ibemo Kazakhstan Ltd.
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ӨНЕРКӘСІП ЖӘНЕ ЭЛЕКТР МАТЕРИАЛДАРДЫН ЖАБДЫҚТАУШЫСЫ
ПОСТАВЩИК ИНДУСТРИАЛЬНОГО И ЭЛЕКТРИЧЕСКОГО ОБОРУДОВАНИЯ И МАТЕРИАЛОВ
SUPPLIER OF INDUSTRIAL & ELECTRICAL EQUIPMENT and MATERIALS

G-TRACE

Roof and Gutter De-Icing System

Prevent Damage from Frozen Roofs, Gutters and Drains

The Problem

Snow that has built up on a roof will start to melt as a result of either exposure to the sun or from heat rising from the building below.

As the melted snow runs from the roof into cold gutters and drainpipes, it can re-freeze forming layers of ice which can continue to build up until the flow is blocked. This can result in damaged drains and gutters. In addition to this, icicles can form - a dangerous potential source of injury to people and damage to vehicles.

Expensive structural damage such as broken roof tiles, damaged plaster and façades may occur once water has got into the roof and walls of the building.

The Solution

Heat Trace have the solution in the form of UV resistant G-TRACE. The self-regulating characteristics of the heating tape means that the cable can adjust its heat output in accordance with the ambient temperature.

In snow and icy water, the G-TRACE operates at full power. As the snow melts and the water drains away, G-TRACE self-regulates to half full power while it dries. As it gets warmer, so G-TRACE gradually reduces its output.

The G-TRACE system is safe and reliable. As self-regulation prevents overheating, G-TRACE can even be installed in plastic gutters and with the UV resistant overjacket, the heating cable is protected from the sun's harmful rays - thus making it totally durable and reliable. G-TRACE provides a cost effective, preventive maintenance solution to damaged roof tops and gutters and the system consumes no more power than it takes to prevent ice formation.

Design and installation of a G-TRACE system is simple as there are no fixed lengths. The heating tape can be cut to length during installation. G-TRACE is cut from the reel and placed in the gutter. The heating tape is hung down into the downpipe without the need for spacers.

All systems - from the simplest to the most elaborate - use exactly the same components, thereby providing maximum flexibility and ease of design.

Economical, Energy Efficient

In addition to preventive maintenance benefits, G-TRACE saves money through low maintenance and reduced energy consumption. G-TRACE only operates when it is required, ie. when snow or ice is present.

Lead and Copper Gutters

After snowfall on roofs with lead or copper lined gutters, water penetration - usually occurring through the drips and rolls within the gutters - is commonplace. These joints are designed to allow for thermal movement due to natural expansion and contraction and, although weatherproof, they cannot be made completely watertight if the joints are subjected to a head of water. This occurs when snow melts and "backs-up" because of frozen drain pipes, etc. The G-TRACE system overcomes this problem.

Roof

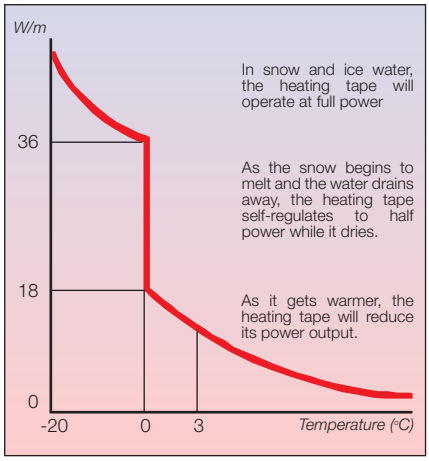
G-TRACE is not designed to keep snow or ice from falling from the roof. G-TRACE is designed to prevent melt water causing ice dams as it runs from the roof.

Snow can build up on a sloping roof and, where this is likely to occur, it is recommended that snow fences or snow guards are used to eliminate snow movement.

The G-TRACE is laid in a "zig-zag" fashion along the lower edge of the sloping roof. The heater should extend at least 300mm above the level of the outer building wall, or 150mm above the snow fence, whichever is the higher, and extend down into the gutter. This will ensure there is a continuous run off path for melted water.

Complete System

Using the design section of this brochure, designing, ordering and installing the G-TRACE system is convenient.

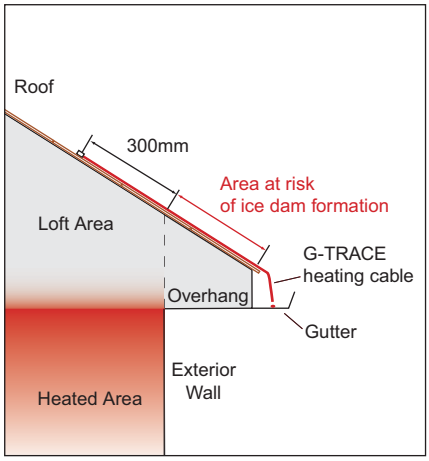


Automatic Energy Efficient Control

The G-TRACE Control System measures the ambient temperature and the presence of both snow and moisture.

The G-TRACE self-regulating heating cables are energised when snow is present or when moisture is present during low ambient temperature conditions, which is when flash freezing could occur.

Hence, G-TRACE ensures that gutters and and downspouts remain free of ice dams and icicles.



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A G-TRACE system can be designed in 5 steps.

STEP 1 - Determine heating cable type.
STEP 2 - Calculate heating cable length required for gutters and drainpipes.
STEP 3 - Calculate heating cable length required for roofing.
STEP 4 - Determine circuit protection and feed cable requirements.
STEP 5 - Define the number of system components needed.

STEP 1

Selection of Heating Cable Type

Operating Voltage	Roof / Gutter Finish Bitumenous	Non-Bitumenous	Heating Cable Selection
100 - 120V	Yes	No	GTe1F
	No	Yes	GTe1T
208 - 277V	Yes	No	GTe2F
	No	Yes	GTe2T
Power output at 0°C, 230V			
In Ice		36W/m nominal	
In Air		18W/m nominal	
Maximum Exposure Temp			
Power on		85°C	
Power off		85°C	
Nominal dimensions		10.5 x 5.9 mm	
Minimum bending radius (20°C)		35mm	

STEP 2

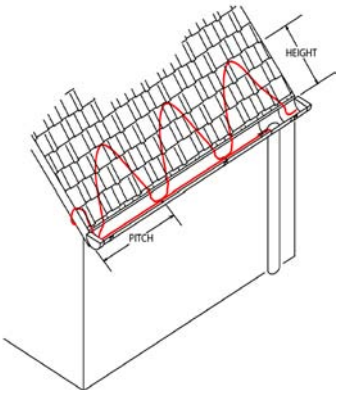
Calculate the G-TRACE length needed for gutters and drainpipes

Use the following questionnaire to determine the total number of metres required for a G-TRACE gutter installation.

	Total Gutter Length	= _____	m
	If gutter is greater than 300mm in width, multiply the above figure by 2 (for a double run)	= _____	m
add	1.0m per metre of drainpipe (extending below the frost line)	= _____	m
add	1.0m per outlet feeding internal gutters	= _____	m
add	0.25m per power connection	= _____	m
add	1.0m per splice	= _____	m
plus	2.5% allowance for cutting, wastage, etc.	= _____	m
	TOTAL CABLE LENGTH	= _____	m

STEP 3

Calculate the G-TRACE length needed for roofing



Use the following table to calculate the total number of metres required for a G-TRACE roof installation.

Roof overhang	Pitch (mm)	Height (mm)	(A) Length of heating cable per metre of roof edge	(B) Total length of roof edge		Total length of G-TRACE required for roof
No overhang	600	300	1.5m	x _____ m	=	_____ m
300mm	600	600	2.3m	x _____ m	=	_____ m
600mm	600	900	3.2m	x _____ m	=	_____ m
900mm	600	1200	4.2m	x _____ m	=	_____ m

Multiply (A) x (B) to determine the length of G-TRACE required for a roof installation.

ADD THE TOTAL FIGURES FOR STEP 2 AND STEP 3 TOGETHER TO DETERMINE THE TOTAL LENGTH OF G-TRACE HEATING CABLE REQUIRED.

TOTAL G-TRACE HEATING CABLE REQUIRED = _____ m

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STEP 4

Determine circuit protection / power feed cable requirements

Over Current Protection and Maximum Recommended Circuit Length

Circuit protection is provided by Type C circuit breakers to EN60898:1991 or equal, sized to the following table (based on 0°C start-up)

	Maximum Recommended Circuit Length	
Circuit Breaker Size	115V	230V
20A	46m	92m

$$\text{Minimum number of circuits} = \frac{\text{Total Cable Length}}{\text{Maximum Recommended Circuit Length}}$$

Hook-up Cables

Outer connecting cables from the controller to each circuit power connection must be correctly sized to satisfy Electrical Wiring Regulations and local/national Standards or Codes. Sizing is determined by the maximum allowable volt drop and current carried by the supply cable.

Generally, supply cables may be sized according to the following table.

MCB Type C or D Rating	Supply Cables Size (min)	Max. Supply Cable Length 115V	230V
20A	2.5mm^2	13m	26m

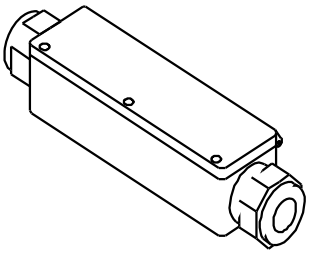
Important: A residual current device (rcd), 30mA is required.

For supply voltages other than those stated above, contact your local Heat Trace Representative.

STEP 5

Determination of System Components

HEAT CLIP termination and connection system



HEAT CLIP is a universal power termination and splicing system. It has been developed for simple connection of Heat Trace's range self-regulating heating cables. Termination is easy without the need for special tools. For indoor, or outdoor use.

A single HEAT CLIP connector may be used for:-

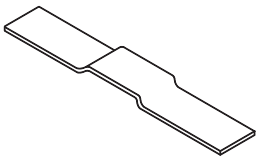
- Power connection to one or two heating cables, (max: 2.5mm^2).
- In-line splicing of two heating cables,
- Tee-splicing of three heating cables
- Cross splicing of four heating cables

Catalogue Ref: HC
HEAT CLIP Connector
(rating 20A, 230V, 2.5mm^2, IP65)

Number required:
1 per power connection
1 per in-line splice
1 per tee or cross splice

Each HEAT CLIP is supplied complete with all components needed for all of the above termination methods.

Fixing Equipment



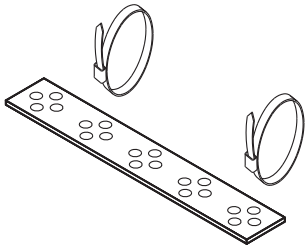
Catalogue Ref : FC/GT
G-TRACE Fixing Clip

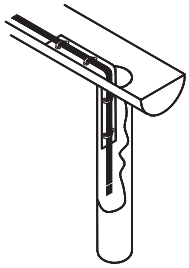
The heating cable is normally fixed into position using adhesive backed fixing clips.

Number required:
1 per metre of heating cable

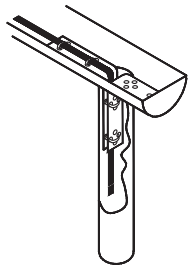
Catalogue Ref : FB/GT
G-TRACE Fixing Bracket

Stainless steel fixing bracket complete with two UV-resistant cable ties. The bracket has several functions.

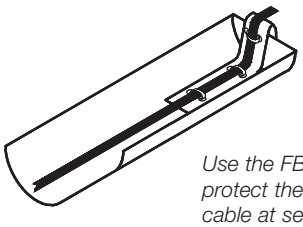




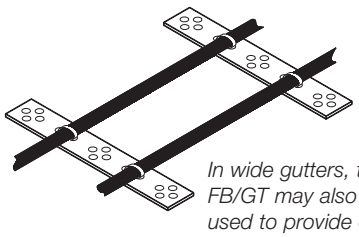
Use the FB/GT to protect the heating cable where the gutter joins the drainpipe.



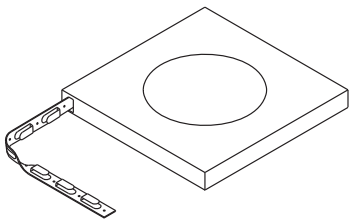
For larger drainpipes, a second FB/GT may be used to provide extra support for the heating cable.



Use the FB/GT to protect the heating cable at sensitive transition zones.



In wide gutters, the FB/GT may also be used to provide equal spacing between each length of heating cable.

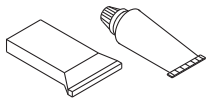


Catalogue Ref : PFS/A
Roof Fixing Strip

Fixing strip used to hold G-TRACE heating cable onto the roof.

Number required:
2 metres of PFS/A per metre of roof edge as calculated in STEP 3. Half of the required length is used to position the G-TRACE heating cable at the correct height.

End Seal

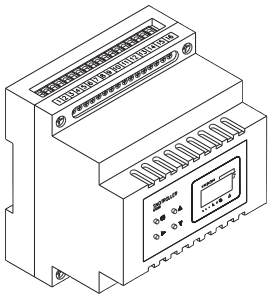


Catalogue Ref : BES2/RTV
Remote end termination of heating cable

End seal for sealing the remote ends of the heating tape.

Number required:
1 per cable end

Snow Control System



Catalogue Ref : GT200E
Snow Control Unit
(rating 8A)

The GT200E control unit switches the heating cable on when the ambient temperature is below 3°C, and icy water / snow is present in the gutter.

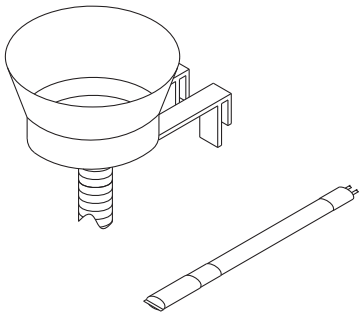
Maximum Circuit Length *(at 0°C start-up)*

115V	230V
10m	18m

For circuit lengths exceeding these figures, switching is accomplished by a suitably rated contactor box (see below)

Number required:
1 per G-TRACE system

Sensors



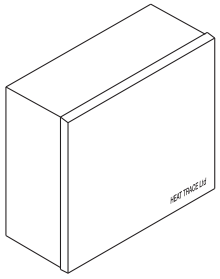
Catalogue Ref : GT200E/S
G-Trace Sensor Pack

The G-TRACE snow sensor is supplied complete with a 3.5m flexible conduit for routing to the GT200E Snow Control Unit. Connection may be made directly into the GT200E unit, or via a HEAT CLIP to which additional cable length may be attached.

The G-TRACE temperature sensor is provided in the same kit. Additional conduit length from the GT200E unit to the sensor should be provided by the installer.

Number required:
1 per G-TRACE system

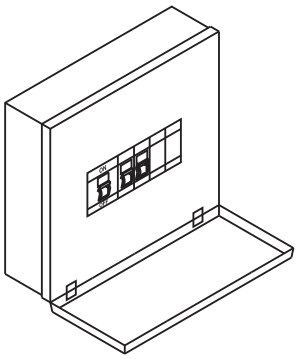
Contactor Box



63A Contactor box for up to 9 circuits. The start up load should not exceed 63A on each of 3 phases. The C63*x*/1 (110V coil), and C63*x*/2 (230V coil) units comprises a metal enclosure 300 x 200 x 1500mm incorporating the contactor. Used in conjunction with Local Distribution Panel (LDP).

Number required:
1 per G-TRACE system
x detailed above denotes single phase (1), or three phase (3) contactors

Local Distribution Panel (LDP)



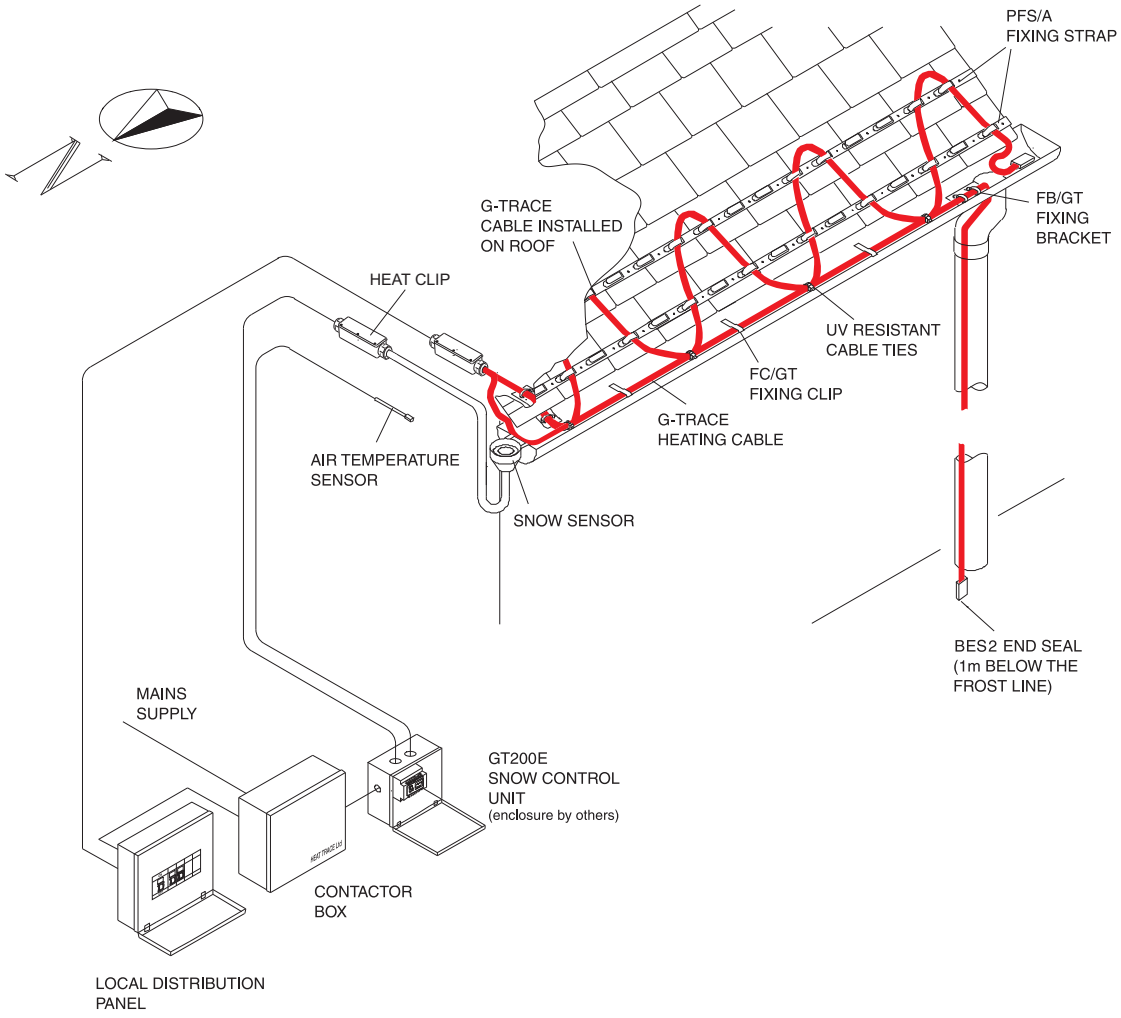
The distribution panel is selected according to the number of circuits calculated at STEP 4. Each panel is provided with a 20A circuit breaker for each outgoing circuit. A ground fault protection device is fitted, sensitivity 30mA, 30ms for protection of all circuits. The LDP is also provided with a main incoming isolator.

Standard panels are:

LDP-03/1P/20 for up to 3 x 20A, 230V circuits, single phase incoming feed.
LDP-06/3P/20 for up to 6 x 20A, 230V circuits, 3 phase & neutral incoming feed.
LDP-09/3P/20 for up to 9 x 20A, 230V circuits, 3 phase & neutral incoming feed.

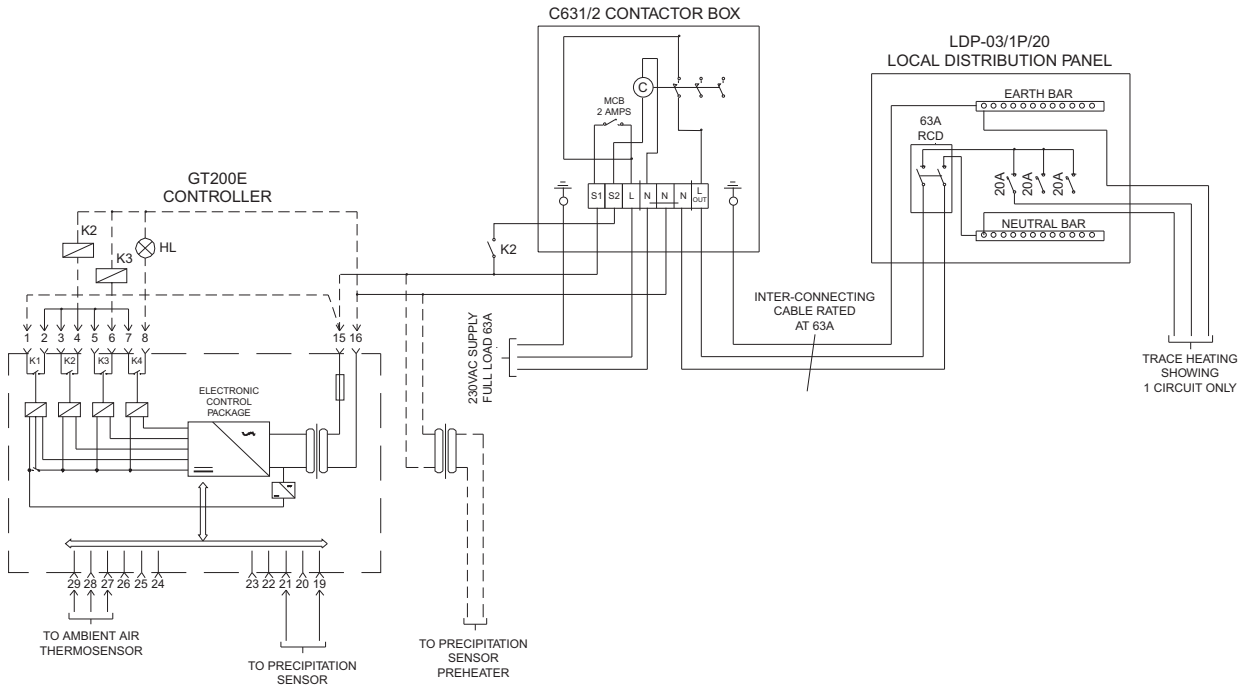
The LDP is rated IP54 for internal use. It must therefore be suitably weather protected if installed outdoors.

Typical G-TRACE System Installation

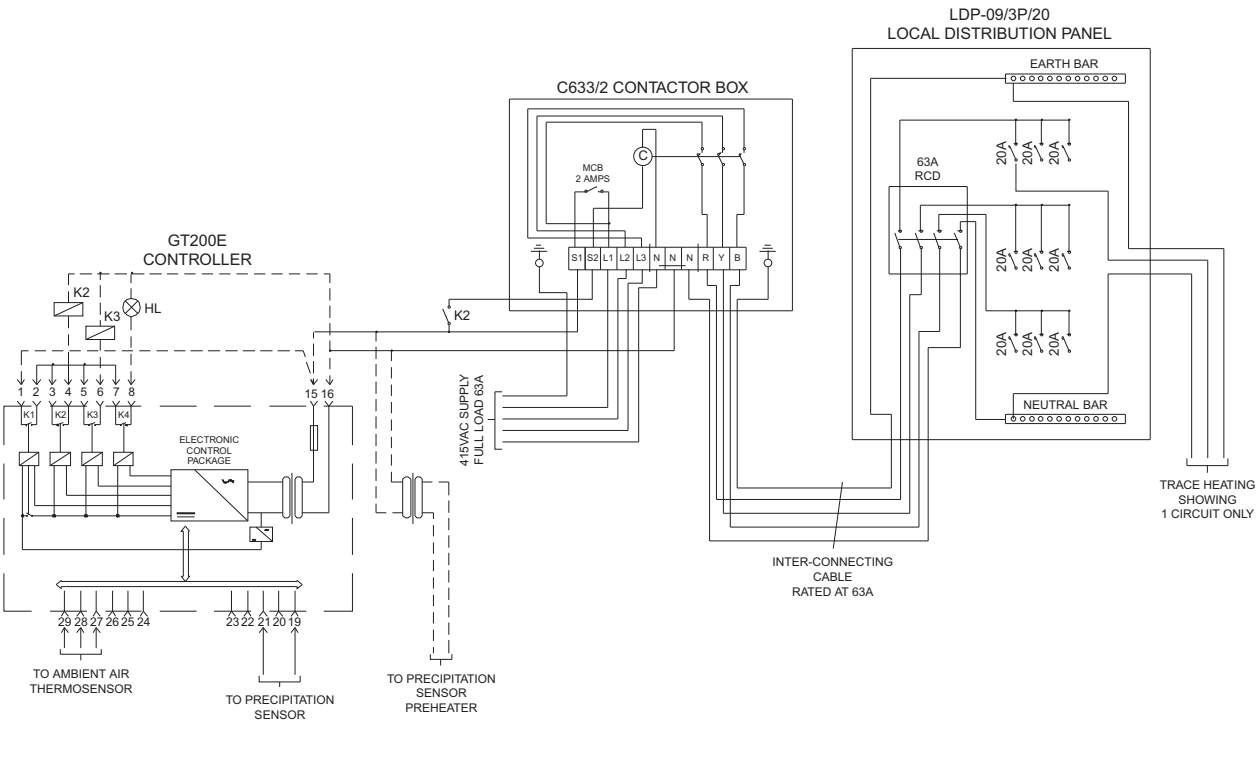


Wiring Arrangement Schematic

3 Way 240VAC 63A Distribution Board



9 Way 415VAC 63A Distribution Board



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Bill of Materials - Order Form

CUSTOMER NAME AND ADDRESS:

Contact:
Tel:
Fax:
Order Number
Order Date / / Date Required / /

SUPPLIER DETAILS:
Heat Trace Limited
Tracer House, Cromwell Road,
Bredbury, Stockport
Cheshire, SK6 2RF
England

Contact: Sales Department
Tel: +44 (0)161 430 8333
Fax: +44 (0)161 430 8654

QUANTITY	TYPE REF.	DESCRIPTION	UNIT PRICE	EXTENDED
m	GTe1-T	G-Trace Heating Tape, 110V	_____	_____
m	GTe1-F	G-Trace Heating Tape, 110V, bitumen exposure	_____	_____
m	GTe2-T	G-Trace Heating Tape, 230V	_____	_____
m	GTe2-F	G-Trace Heating Tape, 230V, bitumen exposure	_____	_____
pcs	HC	Heat Clip Connector	_____	_____
pcs	BES2/RTV	End Seal complete with silicone sealant	_____	_____
pcs	FC/GT	Fixing Clip	_____	_____
pcs	FB/GT	Fixing Bracket	_____	_____
m	PFS/A	Fixing Strip	_____	_____
ea	GT200E	Snow Control Unit	_____	_____
ea	GT200E/S	G-Trace Sensor pack	_____	_____
ea	LDP-03/1P/20	3 x 20A S.P. circuits, single phase incoming feed	_____	_____
ea	LDP-06/3P/20	6 x 20A S.P. circuits, TP&N incoming feed	_____	_____
ea	LDP-09/3P/20	9 x 20A S.P. circuits, TP&N incoming feed	_____	_____
ea	C631/1	Contactor Box, 63A single phase, 110V coil	_____	_____
ea	C631/2	Contactor Box, 63A single phase, 230V coil	_____	_____
ea	C633/1	Contactor Box, 63A per pole, 110V coil	_____	_____
ea	C633/2	Contactor Box, 63A per pole, 230V coil	_____	_____
			SUBTOTAL	£_____
			C & P	£_____
			VAT	£_____
			TOTAL PRICE	£_____

Note:
TP&N: Thee phase and neutral

Additional materials needed to complete the heat tracing installation:

- All mains and interconnecting cables/glands

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