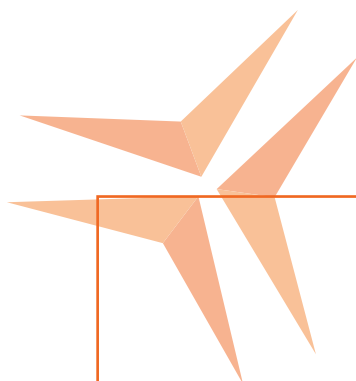


KANAL VARMELEGEMER

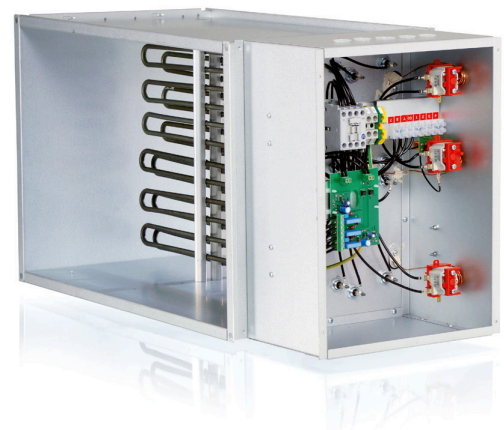


RECTANGULAR

VFL, VFLPG, VTL AND VRA RECTANGULAR ELECTRIC DUCT HEATERS

VEAB's rectangular duct heaters are supplied in customised sizes and with an output of up to 2000 kW. They are used to heat up the inlet air in duct systems, in centralised air handling units and for various industrial processes. When they are properly dimensioned, rectangular duct heaters can handle heating an entire house or building. Our flexible production enable us to precisely adapt the duct heaters to the intended application. This may concern heaters for air handling units, industrial processes or very harsh environments. This may require reinforced electrical insulation, stainless materials, large power requirements, high temperatures or the like.

- Output range 0.5 kW – 2000 kW
- Degree of protection IP43 as standard, IP55 or IP65 upon request
- Integrated control equipment or for external feedback control
- Integrated overheating protection devices, at least one with automatic reset and one with manual reset
- Enclosed stainless tubular heating elements
- 50/60 Hz
- Can be mounted horizontally or vertically



STANDARD DESIGN

The casing is made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. The heating elements are tubular heating elements made from stainless steel, EN 1.4301. The junction box contains all the terminals required for electrical connection. The casing is available in four different designs. See page 6 for further information. The duct heaters are manufactured with an IP43 degree of protection, but are also available with IP55 or IP65.

The products are customised in terms of size and output. The heaters are suitable for a maximum outlet temperature of 50 °C, a minimum air velocity of 1.5 m/s and a maximum pressure of 1000 Pa.

OVERHEATING PROTECTION

All duct heater models come with at least two overheating protection devices, one with an automatic reset and the other with a manual reset. All duct heaters feature a reset button for the overheating protection on the heater cover.

APPROVALS

Our duct heaters up to 1000 kW are tested and approved by Intertek Semko AB in accordance with the following directives:

LVD directive: EN 60335-1 and EN 60335-2-30

EMC directives: EN 61000-6-3 and EN 61000-6-1

EMF directive: EN 62233

Power ratings below 1000 kW are provided with S and CE markings.

Power ratings above 1000 kW are provided with a CE marking.

ALARM RELAY, ADDITION -L

All models can be equipped with an integrated relay with potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. An alarm relay is included as standard for models -MQXL, -MTXL, -MQYL, -MTYL, -MQCL, -MTCL, -MTUL, -MQUL, -MQEML and -MTEML.

ELECTRONIC FLOW SWITCH

You can choose to add an electronic flow switch to any duct heater for 40 A 3-phase max. (e.g. 27 kW, 3x400 V max.). The flow switch continuously monitors the airflow and switches off the heater if the air velocity drops below 1.5 m/s and thus prevents overheating.

When the air velocity rises above 1.5 m/s the heater is turned on automatically if heating is required.

This implies that heaters with an integrated flow switch meet the requirement for interlocking with the fan/air flow and can be installed without any external interlock. This results in a very simple installation.



CONTROL UNIT

INTEGRATED REGULATOR

The integrated regulator provides for a simple installation, among others, because it requires less cabling, which reduces both the installation cost and the risk of misconnections. The regulator is electronic and regulates the output using a triac with so-called time-proportional control (pulse/pause technology). This results in very accurate temperature control. Since feedback control is performed electronically, its operation is completely noiseless and involves minimal wear. For higher outputs, parts of the output is regulated with a step controller. However, fine adjustment of the temperature is always performed by the electronic pulse/pause feedback control. Hinges in the cover facilitate maintenance and servicing. The following models are available with an integrated regulator:

-MTEML / -MQEML / -MTUL / -MQUL, FOR ONE OR TWO SENSORS

Duct heaters with integrated temperature regulator, for room or duct sensors. Can also be connected to a main sensor in the room and to a min./max. sensor in the inlet air.

-MQXL / -MTXL, FOR 0...10 V CONTROL SIGNAL

Duct heaters with integrated regulator for external 0...10 V control signal.

-MQXL / -MTXL, FOR 0...10 V CONTROL SIGNAL

Contact Newtronic for more information.

-MQXL / -MTXL, FOR 0...10 V CONTROL SIGNAL

Contact Newtronic for more information.

-MODBUS

The duct heaters may be equipped with Modbus communication

EXTERNAL REGULATOR

There also are duct heaters without integrated regulator that can instead be complemented with an external one. The following model is available for an external regulator:

-M(L)

The duct heater is complemented with an external temperature regulator and sensor.

ADDITIONAL OPTIONS

There are several options beyond the standard design that can be adapted to your application.

OTHER TYPES OF MATERIALS

The casing can be made of stainless steel, EN 1.4301, or of acid-resistant stainless steel, EN 1.4404.

DUCT HEATERS FOR OUTLET TEMPERATURES RANGING FROM 51 °C TO 120 °C

The overheating protection is adapted to the operating temperature.

The junction box is provided with 25 mm insulation against the duct part.

DUCT HEATERS FOR OUTLET TEMPERATURES RANGING FROM 121 °C TO 400 °C

Acid-resistant or stainless casing. Overheating protection devices are adapted to the operating temperature. The junction box is provided with 100 mm insulation against the duct part. Air gap between duct and terminal box. IP30 degree of protection

REINFORCED ELECTRICAL INSULATION

To avoid leakage currents to earth, the heating elements are mounted in electrically insulating material. Suitable for marine use, for example.

SIGNAL LIGHTS

These are connected to the manual overheating protection and/or the operation indicator.

HOISTING RINGS

The duct heaters can be provided with hoisting rings to facilitate installation.

IP55, IP65 DEGREE OF PROTECTION

Our duct heaters can be manufactured with an IP55 or IP65 degree of protection instead of the standard IP43.

STANDSTILL HEATER IN THE TERMINAL BOX

A standstill heater may be useful for humid environments, for example, to reduce the risk of moisture entering through the heating element ends or to reduce the risk of condensation in the terminal box when cold air is flowing through the duct.

CIRCULAR CONNECTION

If the output requirements or the connection diameter exceed what is available in the standard range for our circular duct heaters, CV, a rectangular duct heater is manufactured with circular connection.

DIFFERENT VOLTAGE

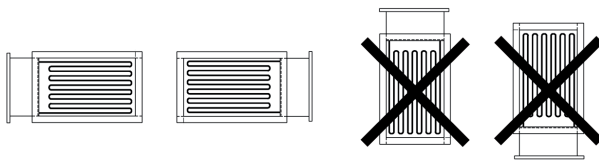
The heaters can be manufactured with a different voltage up to 3 × 690 V for external control unit and up to 3 × 500 V for integrated control unit.

INTEGRATED CIRCUIT BREAKER

Only manufactured for models with integrated control equipment.

INSTALLATION

These duct heaters can be mounted in horizontal or vertical ducts. The air flow through the duct heater must follow the air direction arrow on the duct heater cover. On a horizontal duct, the terminal box can be placed to the right or to the left, but not above or below. The duct heater must be installed in such a way that it receives an even air flow over the entire surface. We recommend that the distance to or from duct bends, fans, dampers, etc. is at least equal to the diagonal dimension of the duct heater, i.e. from corner to corner within the heater's duct part.



INTERLOCKING WITH FAN/AIR FLOW

Electric duct heaters must always be installed in such a way that they are interlocked with the fan, which blows air into the duct, or with the air flow streaming through the heater. The duct heater power must be cut off, should the fan be shut off or if the airflow ceases. For outputs higher than 30 kW, we recommend letting the fan keep blowing for at least 3 minutes before it is stopped.

Models with an integrated electronic flow switch meet the requirement for interlocking with the fan/air flow and can be installed without any external interlock.

Models -MTEML, -MTUL and -MTXL with an output up to 27 kW 3×400 V include a port on the circuit board to connect a pressure or flow switch. For outputs greater than 27 kW, the heater must be interlocked via the inbound control circuit. Model -M must always be interlocked with the inbound power supply.

MINIMUM AIR VELOCITY AND OUTPUT TEMPERATURE

The duct heaters are dimensioned by default for a minimum air flow of 1.5 m/s and a maximum operating temperature of 50 °C for the outlet air.

Ambient temperature during operation:

Without integrated control device = 40 °C max.

With integrated control device = 30 °C max.

The air velocity can be calculated using the following formula:

$$V = \frac{Q}{3600 \times A}$$

V = air velocity, m/s

Q = air flow, m³/h

A = sectional area of duct heater (W×H), m²

POWER REQUIREMENTS

The volume of air that goes through the duct heater is heated according to the following formula:

$$P = Q \times 0.36 \times \Delta t$$

P = output in W

Q = air flow in m³/h

Δt = temperature increase in °C

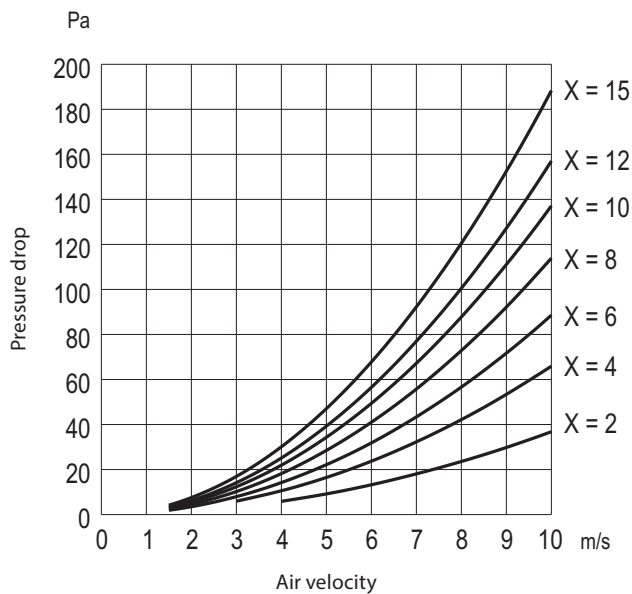
HEAD LOSS OF AIR FLOWING THROUGH DUCT HEATER

The head loss of the air flowing through a duct heater depends on the air velocity and the number of rows of heating elements in the heater.

The approximate number of rows of heating elements can be calculated using the following formula:

$$X = \frac{P}{A \times 15}$$

X = number of rows of heating elements
 A = flow passage area of duct heater, W x H in m²
 P = total output in kW

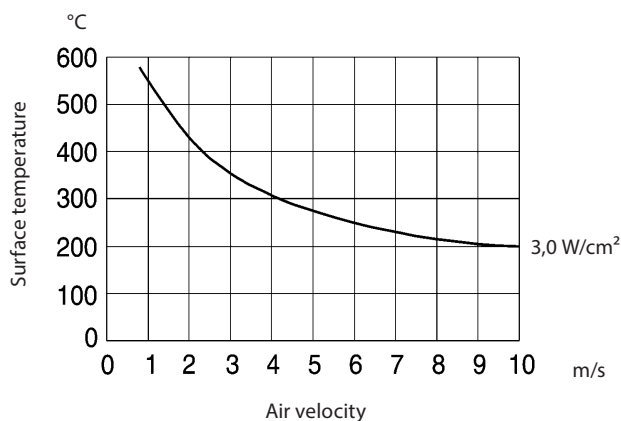


SURFACE TEMPERATURE OF HEATING ELEMENTS

The surface temperature of heating elements is dependent of the air velocity and the heating elements' surface effect.

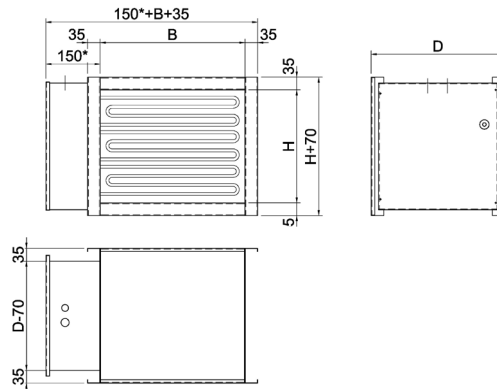
The surface effect of the heating elements is approximately 3 W/cm².

The table shows the surface temperature of the heating elements when the duct heater's outlet air temperature is about 20 °C.

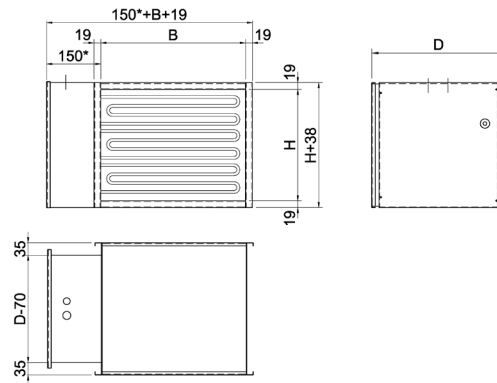


DIMENSIONAL DRAWING

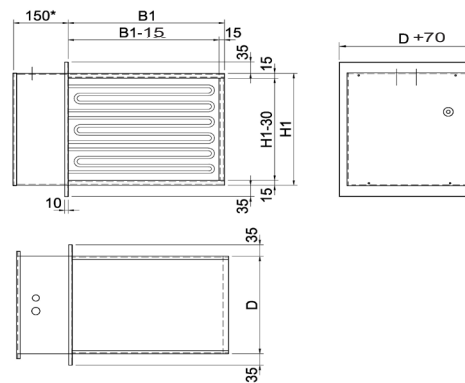
VFL – with Flanges



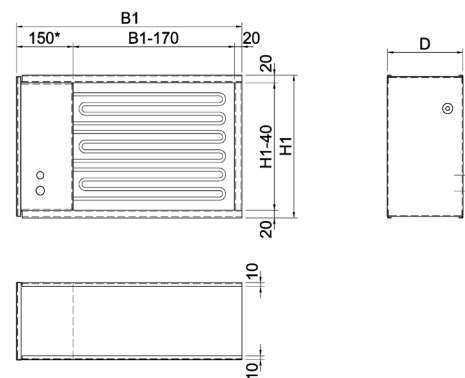
VFLPG – Suitable for PG Guide



VTL – for Plug-in Mounting to Ducts



VRA – for Units



PROJECT DESIGN/ORDERS

Versions	VFL – with flanges VFLPG – suitable for PG guide VTL – for plug-in mounting to ducts VRA – for units	
Model	-MTEML / -MQEML / -MTUL / -MQUL -MQXL / -MTXL -MQYL / -MTYL -MQCL / -MTCL -M(L)	To be connected to a duct and/or room sensor. See page 9. Output is controlled by an external 0...10 V control signal. Output is controlled by an external 2...10 V control signal. Output is controlled by an external 4...20 mA control signal. For external control device.
Width dimension, W Height dimension, H	160 mm min. 3000 mm max. (open surface for air flow) 160 mm min. 3000 mm max. (open surface for air flow)	
Total output kW	Selectable between 0.5 kW and 2000 kW	
Main voltage	1 × 230 V = 1-phase 230 V 2 × 400 V = 2-phase 400 V 3 × 400 V = 3-phase 400 V 3 × 440 V = 3-phase 440 V	3 × 230 V = 3-phase 230 V 3 × 460 V = 3-phase 460 V 3 × 500 V = 3-phase 500 V 3 × 690 V = 3-phase 690 V
Casing material	A = Aluzinc, AZ 185 S = Stainless steel, EN 1.4301 SA = Acid-proof stainless steel, EN 1.4404	
Degree of protection	IP43 / IP55 / IP65	
Electric insulation	NI = Normal electrical insulation RI = Reinforced electrical insulation	
Outlet air temperature	50C = Outlet temperature 50 °C max. 120C = Outlet temperature 400 °C max.	

TYPE DESIGNATION VFL- AND VFLPG-

The type designation of a duct heater can, for example, be VFLPG-M-1200-500-100-3×400V-SA-IP44-NI-50C and describes the product's execution. The type designation is structured as follows:

Design	Model	Width dimension, W	Height dimension, H	Total output kW	Main voltage V	Casing materials	Degree of protection	Electrical insulation	Outlet air temp.
VFLPG	M	1200	500	100 kW	3 × 400 V	SA	IP43	NI	50C

25 + 25 + 25 + 25

*Number of stages and kW.
Only applies to model -M*

Type Designation VRA- and VTL-

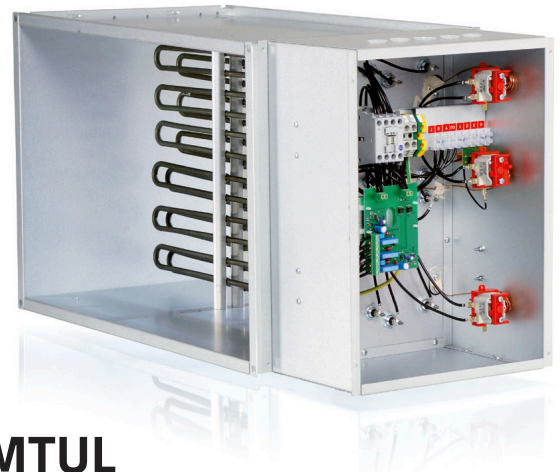
Design	Model	Width dimension, W1	Height dimension, H1	Total output kW	Main voltage V	Casing materials	Degree of protection	Electrical insulation	Outlet air temp.
VRA	M	1400	540	100 kW	3 × 400 V	SA	IP43	NI	50C

VFL, VFLPG, VTL AND VRA RECTANGULAR ELECTRIC DUCT HEATERS WITH BUILT-IN CONTROL EQUIPMENT FOR ONE OR TWO SENSORS

Duct heaters with integrated control equipment are supplied ready for installation.

This provides the following advantages:

- Minimum amount of cabling—fully connected control equipment
- Easy installation—reduced installation cost
- Minimum risk of misconnections during installation
- Accurate feedback control



- MTEML

To be connected to a duct or room sensor.

The setpoint is set externally, e.g. on the room sensor.

Can also be connected to two sensors, one main sensor in the room and one min./max. sensor in the inlet air.

Sensors are to be ordered separately. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped.

-MTEML is available with up to 635 ampere (440 kW, 3 x 400 V) device has tripped.

- MTUL

To be connected to a sensor, e.g. A duct sensor in the inlet air. The setpoint is set on the duct heater cover.

Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. Sensors are to be ordered separately.

- MTUL is available with up to 635 ampere (440 kW, 3 x 400 V)

- MQEML

Same as MTEML plus an integrated electronic air flow switch that shuts off the heater at air velocities below 1.5 m/s.

- MQEML are available with up to 40 ampere (27 kW, 3 x 400 V).

- MQUL

Same as MTUL plus an integrated electronic air flow switch that shuts off the heat at air velocities below 1.5 m/s.

MQUL heaters are available with up to 40 ampere (27 kW, 3 x 400 V)

PROJECT DESIGN/ORDERS

DESCRIPTION - MQEML / MQUL

Duct heater, VEAB type VFLPG-MQEML-800-400-25 kW-3x400V-A-IP43-NI-50C (see page 7), with casing made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. Heating elements made of stainless steel, EN 1.4301. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. Includes an integrated electronic flow switch. Feedback control is achieved by means of the integrated temperature regulator for room or duct sensors. Sensors and a possible external setpoint adjuster must be ordered separately.

DESCRIPTION - MTEML / MTUL

Duct heater, VEAB type VFLPG-MTEML-1200-500-100 kW-3x400V-A-IP43-NI-50C (see page 7), with casing made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. Heating elements made of stainless steel, EN 1.4301. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. Feedback control is achieved by means of the integrated temperature regulator for room or duct sensors. Sensors and a possible external setpoint adjuster must be ordered separately.

VFL, VFLPG, VTL AND VRA RECTANGULAR ELECTRIC DUCT HEATERS WITH BUILT-IN CONTROL EQUIPMENT FOR 0...10V EXTERNAL CONTROL SIGNAL

Duct heaters with integrated control equipment are supplied ready for installation.

This provides the following advantages:

- Minimum amount of cabling—fully connected control equipment
- Easy installation—reduced installation cost
- Minimum risk of misconnections during installation
- Accurate feedback control

- MQXL

To be connected to an external 0...10 V control signal. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped.

The heater includes an integrated electronic flow switch - MQXL are available with up to 40 A 3-phase (27 kW 3x400 V).

- MTXL

To be connected to an external 0...10 V control signal. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped.

-MTXL are available with up to 440 kW.



PROJECT DESIGN/ORDERS

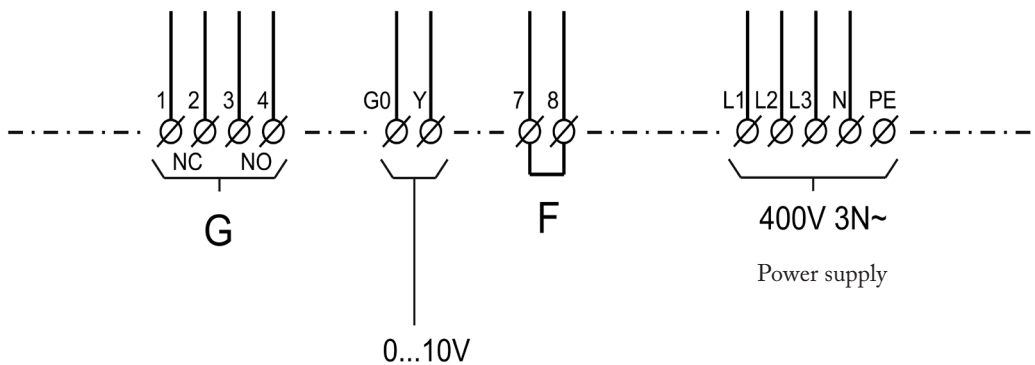
DESCRIPTION - MQXL

Duct heater, VEAB type VFLPG-MQXL-800-400-25kW-3x400V-A-IP43-NI-50C (see page 7), with casing made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. Heating elements made of stainless steel, EN 1.4301. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. Includes an integrated electronic flow switch. Feedback control is achieved by means of an integrated regulator for external 0...10 V control signal.

DESCRIPTION - MTXL

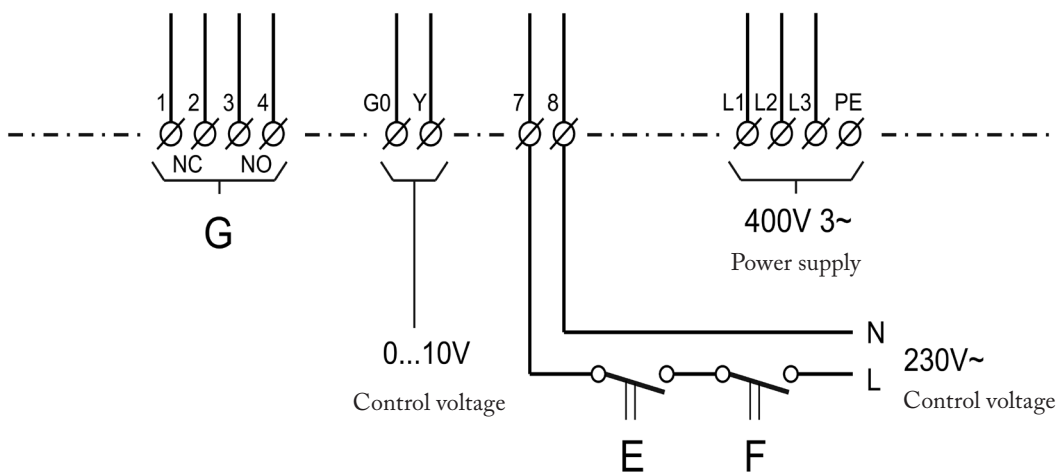
Duct heater, VEAB type VFLPG-MTXL-1200-500-100kW-3x400V-A-IP43-NI-50C (see page 7), with casing made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. Heating elements made of stainless steel, EN 1.4301. Includes a potential-free alarm contact, which indicates whether the manually resettable overheating protection device has tripped. Feedback control is achieved by means of an integrated regulator for external 0...10 V control signal.

**WIRING EXAMPLE
-MQXL**



- F = Jumper can be replaced with control switch or other interlocking device (option)
- G = Alarm contacts for indication of tripped overheating protection
- NO = Normally open contact (closes in the event of overheating alarm)
- NC = Normally closed contact (opens in the event of overheating alarm).

**WIRING EXAMPLE
-MTXL**



- E = Interlock
- F = Control switch
- G = Alarm contacts for indication of tripped overheating protection
- NO = Normally open contact (closes in the event of overheating alarm)
- NC = Normally closed contact (opens in the event of overheating alarm).

VFL, VFLPG, VTL AND VRA RECTANGULAR ELECTRIC DUCT HEATERS FOR EXTERNAL CONTROL EQUIPMENT

The duct heaters are complemented with external control equipment. It is essential that the equipment is suitable for the heater and the output to be controlled. The table on p. 13 provides guidance on suitable control equipment.

- M

A PULSER or TTC regulator is most suitable for its external feedback control.

Choice of Output

The total output for duct heaters for external control equipment can be freely selected from 0.5 kW and up. The output can be broken down into any desired number of output stages with a minimum of 0.3 kW and a maximum of 43 kW per output stage (63 A).



Connecting Stages

Standard

Main voltage 400 VAC 3-ph.

0.3-3.5 kW: 400 VAC 2-ph.

3.6-43.0 kW: 400 VAC 3-ph.

Main voltage 230 VAC 3-ph.

0.3-1.99 kW: 230 VAC 1-ph.

2.0-25.0 kW: 230 VAC 3-ph.

Upon Request

0.3-3.6 kW: 230 VAC 1-ph.

0.3-6.0 kW: 400 VAC 2-ph.

1.0-43.0 kW: 400 VAC 3-ph. or 230 VAC 3-ph.

PROJECT DESIGN/ORDERS

DESCRIPTION - M

Duct heater, VEAB type VFLPG-M-1200-500-100kW-3x400V-A-IP43-NI-50C (see page 7), with casing made of aluzinc-coated sheet steel, AZ 185, which meets the requirements for corrosion class C4. Heating elements made of stainless steel, EN 1.4301.

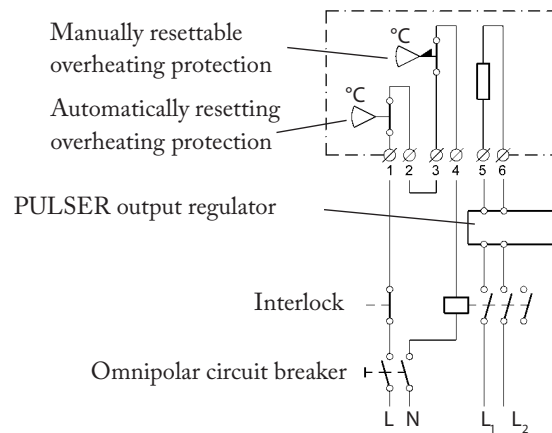
Total output 100 kW.

Output stages 25 kW + 25 kW + 25 kW + 25 kW.

Feedback control is achieved by means of an external regulator to be ordered separately.

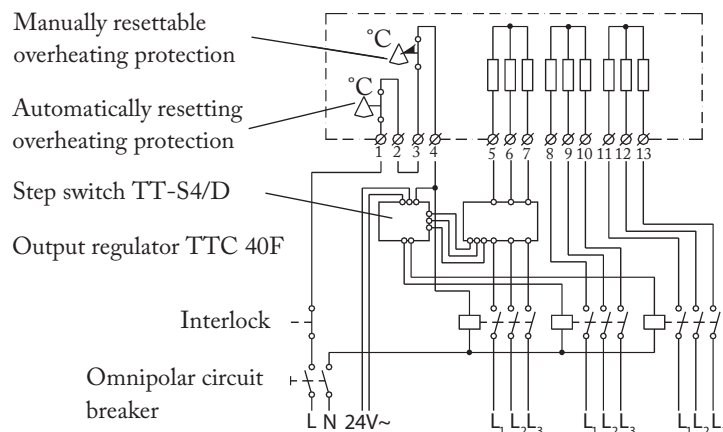
Wiring Example

6 kW max. 400 VAC 2-ph.



Wiring Example

81 kW max. 400 VAC 3-ph.



Choice of Regulator

Total output	Output stage	Regulators
0.5-6.0 kW	1 stage, 400 VAC 2-ph.	PULSER
6.1-17.0 kW	1 stage, 400 VAC 3-ph.	TTC 25 or TTC 2000
17.1-27.0 kW	1 stage, 400 VAC 3-ph.	TTC 40 F
17.1-34.0 kW	2 stages (1/2 + 1/2), 400 VAC 3-ph.	TTC 2000 + TT-S1
28.0-54.0 kW	2 stages (1/2 + 1/2), 400 VAC 3-ph.	TTC 40 F + TT-S4/D
55.0-81.0 kW	3 stages (1/3 + 1/3 + 1/3), 400 VAC 3-ph.	TTC 40 F + TT-S4/D
82.0-108.0 kW	4 stages (1/4 + 1/4 + 1/4 + 1/4), 400 VAC 3-ph.	TTC 40 F + TT-S4/D
109.0-135.0 kW	5 stages (1/5 + 1/5 + 1/5 + 1/5 + 1/5), 400 VAC 3-ph.	TTC 40 F + TT-S4/D
136.0-215.0 kW	Output ratio (1 + 1 + 2 + 4, 400 VAC 3-ph.)	TTC 40 F + TT-S4/D



ELVARME



VORES PRODUKTSORTIMENT INKLUDERER:



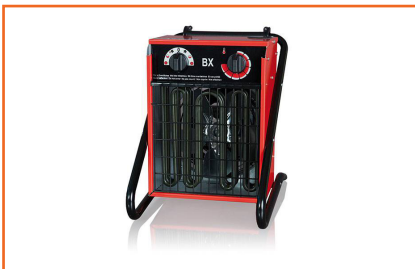
CIRCULAR



KANALVARMELEGEMER KUNDEDES.



FAST IR SYSTEMS



BX - PORTABLE



AIR WARMERS



KANALVARMELEGEMER

VI FØRER PRODUKTER INDENFOR KATEGORIERNE:



AUTOMATIK



**HVAC & BYGNINGS-
AUTOMATIK**



KØLEPROFILER



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