac) power supply to provide 12 Vdc input for the nVent RAYCHEM NGC-30-CRM-E and nVent RAYCHEM NGC-30-CRMS-E cards. DIN 35 rail mountable.

PN: 1244-001505

Weight: 0.18 kg



Hand held cable fault locator

PRODUCT OVERVIEW



The Greenlee Sidekick Plus is a cable fault locator working on the principles of Time Domain Reflectometry or TDR. The Sidekick Plus is a hand held cable fault locator from the latest generation. It gives genuine universal performance for short and long-range applications on all types of metallic cable including many types of heating cable. Innovative features result in a versatile, cable-test instrument that is remarkably easy to use.

The Greenlee Sidekick Plus sold via nVent is preloaded with the nVent heat-tracing cable characteristics.

Principles of operation

If a cable is metal and it has at least two conductors, it can be tested by a TDR. TDRs will troubleshoot and measure all types of cables. The TDR works on the same principle as radar. A pulse of energy is transmitted down the cable under test. When that pulse reaches the end of the cable, or a fault along the cable, part or all of the pulse energy is reflected back to the instrument. The TDR measures the time it takes for the signal to travel down the cable, see the problem, and reflect back. The TDR then converts this time to distance and displays the information as a waveform and/or distance reading.

The Sidekick Plus can be used to locate and identify faults in all types of metallic paired cables including heating cables. TDRs can locate both major and minor cabling problems including: sheath faults, broken conductors, water damage, loose connectors, crimps, cuts, smashed cables, shorted conductors, system components, and a variety of other fault conditions. In addition, TDRs can be used to test reels of cable for shipping damage, cable shortages, cable usage, and inventory management. The speed and accuracy of the Sidekick Plus makes it today's preferred method of cable fault location.

- Easy single-handed operation
- Light hand-held instrument for long and short range applications
- Usable for high variety of metallic cables
- Cable attenuation compensation and narrow pulse for clear and simple trace display
- Large, high resolution display
- Tactile push buttons
- Proven durability



PRODUCT SPECIFICATIONS

Stress Test	0 to 82 dBmC
AC Volts	250 V
DC Volts	300 V
Resistance	100 MΩ
Leakage	999 MΩ
Open Meter	Up to 18.6 miles (30 km)
Count Load Coils	0 to 5
Loop Current	110 mA
Circuit Loss	-70 to 3 dBm
Circuit Noise	0 to 90 dBmC
Tracing Tone Generator	200 Hz to 20 kHz
Reference Tone Output Level	3 to -20 dBm
Custom Auto Test with Pass / Fail	400 Autotest Results
Display Resolution	320 x 240 sunlight readable
Battery	Li-ion
Battery Life (Typical)	8 hours
Weight (Including Battery)	3 lbs (1.4 kg)
Operating Conditions	-0.4°F to 122°F (-18°C to 50°C), 0 to 95% Humidity
IP Rating / Environmental Protection	BS EN 60529 level IP20CW
EAC certified	Yes

ORDERING INFORMATION

Part description	Sidekick Plus
PN (Weight)	1244-020944



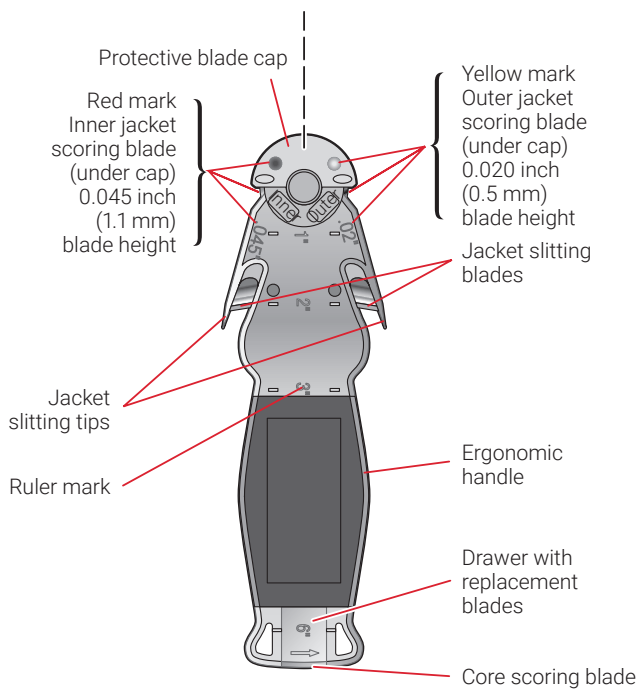
Accessories

Stripping-Tool-SR-Cable

CONNECT AND PROTECT

Stripping tool for nVent RAYCHEM self-regulating cables

PRODUCT OVERVIEW



The nVent RAYCHEM Stripping-Tool-SR-Cable is designed for use with nVent RAYCHEM BTV-CR, BTV-CT, QTVR-CT, XTVR-CT, HTV-CT, HWAT, XL-Trace, IceStop and RaySol self-regulating heat-tracing cables. The tool is designed for faster, safer and more reliable cable terminations.

The tool has two sets of blades designed for precise scoring of the outer and inner jackets of the cables mentioned above. The scoring blades are protected by a spring-loaded cap that rotates automatically. For safety, the cap rotates back to its original position automatically after the cutting operation is performed.

The tool also includes a unique core scoring feature that prevents damage to the conductors. The tool has a robust metallic body, ergonomic contour and replaceable blades.

PRODUCT SPECIFICATIONS

Technical details

Body	Symmetric and Ergonomic Aluminum A380 Metallic Body with TPE soft sleeve.
Jacket scoring blades	A pair of jacket scoring stainless steel blades with depth ranges of 0.04–0.06 inch (1–1.5 mm) and 0.01–0.03 inch (0.25–0.75 mm).
Blade cover	Spring loaded Zinc alloy cap that covers both the blades when the tool is not in use.
Core scoring feature	Core scoring blade which will prevent damage to the conductors. The blade height should be 0.01–0.04 inch (0.25–1 mm).
Replaceable blades	All blades can be replaced with a screwdriver. Replaceable blades are provided with the tool.
Coating	Metallic body coated with electrostatic epoxy powder 0.002–0.005 inch (0.05–0.1 mm) thick.

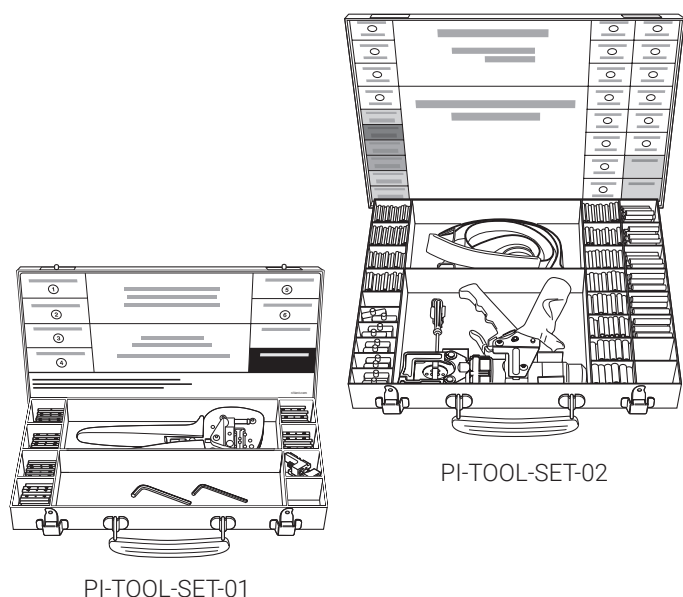
ORDERING INFORMATION

	Catalog Number	Part Number
Stripping tool	Stripping-Tool-SR-Cable	P000001126
Replacement jacket scoring blade	Techni Edge® #10 Hobby blade TE01-103	Should be ordered directly from Techni Edge.
Replacement jacket slitting blade	Techni Edge 3/8 inch (9.5 mm) 13 point blade TE01-333	Should be ordered directly from Techni Edge.



Toolbox for electrical connection system for PI heating cables

PRODUCT OVERVIEW



The nVent RAYCHEM PI-TOOL-SET-xx is a handy metal box containing all materials required to connect Polymer Insulated (PI) heating cables to a suitable cold lead and also to splice two PI heating cables. Electrical continuation is maintained via specially engineered crimps, which provide a highly reliable electrical (gas tight) connection.

In order to assure consistently reliable connections, the crimp is to be performed with the specified crimp tool (PI-TOOL-xx) equipped with the appropriate crimping dies (CD-PI-xx). Different tools are available: a mechanical tool for connecting small size cables (up to 2.5 mm²) and an hydraulic tool for large size cables (from 4 to 25 mm²).

Apart from the crimp tool and dies, the kit contains a variety of crimps (CRP-PI-xx). The tables on this datasheet are providing an overview of the possible combinations of tools, dies and crimps for various PI heating cables. Packs containing 10 pc of crimps are available as spare parts. Connection kits providing the insulation of the connection, have to be ordered separately.

Application

Electrical connection system for Polymer Insulated (PI) heating cables.

Kit contents

	PI-TOOL-SET-01	PI-TOOL-SET-02
Crimp tool	PI-TOOL-01	PI-TOOL-02
Crimping dies	CD-PI-02	CD-PI-03, CD-PI-04, CD-PI-05, CD-PI-06
Crimps	PI-CRP-01N, PI-CRP-02N, PI-CRP-03N, PI-CRP-04 to PI-CRP-06 (50 pcs each)	PI-CRP-07 to PI-CRP-017 (50 pcs each) PI-CRP-18 to PI-CRP-24 (25 pcs each)

ORDERING INFORMATION

Part number (Weight)	1244-000583 (2.5 kg)	1244-000584 (12.5 kg)
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General Accessories

Crimp tool set with various inserts and crimps	Part number	
PI-TOOL-SET-01	1244-000583	Complete set for cold leads/heating cables up to 2.5 mm ²
PI-TOOL-SET-02	1244-000584	Complete set for cold leads/heating cables from 4 to 25 mm ²

Crimp tools (spare part)	Part number	Crimping dies (spare part)	Part number
PI-TOOL-01	1244-000549	CD-PI-02	1244-000554
PI-TOOL-02	1244-000551	CD-PI-03	1244-000552
		CD-PI-04	1244-000553
		CD-PI-05	1244-000555
		CD-PI-06	1244-000556

Compatibility- and selection chart and selection for crimps, dies and tools

Table 1:  PI-TOOL-SET-01 for conductor size ≤ 2,5 mm²

Kit	Possible combinations for all XPI (XPI-NH, XPI, XPI-S) heating cables (Ω/km)	Crimp type	Part number		Spare tool & crimping dies		
	FROM	TO	(10 pieces per pack)		Die	Tool	
CS-150-2.5-PI							
	65 / 100 (only XPI-F) / 180 / 200 / 380 / 480 / 600 / 700 / 810 / 1000 / 1440 / 1750 / 2000 / 3000 / 4000 / 4400 / 5600 / 7000 / 8000	65 / 100 (only XPI-F) / 180 / 200 / 380 / 480 / 600 / 700 / 810 / 1000 / 1440 / 1750 / 2000 / 3000 / 4000 / 4400 / 5600 / 7000 / 8000	PI-CRP-01N	1244-016256		CD-PI-02 (black)	PI-TOOL-01
	11.7	65 / 100 (only XPI-F) / 180 / 200 / 380 / 480 / 600 / 700 / 810 / 1000 / 1440 / 1750 / 2000 / 3000 / 4000 / 4400 / 5600 / 7000 / 8000	PI-CRP-02N	1244-016257			
	11.7 / 15 / 17.8 / 25 / 50 / 80 / 100 (only XPI & XPI-S) / 150 / 320	11.7 / 15 / 17.8 / 25 / 50 / 80 / 100 (only XPI & XPI-S) / 150 / 320	PI-CRP-03N	1244-016258			
	7 / 10 / 11.7 / 31.5 / 100 (only XPI & XPI-S)	65 / 100 (XPI-F only) / 180 / 200 / 380 / 480 / 600 / 700 / 810 / 1000 / 1440 / 1750 / 2000 / 3000 / 4000 / 4400 / 5600 / 7000 / 8000	PI-CRP-04	1244-016259			
	7 / 10 / 11.7 / 31.5 / 100 (only XPI & XPI-S)	11.7 / 15 / 17.8 / 25 / 50 / 80 / 100 (XPI & XPI-S only) / 150 / 320	PI-CRP-05	1244-016260			
7 / 10 / 11.7 / 31.5 / 100 (only XPI & XPI-S)	7 / 10 / 11.7 / 31.5 / 100 (only XPI & XPI-S)	PI-CRP-06	1244-016261				






Important: The electrical insulation for the crimp connection has to be ordered separately (CS-150-xx-PI).

If the inscriptions on crimps PI-CRP-01N, PI-CRP-02N and PI-CRP-03N do not contain 'N', please do no longer use.

Contact nVent for more information.

Crimp selection and installation table

Table 2:  PI-TOOL-SET-02 for conductor size 4 to 25 mm²

Kit	Possible combinations for all XPI (XPI-NH, XPI, XPI-S) heating cables (Ω/km)	Crimp type	Part number		Spare tool & crimping dies		
	FROM	TO	(10 pieces per pack)		Die	Tool	
CS-150-6-PI							
	4.4	11.7 / 15	PI-CRP-07	1244-016262	CD-PI-03 (Grey)		
	4.4	7 / 10	PI-CRP-08	1244-016263			
	4.4	4.4	PI-CRP-09	1244-016264			
	2.9	11.7 / 31.5 / 100 (only XPI & XPI-S)	PI-CRP-10	1244-016265	CD-PI-04 (Blue)		
	2.9	7 / 10	PI-CRP-11	1244-016266			
	2.9	4.4	PI-CRP-12	1244-016267			
2.9	2.9	PI-CRP-13	1244-016268				
CS-150-25-PI	1.8	7	PI-CRP-14	1244-016269			
	1.8	7 / 4.4	PI-CRP-15	1244-016270			
	1.8	2.9	PI-CRP-16	1244-016271			
	1.8	1.8	PI-CRP-17	1244-016272			
	1.1	4.4	PI-CRP-18	1244-016273	(Red) V + N		
	1.1	2.9	PI-CRP-19	1244-016274			
	1.1	1.8	PI-CRP-20	1244-016275	CD-PI-06 (Yellow) V + N		
	1.1	1.1	PI-CRP-21	1244-016276			
	0.8	2.9	PI-CRP-22	1244-016277			
	0.8	1.8	PI-CRP-23	1244-016278			
	0.8	1.1	PI-CRP-24	1244-016279			

Important: The electrical insulation for the crimp connection has to be ordered separately. (CS-150-xx-PI)

The crimp for the electrical connection of the braid is included in the CS-150-xx-PI kit

Table 3: CS-150-xx-PI braid crimps

Kit	Cable family used in kit	Braid crimp to use	Part number	Die	Tool
CS-150-2.5-PI	XPI-F	BR-CRP-1.5	1244-018980	CD-PI-02	PI-TOOL-01
	XPI	BR-CRP-2.5	1244-016304	CD-PI-02	PI-TOOL-01
	XPI-S	BR-CRP-2.5	1244-016304	CD-PI-02	PI-TOOL-01
CS-150-6-PI	XPI-F	BR-CRP-2.5	1244-016304	CD-PI-02	PI-TOOL-01
	XPI	BR-CRP-6	1244-016305	CD-PI-03	PI-TOOL-02
	XPI-S	BR-CRP-6	1244-016305	CD-PI-03	PI-TOOL-02
CS-150-25-PI	XPI-F	BR-CRP-2.5	1244-016304	CD-PI-02	PI-TOOL-01
	XPI	BR-CRP-25	1244-016306	CD-PI-04	PI-TOOL-02
	XPI-S	BR-CRP-25	1244-016306	CD-PI-04	PI-TOOL-02



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